IMPORTANT NOTICE

This Handbook provides technical information to assist prospective applicants understand the planning framework associated with Regional MDS. While the information contained in the Handbook is offered for the assistance of prospective applicants, it remains the responsibility of MDS licensees to plan their services so as to minimise the potential for interference with other services, both within and outside the MDS Bands.

Prospective applicants for Multipoint Distribution Station transmitter licences should read the Radiocommunications (Allocation of Multipoint Distribution Station Licences - Regional Licences) Determination No. 1 of 1995 as it governs the allocation system and the MDS Regional Australia - Information Memorandum (‘the Memorandum’). The licences that are available under the present allocation system are specified in the Determination. A copy of the Determination is at Attachment A of the Information Memorandum. Prospective applicants should also read the Radiocommunications (Coordination) Regulations (see Section 1 of this Handbook) and the Radiocommunications (Multipoint Distribution Station Licences - Regional Licences) Guidelines No. 1 of 1995 (see Section 2 of this Handbook).

However, nothing in the Coordination Handbook should be taken to be a recommendation by the Spectrum Management Agency as to how systems should be planned, and prospective applicants should not rely on any statement made in the Coordination Handbook expressing the views of the SMA on the possible technical operation of MDS systems. Prospective applicants for licences should, on their own responsibility, take whatever steps, independently of the Commonwealth, they consider necessary to ensure that they have access to appropriate technical or other specialist advice concerning:-

- the system established under the Radiocommunications Coordination Regulations to enable prospective licensees to become aware of, and agree with, each other’s proposed MDS system for an area, and to deal with cases where prospective licensees are unable to agree; and
- operation of radiocommunications equipment and services; or
- other matters relevant to the proposed licence allocation system and operation of transmitters and services under the licences.

The Handbook regarding licences to operate Multipoint Distribution Stations in the Spectrum between 2076 and 2111 MHz and between 2300 and 2400 MHz is not intended, and should not be taken either to give rise to, or to acknowledge the existence of, any liabilities on the part of the Commonwealth in regard to the issue or non-issue of any licences by the Spectrum Management Agency. Nor should it be taken to either give rise to, or acknowledge the existence of, any liabilities on the part of the Commonwealth in regard to the conditions which may be imposed on any licences that are issued. Those conditions will be imposed in accordance with the provisions of the Act and the Guidelines, and having regard to all relevant factors at the time at which licensing decisions are taken. Intending applicants should not rely on statements made in the Handbook about the policies that may be followed by other authorities, nor about the effect of any legislation. The comments made about the Radiocommunications Act 1992 reflect the present policies of the Spectrum Management Agency.

The policies and laws of the Commonwealth, a sovereign entity, may change from time to time. The Spectrum Management Agency reserves the right to terminate the allocation process or withdraw from allocation any licence in accordance with the terms set out in the Determination and relevant legislation.
FURTHER INFORMATION

Any questions about the coordination system or the licences to be issued should be directed to:

Postal Address

MDS Registration Centre
Spectrum Management Agency
PO Box 78
Belconnen ACT 2616

or

Street Address

MDS Registration Centre
Spectrum Management Agency
Fifth Floor, Purple Building
Benjamin Offices
Chan Street
Belconnen ACT 2617

Telephone: 06 256 5512
Facsimile: 06 253 3009

Some questions (especially those of a technical nature or substantive questions about the coordination system) will only be answered on receipt of a written request. It is intended that these questions and answers, but not the identity of the questioner, will be circulated to all Applicants.

All documents required under the Determination must be delivered to the postal or street address above.
TABLE OF CONTENTS

OVERVIEW..................................................................................................................................................6

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS & EXPLANATORY
STATEMENT ..................................................................................................................................................17

TECHNICAL REQUIREMENTS ...................................................................................................................55

INTRODUCTION ...........................................................................................................................................56

PART A - RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES -
REGIONAL LICENCES) GUIDELINES NO. 1 OF 1995 ...........................................................................58

PART B - THE POTENTIAL FOR INTERFERENCE BETWEEN MDS REGIONAL SERVICES AND
EARTH STATIONS OF THE SPACE RESEARCH SERVICES .................................................................93

PART C - ASSESSING THE POTENTIAL FOR INTERFERENCE TO REGIONAL MDS RECEIVERS
FROM EARTH STATION TRANSMITTERS ..............................................................................................117

PART D - RALI X 9: FREQUENCY COORDINATION OF FIXED LINKS WITH MDS SERVICES ......124

PART E - LOCATION MAPS: FIXED LINKS THAT MAY AFFECT REGIONAL MDS SERVICES ....126

MDS INTERFERENCE ASSESSMENT STATEMENTS ............................................................................129

PART A - GENERAL INFORMATION ON MDS INTERFERENCE ASSESSMENT STATEMENTS ....131

PART B - INTERFERENCE ASSESSMENT FORMS 1 TO 7 .....................................................................133

ATTACHMENTS .......................................................................................................................................146

ATTACHMENT A - TRANSMITTER PROPOSAL FORM ..............................................................................147

ATTACHMENT B - SAMPLE REGIONAL MDS LICENCE .............................................................................149
OVERVIEW

NOTE: This section provides an overview of the Regional MDS allocation and coordination procedures. This overview is drawn from the Information Memorandum and is intended to enable the technical information in this Handbook to be seen in the context of the overall process.

MDS Licences

Multipoint Distribution Station (MDS) licences are licences which permit the operation of transmission apparatus within the bands 2076 - 2111 MHz (Group A licences) and 2300 - 2400 MHz (Group B licences). MDS licences may be used for the transmission of any of the following: text, graphics, still pictures, sound, non-entertainment video, and entertainment video including pay television.

The Spectrum Management Agency (the 'SMA') has previously issued MDS licences in 13 major cities in Australia (Sydney, Melbourne, Brisbane, Perth, Adelaide, Hobart, Canberra, Darwin, Cairns, Gold Coast, Newcastle, Wollongong and Alice Springs). The Information Memorandum outlines the framework for the allocation of 19 MDS licences in each of 18 areas of regional Australia. A map outlining the areas of regional Australia is on the inside cover of the Information Memorandum. A more detailed description is in Schedule 1 of the Radiocommunications (Allocation of Multipoint Distribution Station Licences - Regional Licences) Determination No. 1 of 1995 (the 'Determination') at Attachment A of the Information Memorandum.

Purpose of this Handbook

This Handbook provides the necessary tools to assist in the coordination process prior to licence issue for licences allocated under the Determination. This handbook should be read in conjunction with a separate information memorandum titled “MDS Regional Australia - Information Memorandum (‘the Memorandum’) which contains more detailed information on the MDS Regional allocation process.

Prospective licensees should note that the legislative basis for this allocation process is contained in three legislative documents:

1. the Radiocommunications (Allocation of Multipoint Distribution Station Licences - Regional Licences) Determination No. 1 of 1995, (‘the Determination’; see the Memorandum);

2. the Radiocommunications (Coordination) Regulations, (‘the Regulations’; see Section 1 of this Handbook); and

3. the MDS Guidelines (‘the Guidelines’; see section 2 of this Handbook)
Applicants will need to be fully conversant with the specific requirements of all three documents. The Memorandum outlines more fully the requirements under the Determination.

In particular, applicants should ensure that they fully understand how the coordination system established by the Regulations works. Failure to provide a Transmitter Proposal (see Section 4 of the Handbook), or information, or a response to a Transmitter Proposal by the deadlines set by the Regulations could have serious results, including the ‘lapsing’ of an application, without refund of monies paid.

Finally, it is important that prospective licensees follow the Guidelines in undertaking their technical coordination. The SMA is required to impose licence conditions to ensure that interference is not caused contrary to the protection requirements established by the Guidelines. This could lead to a licence condition prohibiting operation of equipment.

How to become an MDS licensee

There are three stages in the process that need to be undertaken in order to become a MDS licensee. A summary of the process is outlined below.

(1) **Price-Based Allocation Process**

The SMA has now determined a system under section 106 of the *Radiocommunications Act 1992* (the ’Act’) providing for the price-based allocation of licences in 18 areas of regional Australia. A copy of the Determination is in the Memorandum. Interested parties wishing to obtain an MDS licence must first apply to the SMA to become a Registered Applicant. If at the closing date for applications, there is only one Registered Applicant for any of the 18 Areas, the Lone Applicant for that Area will be offered all 19 MDS licences for that Area at the reserve price per channel for that Area. If a Lone Applicant pays the reserve price for any or all of the 19 channels, the Lone Applicant becomes the Nominated Applicant for those licences in that Area. If there is more than one Registered Applicant in an Area, the SMA will conduct a price-based allocation process similar to an auction. A successful bidder for a licence at that process will become the Nominated Applicant for that licence.

(2) **Coordination of Transmitter Sites and Licence Conditions**

The SMA will not plan Multipoint Distribution Systems. Nominated Applicants must co-ordinate the placement of MDS transmitters within an Area so as to minimise interference caused by the operation of these transmitters. (In some cases this may require licences within the same Group and Area to have some identical technical licence conditions.) The Regulations are made under the Act and establish a process by which applicants for licences can become aware of each other’s proposed systems, and coordinate them.
In outline, the system for coordinating is as follows. When a Nominated Applicant sends a form called a Transmitter Proposal to the SMA (see the Regulations) which details each proposed transmission site and its technical operating characteristics, the SMA will circulate the proposal to other Nominated Applicants in the relevant Group and Area. Other Nominated Applicants in the Group and Area may expressly agree or disagree with a proposal. If they do neither within three months they will be deemed to have agreed. If another Nominated Applicant sends the SMA an incompatible Transmitter Proposal the matter will be referred to conciliation under the Act.

The Guidelines are made under section 112 of the Act and amongst other things, establish the parameters for technical coordination between regional Area MDS services and other MDS and non-MDS services. Nominated Applicants should follow the Guidelines in establishing their systems planning.

Prospective Applicants should note that the SMA will always issue a licence in accordance with a Transmitter Proposal agreed between the applicants in the Group and Area. The SMA is required to impose licence conditions to ensure that interference is not caused contrary to the protection requirements established by the Guidelines. This could lead to a licence condition prohibiting operation of equipment.

Coordination arising out of proposed addition of transmitters to a licence, or variation of the conditions for existing transmitters, will be conducted in the same manner as above.

Nominal Applicants are strongly encouraged to agree on sites and technical parameters.

(3) Licence Issue

The licence will be issued as soon as practicable after the coordination process is complete. The first instalment of the licence fee is payable at this time. Fees are set out in the Memorandum. The licence fee will be payable even if the licence contains a condition that a transmitter cannot be operated.

Transmitters and Repeaters

For MDS licences allocated in the Major City MDS Allocation, a site-based planning model was used including a requirement for main transmitters to use vertical polarisation and for repeaters to use horizontal polarisation. This requirement was imposed to give maximum opportunity for repeaters to fill in coverage with minimum interference from co-channel transmitters from within or outside an area. For regional MDS licences, an area-based planning model applies so that the concept of main transmitters and repeaters is not meaningful in this allocation.
Overview

Licence Areas

Subject to coordination licensees will be able to site and operate any number of transmitters within a defined geographical area. The areas are, broadly speaking, based upon previous or existing terrestrial commercial television areas, or a combination of those areas. The areas are depicted on the map on the inside cover of the Memorandum. This map is indicative only and should not be used for planning purposes. The areas are described in Attachment D of the Memorandum. A definition of each area is given in the Determination.

In brief, the areas in which licences are available under the Determination in Regional Australia are described as:

<table>
<thead>
<tr>
<th>NSW</th>
<th>Southern NSW area</th>
<th>VIC</th>
<th>Regional Victoria area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Northern NSW area</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gosford area</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Broken Hill area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QLD</td>
<td>South-East Qld area</td>
<td>TAS</td>
<td>Regional Tasmania area</td>
</tr>
<tr>
<td></td>
<td>Mackay/Rockhampton area</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Townsville area</td>
<td>WA</td>
<td>South west</td>
</tr>
<tr>
<td></td>
<td>Sanctuary Cove area</td>
<td></td>
<td>Western Australia area</td>
</tr>
<tr>
<td></td>
<td>Mt Isa area</td>
<td></td>
<td>Kalgoorlie area</td>
</tr>
<tr>
<td></td>
<td>Port Douglas area</td>
<td></td>
<td>Geraldton area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA</td>
<td>Spencer Gulf area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mt Gambier area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Renmark/Loxton area</td>
</tr>
</tbody>
</table>

Each Area is defined in Schedule 1 of the Determination by use of the Australian Bureau of Statistics 1991 Population Census statistical collection districts, and local Government areas. These MDS licence Areas will remain fixed for the duration of the licences, that is, for five years.

Licences will also be available in those parts of Australia not covered by the Areas marked on the map. These licences, known as remote area licences, are dealt with in section 5 of the Memorandum.

Licences Available under the Determination

The Determination provides for the allocation of licences to operate transmitters on 19 channels in each of the 18 Areas in this process - a total of 342 licences. The licences will be issued for a period of five years from the time of issue.

MDS licences allocated in this process will allow licensees to erect as many transmitters in an Area as they wish, subject to coordination under the Guidelines and Regulations. The licence fee payable will not be dependent on the number of transmitters covered by the licence.
THE COORDINATION PROCESS

Technical Coordination Process

MDS transmitters must be co-ordinated with other MDS services in the same Group of channels in an MDS area if an acceptable standard of service is to be enjoyed. Group A channels are channels 1-5. Group B channels are channels 6-19. MDS transmitters must also be co-ordinated with any other affected MDS and non-MDS services, both within and outside the area.

The SMA will not undertake the coordination of services to be provided by those who become Nominated Applicants under the price-based allocation system. It will be Nominated Applicants who must coordinate the siting and operating characteristics of transmitters so as to minimise the interference they may cause. To facilitate coordination, the Regulations establish a process by which applicants for licences can become aware of each other’s proposed systems and coordinate their services, and if there is disagreement, the matter can be referred to conciliation under the Act.

The process for coordinating is the same for both the initial issue of licences, and for dealing with any proposed alterations to licences; for example, where a licensee wishes to change the method of operating a licensed transmitter, or to establish a new transmitter in an Area. The process is as follows. Nominated Applicants will be able to send forms (called Transmitter Proposals - see Section 4 of the Handbook) to the SMA detailing the sites, and the technical operating characteristics, for each of the transmitters that they intend to operate in an Area. A Transmitter Proposal must be in the approved form, and should be supported by certain required documentation (see Section 3 of the Handbook) and sent to the MDS Registration Centre or such other address as may be advised. The SMA will circulate the Transmitter Proposals, and accompanying documentation, to all the other Nominated Applicants in the relevant Group and Area. It is the Nominated Applicant’s responsibility to ensure that the Transmitter Proposal is complete, accurate and conforms with all requirements.

Nominated Applicants should then assess the Proposals to see if the proposed operation of the transmitters would be likely to cause interference to their own proposed services. The assessment of Transmitter Proposals should be carried out in accordance with the Guidelines.

A Nominated Applicant who has carried out the assessments contained in the Guidelines, and who agrees with a Transmitter Proposal, may advise the SMA in writing of that agreement. A Nominated Applicant who does not expressly agree or disagree with a Transmitter Proposal within 3 months of it being sent, will be deemed to have agreed to it. If all the Nominated Applicants for a Group and Area have either expressly agreed, or have been deemed to have agreed with a Transmitter Proposal, the SMA will issue licences for that Group and Area to give effect to that agreed Transmitter Proposal.

It is important that Nominated Applicants themselves assess a Transmitter Proposal for potential interference to or by their service (using the methods for assessment contained in the Guidelines) before they agree, or are deemed to agree,
to a Transmitter Proposal. The SMA will not assess a Transmitter Proposal until it is agreed. Furthermore, Nominated Applicants should not rely on the assessment of Transmitter Proposals by other Nominated Applicants. The assessment conducted by others may be incorrect.

It is important that Nominated Applicants themselves assess a Transmitter Proposal because the SMA is required by the Determination to always issue licences to give effect to an agreed Transmitter Proposal. The SMA is required to impose licence conditions to ensure that interference is not caused contrary to the protection requirements established by the Guidelines. This could lead to a licence condition prohibiting operation of equipment. In other words, once a Transmitter Proposal is agreed, the licences with certain identical conditions will be issued to all Nominated Applicants in a Group and Area, and the licence fees will become payable, but the licensees may not be able to operate a service.

A Nominated Applicant who assesses a Transmitter Proposal in accordance with the Guidelines, and disagrees with it should, within 3 months of it being sent:

(1) if it has not already done so, give the SMA its own Transmitter Proposal with transmitter sites or operating characteristics that will, if assessed under the Guidelines, give rise to interference with transmitters operated under the Transmitter Proposal with which the Nominated Applicant disagrees; and

(2) lodge a complaint under section 205 of the Act with the SMA:

   (a) that the operation of the transmitter(s) under the Transmitter Proposal is likely to cause:

   (i) interference or risk of interference to radiocommunications; or

   (ii) any other disruption or disturbance, or risk of disruption of disturbance, to radiocommunications; and

   (b) that the interests of the complainant have been, are or are likely to be affected.

Both of these actions are necessary if the SMA is to be able to refer the matter to conciliation under the Act. The process of conciliation is dealt with below.

Nominated Applicants are strongly encouraged to discuss and, if possible, agree their proposals between themselves before submission to the SMA.

Prospective applicants should also note that in some circumstances, if none of the Nominated Applicants in a Group and Area submits a Transmitter Proposal, all applications for licences in that Group and Area will cease to have effect. In such a case, neither the application fees nor the bid prices paid by those applicants would be refundable.
The circumstances in which failure to submit a Transmitter Proposal will lead to applications ceasing to have effect may vary. Prospective applicants should read the Regulations and the Determination carefully in this regard.

Further detail of the coordination process is provided in the Handbook, which was issued with this Information Memorandum. Additional copies of the Handbook are available on request from the MDS Registration Centre.

The Guidelines

The Guidelines (see Section 2 of the Handbook) are made under section 112 of the Act and establish, amongst other things, the parameters for technical coordination between regional Area MDS services and other MDS and non-MDS services. Nominated Applicants should follow the Guidelines in establishing their proposed systems.

Section 112(2) of the Radiocommunications Act 1992 requires the SMA to comply with the Guidelines in exercising its powers under sections 107, 108 and 111 (imposing or varying licence conditions) in relation to Multipoint Distribution Station - Regional licences:

(a) to give effect to agreed transmitter proposals in accordance with the Radiocommunications (Allocation of Multipoint Distribution Station Licences - Regional Licences) Determination No. 1 of 1995; and

(b) to give effect to any agreement reached following conciliation; and

(c) in imposing or varying licence conditions in circumstances where no agreement is reached at conciliation.

The Guidelines are aimed at minimising the potential for interference by:

(a) requiring the SMA to impose or vary licence conditions on all licences to ensure both the viable operation of services, and the protection of certain space services; and

(b) establishing specific interference assessments which identify certain protection requirements and requiring the SMA to impose or vary licence conditions to ensure that those protection requirements are not exceeded; and

(c) providing criteria for the imposition of licence conditions to deal with the case where, notwithstanding that licence conditions have been imposed in accordance with the Guidelines and the Assessments, interference is in practice caused by the operation of a service; and

(d) establishing certain criteria to which the SMA may have regard in circumstances where licensees have not been able to agree on how services should be provided.

The specific interference assessments required by the Guidelines are:
A. MDS Transmitter to MDS Receiver  
B. MDS Transmitter to Fixed Link Receiver  
C. Fixed Link Transmitter to MDS Receiver  
D. MDS Transmitter to Earth Station Receiver  

The assessments follow the following methodology:

1. For a proposed MDS service, identify which interference assessments are necessary using the criteria specified. If an assessment is necessary, steps 2 - 4 must be completed.

2. Calculate (as appropriate):

   a) the terrain loss between antennas for the services being assessed, when the field strength of an unwanted signal at a receiver, or at a boundary of or within an Area, is to be calculated; or

   b) the propagation loss between antennas for the services being assessed, when the received power of an unwanted signal at the antenna output of a receiver is to be calculated.

3. Using 2 and other technical parameters, calculate received signal levels.

4. Assess the values calculated at 3 against the relevant receiver protection requirements.

Conciliation

Where a matter has been referred to a conciliator under Part 4.3 of the Act, the conciliator will try to settle the dispute regarding technical coordination. If as a result of a conciliation the parties reach agreement, one of the parties should submit a Transmitter Proposal to the SMA. If the SMA then verifies that the agreed Transmitter Proposal conforms with the agreement reached at conciliation, the SMA will issue licences in accordance with that Transmitter Proposal.

If the parties cannot agree, then the conciliator will report to the SMA with a recommendation as to how the matter may be resolved. The SMA must consider what technical conditions to impose on the licences. The same coordination process applies to any licence variation after the initial licence issue.
The SMA must have regard to any relevant factor in making its decision about the imposition or variation of conditions. The SMA may have regard to the following:

(a) the recommendation of the conciliator in relation to the matter, if any; and

(b) any transmitter proposals that have been sent to the SMA in respect of licences in the Group and Area to which the matter relates; and

(c) the bid prices paid by each Nominated Applicant, or licensee, for licences in the Group and Area to which the matter relates; and

(d) the number of channels in the Group and Area to which the matter relates in respect of which a party to conciliation is a Nominated Applicant or licensee; and

(e) the extent to which, in the opinion of the SMA, the interests of each Nominated Applicant for licences, or licensee, in the Group and Area to which the matter relates are likely to be substantially adversely affected by the imposition or variation of licence conditions; and

(f) the terms and conditions upon which each Nominated Applicant for licences in the Group and Area, or licensee, to which the matter relates would be able to obtain access to transmitter sites.

**Licence Issue**

Subject to the Determination, the SMA will issue a Regional MDS licence as soon as practicable after a Transmitter Proposal has become agreed or conciliation is completed. The first instalment of the licence fee is payable at this time. Once a licence has been issued licensees can operate subject to licence conditions.

**Licence Class**

Applicants should be aware that Regional MDS licences do not have the distinction between Class A licences and Class B licences which exist in MDS licences issued earlier. **Regional MDS licences are defined in the Radiocommunications (Definitions) Determination No. 2 of 1993.**

**Licence Fees**

Licences in this allocation system will be issued for a 5 year period. The fee for a 5 year period for a Regional MDS licence is currently $5,000, $30,230, $60,455, or $120,905 depending upon the population in the Area in respect of which the licence is issued. The fee is payable in five equal instalments, calculated as follows:-

<table>
<thead>
<tr>
<th>Population based on 1991 Australian Bureau of Statistics population census districts</th>
<th>Annual Licence Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than or equal to 500,000</td>
<td>$24,181</td>
</tr>
<tr>
<td>Less than 500,000 but greater than or equal to 200,000</td>
<td>$12,091</td>
</tr>
<tr>
<td>Less than 200,000 but greater than or equal to 10,000</td>
<td>$6,046</td>
</tr>
<tr>
<td>Less than 10,000</td>
<td>$1,000</td>
</tr>
</tbody>
</table>

The population figures on which these fees are based will be fixed for the five year duration of the licence. These fees are fixed until 1 December 1995. If the licence is issued after 1 December 1995 the current policy of the SMA is that the fee will be increased by the previous year’s Consumer Price Index. Once a licence is issued, however, the annual payments are fixed for the term of the licence. The first instalment is payable on the issue of the licence and the remaining four instalments are payable on the anniversaries of the issue of the licence.

The licence fees payable in each Area at the date of publication are set out at Attachment C of the Memorandum.

Note that fees are payable in respect of the licence. Subject to technical coordination, the number of transmitters which may be included on each licence without additional licence fees being imposed, is unlimited.

To facilitate the issue of the licence, the SMA seeks payment of the first instalment of the licence fee at the time of issue of the licence.

A successful Applicant will be authorised to operate one or more MDS transmitters on the specified channel once the licence fee is paid and the licence issued. If licence fee instalments are not paid when due the licensee is in breach of a condition of licence, and the SMA may take action under section 113, section 126 and section 128 of the Act. This could include penalty payment, suspension or cancellation of the licence.

**Notification**

The SMA will make the following information public with regard to allocated licences:

- name of licensee;
- channel number assigned to the licensee;
• amount paid by the Applicant for the allocation of the licence; and

• contact name and address.

(see clause 34 of the Determination)

The SMA intends to announce the results of allocations at the end of each day's business, including the names of Nominated Applicants and the amounts bid for licences.

Information concerning the licence including licence conditions, transmitter sites, power levels and contact details for a licensee, will be available on the Register of Licences to be established.
SECTION 1

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS & EXPLANATORY STATEMENT
RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - DATED 4 APRIL 1995
*1* NOTIFIED IN THE COMMONWEALTH OF AUSTRALIA GAZETTE ON 5 APRIL 1995.

1995 No. 65 RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - PART 1
PART 1-PRELIMINARY

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 1
Citation

REG 1. These Regulations may be cited as the Radiocommunications (Coordination) Regulations.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 2
Commencement

REG 2. These Regulations commence on 6 April 1995.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 3
Object of the Regulations

REG 3. The object of these Regulations is to set out procedures with which certain persons are permitted to comply in order to ensure that:
   (a) transmitters used by licensees will be located at places that will assist in the efficient provision of telecommunications services; and
   (b) interference caused by the operation of those transmitters will be minimised.
   (NOTE: These Regulations set out some of the arrangements for the supply of certain radiocommunications services, using multipoint distribution system stations as transmitters. The services are described in detail in the Radiocommunications (Allocation of Multipoint Distribution Station Licences-Regional Licences) Determination No. 1 of 1995. These Regulations should be read in conjunction with that Determination.)

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 4
Interpretation

REG 4. (1) In these Regulations, unless the contrary intention appears:
   "additional agreed Transmitter Proposal" means a Transmitter Proposal that is an agreed Transmitter Proposal under regulation 25;
"additional allocation" means the allocation of a licence in accordance with clause 28 of the MDS allocation Determination;
"agreed Transmitter Proposal" means a Transmitter Proposal that is an agreed Transmitter Proposal under regulation 16;
"area" has the same meaning as in the MDS allocation Determination;
"channel" has the same meaning as in the MDS allocation Determination;
"conciliation" means conciliation under Part 4.3 of the Act;
"group" means a group of channels within the meaning of the Multipoint Distribution System Band Plan;
"licence" has the same meaning as in the MDS allocation Determination;
"licensee" means a person to whom the SMA has issued a licence in accordance with the MDS allocation Determination;
"MDS allocation Determination" means the Radiocommunications (Allocation of Multipoint Distribution Station Licences - Regional Licences) Determination No. 1 of 1995, as in force on the day on which these Regulations commence;
"nominated applicant" means a person who is a nominated applicant, within the meaning of the MDS allocation Determination, for a licence:
(a) in an area; and
(b) that refers to a channel in a group in that area;
"relevant area and group", in relation to a Transmitter Proposal, means:
(a) the area to which the Transmitter Proposal relates; and
(b) the group that includes the channel referred to in the Transmitter Proposal;
"replacement Transmitter Proposal" means a Transmitter Proposal that:
(a) a nominated applicant gives to the SMA under subregulation 9 (1); or
(b) a licensee gives to the SMA under subregulation 19 (1);
"the Act" means the Radiocommunications Act 1992;
"transmitter" means a multipoint distribution station within the meaning of the Radiocommunications Regulations;
"Transmitter Proposal" means the document approved by the SMA under subclause 7 (4) of the MDS allocation Determination.

(2) In these Regulations, a reference to agreement with a Transmitter Proposal is a reference to agreement with the Proposal in accordance with regulation 13, 14, 15, 23 or 24.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 5
When is conciliation required in relation to an area and group?

REG 5. For the purposes of these Regulations, conciliation is required in relation to an area and group if:
(a) the SMA has referred a matter involving disputed conduct to a conciliator under subsection 206 (1) of the Act; and
(b) the disputed conduct relates to the proposed operation, in accordance with a Transmitter Proposal, of a transmitter under a licence:
   (i) for the area to which the Transmitter Proposal relates; and
   (ii) that refers to a channel in a group in that area.

(NOTE: Under section 206 of the Act, if it appears to the SMA that:
   (a) a person has engaged, is engaging or is proposing to engage in disputed conduct as described in paragraph 205 (1) (a) of the Act; and
   (b) the interests of another person have been, are or are likely to be affected by the conduct;
the SMA may refer the matter to a conciliator appointed under section 202 of the Act. The SMA must have regard to the matters described in section 207 of the Act before seeking the conciliator's assistance.
The conciliation process is described in sections 208, 209, 210 and 211 of the Act.)

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - PART 2
PART 2-TRANSMITTER PROPOSALS FOR AN AREA FOR WHICH THE SMA HAS NOT ISSUED LICENCES

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 6
Nominated applicant may give the SMA a Transmitter Proposal

REG 6. (1) Subject to subregulations (2) and (3), a person who becomes a nominated applicant for a licence may give the SMA a completed Transmitter Proposal in accordance with this regulation.
(NOTE: Arrangements for giving the SMA a Transmitter Proposal when an additional allocation is required are set out in regulation 7.)

(2) A nominated applicant must not give the SMA a Transmitter Proposal under subregulation (1) if:
   (a) the SMA has directed, under the MDS allocation Determination, that a licence in the relevant area and group is to be included in an additional allocation; or
   (b) conciliation is required in relation to the relevant area and group; or
   (c) an agreed Transmitter Proposal is in force for the relevant area and group.

(3) A nominated applicant must not give the SMA a Transmitter Proposal later than 12 months after the day on which the person becomes a nominated applicant.

(4) If the SMA asks a nominated applicant, under paragraph 8 (1) (a), to
give it information, the nominated applicant may give the SMA a statement of
the information, with the Transmitter Proposal or at a later time.

(5) For the purposes of subregulation (1):
(a) a Transmitter Proposal may be completed by more than 1 nominated applicant in relation to the relevant area and group; and
(b) if a nominated applicant is an individual—the nominated applicant must
sign the Transmitter Proposal; and
(c) if a nominated applicant is a company—the seal of the company must be
duly affixed to the Transmitter Proposal; and
(d) if a nominated applicant is not an individual or a company—the nominated applicant must duly execute the Transmitter Proposal; and
(e) if a nominated applicant consists of more than one person—each person
must sign or otherwise duly execute the Transmitter Proposal.

(6) The Transmitter Proposal given to the SMA must have on it the nominated applicant's original signature or other means of execution.

(7) A nominated applicant must give the documents and information referred to in subregulations (1) and (4) to the SMA:
(a) if the SMA tells the nominated applicant an address under paragraph 8
(i) (c)—at that address; or
(b) in any other case—at the address published under clause 4 of the MDS allocation Determination in relation to the licence for which the nominated applicant is the nominated applicant.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 7
Nominated applicant may give the SMA a Transmitter Proposal if an additional allocation is required

REG
7. (1) Subject to subregulations (2) and (3), if:
(a) the SMA directs, under the MDS allocation Determination, that a licence:
(i) in an area; and
(ii) that refers to a channel in a group in that area;
is to be included in an additional allocation; and
(b) a person:
(i) is a nominated applicant for a licence in relation to that area and group when the SMA gives the direction; or
(ii) becomes a nominated applicant for a licence in relation to that area and group, before or after the SMA gives the direction;
the nominated applicant may give the SMA a completed Transmitter Proposal in accordance with this regulation.

(2) A nominated applicant must not give the SMA a Transmitter Proposal if:
(a) conciliation is required in relation to the relevant area and group; or
(b) an agreed Transmitter Proposal is in force for the relevant area and group on the day on which the person becomes a nominated applicant.

(3) A nominated applicant must not give the SMA a Transmitter Proposal later than 12 months after the day on which all the licences in relation to the relevant area and group, that have not been withdrawn from the allocation system in accordance with the MDS allocation Determination, have been allocated to nominated applicants by the SMA.

(4) If the SMA asks a nominated applicant, under paragraph 8 (1) (a), to give it information, the nominated applicant may give the SMA a statement of the information, with the Transmitter Proposal or at a later time.

(5) For the purposes of subregulation (1):
(a) a Transmitter Proposal may be completed by more than 1 nominated applicant in relation to the relevant area and group; and
(b) if a nominated applicant is an individual-the nominated applicant must sign the Transmitter Proposal; and
(c) if a nominated applicant is a company-the seal of the company must be duly affixed to the Transmitter Proposal; and
(d) if a nominated applicant is not an individual or a company-the nominated applicant must duly execute the Transmitter Proposal; and
(e) if a nominated applicant consists of more than one person-each person must sign or otherwise duly execute the Transmitter Proposal.

(6) The Transmitter Proposal given to the SMA must have on it the nominated applicant's original signature or other means of execution.

(7) A nominated applicant must give the documents and information referred to in subregulations (1) and (4) to the SMA at:
(a) if the SMA tells the nominated applicant an address under paragraph 8 (1) (c)-that address; or
(b) in any other case-the address published under clause 4 of the MDS allocation Determination in relation to the licence for which the nominated applicant is the nominated applicant.
8. (1) Subject to subregulation (2), the SMA may, in writing:
(a) ask a nominated applicant to give the SMA information, identified in the request, in support of a Transmitter Proposal; and
(b) ask a nominated applicant to give the SMA information, identified in the request, for the purpose of evaluating a Transmitter Proposal that the nominated applicant has given to the SMA; and
(c) tell the nominated applicant an address at which the information, and the Transmitter Proposal, must be given to the SMA.

