



TANZANIA COMMUNICATIONS REGULATORY AUTHORITY

RADIO FREQUENCY BAND PLAN FOR FIXED WIRELESS SERVICES (FWS)

Second Version

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RADIO FREQUENCY BAND PLAN FOR FIXED WIRELESS SERVICES (FWS)

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1.	Version 1.0	Version 2.0	28	30		Addition of the E-Band Channelization plan
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Acronyms and Abbreviations

For the purpose of this document, the following abbreviation applies: -

FWS	Fixed Wireless System
ITU	International Telecommunication Union (ITU)
STM	Synchronous Transfer Mode
XPIC	Cross-Polar Interference Cancellers (XPIC)

PART 1: INTRODUCTION

The Tanzania Communications Regulatory Authority (TCRA) Act of 2003, and Electronic and Postal Communications Act of 2010, mandate TCRA to manage, assign and promote the efficient use of the radio frequency spectrum resource in the United Republic of Tanzania.

The radio frequency spectrum is part of electromagnetic waves propagated in space and used as a communication medium for all wireless systems. The radio frequency spectrum is a scarce public resource and thus subject to transparent, predictable and coherent governing policies, legislations and regulations. It requires proper and timely management in order to accommodate the current and future emerging technologies.

The radio frequency band plan for Fixed Wireless System (FWS) is in line with the frequency allocation under International Telecommunication Union (ITU) region 1 and most adopted frequency channelization plan as a result of harmonising the spectrum.

PART 2: SCOPE AND PURPOSE

This document provides radio frequency spectrum plan for FWS in the United Republic of Tanzania. The FWS radio frequency spectrum plan intend to facilitate the smooth and interference free operation of in the country.

The purpose of the plan is to provide assistance to operators and other stakeholders on the use of the frequency bands allocated for FWS.

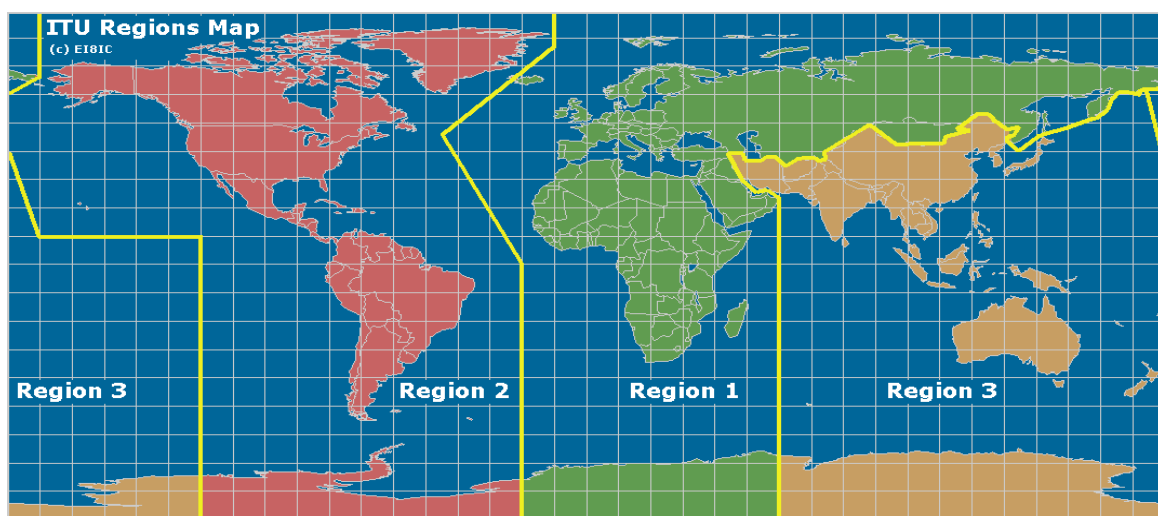


Figure 1: ITU Regions

PART 3: ITU-R RELATED RECOMMENDATIONS AND REPORTS ON FWS

Recommendation ITU-R F.383	Radio-frequency channel arrangements for high-capacity fixed wireless systems operating in the lower 6 GHz (5 925 to 6 425 MHz) band
Recommendation ITU-R F.384	Radio-frequency channel arrangements for medium- and high- capacity digital fixed wireless systems operating in the 6 425-7 125 MHz band
Recommendation ITU-R F.385	Radio-frequency channel arrangements for fixed wireless systems operating in the 7 110-7 900 MHz band
Recommendation ITU-R F.386	Radio-frequency channel arrangements for fixed wireless systems operating in the 8 GHz (7 725 to 8 500 MHz) band
Recommendation ITU-R F. 747-1	Radio-frequency channel arrangements for fixed wireless system operating in the 10.0-10.68 GHz band
Recommendation ITU-R F.387	Radio-frequency channel arrangements for fixed wireless systems operating in the 10.7-11.7 GHz band
Recommendation ITU-R F.497	Radio-frequency channel arrangements for fixed wireless systems operating in the 13 GHz (12.75-13.25 GHz) frequency band
Recommendation ITU-R F.636	Radio-frequency channel arrangements for fixed wireless systems operating in the 14.4-15.35 GHz band
Recommendation ITU-R F.595	Radio-frequency channel arrangements for fixed wireless systems operating in the 17.7-19.7 GHz frequency band
Recommendation ITU-R F.637	Radio-frequency channel arrangements for fixed wireless systems operating in the 21.2-23.6 GHz band
Recommendation ITU-R F.2006	Radio-frequency channel and block arrangements for fixed wireless systems operating in the 71-76 and 81-86 GHz bands

PART 4: FIXED WIRELESS SERVICE BANDS AND FREQUENCY ARRANGEMENTS

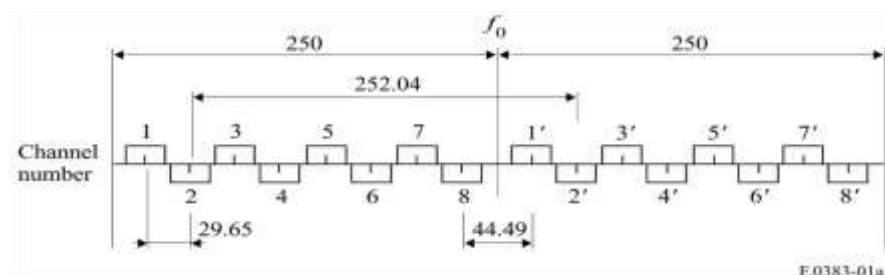
In this document unless otherwise stated:

