



BHUTAN INFOCOMM AND MEDIA AUTHORITY
RADIOCOMM DIVISION

**FREQUENCY BAND PLAN IN THE 850 MHZ BAND FOR USE BY
THIRD GENERATION (3G) MOBILE COMMUNICATION SYSTEM
IN BHUTAN**

Foreword

In accordance with the Bhutan Information, Communications and Media Act 2006 and the National Radio Rules 2011, the "**Frequency Band plan in the 850MHz Band for use by Third Generation (3G) Mobile Communication System in Bhutan**" is hereby adopted as of 10th October, 2012.

This Band Plan shall be an addendum to the schedule 2, Part IV of the National Radio Rules 2011.



(DIRECTOR)

Director
Bhutan InfoComm & Media Authority
Thimphu

BHUTAN INFOCOMM AND MEDIA AUTHORITY



Part I: Background and Purpose

1. The Third generation mobile (3G) services have been allocated in the 2100MHz frequency band currently in Bhutan. However, with the feasibility of deploying the IMT-2000 technologies such as 3G (UMTS and W-CDMA) in the 850MHz due to its efficiency, this Authority formulates the band plan in 850MHz for the implementation of IMT-2000 (3G) services in Bhutan which in future, the operators can upgrade its networks supporting IMT-Advanced services like LTE and HSPA+ at 850MHz.

In this document the Authority publishes the spectrum/frequency band plan for deploying 3G (UMTS and W-CDMA) technology in Bhutan. The mobile operators, private and public sectors intending to implement UMTS and W-CDMA shall deploy in the spectrum/frequency mentioned in the published spectrum band plan.

Part II: Consultation Undertaken

2. On 18th May 2012, the Authority floated the consultation paper titled "**Frequency Band Plan in the 850MHz Band for use by the Third Generation (3G) Mobile Communication System in Bhutan**". Following that, several rounds of consultative meetings including the 1st and 2nd Task Force consultative meeting on 3G Spectrum allocation in 850MHz was done.

Incorporating the comments and feedbacks received from both the mobile operators, the Authority formulates the spectrum/frequency band plan for 3G implementation in 850MHz band in the country.



Part III: Legal basis

3. Subsection 25(a) of the Bhutan Information, Communications and Media Act 2006, provides that the Authority shall plan, supervise, regulate and manage the use of radio frequency spectrum. Section 81(1) of the Act also empowers that the Authority may from time to time prepare a Frequency Band Plan in respect of any part of radio frequency spectrum.
4. The subsection 1.2(a) of the chapter III of the National Radio Rules provides that the Authority shall, by written instrument prepare frequency band plans each relating to one or more frequency bands.

Part IV: Spectrum allocations for 3G Mobile Service in Bhutan

5. As per the ITU-R Resolutions 224 (Rev.WRC-07) and 749 (WRC-07), those parts of the band 790-960 MHz in Regions 1 and 3 (Bhutan falls on region 3) which are allocated to the mobile service on a primary basis are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) services.
6. The tables of frequency allocations in Part IV National Radio Rules also states that the band 610MHz – 876MHz are allocated for the Fixed Mobile services. Therefore, this frequency band plan may be specifically allocated for introducing and promoting the 3G (Third Generation) UMTS / W-CDMA services in the country.

A handwritten signature in blue ink, consisting of stylized initials and a flourish.

Part V: 850MHz Spectrum/Frequency Band Plan for Bhutan

7. The Authority formulates the frequency/spectrum band plan of 850MHz which extends from 824MHz to 894MHz. It is noted that the frequency band plan is provisioned for both the TDD (Time Division Duplex technology) and FDD (Frequency Division Duplex technology) which is shown below:

- a) **824MHz – 849MHz** (radio frequencies that exceeds 824MHz but does not exceed 849MHz) paired with **869MHz – 894MHz** (radio frequencies that exceeds 869MHz but does not exceed 894MHz) in case of Frequency Division Duplex (FDD) deployed technology, and
- b) **824MHz – 894MHz** in case of Time Division Duplex (TDD) deployed technology.

8. The following Table of 850MHz Frequency band plan shows the band plan that divides the following bands 824 MHz to 849 MHz paired with 869 MHz to 894 MHz with band interval of 5MHz and the duplex separation gap of 20MHz. The band plan below has been prepared if the FDD technology is being deployed for 3G services.

Table 1 – The 850MHz band plan with 5MHz interval

Frequency Band (MHz)	Item	Sub-band limits (MHz)	Sub-band limits (MHz)
824-849 869-894	1.1	824-829	869-874
	1.2	829-834	874-879
	1.3	834-839	879-884
	1.4	839-844	884-889
	1.5	844-849	889-894

Frequency Band in MHz										
824-829	829-834	834-839	839-844	844-849	849-869	869-874	874-879	879-884	884-889	889-894
Downlink				Duplex Gap or Centre spacing			Uplink			
25MHz (5 blocks of 5MHz)				20MHz			25MHz (5 blocks of 5MHz)			

9. The following arrangement has been made if the TDD technology is being deployed for the 3G service.

Table 2 - 850MHz Frequency band plan (TDD) with the 5MHz band interval.

Frequency band in MHz														
824	828	831	836	841	846	851	856	861	866	871	876	881	886	891
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
828	831	836	841	846	851	856	861	866	871	876	881	886	891	894
External Guard Band	Internal Guard Band	Unpaired											Internal Guard Band	
7MHz		60MHz (12 blocks of 5MHz)												

This TDD arrangement is made, taking into account the external guard band of 4MHz and the internal guard band of 3MHz at the lower edge (828MHz) and of 3MHz at the upper edge (891MHz)

Part VI: Payment of Spectrum Utilization Fee

10. The frequency being scarce public resource, the use of relevant frequency block by the company/organization should be subject to the payment of the spectrum utilization fee (SUF) annually.

Part VII: Technical standards and requirements

11. For deploying the 3G UMTS and W-CDMA services, the radio emissions and power levels emission shall be in line with the international standards.

Handwritten signature or initials, possibly 'J.B.', in black ink.