(2) The SMA must not ask a nominated applicant for information under paragraph (1) (b):
(a) if conciliation is required in relation to the area and group to which the Transmitter Proposal referred to in paragraph (1) (b) relates; or
(b) if:
   (i) the SMA has already asked the nominated applicant for information under paragraph (1) (b); and
   (ii) the nominated applicant has not complied with that request.

(3) Subject to subregulation (4), if a nominated applicant wishes to comply with a request under paragraph (1) (b), the nominated applicant must give the information to the SMA, in writing, no later than 14 days after the day on which the SMA asks the nominated applicant to give the information.

(4) A nominated applicant is not required to comply with a request under paragraph (1) (b):
(a) if conciliation is required in relation to the area and group to which the Transmitter Proposal referred to in that paragraph relates; or
(b) if:
   (i) the SMA has already asked the nominated applicant for information under paragraph (1) (b); and
   (ii) the nominated applicant has not complied with that request.

(5) If:
(a) a nominated applicant does not give the SMA information in accordance with subregulation (3); and
(b) subregulation (4) does not apply to the nominated applicant; and
(c) the Transmitter Proposal to which the information relates is not, at the end of the time specified in that subregulation for compliance, an agreed Transmitter Proposal;
the Transmitter Proposal specified in paragraph (1) (b) ceases to have effect, for the purposes of these Regulations, at the end of the time specified in subregulation (3) for compliance.
RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 9
Replacement of a Transmitter Proposal

REG
9. (1) Subject to subregulations (2), (3), (4) and (5), a nominated applicant may only change information set out in the nominated applicant's Transmitter Proposal (in this regulation called "the original Proposal") by giving the SMA another completed Transmitter Proposal.

(2) A nominated applicant must not give the SMA a Transmitter Proposal under subregulation (1) if:
   (a) conciliation is required in relation to the relevant area and group; or
   (b) an agreed Transmitter Proposal is in force for the relevant area and group.

(3) If:
   (a) a nominated applicant gave the SMA a Transmitter Proposal under subregulation 6 (1); and
   (b) the period referred to in subregulation 6 (3) ends less than 3 months after the day on which the SMA gave a copy of the original Proposal to the last nominated applicant in accordance with regulation 11;
the nominated applicant may give the SMA a replacement Transmitter Proposal no later than the last day of the period referred to in subregulation 6 (3).

(4) If:
   (a) a nominated applicant gave the SMA a Transmitter Proposal under subregulation 7 (1); and
   (b) the period referred to in subregulation 7 (3) ends less than 3 months after the day on which the SMA gave a copy of the original Proposal to the last nominated applicant in accordance with regulation 11;
the nominated applicant may give the SMA a replacement Transmitter Proposal no later than the last day of the period referred to in subregulation 7 (3).

(5) If subregulations (3) and (4) do not apply, a nominated applicant may give the SMA a replacement Transmitter Proposal no later than 3 months after the day on which the SMA gave a copy of the original Proposal to the last nominated applicant in accordance with regulation 11.

(6) If:
   (a) a nominated applicant gives the SMA a replacement Transmitter Proposal; and
(b) the only person who completed the relevant original Proposal was the nominated applicant; the original Proposal ceases to have effect, for the purposes of these Regulations, when the SMA is given the replacement Transmitter Proposal.

(7) If:
   (a) a nominated applicant gives the SMA a replacement Transmitter Proposal; and
   (b) the relevant original Proposal was completed by more than 1 nominated applicant; the original Proposal has effect, for the purposes of these Regulations, only in relation to the nominated applicants who did not give the SMA the replacement Transmitter Proposal.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 10 Additional information relating to a replacement Transmitter Proposal

REG 10. (1) Subject to subregulation (2), if a nominated applicant gives the SMA a replacement Transmitter Proposal, the SMA may ask the nominated applicant, in writing, to give the SMA additional information, identified in the request, for the purpose of evaluating the replacement Transmitter Proposal.

(2) The SMA must not ask a nominated applicant for information under subregulation (1):
   (a) if conciliation is required in relation to the area and group to which the replacement Transmitter Proposal referred to in subregulation (1) relates; or
   (b) if:
      (i) the SMA has already asked the nominated applicant for information under subregulation (1); and
      (ii) the nominated applicant has not complied with that request.

(3) Subject to subregulation (4), if a nominated applicant wishes to comply with a request under subregulation (1), the nominated applicant must give the information to the SMA, in writing, no later than 14 days after the day on which the SMA asks the nominated applicant to give the information.

(4) A nominated applicant is not required to comply with a request under subregulation (1):
   (a) if conciliation is required in relation to the area and group to which
the replacement Transmitter Proposal referred to in subregulation (1) relates;

or

(b) if:

(i) the SMA has already asked the nominated applicant for information under subregulation (1); and

(ii) the nominated applicant has not complied with that request.

(5) If:

(a) a nominated applicant does not give the SMA information in accordance with subregulation (3); and

(b) subregulation (4) does not apply to the nominated applicant; and

(c) the replacement Transmitter Proposal to which the information relates is not, at that time, an agreed Transmitter Proposal;

the replacement Transmitter Proposal ceases to have effect, for the purposes of these Regulations, at the end of the time specified in subregulation (3) for compliance.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 11

Distribution of Transmitter Proposals and information

REG

11. (1) If a nominated applicant gives the SMA a Transmitter Proposal, or a replacement Transmitter Proposal, the SMA must, as soon as practicable, give a copy of the Proposal to each person (if any) who:

(a) is a nominated applicant, on the day on which the SMA is given the Proposal, in relation to the relevant area and group; and

(b) did not complete the Proposal.

(2) If:

(a) a nominated applicant gives the SMA a Transmitter Proposal, or a replacement Transmitter Proposal; and

(b) a person becomes a nominated applicant, after the day on which the SMA is given the Proposal, in relation to the relevant area and group; and

(c) the person did not complete the Proposal;

the SMA must, as soon as practicable, give a copy of the Proposal to the person.

(3) If a nominated applicant gives the SMA information under subregulation 6 (4), 7 (4), 8 (2), 9 (3) or 10 (3) in relation to a Transmitter Proposal, the SMA must, as soon as practicable, give a copy of the information to:

(a) each person (if any) who is a nominated applicant in relation to:

(i) the area to which the Proposal relates; and

(ii) the group that includes the channel referred to in the Transmitter Proposal;

on the day on which the SMA is given the information; and
(b) each person who becomes a nominated applicant in relation to that area and group after that day.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 12
Giving the SMA a Transmitter Proposal as the result of conciliation

REG 12. If:
(a) conciliation is required in relation to the area and group to which a Transmitter Proposal relates; and
(b) the conciliator is able to effect a settlement of the relevant matter for the purposes of paragraph 208 (b) of the Act;
a nominated applicant may give the SMA a Transmitter Proposal containing arrangements that reflect the terms of the settlement.

(NOTE: If the SMA is given a Transmitter Proposal under clause 12, the Transmitter Proposal becomes the agreed Transmitter Proposal for the relevant area and group: see subclause 16 (4).)

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - PART 3
PART 3-AGREED TRANSMITTER PROPOSALS FOR AN AREA FOR WHICH THE SMA HAS NOT ISSUED LICENCES

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 13
Written agreement with a Transmitter Proposal

REG 13. (1) Subject to subregulations (2) and (3), if the SMA gives a nominated applicant a copy of a Transmitter Proposal in accordance with regulation 11 (in this regulation called "the relevant Proposal"), the nominated applicant may tell the SMA, in writing, that the nominated applicant agrees with the relevant Proposal.

(NOTE: If the nominated applicant does not act under subregulation (1), regulation 14 may apply to the nominated applicant. The effect of regulation 14 is that the nominated applicant may be taken to agree with the relevant Proposal in certain circumstances.)

(2) A nominated applicant must not tell the SMA that the nominated applicant agrees with the relevant Proposal if conciliation is required in relation to the relevant area and group.

(3) A nominated applicant must not tell the SMA that the nominated applicant
agrees with the relevant Proposal later than 3 months after the day on which the SMA gave the relevant Proposal to the nominated applicant.

(4) For the purposes of subregulation (1):
(a) a nominated applicant must identify clearly the relevant Proposal; and
(b) if a nominated applicant is an individual-the nominated applicant must sign the written agreement; and
(c) if a nominated applicant is a company-the seal of the company must be duly affixed to the written agreement; and
(d) if a nominated applicant is not an individual or a company-the nominated applicant must duly execute the written agreement; and
(e) if a nominated applicant consists of more than one person-each person must sign or otherwise duly execute the written agreement.

(5) The written agreement given to the SMA must have on it the nominated applicant's original signature or other means of execution.

(6) For the purposes of these Regulations, the agreement of a nominated applicant ceases to have effect if the relevant Proposal ceases to have effect.

(7) If a nominated applicant gives the SMA a written agreement with a Transmitter Proposal under subregulation (1), the SMA must, as soon as practicable, give a copy of the agreement to:
(a) each of the other nominated applicants in relation to the relevant area and group; and
(b) each person who becomes a nominated applicant in relation to the relevant area and group after that day.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 14
Agreement with a Transmitter Proposal by passage of time

REG 14. (1) Subject to subregulation (2), if:
(a) the SMA gives a nominated applicant a copy of a Transmitter Proposal in accordance with regulation 11 (in this regulation called "the relevant Proposal"); and
(b) the nominated applicant does not, before the approval day referred to in subregulation (3) or (4), tell the SMA under subregulation 13 (1) that the nominated applicant agrees with the relevant Proposal; and
(c) the relevant Proposal does not cease to have effect before the approval day referred to in subregulation (3) or (4);
the nominated applicant is taken to have agreed with the relevant Proposal on the approval day.

(2) A nominated applicant is not taken to have agreed with the relevant Proposal if conciliation is required, before the approval day, in relation to the relevant area and group.

(3) If, at the end of a period of 3 months after the day on which the SMA gave the relevant Proposal to the nominated applicant:

(a) the SMA has not asked the nominated applicant who gave it the relevant Proposal to give the SMA further information about the relevant Proposal; or

(b) the SMA has received all further information that it requires about the relevant Proposal;

the approval day is the first day following the end of the period.

(4) If, at the end of a period of 3 months after the day on which the SMA gave the relevant Proposal to the nominated applicant:

(a) the SMA has asked the nominated applicant who gave it the relevant Proposal to give the SMA further information about the relevant Proposal; and

(b) the nominated applicant who gave the SMA the relevant Proposal has not given the SMA all of the information;

the approval day is the day occurring 36 days after the end of the period.

(5) For the purposes of these Regulations, the agreement of a nominated applicant ceases to have effect if the relevant Proposal ceases to have effect.

(6) If a nominated applicant is taken to have agreed with a relevant Proposal, the SMA must, as soon as practicable after the approval day, tell, in writing, each other nominated applicant in relation to the relevant area and group that the nominated applicant is taken to have agreed with the relevant Proposal.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 15
Agreement with a Transmitter Proposal after an additional allocation

REG 15. (1) If:

(a) the SMA directs, under the MDS allocation Determination, that a licence
in:
   (i) an area; and
   (ii) a group for the area;
is to be included in an additional allocation; and
(b) an agreed Transmitter Proposal is in force, on the day on which the
additional allocation is completed, for that area and group; and
(c) a person becomes a nominated applicant for a licence in relation to that
area and group as a result of the additional allocation;
the person is taken to have agreed with the agreed Transmitter Proposal on the
day on which the person becomes a nominated applicant.

(2) For the purposes of these Regulations, the agreement of a
nominated applicant ceases to have effect if the relevant Proposal ceases to have
effect.

(3) If:
   (a) the SMA directs, under the MDS allocation Determination, that a
 licence
      in:
      (i) an area; and
      (ii) a group for the area;
is to be included in an additional allocation; and
(b) an agreed Transmitter Proposal is not in force, on the day on which the
additional allocation is completed, for that area and group; and
(c) a nominated applicant in relation to that area and group has
given the
SMA a Transmitter Proposal before the day on which the additional
allocation
is completed; and
(d) a person becomes a nominated applicant in relation to that area
and
 group as a result of the additional allocation;
the SMA must give the Transmitter Proposal referred to in paragraph (c)
to the
person.

(4) Regulations 13 and 14 apply to the nominated applicant referred
 to in
paragraph (3) (d) from the day on which the SMA gives the nominated
applicant
the Transmitter Proposal referred to in paragraph (3) (c).

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS – REG 16
How does a Transmitter Proposal become an agreed Transmitter Proposal?

REG
16. (1) If:
   (a) there is only 1 nominated applicant in relation to:
      (i) an area; and
      (ii) a group of channels in the area; and
(b) the nominated applicant gives the SMA a Transmitter Proposal; and
(c) an agreed Transmitter Proposal is not in force, immediately before the nominated applicant gives the SMA the Transmitter Proposal, for that area and group; the Transmitter Proposal becomes the agreed Transmitter Proposal for that area and group on the day on which the nominated applicant gives the SMA the Transmitter Proposal.

(2) If:
(a) there is more than 1 nominated applicant in relation to:
   (i) an area; and
   (ii) a group of channels in the area; and
(b) all of the nominated applicants in relation to that area and group give the SMA a single Transmitter Proposal; and
(c) immediately before the nominated applicants give the SMA the Transmitter Proposal, there is no agreed Transmitter Proposal for that area and group; the Transmitter Proposal becomes the agreed Transmitter Proposal for that area and group on the day on which the nominated applicants give the SMA the Transmitter Proposal.

(3) If:
(a) there is more than 1 nominated applicant in relation to:
   (i) an area; and
   (ii) a group of channels in the area; and
(b) under regulation 13, 14 or 15, each of the nominated applicants in relation to that area and group agrees, or is taken to have agreed, with a Transmitter Proposal; and
(c) immediately before the last of the nominated applicants agreed with the Proposal, there was no agreed Transmitter Proposal for that area and group; the Transmitter Proposal becomes the agreed Transmitter Proposal for that area and group on the day on which the last of the nominated applicants agrees with the Transmitter Proposal.

(4) If a nominated applicant gives the SMA a Transmitter Proposal under regulation 12, the Transmitter Proposal becomes the agreed Transmitter Proposal for the relevant area and group on the day on which it is given to the SMA.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - PART 4
PART 4-CONSIDERATION OF TRANSMITTER PROPOSALS FOR AN AREA FOR WHICH THE SMA HAS ISSUED LICENCES
RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 17
Licensee may give the SMA a Transmitter Proposal

REG 17. (1) Subject to subregulation (2), a licensee in relation to:
(a) an area; and
(b) a group of channels in the area;
may give the SMA a completed Transmitter Proposal in accordance with this regulation.

(2) A licensee must not give the SMA a Transmitter Proposal under subregulation (1) if conciliation is required in relation to the relevant area and group.

(3) If the SMA asks the licensee, under paragraph 18 (1) (a), to give it information, the nominated applicant may give the SMA a statement of the information with the Transmitter Proposal, or at a later time.

(4) For the purposes of subregulation (1):
(a) a Transmitter Proposal may be completed by more than 1 licensee in relation to the relevant area and group; and
(b) if a licensee is an individual-the licensee must sign the Transmitter Proposal; and
(c) if a licensee is a company-the seal of the company must be duly affixed to the Transmitter Proposal; and
(d) if a licensee is not an individual or a company-the licensee must duly execute the Transmitter Proposal; and
(e) if a licensee consists of more than one person-each person must sign or otherwise duly execute the Transmitter Proposal.

(5) The Transmitter Proposal given to the SMA must have on it the licensee's original signature or other means of execution.

(6) A licensee must give the documents and information referred to in subregulations (1) and (3) to the SMA:
(a) if the SMA tells the nominated applicant an address under paragraph 18 (1) (c)-at that address; or
(b) in any other case-at the address published under clause 4 of the MDS allocation Determination in relation to the licence for which the nominated applicant is the nominated applicant.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 18
Information relating to a Transmitter Proposal given by a licensee
REG

18. (1) The SMA may, in writing:
(a) ask a licensee to give the SMA information, identified in the
request,
in support of a Transmitter Proposal; and
(b) ask a licensee to give the SMA information, identified in the
request,
for the purpose of evaluating a Transmitter Proposal that the licensee
has
given to the SMA; and
(c) tell the licensee an address at which the information, and the
Transmitter Proposal, must be given to the SMA.

(2) If the licensee wishes to comply with a request under paragraph
(1) (b),
the licensee must give the information to the SMA, in writing, no
later than
14 days after the day on which the SMA asks the licensee to give the
information.

(3) If:
(a) a licensee does not give the SMA information in accordance with
subregulation (2); and
(b) the Transmitter Proposal to which the information relates is
not, at the
end of the time specified in that subregulation for compliance, an
additional
agreed Transmitter Proposal;
the Transmitter Proposal ceases to have effect, for the purposes of
these
Regulations, at the end of the time specified in that subregulation
for
compliance.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 19
Replacement of a Transmitter Proposal given by a licensee

REG

19. (1) Subject to subregulations (2) and (3), a licensee may only
change
information set out in the licensee's Transmitter Proposal (in this
regulation
called "the original Proposal") by giving the SMA another completed
Transmitter Proposal.

(2) A licensee must not give the SMA a Transmitter Proposal under
subregulation (1) if conciliation is required in relation to the
relevant area
and groups.

(3) A licensee may give the SMA a replacement Transmitter Proposal
no later
than 3 months after the day on which the SMA gave a copy of the
original
Proposal to the last licensee in accordance with regulation 21.
(4) If:
(a) a licensee gives the SMA a replacement Transmitter Proposal; and
(b) the only person who completed the relevant original Proposal was the licensee;
the original Proposal ceases to have effect, for the purposes of these Regulations, when the SMA is given the replacement Transmitter Proposal.

(5) If:
(a) a licensee gives the SMA a replacement Transmitter Proposal; and
(b) the relevant original Proposal was completed by more than 1 licensee;
the original Proposal has effect, for the purposes of these Regulations, only in relation to the licensees who did not give the SMA the replacement Transmitter Proposal.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 20
Additional information relating to a replacement Transmitter Proposal given by a licensee

REG 20. (1) If a licensee gives the SMA a replacement Transmitter Proposal, the SMA may ask the licensee, in writing, to give the SMA additional information, identified in the request, for the purpose of evaluating the replacement Transmitter Proposal.

(2) If a licensee wishes to comply with a request under subregulation (1), the licensee must give the information to the SMA, in writing, no later than 14 days after the day on which the SMA asks the licensee to give the information.

(3) If:
(a) a licensee does not give the SMA information in accordance with subregulation (2); and
(b) the Transmitter Proposal to which the information relates is not, at the end of the time specified in that subregulation for compliance, an additional agreed Transmitter Proposal;
the Transmitter Proposal ceases to have effect, for the purposes of these Regulations, at the end of the time specified in that subregulation for compliance.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 21
Distribution of Transmitter Proposals and information given by a licensee
REG
21. (1) If a licensee gives the SMA a Transmitter Proposal, or a replacement Transmitter Proposal, the SMA must, as soon as practicable, give a copy of the Proposal to each person (if any) who:
(a) is a licensee, on the day on which the SMA is given the Proposal, in relation to the relevant area and group; and
(b) did not complete the Proposal.

(2) If:
(a) a licensee gives the SMA a Transmitter Proposal, or a replacement Transmitter Proposal; and
(b) a person becomes a licensee, after the day on which the SMA is given the Proposal, in relation to the relevant group and area; and
(c) the person did not complete the Proposal;
the SMA must, as soon as practicable, give a copy of the Proposal to the person.

(3) If a licensee gives the SMA information under subregulation 17 (3), 18 (2) or 20 (2) in relation to a Transmitter Proposal, the SMA must, as soon as practicable, give a copy of the information to:
(a) each person (if any) who is a licensee in relation to:
(i) the area to which the Proposal relates; and
(ii) the group that includes the channel referred to in the Transmitter Proposal;
on the day on which the SMA is given the information; and
(b) each person who becomes a licensee in relation to that area and group after that day.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 22
Licensee giving the SMA a Transmitter Proposal as the result of conciliation

REG
22. If:
(a) conciliation is required in relation to the area and group to which a licence relates; and
(b) the conciliator is able to effect a settlement of the relevant matter for the purposes of paragraph 208 (b) of the Act;
a licensee may give the SMA a Transmitter Proposal containing arrangements that reflect the terms of the settlement.
(NOTE: If the SMA is given a Transmitter Proposal under clause 22, the Transmitter Proposal becomes an additional agreed Transmitter Proposal for the relevant area and group: see subclause 25 (2).)

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 23
Written agreement with a Transmitter Proposal given by a licensee
REG

23. (1) Subject to subregulations (2) and (3), if the SMA gives a licensee a Transmitter Proposal, or a replacement Transmitter Proposal, in accordance with regulation 21 (in this regulation called "the relevant Proposal"), the licensee may tell the SMA, in writing, that the licensee agrees with the relevant Proposal.

(NOTE: If the licensee does not act under subregulation (1), regulation 24 may apply to the licensee. The effect of regulation 24 is that the licensee may be taken to agree with the relevant Proposal in certain circumstances.)

(2) A licensee must not tell the SMA that the licensee agrees with the relevant Proposal if conciliation is required in relation to the relevant area and group.

(3) A licensee must not tell the SMA that the licensee agrees with the relevant Proposal later than 3 months after the day on which the SMA gave the relevant Proposal to the licensee.

(4) For the purposes of subregulation (1):
   (a) a licensee must identify clearly the relevant Proposal; and
   (b) if a licensee is an individual—the licensee must sign the written agreement; and
   (c) if a licensee is a company—the seal of the company must be duly affixed to the written agreement; and
   (d) if a licensee is not an individual or a company—the licensee must duly execute the written agreement; and
   (e) if a licensee consists of more than one person—each person must sign or otherwise duly execute the written agreement.

(5) The written agreement given to the SMA must have on it the licensee's original signature or other means of execution.

(6) For the purposes of these Regulations, the agreement of a licensee ceases to have effect if the relevant Proposal ceases to have effect.

(7) If a licensee gives the SMA a written agreement with a Transmitter Proposal under subregulation (1), the SMA must, as soon as practicable, give a
copy of the agreement to:
   (a) each of the other licensees in relation to the relevant area and group;
   and
   (b) each person who becomes a licensee in relation to the relevant area and group after that day.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 24
Agreement with a Transmitter Proposal given by a licensee by passage of time

REG
24. (1) Subject to subregulation (2), if:
   (a) the SMA gives a licensee a copy of a Transmitter Proposal in accordance with regulation 21 (in this regulation called "the relevant Proposal"); and
   (b) the licensee does not, before the approval day referred to in subregulation (3) or (4), tell the SMA under subregulation 23 (1) that the licensee agrees with the relevant Proposal; and
   (c) the relevant Proposal does not cease to have effect before the approval day referred to in subregulation (3) or (4);
the licensee is taken to have agreed with the relevant Proposal on the approval day.

(2) A licensee is not taken to have agreed with the relevant Proposal if conciliation is required, before the approval day, in relation to the group and area to which the licence relates.

(3) If, at the end of a period of 3 months after the day on which the SMA gave the relevant Proposal to the licensee:
   (a) the SMA has not asked the licensee who gave it the relevant Proposal to give the SMA further information about the relevant Proposal; or
   (b) the SMA has received all further information that it requires about the relevant Proposal;
the approval day is the first day following the end of the period.

(4) If, at the end of a period of 3 months after the day on which the SMA gave the relevant Proposal to the licensee:
   (a) the SMA has asked the licensee who gave it the relevant Proposal to give the SMA further information about the relevant Proposal; and
   (b) the licensee who gave the SMA the relevant Proposal has not given the SMA all of the information;
the approval day is the day occurring 36 days after the end of the period.
(5) For the purposes of these Regulations, the agreement of a licensee ceases to have effect if the relevant Proposal ceases to have effect.

(6) If a licensee is taken to have agreed to a relevant Proposal, the SMA must, as soon as practicable after the approval day, tell, in writing, each other licensee in relation to the relevant area and group that the licensee is taken to have agreed to the relevant Proposal.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 25
How does a Transmitter Proposal given by a licensee become an additional agreed Transmitter Proposal?

REG 25. (1) If:
(a) a licensee gives the SMA a Transmitter Proposal, or a replacement Transmitter Proposal for a group and area; and
(b) under regulation 23 or 24, each of the licensees in relation to the group and area agrees, or is taken to have agreed, with the Proposal; the Transmitter Proposal becomes an additional agreed Transmitter Proposal for the relevant area and group on the day on which the last of the licensees in relation to the group and area agrees with the Proposal.

(2) If a licensee gives the SMA a Transmitter Proposal under regulation 22, the Transmitter Proposal becomes an additional agreed Transmitter Proposal for the relevant area and group on the day on which it is given to the SMA.

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - PART 5
PART 5-MISCELLANEOUS

RADIOCOMMUNICATIONS (COORDINATION) REGULATIONS - REG 26
Receipts

REG 26. The SMA must give a nominated applicant, or a licensee, a receipt for a Transmitter Proposal, or information, that the nominated applicant or licensee gives to the SMA in accordance with these Regulations.
Radiocommunications (Coordination) Regulations 1995 No. 65
EXPLANATORY STATEMENT
Statutory Rules 1995 No. 65
Issued by the Authority of the Minister for Communications and the Arts
Radiocommunications Act 1992
Radiocommunications (Coordination) Regulations
Section 314 of the Radiocommunications Act 1992 (the Act) provides that the Governor-General may make regulations prescribing all matters required or permitted by the Act to be prescribed, or necessary or convenient to be prescribed for carrying out or giving effect to the Act.
The Regulations support the proposed allocation of specific multipoint distribution (MDS) licences in regional Australia under a price based allocation system determined by the Spectrum Manager under section 106 of the Act, the Radiocommunications (Allocation of Multipoint Distribution Station Licences Regional Licences) Determination No 1 of 1995 (the Determination). MDS licences can be used for the transmission of services for text, graphics, still pictures, sound, non-entertainment video and entertainment video which includes pay TV.
The Determination provides for the allocation of licences by an auction style process, and for the subsequent issuing of licences to the highest bidders for the licences (the nominated applicants) after they have had an opportunity to reach agreement on the location of transmitters in the MDS channel group and area, and the technical conditions relating to the operation of those transmitters.
This system differs from that which applied to the allocation of MDS licences in 1994 in main city areas under another price-based allocation system determined by the Spectrum Manager under section 106 of the Act. Under that system, the Spectrum Management Agency (SMA) was able to determine in advance of the allocation (also by an auction style process) the location of transmitters and the technical parameters relating to their operation. However, because the regional areas covered by the Determination are much larger, the nominated applicants for each MDS channel group and area must coordinate the location of their transmitters and the technical parameters relating to their operation before they can be issued with their licences.
Accordingly, the Regulations establish procedures which will enable nominated applicants to reach agreement on the location and operation of transmitters which will minimise the potential for interference. The Regulations also provide for the determination of transmitter location by the SMA where nominated applicants in an MDS channel group and area are unable to reach agreement. Because applicants may wish to roll out their services over a period of time, the Regulations also provide the mechanism for adding transmitters to a licence, or otherwise requesting the SMA to vary licence conditions, after licence issue.
The determination of licence conditions by the SMA specifying the location of transmitters and their technical operating characteristics, will be in accordance with guidelines made under section 112 of the Act, which will be made available to all applicants.
The Regulations commenced on 6 April 1995.
Detailed notes on the Regulations are attached.
ATTACHMENT TO EXPLANATORY STATEMENT
Radiocommuncations (Coordination) Regulations
Notes on Regulations
PART 1 - PRELIMINARY
Regulation 1 - Citation
Regulation 1 is a citation provision.
Regulation 2 - Commencement
Regulation 2 provides that the Regulations commence on 6 April 1995.
Regulation 3 - Object of the Regulations
Regulation 3 sets out the object of the Regulations. The Regulations establish procedures which will facilitate the coordinated placement of multipoint distribution station (MDS) transmitters by successful applicants under the price based allocation system to be established by the Radiocommunications (Allocation of Multipoint Distribution Station Licences Regional Licences) Determination No. 1 of 1995 (the Determination), so as to assist in the efficient provision of radiocommunications services and to minimise interference caused by the operation of those transmitters. Accordingly, the Regulations apply to the location of transmitters before and after the issue of licences. Parts 2 and 3 apply to the placement of transmitters before licence issue in an MDS channel group and area, and Part 5 is relevant to the exercise by the SMA of its power under the Act to vary apparatus licences.
Regulation 4 - Interpretation
Regulation 4 defines terms used in the Regulations. The definitions include the following:
"area" has the same meaning as in the Determination. Licences allocated under the Determination are to operate MDS transmitters in the areas defined in Schedule 1 to the Determination.
"group" means a group of channels within the meaning of the Multipoint Distribution Band Plan. Under the Band Plan, there are two MDS channel groups, group A and group 5. To avoid interference, the placement of transmitters within each group in an area must be coordinated, but not the placement of transmitters between each group.
"additional agreed Transmitter Proposal" means a Transmitter Proposal that is an agreed Transmitter Proposal under regulation 25 - that is, after licences have been issued in relation to a group and area.
"agreed Transmitter Proposal" means a Transmitter Proposal that is an agreed Transmitter Proposal under regulation 16 - that is, before licences have been issued in relation to a group and area.
"nominated applicant" means a person who is a nominated applicant within the meaning of the Determination. Under the Determination, a nominated applicant is a registered applicant who pays the highest bid price for a licence, or, if the SMA registers only one applicant for licences in an area, an applicant who pays the reserve price for a licence.
"Transmitter Proposal" has the same meaning as in the Determination. A Transmitter Proposal will propose the location of transmitters for a group and area and the technical characteristics of their operation. The Determination provides, amongst other things, that the SMA must issue a licence for a group and area if an agreed Transmitter Proposal is in force for group and area in which the licence is located, subject to the Radiocommunications (Multipoint Distribution Station Licences - Regional Licences) Guideline No 1 of 1995 (the Guidelines), to be made under section 112 of the Act. The Regulations specify when there is an agreed Transmitter Proposal for a group and area.
Regulation 5 - When is conciliation required In relation to an group and area
Regulation 5 specifies when conciliation is required in relation to the proposed operation of a transmitter for the purposes of the Regulations, under subsection 206(1) of the Radiocommunications Act 1992 (the Act).
Conciliation will be required if the SMA receives technically incompatible Transmitter Proposals for a group and area. Transmitter Proposals will be technically incompatible if their operation would cause interference above a level set by the Guidelines. The SMA is required to comply with the Guidelines in determining the conditions of the licences.
The Regulations also provide that a licensee may give a Transmitter Proposal to the SMA after the issue of licences for the group and area, for the purpose of requesting the SMA to exercise its power under the Act to vary licences. Conciliation will be required if a Transmitter Proposal is technically incompatible, in accordance with the Guidelines, with existing licence conditions, or with another Transmitter Proposal.

PART 2 - Transmitter Proposals
Regulation 6 - Nominated applicant may give the SMA a Transmitter Proposal
Regulation 6 (1) provides that a nominated applicant may give to the SMA a completed Transmitter Proposal. A nominated applicant is a registered applicant for a licence under the Determination who pays the highest bid price for a licence or, if the applicant was a lone applicant in the relevant area, pays the reserve price for the licence. Regulation 6(2) requires that a nominated applicant must not give the SMA a Transmitter Proposal if:
(a) the SMA has directed that a licence in a relevant group and area is to be included in an additional allocation, or
(b) conciliation is required in relation to the relevant group and area; or
(c) an agreed Transmitter Proposal is in force for the relevant group and area.
Under the Determination, where more than one applicant registers to bid for licences in an area, the SMA must tell each registered applicant the period or periods, called allocation periods, within which bids are to be invited for licences in that area. The SMA may arrange for one or more additional allocation periods if no bids are received for a licence or an application for a licence ceases to have effect in one of the circumstances specified in the Determination. Paragraph 6(2)(a) follows from the requirement in the Regulations that 3 months after a Transmitter Proposal is circulated to the other nominated applicants in the group and area, those nominated applicants will be taken to have agreed with the Transmitter Proposal unless the proposal has been referred to conciliation. If the SMA directs that a licence in a group and area be included in an additional allocation, a Transmitter Proposal cannot be given to the SMA and circulated, triggering the commencement of the 3 month period, until that licence has been allocated or withdrawn (regulation 7).
Paragraph 6(2)(b) - Under the scheme established by the Determination and the Regulations, once Transmitter Proposals have been referred to conciliation, the part of the scheme that provides for express or deemed agreement with a Transmitter Proposal that has been circulated (regulation 16), is suspended once conciliation is required. Where conciliation is required, the SMA will issue licences for the group and area following the conclusion of the conciliation. If the conciliator has been able to achieve the agreement of all nominated applicants on the placement of transmitters, any of the nominated applicants may give to the SMA a Transmitter Proposal expressing that agreement (regulation 12). In the absence of such a resolution, the SMA will determine the licence conditions. Accordingly. once conciliation is required for a group and area,
the Regulations prohibit the giving of a Transmitter Proposal to the SMA until licences for the group and area have been issued. Paragraph 6(2)(c) ensures that once there is an agreed Transmitter Proposal, a nominated applicant in the same group and area may not give a Transmitter Proposal to the SMA until after licence issue.

