



TEST REPORT

No. I21N00886-RF-LTE

for

HMD Global Oy

Smart Phone

Model Name: TA-1357

FCC ID: 2AJOTTA-1357

with

Hardware Version: V01A

Software Version: 00WW_0_010

Issued Date: 2021-05-27

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

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No. I21N00886-RF-LTE

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21N00886-RF-LTE	Rev.0	1st edition	2021-05-27



CONTENTS

1. SUMMARY OF TEST REPORT 4

1.1. TEST ITEMS..... 4

1.2. TEST STANDARDS 4

1.3. TEST RESULT 4

1.4. TESTING LOCATION 4

1.5. PROJECT DATA 4

1.6. SIGNATURE..... 4

2. CLIENT INFORMATION 5

2.1. APPLICANT INFORMATION..... 5

2.2. MANUFACTURER INFORMATION..... 5

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) 6

3.1. ABOUT EUT..... 6

3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST 6

3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST..... 6

3.4. GENERAL DESCRIPTION 6

4. REFERENCE DOCUMENTS..... 7

5. LABORATORY ENVIRONMENT..... 8

6. SUMMARY OF TEST RESULTS..... 9

7. STATEMENT 12

8. TEST EQUIPMENTS UTILIZED..... 13

ANNEX A: MEASUREMENT RESULTS 14

A.1 OUTPUT POWER..... 14

A.2 FIELD STRENGTH OF SPURIOUS RADIATION..... 52

A.3 FREQUENCY STABILITY 78

A.4 OCCUPIED BANDWIDTH..... 83

A.5 EMISSION BANDWIDTH 151

A.6 BAND EDGE COMPLIANCE 219

A.7 CONDUCTED SPURIOUS EMISSION 248

A.8 PEAK-TO-AVERAGE POWER RATIO 254

1. SUMMARY OF TEST REPORT

1.1. Test Items

Description	Smart Phone
Model Name	TA-1357
Applicant's name	HMD Global Oy
Manufacturer's Name	HMD Global Oy

1.2. Test Standards

FCC Part 2/22/24/27	10-1-19 Edition
ANSI C63.26	2015
KDB971168 D01	v03r01

1.3. Test Result

All test items are pass. Please refer to "6 Summary of Test Results" for detail.

1.4. Testing Location

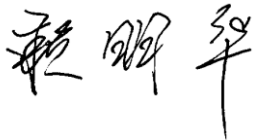
Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518000

1.5. Project Data

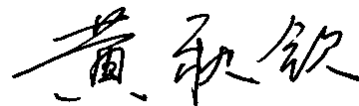
Testing Start Date: 2021-04-09

Testing End Date: 2021-05-24

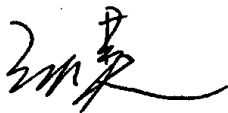
1.6. Signature



Lai Minghua
(Prepared this test report)



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2. CLIENT INFORMATION

2.1. Applicant Information

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2.2. Manufacturer Information

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3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT

(AE)

3.1. About EUT

Description	Smart Phone
Model Name	TA-1357
FCC ID	2AJOTTA-1357
Frequency Bands	LTE Bands 2,4,5,7,12,13,17, 66
Antenna	Integrated
Extreme vol. Limits	3.60V to 4.40V (nominal: 3.85V)
Extreme temp. Tolerance	-10°C to +55°C
Condition of EUT as received	No abnormality in appearance

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version	Sample Arrival Date
UT06aa	350872080007261	V01A	00WW_0_010	2021-04-09
UT05aa	350872080003880	V01A	00WW_0_010	2021-04-12

*EUT ID: is used to identify the test sample in the lab internally.

UT06aa is used for conduction test, UT05aa is used for radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery
AE1	
Model	SE681
Manufacturer	Shenzhen Aerospac Electronic CO.,Ltd.
Capacitance	5850mAh
Nominal Voltage	3.85V

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment Under Test (EUT) is a model Smart Phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfil the test. Samples undergoing test were selected by the Client.



4. REFERENCE DOCUMENTS

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-19 Edition
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-19 Edition
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	10-1-19 Edition
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-19 Edition
ANSI C63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
KDB971168 D01	Power Meas License Digital Systems	v03r01

5. LABORATORY ENVIRONMENT

Shielded room did not exceed following limits along the RF testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz>60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	>2 MΩ
Ground system resistance	< 4 Ω

Fully-anechoic chamber did not exceed following limits along the EMC testing

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	F	Fail
	NA	Not applicable
	NM	Not measured
Location Column	A/B/C/D	The test is performed in test location A, B, C or D which are described in section 1.4 of this report

LTE Band 2

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/24.232	A.1	P
2	Field Strength of Spurious Radiation	2.1053/24.238	A.2	P
3	Frequency Stability	2.1055/24.235	A.3	P
4	Occupied Bandwidth	2.1049/24.238	A.4	P
5	Emission Bandwidth	2.1049/24.238	A.5	P
6	Band Edge Compliance	2.1051/24.238	A.6	P
7	Conducted Spurious Emission	2.1051/24.238	A.7	P
8	Peak-to-Average Power Ratio	24.232/ KDB971168 D01	A.8	P

LTE Band 4

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/27.50(d)	A.1	P
2	Field Strength of Spurious Radiation	2.1053/27.53(h)	A.2	P
3	Frequency Stability	2.1055/27.54	A.3	P
4	Occupied Bandwidth	2.1049/27.53(g)	A.4	P
5	Emission Bandwidth	2.1049/27.53(g)	A.5	P
6	Band Edge Compliance	2.1051/27.53(h)	A.6	P
7	Conducted Spurious Emission	2.1051/27.53(h)	A.7	P
8	Peak-to-Average Power Ratio	27.50(d)/ KDB971168 D01	A.8	P



LTE Band 5

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/22.913	A.1	P
2	Field Strength of Spurious Radiation	2.1053/22.917	A.2	P
3	Frequency Stability	2.1055/22.355	A.3	P
4	Occupied Bandwidth	2.1049/22.917	A.4	P
5	Emission Bandwidth	2.1049/22.917	A.5	P
6	Band Edge Compliance	2.1051/22.917	A.6	P
7	Conducted Spurious Emission	2.1051/22.917	A.7	P
8	Peak-to-Average Power Ratio	KDB971168 D01	A.8	P

LTE Band 7

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/27.50(h)	A.1	P
2	Field Strength of Spurious Radiation	2.1053/27.53(m)	A.2	P
3	Frequency Stability	2.1055/27.54	A.3	P
4	Occupied Bandwidth	2.1049/27.53(m)	A.4	P
5	Emission Bandwidth	2.1049/27.53(m)	A.5	P
6	Band Edge Compliance	2.1051/27.53(m)	A.6	P
7	Conducted Spurious Emission	2.1051/27.53(m)	A.7	P
8	Peak-to-Average Power Ratio	27.50(a)/ KDB971168 D01	A.8	P

LTE Band 12

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/27.50(c)	A.1	P
2	Field Strength of Spurious Radiation	2.1053/27.53(g)	A.2	P
3	Frequency Stability	2.1055/27.54	A.3	P
4	Occupied Bandwidth	2.1049/27.53(g)	A.4	P
5	Emission Bandwidth	2.1049/27.53(g)	A.5	P
6	Band Edge Compliance	2.1051/27.53(g)	A.6	P
7	Conducted Spurious Emission	2.1051/27.53(g)	A.7	P
8	Peak-to-Average Power Ratio	27.50(a)/ KDB971168 D01	A.8	P

**LTE Band 13**

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/27.50(b)	A.1	P
2	Field Strength of Spurious Radiation	2.1053/27.53(c)	A.2	P
3	Frequency Stability	2.1055/27.54	A.3	P
4	Occupied Bandwidth	2.1049/27.53(c)	A.4	P
5	Emission Bandwidth	2.1049/27.53(c)	A.5	P
6	Band Edge Compliance	2.1051/27.53(c)	A.6	P
7	Conducted Spurious Emission	2.1051/27.53(c)	A.7	P
8	Peak-to-Average Power Ratio	27.50(a)/ KDB971168 D01	A.8	P

LTE Band 17

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/27.50(c)	A.1	P
2	Field Strength of Spurious Radiation	2.1053/27.53(g)	A.2	P
3	Frequency Stability	2.1055/27.54	A.3	P
4	Occupied Bandwidth	2.1049/27.53(g)	A.4	P
5	Emission Bandwidth	2.1049/27.53(g)	A.5	P
6	Band Edge Compliance	2.1051/27.53(g)	A.6	P
7	Conducted Spurious Emission	2.1051/27.53(g)	A.7	P
8	Peak-to-Average Power Ratio	27.50(a)/ KDB971168 D01	A.8	P

LTE Band 66

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/27.50(d)	A.1	P
2	Field Strength of Spurious Radiation	2.1053/27.53(h)	A.2	P
3	Frequency Stability	2.1055/27.54	A.3	P
4	Occupied Bandwidth	2.1049/27.53(h)	A.4	P
5	Emission Bandwidth	2.1049/27.53(h)	A.5	P
6	Band Edge Compliance	2.1051/27.53(h)	A.6	P
7	Conducted Spurious Emission	2.1051/27.53(h)	A.7	P
8	Peak-to-Average Power Ratio	27.50(a)/ KDB971168 D01	A.8	P



No. I21N00886-RF-LTE

7. STATEMENT

Since the information of samples in this report is provided by the client, the laboratory is not responsible for the authenticity of sample information.

This report takes measured values as criterion of test conclusion. The test conclusion meets the limit requirements.

8. TEST EQUIPMENTS UTILIZED

NO.	Description	TYPE	Manufacture	series number	CAL DUE DATE
1	Test Receiver	ESR7	R&S	101676	2021-11-25
2	BiLog Antenna	VULB 9163	Schwarzbeck	9163-330	2024-03-22
3	Horn Antenna	3117	ETS-Lindgren	00066577	2022-04-02
4	Horn Antenna	QSH-SL-18 -26-S-20	Q-par	17013	2023-01-06
5	Antenna	BBHA 9120D	Schwarzbeck	1593	2022-12-05
6	Antenna	VUBA 9117	Schwarzbeck	207	2023-07-15
7	Antenna	QWH-SL-18 -40-K-SG	Q-par	15979	2023-01-06
8	preamplifier	83017A	Agilent	MY39501110	/
9	Signal Generator	SMB100A	R&S	179725	2021-11-25
10	Fully Anechoic Chamber	FACT3-2.0	ETS-Lindgren	1285	2021-07-19
11	Spectrum Analyzer	FSV40	R&S	101192	2022-01-13
12	Universal Radio Communication Tester	CMW500	R&S	152499	2021-07-16
13	Universal Radio Communication Tester	CMW500	R&S	129146	2022-04-24
14	Spectrum Analyzer	FSU	R&S	101506	2021-12-13
15	Temperature Chamber	SH-241	ESPEC	92007516	2021-10-15
16	DC Power Supply	U3606A	Agilent Technologies	MY50450012	2021-11-13

Test software

Item	Name	Vesion
Radiated	EMC32	Version 10.01.00



ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

Reference

FCC: CFR Part 2.1046, 22.913, 24.232, 27.50.

A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation.

This result contains peak output power and ERP/EIRP measurements for the EUT.

In all cases, output power is within the specified limits.

A.1.2 Conducted

A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies (bottom, middle and top of operational frequency range) for each bandwidth.

A.1.2.2 Measurement result

LTE band 2

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	1909.3	23.56	22.83	22.04
		1880.0	23.66	22.67	21.99
		1850.7	23.54	22.62	21.86
	1 RB low	1909.3	23.38	22.70	21.81
		1880.0	23.35	22.45	21.54
		1850.7	23.59	22.62	21.47
	50% RB mid	1909.3	23.45	22.74	21.91
		1880.0	23.34	22.38	21.57
		1850.7	23.46	22.60	21.86
	100% RB	1909.3	22.63	21.66	20.83
		1880.0	22.73	21.87	20.92
		1850.7	22.84	21.75	20.77
3MHz	1 RB high	1908.5	23.44	22.75	22.03
		1880.0	23.62	22.74	21.96
		1851.5	23.55	22.75	21.83
	1 RB low	1908.5	23.46	22.69	21.85
		1880.0	23.43	22.48	21.59
		1851.5	23.59	22.54	21.53
	50% RB mid	1908.5	22.70	21.96	21.11
		1880.0	22.68	21.96	21.10
		1851.5	22.81	21.96	21.11



	100% RB	1908.5	22.75	21.70	20.79
		1880.0	22.85	21.77	20.89
		1851.5	22.76	21.85	20.83
5MHz	1 RB high	1907.5	23.46	22.77	21.99
		1880.0	23.65	22.74	21.94
		1852.5	23.44	22.74	21.80
	1 RB low	1907.5	23.35	22.69	21.93
		1880.0	23.30	22.43	21.66
		1852.5	23.43	22.50	21.47
	50% RB mid	1907.5	22.79	21.90	21.10
		1880.0	22.76	21.95	21.00
		1852.5	22.87	21.86	21.06
	100% RB	1907.5	22.71	21.69	20.70
		1880.0	22.73	21.91	20.84
		1852.5	22.83	21.86	20.73
10MHz	1 RB high	1905.0	23.47	22.79	22.02
		1880.0	23.56	22.67	21.83
		1855.0	23.55	22.76	21.75
	1 RB low	1905.0	23.43	22.64	21.92
		1880.0	23.41	22.57	21.59
		1855.0	23.58	22.63	21.50
	50% RB mid	1905.0	22.72	21.88	21.09
		1880.0	22.72	21.82	21.01
		1855.0	22.72	21.89	21.05
	100% RB	1905.0	22.61	21.62	20.77
		1880.0	22.72	21.74	20.83
		1855.0	22.89	21.82	20.79
15MHz	1 RB high	1902.5	23.60	22.72	22.00
		1880.0	23.56	22.76	21.96
		1857.5	23.51	22.77	21.72
	1 RB low	1902.5	23.42	22.74	21.79
		1880.0	23.46	22.49	21.57
		1857.5	23.51	22.60	21.45
	50% RB mid	1902.5	22.86	22.02	21.05
		1880.0	22.63	21.79	21.11
		1857.5	22.69	21.91	21.11
	100% RB	1902.5	22.74	21.79	20.78
		1880.0	22.82	21.79	20.87
		1857.5	22.87	21.73	20.74



20MHz	1 RB high	1900.0	23.52	22.82	22.03
		1880.0	23.63	22.66	21.90
		1860.0	23.52	22.67	21.77
	1 RB low	1900.0	23.43	22.71	21.84
		1880.0	23.38	22.49	21.63
		1860.0	23.50	22.55	21.53
	50% RB mid	1900.0	22.79	21.94	21.02
		1880.0	22.72	21.88	21.07
		1860.0	22.79	21.89	21.02
	100% RB	1900.0	22.69	21.70	20.74
		1880.0	22.80	21.83	20.85
		1860.0	22.81	21.78	20.75

Note: Expanded measurement uncertainty is $U = 0.49\text{dB}$, $k = 1.96$



LTE band 4

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	1754.3	23.48	22.37	21.31
		1732.5	23.49	22.44	21.46
		1710.7	23.34	22.27	21.31
	1 RB low	1754.3	23.39	22.43	21.40
		1732.5	23.50	22.53	21.54
		1710.7	23.13	22.21	21.24
	50% RB mid	1754.3	22.91	21.78	20.82
		1732.5	22.66	21.70	20.75
		1710.7	22.78	21.82	20.85
	100% RB	1754.3	22.88	21.92	20.94
		1732.5	22.85	21.94	20.95
		1710.7	22.30	21.31	20.38
3MHz	1 RB high	1753.5	23.44	22.34	21.29
		1732.5	23.49	22.42	21.48
		1711.5	23.30	22.15	21.21
	1 RB low	1753.5	23.33	22.28	21.22
		1732.5	23.59	22.47	21.43
		1711.5	23.08	21.98	20.89
	50% RB mid	1753.5	22.91	21.77	20.77
		1732.5	22.86	21.85	20.76
		1711.5	22.35	21.30	20.09
	100% RB	1753.5	22.82	21.97	20.81
		1732.5	22.86	21.78	20.73
		1711.5	22.27	21.22	20.24
5MHz	1 RB high	1752.5	23.49	22.42	21.38
		1732.5	23.32	22.36	21.32
		1712.5	23.25	22.21	21.13
	1 RB low	1752.5	23.43	22.31	21.19
		1732.5	23.58	22.47	21.53
		1712.5	23.21	22.16	20.92
	50% RB mid	1752.5	22.90	21.84	20.76
		1732.5	22.82	21.94	20.68
		1712.5	22.38	21.39	20.26
	100% RB	1752.5	22.90	21.94	20.87
		1732.5	22.79	21.64	20.68
		1712.5	22.26	21.25	20.26
10MHz	1 RB high	1750.0	23.45	22.36	21.35



		1732.5	23.49	22.41	21.51
		1715.0	23.20	22.06	21.11
	1 RB low	1750.0	23.37	22.36	21.09
		1732.5	23.54	22.39	21.52
		1715.0	23.04	22.06	20.85
	50% RB mid	1750.0	22.84	21.81	20.83
		1732.5	22.83	21.92	20.79
		1715.0	22.37	21.27	20.15
	100% RB	1750.0	22.91	21.84	20.80
		1732.5	22.73	21.70	20.66
		1715.0	22.38	21.25	20.36
	15MHz	1 RB high	1747.5	23.55	22.36
1732.5			23.49	22.47	21.38
1717.5			23.25	22.13	21.20
1 RB low		1747.5	23.36	22.18	21.26
		1732.5	23.58	22.49	21.50
		1717.5	23.20	22.11	21.00
50% RB mid		1747.5	22.93	21.77	20.78
		1732.5	22.91	21.91	20.65
		1717.5	22.34	21.23	20.19
100% RB		1747.5	22.96	21.93	20.91
		1732.5	22.85	21.66	20.64
		1717.5	22.32	21.26	20.36
20MHz	1 RB high	1745.0	23.53	22.40	21.30
		1732.5	23.40	22.41	21.42
		1720.0	23.21	22.16	21.14
	1 RB low	1745.0	23.39	22.27	21.18
		1732.5	23.63	22.48	21.48
		1720.0	23.14	22.07	20.94
	50% RB mid	1745.0	22.86	21.81	20.74
		1732.5	22.91	21.89	20.75
		1720.0	22.35	21.30	20.19
	100% RB	1745.0	22.90	21.88	20.84
		1732.5	22.80	21.71	20.72
		1720.0	22.28	21.25	20.31

Note: Expanded measurement uncertainty is $U = 0.49\text{dB}$, $k = 1.96$



LTE band 5

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	848.3	22.81	22.03	21.29
		836.5	22.79	21.97	21.32
		824.7	22.86	22.03	21.26
	1 RB low	848.3	22.94	22.18	21.34
		836.5	22.96	22.06	21.35
		824.7	22.53	21.72	21.03
	50% RB mid	848.3	22.98	22.46	21.71
		836.5	22.61	22.26	21.65
		824.7	22.66	21.95	21.37
	100% RB	848.3	21.82	20.91	19.79
		836.5	22.09	20.91	20.02
		824.7	22.03	21.07	20.12
3MHz	1 RB high	847.5	22.70	22.10	21.22
		836.5	22.86	22.03	21.13
		825.5	22.97	22.10	21.31
	1 RB low	847.5	22.80	22.25	21.31
		836.5	22.92	22.05	21.34
		825.5	22.62	21.78	21.10
	50% RB mid	847.5	21.90	21.03	20.09
		836.5	21.93	21.19	20.39
		825.5	21.87	21.25	20.48
	100% RB	847.5	21.91	20.88	19.86
		836.5	21.90	21.02	19.95
		825.5	22.04	21.08	20.04
5MHz	1 RB high	846.5	22.76	22.03	21.23
		836.5	22.94	22.07	21.27
		826.5	22.95	22.11	21.23
	1 RB low	846.5	22.77	22.19	21.44
		836.5	22.80	22.19	21.38
		826.5	22.53	21.73	21.11
	50% RB mid	846.5	21.80	20.98	20.17
		836.5	21.94	21.10	20.32
		826.5	21.96	21.30	20.48
	100% RB	846.5	21.94	20.83	19.91
		836.5	22.01	21.00	19.99
		826.5	22.07	21.11	20.01
10MHz	1 RB high	844.0	22.79	22.02	21.22



		836.5	22.87	22.01	21.23
		829.0	22.88	22.07	21.28
	1 RB low	844.0	22.84	22.16	21.36
		836.5	22.88	22.13	21.36
		829.0	22.56	21.78	21.12
	50% RB mid	844.0	21.83	21.05	20.19
		836.5	21.99	21.16	20.34
		829.0	21.96	21.23	20.45
	100% RB	844.0	21.88	20.86	19.86
		836.5	21.99	21.00	19.98
		829.0	22.00	21.05	20.07

Note: Expanded measurement uncertainty is $U = 0.49\text{dB}$, $k = 1.96$



LTE band 7

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	2567.5	23.20	22.76	22.09
		2535.0	23.22	22.66	22.16
		2502.5	23.37	22.49	21.93
	1 RB low	2567.5	23.22	22.81	22.27
		2535.0	23.27	22.75	22.00
		2502.5	23.12	22.55	22.07
	50% RB mid	2567.5	22.61	21.70	20.75
		2535.0	22.49	21.54	20.71
		2502.5	22.55	21.63	20.78
	100% RB	2567.5	22.61	21.68	20.89
		2535.0	22.64	21.86	21.00
		2502.5	22.45	21.65	20.68
10MHz	1 RB high	2565.0	23.22	22.75	22.15
		2535.0	23.21	22.66	22.16
		2505.0	23.26	22.48	22.01
	1 RB low	2565.0	23.26	22.70	22.28
		2535.0	23.33	22.76	22.07
		2505.0	23.18	22.59	21.94
	50% RB mid	2565.0	22.68	21.59	20.72
		2535.0	22.60	21.60	20.77
		2505.0	22.50	21.68	20.77
	100% RB	2565.0	22.76	21.70	20.95
		2535.0	22.73	21.95	20.96
		2505.0	22.46	21.61	20.66
15MHz	1 RB high	2562.5	23.37	22.74	22.14
		2535.0	23.27	22.70	22.15
		2507.5	23.25	22.39	22.06
	1 RB low	2562.5	23.26	22.75	22.28
		2535.0	23.32	22.74	22.12
		2507.5	23.10	22.67	21.88
	50% RB mid	2562.5	22.59	21.60	20.73
		2535.0	22.59	21.57	20.79
		2507.5	22.60	21.55	20.87
	100% RB	2562.5	22.70	21.72	20.89
		2535.0	22.74	21.93	21.05
		2507.5	22.47	21.73	20.68



20MHz	1 RB high	2560.0	23.28	22.71	22.09
		2535.0	23.24	22.60	22.22
		2510.0	23.31	22.46	21.97
	1 RB low	2560.0	23.24	22.76	22.29
		2535.0	23.26	22.68	22.07
		2510.0	23.12	22.57	21.98
	50% RB mid	2560.0	22.62	21.63	20.75
		2535.0	22.57	21.64	20.80
		2510.0	22.52	21.63	20.84
	100% RB	2560.0	22.68	21.75	20.95
		2535.0	22.67	21.85	21.01
		2510.0	22.52	21.67	20.75

Note: Expanded measurement uncertainty is $U = 0.49\text{dB}$, $k = 1.96$



LTE band 12

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	715.3	23.31	22.65	22.15
		707.5	23.31	22.66	22.06
		699.7	23.06	22.64	22.00
	1 RB low	715.3	23.22	22.39	21.74
		707.5	23.16	22.54	21.97
		699.7	23.21	22.47	21.98
	50% RB mid	715.3	23.42	22.74	21.83
		707.5	23.27	22.64	22.25
		699.7	23.13	22.70	22.21
	100% RB	715.3	22.50	21.49	20.55
		707.5	22.35	21.25	20.35
		699.7	22.59	21.54	20.42
3MHz	1 RB high	714.5	23.24	22.55	22.15
		707.5	23.27	22.72	22.02
		700.5	23.14	22.56	21.91
	1 RB low	714.5	23.16	22.57	21.79
		707.5	23.24	22.66	22.07
		700.5	23.25	22.66	21.92
	50% RB mid	714.5	22.41	21.56	20.50
		707.5	22.51	21.47	20.64
		700.5	22.70	21.63	20.53
	100% RB	714.5	22.66	21.60	20.49
		707.5	22.43	21.41	20.40
		700.5	22.58	21.57	20.51
5MHz	1 RB high	713.5	23.18	22.67	22.06
		707.5	23.25	22.61	21.95
		701.5	23.14	22.53	21.88
	1 RB low	713.5	23.21	22.46	21.87
		707.5	23.29	22.61	21.93
		701.5	23.22	22.48	21.88
	50% RB mid	713.5	22.52	21.53	20.66
		707.5	22.44	21.63	20.54
		701.5	22.68	21.64	20.48
	100% RB	713.5	22.50	21.60	20.45
		707.5	22.30	21.25	20.40
		701.5	22.53	21.53	20.58
10MHz	1 RB high	711.0	23.27	22.64	22.06



