



An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Regulation

26 GHz Band 5G Study

A study by Plum Consulting and IDATE regarding the future use of the 26 GHz Band.

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1 Background

1. Radio spectrum is a medium by which information may be transmitted wirelessly over distances ranging from a few metres to thousands of kilometres. It is a valuable national resource underpinning important economic, social and communications activities. The Commission for Communications Regulation (“ComReg”) is the statutory body responsible for management of Ireland’s radio frequency spectrum
2. The 26 GHz Band consists of 3250 MHz of spectrum in the 24.25 - 27.5 GHz frequency range. Its propagation characteristics along with the large contiguous bandwidth potentially available make the band suited for providing high capacity wireless broadband (“WBB”) services over relatively small areas as well as the provision of point-to-point radio links and other services such as Radio Astronomy (“RA”) and Earth-Exploration Satellite Services (“EESS”).
3. The 26 GHz Band is an important band, given that it is one of the three pioneer radio spectrum bands identified as being suitable for the deployment of “5G” services in Europe.¹ The other two pioneer spectrum bands are the 700 MHz Band (694-790 MHz) (the duplex portion of which forms part of ComReg’s multi-band spectrum award) and the 3.6 GHz Band (3.4-3.8 GHz), for which ComReg awarded rights of use in 2017².
4. Given its potential role in the deployment of 5G technologies in Ireland, ComReg wishes to better understand how best to organise and effectively manage the 26 GHz Band in order to ensure the efficient use of spectrum for the continued provision of existing services and appropriately cater for any future demand for WBB ECS “5G” deployments in this band in a timely and effective manner.
5. The 26 GHz Band is harmonised for WBB in Europe under:
 - European Commission Implementing Decision (EU) 2019/784³, as amended by Decision (EU) 2020/590⁴, which obliges Member States by 30 June 2020 to “designate and make available on a non-exclusive basis” the 26 GHz Band for terrestrial systems capable of providing wireless broadband electronic

¹ See RSPG16-032 FINAL - Opinion on spectrum related aspects for next-generation wireless systems (5G), published November 2016.

² See ComReg Document 17/38.

³ Decision (EU) 2019/784 of 14 May 2019.

⁴ Decision (EU) 2020/590 of 24 April 2020.

communications services in compliance with the essential technical conditions set out in the Annex; and

- Article 54(1)(b) of the European Electronic Communications Code (“EECC”) Directive (EU) 2018/1972⁵ which obliges Member States to take appropriate measures by 31 December 2020 to *“allow the use of at least 1 GHz”* of the 26 GHz Band for terrestrial systems capable of providing wireless broadband services, *“provided that there is clear evidence of market demand and of the absence of significant constraints for migration of existing users or band clearance”*.
6. ComReg first engaged with interested parties in relation to the future of the 26 GHz Band in 2018 and previous ComReg statements regarding the 26 GHz Band are outlined at Annex 1.
 7. In its Response to Consultation and draft Decision document regarding the 2018 26 GHz Spectrum Award, ComReg set out a detailed assessment of the future use of the 26 GHz Band for (a) 5G and (b) fixed links, based on the information available at that time⁶. This new study will further inform ComReg’s consideration of how best to manage the 26 GHz Band.

⁵ https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L_.2018.321.01.0036.01.ENG

⁶ See ComReg Document 18/12.

2 The 26 GHz Band 5G Study

8. To assist its considerations, ComReg commissioned a 26 GHz Band 5G Study by Plum Consulting and IDATE which considers, among other things, the requirements to ensure the continued provision of existing services, as appropriate, while also seeking to facilitate WBB deployments, including “5G”, through the introduction of appropriate licensing framework(s) (“Study”).

9. The Study considers:
 - the range of 5G services originally envisaged and the use of the band internationally;
 - the harmonisation of the 26 GHz Band in the EU;
 - the situation in Europe relating to the award of the 26 GHz Band;
 - the use of the 26 GHz band in Ireland by incumbent services;
 - the potential use of currently unassigned portions of the 26 GHz band;
 - the potential progressive release of the currently assigned spectrum, if required at some point in the future; and
 - the demand in Ireland for WBB ECS in the 26 GHz band; and
 - a range of licencing approaches that ComReg could consider.

10. The key findings by Plum/IDATE include:
 - there is little usage of the band internationally or in Europe as there is limited demand to use the band brought about by business case uncertainty;
 - an international harmonised approach to releasing the 26 GHz band for WBB ECS is not evident – again driven by business case uncertainty;
 - the potential demand in Ireland does not indicate a significant or urgent requirement to award spectrum in the band; and
 - any approach adopted requires sufficient flexibility for ComReg to cater for any future demand for 5G services, that may occur (horizontally or vertically) while also appropriately protecting incumbent services.

