

17 July 2019

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Cc: **YBrs. Encik Al-Ishsal bin Ishak**  
**Chairman**  
Malaysian Communications and Multimedia Commission  
MCMC Tower 1, Jalan Impact, Cyber 6  
63000 Cyberjaya, Selangor Darul Ehsan  
Malaysia

**BY EMAIL**

Dear Sir,

**SPECTRUM FOR 5G IN MALAYSIA**

We write to you on behalf of the Global Satellite Coalition (GSC)<sup>1</sup>, to bring to your kind attention a matter of extreme importance with respect to the mobile industry's sustained attempts to take over spectrum currently used for satellite services.

We understand that the 5G industry in Malaysia is pursuing parts of the spectrum currently being used to provide important satellite services in the 3.4-3.8 GHz and 27.0-29.5 GHz band. This is part of a worldwide campaign to take over as much spectrum as possible for terrestrial 5G services, regardless of impact on other services and without relying on any realistic assessment of 5G spectrum demand.

In GSC's view, neither the 3.4-3.8 GHz band nor the 27.0-29.5 GHz band are needed for 5G. Any realistic 5G spectrum requirements can be met using other available frequency bands without disturbing the existing and planned satellite services in either band.

**Satellite Services in the 3.4-3.8 GHz and 27.0-31 GHz bands**

The Malaysian satellite operator, MEASAT, in addition to the band 3.8-4.2 GHz, currently operates one satellite in the 3.4-3.7 GHz band and three satellites in the 3.7-4.2 GHz band. These bands are

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<sup>1</sup> The GSC is the voice of the global satellite industry that represents the combined membership of seven satellite associations: Satellite Communications Brazilian National Association (ABRASAT), Asia-Pacific Satellite Communications Council (APSCC), Asia Video Industry Association (AVIA), Communications Alliance (CA), EMEA Satellite Operators Association (ESOA), Global VSAT Forum (GVF), Satellite Industry Association (SIA) – covering all continents and all ITU regions.

currently being used to provide a multitude of services including: very small aperture terminal (VSAT) networks, internet services, point-to multipoint links, as well as video broadcasting and satellite news gathering services in Malaysia. To address national demand, MEASAT plans to continue utilizing the entire spectrum of 3.4–4.2 GHz on their future satellite. This satellite, MEASAT-3d, is currently being built and is scheduled to launch in 2021.

In addition, international satellite operators, such as PT Telkom, Thaicom, Intelsat, ABS, APT Satellite, Asiasat and SES, also operate more than eighty C-band satellites that use all or parts of the 3.4-3.8 GHz band in Region 3, to meet the demand for the highly reliable C-band satellite services. With over 3800 TV channels distributed by C-band in Asia, it remains the band of choice for media distribution in Asia. Many other services are provided by C-band satellite in Asia Pacific, including those depicted on the recently produced AVIA – GSC information sheet, “C-band is critical for satellite services”, as attached in Annex A of this letter.

The upcoming MEASAT-3d satellite will also carry a Ka-band payload in the band 27.0-31 GHz to provide High Throughput Satellite (HTS) service in Malaysia. The new HTS Ka-band mission features multiple user spot beams optimized to deliver high speed broadband communications over Malaysia. MEASAT-3d will aid in bridging the digital divide in Malaysia by enabling 100% coverage for high speed consumer broadband services to all Malaysian households.<sup>2</sup>

MEASAT-3d will join the many geostationary and non-geostationary HTS systems that have been launched around the world that use the Ka-band in the range 27.0-31 GHz. For services in the Asia-Pacific region alone, over twenty-five satellites using this band have been launched in just the last 6 years. Many more satellites that use this band are expected to be launched in the next 3 years, including several large constellations of non-geostationary satellites. Annex B summarizes the Ka-band satellites with global / Asia Pacific coverage or coverage over specific countries in Asia Pacific; those with launch dates from July 2019. Today, satellite networks in the Ka-band connect millions of people around the world and provide essential connectivity to governments and many important economic sectors, such as agriculture, aviation, maritime, telecommunications, and energy.