		707.5	23.28	22.67	22.03
		704.0	23.14	22.55	21.96
	1 RB low	711.0	23.22	22.48	21.79
		707.5	23.21	22.61	22.01
		704.0	23.24	22.57	21.96
	50% RB mid	711.0	22.42	21.47	20.57
		707.5	22.48	21.55	20.61
		704.0	22.60	21.60	20.54
	100% RB	711.0	22.56	21.54	20.54
		707.5	22.39	21.33	20.37
		704.0	22.59	21.62	20.52

Note: Expanded measurement uncertainty is $U = 0.49\text{dB}$, $k = 1.96$

LTE band 13

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	784.5	23.33	22.73	22.20
		782.0	23.25	22.75	22.30
		779.5	23.37	22.84	22.30
	1 RB low	784.5	23.01	22.59	22.16
		782.0	23.40	22.83	22.31
		779.5	23.02	22.59	22.18
	50% RB mid	784.5	22.47	21.45	20.42
		782.0	22.45	21.45	20.39
		779.5	22.35	21.41	20.44
	100% RB	784.5	22.76	21.69	20.71
		782.0	22.69	21.71	20.64
		779.5	22.74	21.71	20.68
10MHz	1 RB high	782.0	23.31	22.79	22.28
	1 RB low	782.0	23.41	22.85	22.38
	50% RB mid	782.0	22.48	21.46	20.42
	100% RB	782.0	22.75	21.74	20.66

Note: Expanded measurement uncertainty is $U = 0.49\text{dB}$, $k = 1.96$

LTE band 17

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	713.5	23.28	22.57	22.02
		710.0	23.26	22.51	21.72
		706.5	23.18	22.45	21.68
	1 RB low	713.5	23.24	22.32	21.64
		710.0	23.26	22.43	21.66
		706.5	23.17	22.31	21.49
	50% RB mid	713.5	22.45	21.51	20.61
		710.0	22.46	21.57	20.59
		706.5	22.64	21.66	20.56
	100% RB	713.5	22.53	21.58	20.55
		710.0	22.46	21.38	20.41
		706.5	22.54	21.51	20.56
10MHz	1 RB high	711.0	23.21	22.43	21.86
		710.0	23.25	22.37	21.82
		709.0	23.17	22.32	21.76
	1 RB low	711.0	23.23	22.38	21.49
		710.0	23.28	22.43	21.61
		709.0	23.25	22.37	21.46
	50% RB mid	711.0	22.41	21.45	20.52
		710.0	22.45	21.51	20.56
		709.0	22.51	21.63	20.58
	100% RB	711.0	22.55	21.58	20.55
		710.0	22.42	21.39	20.43
		709.0	22.51	21.58	20.59

Note: Expanded measurement uncertainty is U = 0.49dB, k = 1.96



LTE band 66

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	1779.3	23.23	22.65	22.20
		1745.0	23.09	22.69	22.24
		1710.7	22.99	22.46	21.96
	1 RB low	1779.3	23.31	22.71	22.21
		1745.0	23.16	22.75	22.18
		1710.7	22.95	22.63	21.91
	50% RB mid	1779.3	23.06	22.47	21.92
		1745.0	23.22	22.60	22.00
		1710.7	22.96	22.51	21.83
	100% RB	1779.3	22.24	21.18	20.31
		1745.0	22.18	21.45	20.43
		1710.7	22.18	21.14	20.36
3MHz	1 RB high	1778.5	23.27	22.54	22.04
		1745.0	23.22	22.54	22.21
		1711.5	23.05	22.45	21.97
	1 RB low	1778.5	23.28	22.66	22.18
		1745.0	23.23	22.79	22.12
		1711.5	23.03	22.44	21.90
	50% RB mid	1778.5	22.22	21.15	20.33
		1745.0	22.21	21.24	20.57
		1711.5	22.04	21.22	20.27
	100% RB	1778.5	22.26	21.34	20.32
		1745.0	22.11	21.37	20.51
		1711.5	22.20	21.23	20.27
5MHz	1 RB high	1777.5	23.19	22.55	22.13
		1745.0	23.06	22.57	22.26
		1712.5	23.04	22.54	22.05
	1 RB low	1777.5	23.22	22.62	22.03
		1745.0	23.24	22.70	22.20
		1712.5	23.02	22.48	21.97
	50% RB mid	1777.5	22.24	21.16	20.26
		1745.0	22.27	21.27	20.42
		1712.5	22.13	21.36	20.37
	100% RB	1777.5	22.16	21.34	20.48
		1745.0	22.24	21.27	20.47
		1712.5	22.14	21.30	20.28
10MHz	1 RB high	1775.0	23.13	22.58	22.15



	1 RB low	1745.0	23.06	22.55	22.18	
		1715.0	23.01	22.52	22.07	
		1775.0	23.35	22.78	22.09	
	50% RB mid	1745.0	23.23	22.62	22.11	
		1715.0	22.96	22.46	21.85	
		1775.0	22.10	21.11	20.28	
	100% RB	1745.0	22.28	21.40	20.56	
		1715.0	22.10	21.20	20.40	
		1775.0	22.25	21.22	20.35	
	15MHz	1 RB high	1772.5	23.17	22.56	22.06
			1745.0	23.15	22.72	22.10
			1717.5	22.98	22.44	22.10
1 RB low		1772.5	23.36	22.77	22.11	
		1745.0	23.23	22.64	22.18	
		1717.5	23.02	22.59	21.85	
50% RB mid		1772.5	22.14	21.15	20.23	
		1745.0	22.28	21.29	20.47	
		1717.5	22.12	21.27	20.28	
100% RB		1772.5	22.28	21.18	20.47	
		1745.0	22.21	21.27	20.51	
		1717.5	22.09	21.19	20.40	
20MHz	1 RB high	1770.0	23.18	22.60	22.14	
		1745.0	23.15	22.63	22.16	
		1720.0	22.96	22.49	22.00	
	1 RB low	1770.0	23.29	22.68	22.12	
		1745.0	23.22	22.72	22.12	
		1720.0	23.02	22.53	21.91	
	50% RB mid	1770.0	22.16	21.19	20.33	
		1745.0	22.25	21.31	20.48	
		1720.0	22.13	21.27	20.31	
	100% RB	1770.0	22.18	21.27	20.39	
		1745.0	22.20	21.35	20.47	
		1720.0	22.17	21.22	20.33	

Note: Expanded measurement uncertainty is $U = 0.49\text{dB}$, $k = 1.96$

A.1.3 Radiated

A.1.3.1 Description

This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(b) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

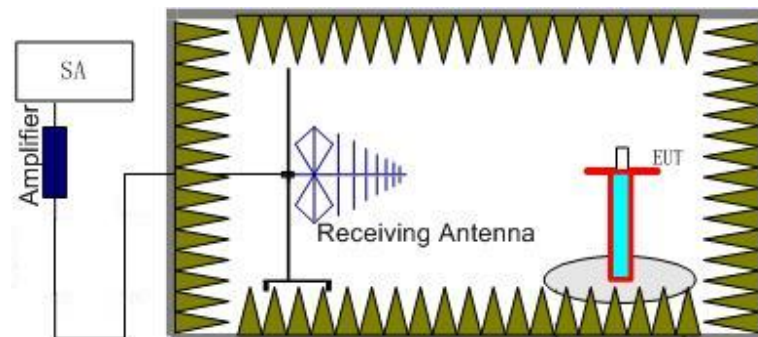
Rule Part 27.50(d) specifies "Fixed, mobile, and portable (handheld) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP".

Rule Part 27.50(h)(2) specifies "Mobile stations are limited to 2.0 watts EIRP".

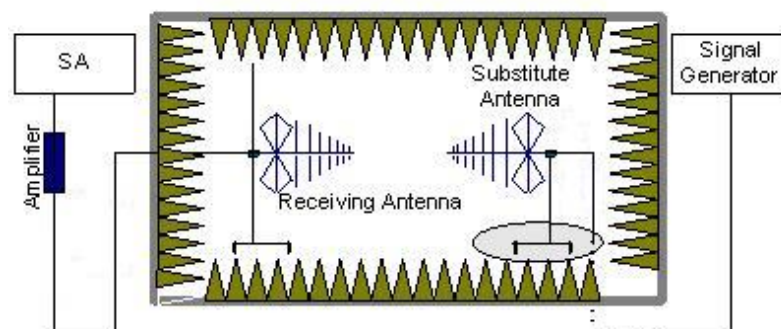
Rule Part 27.50(c) specifies "Portable stations (hand-held de-vices) are limited to 3 watts ERP".

A.1.3.2 Method of Measurement

1. For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, EUT was placed on a 80 cm high non-conductive stand at a 3 meter test distance from the receive antenna. For radiated measurements performed at frequencies above 1 GHz, EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. Receiving antenna was placed on the antenna mast 3 meters from the EUT. For emission measurements. The receiving antenna shall be varied from 1 m to 4 m in height above the reference ground in a search for the relative positioning that produces the maximum radiated signal level. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna and adjusts the level of the signal generator output until the value of the receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. An amplifier should be connected to the Signal Source output port. And the cable should be connected between the amplifier and the substitution antenna.

The cable loss (P_{cl}), the substitution Antenna Gain(dBi) (G_a) and the amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{\text{Mea}} - P_{\text{Ag}} - P_{\text{cl}} + G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, $\text{ERP} = \text{EIRP} - 2.15\text{dB}$.

A.1.3.3 Measurement result

LTE Band 2- EIRP Part 24. 232(b)

Limits: ≤33dBm (2W)

LTE Band 2_1.4MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1850.70	-15.16	-29.30	8.10	22.24	33.00	H
1880.00	-15.10	-29.40	8.10	22.40	33.00	H
1909.30	-14.79	-29.30	8.10	22.61	33.00	H

LTE Band 2_3MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1851.50	-15.15	-29.30	8.10	22.25	33.00	H
1880.00	-14.73	-29.40	8.10	22.77	33.00	H
1908.50	-14.93	-29.30	8.10	22.47	33.00	H

LTE Band 2_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1852.50	-14.72	-29.30	8.10	22.68	33.00	H
1880.00	-15.14	-29.40	8.10	22.36	33.00	H
1907.50	-14.93	-29.30	8.10	22.47	33.00	H

LTE Band 2_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1855.00	-15.24	-29.30	8.10	22.16	33.00	H
1880.00	-15.30	-29.40	8.10	22.20	33.00	H
1905.00	-15.01	-29.30	8.10	22.39	33.00	H

LTE Band 2_15MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1857.50	-14.93	-29.30	8.10	22.47	33.00	H
1880.00	-15.11	-29.40	8.10	22.39	33.00	H
1902.50	-14.90	-29.30	8.10	22.50	33.00	H

LTE Band 2_20 MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1860.00	-14.90	-29.30	8.10	22.50	33.00	H
1880.00	-15.10	-29.40	8.10	22.40	33.00	H
1900.00	-15.10	-29.30	8.10	22.30	33.00	H



LTE Band 2_1.4MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1850.70	-15.93	-29.30	8.10	21.47	33.00	H
1880.00	-16.15	-29.40	8.10	21.35	33.00	H
1909.30	-15.93	-29.30	8.10	21.47	33.00	H

LTE Band 2_3MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1851.50	-15.93	-29.30	8.10	21.47	33.00	H
1880.00	-16.15	-29.40	8.10	21.35	33.00	H
1908.50	-15.90	-29.30	8.10	21.50	33.00	H

LTE Band 2_5MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1852.50	-15.93	-29.30	8.10	21.47	33.00	H
1880.00	-16.05	-29.40	8.10	21.45	33.00	H
1907.50	-16.00	-29.30	8.10	21.40	33.00	H

LTE Band 2_10MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1855.00	-16.00	-29.30	8.10	21.40	33.00	H
1880.00	-15.99	-29.40	8.10	21.51	33.00	H
1905.00	-15.89	-29.30	8.10	21.51	33.00	H

LTE Band 2_15MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1857.50	-15.56	-29.30	8.10	21.84	33.00	H
1880.00	-16.01	-29.40	8.10	21.49	33.00	H
1902.50	-16.11	-29.30	8.10	21.29	33.00	H

LTE Band 2_20 MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1860.00	-16.04	-29.30	8.10	21.36	33.00	H
1880.00	-16.14	-29.40	8.10	21.36	33.00	H
1900.00	-16.10	-29.30	8.10	21.30	33.00	H



LTE Band 2_1.4MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1850.70	-15.54	-29.30	8.10	21.86	33.00	H
1880.00	-16.03	-29.40	8.10	21.47	33.00	H
1909.30	-16.50	-29.30	8.10	20.90	33.00	H

LTE Band 2_3MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1851.50	-16.05	-29.30	8.10	21.35	33.00	H
1880.00	-16.00	-29.40	8.10	21.50	33.00	H
1908.50	-16.21	-29.30	8.10	21.19	33.00	H

LTE Band 2_5MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1852.50	-15.60	-29.30	8.10	21.80	33.00	H
1880.00	-16.41	-29.40	8.10	21.09	33.00	H
1907.50	-16.28	-29.30	8.10	21.12	33.00	H

LTE Band 2_10MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1855.00	-16.43	-29.30	8.10	20.97	33.00	H
1880.00	-15.90	-29.40	8.10	21.60	33.00	H
1905.00	-16.59	-29.30	8.10	20.81	33.00	H

LTE Band 2_15MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1857.50	-16.04	-29.30	8.10	21.36	33.00	H
1880.00	-16.37	-29.40	8.10	21.13	33.00	H
1902.50	-16.26	-29.30	8.10	21.14	33.00	H

LTE Band 2_20 MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1860.00	-16.42	-29.30	8.10	20.98	33.00	H
1880.00	-16.34	-29.40	8.10	21.16	33.00	H
1900.00	-16.23	-29.30	8.10	21.17	33.00	H

Peak EIRP (dBm)=P_{Mea}(-14.73dBm)-(P_{cl}+P_{Ag})(-29.40dB)+G_a(8.10dB) =22.77dBm



LTE Band 4- EIRP Part 27.50(d)

Limits: ≤30dBm (1W)

LTE Band 4_1.4MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1710.70	-15.34	-29.60	8.10	22.36	30.00	H
1732.50	-15.54	-29.60	8.10	22.16	30.00	H
1754.30	-15.33	-29.50	8.10	22.27	30.00	H

LTE Band 4_3MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1711.50	-15.43	-29.60	8.10	22.27	30.00	H
1732.50	-15.34	-29.60	8.10	22.36	30.00	H
1753.50	-15.33	-29.50	8.10	22.27	30.00	H

LTE Band 4_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1712.50	-15.54	-29.60	8.10	22.16	30.00	H
1732.50	-15.49	-29.60	8.10	22.21	30.00	H
1752.50	-15.41	-29.50	8.10	22.19	30.00	H

LTE Band 4_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1715.00	-15.43	-29.60	8.10	22.27	30.00	H
1732.50	-15.52	-29.60	8.10	22.18	30.00	H
1750.00	-15.35	-29.50	8.10	22.25	30.00	H

LTE Band 4_15MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1717.50	-15.50	-29.60	8.10	22.20	30.00	H
1732.50	-15.41	-29.60	8.10	22.29	30.00	H
1747.50	-15.30	-29.50	8.10	22.30	30.00	H

LTE Band 4_20MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1720.00	-15.48	-29.60	8.10	22.22	30.00	H
1732.50	-15.42	-29.60	8.10	22.28	30.00	H
1745.00	-15.33	-29.50	8.10	22.27	30.00	H



LTE Band 4_1.4MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1710.70	-16.01	-29.60	8.10	21.69	30.00	H
1732.50	-16.02	-29.60	8.10	21.68	30.00	H
1754.30	-16.13	-29.50	8.10	21.47	30.00	H

LTE Band 4_3MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1711.50	-16.09	-29.60	8.10	21.61	30.00	H
1732.50	-16.33	-29.60	8.10	21.37	30.00	H
1753.50	-16.39	-29.50	8.10	21.21	30.00	H

LTE Band 4_5MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1712.50	-16.41	-29.60	8.10	21.29	30.00	H
1732.50	-16.53	-29.60	8.10	21.17	30.00	H
1752.50	-16.41	-29.50	8.10	21.19	30.00	H

LTE Band 4_10MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1715.00	-15.70	-29.60	8.10	22.00	30.00	H
1732.50	-16.54	-29.60	8.10	21.16	30.00	H
1750.00	-16.33	-29.50	8.10	21.27	30.00	H

LTE Band 4_15MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1717.50	-16.40	-29.60	8.10	21.30	30.00	H
1732.50	-16.43	-29.60	8.10	21.27	30.00	H
1747.50	-16.01	-29.50	8.10	21.59	30.00	H

LTE Band 4_20MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1720.00	-15.74	-29.60	8.10	21.96	30.00	H
1732.50	-16.34	-29.60	8.10	21.36	30.00	H
1745.00	-16.44	-29.50	8.10	21.16	30.00	H



LTE Band 4_1.4MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1710.70	-15.89	-29.60	8.10	21.81	30.00	V
1732.50	-16.51	-29.60	8.10	21.19	30.00	V
1754.30	-15.89	-29.50	8.10	21.71	30.00	V

LTE Band 4_3MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1711.50	-15.99	-29.60	8.10	21.71	30.00	V
1732.50	-16.30	-29.60	8.10	21.40	30.00	V
1753.50	-16.32	-29.50	8.10	21.28	30.00	V

LTE Band 4_5MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1712.50	-16.51	-29.60	8.10	21.19	30.00	V
1732.50	-16.49	-29.60	8.10	21.21	30.00	V
1752.50	-16.10	-29.50	8.10	21.50	30.00	V

LTE Band 4_10MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1715.00	-16.49	-29.60	8.10	21.21	30.00	V
1732.50	-16.35	-29.60	8.10	21.35	30.00	V
1750.00	-16.15	-29.50	8.10	21.45	30.00	V

LTE Band 4_15MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1717.50	-16.43	-29.60	8.10	21.27	30.00	V
1732.50	-16.38	-29.60	8.10	21.32	30.00	V
1747.50	-16.29	-29.50	8.10	21.31	30.00	V

LTE Band 4_20MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1720.00	-16.09	-29.60	8.10	21.61	30.00	V
1732.50	-16.30	-29.60	8.10	21.40	30.00	V
1745.00	-16.09	-29.50	8.10	21.51	30.00	V

Peak EIRP (dBm)=P_{Mea}(-15.34dBm)-(P_{cl}+P_{Ag})(-29.60dB)+G_a(8.10dB) =22.36dBm



LTE Band 5- ERP Part 22.913(a)

Limits: ≤38.45dBm (7W)

LTE Band 5_1.4MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
824.70	-12.16	-33.60	-0.79	2.15	18.50	38.45	H
836.50	-12.11	-33.50	-0.74	2.15	18.50	38.45	H
848.30	-12.27	-33.50	-0.73	2.15	18.35	38.45	H

LTE Band 5_3MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
825.50	-12.29	-33.60	-0.84	2.15	18.32	38.45	H
836.50	-12.23	-33.50	-0.74	2.15	18.38	38.45	H
847.50	-11.68	-33.50	-0.73	2.15	18.94	38.45	H

LTE Band 5_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
826.50	-11.81	-33.60	-0.84	2.15	18.80	38.45	H
836.50	-12.60	-33.50	-0.74	2.15	18.01	38.45	H
846.50	-12.60	-33.50	-0.73	2.15	18.02	38.45	H

LTE Band 5_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
829.00	-12.57	-33.60	-0.84	2.15	18.04	38.45	H
836.50	-12.54	-33.50	-0.74	2.15	18.07	38.45	H
844.00	-12.48	-33.50	-0.78	2.15	18.09	38.45	H



LTE Band 5_1.4MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
824.70	-12.61	-33.60	-0.79	2.15	18.05	38.45	H
836.50	-11.96	-33.50	-0.74	2.15	18.65	38.45	H
848.30	-12.25	-33.50	-0.73	2.15	18.37	38.45	H

LTE Band 5_3MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
825.50	-12.26	-33.60	-0.84	2.15	18.35	38.45	H
836.50	-12.43	-33.50	-0.74	2.15	18.18	38.45	H
847.50	-12.10	-33.50	-0.73	2.15	18.52	38.45	H

LTE Band 5_5MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
826.50	-12.02	-33.60	-0.84	2.15	18.59	38.45	H
836.50	-12.36	-33.50	-0.74	2.15	18.25	38.45	H
846.50	-12.35	-33.50	-0.73	2.15	18.27	38.45	H

LTE Band 5_10MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
829.00	-12.13	-33.60	-0.84	2.15	18.48	38.45	H
836.50	-12.05	-33.50	-0.74	2.15	18.56	38.45	H
844.00	-11.81	-33.50	-0.78	2.15	18.76	38.45	H



LTE Band 5_1.4MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
824.70	-12.30	-33.60	-0.79	2.15	18.36	38.45	H
836.50	-11.93	-33.50	-0.74	2.15	18.68	38.45	H
848.30	-11.98	-33.50	-0.73	2.15	18.64	38.45	H

LTE Band 5_3MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
825.50	-11.72	-33.60	-0.84	2.15	18.89	38.45	H
836.50	-12.12	-33.50	-0.74	2.15	18.49	38.45	H
847.50	-11.64	-33.50	-0.73	2.15	18.98	38.45	H

LTE Band 5_5MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
826.50	-11.96	-33.60	-0.84	2.15	18.65	38.45	H
836.50	-12.06	-33.50	-0.74	2.15	18.55	38.45	H
846.50	-11.96	-33.50	-0.73	2.15	18.65	38.45	H

LTE Band 5_10MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
829.00	-12.07	-33.60	-0.84	2.15	18.54	38.45	H
836.50	-11.96	-33.50	-0.74	2.15	18.65	38.45	H
844.00	-11.66	-33.50	-0.78	2.15	18.90	38.45	H

Peak ERP (dBm)=P_{Mea}(-11.64dBm)-(P_{ci}+P_{Ag})(-33.50dB)+G_a(-0.73dB) -2.15dB =18.98dBm

**LTE Band 7- EIRP Part 27.50(h)(2)****Limits:** ≤33 dBm (2W)**LTE Band 7_5MHz_QPSK**

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
2502.50	-18.40	-28.70	10.70	21.00	33.00	H
2535.00	-18.50	-28.60	10.70	20.80	33.00	H
2567.50	-18.46	-28.60	10.70	20.84	33.00	H

LTE Band 7_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
2505.00	-18.68	-28.70	10.70	20.72	33.00	H
2535.00	-18.90	-28.60	10.70	20.40	33.00	H
2565.00	-18.80	-28.60	10.70	20.50	33.00	H

LTE Band 7_15MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Polarization
2507.50	-18.90	-28.70	10.70	20.50	33.00	H
2535.00	-18.28	-28.60	10.70	21.02	33.00	H
2562.50	-18.50	-28.60	10.70	20.80	33.00	H

LTE Band 7_20MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
2510.00	-18.66	-28.70	10.70	20.74	33.00	H
2535.00	-19.11	-28.60	10.70	20.19	33.00	H
2560.00	-18.25	-28.60	10.70	21.05	33.00	H

**LTE Band 7_5MHz_16QAM**

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
2502.50	-19.35	-28.70	10.70	20.05	33.00	H
2535.00	-19.14	-28.60	10.70	20.16	33.00	H
2567.50	-19.13	-28.60	10.70	20.17	33.00	H

LTE Band 7_10MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
2505.00	-19.21	-28.70	10.70	20.19	33.00	H
2535.00	-19.03	-28.60	10.70	20.27	33.00	H
2565.00	-18.74	-28.60	10.70	20.56	33.00	H

LTE Band 7_15MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
2507.50	-19.23	-28.70	10.70	20.17	33.00	H
2535.00	-19.09	-28.60	10.70	20.21	33.00	H
2562.50	-18.84	-28.60	10.70	20.46	33.00	H

LTE Band 7_20MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
2510.00	-19.02	-28.70	10.70	20.38	33.00	H
2535.00	-18.46	-28.60	10.70	20.84	33.00	H
2560.00	-18.30	-28.60	10.70	21.00	33.00	H



LTE Band 7_5MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
2502.50	-19.25	-28.70	10.70	20.15	33.00	H
2535.00	-18.94	-28.60	10.70	20.36	33.00	H
2567.50	-18.95	-28.60	10.70	20.35	33.00	H