11. The **specific recommendations** identified by Plum/IDATE include:

Spectrum

- only the two larger tranches of spectrum currently unassigned (355 MHz between 24.25 and 24.605 GHz and 1047 MHz between 26.453 and 27.5 GHz) should be currently considered for WBB-ECS;
- the key band for award is the 26.5 - 27.5 GHz due to the expected equipment availability including devices and its adoption across Europe and overlap with 28 GHz band frequencies used outside of Europe;
- 24.25 - 24.5 GHz could be made available for indoor use to support the first phase of indoor applications, including industrial. Indoor use only would limit potential out of band emissions to the Earth Exploration Satellite Service (EESS) until tighter 5G equipment limits are introduced; and
- currently there are no indications that further spectrum should be considered for award.

Recommended methods of award

- While ComReg’s approach in most harmonised ECS bands to date has tended towards national or large regional awards⁷, there is not a strong basis for such an approach on this occasion or at least at this time. On this basis, it is recommended that the 26 GHz band should be localised and that the 26.5 – 27.5 GHz portion should be awarded on a local-licensing basis, either on a frequency / area basis or using an individual small cell approach;
- the 24.25 – 24.5 GHz portion should be made available using either a licence-exempt or “light licensing” approach⁸; and
- on balance, a light licensing approach could be adopted (rather than licence-exemption) which would enable monitoring of the nature and extent of the use of the band.

⁷ While noting that Fixed Wireless Access Local Area (FWALA) licences have been awarded to provide ECS within a local area.

⁸ In the case of light licensing the licensee will require a licence to use the frequency band according to specified technical conditions and must notify the regulator of individual deployments (e.g. location, coverage, frequencies, date of taking into service). The regulator does not undertake any technical analysis to determine frequency assignments and in the case of interference the most recent user will be required to retune to new frequencies.

Licensing

- technical licensing conditions should be consistent with those defined in European Commission Implementing Decision (EU) 2019/784, as amended by European Commission Implementing Decision (EU) 2020/590, which are sufficient to provide protection and co-existence with other services in the band;
- if Radioastronomy⁹ is planned in the future, appropriate exclusions or co-ordination zones may be necessary; and
- appropriate licence conditions that may be required to ensure spectrum is efficiently used.

Timescales

- assignment of the upper 1 GHz of the 26 GHz Band could be 2023-2027 depending on the type of award (local, regional or national) used;
- assignment of the lower 250 MHz of the 26 GHz band could be within 2022 – 2023 subject to demand;
- there is no strong basis currently to limit the use of any existing licensing regimes for point-to-point or block allocations or to announce migration plans;
- as there is no current use of the FWALA bands it might be an ideal opportunity to consider their future use and establish a roadmap to avoid any downstream migration or co-existence issues; and
- ComReg should indicate a date when it will review the development of WBB-ECS in Ireland, for example 2025, to assess whether there is a need for further spectrum and / or a different licensing approach.

⁹ Astronomy based on the reception of radio waves of cosmic origin.

3 Request for comments

12. ComReg now invites submissions from interested parties on the matters discussed in the Study and interested parties are directed to ComReg Document 21/07a for the full study.
13. One of the important issues that arises from the Study is the requirement for clarity regarding potential use cases in Ireland. The Study indicates that for the short to medium term there:
 - would be very limited demand to use the 26 GHz band for 5G technologies providing fixed wireless access or widescale mobile services;
 - may develop in time a use case for eMBB services for city centres and “hot spots” such as airports, railway stations and malls but it is not clear if any of these “hots spots” exist on a suitable scale in Ireland;
 - may be interest from verticals such as industry, ports and airports but again it is not clear as to the extent of this interest; and
 - may develop in time a requirement for in-band backhauling which is an overlay on other services. However, given the current paucity of use cases, this may not come to fruition.
14. Absent sufficient clarity it would remain difficult to design an appropriate licensing regime/s for the band that could be put forward for consultation and implementation.
15. ComReg respectively requests that all input is well supported, justified and evidenced-based.

