TEST REPORT

No. 2013TAR767

for

Sony Mobile Communications AB

GSM/WCDMA/LTE mobile phone

Type: PM-0640-BV

FCC ID: PY7PM-0640

with

Hardware Version: A

Software Version: 14.2.A.0.78

Issued Date: Dec. 09th, 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.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 Shouxiang, No.51, Xueyuan Road, Haidian District, Beijing, China
Postal Code:	100191

1.2. Testing Environment

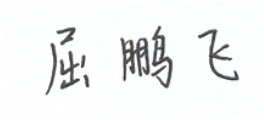
Normal Temperature:	15-35℃
Relative Humidity:	20-75%
Air pressure	980 - 1040 hPa

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

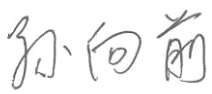
Receipt of Sample	Oct. 29th, 2013
Testing Start Date:	Oct. 31st, 2013
Testing End Date:	Nov. 22nd, 2013

1.4. Signature



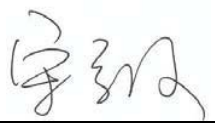
Qu Pengfei

(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
Address /Post:	Sony Mobile R&D Center, No. 16, Guangshun South Street, Chaoyang District
City:	Beijing
Postal Code:	100102
Country:	China
Contact Person:	Ma, Gang
Telephone:	+86-10-58656312
Fax:	+86-10-58659049

2.2. Manufacturer Information

Company Name:	Sony Mobile Communications AB
Address /Post:	Mobilvägen, 22188 Lund, Sweden
City:	Lund
Postal Code:	22188
Country:	Sweden
Contact Person:	Nilsson, Mikael
Telephone:	+46 703 227503
Fax:	+46 706 127385

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

3.1. About EUT

Description	GSM 850/900/1800/1900 quad bands, GPRS, EDGE, WCDMA FDD bands 1/2/4/5/8, HSDPA, HSUPA, LTE FDD bands 1/2/3/4/5/7/8/20, Bluetooth (EDR and 4.0), ANT+, WLAN (802.11 a/ac/b/g/n), NFC, FM, GPS mobile phone
Type	PM-0640-BV
FCC ID	PY7PM-0640
GSM Frequency Band	GSM 850/900/1800/1900
UMTS Frequency Band	FDD Band 1 / FDD Band 2/ FDD Band 4/ FDD Band 5 / FDD Band 8
LTE Frequency Band	FDD Band 1/ FDD Band 2/ FDD Band 3 / FDD Band 4 / FDD Band 5/ FDD Band 7/ FDD Band 8/ FDD Band 20
Antenna	Internal
Power supply	Battery (charged by travel adapter or vehicle charger)
Extreme vol. Limits	3.6VDC to 4.2VDC (nominal: 4.2VDC)
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
EUT3	CB5A1VGB2K	004402451604478	A	14.2.A.0.78
EUT5	CB5A1VGB7K	004402451604619	A	14.2.A.0.78

*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
#22974	Travel Charger	8512W19 200056	1C
#24009	USB Cable	123307DD003654E	1

#22974

Commercial name	EP880
Type	AC-0400-EU
Manufacturer	SALCOMP
Length of cable	98.5 cm (length of USB cable)

#24009

Commercial name	EC801
Type	AI-0401
Manufacturer	Sony Mobile
Length of cable	98.5 cm

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

3.4. General Description

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

The EUT supports GSM 850/900/1800/1900MHz bands, WCDMA FDD band 1/2/4/5/8 and LTE FDD bands 1/2/3/4/5/7/8/20. It supports GPRS service with multi-slots class 33 and EGPRS service with multi-slots class 33. The HSDPA and HSUPA features are also supported.

It has MP3, camera, USB memory, Mobile High-Definition Link (MHL), FM radio, GPS receiver, NFC, Bluetooth (EDR and Bluetooth 4.0), ANT+, WLAN (802.11 a/ac/b/g/n) and Wi-Fi hotspot functions. For WLAN 802.11n, it supports 20MHz bandwidth on 2.4GHz band and 20MHz/40MHz bandwidths on 5GHz/5.8GHz band. For WLAN 802.11 ac, it supports 20MHz/40MHz/80MHz bandwidths.

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

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

Samples undergoing test were selected by the client.

3.5. EUT set-ups

EUT Set-up No.	Combination of EUT and AE	Remarks
Set.3	EUT3 + #22974 + #24009	Tests with travel charger
Set.4	EUT3	ERP/EIRP/RSE tests
Set.8	EUT5	Conducted RF tests

4. Reference Documents

4.1. Reference Documents for testing

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

Reference	Title	Version
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-12 Edition
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-12 Edition
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-12 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 ℃, Max. = 35 ℃
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 ℃, Max. = 35 ℃
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 ℃, Max. = 35 ℃
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, 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(b)	A.6	P	B
7	Band Edge Compliance	24.238(b)	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 5

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Output Power	22.913(a)	A.1	P	B
2	Emission Limit	22.917, 2.1051	A.2	P	B
3	Conducted Emission	15.107/207	A.3	P	A
4	Frequency Stability	22.355, 2.1055	A.4	P	B
5	Occupied Bandwidth	2.1049(h)(i)	A.5	P	B
6	Emission Bandwidth	22.917(b)	A.6	P	B
7	Band Edge Compliance	22.917(b)	A.7	P	B
8	Conducted Spurious Emission	22.917, 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

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.	Spectrum Analyzer	E4440A	MY48250642	Agilent	2014-03-04
3.	LISN	ESH2-Z5	829991/012	R&S	2014-04-14
4.	EMI Antenna	VULB 9163	9163-482	Schwarzbeck	2014-02-17
5.	EMI Antenna	3117	00119024	ETS-Lindgren	2014-02-02
6.	EMI Antenna	3117	00058889	ETS-Lindgren	2014-02-02
7.	EMI Antenna	VUBA 9117	177	Schwarzbeck	2014-06-29
8.	Signal Generator	N5183A	MY49060052	Agilent	2014-03-19
9.	Climatic chamber	SH-241	92003546	ESPEC	2014-05-11
10.	Universal Radio Communication Tester	CMW500	116588	R&S	2014-11-04

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER

Reference

FCC: CFR Part 22.913(a), 24.232(b), 27.50(d)(4), 27.50(h)(2).

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 spectrum analyzer's RMS detector.

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

A.1.2.2 Measurement result

LTE band 2

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	1850.7	22.06	20.79
		1880.0	**23.51**	22.38
		1909.3	23.49	22.28
	1 RB low	1850.7	21.95	20.76
		1880.0	23.52	22.39
		1909.3	23.45	22.26
	50% RB mid	1850.7	21.98	20.87
		1880.0	23.43	22.52
		1909.3	23.44	22.37
	100% RB	1850.7	21.01	20.04
		1880.0	22.50	21.54
		1909.3	22.44	21.51

(continued)

3MHz	1 RB high	1851.5	21.94	21.19
		1880.0	23.41	22.70
		1908.5	23.39	22.67
	1 RB low	1851.5	21.83	21.17
		1880.0	23.41	22.68
		1908.5	23.41	22.67
	50% RB mid	1851.5	20.82	19.99
		1880.0	22.48	21.57
		1908.5	22.42	21.56
	100% RB	1851.5	20.79	19.86
		1880.0	22.47	21.47
		1908.5	22.40	21.42
5MHz	1 RB high	1852.5	22.01	20.67
		1880.0	23.35	22.11
		1907.5	23.28	22.02
	1 RB low	1852.5	23.40	21.98
		1880.0	23.42	22.11
		1907.5	23.34	21.98
	50% RB mid	1852.5	20.83	19.80
		1880.0	22.49	21.43
		1907.5	22.40	21.43
	100% RB	1852.5	22.23	21.34
		1880.0	22.40	21.42
		1907.5	22.35	21.48
10MHz	1 RB high	1855.0	21.99	21.14
		1880.0	23.45	22.70
		1905.0	23.37	22.65
	1 RB low	1855.0	23.45	23.04
		1880.0	23.34	22.69
		1905.0	23.39	22.70
	50% RB mid	1855.0	22.28	21.37
		1880.0	22.40	21.37
		1905.0	22.34	21.27
	100% RB	1855.0	22.30	21.24
		1880.0	22.30	21.24
		1905.0	22.19	21.20

(continued)

15MHz	1 RB high	1857.5	21.99	21.46
		1880.0	23.33	22.70
		1902.5	23.35	22.64
	1 RB low	1857.5	23.27	22.68
		1880.0	23.31	22.70
		1902.5	23.30	22.65
	50% RB mid	1857.5	22.34	21.56
		1880.0	22.21	21.56
		1902.5	22.27	21.48
	100% RB	1857.5	22.27	21.26
		1880.0	22.27	21.20
		1902.5	22.18	21.24
20MHz	1 RB high	1860.0	22.02	21.17
		1880.0	23.48	22.70
		1900.0	23.43	22.58
	1 RB low	1860.0	23.45	22.44
		1880.0	23.26	22.52
		1900.0	23.30	22.52
	50% RB mid	1860.0	22.25	21.24
		1880.0	22.28	21.20
		1900.0	22.27	21.29
	100% RB	1860.0	22.36	21.26
		1880.0	22.32	21.36
		1900.0	22.16	21.19

LTE band 4

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	1754.3	23.43	22.23
		1732.5	23.52	22.18
		1710.7	23.60	22.30
	1 RB low	1754.3	23.43	22.19
		1732.5	23.46	22.11
		1710.7	**23.66**	22.45
	50% RB mid	1754.3	23.39	22.36
		1732.5	23.48	22.67
		1710.7	23.54	22.49
	100% RB	1754.3	22.38	21.35
		1732.5	22.50	21.58
		1710.7	22.54	21.50
3MHz	1 RB high	1753.5	23.36	22.63
		1732.5	23.46	22.70
		1711.5	23.33	22.60
	1 RB low	1753.5	23.32	22.56
		1732.5	23.43	22.70
		1711.5	23.60	22.69
	50% RB mid	1753.5	22.33	21.34
		1732.5	22.44	21.46
		1711.5	22.37	21.41
	100% RB	1753.5	22.31	21.25
		1732.5	22.43	21.37
		1711.5	22.37	21.33
5MHz	1 RB high	1752.5	23.41	22.05
		1732.5	23.45	22.09
		1712.5	23.39	21.99
	1 RB low	1752.5	23.31	21.90
		1732.5	23.36	21.98
		1712.5	23.56	22.20
	50% RB mid	1752.5	22.37	21.23
		1732.5	22.45	21.36
		1712.5	22.38	21.28
	100% RB	1752.5	22.22	21.24
		1732.5	22.30	21.33
		1712.5	22.20	21.23

(continued)

10MHz	1 RB high	1750	23.42	22.62
		1732.5	23.41	22.70
		1715	23.34	22.69
	1 RB low	1750	23.26	22.51
		1732.5	23.16	22.53
		1715	23.41	22.66
	50% RB mid	1750	22.15	21.11
		1732.5	22.32	21.29
		1715	22.18	21.16
	100% RB	1750	22.10	21.04
		1732.5	22.30	21.20
		1715	22.12	21.08
15MHz	1 RB high	1747.5	23.32	22.64
		1732.5	23.38	22.62
		1717.5	23.26	22.60
	1 RB low	1747.5	23.24	22.66
		1732.5	23.11	22.62
		1717.5	23.38	22.70
	50% RB mid	1747.5	22.19	21.30
		1732.5	22.25	21.43
		1717.5	22.14	21.37
	100% RB	1747.5	22.08	21.01
		1732.5	22.18	21.08
		1717.5	22.10	21.04
20MHz	1 RB high	1745	23.45	22.59
		1732.5	23.45	22.57
		1720	23.39	22.50
	1 RB low	1745	23.38	22.48
		1732.5	23.24	22.37
		1720	23.42	22.61
	50% RB mid	1745	22.07	21.05
		1732.5	22.24	21.19
		1720	22.11	21.07
	100% RB	1745	22.16	21.07
		1732.5	22.19	21.11
		1720	22.10	21.13

LTE band 5

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	824.7	23.05	21.86
		836.5	22.97	21.82
		848.3	**23.13**	21.90
	1 RB low	824.7	23.08	21.87
		836.5	23.01	21.76
		848.3	23.12	21.90
	50% RB mid	824.7	22.93	22.05
		836.5	22.90	21.86
		848.3	23.01	21.98
	100% RB	824.7	22.01	21.07
		836.5	21.97	20.99
		848.3	22.06	21.05
3MHz	1 RB high	825.5	23.00	22.20
		836.5	23.01	21.73
		847.5	22.87	22.54
	1 RB low	825.5	22.96	22.18
		836.5	22.92	21.66
		847.5	22.95	22.55
	50% RB mid	825.5	22.02	21.15
		836.5	21.96	21.02
		847.5	22.07	21.06
	100% RB	825.5	22.01	21.07
		836.5	21.90	20.94
		847.5	22.00	20.94
5MHz	1 RB high	826.5	23.05	21.67
		836.5	22.99	21.64
		846.5	22.92	21.99
	1 RB low	826.5	22.93	21.59
		836.5	22.93	21.51
		846.5	22.91	21.96
	50% RB mid	826.5	22.06	20.95
		836.5	21.92	20.89
		846.5	22.02	21.02
	100% RB	826.5	21.94	21.00
		836.5	21.88	20.90
		846.5	21.91	20.97

(continued)

10MHz	1 RB high	829.0	23.02	22.20
		836.5	22.91	21.55
		844.0	22.84	22.19
	1 RB low	829.0	22.89	22.19
		836.5	22.90	21.50
		844.0	22.87	22.19
	50% RB mid	829.0	21.95	20.91
		836.5	21.85	20.87
		844.0	21.94	20.88
	100% RB	829.0	21.89	20.82
		836.5	21.82	20.82
		844.0	21.86	20.86

LTE band 7

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
5MHz	1 RB high	2502.5	23.36	21.98
		2535	23.33	21.97
		2567.5	23.36	22.06
	1 RB low	2502.5	23.30	21.92
		2535	23.33	21.98
		2567.5	23.36	21.98
	50% RB mid	2502.5	22.29	21.18
		2535	22.30	21.24
		2567.5	22.27	21.26
	100% RB	2502.5	22.16	21.22
		2535	22.23	21.26
		2567.5	22.28	21.26

(continued)

10MHz	1 RB high	2505	23.34	22.35
		2535	**23.43**	22.42
		2565	23.26	22.21
	1 RB low	2505	23.39	22.31
		2535	23.29	22.33
		2565	23.30	22.32
	50% RB mid	2505	22.25	21.19
		2535	22.26	21.20
		2565	22.25	21.22
	100% RB	2505	22.15	21.09
		2535	22.17	21.20
		2565	22.27	21.17
15MHz	1 RB high	2507.5	23.27	22.30
		2535	23.37	22.36
		2562.5	23.24	22.29
	1 RB low	2507.5	23.30	22.26
		2535	23.21	22.25
		2562.5	23.19	22.17
	50% RB mid	2507.5	22.18	21.19
		2535	22.09	21.09
		2562.5	22.21	21.10
	100% RB	2507.5	22.11	21.03
		2535	22.15	21.11
		2562.5	22.20	21.12
20MHz	1 RB high	2510	23.34	22.40
		2535	23.39	22.39
		2560	23.37	22.35
	1 RB low	2510	23.27	22.38
		2535	23.23	22.34
		2560	23.19	22.31
	50% RB mid	2510	22.27	21.13
		2535	22.20	21.10
		2560	22.17	21.09
	100% RB	2510	22.17	21.13
		2535	22.18	21.18
		2560	22.26	21.21

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

A.1.3 Radiated

A.1.3.1 Description

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

Rule Part 22.913(a) specifies ”Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.”

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

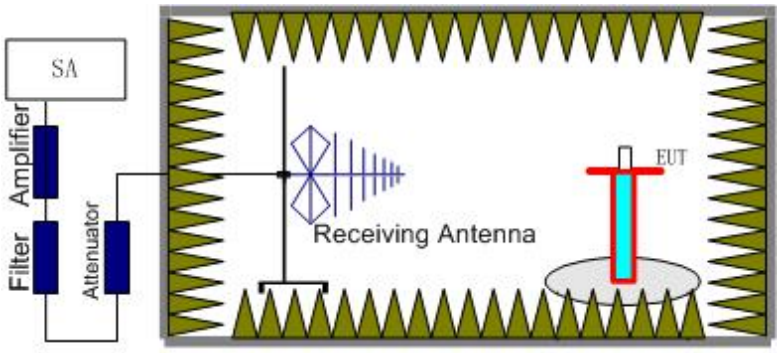
Rule Part 27.50(d) specifies “Fixed, mobile, and portable (handheld) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP”.

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

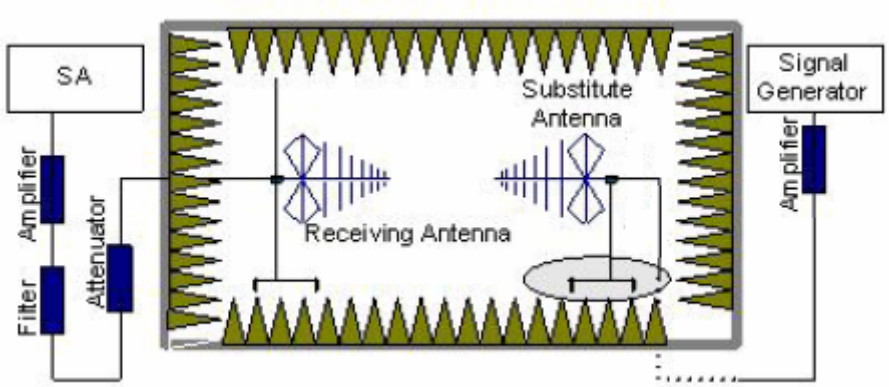
A.1.3.2 Method of Measurement

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

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



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



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

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

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

A.1.3.3 Measurement result

LTE Band 2- EIRP 24. 232(b)

Limits: ≤33dBm (2W)

LTE Band 2_1.4MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1850.70	-28.25	3.18	-50.00	-4.56	23.13	Horizontal
1880.00	-28.73	3.11	-50.00	-4.43	22.59	Horizontal
1909.30	-28.96	3.18	-50.00	-4.30	22.16	Horizontal

LTE Band 2_3MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1851.50	-27.90	3.18	-50.00	-4.55	**23.47**	Horizontal
1880.00	-29.12	3.11	-50.00	-4.43	22.20	Horizontal
1908.50	-29.19	3.18	-50.00	-4.30	21.93	Horizontal

LTE Band 2_5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1852.50	-28.23	3.18	-50.00	-4.55	23.14	Horizontal
1880.00	-29.20	3.11	-50.00	-4.43	22.12	Horizontal
1907.50	-27.80	3.18	-50.00	-4.31	23.33	Horizontal

LTE Band 2_10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1855.00	-28.59	3.16	-50.00	-4.54	22.79	Horizontal
1880.00	-29.64	3.11	-50.00	-4.43	21.68	Horizontal
1905.00	-28.37	3.17	-50.00	-4.32	22.78	Horizontal

LTE Band 2_15MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1857.50	-29.41	3.15	-50.00	-4.53	21.97	Horizontal
1880.00	-30.00	3.11	-50.00	-4.43	21.32	Horizontal
1902.50	-29.25	3.16	-50.00	-4.33	21.92	Horizontal

LTE Band 2_20 MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1860.00	-30.43	3.14	-50.00	-4.52	20.95	Horizontal
1880.00	-30.94	3.11	-50.00	-4.43	20.38	Horizontal
1900.00	-30.61	3.16	-50.00	-4.34	20.57	Horizontal

LTE Band 2_1.4MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1850.70	-28.07	3.18	-50.00	-4.56	23.31	Horizontal
1880.00	-29.07	3.11	-50.00	-4.43	22.25	Horizontal
1909.30	-29.43	3.18	-50.00	-4.30	21.69	Horizontal

LTE Band 2_3MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1851.50	-28.22	3.18	-50.00	-4.55	23.15	Horizontal
1880.00	-29.43	3.11	-50.00	-4.43	21.89	Horizontal
1908.50	-29.23	3.18	-50.00	-4.30	21.89	Horizontal

LTE Band 2_5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1852.50	-28.14	3.18	-50.00	-4.55	23.23	Horizontal
1880.00	-29.47	3.11	-50.00	-4.43	21.85	Horizontal
1907.50	-27.93	3.18	-50.00	-4.31	23.20	Horizontal

LTE Band 2_10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1855.00	-28.95	3.16	-50.00	-4.54	22.43	Horizontal
1880.00	-29.86	3.11	-50.00	-4.43	21.46	Horizontal
1905.00	-28.93	3.17	-50.00	-4.32	22.22	Horizontal

LTE Band 2_15MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1857.50	-29.36	3.15	-50.00	-4.53	22.02	Horizontal
1880.00	-30.23	3.11	-50.00	-4.43	21.09	Horizontal
1902.50	-29.46	3.16	-50.00	-4.33	21.71	Horizontal

LTE Band 2_20 MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1860.00	-30.78	3.14	-50.00	-4.52	20.60	Horizontal
1880.00	-31.34	3.11	-50.00	-4.43	19.98	Horizontal
1900.00	-30.33	3.16	-50.00	-4.34	20.85	Horizontal

Sample calculation: LTE Band 2, 3MHz bandwidth, frequency 1851.50 MHz, QPSK

Peak EIRP(dBm) = P_{Mea}(-27.90 dBm) - G_a (-4.55 dBi) - P_{Ag} (-50.00 dB) - P_{cl} (3.18 dB)

