



An Coimisiún um
Rialáil Cumarsáide
Commission for
Communications Reg

Multi Band Spectrum Award (MBSA2) update: Commencement of all MBSA2 spectrum rights

Supporting new 5G investments and its
substantial benefits

Information Notice

Reference: ComReg 23/35

Date: 17/04/2023

Content

Section	Page
1 Multi Band Spectrum Award (MBSA2) update	4
1.1 Supporting investment: All MBSA2 spectrum rights now commenced	4
1.2 Ideally suited for new 5G and FWA services.....	5
1.3 Widespread 5G services will provide substantial economic benefits.....	7
1.4 4G and some 5G services already being delivered via MBSA2 bands	8
1.5 Summary of MBSA2 licence conditions	9
Annex: 1 Commencement dates of MBSA2 spectrum rights	11
Annex: 2 The 2.1 GHz Transition: Completion dates.....	13

Table of Figures and Tables

Section	Page
Table 1: Number of 5G and 4G devices available in the MBSA2 spectrum bands (March 2023).....	6
Table 2: No. of sites licensed per spectrum band in MBSA2 licences	8
Table 3: Commencement dates of MBSA2 spectrum rights.....	11
Figure 1: MBSA2 frequency assignments in the 700 MHz, 2.1 GHz and 2.6 GHz bands (FDD)	12
Figure 2: MBSA2 frequency assignments in the 2.3 and 2.6 GHz bands (TDD)	12
Table 4: 2.1 GHz Transition – the Transition steps, and dates of actual Transition and MNO reporting of completion	13

1 Multi Band Spectrum Award (MBSA2) update

1.1 Supporting investment: All MBSA2 spectrum rights now commenced

1. Following the announcement of the results of its Multi-Band Spectrum Award (“MBSA2”)¹ in December 2022, and Three’s withdrawal of its appeal of the MBSA2 Decision², ComReg has completed two important milestones.
2. First, following the completion of final stages of the MBSA2 award³, **ComReg issued MBSA2 Liberalised Use Licences** with a commencement date of 20 January 2023 to each of the Winning Bidders:
 - Imagine Communications Ireland Limited (“Imagine”);
 - Meteor Mobile Communications Limited, trading as Eir (“Eir”);
 - Three Ireland (Hutchison) Limited (“Three”); and
 - Vodafone Ireland Limited (“Vodafone”).
3. The issue of these long-term licences provides the Winning Bidders (or “Licensees”) with access to MBSA2 spectrum rights until licence expiry in 2042⁴, thereby supporting investments by Licensees to deliver new 5G services, as well as other mobile and fixed wireless broadband (“WBB”) services, such as 4G (LTE) and Fixed Wireless Access (FWA) services.
4. Second, since 2 April 2023 **all MBSA2 spectrum rights of use have been commenced**⁵. As detailed in Annex 1:
 - spectrum rights in the 2.3 GHz and 2.6 GHz bands commenced on 20 January 2023; and

¹ [Document 22/105](#), “Multi Band Spectrum Award – Results of the Main Stage”, published 14 December 2022, available at www.comreg.ie

² [Document 22/113](#), “Multi Band Spectrum Award – Three granted leave to withdraw its Appeal and ordered to pay ComReg’s costs”, published 20 December 2022, available at www.comreg.ie

³ See [Document 23/06](#), “Multi Band Spectrum Award – Final Assignment Plan”, published 12 January 2023, available at www.comreg.ie

⁴ This assumes that the MBSA2 Licence is not foreshorten or surrendered over its duration.

⁵ This refers to the MBSA2 spectrum rights won in Time Slice 1 of the MBSA2 award, noting that there are 3 spectrum blocks in the 2.1 GHz Band currently licensed to Eir which commence on 12 March 2027, i.e. Time Slice 2.

- spectrum rights in the 700 MHz and 2.1 GHz bands commenced between 26 January 2023 and 2 April 2023, as the commencement of these spectrum rights was subject to:
 - the completion of Transition activities⁶ in the 2.1 GHz band by Eir, Three and Vodafone (the “MNOs”), which was completed on 3 March 2023 (see Annex 2); and/or
 - the expiry of 700 MHz and 2.1 GHz spectrum rights in the Short-Term Electronic Communications Services (ECS) Licences⁷, which occurred on 1 April 2023.
- 5. This means that all Licensees now have full access to their respective MBSA2 spectrum rights.