LTE Band 7_10MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
2505.00	-18.94	-28.70	10.70	20.46	33.00	H
2535.00	-18.80	-28.60	10.70	20.50	33.00	H
2565.00	-18.35	-28.60	10.70	20.95	33.00	H

LTE Band 7_15MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
2507.50	-19.04	-28.70	10.70	20.36	33.00	H
2535.00	-18.97	-28.60	10.70	20.33	33.00	H
2562.50	-18.51	-28.60	10.70	20.79	33.00	H

LTE Band 7_20MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	G _a Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
2510.00	-19.04	-28.70	10.70	20.36	33.00	H
2535.00	-18.51	-28.60	10.70	20.79	33.00	H
2560.00	-18.50	-28.60	10.70	20.80	33.00	H

Peak EIRP (dBm)=P_{Mea}(-18.25dBm)-(P_{cl}+P_{Ag})(-28.60dB)+G_a(10.70dB) =21.05dBm



LTE Band 12 - ERP Part 27.50(c)(10)

Limits: ≤34.77dBm (3W)

LTE Band 12_1.4MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
699.70	-12.74	-34.80	-0.93	2.15	18.98	34.77	H
707.50	-12.67	-34.70	-0.91	2.15	18.97	34.77	H
715.30	-13.52	-34.70	-0.68	2.15	18.35	34.77	H

LTE Band 12_3MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
700.50	-13.03	-34.80	-0.97	2.15	18.65	34.77	H
707.50	-13.29	-34.70	-0.91	2.15	18.35	34.77	H
714.50	-13.29	-34.70	-0.64	2.15	18.62	34.77	H

LTE Band 12_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
701.50	-13.33	-34.80	-0.97	2.15	18.35	34.77	H
707.50	-13.32	-34.70	-0.91	2.15	18.32	34.77	H
713.50	-13.56	-34.70	-0.64	2.15	18.35	34.77	H

LTE Band 12_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{ci} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
704.00	-13.35	-34.80	-0.97	2.15	18.33	34.77	H
707.50	-13.11	-34.70	-0.91	2.15	18.53	34.77	H
711.00	-13.24	-34.70	-0.64	2.15	18.67	34.77	H



LTE Band 12_1.4MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
699.70	-13.24	-34.80	-0.93	2.15	18.48	34.77	H
707.50	-12.72	-34.70	-0.91	2.15	18.92	34.77	H
715.30	-13.25	-34.70	-0.68	2.15	18.62	34.77	H

LTE Band 12_3MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
700.50	-13.46	-34.80	-0.97	2.15	18.22	34.77	H
707.50	-13.27	-34.70	-0.91	2.15	18.37	34.77	H
714.50	-13.40	-34.70	-0.64	2.15	18.51	34.77	H

LTE Band 12_5MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
701.50	-13.43	-34.80	-0.97	2.15	18.25	34.77	H
707.50	-12.92	-34.70	-0.91	2.15	18.72	34.77	H
713.50	-13.29	-34.70	-0.64	2.15	18.62	34.77	H

LTE Band 12_10MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
704.00	-13.24	-34.80	-0.97	2.15	18.44	34.77	H
707.50	-13.27	-34.70	-0.91	2.15	18.37	34.77	H
711.00	-13.42	-34.70	-0.64	2.15	18.49	34.77	H



LTE Band 12_1.4MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
699.70	-13.76	-34.80	-0.93	2.15	17.96	34.77	H
707.50	-13.41	-34.70	-0.91	2.15	18.23	34.77	H
715.30	-13.16	-34.70	-0.68	2.15	18.70	34.77	H

LTE Band 12_3MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
700.50	-13.57	-34.80	-0.97	2.15	18.11	34.77	H
707.50	-13.39	-34.70	-0.91	2.15	18.25	34.77	H
714.50	13.21	-34.70	-0.64	2.15	18.70	34.77	H

LTE Band 12_5MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
701.50	-13.43	-34.80	-0.97	2.15	18.25	34.77	H
707.50	-13.38	-34.70	-0.91	2.15	18.26	34.77	H
713.50	-13.30	-34.70	-0.64	2.15	18.61	34.77	H

LTE Band 12_10MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
704.00	-13.22	-34.80	-0.97	2.15	18.46	34.77	H
707.50	-12.99	-34.70	-0.91	2.15	18.65	34.77	H
711.00	-13.56	-34.70	-0.64	2.15	18.35	34.77	H

Peak ERP (dBm)=P_{Mea}(-12.74Bm)-(P_{cl}+P_{Ag})(-34.80dB)+G_a(-0.93dB) -2.15dB =18.98dBm



LTE Band 13- ERP Part 27.50(b)(10)

Limits: ≤34.77dBm (3W)

LTE Band 13_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
779.50	-12.10	-34.00	-0.08	2.15	19.67	34.77	H
782.00	-12.61	-34.00	-0.13	2.15	19.11	34.77	H
784.50	-12.85	-34.00	-0.13	2.15	18.87	34.77	H

LTE Band 13_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
782.00	-12.18	-34.00	-0.13	2.15	19.54	34.77	H

LTE Band 13_5MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
779.50	-12.60	-34.00	-0.08	2.15	19.17	34.77	H
782.00	-13.36	-34.00	-0.13	2.15	18.36	34.77	H
784.50	-12.61	-34.00	-0.13	2.15	19.11	34.77	H

LTE Band 13_10MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
782.00	-11.63	-34.00	-0.13	2.15	20.09	34.77	H

LTE Band 13_5MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
779.50	-12.59	-34.00	-0.08	2.15	19.17	34.77	H
782.00	-13.46	-34.00	-0.13	2.15	18.26	34.77	H
784.50	-12.88	-34.00	-0.13	2.15	18.84	34.77	H

LTE Band 13_10MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
782.00	-11.72	-34.00	-0.13	2.15	20.00	34.77	H

Peak ERP (dBm)=P_{Mea}(-11.63dBm)-(P_{cl}+P_{Ag})(-34.00dB)+G_a(-0.13dB) -2.15dB =20.09dBm



LTE Band 17 - ERP Part 27.50(c)(10)

Limits: ≤34.77dBm (3W)

LTE Band 17_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _c (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
706.50	-12.29	-34.70	-0.91	2.15	19.36	34.77	V
710.00	-12.99	-34.70	-0.64	2.15	18.91	34.77	V
713.50	-13.03	-34.70	-0.64	2.15	18.88	34.77	V

LTE Band 17_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _c (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
709.00	-13.42	-34.70	-0.91	2.15	18.23	34.77	V
710.00	-13.22	-34.70	-0.64	2.15	18.68	34.77	V
711.00	-13.39	-34.70	-0.64	2.15	18.52	34.77	V

LTE Band 17_5MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _c (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
706.50	-13.62	-34.70	-0.91	2.15	18.02	34.77	V
710.00	-13.52	-34.70	-0.64	2.15	18.39	34.77	V
713.50	-13.79	-34.70	-0.64	2.15	18.12	34.77	V

LTE Band 17_10MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _c (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
709.00	-13.24	-34.70	-0.91	2.15	18.40	34.77	V
710.00	-13.45	-34.70	-0.64	2.15	18.46	34.77	V
711.00	-13.43	-34.70	-0.64	2.15	18.48	34.77	V



LTE Band 17_5MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
706.50	-13.46	-34.70	-0.91	2.15	18.18	34.77	H
710.00	-13.76	-34.70	-0.64	2.15	18.15	34.77	H
713.50	-13.26	-34.70	-0.64	2.15	18.65	34.77	H

LTE Band 17_10MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	Correction (dB)	ERP(dBm)	Limit(dBm)	Polarization
709.00	-13.12	-34.70	-0.91	2.15	18.52	34.77	H
710.00	-13.29	-34.70	-0.64	2.15	18.62	34.77	H
711.00	-13.61	-34.70	-0.64	2.15	18.30	34.77	H

Peak ERP (dBm)=P_{Mea}(-12.29dBm)-(P_{cl}+P_{Ag})(-34.70dB)+G_a(-0.91dB) -2.15dB =19.36dBm



LTE Band 66- EIRP Part 27.50(d)

Limits: ≤30dBm (1W)

LTE Band 66_1.4MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1710.70	-16.54	-29.60	8.10	21.16	30.00	H
1745.00	-16.33	-29.50	8.10	21.27	30.00	H
1779.30	-16.35	-29.50	8.10	21.25	30.00	H

LTE Band 66_3MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1711.50	-16.59	-29.60	8.10	21.11	30.00	H
1745.00	-16.50	-29.50	8.10	21.10	30.00	H
1778.50	-16.81	-29.50	8.10	20.79	30.00	H

LTE Band 66_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1712.50	-16.84	-29.60	8.10	20.86	30.00	H
1745.00	-16.30	-29.50	8.10	21.30	30.00	H
1777.50	-16.79	-29.50	8.10	20.81	30.00	H

LTE Band 66_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1715.00	-15.56	-29.60	8.10	22.14	30.00	H
1745.00	-16.20	-29.50	8.10	21.40	30.00	H
1775.00	-16.23	-29.50	8.10	21.37	30.00	H

LTE Band 66_15MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1717.50	-16.74	-29.60	8.10	20.96	30.00	H
1745.00	-17.25	-29.50	8.10	20.35	30.00	H
1772.53	-16.54	-29.50	8.10	21.07	30.00	H

LTE Band 66_20MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1720.00	-16.64	-29.60	8.10	21.06	30.00	H
1745.00	-17.23	-29.50	8.10	20.37	30.00	H
1770.00	-16.11	-29.50	8.10	21.49	30.00	H

**LTE Band 66_1.4MHz_16QAM**

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1710.70	-17.01	-29.60	8.10	20.69	30.00	H
1745.00	-17.29	-29.50	8.10	20.31	30.00	H
1779.30	-17.27	-29.50	8.10	20.33	30.00	H

LTE Band 66_3MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1711.50	-17.76	-29.60	8.10	19.94	30.00	H
1745.00	-17.42	-29.50	8.10	20.18	30.00	H
1778.50	-17.11	-29.50	8.10	20.49	30.00	H

LTE Band 66_5MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1712.50	-17.56	-29.60	8.10	20.14	30.00	H
1745.00	-17.13	-29.50	8.10	20.47	30.00	H
1777.50	-16.92	-29.50	8.10	20.68	30.00	H

LTE Band 66_10MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1715.00	-16.90	-29.60	8.10	20.80	30.00	H
1745.00	-17.10	-29.50	8.10	20.50	30.00	H
1775.00	-16.55	-29.50	8.10	21.05	30.00	H

LTE Band 66_15MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1717.50	-17.30	-29.60	8.10	20.40	30.00	H
1745.00	-17.29	-29.50	8.10	20.31	30.00	H
1772.53	-16.81	-29.50	8.10	20.79	30.00	H

LTE Band 66_20MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1720.00	-17.41	-29.60	8.10	20.30	30.00	H
1745.00	-17.32	-29.50	8.10	20.28	30.00	H
1770.00	-16.93	-29.50	8.10	20.67	30.00	H



LTE Band 66_1.4MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1710.70	-16.59	-29.60	8.10	21.11	30.00	H
1745.00	-16.85	-29.50	8.10	20.75	30.00	H
1779.30	-16.72	-29.50	8.10	20.88	30.00	H

LTE Band 66_3MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1711.50	-17.31	-29.60	8.10	20.39	30.00	H
1745.00	-17.14	-29.50	8.10	20.46	30.00	H
1778.50	-17.25	-29.50	8.10	20.35	30.00	H

LTE Band 66_5MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1712.50	-17.03	-29.60	8.10	20.67	30.00	H
1745.00	-17.10	-29.50	8.10	20.50	30.00	H
1777.50	-17.24	-29.50	8.10	20.36	30.00	H

LTE Band 66_10MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1715.00	-17.34	-29.60	8.10	20.36	30.00	H
1745.00	-17.14	-29.50	8.10	20.46	30.00	H
1775.00	-17.13	-29.50	8.10	20.47	30.00	H

LTE Band 66_15MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1717.50	-17.03	-29.60	8.10	20.67	30.00	H
1745.00	-16.93	-29.50	8.10	20.67	30.00	H
1772.53	-16.91	-29.50	8.10	20.69	30.00	H

LTE Band 66_20MHz_64QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)+ P _{Ag} (dB)	Ga Antenna Gain(dBi)	EIRP(dBm)	Limit(dBm)	Polarization
1720.00	-17.30	-29.60	8.10	20.40	30.00	H
1745.00	-17.13	-29.50	8.10	20.47	30.00	H
1770.00	-16.80	-29.50	8.10	20.80	30.00	H

Peak EIRP (dBm)=P_{Mea}(-15.56dBm)-(P_{cl}+P_{Ag})(-29.60dB)+G_a(8.10dB) =22.14dBm

ANALYZER SETTINGS:

RBW = VBW = 8MHz for occupied bandwidths equal to or less than 5MHz.

RBW = VBW = 20MHz for occupied bandwidths equal to or greater than 10MHz.

Note: The maximum value of expanded measurement uncertainty for this test item is U =

2.72dB(30MHz-3GHz)/3.60dB(3GHz-18GHz)/3.58dB(18GHz-40GHz), k = 2

Note: Both of Vertical and Horizontal polarizations are evaluated, but only the worst case is recorded in this report.

A.2 FIELD STRENGTH OF SPURIOUS RADIATION

Reference

FCC: CFR 2.1053, 22.917, 24.238, 27.53.

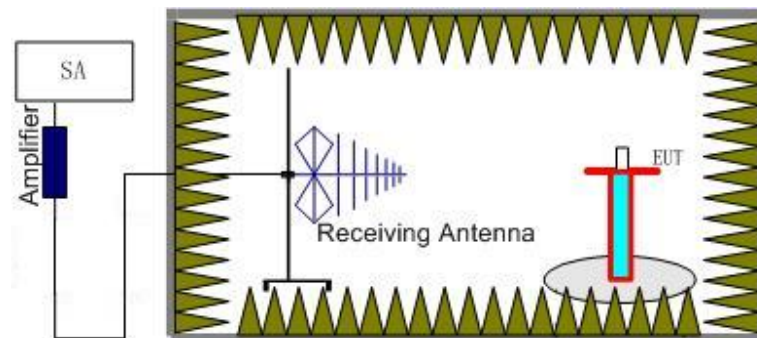
A.2.1 Measurement Method

This measurement is carried out in fully-anechoic chamber FAC-3.

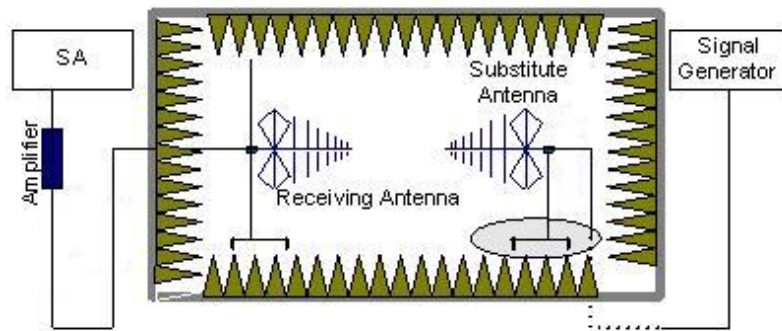
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz as outlined in Part 22.917, 24.238, 27.53(h) . The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE Bands 2,4,5,7,12,13, 17, 66.

The procedure of radiated spurious emissions is as follows:

1. For radiated emissions measurements performed at frequencies less than or equal to 1 GHz, EUT was placed on a 80 cm high non-conductive stand at a 3 meter test distance from the receive antenna. For radiated measurements performed at frequencies above 1 GHz, EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. Receiving antenna was placed on the antenna mast 3 meters from the EUT. For emission measurements. The receiving antenna shall be varied from 1 m to 4 m in height above the reference ground in a search for the relative positioning that produces the maximum radiated signal level. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna and adjusts the level of the signal generator output until the value of the receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain(dBi) (G_a) should be recorded after test.

An amplifier should be connected in for the test.

The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.

The measurement results are obtained as described below:

$$\text{Power (EIRP)} = P_{Mea} - P_{pl} + G_a$$

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit: dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dB}$.

A.2.2 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE Bands 2,4,5,7,12,13, 17, 66. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE Bands 2,4,5,7,12,13, 17, 66 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this. Only worst case result is given below.



LTE Band 2, 1.4MHz, QPSK, Channel 18607

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2965.60	-65.80	1.00	10.70	-53.95	-13.00	H
5038.80	-74.65	1.30	12.50	-63.45	-13.00	H
7248.23	-68.45	1.90	12.00	-58.35	-13.00	H
11032.23	-61.85	2.30	10.50	-53.65	-13.00	H
14794.97	-58.05	2.50	11.20	-49.35	-13.00	H
17692.37	-57.05	3.30	12.80	-47.55	-13.00	H

LTE Band 2, 1.4MHz, QPSK, Channel 18900

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2971.60	-63.55	1.00	10.70	-53.85	-13.00	H
4982.80	-74.65	1.30	12.50	-63.45	-13.00	H
7286.73	-68.45	1.90	12.00	-58.35	-13.00	H
11052.77	-61.95	2.30	10.50	-53.75	-13.00	H
14782.50	-58.05	2.50	11.20	-49.35	-13.00	H
17695.67	-56.65	3.30	12.80	-47.15	-13.00	H

LTE Band 2, 1.4MHz, QPSK, Channel 19193

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2972.40	-63.55	1.00	10.70	-53.85	-13.00	H
4910.00	-74.95	1.40	12.50	-63.85	-13.00	H
7281.97	-68.55	1.90	12.00	-58.45	-13.00	H
11050.20	-61.65	2.30	10.50	-53.45	-13.00	H
14811.83	-57.95	2.50	11.20	-49.25	-13.00	H
17873.13	-56.65	3.60	12.80	-47.45	-13.00	H

**LTE Band 2, 1.4MHz, 16QAM, Channel 18607**

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2965.20	-65.70	1.00	10.70	-53.85	-13.00	H
5010.00	-74.45	1.30	12.50	-63.25	-13.00	H
7286.73	-68.65	1.90	12.00	-58.55	-13.00	H
11044.33	-61.65	2.30	10.50	-53.45	-13.00	H
14793.50	-58.15	2.50	11.20	-49.45	-13.00	H
17698.23	-56.75	3.30	12.80	-47.25	-13.00	H

LTE Band 2, 1.4MHz, 16QAM, Channel 18900

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2965.60	-63.45	1.00	10.70	-53.75	-13.00	H
5031.20	-74.75	1.30	12.50	-63.55	-13.00	H
7307.63	-68.85	1.90	12.00	-58.75	-13.00	H
11015.00	-61.85	2.30	10.50	-53.65	-13.00	H
14866.83	-57.95	2.70	11.20	-49.45	-13.00	H
17693.83	-56.95	3.30	12.80	-47.45	-13.00	H

LTE Band 2, 1.4MHz, 16QAM, Channel 19193

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2973.20	-63.45	1.00	10.70	-53.75	-13.00	H
4803.20	-74.55	1.30	12.50	-63.35	-13.00	H
7257.77	-68.45	1.90	12.00	-58.35	-13.00	H
11026.00	-61.45	2.30	10.50	-53.25	-13.00	H
14793.50	-57.85	2.50	11.20	-49.15	-13.00	H
17696.77	-57.05	3.30	12.80	-47.55	-13.00	H

LTE Band 2, 1.4MHz, 64QAM, Channel 18607

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2968.80	-65.60	1.00	10.70	-53.75	-13.00	H
4988.80	-74.65	1.30	12.50	-63.45	-13.00	H
7249.70	-68.55	1.90	12.00	-58.45	-13.00	H
11041.40	-61.85	2.30	10.50	-53.65	-13.00	H
14796.80	-58.05	2.50	11.20	-49.35	-13.00	H
17698.23	-56.65	3.30	12.80	-47.15	-13.00	H

LTE Band 2, 1.4MHz, 64QAM, Channel 18900

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2970.40	-63.65	1.00	10.70	-53.95	-13.00	H
4972.80	-74.85	1.30	12.50	-63.65	-13.00	H
7283.80	-68.45	1.90	12.00	-58.35	-13.00	H
11049.47	-61.95	2.30	10.50	-53.75	-13.00	H
14800.47	-58.25	2.50	11.20	-49.55	-13.00	H
17876.07	-56.25	3.60	12.80	-47.05	-13.00	H

LTE Band 2, 1.4MHz, 64QAM, Channel 19193

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2966.00	-63.45	1.00	10.70	-53.75	-13.00	H
4802.40	-74.65	1.30	12.50	-63.45	-13.00	H
7282.70	-68.35	1.90	12.00	-58.25	-13.00	H
11050.20	-61.65	2.30	10.50	-53.45	-13.00	H
14821.73	-57.85	2.50	11.20	-49.15	-13.00	H
17696.77	-56.65	3.30	12.80	-47.15	-13.00	H

Note: The maximum value of expanded measurement uncertainty for this test item is $U = 2.72\text{dB}(30\text{MHz}-3\text{GHz})/3.60\text{dB}(3\text{GHz}-18\text{GHz})/3.58\text{dB}(18\text{GHz}-40\text{GHz})$, $k = 2$

**LTE Band 4, 1.4MHz QPSK, Channel 19957**

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2974.80	-63.45	1.00	10.70	-53.75	-13.00	H
3943.60	-76.25	1.30	12.20	-65.35	-13.00	H
5029.60	-74.75	1.30	12.50	-63.55	-13.00	H
7246.40	-68.35	1.90	12.00	-58.25	-13.00	H
11046.17	-61.55	2.30	10.50	-53.35	-13.00	H
14815.13	-58.05	2.50	11.20	-49.35	-13.00	H

LTE Band 4, 1.4MHz, QPSK, Channel 20175

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2530.40	-65.05	0.90	10.70	-55.25	-13.00	H
2965.20	-63.65	1.00	10.70	-53.95	-13.00	H
5012.40	-74.55	1.30	12.50	-63.35	-13.00	H
7285.27	-68.45	1.90	12.00	-58.35	-13.00	H
11037.73	-61.65	2.30	10.50	-53.45	-13.00	H
14808.90	-57.95	2.50	11.20	-49.25	-13.00	H

LTE Band 4, 1.4MHz, QPSK, Channel 20393

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2527.20	-65.45	0.90	10.70	-55.65	-13.00	H
2975.20	-63.45	1.00	10.70	-53.75	-13.00	H
4802.40	-74.75	1.30	12.50	-63.55	-13.00	H
7287.10	-68.45	1.90	12.00	-58.35	-13.00	H
11014.27	-61.85	2.30	10.50	-53.65	-13.00	H
14797.90	-58.05	2.50	11.20	-49.35	-13.00	H

**LTE Band 4, 1.4MHz, 16QAM, Channel 19957**

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2653.20	-65.25	1.00	10.70	-55.55	-13.00	H
2964.80	-63.45	1.00	10.70	-53.75	-13.00	H
4992.40	-74.45	1.30	12.50	-63.25	-13.00	H
7249.70	-68.85	1.90	12.00	-58.75	-13.00	H
11023.07	-61.85	2.30	10.50	-53.65	-13.00	H
14798.63	-58.05	2.50	11.20	-49.35	-13.00	H

LTE Band 4, 1.4MHz, 16QAM, Channel 20175

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2540.00	-65.15	0.90	10.70	-55.35	-13.00	H
2970.80	-63.85	1.00	10.70	-54.15	-13.00	H
4801.60	-74.85	1.30	12.50	-63.65	-13.00	H
7295.53	-68.55	1.90	12.00	-58.45	-13.00	H
11039.93	-61.75	2.30	10.50	-53.55	-13.00	H
14792.40	-58.05	2.50	11.20	-49.35	-13.00	H

LTE Band 4, 1.4MHz, 16QAM, Channel 20393

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2602.40	-64.95	0.90	10.70	-55.15	-13.00	H
2967.60	-63.25	1.00	10.70	-53.55	-13.00	H
4803.20	-74.95	1.30	12.50	-63.75	-13.00	H
7283.80	-68.45	1.90	12.00	-58.35	-13.00	H
11040.30	-61.75	2.30	10.50	-53.55	-13.00	H
14790.93	-58.05	2.50	11.20	-49.35	-13.00	H

LTE Band 4, 1.4MHz, 64QAM, Channel 19957

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2966.00	-63.65	1.00	10.70	-53.95	-13.00	H
3955.60	-76.45	1.20	12.20	-65.45	-13.00	H
5541.60	-75.15	1.40	13.10	-63.45	-13.00	H
7282.33	-68.55	1.90	12.00	-58.45	-13.00	H
11176.33	-62.35	2.50	10.50	-54.35	-13.00	H
14853.27	-58.35	2.70	11.20	-49.85	-13.00	H

