



FCC RF Test Report

APPLICANT : Fibocom Wireless Inc.
EQUIPMENT : 5G Module
BRAND NAME : Fibocom
MODEL NAME : FM150-NA
FCC ID : ZMOFM150NA
STANDARD : 47 CFR Part 2, 27(F), 27(M), 27(H), 27(N)
CLASSIFICATION : PCS Licensed Transmitter (PCB)

The product was received on May 14, 2020 and completely tested on Sep. 10, 2020. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

James Huang

Approved by: James Huang / Manager



Sporton International (Kunshan) Inc.

**No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China**



TABLE OF CONTENTS

REVISION HISTORY	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Manufacturer	5
1.3 Product Feature of Equipment Under Test	5
1.4 Product Specification of Equipment Under Test	5
1.5 Modification of EUT	6
1.6 Maximum Conducted Power, Frequency Tolerance, and Emission Designator	7
1.7 Testing Location	10
1.8 Test Software	10
1.9 Applicable Standards	10
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	11
2.1 Test Mode	11
2.2 Connection Diagram of Test System	13
2.3 Support Unit used in test configuration and system	13
2.4 Measurement Results Explanation Example	13
2.5 Frequency List of Low/Middle/High Channels	14
3 CONDUCTED TEST ITEMS	16
3.1 Measuring Instruments	16
3.2 Test Setup	16
3.3 Test Result of Conducted Test	16
3.4 Conducted Output Power and ERP/EIRP	17
3.5 Peak-to-Average Ratio	18
3.6 Occupied Bandwidth	19
3.7 Conducted Band Edge	20
3.8 Conducted Spurious Emission	22
3.9 Frequency Stability	23
4 RADIATED TEST ITEMS	24
4.1 Measuring Instruments	24
4.2 Test Setup	24
4.3 Test Result of Radiated Test	24
4.4 Radiated Spurious Emission	25
5 LIST OF MEASURING EQUIPMENT	26
6 UNCERTAINTY OF EVALUATION	27
APPENDIX A. TEST RESULTS OF CONDUCTED TEST	
APPENDIX B. TEST RESULTS OF RADIATED TEST	
APPENDIX C. TEST SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG051416C	Rev. 01	Initial issue of report	Sep. 11, 2020

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§27.50(b)(10) §27.50(c)(10)	Effective Radiated Power (Band 12) (Band 13) (Band 17) (Band 71)	ERP < 3 Watt		
	§27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 7) (Band 41)	EIRP < 2Watt		
3.5	N/A	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §27.53(c)(2)(4) §27.53(g) §27.53(m)(2)	Conducted Band Edge Measurement (Band 12) (Band 13) (Band 17) (Band 71) (Band 7) (Band 41)	< 43+10log ₁₀ (P[Watts])	PASS	-
3.8	§2.1051 §27.53(c)(2) §27.53(g) §27.53(m)(2)	Conducted Spurious Emission (Band 12) (Band 13) (Band 17) (Band 71) (Band 7) (Band 41)	< 43+10log ₁₀ (P[Watts])	PASS	-
3.9	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Within Authorized Band	PASS	-
4.4	§2.1053 §27.53(c)(2) §27.53(f) §27.53(g) §27.53(m)(2)	Radiated Spurious Emission (Band 12) (Band 13) (Band 17) (Band 71) (Band 7) (Band 41)	< 43+10log ₁₀ (P[Watts])	PASS	Under limit 20.66 dB at 1564.000 MHz

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

Fibocom Wireless Inc.

5/F, Tower A, Technology Building II, 1057 Nanhai Avenue, Shenzhen, China

1.2 Manufacturer

Fibocom Wireless Inc.

5/F, Tower A, Technology Building II, 1057 Nanhai Avenue, Shenzhen, China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	5G Module
Brand Name	Fibocom
Model Name	FM150-NA
FCC ID	ZMOFM150NA
EUT supports Radios application	WCDMA/LTE/5G NR/GNSS
IMEI Code	Conducted: 867654040313583 RSE: 867654040317451
HW Version	V1.0.1
SW Version	89601.1000.00.02.11.20
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz LTE Band 12 : 699.7 MHz ~ 715.3 MHz LTE Band 13 : 779.5 MHz ~ 784.5 MHz LTE Band 17 : 706.5 MHz ~ 713.5 MHz LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz LTE Band 71: 665.5 MHz ~ 695.5MHz
Rx Frequency	LTE Band 7 : 2622.5MHz ~ 2687.5 MHz LTE Band 12 : 729.7 MHz ~ 745.3 MHz LTE Band 13 : 748.5 MHz ~ 753.5 MHz LTE Band 17 : 736.5 MHz ~ 743.5 MHz LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz LTE Band 71: 619.5 MHz ~ 649.5MHz
Bandwidth	LTE Band 7 : 5MHz/ 10MHz / 15MHz / 20MHz LTE Band 12 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 13 : 5MHz / 10MHz LTE Band 17 : 5MHz / 10MHz LTE Band 41 : 5MHz / 10MHz / 15MHz / 20MHz LTE Band 71 : 5MHz / 10MHz / 15MHz / 20MHz

Maximum Output Power to Antenna	LTE Band 7 : 23.31 dBm
	LTE Band 12 : 22.76 dBm
	LTE Band 13 : 22.99 dBm
	LTE Band 17 : 22.70 dBm
	LTE Band 41 : 25.83 dBm
	LTE Band 71 : 23.31 dBm
Type of Modulation	QPSK / 16QAM / 64QAM

Remark:

1. LTE band 41 supports HPUE
2. This module is limited to installation in fixed applications.

WWAN ANTENNA GAIN (dBi)		
Frequency Band	ANT.1: GHT-019A	ANT.2: AN0750-64S01BSM
LTE Band 7	1.07	3.27
LTE Band 12	1.58	-0.52
LTE Band 13	1.94	-0.34
LTE Band 17	1.58	-0.52
LTE Band 41	1.52	3.27
LTE Band 71	1.61	-0.52

Remark: Between the two type of antennas, only the worst antenna gain evaluated test is shown in bold.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.



1.6 Maximum Conducted Power, Frequency Tolerance, and Emission Designator

LTE Band 7		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)
5	2502.5 ~ 2567.5	4M49G7D	-	0.2143	4M49W7D	-	0.1854
10	2505.0 ~ 2565.0	9M03G7D	0.0044	0.2104	9M03W7D	-	0.1742
15	2507.5 ~ 2562.5	13M5G7D	-	0.2070	13M5W7D	-	0.1770
20	2510.0 ~ 2560.0	18M3G7D	-	0.2118	18M5W7D	-	0.1778
LTE Band 7		64QAM					
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)			
5	2502.5 ~ 2567.5	4M48W7D	-	0.1117			
10	2505.0 ~ 2565.0	9M03W7D	-	0.1096			
15	2507.5 ~ 2562.5	13M4W7D	-	0.1102			
20	2510.0 ~ 2560.0	18M5W7D	-	0.1112			
LTE Band 12		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)
1.4	699.7 ~ 715.3	1M09G7D	-	0.1845	1M09W7D	-	0.1626
3	700.5 ~ 714.5	2M73G7D	-	0.1884	2M72W7D	-	0.1622
5	701.5 ~ 713.5	4M51G7D	-	0.1884	4M50W7D	-	0.1607
10	704.0 ~ 711.0	9M09G7D	0.0033	0.1888	8M99W7D	-	0.1683
LTE Band 12		64QAM					
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)			
1.4	699.7 ~ 715.3	1M09W7D	-	0.1014			
3	700.5 ~ 714.5	2M73W7D	-	0.1028			
5	701.5 ~ 713.5	4M50W7D	-	0.1038			
10	704.0 ~ 711.0	9M09W7D	-	0.1030			



LTE Band 13		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)
5	779.5 ~ 784.5	4M49G7D	-	0.1905	4M51W7D	-	0.1730
10	782.0	8M95G7D	0.0066	0.1991	8M99W7D	-	0.1774
LTE Band 13		64QAM					
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)		Frequency Tolerance (ppm)		Maximum Conducted power (W)	
5	779.5 ~ 784.5	4M49W7D		-		0.1074	
10	782.0	8M97W7D		-		0.1114	
LTE Band 17		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)
5	706.5 ~ 713.5	4M51G7D	-	0.1884	4M50W7D	-	0.1607
10	709.0 ~ 711.0	9M09G7D	0.0033	0.1888	8M99W7D	-	0.1683
LTE Band 17		64QAM					
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)		Frequency Tolerance (ppm)		Maximum Conducted power (W)	
5	706.5 ~ 713.5	4M51G7D		-		0.1884	
10	709.0 ~ 711.0	9M09G7D		0.0033		0.1888	
LTE Band 41		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)
5	2498.5 ~ 2687.5	4M49G7D	-	0.3475	4M49W7D	-	0.2972
10	2501.0 ~ 2685.0	9M07G7D	0.0025	0.3828	9M05W7D	-	0.3112
15	2503.5 ~ 2682.5	13M5G7D	-	0.3698	13M4W7D	-	0.3027
20	2506.0 ~ 2680.0	18M4G7D	-	0.3802	18M5W7D	-	0.3214



LTE Band 41		64QAM					
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)		Maximum Conducted power (W)		
5	2498.5 ~ 2687.5	4M50W7D	-		0.2911		
10	2501.0 ~ 2685.0	9M05W7D	-		0.3228		
15	2503.5 ~ 2682.5	13M5W7D	-		0.2992		
20	2506.0 ~ 2680.0	18M3W7D	-		0.3155		
LTE Band 71		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum Conducted power (W)
5	665.5 ~ 695.5	4M50G7D	-	0.2089	4M49W7D	-	0.1879
10	668.0 ~ 693.0	9M01G7D	0.0055	0.2109	9M01W7D	-	0.1811
15	670.5 ~ 690.5	13M5G7D	-	0.2143	13M5W7D	-	0.1862
20	673.0 ~ 688.0	17M9G7D	-	0.2118	17M9W7D	-	0.1871
LTE Band 71		64QAM					
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)		Maximum Conducted power (W)		
5	665.5 ~ 695.5	4M52W7D	-		0.1130		
10	668.0 ~ 693.0	9M05W7D	-		0.1119		
15	670.5 ~ 690.5	13M5W7D	-		0.1114		
20	673.0 ~ 688.0	17M9W7D	-		0.1104		

Note: LTE Band 12 overlaps the entire frequency range of LTE Band 17. Therefore, the test results provided in this report covers Band 12 as well as Band 17.

1.7 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH02-KS TH01-KS	CN1257	314309

1.8 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH02-KS	AUDIX	E3	6.2009-8-24a

1.9 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2, 27(F), 27(M), 27(H), 27(N)
- ♦ ANSI C63.26-2015
- ♦ FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

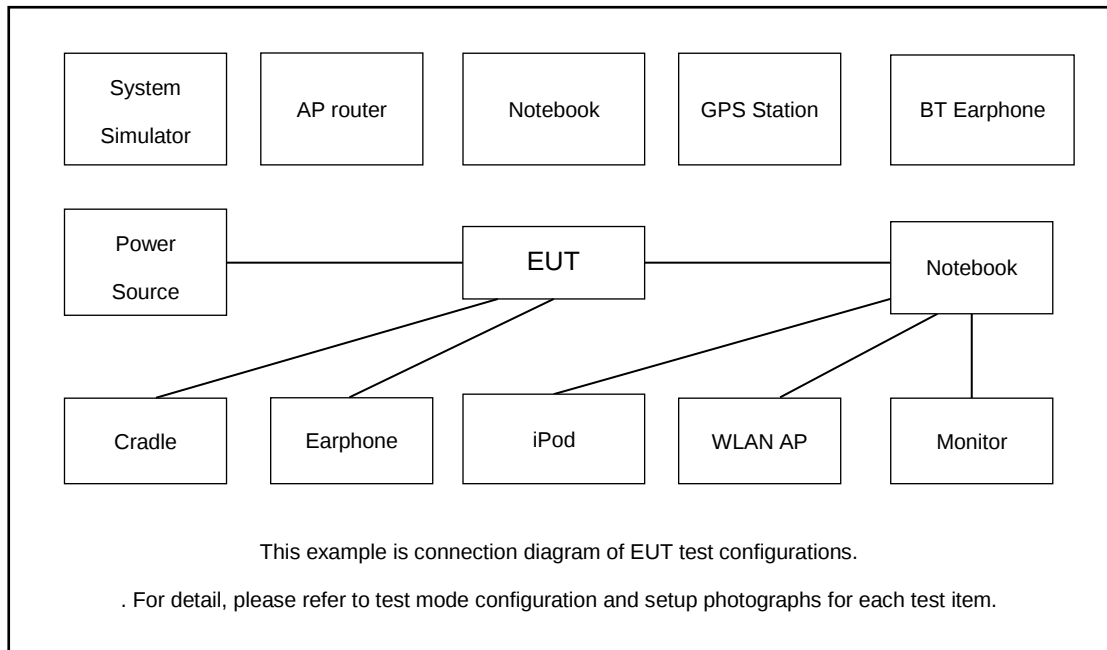
Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	7	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
	12	v	v	v	v	-	-	v	v	v	v	v	v	v	v	v
	13	-	-	v	v	-	-	v	v	v	v	v	v	v	v	v
	17	-	-	v	v	-	-	v	v	v	v	v	v	v	v	v
	41	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
	71	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	7	-	-				v	v	v	v	v		v	v	v	v
	12				v	-	-	v	v	v	v		v	v	v	v
	13	-	-		v	-	-	v	v	v	v		v	v	v	v
	41	-	-				v	v	v	v	v		v	v	v	v
	71	-	-				v	v	v	v	v		v	v	v	v
26dB and 99% Bandwidth	7	-	-	v	v	v	v	v	v	v			v	v	v	v
	12	v	v	v	v	-	-	v	v	v			v	v	v	v
	13	-	-	v	v	-	-	v	v	v			v	v	v	v
	41	-	-	v	v	v	v	v	v	v			v	v	v	v
	71	-	-	v	v	v	v	v	v	v			v	v	v	v
Conducted Band Edge	7	-	-	v	v	v	v	v	v	v	v		v	v		v
	12	v	v	v	v	-	-	v	v	v	v		v	v		v
	13	-	-	v	v	-	-	v	v	v	v		v	v		v
	41	-	-	v	v	v	v	v	v	v	v		v	v		v
	71	-	-	v	v	v	v	v	v	v	v		v	v		v



Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Conducted Spurious Emission	7	-	-	v	v	v	v	v	v	v	v			v	v	v
	12	v	v	v	v	-	-	v	v	v	v			v	v	v
	13	-	-	v	v	-	-	v	v	v	v			v	v	v
	41	-	-	v	v	v	v	v	v	v	v			v	v	v
	71	-	-	v	v	v	v	v	v	v	v			v	v	v
Frequency Stability	7	-	-		v			v					v		v	
	12				v	-	-	v					v		v	
	13	-	-		v	-	-	v					v		v	
	41	-	-		v			v					v		v	
	71	-	-		v			v					v		v	
E.R.P / E.I.R.P	7	-	-	v	v	v	v	v	v	v	v			v	v	v
	12	v	v	v	v	-	-	v	v	v	v			v	v	v
	13	-	-	v	v	-	-	v	v	v	v			v	v	v
	41	-	-	v	v	v	v	v	v	v	v			v	v	v
	71	-	-	v	v	v	v	v	v	v	v			v	v	v
Radiated Spurious Emission	7	Worst Case												v	v	v
	12	Worst Case												v	v	v
	13	Worst Case												v	v	v
	41	Worst Case												v	v	v
	71	Worst Case												v	v	v
Note	1. The mark “v ” means that this configuration is chosen for testing 2. The mark “-” means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. 4. LTE Band 12 overlaps the entire frequency range of LTE Band 17. Therefore, the test results provided in this report covers Band 12 as well as Band 17.															

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
3.	Antenna	N/A	N/A	N/A	N/A	N/A
4.	Adapter	N/A	N/A	N/A	N/A	N/A
5.	Test jig	N/A	N/A	N/A	N/A	N/A

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 5.4 dB.

Example :

Offset(dB) = RF cable loss(dB).

= 5.4 (dB)

2.5 Frequency List of Low/Middle/High Channels

LTE Band 7 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	20850	21100	21350
	Frequency	2510	2535	2560
15	Channel	20825	21100	21375
	Frequency	2507.5	2535	2562.5
10	Channel	20800	21100	21400
	Frequency	2505	2535	2565
5	Channel	20775	21100	21425
	Frequency	2502.5	2535	2567.5

LTE Band 12 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	23060	23095	23130
	Frequency	704	707.5	711
5	Channel	23035	23095	23155
	Frequency	701.5	707.5	713.5
3	Channel	23025	23095	23165
	Frequency	700.5	707.5	714.5
1.4	Channel	23017	23095	23173
	Frequency	699.7	707.5	715.3

LTE Band 13 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	-	23230	-
	Frequency	-	782	-
5	Channel	23205	23230	23255
	Frequency	779.5	782	784.5

LTE Band 17 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	23780	23790	23800
	Frequency	709	710	711
5	Channel	23755	23790	23825
	Frequency	706.5	710	713.5

LTE Band 41 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	39750	40620	41490
	Frequency	2506	2593	2680
15	Channel	39725	40620	41515
	Frequency	2503.5	2593	2682.5
10	Channel	39700	40620	41540
	Frequency	2501	2593	2685
5	Channel	39675	40620	41565
	Frequency	2498.5	2593	2687.5

LTE Band 71 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	133222	133322	133372
	Frequency	673.0	680.5	688.0
15	Channel	133197	133297	133397
	Frequency	670.5	680.5	690.5
10	Channel	133172	133272	133422
	Frequency	668.0	678.0	693.0
5	Channel	133147	133247	133447
	Frequency	665.5	675.5	695.5

3 Conducted Test Items

3.1 Measuring Instruments

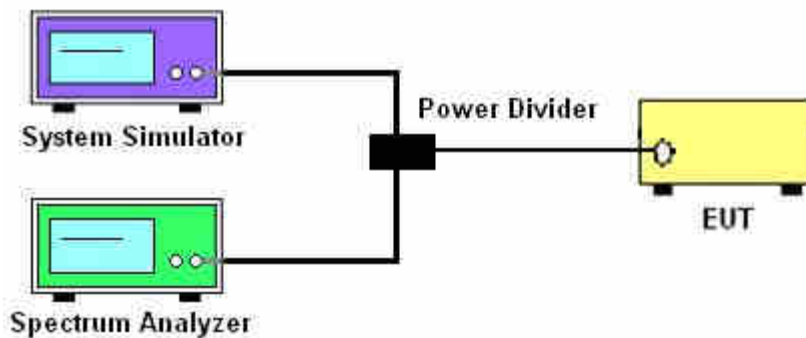
See list of measuring instruments of this test report.

3.2 Test Setup

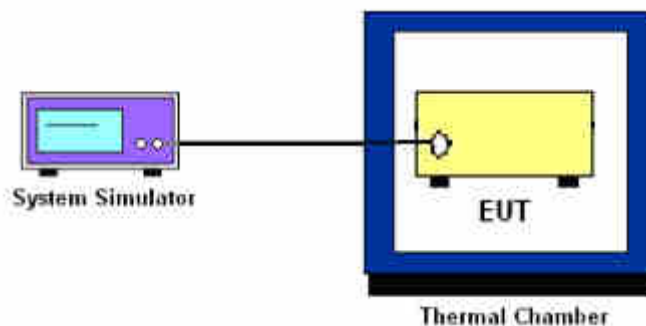
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and ERP/EIRP

3.4.1 Description of the Conducted Output Power Measurement and ERP/EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.6 Occupied Bandwidth

3.6.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.6.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.
(this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “-X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

27.53 (c)

For operations in the 776-788 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 100 kHz bandwidth. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed. In addition, the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least $65 + 10 \log_{10} p(\text{watts})$, dB, for mobile and portable equipment.

27.53 (g)

For operations in the 600MHz band and 698 -746 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 100 kHz bandwidth. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

27.53(m)(2)(v)

For all fixed digital user stations, the attenuation factor shall be not less than $43 + 10 \log (P)$ dB at the channel edge

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW $\geq$ 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. Checked that all the results comply with the emission limit line.

Example:

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)

$= P(W) - [43 + 10\log(P)] \text{ (dB)}$

$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)} = -13\text{dBm}.$

3.8 Conducted Spurious Emission

3.8.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
 $= -13\text{dBm}$.

