



24 - 30GHz Spectrum Allocation – Public Consultation - MetService

Issue 1.0
12 December 2025

24 - 30GHz Spectrum Allocation – Public Consultation - MetService

RSM Request...

On 21 Oct 2025, at 11:09 AM, Radio Spectrum <Radio.Spectrum@mbie.govt.nz> wrote:

Kia ora,

On 17 October 2025, Radio Spectrum Management (RSM) commenced public consultation on a technical discussion document to better understand the current and future uses and preferred allocation approaches for the 24-30 GHz band. Submissions are due by 5pm on 28 November 2025.

This consultation seeks feedback on:

- Key use cases and spectrum requirements for different radio services in both 26 GHz and 28 GHz frequency bands
- Technical options for the 26 GHz and 28 GHz frequency bands, including options for sharing lower 28 GHz between mobile and satellite services and the associated segmentation of these frequency bands, and
- Applicable technical parameters for new usage.

Feedback from the consultation will assist us in revising and refining our approaches to the allocation and implementation and will inform any updates to our planned timeframes for long term use. With the consultation concluding in November 2025, RSM is working towards making the 28 GHz band available for long-term use by satellite services by May 2026.

More information, including the technical discussion document, can be found on the RSM website: [Allocation of 24–30 GHz spectrum | Radio Spectrum Management New Zealand](#)

Please direct any questions that you have in relation to the submission process, or the content of the discussion document, to Radio.Spectrum@mbie.govt.nz.

We look forward to receiving your submission and engaging with you on this review.

Ngā mihi nui,

Radio Spectrum Policy and Planning team



Noting...

On 27 Nov 2025, at 12:46 PM, **Privacy of natural persons** wrote:

Thanks Bruce, no problem

We intended to implement the limits as specified in the RR albeit that we have proposed to implement the long-term limits not the short term relaxed limits.

As you will know there can always be some nuance in these matters as well other tangential things (e.g. TWG discussions on 24.0 – 24.25 GHz)

Just for clarification, from what I understand MetService have not provided a submission on this (unless I am missing something – please correct if I am wrong) so you do not have anything public in on this process, see:

- [2021 24 -30 GHz consultation submissions](#)
- [Spectrum outlook submissions](#)

It is your call on what you think is best and we will continue to engage with you on matters of interest regardless

Craig

WRC and RR References...

- Resolution 242 (WRC-19) "Terrestrial component of International Mobile Telecommunications in the frequency band 24.25-27.5 GHz
- Resolution 750 (Rev.WRC-19) limits on unwanted emissions in the frequency band 23.6-24 GHz from IMT base stations and IMT mobile stations within the frequency band 24.25-27.5 GHz
- RR footnote 5.340 All emissions are prohibited in the frequency range 23.6 – 24.0 GHz

Accompanying Background Documents...

Document Title	Document Name
Potential impact of the 5G network on MetService's operations, Presentation to EDSI Select Committee, Thursday 27 June 2019	20190627 5G_for_EDSI_Select_Committee - final.pdf
MetService Submission to MBIE Regarding NZ Preliminary Positions for WRC-19 Agenda Items, Issue 1.0, 16 July 2019	20190716 MetService Submission WRC-19 ag1.13 IMT-2020 (5G) 26GHz - i1.0.pdf
24-30GHz Spectrum Allocation – Public Consultation - MetService, Issue 1.0, 22 March 2024	20240325 a) RSM Questions to 24-30 GHz TWG Final - MetService.docx
Allocation of 24 - 30 GHz Spectrum Technical discussion document, 17 October 2025 (by RSM)	20251017 Allocation-of-24-30-GHz-Spectrum.pdf
EGUsphere Preprint: Systematic Assessment of the RFI Environment in Passive Microwave Bands for Earth Observation from 6 to 200 GHz	Document Link



Discussion...

The importance of the Meteorologically significant water vapour band (23.6 - 24.0 GHz) is well recognised and discussed over the past few years by MetService with activities on this including:

- Potential impact of the 5G network on MetService's operations, Presentation to EDSI Select Committee, Thursday 27 June 2019
- MetService Submission to MBIE Regarding NZ Preliminary Positions for WRC-19 Agenda Items, Issue 1.0, 16 July 2019
- 24-30GHz Spectrum Allocation – Public Consultation - MetService, Issue 1.0, 22 March 2024

The importance of the water vapour band (23.6 - 24.0 GHz) has also been well identified in the recent document by RSM "Allocation of 24 - 30 GHz Spectrum Technical discussion document, 17 October 2025".