LTE Band 4, 1.4MHz, 64QAM, Channel 20175

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2528.80	-65.25	0.90	10.70	-55.45	-13.00	H
2973.60	-63.65	1.00	10.70	-53.95	-13.00	H
4785.20	-74.85	1.30	12.50	-63.65	-13.00	H
7284.90	-68.25	1.90	12.00	-58.15	-13.00	H
11050.20	-61.75	2.30	10.50	-53.55	-13.00	H
14811.83	-57.85	2.50	11.20	-49.15	-13.00	H

LTE Band 4, 1.4MHz, 64QAM, Channel 20393

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2601.20	-64.95	0.90	10.70	-55.15	-13.00	H
2976.00	-63.45	1.00	10.70	-53.75	-13.00	H
4778.00	-74.65	1.30	12.50	-63.45	-13.00	H
7281.97	-68.55	1.90	12.00	-58.45	-13.00	H
11041.40	-61.45	2.30	10.50	-53.25	-13.00	H
14813.30	-58.05	2.50	11.20	-49.35	-13.00	H

Note: The maximum value of expanded measurement uncertainty for this test item is $U = 2.72\text{dB}(30\text{MHz}-3\text{GHz})/3.60\text{dB}(3\text{GHz}-18\text{GHz})/3.58\text{dB}(18\text{GHz}-40\text{GHz})$, $k = 2$



LTE Band 5, 1.4MHz, QPSK, Channel 20407

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1648.40	-67.75	0.80	8.10	-62.60	-13.00	H
2472.80	-65.85	0.90	9.80	-59.10	-13.00	V
3570.40	-77.25	1.20	12.20	-68.40	-13.00	H
4785.60	-75.05	1.30	12.50	-66.00	-13.00	H
6202.40	-73.85	1.60	13.10	-64.50	-13.00	H
7345.60	-69.15	1.70	12.00	-61.00	-13.00	H

LTE Band 5, 1.4MHz, QPSK, Channel 20525

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1672.00	-70.35	0.80	8.10	-65.20	-13.00	H
2508.40	-64.15	0.90	10.70	-56.50	-13.00	V
5032.00	-74.75	1.30	12.50	-65.70	-13.00	H
7283.60	-68.95	1.90	12.00	-61.00	-13.00	H
6129.60	-73.95	1.60	13.10	-64.60	-13.00	H
3605.60	-77.45	1.10	12.20	-68.50	-13.00	H

LTE Band 5, 1.4MHz, QPSK, Channel 20643

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1695.60	-67.45	0.80	8.10	-62.30	-13.00	V
2543.60	-57.55	0.90	10.70	-49.90	-13.00	H
3608.00	-77.35	1.10	12.20	-68.40	-13.00	H
4804.00	-75.05	1.30	12.50	-66.00	-13.00	H
5714.40	-75.35	1.50	13.10	-65.90	-13.00	H
7281.60	-68.85	1.90	12.00	-60.90	-13.00	H



LTE Band 5, 1.4MHz, 16QAM, Channel 20407

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1648.40	-71.35	0.80	8.10	-66.20	-13.00	H
2472.80	-67.25	0.90	9.80	-60.50	-13.00	V
3608.80	-77.55	1.10	12.20	-68.60	-13.00	H
5004.00	-74.95	1.30	12.50	-65.90	-13.00	H
5543.20	-75.15	1.40	13.10	-65.60	-13.00	H
7282.40	-68.95	1.90	12.00	-61.00	-13.00	H

LTE Band 5, 1.4MHz, 16QAM, Channel 20525

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1672.00	-70.65	0.80	8.10	-65.50	-13.00	H
2508.40	-65.15	0.90	10.70	-57.50	-13.00	V
3612.80	-77.45	1.20	12.20	-68.60	-13.00	H
4986.40	-74.75	1.30	12.50	-65.70	-13.00	H
6172.00	-74.15	1.60	13.10	-64.80	-13.00	H
7291.60	-68.65	1.90	12.00	-60.70	-13.00	H

LTE Band 5, 1.4MHz, 16QAM, Channel 20643

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1695.60	-68.05	0.80	8.10	-62.90	-13.00	H
2543.60	-57.55	0.90	10.70	-49.90	-13.00	H
3571.20	-77.45	1.20	12.20	-68.60	-13.00	H
4802.40	-75.15	1.30	12.50	-66.10	-13.00	H
6528.00	-72.25	1.70	12.40	-63.70	-13.00	H
7306.40	-68.95	1.90	12.00	-61.00	-13.00	H

LTE Band 5, 1.4MHz, 64QAM, Channel 20407

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1648.40	-71.45	0.80	8.10	-66.30	-13.00	H
2472.80	-67.35	0.90	9.80	-60.60	-13.00	V
5031.20	-74.85	1.30	12.50	-65.80	-13.00	H
6144.00	-74.15	1.60	13.10	-64.80	-13.00	H
7289.20	-68.65	1.90	12.00	-60.70	-13.00	H
7870.80	-68.95	1.70	11.30	-61.50	-13.00	H

LTE Band 5, 1.4MHz, 64QAM, Channel 20525

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1672.00	-70.55	0.80	8.10	-65.40	-13.00	H
2508.40	-65.15	0.90	10.70	-57.50	-13.00	H
3187.20	-77.65	1.10	11.50	-69.40	-13.00	H
4997.60	-74.85	1.30	12.50	-65.80	-13.00	H
6123.20	-74.15	1.60	13.10	-64.80	-13.00	H
7292.00	-68.65	1.90	12.00	-60.70	-13.00	H

LTE Band 5, 1.4MHz, 64QAM, Channel 20643

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1695.60	-68.45	0.80	8.10	-63.30	-13.00	H
2543.60	-57.85	0.90	10.70	-50.20	-13.00	H
3563.20	-77.35	1.20	12.20	-68.50	-13.00	H
4989.60	-74.75	1.30	12.50	-65.70	-13.00	H
6234.40	-73.65	1.60	13.10	-64.30	-13.00	H
7284.00	-68.75	1.90	12.00	-60.80	-13.00	H

Note: The maximum value of expanded measurement uncertainty for this test item is $U = 2.72\text{dB}(30\text{MHz}-3\text{GHz})/3.60\text{dB}(3\text{GHz}-18\text{GHz})/3.58\text{dB}(18\text{GHz}-40\text{GHz})$, $k = 2$



LTE Band 7, 5 MHz, QPSK, Channel 20775

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
3603.20	-77.55	1.10	12.20	-66.45	-25.00	H
5006.40	-74.85	1.30	12.50	-63.65	-25.00	H
7356.80	-69.15	1.70	12.00	-58.85	-25.00	H
11378.35	-61.55	2.50	10.50	-53.55	-25.00	V
14869.50	-60.15	2.70	11.20	-51.65	-25.00	H
17925.60	-57.55	3.20	12.80	-47.95	-25.00	H

LTE Band 7, 5 MHz, QPSK, Channel 21100

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
3605.60	-77.55	1.10	12.20	-66.45	-25.00	H
4774.40	-75.15	1.30	12.50	-63.95	-25.00	H
7353.60	-69.45	1.70	12.00	-59.15	-25.00	H
11322.35	-62.25	2.60	10.50	-54.35	-25.00	H
14767.35	-60.25	2.50	11.20	-51.55	-25.00	H
17982.90	-57.55	3.20	12.80	-47.95	-25.00	H

LTE Band 7, 5 MHz, QPSK, Channel 21425

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
3613.60	-77.25	1.20	12.20	-66.25	-25.00	H
5032.00	-74.75	1.30	12.50	-63.55	-25.00	H
7354.40	-69.45	1.70	12.00	-59.15	-25.00	H
9438.40	-67.35	2.10	11.60	-57.85	-25.00	H
14811.45	-59.75	2.50	11.20	-51.05	-25.00	H
17875.50	-57.15	3.60	12.80	-47.95	-25.00	H

**LTE Band 7, 5 MHz, 16QAM, Channel 20775**

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
3614.40	-77.45	1.20	12.20	-66.45	-25.00	H
4972.80	-74.95	1.30	12.50	-63.75	-25.00	H
7282.00	-68.65	1.90	12.00	-58.55	-25.00	H
11378.00	-61.65	2.50	10.50	-53.65	-25.00	V
14869.05	-59.85	2.70	11.20	-51.35	-25.00	H
17982.00	-57.95	3.20	12.80	-48.35	-25.00	H

LTE Band 7, 5 MHz, 16QAM, Channel 21100

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
3600.80	-77.55	1.10	12.20	-66.45	-25.00	H
4988.00	-74.95	1.30	12.50	-63.75	-25.00	H
7283.60	-68.85	1.90	12.00	-58.75	-25.00	H
11367.50	-62.75	2.50	10.50	-54.75	-25.00	H
14862.75	-59.55	2.70	11.20	-51.05	-25.00	H
17981.70	-57.75	3.20	12.80	-48.15	-25.00	H

LTE Band 7, 5 MHz, 16QAM, Channel 21425

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
4984.80	-74.95	1.30	12.50	-63.75	-25.00	H
7304.80	-69.15	1.90	12.00	-59.05	-25.00	H
8946.00	-68.45	2.00	12.00	-58.45	-25.00	H
11323.05	-62.35	2.60	10.50	-54.45	-25.00	H
14803.35	-60.15	2.50	11.20	-51.45	-25.00	H
17875.20	-57.25	3.60	12.80	-48.05	-25.00	H

**LTE Band 7, 5 MHz, 64QAM, Channel 20775**

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
3612.00	-77.25	1.20	12.20	-66.25	-25.00	H
5003.20	-74.95	1.30	12.50	-63.75	-25.00	H
7305.20	-69.05	1.90	12.00	-58.95	-25.00	H
11319.90	-62.35	2.60	10.50	-54.45	-25.00	H
14811.45	-59.95	2.50	11.20	-51.25	-25.00	H
17873.40	-57.25	3.60	12.80	-48.05	-25.00	H

LTE Band 7, 5 MHz, 64QAM, Channel 21100

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
3560.00	-77.35	1.20	12.20	-66.35	-25.00	H
4988.00	-74.85	1.30	12.50	-63.65	-25.00	H
7248.00	-69.05	1.90	12.00	-58.95	-25.00	H
11365.40	-62.35	2.50	10.50	-54.35	-25.00	H
14809.20	-59.75	2.50	11.20	-51.05	-25.00	H
17871.00	-57.15	3.60	12.80	-47.95	-25.00	H

LTE Band 7, 5 MHz, 64QAM, Channel 21425

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
3612.80	-77.45	1.20	12.20	-66.45	-25.00	H
5009.60	-74.85	1.30	12.50	-63.65	-25.00	H
7344.80	-69.45	1.70	12.00	-59.15	-25.00	H
11321.65	-62.25	2.60	10.50	-54.35	-25.00	H
14813.25	-59.75	2.50	11.20	-51.05	-25.00	H
17980.50	-58.15	3.20	12.80	-48.55	-25.00	H

Note: The maximum value of expanded measurement uncertainty for this test item is $U = 2.72\text{dB}(30\text{MHz}-3\text{GHz})/3.60\text{dB}(3\text{GHz}-18\text{GHz})/3.58\text{dB}(18\text{GHz}-40\text{GHz})$, $k = 2$

**LTE Band 12, 1.4MHz, QPSK, Channel 23017**

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1398.40	-41.55	0.70	6.00	-38.40	-13.00	H
2028.80	-77.55	0.80	9.80	-70.70	-13.00	H
2797.20	-63.95	1.00	10.70	-56.40	-13.00	H
3593.60	-77.85	1.10	12.20	-68.90	-13.00	H
5032.80	-74.85	1.30	12.50	-65.80	-13.00	H
6128.00	-74.15	1.60	13.10	-64.80	-13.00	H

LTE Band 12, 1.4MHz, QPSK, Channel 23095

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1414.00	-41.85	0.70	6.00	-38.70	-13.00	H
1862.00	-67.95	0.80	8.10	-62.80	-13.00	H
2266.40	-66.55	0.90	9.80	-59.80	-13.00	H
2409.20	-53.45	0.90	9.80	-46.70	-13.00	H
2974.40	-63.95	1.00	10.70	-56.40	-13.00	H
3949.20	-77.35	1.20	12.20	-68.50	-13.00	H

LTE Band 12, 1.4MHz, QPSK, Channel 23173

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1429.60	-43.35	0.70	6.00	-40.20	-13.00	H
1861.20	-67.95	0.80	8.10	-62.80	-13.00	H
2266.00	-66.45	0.90	9.80	-59.70	-13.00	H
2760.80	-64.75	1.00	10.70	-57.20	-13.00	H
2859.60	-62.35	1.00	10.70	-54.80	-13.00	H
3916.40	-77.25	1.30	12.20	-68.50	-13.00	H

**LTE Band 12, 1.4MHz, 16QAM, Channel 23017**

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1398.40	-42.85	0.70	6.00	-39.70	-13.00	H
1848.00	-67.95	0.80	8.10	-62.80	-13.00	H
2268.00	-66.35	0.90	9.80	-59.60	-13.00	H
2797.20	-62.05	1.00	10.70	-54.50	-13.00	H
2968.00	-63.95	1.00	10.70	-56.40	-13.00	H
4438.00	-76.35	1.30	12.40	-67.40	-13.00	H

LTE Band 12, 1.4MHz 16QAM, Channel 23095

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1414.00	-42.15	0.70	6.00	-39.00	-13.00	H
1861.20	-67.75	0.80	8.10	-62.60	-13.00	H
2266.00	-66.35	0.90	9.80	-59.60	-13.00	H
2759.60	-64.75	1.00	10.70	-57.20	-13.00	H
2973.20	-63.85	1.00	10.70	-56.30	-13.00	H
5001.20	-74.85	1.30	12.50	-65.80	-13.00	H

LTE Band 12, 1.4MHz, 16QAM, Channel 23173

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1429.60	-43.25	0.70	6.00	-40.10	-13.00	H
1861.20	-67.85	0.80	8.10	-62.70	-13.00	H
2266.80	-66.25	0.90	9.80	-59.50	-13.00	H
2756.80	-64.85	1.00	10.70	-57.30	-13.00	H
2859.60	-62.25	1.00	10.70	-54.70	-13.00	H
4770.40	-75.35	1.30	12.50	-66.30	-13.00	H



LTE Band 12, 1.4MHz, 64QAM, Channel 23017

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1398.40	-42.85	0.70	6.00	-39.70	-13.00	H
1856.00	-67.95	0.80	8.10	-62.80	-13.00	H
2264.00	-66.45	0.90	9.80	-59.70	-13.00	H
2797.20	-61.85	1.00	10.70	-54.30	-13.00	H
2973.20	-63.85	1.00	10.70	-56.30	-13.00	H
4802.80	-75.15	1.30	12.50	-66.10	-13.00	H

LTE Band 12, 1.4MHz 64QAM, Channel 23095

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1414.00	-42.25	0.70	6.00	-39.10	-13.00	H
1860.80	-67.85	0.80	8.10	-62.70	-13.00	H
2269.20	-66.35	0.90	9.80	-59.60	-13.00	H
2800.40	-64.85	1.00	10.70	-57.30	-13.00	H
2964.80	-63.85	1.00	10.70	-56.30	-13.00	H
5011.10	-74.65	1.30	12.50	-65.60	-13.00	H

LTE Band 12, 1.4MHz, 64QAM, Channel 23173

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1429.60	-43.35	0.70	6.00	-40.20	-13.00	H
2859.60	-62.25	1.00	10.70	-54.70	-13.00	H
2602.80	-65.35	0.90	10.70	-57.70	-13.00	H
2014.80	-67.65	0.80	9.80	-60.80	-13.00	H
3570.00	-77.35	1.20	12.20	-68.50	-13.00	H
4284.40	-76.75	1.20	12.40	-67.70	-13.00	H

Note: The maximum value of expanded measurement uncertainty for this test item is $U = 2.72\text{dB}(30\text{MHz}-3\text{GHz})/3.60\text{dB}(3\text{GHz}-18\text{GHz})/3.58\text{dB}(18\text{GHz}-40\text{GHz})$, $k = 2$

**LTE Band 13, 5 MHz, QPSK, Channel 23205**

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1603.20	-69.15	0.70	8.10	-63.90	-40.00	H
1551.20	-60.95	0.70	8.10	-55.70	-13.00	H
2024.40	-67.75	0.80	9.80	-60.90	-13.00	H
2540.40	-65.55	0.90	10.70	-57.90	-13.00	H
2965.20	-63.95	1.00	10.70	-56.40	-13.00	H
5010.50	-74.65	1.30	12.50	-65.60	-13.00	H

LTE Band 13, 5 MHz, QPSK, Channel 23230

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1599.60	-69.15	0.70	8.10	-63.90	-40.00	H
1556.00	-63.35	0.70	8.10	-58.10	-13.00	H
2031.20	-67.75	0.80	9.80	-60.90	-13.00	H
2539.20	-65.55	0.90	10.70	-57.90	-13.00	H
2967.60	-63.95	1.00	10.70	-56.40	-13.00	H
5031.20	-74.65	1.30	12.50	-65.60	-13.00	H

LTE Band 13, 5 MHz, QPSK, Channel 23255

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1608.00	-69.15	0.70	8.10	-63.90	-40.00	H
1562.80	-64.05	0.70	8.10	-58.80	-13.00	H
2032.40	-67.85	0.80	9.80	-61.00	-13.00	H
2538.80	-65.65	0.90	10.70	-58.00	-13.00	H
2971.60	-63.95	1.00	10.70	-56.40	-13.00	H
5012.00	-74.55	1.30	12.50	-65.50	-13.00	H

**LTE Band 13, 5 MHz, 16QAM, Channel 23205**

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1605.20	-60.05	0.70	8.10	-54.80	-40.00	H
2024.40	-67.65	0.80	9.80	-60.80	-13.00	H
2537.20	-65.55	0.90	10.70	-57.90	-13.00	H
2974.00	-63.85	1.00	10.70	-56.30	-13.00	H
3612.00	-77.35	1.20	12.20	-68.50	-13.00	H
6558.20	-71.95	1.70	12.40	-63.40	-13.00	H

LTE Band 13, 5 MHz, 16QAM, Channel 23230

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1595.35	-61.95	0.70	8.10	-56.70	-40.00	H
2016.00	-67.75	0.80	9.80	-60.90	-13.00	H
2976.40	-64.05	1.00	10.70	-56.50	-13.00	H
3884.80	-76.95	1.20	12.20	-68.10	-13.00	H
5027.90	-74.75	1.30	12.50	-65.70	-13.00	H
6580.70	-71.95	1.70	12.40	-63.40	-13.00	H

LTE Band 13, 5 MHz, 16QAM, Channel 23255

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1562.80	-62.95	0.70	8.10	-57.70	-40.00	H
2014.40	-67.95	0.80	9.80	-61.10	-13.00	H
2530.00	-65.65	0.90	10.70	-58.00	-13.00	H
2973.60	-63.95	1.00	10.70	-56.40	-13.00	H
4782.80	-74.95	1.30	12.50	-65.90	-13.00	H
6615.20	-71.95	1.70	12.40	-63.40	-13.00	H



LTE Band 13, 5 MHz, 64QAM, Channel 23205

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1607.20	-61.65	0.70	8.10	-56.40	-40.00	H
2024.80	-67.65	0.80	9.80	-60.80	-13.00	H
2541.20	-65.65	0.90	10.70	-58.00	-13.00	H
3570.80	-77.25	1.20	12.20	-68.40	-13.00	H
5010.20	-74.65	1.30	12.50	-65.60	-13.00	H
7303.40	-68.75	1.90	12.00	-60.80	-13.00	H

LTE Band 13, 5 MHz, 64QAM, Channel 23230

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1595.50	-61.25	0.70	8.10	-56.00	-40.00	H
2019.60	-68.15	0.80	9.80	-61.30	-13.00	H
2541.60	-65.65	0.90	10.70	-58.00	-13.00	H
2976.40	-64.15	1.00	10.70	-56.60	-13.00	H
3651.20	-77.65	1.20	12.20	-68.80	-13.00	H
5007.20	-74.65	1.30	12.50	-65.60	-13.00	H

LTE Band 13, 5 MHz, 64QAM, Channel 23255

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1596.80	-68.95	0.70	8.10	-63.70	-40.00	H
1562.80	-63.85	0.70	8.10	-58.60	-13.00	H
2266.80	-66.45	0.90	9.80	-59.70	-13.00	H
2809.60	-64.85	1.00	10.70	-57.30	-13.00	H
2972.00	-63.95	1.00	10.70	-56.40	-13.00	H
7304.90	-68.65	1.90	12.00	-60.70	-13.00	H

Note: The maximum value of expanded measurement uncertainty for this test item is $U = 2.72\text{dB}(30\text{MHz}-3\text{GHz})/3.60\text{dB}(3\text{GHz}-18\text{GHz})/3.58\text{dB}(18\text{GHz}-40\text{GHz})$, $k = 2$

**LTE Band 17, 5MHz, QPSK, Channel 23755**

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1408.40	-43.15	0.70	6.00	-40.00	-13.00	H
1862.80	-67.95	0.80	8.10	-62.80	-13.00	H
2267.60	-66.45	0.90	9.80	-59.70	-13.00	H
2817.60	-62.55	1.00	10.70	-55.00	-13.00	H
2975.60	-63.95	1.00	10.70	-56.40	-13.00	H
5554.10	-75.35	1.40	13.10	-65.80	-13.00	H

LTE Band 17, 5MHz, QPSK, Channel 23790

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1415.60	-37.15	0.70	6.00	-34.00	-13.00	H
1860.40	-67.95	0.80	8.10	-62.80	-13.00	H
2268.00	-66.55	0.90	9.80	-59.80	-13.00	H
2760.80	-64.75	1.00	10.70	-57.20	-13.00	H
2831.60	-63.25	1.00	10.70	-55.70	-13.00	H
6131.00	-73.65	1.60	13.10	-64.30	-13.00	H

LTE Band 17, 5MHz, QPSK, Channel 23825

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1422.40	-36.75	0.70	6.00	-33.60	-13.00	H
1862.00	-67.95	0.80	8.10	-62.80	-13.00	H
2265.20	-66.55	0.90	9.80	-59.80	-13.00	H
2594.40	-65.55	1.00	10.70	-58.00	-13.00	H
2845.60	-58.65	1.00	10.70	-51.10	-13.00	H
5541.50	-74.85	1.40	13.10	-65.30	-13.00	H

LTE Band 17, 5MHz, 16QAM, Channel 23755

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1408.40	-43.05	0.70	6.00	-39.90	-13.00	H
1859.60	-67.95	0.80	8.10	-62.80	-13.00	H
2266.00	-66.55	0.90	9.80	-59.80	-13.00	H
2817.60	-62.45	1.00	10.70	-54.90	-13.00	H
2966.00	-63.95	1.00	10.70	-56.40	-13.00	H
5850.50	-74.65	1.40	13.10	-65.10	-13.00	H

LTE Band 17, 5MHz 16QAM, Channel 23790

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1415.60	-37.15	0.70	6.00	-34.00	-13.00	H
1852.80	-67.95	0.80	8.10	-62.80	-13.00	H
2268.00	-66.45	0.90	9.80	-59.70	-13.00	H
2831.60	-62.95	1.00	10.70	-55.40	-13.00	H
4582.40	-75.95	1.30	12.50	-66.90	-13.00	H
5040.50	-74.75	1.30	12.50	-65.70	-13.00	H

LTE Band 17, 5MHz, 16QAM, Channel 23825

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1422.40	-36.65	0.70	6.00	-33.50	-13.00	H
1860.00	-68.05	0.80	8.10	-62.90	-13.00	H
2263.60	-66.55	0.90	9.80	-59.80	-13.00	H
2845.60	-58.65	1.00	10.70	-51.10	-13.00	H
2973.20	-63.95	1.00	10.70	-56.40	-13.00	H
6560.30	-71.75	1.70	12.40	-63.20	-13.00	H

LTE Band 17, 5MHz, 64QAM, Channel 23755

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1408.40	-43.05	0.70	6.00	-39.90	-13.00	H
1846.80	-67.95	0.80	8.10	-62.80	-13.00	H
2268.40	-66.45	0.90	9.80	-59.70	-13.00	H
2817.60	-62.65	1.00	10.70	-55.10	-13.00	H
2965.60	-63.95	1.00	10.70	-56.40	-13.00	H
4868.80	-75.35	1.40	12.50	-66.40	-13.00	H

LTE Band 17, 5MHz 64QAM, Channel 23790

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1415.60	-37.15	0.70	6.00	-34.00	-13.00	H
1862.00	-68.05	0.80	8.10	-62.90	-13.00	H
2266.80	-66.45	0.90	9.80	-59.70	-13.00	H
2539.60	-65.55	0.90	10.70	-57.90	-13.00	H
2831.60	-63.15	1.00	10.70	-55.60	-13.00	H
5032.40	-74.65	1.30	12.50	-65.60	-13.00	H