= 23.47 dBm

LTE Band 4- EIRP 27.50(d)

Limits: ≤30dBm (1W)

LTE Band 4_1.4MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1710.70	-28.65	2.96	-50.00	-5.17	23.56	Horizontal
1732.50	-29.59	2.99	-50.00	-5.08	22.50	Horizontal
1754.30	-28.08	3.01	-50.00	-4.98	**23.89**	Horizontal

LTE Band 4_3MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1711.50	-28.91	2.96	-50.00	-5.17	23.30	Horizontal
1732.50	-29.80	2.99	-50.00	-5.08	22.29	Horizontal
1753.50	-28.29	3.01	-50.00	-4.98	23.68	Horizontal

LTE Band 4_5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1712.50	-28.81	2.97	-50.00	-5.17	23.39	Horizontal
1732.50	-29.95	2.99	-50.00	-5.08	22.14	Horizontal
1752.50	-28.40	3.01	-50.00	-4.99	23.58	Horizontal

LTE Band 4_10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1715.00	-28.97	2.97	-50.00	-5.15	23.21	Horizontal
1732.50	-30.12	2.99	-50.00	-5.08	21.97	Horizontal
1750.00	-29.20	3.00	-50.00	-5.00	22.80	Horizontal

LTE Band 4_15MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1717.50	-30.20	2.97	-50.00	-5.14	21.97	Horizontal
1732.50	-30.84	2.99	-50.00	-5.08	21.25	Horizontal
1747.50	-30.32	3.00	-50.00	-5.01	21.69	Horizontal

LTE Band 4_20MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1720.00	-31.43	2.97	-50.00	-5.13	20.73	Horizontal
1732.50	-31.46	2.99	-50.00	-5.08	20.63	Horizontal
1745.00	-31.87	3.00	-50.00	-5.02	20.15	Horizontal

LTE Band 4_1.4MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1710.70	-29.07	2.96	-50.00	-5.17	23.14	Horizontal
1732.50	-29.98	2.99	-50.00	-5.08	22.11	Horizontal
1754.30	-28.14	3.01	-50.00	-4.98	23.83	Horizontal

LTE Band 4_3MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1711.50	-29.13	2.96	-50.00	-5.17	23.08	Horizontal
1732.50	-30.02	2.99	-50.00	-5.08	22.07	Horizontal
1753.50	-28.59	3.01	-50.00	-4.98	23.38	Horizontal

LTE Band 4_5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1712.50	-29.27	2.97	-50.00	-5.17	22.93	Horizontal
1732.50	-29.87	2.99	-50.00	-5.08	22.22	Horizontal
1752.50	-28.75	3.01	-50.00	-4.99	23.23	Horizontal

LTE Band 4_10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1715.00	-29.32	2.97	-50.00	-5.15	22.86	Horizontal
1732.50	-30.64	2.99	-50.00	-5.08	21.45	Horizontal
1750.00	-29.30	3.00	-50.00	-5.00	22.70	Horizontal

LTE Band 4_15MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1717.50	-30.21	2.97	-50.00	-5.14	21.96	Horizontal
1732.50	-30.84	2.99	-50.00	-5.08	21.25	Horizontal
1747.50	-30.49	3.00	-50.00	-5.01	21.52	Horizontal

LTE Band 4_20MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1720.00	-31.81	2.97	-50.00	-5.13	20.35	Horizontal
1732.50	-31.88	2.99	-50.00	-5.08	20.21	Horizontal
1745.00	-31.96	3.00	-50.00	-5.02	20.06	Horizontal

Sample calculation: LTE Band 4, 1.4MHz bandwidth, frequency 1754.30 MHz, QPSK

Peak EIRP(dBm) = P_{Mea}(-28.08 dBm) - G_a (-4.98 dBi) - P_{Ag} (-50.00 dB) - P_{cl} (3.01 dB)

= 23.89 dBm

LTE Band 5- ERP 22.913(a)

Limits: ≤38.45dBm (7W)

LTE Band 5_1.4MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
824.7	-28.95	2.07	-53	0.84	2.15	18.99	Vertical
836.5	-28.93	2.08	-53	0.9	2.15	18.94	Vertical
848.3	-30.08	2.09	-53	0.95	2.15	17.73	Vertical

LTE Band 5_3MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
825.50	-28.93	2.07	-53.00	0.85	2.15	**19.00**	Vertical
836.50	-28.95	2.08	-53.00	0.90	2.15	18.92	Vertical
847.50	-30.00	2.09	-53.00	0.94	2.15	17.82	Vertical

LTE Band 5_5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
826.50	-29.20	2.07	-53.00	0.85	2.15	18.73	Vertical
836.50	-29.22	2.08	-53.00	0.90	2.15	18.65	Vertical
846.50	-29.98	2.09	-53.00	0.94	2.15	17.84	Vertical

LTE Band 5_10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
829.00	-29.48	2.08	-53.00	0.86	2.15	18.43	Vertical
836.50	-29.70	2.08	-53.00	0.90	2.15	18.17	Vertical
844.00	-29.79	2.09	-53.00	0.93	2.15	18.04	Vertical

LTE Band 5_1.4MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
824.70	-29.24	2.07	-53.00	0.84	2.15	18.70	Vertical
836.50	-29.12	2.08	-53.00	0.90	2.15	18.75	Vertical
848.30	-30.23	2.09	-53.00	0.95	2.15	17.58	Vertical

LTE Band 5_3MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
825.50	-29.18	2.07	-53.00	0.85	2.15	18.75	Vertical
836.50	-29.15	2.08	-53.00	0.90	2.15	18.72	Vertical
847.50	-30.31	2.09	-53.00	0.94	2.15	17.51	Vertical

LTE Band 5_5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
826.50	-29.05	2.07	-53.00	0.85	2.15	18.88	Vertical
836.50	-29.21	2.08	-53.00	0.90	2.15	18.66	Vertical
846.50	-29.89	2.09	-53.00	0.94	2.15	17.93	Vertical

LTE Band 5_10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
829.00	-29.70	2.08	-53.00	0.86	2.15	18.21	Vertical
836.50	-30.04	2.08	-53.00	0.90	2.15	17.83	Vertical
844.00	-30.20	2.09	-53.00	0.93	2.15	17.63	Vertical

Sample calculation: LTE Band 5, 3 MHz bandwidth, frequency 825.50 MHz, QPSK

Peak ERP(dBm) = P_{Mea}(-28.93 dBm) - G_a (0.85 dBi) - P_{Ag} (-53.00 dB) - P_{cl} (2.07 dB) -2.15 dB

= 19.00 dBm

LTE Band 7_5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2502.50	-37.50	3.59	-50.00	-5.41	14.32	Horizontal
2535.00	-36.21	3.62	-50.00	-5.49	15.66	Horizontal
2567.50	-36.18	3.65	-50.00	-5.58	**15.75**	Horizontal

LTE Band 7_10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2505.00	-38.11	3.59	-50.00	-5.41	13.71	Horizontal
2535.00	-37.75	3.62	-50.00	-5.49	14.12	Horizontal
2565.00	-37.20	3.65	-50.00	-5.57	14.72	Horizontal

LTE Band 7_15MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2507.50	-38.59	3.59	-50.00	-5.42	13.24	Horizontal
2535.00	-38.09	3.62	-50.00	-5.49	13.78	Horizontal
2562.50	-37.71	3.64	-50.00	-5.56	14.21	Horizontal

LTE Band 7_20MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2510.00	-38.48	3.59	-50.00	-5.43	13.36	Horizontal
2535.00	-38.87	3.62	-50.00	-5.49	13.00	Horizontal
2560.00	-38.17	3.64	-50.00	-5.56	13.75	Horizontal

LTE Band 7_5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2502.50	-37.66	3.59	-50.00	-5.41	14.16	Horizontal
2535.00	-36.14	3.62	-50.00	-5.49	15.73	Horizontal
2567.50	-36.40	3.65	-50.00	-5.58	15.53	Horizontal

LTE Band 7_10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2505.00	-38.50	3.59	-50.00	-5.41	13.32	Horizontal
2535.00	-38.09	3.62	-50.00	-5.49	13.78	Horizontal
2565.00	-37.92	3.65	-50.00	-5.57	14.00	Horizontal

LTE Band 7_15MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2507.50	-38.61	3.59	-50.00	-5.42	13.22	Horizontal
2535.00	-38.28	3.62	-50.00	-5.49	13.59	Horizontal
2562.50	-38.06	3.64	-50.00	-5.56	13.86	Horizontal

LTE Band 7_20MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2510.00	-39.15	3.59	-50.00	-5.43	12.69	Horizontal
2535.00	-39.13	3.62	-50.00	-5.49	12.74	Horizontal
2560.00	-38.73	3.64	-50.00	-5.56	13.19	Horizontal

Sample calculation: LTE Band 7, 5 MHz bandwidth, frequency 2567.50 MHz, QPSK

Peak EIRP(dBm) = P_{Mea}(-36.18 dBm) - G_a (-5.58 dBi) - P_{Ag} (-50.00 dB) - P_{cl} (3.65 dB)

= 15.75 dBm

ANALYZER SETTINGS:

RBW = VBW = 8MHz for occupied bandwdiths 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 dB, k = 2.

A.2 EMISSION LIMT

Reference

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

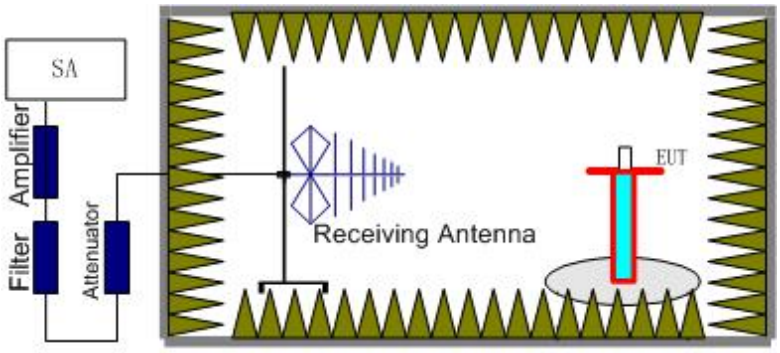
A.2.1 Measurement Method

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

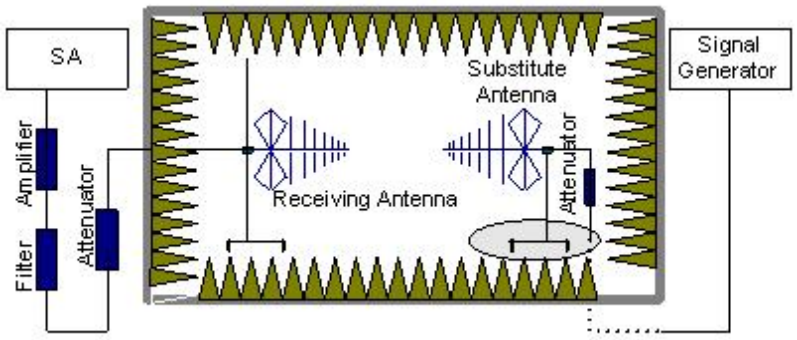
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz as outlined in Part 24.238, Part 22.917, Part 27.53(h) and Part 27.53(m). The spectrum was scanned with the mobile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

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

A.2.2 Measurement Limit

Part 22.917(a), 24.238(a), 27.53(h) and 27.53(m) all specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE Bands 2, 4, 5 and 7. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE Bands 2, 4, 5 and 7 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(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
3700.25	-49.67	4.44	-8.14	-45.97	-13.00	Vertical
5550.74	-54.63	5.46	-10.02	-50.07	-13.00	Vertical
8631.28	-62.04	7.36	-12.31	-57.09	-13.00	Vertical
10304.41	-58.75	7.71	-12.46	-54.00	-13.00	Horizontal
11458.79	-58.94	8.64	-12.40	-55.18	-13.00	Vertical
13581.15	-57.94	9.23	-13.83	-53.34	-13.00	Vertical

LTE Band 2, 1.4MHz, QPSK, Channel 18900

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
3758.91	-49.97	4.53	-8.21	-46.29	-13.00	Vertical
5212.96	-63.41	5.28	-9.83	-58.86	-13.00	Horizontal
7110.39	-60.65	6.36	-11.17	-55.84	-13.00	Horizontal
8542.15	-60.47	7.23	-12.23	-55.47	-13.00	Vertical
10225.03	-58.53	7.53	-12.45	-53.61	-13.00	Vertical
11346.87	-59.02	8.60	-12.40	-55.22	-13.00	Horizontal

LTE Band 2, 1.4MHz, QPSK, Channel 19193

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
3817.74	-52.05	4.49	-8.28	-48.26	-13.00	Vertical
5083.01	-62.35	5.20	-9.75	-57.80	-13.00	Vertical
6589.96	-61.27	6.11	-10.69	-56.69	-13.00	Vertical
8860.29	-60.81	7.34	-12.49	-55.66	-13.00	Horizontal
10230.02	-59.82	7.50	-12.45	-54.87	-13.00	Vertical
13789.76	-58.47	9.09	-13.92	-53.64	-13.00	Horizontal

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
3700.38	-49.74	-8.14	4.44	-46.04	-13.00	Vertical
5550.81	-54.88	-10.02	5.46	-50.32	-13.00	Vertical
6772.96	-62.42	-10.87	6.15	-57.70	-13.00	Horizontal
8717.07	-61.59	-12.37	7.45	-56.67	-13.00	Horizontal
10225.80	-57.85	-12.45	7.52	-52.92	-13.00	Vertical
11979.43	-57.70	-12.50	8.63	-53.83	-13.00	Horizontal

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
3759.03	-50.37	4.53	-8.21	-46.69	-13.00	Vertical
4561.98	-61.94	4.94	-8.91	-57.97	-13.00	Vertical
7112.00	-60.10	6.37	-11.17	-55.30	-13.00	Vertical
9011.40	-61.17	7.40	-12.60	-55.97	-13.00	Vertical
10124.18	-59.50	8.03	-12.42	-55.11	-13.00	Horizontal
11012.35	-59.19	8.73	-12.40	-55.52	-13.00	Vertical

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
3817.77	-53.24	4.49	-8.28	-49.45	-13.00	Vertical
5050.24	-63.85	5.24	-9.73	-59.36	-13.00	Vertical
6334.75	-60.49	5.84	-10.47	-55.86	-13.00	Horizontal
7887.48	-60.17	6.82	-11.79	-55.20	-13.00	Horizontal
10232.18	-59.23	7.50	-12.45	-54.28	-13.00	Horizontal
12432.41	-57.65	8.71	-12.67	-53.69	-13.00	Horizontal

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
3420.39	-55.16	4.19	-7.71	-51.64	-13.00	Horizontal
5103.80	-63.73	5.23	-9.76	-59.20	-13.00	Horizontal
9040.62	-62.28	7.48	-12.60	-57.16	-13.00	Vertical
10231.24	-60.30	7.50	-12.45	-55.35	-13.00	Horizontal
12627.26	-57.48	8.79	-12.85	-53.42	-13.00	Vertical
13373.59	-57.93	9.04	-13.67	-53.30	-13.00	Vertical

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
3464.05	-53.72	4.24	-7.81	-50.15	-13.00	Vertical
5108.27	-63.73	5.24	-9.76	-59.21	-13.00	Horizontal
6635.59	-61.61	6.08	-10.74	-56.95	-13.00	Horizontal
8076.75	-64.46	6.93	-11.95	-59.44	-13.00	Horizontal
10125.32	-59.62	8.02	-12.43	-55.21	-13.00	Vertical
11881.90	-58.17	8.53	-12.48	-54.22	-13.00	Horizontal

LTE Band 4, 1.4MHz, QPSK, Channel 20393

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
3507.40	-55.84	4.32	-7.91	-52.25	-13.00	Horizontal
5008.81	-63.81	5.17	-9.71	-59.27	-13.00	Horizontal
6982.38	-62.12	6.24	-11.08	-57.28	-13.00	Horizontal
8461.96	-62.07	6.92	-12.18	-56.81	-13.00	Vertical
9981.78	-58.14	7.93	-12.41	-53.66	-13.00	Vertical
12518.39	-56.61	8.89	-12.72	-52.78	-13.00	Horizontal

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
3420.51	-55.70	4.19	-7.71	-52.18	-13.00	Vertical
5130.50	-63.83	5.25	-9.78	-59.30	-13.00	Horizontal
7109.84	-62.03	6.36	-11.17	-57.22	-13.00	Vertical
8734.54	-60.10	7.36	-12.39	-55.07	-13.00	Horizontal
10095.22	-60.68	8.23	-12.42	-56.49	-13.00	Vertical
13777.68	-58.67	9.12	-13.91	-53.88	-13.00	Horizontal

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
3410.67	-62.73	4.18	-7.69	-59.22	-13.00	Vertical
4122.77	-63.10	4.68	-8.57	-59.21	-13.00	Horizontal
5186.78	-63.72	5.19	-9.81	-59.10	-13.00	Horizontal
7989.91	-62.71	6.96	-11.89	-57.78	-13.00	Horizontal
10161.08	-59.21	7.82	-12.43	-54.60	-13.00	Vertical
12210.26	-56.80	8.94	-12.58	-53.16	-13.00	Horizontal

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
3507.69	-55.42	4.33	-7.91	-51.84	-13.00	Horizontal
4959.24	-61.38	5.10	-9.63	-56.85	-13.00	Horizontal
6846.67	-60.76	6.16	-10.95	-55.97	-13.00	Horizontal
8447.93	-60.74	6.92	-12.17	-55.49	-13.00	Vertical
10056.59	-57.79	8.23	-12.41	-53.61	-13.00	Vertical
11661.90	-58.21	8.62	-12.43	-54.40	-13.00	Horizontal

LTE Band 5, 1.4MHz, QPSK, Channel 20407

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
3609.73	-63.49	4.39	-8.03	2.15	-62.00	-13.00	Horizontal
4148.03	-63.00	4.65	-8.59	2.15	-61.21	-13.00	Horizontal
4957.72	-61.10	5.10	-9.62	2.15	-58.73	-13.00	Horizontal
5299.18	-62.91	5.37	-9.88	2.15	-60.55	-13.00	Horizontal
6880.47	-59.89	6.07	-10.98	2.15	-57.13	-13.00	Horizontal
8704.29	-59.83	7.45	-12.36	2.15	-57.07	-13.00	Vertical

LTE Band 5, 1.4MHz, QPSK, Channel 20525

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
3591.59	-61.84	4.37	-8.01	2.15	-60.35	-13.00	Vertical
4325.79	-61.87	4.83	-8.70	2.15	-60.15	-13.00	Horizontal
5034.08	-62.23	5.17	-9.72	2.15	-59.83	-13.00	Vertical
6764.17	-61.42	6.14	-10.86	2.15	-58.85	-13.00	Horizontal
7136.66	-62.81	6.41	-11.18	2.15	-60.19	-13.00	Horizontal
7828.71	-62.72	6.90	-11.73	2.15	-60.04	-13.00	Vertical

LTE Band 5, 1.4MHz, QPSK, Channel 20643

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
3415.02	-62.62	4.19	-7.70	2.15	-61.26	-13.00	Horizontal
4020.44	-64.00	4.66	-8.51	2.15	-62.30	-13.00	Vertical
5095.65	-61.42	5.21	-9.76	2.15	-59.02	-13.00	Horizontal
6200.03	-61.54	5.78	-10.36	2.15	-59.11	-13.00	Horizontal
7073.64	-60.92	6.55	-11.14	2.15	-58.48	-13.00	Vertical
7726.51	-61.73	6.49	-11.63	2.15	-58.74	-13.00	Horizontal

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
3346.57	-62.66	4.23	-7.53	2.15	-61.51	-13.00	Vertical
4101.32	-64.23	4.69	-8.56	2.15	-62.51	-13.00	Vertical
4473.98	-62.90	4.85	-8.78	2.15	-61.12	-13.00	Horizontal
5130.75	-63.26	5.25	-9.78	2.15	-60.88	-13.00	Vertical
6170.91	-61.95	5.80	-10.34	2.15	-59.56	-13.00	Vertical
6840.08	-61.09	6.17	-10.94	2.15	-58.47	-13.00	Vertical

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
3491.60	-63.74	4.27	-7.88	2.15	-62.28	-13.00	Horizontal
4253.21	-61.53	4.79	-8.65	2.15	-59.82	-13.00	Horizontal
4996.68	-63.22	5.17	-9.69	2.15	-60.85	-13.00	Horizontal
6089.98	-60.75	5.80	-10.27	2.15	-58.43	-13.00	Horizontal
7013.53	-61.46	6.33	-11.11	2.15	-58.83	-13.00	Vertical
7743.32	-63.09	6.62	-11.64	2.15	-60.22	-13.00	Horizontal

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
3510.40	-62.75	4.33	-7.91	2.15	-61.32	-13.00	Horizontal
4399.99	-61.47	4.83	-8.74	2.15	-59.71	-13.00	Horizontal
4998.08	-62.33	5.17	-9.70	2.15	-59.95	-13.00	Vertical
5597.32	-61.81	5.43	-10.04	2.15	-59.35	-13.00	Vertical
6497.67	-62.07	5.97	-10.60	2.15	-59.59	-13.00	Vertical
7146.16	-61.76	6.38	-11.19	2.15	-59.10	-13.00	Vertical

LTE Band 7, 5 MHz, QPSK, Channel 20775

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
5000.76	-44.75	5.17	-9.70	-40.22	-13.00	Vertical
7501.16	-46.88	6.61	-11.40	-42.09	-13.00	Horizontal
10001.28	-54.24	7.99	-12.40	-49.83	-13.00	Horizontal
12501.72	-43.94	8.83	-12.70	-40.07	-13.00	Horizontal
15002.34	-47.42	9.64	-13.50	-43.56	-13.00	Horizontal
17502.52	-44.83	11.02	-13.30	-42.55	-13.00	Vertical

LTE Band 7, 5 MHz, QPSK, Channel 21100

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
5065.66	-39.25	5.22	-9.74	-34.73	-13.00	Vertical
7598.62	-43.47	6.88	-11.50	-38.85	-13.00	Vertical
10131.59	-50.87	7.97	-12.43	-46.41	-13.00	Horizontal
12663.96	-48.07	8.87	-12.90	-44.04	-13.00	Horizontal
15196.88	-40.00	9.78	-13.46	-36.32	-13.00	Horizontal
17129.63	-54.20	10.43	-12.63	-52.00	-13.00	Vertical

LTE Band 7, 5 MHz, QPSK, Channel 21425

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
5130.89	-46.73	5.25	-9.78	-42.20	-13.00	Horizontal
7696.15	-44.05	6.55	-11.60	-39.00	-13.00	Horizontal
10261.45	-49.98	7.55	-12.45	-45.08	-13.00	Vertical
12826.66	-42.08	9.05	-13.09	-38.04	-13.00	Horizontal
15392.04	-38.29	9.72	-13.42	-34.59	-13.00	Vertical
17927.46	-54.19	10.67	-13.56	-51.30	-13.00	Vertical

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
5000.61	-47.86	5.17	-9.70	-43.33	-13.00	Vertical
7501.18	-42.20	6.61	-11.40	-37.41	-13.00	Horizontal
10176.51	-58.79	7.76	-12.44	-54.11	-13.00	Horizontal
12501.52	-50.25	8.82	-12.70	-46.37	-13.00	Horizontal
15001.78	-45.55	9.63	-13.50	-41.68	-13.00	Horizontal
17715.47	-53.86	10.77	-13.43	-51.20	-13.00	Horizontal

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
5065.64	-38.74	5.22	-9.74	-34.22	-13.00	Vertical
7598.50	-46.94	6.88	-11.50	-42.32	-13.00	Horizontal
8964.29	-59.34	7.29	-12.57	-54.06	-13.00	Vertical
10131.50	-51.89	7.97	-12.43	-47.43	-13.00	Horizontal
13599.49	-57.78	9.16	-13.84	-53.10	-13.00	Vertical
15197.16	-42.47	9.78	-13.46	-38.79	-13.00	Horizontal

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
5130.08	-34.01	5.25	-9.78	-29.48	-13.00	Horizontal
7696.17	-44.04	6.55	-11.60	-38.99	-13.00	Horizontal
10067.58	-59.31	8.17	-12.41	-55.07	-13.00	Vertical
12826.85	-43.04	9.06	-13.09	-39.01	-13.00	Horizontal
15392.07	-37.86	9.72	-13.42	-34.16	-13.00	Horizontal
17294.94	-54.38	10.82	-12.93	-52.27	-13.00	Vertical

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 2/4/5/7 traffic mode which is the worst case of conducted emission measurement.

