

## IFC 22/2020 Replanning of the 3700–4200 MHz band Options paper

Motorola Solutions Inc. (MSI) thanks the ACMA for the opportunity to comment on its public consultation document IFC 22/2020 “Replanning of the 3700–4200 MHz band Options paper”

MSI is a global leader in mission-critical communications. Our platforms in communications, command center software, video security and analytics, and managed and support services make cities safer and help communities and businesses thrive. We serve more than 100,000 customers in more than 100 countries, with 17,000 employees and an install base of more than 13,000 systems around the world. We have been a leader in the field of radiocommunication for over 90 years.

Find below comments to selected questions.

1. Comment is sought on the case for action and desirable planning outcomes for the 3700–4200 MHz band, including the supporting information at Appendices A, B and C.

MSI supports the introduction of Wireless Broadband uses within this range for local area, and continued use of the band for:

- FSS use; only for licensed FSS earth stations.
- Point-to-point (PTP) use, focused on the delivery of Universal Service Obligation services.
- Radiodetermination services operated by the Department of Defence.
- Earth station protection zones (ESPZs), as detailed in RALI MS44, to ensure there are long term options for FSS in the entire 3700–4200 MHz band in some locations.
- Class licensing arrangements for building material analysis and ultra-wideband (UWB) devices.

Following ACMA’s August 2019 consultation on planning of the 3700–4200 MHz band, we reaffirm our recommendation that parts of 3700-4200 MHz should be made available for localized broadband systems using innovative sharing techniques such as CBRS or apparatus licensing. We believe that use of Dynamic Spectrum Sharing Model (DLSM) for localised access Wireless BroadBand (LA-WBB) systems will allow continued use of 3700-4200 MHz by services listed above and open the band for Wireless Broadband use.

2. Comment is sought on the proposed options, including appropriate values for frequency segment breakpoints as well as any alternative options.

MSI recognises that the band 4200-4400 MHz, adjacent to 3700-4200 MHz, is allocated to the aeronautical radionavigation service, a safety service, and that the use of the band is reserved exclusively for radio altimeters installed on board aircraft and for the associated transponders on the ground.

We agree that due consideration be taken to protect radio altimeters in the technical framework of Options 1, 2 and 3. In ACMA’s spectrum planning paper ‘Wireless broadband and radio altimeter compatibility study’ we note the following:

a) In section “Japan MIC study”, in the summary are two points:

- 1) Installation of BSs should be avoided within a separation distance of 200 m from the airplane approach area at vicinity of an airport. This vicinity means an area of about 1 km separation from the airport.
- 2) To decrease unwanted emissions of a BS, a filter insertion into the BS should be applied, while keeping about 100 MHz separation between the edge of frequencies for RAs and 5G systems.

b) In the section "Study submitted to the FCC", it is stated AVSI studies concluded that false altitude reports occur significantly if a PSD of at least -25 dBm/MHz is present in 3700-3800 MHz; that ACMA static study results indicate that the value is never likely to be reached if 5G is used in the segment 3700-3800 MHz.

From the above, we consider it prudent to allow the assignment of 5G base stations within the immediate vicinity of airports within the segment 3700-3800 MHz.

3. Comment is sought on possible variations to the proposed options and implementation considerations.

For Option 2, we propose that the introduction of shared arrangements for apparatus licensed LA WBB be extended over the range 3700-4200 MHz – see illustration of Option 2-variation below.

### Option 2 - As proposed by ACMA

3700 MHz	3800 MHz	[3800/4000] MHz	4200 MHz
<b>Australia wide</b> <b>Planned uses:</b> FSS, PTP, WBB <b>Access approach:</b> Shared, coordinated first-in-time <b>Licence type:</b> Apparatus licence <b>Incumbent user licences:</b> Continued		<b>Australia wide</b> <b>Planned uses:</b> Individually licensed FSS, PTP <b>Access approach:</b> Shared, coordinated, first-in-time <b>Licence type:</b> Apparatus licence <b>Incumbent user licences:</b> Continued	

### Option 2 - Variation as Recommended by MSI

3700 MHz	4200 MHz
<b>Australia wide</b> <b>Planned uses:</b> FSS, PTP, LA WBB <b>Access Approach:</b> Shared, coordinated first-in-time <b>License Type:</b> Apparatus licence <b>Incumbent user licenses:</b> Continued	

The technical condition of prioritizing spectrum in 3700-3800 MHz for macro base stations operating at and in the vicinity of airports should be considered to mitigate interference to radio altimeter systems operating in 4200-4400 MHz.

