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BHUTAN INFOCOMM AND MEDIA AUTHORITY

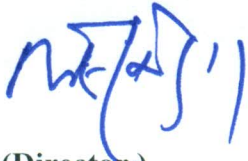
ROYAL GOVERNMENT OF BHUTAN

**Frequency Band Plan for services in 3.5 GHz band
(3.3 GHz-4.2 GHz).**

July, 2021

FOREWORD

In accordance with the Information, Communications and Media Act of Bhutan 2018 and the National Radio Rules and Regulations, the “**Frequency Band plan for services in 3.5 GHz Band (3.3 GHz- 4.2 GHz)**” is hereby adopted as of 1st July, 2021.



(Director)

BHUTAN INFOCOMM AND MEDIA AUTHORITY

1. Background

With the exponential increase in domestic communication traffic, there is a need to enhance the capacity of mobile networks. In order to cater new demand of people in mobile technology, in 2015, the International Telecommunication Union – Radiocommunication sector (“ITU-R”) officially adopted the term International Mobile Telecommunication beyond 2020 (“IMT-2020”) as the vision for fifth generation (“5G”) mobile networks and finalized the projected timeline towards IMT-2020. The 3GPP (3rd Generation Partnership Project), an industry driven standardization body, is currently developing standards for 5G to reflect the ITU requirements. The 3GPP uses a system of parallel “Releases”, with each Release describing a firm set of features and specifications which provides developers with a stable platform for the implementation of features at a given point in time and allows the addition of new functionality in subsequent Releases.

5G is projected to operate in a mix of frequency bands with different propagation characteristics. This spectrum mix includes radio frequencies below 1 GHz to support massive IoT applications, frequencies from 1 to 6 GHz for enhanced mobile broadband and mission control, and high frequencies above 6 GHz for dense networks (commonly known as the millimeter wave or mm Wave band). The 3.5 GHz band is the current frontrunner 5G band which has a mixed advantages of both capacity and coverage over low and high bands.

2. Legal basis

This frequency band plan is prepared as per:

1. Section 165 and 166 of the Information, Communications and Media Act of Bhutan 2018, which requires Authority , from time to time, prepare a Frequency Band Plan in respect of any part of radio frequency spectrum;
2. Subsection 1.2(a) of the chapter I of the National Radio Rules and Regulations 2021(NRRR-2021) which requires the Authority to prepare frequency band plans.
3. The band plan shall be the part of schedule A of NRRR-2021.

3. Title and Commencement

These band plan shall come into force on 1st day of July, 2020 corresponding to the 22th day of the fifth month of the Bhutanese Iron Female Ox Year.

4. Scope of Application

These band plan shall apply to:

- (i) Any individuals, entity and organizations involved in the use and management of radio frequencies in Bhutan, and
- (ii) All matters by any individuals, entity and organizations related to the radiocommunications within or from the territory of Bhutan, its atmosphere and its outer space, to stations and devices using radio frequency spectrum.

And shall be read in conjunction with all other existing Codes of practice, Rules and Regulations established by the Authority.

5. Amendment

Amendment to these band plan shall be made according to the needs and changes in national priorities, policies and industry trends. The amendment of these band plan by way of addition, variation or repeal may be effected by the Authority as and when required.

6. Repeal

With the commencement of these Band plan, Frequency band plan for use of WiMAX technology in Bhutan (2013) is repealed.

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7. Allocations and Band plan

7.1 Frequency Allocation

The frequency allocations in 3.5 GHz band is as per the frequency allocation table of Bhutan which further is in line with ITU-R (international Telecommunication Union Radiocommunication Sectors) frequency table of allocation for Region 3. The frequency allocation in 3.5 GHz at international and national level is in the following table.