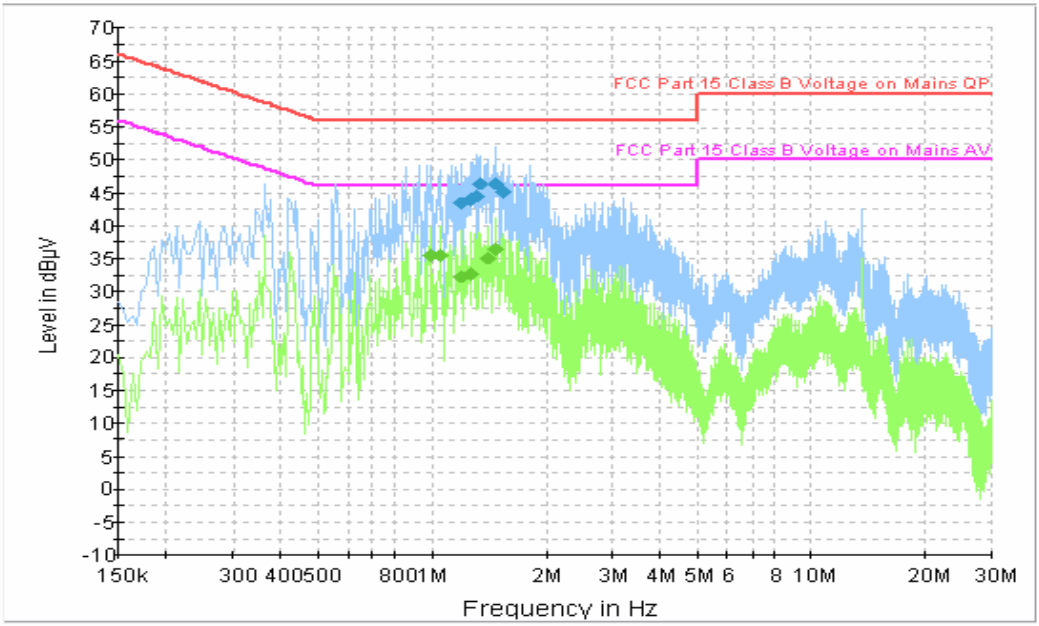
For test layout photo, please refer to Pic.2 in Annex B.

A.3.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	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



IF bandwidth 9 kHz

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

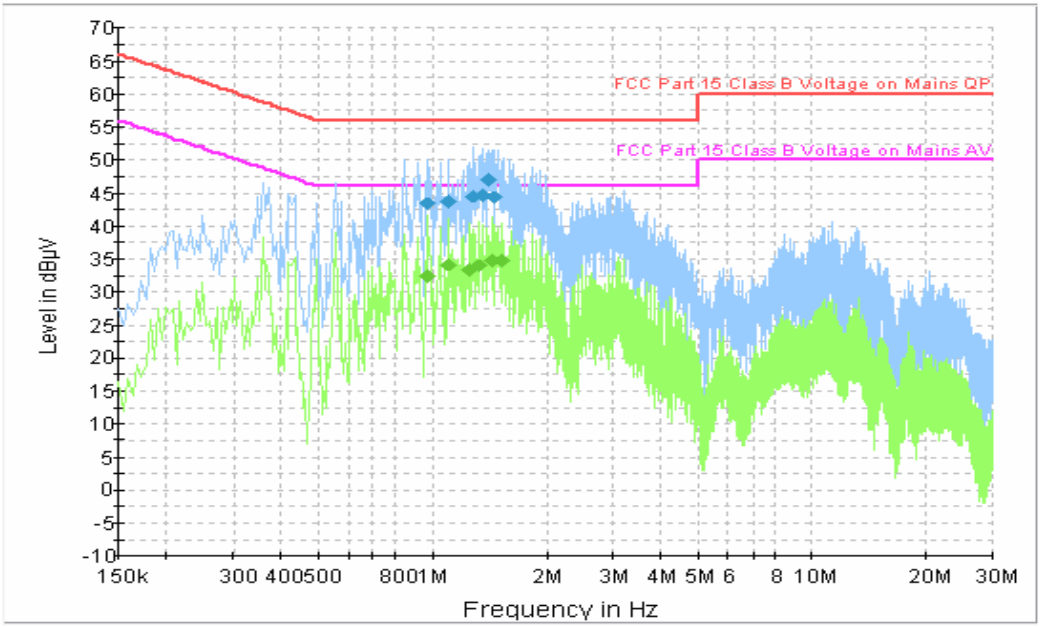
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.194000	43.4	Local	L1	9.7	12.6	56.0
1.270500	44.0	Local	L1	9.7	12.0	56.0
1.315500	44.6	Local	L1	9.7	11.4	56.0
1.347000	46.4	Local	L1	9.7	9.6	56.0
1.482000	46.3	Local	L1	9.7	9.7	56.0
1.545000	45.1	Local	L1	9.7	10.9	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.991500	35.5	Local	L1	9.7	10.5	46.0
1.054500	35.4	Local	L1	9.7	10.6	46.0
1.194000	32.2	Local	L1	9.7	13.8	46.0
1.270500	32.7	Local	L1	9.7	13.3	46.0
1.405500	35.1	Local	L1	9.7	10.9	46.0
1.482000	36.4	Local	L1	9.7	9.6	46.0

LTE Band 4, 1.4 MHz bandwidth



IF bandwidth 9 kHz

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

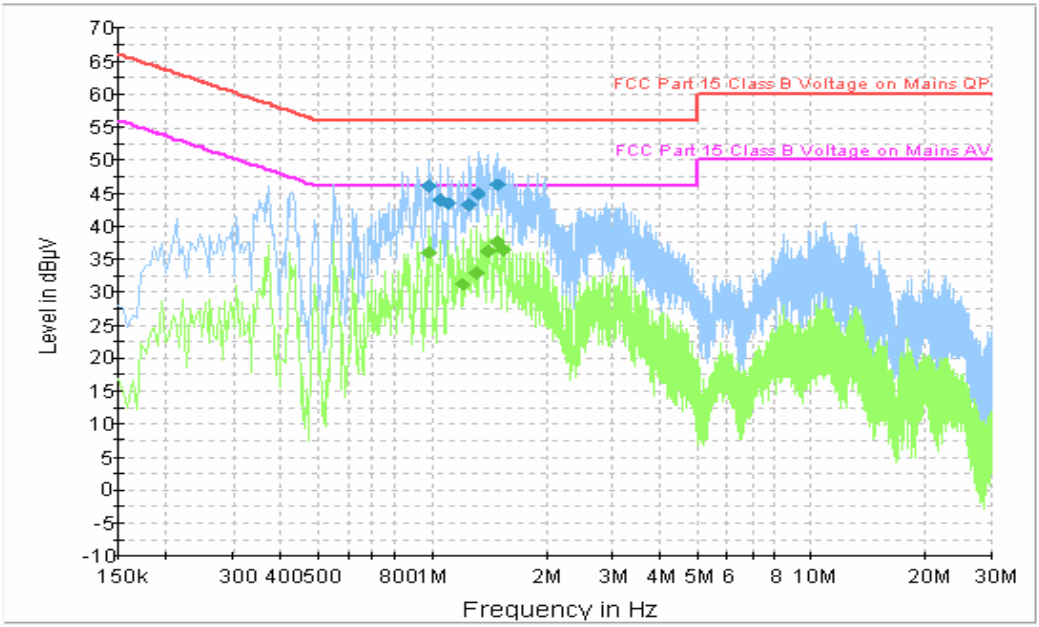
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.973500	43.4	GND	L1	9.7	12.6	56.0
1.113000	43.7	GND	L1	9.7	12.3	56.0
1.284000	44.6	GND	L1	9.7	11.4	56.0
1.360500	44.8	GND	L1	9.7	11.2	56.0
1.414500	47.0	GND	L1	9.7	9.0	56.0
1.464000	44.4	GND	L1	9.7	11.6	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.973500	32.4	GND	L1	9.7	13.6	46.0
1.113000	34.1	GND	L1	9.7	11.9	46.0
1.252500	33.3	GND	L1	9.7	12.7	46.0
1.329000	34.0	GND	L1	9.7	12.0	46.0
1.432500	34.7	GND	L1	9.7	11.3	46.0
1.540500	34.8	GND	L1	9.7	11.2	46.0

LTE Band 5, 1.4 MHz bandwidth



IF bandwidth 9 kHz

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

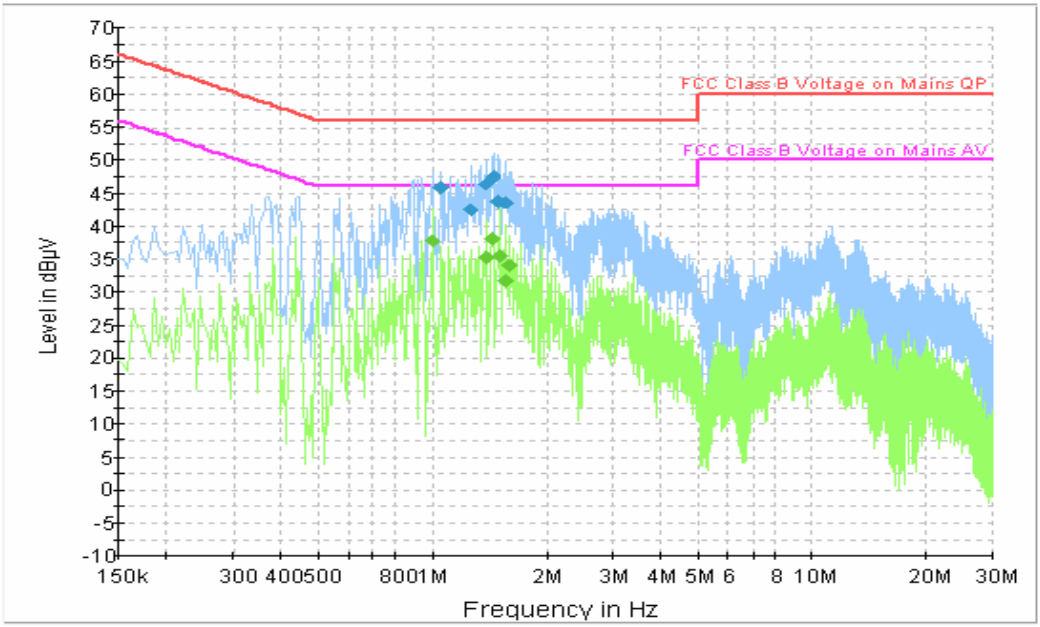
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.987000	46.1	GND	L1	9.7	9.9	56.0
1.045500	43.9	GND	L1	9.7	12.1	56.0
1.108500	43.5	GND	L1	9.7	12.5	56.0
1.248000	43.1	GND	L1	9.7	12.9	56.0
1.324500	44.9	GND	L1	9.7	11.1	56.0
1.491000	46.3	GND	L1	9.7	9.7	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.987000	36.1	GND	L1	9.7	9.9	46.0
1.203000	31.1	GND	L1	9.7	14.9	46.0
1.311000	32.9	GND	L1	9.7	13.1	46.0
1.414500	36.1	GND	L1	9.7	9.9	46.0
1.491000	37.6	GND	L1	9.7	8.4	46.0
1.554000	36.4	GND	L1	9.7	9.6	46.0

LTE Band 7, 5 MHz bandwidth



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.059000	45.8	GND	L1	9.7	10.2	56.0
1.261500	42.5	GND	L1	9.7	13.5	56.0
1.387500	46.4	GND	L1	9.7	9.6	56.0
1.446000	47.6	GND	L1	9.7	8.4	56.0
1.491000	43.7	GND	L1	9.7	12.3	56.0
1.567500	43.6	GND	L1	9.7	12.4	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.000500	37.8	GND	L1	9.7	8.2	46.0
1.387500	35.2	GND	L1	9.7	10.8	46.0
1.441500	38.2	GND	L1	9.7	7.8	46.0
1.504500	35.5	GND	L1	9.7	10.5	46.0
1.567500	31.7	GND	L1	9.7	14.3	46.0
1.612500	33.9	GND	L1	9.7	12.1	46.0

Note: The maximum value of expanded measurement uncertainty for this test item is U =2.9 dB, k = 2.

A.4 FREQUENCY STABILITY

Reference

FCC: CFR Part 2.1055, 22.355, 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℃.
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℃ increments from -30℃ to +50℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the 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 ℃ increments from +50℃ to -30℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

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 3.6VDC and 4.2VDC, with a nominal voltage of 4.2VDC. 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 -14.3 %. For the purposes of measuring frequency stability these voltage limits are to be used.

A.4.3 Measurement results

Room Temperature: 24 ℃

LTE Band 2, 3MHz bandwidth (worst case of all bandwidths)

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
4.2	5	-28	0.003	0.015
4.2	-12	-21	0.007	0.011
3.6	-3	-24	0.002	0.013

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	8	-2	0.004	0.001
40°	-11	2	0.006	0.001
30°	9	-22	0.005	0.012
20°	-13	-16	0.007	0.009
10°	-5	-10	0.003	0.005
0°	-18	-13	0.010	0.007
- 10°	-3	-8	0.002	0.004
- 20°	-7	-12	0.004	0.007
- 30°	-19	-11	0.010	0.006

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

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
4.2	4	24	0.002	0.014
4.2	4	27	0.002	0.016
3.6	3	27	0.002	0.015

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	3	24	0.001	0.014
40°	7	23	0.004	0.013
30°	12	20	0.007	0.012
20°	2	22	0.001	0.013
10°	0	20	0.000	0.011
0°	0	25	0.000	0.014
- 10°	-3	22	0.002	0.013
- 20°	4	18	0.002	0.011
- 30°	-4	29	0.002	0.017

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

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
4.2	1	21	0.001	0.025
4.2	2	23	0.003	0.027
3.6	5	21	0.006	0.025

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	3	23	0.003	0.027
40°	1	19	0.001	0.023
30°	1	20	0.001	0.024
20°	3	18	0.004	0.021
10°	0	20	0.000	0.024
0°	2	18	0.002	0.021
- 10°	5	24	0.006	0.029
- 20°	1	20	0.002	0.024
- 30°	0	21	0.000	0.025

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

Frequency Error vs Voltage

Voltage (V)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
4.2	-7	-17	0.003	0.007
4.2	14	-16	0.006	0.006
3.6	2	12	0.001	0.005

Frequency Error vs Temperature

Temperature (℃)	Frequency error (Hz)		Frequency error (ppm)	
	QPSK	16QAM	QPSK	16QAM
50°	4	13	0.002	0.005
40°	-24	-23	0.009	0.009
30°	-12	-15	0.005	0.006
20°	-7	-26	0.003	0.010
10°	9	-21	0.004	0.008
0°	9	8	0.003	0.003
- 10°	1	10	0.000	0.004
- 20°	-17	-5	0.007	0.002
- 30°	-17	-14	0.007	0.005

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

A.5 OCCUPIED BANDWIDTH

Reference

FCC: CFR Part 2.1049(h)(i)

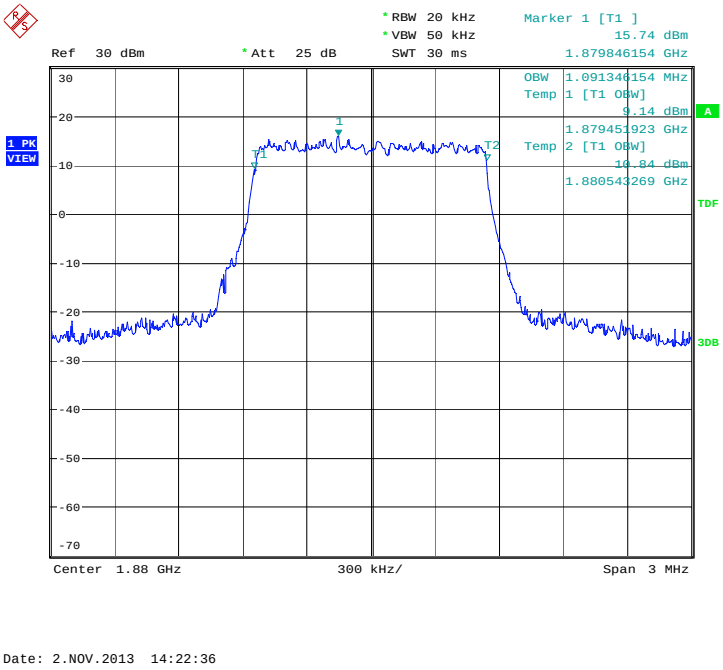
A.5.1 Occupied Bandwidth Measurement Results

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the mid frequencies of the LTE bands 2, 4, 5 and 7. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

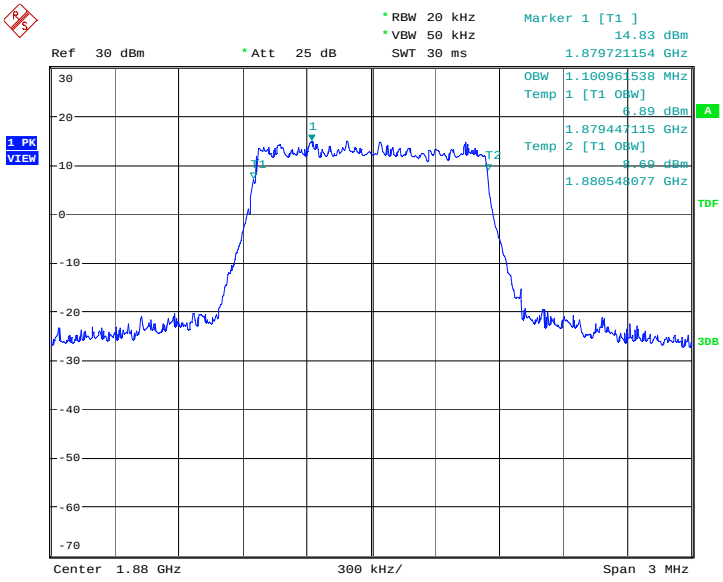
LTE band 2, 1.4MHz (99% BW)

Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1880.0	1091.346	1100.962

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



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

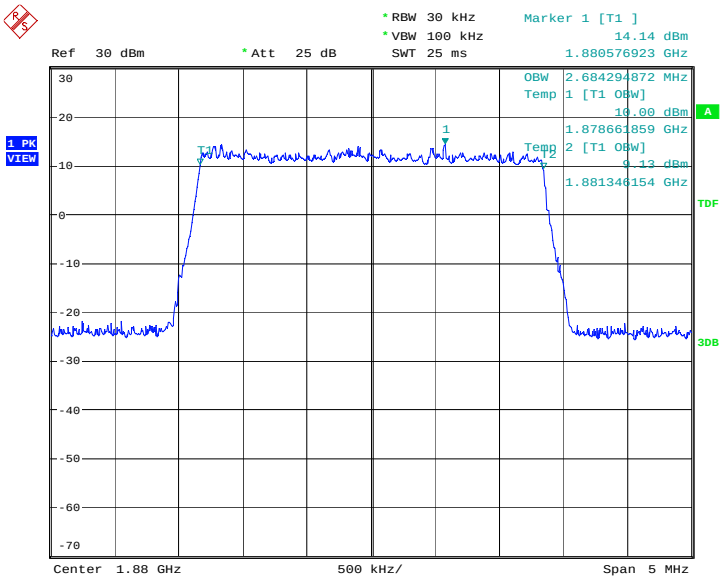


Date: 2.NOV.2013 14:22:49

LTE band 2, 3MHz (99% BW)

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

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



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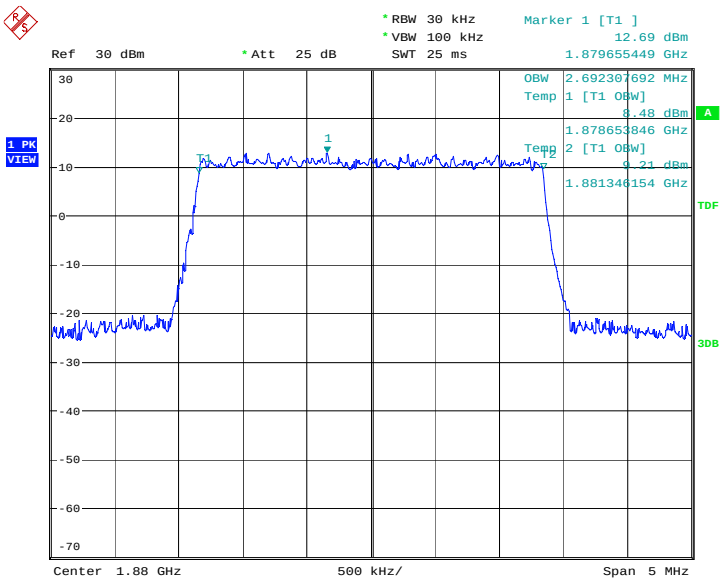
LTE band 2, 3MHz Bandwidth, 16QAM (99% BW)

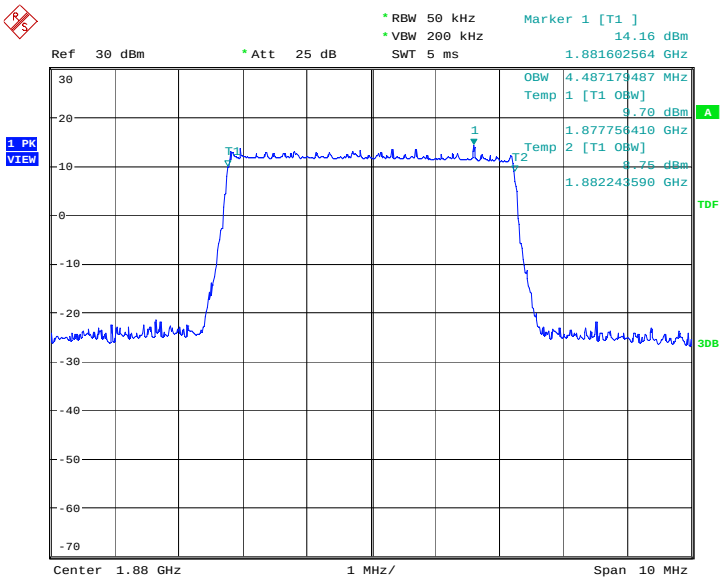


Date: 2.NOV.2013 14:28:25

LTE band 2, 5MHz (99% BW)

Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1880.0	4487.179	4487.179

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



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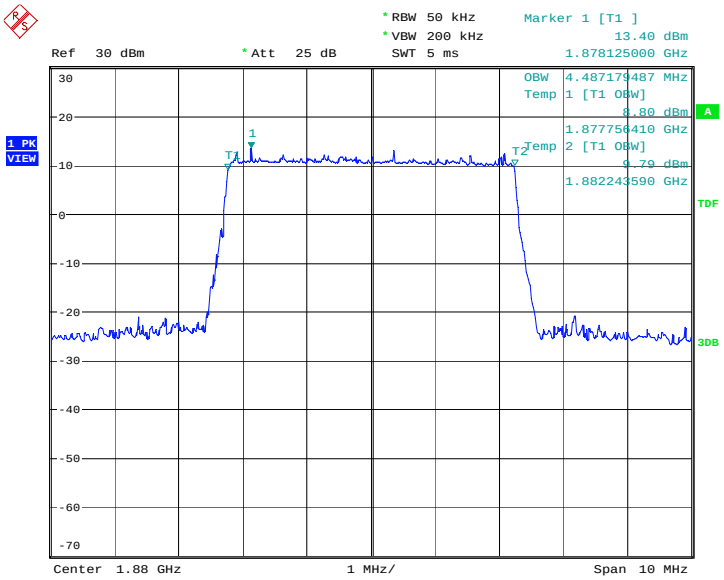
LTE band 2, 5MHz Bandwidth,16QAM (99% BW)

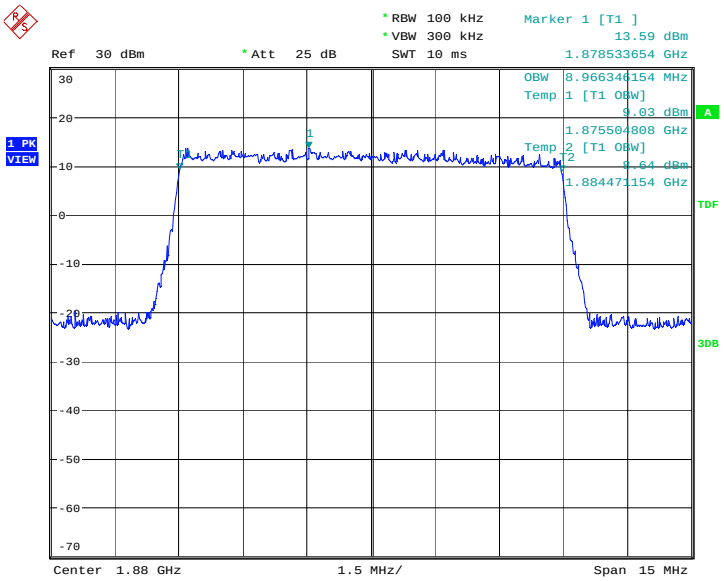


Date: 2.NOV.2013 14:34:02

LTE band 2, 10MHz (99% BW)

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

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



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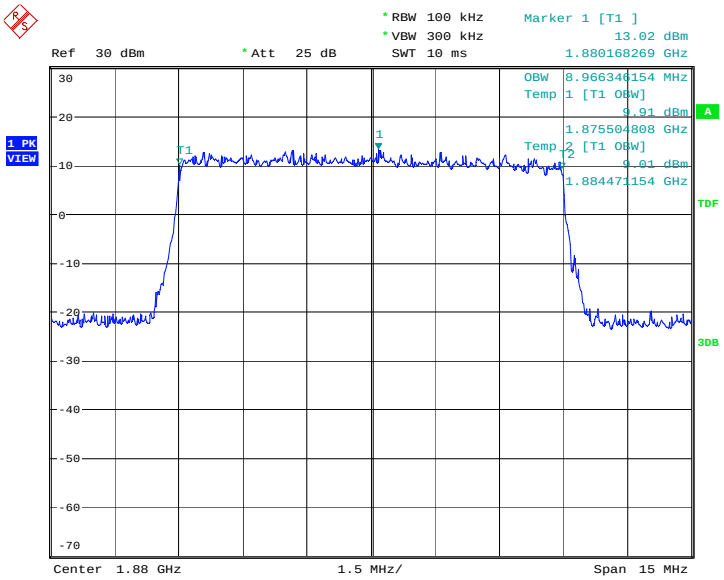
LTE band 2, 10MHz Bandwidth, 16QAM (99% BW)

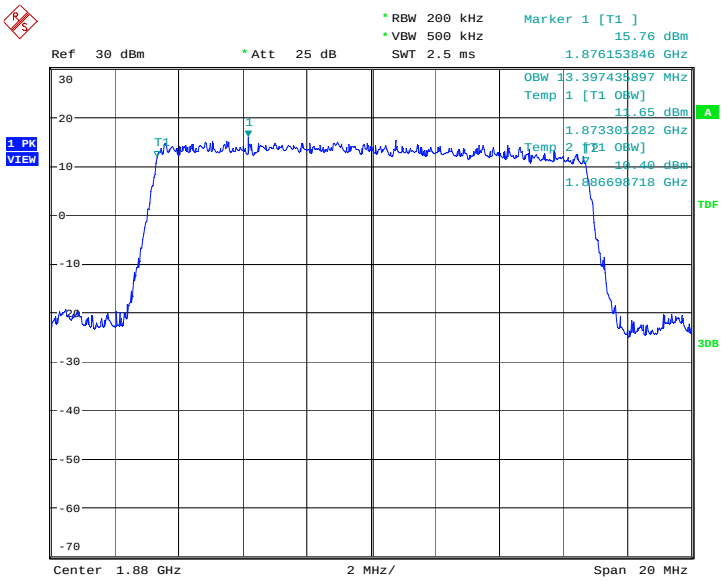


Date: 2.NOV.2013 14:39:38

LTE band 2, 15MHz (99% BW)

Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1880.0	13397.436	13429.487

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



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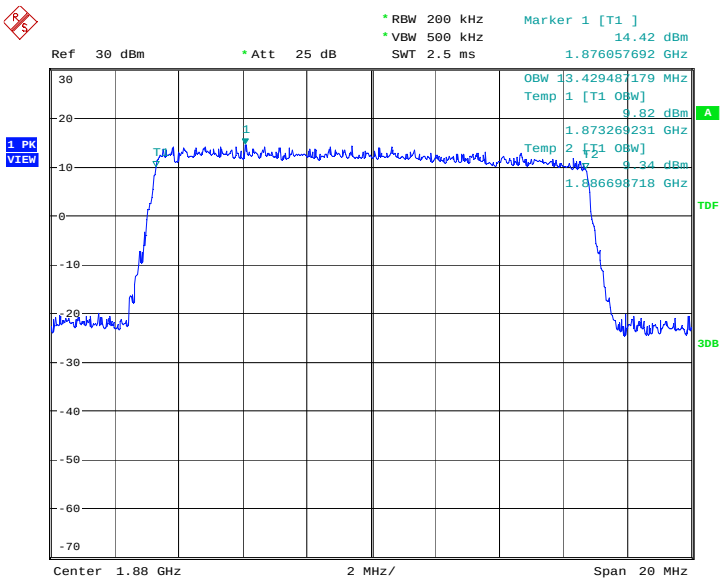
LTE band 2, 15MHz Bandwidth, 16QAM (99% BW)

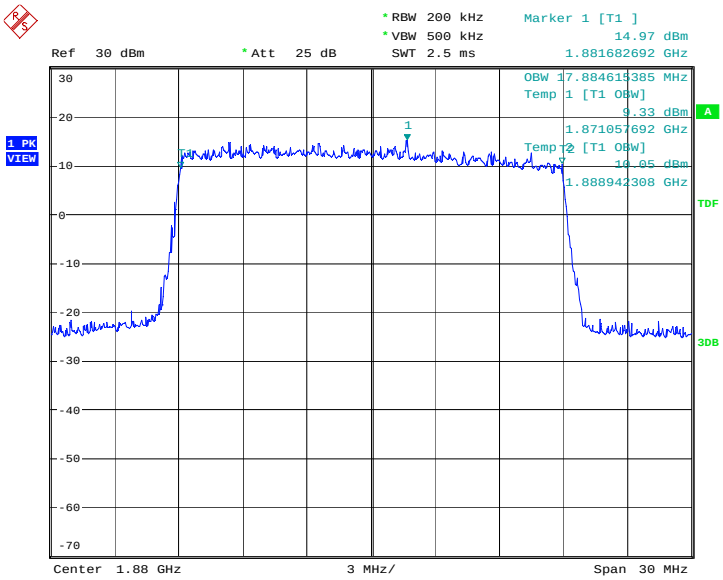


Date: 2.NOV.2013 14:45:20

LTE band 2, 20MHz (99% BW)

Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1880.0	17884.615	17836.538

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



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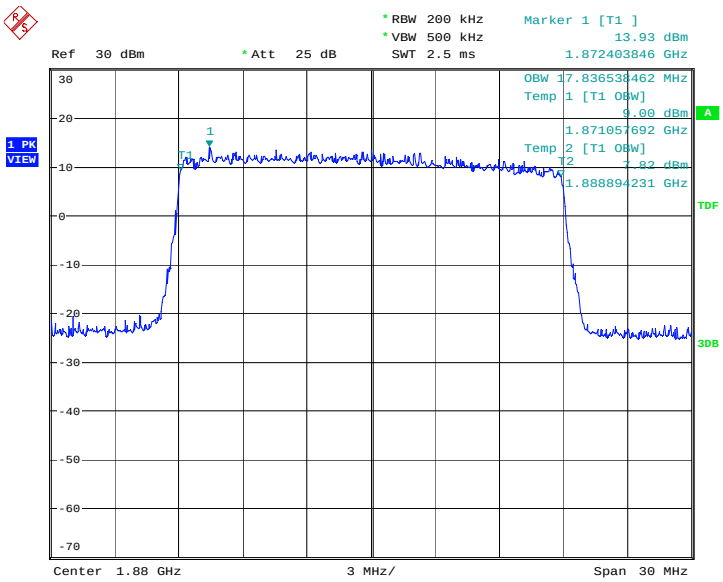
LTE band 2, 20MHz Bandwidth, 16QAM (99% BW)



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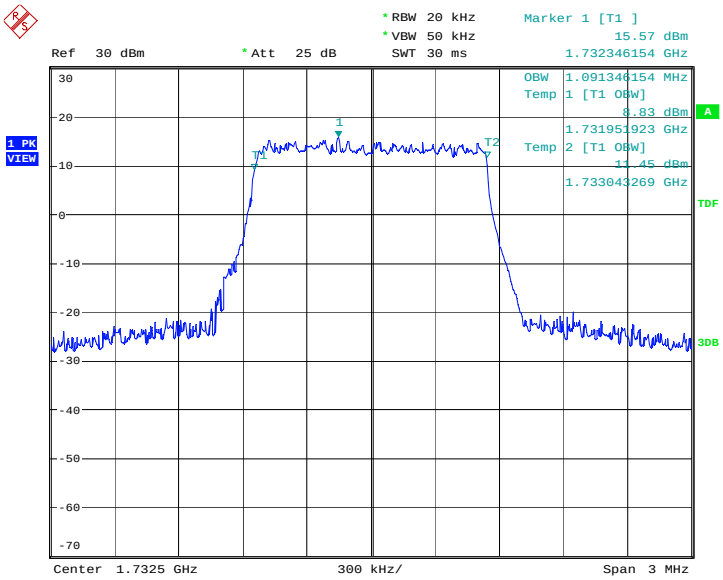
LTE band 4, 1.4MHz (99% BW)

Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1732.5	1091.346	1096.154

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



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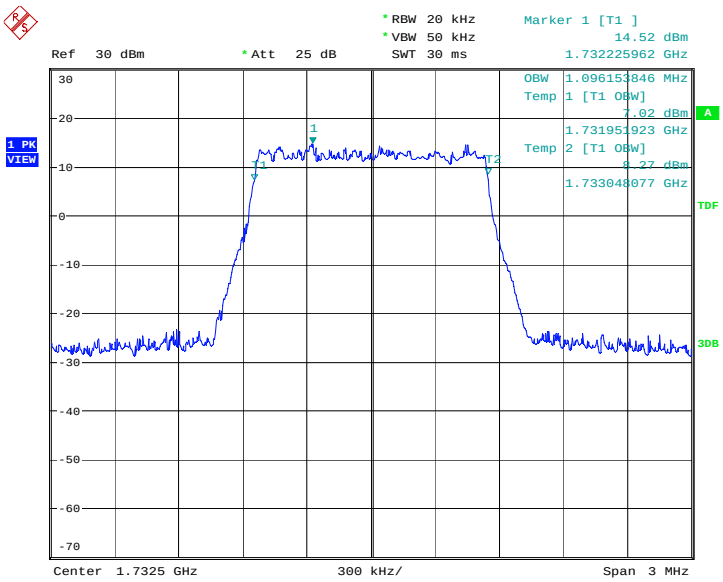
LTE band 4, 1.4MHz Bandwidth, 16QAM (99% BW)

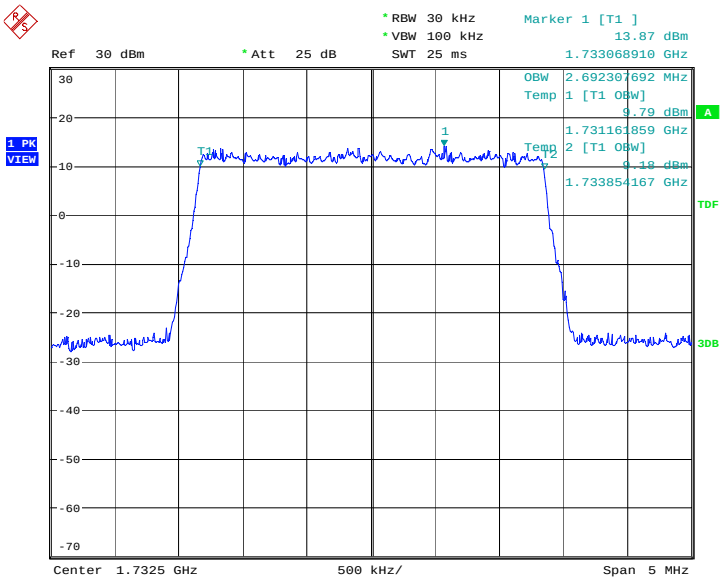


Date: 2.NOV.2013 14:56:45

LTE band 4, 3MHz (99% BW)

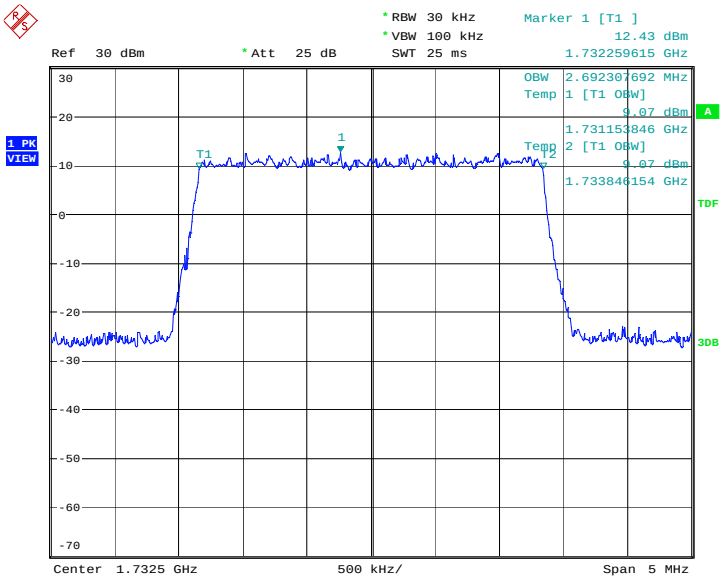
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1732.5	2692.308	2692.308

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



Date: 2.NOV.2013 15:02:07

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

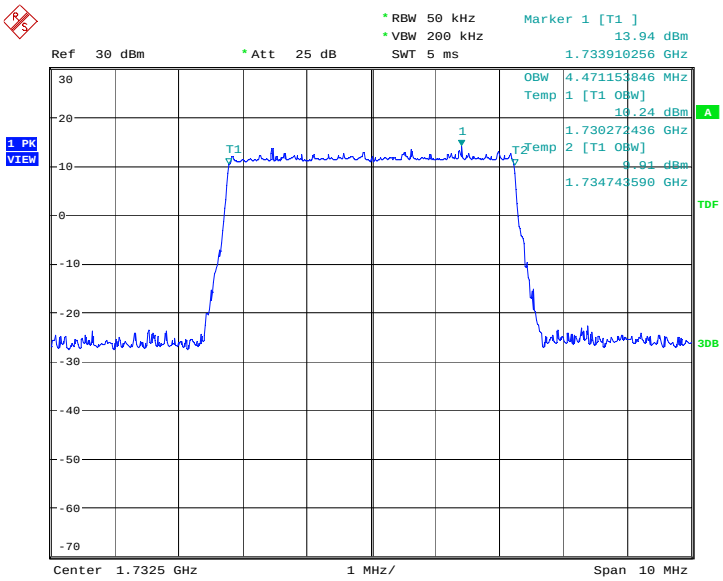


Date: 2.NOV.2013 15:02:21

LTE band 4, 5MHz (99% BW)