Namely...

"1.2.3. 23.6 – 24 GHz

Article 5 of the ITU RR allocates the 23.6 – 24 GHz frequency range exclusively to passive services. In particular, it covers EESS (passive), SRS (passive) and RAS, respectively. This frequency range is subject to RR No 5.340 (WRC-03), where **"all emissions are prohibited" within 23.6 – 24 GHz**. Passive services perform important scientific measurements for a range of applications (e.g., estimating climate change, weather forecasting, measuring temperature of different planets, as well as collecting radio emissions from stars, galaxies and other objects in the universe). As passive services imply receive-only functionality, in the case of EESS (passive) and SRS (passive), **the receivers on board EESS and SRS satellites must be protected from adjacent-band emissions (e.g., in this case above 24.0 GHz** from 24.0 – 24.25 GHz and 24.25 – 27.5 GHz, respectively).

The EESS (passive) sensors (a.k.a., radiometers) within 23.6 – 24 GHz are low-noise receivers which are extensively used for meteorology and climatology purposes. For example, measurement of atmospheric water vapour content and sea-surface temperature is natural in this frequency range, as it coincides with the primary *H2O* (water) spectral line. This is used to understand the concentration of water vapour for assisting accurate weather prediction."

Further it has been internationally agreed...

"With the various unwanted emissions limits proposed within ITU-R Task Group 5/1, for the protection of EESS (passive) receivers, **WRC-19 approved a revision to Resolution 750**, which under "resolves 1" prescribes limits on the unwanted emissions within a specified bandwidth. In particular, the prescribed limits are recommended to be applied in two stages:

- Stage 1 – Initial limits: Equipment brought into use before September 1, 2027, must meet the unwanted emissions limit of –33 dBW/200 MHz for mobile BSs and –29 dBW/200 MHz for UEs.
- Stage 2 – Final limits: Equipment brought into use after September 1, 2027, must meet the unwanted emissions limit of –39 dBW/200 MHz for mobile BSs and –35 dBW/200 MHz for UEs."

And...

"RSM proposes to adopt Stage 2 (Final) limits for protecting EESS (passive), since RSM expects that mobile system deployments in the 26 GHz band are not likely to take place until after 2027 and perhaps not before 2030. This aligns with our overall decision to defer the assignment of the 26 GHz frequency band to Mobile Services till between 2028 - 2030."

A recent study "Systematic Assessment of the RFI Environment in Passive Microwave Bands for Earth Observation from 6 to 200 GHz" has found that there are already bright spots seen on the Earth's surface: quote "A few brightness temperatures in the range of 350-400 K have been observed at 23.8 GHz". Without knowing the source of these emissions it still raises concerns for potential future aggregated emissions and/or out of band emissions causing significant bright spots in the satellite receiver imagery.



MetService Submission..

MetService fully supports the proposal by RSM to adopt Stage 2 (Final) limits for protecting EESS (passive), and the RSM overall decision to defer the assignment of the 26 GHz frequency band to Mobile Services till between 2028 - 2030.

MetService requests that the following be in place to ensure that the **Earth exploration satellite (EES) (passive) in the frequency range 23.6 – 24.0 GHz** is fully protected:

- The documentation (regulations etc.) for implementation of the 26 GHz band (24.25 – 27.5 GHz) in New Zealand:
 - o Includes a clear statement on why there is the need to limit out-of-band emissions in the adjacent frequency range 23.6 – 24.0 GHz;
 - o Incorporates the out of band limits from Table 1 of Resolution 750 (Rev. WRC-19) for the frequency band (preferably the long term limits as RSM have indicated above).
- MBIE Radio Engineers have the appropriate technical equipment to:
 - o Detect and measure any out-of-band emissions in the satellite water vapour band frequency range 23.6 – 24.0 GHz that exceed the levels specified in the RR.
 - o Detect and measure prohibited emissions in the guard band frequency range 24.0 – 24.25 GHz

Bruce Hartley
Systems Engineering Manager
MetService





RSM Questions to 24-30 GHz TWG Final - MetService

Issue 1.0
22 March 2024

RSM Questions to 24-30 GHz TWG Final - MetService

2 Questions to the TWG Membership for Response

1.1 Question f)...

Considering the August 2023 Cabinet decisions and the principle of protecting incumbent users of the radio spectrum, what would be the precise technical conditions your organisation/entity would recommend RSM to manage both in-band and adjacent-band services, applicable to both the 26 GHz (24.25 – 27.5 GHz) and 28 GHz (27.5 – 29.5 GHz) frequency bands. For example, does your organisation/entity have any views technically on managing the co-existence between FSS GSO/NGSO ESIM use and mobile service especially close to seaports and airports?

