



TEST REPORT

No. 2013TAR240

for

Sony Mobile Communications AB

GSM/UMTS/LTE mobile phone

Type: PM-0520-BV

FCC ID: PY7PM-0520

IC No.: 4170B-PM0520

with

Hardware Version: A

Software Version: 10.2.G.0.4

Issued Date: Apr. 24th, 2013

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:

DAkks accreditation (DIN EN ISO/IEC 17025): No. 12123-01-01

FCC 2.948 Listed: No.733176

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

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1. Test Laboratory

1.1. Testing Location

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

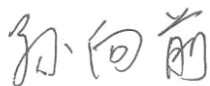
1.3. Project data

Receipt of Sample Mar 4th, 2013
Testing Start Date: Mar 4th, 2013
Testing End Date: Mar 19th, 2013

1.4. Signature



Qu Pengfei
(Prepared this test report)



Sun Xiangqian
(Reviewed this test report)



Song Chongwen
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: Sony Mobile Communications (China) Co. Ltd
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2.2. Manufacturer Information

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

3.1. About EUT

Description	GSM 850/900/1800/1900, GPRS, EDGE, WCDMA FDD Band 1/2/4/5/8, HSDPA, HSUPA, LTE FDD Band 4 Bluetooth EDR & BLE, WLAN (802.11 a/b/g/n), FM, NFC, GPS receiver mobile phone
Type	PM-0520-BV
FCC ID	PY7PM-0520
Frequency range (Tx)	GSM 850: 824.2 MHz - 848.8 MHz PCS 1900: 1850.2 MHz -1909.8 MHz WCDMA 850:824 MHz - 849 MHz WCDMA 1700: 1710 MHz -1755 MHz WCDMA 1900:1850 MHz -1910 MHz LTE Band 4: 1710MHz-1755MHz
Antenna	Internal
Power supply	Battery or charger (travel adapter / vehicle charger)
Output power	30.32 dBm maximum ERP measured for GSM850 30.72 dBm maximum EIRP measured for PCS1900 21.71 dBm maximum ERP measured for WCDMA 850 22.22 dBm maximum EIRP measured for WCDMA 1700 22.87 dBm maximum EIRP measured for WCDMA 1900 22.92 dBm maximum EIRP measured for LTE Band 4
Extreme vol. Limits	3.5VDC to 4.1VDC (nominal: 3.7VDC)
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*	SN	IMEI	HW Version	SW Version
#23830	BX903DK1RL	004402450816685	A	10.2.G.0.4
#23829	BX903DKQSP	004402450817105	A	10.2.G.0.4

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

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN	Revision
#23498	Travel Charger	8512W24400476	1C
#23812	USB Cable	123107D1000A4AE	1

#23498

Type	EP880
Manufacturer	SALCOMP
Length of cable	/

#23812

Commercial name	EC801
Type	AI-0401
Manufacturer	Sony Mobile
Length of cable	96.5cm

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

3.4. General Description

The Equipment Under Test (EUT) is a model of GSM/UMTS/LTE mobile phone with integrated antenna and inbuilt Li-Polymer battery.

The EUT supports GSM 850/900/1800/1900MHz bands, WCDMA FDD bands 1/2/4/5/8 and LTE FDD bands 4. It also supports GPRS service with multi-slots class 33 and EGPRS service with multi-slots class 33 too. The HSDPA and HSUPA features are also supported.

It has MP3, camera, FM radio, USB memory, GPS receiver, NFC, Mobile High-Definition Link (MHL), Bluetooth (EDR and Bluetooth 4.0), WLAN (802.11 a/b/g/n) and Wi-Fi hotspot functions.

It consists of normal option: travel charger.

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

Samples undergoing test were selected by the client.

3.5. EUT set-ups

EUT Set-up No.	Combination of EUT and AE	Remarks
Set. 1	#23830 + #23498+ #23812	Tests with travel charger
Set. 2	#23830	ERP/EIRP/RSE tests
Set. 3	#23829	Conducted RF tests

4. Reference Documents

4.1. Reference Documents for testing

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

Reference	Title	Version
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-11 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	2003
RSS-139	Advanced Wireless Services Equipment Operating in the Bands 1710-1755 MHz and 2110-2155 MHz	Issue2

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-2 (10 meters×6.7meters×6.1meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1Ω
Normalised site attenuation (NSA)	< ±3.5 dB, 3m 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. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz

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

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

6. SUMMARY OF TEST RESULTS

6.1. Summary of test results

Abbreviations used in this clause:

P	Pass
NA	Not applicable
F	Fail

LTE Band V

Items	Test Name	Clause in FCC rules	Clause in IC rules	Section in this report	Verdict
1	Output Power	22.913(a)	6.4	A.1	P
2	Emission Limit	22.917, 2.1051	6.5	A.2	P
3	Conducted Emission	15.107/207	/	A.3	P
4	Frequency Stability	22.235, 2.1055	6.3	A.4	P
5	Occupied Bandwidth	2.1049(h)(i)	6.5	A.5	P
6	Emission Bandwidth	22.917(b)	6.5	A.6	P
7	Band Edge Compliance	22.917(b)	6.5	A.7	P
8	Conducted Spurious Emission	22.917, 2.1057	6.5	A.8	P

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	2013-03-28
3	Test Receiver	ESU26	100376	R&S	2013-11-07
4	EMI Antenna	VULB 9163	514	Schwarzbeck	2014-11-10
5	EMI Antenna	3117	00139065	ETS-Lindgren	2014-07-31
6	LISN	ESH2-Z5	829991/012	R&S	2013-04-16
7	Universal Radio Communication Tester	E5515C	MY48361083	Agilent	2013-03-16
8	Spectrum Analyzer	E4440A	MY48250642	Agilent	2014-03-04
9	EMI Antenna	9117	177	Schwarzbeck	2014-06-29
10	EMI Antenna	VULB 9163	482	Schwarzbeck	2014-02-17
11	EMI Antenna	3117	00119024	ETS-Lindgren	2014-02-02
12	EMI Antenna	3117	00058889	ETS-Lindgren	2014-02-02
13	Signal Generator	N5183A	MY49060052	Agilent	2013-03-19
14	Climatic chamber	PL-2G	343074	ESPEC	2013-05-12
15	Universal Radio Communication Tester	CMW500	116588	R&S	2013-11-06

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

Reference

FCC: 27.50(d)(2).

IC: RSS-139 Issue 2, Section 6.4.

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 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 spectrum analyzer's peak detector.

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

LTE band 4

Measurement result

Bandwidth	RB Size	Channel	Power	
	RB offset		QPSK	16QAM
1.4MHz	1 RB high	1754.3	23.54	22.48
		1732.5	23.64	23.00
		1710.7	23.58	22.53
	1 RB low	1754.3	23.61	22.65
		1732.5	23.42	23.00
		1710.7	23.47	22.50
	50% RB mid	1754.3	23.58	22.87
		1732.5	23.48	22.71
		1710.7	23.42	22.81
	100% RB	1754.3	22.99	22.06
		1732.5	22.79	22.18
		1710.7	22.98	22.11
3MHz	1 RB high	1753.5	23.55	22.99
		1732.5	23.62	22.98
		1711.5	23.64	22.97
	1 RB low	1753.5	23.43	23.00
		1732.5	23.60	22.92

	50% RB mid	1711.5	23.58	22.97
		1753.5	22.83	22.15
		1732.5	22.82	22.13
		1711.5	22.94	22.26
	100% RB	1753.5	22.88	22.08
		1732.5	22.82	22.21
		1711.5	22.96	22.00
5MHz	1 RB high	1752.5	23.52	23.00
		1732.5	23.66	22.92
		1712.5	23.57	22.99
	1 RB low	1752.5	23.47	22.96
		1732.5	23.63	23.00
		1712.5	23.49	22.89
	50% RB mid	1752.5	22.84	22.10
		1732.5	22.85	22.22
		1712.5	22.95	22.00
	100% RB	1752.5	22.82	22.08
		1732.5	22.87	22.16
		1712.5	22.99	22.12
10MHz	1 RB high	1750	23.48	23.00
		1732.5	23.62	22.86
		1715	23.44	22.97
	1 RB low	1750	23.34	22.96
		1732.5	23.49	22.94
		1715	23.51	22.93
	50% RB mid	1750	22.86	22.05
		1732.5	22.84	22.13
		1715	22.83	22.02
	100% RB	1750	22.71	22.09
		1732.5	22.70	22.07
		1715	22.80	22.06
15MHz	1 RB high	1747.5	23.39	22.86
		1732.5	23.57	23.00
		1717.5	23.50	23.00
	1 RB low	1747.5	23.53	22.98
		1732.5	23.31	22.70
		1717.5	23.39	22.96
	50% RB mid	1747.5	22.54	22.08
		1732.5	22.56	22.02

	100% RB	1717.5	22.81	22.21
		1747.5	22.63	22.06
		1732.5	22.74	22.06
		1717.5	22.70	22.05
20MHz	1 RB high	1745	23.42	22.89
		1732.5	23.56	23.00
		1720	23.50	22.95
	1 RB low	1745	23.65	22.97
		1732.5	23.51	22.86
		1720	23.33	22.94
	50% RB mid	1745	22.68	22.05
		1732.5	22.69	22.03
		1720	22.58	22.09
	100% RB	1745	22.74	22.03
		1732.5	22.70	22.01
		1720	22.69	22.01

Note: Expanded measurement uncertainty for LTE Band IV is $U = 0.83\text{dB}$, $k=2$.

A.1.3 Radiated

A.1.3.1 Description

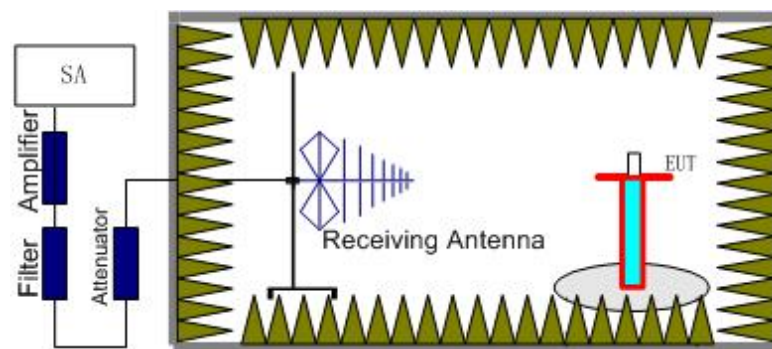
This is the test for the maximum radiated power from the EUT.

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

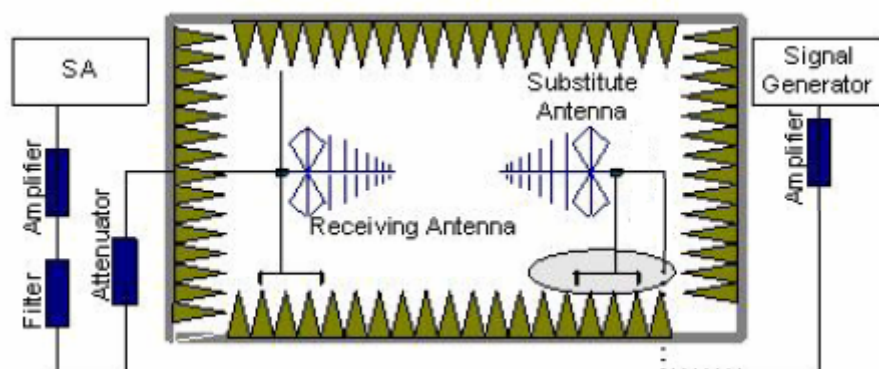
A.1.3.2 Method of Measurement

The measurements procedures in TIA-603C-2004 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



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



In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the

receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. An amplifier should be connected to the Signal Source output port. And the cable should be connected between the amplifier and the substitution antenna.
The cable loss (P_{cl}), the substitution antenna Gain (G_a) and the amplifier Gain (P_{Ag}) should be recorded after test.
The measurement results are obtained as described below:
Power (EIRP) = $P_{Mea} - P_{Ag} - P_{cl} - G_a$
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 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.

LTE Band IV- EIRP 27.50(d)

Limits: $\leq 30\text{dBm}$ (1W)

Measurement result

LTE Band IV_1.4MHz_QPSK

Frequency (MHz)	Pmea (dBm)	Cable Loss(dB)	Pag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1710.70	-30.96	2.96	-50.00	-5.17	21.25	Horizontal
1732.50	-29.86	2.99	-50.00	-5.08	22.23	Horizontal
1754.30	-29.05	3.01	-50.00	-4.98	22.92	Horizontal

LTE Band IV_3MHz_QPSK

Frequency (MHz)	Pmea (dBm)	Cable Loss(dB)	Pag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1711.50	-31.99	2.96	-50.00	-5.17	20.22	Horizontal
1732.50	-30.71	2.99	-50.00	-5.08	21.38	Horizontal
1753.50	-30.40	3.01	-50.00	-4.98	21.57	Horizontal

LTE Band IV_5MHz_QPSK

Frequency (MHz)	Pmea (dBm)	Cable Loss(dB)	Pag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1712.50	-31.75	2.96	-50.00	-5.17	20.46	Horizontal
1732.50	-30.69	2.99	-50.00	-5.08	21.40	Horizontal
1752.50	-30.49	3.01	-50.00	-4.98	21.48	Horizontal

LTE Band IV_10MHz_QPSK

Frequency (MHz)	Pmea (dBm)	Cable Loss(dB)	Pag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1715.00	-32.70	2.97	-50.00	-5.15	19.48	Horizontal
1732.50	-31.62	2.99	-50.00	-5.08	20.47	Horizontal
1750.50	-30.48	3.01	-50.00	-5.00	21.51	Horizontal

LTE Band IV_15MHz_QPSK

Frequency (MHz)	Pmea (dBm)	Cable Loss(dB)	Pag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1717.50	-33.14	2.97	-50.00	-5.14	19.03	Horizontal
1732.50	-32.60	2.99	-50.00	-5.08	19.49	Horizontal
1747.50	-32.25	3.00	-50.00	-5.01	19.76	Horizontal

LTE Band IV_20MHz_QPSK

Frequency (MHz)	Pmea (dBm)	Cable Loss(dB)	Pag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1720.00	-34.44	2.97	-50.00	-5.13	17.72	Horizontal
1732.50	-33.59	2.99	-50.00	-5.08	18.50	Horizontal
1745.00	-33.59	3.00	-50.00	-5.02	18.43	Horizontal

LTE Band IV_1.4MHz_16QAM

Frequency (MHz)	Pmea (dBm)	Cable Loss(dB)	Pag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1710.70	-31.14	2.96	-50.00	-5.17	21.07	Horizontal
1732.50	-30.47	2.99	-50.00	-5.08	21.62	Horizontal
1754.30	-29.82	3.01	-50.00	-4.98	22.15	Horizontal

LTE Band IV_3MHz_16QAM

Frequency (MHz)	Pmea (dBm)	Cable Loss(dB)	Pag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1711.50	-31.44	2.96	-50.00	-5.17	20.77	Horizontal
1732.50	-30.50	2.99	-50.00	-5.08	21.59	Horizontal
1753.50	-29.99	3.01	-50.00	-4.98	21.98	Horizontal

LTE Band IV_5MHz_16QAM

Frequency (MHz)	Pmea (dBm)	Cable Loss(dB)	Pag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1712.50	-31.77	2.96	-50.00	-5.17	20.44	Horizontal
1732.50	-30.44	3.01	-50.00	-4.99	21.54	Horizontal
1752.50	-29.87	3.01	-50.00	-4.98	22.10	Horizontal

LTE Band IV_10MHz_16QAM

Frequency (MHz)	Pmea (dBm)	Cable Loss(dB)	Pag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1715.00	-32.64	2.97	-50.00	-5.15	19.54	Horizontal
1732.50	-31.45	2.99	-50.00	-5.08	20.64	Horizontal
1750.50	-31.50	3.01	-50.00	-5.00	20.49	Horizontal

LTE Band IV_15MHz_16QAM

Frequency (MHz)	P _{mea} (dBm)	Cable Loss(dB)	P _{ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1717.50	-32.96	2.97	-50.00	-5.14	19.21	Horizontal
1732.50	-32.90	2.99	-50.00	-5.08	19.19	Horizontal
1747.50	-32.32	3.00	-50.00	-5.01	19.69	Horizontal

LTE Band IV_20MHz_16QAM

Frequency (MHz)	P _{mea} (dBm)	Cable Loss(dB)	P _{ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1720.00	-34.63	2.97	-50.00	-5.13	17.53	Horizontal
1732.50	-34.18	2.99	-50.00	-5.08	17.91	Horizontal
1745.00	-34.25	3.00	-50.00	-5.02	17.77	Horizontal

Sample calculation: LTE Band IV, QPSK, 20MHz 1720.00 MHz

$$\begin{aligned} \text{Peak EIRP(dBm)} &= P_{\text{Mea}}(-34.44 \text{ dBm}) - G_a(-5.13 \text{ dBi}) - P_{\text{Ag}}(-50.00 \text{ dB}) - P_{\text{cl}}(2.97 \text{ dB}) \\ &= 17.72 \text{ dBm} \end{aligned}$$

ANALYZER SETTINGS: RBW = VBW = 3MHz

Note: Expanded measurement uncertainty for LTE band 4 is $U = 0.96\text{dB}$, $k=2$.

A.2 EMISSION LIMIT

Reference

FCC: CFR 2.1051, 27.53(h).

IC: RSS-139 Issue 2, Section 6.5

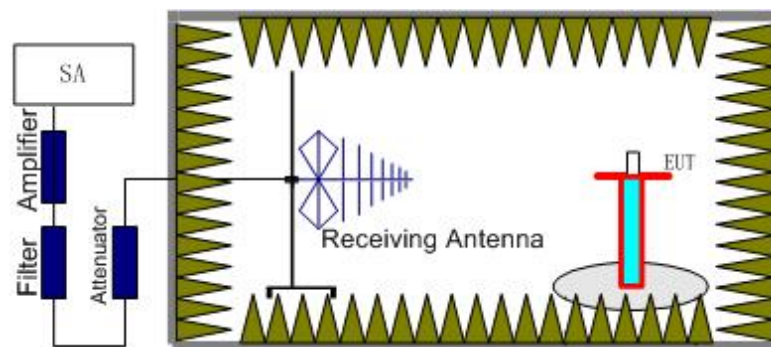
A.2.1 Measurement Method

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

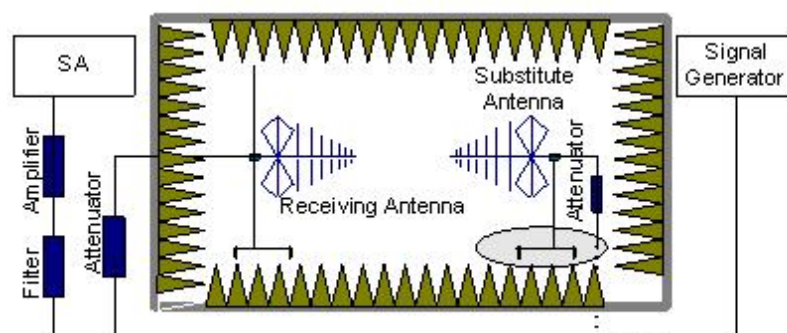
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set 1MHz as outlined in Part 27.53(h). The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE Band 4.

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 (2.15 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 specifies 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 Band 4. 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 Band 4 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 4, 1.4MHz, QPSK, Channel 19957

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3872.91	-70.05	4.52	-8.35	-66.22	-13.00	Vertical
6602.57	-64.79	6.10	-10.70	-60.19	-13.00	Vertical
9032.53	-61.59	7.46	-12.60	-56.45	-13.00	Horizontal
11352.15	-64.67	8.62	-12.40	-60.89	-13.00	Horizontal

13239.74	-64.58	9.12	-13.54	-60.16	-13.00	Vertical
14900.61	-59.37	9.68	-13.52	-55.53	-13.00	Horizontal

LTE Band 4, 1.4MHz, QPSK, Channel 20175

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3464.35	-59.38	4.24	-7.81	-55.81	-13.00	Horizontal
5168.63	-66.80	5.20	-9.80	-62.20	-13.00	Horizontal
6805.45	-68.86	6.16	-10.91	-64.11	-13.00	Horizontal
8663.48	-63.74	7.42	-12.33	-58.83	-13.00	Vertical
9999.81	-66.84	7.99	-12.40	-62.43	-13.00	Vertical
12338.73	-64.56	8.74	-12.64	-60.66	-13.00	Vertical

LTE Band 4, 1.4MHz, QPSK, Channel 20394

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3830.27	-67.11	4.51	-8.30	-63.32	-13.00	Horizontal
5034.88	-67.68	5.18	-9.72	-63.14	-13.00	Horizontal
8855.79	-66.31	7.31	-12.48	-61.14	-13.00	Vertical
10321.82	-62.36	7.86	-12.46	-57.76	-13.00	Vertical
12672.57	-66.18	8.92	-12.91	-62.19	-13.00	Vertical
15722.55	-59.41	10.08	-13.22	-56.27	-13.00	Vertical

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

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3420.54	-60.85	4.19	-7.71	-57.33	-13.00	Horizontal
5247.61	-68.29	5.26	-9.85	-63.70	-13.00	Vertical
6876.83	-67.57	6.07	-10.98	-62.66	-13.00	Horizontal
9065.42	-65.53	7.53	-12.60	-60.46	-13.00	Horizontal
10173.13	-63.48	7.77	-12.43	-58.82	-13.00	Vertical
11986.87	-61.91	8.67	-12.50	-58.08	-13.00	Vertical

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

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3464.17	-61.18	4.24	-7.81	-57.61	-13.00	Horizontal
5514.50	-67.56	5.48	-10.01	-63.03	-13.00	Vertical
8660.17	-58.55	7.44	-12.33	-53.66	-13.00	Vertical
10184.25	-62.37	7.72	-12.44	-57.65	-13.00	Horizontal
13856.32	-52.38	9.18	-13.94	-47.62	-13.00	Horizontal
15443.83	-60.76	9.59	-13.41	-56.94	-13.00	Vertical

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

Frequency (MHz)	P _{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit (dBm)	Polarization
3507.59	-56.55	4.32	-7.91	-52.96	-13.00	Horizontal
4269.66	-67.98	4.79	-8.66	-64.11	-13.00	Vertical
7149.11	-66.82	6.37	-11.19	-62.00	-13.00	Horizontal
8769.19	-54.89	7.36	-12.42	-49.83	-13.00	Horizontal
10225.32	-64.95	7.53	-12.45	-60.03	-13.00	Vertical
14031.00	-47.19	9.37	-13.98	-42.58	-13.00	Vertical

Note: Expanded measurement uncertainty for this test item is $U = 4.21\text{dB}$, $k=2$.

A.3 CONDUCTED EMISSION

Reference

FCC: CFR Part 15.107/207.

The measurement procedure in ANSI C63.4-2003 is used. Conducted Emission is measured with travel charger. For test layout photo, please refer to Pic.2 in Annex B.

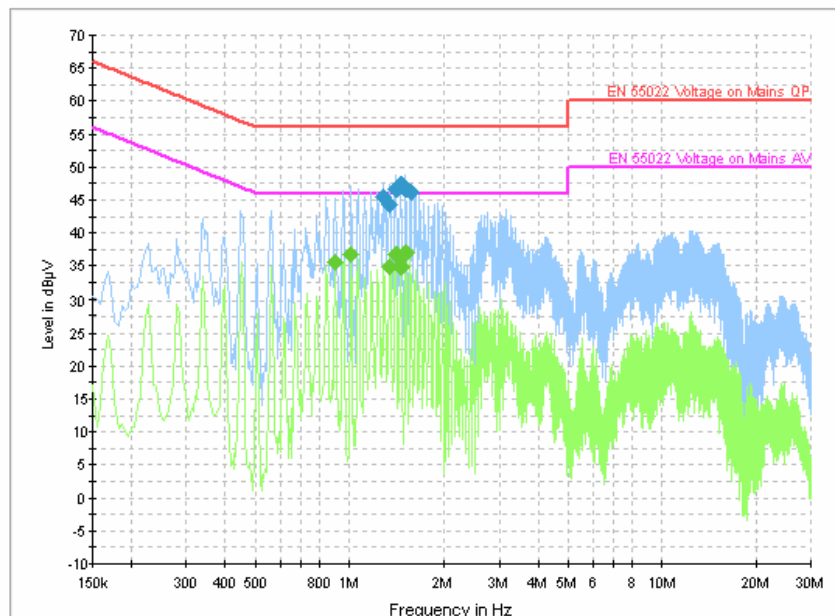
A.3.1 Limit

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 4, 1.4MHz



IF bandwidth 9 kHz

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dB μ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
1.293000	45.5	GND	L1	10.0	10.5	56.0
1.351500	44.3	GND	L1	10.0	11.7	56.0
1.405500	46.6	GND	L1	10.0	9.4	56.0
1.455000	47.3	GND	L1	10.0	8.8	56.0
1.513500	46.7	GND	L1	10.0	9.3	56.0
1.572000	46.2	GND	L1	10.0	9.8	56.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.901500	35.5	GND	L1	10.0	10.5	46.0
1.009500	36.8	GND	L1	10.0	9.2	46.0
1.351500	34.7	GND	L1	10.0	11.3	46.0
1.405500	36.6	GND	L1	10.0	9.4	46.0
1.464000	34.9	GND	L1	10.0	11.1	46.0
1.513500	37.0	GND	L1	10.0	9.0	46.0

A.4 FREQUENCY STABILITY

Reference

FCC: CFR Part 2.1055, 27.54.

IC: RSS-139 Issue 2, Section 6.3

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 channel 661 for LTE band 4 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 1/2 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 1/2 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 1/2 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

A.4.2.1 For Hand carried battery powered equipment

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 4.1VDC, with a nominal voltage of 3.7VDC. 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 of -5.4 % and +10.8 %. For the purposes of measuring frequency stability these voltage limits are to be used.

A.4.3 Measurement results

LTE Band 4, 1.4MHz

Room Temperature: 24 °C

Frequency Error vs Voltage

Voltage(V)	Frequency error(Hz)		Frequency error(ppm)	
Modulation	QPSK	16QAM	QPSK	16QAM
3.5	2	0.001	11	0.006
3.7	-1	0.000	8	0.004
4.1	3	0.001	6	0.003

Frequency Error vs Temperature

temperature(°C)	Frequency error(Hz)		Frequency error(ppm)	
Modulation	QPSK	16QAM	QPSK	16QAM
50	3	9	0.002	0.005
40	4	10	0.002	0.006
30	7	12	0.004	0.007
20	4	4	0.002	0.002
10	2	4	0.001	0.002
0	1	9	0.000	0.005
-10	0	9	0.000	0.005
-20	4	7	0.002	0.004
-30	5	12	0.003	0.007

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

A.5 OCCUPIED BANDWIDTH

Reference

FCC: CFR Part 2.1049(h)(i).

IC: RSS-139 Issue 2, Section 6.5

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 -20dBc BW (99%). Spectrum analyzer plots are included on the following pages.