Under the scheme established by the Determination and the Regulations, licences will be issued under the Determination if there is an agreed Transmitter Proposal. The Regulations specify when a Transmitter Proposal becomes an agreed Transmitter Proposal. A Transmitter Proposal will become an agreed Transmitter Proposal if:

- a nominated applicant gives the SMA a Transmitter Proposal following conciliation which reflects the terms of the conciliation (regulation 12); or
- all nominated applicants in the group and area expressly agree with the proposal (regulation 13); or
- all nominated applicants are taken to agree with the proposal by the passage of time (regulation 14) or a ‘new’ nominated applicant is taken to agree with the proposal after an additional licence allocation is held (regulation 15).

All nominated applicants will be taken to agree with the proposal 3 months after being given a copy of the proposal unless, within that period, another technically incompatible Transmitter Proposal is given to the SMA which requires conciliation. Regulation 6(3) provides that a nominated applicant must not give the SMA a Transmitter Proposal later than 12 months after the day it became a nominated applicant. This requirement is subject to regulation 7(3), which extends that period where the SMA directs that a licence be included in an additional allocation. Under the Determination, all applications for licences in a group and area will cease to have effect if none of the nominated applicants gives a Transmitter Proposal to the SMA within the specified period.

Regulation 6(4) provides that a nominated applicant may give to the SMA information requested by the SMA under paragraph 8(1)(a) of the Regulations. Compliance with the request is not mandatory because a failure to provide the information will not affect the validity of a Transmitter Proposal.

Regulation 6(5) provides that for the purposes of regulation 6(1), a Transmitter Proposal may be completed by more than one nominated applicant in a group and area, and specifies how a Transmitter Proposal must be executed, depending on whether the Transmitter Proposal is completed by an individual, more than one person, a company, or a body that is neither an individual or a company.

Regulation 6(6) - a Transmitter Proposal given to the SMA will not be valid if it does not have on it the nominated applicants original signature or other means of execution.

Regulation 6(7) provides that a nominated applicant must give a Transmitter Proposal, or information the applicant has been asked to give the SMA under paragraph 8(1)(a), at the address notified to the applicant in writing or, if the SMA has not notified the applicant of such an address, at an address published in a national newspaper under clause 4 of the Determination.

**Regulation 7 - Nominated applicant may give the SMA a Transmitter Proposal if an additional allocation is required**

Regulation 7(1) provides that if the SMA directs that a licence for a channel in an area is to be included in an additional allocation then an existing nominated applicant or a nominated applicant from the additional allocation in that group and area may give the SMA a completed Transmitter Proposal in accordance with regulations 7(2) to 7(3).
Regulation 7(2) provides that the restrictions imposed by paragraphs 6(2)(b) and (c) of the Regulations, on when a Transmitter Proposal may be given to the SMA, apply when the SMA has directed under the Determination that a licence is to be included in an additional allocation.

Regulation 7(3) qualifies, where there is an additional allocation, the requirement under regulation 6(3) that a nominated applicant must not give a Transmitter Proposal to the SMA later than 12 months after the applicant became a nominated applicant. Regulation 7(3) provides that a nominated applicant must not give the SMA a Transmitter Proposal later than 12 months after the day all licences in that group and area, that have not been withdrawn from allocation, have been allocated under the Determination by the SMA. Under the Determination, the SMA may direct, in specified circumstances, that a licence be included in an additional allocation or be withdrawn from the allocation process.

Regulation 7(4) repeats, in the case of an additional allocation, the direction in regulation 6(4) that a nominated applicant may comply with a request from the SMA under paragraph 8(1)(a) to give the SMA information in support of a Transmitter Proposal.

Regulation 7(5) repeats, in the case of an additional allocation, the requirement under regulation 6(5) that a Transmitter Proposal may be completed by more than one nominated applicant in a group and area, and specifies the manner of executing a Transmitter Proposal, depending on whether the Transmitter Proposal is completed by an individual, more than one person, a company, or a body that is not an individual or a company.

Regulation 7(6) repeats, in the case of an additional allocation, the requirement under regulation 8(6) that a Transmitter Proposal given to the SMA must have on it the nominated applicant's original signature or other means of execution.

Regulation 7(7) repeats, in the case of an additional allocation, the requirement under regulation 6(7) that a nominated applicant must give a Transmitter Proposal, or information the applicant has been asked to give the SMA under paragraph 8(1)(a), at the address notified to the applicant in writing or, if the SMA has not notified the applicant of such an address, at an address published in a national newspaper under clause 4 of the Determination.

**Regulation 8 - Information relating to a Transmitter Proposal**

Paragraph 8(1)(a) provides that the SMA may, in writing, ask a nominated applicant to give it information in support of a Transmitter Proposal. Compliance with a request is not mandatory, under regulations 6(4) and 7(4), because a failure to comply with a request does not affect the validity of a Transmitter Proposal.

Paragraph 8(1)(b) provides that the SMA may, in writing, ask a nominated applicant to give it information for the purpose of evaluating a Transmitter Proposal. Such a request would be made where a nominated applicant failed to comply with a request under paragraph 8(1)(a), or the SMA required additional information in order to evaluate a Transmitter Proposal in accordance with the Guidelines. A request under this paragraph must be complied with for a Transmitter Proposal to remain in force (regulation 8(3)).

Paragraph 8(1)(c) provides that the SMA may tell the nominated applicant in writing an address to which information requested under paragraphs 8(1)(a) and (b) must be sent.

Regulation 8(2) provides that the SMA must not ask a nominated applicant for information under paragraph 8(1)(b) if conciliation is required in relation to the relevant group and area, or if the SMA has already asked the nominated applicant for that information and the nominated applicant has not complied with that request. The effect
of these requirements, in conjunction with regulations 8(4) and 8(5), is that a Transmitter Proposal cannot cease to have effect, under regulation 8(3), if it is the subject of conciliation.

Regulation 8(3) provides that a nominated applicant must comply with a request for information under paragraph 8(1)(b) within 14 days, if the nominated applicant wishes to comply with the request, subject to regulation 8(4).

Regulation 8(4) provides that a nominated applicant is not required to comply with a request for information under paragraph 8(1)(b) if conciliation is required in relation to the relevant group and area, or if the SMA has already asked the nominated applicant for information under paragraph 8(1)(b) and the nominated applicant has not complied with that request.

Regulation 8(5) provides that if a nominated applicant does not give information requested under paragraph 8(1)(b) to the SMA within 14 days, the Transmitter Proposal to which the information relates will cease to have effect, unless regulation 8(4) applies to the applicant or the proposal is an agreed Transmitter Proposal. (Under the scheme established by the Determination and these Regulations, the SMA will be required under the Determination to issue licences to all nominated applicants in a group and area once there is an agreed Transmitter Proposal). Therefore, if the SMA has asked for information under paragraph 8(1)(b) and conciliation is subsequently required in relation to the group and area, the relevant Transmitter Proposal will not cease to have effect if the nominated applicant does not comply with the SMA's request.

**Regulation 9 - Replacement of a Transmitter Proposal**

Regulation 9(1) provides that a nominated applicant may only amend any information on a Transmitter Proposal (as distinct from information provided in support of a Transmitter Proposal under paragraph 8(1)(a) or for the purpose of evaluating a Transmitter Proposal under paragraph 8(1)(c)) by submitting a replacement Transmitter Proposal, subject to this regulation.

Regulation 9(2) requires that a nominated applicant must not give the SMA a replacement Transmitter Proposal in a group and area if conciliation is required or there is already an agreed Transmitter Proposal. This regulation repeats, in the case of replacement Transmitter Proposals, the requirements of paragraphs 6(2)(b) and 6(2)(c).

Regulation 9(3) provides that replacement Proposals can only be given to the SMA no later than 3 months from the date when the Transmitter Proposal to be replaced (the original proposal) was given to the last nominated applicant in the group and area, in accordance with regulation 11. Regulation 9(3) ensures that a Transmitter Proposal cannot be replaced after it has become an agreed Transmitter Proposal by the passage of time.

Regulation 9(4) provides that where a replacement Transmitter Proposal is given to the SMA, the original proposal ceases to have effect if the nominated applicant who gave the replacement Transmitter Proposal to the SMA was the only nominated applicant who completed the original proposal.

Regulation 9(5) allows for the possibility that where an original proposal is completed by more than one nominated applicant, one or more of those applicants may wish to replace the proposal. Regulation 9(5) provides that where the relevant original proposal was completed by more than one nominated applicant, the original proposal will continue in force in relation to those nominated applicants who completed the original proposal but did not give the replacement proposal to the SMA.

**Regulation 10 - Additional information relating to a replacement Transmitter Proposal**
Regulation 10(1) provides that the SMA may ask a nominated applicant, in writing, for additional information for the purpose of evaluating a replacement Transmitter Proposal.

Regulation 10(2) provides that the SMA must not ask a nominated applicant for information under regulation 10(1) if conciliation is required in relation to the relevant group and area, or if the SMA has already asked the nominated applicant for that information and the nominated applicant has not complied with that request. This regulation repeats, in the case of replacement Transmitter Proposals, the requirements of regulation 8(2).

Regulation 10(3) provides that a nominated applicant must comply with a request for information under regulation 10(2) within 14 days. If the nominated applicant wishes to comply with the request, subject to regulation 10(4).

Regulation 10(4) provides that a nominated applicant is not required to comply with a request for information under regulation 10(1) if conciliation is required in relation to the relevant group and area, or if the SMA has already asked the nominated applicant for information under regulation 10(1) and the nominated applicant has not complied with that request.

Regulation 10(5) provides, as is the case with other Transmitter Proposals (regulation 8(5)), that if a nominated applicant does not give information requested under regulation 10(1) to the SMA within 14 days, the Transmitter Proposal to which the information relates will cease to have effect, unless regulation 10(4) applies to the proposal or the proposal is an agreed Transmitter Proposal. This regulation applies, in the case of replacement Transmitter Proposals, the requirements of regulation 8(5).

**Regulation 11 - Distribution of Transmitter Proposals and information**

Regulation 11(1) requires the SMA, as soon as practicable after it is given a Transmitter Proposal or replacement Transmitter Proposal, to distribute the proposal to all nominated applicants in the relevant group and area who did not complete the proposal.

Regulation 11(2) - Paragraph 6(2)(a) provides that a nominated applicant may not give a Transmitter Proposal to the SMA if the SMA has directed that a licence in the relevant group and area is to be included in an additional allocation. However, it is possible that a nominated applicant may have given the SMA a Transmitter Proposal before the SMA gives such a direction. Regulation 11(2) therefore requires the SMA to give, as soon as practicable, a copy of a Transmitter Proposal to a nominated applicant in the group and area who becomes a nominated applicant after a Transmitter Proposal was given to the SMA.

Regulation 11(3) requires the SMA to distribute, as soon as practicable, to all nominated applicants in the relevant group and area, including any nominated applicant who became a nominated applicant after the information was given to the SMA, any supporting or additional information given to SMA at its request (under regulations 6(4), (7)(4), 8(2), 9(3) and 10(2)). An applicant could only become a nominated applicant after such information had been given to the SMA if a licence in the group and area is included in an additional allocation.

**Regulation 12 - Giving the SMA a Transmitter Proposal as the result of conciliation**

Under the scheme established by the Determination and the Regulations, if conciliation is required in relation to a Transmitter Proposal for a group and area, the SMA will issue licences for the group and area following the conclusion of the conciliation. Regulation 12 provides that if conciliation is required and the conciliator has been able to effect a settlement of the matter, any of the nominated applicants for the group and
area may give to the SMA a Transmitter Proposal that reflects the terms of the settlement.

PART 3 - Agreed Transmitter Proposals

Regulation 13 - Written agreement with a Transmitter Proposal

Regulation 13(1) provides that a nominated applicant may tell the SMA in writing that it agrees with a Transmitter Proposal given to the nominated applicant under regulation 11.

Regulation 13(2) - a nominated applicant must not tell the SMA that it agrees with a Transmitter Proposal if it is the subject of conciliation. This is because the part of the scheme that provides for express or deemed agreement with a Transmitter Proposal that has been circulated is suspended once conciliation is required. If conciliation is required in relation to a Transmitter Proposal, the SMA will issue licences for the group and area on the basis of the outcome of the conciliation. If the conciliator is able to achieve a settlement of the matter, regulation 12 enables any of the nominated applicants to submit an agreed Transmitter Proposal. If the conciliator is unable to achieve the agreement of all nominated applicants for the group and area, the SMA will issue the licences and determine the conditions relating to the placement and operation of transmitters (see clause 31 of the Determination).

Regulation 13(3) provides that a nominated applicant must not tell the SMA that it agrees with a Transmitter Proposal later than 3 months after the SMA gave it the proposal under regulation 11. (Regulation 14 provides that at the conclusion of that 3 month period, the nominated applicant will be taken to agree with the Transmitter Proposal unless conciliation is required in relation to the placement of transmitters in the group and area.)

Regulation 13(4) requires the nominated applicant to clearly identify, in a notice under regulation 13(1) to the SMA expressing its agreement with a Transmitter Proposal, the Transmitter Proposal it is agreeing with, and specifies how a notice under regulation 13 must be executed, depending on whether the Transmitter Proposal is completed by an individual, more than one person, a company, or a body that is neither an individual or a company.

Regulation 13(5) provides that the written agreement of a nominated applicant to a Transmitter Proposal, under regulation 13(1), must have on it the nominated applicant's original signature or other means of execution.

Regulation 13(6) provides that the agreement of a nominated applicant to a Transmitter Proposal ceases to have effect if the proposal ceases to have effect. Note that if a nominated applicant fails to provide to the SMA within 14 days information requested under paragraph 8(1)(b) or regulation 10(1), the relevant Transmitter Proposal will not cease to have effect if it is an agreed Transmitter Proposal (regulations 8(3) and 10(3)).

Regulation 13(7) requires the SMA to distribute to all nominated applicants in a group and area, the written agreement of a nominated applicant to a Transmitter Proposal, including all persons who became nominated applicants after the day on which agreement was given to the SMA. An applicant could become a nominated applicant after such written agreement had been given to the SMA if, after the relevant Transmitter Proposal had been given to the SMA, a licence in the group and area is included in an additional allocation.

Regulation 14 - Agreement with a Transmitter Proposal by passage of time

Regulation 14(1) provides that a nominated applicant will be deemed to agree with a Transmitter Proposal, given to K by the SMA, on the 'approval day' if:
the nominated applicant does not, before the approval day, tell the SMA under regulation 13 that it agrees with the Transmitter Proposal; and

• the Transmitter Proposal has not ceased to have effect before the approval day. A Transmitter Proposal will only cease to have effect if the nominated applicant fails to provide information requested by the SMA under paragraph 8(1)(b) or regulation 10(1) within the required 14 day period.

It follows that a nominated applicant can only disagree with the Transmitter Proposal of another nominated applicant by giving the SMA a Transmitter Proposal that is technically incompatible with the first mentioned Transmitter Proposal, in the sense that the proposed transmitters would cause interference to one another, before the 'approval day' for the first mentioned Transmitter Proposal. In this circumstance, the SMA will refer the proposals to a conciliator under section 206 of the Act.

Regulation 14(2) provides that a nominated applicant is not taken to have agreed with a relevant proposal if conciliation is required in respect of the relevant proposal before the 'approval day'.

Regulations 14(3) and 14(4) specify when the 'approval day' occurs in relation to a Transmitter Proposal. The approval day will be the first day after 3 months has expired since the relevant Transmitter Proposal was given to the nominated applicant, unless the SMA has requested further information (under paragraph 8(1)(b) or regulation 10(1)) in relation to a Transmitter Proposal and that Information has not been given to it by the nominated applicant who gave it the proposal.

If, at the end of the 3 month period after the Transmitter Proposal was given to the relevant nominated applicant, the nominated applicant who gave the Transmitter Proposal to the SMA has not provided further information requested by the SMA, the approval day will occur 36 days after the end of the 3 month period specified in regulation 14(3). The additional time period is for the SMA to: circulate the information to other nominated applicants in the group and area; for them to consider that information; if they disagree with the Transmitter Proposal to which the information relates, to submit a technically incompatible Transmitter Proposal, so requiring the issue to be dealt with at conciliation. The additional time period is also to allow the SMA sufficient time to request further information in relation to a Transmitter Proposal (if necessary), and to give the nominated applicant an opportunity to comply with the request, before any other nominated applicants can be taken to have agreed with the relevant Transmitter Proposal.

Regulation 14(5) provides that the agreement of a nominated applicant ceases to have effect if the relevant Transmitter Proposal ceases to have effect. Note that if a nominated applicant fails to provide to the SMA within 14 days information requested under paragraph 8(1)(b) or regulation 10(1), the relevant Transmitter Proposal will not cease to have effect if it is an agreed Transmitter Proposal (regulations 8(3) and 110(3)).

Regulation 14(6) provides that the SMA must, as soon as practicable inform, in writing, all other nominated applicants in the group and area when a nominated applicant is taken to have agreed with a Transmitter Proposal.

**Regulation 15 - Agreement with a Transmitter Proposal after an additional allocation**

Regulation 15(1) provides that if a person becomes a nominated applicant in an area as a result of an additional allocation, and when the person becomes a nominated applicant there is already an agreed Transmitter Proposal in force (under regulations 13 or 14), the new nominated applicant is taken to also agree with the Transmitter Proposal. Note
that a Transmitter Proposal cannot be given to the SMA after the SMA has directed that a licence be included in an additional allocation. Therefore, regulation 16(1) will only apply if there is an additional licence allocation after a Transmitter Proposal in the group and area has been given to the SMA and the additional licence is allocated after all other nominated applicants have either expressly agreed with the Transmitter Proposal or are taken to have agreed with it by the passage of time.

Regulation 15(2) repeats, where a nominated applicant is taken to have agreed with a Transmitter Proposal upon becoming a nominated applicant, the direction under regulations 13(6) and 14(5) that the agreement of a nominated applicant ceases to have effect if the relevant Transmitter Proposal ceases to have effect.

Regulation 15(3) provides that if the SMA directs that a licence in a group and area is to be included in an additional allocation; an agreed Transmitter Proposal is not in force (either by the express agreement of all nominated applicants or by their deemed agreement) when the additional allocation is completed; then a nominated applicant from the additional allocation in that group and area must be given a copy of any Transmitter Proposal for that group and area that was given to the SMA before the additional allocation was completed. Note that a Transmitter Proposal must not be given to the SMA if the SMA has directed that a licence in the group and area is to be included in an additional allocation (paragraph 6(2)(a)).

Regulation 15(4) provides that regulations 13 and 14 apply to the nominated applicant referred to in regulation 15(3) from the day on which the SMA gives the nominated applicant the Transmitter Proposal. That is, the 'new' nominated applicant may expressly agree with the Transmitter Proposal or will be taken to have agreed with it, within the time periods specified in regulations 13 and 14. This means that, if conciliation is not required in relation to the group and area, there can be no agreed Transmitter Proposal until the 'new' nominated applicant has either expressly agreed with the relevant Transmitter Proposal or is taken to have agreed with that proposal.

**Regulation 16 - How does a Transmitter Proposal become an agreed Transmitter Proposal?**

Regulation 16(1) provides that if the only nominated applicant for a group and area gives the SMA a Transmitter Proposal and, at that time, there is no agreed Transmitter Proposal in force, that Proposal becomes the agreed Transmitter Proposal for that group and area. This regulation is included for the purposes of clause 31 of the Determination, which provides that the SMA will determine the location and operating conditions of transmitters if there is no agreed Transmitter Proposal. The situation where there is only one nominated applicant, following the price-based allocation, is to be distinguished from the concept of a 'lone applicant' under the Determination.

Regulations 16(2) and 16(3) apply where there is more than one nominated applicant in a group and area. Regulation 16(2) provides that if all the nominated applicants for the group and area give a single Transmitter Proposal to the SMA, that proposal becomes the agreed Transmitter Proposal, unless there is already an agreed Transmitter Proposal. The scheme established under the Determination and the Regulations is directed at determining one agreed Transmitter Proposal for a group and area which will be the basis of licences issued in that group and area under clause 31 of the Determination. Regulation 18(3) provides that if there is more than one nominated applicant in a group and area, and all of the nominated applicants either agree or are taken to have agreed with a Transmitter Proposal under regulations 13 (express agreement), 14 (agreement by passage of time), or 15 (agreement after an additional allocation), the relevant Transmitter Proposal becomes the agreed Transmitter Proposal for the group and area.
Regulation 16(4) provides that when a nominated applicant gives the SMA a Transmitter Proposal under regulation 12 as a result of conciliation, being a Transmitter Proposal that reflects the settlement of the disputed conduct reached at the conciliation, that Transmitter Proposal becomes the agreed Transmitter Proposal for the relevant group and area on the day on which it is given to the SMA.

PART 4 - CONSIDERATION OF TRANSMITTER PROPOSALS FOR AN AREA FOR WHICH THE SMA HAS ISSUED LICENCES

Regulation 17 - Licensee may give the SMA a Transmitter Proposal

Regulation 17(1) allows a licensee in relation to a group and area to give to the SMA a completed Transmitter Proposal. Note that a nominated applicant in a group and area becomes a licensee when issued with a licence for a channel under clause 30 or 31 of the Determination. A licensee must give a Transmitter Proposal to the SMA if it wishes to add transmitter locations to a licence, or to otherwise vary licence conditions. The scheme that applies under Part 3 and Part 4 of the Regulations generally applies where a licensee gives a Transmitter Proposal to the SMA. Note that the Determination only applies to the point of licence issue. The SMA has the power to vary licence conditions under section 111 of the Act.

Regulation 17(2) provides that a licensee must not give the SMA a Transmitter Proposal if conciliation is required in relation to the relevant group and area. As is the case prior to licence issue, if conciliation is required in relation to a Transmitter Proposal, any licensee would be able to submit another Transmitter Proposal for the consideration of the licensees in the group and area in the context of conciliation.

Regulation 17(3) provides that a licensee may give to the SMA information requested by the SMA under paragraph 18(1)(a) of the Regulations. Compliance with the request is not mandatory because a failure to provide the information will not affect the validity of a Transmitter Proposal.

Regulation 17(4) provides that for the purposes of regulation 17(1), a Transmitter Proposal may be completed by more than one licensee in a group and area, and specifies how a Transmitter Proposal must be executed, depending on whether the Transmitter Proposal is completed by an individual, more than one person, a company, or a body that is neither an individual or a company.

Regulation 17(5) - a Transmitter Proposal given to the SMA will not be valid if it does not have on it the licensee's original signature or other means of execution.

Regulation 17(6) provides that a licensee must give a Transmitter Proposal, or information the applicant has been asked to give the SMA under paragraph 18(1)(a), at the address notified to the applicant in writing or, if the SMA has not notified the applicant of such an address, at an address published in a national newspaper under clause 4 of the Determination.

Regulation 18 - Information relating to a Transmitter Proposal given by a licensee

Regulation 18(1)(a) provides that the SMA may, in writing, ask a licensee to give it information in support of a Transmitter Proposal. Compliance with a request is not mandatory because a failure to comply with a request does not affect the validity of a Transmitter Proposal.

Regulation 18(1)(b) provides that the SMA may, in writing, ask a licensee to give it information for the purpose of evaluating a Transmitter Proposal. Such a request would be made where a licensee failed to comply with a request under paragraph 18(1)(a), or the SMA required additional information in order to evaluate a Transmitter Proposal in accordance with the Guidelines. A request under this paragraph must be complied with for a Transmitter Proposal to remain in force (regulation 18(3)).
Paragraph 18(1)(c) provides that the SMA may tell the licensee in writing an address to which information requested under paragraphs 18(1)(a) and (b) must be sent. Regulation 18(2) provides that a licensee must comply with a request for information under paragraph 118(1)(b) within 14 days, if the licensee wishes to comply with the request. Regulation 18(3) provides that if a licensee does not give information requested under paragraph 8(1)(b) to the SMA within 14 days, the Transmitter Proposal to which the information relates will cease to have effect, unless the relevant Transmitter Proposal is an 'additional agreed Transmitter Proposal'. An 'additional agreed Transmitter Proposal' is a Transmitter Proposal that all licensees either expressly agree with (regulation 23), are taken to agree with (regulation 24), or that is provided to the SMA following agreement reached at conciliation (regulation 22).

**Regulation 19 - Replacement of a Transmitter Proposal given by a licensee**

Regulation 19(1) provides that a licensee may only amend any information on a Transmitter Proposal (as distinct from information provided in support of a Transmitter Proposal under paragraph 18(1)(a) or for the purpose of evaluating a Transmitter Proposal under paragraph 18(1)(c)) by submitting a replacement Transmitter Proposal, subject to this regulation.

Regulation 19(2) provides that a licensee must not give the SMA a replacement Transmitter Proposal in a group and area if conciliation is required.

Regulation 19(3) provides that replacement Transmitter Proposal can only be given to the SMA by a licensee no later than 3 months after the day on which the SMA gave a copy of the Transmitter Proposal to be, replaced (the original proposal) to the last licensee in the group and area in accordance with regulation 21. This Regulation ensures that a Transmitter Proposal cannot be replaced after it has become an 'additional agreed Transmitter Proposal' by the passage of time.

Regulation 19(4) provides that where a replacement Transmitter Proposal is given to the SMA, the original proposal ceases to have effect if the licensee who gave the replacement Transmitter Proposal to the SMA was the only licensee who completed the original proposal.

Regulation 19(5) allows for the possibility that where an original proposal is completed by more than one licensee, one or more of those licensees may wish to replace the proposal. Regulation 19(5) provides that where the relevant original proposal was completed by more than one licensee, the original proposal will continue in force in relation to those licensees who completed the original proposal but did not give the replacement proposal to the SMA.

**Regulation 20 - Additional information relating to a replacement Transmitter Proposal given by a licensee**

Regulation 20(1) provides that the SMA may ask a licensee, in writing, for additional information for the purpose of evaluating a replacement Transmitter Proposal.

Regulation 20(2) provides that a licensee must comply with a request for information under regulation 10(2) within 14 days, if the licensee wishes to comply with the request.

Regulation 20(3) provides, as is the case with other Transmitter Proposals (regulation 18(3)), that if a licensee does not give information requested under regulation 20(1) to the SMA within 14 days, the replacement Transmitter Proposal to which the information relates will cease to have effect, unless the relevant Transmitter Proposal is an additional agreed Transmitter Proposal'.

**Regulation 21 - Distribution of Transmitter Proposals and information given by a licensee**
Regulation 21(1) requires the SMA, as soon as practicable after it is given a Transmitter Proposal or replacement Transmitter Proposal, to distribute the proposal to all licensees in the relevant group and area who did not complete the proposal.

Regulation 21(2) requires the SMA to give, as soon as practicable, a copy of a Transmitter Proposal to a licensee in the group and area who becomes a licensee after the Transmitter Proposal was given to the SMA. This would occur where a licence is issued for a channel in a group and area after licences have been issued for other channels in the group and area.

Regulation 21(3) requires the SMA to distribute, as soon as practicable, to all licensees in the relevant group and area, including any licensee who became a licensee after the information was given to the SMA, any supporting or additional information given to SMA at its request (under regulations 17(3), 18(2), or 20(2)).

**Regulation 22 - Giving the SMA a Transmitter Proposal as the result of conciliation**

Conciliation would be required if a Transmitter Proposal given to the SMA after licence issue involved 'disputed conduct' within the meaning of section 206 of the Act. This would be the case if the operation of the proposed transmitter(s) would cause interference above a level set by the Guidelines. Regulation 22 provides that if conciliation is required and the conciliator has been able to effect a settlement of the matter, any of the licensees for the group and area may give to the SMA a Transmitter Proposal that reflects the terms of the settlement.

**Regulation 23 - Written agreement with a Transmitter Proposal given by a licensee**

Regulation 23(1) provides that a licensee may tell the SMA in writing that it agrees with a Transmitter Proposal or a replacement Transmitter Proposal given to the licensee under regulation 17 or 19.

Regulation 23(2) - a licensee may not tell the SMA that it agrees with a Transmitter Proposal if it is the subject of conciliation. This is because the part of the scheme that provides for express or deemed agreement with a Transmitter Proposal that has been circulated is suspended once conciliation is required. If, following the issue of licences in a group and area, conciliation is required in relation to a Transmitter Proposal, the SMA will decide whether to vary the licence conditions on the basis of the outcome of the conciliation.

Regulation 23(3) provides that a licensee must not tell the SMA that it agrees with a Transmitter Proposal later than 3 months after the SMA gave it the proposal under regulation 11. (Regulation 24 provides that at the conclusion of that 3 month period, the licensee will be taken to agree with the Transmitter Proposal unless conciliation is required in relation to the placement of transmitters in the group and area.)

Regulation 23(4) requires the licensee to clearly identify, in a notice under regulation 23(1) to the SMA expressing its agreement with a Transmitter Proposal, the Transmitter Proposal it is agreeing with, and specifies how a notice under regulation 23 must be executed, depending on whether the Transmitter Proposal is completed by an individual, more than one person, a company, or a body that is neither an individual or a company.

Regulation 23(5) provides that the written agreement of a licensee to a Transmitter Proposal, under regulation 23(1), must have on it the licensee's original signature or other means of execution.

Regulation 23(6) provides that the agreement of a licensee to a Transmitter Proposal ceases to have effect if the proposal ceases to have effect. Note that if a licensee fails to
provide to the SMA, within 14 days, information requested under paragraph 18(1)(b) or regulation 20(2), the relevant Transmitter Proposal will not cease to have effect if it is an 'additional agreed Transmitter Proposal' (regulations 18(3) and 20(3)). Regulation 23(7) requires the SMA to distribute to all licensees in a group and area, including all persons who became licensees after the day on which agreement was given to the SMA, the written agreement of a licensee to a Transmitter Proposal.

**Regulation 24 - Agreement with a Transmitter Proposal given by a licensee by passage of time**

Regulation 24(1) provides that a licensee will be deemed to agree with a Transmitter Proposal, given to it by the SMA, on the 'approval day' if:

- the licensee does not, before the approval day, tell the SMA under regulation 23 that it agrees with the Transmitter Proposal; and
- the Transmitter Proposal has not ceased to have effect before the approval day, a Transmitter Proposal will only cease to have effect if the licensee fails to provide information requested by the SMA under paragraph 18(1)(b) or regulation 20(1) within the required 14 day period.

Regulation 24(2) provides that a licensee is not taken to have agreed with a relevant proposal if conciliation is required in respect of the relevant proposal before the 'approval day' - that is, if a technically incompatible Transmitter Proposal, as determined by the Guidelines, has been given to the SMA. This is because the intention is that the issue of whether the proposed transmitter(s) would cause interference will be dealt with at conciliation.

Regulations 24(3) and 24(4) specify when the 'approval day' occurs in relation to a Transmitter Proposal. The approval day will be the first day after 3 months has expired since the relevant Transmitter Proposal was given to the licensee, unless the SMA has requested further information (under paragraph 18(1)(b) or Regulation 20(1)) in relation to a Transmitter Proposal and that information has not been given to R by the licensee who gave it the proposal. If, at the end of the 3 month period after the Transmitter Proposal was given to the relevant licensee, the licensee who gave the Transmitter Proposal to the SMA has not provided further information requested by the SMA, the approval day will occur 36 days after the end of the 3 month period specified in regulation 24(3). The additional time period is for the SMA to: circulate the information to other licensees in the group and area; for them to consider that information; if they disagree with the Transmitter Proposal to which the information relates, to submit an alternative Transmitter Proposal, so requiring the issue to be dealt with at conciliation. The additional time period is also to allow the SMA sufficient time to request further information in relation to a Transmitter Proposal (if necessary), and to give the licensee an opportunity to comply with the request, before any other licensees can be taken to have agreed with the relevant Transmitter Proposal.

Regulation 24(5) provides that the agreement of a licensee ceases to have effect if the relevant Transmitter Proposal ceases to have effect. Note that if a licensee fails to provide to the SMA within 14 days information requested under paragraph 18(1)(b) or regulation 20(1), the relevant Transmitter Proposal will not cease to have effect if it is an 'additional agreed Transmitter Proposal' (regulations 18(3) and 20(3)).

Regulation 24(6) provides that the SMA must as soon as practicable inform, in writing, all other licensees in the group and area when a licensee is taken to have agreed with a Transmitter Proposal.
Regulation 25 - How does a Transmitter Proposal given by a licensee become an additional agreed Transmitter Proposal
Regulation 25(1) provides that if a licensee in a group and area gives a Transmitter Proposal, or a replacement Transmitter Proposal, and each of the licensees in the group and area either agree, or are taken to have agreed with a Transmitter Proposal under regulations 23 (express agreement) or 24 (agreement by passage of time), the relevant Transmitter Proposal becomes an 'additional agreed Transmitter Proposal' for the group and area.
Regulation 25(2) provides that if a licensee gives the SMA a Transmitter Proposal under regulation 22 as a result of conciliation, being a Transmitter Proposal that reflects the settlement of the disputed conduct reached at the conciliation, that Transmitter Proposal becomes an 'additional agreed Transmitter Proposal' for the relevant group and area on the day on which it is given to the SMA.