Noting that:

- Resolution 242 (WRC-19) "Terrestrial component of International Mobile Telecommunications in the frequency band 24.25-27.5 GHz
- Resolution 750 (Rev.WRC-19) limits on unwanted emissions in the frequency band 23.6-24 GHz from IMT base stations and IMT mobile stations within the frequency band 24.25-27.5 GHz
- RR footnote 5.340 All emissions are prohibited in the frequency range 23.6 – 24.0 GHz

MetService requests that the following be in place to ensure that the Earth exploration satellite (EESS) (passive) in the frequency range 23.6 – 24.0 GHz is fully protected by ensuring...

- The documentation (regulations etc.) for implementation of the 26 GHz band (24.25 – 27.5 GHz) in New Zealand:
 - o Includes a clear statement on the prohibition of any emitters in the adjacent frequency range 23.6 – 24.0 GHz;
 - o Incorporates the out of band limits from Table 1 of Resolution 750 (Rev. WRC-19) for the frequency band.
- MBIE Radio Engineers have the appropriate technical equipment to detect and measure any emissions in the frequency range 23.6 – 24.0 GHz.
- MBIE Radio Engineers have the appropriate technical equipment to detect and measure any adjacent band out of band emissions in the frequency range 23.6 – 24.0 GHz that exceed the levels specified in the RR.

End





MetService Submission to MBIE Regarding NZ Preliminary Positions for WRC-19 Agenda Items

Issue 1.0

16 July 2019

Document History

Versions

Version	Revision Date	Summary	Reviewed by
1.0	16 July 2019		B Hartley, P Kreft

Distribution

Version	Date	Distribution
1.0	16 July 2019	MetService, MBIE

Authorisation

Version	Date	Authorised by:
1.0	16 July 2019	Peter Lennox, Chief Executive and Permanent Representative of New Zealand with the World Meteorological Organization

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With reference to:
"NZ Preliminary Positions for WRC-19 Agenda Items - Version 2.3.docx"
New Zealand Preliminary Positions for WRC-19 Agenda Items

2.2 CPM Report Chapter 2: Broadband Applications in the Mobile Service

2.2.1 Agenda item 1.13

Regarding 5G in the frequency band 24.25-27.5 GHz and protection of the adjacent EESS water vapour band 23.6 to 24.0 GHz

Executive Summary

MetService's position on this issue reflects the position of the World Meteorological Organization: for the fidelity of data gathered from the water vapour band 23.6 to 24.0 GHz, that the global spurious emission limit should be set at -55dBW/200MHz.

Satellite sensing of the water vapour band 23.6 to 24.0 GHz is of critical importance to weather and climate models; studies show that spurious emissions in this band have a detrimental effect on the accuracy of weather and climate model forecasts.

Should a value of -37dBW/200MHz for spurious emissions in New Zealand be implemented, MetService expects to be consulted on the size of the guard bands adjacent to the water vapour band 23.6 to 24.0 GHz.

If it was realised (after the implementation of a low threshold for spurious emissions in New Zealand) that there was a decline in the accuracy of weather forecasts, reduction or elimination of spurious emissions would be very costly. We urge prevention rather than remediation.

MetService (Meteorological Service of New Zealand Ltd) has the view that:

On a global scale, once protection levels have been set and 5G equipment has been deployed, the presence of spurious emissions in the water vapour band 23.6 to 24.0 GHz would be largely irreversible. If even possible, remediation would be difficult and expensive.

MetService's position on this issue is in accord with its responsibility, as New Zealand's National Meteorological Service, to provide forecasts and warnings, particularly of severe weather.

MetService does not stand to make any direct commercial gain from its position.

The protection of life and property from weather-related hazards has significant economic benefit.

Remotely sensed data from the water vapour band 23.6 to 24.0 GHz is of critical importance:

- To global and local weather and climate models, and therefore to the accuracy of weather forecasts and warnings¹;
- As a primary source for correction of other satellite data channels: data corruption in this channel will have a flow-on effect.

¹ MetService submission to Economic Development, Science and Innovation Select Committee, Thursday 27 June 2019.