- f_0 The frequency (MHz) of the centre of the band of frequencies occupied
- f_n The centre frequency (MHz) of one RF channel in the lower half of the band;
- f'_n The centre frequency (MHz) of one RF channel in the upper half of the band;
- n Number of RF channels in the band

4.1 BAN PLAN FOR 5 925 – 7 125 MHz (6 GHz) BAND

4.1.1 Lower 6 GHz band (5 925 – 6 425 MHz)

i. Channel separation of 29.65 MHz



$$f_n = f_0 - 259.45 + 29.65 n \text{ MHz}$$

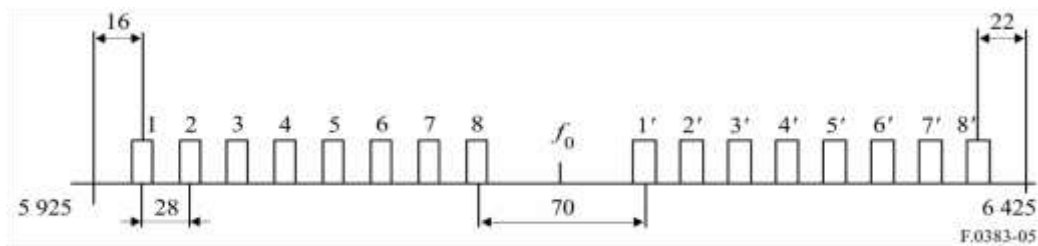
$$f'_n = f_0 - 7.41 + 29.65 n \text{ MHz}$$

Where:

$n = 1, 2, 3, 4, 5, 6, 7$ or 8

Rec. ITU-R F.383 5925-6425 MHz			
f_0 (MHz):		6175	
T/T Spacing(MHz):		29.65	
T/R Spacing(MHz):		252.04	
Channel	f (MHz)	Channel	f' (MHz)
1	5945.2	1'	6197.24
2	5974.85	2'	6226.89
3	6004.5	3'	6256.54
4	6034.15	4'	6286.19
5	6063.8	5'	6315.8
6	6093.5	6'	6345.5
7	6123.1	7'	6375.1
8	6152.8	8'	6404.8

ii. Channel separation of 28 MHz



Frequencies (MHz) of individual channels are expressed by the following relationships:

$$f_n = f_0 - 259 + 28n$$

$$f'_n = f_0 + 7 + 28n$$

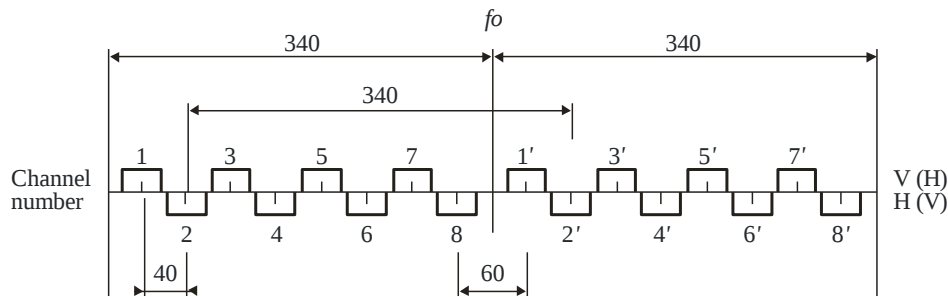
where:

$$n = 1, 2, \dots, 8.$$

Rec. ITU-R F.383			
5925-6425 MHz			
f_0 (MHz):		6175	
T/T Spacing(MHz):		28	
T/R Spacing(MHz):		266	
Channel	f (MHz)	Channel	f' (MHz)
1	5944	1'	6210
2	5972	2'	6238
3	6000	3'	6266
4	6028	4'	6294
5	6056	5'	6322
6	6084	6'	6350
7	6112	7'	6378
8	6140	8'	6406

4.1.2 Upper 6 GHz band (6 425 -7 125 MHz)

i. 40 MHz Channelization



F.0384-01a

Frequencies (MHz) of the individual channels are expressed by the following relationships

$f_n = f_0 - 350 + 40 n \text{ MHz}$

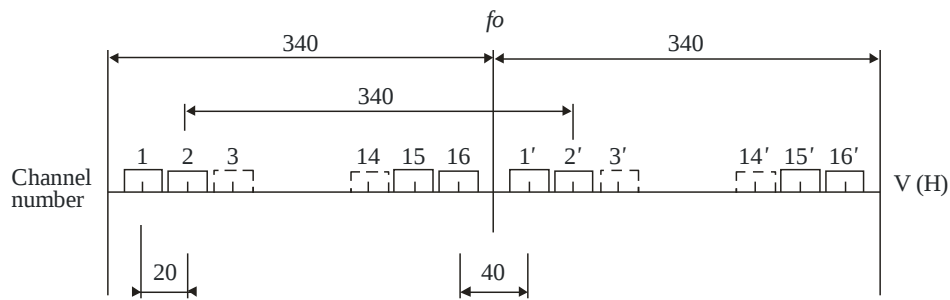
$f'_n = f_0 - 10 + 40 n \text{ MHz}$

Where :

$n = 1, 2, 3, 4, 5, 6, 7 \text{ or } 8 ;$

Rec. ITU-R F.384 6425-7125 MHz			
f_0 (MHz):		6765	
T/T Spacing(MHz):		40	
T/R Spacing(MHz):		340	
Channel	f (MHz)	Channel	f' (MHz)
1	6455	1'	6795
2	6495	2'	6835
3	6535	3'	6875
4	6575	4'	6915
5	6615	5'	6955
6	6655	6'	6995
7	6695	7'	7035
8	6735	8'	7075

ii. 20 MHz Channelization



F.0384-02

Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 - 350 + 20 n \text{ MHz}$$

$$f'_n = f_0 - 10 + 20 n \text{ MHz}$$

where:

$$n = 1, 2, 3, \dots, 15, 16 ;$$

Rec. ITU-R F.384 6425-7110 MHz			
f_0 (MHz):		6765	
T/T Spacing(MHz):		20	
T/R Spacing(MHz):		340	
Channel	f (MHz)	Channel	f' (MHz)
1	6435	1'	6775
2	6455	2'	6795
3	6475	3'	6815
4	6495	4'	6835
5	6515	5'	6855
6	6535	6'	6875
7	6555	7'	6895
8	6575	8'	6915
9	6595	9'	6935
10	6615	10'	6955
11	6635	11'	6975
12	6655	12'	6995
13	6675	13'	7015
14	6695	14'	7035
15	6715	15'	7055
16	6735	16'	7075