4 Practical aspects of submitting Comments

16. ComReg requests that submissions be made by no later than 5pm 23 February 2021.
17. Submissions must be provided in written form (e-mail) to marketframeworkconsult@comreg.ie, clearly marked – Submissions to ComReg Document 21/07a.
18. Electronic submissions should be submitted in an unprotected format so that they may be readily included in the ComReg submissions document for electronic publication.
19. ComReg appreciates that respondents may wish to provide confidential information if their comments are to be meaningful. In order to promote openness and transparency, ComReg will publish all respondents' submissions to this notice, as well as all substantive correspondence on matters relating to this document, subject to the provisions of ComReg's guidelines on the treatment of confidential information (Document 05/24).
20. In this regard, respondents should submit views in accordance with the instructions set out below. When submitting a response to this notification that contains confidential information, respondents must choose one of the following options:
 - A. Submit both a non-confidential version and a confidential version of the response. The confidential version must have all confidential information clearly marked and highlighted in accordance with the instruction set out below. The separate non-confidential version must have actually redacted all items that were marked and highlighted in the confidential version.

OR

 - B. Submit only a confidential version and ComReg will perform the required redaction to create a non-confidential version for publication. With this option, respondents must ensure that confidential information has been marked and highlighted in accordance with the instructions set out below. Where confidential information has not been marked as per our instructions below, then ComReg will not create the non-confidential redacted version and the respondent will have to provide the redacted non-confidential version in

accordance with option A above. 20. For ComReg to perform the redactions under Option B above, respondents must mark and highlight all confidential information in their submission as follows:

- a. Confidential information contained within a paragraph must be highlighted with a chosen colour,
- b. Square brackets must be included around the confidential text (one at the start and one at the end of the relevant highlighted confidential information),
- c. A Scissors symbol (Symbol code: Wingdings 2:38) must be included after the first square bracket. 21.

21. For example, “Redtelecom has a market share of [~~25%~~].”

5 Next Steps

22. ComReg will publish all non-confidential submissions received and may invite comments on same to facilitate extensive consideration on all matters raised.
23. ComReg will further consider the Study, along with the views of interested parties, as part of its deliberations for its next Radio Spectrum Management Strategy Statement (2022-24) which is currently scheduled for consultation during the second quarter of 2021.

Annex 1: ComReg statements on the 26 GHz Band

1. This annex details recent comments made, or position(s) taken by ComReg regarding the 26 GHz Band.

26 GHz National Block Licences Award

2. In 2018, ComReg assigned 840 MHz of new spectrum rights of use in the 26 GHz Band to three licensees in accordance with the Wireless Telegraphy (National Point-to-Point Block Licences) Regulations 2018¹⁰. These licences, which expire in 2028, permit licensees to operate Point-to-Point radio communications links, on a national basis, utilising “Frequency Division Duplexing” technology.¹¹
3. In its Response to Consultation and Draft Decision document on that award in 2018, ComReg set out a detailed assessment of the future use of the 26 GHz Band for (a) 5G and (b) fixed links based on the information available at that time.¹²

Radio Spectrum Strategy Statement

4. In its Radio Spectrum Management Strategy for the period 2019-2021, ComReg stated that it will “*Monitor the progress of the developments in respect of 5G with a view to making a portion of the 26 GHz band available, if and when it is required.*”¹³ The Study is a key part of that monitoring.

Proposed Multi Band Spectrum Award

5. ComReg has consulted three times on the potential award of spectrum rights in the 26 GHz Band for the provision of WBB ECS as part of its proposed Multiband Spectrum Award consultation process (see, in particular, Documents 18/60¹⁴,

¹⁰ S.I. 158 of 2018

¹¹ See ComReg Document [18/53](#)

¹² See section 2.2 of ComReg Document 18/12

¹³ See ComReg Document 18/118.

¹⁴ <https://www.comreg.ie/publication-download/proposed-multi-band-spectrum-award-preliminary-consultation-on-which-spectrum-bands-to-award>

19/59R¹⁵ and Document 19/124¹⁶). A summary of the information pertinent to the 26 GHz Band is provided below.

ComReg Document 18/60 – *Proposed Multi Band Spectrum Award: Preliminary consultation on which spectrum bands to award*

6. In its preliminary assessment of the potential bands to be awarded, ComReg noted that the RSPG Second Opinion on 5G identified the 26 GHz Band as a pioneer band for 5G in Europe, providing ultra-high capacity for innovative new services.
7. In relation to the potential uses of the 26 GHz Band, ComReg also noted the observations from DotEcon and Axon in their report for BEREC¹⁷, including:
 - 5G has the potential to change business models for MNOs compared to the current marketplace, where MNOs have offered largely standardised services and differentiation has been limited to pricing plans;
 - this potentially generates new roles for intermediaries in the value chain, positioned downstream of MNOs, and there may also be opportunities for new players upstream of traditional mobile networks;
 - spectrum award designers should be aware of these possibilities for upstream entry, rather than assume that the only buyers of spectrum will be incumbent MNOs; and
 - spectrum rights should be packaged to allow entry, for example by allowing bidders to assemble smaller blocks, to give flexibility over the amount of spectrum acquired.
8. ComReg considered that close substitutes for rights of use in the 26 GHz Band to provide 5G services are likely to be other mmWave bands rather than the sub-6 GHz bands considered in the proposed award. In addition, ComReg considered that complementarities between the 26 GHz Band and the sub-6 GHz bands proposed as part of the award were unlikely to be strong.

