

## **Submission to Radio Spectrum Management (RSM):**

## **Comments on 24-30 GHz use in New Zealand: Discussion document**

4<sup>TH</sup> JUNE, 2021

# **SAMSUNG**

## 1. Executive Summary

Samsung Electronics Co., Ltd (hereinafter Samsung) is pleased to submit comments to the RSM in response to the consultation on “24-30 GHz use in New Zealand<sup>1</sup>”, and is grateful to work with the RSM on this subject.

In section 2, Samsung provides views on each question. Samsung welcomes that RSM proposes the 26/28 GHz bands for IMT/5G use including eMBB, FWA and industry verticals. In order to drive a timely 5G market, prioritizing the use of these band in New Zealand, Samsung would encourage RSM to allocate these bands as early as possible, taking into account the readiness of the technology, matured ecosystems and global progress. By making 26/28 GHz bands available for 5G in addition to the 3.5 GHz allocation for 5G in 2020, RSM’s plans will help to expedite the deployment of 5G and provide an important step for a wide set of spectrum bands which requires spectrum in low-, mid- and high-bands.

Finally, Samsung looks forward to working closely with the RSM for 5G deployment in these bands in New Zealand.

## 2. Comments

From this consultation document, Samsung fully recognize that current usages within 24.25-28.35 GHz generally expire in 2022 and there are no further renewals after this expiration. With that, Samsung believes that the 26/28 GHz bands should be implemented in the immediate future for 5G in New Zealand.

In the case of the 28 GHz band, considering an efficient use of spectrum while not have a negative impact on the future planning such as 5G use, Samsung welcomes that RSM has decided to grant fixed term licenses for FSS earth stations in a few rural locations.

In this section, Samsung would like to provide views on some questions.

### *The technologies and applications in 24-30 GHz*

#### **Q1. What are the most likely use cases in New Zealand for mmWave based 5G services?**

Samsung supports that 5G using mmWave, *inter alia*, the 26/28 GHz bands supporting extreme capacity and license-based QoS will be used for eMBB, FWA, industry verticals, etc. in varied usage scenarios and use cases. And in our view, 5G use cases, in specific surveillance, e-education, e-health, smart agriculture, etc. as depicted in Recommendation ITU-R M.2083 as usage scenarios such as eMBB, URLLC and mMTC, are important use cases for New Zealand. Because mmWave bands such as 26 GHz and 28 GHz are key bands to support eMBB as well as FWA using IMT technologies, we recommend that New Zealand consider possible usage of IMT in these bands.

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<sup>1</sup> Available at <https://www.rsm.govt.nz/projects-and-auctions/consultations/24-30-ghz-use-in-new-zealand/>

## *Spectrum allocations*

### **Q6. Do you agree New Zealand should allocate 24.25-27.5 GHz primarily for IMT use?**

Samsung supports this way forward to allocate 24.25-27.5 GHz for primarily IMT use in New Zealand. This frequency band known as the 26 GHz band was identified to IMT at WRC-19 based on tremendous global support. In addition, this band is defined as n258 to provide 3GPP 5G NR services. According to many reports published by the Global mobile Suppliers Association (GSA), this band has plenty of maturity from a regulatory and implementation perspective. Moreover, this band can lead to a full 5G experience in combination the 3.5 GHz 5G band assigned in 2020, even though it is allowed in short term.

### **Q7. How should RSM accommodate other use in this band such as space services?**

We support that the 26 GHz band should be allocated exclusively for 5G.

### **Q8. How do you see our proposal of the 28 GHz band allocation?**

According to the Radio Regulations in ITU, the 28 GHz band covering 27.5-29.5 GHz is allocated to mobile service on a co-primary basis. And even though this band is identified for the use of high-density applications in the fixed-satellite service (HD-FSS), this identification does not preclude the use of other services allocated on a co-primary basis and does not establish priority among users of the band, in accordance with No. 5.516B in the Radio Regulations.

In addition, this band is part of 3GPP n257 band covering 26.5-29.5 GHz and n261 covering 27.5-28.35 GHz for 5G NR, and its ecosystems of equipment are ready.

Considering an efficient use of spectrum while not have negative impact on the future planning such as 5G use, Samsung welcomes that RSM has decided to grant fixed term licenses for FSS earth stations in a few rural locations.