The allocation of 3.5 GHz to Mobile service in frequency table of allocation of Bhutan is highlighted by blue color as shown in table 1. The preference in allocation to services is done by method of frequency allocation to service on primary and secondary basis. Where primary allocation services are designated by capital letters while secondary allocation services are designated by small letters. The primary allocation services will have preferences over the secondary allocation services in the table of frequency Allocation. Further, band footnotes and allocation footnotes will provide exceptional and additional information allocation to the services by different regions and countries.

Table 1: Table of frequency allocation for Bhutan in line with ITU-R table of allocation

Allocation to services			
Region 1 (Europe, Middle east and Africa)	Region 2 (North and South America)	Region 3 (Asia and pacific)	Bhutan
3 300-3 400 RADIOLOCATION 5.149 5.429 5.429A 5.429B 5.430	3 300-3 400 RADIOLOCATION Amateur Fixed Mobile 5.149 5.429C 5.429D	3 300-3 400 RADIOLOCATION Amateur 5.149 5.429 5.429E 5.429F	3 300-3 400 RADIOLOCATION Amateur 5.149 5.429 5.429E 5.429F
3 400-3 600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.430A	3 400-3 500 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431A 5.431B Amateur	3 400-3 500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.432 5.432B Radiolocation 5.433	3 400-3 500 FIXED FIXED-SATELLITE (space-to- Earth) Amateur Mobile 5.432 5.432B Radiolocation 5.433

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Radiolocation	Radiolocation 5.433 5.282	5.282 5.432A	5.282 5.432A
	3 500-3 600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431B Radiolocation 5.433	3 500-3 600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.433A Radiolocation 5.433	3 500-3 600 FIXED FIXED-SATELLITE (space-to- Earth) MOBILE except aeronautical mobile 5.433A Radiolocation 5.433
5.431			
3 600-4 200 FIXED FIXED-SATELLITE (space-to-Earth) Mobile	3 600-3 700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.434 Radiolocation 5.433	3 600-3 700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.435	3 600-3 700 FIXED FIXED-SATELLITE (space-to- Earth) MOBILE except aeronautical mobile Radiolocation 5.435
	3 700-4 200 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile		3 700-4 200 FIXED FIXED-SATELLITE (space-to- Earth) MOBILE except aeronautical mobile

7.2 Spectrum Harmonization in 3.5 GHz

The global harmonization within the band 3.3-4.2GHz is limited, with only a small portion of 200 MHz at 3.4-3.6 GHz having near-global harmonization. Regional groups and individual countries have identified the portion of spectrum from the 3.5 GHz band. Europe and Gulf countries are using 3.4-3.8 GHz for 5G launch. Japan is looking at 3.6-4.2 GHz, having already made 3.4-3.6 GHz available for LTE and 3.6-4.1 GHz for 5G. The US is making the bands 3.55-3.7 GHz and 3.7-3.98 GHz available for 5G while Canada will make 500 MHz of spectrum available.

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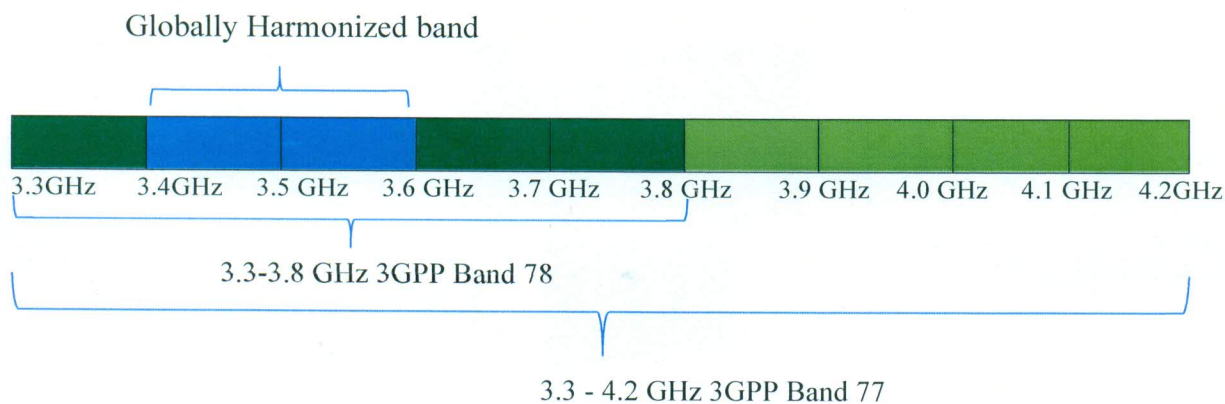