### **Neither the 3.4-3.8 GHz nor the 27.0-29.5 GHz bands are required for 5G in Malaysia**

We believe satellite services and investments made to operate in the 3.4-3.8 GHz and 27.0-29.5 GHz bands need not be jeopardized to meet realistic 5G spectrum requirements in Malaysia. There is ample spectrum in other bands that could be used for 5G without touching satellite bands.

### **5G spectrum requirements should be based on realistic estimates:**

Based on the traffic forecast-based approach in Report ITU-R M.2290-0, it was estimated that the 5G spectrum requirements vary between 1.34 GHz and 1.96 GHz in the lower and higher user

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<sup>2</sup> Airbus, “Airbus to build multimission satellite for MEASAT” Source: <https://www.airbus.com/newsroom/press-releases/en/2019/05/airbus-to-build-multimission-satellite-for-measat.html>.

settings respectively. It was also found that there are other modelling approaches as being considered by ITU Working Party 5D which estimates a total of 19.7 GHz. The high-end of these estimates are wildly unrealistic. To test the upper limit of mobile spectrum requirements, LS Telcom examined how much spectrum would be required to enable every person on Earth to stream unique 4K video to their mobile device for 16 hours a day.<sup>3</sup> It was found that this extreme level of mobile data consumption would require *less* spectrum (38% per annum compounded to 2035) than the extrapolated 5G spectrum demand estimates, based on the then recent rapid annual growth of 50% per annum compound annual growth. A more realistic estimate of 6 hours of unique video per day, half of which is 4K video, indicated only 28% compound annual growth to 2035. Even this is a very high estimate, since it is unlikely that so much unique video could be found, and assuming not, there are far more efficient ways to deliver it to multiple devices, e.g. broadcast mode, particularly for live content.

Indeed, countries that have examined the question more closely have invariably concluded that considerably less spectrum is required. For example, a whitepaper released by Universiti Teknologi Malaysia (UTM)<sup>4</sup> estimated that the spectrum gap for mobile broadband services in Malaysia would be just 177 MHz in 2020, after the 700 MHz and 1400 MHz bands are taken into account.

Singapore's IMDA, after a detailed review of various models and its own data on mobile data consumption growth, has estimated that densely-populated Singapore would need 3360 MHz of 5G spectrum in the 2022-2025 timeframe. These estimates could be made even more realistic by examining the efficiency with which mobile data is delivered in other countries. For example, Finnish regulator, Traficom reported that the Finnish mobile operators deliver an average of 16.1 gigabytes of data per month to each SIM in Finland,<sup>5</sup> using 655.4 MHz of licensed spectrum in total divided among 5 carriers.<sup>6</sup> In contrast, the top three Malaysian mobile data operators, Digi, Maxis and Celcom, delivering a weighted average of 12.3 gigabytes per month<sup>7</sup> based on 620 MHz of

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<sup>3</sup> LS Telecom, "When will Exponential Mobile Growth Stop?" Source: [https://www.lstelcom.com/fileadmin/content/marketing/news/2017\\_LStelcom\\_Report\\_WhenWillExponentialMobileGrowthStop.pdf](https://www.lstelcom.com/fileadmin/content/marketing/news/2017_LStelcom_Report_WhenWillExponentialMobileGrowthStop.pdf)

<sup>4</sup> UTM "Perspective on Malaysia Mobile Broadband Development 2020". Source: [https://www.malaysianwireless.com/wp-content/uploads/2017/08/UTM\\_Perspective-on-Malaysia-Mobile-Broadband-Development-2020.pdf](https://www.malaysianwireless.com/wp-content/uploads/2017/08/UTM_Perspective-on-Malaysia-Mobile-Broadband-Development-2020.pdf).