1.2 Ideally suited for new 5G and FWA services

6. The MBSA2 spectrum rights are ideal for the provision of new 5G services, as well as the advancement of other fixed and mobile WBB services, such as 4G (LTE) or FWA services.
7. The 700 MHz band is ideally suited for the provision of widespread 5G coverage, including in rural areas and on national transport routes, which are particularly important in Ireland given our challenging demographic characteristics and the high and exponential costs associated with deploying very high levels of coverage.
8. The suitability of the 700 MHz band for widespread 5G coverage stems from several factors including its:
 - superior propagation characteristics – ideal for widespread and in-building coverage⁸;
 - harmonisation status as an EU 5G “pioneer” band⁹; and

⁶ Transition activities refers to the adjustments required by each MNO to align its network with the outcome of the MBSA2 process for the 2.1 GHz band

⁷ In accordance with the Wireless Telegraphy (Short-Term Electronic Communications Services Licences) Regulations 2022 ([S.I. No. 484 of 2022](#)), a Short-Term ECS Licence was issued to each of Eir, Three and Vodafone. The licences expired on 1 April 2023.

⁸ See for example, GSMA Report, “[Socio-Economic Benefits of 5G: The importance of low-band spectrum](#)”, published February 2023

⁹ See for example, RSPG Opinion on spectrum related aspects for next-generation wireless systems (5G), Document RSPG16-032 FINAL (09 November 2016).

- substantial 5G and 4G device and phone ecosystem (see Table 1 below), including being available on many popular smartphone models from manufacturers such as Apple and Samsung¹⁰.

Table 1: Number of 5G and 4G devices available in the MBSA2 spectrum bands (March 2023)¹¹

Band	No. of 5G devices and phones	No. of 4G Devices and phones
700 MHz (n28/B28)	985 of which 570 are phones	4,357 of which 1,937 are phones
2.1 GHz (n1/B1)	1,095 of which 667 are phones	13,078 of which 7,430 are phones
2.3 GHz (n40/B40)	539 of which 294 are phones	8,035 of which 4,762 are phones
2.6 GHz FDD (n7/B7)	685 of which 322 are phones	12,824 of which 7,639 are phones
2.6 GHz TDD (n38/B38)	626 of which 360 are phones	6,408 of which 3,620 are phones

9. In contrast, spectrum rights in the 2.1 GHz, 2.3 GHz and 2.6 GHz bands are expected to be used to provide additional network capacity to support enhanced services (5G and 4G) where there are a greater number of consumers or deliver FWA services over wide areas¹² because:

- these spectrum bands offer higher capacity than low-band spectrum (such as 700 MHz);
- the 2.1 GHz band is currently being used to provide network capacity for 3G, 4G and some 5G services;
- these spectrum bands are harmonised for 4G and 5G use; and

¹⁰ Source, the GAMBOD database (21 March 2023) from www.gsacom.com (members only)

¹¹ *Ibid.*

¹² See for example, GSA Report "[FWA Market Update November-2022](#)", which provides information on the evolving extent and nature of availability of FWA broadband services based on LTE or 5G technologies worldwide, available from www.gsacom.com

- the spectrum bands have a substantial 5G and 4G device and phone ecosystem (see Table 1 above) and are compatible with many popular smartphone models¹³.

1.3 Widespread 5G services will provide substantial economic benefits

10. In the MBSA2 High Court proceedings¹⁴, ComReg obtained reports from economic experts Dr. Dan Maldoom¹⁵ and Professor J. Peter Clinch¹⁶ with regard to the economic impact of a delay in the award of MBSA2 rights. Of necessity, they had to consider the likely economic benefits from the widespread deployment of 5G. Redacted versions of those reports dealing with the expected economic benefit to Ireland from the widespread deployment of 5G are published alongside this Information Notice as ComReg Documents 23/35a and 23/35b.

11. In both of these reports, the benefits of 5G are considered in order to estimate the economic cost of a delay in MBSA2 rights, and as outlined below both experts note that:

- the deployment of **5G services is a fundamental shift in how services are deployed** which is expected to have a more profound transformative effect than previous generational shifts in mobile network technology¹⁷;
- **5G has applications in many sectors**, including healthcare, automotive, transport, and utilities sectors, in the form of smart energy grids, smart cars, fleet management, advanced medical procedures, smart homes, smart workplaces, etc., as well as the sectors where investment initially takes place - radio, television and communication equipment, construction and, post and telecommunications¹⁸; and
- the deployment of **widespread 5G will provide substantial economic benefits to Ireland** which could easily be **in the order of €1 bn per**

¹³ Source, the GAMBOD database (21 March 2023) from www.gsacom.com (members only)

¹⁴ High Court Record Number: 2021/9 MCA.

