TEST REPORT

No. I22Z70189-WMD03

for

Samsung Electronics Co., Ltd.

Multi-band GSM/WCDMA/LTE Tablet with Bluetooth, WLAN

Model Name: SM-T509

FCC ID: ZCASMT509

with

Hardware Version: REV1.0

Software Version: T509.001

Issued Date: 2022-08-19

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 CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel: +86(0)10-62304633-2512, Fax: +86(0)10-62304633-2504

Email: cttl_terminals@caict.ac.cn, website: www.caict.ac.cn

©Copyright. All rights reserved by CTTL

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I22Z70189-WMD03	Rev.0	1st edition	2022-08-19

Note: the latest revision of the test report supersedes all previous version.

©Copyright. All rights reserved by CTTL.

CONTENTS

1. TEST LABORATORY 4

1.1. INTRODUCTION & ACCREDITATION 4

1.2. TESTING LOCATION 4

1.3. TESTING ENVIRONMENT 5

1.4. PROJECT DATA 5

1.5. SIGNATURE 5

2. CLIENT INFORMATION 6

2.1. APPLICANT INFORMATION 6

2.2. MANUFACTURER INFORMATION 6

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) 7

3.1. ABOUT EUT 7

3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST 7

3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST 7

4. REFERENCE DOCUMENTS 8

4.1. DOCUMENTS SUPPLIED BY APPLICANT 8

4.2. REFERENCE DOCUMENTS FOR TESTING 8

5. LABORATORY ENVIRONMENT 9

6. SUMMARY OF TEST RESULT 10

7. TEST EQUIPMENT UTILIZED 13

ANNEX A: MEASUREMENT RESULTS 14

A.1 OUTPUT POWER 14
A.2 EMISSION LIMIT 52
A.3 FREQUENCY STABILITY 62
A.4 OCCUPIED BANDWIDTH 67
A.5 EMISSION BANDWIDTH 102
A.6 BAND EDGE COMPLIANCE 137
A.7 CONDUCTED SPURIOUS EMISSION 174
A.8 PEAK-TO-AVERAGE POWER RATIO 179

ANNEX B: ACCREDITATION CERTIFICATE 180

©Copyright. All rights reserved by CTTL.

1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0 and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (CN0066). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Location 1: CTTL (huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191

Location 2: CTTL (BDA)

Address: No. 18A, Kangding Street, Beijing Economic-Technology Development Area, Beijing, 100176, P.R. China

©Copyright. All rights reserved by CTTL.

1.3. Testing Environment

Normal Temperature: 15-35℃

Relative Humidity: 20-75%

1.4. Project Data

Testing Start Date: 2022-07-12

Testing End Date: 2022-08-17

1.5. Signature

Dong Yuan

(Prepared this test report)

Zhou Yu

(Reviewed this test report)

Zhao Hui Lin

Deputy Director of the laboratory

(Approved this test report)

©Copyright. All rights reserved by CTTL.

2. Client Information

2.1. Applicant Information

Company Name:	SAMSUNG Electronics Co., Ltd.
Address /Post:	19 Chapin Rd.,Building D Pine Brook, NJ 07058
Contact:	Jenni Chun
Email:	j1.chun@samsung.com
Telephone:	+1-201-937-4203

2.2. Manufacturer Information

Company Name:	SAMSUNG Electronics Co., Ltd.
Address /Post:	Samsung R5, Maetan dong 129, Samsung ro Youngtong gu, Suwon city 443 742, Korea
Contact:	Kobe Cho
Email:	ggobi.cho@samsung.com
Telephone:	+82 - 10 - 2722 - 4159

©Copyright. All rights reserved by CTTL.

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Multi-band GSM/WCDMA/LTE Tablet with Bluetooth, WLAN
Model Name	SM-T509
FCC ID	ZCASMT509
Antenna	Embedded
Output power	24.98dBm maximum EIRP measured for LTE Band7
Extreme vol. Limits	3.4VDC to 4.4VDC (nominal: 3.8VDC)
Extreme temp. Tolerance	-10°C to +55°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN	HW Version	SW Version	Date of receipt
UT14a	70189UT14a	REV1.0	T509.001	2022-07-14
UT09a	70189UT09a	REV1.0	T509.001	2022-07-12

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

3.3. Internal Identification of AE used during the test

AE ID*	Description
AE1	Battery

AE1

Model	SCUD-WT-N19_V1
Manufacturer	SCUD (FUJIAN) Electronics Co., Ltd.
Capacitance	7040mAh

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

©Copyright. All rights reserved by CTTL.

4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters are supplied by the client or manufacturer, which are the bases of testing.

4.2. Reference Documents for testing

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

Reference	Title	Version
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-20 Edition
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-20 Edition
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-20 Edition
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
ANSI C63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
KDB 971168 D01	MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS	v03r01

©Copyright. All rights reserved by CTTL.

5. Laboratory Environment

Control room / conducted chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. =20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	>2 MΩ
Ground system resistance	< 0.5 Ω

Semi-anechoic chamber SAC 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, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4Ω
Normalised site attenuation (NSA)	< ± 4 dB, 3m/10m distance, from 30 to 1000 MHz
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

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

Temperature	Min. = 15 ˚C, Max. = 30 ˚C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	>2 MΩ
Ground system resistance	< 1 Ω
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

©Copyright. All rights reserved by CTTL.

6. Summary Of Test Result

LTE Band 2

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	24.232	P
2	Emission Limit	2.1051/24.238	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	24.238	P
6	Band Edge Compliance	24.238	P
7	Conducted Spurious Emission	24.238	P
8	Peak-to-Average Power Ratio	24.232	P

LTE Band 4

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	2.1051/27.53	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	27.53	P
6	Band Edge Compliance	27.53	P
7	Conducted Spurious Emission	27.53	P
8	Peak-to-Average Power Ratio	27.50	P

LTE Band 5

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	22.913	P
2	Emission Limit	2.1051/22.917	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	22.917	P
6	Band Edge Compliance	22.917	P
7	Conducted Spurious Emission	22.917	P

©Copyright. All rights reserved by CTTL.

LTE Band 7

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	2.1051/27.53	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	27.53	P
6	Band Edge Compliance	27.53	P
7	Conducted Spurious Emission	27.53	P
8	Peak-to-Average Power Ratio	27.50	P

LTE Band 12 (17)

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	2.1051/27.53	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	27.53	P
6	Band Edge Compliance	27.53	P
7	Conducted Spurious Emission	27.53	P
8	Peak-to-Average Power Ratio	27.50	P

LTE Band 41 (38)

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	2.1051/27.53	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	27.53	P
6	Band Edge Compliance	27.53	P
7	Conducted Spurious Emission	27.53	P
8	Peak-to-Average Power Ratio	27.50	P

©Copyright. All rights reserved by CTTL.

LTE Band 66

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	27.50	P
2	Emission Limit	2.1051/27.53	P
3	Frequency Stability	2.1055	P
4	Occupied Bandwidth	2.1049	P
5	Emission Bandwidth	27.53	P
6	Band Edge Compliance	27.53	P
7	Conducted Spurious Emission	27.53	P
8	Peak-to-Average Power Ratio	27.50	P

Terms used in Verdict column

P	Pass. The EUT complies with the essential requirements in the standard.
NP	Not Performed. The test was not performed by CTTL.
NA	Not Applicable.The test was not applicable.
BR	Re-use test data from basic model report.
F	Fail. The EUT does not comply with the essential requirements in the standard.

All the test results are based on normal power.

LTE Band 12 and Band 41 overlaps the entire frequency range of LTE Band 17 and Band 38. Therefore, test data provided in this report covers Band 17, Band 38 as well as Band 12, Band 41.

LTE Band 41 is tested by power class 3.

Explanation of worst-case configuration

The worst-case scenario for all measurements is based on the conducted output power measurement investigation results. Output power was measured on QPSK,16QAM and 64QAM modulations. It was found that QPSK was the worst case. All testing was performed using QPSK modulations to represent the worst case unless otherwise stated. The test results shown in the following sections represent the worst case emission.

©Copyright. All rights reserved by CTTL.

7. Test Equipment Utilized

Description	Type	Series Number	Manufacture	Cal Due Date	Calibration Interval
Wideband Radio Communication Tester	CMW500	159082	R&S	2023-01-17	25 months
Spectrum Analyzer	FSU	200030	R&S	2023-05-25	1 year
Climate Chamber	SH-242	93008556	ESPEC	2023-12-23	3 years
Test Receiver	E4440A	MY48250642	Agilent	2023-03-10	1 year
EMI Antenna	VULB9163	9163-482	Schwarzbeck	2022-11-16	1 year
EMI Antenna	LB-7180-NF	J203001300005	A-INFO	2023-02-23	1 year
EMI Antenna	3117	00058889	ETS-Lindgren	2022-11-07	1 year
EMI Antenna	9117	167	Schwarzbeck	2022-09-21	1 year
Signal Generator	SMF100A	101295	R&S	2022-12-23	1 year
Power Amplifier	5S1G4	0341863	AR	/	/
Universal Radio Communication Tester	CMW500	143008	R&S	2022-12-01	1 year
Universal Radio Communication Tester	MT8821C	Anritsu	6262257899	2023-05-15	1 year

©Copyright. All rights reserved by CTTL.

Annex A: Measurement Results

A.1 Output Power

A.1.1 Summary

During the process of testing, the EUT was controlled via communication tester to ensure max power transmission and proper modulation.

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	23.28	21.81
		1880.0	23.81	22.14	21.61
		1850.7	23.71	22.93	21.97
	1 RB low	1909.3	23.55	23.33	21.91
		1880.0	23.75	22.82	21.64
		1850.7	23.78	22.88	21.97
	50% RB mid	1909.3	23.81	23.01	21.55
		1880.0	23.81	22.78	21.52
		1850.7	23.86	23.08	21.78
	100% RB	1909.3	22.69	21.57	21.10
		1880.0	22.78	21.60	21.10
		1850.7	22.86	21.77	20.78
3MHz	1 RB high	1908.5	23.72	22.71	21.88
		1880.0	23.78	22.76	21.52
		1851.5	23.73	23.37	21.97
	1 RB low	1908.5	23.77	22.80	21.80
		1880.0	23.72	22.74	21.78
		1851.5	23.78	23.49	22.07
	50% RB mid	1908.5	22.79	21.97	21.19
		1880.0	22.81	21.84	21.09
		1851.5	22.96	21.83	20.75
	100% RB	1908.5	22.76	21.90	21.22
		1880.0	22.79	21.78	21.20

©Copyright. All rights reserved by CTTL.

		1851.5	22.80	21.90	20.98
5MHz	1 RB high	1907.5	23.71	22.67	21.85
		1880.0	23.63	22.73	21.99
		1852.5	23.87	22.80	21.79
	1 RB low	1907.5	23.51	22.68	21.75
		1880.0	23.62	22.81	21.98
		1852.5	23.83	22.90	21.90
	50% RB mid	1907.5	22.71	21.89	21.23
		1880.0	22.75	21.84	21.17
		1852.5	22.80	22.01	21.26
	100% RB	1907.5	22.79	21.68	21.27
		1880.0	22.76	22.12	21.23
		1852.5	22.83	22.11	21.32
10MHz	1 RB high	1905.0	23.68	22.91	21.89
		1880.0	23.79	23.29	21.82
		1855.0	23.70	23.44	21.81
	1 RB low	1905.0	23.59	22.62	21.72
		1880.0	23.65	23.49	21.98
		1855.0	23.76	23.49	22.15
	50% RB mid	1905.0	22.73	21.96	21.26
		1880.0	22.76	21.81	21.20
		1855.0	22.88	21.90	21.21
	100% RB	1905.0	22.77	21.83	21.33
		1880.0	22.81	21.85	21.28
		1855.0	22.93	21.85	21.28
15MHz	1 RB high	1902.5	23.83	23.44	21.96
		1880.0	23.64	23.45	21.83
		1857.5	23.72	23.43	22.00
	1 RB low	1902.5	23.74	22.82	21.69
		1880.0	23.80	23.43	22.32
		1857.5	23.76	23.45	22.24
	50% RB mid	1902.5	22.84	21.89	21.16
		1880.0	22.82	21.81	21.16
		1857.5	22.82	21.85	20.90
	100% RB	1902.5	22.87	21.95	21.27
		1880.0	22.91	21.92	21.28
		1857.5	22.93	21.98	20.95
20MHz	1 RB high	1900.0	23.67	22.73	21.63
		1880.0	23.93	22.74	21.64
		1860.0	23.44	22.66	21.69
	1 RB low	1900.0	23.82	22.90	21.97
		1880.0	23.70	22.65	21.43
		1860.0	23.55	22.59	21.60

©Copyright. All rights reserved by CTTL.

	50% RB mid	1900.0	22.73	21.80	21.23
		1880.0	22.69	21.83	21.10
		1860.0	22.61	21.68	21.14
	100% RB	1900.0	22.79	21.80	21.21
		1880.0	22.66	21.70	21.11
		1860.0	22.61	21.75	21.02

©Copyright. All rights reserved by CTTL.

LTE band 4

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	1754.3	24.07	23.71	22.50
		1732.5	24.22	23.18	22.11
		1710.7	24.09	23.34	22.42
	1 RB low	1754.3	24.05	23.85	22.46
		1732.5	24.14	23.82	22.41
		1710.7	24.23	23.80	22.45
	50% RB mid	1754.3	24.32	23.35	22.03
		1732.5	24.33	23.45	22.01
		1710.7	24.34	23.58	22.06
	100% RB	1754.3	23.21	21.83	21.54
		1732.5	23.14	21.92	21.63
		1710.7	23.23	21.98	21.19
3MHz	1 RB high	1753.5	24.15	23.38	22.38
		1732.5	24.14	23.80	22.31
		1711.5	24.09	23.83	22.24
	1 RB low	1753.5	24.16	23.41	22.40
		1732.5	24.07	23.85	22.52
		1711.5	24.10	23.82	22.39
	50% RB mid	1753.5	23.28	22.41	21.34
		1732.5	23.25	22.42	21.63
		1711.5	23.31	22.42	21.18
	100% RB	1753.5	23.20	22.38	21.30
		1732.5	23.22	22.34	21.82
		1711.5	23.33	22.35	21.39
5MHz	1 RB high	1752.5	24.12	23.11	22.13
		1732.5	24.27	23.30	22.33
		1712.5	24.10	23.12	22.24
	1 RB low	1752.5	24.15	23.30	22.31
		1732.5	24.24	23.32	22.46
		1712.5	24.15	23.20	22.48
	50% RB mid	1752.5	23.28	22.39	21.22
		1732.5	23.18	22.34	21.75
		1712.5	23.27	22.34	21.67
	100% RB	1752.5	23.14	22.51	21.34
		1732.5	23.28	22.44	21.70
		1712.5	23.27	22.22	21.78
10MHz	1 RB high	1750.0	24.08	24.01	22.19
		1732.5	24.14	23.89	22.38
		1715.0	24.25	23.83	22.35
	1 RB low	1750.0	24.12	24.05	22.24

©Copyright. All rights reserved by CTTL.

		1732.5	24.30	23.85	22.36
		1715.0	24.21	23.96	22.39
	50% RB mid	1750.0	23.27	22.36	21.31
		1732.5	23.22	22.24	21.76
		1715.0	23.27	22.34	21.38
	100% RB	1750.0	23.36	22.31	21.48
		1732.5	23.26	22.27	21.81
		1715.0	23.23	22.28	21.45
15MHz	1 RB high	1747.5	24.17	23.87	22.30
		1732.5	24.14	23.75	22.22
		1717.5	24.34	23.86	22.31
	1 RB low	1747.5	24.16	24.11	22.42
		1732.5	24.18	23.93	22.48
		1717.5	24.22	23.88	22.44
	50% RB mid	1747.5	23.34	22.45	21.76
		1732.5	23.26	22.22	21.71
		1717.5	23.24	22.20	21.70
	100% RB	1747.5	23.28	22.26	21.83
		1732.5	23.33	22.35	21.77
		1717.5	23.26	22.34	21.72
20MHz	1 RB high	1745.0	24.14	23.77	22.45
		1732.5	24.09	23.47	22.37
		1720.0	24.15	23.18	22.30
	1 RB low	1745.0	24.23	23.90	22.43
		1732.5	24.09	23.25	22.42
		1720.0	24.16	23.19	22.44
	50% RB mid	1745.0	23.21	22.40	21.44
		1732.5	23.27	22.30	21.84
		1720.0	23.15	22.34	21.39
	100% RB	1745.0	23.21	22.36	21.24
		1732.5	23.24	22.31	21.73
		1720.0	23.18	22.26	21.30

©Copyright. All rights reserved by CTTL.

LTE band 5

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	848.3	23.86	22.71	22.27
		836.5	23.71	22.86	21.84
		824.7	23.71	22.98	21.89
	1 RB low	848.3	23.82	22.63	22.21
		836.5	23.63	22.51	22.01
		824.7	23.74	22.87	22.07
	50% RB mid	848.3	24.09	23.43	22.01
		836.5	23.83	23.18	21.80
		824.7	23.95	23.38	21.93
	100% RB	848.3	23.05	21.79	21.03
		836.5	22.74	21.67	20.96
		824.7	22.94	21.91	21.03
3MHz	1 RB high	847.5	23.94	23.34	22.21
		836.5	23.66	23.50	22.11
		825.5	23.71	22.92	22.31
	1 RB low	847.5	23.84	23.44	22.23
		836.5	23.69	23.50	22.21
		825.5	23.84	23.02	22.35
	50% RB mid	847.5	23.04	22.21	20.99
		836.5	22.82	22.00	20.76
		825.5	22.88	22.12	20.89
	100% RB	847.5	23.03	22.21	21.19
		836.5	22.79	21.99	21.02
		825.5	22.98	22.07	21.10
5MHz	1 RB high	846.5	23.95	23.11	22.17
		836.5	23.76	22.87	22.16
		826.5	23.78	22.95	21.95
	1 RB low	846.5	23.75	22.96	22.07
		836.5	23.67	22.89	22.03
		826.5	23.83	22.91	22.32
	50% RB mid	846.5	22.87	22.16	21.18
		836.5	22.82	21.96	20.91
		826.5	22.78	22.06	21.11
	100% RB	846.5	22.96	22.11	21.15
		836.5	22.73	21.90	20.80
		826.5	22.94	21.98	21.30
10MHz	1 RB high	844.0	24.04	23.06	22.32
		836.5	23.68	23.27	21.83
		829.0	23.72	23.29	22.10
	1 RB low	844.0	23.82	22.88	22.07

©Copyright. All rights reserved by CTTL.

		836.5	23.82	23.30	22.08
		829.0	23.85	23.34	22.21
	50% RB mid	844.0	22.90	22.17	21.11
		836.5	22.86	21.90	20.94
		829.0	22.88	22.01	21.11
	100% RB	844.0	22.78	21.99	21.12
		836.5	22.80	22.05	21.05
		829.0	22.82	22.02	21.14

©Copyright. All rights reserved by CTTL.

LTE band 7

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	2567.5	23.57	22.64	22.11
		2535.0	23.15	22.86	21.71
		2502.5	23.22	22.80	21.58
	1 RB low	2567.5	23.51	22.71	22.18
		2535.0	23.08	22.85	21.56
		2502.5	23.10	22.90	21.75
	50% RB mid	2567.5	22.68	21.86	20.75
		2535.0	22.27	21.45	20.35
		2502.5	22.14	21.31	20.24
	100% RB	2567.5	22.57	21.75	20.89
		2535.0	22.19	21.49	20.46
		2502.5	22.21	21.33	20.33
10MHz	1 RB high	2565.0	23.59	22.79	21.99
		2535.0	23.18	22.41	21.63
		2505.0	23.01	22.34	21.50
	1 RB low	2565.0	23.49	22.58	21.93
		2535.0	23.09	22.37	21.60
		2505.0	23.16	22.22	21.66
	50% RB mid	2565.0	22.60	21.67	20.84
		2535.0	22.31	21.37	20.39
		2505.0	22.13	21.31	20.40
	100% RB	2565.0	22.65	21.73	20.77
		2535.0	22.26	21.47	20.50
		2505.0	22.23	21.25	20.39
15MHz	1 RB high	2562.5	23.45	22.86	21.82
		2535.0	23.18	22.48	21.61
		2507.5	22.91	22.98	21.30
	1 RB low	2562.5	23.28	23.22	21.54
		2535.0	23.08	22.30	21.49
		2507.5	23.06	23.05	21.29
	50% RB mid	2562.5	22.64	21.60	20.66
		2535.0	22.39	21.58	20.35
		2507.5	22.34	21.55	20.27
	100% RB	2562.5	22.61	21.64	20.77
		2535.0	22.32	21.29	20.47
		2507.5	22.25	21.40	20.40
20MHz	1 RB high	2560.0	23.88	22.83	22.01
		2535.0	23.94	22.91	22.34
		2510.0	23.58	22.94	21.75
	1 RB low	2560.0	23.93	22.79	22.20

©Copyright. All rights reserved by CTTL.