<sup>5</sup> Statistics Table on Communications Services, 2H/2018, cell E114/(cell E21 \* 1000 \*6). Source: <https://www.traficom.fi/sites/default/files/media/publication/Viestintapalveluiden-tilastokoonti ods>

<sup>6</sup> Spectrum Monitoring Frequency Table comprising mostly 4G, but also 3G and 2G services using spectrum in 450, 700, 800, 900, 1800, 2100 and 2600 MHz bands. Source: <https://www.spectrummonitoring.com/frequencies/#Finland>

<sup>7</sup> 3Q and 4Q 2018 subscriber data for Digi, Maxis and Celcom. Source: <https://www.malaysianwireless.com/2019/01/digi-mobile-subscriber-base-4q18/>, <https://www.malaysianwireless.com/2019/02/maxis-prepaid-subscribers-4q18/> and <https://www.malaysianwireless.com/2019/03/celcom-mobile-subscribers-4q18/>

licensed spectrum , with a further 30 MHz apparently available but not licensed.<sup>8</sup> Allowing for the difference in available spectrum, the top three Malaysian mobile data operators deliver about 19.2% less data per subscriber than the average Finnish mobile operator. This may be due to lower proportion of 4G usage in Malaysia as compared to earlier generations, among other factors.

It is important not to over allocate spectrum for 5G, especially when the business cases for many 5G applications remain uncertain and when re-allocation would negatively impact existing services and investments in the bands in question.

### **Spectrum options in Malaysia to meet realistic 5G requirements:**

According to LS Telcom<sup>9</sup>, there is 915 MHz of harmonized spectrum in ITU Region 3 that has been identified for IMT. In this regard, Malaysia has a number of spectrum options for meeting more realistic 5G requirements. Since Malaysia has so far only licensed no more than 620 MHz of spectrum for mobile services (with another 30 MHz available but not licensed), nearly 300 MHz of IMT spectrum is still available for 5G requirements. For instance, the 4.4-5.0 GHz band may be a good candidate for 5G as this band is not being used by satellite services in Malaysia.

GSC believes that Malaysia’s “low-band” (<1 GHz) and “mid-band” (1 to 6 GHz) 5G spectrum requirements can be met from these other bands without displacing existing satellite services in the 3.4-3.8 GHz. It should be recalled that, at WRC-15, most ITU Region 3 countries, including Malaysia, opposed a regional International Mobile Telecommunications (IMT) identification for the 3.4-3.6 GHz band. In fact, only 11 countries in ITU Region 3, not including Malaysia, elected to identify the 3400-3600 MHz band for IMT under ITU footnotes No. 5.5.432, 432A, 432B and 5.433A. At that time, Malaysia took the decision not to be included in these footnotes in recognition of the important satellite services being provided in the band in Malaysia and throughout the region, by MEASAT and other international satellite operators in the region. We believe the reasons that prompted Malaysia’s position at WRC-15 regarding the criticality of fixed-satellite services (FSS) for essential connectivity – not only in urban areas but also to remote and hard-to-reach areas, particularly in high rainfall regions – remain very much valid today, and as such, a change is not warranted.

In the millimetre wave spectrum, most countries are focusing on the 24.25-27.5 GHz band or parts thereof for 5G. Australia, Brazil, China, the EU-28, the Arab League and Russia are all prioritizing this band for 5G. Up to 3250 MHz of spectrum is available in this range, which is more than enough to meet any realistic estimate of 5G spectrum requirements. Moreover, the band stands a high chance of international harmonization since it is among those being considered by WRC-19 for IMT-2020. Satellite service allocations that are in portions of the 26 GHz band can be protected

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<sup>8</sup> Spectrum Monitoring Frequency Table comprising 4G, 3G and 2G services using spectrum in 850, 900, 1800, 2100 and 2600 MHz bands. Source: <https://www.spectrummonitoring.com/frequencies/frequencies3.html#Malaysia>