LTE Band 17, 5MHz, 64QAM, Channel 23825

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak ERP(dBm)	Limit(dBm)	Polarization
1422.40	-36.85	0.70	6.00	-33.70	-13.00	H
1861.20	-67.95	0.80	8.10	-62.80	-13.00	H
2268.40	-66.45	0.90	9.80	-59.70	-13.00	H
2845.60	-58.75	1.00	10.70	-51.20	-13.00	H
4780.00	-75.05	1.30	12.50	-66.00	-13.00	H
6572.90	-71.55	1.70	12.40	-63.00	-13.00	H

Note: The maximum value of expanded measurement uncertainty for this test item is $U = 2.72\text{dB}(30\text{MHz}-3\text{GHz})/3.60\text{dB}(3\text{GHz}-18\text{GHz})/3.58\text{dB}(18\text{GHz}-40\text{GHz})$, $k = 2$

**LTE Band 66, 1.4MHz QPSK, Channel 131979**

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2963.60	-63.85	1.00	10.70	-54.15	-13.00	H
5005.60	-74.25	1.30	12.50	-63.05	-13.00	H
7283.43	-68.05	1.90	12.00	-57.95	-13.00	H
11049.47	-62.55	2.30	10.50	-54.35	-13.00	H
14869.03	-58.25	2.70	11.20	-49.75	-13.00	H
16879.47	-64.45	2.90	16.50	-50.85	-13.00	H

LTE Band 66, 1.4MHz, QPSK, Channel 132322

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2614.40	-65.35	0.90	10.70	-55.55	-13.00	H
2979.20	-63.95	1.00	10.70	-54.25	-13.00	H
5008.80	-74.15	1.30	12.50	-62.95	-13.00	H
7281.97	-68.75	1.90	12.00	-58.65	-13.00	H
8940.03	-68.25	2.00	12.00	-58.25	-13.00	H
10245.37	-64.45	2.20	11.30	-55.35	-13.00	H

LTE Band 66, 1.4MHz, QPSK, Channel 132665

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2538.40	-64.85	0.90	10.70	-55.05	-13.00	H
2968.80	-63.55	1.00	10.70	-53.85	-13.00	H
3600.00	-77.05	1.10	12.20	-65.95	-13.00	H
5032.40	-74.45	1.30	12.50	-63.25	-13.00	H
7304.70	-68.65	1.90	12.00	-58.55	-13.00	H
9465.83	-66.95	2.10	11.60	-57.45	-13.00	H

LTE Band 66, 1.4MHz, 16QAM, Channel 131979

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2600.40	-65.05	0.90	10.70	-55.25	-13.00	H
3874.40	-76.75	1.20	12.20	-65.75	-13.00	H
5032.00	-74.65	1.30	12.50	-63.45	-13.00	H
7252.27	-68.55	1.90	12.00	-58.45	-13.00	H
8948.83	-68.25	2.00	12.00	-58.25	-13.00	H
11233.53	-61.85	2.60	10.50	-53.95	-13.00	H

LTE Band 66, 1.4MHz, 16QAM, Channel 132322

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2760.00	-64.45	1.00	10.70	-54.75	-13.00	H
3566.80	-77.25	1.20	12.20	-66.25	-13.00	H
4284.80	-76.35	1.20	12.40	-65.15	-13.00	H
5005.20	-74.55	1.30	12.50	-63.35	-13.00	H
7342.47	-69.05	1.70	12.00	-58.75	-13.00	H
10199.90	-64.75	2.20	11.30	-55.65	-13.00	H

LTE Band 66, 1.4MHz, 16QAM, Channel 132665

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2540.40	-65.25	0.90	10.70	-55.45	-13.00	H
2965.20	-63.55	1.00	10.70	-53.85	-13.00	H
3940.40	-76.55	1.30	12.20	-65.65	-13.00	H
4875.20	-74.75	1.40	12.50	-63.65	-13.00	H
7290.03	-68.25	1.90	12.00	-58.15	-13.00	H
8247.77	-68.55	1.90	11.30	-59.15	-13.00	H



LTE Band 66, 1.4MHz, 64QAM, Channel 131979

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2606.40	-64.95	0.90	10.70	-55.15	-13.00	H
2964.80	-63.75	1.00	10.70	-54.05	-13.00	H
4743.60	-74.85	1.30	12.50	-63.65	-13.00	H
7279.77	-68.65	1.90	12.00	-58.55	-13.00	H
8141.80	-68.35	1.80	11.30	-58.85	-13.00	H
11357.83	-61.55	2.50	10.50	-53.55	-13.00	H

LTE Band 66, 1.4MHz, 64QAM, Channel 132322

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2600.80	-64.85	0.90	10.70	-55.05	-13.00	H
2964.40	-63.55	1.00	10.70	-53.85	-13.00	H
4035.60	-76.85	1.20	12.40	-65.65	-13.00	H
5033.60	-74.45	1.30	12.50	-63.25	-13.00	H
7247.50	-68.55	1.90	12.00	-58.45	-13.00	H
10249.03	-64.35	2.20	11.30	-55.25	-13.00	H

LTE Band 66, 1.4MHz, 64QAM, Channel 132665

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit(dBm)	Polarization
2604.40	-65.15	0.90	10.70	-55.35	-13.00	H
2967.20	-63.55	1.00	10.70	-53.85	-13.00	H
4036.40	-76.85	1.20	12.40	-65.65	-13.00	H
5015.20	-74.45	1.30	12.50	-63.25	-13.00	H
7267.30	-68.75	1.90	12.00	-58.65	-13.00	H
9062.13	-67.75	2.20	11.60	-58.35	-13.00	H

Note: The maximum value of expanded measurement uncertainty for this test item is $U = 2.72\text{dB}(30\text{MHz}-3\text{GHz})/3.60\text{dB}(3\text{GHz}-18\text{GHz})/3.58\text{dB}(18\text{GHz}-40\text{GHz})$, $k = 2$



A.3 FREQUENCY STABILITY

Reference

FCC: CFR Part 2.1055, 22.355, 24.235, 27.54.

A.3.1 Method of Measurement

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -10°C .
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -10°C to $+50^{\circ}\text{C}$. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at $+50^{\circ}\text{C}$.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10°C increments from $+50^{\circ}\text{C}$ to -10°C . Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to $\pm 0.5^{\circ}\text{C}$ during the measurement procedure.

A.3.2 Measurement Limit

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d) (2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.60V and 4.40V, with a nominal voltage of 3.85V. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance from -5.4% to 10.8%. For the purposes of measuring frequency stability these voltage limits are to be used.

A.3.3 Measurement results

LTE Band 2, 1.4MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
3.60	23	18	9	0.012	0.010	0.005
3.85	9	7	16	0.005	0.004	0.009
4.40	11	12	3	0.006	0.006	0.002

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
-10	15	25	23	0.008	0.013	0.012
0	17	15	28	0.009	0.008	0.015
10	14	17	15	0.007	0.009	0.008
20	22	24	17	0.012	0.013	0.009
30	18	18	7	0.010	0.010	0.004
40	6	16	9	0.003	0.009	0.005
50	13	13	16	0.007	0.007	0.009

Expanded measurement uncertainty is 10 Hz, $k = 2$

LTE Band 4, 1.4MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
3.60	8	12	9	0.005	0.007	0.005
3.85	7	5	16	0.004	0.003	0.009
4.40	11	7	22	0.006	0.004	0.013

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
-10	16	13	16	0.009	0.008	0.009
0	17	8	15	0.010	0.005	0.009
10	18	7	27	0.010	0.004	0.016
20	24	14	18	0.014	0.008	0.010
30	23	3	14	0.013	0.002	0.008
40	18	16	19	0.010	0.009	0.011
50	26	8	7	0.015	0.005	0.004

Expanded measurement uncertainty is 10Hz, $k = 2$



LTE Band 5, 1.4MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
3.60	23	29	9	0.027	0.035	0.011
3.85	14	24	15	0.017	0.029	0.018
4.40	27	31	33	0.032	0.037	0.039

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
-10	26	18	29	0.031	0.022	0.035
0	31	29	15	0.037	0.035	0.018
10	15	24	24	0.018	0.029	0.029
20	24	33	17	0.029	0.039	0.020
30	35	26	15	0.042	0.031	0.018
40	33	15	16	0.039	0.018	0.019
50	26	37	22	0.031	0.044	0.026

Expanded measurement uncertainty is 10Hz, $k = 2$

LTE Band 7, 5MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
3.60	16	8	13	0.006	0.003	0.005
3.85	17	15	21	0.007	0.006	0.008
4.40	4	7	4	0.002	0.003	0.002

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
-10	16	18	16	0.006	0.007	0.006
0	24	15	24	0.009	0.006	0.009
10	17	17	17	0.007	0.007	0.007
20	15	22	22	0.006	0.009	0.009
30	8	16	22	0.003	0.006	0.009
40	22	24	13	0.009	0.009	0.005
50	13	25	18	0.005	0.010	0.007

Expanded measurement uncertainty is 10 Hz, $k = 2$



LTE Band 12, 1.4MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
3.60	24	24	9	0.034	0.034	0.013
3.85	11	25	11	0.016	0.035	0.016
4.40	13	18	23	0.018	0.025	0.033

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
-10	24	20	18	0.034	0.028	0.025
0	15	10	14	0.021	0.014	0.020
10	26	14	16	0.037	0.020	0.023
20	28	16	12	0.040	0.023	0.017
30	18	24	10	0.025	0.034	0.014
40	17	18	8	0.024	0.025	0.011
50	10	9	15	0.014	0.013	0.021

Expanded measurement uncertainty is 10Hz, k = 2

LTE Band 13, 5MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
3.60	20	16	18	0.026	0.020	0.023
3.85	15	12	15	0.019	0.015	0.019
4.40	17	24	22	0.022	0.031	0.028

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
-10	26	19	20	0.033	0.024	0.026
0	16	15	15	0.020	0.019	0.019
10	14	24	17	0.018	0.031	0.022
20	18	28	18	0.023	0.036	0.023
30	10	16	16	0.013	0.020	0.020
40	12	31	21	0.015	0.040	0.027
50	13	22	24	0.017	0.028	0.031

Expanded measurement uncertainty is 10Hz, k = 2



LTE Band 17, 5MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
3.60	15	22	13	0.019	0.028	0.017
3.85	14	15	26	0.018	0.019	0.033
4.40	12	7	24	0.015	0.009	0.031

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
-10	22	3	19	0.028	0.004	0.024
0	15	15	25	0.019	0.019	0.032
10	14	7	14	0.018	0.009	0.018
20	10	14	28	0.013	0.018	0.036
30	17	12	16	0.022	0.015	0.020
40	15	8	11	0.019	0.010	0.014
50	9	6	7	0.012	0.008	0.009

Expanded measurement uncertainty is 10Hz, k = 2

LTE Band 66, 1.4MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
3.60	24	13	9	0.014	0.007	0.005
3.85	17	25	5	0.010	0.014	0.003
4.40	16	14	11	0.009	0.008	0.006

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)			Frequency error (ppm)		
	QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
-10	20	13	26	0.011	0.007	0.015
0	15	15	24	0.009	0.009	0.014
10	17	10	12	0.010	0.006	0.007
20	14	14	15	0.008	0.008	0.009
30	10	24	14	0.006	0.014	0.008
40	16	21	17	0.009	0.012	0.010
50	23	18	27	0.013	0.010	0.015

Expanded measurement uncertainty is 10Hz, k = 2

A.4 OCCUPIED BANDWIDTH

Reference

FCC: CFR Part 2.1049, 22.917, 24.238, 27.53.

A.4.1 Occupied Bandwidth Results

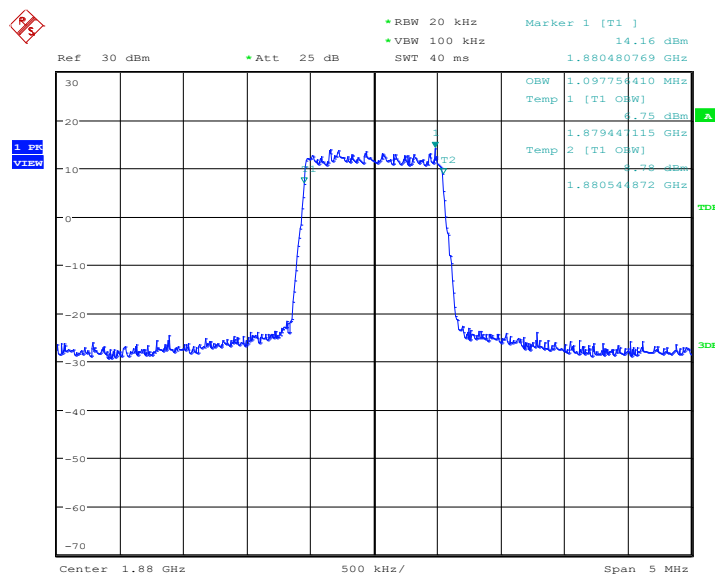
Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

- The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- The nominal IF filter bandwidth (3 dB 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.
- Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- Set the detection mode to peak, and the trace mode to max hold.
- Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

LTE band 2, 1.4MHz (99% BW)

Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
1880.0	1097.76	1089.74	1097.76

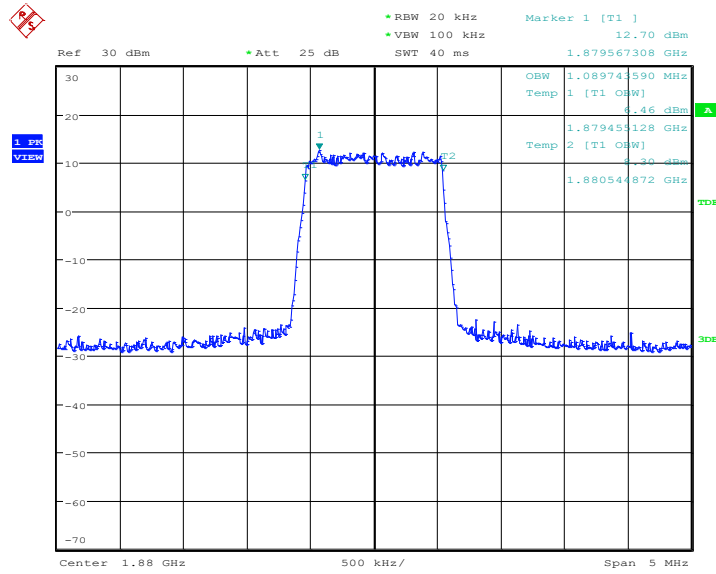
LTE band 2, 1.4MHz Bandwidth, QPSK (99% BW)



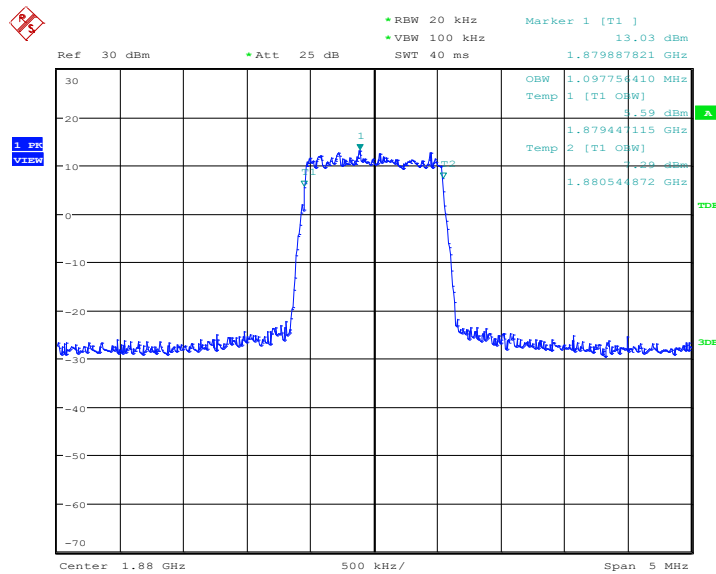
Date: 12.APR.2021 14:29:37



LTE band 2, 1.4MHz Bandwidth, 16QAM (99% BW)



LTE band 2, 1.4MHz Bandwidth, 64QAM (99% BW)

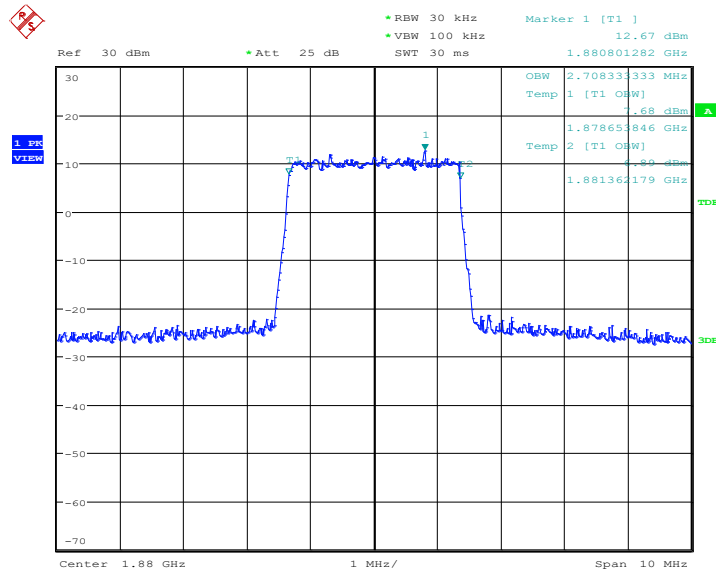




LTE band 2, 3MHz (99% BW)

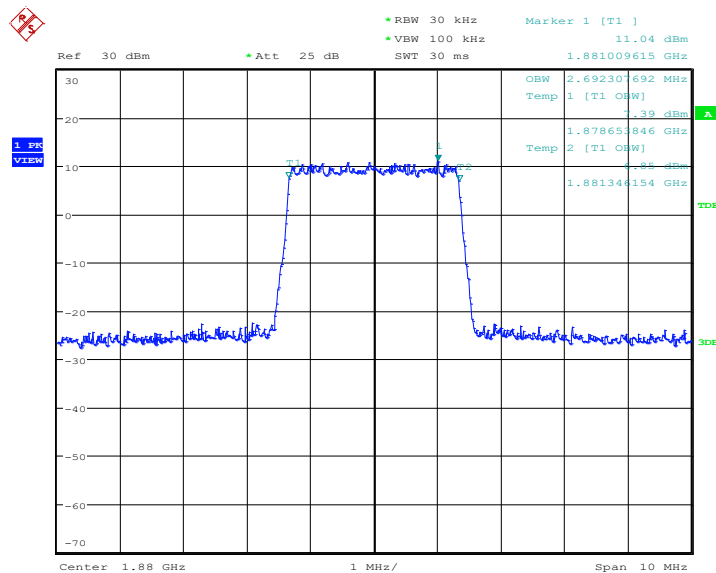
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
1880.0	2708.33	2692.31	2692.31

LTE band 2, 3MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:31:54

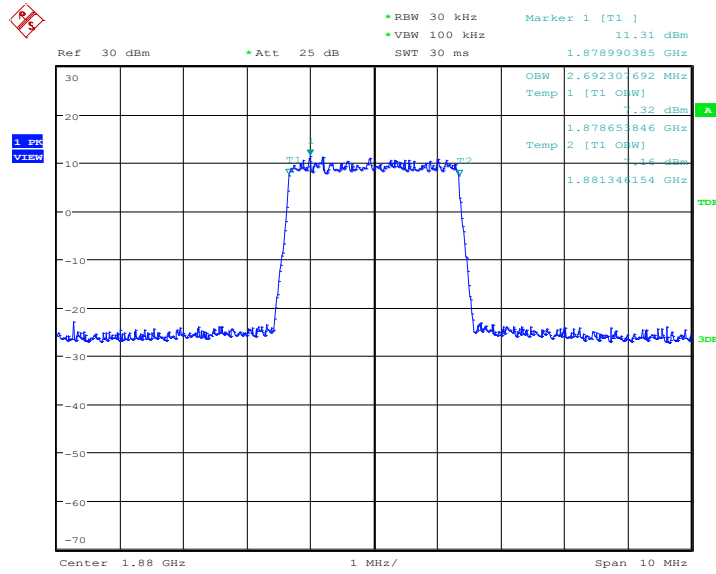
LTE band 2, 3MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:32:08



LTE band 2, 3MHz Bandwidth, 64QAM (99% BW)



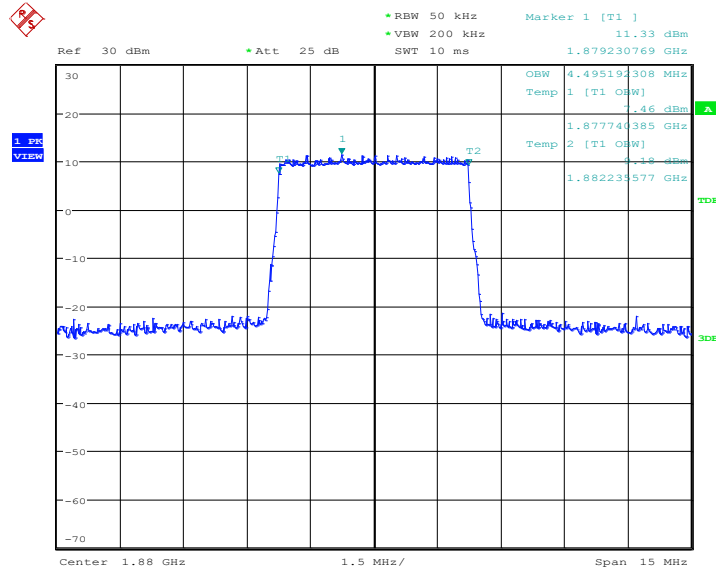
Date: 12.APR.2021 15:57:26



LTE band 2, 5MHz (99% BW)

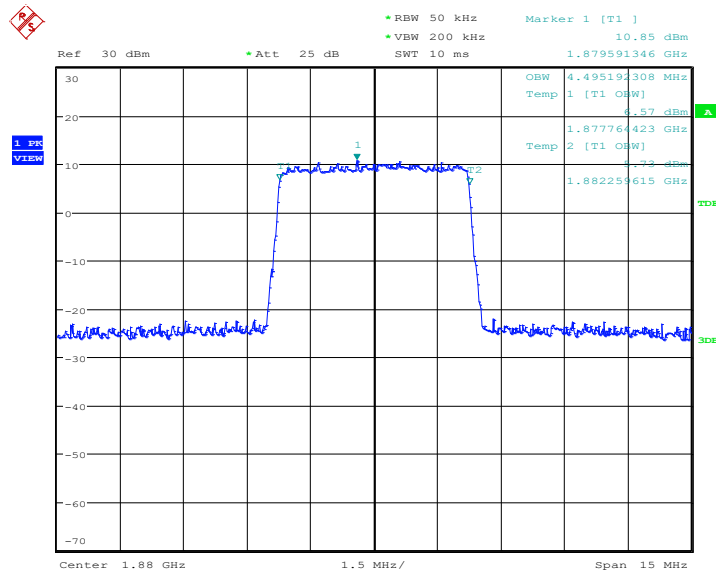
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
1880.0	4495.19	4495.19	4471.15

LTE band 2, 5MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:34:12

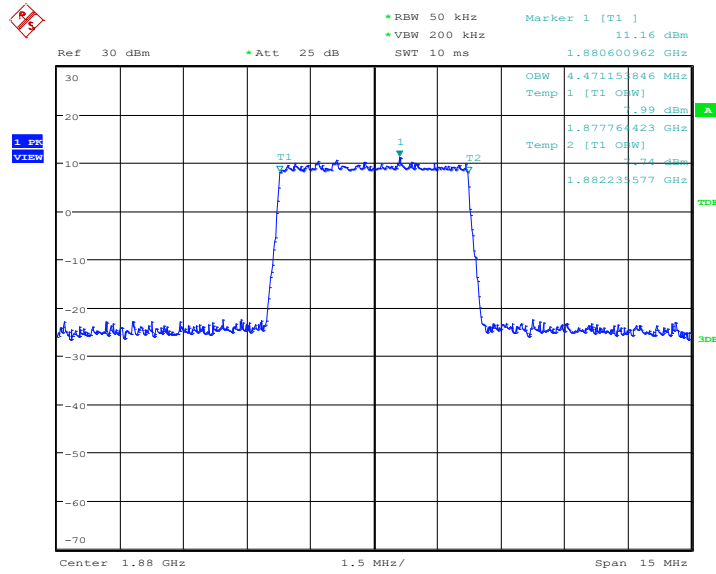
LTE band 2, 5MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:34:25