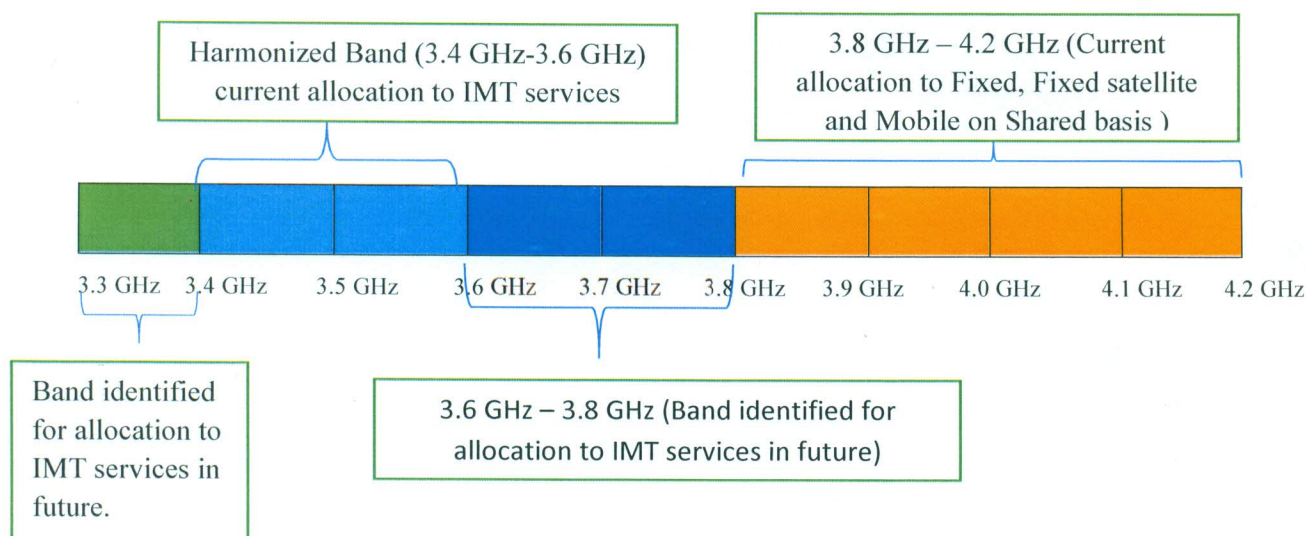
Figure 1: status on internationally harmonized band in 3.5 GHz

7.3 Frequency band plan in 3.5 GHz

The 3.5 GHz band plan for the 5G deployment will be based on 3.5 GHz TDD band planning. Currently, only part of 3GPP band 78(3.4 GHz- 3.8 GHz) will be identified for allocation to IMT services considering specific allocation of the band 3.3- 3.4 GHz to radiolocation services on primary basis and amateur on secondary basis. While part of 3GPP Band 77(3.8 GHz – 4.2GHz) currently predominantly used by Fixed satellite systems. Therefore, the band 3.3 -3.4 GHz and 3.8 – 4.2 GHz will be considered for future allocation to IMT services.

Further, the allocation priority for the IMT -2020 and beyond service will be given to the internationally harmonized band (3.4 GHz- 3.6 GHz) for IMT-2020 and beyond services.

The proposed 3.5GHz TDD band plan is as shown below:



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