Measurement Parameters:

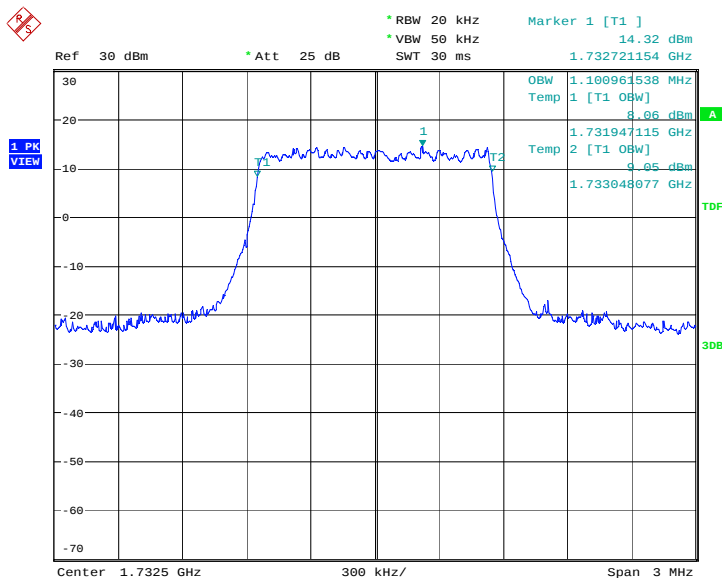
RBW = 20 kHz, VBW = 50 kHz

LTE band 4, 1.4MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	1100.962	1091.346

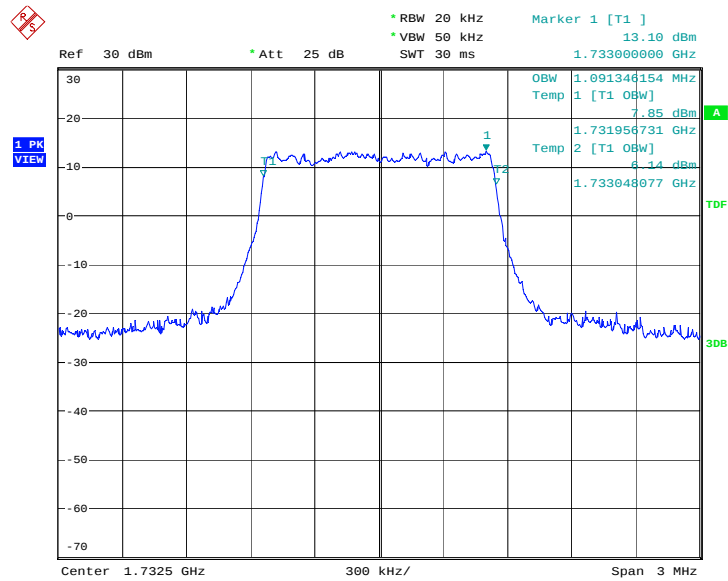
Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

LTE band 4, 1.4MHz Bandwidth, QPSK (-20dBc BW)



Date: 7.MAR.2013 01:47:40

LTE band 4, 1.4MHz Bandwidth, 16QAM (-20dBc BW)



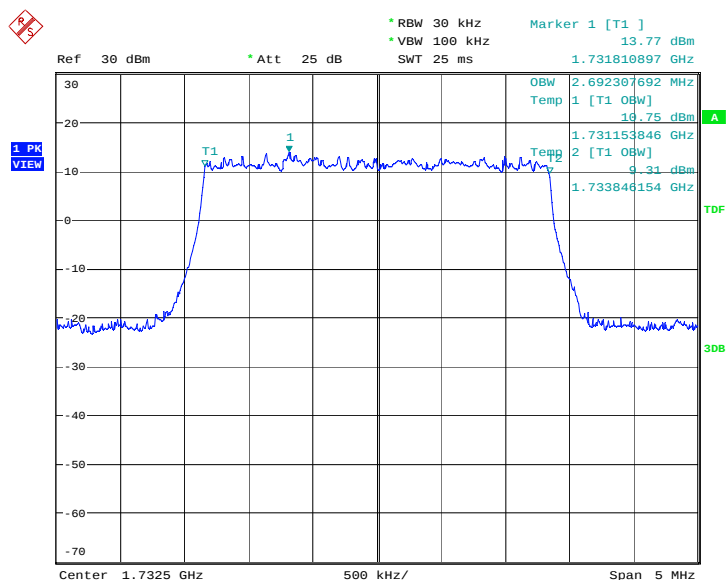
Date: 7.MAR.2013 01:49:15

LTE band 4, 3MHz (99%)

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

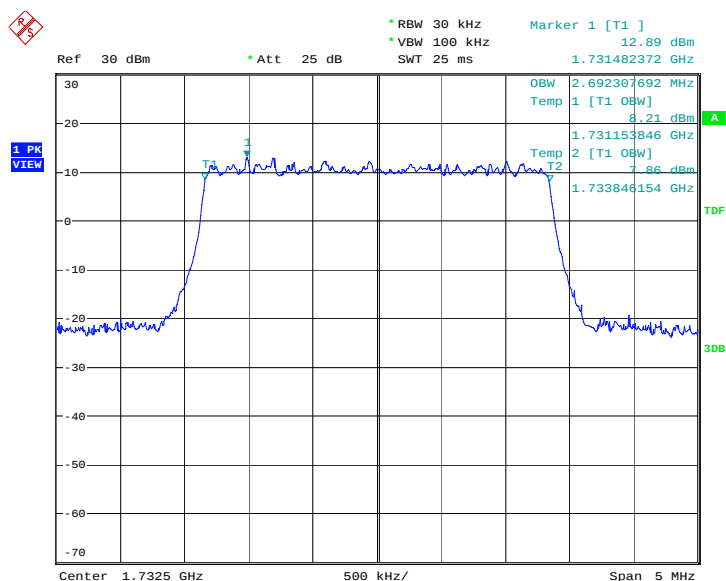
Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

LTE band 4, 3MHz Bandwidth, QPSK (-20dBc BW)



Date: 7.MAR.2013 02:50:44

LTE band 4, 3MHz Bandwidth, 16QAM (-20dBc BW)



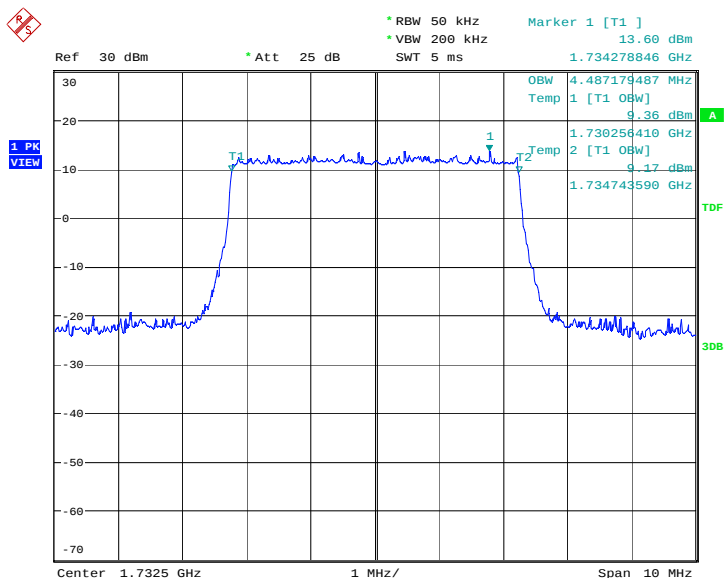
Date: 7.MAR.2013 02:52:19

LTE band 4, 5MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	4487.179	4503.205

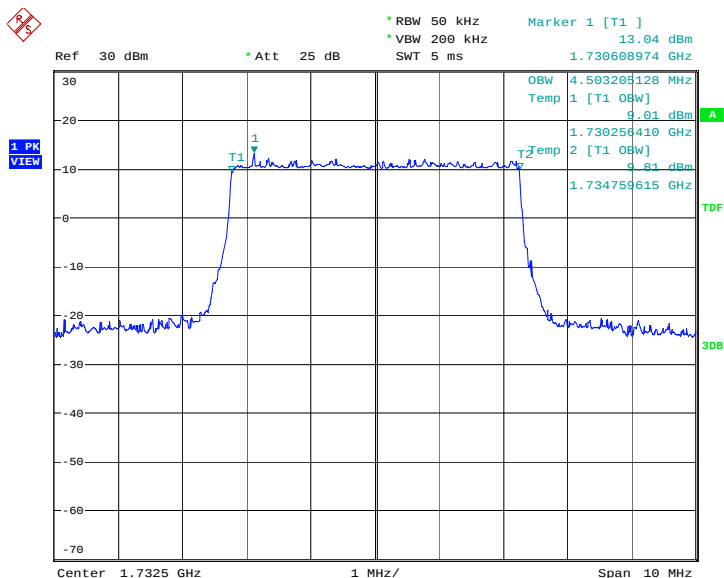
Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

LTE band 4, 5MHz Bandwidth, QPSK (-20dBc BW)



Date: 7.MAR.2013 03:59:17

LTE band 4, 5MHz Bandwidth,16QAM (-20dBc BW)



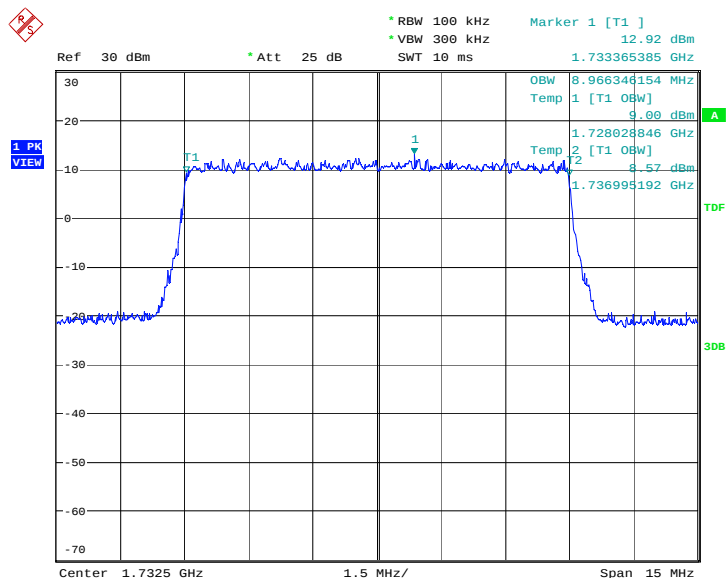
Date: 7.MAR.2013 04:00:53

LTE band 4, 10MHz (99%)

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

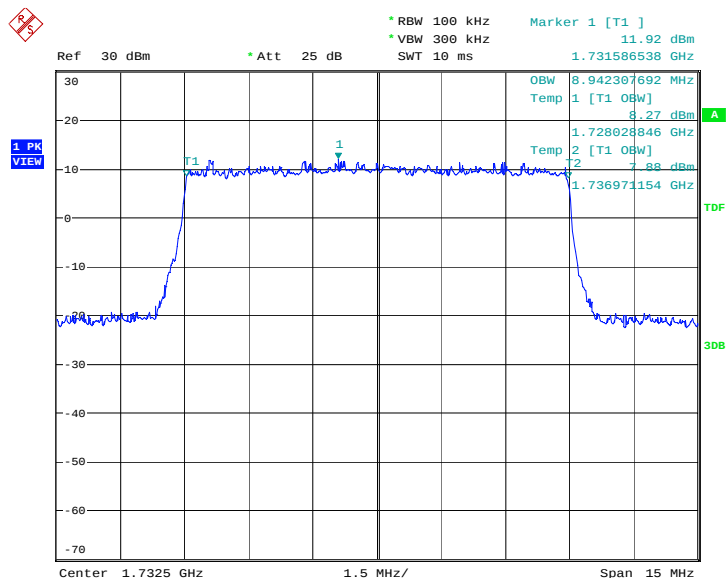
Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

LTE band 4, 10MHz Bandwidth, QPSK (-20dBc BW)



Date: 7.MAR.2013 23:47:35

LTE band 4, 10MHz Bandwidth, 16QAM (-20dBc BW)



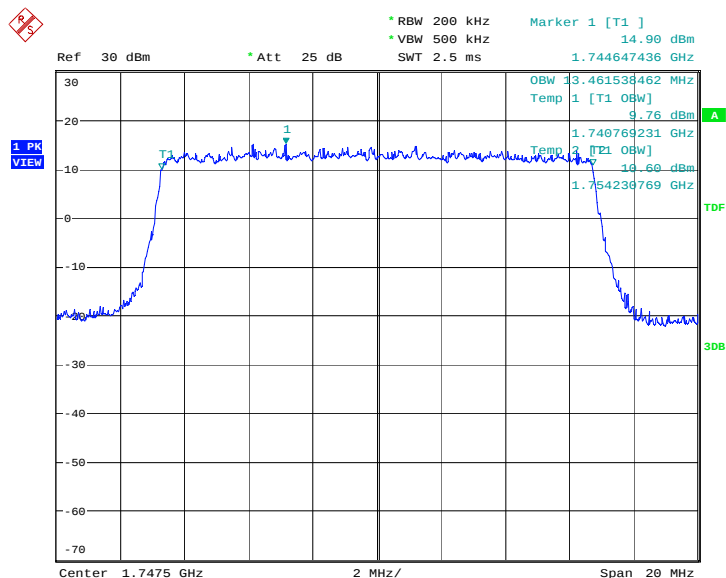
Date: 7.MAR.2013 23:49:10

LTE band 4, 15MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1747.5	QPSK	16QAM
	13461.54	13461.54

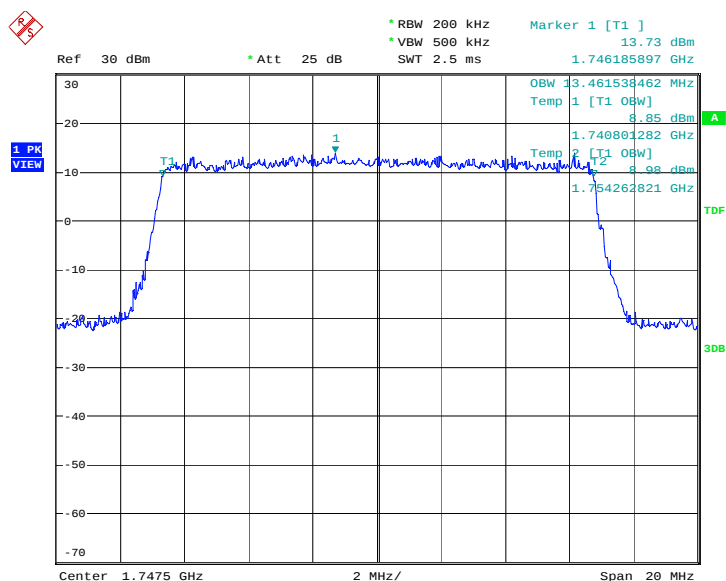
Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

LTE band 4, 10MHz Bandwidth, QPSK (-20dBc BW)



Date: 8.MAR.2013 01:43:22

LTE band 4, 10MHz Bandwidth, 16QAM (-20dBc BW)



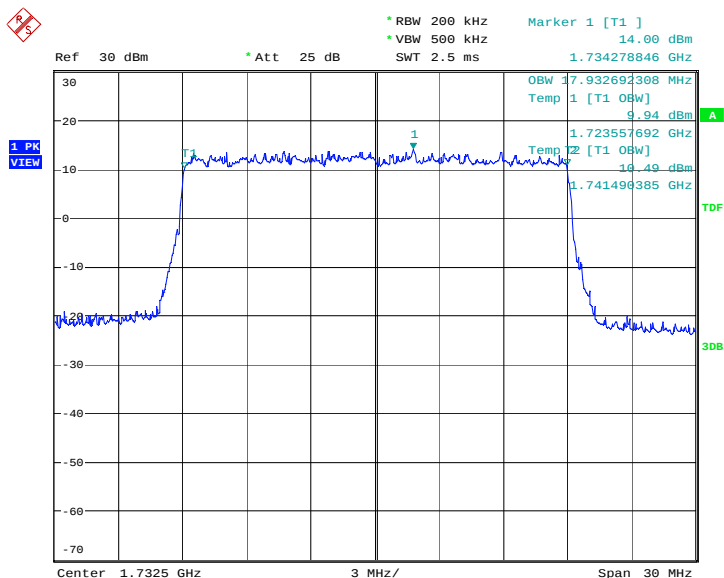
Date: 8.MAR.2013 01:44:58

LTE band 4, 20MHz (99%)

Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	
1732.5	QPSK	16QAM
	17932.69	17884.62

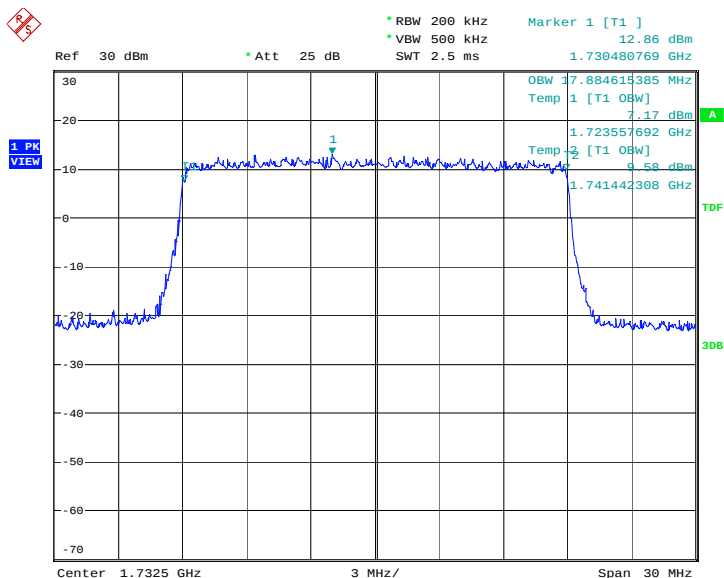
Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

LTE band 4, 10MHz Bandwidth, QPSK (-20dBc BW)



Date: 8.MAR.2013 02:50:51

LTE band 4, 10MHz Bandwidth, 16QAM (-20dBc BW)



Date: 8.MAR.2013 02:52:27

A.6 EMISSION BANDWIDTH

Reference

FCC: CFR Part 27.53(h)

IC: RSS-139 Issue 2, Section 6.5

A.6.1 Emission Bandwidth Results

Emission 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 LTE band 4. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

Measurement Parameters:

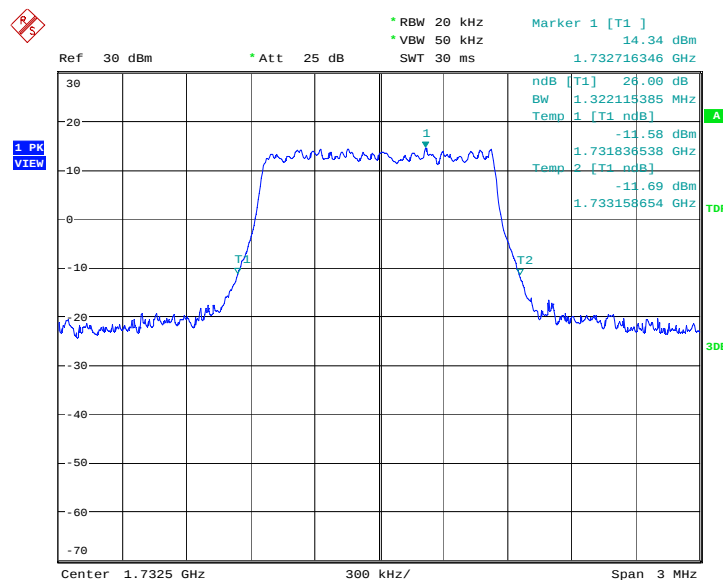
RBW = 20 kHz, VBW = 50 kHz

LTE band 4, 1.4MHz bandwidth (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc BW)(kHz)	
836.5	QPSK	16QAM
	1322.115	1307.692

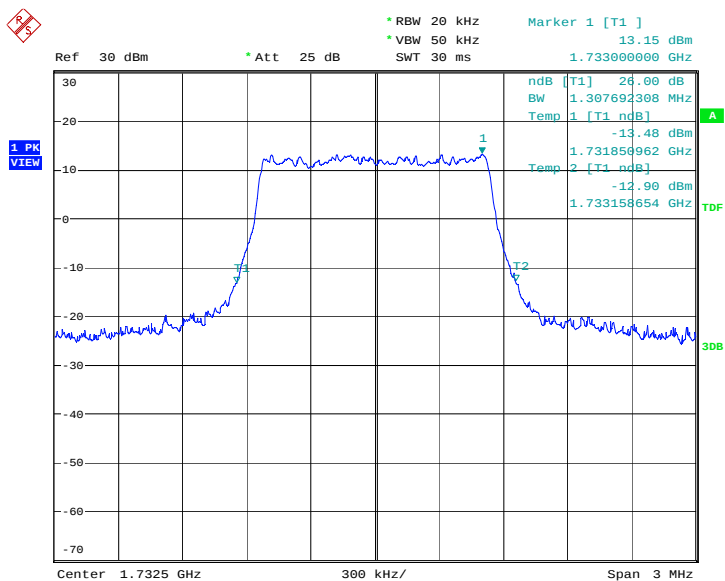
Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

LTE band 4, 1.4MHz bandwidth, QPSK



Date: 7.MAR.2013 02:02:11

LTE band 4, 1.4MHz bandwidth, 16QAM



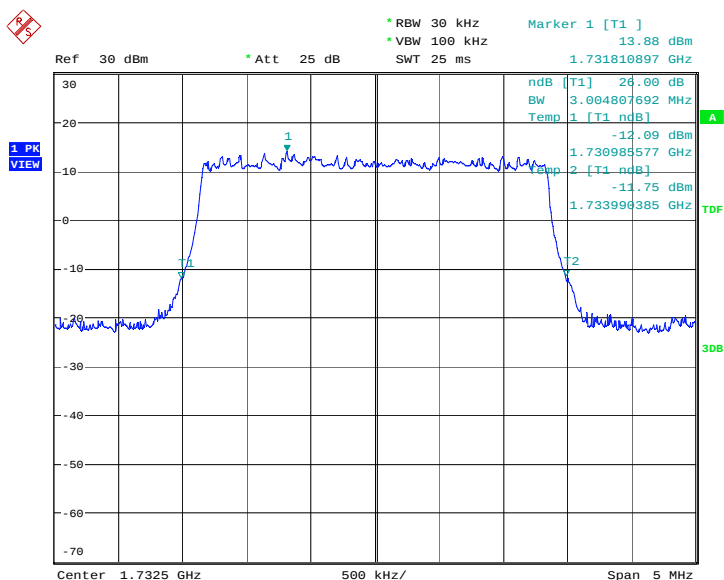
Date: 7.MAR.2013 02:03:54

LTE band 4, 3MHz bandwidth (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc BW)(kHz)	
836.5	QPSK	16QAM
	3004.808	3004.808

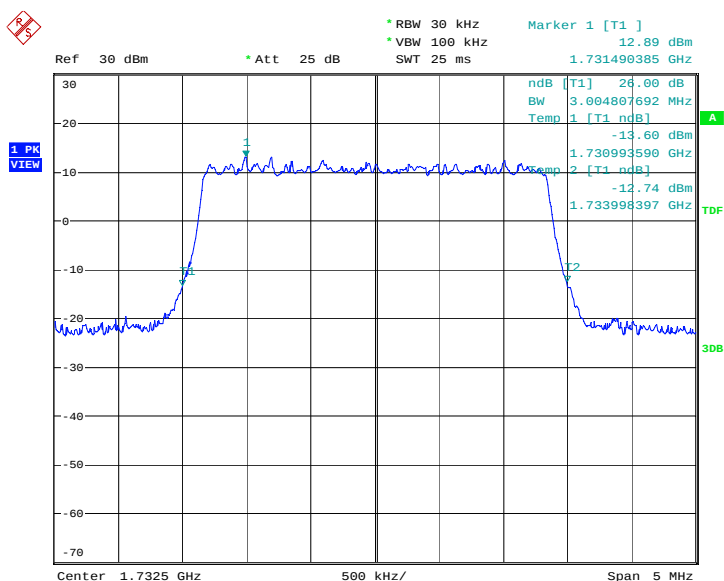
Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

LTE band 4, 3MHz bandwidth, QPSK



Date: 7.MAR.2013 03:09:44

LTE band 4, 3MHz bandwidth, 16QAM



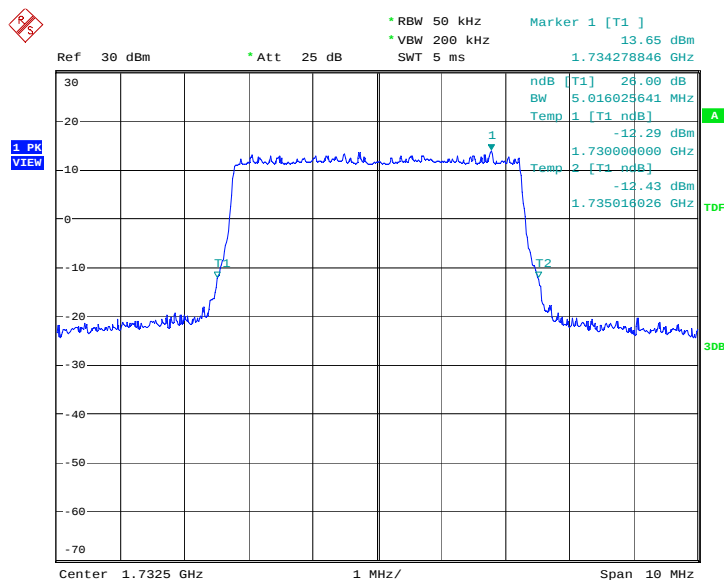
Date: 7.MAR.2013 03:11:28

LTE band 4, 5MHz bandwidth (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc BW)(kHz)	
	QPSK	16QAM
836.5	5016.026	5032.051

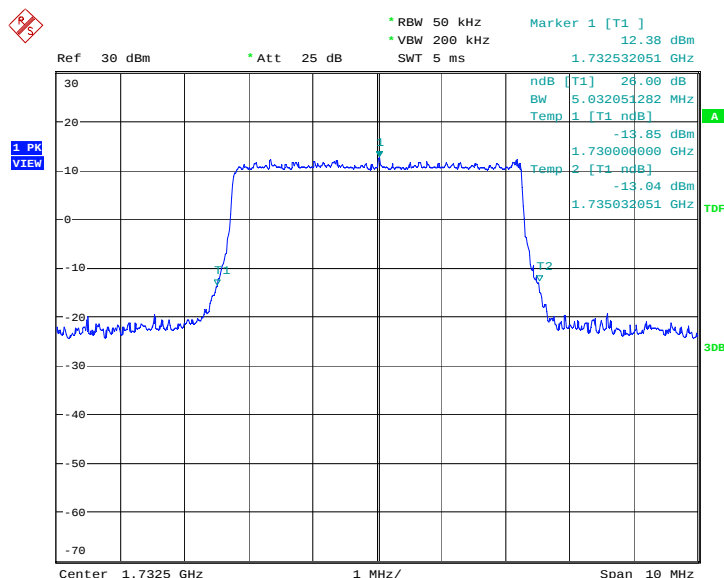
Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