¹⁵ Doctor Dan Maldoom is a founding Partner of DotEcon Limited and expert economic advisor to ComReg.

¹⁶ Professor J. Peter Clinch is Chairman and Director of EnvEcon Decision Support Ltd., Dublin, Ireland and is Full Professor of Public Policy at University College Dublin where he formerly served as Vice-President for Innovation, Enterprise Development and Corporate Partnerships.

¹⁷ See for example, paragraphs 5 and 6 of Dr. Maldoom's report (Document 23/35a) and Section 3 of Professor Clinch's report (Document 23/35b).

¹⁸ See for example, Section 4.1 of Dr. Maldoom's report (Document 23/35a) and Section 3 of Professor Clinch's report (Document 23/35b).

annum, noting that this figure is necessarily an estimate given its extrapolation from EU and other single country (e.g. US) studies¹⁹.

1.4 4G and some 5G services already being delivered via MBSA2 bands

12. Given the prior licensing of WBB in the 700 MHz and 2.1 GHz bands²⁰, both bands are already being used to provide 4G and some 5G services.
13. The usage of the 700 MHz and 2.1 GHz bands is also reflected in the number of sites licensed in the MBSA2 Liberalised Use Licences (see Table 2 below), where the Licensees have a significant number of licensed sites in the 700 MHz and 2.1 GHz bands, and one Licensee, Vodafone, already has a considerable number of licensed sites in the 2.6 GHz band (a band not licensed previously for WBB).

Table 2: No. of sites licensed per spectrum band in MBSA2 licences

No. of Sites licensed in MBSA2 Licence	Eir	Imagine	Three	Vodafone
700 MHz	2,130	N/A	1,109	909
2.1 GHz	1,481	N/A	1,409	986
2.3 GHz	11	0	N/A	N/A
2.6 GHz FDD	N/A	N/A	2	247
2.6 GHz TDD	N/A	0	N/A	0

14. While it is regrettable that the commencement of MBSA2 spectrum rights has been delayed beyond its original expectations²¹, ComReg is pleased that all MBSA2 spectrum rights have now commenced and looks forward to the

¹⁹ See for example, paragraph 7 and Section 4.5 of Dr. Maldoom's report (Document 23/35a) and Section 7.4 (e.g. paragraph 100) of Professor Clinch's report (Document 23/35b).

²⁰ The 700 MHz band has been licensed for WBB since April 2020 while the 2.1 GHz band has been licensed since 2002.

²¹ Based on the expected commencement dates 14 February 2022 (700 MHz, 2.3 GHz and 2.6 GHz bands) and 16 October 2022 (2.1 GHz band) in the MBSA2 Information Notice (Document 21/40) and MBSA2 Regulations (S.I. 264 of 2021), ComReg observes that spectrum rights in the

- 700 MHz, 2.3 GHz and 2.6 GHz bands were delayed between circa 11 to 14 months; and
- 2.1 GHz band were delayed between circa 3 to 6 months.

deployment of new and advanced services with these bands, and the fulfilment of the MBSA2 licences conditions that are now active, all to the benefit of users.

1.5 Summary of MBSA2 licence conditions

15. The MBSA2 licence conditions include obligations:

- to expand mobile coverage²² by providing and maintaining an outdoor mobile service of:
 - 3 Mbit/s to 99% of the population within 3 years and 92% of the geographic area of Ireland within 7 years;
 - 30 Mbit/s to 95% of the population, 90% of motorways, and 80% of primary roads within 7 years; and
 - 30 Mbit/s service to 345 specific locations²³ within 7 years, consisting of 40 business and technology parks (including “strategic sites”), 65 hospitals, 24 higher education campuses, 14 air and seaports, 160 train and bus stations, and 42 top visitor attraction information points.
- to improve indoor voice and text coverage and quality of service, by:
 - making available Native Wi-Fi²⁴ voice or text services to end users within 2 years²⁵;
 - deploying and maintaining the Voice over LTE (VoLTE)²⁶ technology across 100% of LTE Base Stations within 2 years²⁷; and,
 - ensuring minimum quality of service (“QoS”) standards for network availability and voice calls²⁸.

