



TEST REPORT

No. 2013TAR916

for

TCT Mobile Limited

**HSDPA/HSUPA/HSPA+/UMTS Quad bands / GSM quad bands/LTE 5
bands mobile phone**

Model Name: Miata LATAM

Marketing Name: 6036A

FCC ID: RAD449

with

Hardware Version: PIO

Software Version: v4E18

Issued Date: 2014-04-02

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 TMC Beijing.

Test Laboratory:

FCC 2.948 Listed: No.733176

IC O.A.T.S listed: No.6629A-1

TMC Beijing, Telecommunication Metrology Center of Ministry of Industry and Information Technology

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

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1. Test Laboratory

1.1. Testing Location

Location A

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: No 52, Huayuan Bei Road, Haidian District, Beijing, P.R. China
Postal Code: 100191

Location B

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: Building Shouxian, No.51, Xueyuan Road, Haidian District, Beijing, China
Postal Code: 100191

1.2. Testing Environment

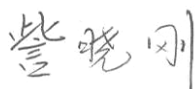
Normal Temperature: 15-35℃
Relative Humidity: 20-75%
Air pressure 980 - 1040 hPa

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

Testing Start Date: 2014-02-25
Testing End Date: 2013-03-16

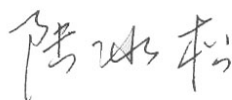
1.4. Signature



Zi Xiaogang
(Prepared this test report)



Sun Xiangqian
(Reviewed this test report)



Lu Bingsong
Deputy Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: TCT Mobile Limited
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China.
City: Shanghai
Postal Code: 201203
Country: China
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2.2. Manufacturer Information

Company Name: TCT Mobile Limited
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China.
City: Shanghai
Postal Code: 201203
Country: China
Telephone: 0086-21-61460890
Fax: 0086-21-61460602

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

3.1. About EUT

Description	HSDPA/HSUPA/HSPA+/UMTS Quad bands / GSM quad bands/LTE 5 bands mobile phone
Model Name	Miata LATAM
Marketing Name	6036A
FCC ID	RAD449
Antenna	Integrated
Output power	24.43dBm maximum EIRP measured for LTE Band 4
Extreme vol. Limits	3.5VDC to 4.2VDC (nominal: 3.9VDC)
Extreme temp. Tolerance	-30°C to +50°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*	IMEI	HW Version	SW Version
R06a	014010000000250	PIO	v4E18
N33	014010000053234	PIO	v4E18

*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	Remarks
AE1	Battery	/	/
AE2	Battery	/	/
AE3	Travel charger	/	TCT-CHR-0136
AE4	Travel charger	/	TCT-CHR-1557
AE5	USB cable	/	TCT-DC-0493
AE6	USB cable	/	TCT-DC-0331

AE1

Model	CAB2000013C2
Manufacturer	BYD
Capacitance	2000 mAh
Nominal voltage	3.8V

AE2

Model	CAB2000010C1
Manufacturer	SCUD
Capacitance	2000 mAh
Nominal voltage	3.8V

AE3

Model	CBA3000AG0C1
Manufacturer	TEN PAO
Length of cable	/

AE4

Model	CBA3000AG0C2
Manufacturer	BYD
Length of cable	/

AE5

Model	CDA3122002C1
Manufacturer	/
Length of cable	98cm

AE6

Model	CDA3122002C2
Manufacturer	/
Length of cable	98cm

*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 HSDPA/HSUPA/HSPA+/UMTS Quad bands / GSM quad bands/LTE 5 bands mobile phone with integrated antenna. Manual and specifications of the EUT were provided to fulfil the test.

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 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
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2009
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	A/B/C/D	The test is performed in test location A, B, C or D 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	B
2	Emission Limit	24.238(a), 2.1051	A.2	P	B
3	Conducted Emission	15.107/207	A.3	P	A
4	Frequency Stability	24.235, 2.1055	A.4	P	B
5	Occupied Bandwidth	2.1049(h)(i)	A.5	P	B
6	Emission Bandwidth	24.238(a)	A.6	P	B
7	Band Edge Compliance	24.238(a)	A.7	P	B
8	Conducted Spurious Emission	24.238, 2.1057	A.8	P	B

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	B
2	Emission Limit	27.53(h), 2.1051	A.2	P	B
3	Conducted Emission	15.107/15.207	A.3	P	A
4	Frequency Stability	27.54, 2.1055	A.4	P	B
5	Occupied Bandwidth	2.1049(h)(i)	A.5	P	B
6	Emission Bandwidth	27.53(h)	A.6	P	B
7	Band Edge Compliance	27.53(h)	A.7	P	B
8	Conducted Spurious Emission	27.53(h), 2.1057	A.8	P	B

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	B
2	Emission Limit	27.53(m), 2.1051	A.2	P	B
3	Conducted Emission	15.107/15.207	A.3	P	A
4	Frequency Stability	27.54, 2.1055	A.4	P	B
5	Occupied Bandwidth	2.1049(h)(i)	A.5	P	B
6	Emission Bandwidth	27.53(m)	A.6	P	B
7	Band Edge Compliance	27.53(m)	A.7	P	B
8	Conducted Spurious Emission	27.53(m), 2.1057	A.8	P	B

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	B
2	Emission Limit	27.53(g), 2.1051	A.2	P	B
3	Conducted Emission	15.107/15.207	A.3	P	A
4	Frequency Stability	27.54, 2.1055	A.4	P	B
5	Occupied Bandwidth	2.1049(h)(i)	A.5	P	B
6	Emission Bandwidth	27.53(g)	A.6	P	B
7	Band Edge Compliance	27.53(g)	A.7	P	B
8	Conducted Spurious Emission	27.53(g), 2.1057	A.8	P	B

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.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
1	Test Receiver	ESCI	100344	R&S	2014-03-28
2	Test Receiver	ESU26	100376	R&S	2014-11-05
3	EMI Antenna	VULB 9163	514	Schwarzbeck	2014-11-10
4	EMI Antenna	3117	00139065	ETS-Lindgren	2014-07-31
5	LISN	ESH2-Z5	829991/012	R&S	2014-04-14
6	Universal Radio Communication Tester	CMU200	102228	R&S	2014-06-23
7	Universal Radio Communication Tester	E5515C	MY48361083	Agilent	2015-02-27
8	Spectrum Analyzer	E4440A	MY48250642	Agilent	2015-02-27
9	EMI Antenna	9117	177	Schwarzbeck	2014-06-29
10	EMI Antenna	VULB 9163	9163 175	Schwarzbeck	2014-07-13
11	EMI Antenna	3117	00119021	ETS-Lindgren	2014-04-19
12	Signal Generator	N5183A	MY49060052	Agilent	2015-03-02
13	Climate chamber	SH-241	92003546	ESPEC	2014-05-11
14	Loop Antenna	HFH2-Z2	829324/007	R&S	2014-12-12

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

Reference

FCC: 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 and ERP/EIRP measurements for the EUT.

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

A.1.2 Conducted

A.1.2.1 Method of Measurements

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

The power was measured with Rhode & Schwarz Digital Radio Communication tester CMW500

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	23.50	22.65
		1880.0	23.68	22.74
		1909.3	23.62	22.76
	1 RB low	1850.7	23.49	22.62
		1880.0	23.60	22.71
		1909.3	23.66	22.75
	50% RB mid	1850.7	23.51	22.39
		1880.0	23.61	22.49
		1909.3	23.70	22.48
	100% RB	1850.7	22.51	21.65
		1880.0	22.58	21.62
		1909.3	22.56	21.65

(continued)

3MHz	1 RB high	1851.5	23.32	22.65
		1880.0	23.43	22.83
		1908.5	23.55	22.93
	1 RB low	1851.5	23.27	22.64
		1880.0	23.45	22.79
		1908.5	23.53	22.94
	50% RB mid	1851.5	22.28	21.38
		1880.0	22.42	21.42
		1908.5	22.43	21.45
	100% RB	1851.5	22.31	21.27
		1880.0	22.44	21.45
		1908.5	22.47	21.45
5MHz	1 RB high	1852.5	23.62	22.62
		1880.0	23.75	22.73
		1907.5	23.75	22.77
	1 RB low	1852.5	23.54	22.52
		1880.0	23.66	22.63
		1907.5	23.67	22.65
	50% RB mid	1852.5	22.60	21.59
		1880.0	22.73	21.75
		1907.5	22.74	21.74
	100% RB	1852.5	22.58	21.65
		1880.0	22.74	21.83
		1907.5	22.77	21.83
10MHz	1 RB high	1855.0	23.63	22.99
		1880.0	23.64	23.04
		1905.0	23.75	23.16
	1 RB low	1855.0	23.57	23.00
		1880.0	23.60	22.98
		1905.0	23.65	22.99
	50% RB mid	1855.0	22.59	21.64
		1880.0	22.70	21.67
		1905.0	22.81	21.76
	100% RB	1855.0	22.64	21.54
		1880.0	22.75	21.66
		1905.0	22.83	21.81

(continued)

15MHz	1 RB high	1857.5	23.66	22.98
		1880.0	23.70	23.05
		1902.5	23.81	23.07
	1 RB low	1857.5	23.49	22.82
		1880.0	23.68	22.93
		1902.5	23.62	23.01
	50% RB mid	1857.5	22.49	21.76
		1880.0	22.55	21.94
		1902.5	22.60	21.99
	100% RB	1857.5	22.69	21.58
		1880.0	22.80	21.79
		1902.5	22.91	21.91
20MHz	1 RB high	1860.0	23.60	22.92
		1880.0	23.75	22.71
		1900.0	23.89	22.85
	1 RB low	1860.0	23.62	22.65
		1880.0	23.77	22.89
		1900.0	23.69	22.78
	50% RB mid	1860.0	22.66	21.57
		1880.0	22.79	21.74
		1900.0	22.83	21.85
	100% RB	1860.0	22.65	21.61
		1880.0	22.73	21.76
		1900.0	22.72	21.82

LTE band 4

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	1754.3	23.67	22.81
		1732.5	23.63	22.76
		1710.7	23.65	22.80
	1 RB low	1754.3	23.65	22.77
		1732.5	23.58	22.75
		1710.7	23.68	22.83
	50% RB mid	1754.3	23.62	22.56
		1732.5	23.55	22.50
		1710.7	23.73	22.55
	100% RB	1754.3	22.64	21.63
		1732.5	22.59	21.64
		1710.7	22.63	21.73
3MHz	1 RB high	1753.5	23.55	22.96
		1732.5	23.49	22.87
		1711.5	23.45	22.79
	1 RB low	1753.5	23.62	23.02
		1732.5	23.50	22.89
		1711.5	23.61	22.89
	50% RB mid	1753.5	22.51	21.51
		1732.5	22.56	21.57
		1711.5	22.44	21.54
	100% RB	1753.5	22.59	21.54
		1732.5	22.53	21.57
		1711.5	22.51	21.53
5MHz	1 RB high	1752.5	23.51	22.49
		1732.5	23.47	22.52
		1712.5	23.45	22.47
	1 RB low	1752.5	23.49	22.48
		1732.5	23.39	22.40
		1712.5	23.47	22.55
	50% RB mid	1752.5	22.61	21.62
		1732.5	22.53	21.53
		1712.5	22.43	21.54
	100% RB	1752.5	22.57	21.71
		1732.5	22.49	21.61
		1712.5	22.45	21.53

(continued)

10MHz	1 RB high	1750	23.48	22.82
		1732.5	23.43	22.88
		1715	23.49	22.94
	1 RB low	1750	23.41	22.81
		1732.5	23.39	22.80
		1715	23.43	22.76
	50% RB mid	1750	22.59	21.51
		1732.5	22.55	21.51
		1715	22.47	21.44
	100% RB	1750	22.61	21.60
		1732.5	22.58	21.50
		1715	22.48	21.48
15MHz	1 RB high	1747.5	23.54	22.78
		1732.5	23.57	22.86
		1717.5	23.57	22.95
	1 RB low	1747.5	23.49	22.84
		1732.5	23.46	22.88
		1717.5	23.46	22.85
	50% RB mid	1747.5	22.56	21.73
		1732.5	22.53	21.71
		1717.5	22.60	21.65
	100% RB	1747.5	22.65	21.62
		1732.5	22.62	21.56
		1717.5	22.60	21.58
20MHz	1 RB high	1745	23.79	22.89
		1732.5	23.81	22.78
		1720	23.68	22.76
	1 RB low	1745	23.61	22.72
		1732.5	23.65	22.73
		1720	23.59	22.60
	50% RB mid	1745	22.70	21.70
		1732.5	22.70	21.72
		1720	22.69	21.72
	100% RB	1745	22.77	21.82
		1732.5	22.67	21.69
		1720	22.67	21.72

LTE band 7

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
5MHz	1 RB high	2502.5	22.90	21.97
		2535	23.25	22.28
		2567.5	23.30	22.31
	1 RB low	2502.5	22.99	22.11
		2535	23.18	22.14
		2567.5	23.18	22.21
	50% RB mid	2502.5	22.05	21.09
		2535	22.39	21.33
		2567.5	22.26	21.26
	100% RB	2502.5	22.07	21.14
		2535	22.34	21.41
		2567.5	22.27	21.28
10MHz	1 RB high	2505	23.03	22.39
		2535	23.29	22.64
		2565	23.13	22.62
	1 RB low	2505	23.07	22.52
		2535	23.14	22.56
		2565	23.03	22.47
	50% RB mid	2505	22.17	21.14
		2535	22.43	21.28
		2565	22.38	21.21
	100% RB	2505	22.11	21.06
		2535	22.38	21.30
		2565	22.24	21.23
15MHz	1 RB high	2507.5	22.97	22.34
		2535	23.31	22.63
		2562.5	23.28	22.57
	1 RB low	2507.5	23.11	22.49
		2535	23.12	22.53
		2562.5	22.98	22.44
	50% RB mid	2507.5	22.11	21.33
		2535	22.22	21.57
		2562.5	22.09	21.39
	100% RB	2507.5	22.16	21.08
		2535	22.43	21.36
		2562.5	22.25	21.20

(Continued)

20MHz	1 RB high	2510	23.20	22.20
		2535	23.50	22.53
		2560	23.31	22.26
	1 RB low	2510	23.13	22.29
		2535	23.26	22.43
		2560	23.02	21.98
	50% RB mid	2510	22.15	21.10
		2535	22.39	21.33
		2560	22.21	21.11
	100% RB	2510	22.12	21.10
		2535	22.34	21.41
		2560	22.26	21.20

LTE band 17

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
5MHz	1 RB high	706.5	23.28	22.29
		710.0	23.15	22.28
		713.5	23.35	22.39
	1 RB low	706.5	23.16	22.17
		710.0	23.26	22.23
		713.5	23.22	22.25
	50% RB mid	706.5	22.23	21.34
		710.0	22.16	21.40
		713.5	22.29	21.41
	100% RB	706.5	22.24	21.41
		710.0	22.29	21.31
		713.5	22.33	21.51

(Continued)

10MHz	1 RB high	709	23.31	22.61
		710	23.29	22.63
		711	23.20	22.48
	1 RB low	709	23.19	22.55
		710	23.25	22.53
		711	23.12	22.39
	50% RB mid	709	22.24	21.23
		710	22.34	21.36
		711	22.32	21.36
	100% RB	709	22.32	21.38
		710	22.31	21.49
		711	22.33	21.35

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 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".

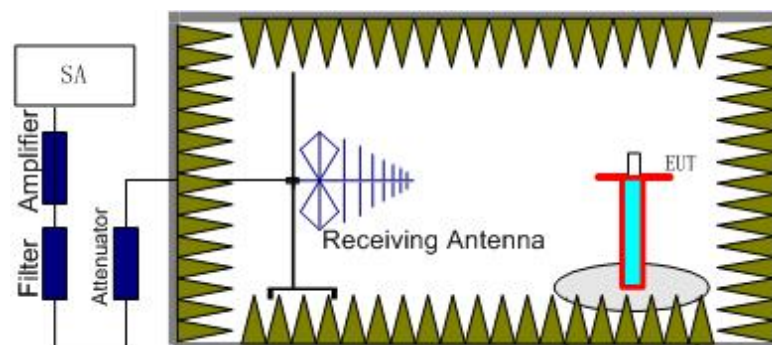
Rule Part 27.50(h)(2) specifies "Mobile stations are limited to 2.0 watts EIRP".

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

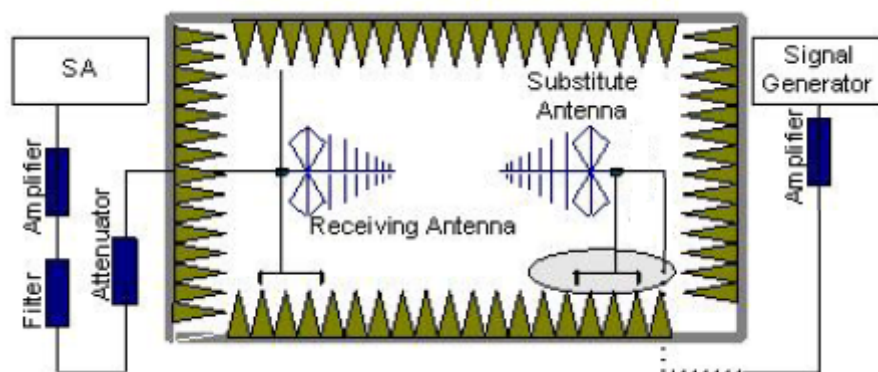
A.1.3.2 Method of Measurement

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:

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

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: $\leq 33\text{dBm}$ (2W)

LTE Band 2_1.4MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.70	-31.48	3.18	-50.00	-4.56	19.90	33.00	13.10	H
1880.00	-28.65	3.11	-50.00	-4.43	22.67	33.00	10.33	H
1909.30	-28.93	3.18	-50.00	-4.30	22.19	33.00	10.81	H

LTE Band 2_3MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1851.50	-31.59	3.18	-50.00	-4.55	19.78	33.00	13.22	H
1880.00	-28.66	3.11	-50.00	-4.43	22.66	33.00	10.34	H
1908.50	-28.85	3.18	-50.00	-4.30	22.27	33.00	10.73	H

LTE Band 2_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1852.50	-31.73	3.18	-50.00	-4.55	19.64	33.00	13.36	H
1880.00	-28.68	3.11	-50.00	-4.43	22.64	33.00	10.36	H
1907.50	-28.93	3.18	-50.00	-4.31	22.20	33.00	10.80	H

LTE Band 2_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1855.00	-31.86	3.16	-50.00	-4.54	19.52	33.00	13.48	H
1880.00	-28.87	3.11	-50.00	-4.43	22.45	33.00	10.55	H
1905.00	-28.88	3.17	-50.00	-4.32	22.27	33.00	10.73	H

LTE Band 2_15MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1857.50	-31.92	3.15	-50.00	-4.53	19.46	33.00	13.54	H
1880.00	-28.78	3.11	-50.00	-4.43	22.54	33.00	10.46	H
1902.50	-28.72	3.16	-50.00	-4.33	22.45	33.00	10.55	H

LTE Band 2_20 MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1860.00	-31.91	3.14	-50.00	-4.52	19.47	33.00	13.53	H
1880.00	-28.73	3.11	-50.00	-4.43	22.59	33.00	10.41	H
1900.00	-28.55	3.16	-50.00	-4.34	22.63	33.00	10.37	H

LTE Band 2 1.4MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1850.70	-32.16	3.18	-50.00	-4.56	19.22	33.00	13.78	H
1880.00	-29.50	3.11	-50.00	-4.43	21.82	33.00	11.18	H
1909.30	-29.81	3.18	-50.00	-4.30	21.31	33.00	11.69	H

LTE Band 2 3MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1851.50	-32.46	3.18	-50.00	-4.55	18.91	33.00	14.09	H
1880.00	-29.61	3.11	-50.00	-4.43	21.71	33.00	11.29	H
1908.50	-29.84	3.18	-50.00	-4.30	21.28	33.00	11.72	H

LTE Band 2 5MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1852.50	-32.63	3.18	-50.00	-4.55	18.74	33.00	14.26	H
1880.00	-29.81	3.11	-50.00	-4.43	21.51	33.00	11.49	H
1907.50	-29.75	3.18	-50.00	-4.31	21.38	33.00	11.62	H

LTE Band 2 10MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1855.00	-32.86	3.16	-50.00	-4.54	18.52	33.00	14.48	H
1880.00	-29.68	3.11	-50.00	-4.43	21.64	33.00	11.36	H
1905.00	-29.84	3.17	-50.00	-4.32	21.31	33.00	11.69	H

LTE Band 2 15MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1857.50	-32.92	3.15	-50.00	-4.53	18.46	33.00	14.54	H
1880.00	-29.72	3.11	-50.00	-4.43	21.60	33.00	11.40	H
1902.50	-29.75	3.16	-50.00	-4.33	21.42	33.00	11.58	H

LTE Band 2 20 MHz 16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1860.00	-32.93	3.14	-50.00	-4.52	18.45	33.00	14.55	H
1880.00	-29.81	3.11	-50.00	-4.43	21.51	33.00	11.49	H
1900.00	-29.58	3.16	-50.00	-4.34	21.60	33.00	11.40	H

Peak EIRP(dBm) = P_{Mea}(-28.65 dBm) - G_a (-4.43dBi) - P_{Ag} (-50.00 dB) - P_{cl} (3.11dB) = 22.67dBm

LTE Band 4- EIRP 27.50(d)

Limits: ≤30dBm (1W)

LTE Band 4_1.4MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1710.70	-29.64	2.96	-50.00	-5.17	22.57	30.00	7.43	H
1732.50	-27.66	2.99	-50.00	-5.08	24.43	30.00	5.57	H
1754.30	-27.77	3.01	-50.00	-4.98	24.20	30.00	5.80	H

LTE Band 4_3MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1711.50	-29.47	2.96	-50.00	-5.17	22.74	30.00	7.26	H
1732.50	-27.73	2.99	-50.00	-5.08	24.36	30.00	5.64	H
1753.50	-27.81	3.01	-50.00	-4.98	24.16	30.00	5.84	H

LTE Band 4_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1712.50	-29.33	2.97	-50.00	-5.17	22.87	30.00	7.13	H
1732.50	-27.74	2.99	-50.00	-5.08	24.35	30.00	5.65	H
1752.50	-27.88	3.01	-50.00	-4.99	24.10	30.00	5.90	H

LTE Band 4_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1715.00	-28.90	2.97	-50.00	-5.15	23.28	30.00	6.72	H
1732.50	-27.76	2.99	-50.00	-5.08	24.33	30.00	5.67	H
1750.00	-27.86	3.00	-50.00	-5.00	24.14	30.00	5.86	H

LTE Band 4_15MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1717.50	-28.64	2.97	-50.00	-5.14	23.53	30.00	6.47	H
1732.50	-27.69	2.99	-50.00	-5.08	24.40	30.00	5.60	H
1747.50	-27.83	3.00	-50.00	-5.01	24.18	30.00	5.82	H

LTE Band 4_20MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1720.00	-28.24	2.97	-50.00	-5.13	23.92	30.00	6.08	H
1732.50	-27.66	2.99	-50.00	-5.08	24.43	30.00	5.57	H
1745.00	-27.71	3.00	-50.00	-5.02	24.31	30.00	5.69	H

LTE Band 4 1.4MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1710.70	-30.43	2.96	-50.00	-5.17	21.78	30.00	8.22	H
1732.50	-28.46	2.99	-50.00	-5.08	23.63	30.00	6.37	H
1754.30	-28.32	3.01	-50.00	-4.98	23.65	30.00	6.35	H

LTE Band 4 3MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1711.50	-30.52	2.96	-50.00	-5.17	21.69	30.00	8.31	H
1732.50	-28.60	2.99	-50.00	-5.08	23.49	30.00	6.51	H
1753.50	-28.69	3.01	-50.00	-4.98	23.28	30.00	6.72	H

LTE Band 4 5MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1712.50	-29.95	2.97	-50.00	-5.17	22.25	30.00	7.75	H
1732.50	-28.75	2.99	-50.00	-5.08	23.34	30.00	6.66	H
1752.50	-28.70	3.01	-50.00	-4.99	23.28	30.00	6.72	H

LTE Band 4 10MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1715.00	-29.76	2.97	-50.00	-5.15	22.42	30.00	7.58	H
1732.50	-28.67	2.99	-50.00	-5.08	23.42	30.00	6.58	H
1750.00	-28.73	3.00	-50.00	-5.00	23.27	30.00	6.73	H

LTE Band 4 15MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1717.50	-29.61	2.97	-50.00	-5.14	22.56	30.00	7.44	H
1732.50	-28.69	2.99	-50.00	-5.08	23.40	30.00	6.60	H
1747.50	-28.71	3.00	-50.00	-5.01	23.30	30.00	6.70	H

LTE Band 4 20MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
1720.00	-29.32	2.97	-50.00	-5.13	22.84	30.00	7.16	H
1732.50	-28.66	2.99	-50.00	-5.08	23.43	30.00	6.57	H
1745.00	-28.87	3.00	-50.00	-5.02	23.15	30.00	6.85	H

Peak EIRP(dBm) = P_{Mea}(-27.66dBm) - G_a (-5.08dBi) - P_{Ag} (-50.00dB) - P_{cl} (2.99dB) = 24.43dBm

LTE Band 7- EIRP 27.50(h)(2)

Limits: ≤ 33 dBm (2W)

LTE Band 7_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
2502.50	-32.67	3.59	-50.00	-5.41	19.15	33.00	13.85	H
2535.00	-33.25	3.62	-50.00	-5.49	18.62	33.00	14.38	H
2567.50	-34.06	3.65	-50.00	-5.58	17.87	33.00	15.13	H

LTE Band 7_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
2505.00	-32.68	3.59	-50.00	-5.41	19.14	33.00	13.86	H
2535.00	-33.44	3.62	-50.00	-5.49	18.43	33.00	14.57	H
2565.00	-33.72	3.65	-50.00	-5.57	18.20	33.00	14.80	H

LTE Band 7_15MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
2507.50	-32.27	3.59	-50.00	-5.42	19.56	33.00	13.44	H
2535.00	-32.63	3.62	-50.00	-5.49	19.24	33.00	13.76	H
2562.50	-32.91	3.64	-50.00	-5.56	19.01	33.00	13.99	H

LTE Band 7_20MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
2510.00	-31.69	3.59	-50.00	-5.43	20.15	33.00	12.85	H
2535.00	-32.27	3.62	-50.00	-5.49	19.60	33.00	13.40	H
2560.00	-32.38	3.64	-50.00	-5.56	19.54	33.00	13.46	H

LTE Band 7_5MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
2502.50	-32.91	3.59	-50.00	-5.41	18.91	33.00	14.09	H
2535.00	-33.26	3.62	-50.00	-5.49	18.61	33.00	14.39	H
2567.50	-33.85	3.65	-50.00	-5.58	18.08	33.00	14.92	H

LTE Band 7_10MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
2505.00	-32.70	3.59	-50.00	-5.41	19.12	33.00	13.88	H
2535.00	-33.02	3.62	-50.00	-5.49	18.85	33.00	14.15	H
2565.00	-33.84	3.65	-50.00	-5.57	18.08	33.00	14.92	H

LTE Band 7_15MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
2507.50	-32.53	3.59	-50.00	-5.42	19.30	33.00	13.70	H
2535.00	-34.81	3.62	-50.00	-5.49	17.06	33.00	15.94	H
2562.50	-33.13	3.64	-50.00	-5.56	18.79	33.00	14.21	H

LTE Band 7_20MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	EIRP(dBm)	Limit(dBm)	Margin(dB)	Polarization
2510.00	-34.75	3.59	-50.00	-5.43	17.09	33.00	15.91	H
2535.00	-34.68	3.62	-50.00	-5.49	17.19	33.00	15.81	H
2560.00	-34.99	3.64	-50.00	-5.56	16.93	33.00	16.07	H

Peak EIRP(dBm) = P_{Mea}(-31.69dBm) - G_a (-5.43dBi) - P_{Ag} (-50.00dB) - P_{cl} (3.59dB) = 20.15dBm

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

Limits: $\leq 34.77\text{dBm}$ (3W)

LTE Band 17_5MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
706.50	-30.26	1.91	-53.00	0.30	2.15	18.38	34.77	16.39	V
710.00	-29.99	1.92	-53.00	0.32	2.15	18.62	34.77	16.15	V
713.50	-29.78	1.93	-53.00	0.34	2.15	18.80	34.77	15.97	V

LTE Band 17_10MHz_QPSK

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
709.00	-30.50	1.92	-53.00	0.32	2.15	18.11	34.77	16.66	V
710.00	-29.98	1.92	-53.00	0.32	2.15	18.63	34.77	16.14	V
711.00	-30.44	1.92	-53.00	0.33	2.15	18.16	34.77	16.61	V

LTE Band 17_5MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
706.50	-31.18	1.91	-53.00	0.30	2.15	17.46	34.77	17.31	V
710.00	-31.25	1.92	-53.00	0.32	2.15	17.36	34.77	17.41	V
713.50	-31.13	1.93	-53.00	0.34	2.15	17.45	34.77	17.32	V

LTE Band 17_10MHz_16QAM

Frequency(MHz)	P _{Mea} (dBm)	P _{cl} (dB)	P _{Ag} (dB)	G _a Antenna Gain(dB)	Correction (dB)	ERP(dBm)	Limit(dBm)	Margin(dB)	Polarization
709.00	-31.20	1.92	-53.00	0.32	2.15	17.41	34.77	17.36	V
710.00	-31.13	1.92	-53.00	0.32	2.15	17.48	34.77	17.29	V
711.00	-31.20	1.92	-53.00	0.33	2.15	17.40	34.77	17.37	V

$$\text{Peak ERP(dBm)} = P_{\text{Mea}}(-29.78\text{dBm}) - G_a(0.34\text{dBi}) - P_{\text{Ag}}(-53.00\text{dB}) - P_{\text{cl}}(1.93\text{dB}) - 2.15\text{dB} = 18.80\text{dBm}$$

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, 24.238(a), 27.53(h) , 27.53(m), 27.53(g).

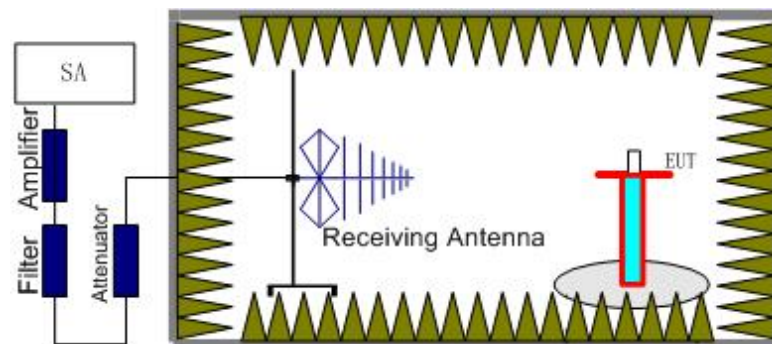
A.2.1 Measurement Method

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

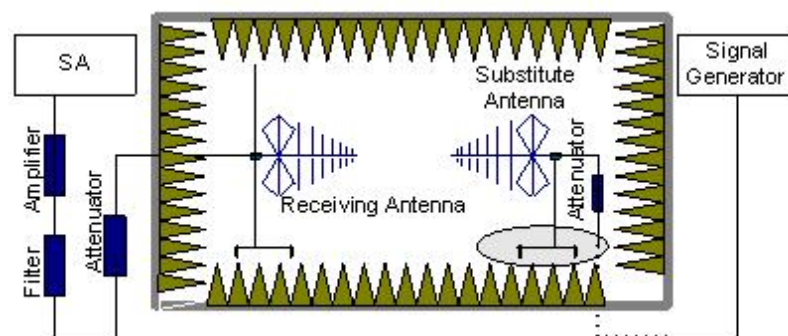
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz as outlined in Part 24.238(a), Part 27.53(h), Part 27.53(m) and Part 27.53(g). The spectrum was scanned with the mobile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

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 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, 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, 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

Frequency(MHz)	P_{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3749.55	-58.75	4.54	-8.20	-55.09	-13.00	42.09	H
4562.64	-60.87	4.94	-8.91	-56.90	-13.00	43.90	V
5950.15	-60.63	5.51	-10.18	-55.96	-13.00	42.96	V
8684.65	-59.73	7.38	-12.35	-54.76	-13.00	41.76	V

12539.92	-55.33	8.97	-12.75	-51.55	-13.00	38.55	H
13329.91	-51.87	8.95	-13.63	-47.19	-13.00	34.19	V

LTE Band 2, 1.4MHz, QPSK, Channel 18900

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3759.94	-55.08	4.52	-8.21	-51.39	-13.00	38.39	V
5639.65	-51.38	5.45	-10.06	-46.77	-13.00	33.77	H
7520.65	-56.24	6.83	-11.42	-51.65	-13.00	38.65	V
9395.17	-59.38	7.47	-12.60	-54.25	-13.00	41.25	V
13184.27	-55.21	9.34	-13.48	-51.07	-13.00	38.07	V
16826.18	-45.65	10.57	-12.40	-43.82	-13.00	30.82	H

LTE Band 2, 1.4MHz, QPSK, Channel 19193

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3759.46	-57.25	4.52	-8.21	-53.56	-13.00	40.56	V
5727.59	-55.41	5.54	-10.09	-50.86	-13.00	37.86	V
7956.80	-56.85	6.89	-11.86	-51.88	-13.00	38.88	H
11625.37	-56.29	8.66	-12.43	-52.52	-13.00	39.52	H
12486.22	-54.70	8.75	-12.69	-50.76	-13.00	37.76	H
13598.75	-53.96	9.16	-13.84	-49.28	-13.00	36.28	V

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

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3227.24	-57.75	4.18	-7.25	-54.68	-13.00	41.68	V
5551.73	-44.87	5.46	-10.02	-40.31	-13.00	27.31	H
8201.17	-61.62	6.94	-12.02	-56.54	-13.00	43.54	H
10370.82	-57.90	8.06	-12.47	-53.49	-13.00	40.49	H
13293.76	-51.55	9.06	-13.59	-47.02	-13.00	34.02	H
16731.05	-46.53	10.34	-12.40	-44.47	-13.00	31.47	V

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

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3812.78	-59.83	4.48	-8.28	-56.03	-13.00	43.03	V
5216.85	-60.64	5.27	-9.83	-56.08	-13.00	43.08	V
7106.50	-59.71	6.38	-11.16	-54.93	-13.00	41.93	V
9661.40	-58.93	7.99	-12.54	-54.38	-13.00	41.38	V
11262.41	-57.68	8.42	-12.40	-53.70	-13.00	40.70	V
14139.82	-52.61	9.17	-13.89	-47.89	-13.00	34.89	H

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

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3748.19	-58.32	4.53	-8.20	-54.65	-13.00	41.65	H
4267.62	-60.60	4.79	-8.66	-56.73	-13.00	43.73	V
5360.60	-58.96	5.41	-9.92	-54.45	-13.00	41.45	V
7382.78	-61.40	6.43	-11.33	-56.50	-13.00	43.50	V
10596.26	-55.70	8.22	-12.48	-51.44	-13.00	38.44	V
13568.56	-54.48	9.23	-13.83	-49.88	-13.00	36.88	V

LTE Band 4, 1.4MHz, QPSK, Channel 19957

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3421.93	-53.70	4.19	-7.71	-50.18	-13.00	37.18	H
5132.14	-56.26	5.25	-9.78	-51.73	-13.00	38.73	H
6842.55	-44.95	6.17	-10.94	-40.18	-13.00	27.18	V
7792.86	-59.03	6.67	-11.69	-54.01	-13.00	41.01	H
10327.88	-58.86	7.93	-12.47	-54.32	-13.00	41.32	H
13419.63	-53.72	9.13	-13.72	-49.13	-13.00	36.13	H

LTE Band 4, 1.4MHz, QPSK, Channel 20175

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3464.84	-55.57	4.24	-7.82	-51.99	-13.00	38.99	H
4572.32	-58.93	4.94	-8.93	-54.94	-13.00	41.94	V
6022.12	-57.51	5.64	-10.22	-52.93	-13.00	39.93	V
8530.06	-55.07	7.13	-12.22	-49.98	-13.00	36.98	H
9905.64	-59.86	7.49	-12.44	-54.91	-13.00	41.91	V
12630.98	-53.46	8.76	-12.86	-49.36	-13.00	36.36	V

LTE Band 4, 1.4MHz, QPSK, Channel 20393

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3740.06	-58.98	4.49	-8.19	-55.28	-13.00	42.28	H
5262.91	-50.77	5.30	-9.86	-46.21	-13.00	33.21	H
7016.96	-50.94	6.35	-11.11	-46.18	-13.00	33.18	V
7620.87	-60.70	6.80	-11.52	-55.98	-13.00	42.98	V
10246.01	-57.76	7.50	-12.45	-52.81	-13.00	39.81	H
13912.15	-51.77	9.15	-13.96	-46.96	-13.00	33.96	H

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

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3421.42	-54.92	4.19	-7.71	-51.40	-13.00	38.40	H
4291.00	-58.84	4.80	-8.67	-54.97	-13.00	41.97	H
6843.32	-44.47	6.17	-10.94	-39.70	-13.00	26.70	V
8672.50	-60.26	7.38	-12.34	-55.30	-13.00	42.30	V
12210.87	-55.56	8.93	-12.58	-51.91	-13.00	38.91	H
13630.83	-52.07	9.23	-13.85	-47.45	-13.00	34.45	V

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

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3441.98	-58.45	4.22	-7.76	-54.91	-13.00	41.91	V
4635.83	-59.21	4.96	-9.04	-55.13	-13.00	42.13	H
6175.38	-57.42	5.79	-10.34	-52.87	-13.00	39.87	H
8529.87	-52.74	7.13	-12.22	-47.65	-13.00	34.65	H
11892.70	-56.95	8.52	-12.48	-52.99	-13.00	39.99	V
14466.72	-50.01	9.30	-13.63	-45.68	-13.00	32.68	V

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

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3508.07	-53.99	4.33	-7.91	-50.41	-13.00	37.41	H
5262.59	-51.03	5.30	-9.86	-46.47	-13.00	33.47	H
7017.20	-48.09	6.35	-11.11	-43.33	-13.00	30.33	V
9903.43	-58.43	7.49	-12.44	-53.48	-13.00	40.48	H
13239.02	-53.54	9.12	-13.54	-49.12	-13.00	36.12	V
16219.77	-47.84	10.02	-12.74	-45.12	-13.00	32.12	H

LTE Band 7, 5 MHz, QPSK, Channel 20775

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
5005.36	-45.70	5.17	-9.70	-41.17	-13.00	28.17	V
6180.70	-60.25	5.78	-10.34	-55.69	-13.00	42.69	V
7508.06	-45.28	6.65	-11.41	-40.52	-13.00	27.52	V
10010.66	-45.84	7.96	-12.40	-41.40	-13.00	28.40	H
12513.56	-49.63	8.88	-12.72	-45.79	-13.00	32.79	H
15044.32	-48.85	9.63	-13.49	-44.99	-13.00	31.99	H

LTE Band 7, 5 MHz, QPSK, Channel 21100

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
5067.51	-55.05	5.21	-9.74	-50.52	-13.00	37.52	V
6287.06	-59.33	5.88	-10.43	-54.78	-13.00	41.78	V
7840.78	-59.82	6.98	-11.74	-55.06	-13.00	42.06	H
9686.15	-58.21	8.03	-12.53	-53.71	-13.00	40.71	V
12649.76	-53.61	8.74	-12.88	-49.47	-13.00	36.47	H
14566.41	-51.36	9.45	-13.59	-47.22	-13.00	34.22	V

LTE Band 7, 5 MHz, QPSK, Channel 21425

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
5135.43	-32.95	5.24	-9.78	-28.41	-13.00	15.41	H
7703.24	-50.09	6.51	-11.60	-45.00	-13.00	32.00	V
8595.08	-59.06	7.37	-12.28	-54.15	-13.00	41.15	V
10270.36	-45.18	7.60	-12.45	-40.33	-13.00	27.33	H
12841.29	-53.52	9.00	-13.11	-49.41	-13.00	36.41	H
14355.49	-49.55	9.39	-13.72	-45.22	-13.00	32.22	V

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

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
5005.22	-45.92	5.17	-9.70	-41.39	-13.00	28.39	V
7508.18	-46.28	6.65	-11.41	-41.52	-13.00	28.52	V
10010.90	-46.28	7.96	-12.40	-41.84	-13.00	28.84	H
12513.69	-49.41	8.88	-12.72	-45.57	-13.00	32.57	H
15026.61	-48.94	9.68	-13.49	-45.13	-13.00	32.13	H
17515.31	-46.75	11.00	-13.31	-44.44	-13.00	31.44	H

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

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
5070.40	-40.48	5.21	-9.74	-35.95	-13.00	22.95	H
6201.89	-59.81	5.78	-10.36	-55.23	-13.00	42.23	V
7605.71	-48.20	6.78	-11.51	-43.47	-13.00	30.47	V
10140.89	-47.89	7.92	-12.43	-43.38	-13.00	30.38	H
12038.28	-55.10	8.90	-12.52	-51.48	-13.00	38.48	V
13331.61	-52.62	8.96	-13.63	-47.95	-13.00	34.95	V

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

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit (dBm)	Margin(dB)	Polarization
5135.49	-33.24	5.24	-9.78	-28.70	-13.00	15.70	H
6865.14	-61.03	6.09	-10.97	-56.15	-13.00	43.15	V
7703.08	-51.21	6.51	-11.60	-46.12	-13.00	33.12	V
10270.79	-42.49	7.60	-12.45	-37.64	-13.00	24.64	H
11452.27	-55.69	8.64	-12.40	-51.93	-13.00	38.93	V
13806.67	-52.35	9.20	-13.92	-47.63	-13.00	34.63	V

LTE Band 17, 5MHz, QPSK, Channel 23755

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Margin(dB)	Polarization
2119.57	-55.43	3.29	-4.26	2.15	-56.61	-13.00	43.61	H
3533.49	-49.33	4.32	-7.94	2.15	-47.86	-13.00	34.86	H
4240.02	-54.91	4.73	-8.64	2.15	-53.15	-13.00	40.15	V
5953.16	-58.87	5.51	-10.18	2.15	-56.35	-13.00	43.35	H
6611.60	-59.87	6.10	-10.71	2.15	-57.41	-13.00	44.41	H
7260.42	-58.73	6.37	-11.26	2.15	-55.99	-13.00	42.99	V

LTE Band 17, 5MHz, QPSK, Channel 23790

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3550.72	-48.57	4.31	-7.96	2.15	-47.07	-13.00	34.07	H
4260.91	-52.24	4.79	-8.66	2.15	-50.52	-13.00	37.52	V
4970.90	-59.89	5.11	-9.65	2.15	-57.50	-13.00	44.50	V
5663.85	-60.92	5.46	-10.07	2.15	-58.46	-13.00	45.46	V
6420.10	-59.45	5.83	-10.54	2.15	-56.89	-13.00	43.89	V
7161.04	-58.44	6.36	-11.20	2.15	-55.75	-13.00	42.75	V

LTE Band 17, 5MHz, QPSK, Channel 23825

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Margin(dB)	Polarization
2140.97	-60.41	3.32	-4.32	2.15	-61.56	-13.00	48.56	V
3568.43	-47.27	4.34	-7.98	2.15	-45.78	-13.00	32.78	H
4282.17	-55.74	4.79	-8.67	2.15	-54.01	-13.00	41.01	H
4995.72	-56.31	5.17	-9.69	2.15	-53.94	-13.00	40.94	H
5785.36	-59.02	5.66	-10.11	2.15	-56.72	-13.00	43.72	V
6703.09	-60.03	6.09	-10.80	2.15	-57.47	-13.00	44.47	V

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

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Margin(dB)	Polarization
2115.75	-56.34	3.28	-4.25	2.15	-57.52	-13.00	44.52	H
3533.52	-50.21	4.32	-7.94	2.15	-48.74	-13.00	35.74	H
4240.04	-56.81	4.73	-8.64	2.15	-55.05	-13.00	42.05	H
4925.30	-59.32	5.13	-9.57	2.15	-57.03	-13.00	44.03	V
5802.14	-60.04	5.68	-10.12	2.15	-57.75	-13.00	44.75	H
6711.21	-57.83	6.08	-10.81	2.15	-55.25	-13.00	42.25	V

LTE Band 17, 5MHz, 16QAM, Channel 23790

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Margin(dB)	Polarization
3551.16	-48.46	4.31	-7.96	2.15	-46.96	-13.00	33.96	H
4261.22	-56.04	4.79	-8.66	2.15	-54.32	-13.00	41.32	V
5175.97	-59.84	5.20	-9.81	2.15	-57.38	-13.00	44.38	H
5937.61	-59.65	5.52	-10.18	2.15	-57.14	-13.00	44.14	H
6574.22	-59.35	6.14	-10.67	2.15	-56.97	-13.00	43.97	V
7367.37	-59.22	6.43	-11.32	2.15	-56.48	-13.00	43.48	V

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

Frequency(MHz)	P _{Mea} (dBm)	Path Loss	Antenna Gain	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Margin(dB)	Polarization
2140.56	-55.93	3.32	-4.32	2.15	-57.08	-13.00	44.08	V
3568.53	-48.19	4.34	-7.98	2.15	-46.70	-13.00	33.70	H
4282.16	-53.54	4.79	-8.67	2.15	-51.81	-13.00	38.81	V
4995.96	-53.70	5.17	-9.69	2.15	-51.33	-13.00	38.33	H
5719.84	-59.18	5.53	-10.09	2.15	-56.77	-13.00	43.77	V
6448.55	-60.00	5.85	-10.56	2.15	-57.44	-13.00	44.44	V

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

A.3 CONDUCTED EMISSION

Reference

FCC: CFR Part 15.107/207

The measurement procedure in ANSI C63.4-2009 is used. Conducted emission is measured with travel charger. The EUT is working under LTE FDD bands 2/4/7/17 traffic mode which is the worst case of conducted emission measurement.

