



EMC TEST REPORT

No. I15Z40514-EMC13

for

Sony Mobile Communications Inc.

GSM/WCDMA/LTE device

FCC ID: PY7-PM0796

with

Hardware Version: A

Software Version: 28.0.A.0.684

Issued Date: 2015-05-19

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 Beijing.

Test Laboratory:

FCC 2.948 Listed: No. 525429

IC O.A.T.S listed: No. 12389A-1

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I15Z40514-EMC13	Rev.0	1st edition	2015-04-24
I15Z40514-EMC13	Rev.1	2st edition	2015-05-19

CONTENTS

1. TEST LABORATORY	4
1.1. TESTING LOCATION	4
1.2. TESTING ENVIRONMENT	4
1.3. PROJECT DATA	4
1.4. SIGNATURE	4
2. CLIENT INFORMATION	5
2.1. APPLICANT INFORMATION.....	5
2.2. MANUFACTURER INFORMATION.....	5
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	6
3.1. ABOUT EUT	6
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	6
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST.....	6
3.4. GENERAL DESCRIPTION	7
3.5. EUT SET-UPS	7
4. REFERENCE DOCUMENTS.....	8
4.1. REFERENCE DOCUMENTS FOR TESTING.....	8
5. LABORATORY ENVIRONMENT.....	9
6. SUMMARY OF TEST RESULTS.....	10
6.1. SUMMARY OF TEST RESULTS	10
6.2. STATEMENTS.....	12
7. TEST EQUIPMENTS UTILIZED.....	13
ANNEX A: MEASUREMENT RESULTS	14
A.1 OUTPUT POWER	14
A.2 EMISSION LIMIT	39
A.3 FREQUENCY STABILITY	51
A.4 OCCUPIED BANDWIDTH.....	55
A.5 EMISSION BANDWIDTH	82
A.6 BAND EDGE COMPLIANCE.....	109
A.7 CONDUCTED SPURIOUS EMISSION	128

1. Test Laboratory

1.1. Testing Location

Location 2: CTTL(Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road,
Haidian District, Beijing, P. R. China 100191

1.2. Testing Environment

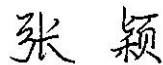
Normal Temperature: 15-35°C
Relative Humidity: 20-75%
Air pressure 980 - 1040 hPa

The climatic requirements above are general exclude the special requirements for dedicated test environments listed in section 5 and some specific test cases in other parts of this report.

1.3. Project data

Receipt of Sample 2015-03-20
Testing Start Date: 2015-03-27
Testing End Date: 2015-04-21

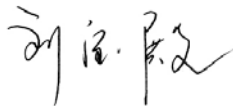
1.4. Signature



Zhang Ying
(Prepared this test report)



Qu Pengfei
(Reviewed this test report)



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(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: Sony Mobile Communications (China) Co. Ltd
Address /Post: Sony Mobile R&D Center, No. 16, Guangshun South Street,
Chaoyang District
City: Beijing
Postal Code: 100102
Country: China
Contact Person: Ma, Gang
Telephone: +86-10-58656312
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2.2. Manufacturer Information

Company Name: Sony Mobile Communications Inc.
Address /Post: 1-8-15 Konan, Minato-ku, Tokyo, 108-0075, Japan
City: Tokyo
Postal Code: 108-0075
Country: Japan

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

3.1. About EUT

Description	GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA, LTE Bluetooth (EDR and BLE), ANT+, WLAN (802.11 a/ac/b/g/n), NFC, FM, GPS device
FCC ID	PY7-PM0796
Antenna	Internal
Power supply	Battery (charged by travel adapter or vehicle charger)
Extreme vol. Limits	3.6VDC to 4.2VDC (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 Telecommunication Metrology Center of MIIT of People's Republic of China.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN	IMEI	HW Version	SW Version
EUT9	CB5A24YCVK	004402148060381	A	28.0.A.0.684
EUT11	/	004402148060001	A	28.0.A.0.684

*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	SN	Revision
AE21	Embedded Battery	/	/

AE21

Model name	1288-9125
Manufacturer	Sony Mobile
Minimum Capacitance	2930 mAh
Nominal Voltage	3.8 V

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

3.4. General Description

The Equipment Under Test (EUT) is a model of GSM/WCDMA/LTE Device with integrated antenna and embedded battery.

The EUT supports GSM, WCDMA and LTE. It supports GPRS service with multi-slots class 33 and EGPRS service with multi-slots class 33. The HSDPA (Cat 24) and HSUPA (Cat 6) features are also supported.

It has MP3, camera, USB memory, FM radio, GPS receiver, NFC, Bluetooth (EDR, BLE), ANT+, WLAN (802.11 a/ac/b/g/n) and Wi-Fi hotspot functions.

It consists of normal options: USB cable and travel charger.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

3.5. EUT set-ups

EUT Set-up No.	Combination of EUT and AE	Remarks
Set.4	EUT9 + AE21	ERP/EIRP/RSE tests
Set.20	AE11	Conducted RF tests

4. Reference Documents

4.1. Reference Documents for testing

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

Reference	Title	Version
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-13 Edition
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-13 Edition
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-13 Edition
ANSI/TIA-603-C	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2004
KDB 971168 D01	Measurement Guidance for Certification of Licensed Digital Transmitters	v02r01

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-1 (23 meters×17meters×10meters) 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 3000 MHz

Fully-anechoic chamber FAC-3 (9 meters×6.5 meters×4 meters) 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	< 4 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 4000 MHz

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

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

6. SUMMARY OF TEST RESULTS

6.1. Summary of test results

Abbreviations used in this clause:		
Verdict Column	P	Pass
	F	Fail
	NA	Not applicable
	NM	Not measured
Location Column	1/2/3/4	The test is performed in test location 1, 2, 3 or 4 which are described in section 1.1 of this report

LTE Band 2

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Output Power	24.232(c)	A.1	P	2
2	Emission Limit	24.238(a), 2.1051	A.2	P	2
3	Frequency Stability	24.235, 2.1055	A.3	P	2
4	Occupied Bandwidth	2.1049(h)(i)	A.4	P	2
5	Emission Bandwidth	24.238(a)	A.5	P	2
6	Band Edge Compliance	24.238(a)	A.6	P	2
7	Conducted Spurious Emission	24.238, 2.1057	A.7	P	2

LTE Band 4

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Output Power	27.50(d)(4)	A.1	P	2
2	Emission Limit	27.53(h), 2.1051	A.2	P	2
3	Frequency Stability	27.54, 2.1055	A.3	P	2
4	Occupied Bandwidth	2.1049(h)(i)	A.4	P	2
5	Emission Bandwidth	27.53(h)	A.5	P	2
6	Band Edge Compliance	27.53(h)	A.6	P	2
7	Conducted Spurious Emission	27.53(h), 2.1057	A.7	P	2

LTE Band 5

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Output Power	22.913(a)	A.1	P	2
2	Emission Limit	22.917, 2.1051	A.2	P	2
3	Frequency Stability	22.355, 2.1055	A.3	P	2
4	Occupied Bandwidth	2.1049(h)(i)	A.4	P	2
5	Emission Bandwidth	22.917(b)	A.5	P	2
6	Band Edge Compliance	22.917(b)	A.6	P	2
7	Conducted Spurious Emission	22.917, 2.1057	A.7	P	2

LTE Band 7

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Output Power	27.50(h)(2)	A.1	P	2
2	Emission Limit	27.53(m), 2.1051	A.2	P	2
3	Frequency Stability	27.54, 2.1055	A.3	P	2
4	Occupied Bandwidth	2.1049(h)(i)	A.4	P	2
5	Emission Bandwidth	27.53(m)	A.5	P	2
6	Band Edge Compliance	27.53(m)	A.6	P	2
7	Conducted Spurious Emission	27.53(m), 2.1057	A.7	P	2

LTE Band 17

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Output Power	27.50(c)(10)	A.1	P	2
2	Emission Limit	27.53(g), 2.1051	A.2	P	2
3	Frequency Stability	27.54, 2.1055	A.3	P	2
4	Occupied Bandwidth	2.1049(h)(i)	A.4	P	2
5	Emission Bandwidth	27.53(g)	A.5	P	2
6	Band Edge Compliance	27.53(g)	A.6	P	2
7	Conducted Spurious Emission	27.53(g), 2.1057	A.7	P	2

LTE Band 41

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Output Power	27.50(h)(2)	A.1	P	2
2	Emission Limit	27.53(m), 2.1051	A.2	P	2
3	Frequency Stability	27.54, 2.1055	A.3	P	2
4	Occupied Bandwidth	2.1049(h)(i)	A.4	P	2
5	Emission Bandwidth	27.53(m)	A.5	P	2
6	Band Edge Compliance	27.53(m)	A.6	P	2
7	Conducted Spurious Emission	27.53(m), 2.1057	A.7	P	2

6.2. Statements

The test cases listed in section 6.1 of this report for the EUT specified in section 3 were performed by TMC according to the standards or reference documents in section 4.1

The EUT met all applicable requirements of the standards or reference documents in section 4.1.

This report only deals with the LTE functions among the features described in section 3.

7. Test Equipments Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL. DUE DATE	CAL. INTERVAL
1.	EMI Antenna	VULB 9163	9163-235	Schwarzbeck	2017-10-29	3 Years
2.	EMI Antenna	3117	00119024	ETS-Lindgren	2017-01-20	3 Years
3.	EMI Antenna	9117	167	Schwarzbeck	2016-04-01	3 Years
4.	EMI Antenna	3117	00058889	ETS-Lindgren	2017-12-15	3 Years
5.	Signal Generator	N5183A	MY49060052	Agilent	2016-03-02	1 Year
6.	Power Amplifier	5S1G4	0341863	AR	/	1 Year
7.	Universal Radio Communication Tester	E5515C	MY48363198	Agilent	2015-07-06	1 Year
8.	Spectrum Analyzer	E4440A	MY48250642	Agilent	2016-03-02	1 Year
9.	Universal Radio Communication Tester	CMW500	116588	R&S	2015-10-23	1 Year
10.	Climatic chamber	SH-641	92014694	ESPEC	2015-11-27	1 Year
11.	Universal Radio Communication Tester	CMW500	101675	2015-07-13	2015-07-13	1 Year

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

Reference

FCC: 22.913(a), 24.232(c), 27.50(d)(4), 27.50(h)(2), 27.50(c)(10)

A.1.1 Summary

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

This result contains peak output power, ERP/EIRP measurements and peak-to-average power ratio (PAPR) for the EUT.

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

A.1.2 Conducted

A.1.2.1 Method of Measurements

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

The power was measured with spectrum analyzer's RMS detector.

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
1.4MHz	1 RB high	1850.7	22.25	21.38
		1880.0	23.12	22.12
		1909.3	22.93	22.01
	1 RB low	1850.7	22.31	21.44
		1880.0	23.10	22.18
		1909.3	22.94	21.92
	50% RB mid	1850.7	22.31	21.44
		1880.0	22.98	21.95
		1909.3	22.95	21.97
	100% RB	1850.7	21.40	20.60
		1880.0	21.88	21.05
		1909.3	21.97	21.10

(continued)

3MHz	1 RB high	1851.5	22.29	21.87
		1880.0	22.85	22.49
		1908.5	22.93	22.49
	1 RB low	1851.5	22.50	22.07
		1880.0	23.07	22.67
		1908.5	22.94	22.50
	50% RB mid	21.60	20.76	21.60
		21.99	21.03	21.99
		22.09	21.13	22.09
	100% RB	21.56	20.66	21.56
		22.01	21.00	22.01
		22.06	21.12	22.06
5MHz	1 RB high	1852.5	22.30	21.42
		1880.0	23.03	22.11
		1907.5	22.99	22.06
	1 RB low	1852.5	22.55	21.68
		1880.0	23.07	22.19
		1907.5	22.91	21.99
	50% RB mid	1852.5	21.69	20.77
		1880.0	22.00	21.00
		1907.5	22.08	21.11
	100% RB	1852.5	21.62	20.77
		1880.0	21.97	21.10
		1907.5	22.05	21.16
10MHz	1 RB high	1855.0	22.24	21.81
		1880.0	22.95	22.75
		1905.0	22.94	22.69
	1 RB low	1855.0	22.74	22.31
		1880.0	23.21	22.95
		1905.0	22.83	22.39
	50% RB mid	1855.0	21.76	20.84
		1880.0	21.99	21.02
		1905.0	22.09	21.11
	100% RB	21.72	20.79	21.72
		22.03	20.95	22.03
		22.02	21.03	22.02

(continued)

15MHz	1 RB high	1857.5	22.31	21.90
		1880.0	23.52	22.97
		1902.5	23.42	22.97
	1 RB low	1857.5	23.15	22.73
		1880.0	23.44	22.91
		1902.5	22.91	22.50
	50% RB mid	1857.5	21.85	20.93
		1880.0	22.52	21.52
		1902.5	22.27	21.30
	100% RB	1857.5	21.81	20.88
		1880.0	22.49	21.51
		1902.5	22.18	21.22
20MHz	1 RB high	1860.0	22.35	21.72
		1880.0	23.55	22.88
		1900.0	23.43	22.79
	1 RB low	1860.0	23.37	22.72
		1880.0	23.34	22.70
		1900.0	22.91	22.27
	50% RB mid	1860.0	22.02	21.09
		1880.0	22.54	21.58
		1900.0	22.27	21.32
	100% RB	1860.0	21.96	21.04
		1880.0	22.50	21.56
		1900.0	22.22	21.30

LTE band 4

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	1754.3	23.69	22.76
		1732.5	23.54	22.61
		1710.7	23.38	22.61
	1 RB low	1754.3	23.63	22.68
		1732.5	23.68	22.48
		1710.7	23.43	22.64
	50% RB mid	1754.3	23.53	22.65
		1732.5	23.41	22.48
		1710.7	23.59	22.59
	100% RB	1754.3	22.40	21.58
		1732.5	22.38	21.59
		1710.7	22.51	21.59
3MHz	1 RB high	1753.5	23.56	22.88
		1732.5	23.47	22.87
		1711.5	23.69	22.95
	1 RB low	1753.5	23.50	22.84
		1732.5	23.65	22.88
		1711.5	23.71	22.93
	50% RB mid	1753.5	22.59	21.80
		1732.5	22.45	21.66
		1711.5	22.68	21.77
	100% RB	1753.5	22.58	21.54
		1732.5	22.46	21.52
		1711.5	22.65	21.60
5MHz	1 RB high	1752.5	23.61	22.72
		1732.5	23.57	22.75
		1712.5	23.82	22.89
	1 RB low	1752.5	23.52	22.71
		1732.5	23.56	22.78
		1712.5	23.73	22.71
	50% RB mid	1752.5	22.51	21.59
		1732.5	22.50	21.60
		1712.5	22.62	21.62
	100% RB	1752.5	22.49	21.59
		1732.5	22.46	21.61
		1712.5	22.58	21.68

(continued)

10MHz	1 RB high	1750	23.71	22.81
		1732.5	23.52	22.69
		1715	23.79	22.89
	1 RB low	1750	23.60	22.79
		1732.5	23.71	22.88
		1715	23.79	22.95
	50% RB mid	1750	22.53	21.55
		1732.5	22.47	21.59
		1715	22.70	21.75
	100% RB	1750	22.50	21.57
		1732.5	22.49	21.57
		1715	22.74	21.74
15MHz	1 RB high	1747.5	23.64	22.94
		1732.5	23.58	22.82
		1717.5	23.77	22.95
	1 RB low	1747.5	23.60	22.76
		1732.5	23.92	22.99
		1717.5	23.92	22.97
	50% RB mid	1747.5	22.42	21.45
		1732.5	22.48	21.53
		1717.5	22.57	21.62
	100% RB	1747.5	22.54	21.51
		1732.5	22.54	21.59
		1717.5	22.71	21.66
20MHz	1 RB high	1745	23.84	22.87
		1732.5	23.71	22.76
		1720	23.81	22.92
	1 RB low	1745	23.63	22.74
		1732.5	23.98	22.95
		1720	23.92	22.88
	50% RB mid	1745	22.55	21.54
		1732.5	22.55	21.64
		1720	22.58	21.63
	100% RB	1745	22.64	21.68
		1732.5	22.63	21.70
		1720	22.73	21.79

LTE band 5

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	1754.3	23.45	22.90
		1732.5	23.57	22.42
		1710.7	23.47	22.70
	1 RB low	1754.3	23.43	22.94
		1732.5	23.81	22.45
		1710.7	23.44	22.67
	50% RB mid	1754.3	23.46	22.52
		1732.5	23.38	22.44
		1710.7	23.98	22.97
	100% RB	1754.3	22.37	21.55
		1732.5	22.33	21.51
		1710.7	22.99	21.98
3MHz	1 RB high	1753.5	23.45	22.92
		1732.5	23.45	22.92
		1711.5	23.51	22.99
	1 RB low	1753.5	23.52	22.96
		1732.5	23.47	22.98
		1711.5	23.61	22.95
	50% RB mid	1753.5	22.42	21.54
		1732.5	22.39	21.48
		1711.5	22.53	21.64
	100% RB	1753.5	22.49	21.49
		1732.5	22.38	21.40
		1711.5	22.52	21.58
5MHz	1 RB high	1752.5	23.57	22.68
		1732.5	23.50	22.61
		1712.5	23.63	22.72
	1 RB low	1752.5	23.50	22.57
		1732.5	23.50	22.61
		1712.5	23.66	22.71
	50% RB mid	1752.5	22.42	21.41
		1732.5	22.38	21.41
		1712.5	22.53	21.54
	100% RB	1752.5	22.44	21.56
		1732.5	22.37	21.47
		1712.5	22.51	21.59

(continued)

10MHz	1 RB high	1750	23.49	22.95
		1732.5	23.46	22.94
		1715	23.41	22.98
	1 RB low	1750	23.66	22.87
		1732.5	23.48	22.83
		1715	23.55	22.92
	50% RB mid	1750	22.42	21.47
		1732.5	22.34	21.37
		1715	22.37	21.42
	100% RB	1750	22.44	21.43
		1732.5	22.45	21.43
		1715	22.41	21.41

LTE band 7

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
5MHz	1 RB high	2502.5	22.61	21.83
		2535	23.30	22.41
		2567.5	23.22	22.42
	1 RB low	2502.5	23.06	22.29
		2535	23.39	22.59
		2567.5	23.18	22.36
	50% RB mid	2502.5	21.99	21.22
		2535	22.29	21.36
		2567.5	22.24	21.35
	100% RB	2502.5	21.96	21.19
		2535	22.20	21.34
		2567.5	22.15	21.27
10MHz	1 RB high	2505	22.41	22.08
		2535	22.94	22.58
		2565	23.12	22.72
	1 RB low	2505	23.44	22.94
		2535	23.37	22.89
		2565	23.08	22.65
	50% RB mid	2505	22.23	21.37
		2535	22.27	21.35
		2565	22.27	21.40
	100% RB	2505	22.10	21.24
		2535	22.20	21.26
		2565	22.23	21.24
15MHz	1 RB high	2507.5	22.67	22.27
		2535	23.02	22.83
		2562.5	23.00	22.74
	1 RB low	2507.5	23.28	22.98
		2535	23.35	22.95
		2562.5	23.25	22.91
	50% RB mid	22.32	21.38	22.32
		22.30	21.41	22.30
		22.28	21.40	22.28
	100% RB	22.28	21.33	22.28
		22.27	21.34	22.27
		22.27	21.33	22.27

(Continued)

20MHz	1 RB high	2510	22.64	22.07
		2535	22.94	22.45
		2560	22.85	22.61
	1 RB low	2510	23.30	22.99
		2535	23.23	22.82
		2560	23.23	22.76
	50% RB mid	2510	22.36	21.44
		2535	22.33	21.45
		2560	22.22	21.32
	100% RB	2510	22.32	21.41
		2535	22.28	21.41
		2560	22.23	21.36

LTE band 17

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
5MHz	1 RB high	706.5	23.23	22.19
		710.0	23.08	22.06
		713.5	23.20	22.21
	1 RB low	706.5	23.15	22.16
		710.0	23.23	22.23
		713.5	23.24	22.17
	50% RB mid	706.5	21.93	21.02
		710.0	22.04	21.11
		713.5	22.02	21.02
	100% RB	706.5	21.94	21.08
		710.0	21.96	21.12
		713.5	21.99	21.16

(Continued)

10MHz	1 RB high	709	23.05	22.67
		710	23.06	22.65
		711	23.04	22.69
	1 RB low	709	23.15	22.66
		710	23.18	22.62
		711	23.14	22.71
	50% RB mid	709	22.02	21.05
		710	22.05	21.11
		711	22.04	21.09
	100% RB	709	22.06	21.02
		710	21.99	20.90
		711	22.01	20.90

LTE band 41

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
5MHz	1 RB high	2498.5	23.09	21.80
		2593	23.21	21.98
		2687.5	23.09	21.92
	1 RB low	2498.5	23.29	21.98
		2593	22.84	21.61
		2687.5	22.75	21.52
	50% RB mid	2498.5	22.03	21.08
		2593	22.21	21.24
		2687.5	22.07	21.13
	100% RB	2498.5	22.10	21.11
		2593	22.14	21.20
		2687.5	22.04	21.11
10MHz	1 RB high	2501	23.11	22.30
		2593	22.92	22.05
		2685	22.89	22.06
	1 RB low	2501	23.42	22.62
		2593	23.04	22.16
		2685	22.48	21.68
	50% RB mid	2501	22.04	21.11
		2593	22.14	21.21
		2685	22.17	21.20
	100% RB	2501	22.06	21.16
		2593	22.07	21.15
		2685	22.06	21.09
15MHz	1 RB high	2503.5	23.01	22.27
		2593	23.05	22.33
		2682.5	23.22	22.62
	1 RB low	2503.5	23.18	22.46
		2593	23.37	22.79
		2682.5	22.86	22.19
	50% RB mid	2503.5	22.40	21.39
		2593	22.02	21.08
		2682.5	22.22	21.27
	100% RB	2503.5	22.32	21.36
		2593	22.07	21.12
		2682.5	22.28	21.35

(Continued)

20MHz	1 RB high	2506	23.08	22.06
		2593	22.99	22.28
		2680	23.40	22.65
	1 RB low	2506	23.15	22.47
		2593	23.48	22.91
		2680	22.75	22.03
	50% RB mid	2506	22.37	21.37
		2593	22.21	21.30
		2680	22.48	21.56
	100% RB	2506	22.24	21.34
		2593	22.32	21.36
		2680	22.42	21.46

Note: Expanded measurement uncertainty is $U = 0.83$ dB, $k = 2$.

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 "Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

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

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

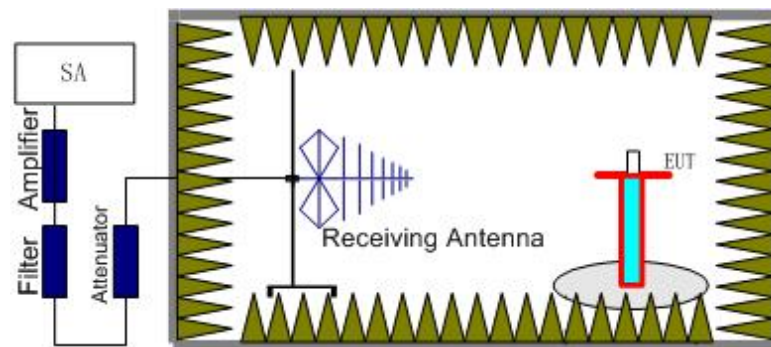
Rule Part 27.50(h)(2) specifies "Mobile stations are limited to 2.0 watts EIRP".

Rule Part 27.50(c)(10) specifies "Portable stations (hand-held devices) are limited to 3 watts ERP".

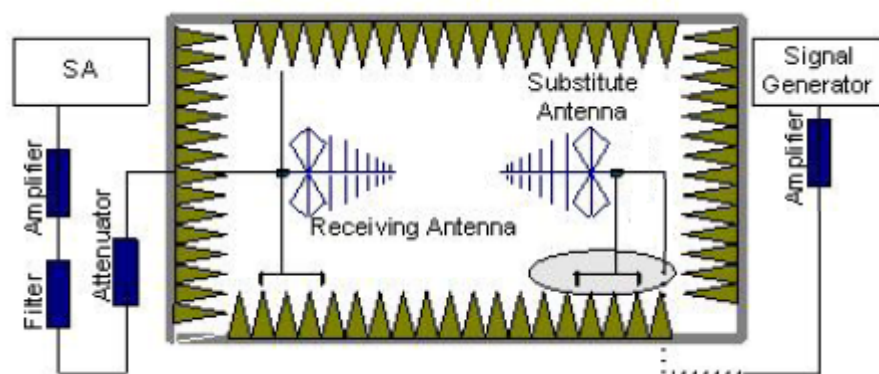
A.1.3.2 Method of Measurement

The measurements procedures in TIA-603C-2004 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 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 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, $ERP = EIRP - 2.15$.

For test layout photo, please refer to Pic.1 in Annex B.

A.1.3.3 Measurement result

LTE Band 2- EIRP 24. 232(b)

Limits: ≤33dBm (2W)

LTE Band 2_1.4MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1850.70	-28.85	2.92	-43.75	-4.87	16.85	Horizontal
1880.00	-24.39	2.85	-43.75	-4.82	21.33	Horizontal
1909.30	-24.82	2.87	-43.77	-4.76	20.84	Horizontal

LTE Band 2_3MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1851.50	-28.12	2.87	-43.75	-4.87	17.63	Horizontal
1880.00	-24.46	2.85	-43.75	-4.82	21.26	Horizontal
1908.50	-24.96	2.89	-43.78	-4.76	20.69	Horizontal

LTE Band 2_5MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1852.50	-27.96	2.87	-43.75	-4.87	17.79	Horizontal
1880.00	-24.31	2.85	-43.75	-4.82	21.41	Horizontal
1907.50	-24.80	2.84	-43.77	-4.77	20.90	Horizontal

LTE Band 2_10MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1855.00	-27.03	2.88	-43.74	-4.86	18.69	Horizontal
1880.00	-24.49	2.85	-43.75	-4.82	21.23	Horizontal
1905.00	-23.65	2.87	-43.77	-4.77	22.02	Horizontal

LTE Band 2_15MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1857.50	-26.63	2.87	-43.75	-4.86	19.11	Horizontal
1880.00	-24.61	2.85	-43.75	-4.82	21.11	Horizontal
1902.50	-24.47	2.86	-43.77	-4.78	21.22	Horizontal

LTE Band 2_20 MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1860.00	-27.19	2.86	-43.75	-4.85	18.55	Horizontal
1880.00	-24.82	2.85	-43.75	-4.82	20.90	Horizontal
1900.00	-23.56	2.87	-43.77	-4.78	22.12	Horizontal

LTE Band 2_1.4MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1850.70	-29.71	2.92	-43.75	-4.87	15.99	Horizontal
1880.00	-25.19	2.85	-43.75	-4.82	20.53	Horizontal
1909.30	-25.66	2.87	-43.77	-4.76	20.00	Horizontal

LTE Band 2_3MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1851.50	-29.02	2.87	-43.75	-4.87	16.73	Horizontal
1880.00	-25.10	2.85	-43.75	-4.82	20.62	Horizontal
1908.50	-25.83	2.89	-43.78	-4.76	19.82	Horizontal

LTE Band 2_5MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1852.50	-28.84	2.87	-43.75	-4.87	16.91	Horizontal
1880.00	-25.12	2.85	-43.75	-4.82	20.60	Horizontal
1907.50	-26.22	2.84	-43.77	-4.77	19.48	Horizontal

LTE Band 2_10MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1855.00	-28.35	2.88	-43.74	-4.86	17.37	Horizontal
1880.00	-25.34	2.85	-43.75	-4.82	20.38	Horizontal
1905.00	-26.16	2.87	-43.77	-4.77	19.51	Horizontal

LTE Band 2_15MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1857.50	-27.52	2.87	-43.75	-4.86	18.22	Horizontal
1880.00	-25.57	2.85	-43.75	-4.82	20.15	Horizontal
1902.50	-25.20	2.86	-43.77	-4.78	20.49	Horizontal

LTE Band 2_20 MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1860.00	-28.15	2.86	-43.75	-4.85	17.59	Horizontal
1880.00	-25.66	2.85	-43.75	-4.82	20.06	Horizontal
1900.00	-24.79	2.87	-43.77	-4.78	20.89	Horizontal

Sample calculation: LTE Band 2, 20MHz bandwidth, frequency 1900.00 MHz, QPSK

$$\begin{aligned} \text{Peak EIRP(dBm)} &= P_{\text{Mea}}(-23.56\text{dBm}) - G_a(-4.78\text{ dBi}) - P_{\text{Ag}}(-43.77\text{ dB}) - P_{\text{cl}}(2.87\text{ dB}) \\ &= 22.12\text{ dBm} \end{aligned}$$

LTE Band 4- EIRP 27.50(d)
Limits: ≤30dBm (1W)

LTE Band 4 1.4MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1710.70	-28.51	3.17	-44.10	-5.12	17.54	Vertical
1732.50	-27.10	3.33	-44.14	-5.08	18.79	Vertical
1754.30	-25.89	3.76	-44.14	-5.04	19.53	Vertical

LTE Band 4 3MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1711.50	-28.79	3.40	-44.10	-5.12	17.03	Vertical
1732.50	-27.18	3.33	-44.14	-5.08	18.71	Vertical
1753.50	-25.44	3.80	-44.13	-5.04	19.93	Vertical

LTE Band 4 5MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1712.50	-27.96	3.66	-44.10	-5.12	17.60	Vertical
1732.50	-27.33	3.33	-44.14	-5.08	18.56	Vertical
1752.50	-25.35	3.82	-44.14	-5.05	20.02	Vertical

LTE Band 4 10MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1715.00	-27.51	3.56	-44.10	-5.11	18.14	Vertical
1732.50	-27.15	3.33	-44.14	-5.08	18.74	Vertical
1750.50	-26.63	3.16	-44.14	-5.05	19.40	Vertical

LTE Band 4 15MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1717.50	-27.82	3.47	-44.11	-5.11	17.93	Vertical
1732.50	-27.15	3.33	-44.14	-5.08	18.74	Vertical
1747.50	-26.67	3.34	-44.15	-5.05	19.19	Vertical

LTE Band 4 20MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1720.00	-27.84	3.37	-44.11	-5.10	18.00	Vertical
1732.50	-27.30	3.33	-44.14	-5.08	18.59	Vertical
1745.00	-26.09	3.68	-44.16	-5.06	19.45	Vertical

LTE Band 4_1.4MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1710.70	-29.76	3.17	-44.10	-5.12	16.29	Vertical
1732.50	-28.09	3.33	-44.14	-5.08	17.80	Vertical
1754.30	-26.85	3.76	-44.14	-5.04	18.57	Vertical

LTE Band 4_3MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1711.50	-29.58	3.40	-44.10	-5.12	16.24	Vertical
1732.50	-28.39	3.33	-44.14	-5.08	17.50	Vertical
1753.50	-26.42	3.80	-44.13	-5.04	18.95	Vertical

LTE Band 4_5MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1712.50	-28.99	3.66	-44.10	-5.12	16.57	Vertical
1732.50	-28.22	3.33	-44.14	-5.08	17.67	Vertical
1752.50	-29.94	3.82	-44.14	-5.05	15.43	Vertical

LTE Band 4_10MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1715.00	-28.55	3.56	-44.10	-5.11	17.10	Vertical
1732.50	-28.05	3.33	-44.14	-5.08	17.84	Vertical
1750.50	-27.48	3.16	-44.14	-5.05	18.55	Vertical

LTE Band 4_15MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1717.50	-28.44	3.47	-44.11	-5.11	17.31	Vertical
1732.50	-27.98	3.33	-44.14	-5.08	17.91	Vertical
1747.50	-27.59	3.34	-44.15	-5.05	18.27	Vertical

LTE Band 4_20MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1720.00	-28.98	3.37	-44.11	-5.10	16.86	Vertical
1732.50	-28.05	3.33	-44.14	-5.08	17.84	Vertical
1745.00	-26.95	3.68	-44.16	-5.06	18.59	Vertical

Sample calculation: LTE Band 4, 5MHz bandwidth, frequency 1752.50 MHz, QPSK

$$\begin{aligned} \text{Peak EIRP(dBm)} &= P_{\text{Mea}}(-25.35 \text{ dBm}) - G_a(-5.05 \text{ dBi}) - P_{\text{Ag}}(-44.14 \text{ dB}) - P_{\text{cl}}(3.82 \text{ dB}) \\ &= 20.02 \text{ dBm} \end{aligned}$$

LTE Band 5- ERP 22.913(a)
Limits: ≤38.45dBm (7W)

LTE Band 5_1.4MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
824.70	-24.97	2.26	-45.79	-0.95	2.15	17.36	Horizontal
836.50	-23.70	2.26	-45.66	-0.82	2.15	18.37	Vertical
848.30	-23.18	2.27	-45.55	-0.80	2.15	18.75	Vertical

LTE Band 5_3MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
825.50	-24.98	2.26	-45.79	-0.94	2.15	17.34	Horizontal
836.50	-23.97	2.26	-45.66	-0.82	2.15	18.10	Vertical
847.50	-23.87	2.27	-45.56	-0.81	2.15	18.08	Vertical

LTE Band 5_5MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
826.50	-24.84	2.25	-45.77	-0.93	2.15	17.46	Horizontal
836.50	-23.80	2.26	-45.66	-0.82	2.15	18.27	Vertical
846.50	-23.24	2.26	-45.56	-0.82	2.15	18.73	Vertical

LTE Band 5_10MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
829.00	-24.61	2.13	-45.74	-0.90	2.15	17.75	Horizontal
836.50	-23.49	2.26	-45.66	-0.82	2.15	18.58	Vertical
844.00	-23.55	2.26	-45.59	-0.82	2.15	18.45	Vertical

LTE Band 5 1.4MHz 16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
824.70	-25.84	2.26	-45.79	-0.95	2.15	16.49	Horizontal
836.50	-24.58	2.26	-45.66	-0.82	2.15	17.49	Vertical
848.30	-24.09	2.27	-45.55	-0.80	2.15	17.84	Vertical

LTE Band 5 3MHz 16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
825.50	-25.96	2.26	-45.79	-0.94	2.15	16.36	Horizontal
836.50	-24.75	2.26	-45.66	-0.82	2.15	17.32	Vertical
847.50	-24.76	2.27	-45.56	-0.81	2.15	17.19	Vertical

LTE Band 5 5MHz 16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
826.50	-25.96	2.25	-45.77	-0.93	2.15	16.34	Horizontal
836.50	-25.02	2.26	-45.66	-0.82	2.15	17.05	Horizontal
846.50	-24.18	2.26	-45.56	-0.82	2.15	17.79	Vertical

LTE Band 5 10MHz 16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
829.00	-25.39	2.13	-45.74	-0.90	2.15	16.97	Horizontal
836.50	-24.05	2.26	-45.66	-0.82	2.15	18.02	Vertical
844.00	-24.34	2.26	-45.59	-0.82	2.15	17.66	Vertical

Sample calculation: LTE Band 5, 1.4MHz bandwidth, frequency 848.30 MHz, QPSK

$$\text{Peak ERP(dBm)} = P_{\text{Mea}}(-23.18\text{dBm}) - G_a(-0.80\text{dBi}) - P_{\text{Ag}}(-45.55\text{ dB}) - P_{\text{cl}}(2.27\text{ dB}) - 2.15\text{ dB} \\ = 18.75\text{ dBm}$$

LTE Band 7- ERP 27.50(h)(2)
Limits: ≤33 dBm (2W)

LTE Band 7_5MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2502.50	-27.24	3.58	-45.68	-6.10	20.96	Horizontal
2535.00	-26.50	3.63	-44.82	-6.16	20.85	Horizontal
2567.50	-27.04	3.65	-44.92	-6.22	20.45	Horizontal

LTE Band 7_10MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2505.00	-27.29	3.59	-45.64	-6.11	20.87	Horizontal
2535.00	-26.55	3.63	-44.82	-6.16	20.80	Horizontal
2565.00	-26.63	3.65	-44.97	-6.22	20.91	Horizontal

LTE Band 7_15MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2507.50	-26.46	3.59	-44.92	-6.11	20.98	Horizontal
2535.00	-26.60	3.63	-44.82	-6.16	20.75	Horizontal
2562.50	-26.97	3.65	-45.67	-6.21	21.26	Horizontal

LTE Band 7_20MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2510.00	-26.81	3.58	-45.36	-6.12	21.09	Horizontal
2535.00	-26.55	3.63	-44.82	-6.16	20.80	Horizontal
2560.00	-27.14	3.64	-45.98	-6.21	21.41	Horizontal

LTE Band 7_5MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2502.50	-27.95	3.58	-45.68	-6.10	20.25	Horizontal
2535.00	-27.36	3.63	-44.82	-6.16	19.99	Horizontal
2567.50	-27.90	3.65	-44.92	-6.22	19.59	Horizontal

LTE Band 7_10MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2505.00	-28.09	3.59	-45.64	-6.11	20.07	Horizontal
2535.00	-27.28	3.63	-44.82	-6.16	20.07	Horizontal
2565.00	-27.40	3.65	-44.97	-6.22	20.14	Horizontal

LTE Band 7_15MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2507.50	-27.30	3.59	-44.92	-6.11	20.14	Horizontal
2535.00	-27.18	3.63	-44.82	-6.16	20.17	Horizontal
2562.50	-27.79	3.65	-45.67	-6.21	20.44	Horizontal

LTE Band 7_20MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2510.00	-27.59	3.58	-45.36	-6.12	20.31	Horizontal
2535.00	-27.24	3.63	-44.82	-6.16	20.11	Horizontal
2560.00	-27.97	3.64	-45.98	-6.21	20.58	Horizontal

Sample calculation: LTE Band 7, 20 MHz bandwidth, frequency 2560.00 MHz, QPSK

$$\begin{aligned} \text{Peak EIRP(dBm)} &= P_{\text{Mea}}(-27.14\text{dBm}) - G_a(-6.21\text{dBi}) - P_{\text{Ag}}(-45.98\text{ dB}) - P_{\text{cl}}(3.64\text{dB}) \\ &= 21.41\text{ dBm} \end{aligned}$$

LTE Band 17- ERP 27.50(c)(10)
Limits: ≤34.77dBm (3W)

LTE Band 17_5MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
706.50	-30.48	1.91	-45.53	-0.66	2.15	11.65	Vertical
710.00	-30.77	1.92	-45.68	-0.54	2.15	11.38	Vertical
713.50	-29.89	1.92	-45.22	-0.50	2.15	11.76	Vertical

LTE Band 17_10MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
709.00	-30.28	1.92	-45.64	-0.57	2.15	11.86	Vertical
710.00	-30.78	1.92	-45.68	-0.54	2.15	11.37	Vertical
711.00	-29.92	1.92	-45.19	-0.53	2.15	11.73	Vertical

LTE Band 17_5MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
706.50	-31.43	1.91	-45.53	-0.66	2.15	10.70	Vertical
710.00	-31.78	1.92	-45.68	-0.54	2.15	10.37	Vertical
713.50	-30.94	1.92	-45.22	-0.50	2.15	10.71	Vertical

LTE Band 17_10MHz_16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
709.00	-31.27	1.92	-45.64	-0.57	2.15	10.87	Vertical
710.00	-31.79	1.92	-45.68	-0.54	2.15	10.36	Vertical
711.00	-31.01	1.92	-45.19	-0.53	2.15	10.64	Vertical

Sample calculation: LTE Band 17, 10 MHz bandwidth, frequency 709.00 MHz, QPSK

$$\begin{aligned} \text{Peak ERP(dBm)} &= P_{\text{Mea}}(-30.28 \text{ dBm}) - G_a(-0.57 \text{ dBi}) - P_{\text{Ag}}(-45.64 \text{ dB}) - P_{\text{cl}}(1.92\text{dB}) - 2.15 \text{ dB} \\ &= 11.86 \text{ dBm} \end{aligned}$$

ANALYZER SETTINGS:

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

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

Note: Expanded measurement uncertainty is $U = 0.96 \text{ dB}$, $k = 2$.