3.9 Frequency Stability

3.9.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

3.9.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.9.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5
2. The EUT was placed in a temperature chamber at $20\pm 5^{\circ}\text{C}$ and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

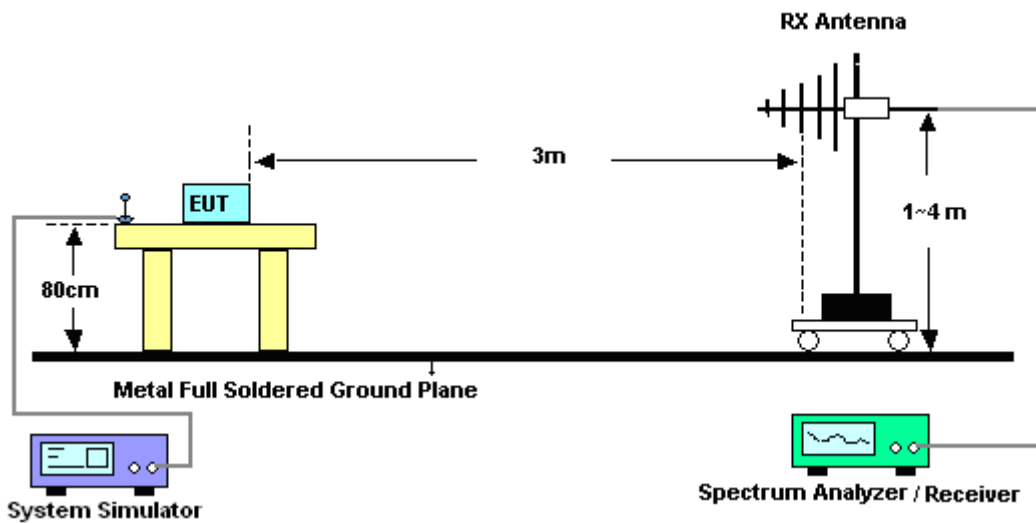
4 Radiated Test Items

4.1 Measuring Instruments

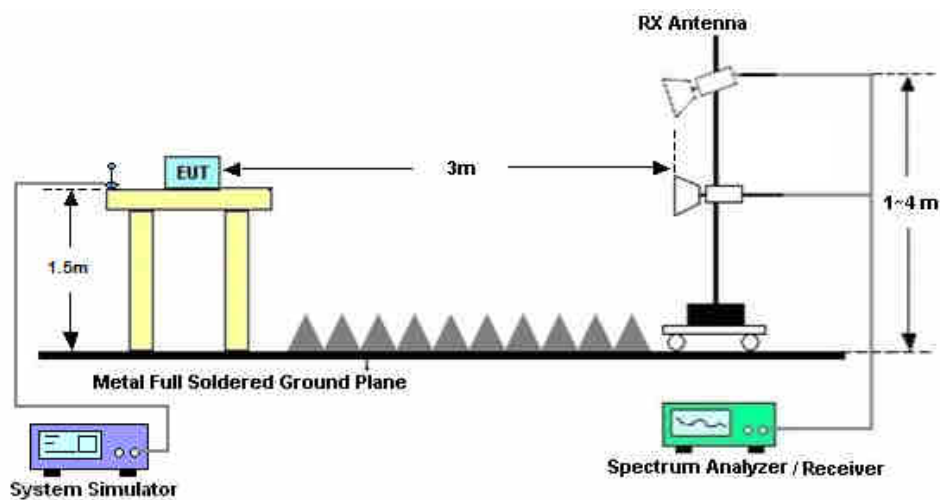
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

4.4 Radiated Spurious Emission

4.4.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For LTE Band 13

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. $\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$
11. $\text{ERP (dBm)} = \text{EIRP} - 2.15$
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Nov. 02, 2019	Jul. 08, 2020~ Sep. 10, 2020	Nov. 01, 2020	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 28, 2019	Jul. 08, 2020~ Sep. 10, 2020	Oct. 27, 2020	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 18, 2019	Aug. 10, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz~44G,MAX 30dB	Oct. 18, 2019	Aug. 10, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz~1GHz	Dec. 30, 2019	Aug. 10, 2020	Dec. 29, 2020	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 10, 2019	Aug. 10, 2020	Nov. 09, 2020	Radiation (03CH02-KS)
high gain Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P	2025788	100MHz~18GHz	Jan. 03, 2020	Aug. 10, 2020	Jan. 02, 2021	Radiation (03CH02-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2019	Aug. 10, 2020	Nov. 09, 2020	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz~1GHz	Jan. 03, 2020	Aug. 10, 2020	Jan. 02, 2021	Radiation (03CH02-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Oct. 18, 2019	Aug. 10, 2020	Oct. 17, 2020	Radiation (03CH02-KS)
Amplifier	MITEQ	EM18G40G GA	060728	18~40GHz	Jan. 08, 2020	Aug. 10, 2020	Jan. 07, 2021	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Aug. 10, 2020	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Aug. 10, 2020	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Aug. 10, 2020	NCR	Radiation (03CH02-KS)

NCR: No Calibration Required



6 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage $K=2$ to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.5dB
---	-------

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.1dB
---	-------



Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 7

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				20850	21100	21350
Frequency (MHz)				2510	2535	2560
20	QPSK	1	0	22.78	23.15	23.20
20	QPSK	1	49	22.91	23.13	22.99
20	QPSK	1	99	23.04	23.26	23.06
20	QPSK	50	0	22.06	22.13	22.25
20	QPSK	50	24	22.18	22.10	22.30
20	QPSK	50	50	22.20	22.37	22.27
20	QPSK	100	0	22.13	22.32	22.29
20	16QAM	1	0	22.35	22.46	22.50
20	16QAM	1	49	22.26	22.22	22.32
20	16QAM	1	99	22.34	22.24	22.38
20	16QAM	50	0	20.97	21.15	21.40
20	16QAM	50	24	21.18	21.13	21.20
20	16QAM	50	50	21.12	21.30	21.29
20	16QAM	100	0	21.17	20.99	21.26
20	64QAM	1	0	19.97	20.19	20.35
20	64QAM	1	49	20.22	20.05	20.31
20	64QAM	1	99	20.21	20.41	20.46
20	64QAM	50	0	20.05	20.27	20.31
20	64QAM	50	24	20.22	20.08	20.25
20	64QAM	50	50	20.26	20.36	20.20
20	64QAM	100	0	20.20	20.02	20.26



Channel				20825	21100	21375
Frequency (MHz)				2507.5	2535	2562.5
15	QPSK	1	0	22.79	23.04	23.16
15	QPSK	1	37	22.89	23.15	23.09
15	QPSK	1	74	23.02	23.10	22.95
15	QPSK	36	0	22.09	22.22	22.25
15	QPSK	36	20	22.15	22.13	22.16
15	QPSK	36	39	22.12	21.79	22.23
15	QPSK	75	0	22.09	22.31	22.25
15	16QAM	1	0	22.02	22.32	22.46
15	16QAM	1	37	22.03	22.48	22.48
15	16QAM	1	74	22.25	22.42	22.40
15	16QAM	36	0	21.09	21.16	21.30
15	16QAM	36	20	21.12	21.28	21.29
15	16QAM	36	39	21.16	21.30	21.25
15	16QAM	75	0	21.05	21.23	21.35
15	64QAM	1	0	19.93	20.13	20.41
15	64QAM	1	37	19.94	20.15	20.33
15	64QAM	1	74	20.02	20.39	20.42
15	64QAM	36	0	20.04	20.15	20.26
15	64QAM	36	20	20.08	20.33	20.31
15	64QAM	36	39	20.13	20.27	20.24
15	64QAM	75	0	20.09	20.38	20.26



Channel				20800	21100	21400
Frequency (MHz)				2505	2535	2565
10	QPSK	1	0	23.20	23.23	23.09
10	QPSK	1	25	22.86	23.03	23.12
10	QPSK	1	49	23.11	23.16	23.03
10	QPSK	25	0	22.20	22.19	22.13
10	QPSK	25	12	22.08	22.35	22.10
10	QPSK	25	25	21.93	22.26	22.21
10	QPSK	50	0	21.92	22.27	22.25
10	16QAM	1	0	22.23	22.24	22.36
10	16QAM	1	25	22.41	22.26	22.24
10	16QAM	1	49	22.12	22.36	22.18
10	16QAM	25	0	21.34	21.30	21.14
10	16QAM	25	12	21.16	21.40	21.19
10	16QAM	25	25	21.00	21.37	21.25
10	16QAM	50	0	21.13	21.39	21.18
10	64QAM	1	0	20.38	20.18	20.32
10	64QAM	1	25	20.16	20.40	20.26
10	64QAM	1	49	20.12	20.39	20.21
10	64QAM	25	0	20.31	20.18	20.17
10	64QAM	25	12	20.04	20.36	20.24
10	64QAM	25	25	20.00	20.40	20.13
10	64QAM	50	0	19.98	20.35	19.70



Channel				20775	21100	21425
Frequency (MHz)				2502.5	2535	2567.5
5	QPSK	1	0	23.31	23.02	23.08
5	QPSK	1	12	23.12	22.99	22.96
5	QPSK	1	24	22.97	23.11	22.90
5	QPSK	12	0	22.36	22.23	22.14
5	QPSK	12	7	22.29	22.33	22.17
5	QPSK	12	13	22.15	22.06	22.09
5	QPSK	25	0	22.30	22.02	22.08
5	16QAM	1	0	22.59	22.46	22.68
5	16QAM	1	12	22.26	22.38	22.54
5	16QAM	1	24	22.46	22.35	22.39
5	16QAM	12	0	21.47	21.12	21.24
5	16QAM	12	7	21.29	21.24	21.07
5	16QAM	12	13	21.26	21.28	21.15
5	16QAM	25	0	21.19	21.16	21.14
5	64QAM	1	0	20.48	20.07	20.36
5	64QAM	1	12	20.34	20.06	20.27
5	64QAM	1	24	20.25	20.35	20.18
5	64QAM	12	0	20.40	20.41	20.16
5	64QAM	12	7	20.46	20.36	20.13
5	64QAM	12	13	20.29	20.35	20.11
5	64QAM	25	0	20.34	20.27	20.15

**LTE Band 12**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				23060	23095	23130
Frequency (MHz)				704	707.5	711
10	QPSK	1	0	22.65	22.51	22.52
10	QPSK	1	25	22.52	22.57	22.62
10	QPSK	1	49	22.50	22.68	22.76
10	QPSK	25	0	21.59	21.69	21.76
10	QPSK	25	12	21.68	21.66	21.72
10	QPSK	25	25	21.74	21.70	21.86
10	QPSK	50	0	21.78	21.69	21.84
10	16QAM	1	0	21.78	21.83	22.18
10	16QAM	1	25	21.85	22.08	22.01
10	16QAM	1	49	22.10	22.16	22.26
10	16QAM	25	0	20.63	20.70	20.81
10	16QAM	25	12	20.70	20.73	20.86
10	16QAM	25	25	20.66	20.78	20.80
10	16QAM	50	0	20.69	20.71	20.93
10	64QAM	1	0	19.77	19.83	20.04
10	64QAM	1	25	20.00	20.02	19.87
10	64QAM	1	49	20.02	20.09	20.13
10	64QAM	25	0	19.68	19.69	19.76
10	64QAM	25	12	19.70	19.82	19.84
10	64QAM	25	25	19.83	19.79	19.85
10	64QAM	50	0	19.76	19.77	19.87



Channel				23035	23095	23155
Frequency (MHz)				701.5	707.5	713.5
5	QPSK	1	0	22.55	22.52	22.51
5	QPSK	1	12	22.61	22.63	22.75
5	QPSK	1	24	22.60	22.67	22.62
5	QPSK	12	0	21.64	21.73	21.74
5	QPSK	12	7	21.63	21.72	21.81
5	QPSK	12	13	21.61	21.75	21.72
5	QPSK	25	0	21.64	21.72	21.69
5	16QAM	1	0	21.81	21.93	21.89
5	16QAM	1	12	21.78	21.66	22.06
5	16QAM	1	24	21.95	21.86	21.95
5	16QAM	12	0	20.82	20.73	20.82
5	16QAM	12	7	20.74	20.69	20.85
5	16QAM	12	13	20.71	20.79	20.83
5	16QAM	25	0	20.59	20.77	20.78
5	64QAM	1	0	19.93	19.87	19.90
5	64QAM	1	12	19.90	20.01	20.16
5	64QAM	1	24	19.88	19.75	19.98
5	64QAM	12	0	19.80	19.72	19.91
5	64QAM	12	7	19.66	19.73	19.86
5	64QAM	12	13	19.73	19.84	19.84
5	64QAM	25	0	19.62	19.75	19.77



Channel				23025	23095	23165
Frequency (MHz)				700.5	707.5	714.5
3	QPSK	1	0	22.62	22.72	22.63
3	QPSK	1	8	22.56	22.68	22.74
3	QPSK	1	14	22.50	22.59	22.75
3	QPSK	8	0	21.59	21.75	21.78
3	QPSK	8	4	21.60	21.83	21.80
3	QPSK	8	7	21.55	21.88	21.83
3	QPSK	15	0	21.61	21.76	21.75
3	16QAM	1	0	21.73	21.97	22.10
3	16QAM	1	8	21.75	21.94	21.95
3	16QAM	1	14	21.94	21.99	21.99
3	16QAM	8	0	20.72	20.90	20.84
3	16QAM	8	4	20.73	20.96	20.77
3	16QAM	8	7	20.63	20.77	20.85
3	16QAM	15	0	20.60	20.83	20.70
3	64QAM	1	0	19.88	19.83	20.12
3	64QAM	1	8	19.99	20.06	20.06
3	64QAM	1	14	19.95	20.04	19.98
3	64QAM	8	0	19.74	19.81	19.87
3	64QAM	8	4	19.76	19.84	19.82
3	64QAM	8	7	19.86	19.87	19.85
3	64QAM	15	0	19.71	19.89	19.78



Channel				23017	23095	23173
Frequency (MHz)				699.7	707.5	715.3
1.4	QPSK	1	0	22.61	22.50	22.60
1.4	QPSK	1	3	22.56	22.62	22.63
1.4	QPSK	1	5	22.53	22.49	22.56
1.4	QPSK	3	0	22.48	22.47	22.66
1.4	QPSK	3	1	22.57	22.51	22.60
1.4	QPSK	3	3	22.44	22.46	22.56
1.4	QPSK	6	0	21.51	21.55	21.72
1.4	16QAM	1	0	21.63	21.72	22.00
1.4	16QAM	1	3	21.90	21.99	21.92
1.4	16QAM	1	5	21.82	22.00	22.11
1.4	16QAM	3	0	21.72	21.67	21.75
1.4	16QAM	3	1	21.80	21.72	21.71
1.4	16QAM	3	3	21.61	21.59	21.77
1.4	16QAM	6	0	20.68	20.61	20.87
1.4	64QAM	1	0	19.78	19.88	19.96
1.4	64QAM	1	3	19.83	19.94	20.06
1.4	64QAM	1	5	19.81	19.87	19.90
1.4	64QAM	3	0	19.58	19.78	19.98
1.4	64QAM	3	1	19.87	19.70	20.00
1.4	64QAM	3	3	19.90	19.71	19.95
1.4	64QAM	6	0	19.58	19.76	19.77

**LTE Band 13**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				23230		
Frequency (MHz)				782		
10	QPSK	1	0		22.99	
10	QPSK	1	25		22.81	
10	QPSK	1	49		22.64	
10	QPSK	25	0		21.95	
10	QPSK	25	12		21.87	
10	QPSK	25	25		21.80	
10	QPSK	50	0		21.81	
10	16QAM	1	0		22.49	
10	16QAM	1	25		22.31	
10	16QAM	1	49		22.25	
10	16QAM	25	0		20.97	
10	16QAM	25	12		20.96	
10	16QAM	25	25		20.91	
10	16QAM	50	0		20.94	
10	64QAM	1	0		20.47	
10	64QAM	1	25		20.21	
10	64QAM	1	49		20.07	
10	64QAM	25	0		20.05	
10	64QAM	25	12		19.90	
10	64QAM	25	25		19.94	
10	64QAM	50	0		19.97	



Channel				23205	23230	23255
Frequency (MHz)				779.5	782	784.5
5	QPSK	1	0	22.80	22.74	22.60
5	QPSK	1	12	22.76	22.67	22.55
5	QPSK	1	24	22.78	22.64	22.51
5	QPSK	12	0	21.95	21.98	21.94
5	QPSK	12	7	22.01	21.85	21.79
5	QPSK	12	13	21.84	21.80	21.70
5	QPSK	25	0	22.03	21.91	21.83
5	16QAM	1	0	22.09	22.16	22.38
5	16QAM	1	12	21.99	21.93	21.90
5	16QAM	1	24	22.28	22.15	22.02
5	16QAM	12	0	21.15	20.95	20.99
5	16QAM	12	7	20.95	20.88	20.88
5	16QAM	12	13	20.99	20.97	20.96
5	16QAM	25	0	21.10	20.83	20.81
5	64QAM	1	0	20.31	20.09	20.17
5	64QAM	1	12	19.88	20.00	20.05
5	64QAM	1	24	19.90	19.83	19.84
5	64QAM	12	0	20.01	19.81	19.88
5	64QAM	12	7	19.92	19.94	19.81
5	64QAM	12	13	19.96	19.98	19.76
5	64QAM	25	0	20.10	19.92	19.80

**LTE Band 17**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				23780	23790	23800
Frequency (MHz)				709	710	711
10	QPSK	1	0	22.52	22.39	22.51
10	QPSK	1	25	22.41	22.48	22.64
10	QPSK	1	49	22.39	22.52	22.70
10	QPSK	25	0	21.73	21.61	21.66
10	QPSK	25	12	21.57	21.63	21.70
10	QPSK	25	25	21.69	21.72	21.79
10	QPSK	50	0	21.50	21.54	21.72
10	16QAM	1	0	22.00	22.03	21.75
10	16QAM	1	25	21.96	21.95	21.84
10	16QAM	1	49	22.05	22.18	21.97
10	16QAM	25	0	20.68	20.66	20.68
10	16QAM	25	12	20.70	20.70	20.64
10	16QAM	25	25	20.83	20.73	20.82
10	16QAM	50	0	20.62	20.64	20.69
10	64QAM	1	0	19.80	19.75	19.71
10	64QAM	1	25	19.71	19.61	19.87
10	64QAM	1	49	19.87	19.98	20.08
10	64QAM	25	0	19.68	19.70	19.72
10	64QAM	25	12	19.81	19.76	19.76
10	64QAM	25	25	19.72	19.79	19.80
10	64QAM	50	0	19.59	19.74	19.60



Channel				23755	23790	23825
Frequency (MHz)				706.5	710	713.5
5	QPSK	1	0	22.47	22.39	22.49
5	QPSK	1	12	22.51	22.50	22.53
5	QPSK	1	24	22.61	22.52	22.62
5	QPSK	12	0	21.64	21.78	21.68
5	QPSK	12	7	21.68	21.70	21.84
5	QPSK	12	13	21.74	21.72	21.73
5	QPSK	25	0	21.60	21.61	21.66
5	16QAM	1	0	21.81	21.68	21.77
5	16QAM	1	12	21.94	21.85	21.72
5	16QAM	1	24	22.16	21.91	22.00
5	16QAM	12	0	20.62	20.68	20.74
5	16QAM	12	7	20.69	20.73	20.83
5	16QAM	12	13	20.67	20.69	20.82
5	16QAM	25	0	20.61	20.54	20.76
5	64QAM	1	0	19.86	19.68	19.86
5	64QAM	1	12	19.71	19.70	19.88
5	64QAM	1	24	19.64	19.69	20.00
5	64QAM	12	0	19.59	19.74	19.72
5	64QAM	12	7	19.72	19.71	19.83
5	64QAM	12	13	19.80	19.79	19.85
5	64QAM	25	0	19.74	19.61	19.69

**LTE Band 41**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				39750	40620	41490
Frequency (MHz)				2506	2593	2680
20	QPSK	1	0	25.43	25.37	25.80
20	QPSK	1	49	25.40	25.25	25.68
20	QPSK	1	99	25.36	25.38	25.57
20	QPSK	50	0	24.50	24.36	24.80
20	QPSK	50	24	24.58	24.40	24.75
20	QPSK	50	50	24.57	24.49	24.72
20	QPSK	100	0	24.67	24.50	24.75
20	16QAM	1	0	24.71	24.63	25.07
20	16QAM	1	49	24.74	24.47	24.87
20	16QAM	1	99	24.90	24.53	24.83
20	16QAM	50	0	23.50	23.34	23.77
20	16QAM	50	24	23.64	23.51	23.71
20	16QAM	50	50	23.66	23.57	23.81
20	16QAM	100	0	23.65	23.46	23.82
20	64QAM	1	0	24.79	24.67	24.99
20	64QAM	1	49	24.56	24.40	24.75
20	64QAM	1	99	24.57	24.60	24.91
20	64QAM	50	0	23.48	23.36	23.79
20	64QAM	50	24	23.59	23.41	23.76
20	64QAM	50	50	23.56	23.40	23.73
20	64QAM	100	0	23.70	23.55	23.75



Channel				39725	40620	41515
Frequency (MHz)				2503.5	2593	2682.5
15	QPSK	1	0	25.40	25.40	25.25
15	QPSK	1	37	25.68	25.21	25.23
15	QPSK	1	74	25.55	25.44	25.28
15	QPSK	36	0	24.51	24.37	24.30
15	QPSK	36	20	24.60	24.43	24.28
15	QPSK	36	39	24.62	24.47	24.30
15	QPSK	75	0	24.61	24.46	24.33
15	16QAM	1	0	24.65	24.68	24.53
15	16QAM	1	37	24.81	24.51	24.46
15	16QAM	1	74	24.77	24.67	24.59
15	16QAM	36	0	23.46	23.42	23.25
15	16QAM	36	20	23.63	23.41	23.26
15	16QAM	36	39	23.61	23.48	23.23
15	16QAM	75	0	23.64	23.49	23.32
15	64QAM	1	0	24.76	24.63	24.45
15	64QAM	1	37	24.57	24.40	24.26
15	64QAM	1	74	24.64	24.65	24.48
15	64QAM	36	0	23.47	23.44	23.28
15	64QAM	36	20	23.74	23.45	23.29
15	64QAM	36	39	23.65	23.53	23.25
15	64QAM	75	0	23.70	23.43	23.32



Channel				39700	40620	41540
Frequency (MHz)				2501	2593	2685
10	QPSK	1	0	25.48	25.32	25.83
10	QPSK	1	25	25.52	25.54	25.64
10	QPSK	1	49	25.60	25.40	25.59
10	QPSK	25	0	24.58	24.37	24.78
10	QPSK	25	12	24.60	24.45	24.67
10	QPSK	25	25	24.57	24.41	24.77
10	QPSK	50	0	24.63	24.43	24.73
10	16QAM	1	0	24.79	24.72	24.90
10	16QAM	1	25	24.88	24.62	24.92
10	16QAM	1	49	24.81	24.71	24.93
10	16QAM	25	0	23.54	23.45	23.69
10	16QAM	25	12	23.67	23.54	23.81
10	16QAM	25	25	23.64	23.50	23.80
10	16QAM	50	0	23.64	23.46	23.73
10	64QAM	1	0	24.86	24.59	25.09
10	64QAM	1	25	24.78	24.68	24.90
10	64QAM	1	49	24.99	24.62	24.93
10	64QAM	25	0	23.60	23.35	23.73
10	64QAM	25	12	23.61	23.45	23.74
10	64QAM	25	25	23.59	23.50	23.84
10	64QAM	50	0	23.56	23.42	23.77



Channel				39675	40620	41565
Frequency (MHz)				2498.5	2593	2687.5
5	QPSK	1	0	25.36	25.11	25.40
5	QPSK	1	12	25.29	25.16	25.41
5	QPSK	1	24	25.23	25.09	25.39
5	QPSK	12	0	24.24	24.28	24.50
5	QPSK	12	7	24.30	24.15	24.47
5	QPSK	12	13	24.28	24.16	24.52
5	QPSK	25	0	24.21	24.22	24.43
5	16QAM	1	0	24.42	24.23	24.73
5	16QAM	1	12	24.55	24.28	24.69
5	16QAM	1	24	24.51	24.35	24.64
5	16QAM	12	0	23.37	23.22	23.53
5	16QAM	12	7	23.36	23.24	23.51
5	16QAM	12	13	23.36	23.25	23.46
5	16QAM	25	0	23.31	23.22	23.58
5	64QAM	1	0	24.39	24.28	24.64
5	64QAM	1	12	24.36	24.24	24.56
5	64QAM	1	24	24.41	24.27	24.55
5	64QAM	12	0	23.19	23.19	23.51
5	64QAM	12	7	23.21	23.23	23.50
5	64QAM	12	13	23.22	23.21	23.43
5	64QAM	25	0	23.24	23.20	23.54

