

# Cambium Networks

## Response to Consultation on Spectrum Sharing

September 2019

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## 1. EXECUTIVE SUMMARY

Cambium Networks truly welcomes and appreciates the opportunity to respond to the Consultation Paper on spectrum sharing.

As you are well aware, we have been advocating for a number of years for the ACMA to adopt an approach to spectrum sharing to gain best use of the available spectrum in certain bands, like the 3.3GHz to 3.4GHz that is currently under monitor mode. Sharing will enable broader and more effective access to spectrum across multiple industries and geographies, such a remote mine sites that need access to licensed spectrum for communication for automation applications, regional councils that could derive significant value buy building their own reliable communication infrastructure in places often too remote for the Tier 1 providers to be able to prioritise and support and traffic authorities, such as TMR QLD which use licensed spectrum for backhaul of traffic control signals and CCTV.

A Dynamic Spectrum Licensing Model(DSLM) would be very valuable to extend use of licensed spectrum for both Fixed and Mobile Applications.

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.

Our response to this consultation paper is based on our knowledge and experience gained from participating in the FCC, CBRS program and implementation of our solution to support spectrum sharing under this program as well as recent input to UK regulator, Ofcom, and the Italian regulator looking at similar but less complex models.

## 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 divestiture 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.GIVEN CURRENT MOMENTUM IN INTERNATIONAL MARKETS AND OPPORTUNITIES FOR OTHER SHARING MODELS OFFERED BY 5G TECHNOLOGIES, IS IT TIMELY TO DEVELOP A MORE DETAILED CONSIDERATION OF SPECTRUM SHARING OPPORTUNITIES IN AUSTRALIA?

Yes, Cambium Networks has been advocating the value of the approach for making more effective use of a number of bands that can be more effectively utilised “shared” to enable WiSPS, and large mining companies access to spectrum that could be better utilised to achieve BEST USE VALUE outside of the key and traditional value use case of mobile broadband. Spectrum can also be far better used geographically, ~~buy allowing~~ ensuring a more effective use and access to spectrum where there is for example little or no value today to deploy 5G mobile broadband. The old days of carriers buying up spectrum licenses for large areas and never using them is a thing of the past.

3.2.ARE THERE RECENT DEVELOPMENTS IN SHARING TECHNIQUES THAT INDUSTRY AND THE ACMA SHOULD BE AWARE OF?

A key example ~~of~~ a sharing technique is that used by CBRS and which will be supported and enabled ~~d~~ by a number of Spectrum Authorisation Services (SAS), including Federated Wireless, Google. Ofcom, the UK regulator has also recently undertaken a review and published an approach to spectrum sharing. The Italian regulator are also exploring a DLSSM model.

3.3.WHAT ARE THE (POTENTIALLY NEW) USE CASES THAT MIGHT BENEFIT FROM SECONDARY OR TERTIARY ACCESS TO SPECTRUM AND WHO BENEFITS?

Access to licensed spectrum for key applications on:

- Remote mine sites.
- Regional city Smart City networks.
- Regional and Rural WiSPs for continuing to deliver services to underserved areas and bridging the digital divide
- Traffic Authorities for IoT solutions, like traffic light signalling, overhead lane messaging updates.

### 3.4. WHAT ARE THE POTENTIAL CHALLENGES/IMPEDIMENTS TO THE INTRODUCTION OF DSA IN AUSTRALIA—TECHNICAL, INDUSTRY CAPABILITY, LICENSING AND REGULATORY FRAMEWORKS?

One challenge would be trying to make the system too complex which will add cost and also add time to implement. Learning from others, like Ofcom and FCC, but designing a model for Australian needs would be advised.

### 3.5. FACILITATING SPECTRUM ACCESS (E.G. MONITORING, CONTROL, REPORTING, ASSIGNMENT) LOGICALLY NECESSITATES INVOLVEMENT FROM BOTH GOVERNMENT AND INDUSTRY. ARE THERE ANY EARLY THOUGHTS ON WHAT AN APPROPRIATE INDUSTRY/GOVERNMENT BALANCE MIGHT LOOK LIKE? HOW MIGHT THE ACMA FACILITATE SHARED SPECTRUM ACCESS? HOW MIGHT THE ACMA ADDRESS THIS?

