Cambium Networks

Planning of the 3700–4200 MHz band

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1. EXECUTIVE SUMMARY

Cambium Networks appreciates the opportunity to respond to the Planning of the 3700–4200 MHz band Paper. We also welcome the progress being made.

Cambium Networks, is a leading vendor of Fixed Wireless products, that supplies Point to Multipoint and Point to Point products that support the 900MHz, 2.4GHz, 3.3 GHz to 3.9, 4.9 GHz to 5.9 GHz for Broadband Wireless Access (BWA), 6-38 GHz for PTP Fixed Microwave band, narrowband IoT SCADA solutions and Cloud Managed Wi-Fi and Ethernet Switches Current PMP products are all TDD based whilst our PTP products are available as TDD or FDD.

Our response to this consultation paper is based on our knowledge and experience being gained in other geographies in this band in other parts of the world and also with the knowledge of the capabilities of our current solutions that cover parts of this band today.

2. INTRODUCTION TO CAMBIUM NETWORKS

At Cambium Networks, we support the communications of life for millions of people around the world and connect enterprise networks where other options cannot. No matter what the conditions or locations, wherever people or networks need to be connected, our wireless broadband solutions deliver clear voice, data and video communications people and networks can rely on.

Our Mission is Connecting the Unconnected and delivering solutions and technology that Bridge the Digital Divide.

Cambium Networks provides professional grade fixed wireless broadband, microwave, narrowband IoT and more recently Wi-Fi solutions. Our solutions are deployed in thousands of networks in over 150 countries, with our innovative technologies providing reliable, secure, cost-effective connectivity that's easy to deploy and proven to deliver outstanding performance metrics. To date Cambium Networks has delivered over eight million radio devices, a count that continues to accelerate year-over-year.

Cambium Networks are proven, respected leaders in the wireless broadband industry. We design, deploy and deliver innovative data, voice, and video connectivity solutions, through a qualified channel of distributors, Wireless Internet Service Providers, Telecommunications Companies, Value Added Resellers and System Integrators. Our solutions enable and ensure the communications of life, empowering personal, commercial, and community growth virtually everywhere in the world.

Following ten-years as a business unit within Motorola Solutions, Inc. Cambium Networks was established in 2011 following divesture from Motorola Solutions. In July this Cambium Networks was listed on the NASDAQ trading as a public company, CMBM.

3. ISSUES FOR COMMENT

3.1. ARE THERE ANY OTHER INTERNATIONAL DEVELOPMENTS IN THE 3700–4200 MHZ BAND THAT THE ACMA SHOULD BE AWARE OF?

Yes, there are several governments considering the expanded use of this band. Foremost, in the USA, the FCC is accepting comments and promoting discussing on petitions to open this band (referred to as the "mid-band"). The FCC began this discussion in 2017 with a public inquiry:

https://www.fcc.gov/document/fcc-opens-inquiry-new-opportunities-mid-band-spectrum-0

Since then, the FCC has called for flexible use of this spectrum via a Notice of Proposed Rulemaking (NPRM): https://www.fcc.gov/document/fcc-expands-flexible-use-mid-band-spectrum

Aside from FCC communications on this topic, there are several industry articles discussing the importance and relevance of this band:

https://www.rcrwireless.com/20190513/5g/fcc-pivots-to-midband-spectrum

https://www.fiercewireless.com/wireless/lawmakers-call-fcc-to-speed-efforts-to-release-midband-spectrum-for-5g

https://www.telecompetitor.com/fcc-takes-next-steps-to-free-up-3-7-4-2-ghz-mid-band-spectrum/

In fact, Cambium Networks supports the use of this band, and has filed public comments in support of the Reed Study, which was commissioned by WISPA (the Wireless Internet Service Provider Association of America). This study analyzed the restricted zones around fixed satellite stations and proposes that 10 km zones are sufficient to protect most stations, rather than the 150 km zones that exist today.

Reed Study:
https://ecfsapi.fcc.gov/file/10715379201594/Joint%20Ex%20Parte%20Letter%20(WISPA%20Microsoft%20Google).pdf

Cambium Networks ex-parte letter: http://community.cambiumnetworks.com/t5/Regulatory-and-Homologation/3-7-4-2-GHz-Band-Proceeding-GN-Docket-No-18-122-RM-11791-RM/m-p/107835

Ofcom in the UK is also discussing opening the use of this band for fixed wireless applications, and Cambium Networks is heavily engaged in those conversations as well. Similar points have been raised and debated as those in the US.

3.2. WHAT ARE THE FUTURE REQUIREMENTS OF POINT-TO-POINT LINKS AND FSS EARTH STATIONS IN THE 3700–4200 MHZ BAND? DOES THIS DIFFER BY GEOGRAPHICAL AREA AND/OR SEGMENT OF THE BAND?

Deploying PTP links in this band using the same technology as the PMP option, is like having an Access Point with one Subscriber Module. The licensing model should be flexible to support both Fixed PTP and PMP links, that would support Wireless Service Providers BUT also importantly industrial IoT applications.

3.3. IF LICENSED POINT-TO-POINT LINKS AND FSS EARTH STATIONS ARE AFFECTED BY REPLANNING ACTIVITIES IN THE 3700–4200 MHZ BAND, WHAT ALTERNATIVE DEPLOYMENT OPTIONS COULD BE CONSIDERED?

Cambium Networks has no comment

3.4. IN THE EVENT ARRANGEMENTS ARE MADE FOR NEW SERVICES IN THE 3700–4200 MHZ BAND, DO STAKEHOLDERS HAVE ANY COMMENTS ON THE ACMA'S PROPOSAL TO MAINTAIN THE EXISTING ARRANGEMENTS FOR RADIODETERMINATION AND LIPD DEVICES, AND THE EXISTING POLICY AROUND TVRO SYSTEMS?