**LTE Band 71**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				133222	133322	133372
Frequency (MHz)				673	683	688
20	QPSK	1	0	23.25	23.20	23.26
20	QPSK	1	49	23.08	23.18	23.03
20	QPSK	1	99	22.91	22.96	22.86
20	QPSK	50	0	22.33	22.24	22.19
20	QPSK	50	24	22.24	22.26	22.31
20	QPSK	50	50	22.22	22.26	22.20
20	QPSK	100	0	22.30	22.11	22.20
20	16QAM	1	0	22.72	22.64	22.56
20	16QAM	1	49	22.57	22.39	22.46
20	16QAM	1	99	22.36	22.29	22.34
20	16QAM	50	0	21.23	21.20	21.26
20	16QAM	50	24	21.38	21.19	21.21
20	16QAM	50	50	21.27	21.15	21.17
20	16QAM	100	0	21.26	21.19	21.23
20	64QAM	1	0	20.43	20.33	20.25
20	64QAM	1	49	20.33	20.39	20.30
20	64QAM	1	99	20.42	20.11	20.12
20	64QAM	50	0	20.39	20.37	20.36
20	64QAM	50	24	20.28	20.26	20.27
20	64QAM	50	50	20.15	20.18	20.13
20	64QAM	100	0	20.33	20.12	20.23



Channel				133197	133297	133397
Frequency (MHz)				670.5	680.5	690.5
15	QPSK	1	0	23.22	23.31	23.27
15	QPSK	1	37	23.09	23.21	23.19
15	QPSK	1	74	22.88	23.01	22.92
15	QPSK	36	0	22.32	22.15	22.46
15	QPSK	36	20	22.17	22.18	22.30
15	QPSK	36	39	22.30	22.27	22.20
15	QPSK	75	0	22.34	22.07	22.19
15	16QAM	1	0	22.56	22.60	22.70
15	16QAM	1	37	22.55	22.62	22.54
15	16QAM	1	74	22.65	22.53	22.68
15	16QAM	36	0	21.22	21.30	21.34
15	16QAM	36	20	21.43	21.21	21.05
15	16QAM	36	39	21.26	21.25	21.19
15	16QAM	75	0	21.30	21.16	21.21
15	64QAM	1	0	20.33	20.19	20.46
15	64QAM	1	37	20.43	20.34	20.29
15	64QAM	1	74	20.39	20.30	20.25
15	64QAM	36	0	20.37	20.47	20.42
15	64QAM	36	20	20.41	20.24	20.18
15	64QAM	36	39	20.13	20.21	20.03
15	64QAM	75	0	20.40	20.16	20.20



Channel				133172	133272	133422
Frequency (MHz)				668	678	693
10	QPSK	1	0	23.20	23.20	23.24
10	QPSK	1	25	23.18	23.20	22.92
10	QPSK	1	49	23.13	22.96	22.78
10	QPSK	25	0	22.24	22.41	22.21
10	QPSK	25	12	22.35	22.33	22.45
10	QPSK	25	25	22.27	22.26	22.14
10	QPSK	50	0	22.40	22.18	22.14
10	16QAM	1	0	22.53	22.29	22.58
10	16QAM	1	25	22.55	22.29	22.34
10	16QAM	1	49	22.47	22.31	22.37
10	16QAM	25	0	21.17	21.22	21.32
10	16QAM	25	12	21.37	21.22	21.40
10	16QAM	25	25	21.11	21.11	21.17
10	16QAM	50	0	21.25	21.09	21.30
10	64QAM	1	0	20.49	20.26	20.40
10	64QAM	1	25	20.33	20.48	20.31
10	64QAM	1	49	20.19	20.15	20.04
10	64QAM	25	0	20.30	20.41	20.36
10	64QAM	25	12	20.19	20.21	20.34
10	64QAM	25	25	20.23	20.18	20.18
10	64QAM	50	0	20.48	19.99	20.32



Channel				133147	133247	133447
Frequency (MHz)				665.5	675.5	695.5
5	QPSK	1	0	23.18	23.13	23.17
5	QPSK	1	12	23.10	23.20	23.05
5	QPSK	1	24	22.94	22.96	22.71
5	QPSK	12	0	22.30	22.28	22.46
5	QPSK	12	7	22.31	22.28	22.30
5	QPSK	12	13	22.22	22.16	22.20
5	QPSK	25	0	22.29	22.10	22.19
5	16QAM	1	0	22.74	22.62	22.70
5	16QAM	1	12	22.66	22.28	22.54
5	16QAM	1	24	22.42	22.35	22.40
5	16QAM	12	0	21.30	21.17	21.34
5	16QAM	12	7	21.48	21.30	21.05
5	16QAM	12	13	21.24	21.22	21.19
5	16QAM	25	0	21.34	21.27	21.21
5	64QAM	1	0	20.49	20.53	20.46
5	64QAM	1	12	20.41	20.48	20.29
5	64QAM	1	24	20.37	20.23	20.25
5	64QAM	12	0	20.41	20.37	20.42
5	64QAM	12	7	20.36	20.27	20.18
5	64QAM	12	13	20.21	20.14	20.03
5	64QAM	25	0	20.32	20.02	20.20

ERP/EIRP

LTE Band 7 (GT - LC = 3.27 dB) QPSK			
Bandwidth	5M		
Channel	20775	21100	21425
	(Low)	(Mid)	(High)
Frequency	2502.5	2535	2567.5
(MHz)			
Conducted Power (dBm)	23.31	23.02	23.08
Conducted Power (Watts)	0.2143	0.2004	0.2032
EIRP(dBm)	26.58	26.29	26.35
EIRP(Watts)	0.4550	0.4256	0.4315

LTE Band 7 (GT - LC = 3.27 dB) QPSK									
Bandwidth	10M			15M			20M		
Channel	20800	21100	21400	20825	21100	21375	20850	21100	21350
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	2505	2535	2565	2507.5	2535	2562.5	2510	2535	2560
(MHz)									
Conducted Power (dBm)	23.20	23.23	23.09	22.79	23.04	23.16	23.04	23.26	23.06
Conducted Power (Watts)	0.2089	0.2104	0.2037	0.1901	0.2014	0.2070	0.2014	0.2118	0.2023
EIRP(dBm)	26.47	26.50	26.36	26.06	26.31	26.43	26.31	26.53	26.33
EIRP(Watts)	0.4436	0.4467	0.4325	0.4036	0.4276	0.4395	0.4276	0.4498	0.4295

LTE Band 7 (GT - LC = 3.27 dB) 16QAM			
Bandwidth	5M		
Channel	20775	21100	21425
	(Low)	(Mid)	(High)
Frequency	2502.5	2535	2567.5
(MHz)			
Conducted Power (dBm)	22.59	22.46	22.68
Conducted Power (Watts)	0.1816	0.1762	0.1854
EIRP(dBm)	25.86	25.73	25.95
EIRP(Watts)	0.3855	0.3741	0.3936

LTE Band 7 (GT - LC = 3.27 dB) 16QAM									
Bandwidth	10M			15M			20M		
Channel	20800	21100	21400	20825	21100	21375	20850	21100	21350
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	2505	2535	2565	2507.5	2535	2562.5	2510	2535	2560
(MHz)									
Conducted Power (dBm)	22.41	22.26	22.24	22.03	22.48	22.48	22.35	22.46	22.50
Conducted Power (Watts)	0.1742	0.1683	0.1675	0.1596	0.1770	0.1770	0.1718	0.1762	0.1778
EIRP(dBm)	25.68	25.53	25.51	25.30	25.75	25.75	25.62	25.73	25.77
EIRP(Watts)	0.3698	0.3573	0.3556	0.3388	0.3758	0.3758	0.3648	0.3741	0.3776



LTE Band 7 (GT - LC = 3.27 dB) 64QAM			
Bandwidth	5M		
Channel	20775	21100	21425
	(Low)	(Mid)	(High)
Frequency	2502.5	2535	2567.5
(MHz)			
Conducted Power (dBm)	20.48	20.07	20.36
Conducted Power (Watts)	0.1117	0.1016	0.1086
EIRP(dBm)	23.75	23.34	23.63
EIRP(Watts)	0.2371	0.2158	0.2307

LTE Band 7 (GT - LC = 3.27 dB) 64QAM									
Bandwidth	10M			15M			20M		
Channel	20800	21100	21400	20825	21100	21375	20850	21100	21350
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	2505	2535	2565	2507.5	2535	2562.5	2510	2535	2560
(MHz)									
Conducted Power (dBm)	20.16	20.40	20.26	20.02	20.39	20.42	20.21	20.41	20.46
Conducted Power (Watts)	0.1038	0.1096	0.1062	0.1005	0.1094	0.1102	0.1050	0.1099	0.1112
EIRP(dBm)	23.43	23.67	23.53	23.29	23.66	23.69	23.48	23.68	23.73
EIRP(Watts)	0.2203	0.2328	0.2254	0.2133	0.2323	0.2339	0.2228	0.2333	0.2360



LTE Band 12 (GT - LC = 1.58 dB) QPSK									
Bandwidth	1.4M			3M			5M		
Channel	23017	23095	23173	23025	23095	23165	23035	23095	23155
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	699.7	707.5	715.3	700.5	707.5	714.5	701.5	707.5	713.5
(MHz)									
Conducted Power (dBm)	22.48	22.47	22.66	22.50	22.59	22.75	22.61	22.63	22.75
Conducted Power (Watts)	0.1770	0.1766	0.1845	0.1778	0.1816	0.1884	0.1824	0.1832	0.1884
ERP(dBm)	21.91	21.90	22.09	21.93	22.02	22.18	22.04	22.06	22.18
ERP(Watts)	0.1552	0.1549	0.1618	0.1560	0.1592	0.1652	0.1600	0.1607	0.1652

LTE Band 12 (GT - LC = 1.58 dB) QPSK			
Bandwidth	10M		
Channel	23060	23095	23130
	(Low)	(Mid)	(High)
Frequency	704	707.5	711
(MHz)			
Conducted Power (dBm)	22.50	22.68	22.76
Conducted Power (Watts)	0.1778	0.1854	0.1888
ERP(dBm)	21.93	22.11	22.19
ERP(Watts)	0.1560	0.1626	0.1656



LTE Band 12 (GT - LC = 1.58 dB) 16QAM									
Bandwidth	1.4M			3M			5M		
Channel	23017	23095	23173	23025	23095	23165	23035	23095	23155
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	699.7	707.5	715.3	700.5	707.5	714.5	701.5	707.5	713.5
Conducted Power (dBm)	21.82	22.00	22.11	21.73	21.97	22.10	21.78	21.66	22.06
Conducted Power (Watts)	0.1521	0.1585	0.1626	0.1489	0.1574	0.1622	0.1507	0.1466	0.1607
ERP(dBm)	21.25	21.43	21.54	21.16	21.40	21.53	21.21	21.09	21.49
ERP(Watts)	0.1334	0.1390	0.1426	0.1306	0.1380	0.1422	0.1321	0.1285	0.1409

LTE Band 12 (GT - LC = 1.58 dB) 16QAM			
Bandwidth	10M		
Channel	23060	23095	23130
	(Low)	(Mid)	(High)
Frequency (MHz)	704	707.5	711
Conducted Power (dBm)	22.10	22.16	22.26
Conducted Power (Watts)	0.1622	0.1644	0.1683
ERP(dBm)	21.53	21.59	21.69
ERP(Watts)	0.1422	0.1442	0.1476



LTE Band 12 (GT - LC = 1.58 dB) 64QAM									
Bandwidth	1.4M			3M			5M		
Channel	23017	23095	23173	23025	23095	23165	23035	23095	23155
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	699.7	707.5	715.3	700.5	707.5	714.5	701.5	707.5	713.5
(MHz)									
Conducted Power (dBm)	19.83	19.94	20.06	19.88	19.83	20.12	19.90	20.01	20.16
Conducted Power (Watts)	0.0962	0.0986	0.1014	0.0973	0.0962	0.1028	0.0977	0.1002	0.1038
ERP(dBm)	19.26	19.37	19.49	19.31	19.26	19.55	19.33	19.44	19.59
ERP(Watts)	0.0843	0.0865	0.0889	0.0853	0.0843	0.0902	0.0857	0.0879	0.0910

LTE Band 12 (GT - LC = 1.58 dB) 64QAM			
Bandwidth	10M		
Channel	23060	23095	23130
	(Low)	(Mid)	(High)
Frequency	704	707.5	711
(MHz)			
Conducted Power (dBm)	20.02	20.09	20.13
Conducted Power (Watts)	0.1005	0.1021	0.1030
ERP(dBm)	19.45	19.52	19.56
ERP(Watts)	0.0881	0.0895	0.0904



LTE Band 13 (GT - LC = 1.94 dB) QPSK						
Bandwidth	5M			10M		
Channel	23205	23230	23255	23230		
	(Low)	(Mid)	(High)	-	(Mid)	-
Frequency	779.5	782	784.5	-	782	-
(MHz)						
Conducted Power (dBm)	22.80	22.74	22.60		22.99	-
Conducted Power (Watts)	0.1905	0.1879	0.1820		0.1991	-
ERP(dBm)	22.59	22.53	22.39		22.78	-
ERP(Watts)	0.1816	0.1791	0.1734		0.1897	-

LTE Band 13 (GT - LC = 1.94 dB) 16QAM						
Bandwidth	5M			10M		
Channel	23205	23230	23255	23230		
	(Low)	(Mid)	(High)	-	(Mid)	-
Frequency	779.5	782	784.5	-	782	-
(MHz)						
Conducted Power (dBm)	22.09	22.16	22.38		22.49	-
Conducted Power (Watts)	0.1618	0.1644	0.1730		0.1774	-
ERP(dBm)	21.88	21.95	22.17		22.28	-
ERP(Watts)	0.1542	0.1567	0.1648		0.1690	-

LTE Band 13 (GT - LC = 1.94 dB) 64QAM						
Bandwidth	5M			10M		
Channel	23205	23230	23255	23230		
	(Low)	(Mid)	(High)	-	(Mid)	-
Frequency	779.5	782	784.5	-	782	-
(MHz)						
Conducted Power (dBm)	20.31	20.09	20.17		20.47	-
Conducted Power (Watts)	0.1074	0.1021	0.1040		0.1114	-
ERP(dBm)	20.10	19.88	19.96		20.26	-
ERP(Watts)	0.1023	0.0973	0.0991		0.1062	-

LTE Band 41 ($G_T - L_C = 3.27\text{dB}$) QPSK									
Bandwidth	5M			10M			15M		
Channel	39675	40620	41565	39700	40620	41540	39725	40620	41515
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	2498.5	2593	2687.5	2501	2593	2685	2503.5	2593	2682.5
(MHz)									
Conducted Power (dBm)	25.29	25.16	25.41	25.48	25.32	25.83	25.68	25.21	25.23
Conducted Power (Watts)	0.3381	0.3281	0.3475	0.3532	0.3404	0.3828	0.3698	0.3319	0.3334
EIRP(dBm)	28.56	28.43	28.68	28.75	28.59	29.10	28.95	28.48	28.50
EIRP(Watts)	0.7178	0.6966	0.7379	0.7499	0.7228	0.8128	0.7852	0.7047	0.7079

LTE Band 41 ($G_T - L_C = 3.27\text{dB}$) QPSK			
Bandwidth	20M		
Channel	39750	40620	41490
	(Low)	(Mid)	(High)
Frequency	2506	2593	2680
(MHz)			
Conducted Power (dBm)	25.43	25.37	25.80
Conducted Power (Watts)	0.3491	0.3443	0.3802
EIRP(dBm)	28.70	28.64	29.07
EIRP(Watts)	0.7413	0.7311	0.8072

LTE Band 41 ($G_T - L_C = 3.27\text{dB}$) 16QAM									
Bandwidth	5M			10M			15M		
Channel	39675	40620	41565	39700	40620	41540	39725	40620	41515
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	2498.5	2593	2687.5	2501	2593	2685	2503.5	2593	2682.5
(MHz)									
Conducted Power (dBm)	24.42	24.23	24.73	24.81	24.71	24.93	24.81	24.51	24.46
Conducted Power (Watts)	0.2767	0.2649	0.2972	0.3027	0.2958	0.3112	0.3027	0.2825	0.2793
EIRP(dBm)	27.69	27.50	28.00	28.08	27.98	28.20	28.08	27.78	27.73
EIRP(Watts)	0.5875	0.5623	0.6310	0.6427	0.6281	0.6607	0.6427	0.5998	0.5929

LTE Band 41 ($G_T - L_C = 3.27\text{dB}$) 16QAM			
Bandwidth	20M		
Channel	39750	40620	41490
	(Low)	(Mid)	(High)
Frequency	2506	2593	2680
(MHz)			
Conducted Power (dBm)	24.71	24.63	25.07
Conducted Power (Watts)	0.2958	0.2904	0.3214
EIRP(dBm)	27.98	27.90	28.34
EIRP(Watts)	0.6281	0.6166	0.6823

LTE Band 41 ($G_T - L_C = 3.27\text{dB}$) 64QAM									
Bandwidth	5M			10M			15M		
Channel	39675	40620	41565	39700	40620	41540	39725	40620	41515
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	2498.5	2593	2687.5	2501	2593	2685	2503.5	2593	2682.5
(MHz)									
Conducted Power (dBm)	24.39	24.28	24.64	24.86	24.59	25.09	24.76	24.63	24.45
Conducted Power (Watts)	0.2748	0.2679	0.2911	0.3062	0.2877	0.3228	0.2992	0.2904	0.2786
EIRP(dBm)	27.66	27.55	27.91	28.13	27.86	28.36	28.03	27.90	27.72
EIRP(Watts)	0.5834	0.5689	0.6180	0.6501	0.6109	0.6855	0.6353	0.6166	0.5916

LTE Band 41 ($G_T - L_C = 3.27\text{dB}$) 64QAM			
Bandwidth	20M		
Channel	39750	40620	41490
	(Low)	(Mid)	(High)
Frequency	2506	2593	2680
(MHz)			
Conducted Power (dBm)	24.79	24.67	24.99
Conducted Power (Watts)	0.3013	0.2931	0.3155
EIRP(dBm)	28.06	27.94	28.26
EIRP(Watts)	0.6397	0.6223	0.6699

LTE Band 71 (GT - LC = 1.61 dB) QPSK									
Bandwidth	5M			10M			15M		
Channel	133147	133297	133447	133172	133297	133422	133197	133297	133397
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	665.5	680.5	695.5	668	680.5	693	670.5	680.5	690.5
(MHz)									
Conducted Power (dBm)	23.10	23.20	23.05	23.20	23.20	23.24	23.22	23.31	23.27
Conducted Power (Watts)	0.2042	0.2089	0.2018	0.2089	0.2089	0.2109	0.2099	0.2143	0.2123
ERP(dBm)	22.56	22.66	22.51	22.66	22.66	22.70	22.68	22.77	22.73
ERP(Watts)	0.1803	0.1845	0.1782	0.1845	0.1845	0.1862	0.1854	0.1892	0.1875

LTE Band 71 (GT - LC = 1.61 dB) QPSK			
Bandwidth	20M		
Channel	133222	133297	133372
	(Low)	(Mid)	(High)
Frequency	673	680.5	688
(MHz)			
Conducted Power (dBm)	23.25	23.20	23.26
Conducted Power (Watts)	0.2113	0.2089	0.2118
ERP(dBm)	22.71	22.66	22.72
ERP(Watts)	0.1866	0.1845	0.1871

LTE Band 71 (GT - LC = 1.61 dB) 16QAM									
Bandwidth	5M			10M			15M		
Channel	133147	133297	133447	133172	133297	133422	133197	133297	133397
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	665.5	680.5	695.5	668	680.5	693	670.5	680.5	690.5
(MHz)									
Conducted Power (dBm)	22.74	22.62	22.70	22.53	22.29	22.58	22.56	22.60	22.70
Conducted Power (Watts)	0.1879	0.1828	0.1862	0.1791	0.1694	0.1811	0.1803	0.1820	0.1862
ERP(dBm)	22.20	22.08	22.16	21.99	21.75	22.04	22.02	22.06	22.16
ERP(Watts)	0.1660	0.1614	0.1644	0.1581	0.1496	0.1600	0.1592	0.1607	0.1644

LTE Band 71 (GT - LC = 1.61 dB) 16QAM			
Bandwidth	20M		
Channel	133222	133297	133372
	(Low)	(Mid)	(High)
Frequency	673	680.5	688
(MHz)			
Conducted Power (dBm)	22.72	22.64	22.56
Conducted Power (Watts)	0.1871	0.1837	0.1803
ERP(dBm)	22.18	22.10	22.02
ERP(Watts)	0.1652	0.1622	0.1592



LTE Band 71 (GT - LC = 1.61 dB) 64QAM									
Bandwidth	5M			10M			15M		
Channel	133147	133297	133447	133172	133297	133422	133197	133297	133397
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	665.5	680.5	695.5	668	680.5	693	670.5	680.5	690.5
(MHz)									
Conducted Power (dBm)	20.49	20.53	20.46	20.49	20.26	20.40	20.37	20.47	20.42
Conducted Power (Watts)	0.1119	0.1130	0.1112	0.1119	0.1062	0.1096	0.1089	0.1114	0.1102
ERP(dBm)	19.95	19.99	19.92	19.95	19.72	19.86	19.83	19.93	19.88
ERP(Watts)	0.0989	0.0998	0.0982	0.0989	0.0938	0.0968	0.0962	0.0984	0.0973

LTE Band 71 (GT - LC = 1.61 dB) 64QAM			
Bandwidth	20M		
Channel	133222	133297	133372
	(Low)	(Mid)	(High)
Frequency	673	680.5	688
(MHz)			
Conducted Power (dBm)	20.43	20.33	20.25
Conducted Power (Watts)	0.1104	0.1079	0.1059
ERP(dBm)	19.89	19.79	19.71
ERP(Watts)	0.0975	0.0953	0.0935