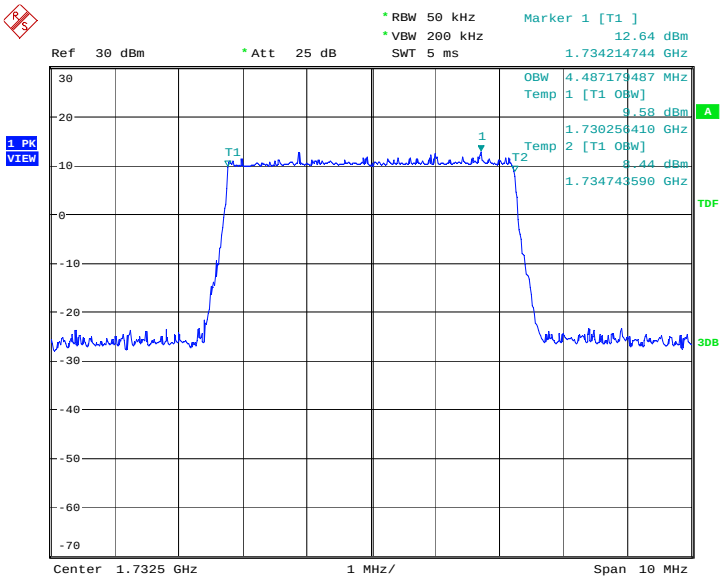
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1732.5	4471.154	4487.179

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



Date: 2.NOV.2013 15:07:44

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

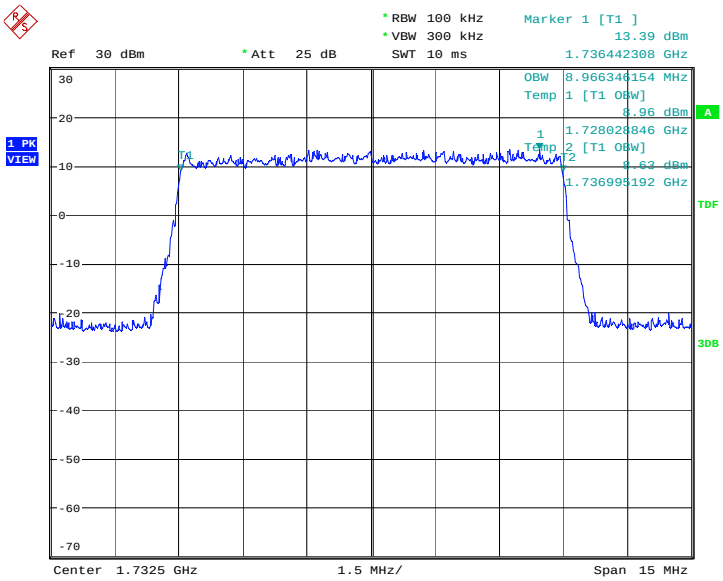


Date: 2.NOV.2013 15:07:58

LTE band 4, 10MHz (99% BW)

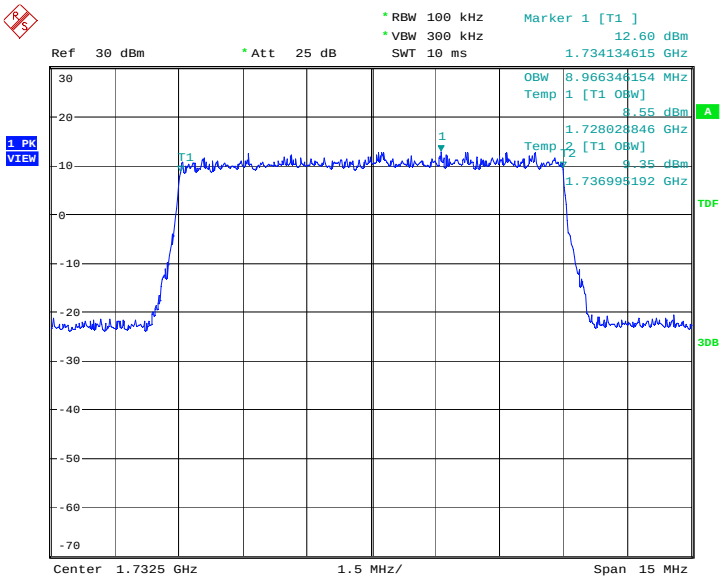
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1732.5	8966.346	8966.346

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



Date: 2.NOV.2013 15:13:21

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

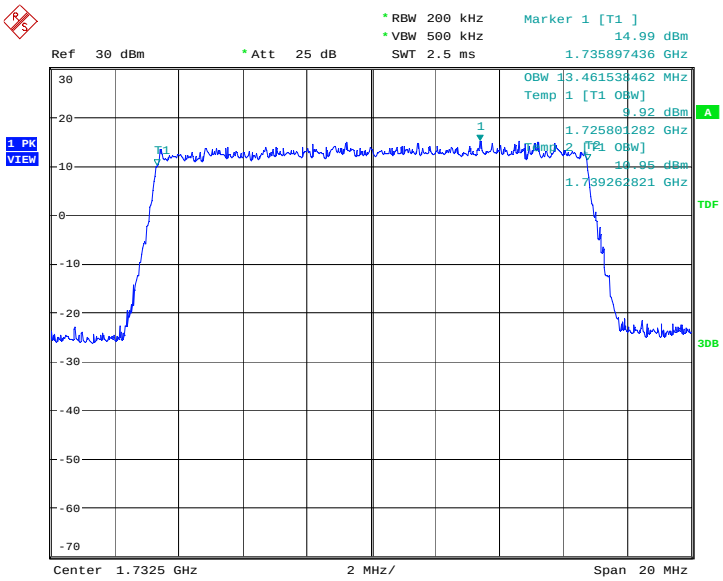


Date: 2.NOV.2013 15:13:34

LTE band 4, 15MHz (99% BW)

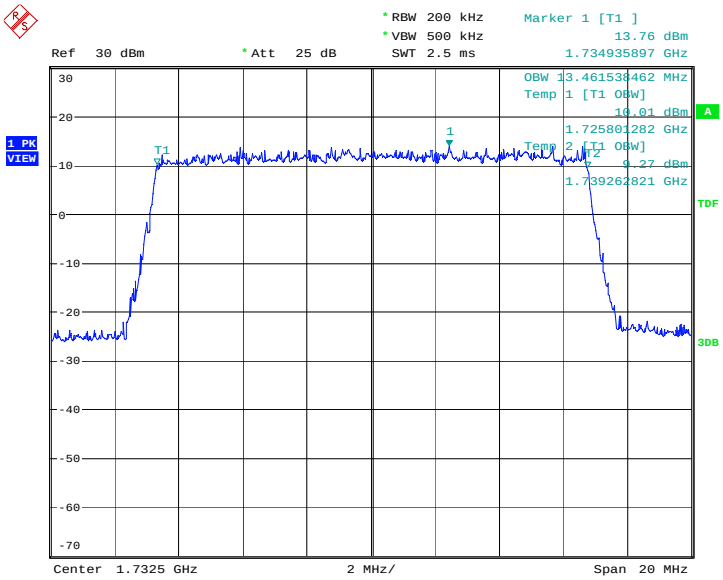
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1732.5	13461.538	13461.538

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



Date: 2.NOV.2013 15:19:02

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

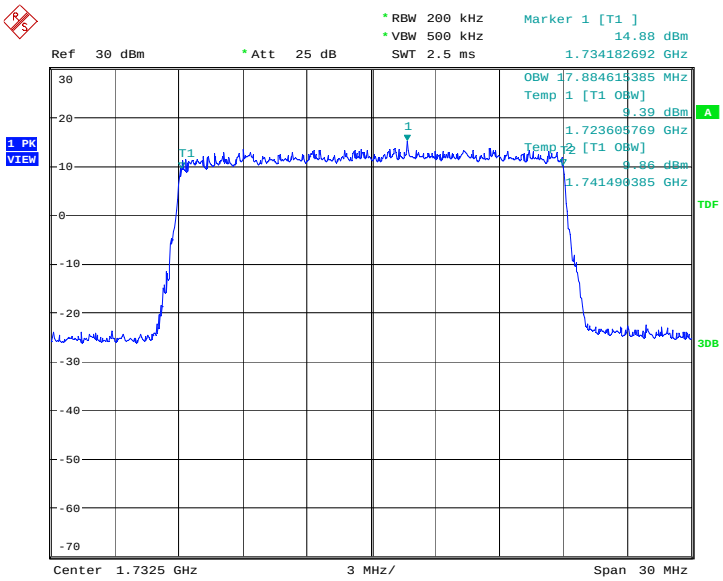


Date: 2.NOV.2013 15:19:16

LTE band 4, 20MHz (99% BW)

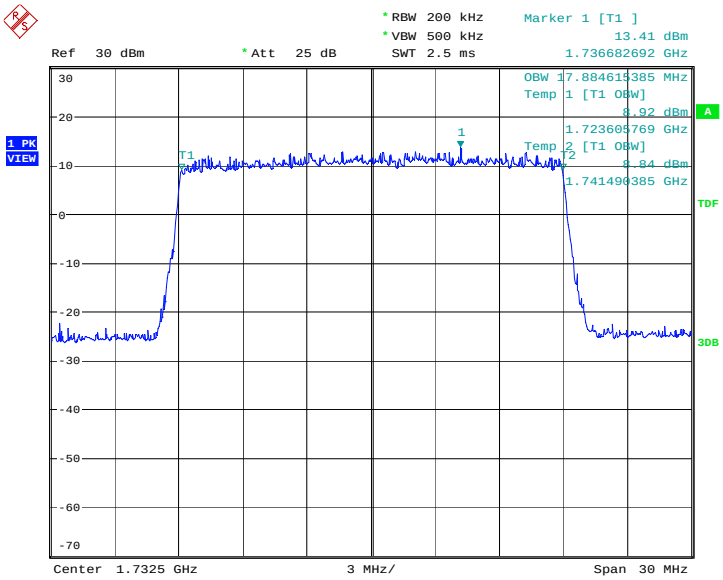
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
1732.5	17884.615	17884.615

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



Date: 2.NOV.2013 15:24:48

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

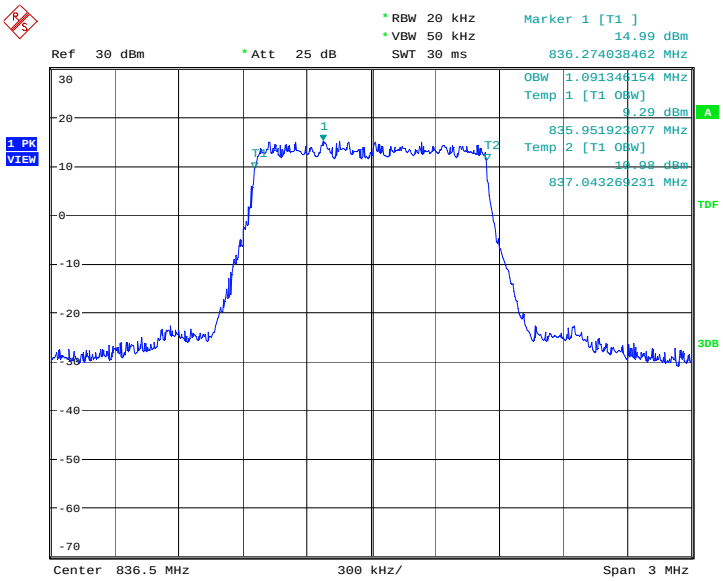


Date: 2.NOV.2013 15:25:02

LTE band 5, 1.4 MHz (99% BW)

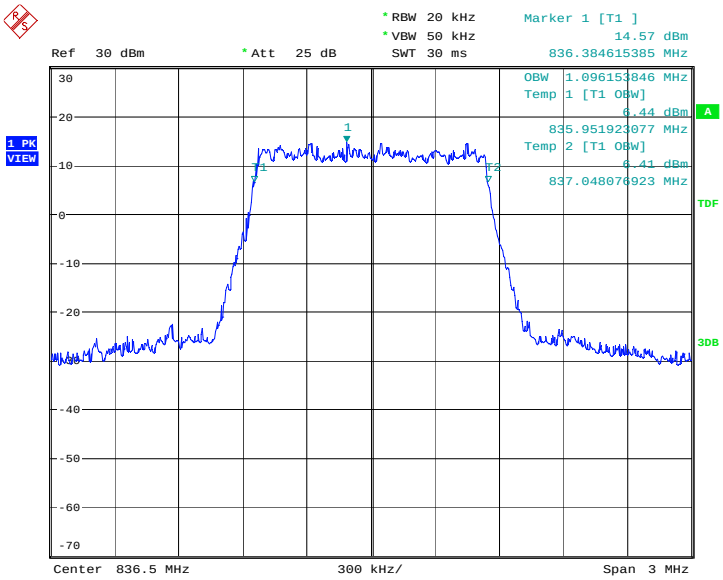
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
836.5MHz	1091.346	1096.154

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



Date: 2.NOV.2013 14:00:09

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

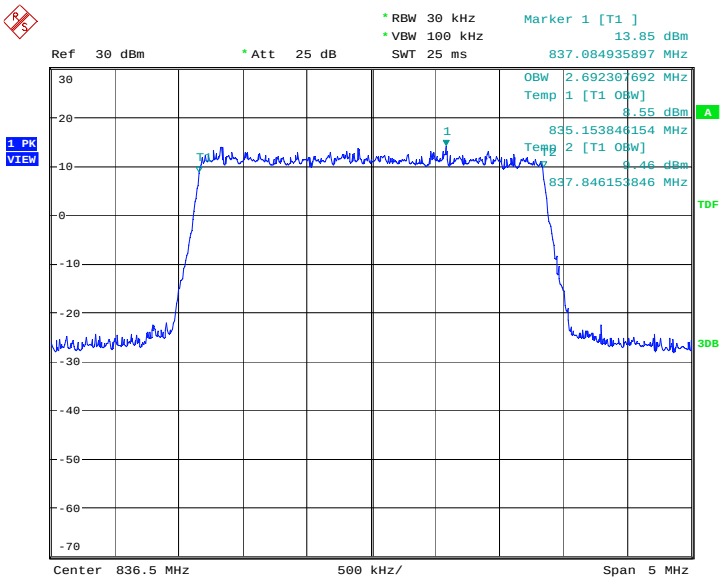


Date: 2.NOV.2013 14:00:23

LTE band 5, 3 MHz (99% BW)

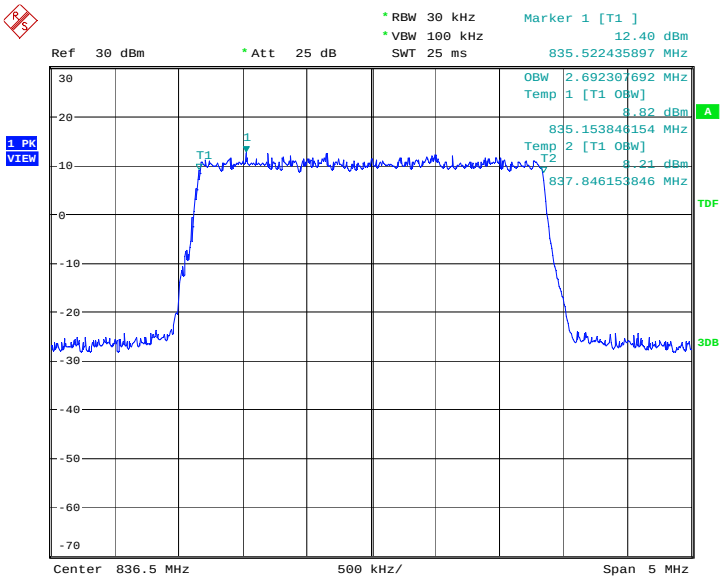
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
836.5MHz	2692.308	2692.308

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



Date: 2.NOV.2013 14:05:45

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

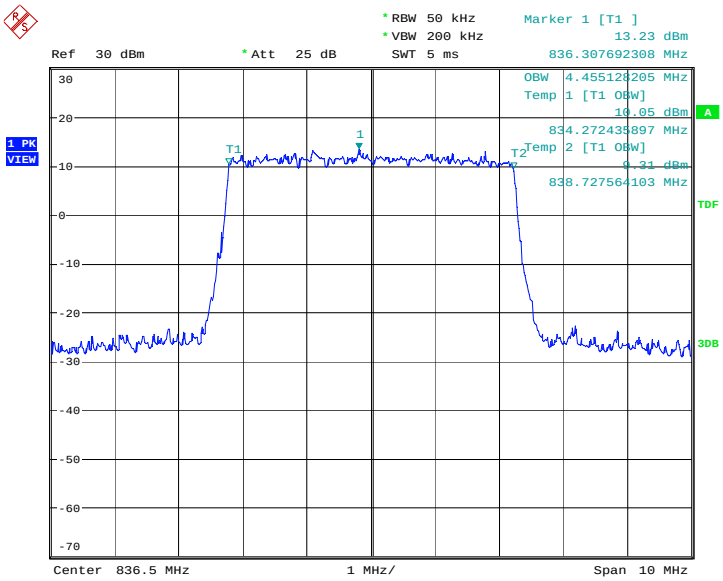


Date: 2.NOV.2013 14:05:59

LTE band 5, 5MHz (99% BW)

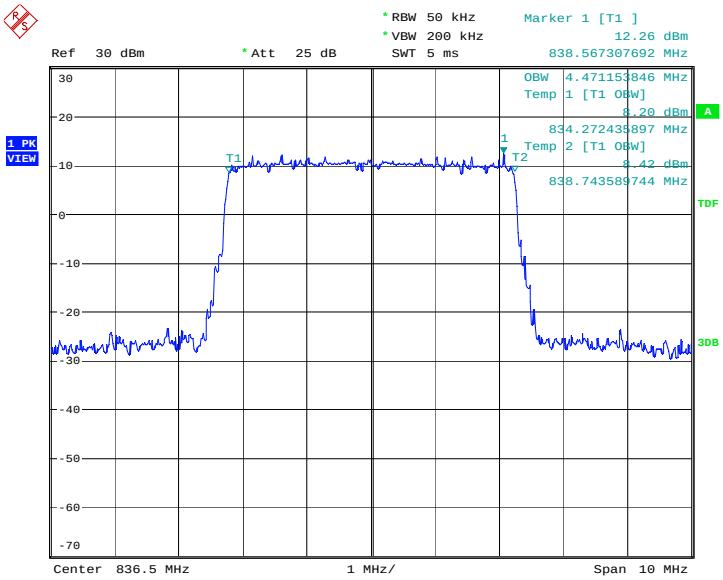
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
836.5MHz	4455.128	4471.154

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



Date: 2.NOV.2013 14:11:21

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

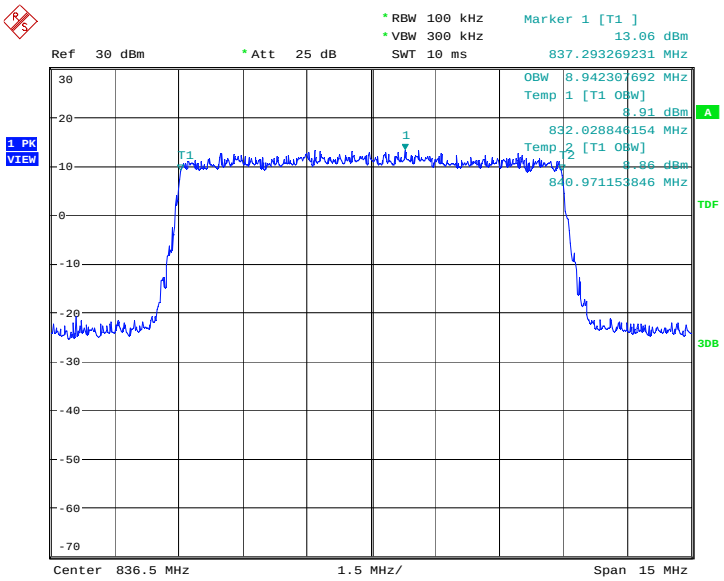


Date: 2.NOV.2013 14:11:35

LTE band 5, 10MHz (99% BW)

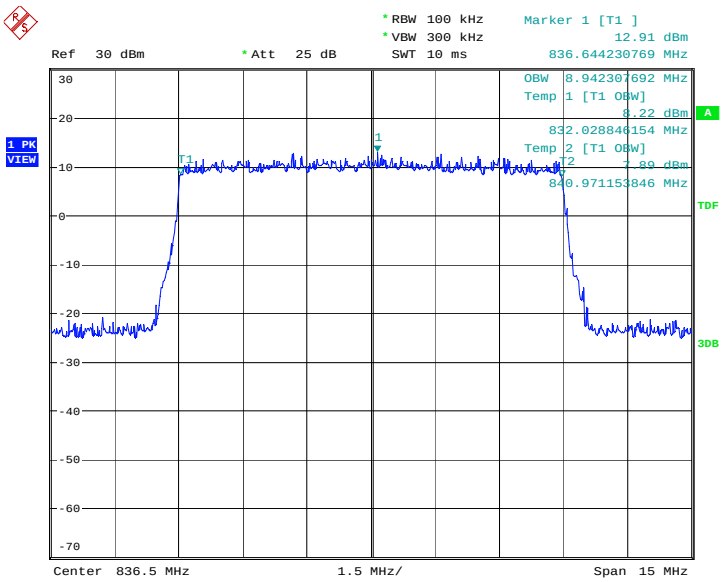
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
836.5MHz	8942.308	8942.308