PART 5 - MISCELLANEOUS
Regulation 26 - Receipts
Regulation 26 requires the SMA to give a nominated applicant or licensee a receipt for any Transmitter Proposal or information given to the SMA by the nominated applicant or licensee.
SECTION 2

TECHNICAL REQUIREMENTS
INTRODUCTION

The information in this section supplements general technical information on the planning framework associated with Regional MDS contained in the Multipoint Distribution Station Information Memorandum (Regional Australia Transmitter Licence Allocations) of April 1995. This section is divided into five parts, Parts A to E. They contain the following information:

- **Part A - The MDS Guidelines**
  The MDS Guidelines have been made under S. 112 of the Radiocommunications Act for the purpose of imposing licence conditions relating to interference on Regional MDS licences. They include methods for calculating whether specific interference protection limits with respect to other services are met.

- **Part B - Information Paper: The Potential for Interference Between Regional MDS Services and Earth Stations of the Space Research Service**
  This part contains background information on the potential for interference between Regional MDS services and the Space Research service earth stations at Tidbinbilla, Parkes and Gnangara. The results of field trials conducted by the Department of Communications and the Arts are used to present information on the potential for interference from the Tidbinbilla earth station to Regional MDS receivers. Information on the potential for interference from the Gnangara earth station to Regional MDS receivers is also presented, based on calculations performed using the method at Part C in Section 2 of this handbook. Finally, Part B presents information on the potential for Regional MDS transmitters to cause interference to the Tidbinbilla and Parkes earth station receivers.

- **Part C - Assessing the Potential for Interference to Regional MDS receivers from Earth Station Transmitters**
  This part provides a method for assessing the potential for interference from the earth stations at Gnangara and Tidbinbilla to Group A Regional MDS receivers in the areas around Perth and Canberra.

- **Part D - RALI FX 9: Frequency Coordination of Fixed Links with MDS Services**
  This part provides procedures for the coordination of fixed links with Regional MDS services.

- **Part E - Location Maps: Fixed Links That May Affect Regional MDS Services**
  Two maps are provided, showing the location of existing fixed links with which Regional MDS services (Groups A and B) may require coordination (in accordance with Interference Assessments B and C of the Guidelines). The links shown lie within the bands 2030 - 2157 MHz and 2256 - 2420 MHz.
THE MDS GUIDELINES
RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995

- Dated 3 April 1995

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- PART 1
  PART 1 - PRELIMINARY

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- REG 1
  Citation

REG

1. These Guidelines may be cited as the Radiocommunications (Multipoint Distribution Station Licences - Regional Licences) Guidelines No. 1 of 1995.

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- REG 2
  Commencement

REG

2. These Guidelines come into force on 6 April 1995.

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- REG 3
  Interpretation

REG

3. (1) In these Guidelines, unless the contrary intention appears:
   "Act" means the Radiocommunications Act 1992;
   "AHD" means Australian Height Datum;
   "assessment area" in relation to an MDS transmitter in an area means the assessment area calculated in relation to that transmitter in accordance with Assessment A.3 or C of these Guidelines;
   "area" has the same meaning as in the Determination;
   "Coordination Handbook" means the Multipoint Distribution Station Coordination Handbook compiled by the SMA as in force on the date of commencement of these Guidelines;
   "Coordination Regulations" means the Radiocommunications (Coordination) Regulations;
   "Determination" means the Radiocommunications (Allocation of Multipoint
Distribution Station Licences – Regional Licences) Determination No. 1 of 1995;
   (i) determined by the SMA, under subsection 106 (1) of the Act on 4 April 1995; and
   (ii) as in force on the date of commencement of these Guidelines;
'EIRP' means equivalent isotropically radiated power;
"fixed link" means a communications link between stations in the fixed (point-to-point) service;
"group" has the same meaning as in the Coordination Regulations;
"MDS channel" means a channel in a group;
"MDS licence" means an Multipoint Distribution Station Licence within the meaning of the Radiocommunications (Definitions) Determination No. 2 of 1993 as in force on 6 April 1995.
"MDS receiver" means a multipoint distribution receiver within the meaning of the Radiocommunications Regulations;
"MDS transmitter" means:
   (i) a Multipoint Distribution Station within the meaning of the Radiocommunications Regulations; and
   (ii) a Multipoint Distribution Station repeater within the meaning of the Radiocommunications Regulations; and
   (iii) a station the operation of which is authorised by an MDS licence; and
   (iv) a station which is the subject of a Transmitter proposal that is in effect under the Coordination Regulations;
"nominated applicant" has the same meaning as in the Coordination Regulations;
"primary fixed link" means a fixed link operating with primary status in a frequency band adjacent to an MDS band, including a fixed link with channel centre frequency that is adjacent to an MDS band but with emission overlapping that MDS band;
"RALI FX3" means the Radiocommunications Assignment and Licensing Instruction of that name compiled by the SMA as in force on the date of commencement of these Guidelines;
"Schedule" means a Schedule to these Guidelines;
"secondary fixed link" means a fixed link with secondary status operating in, or adjacent to an MDS channel;
"Spectrum Plan" means the Radiocommunications – Australian Spectrum Plan;
"transmitter proposal" has the same meaning as in the Coordination Regulations.

(2) For the purposes of these Guidelines:
   (a) MDS channels are taken to be adjacent if their centre frequencies are separated by 7 MHz; and
   (b) MDS transmitters are 'co-sited' with each other if they can be encompassed within a circle having a radius of 500 metres

(3) A reference in these Guidelines to an assessment is a reference to an assessment of that letter set out in Schedule 1.
(NOTE. In the assessments at Schedule 1 of these Guidelines, the calculation of certain values may be required. What is being calculated in each case is as follows:

(a) received power - the received power from an MDS transmitter at the output of an earth station receiver's antenna into the receiver's low noise amplifier; and

(b) received noise power - received noise power in the band 2290 - 2300 MHz from an MDS transmitter at the output of an earth station receiver's antenna into that receiver's low noise amplifier; and

(c) unwanted field strength - the field strength from any unwanted transmitter at a point on an MDS licence area or assessment area boundary; and

(d) unwanted power - the power from an MDS transmitter at the output of a fixed link receiver's antenna; and

(e) wanted power - the power from a fixed link transmitter at the antenna output of a fixed link receiver in the same system.)

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995 - PART 2

PART 2 - GUIDELINES

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995 - REG 4

MDS Emissions

REG

4. Subject to the Act and these Guidelines, where exercising its power:

(a) under section 107 of the Act to impose a condition on an MDS licence;
or

(b) under section 111 of the Act to impose a further condition on, or to vary a condition of, an MDS licence;

the SMA must exercise the power for the purpose of ensuring that radiated power from an MDS transmit antenna to be operated under an MDS licence at angles of elevation of 5 degrees or more above the horizontal plane does not exceed the following EIRP limits:

(c) 100 Watts at 5 degrees, decreasing linearly to 31.6 Watts at 10 degrees;

and

(d) 31.6 Watts between 10 degrees and 15 degrees; and

(e) 31.6 Watts at 15 degrees, decreasing linearly to 10 Watts at 20 degrees;

and

(f) 10 Watts between 20 degrees and 90 degrees.
RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- REG 5

REG
5. Subject to the Act, where exercising its power:
(a) under section 107 of the Act to impose a condition on an MDS licence;
or
(b) under section 111 of the Act to impose a further condition on, or to vary a condition of, an MDS licence;
the SMA must exercise the power for the purpose of ensuring that the relative transmission power of an MDS transmitter to be operated under an MDS licence at any frequency does not exceed that shown in the following diagram.

![TRANSMISSION MASK (EMISSION LIMITS)](image)

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- REG 6
Spurious emissions

REG
6. Subject to the Act and these Guidelines, where exercising its power:
(a) under section 107 of the Act to impose a condition on an MDS licence;
or
(b) under section 111 of the Act to impose a further condition on, or to vary a condition of, an MDS licence;
the SMA must exercise the power for the purpose of ensuring that the
level of
any discrete spurious emissions from an MDS transmitter to be operated
under
an MDS licence (including any due to intermodulation products) will be
greater
than 60dB below its maximum EIRP.

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES -
REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- REG 7
Unwanted emissions

REG
7. Subject to the Act and these Guidelines, where exercising its
power:
(a) under section 107 of the Act to impose a condition on an MDS
licence;
or
(b) under section 111 of the Act to impose a further condition on,
or to
vary a condition of, an MDS licence;
the SMA must exercise the power for the purpose of ensuring that the
unwanted
emissions at the output of any Group B MDS transmitter to be operated
under an
MDS licence will not exceed the following levels in the band 2290 -
2300 MHz
in a 1 kHz bandwidth:

<table>
<thead>
<tr>
<th>Unwanted emissions (dBm in a 1 kHz bandwidth)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel 6</td>
</tr>
<tr>
<td>Transmitters</td>
</tr>
<tr>
<td>Pt-56.25</td>
</tr>
</tbody>
</table>

where Pt = the maximum average power supplied to the antenna
transmission line
by the MDS transmitter (dBm)

(NOTE. The above requirement arises from a need to protect space
services in
the adjacent band 2290 - 2300 MHz. Accordingly it only applies to
Group B and
not to Group A transmitters.)

(NOTE. There are no constraints on the polarisation of MDS transmitter
antennas. Under regional MDS there is no distinction between
transmitters and
repeaters. The interference assessments of these Guidelines make no
allowance
for polarisation discrimination. Guidelines 17 and 18 allow for
licence
conditions to be imposed which would result in those protection
requirements
being exceeded, provided the affected licensees agree. Polarisation
discrimination is one factor that may contribute to gaining such
agreement.)

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES -
REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- REG 8
Interference to MDS, fixed link and earth station receivers

REG
8. Subject to the Act if, in the opinion of the SMA, the operation
of an MDS
transmitter in accordance with the conditions of an MDS licence,
including
conditions imposed in accordance with these Guidelines, results in
interference:
(a) to an MDS receiver in the same channel in another area; or
(b) to an MDS receiver in an adjacent channel in another area; or
(c) to an MDS receiver in an adjacent channel in the same area,
where that
receiver lies within the assessment area of that adjacent channel
transmitter;
or
(d) to a primary fixed link receiver existing when the MDS licence
to
operate the MDS transmitter was issued; or
(e) to an earth station receiver;
then in exercising its power:
(f) under section 107 of the Act to impose a condition on an MDS
licence;
or
(g) under section 111 of the Act to impose a further condition on,
or to
vary a condition of, an MDS licence;
the SMA must exercise the power for the purpose of ensuring that the
interference is no longer caused.

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES -
REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- REG 9
Site based Interference

REG
9. Subject to the Act if, in the opinion of the SMA, the operation
of a
number of co-sited MDS transmitters in accordance with licence
conditions,
including licence conditions imposed in accordance with these
Guidelines,
results in interference to radiocommunications receivers of other
services
operating in the same or any other frequency band, through mechanisms
such as
intermodulation, receiver overload or receiver blocking, then:
(a) in exercising its power under section 107 of the Act to impose a
condition on an MDS licence; or
(b) its power under section 111 of the Act to impose a further
condition on,
or to vary a condition of an MDS licence;
the SMA must exercise the power for the purpose of ensuring that the
interference no longer results from the operation of those
transmitters.
(Note. The likelihood of such interference is increased when an MDS
transmitter is sited in close proximity to those other
radiocommunications
receivers. Licensees should be encouraged to consider these
interference
mechanisms in selecting sites for their MDS transmitters, and to take
all
reasonable steps to avoid interference to closely sited receivers.)
REG 10. In varying conditions in accordance with Guideline 9, the SMA must have regard to:
   (a) the primary or secondary status of the services; and
   (b) the selectivity characteristics of the relevant receivers; and
   (c) the emission characteristics of the relevant transmitters; and
   (d) the nature of any alterations or additions to equipment that might be required as the result of any alternative conditions that might be applied; and
   (e) the cost of such alterations or additions; and
   (f) any other relevant factor.

REG 11. Subject to the Act and these Guidelines if, in the opinion of the SMA, the operation of a number of co-sited MDS transmitters in accordance with licence conditions, including licence conditions imposed in accordance with these Guidelines, results in intermodulation interference to an earth station receiver, then:
   (a) in exercising its power under section 107 of the Act to impose a condition on an MDS licence; or
   (b) its power under section 111 of the Act to impose a further condition on, or to vary a condition of an MDS licence; the SMA must exercise the power for the purpose of ensuring that the interference no longer results from the operation of those transmitters.

   (NOTE. Intermodulation products arising from the operation of a number of co-sited MDS transmitters may have the potential to cause interference to the earth station receivers of space services located at some distance from these sites. It is in MDS licensees' interests to apply good site engineering practices in order to minimise the generation of these products.)

REG 12. SMA must impose or vary conditions in accordance with Transmitter Proposals.
12. Subject to the Act and these Guidelines, where all nominated applicants for licences in a group and area have agreed, or are taken to have agreed, under the Coordination Regulations to a transmitter proposal that is in force, then:
   (a) in exercising its power under section 107 of the Act to impose a condition on an MDS licence; or
   (b) its power under section 111 of the Act to impose a further condition on, or to vary a condition of an MDS licence; the SMA must, in exercising the power, have regard only to the transmitter proposal.

REG 13. If the service to be provided under an MDS licence is not based upon a PAL B video transmission format and the Reference Receiving system as specified in the Coordination Handbook, the SMA may impose or vary the conditions of any licence issued by the SMA under the Act, including an MDS licence, without regard to these Guidelines, other than Guidelines 4, 6 and 7.

REG 14. Subject to the Act and the Guidelines if, in the opinion of the SMA, a transmitter operated in accordance with an MDS licence with conditions imposed so as to give effect to a transmitter proposal would not meet the protection requirements in relation to:
   (a) a co-channel MDS receiver in another licence area (calculated as set out in steps 1 - 4 of Assessment A.1); or
   (b) an adjacent channel MDS receiver in another licence area (calculated as set out in steps 1 - 4 of Assessment A.2); or
   (c) an adjacent channel MDS receiver in the same licence area as the transmitter (calculated as set out in steps 1 - 4 of Assessment A.3); or
   (d) a primary fixed link receiver (calculated as set out in steps 1 - 4 of Assessment B); or
   (e) earth station receivers located at Parkes and Tidbinbilla (see Assessment D); then:
(f) in exercising its power under section 107 of the Act to impose a condition on an MDS licence; or
(g) its power under section 111 of the Act to impose a further condition on, or to vary a condition of an MDS licence;
the SMA must exercise the power for the purpose of ensuring that the relevant protection requirement is not exceeded.

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995 - REG 15

REG
15. Subject to the Act and these Guidelines if, in the opinion of the SMA, a transmitter operated in accordance with an MDS licence with conditions imposed so as to give effect to a transmitter proposal would not meet the protection requirements in relation to secondary fixed links (calculated as set out in steps 1 - 4 of Assessment B), then:
(a) in exercising its power under section 107 of the Act to impose a condition on a licence; or
(b) its power under section 111 of the Act to impose a further condition on, or to vary a condition of a licence;
the SMA must:
(c) in the case of an MDS licence - not have regard to the failure of the transmitter to meet those protection requirements; and
(d) in the case of a licence for a secondary fixed link service - have regard to clause 7 of the Spectrum Plan.

NOTE. clause 7 of the Spectrum Plan provides, amongst other things, that a station of a secondary service must not cause harmful interference to stations of a primary service. Secondary fixed link licences should already be subject to the condition that the service cannot claim protection from, or cause interference to, services of a primary status. Secondary fixed link receivers cannot claim protection from interference from an MDS transmitter. The licensee of the secondary fixed link should be advised by the SMA of the potential for interference.)

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995 - REG 16

REG
16. (1) Subject to the Act and these Guidelines if, in the opinion of the SMA, a transmitter operated in accordance with an MDS licence with conditions
imposed so as to give effect to a transmitter proposal would not meet the protection requirements in relation to fixed links (calculated as set out in steps 1 - 4 of Assessment C) then:
(a) in exercising its power under section 107 of the Act to impose a condition on a licence authorising the operation of a primary fixed link; or
(b) its power under section 111 of the Act to impose a further condition on, or to vary a condition of a licence authorising the operation of a primary fixed link; the SMA must not have regard to that interference. (NOTE. MDS licensees should be aware that they cannot claim protection from interference from existing primary fixed link transmitters.)

(2). Subject to the Act and these Guidelines if, in the opinion of the SMA, a transmitter operated in accordance with an MDS licence with conditions imposed so as to give effect to a transmitter proposal would not meet the protection requirements in relation to fixed links (calculated as set out in steps 1 - 4 of Assessment C) then:
(a) in exercising its power under section 107 of the Act to impose a condition on a licence authorising the operation of a secondary fixed link; or
(b) its power under section 111 of the Act to impose a further condition on, or to vary a condition of a licence authorising the operation of a secondary fixed link; the SMA must have regard to clause 7 of the Spectrum Plan. (NOTE. clause 7 of the Spectrum Plan provides, amongst other things, that a station of a secondary service must not cause harmful interference to stations of a primary service. Secondary fixed link licences should already be subject to the condition that the service cannot claim protection from, or cause interference to, services of a primary status. Secondary fixed link receivers cannot claim protection from interference from an MDS transmitter. The licensee of the secondary fixed link should be advised by the SMA of the potential for interference.)

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995 - REG 17
Licence conditions with agreement of all affected parties

REG 17. Subject to Guideline 18, the SMA may impose or vary the conditions of
any licence issued by the SMA under the Act, including an MDS licence, without regard to the other provisions of these Guidelines, other than Guidelines 4, 6 and 7.

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- REG 18

REG 18. The SMA may only impose or vary conditions under Guideline 17 if the holders of all licences whose services, in the opinion of the SMA, may be affected by the operation of an MDS or other transmitter in accordance with such conditions have agreed, in writing, to those conditions being so imposed or varied.

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- REG 19
Licence conditions following conciliation

REG 19. Subject to the Act and these Guidelines, where:
(a) conciliation is required in relation to a group and area within the meaning of the Coordination Regulations; and
(b) a matter has been referred to a conciliator under Division 2 of Part 4.3 of the Act and
(c) the conciliator has effected a settlement of the matter; then:
(d) in exercising its power under section 107 of the Act to impose a condition on an MDS licence; or
(e) its power under section 111 of the Act to impose a further condition on, or to vary a condition of an MDS licence; the SMA must give effect to the terms of that settlement.

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- REG 20

REG 20. Subject to the Act, where:
(a) conciliation is required in relation to a group and area within the meaning of the Coordination Regulations; and
(b) a matter has been referred to a conciliator under Division 2 of Part 4.3 of the Act and
(c) the conciliator:
(i) decided not to inquire into, or not to continue to inquire into, conduct to which the matter relates; or
(ii) cannot effect a settlement of the matter;
   then:
   (d) in exercising its power under section 107 of the Act to impose a
   condition on an MDS licence; or
   (e) its power under section 111 of the Act to impose a further
   condition on,
   or to vary a condition of an MDS licence;
   the SMA may have regard to the following:
   (f) the recommendation of the conciliator in relation to the matter,
   if any;
   and
   (g) any transmitter proposals that have been sent to the SMA in
   respect of
   licences in the group and area to which the matter relates; and
   (h) the bid prices paid by each nominated applicant for licences in
   the
   group and area to which the matter relates; and
   (i) the number of licences held by each nominated applicant for
   licences in
   the group and area to which the matter relates; and
   (j) the extent to which, in the opinion of the SMA, the interests of
   each
   nominated applicant for licences in the group and area to which the
   matter
   relates are likely to be substantially adversely affected by the
   imposition or
   variation of licence conditions; and
   (k) the terms and conditions upon which each nominated applicant for
   licences in the group and area to which the matter relates would be
   able to
   obtain access to transmitter sites;
   and must have regard to any other relevant factor.

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES -
REGIONAL LICENCES) GUIDELINES No. 1 of 1995
- SCHEDULE 1

SCH

SCHEDULE 1               Subclause 3(1)
ASSESSMENT

ASSESSMENT A - MDS TRANSMITTER TO MDS RECEIVER

PURPOSE OF ASSESSMENT OF INTERFERENCE FROM MDS TRANSMITTER TO MDS
RECEIVER

The assessments A.1, A.2 and A.3 below specify how to assess the
potential for interference from an MDS transmitter to co-channel or
adjacent channel MDS receivers for the purposes of Guidelines 14(a),
(b) and (c).

A.1 MDS TRANSMITTER TO CO-CHANNEL MDS RECEIVERS IN OTHER LICENCE
AREAS

A.1.1. This assessment (A.1) is intended to lead, where necessary, to
the imposition of a licence condition aimed at ensuring that the field
strength from an MDS transmitter does not exceed 32 dBuV/m in any
other co-channel licensee's MDS licence area.

Step 1: Identifying if an Interference Assessment is Necessary

A.1.2. The following information is needed to decide if an
interference assessment must be carried out:

   Information provided by MDS Licensee
   - MDS transmitter location
   - MDS transmitter channel
   Information provided by the SMA
   - MDS licence area boundaries

(Note. Details of the MDS licence area boundaries are contained in
A.1.3. An assessment of the potential for interference from an MDS transmitter to another MDS licence area is necessary if the MDS transmitter is to be located within a distance 'D' of another MDS licence area. The distance 'D' is determined from the height of the transmitting antenna of the MDS transmitter above average ground level and is indicated in the following table.

<table>
<thead>
<tr>
<th>Height of Transmitting Antenna above Average Ground Level, Ht* (m)</th>
<th>D (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ht37.5</td>
<td>65</td>
</tr>
<tr>
<td>37.5t75</td>
<td>75</td>
</tr>
<tr>
<td>75t150</td>
<td>90</td>
</tr>
<tr>
<td>150t300</td>
<td>110</td>
</tr>
<tr>
<td>300t600</td>
<td>135</td>
</tr>
<tr>
<td>600t1200</td>
<td>175</td>
</tr>
</tbody>
</table>

* Ht: the height of the MDS transmitting antenna above the average level of the ground between distances of 3 and 15 km from the transmitter in the direction of the nearest point on the boundary of another MDS licence area (see CCIR Rec 370-5).

(NOTE. Distances for MDS transmitters with heights of transmitting antennas greater than 1200 m above average ground level will be provided by the Customer Services Group of the SMA, if required.)

(NOTE. CCIR Recommendations are available from the Standards Australia International Sales Group, Strathfield NSW.)

A.1.4. If an interference assessment is necessary, the assessment will comprise the following Steps 2, 3 and 4.

Step 2: Calculating Terrain Loss

A.1.5. The following information is needed to complete this calculation:

- Information provided by MDS licensee
  - MDS transmitter location, site height and antenna height
  - terrain profiles between the MDS transmitter and the point on the boundary of each other licence area identified at Step 1, that is nearest to the MDS transmitter

- Information provided by the SMA
  - MDS licence area boundaries
  - nominal MDS receiver antenna height = 10m

(NOTE. Details of the MDS licence area boundaries are contained in Schedule 1 to the Radiocommunications (Allocation of Multipoint Distribution Station Licences - Regional Licences) Determination No. 1 of 1995.)

A.1.6. Using the method detailed at Schedule 2, calculate the terrain loss between the MDS transmitter and the point on the boundary of each other licence area identified at Step 1, that is nearest to the MDS transmitter.

(NOTE. If the protection criteria of Assessment A.1.10 are satisfied when a terrain loss value of Lt = 0 dB is used in the equation at Assessment A.1.8. then calculation of an actual value for Lt is not required.)

Step 3: Calculating Received Signal Levels

A.1.7. The following information is needed for this calculation:

- Information provided by MDS licensee
  - MDS transmitter power and antenna gain in the direction of the point on the boundary of each other licence area, identified at Step 1, that is nearest to the MDS transmitter
  - terrain loss (as calculated at Step 2)

- Information provided by the SMA
  - none

A.1.8. The unwanted field strength is then calculated at the point on the boundary of each other MDS licence area identified at Step 1, that is nearest to the MDS transmitter. The following equation is used for
this calculation:

\[ Eu = 44.77 - 20 \log(d) + Pt + Gt - Lt \]

where:
- \( Eu \) = unwanted field strength at the point (dBuV/m)
- \( d \) = distance between the MDS transmitter and the point on the boundary of each other licence area identified at Step 1, that is nearest to the MDS transmitter (km)
- \( Pt \) = MDS transmitter power (dBm)
- \( Gt \) = gain of the MDS transmitter antenna in the direction of the point on the boundary of each other licence area identified at Step 1, that is nearest to the MDS transmitter (dBi)
- \( Lt \) = terrain loss as calculated at Step 2 (dB)

Step 4: Assessing Received Signal Levels Against Protection Requirements

A.1.9. The following information is needed for this assessment:
- Information provided by MDS licensee
  - unwanted field strength (as calculated at Step 3)
- Information provided by the SMA
  - maximum permissible unwanted field strength in a co channel MDS licence area (see below).

A.1.10. An MDS transmitter will meet the protection requirements for co-channel MDS licence areas if:

\[ Eu \leq Em \]

where:
- \( Eu \) = unwanted field strength at the point on the boundary of each other licence area identified at Step 1, that is nearest the MDS transmitter (as calculated at Step 3) (dBuV/m)
- \( Em \) = 32 dBuV/m, the maximum permissible unwanted field strength in a co-channel MDS licence area

(NOTE. The results of Assessment A.1 may lead to the imposition or variation of licence conditions (see Guideline 14(a)).)

A.2. MDS TRANSMITTER TO ADJACENT CHANNEL MDS RECEIVERS IN OTHER LICENCE AREAS

A.2.1. This assessment (A.2) is intended to lead, where necessary, to the imposition of a licence condition aimed at ensuring that the field strength from an MDS transmitter does not exceed 76 dBuV/m in any other MDS licence area where transmitters are licensed to operate on adjacent MDS channels.

Step 1: Identifying if an Interference Assessment is Necessary

A.2.2. The following information is needed to decide if an interference assessment must be carried out:
- Information provided by MDS Licensee
  - MDS transmitter location
  - MDS transmitter channel
- Information provided by the SMA
  - MDS licence area boundaries

(NOTE. Details of the MDS licence area boundaries are contained in Schedule 1 to the Radiocommunications (Allocation of Multipoint Distribution Station Licences – Regional Licences) Determination No. 1 of 1995.)

A.2.3. An assessment of the potential for interference from an MDS transmitter to another MDS licence area is necessary if the MDS transmitter is to be located within a distance 'D' of another licence area in which an MDS service is on an adjacent channel. The distance 'D' is determined from the EIRP of the MDS transmitter and is indicated in the following table:

<table>
<thead>
<tr>
<th>EIRP* (dBm)</th>
<th>D (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>53</td>
<td>15</td>
</tr>
<tr>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>63</td>
<td>40</td>
</tr>
<tr>
<td>70</td>
<td>90</td>
</tr>
</tbody>
</table>

*EIRP: the EIRP of the MDS transmitter
Step 2: Calculating Terrain Loss
A.2.4. The following information is needed to complete this calculation:

- Information provided by MDS licensee
  - MDS transmitter location, site height and antenna height
  - Terrain profiles between the MDS transmitter and the point on the boundary of each other licence area identified at Step 1, that is nearest to the MDS transmitter

- Information provided by the SMA
  - MDS licence area boundaries
  - Nominal MDS receiver antenna height = 10m

(Note. Details of the MDS licence area boundaries are contained in Schedule 1 to the Radiocommunications (Allocation of Multipoint Distribution Station Licences - Regional Licences) Determination No. 1 of 1995.)

A.2.5. Using the method detailed at Schedule 2, calculate the terrain loss between the MDS transmitter and the point on the boundary of each other licence area identified at Step 1, that is nearest the MDS transmitter.

Step 3: Calculating Received Signal Levels
A.2.6. The following information is needed for this calculation:

- Information provided by MDS licensee
  - MDS transmitter power and antenna gain in the direction of the point on the boundary of each other licence area identified at Step 1, that is nearest to the MDS transmitter.
  - Terrain loss (as calculated at Step 2)

- Information provided by the SMA
  - None

A.2.7. The unwanted field strength is then calculated at the point on the boundary of each other MDS licence area identified at Step 1, that is nearest to the MDS transmitter. The following equation is used for this calculation:

$$ Eu = 44.77 - 20 \log(d) + Pt + Gt - Lt $$

Where:

- $ Eu $ = unwanted field strength at the point (dBuV/m)
- $ d $ = distance between the MDS transmitter and the point on the boundary of each other licence area identified at Step 1, that is nearest the MDS transmitter (km)
- $ Pt $ = MDS transmitter power (dBm)
- $ Gt $ = gain of the MDS transmitter antenna in the direction of the point on the boundary of each other licence area identified at Step 1, that is nearest to the MDS transmitter (dBi)
- $ Lt $ = terrain loss (as calculated at Step 2) (dB)

Step 4: Assessing Received Signal Levels Against Protection Requirements
A.2.8. The following information is needed for this assessment:

- Unwanted field strength (as calculated at Step 3)

- Information provided by the SMA
  - Maximum permissible unwanted field strength in each other licence area which licensees are on adjacent channels identified at Step 1 (see below)

A.2.9. An MDS transmitter will meet the protection requirements for adjacent channels in another licence area if:

$$ Eu < Em $$

Where:

- $ Eu $ = unwanted field strength at the point on the boundary of each other licence area identified at Step 1, that is nearest to the MDS transmitter (as calculated at Step 3) (dBuV/m)
- $ Em = 76 $ dBuV/m, the maximum permissible unwanted field strength in other licence areas in which services are on adjacent channels

(Note. The results of Assessment A.2 may lead to the imposition or variation of licence conditions (see Guideline 14(b)).)

A.3 MDS TRANSMITTER TO ADJACENT CHANNEL MDS RECEIVERS IN THE SAME
LICENCE AREA
A.3.1. This assessment (A.3) specifies how to assess the potential for interference from an MDS transmitter to a notional adjacent channel MDS receiver lying within a defined area (called an assessment area) around an adjacent channel MDS transmitter operating in the same licence area.
A.3.2. The assessment is intended to lead to the imposition, where necessary, of a licence condition aimed at ensuring that the field strength from an MDS transmitter will not exceed 76 dBuV/m in the assessment area around any adjacent channel transmitter operating in the same licence area.

Step 1: Identifying if an Interference Assessment is Necessary
A.3.3. The following information is needed to identify if an interference assessment must be carried out:
   Information provided by MDS Licensee
   - MDS transmitter location
   - MDS transmitter channel
   (NOTE. The location and channel of the MDS transmitter are required because the notional MDS receiver for which this assessment (A.3.) may be required is deemed to be lying within the assessment area around that MDS transmitter. The assessment area is bounded by a circle of radius R kilometres from the MDS transmitter. The radius R is derived from the transmitter height and EIRP, and is calculated in accordance with Schedule 3. See also A.3.9. below.)
   Information provided by the SMA
   - location of existing adjacent channel MDS transmitters within the same licence area
   (NOTE. Information on the location of licensed MDS transmitters is held by the Spectrum Management Agency.)
A.3.4. It is not necessary to carry out the adjacent channel interference assessment in this section in relation to a transmitter and another MDS transmitter in the same licence area, if the MDS transmitters are 'co-sited'.
   (NOTE. Transmitters are taken to be co-sited with each other if they can be encompassed within a circle having a radius of 500 metres (see Guideline 3(2).)
A.3.5. An assessment of the potential for interference must be carried out if:
   (a) the MDS transmitters are not co-sited (see Guideline 3(2)); and
   (b) an MDS transmitter is to be located within a distance 'D' of an adjacent channel MDS transmitter operating in the same MDS licence area.
A.3.6. The distance 'D' referred to in A.3.5.(b) above is determined from the EIRP of the MDS transmitter and is indicated in the table below.

<table>
<thead>
<tr>
<th>EIRP* (dBm)</th>
<th>D (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>155</td>
</tr>
<tr>
<td>53</td>
<td>160</td>
</tr>
<tr>
<td>60</td>
<td>175</td>
</tr>
<tr>
<td>63</td>
<td>185</td>
</tr>
<tr>
<td>70</td>
<td>235</td>
</tr>
</tbody>
</table>

* EIRP: the EIRP of the MDS transmitter

Step 2: Calculating Terrain Loss
A.3.7. The following information is needed to complete this calculation:
   Information provided by MDS licensee
   - MDS transmitter location, site height and antenna height
   - terrain profiles between the MDS transmitter and the point nearest the MDS transmitter, in each assessment area around adjacent channel MDS transmitters identified at Step 1.
   (NOTE. For the purpose of this assessment, the point described above represents the location of the antenna of a notional MDS receiver, with nominal antenna height as specified below.)
Information provided by the SMA
- MDS licence area boundaries
- nominal MDS receiver antenna height = 10m
- location of existing adjacent channel MDS transmitters within the same licence area

(NOTE. Details of the MDS licence area boundaries are contained in Schedule 1 to the Radiocommunications (Allocation of Multipoint Distribution Station Licences - Regional Licences) Determination No. 1 of 1995. Details of the location of existing adjacent channel MDS transmitters are held by the SMA.)

A.3.8. The assessment area for an MDS transmitter is the area bounded by a circle of radius R kilometres from each of the adjacent channel MDS transmitters identified at Step 1. R is calculated using Schedule 3.