LTE Band 7

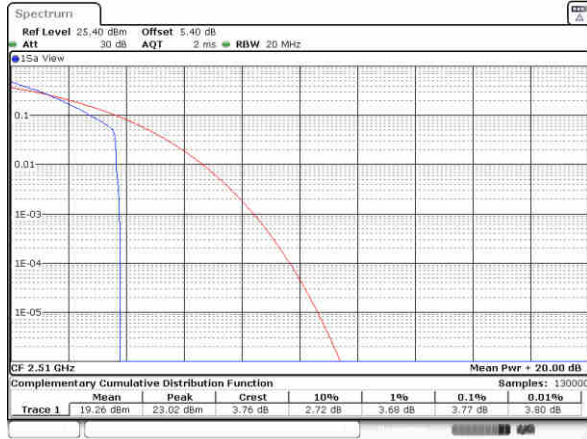
Peak-to-Average Ratio

Mode	LTE Band 7 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	3.77	5.04	5.45	5.91	PASS
Middle CH	3.68	4.93	5.57	5.88	
Highest CH	3.39	5.01	4.87	6.00	
Mode	LTE Band 7 / 20MHz				
Mod.	64QAM				Limit: 13dB
RB Size	1RB	Full RB			Result
Lowest CH	5.48	5.94	-	-	PASS
Middle CH	5.68	5.94	-	-	
Highest CH	4.93	5.97	-	-	

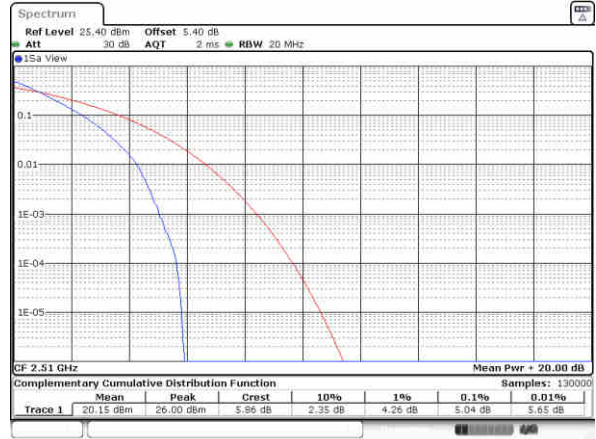


LTE Band 7 / 20MHz / QPSK

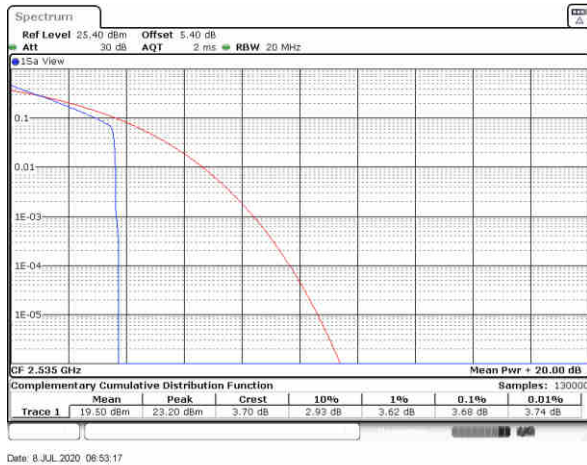
Lowest Channel / 1RB



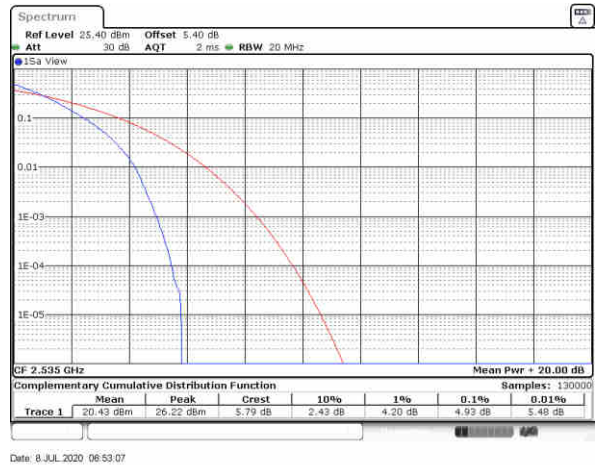
Lowest Channel / Full RB



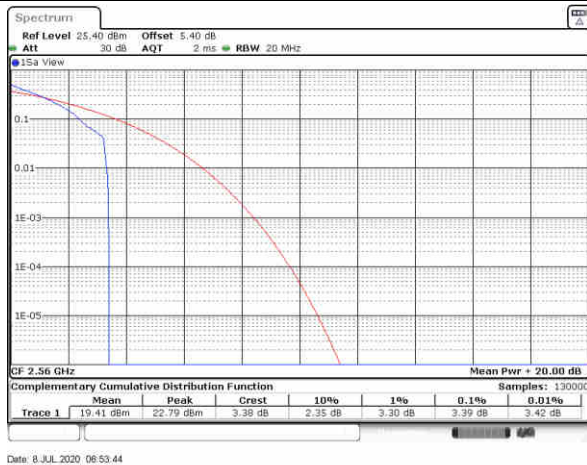
Middle Channel / 1RB



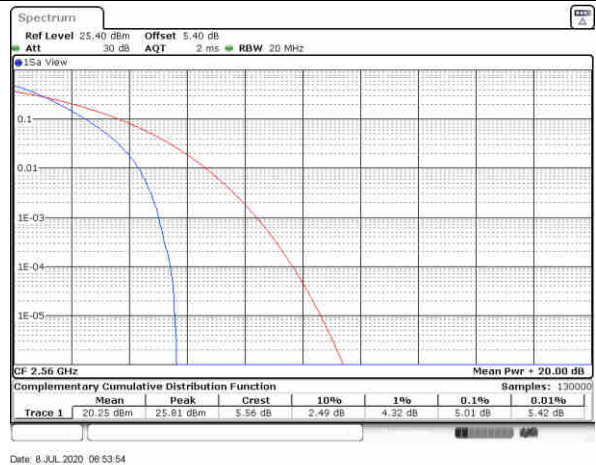
Middle Channel / Full RB



Highest Channel / 1RB



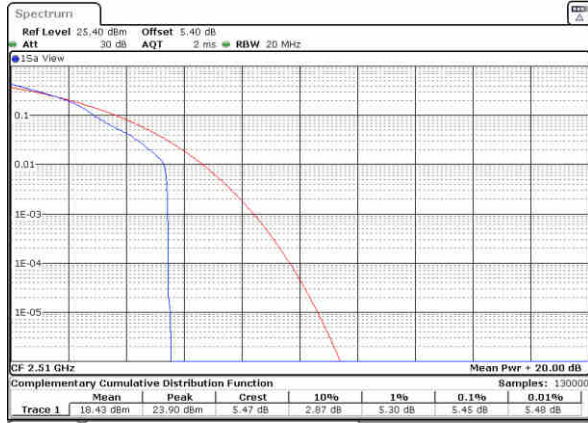
Highest Channel / Full RB





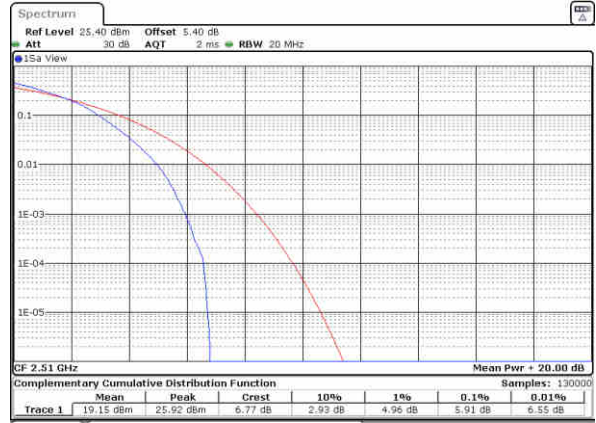
LTE Band 7 / 20MHz / 16QAM

Lowest Channel / 1RB



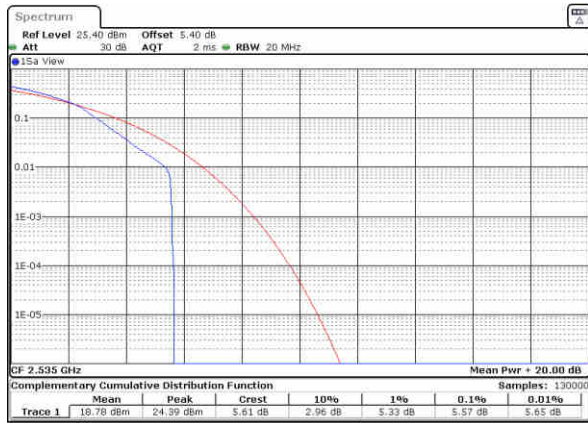
Date: 8 JUL 2020 06:52:21

Lowest Channel / Full RB



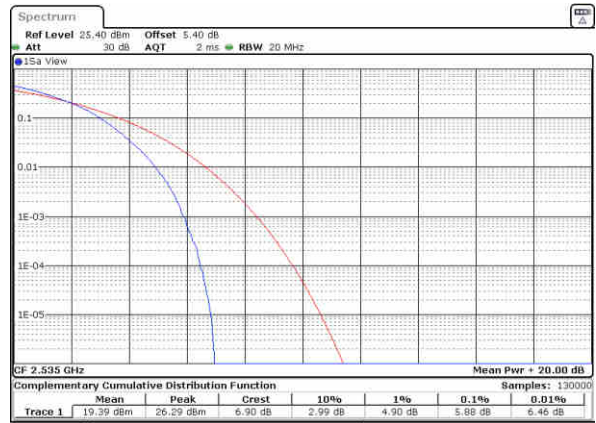
Date: 8 JUL 2020 06:52:49

Middle Channel / 1RB



Date: 8 JUL 2020 06:53:26

Middle Channel / Full RB



Date: 8 JUL 2020 06:53:58

Highest Channel / 1RB



Date: 8 JUL 2020 06:53:36

Highest Channel / Full RB

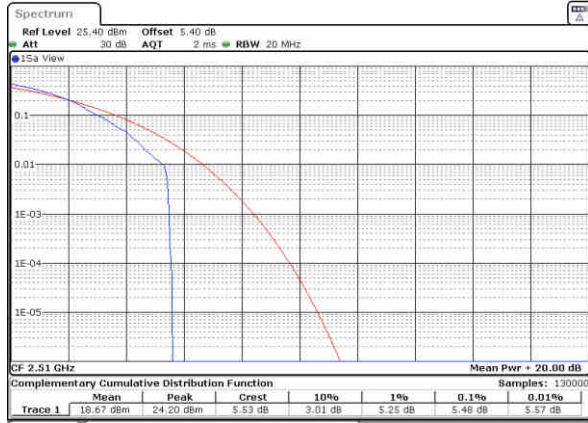


Date: 8 JUL 2020 06:54:03



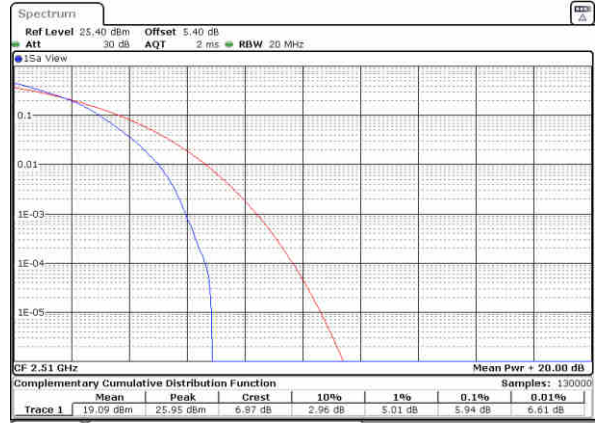
LTE Band 7 / 20MHz / 64QAM

Lowest Channel / 1RB



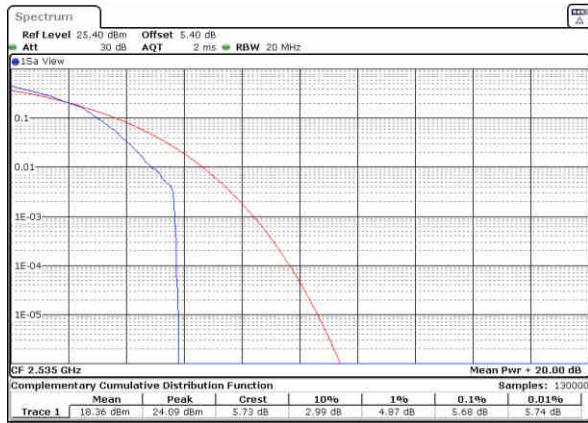
Date: 8 JUL 2020 06:51:26

Lowest Channel / Full RB



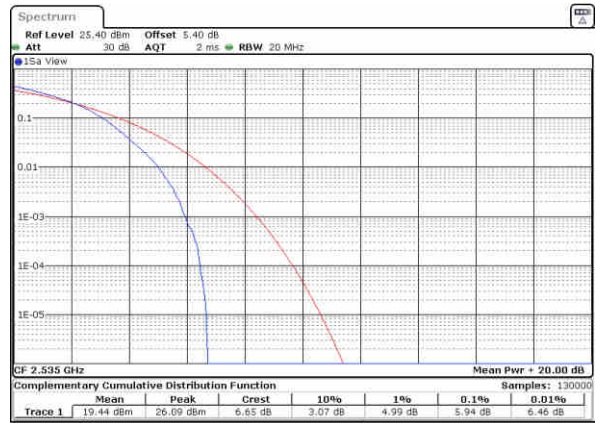
Date: 8 JUL 2020 06:51:36

Middle Channel / 1RB



Date: 8 JUL 2020 06:51:54

Middle Channel / Full RB



Date: 8 JUL 2020 06:51:45

Highest Channel / 1RB



Date: 8 JUL 2020 06:52:03

Highest Channel / Full RB



Date: 8 JUL 2020 06:52:12

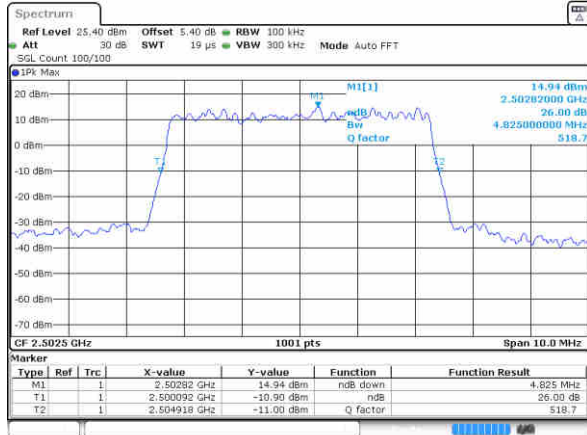
**26dB Bandwidth**

Mode	LTE Band 7 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.83	4.88	9.91	9.75	14.12	14.63	19.98	20.10
Middle CH	-	-	-	-	4.94	4.89	9.81	9.83	14.42	14.18	20.26	20.22
Highest CH	-	-	-	-	4.93	4.87	9.87	9.77	14.36	14.21	20.18	20.14
Mode	LTE Band 7 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	4.79	-	9.61	-	14.42	-	20.14	-
Middle CH	-	-	-	-	4.81	-	9.81	-	14.42	-	20.06	-
Highest CH	-	-	-	-	4.92	-	9.77	-	14.24	-	20.26	-