The current device spurious emission limit of -37dBW/200MHz², decided at a time in the past when the limit was adequate for the technology and transmitter (base station and user equipment) densities of that era, is not representative of a future 5G situation:

- The densities of user devices (personal and machine - IoT/M2M) used in the ITU technical studies³ (at 100 square kilometres urban and 30 square kilometres suburban) are likely to be far exceeded in the future, thereby creating a potential for far more accumulated noise (from per device spurious emissions) in the water vapour band in high density population areas;
- The signal-to-noise factor in the water vapour data is completely defined by the cumulative value of spurious emissions into the water vapour band, in this case primarily from the proposed adjacent 5G band.

MetService opinion on New Zealand negotiating position:

- Agrees with the New Zealand preliminary position on Agenda item 1.13 as of June 2019 toward the APG19-5 meeting.
- Supports the following⁴:
 - Strategy for negotiation (to be included as part of the New Zealand delegation brief during the final Asia Pacific preparatory meeting at APG19-5) where the New Zealand delegation would work collaboratively with other countries toward an agreement based on an acceptable range of this limit, for example, a range between -33.5 dBW/200 MHz and -42 dBW/200 MHz for both base station and mobile station;
 - Review the New Zealand position depending on the outcomes of APG19-5, and further review our strategy for negotiation during WRC-19 (to be included as part of the New Zealand delegation brief).

Noting that, for the reasons outlined on page 1 and in Appendix II Positions of Others, MetService has a strong desire for implementation of the higher spurious emission protection levels in alignment with the WMO minimum position of -42 dBW/200 MHz (for base station) and -38 dBW/200 MHz (for mobile station).

² Value provided by MBIE.

³ Appendix I: ITU Technical Studies

⁴ Based on those proposed by MBIE (Tommy Chee) 1/7/19.



Appendix I: ITU Technical Studies

Ten ITU technical studies⁵ were performed in relation to compatibility between IMT-2020 in the 24.25-27.5 GHz frequency band and EESS (passive) in the frequency band 23.6-24.0 GHz; most results are based on the most restrictive satellite receiver sensor F3:

- The studies used different apportionment of protection criteria, and some used population-based redistribution of the IMT-2020 base stations.
- Show that a significant range of determined protection criteria are needed to ensure that accumulated spurious emissions are not significant enough to cause data degradation.
- The following table lists the most conservative maximum spurious emission limit per device before there is potential degradation of the water vapour signal as received at the satellite. Studies A(1), B(1), I, L, M, A(2) and B(2) applied an additional apportionment of 3 dB protection.

Study ⁶	A(1)	B(1)	F	H	I	J	L	M	A(2)	B(2)
UE	-42	-44	-30	-36	-42	-36.4	-45	-43	-51	-50
BS	-46	-48	-40	-40	-44	-40.1	-49	-47	-55	-54

⁵ Attachment 2 to Annex 3 to Task Group 5/1 Chairman's Report - Sharing and compatibility of passive services in adjacent frequency bands and IMT operating in the 24.25-27.5 GHz frequency range.

⁶ Results for the single element antenna pattern. Beam forming antenna model results are not considered here as ... TG 5/1 has agreed that the baseline assumption is the one given in Recommendation ITU-R M.2101 (section 5) that states that "in an adjacent frequency band situation with IMT as the interfering system, the antenna pattern for the unwanted emission can be assumed to have a similar antenna pattern as a single antenna element."



Appendix II: WMO, CEPT and Australian Positions

At the 4th Meeting of the APT Conference Preparatory Group for WRC-19 (APG19-4) 7 – 12 January 2019, Busan, Republic of Korea⁷, WMO indicated that protection levels of -54 dBW/200 MHz (BS) and -50 dBW/200 MHz (UE), as determined by ITU technical studies A(2) and B(2) in the table in Appendix I, would be required to ensure protection of the water vapour band, however WMO also recognises that compromise to a lower level of protection may be necessary.