LTE Band 41- EIRP Part 27.50(h)(2)

Limits: ≤33dBm (2W)

LTE Band 41_5MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2498.50	-30.14	3.58	-45.59	-6.10	17.97	Horizontal
2593.00	-29.40	3.68	-44.93	-6.27	18.12	Horizontal
2687.50	-30.85	3.73	-44.98	-6.44	16.84	Horizontal

LTE Band 41_10MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2501.00	-30.21	3.58	-45.65	-6.10	17.96	Horizontal
2593.00	-28.52	3.68	-44.93	-6.27	19.00	Horizontal
2685.00	-30.25	3.73	-44.98	-6.43	17.43	Horizontal

LTE Band 41_15MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2503.50	-29.92	3.58	-45.65	-6.11	18.26	Horizontal
2593.00	-29.72	3.68	-44.93	-6.27	17.80	Horizontal
2682.50	-30.31	3.73	-44.98	-6.43	17.37	Horizontal

LTE Band 41_20MHz_QPSK

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2506.00	-30.51	3.59	-45.15	-6.11	17.16	Horizontal
2593.00	-30.76	3.68	-44.93	-6.27	16.76	Horizontal
2680.00	-30.59	3.73	-44.97	-6.42	17.07	Horizontal

LTE Band 41 5MHz 16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2498.50	-31.05	3.58	-45.59	-6.10	17.06	Horizontal
2593.00	-29.41	3.68	-44.93	-6.27	18.11	Horizontal
2687.50	-31.91	3.73	-44.98	-6.44	15.78	Horizontal

LTE Band 41 10MHz 16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2501.00	-30.95	3.58	-45.65	-6.10	17.22	Horizontal
2593.00	-29.41	3.68	-44.93	-6.27	18.11	Horizontal
2685.00	-31.40	3.73	-44.98	-6.43	16.28	Horizontal

LTE Band 41 15MHz 16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2503.50	-31.75	3.58	-45.65	-6.11	16.43	Horizontal
2593.00	-30.51	3.68	-44.93	-6.27	17.01	Horizontal
2682.50	-31.10	3.73	-44.98	-6.43	16.58	Horizontal

LTE Band 41 20MHz 16QAM

Frequency (MHz)	P _{Mea} (dBm)	Cable Loss (dB)	P _{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2506.00	-32.13	3.59	-45.15	-6.11	15.54	Horizontal
2593.00	-31.64	3.68	-44.93	-6.27	15.88	Horizontal
2680.00	-31.30	3.73	-44.97	-6.42	16.36	Horizontal

Sample calculation: LTE Band 41, 10 MHz bandwidth, frequency 2593.00 MHz, QPSK

$$\begin{aligned} \text{Peak ERP(dBm)} &= P_{\text{Mea}}(-28.52 \text{ dBm}) - G_a(-6.27 \text{ dBi}) - P_{\text{Ag}}(-44.93 \text{ dB}) - P_{\text{cl}}(3.68 \text{ dB}) \\ &= 19.00 \text{ dBm} \end{aligned}$$

ANALYZER SETTINGS:

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

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

Note: Expanded measurement uncertainty is $U = 0.96 \text{ dB}$, $k = 2$.

A.2 EMISSION LIMIT

Reference

FCC: CFR 2.1051, Part 22.917(a), 24.238(a), 27.53(h) , 27.53(m), 27.53(g).

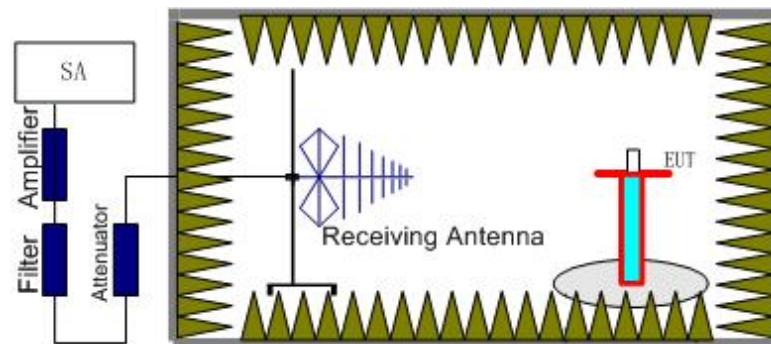
A.2.1 Measurement Method

The measurements procedures in TIA-603C-2004 are used. This measurement is carried out in fully-anechoic chamber FAC-3.

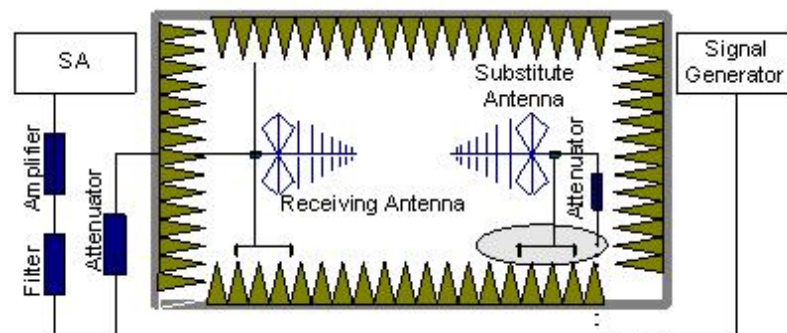
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz as outlined in Part 22.917(a), 24.238(a), Part 27.53(h), Part 27.53(m) and Part 27.53(g). The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE FDD Bands 2, 4, 5, 7 and 17 and TDD band 41.

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, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna. 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. 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:

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

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

A.2.2 Measurement Limit

Part 22.917(a)24.238(a), 27.53(h), 27.53(m) and 27.53(g) all 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.

A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE Bands 2, 4, 5, 7 and 17. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE Bands 2, 4, 5, 7 and 17 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.

LTE Band 2, 1.4MHz, QPSK, Channel 18607, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3797.44	-63.25	5.17	-8.62	-59.80	-13.00	Horizontal
6680.85	-57.76	7.38	-11.22	-53.92	-13.00	Horizontal
8827.41	-56.04	8.05	-13.07	-51.02	-13.00	Horizontal
10819.88	-54.89	8.79	-13.16	-50.52	-13.00	Vertical
13731.00	-49.24	9.77	-14.34	-44.67	-13.00	Horizontal
14235.06	-48.99	10.23	-14.45	-44.77	-13.00	Horizontal

LTE Band 2, 1.4MHz, QPSK, Channel 18900, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3760.01	-57.90	5.14	-8.56	-54.48	-13.00	Horizontal
5640.44	-52.97	6.85	-10.57	-49.25	-13.00	Vertical
7290.44	-57.26	7.09	-11.95	-52.40	-13.00	Vertical
8641.13	-58.60	7.64	-13.03	-53.21	-13.00	Horizontal
12310.51	-51.00	8.86	-13.12	-46.74	-13.00	Vertical
13607.46	-47.81	10.12	-14.26	-43.67	-13.00	Vertical

LTE Band 2, 1.4MHz, QPSK, Channel 19193, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3402.08	-59.72	5.53	-7.96	-57.29	3402.08	Horizontal
5677.18	-57.33	6.71	-10.56	-53.48	5677.18	Horizontal
6839.58	-58.24	6.96	-11.41	-53.79	6839.58	Vertical
7756.32	-59.35	7.36	-12.41	-54.30	7756.32	Vertical
9651.36	-57.57	8.41	-13.25	-52.73	9651.36	Vertical
13281.97	-49.81	9.93	-13.89	-45.85	13281.97	Vertical

LTE Band 2, 1.4MHz, 16QAM, Channel 18607, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3770.77	-58.15	5.06	-8.58	-54.63	-13.00	Vertical
4869.21	-57.83	6.33	-9.77	-54.39	-13.00	Vertical
7331.55	-55.73	7.22	-12.00	-50.95	-13.00	Horizontal
8333.09	-58.11	7.98	-12.87	-53.22	-13.00	Vertical
10732.05	-56.02	8.72	-13.15	-51.59	-13.00	Vertical
13620.08	-46.86	10.23	-14.27	-42.82	-13.00	Horizontal

LTE Band 2, 1.4MHz, 16QAM, Channel 18900, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
5640.39	-56.59	6.85	-10.57	-52.87	-13.00	Horizontal
6805.15	-56.02	7.09	-11.37	-51.74	-13.00	Horizontal
7352.86	-57.48	7.04	-12.02	-52.50	-13.00	Vertical
8576.31	-55.94	7.48	-13.02	-50.40	-13.00	Horizontal
10313.77	-53.96	8.61	-13.03	-49.54	-13.00	Vertical
13627.86	-49.68	10.31	-14.28	-45.71	-13.00	Vertical

LTE Band 2, 1.4MHz, 16QAM, Channel 19193, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3818.74	-40.61	5.47	-8.65	-37.43	-13.00	Horizontal
5728.27	-40.15	6.76	-10.55	-36.36	-13.00	Vertical
7147.07	-57.50	6.95	-11.78	-52.67	-13.00	Horizontal
9632.42	-58.06	8.54	-13.27	-53.33	-13.00	Horizontal
11273.92	-54.41	9.23	-13.15	-50.49	-13.00	Horizontal
13941.93	-50.62	10.09	-14.47	-46.24	-13.00	Vertical

LTE Band 4, 1.4MHz, QPSK, Channel 19957, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3421.60	-42.21	5.47	-8.01	-39.67	-13.00	Vertical
5132.10	-48.93	6.42	-10.08	-45.27	-13.00	Vertical
6711.46	-59.05	7.16	-11.25	-54.96	-13.00	Vertical
7381.65	-57.81	7.01	-12.06	-52.76	-13.00	Horizontal
8554.18	-53.05	7.57	-13.01	-47.61	-13.00	Vertical
10722.81	-54.32	8.66	-13.14	-49.84	-13.00	Horizontal

LTE Band 4, 1.4MHz, QPSK, Channel 20175, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3465.16	-40.83	5.41	-8.12	-38.12	-13.00	Vertical
5197.73	-47.03	6.55	-10.18	-43.40	-13.00	Vertical
7121.43	-57.48	7.37	-11.75	-53.10	-13.00	Vertical
8663.38	-52.40	7.69	-13.03	-47.06	-13.00	Vertical
9561.64	-55.41	8.17	-13.34	-50.24	-13.00	Vertical
12604.10	-51.67	9.49	-13.26	-47.90	-13.00	Vertical

LTE Band 4, 1.4MHz, QPSK, Channel 20393, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3508.75	-43.96	5.39	-8.21	-41.14	-13.00	Vertical
5263.11	-47.84	6.45	-10.27	-44.02	-13.00	Horizontal
6891.82	-59.34	6.84	-11.47	-54.71	-13.00	Horizontal
8672.36	-57.35	7.71	-13.03	-52.03	-13.00	Horizontal
9876.58	-56.53	8.30	-13.02	-51.81	-13.00	Vertical
13994.72	-50.24	10.14	-14.50	-45.88	-13.00	Horizontal

LTE Band 4, 1.4MHz, 16QAM, Channel 19957, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3421.62	-40.22	5.47	-8.01	-37.68	-13.00	Vertical
5132.37	-51.16	6.42	-10.09	-47.49	-13.00	Horizontal
6799.53	-57.73	7.06	-11.36	-53.43	-13.00	Horizontal
9410.79	-56.00	7.96	-13.35	-50.61	-13.00	Horizontal
10887.30	-54.32	8.75	-13.18	-49.89	-13.00	Horizontal
13981.65	-49.17	10.17	-14.49	-44.85	-13.00	Horizontal

LTE Band 4, 1.4MHz, 16QAM, Channel 20175, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3465.02	-46.27	5.41	-8.12	-43.56	-13.00	Horizontal
5198.00	-50.61	6.56	-10.18	-46.99	-13.00	Vertical
6325.25	-57.31	6.92	-10.83	-53.40	-13.00	Vertical
8500.29	-56.98	7.71	-13.00	-51.69	-13.00	Horizontal
9831.99	-58.91	8.37	-13.07	-54.21	-13.00	Vertical
12006.28	-53.08	9.04	-13.00	-49.12	-13.00	Horizontal

LTE Band 4, 1.4MHz, 16QAM, Channel 20393, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3508.86	-44.79	5.39	-8.21	-41.97	-13.00	Horizontal
5263.35	-46.68	6.45	-10.27	-42.86	-13.00	Horizontal
6715.08	-55.94	7.18	-11.26	-51.86	-13.00	Vertical
8559.30	-58.94	7.49	-13.01	-53.42	-13.00	Horizontal
10505.65	-54.85	8.75	-13.10	-50.50	-13.00	Vertical
11374.44	-54.34	9.21	-13.13	-50.42	-13.00	Vertical

LTE Band 5, 1.4MHz, QPSK, Channel 20407, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
2474.37	-22.59	4.43	-6.02	2.15	-23.15	-13.00	Vertical
3598.45	-60.10	5.55	-8.34	2.15	-59.46	-13.00	Horizontal
4682.95	-54.83	6.07	-9.58	2.15	-53.47	-13.00	Vertical
5719.87	-57.95	6.75	-10.56	2.15	-56.29	-13.00	Vertical
6839.04	-58.02	6.97	-11.41	2.15	-55.73	-13.00	Vertical
7242.03	-59.67	7.66	-11.89	2.15	-57.59	-13.00	Horizontal

LTE Band 5, 1.4MHz, QPSK, Channel 20525, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
1673.10	-38.92	3.54	-5.19	2.15	-39.42	-13.00	Vertical
2509.62	-23.37	4.48	-6.12	2.15	-23.88	-13.00	Vertical
4182.55	-49.45	5.83	-9.08	2.15	-48.35	-13.00	Vertical
5587.17	-58.36	6.67	-10.58	2.15	-56.60	-13.00	Vertical
7179.96	-58.62	7.20	-11.82	2.15	-56.15	-13.00	Horizontal
8097.97	-57.86	7.41	-12.68	2.15	-54.74	-13.00	Horizontal

LTE Band 5, 1.4MHz, QPSK, Channel 20643, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
2545.11	-41.48	4.47	-6.18	2.15	-41.92	-13.00	Vertical
3832.18	-59.32	5.68	-8.67	2.15	-58.48	-13.00	Vertical
4728.59	-60.18	6.14	-9.63	2.15	-58.84	-13.00	Horizontal
5648.26	-58.74	6.82	-10.57	2.15	-57.14	-13.00	Vertical
6012.56	-56.69	6.90	-10.51	2.15	-55.23	-13.00	Vertical
7129.14	-58.54	7.19	-11.75	2.15	-56.13	-13.00	Horizontal

LTE Band 5, 1.4MHz, 16QAM, Channel 20407, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
1649.58	-50.22	3.41	-5.23	2.15	-50.55	-13.00	Vertical
2474.38	-27.28	4.43	-6.02	2.15	-27.84	-13.00	Vertical
4123.96	-48.98	5.80	-9.02	2.15	-47.91	-13.00	Horizontal
5401.61	-57.66	6.50	-10.46	2.15	-55.85	-13.00	Horizontal
6868.38	-57.08	6.67	-11.44	2.15	-54.46	-13.00	Vertical
7662.24	-57.81	7.57	-12.33	2.15	-55.20	-13.00	Horizontal

LTE Band 5, 1.4MHz, 16QAM, Channel 20525, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
1673.19	-50.60	3.54	-5.19	2.15	-51.10	-13.00	Vertical
2509.73	-24.17	4.48	-6.12	2.15	-24.68	-13.00	Vertical
4182.99	-52.62	5.84	-9.08	2.15	-51.53	-13.00	Horizontal
4904.29	-59.15	6.26	-9.80	2.15	-57.76	-13.00	Vertical
6091.44	-59.64	6.79	-10.59	2.15	-57.99	-13.00	Vertical
6950.60	-57.54	7.09	-11.54	2.15	-55.24	-13.00	Vertical

LTE Band 5, 1.4MHz, 16QAM, Channel 20643, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
2544.95	-37.49	4.47	-6.18	2.15	-37.93	-13.00	Vertical
5847.50	-58.81	6.61	-10.53	2.15	-57.04	-13.00	Vertical
7423.69	-56.97	7.23	-12.11	2.15	-54.24	-13.00	Vertical
10209.38	-56.24	8.39	-12.98	2.15	-53.80	-13.00	Horizontal
13575.98	-49.40	9.91	-14.25	2.15	-47.21	-13.00	Horizontal
16797.11	-44.78	11.50	-13.72	2.15	-44.71	-13.00	Horizontal

LTE Band 7, 5 MHz, QPSK, Channel 20775, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3344.94	-59.44	5.21	-7.83	-56.82	-13.00	Vertical
5461.31	-59.94	6.69	-10.55	-56.08	-13.00	Horizontal
7069.95	-57.01	7.38	-11.68	-52.71	-13.00	Horizontal
8512.30	-59.09	7.75	-13.00	-53.84	-13.00	Horizontal
9624.40	-56.25	8.68	-13.28	-51.65	-13.00	Vertical
13555.36	-48.99	9.95	-14.23	-44.71	-13.00	Vertical

LTE Band 7, 5 MHz, QPSK, Channel 21100, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
4029.98	-58.04	5.63	-8.93	-54.74	-13.00	Vertical
5826.67	-57.65	6.59	-10.53	-53.71	-13.00	Vertical
6727.57	-57.71	7.18	-11.27	-53.62	-13.00	Horizontal
8502.04	-56.51	7.72	-13.00	-51.23	-13.00	Vertical
9867.14	-56.67	8.38	-13.03	-52.02	-13.00	Vertical
13444.08	-48.57	9.99	-14.12	-44.44	-13.00	Horizontal

LTE Band 7, 5 MHz, QPSK, Channel 21425, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3653.65	-59.20	5.44	-8.42	-56.22	-13.00	Vertical
4716.42	-56.08	6.15	-9.62	-52.61	-13.00	Vertical
7245.01	-56.55	7.58	-11.89	-52.24	-13.00	Horizontal
7771.41	-57.28	7.26	-12.42	-52.12	-13.00	Horizontal
10324.36	-55.23	8.51	-13.03	-50.71	-13.00	Vertical
14699.97	-47.42	10.66	-14.24	-43.84	-13.00	Horizontal

LTE Band 7, 5 MHz, 16QAM, Channel 20775, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3332.99	-60.25	5.18	-7.80	-57.63	-13.00	Vertical
4537.78	-56.84	6.00	-9.44	-53.40	-13.00	Vertical
6900.85	-56.60	6.98	-11.48	-52.10	-13.00	Vertical
8730.60	-55.97	7.76	-13.05	-50.68	-13.00	Vertical
9601.48	-57.50	8.45	-13.30	-52.65	-13.00	Horizontal
13633.36	-46.39	10.37	-14.28	-42.48	-13.00	Vertical

LTE Band 7, 5 MHz, 16QAM, Channel 21100, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3506.02	-60.84	5.40	-8.21	-58.03	-13.00	Vertical
4916.90	-58.84	6.32	-9.82	-55.34	-13.00	Horizontal
7016.70	-56.60	7.40	-11.62	-52.38	-13.00	Horizontal
8562.75	-58.05	7.48	-13.01	-52.52	-13.00	Vertical
9681.29	-58.18	8.21	-13.22	-53.17	-13.00	Horizontal
11240.74	-55.70	9.24	-13.15	-51.79	-13.00	Horizontal

LTE Band 7, 5 MHz, 16QAM, Channel 21425, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3727.76	-59.52	5.29	-8.52	-56.29	-13.00	Vertical
5135.21	-55.07	6.40	-10.09	-51.38	-13.00	Vertical
6889.83	-56.93	6.80	-11.47	-52.26	-13.00	Vertical
10209.38	-56.24	8.39	-12.98	-51.65	-13.00	Horizontal
13575.98	-49.40	9.91	-14.25	-45.06	-13.00	Horizontal
16797.11	-44.78	11.50	-13.72	-42.56	-13.00	Horizontal

LTE Band 17, 5MHz, QPSK, Channel 23755, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
2112.98	-36.62	4.04	-4.94	2.15	-37.87	-13.00	Vertical
3327.08	-59.36	5.17	-7.78	2.15	-58.90	-13.00	Vertical
4016.57	-57.58	5.68	-8.92	2.15	-56.49	-13.00	Horizontal
4680.29	-56.36	6.06	-9.58	2.15	-54.99	-13.00	Vertical
5502.93	-58.77	6.67	-10.60	2.15	-56.99	-13.00	Vertical
6822.92	-58.38	7.14	-11.39	2.15	-56.28	-13.00	Horizontal

LTE Band 17, 5MHz, QPSK, Channel 23790, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
2130.53	-34.58	4.12	-4.99	2.15	-35.86	-13.00	Horizontal
3498.48	-58.94	5.42	-8.20	2.15	-58.31	-13.00	Vertical
4622.92	-57.76	5.94	-9.52	2.15	-56.33	-13.00	Vertical
5642.13	-59.39	6.84	-10.57	2.15	-57.81	-13.00	Horizontal
6866.20	-56.33	6.68	-11.44	2.15	-53.72	-13.00	Horizontal
7491.43	-56.99	7.51	-12.19	2.15	-54.46	-13.00	Vertical

LTE Band 17, 5MHz, QPSK, Channel 23825, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
2133.81	-39.80	4.11	-5.00	2.15	-41.06	-13.00	Horizontal
3168.78	-60.02	5.57	-7.41	2.15	-60.33	-13.00	Vertical
4060.89	-60.71	5.61	-8.96	2.15	-59.51	-13.00	Horizontal
4729.40	-56.30	6.14	-9.63	2.15	-54.96	-13.00	Vertical
5845.69	-56.30	6.60	-10.53	2.15	-54.52	-13.00	Vertical
6193.89	-56.67	6.85	-10.69	2.15	-54.98	-13.00	Horizontal

LTE Band 17, 5MHz, 16QAM, Channel 23755, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
2113.47	-40.72	4.04	-4.94	2.15	-41.97	-13.00	Vertical
3329.71	-60.03	5.17	-7.79	2.15	-59.56	-13.00	Horizontal
3783.63	-58.17	5.03	-8.60	2.15	-56.75	-13.00	Horizontal
4491.05	-56.86	5.95	-9.39	2.15	-55.57	-13.00	Vertical
5265.25	-58.05	6.44	-10.27	2.15	-56.37	-13.00	Horizontal
5729.63	-58.54	6.76	-10.55	2.15	-56.90	-13.00	Horizontal

LTE Band 17, 5MHz, 16QAM, Channel 23790, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
2130.60	-31.79	4.12	-4.99	2.15	-33.07	-13.00	Vertical
3492.14	-58.94	5.42	-8.18	2.15	-58.33	-13.00	Vertical
4231.63	-56.85	6.06	-9.13	2.15	-55.93	-13.00	Vertical
5163.76	-57.68	6.33	-10.13	2.15	-56.03	-13.00	Horizontal
6099.18	-56.15	6.81	-10.60	2.15	-54.51	-13.00	Horizontal
6863.95	-58.66	6.68	-11.44	2.15	-56.05	-13.00	Horizontal

LTE Band 17, 5MHz, 16QAM, Channel 23825, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
2141.14	-40.00	4.10	-5.02	2.15	-41.23	-13.00	Vertical
3526.18	-59.66	5.37	-8.24	2.15	-58.94	-13.00	Horizontal
4859.68	-56.99	6.32	-9.76	2.15	-55.70	-13.00	Vertical
5558.56	-57.51	6.57	-10.59	2.15	-55.64	-13.00	Horizontal
6306.46	-56.95	7.00	-10.81	2.15	-55.29	-13.00	Horizontal
7032.26	-58.60	7.46	-11.64	2.15	-56.57	-13.00	Vertical

LTE Band 41, 5MHz, QPSK, Channel 39675, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3353.80	-51.19	5.27	-7.85	-48.61	-13.00	Horizontal
5335.58	-57.66	6.58	-10.37	-53.87	-13.00	Horizontal
6638.70	-55.88	7.36	-11.17	-52.07	-13.00	Vertical
8613.52	-58.21	7.71	-13.02	-52.90	-13.00	Horizontal
9589.05	-55.85	8.31	-13.31	-50.85	-13.00	Vertical
13348.73	-50.76	9.74	-13.99	-46.51	-13.00	Vertical

LTE Band 41, 5MHz, QPSK, Channel 40620, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
5145.26	-56.47	6.35	-10.10	-52.72	-13.00	Vertical
6883.20	-57.21	6.69	-11.46	-52.44	-13.00	Vertical
8623.34	-57.25	7.70	-13.02	-51.93	-13.00	Vertical
10400.02	-55.06	9.01	-13.06	-51.01	-13.00	Horizontal
13397.45	-49.54	9.88	-14.06	-45.36	-13.00	Vertical
15849.59	-47.26	11.18	-13.70	-44.74	-13.00	Horizontal

LTE Band 41, 5MHz, QPSK, Channel 41565, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
5375.51	-24.28	6.63	-10.43	-20.48	-13.00	Vertical
8062.97	-39.51	7.59	-12.65	-34.45	-13.00	Vertical
10750.63	-41.10	8.80	-13.15	-36.75	-13.00	Vertical
13438.61	-47.22	9.99	-14.11	-43.10	-13.00	Vertical
13985.56	-50.12	10.16	-14.49	-45.79	-13.00	Vertical
16180.24	-47.05	11.32	-13.66	-44.71	-13.00	Horizontal

LTE Band 41 5MHz, 16QAM, Channel 39675, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3746.68	-60.20	5.16	-8.55	-56.81	-13.00	Horizontal
5387.75	-59.05	6.58	-10.44	-55.19	-13.00	Vertical
7152.29	-57.60	6.96	-11.78	-52.78	-13.00	Horizontal
7885.55	-56.97	7.33	-12.51	-51.79	-13.00	Horizontal
10057.53	-54.66	8.83	-12.92	-50.57	-13.00	Horizontal
13988.53	-50.50	10.15	-14.49	-46.16	-13.00	Vertical

LTE Band 41, 5MHz, 16QAM, Channel 40620, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
4547.62	-58.14	5.95	-9.45	-54.64	-13.00	Horizontal
5707.05	-58.32	6.68	-10.56	-54.44	-13.00	Horizontal
8052.64	-58.09	7.61	-12.64	-53.06	-13.00	Horizontal
10710.92	-55.30	8.59	-13.14	-50.75	-13.00	Vertical
13222.03	-49.20	9.77	-13.81	-45.16	-13.00	Vertical
16507.38	-44.59	11.29	-13.60	-42.28	-13.00	Vertical

LTE Band 41, 5MHz, 16QAM, Channel 39675, RB=1, RB position=middle.

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
5375.45	-24.22	6.63	-10.43	-20.42	-13.00	Vertical
8062.96	-39.79	7.59	-12.65	-34.73	-13.00	Vertical
10750.65	-40.37	8.80	-13.15	-36.02	-13.00	Vertical
13378.84	-51.26	9.80	-14.03	-47.03	-13.00	Vertical
13929.73	-50.65	10.06	-14.46	-46.25	-13.00	Vertical
16241.64	-44.80	10.97	-13.65	-42.12	-13.00	Horizontal

Note: The maximum value of expanded measurement uncertainty for this test item is $U = 4.2$ dB, $k = 2$.

A.3 FREQUENCY STABILITY

Reference

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

A.3.1 Method of Measurement

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

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30°C.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE FDD band 2/4/5/7/17 and TDD band 41, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 °C increments from +50°C to -30°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

A.3.2 Measurement Limit

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d) (2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.6VDC and 4.2VDC, with a nominal voltage of 3.8VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance from -5.4% to 10.8%. For the purposes of measuring frequency stability these voltage limits are to be used.

A.3.3 Measurement results

Room Temperature: 24 °C

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

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.8	-3	14	0.002	0.008
4.2	-3	14	0.002	0.007
3.6	-3	10	0.002	0.005

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	-5	19	0.003	0.010
40°	-2	10	0.001	0.005
30°	-1	18	0.000	0.010
20°	-1	16	0.000	0.008
10°	-5	13	0.003	0.007
0°	-5	13	0.003	0.007
- 10°	-5	14	0.003	0.008
- 20°	-3	17	0.002	0.009
- 30°	-3	12	0.001	0.006

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

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.8	1	17	0.001	0.010
4.2	0	22	0.000	0.013
3.6	3	19	0.002	0.011

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	1	19	0.001	0.011
40°	-1	19	0.001	0.011
30°	0	18	0.000	0.011
20°	3	19	0.001	0.011
10°	0	21	0.000	0.012
0°	3	20	0.001	0.012
- 10°	2	21	0.001	0.012
- 20°	-2	15	0.001	0.009
- 30°	-1	22	0.002	0.011

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

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.8	1	18	0.001	0.022
4.2	1	19	0.001	0.023
3.6	-1	18	0.002	0.021

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	0	20	0.000	0.024
40°	-2	19	0.003	0.023
30°	0	19	0.000	0.023
20°	0	20	0.000	0.023
10°	0	18	0.000	0.021
0°	0	17	0.000	0.021
- 10°	-4	22	0.004	0.026
- 20°	-2	20	0.002	0.024
- 30°	1	20	0.001	0.024

LTE Band 7, 10 MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.8	-8	-6	0.003	0.002
4.2	-2	-9	0.001	0.004
3.6	0	-5	0.000	0.002

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	-4	-10	0.002	0.004
40°	-4	-14	0.002	0.005
30°	-2	-7	0.001	0.003
20°	-4	-10	0.002	0.004
10°	-2	-6	0.001	0.002
0°	-8	-8	0.003	0.003
- 10°	-4	-9	0.002	0.003
- 20°	-3	-12	0.001	0.005
- 30°	-4	-12	0.001	0.005

LTE Band 17, 10 MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.8	3	-4	0.004	0.006
4.2	-1	-3	0.001	0.004
3.6	-1	-4	0.001	0.005

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	0	-3	0.000	0.004
40°	1	-4	0.001	0.005
30°	-2	-5	0.003	0.007
20°	0	-3	0.000	0.005
10°	1	-5	0.001	0.007
0°	1	-4	0.001	0.006
- 10°	0	-3	0.000	0.004
- 20°	-2	-5	0.003	0.007
- 30°	1	-2	0.002	0.003

LTE Band 41, 15 MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.8	-3	14	0.001	0.005
4.2	2	12	0.001	0.005
3.6	4	15	0.002	0.006

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	-2	17	0.001	0.006
40°	6	8	0.002	0.003
30°	1	6	0.000	0.002
20°	-1	10	0.000	0.004
10°	-1	5	0.001	0.002
0°	6	10	0.002	0.004
- 10°	-7	16	0.003	0.006
- 20°	12	13	0.005	0.005
- 30°	-3	11	0.001	0.004

Expanded measurement uncertainty for this test item is 10 Hz, $k = 2$.