Meanwhile, as for the proposal by the RSM to allocate the whole 28 GHz band to satellite service, we do not support this proposal. In this regard, we would reiterate our original position submitted at the previous consultation in April 2018 to use the band, together with the 26 GHz band, for mobile broadband/5G providing approximately 1000 MHz bandwidth per operator<sup>2</sup>. Study results<sup>3</sup> show that satellite services and mobile services can co-exist in the 28 GHz band. Mitigation measures can further enhance interference margin among services operating in this band. In addition, we also encourage RSM to explore other usage types like FWA, private IMT network/local 5G and/or indoor and outdoor

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<sup>2</sup> Reference: GSA presentation at the 7<sup>th</sup> Asia-Pacific Spectrum Management Conference, 24<sup>th</sup> May 2021 (GSA presentation material is available at [https://drive.google.com/drive/folders/1UhDKDtYK5onbNWvXUf6cm8AI-ISsxYt?dm\\_i=4SEG,IAXX,EIJJJ,262Z3,1](https://drive.google.com/drive/folders/1UhDKDtYK5onbNWvXUf6cm8AI-ISsxYt?dm_i=4SEG,IAXX,EIJJJ,262Z3,1))

<sup>3</sup> References: AWG-26/TMP-25, AWG-27/INP-48 (Rev. 1), outcomes from WRC-19 agenda item 1.5, <https://gsacom.com/paper/mmwave-bands-for-5g-india-october-2020/>, <https://docs.fcc.gov/public/attachments/FCC-16-89A1.pdf>, etc.

eMBB with band segmentation approach for both services to operate on non-interference basis. And, we suggest that if fixed applications like backhaul links are used in the 28 GHz band then these are confined to areas where 5G is not needed.

Also, we are of the view that allocating the entire 2 GHz bandwidth in the 28 GHz band to satellite services will not be an efficient spectrum use of valuable spectrum. We question whether such wide bandwidth would be needed for satellite services in New Zealand. Therefore, we would like RSM to review again about this point.

**Q9. Which option do you prefer for allocating 28 GHz band? Or is there any other option for managing the shared use of IMT, ESIMs and FSS in the 28 GHz band?**

**Q10. If you prefer option 1, do you agree with the proposed sharing mechanism (defining satellite coordination zones) between IMT use and FSS ground stations?**

**Q11. If you prefer option 2, how much spectrum do you think RSM should allocate to ESIM, IMT private network/FWA? And what's the preferred spectrum placement?**

Answer to the questions from Q9 to Q11.

Each of the options has its pros and cons. As provided in the answer to Q8 above, 27.5-28.35 GHz could be used for services both IMT and IMT private network, including FWA, by considering band segmentation. Meanwhile, we are also of the view that the entire 28 GHz band could be extended with IMT usage both indoor use and outdoor use in addition to IMT private network/FWA, taking into account possibility of co-existence between satellite services and IMT/mobile services.

Moreover, as emphasized in answer to Q8 above, the 28 GHz band is not exclusively allocated to satellite use. We believe that co-existence between IMT and ESIM could be managed taking into account discussion in preparation for WRC-19 and outcomes from WRC-19. Therefore, we don't support the proposal which is restricted to indoor only in option 1.

**Q12. Are there any other issues of sharing use between satellite earth stations and ESIMs that you would like to bring to our attention?**

No specific issue of sharing use between satellite earth stations and ESIM. Meanwhile, we are of the view that IMT and mobile broadband in the bands should be protected from satellite earth stations and ESIMs.

**Q14. What's your preferred licensing option in 26/28 GHz spectrum?**

We prefer option 1 (national management rights) for 26/28 GHz bands. But in some specific cases, option 2 as regional rights and/or option 3 as radio licenses could also be considered, as appropriate.

**Q15. Do you see any need for general user license spectrum for IMT? If so, what use case might there be?**

We don't see any need for general user license (GUL) spectrum for IMT. To provide QoS and to make for efficient management of the network, in principle, we are not supportive of the use by the GUL, a license-exempt (unlicensed) basis.

**Q16. If there is a need for general use spectrum for IMT and ESIM, how much spectrum should we set aside for it? Should RSM mandate technical conditions on the general use license?**

See answer for IMT to Q15 above.

**Q17. Do you agree RSM should adopt 3GPP NR FR2 based channel bandwidth to design a channel plan in the radio license regime for IMT services?**

3GPP has defined the detailed technical specifications (38.101 and 38.104) for 5G NR to support implementation for the FR2 covering 24.25-52.6 GHz. The following table summarizes what kinds of channel bandwidths are defined for 5G NR FR2. In 3GPP, the transmission bandwidth configuration  $N_{RB}$  for each base station (BS), channel bandwidth, and subcarrier spacing (SCS) is specified.

Table 1. Transmission bandwidth for FR2<sup>4</sup>

SCS [kHz]	50 MHz	100 MHz	200 MHz	400 MHz
	$N_{RB}$	$N_{RB}$	$N_{RB}$	$N_{RB}$
60	66	132	264	N/A
120	32	66	132	264

We agree RSM should adopt 3GPP NR FR2 based channel bandwidth to design a channel plan in the radio license regime for IMT service, taking into account global interoperability of equipment.

### *Technical Considerations*

**Q18. Do you agree RSM should refer 3GPP standards to set the regulatory requirements for spectrum allocated to IMT?**

Many countries establish their own regulatory requirements based on 3GPP technical specifications (TSs) such as 38.101 and 38.104. These technical specifications are significant to implement 5G. Therefore, we agree RSM should refer to 3GPP technical specifications to set the regulatory requirements for spectrum allocated to IMT for the swift introduction of 5G using these bands.