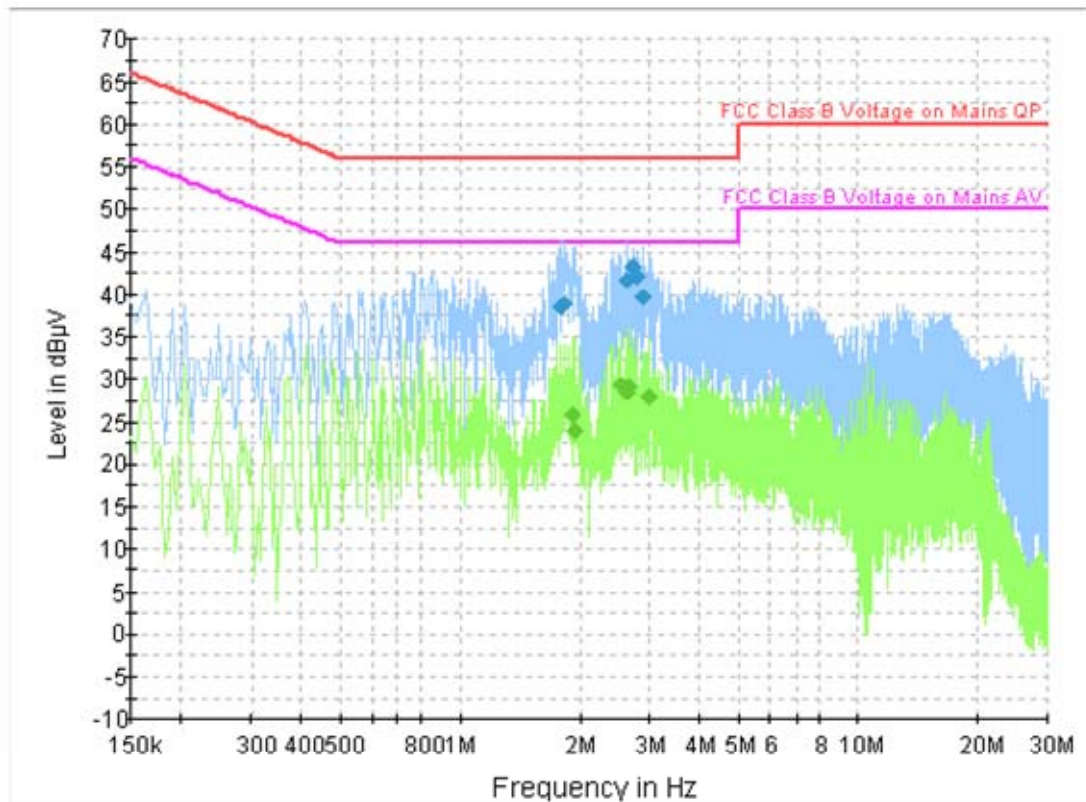
For test layout photo, please refer to Pic.2 in Annex B.

A.3.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi -Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

A.3.2 Measurement result

LTE Band 2, 1.4 MHz bandwidth



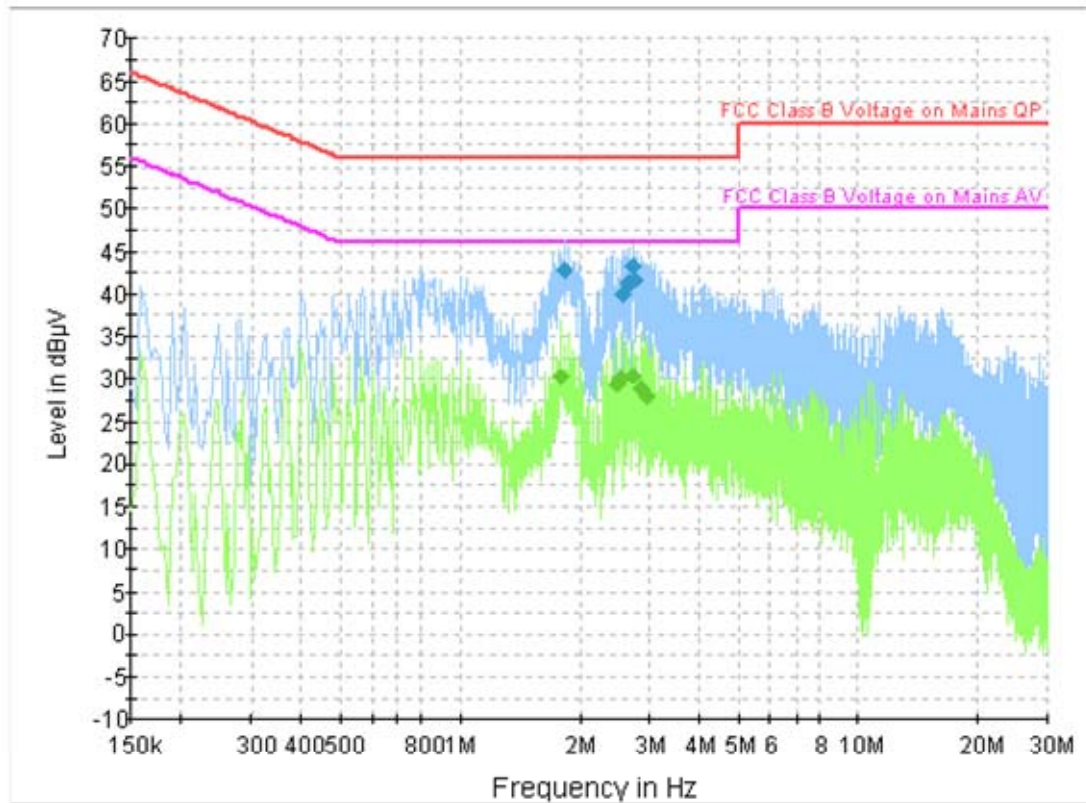
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.788000	38.6	GND	L1	9.7	17.4	56.0
1.828500	38.8	GND	L1	9.7	17.2	56.0
2.629500	41.6	GND	L1	9.7	14.4	56.0
2.719500	43.2	GND	L1	9.7	12.8	56.0
2.805000	42.2	GND	L1	9.7	13.8	56.0
2.877000	39.7	GND	L1	9.7	16.3	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.909500	25.8	GND	L1	9.7	20.2	46.0
1.954500	24.0	GND	L1	9.7	22.0	46.0
2.557500	29.3	GND	L1	9.7	16.7	46.0
2.629500	28.4	GND	L1	9.7	17.6	46.0
2.674500	29.1	GND	L1	9.7	16.9	46.0
2.994000	28.0	GND	L1	9.7	18.0	46.0

LTE Band 4, 1.4 MHz bandwidth



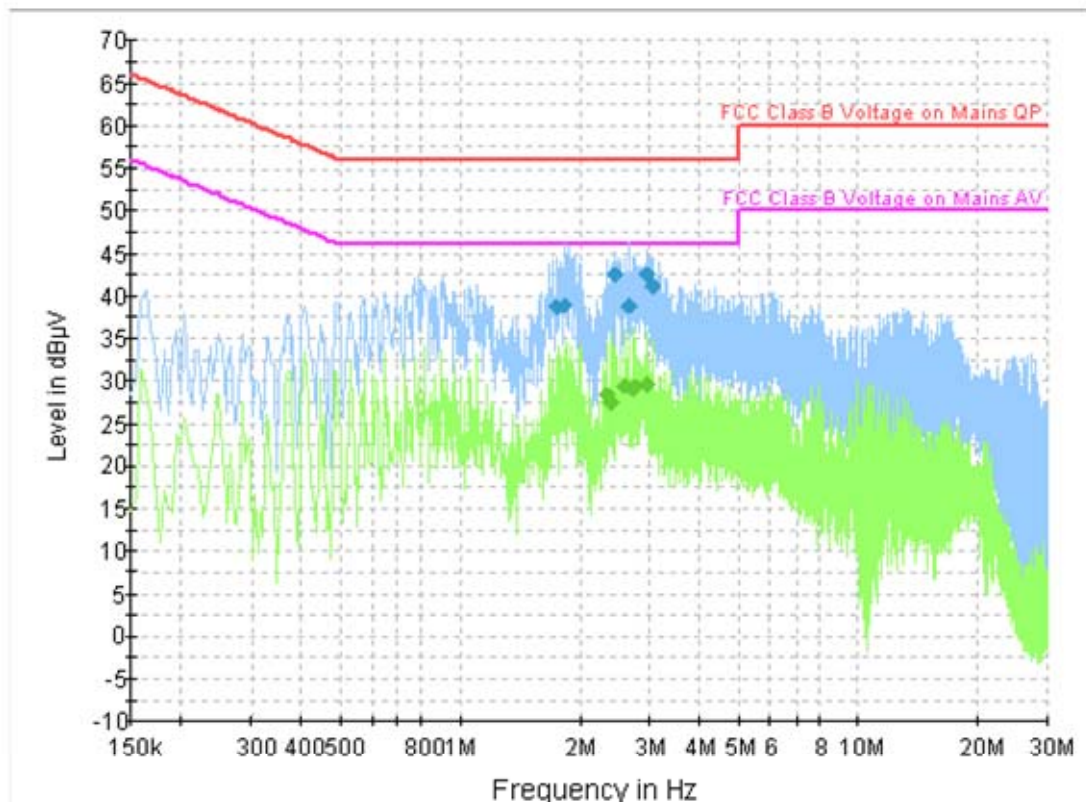
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.828500	42.8	GND	L1	9.7	13.2	56.0
2.566500	40.0	GND	L1	9.7	16.0	56.0
2.638500	41.1	GND	L1	9.7	14.9	56.0
2.679000	41.4	GND	L1	9.7	14.6	56.0
2.724000	43.2	GND	L1	9.7	12.8	56.0
2.751000	41.7	GND	L1	9.7	14.3	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.797000	30.2	GND	L1	9.7	15.8	46.0
2.476500	29.5	GND	L1	9.7	16.5	46.0
2.521500	30.0	GND	L1	9.7	16.0	46.0
2.724000	30.5	GND	L1	9.7	15.5	46.0
2.841000	28.8	GND	L1	9.7	17.2	46.0
2.958000	27.9	GND	L1	9.7	18.1	46.0

LTE Band 7, 5 MHz bandwidth



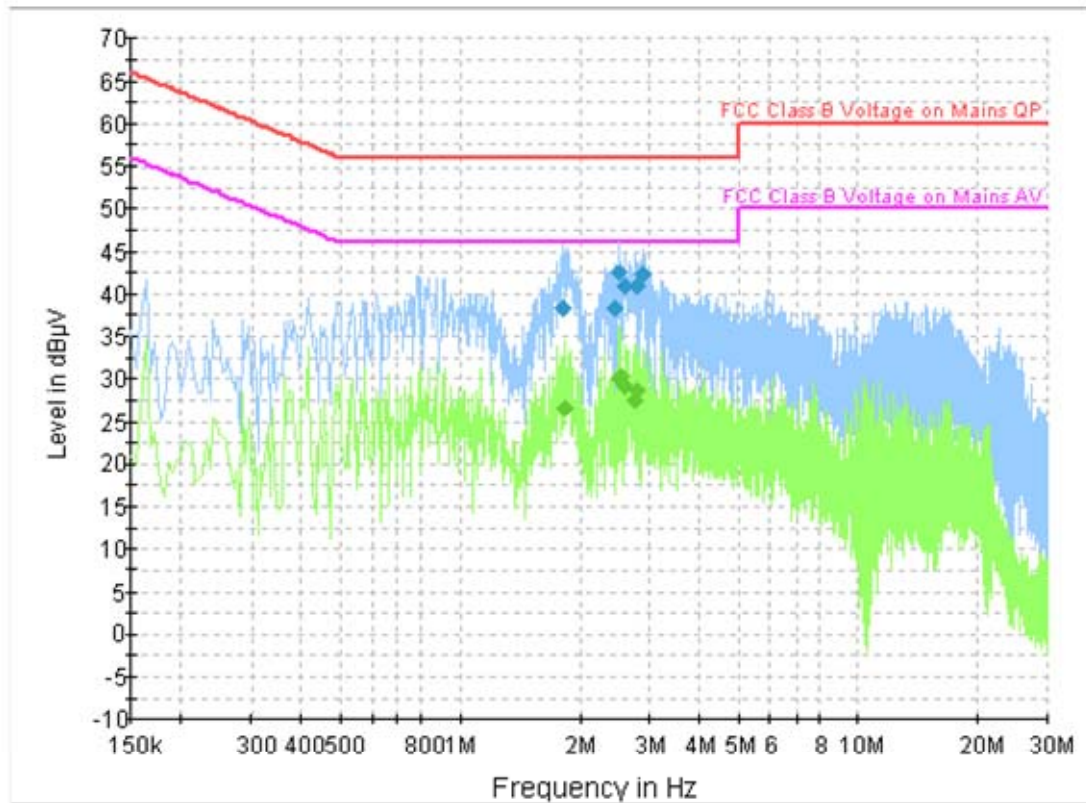
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.752000	38.7	GND	L1	9.7	17.3	56.0
1.828500	38.9	GND	L1	9.7	17.1	56.0
2.467500	42.4	GND	L1	9.7	13.6	56.0
2.670000	38.8	GND	L1	9.7	17.2	56.0
2.949000	42.4	GND	L1	9.7	13.6	56.0
3.034500	41.1	GND	L1	9.7	14.9	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
2.350500	28.2	GND	L1	9.7	17.8	46.0
2.395500	27.4	GND	L1	9.7	18.6	46.0
2.598000	29.4	GND	L1	9.7	16.6	46.0
2.715000	29.0	GND	L1	9.7	17.0	46.0
2.760000	29.3	GND	L1	9.7	16.7	46.0
2.962500	29.5	GND	L1	9.7	16.5	46.0

LTE Band 17, 5 MHz bandwidth



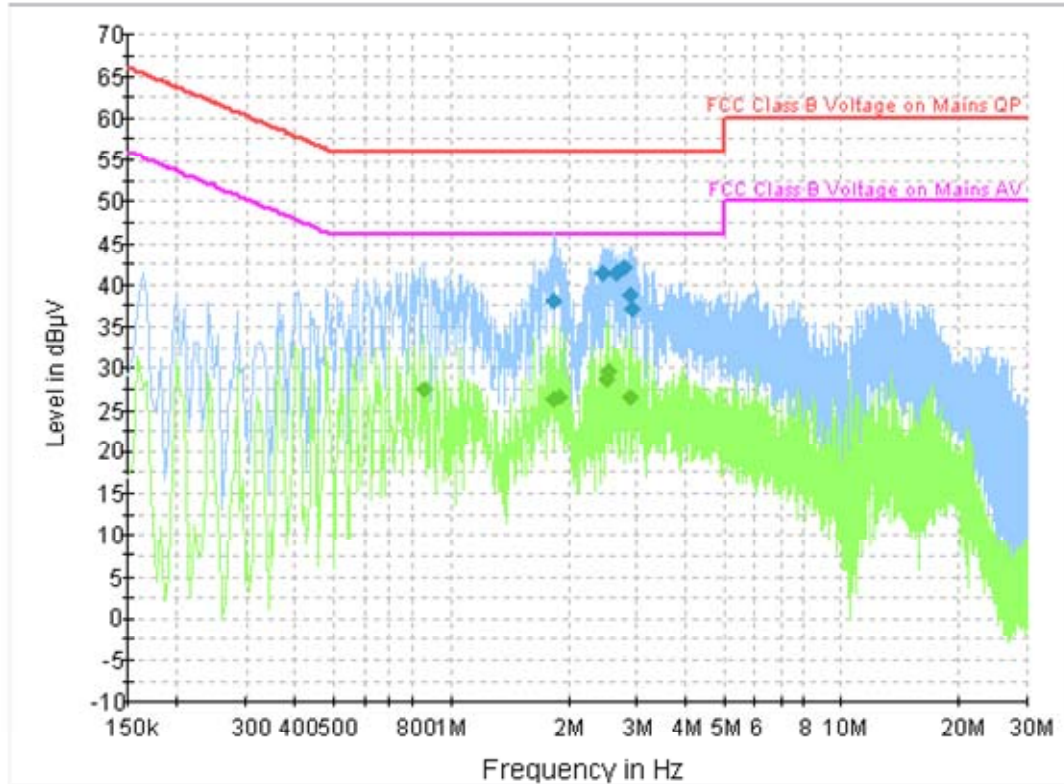
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.810500	38.4	GND	L1	9.7	17.6	56.0
2.463000	38.3	GND	L1	9.7	17.7	56.0
2.508000	42.5	GND	L1	9.7	13.5	56.0
2.598000	40.9	GND	L1	9.7	15.1	56.0
2.800500	40.9	GND	L1	9.7	15.1	56.0
2.890500	42.2	GND	L1	9.7	13.8	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.851000	26.6	GND	L1	9.7	19.4	46.0
2.508000	30.1	GND	L1	9.7	15.9	46.0
2.553000	30.3	GND	L1	9.7	15.7	46.0
2.589000	29.1	GND	L1	9.7	16.9	46.0
2.755500	27.4	GND	L1	9.7	18.6	46.0
2.800500	28.7	GND	L1	9.7	17.3	46.0

MP3



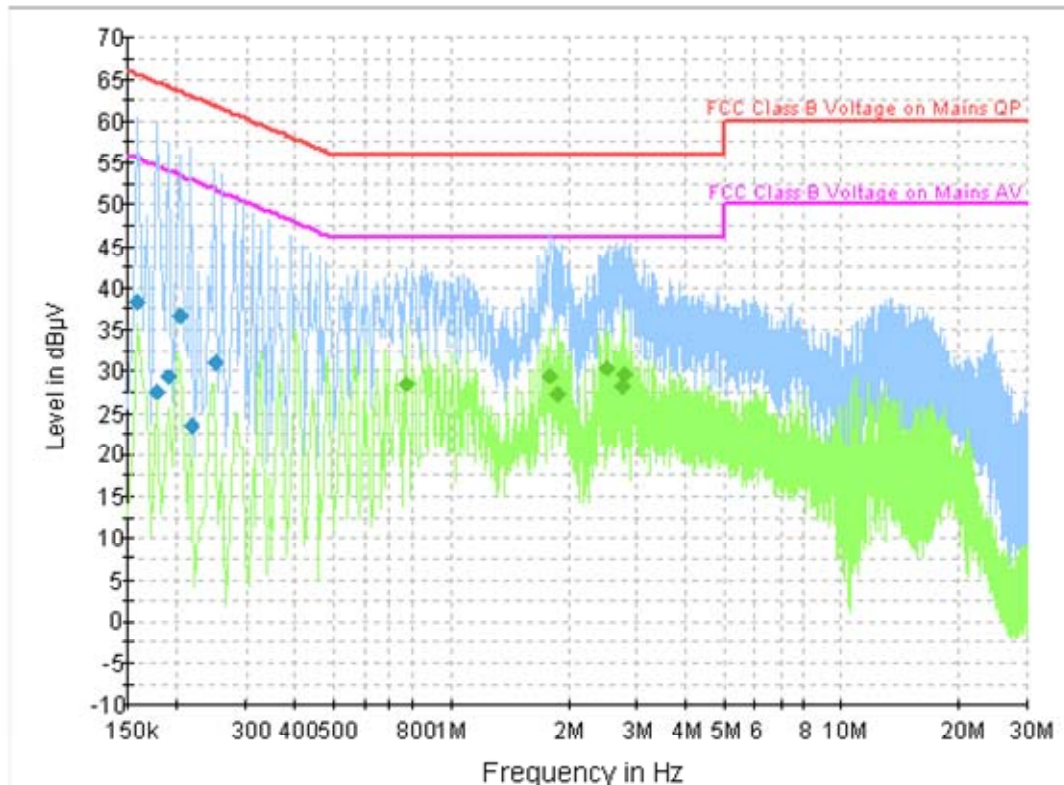
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.851000	38.1	GND	L1	9.7	17.9	56.0
2.467500	41.4	GND	L1	9.7	14.6	56.0
2.643000	41.4	GND	L1	9.7	14.6	56.0
2.796000	42.2	GND	L1	9.7	13.8	56.0
2.890500	38.8	GND	L1	9.7	17.2	56.0
2.935500	37.2	GND	L1	9.7	18.8	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.852000	27.4	GND	L1	9.8	18.6	46.0
1.851000	26.2	GND	L1	9.7	19.8	46.0
1.896000	26.5	GND	L1	9.7	19.5	46.0
2.512500	28.6	GND	L1	9.7	17.4	46.0
2.557500	29.6	GND	L1	9.7	16.4	46.0
2.890500	26.5	GND	L1	9.7	19.5	46.0

CAMERA



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.159000	38.3	GND	L1	9.8	27.2	65.5
0.177000	27.6	GND	L1	9.8	37.0	64.6
0.190500	29.2	GND	L1	9.8	34.8	64.0
0.204000	36.6	GND	L1	9.8	26.9	63.4
0.217500	23.3	GND	L1	9.8	39.6	62.9
0.249000	30.9	GND	L1	9.8	30.9	61.8

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.771000	28.4	GND	L1	9.8	17.6	46.0
1.801500	29.4	GND	L1	9.7	16.6	46.0
1.878000	27.1	GND	L1	9.7	18.9	46.0
2.512500	30.4	GND	L1	9.7	15.6	46.0
2.760000	28.1	GND	L1	9.7	17.9	46.0
2.805000	29.7	GND	L1	9.7	16.3	46.0

A.4 FREQUENCY STABILITY

Reference

FCC: CFR Part 2.1055, 24.235, 27.54.

A.4.1 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 band 2/4/5/7, 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.4.2 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 3.5VDC and 4.2VDC, with a nominal voltage of 3.9VDC. 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.4.3 Measurement results

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

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.5	4	19	0.002	0.010
3.9	-4	22	0.002	0.012
4.2	1	14	0.000	0.007

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	-2	21	0.001	0.011
40°	2	16	0.001	0.009
30°	3	14	0.002	0.008
20°	-6	21	0.003	0.011
10°	1	20	0.000	0.011
0°	-5	16	0.003	0.009
- 10°	-4	18	0.002	0.010
- 20°	-1	22	0.001	0.012
- 30°	2	15	0.001	0.008

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
3.5	1	20	0.000	0.011
3.9	1	21	0.000	0.012
4.2	1	20	0.001	0.012

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	2	20	0.001	0.011
40°	3	25	0.002	0.014
30°	1	18	0.000	0.010
20°	1	22	0.000	0.012
10°	0	20	0.000	0.011
0°	7	23	0.004	0.013
- 10°	0	19	0.000	0.011
- 20°	5	18	0.003	0.011
- 30°	1	21	0.000	0.012

LTE Band 7, 20MHz bandwidth (worst case of all bandwidths)
Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.5	-4	-10	0.002	0.004
3.9	0	-13	0.000	0.005
4.2	11	5	0.004	0.002

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	4	-6	0.002	0.002
40°	-8	-4	0.003	0.001
30°	-1	-8	0.000	0.003
20°	-12	-1	0.005	0.000
10°	-5	-4	0.002	0.002
0°	1	-8	0.000	0.003
- 10°	-7	-9	0.003	0.004
- 20°	-11	-16	0.004	0.006
- 30°	3	-2	0.001	0.001

LTE Band 17, 10MHz bandwidth (worst case of all bandwidths)
Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
3.5	1	-5	0.001	0.007
3.9	-2	-4	0.003	0.005
4.2	0	-2	0.000	0.003

Frequency Error vs Temperature

Temperature (°C)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	0	-2	0.000	0.003
40°	-2	-5	0.003	0.007
30°	-1	-3	0.001	0.005
20°	0	-7	0.000	0.010
10°	-2	-5	0.003	0.007
0°	1	-4	0.001	0.006
- 10°	-4	-5	0.006	0.007
- 20°	1	-4	0.001	0.006
- 30°	0	-3	0.000	0.004

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

A.5 OCCUPIED BANDWIDTH

Reference

FCC: CFR Part 2.1049(h)(i)

A.5.1 Occupied Bandwidth Results

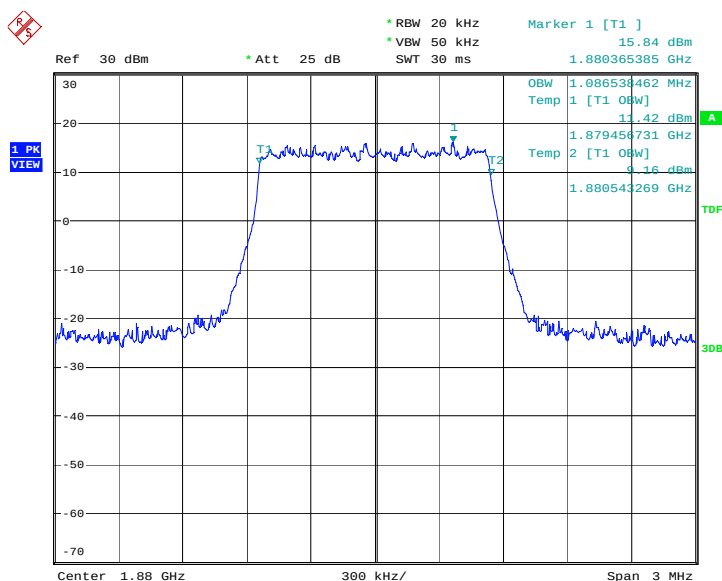
Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the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

The EUT was set up for the max output power with pseudo random data modulation. Use the Occupied Bandwidth function of SA to measure the 99% bandwidth.

LTE band 2, 1.4MHz (99%)

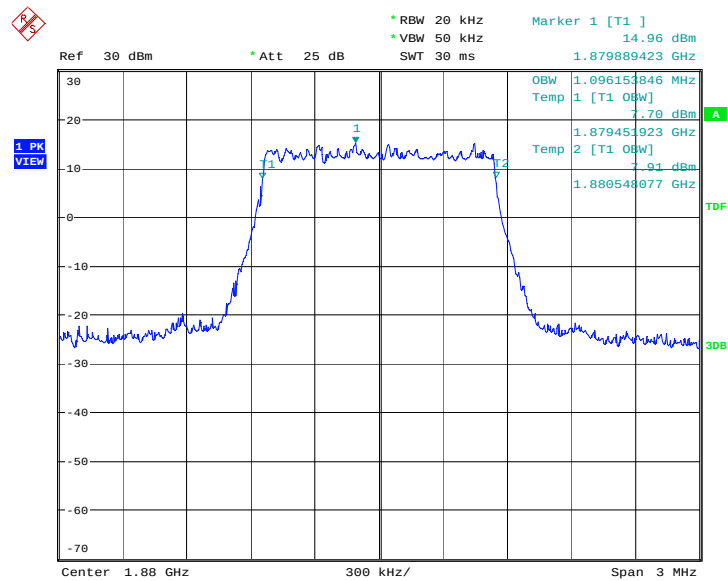
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	1086.538	1096.154

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



Date: 25.FEB.2014 15:37:43

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

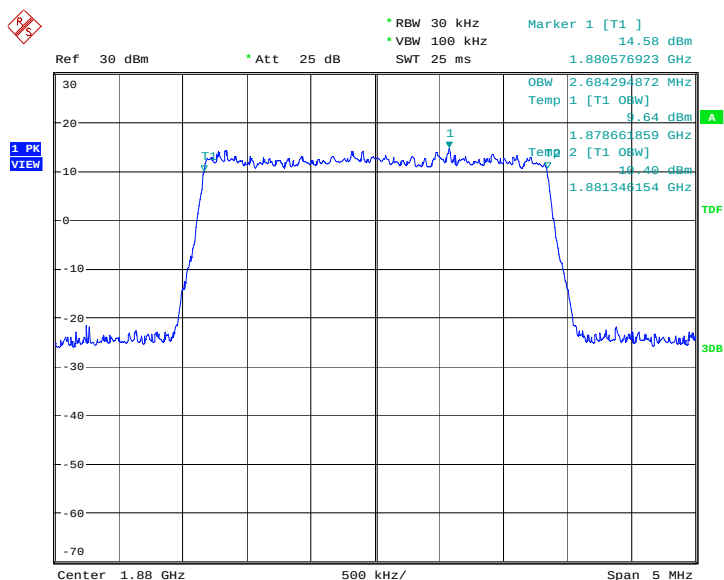


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LTE band 2, 3MHz (99%)

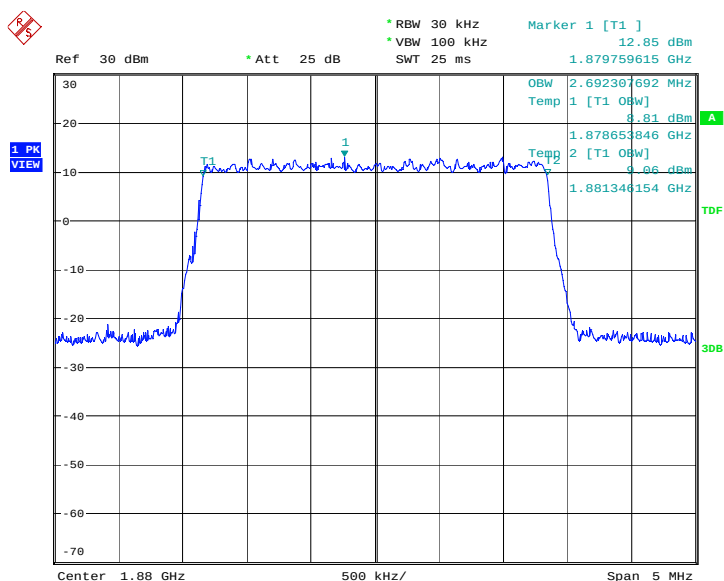
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	2684.295	2692.308

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



Date: 25.FEB.2014 15:46:05

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

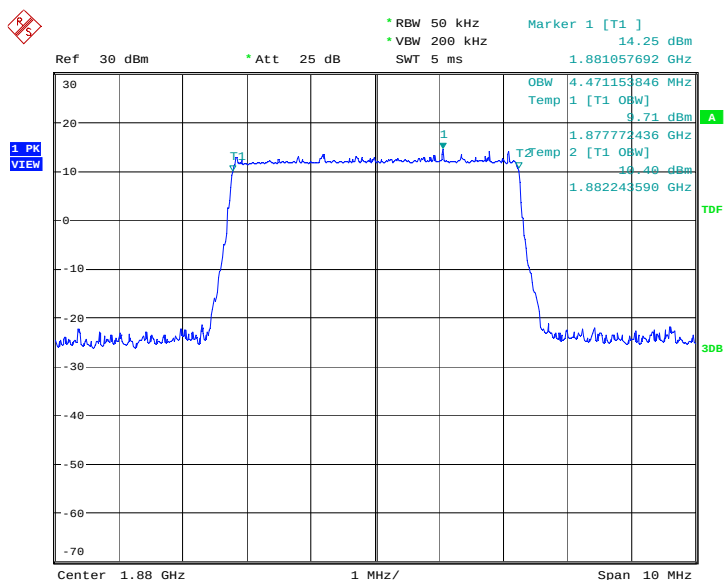


Date: 25.FEB.2014 15:46:19

LTE band 2, 5MHz (99%)

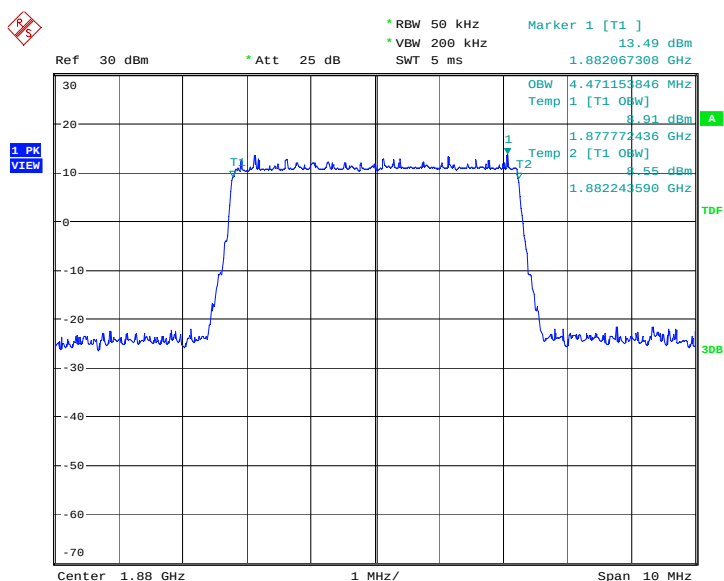
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	4471.154	4471.154

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



Date: 25.FEB.2014 16:05:14

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

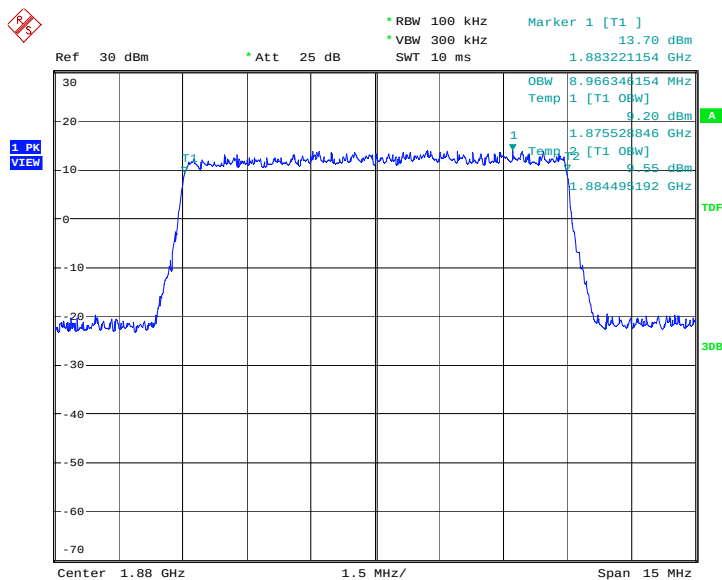


Date: 25.FEB.2014 16:05:28

LTE band 2, 10MHz (99%)

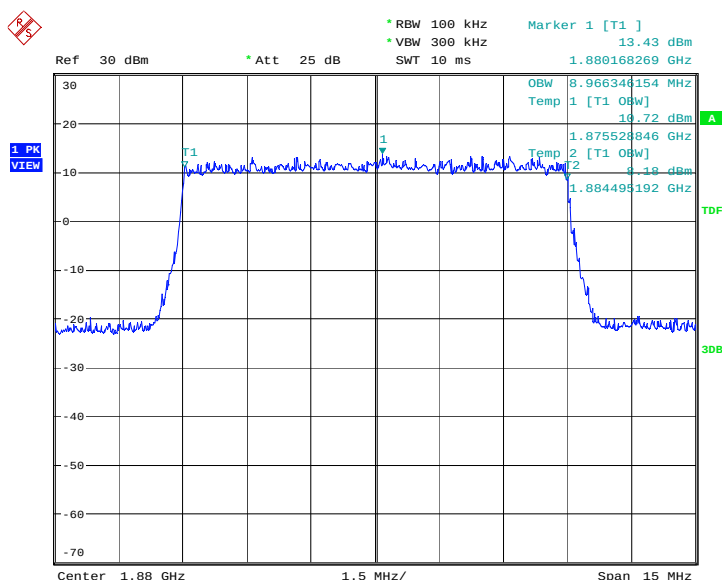
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	8966.346	8966.346

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



Date: 25.FEB.2014 16:12:32

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

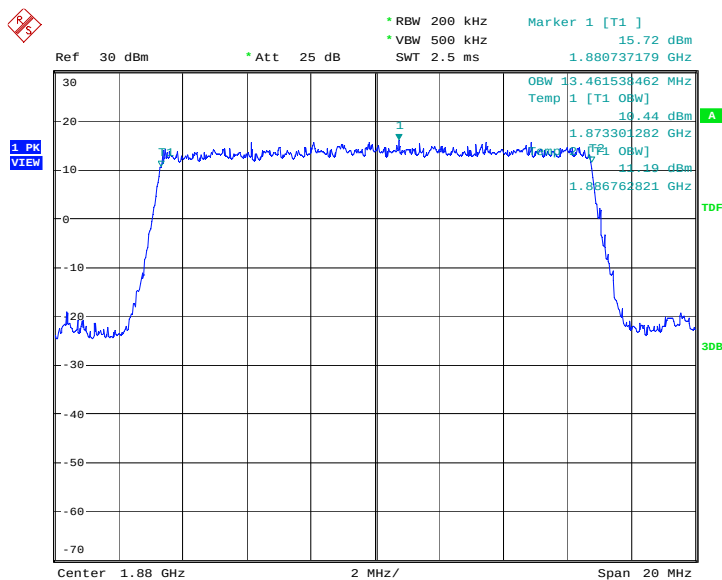


Date: 25.FEB.2014 16:12:46

LTE band 2, 15MHz (99%)

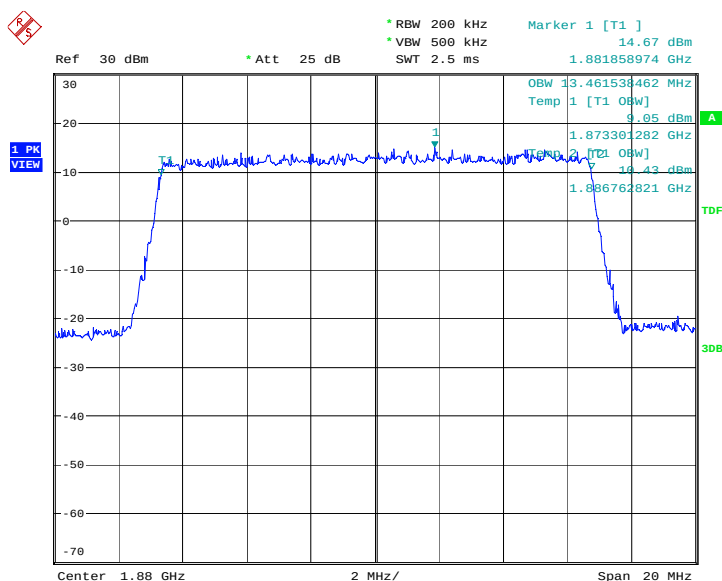
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	13461.538	13461.538