²² The MBSA2 outdoor mobile coverage obligations apply to Licensees with 700 MHz spectrum rights, i.e. Eir, Three and Vodafone.

²³ These specific locations are specified in Annex 4 of ComReg [Document 21/40](#), “Multi Band Spectrum Award - Information Memorandum and Draft Regulations The 700 MHz Duplex, 2.1 GHz, 2.3 GHz and 2.6 GHz Bands”, published 16 April 2021, available at www.comreg.ie.

²⁴ With native Wi-Fi calling, calls and texts on a smartphone, rather than going through the mobile network directly, instead use the available Wi-Fi connection. Native Wi-Fi is particularly relevant for Ireland given the challenges in providing mobile connectivity to all premises and the use of modern building materials which can significantly impair the availability of radio signals indoors. The advent of the National Broadband Plan seems likely to increase its ability even further.

²⁵ The MBSA2 Native-WiFi obligation applies to Licensees with 700 MHz spectrum rights, i.e. Eir, Three and Vodafone.

²⁶ Voice over LTE (VoLTE) is a managed voice service that benefits from prioritisation over other traffic.

²⁷ The MBSA2 VoLTE obligation applies to all Licensees, i.e. Eir, Imagine, Three and Vodafone.

²⁸ The MBSA2 QoS obligation applies to all Licensees, i.e. Eir, Imagine, Three and Vodafone.

- to ensure the efficient use of spectrum and promote competition in relation to the use of 2.1 GHz, 2.3 GHz and 2.6 GHz bands by obliging:
 - the work and use of 1,200 base stations in the 2.1 GHz band and 525 base stations in each of the 2.3 GHz and 2.6 GHz bands for Eir, Three and Vodafone (as existing mobile network operators) within 4 years; and
 - the work and use of 290 base stations in the 2.3 GHz and 2.6 GHz band for Imagine (as an existing operator of other services).

Annex: 1 Commencement dates of MBSA2 spectrum rights

- A 1.1 On 19 January 2023, ComReg issued a MBSA2 Liberalised Use Licence to each of the MBSA2 Winning Bidders with a commencement date of 20 January 2023 and an expiry date of 13 February 2042.
- A 1.2 Among other things, these licences specify the MBSA2 spectrum rights licensed to the MBSA2 Winning Bidder in terms of the specific spectrum block assignments and their commencement dates as set out in Table 3 below.

Table 3: Commencement dates of MBSA2 spectrum rights

	Eir	Imagine	Three	Vodafone
Licence commencement and expiry	20-Jan-23 to 13-Feb-42	20-Jan-23 to 13-Feb-42	20-Jan-23 to 13-Feb-42	20-Jan-23 to 13-Feb-42
700 MHz	Blocks A&B: 02-Apr-23	N/A`	Blocks C&D: 26-Jan-23	Blocks E&F: 02-Apr-23
2.1 GHz	Block I: 04-Mar-23 Blocks J-L: 12-Mar-27	N/A	Blocks A&B: 26-Jan-23 Block C: 14-Feb-23 Block D: 25-Feb-23	Block E: 25-Feb-23 Blocks F-H: 02-Apr-23
2.3 GHz	Blocks A-L: 20-Jan-23	Blocks M-T: 20-Jan-23	N/A	N/A
2.6 GHz FDD	N/A	N/A	Blocks A-G: 20-Jan-23	Blocks H-N: 20-Jan-23
2.6 GHz TDD	N/A	Blocks A-C: 20-Jan-23	N/A	Blocks D-I: 20-Jan-23