		2535.0	23.81	22.94	22.08
		2510.0	23.57	22.73	21.87
	50% RB mid	2560.0	23.12	22.12	21.22
		2535.0	22.84	21.86	20.86
		2510.0	22.61	21.75	20.70
	100% RB	2560.0	22.89	22.04	20.95
		2535.0	22.82	21.87	20.75
		2510.0	22.67	21.81	20.62

©Copyright. All rights reserved by CTTL.

LTE band 12

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	715.3	23.54	22.77	21.75
		707.5	23.75	23.34	21.89
		699.7	23.60	22.75	21.85
	1 RB low	715.3	23.61	22.82	21.79
		707.5	23.68	22.80	21.73
		699.7	23.55	22.90	22.05
	50% RB mid	715.3	23.72	22.87	21.64
		707.5	23.87	23.03	21.76
		699.7	23.77	23.29	21.67
	100% RB	715.3	22.62	21.61	20.80
		707.5	22.79	21.58	21.20
		699.7	22.72	21.64	20.80
3MHz	1 RB high	714.5	23.52	23.49	21.81
		707.5	23.67	23.43	21.80
		700.5	23.62	22.93	21.69
	1 RB low	714.5	23.73	23.48	21.98
		707.5	23.73	23.46	21.58
		700.5	23.54	22.94	21.95
	50% RB mid	714.5	22.81	21.92	20.76
		707.5	22.75	21.98	21.12
		700.5	22.78	21.87	20.87
	100% RB	714.5	22.71	21.90	20.96
		707.5	22.81	22.00	21.43
		700.5	22.72	21.97	20.93
5MHz	1 RB high	713.5	23.51	23.30	21.80
		707.5	23.69	22.95	21.87
		701.5	23.84	22.85	22.10
	1 RB low	713.5	23.66	23.42	21.75
		707.5	23.73	22.84	21.83
		701.5	23.74	22.64	21.94
	50% RB mid	713.5	22.65	21.81	20.83
		707.5	22.75	21.96	21.16
		701.5	22.80	21.99	20.95
	100% RB	713.5	22.76	22.09	20.90
		707.5	22.85	21.77	21.31
		701.5	22.72	22.07	20.94
10MHz	1 RB high	711.0	23.48	22.68	21.75
		707.5	23.54	23.38	21.83
		704.0	23.57	23.42	21.67
	1 RB low	711.0	23.59	22.68	22.08

©Copyright. All rights reserved by CTTL.

		707.5	23.65	23.40	21.58
		704.0	23.64	23.42	21.79
	50% RB mid	711.0	22.59	21.91	20.89
		707.5	22.78	21.78	20.93
		704.0	22.69	21.71	21.14
	100% RB	711.0	22.60	21.76	20.81
		707.5	22.69	21.86	21.04
		704.0	22.66	21.90	21.19

©Copyright. All rights reserved by CTTL.

LTE band 41

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
5MHz	1 RB high	2652.5	24.06	22.62	21.96
		2595	24.12	22.70	21.97
		2540	23.91	22.44	21.75
	1 RB low	2652.5	24.05	23.16	21.96
		2595	24.18	23.26	22.14
		2540	23.82	22.84	21.70
	50% RB mid	2652.5	23.09	22.05	21.20
		2595	23.16	22.23	21.44
		2540	22.99	21.95	21.05
	100% RB	2652.5	23.09	22.24	21.27
		2595	23.17	22.32	21.33
		2540	22.86	22.02	21.06
10MHz	1 RB high	2650	24.13	23.02	21.54
		2595	24.12	23.18	22.00
		2540	23.90	22.89	21.80
	1 RB low	2650	24.00	23.07	21.90
		2595	24.16	23.24	22.10
		2540	23.86	22.79	21.67
	50% RB mid	2650	23.17	22.53	21.22
		2595	23.25	22.29	21.33
		2540	22.87	21.96	21.10
	100% RB	2650	23.05	22.30	21.23
		2595	23.17	22.43	21.32
		2540	22.90	22.08	21.07
15MHz	1 RB high	2647.5	24.12	23.07	21.87
		2595	24.12	22.64	21.39
		2542.5	23.98	22.95	21.22
	1 RB low	2647.5	24.02	23.08	21.85
		2595	24.21	23.26	22.12
		2542.5	23.82	22.90	21.74
	50% RB mid	2647.5	23.08	22.23	21.31
		2595	23.27	22.21	21.40
		2542.5	22.85	22.04	21.13
	100% RB	2647.5	23.18	22.27	21.21
		2595	23.29	22.35	21.36
		2542.5	22.89	22.12	21.18
20MHz	1 RB high	2645	23.94	23.09	21.71
		2595	24.06	23.06	21.37
		2545	23.93	22.99	21.28
	1 RB low	2645	23.97	23.06	21.83

©Copyright. All rights reserved by CTTL.

		2595	24.28	23.28	22.16
		2545	23.88	22.85	21.69
	50% RB mid	2645	23.02	22.29	21.26
		2595	23.18	22.40	21.25
		2545	23.07	22.19	21.23
	100% RB	2645	23.06	22.23	21.33
		2595	23.21	22.33	21.38
		2545	22.92	22.12	21.24

©Copyright. All rights reserved by CTTL.

LTE band 66

Bandwidth	RB size/offset	Frequency (MHz)	Power (dBm)		
			QPSK	16QAM	64QAM
1.4MHz	1 RB high	1779.3	22.92	22.64	21.45
		1745.0	22.87	22.20	21.39
		1710.7	22.59	22.21	20.75
	1 RB low	1779.3	23.04	22.65	21.41
		1745.0	22.87	22.12	21.55
		1710.7	22.58	22.15	20.79
	50% RB mid	1779.3	23.15	22.36	21.06
		1745.0	23.05	22.13	20.86
		1710.7	22.61	21.89	20.65
	100% RB	1779.3	22.07	21.05	20.06
		1745.0	21.98	20.70	20.52
		1710.7	21.63	20.56	19.75
3MHz	1 RB high	1778.5	22.92	22.60	21.33
		1745.0	22.89	22.62	21.06
		1711.5	22.45	22.19	21.06
	1 RB low	1778.5	22.92	22.41	21.49
		1745.0	22.87	22.51	21.15
		1711.5	22.49	22.24	20.76
	50% RB mid	1778.5	22.17	21.36	20.16
		1745.0	22.05	21.22	20.38
		1711.5	21.64	20.86	19.71
	100% RB	1778.5	22.14	21.31	20.33
		1745.0	22.01	21.08	20.58
		1711.5	21.59	20.78	19.92
5MHz	1 RB high	1777.5	23.07	22.60	21.37
		1745.0	23.00	22.56	21.36
		1712.5	22.62	22.14	20.71
	1 RB low	1777.5	23.20	22.82	21.63
		1745.0	22.73	22.59	21.24
		1712.5	22.60	22.16	20.66
	50% RB mid	1777.5	22.08	21.29	20.28
		1745.0	21.96	20.98	20.43
		1712.5	21.73	21.13	20.24
	100% RB	1777.5	22.06	21.42	20.27
		1745.0	21.95	21.39	20.39
		1712.5	21.69	21.09	20.03
10MHz	1 RB high	1775.0	23.10	22.53	21.48
		1745.0	22.98	22.82	21.49
		1715.0	22.65	22.48	21.15
	1 RB low	1775.0	23.24	22.78	21.53

©Copyright. All rights reserved by CTTL.

		1745.0	22.92	22.62	21.10
		1715.0	22.46	22.21	20.92
	50% RB mid	1775.0	22.12	21.53	20.34
		1745.0	22.10	21.16	20.49
		1715.0	21.73	20.74	20.12
	100% RB	1775.0	22.15	21.21	20.37
		1745.0	22.12	21.06	20.50
		1715.0	21.73	20.86	20.35
15MHz	1 RB high	1772.5	23.05	22.75	21.35
		1745.0	22.96	22.43	21.54
		1717.5	22.74	22.46	21.30
	1 RB low	1772.5	23.44	22.94	21.75
		1745.0	22.85	22.63	21.26
		1717.5	22.46	22.23	20.93
	50% RB mid	1772.5	22.17	21.15	20.80
		1745.0	22.00	21.07	20.48
		1717.5	21.76	20.85	20.08
	100% RB	1772.5	22.20	21.25	20.88
		1745.0	22.02	21.10	20.59
		1717.5	21.81	20.92	19.98
20MHz	1 RB high	1770.0	23.77	22.85	21.79
		1745.0	23.58	22.88	21.69
		1720.0	23.27	22.93	21.51
	1 RB low	1770.0	23.62	22.86	21.94
		1745.0	23.35	22.80	21.64
		1720.0	22.85	22.55	21.14
	50% RB mid	1770.0	22.64	21.81	20.88
		1745.0	22.43	21.56	20.66
		1720.0	22.35	21.34	20.72
	100% RB	1770.0	22.77	21.92	20.89
		1745.0	22.37	21.60	20.45
		1720.0	22.23	21.30	20.88

Note: Expanded measurement uncertainty is U = 0.578 dB, k = 2.

©Copyright. All rights reserved by CTTL.

A.1.3 Radiated

A.1.3.1 Description

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

Rule Part 22.913(a) specifies "Mobile stations are limited to 2.0 watts EIRP."

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

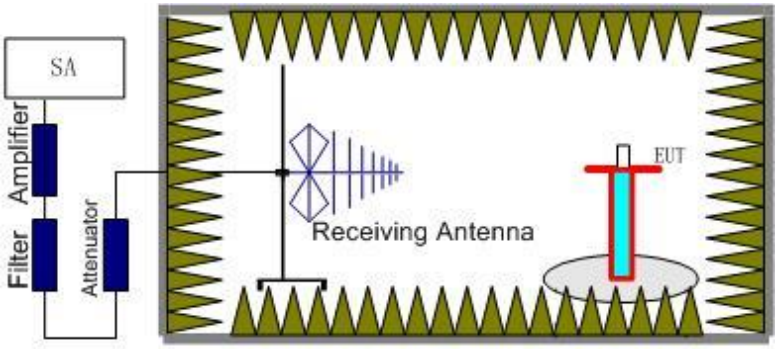
Rule Part 27.50(d) specifies " Fixed, mobile, and portable (handheld) stations operating in the 1710–1755 MHz band and mobile and portable stations operating in the 1695–1710 MHz and 1755–1780 MHz bands are limited to 1 watt EIRP"Rule Part 27.50(h)(2) specifies "Mobile stations are limited to 2.0 watts EIRP."

Rule Part 27.50(h) (2) specifies "Mobilestations are limited to 2.0 wattsEIRP."

A.1.3.2 Method of Measurement

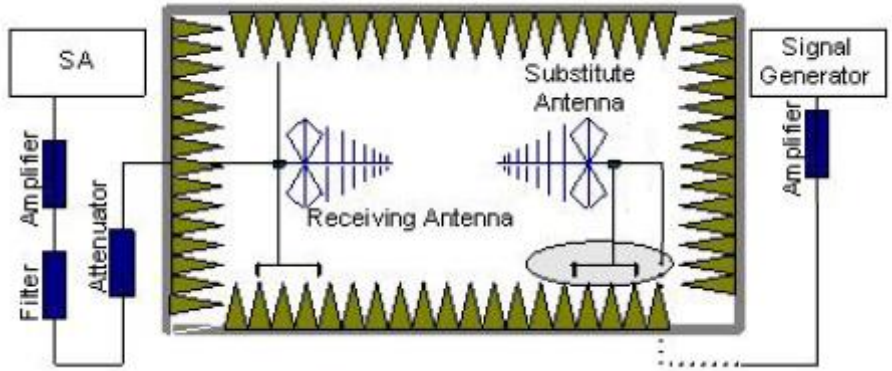
The measurements procedures in TIA-603E-2016 are used.

1. EUT was placed on a 1.5-meter-high non-conductive stand at a 3-meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. 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 rms 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.

©Copyright. All rights reserved by CTTL.



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. Adjust 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 (G_a) and the amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power (EIRP) = $P_{Mea} + P_{Ag} - P_{cl} + G_a$
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, ERP = EIRP - 2.15.

©Copyright. All rights reserved by CTTL.

A.1.3.3 Measurement result

LTE Band 2-EIRP

Limits: ≤33dBm (2W)

LTE Band 2_1.4MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.70	-23.20	2.92	43.75	4.87	22.50	33.00	10.50	H
1880.00	-24.44	2.85	43.75	4.82	21.28	33.00	11.72	H
1909.30	-25.56	2.87	43.77	4.76	20.10	33.00	12.90	V

LTE Band 2_3MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1851.50	-22.19	2.87	43.75	4.87	23.56	33.00	9.44	H
1880.00	-24.05	2.85	43.75	4.82	21.67	33.00	11.33	H
1908.50	-25.06	2.89	43.78	4.76	20.59	33.00	12.41	V

LTE Band 2_5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1852.50	-23.16	2.87	43.75	4.87	22.59	33.00	10.41	H
1880.00	-24.05	2.85	43.75	4.82	21.67	33.00	11.33	H
1907.50	-25.06	2.84	43.77	4.77	20.64	33.00	12.36	V

LTE Band 2_10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1855.00	-23.26	2.88	43.74	4.86	22.46	33.00	10.54	H
1880.00	-24.09	2.85	43.75	4.82	21.63	33.00	11.37	H
1905.00	-24.93	2.87	43.77	4.77	20.74	33.00	12.26	V

LTE Band 2_15MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1857.50	-23.02	2.87	43.75	4.86	22.72	33.00	10.28	H
1880.00	-24.07	2.85	43.75	4.82	21.65	33.00	11.35	H
1902.50	-25.49	2.86	43.77	4.78	20.20	33.00	12.80	H

LTE Band 2_20 MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1860.00	-23.12	2.86	43.75	4.85	22.62	33.00	10.38	H
1880.00	-24.31	2.85	43.75	4.82	21.41	33.00	11.59	H
1900.00	-25.67	2.87	43.77	4.78	20.01	33.00	12.99	H

©Copyright. All rights reserved by CTTL.

LTE Band 2_1.4MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.70	-23.66	2.92	43.75	4.87	22.04	33.00	10.96	H
1880.00	-25.45	2.85	43.75	4.82	20.27	33.00	12.73	H
1909.30	-25.42	2.87	43.77	4.76	20.24	33.00	12.76	V

LTE Band 2_3MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1851.50	-23.10	2.87	43.75	4.87	22.65	33.00	10.35	H
1880.00	-25.41	2.85	43.75	4.82	20.31	33.00	12.69	H
1908.50	-25.70	2.89	43.78	4.76	19.95	33.00	13.05	V

LTE Band 2_5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1852.50	-23.38	2.87	43.75	4.87	22.37	33.00	10.63	H
1880.00	-24.81	2.85	43.75	4.82	20.91	33.00	12.09	H
1907.50	-25.29	2.84	43.77	4.77	20.41	33.00	12.59	V

LTE Band 2_10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1855.00	-23.28	2.88	43.74	4.86	22.44	33.00	10.56	H
1880.00	-24.76	2.85	43.75	4.82	20.96	33.00	12.04	H
1905.00	-25.90	2.87	43.77	4.77	19.77	33.00	13.23	V

LTE Band 2_15MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1857.50	-23.68	2.87	43.75	4.86	22.06	33.00	10.94	H
1880.00	-24.25	2.85	43.75	4.82	21.47	33.00	11.53	H
1902.50	-25.89	2.86	43.77	4.78	19.80	33.00	13.20	V

LTE Band 2_20 MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1860.00	-23.88	2.86	43.75	4.85	21.86	33.00	11.14	H
1880.00	-24.78	2.85	43.75	4.82	20.94	33.00	12.06	H
1900.00	-25.85	2.87	43.77	4.78	19.83	33.00	13.17	H

©Copyright. All rights reserved by CTTL.

LTE Band 2_1.4MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1850.70	-24.59	2.92	43.75	4.87	21.11	33.00	11.89	H
1880.00	-25.99	2.85	43.75	4.82	19.73	33.00	13.27	H
1909.30	-26.77	2.87	43.77	4.76	18.89	33.00	14.11	V

LTE Band 2_3MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1851.50	-24.50	2.87	43.75	4.87	21.25	33.00	11.75	H
1880.00	-26.02	2.85	43.75	4.82	19.70	33.00	13.30	H
1908.50	-26.68	2.89	43.78	4.76	18.97	33.00	14.03	V

LTE Band 2_5MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1852.50	-24.41	2.87	43.75	4.87	21.34	33.00	11.66	H
1880.00	-25.66	2.85	43.75	4.82	20.06	33.00	12.94	H
1907.50	-26.66	2.84	43.77	4.77	19.04	33.00	13.96	V

LTE Band 2_10MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1855.00	-24.54	2.88	43.74	4.86	21.18	33.00	11.82	H
1880.00	-25.70	2.85	43.75	4.82	20.02	33.00	12.98	H
1905.00	-25.79	2.87	43.77	4.77	19.88	33.00	13.12	V

LTE Band 2_15MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1857.50	-24.52	2.87	43.75	4.86	21.22	33.00	11.78	H
1880.00	-25.81	2.85	43.75	4.82	19.91	33.00	13.09	H
1902.50	-27.00	2.86	43.77	4.78	18.69	33.00	14.31	H

LTE Band 2_20 MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1860.00	-24.73	2.86	43.75	4.85	21.01	33.00	11.99	H
1880.00	-26.01	2.85	43.75	4.82	19.71	33.00	13.29	H
1900.00	-27.08	2.87	43.77	4.78	18.60	33.00	14.40	H

©Copyright. All rights reserved by CTTL.

LTE Band 4- EIRP

Limits: ≤30dBm (1W)

LTE Band 4_1.4MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1710.70	-27.10	3.17	44.10	5.12	18.95	30.00	11.05	H
1732.50	-25.57	3.33	44.14	5.08	20.32	30.00	9.68	V
1754.30	-24.08	3.76	44.14	5.04	21.34	30.00	8.66	V

LTE Band 4_3MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1711.50	-27.09	3.40	44.10	5.12	18.73	30.00	11.27	H
1732.50	-25.82	3.33	44.14	5.08	20.07	30.00	9.93	V
1753.50	-24.17	3.80	44.13	5.04	21.20	30.00	8.80	V

LTE Band 4_5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.50	-26.92	3.66	44.10	5.12	18.64	30.00	11.36	H
1732.50	-25.81	3.33	44.14	5.08	20.08	30.00	9.92	V
1752.50	-24.16	3.82	44.14	5.05	21.21	30.00	8.79	V

LTE Band 4_10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1715.00	-27.16	3.56	44.10	5.11	18.49	30.00	11.51	H
1732.50	-25.59	3.33	44.14	5.08	20.30	30.00	9.70	V
1750.00	-25.18	3.00	44.15	5.05	21.02	30.00	8.98	V

LTE Band 4_15MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1717.50	-26.29	3.47	44.11	5.11	19.46	30.00	10.54	H
1732.50	-25.64	3.33	44.14	5.08	20.25	30.00	9.75	H
1747.50	-24.95	3.34	44.15	5.05	20.91	30.00	9.09	V

LTE Band 4_20 MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1720.00	-26.50	3.37	44.11	5.10	19.34	30.00	10.66	H
1732.50	-25.59	3.33	44.14	5.08	20.30	30.00	9.70	H
1745.00	-24.86	3.68	44.16	5.06	20.68	30.00	9.32	V

©Copyright. All rights reserved by CTTL.