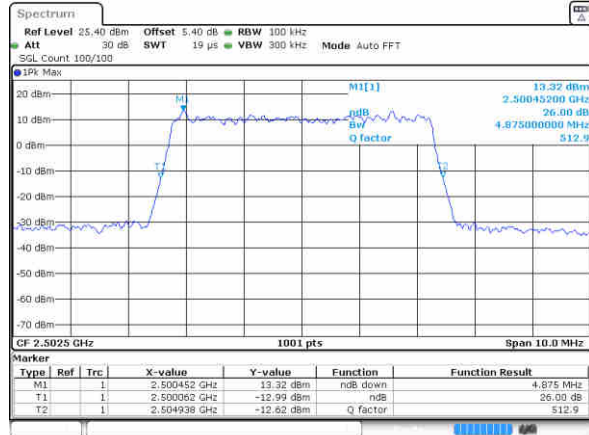
LTE Band 7

Lowest Channel / 5MHz / QPSK



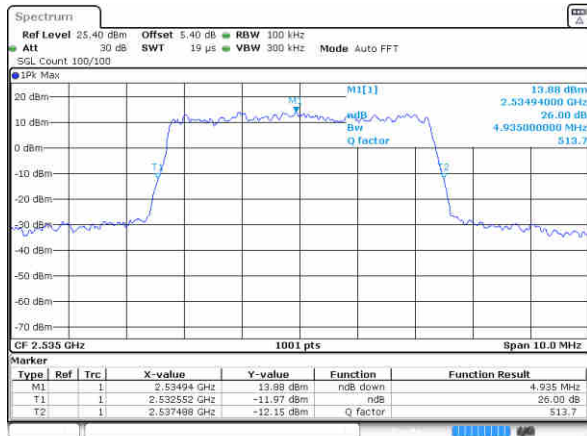
Date: 8 JUL 2020 05:10:19

Lowest Channel / 5MHz / 16QAM



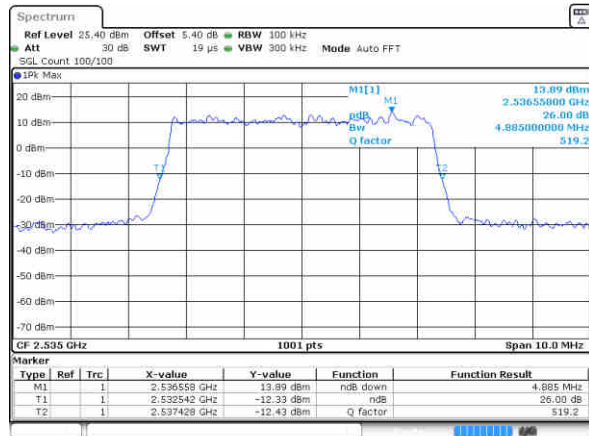
Date: 8 JUL 2020 05:10:39

Middle Channel / 5MHz / QPSK



Date: 8 JUL 2020 05:11:19

Middle Channel / 5MHz / 16QAM



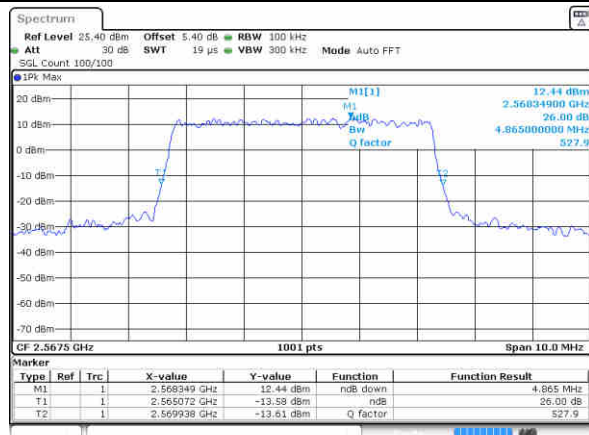
Date: 8 JUL 2020 05:10:59

Highest Channel / 5MHz / QPSK



Date: 8 JUL 2020 05:11:39

Highest Channel / 5MHz / 16QAM



Date: 8 JUL 2020 05:11:59



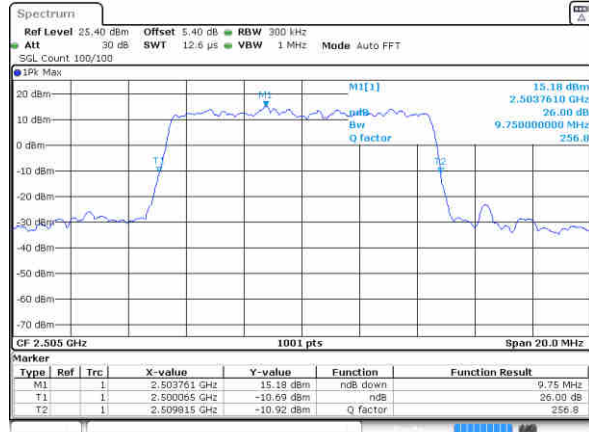
LTE Band 7

Lowest Channel / 10MHz / QPSK



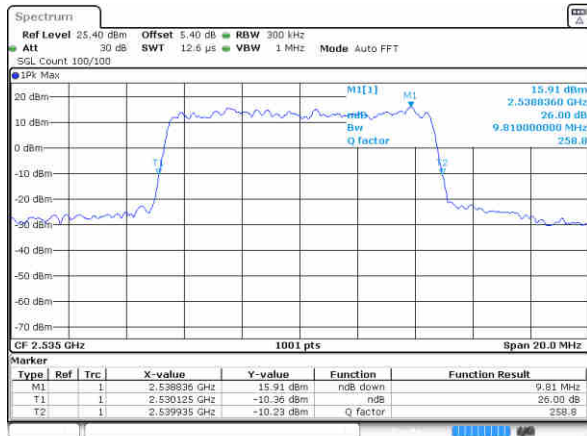
Date: 8 JUL 2020 05:26:48

Lowest Channel / 10MHz / 16QAM



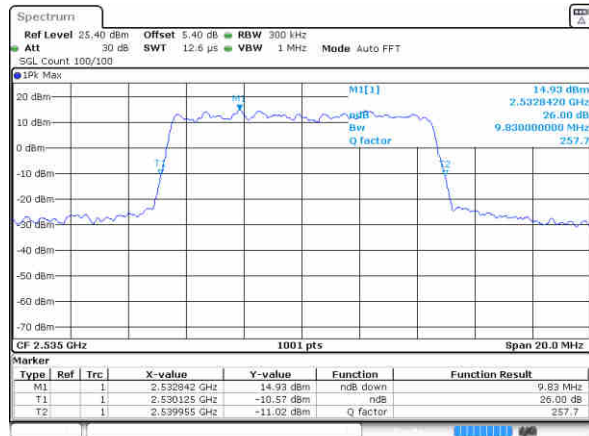
Date: 8 JUL 2020 05:27:08

Middle Channel / 10MHz / QPSK



Date: 8 JUL 2020 05:27:48

Middle Channel / 10MHz / 16QAM



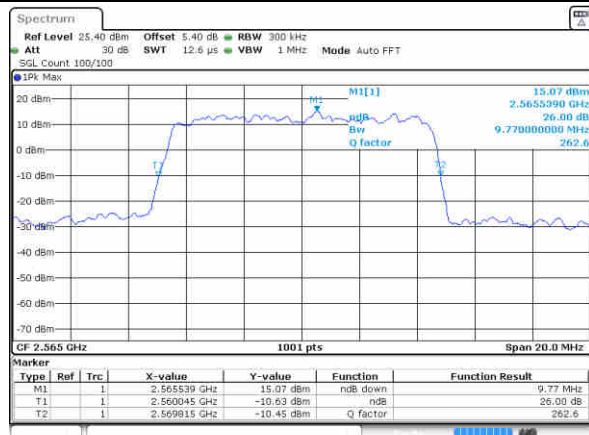
Date: 8 JUL 2020 05:27:28

Highest Channel / 10MHz / QPSK



Date: 8 JUL 2020 05:28:08

Highest Channel / 10MHz / 16QAM

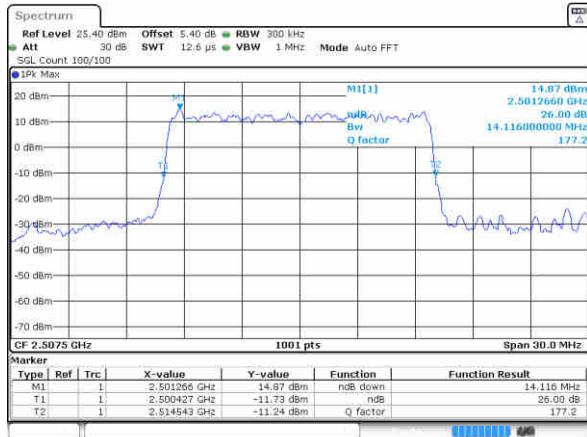


Date: 8 JUL 2020 05:28:28

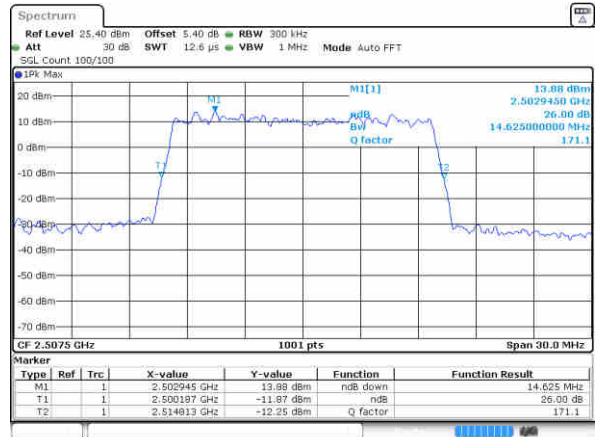


LTE Band 7

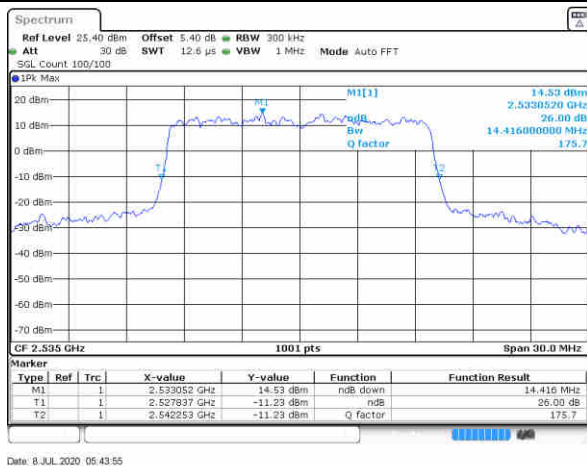
Lowest Channel / 15MHz / QPSK



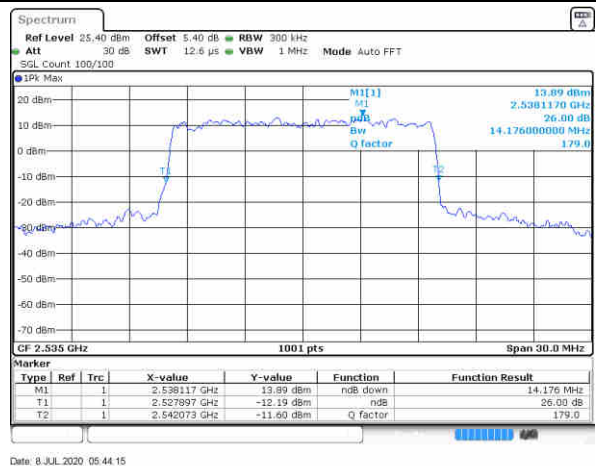
Lowest Channel / 15MHz / 16QAM



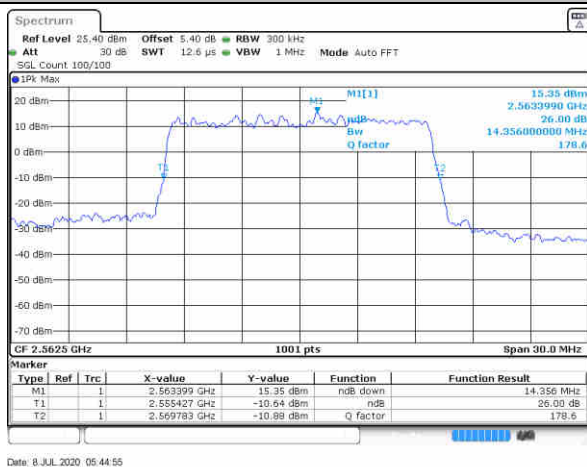
Middle Channel / 15MHz / QPSK



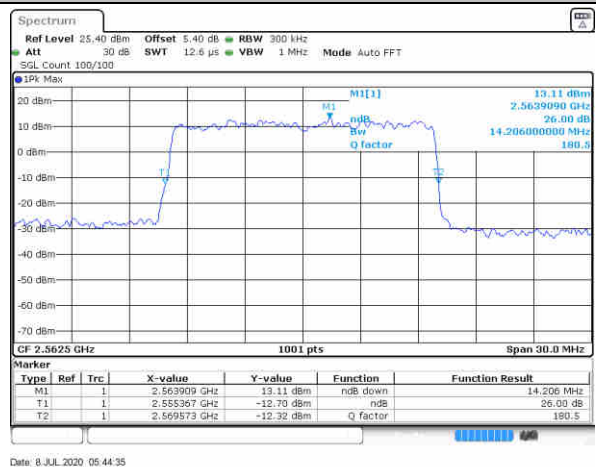
Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK



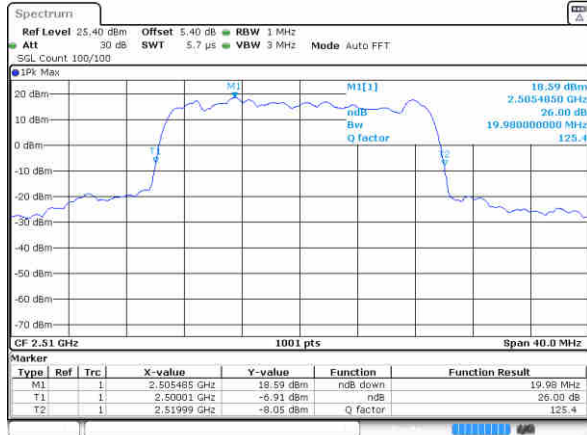
Highest Channel / 15MHz / 16QAM



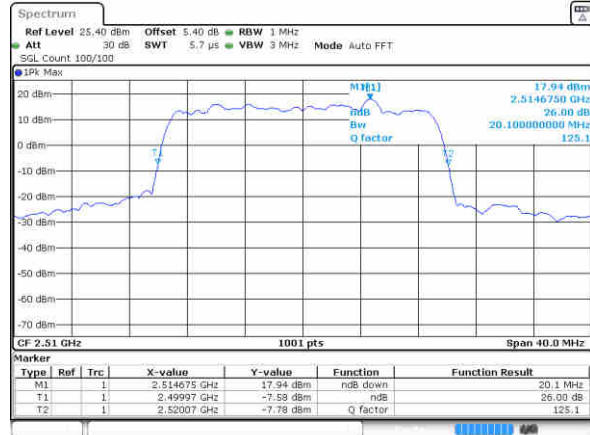


LTE Band 7

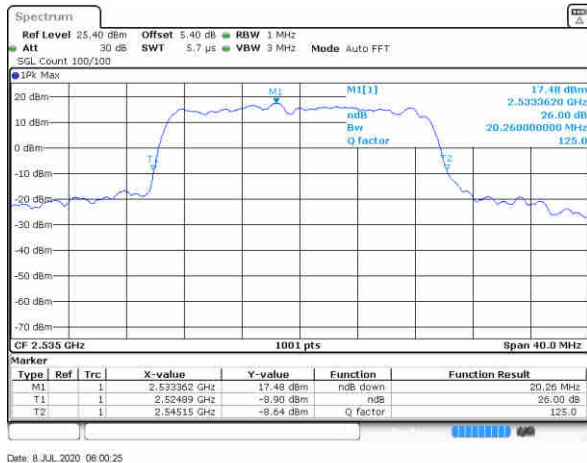
Lowest Channel / 20MHz / QPSK



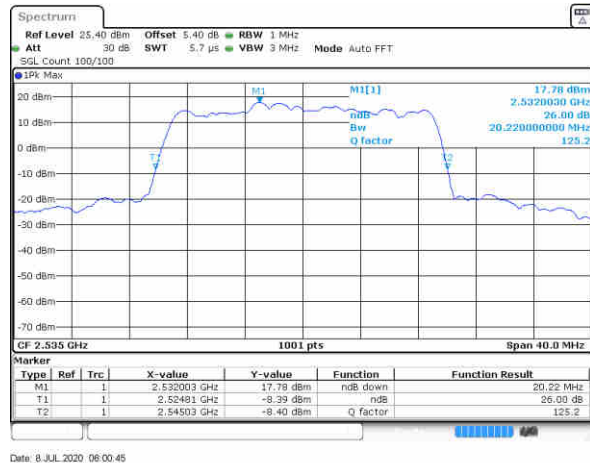
Lowest Channel / 20MHz / 16QAM



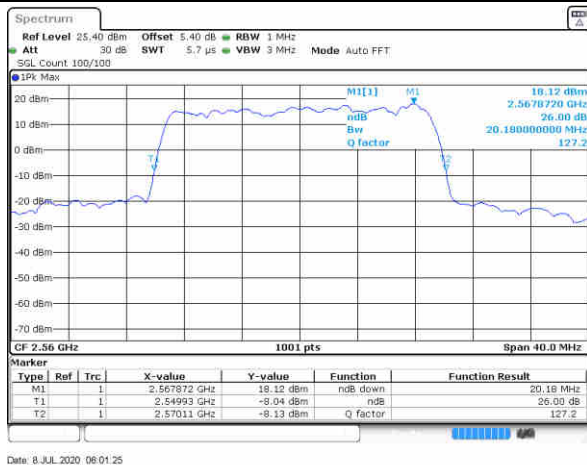
Middle Channel / 20MHz / QPSK



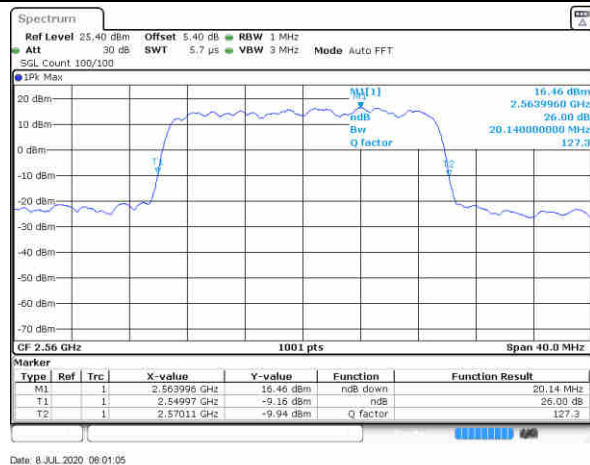
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK



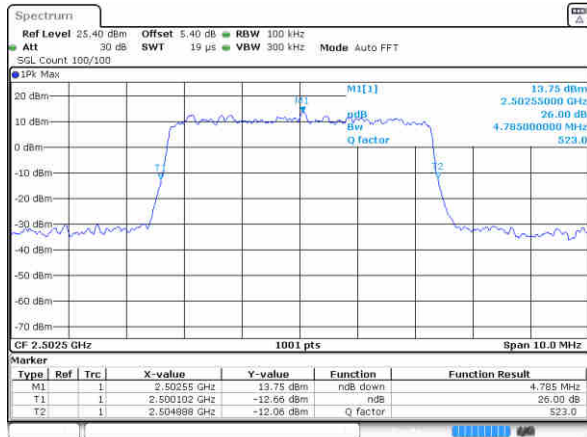
Highest Channel / 20MHz / 16QAM



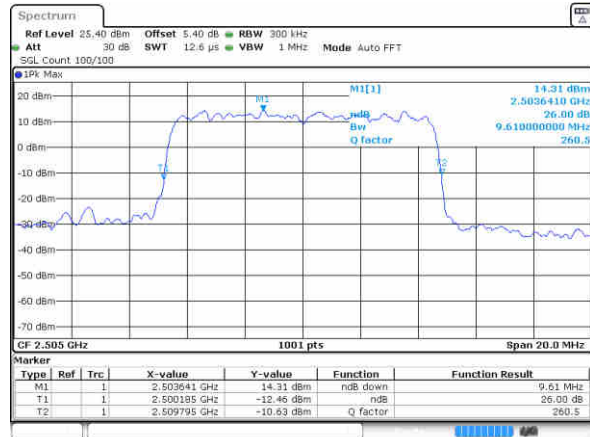


LTE Band 7

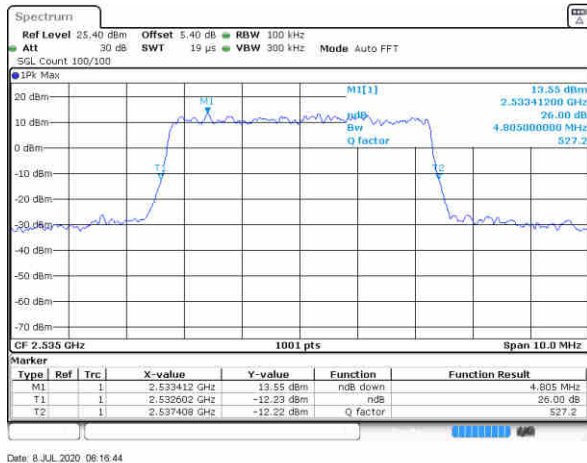
Lowest Channel / 5MHz / 64QAM



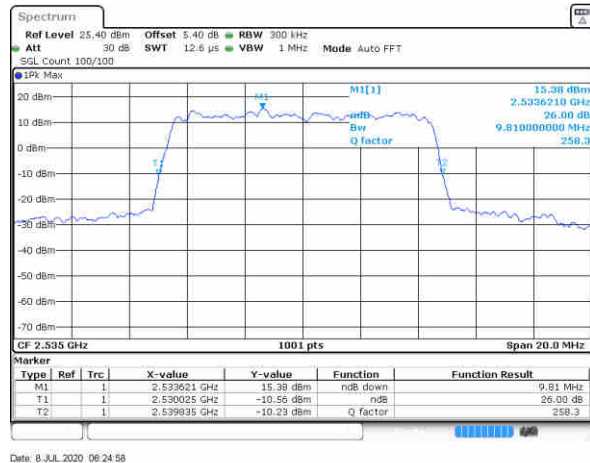
Lowest Channel / 10MHz / 64QAM



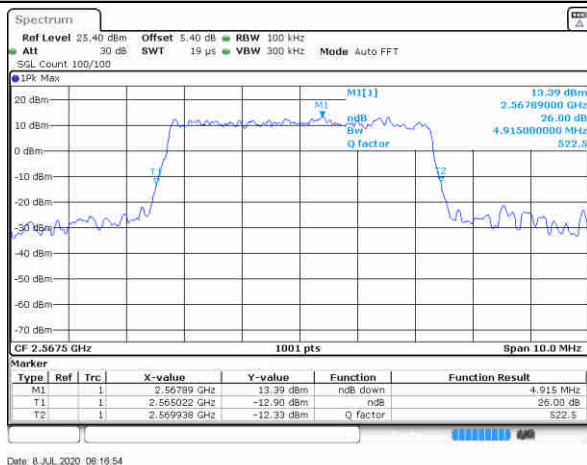
Middle Channel / 5MHz / 64QAM



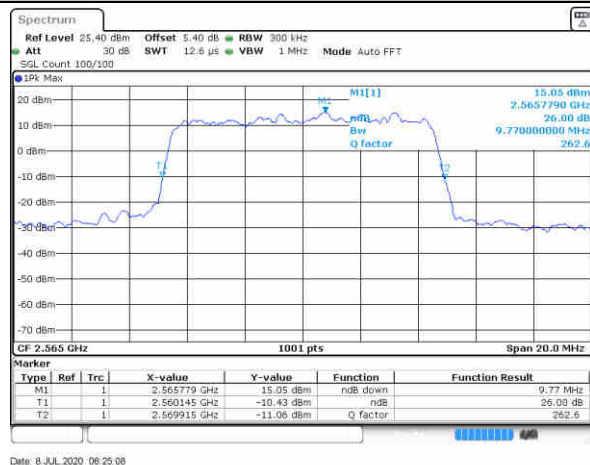
Middle Channel / 10MHz / 64QAM



Highest Channel / 5MHz / 64QAM



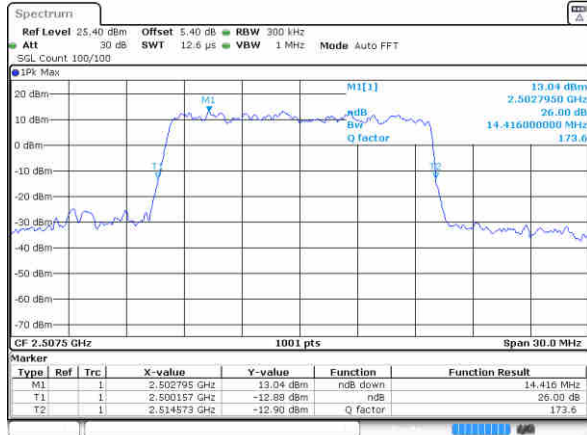
Highest Channel / 10MHz / 64QAM





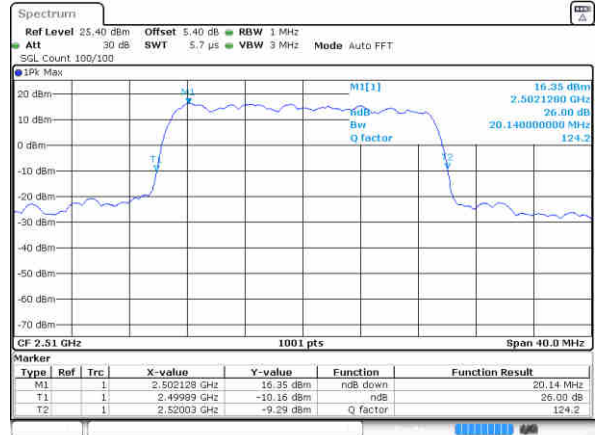
LTE Band 7

Lowest Channel / 15MHz / 64QAM



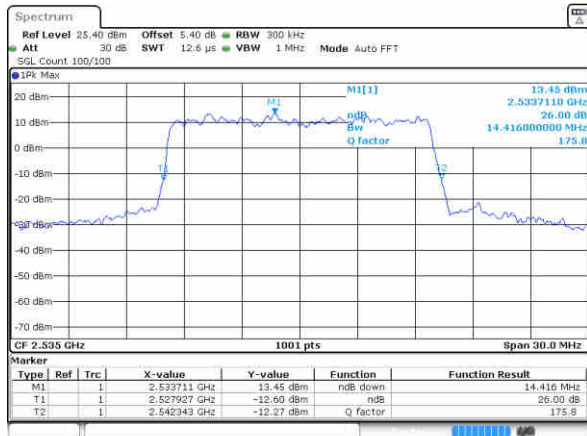
Date: 8 JUL 2020 06:33:02

Lowest Channel / 20MHz / 64QAM



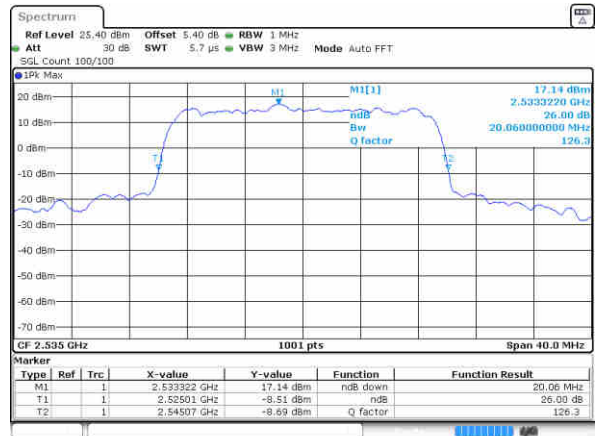
Date: 8 JUL 2020 06:41:17

Middle Channel / 15MHz / 64QAM



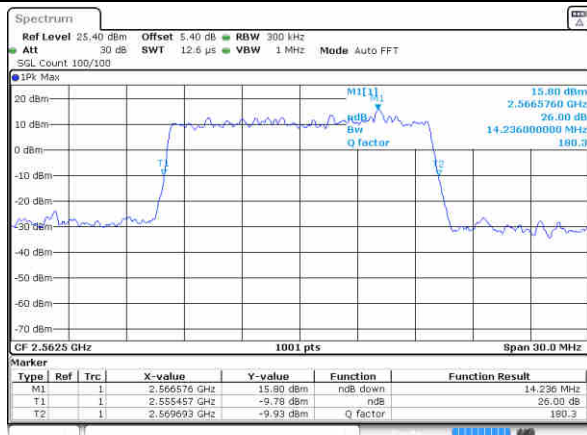
Date: 8 JUL 2020 06:33:12

Middle Channel / 20MHz / 64QAM



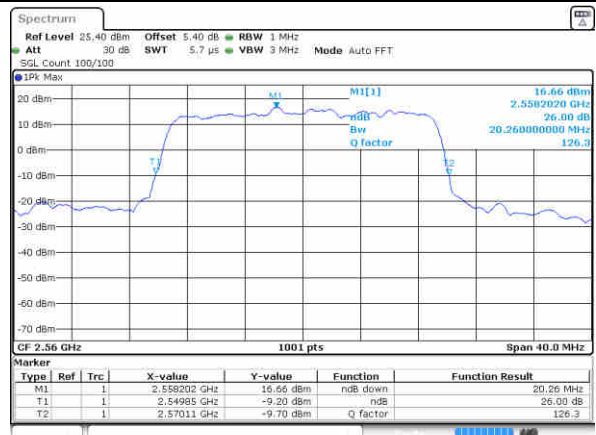
Date: 8 JUL 2020 06:41:27

Highest Channel / 15MHz / 64QAM



Date: 8 JUL 2020 06:33:22

Highest Channel / 20MHz / 64QAM



Date: 8 JUL 2020 06:41:36

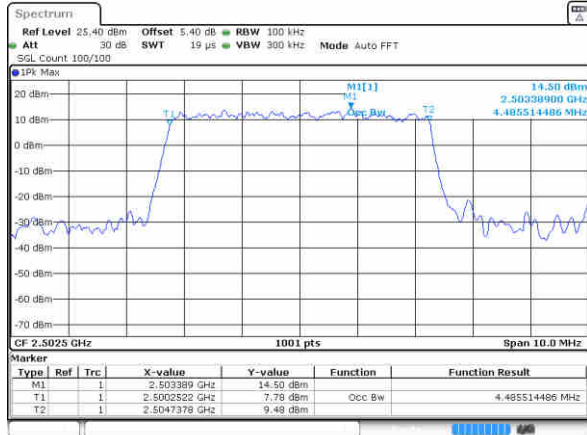
**Occupied Bandwidth**

Mode	LTE Band 7 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.49	4.49	8.97	8.97	13.46	13.49	18.34	18.46
Middle CH	-	-	-	-	4.49	4.48	8.99	9.03	13.40	13.43	18.30	18.30
Highest CH	-	-	-	-	4.48	4.49	9.03	9.03	13.40	13.43	18.34	18.38
Mode	LTE Band 7 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	4.48	-	9.03	-	13.40	-	18.46	-
Middle CH	-	-	-	-	4.48	-	9.03	-	13.43	-	18.18	-
Highest CH	-	-	-	-	4.48	-	9.01	-	13.40	-	18.22	-