Regarding the 23.6-24 GHz band, WMO states that:

- The **levels agreed within CEPT (-42 dBW/200 MHz for BS) are already based on a very optimistic set of assumptions (in favour of IMT-2020)** to facilitate compatibility with passive sensors and already represent a huge back-off (10 to 12 dB) from the required EESS (passive) protection levels;
- Several factors (antenna pattern and pointing, number of BS) can easily lead to an increase of the interference distributions (IMT-2020 antenna pattern, IMT-2020 BS antenna pointing and number of BS) and their impact cannot be neglected and **could lead to a need for a much lower value than -42 dBW/200 MHz for BS or -38 dBW/200 MHz for UE;**
- No further compromise can be made and therefore cannot accept any further relaxation of unwanted emission levels of **-42 dBW/200 MHz for BS and -38 dBW/200 MHz for UE**. These levels indeed **constitute the absolute minimum to provide a certain level of protection to passive sensors**.
- However, without new compelling elements (e.g. antenna pattern measurements), in particular on relevant IMT-2020 antenna model, **only the levels -54 dBW/200 MHz (BS) and -50 dBW/200 MHz (UE) would fully ensure protection of all existing and under development EESS (passive) sensors in the band 23.6-24 GHz.**

Regarding the 23.6-24 GHz band, CEPT (European region) states that⁸:

- The agreed spurious emission levels are -42 dBW/200 MHz for BS and -38 dBW/200 MHz for UE.

Regarding the 23.6-24 GHz band, Australia states that⁸:

- The Australian position is to increase the guard band from 500 MHz (24.0/24.5 GHz) to 1.51 GHz (24.0/25.1 GHz) with spurious emission levels limits -37 dBW/200 MHz for BS and -32 dBW/200 MHz for UE.

⁷ Document No: APG19-4/OUT-28

⁸ Email from Tommy Chee, 12 June 2019.





Potential impact of the 5G network on MetService's operations

Presentation to EDSI Select Committee
Thursday 27 June 2019

Peter Lennox, Chief Executive

Bruce Hartley, Systems Engineering Manager (subject matter expert on radio frequency issues)

Iman Soltanzadeh, Manager Forecasting Research and Development (subject matter expert on weather modelling)

Introduction

This presentation outlines

- How the advent of 5G technology might impact MetService's operations
- The discussions MetService has been involved in with the Ministry of Business, Innovation and Employment
- Plans MetService has to mitigate the potential effects of 5G

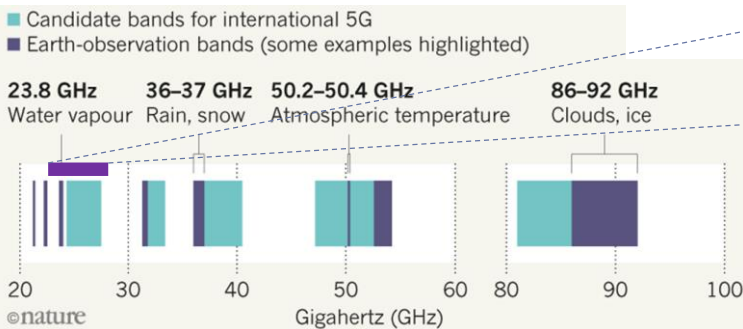
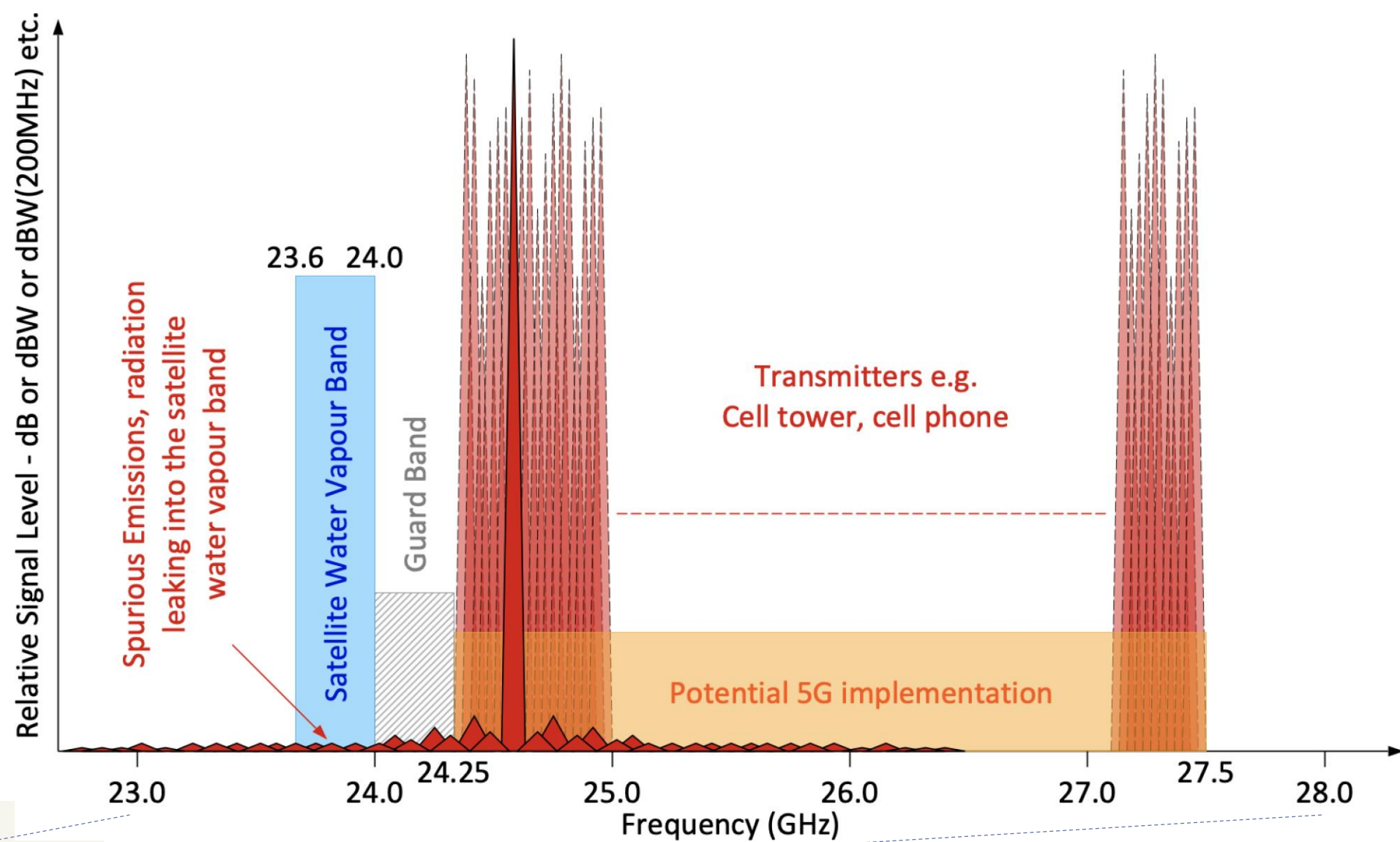