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



Date: 2.NOV.2013 14:16:57

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

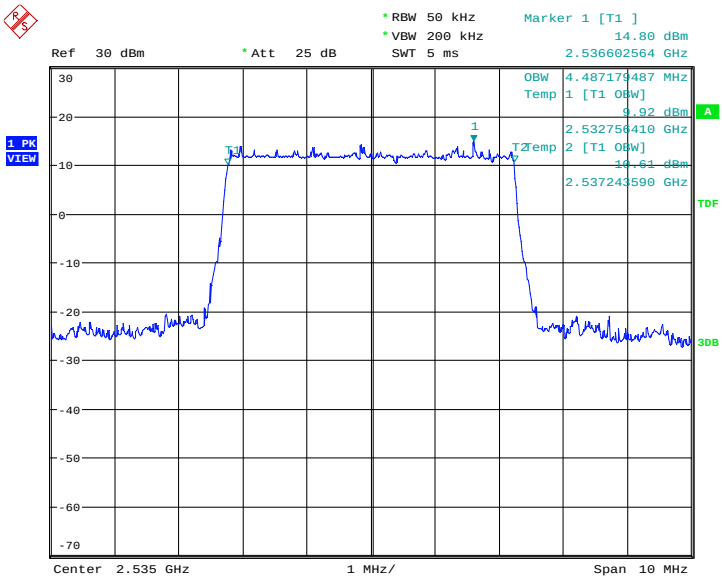


Date: 2.NOV.2013 14:17:11

LTE band 7, 5MHz (99% BW)

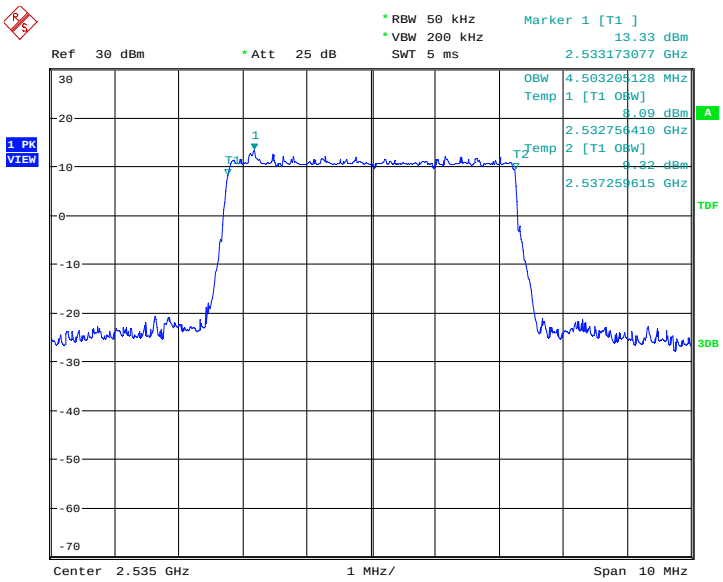
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
2535	4487.179	4503.205

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



Date: 20.NOV.2013 16:58:23

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

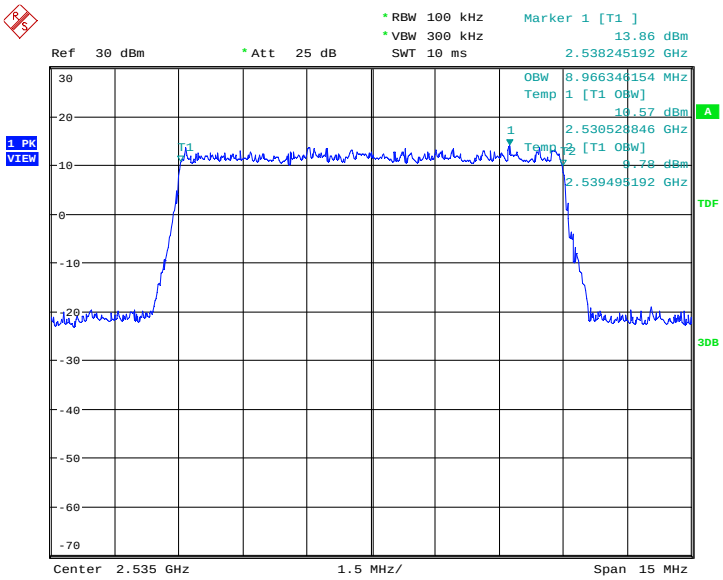


Date: 20.NOV.2013 16:58:36

LTE band 7, 10MHz (99% BW)

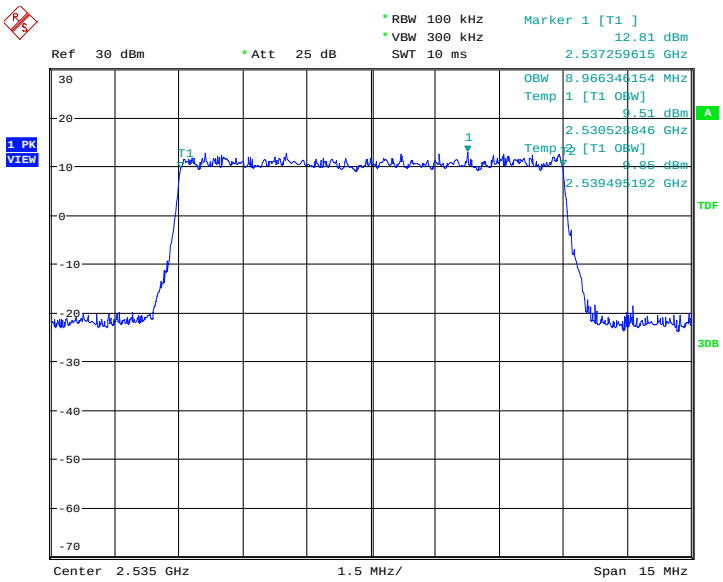
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
2535	8966.346	8966.346

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



Date: 20.NOV.2013 17:22:27

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

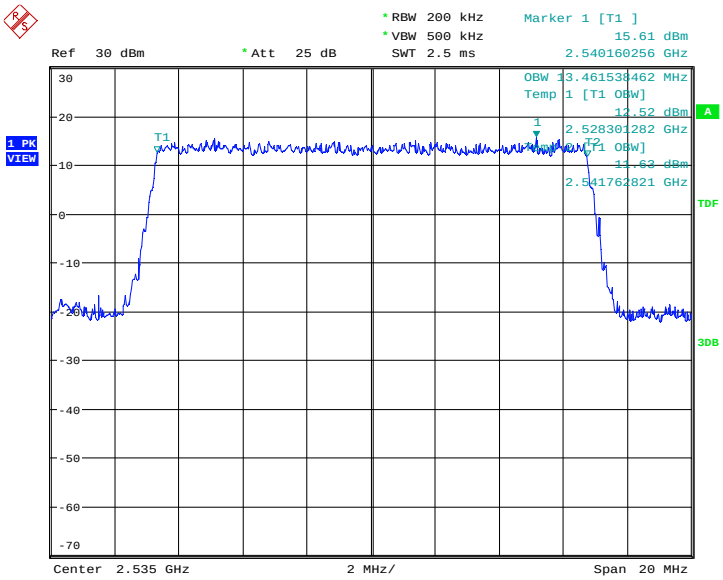


Date: 20.NOV.2013 17:22:40

LTE band 7, 15MHz (99% BW)

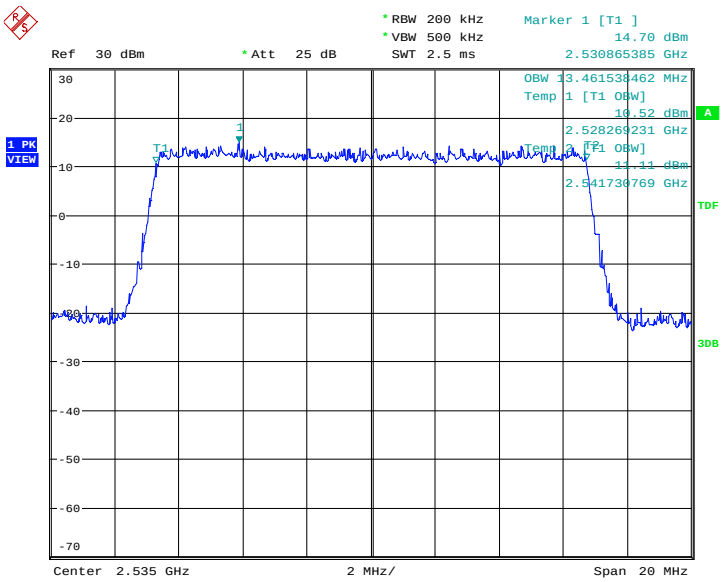
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
2535	13461.538	13461.538

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



Date: 20.NOV.2013 17:46:43

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

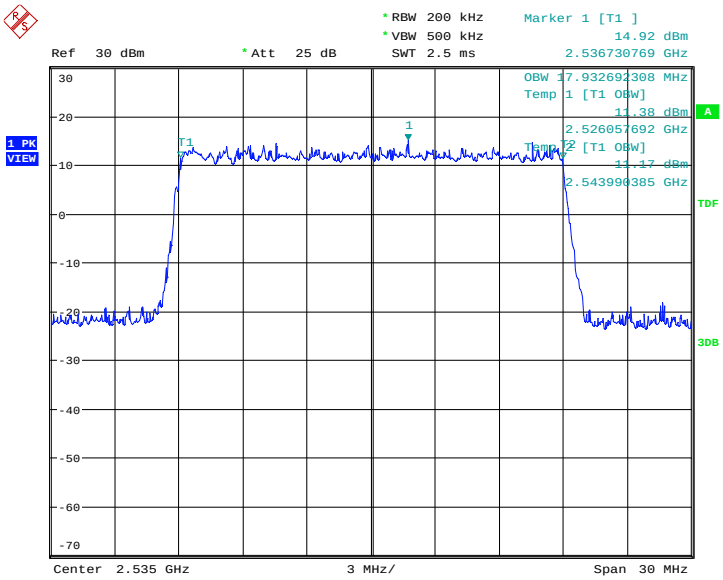


Date: 20.NOV.2013 17:46:55

LTE band 7, 20MHz (99% BW)

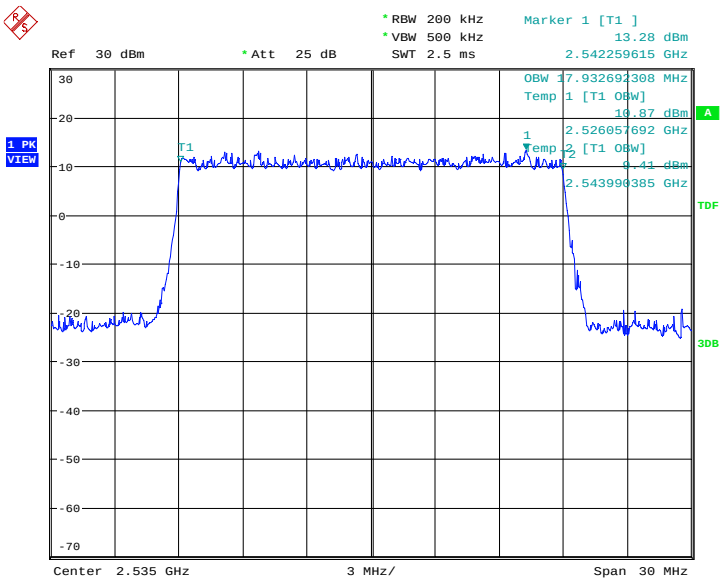
Frequency (MHz)	Occupied Bandwidth (99% BW)(kHz)	
	QPSK	16QAM
2535	17932.692	17932.692

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



Date: 20.NOV.2013 18:10:44

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



Date: 20.NOV.2013 18:10:57

A.6 EMISSION BANDWIDTH

Reference

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

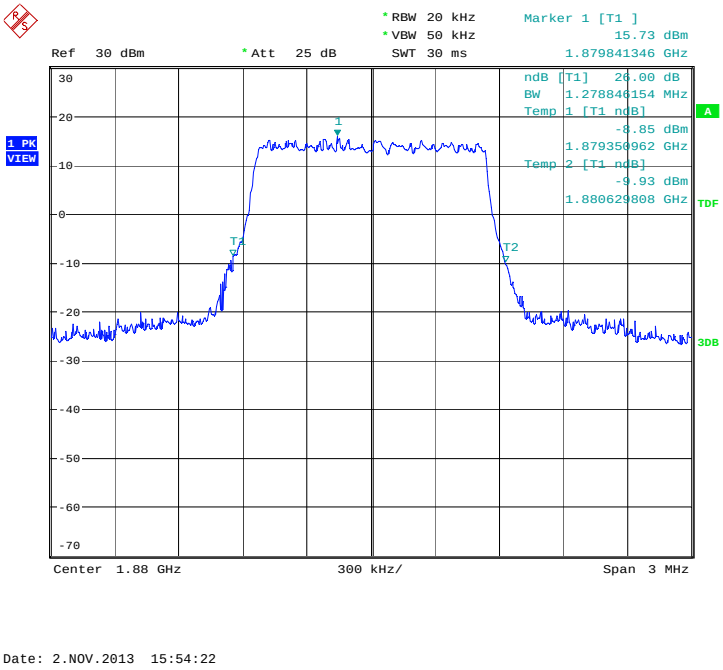
A.6.1Emission Bandwidth Measurement Results

Emission bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the mid frequencies of the LTE bands 2, 4 and 5. Table below lists the measured 100% BW. Spectrum analyzer plots are included on the following pages.

LTE band 2, 1.4MHz (100% BW)

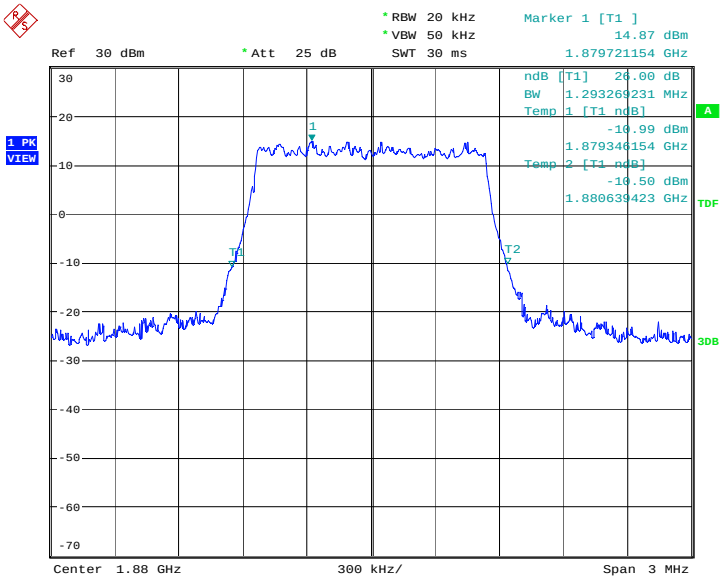
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
1880.0	1278.846	1293.269

LTE band 2, 1.4MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 15:54:22

LTE band 2, 1.4MHz Bandwidth, 16QAM (100% BW)

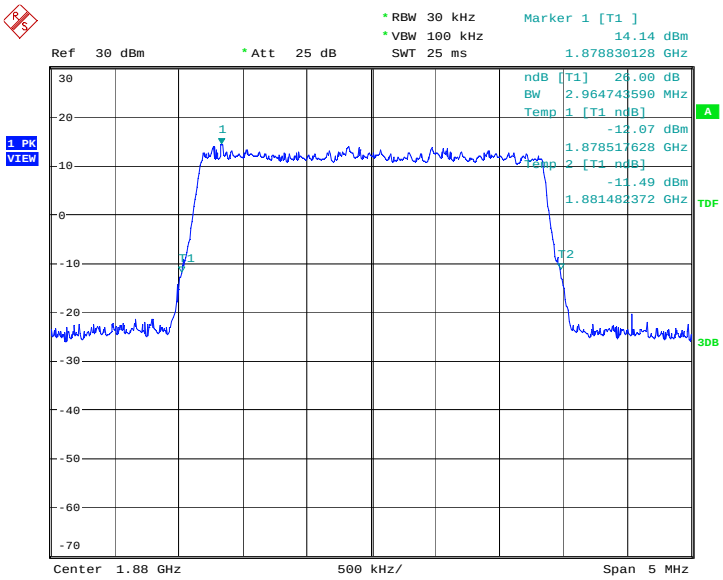


Date: 2.NOV.2013 15:54:38

LTE band 2, 3MHz (100% BW)

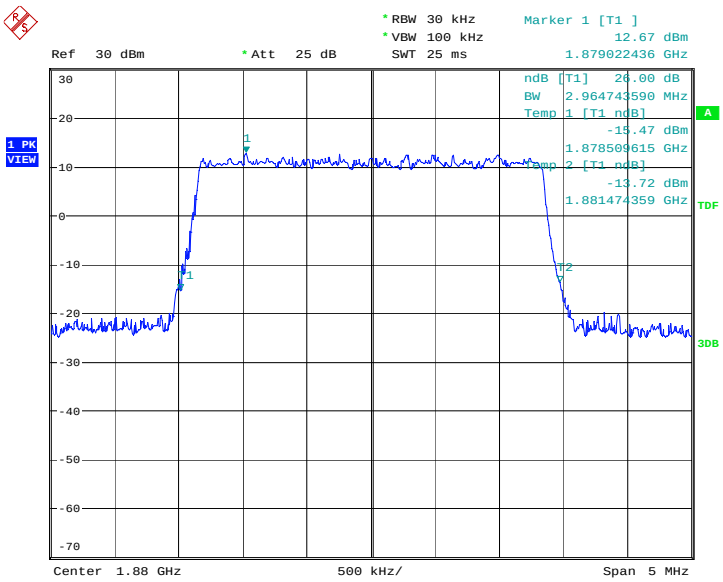
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
1880.0	2964.744	2964.744

LTE band 2, 3MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 15:59:52

LTE band 2, 3MHz Bandwidth, 16QAM (100% BW)

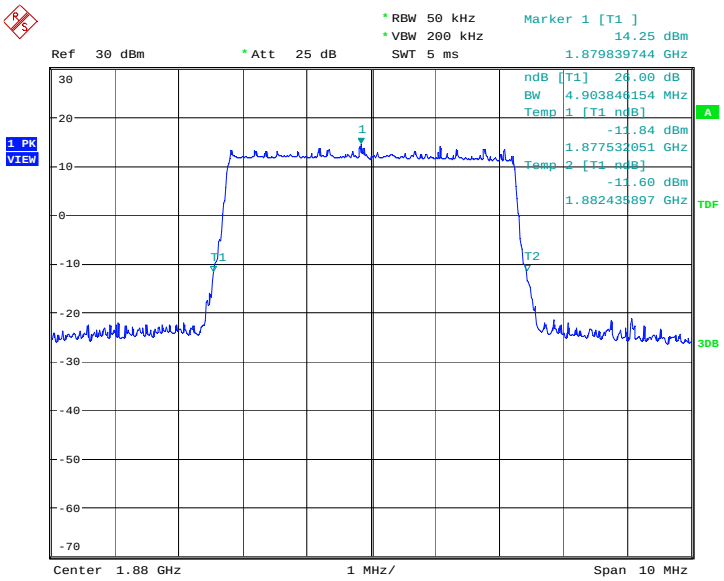


Date: 2.NOV.2013 16:00:07

LTE band 2, 5MHz (100% BW)

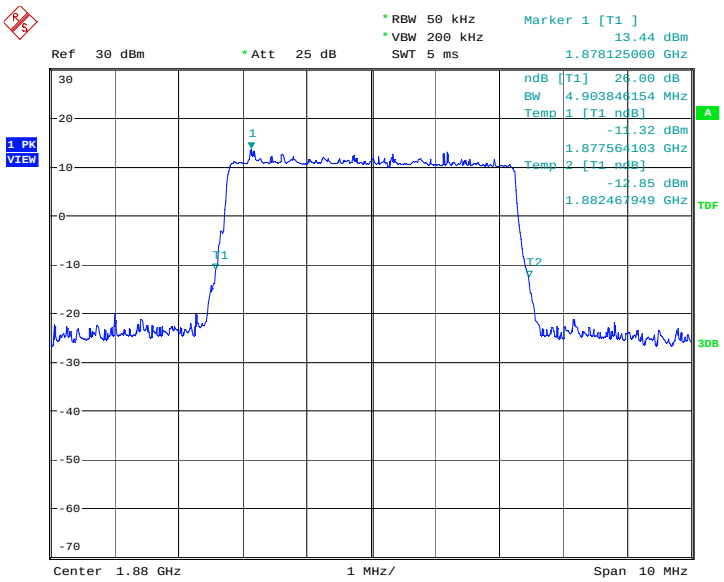
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
1880.0	4903.846	4903.846

LTE band 2, 5MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 16:05:21

LTE band 2, 5MHz Bandwidth,16QAM (100% BW)

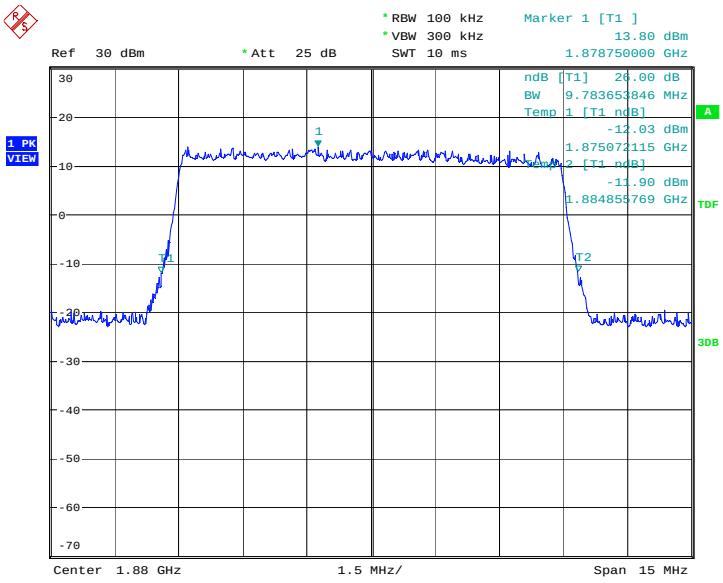


Date: 2.NOV.2013 16:05:37

LTE band 2, 10MHz (100% BW)