LTE Band 4_1.4MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1710.70	-27.89	3.17	44.10	5.12	18.16	30.00	11.84	H
1732.50	-26.10	3.33	44.14	5.08	19.79	30.00	10.21	H
1754.30	-24.70	3.76	44.14	5.04	20.72	30.00	9.28	V

LTE Band 4_3MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1711.50	-27.82	3.40	44.10	5.12	18.00	30.00	12.00	H
1732.50	-25.85	3.33	44.14	5.08	20.04	30.00	9.96	V
1753.50	-24.23	3.80	44.13	5.04	21.14	30.00	8.86	V

LTE Band 4_5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.50	-27.60	3.66	44.10	5.12	17.96	30.00	12.04	H
1732.50	-25.75	3.33	44.14	5.08	20.14	30.00	9.86	V
1752.50	-24.88	3.82	44.14	5.05	20.49	30.00	9.51	V

LTE Band 4_10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1715.00	-27.78	3.56	44.10	5.11	17.87	30.00	12.13	H
1732.50	-26.36	3.33	44.14	5.08	19.53	30.00	10.47	V
1750.00	-25.79	3.00	44.15	5.05	20.41	30.00	9.59	V

LTE Band 4_15MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1717.50	-26.43	3.47	44.11	5.11	19.32	30.00	10.68	H
1732.50	-25.89	3.33	44.14	5.08	20.00	30.00	10.00	V
1747.50	-25.50	3.34	44.15	5.05	20.36	30.00	9.64	V

LTE Band 4_20 MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1720.00	-26.55	3.37	44.11	5.10	19.29	30.00	10.71	H
1732.50	-25.61	3.33	44.14	5.08	20.28	30.00	9.72	H
1745.00	-24.82	3.68	44.16	5.06	20.72	30.00	9.28	H

©Copyright. All rights reserved by CTTL.

LTE Band 4_1.4MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1710.70	-28.92	3.17	44.10	5.12	17.13	30.00	12.87	H
1732.50	-27.10	3.33	44.14	5.08	18.79	30.00	11.21	V
1754.30	-25.53	3.76	44.14	5.04	19.89	30.00	10.11	V

LTE Band 4_3MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1711.50	-28.31	3.40	44.10	5.12	17.51	30.00	12.49	H
1732.50	-27.23	3.33	44.14	5.08	18.66	30.00	11.34	V
1753.50	-26.06	3.80	44.13	5.04	19.31	30.00	10.69	V

LTE Band 4_5MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.50	-28.66	3.66	44.10	5.12	16.90	30.00	13.10	H
1732.50	-27.33	3.33	44.14	5.08	18.56	30.00	11.44	V
1752.50	-25.80	3.82	44.14	5.05	19.57	30.00	10.43	V

LTE Band 4_10MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1715.00	-28.84	3.56	44.10	5.11	16.81	30.00	13.19	H
1732.50	-27.23	3.33	44.14	5.08	18.66	30.00	11.34	V
1750.00	-26.51	3.00	44.15	5.05	19.69	30.00	10.31	V

LTE Band 4_15MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1717.50	-27.91	3.47	44.11	5.11	17.84	30.00	12.16	H
1732.50	-27.09	3.33	44.14	5.08	18.80	30.00	11.20	H
1747.50	-24.27	3.34	44.15	5.05	21.59	30.00	8.41	V

LTE Band 4_20 MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1720.00	-27.76	3.37	44.11	5.10	18.08	30.00	11.92	H
1732.50	-26.22	3.33	44.14	5.08	19.67	30.00	10.33	H
1745.00	-26.48	3.68	44.16	5.06	19.06	30.00	10.94	H

©Copyright. All rights reserved by CTTL.

LTE Band 5-ERP

Limits: ≤38.45dBm (7W)

LTE Band 5_1.4MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.70	-21.01	2.26	45.79	0.95	2.15	21.32	38.45	17.13	H
836.50	-19.82	2.26	45.66	0.82	2.15	22.25	38.45	16.20	H
848.30	-18.31	2.27	45.55	0.80	2.15	23.62	38.45	14.83	H

LTE Band 5_3MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.50	-20.90	2.26	45.79	0.94	2.15	21.42	38.45	17.03	H
836.50	-19.57	2.26	45.66	0.82	2.15	22.50	38.45	15.95	H
847.50	-18.55	2.27	45.56	0.81	2.15	23.40	38.45	15.05	H

LTE Band 5_5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.50	-20.82	2.25	45.77	0.93	2.15	21.48	38.45	16.97	H
836.50	-19.90	2.26	45.66	0.82	2.15	22.17	38.45	16.28	H
846.50	-18.74	2.26	45.56	0.82	2.15	23.23	38.45	15.22	H

LTE Band 5_10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.00	-20.34	2.25	45.77	0.90	2.15	21.93	38.45	16.52	H
836.50	-19.87	2.26	45.66	0.82	2.15	22.20	38.45	16.25	H
844.00	-19.33	2.26	45.59	0.82	2.15	22.67	38.45	15.78	H

©Copyright. All rights reserved by CTTL.

LTE Band 5_1.4MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.70	-20.95	2.26	45.79	0.95	2.15	21.38	38.45	17.07	H
836.50	-19.70	2.26	45.66	0.82	2.15	22.37	38.45	16.08	H
848.30	-18.92	2.27	45.55	0.80	2.15	23.01	38.45	15.44	H

LTE Band 5_3MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.50	-20.77	2.26	45.79	0.94	2.15	21.55	38.45	16.90	H
836.50	-20.30	2.26	45.66	0.82	2.15	21.77	38.45	16.68	H
847.50	-19.11	2.27	45.56	0.81	2.15	22.84	38.45	15.61	H

LTE Band 5_5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.50	-20.68	2.25	45.77	0.93	2.15	21.62	38.45	16.83	H
836.50	-19.74	2.26	45.66	0.82	2.15	22.33	38.45	16.12	H
846.50	-18.72	2.26	45.56	0.82	2.15	23.25	38.45	15.20	H

LTE Band 5_10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.00	-20.97	2.25	45.77	0.90	2.15	21.30	38.45	17.15	H
836.50	-20.39	2.26	45.66	0.82	2.15	21.68	38.45	16.77	H
844.00	-19.19	2.26	45.59	0.82	2.15	22.81	38.45	15.64	H

©Copyright. All rights reserved by CTTL.

LTE Band 5_1.4MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
824.70	-22.56	2.26	45.79	0.95	2.15	19.77	38.45	18.68	H
836.50	-21.28	2.26	45.66	0.82	2.15	20.79	38.45	17.66	H
848.30	-19.80	2.27	45.55	0.80	2.15	22.13	38.45	16.32	H

LTE Band 5_3MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
825.50	-22.40	2.26	45.79	0.94	2.15	19.92	38.45	18.53	H
836.50	-21.01	2.26	45.66	0.82	2.15	21.06	38.45	17.39	H
847.50	-19.96	2.27	45.56	0.81	2.15	21.99	38.45	16.46	H

LTE Band 5_5MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
826.50	-22.17	2.25	45.77	0.93	2.15	20.13	38.45	18.32	H
836.50	-21.14	2.26	45.66	0.82	2.15	20.93	38.45	17.52	H
846.50	-19.97	2.26	45.56	0.82	2.15	22.00	38.45	16.45	H

LTE Band 5_10MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
829.00	-21.86	2.25	45.77	0.90	2.15	20.41	38.45	18.04	H
836.50	-21.19	2.26	45.66	0.82	2.15	20.88	38.45	17.57	H
844.00	-20.53	2.26	45.59	0.82	2.15	21.47	38.45	16.98	H

©Copyright. All rights reserved by CTTL.

LTE Band 7- EIRP

Limits: ≤33 dBm (2W)

LTE Band 7_5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2502.50	-23.35	3.58	45.68	6.10	24.85	33.00	8.15	H
2535.00	-22.45	3.63	44.82	6.16	24.90	33.00	8.10	H
2567.50	-25.29	3.65	44.92	6.22	22.20	33.00	10.80	H

LTE Band 7_10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2505.00	-23.17	3.59	45.64	6.11	24.99	33.00	8.01	H
2535.00	-22.65	3.63	44.82	6.16	24.70	33.00	8.30	H
2565.00	-24.86	3.65	44.97	6.22	22.68	33.00	10.32	H

LTE Band 7_15MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2507.50	-22.30	3.59	44.92	6.11	25.14	33.00	7.86	H
2535.00	-22.71	3.63	44.82	6.16	24.64	33.00	8.36	H
2562.50	-26.37	3.65	45.67	6.21	21.86	33.00	11.14	H

LTE Band 7_20 MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2510.00	-22.65	3.58	45.36	6.12	25.25	33.00	7.75	H
2535.00	-22.85	3.63	44.82	6.16	24.50	33.00	8.50	H
2560.00	-26.30	3.64	45.98	6.21	22.25	33.00	10.75	H

©Copyright. All rights reserved by CTTL.

LTE Band 7_5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2502.50	-23.29	3.58	45.68	6.10	24.91	33.00	8.09	H
2535.00	-23.40	3.63	44.82	6.16	23.95	33.00	9.05	H
2567.50	-25.70	3.65	44.92	6.22	21.79	33.00	11.21	H

LTE Band 7_10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2505.00	-22.95	3.59	45.64	6.11	25.21	33.00	7.79	H
2535.00	-23.41	3.63	44.82	6.16	23.94	33.00	9.06	H
2565.00	-25.52	3.65	44.97	6.22	22.02	33.00	10.98	H

LTE Band 7_15MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2507.50	-22.10	3.59	44.92	6.11	25.34	33.00	7.66	H
2535.00	-23.41	3.63	44.82	6.16	23.94	33.00	9.06	H
2562.50	-25.98	3.65	45.67	6.21	22.25	33.00	10.75	H

LTE Band 7_20 MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2510.00	-23.32	3.58	45.36	6.12	24.58	33.00	8.42	H
2535.00	-23.13	3.63	44.82	6.16	24.22	33.00	8.78	H
2560.00	-26.14	3.64	45.98	6.21	22.41	33.00	10.59	H

©Copyright. All rights reserved by CTTL.

LTE Band 7_5MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2502.50	-24.58	3.58	45.68	6.10	23.62	33.00	9.38	H
2535.00	-24.06	3.63	44.82	6.16	23.29	33.00	9.71	H
2567.50	-27.33	3.65	44.92	6.22	20.16	33.00	12.84	H

LTE Band 7_10MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2505.00	-24.45	3.59	45.64	6.11	23.71	33.00	9.29	H
2535.00	-24.07	3.63	44.82	6.16	23.28	33.00	9.72	H
2565.00	-27.20	3.65	44.97	6.22	20.34	33.00	12.66	H

LTE Band 7_15MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2507.50	-23.76	3.59	44.92	6.11	23.68	33.00	9.32	H
2535.00	-24.23	3.63	44.82	6.16	23.12	33.00	9.88	H
2562.50	-27.86	3.65	45.67	6.21	20.37	33.00	12.63	H

LTE Band 7_20 MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2510.00	-24.12	3.58	45.36	6.12	23.78	33.00	9.22	H
2535.00	-24.08	3.63	44.82	6.16	23.27	33.00	9.73	H
2560.00	-27.63	3.64	45.98	6.21	20.92	33.00	12.08	H

©Copyright. All rights reserved by CTTL.

LTE Band 12 - ERP

Limits: ≤34.77dBm (3W)

LTE Band 12_1.4MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
699.70	-22.74	1.90	44.66	0.77	2.15	18.64	34.77	16.13	H
707.50	-23.55	1.91	44.94	0.62	2.15	17.95	34.77	16.82	H
715.30	-23.96	1.92	45.26	0.50	2.15	17.73	34.77	17.04	H

LTE Band 12_3MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
700.50	-22.99	1.90	44.68	0.76	2.15	18.40	34.77	16.37	H
707.50	-23.39	1.91	44.94	0.62	2.15	18.11	34.77	16.66	H
714.50	-24.02	1.92	45.26	0.50	2.15	17.67	34.77	17.10	H

LTE Band 12_5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
701.50	-22.95	1.90	44.81	0.74	2.15	18.55	34.77	16.22	H
707.50	-23.69	1.91	44.94	0.62	2.15	17.81	34.77	16.96	H
713.50	-23.93	1.92	45.22	0.50	2.15	17.72	34.77	17.05	H

LTE Band 12_10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
704.00	-23.31	1.91	44.93	0.70	2.15	18.26	34.77	16.51	H
707.50	-23.67	1.91	44.94	0.62	2.15	17.83	34.77	16.94	H
711.00	-24.00	1.92	45.19	0.53	2.15	17.65	34.77	17.12	H

©Copyright. All rights reserved by CTTL.

LTE Band 12_1.4MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
699.70	-23.52	1.90	44.66	0.77	2.15	17.86	34.77	16.91	H
707.50	-23.49	1.91	44.94	0.62	2.15	18.01	34.77	16.76	H
715.30	-24.04	1.92	45.26	0.50	2.15	17.65	34.77	17.12	H

LTE Band 12_3MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
700.50	-22.74	1.90	44.68	0.76	2.15	18.65	34.77	16.12	H
707.50	-24.06	1.91	44.94	0.62	2.15	17.44	34.77	17.33	H
714.50	-24.63	1.92	45.26	0.50	2.15	17.06	34.77	17.71	H

LTE Band 12_5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
701.50	-23.64	1.90	44.81	0.74	2.15	17.86	34.77	16.91	H
707.50	-24.11	1.91	44.94	0.62	2.15	17.39	34.77	17.38	H
713.50	-24.07	1.92	45.22	0.50	2.15	17.58	34.77	17.19	H

LTE Band 12_10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
704.00	-23.99	1.91	44.93	0.70	2.15	17.58	34.77	17.19	H
707.50	-24.15	1.91	44.94	0.62	2.15	17.35	34.77	17.42	H
711.00	-23.90	1.92	45.19	0.53	2.15	17.75	34.77	17.02	H

©Copyright. All rights reserved by CTTL.

LTE Band 12_1.4MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
699.70	-24.47	1.90	44.66	0.77	2.15	16.91	34.77	17.86	H
707.50	-25.21	1.91	44.94	0.62	2.15	16.29	34.77	18.48	H
715.30	-25.57	1.92	45.26	0.50	2.15	16.12	34.77	18.65	H

LTE Band 12_3MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
700.50	-24.44	1.90	44.68	0.76	2.15	16.95	34.77	17.82	H
707.50	-24.95	1.91	44.94	0.62	2.15	16.55	34.77	18.22	H
714.50	-25.64	1.92	45.26	0.50	2.15	16.05	34.77	18.72	H

LTE Band 12_5MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
701.50	-24.63	1.90	44.81	0.74	2.15	16.87	34.77	17.90	H
707.50	-24.82	1.91	44.94	0.62	2.15	16.68	34.77	18.09	H
713.50	-25.71	1.92	45.22	0.50	2.15	15.94	34.77	18.83	H

LTE Band 12_10MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	Correction (dB)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarization
704.00	-24.73	1.91	44.93	0.70	2.15	16.84	34.77	17.93	H
707.50	-25.05	1.91	44.94	0.62	2.15	16.45	34.77	18.32	H
711.00	-25.45	1.92	45.19	0.53	2.15	16.20	34.77	18.57	H

©Copyright. All rights reserved by CTTL.

LTE band 41- EIRP

Limits: ≤33dBm (2W)

LTE Band 41_5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2537.50	-27.11	3.63	44.94	6.17	20.37	33.00	12.63	H
2593.00	-27.33	3.69	44.93	6.27	20.18	33.00	12.82	H
2652.50	-26.78	3.69	44.96	6.37	20.86	33.00	12.14	H

LTE Band 41_10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2540.00	-26.53	3.63	45.05	6.17	21.06	33.00	11.94	H
2593.00	-26.82	3.69	44.93	6.27	20.69	33.00	12.31	H
2650.00	-26.85	3.69	44.96	6.37	20.79	33.00	12.21	H

LTE Band 41_15MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2542.50	-26.47	3.63	45.17	6.18	21.25	33.00	11.75	H
2593.00	-27.03	3.69	44.93	6.27	20.48	33.00	12.52	H
2647.50	-26.50	3.69	44.96	6.37	21.14	33.00	11.86	H

LTE Band 41_20MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2545.00	-26.54	3.62	45.28	6.18	21.30	33.00	11.70	H
2593.00	-26.71	3.69	44.93	6.27	20.80	33.00	12.20	H
2645.00	-25.42	3.68	44.96	6.36	22.22	33.00	10.78	H

©Copyright. All rights reserved by CTTL.

LTE Band 41_5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2537.50	-28.46	3.63	44.94	6.17	19.02	33.00	13.98	H
2593.00	-28.75	3.69	44.93	6.27	18.76	33.00	14.24	H
2652.50	-28.06	3.69	44.96	6.37	19.58	33.00	13.42	H

LTE Band 41_10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2540.00	-28.46	3.63	45.05	6.17	19.13	33.00	13.87	H
2593.00	-28.76	3.69	44.93	6.27	18.75	33.00	14.25	H
2650.00	-28.51	3.69	44.96	6.37	19.13	33.00	13.87	H

LTE Band 41_15MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2542.50	-28.26	3.63	45.17	6.18	19.46	33.00	13.54	H
2593.00	-28.41	3.69	44.93	6.27	19.10	33.00	13.90	H
2647.50	-28.47	3.69	44.96	6.37	19.17	33.00	13.83	H

LTE Band 41_20MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2545.00	-28.28	3.62	45.28	6.18	19.56	33.00	13.44	H
2593.00	-28.56	3.69	44.93	6.27	18.95	33.00	14.05	H
2645.00	-28.32	3.68	44.96	6.36	19.32	33.00	13.68	H

©Copyright. All rights reserved by CTTL.

LTE Band 41_5MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2537.50	-29.38	3.63	44.94	6.17	18.10	33.00	14.90	H
2593.00	-29.56	3.69	44.93	6.27	17.95	33.00	15.05	H
2652.50	-29.52	3.69	44.96	6.37	18.12	33.00	14.88	H

LTE Band 41_10MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2540.00	-29.35	3.63	45.05	6.17	18.24	33.00	14.76	H
2593.00	-29.69	3.69	44.93	6.27	17.82	33.00	15.18	H
2650.00	-29.43	3.69	44.96	6.37	18.21	33.00	14.79	H

LTE Band 41_15MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2542.50	-29.24	3.63	45.17	6.18	18.48	33.00	14.52	H
2593.00	-29.77	3.69	44.93	6.27	17.74	33.00	15.26	H
2647.50	-29.27	3.69	44.96	6.37	18.37	33.00	14.63	H

LTE Band 41_20MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
2545.00	-29.27	3.62	45.28	6.18	18.57	33.00	14.43	H
2593.00	-29.61	3.69	44.93	6.27	17.90	33.00	15.10	H
2645.00	-28.82	3.68	44.96	6.36	18.82	33.00	14.18	H

©Copyright. All rights reserved by CTTL.

LTE Band 66- EIRP

Limits: ≤30dBm (1W)

LTE Band 66_1.4MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1710.70	-33.07	3.17	44.10	5.12	19.32	30.00	10.68	V
1745.00	-32.11	3.68	44.16	5.06	20.79	30.00	9.21	V
1779.30	-30.75	3.04	44.03	5.00	21.32	30.00	8.68	V

LTE Band 66_3MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1711.50	-33.17	3.40	44.10	5.12	19.45	30.00	10.55	H
1745.00	-32.13	3.68	44.16	5.06	20.77	30.00	9.23	V
1778.50	-30.95	3.04	44.03	5.00	21.12	30.00	8.88	V

LTE Band 66_5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.50	-25.68	3.66	44.10	5.12	19.88	30.00	10.12	H
1745.00	-24.77	3.68	44.16	5.06	20.77	30.00	9.23	H
1777.50	-24.78	3.04	44.04	5.00	21.22	30.00	8.78	V

LTE Band 66_10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1715.00	-26.16	3.56	44.10	5.11	19.49	30.00	10.51	V
1745.00	-25.06	3.68	44.16	5.06	20.48	30.00	9.52	V
1775.00	-25.39	3.05	44.05	5.01	20.61	30.00	9.39	V

LTE Band 66_15MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1717.50	-25.82	3.47	44.11	5.11	19.93	30.00	10.07	V
1745.00	-24.48	3.68	44.16	5.06	21.06	30.00	8.94	V
1772.50	-24.65	3.05	44.06	5.01	21.37	30.00	8.63	V

LTE Band 66_20MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1720.00	-25.58	3.37	44.11	5.10	20.26	30.00	9.74	V
1745.00	-24.69	3.68	44.16	5.06	20.85	30.00	9.15	V
1770.00	-24.73	3.05	44.07	5.01	21.31	30.00	8.69	V

©Copyright. All rights reserved by CTTL.