The “5G issue”

- The “5G issue” is about radio frequency radiation leaking into the frequency band from 23.6 to 24.0 GHz
- Data gathered by satellite in the frequency band from 23.6 to 24.0 GHz is a principal source of information on water vapour, a key atmospheric gas
- Water vapour satellite data are critical to the modelling that supports climate and weather forecasting
- Satellite sensing in the frequency band from 23.6 to 24.0 GHz is *passive*; that is, it assumes there is no significant radio frequency radiation leaking into the band to contaminate the signal
- MetService interpreted questions at the 14 February 2019 EDSI Select Committee, on 5G, as being about the potential introduction of Huawei 5G equipment, and not about the 5G issue as described above
- MetService does not use any Huawei equipment in its network



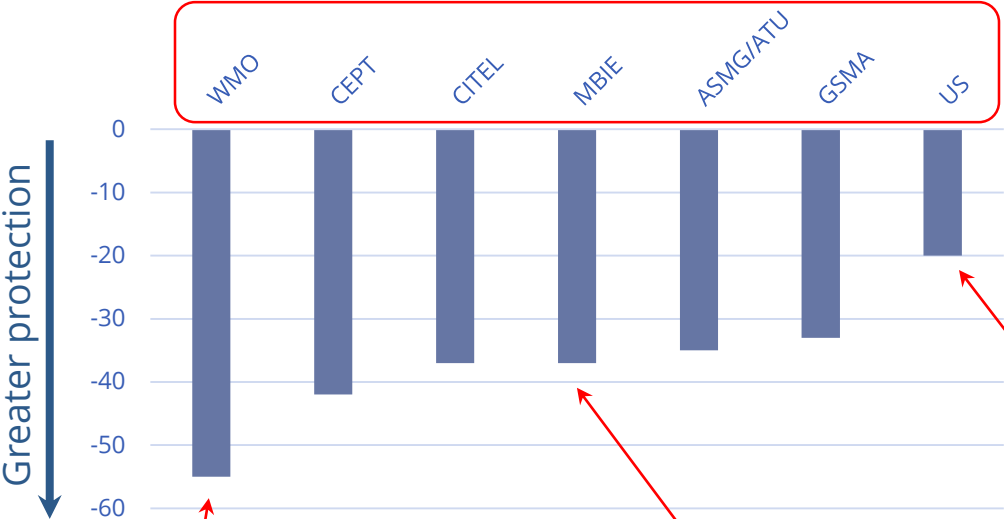
The “5G issue” in a picture



Limiting unwanted 5G leakage of radio frequency radiation

Standpoints of some international organisations and countries

23.6 to 24.0 GHz:
Unwanted background radiation limit
(dBW/200 MHz)