LTE band 4, 5MHz bandwidth, QPSK



Date: 7.MAR.2013 04:13:50

LTE band 4, 5MHz bandwidth, 16QAM



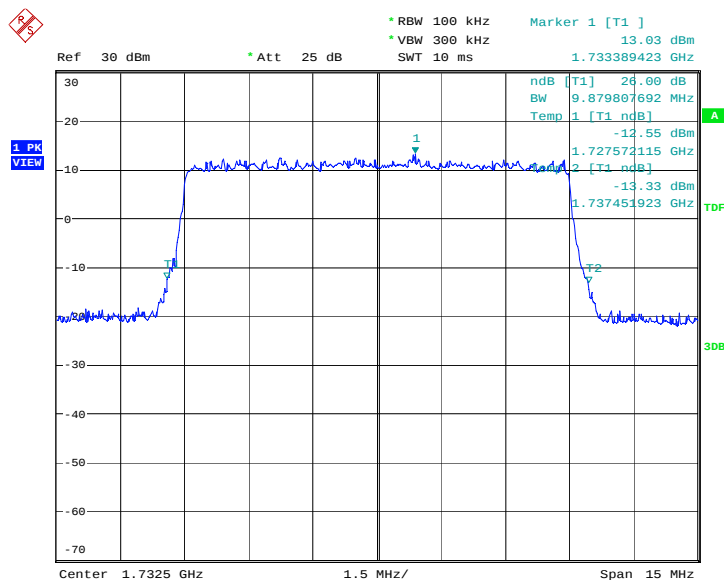
Date: 7.MAR.2013 04:15:33

LTE band 4, 10MHz bandwidth (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc BW)(kHz)	
836.5	QPSK	16QAM
	9879.808	9783.654

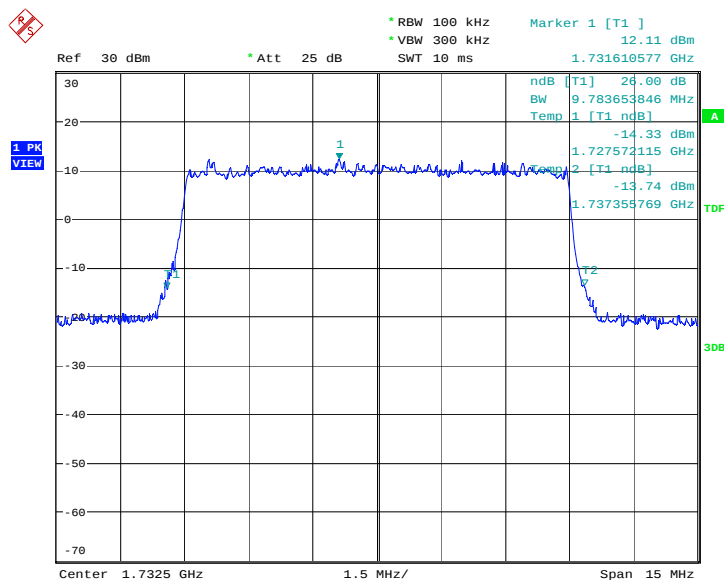
Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

LTE band 4, 10MHz bandwidth, QPSK



Date: 8.MAR.2013 00:05:07

LTE band 4, 10MHz bandwidth, 16QAM



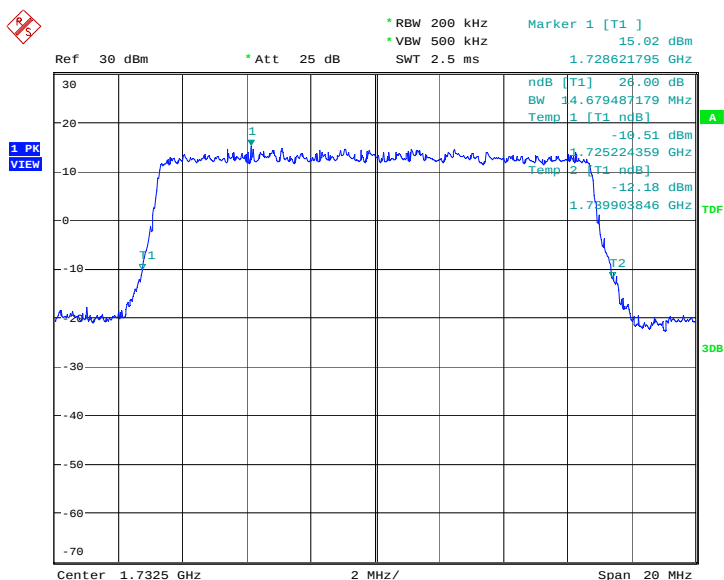
Date: 8.MAR.2013 00:06:51

LTE band 4, 15MHz bandwidth (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc BW)(kHz)	
836.5	QPSK	16QAM
	14679.49	14807.69

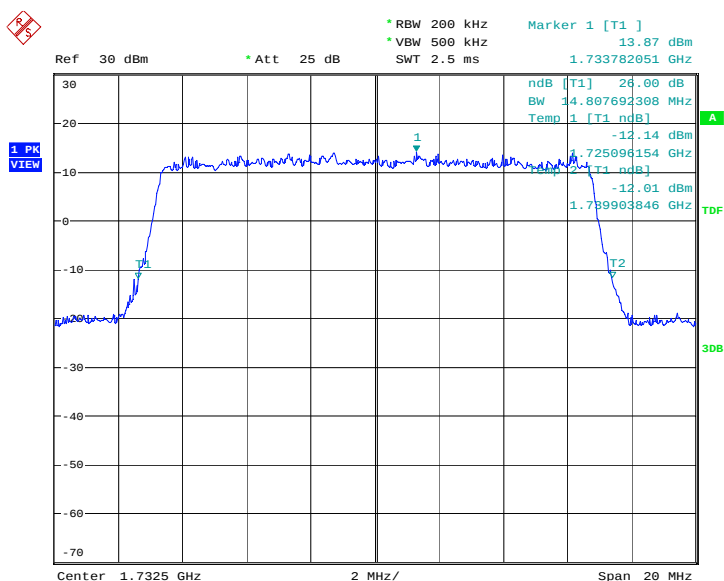
Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

LTE band 4, 15MHz bandwidth, QPSK



Date: 8.MAR.2013 01:54:37

LTE band 4, 15MHz bandwidth, 16QAM



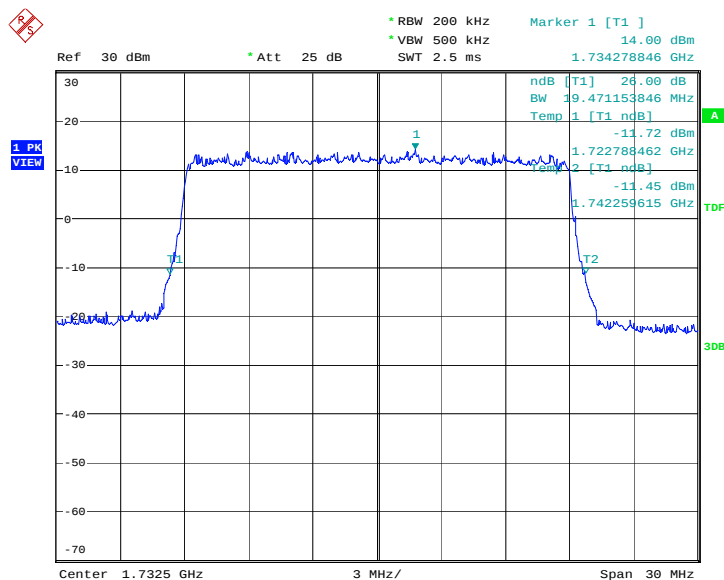
Date: 8.MAR.2013 01:56:21

LTE band 4, 20MHz bandwidth (-26dBc)

Frequency(MHz)	Occupied Bandwidth (-26dBc BW)(kHz)	
836.5	QPSK	16QAM
	19471.15	19471.15

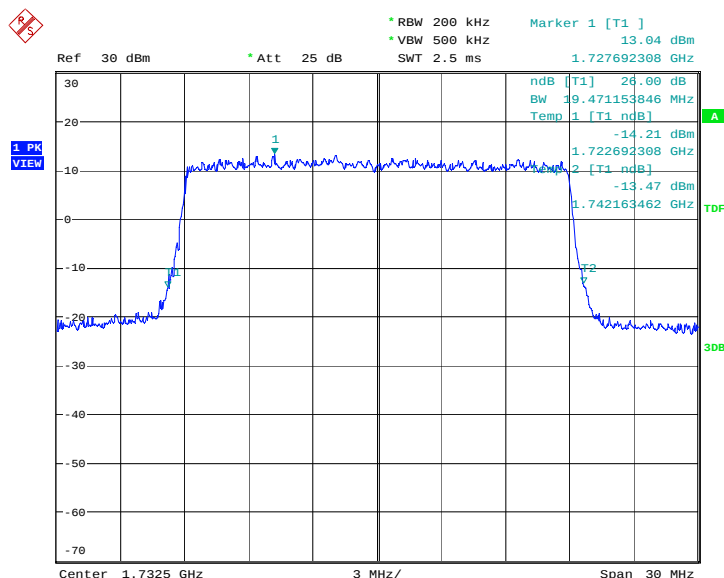
Expanded measurement uncertainty for this test item is 1.1 kHz, k=2

LTE band 4, 20MHz bandwidth, QPSK



Date: 8.MAR.2013 03:05:25

LTE band 4, 20MHz bandwidth, 16QAM



Date: 8.MAR.2013 03:07:09

A.7 BAND EDGE COMPLIANCE

Reference

FCC: CFR Part 27.53(h)

IC: RSS-139 Issue 2, Section 6.5

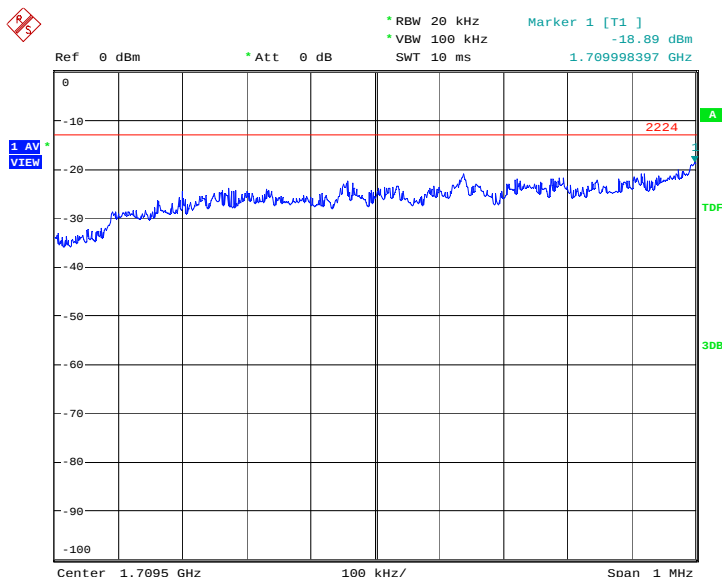
A.7.1 Measurement limit

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.

A.7.2 Measurement result

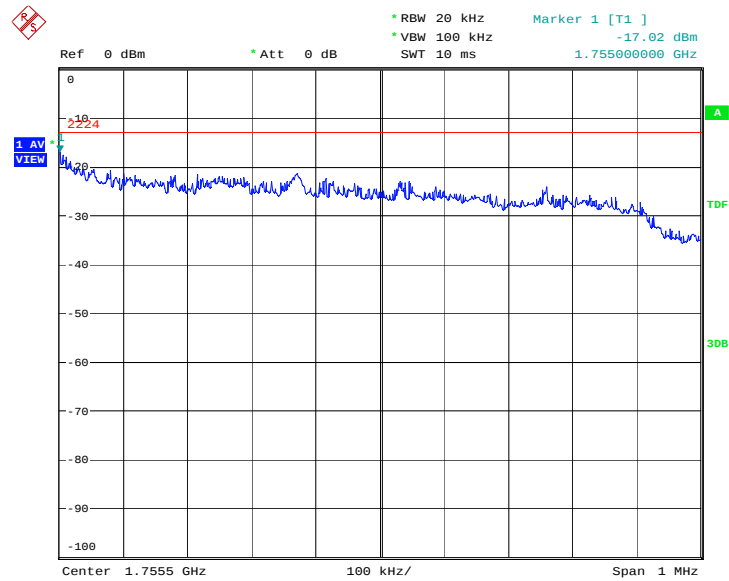
LTE band 4, 1.4MHz

LOW BAND EDGE BLOCK-QPSK



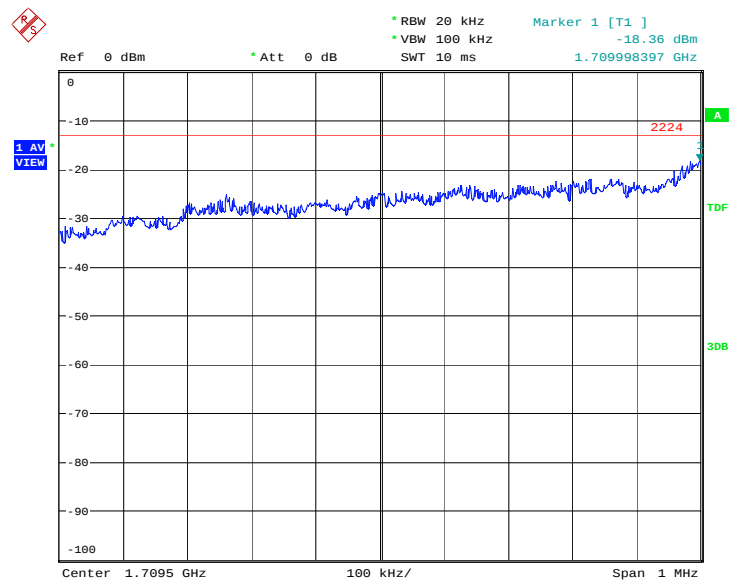
Date: 7.MAR.2013 01:58:47

HIGH BAND EDGE BLOCK-QPSK



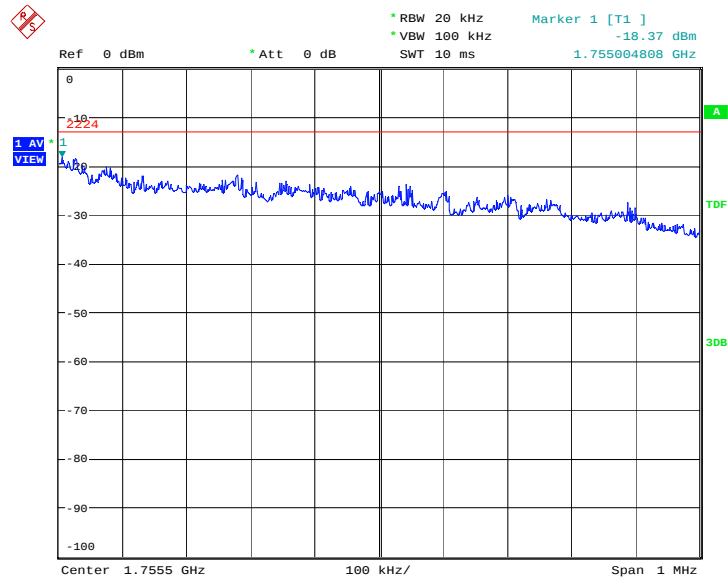
Date: 7.MAR.2013 02:09:40

LOW BAND EDGE BLOCK-16QAM



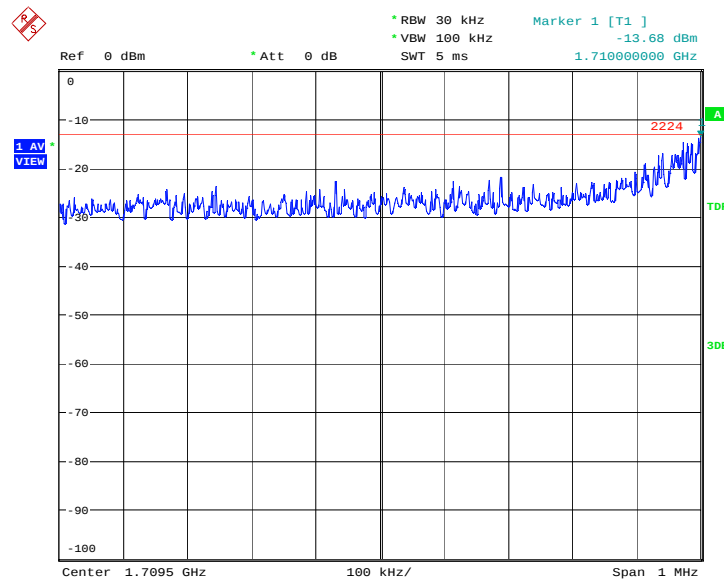
Date: 7.MAR.2013 01:59:48

HIGH BAND EDGE BLOCK-16QAM



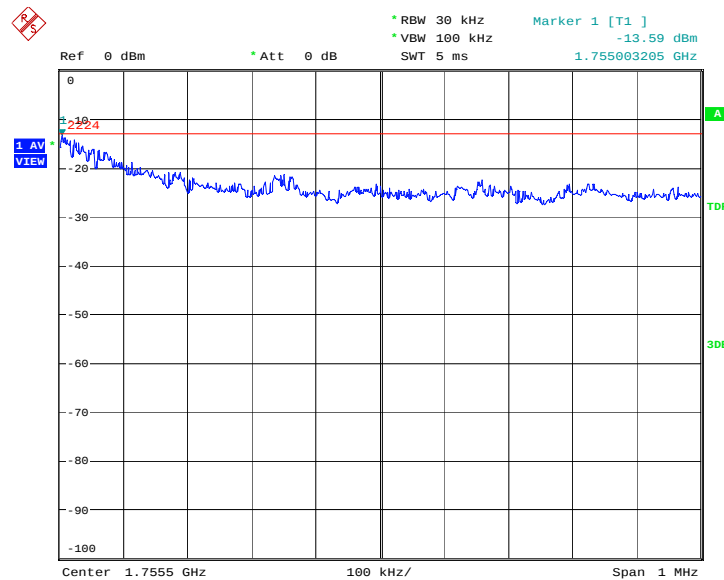
Date: 7.MAR.2013 02:10:41

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



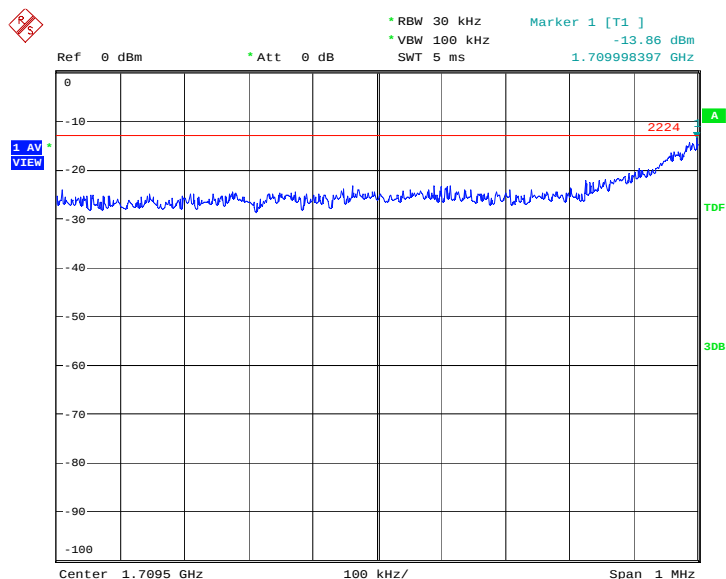
Date: 8.MAR.2013 04:42:19

HIGH BAND EDGE BLOCK-QPSK



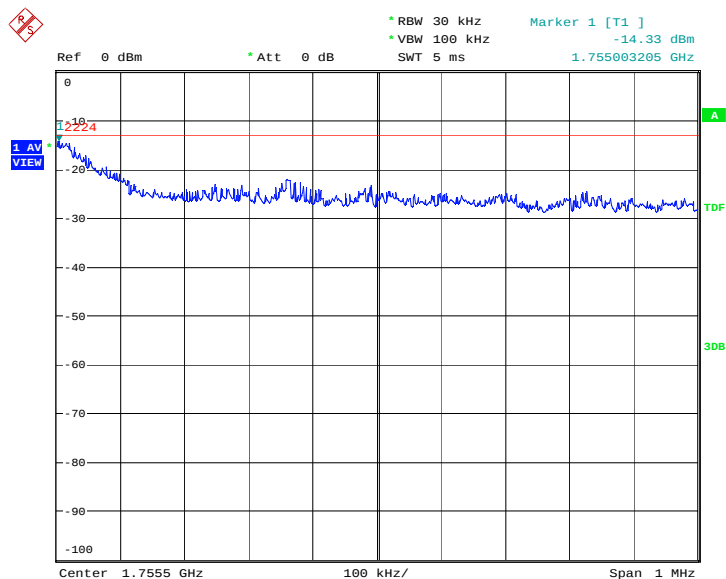
Date: 8.MAR.2013 04:30:47

LOW BAND EDGE BLOCK-16QAM



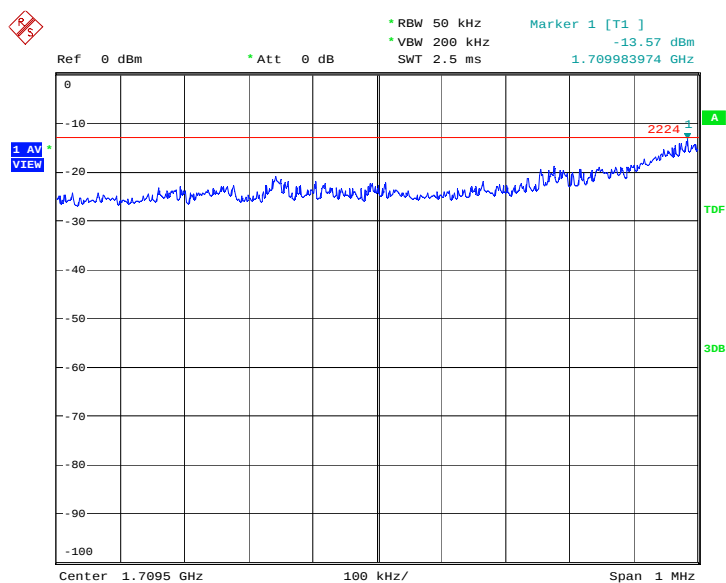
Date: 7.MAR.2013 03:06:52

HIGH BAND EDGE BLOCK-16QAM



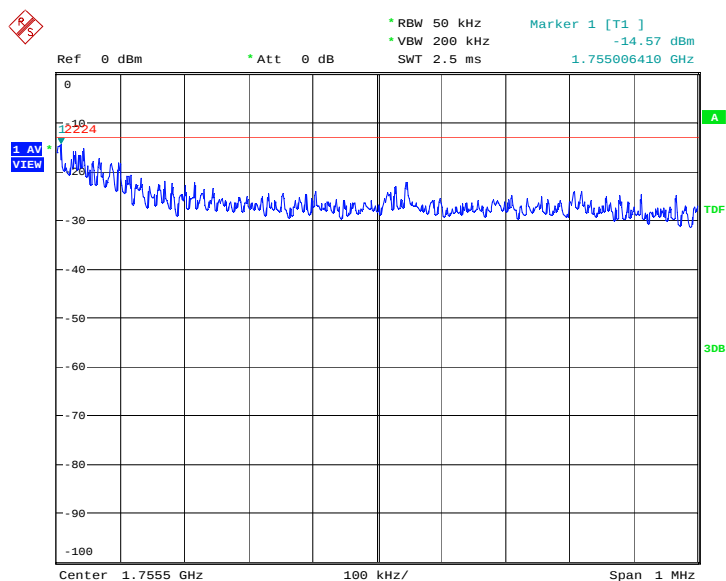
Date: 7.MAR.2013 03:18:15

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



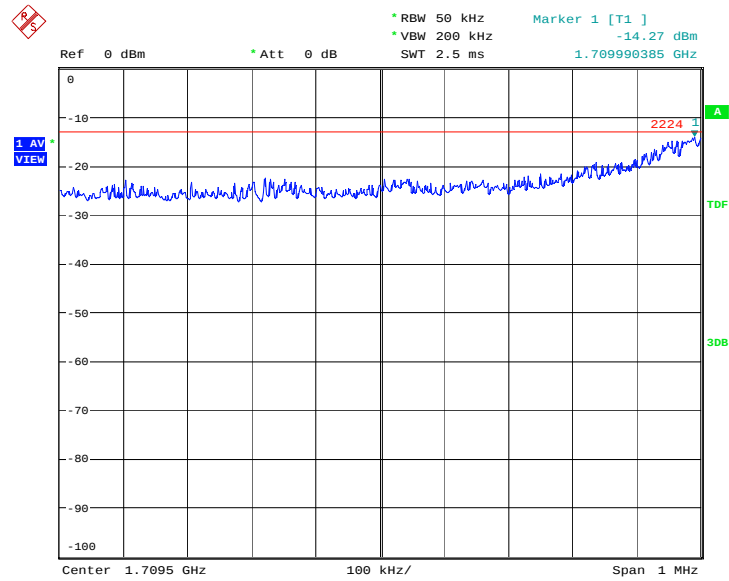
Date: 7.MAR.2013 04:10:25

HIGH BAND EDGE BLOCK-QPSK



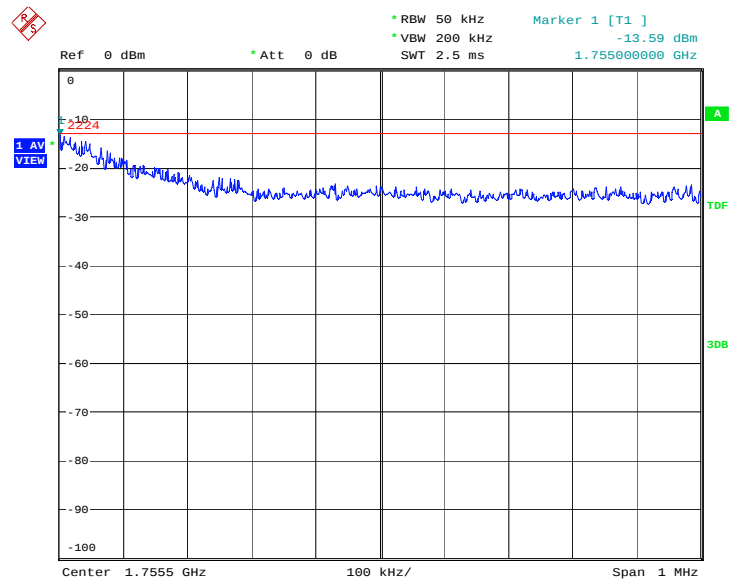
Date: 8.MAR.2013 04:56:14

LOW BAND EDGE BLOCK-16QAM



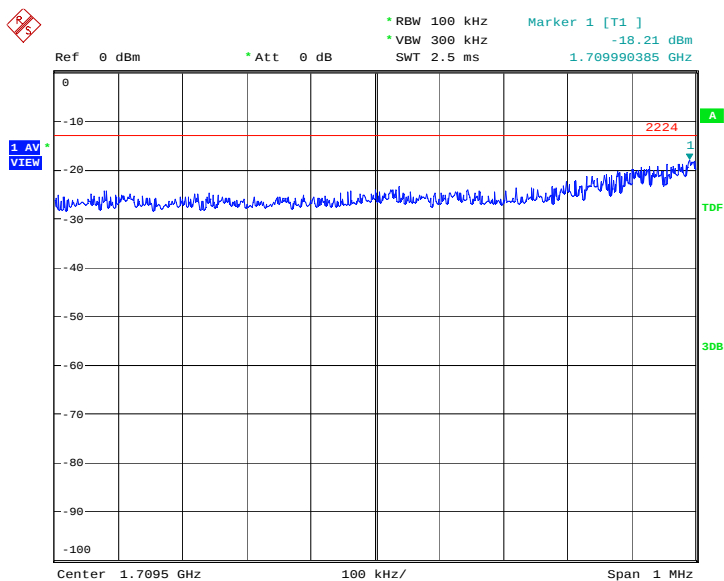
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HIGH BAND EDGE BLOCK-16QAM