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



Date: 25.FEB.2014 16:21:06

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

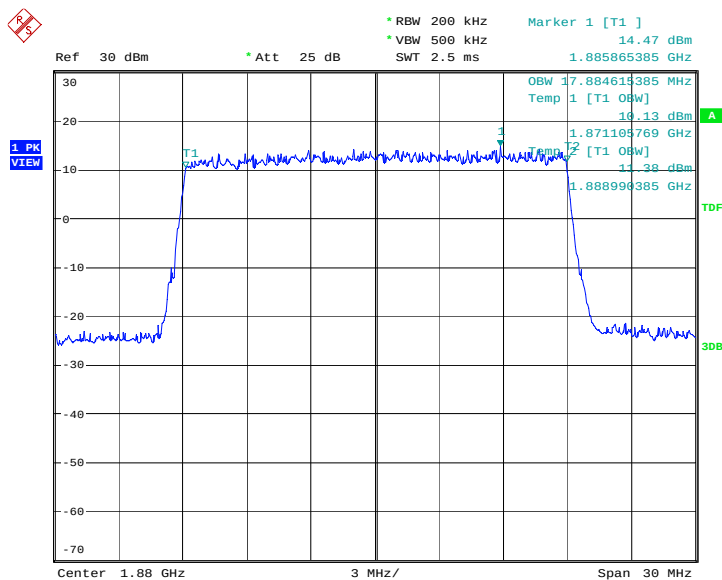


Date: 25.FEB.2014 16:21:20

LTE band 2, 20MHz (99%)

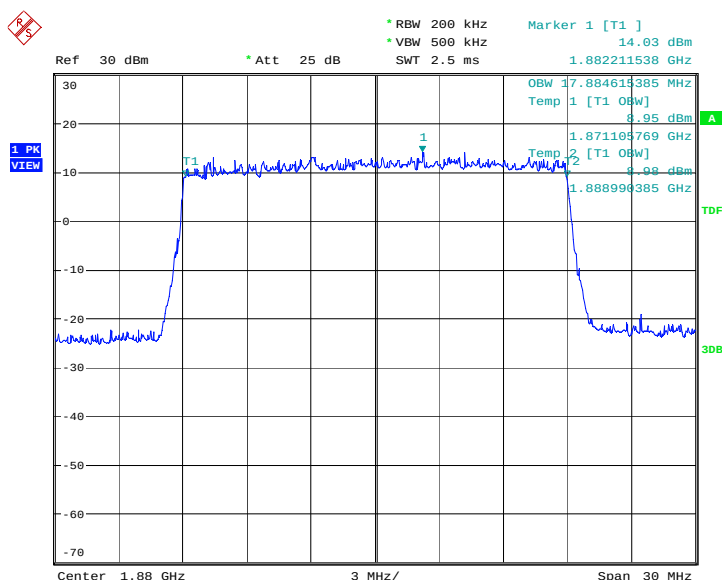
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1880.0	QPSK	16QAM
	17884.615	17884.615

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



Date: 25.FEB.2014 16:28:41

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

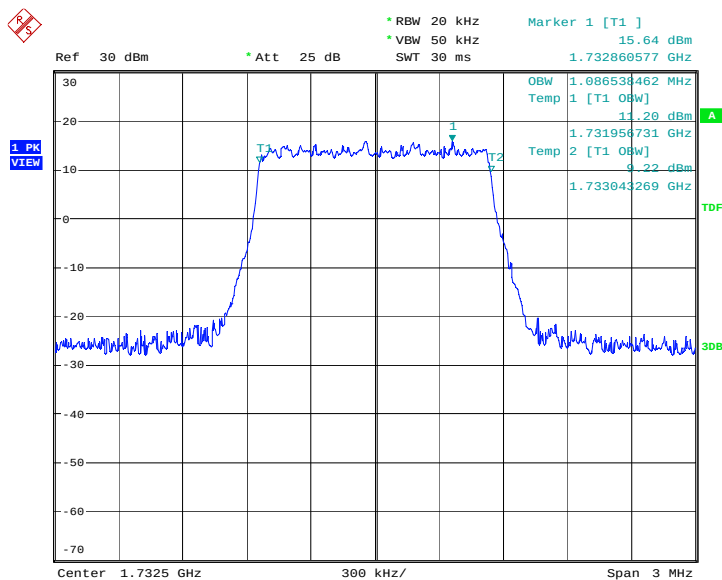


Date: 25.FEB.2014 16:28:55

LTE band 4, 1.4MHz (99%)

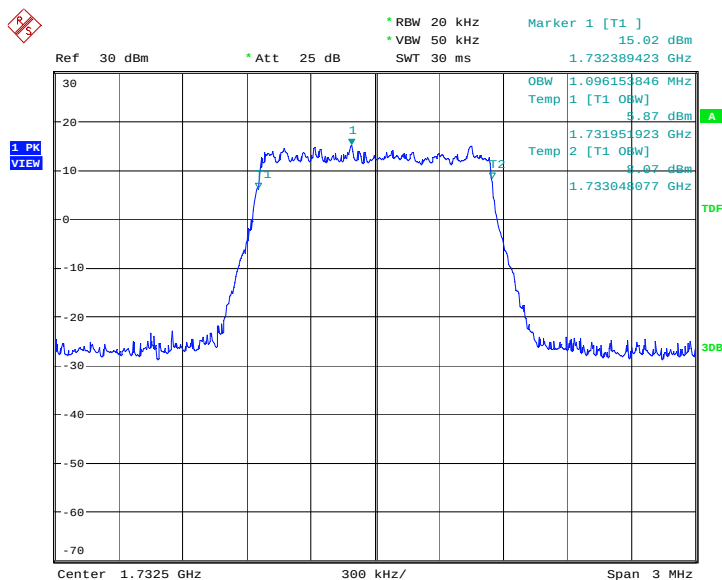
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	1086.538	1096.154

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



Date: 19.MAR.2014 09:16:20

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

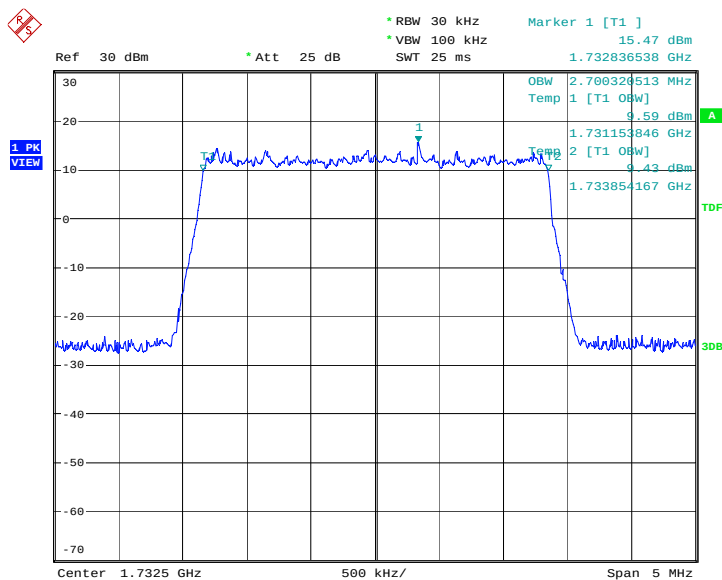


Date: 19.MAR.2014 09:16:33

LTE band 4, 3MHz (99%)

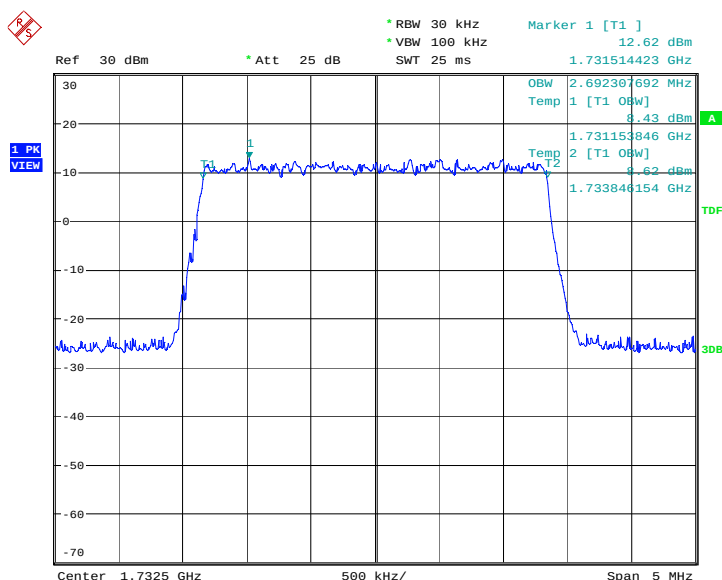
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	2700.321	2692.308

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



Date: 19.MAR.2014 09:17:55

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

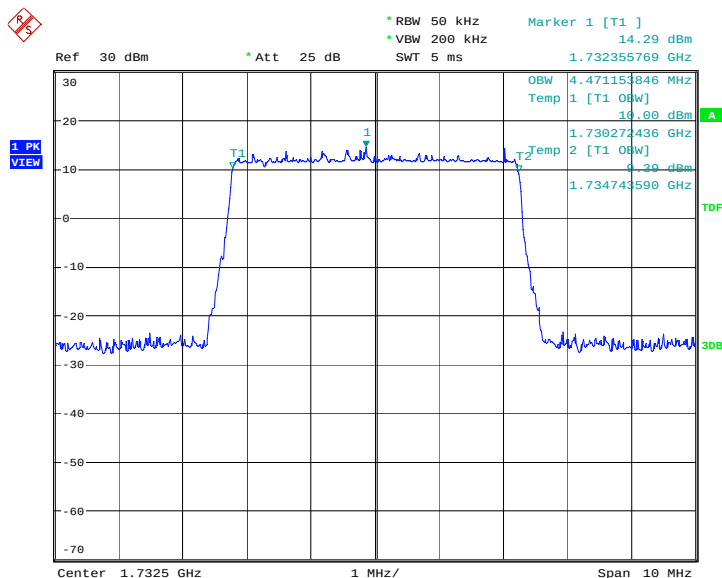


Date: 19.MAR.2014 09:18:08

LTE band 4, 5MHz (99%)

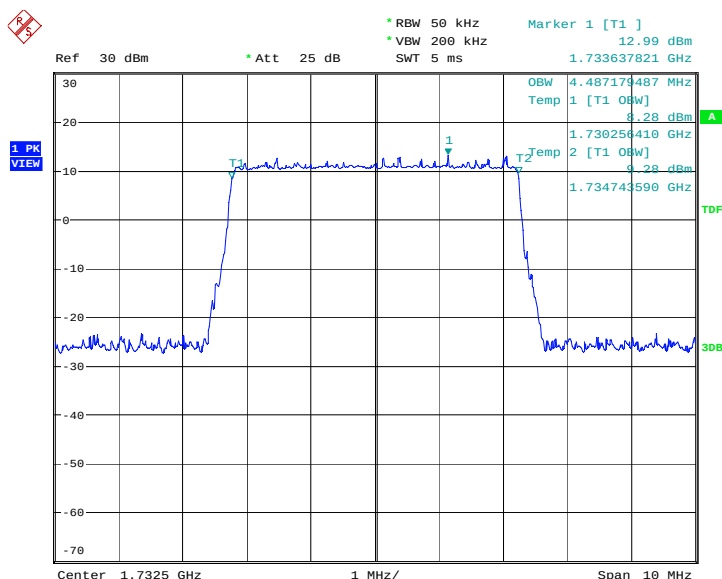
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	4471.154	4487.179

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



Date: 19.MAR.2014 09:20:01

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

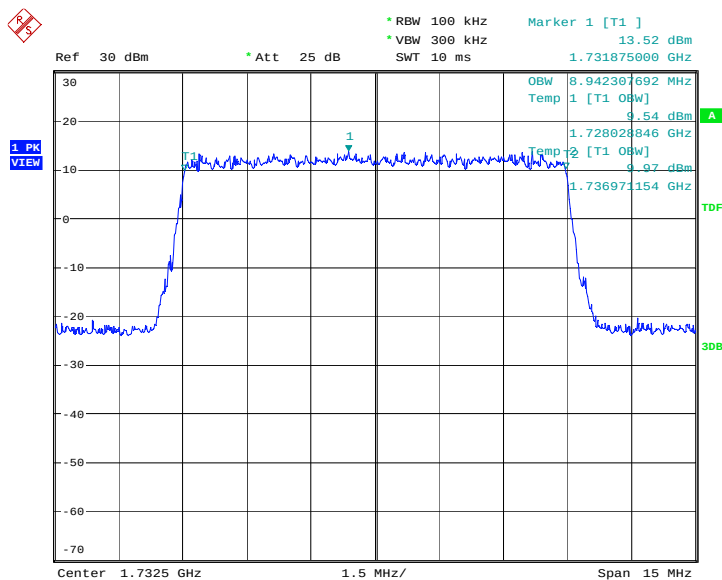


Date: 19.MAR.2014 09:20:14

LTE band 4, 10MHz (99%)

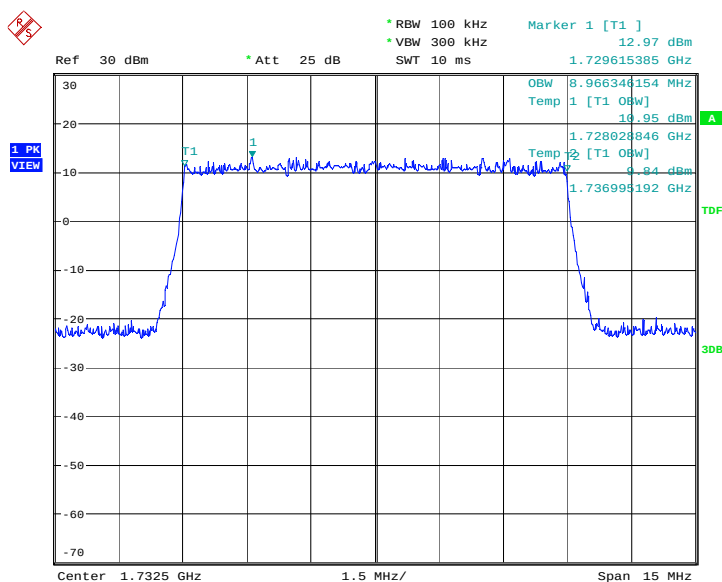
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	8942.308	8966.346

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



Date: 19.MAR.2014 09:21:06

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

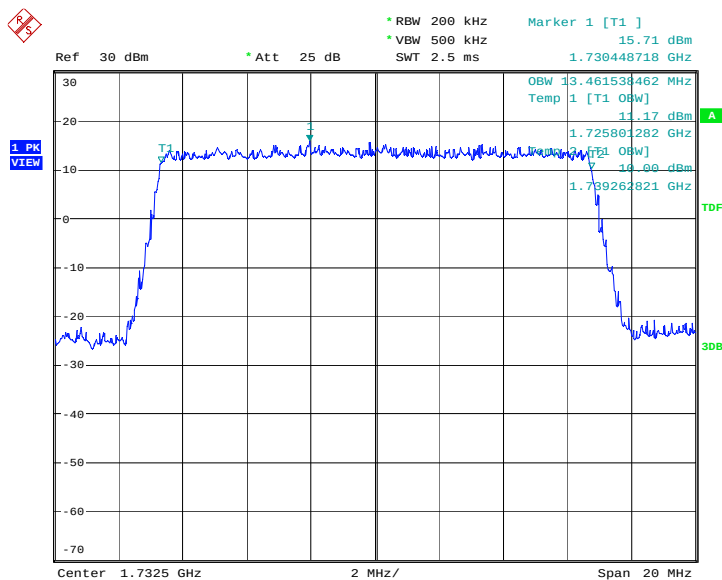


Date: 19.MAR.2014 09:21:19

LTE band 4, 15MHz (99%)

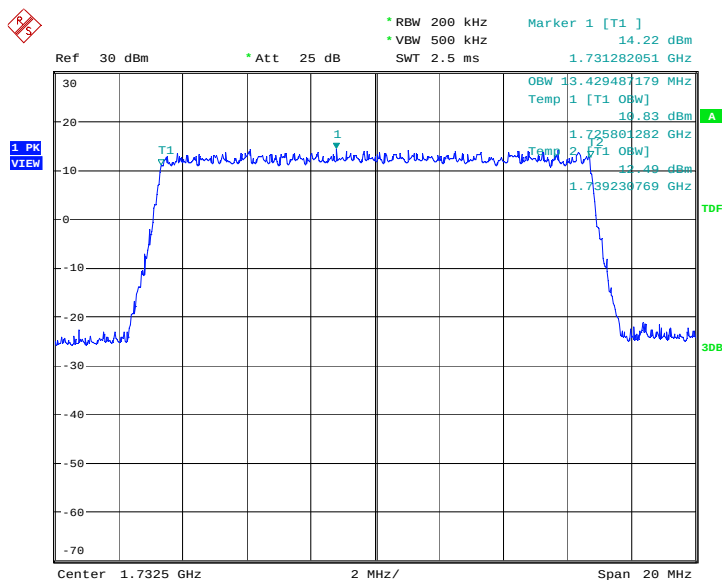
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	13461.54	13429.49

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



Date: 19.MAR.2014 09:22:10

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

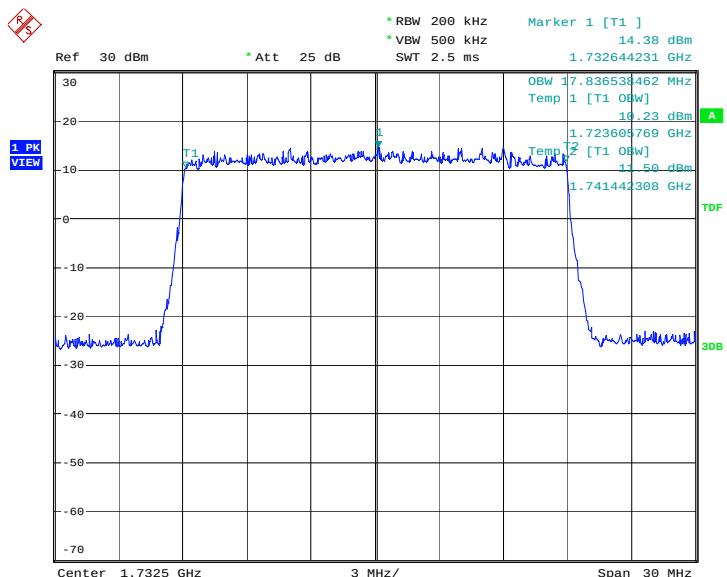


Date: 19.MAR.2014 09:22:24

LTE band 4, 20MHz (99%)

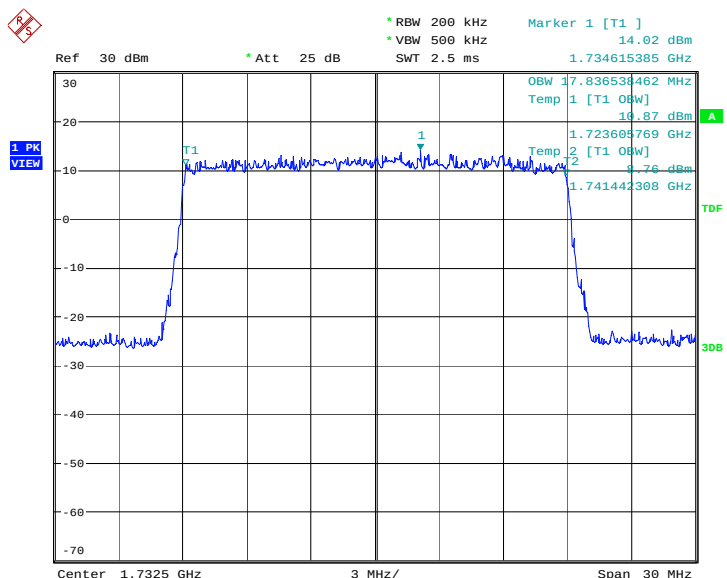
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	17836.54	17836.54

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



Date: 19.MAR.2014 09:23:15

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

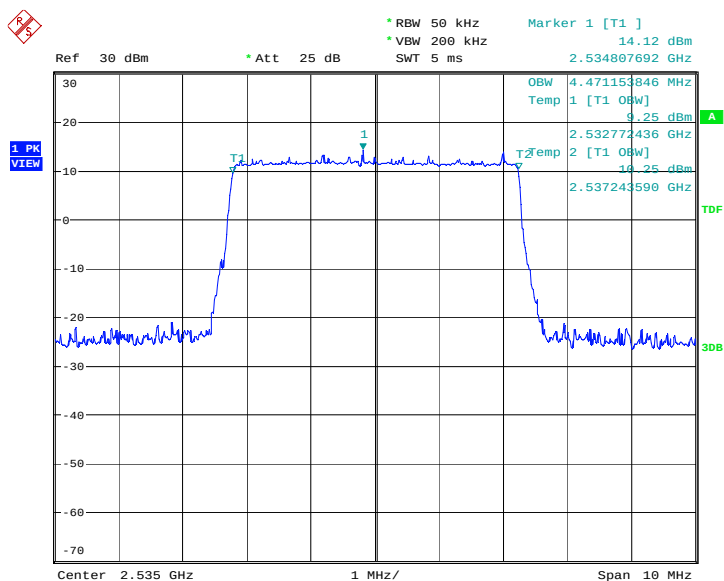


Date: 19.MAR.2014 09:23:29

LTE band 7, 5MHz (99%)

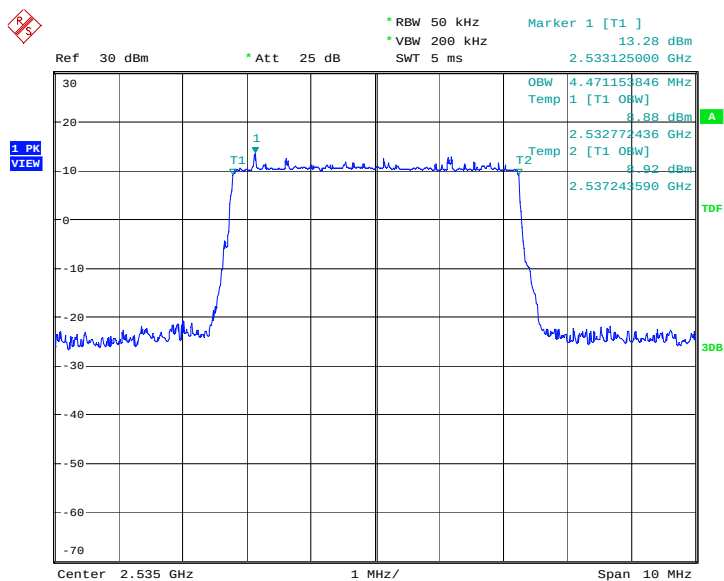
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2535.0	QPSK	16QAM
	4471.154	4471.154

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



Date: 19.MAR.2014 09:10:58

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

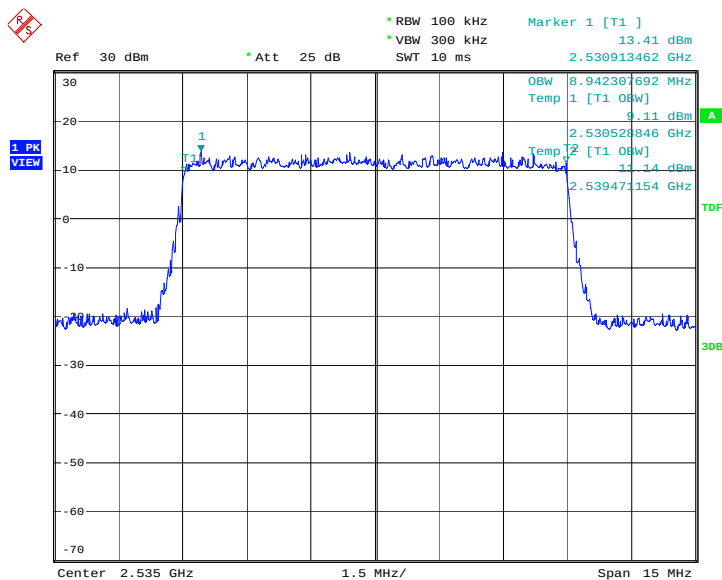


Date: 19.MAR.2014 09:11:12

LTE band 7, 10MHz (99%)

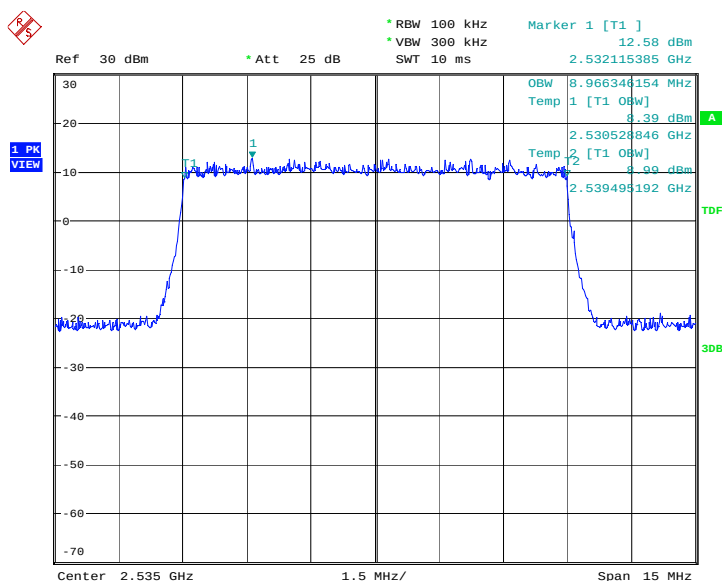
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2535.0	QPSK	16QAM
	8942.308	8966.346

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



Date: 19.MAR.2014 09:12:03

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

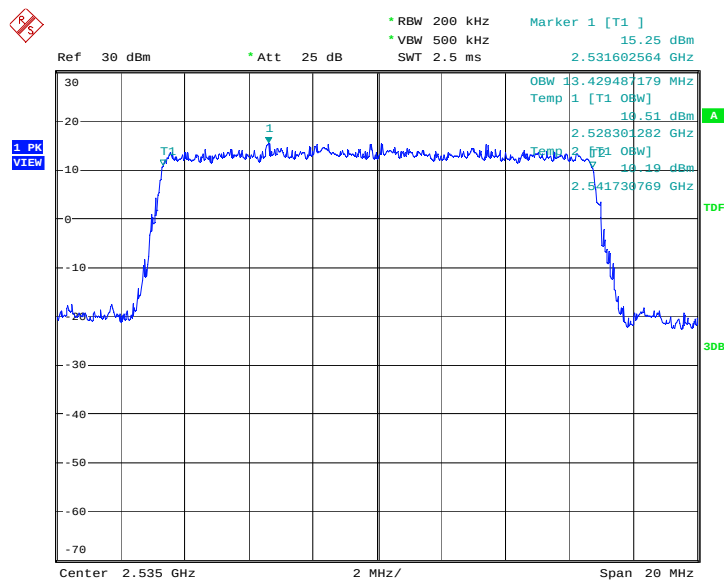


Date: 19.MAR.2014 09:12:16

LTE band 7, 15MHz (99%)

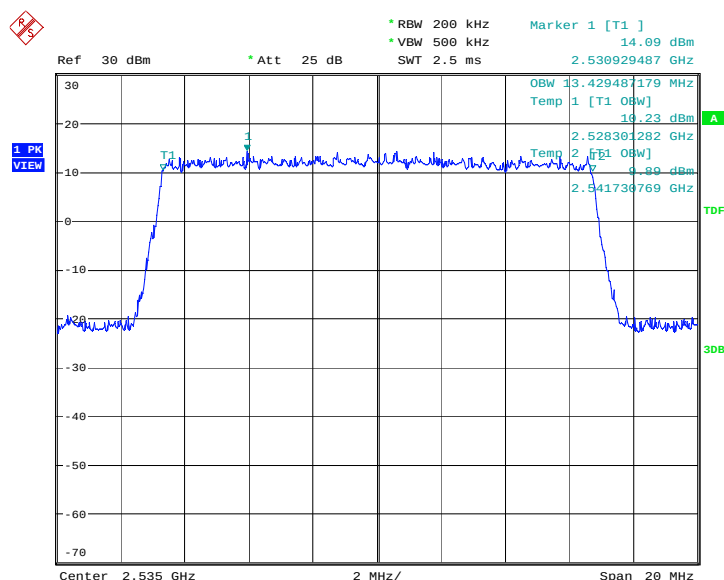
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2535.0	QPSK	16QAM
	13429.487	13429.487

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



Date: 19.MAR.2014 09:13:07

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

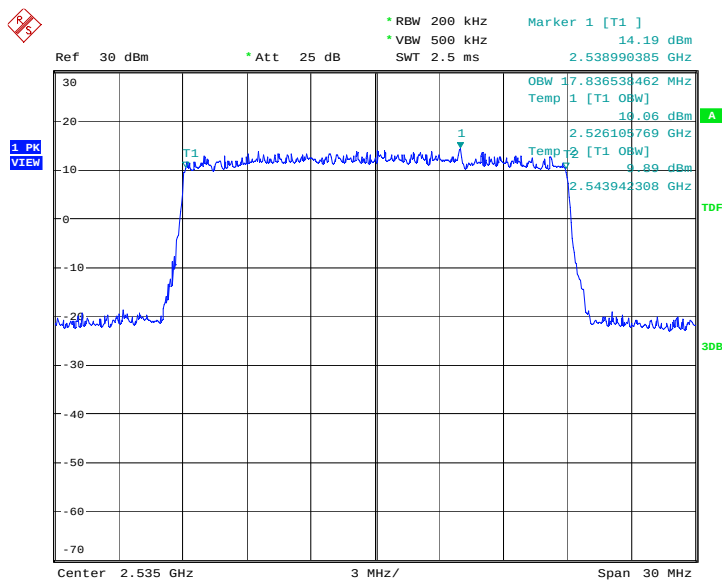


Date: 19.MAR.2014 09:13:21

LTE band 7, 20MHz (99%)

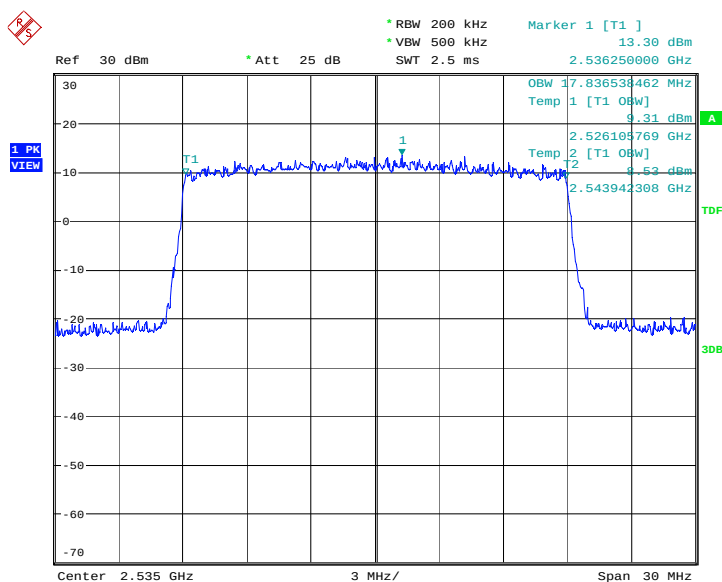
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
2535.0	QPSK	16QAM
	17836.538	17836.538

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



Date: 19.MAR.2014 09:14:13

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

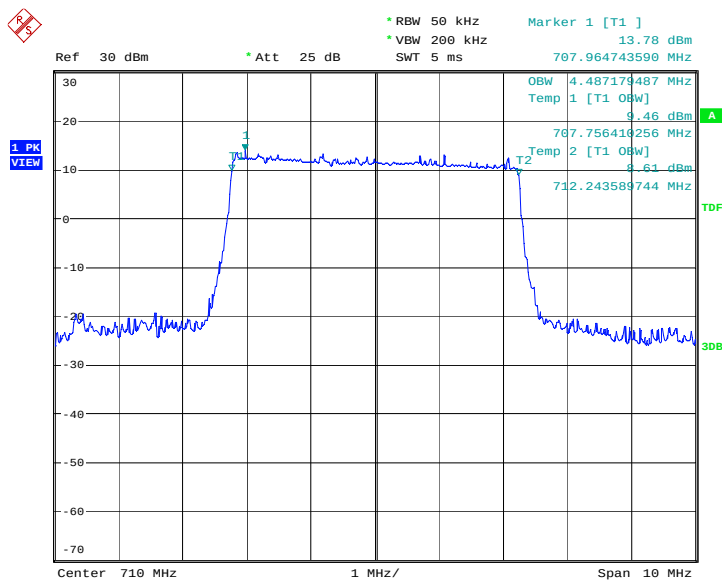


Date: 19.MAR.2014 09:14:27

LTE band 17, 5MHz (99%)

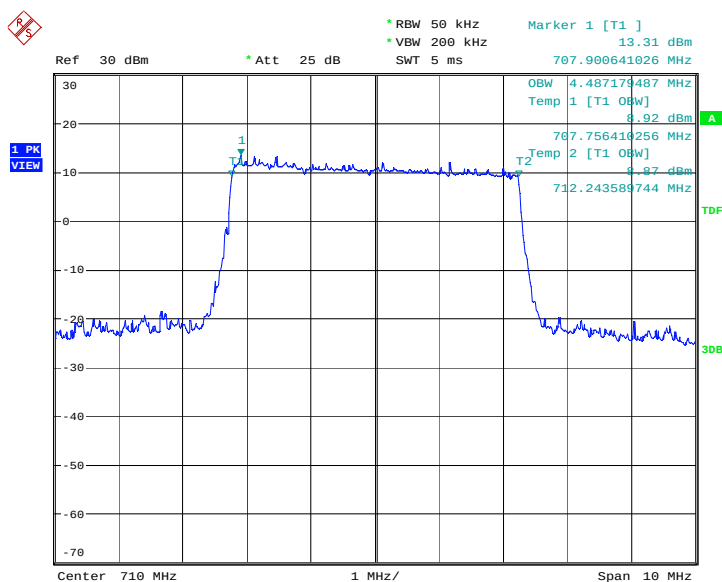
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
710.0	QPSK	16QAM
	4487.179	4487.179

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



Date: 25.FEB.2014 16:39:43

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

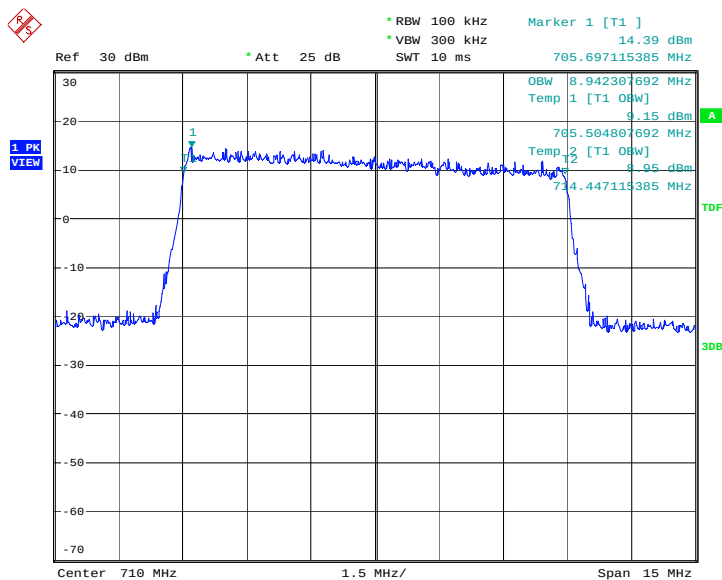


Date: 25.FEB.2014 16:39:57

LTE band 17, 10MHz (99%)

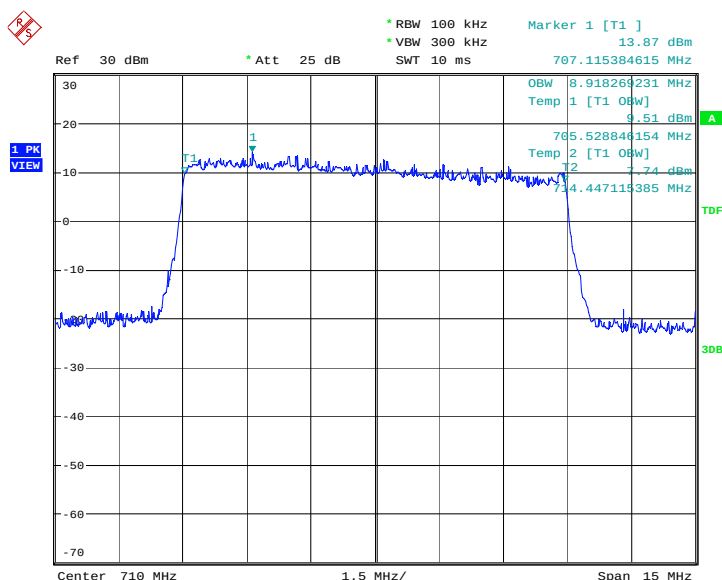
Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
710.0	QPSK	16QAM
	8942.308	8918.269

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



Date: 25.FEB.2014 16:49:30

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



Date: 25.FEB.2014 16:49:44

A.6 EMISSION BANDWIDTH

Reference

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

A.6.1 Emission Bandwidth Results

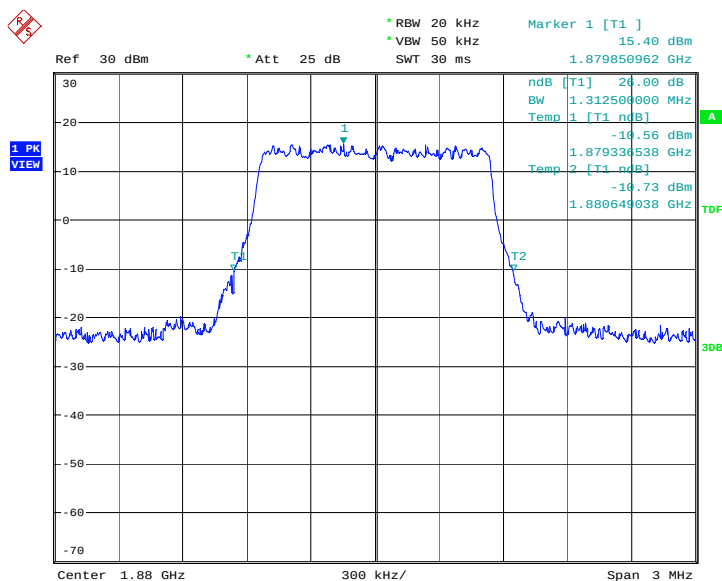
Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

The EUT was set up for the max output power with pseudo random data modulation. Use the Occupied Bandwidth function of SA to measure the 100% bandwidth.

LTE band 2, 1.4MHz (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	1312.500	1302.885

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



Date: 18.MAR.2014 14:01:55

The screenshot displays a VNA measurement of a device under test (DUT). The main plot area shows the magnitude of the transmission coefficient S_{21} in dB versus frequency. The frequency axis is centered at 1.8 GHz with a 300 kHz resolution bandwidth (RBW). The magnitude axis ranges from -70 dB to 30 dB. A blue trace represents the measured signal, which exhibits a clear passband characteristic. Two specific points on the curve are highlighted with green arrows and labeled T1 and T2. To the right of the plot, a parameter panel provides detailed information about the current marker (Marker 1 [T1]), including its power level (14.96 dBm), the used filters (RBW 20 kHz, VBW 50 kHz), and sweep time (SWT 30 ms). Further down, the noise characteristics are shown, with a noise floor of -11.48 dBm and a noise power spectral density (NPD) of -11.06 dBm. The bottom status bar indicates the overall measurement settings: Center 1.8 GHz, Span 3 MHz.