4.2 BAND PLAN FOR 7 110-7 900 MHz (7 GHz BAND)

Frequencies (MHz) of the individual channels are expressed by the following relationships

lower half of the band: $f_n = f_0 - 161 + 28 n$

upper half of the band: $f'_n = f_0 - 7 + 28 n$

where:

$n = 1, 2, 3, 4$ and 5 .

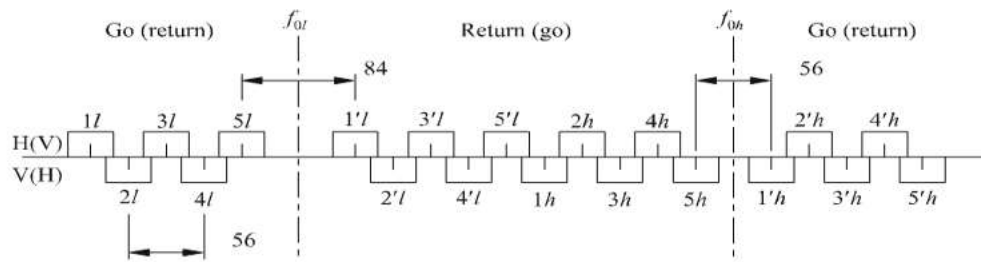
4.2.1 7 125 – 7 425 MHz segment

Rec. ITU-R F.385 7125-7425 MHz			
f_0 (MHz):		7275	
T/T Spacing(MHz):		28	
T/R Spacing(MHz):		154	
Channel	F(MHz)	Channel	F'(MHz)
1	7142	1'	7296
2	7170	2'	7324
3	7198	3'	7352
4	7226	4'	7380
5	7254	5'	7408

4.2.2 7 425 – 7 725 MHz segment

Rec. ITU-R F.385 7425-7725 MHz			
f_0 (MHz):		7575	
T/T Spacing(MHz):		28	
T/R Spacing(MHz):		154	
Channel	F(MHz)	Channel	F'(MHz)
1	7442	1'	7596
2	7470	2'	7624
3	7498	3'	7652
4	7526	4'	7680
5	7554	5'	7708

4.2.3 7 110-7 750 MHz Segment



Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_{nl} = f_{0l} - 182 + 28 n$$

$$f'_{nl} = f_{0l} + 14 + 28 n$$

$$f_{nh} = f_{0h} - 168 + 28 n$$

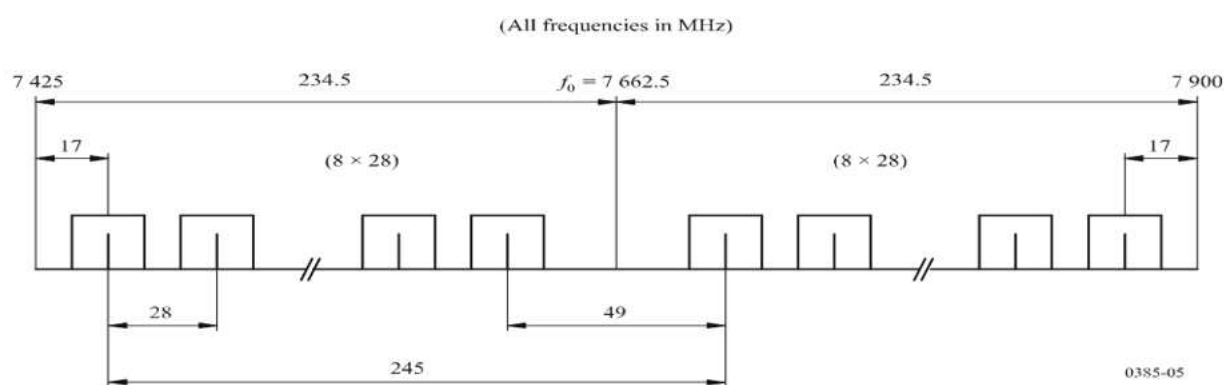
$$f'_{nh} = f_{0h} + 28 n$$

Where

- f_{nl} centre frequency of one RF channel in the lower half of the lower part of the band,
- f'_{nl} centre frequency of one RF channel in the upper half of the lower part of the band,
- f_{nh} centre frequency of one RF channel in the lower half of the higher part of the band,
- f'_{nh} centre frequency of one RF channel in the upper half of the higher part of the band,
- f_{0l} frequency at the centre of the lower part of the band: ($f_{0l} = 7\,275$ MHz),
- f_{0h} frequency at the centre of the higher part of the band: ($f_{0h} = 7\,597$ MHz),

Rec. ITU-R F.385 7110-7750 MHz			
f_0 low (MHz):			7275
f_0 high (MHz):			7597
T/T Spacing(MHz):			28
T/R Spacing low (MHz):			196
T/R Spacing high (MHz):			168
Channel	F(MHz)	Channel	F'(MHz)
1l	7121	1'l	7317
2l	7149	2'l	7345
3l	7177	3'l	7373
4l	7205	4'l	7401
5l	7233	5'l	7429
1h	7457	1'h	7625
2h	7485	2'h	7653
3h	7513	3'h	7681
4h	7541	4'h	7709
5h	7569	5'h	7737