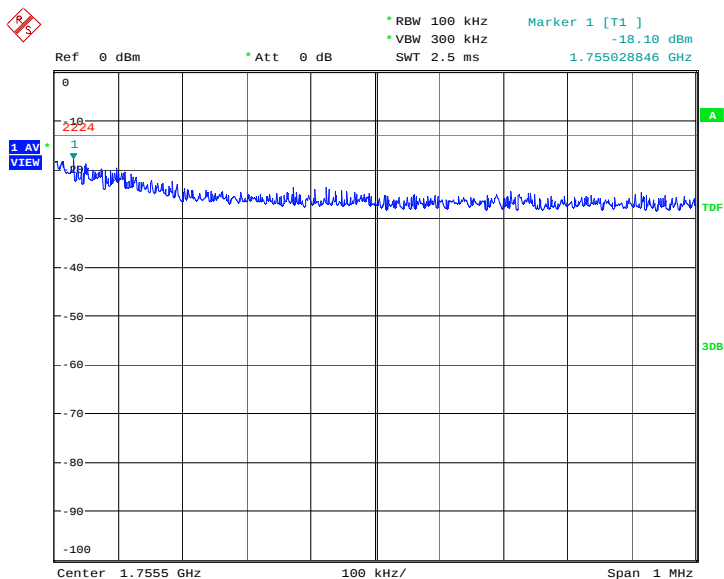
Date: 7.MAR.2013 04:22:21

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



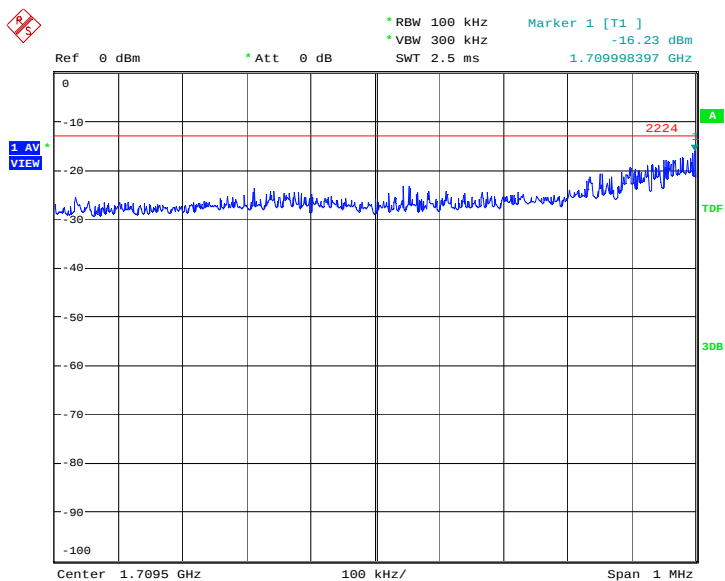
Date: 7.MAR.2013 23:59:43

HIGH BAND EDGE BLOCK-QPSK



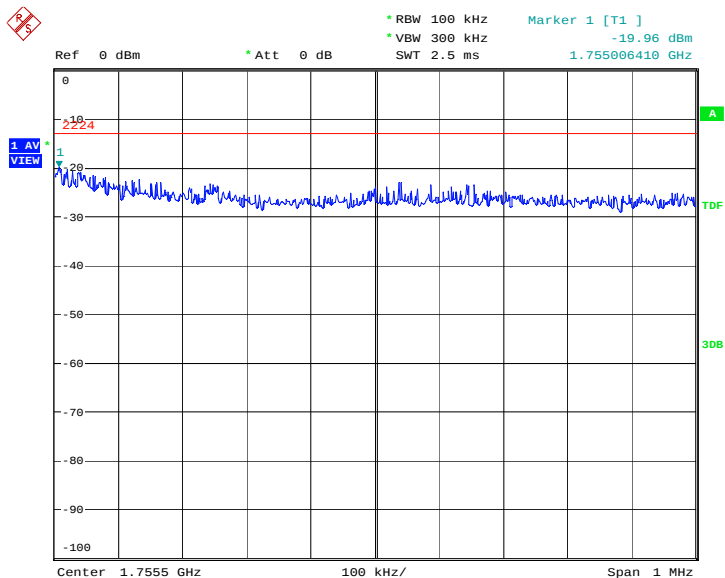
Date: 8.MAR.2013 00:14:08

LOW BAND EDGE BLOCK-16QAM



Date: 8.MAR.2013 00:00:44

HIGH BAND EDGE BLOCK-16QAM



Date: 8.MAR.2013 00:15:09

* RBW 200 kHz
 * VBW 1 MHz
 SWT 2.5 ms
 Marker 1 [T1]
 -17.58 dBm
 1.709971154 GHz

Ref 0 dBm
 Att 0 dB

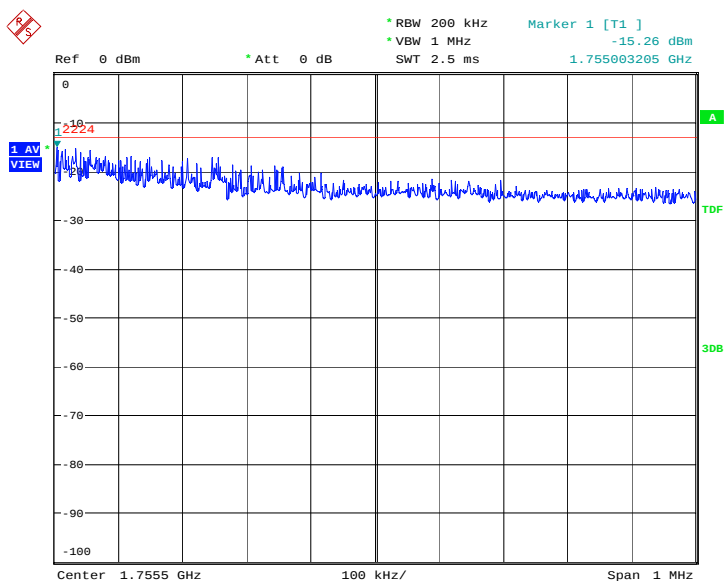
1. AV
 VIEW

2224
 1

TDF
 3DB

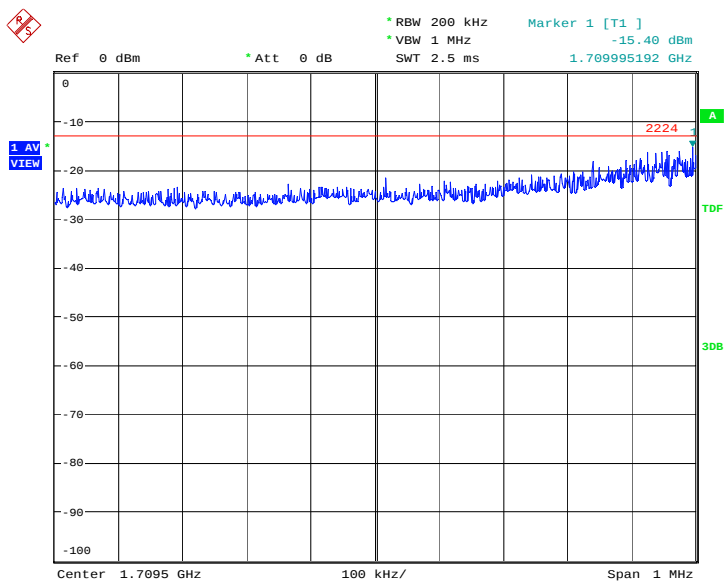
Center 1.7095 GHz
 100 kHz/
 Span 1 MHz

HIGH BAND EDGE BLOCK-QPSK



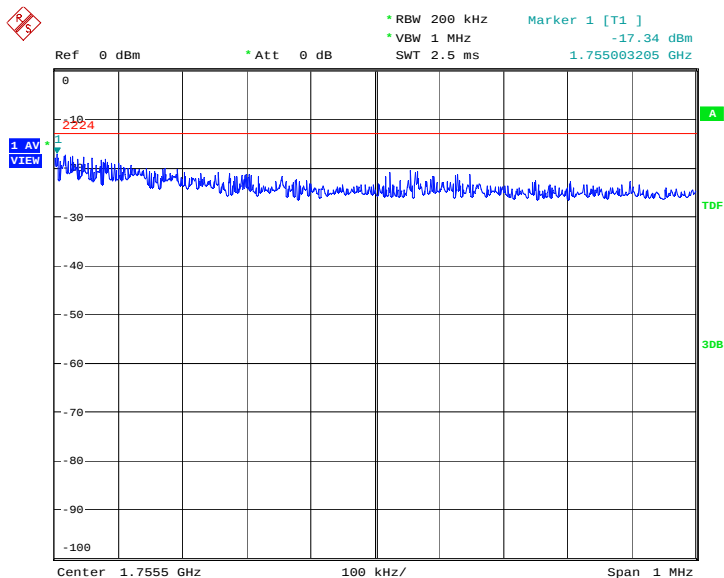
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LOW BAND EDGE BLOCK-16QAM



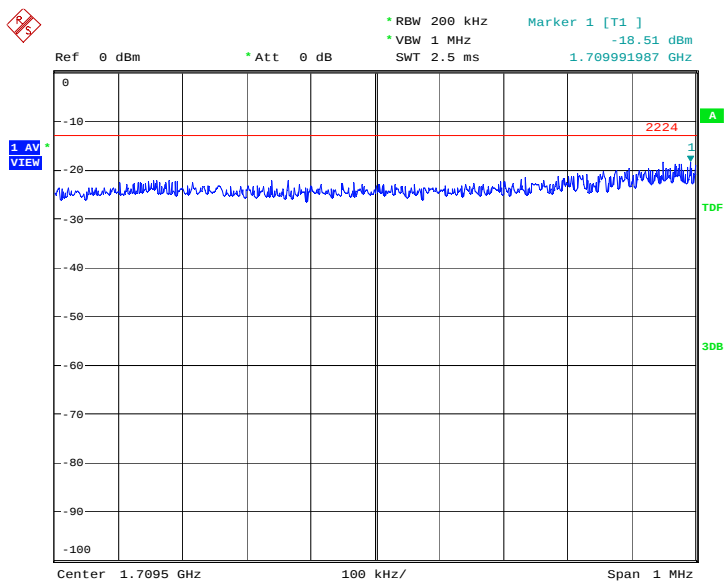
Date: 8.MAR.2013 01:51:44

HIGH BAND EDGE BLOCK-16QAM



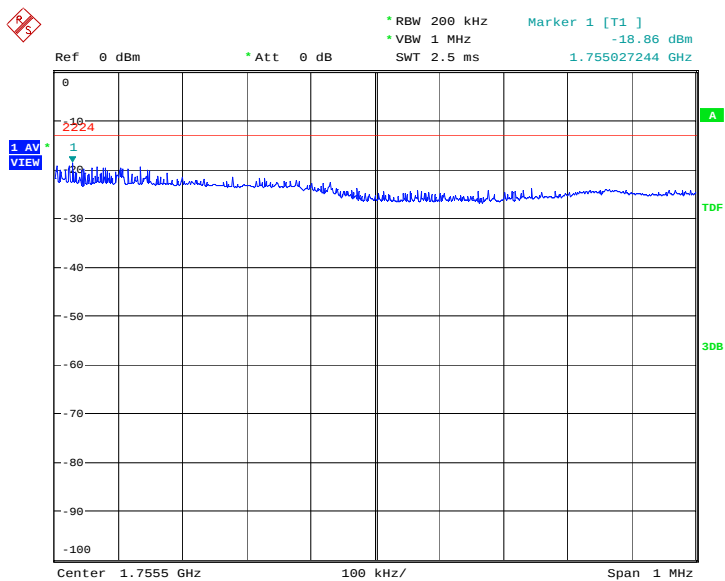
Date: 8.MAR.2013 02:03:09

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



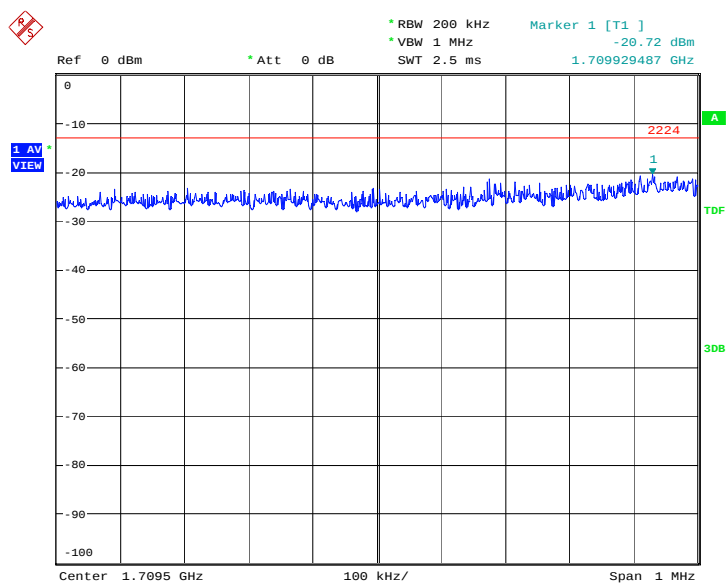
Date: 8.MAR.2013 03:02:01

HIGH BAND EDGE BLOCK-QPSK



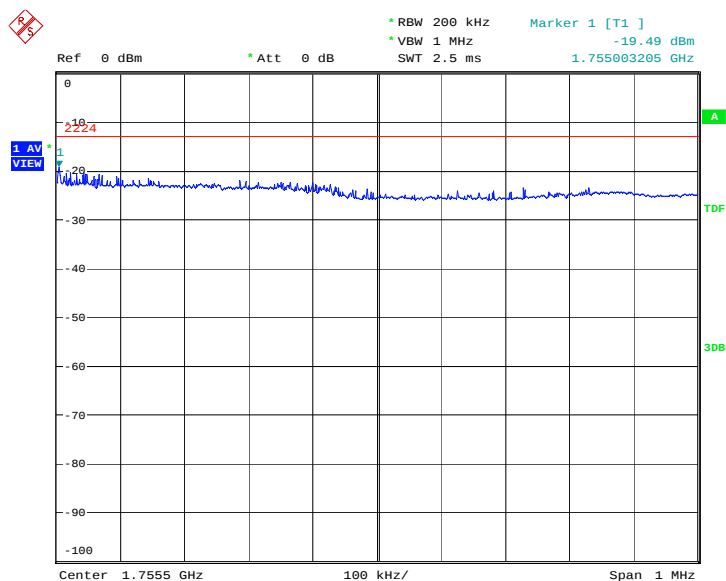
Date: 8.MAR.2013 03:12:56

LOW BAND EDGE BLOCK-16QAM



Date: 8.MAR.2013 03:03:02

HIGH BAND EDGE BLOCK-16QAM



Date: 8.MAR.2013 03:13:57

A.8 CONDUCTED SPURIOUS EMISSION

Reference

FCC: CFR Part 2.1057, 27.53(h)

IC: RSS-139 Issue 2, Section 6.5

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.

LTE band 4 Transmitter

	Bandwidth	Channel	Frequency (MHz)
Low	1.4	19957	1710.7
	3	19965	1711.5
	5	19975	1712.5
	10	20000	1715
	15	20025	1717.5
	20	20050	1720
Middle	1.4/3/5/10/15/20	20175	1732.5
High	1.4	20393	1.4
	3	20385	3
	5	20375	5
	10	20350	10
	15	20325	15
	20	20300	20

A. 8.2 Measurement Limit

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

Measurement Uncertainty: 0.3dB

LTE band 4, 1.4MHz bandwidth

QPSK

Harmonic	Lowest channel Freq (MHz)	Level (dBm)	Middle channel Freq (MHz)	Level (dBm)	Highest channel Freq (MHz)	Level (dBm)
2	3421.4	nf	3465	nf	3508.6	nf
3	5132.1	nf	5197.5	nf	5262.9	nf
4	6842.8	nf	6930	nf	7017.2	nf
5	8553.5	nf	8662.5	nf	8771.5	nf
6	10264.2	nf	10395	nf	10525.8	nf
7	11974.9	nf	12127.5	nf	12280.1	nf
8	13685.6	nf	13860	nf	14034.4	nf
9	15396.3	nf	15592.5	nf	15788.7	nf
10	17107	nf	17325	nf	17543	nf
nf: Noise floor						

16QAM

Harmonic	Lowest channel Freq (MHz)	Level (dBm)	Middle channel Freq (MHz)	Level (dBm)	Highest channel Freq (MHz)	Level (dBm)
2	3421.4	nf	3465	nf	3508.6	nf
3	5132.1	nf	5197.5	nf	5262.9	nf
4	6842.8	nf	6930	nf	7017.2	nf
5	8553.5	nf	8662.5	nf	8771.5	nf
6	10264.2	nf	10395	nf	10525.8	nf
7	11974.9	nf	12127.5	nf	12280.1	nf
8	13685.6	nf	13860	nf	14034.4	nf
9	15396.3	nf	15592.5	nf	15788.7	nf
10	17107	nf	17325	nf	17543	nf
nf: Noise floor						

LTE band 4, 3MHz bandwidth
QPSK

Harmonic	Lowest channel Freq (MHz)	Level (dBm)	Middle channel Freq (MHz)	Level (dBm)	Highest channel Freq (MHz)	Level (dBm)
2	3423	nf	3465	nf	3507	nf
3	5134.5	nf	5197.5	nf	5260.5	nf
4	6846	nf	6930	nf	7014	nf
5	8557.5	nf	8662.5	nf	8767.5	nf
6	10269	nf	10395	nf	10521	nf
7	11980.5	nf	12127.5	nf	12274.5	nf
8	13692	nf	13860	nf	14028	nf
9	15403.5	nf	15592.5	nf	15781.5	nf
10	17115	nf	17325	nf	17535	nf
nf: Noise floor						

16QAM

Harmonic	Lowest channel Freq (MHz)	Level (dBm)	Middle channel Freq (MHz)	Level (dBm)	Highest channel Freq (MHz)	Level (dBm)
2	3423	nf	3465	nf	3507	nf
3	5134.5	nf	5197.5	nf	5260.5	nf
4	6846	nf	6930	nf	7014	nf
5	8557.5	nf	8662.5	nf	8767.5	nf
6	10269	nf	10395	nf	10521	nf
7	11980.5	nf	12127.5	nf	12274.5	nf
8	13692	nf	13860	nf	14028	nf
9	15403.5	nf	15592.5	nf	15781.5	nf
10	17115	nf	17325	nf	17535	nf
nf: Noise floor						

LTE band 4, 5MHz bandwidth

QPSK

Harmonic	Lowest channel Freq (MHz)	Level (dBm)	Middle channel Freq (MHz)	Level (dBm)	Highest channel Freq (MHz)	Level (dBm)
2	3425	nf	3465	nf	3505	nf
3	5137.5	nf	5197.5	nf	5257.5	nf
4	6850	nf	6930	nf	7010	nf
5	8562.5	nf	8662.5	nf	8762.5	nf
6	10275	nf	10395	nf	10515	nf
7	11987.5	nf	12127.5	nf	12267.5	nf
8	13700	nf	13860	nf	14020	nf
9	15412.5	nf	15592.5	nf	15772.5	nf
10	17125	nf	17325	nf	17525	nf
nf: Noise floor						

16QAM

Harmonic	Lowest channel Freq (MHz)	Level (dBm)	Middle channel Freq (MHz)	Level (dBm)	Highest channel Freq (MHz)	Level (dBm)
2	3425	nf	3465	nf	3505	nf
3	5137.5	nf	5197.5	nf	5257.5	nf
4	6850	nf	6930	nf	7010	nf
5	8562.5	nf	8662.5	nf	8762.5	nf
6	10275	nf	10395	nf	10515	nf
7	11987.5	nf	12127.5	nf	12267.5	nf
8	13700	nf	13860	nf	14020	nf
9	15412.5	nf	15592.5	nf	15772.5	nf
10	17125	nf	17325	nf	17525	nf
nf: Noise floor						

LTE band 4, 15MHz bandwidth

QPSK

Harmonic	Lowest channel Freq (MHz)	Level (dBm)	Middle channel Freq (MHz)	Level (dBm)	Highest channel Freq (MHz)	Level (dBm)
2	3435	nf	3465	nf	3495	nf
3	5152.5	nf	5197.5	nf	5242.5	nf
4	6870	nf	6930	nf	6990	nf
5	8587.5	nf	8662.5	nf	8737.5	nf
6	10305	nf	10395	nf	10485	nf
7	12022.5	nf	12127.5	nf	12232.5	nf
8	13740	nf	13860	nf	13980	nf
9	15457.5	nf	15592.5	nf	15727.5	nf
10	17175	nf	17325	nf	17475	nf
nf: Noise floor						

16QAM

Harmonic	Lowest channel Freq (MHz)	Level (dBm)	Middle channel Freq (MHz)	Level (dBm)	Highest channel Freq (MHz)	Level (dBm)
2	3435	nf	3465	nf	3495	nf
3	5152.5	nf	5197.5	nf	5242.5	nf
4	6870	nf	6930	nf	6990	nf
5	8587.5	nf	8662.5	nf	8737.5	nf
6	10305	nf	10395	nf	10485	nf
7	12022.5	nf	12127.5	nf	12232.5	nf
8	13740	nf	13860	nf	13980	nf
9	15457.5	nf	15592.5	nf	15727.5	nf
10	17175	nf	17325	nf	17475	nf
nf: Noise floor						

LTE band 4, 20MHz bandwidth

QPSK

Harmonic	Lowest channel Freq (MHz)	Level (dBm)	Middle channel Freq (MHz)	Level (dBm)	Highest channel Freq (MHz)	Level (dBm)
2	3440	nf	3465	nf	3490	nf
3	5160	nf	5197.5	nf	5235	nf
4	6880	nf	6930	nf	6980	nf
5	8600	nf	8662.5	nf	8725	nf
6	10320	nf	10395	nf	10470	nf
7	12040	nf	12127.5	nf	12215	nf
8	13760	nf	13860	nf	13960	nf
9	15480	nf	15592.5	nf	15705	nf
10	17200	nf	17325	nf	17450	nf
nf: Noise floor						

16QAM

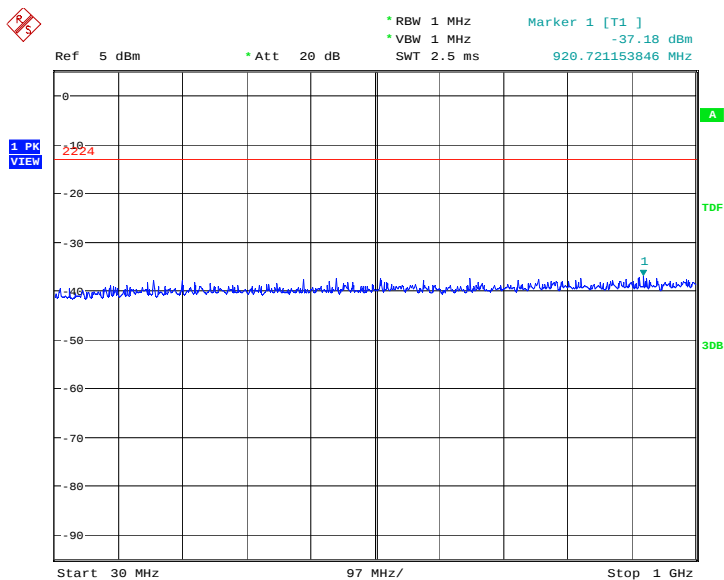
Harmonic	Lowest channel Freq (MHz)	Level (dBm)	Middle channel Freq (MHz)	Level (dBm)	Highest channel Freq (MHz)	Level (dBm)
2	3440	nf	3465	nf	3490	nf
3	5160	nf	5197.5	nf	5235	nf
4	6880	nf	6930	nf	6980	nf
5	8600	nf	8662.5	nf	8725	nf
6	10320	nf	10395	nf	10470	nf
7	12040	nf	12127.5	nf	12215	nf
8	13760	nf	13860	nf	13960	nf
9	15480	nf	15592.5	nf	15705	nf
10	17200	nf	17325	nf	17450	nf
nf: Noise floor						

LTE band 4, 1.4MHz bandwidth

A.8.3.1 QPSK: 30MHz – 1GHz

Spurious emission limit –13dBm.

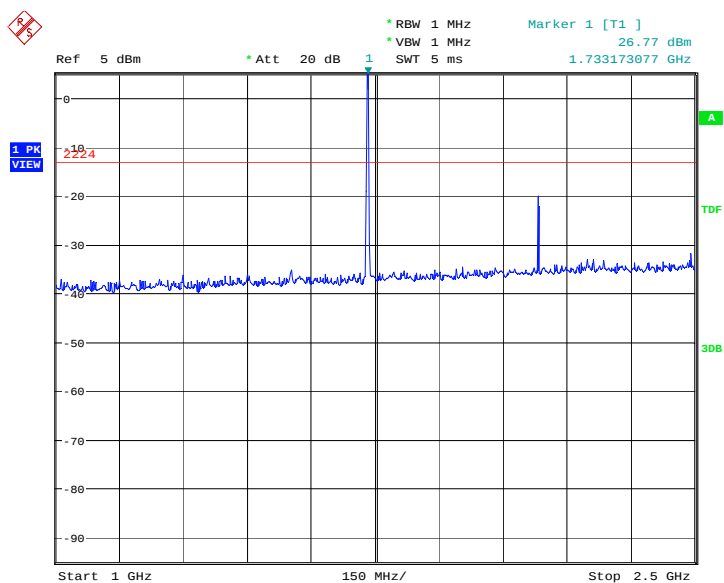
NOTE: peak above the limit line is the carrier frequency.



Date: 7.MAR.2013 02:26:55

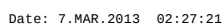
A.8.3.2 QPSK: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

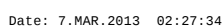


Date: 7.MAR.2013 02:24:28

Spurious emission limit -13dBm .

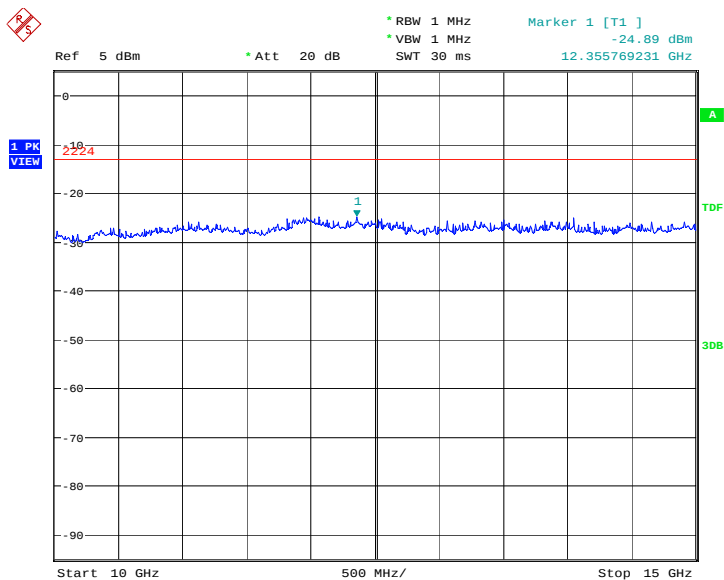


Spurious emission limit -13dBm .