LTE Band 66_1.4MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1710.70	-32.97	3.17	44.10	5.12	19.42	30.00	10.58	H
1745.00	-32.18	3.68	44.16	5.06	20.72	30.00	9.28	V
1779.30	-31.19	3.04	44.03	5.00	20.88	30.00	9.12	V

LTE Band 66_3MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1711.50	-33.35	3.40	44.10	5.12	19.27	30.00	10.73	H
1745.00	-32.17	3.68	44.16	5.06	20.73	30.00	9.27	V
1778.50	-30.89	3.04	44.03	5.00	21.18	30.00	8.82	V

LTE Band 66_5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.50	-26.07	3.66	44.10	5.12	19.49	30.00	10.51	H
1745.00	-25.08	3.68	44.16	5.06	20.46	30.00	9.54	V
1777.50	-25.14	3.04	44.04	5.00	20.86	30.00	9.14	V

LTE Band 66_10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1715.00	-26.31	3.56	44.10	5.11	19.34	30.00	10.66	H
1745.00	-25.49	3.68	44.16	5.06	20.05	30.00	9.95	V
1775.00	-25.43	3.05	44.05	5.01	20.57	30.00	9.43	V

LTE Band 66_15MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1717.50	-25.97	3.47	44.11	5.11	19.78	30.00	10.22	V
1745.00	-24.86	3.68	44.16	5.06	20.68	30.00	9.32	V
1772.50	-24.63	3.05	44.06	5.01	21.39	30.00	8.61	V

LTE Band 66_20MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1720.00	-26.01	3.37	44.11	5.10	19.83	30.00	10.17	V
1745.00	-25.03	3.68	44.16	5.06	20.51	30.00	9.49	H
1770.00	-25.15	3.05	44.07	5.01	20.89	30.00	9.11	V

©Copyright. All rights reserved by CTTL.

LTE Band 66_1.4MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1710.70	-34.40	3.17	44.10	5.12	17.99	30.00	12.01	H
1745.00	-33.64	3.68	44.16	5.06	19.26	30.00	10.74	V
1779.30	-32.30	3.04	44.03	5.00	19.77	30.00	10.23	V

LTE Band 66_3MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1711.50	-34.42	3.40	44.10	5.12	18.20	30.00	11.80	H
1745.00	-33.48	3.68	44.16	5.06	19.42	30.00	10.58	H
1778.50	-32.13	3.04	44.03	5.00	19.94	30.00	10.06	V

LTE Band 66_5MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1712.50	-27.13	3.66	44.10	5.12	18.43	30.00	11.57	H
1745.00	-26.26	3.68	44.16	5.06	19.28	30.00	10.72	H
1777.50	-26.21	3.04	44.04	5.00	19.79	30.00	10.21	V

LTE Band 66_10MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1715.00	-27.73	3.56	44.10	5.11	17.92	30.00	12.08	H
1745.00	-26.39	3.68	44.16	5.06	19.15	30.00	10.85	V
1775.00	-26.98	3.05	44.05	5.01	19.02	30.00	10.98	V

LTE Band 66_15MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1717.50	-26.92	3.47	44.11	5.11	18.83	30.00	11.17	V
1745.00	-25.78	3.68	44.16	5.06	19.76	30.00	10.24	V
1772.50	-26.16	3.05	44.06	5.01	19.86	30.00	10.14	V

LTE Band 66_20MHz_64QAM

Frequency (MHz)	P_{Mea} (dBm)	P_{cl} (dB)	P_{Ag} (dB)	G_a (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1720.00	-27.19	3.37	44.11	5.10	18.65	30.00	11.35	H
1745.00	-25.92	3.68	44.16	5.06	19.62	30.00	10.38	V
1770.00	-26.19	3.05	44.07	5.01	19.85	30.00	10.15	V

Frequency: 1770.00MHz

Peak EIRP (dBm) = PMea (-26.19dBm) + Ga (5.01dBi) +PAg (44.07dB) - Pcl (3.05dB) =19.85dBm

Note: The maximum value of expanded measurement uncertainty for this test item is U = 4.69 dB, k = 2.

©Copyright. All rights reserved by CTTL.

A.2 Emission Limit

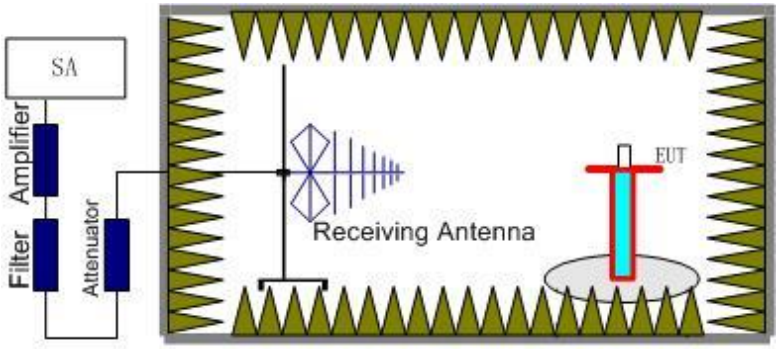
A.2.1 Measurement Method

The measurements procedures in TIA-603E-2016 are used. This measurement is carried out in fully anechoic chamber FAC-3.

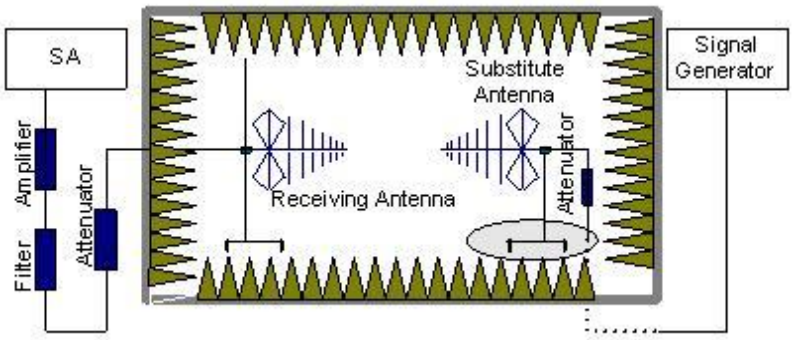
The spectrum was scanned from 9 kHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of each LTE Band.

The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5-meter-high non-conductive stand at a 3-meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. 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 non-harmonic and harmonics of the transmit frequency through the 10th harmonic 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. Adjust the level of the signal generator output until the value of the

©Copyright. All rights reserved by CTTL.

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 (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:
   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 - 2.15dB.

A.2.2 Measurement Limit

Part 22.917, Part 24.238 and Part 27.53(h) specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Part 27.53(m)(4) specifies for mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Part 27.53(g) states for operations in the 600 MHz band and the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

©Copyright. All rights reserved by CTTL.

A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of each LTE Band. 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 each LTE Band 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.

All mode of operation were investigated and the worst case configuration results are reported in this section.

The range of evaluated frequency is from 9 kHz to 26GHz. Measurement value show only up to 6 maximum emissions noted.

©Copyright. All rights reserved by CTTL.

LTE Band 2, 1.4MHz, QPSK, Channel 18607

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
3702.02	-52.36	6.42	8.48	-50.30	-13.00	37.30	H
5553.02	-45.40	7.18	10.59	-41.99	-13.00	28.99	V
7376.01	-52.90	8.11	12.05	-48.96	-13.00	35.96	V
9268.01	-52.16	9.08	13.26	-47.98	-13.00	34.98	V
11058.01	-49.39	9.91	13.19	-46.11	-13.00	33.11	V
13004.01	-45.98	10.48	13.51	-42.95	-13.00	29.95	V

LTE Band 2, 1.4MHz, QPSK, Channel 18900

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
3760.02	-51.34	6.26	8.56	-49.04	-13.00	36.04	H
5640.02	-43.90	7.27	10.57	-40.60	-13.00	27.60	V
7560.01	-53.39	8.14	12.25	-49.28	-13.00	36.28	V
9353.01	-52.05	9.09	13.31	-47.83	-13.00	34.83	V
11250.01	-49.31	9.70	13.15	-45.86	-13.00	32.86	V
13123.01	-43.88	10.84	13.67	-41.05	-13.00	28.05	V

LTE Band 2, 1.4MHz, QPSK, Channel 19193

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
3819.02	-50.55	6.08	8.65	-47.98	-13.00	34.98	H
5728.02	-41.51	7.30	10.55	-38.26	-13.00	25.26	V
7600.01	-53.46	7.97	12.28	-49.15	-13.00	36.15	V
9534.01	-53.35	9.42	13.37	-49.40	-13.00	36.40	H
11503.01	-48.93	9.81	13.10	-45.64	-13.00	32.64	V
13414.01	-43.76	10.58	14.08	-40.26	-13.00	27.26	H

©Copyright. All rights reserved by CTTL.

LTE Band 4, 1.4MHz, QPSK, Channel 19957

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
3422.02	-62.50	5.38	8.01	-59.87	-13.00	46.87	V
5132.02	-53.12	6.85	10.08	-49.89	-13.00	36.89	V
6841.01	-64.31	7.84	11.41	-60.74	-13.00	47.74	V
8594.01	-63.67	8.50	13.02	-59.15	-13.00	46.15	V
10313.01	-60.70	9.66	13.03	-57.33	-13.00	44.33	V
12006.01	-58.21	10.07	13.00	-55.28	-13.00	42.28	V

LTE Band 4, 1.4MHz, QPSK, Channel 20175

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
3465.02	-60.87	5.46	8.12	-58.21	-13.00	45.21	V
5200.02	-54.89	6.96	10.18	-51.67	-13.00	38.67	V
6881.01	-64.80	7.78	11.46	-61.12	-13.00	48.12	V
8616.01	-63.79	8.47	13.02	-59.24	-13.00	46.24	V
10441.01	-60.40	9.74	13.08	-57.06	-13.00	44.06	V
12089.01	-58.69	10.31	13.04	-55.96	-13.00	42.96	V

LTE Band 4, 1.4MHz, QPSK, Channel 20393

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
3509.02	-63.62	5.54	8.21	-60.95	-13.00	47.95	V
5264.02	-54.30	6.99	10.27	-51.02	-13.00	38.02	V
7001.01	-64.18	8.30	11.60	-60.88	-13.00	47.88	V
8745.01	-63.37	8.49	13.05	-58.81	-13.00	45.81	V
10480.01	-60.42	9.68	13.09	-57.01	-13.00	44.01	V
12247.01	-58.32	10.03	13.10	-55.25	-13.00	42.25	V

©Copyright. All rights reserved by CTTL.

LTE Band 5, 1.4MHz, QPSK, Channel 20407

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polorization
1640.01	-54.55	3.56	5.25	2.15	-55.01	-13.00	42.01	H
2487.00	-45.36	4.61	6.06	2.15	-46.06	-13.00	33.06	H
3298.02	-61.57	5.29	7.72	2.15	-61.29	-13.00	48.29	V
4114.02	-56.82	6.04	9.01	2.15	-56.00	-13.00	43.00	V
4951.01	-57.09	6.69	9.85	2.15	-56.08	-13.00	43.08	V
5785.01	-57.10	7.21	10.54	2.15	-55.92	-13.00	42.92	H

LTE Band 5, 1.4MHz, QPSK, Channel 20525

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polorization
1668.01	-54.70	3.58	5.20	2.15	-55.23	-13.00	42.23	H
2498.00	-45.31	4.62	6.09	2.15	-45.99	-13.00	32.99	H
3357.02	-60.51	5.32	7.86	2.15	-60.12	-13.00	47.12	V
4173.02	-56.87	6.14	9.07	2.15	-56.09	-13.00	43.09	V
5015.01	-57.41	6.58	9.92	2.15	-56.22	-13.00	43.22	H
5858.01	-56.83	7.26	10.53	2.15	-55.71	-13.00	42.71	V

LTE Band 5, 1.4MHz, QPSK, Channel 20643

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polorization
1697.01	-52.15	3.60	5.15	2.15	-52.75	-13.00	39.75	V
2532.00	-44.40	4.65	6.16	2.15	-45.04	-13.00	32.04	H
3398.02	-61.28	5.36	7.96	2.15	-60.83	-13.00	47.83	V
4247.02	-57.32	6.24	9.15	2.15	-56.56	-13.00	43.56	H
5099.01	-55.88	6.77	10.04	2.15	-54.76	-13.00	41.76	V
5934.01	-55.90	7.47	10.51	2.15	-55.01	-13.00	42.01	V

©Copyright. All rights reserved by CTTL.

LTE Band 7, 5 MHz, QPSK, Channel 20775

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
5006.02	-59.51	6.59	9.91	-56.19	-25.00	31.19	V
7510.01	-45.70	8.35	12.21	-41.84	-25.00	16.84	H
10028.01	-52.61	9.26	12.91	-48.96	-25.00	23.96	H
12497.01	-48.69	10.18	13.20	-45.67	-25.00	20.67	V
15021.00	-43.83	11.24	13.99	-41.08	-25.00	16.08	H
17511.00	-39.65	12.77	14.92	-37.50	-25.00	12.50	V

LTE Band 7, 5 MHz, QPSK, Channel 21100

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
5087.02	-59.11	6.74	10.02	-55.83	-25.00	30.83	H
7606.01	-49.43	8.00	12.28	-45.15	-25.00	20.15	V
10146.01	-53.40	9.39	12.96	-49.83	-25.00	24.83	V
12666.01	-48.04	10.36	13.30	-45.10	-25.00	20.10	H
15226.00	-43.85	11.37	13.86	-41.36	-25.00	16.36	H
17746.00	-41.50	12.44	15.24	-38.70	-25.00	13.70	H

LTE Band 7, 5 MHz, QPSK, Channel 21425

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
5115.02	-59.54	6.81	10.06	-56.29	-25.00	31.29	H
7704.01	-49.86	8.42	12.36	-45.92	-25.00	20.92	V
10289.01	-51.88	9.61	13.02	-48.47	-25.00	23.47	V
12820.01	-48.25	10.71	13.39	-45.57	-25.00	20.57	H
15404.00	-44.66	11.40	13.76	-42.30	-25.00	17.30	V
17971.00	-40.96	12.89	15.56	-38.29	-25.00	13.29	V

©Copyright. All rights reserved by CTTL.

LTE Band 12, 1.4MHz, QPSK, Channel 23017

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polorization
1327.01	-55.70	3.15	4.60	2.15	-56.40	-13.00	43.40	H
1997.01	-48.99	4.04	4.61	2.15	-50.57	-13.00	37.57	H
2683.00	-43.41	4.77	6.43	2.15	-43.90	-13.00	30.90	H
3344.02	-60.61	5.31	7.83	2.15	-60.24	-13.00	47.24	V
4014.02	-57.97	6.06	8.91	2.15	-57.27	-13.00	44.27	H
4701.02	-58.66	6.51	9.60	2.15	-57.72	-13.00	44.72	V

LTE Band 12, 1.4MHz, QPSK, Channel 23095

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polorization
1425.01	-55.46	3.27	5.11	2.15	-55.77	-13.00	42.77	H
2129.00	-47.66	4.22	4.99	2.15	-49.04	-13.00	36.04	H
2828.00	-44.74	4.95	6.69	2.15	-45.15	-13.00	32.15	V
3546.02	-58.30	5.78	8.26	2.15	-57.97	-13.00	44.97	V
4239.02	-57.13	6.25	9.14	2.15	-56.39	-13.00	43.39	V
4949.01	-57.19	6.69	9.85	2.15	-56.18	-13.00	43.18	V

LTE Band 12, 1.4MHz, QPSK, Channel 23173

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Correction	Peak ERP (dBm)	Limit (dBm)	Margin (dB)	Polorization
1433.01	-55.29	3.28	5.15	2.15	-55.57	-13.00	42.57	H
2146.00	-47.42	4.24	5.04	2.15	-48.77	-13.00	35.77	H
2869.00	-45.03	4.97	6.76	2.15	-45.39	-13.00	32.39	H
3583.02	-57.84	6.16	8.32	2.15	-57.83	-13.00	44.83	H
4289.02	-57.23	6.20	9.19	2.15	-56.39	-13.00	43.39	V
5017.01	-57.18	6.57	9.92	2.15	-55.98	-13.00	42.98	H

©Copyright. All rights reserved by CTTL.

LTE Band 41, 5MHz, QPSK, Channel 39675

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
5096.02	-59.05	6.76	10.03	-55.78	-25.00	30.78	V
7614.01	-53.74	8.04	12.29	-49.49	-25.00	24.49	V
10164.01	-52.92	9.36	12.97	-49.31	-25.00	24.31	H
12692.01	-47.46	10.31	13.32	-44.45	-25.00	19.45	H
15221.00	-44.25	11.37	13.87	-41.75	-25.00	16.75	H
17767.00	-40.84	12.55	15.27	-38.12	-25.00	13.12	H

LTE Band 41, 5MHz, QPSK, Channel 40620

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
5215.02	-60.50	6.98	10.20	-57.28	-25.00	32.28	H
7799.01	-55.92	8.29	12.44	-51.77	-25.00	26.77	H
10374.01	-50.72	9.76	13.05	-47.43	-25.00	22.43	V
12961.01	-47.20	10.48	13.48	-44.20	-25.00	19.20	H
15575.00	-44.39	11.50	13.70	-42.19	-25.00	17.19	H
16873.00	-40.17	12.03	13.75	-38.45	-25.00	13.45	H

LTE Band 41, 5MHz, QPSK, Channel 41565

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
5301.02	-60.18	6.99	10.32	-56.85	-25.00	31.85	V
7960.01	-53.00	8.36	12.57	-48.79	-25.00	23.79	H
10609.01	-51.61	9.28	13.12	-47.77	-25.00	22.77	V
13291.01	-44.35	10.57	13.91	-41.01	-25.00	16.01	V
15951.00	-44.49	11.72	13.70	-42.51	-25.00	17.51	V
17263.00	-39.42	12.36	14.38	-37.40	-25.00	12.40	H

©Copyright. All rights reserved by CTTL.

LTE Band 66, 1.4MHz QPSK, Channel 131979

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
3422.02	-64.40	5.38	8.01	-61.77	-13.00	48.77	H
5132.02	-55.06	6.85	10.08	-51.83	-13.00	38.83	V
6845.01	-64.10	7.83	11.41	-60.52	-13.00	47.52	V
8592.01	-63.53	8.51	13.02	-59.02	-13.00	46.02	V
10315.01	-60.59	9.67	13.03	-57.23	-13.00	44.23	V
12000.01	-58.14	10.05	13.00	-55.19	-13.00	42.19	V

LTE Band 66, 1.4MHz, QPSK, Channel 132322

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
3490.02	-63.23	5.50	8.18	-60.55	-13.00	47.55	V
5237.02	-56.40	7.00	10.23	-53.17	-13.00	40.17	V
7006.01	-64.07	8.29	11.61	-60.75	-13.00	47.75	V
8758.01	-63.12	8.53	13.05	-58.60	-13.00	45.60	V
10450.01	-60.02	9.73	13.08	-56.67	-13.00	43.67	V
12249.01	-58.27	10.03	13.10	-55.20	-13.00	42.20	V

LTE Band 66, 1.4MHz, QPSK, Channel 132665

Frequency (MHz)	SG (dBm)	CableLoss (dB)	AntennaGain (dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polorization
3559.02	-64.17	5.92	8.28	-61.81	-13.00	48.81	H
5338.02	-60.80	6.96	10.37	-57.39	-13.00	44.39	H
7162.01	-65.05	8.18	11.79	-61.44	-13.00	48.44	V
8943.01	-62.73	9.00	13.09	-58.64	-13.00	45.64	V
10648.01	-60.55	9.29	13.13	-56.71	-13.00	43.71	V
12402.01	-58.04	10.43	13.16	-55.31	-13.00	42.31	V

Note: The maximum value of expanded measurement uncertainty for this test item is U = 4.69 dB, k = 2.

©Copyright. All rights reserved by CTTL.

A.3 Frequency Stability

A.3.1 Method of Measurement

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage. Two reference points are established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and highest channel of operation shall be identified as F_L and F_H respectively.

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 CMW500.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30℃.
3. With the EUT, powered via nominal voltage, connected to the CMW500, and in a simulated call on middle channel for each LTE band, 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℃ increments from -30℃ to +50℃. 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℃.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the center 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 ℃increments from +50℃ to -30℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

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 the lower, higher and nominal voltage. 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.

©Copyright. All rights reserved by CTTL.

A.3.2 Measurement results

LTE Band 2, 20MHz bandwidth QPSK (worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	1850.833	1909.199		
50				11.23	0.0060
40				15.05	0.0080
30				7.30	0.0039
10				7.07	0.0038
0				0.19	0.0001
-10				8.04	0.0043
-20				3.32	0.0018
-30				7.47	0.0040

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
3.5	20	1850.833	1909.199	3.20	0.0017
4.4				5.41	0.0029

LTE Band 4, 20MHz bandwidth QPSK (worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	1710.833	1754.199		
50				17.95	0.0104
40				20.76	0.0120
30				2.56	0.0015
10				31.11	0.0180
0				19.28	0.0111
-10				4.28	0.0025
-20				27.37	0.0158
-30				12.70	0.0073

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
3.5	20	1710.833	1754.199	-0.76	0.0004
4.4				-6.79	0.0039

©Copyright. All rights reserved by CTTL.