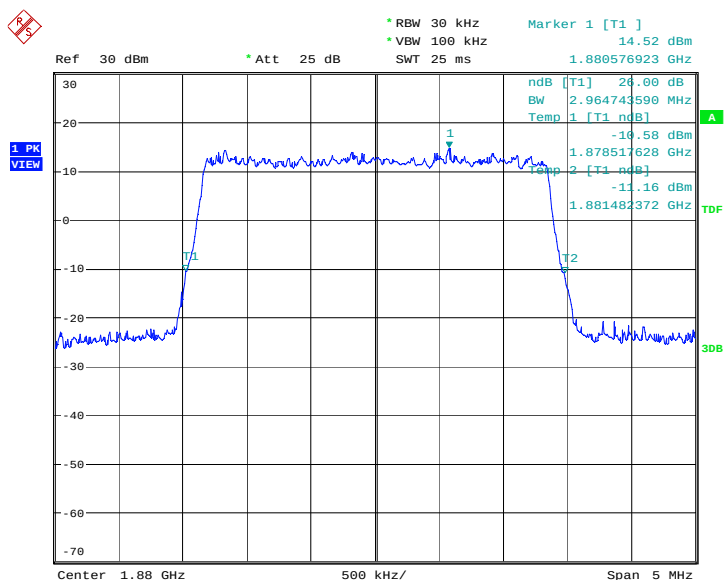
Parameter	Value
Marker 1 [T1]	14.96 dBm
RBW	20 kHz
VBW	50 kHz
SWT	30 ms
Noise Floor	-11.48 dBm
NPD	-11.06 dBm
Center Frequency	1.8 GHz
Span	3 MHz
Resolution Bandwidth	300 kHz

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LTE band 2, 3MHz (-26dBc)

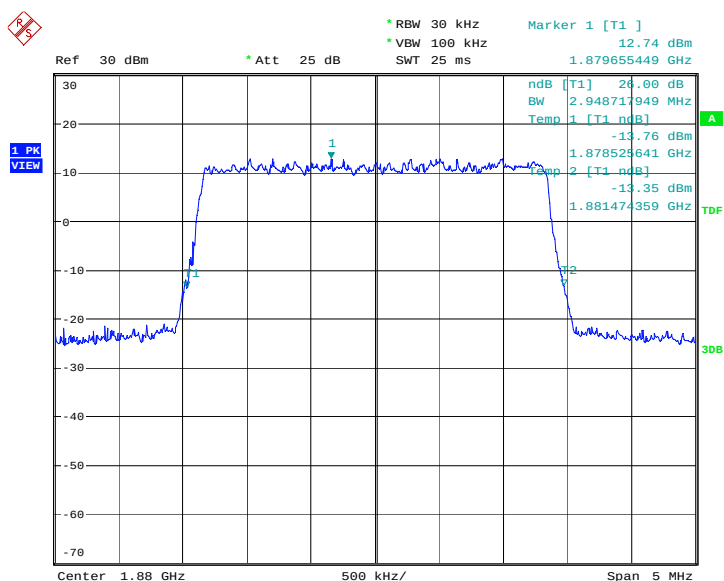
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	2964.744	2948.718

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



Date: 18.MAR.2014 14:08:55

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

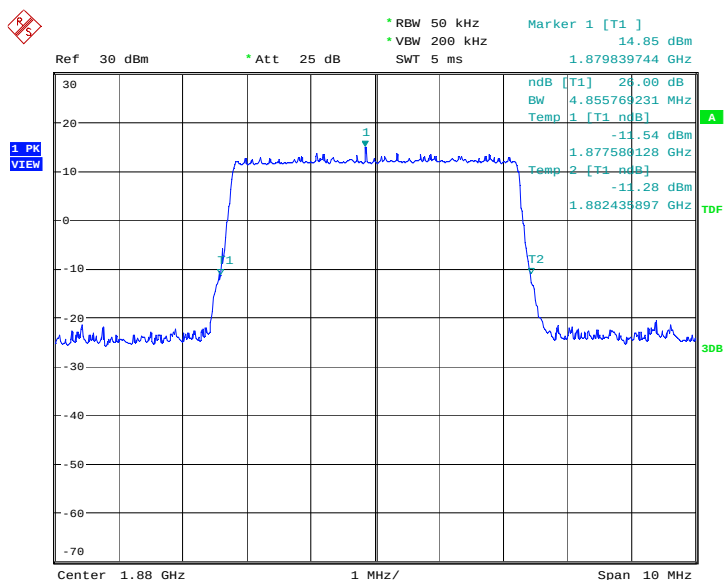


Date: 18.MAR.2014 14:09:11

LTE band 2, 5MHz (-26dBc)

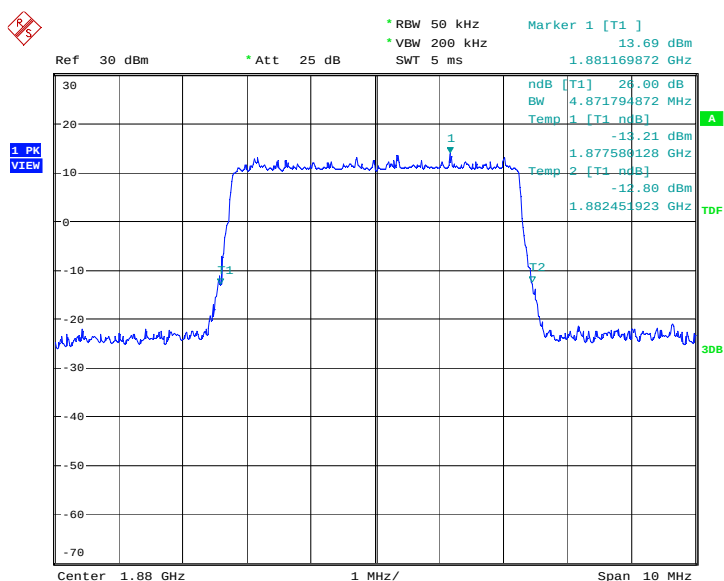
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	4855.769	4871.795

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



Date: 18.MAR.2014 14:15:25

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

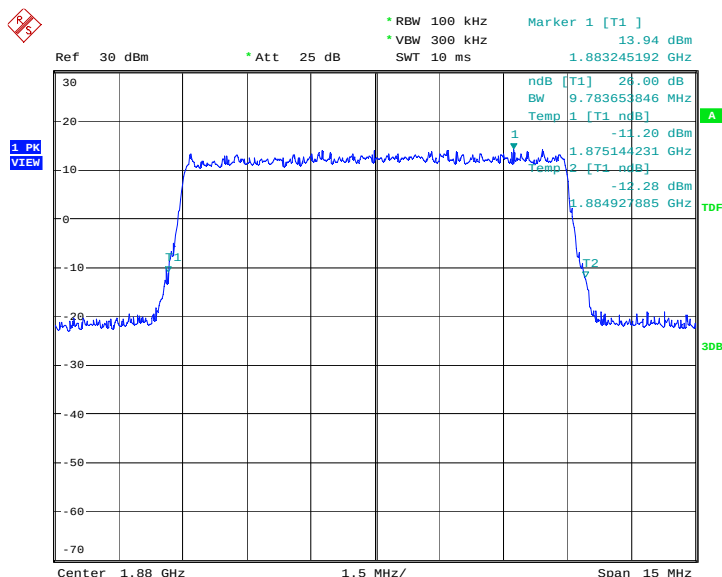


Date: 18.MAR.2014 14:15:41

LTE band 2, 10MHz (-26dBc)

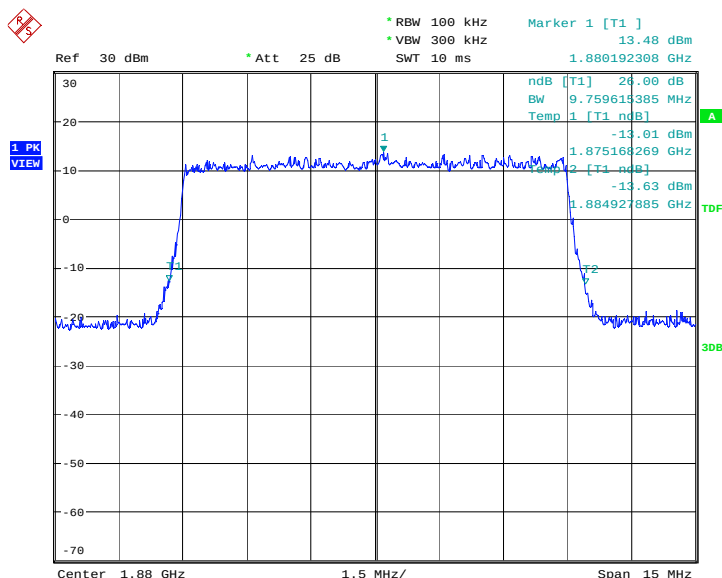
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	9783.654	9759.615

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



Date: 18.MAR.2014 14:21:24

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

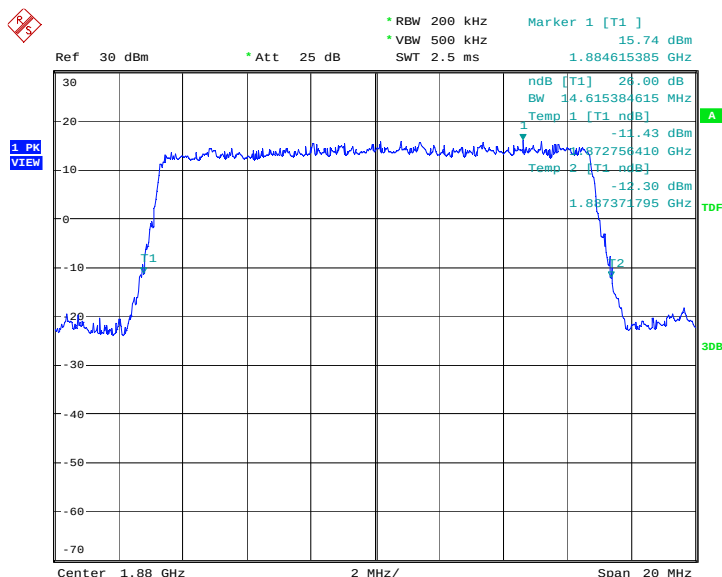


Date: 18.MAR.2014 14:21:40

LTE band 2, 15MHz (-26dBc)

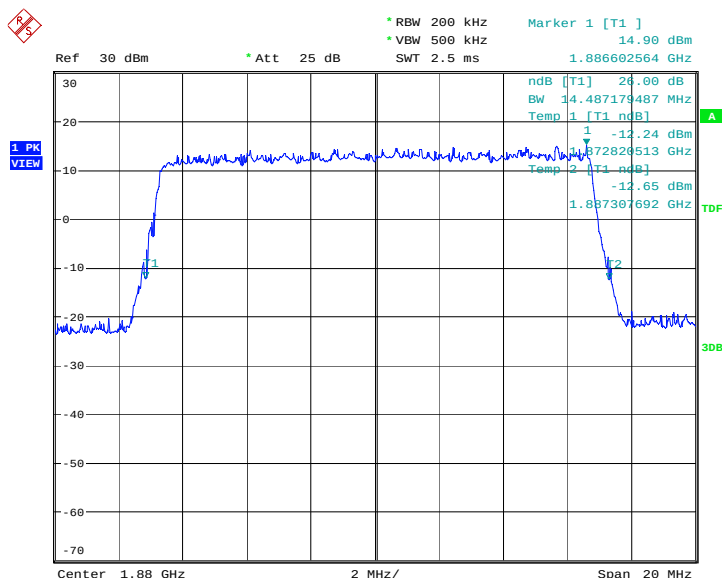
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	14615.385	14487.179

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



Date: 18.MAR.2014 14:27:24

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

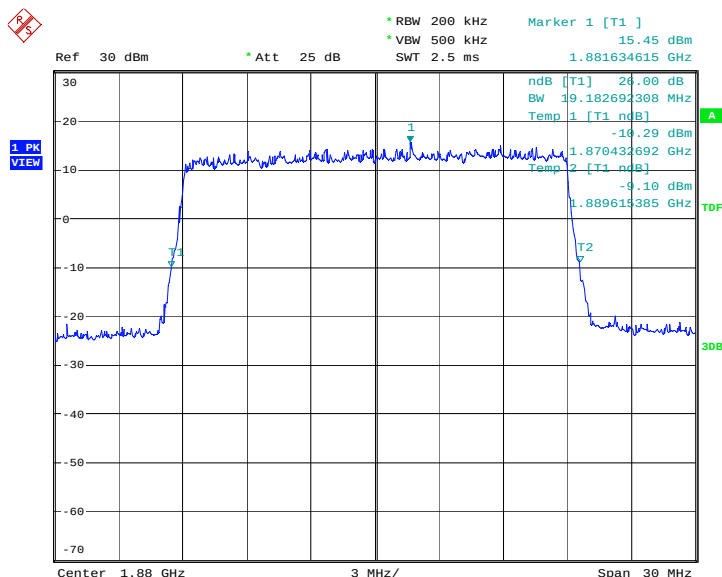


Date: 18.MAR.2014 14:27:40

LTE band 2, 20MHz (-26dBc)

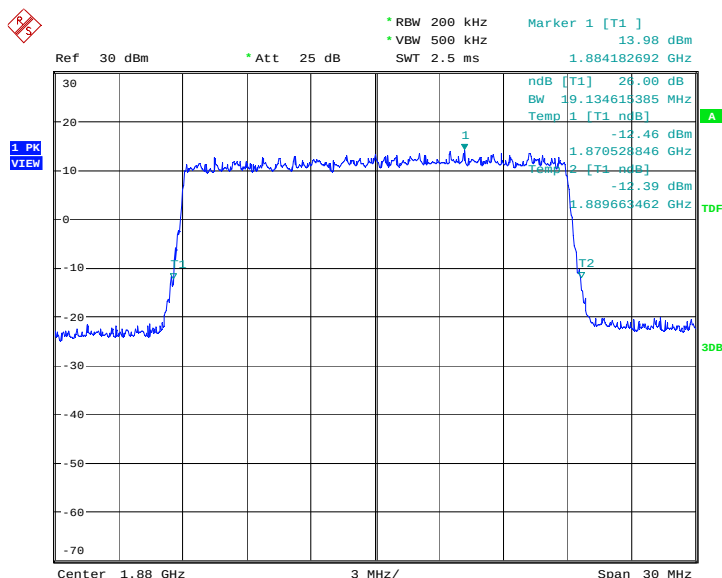
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
1880.0	QPSK	16QAM
	19182.692	19134.615

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



Date: 18.MAR.2014 14:35:25

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

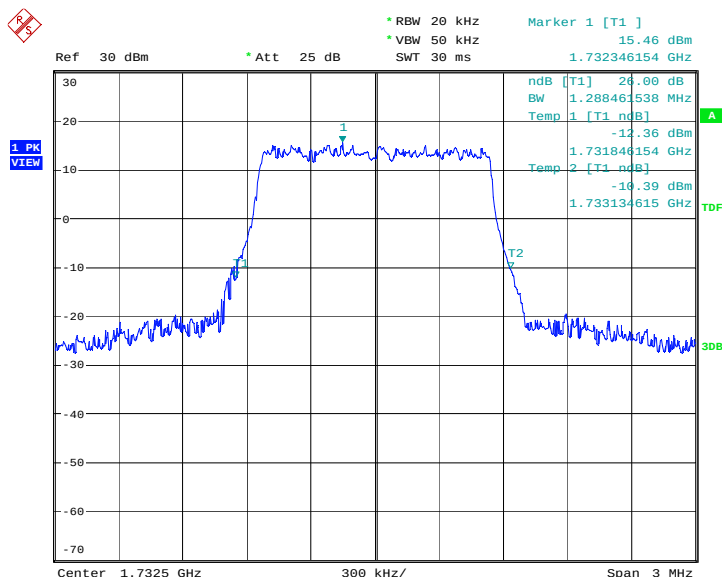


Date: 18.MAR.2014 14:35:40

LTE band 4, 1.4MHz (-26dBc)

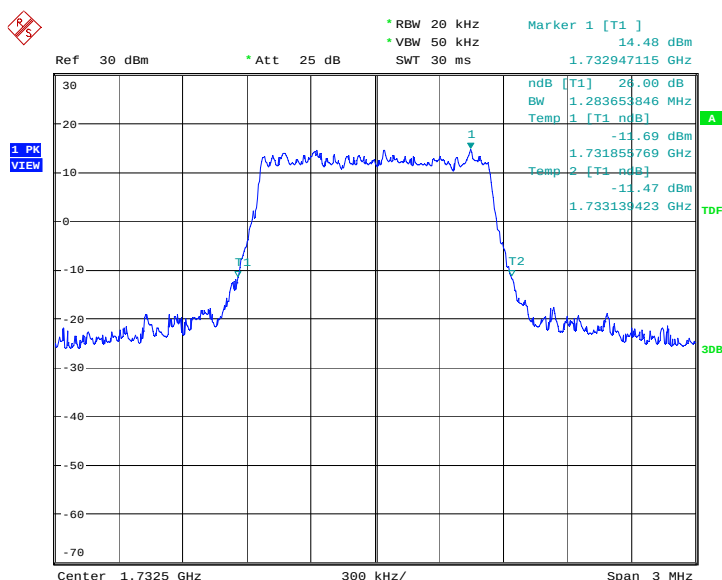
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
1732.5	QPSK	16QAM
	1288.462	1283.654

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



Date: 18.MAR.2014 14:43:29

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

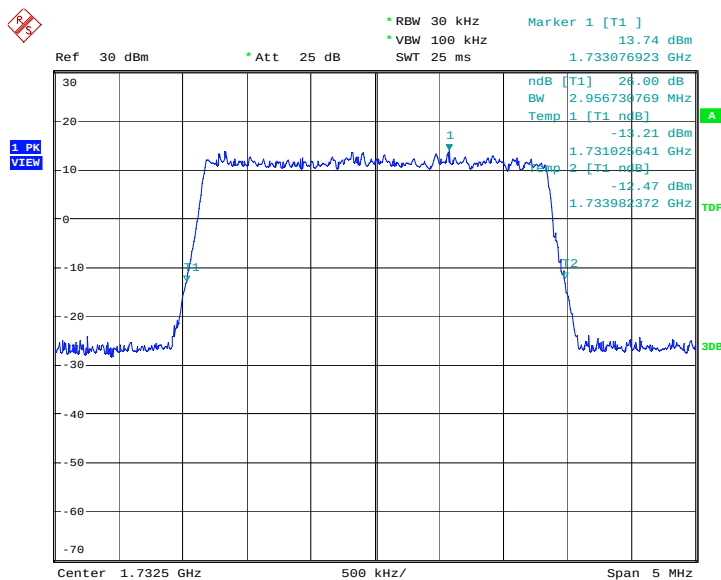


Date: 18.MAR.2014 14:43:45

LTE band 4, 3MHz (-26dBc)

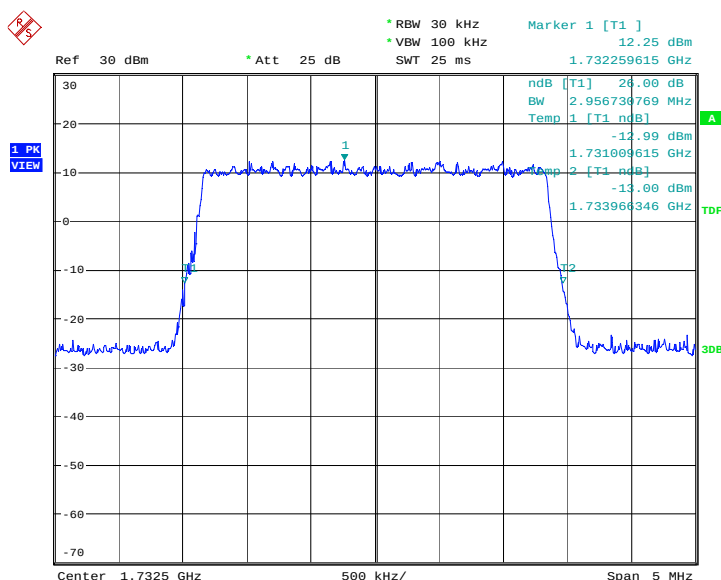
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
1732.5	QPSK	16QAM
	2956.731	2956.731

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



Date: 18.MAR.2014 15:36:01

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

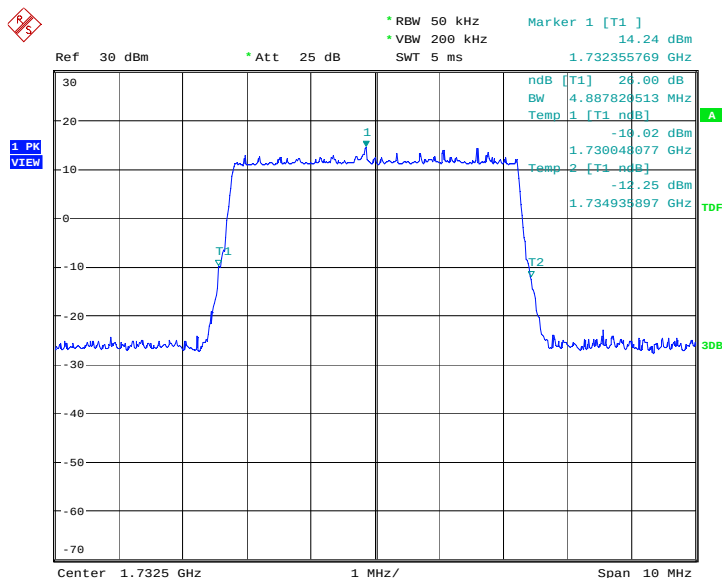


Date: 18.MAR.2014 15:36:17

LTE band 4, 5MHz (-26dBc)

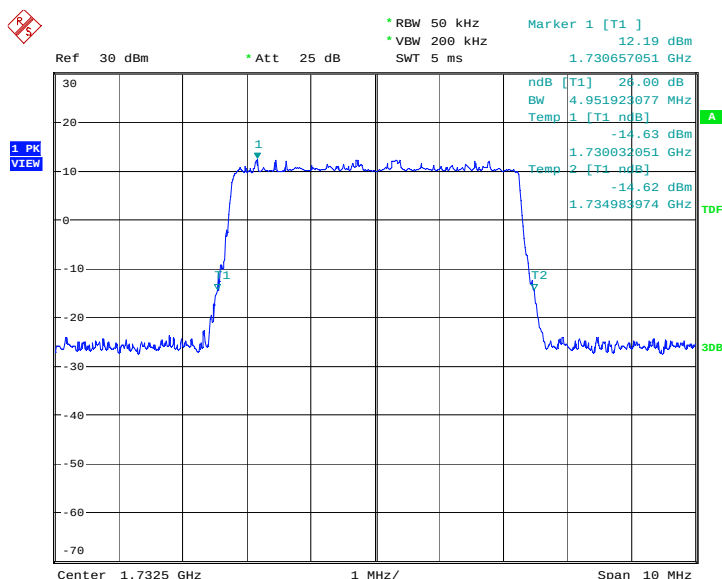
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
1732.5	QPSK	16QAM
	4887.821	4951.923

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



Date: 18.MAR.2014 15:41:30

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

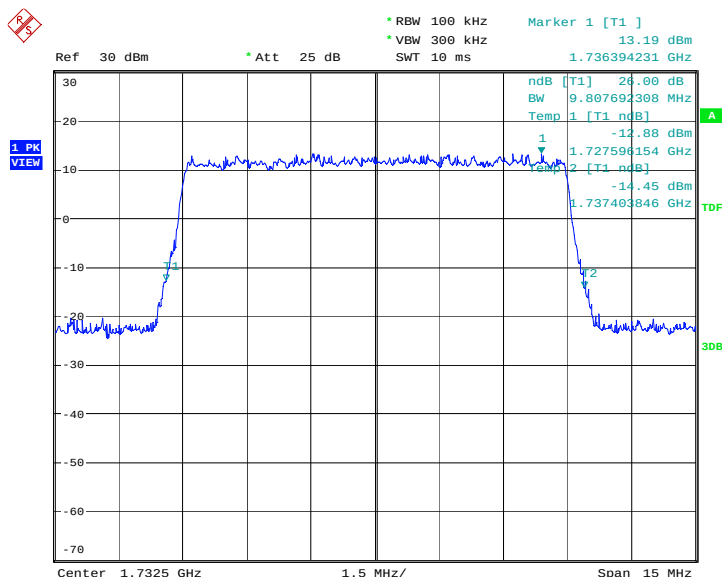


Date: 18.MAR.2014 15:41:46

LTE band 4, 10MHz (-26dBc)

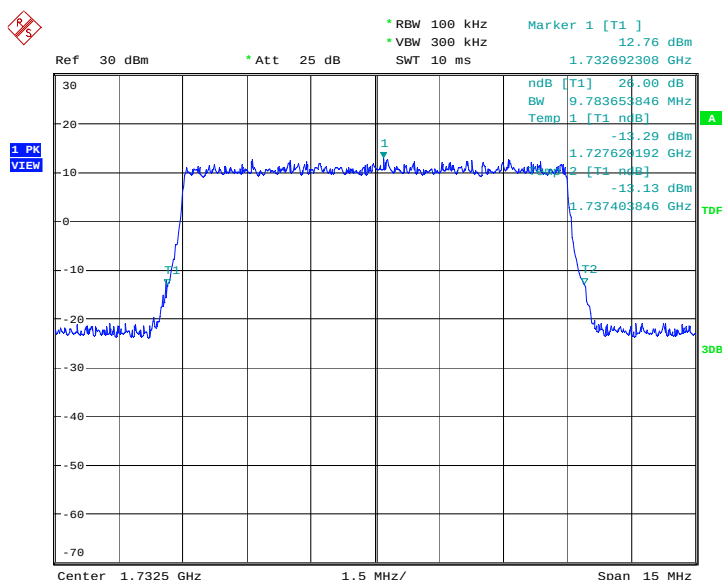
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
1732.5	QPSK	16QAM
	9807.692	9783.654

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



Date: 18.MAR.2014 15:47:30

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

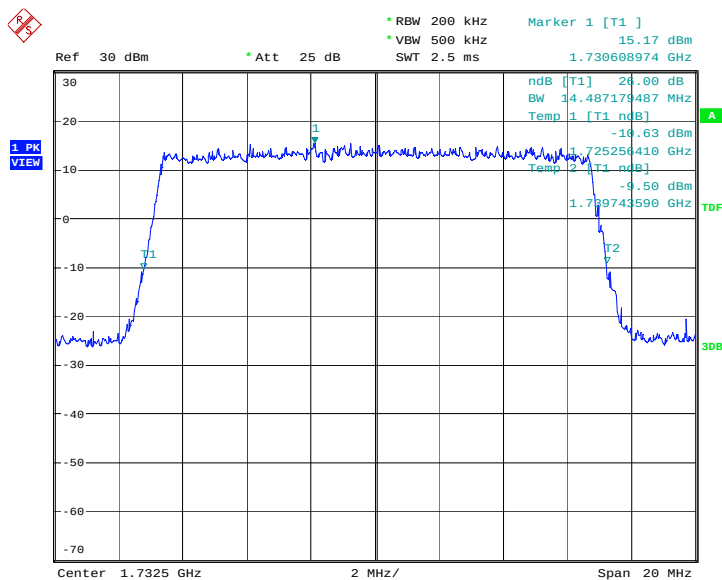


Date: 18.MAR.2014 15:47:46

LTE band 4, 15MHz (-26dBc)

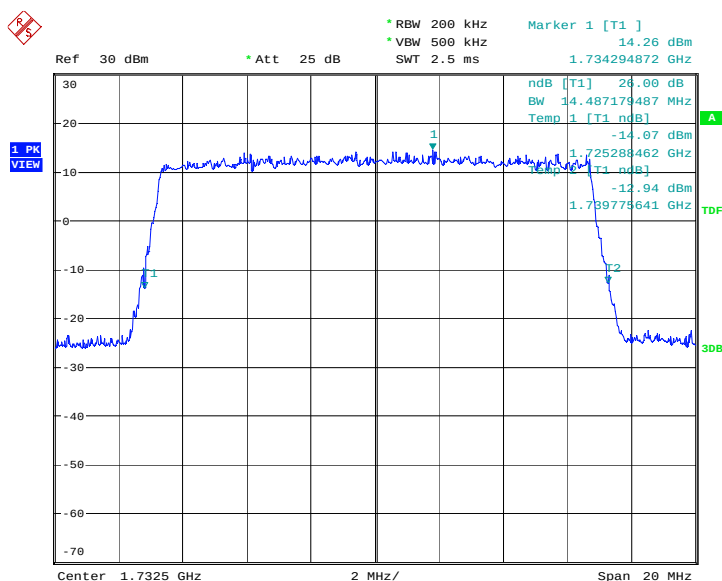
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
1732.5	QPSK	16QAM
	14487.18	14487.18

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



Date: 18.MAR.2014 15:53:30

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

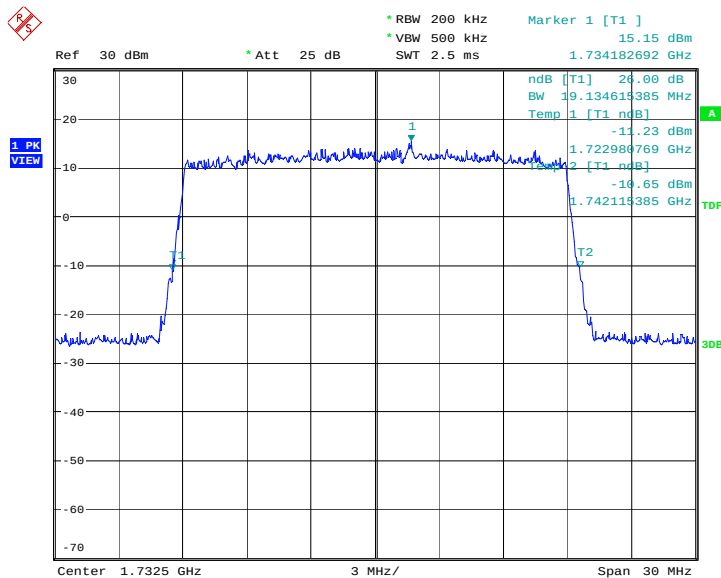


Date: 18.MAR.2014 15:53:46

LTE band 4, 20MHz (-26dBc)

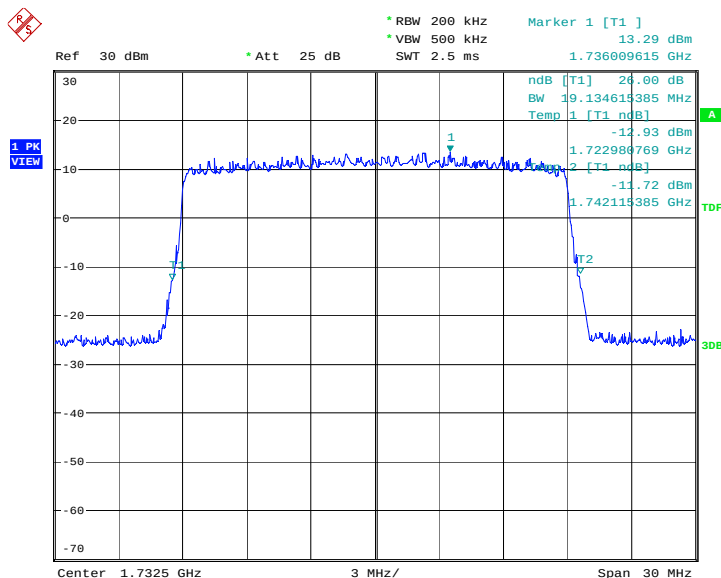
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
1732.5	QPSK	16QAM
	19134.62	19134.62

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



Date: 18.MAR.2014 15:59:30

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

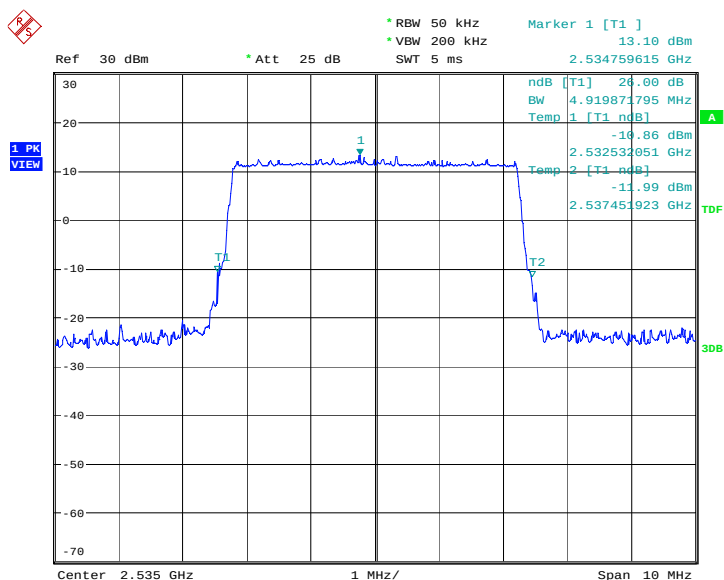


Date: 18.MAR.2014 15:59:46

LTE band 7, 5MHz (-26dBc)

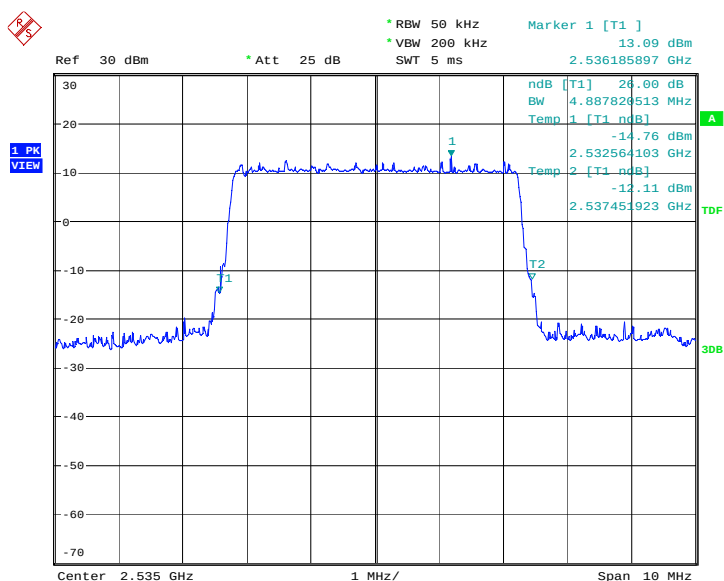
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
2535.0	QPSK	16QAM
	4919.872	4887.821

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



Date: 18.MAR.2014 13:38:22

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

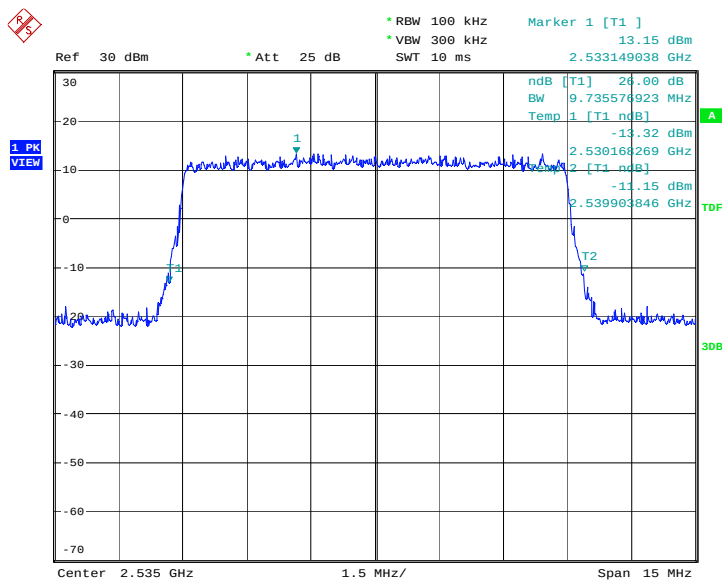


Date: 18.MAR.2014 13:38:38

LTE band 7, 10MHz (-26dBc)

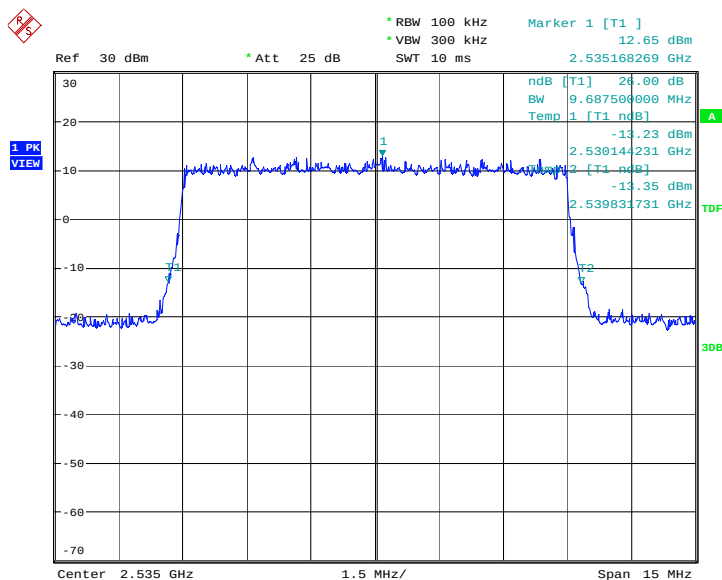
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
2535.0	QPSK	16QAM
	9735.577	9687.5

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



Date: 18.MAR.2014 13:43:52

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

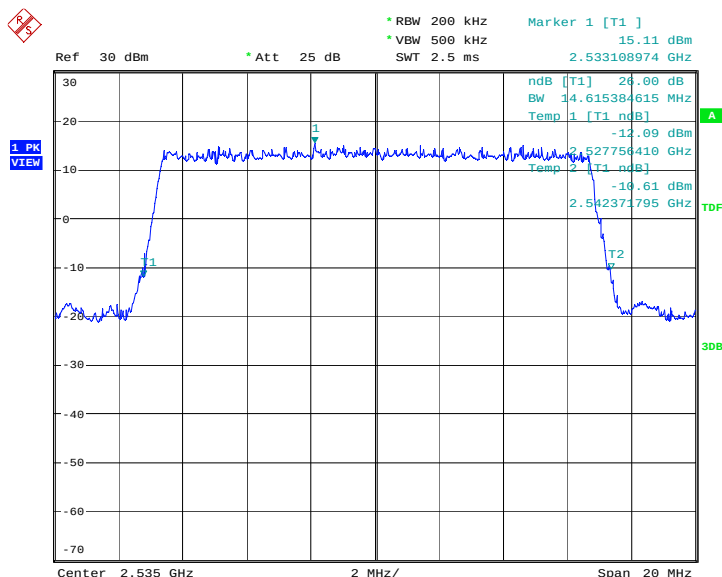


Date: 18.MAR.2014 13:44:08

LTE band 7, 15MHz (-26dBc)

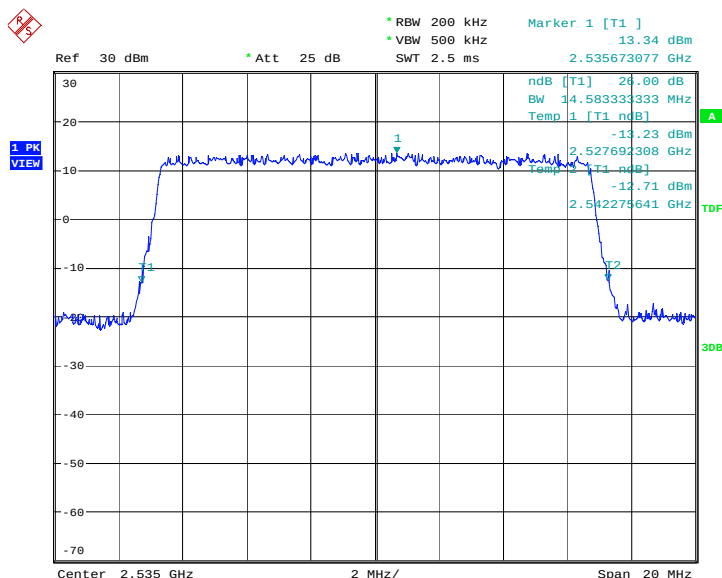
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
2535.0	QPSK	16QAM
	14615.38	14583.33

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



Date: 18.MAR.2014 13:50:22

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

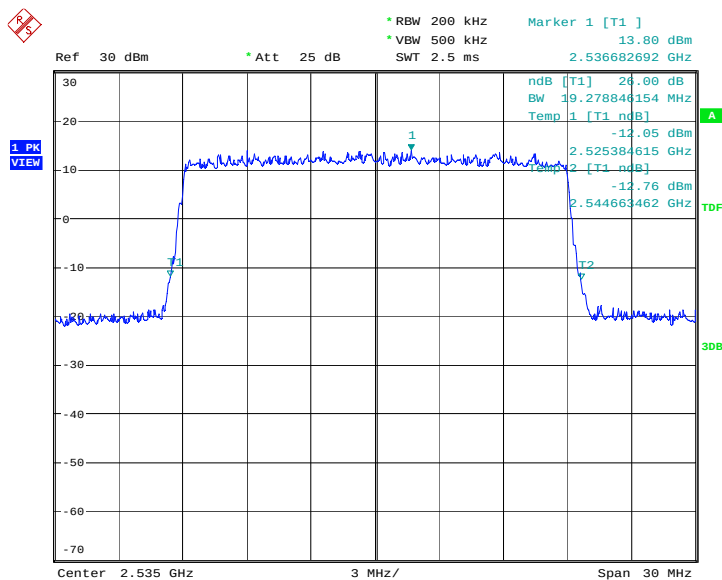


Date: 18.MAR.2014 13:50:38

LTE band 7, 20MHz (-26dBc)

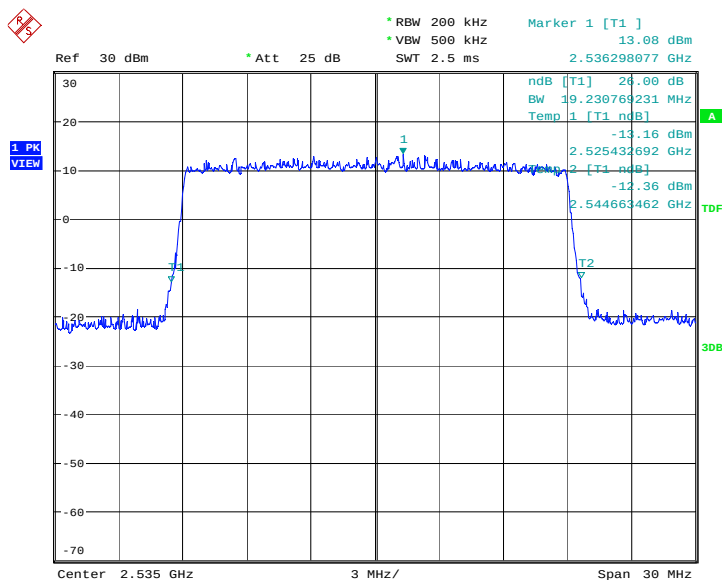
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
2535.0	QPSK	16QAM
	19278.85	19230.77

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



Date: 18.MAR.2014 13:56:22

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

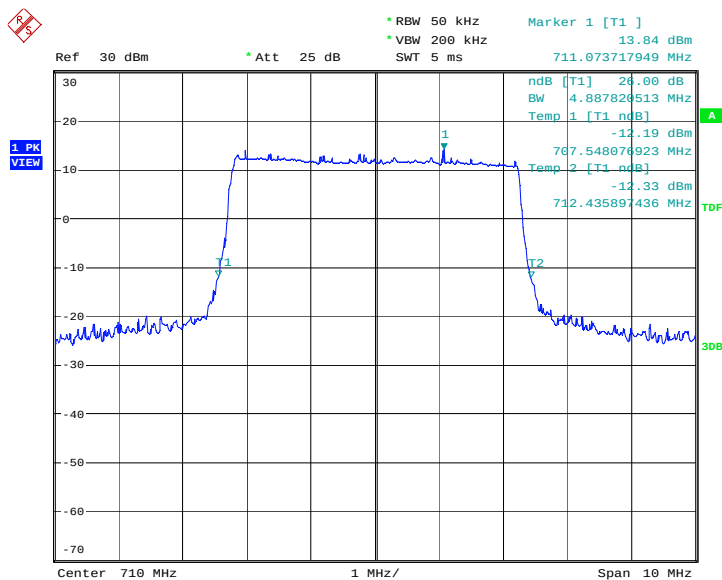


Date: 18.MAR.2014 13:56:38

LTE band 17, 5MHz (-26dBc)

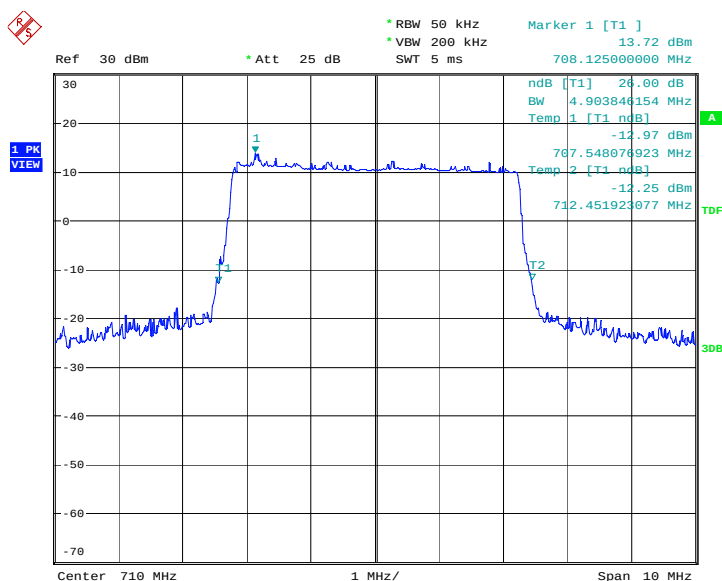
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
710.0	QPSK	16QAM
	4887.821	4903.846

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



Date: 19.MAR.2014 09:29:34

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

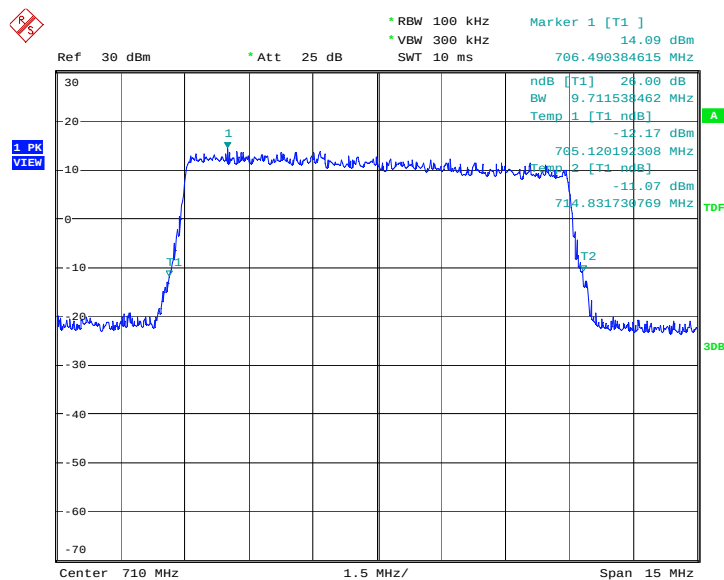


Date: 19.MAR.2014 09:29:50

LTE band 17, 10MHz (-26dBc)

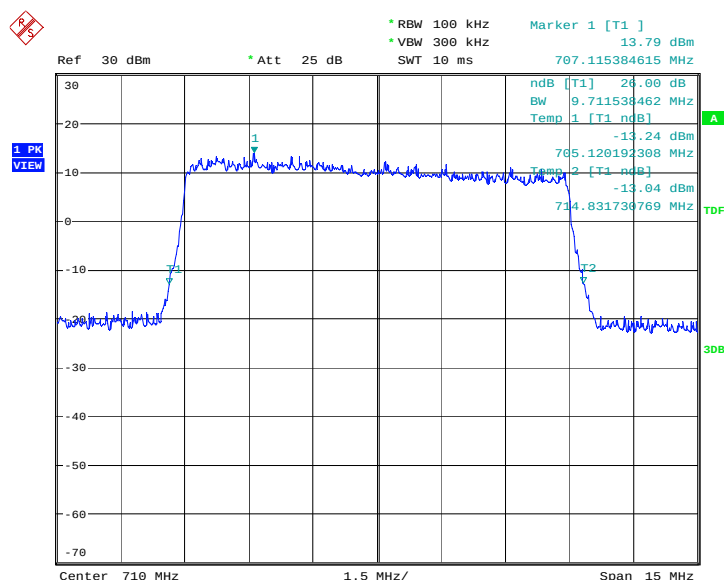
Frequency(MHz)	Occupied Bandwidth (-26dBc)(kHz)	
710.0	QPSK	16QAM
	9711.538	9711.538

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



Date: 19.MAR.2014 13:16:13

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



Date: 19.MAR.2014 13:16:28

A.7 BAND EDGE COMPLIANCE

Reference

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

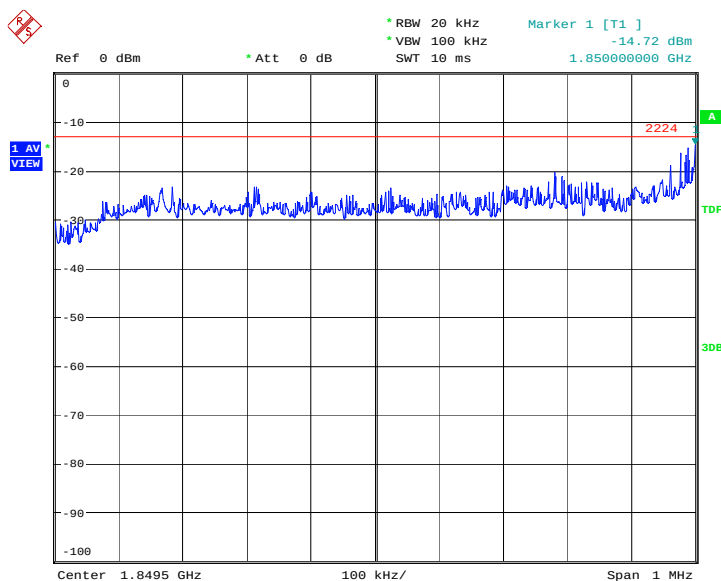
A.7.1 Measurement limit

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. Search the peak marker below low frequency for low band edge or above high frequency for high band edge.