A.3.9. Using the method detailed at Schedule 2, calculate the terrain loss between the MDS transmitter and the nearest point on the boundary of the assessment area for each adjacent channel transmitter identified at Step 1.

(NOTE. If the protection criteria of Assessment A.3.13. are satisfied when a terrain loss value of Lt = 0 dB is used in the equation at Assessment A.3.11 then calculation of an actual value for Lt is not required.)

Step 3: Calculating Received Signal Levels

A.3.10. The following information is needed for this calculation:
- Information provided by MDS licensee
  - MDS transmitter power and antenna gain in the direction of the nearest point on the boundary of the assessment area for each adjacent channel transmitter.
  - terrain loss (as calculated at Step 2)
- Information provided by the SMA
  - none

A.3.11. The unwanted field strength is then calculated at the nearest point on the boundary of the assessment area for each adjacent channel transmitter. The following equation is used for this calculation:

\[ Eu = 44.77 - 20 \log(d) + Pt + Gt - Lt \]

where:
- \( Eu \) = unwanted field strength at a point in the assessment area around an adjacent channel transmitter (dBuV/m)
- \( d \) = distance between the MDS transmitter and the nearest point on the boundary of the assessment area around an adjacent channel transmitter (km)
- \( Pt \) = MDS transmitter power (dBm)
- \( Gt \) = gain of the MDS transmitter antenna in the direction of the nearest point on the boundary of the assessment area for an adjacent channel transmitter (dBi)
- \( Lt \) = terrain loss (as calculated at Step 2) (dB)

Step 4: Assessing Received Signal Levels Against Protection Requirements

A.3.12. The following information is needed for this assessment:
- Information provided by MDS licensee
  - unwanted field strength (as calculated at Step 3)
  - maximum permissible unwanted field strength in the assessment area for each adjacent channel transmitter in the same licence area (see below)

A.3.13. An MDS transmitter will meet the protection requirements for adjacent channels in the same MDS licence area if:

\[ Eu < Em \]

where:
- \( Eu \) = unwanted field strength at the nearest point on the boundary of the assessment area for each adjacent channel transmitter (as calculated at Step 3) (dBuV/m)
- \( Em = 76 \) dBuV/m, the maximum permissible unwanted field strength in
the assessment area around an adjacent channel transmitter in the same licence area. (NOTE. The results of Assessment A.3 may lead to the imposition or variation of licence conditions (see Guideline 14(c)).)

ASSESSMENT B MDS TRANSMITTER TO FIXED LINK RECEIVER
PURPOSE OF ASSESSMENT OF INTERFERENCE FROM MDS TRANSMITTER TO FIXED LINK RECEIVER
This Assessment B specifies how to assess the potential for interference from a proposed MDS transmitter to a primary or secondary fixed link receiver for the purposes of Guideline 14(d).

(NOTE. The references in steps 1 to 4 below to 'fixed link' receivers are to both primary and secondary fixed link receivers.)
The assessment is intended to lead, where necessary, to the imposition of a licence condition aimed at ensuring that the unwanted power from an MDS transmitter does not exceed a particular value at any primary fixed link receiver operating in a particular frequency band.

Step 1: Identifying if an Interference Assessment is Necessary
B.1. The following information is needed to decide if an interference assessment must be carried out:
Information provided by MDS Licensee
- MDS transmitter location
- MDS transmitter frequency
Information provided by the SMA
- location and frequency of fixed links

(NOTE. Details of the location of existing fixed links are held by the SMA.)
B.2. An assessment of the potential for interference from a proposed MDS transmitter to a fixed link receiver is necessary if the proposed MDS transmitter is located within 200 km of the fixed link receiver and the receiver is licensed to operate in the frequency range:
- 2030 - 2157 MHz for Group A MDS channels; or
- 2256 - 2420 MHz for Group B MDS channels.
B.3. If an assessment is necessary, the assessment will comprise the following steps 2 to 4.

Step 2: Calculating Propagation Loss
B.4. The following information is needed to complete this calculation:
Information provided by MDS licensee
- proposed MDS transmitter location, site height and antenna height
- fixed link transmitter and receiver site heights (found by knowing fixed link location)
- terrain profile between the proposed MDS transmitter and fixed link receiver of the fixed link under assessment
- terrain profile between the fixed link transmitter and fixed link receiver of the fixed link under assessment
Information provided by the SMA
- fixed link transmitter location and antenna height
- fixed link receiver location and antenna height

(NOTE. The details of the locations and of some antenna heights of fixed link transmitters and fixed link receivers are held by the Spectrum Management Agency. If not, details of the antenna height of the link under consideration must be sought from the fixed link licensee.)
B.5. Using the method detailed at Schedule 2, propagation loss between antennas is to be calculated for:
(a) the fixed link receiver under assessment and the associated fixed link transmitter; and
(b) the proposed MDS transmitter and the fixed link receiver under assessment.

Step 3: Calculating Received Signal Levels
B.6.1. Calculating Wanted Power (at the fixed link receiver)
B.6.1.1. The following information is needed for this calculation:
Information provided by MDS licensee
- propagation loss between antennas calculated for the fixed link
receiver under assessment and the associated fixed link transmitter (see Step 2, para. B.5.(a))

Information provided by the SMA
- fixed link transmitter power and antenna gain
- fixed link receiver antenna gain

B.6.1.2. The wanted power (at the fixed link receiver) is then calculated using the following equation:

\[ P_w = P_t + G_t - L_b + G_r \]

where:
- \( P_w \) = wanted power (dBm)
- \( P_t \) = fixed link transmitter power (dBm)
- \( G_t \) = gain of the fixed link transmitter antenna in the direction of the fixed link receiver (dBi)
- \( L_b \) = propagation loss (as calculated at Step 2) (dB)
- \( G_r \) = gain of the fixed link receiver antenna in the direction of the fixed link transmitter (dBi)

*(NOTE. If either the transmitter power or the antenna gain of the link under consideration is not held by the Spectrum Management Agency, the value of the EIRP held by the Spectrum Management Agency in respect of the link may be used in lieu of the combined value of \( P_t + G_t \). If no value of the EIRP in respect of the link is held by the Spectrum Management Agency, then the values of \( P_t \) and \( G_t \) must be sought from the fixed link licensee.)*

B.6.2 Calculating Unwanted Power (at the fixed link receiver)

B.6.2.1. The following information is needed for this calculation:

Information provided by MDS licensee
- propagation loss between antennas for the proposed MDS transmitter and the fixed link receiver under assessment (see Step 2, para B.5.(b))
- proposed MDS transmitter power and antenna radiation pattern

Information provided by the SMA
- fixed link receiver antenna radiation pattern

B.6.2.2. The unwanted power (at the fixed link receiver) is then calculated using the following equation:

\[ P_u = P_t + G_{tf} - L_b + G_{rm} \]

where:
- \( P_u \) = unwanted power (dBm)
- \( P_t \) = proposed MDS transmitter power (dBm)
- \( G_{tf} \) = gain of the proposed MDS transmitter antenna in the direction of the fixed link receiver (dBi)
- \( L_b \) = propagation loss between antennas for the proposed MDS transmitter and the fixed link receiver under assessment (see Step 2, para B.5.(b)) (dB)
- \( G_{rm} \) = gain of the fixed link receiver antenna in the direction of the proposed MDS transmitter (dBi)

*(NOTE. Details of the boresight gain are generally held by the SMA. This gain value should then be de-rated in accordance with the 2.1 GHz Fixed Link Notional Antenna Radiation Pattern at Schedule 4, to find the off-axis gain (\( G_{rm} \)) in the relevant direction. If the boresight gain for the fixed link receive antenna is not held by the Spectrum Management Agency, the value must be sought from the fixed link licensee.)*

Step 4: Assessing Receive Levels Against Protection Requirements

B.7. The following information is needed for this assessment:

Information provided by MDS licensee
- wanted and unwanted power (as calculated at Step 3)
- MDS transmitter channel centre frequency

Information provided by the SMA
- fixed link receiver protection requirements (see Schedule 5)
- fixed link receiver centre frequency (fr)

*(NOTE. The details of the centre frequency of fixed link receivers are held by the Spectrum Management Agency.)*

B.8. A proposed MDS transmitter will meet the protection requirements for fixed link receivers if:
\[ P_w - P_u - P_R \]

where:
- \( P_w \) = wanted power, calculated at step 3 (dBm)
- \( P_u \) = unwanted power, calculated at step 3 (dBm)
- \( P_R \) = is the protection ratio required by a fixed link receiver from an MDS transmitter at frequency offset of \( f_o \) MHz (dB) (see Schedule 5)
- \( f_o \) = frequency difference between MDS transmitter frequency and fixed link receiver frequency (MHz)
- \( f_0 \) is calculated from the equation:
  \[ f_0 = \text{the absolute value of } (f_{\text{MDS}} - f_{\text{r}}) \]

where:
- \( f_{\text{MDS}} \) = MDS transmitter channel centre frequency (MHz)
- \( f_r \) = fixed link receiver centre frequency (MHz)

(NOTE. The results of Assessment D may lead to the imposition of licence conditions, see Guideline 14(e)).

(NOTE. Secondary fixed link receivers cannot claim protection from interference from an MDS transmitter. The SMA will advise the licensee of the secondary fixed link of the potential for interference. Secondary fixed link licences should already be subject to the condition that the service cannot claim protection from, or cause interference to, services of a primary status. If not, a licence condition may be imposed on the licence authorising operation of the secondary fixed link (see Guideline 15).)

ASSESSMENT C - FIXED LINK TRANSMITTER TO MDS RECEIVER

PURPOSE OF ASSESSMENT OF INTERFERENCE FROM FIXED LINK TRANSMITTER TO MDS RECEIVER

This Assessment C specifies how to assess the potential for interference from a primary or secondary fixed link transmitter to a notional MDS receiver lying within a defined area (called an assessment area).

This assessment is intended to lead, where necessary, to the imposition of a licence condition on a secondary fixed link transmitter, where the unwanted field strength from that secondary fixed link transmitter received by a notional MDS receiver in an assessment area is calculated to exceed protection requirements (see C.9. below).

(NOTE. The references in steps 1 - 4 below to 'fixed link' transmitters are to both primary and secondary fixed link transmitters.)

Step 1: Identifying if an Interference Assessment is Necessary

C.1. The following information is needed to decide if an interference assessment must be carried out:
- Information provided by MDS Licensee
  - MDS transmitter location
  - MDS transmitter frequency
  (NOTE. The location and channel of the MDS transmitter are required because the notional MDS receiver for which this assessment (C) may be required is deemed to be lying within the assessment area around that MDS transmitter. The assessment area is bounded by a circle of radius \( R \) kilometres from the MDS transmitter. The radius \( R \) is related to the transmitter height and EIRP, and is calculated in accordance with Schedule 3. See also C.4. below.)
- Information provided by the SMA
  - location and frequency of fixed links
  (NOTE. The details of the location and frequency of fixed link receivers are held by the Spectrum Management Agency.)

C.2. An assessment of the potential for interference to an MDS receiver from a fixed link transmitter is necessary if the MDS transmitter is located within a distance \( D \) from a fixed link transmitter as indicated in the following table, and the fixed link transmitter is operating in the frequency range:
- 2040 - 2147 MHz for Group A MDS channels; or
- 2266 - 2420 MHz for Group B MDS channels.
Technical Requirements – Part A - The MDS Guidelines

<table>
<thead>
<tr>
<th>Ht* (metres)</th>
<th>EIRP** (Watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>200 1000 229 234</td>
</tr>
<tr>
<td>37.5</td>
<td>216 222 227 229 234</td>
</tr>
<tr>
<td>75</td>
<td>216 223 237 239 244</td>
</tr>
<tr>
<td>150</td>
<td>216 223 250 252 257</td>
</tr>
<tr>
<td>300</td>
<td>216 223 250 271 277</td>
</tr>
<tr>
<td>600</td>
<td>216 223 250 271 304</td>
</tr>
<tr>
<td>1200</td>
<td>216 223 250 271 344</td>
</tr>
</tbody>
</table>

Values for D (km)

* Ht: MDS transmitting antenna height above the average level of the ground between distances of 3 and 15 km from the transmitter in the direction of the receiver (see CCIR Rec 370-5)

**EIRP: the EIRP of the proposed MDS transmitter

(NOTE. CCIR Recommendations are available from the Standards Australia International Sales Group, Strathfield NSW.)

Step 2: Calculating Terrain Loss

C.3. The following information is needed to complete this calculation:

- Information provided by MDS Licensee
  - location and site height of the point in the assessment area around the proposed MDS transmitter nearest to the fixed link transmitter
  (NOTE. For the purpose of this assessment, the point described above represents the location of the antenna of a notional MDS receiver, with nominal antenna height as specified below.)
  - fixed link transmitter site height (determined by knowing the fixed link transmitter location)
  - terrain profile between the fixed link transmitter and the point in the assessment area around the MDS transmitter nearest to the fixed link transmitter

- Information provided by the SMA
  - fixed link transmitter location and antenna height
  - nominal MDS receiver antenna height = 10 m
  (NOTE. The details of the locations and of some antenna heights of fixed link transmitters are held by the Spectrum Management Agency. If the antenna height of the link under consideration is not held by the Spectrum Management Agency a height of 70 m may be used, or specific height information sought from the fixed link licensee.)

C.4. The assessment area is bounded by a circle of radius R kilometres from an MDS transmitter. The radius R is proportional to the transmitter height and EIRP, and is calculated in accordance with Schedule 3.

C.5. Using the method detailed at Schedule 2, calculate the terrain loss between the fixed link transmitter and the point in the assessment area around the MDS transmitter that is nearest to the fixed link transmitter.

(NOTE. If the protection criteria of Assessment C.9. are satisfied when a terrain loss value of Lt = 0 dB is used in the equation at assessment C.7. then calculation of an actual value for Lt is not required.)

Step 3: Calculating Received Signal Levels

C.6. The following information is needed for this calculation:

- Information provided by MDS Licensee
  - terrain loss (calculated in the same manner as under Step 2, para C.5)

- Information provided by the SMA
  - fixed link transmitter power and antenna gain in the direction of the point in the assessment area around the MDS transmitter that is nearest to the fixed link transmitter

C.7. The unwanted field strength (at an MDS receiver) is then calculated at the point in the assessment area around the MDS transmitter that is nearest to the fixed link transmitter using the following equation:

\[ Eu = 44.77 - 20 \log(d) + Pt + Gtm - Lt \]
where:

\[ Eu = \text{unwanted field strength (dBuV/m)} \]
\[ d = \text{distance between fixed link transmitter and the point in the assessment area around the MDS transmitter that is nearest to the fixed link transmitter (km)} \]
\[ Pt = \text{fixed link transmitter power (dBm)} \]
\[ Gtm = \text{gain of the fixed link transmitter antenna in the direction of the point in the assessment area around the MDS transmitter that is nearest to the fixed link transmitter (dBi)} \]
\[ Lt = \text{terrain loss (as calculated at Step 2) (dB)} \]

(Note. The Spectrum Management Agency holds details of both the power, and the antenna gain, of fixed link transmitters. If either the transmitter power or the antenna gain of the link under consideration is not held by the Spectrum Management Agency, the value in the EIRP data field may be used in lieu of the combined value of \( Pt + Gt \). If the EIRP is also not held by the Spectrum Management Agency, then the values of \( Pt \) and \( Gt \) must be sought from the fixed link licensee. The boresight gain value (or EIRP, as applicable) should then be de-rated in accordance with the 2.1 GHz Fixed Link Notional Antenna Radiation Pattern at Schedule 4, to find the off-axis gain (Gtm) (or EIRP) in the relevant direction. Note that off-axis antenna gain (or EIRP) should be considered in both the horizontal and vertical planes.)

Step 4: Assessing Received Signal Levels Against Protection Requirements

C.8. The following information is needed for this assessment:

- Information provided by MDS Licensee
  - unwanted field strength (as calculated at Step 3)
  - MDS transmitter channel centre frequency
- Information provided by the SMA
  - MDS receiver protection requirements (see Schedule 6)
  - fixed link transmitter centre frequency (ft)

C.9. A fixed link transmitter will meet the protection requirements for MDS receivers if:

\[ Eu \leq Em \]

where:

\[ Eu = \text{unwanted field strength calculated at Step 3 (dBuV/m)} \]
\[ Em = \text{the maximum permissible unwanted field strength in the assessment area around the MDS transmitter at frequency offset of } fo \text{ MHz (dBuV/m) (see Schedule 6)} \]
\[ fo = \text{frequency difference between MDS transmitter channel centre frequency and fixed link transmitter frequency (MHz)} \]

fo is calculated from the equation:

\[ fo = |fMDS - ft| \]

where:

\[ fMDS = \text{MDS transmitter channel centre frequency (MHz)} \]
\[ ft = \text{fixed link transmitter centre frequency (MHz)} \]

(Note. Details of the centre frequencies of fixed link transmitters are held by the SMA.)

(Note. The results of Assessment C may lead to the imposition of licence conditions, see Guideline 16.)

ASSESSMENT D – MDS TRANSMITTER TO EARTH STATION RECEIVER

This Assessment D specifies how to assess the potential for interference from an MDS Group B transmitter to an earth station receiver in the space research service.

A detailed discussion of the interference mechanisms between MDS and earth stations can be found in Section 2 Part B of the Coordination Handbook.

The SMA considers that earth station receivers in the space research service are not likely to receive interference from Group A MDS transmitters. Accordingly, no assessment of the interference potential to earth station receivers from Group A MDS transmitters need be carried out.

Step 1: Identifying if an Interference Assessment is Necessary
D.1. The following information is needed to decide if an interference assessment must be carried out:

- Information provided by MDS Licensee
  - MDS transmitter location
  - MDS transmitter EIRP (in dBm)
- Information provided by the SMA
  - Location of Parkes earth station
  - Location of Tidbinbilla earth station

(NOTE. For information on the locations of the Parkes and Tidbinbilla earth stations see Schedule 7.)

D.2. An assessment of the potential for interference to the Parkes earth station is necessary if an MDS transmitter is to be located within a circle around the Parkes facility of radius:

- 250 km for an MDS transmitter EIRP 60 dBm
- 250 + 12(EIRP - 60) km for an MDS transmitter EIRP 60 dBm

D.3. An assessment of the potential for interference to the Tidbinbilla earth station is necessary if an MDS transmitter is to be located within a circle around the Tidbinbilla facility of radius:

- 180 km for an MDS transmitter EIRP 60 dBm
- 180 + 12(EIRP - 60) km for an MDS transmitter EIRP 60 dBm

D.4 If an interference assessment is necessary, the assessment will comprise the following steps 2 - 4.

Step 2: Calculating Propagation Loss

D.5. The following information is needed to complete this calculation:

- Information provided by MDS Licensee
  - MDS transmitter location, site height, antenna height and antenna gain in the direction of the earth station receiver
  - terrain profile between MDS transmitter and earth station receiver
- Information provided by the SMA
  - Earth station receiver location, site height, antenna height and antenna gain in the direction of the MDS transmitter (see Schedule 7)
  - required time percentage for which the calculated basic transmission loss is not exceeded (see Schedule 8)
  - meteorological data for path profile under assessment (see Schedule 8)

D.6. The propagation loss between the MDS transmitter and the earth station receiver under assessment is to be calculated using ITU Rec 452-5 (see Schedule 8).

(NOTE. ITU Recommendations are available from the Standards Australia International Sales Group, Strathfield NSW.)

Step 3: Calculating Received Signal Levels

D.7. Calculating Received Power (at the earth station receiver)

D.7.1. The following information is needed for this calculation:

- Information provided by MDS Licensee
  - MDS transmitter power
  - MDS antenna gain in the direction of the earth station receiver
  - propagation loss (as calculated at Step 2)
- Information provided by the SMA
  - earth station receiver antenna gain
  - allowance factor for multiple MDS transmitters

D.7.2. The received power (at the earth station receiver) is then calculated using the following equation:

\[ Pr = Pt + Gte - Lb + Grm + Fa \]

where:

- \( Pr \) = power received (dBm)
- \( Pt \) = proposed MDS transmitter power (dBm)
- \( Gte \) = proposed MDS antenna gain in the direction of the earth station receiver (dBi)
- \( Lb \) = propagation loss (as calculated at Step 2) (dB)
- \( Grm \) = gain of the earth station antenna in the direction of the MDS transmitter (dBi) (see Schedule 7)
D.8. Calculating Received Noise Power (at the earth station receiver)

D.8.1. The following information is needed for this calculation:

- MDS transmitter power
- MDS antenna gain in the direction of the earth station receiver
- propagation loss (as calculated at Step 2)

Information provided by the SMA
- earth station receiver antenna gain
- MDS emission limits in the band 2290 – 2300 MHz
- allowance factor for multiple MDS transmitters

D.8.2. The received noise power (at the earth station receiver) is then calculated using the following equation:

\[ Prn = Ptn - Lb + Grm + Fa \]

where:
- \( Prn \) = received noise power (dBm in a 1 Hz bandwidth)
- \( Ptn \) = deemed transmitted MDS noise power in the band 2290 – 2300 MHz
- \( Lb \) = propagation loss (as calculated at Step 2) (dB)
- \( Grm \) = gain of the earth station antenna in the direction of the MDS transmitter (dBi) (see Schedule 7)
- \( Fa \) = factor to account for the additive contributions from multiple MDS transmitters (dB) (see Schedule 7)

* For the purposes of this calculation, the transmitted MDS noise power (Ptn) is deemed to be:
  - for channel 6 transmitters \((EIRP - 56.25)\) dBm in a 1 Hz bandwidth
  - for channel 7 - 19 transmitters \((EIRP - 90)\) dBm in a 1 Hz bandwidth

where:
- \( EIRP \) is the equivalent isotropically radiated power (in dBm) of the proposed MDS transmitter in the direction of the earth station receiver

  (NOTE. If a licensee can demonstrate to the SMA that the noise power of the proposed MDS transmitter is less than the relevant limit specified above, then the actual noise power of the proposed transmitter may be used instead of the deemed noise power.)

  (NOTE. The rationale for this approach is given in the Coordination Handbook.)

Step 4: Assessing Receive Levels Against Protection Requirements

D.9. An MDS transmitter will meet the earth station receiver protection requirements if the levels calculated at Step 3 do not exceed those listed below:

<table>
<thead>
<tr>
<th>Location</th>
<th>Receiver Overload</th>
<th>Noise Floor Degradation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parkes</td>
<td>(-30) dBm in the band 2240 – 2340 MHz</td>
<td>(-192) dBm in a 1 Hz bandwidth in the band 2290 – 2300 MHz</td>
</tr>
<tr>
<td>Tidbinbilla</td>
<td>(-84 + 3.5(n-6)) dBm ((n \text{ is the MDS channel number in the range 6 to 19}))</td>
<td>(-192) dBm in a 1 Hz bandwidth in the band 2290 – 2300 MHz</td>
</tr>
</tbody>
</table>

(Note. The results of Assessment D may lead to the imposition of licence conditions, see Guideline 14.)
SCHEDULE 2  Subclause 3(1)
CALCULATION OF PROPAGATION LOSS BETWEEN MDS SERVICES, AND BETWEEN MDS SERVICES AND FIXED LINKS

Propagation Loss Components
In calculating the propagation loss between MDS services, and between MDS services and fixed links, the basic propagation loss (Lb) between two antennas may be represented by the following components:

. a free space basic transmission loss (Lbf); and
. an additional component due to the presence of terrain (Lt)

\[ Lb = Lbf + Lt \]

Initial assessments may be made using the free space transmission loss component only (\( Lt = 0 \)). If, as a result of this assessment, the specified protection requirements are met then the more complex assessment that includes terrain loss is not required.

For the purpose of paragraph B.5 (a) of Step 2 in Assessment B, the propagation loss between fixed link transmitters and fixed link receivers should be calculated using only the free space basic transmission loss (Lbf).

Free Space Loss
The free space loss component (Lbf) is calculated by the following formula:

\[ Lbf = 32.44 + 20 \log(f) + 20 \log(d) \]

where:
- \( f \) = frequency (MHz)
- \( d \) = distance (km)

Terrain Loss
The terrain loss (Lt) may be calculated by using Method A or Method B below. Alternatively, where there is more than one obstacle, ITU Recommendation 526-2 'Propagation by Diffraction' may be used for calculation of terrain loss.

(Note. ITU Recommendations are available from the Standards Australia International Sales Group, Strathfield NSW.)

Method A: Diffraction over a spherical Earth
Terrain loss due to diffraction over a spherical Earth is calculated using the formulas below. These formulas are valid for systems operating above 1 GHz and apply to both horizontal and vertical polarisation.

\[ Lt = -(F(X) + G(Y_1) + G(Y_2)) \quad (\text{dB}) \]

where:
- \( Lt \) = terrain loss due to diffraction over a smooth sphere (dB)
- \( X \) = the normalised length of the path between the antennas at normalised heights \( Y_1 \) and \( Y_2 \)
- \( X = 2.2f^{1/3}a - 2/3d \)
- \( Y_n = 0.0096f^{2/3}ae^{-1/3}H_n \)
- \( ae = kr \) (ie, the equivalent Earth's radius (km); see ITU-Rec. 310-8)
- \( r = 6370 \text{ km (earth radius)} \)
- \( k = \text{equivalent earth radius factor (nominally 4/3)} \)
- \( H_n = \text{antenna height above the spherical Earth (m)} \)
- \( d = \text{path length (km)} \)
- \( f = \text{frequency (MHz)} \)

(Note. ITU Recommendations are available from the Standards Australia International Sales Group, Strathfield NSW.)

The distance term is given by:

\[ F(X) = 11 + 10 \log(X) - 17.6X \]

The height gain term is given by:

\[ G(Y_n) = 17.6(Y_n - 1.1)^{1/2} - 5 \log(Y_n - 1.1) - 8 \quad \text{for } Y_n 2 \]

\[ G(Y_n) = 20 \log(Y_n + 0.1Y_n^3) \quad \text{for } Y_n 2 \]

If the equation for \( Lt \) gives a value less than zero, the method is invalid, and \( Lt \) is to be taken as zero.

Method B: Single knife edge diffraction loss calculation
Terrain loss due to diffraction over a single knife edge obstacle is calculated using the formulas below.

\[ Lt = 6.9 + 20 \log(((v - 0.1)^{1/2} + 1)^{1/2} + v - 0.1) \quad \text{for } v -0.7 \]
where:

\[ \text{Lt} = \text{terrain loss due to knife edge diffraction (dB)} \]
\[ v = \frac{H_o(fd/150d_1d_2)^{1/2}}{} \]
\[ H_o = \text{height (m) of the top of the obstacle above the straight line joining the two ends of the path} \]
\[ d_1, d_2 = \text{distances (km) of the two ends of the path from the top of the obstruction} \]
\[ d = \text{path length (km)}, \]
\[ f = \text{frequency (GHz)} \]

(Note: For situations where \( v \) = 0.7 see CCIR Recommendation 526-2. CCIR Recommendations are available from the Standards Australia International Sales Group, Strathfield NSW.)

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995 - SCHEDULE 3

SCH

**SCHEDULE 3**

Subclause 3(1)

**CALCULATION OF "R"**

For EIRP 63 dBm

\[ R = 10^{ \frac{(EIRP - 26.03)}{20}} \]

For EIRP 63 dBm and \( H_t \) 300 m

\[ R = 71 + \frac{(EIRP-63)}{1.2271} \]

For EIRP 63 dBm and \( H_t \) 300 m

\[ R = 10^{ \frac{(EIRP - 26.03)}{20}} \]

\[ \text{or,} \]

\[ R = x + \frac{(EIRP-P_i)}{1.2271} \]

\[ P_i = 26.03 - 20\log(x) \]

where:

EIRP : EIRP of the adjacent channel transmitter (dBm)

\[ H_t : \text{height of the transmitting antenna over the average level of the ground between distances of 3 and 15 km from the transmitter in the direction of the receiver (m)} \]

\[ \text{x : distance to the horizon (km)} \]

where:

\[ x = x' + 8.1493\log(x'/71) \]
\[ x' = \frac{G}{1.2271} + 71 \]
\[ G = 17.6y + 5\log(y) - 78.446 \]
\[ y = 24.589H_t/300 - 1.1 \]

The table below provides values for R based on specific values of \( H_t \) and EIRP. It can be used to verify values of R calculated in accordance with the above method.

<table>
<thead>
<tr>
<th>( H_t ) (metres)</th>
<th>EIRP (Watts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>200 1000 2000 10000</td>
</tr>
<tr>
<td>37.5</td>
<td>16 22 27 29 34</td>
</tr>
<tr>
<td>75</td>
<td>16 23 37 39 44</td>
</tr>
<tr>
<td>150</td>
<td>16 23 50 52 57</td>
</tr>
<tr>
<td>300</td>
<td>16 23 50 71 77</td>
</tr>
<tr>
<td>600</td>
<td>16 23 50 71 104</td>
</tr>
<tr>
<td>1200</td>
<td>16 23 50 71 144</td>
</tr>
</tbody>
</table>

Values for R (km)

* \( H_t \): MDS transmitting antenna height above the average level of the ground between distances of 3 and 15 km from the transmitter in the direction of the receiver (see CCIR Rec 370-5)

**EIRP**: the EIRP of the proposed MDS transmitter

(Note. CCIR Recommendations are available from the Standards Australia International Sales Group, Strathfield NSW.)
RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995 - SCHEDULE 4

SCHEDULE 4                  Subclause 3(1)
2.1 GHz FIXED LINK NOTIONAL ANTENNA RADIATION PATTERN
Frequency band : 1900 to 2300 MHz (2.1 GHz Band)
Diameter : 3.0 m parabolic dish
Half Power beam width : 3.3 Deg
Minimum gain : 33 dBi

ANTENNA DIRECTIVITY
dB DOWN FROM MAIN LOBE

[Graph showing co-polarization and cross-polarization]
### SCH SCHEDULE 5

#### PROTECTION RATIOS

<table>
<thead>
<tr>
<th>Frequency Offset, fo (MHz)</th>
<th>Digital Emission 8 MHz</th>
<th>Digital Emission 15 MHz</th>
<th>Digital Emission 28 MHz</th>
<th>FM Video Emission 28 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>0fo2.5</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>12.5fo3.0</td>
<td>49</td>
<td>52</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>13.0fo9.5</td>
<td>43</td>
<td>41</td>
<td>51</td>
<td>51</td>
</tr>
<tr>
<td>19.5fo0.0</td>
<td>29</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>20.0fo5.5</td>
<td>N/A</td>
<td>29</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>25.5fo6.5</td>
<td>N/A</td>
<td>26</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>26.5fo7.0</td>
<td>N/A</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>27.0fo7.5</td>
<td>N/A</td>
<td>23</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>27.5fo2.5</td>
<td>N/A</td>
<td>23</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>32.5fo3.5</td>
<td>N/A</td>
<td>-27</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>33.5fo4.0</td>
<td>N/A</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>34.0fo4.5</td>
<td>N/A</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>34.5fo9.5</td>
<td>N/A</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>39.5fo0.0</td>
<td>N/A</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>40.0fo0.5</td>
<td>N/A</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>40.5fo1.0</td>
<td>N/A</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>41.0fo1.5</td>
<td>N/A</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>41.5fo2.0</td>
<td>N/A</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>42.0fo6.5</td>
<td>N/A</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>46.5fo7.0</td>
<td>N/A</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>47.0fo8.0</td>
<td>N/A</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>48.0fo8.5</td>
<td>N/A</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>48.5fo9.0</td>
<td>N/A</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>f-49.0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

The above protection ratios are based on the concepts contained in RALI FX 3. The digital protection ratios are for a 60 km path length and PL = 20. For other path lengths and PL values the appropriate path length correction factor must be added (refer to the graph and seasonal contour maps below (see pages 45 and 46 respectively). The contour map which yields the highest value of PL must be used. Note that the entry N/A means that fixed links at the indicated frequency offsets do not need to be considered.

(Note. PL - percentage of time that the average refractivity gradient in the lowest 100 m of the atmosphere is less than -100 N units/km.)