LTE Band 5, 10MHz bandwidth QPSK (worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	824.417	848.583		
50				25.41	0.0304
40				20.57	0.0246
30				13.49	0.0161
10				20.90	0.0250
0				27.78	0.0332
-10				30.26	0.0362
-20				31.59	0.0378
-30				30.43	0.0364

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
3.5	20	824.417	848.583	-3.95	0.0047
4.4				32.10	0.0384

LTE Band 7, 20MHz bandwidth QPSK (worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	2500.897	2569.103		
50				-4.28	0.0017
40				2.73	0.0011
30				-4.12	0.0016
10				1.59	0.0006
0				-8.51	0.0034
-10				6.44	0.0025
-20				6.97	0.0027
-30				6.59	0.0026

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
3.5	20	2500.897	2569.103	2.12	0.0008
4.4				5.89	0.0023

©Copyright. All rights reserved by CTTL.

LTE Band 12, 10MHz bandwidth QPSK (worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	699.481	715.519		
50				-8.00	0.0113
40				40.55	0.0573
30				38.55	0.0545
10				33.50	0.0473
0				33.27	0.0470
-10				32.50	0.0459
-20				30.68	0.0434
-30				29.98	0.0424

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
3.5	20	699.481	715.519	-4.18	0.0059
4.4				-4.13	0.0058

LTE Band 41, 20MHz bandwidth QPSK (worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	2535.915	2654.095		
50				-7.42	0.0029
40				-7.21	0.0028
30				-13.99	0.0054
10				-5.74	0.0022
0				16.61	0.0064
-10				-14.10	0.0054
-20				-13.20	0.0051
-30				26.79	0.0103

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
3.5	20	2535.915	2654.095	-14.63	0.0056
4.4				-12.12	0.0047

©Copyright. All rights reserved by CTTL.

LTE Band 66, 20MHz bandwidth QPSK (worst case of all bandwidths)

Frequency Error vs Temperature

Temperature(℃)	Voltage(V)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.8	1710.833	1779.199		
50				-7.68	0.0044
40				46.48	0.0266
30				18.74	0.0107
10				9.36	0.0054
0				5.97	0.0034
-10				2.25	0.0013
-20				1.04	0.0006
-30				27.98	0.0160

Frequency Error vs Voltage

Voltage(V)	Temperature(℃)	F_L(MHz)	F_H(MHz)	Offset(Hz)	Frequency error(ppm)
3.5	20	1710.833	1779.199	-2.30	0.0013
4.4				-6.08	0.0035

Note: Expanded measurement uncertainty is U = 0.01 PPM, k = 2.

©Copyright. All rights reserved by CTTL.

A.4 Occupied Bandwidth

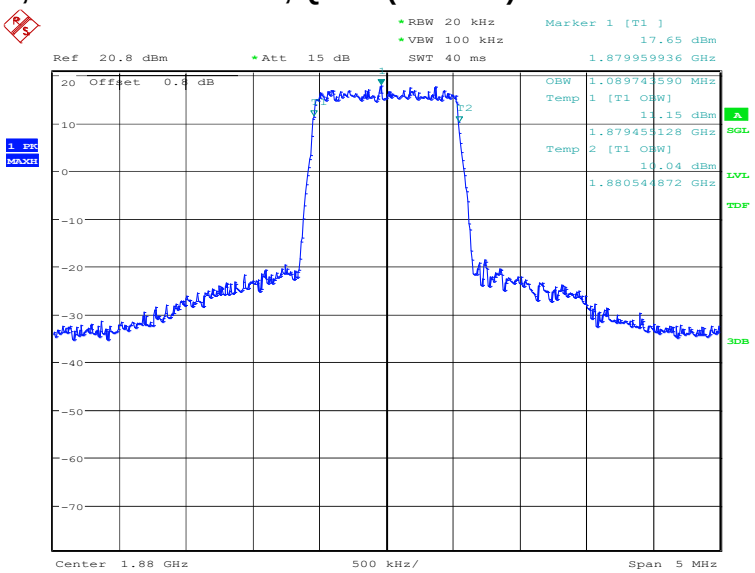
Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the mid frequencies frequency. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.
The measurement method is from ANSI C63.26:
a) 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.
b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set ≥ 3 × RBW.
c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
d) Set the detection mode to peak, and the trace mode to max-hold.

©Copyright. All rights reserved by CTTL.

LTE band 2, 1.4MHz (99%)

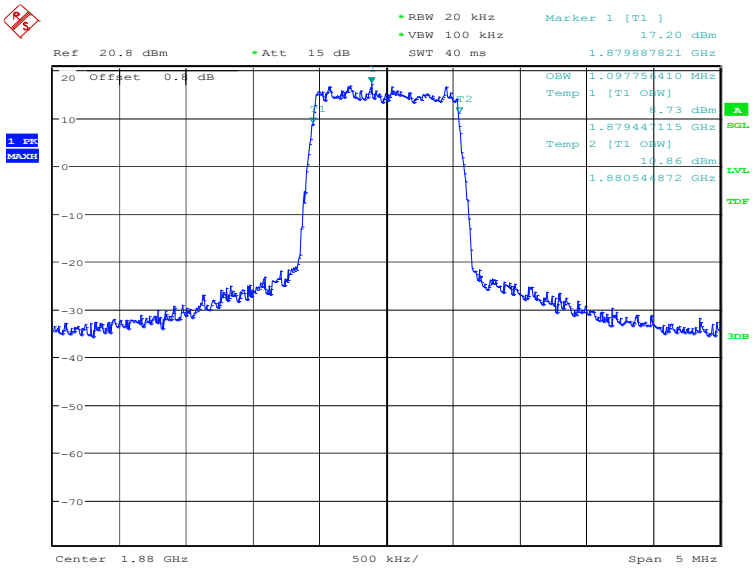
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	1089.74	1097.76

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



Date: 18.JUL.2022 16:53:08

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



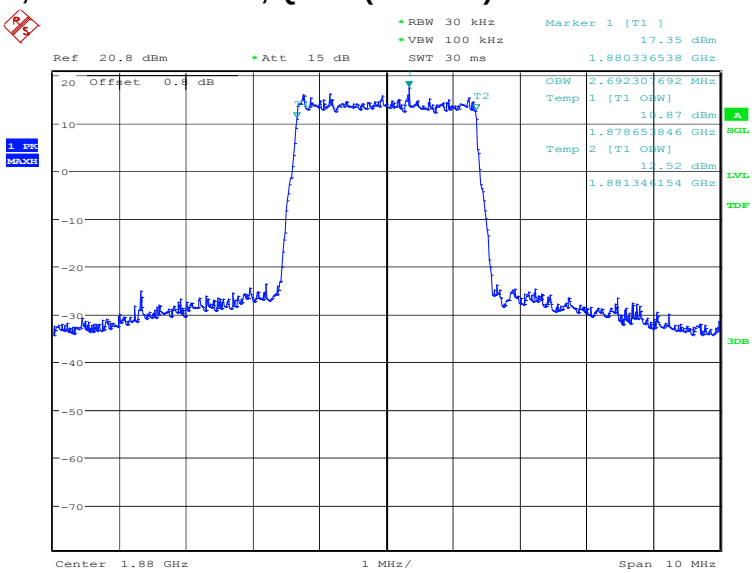
Date: 18.JUL.2022 16:53:48

©Copyright. All rights reserved by CTTL.

LTE band 2, 3MHz (99%)

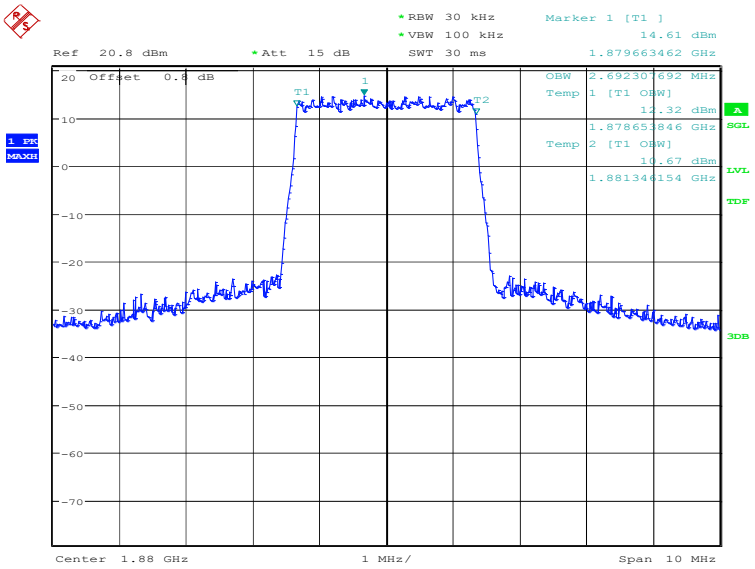
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	2692.31	2692.31

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



Date: 18.JUL.2022 16:54:29

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



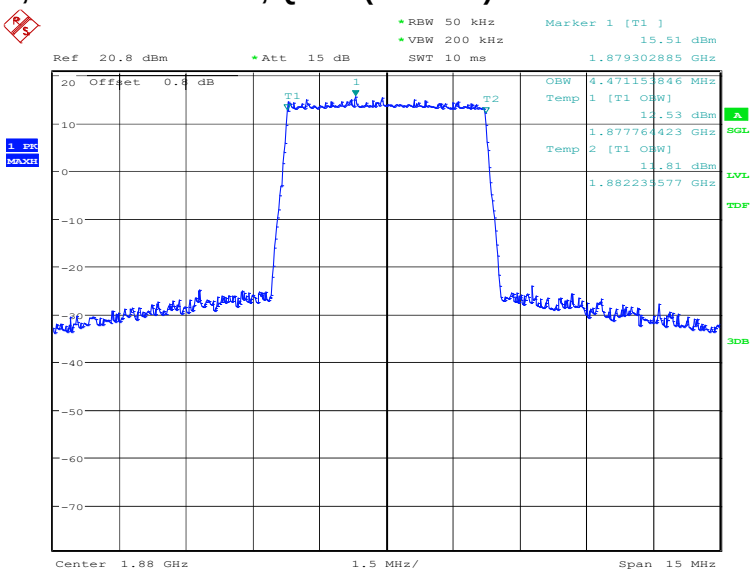
Date: 18.JUL.2022 16:55:09

©Copyright. All rights reserved by CTTL.

LTE band 2, 5MHz (99%)

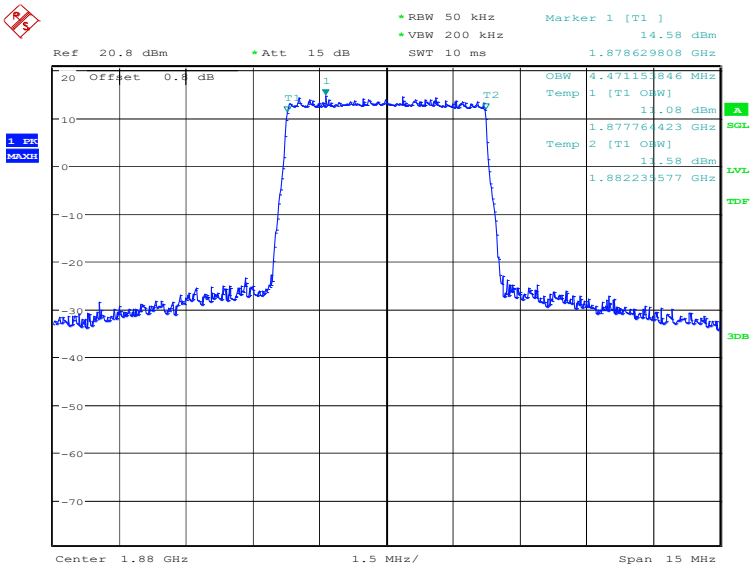
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	4471.15	4471.15

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



Date: 18.JUL.2022 16:55:51

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



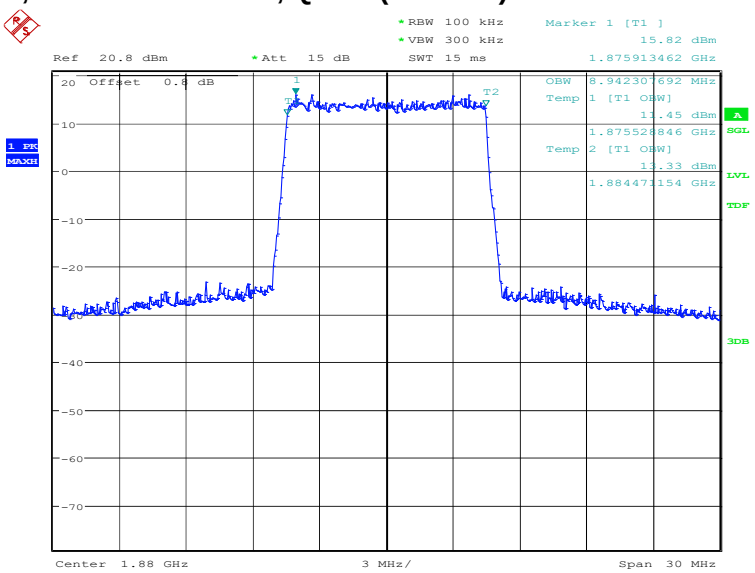
Date: 18.JUL.2022 16:56:30

©Copyright. All rights reserved by CTTL.

LTE band 2, 10MHz (99%)

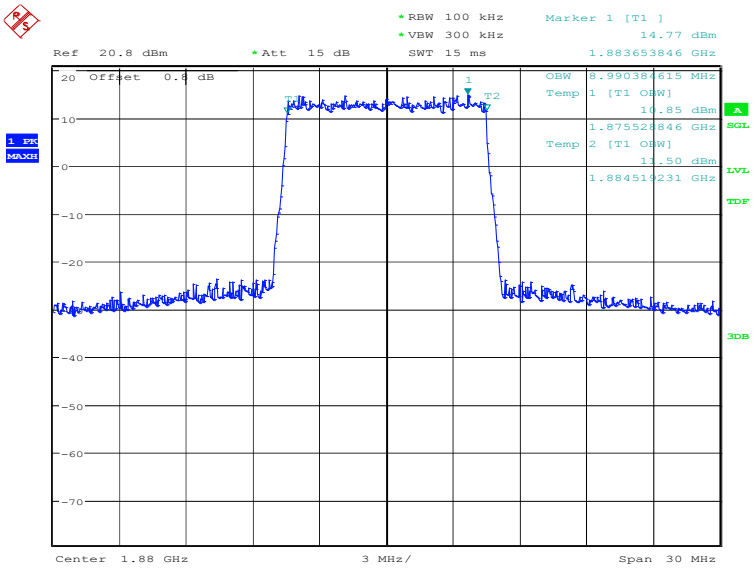
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	8942.31	8990.38

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



Date: 18.JUL.2022 16:57:13

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



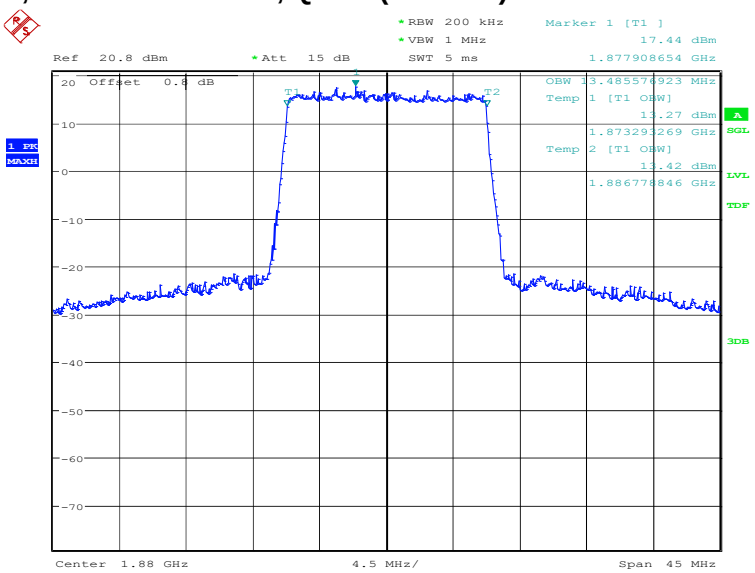
Date: 18.JUL.2022 16:57:52

©Copyright. All rights reserved by CTTL.

LTE band 2, 15MHz (99%)

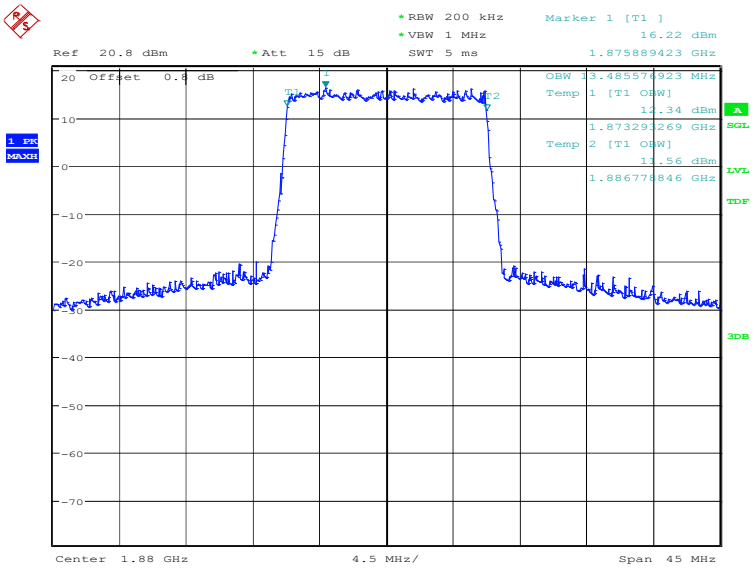
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	13485.58	13485.58

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



Date: 18.JUL.2022 16:58:33

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



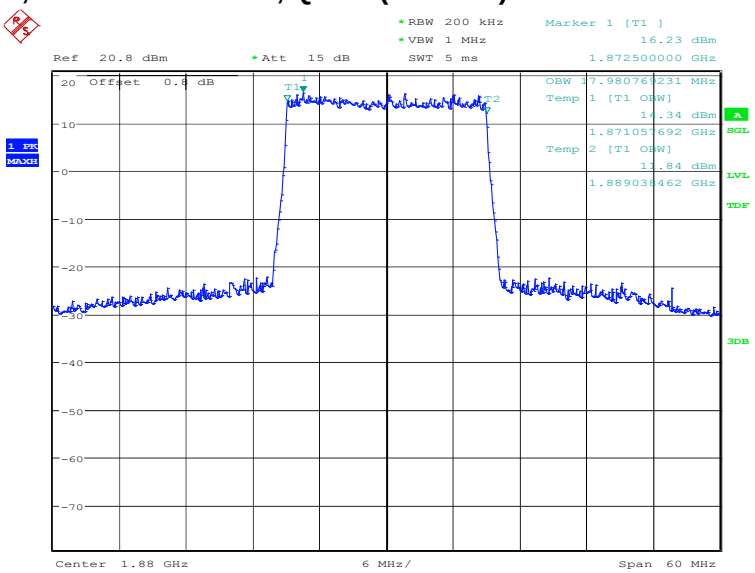
Date: 18.JUL.2022 16:59:13

©Copyright. All rights reserved by CTTL.