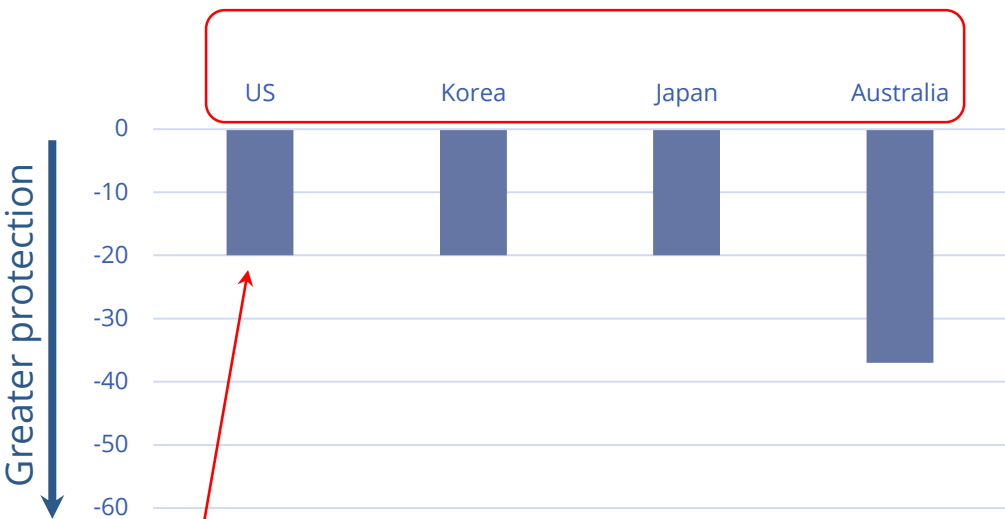


World Meteorological Organization (WMO) position

MBIE position

Licences already assigned

23.6 to 24.0 GHz:
Unwanted background radiation limit
(dBW/200 MHz)



Major cause of concern at US National Oceanographic and Atmospheric Administration (NOAA)



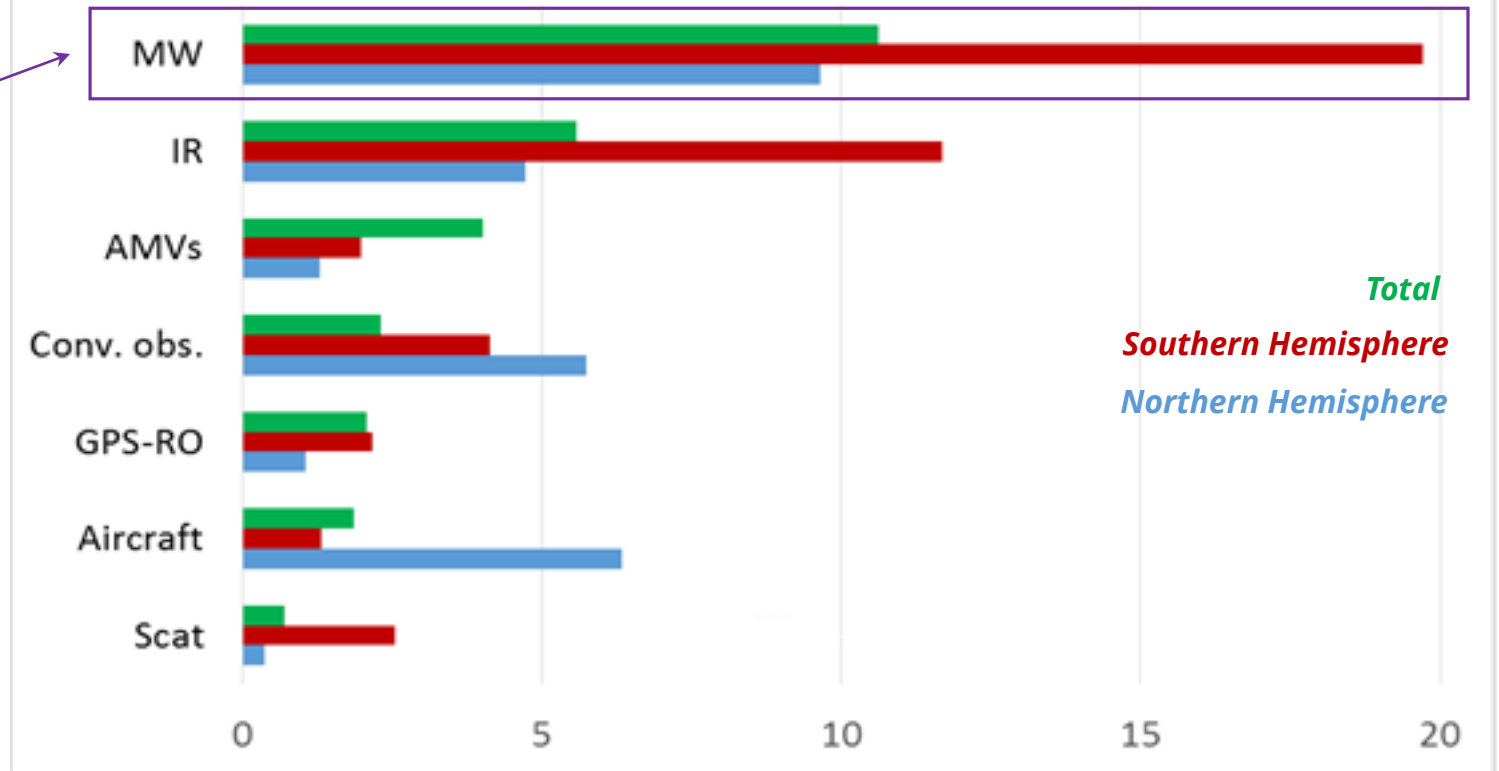
The global value of satellite and other data to weather modelling