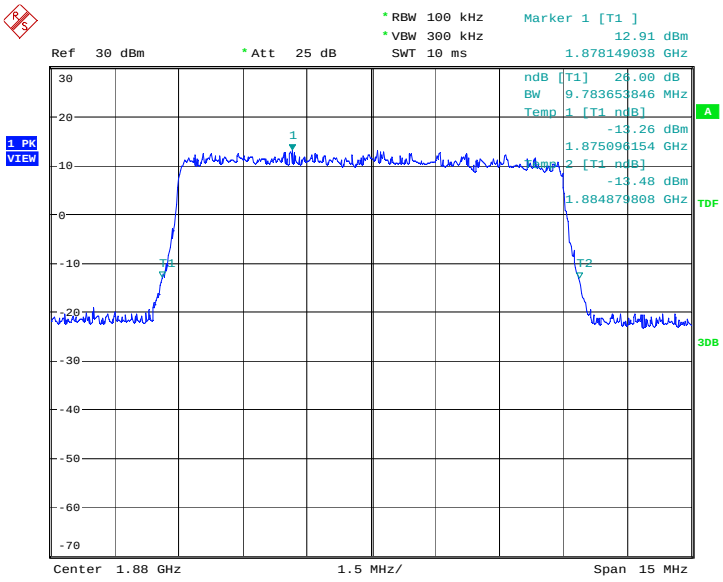
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
1880.0	9783.654	9783.654

LTE band 2, 10MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 16:10:51

LTE band 2, 10MHz Bandwidth, 16QAM (100% BW)

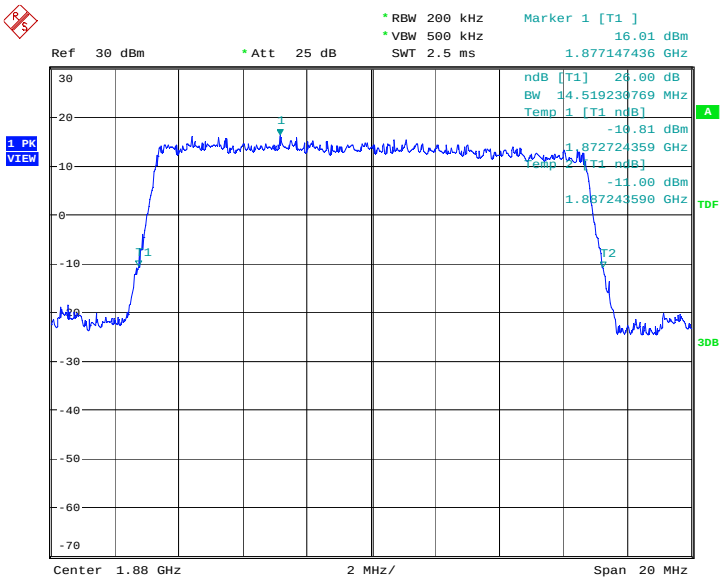


Date: 2.NOV.2013 16:11:06

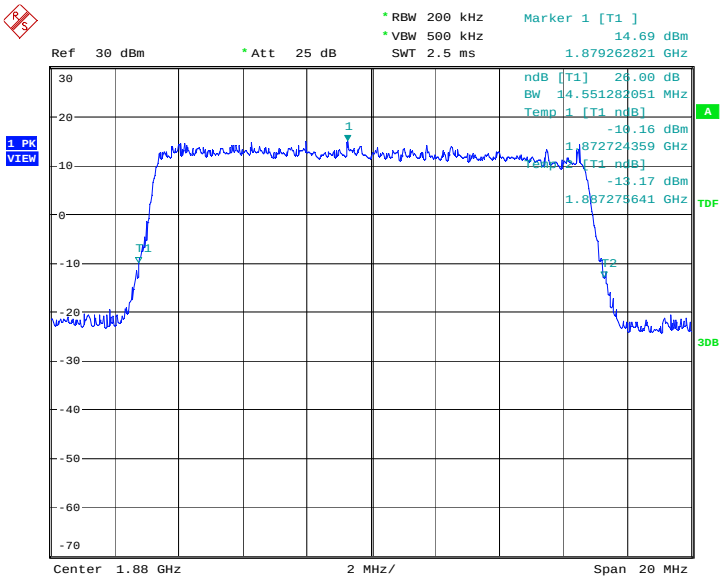
LTE band 2, 15MHz (100% BW)

Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
1880.0	14519.231	14551.282

LTE band 2, 15MHz Bandwidth, QPSK (100% BW)



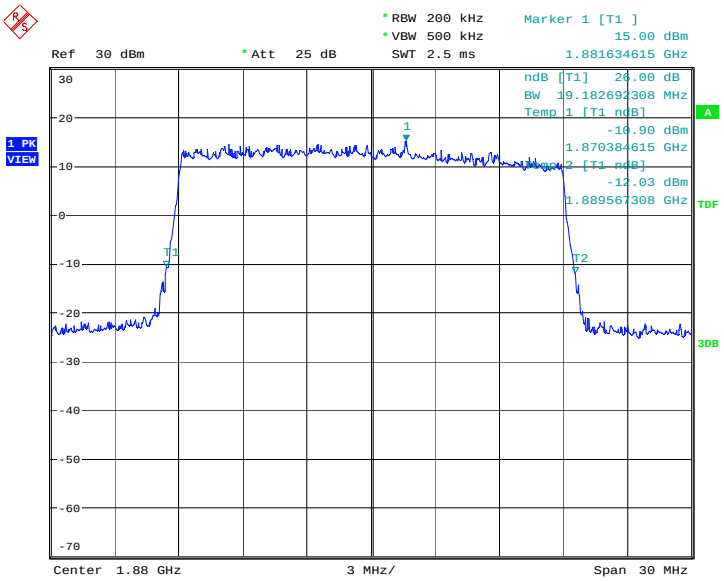
LTE band 2, 15MHz Bandwidth, 16QAM (100% BW)



LTE band 2, 20MHz (100% BW)

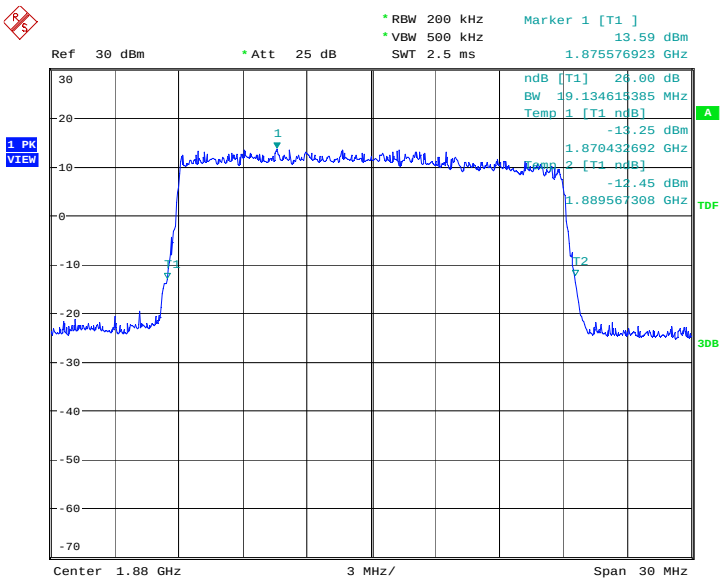
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
1880.0	19182.692	19134.615

LTE band 2, 20MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 16:21:51

LTE band 2, 20MHz Bandwidth, 16QAM (100% BW)

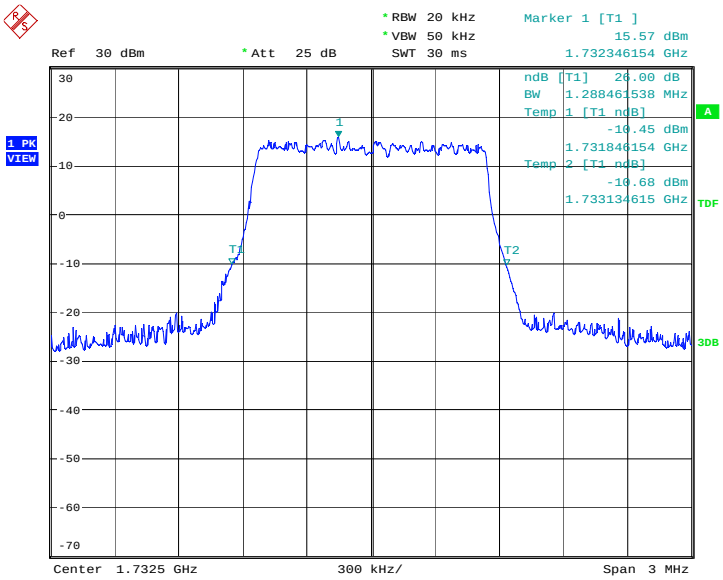


Date: 2.NOV.2013 16:22:06

LTE band 4, 1.4MHz (100% BW)

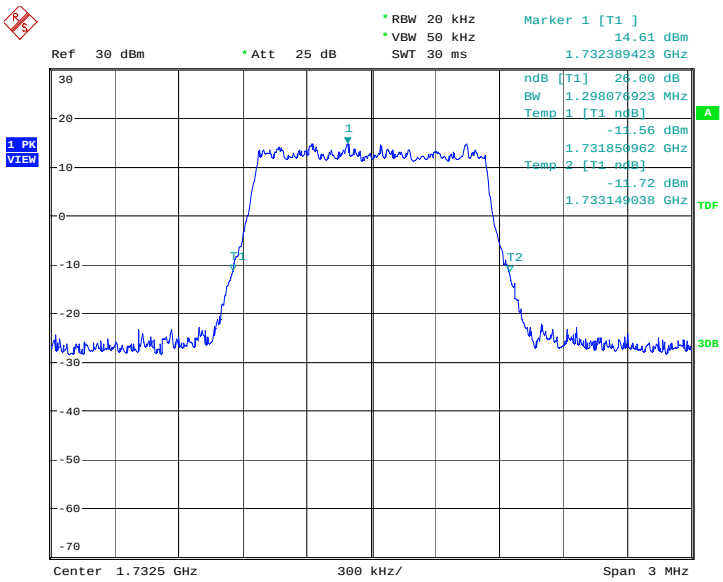
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
1732.5	1288.462	1298.077

LTE band 4, 1.4MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 16:27:22

LTE band 4, 1.4MHz Bandwidth, 16QAM (100% BW)

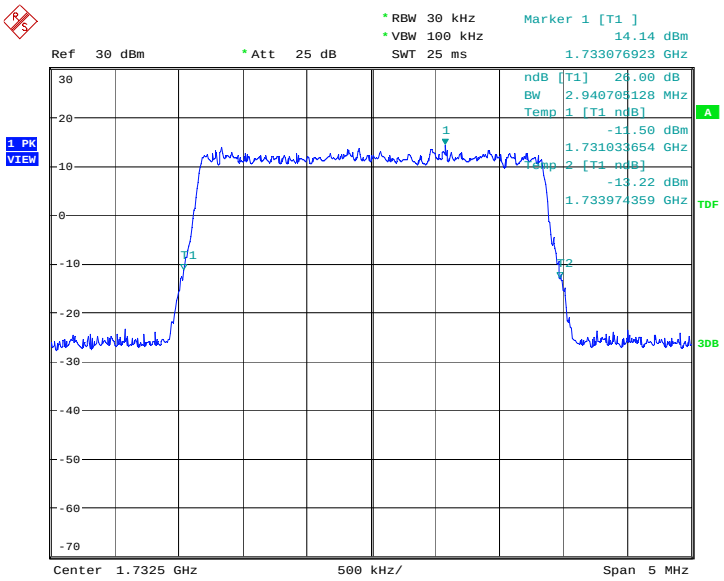


Date: 2.NOV.2013 16:27:37

LTE band 4, 3MHz (100% BW)

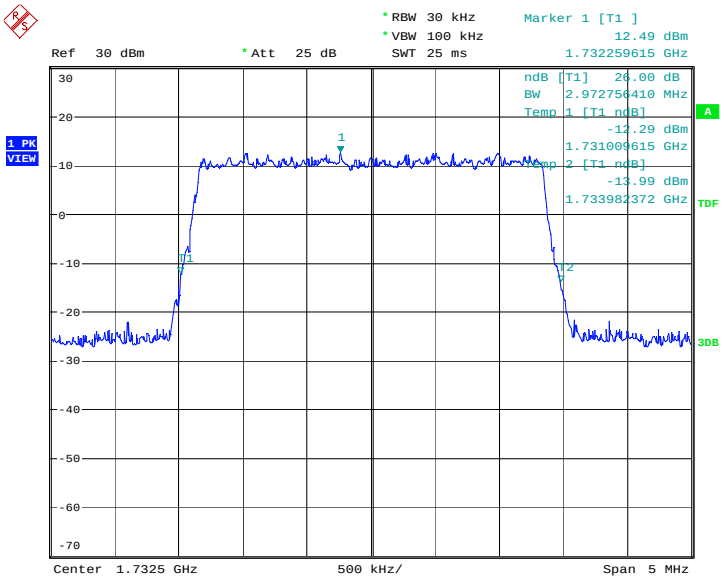
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
1732.5	2940.705	2972.756

LTE band 4, 3MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 16:32:51

LTE band 4, 3MHz Bandwidth, 16QAM (100% BW)

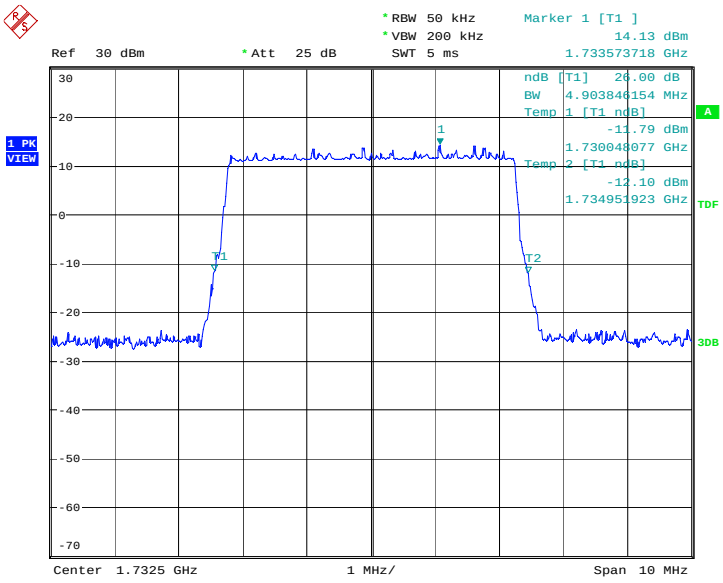


Date: 2.NOV.2013 16:33:07

LTE band 4, 5MHz (100% BW)

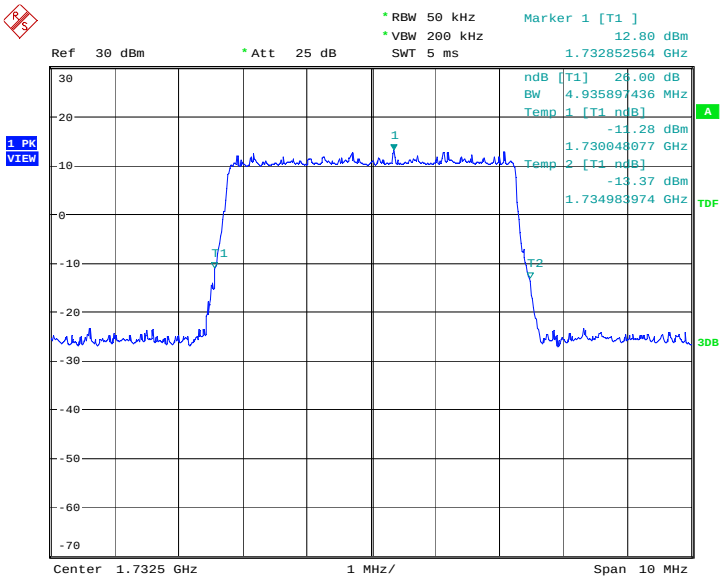
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
1732.5	4903.846	4935.897

LTE band 4, 5MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 16:38:21

LTE band 4, 5MHz Bandwidth,16QAM (100% BW)

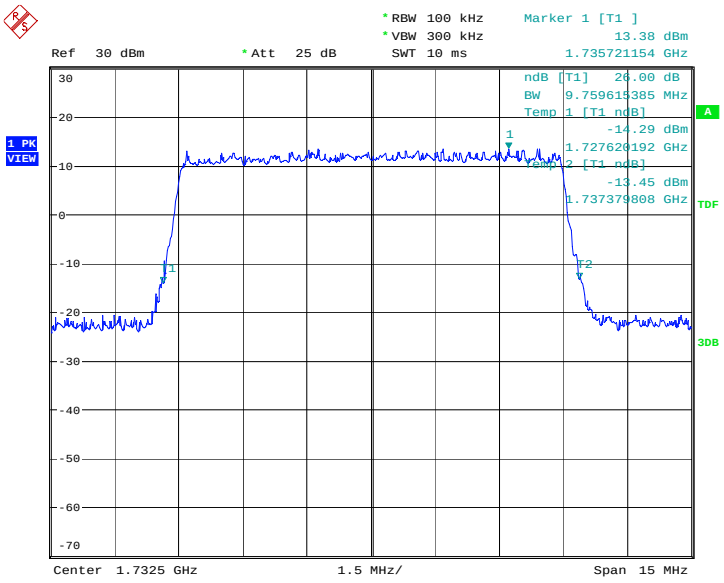


Date: 2.NOV.2013 16:38:37

LTE band 4, 10MHz (100% BW)

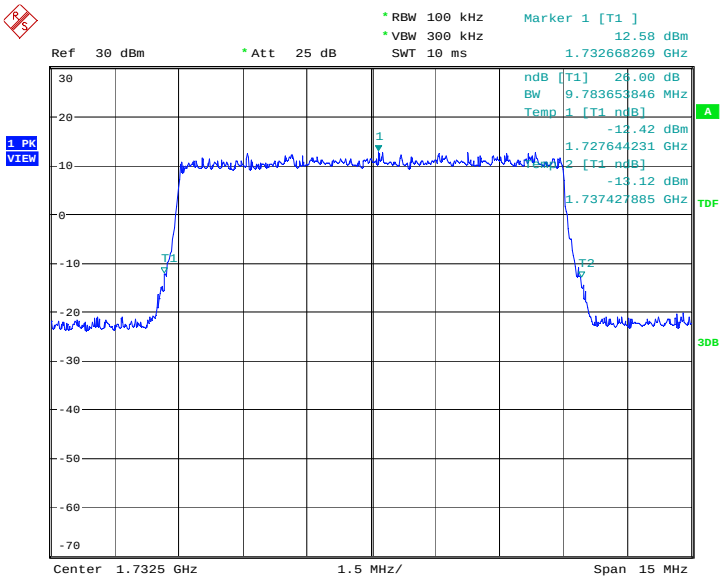
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
1732.5	9759.615	9783.654

LTE band 4, 10MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 16:43:50

LTE band 4, 10MHz Bandwidth, 16QAM (100% BW)

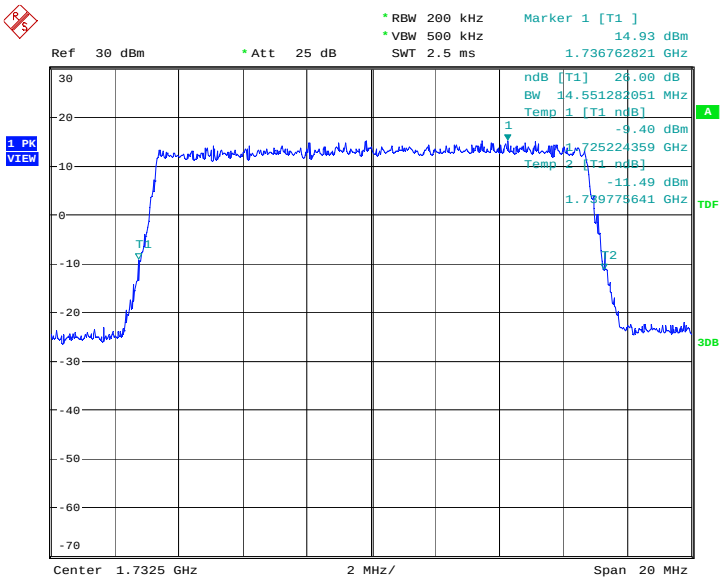


Date: 2.NOV.2013 16:44:06

LTE band 4, 15MHz (100% BW)

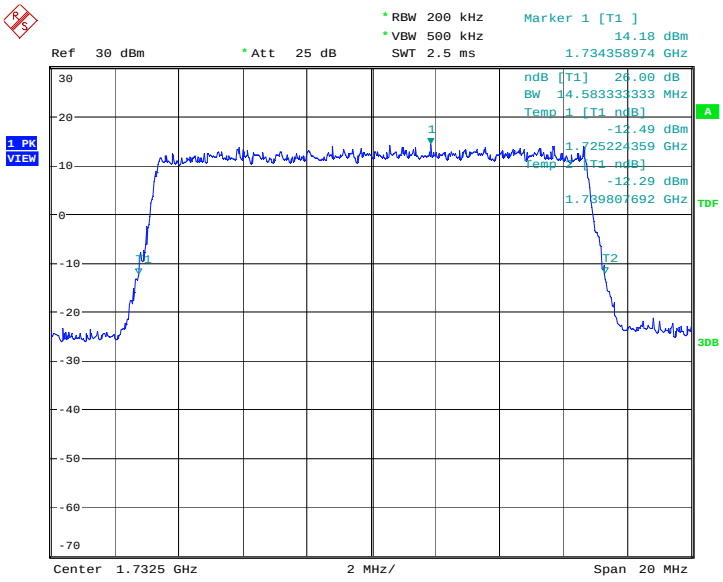
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
1732.5	14551.282	14583.333