LTE band 2, 20MHz (99%)

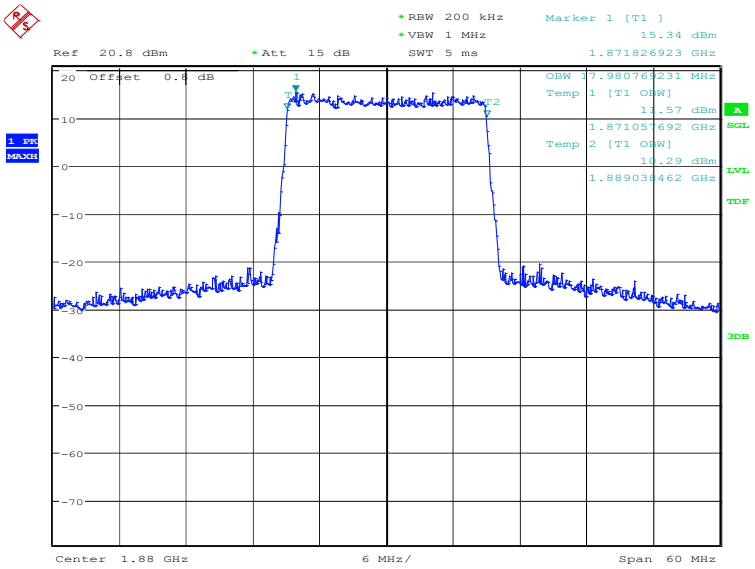
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	17980.77	17980.77

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



Date: 18.JUL.2022 16:59:54

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



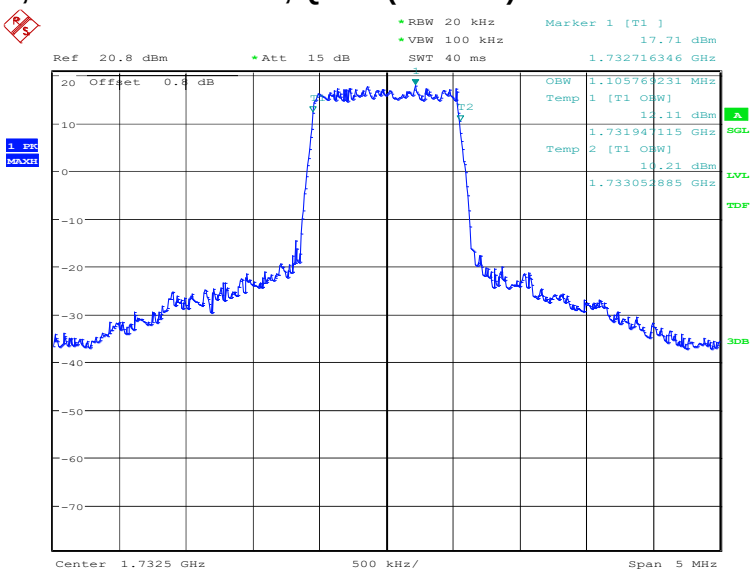
Date: 18.JUL.2022 17:00:34

©Copyright. All rights reserved by CTTL.

LTE band 4, 1.4MHz (99%)

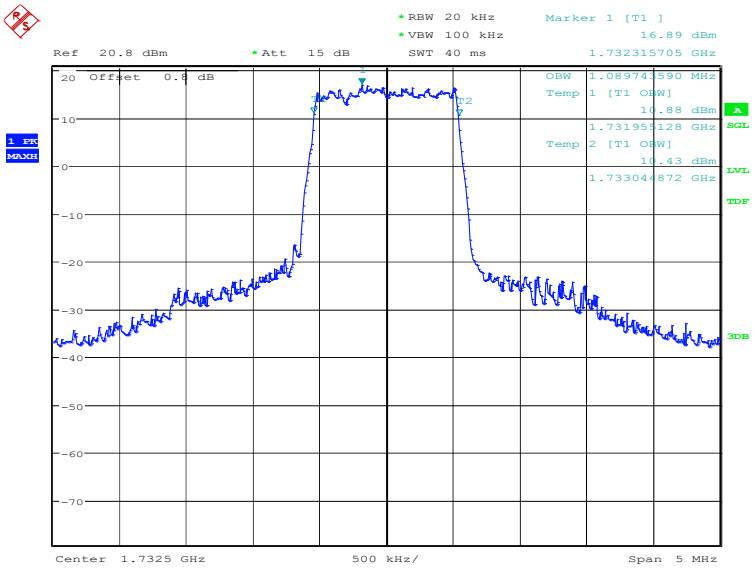
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	1105.77	1089.74

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



Date: 18.JUL.2022 17:01:27

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



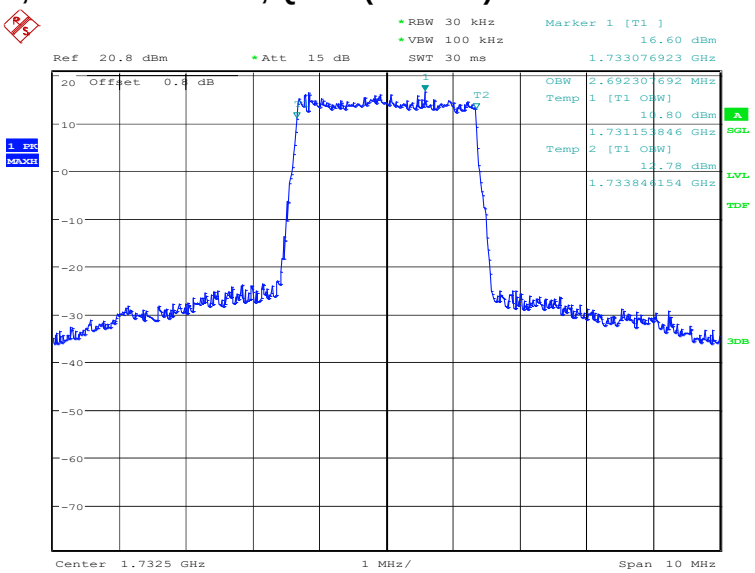
Date: 18.JUL.2022 17:02:06

©Copyright. All rights reserved by CTTL.

LTE band 4, 3MHz (99%)

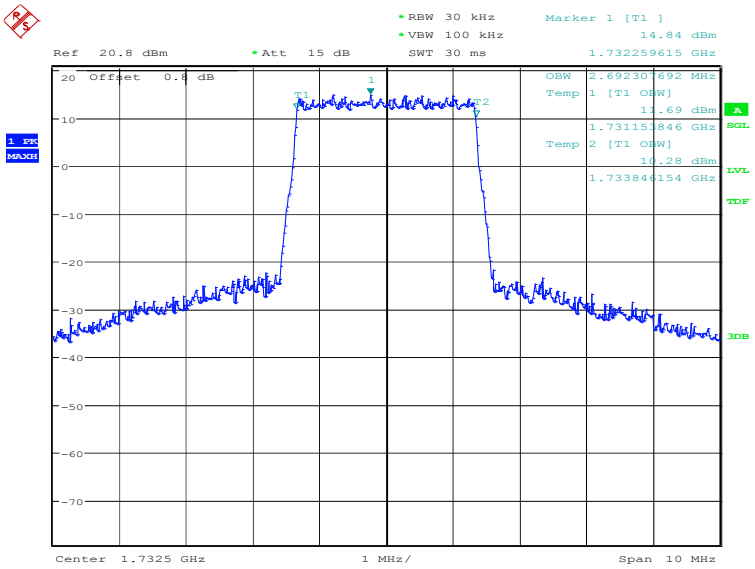
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	2692.31	2692.31

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



Date: 18.JUL.2022 17:02:49

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



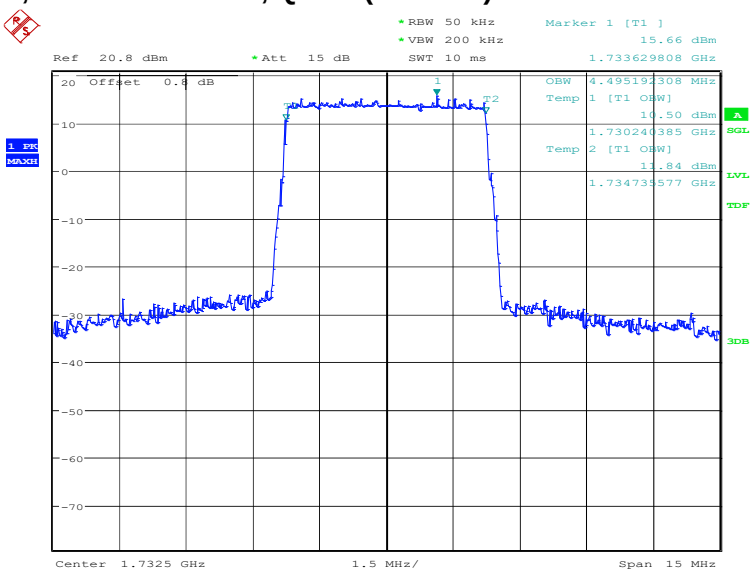
Date: 18.JUL.2022 17:03:28

©Copyright. All rights reserved by CTTL.

LTE band 4, 5MHz (99%)

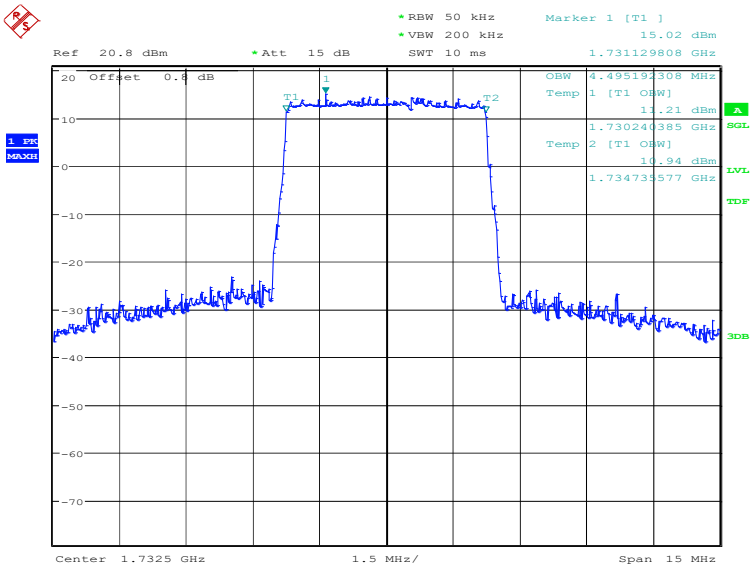
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	4495.19	4495.19

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



Date: 18.JUL.2022 17:04:11

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



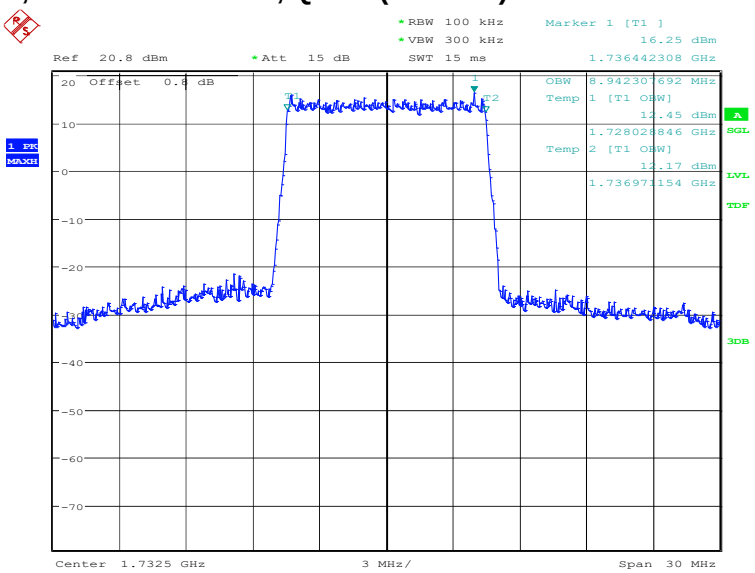
Date: 18.JUL.2022 17:04:50

©Copyright. All rights reserved by CTTL.

LTE band 4, 10MHz (99%)

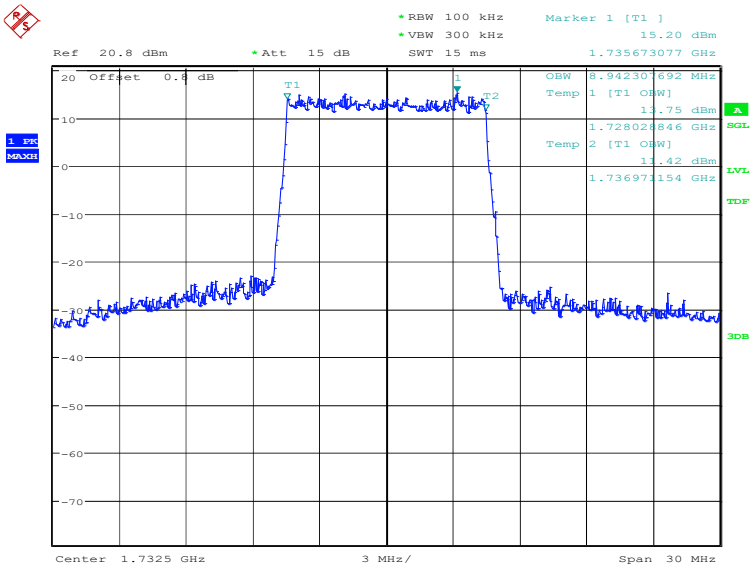
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	8942.31	8942.31

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



Date: 18.JUL.2022 17:05:33

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



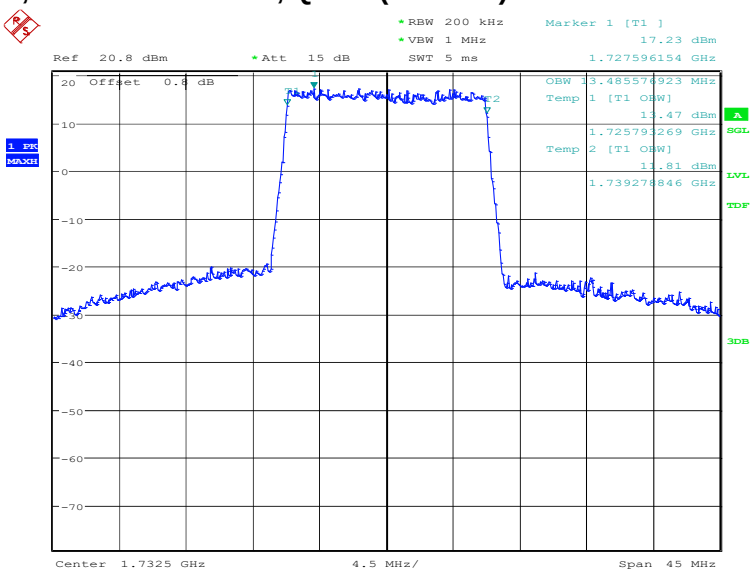
Date: 18.JUL.2022 17:06:12

©Copyright. All rights reserved by CTTL.

LTE band 4, 15MHz (99%)

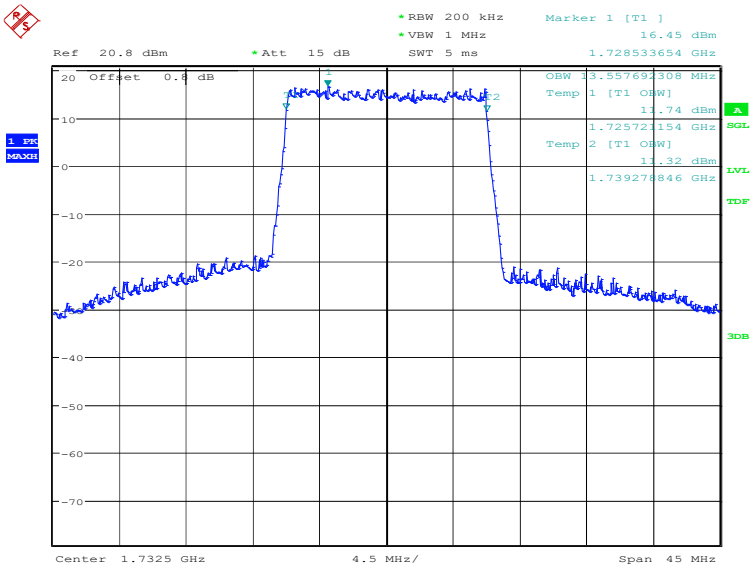
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	13485.58	13557.69

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



Date: 18.JUL.2022 17:06:55

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



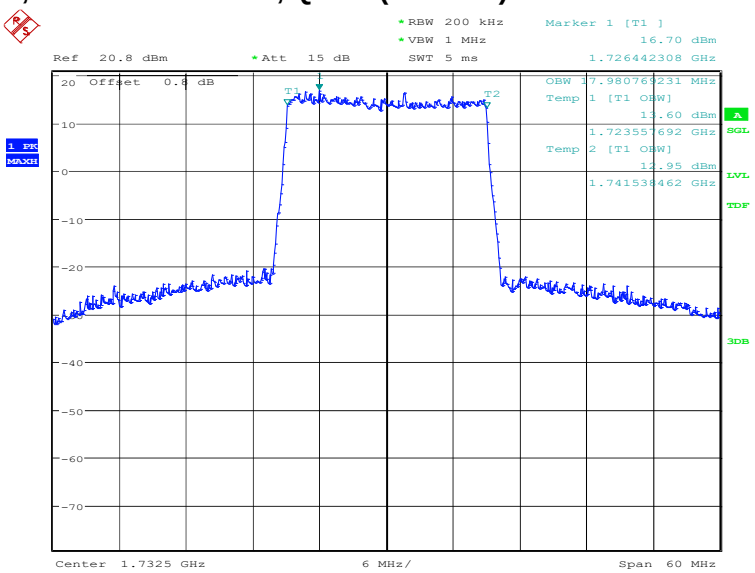
Date: 18.JUL.2022 17:07:34

©Copyright. All rights reserved by CTTL.

LTE band 4, 20MHz (99%)

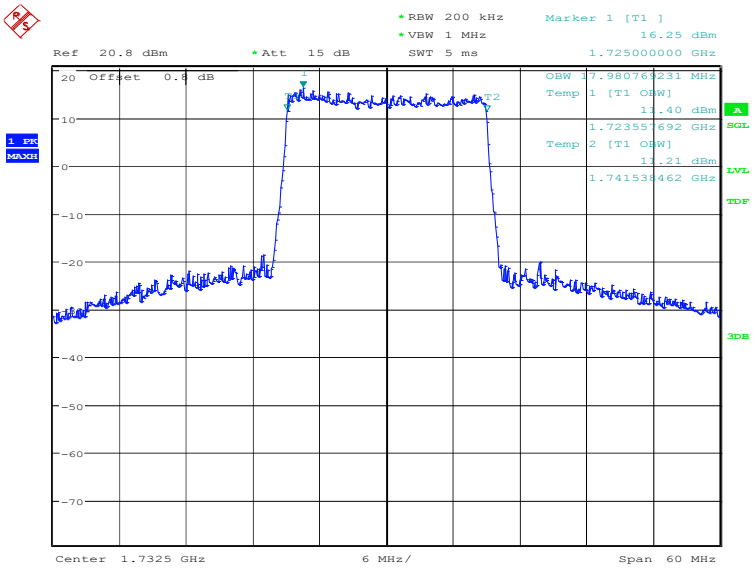
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	17980.77	17980.77

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



Date: 18.JUL.2022 17:08:17

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



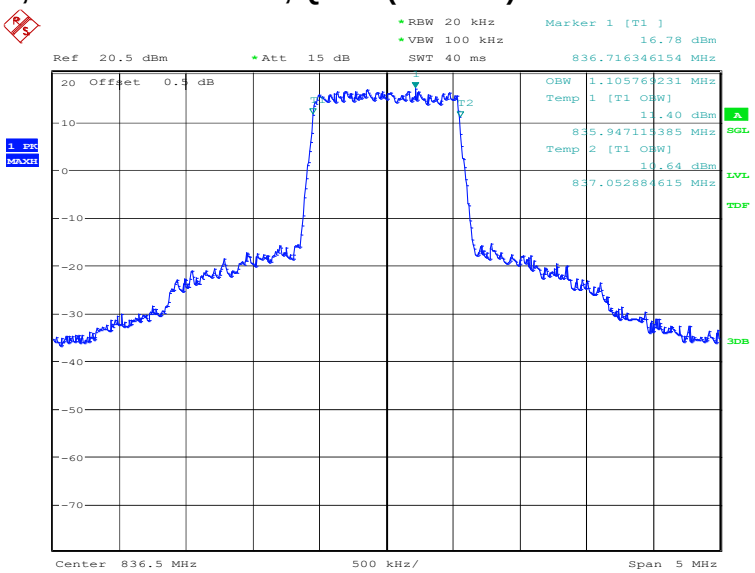
Date: 18.JUL.2022 17:08:56

©Copyright. All rights reserved by CTTL.