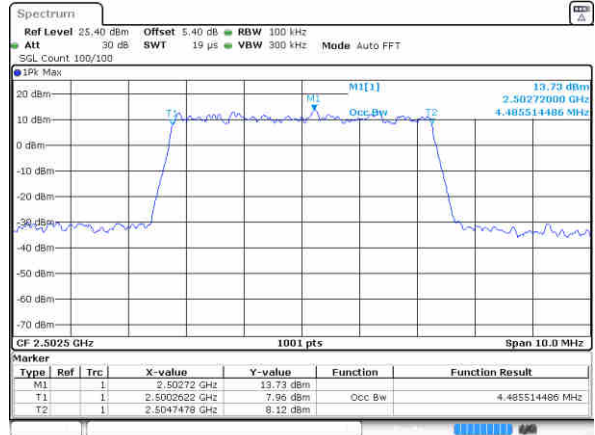


LTE Band 7

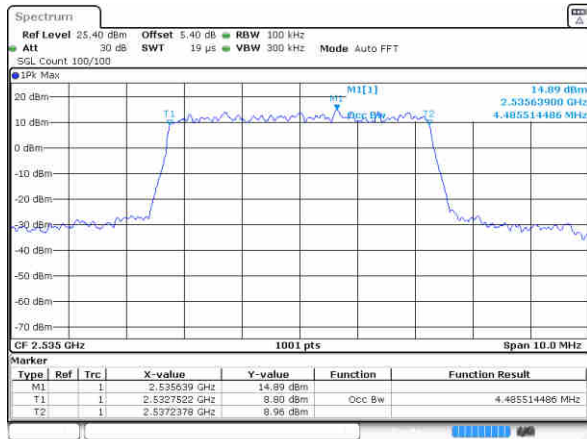
Lowest Channel / 5MHz / QPSK



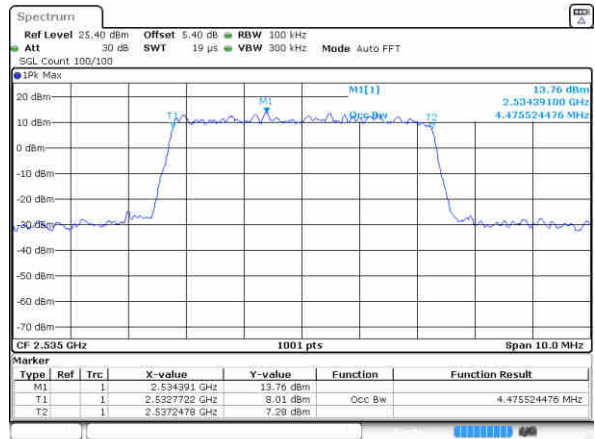
Lowest Channel / 5MHz / 16QAM



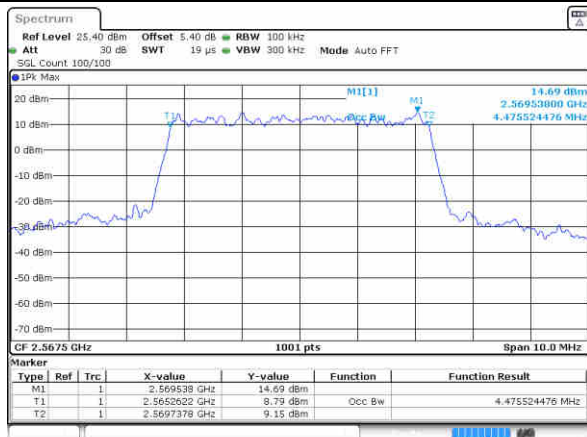
Middle Channel / 5MHz / QPSK



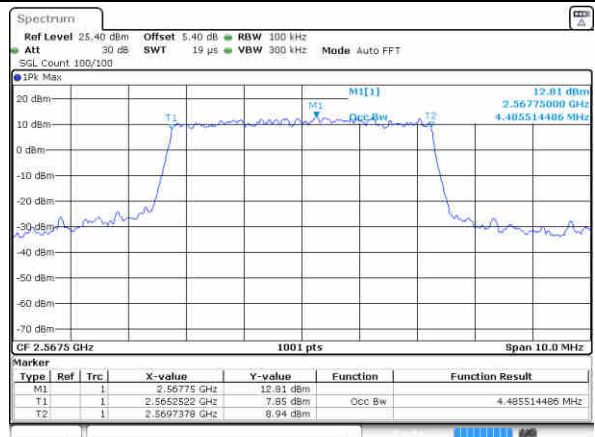
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK



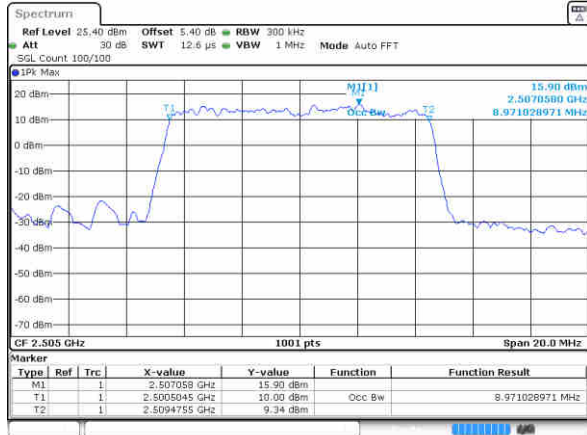
Highest Channel / 5MHz / 16QAM



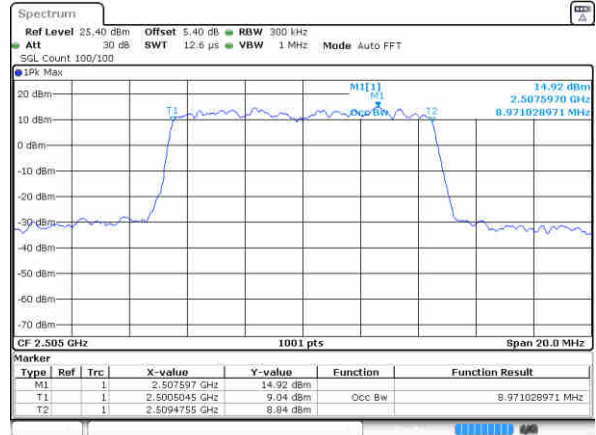


LTE Band 7

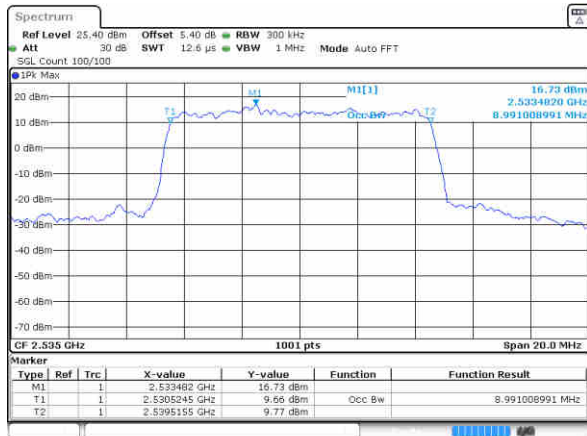
Lowest Channel / 10MHz / QPSK



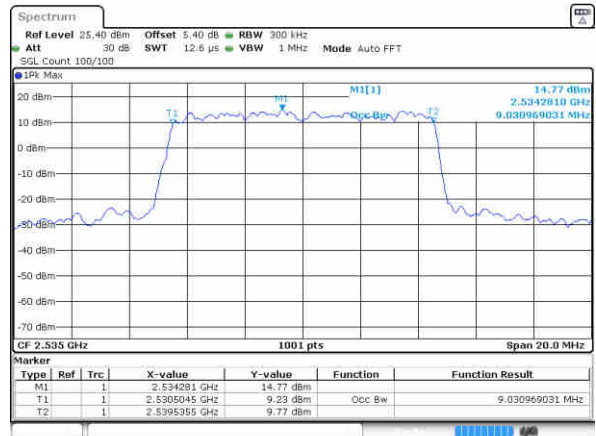
Lowest Channel / 10MHz / 16QAM



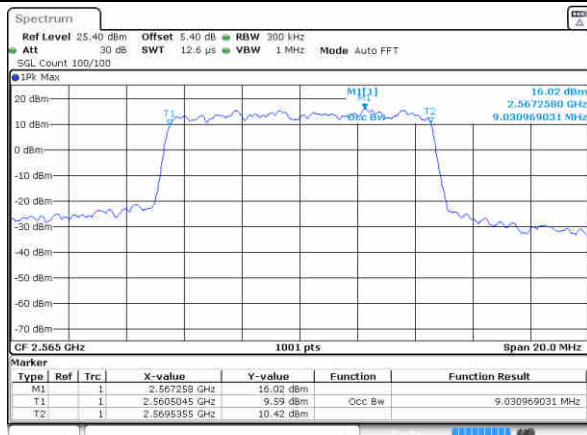
Middle Channel / 10MHz / QPSK



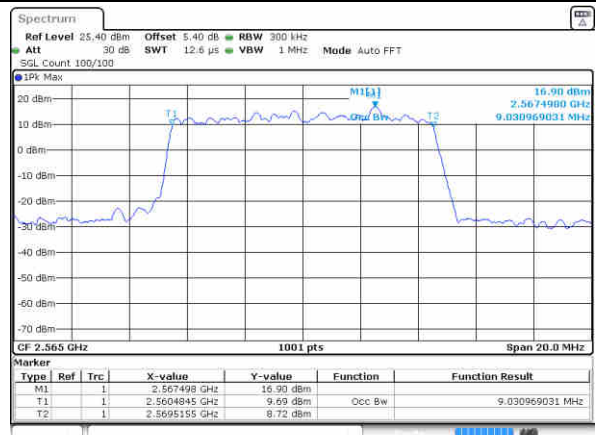
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK



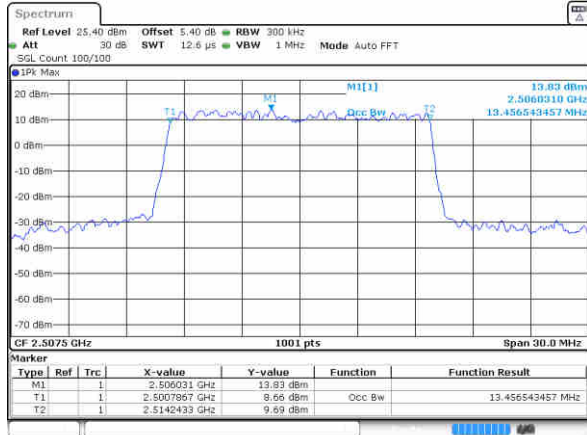
Highest Channel / 10MHz / 16QAM





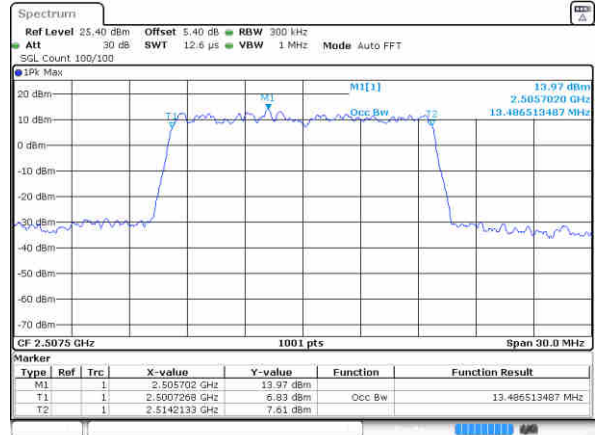
LTE Band 7

Lowest Channel / 15MHz / QPSK



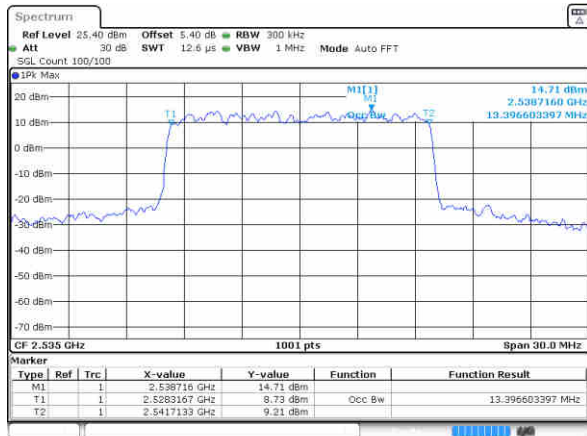
Date: 8 JUL 2020 05:43:25

Lowest Channel / 15MHz / 16QAM



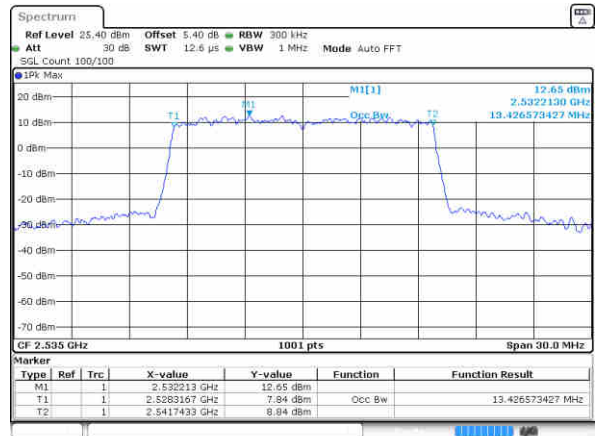
Date: 8 JUL 2020 05:43:05

Middle Channel / 15MHz / QPSK



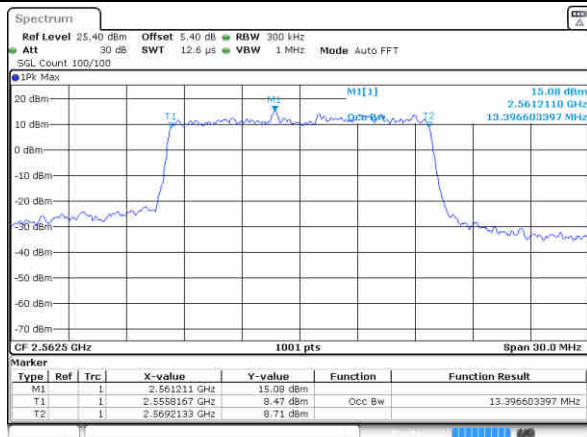
Date: 8 JUL 2020 05:43:45

Middle Channel / 15MHz / 16QAM



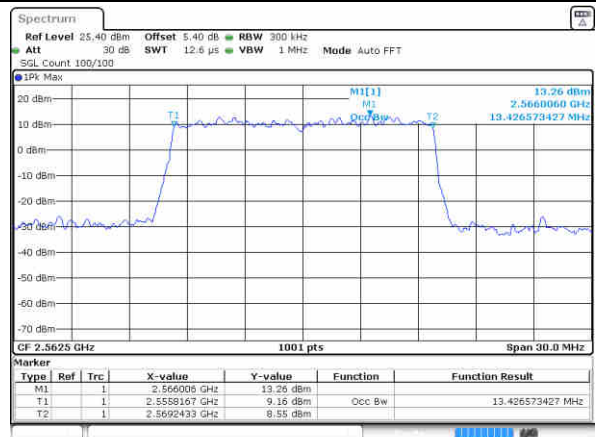
Date: 8 JUL 2020 05:44:05

Highest Channel / 15MHz / QPSK



Date: 8 JUL 2020 05:44:45

Highest Channel / 15MHz / 16QAM

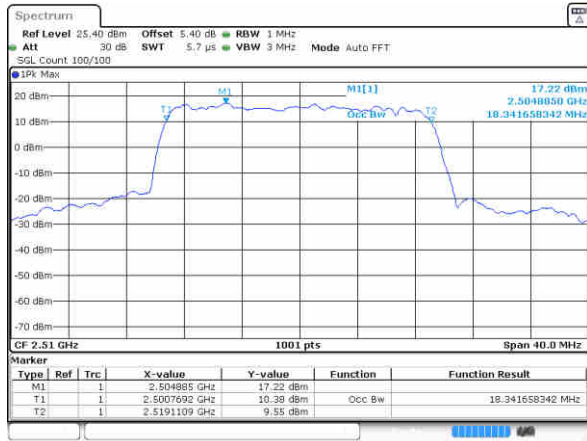


Date: 8 JUL 2020 05:44:25

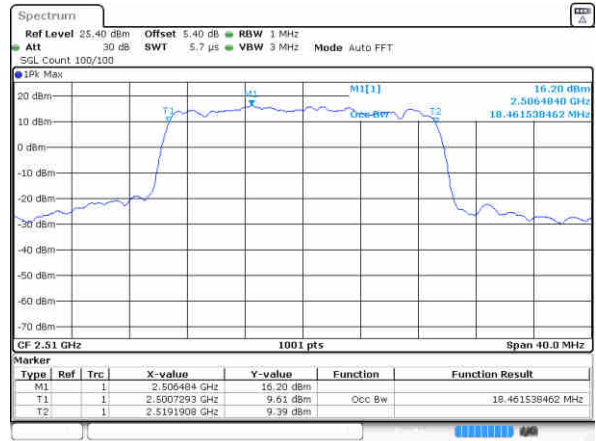


LTE Band 7

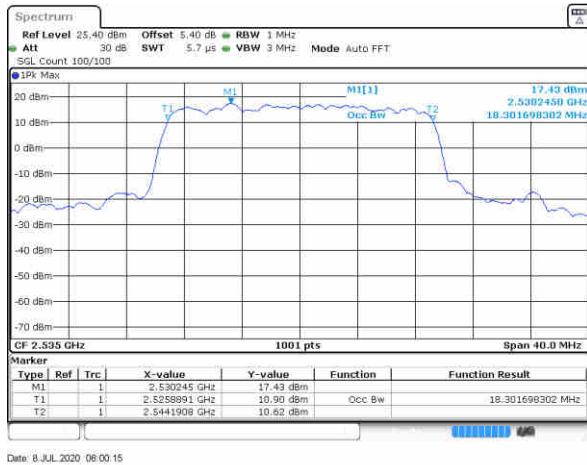
Lowest Channel / 20MHz / QPSK



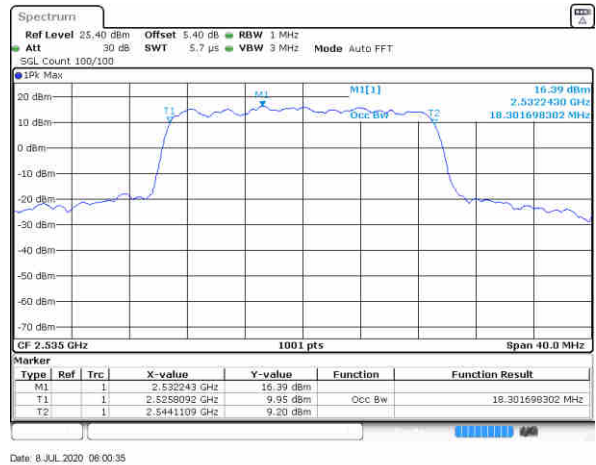
Lowest Channel / 20MHz / 16QAM



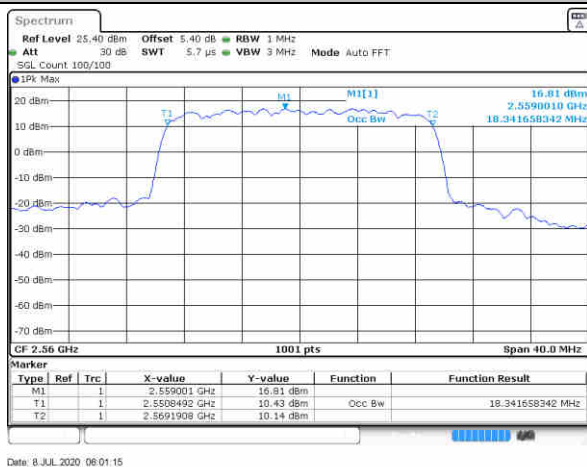
Middle Channel / 20MHz / QPSK



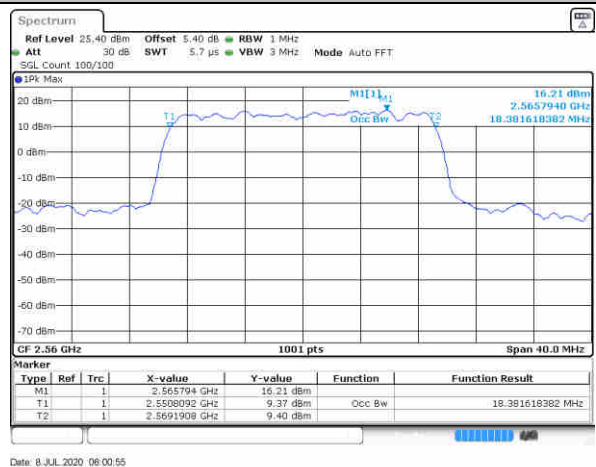
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK



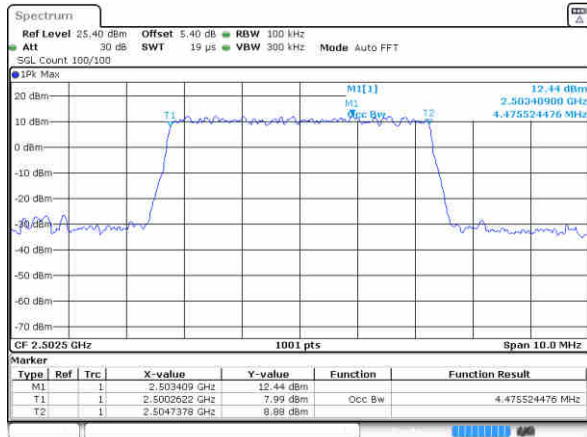
Highest Channel / 20MHz / 16QAM



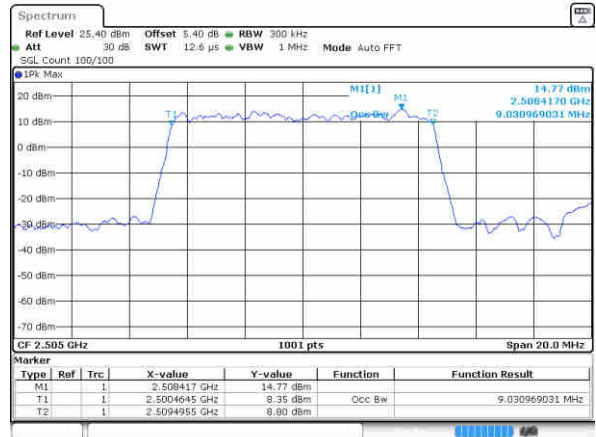


LTE Band 7

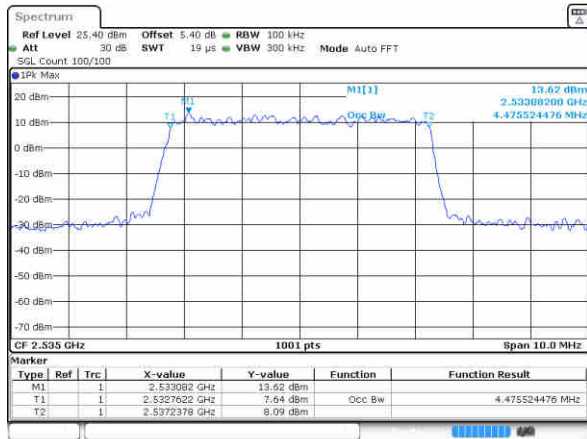
Lowest Channel / 5MHz / 64QAM



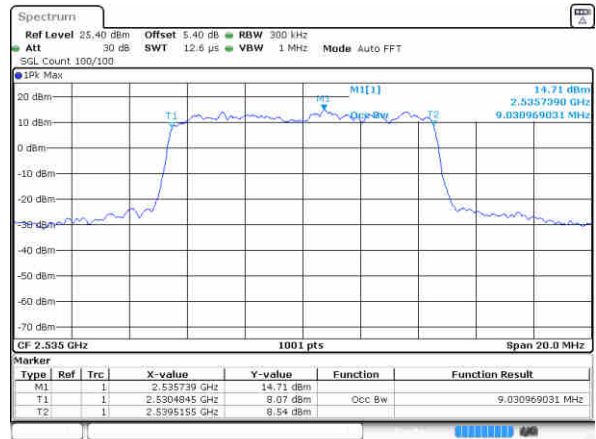
Lowest Channel / 10MHz / 64QAM



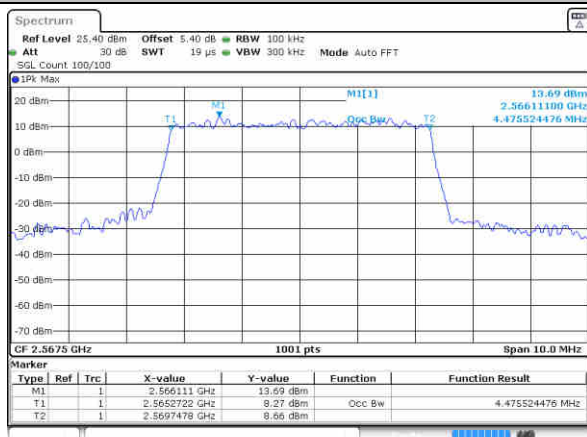
Middle Channel / 5MHz / 64QAM



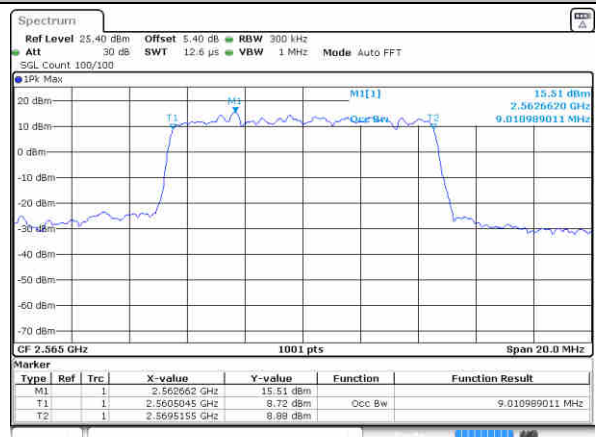
Middle Channel / 10MHz / 64QAM



Highest Channel / 5MHz / 64QAM



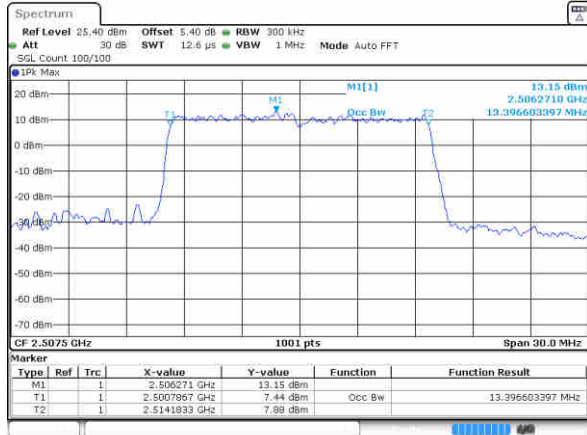
Highest Channel / 10MHz / 64QAM



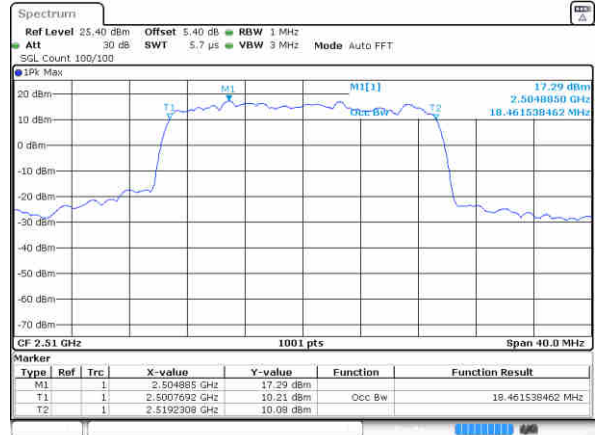


LTE Band 7

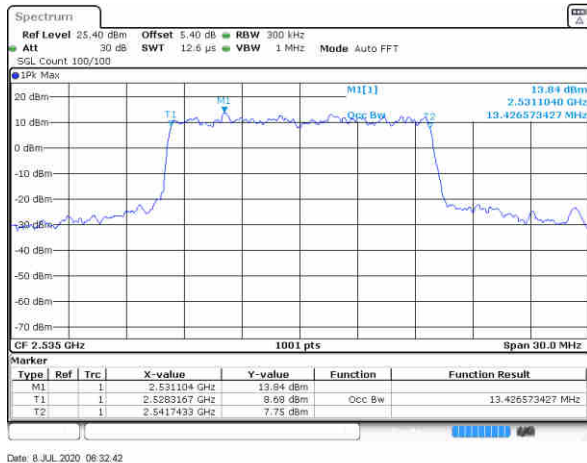
Lowest Channel / 15MHz / 64QAM



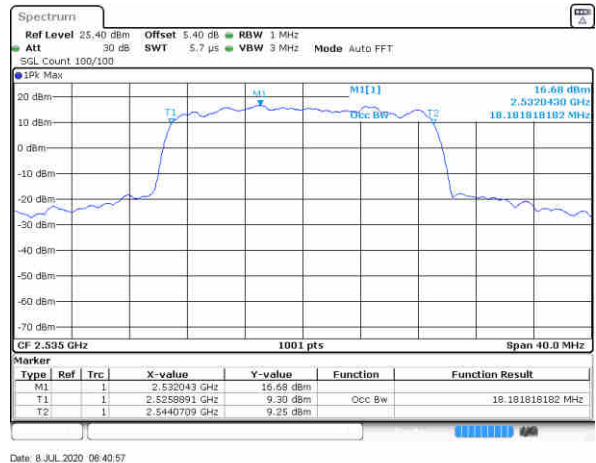
Lowest Channel / 20MHz / 64QAM



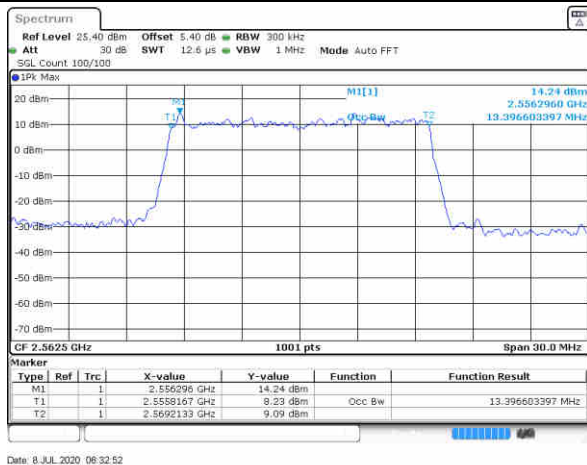
Middle Channel / 15MHz / 64QAM



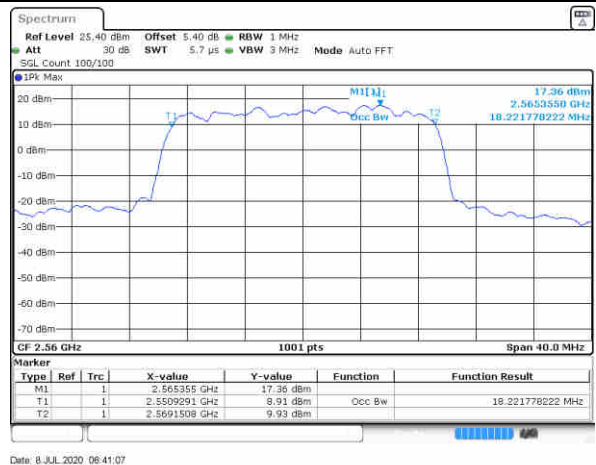
Middle Channel / 20MHz / 64QAM



Highest Channel / 15MHz / 64QAM



Highest Channel / 20MHz / 64QAM

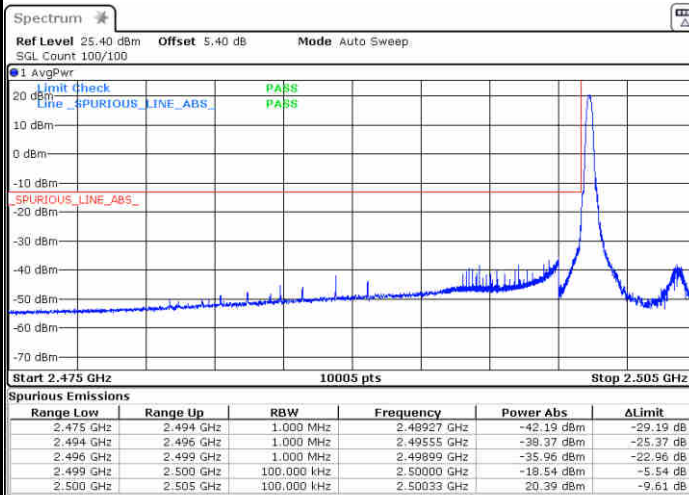




Conducted Band Edge

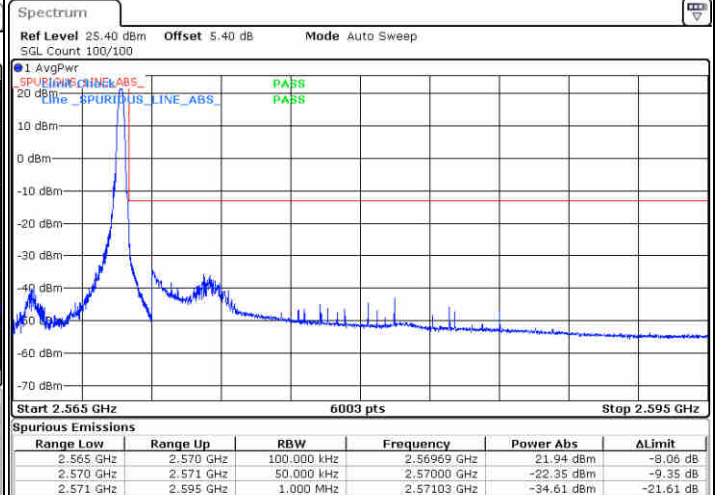
LTE Band 7 / 5MHz / QPSK

Lowest Band Edge / 1 RB



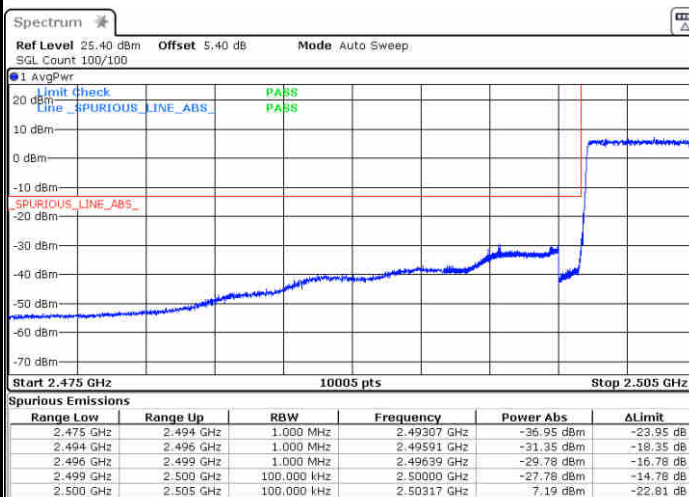
Date: 10 SEP 2020 10:18:35

Highest Band Edge / 1 RB



Date: 1 SEP 2020 21:03:20

Lowest Band Edge / Full RB



Date: 10 SEP 2020 10:15:27

Highest Band Edge / Full RB

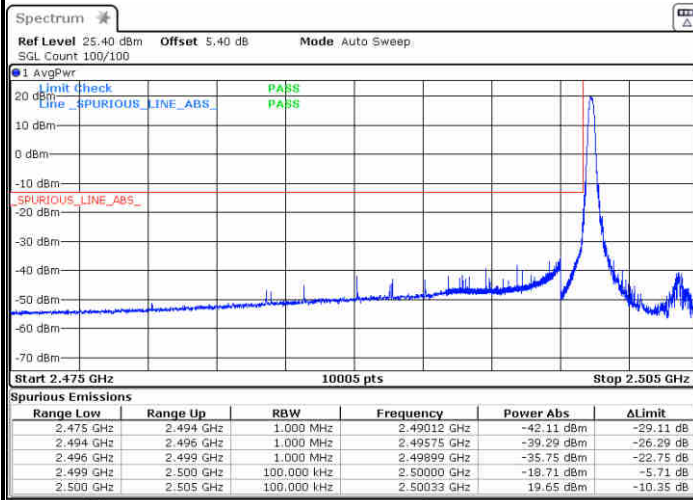


Date: 1 SEP 2020 21:06:33

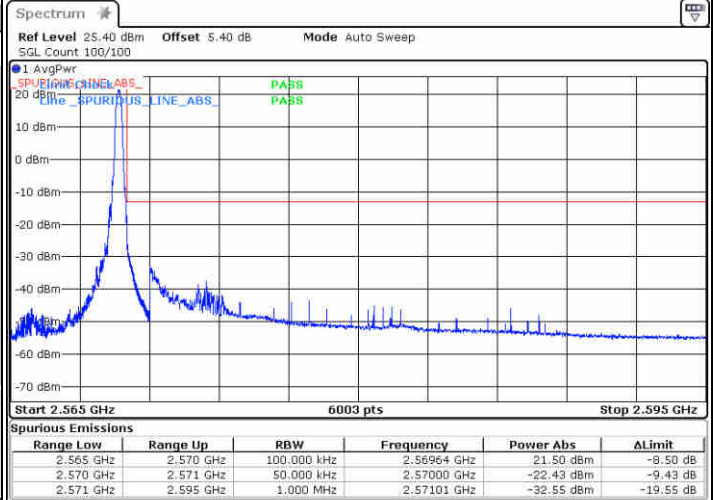


LTE Band 7 / 5MHz / 16QAM

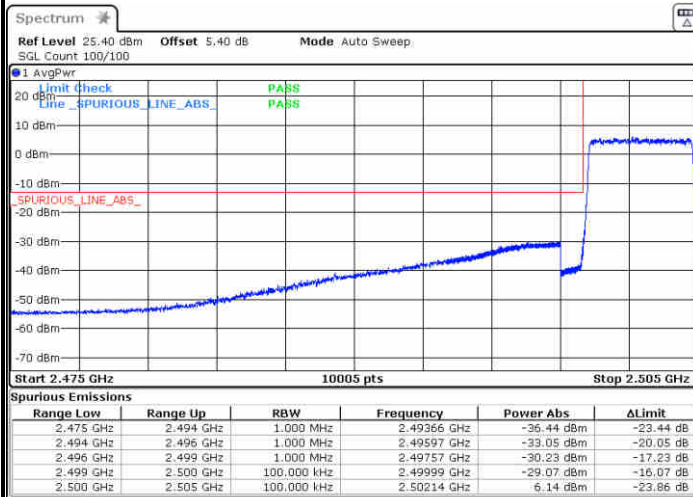
Lowest Band Edge / 1 RB



Highest Band Edge / 1 RB



Lowest Band Edge / Full RB



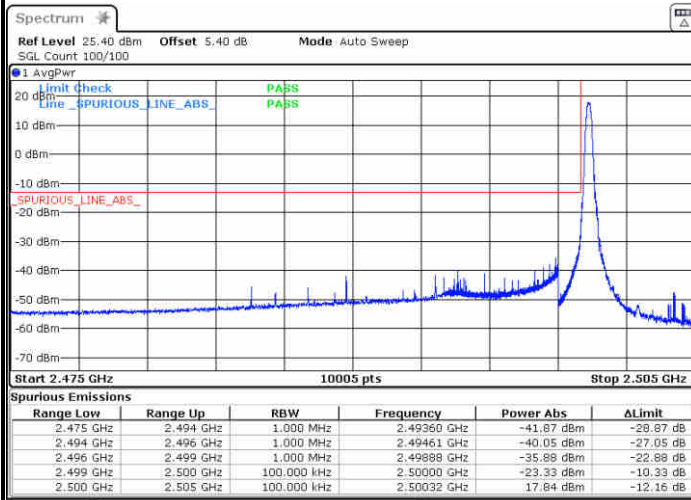
Highest Band Edge / Full RB



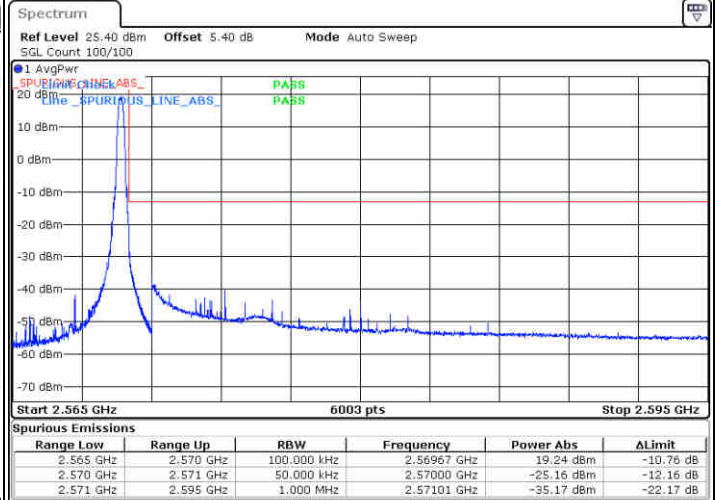


LTE Band 7 / 5MHz / 64QAM

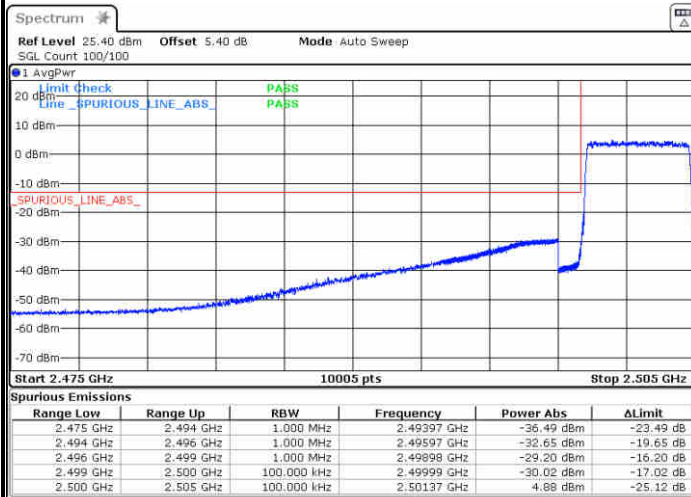