(Note. The seasonal contour maps may be obtained from RALI FX3.)
Path Length Correction Factors

Correction Factor (dB)

Path Length (km)

- PL=20
- PL=10
- PL=5
PL Contour Maps

February

May

August

November

RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995 - SCHEDULE 6

SCHEDULE 6               Subclause 3(1)
Frequency               Maximum Permissible Unwanted Field Strength
                        (dBuV/m)
Offset, fo               Digital        Digital        Digital       FM Video
(MHz)                      Emission       Emission       Emission      Emission
8 MHz                      15 MHz         28 MHz         28 MHz
RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995 - SCHEDULE 7

SCHEDULE 7

CHARACTERISTICS OF EARTH STATIONS IN THE DEEP SPACE RESEARCH SERVICE

Gnangara Earth Station
Australian Map Grid coordinates for the Gnangara facility are:
Zone 50
Easting 394330
Northing 6480766
Site height 40 m AHD
Antenna height 50 m
Antenna gain in the direction of MDS receiver (Gtm) 20 dBi
Earth station transmitter power 2 kW

Parkes Earth Station
Australian Map Grid coordinates for the Parkes facility are:
Zone 55
Easting 618000
Northing 6348000
Site height 360 m AHD
Antenna height 50 m
Antenna gain in direction of MDS transmitter (Grm) 0 dBi
Allowance for multiple MDS transmitters (Fa) received power 8 dB
noise power 0 dB (channel 6)
11 dB (channels 7 - 19)

Tidbinbilla Earth Station
Australian Map Grid coordinates for the Tidbinbilla facility are:
Zone 55
Easting 679700
Northing 6080400
Site height 640 m AHD
Antenna height 50 m
Antenna gain in direction of MDS transmitter (Grm) 53 dBi
Antenna gain in direction of MDS receiver (Gtm) 53 dBi
Earth station transmitter power 20 kW
Allowance for multiple MDS transmitters (Fa) received power 3 dB
noise power 0 dB (channel 6)
11 dB
RADIOCOMMUNICATIONS (MULTIPOINT DISTRIBUTION STATION LICENCES - REGIONAL LICENCES) GUIDELINES No. 1 of 1995 - SCHEDULE 8

SCHEDULE 8               Subclause 3(1)
CALCULATION OF PROPAGATION LOSS BETWEEN MDS SERVICES AND EARTH STATIONS IN THE SPACE RESEARCH SERVICE

Basic Transmission Loss Calculation
International Telecommunication Union (ITU) Recommendation 452-5: "Prediction Procedure for the Evaluation of Microwave Interference Between Stations on the Surface of the Earth at Frequencies Above About 0.7 GHz" (1992) is specifically intended for interference prediction purposes, and is to be used for the calculation of basic transmission loss (i.e., propagation loss) between MDS services and earth stations in the space research service. The information below lists sections of the Recommendation relevant to the assessment and specifies parameter values to be used when applying the Recommendation to the calculation of propagation loss.

(Note. A spreadsheet for Rec 452-5 calculations is held by the SMA.)

Relevant Sections of ITU Recommendation 452-5
The following parts of Rec 452-5 need to be applied in the propagation loss calculation:

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>Clear-air interference prediction</td>
</tr>
<tr>
<td>3.2.1</td>
<td>Outline of the procedure</td>
</tr>
<tr>
<td>3.2.3</td>
<td>Assembling the input data (excluding Table 2)</td>
</tr>
<tr>
<td>3.2.4</td>
<td>Radio-meteorological data for the path</td>
</tr>
<tr>
<td>3.2.5</td>
<td>Calculating predictions for appropriate individual mechanisms</td>
</tr>
<tr>
<td>3.2.6</td>
<td>Analysis of the path profile</td>
</tr>
<tr>
<td>3.2.7</td>
<td>Calculation of individual propagation predictions</td>
</tr>
<tr>
<td>3.2.8</td>
<td>Determine overall prediction</td>
</tr>
</tbody>
</table>

(Note. ITU Recommendations are available from the Standards Australia International Sales Group, Strathfield NSW.)

The above Sections refer to supporting information in subsequent sections of Recommendation 452-5, of which the following are relevant:

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>Clear-air propagation models (excluding Figure 5)</td>
</tr>
<tr>
<td>Appendix 1</td>
<td>Radio-meteorological data required for the clear-air prediction procedure (excluding Figures 7 and 9, and sections 4 and 5)</td>
</tr>
<tr>
<td>Appendix 2</td>
<td>Path profile analysis</td>
</tr>
</tbody>
</table>

Parameter Values To Be Used When Applying ITU Recommendation 452-5
In applying the Recommendation 452-5 method when assessing the interference potential of an MDS transmitter to an earth station receiver, the following parameter values are to be used:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>Required time percentage for which the calculated basic transmission loss is not exceeded.</td>
<td>0.001%</td>
</tr>
<tr>
<td>N</td>
<td>Average radio-refractive index lapse-rate through the first 1 km of the atmosphere (average annual values).</td>
<td>44</td>
</tr>
<tr>
<td>BO</td>
<td>Time percentage for which super-refractive lapse rates with gradients of modulus exceeding 100 N-units/km can be expected in the lower</td>
<td>9%</td>
</tr>
</tbody>
</table>
Technical Requirements – Part A - The MDS Guidelines

atmosphere (average annual values).

hrq  Antenna centre height above ground level.          50 m
Gr   Antenna gain in the direction of the horizon          0  
along the great-circle interference path.           dBi  

(NOTE. ITU Recommendations are available from the Standards 
Australia International Sales Group, Strathfield NSW.)

2. Tidbinbilla Earth Station

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>Required time percentage for which the calculated basic transmission loss is not exceeded.</td>
<td>0.001</td>
</tr>
<tr>
<td>N</td>
<td>Average radio-refractive index lapse-rate through the first 1 km of the atmosphere (average annual values).</td>
<td>43</td>
</tr>
<tr>
<td>BO</td>
<td>Time percentage for which super-refractive lapse rates with gradients of modulus exceeding 100 N-units/km can be expected in the lower atmosphere (average annual values).</td>
<td>8%</td>
</tr>
<tr>
<td>hrq</td>
<td>Antenna centre height above ground level.          50 m</td>
<td></td>
</tr>
<tr>
<td>Gr</td>
<td>Antenna gain in the direction of the horizon along the great-circle interference path.</td>
<td>53</td>
</tr>
</tbody>
</table>

(NOTE: The propagation loss predicted by this method is typically much less than that which might be measured over a short observation period, or which may be calculated for the design of a communications link. The use of this value, however, ensures that deep space receivers are adequately protected against both short and long term interference arising due to clear-air propagation mechanisms, including free space, diffraction, troposscatter and ducting/layer reflection.)

In applying the Recommendation 452-5 method when assessing the interference potential of an earth station transmitter to an MDS receiver, the following parameter values are to be used:

1. Gnangara Earth Station

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>Required time percentage for which the calculated basic transmission loss is not exceeded.</td>
<td>10%*</td>
</tr>
<tr>
<td>N</td>
<td>Average radio-refractive index lapse-rate through the first 1 km of the atmosphere (average annual values).</td>
<td>45</td>
</tr>
<tr>
<td>BO</td>
<td>Time percentage for which super-refractive lapse rates with gradients of modulus exceeding 100 N-units/km can be expected in the lower atmosphere (average annual values).</td>
<td>5%</td>
</tr>
<tr>
<td>hrq</td>
<td>Antenna centre height above ground level.          50 m</td>
<td></td>
</tr>
<tr>
<td>Gr</td>
<td>Antenna gain in the direction of the horizon along the great-circle interference path.</td>
<td>20</td>
</tr>
</tbody>
</table>

2. Tidbinbilla Earth Station

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>Required time percentage for which the calculated basic transmission loss is not exceeded.</td>
<td>10%*</td>
</tr>
<tr>
<td>N</td>
<td>Average radio-refractive index lapse-rate through the first 1 km of the atmosphere (average annual values).</td>
<td>43</td>
</tr>
<tr>
<td>BO</td>
<td>Time percentage for which super-refractive lapse rates with gradients of modulus exceeding 100 N-units/km can be expected in the lower atmosphere (average annual values).</td>
<td>8%</td>
</tr>
<tr>
<td>hrq</td>
<td>Antenna centre height above ground level.          50 m</td>
<td></td>
</tr>
<tr>
<td>Gr</td>
<td>Antenna gain in the direction of the horizon along the great-circle interference path.</td>
<td>53</td>
</tr>
</tbody>
</table>

* p = 10% is a value that is consistent with accepted broadcast planning procedures
SECTION 2
Part B

THE POTENTIAL FOR INTERFERENCE BETWEEN MDS REGIONAL SERVICES AND EARTH STATIONS OF THE SPACE RESEARCH SERVICES
THE POTENTIAL FOR INTERFERENCE BETWEEN MDS REGIONAL SERVICES AND EARTH STATIONS OF THE SPACE RESEARCH SERVICES

INTRODUCTION

There are two interference scenarios arising from the operation of MDS and space research services in Australia. These are:

- interference to MDS Group A receivers from space research transmitters at Tidbinbilla (about 20 km south-west of Canberra) and Gnangara (about 17 km north of the Perth CBD) operating in the same band; and
- interference from MDS Group B transmitters to the earth station receivers of the Parkes space research service (about 17 km north-east of Parkes, NSW) and the Tidbinbilla space research service operating in adjacent bands.

This paper aims to provide potential applicants for Regional MDS licences with a broad understanding of the potential for interference associated with each of the above scenarios. While the information contained herein is offered for guidance purposes, it remains the responsibility of MDS licensees to plan their services so as not to infringe the protection criteria for space services specified in the MDS Guidelines.

Interference potential: Space Research Services into MDS Group A Channels

One of the frequency bands in which space research services operate is the band 2025 - 2120 MHz. This band overlaps the MDS Group A band 2076 - 2111 MHz as shown in Diagram 1 below. The consequence of this overlap is that transmissions from the space research facilities at Tidbinbilla and Gnangara have the potential to cause interference to MDS Group A receivers operating in the same band. This potential is detailed in the following paragraphs.

<table>
<thead>
<tr>
<th>2076 MHz</th>
<th>2111 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDS Group A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2025 MHz</th>
<th>2120 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space Research Service (Earth-to-space)</td>
<td></td>
</tr>
</tbody>
</table>

DIAGRAM 1 - Space Research Service and MDS Group A Overlap
Tidbinbilla

Typical Operation

The Tidbinbilla facility operates 24 hours a day, 365 days a year, on a range of frequency bands, often transmitting and receiving simultaneously. Transmitter powers typically up to 20 kW are used in the frequency band 2025 - 2120 MHz. The facility employs a number of large parabolic antennas with on-axis gains between 52 and 63 dBi. To facilitate sharing with terrestrial radiocommunication services, the International Telecommunication Union Radio Regulations specify a minimum elevation angle for transmission of 5 degrees for these antennas. Operating frequencies and emission bandwidths of the transmissions from the Tidbinbilla facility are such that any of the 5 MDS Group A channels may be affected. Occasionally, higher transmitter power levels up to 100 kW, 200 kW or 400 kW may be used, but only at antenna elevation angles exceeding 10, 15 or 20 degrees respectively, and normally in the sub-band 2110 - 2120 MHz.

Interference Modelling

The Department of Communications and the Arts Laboratory has conducted signal strength measurements resulting from transmissions from the Tidbinbilla earth station in the surrounding south eastern region of Australia. Measurements were taken over a range of earth station azimuths and antenna elevation angles extending from 6 to 19 degrees, using a transmitter power of 20 kW and the 63 dBi antenna. In addition the results were scaled to assess the effect of higher powered transmissions. Typically, the maximum recorded signal strength was found to occur at antenna elevation angles near 6 degrees. In other words, the limits on minimum elevation angles that apply to higher transmitter powers appear to lead to less power being received during periods of higher power operation.

The maximum signal strength (in dBm) measured at each regional location is indicated on the map of Figure 1, and also in Table 1. It should be noted, however, that these measured signal strengths were the outcome of a short duration propagation study. Longer term propagation studies covering a range of propagation environments for each location, including such anomalous propagation effects as ducting, may lead to different findings. As an example of the complexity of propagation measurements, Annex A gives an indication of signal level variations measured over a (brief) 11 minute period at the measurement site at Cootamundra. All tests were carried out using a transmit frequency of 2116 MHz. This frequency is just above the MDS Group A band; however, in practical terms the received signal strength at this frequency would not differ significantly from that received at slightly lower frequencies in the MDS Group A band.

The most typical interference scenario would involve a transmitter power of up to 20 kW feeding a parabolic antenna of 57 dBi gain in the band 2025 - 2120 MHz, resulting in received signal strengths some 6 dB lower than those shown at Figure 1.
Figure 1 Signal levels (dBm) from Tidbinbilla Earth Station as measured at various regional locations
Location & Measured Signal Level (dBm)

<table>
<thead>
<tr>
<th>Location</th>
<th>Measured Signal Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bega</td>
<td>-105.4</td>
</tr>
<tr>
<td>Batemans Bay</td>
<td>&lt;-135.0</td>
</tr>
<tr>
<td>Bodalla</td>
<td>-118.4</td>
</tr>
<tr>
<td>Campbelltown (10 km south)</td>
<td>-112.9</td>
</tr>
<tr>
<td>Cobargo</td>
<td>-109.4</td>
</tr>
<tr>
<td>Collingullie</td>
<td>-110.4</td>
</tr>
<tr>
<td>Cooma</td>
<td>-102.4</td>
</tr>
<tr>
<td>Cootamundra</td>
<td>-89.4</td>
</tr>
<tr>
<td>Cowra</td>
<td>-103.4</td>
</tr>
<tr>
<td>Galore</td>
<td>-120.4</td>
</tr>
<tr>
<td>Goulburn</td>
<td>-105.2</td>
</tr>
<tr>
<td>Moss Vale</td>
<td>-99.4</td>
</tr>
<tr>
<td>Narrandera</td>
<td>-121.4</td>
</tr>
<tr>
<td>Nowra</td>
<td>-107.4</td>
</tr>
<tr>
<td>Shell Harbour</td>
<td>&lt;-135.0</td>
</tr>
<tr>
<td>Temora</td>
<td>-95.4</td>
</tr>
<tr>
<td>Wagga</td>
<td>-100.9</td>
</tr>
<tr>
<td>Weethalle</td>
<td>-129.4</td>
</tr>
<tr>
<td>Wollongong</td>
<td>&lt;-135.0</td>
</tr>
<tr>
<td>Wyalong</td>
<td>-117.4</td>
</tr>
<tr>
<td>Young</td>
<td>-109.2</td>
</tr>
</tbody>
</table>

**TABLE 1 - Signal Levels from Tidbinbilla Earth Station as Measured at Various Regional Locations**

The following comments are relevant to the measured signal levels contained in Table 1:

- An interfering signal level of –100 dBm at an MDS antenna terminal is considered as the threshold at which interference will be just perceptible at the output of that MDS receiver. This threshold is recommended by the Department of Communications and the Arts Laboratory and was derived from measurements and the following considerations:
  
  i) use of an MDS receiving antenna with a gain of 20 dBi (considered to be typical of most MDS receiving installations);
  
  ii) a wanted MDS signal between –50 and –60 dBm at the antenna terminals (most MDS installations within a licence area could be expected to receive a signal of at least –50 dBm at the terminals of a 20 dBi gain antenna); and
  
  iii) the use of a block down converter (which converts the microwave frequencies of MDS transmissions to lower frequencies that can be received by a standard television) with a noise figure between 1 and 1.5 dB (down converters with such noise performance are readily available). With such a down converter, interference to a –60 dBm signal will be just noticeable from an unwanted input signal of –100 dBm. If the wanted signal is increased by 10 dB to -50 dBm, interference is expected to be noticeable to about the same degree because there will be less downconverter noise masking the interference.

- Based on the –100 dBm interference threshold, and the measured signal levels obtained, there appears to be a possibility of interference to MDS Group A receivers within approximately a 150 km radius of Tidbinbilla. However within the circle described by this radius (indicated on the map at Figure 1), the
measurements taken along the coastal strip between Bega and Nowra yielded measured signals considerably less than –100 dBm. Interference from the Tidbinbilla transmissions to MDS Group A receivers located on the NSW south coast area is therefore considered unlikely.

- The measured signal strength is based on the scenario of an MDS receive antenna pointing towards the Tidbinbilla site. In many cases an MDS Group A transmitter may be sited to make maximum use of the directional characteristics of MDS receive antennas. For example, if an MDS transmitter was positioned such that receive antennas in the licence area were pointing in the opposite direction to the Tidbinbilla site, the level of unwanted signal at these receivers from Tidbinbilla could be reduced by up to 25 dB (based on typical MDS receive antenna characteristics).

**Gnangara**

**Typical Operation**

The Gnangara earth station operates in the sub-band 2025 - 2097 MHz of the band available for Space Research Services, with a transmitter power of up to 2 kW (typically 400 W) feeding a parabolic antenna with a boresight gain of 48 dBi. Note that this sub-band overlaps MDS Group A channels 1, 2 and 3 only. The transmitter typically operates for several weeks per year, and during these periods may be transmitting for times ranging from 15 minutes a day to 10 hours a day. The earth station antenna may be pointing in any direction during transmissions, and the angle of elevation to the horizon from the Gnangara site is approximately 1 degree in all directions. However the minimum elevation angle of the antenna is 5 degrees, and the effect of this is to reduce the antenna gain in the direction of the horizon (which is the direction of concern for interference prediction purposes) to a value of 20 dBi (from information provided by the European Space Agency).

**Interference Modelling**

No measurements of received signal strength due to operation of the Gnangara transmitter have been conducted; however, using the procedure of Part C in Section 2 of the MDS Coordination Handbook, the SMA has calculated the signal strength likely to be seen by MDS receivers in a number of regional centres around Perth. These centres are located roughly on radials from Perth, extending east towards Southern Cross, north to Moora, south to Margaret River and south-east to Katanning. The calculations were based on use of the maximum 2 kW transmitter power, with 20 dBi of antenna gain, and an angle to the horizon of 1 degree. Noting that the dominant use of MDS is for broadcasting applications, it is appropriate to use accepted broadcast planning procedures, and predict values for unwanted signal strength that will not be exceeded for more than 10% of the time. The resulting predicted signal level (in dBm) at each location due to the Gnangara earth station is indicated on the map at Figure 2, and also in Table 2. The unwanted signal strength could be expected to remain below those values shown at Figure 2 for 90% of the time.
Figure 2. Predicted signal levels (dBm) from Gnangara earth stations at various regional locations
It should be noted also that the predicted signal strength is based on the worst case scenario of an MDS receive antenna pointing towards the Gnangara site. However, in many cases an MDS Group A transmitter may be sited to make maximum use of the directional characteristics of MDS receive antennas. For example, if an MDS transmitter was positioned such that receive antennas in the licence area were pointing in the opposite direction to the Gnangara site, the level of unwanted signal at these receivers from Gnangara could be reduced by up to 25 dB (based on typical MDS receive antenna characteristics).

<table>
<thead>
<tr>
<th>Location</th>
<th>Predicted Signal Level (dBm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bunbury</td>
<td>-88</td>
</tr>
<tr>
<td>Busselton</td>
<td>-89</td>
</tr>
<tr>
<td>Katanning</td>
<td>-116</td>
</tr>
<tr>
<td>Mandurah</td>
<td>-48</td>
</tr>
<tr>
<td>Margaret River</td>
<td>-108</td>
</tr>
<tr>
<td>Merredin</td>
<td>-108</td>
</tr>
<tr>
<td>Moora</td>
<td>-92</td>
</tr>
<tr>
<td>Narrogin</td>
<td>-106</td>
</tr>
<tr>
<td>Northam</td>
<td>-97</td>
</tr>
<tr>
<td>Pinjarra</td>
<td>-54</td>
</tr>
<tr>
<td>Southern Cross</td>
<td>-121</td>
</tr>
<tr>
<td>Toodyay</td>
<td>-93</td>
</tr>
</tbody>
</table>

**TABLE 2 - Predicted Signal Levels from Gnangara Earth Station at Various Regional Locations**

Based on the previously established MDS receiver interference threshold of –100 dBm, conclusions can be drawn on the likelihood of interference to MDS receivers in and around the regional centres for which signal strength values are shown at Figure 2 and Table 2. These are:

- that receivers in the vicinity of Mandurah and Pinjarra are highly likely to suffer interference when the Gnangara station is operating, as the predicted signal strength at those locations is well in excess of the –100 dBm MDS interference threshold.
- Further south along the coast the likelihood of interference could be minimal beyond Bunbury, particularly if use is made of the directional characteristics of receive antennas. This would require that the MDS transmitter site is chosen such that receive antennas, in being directed towards the MDS transmitter, are pointing away from the Gnangara earth station.
- The possibility of interference to receivers at Northam to the east and Moora to the north seems minimal (some receive antenna directivity may need to be employed).
- To the south-east, receivers at Narrogin are unlikely to suffer interference from Gnangara, even without the benefit of antenna directionality.

**Interference Potential: MDS Group B Channels to Deep Space Research Services**

There is considerable potential for some regional MDS transmitters operating in the Group B band (2300 – 2400 MHz) to cause harmful interference to receivers of the deep space research services operated at Tidbinbilla (ACT) and Parkes (NSW). The mechanisms for this interference are:
1. **Noise Floor Degradation.** Earth station receivers are highly sensitive. Out of band emissions from MDS transmissions (in the band 2300 - 2400 MHz) falling in the deep space band may diminish the ability of earth station receivers to receive low level signals from deep space satellites (see diagram 2 below). These emissions are typical broadband noise emissions. To protect the noise floor of earth station receivers, unwanted signals in the band 2290 - 2300 MHz shall not exceed a level of -192 dBm/Hz at the output of the antenna into the receiver's low noise amplifier for more than 0.001% of the time. This level is derived from internationally agreed protection criteria for deep space services.

![Diagram 2 - Noise Floor Degradation](image)

2. **Receiver Overload.** Earth station receivers have a wide bandwidth (typically 100 MHz). MDS emissions falling in this bandwidth may cause the earth station receivers to overload. To protect earth station receivers at Parkes from overload, the aggregate of MDS emissions is required to not exceed -30 dBm at the output of the Parkes antenna into the receiver's low noise HEMT amplifier in the band 2240 - 2340 MHz. Receiver overload level for the Tidbinbilla earth station receiver low noise MASER amplifier is -85 dBm in the band 2260 - 2300 MHz, increasing by 0.5 dB per MHz outside of this band.
Figure 3. Coordination boundaries around Parkes and Tidbinbilla earth station facilities
In demonstrating that the deep space protection requirements are met, MDS licensees must calculate the predicted propagation loss\(^1\) between the Parkes/Tidbinbilla earth station receivers and any MDS transmitter proposed for siting within a specified co-ordination boundary surrounding those facilities. The method of propagation loss prediction to be applied is specified in Assessment D of the MDS Guidelines, and is based on ITU-R Recommendation 452-5. The co-ordination boundaries, within which compliance with the protection criteria must be demonstrated as being met, are illustrated in Figure 3. Broadly these boundaries can be described as follows:

**Parkes**
- For MDS transmitters of up to 60 dBm (1 kW) EIRP - a circle of radius 250 km around the site of the Parkes radiotelescope (Australian Map Grid coordinates: Zone 55, Easting 618000, Northing 6348000); and
- for transmitters exceeding 60 dBm EIRP - the circle radius is extended by 12 km for every dB by which the EIRP exceeds 60 dBm.

**Tidbinbilla**
- For MDS transmitters of up to 60 dBm (1 kW) EIRP - a circle of radius 180 km\(^2\) around the Tidbinbilla facility (Australian Map Grid coordinates: Zone 55, Easting 679700, Northing 6080400); and
- for transmitters exceeding 60 dBm EIRP - the circle radius is extended by 12 km for every dB by which the EIRP exceeds 60 dBm.

If the predicted propagation loss as indicated by the calculations would not sufficiently attenuate the unwanted MDS signal at the relevant earth station receiver to meet the protection criteria, then extra transmission losses must be provided (eg through additional filtering of the MDS transmitter output in the deep space band, or use of a directional antenna to focus radiation away from the earth station receivers) such that the total transmission loss\(^3\) would result in the protection requirements being met. Note that in some cases it will not be possible to meet the protection requirements and, as a consequence, siting of MDS transmitters at some locations within the coordination zone will not be possible.

**Predicted Propagation Losses**

The SMA has predicted propagation losses between various regional sites within the above co-ordination boundaries and the Parkes and Tidbinbilla facilities, using the method contained in the MDS Guidelines. The predicted losses are presented at Tables 4 and 5; the following comments are relevant to their interpretation:

---

\(^1\) A signal propagated over a path between a transmitting antenna and a receiving antenna is subject to attenuation (ie a reduction in level) with distance, due to its spreading out from the source and the effects of terrain and atmosphere. The loss incurred by the signal as a result of these factors is referred to as the propagation loss.

\(^2\) This radius is less than required for the Parkes facility because additional terrain protection is afforded to the Tidbinbilla facility by its location in the Tidbinbilla Valley.

\(^3\) Additional signal losses between the transmitter and receiver, when added to the propagation loss, produce a total loss figure which is termed the total transmission loss.
Technical Requirements – Part B – the Potential for Interference Between Regional MDS Services and Earth Stations for the Space Research Services

• The propagation loss calculations were performed for path profiles extending between high sites in the vicinity of the locations indicated on each table (eg Wagga or Young) and the facilities at Parkes (refer Table 4) or Tidbinbilla (refer Table 5). The distance to each of these sites is contained in the "DISTANCE TO SITE" field.

• The exact locations of each of the sites named in Tables 4 and 5, and the antenna heights assumed at each site, are specified at Annex B (Part 1).

• Propagation losses were predicted for three modes of propagation - troposcatter, ducting/layer reflection and diffraction for 0.001 % of the time. The results for each prediction are contained in the fields labelled "Troposcatter", "Ducting" and "Diffraction". An entry of "n/a" in the "Predicted Loss" field indicates that the path profile does not qualify for consideration under specific modes of propagation (eg diffraction loss predictions are not performed for path distances exceeding 200 km).

• The field labelled "Combined" contains the predicted value of propagation loss to be used for interference calculations. It represents the result of combining the individual propagation losses predicted for each of the three propagation modes in order to establish an overall prediction, using the combining method referred to in the MDS Guidelines. (The method results in the lowest loss value of the three modes being dominant).

• The SMA has calculated the minimum propagation loss required for a 1 kW EIRP MDS emission to meet the deep space protection criteria. These calculations are detailed at Annex B (Part 2) and the results listed in the table below:

<table>
<thead>
<tr>
<th></th>
<th>Parkes</th>
<th>Tidbinbilla</th>
</tr>
</thead>
<tbody>
<tr>
<td>noise floor protection⁴</td>
<td>196 dB (channel 6)</td>
<td>249 dB (channel 6)</td>
</tr>
<tr>
<td></td>
<td>173 dB (channels 7 - 19)</td>
<td>226 dB (channels 7 - 19)</td>
</tr>
<tr>
<td>receiver overload protection⁵</td>
<td>98 dB (all channels)</td>
<td>200 - 3.5(n - 6) dB (n = 6 - 19)</td>
</tr>
</tbody>
</table>

**TABLE 3 - Minimum Propagation Loss Required Between an MDS Transmitter and Earth Station Receiver**

Note that for the noise floor protection requirement a value was calculated for the condition where channels 7 - 19 are operating, and also for the condition where channel 6 is operating⁶ (alone or with other channels). For the receiver overload

---

⁴ Noise floor protection relates to protection of the receiver from received noise power (this term is used in the MDS Guidelines) in the band 2290 - 2300 MHz.

⁵ Overload protection relates to protection of the receiver from received power (this term is used in the MDS Guidelines) in the overload band of the receiver.

⁶ A distinction has been made for the channel 6 case because of the proximity of this channel (centre frequency at 2305.5 MHz) to the deep space band (2290 – 2300 MHz). SMA measurements indicate that typical MDS transmitters have unwanted emission components around 60 dB below maximum EIRP within 7 MHz of the lower edge of the channel in which the transmitter is operating (the dominant emissions are discrete spurious emissions), but that the emissions are broadband noise in nature and are at least 90 dB below maximum EIRP (when measured in a 1 kHz bandwidth) at frequencies more than 7 MHz removed from the lower channel edge. Consequently, MDS transmitters operating on channel 6 are anticipated to produce emission levels in the deep
requirement at Parkes one value has been calculated for all channels, due to the flat characteristic of the overload requirement. For the receiver overload requirement at Tidbinbilla an equation reflecting the roll-off characteristic of the overload requirement is given.

- The "Extra Loss Reqd Noise Floor (Channels 7 - 19)" field contains the value of additional attenuation that must be added to the predicted propagation loss for operation of channels 7 to 19, such that the total transmission loss required for noise floor protection is achieved. All extra loss values are based on an MDS EIRP of 1 kW.
- The "Extra Loss Reqd Noise Floor (Channel 6 )" field contains the value of additional attenuation which must be added to the predicted propagation loss for operation of channel 6, such that the total transmission loss required for noise floor protection is met. All extra loss values are based on an MDS EIRP of 1 kW.
- The "Extra Loss Reqd Receiver Overload" field contains the value of additional attenuation which must be added to the predicted propagation loss, such that the total transmission loss required for receiver overload is met. All extra loss values are based on an MDS EIRP of 1 kW.
- The "Measured Loss" field contains propagation loss values derived from received signal level measurements taken during field trials. Annex B (Part 3) summarised how these values were derived. In many cases the measured propagation losses are considerably greater than those in the "Combined" field. The following factors would contribute to these differences:
  - The predicted values represent the propagation losses required to ensure that the interference threshold of the earth station receivers is not exceeded more than 0.001% of the time, due to tropospheric, ducting/layer reflection and diffraction modes of propagation. The measured propagation loss values were, however, derived from measurements taken over a short period on one particular day, and therefore do not include any provision for the transient and/or anomalous propagation modes which are catered for in the prediction method of the MDS Guidelines. These modes of propagation could result in higher interfering signals at the earth station receivers than might otherwise be expected, ie for interference management purposes, the propagation loss for these modes is considerably lower than that indicated by short term measurements.
  - In the Tidbinbilla case (Table 5), the sites at which measurements were taken were not identical to those used to predict propagation loss. The measurements taken around Tidbinbilla were primarily aimed at quantifying the potential for interference from Tidbinbilla transmissions to MDS Group A receivers. Hence, measurement sites were selected based on their likelihood of being representative of receiver sites within an MDS service area; they were

---

7 The 0.001% time percentage figure used in the propagation loss prediction is recommended by the International Telecommunication Union (ITU) to ensure adequate protection of deep space receivers against both short term (ie transient and/or anomalous) and long term interference.
Technical Requirements – Part B – the Potential for Interference Between Regional MDS Services and Earth Stations for the Space Research Services

typically lower in elevation, and some distance from the potential transmit sites upon which propagation loss predictions were based.

- Note that, as stated previously, calculation of the predicted propagation loss according to the MDS Guidelines, rather than use of a measured propagation loss, is fundamental to demonstrating that protection requirements for earth station receivers will be met.

- For most of the sites assessed, the dominant mechanism for interference to earth station receivers is noise floor degradation. It should be noted, however, that for two sites in Table 5 (Young and Goulburn) additional measures would be required to meet the receiver overload protection requirement for the Tidbinbilla earth station.