LTE band 2, 5MHz Bandwidth,64QAM (99% BW)



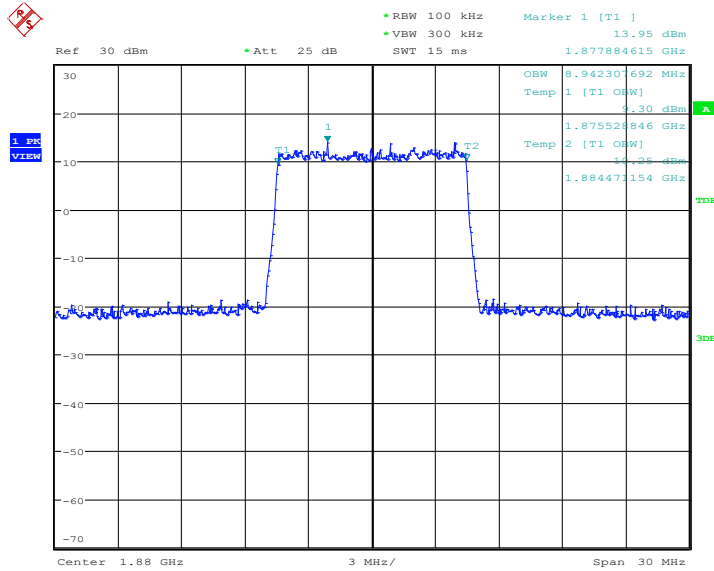
Date: 12.APR.2021 15:59:14



LTE band 2, 10MHz (99% BW)

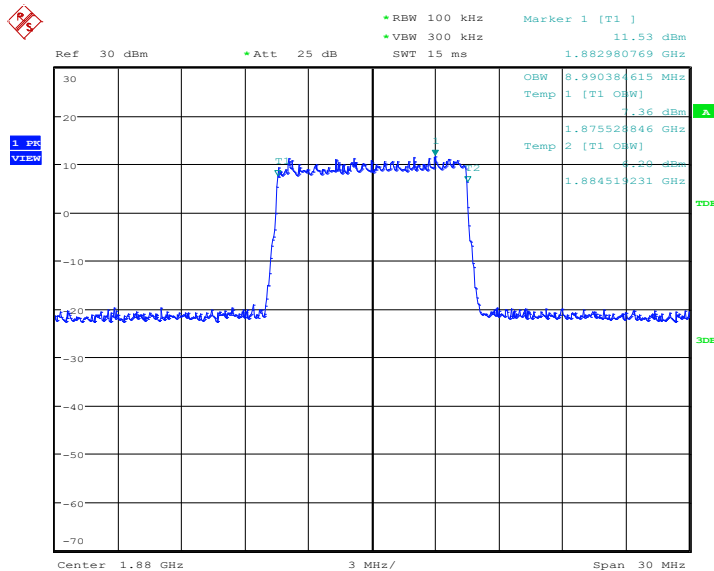
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
1880.0	8942.31	8990.38	8990.38

LTE band 2, 10MHz Bandwidth, QPSK (99% BW)



Date: 15.APR.2021 14:26:17

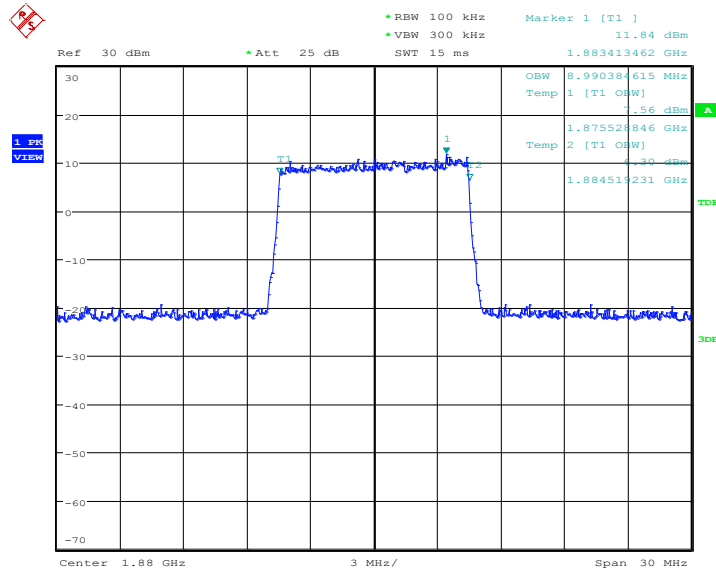
LTE band 2, 10MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:36:43



LTE band 2, 10MHz Bandwidth, 64QAM (99% BW)



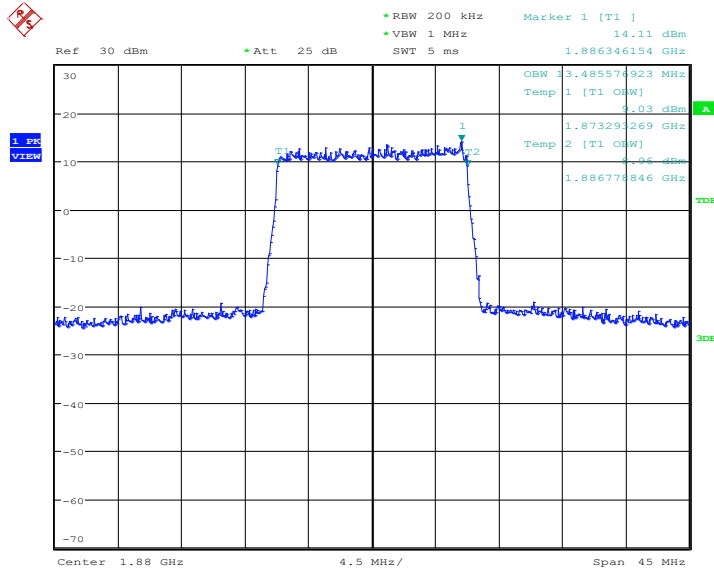
Date: 12.APR.2021 16:01:02



LTE band 2, 15MHz (99% BW)

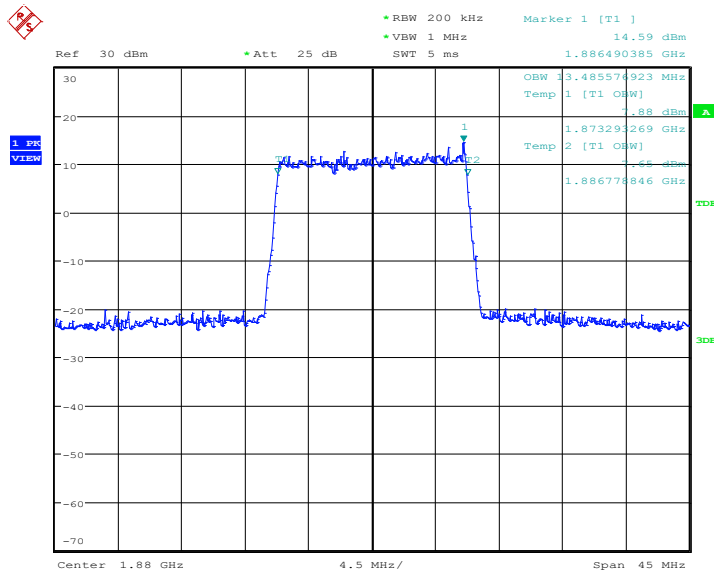
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
1880.0	13485.58	13485.58	13485.58

LTE band 2, 15MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:40:17

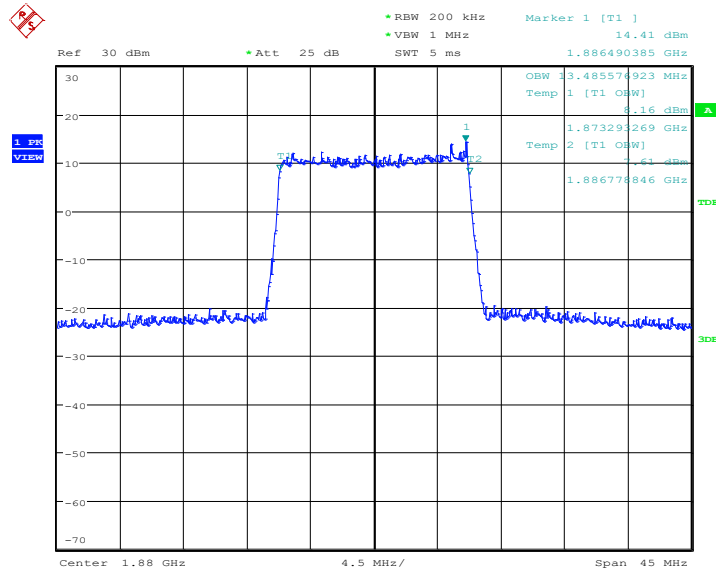
LTE band 2, 15MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:40:31



LTE band 2, 15MHz Bandwidth, 64QAM (99% BW)



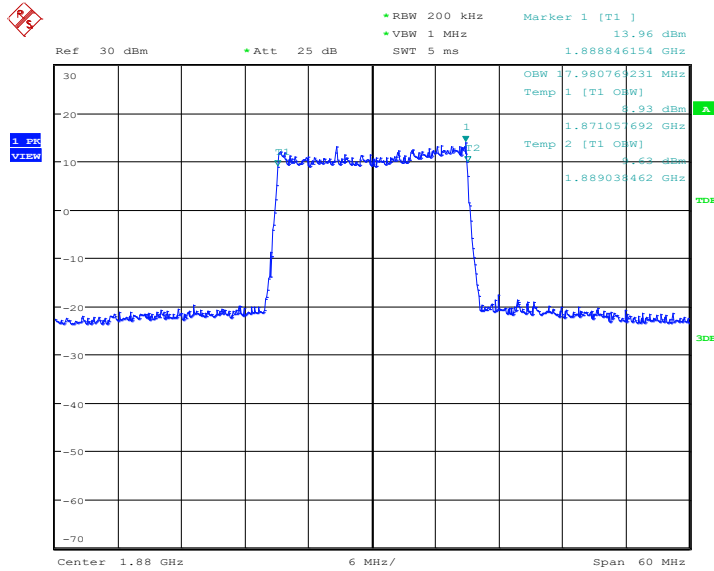
Date: 12.APR.2021 16:02:51



LTE band 2, 20MHz (99% BW)

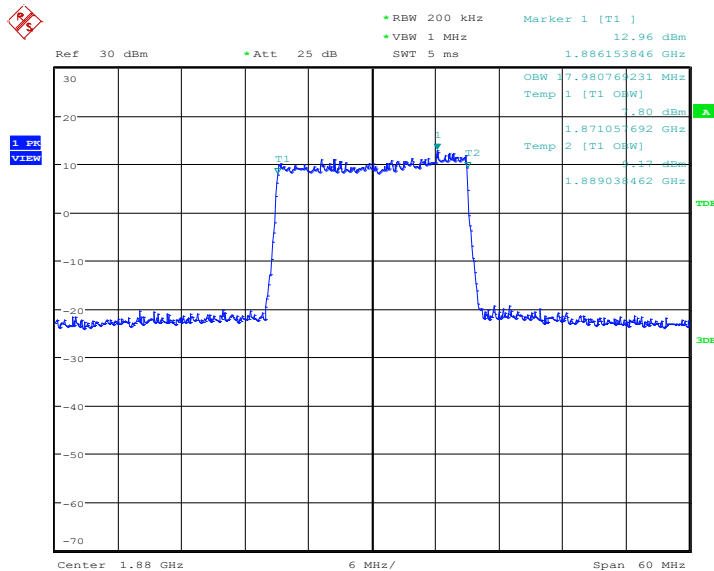
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
1880.0	17980.77	17980.77	17980.77

LTE band 2, 20MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:42:35

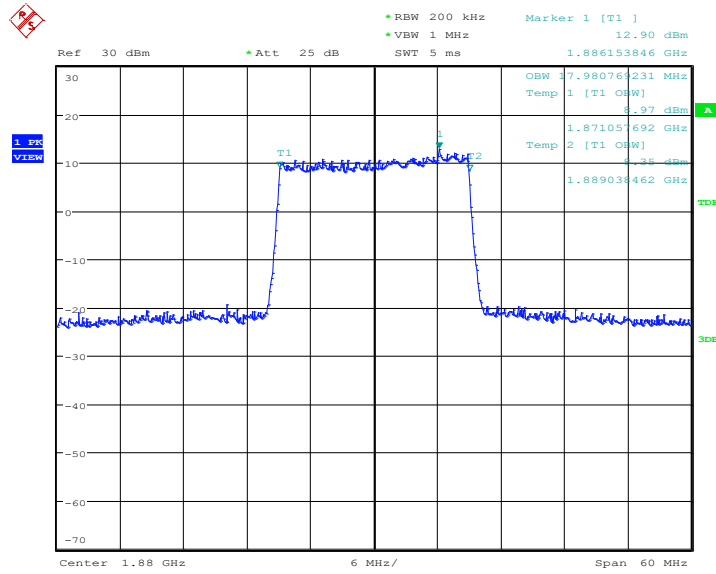
LTE band 2, 20MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:42:49



LTE band 2, 20MHz Bandwidth, 64QAM (99% BW)



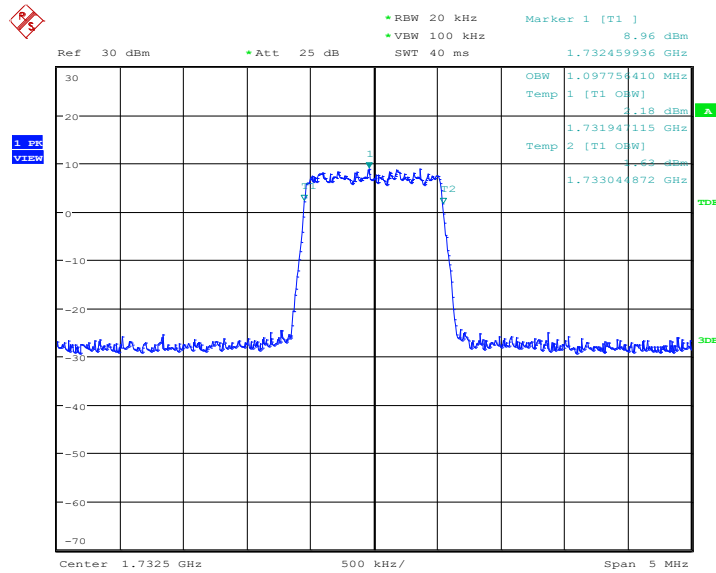
Date: 12.APR.2021 16:04:39



LTE band 4, 1.4MHz (99% BW)

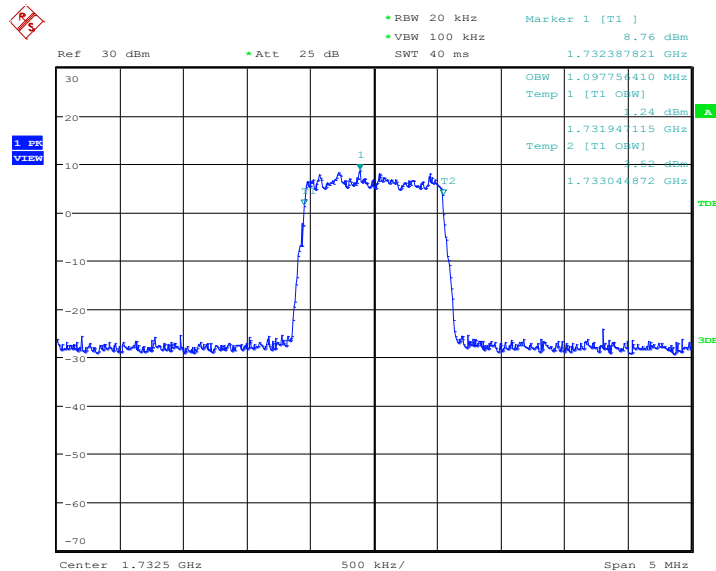
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
1732.5	1097.76	1097.76	1089.74

LTE band 4, 1.4MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:45:28

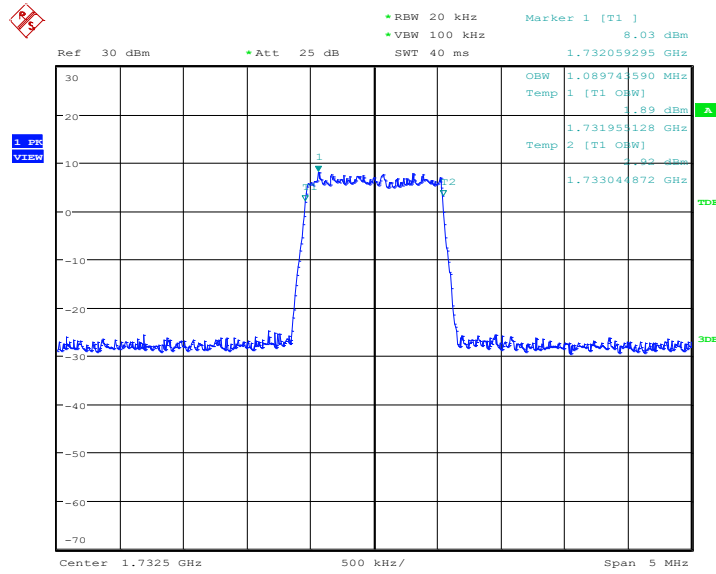
LTE band 4, 1.4MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:45:42



LTE band 4, 1.4MHz Bandwidth, 64QAM (99% BW)



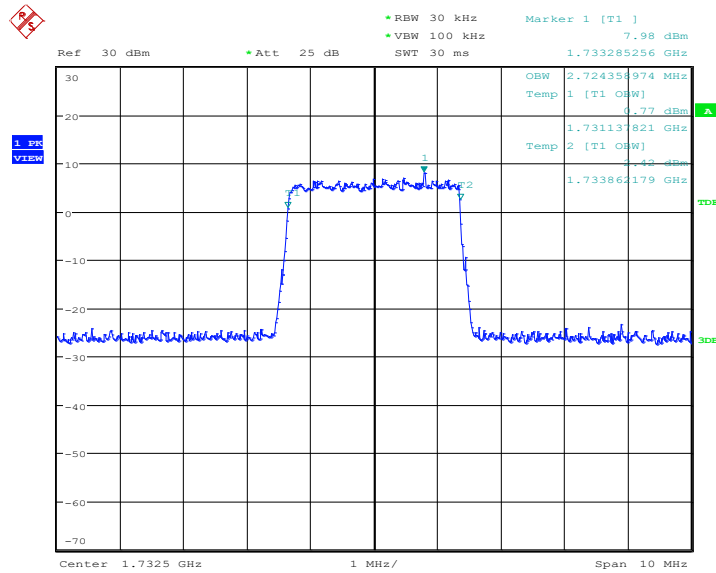
Date: 12.APR.2021 16:06:59



LTE band 4, 3MHz (99% BW)

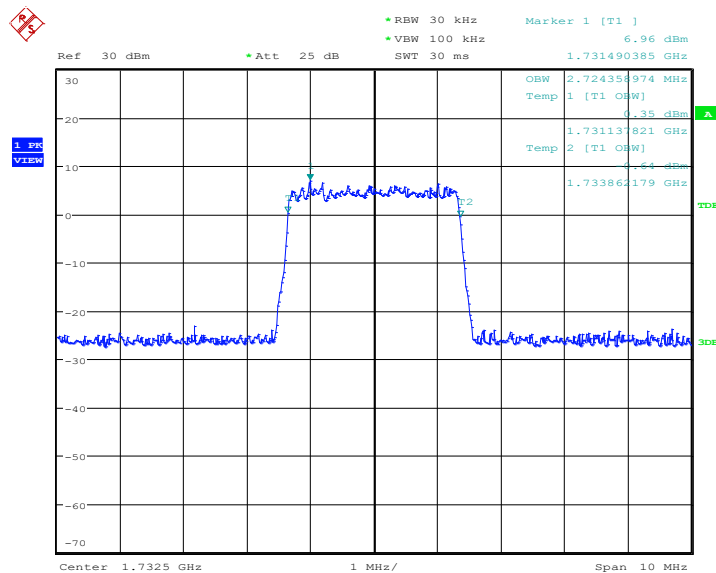
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
1732.5	2724.36	2724.36	2724.36

LTE band 4, 3MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:47:46

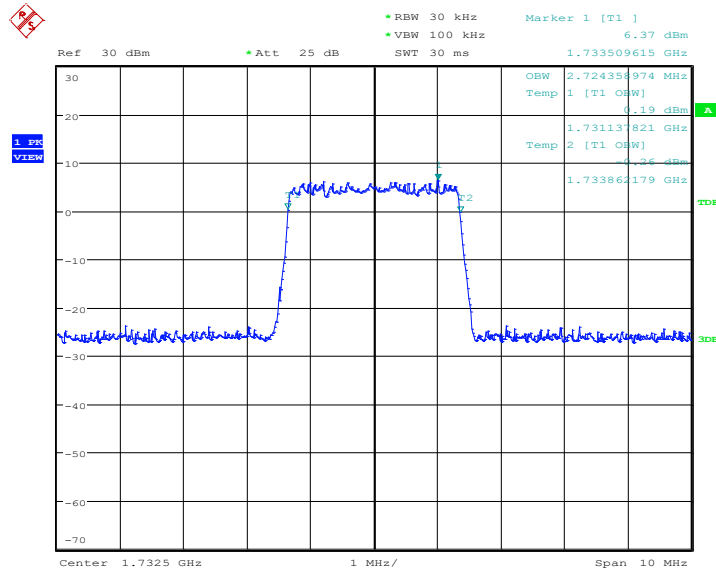
LTE band 4, 3MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:48:00



LTE band 4, 3MHz Bandwidth, 64QAM (99% BW)



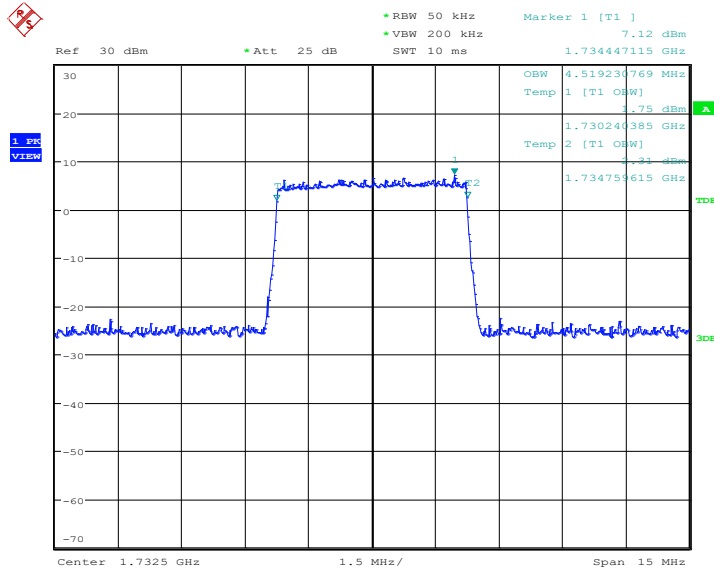
Date: 12.APR.2021 16:08:47



LTE band 4, 5MHz (99% BW)

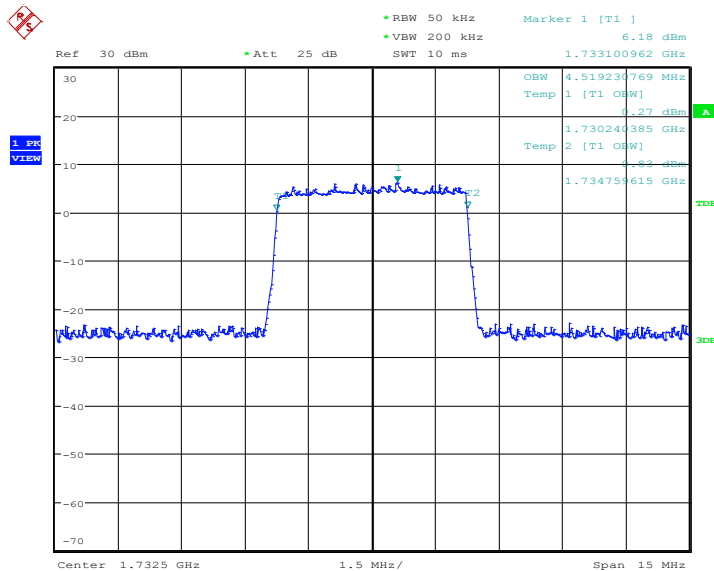
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
1732.5	4519.23	4519.23	4519.23