LTE band 5, 1.4MHz (99%)

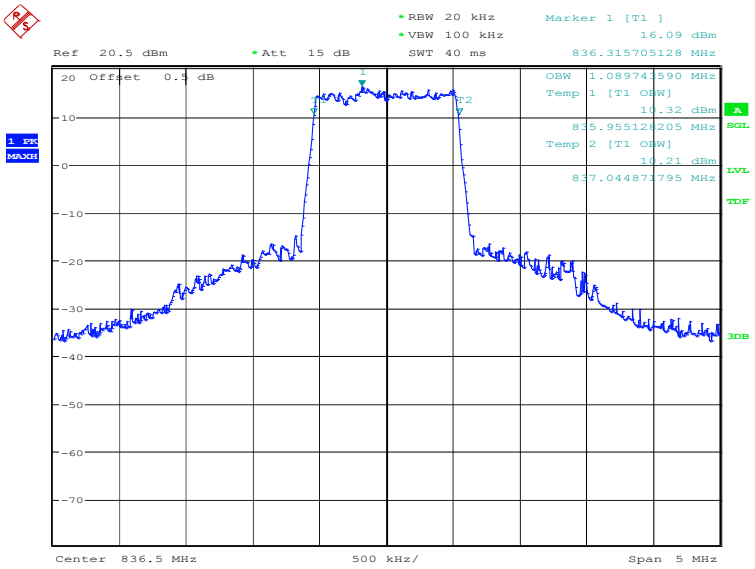
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	1105.77	1089.74

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



Date: 18.JUL.2022 17:09:49

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



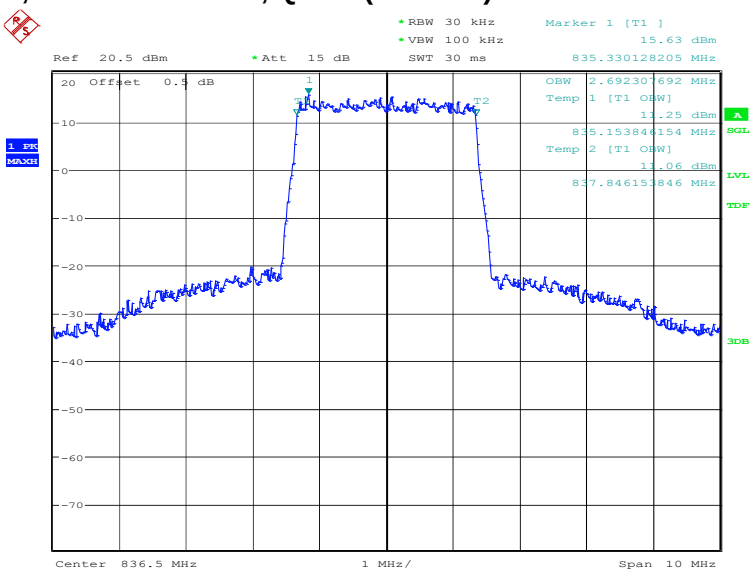
Date: 18.JUL.2022 17:10:29

©Copyright. All rights reserved by CTTL.

LTE band 5, 3MHz (99%)

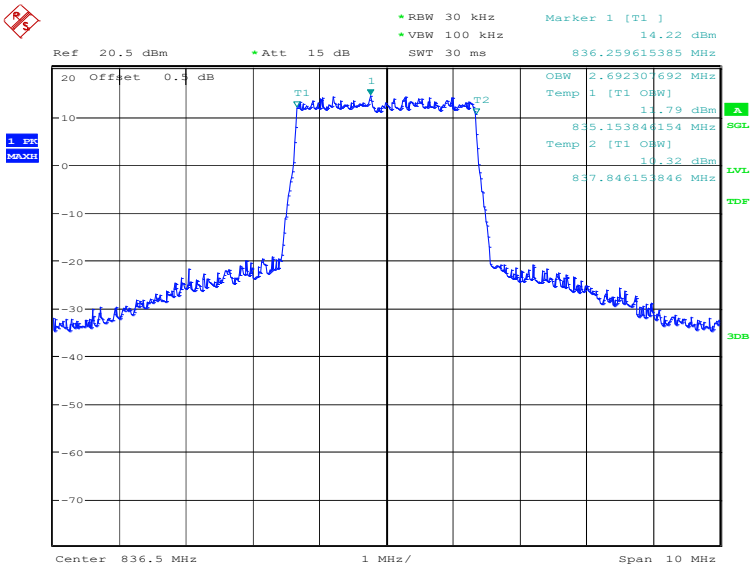
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	2692.31	2692.31

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



Date: 18.JUL.2022 17:11:11

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



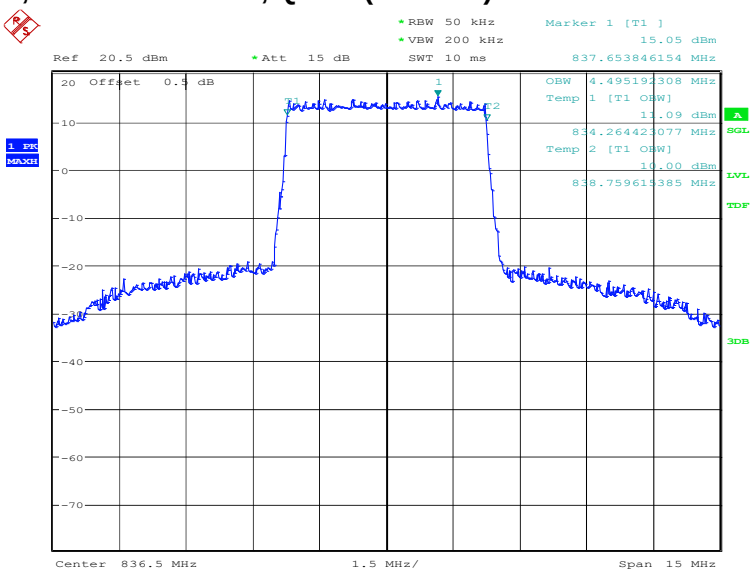
Date: 18.JUL.2022 17:11:50

©Copyright. All rights reserved by CTTL.

LTE band 5, 5MHz (99%)

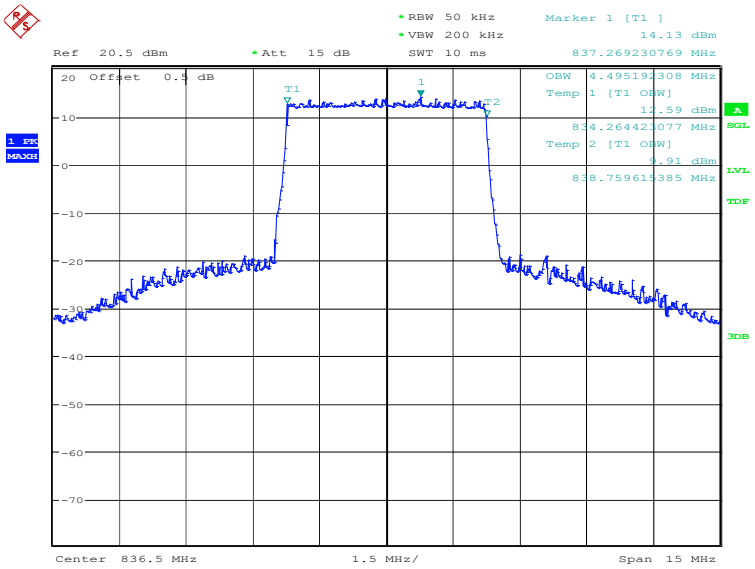
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	4495.19	4495.19

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



Date: 18.JUL.2022 17:12:32

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



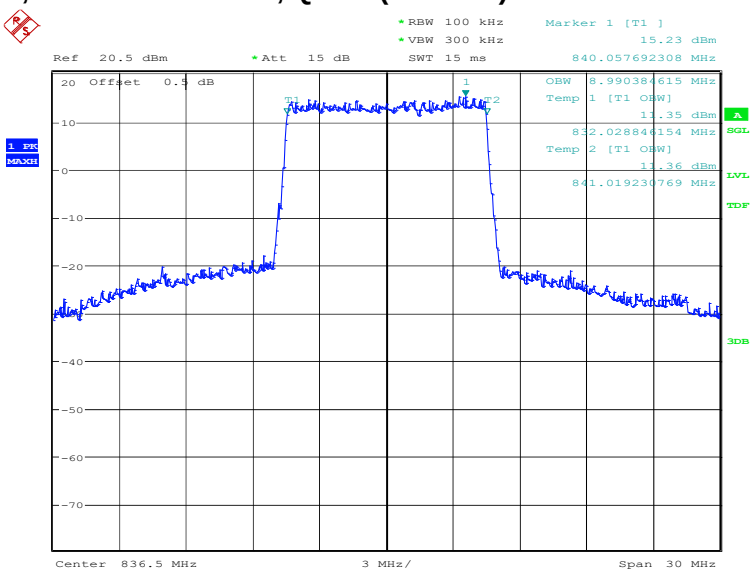
Date: 18.JUL.2022 17:13:12

©Copyright. All rights reserved by CTTL.

LTE band 5, 10MHz (99%)

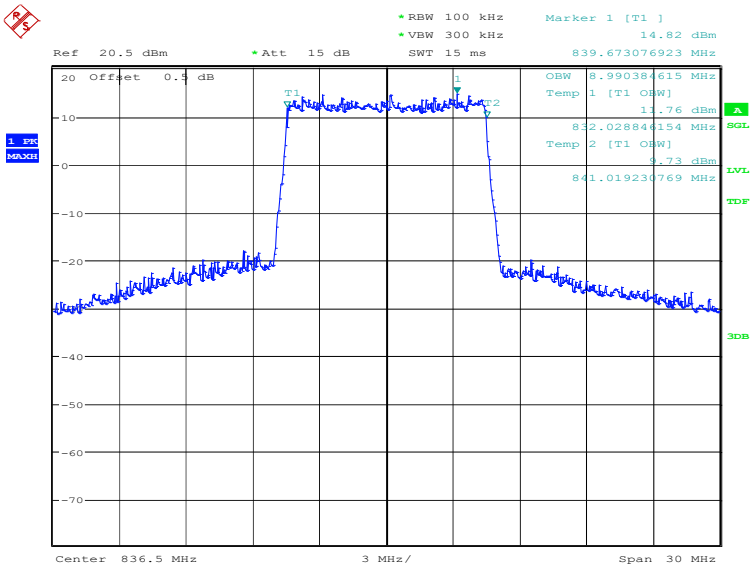
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	8990.38	8990.38

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



Date: 18.JUL.2022 17:13:54

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



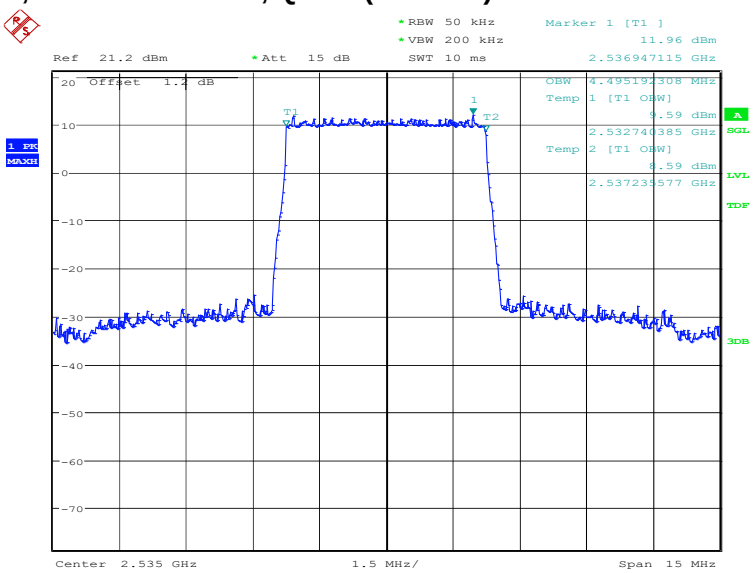
Date: 18.JUL.2022 17:14:34

©Copyright. All rights reserved by CTTL.

LTE band 7, 5MHz (99%)

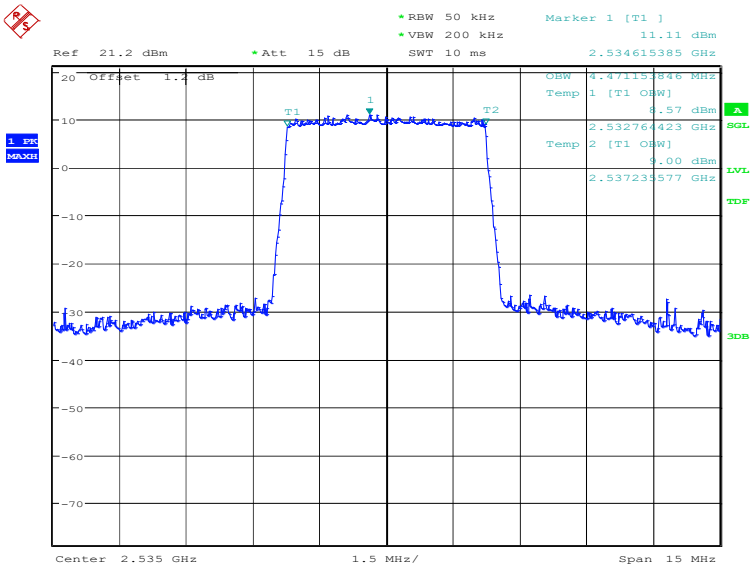
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2535.0	QPSK	16QAM
	4495.19	4471.15

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



Date: 19.JUL.2022 08:13:24

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



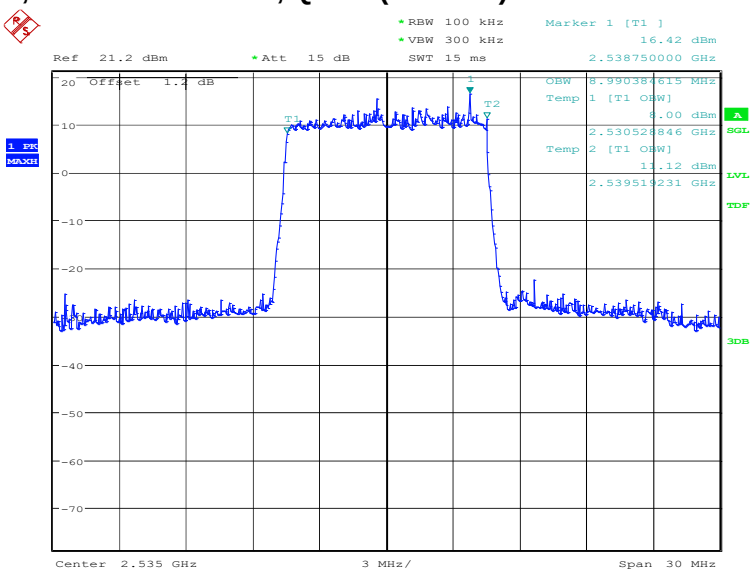
Date: 19.JUL.2022 08:14:03

©Copyright. All rights reserved by CTTL.

LTE band 7, 10MHz (99%)

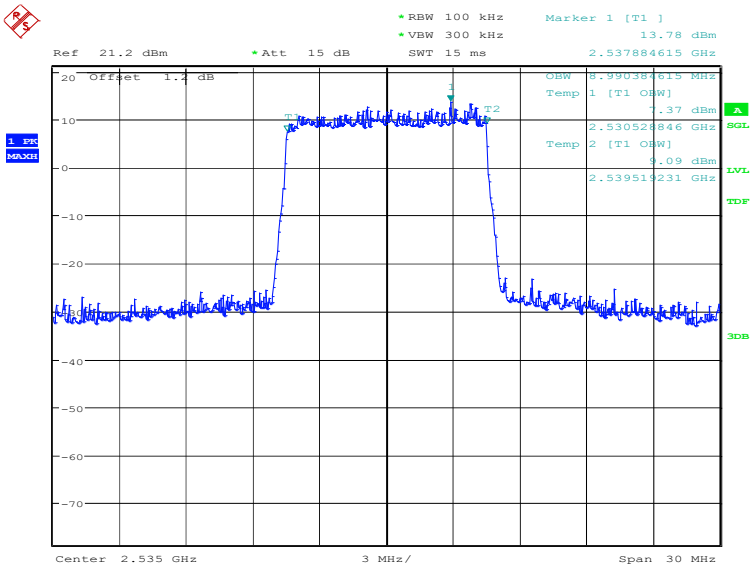
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2535.0	QPSK	16QAM
	8990.38	8990.38

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



Date: 19.JUL.2022 08:14:44

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



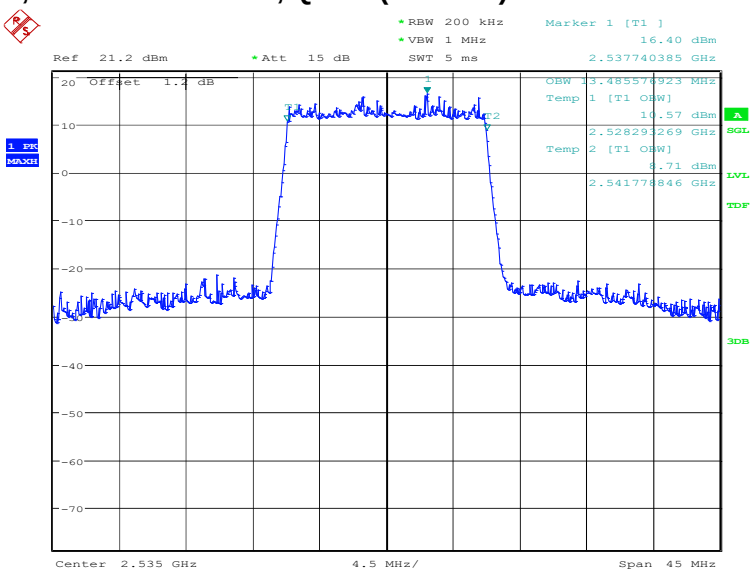
Date: 19.JUL.2022 08:15:23

©Copyright. All rights reserved by CTTL.

LTE band 7, 15MHz (99%)

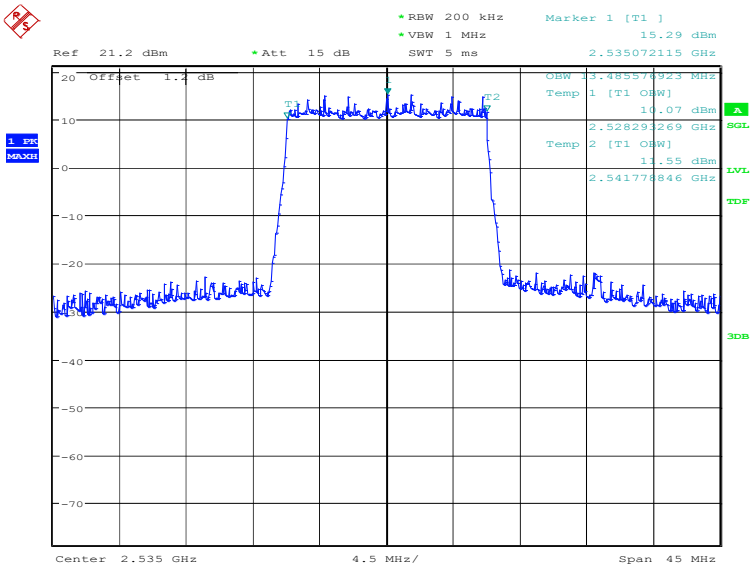
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2535.0	QPSK	16QAM
	13485.58	13485.58

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



Date: 19.JUL.2022 08:16:04

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



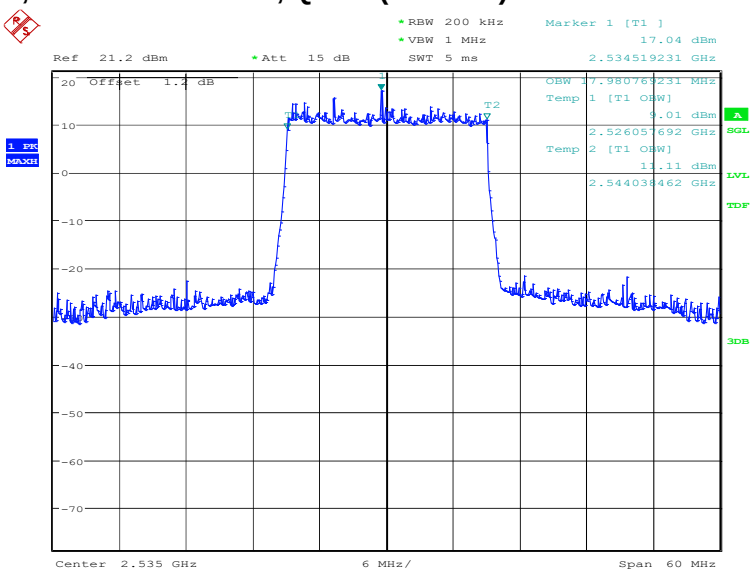
Date: 19.JUL.2022 08:16:43

©Copyright. All rights reserved by CTTL.

