

## ***5G and mobile network developments – emerging issues.***

Hi, I would like to make a few constructive comments.

Firstly this document has been written from the telecommunications industry and its providers who have a vested interest in maximising its use for profit.

The all frequency bands used by mobile phones and wireless broadband are in the Ultra and Super high frequency bands which can only cover small areas being blocked by the horizon, terrain, buildings etc. This is desirable when you wish to have a two way communication with large numbers of users and when the spectrum available is limited. The frequencies suggested for 5G are very short range. This is a big disadvantage for the one way broadcast system.

There appears to be no consultation with the broadcasting industry.

Television broadcasting to handheld devices

TV broadcasting covers large areas from a single transmitter. For example virtually all of Melbourne is covered by a single transmitter with some low powered transmitters in the Dandenong Ranges, CBD, Geelong and near the heads of Port Phillip Bay. In that area how many Telco base stations are there? If 5G broadcast is used each base station will require a separate transmitter which means a duplication of an existing system. That transmitter cannot be used for two way communications.

TV broadcasters want to transmit Ultra-High Definition TV they will have to upgrade their transmitters to DVB-T2 which will carry 40% more data in a TV channel.  
<https://www.dvb.org/standards/dvb-t2> A DVB-T2 transmitter can be set up to simultaneously transmit to TV sets with antennas and a separate signal designed for handheld devices. DVB-T2 is being used in 37 countries including the UK and USSR. New handheld devices will be required for 5G, so these should be required to include a DVB-T2 receiver. If the broadcasters upgraded to DVB-T2 and the handset manufacturers worldwide had to include it in portable devices the viewers could watch for free rather than paying the telcos. The reception would also be more reliable because of the lower frequencies used.

The only real trial of 5G broadcast is in South Korea which has an area of 96,920 km<sup>2</sup> when compared to Australia 7,682,300 km<sup>2</sup>. We already have a TV broadcasting system covering the whole population which could increase its data carrying capacity by 40% using the newer DVB-T2 (The VAST satellite System for remote and black spot areas is already upgraded to DVB-S2). Do not use the USA as an example for TV because their digital TV system (ATSC) is nowhere near as robust inside buildings as ours is. The USA has a tradition of pay cable TV which is not the case in Australia. Even where Optus cable is used in Sydney and Melbourne, there is no cable in Perth because the WA Government would not allow the cables to be put on Western Power's poles. (Western Power is a government owned corporation)

Your quote on page 23 about the TV being consumed on portable devices comes without any statistics and is sourced by a company whose major customers are telcos.

Now that the ABC and the seven network are streaming live programs, ask them how many viewers are watching using this method and compare it to the Oztam ratings for the number of over the air viewers. [www.oztam.com.au](http://www.oztam.com.au)

The cost of broadcasting a TV or radio program is fixed regardless of the number of viewers/listeners, whereas the cost of webcasting increases exponentially as the number of

simultaneous users. Ask the industry what is required and what the cost is to distribute a program to 24 million people using our existing broadcast vs the internet. An example would be the Melbourne Cup.

Page 23 “Transference and delivery of ultra-high resolution images such as 4K-UHD (four times the resolution of Full-HD) and 8K-UHD (16 times the resolution), expanding to 3D imaging and hologram services over time.” <https://help.netflix.com/en/node/306> says that they want a continuous 25 Mbit/s data rate which is for 4K program for one viewer. On Page 7 it says “the ITU’s official roadmap states 5G could achieve speeds of up to 20 Mbps” They don’t give the range of 1 – 10 Gbit/s which is unrealistic. It is a theoretical maximum which is ok for a single user, but this is unlikely and that it will be shared between the simultaneous users. As a result the user gets their speed reduced as traffic increases.

Ask the NBN what will be the slowest acceptable speed will be delivered to a Fibre to the Node customer. (The speed drops rapidly as the distance from the node increases, particularly when all of the residents in the street are using the internet at the same time)

Page 26 “Automotive. Motor vehicles are increasingly connected to their environments. Automotive demands for improved mobile data networks include: Infotainment. Real-time information provided through connected devices including augmented reality dashboards.”

Digital Radio is not mentioned. See [www.worldDAB.org](http://www.worldDAB.org) and interview <http://www.digitalradioplus.com.au/dab-in-vehicles> Australia has had DAB+ digital radio broadcasting in all mainland State capital cities since 2009. DigitalRadioPlus is owned by Commercial Radio Australia who are in common with World DAB are trying to get the phone manufacturers to install a DAB+ receiving chip in their products. The new LG Stylus 2 Smart phone is the first to contain a DAB+ receiver. <http://www.lgnewsroom.com/2016/03/lg-stylus-2-first-smartphone-to-support-dab/>

[www.DRM.org](http://www.DRM.org) is a newer digital radio transmission system which uses the same bands as AM and FM band which gives even bigger coverage areas than the DAB+ we currently use and is more suited to nationwide coverage from a single transmitter to local area transmitters. Both DAB+ and DRM will carry image, text and emergency warning systems.

“Traffic. monitors on cars and transport links will provide a more detailed understanding of traffic flows, and may enable real-time changes to traffic (such as traffic lights, changing direction of lanes) to improve traffic flows immediately and long-term.<sup>86</sup>” Look at Transport Protocol Expert Group <http://tisa.org/technologies/tpcg/> which has the above facility, it is currently added to DAB+ transmissions in Australia by <http://www.intelematics.com/customers/suna-traffic-channelcustomers> and <http://www.sunattraffic.com.au/> Traffic data is also currently transmitted on FM radio.

5G in common with all other mobile systems cannot be relied upon in emergency situations, such as bushfires and cyclones for the following reasons,

- The power to base stations commonly fails particularly in bushfires. This is because the power lines go through the bush to the tops of hills where most base stations are. Base stations get the best coverage from the tops of hills. Hot air rises making these locations the most likely to be burnt.
- The phone used for emergency messages is useless when the battery goes flat, which is likely for users without domestic power which commonly fails.

5G is better off being used only for two way communications which it is very good at, and leave one to many users to broadcasters.

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