4.2.4 7 425-7 900 MHz Segment



RF channel arrangement for digital systems operating in the band 7 425-7 900 MHz

Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 - 248.5 + 28 n \text{ MHz}$$

$$f'_n = f_0 - 3.5 + 28 n \text{ MHz}$$

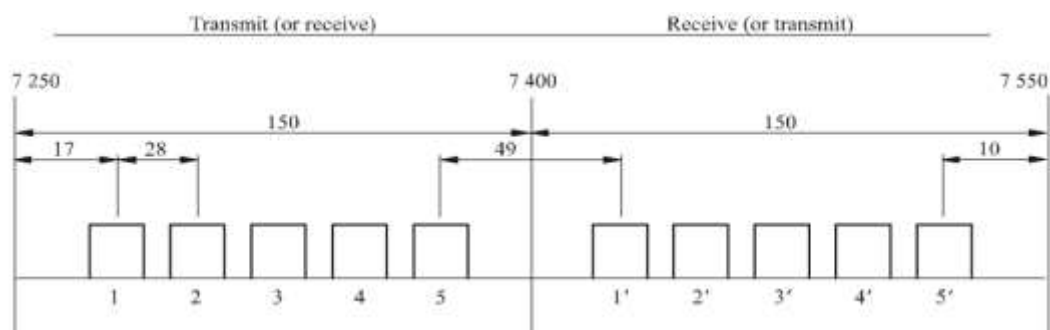
Where:

$$n = 1, 2, 3, 4, 5, 6, 7 \text{ and } 8;$$

Rec. ITU-R F.385 7425-7900 MHz			
f_0 (MHz):		7662.5	
T/T Spacing(MHz):		28	
T/R Spacing(MHz):		245	
Channel	F(MHz)	Channel	F'(MHz)
1	7442	1'	7687
2	7470	2'	7715
3	7498	3'	7743
4	7526	4'	7771
5	7554	5'	7799
6	7582	6'	7827
7	7610	7'	7855
8	7638	8'	7883

Note: The frequency range in this Annex partly overlaps with the band 7 250-8 500 MHz mentioned in Recommendation ITU-R F.386

4.2.5 7 250-7 550 MHz Segments



Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 - 161 + 28n \text{ MHz}$$

$$f'_n = f_0 + 28n \text{ MHz}$$

Where:

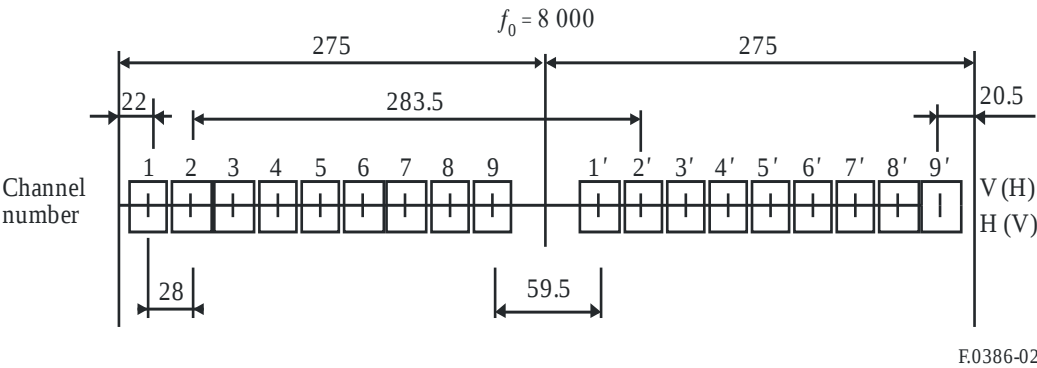
$$n = 1, 2, \dots 5;$$

Rec. ITU-R F.385			
7250-7550 MHz			
fo (MHz):		7400	
T/T Spacing(MHz):		28	
T/R Spacing(MHz):		161	
Channel	F(MHz)	Channel	F'(MHz)
1	7267	1'	7428
2	7295	2'	7456
3	7323	3'	7484
4	7351	4'	7512
5	7379	5'	7540

4.3 BAND PLAN FOR 7 725 – 8500 MHz (8 GHZ) BAND

4 3.1 7 725-8 275 MHz Segment

i. 28 MHz Channelisation



Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 - 281 + 28 n \text{ MHz}$$

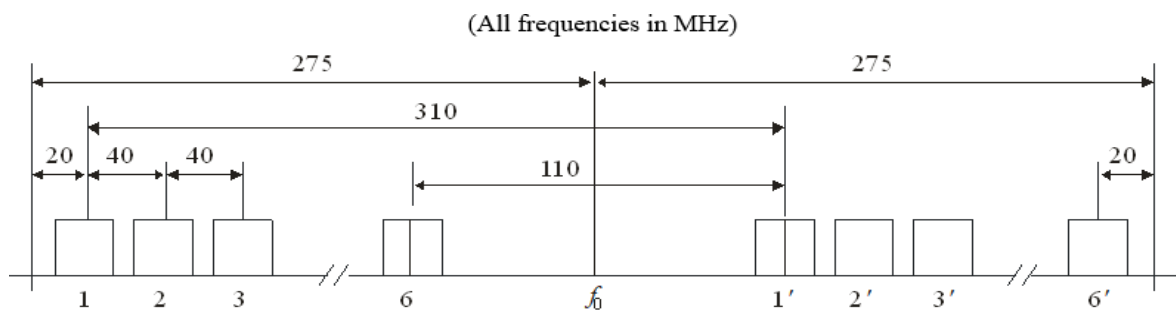
$$f'_n = f_0 + 2.5 + 28 n \text{ MHz}$$

where:

$$n = 1, 2, 3, 4, 5, 6, 7, 8 \text{ or } 9;$$

Rec. ITU-R F.386 7725-8275 MHz			
f_0 (MHz):		8000	
T/T Spacing(MHz):		28.00	
T/R Spacing(MHz):		283.50	
Channel	F(MHz)	Channel	F'(MHz)
1	7747.00	1'	8030.50
2	7775.00	2'	8058.50
3	7803.00	3'	8086.50
4	7831.00	4'	8114.50
5	7859.00	5'	8142.50
6	7887.00	6'	8170.50
7	7915.00	7'	8198.50
8	7943.00	8'	8226.50
9	7971.00	9'	8254.50