A.7.2 Measurement result

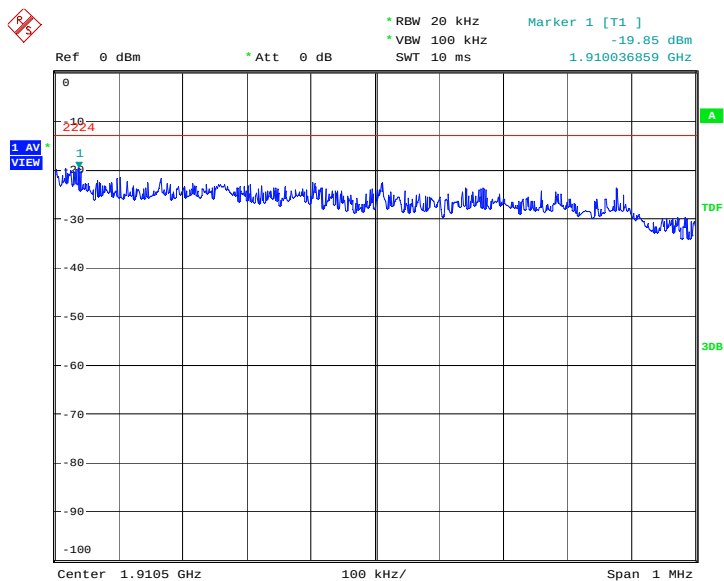
LTE band 2, 1.4MHz

LOW BAND EDGE BLOCK-QPSK



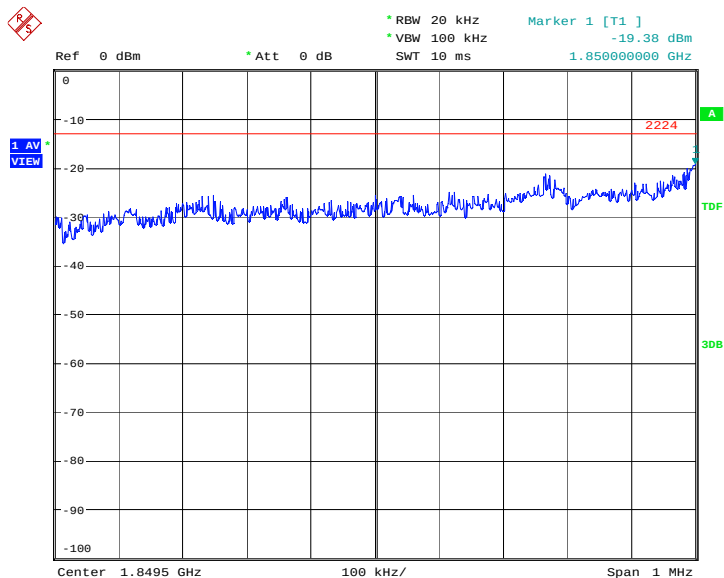
Date: 18.MAR.2014 14:00:50

HIGH BAND EDGE BLOCK-QPSK



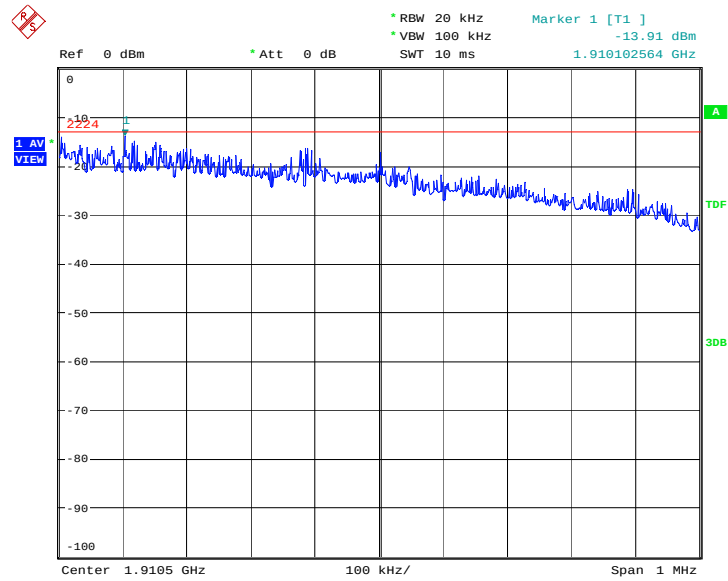
Date: 18.MAR.2014 14:04:10

LOW BAND EDGE BLOCK-16QAM



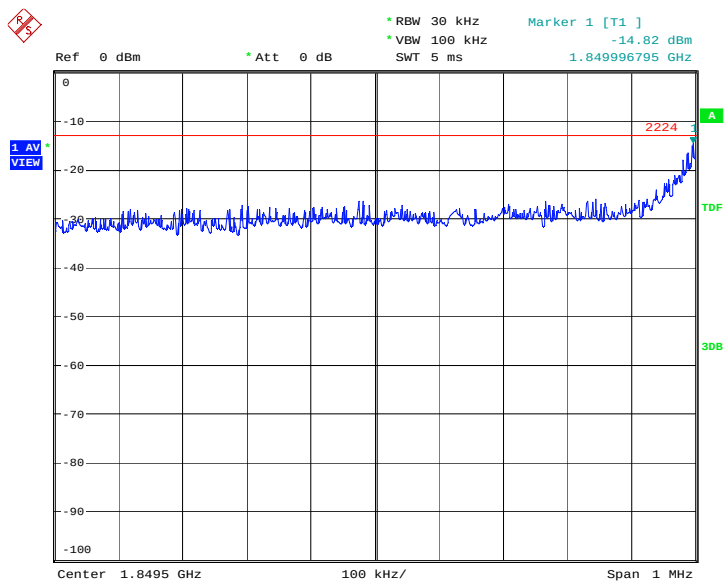
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HIGH BAND EDGE BLOCK-16QAM



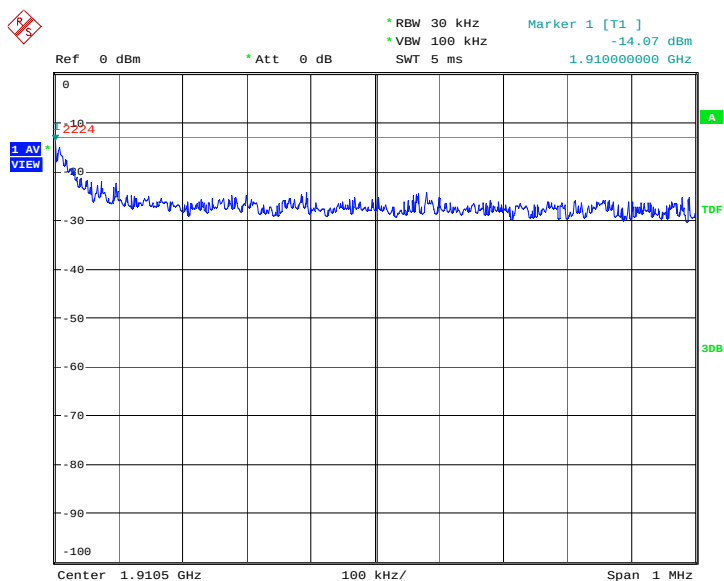
Date: 19.MAR.2014 13:52:56

LTE band 2, 3MHz LOW BAND EDGE BLOCK-QPSK



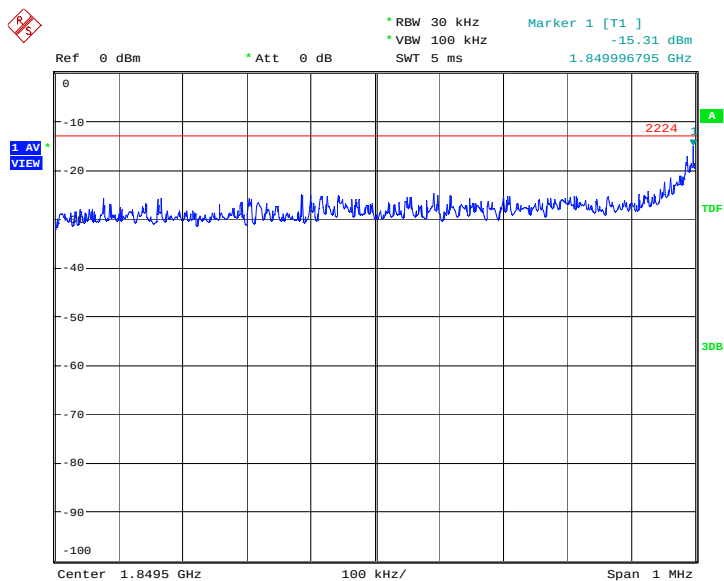
Date: 18.MAR.2014 14:06:19

HIGH BAND EDGE BLOCK-QPSK



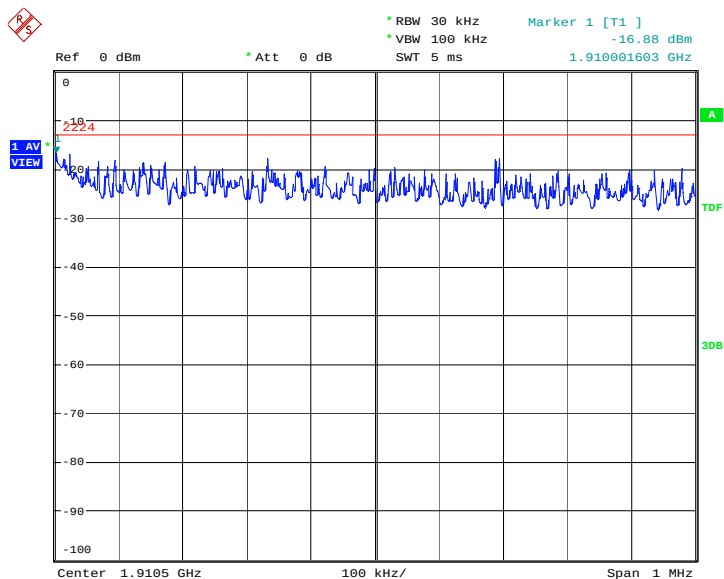
Date: 18.MAR.2014 14:11:10

LOW BAND EDGE BLOCK-16QAM



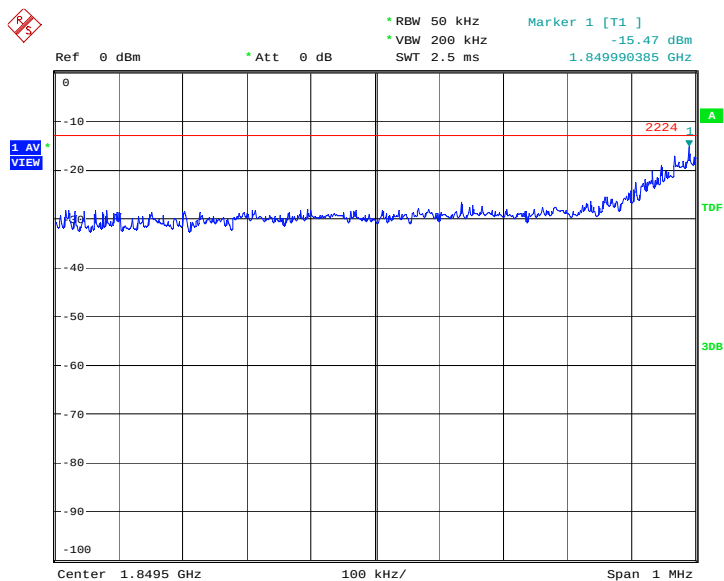
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HIGH BAND EDGE BLOCK-16QAM



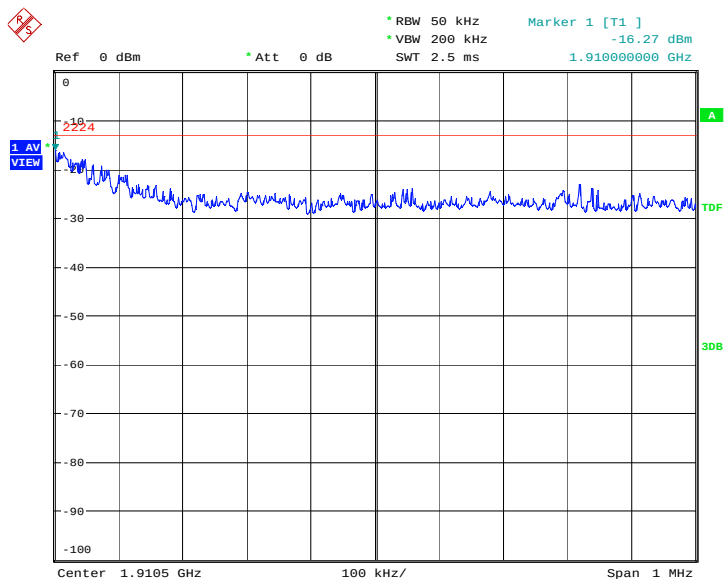
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LTE band 2, 5MHz LOW BAND EDGE BLOCK-QPSK



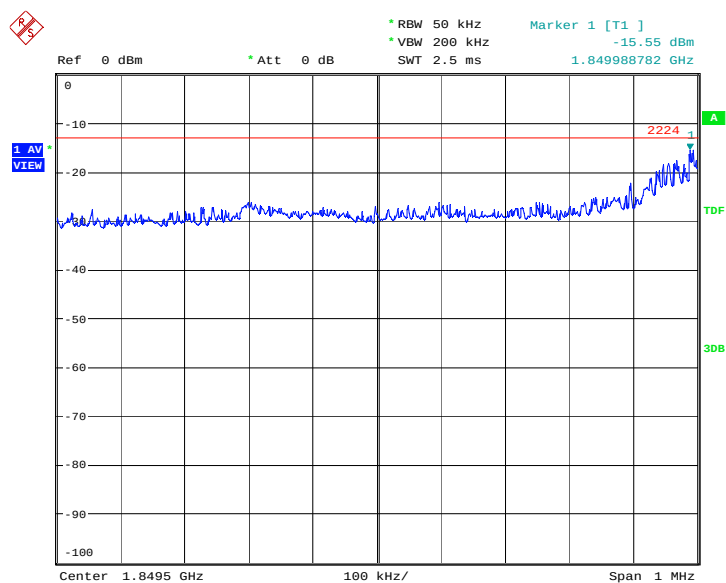
Date: 18.MAR.2014 14:14:20

HIGH BAND EDGE BLOCK-QPSK



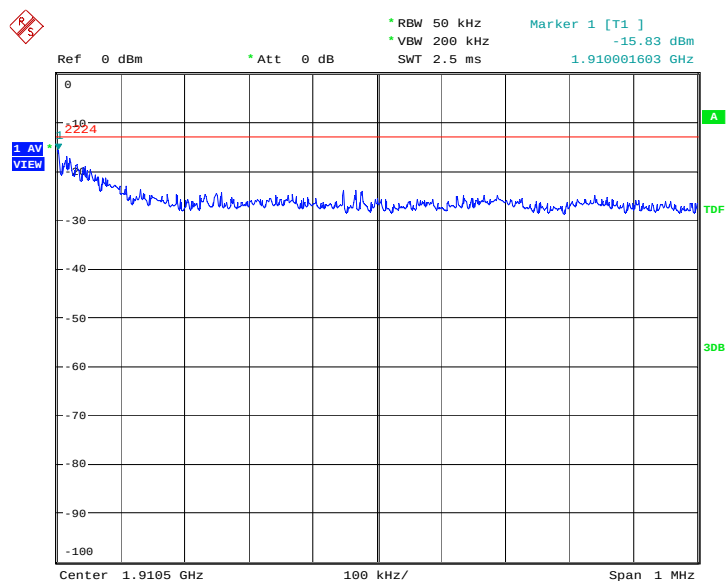
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LOW BAND EDGE BLOCK-16QAM



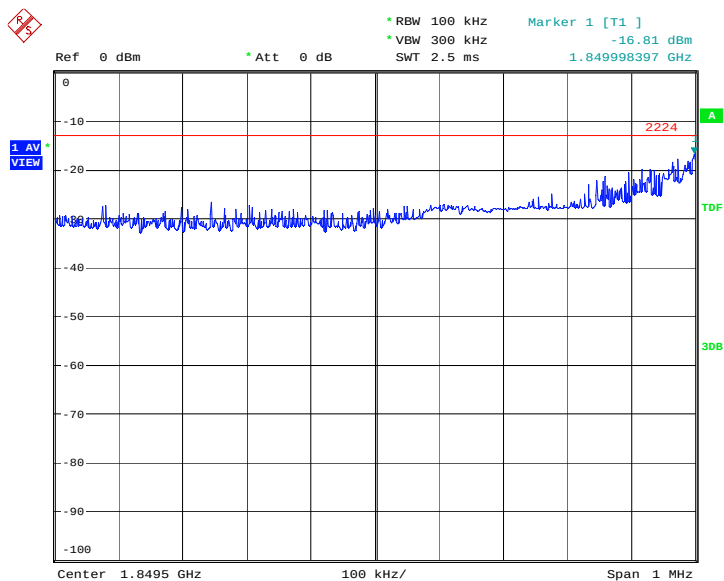
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HIGH BAND EDGE BLOCK-16QAM



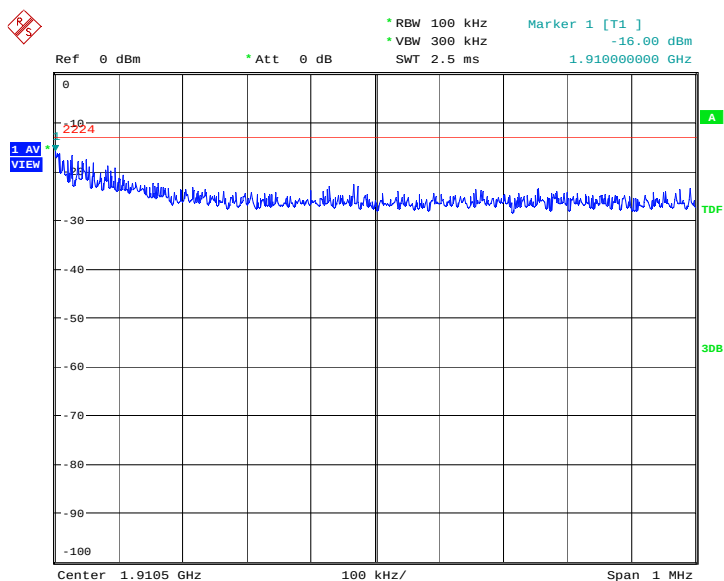
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LTE band 2, 10MHz LOW BAND EDGE BLOCK-QPSK



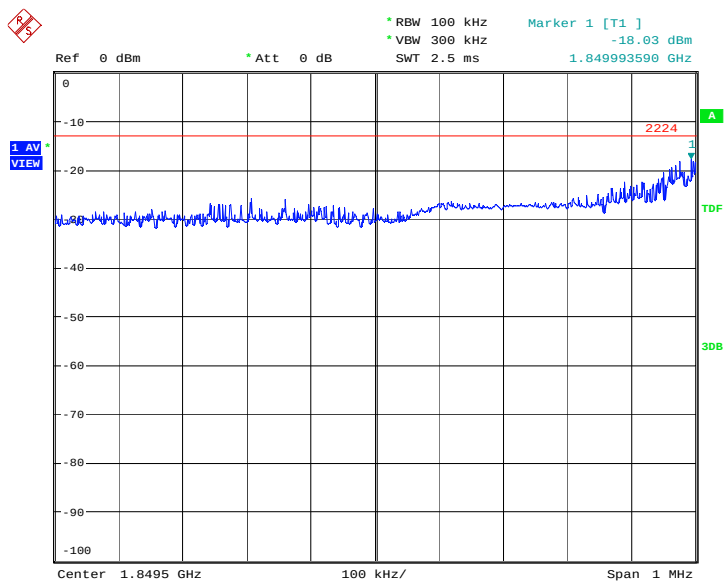
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HIGH BAND EDGE BLOCK-QPSK



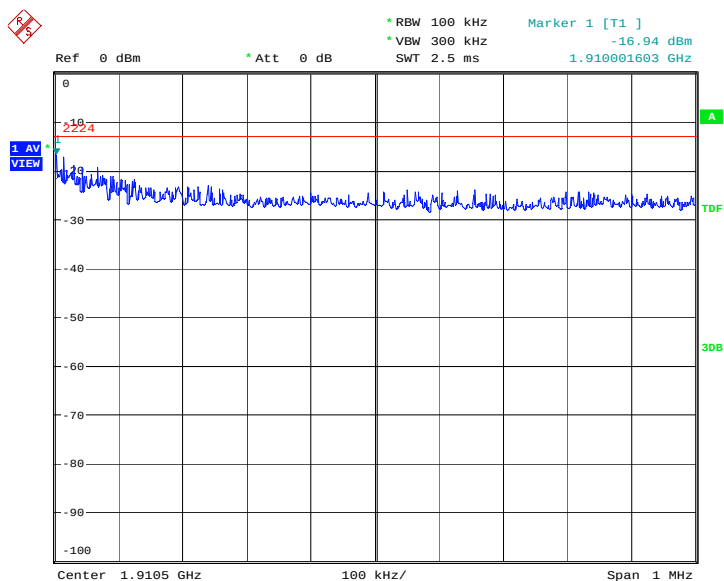
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LOW BAND EDGE BLOCK-16QAM



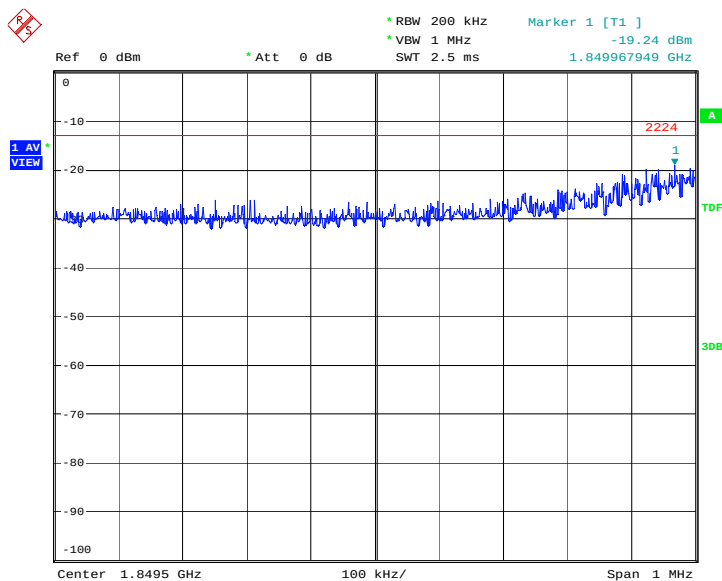
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HIGH BAND EDGE BLOCK-16QAM



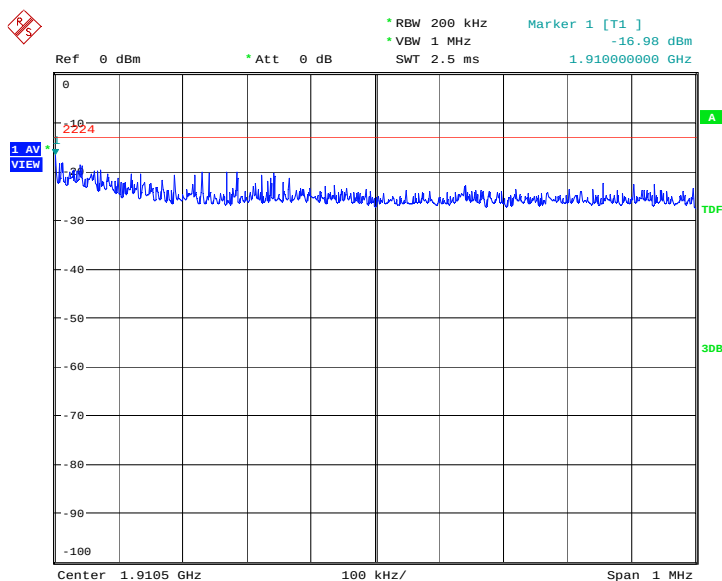
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LTE band 2, 15MHz LOW BAND EDGE BLOCK-QPSK



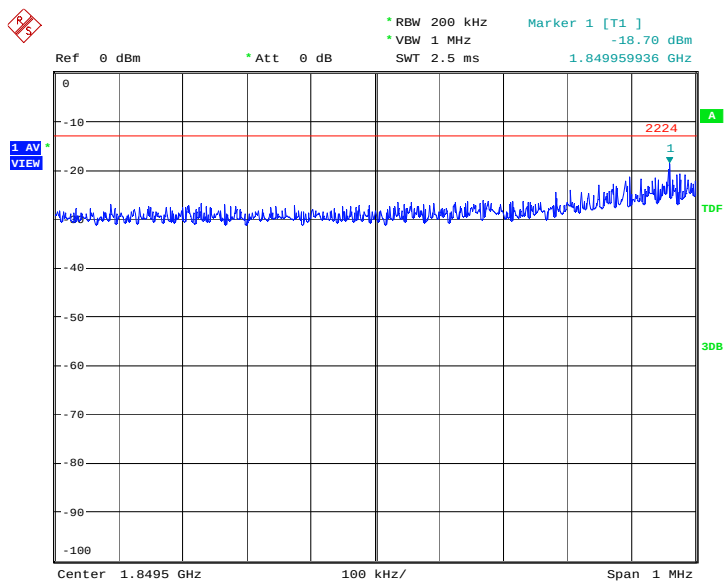
Date: 18.MAR.2014 14:26:19

HIGH BAND EDGE BLOCK-QPSK



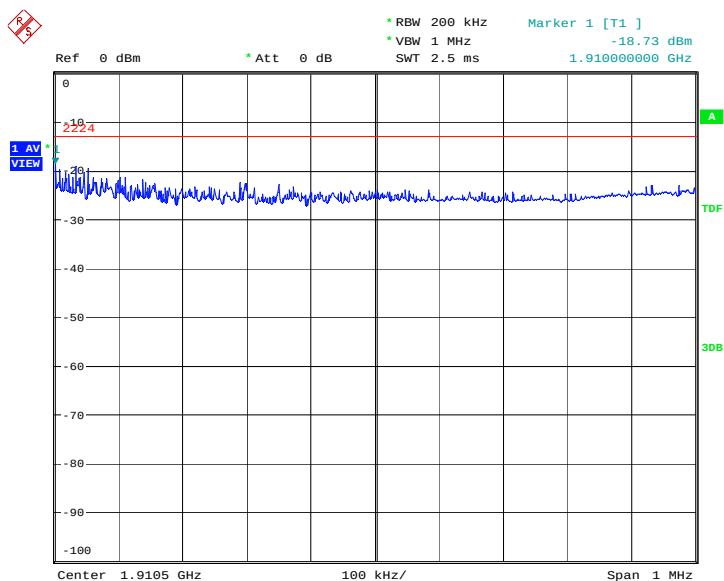
Date: 18.MAR.2014 14:30:10

LOW BAND EDGE BLOCK-16QAM



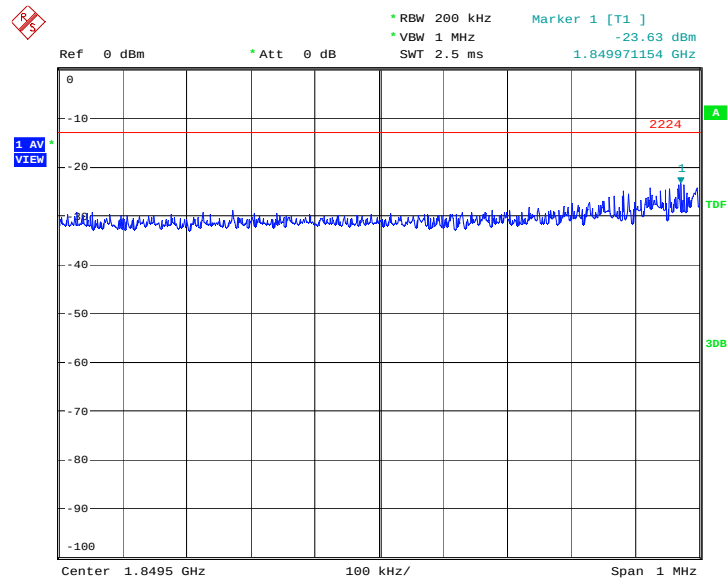
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HIGH BAND EDGE BLOCK-16QAM



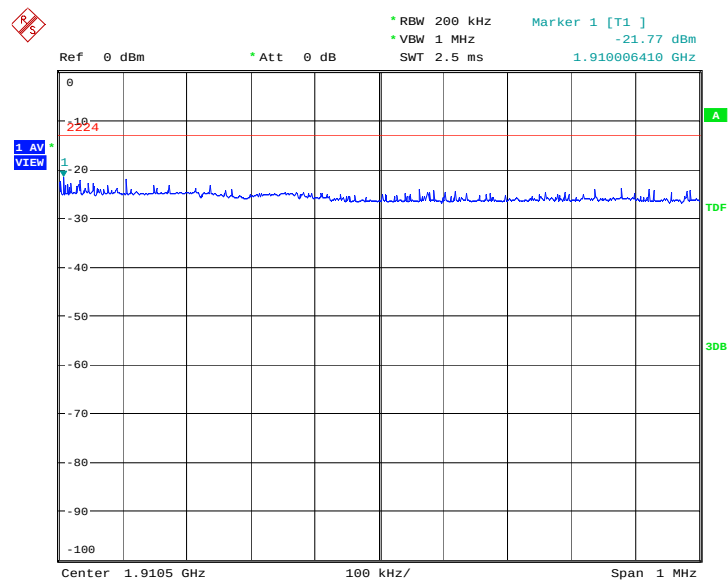
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LTE band 2, 20MHz LOW BAND EDGE BLOCK-QPSK



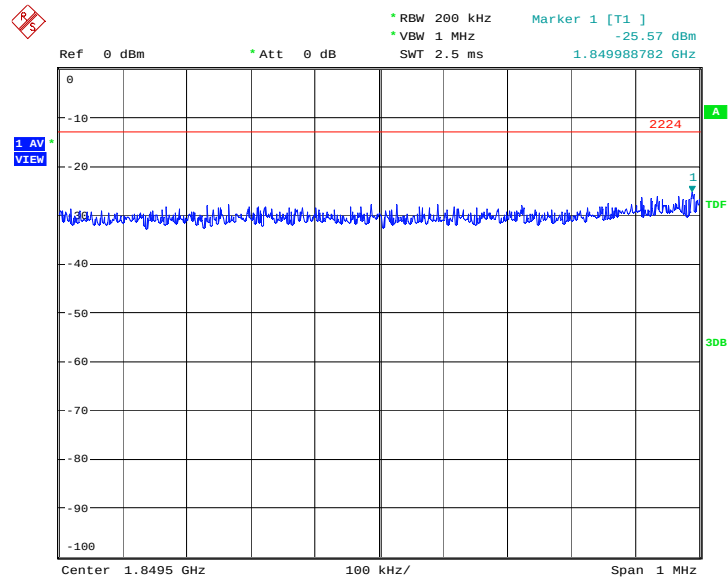
Date: 18.MAR.2014 14:34:19

HIGH BAND EDGE BLOCK-QPSK



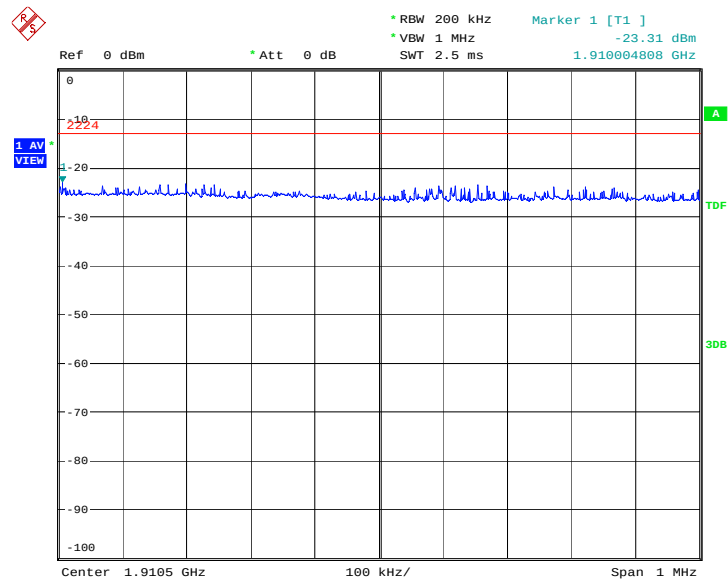
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LOW BAND EDGE BLOCK-16QAM



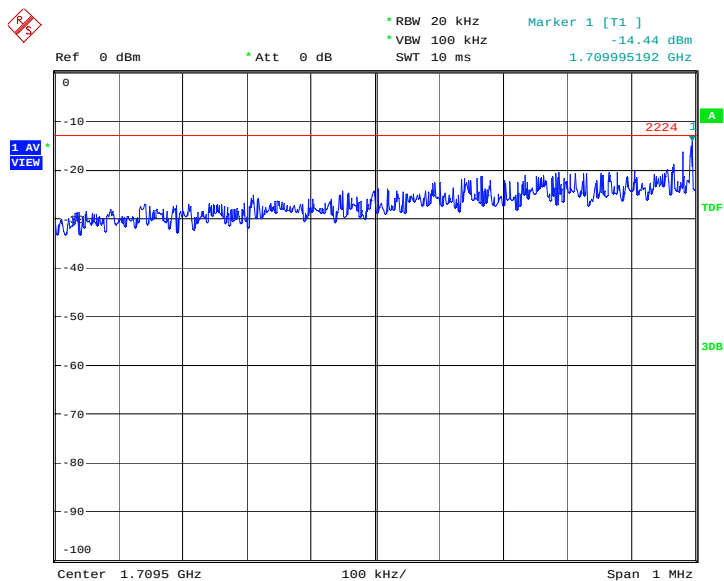
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HIGH BAND EDGE BLOCK-16QAM



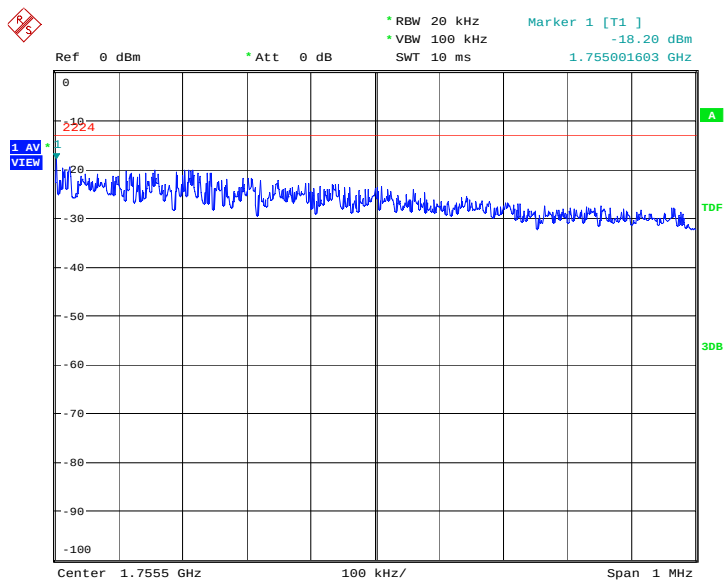
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LTE band 4, 1.4MHz LOW BAND EDGE BLOCK-QPSK



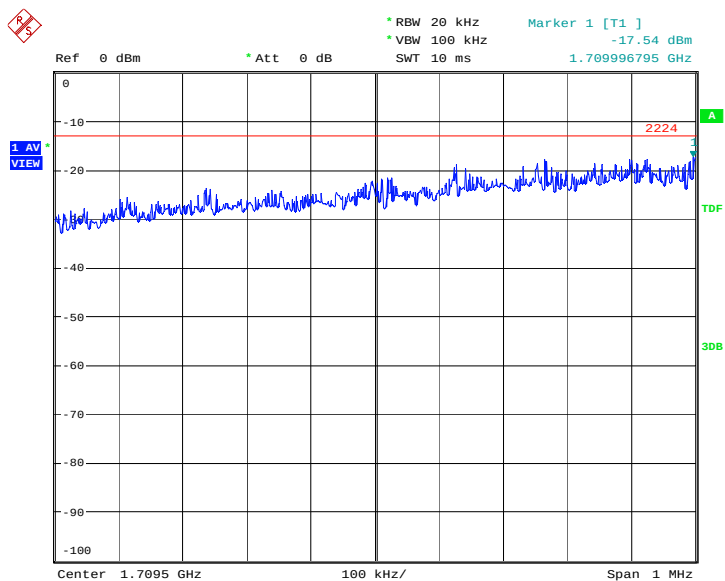
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HIGH BAND EDGE BLOCK-QPSK