MSI encourages ACMA to consider relaxed values of 3 to 5 dB higher than those that the UK, OFCOM [rules](https://www.ofcom.org.uk/manage-your-licence/radiocommunication-licences/shared-access)<sup>1</sup> state on the use of the band 3800-4200 MHz for Shared Access license (low power, medium power options) for indoor and outdoor. The OFCM values are as follows:

<sup>1</sup> <https://www.ofcom.org.uk/manage-your-licence/radiocommunication-licences/shared-access>

- Medium Power Shared Access licence in Rural Areas Maximum base station power (EIRP) per sector 42 dBm / carrier for carriers  $\leq 20$  MHz; or 36 dBm/5 MHz for carriers  $> 20$  MHz. For Mobile/ Nomadic terminal stations: 28 dBm TRP (28 dBm includes a 2 dB tolerance) Fixed or installed terminal stations: 28 dBm TRP and 35 dBm/5 MHz EIRP (28 dBm includes a 2 dB tolerance)

Low power shared Access licence based on maximum base station power (EIRP) of 24 dBm / carrier for carriers  $\leq 20$  MHz; or 18 dBm / 5 MHz for carriers  $> 20$  MHz and terminal power of mobile/ nomadic & fixed terminals/ of TRP 28 dBm  $\pm$  2 dB EIRP. The antenna system height is limited to 10 metres height above ground for low power.

- 3.8-4.2 GHz base station out of band emission limits

Frequency	Maximum mean EIRP density
3795 MHz-3800 MHz 4200 MHz-4205 MHz	(Pmax - 40) dBm / 5 MHz EIRP per antenna
3760 MHz-3795 MHz 4205 MHz-4240 MHz	(Pmax - 43) dBm / 5 MHz EIRP per antenna
Below 3760 MHz Above 4240 MHz	-2 dBm / 5 MHz EIRP per antenna

Similarly, for Option 3, we propose that the segment 3800 – 4200 MHz be made available for the introduction of shared arrangements for small area apparatus licensed WBB. Below is an illustration of Option 3 variation.

For the 3.7-3.8 GHz segment in Metropolitan and regional areas, we support clearing the band from current incumbent use but propose that all new users be licensed on a small area / apparatus licensing basis to enable verticals and users quick access to this band band as it is supported by LTE & 5G NR and commercialized already in many countries.

### Illustration of Option 3 as proposed by ACMA

3700 MHz	3800 MHz	[3900/4000] MHz	4200 MHz
<b>Metro and regional</b>  Planned uses: WA WBB Access approach: Exclusive use Licence type: Spectrum licence Incumbent user licences: Cleared	<b>Australia wide</b>  Planned uses: FSS, PTP, LA WBB Access approach: Shared, Licence type: Apparatus licence Incumbent user licences: Continued		<b>Australia wide</b>  Planned uses: Individually licensed FSS, PTP Access approach: Shared, coordinated, first-in-time Licence type: Apparatus licence Incumbent user licences: Continued
<b>Remote</b>  Planned uses: FSS, PTP, LA WBB Access approach: Shared, coordinated, first-in-time Licence type: Apparatus licence Incumbent user licences: Continued			

### Illustration of Option 3 as proposed by MSI

3700 MHz	3800 MHz	4200 MHz
<b>Metro &amp; Regional</b> Planned use: LA WBB Access approach: Shared, coordinated, first-in-time License type: Apparatus license Incumbent user licenses: Cleared	<b>Australia wide</b> Planned uses: FSS, PTP, LA WBB Access Approach: Shared, coordinated first-in-time License Type: Apparatus licence Incumbent user licenses: Continued	
<b>Remote</b> Planned uses: FSS, PTP, LA WBB Access approach: Shared, coordinated, first-in-time License type: Apparatus license Incumbent user: Continued		

4. Comment is sought on the discussion and outcomes of the assessment of options, including the cost benefit analysis and its assumptions. This includes any evidence for the value placed on the band for WBB and FSS use.

The band 3.7-3.8 GHz is already being considered as part or extension to the 3.4-3.7 GHz in many countries. In Europe, an [EC Implementation Decision](#)<sup>2</sup> harmonises the radio spectrum in the 3.4-3.8 GHz (or 3.6 GHz) band for the future mobile broadband (5G) and sets a deadline for releasing spectrum. A number of countries have decided to keep part or all of the 3.7-3.8 GHz restricted to commercial carriers but available for shared or local licensing for enterprise customers and private broadband applications.

The band 3.4-3.8 GHz is already supported and commercialized by two non overlapping 3GPP LTE bands and is also supported by two 5G NR bands as per the table below. MSI is of the view that it is more important to enable access to apparatus licensing in the lower 100MHz of the band (in particular 3.7 – 3.8 GHz) and not to award on larger metro/regional area licensing that is typically suitable only for commercial carriers. The German regulator BnetzA, as an example, decided<sup>3</sup> (November 21<sup>st</sup> 2019) to make this exact swath of spectrum available only for private local & regional broadband applications after it awarded commercial carriers 300MHz in the same band (3.4-3.7 GHz) auctioned for wide area licensing. BnetzA has recently reported<sup>4</sup> 67 private broadband licenses granted in 10 months in the 3.7-3.8 GHz band. Sweden regulator PTS<sup>5</sup> announced that the 3720-3800 MHz be reserved for a new assignment by local license without selection procedure 2020/21 to support enterprise broadband applications.