ii. 40 MHz Channelization



Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 - 295 + 40 n \text{ MHz}$$

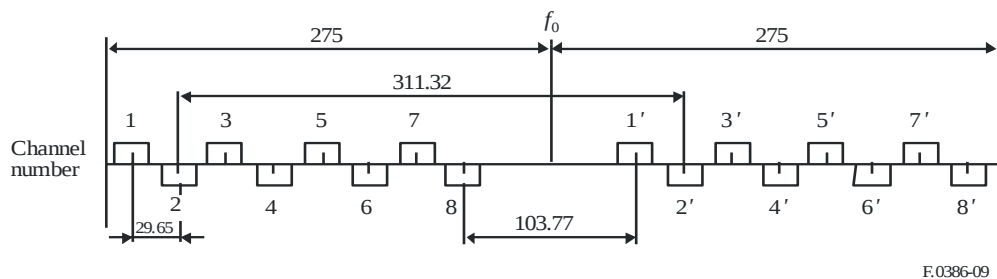
$$f'_n = f_0 + 15 + 40 n \text{ MHz}$$

where:

$$n = 1, 2, 3, \dots 6;$$

Rec. ITU-R F.386 7725-8275 MHz			
f_0 (MHz):		8000	
Channel Spacing(MHz):		40	
T/R Spacing(MHz):		310	
Channel	F(MHz)	Channel	F'(MHz)
1	7745	1'	8055
2	7785	2'	8095
3	7825	3'	8135
4	7865	4'	8175
5	7905	5'	8215
6	7945	6'	8255

iii. 29.65 MHz Channelization



Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 - 281.95 + 29.65 n \quad \text{MHz}$$

$$f'_n = f_0 + 29.37 + 29.65 n \quad \text{MHz}$$

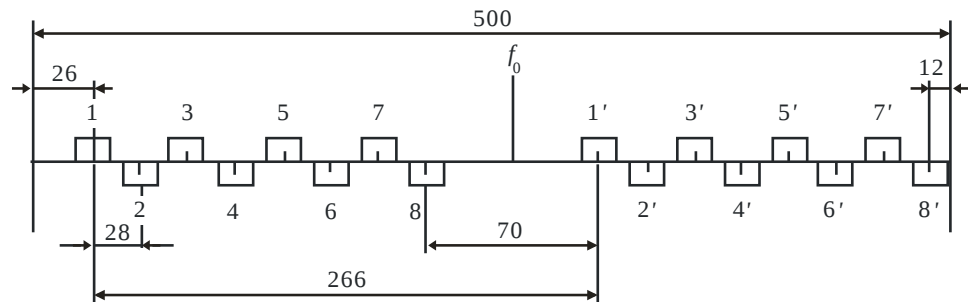
where:

$n = 1, 2, 3, 4, 5, 6, 7$ or 8 .

Rec. ITU-R F.386 7725-8275 MHz			
f_0 (MHz):		8000	
T/T Spacing(MHz):		29.65	
T/R Spacing(MHz):		311.32	
Channel	F(MHz)	Channel	F'(MHz)
1	7747.70	1'	8059.02
2	7777.35	2'	8088.67
3	7807.00	3'	8118.32

4	7836.65	4'	8147.97
5	7866.30	5'	8177.62
6	7895.95	6'	8207.27
7	7925.60	7'	8236.92
8	7955.25	8'	8266.57

4.3.2 7 900-8 400 MHz Segments



E0386-05

Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 - 259 + 28 n \text{ MHz}$$

$$f'_n = f_0 + 7 + 28 n \text{ MHz}$$

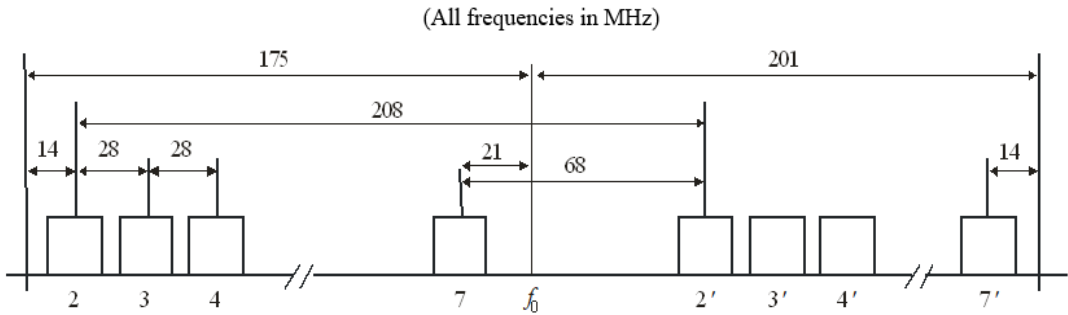
where:

$$n = 1, 2, 3, \dots, 8;$$

Rec. ITU-R F.386-9 Annex 3			
8900-8400 MHz			
f_0 (MHz):	8150		
T/T Spacing(MHz):	28		
T/R Spacing(MHz):	266		
Channel	F(MHz)	Channel	F'(MHz)
1	7919	1'	8185
2	7947	2'	8213
3	7975	3'	8241
4	8003	4'	8269
5	8031	5'	8297
6	8059	6'	8325
7	8087	7'	8353
8	8115	8'	8381



4.3.3 8 025- 8 500 MHz Segments



Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 - 217 + 28 n \text{ MHz}$$
$$f'_n = f_0 - 9 + 28 n \text{ MHz}$$

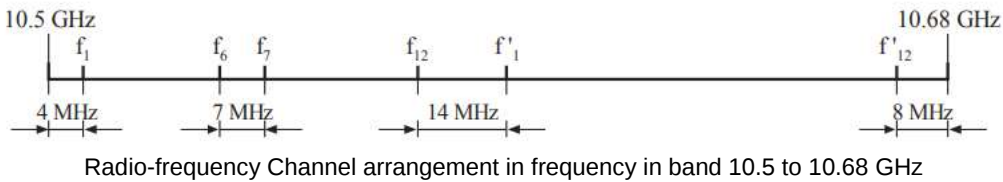
where:
 $n = 1, 2, 3, \dots, 8;$

Rec. ITU-R F.386-9 Annex 5			
8025-8500 MHz			
f_0 (MHz):		8200	
T/T Spacing(MHz):		28	
T/R Spacing(MHz):		208	
Channel	F(MHz)	Channel	F'(MHz)
1	8011	1'	8219
2	8039	2'	8247
3	8067	3'	8275
4	8095	4'	8303
5	8123	5'	8331
6	8151	6'	8359
7	8179	7'	8387
8	8207	8'	8415