A.8.3.5 QPSK: 10GHz –15GHz

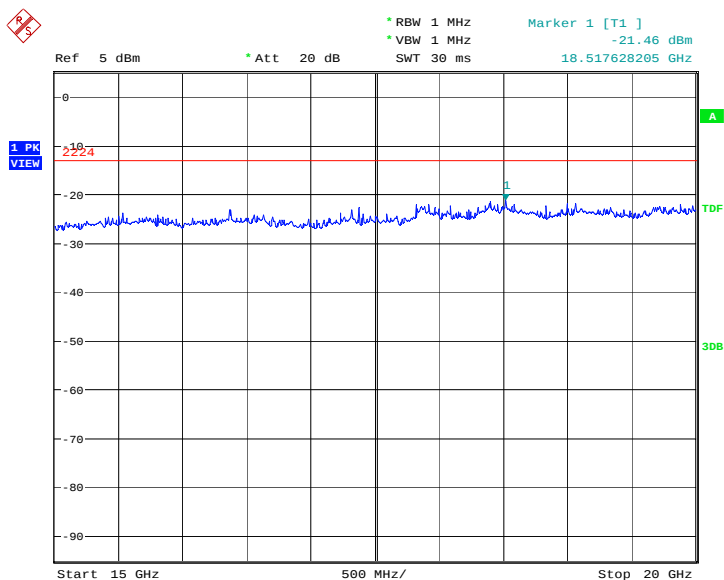
Spurious emission limit –13dBm.



Date: 7.MAR.2013 02:27:47

A.8.3.6 QPSK: 15GHz –20GHz

Spurious emission limit –13dBm.

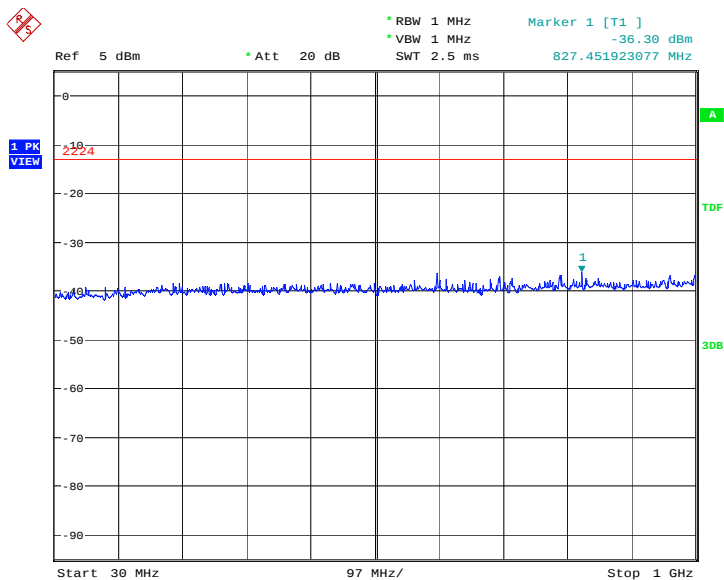


Date: 7.MAR.2013 02:28:00

A.8.3.7 16QAM: 30MHz – 1GHz

Spurious emission limit –13dBm

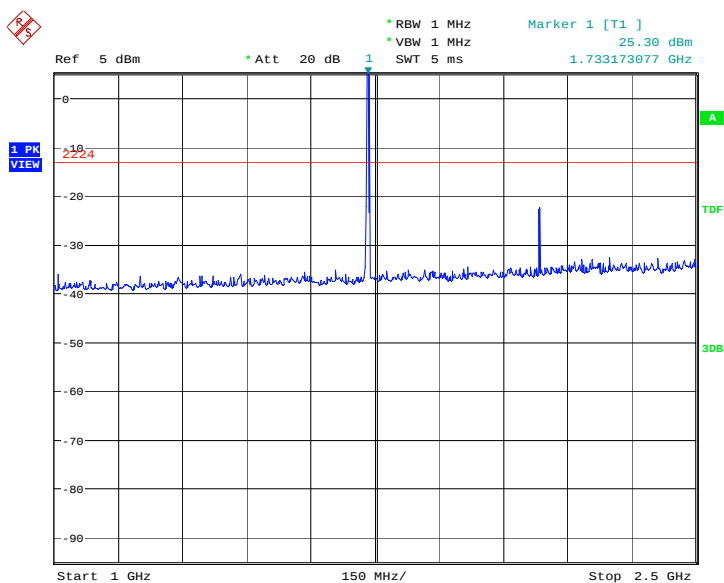
NOTE: peak above the limit line is the carrier frequency.



Date: 7.MAR.2013 02:32:16

A.8.3.8 16QAM: 1GHz –2.5GHz

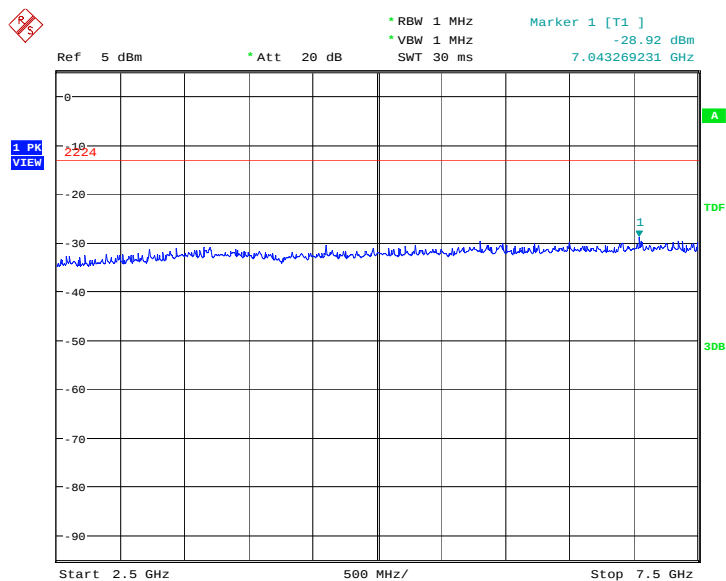
Spurious emission limit –13dBm



Date: 7.MAR.2013 02:32:29

A.8.3.9 16QAM: 2.5GHz –7.5GHz

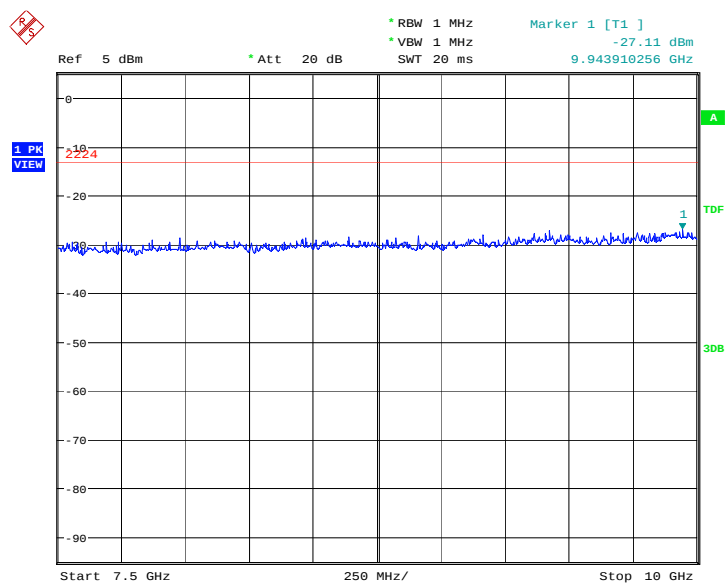
Spurious emission limit –13dBm



Date: 7.MAR.2013 02:32:42

A.8.3.10 16QAM: 7.5GHz –10GHz

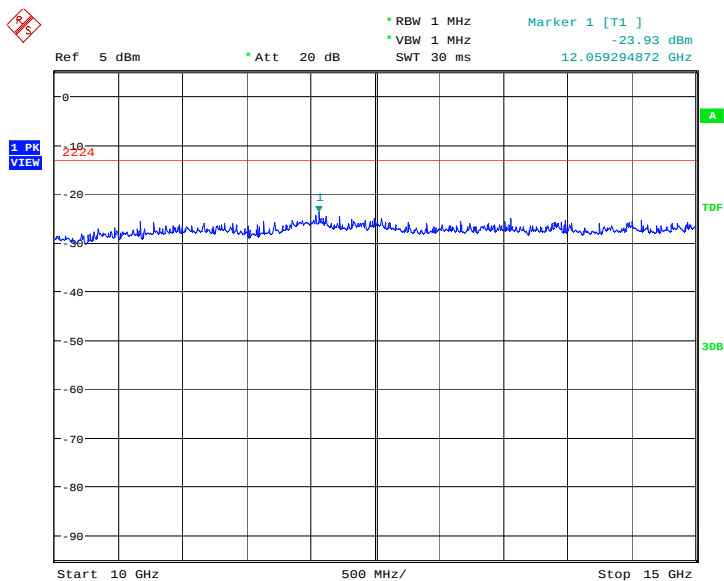
Spurious emission limit –13dBm



Date: 7.MAR.2013 02:32:55

A.8.3.11 16QAM: 10GHz –15GHz

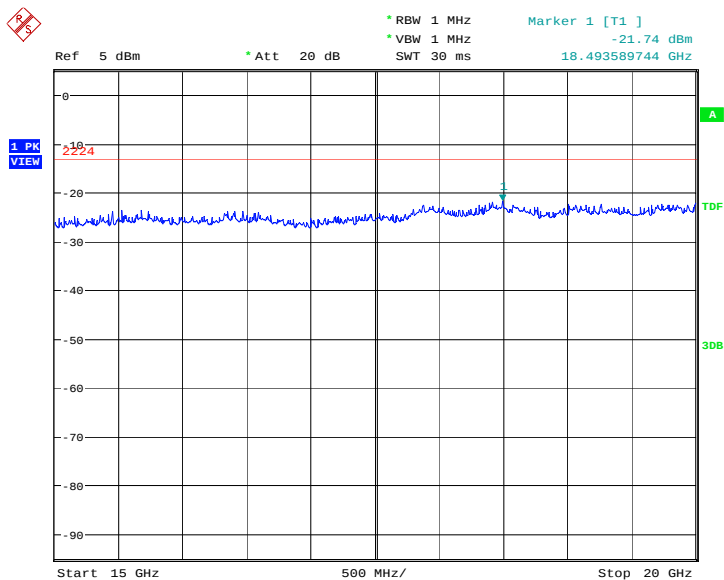
Spurious emission limit –13dBm



Date: 7.MAR.2013 02:33:08

A.8.3.12 16QAM: 15GHz –20GHz

Spurious emission limit –13dBm



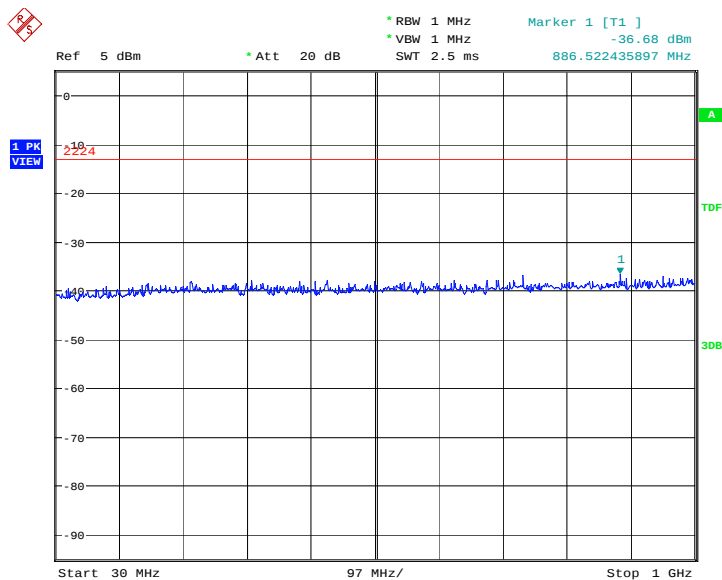
Date: 7.MAR.2013 02:33:21

LTE band 4, 3MHz bandwidth

A.8.3.13 QPSK: 30MHz – 1GHz

Spurious emission limit –13dBm.

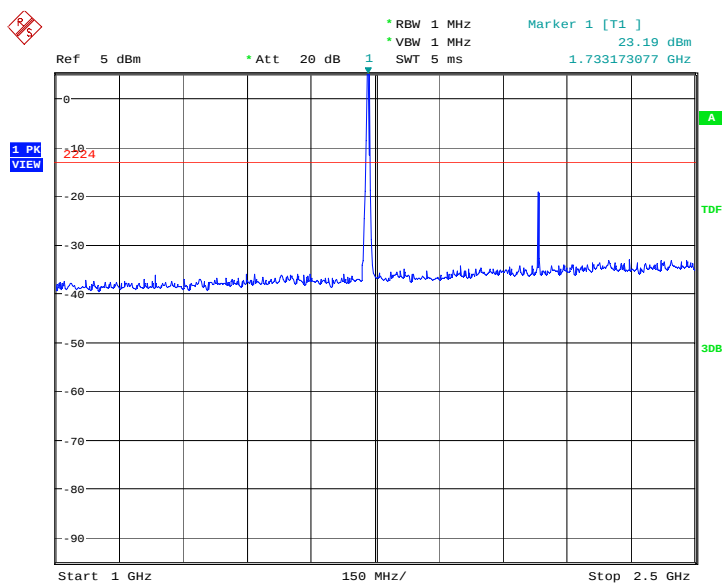
NOTE: peak above the limit line is the carrier frequency.



Date: 7.MAR.2013 03:35:28

A.8.3.14 QPSK: 1GHz – 2.5GHz

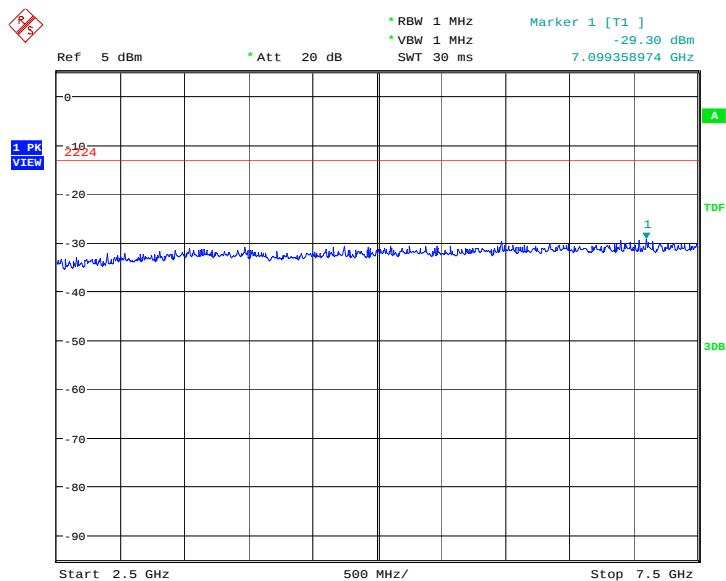
Spurious emission limit –13dBm.



Date: 7.MAR.2013 03:35:41

A.8.3.15 QPSK:2.5GHz – 7.5GHz

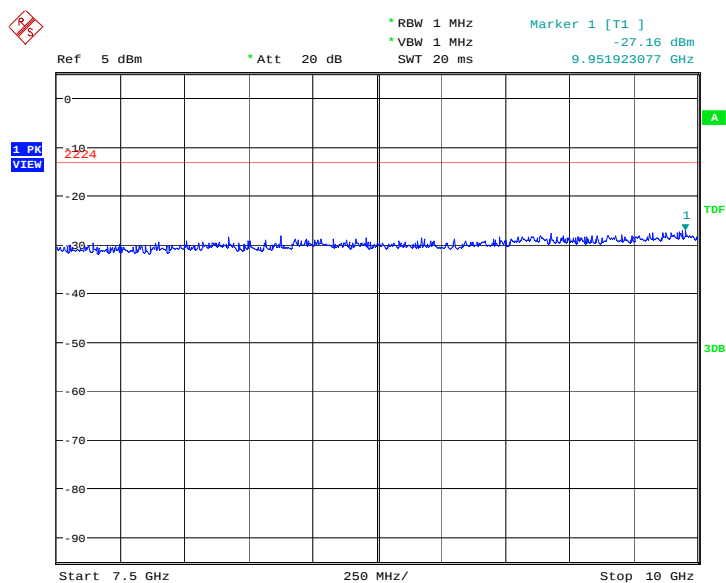
Spurious emission limit –13dBm.



Date: 7.MAR.2013 03:35:54

A.8.3.16 QPSK: 7.5GHz – 10GHz

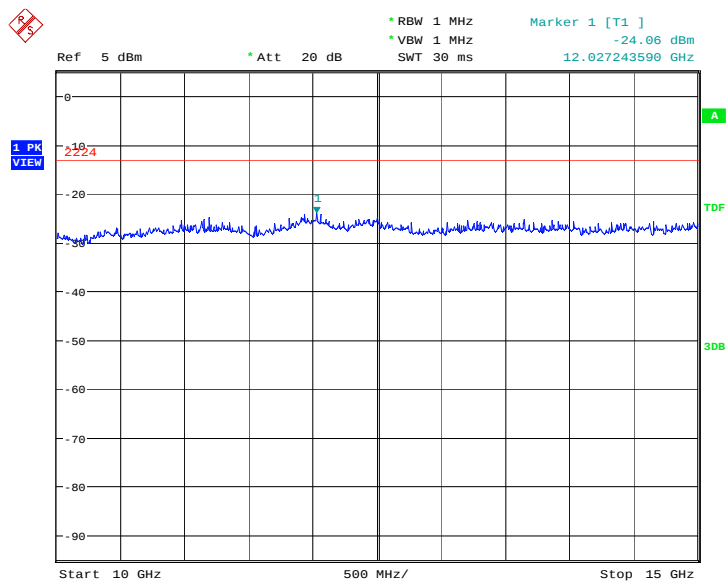
Spurious emission limit –13dBm.



Date: 7.MAR.2013 03:36:07

A.8.3.17 QPSK:10GHz – 15GHz

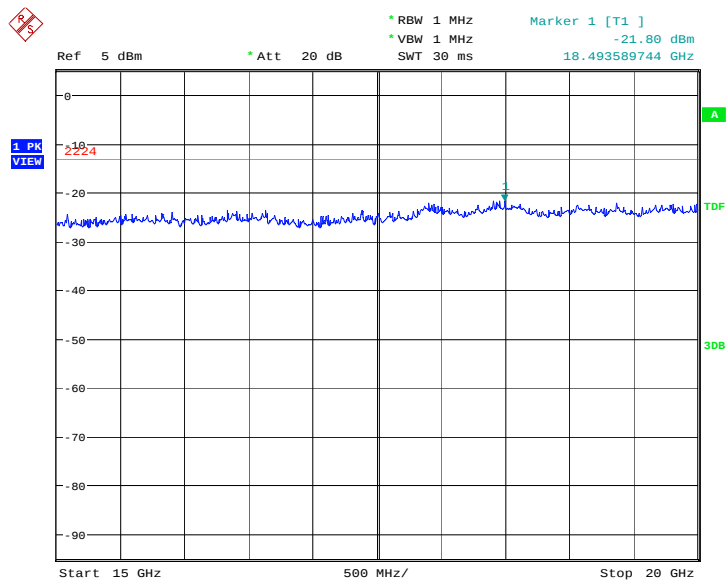
Spurious emission limit –13dBm.



Date: 7.MAR.2013 03:47:40

A.8.3.18 QPSK: 15GHz – 20GHz

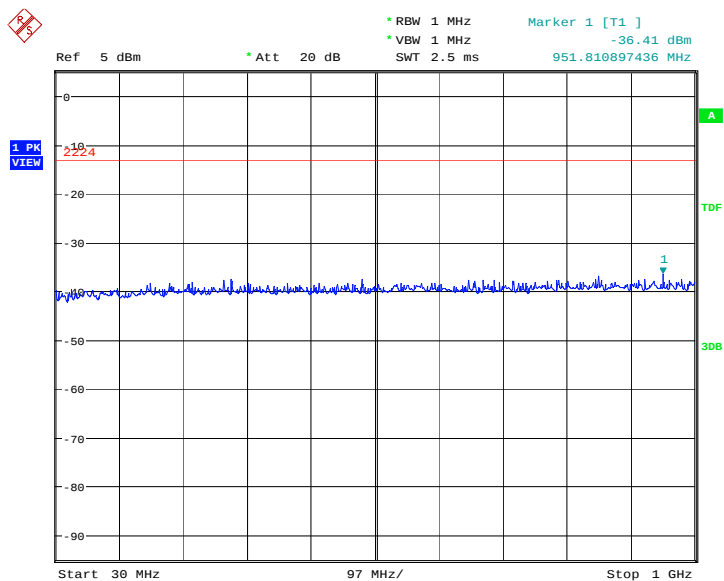
Spurious emission limit –13dBm.



Date: 7.MAR.2013 03:47:53

A.8.3.19 16QAM: 30MHz – 1GHz

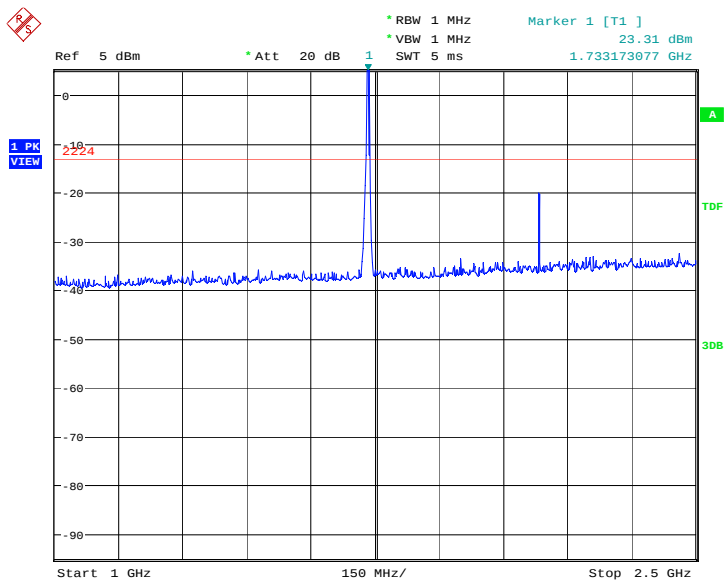
Spurious emission limit –13dBm.



Date: 7.MAR.2013 03:40:49

A.8.3.20 16QAM: 1GHz – 2.5GHz

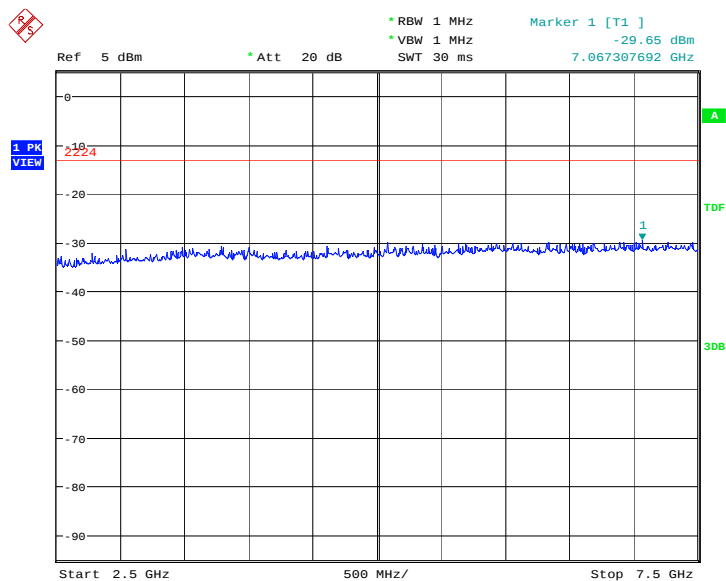
Spurious emission limit –13dBm.



Date: 7.MAR.2013 03:41:02

A.8.3.21 16QAM: 2.5GHz – 7.5GHz

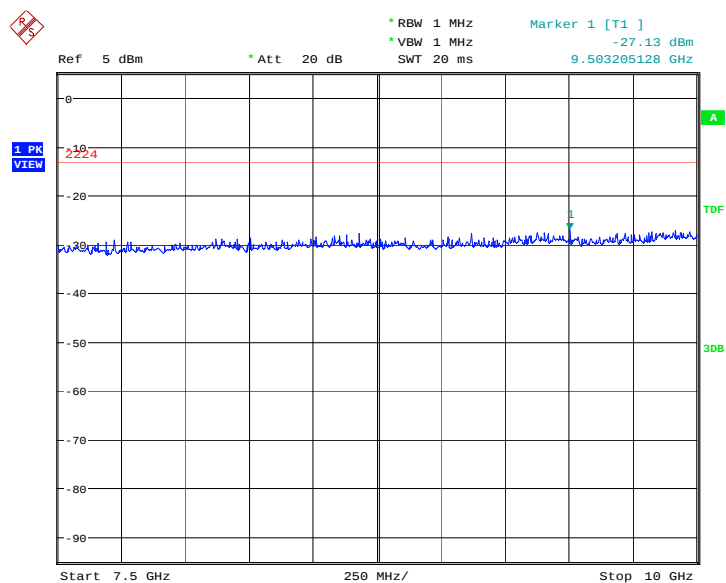
Spurious emission limit –13dBm.



Date: 7.MAR.2013 03:41:15

A.8.3.22 16QAM: 7.5GHz – 10GHz

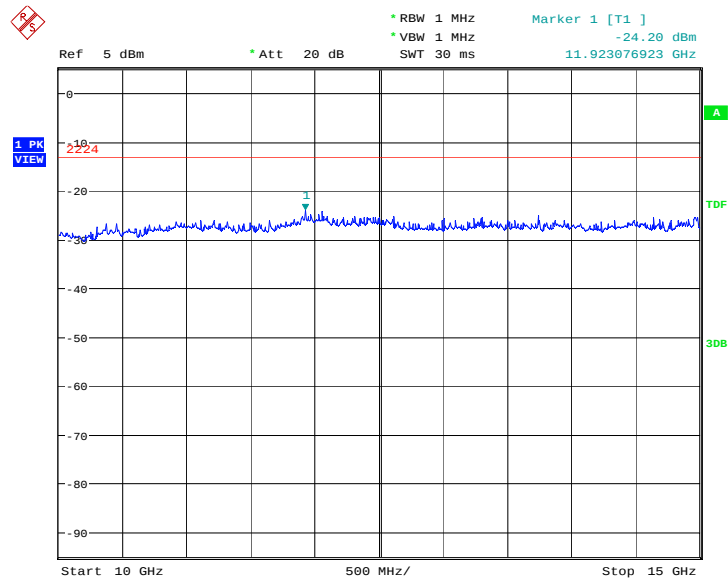
Spurious emission limit –13dBm.



Date: 7.MAR.2013 03:41:28

A.8.3.23 16QAM: 10GHz – 15GHz

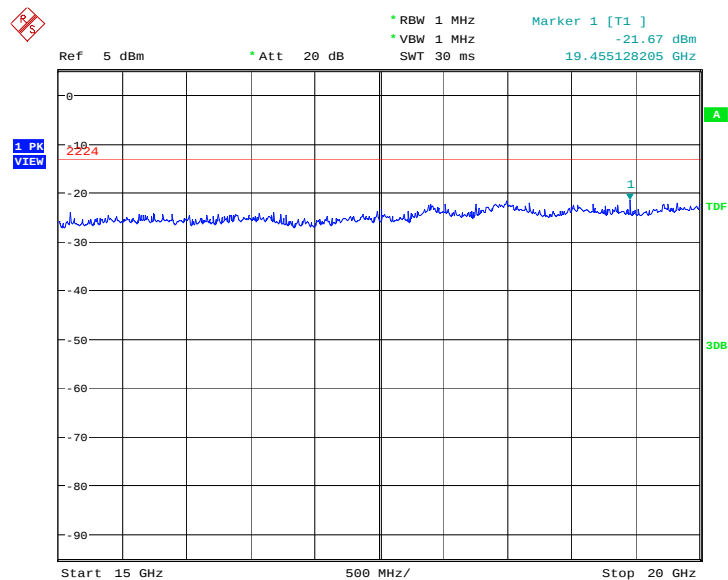
Spurious emission limit –13dBm.