<sup>9</sup> LS Telecom, “Analysis of the World-Wide Licensing and Usage of IMT Spectrum”. Source: [https://www.esoa.net/cms-data/positions/2019\\_Study\\_LicensingUseofMobileSpectrum\\_1.pdf](https://www.esoa.net/cms-data/positions/2019_Study_LicensingUseofMobileSpectrum_1.pdf)

with reasonable regulatory measures. While MEASAT is proposing to use the 27.0-27.5 GHz on MEASAT-3d, that still leaves plenty of millimetre wave spectrum in the 24.25-27.0 GHz band that is relatively lightly used by satellite services, not to mention the over 33 GHz of total spectrum above 24 GHz being studied by the ITU for IMT-2020. It is recommended that this 500 MHz of spectrum be preserved for continued use for FSS, as is being considered by Australia<sup>10</sup>.

The 27.5-29.5 GHz band stands in stark contrast to the 24.25-27.5 GHz band. At WRC-15, this band was excluded from the spectrum being considered for IMT-2020 in recognition of the intense use of these bands by satellite services. Indeed, as noted above, this band is a critical uplink band for virtually all modern HTS systems and is used for both gateways and user terminals. There is an Agenda Item at WRC-19 to *expand* the use of the 27.5-29.5 GHz band for Earth Stations in Motion (ESIMs). Satellite manufacturers and operators have invested hundreds of billions of dollars in 27.5-29.5 GHz band satellites and other critical infrastructure, including rockets and manufacturing facilities, Internet gateways and other ground infrastructure, and the devices that connect consumer, business and government users to the Internet. Because of that investment, hundreds of millions of satellite broadband connections now occur over the Ka-band and, in particular, the 27.5-29.5 GHz band every day.

Fortunately, there is no need to look to the 27.5-29.5 GHz band for 5G because there will be ample other millimetre wave spectrum available for 5G in the 24.25-27.5 GHz band. For example, Australia recently reached the preliminary conclusion that it need not consider the 27.5-29.5 GHz band for 5G: *“Given that planning decisions in 26 GHz accommodate 2.4 GHz of spectrum suitable for wide area wireless broadband, the ACMA has formed the preliminary views that these applications are adequately catered for in the 26 GHz band.”*<sup>11</sup> WRC-19 is also expected to identify tens of gigahertz of additional spectrum above 24 GHz for IMT-2020.

## **Recommendations**

We therefore respectfully request that Malaysia consider available IMT bands other than the 3.4-3.8 GHz and 27.0-29.5 GHz bands to satisfy 5G spectrum requirements. As some countries have found, there are ample other bands that can be used to meet any realistic assessment of 5G spectrum demand. These could include portions of the 3.3-3.4 GHz, the 4.4-5.0 GHz, and the 24.25-27.0 GHz, as well as the tens of Gigahertz of spectrum expected to be identified for IMT-2020 at WRC-19. There is simply no need to disturb the valuable satellite services being provided and planned in the 3.4-3.8 GHz and 27.0-29.5 GHz bands in order to satisfy 5G requirements. Instead, Malaysia can have both robust satellite services and 5G services through a balanced choice for 5G.

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<sup>10</sup> ACMA, “Future use of the 26 GHz band—Planning decisions and preliminary views” Source: <https://www.acma.gov.au/theACMA/-/media/9C1539075B074218AE7A88578F8C9178.ashx>.

<sup>11</sup> ACMA, “Replanning of the 28 GHz band – Options Paper” Source: <https://www.acma.gov.au/theACMA/-/media/A18AE5C2EE354C94837C87E2D7FDF2A2.ashx>; see also ACMA, “Future use of the 26 GHz band—Planning decisions and preliminary views” Source: <https://www.acma.gov.au/theACMA/-/media/9C1539075B074218AE7A88578F8C9178.ashx>.

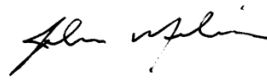
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