A.4 OCCUPIED BANDWIDTH

Reference

FCC: CFR Part 2.1049(h)(i)

A.4.1 Occupied Bandwidth Results

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

The measurement method is from KDB 971168 v02r01 4.2:

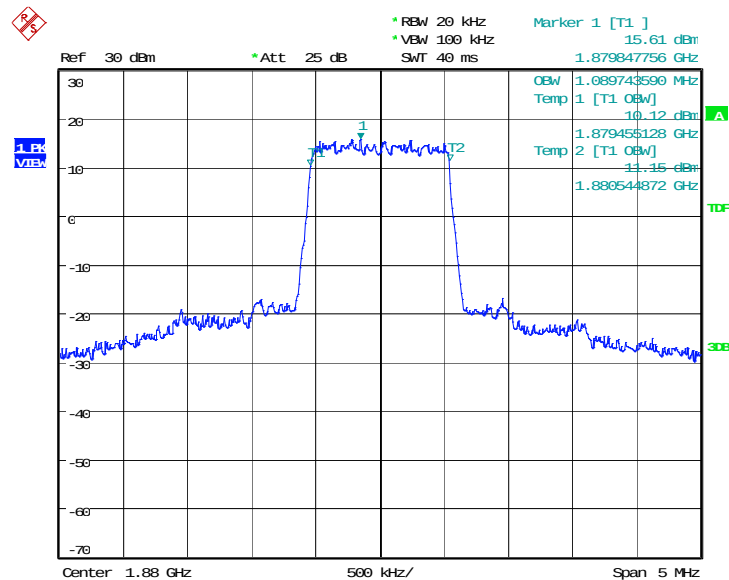
- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
- c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- d) Set the detection mode to peak, and the trace mode to max hold.
- e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

A.4.1.1 Measurement results per FCC rules

LTE band 2, 1.4MHz (99% BW)

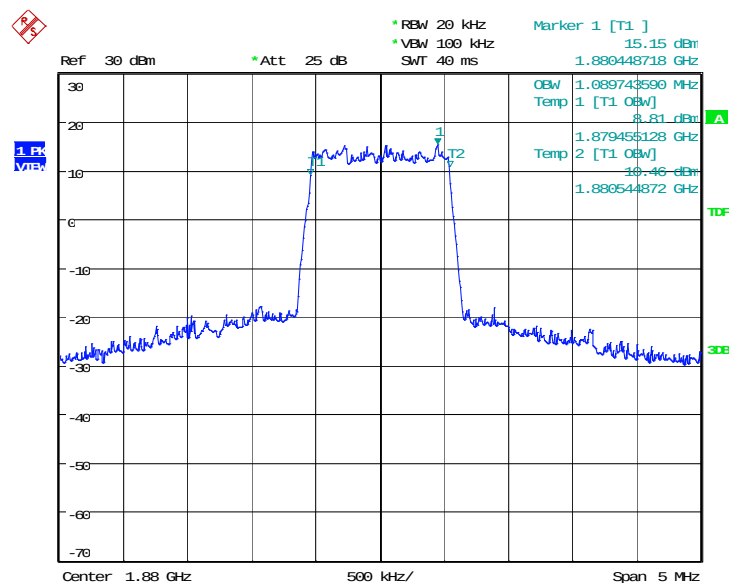
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1880.0	1089.74	1089.74

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



Date: 15.APR.2015 01:05:33

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

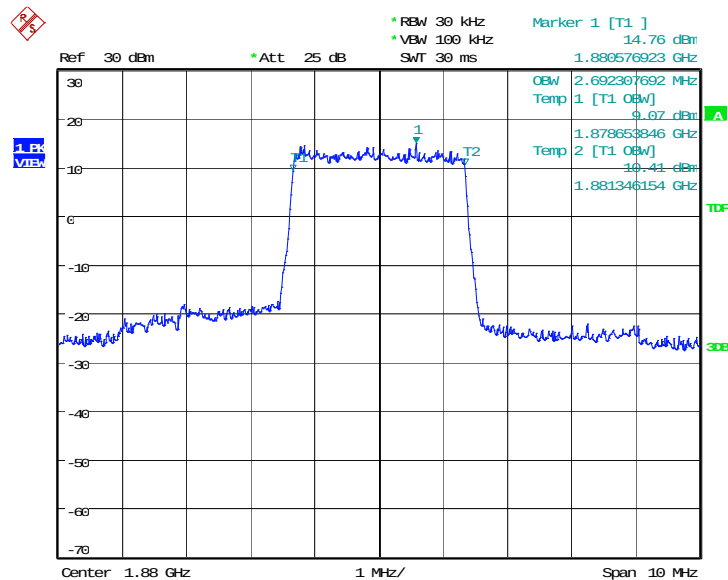


Date: 15.APR.2015 01:05:46

LTE band 2, 3MHz (99% BW)

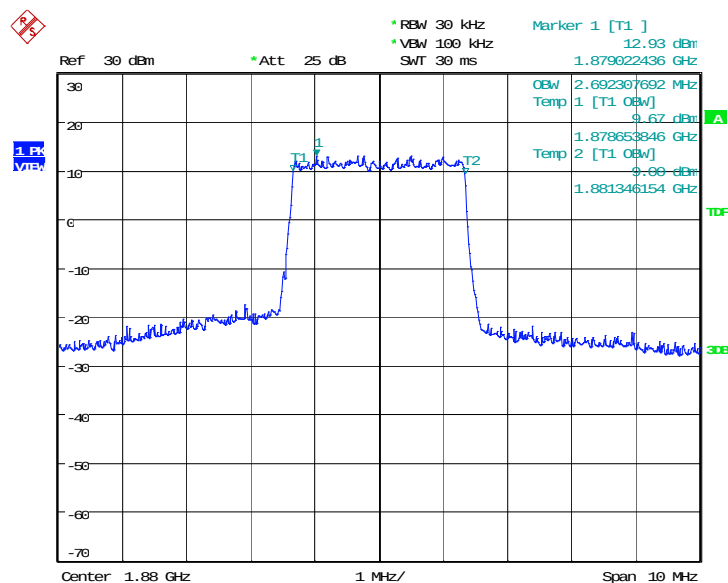
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1880.0	2692.31	2692.31

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



Date: 15.APR.2015 01:11:11

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

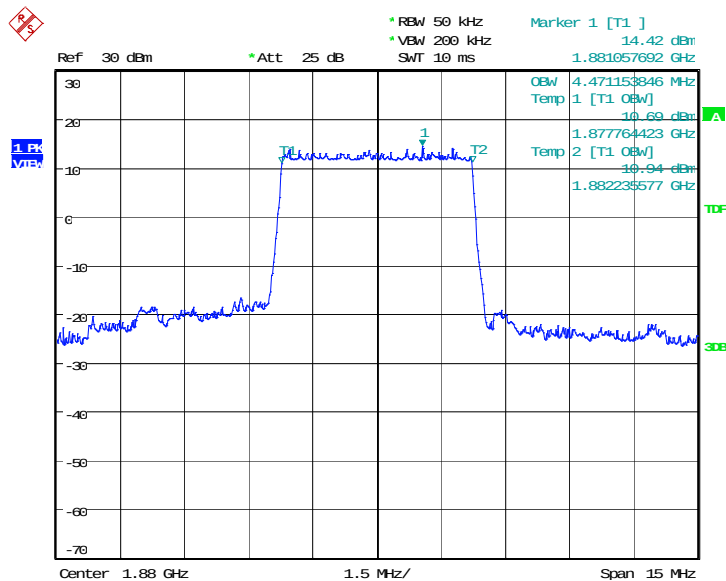


Date: 15.APR.2015 01:11:24

LTE band 2, 5MHz (99% BW)

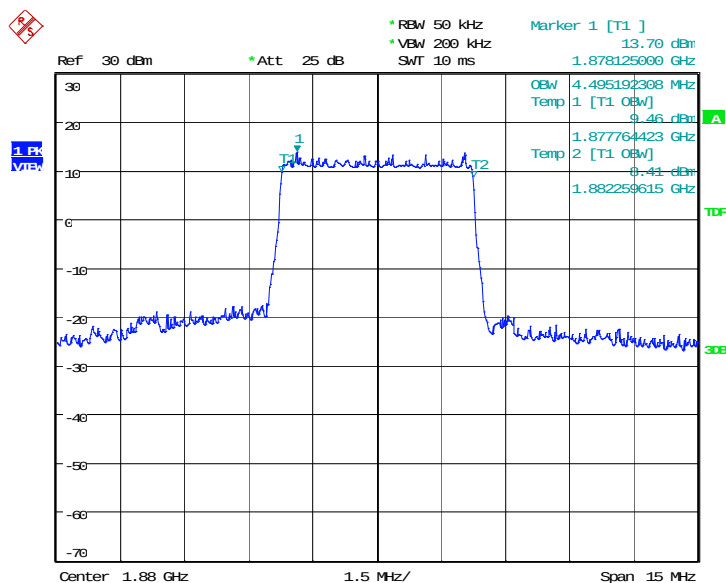
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1880.0	4471.15	4495.19

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



Date: 15.APR.2015 01:16:48

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

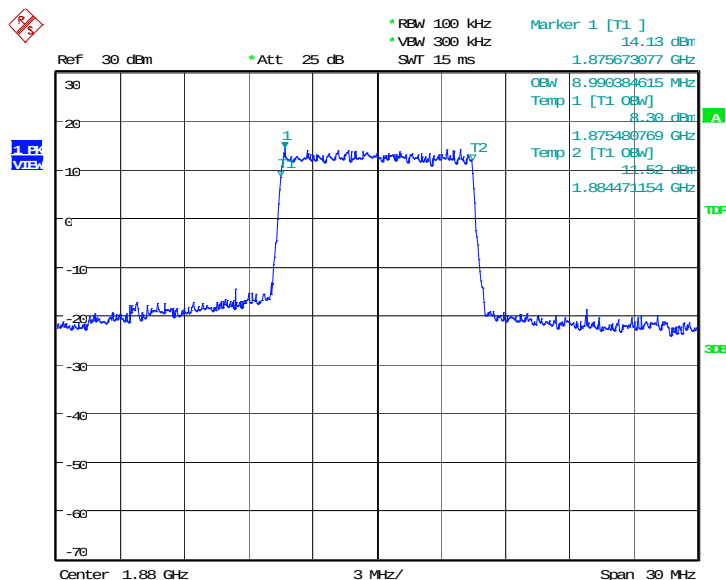


Date: 15.APR.2015 01:17:02

LTE band 2, 10MHz (99% BW)

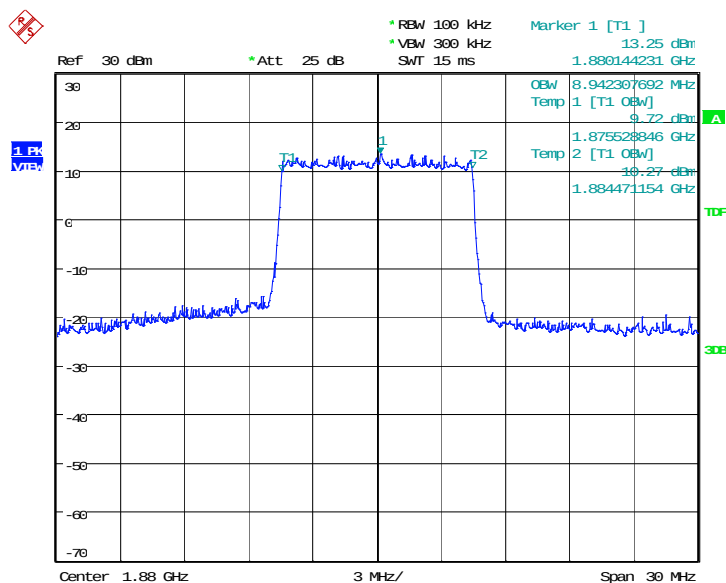
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1880.0	8990.38	8942.31

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



Date: 15.APR.2015 01:22:28

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

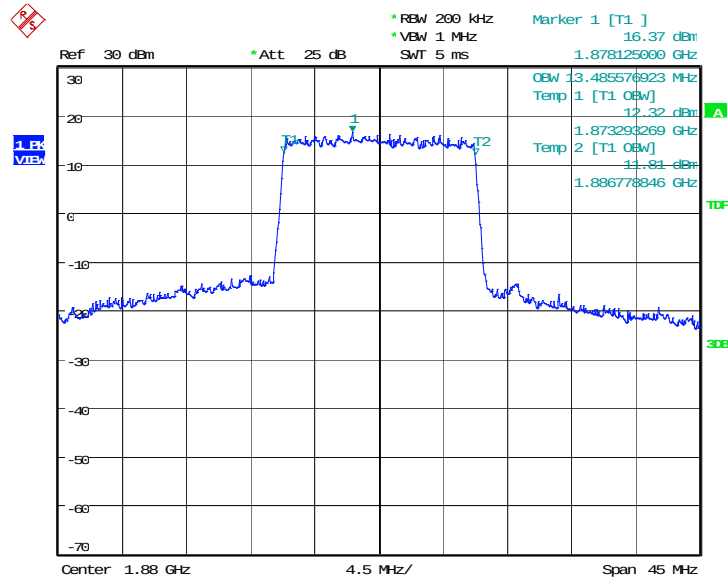


Date: 15.APR.2015 01:22:42

LTE band 2, 15MHz (99% BW)

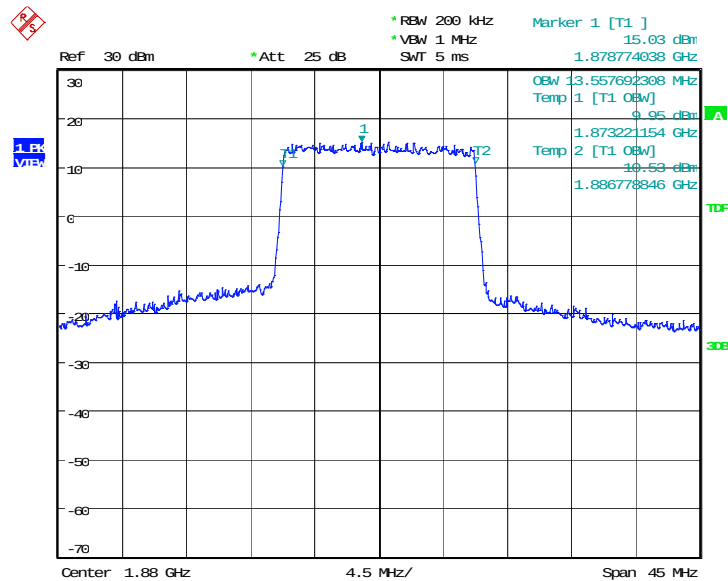
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1880.0	13485.58	13557.69

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



Date: 15.APR.2015 01:28:11

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

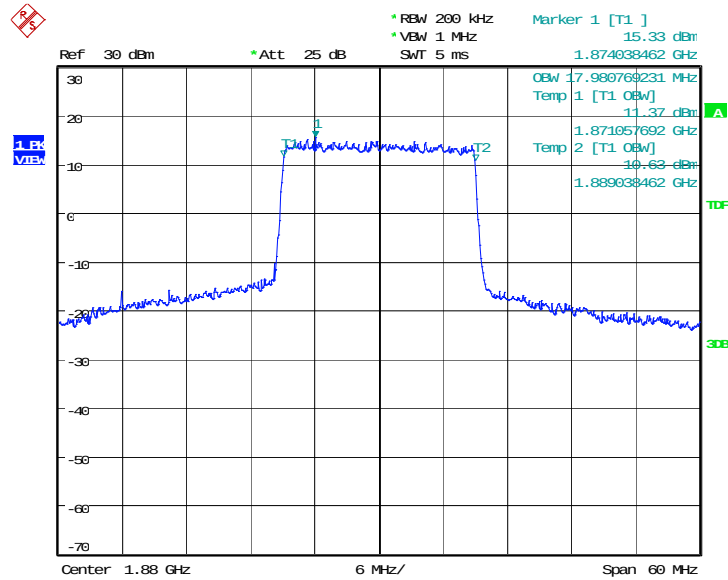


Date: 15.APR.2015 01:28:25

LTE band 2, 20MHz (99% BW)

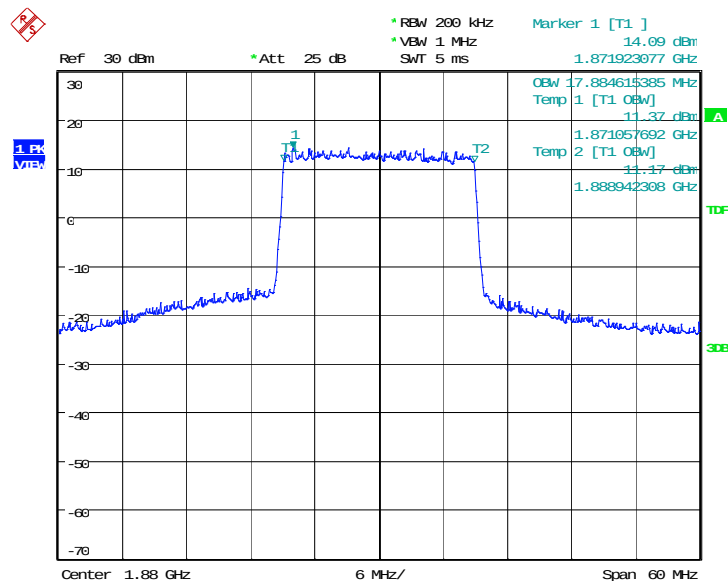
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1880.0	17980.77	17884.62

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



Date: 15.APR.2015 01:33:58

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

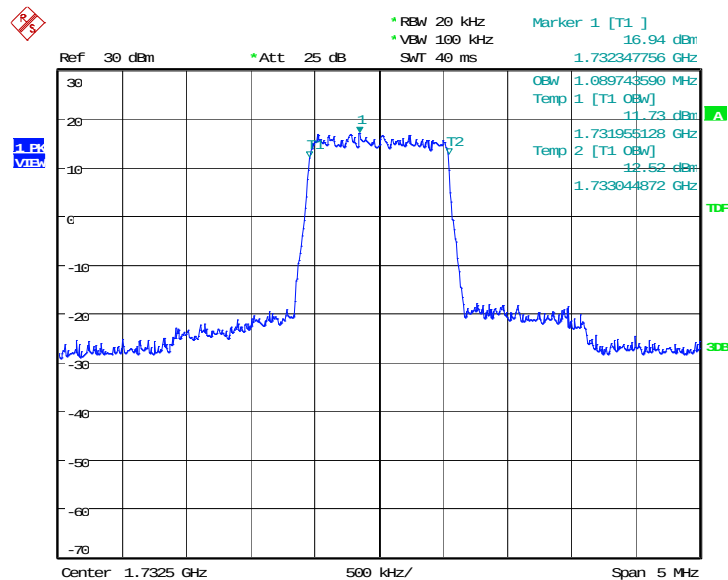


Date: 15.APR.2015 01:34:12

LTE band 4, 1.4MHz (99% BW)

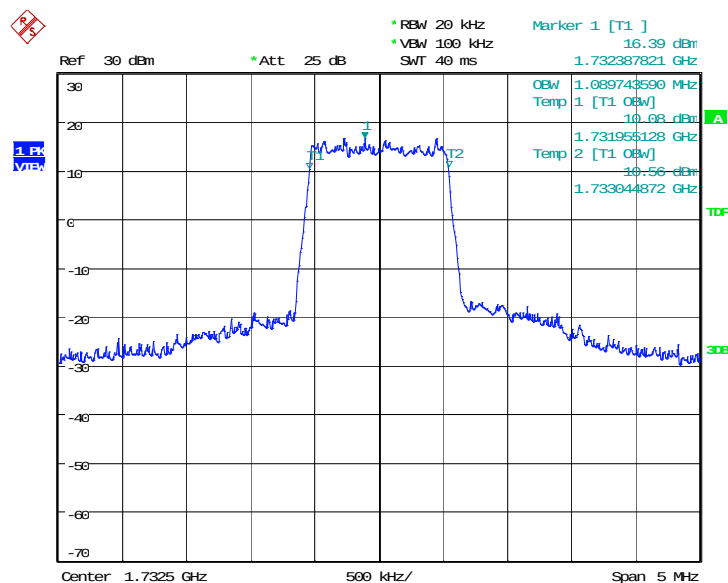
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1732.5	1089.74	1089.74

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



Date: 15.APR.2015 01:53:57

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

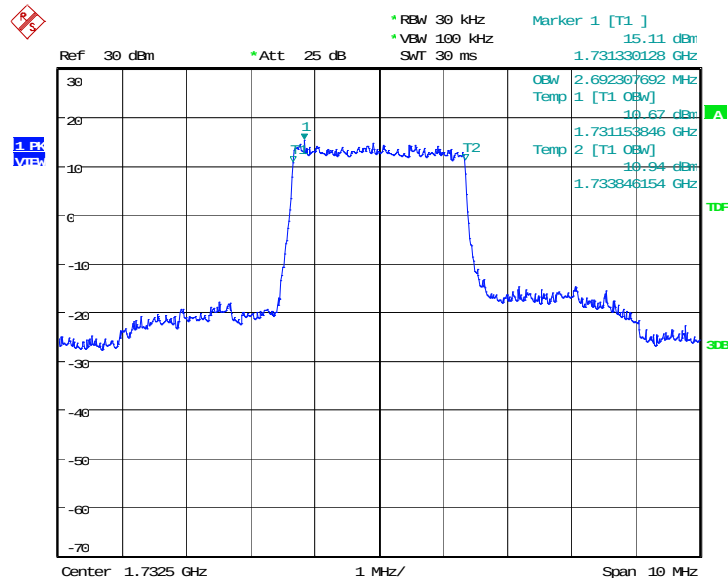


Date: 15.APR.2015 01:54:11

LTE band 4, 3MHz (99% BW)

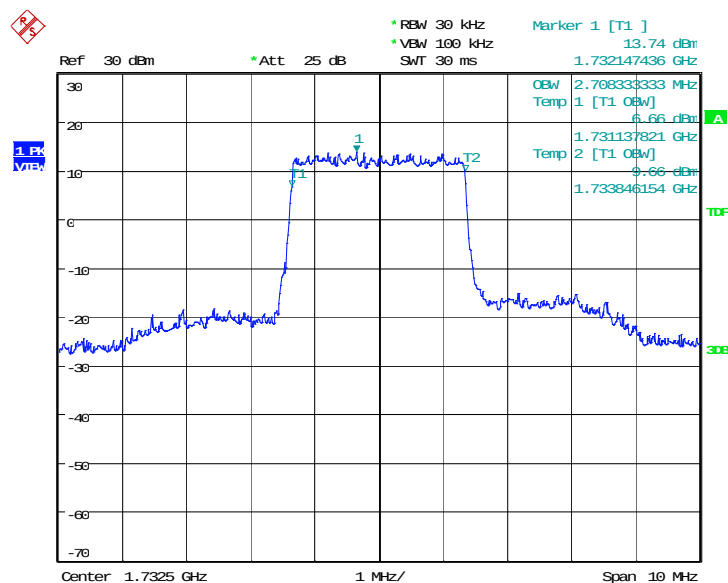
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1732.5	2692.31	2708.33

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



Date: 15.APR.2015 02:12:49

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

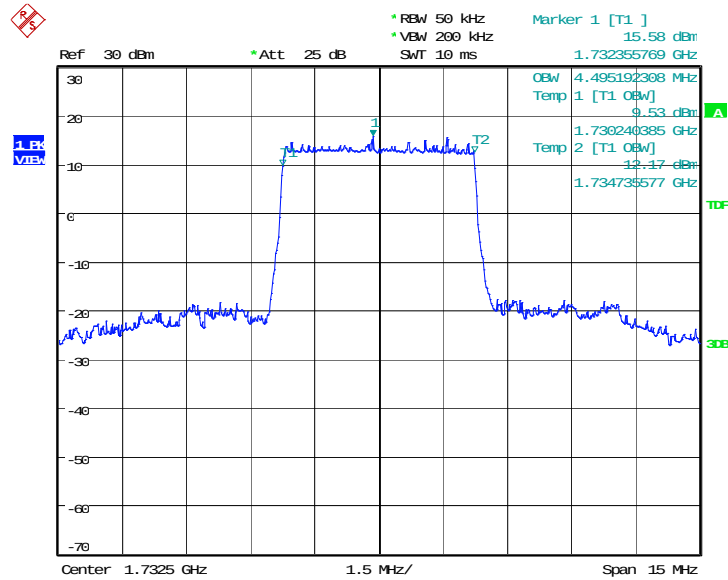


Date: 15.APR.2015 02:13:02

LTE band 4, 5MHz (99% BW)

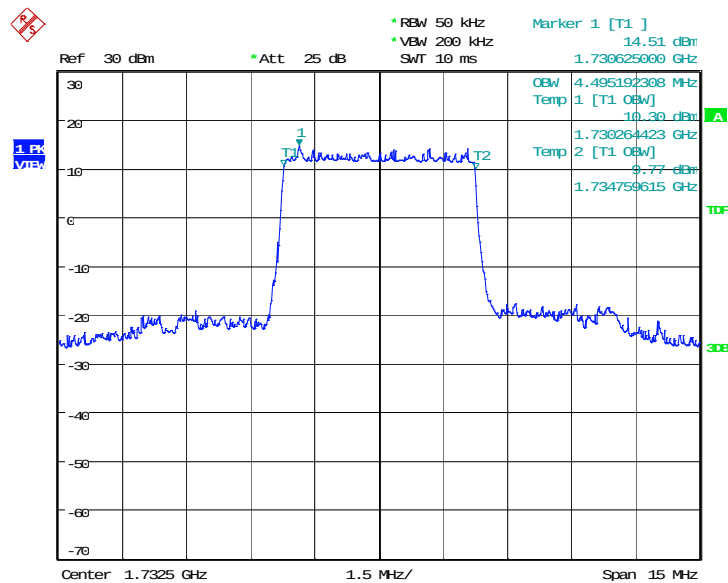
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1732.5	4495.19	4495.19

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



Date: 15.APR.2015 02:18:27

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

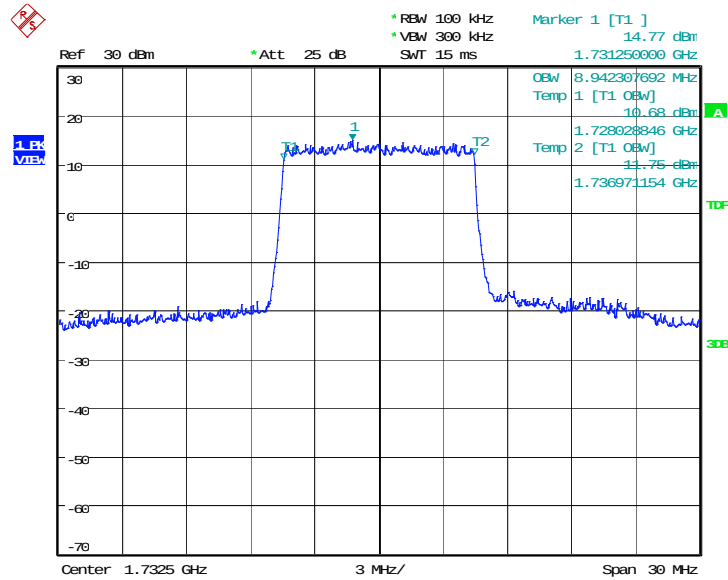


Date: 15.APR.2015 02:18:40

LTE band 4, 10MHz (99% BW)

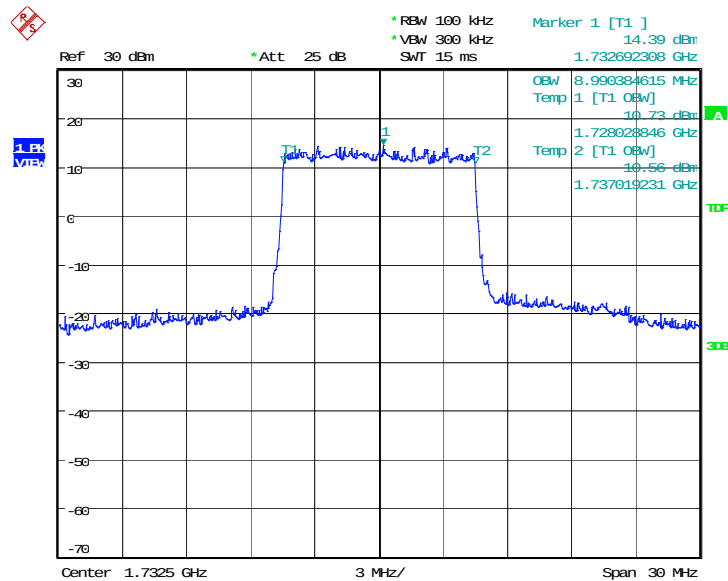
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1732.5	8942.31	8990.38

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



Date: 15.APR.2015 02:24:07

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

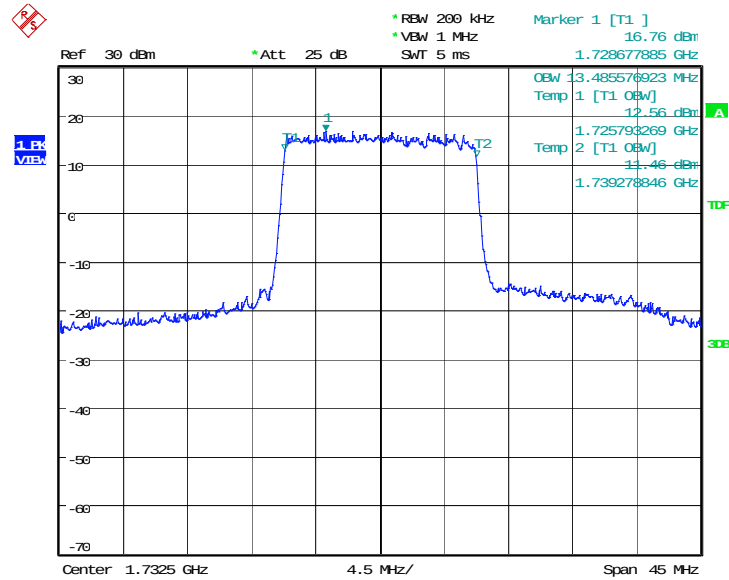


Date: 15.APR.2015 02:24:20

LTE band 4, 15MHz (99% BW)

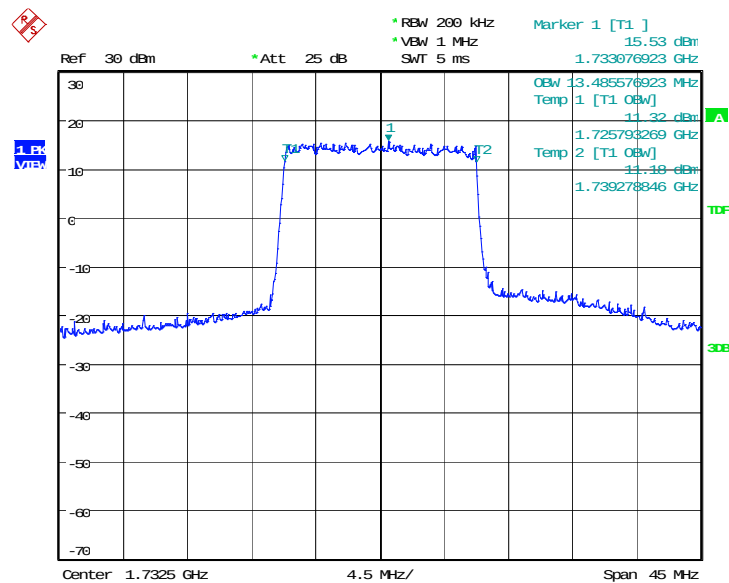
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1732.5	13485.58	13485.58

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



Date: 15.APR.2015 02:29:51

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

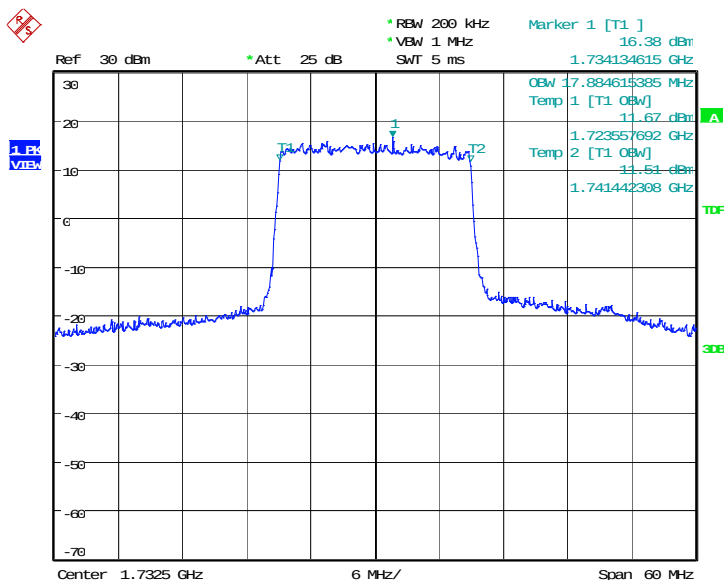


Date: 15.APR.2015 02:30:04

LTE band 4, 20MHz (99% BW)

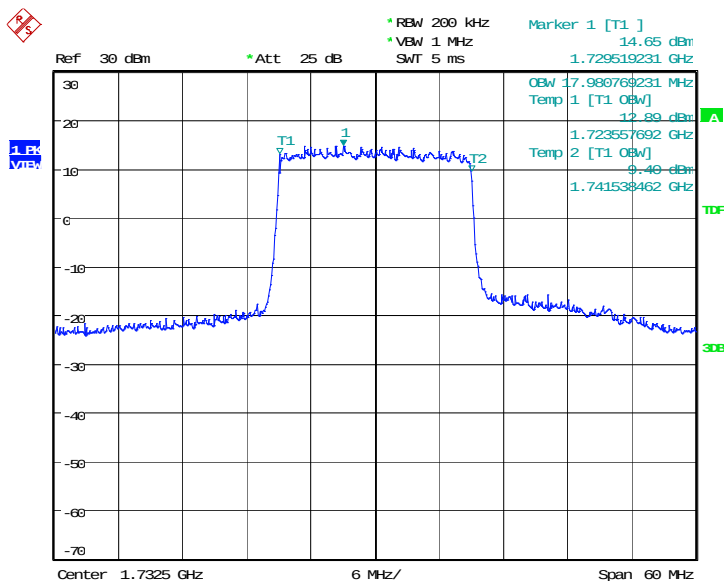
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1732.5	17884.62	17980.77