LTE band 4, 5MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:50:04

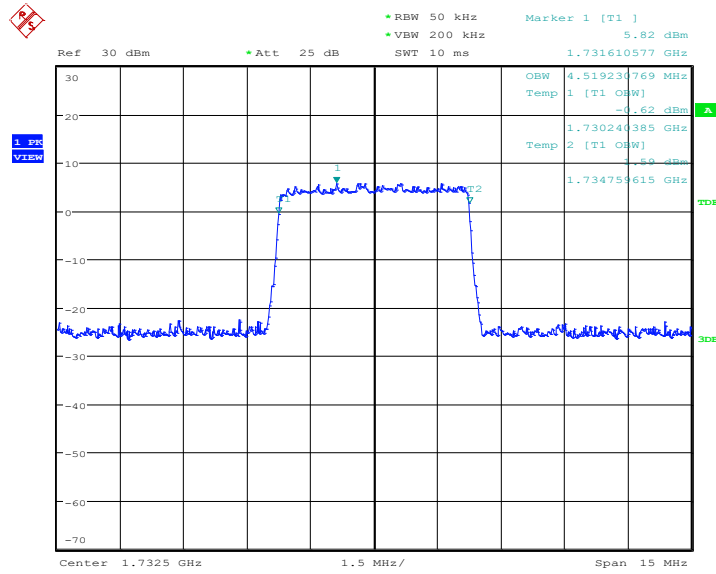
LTE band 4, 5MHz Bandwidth,16QAM (99% BW)



Date: 12.APR.2021 14:50:17



LTE band 4, 5MHz Bandwidth,64QAM (99% BW)



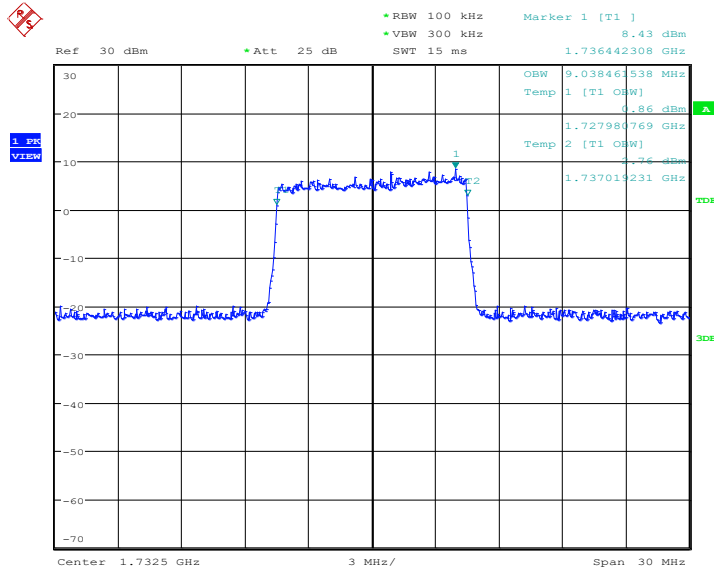
Date: 12.APR.2021 16:10:35



LTE band 4, 10MHz (99% BW)

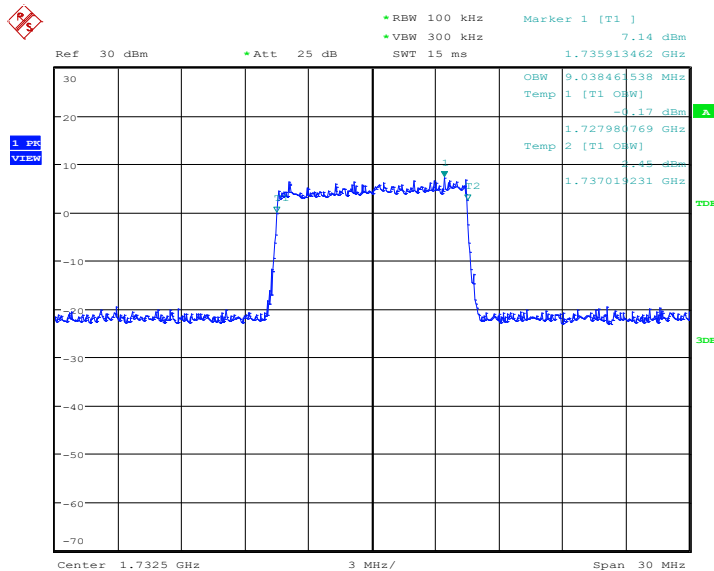
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
1732.5	9038.46	9038.46	9038.46

LTE band 4, 10MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:52:21

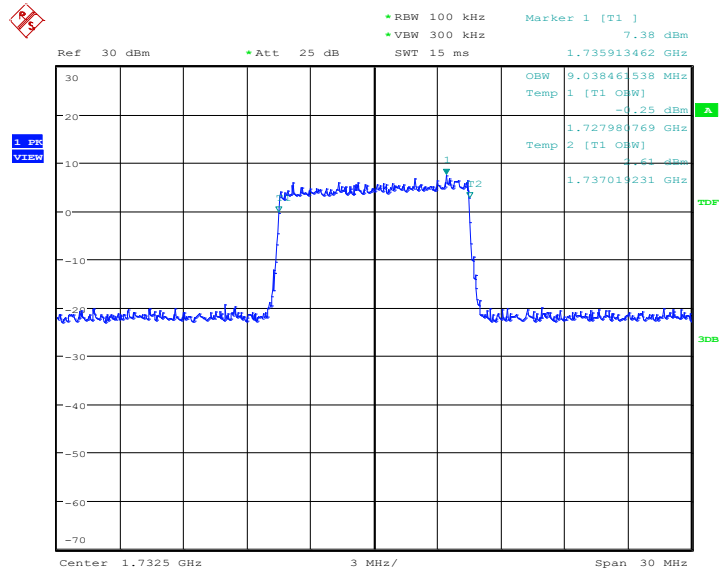
LTE band 4, 10MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:52:35



LTE band 4, 10MHz Bandwidth, 64QAM (99% BW)



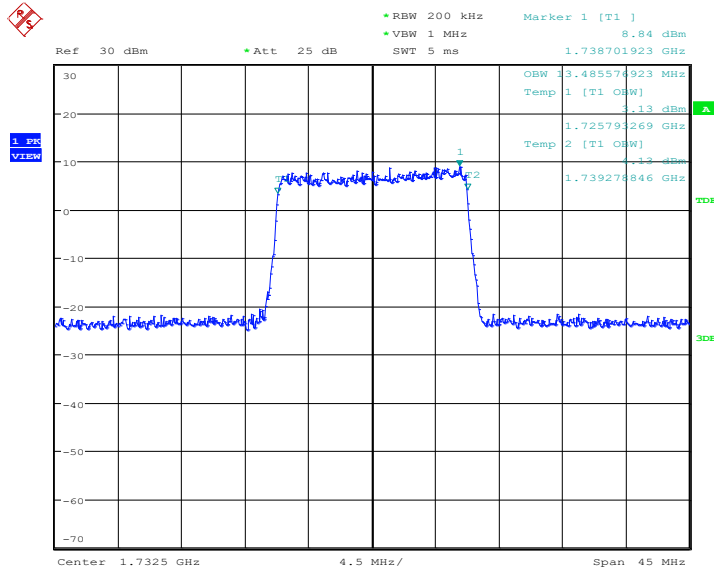
Date: 12.APR.2021 16:12:24



LTE band 4, 15MHz (99% BW)

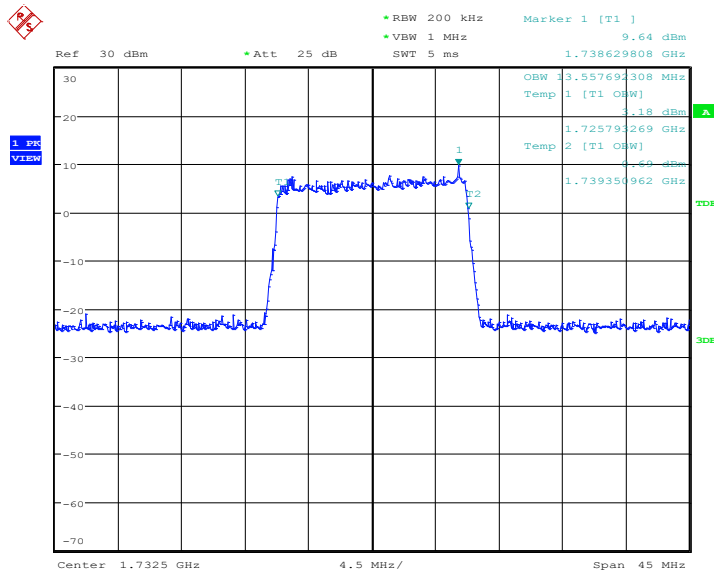
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
1732.5	13485.58	13557.69	13557.69

LTE band 4, 15MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:54:39

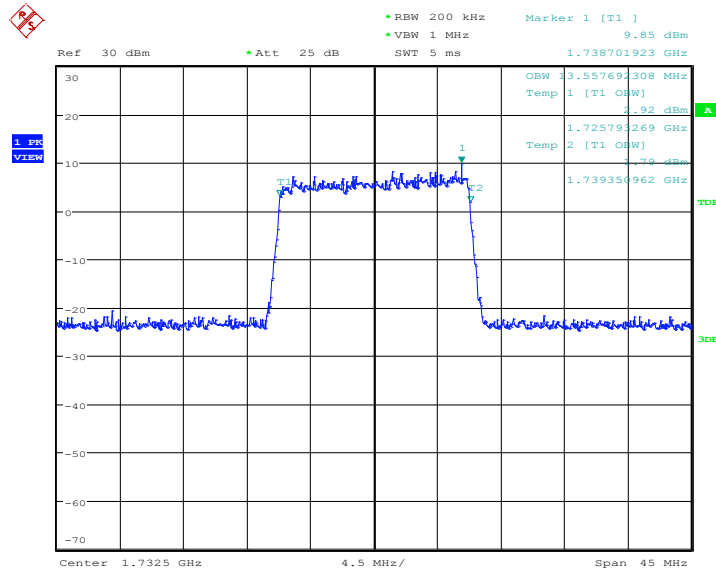
LTE band 4, 15MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:54:53



LTE band 4, 15MHz Bandwidth, 64QAM (99% BW)



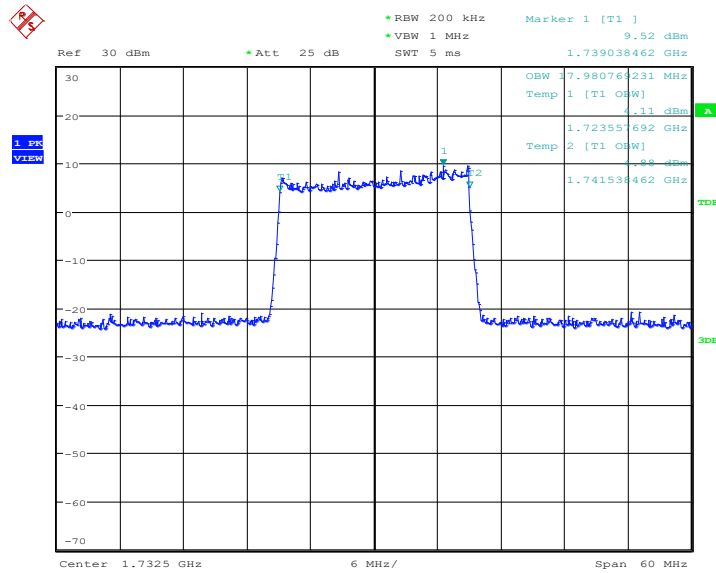
Date: 12.APR.2021 16:14:12



LTE band 4, 20MHz (99% BW)

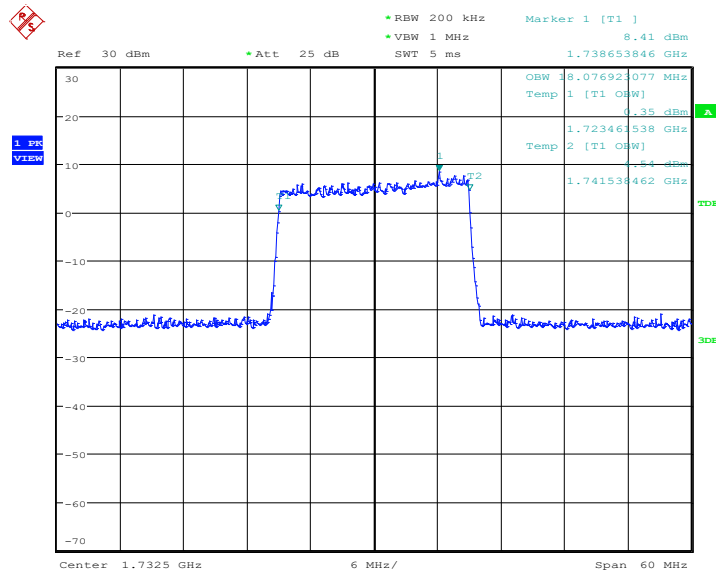
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
1732.5	17980.77	18076.92	18076.92

LTE band 4, 20MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:56:57

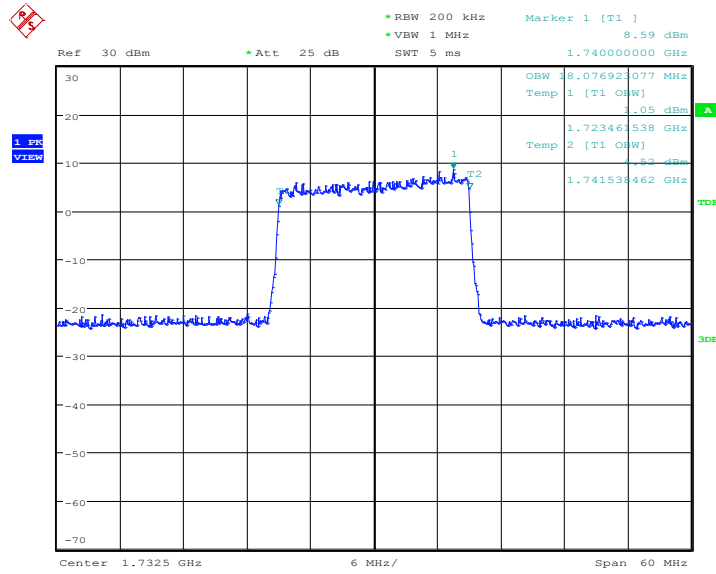
LTE band 4, 20MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:57:11



LTE band 4, 20MHz Bandwidth, 64QAM (99% BW)



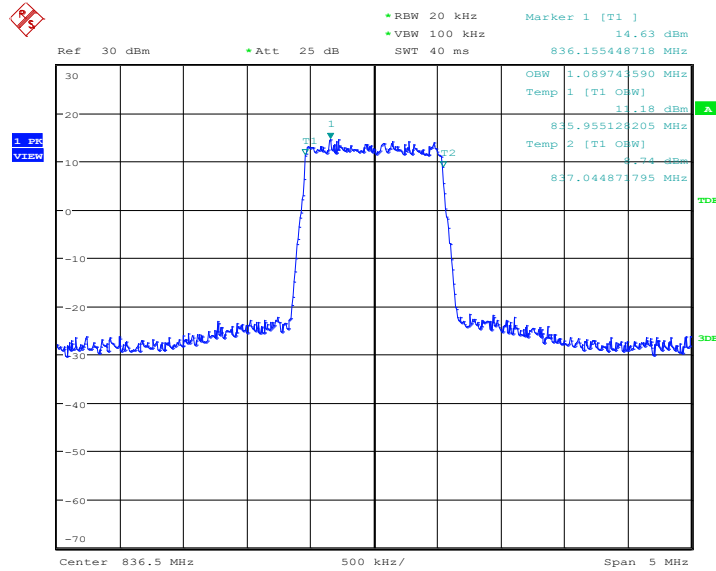
Date: 12.APR.2021 16:16:00



LTE band 5, 1.4MHz (99% BW)

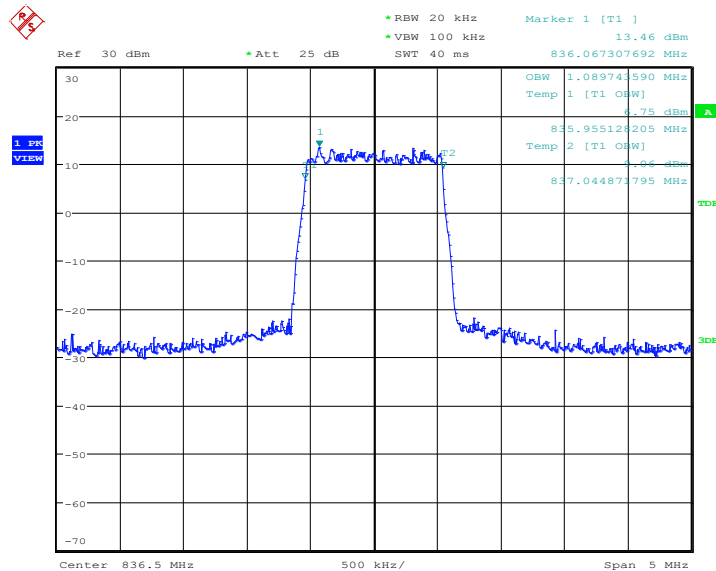
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
836.5	1089.74	1089.74	1089.74

LTE band 5, 1.4MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:19:54

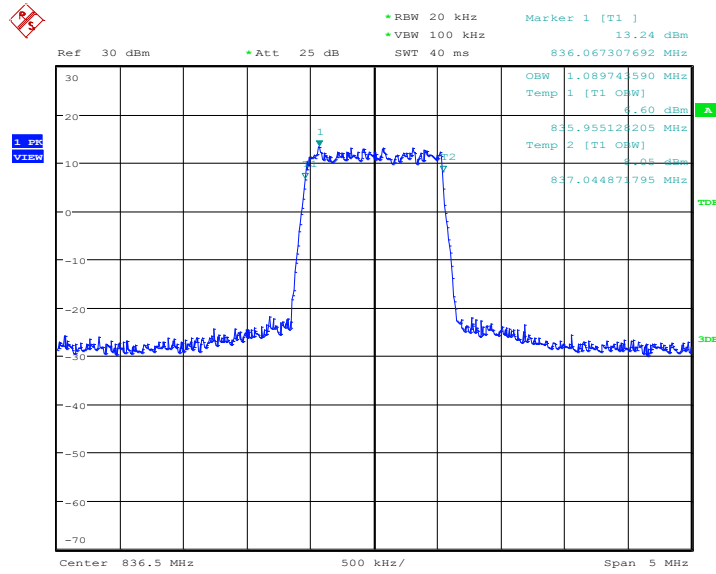
LTE band 5, 1.4MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:20:08



LTE band 5, 1.4MHz Bandwidth, 64QAM (99% BW)

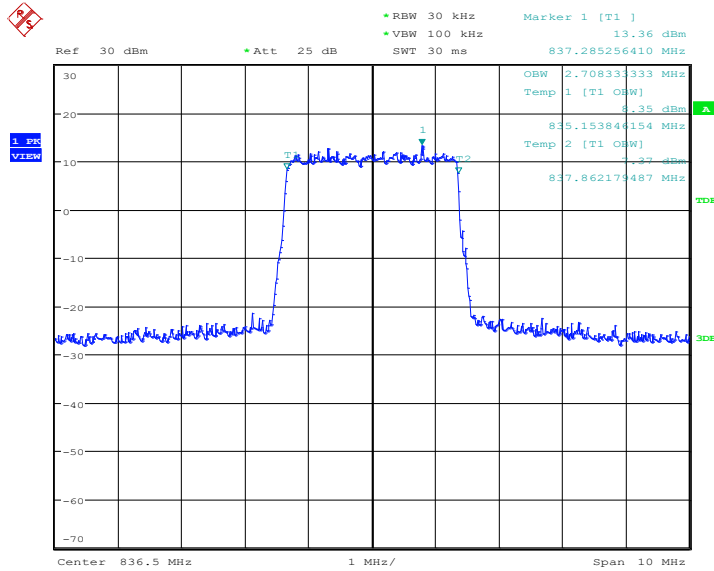


Date: 12.APR.2021 15:47:51

LTE band 5, 3MHz (99% BW)

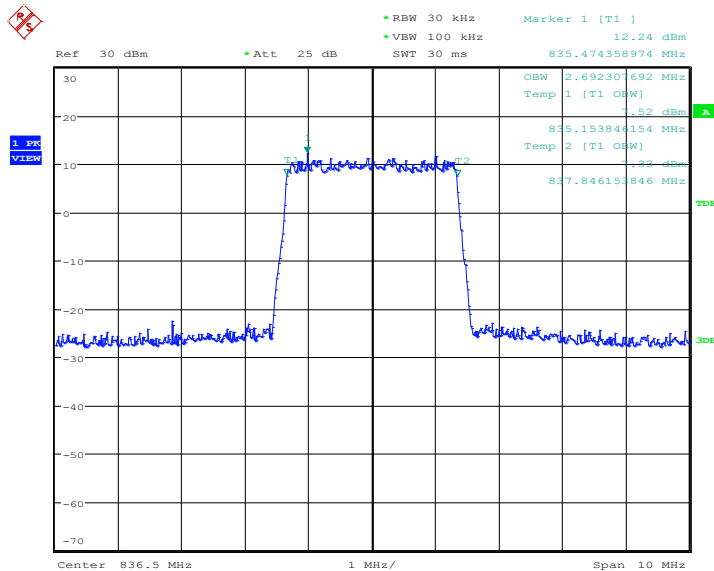
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
836.5	2708.33	2692.31	2692.31

LTE band 5, 3MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:22:12

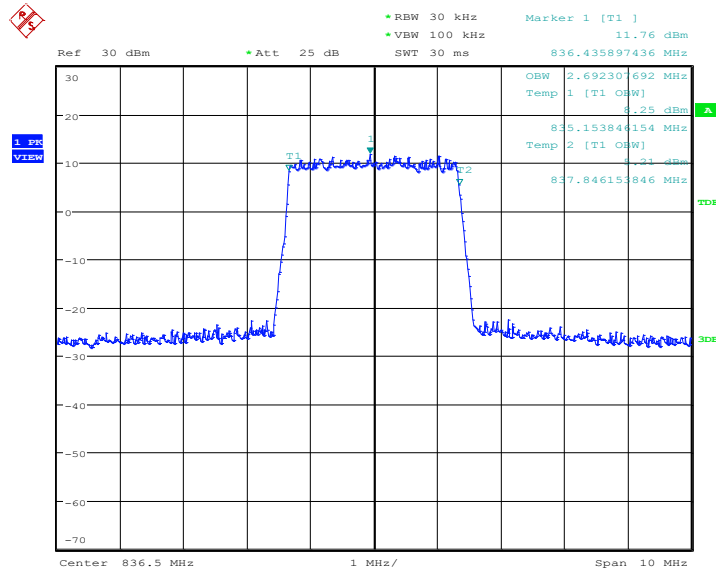
LTE band 5, 3MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:22:26



LTE band 5, 3MHz Bandwidth, 64QAM (99% BW)

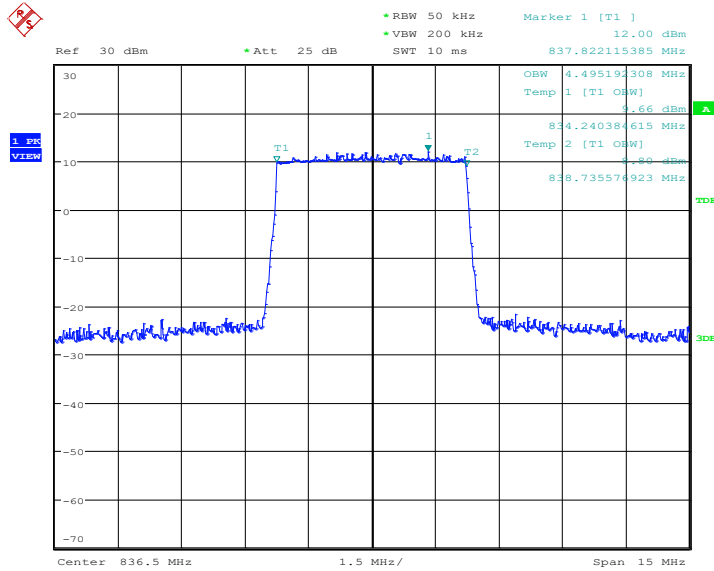


Date: 12.APR.2021 15:49:39

LTE band 5, 5MHz (99% BW)