### TABLE 4: - Assessment of Required Propagation Losses between Various Regional Sites and the Parkes Earth Station

<table>
<thead>
<tr>
<th>DISTANCE TO SITE</th>
<th>WAGGA</th>
<th>MT CER-</th>
<th>CRUAICH</th>
<th>YOUNG</th>
<th>BLAYNEY</th>
<th>GRENFELL</th>
<th>ORANGE</th>
<th>FORBES</th>
<th>PARKES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>250 km</td>
<td>197 km</td>
<td>144 km</td>
<td>117 km</td>
<td>102 km</td>
<td>77 km</td>
<td>50 km</td>
<td>17 km</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PREDICTED LOSS</th>
<th>Loss (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Troposcatter</td>
<td>190</td>
</tr>
<tr>
<td></td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>178</td>
</tr>
<tr>
<td></td>
<td>179</td>
</tr>
<tr>
<td></td>
<td>205</td>
</tr>
<tr>
<td></td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>163</td>
</tr>
<tr>
<td></td>
<td>n/a</td>
</tr>
<tr>
<td>Ducting</td>
<td>167</td>
</tr>
<tr>
<td></td>
<td>171</td>
</tr>
<tr>
<td></td>
<td>162</td>
</tr>
<tr>
<td></td>
<td>178</td>
</tr>
<tr>
<td></td>
<td>198</td>
</tr>
<tr>
<td></td>
<td>154</td>
</tr>
<tr>
<td></td>
<td>146</td>
</tr>
<tr>
<td></td>
<td>n/a</td>
</tr>
<tr>
<td>Diffraction</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>189</td>
</tr>
<tr>
<td></td>
<td>168</td>
</tr>
<tr>
<td></td>
<td>195</td>
</tr>
<tr>
<td></td>
<td>196</td>
</tr>
<tr>
<td></td>
<td>159</td>
</tr>
<tr>
<td></td>
<td>186</td>
</tr>
<tr>
<td></td>
<td>113</td>
</tr>
<tr>
<td>Combined</td>
<td>167</td>
</tr>
<tr>
<td></td>
<td>171</td>
</tr>
<tr>
<td></td>
<td>162</td>
</tr>
<tr>
<td></td>
<td>177</td>
</tr>
<tr>
<td></td>
<td>195</td>
</tr>
<tr>
<td></td>
<td>153</td>
</tr>
<tr>
<td></td>
<td>146</td>
</tr>
<tr>
<td></td>
<td>113</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXTRA LOSS REQD</th>
<th>Loss (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise Floor</td>
<td></td>
</tr>
<tr>
<td>Channels 7 - 19</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>nil</td>
</tr>
<tr>
<td></td>
<td>nil</td>
</tr>
<tr>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>60</td>
</tr>
<tr>
<td>Channel 6</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>83</td>
</tr>
<tr>
<td>Receiver Overload</td>
<td></td>
</tr>
<tr>
<td>All Channels</td>
<td>nil</td>
</tr>
<tr>
<td></td>
<td>nil</td>
</tr>
<tr>
<td></td>
<td>nil</td>
</tr>
<tr>
<td></td>
<td>nil</td>
</tr>
<tr>
<td></td>
<td>nil</td>
</tr>
<tr>
<td></td>
<td>nil</td>
</tr>
<tr>
<td></td>
<td>192</td>
</tr>
<tr>
<td></td>
<td>167</td>
</tr>
<tr>
<td></td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>145</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MEASURED LOSS</th>
<th>Loss (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>192</td>
</tr>
<tr>
<td></td>
<td>167</td>
</tr>
<tr>
<td></td>
<td>184</td>
</tr>
<tr>
<td></td>
<td>145</td>
</tr>
</tbody>
</table>
Technical Requirements – Part B – the Potential for Interference Between Regional MDS Services and Earth Stations for the Space Research Services

### TABLE 5 - Assessment of Required Propagation Losses between Various Regional Sites and the Tidbinbilla Earth Station

<table>
<thead>
<tr>
<th>DISTANCE TO SITE</th>
<th>BOWRAL</th>
<th>WAGGA</th>
<th>YOUNG</th>
<th>COOTAMUNDRA</th>
<th>MT WANDERRA</th>
<th>GOULBURN</th>
<th>COOMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>km</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>168</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>149</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>135</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>121</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>103</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>101</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PREDICTED LOSS</th>
<th>Loss (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Troposcatter</td>
<td>241</td>
</tr>
<tr>
<td></td>
<td>217</td>
</tr>
<tr>
<td></td>
<td>185</td>
</tr>
<tr>
<td></td>
<td>203</td>
</tr>
<tr>
<td></td>
<td>230</td>
</tr>
<tr>
<td></td>
<td>217</td>
</tr>
<tr>
<td></td>
<td>216</td>
</tr>
<tr>
<td>Ducting</td>
<td>220</td>
</tr>
<tr>
<td></td>
<td>222</td>
</tr>
<tr>
<td></td>
<td>187</td>
</tr>
<tr>
<td></td>
<td>225</td>
</tr>
<tr>
<td></td>
<td>249</td>
</tr>
<tr>
<td></td>
<td>191</td>
</tr>
<tr>
<td></td>
<td>235</td>
</tr>
<tr>
<td>Diffraction</td>
<td>204</td>
</tr>
<tr>
<td></td>
<td>236</td>
</tr>
<tr>
<td></td>
<td>240</td>
</tr>
<tr>
<td></td>
<td>290</td>
</tr>
<tr>
<td></td>
<td>251</td>
</tr>
<tr>
<td></td>
<td>218</td>
</tr>
<tr>
<td></td>
<td>279</td>
</tr>
<tr>
<td>Combined</td>
<td>204</td>
</tr>
<tr>
<td></td>
<td>217</td>
</tr>
<tr>
<td></td>
<td>185</td>
</tr>
<tr>
<td></td>
<td>203</td>
</tr>
<tr>
<td></td>
<td>230</td>
</tr>
<tr>
<td></td>
<td>191</td>
</tr>
<tr>
<td></td>
<td>216</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXTRA LOSS REQD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise Floor</td>
</tr>
<tr>
<td>Channels 7 - 19</td>
</tr>
<tr>
<td>Channel 6</td>
</tr>
<tr>
<td>Receiver Overload</td>
</tr>
<tr>
<td>Channels 6 - 19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MEASURED LOSS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>257 265 245</td>
</tr>
</tbody>
</table>

*NOTE*
This is the calculated worse case value, and applies to channel 6. Using the equation for receiver overload (ie required loss = 200 - 3.5(n - 6); where n is the channel number of the Group B channel under assessment) indicates that potentially 5 channels at Wagga and 3 at Goulburn have to be considered when assessing the receiver overload criteria at these sites.

Discussion Regarding the Potential for Interference from MDS Channels 7 to 19

Table 4 indicates that the propagation losses between the Parkes receiver and the Blayney and Grenfell sites are sufficient to allow the operation of MDS transmitters from those sites on channels 7 - 19 without any additional transmission loss. However the operation of MDS transmitters from the other sites indicated in Table 4 would require some extra transmission loss in each case.

Table 5 indicates that the propagation losses between the Tidbinbilla receiver and the Mt Wanderra site (on the NSW south coast) are sufficient to allow the operation of MDS transmitters from those sites on channels 7 - 19 without any additional transmission loss. Operation from the Wagga and Cooma sites would require moderate amounts of extra transmission loss, whereas MDS transmissions from the remaining sites in Table 5 would require significant extra transmission losses to meet the Tidbinbilla receiver protection criteria.

Achievement of the extra transmission losses indicated in Tables 4 and 5 could be accomplished in some cases with modest amounts of filtering and careful selection of transmitter power and antenna radiation pattern. For example, a typical two resonator band stop filter is able to provide an attenuation of around 30 dB in the band 2290 - 2300 MHz. However, it should be noted that the characteristic of such a filter is not that of a "brick wall", ie the attenuation provided by the filter in the stop band is the result of a gradual "roll-off" from approximately 0 dB at 2350 MHz, to the maximum of 30 dB in the band 2290 to 2300 MHz.
To illustrate the effect of this roll-off characteristic, consider the propagation loss prediction between Forbes and the Parkes earth station (refer Table 4). This indicates that an extra transmission loss of 27 dB is required for operation of a 1 kW EIRP MDS transmitter sited at Forbes on channels in the range 7 to 19. The filter described above requires 50 MHz to achieve a final attenuation in its stop band of 30 dB. Channel 13 has its band edge at 2351 MHz, so placement of such a filter on the output of a channel 13 transmitter would achieve the required 27 dB of extra attenuation (with 3 dB to spare) and without significant attenuation of the wanted transmission on channel 13. Similarly, such a filter placed on the outputs of transmitters operating at Forbes on channels 14 to 19 would ensure that they also meet the protection criteria. Channels 7 to 12 are, however, too close to the band 2290 - 2300 MHz to exploit the attenuation characteristics of the abovementioned filter without incurring some attenuation of the wanted MDS signals. For transmitters to operate on these channels, other measures to increase the transmission loss may need to be taken (eg use of a more complex filter, reducing transmitter EIRP, and/or using directional transmit antennas).

In some cases no practical measures will be able to achieve the required transmission loss, and as a result such sites will not be viable for the location of MDS transmitters.

Discussion Regarding the Potential for Interference From MDS Channel 6

For MDS transmitters operating on channel 6, almost all sites on Tables 4 and 5 require significant amounts of extra transmission loss to meet the earth station receiver protection criteria. It is reasonable to conclude that this situation would prevail for most potential MDS transmitter sites within the specified co-ordination boundaries for Parkes and Tidbinbilla. Even the combined effects of filtering, transmitter power reduction and antenna directionality may not provide sufficient extra transmission loss in these cases. It is likely therefore that many MDS transmitters proposed for operation on channel 6 within these co-ordination boundaries would not be able to meet the noise threshold protection criteria for Parkes and Tidbinbilla.

MDS Transmitter Site Engineering Issues

The above material has examined the potential for interference between individual MDS systems and space research services at Parkes, Tidbinbilla or Gnangara. Where a number of MDS transmitters are co-sited, additional unwanted signals known as intermodulation products are likely to occur. Some of these intermodulation products may have the potential to cause interference to space research services. MDS licensees will be responsible for resolving any interference to space research services from generated intermodulation products. It is therefore in MDS licensees' interests to apply good engineering site practices in order to minimize the generation of these products.
ANNEX A

SHORT TERM SIGNAL LEVEL VARIATIONS
MEASURED AT COOTAMUNDRA
Short term signal level variations measured at Cootamundra
Technical Requirements – Part B – the Potential for Interference Between Regional MDS Services and Earth Stations for the Space Research Services

ANNEX B

INFORMATION USED IN COMPILING TABLES 4 and 5
## PART 1: LOCATIONS OF SITES FOR WHICH PROPAGATION LOSS CALCULATIONS WERE PERFORMED FOR THE PARKES AND TIDBINBILLA EARTH STATIONS

<table>
<thead>
<tr>
<th>Site</th>
<th>Australian Map Grid Coordinates</th>
<th>Assumed Antenna Height (metres above the site)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zone</td>
<td>Easting</td>
</tr>
<tr>
<td><strong>Receivers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PARKES EARTH STATION</td>
<td>55</td>
<td>618000</td>
</tr>
<tr>
<td>TIDBINBILLA EARTH STATION</td>
<td>55</td>
<td>679700</td>
</tr>
<tr>
<td><strong>MDS Transmitters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blayney</td>
<td>55</td>
<td>715753</td>
</tr>
<tr>
<td>Bowral</td>
<td>56</td>
<td>263600</td>
</tr>
<tr>
<td>Cooma</td>
<td>55</td>
<td>686800</td>
</tr>
<tr>
<td>Cootamundra</td>
<td>55</td>
<td>594714</td>
</tr>
<tr>
<td>Goulburn</td>
<td>55</td>
<td>752900</td>
</tr>
<tr>
<td>Forbes</td>
<td>55</td>
<td>594050</td>
</tr>
<tr>
<td>Grenfell</td>
<td>55</td>
<td>603500</td>
</tr>
<tr>
<td>Mt Cen-Cruaich</td>
<td>55</td>
<td>692300</td>
</tr>
<tr>
<td>Mt Wanderra</td>
<td>56</td>
<td>229300</td>
</tr>
<tr>
<td>Orange (Mt Canobolas)</td>
<td>55</td>
<td>684412</td>
</tr>
<tr>
<td>Parkes</td>
<td>55</td>
<td>610200</td>
</tr>
<tr>
<td>Wagga</td>
<td>55</td>
<td>533800</td>
</tr>
<tr>
<td>Young</td>
<td>55</td>
<td>620000</td>
</tr>
</tbody>
</table>
PART 2: CALCULATION OF THE MINIMUM PROPAGATION LOSS REQUIRED TO MEET THE DEEP SPACE PROTECTION CRITERIA

Summary of Parameters Used

Parkes Earth Station
- Antenna gain of 0 dBi in the direction of the horizon (minimum elevation of Parkes antenna is 30.5 degrees, angle to horizon is ≈ 1 degree, gain at this elevation is 0 dBi - from information supplied by the Parkes Observatory).
- Noise floor protection level of -192 dBm/Hz in the band 2290 - 2300 MHz.
- Receiver overload level of -30 dBm in the band 2240 - 2340 MHz.

Tidbinbilla Earth Station
- Antenna gain of 53 dBi in the direction of the horizon (maximum antenna gain of 63 dBi derated by 10 dB, as per ITU Recommendation ITU-R IS.849-1).
- Noise floor protection level of -192 dBm/Hz in the band 2290 - 2300 MHz.
- Receiver overload level of -85 dBm in the band 2260 - 2300 MHz, increasing by 0.5 dB per MHz outside of this band.

MDS Transmitter Characteristics
- **Power**
  EIRP of 60 dBm (1 kW).

- **Emissions in the Deep Space Band 2290 - 2300 MHz**
  *MDS Channel 6.* Emissions at the edge of the deep space band (2300 MHz) are a minimum of 56.25 dB below the maximum EIRP (derived from MDS emission mask). For the purposes of noise floor protection propagation loss calculations, this emission is modelled as:
  
  \[
  P_u = \text{EIRP (dBm)} - 56.25 \text{ dBm/Hz.}
  \]

  *MDS Channels 7 - 19.* SMA measurements indicate that typical MDS transmitters have unwanted emission at a level 90 dB (when measured in a 1 kHz bandwidth) below the maximum EIRP. For the purposes of noise floor degradation propagation loss calculations this emission is modelled as:
  
  \[
  \text{EIRP (dBm)} - 90 \text{ dBm/Hz.}
  \]

**NOTE:** Measurements were done with a laboratory grade spectrum analyser using a 1 kHz measurement bandwidth, and the only apparent signal present was broadband noise, at a level around 90 dB below maximum EIRP. The dominant source of this noise may have been the MDS transmitter, or the measurement device itself. Suffice to say, the measurements indicate that all emissions from an MDS transmitter are at least below this level. While it might seem reasonable to then normalise this result to unit bandwidth (ie 120 dB/Hz below maximum EIRP) for the purpose of determining a minimum propagation loss requirement, this can only be done with certainty if it is known that there are no low level discrete unwanted emissions masked by the broadband noise. The propagation loss calculations were therefore done based on the only known criterion, namely, that all unwanted emissions will be more than 90 dB below maximum EIRP, whether discrete or broadband in nature, with this level then normalised to unit bandwidth. Measurements done at narrower bandwidths may indeed reveal the absence of lower level discrete unwanted emissions, and the propagation loss calculation can be adjusted accordingly. In situations where an additional loss has been calculated to be required (eg Young, Table 5) the application of a lower known level of unwanted emissions will lessen the amount of additional loss actually required.
For multiple interferers (e.g., multiple MDS signals) the total interference power at a receiver can be modelled as:

\[
Pr_u = \sum a_i Pr_i
\]

where

- \(Pr_u\): is the total interfering signal power at the receiver (watts).
- \(Pr_i\): is the interfering signal power at the receiver from the \(i\)-th interfering transmitter (watts).
- \(a_i\): protection ratio (as a linear, not logarithmic, ratio) associated with the \(i\)-th interfering transmitter.

This equation can be used in situations where multiple transmissions have different protection requirements (e.g., receiver overload at Tidbinbilla). For the simple case where the protection ratios are the same, and there are "\(n\)" interfering signals of equal power \(P_i\) (dBm) the total interfering signal power (in dBm) is \(P_i + 10 \log n\).

Thus values for \(F_a\) (used in equation 1 below to account for multiple interferers), calculated in accordance with the above method, are shown in the table below.

<table>
<thead>
<tr>
<th></th>
<th>Parkes</th>
<th>Tidbinbilla</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overload Protection (dB)</td>
<td>Noise Threshold Protection (dB)</td>
</tr>
<tr>
<td>Channel 6</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Channels 7 to 19</td>
<td>8</td>
<td>11</td>
</tr>
</tbody>
</table>

**Values for \(F_a\)**
Calculation Of Minimum Propagation Loss Required

In calculating the minimum propagation loss required to meet the noise floor and receiver overload protection levels, the generic equation below was used:

\[
L_b = P_t + G_{te} - P_r + G_r + F_a
\]  

Equation 1

where:

- \( L \): propagation loss between MDS transmit and earth station receive antennas (dB)
- \( P_t \): MDS transmitter power (dBm)
- \( G_{te} \): gain of MDS transmitting antenna in the direction of the earth station (dBi)
- \( P_r \): power received at the earth station receiver (dBm)
- \( G_r \): gain of earth station receiving antenna (dBi)
- \( F_a \): factor to account for the additive contributions from multiple MDS transmissions (dB)

and using:

\( G_r^8 \) (Tidbinbilla) = 53 dBi

\( G_r^8 \) (Parkes) = 0 dBi

for Receiver Overload protection:

\( P_t + G_{te} = 60 \) dBm

\( P_r \) (Parkes) = -30 dBm

\( F_a \) (Parkes) = 8 dB

\( P_r \) (Tidbinbilla) = -85 dBm + 0.5 dB per MHz above 2300 MHz

\( F_a \) (Tidbinbilla) = 3 dB

for Noise Floor protection:

Channel 6

\( P_t^{10} + G_{te} = 60 - 56.25 \) dBm

\( F_a = 0 \) dB

Channels 7 - 19

\( P_t^{10} + G_{te} = 60 - 90 \) dBm

\( F_a = 11 \) dB

\( P_r^{11} = -192 \) dBm

---

8 Equivalent to \( G_{rm} \) in Assessment D of the MDS Guidelines.

9 Note that this value was calculated assuming a protection ratio of \( a_i = 1 \) for MDS Channel 6, and de-rating the protection ratio at subsequent channel centre frequencies by 0.5 dB per MHz.

10 Equivalent to \( P_{tn} \) in Assessment D of the MDS Guidelines.

11 Equivalent to \( P_{rn} \) in Assessment D of the MDS Guidelines.
Substituting the above values into equation 1 yields the following minimum propagation losses required between proposed MDS transmitters and the Parkes and Tidbinbilla earth stations:

**Parkes**
- noise floor protection: 196 dB (channel 6)
- noise floor protection: 173 dB (channels 7 - 19)
- receiver overload protection: 98 dB (all Group B channels)

**Tidbinbilla**
- noise floor protection: 249 dB (channel 6)
- noise floor protection: 226 dB (channels 7 - 19)
- receiver overload protection: $200 - 3.5(n - 6)$ dB
  (where n is the channel number of the Group B channel under assessment)

### PART 3: MEASURED PROPAGATION LOSS

**Parkes**

Measured propagation loss was derived using equation 1 (from Part 2 of this Annex) with the following parameter values:

- $P_r$: signal level measured during field trials conducted by the Department of Communications and the Arts Laboratory.
- $P_t + G_t$: 1 kW (60 dBm).
- $G_r$: 20 dBi (gain of the receive antenna used in the field trials).

**Tidbinbilla**

Measured propagation loss was derived using equation 1 (from Part 2 of this Annex) with the following parameter values:

- $P_r$: measured signal levels from Table 1 - supplied by the Department of Communications and the Arts Laboratory*.
- $P_t$: 20 kW (73 dBm)
- $G_t$: 53 dBi.
- $G_r$: 20 dBi.

* **NOTE:** These measurements were aimed at quantifying the potential for interference from Tidbinbilla transmissions to MDS Group A receivers. Path reciprocity is assumed, so the propagation loss values calculated from these measurements have been applied to the converse situation being assessed in Table 5.
ASSESSING THE POTENTIAL FOR INTERFERENCE TO REGIONAL MDS RECEIVERS FROM EARTH STATION TRANSMITTERS
ASSESSING THE POTENTIAL FOR INTERFERENCE TO REGIONAL MDS RECEIVERS FROM EARTH STATION TRANSMITTERS

The procedure below specifies a method to assess the potential for interference to a proposed MDS Group A receiver from an earth station transmitter in the space research service\(^1\). The procedure is provided as one example of how such an assessment could be done by an MDS licensee, and was used by the SMA in preparing the information on the potential for interference to MDS receivers from co-channel transmissions from the Gnangara earth station near Perth, for inclusion in part B of Section 2 of the MDS Coordination Handbook. A detailed discussion of the various interference mechanisms between MDS services and earth stations can also be found in Part B.

The methodology employed is as follows:
- **Step 1**: Determine if a detailed interference assessment needs to be done for the location of the proposed MDS service.
  - If a detailed assessment needs to be done then:
    - **Step 2**: Calculate the propagation loss between the earth station transmitter and a proposed MDS receiver.
    - **Step 3**: Calculate the received signal level.
    - **Step 4**: Assess the received level against protection requirements.

### Step 1: Identifying if an Interference Assessment is Necessary

The following information can be used to determine if a detailed interference assessment is necessary:
- proposed location of Group A MDS transmitter (known by MDS licensee)
- location of Gnangara Earth Station\(^2\)
- location of Tidbinbilla Earth Station

Note: Knowing the relative locations of a proposed MDS transmitter (around which MDS receivers can be expected to be sited) and existing earth station transmitters provides a simple test to determine if a more detailed assessment should be done.

**Gnangara**

Interference to MDS receivers from Gnangara earth station transmitters may occur if an MDS Group A transmitter is located within a radius of 250 km from the Gnangara facility.

**Tidbinbilla**

Interference to MDS receivers from Tidbinbilla earth station transmitters may occur if an MDS Group A transmitter is located within a radius of 180 km from the Tidbinbilla facility.

### Step 2: Calculating Propagation Loss

\(^1\) The SMA considers that earth station transmitters in the space research service are not likely to interfere with Group B MDS receivers.

\(^2\) See Annex A.
Technical Requirements – Part C - Assessing the Potential for Interference to Regional MDS receivers from Earth Station Transmitters

The following information is needed to complete this calculation:

- MDS receiver location, site height, antenna height and antenna gain in the direction of the earth station transmitter (known by MDS licensee)
- terrain profile between MDS receiver and earth station transmitter (determined by the MDS licensee)
- Earth station transmitter location, site height, antenna height and antenna gain in the direction of the MDS receiver
- required time percentage for which the calculated basic transmission loss should not be exceeded
- meteorological data for path profile under assessment

The propagation loss between an earth station transmitter and the MDS receiver under assessment is calculated using ITU Rec 452-5.

**Step 3: Calculating Received Signal Levels**

The following information is needed for this calculation:

- propagation loss (as calculated at Step 2 above)
- earth station transmitter power and antenna gain

The unwanted field strength at an MDS receiver is then calculated using the following equation:

\[ E_u = 77.21 + 20\log(f) + P_t + G_{tm} - L \]

\[ \text{where:} \]
\[ E_u = \text{unwanted field strength (dBuV/m)} \]
\[ f = \text{MDS receiver frequency (MHz)} \]
\[ P_t = \text{earth station transmitter power (dBm)} \]
\[ G_{tm} = \text{gain of the earth station transmitter antenna in the direction of the MDS receiver (dBi)} \]
\[ L = \text{propagation loss as calculated at Step 2 (dB)} \]

**Step 4: Assessing Received Levels Against Protection Requirements**

The following information is needed for this assessment:

- unwanted field strength (as calculated at Step 3 above)
- MDS receiver protection requirements (see below)

An earth station transmitter has the potential to cause interference to an MDS receiver if:

\[ E_u \geq 32 \text{ dBuV/m} \]

---

14 See Annex A.
15 See Annex B.
16 See Annex A.
ANNEX A

CHARACTERISTICS OF EARTH STATIONS IN THE DEEP SPACE RESEARCH SERVICE
CHARACTERISTICS OF EARTH STATIONS IN THE DEEP SPACE RESEARCH SERVICE

Gnangara Earth Station
Australian Map Grid coordinates for the Gnangara facility are:
- Zone: 50
- Easting: 394330
- Northing: 6480766

Site height: 40 m AHD
Antenna height: 50 m
Earth station transmitter power: 2 kW
Antenna gain in the direction of an MDS receiver (G_{tn}): 20 dBi

Tidbinbilla Earth Station
Australian Map Grid coordinates for the Tidbinbilla facility are:
- Zone: 55
- Easting: 679700
- Northing: 6080400

Site height: 640 m AHD
Antenna height: 50 m
Earth station transmitter power: 20 kW
Antenna gain in the direction of an MDS receiver (G_{tn}): 53 dBi
ANNEX B

CALCULATION OF PROPAGATION LOSS BETWEEN MDS SERVICES AND EARTH STATIONS IN THE SPACE RESEARCH SERVICE
CALCULATION OF PROPAGATION LOSS BETWEEN MDS SERVICES AND EARTH STATIONS IN THE SPACE RESEARCH SERVICE

Basic Transmission Loss Calculation
International Telecommunication Union (ITU) Recommendation 452-5: "Prediction Procedure for the Evaluation of Microwave Interference Between Stations on the Surface of the Earth at Frequencies Above About 0.7 GHz" (1992) is specifically intended for interference prediction purposes, and can be used for the prediction of basic transmission loss (ie propagation loss) between earth stations in the space research service and MDS services. The Recommendation provides for prediction of propagation loss due to tropospheric, ducting/layer reflection, diffraction and enhanced line of sight modes of propagation; based on a nominated time percentage for which the predicted propagation loss is not exceeded.

The information below lists sections of the Recommendation relevant to assessing the potential for interference from earth stations to MDS Group A receivers, and specifies parameter values to be used when applying the Recommendation to the calculation of propagation loss.

Note that a Microsoft Excel spreadsheet is available from the SMA, for the purpose of Rec 452-5 calculations associated with assessing the potential for interference from earth stations to MDS receivers.

Relevant Sections of ITU Recommendation 452-5
For the purpose of this assessment, the following parts of Rec 452-5 need to be applied in the propagation loss calculation:

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>Clear-air interference prediction</td>
</tr>
<tr>
<td>3.2.1</td>
<td>Outline of the procedure</td>
</tr>
<tr>
<td>3.2.3</td>
<td>Assembling the input data (excluding Table 2)</td>
</tr>
<tr>
<td>3.2.4</td>
<td>Radio-meteorological data for the path</td>
</tr>
<tr>
<td>3.2.5</td>
<td>Calculating predictions for appropriate individual mechanisms</td>
</tr>
<tr>
<td>3.2.6</td>
<td>Analysis of the path profile</td>
</tr>
<tr>
<td>3.2.7</td>
<td>Calculation of individual propagation predictions</td>
</tr>
<tr>
<td>3.2.8</td>
<td>Determine overall prediction</td>
</tr>
</tbody>
</table>

Note that the above Sections refer to supporting information in subsequent sections of Recommendation 452-5, of which the following are relevant:

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>Clear-air propagation models (excluding Figure 5)</td>
</tr>
<tr>
<td>Appendix 1</td>
<td>Radio-meteorological data required for the clear-air prediction procedure (excluding Figures 7 and 9, and sections 4 and 5)</td>
</tr>
<tr>
<td>Appendix 2</td>
<td>Path profile analysis</td>
</tr>
</tbody>
</table>

1 ITU Recommendations are available from the Standards Australia International Sales Group, Strathfield NSW.

2 The spreadsheet is specifically intended for use by prospective MDS licensees in performing Interference Assessment D of the MDS Guidelines. However, it can also be used to assess the potential for interference from earth stations to MDS receivers.
**Parameter Values To Be Used When Applying Rec 452-5**

When applying the Recommendation 452-5 method to assess the potential for interference from an earth station transmitter to an MDS receiver, the following parameter values should be used:

<table>
<thead>
<tr>
<th>Gnangara Earth Station</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>Required time percentage for which the calculated basic transmission loss is not exceeded.</td>
<td>10%³</td>
</tr>
<tr>
<td>ΔN</td>
<td>Average radio-refractive index lapse-rate through the first 1 km of the atmosphere (average annual values).</td>
<td>45</td>
</tr>
<tr>
<td>β₀</td>
<td>Time percentage for which super-refractive lapse rates with gradients of modulus exceeding 100 N-units/km can be expected in the lower atmosphere (average annual values).</td>
<td>5%</td>
</tr>
<tr>
<td>hₜ₉</td>
<td>Antenna centre height above ground level.</td>
<td>50 m</td>
</tr>
<tr>
<td>Gₜ</td>
<td>Antenna gain in the direction of the horizon along the great-circle interference path.</td>
<td>20 dBi</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tidbinbilla Earth Station</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>Required time percentage for which the calculated basic transmission loss is not exceeded.</td>
<td>10%³</td>
</tr>
<tr>
<td>ΔN</td>
<td>Average radio-refractive index lapse-rate through the first 1 km of the atmosphere (average annual values).</td>
<td>43</td>
</tr>
<tr>
<td>β₀</td>
<td>Time percentage for which super-refractive lapse rates with gradients of modulus exceeding 100 N-units/km can be expected in the lower atmosphere (average annual values).</td>
<td>8%</td>
</tr>
<tr>
<td>hₜ₉</td>
<td>Antenna centre height above ground level.</td>
<td>50 m</td>
</tr>
<tr>
<td>Gₜ</td>
<td>Antenna gain in the direction of the horizon along the great-circle interference path.</td>
<td>53 dBi</td>
</tr>
</tbody>
</table>

**NOTE:** The propagation loss predicted by this method is typically less than that which might be measured over a short observation period, or which may be calculated for the design of a communications link. This results from the consideration of anomalous propagation modes (tropospheric, ducting/layer reflection, diffraction and enhanced line of sight), which lower the predicted propagation loss, commensurate with the "p" value used (in this case 10%).

³ p = 10% is a value that is consistent with accepted broadcast planning procedures. Its use will yield the predicted propagation loss that would result in interference being received from an earth station for no more than 10% of the time.
RALI X 9: FREQUENCY COORDINATION OF FIXED LINKS WITH MDS SERVICES
The RALI FX 9 is available from the ACA web site at

Or, for a hard copy please email mat@aca.gov.au
LOCATION MAPS: FIXED LINKS THAT MAY AFFECT REGIONAL MDS SERVICES
Locations of fixed links that may affect proposed Group A regional MDS services
Locations of fixed links that may affect proposed Group B regional MDS services
SECTION 3

MDS INTERFERENCE ASSESSMENT STATEMENTS
GENERAL INFORMATION ON MDS INTERFERENCE ASSESSMENT STATEMENTS
GENERAL INFORMATION ON MDS INTERFERENCE ASSESSMENT STATEMENTS

The MDS Guidelines require that specific protection criteria be met by MDS services in relation to other services, as specified in Assessments A to D of the Guidelines. An MDS Interference Assessment Statement provides details of the results of these interference assessments. The SMA is offering a set of 7 forms to assist with consistent presentation of this information, in order to help with the exchange of information between MDS licensees and so that the SMA can more readily review the information against the protection criteria contained in the MDS Guidelines.

An Interference Assessment Statement should be submitted with each Regional MDS Transmitter Proposal (a copy of an MDS Transmitter Proposal form is at Attachment A in Section 4).

Content of an MDS Interference Assessment Statement

An MDS Interference Assessment Statement consists of three major elements, as follows:

• General Technical Requirements providing information relating to antenna and emission characteristics of the proposed MDS transmitter, as well as a statement on whether the proposed MDS transmitter will be co-sited with others in the same Area and Group.

• An Interference Assessment Summary providing key results arising from each interference assessment; presented in a standard tabular format.

• Interference Assessment Details containing technical calculations and results, performed in the manner specified in the MDS Guidelines, to demonstrate that proposed MDS transmitters will meet the interference criteria contained in the Guidelines.

Each of the above elements should contain the information indicated in the following paragraphs.

General Technical Requirements

1. Statements should be made regarding the actual technical characteristics of each proposed MDS station for the following items:
   • MDS Emissions (see clauses 4 and 5 of the MDS Guidelines);
   • Spurious emissions (see clause 6 of the MDS Guidelines); and
   • Unwanted emissions (see clause 7 of the MDS Guidelines).

2. A statement should be made as to whether or not the proposed transmitter will be co-sited with other MDS transmitters in the same Area and Group.

Interference Assessment Summary

The key results of each interference assessment should be provided in summary form, using the Interference Assessment Forms contained at Part B to this section. All the Forms 1 to 7 are available in electronic form from the SMA. Note that Form 7 has been prepared as a spreadsheet that performs the required ITU Rec 452-5 calculations.

Interference Assessment Details

Transmitter Characteristics
• In addition to the transmitter details provided on the MDS Transmitter Proposal, the following characteristics of the proposed MDS transmitter should be provided:
  - Maximum equivalent isotropically radiated power (EIRP) of transmitter.
  - MDS channel centre frequency.
  - Transmitter site height.
  - Antenna radiation pattern (in E and H planes), preferably in the form of a polar or X-Y coordinate plot.

Worked Interference Assessment
• The information required for Interference Assessments A to D of the MDS Guidelines should be presented in the following form:

Step 1: Identifying if an Interference Assessment is Necessary
- It would be useful to include sketch maps showing location and frequency of services assessed. These services should be listed in the Interference Assessment Summary, mentioned previously.

Step 2: Calculating Propagation or Terrain Loss
- The terrain profiles required by specific Interference Assessments in the MDS Guidelines should be provided. It would assist if the profiles are at least the size of an A4 sheet, with profiles covering more than 100 km of A3 size.
- For Assessments A to C, worked propagation loss calculations should be presented in the general form indicated in Step 2 of each Interference Assessment in the MDS Guidelines.
- For Assessment D, the ITU Rec 452-5 calculations should be set out in the tabular format shown on Interference Assessment Form 8 at Part B to this section.

Step 3: Calculating Received Signal Levels
- Received signal level calculations should be presented in the general form indicated in Step 3 of each Interference Assessment in the MDS Guidelines.

Step 4: Assessing Received Signal Levels Against Protection Requirements
- The assessment of received signal levels against protection requirements should be presented in the general form indicated in Step 4 of each Interference Assessment in the MDS Guidelines.