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



Date: 15.APR.2015 02:35:41

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

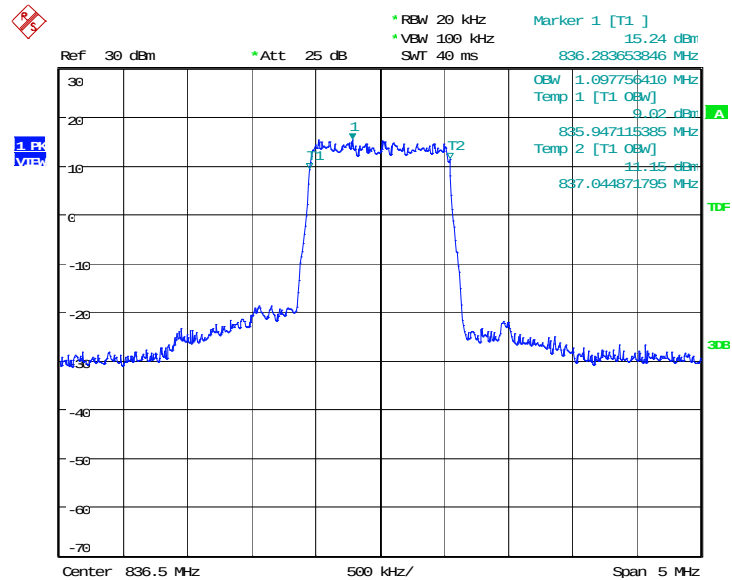


Date: 15.APR.2015 02:35:54

LTE band 5, 1.4MHz (99%BW)

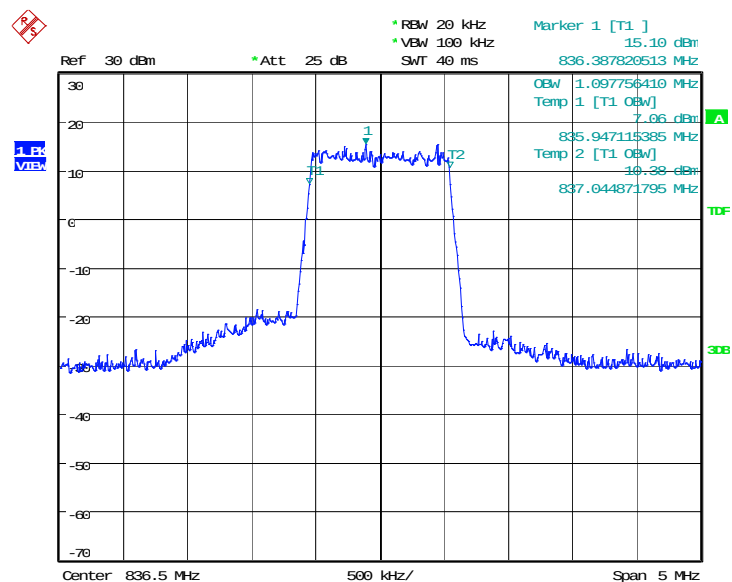
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	1097.76	1097.76

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



Date: 15.APR.2015 00:42:25

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

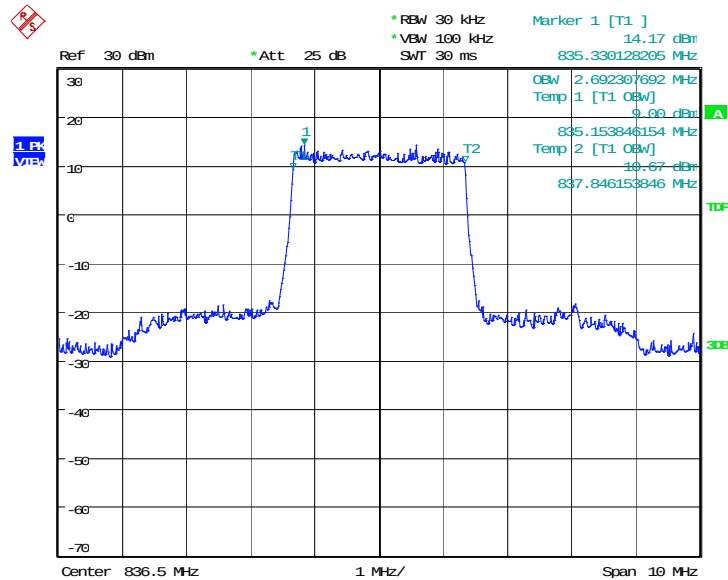


Date: 15.APR.2015 00:42:39

LTE band 5, 3MHz (99%BW)

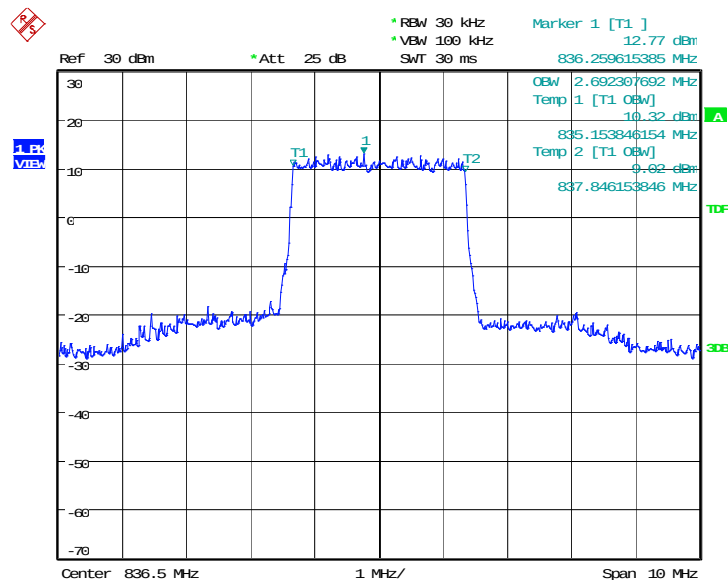
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	2692.31	2692.31

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



Date: 15.APR.2015 00:48:03

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

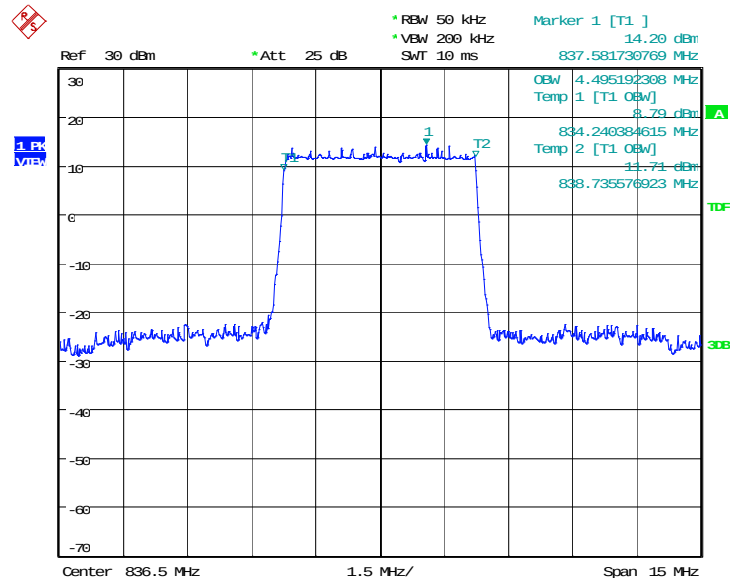


Date: 15.APR.2015 00:48:17

LTE band 5, 5MHz (99%BW)

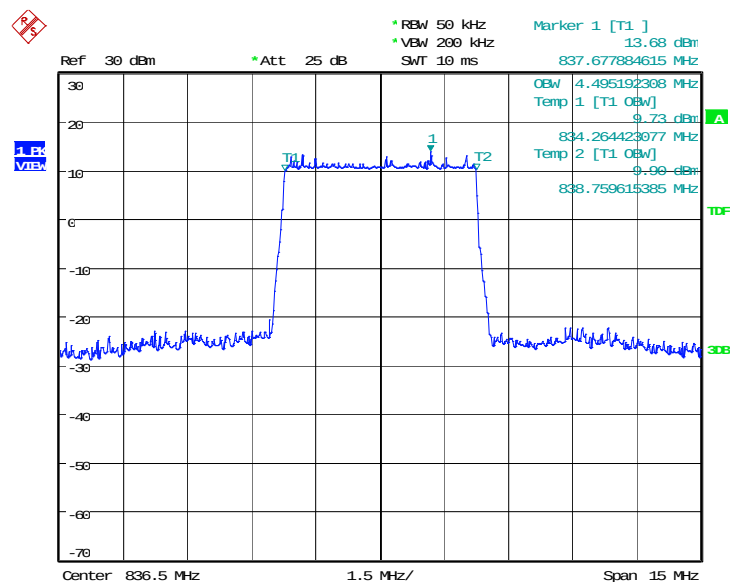
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	4495.19	4495.19

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



Date: 15.APR.2015 00:53:41

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

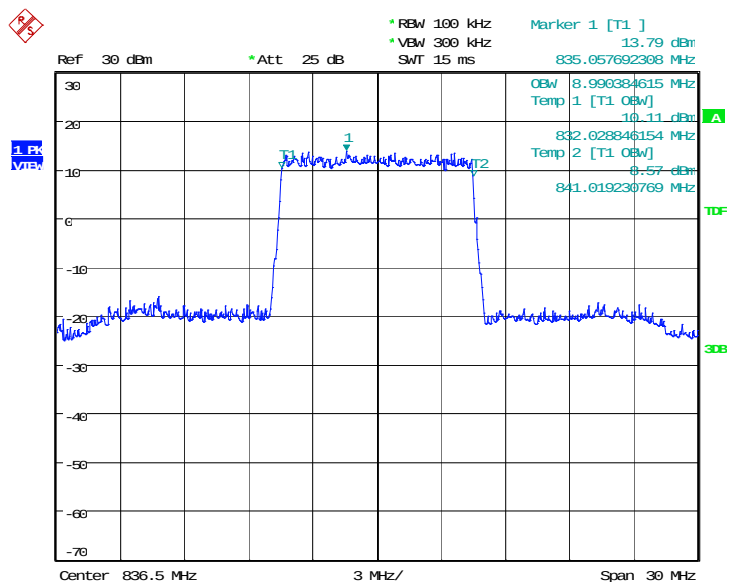


Date: 15.APR.2015 00:53:55

LTE band 5, 10MHz (99%BW)

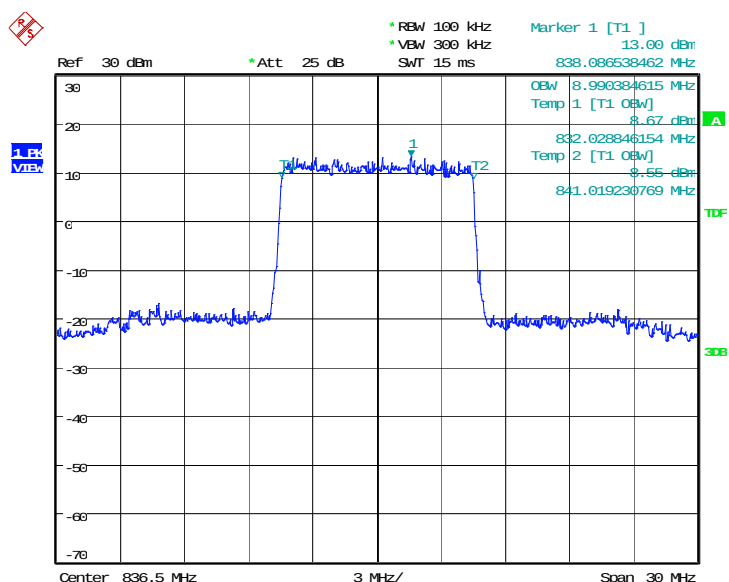
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
836.5	QPSK	16QAM
	8990.38	8990.38

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



Date: 15.APR.2015 00:59:19

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

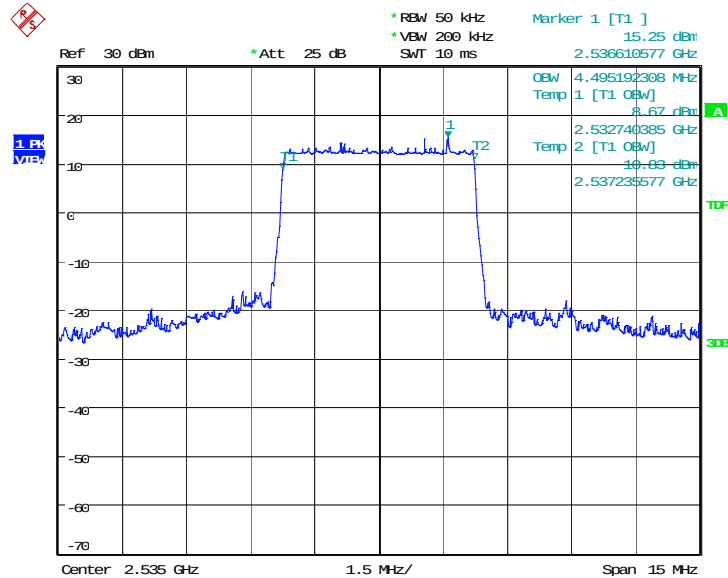


Date: 15.APR.2015 00:59:33

LTE band 7, 5MHz (99% BW)

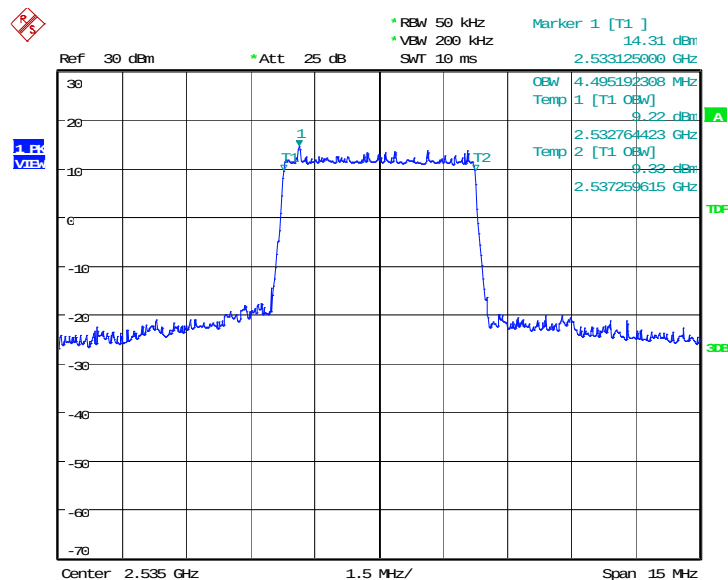
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
2535	4495.19	4495.19

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



Date: 15.APR.2015 00:18:33

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

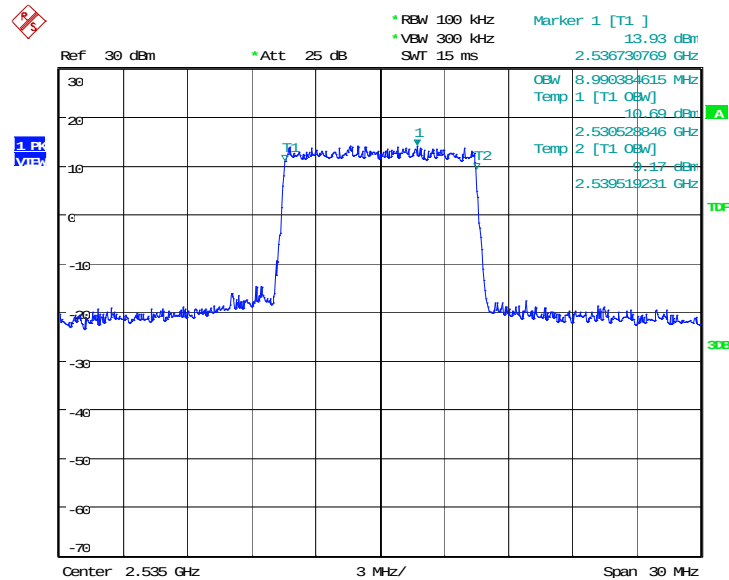


Date: 15.APR.2015 00:18:47

LTE band 7, 10MHz (99% BW)

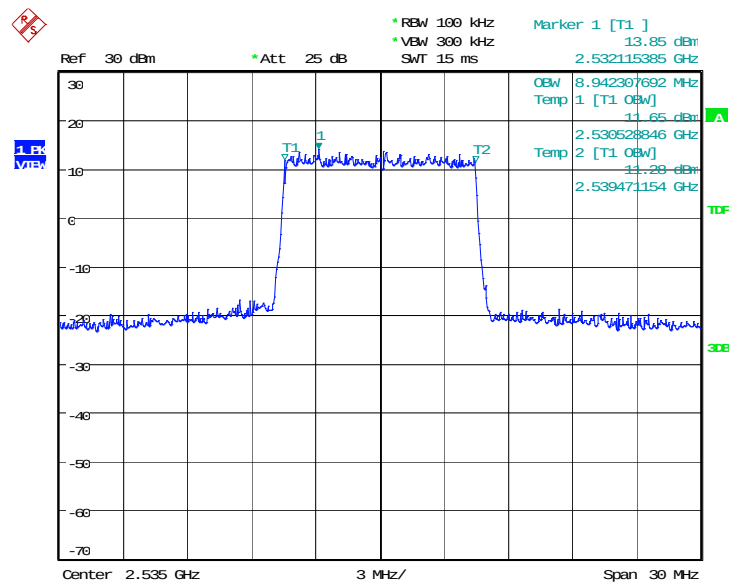
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
2535	8990.38	8942.31

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



Date: 15.APR.2015 00:24:12

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

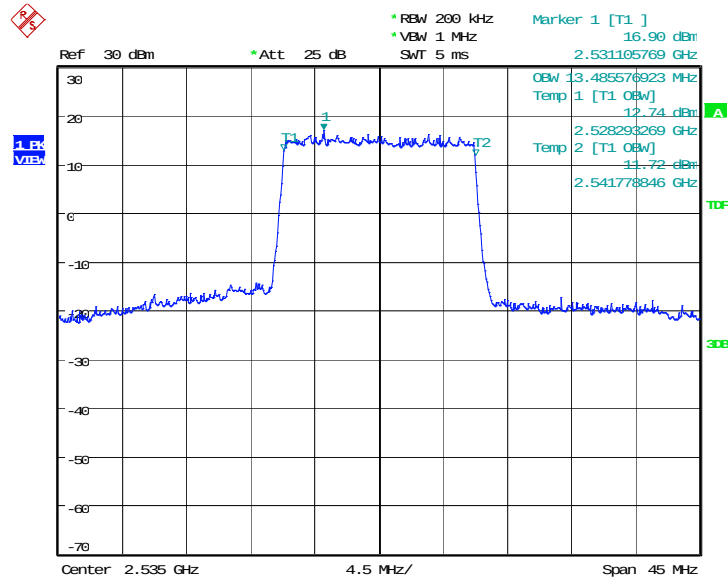


Date: 15.APR.2015 00:24:26

LTE band 7, 15MHz (99% BW)

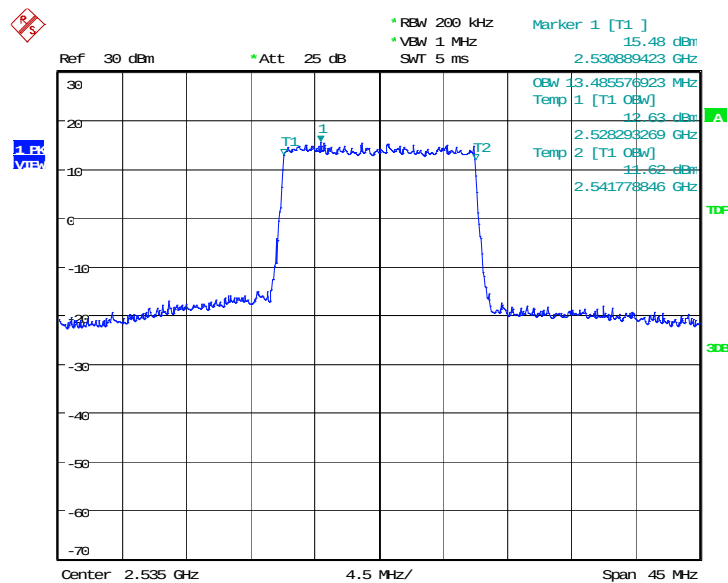
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
2535	13485.58	13485.58

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



Date: 15.APR.2015 00:29:56

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

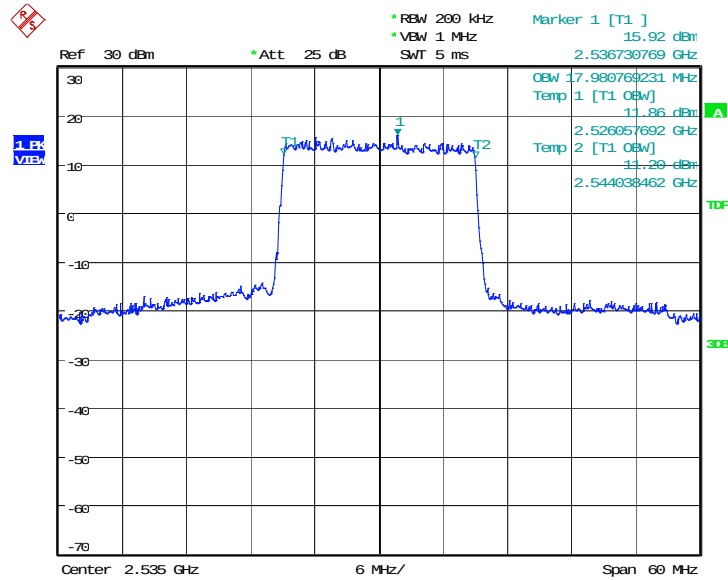


Date: 15.APR.2015 00:30:10

LTE band 7, 20MHz (99% BW)

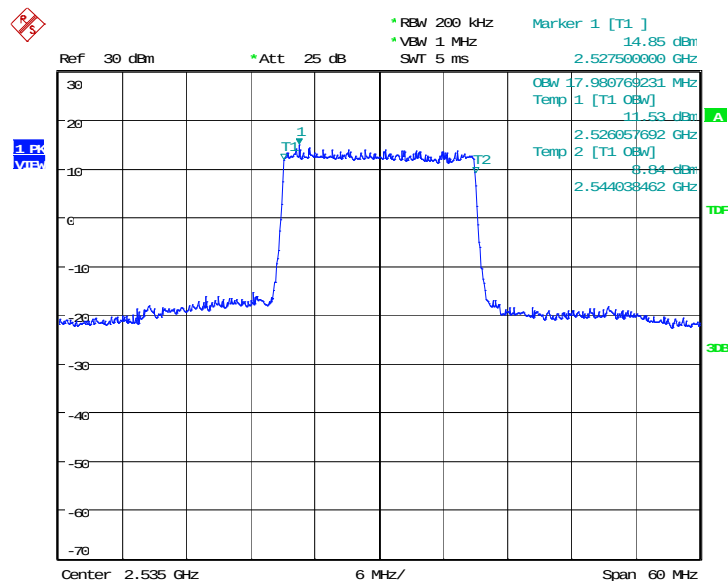
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
2535	17980.77	17980.77

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



Date: 15.APR.2015 00:35:44

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

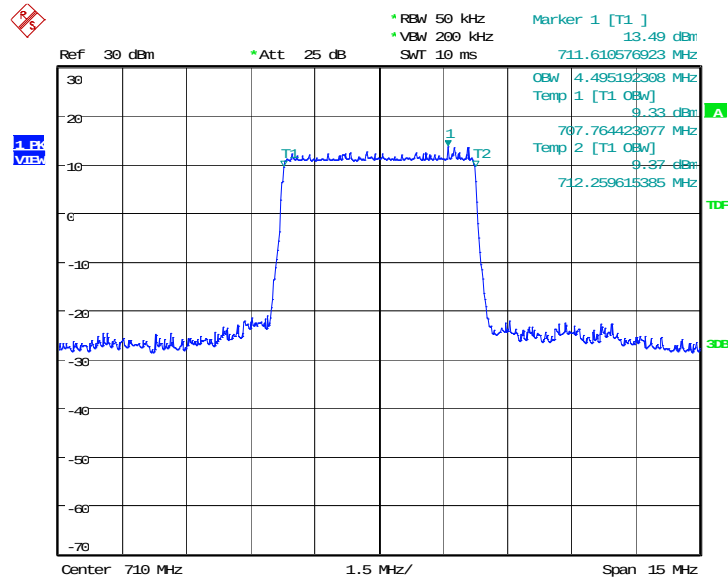


Date: 15.APR.2015 00:35:57

LTE band 17, 5MHz (99% BW)

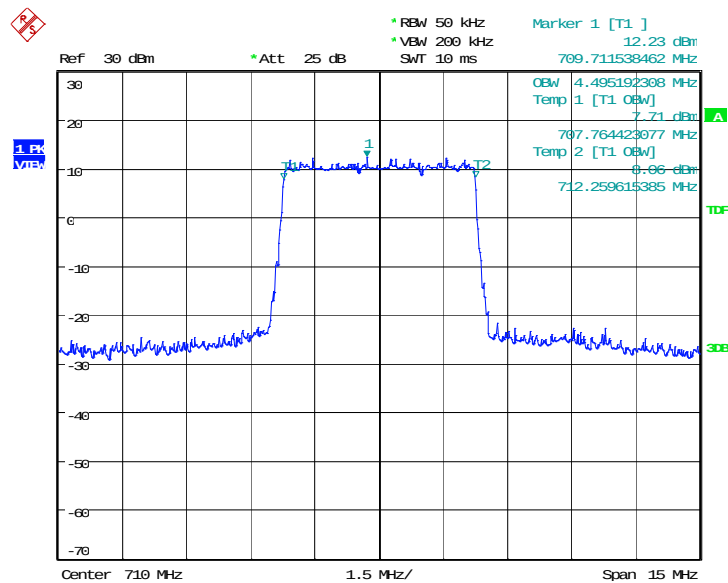
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
710	4495.19	4495.19

LTE band 17, 5MHz Bandwidth, QPSK (99% BW)



Date: 15.APR.2015 02:41:52

LTE band 17, 5MHz Bandwidth, 16QAM (99% BW)

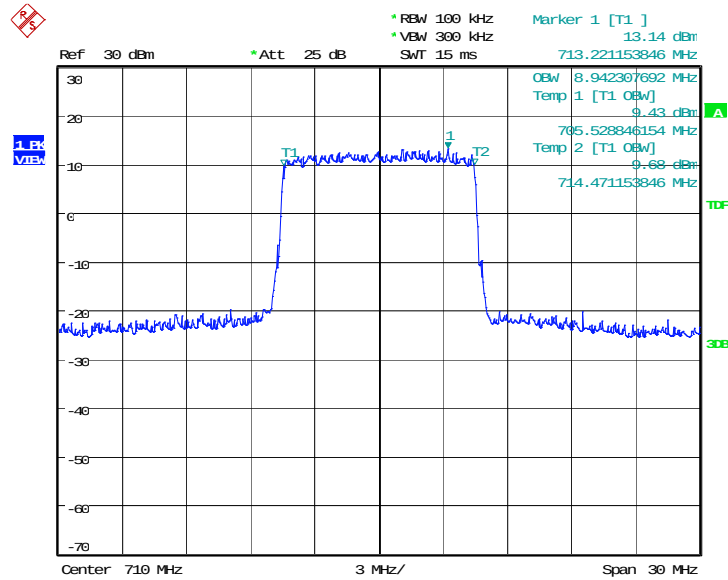


Date: 15.APR.2015 02:42:06

LTE band 17, 10MHz (99% BW)

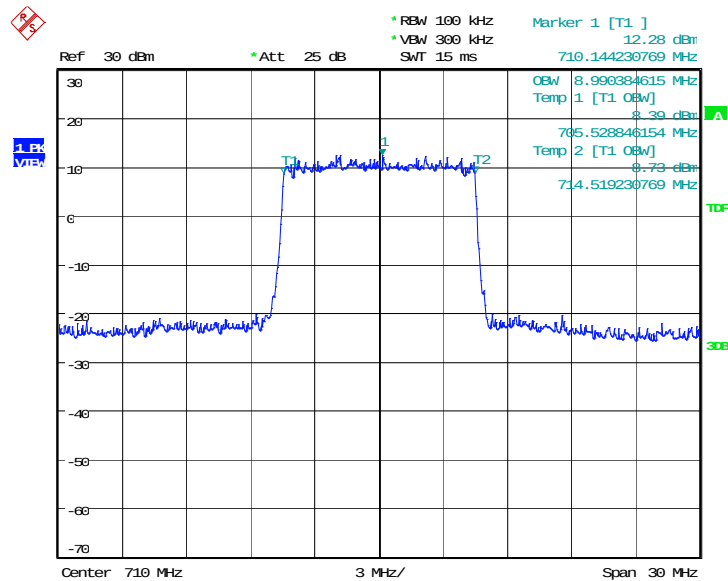
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
710	8942.31	8990.38

LTE band 17, 10MHz Bandwidth, QPSK (99% BW)



Date: 15.APR.2015 03:28:20

LTE band 17, 10MHz Bandwidth, 16QAM (99% BW)

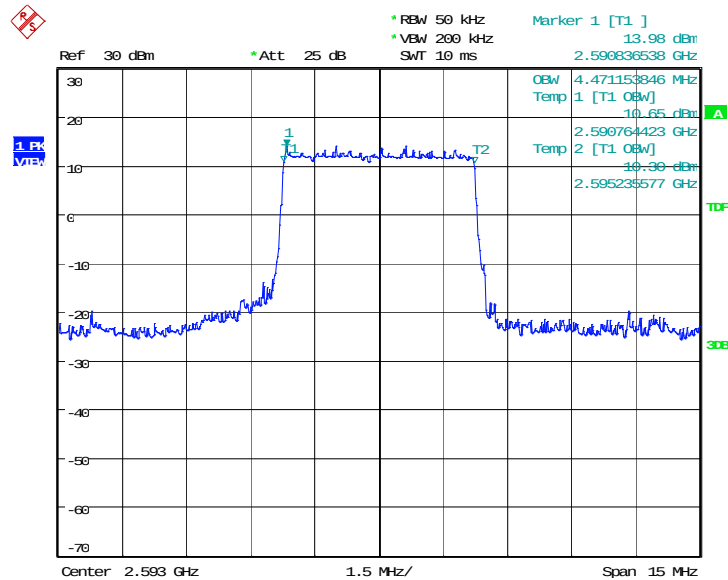


Date: 15.APR.2015 03:28:34

LTE band 41, 5MHz (99% BW)

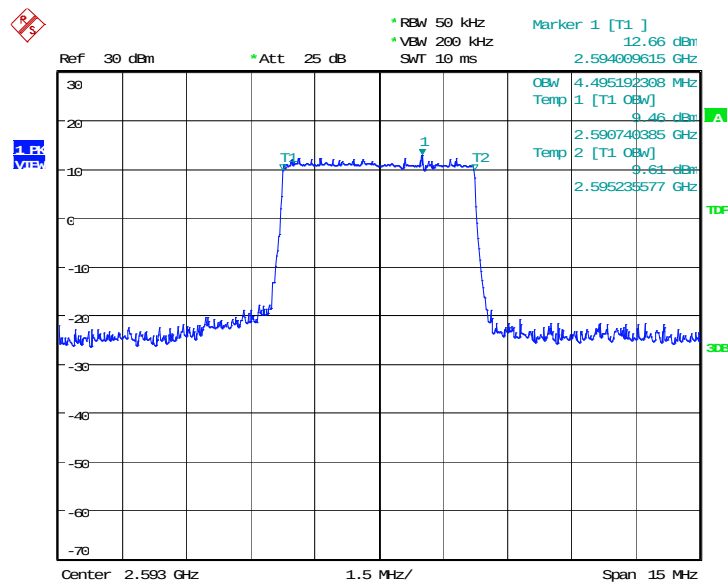
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
2535	4471.15	4495.19

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



Date: 15.APR.2015 03:48:18

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

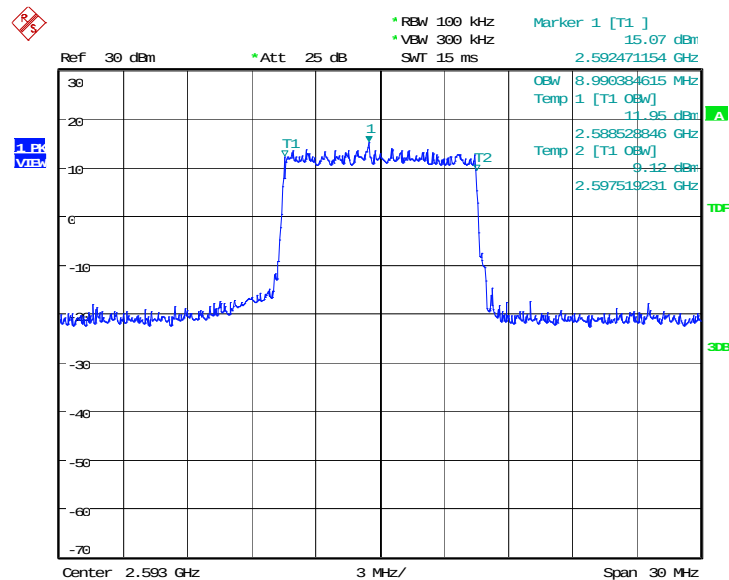


Date: 15.APR.2015 03:48:31

LTE band 41, 10MHz (99% BW)

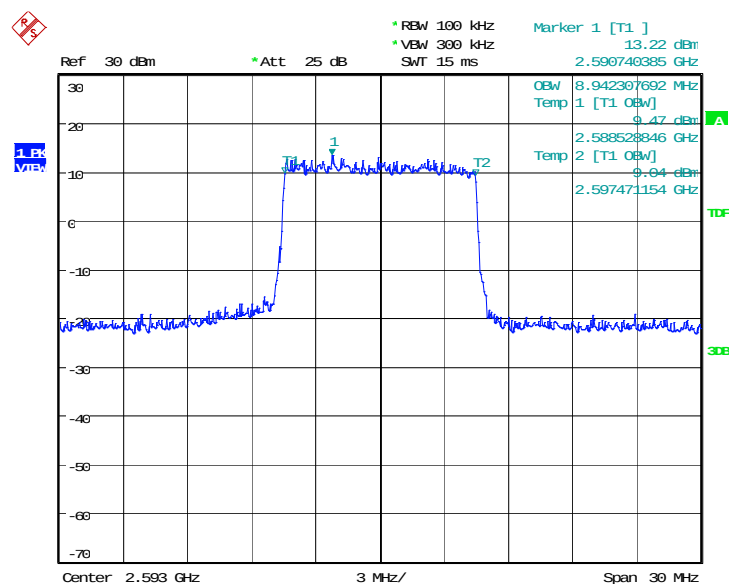
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
2535	8990.38	8942.31

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



Date: 15.APR.2015 03:54:27

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

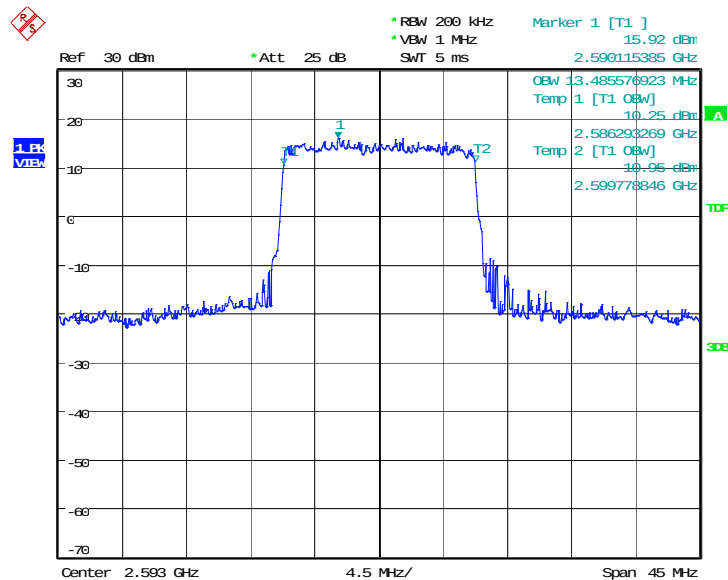


Date: 15.APR.2015 03:54:41

LTE band 41, 15MHz (99% BW)

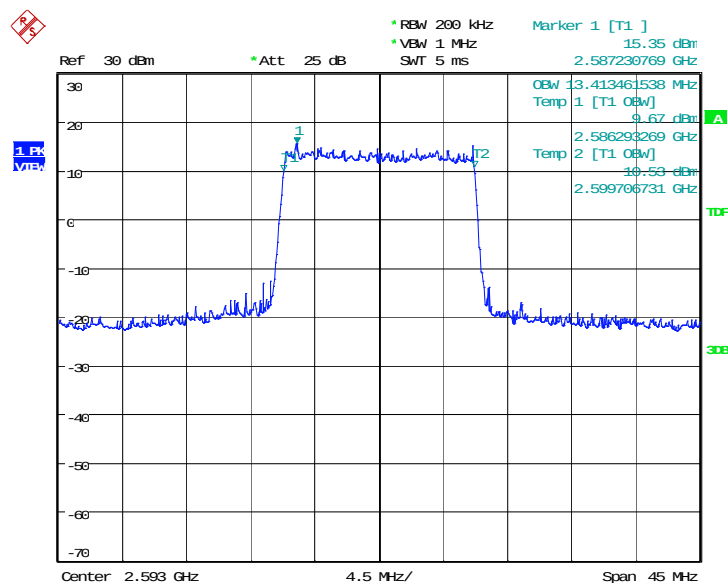
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
2535	13485.58	13413.46

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



Date: 15.APR.2015 04:05:49

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

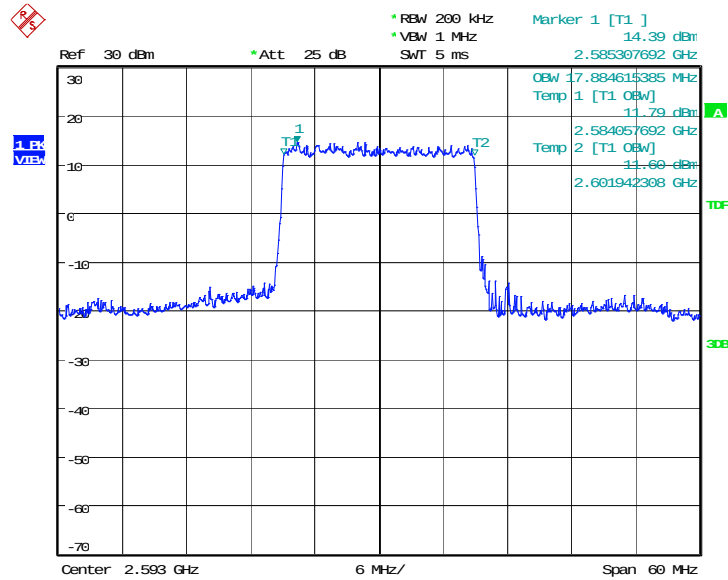


Date: 15.APR.2015 04:06:03

LTE band 41, 20MHz (99% BW)

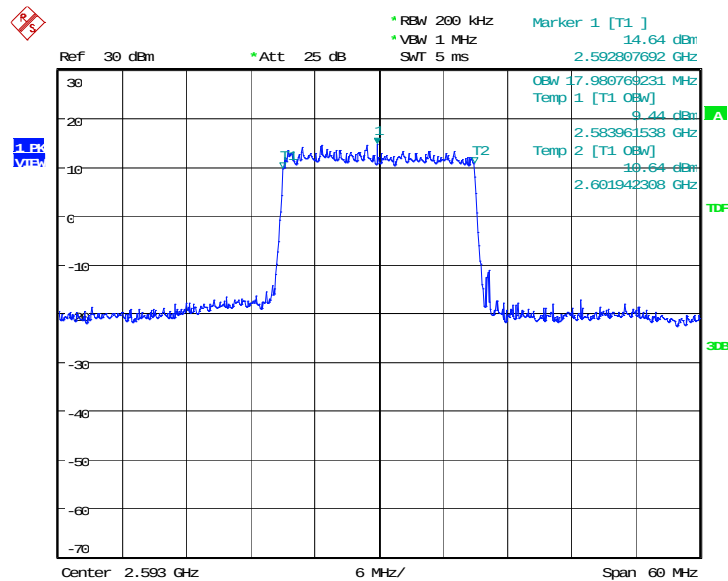
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
2535	17884.62	17980.77

LTE band 41, 20MHz Bandwidth, QPSK (99% BW)



Date: 15.APR.2015 04:11:36

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



Date: 15.APR.2015 04:11:49

A.5 EMISSION BANDWIDTH

Reference

FCC: CFR Part 22.917(b), 24.238(a), 27.53(h) , 27.53(m), 27.53(g).