<sup>2</sup> <https://ec.europa.eu/digital-single-market/en/news/commission-decides-harmonise-radio-spectrum-future-5g>

<sup>3</sup> <http://www.bundesnetzagentur.de/lokalesbreitband>

<sup>4</sup> <https://enterpriseiotinsights.com/20200827/channels/news/67-local-licences-in-10-months-5g-in-the-home-of-industry-40>

<sup>5</sup> <https://pts.se/contentassets/430b8fbfa510476d8d70bc2c7ff73da3/spectrum-orientation-plan-200505.pdf>

NR / LTE operating band	Uplink (UL) operating band	Downlink (DL) operating band	Duplex Mode
	BS receive / UE transmit	BS transmit / UE receive	
	$F_{UL\_low} - F_{UL\_high}$	$F_{DL\_low} - F_{DL\_high}$	
n77	3300 MHz – 4200 MHz	3300 MHz – 4200 MHz	TDD
n78	3300 MHz – 3800 MHz	3300 MHz – 3800 MHz	TDD
42	3400 MHz - 3600 MHz	3400 MHz - 3600 MHz	TDD
43	3600 MHz - 3800 MHz	3600 MHz - 3800 MHz	TDD

5. The ACMA invites comment on its preliminary preferred option

MSI agrees with ACMA's tentative position to not prefer Option 1 as that option would not enable access to spectrum for LA WBB in the Metro or Regional areas.

From use cases presented at the 6th Asia Pacific Spectrum Management Conference, we can see that vertical sectors such as healthcare, construction, universities, airports and seaports can benefit from using 5G private networks (LA WBB). We note that in Australia, the locations of ports and airports (e.g. Sydney, Melbourne) are not necessarily in the remote areas. It should not be that the digitalisation of Australia's major airports and ports as an example are denied the use of private 5G networks due to non-availability of spectrum in this frequency band within Metro areas.

Universities in Australia can benefit from access to 5G spectrum (for campus operations and for R&D projects) in this frequency band and some of the prominent universities are within or near metropolitan areas, not in remote areas (e.g. University of Melbourne, University of Sydney, RMIT University).

For the above reasons, Motorola strongly opposes Option 1.

ACMA's preliminary preferred option, Option 3 is acceptable, with the proposed changes above, especially if the segment for the introduction of shared arrangements for apparatus licensed LA WBB is extended to cover the range 3800-4200 MHz (as illustrated in Option 3 variation). However, we are of the view that Option 2, enhanced with the introduction of shared arrangements for apparatus licensed LA WBB to cover the whole of 3700-4200 MHz (see illustration of Option 2-variation) would provide even greater flexibility than current Option 3 (without the proposed changes to the conditions).

The use of automated spectrum access systems for shared use of radio spectrum will become the norm in the future:

- In April of this year, in the USA, the FCC authorised<sup>6</sup> the use of the 6 GHz band (5925-7125 MHz) for two types of unlicensed operations - standard-power and indoor low-power operations. FCC authorised standard-power access points using an automated frequency coordination system (AFC) to protect the fixed service (microwave links). This makes the 6 GHz band as the third frequency band in the USA in which FCC authorised the use of automated spectrum access systems to enable spectrum sharing.

<sup>6</sup> <https://www.federalregister.gov/documents/2020/05/26/2020-11236/unlicensed-use-of-the-6-ghz-band>



- The European [Electronic Communications Committee \(ECC\) Strategic Plan 2020-2025](https://cept.org/ecc/ecc-strategic-plan)<sup>7</sup> will be promoting spectrum sharing through its technical and regulatory work and balancing the interests of spectrum users including verticals.
- South Korea's Ministry of Science and Technology Information and Communication Announcement No. 2020-384 issued under administrative notice of partial amendment to the technical standards of radio equipment for radio stations that can be operated without licenses, In order to realize the benefits of high-speed data and accelerate the spread of 5G convergence services across the industry, 5G-class performance unlicensed technologies (WiFi 6E, 5G NR-U, etc.) can be used in the 6GHz band<sup>8</sup>

ACMA can lay the groundwork in preparation for the implementation of a future automated spectrum access system in this band by not having spectrum licences in this band. <https://cept.org/ecc/ecc-strategic-plan>

Traditionally spectrum licences are utilised to deploy commercial mobile broadband networks with extensive base station infrastructure serving large geographic areas. In contrast, with shared arrangements for apparatus licensed LA WBB, the density of base stations will be relatively lower than those of commercial WBB networks, leading to a lower unwanted emission from 5G base stations into the adjacent band.

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<sup>7</sup> <https://cept.org/ecc/ecc-strategic-plan>

<sup>8</sup> <https://msit.go.kr/web/msipContents/contentsView.do?catId=law4&artId=2942268>