Date: 7.MAR.2013 03:41:41

A.8.3.24 16QAM: 15GHz – 20GHz

Spurious emission limit –13dBm.



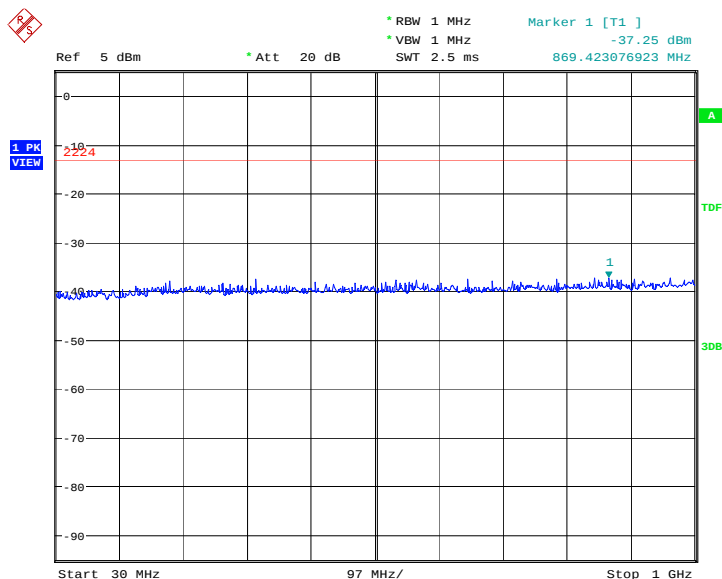
Date: 7.MAR.2013 03:41:54

LTE band 4, 5MHz bandwidth

A.8.3.25 QPSK: 30MHz – 1GHz

Spurious emission limit –13dBm.

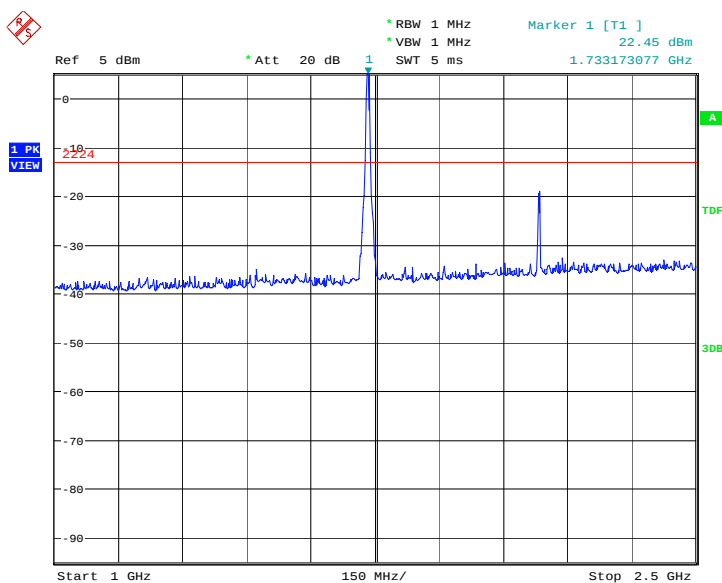
NOTE: peak above the limit line is the carrier frequency.



Date: 7.MAR.2013 04:39:34

A.8.3.26 QPSK: 1GHz – 2.5GHz

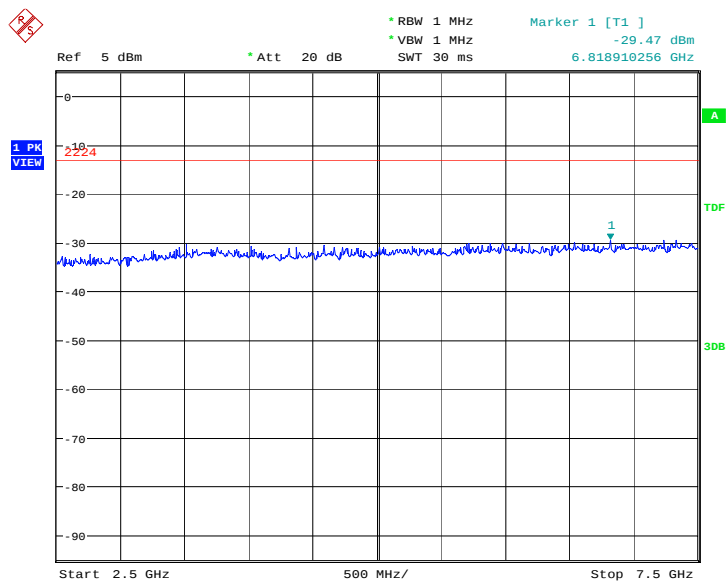
Spurious emission limit –13dBm.



Date: 7.MAR.2013 04:39:47

A.8.3.27 QPSK: 2.5GHz – 7.5GHz

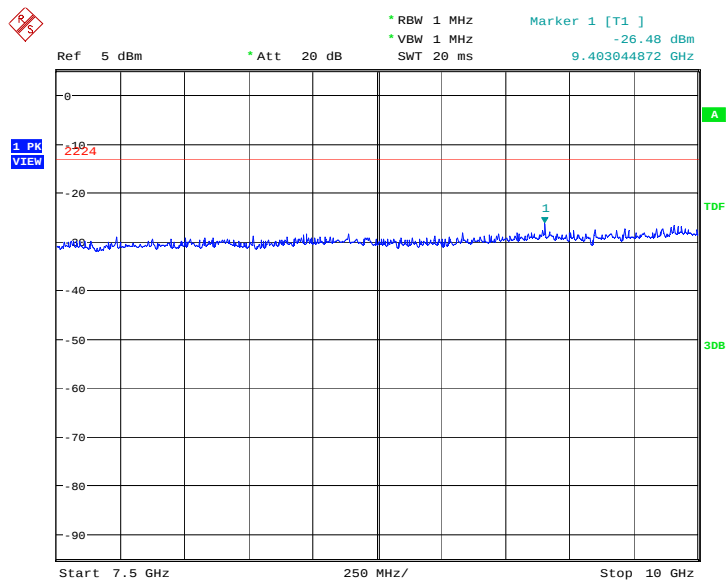
Spurious emission limit –13dBm.



Date: 7.MAR.2013 04:40:00

A.8.3.28 QPSK: 7.5GHz –10GHz

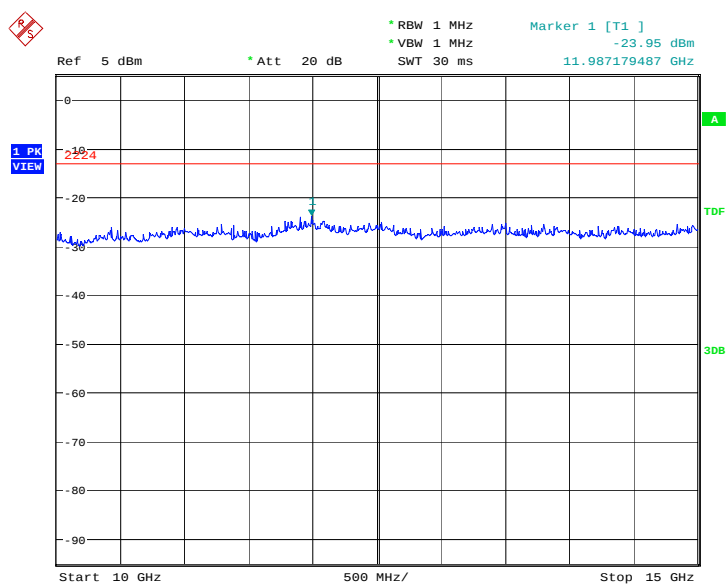
Spurious emission limit –13dBm.



Date: 7.MAR.2013 04:40:13

A.8.3.29 QPSK: 10GHz – 15GHz

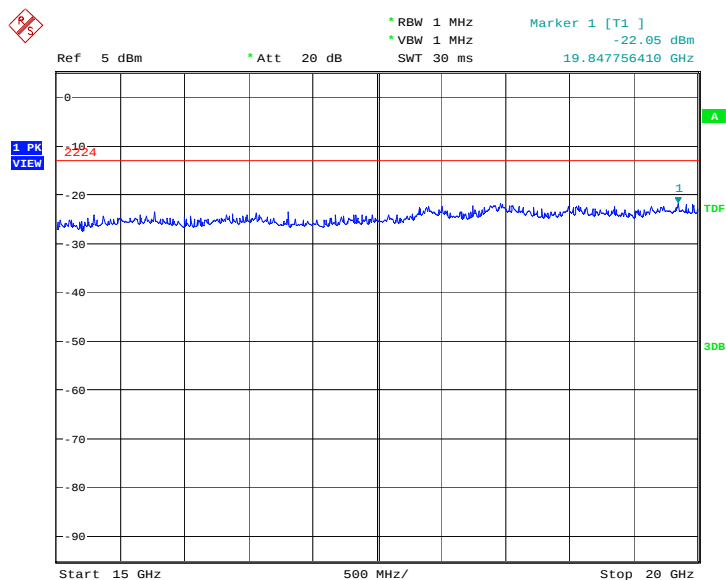
Spurious emission limit –13dBm.



Date: 7.MAR.2013 04:51:41

A.8.3.30 QPSK:15GHz –20GHz

Spurious emission limit –13dBm.

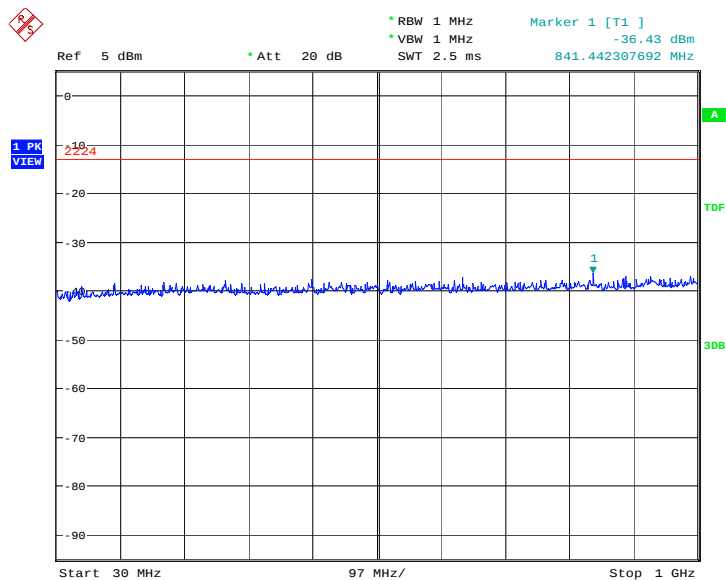


Date: 7.MAR.2013 04:51:54

A.8.3.31 16QAM: 30MHz – 1GHz

Spurious emission limit –13dBm

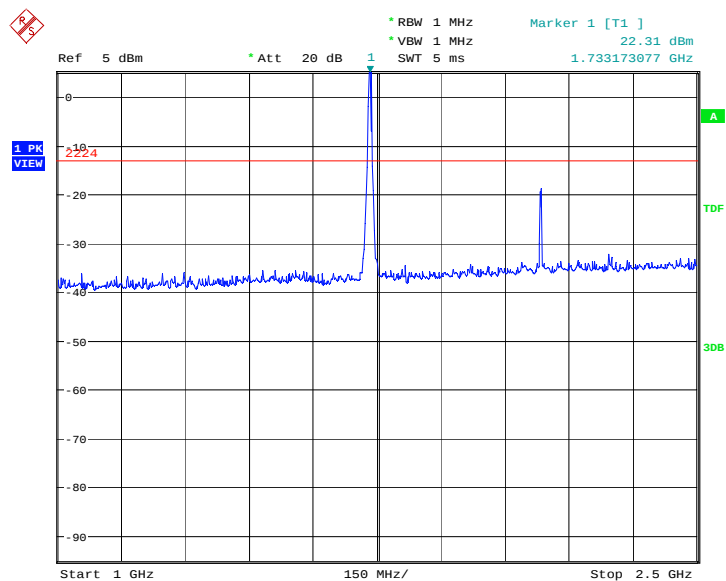
NOTE: peak above the limit line is the carrier frequency.



Date: 7.MAR.2013 04:44:55

A.8.3.32 16QAM: 1GHz –2.5GHz

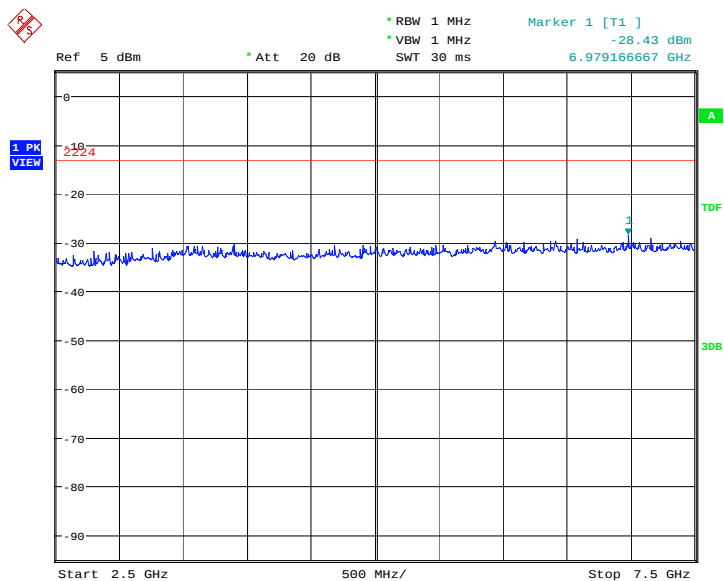
Spurious emission limit –13dBm



Date: 7.MAR.2013 04:45:08

A.8.3.33 16QAM: 2.5GHz –7.5GHz

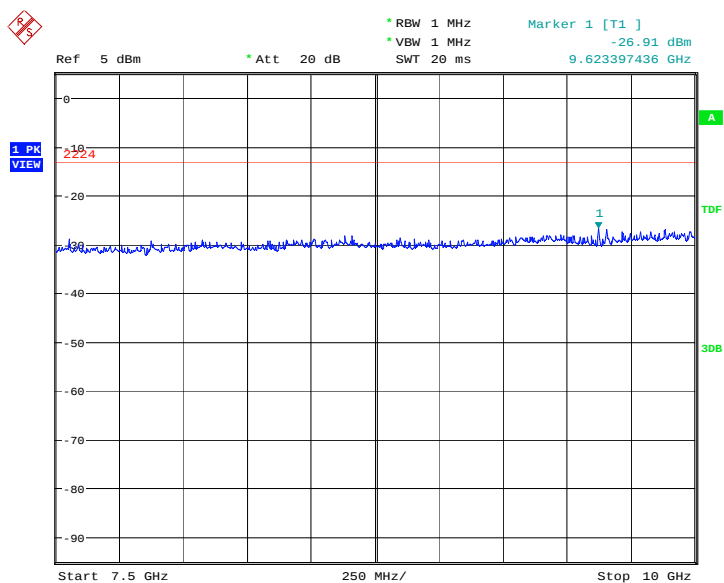
Spurious emission limit –13dBm



Date: 7.MAR.2013 04:45:21

A.8.3.34 16QAM: 7.5GHz –10GHz

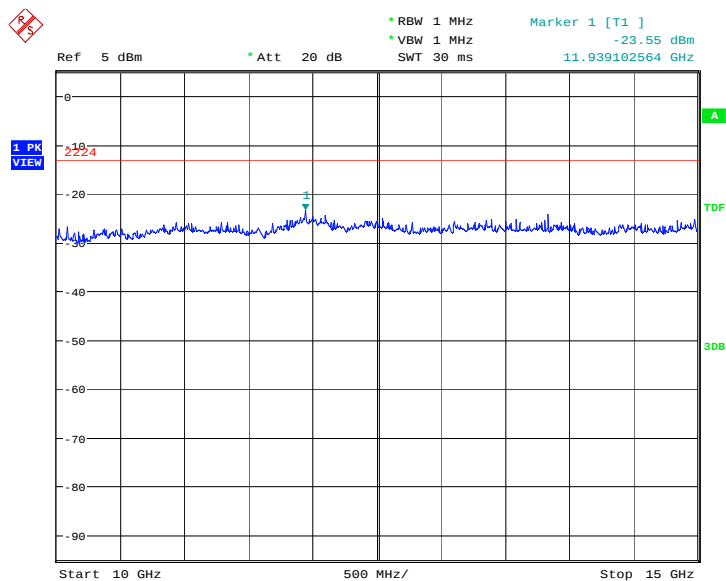
Spurious emission limit –13dBm



Date: 7.MAR.2013 04:45:34

A.8.3.35 16QAM: 10GHz –15GHz

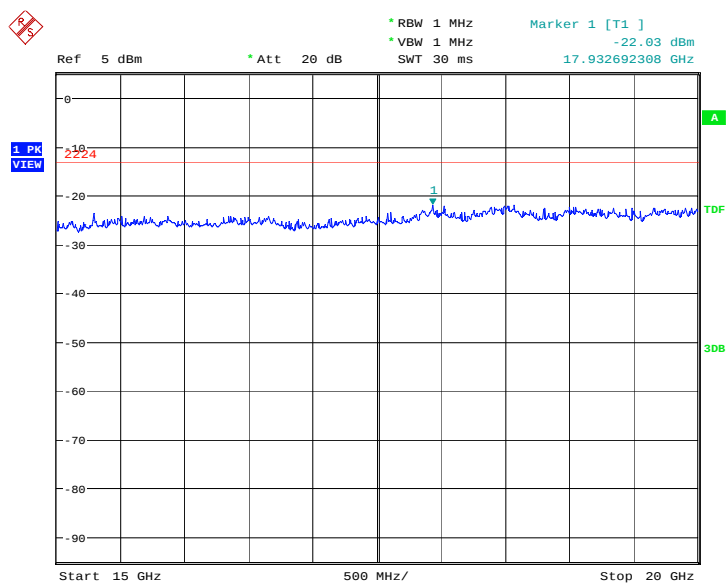
Spurious emission limit –13dBm



Date: 7.MAR.2013 04:45:47

A.8.3.36 16QAM:15GHz –20GHz

Spurious emission limit –13dBm



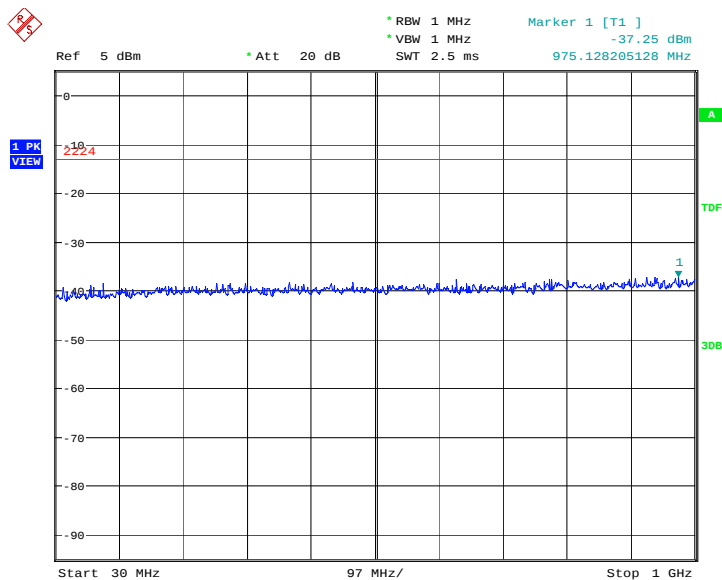
Date: 7.MAR.2013 04:46:00

LTE band 4, 10MHz bandwidth

A.8.3.37 QPSK: 30MHz – 1GHz

Spurious emission limit –13dBm.

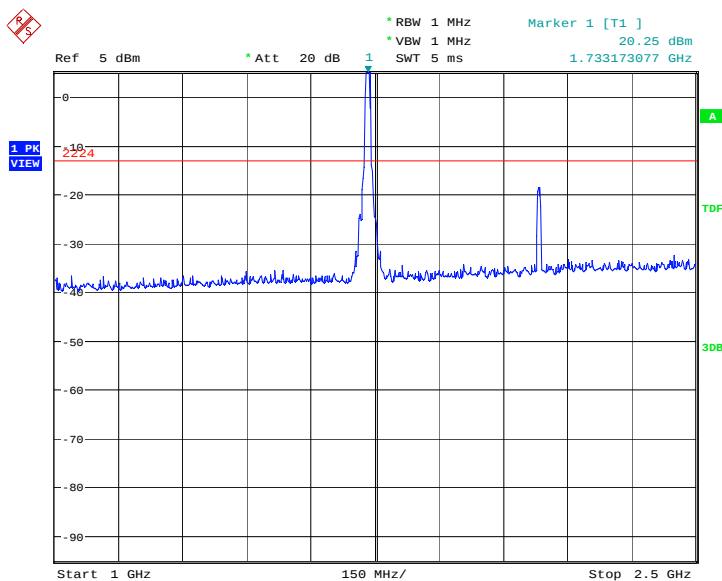
NOTE: peak above the limit line is the carrier frequency.



Date: 8.MAR.2013 00:39:31

A.8.3.38 QPSK: 1GHz – 2.5GHz

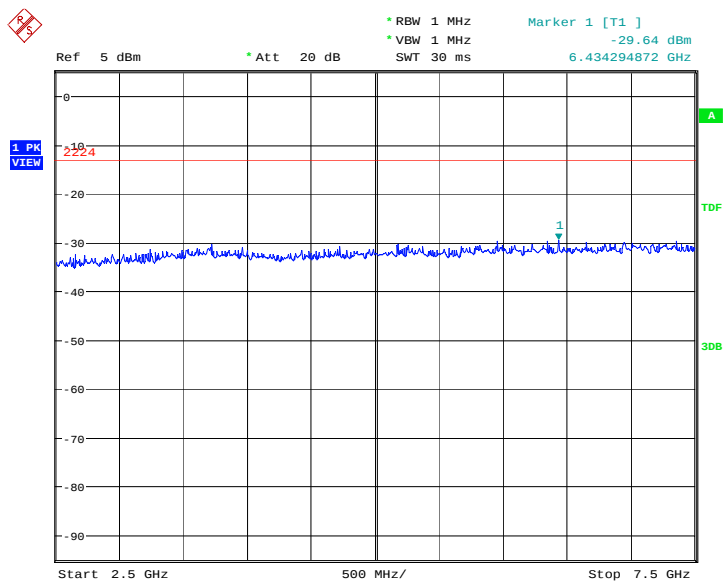
Spurious emission limit –13dBm.



Date: 8.MAR.2013 00:39:45

A.8.3.39 QPSK:2.5GHz – 7.5GHz

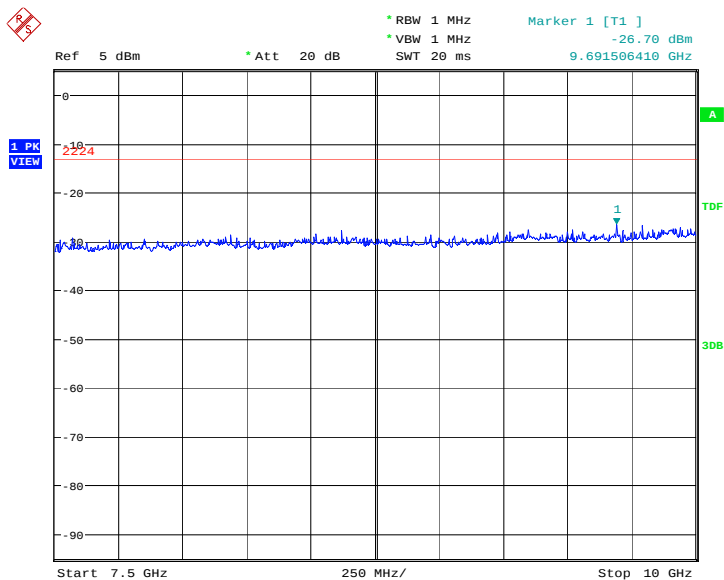
Spurious emission limit –13dBm.



Date: 8.MAR.2013 00:39:58

A.8.3.40 QPSK: 7.5GHz – 10GHz

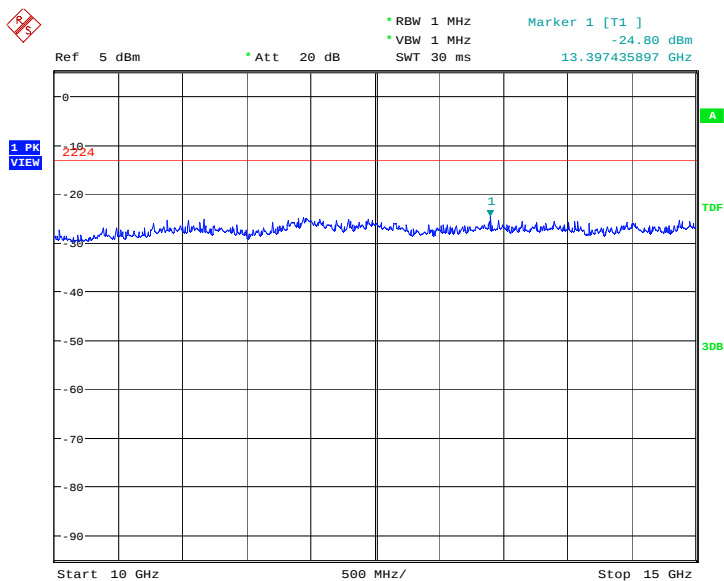
Spurious emission limit –13dBm.



Date: 8.MAR.2013 00:40:11

A.8.3.41 QPSK:10GHz – 15GHz

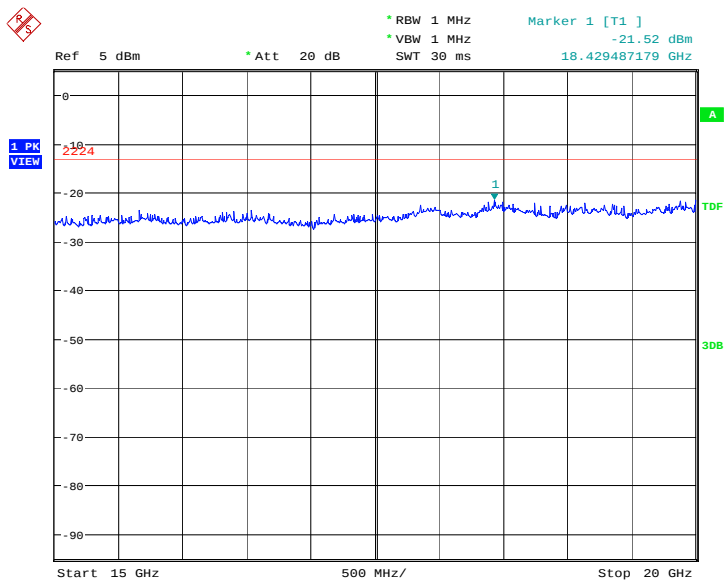
Spurious emission limit –13dBm.



Date: 8.MAR.2013 00:54:14

A.8.3.42 QPSK: 15GHz – 20GHz

Spurious emission limit –13dBm.