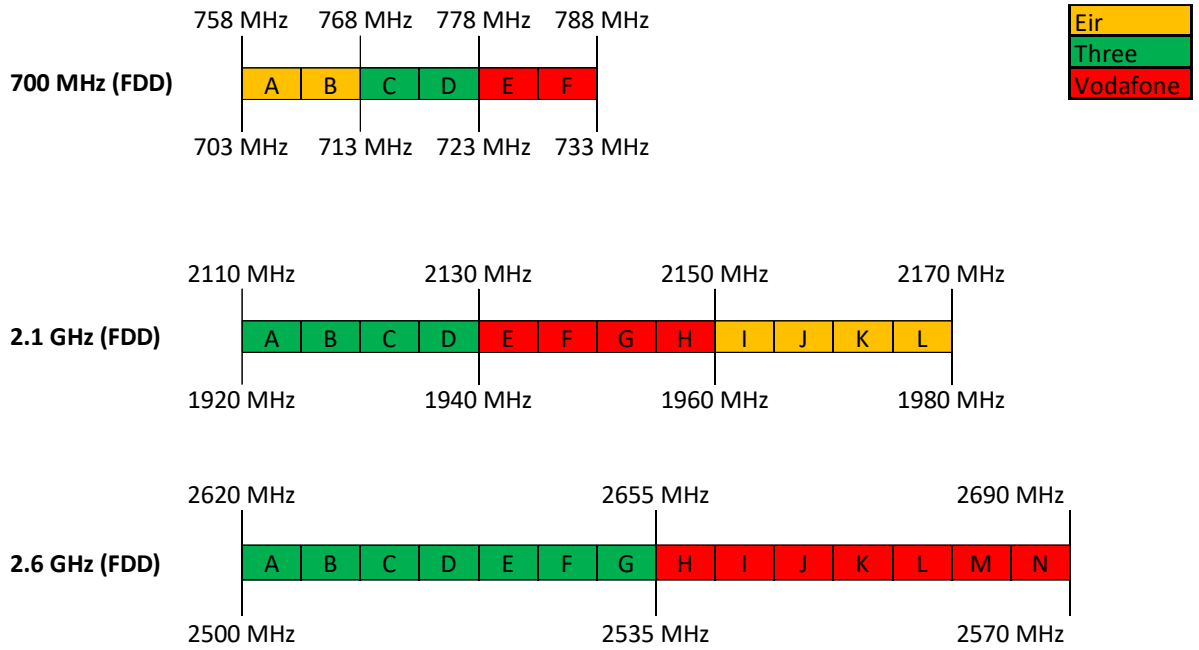


Figure 1: MBSA2 frequency assignments in the 700 MHz, 2.1 GHz and 2.6 GHz bands (FDD)

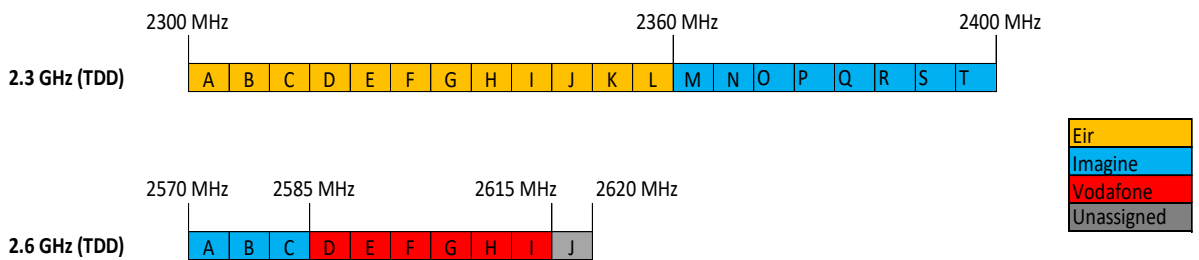


Figure 2: MBSA2 frequency assignments in the 2.3 and 2.6 GHz bands (TDD)

Annex: 2 The 2.1 GHz Transition: Completion dates

A 2.1 In line with the 2.1 GHz Transition Plan²⁹ Table 4 below sets out information on the Transition Steps, actual Transition dates and the reporting dates implemented in the 2.1 GHz band Transition.

Table 4: 2.1 GHz Transition – the Transition steps, and dates of actual Transition and MNO reporting of completion

Transition Step	Description	Actual Transition date	MNO reported Transition Step completed
Step 0	All Operators: Preparatory work	N/A	N/A
Step 1A	Three: Moves some traffic from Blocks J, K and L to Blocks A and B. Remaining traffic continues to be active on Blocks J, K and L.	30-Jan-23	N/A
Step 1B	Three: Moves remaining traffic from Blocks J, K and L to Blocks A, B and C.	13-Feb-23	16-Feb-23
Step 2	Eir: Moves from Blocks D, E, F to Blocks J, K, L	21-Feb-23	23-Feb-23
Step 3	Three: Block D assigned to Three Vodafone: Block E assigned to Vodafone	N/A	N/A
Step 4	Vodafone: Moves from Blocks G, H, I to F, G, H		3-Mar-23
Step 5	Eir: Block I assigned to Eir	N/A	N/A

²⁹ [Document 23/13](#), “Multi Band Spectrum Award – The 2.1 GHz Band Transition Plan”, published 10 February 2023, available at www.comreg.ie.