<sup>4</sup> FR2 (Frequency range 2) is covering frequency range from 24.25 GHz to 52.6 GHz.

**Q21. Which option do you prefer to set the unwanted emissions?**

**Q22. If we use a TRP option for setting AFEL and UEL, do you have any recommended solutions on TRP measurement in field?**

Answer to the questions from Q21 to Q22.

This is one of the critical items under discussion within ITU-R WP 5D. It is recommended that RSM follow up the discussions in ITU-R continuously. Therefore, we would like to reserve our answer for now. Meanwhile, we recommend that RSM follow relevant discussions in several places continuously.

**Q23. Do you agree that RSM should set unwanted emissions limits (in UELs and AFELs) base on 3GPP category B requirements? If no, please explain the reasons and provide your suggestions?**

Category B defined in 3GPP technical specification 38.104 would be preferable.

**Q24. Do you agree that we should we implement (e.g. through UELs and AFELs) the ITU Radio Regulations, Resolution 750 limits, including the 1 September 2027 transition date and grandfathering clause for the protection of the EESS (Passive) Band? If not, please explain what limits and transition dates you consider to be more appropriate.**

In general, we respect Resolution 750 (REV.WRC-19) as a global compromise. As provided answer to Q8 above, Samsung as a global manufacturer recommends that RSM implement 5G based on 3GPP technical specifications such as 38.101 and 38.104.

**Q25. Do you have any insights on equipment availability at, or close to, the edge of 24.25 GHz that can meet both pre-1 September 2027 and post-1 September 2027 unwanted emission limits? Is there any additional technical solution such as frequency separation or filtering required for some equipment types?**

We would like to reserve our answer for now.

Meanwhile, we support RSM considers the relevant 3GPP technical specifications for 5G implementation as mentioned above. And we do not support values which would be more stringent than those decided at WRC-19 as defined in Resolution 750 (REV.WRC-19). In addition, we also do not support to start the phase 2 before September 1, 2027.

**Q26. Do you agree with RSM's position to not establish a framework for coordination zones for RAS?**

From the consultation paper, we recognize that there are no licenses for RAS in the 23.6-24 GHz band and there are no current, planned or future operations of RAS in this band in New Zealand. Therefore, we agree not to establish a framework for coordination zones for RAS.

**Q31. Do you agree that think RSM should implement ITU Radio Regulations, Resolution 242, resolves 2.1 in the management rights and license conditions? If not please explain why or propose an alternative?**

*Resolves 2.1 in Resolution 242 (WRC-19) is related to implementation aspects. There is no need to define as regulations.*

**Q33. Do you have any comments regarding the spectrum sharing approach proposed by RSM between FSS and IMT FWA in the 28 GHz band?**

We agree that FSS earth stations may be more prevalent in less populated areas while IMT may be more prevalent in more densely populated urban and suburban areas.

**Q36. Do you think RSM should mandate the regulatory requirements as laid out in Resolution 169 (WRC-19) for ESIM use if a shared use between 27.5-28.35 GHz?**

According to Resolution 169 (WRC-19), the regulatory requirements such as pfd masks with altitude condition for Aeronautical ESIM and separate distance with maximum transmitting power for Maritime ESIM are defined to protect terrestrial services including mobile service in the band.

As for Aeronautical ESIM, we have further observation on how to ensure the requirements of pfd mask defined in Resolution 169 (WRC-19) are practically met due to requirement in receiver domain of a victim. Unlike a satellite and a fixed earth station which have had a regulatory measure type of pfd limits, Aeronautical ESIM mounted in aircraft would dynamically move everywhere, so that it is not easy to meet the pdf limit anywhere and anytime dynamically. Furthermore, there is no specific technical standard for ESIM taking into account this matter.

In this regard, we are of the view that a compatible requirement with WRC-19 decision practically to ensure protection from ESIM to 5G should be studied further, e.g. complementary transmitting power limitation according to altitude of Aeronautical ESIM compatible with pfd masks in Resolution 169 (WRC-19). We are welcome to discuss this matter with RSM.

### 3. Acronyms and Abbreviation

3GPP	3 <sup>rd</sup> Generation Partnership Project
EESS	Earth-Exploration Satellite Service
eMBB	Enhanced Mobile Broadband
FR2	Frequency Range 2 (24.25 GHz to 52.6 GHz)
FSS	Fixed Satellite Service
FWA	Fixed Wireless Access
GSA	Global mobile Suppliers Association
HD-FSS	High-density applications in the FSS
IMT	International Mobile Telecommunication
ITU	International Telecommunications Union

ITU-R	ITU-Radiocommunication sector
NR	New Radio
$N_{RB}$	Transmission bandwidth configuration, expressed in units of resource blocks
QoS	Quality of Service
SCS	Subcarrier Spacing

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