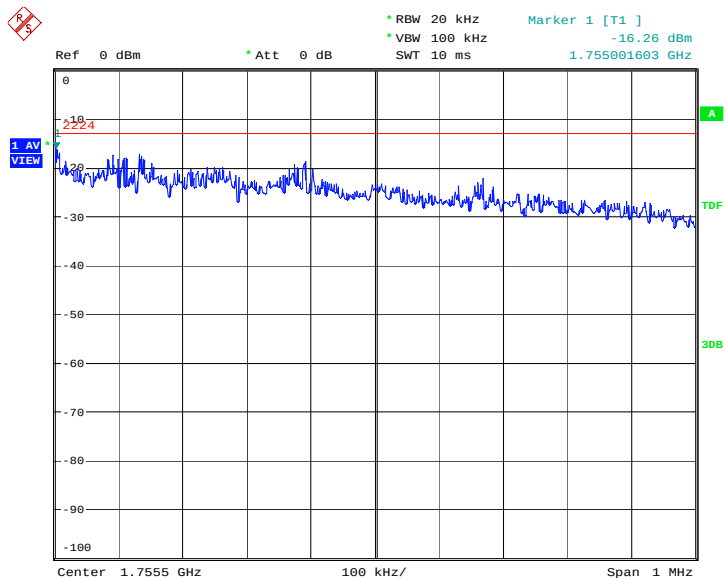
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LOW BAND EDGE BLOCK-16QAM



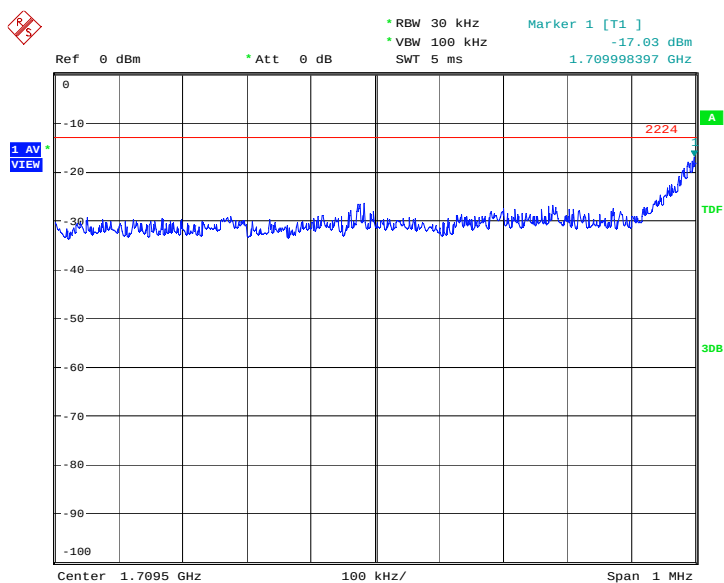
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HIGH BAND EDGE BLOCK-16QAM



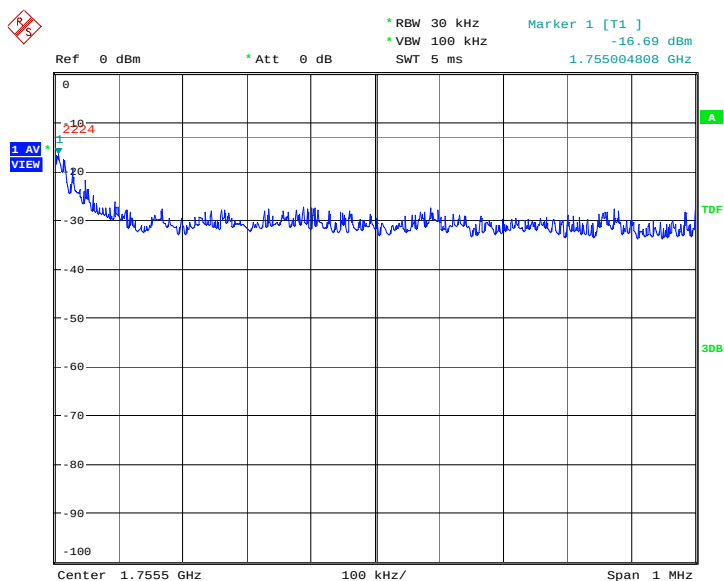
Date: 18.MAR.2014 14:49:54

LTE band 4, 3MHz LOW BAND EDGE BLOCK-QPSK



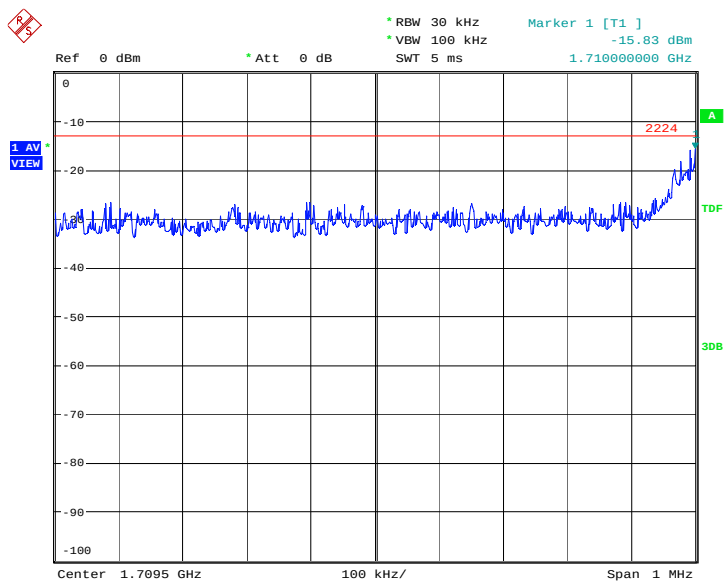
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HIGH BAND EDGE BLOCK-QPSK



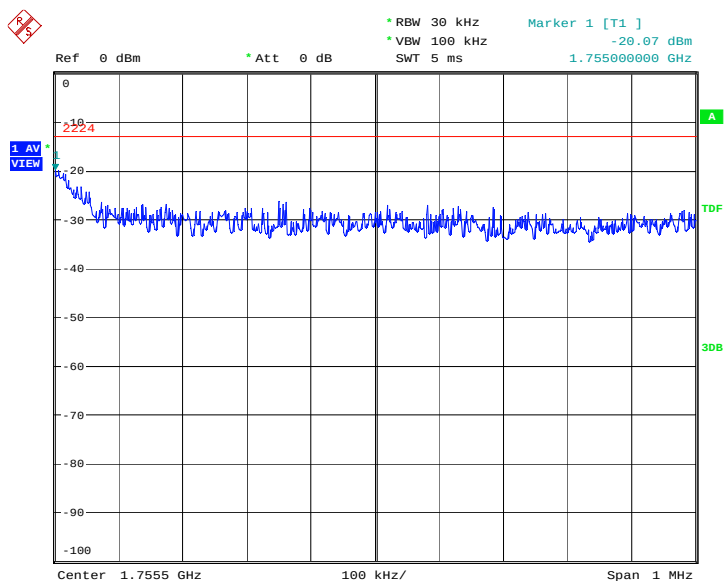
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LOW BAND EDGE BLOCK-16QAM



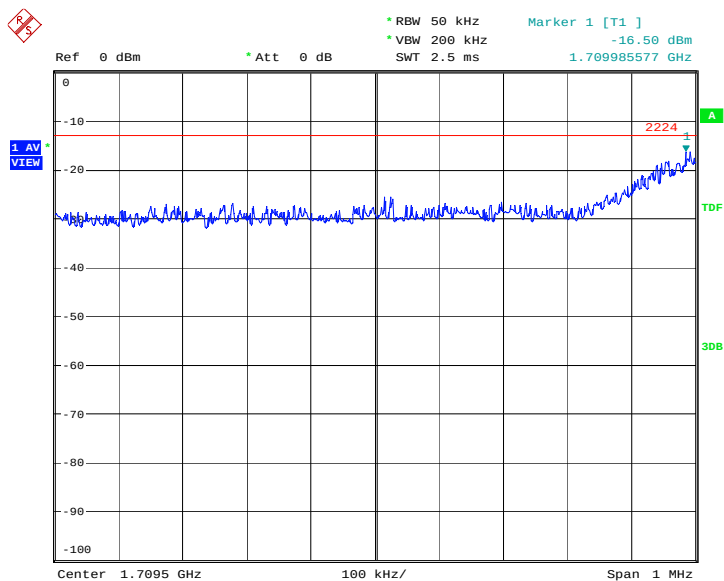
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HIGH BAND EDGE BLOCK-16QAM



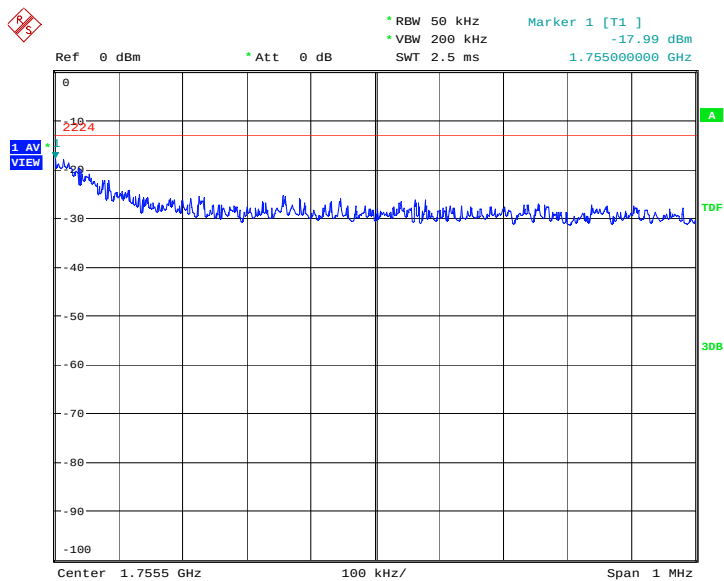
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LTE band 4, 5MHz LOW BAND EDGE BLOCK-QPSK



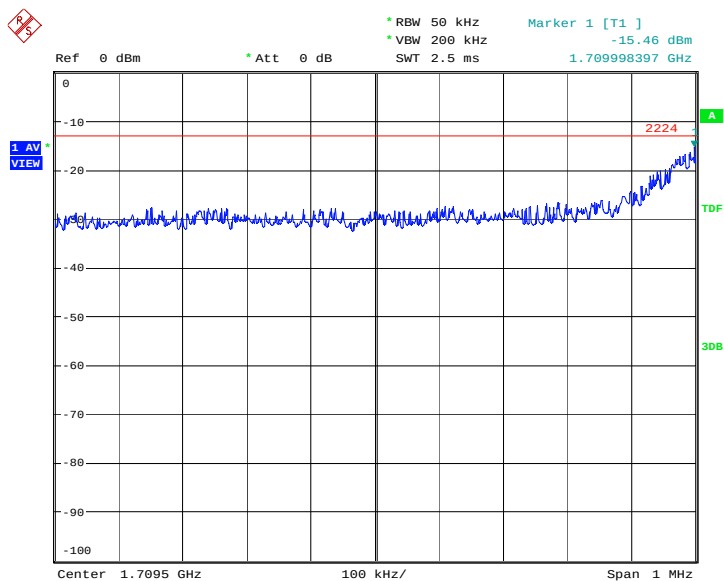
Date: 18.MAR.2014 15:40:25

HIGH BAND EDGE BLOCK-QPSK



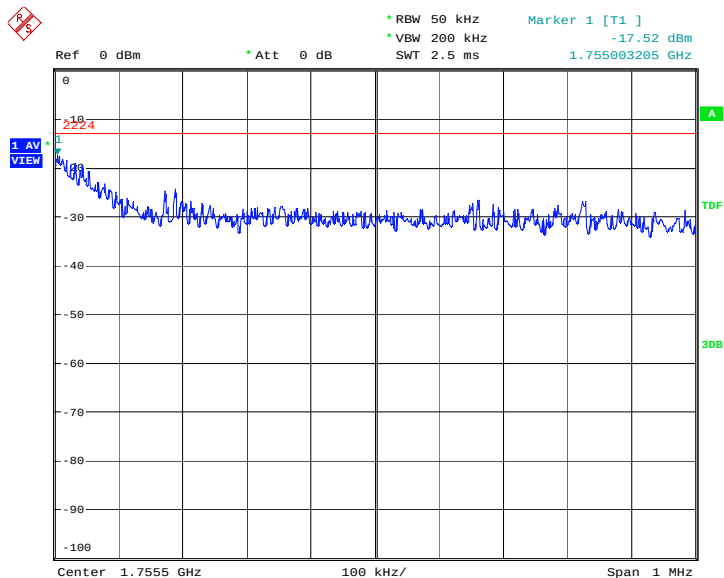
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LOW BAND EDGE BLOCK-16QAM



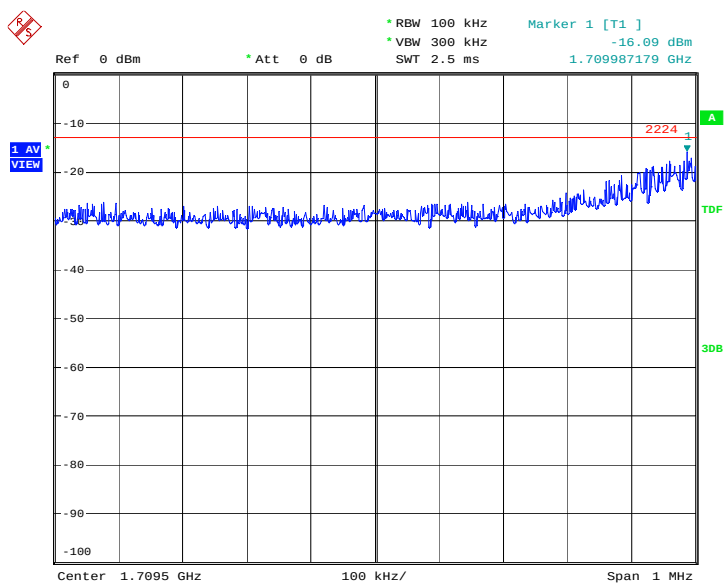
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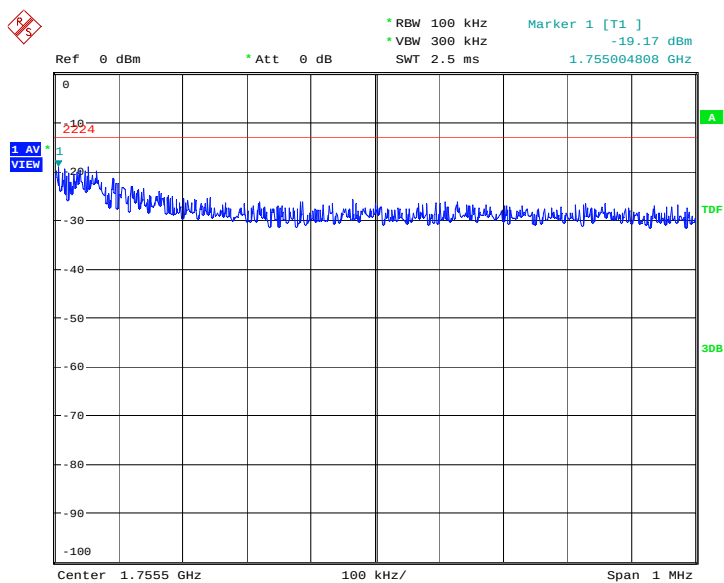
Date: 18.MAR.2014 15:43:56

LTE band 4, 10MHz LOW BAND EDGE BLOCK-QPSK



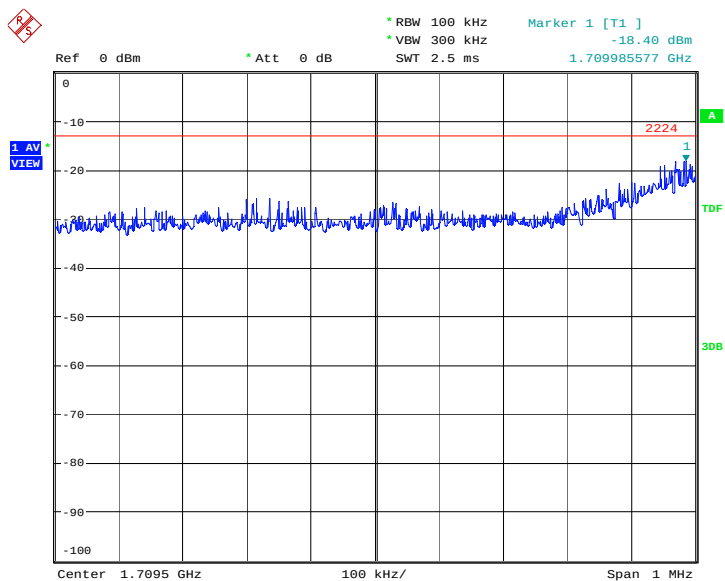
Date: 18.MAR.2014 15:46:25

HIGH BAND EDGE BLOCK-QPSK



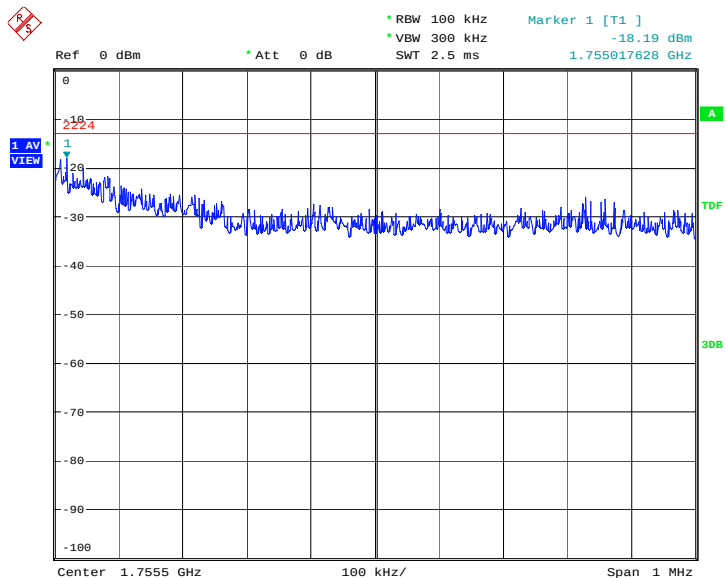
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LOW BAND EDGE BLOCK-16QAM



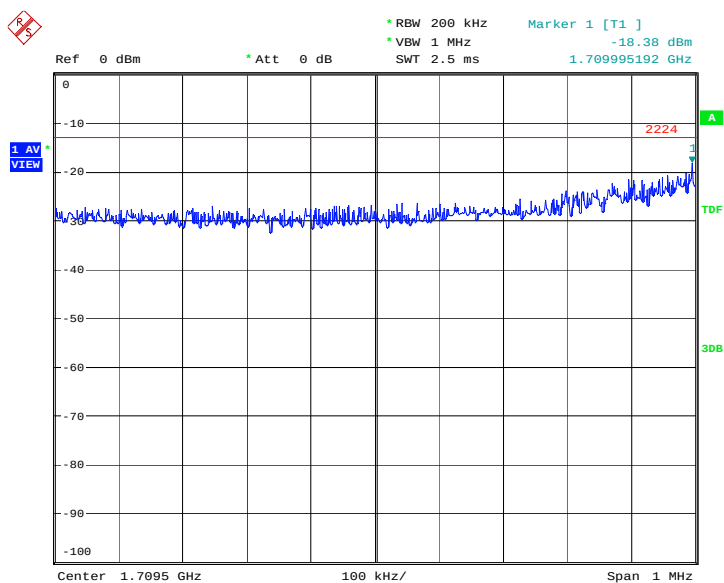
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HIGH BAND EDGE BLOCK-16QAM



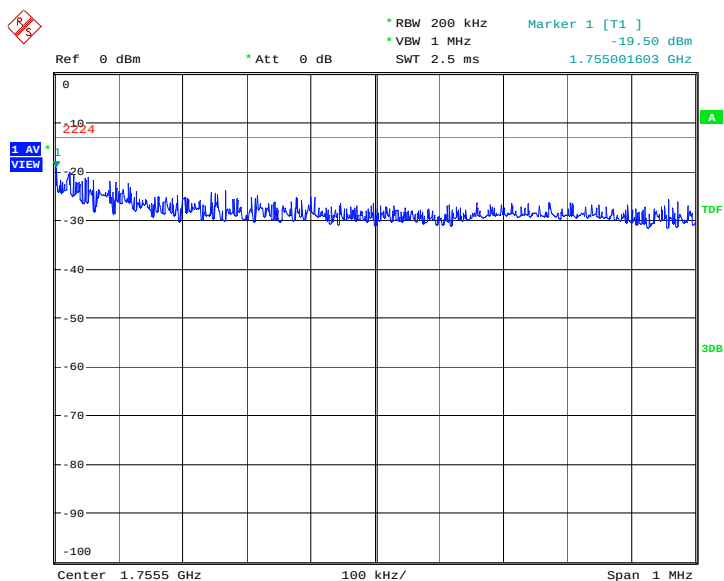
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LTE band 4, 15MHz LOW BAND EDGE BLOCK-QPSK



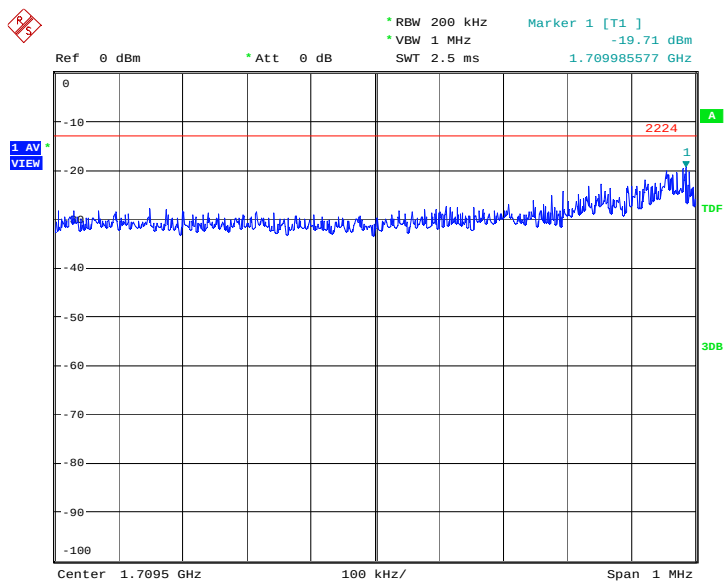
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HIGH BAND EDGE BLOCK-QPSK



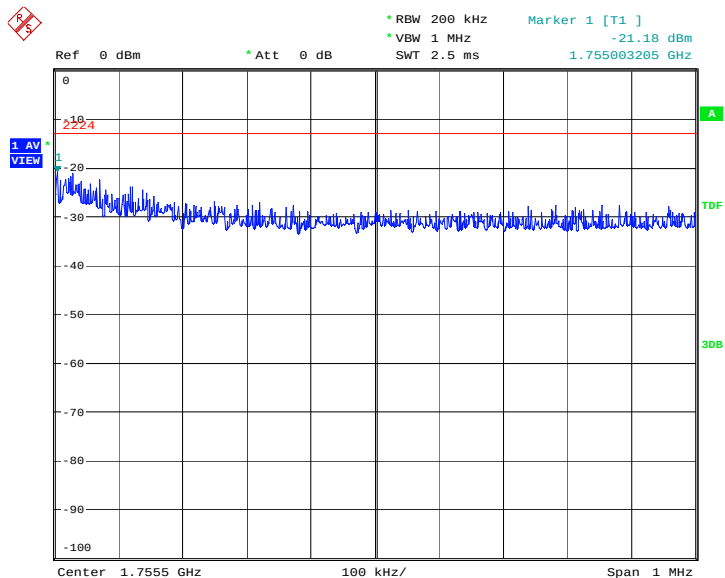
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LOW BAND EDGE BLOCK-16QAM



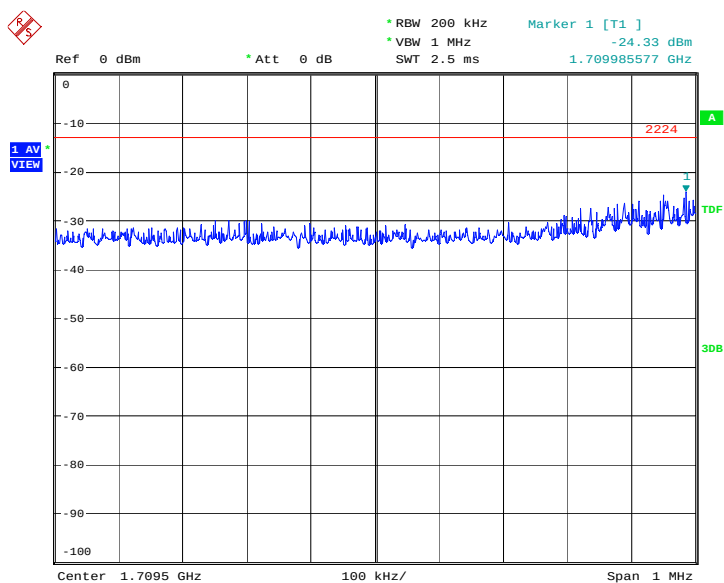
Date: 18.MAR.2014 15:52:35

HIGH BAND EDGE BLOCK-16QAM



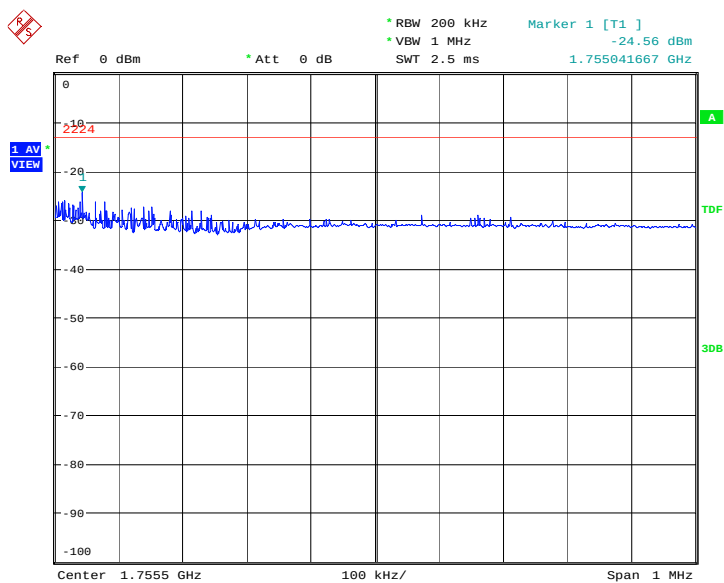
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LTE band 4, 20MHz LOW BAND EDGE BLOCK-QPSK



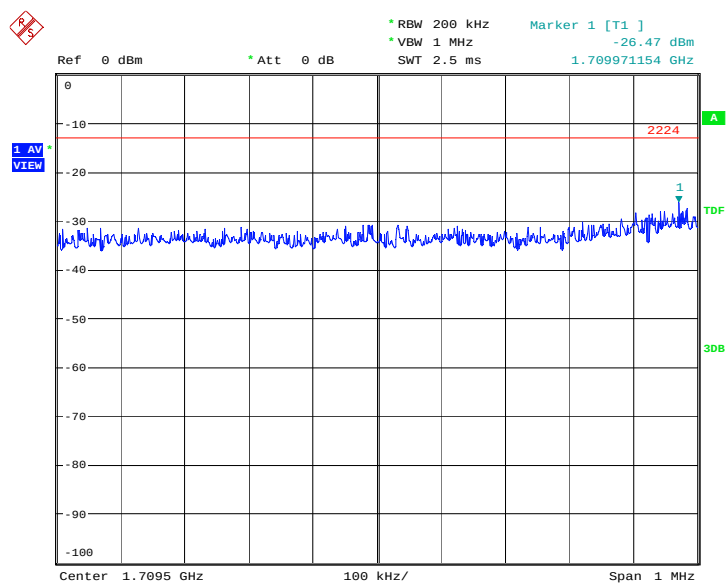
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HIGH BAND EDGE BLOCK-QPSK



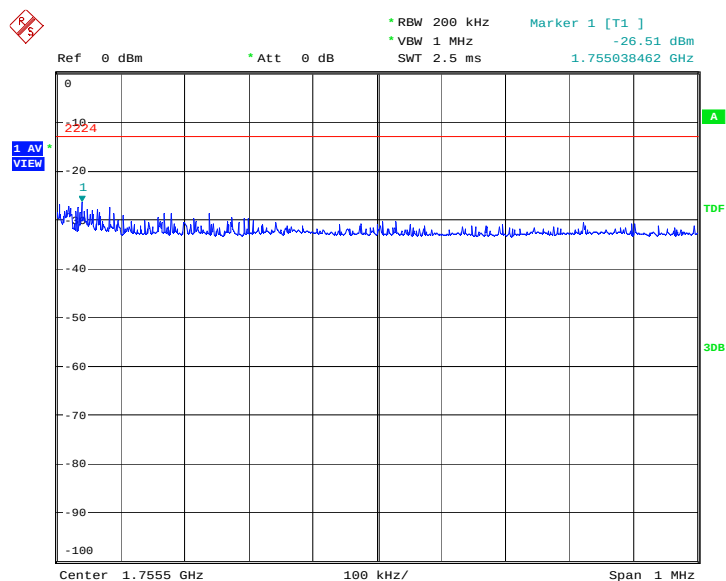
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LOW BAND EDGE BLOCK-16QAM



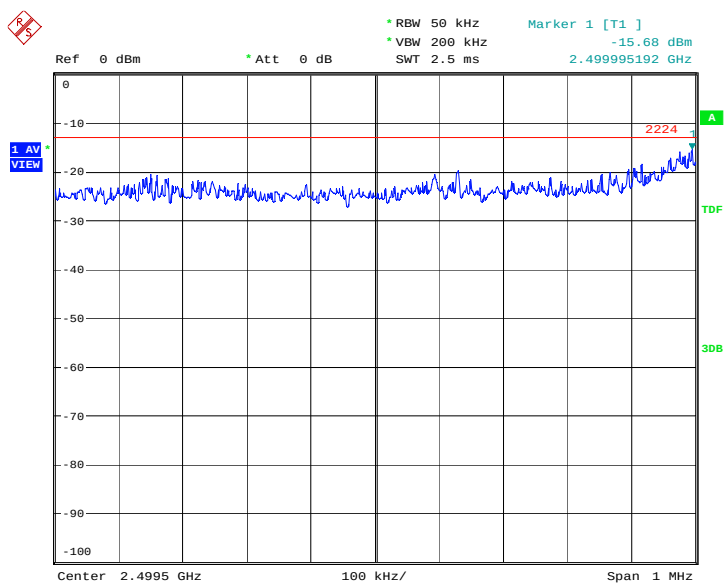
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HIGH BAND EDGE BLOCK-16QAM



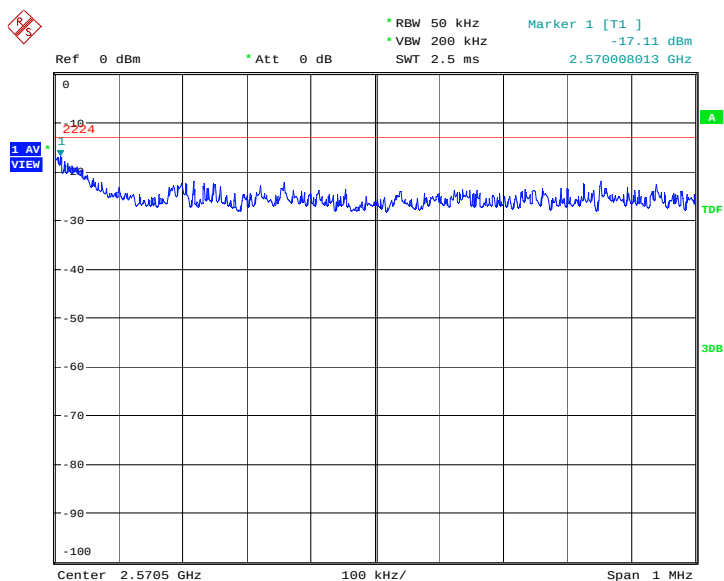
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LTE band 7, 5MHz LOW BAND EDGE BLOCK-QPSK



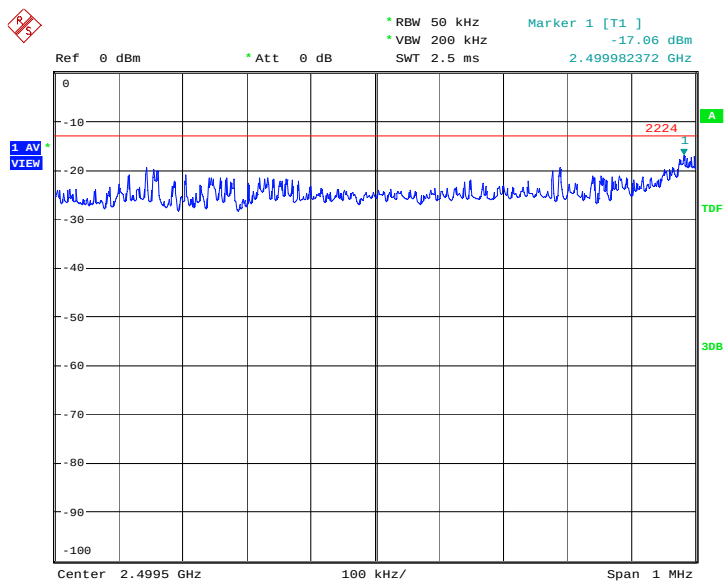
Date: 18.MAR.2014 13:37:17

HIGH BAND EDGE BLOCK-QPSK



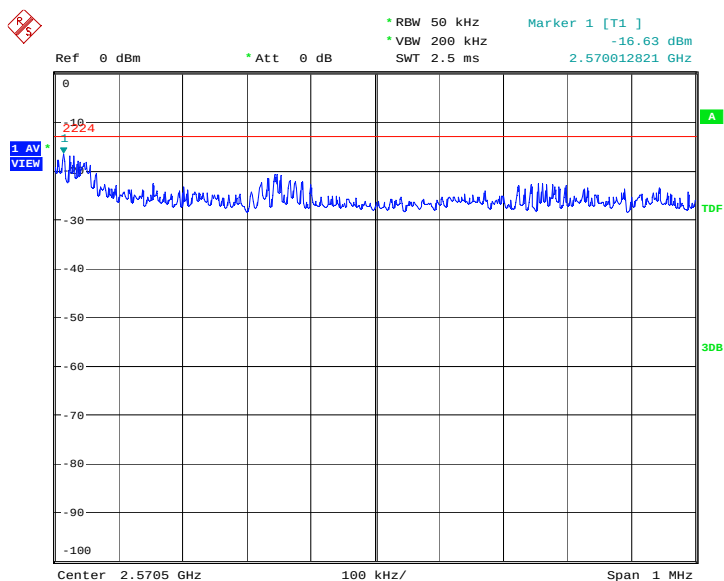
Date: 18.MAR.2014 13:40:37

LOW BAND EDGE BLOCK-16QAM



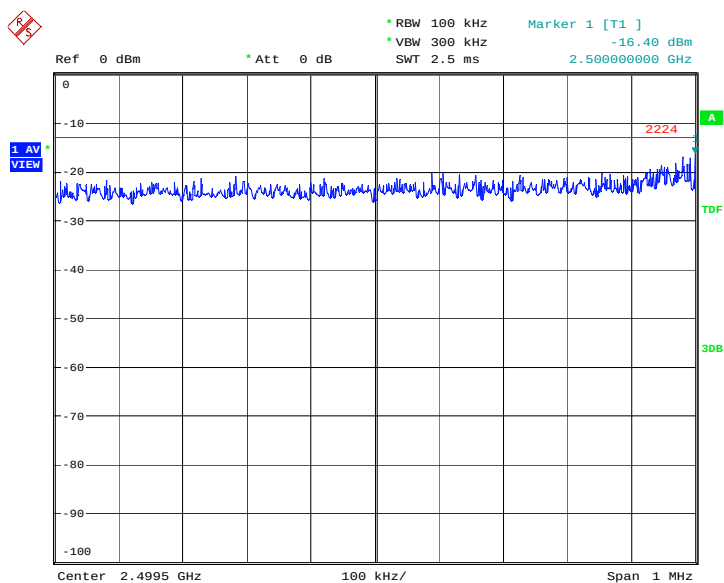
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HIGH BAND EDGE BLOCK-16QAM



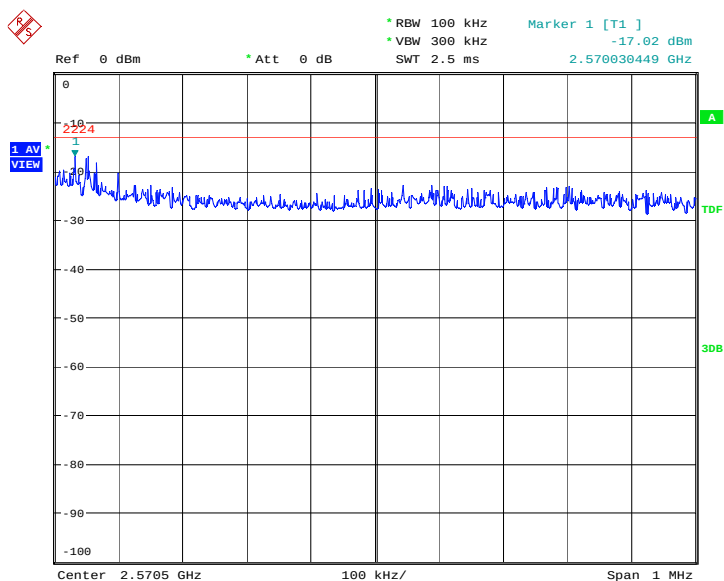
Date: 18.MAR.2014 13:40:48

LTE band 7, 10MHz LOW BAND EDGE BLOCK-QPSK



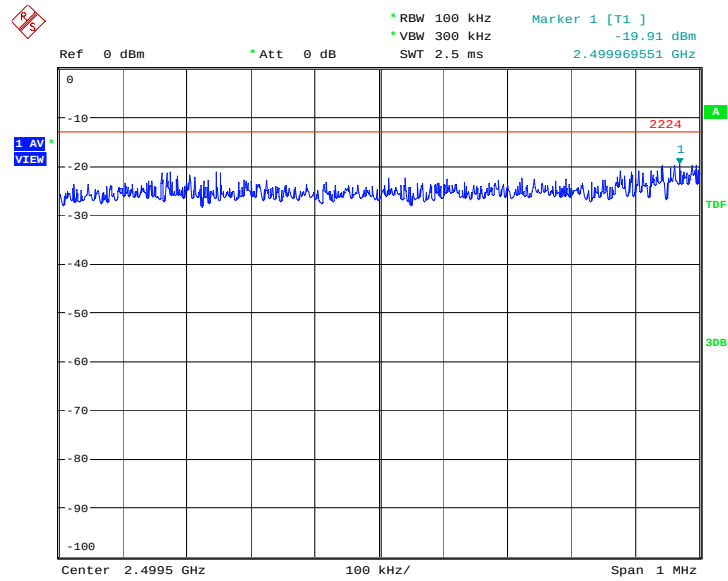
Date: 18.MAR.2014 13:42:47

HIGH BAND EDGE BLOCK-QPSK



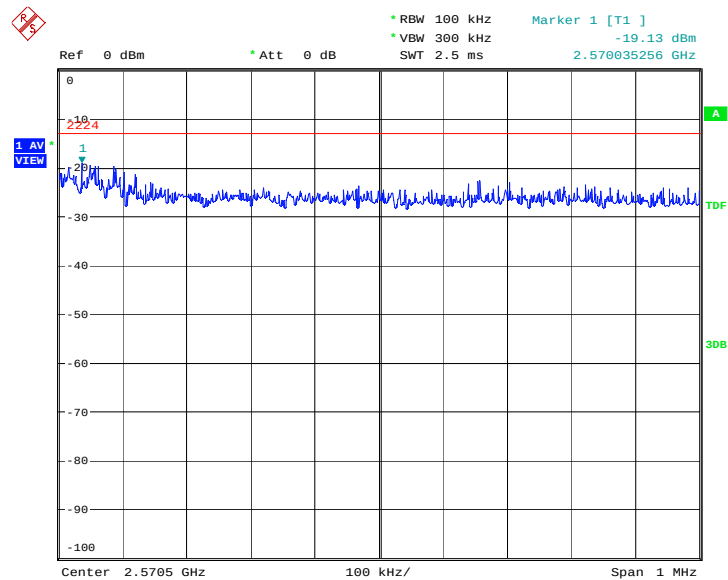
Date: 18.MAR.2014 13:46:07

LOW BAND EDGE BLOCK-16QAM



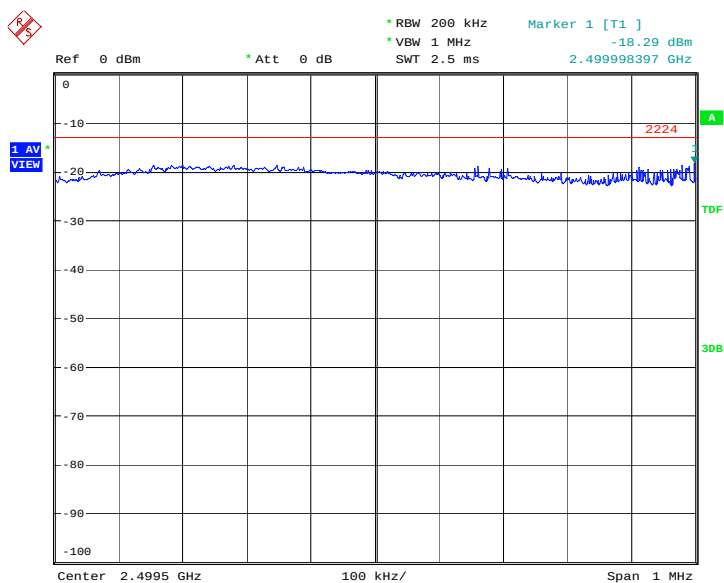
Date: 18.MAR.2014 13:42:57

HIGH BAND EDGE BLOCK-16QAM



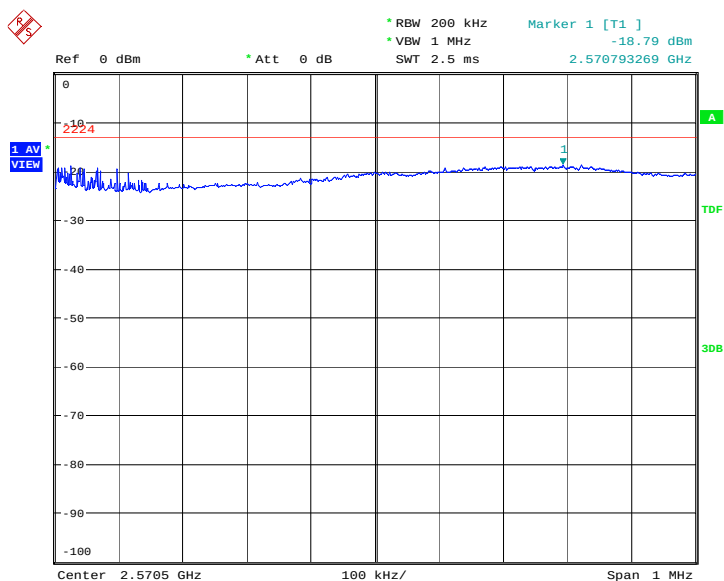
Date: 18.MAR.2014 13:46:17

LTE band 7, 15MHz LOW BAND EDGE BLOCK-QPSK



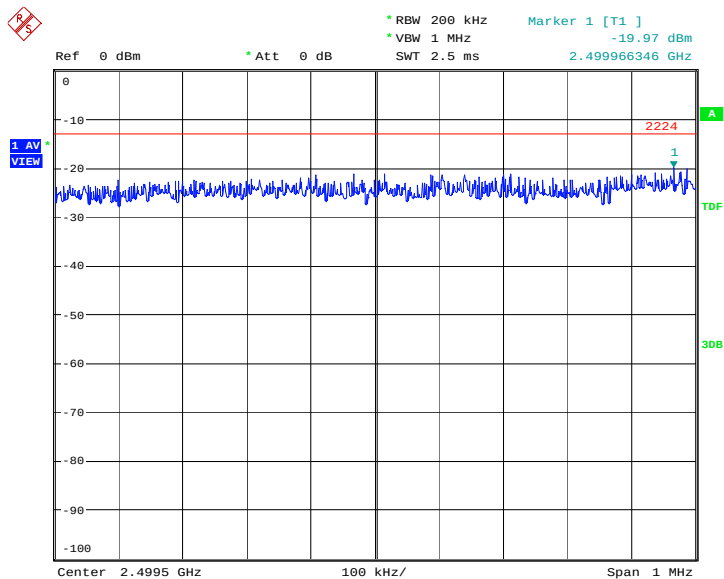
Date: 18.MAR.2014 13:49:17

HIGH BAND EDGE BLOCK-QPSK



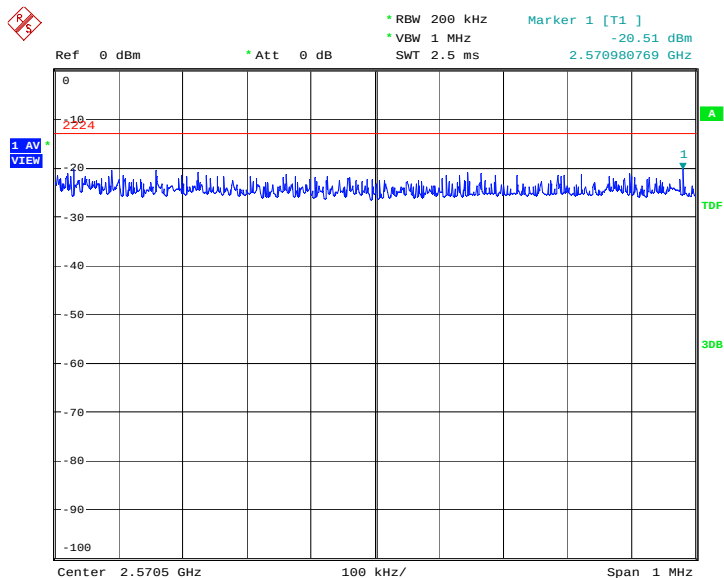
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LOW BAND EDGE BLOCK-16QAM