Lowest Band Edge / 1RB



Highest Band Edge / 1 RB



Lowest Band Edge / Full RB



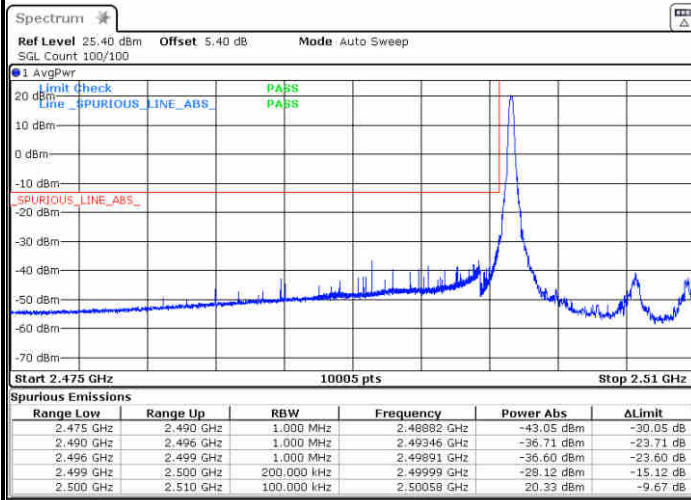
Highest Band Edge / Full RB



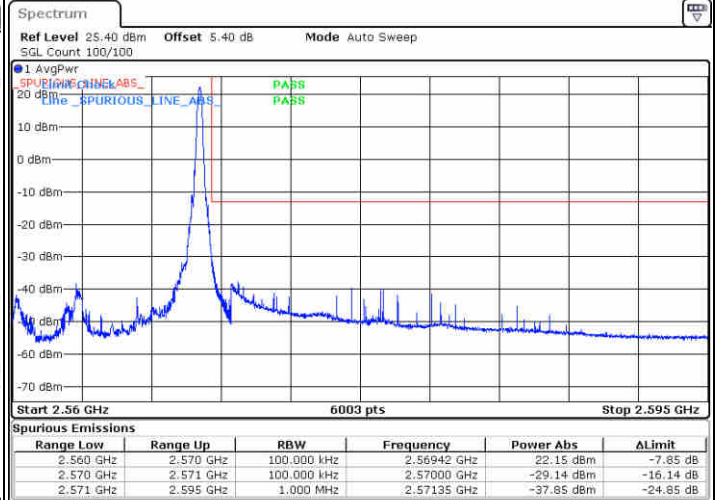


LTE Band 7 / 10MHz / QPSK

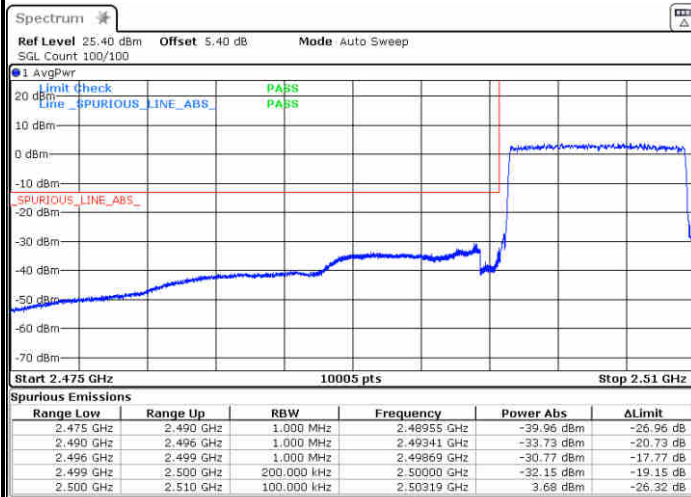
Lowest Band Edge / 1 RB



Highest Band Edge / 1 RB



Lowest Band Edge / Full RB



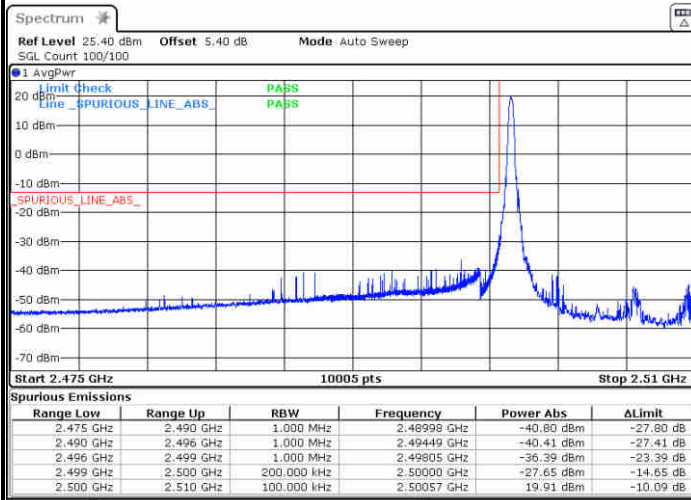
Highest Band Edge / Full RB



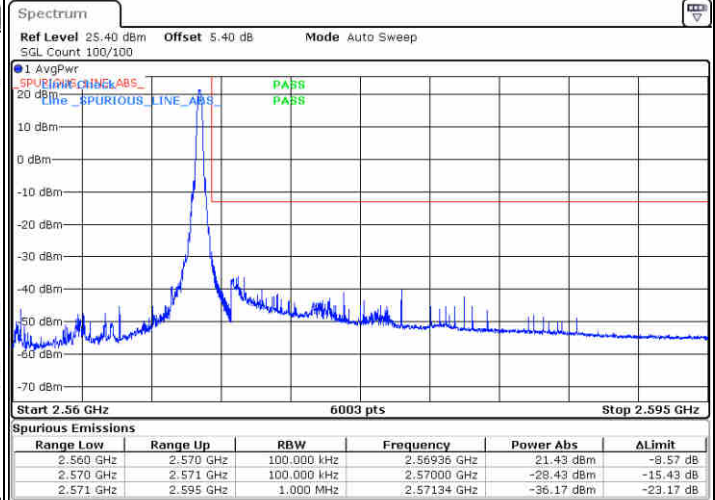


LTE Band 7 / 10MHz / 16QAM

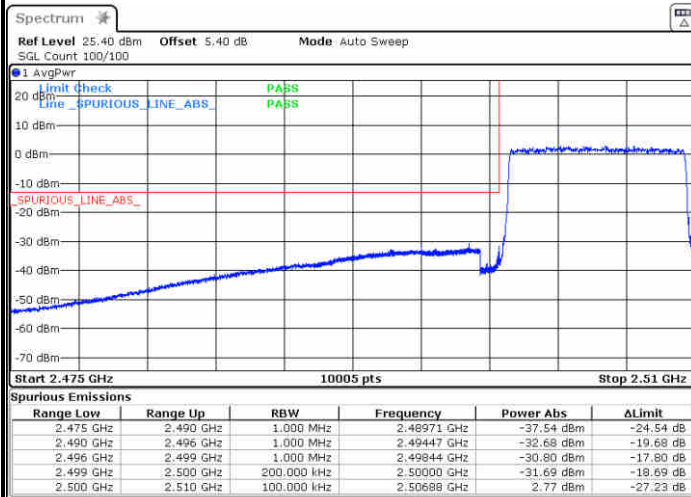
Lowest Band Edge / 1 RB



Highest Band Edge / 1 RB



Lowest Band Edge / Full RB



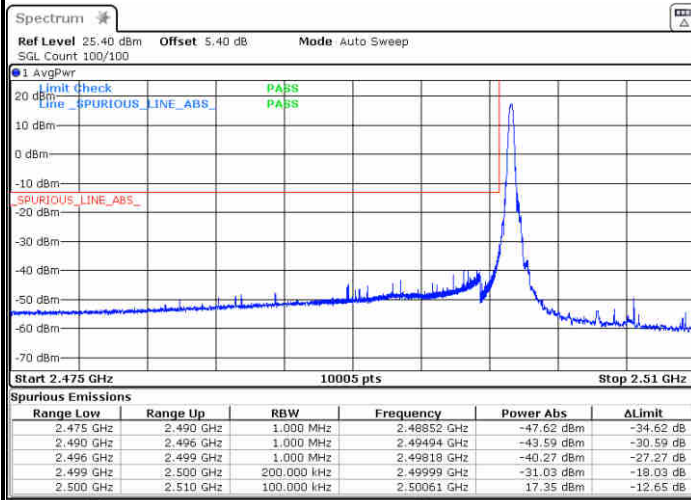
Highest Band Edge / Full RB



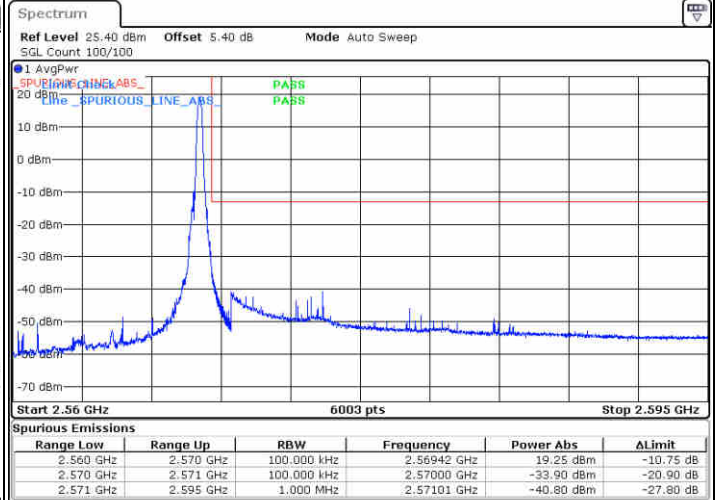


LTE Band 7 / 10MHz / 64QAM

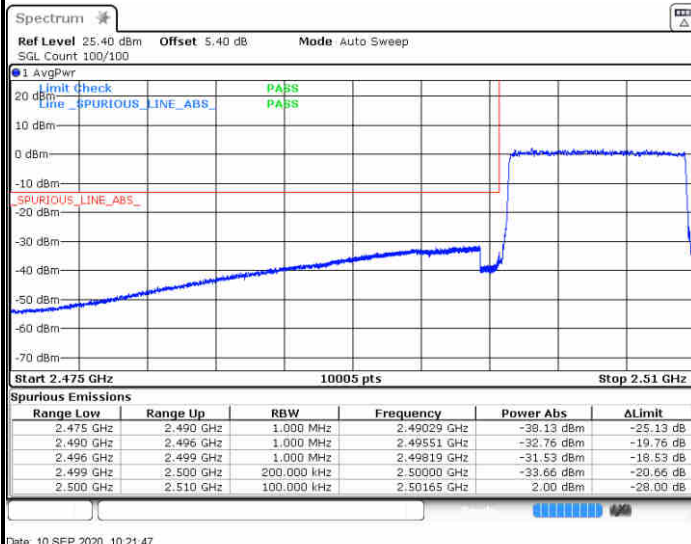
Lowest Band Edge / 1 RB



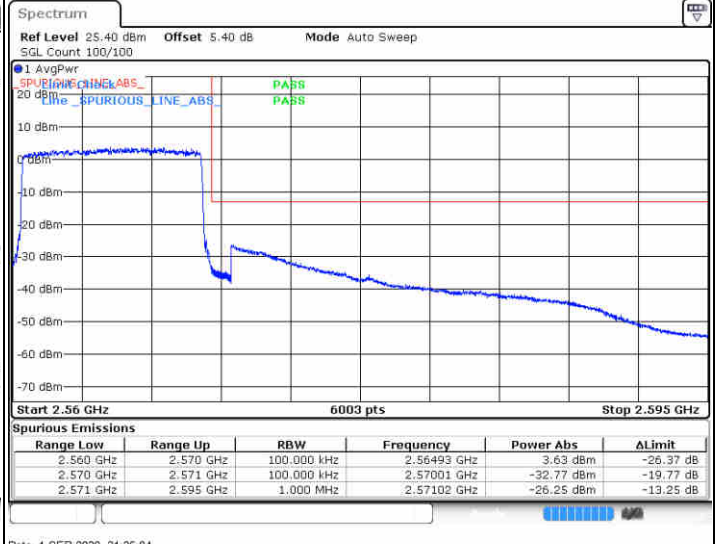
Highest Band Edge / 1 RB



Lowest Band Edge / Full RB



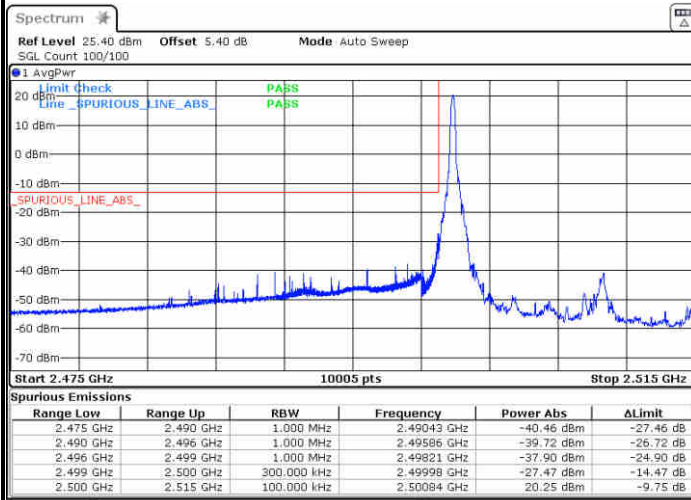
Highest Band Edge / Full RB



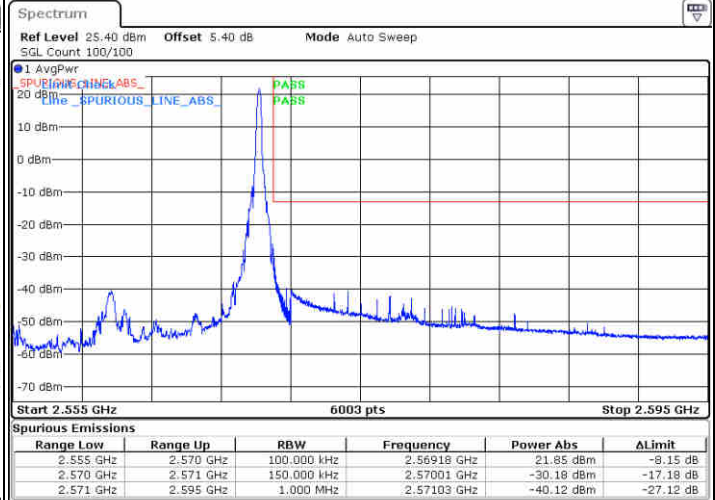


LTE Band 7 / 15MHz / QPSK

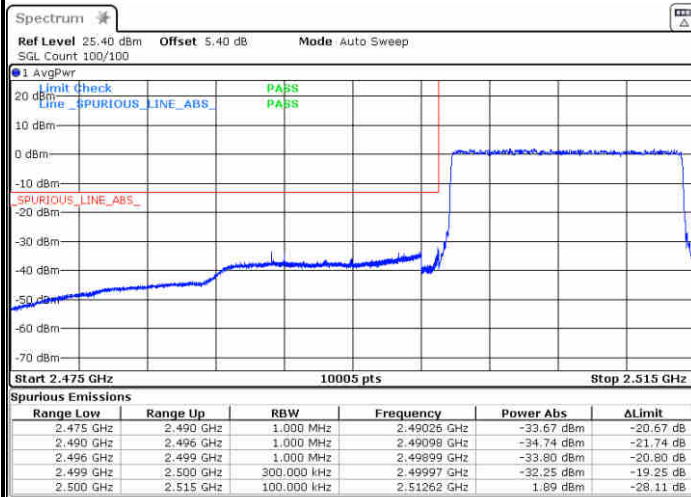
Lowest Band Edge / 1 RB



Highest Band Edge / 1 RB



Lowest Band Edge / Full RB



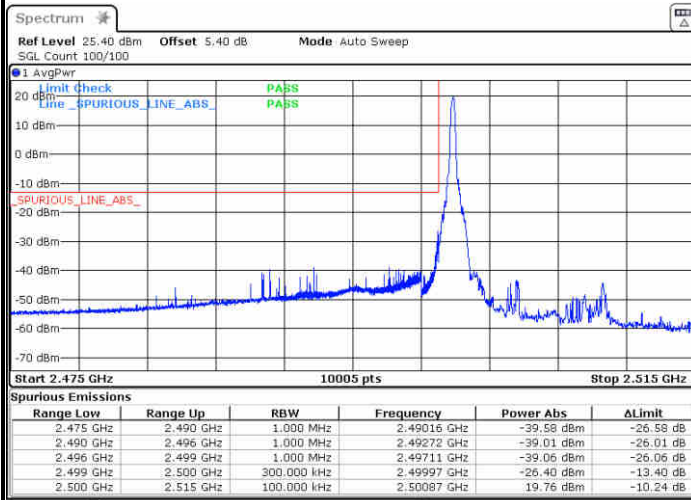
Highest Band Edge / Full RB



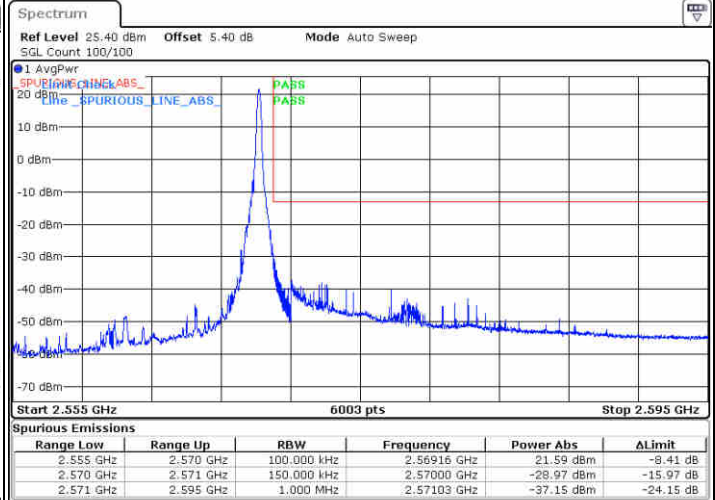


LTE Band 7 / 15MHz / 16QAM

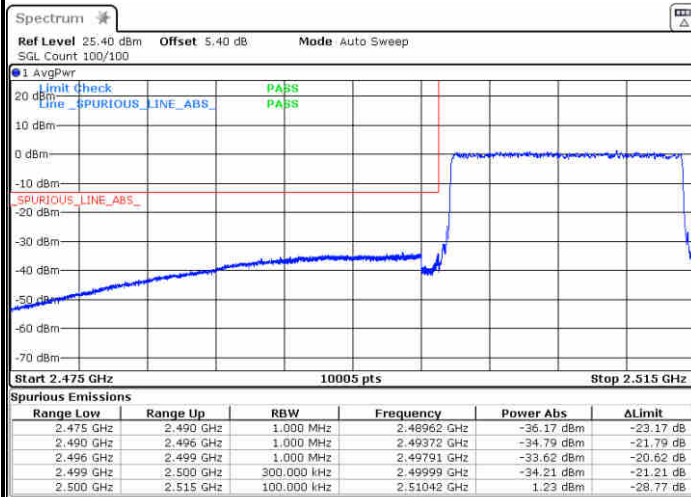
Lowest Band Edge / 1 RB



Highest Band Edge / 1 RB



Lowest Band Edge / Full RB



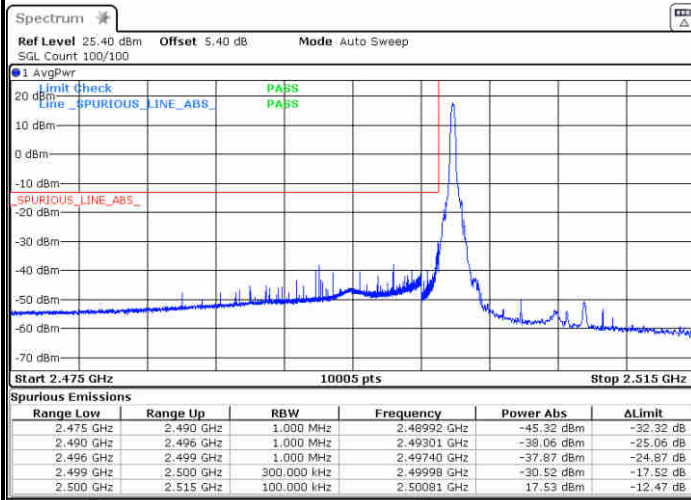
Highest Band Edge / Full RB



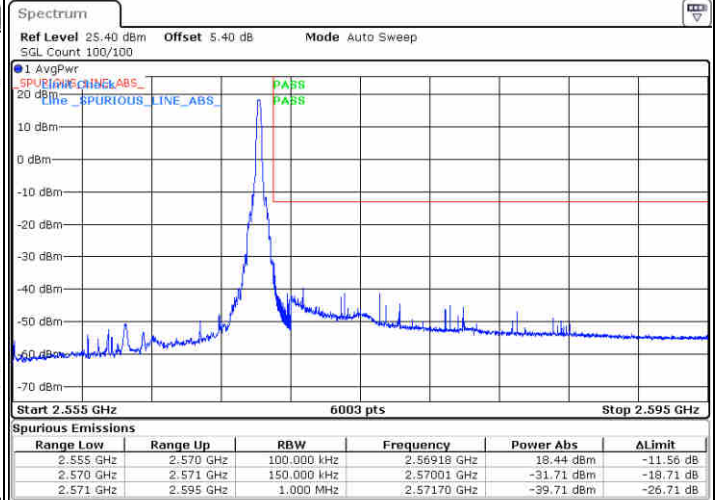


LTE Band 7 / 15MHz / 64QAM

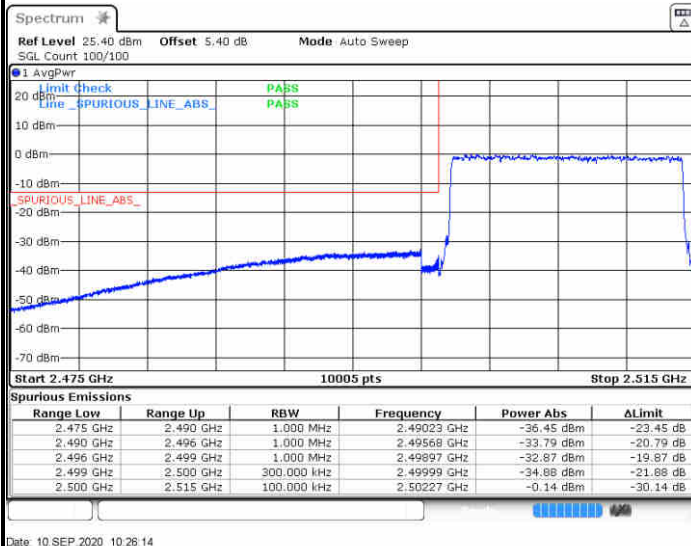
Lowest Band Edge / 1 RB



Highest Band Edge / 1 RB



Lowest Band Edge / Full RB



Highest Band Edge / Full RB