Create a shared spectrum working group with all interested parties.

### 3.6. WHAT IS THE RELEVANCE OF DSA EXAMPLES SUCH AS THE US CITIZENS BROADBAND RADIO SERVICE (CBRS) ARRANGEMENTS TO THE AUSTRALIAN SPECTRUM ENVIRONMENT? ARE THERE OTHER OR LOWER COST ALTERNATIVES TO HELP INFORM ACCESS CONTROL AND ASSIGNMENT SYSTEMS OF INCUMBENT USAGE IN A TIMELY MANNER?

The CBRS now demonstrates and validates how greater use can be derived from 150MHz of valuable spectrum in the 3.55 to 3.7GHz band. Ofcom looks to be adopting a less complex approach to CBRS.

### 3.7.UNDER A MULTI-TIER DSA APPROACH:

3.7.1. TIER 1 (HIGHEST PRIORITY OR INCUMBENT) USERS WOULD BE EXPECTED TO SHARE SPECTRUM WITH LOWER TIER USERS WHEN NOT BEING UTILISED. ARE THERE ANY SPECIFIC LICENSING AND/OR REGULATORY ARRANGEMENTS THAT MIGHT INCENTIVISE THE TIER 1 USERS TO RELEASE UNUTILISED SPECTRUM FOR LOWER-TIER ACCESS?

See below.

3.7.2. TIER 2 AND 3 USERS NEED TO VACATE SPECTRUM (REGARDLESS OF THEIR SERVICE TYPE OR COMMUNICATION URGENCY) FOR TIER 1 USERS TO OPERATE SEAMLESSLY. DO WE SEE POTENTIAL SERVICES/SERVICE TYPES IN AUSTRALIA WHO WOULD FIT THE CRITERIA OF SECOND OR THIRD TIER USERS? WHAT ARE THE INCENTIVES TO ADOPT A CONDITIONAL (LOWER PRIORITY) SPECTRUM THAN AN UNCONDITIONAL (FULL ACCESS) SPECTRUM?

The CBRS approach is complex, and we would suggest that a relevant approach for Australia is similar to the Ofcom approach. ACMA should request and review a copy of their report, *“Enabling wireless innovation through local licensing”*.

Here is some feedback from one of our engineers, who actively participated in the CBRS process and is worth consideration.

“The multiple-tier approach makes sense if the lower tier devices can have some guarantee of spectrum availability. For example, tier 1 devices are only operating in a specific area, and tier 2 devices are allowed with no restrictions outside this area. Or tier 1 devices, when operating, are only using a portion of the spectrum, and tier 2 devices can use the remaining portion of the spectrum all the time plus the tier-1 portion of the spectrum when tier 1 devices are not in use. The point is that tier 2 devices need to have some resources (area, spectrum) that is guaranteed no matter what, otherwise deploying a network becomes impractical. In a fixed deployment scenario it may be acceptable to temporarily operate on restricted resources (e.g. smaller channel BW), but it is difficult to deploy if there is a chance that you will suddenly have no resources at all.

Letting a central authority (the SAS in case of CBRS) control the EIRP of the device, and be able to change it on a daily basis, certainly raises concerns when deploying a fixed network, because if the EIRP is suddenly lowered there is the risk the farther SMs are no longer reachable. To solve the problem, more

APs need to be installed, but this is not done in a timely manner and the end customers experience an outage.

Requiring the device to periodically check with the central authority (this is done every few minutes in CBRS) is also a burden. If there is congestion, or the link becomes unavailable to contact the SAS and extend the grant time, the whole sector loses the grant and needs to stop transmission. This is clearly an inconvenience. Also, the frequent exchanges with the SAS seem to justify the cost the operator incurs to operate in this band, which is per device per month. Having a single payment to operate in the band, and access for example to a database that doesn't need to be consulted this often, would make it more appealing also to operators who deploy in areas where they cannot justify the additional monthly cost of connecting to the SAS.

On the flip side, one advantage of a centralized authority is that, having visibility of all devices and their operational parameters, it has the capability of offering a more efficient frequency planning to operators, better than what they could coordinate among themselves."