5.4BAND PLAN FOR 10.0-10.68 GHz (10 GHz) BAND

4.4.1 10.5 – 10.68 GHz Segments

i. 7 MHz Channelization



Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 - 1204 + 7n \text{ MHz}$$

$$f'_n = f_0 - 1113 + 7n \text{ MHz}$$

where:

$$f_0 = 11701 \text{ MHz}$$

$$n = 1, 2, 3, 4 \dots 12;$$

ITU-R Rec. 747-1 10500-10680 MHz			
f_0 (MHz):		11701	
T/R Spacing(MHz):		91	
T/T Spacing(MHz):		7	
Channel	F(MHz)	Channel	F'(MHz)
1	10504	1'	10595
2	10511	2'	10602
3	10518	3'	10609
4	10525	4'	10616
5	10532	5'	10623
6	10539	6'	10630
7	10546	7'	10637
8	10553	8'	10644
9	10560	9'	10651
10	10567	10'	10658
11	10574	11'	10665
12	10581	12'	10672

4.4.2 10.15 to 10.3 GHz Segment paired with 10.5 to 10.65 GHz Segment

i. 28 MHz Channelization

$$f_n = (f_0 - 1561 + 28n) \text{ MHz};$$

$$f'_n = (f_0 - 1211 + 28n) \text{ MHz};$$



where:

$$n = 1, 2, 3, 4, 5;$$

ITU-R Rec. 747-1 10150-10300/10500-10650MHz			
f_0 (MHz):		11701	
T/R Spacing(MHz):		350	
T/T Spacing(MHz):		28	
Channel	F(MHz)	Channel	F'(MHz)
1	10168	1'	10518
2	10196	2'	10546
3	10224	3'	10574
4	10252	4'	10602
5	10280	5'	10630

ii. 14 MHz Channelization

$$f_n = (f_0 - 1\,554 + 28n) \text{ MHz};$$

$$f'_n = (f_0 - 1\,204 + 28n) \text{ MHz};$$

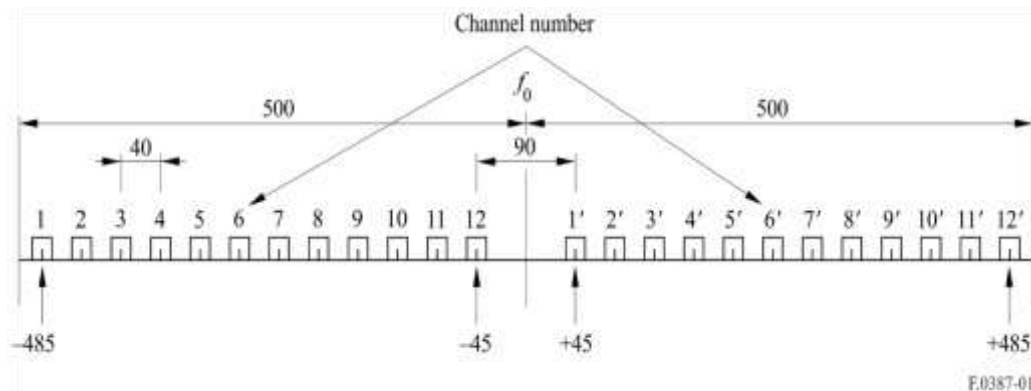
where:

$$n = 1, 2, 3, 4 \dots 10;$$

ITU-R Rec. 747-1 10150-10300/10500-10650MHz			
f_0 (MHz):		11701	
T/R Spacing(MHz):		350	
T/T Spacing (MHz):		14	
Channel	F(MHz)	Channel	F'(MHz)
1	10161	1'	10511
2	10175	2'	10525
3	10189	3'	10539
4	10203	4'	10553
5	10217	5'	10567
6	10231	6'	10581
7	10245	7'	10595
8	10259	8'	10609
9	10273	9'	10623
10	10287	10'	10637

4.5 BAND PLAN FOR 10.7-11.7 GHz (11 GHz) BAND

i. 40 MHz Channelization, Tx/Rx Separation of 530 MHz



Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 - 525 + 40 n \text{ MHz}$$

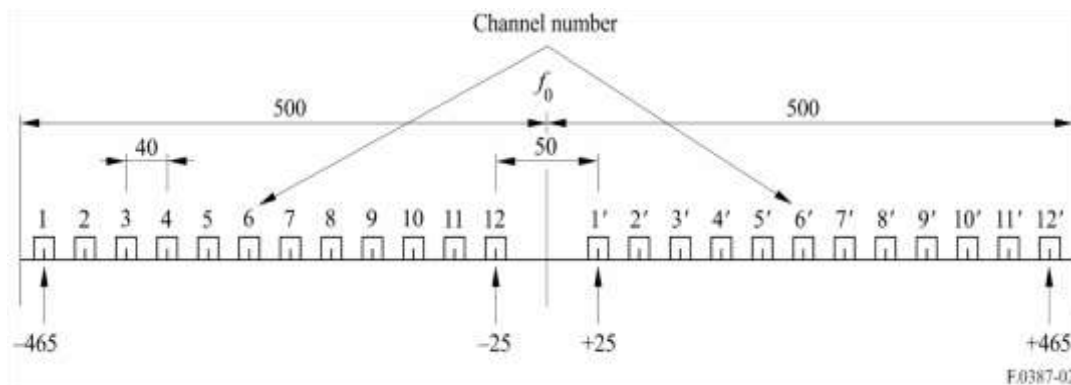
$$f'_n = f_0 + 5 + 40 n \text{ MHz}$$

Where:

$$n = 1, 2, 3, \dots 12;$$

ITU-R Rec. 387			
10700-11700 MHz			
f_0 (MHz):			11200
T/T Spacing(MHz):			40
T/R Spacing(MHz):			530
Channel	F(MHz)	Channel	F'(MHz)
1	10715	1'	11245
2	10755	2'	11285
3	10795	3'	11325
4	10835	4'	11365
5	10875	5'	11405
6	10915	6'	11445
7	10955	7'	11485
8	10995	8'	11525
9	11035	9'	11565
10	11075	10'	11605
11	11115	11'	11645
12	11155	12'	11685

ii. 40 MHz Channelization, Tx/Rx Separation of 490 MHz



Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 - 505 + 40 n \text{ MHz}$$

$$f'_n = f_0 - 15 + 40 n \text{ MHz}$$

Where:

$$n = 1, 2, 3, \dots 12;$$

ITU-R Rec. 387-7 Annex 2			
10700-11700 MHz			
f_0 (MHz):			11200
T/T Spacing(MHz):			40
T/R Spacing(MHz):			490
Channel	F(MHz)	Channel	F'(MHz)
1	10735	1'	11225
2	10775	2'	11265
3	10815	3'	11305
4	10855	4'	11345
5	10895	5'	11385
6	10935	6'	11425
7	10975	7'	11465
8	11015	8'	11505
9	11055	9'	11545
10	11095	10'	11585
11	11135	11'	11625
12	11175	12'	11665

