

21 July 2023

Response to acma Proposal to remake the Public Safety and Emergency Response Class Licence

We have pleasure in responding to your proposal as follows.

Question 1

Is the class licence still needed? Why or why not?

Yes. In our opinion the class licence provides essential spectrum for emergency services to operate ad-hoc radio networks. These are necessary to provide communication in situations where “normal” infrastructure is unavailable - either temporarily or permanently - and no alternative exists. In our view, it is at times such as this (times of interruption to or unavailability of normal service) that the Emergency Services most urgently require ad-hoc connectivity solutions.

Question 2

Is the class licence operating effectively and efficiently? Why or why not?

The class licence has been operated to great benefit in many different circumstances.

The only significant issues appear to be:

1. A lack of a co-ordinating body to manage spectrum use, resulting in unnecessary interference
2. Insufficient bandwidth to meet demand
3. Restrictions on channel use near Radio Astronomy sites, reducing available bandwidth even further
4. High frequency compromises range performance. Lower frequencies would improve performance
5. Transmitter power is inadequate for aerial use with Omni antennas

Question 3

How are PSBs currently using the class licence? Are the current authorised services fit-for-purpose?

Amber Technology currently support several hundred MANET (Mobile Adhoc NETwork) meshing data radios deployed with Emergency Services in Australia, operating in the 4940-4990 spectrum under the Class Licence.

These meshing radios form a critical part of Emergency Management infrastructure for a wide range of organisations in Australia including:

Police forces in every jurisdiction in Australia without exception

Fire and Emergency Service bodies in WA and the ACT

WA and ACT have very significant deployments of radios providing large scale ad-hoc emergency communications infrastructure for both Fire, Police and Emergency Services applications. These systems represent very significant investments designed to secure data networks that operate independently from commercial carriers, ensuring that essential Voice, Video and data carriage is available in all circumstances regardless of the environment, circumstance or location. The networks are well proven in these respects and we are advised of ongoing plans to expand and consolidate the capability in both short and long terms, as they have been very successful indeed.

Mesh networks are typically formed as part of a hybrid solution where a mesh connects multiple clients (vehicles, aircraft, people) both to each other and to a backhaul, and thereby back to HQ and/or other meshes. The backhaul is typically a bonded cellular/Satcom connection that may utilise any of the existing or emerging technologies (Starlink, 4G/5G/PSMB) for the “back to base” connection. Connection into the mesh from client devices is achieved using inbuilt WiFi access points on the mesh radios themselves. These WiFi access points can be connected to by any common handheld phone or tablet, or personal computer. The mesh acts as a smart layer 2 router, connecting clients directly to each other and the backhaul connection, which typically has a DHCP server. Clients can and do interconnect P25, LMR, WiFi and data links all on the same ad-hoc mesh infrastructure, carrying Voice, Video and Data to and from each other and HQ.

The benefits of using a mesh-type deployable network as opposed to a Private or commercial LTE network are very straightforward, in that every mesh radio – even the tiny bodyworn units – acts as a relay for every other mesh radio, and all clients are connected to each other as well as the backhaul. Compare with an LTE solution where all clients are required to link back to a single node in a star configuration. The mesh solution leads to very robust, simple and powerful connectivity in the field, where vehicles, UAVs and tethered drones act as relays for all units that might connect to them, without operator intervention. It becomes very straightforward to extend a network into a Cave, tunnel or underground carpark, for example, where an LTE solution would not be able to reach. Long range meshes can deliver single-hop connections to areas as far as 150 kms away from an available backhaul. This is proven on a regular basis with helicopters and UAVs providing video feeds and data connections to both ground assets and HQ Infrastructure simultaneously, connecting assets and teams at all times in a way that is simply not possible by other means.

Mesh radios with performance at this level have only recently become available at costs compatible with general Emergency Service use (although Police forces have been utilising them for over 5 years now) as they are direct descendants of (and fully compatible with) military systems that are widely deployed in every sphere. The capability that they deliver is truly transformative to public safety networking. The benefit that they bring is in their ability to travel with the teams on a temporary basis wherever they go and whenever they need them, enabling those teams to rapidly establish networks in any location – especially in rugged terrain, underground and undercover areas, and areas where no other coverage is available. To achieve this, a band of available ad-hoc spectrum is critical, and the continuation of the last freely usable piece of spectrum from 4940-4990 would seem essential. To lose that band would be highly detrimental to current and future Emergency Services operations.

Question 4

Is the current class licensing model fit-for-purpose? Why or why not? How would any interference protection or hybrid class / apparatus licensing arrangements work?

The current model is adequate but a central management body would alleviate unanticipated interference issues substantially.

Question 5

Should specific provisions for cellular mobile technologies be included in the class licence? Why or why not?

Although we support the ability to use any available compliant technology in the band, we fail to understand what benefit 5G services would offer. No standard personal devices are currently available in this band and the technology lacks merit in emergency deployments as the devices cannot self-relay. A mesh system deploying WiFi Access Points across a wide area provides a significantly more flexible coverage capability using existing WiFi facilities on personal devices.

The current fundamental purpose of the band is to allow ad-hoc services to be deployed to temporarily augment existing services, and we strongly support this position. In order to ensure that sufficient bandwidth is available to bring up those required services, no user should be able to occupy the entire band, therefore in our opinion devices should be limited to no more than a 25 MHz bandwidth in total.

Question 6

Are the proposed emission mask, power limit and EIRP limit for cellular mobile BS appropriate? Does emission mask P, in conjunction with other proposed measures, sufficiently mitigate the risk of adjacent channel interference to other devices authorised under the class licence?

No comment

Question 7

Are the proposed emission mask, power limit and EIRP limit for cellular mobile user equipment appropriate?

No comment

Question 8

Are the emission masks, power limits and EIRP limits for existing services appropriate?

As performance at higher frequencies is compromised, it would be beneficial to increase the allowable EIRP and baseline transmitter power limits. Although ranges of up to 150 kms are achievable in the real world, this does require sophisticated directional tracking antennas that are complex and expensive.

Question 9

Do the technical parameters proposed in the draft class licence restrict the use of any other technologies required by PSBs?

No comment

Question 10

Do the current definitions of 'public safety bodies' and 'public safety or emergency response function' remain fit-for-purpose? Do the authorisation arrangements for other bodies remain appropriate? Why or why not?

We suggest that entities permitted to use the band are registered, and that this is achieved with a central management body. This would reduce potential abuse of the band.

Question 11

Is the 6-month limit for fixed point-to-point services appropriate? Why or why not? Does the 6-month limit prevent deployments of networks aligned with the purpose of the class licence?

The new wording is a welcome clarification. However it should be stipulated that no single service may occupy more than 25 MHz of bandwidth.

Question 12

Which channel plan should be adopted in the class licence? Why?

A major function of the band is to allow multiple agencies to operate together. Therefore no transmitter should be allowed to occupy a bandwidth greater than 50% of the total available (ie 25 MHz). This would prevent a deployed single agency system from occupying the entire available frequency band.

Question 13

Are the current interference protection measures for radio astronomy sites fit-for-purpose? Are the proposed protection measures from cellular mobile BS and user equipment appropriate?

Cellular systems should be limited to 25 MHz bandwidth.

We hope that this feedback is of use and look forward to understanding the results of your deliberations.

Yours sincerely

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