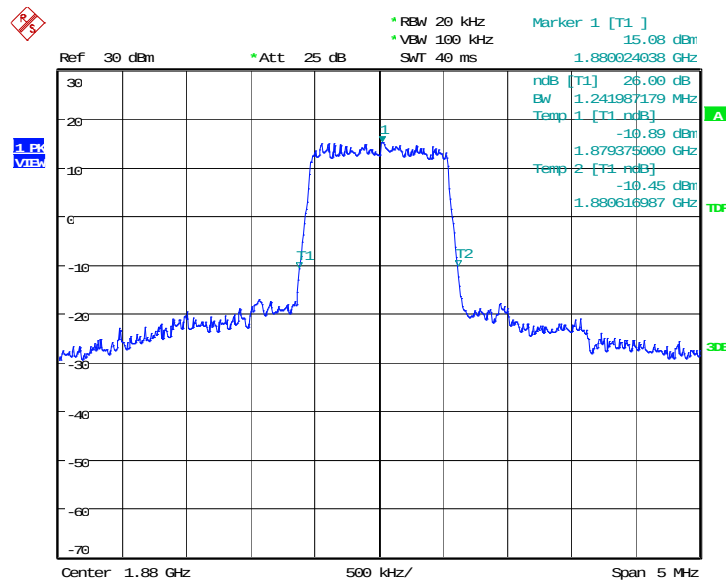
A.5.1 Emission Bandwidth Measurement Results

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

LTE band 2, 1.4MHz (-26dBc)

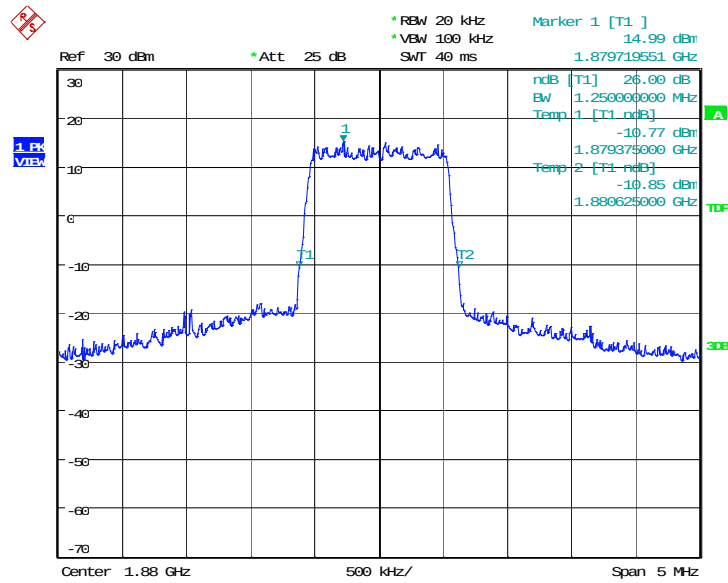
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
1880.0	1241.99	1250.00

LTE band 2, 1.4MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 01:06:38

LTE band 2, 1.4MHz Bandwidth, 16QAM (-26dBc BW)

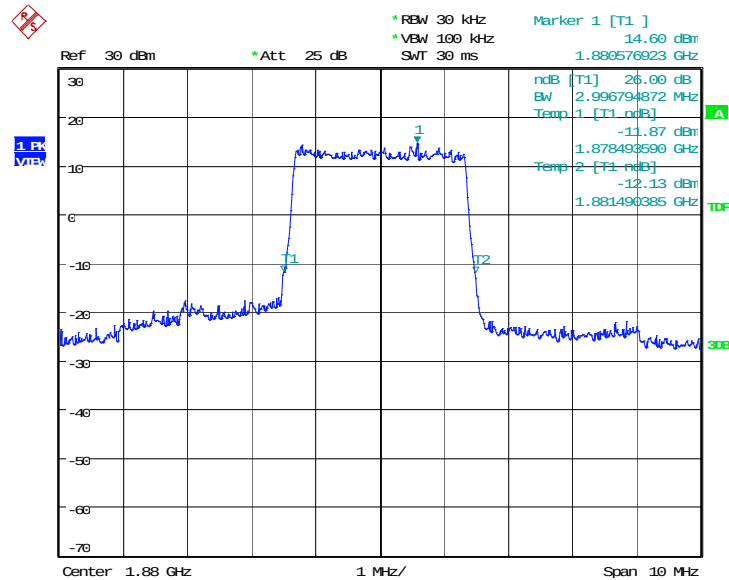


Date: 15.APR.2015 01:06:54

LTE band 2, 3MHz (-26dBc)

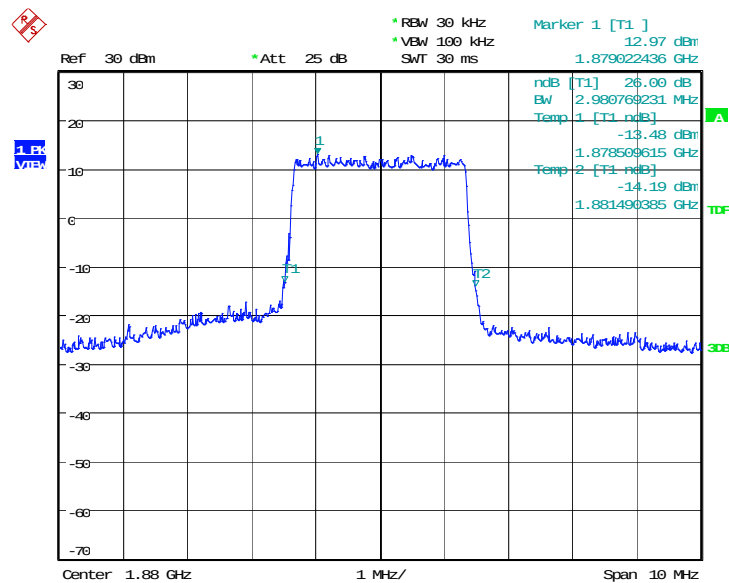
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
1880.0	2996.79	2980.77

LTE band 2, 3MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 01:12:16

LTE band 2, 3MHz Bandwidth, 16QAM (-26dBc BW)

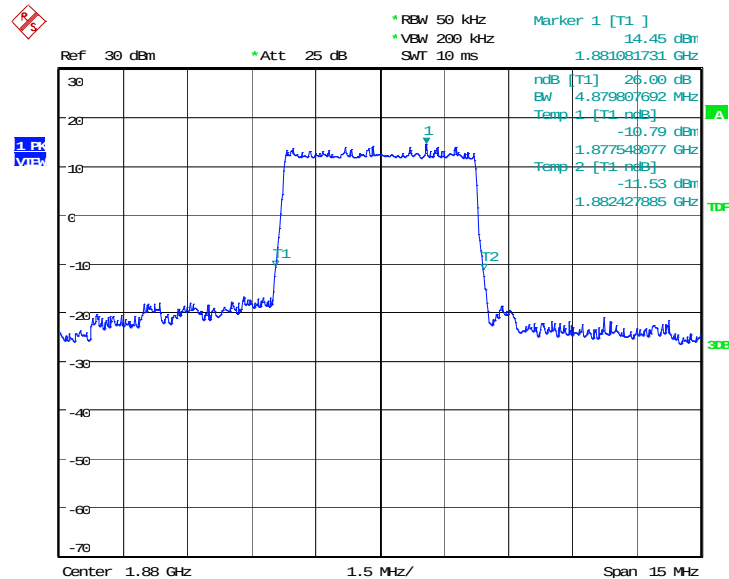


Date: 15.APR.2015 01:12:32

LTE band 2, 5MHz (-26dBc)

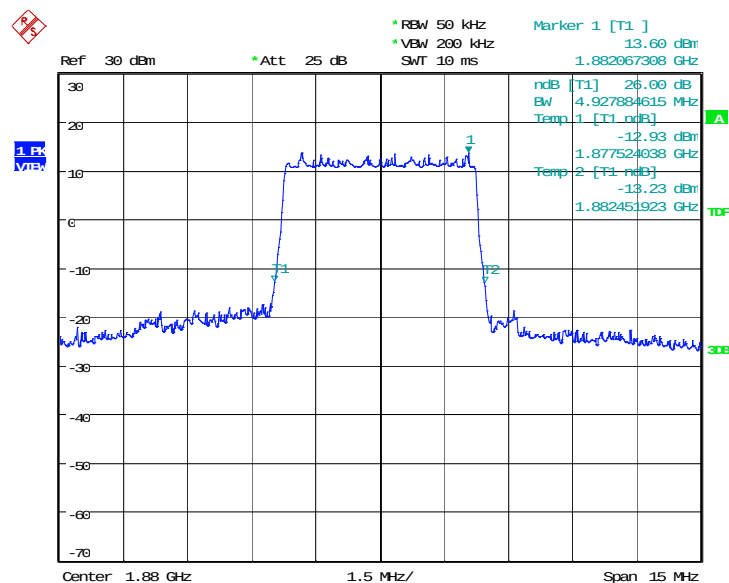
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
1880.0	4879.81	4927.88

LTE band 2, 5MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 01:17:54

LTE band 2, 5MHz Bandwidth, 16QAM (-26dBc BW)

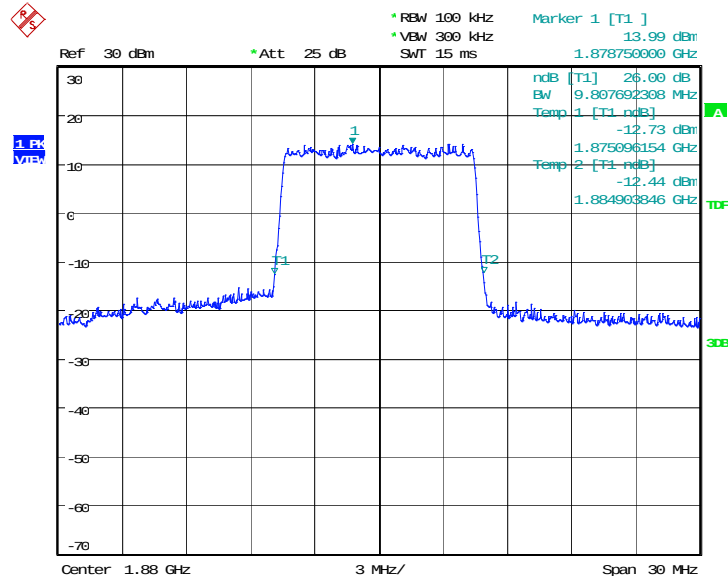


Date: 15.APR.2015 01:18:10

LTE band 2, 10MHz (-26dBc)

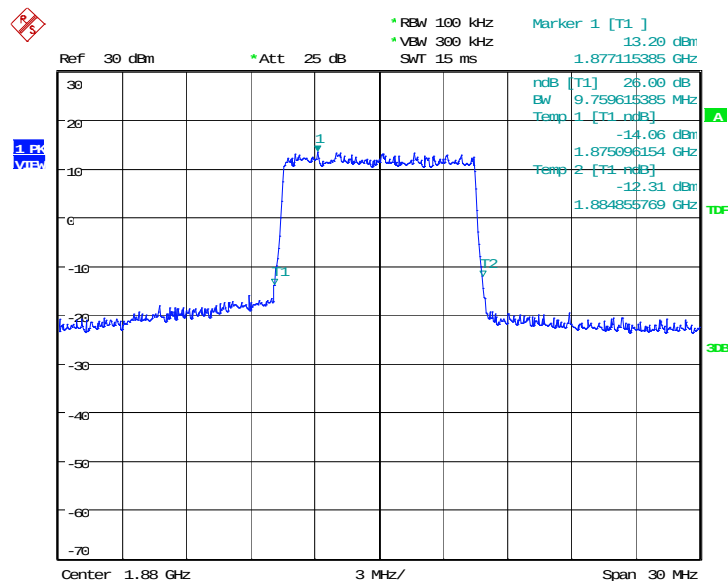
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
1880.0	9807.69	9759.62

LTE band 2, 10MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 01:23:34

LTE band 2, 10MHz Bandwidth, 16QAM (-26dBc BW)

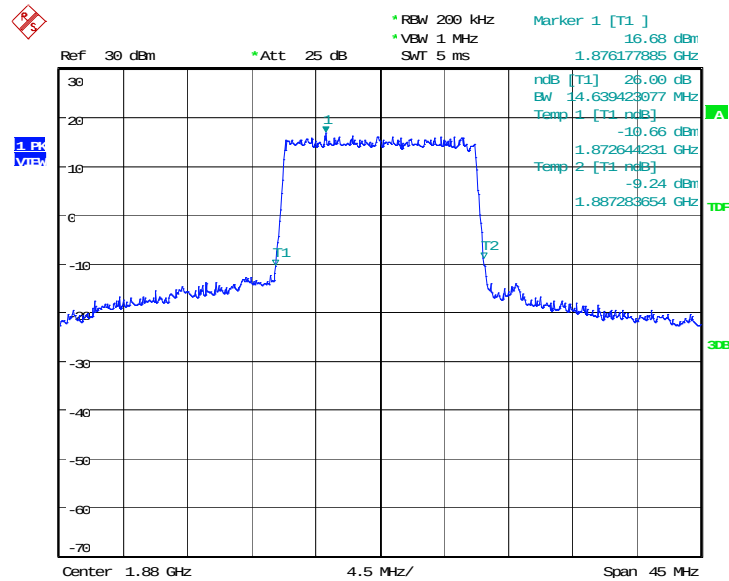


Date: 15.APR.2015 01:23:50

LTE band 2, 15MHz (-26dBc)

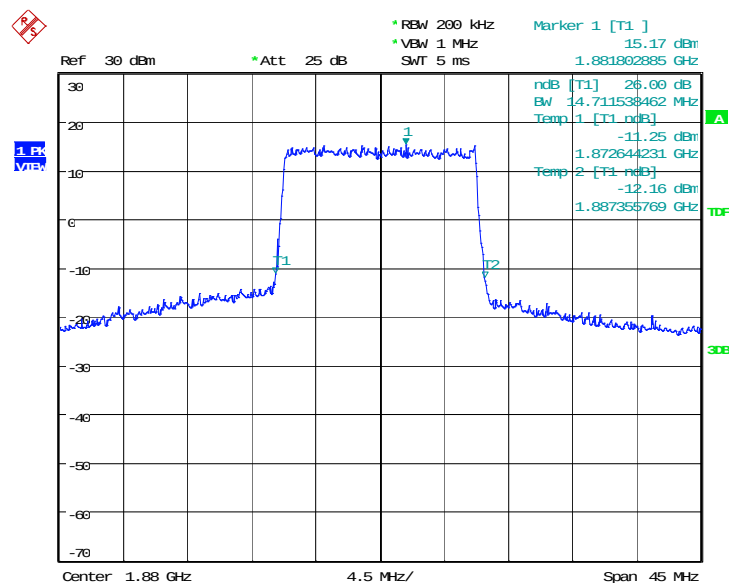
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
1880.0	14639.42	14711.54

LTE band 2, 15MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 01:29:17

LTE band 2, 15MHz Bandwidth, 16QAM (-26dBc BW)

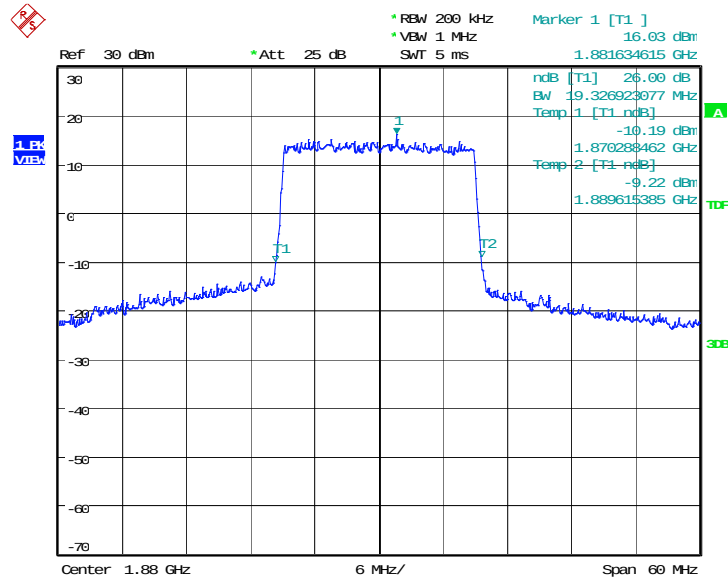


Date: 15.APR.2015 01:29:33

LTE band 2, 20MHz (-26dBc)

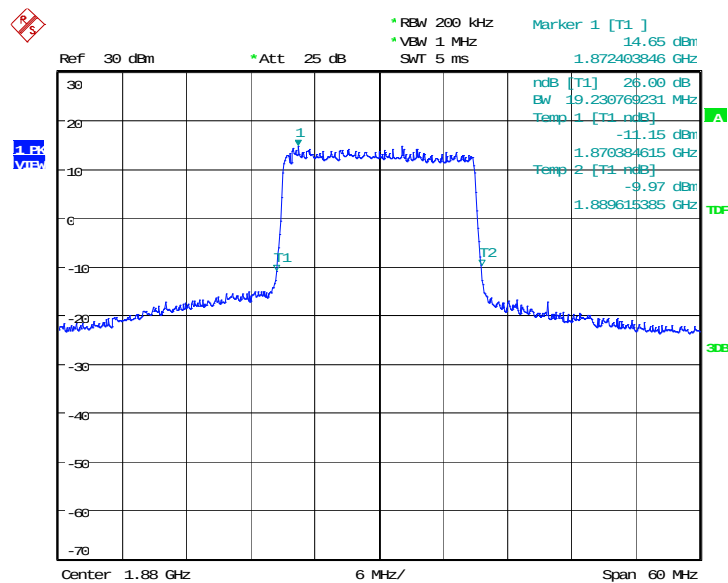
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
1880.0	19326.92	19230.77

LTE band 2, 20MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 01:35:04

LTE band 2, 20MHz Bandwidth, 16QAM (-26dBc BW)

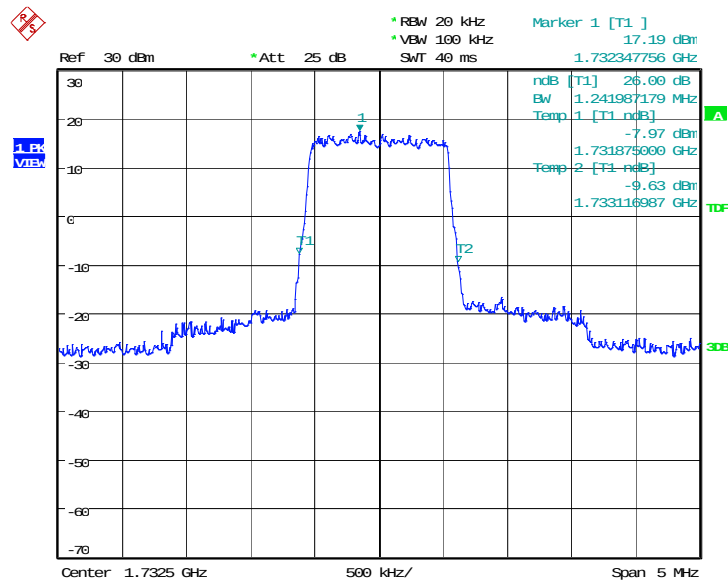


Date: 15.APR.2015 01:35:20

LTE band 4, 1.4MHz (-26dBc)

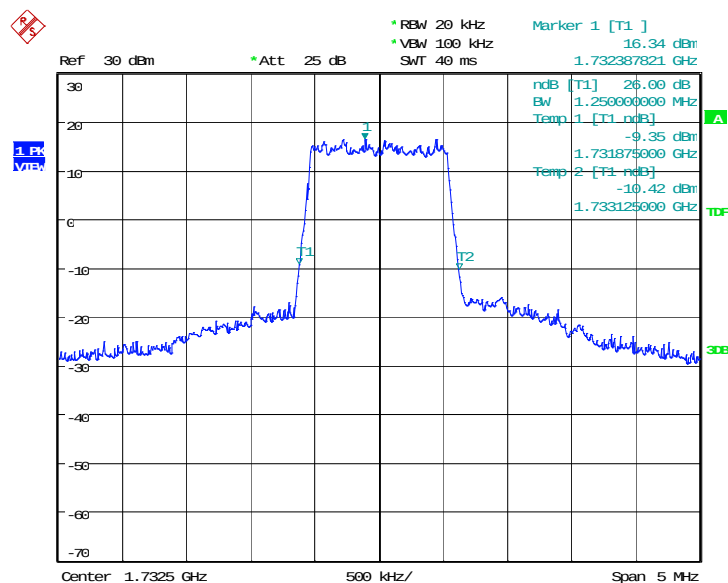
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
1732.5	1241.99	1250.00

LTE band 4, 1.4MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 02:08:16

LTE band 4, 1.4MHz Bandwidth, 16QAM (-26dBc BW)

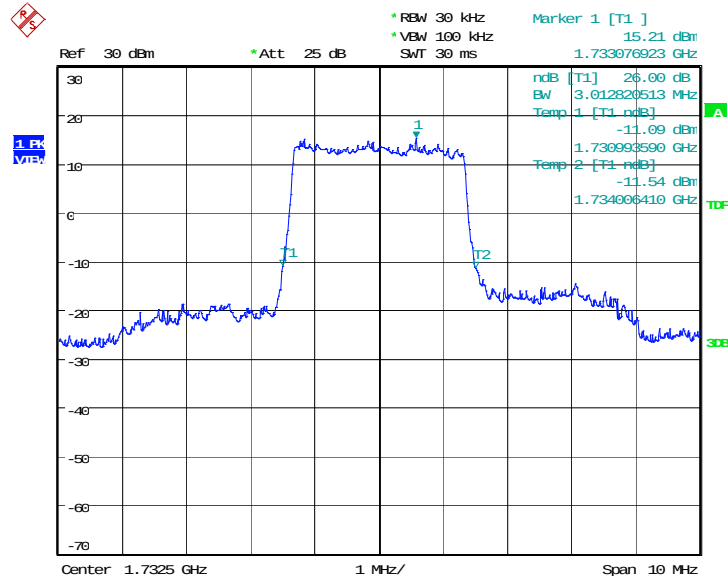


Date: 15.APR.2015 02:08:32

LTE band 4, 3MHz (-26dBc)

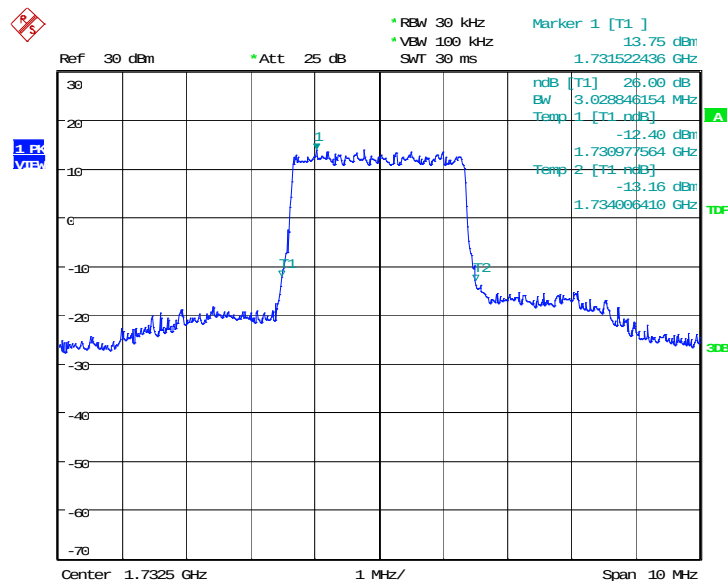
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
1732.5	3012.82	3028.85

LTE band 4, 3MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 02:13:54

LTE band 4, 3MHz Bandwidth, 16QAM (-26dBc BW)

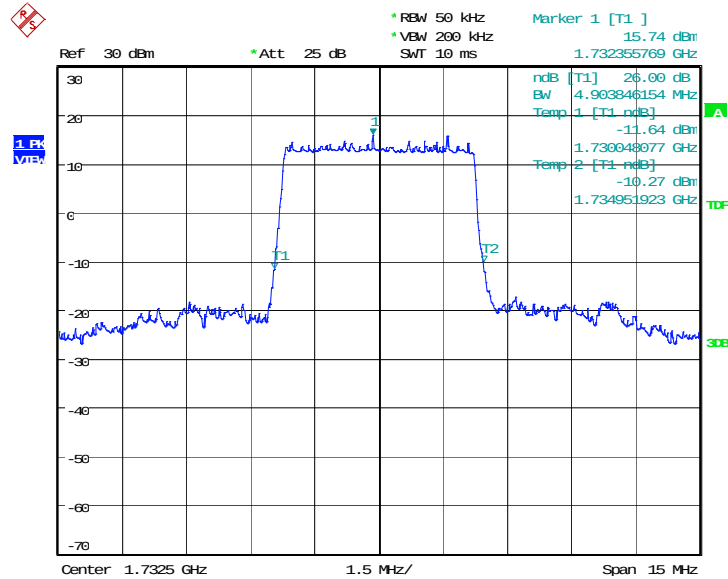


Date: 15.APR.2015 02:14:10

LTE band 4, 5MHz (-26dBc)

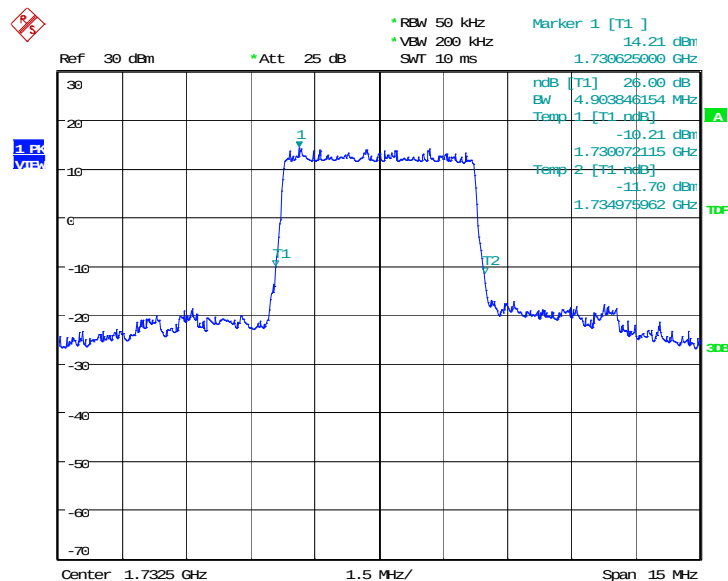
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
1732.5	4903.85	4903.85

LTE band 4, 5MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 02:19:34

LTE band 4, 5MHz Bandwidth, 16QAM (-26dBc BW)

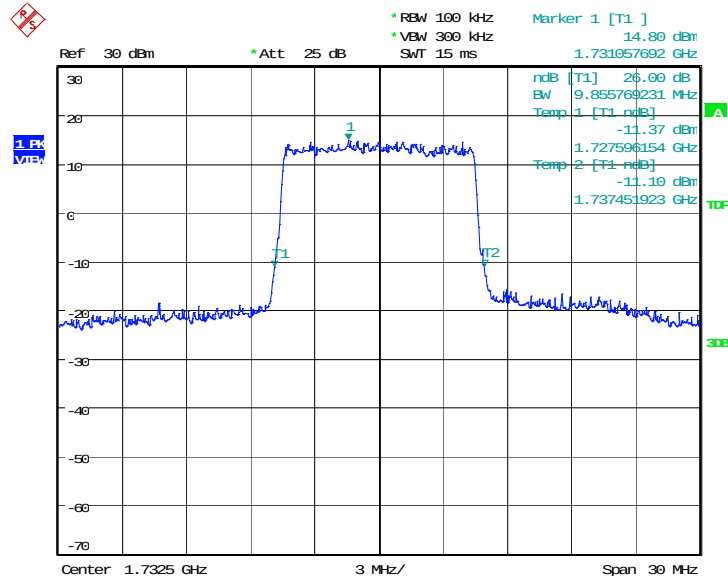


Date: 15.APR.2015 02:19:50

LTE band 4, 10MHz (-26dBc)

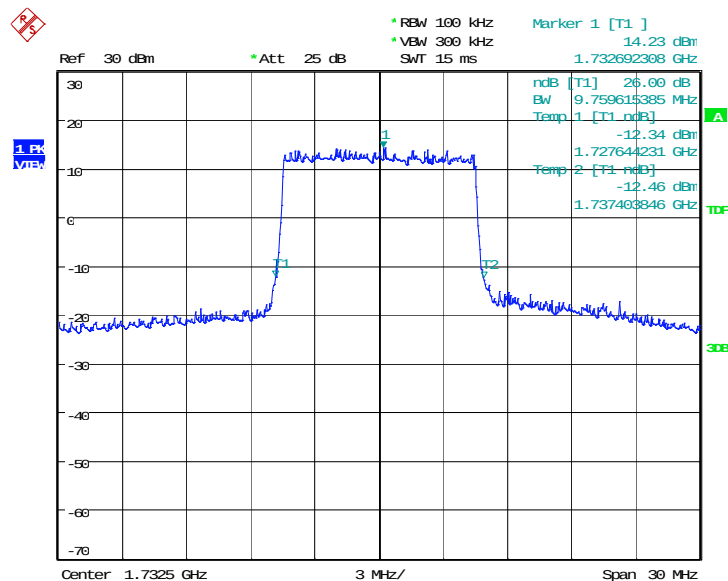
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
1732.5	9855.77	9759.62

LTE band 4, 10MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 02:25:13

LTE band 4, 10MHz Bandwidth, 16QAM (-26dBc BW)