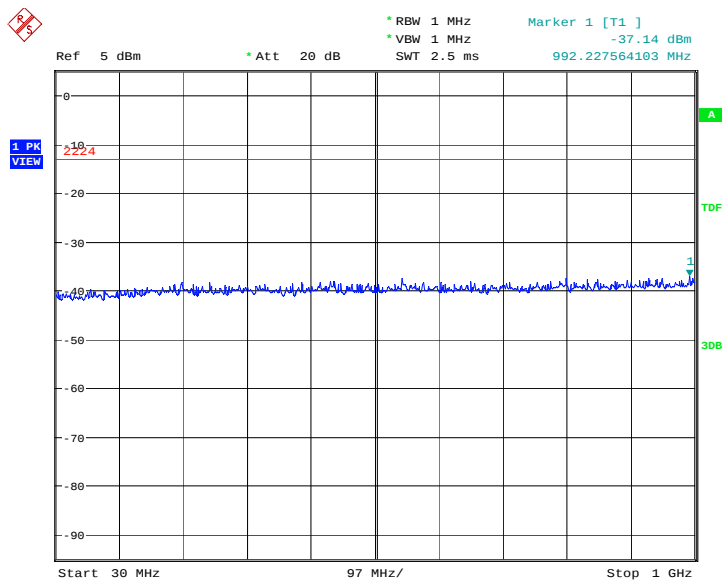


Date: 8.MAR.2013 00:54:27

A.8.3.43 16QAM: 30MHz – 1GHz

Spurious emission limit –13dBm.

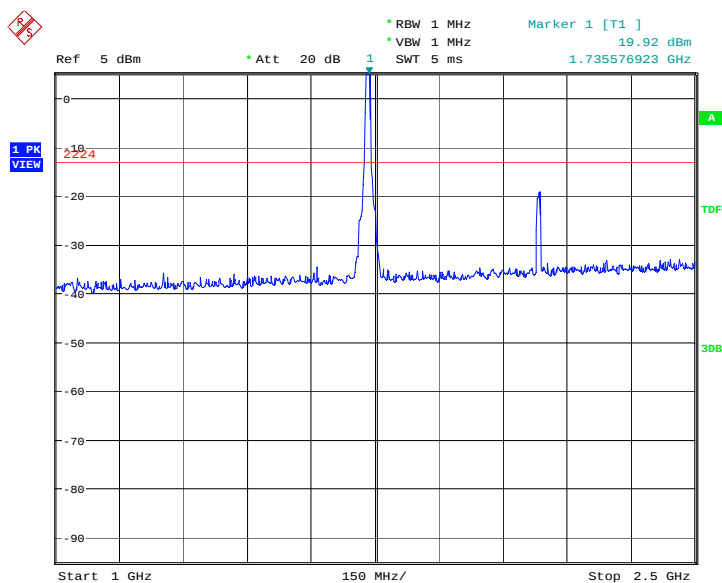
NOTE: peak above the limit line is the carrier frequency.



Date: 8.MAR.2013 00:44:53

A.8.3.44 16QAM: 1GHz – 2.5GHz

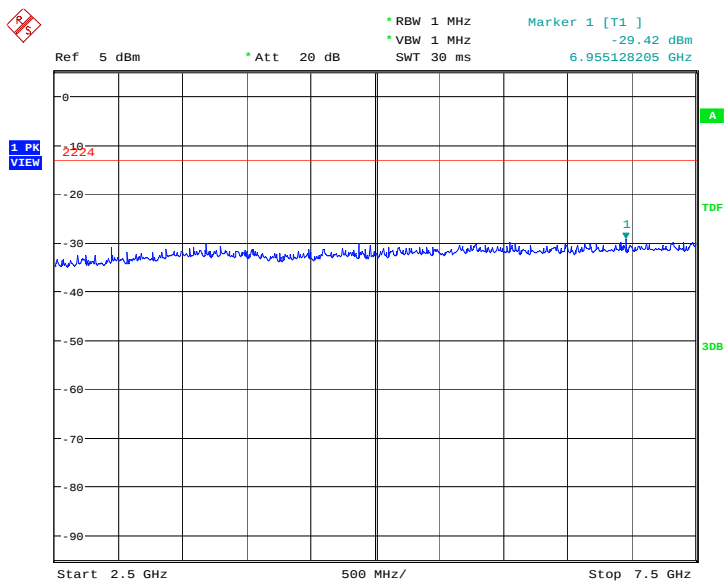
Spurious emission limit –13dBm.



Date: 8.MAR.2013 00:45:06

A.8.3.45 16QAM: 2.5GHz – 7.5GHz

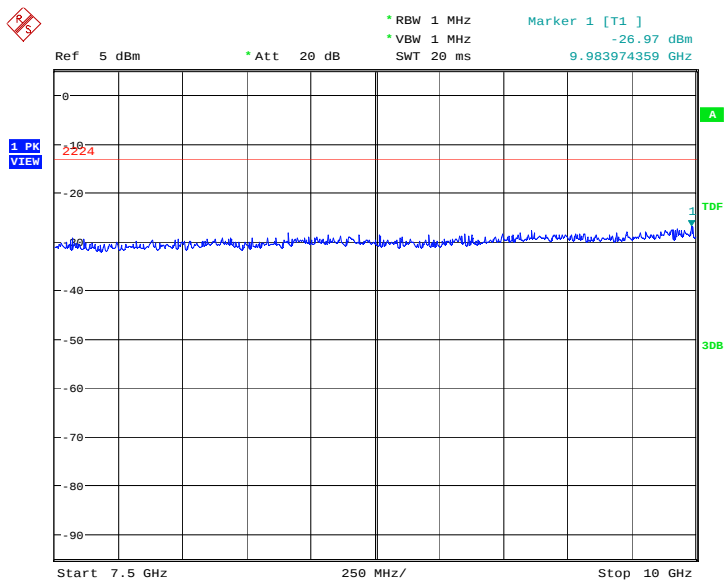
Spurious emission limit –13dBm.



Date: 8.MAR.2013 00:45:19

A.8.3.46 16QAM: 7.5GHz – 10GHz

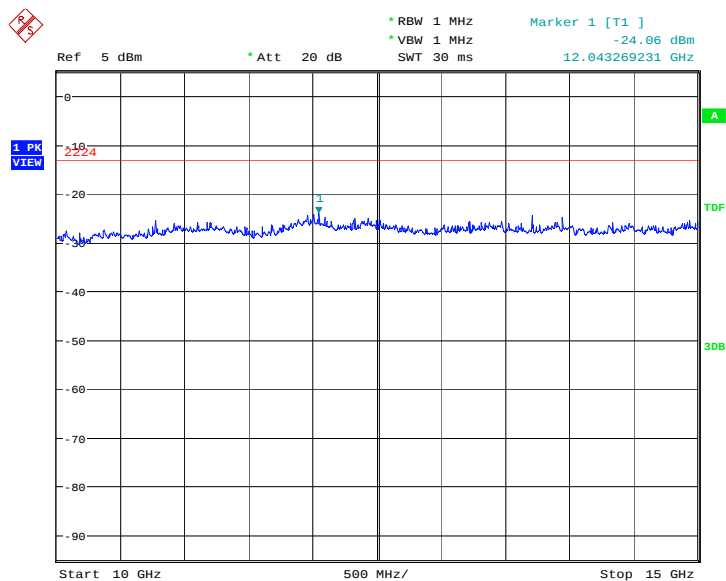
Spurious emission limit –13dBm.



Date: 8.MAR.2013 00:45:32

A.8.3.47 16QAM: 10GHz – 15GHz

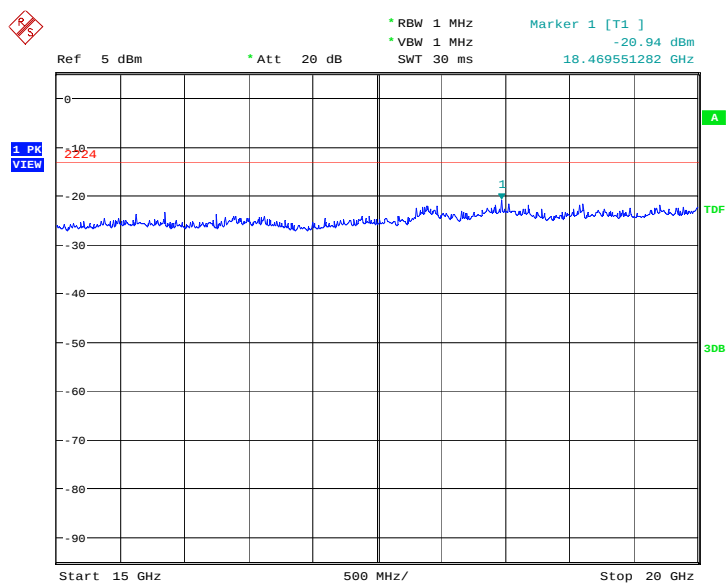
Spurious emission limit –13dBm.



Date: 8.MAR.2013 00:45:45

A.8.3.48 16QAM: 15GHz – 20GHz

Spurious emission limit –13dBm.



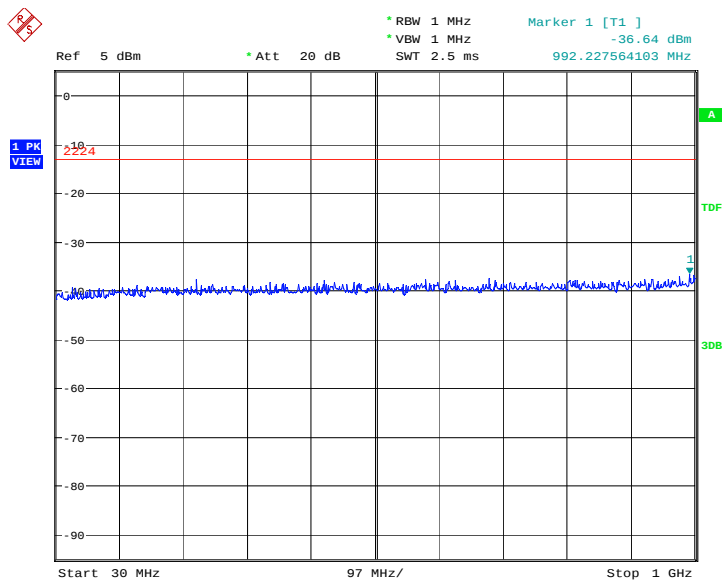
Date: 8.MAR.2013 00:45:58

LTE band 4, 15MHz bandwidth

A.8.3.49 QPSK: 30MHz – 1GHz

Spurious emission limit –13dBm.

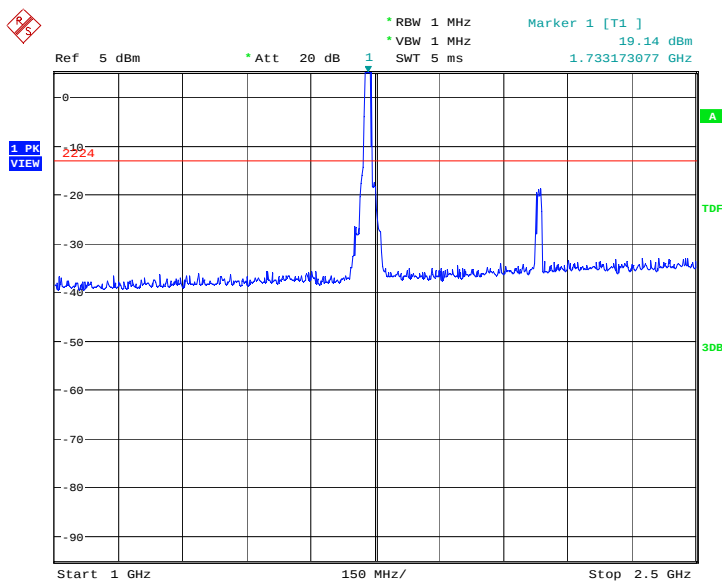
NOTE: peak above the limit line is the carrier frequency.



Date: 8.MAR.2013 02:20:23

A.8.3.50 QPSK: 1GHz – 2.5GHz

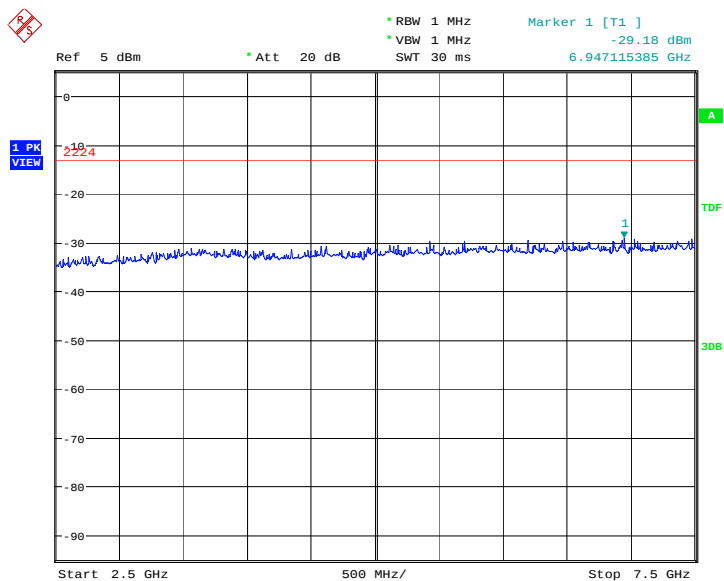
Spurious emission limit –13dBm.



Date: 8.MAR.2013 02:20:36

A.8.3.51 QPSK:2.5GHz – 7.5GHz

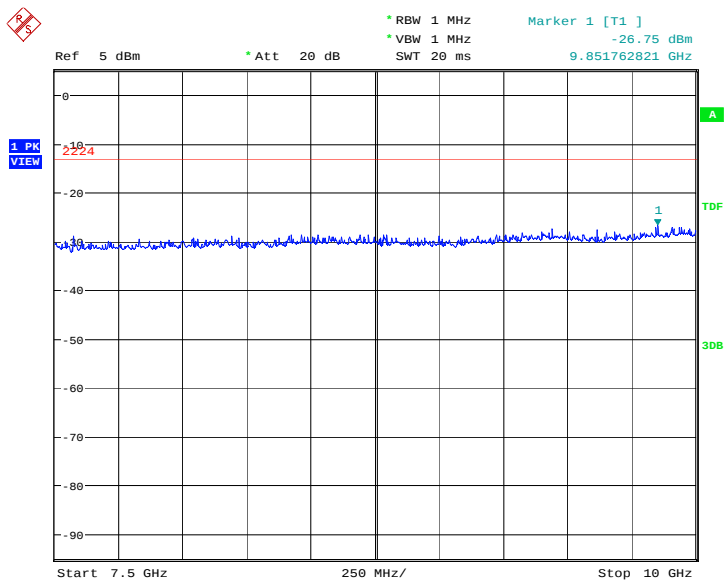
Spurious emission limit –13dBm.



Date: 8.MAR.2013 02:20:49

A.8.3.52 QPSK: 7.5GHz – 10GHz

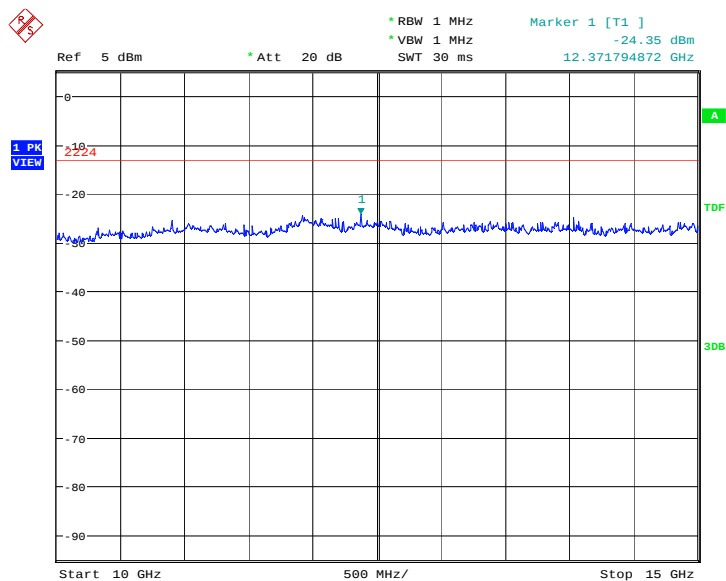
Spurious emission limit –13dBm.



Date: 8.MAR.2013 02:21:02

A.8.3.53 QPSK:10GHz – 15GHz

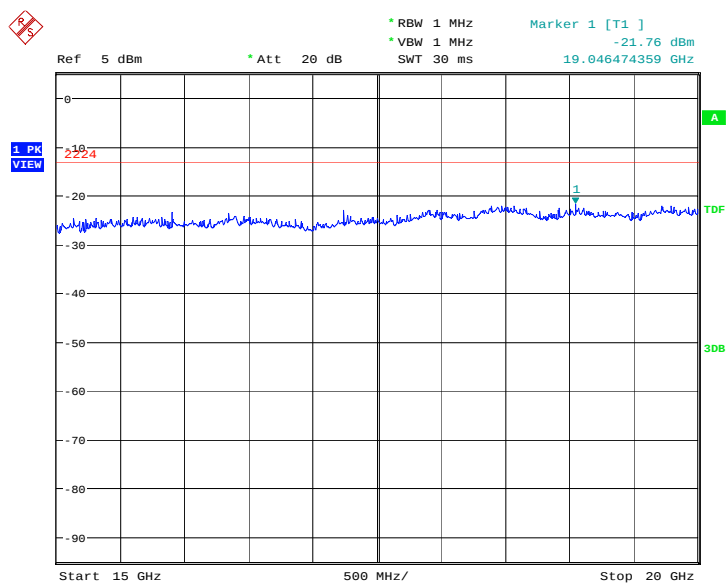
Spurious emission limit –13dBm.



Date: 8.MAR.2013 02:21:15

A.8.3.54 QPSK: 15GHz – 20GHz

Spurious emission limit –13dBm.

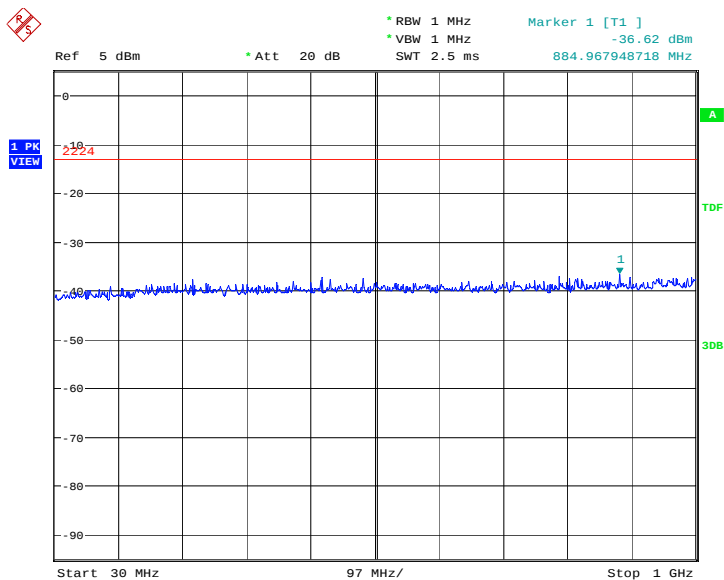


Date: 8.MAR.2013 02:21:28

A.8.3.55 16QAM: 30MHz – 1GHz

Spurious emission limit –13dBm.

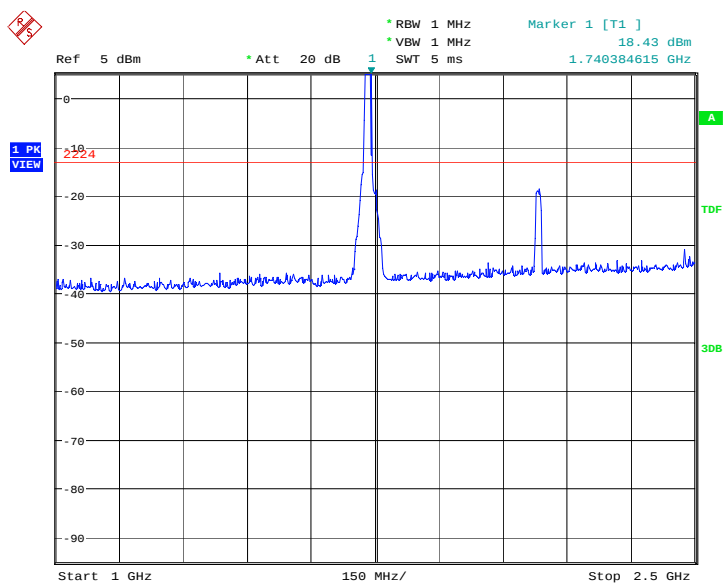
NOTE: peak above the limit line is the carrier frequency.



Date: 8.MAR.2013 02:25:43

A.8.3.56 16QAM: 1GHz – 2.5GHz

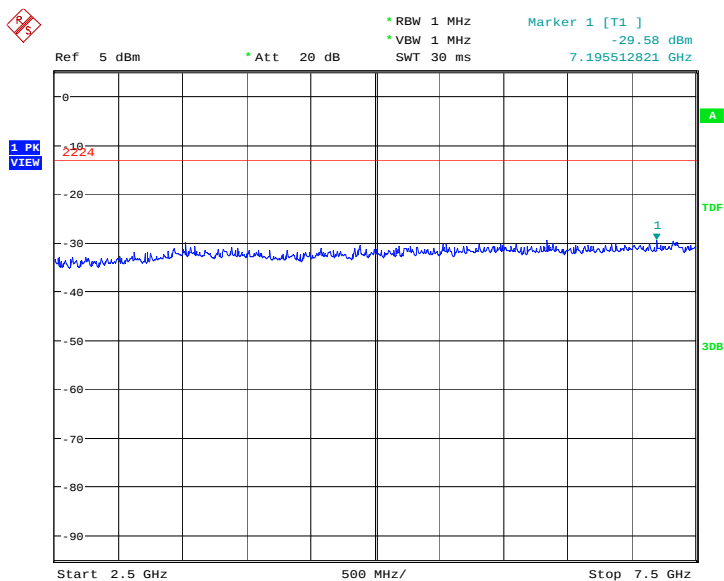
Spurious emission limit –13dBm.



Date: 8.MAR.2013 02:25:56

A.8.3.57 16QAM: 2.5GHz – 7.5GHz

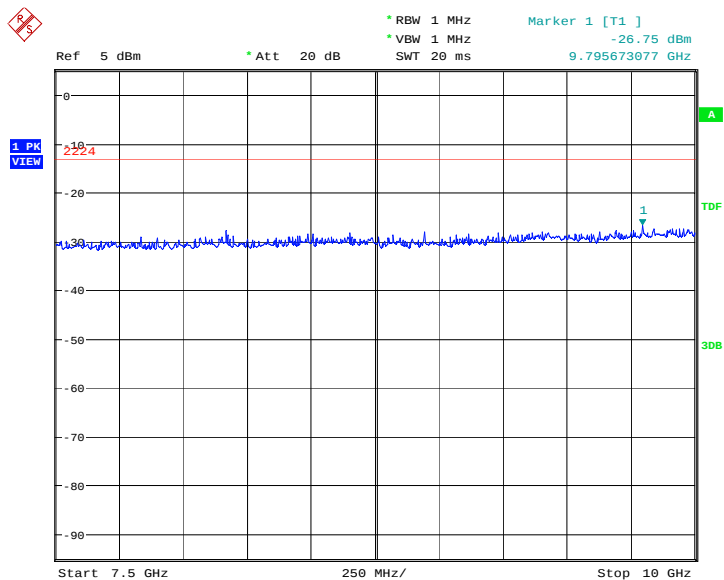
Spurious emission limit –13dBm.



Date: 8.MAR.2013 02:26:09

A.8.3.58 16QAM: 7.5GHz – 10GHz

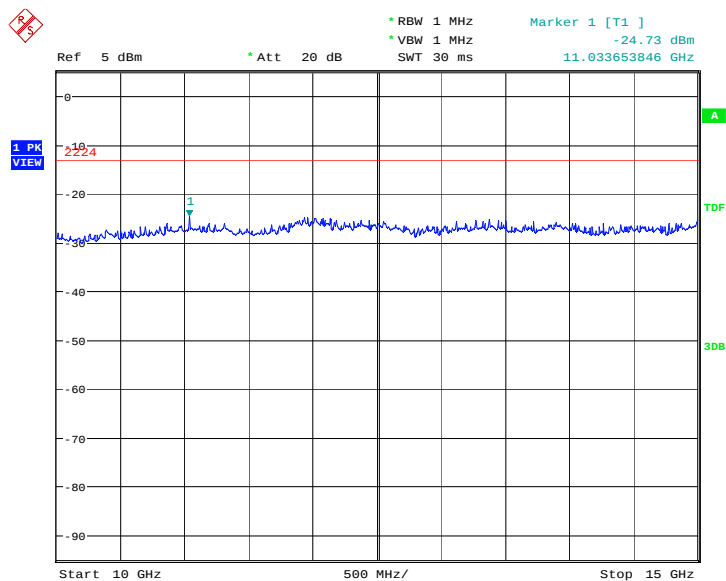
Spurious emission limit –13dBm.



Date: 8.MAR.2013 02:26:22

A.8.3.59 16QAM: 10GHz – 15GHz

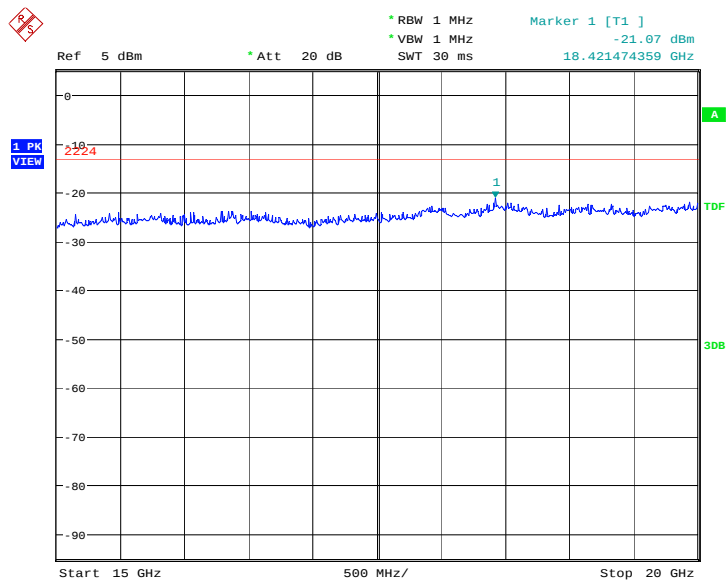
Spurious emission limit –13dBm.



Date: 8.MAR.2013 02:26:35

A.8.3.60 16QAM: 15GHz – 20GHz

Spurious emission limit –13dBm.



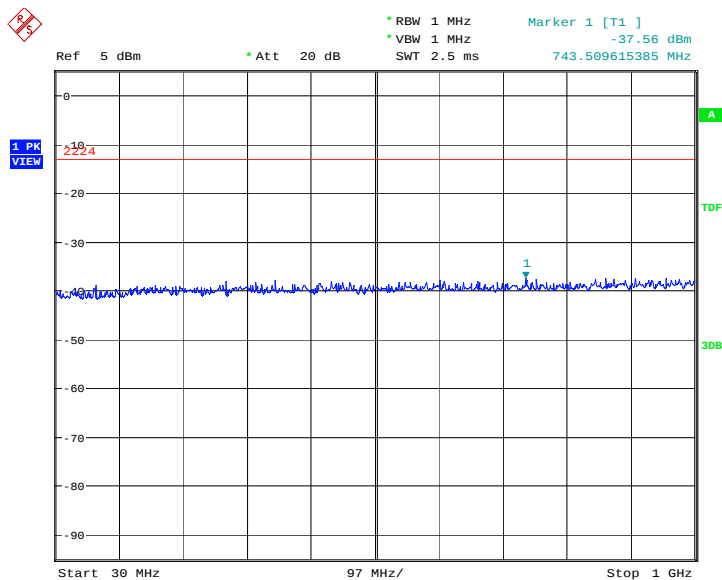
Date: 8.MAR.2013 02:26:48

LTE band 4, 20MHz bandwidth

A.8.3.61 QPSK: 30MHz – 1GHz

Spurious emission limit –13dBm.