LTE band 7, 20MHz (99%)

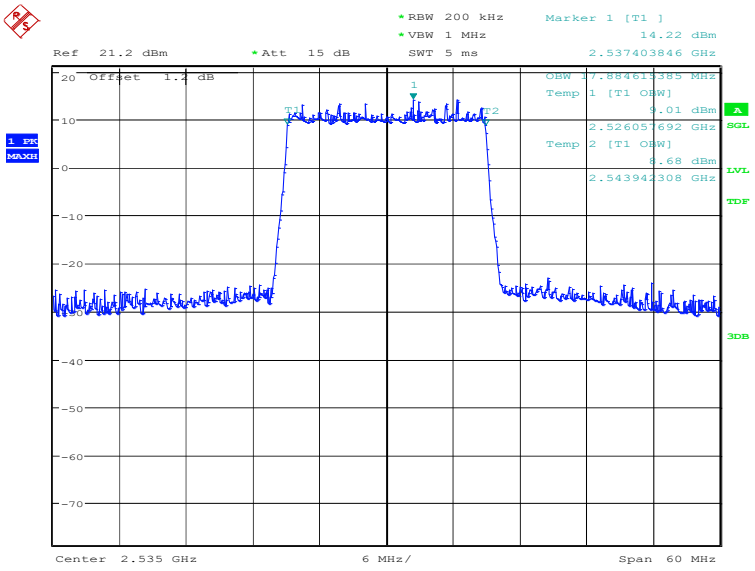
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2535.0	QPSK	16QAM
	17980.77	17884.62

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



Date: 19.JUL.2022 08:17:24

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



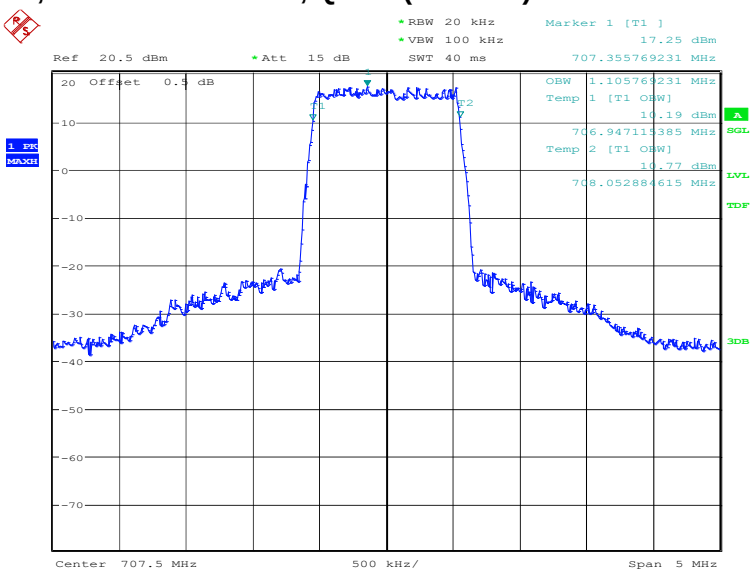
Date: 19.JUL.2022 08:18:03

©Copyright. All rights reserved by CTTL.

LTE band 12, 1.4MHz (99%)

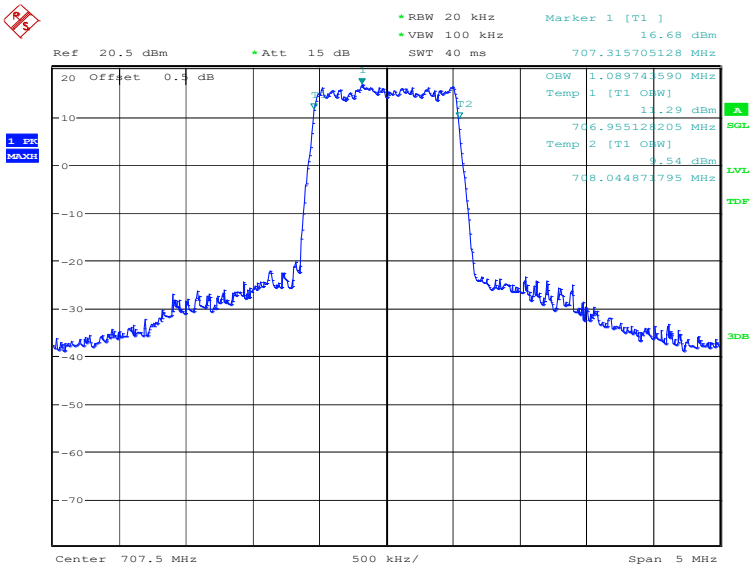
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
707.5	QPSK	16QAM
	1105.77	1089.74

LTE band 12, 1.4MHz Bandwidth, QPSK (99% BW)



Date: 18.JUL.2022 17:15:26

LTE band 12, 1.4MHz Bandwidth, 16QAM (99% BW)



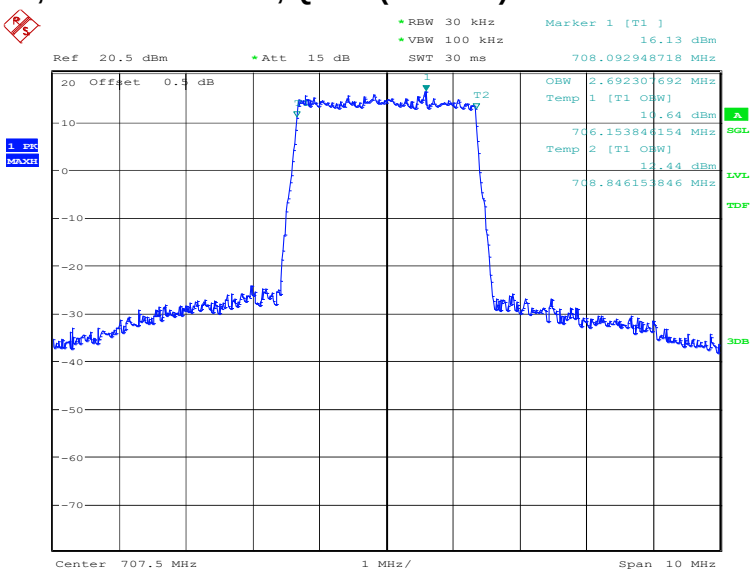
Date: 18.JUL.2022 17:16:06

©Copyright. All rights reserved by CTTL.

LTE band 12, 3MHz (99%)

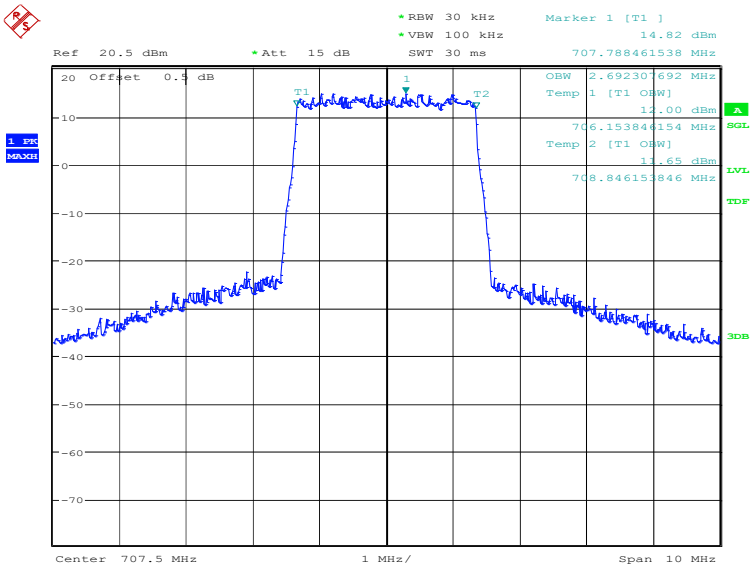
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
707.5	QPSK	16QAM
	2692.31	2692.31

LTE band 12, 3MHz Bandwidth, QPSK (99% BW)



Date: 18.JUL.2022 17:16:48

LTE band 12, 3MHz Bandwidth, 16QAM (99% BW)



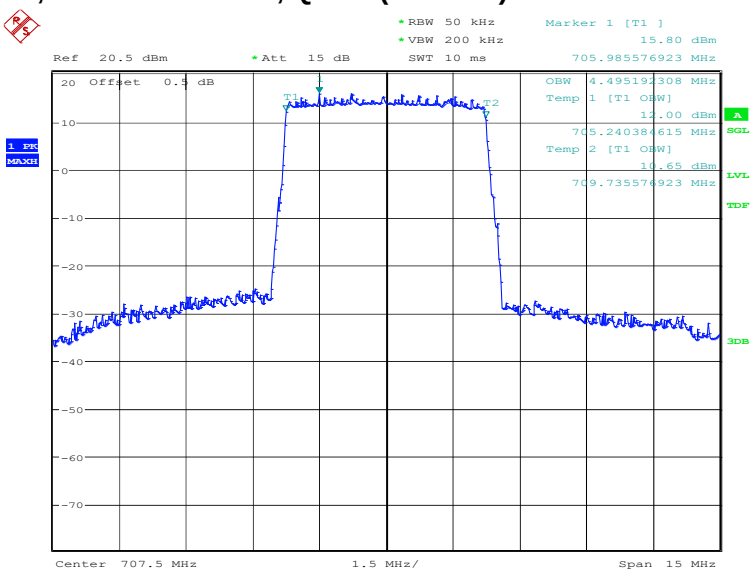
Date: 18.JUL.2022 17:17:28

©Copyright. All rights reserved by CTTL.

LTE band 12, 5MHz (99%)

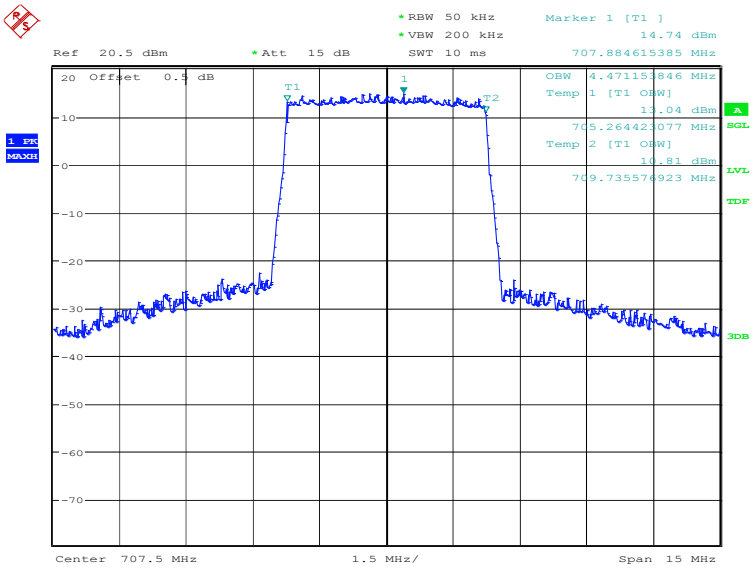
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
707.5	QPSK	16QAM
	4495.19	4471.15

LTE band 12, 5MHz Bandwidth, QPSK (99% BW)



Date: 18.JUL.2022 17:18:09

LTE band 12, 5MHz Bandwidth, 16QAM (99% BW)



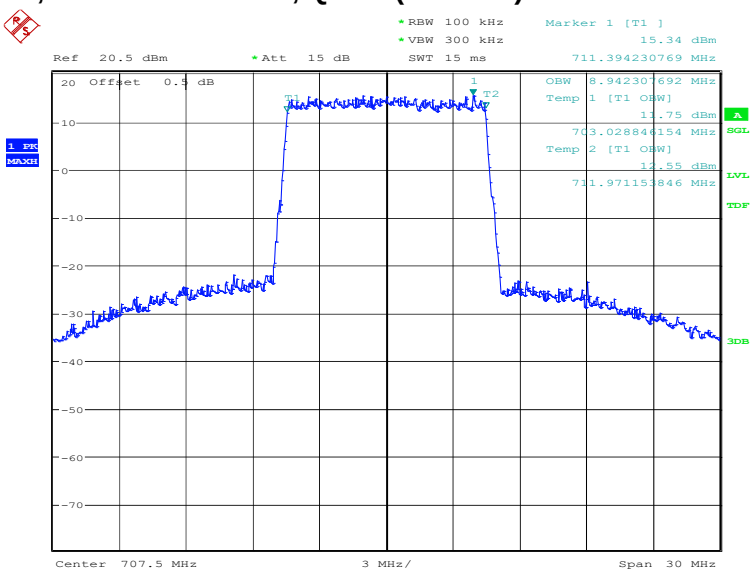
Date: 18.JUL.2022 17:18:49

©Copyright. All rights reserved by CTTL.

LTE band 12, 10MHz (99%)

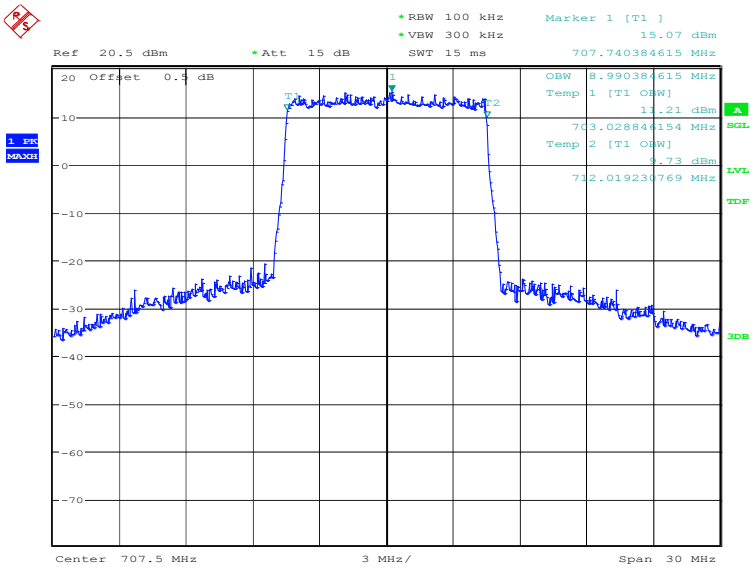
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
707.5	QPSK	16QAM
	8942.31	8990.38

LTE band 12, 10MHz Bandwidth, QPSK (99% BW)



Date: 18.JUL.2022 17:19:30

LTE band 12, 10MHz Bandwidth, 16QAM (99% BW)



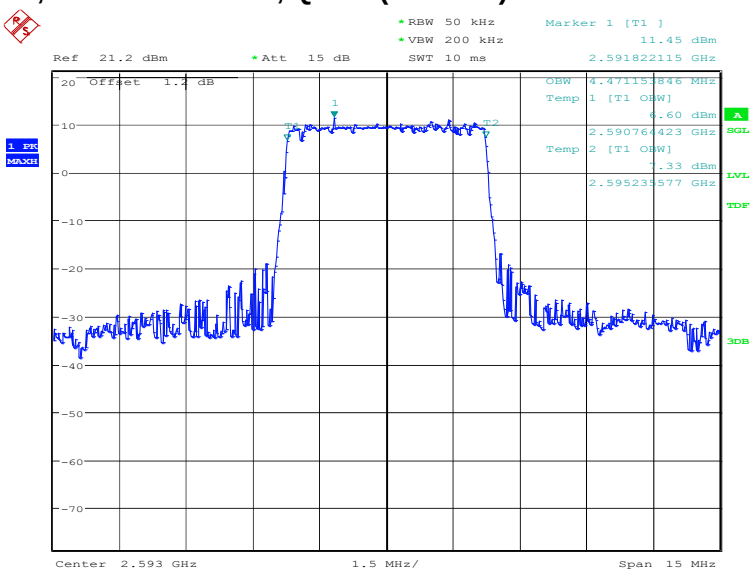
Date: 18.JUL.2022 17:20:09

©Copyright. All rights reserved by CTTL.

LTE band 41, 5MHz (99%)

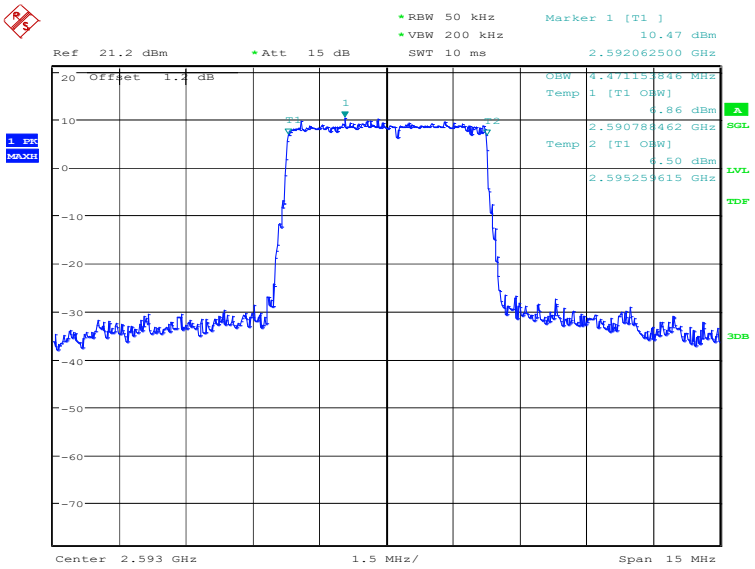
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2593.0	QPSK	16QAM
	4471.15	4471.15

LTE band 41, 5MHz Bandwidth, QPSK (99% BW)



Date: 19.JUL.2022 14:17:05

LTE band 41, 5MHz Bandwidth,16QAM (99% BW)



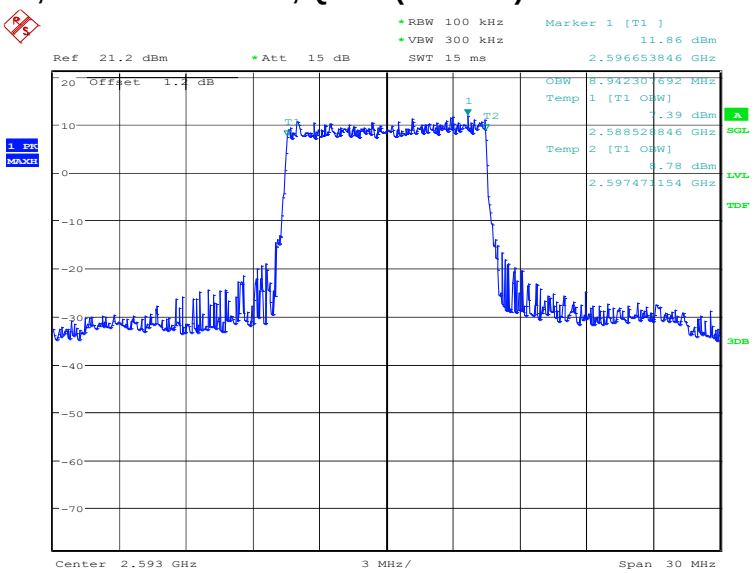
Date: 19.JUL.2022 14:17:44

©Copyright. All rights reserved by CTTL.

LTE band 41, 10MHz (99%)

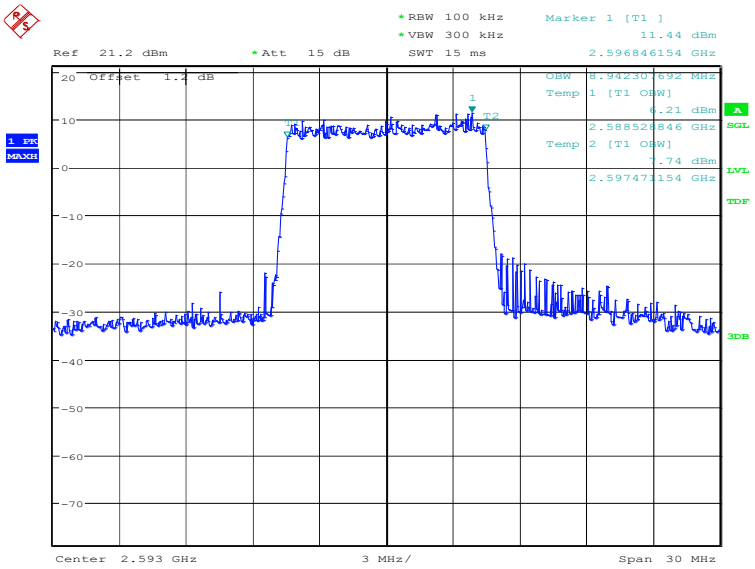
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2593.0	QPSK	16QAM
	8942.31	8942.31

LTE band 41, 10MHz Bandwidth, QPSK (99% BW)



Date: 19.JUL.2022 14:18:26

LTE band 41, 10MHz Bandwidth,16QAM (99% BW)



Date: 19.JUL.2022 14:19:06

©Copyright. All rights reserved by CTTL.