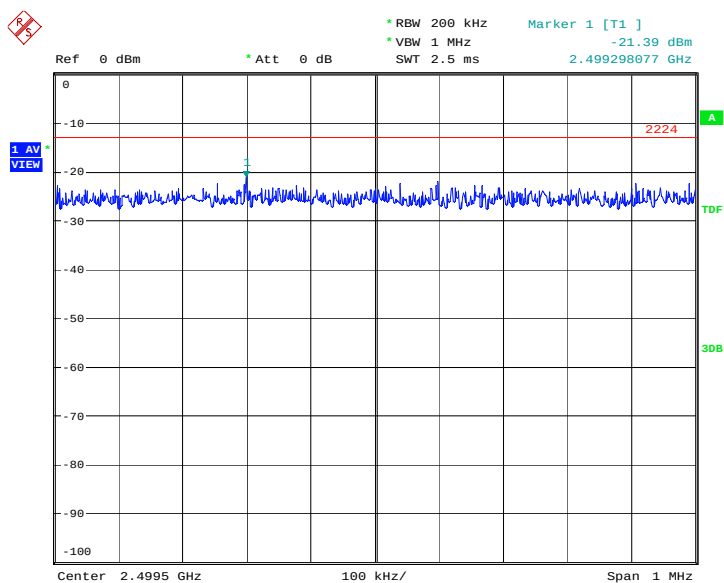
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HIGH BAND EDGE BLOCK-16QAM



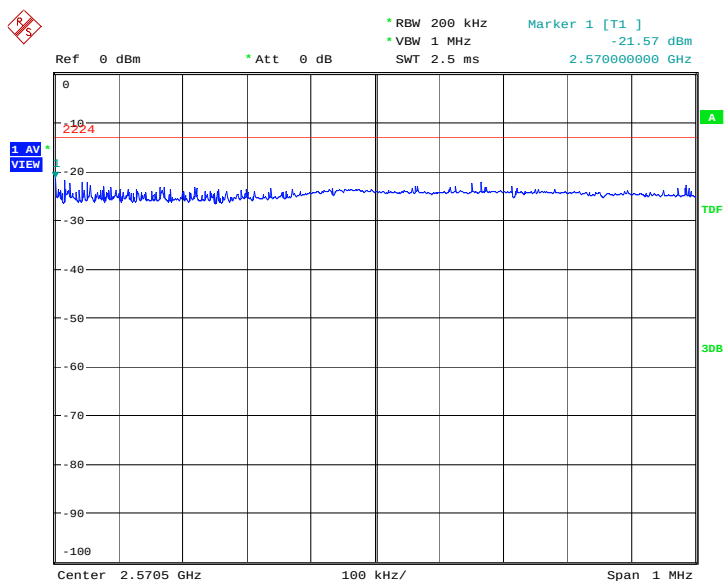
Date: 18.MAR.2014 13:52:47

LTE band 7, 20MHz LOW BAND EDGE BLOCK-QPSK



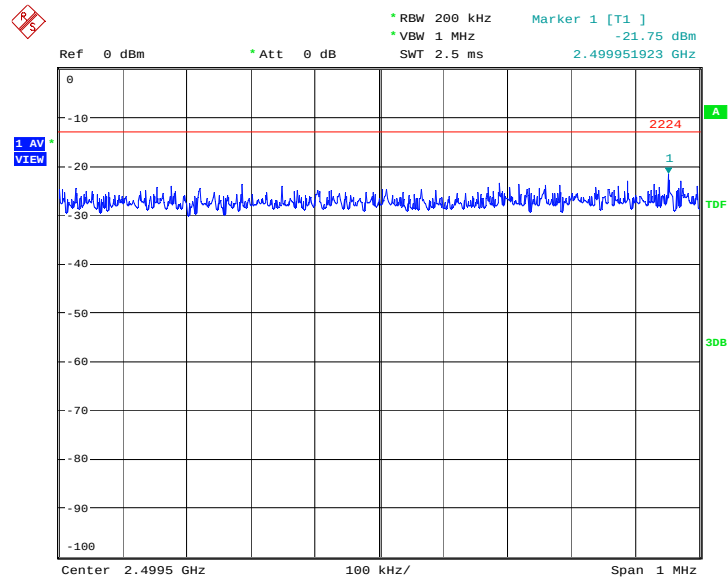
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HIGH BAND EDGE BLOCK-QPSK



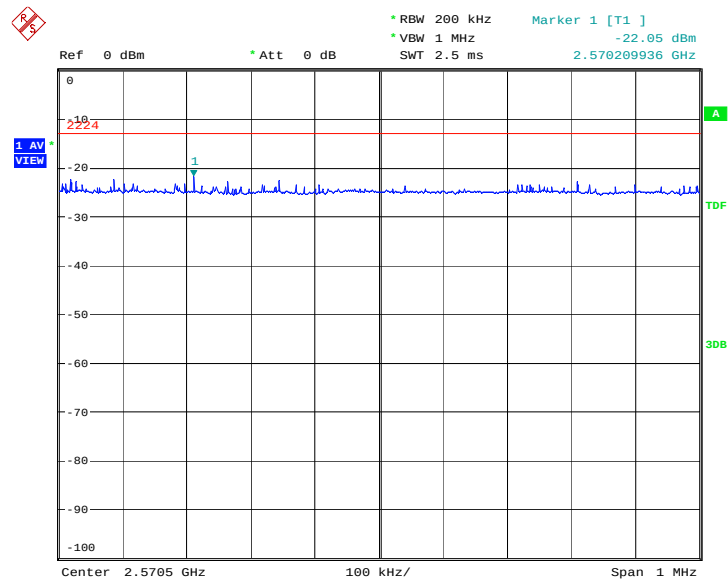
Date: 18.MAR.2014 13:58:38

LOW BAND EDGE BLOCK-16QAM



Date: 18.MAR.2014 13:55:27

HIGH BAND EDGE BLOCK-16QAM



Date: 18.MAR.2014 13:58:48

[illegible]

RBW 50 kHz
 VBW 200 kHz
 SWT 2.5 ms
 Marker 1 [T1]
 -15.09 dBm
 716.003205128 MHz

Ref 0 dBm
 Att 0 dB

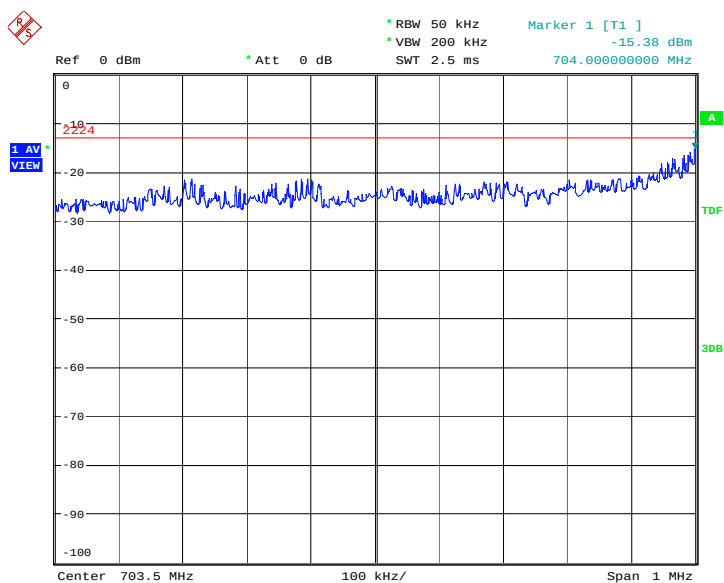
1. AV
 V1CM

TDF
 3dB

Center 716.5 MHz
 100 kHz/
 Span 1 MHz

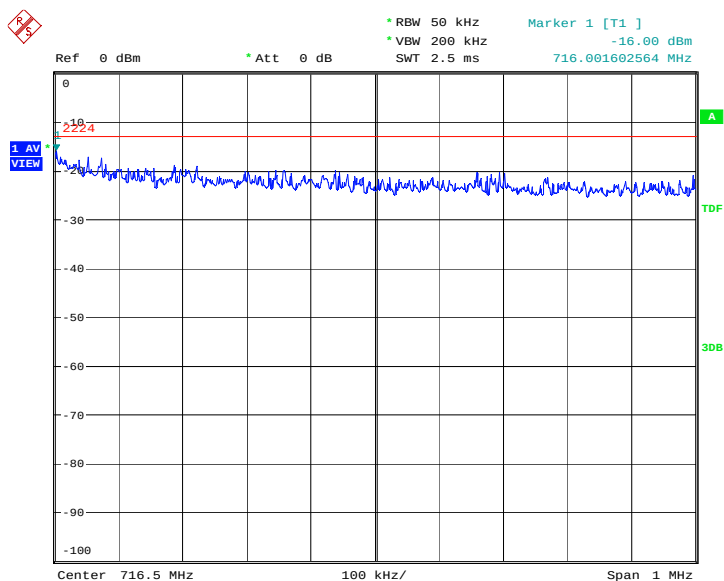
©Copyright. All rights reserved by TMC Beijing.

LOW BAND EDGE BLOCK-16QAM



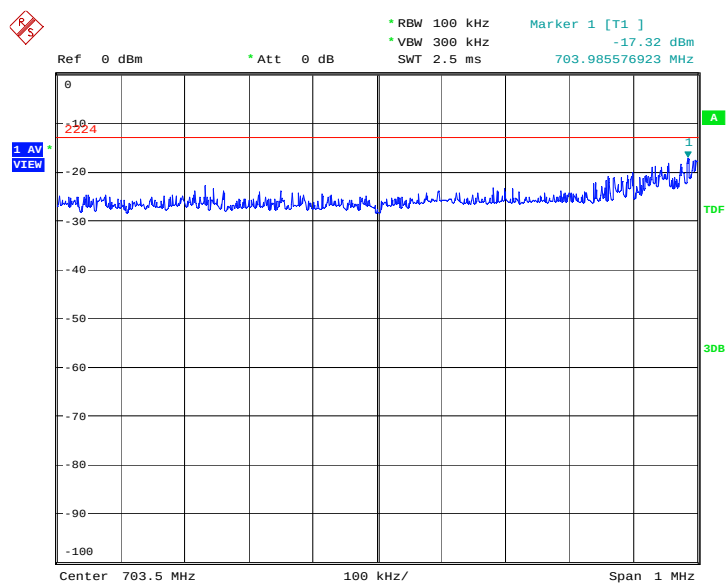
Date: 19.MAR.2014 09:28:39

HIGH BAND EDGE BLOCK-16QAM



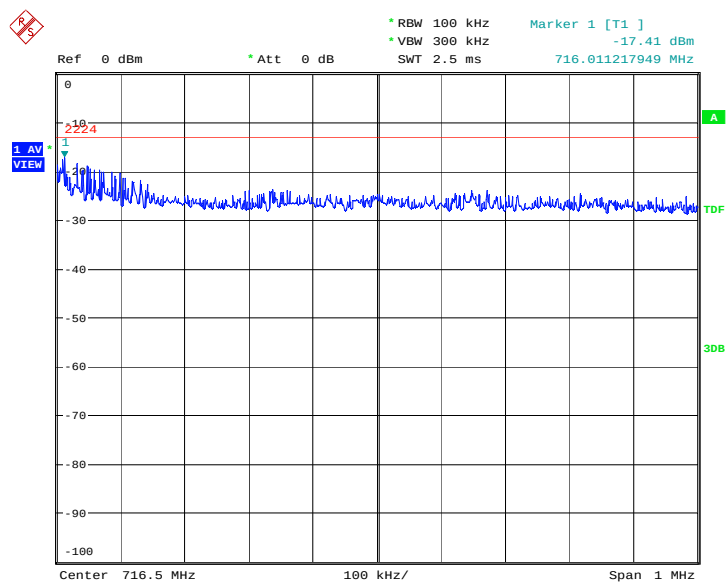
Date: 19.MAR.2014 09:31:59

LTE band 17, 10MHz LOW BAND EDGE BLOCK-QPSK



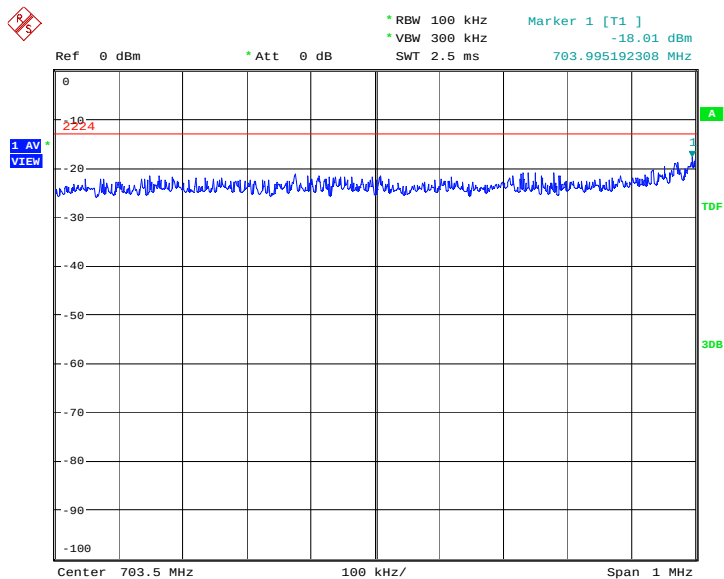
Date: 19.MAR.2014 13:15:08

HIGH BAND EDGE BLOCK-QPSK



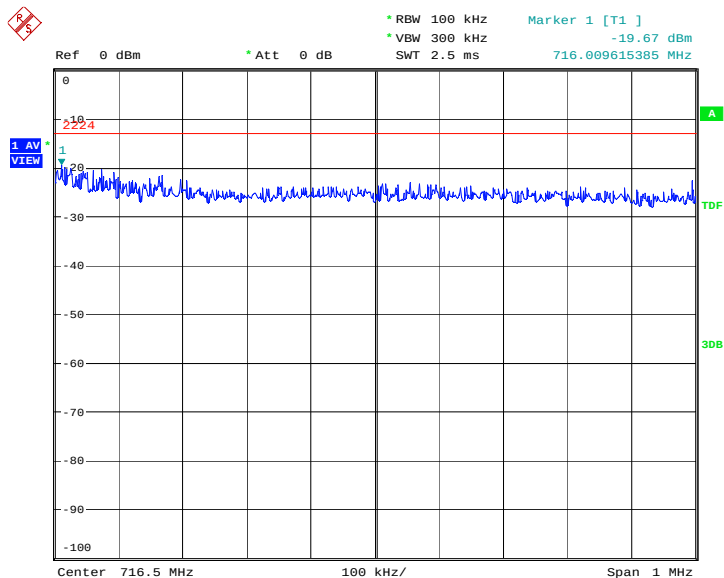
Date: 19.MAR.2014 13:18:28

LOW BAND EDGE BLOCK-16QAM



Date: 19.MAR.2014 13:15:18

HIGH BAND EDGE BLOCK-16QAM



Date: 19.MAR.2014 13:18:38

A.8 CONDUCTED SPURIOUS EMISSION

Reference

FCC: CFR Part 2.1057, 22.917, 24.238, 27.53(h).

A.8.1 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. 8.2 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.

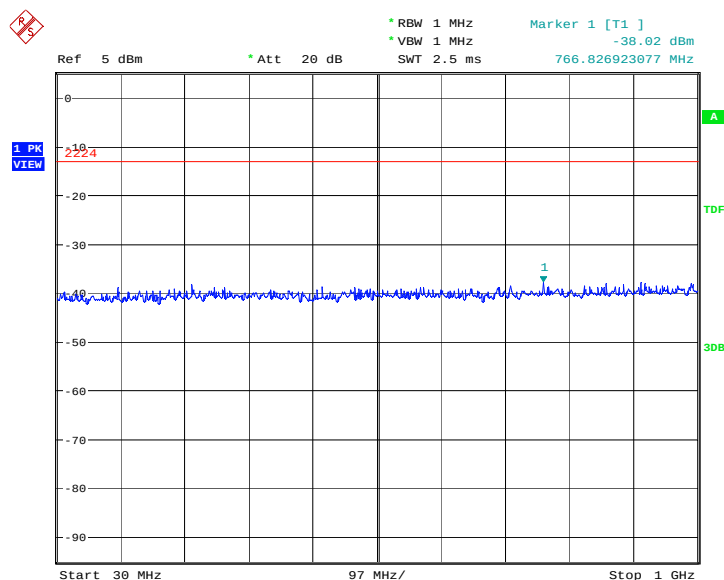
The specification that emissions shall be attenuated below the transmitter power (P) by at least $43 + 10 \log (P)$ dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 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. 8.3 Measurement result

LTE band 2, 1.4MHz bandwidth

QPSK: 30MHz – 1GHz

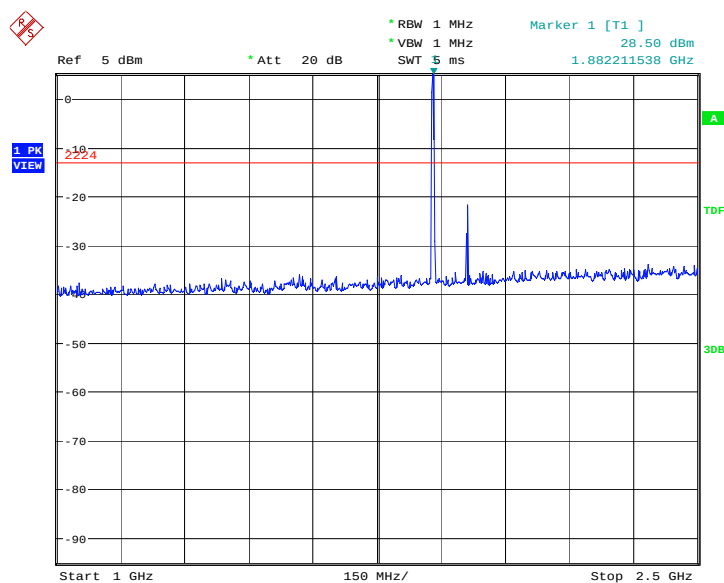
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:02:06

QPSK: 1GHz – 2.5GHz

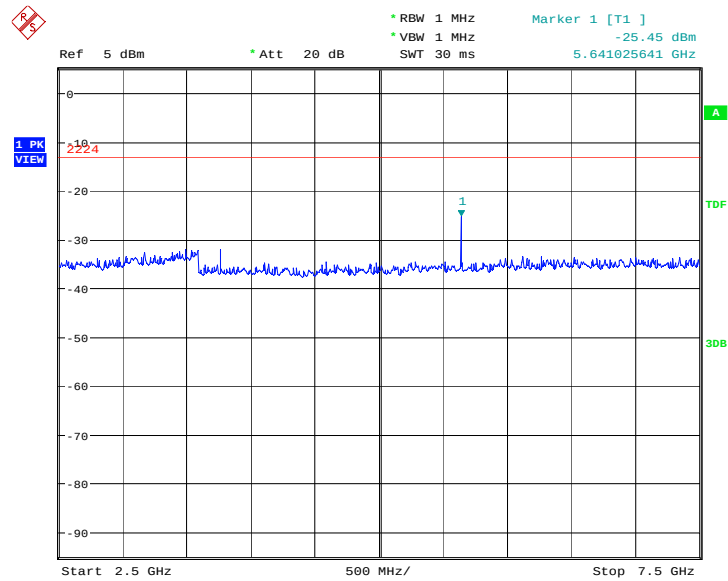
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:02:14

QPSK: 2.5GHz – 7.5GHz

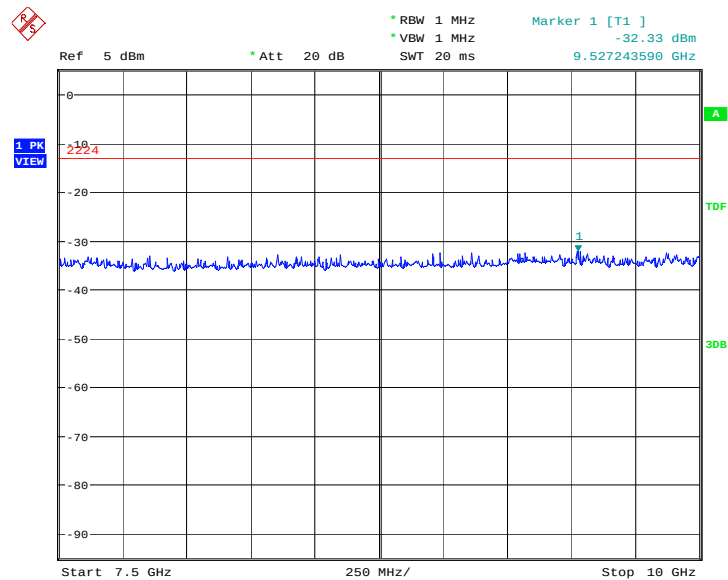
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:02:22

QPSK: 7.5GHz –10GHz

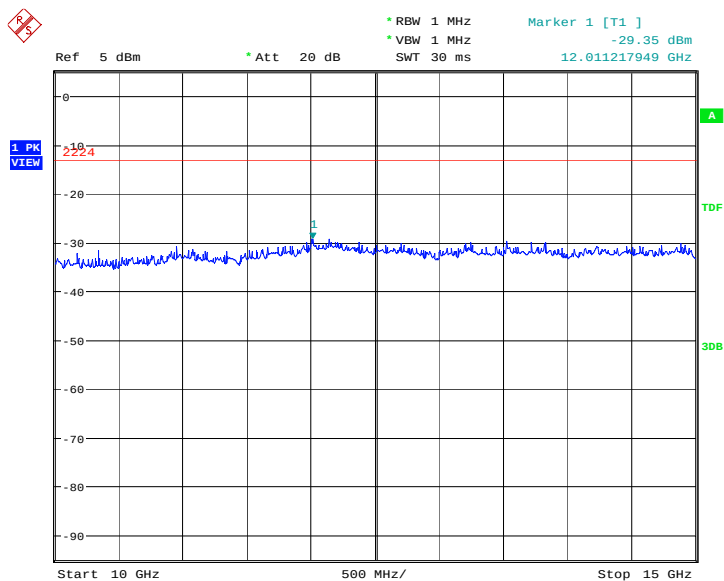
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:02:30

QPSK: 10GHz –15GHz

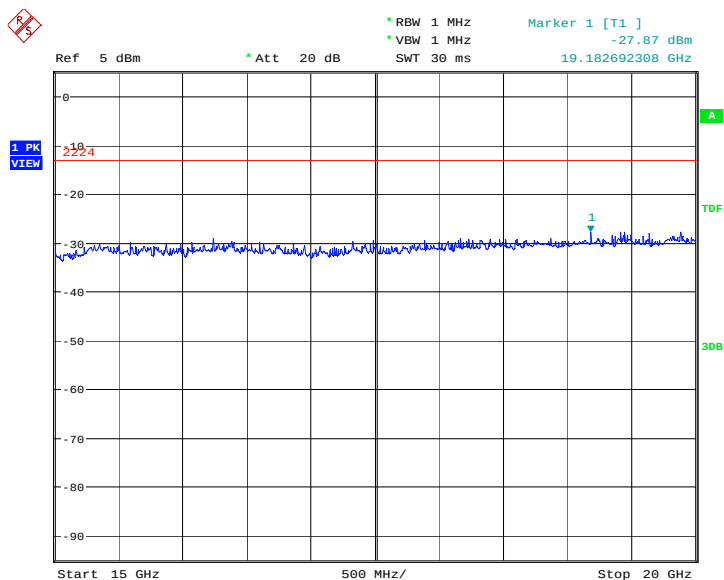
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:02:38

QPSK: 15GHz –20GHz

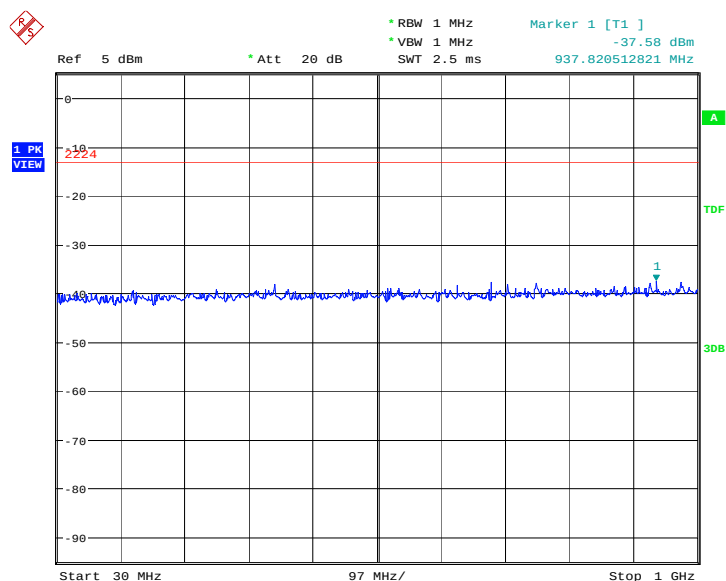
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:02:46

16QAM: 30MHz – 1GHz

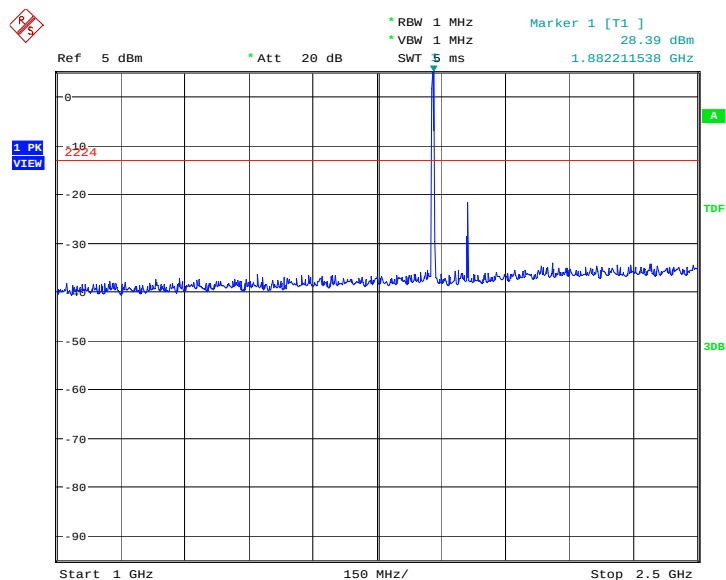
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:02:56

16QAM: 1GHz – 2.5GHz

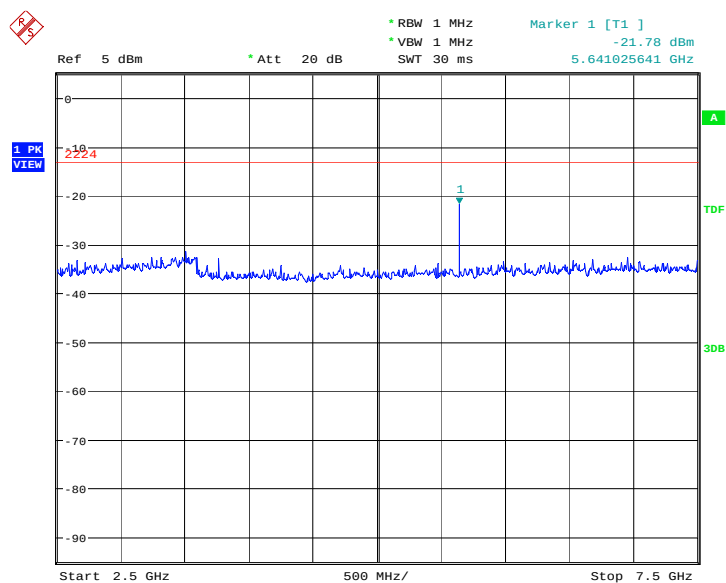
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:03:04

16QAM: 2.5GHz – 7.5GHz

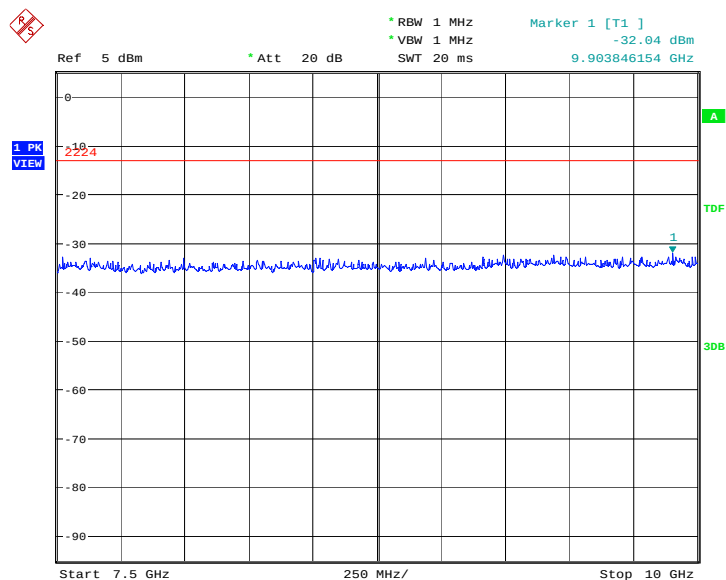
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:03:12

16QAM: 7.5GHz –10GHz

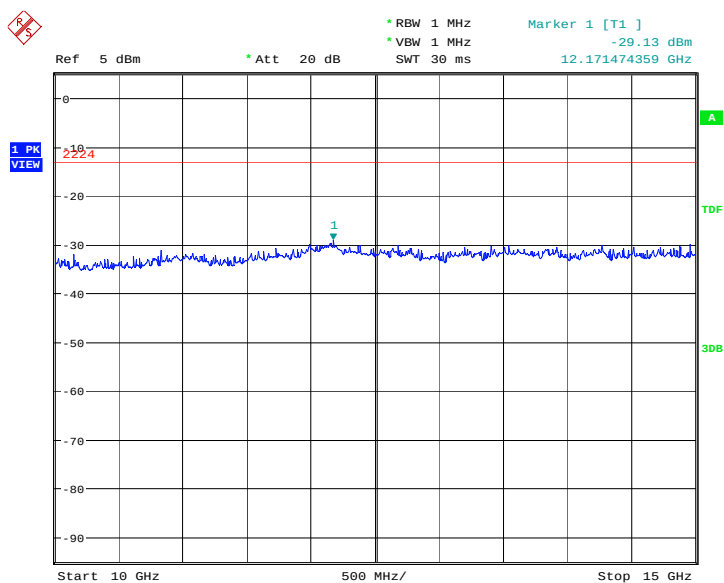
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:03:20

16QAM: 10GHz –15GHz

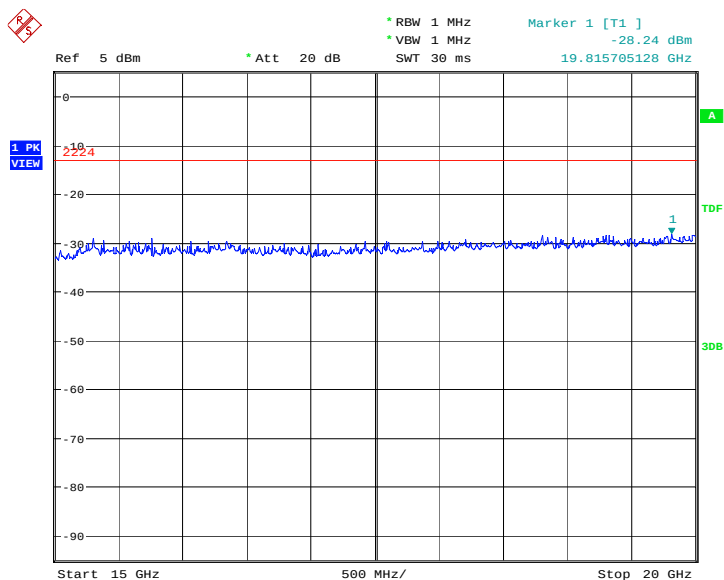
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:03:28

16QAM: 15GHz –20GHz

Spurious emission limit –13dBm.