Cambium Networks sees no issue with this.

3.5. WHAT ARE THE FUTURE REQUIREMENTS FOR WBB SERVICES IN THE 3700–4200 MHZ BAND AND WHAT ARRANGEMENTS SHOULD BE CONSIDERED? DOES THIS DIFFER BY GEOGRAPHICAL AREA AND/OR SEGMENT OF THE BAND?

WBB services (i.e. Fixed Wireless PMP/PTP services) would be similar to those deployed in the 3.65GHz band recently auctioned off for 5G. The application is for Wireless Service Providers to deliver reliable last mile Fixed Services using RF. Smart City application and Industrial IoT as are currently deployed on many mine sites in WA, SA, QLD and NSW.

3.6. WHAT WBB DEPLOYMENT SCENARIOS SHOULD BE CONSIDERED FOR THE 3700–4200 MHZ BAND? SHOULD USE BE LIMITED TO ONE SCENARIO OR SHOULD MORE FLEXIBLE ARRANGEMENTS BE IMPLEMENTED?

Cambium Networks suggest a range of Fixed Wireless options be supported i.e. both PTP, PMP.

3.7. WHAT IS THE CURRENT AND PLANNED AVAILABILITY OF FIXED AND MOBILE WBB EQUIPMENT IN THE 3700–4200 MHZ BAND?

Cambium Networks has many solutions in the fixed wireless space and continues to expand its portfolio to accommodate the requirements of its customers. Because many of its products are Software Defined Radios (SDR) and based on FPGA technology, it is a relatively simple exercise to create new solutions to take advantage of new spectrum that becomes available, including 3.7 GHz – 4.2 GHz. Current solutions support the 3.3 GHz – 3.9 GHz bands for both PMP and PTP solutions.

3.8. IS THERE INTEREST IN THE USE OF OTHER NEW SERVICE TYPES IN THE 3700–4200 MHZ BAND?

Cambium Networks has no comment

3.9. WHAT SERVICES/APPLICATIONS SHOULD BE ACCOMMODATED IN THE 3700–4200 MHZ BAND?

Fixed Wireless Solutions for last mile Wireless Service providers, Smart City solutions such as internet access (Fixed Data Services), Wi-Fi backhaul, Sensor and CCTV backhaul and data connectivity for mining operations including autonomous trucks, drilling rigs, CCTV backhaul, and Land Mobile Radio backhaul.

3.10. WHICH FREQUENCIES RANGES SHOULD BE MADE AVAILABLE FOR THESE SERVICES/APPLICATIONS?

Ideally, all 500 MHz of this spectrum should be made available for fixed wireless access applications. Protection criteria similar to that of RALI FX19 could be applied along with a channeling model that incorporates at least 5, 10, 15 and 20 MHz channel arrangements. It may also be suggested that 30 MHz and 40 MHz channeling be supported.

3.11. WHICH GEOGRAPHIC AREAS SHOULD BE MADE AVAILABLE FOR THESE SERVICES/APPLICATIONS?

Ideally, the entire geography should be made available for these applications, with possible exceptions for protection zones of Fixed Satellite Stations as required.

3.12. ON WHAT BASIS SHOULD ACCESS BE PROVIDED? SHOULD ACCESS BE GRANTED ON AN EXCLUSIVE OR SHARED BASIS, ON A COORDINATED OR UNCOORDINATED BASIS, ET CETERA?

It may be early to claim success of the dynamic sharing system being implemented in the CBRS band (3.55-3.7 GHz in the US), but this Spectrum Sharing model may be replicated in other countries/regions to maximize the use of the band, and allow the most effective use of available spectrum, serving the most citizens.

3.13. WHAT LICENSING MECHANISMS ARE APPROPRIATE (SPECTRUM, APPARATUS OR CLASS LICENSING)?

Cambium Networks supports apparatus licensing, Areas based licensing as is currently being contemplated or even support by Dynamic Spectrum Licensing Models (DSLM) also being contemplated.

3.14. IF ARRANGEMENTS FOR WBB SPECIFICALLY ARE IMPLEMENTED IN THE 3700–4200 MHZ BAND, ARE THE PROPOSED INTERFERENCE MANAGEMENT TECHNIQUES WITH SERVICES IN THE 3.6 GHZ BAND SUITABLE? ARE ANY OTHER TECHNIQUES PROPOSED? ARE THERE ANY OTHER COMPATIBILITY ISSUES WITH THE 3.6 GHZ BAND THE ACMA SHOULD CONSIDER?

We see no issue do be able to co-ordinate and co-locate equipment. Techniques exist for provide TDD Sync across technologies in this space including Cambium proprietary PMP450i/m and 4G and 5G technologies.

3.15. SHOULD THE ACMA CONSIDER EXTENDING EXISTING APPARATUS AND SPECTRUM LICENCE ARRANGEMENTS IN THE 3.6 GHZ BAND INTO THE 3700–3800 MHZ BAND OR ANOTHER SEGMENT OF THE 3700–4200 MHZ BAND?

Cambium Networks feels a large part of this spectrum if not all should be dedicated to services under apparatus, geographic apparatus or DLSM models for Fixed Wireless applications.

3.16. IS THERE ANY ADDITIONAL INFORMATION AVAILABLE THAT WOULD ASSIST THE ACMA IN ASSESSING COMPATIBLY OF POTENTIAL NEW WBB SERVICES IN THE 3700–4200 MHZ BAND WITH WAIC AND RADIO ALTIMETER SYSTEMS IN THE 4200–4400 MHZ BAND?