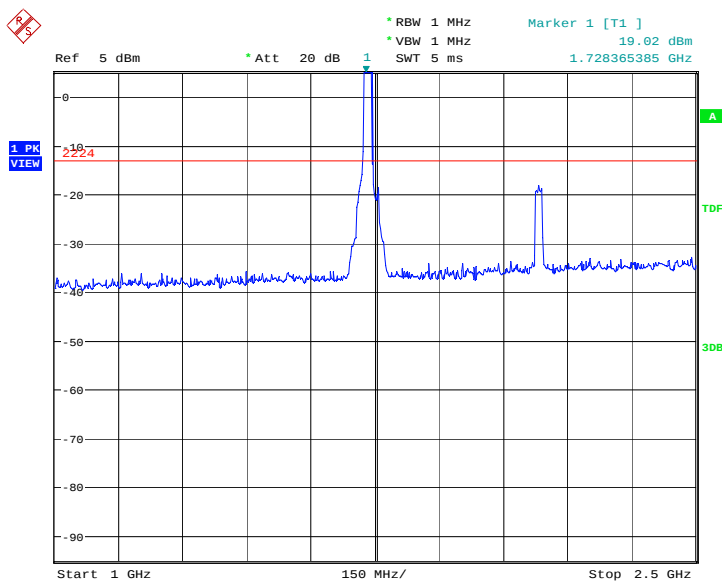
NOTE: peak above the limit line is the carrier frequency.



Date: 8.MAR.2013 03:31:12

A.8.3.62 QPSK: 1GHz – 2.5GHz

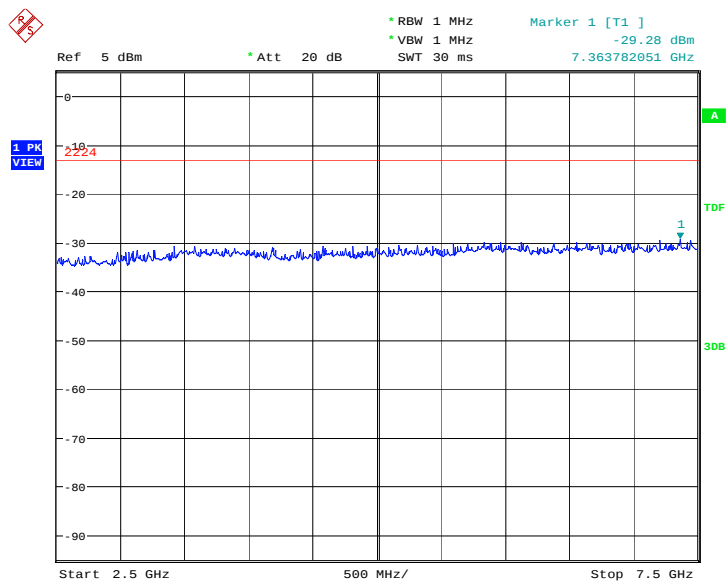
Spurious emission limit –13dBm.



Date: 8.MAR.2013 03:31:25

A.8.3.63 QPSK:2.5GHz – 7.5GHz

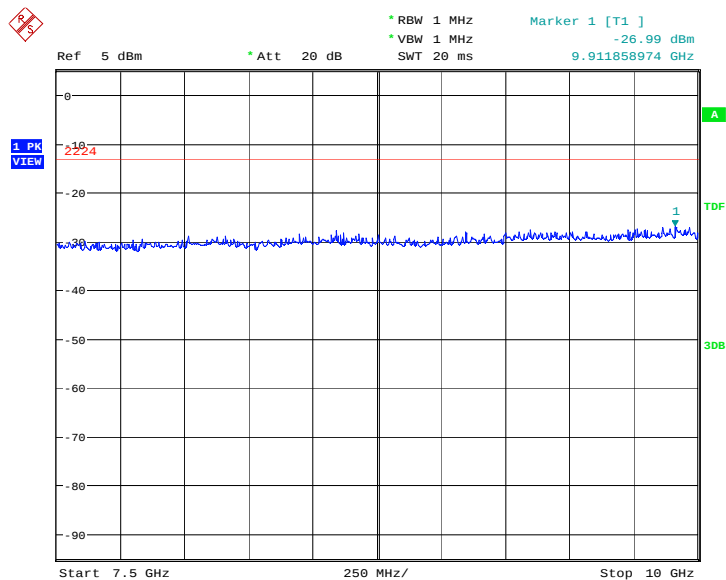
Spurious emission limit –13dBm.



Date: 8.MAR.2013 03:31:38

A.8.3.64 QPSK: 7.5GHz – 10GHz

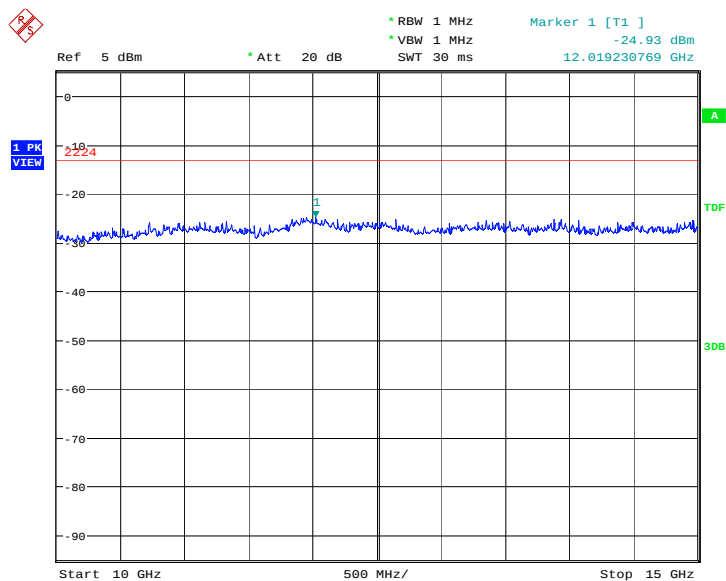
Spurious emission limit –13dBm.



Date: 8.MAR.2013 03:31:51

A.8.3.65 QPSK:10GHz – 15GHz

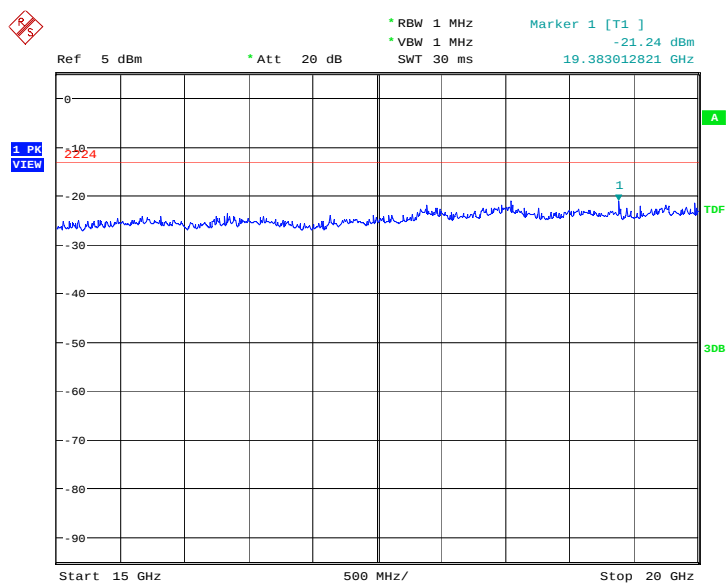
Spurious emission limit –13dBm.



Date: 8.MAR.2013 03:32:04

A.8.3.66 QPSK: 15GHz – 20GHz

Spurious emission limit –13dBm.

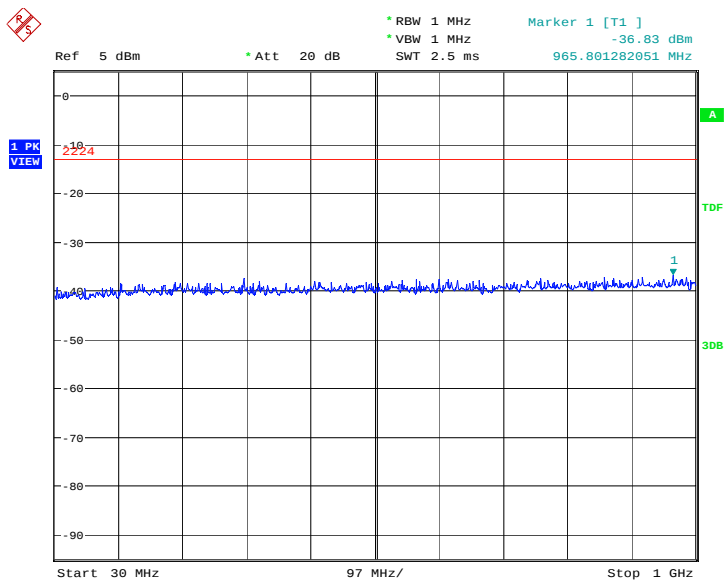


Date: 8.MAR.2013 03:32:17

A.8.3.67 16QAM: 30MHz – 1GHz

Spurious emission limit –13dBm.

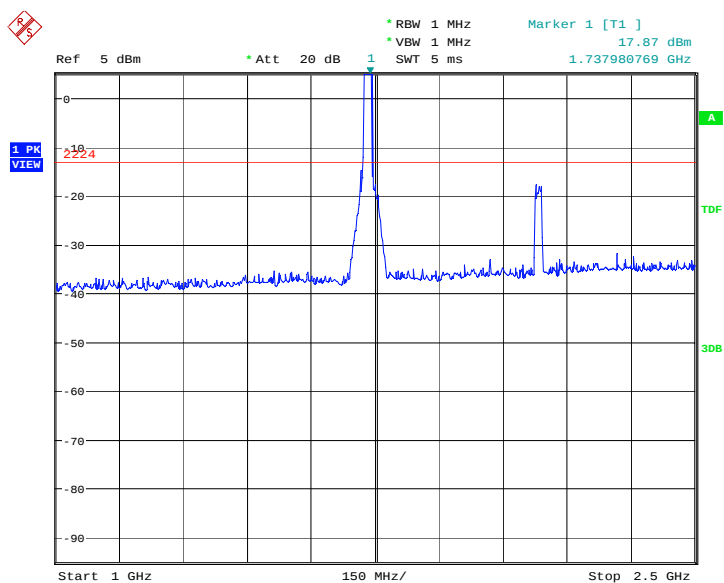
NOTE: peak above the limit line is the carrier frequency.



Date: 8.MAR.2013 03:36:33

A.8.3.68 16QAM: 1GHz – 2.5GHz

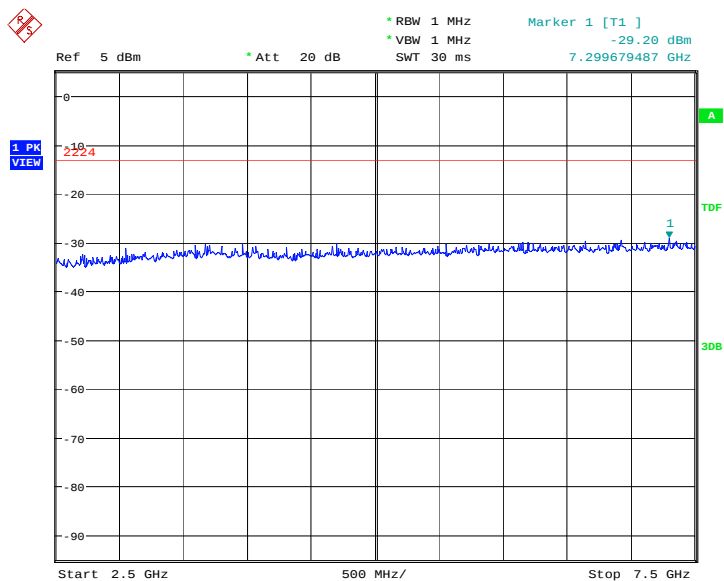
Spurious emission limit –13dBm.



Date: 8.MAR.2013 03:36:46

A.8.3.69 16QAM: 2.5GHz – 7.5GHz

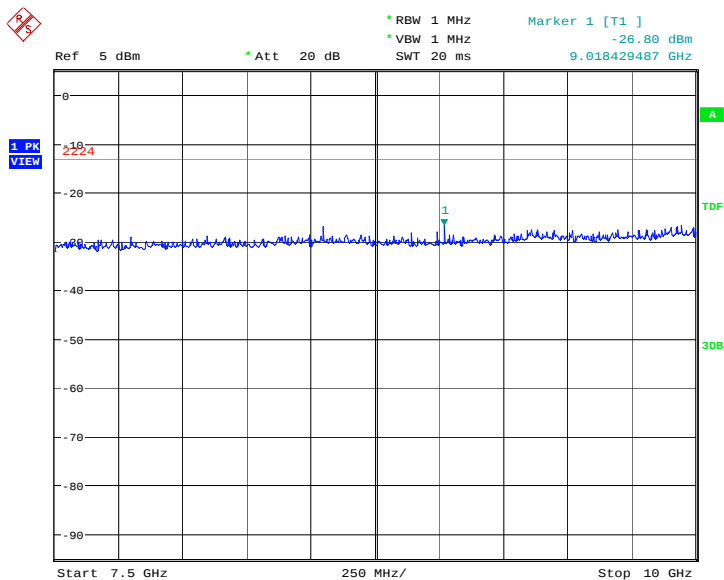
Spurious emission limit –13dBm.



Date: 8.MAR.2013 03:36:59

A.8.3.70 16QAM: 7.5GHz – 10GHz

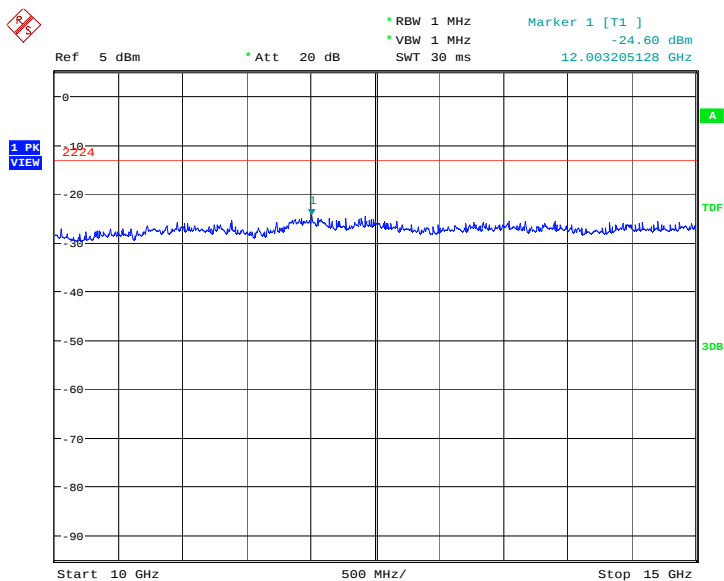
Spurious emission limit –13dBm.



Date: 8.MAR.2013 03:37:12

A.8.3.71 16QAM: 10GHz – 15GHz

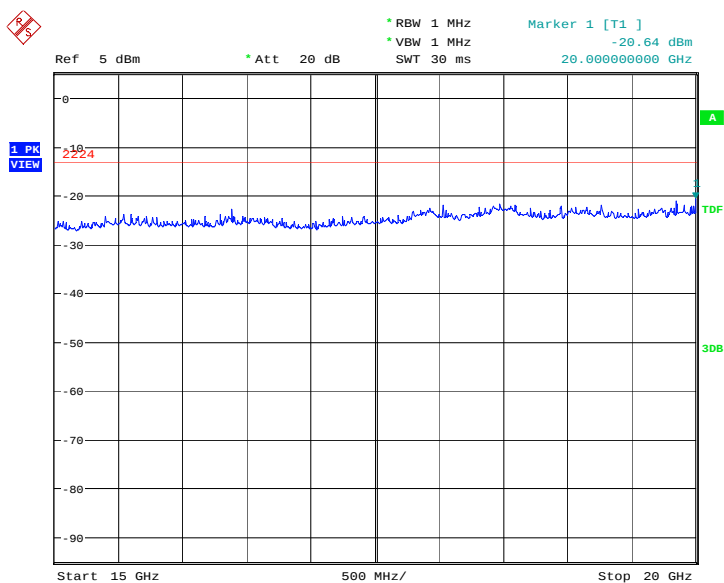
Spurious emission limit –13dBm.



Date: 8.MAR.2013 03:37:25

A.8.3.72 16QAM: 15GHz – 20GHz

Spurious emission limit –13dBm.



Date: 8.MAR.2013 03:37:38

A.9 RECEIVER RADIATION EMISSION

Reference

FCC: CFR Part 2.1053, 15.109.

IC: RSS-139 Issue 2, Section 6.6.

A.9.1 Method of Measurement

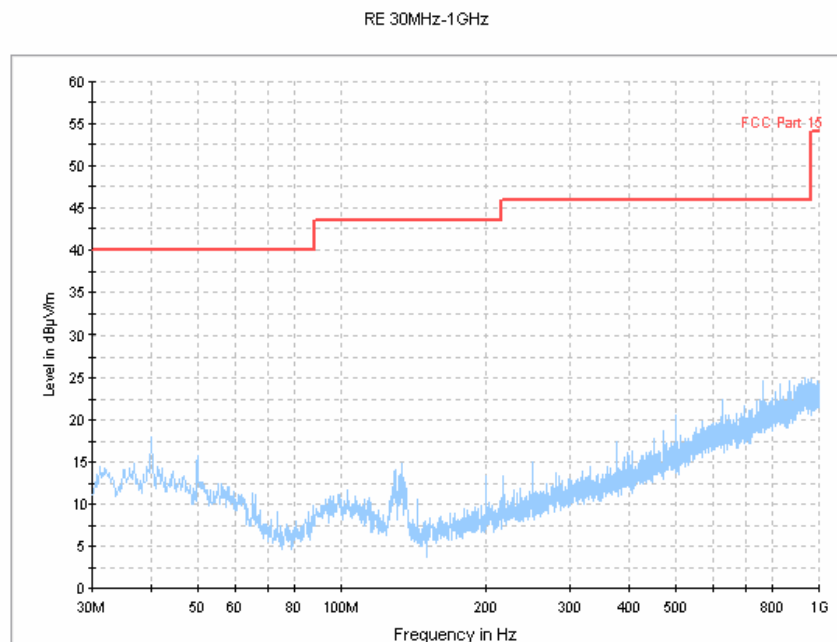
The measurement procedure in ANSI C63.4-2003 is used. The EUT is placed on an 80cm height non-conductive table locating on the center of turntable. From 30MHz-1GHz, the measurement distance is 3 m. For frequency range above 1GHz, the measurement distance is 3m.

The EUT is measured with travel charger and the operating mode is idle without CMU200's signaling.

A.9.2 Method of Measurement

Frequency of Emission (MHz)	Limit (dB μ V/m)	Measurement Distance (m)
30-88	40	3
88-216	43.5	3
216-960	46	3
960-1000	54	3
>1000	54	3

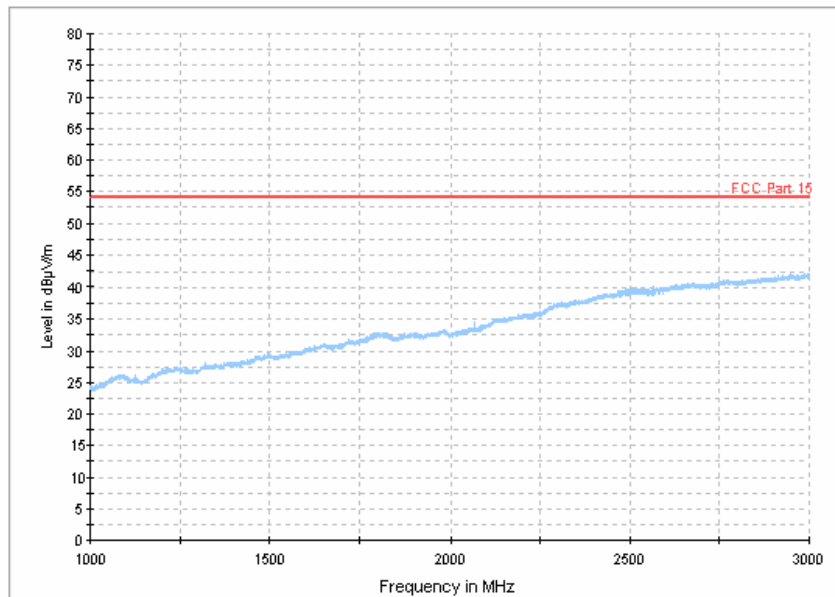
A. 9.3 Measurement results



IF bandwidth: 120 kHz

Idle Mode: 30MHz-1GHz

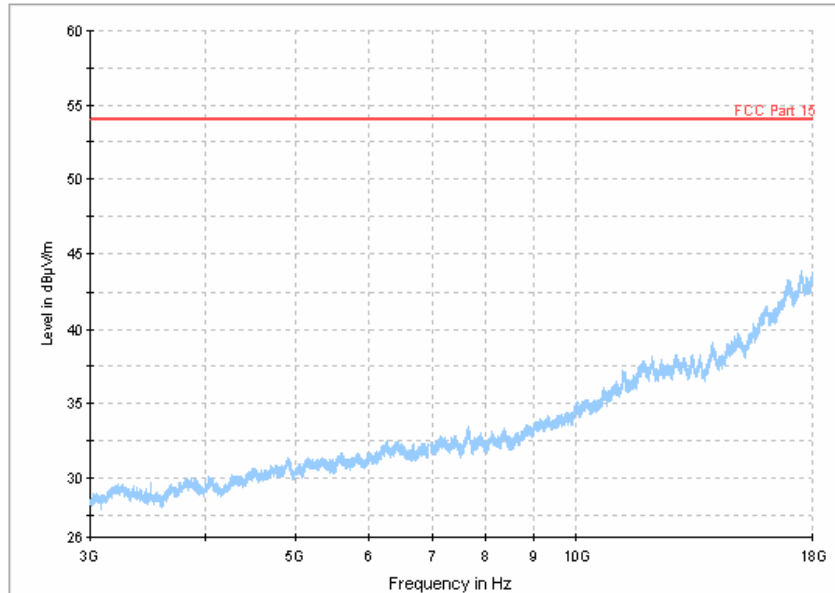
RE - 1GHz-3GHz



RBW / VBW 1 MHz

Idle Mode: 1GHz-3GHz

RE - 3GHz-18GHz



RBW / VBW 1 MHz

Idle Mode: 3GHz-18GHz

ANNEX B: TEST LAYOUT

Pic.1 Radiated spurious emission



Pic.2 Conducted emission

ANNEX C: EUT photograph**Mobile Phone****Mobile Phone**



Mobile Phone



Mobile Phone



Mobile Phone



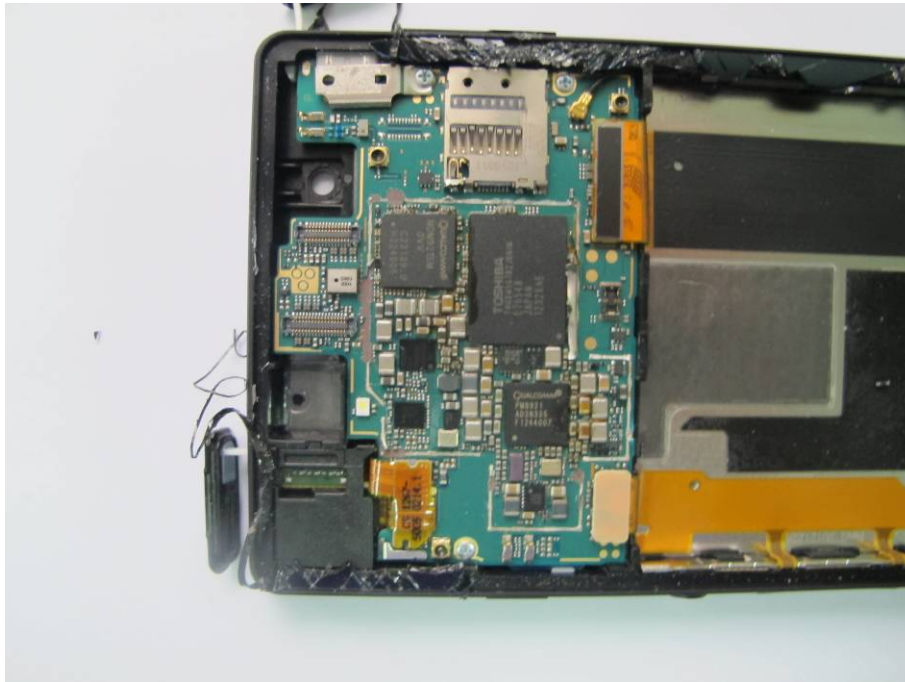
Mobile Phone



Label of Mobile Phone



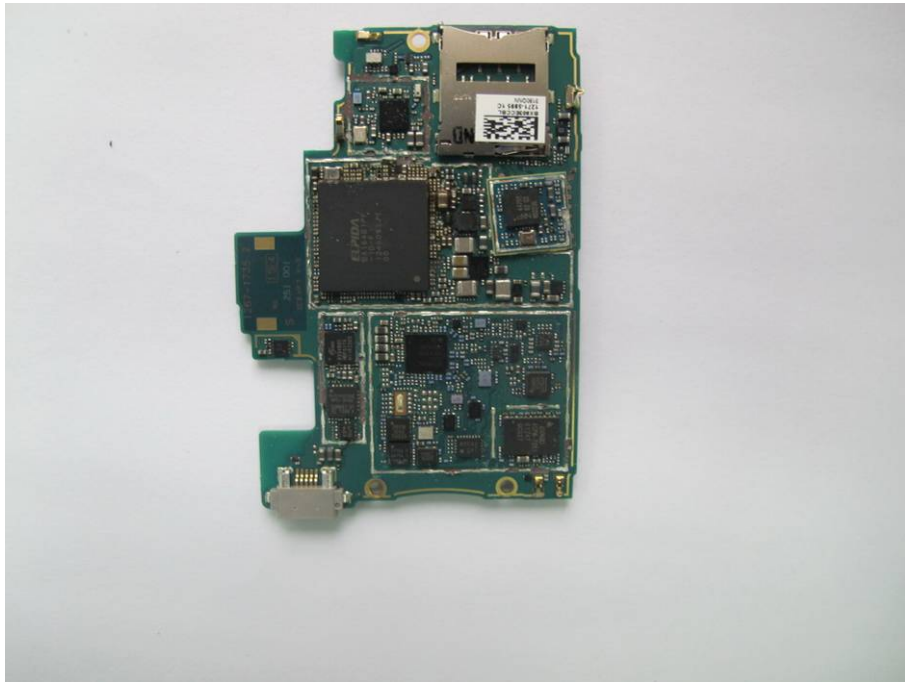
Mobile Phone Disassembly



Mobile Phone Disassembly



Mobile Phone Disassembly



Mobile Phone Disassembly



Mobile Phone Disassembly



Li-Polymer Battery



Travel Charger



Label of Travel Charger



USB Cable

*****END OF REPORT*****