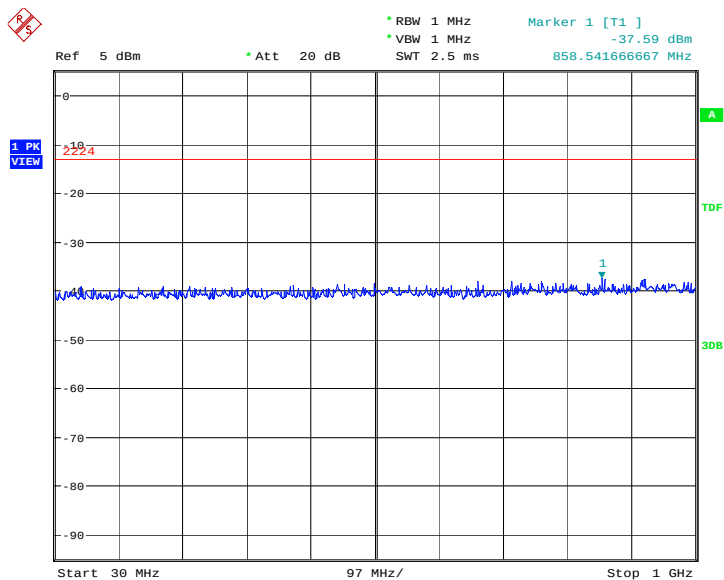


Date: 19.MAR.2014 09:03:36

LTE band 4, 1.4MHz bandwidth

QPSK: 30MHz – 1GHz

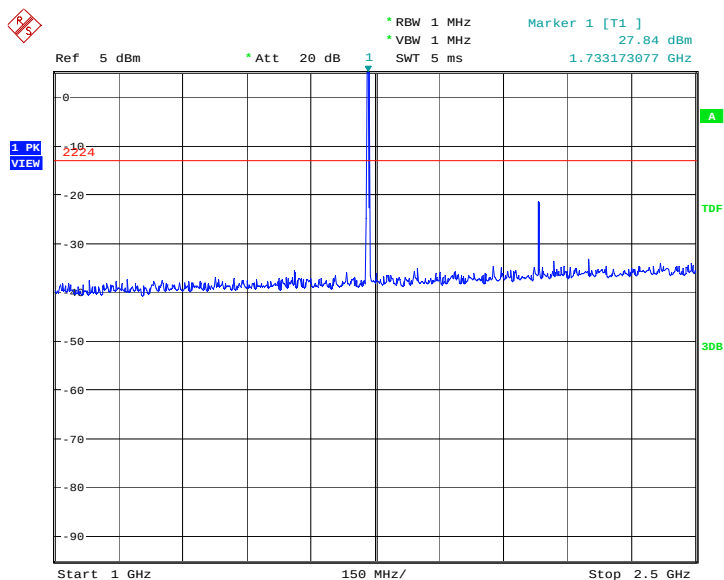
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:04:27

QPSK: 1GHz – 2.5GHz

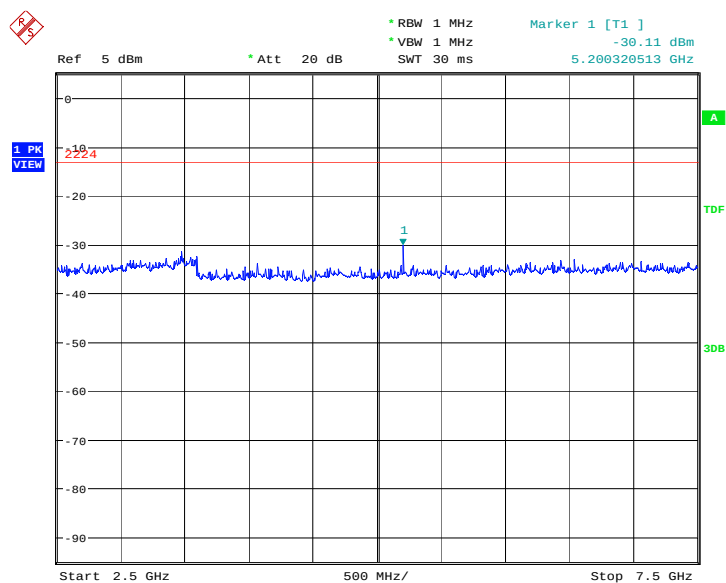
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:04:35

QPSK: 2.5GHz – 7.5GHz

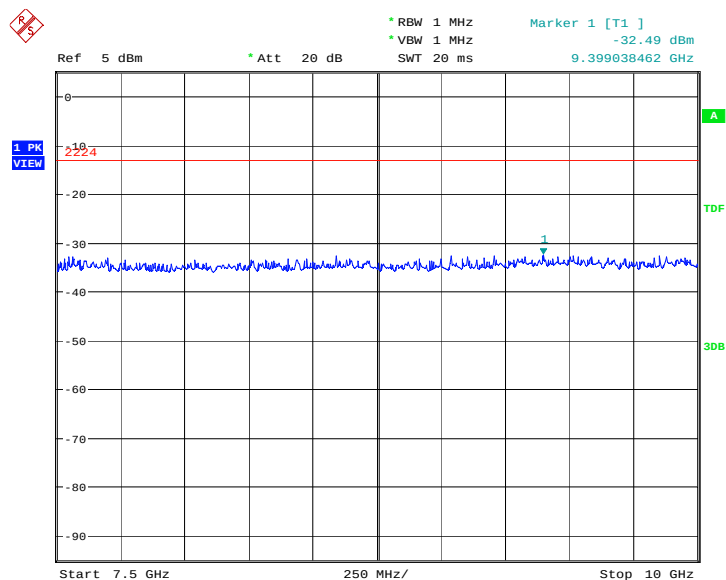
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:04:43

QPSK: 7.5GHz –10GHz

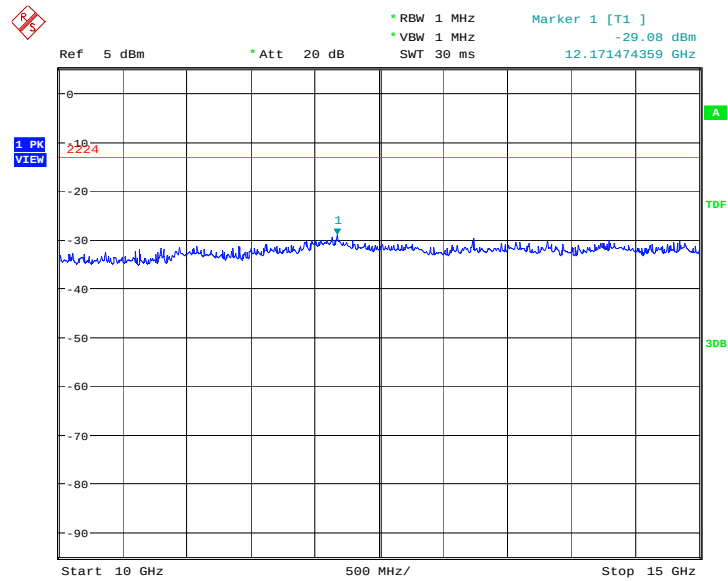
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:04:51

QPSK: 10GHz –15GHz

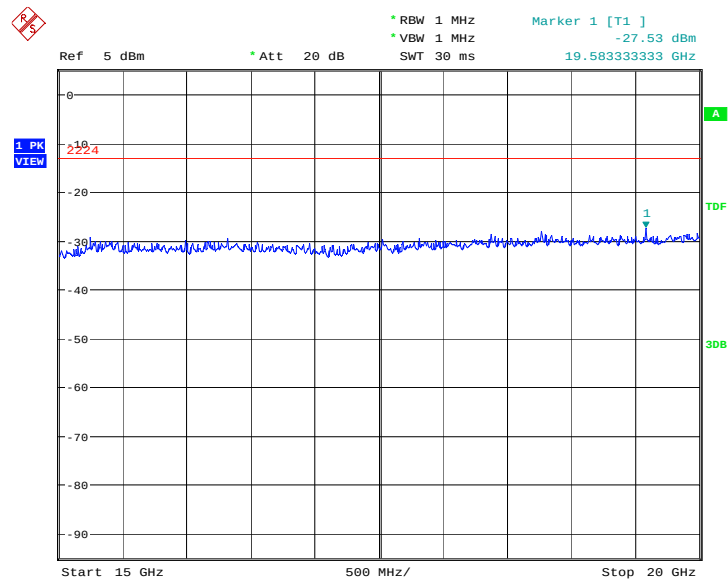
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:04:59

QPSK: 15GHz –20GHz

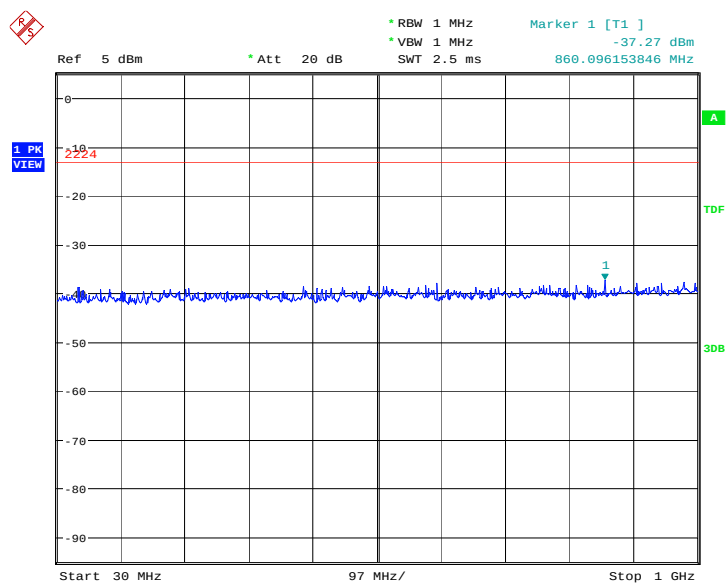
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:05:07

16QAM: 30MHz – 1GHz

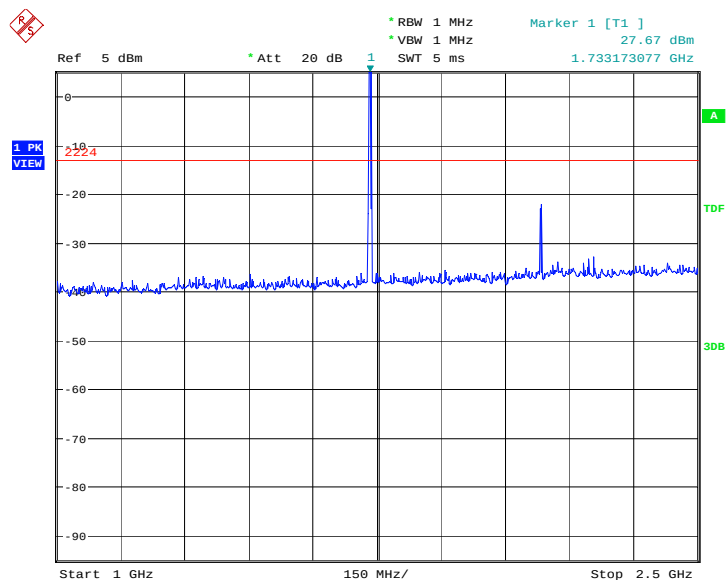
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:07:11

16QAM: 1GHz – 2.5GHz

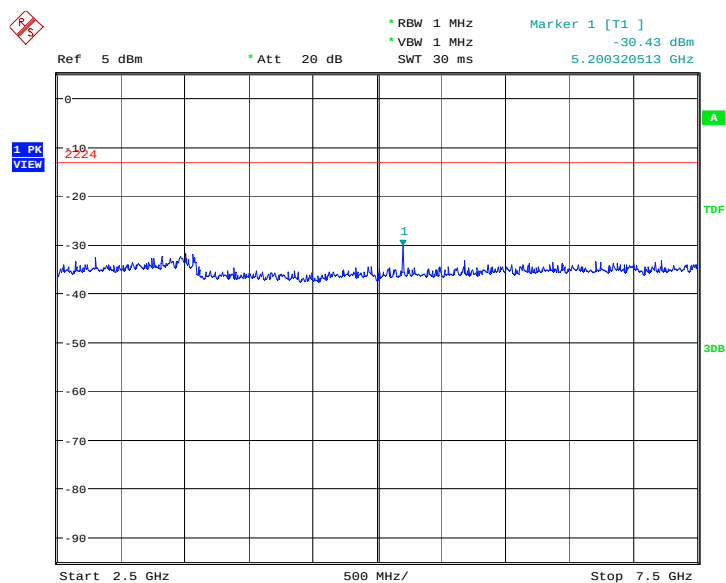
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:07:19

16QAM: 2.5GHz – 7.5GHz

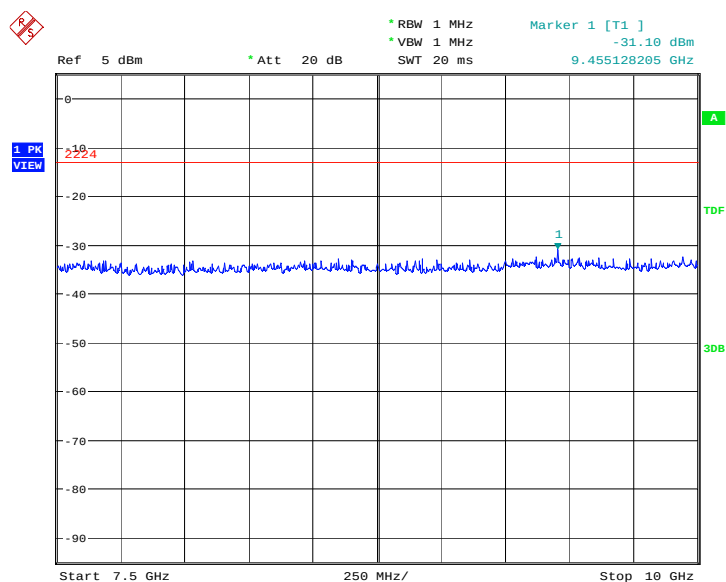
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:07:27

16QAM: 7.5GHz –10GHz

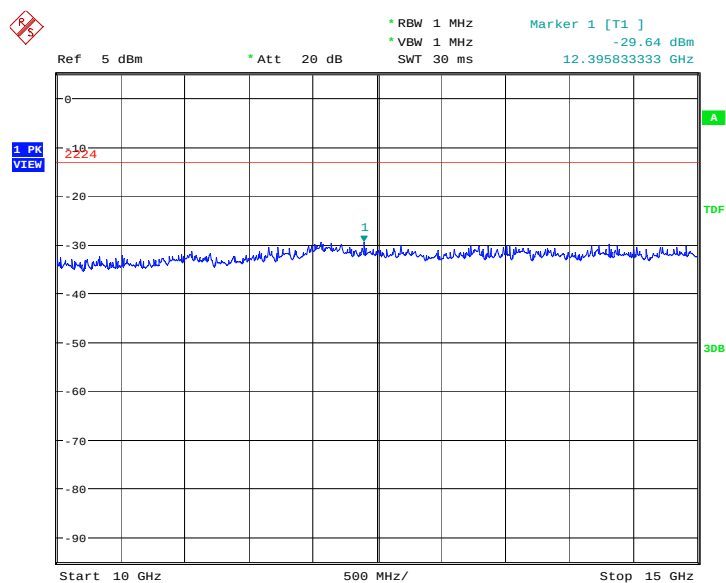
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:07:35

16QAM: 10GHz –15GHz

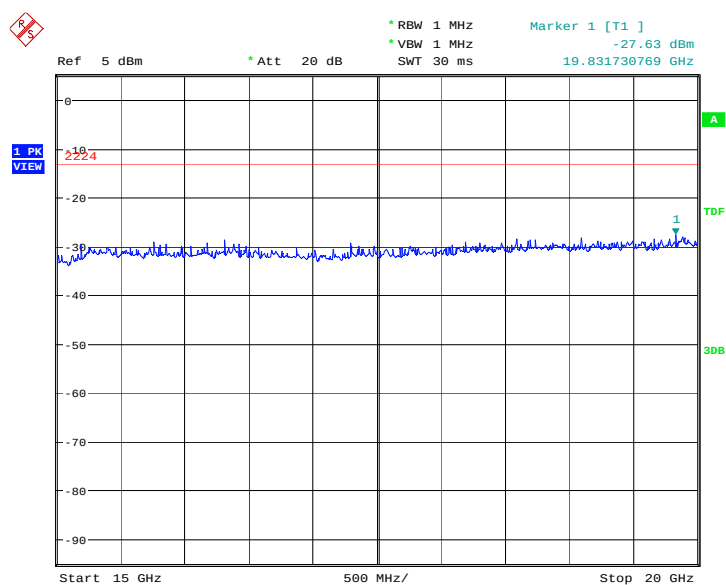
Spurious emission limit –13dBm.



Date: 19.MAR.2014 09:07:43

16QAM: 15GHz –20GHz

Spurious emission limit –13dBm.

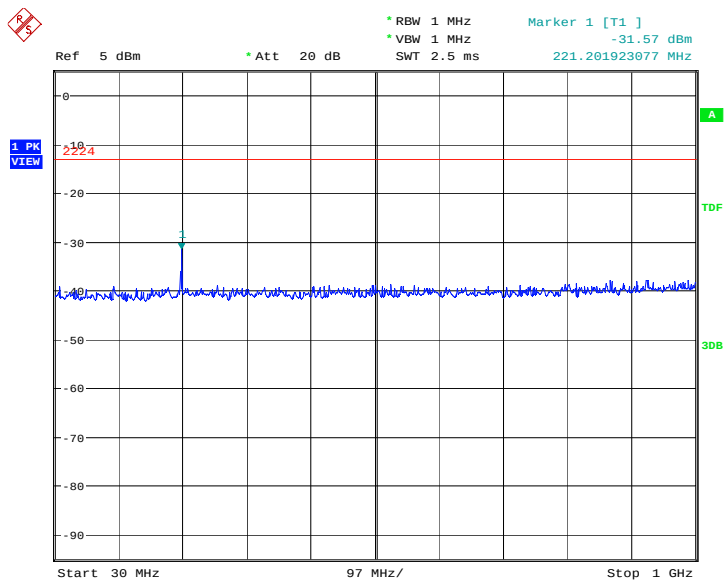


Date: 19.MAR.2014 09:07:51

LTE band 7, 5MHz bandwidth

QPSK: 30MHz – 1GHz

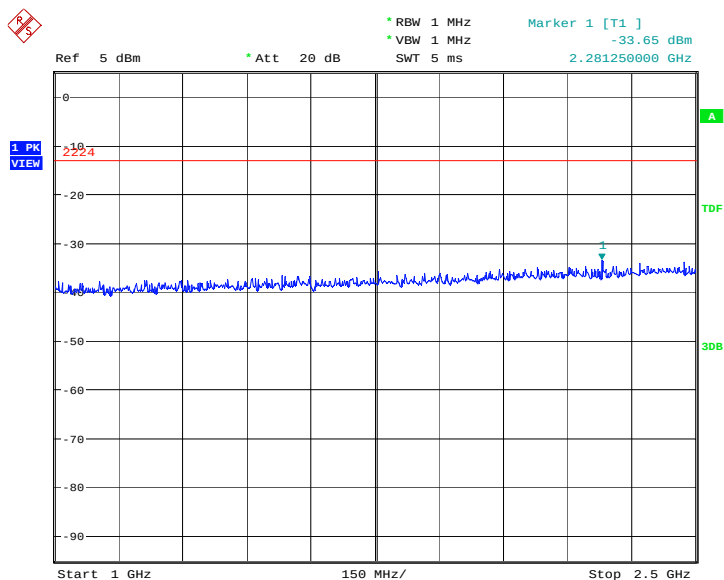
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:55:53

QPSK: 1GHz – 2.5GHz

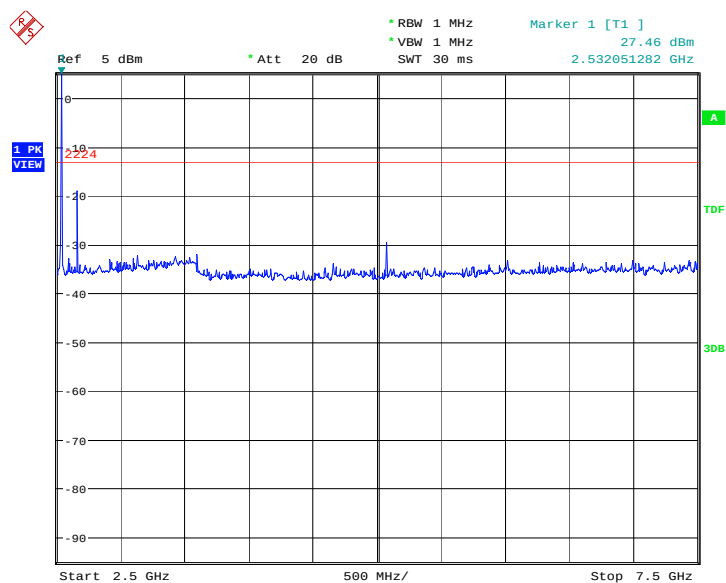
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:56:01

QPSK: 2.5GHz – 7.5GHz

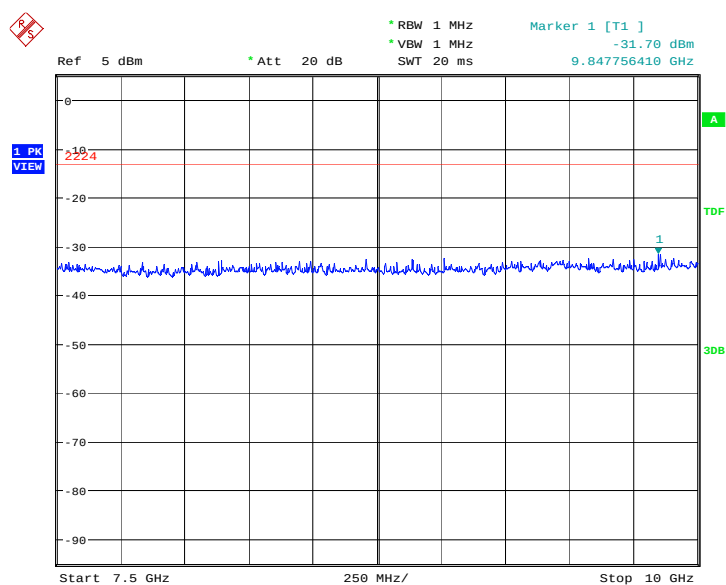
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:56:09

QPSK: 7.5GHz –10GHz

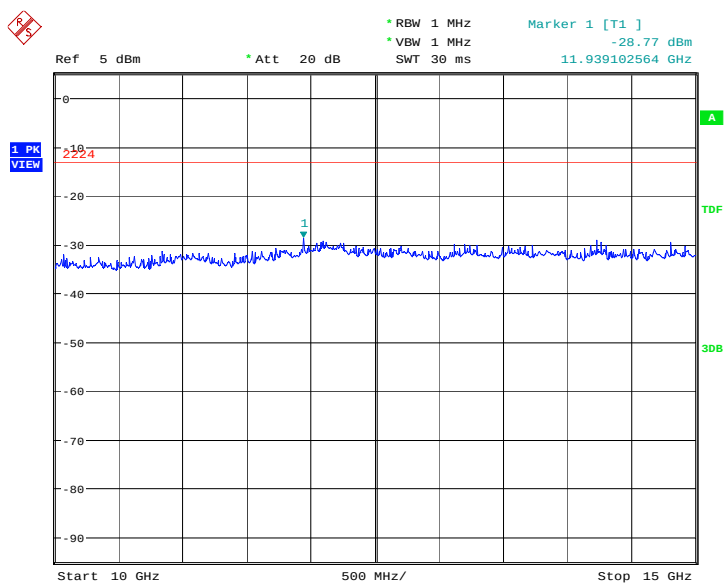
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:56:17

QPSK: 10GHz –15GHz

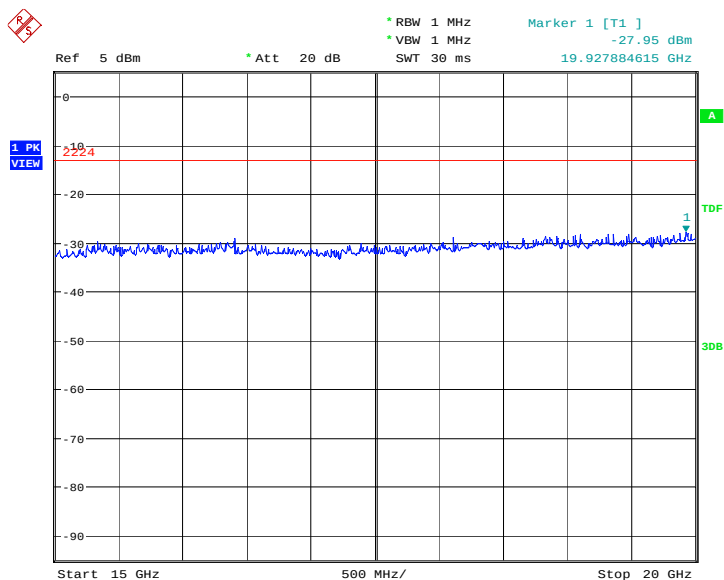
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:56:25

QPSK: 15GHz –20GHz

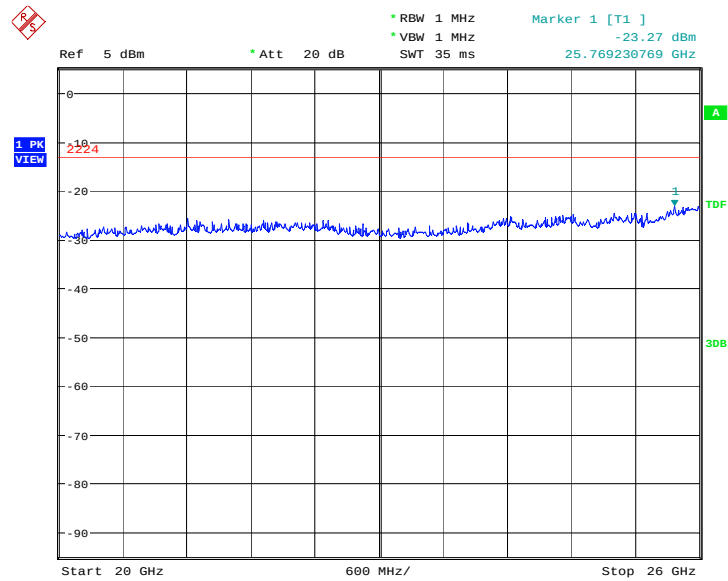
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:56:33

QPSK: 20GHz –26GHz

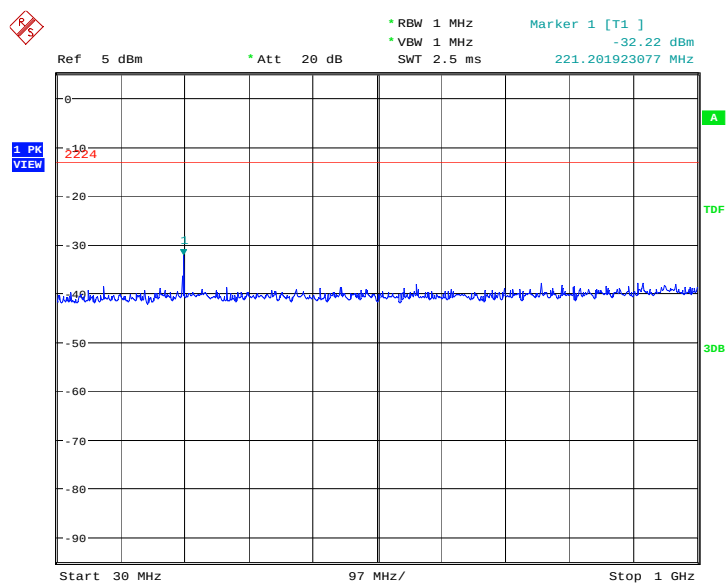
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:56:41

16QAM: 30MHz – 1GHz

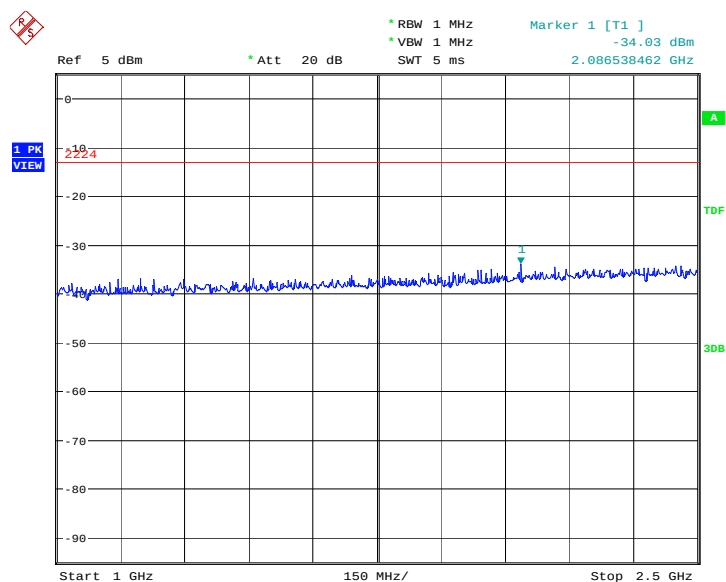
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:56:51

16QAM: 1GHz – 2.5GHz

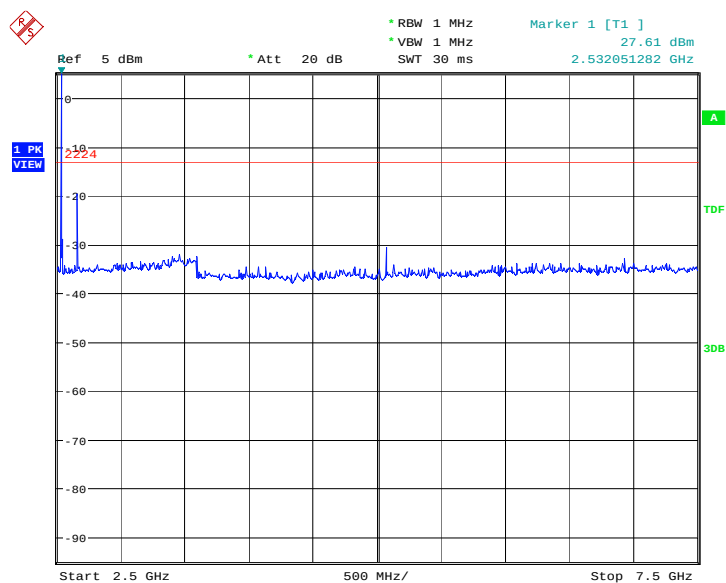
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:56:59

16QAM: 2.5GHz – 7.5GHz

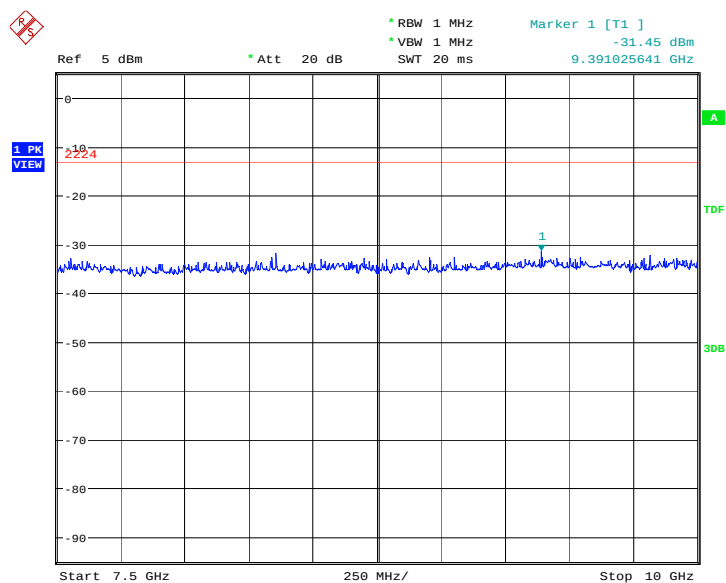
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:57:07

16QAM: 7.5GHz –10GHz

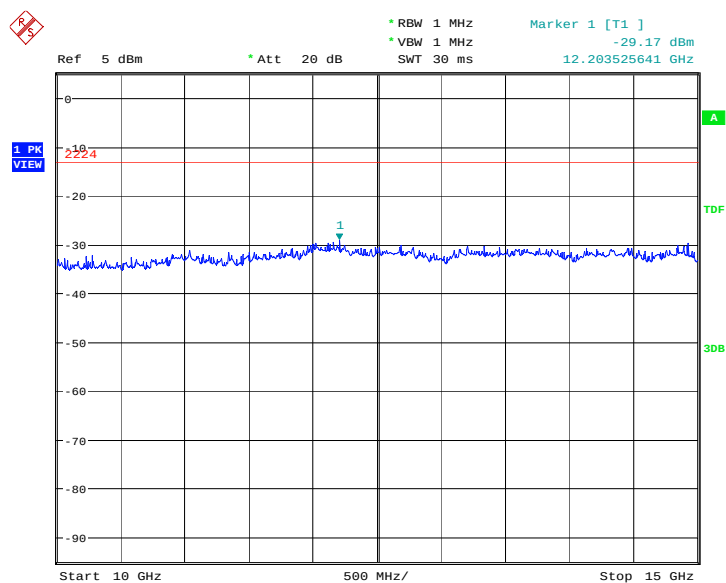
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:57:15

16QAM: 10GHz –15GHz

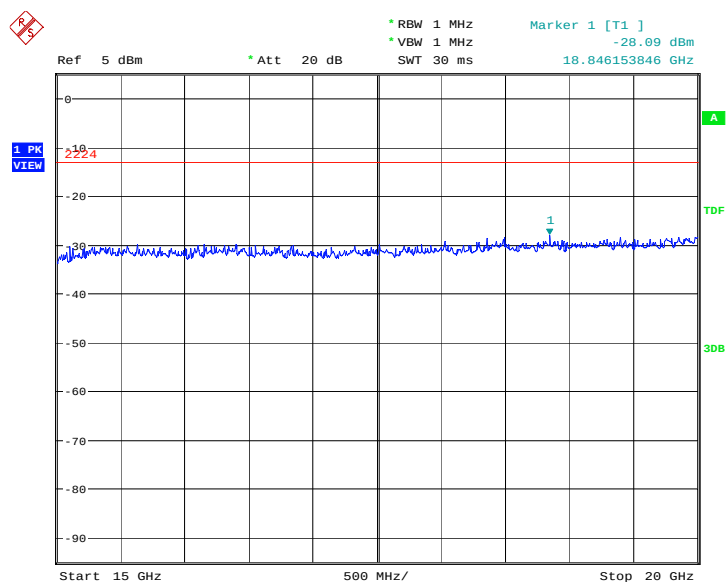
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:57:23

16QAM: 15GHz –20GHz

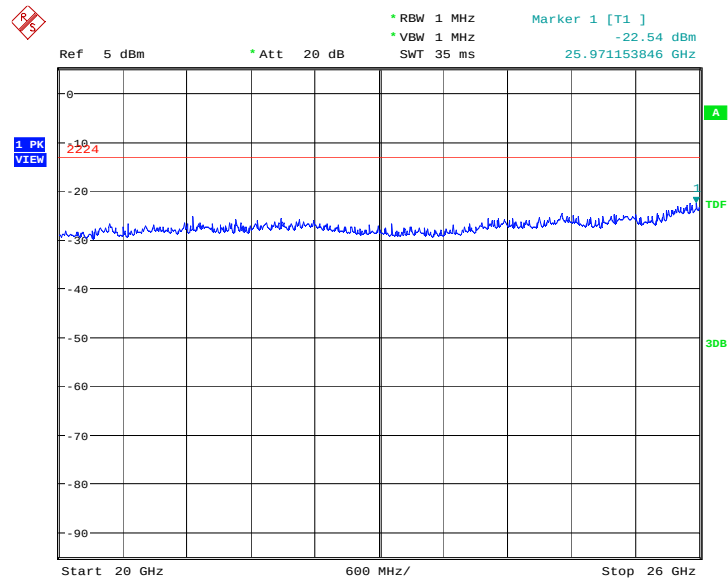
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:57:31

16QAM: 20GHz –26GHz

Spurious emission limit –13dBm.

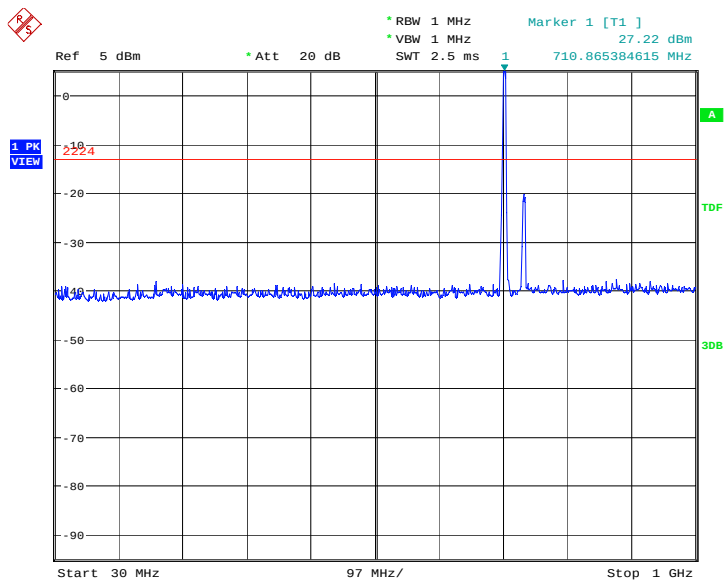


Date: 19.MAR.2014 08:57:39

LTE band 17, 5MHz bandwidth

QPSK: 30MHz – 1GHz

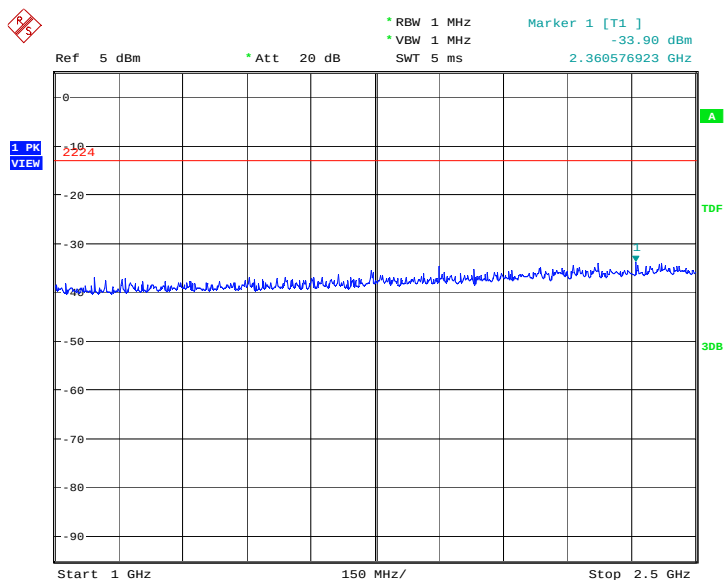
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:58:30

QPSK: 1GHz – 2.5GHz

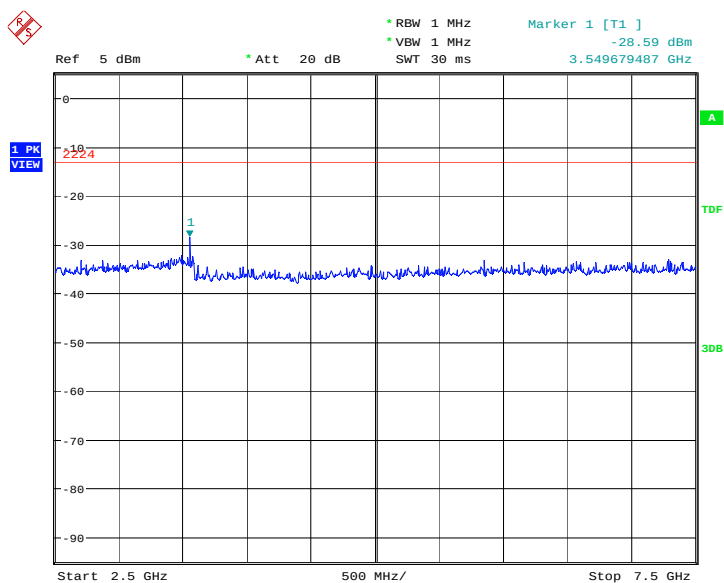
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:58:38

QPSK: 2.5GHz – 7.5GHz

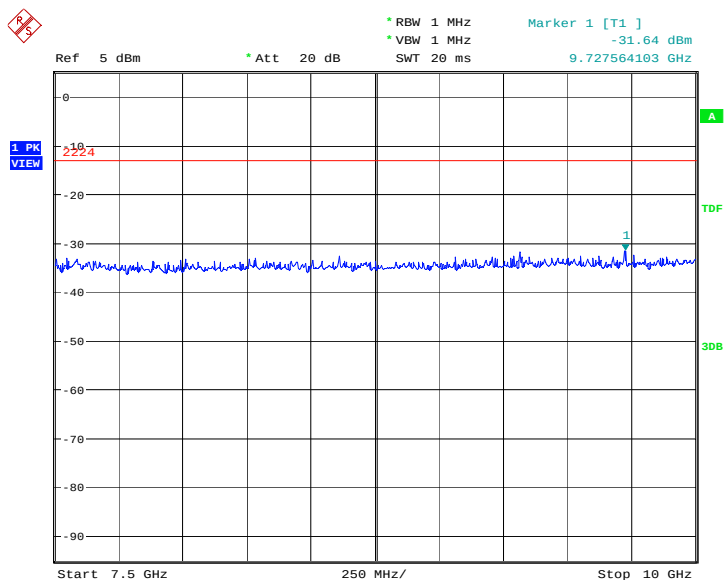
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:58:46

QPSK: 7.5GHz –10GHz

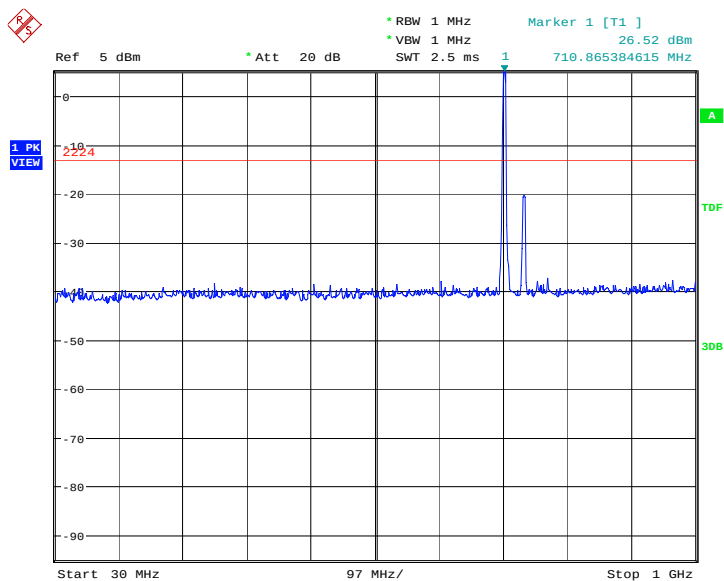
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:58:54

16QAM: 30MHz – 1GHz

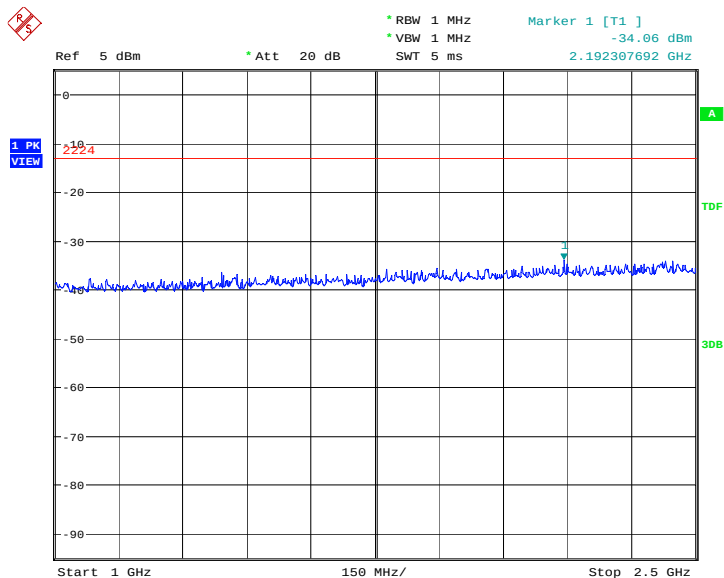
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:59:04

16QAM: 1GHz – 2.5GHz

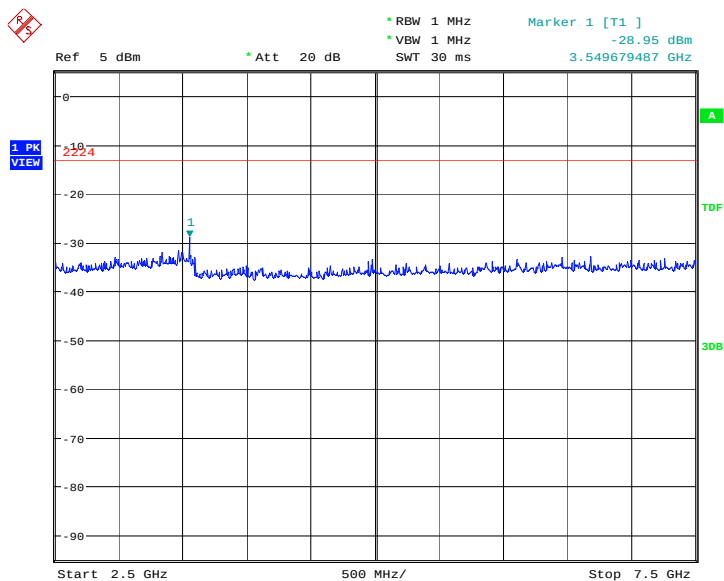
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:59:12

16QAM: 2.5GHz – 7.5GHz

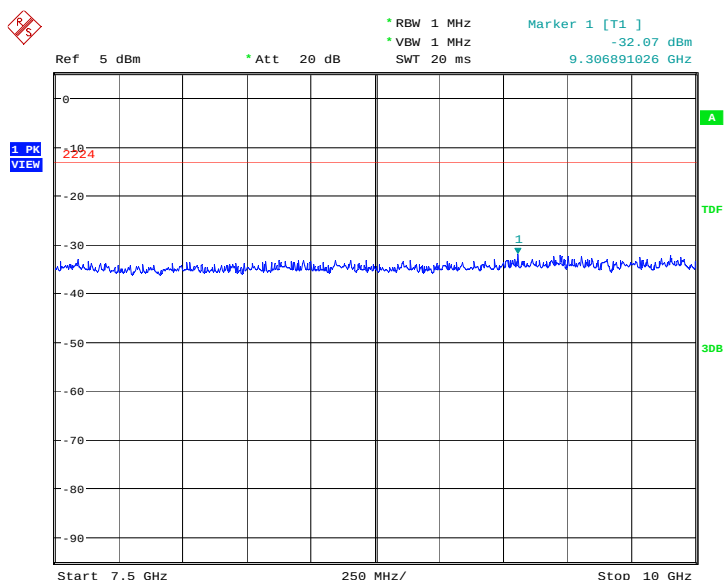
Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:59:20

16QAM: 7.5GHz –10GHz

Spurious emission limit –13dBm.



Date: 19.MAR.2014 08:59:28

END OF REPORT