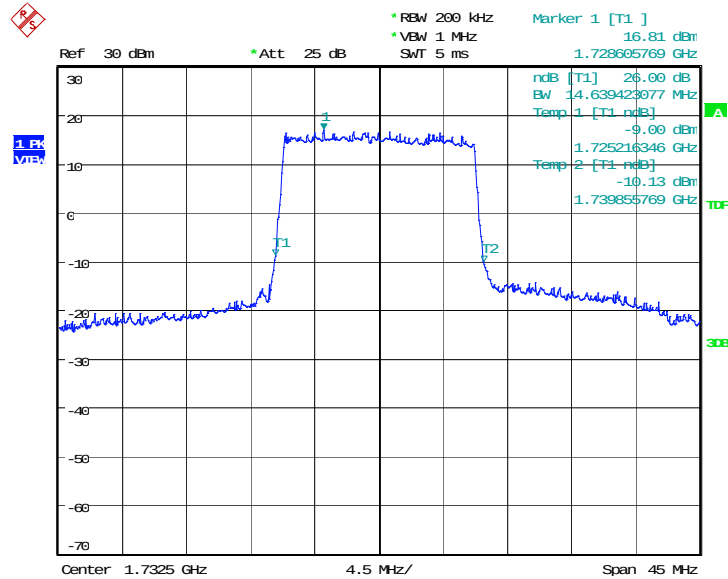


Date: 15.APR.2015 02:25:29

LTE band 4, 15MHz (-26dBc)

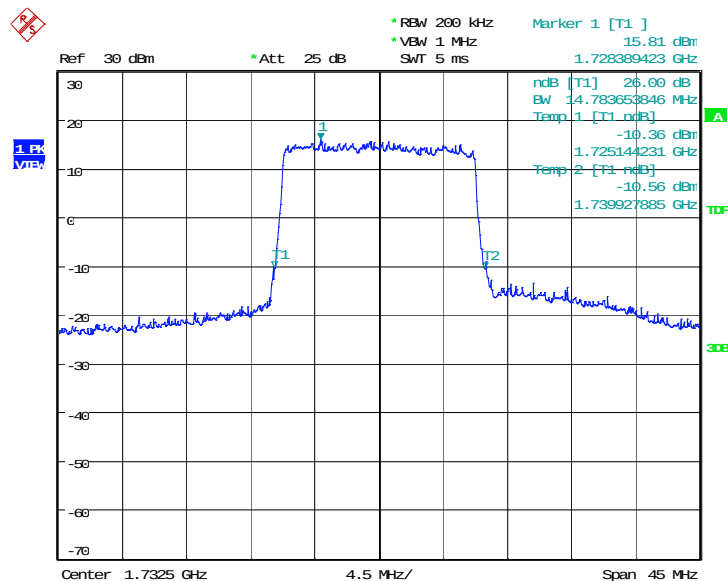
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
1732.5	14639.42	14783.65

LTE band 4, 15MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 02:30:56

LTE band 4, 15MHz Bandwidth, 16QAM (-26dBc BW)

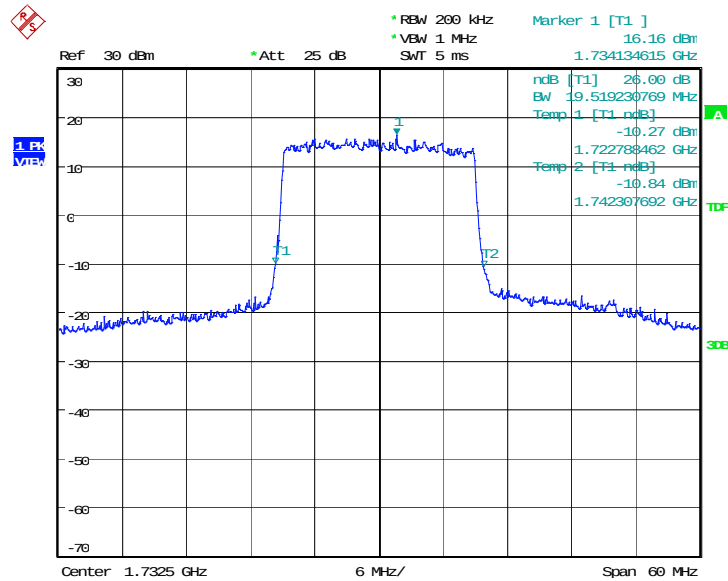


Date: 15.APR.2015 02:31:12

LTE band 4, 20MHz (-26dBc)

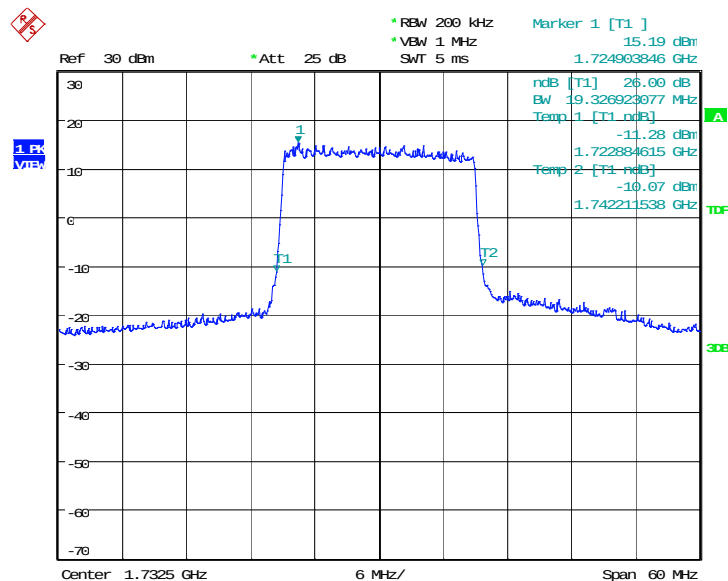
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
1732.5	19519.23	19326.92

LTE band 4, 20MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 02:36:46

LTE band 4, 20MHz Bandwidth, 16QAM (-26dBc BW)

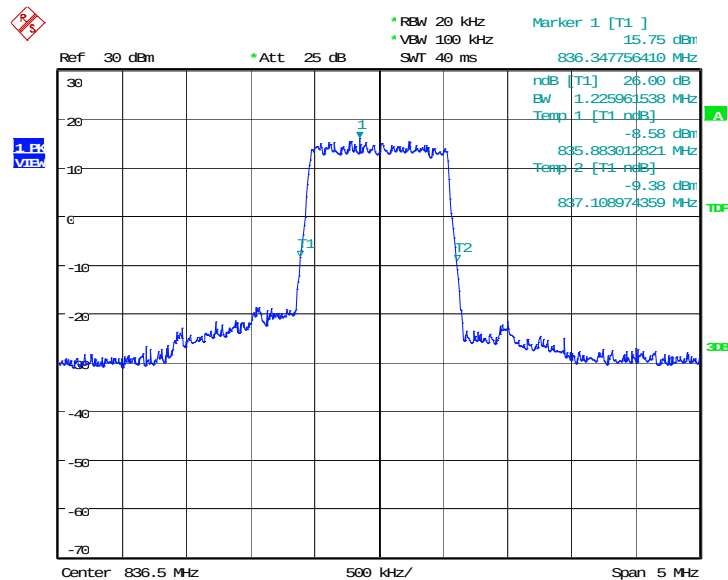


Date: 15.APR.2015 02:37:02

LTE band 5, 1.4MHz (-26dBc)

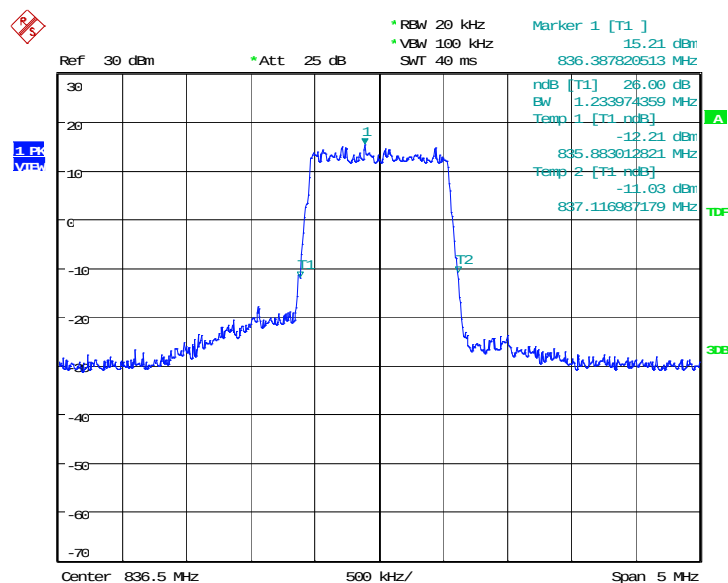
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
836.5	QPSK	16QAM
	1225.96	1233.97

LTE band 5, 1.4MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 00:43:31

LTE band 5, 1.4MHz Bandwidth, 16QAM (-26dBc BW)

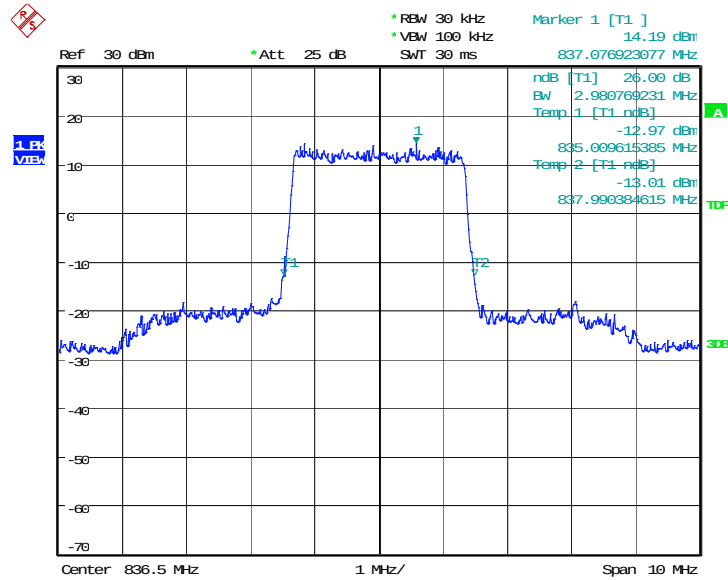


Date: 15.APR.2015 00:43:47

LTE band 5, 3MHz (-26dBc)

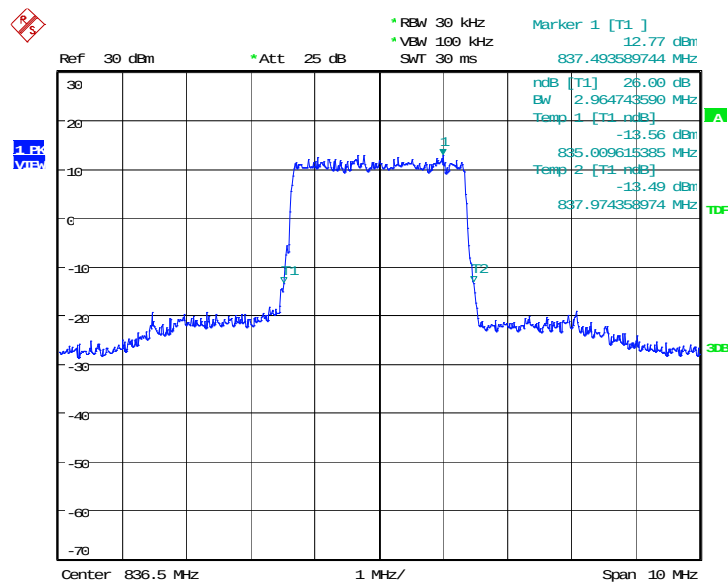
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
836.5	QPSK	16QAM
	2980.77	2964.74

LTE band 5, 3MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 00:49:09

LTE band 5, 3MHz Bandwidth, 16QAM (-26dBc BW)

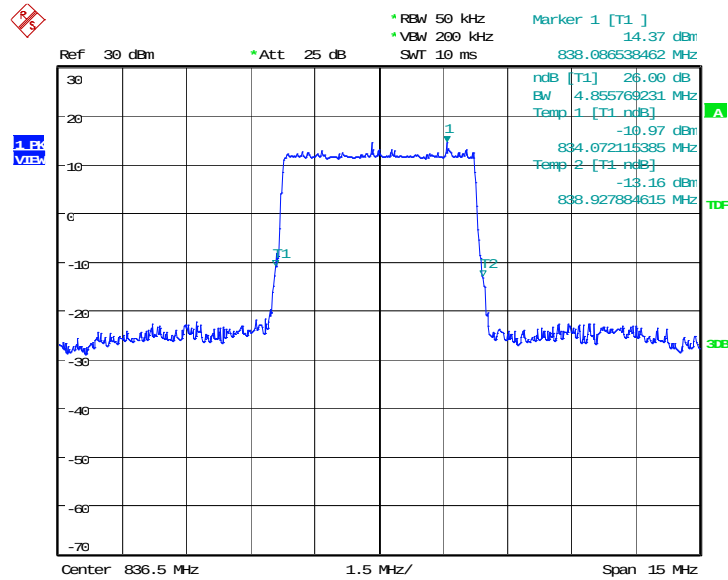


Date: 15.APR.2015 00:49:24

LTE band 5, 5MHz (-26dBc)

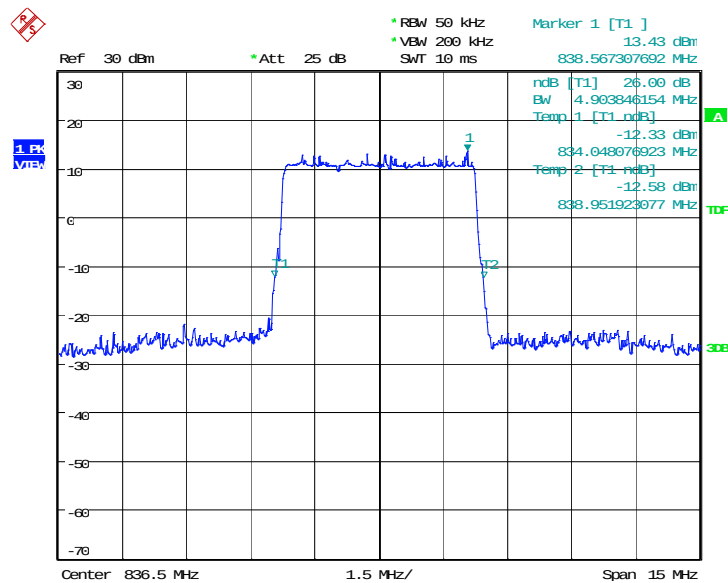
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
836.5	QPSK	16QAM
	4855.77	4903.85

LTE band 5, 5MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 00:54:47

LTE band 5, 5MHz Bandwidth, 16QAM (-26dBc BW)

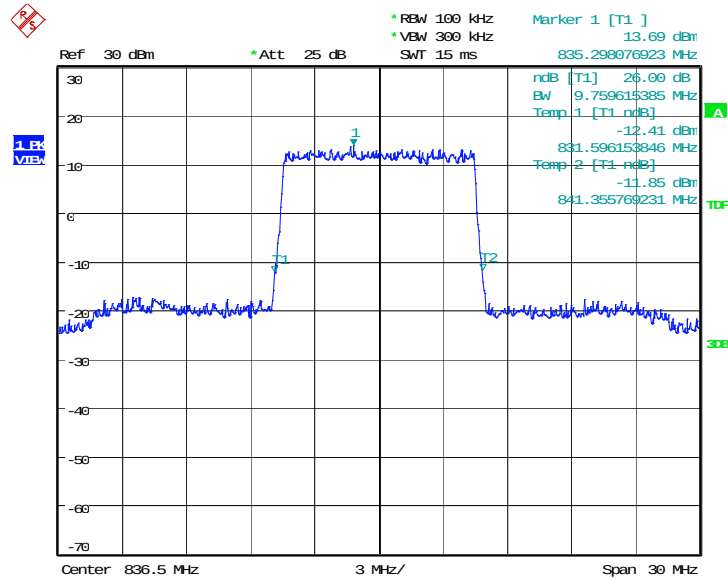


Date: 15.APR.2015 00:55:02

LTE band 5, 10MHz (-26dBc)

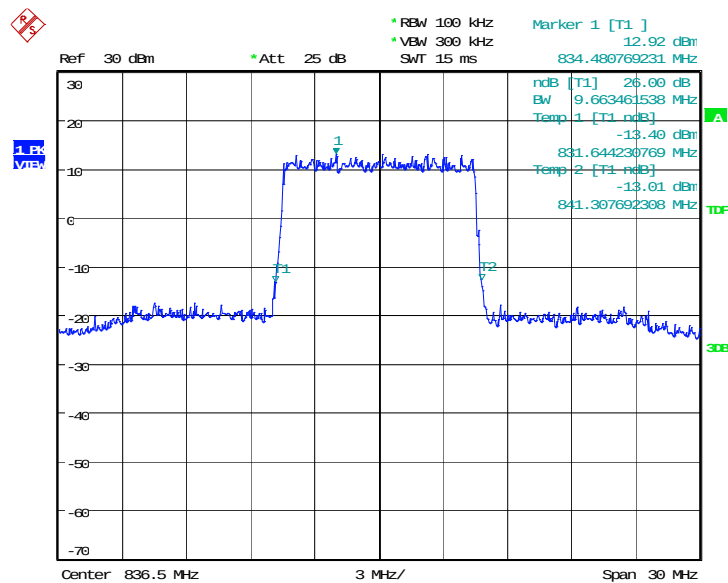
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
836.5	QPSK	16QAM
	9759.62	9663.46

LTE band 5, 10MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 01:00:26

LTE band 5, 10MHz Bandwidth, 16QAM (-26dBc BW)

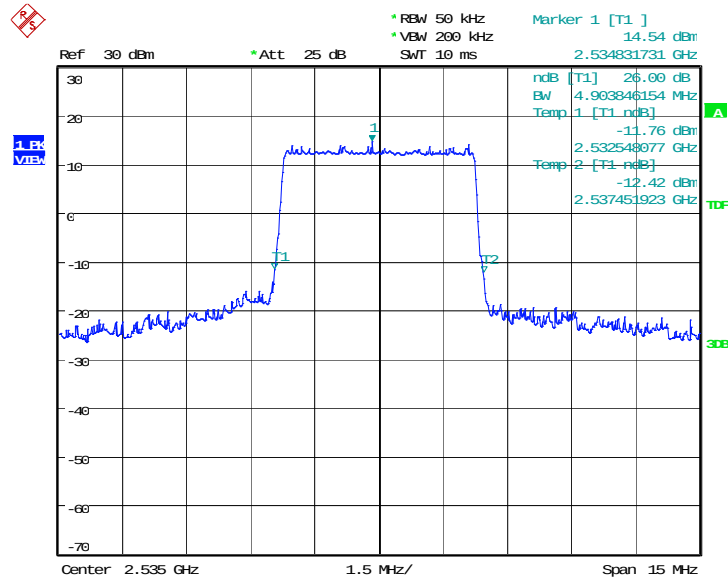


Date: 15.APR.2015 01:00:42

LTE band 7, 5MHz (-26dBc)

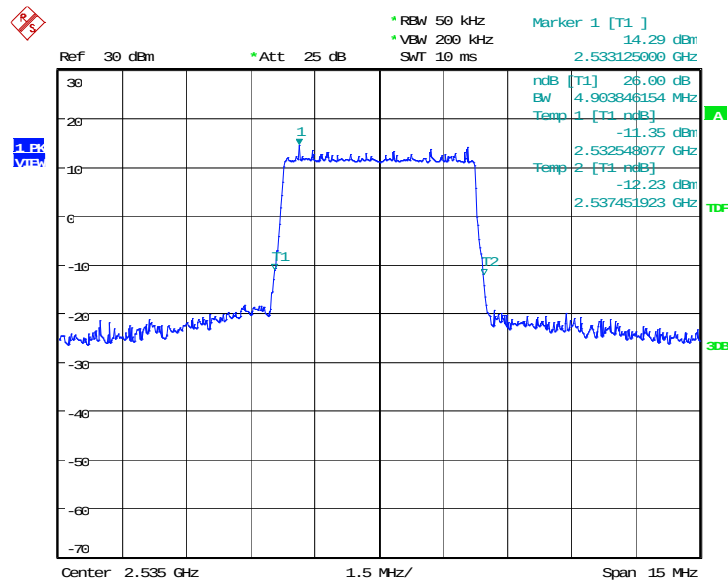
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
2535	4903.85	4903.85

LTE band 7, 5MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 00:19:39

LTE band 7, 5MHz Bandwidth, 16QAM (-26dBc BW)

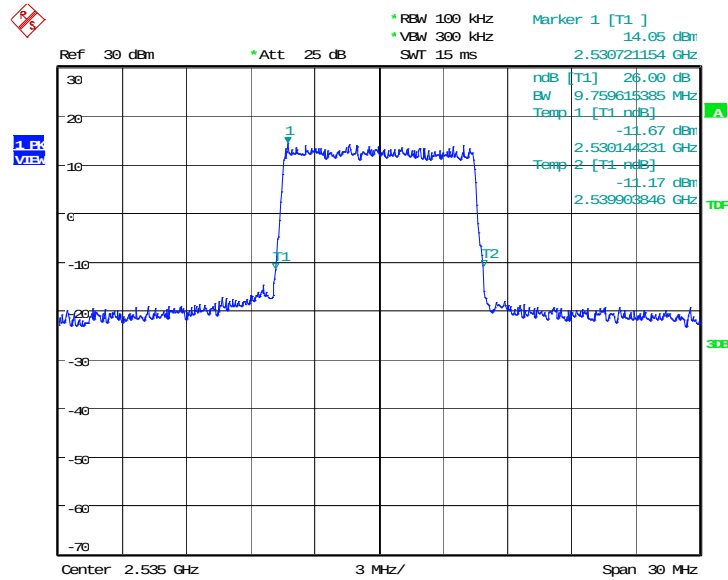


Date: 15.APR.2015 00:19:55

LTE band 7, 10MHz (-26dBc)

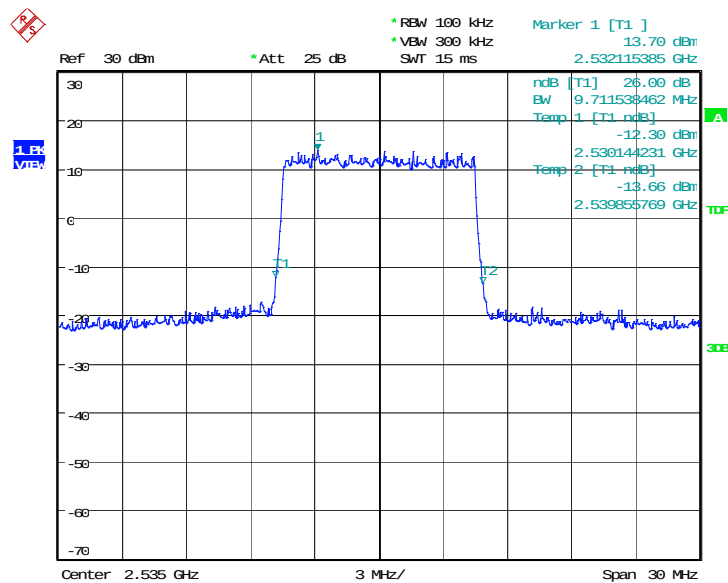
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
2535	9759.62	9711.54

LTE band 7, 10MHz Bandwidth, QPSK (-26dBc BW)



Date: 15. APR. 2015 00:25:18

LTE band 7, 10MHz Bandwidth, 16QAM (-26dBc BW)

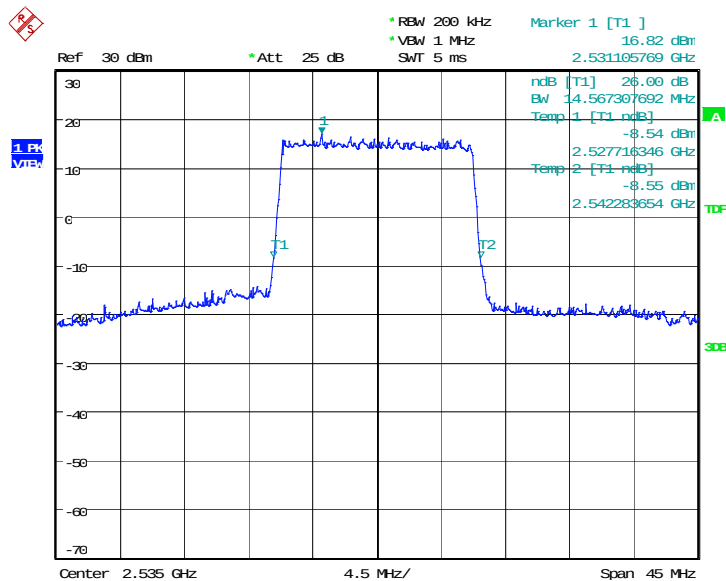


Date: 15. APR. 2015 00:25:34

LTE band 7, 15MHz (-26dBc)

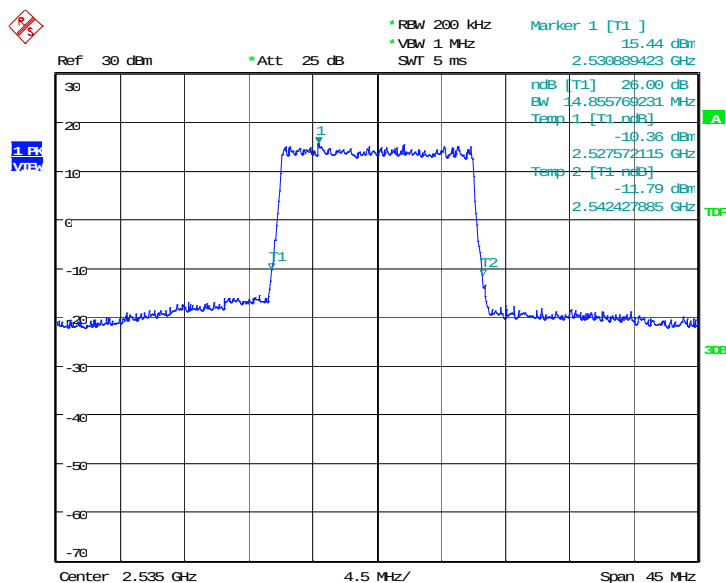
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
2535	14567.31	14855.77

LTE band 7, 15MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 00:31:03

LTE band 7, 15MHz Bandwidth, 16QAM (-26dBc BW)

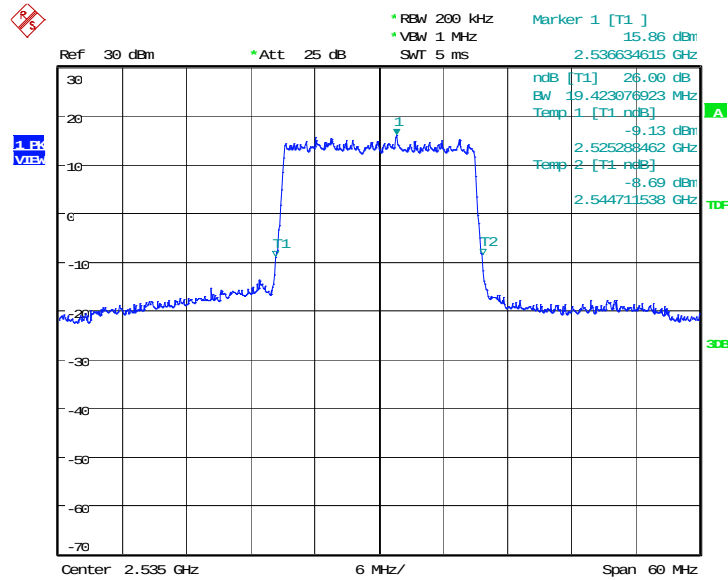


Date: 15.APR.2015 00:31:18

LTE band 7, 20MHz (-26dBc)

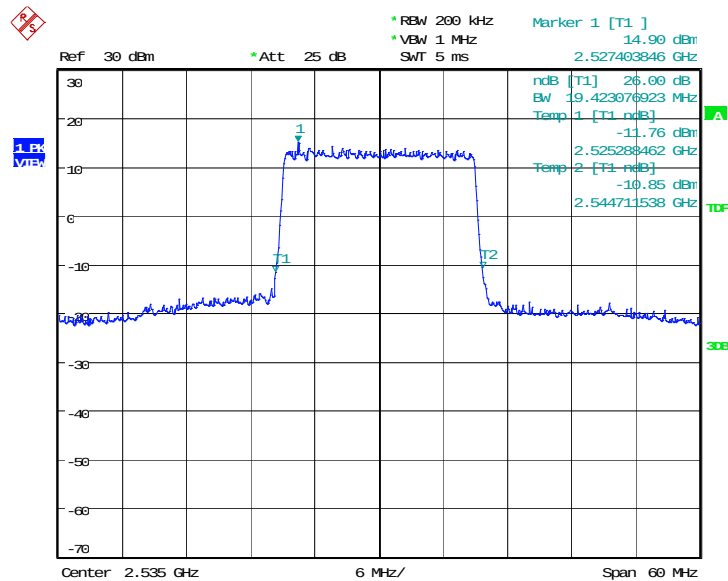
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
2535	19423.08	19423.08

LTE band 7, 20MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 00:36:49

LTE band 7, 20MHz Bandwidth, 16QAM (-26dBc BW)

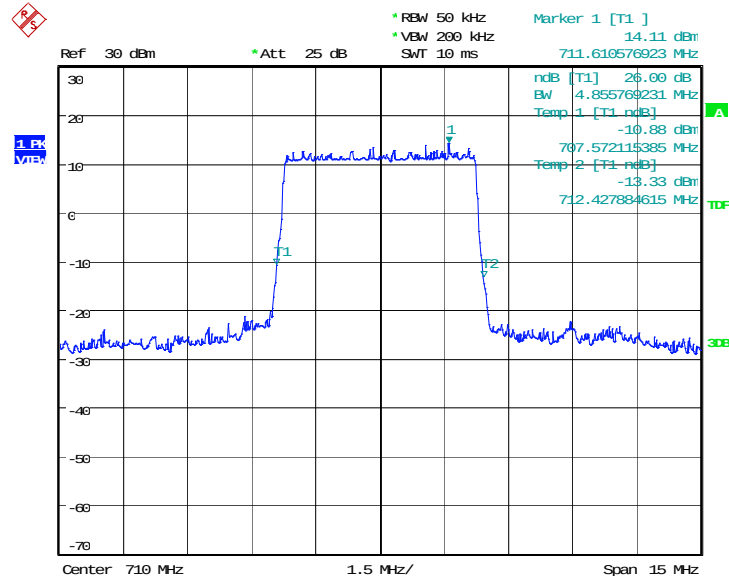


Date: 15.APR.2015 00:37:05

LTE band 17, 5 MHz (-26dBc)

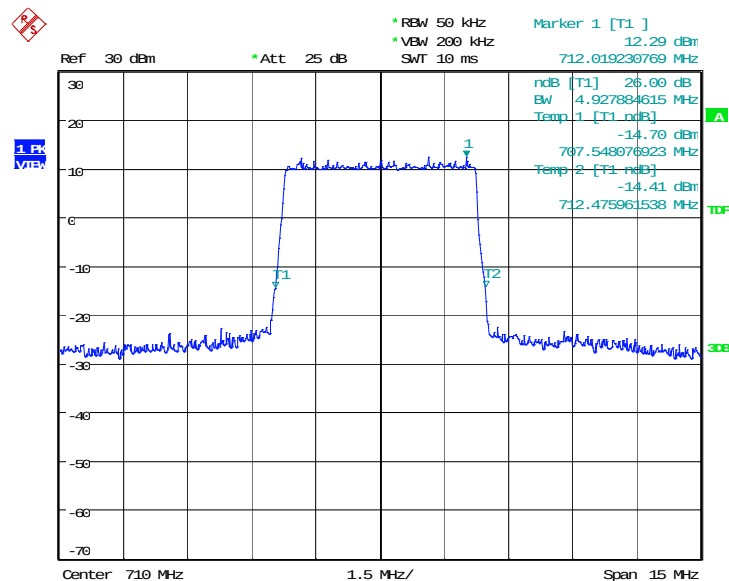
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
710	4855.77	4927.88

LTE band 17, 5 MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 02:42:58

LTE band 17, 5 MHz Bandwidth, 16QAM (-26dBc BW)

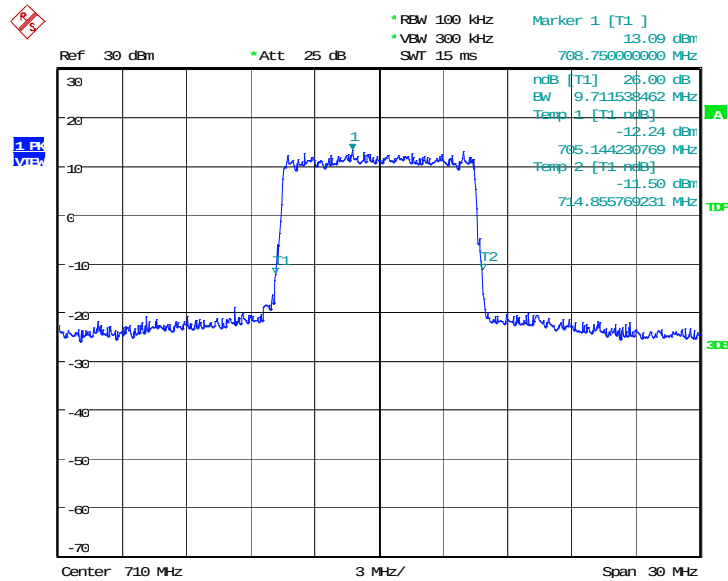


Date: 15.APR.2015 02:43:13

LTE band 17, 10 MHz (-26dBc)

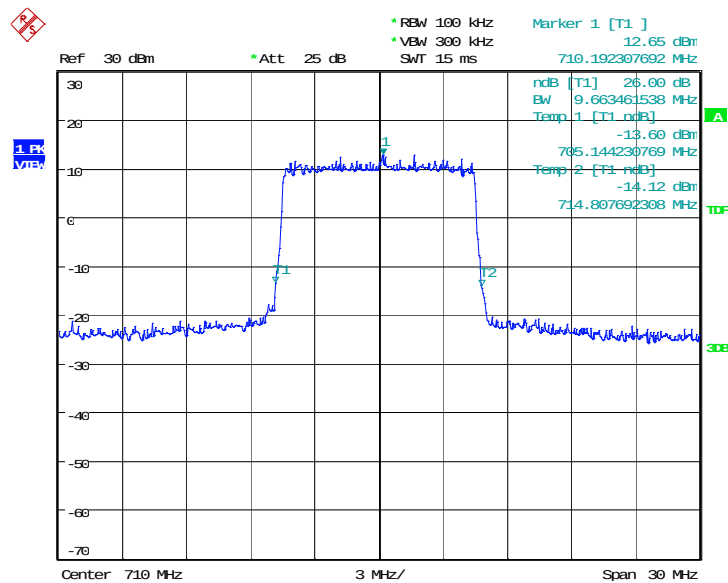
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
710	9711.54	9663.46

LTE band 17, 10 MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 03:42:40

LTE band 17, 10 MHz Bandwidth, 16QAM (-26dBc BW)