¹⁵ <https://www.comreg.ie/publication-download/proposed-multi-band-spectrum-award-including-the-700-mhz-2-1-ghz-2-3-ghz-and-2-6-ghz-bands>

¹⁶ Document 19/124– Response to Consultation and Draft Decision on a Proposed Multi Band Spectrum Award for the 700 MHz, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands

¹⁷ BoR (18) 23, “Study on Implications of 5G Deployment on Future Business Models”, published March 2018

9. Given the information available, the limited equipment availability, and the importance of greater visibility over the development and assignment of mmWave bands (including the 26 GHz Band), ComReg stated that the 26 GHz Band should be considered in a subsequent separate award process.

ComReg Document 19/59R – Proposed Multi Band Spectrum Award: Including the 700 MHz, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands

10. In response to Document 18/60, six respondents submitted comments on the 26 GHz Band (Dense Air, Eir, ESBN, Imagine, JRC, Three) all of whom agreed with ComReg's proposal to exclude this band from the proposed award. No respondents disagreed with ComReg's proposal.

11. Views submitted in support of ComReg's proposal include that:

- greater clarity is required on the potential uses and users of the band, equipment development for the band, and its role relative to other mmWave bands (JRC);
- as the 26 GHz Band is a key band for 5G NR (New Radio), the release of this band should be aligned to its release in Europe and beyond (Dense Air);
- there is no benefit in including this band in the same award as sub-6 GHz "non-line-of-sight" bands and it should be released in a separate award instead (Dense Air);
- additional spectrum for 5G capacity above 6 GHz may not be required in the near term (Eir);
- the band will be an important band in the medium term to support new 5G services (Vodafone);
- the current status of standardisation (Vodafone); and
- this band and other 'high bands' are targeted at the densification of 5G networks (Imagine).

12. In light of the views of the respondents, ComReg remained of the view that the 26 GHz Band should be considered separately and indicated that in preparation for any such consultation, ComReg would continue to monitor 26 GHz Band developments and stated that it intended to carry out a 5G study in the coming ComReg working year (i.e. during Q3 2019 to Q2 2020).

ComReg Document 19/124 – Response to Consultation and Draft Decision on a Proposed Multi Band Spectrum Award for the 700 MHz, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands

13. In response to Document 19/59R, two respondents (Three and Vodafone) commented on the 26 GHz Band and agreed with ComReg’s proposal to exclude this band from the proposed award. Views submitted include:
- the characteristics of the 26 GHz Band are significantly different to those of the [other bands] in the proposed award, and the network and device ecosystem is less advanced (Three); and
 - there are several issues to be considered in order to optimise the 26 GHz Band before an award, and reconfiguration might be necessary. Three is of the view that a separate consultation is required to resolve these matters. Accordingly, it agrees that this band should be awarded in a separate process, so as not to delay the award of the lower frequency spectrum (Three).
14. Noting these views, and other relevant information, ComReg remained of the view that the 26 GHz Band should be considered under a separate, subsequent process. In addition, ComReg noted that its annual action plan for the year to 2020 included an action to carry out a study on the appropriate licensing framework/s for assigning spectrum in the 26 GHz band for 5G.
- 15. Radio Frequency Plan for Ireland**
16. In March 2020, ComReg published the updated Radio Frequency Plan for Ireland and, in accordance with Article 2 of the EC Implementing Decision 2019/784¹⁸, updated the entry for the 26 GHz Band¹⁹ by designating the band under the relevant EC legislation.

Fixed Links Band Review

17. In November 2020 ComReg published a preliminary consultation on the Fixed Links Licensing Regime²⁰. In its consideration of the 26 GHz Band, DotEcon observed that there is no immediate need to decide on the future of Fixed Links in the band until the 5G situation becomes clearer²¹. In that regard, ComReg

¹⁸ The EC Implementing Decision 2019/784 was then amended by Commission Implementing Decision 2020/590 in April.

¹⁹ See ComReg Document 20/17

²⁰ See ComReg Document 20/109

²¹ See ComReg Document 20/109A

sought views from interested parties by 7 December 2020 on the current use of the 26 GHz Band for Fixed Links and that any views in relation to the future use of the band for other technologies should be directed at this separate 26 GHz Study.