4.6 BAND PLAN FOR 12 750 -13 250 MHz (13 GHz) BAND

i. Channel Separation of 28 MHz

Frequencies (MHz) of the individual channels are expressed by the following relationships

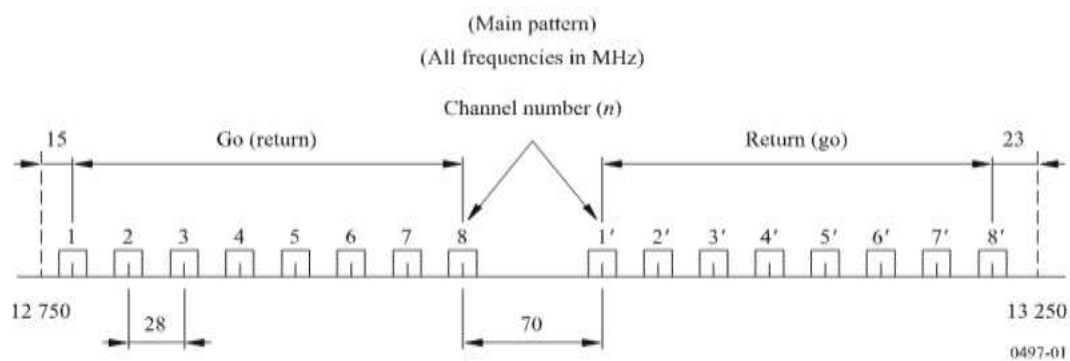
$$f_n = f_0 - 259 + 28 n \text{ MHz}$$

$$f'_n = f_0 + 7 + 28 n \text{ MHz}$$

$$f_0 = 12\,996 \text{ MHz}$$

Where

$n = 1, 2, 3, 4, 5, 6, 7$ or 8 ;



ITU-R Rec. 497			
12750-13250 MHz			
f_0 (MHz):			12996
T/T Spacing(MHz):			28
T/R Spacing(MHz):			266
Channel	F(MHz)	Channel	F'(MHz)
1	12765	1'	13031
2	12793	2'	13059
3	12821	3'	13087
4	12849	4'	13115
5	12877	5'	13143
6	12905	6'	13171
7	12933	7'	13199
8	12961	8'	13227

4.7 BAND PLAN FOR 14400-15350 MHz (15 GHz) BAND

Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 + a + 28 n \text{ MHz}$$

$$f'_n = f_0 + 3\,626 - 28 (N_{28} - n) \text{ MHz}$$

where:

f_0 : reference frequency

$a = 2\,688$ MHz for the band 14.4-15.35 GHz and

$a = 2\,786$ MHz for the band 14.5-15.35 GHz

N_{28} be the number of RF channels;

$n = 1, 2, \dots, N_{28}$, with $N_{28} \leq 16$ for the band 14.4-15.35 GHz

14400-15350 MHz			
f_0 (MHz):		11701	
T/T Spacing(MHz):		28	
T/R Spacing(MHz):		490	
Channel	F(MHz)	Channel	F'(MHz)
1	14417	1'	14907
2	14445	2'	14935
3	14473	3'	14963
4	14501	4'	14991
5	14529	5'	15019
6	14557	6'	15047
7	14585	7'	15075
8	14613	8'	15103
9	14641	9'	15131
10	14669	10'	15159
11	14697	11'	15187
12	14725	12'	15215
13	14753	13'	15243
14	14781	14'	15271
15	14809	15'	15299
16	14837	16'	15327

4.8 BAND PLAN FOR 17.7-19.7 GHz (18 GHz) BAND

Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 - 1000 + 27.5 n \text{ MHz}$$

$$f'_n = f_0 + 10 + 27.5 n \text{ MHz}$$

where:

$$n = 1, 2, 3, \dots 35;$$

ITU-R Rec. 595-4			
17700-19700 MHz			
f_0 (MHz):			18700
T/T Spacing(MHz):			27.5
T/R Spacing(MHz):			1010
Channel	F(MHz)	Channel	F'(MHz)
1	17727.5	1'	18737.5
2	17755.0	2'	18765.0
3	17782.5	3'	18792.5
4	17810.0	4'	18820.0
5	17837.5	5'	18847.5
6	17865.0	6'	18875.0
7	17892.5	7'	18902.5
8	17920.0	8'	18930.0
9	17947.5	9'	18957.5
10	17975.0	10'	18985.0
11	18002.5	11'	19012.5
12	18030.0	12'	19040.0
13	18057.5	13'	19067.5
14	18085.0	14'	19095.0
15	18112.5	15'	19122.5
16	18140.0	16'	19150.0
17	18167.5	17'	19177.5
18	18195.0	18'	19205.0
19	18222.5	19'	19232.5
20	18250.0	20'	19260.0
21	18277.5	21'	19287.5
22	18305.0	22'	19315.0
23	18332.5	23'	19342.5
24	18360.0	24'	19370.0
25	18387.5	25'	19397.5

26	18415.0	26'	19425.0
27	18442.5	27'	19452.5
28	18470.0	28'	19480.0
29	18497.5	29'	19507.5
30	18525.0	30'	19535.0
31	18552.5	31'	19562.5
32	18580.0	32'	19590.0
33	18607.5	33'	19617.5
34	18635.0	34'	19645.0
35	18662.5	35'	19672.5