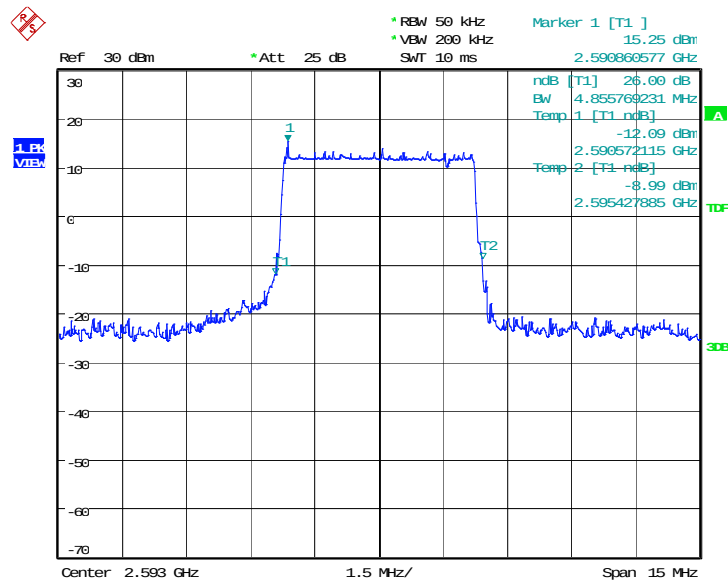


Date: 15.APR.2015 03:42:56

LTE band 41, 5MHz (-26dBc)

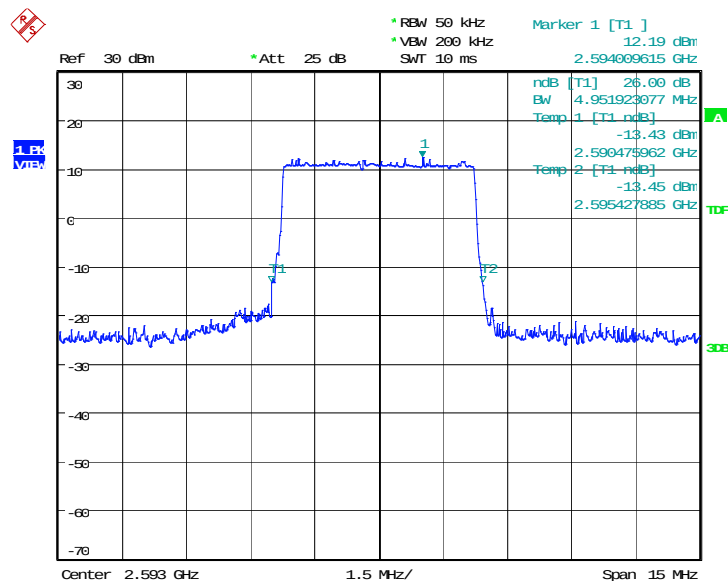
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
2535	4855.77	4951.92

LTE band 41, 5MHz Bandwidth, QPSK (-26dBc BW)



Date: 15. APR. 2015 03:49:53

LTE band 41, 5MHz Bandwidth, 16QAM (-26dBc BW)

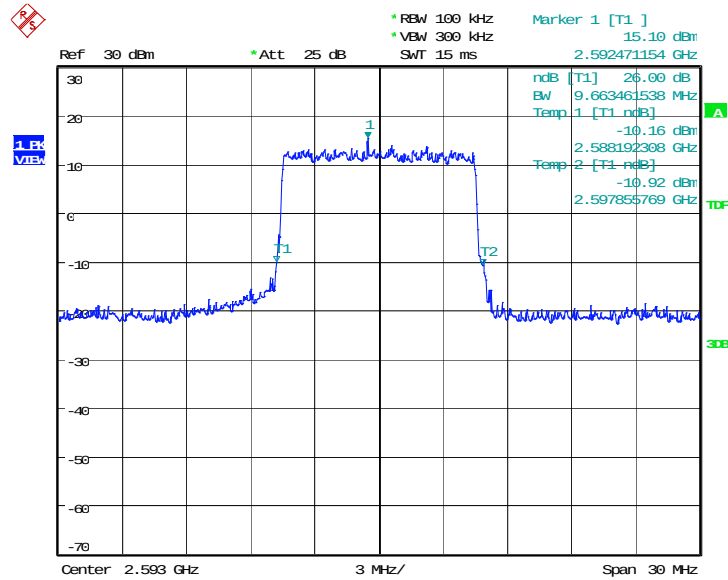


Date: 15. APR. 2015 03:50:09

LTE band 41, 10MHz (-26dBc)

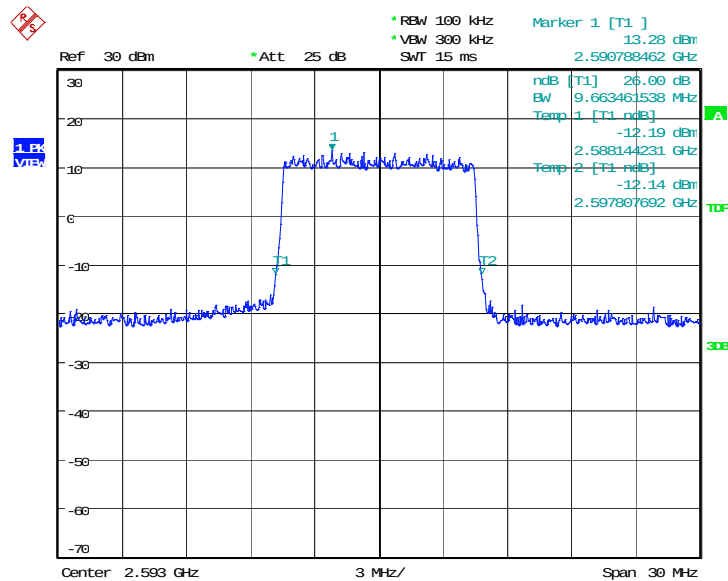
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
2535	9663.46	9663.46

LTE band 41, 10MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 03:55:33

LTE band 7, 10MHz Bandwidth, 16QAM (-26dBc BW)

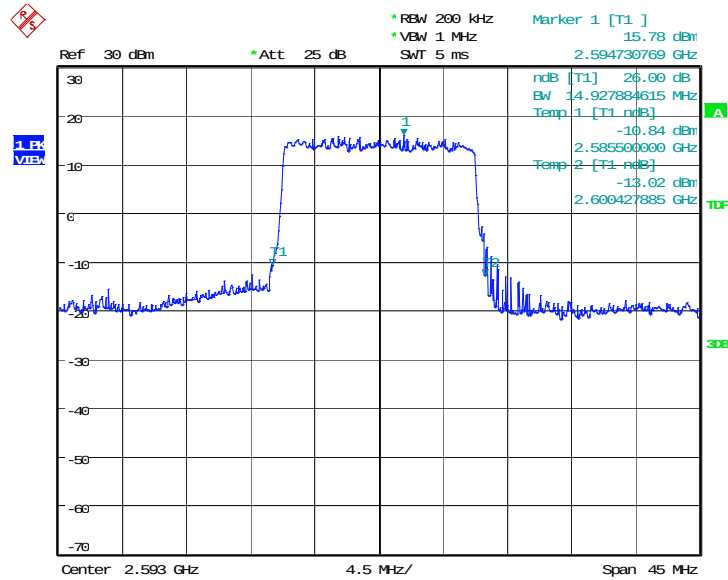


Date: 15.APR.2015 03:55:48

LTE band 41, 15MHz (-26dBc)

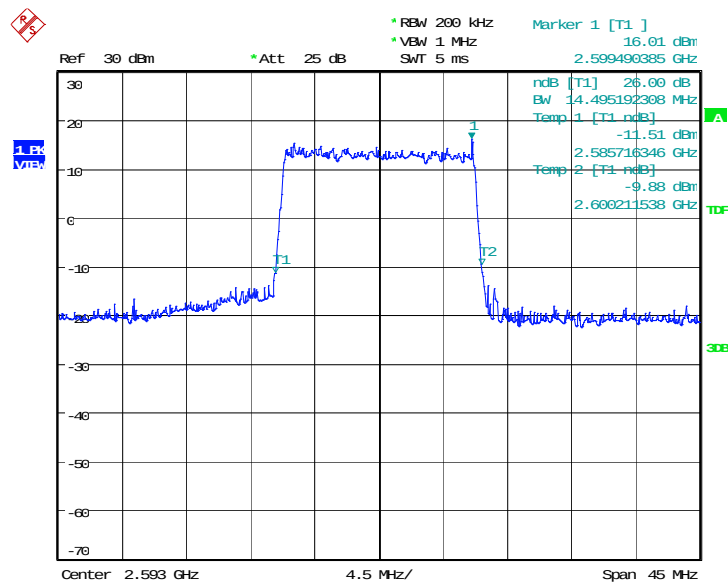
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
2535	14927.88	14495.19

LTE band 41, 15MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 04:06:55

LTE band 7, 15MHz Bandwidth, 16QAM (-26dBc BW)

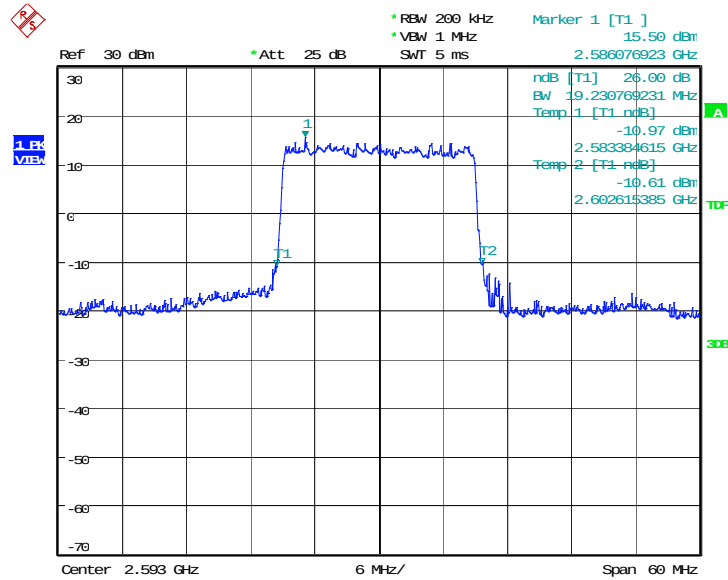


Date: 15.APR.2015 04:07:10

LTE band 41, 20MHz (-26dBc)

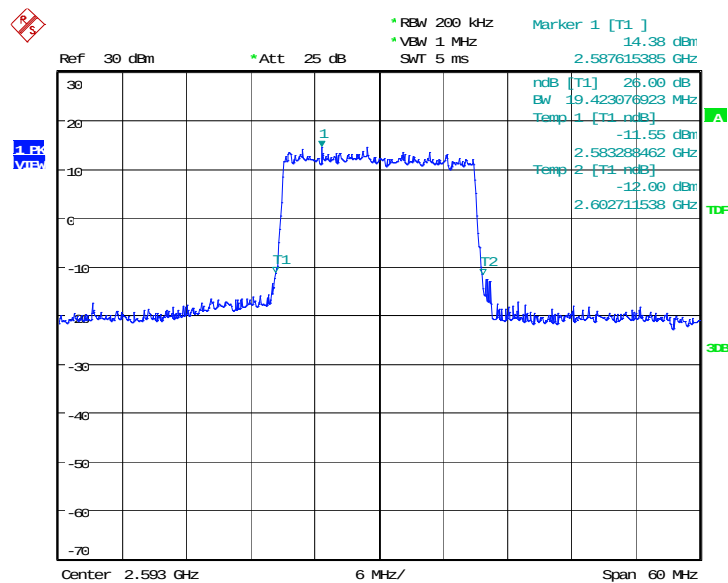
Frequency (MHz)	Occupied Bandwidth (-26dBc)(kHz)	
	QPSK	16QAM
2535	19230.77	19423.08

LTE band 41, 20MHz Bandwidth, QPSK (-26dBc BW)



Date: 15.APR.2015 04:13:11

LTE band 41, 20MHz Bandwidth, 16QAM (-26dBc BW)



Date: 15.APR.2015 04:13:27

A.6 BAND EDGE COMPLIANCE

Reference

FCC: CFR Part 22.917(b), 24.238(a), 27.53(h) , 27.53(m), 27.53(g).

A.6.1 Measurement limit

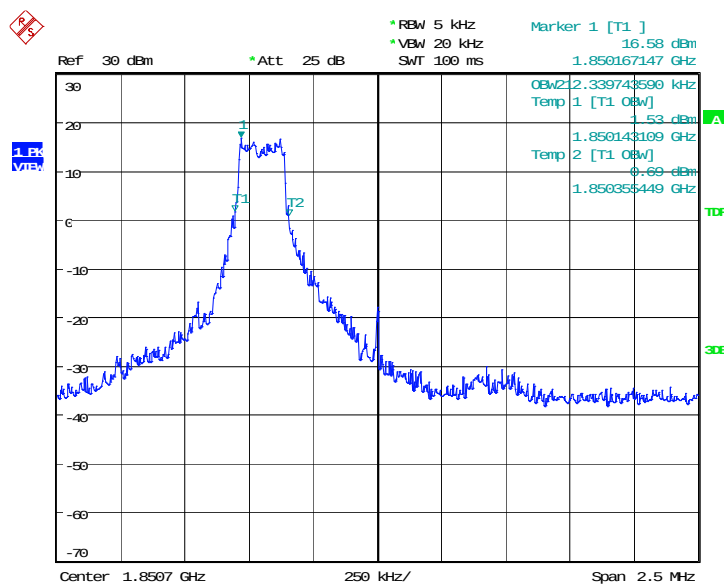
On any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least $43+10\log(P)$ dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm. According to KDB 971168 v02r01 6.0, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

A.6.2 Measurement result

Only worst case result is given below

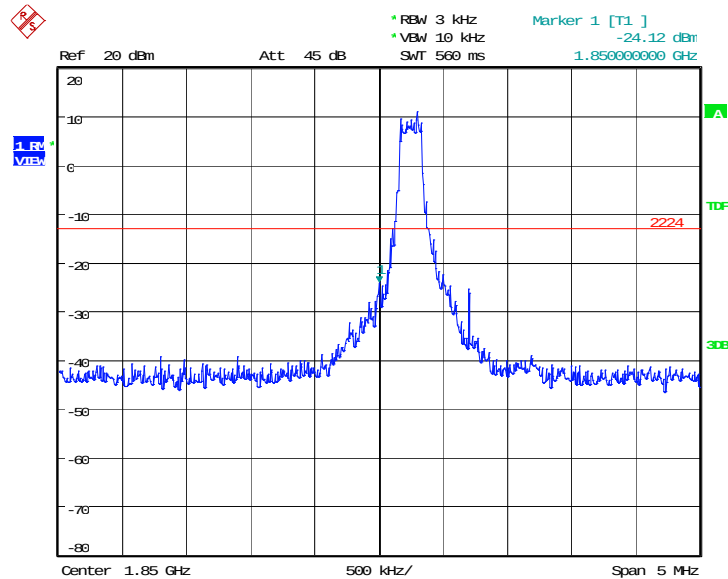
LTE band 2

OBW: 1RB-low_offset



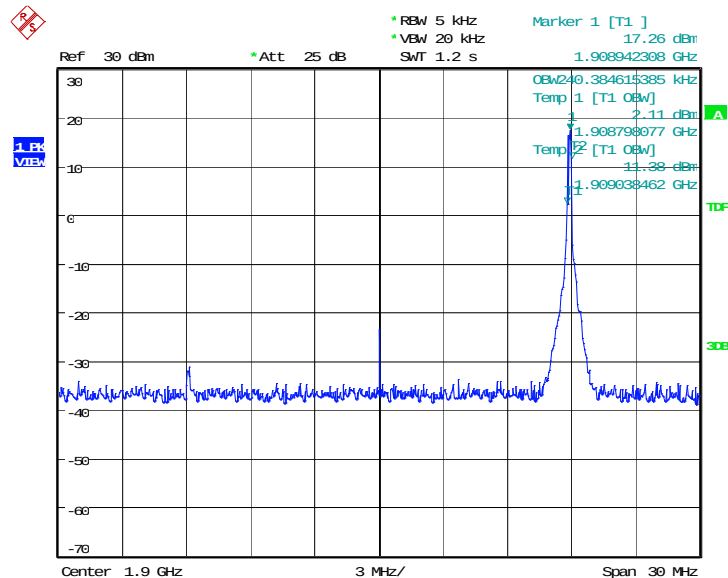
Date: 15.APR.2015 23:06:12

LOW BAND EDGE BLOCK-1RB-low_offset



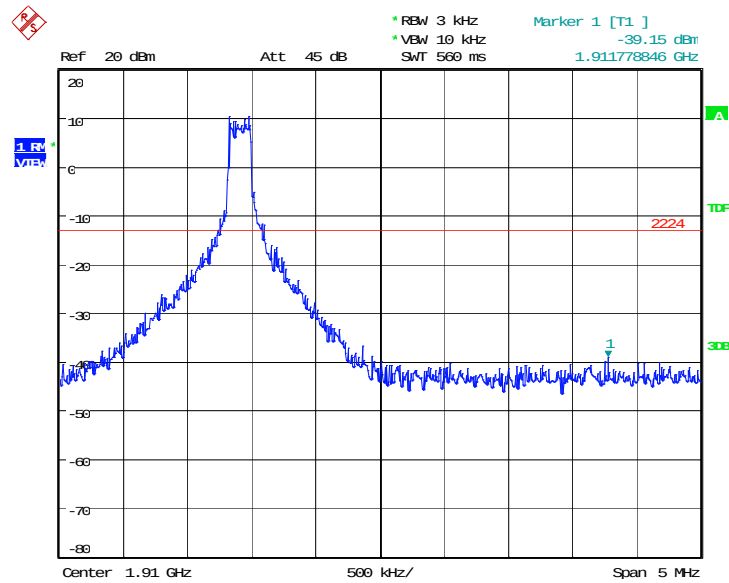
Date: 15.APR.2015 23:06:59

OBW: 1RB-high_offset



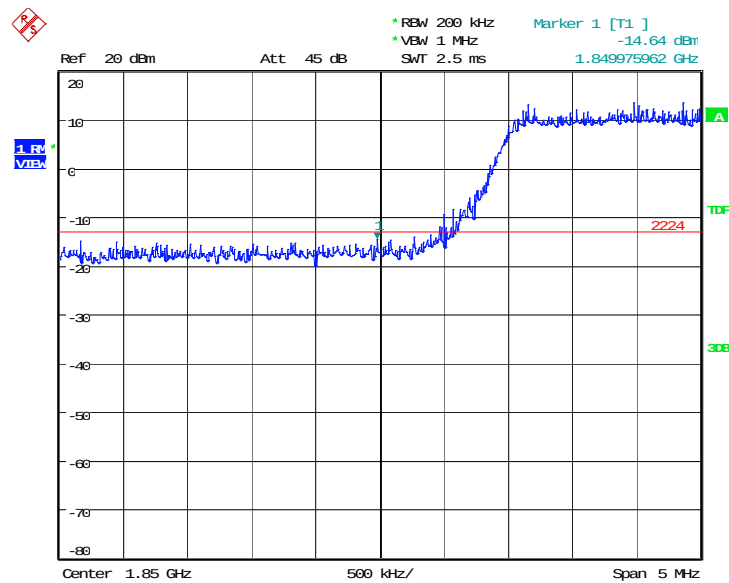
Date: 15.APR.2015 23:10:20

HIGH BAND EDGE BLOCK-1RB-high_offset



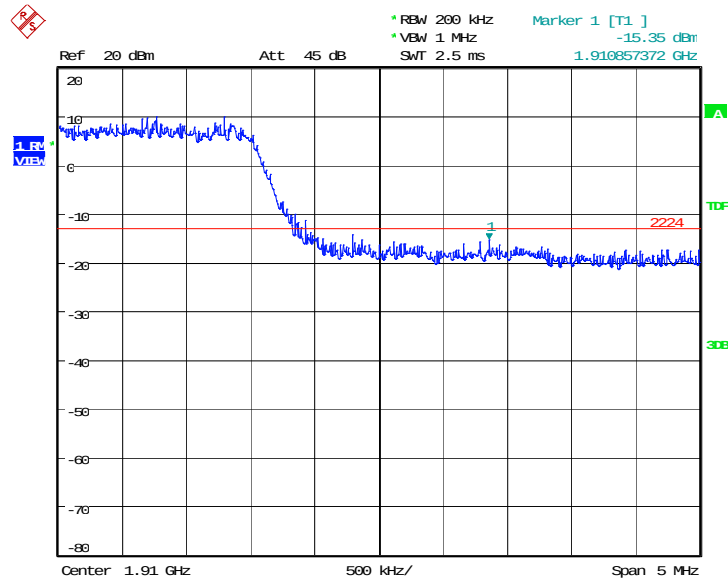
Date: 15.APR.2015 23:11:07

LOW BAND EDGE BLOCK-20MHz-100%RB



Date: 16.APR.2015 14:55:16

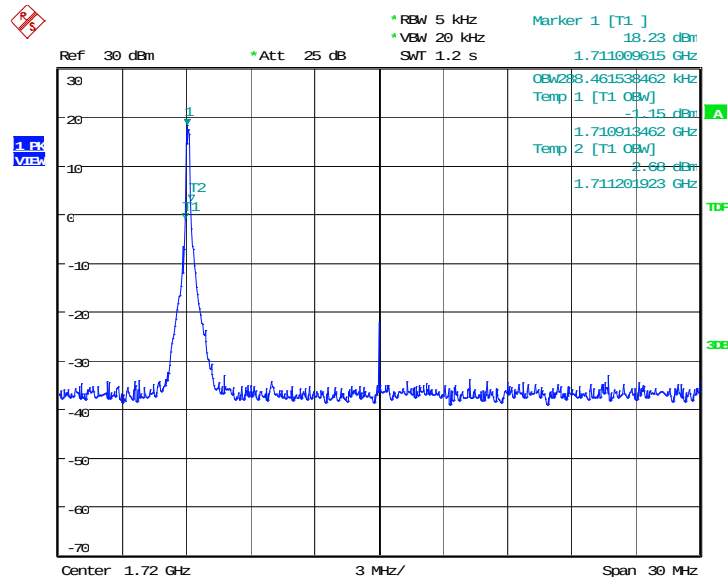
HIGH BAND EDGE BLOCK-20MHz-100%RB



Date: 16.APR.2015 23:19:13

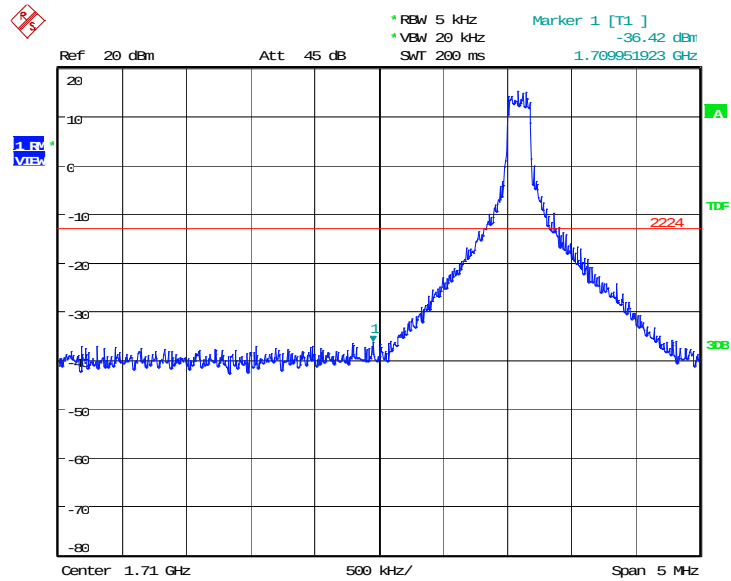
LTE band 4

OBW: 1RB-low_offset



Date: 15.APR.2015 23:17:14

LOW BAND EDGE BLOCK-1RB-low_offset



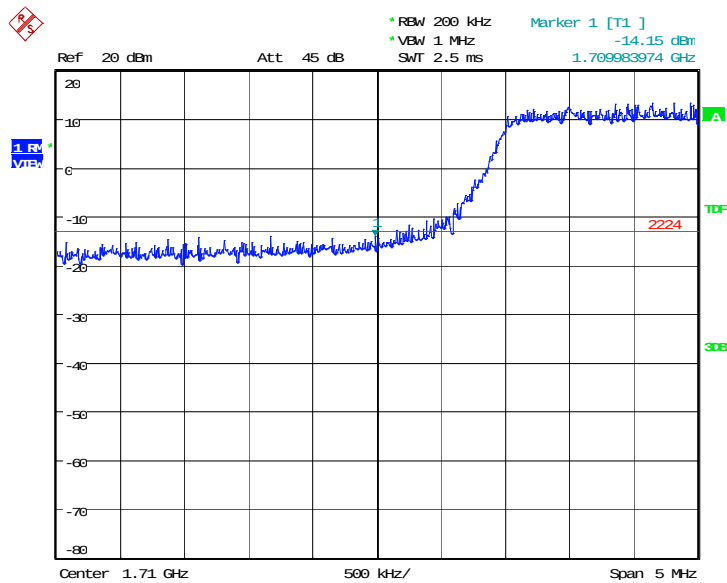
Ref 20 dBm Att 45 dB

RBW 5 kHz VBW 20 kHz SWF 200 ms

Marker 1 [T1] -35.98 dBm 1.755232372 GHz

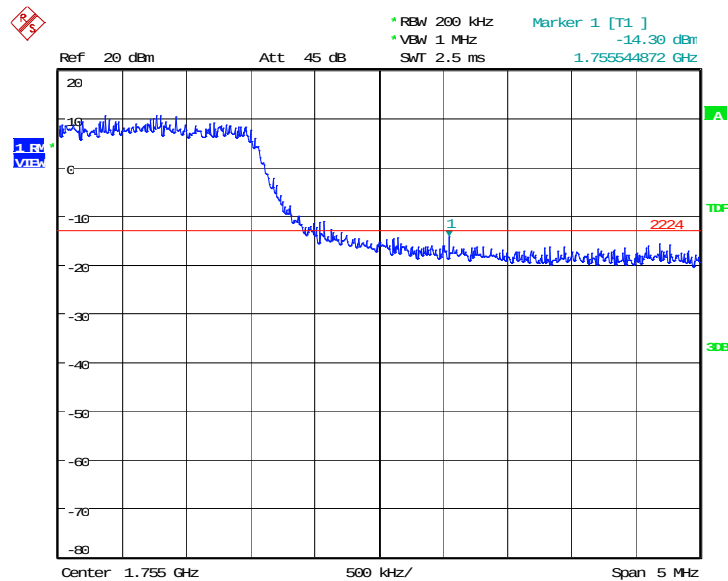
Center 1.755 GHz 500 kHz/ Span 5 MHz

LOW BAND EDGE BLOCK-20MHz-100%RB



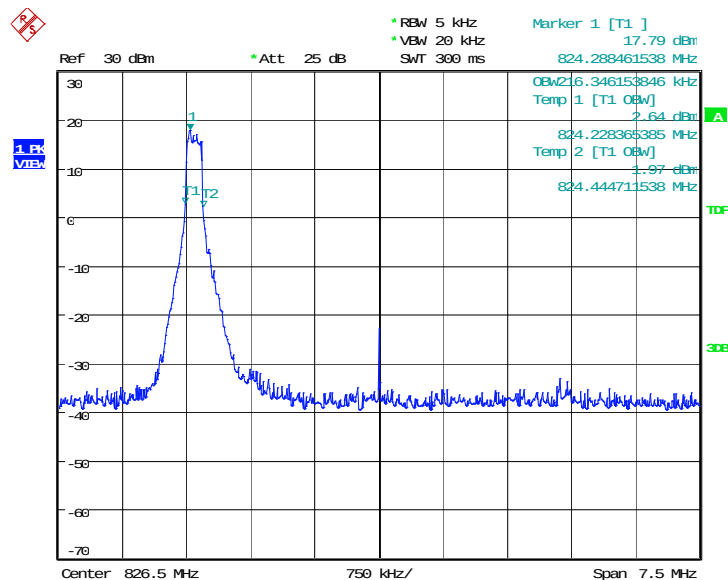
©Copyright. All rights reserved by CTTL.