The single biggest contributor to the reduction of error in weather forecast models is satellite-sensed water vapour data from the 23.6 to 24.0 GHz frequency band

The *value* of these data to weather modelling is greater in the Southern Hemisphere

Water vapour satellite data are critical for the prediction of precipitation, temperature and other atmospheric variables

Example of value of different observation types to a global model



From https://confluence.ecmwf.int/download/attachments/131371575/FSOI_DALecture_CLupu_2019.pdf?version=1&modificationDate=1552647714213&api=v2; slide 20



Potential impact – New Zealand

It is unclear, because it depends on many factors, for example:

- How many countries permit 5G operations adjacent to the frequency band used for satellite sensing
- What leakage limit regulations countries impose on 5G equipment
- The cumulative amounts of leakage with device density, geographical spread, and with time of day/month/season/year
- What other types of weather observations are available
- The sensitivities of each weather model to corrupted satellite water vapour data

The potential impact of contaminated data over New Zealand is lessened by New Zealand's small land area



Discussions between MetService and MBIE

- MetService has been participating in MBIE's Radio Sector Group meetings since 2001, and represents its views and the views of the World Meteorological Organization (WMO) on 5G at these meetings
- MetService supports protection of the frequency band from 23.6 to 24.0 GHz in the interests of the accuracy of numerically modelled weather and climate forecasts

Recent meetings with MBIE

December 2017	77th meeting of New Zealand Radio Sector Group
March 2018	"Preparing for 5G in New Zealand" discussion session
November 2018	78th meeting of New Zealand Radio Sector Group
June 2019	79th meeting of New Zealand Radio Sector Group, followed by 19 th World Radiocommunication Conference (WRC-19) preparatory meeting

Recent documents

February 2018	Preliminary WMO Position on WRC-19 agenda [WMO]
September 2018	Sharing & compatibility of passive services in adjacent bands 24.25-27.5 GHz [ITU]
October 2018	WMO preparation and coordination of WRC-19 [WMO]
December 2018	Allocation of radio spectrum for 5G Mobile [Cabinet Paper]
June 2019	WMO: protect radio frequencies vital to earth observations [WMO]



MetService's plans for mitigation

Preventative: Radio spectrum:

- MetService has communicated our preference to MBIE that we would prefer greater protection for the water vapour band
- MetService is seeking further technical evidence supporting our view from WMO and the US Navy

Mitigation: Modelling:

- Use many diverse sources of observations, and many different global models, to minimise the effects of any single point of failure
- Support for key atmospheric observing programmes over the southwest Pacific
- Strengthen observation quality control
- Sharpen model verification tools