4.9 BAND PLAN FOR 21.2-23.6 GHz (23 GHz) BAND

i. 28 MHz Channelization, Tx/Rx Separation of 1232 MHz

Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 + 14 + 28 n \quad \text{MHz}$$

$$f'_n = f_0 + 1\,246 + 28 n \quad \text{MHz}$$

where:

$$n = 1, \dots, 40;$$

ITU-R Rec. 637

21200-23600 MHz

f_0 (MHz):	22400
T/T Spacing(MHz):	28
T/R Spacing(MHz):	1232

Channel	F(MHz)	Channel	F'(MHz)	Channel	F(MHz)	Channel	F'(MHz)
1	21238	1'	22470	21	21798	21'	23030
2	21266	2'	22498	22	21826	22'	23058
3	21294	3'	22526	23	21854	23'	23086
4	21322	4'	22554	24	21882	24'	23114
5	21350	5'	22582	25	21910	25'	23142
6	21378	6'	22610	26	21938	26'	23170
7	21406	7'	22638	27	21966	27'	23198
8	21434	8'	22666	28	21994	28'	23226
9	21462	9'	22694	29	22022	29'	23254
10	21490	10'	22722	30	22050	30'	23282
11	21518	11'	22750	31	22078	31'	23310
12	21546	12'	22778	32	22106	32'	23338
13	21574	13'	22806	33	22134	33'	23366
14	21602	14'	22834	34	22162	34'	23394
15	21630	15'	22862	35	22190	35'	23422
16	21658	16'	22890	36	22218	36'	23450
17	21686	17'	22918	37	22246	37'	23478
18	21714	18'	22946	38	22274	38'	23506
19	21742	19'	22974	39	22302	39'	23534
20	21770	20'	23002	40	22330	40'	23562

ii. 28 MHz Channelization, Tx/Rx Separation of 1008 MHz

Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 + 798 + 28 n \text{ MHz}$$

$$f'_n = f_0 + 1806 + 28 n \text{ MHz}$$

where:

$$n = 1, \dots, 20;$$

ITU-R Rec. 637			
21200-23600 MHz			
f_0 (MHz):		22000	
T/T Spacing(MHz):		28	
T/R Spacing(MHz):		1008	
Channel	F(MHz)	Channel	F'(MHz)
1	22022	1'	23030
2	22050	2'	23058
3	22078	3'	23086
4	22106	4'	23114
5	22134	5'	23142
6	22162	6'	23170
7	22190	7'	23198
8	22218	8'	23226
9	22246	9'	23254
10	22274	10'	23282
11	22302	11'	23310
12	22330	12'	23338
13	22358	13'	23366
14	22386	14'	23394
15	22414	15'	23422
16	22442	16'	23450
17	22470	17'	23478
18	22498	18'	23506
19	22526	19'	23534
20	22554	20'	23562

4.10 BAND PLAN FOR 71-76 GHz and 81-86 GHz BAND

- i. Basic 250 MHz channels in the 71-76 GHz and 81-86 GHz bands

Frequencies (MHz) of the individual channels are expressed by the following relationships

$$f_n = f_0 + 250 \cdot n \text{ MHz}$$

where:

$$n = 1, 2, 3, \dots, 19$$



Note: f_0 is the reference frequency of:

- ✓ 71 000 MHz for the band 71-76 GHz,
- ✓ 81 000 MHz for the band 81-86 GHz

f_n is the centre frequency of a radio-frequency channel in the band 71-76 GHz or 81-86 GHz band,

n is the channel number in each band,

The 19 basic 250 MHz channels derived as above maintain 125 MHz guard band

ITU-R F.2006 (03/2012)			
fo(MHz):		71000, 81000	
T/R Spacing (MHz):		10,000	
T/T Spacing (MHz):		250	
Channels	Center Frequency	Channels	Center Frequency
1	71250	1'	81250
2	71500	2'	81500
3	71750	3'	81750
4	72000	4'	82000
5	72250	5'	82250
6	72500	6'	82500
7	72750	7'	82750
8	73000	8'	83000
9	73250	9'	83250
10	73500	10'	83500
11	73750	11'	83750
12	74000	12'	84000
13	74250	13'	84250
14	74500	14'	84500
15	74750	15'	84750
16	75000	16'	85000
17	75250	17'	85250
18	75500	18'	85500
19	75750	19'	85750

Note: The E-Band also supports the channelization of 500, 750 and 1000 MHz



ii. 500 MHz channels in the 71-76 GHz and 81-86 GHz bands

ITU-R F.2006 (03/2012)			
fo(MHz):		71000, 81000	
T/R Spacing (MHz):		10,000	
T/T Spacing (MHz):		500	
Channels	Center Frequency	Channels	Center Frequency
1	71375	1'	81375
2	71875	2'	81875
3	72375	3'	82375
4	72875	4'	82875
5	73375	5'	83375
6	73875	6'	83875
7	74375	7'	84375
8	74875	8'	84875
9	75375	9'	85375

iii. 750 MHz channels in the 71-76 GHz and 81-86 GHz bands

ITU-R F.2006 (03/2012)			
fo(MHz):		71000, 81000	
T/R Spacing (MHz):		10,000	
T/T Spacing (MHz):		750	
Channels	Center Frequency	Channels	Center Frequency
1	71500	1'	81500
2	72200	2'	82200
3	72900	3'	82900
4	73600	4'	83600
5	74300	5'	84300
6	75000	6'	85000

iv. 1000 MHz channels in the 71-76 GHz and 81-86 GHz bands

ITU-R F.2006 (03/2012)			
fo(MHz):		71000, 81000	
T/R Spacing (MHz):		10,000	
T/T Spacing (MHz):		1000	
Channels	Center Frequency	Channels	Center Frequency
1	71625	1'	81500
2	72625	2'	82200
3	73625	3'	82900
4	74625	4'	83600

PART 5: DOCUMENT ADMINISTRATION

5.1 Amendments

TCRA may from time-to-time, review, and update or modify this document to ensure its continued service and to meet the international and/or national performance requirements as necessary.

5.2 Compliance

Appropriate provisions of the TCRA Act, 2003, the Electronic and Postal Communications Act, 2010 and the Electronic and Postal Communications (Radiocommunication and Frequency Spectrum) Regulations, 2018, shall be used for compliance of this document and effective from the date it has been published.

5.3 Publication

This document shall be published on the TCRA website <https://www.tcra.go.tz> for public information, compliance and reference purposes.



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