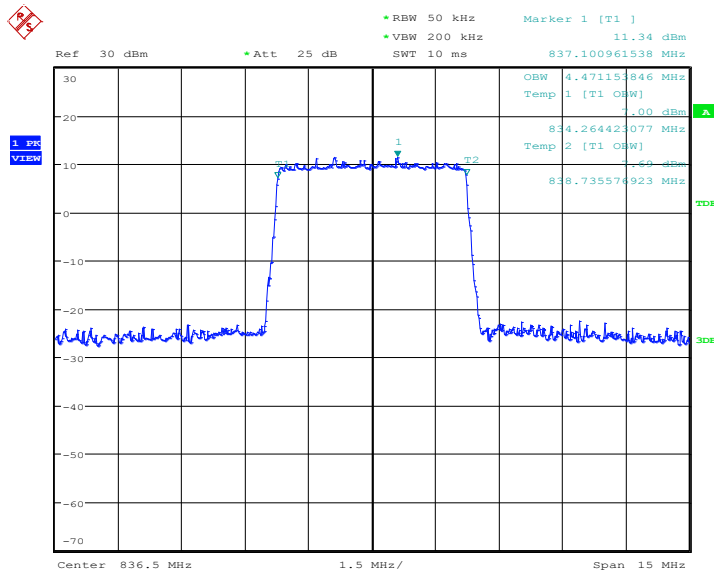
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
836.5	4495.19	4471.15	4495.19

LTE band 5, 5MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:24:30

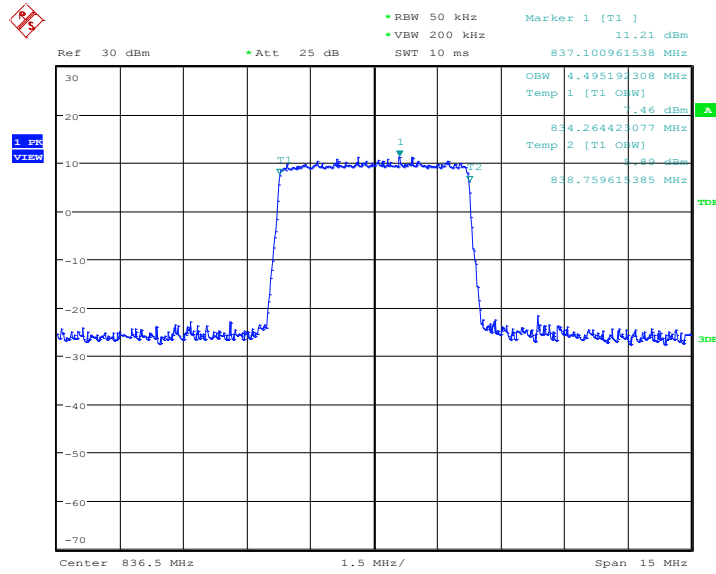
LTE band 5, 5MHz Bandwidth,16QAM (99% BW)



Date: 12.APR.2021 14:24:43



LTE band 5, 5MHz Bandwidth,64QAM (99% BW)



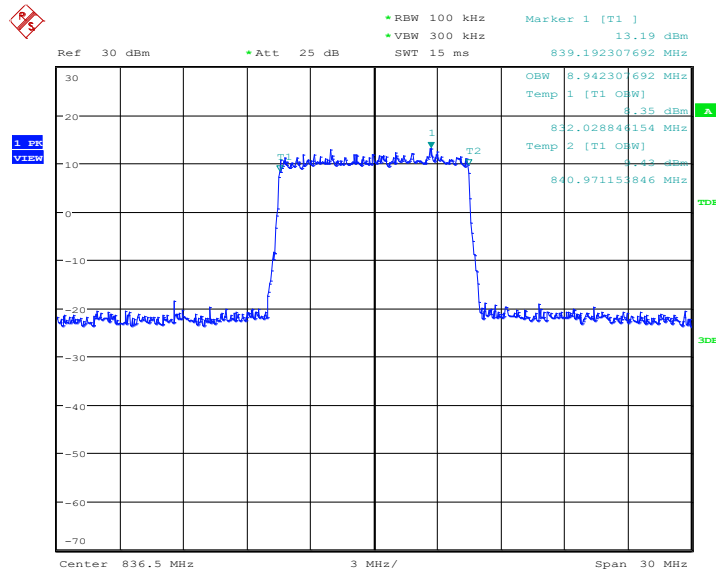
Date: 12.APR.2021 15:51:28



LTE band 5, 10MHz (99% BW)

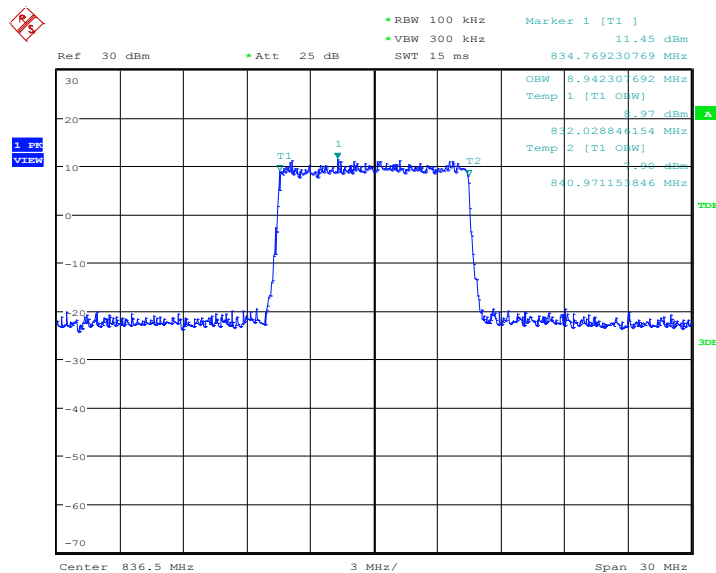
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
836.5	8942.31	8942.31	8942.31

LTE band 5, 10MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:26:47

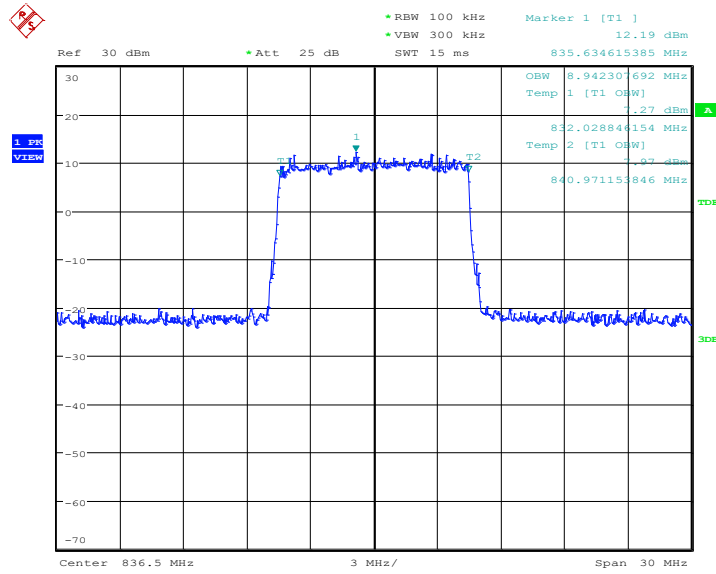
LTE band 5, 10MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:27:01



LTE band 5, 10MHz Bandwidth, 64QAM (99% BW)



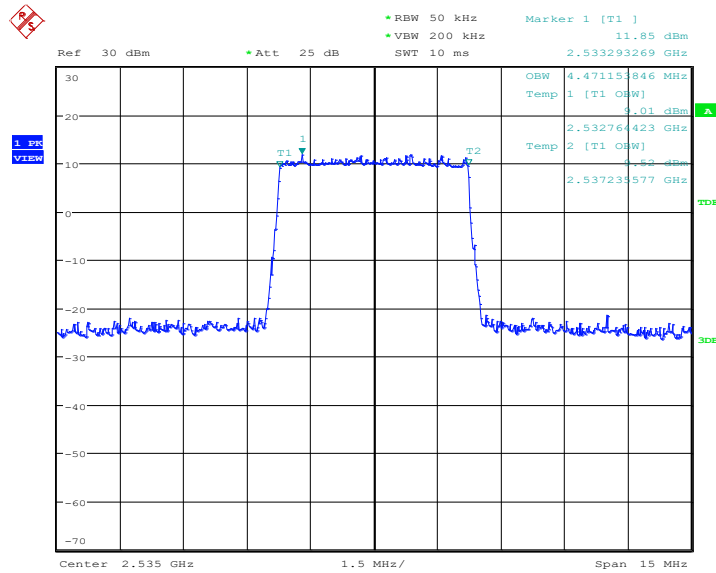
Date: 12.APR.2021 15:53:16



LTE band 7, 5MHz (99% BW)

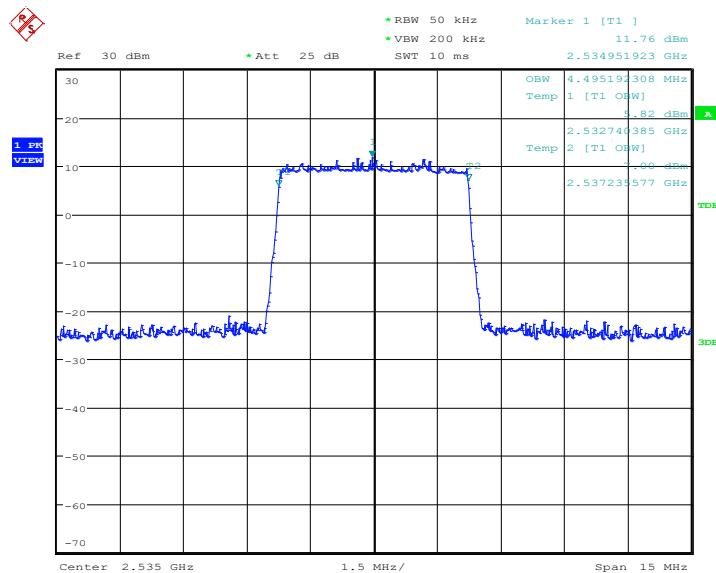
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
2535.0	4471.15	4495.19	4519.23

LTE band 7, 5MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:06:01

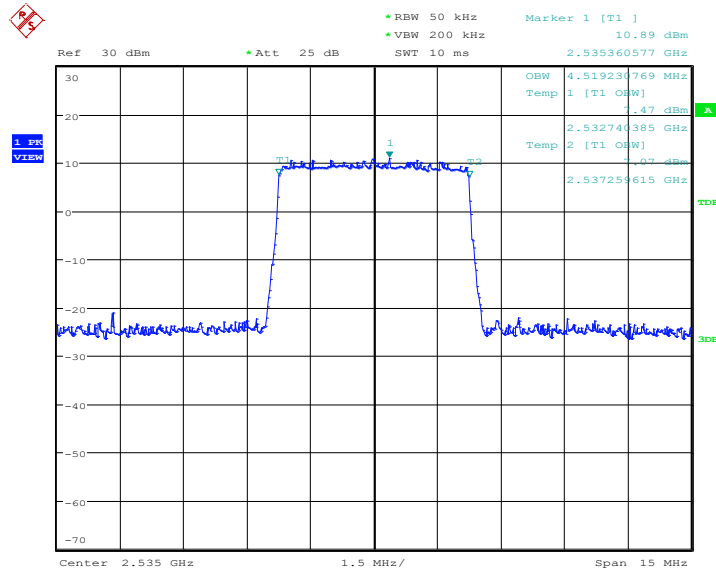
LTE band 7, 5MHz Bandwidth,16QAM (99% BW)



Date: 12.APR.2021 14:06:15



LTE band 7, 5MHz Bandwidth,64QAM (99% BW)

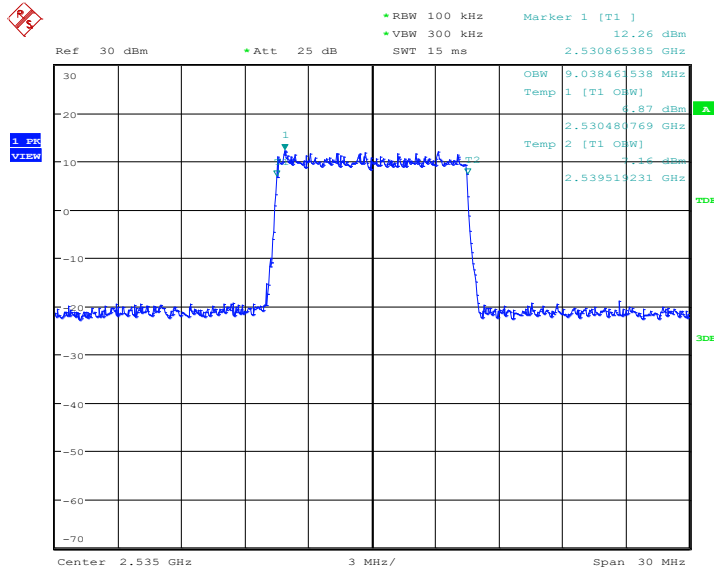


Date: 12.APR.2021 15:36:56

LTE band 7, 10MHz (99% BW)

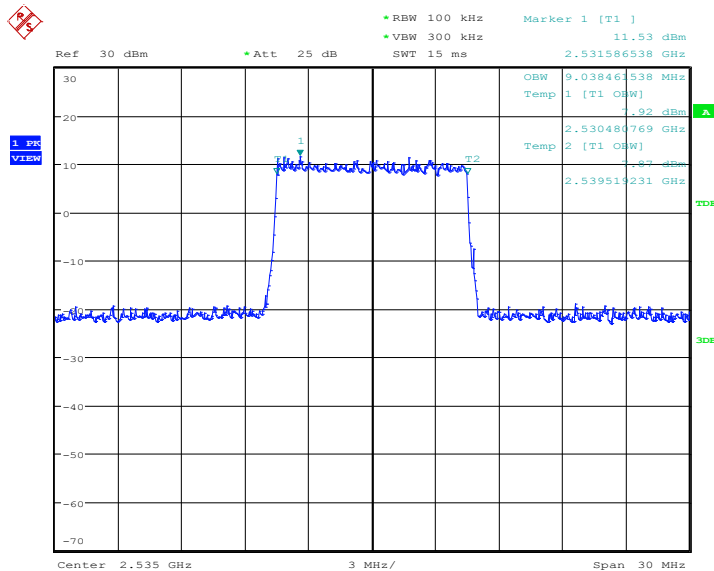
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
2535.0	9038.46	9038.46	9038.46

LTE band 7, 10MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:08:19

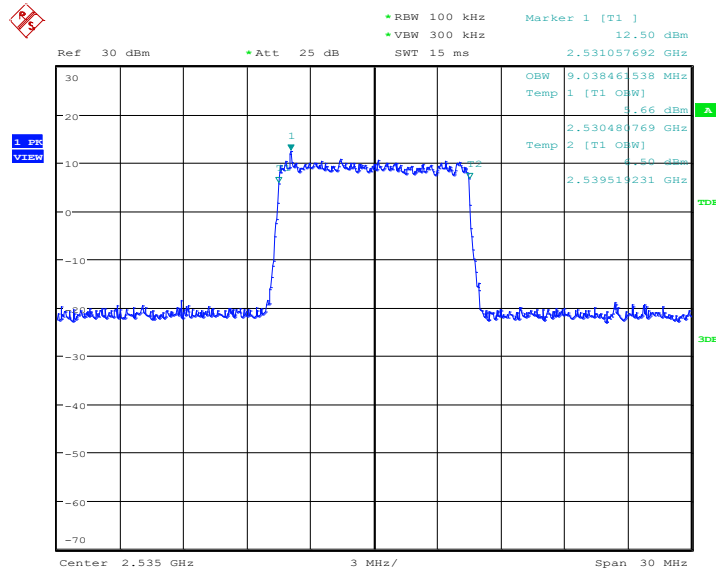
LTE band 7, 10MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:08:33



LTE band 7, 10MHz Bandwidth, 64QAM (99% BW)



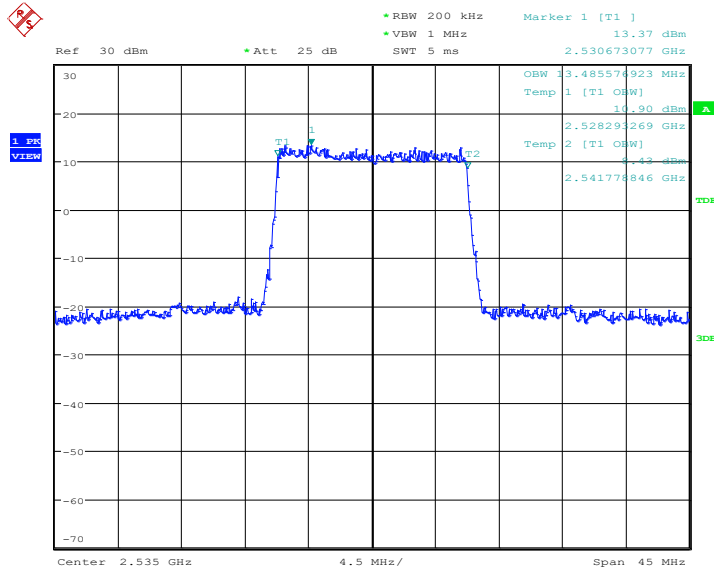
Date: 12.APR.2021 15:38:44



LTE band 7, 15MHz (99% BW)

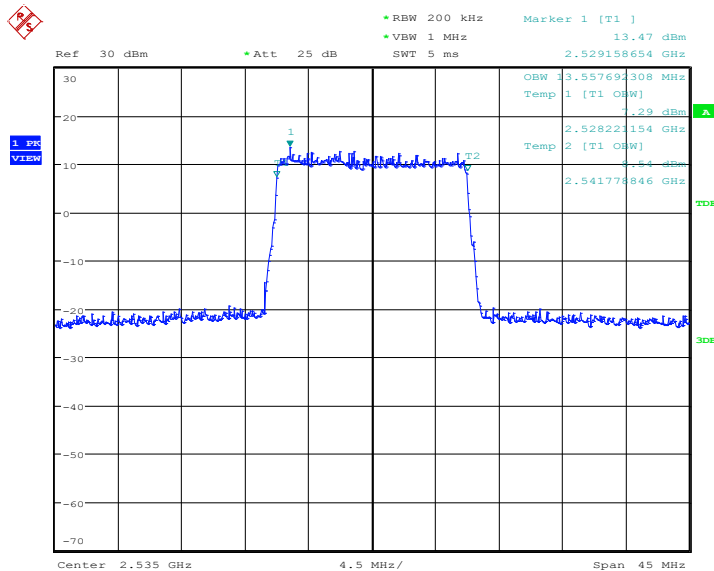
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
2535.0	13485.58	13557.69	13557.69

LTE band 7, 15MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:10:37

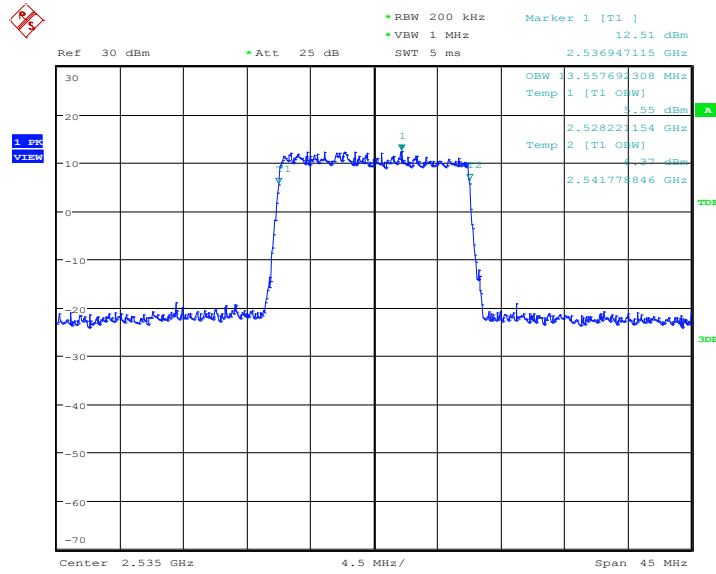
LTE band 7, 15MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:10:51



LTE band 7, 15MHz Bandwidth, 64QAM (99% BW)



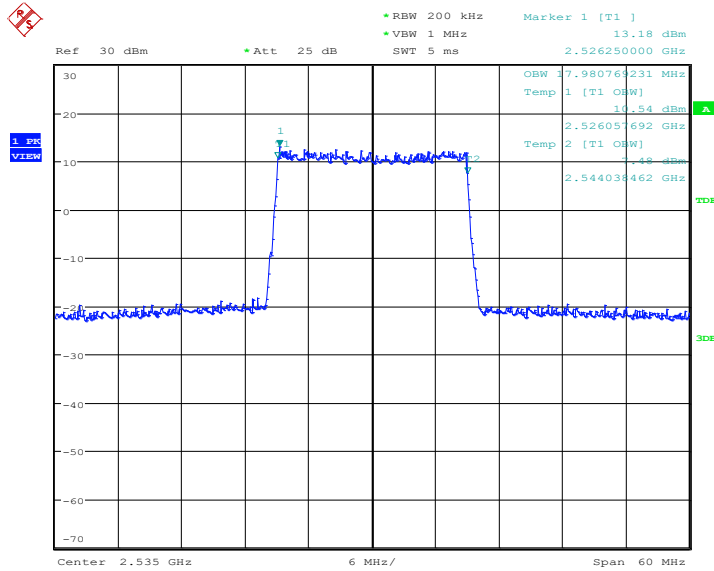
Date: 12.APR.2021 15:40:32



LTE band 7, 20MHz (99% BW)

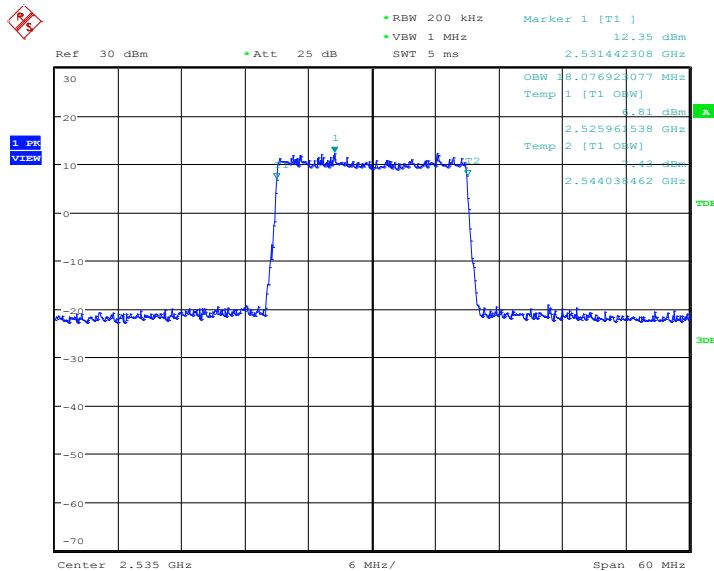
Frequency(MHz)	Occupied Bandwidth (99% BW)(kHz)		
	QPSK	16QAM	64QAM
2535.0	17980.77	18076.92	18076.92

LTE band 7, 20MHz Bandwidth, QPSK (99% BW)



Date: 12.APR.2021 14:12:55

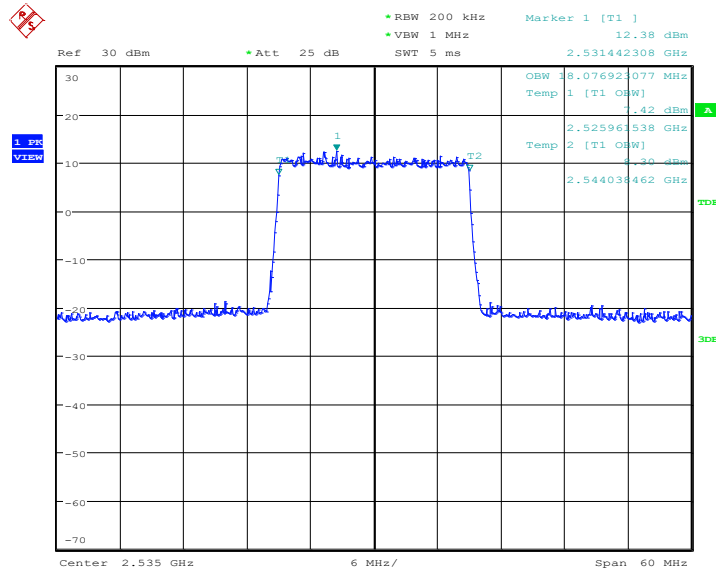
LTE band 7, 20MHz Bandwidth, 16QAM (99% BW)



Date: 12.APR.2021 14:13:09



LTE band 7, 20MHz Bandwidth, 64QAM (99% BW)



Date: 12.APR.2021 15:42:21

Note: Expanded measurement uncertainty is $U = 3428\text{Hz}$, $k = 2$