HIGH BAND EDGE BLOCK-20MHz-100%RB



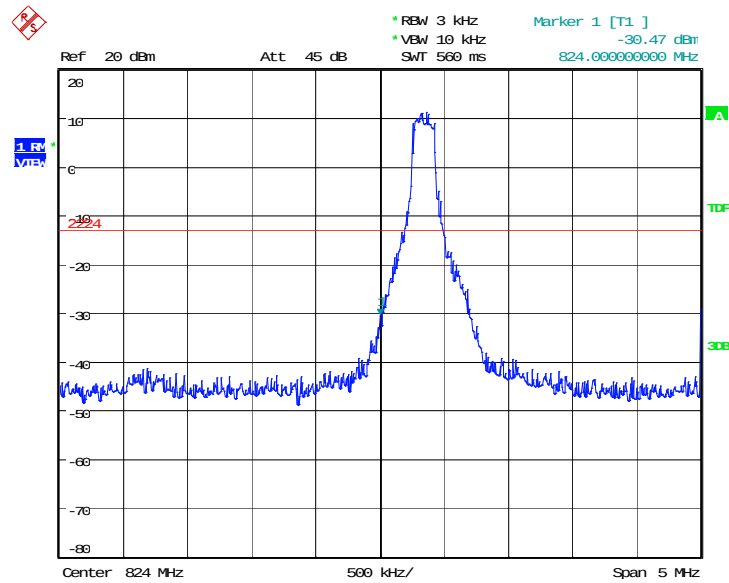
Date: 16.APR.2015 23:20:07

LTE band 5 OBW: 1RB-low_offset



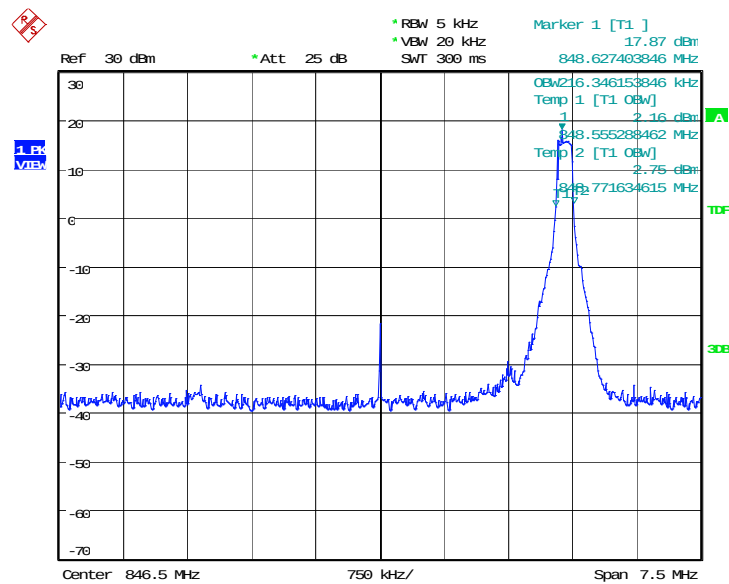
Date: 15.APR.2015 23:23:11

LOW BAND EDGE BLOCK-1RB-low_offset



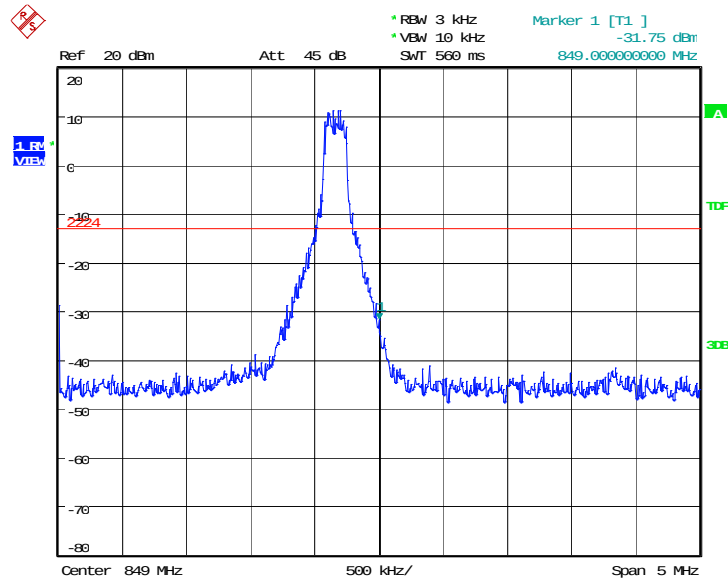
Date: 15.APR.2015 23:23:58

OBW: 1RB-high_offset



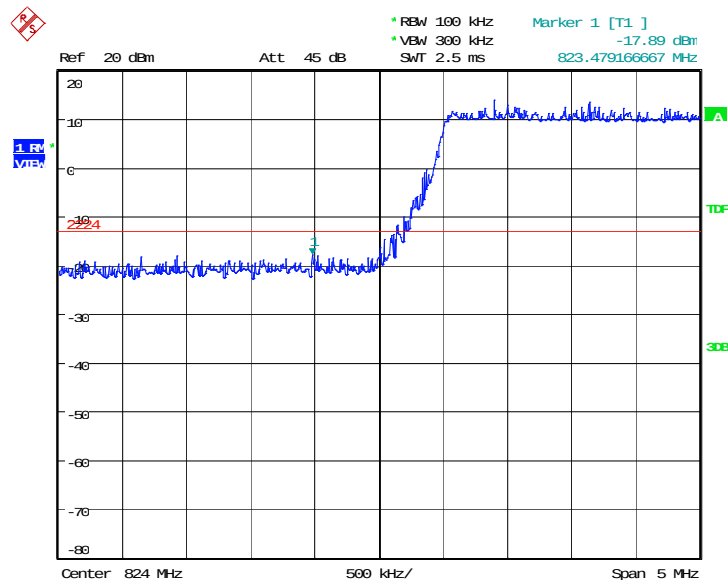
Date: 15.APR.2015 23:20:16

HIGH BAND EDGE BLOCK-1RB-high_offset



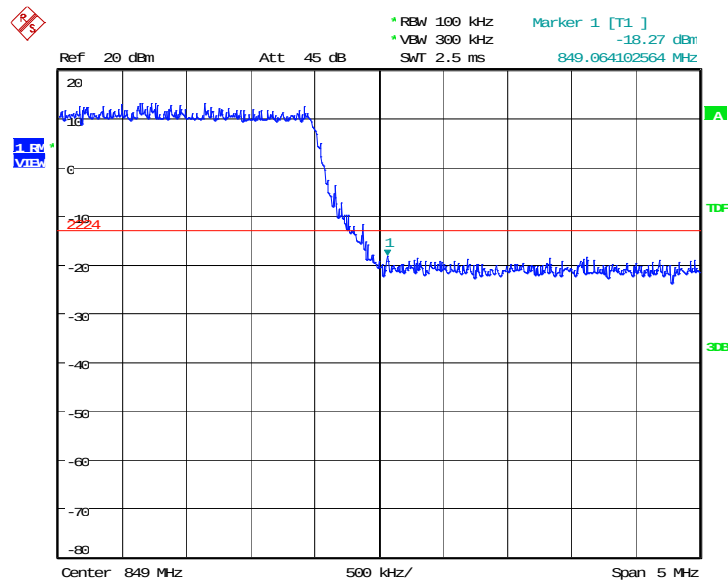
Date: 15.APR.2015 23:21:02

LOW BAND EDGE BLOCK-10MHz-100%RB



Date: 16.APR.2015 15:08:31

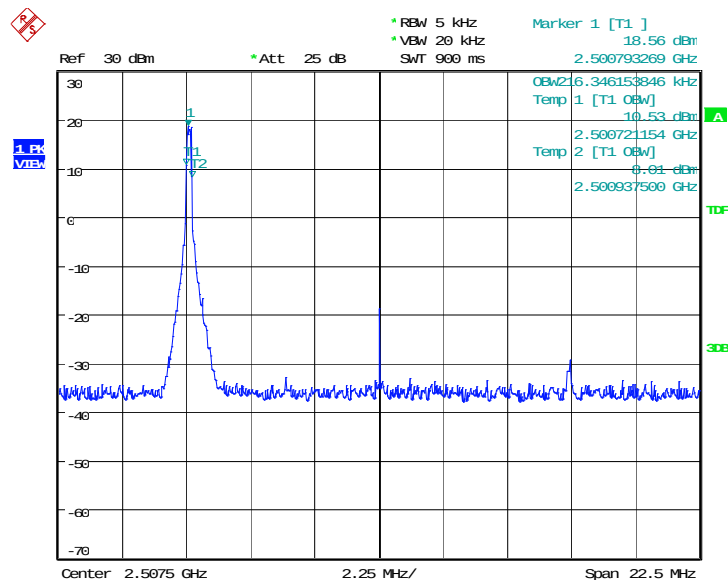
HIGH BAND EDGE BLOCK-10MHz-100%RB



Date: 16.APR.2015 15:09:19

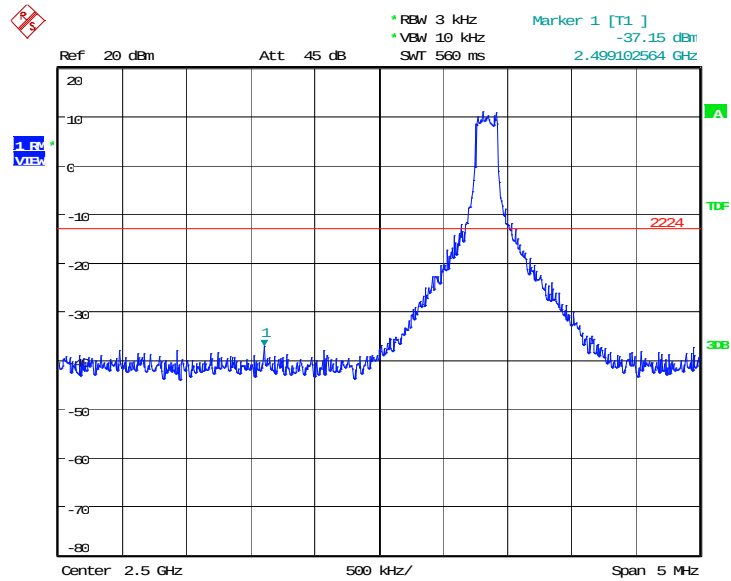
LTE band 7

OBW: 1RB-low_offset



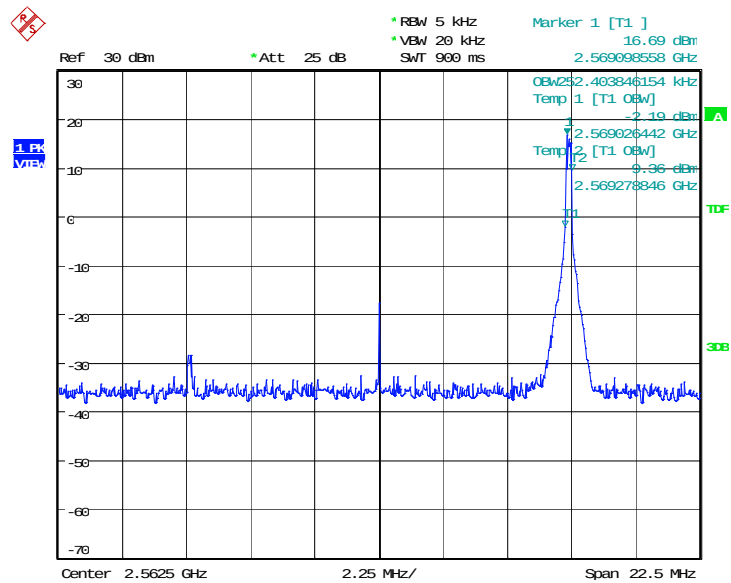
Date: 15.APR.2015 23:28:26

LOW BAND EDGE BLOCK-1RB-low_offset



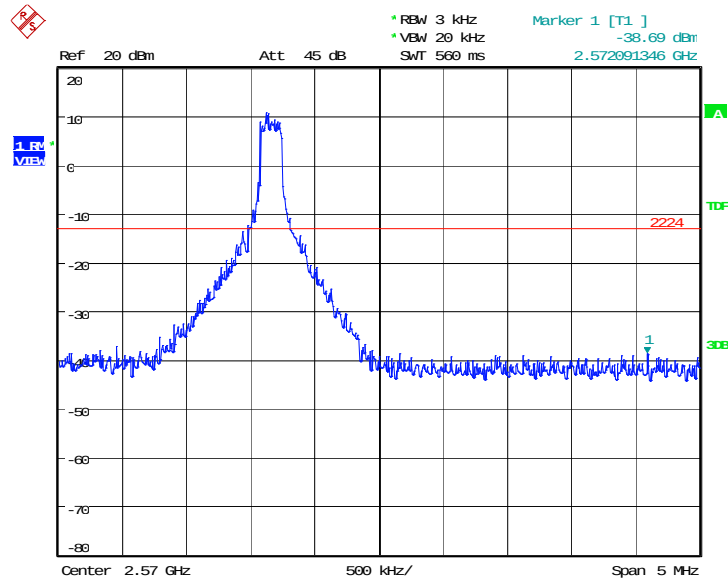
Date: 15.APR.2015 23:29:13

OBW: 1RB-high_offset



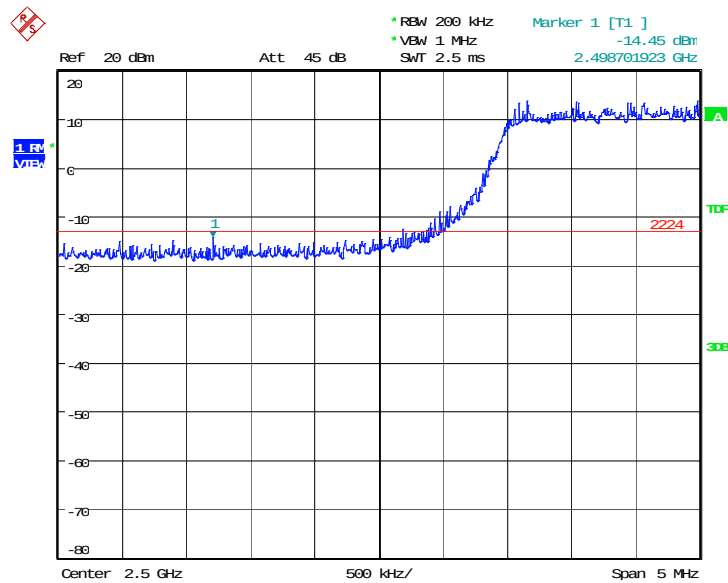
Date: 15.APR.2015 23:25:47

HIGH BAND EDGE BLOCK-1RB-high_offset



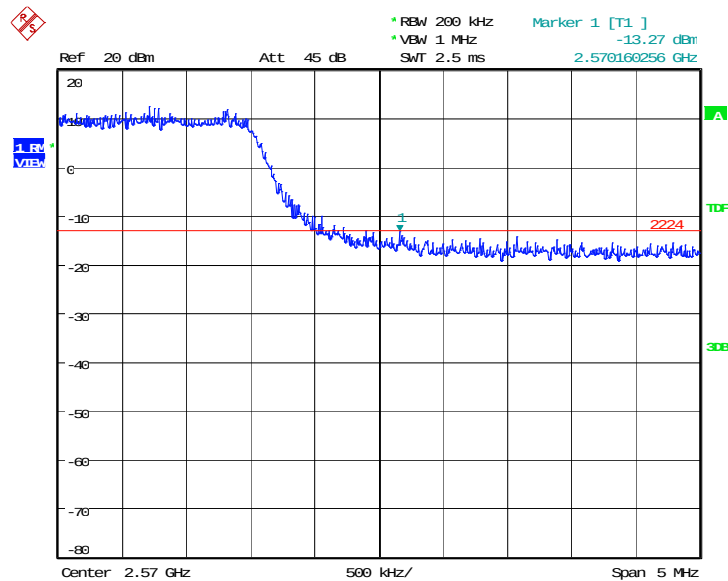
Date: 15.APR.2015 23:26:33

LOW BAND EDGE BLOCK-20MHz-100%RB



Date: 16.APR.2015 14:53:36

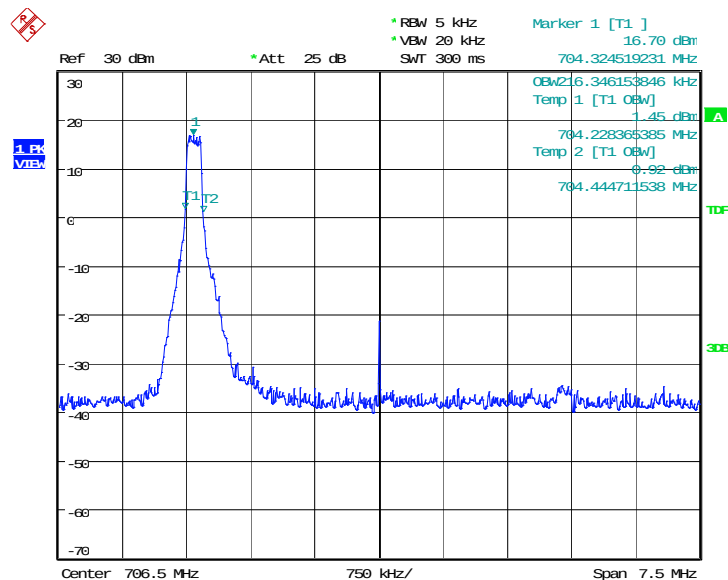
HIGH BAND EDGE BLOCK-20MHz-100%RB



Date: 16.APR.2015 14:54:26

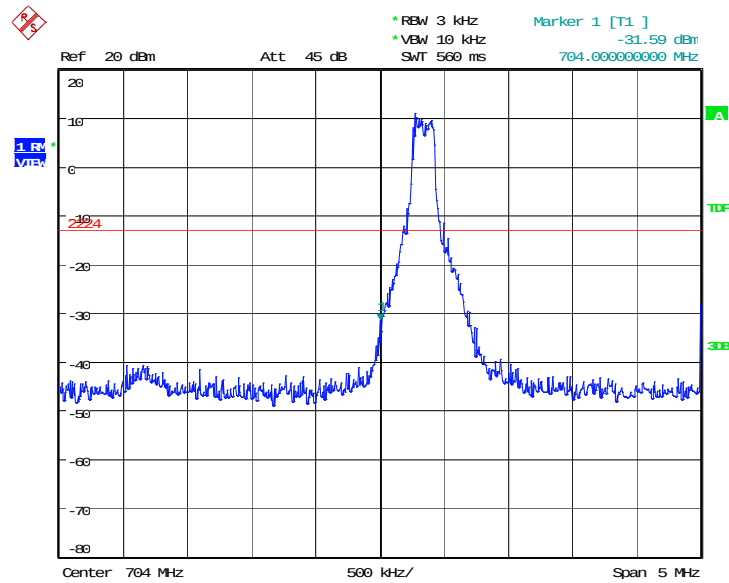
LTE band 17

OBW: 1RB-low_offset



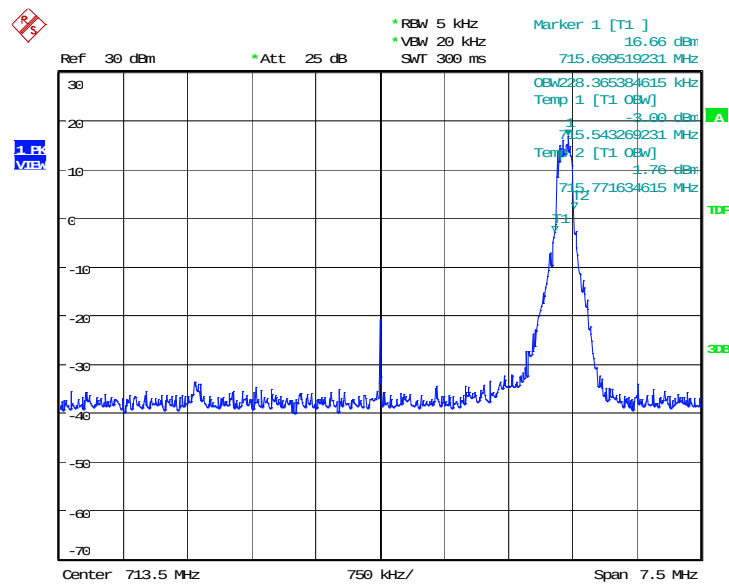
Date: 15.APR.2015 23:34:17

LOW BAND EDGE BLOCK-1RB-low_offset



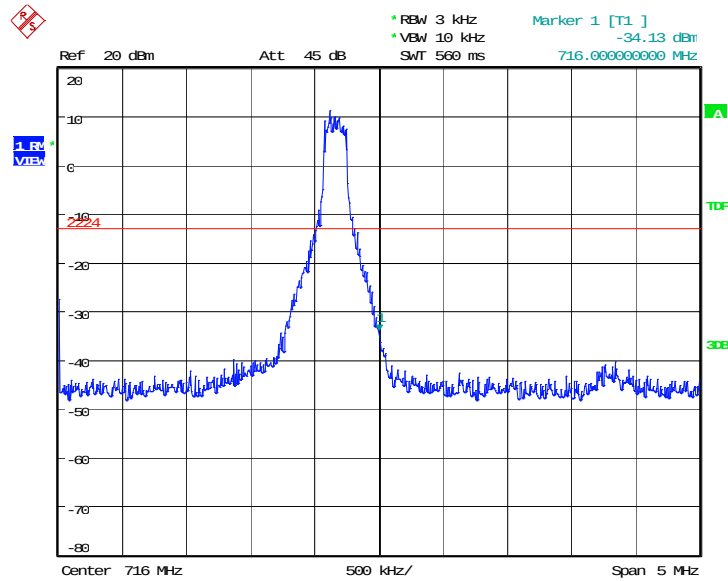
Date: 15.APR.2015 23:35:03

OBW: 1RB-high_offset



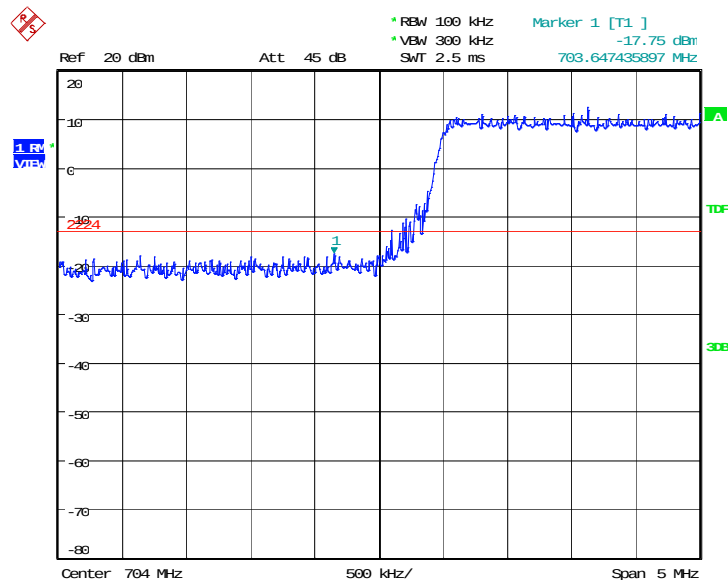
Date: 15.APR.2015 23:31:28

HIGH BAND EDGE BLOCK-1RB-high_offset



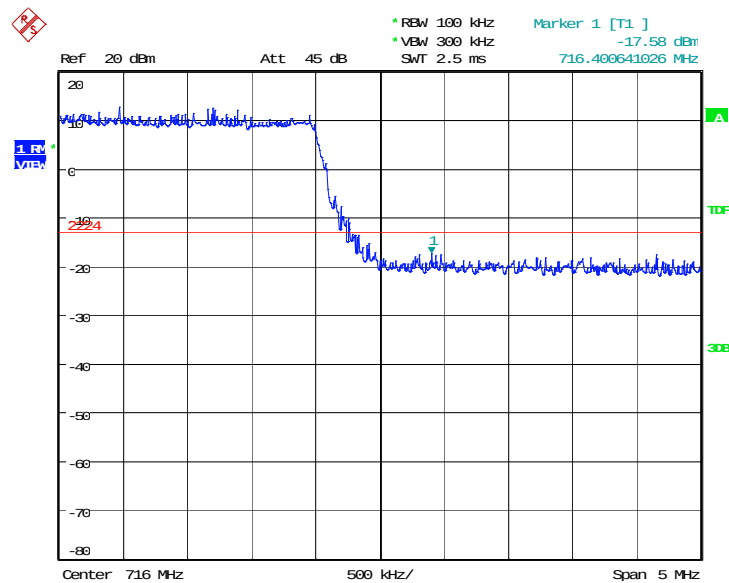
Date: 15.APR.2015 23:32:14

LOW BAND EDGE BLOCK-10MHz-100%RB



Date: 16.APR.2015 21:10:42

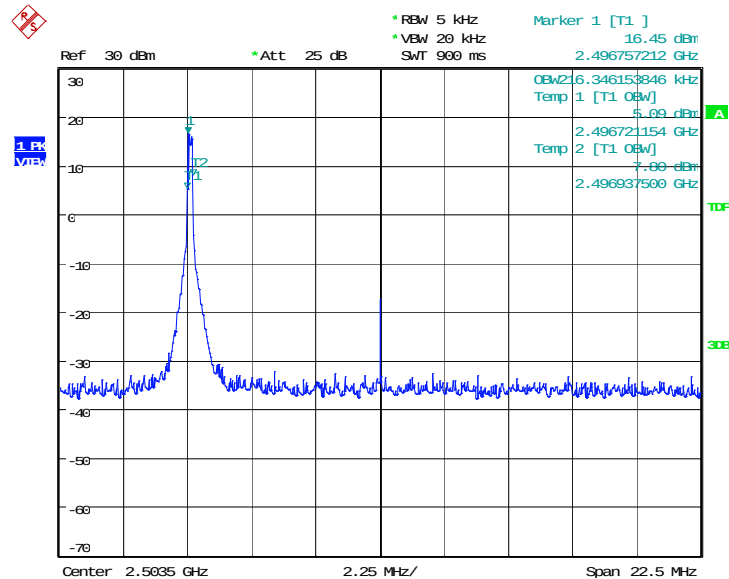
HIGH BAND EDGE BLOCK-10MHz-100%RB



Date: 16.APR.2015 21:11:30

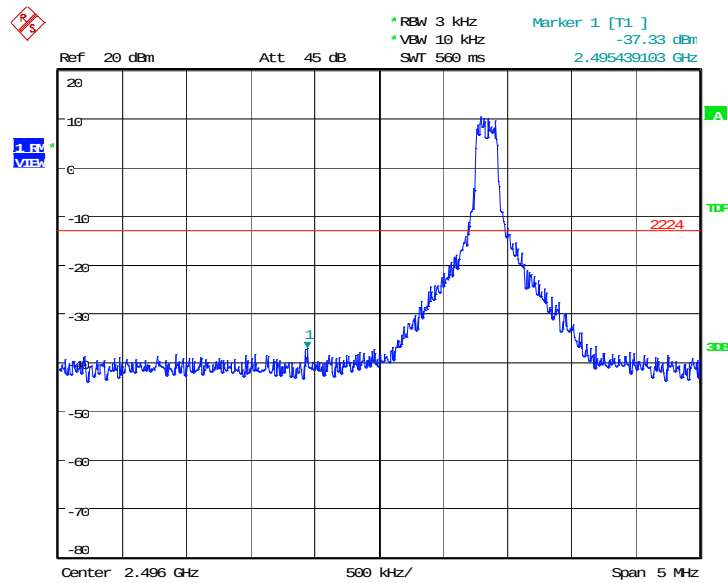
LTE band 41

OBW: 1RB-low_offset



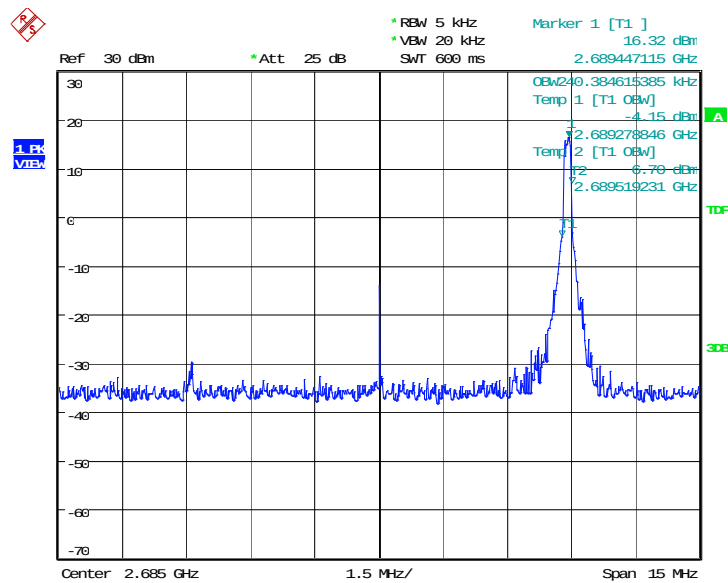
Date: 15.APR.2015 23:41:25

LOW BAND EDGE BLOCK-1RB-low_offset



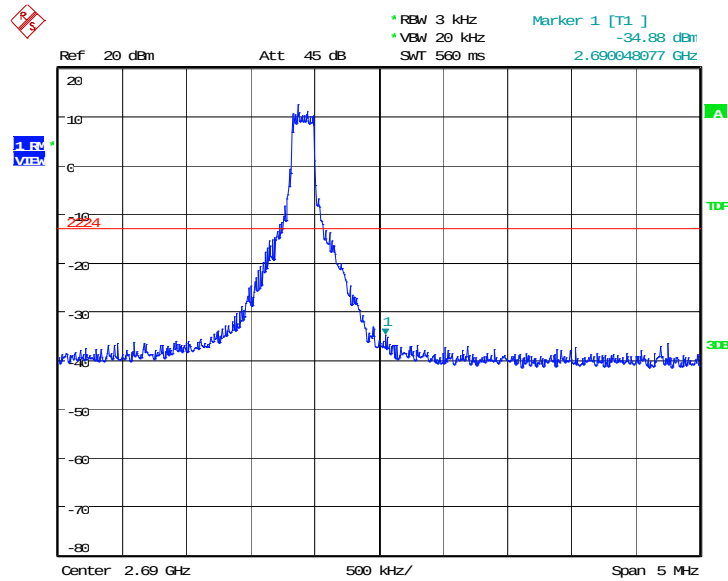
Date: 15.APR.2015 23:42:12

OBW: 1RB-high_offset



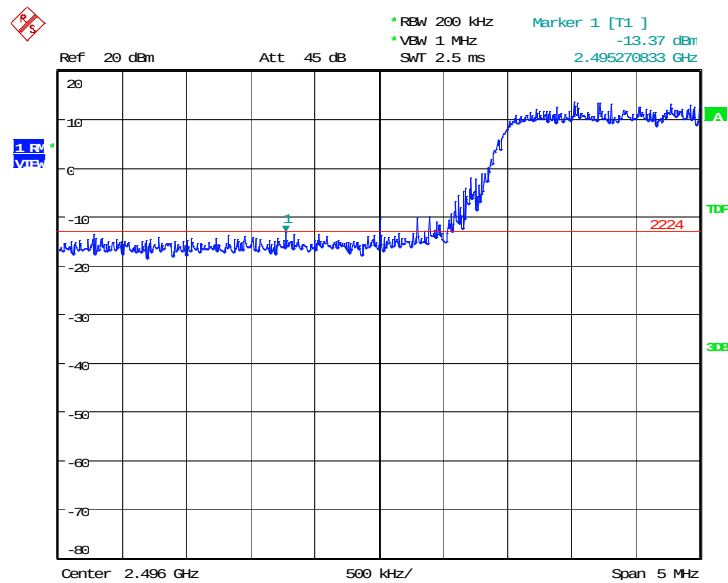
Date: 15.APR.2015 23:37:30

HIGH BAND EDGE BLOCK-1RB-high_offset



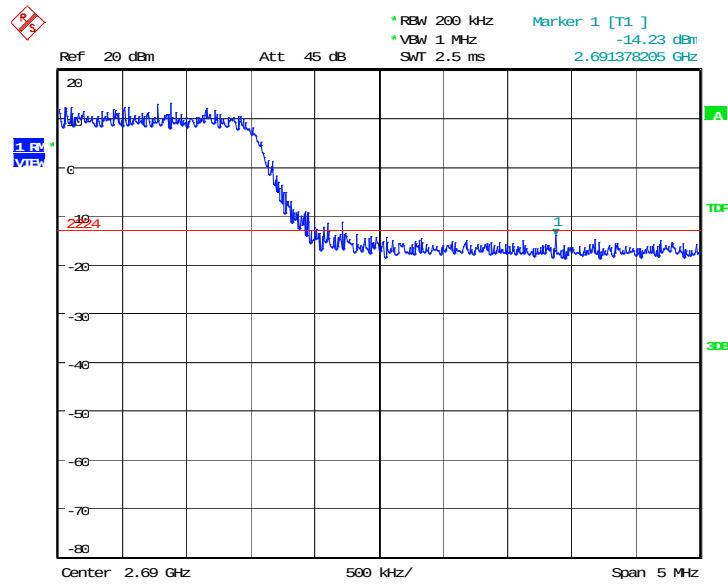
Date: 16.APR.2015 23:52:04

LOW BAND EDGE BLOCK-20MHz-100%RB



Date: 16.APR.2015 21:13:35

HIGH BAND EDGE BLOCK-20MHz-100%RB



Date: 16.APR.2015 15:00:27

A.7 CONDUCTED SPURIOUS EMISSION

Reference

FCC: CFR Part 22.917, 24.238(a), 27.53(h) , 27.53(m), 27.53(g).

A.7.1 Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 9 GHz, data taken from 10 MHz to 25 GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

A.7.2 Measurement Limit

Part 22.917, Part 24.238 and Part 27.53 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.

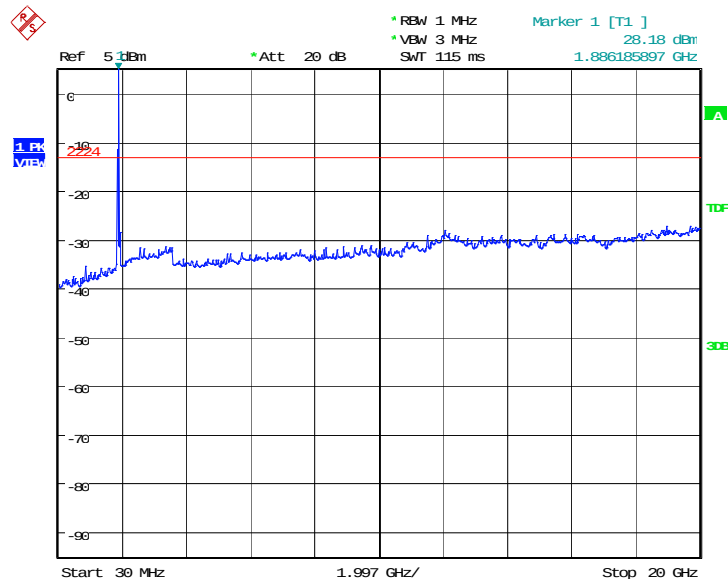
The specification that emissions shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 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.

A.7.3 Measurement result

Only worst case result is given below

LTE band 2: 30MHz – 20GHz

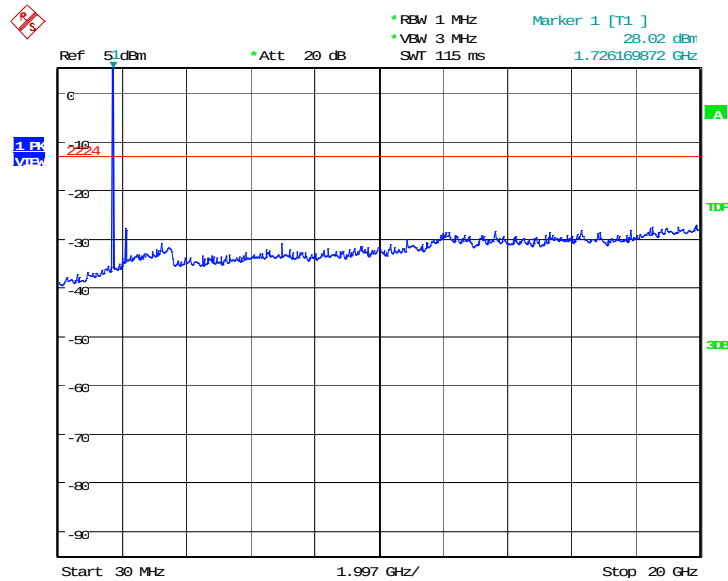
Spurious emission limit –13dBm.



Date: 16.APR.2015 21:20:12

LTE band 4: 30MHz – 20GHz

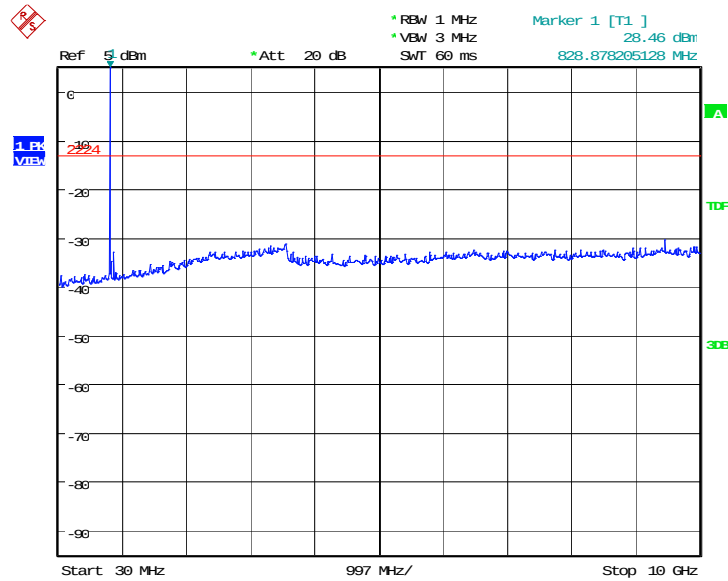
Spurious emission limit –13dBm.



Date: 16.APR.2015 21:24:19

LTE band 5: 30MHz – 10GHz

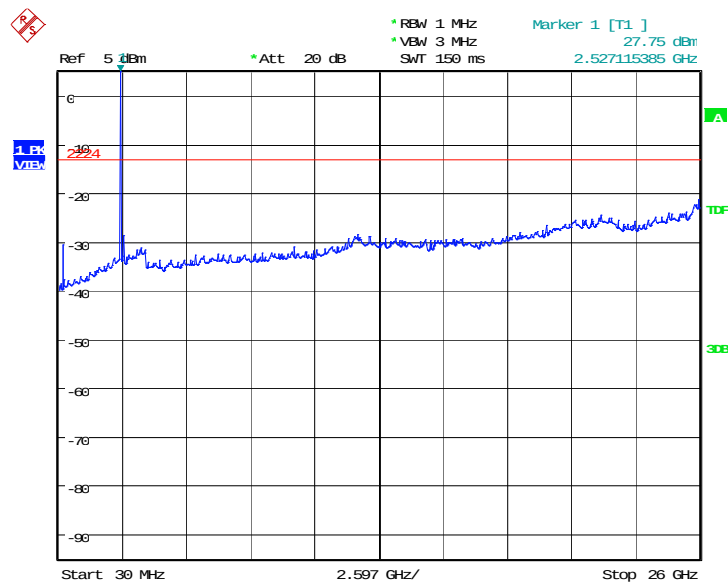
Spurious emission limit –13dBm.



Date: 16.APR.2015 21:26:46

LTE band 7: 30MHz – 26GHz

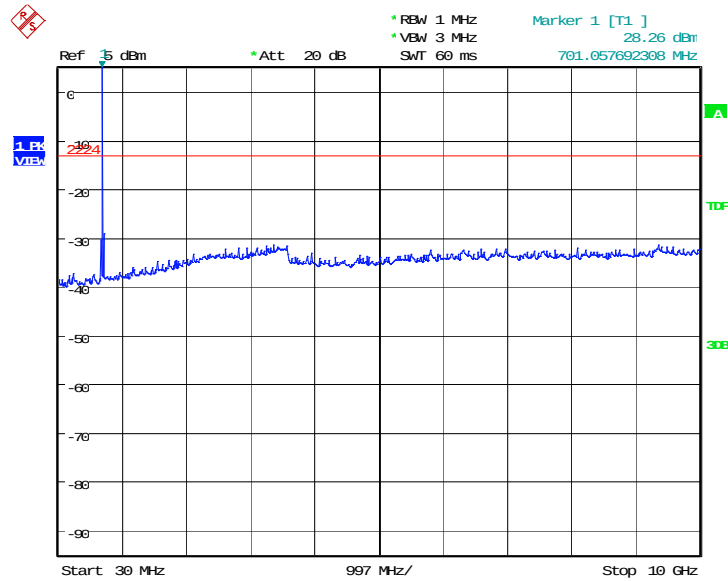
Spurious emission limit –13dBm.



Date: 16.APR.2015 21:28:38

LTE band 17: 30MHz – 10GHz

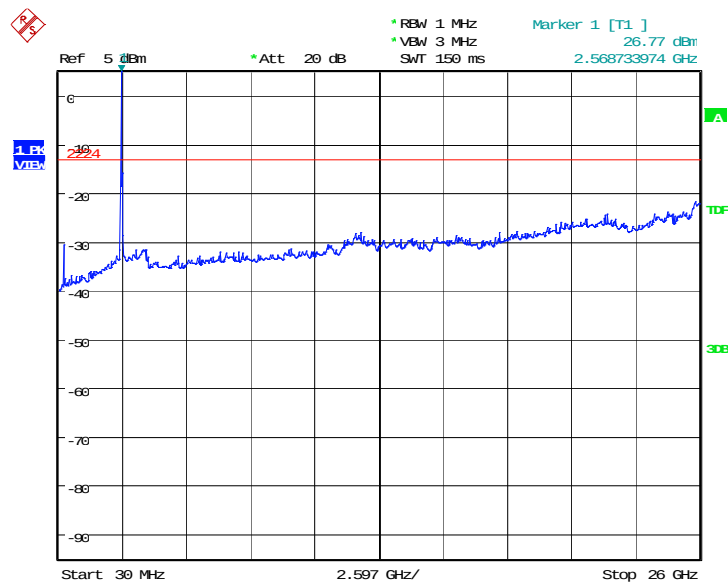
Spurious emission limit –13dBm.



Date: 16.APR.2015 21:31:39

LTE band 41: 30MHz – 26GHz

Spurious emission limit –13dBm.



Date: 16.APR.2015 21:33:57

END OF REPORT