-------
SECTION 3
Part B

INTERFERENCE ASSESSMENT FORMS 1 TO 7
APPLICATION OF MDS INTERFERENCE ASSESSMENT FORMS
**Assessment A.1: MDS-MDS Co-Channel Assessment**

MDS Channel No: 

<table>
<thead>
<tr>
<th>Affected MDS Areas</th>
<th></th>
<th></th>
<th></th>
<th>d (km)</th>
<th>Lt (dB)</th>
<th>Eu (dBuV/m)</th>
<th>Protection Reqt Met * (Eu = &lt; 32 dBuV/m)</th>
<th>yes/no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licence Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Licence Area Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Licence Area Zone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Licence Area Easting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Licence Area Northing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**

d, Lt, Eu as per Interference Assessment A.1 of the MDS Guidelines

*Identify below licensees with whom agreement reached on exceedance of 32 dBuV/m (if applicable)

<table>
<thead>
<tr>
<th>Licence Area</th>
<th>Licensee</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Assessment A.2: MDS-MDS Adjacent Channel (field strength in other licence areas)**

MDS Channel No: 

<table>
<thead>
<tr>
<th>Licence Area No.</th>
<th>Licence Area Name</th>
<th>Zone</th>
<th>Easting</th>
<th>Northing</th>
<th>d (km)</th>
<th>Lt (dB)</th>
<th>Eu (dBuV/m)</th>
<th>Protection Reqt Met * (Eu = &lt; 76 dBuV/m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**

- d, Lt, Eu as per Interference Assessment A.2 of the MDS Guidelines

*Identify below licensees with whom agreement reached on exceedance of 76 dBuV/m (if applicable)

<table>
<thead>
<tr>
<th>Licence Area No.</th>
<th>Licence Area Name</th>
<th>Channel No.</th>
<th>Licensee</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Assessment A.3: MDS-MDS Adjacent Channel (field strength in the same licence area):

<table>
<thead>
<tr>
<th>MDS Channel No:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Adjacent Channel MDS Transmitter</th>
<th>Point on Assessment Area Boundary</th>
<th>Protection Requirement Met *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Name</td>
<td>Chan No</td>
<td>Zone</td>
</tr>
<tr>
<td>-----------</td>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
R, d, Lt, Eu: as per Interference Assessment A.3 of the MDS Guidelines

*Identify below licensees with whom agreement reached on exceedance of 76 dBuV/m (if applicable):

<table>
<thead>
<tr>
<th>Tx Site Name</th>
<th>Chan No.</th>
<th>Licensee</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MDS Coordination Handbook April 1995  137
Assessment B: MDS Transmitter to Fixed Link Receiver

<table>
<thead>
<tr>
<th>Assessment Details / Unwanted MDS Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDS Tx - Fixed Link Rx</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assnum</th>
<th>ZN</th>
<th>Easting</th>
<th>Northing</th>
<th>fr (MHz)</th>
<th>Pt (dBm)</th>
<th>Gt (dBi)</th>
<th>EIRP*</th>
<th>d (km)</th>
<th>Lbf (dB)</th>
<th>Gr (dBi)</th>
<th>Pw (dBm)</th>
<th>Gtf (dBi)</th>
<th>d (km)</th>
<th>Lb** (dB)</th>
<th>Grm (dB)</th>
<th>Pu (dBm)</th>
<th>W/U (dB)</th>
<th>PR (dB)</th>
<th>OK (Y/N)</th>
</tr>
</thead>
</table>

NOTES:

fr, Pt, Gt, Gr, Gtf, d, Lb, Grm: as per Interference Assessment B of the MDS Guidelines

Pw, Pu, PR: as per Interference Assessment B of the MDS Guidelines

W/U: Pw-Pu, as per Interference Assessment B of the MDS Guidelines

* Use EIRP if Pt or Gt are not available

** State if result represents free space loss only

COMMENTS
## Assessment C: Fixed Link Transmitter to MDS Receiver

**MDS Channel No:**

### Fixed Link Details

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Zone</th>
<th>Easting</th>
<th>Northing</th>
<th>Assnum</th>
<th>Emission Type*</th>
<th>Emission Bandwidth</th>
<th>Pt (dBm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tx:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rx:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Assessment Details

<table>
<thead>
<tr>
<th>Point on Assessment</th>
<th>Area Boundary</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Protection Reqt Met</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Zone</td>
<td>Easting</td>
<td>Northing</td>
<td>d (km)</td>
<td>Gtm (dBi)</td>
<td>EIRPm**</td>
<td>Lt (dB)</td>
<td>Em (dBuV/m)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### NOTES:

- ft, Pt, d, Gtm, Lt, Em, Eu, : as per Interference Assessment C of MDS Guidelines
- * specify whether emission is FM Video or Digital
- ** EIRPm is the EIRP of the fixed link in the direction of the MDS receiver, and is to be used if Pt or Gtm are not available

### COMMENTS
Assessment D: MDS Transmitter to Earth Station Receiver

MDS Channel No:

<table>
<thead>
<tr>
<th>d (km)</th>
<th>Pt (dBm)</th>
<th>Ptn (dBm)</th>
<th>Gte (dBi)</th>
<th>Lb (dB)</th>
<th>Grm (dBi)</th>
<th>Fa (dB)</th>
<th>Pr (dBm)</th>
<th>Prmax (dBm)</th>
<th>Overload OK (Y/N)</th>
<th>Prn (dBm)</th>
<th>Prnmax (dBm)</th>
<th>Noise Floor OK (Y/N)</th>
</tr>
</thead>
</table>

NOTES:
d, Pt, Ptn, Gte, Lb, Grm, Fa, Pr, Prmax, Prn, Prnmax: as per Interference Assessment D of the MDS Guidelines
**Recommendation 452-5**

Prediction Procedure for the Evaluation of Microwave Interference Between Stations on the Surface of the Earth at Frequencies above about 0.7 GHz

The following spreadsheet is for use in Interference Assessment D of the MDS Guidelines. The data shown is for example purposes only, and must be replaced with data appropriate to the particular assessment being performed.

<table>
<thead>
<tr>
<th>Zone</th>
<th>Easting</th>
<th>Northing</th>
<th>AHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmitter site:</td>
<td></td>
<td></td>
<td>800</td>
</tr>
<tr>
<td>Receiver site:</td>
<td></td>
<td></td>
<td>640</td>
</tr>
</tbody>
</table>

Rec. 452-5 Reference

**Step 1**  
Average Year  
Section 3.2.1

**Step 2**  
Input Data  
Section 3.2.1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f )</td>
<td>2.305 GHz</td>
<td>Table 1</td>
</tr>
<tr>
<td>( p )</td>
<td>0.001 %</td>
<td>Table 1</td>
</tr>
<tr>
<td>htg</td>
<td>30 m</td>
<td>Table 1</td>
</tr>
<tr>
<td>hrg</td>
<td>50 m</td>
<td>Table 1</td>
</tr>
<tr>
<td>( G_t )</td>
<td>-5.5 dBi</td>
<td>Table 1</td>
</tr>
<tr>
<td>( G_r )</td>
<td>53 dBi</td>
<td>Table 1</td>
</tr>
</tbody>
</table>

**Step 3**  
Meteorological Data  
Section 3.2.1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \delta N )</td>
<td>43</td>
<td>Figure 6</td>
</tr>
<tr>
<td>( \beta_0 )</td>
<td>8 %</td>
<td>Figure 8</td>
</tr>
<tr>
<td>k50</td>
<td>1.38</td>
<td>Equation 2</td>
</tr>
<tr>
<td>k(p)</td>
<td>22.74</td>
<td>Equation 2a</td>
</tr>
<tr>
<td>ae</td>
<td>8779.61 km</td>
<td>Equation 3</td>
</tr>
<tr>
<td>10(^3/2)ae</td>
<td>5.70E-02</td>
<td></td>
</tr>
<tr>
<td>a(p)</td>
<td>144991.16 km</td>
<td>Equation 3a</td>
</tr>
</tbody>
</table>

**Step 4**  
Path Profile  
Rec 452-5  
Section 3.2.1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Path Length</td>
<td>d</td>
<td>36 km</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Table 9</td>
</tr>
</tbody>
</table>
### MDS Interference Assessment statements – Part B - Interference Assessment Forms

**Number of Points**  
$n = 40$  
Appendix 2, Section 2

*(Note that the number of points will vary depending on path length and terrain profile)*

<table>
<thead>
<tr>
<th>Tx Antenna height above mean sea level</th>
<th>hts</th>
<th>830 m</th>
<th>Table 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenna height above mean sea level</td>
<td>hrs</td>
<td>690 m</td>
<td>Table 9</td>
</tr>
</tbody>
</table>

**Appendix 2, Section 2**

<table>
<thead>
<tr>
<th>i</th>
<th>Distance $d_i$ (km)</th>
<th>Height $h_i$ (m)</th>
<th>Equation 33 $R_i$</th>
<th>Equation 37 $R_i$</th>
<th>Equation 38 $R_i$</th>
<th>Equation 42 $R_i$</th>
<th>Equation 45 $h_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.00</td>
<td>800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0.90</td>
<td>690</td>
<td>-155.6 mrad</td>
<td>10.73 m</td>
<td>-144 mrad</td>
<td>-2 mrad</td>
<td>-65 m</td>
</tr>
<tr>
<td>2</td>
<td>1.80</td>
<td>660</td>
<td>-94.55 mrad</td>
<td>14.98 m</td>
<td>-86.2 mrad</td>
<td>-2.82 mrad</td>
<td>-93 m</td>
</tr>
<tr>
<td>3</td>
<td>2.70</td>
<td>680</td>
<td>-55.71 mrad</td>
<td>18.10 m</td>
<td>-49 mrad</td>
<td>-2.2 mrad</td>
<td>-72 m</td>
</tr>
<tr>
<td>4</td>
<td>3.60</td>
<td>695</td>
<td>-37.71 mrad</td>
<td>20.62 m</td>
<td>-32 mrad</td>
<td>-1.69 mrad</td>
<td>-55 m</td>
</tr>
<tr>
<td>5</td>
<td>4.50</td>
<td>650</td>
<td>-40.26 mrad</td>
<td>22.73 m</td>
<td>-35.2 mrad</td>
<td>-3.06 mrad</td>
<td>-98 m</td>
</tr>
<tr>
<td>6</td>
<td>5.40</td>
<td>760</td>
<td>-13.27 mrad</td>
<td>24.54 m</td>
<td>-8.73 mrad</td>
<td>0.54 mrad</td>
<td>13 m</td>
</tr>
<tr>
<td>7</td>
<td>6.30</td>
<td>710</td>
<td>-19.41 mrad</td>
<td>26.12 m</td>
<td>-15.3 mrad</td>
<td>-1.02 mrad</td>
<td>-35 m</td>
</tr>
<tr>
<td>8</td>
<td>7.20</td>
<td>748</td>
<td>-11.8 mrad</td>
<td>27.49 m</td>
<td>-7.98 mrad</td>
<td>0.37 mrad</td>
<td>5 m</td>
</tr>
<tr>
<td>9</td>
<td>8.10</td>
<td>775</td>
<td>-7.251 mrad</td>
<td>28.70 m</td>
<td>-3.71 mrad</td>
<td>1.46 mrad</td>
<td>34 m</td>
</tr>
<tr>
<td>10</td>
<td>9.00</td>
<td>780</td>
<td>-6.068 mrad</td>
<td>29.76 m</td>
<td>-2.76 mrad</td>
<td>1.8 mrad</td>
<td>40 m</td>
</tr>
<tr>
<td>11</td>
<td>9.90</td>
<td>877</td>
<td>4.184 mrad</td>
<td>30.69 m</td>
<td>7.28 mrad</td>
<td>5.68 mrad</td>
<td>139 m</td>
</tr>
<tr>
<td>12</td>
<td>10.80</td>
<td>790</td>
<td>-4.319 mrad</td>
<td>31.50 m</td>
<td>-1.4 mrad</td>
<td>2.53 mrad</td>
<td>54 m</td>
</tr>
<tr>
<td>13</td>
<td>11.70</td>
<td>820</td>
<td>-1.521 mrad</td>
<td>32.19 m</td>
<td>1.23 mrad</td>
<td>3.97 mrad</td>
<td>85 m</td>
</tr>
<tr>
<td>14</td>
<td>12.60</td>
<td>795</td>
<td>-3.495 mrad</td>
<td>32.78 m</td>
<td>-0.89 mrad</td>
<td>3.15 mrad</td>
<td>62 m</td>
</tr>
<tr>
<td>15</td>
<td>13.50</td>
<td>770</td>
<td>-5.213 mrad</td>
<td>33.28 m</td>
<td>-2.75 mrad</td>
<td>2.27 mrad</td>
<td>39 m</td>
</tr>
<tr>
<td>16</td>
<td>14.40</td>
<td>885</td>
<td>2.999 mrad</td>
<td>33.67 m</td>
<td>5.34 mrad</td>
<td>7.8 mrad</td>
<td>155 m</td>
</tr>
<tr>
<td>17</td>
<td>15.30</td>
<td>710</td>
<td>-8.714 mrad</td>
<td>33.98 m</td>
<td>-6.49 mrad</td>
<td>-0.21 mrad</td>
<td>-18 m</td>
</tr>
<tr>
<td>18</td>
<td>16.20</td>
<td>750</td>
<td>-5.861 mrad</td>
<td>34.19 m</td>
<td>-3.75 mrad</td>
<td>1.9 mrad</td>
<td>24 m</td>
</tr>
<tr>
<td>19</td>
<td>17.10</td>
<td>680</td>
<td>-9.746 mrad</td>
<td>34.32 m</td>
<td>-7.74 mrad</td>
<td>-1.61 mrad</td>
<td>-44 m</td>
</tr>
<tr>
<td>20</td>
<td>18.00</td>
<td>660</td>
<td>-9.358 mrad</td>
<td>34.37 m</td>
<td>-7.45 mrad</td>
<td>-1.58 mrad</td>
<td>-43 m</td>
</tr>
<tr>
<td>21</td>
<td>18.90</td>
<td>718</td>
<td>-7.002 mrad</td>
<td>34.32 m</td>
<td>-5.19 mrad</td>
<td>0.66 mrad</td>
<td>-3 m</td>
</tr>
<tr>
<td>22</td>
<td>19.80</td>
<td>710</td>
<td>-7.188 mrad</td>
<td>34.19 m</td>
<td>-5.46 mrad</td>
<td>0.31 mrad</td>
<td>-9 m</td>
</tr>
<tr>
<td>23</td>
<td>20.70</td>
<td>770</td>
<td>-4.077 mrad</td>
<td>33.98 m</td>
<td>-2.44 mrad</td>
<td>4.36 mrad</td>
<td>52 m</td>
</tr>
<tr>
<td>24</td>
<td>21.60</td>
<td>748</td>
<td>-7.249 mrad</td>
<td>33.67 m</td>
<td>-5.69 mrad</td>
<td>-0.13 mrad</td>
<td>-16 m</td>
</tr>
<tr>
<td>25</td>
<td>22.50</td>
<td>745</td>
<td>-5.059 mrad</td>
<td>33.28 m</td>
<td>-3.58 mrad</td>
<td>3.31 mrad</td>
<td>31 m</td>
</tr>
<tr>
<td>26</td>
<td>23.40</td>
<td>650</td>
<td>-9.025 mrad</td>
<td>32.78 m</td>
<td>-7.62 mrad</td>
<td>-3.89 mrad</td>
<td>-62 m</td>
</tr>
<tr>
<td>27</td>
<td>24.30</td>
<td>700</td>
<td>-6.734 mrad</td>
<td>32.19 m</td>
<td>-5.41 mrad</td>
<td>0.19 mrad</td>
<td>-11 m</td>
</tr>
<tr>
<td>28</td>
<td>25.20</td>
<td>740</td>
<td>-5.007 mrad</td>
<td>31.50 m</td>
<td>-3.76 mrad</td>
<td>4.01 mrad</td>
<td>31 m</td>
</tr>
<tr>
<td>29</td>
<td>26.10</td>
<td>690</td>
<td>-6.85 mrad</td>
<td>30.69 m</td>
<td>-5.67 mrad</td>
<td>-0.56 mrad</td>
<td>-17 m</td>
</tr>
<tr>
<td>30</td>
<td>27.00</td>
<td>890</td>
<td>0.685 mrad</td>
<td>29.76 m</td>
<td>1.79 mrad</td>
<td>21.7 mrad</td>
<td>184 m</td>
</tr>
<tr>
<td>31</td>
<td>27.90</td>
<td>650</td>
<td>-8.041 mrad</td>
<td>28.70 m</td>
<td>-7.01 mrad</td>
<td>-5.4 mrad</td>
<td>-54 m</td>
</tr>
<tr>
<td>32</td>
<td>28.80</td>
<td>610</td>
<td>-9.279 mrad</td>
<td>27.49 m</td>
<td>-8.32 mrad</td>
<td>-11.5 mrad</td>
<td>-92 m</td>
</tr>
<tr>
<td>33</td>
<td>29.70</td>
<td>630</td>
<td>-8.425 mrad</td>
<td>26.12 m</td>
<td>-7.55 mrad</td>
<td>-9.88 mrad</td>
<td>-70 m</td>
</tr>
<tr>
<td>34</td>
<td>30.60</td>
<td>660</td>
<td>-7.298 mrad</td>
<td>24.54 m</td>
<td>-6.5 mrad</td>
<td>-5.86 mrad</td>
<td>-39 m</td>
</tr>
<tr>
<td>35</td>
<td>31.50</td>
<td>600</td>
<td>-9.096 mrad</td>
<td>22.73 m</td>
<td>-8.37 mrad</td>
<td>-20.3 mrad</td>
<td>-97 m</td>
</tr>
<tr>
<td>36</td>
<td>32.40</td>
<td>575</td>
<td>-9.716 mrad</td>
<td>20.62 m</td>
<td>-9.08 mrad</td>
<td>-32.1 mrad</td>
<td>-120 m</td>
</tr>
<tr>
<td>37</td>
<td>33.30</td>
<td>715</td>
<td>-5.35 mrad</td>
<td>18.10 m</td>
<td>-4.81 mrad</td>
<td>9.11 mrad</td>
<td>21 m</td>
</tr>
<tr>
<td>38</td>
<td>34.20</td>
<td>740</td>
<td>-4.579 mrad</td>
<td>14.98 m</td>
<td>-4.14 mrad</td>
<td>27.7 mrad</td>
<td>48 m</td>
</tr>
<tr>
<td>39</td>
<td>35.10</td>
<td>792</td>
<td>-3.082 mrad</td>
<td>10.7 m</td>
<td>-2.78 mrad</td>
<td>113 mrad</td>
<td>102 m</td>
</tr>
<tr>
<td>40</td>
<td>36.00</td>
<td>640</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| theta max | 4.18 mrad | Section 3.1 | Equation 32 |
|theta td  | -5.94 mrad | Equation 34 |
|Trans-horizon test | Pass | |
|theta fmax | 7.28 mrad | Section 3.2 | Equation 36 |
|Sub-path test | Pass | Equation 35 |

**Step 4 Continued**

**Appendix 2, Section 4.1**

| theta t | 4.18 mrad | Equation 39 |
| dlt     | 9.90 km   | Equation 40 |
| theta r | 113.28 mrad | Equation 41 |
### MDS Interference Assessment statements – Part B - Interference Assessment Forms

<table>
<thead>
<tr>
<th>dlr (km)</th>
<th>theta (mrad)</th>
<th>Equation 43</th>
<th>Equation 44</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.90</td>
<td>121.57</td>
<td>dlr</td>
<td>theta</td>
</tr>
</tbody>
</table>

#### Appendix 2, Section 4.1.6

<table>
<thead>
<tr>
<th>i</th>
<th>Distance di (km)</th>
<th>Height hi (m)</th>
<th>(hi-ha)(di-d/2)</th>
<th>(di-(d/2))^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.00</td>
<td>800</td>
<td>-1392</td>
<td>324</td>
</tr>
<tr>
<td>1</td>
<td>0.90</td>
<td>690</td>
<td>558.878</td>
<td>292</td>
</tr>
<tr>
<td>2</td>
<td>1.80</td>
<td>660</td>
<td>1015.463</td>
<td>262</td>
</tr>
<tr>
<td>3</td>
<td>2.70</td>
<td>680</td>
<td>653.0488</td>
<td>234</td>
</tr>
<tr>
<td>4</td>
<td>3.60</td>
<td>695</td>
<td>398.6341</td>
<td>207</td>
</tr>
<tr>
<td>5</td>
<td>4.50</td>
<td>650</td>
<td>981.2195</td>
<td>182</td>
</tr>
<tr>
<td>6</td>
<td>5.40</td>
<td>760</td>
<td>-470.195</td>
<td>159</td>
</tr>
<tr>
<td>7</td>
<td>6.30</td>
<td>710</td>
<td>148.3902</td>
<td>137</td>
</tr>
<tr>
<td>8</td>
<td>7.20</td>
<td>748</td>
<td>-273.424</td>
<td>117</td>
</tr>
<tr>
<td>9</td>
<td>8.10</td>
<td>775</td>
<td>-517.939</td>
<td>98</td>
</tr>
<tr>
<td>10</td>
<td>9.00</td>
<td>780</td>
<td>-515.854</td>
<td>81</td>
</tr>
<tr>
<td>11</td>
<td>9.90</td>
<td>877</td>
<td>-1249.97</td>
<td>65.6</td>
</tr>
<tr>
<td>12</td>
<td>10.80</td>
<td>790</td>
<td>-484.683</td>
<td>51.8</td>
</tr>
<tr>
<td>13</td>
<td>11.70</td>
<td>820</td>
<td>-613.098</td>
<td>39.7</td>
</tr>
<tr>
<td>14</td>
<td>12.60</td>
<td>795</td>
<td>-390.512</td>
<td>29.2</td>
</tr>
<tr>
<td>15</td>
<td>13.50</td>
<td>770</td>
<td>-212.927</td>
<td>20.3</td>
</tr>
<tr>
<td>16</td>
<td>14.40</td>
<td>885</td>
<td>-584.341</td>
<td>13</td>
</tr>
<tr>
<td>17</td>
<td>15.30</td>
<td>710</td>
<td>34.2439</td>
<td>7.29</td>
</tr>
<tr>
<td>18</td>
<td>16.20</td>
<td>750</td>
<td>-49.1707</td>
<td>3.24</td>
</tr>
<tr>
<td>19</td>
<td>17.10</td>
<td>680</td>
<td>38.41463</td>
<td>0.81</td>
</tr>
<tr>
<td>20</td>
<td>18.00</td>
<td>680</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>21</td>
<td>18.90</td>
<td>718</td>
<td>-4.21463</td>
<td>0.81</td>
</tr>
<tr>
<td>22</td>
<td>19.80</td>
<td>710</td>
<td>-22.8293</td>
<td>3.24</td>
</tr>
<tr>
<td>23</td>
<td>20.70</td>
<td>770</td>
<td>127.7561</td>
<td>7.29</td>
</tr>
<tr>
<td>24</td>
<td>21.60</td>
<td>700</td>
<td>-81.6585</td>
<td>13</td>
</tr>
<tr>
<td>25</td>
<td>22.50</td>
<td>745</td>
<td>100.4268</td>
<td>20.3</td>
</tr>
<tr>
<td>26</td>
<td>23.40</td>
<td>650</td>
<td>-392.488</td>
<td>29.2</td>
</tr>
<tr>
<td>27</td>
<td>24.30</td>
<td>700</td>
<td>-142.902</td>
<td>39.7</td>
</tr>
<tr>
<td>28</td>
<td>25.20</td>
<td>740</td>
<td>124.6829</td>
<td>51.8</td>
</tr>
<tr>
<td>29</td>
<td>26.10</td>
<td>690</td>
<td>-264.732</td>
<td>65.6</td>
</tr>
<tr>
<td>30</td>
<td>27.00</td>
<td>890</td>
<td>1505.854</td>
<td>81</td>
</tr>
<tr>
<td>31</td>
<td>27.90</td>
<td>650</td>
<td>-719.561</td>
<td>98</td>
</tr>
<tr>
<td>32</td>
<td>28.80</td>
<td>610</td>
<td>-1216.98</td>
<td>117</td>
</tr>
<tr>
<td>33</td>
<td>29.70</td>
<td>630</td>
<td>-1084.39</td>
<td>137</td>
</tr>
<tr>
<td>34</td>
<td>30.60</td>
<td>660</td>
<td>-789.805</td>
<td>159</td>
</tr>
<tr>
<td>35</td>
<td>31.50</td>
<td>600</td>
<td>-1656.22</td>
<td>182</td>
</tr>
<tr>
<td>36</td>
<td>32.40</td>
<td>575</td>
<td>-2126.63</td>
<td>207</td>
</tr>
<tr>
<td>37</td>
<td>33.30</td>
<td>715</td>
<td>-117.549</td>
<td>234</td>
</tr>
<tr>
<td>38</td>
<td>34.20</td>
<td>740</td>
<td>280.5366</td>
<td>262</td>
</tr>
<tr>
<td>39</td>
<td>35.10</td>
<td>792</td>
<td>1185.322</td>
<td>292</td>
</tr>
<tr>
<td>40</td>
<td>36.00</td>
<td>640</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Step 4

<table>
<thead>
<tr>
<th>m</th>
<th>-1.90 m/km</th>
<th>Equation 46</th>
</tr>
</thead>
<tbody>
<tr>
<td>hst</td>
<td>757 m</td>
<td>Equation 48</td>
</tr>
<tr>
<td>hsr</td>
<td>688 m</td>
<td>Equation 49</td>
</tr>
<tr>
<td>hst-correction</td>
<td>756.89394 m</td>
<td>Equation 50a</td>
</tr>
<tr>
<td>hsr-correction</td>
<td>688.47191 m</td>
<td>Equation 50b</td>
</tr>
<tr>
<td>m-correction</td>
<td>-1.90 m/km</td>
<td>Equation 51</td>
</tr>
<tr>
<td>hmr</td>
<td>184 m</td>
<td>Equation 52</td>
</tr>
</tbody>
</table>

Step 5

<table>
<thead>
<tr>
<th>Identification Propagation Models</th>
<th>Section 3.2.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>diffraction</td>
<td>Yes</td>
</tr>
<tr>
<td>troposcatter</td>
<td>Yes</td>
</tr>
<tr>
<td>ducting</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Step 6

## Ducting

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>hte</td>
<td>73.106056 m</td>
</tr>
<tr>
<td>hre</td>
<td>1.5280899 m</td>
</tr>
<tr>
<td>kc</td>
<td>0.77</td>
</tr>
<tr>
<td>kc&gt;1?</td>
<td>1.00</td>
</tr>
<tr>
<td>µ2</td>
<td>1.00</td>
</tr>
<tr>
<td>dtest</td>
<td>25.2 km</td>
</tr>
<tr>
<td>µ3</td>
<td>2.10E+01</td>
</tr>
<tr>
<td>β</td>
<td>1.68E+00 %</td>
</tr>
<tr>
<td>Theta t'</td>
<td>0.99 mrad</td>
</tr>
<tr>
<td>Theta r'</td>
<td>0.09 mrad</td>
</tr>
<tr>
<td>Theta'</td>
<td>5.18 mrad</td>
</tr>
<tr>
<td>Ast</td>
<td>17.381948 dB</td>
</tr>
<tr>
<td>Asr</td>
<td>75.02 dB</td>
</tr>
<tr>
<td>Ac</td>
<td>113.07 dB</td>
</tr>
<tr>
<td>γ0</td>
<td>5.89E-03 dB/km</td>
</tr>
<tr>
<td>γ0(p)</td>
<td>2.99E-04 dB/km</td>
</tr>
<tr>
<td>Ag</td>
<td>0.22 dB</td>
</tr>
<tr>
<td>Yd</td>
<td>5.80E-01 dB/mrad</td>
</tr>
<tr>
<td>Lbr</td>
<td>226.05 dB</td>
</tr>
<tr>
<td>γ</td>
<td>6.07E-01</td>
</tr>
<tr>
<td>Lb(p)</td>
<td>207.62 dB</td>
</tr>
</tbody>
</table>

## Troposcatter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>k(f)</td>
<td>10.25 dB</td>
</tr>
<tr>
<td>No</td>
<td>325</td>
</tr>
<tr>
<td>Lc</td>
<td>0.70 dB</td>
</tr>
<tr>
<td>Lbs(p)</td>
<td>223.47 dB</td>
</tr>
</tbody>
</table>

## Diffraction

(This spreadsheet does not calculate Ld(p) - refer Rec 452-5 Section 4.3)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ld(p)</td>
<td>-</td>
</tr>
<tr>
<td>Lbd(p)</td>
<td>#VALUE!</td>
</tr>
</tbody>
</table>
**Recommendation 452-5 Path Loss Predictions**

For the Path

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>To</td>
</tr>
</tbody>
</table>

**Step 7**

<table>
<thead>
<tr>
<th>Combined Loss</th>
<th>Section 3.2.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tropo</td>
<td>223.47 dB</td>
</tr>
<tr>
<td>Duct</td>
<td>207.62 dB</td>
</tr>
<tr>
<td>Diff</td>
<td>#VALUE! dB</td>
</tr>
<tr>
<td>Lb(p)</td>
<td>#VALUE! dB</td>
</tr>
</tbody>
</table>

Equation 5
SECTION 4

ATTACHMENTS
TRANSMITTER PROPOSAL FORM
Transmitter Proposal

The Transmitter Proposal is available only in hard copy.

For a copy please email mat@aca.gov.au
SAMPLE REGIONAL MDS LICENCE
COMMONWEALTH OF AUSTRALIA

Spectrum Management Agency

Radiocommunications Act 1992

Transmitter Licence Issued Under
Price-Based Allocation System


Dated:

(signature)
(name)
for the Spectrum Management Agency

1. In this licence:
   “area” has the same meaning as in the Determination;
   “station” has the same meaning as in the Radiocommunications Regulations.

2. The person shown in Item 3 of Schedule 1 is licensed under Determination to operate a station or stations in the area referred to at Item 1 of Schedule 1 for the purposes of:
   (a) (i) providing 1 or more services of a category referred to in clause 4 of the Multipoint Distribution System Band Plan in force under the Radiocommunications Act 1992, on the frequency bands referred to at Item 5 of Schedule 1; and
      (ii) receiving radio transmissions from a station or stations referred to in subparagraph (i) for the automatic retransmission of those transmissions; and
   (b) receiving radio transmissions from a station or stations referred to in subparagraph (a) (i) for the automatic retransmission of those transmissions;

3. The operation of a station or stations under clause 2 of this licence is subject to the conditions set out in:
   (a) Part 3.3 of the Radiocommunications Act 1992; and
   (b) Schedule 2.

4. This licence comes into force on ##/##/#### and remains in force until the end of the day shown at Item 7 of Schedule 1.
SCHEDULE 1

LICENCE DETAILS

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Subject</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Area name</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Licence number</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Licensee</td>
<td>NAME: ADDRESS: ACN:</td>
</tr>
<tr>
<td>4.</td>
<td>SMA customer number</td>
<td>####</td>
</tr>
<tr>
<td>5.</td>
<td>Frequency bands</td>
<td>2302 - 2309 MHz</td>
</tr>
<tr>
<td>6.</td>
<td>Date of issue</td>
<td>#/#/#/#/#/#/#/#/#/#/#/#/#</td>
</tr>
<tr>
<td>7.</td>
<td>Expiry date</td>
<td>#/#/#/#/#/#/#/#/#/#/#/#/#</td>
</tr>
<tr>
<td>8.</td>
<td>Date printed</td>
<td>#/#/#/#/#/#/#/#/#/#/#/#/#</td>
</tr>
<tr>
<td>9.</td>
<td>Transmitter site (s)</td>
<td>________________________</td>
</tr>
</tbody>
</table>

SCHEDULE 2

LICENCE CONDITIONS

1. A station must be operated at a transmitter site referred to at Item 9 of Schedule 1.

2. When transmitting, the licensee must transmit a vision signal from each station with the following characteristics:
   (a) maximum power of 1000 Watts EIRP;
   (b) vertical antenna polarity;
   (c) vision carrier frequency of 2303.25 MHz with a tolerance of +/- 0.0005%;
   (d) vision emission of 6M25C3F.

3. When transmitting, the licensee must transmit a sound signal from each station with the following characteristics:
   (a) maximum power of 31.5 Watts EIRP;
   (b) vertical antenna polarity;
   (c) sound carrier frequency of 2308.75 with a tolerance of +/- 500Hz;
   (d) sound emission of 150KF3E.
4. The spurious radiation level of each transmitter (including intermodulation products) must be greater than 60 dB below its maximum transmitted EIRP.

5. The transmission power of each station at any frequency must not exceed the transmission power in relation to that frequency shown in the following diagram.

6. The transmission power of a station at angles of elevation of 5 degrees or more above the horizontal plane must not exceed the following EIRP limits:
   (a) 100 Watts at 5 degrees, decreasing linearly to 31.6 Watts at 10 degrees;
   (b) 31.6 Watts between 10 degrees and 15 degrees;
   (c) 31.6 Watts at 15 degrees, decreasing linearly to 10 Watts at 20 degrees; and
   (d) 10 Watts between 20 degrees and 90 degrees.
7. The station or stations must be operated with an antenna(s) having following characteristics:
   (a) [insert type]; and
   (b) [insert the number of elements]; and
   (c) [insert gain]; and
   (d) [insert height above ground level]; and
   (e) [if the antenna is a directional antenna, insert:
      (i) the front/back ratio; and
      (ii) the azimuth].

8. (1) The unwanted emissions at the output of any station operated under this licence must not exceed $P_t - 56.25$ in a 1 kHz bandwidth in the frequency band 2290 - 2300 MHz.

   (2) In this condition, $P_t = \text{the maximum average power supplied to the antenna transmission line by the MDS transmitter (dBm)}$.

   [NOTE The requirement at clause 8 depends on the assigned frequency bands.]

________________

NOTES

[1. Operation of a station is not authorised by this licence if it is not operated in accordance with the conditions set out in:
   (a) part 3.3 of the Radiocommunications Act 1992 (see sections 107 and 108 of the Radiocommunications Act 1992); and
   (b) Schedule 2 (see section 97(4) of the Radiocommunications Act 1992).

   In certain circumstances, a contravention of the conditions to which this licence is subject may also constitute an offence (see section 113 of the Radiocommunications Act 1992).

2. Section 111 of the Radiocommunications Act 1992 empowers the SMA to alter, in a number of ways, the conditions of this licence. Decisions made under section 111 are reviewable under the scheme established by Part 5.6 of the Radiocommunications Act 1992.]