LTE band 4, 15MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 16:49:20

LTE band 4, 15MHz Bandwidth, 16QAM (100% BW)

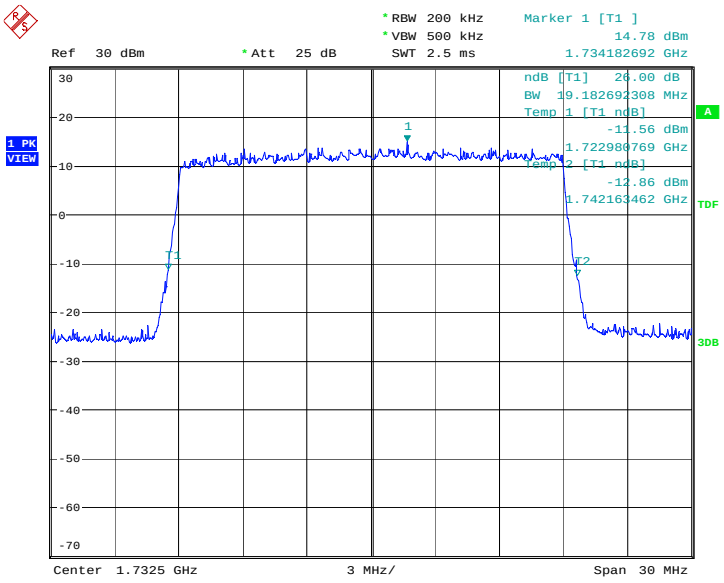


Date: 2.NOV.2013 16:49:36

LTE band 4, 20MHz (100% BW)

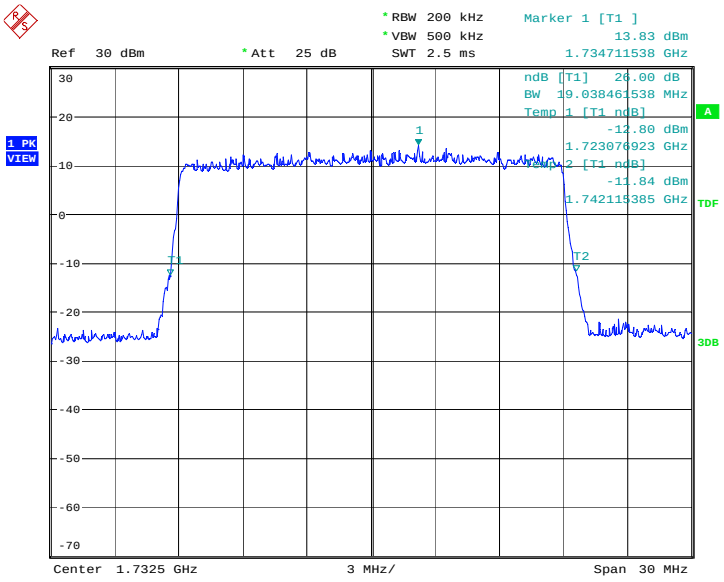
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
1732.5	19182.692	19038.462

LTE band 4, 20MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 16:54:51

LTE band 4, 20MHz Bandwidth, 16QAM (100% BW)

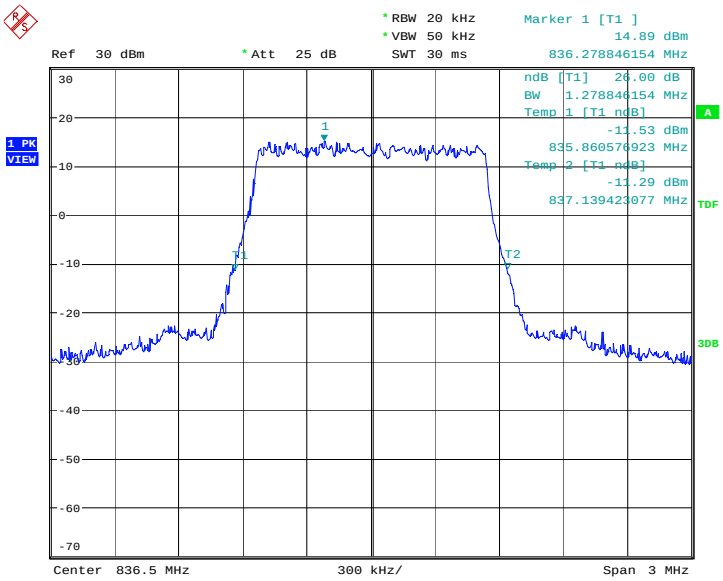


Date: 2.NOV.2013 16:55:07

LTE band 5, 1.4 MHz (100% BW)

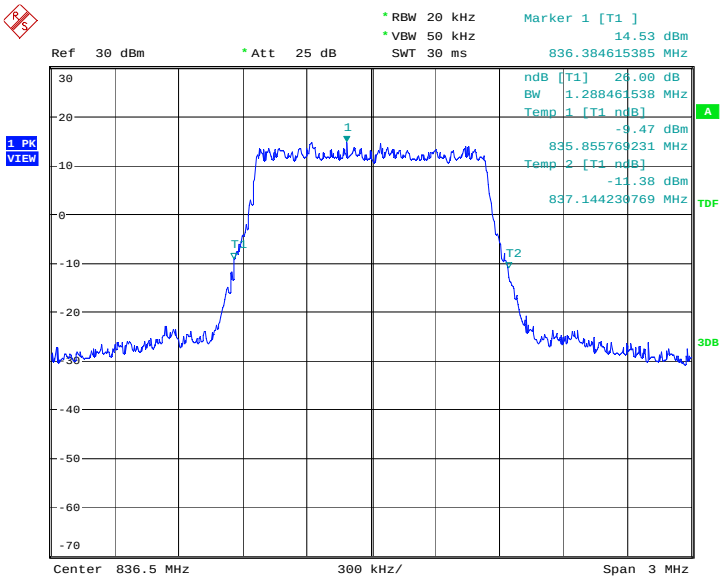
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
836.5	1278.846	1288.462

LTE band 5, 1.4 MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 15:32:21

LTE band 5, 1.4 MHz Bandwidth,16QAM (100% BW)

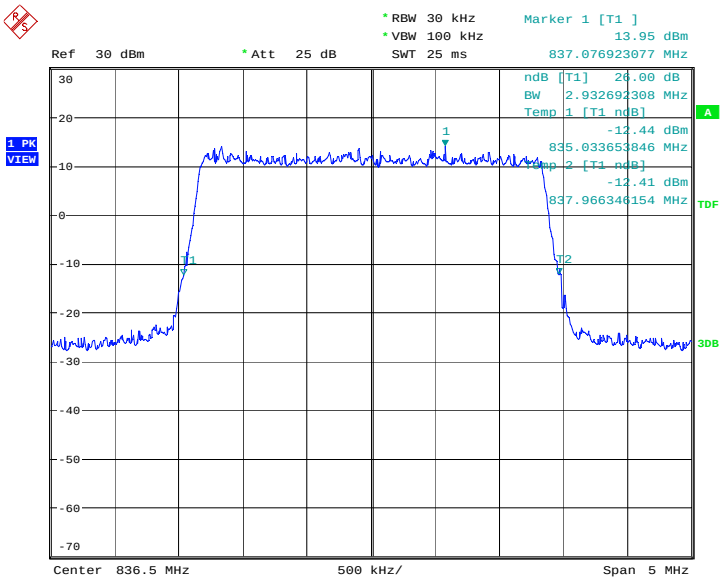


Date: 2.NOV.2013 15:32:37

LTE band 5, 3 MHz (100% BW)

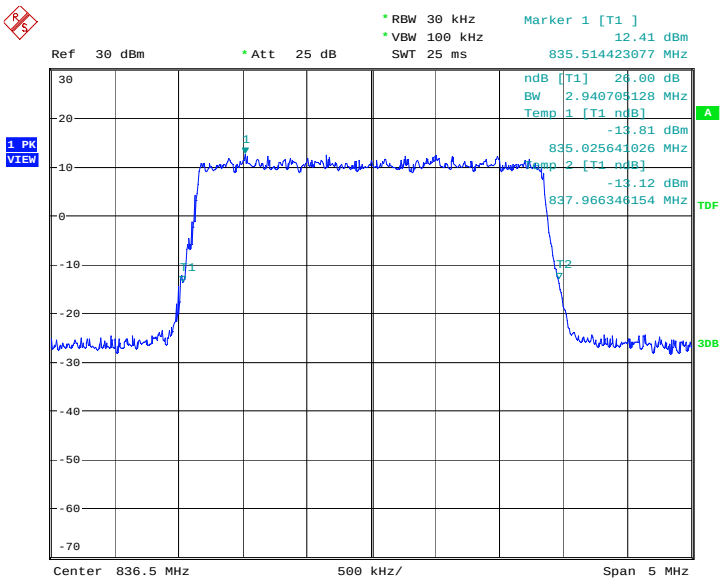
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
836.5	2932.692	2940.705

LTE band 5, 3 MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 15:37:50

LTE band 5, 3 MHz Bandwidth,16QAM (100% BW)

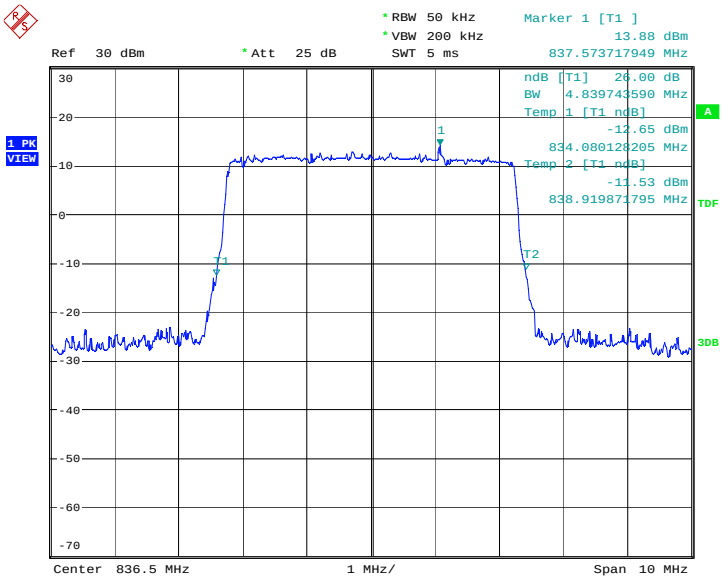


Date: 2.NOV.2013 15:38:06

LTE band 5, 5 MHz (100% BW)

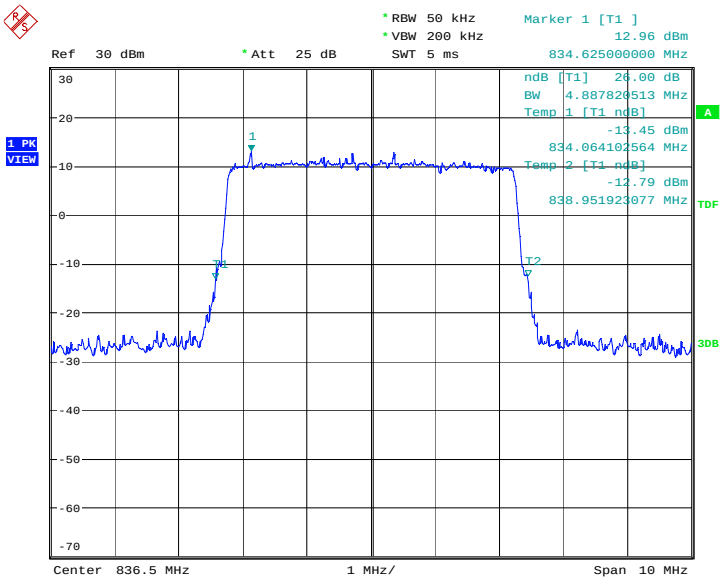
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
836.5	4839.744	4887.821

LTE band 5, 5 MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 15:43:20

LTE band 5, 5 MHz Bandwidth,16QAM (100% BW)

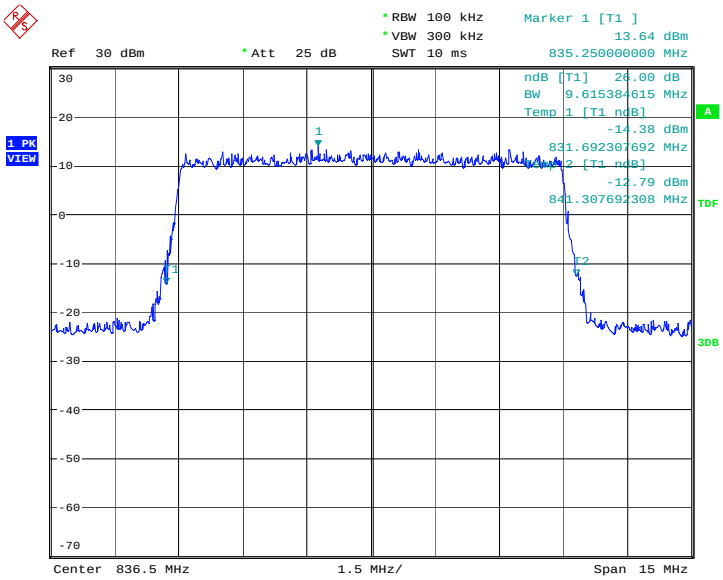


Date: 2.NOV.2013 15:43:35

LTE band 5, 10 MHz (100% BW)

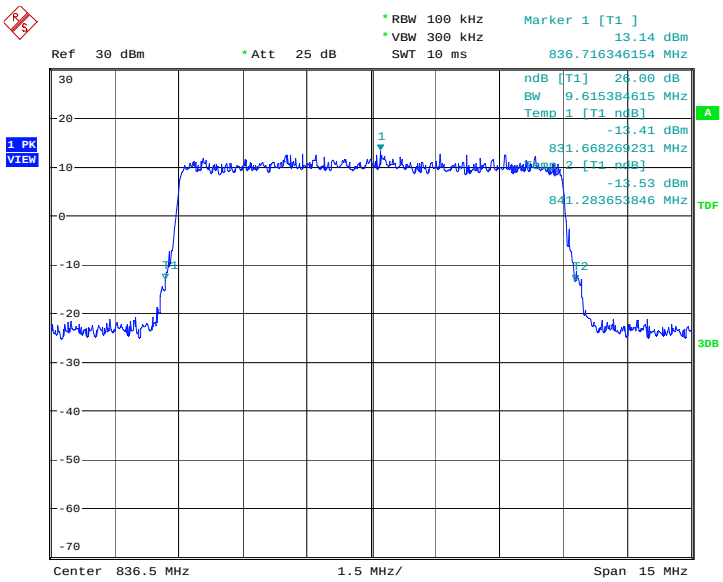
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
836.5	9615.385	9615.385

LTE band 5, 10 MHz Bandwidth, QPSK (100% BW)



Date: 2.NOV.2013 15:48:49

LTE band 5, 10 MHz Bandwidth, 16QAM (100% BW)

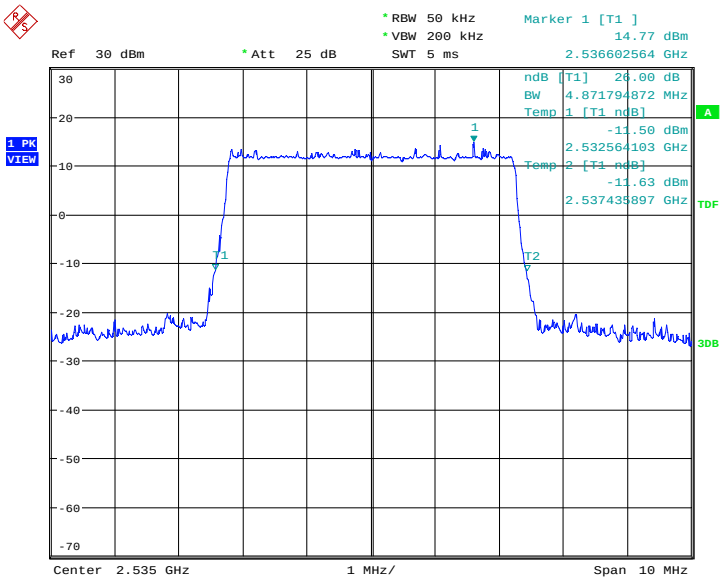


Date: 2.NOV.2013 15:49:05

LTE band 7, 5MHz (100% BW)

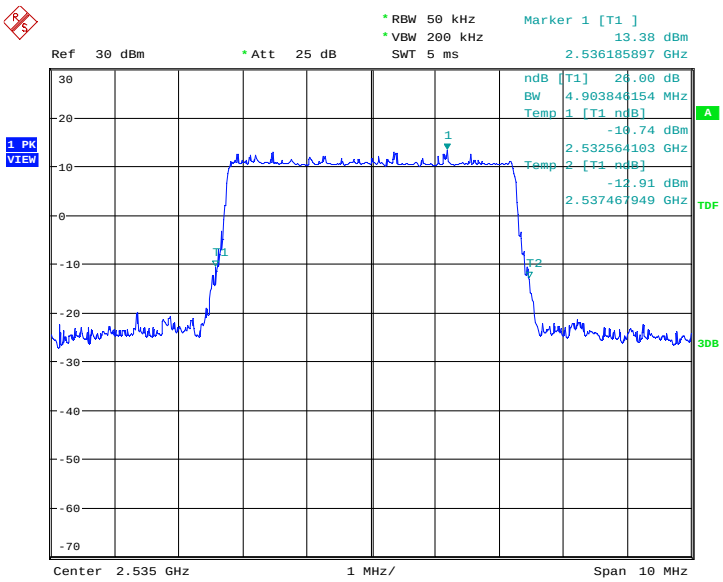
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
2535	4871.795	4903.846

LTE band 7, 5MHz Bandwidth, QPSK (100% BW)



Date: 20.NOV.2013 17:02:36

LTE band 7, 5MHz Bandwidth,16QAM (100% BW)

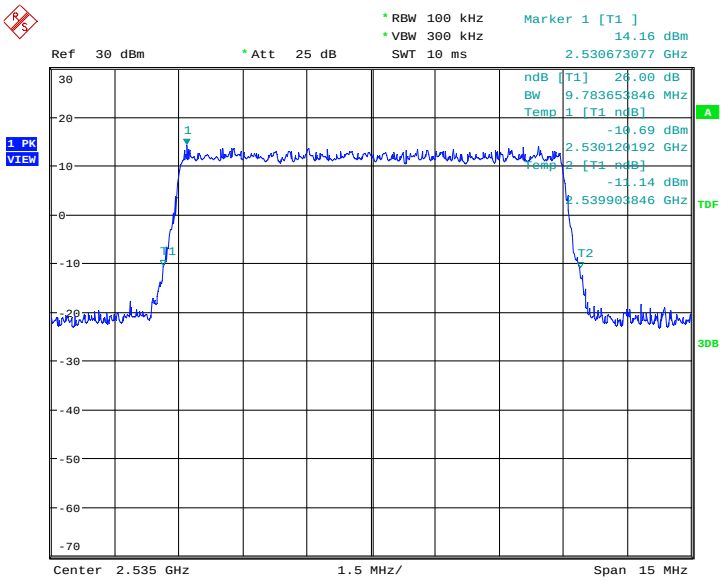


Date: 20.NOV.2013 17:02:51

LTE band 7, 10MHz (100% BW)

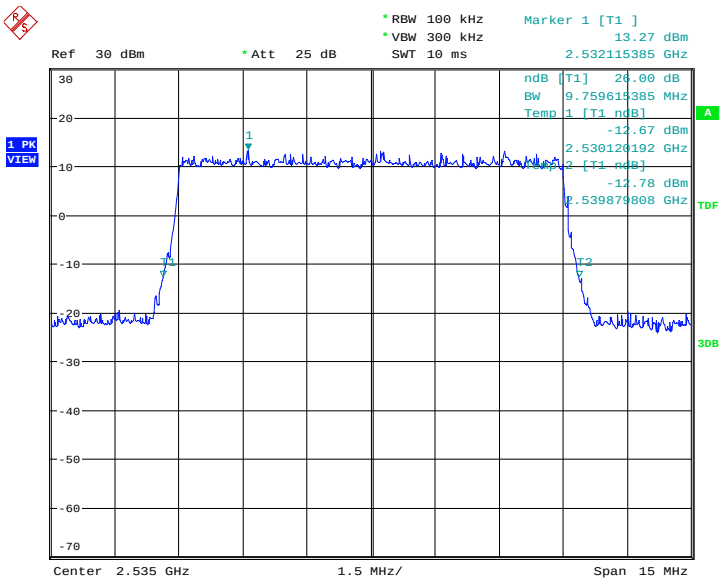
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
2535	9783.654	9759.615

LTE band 7, 10MHz Bandwidth, QPSK (100% BW)



Date: 20.NOV.2013 17:26:40

LTE band 7, 10MHz Bandwidth, 16QAM (100% BW)

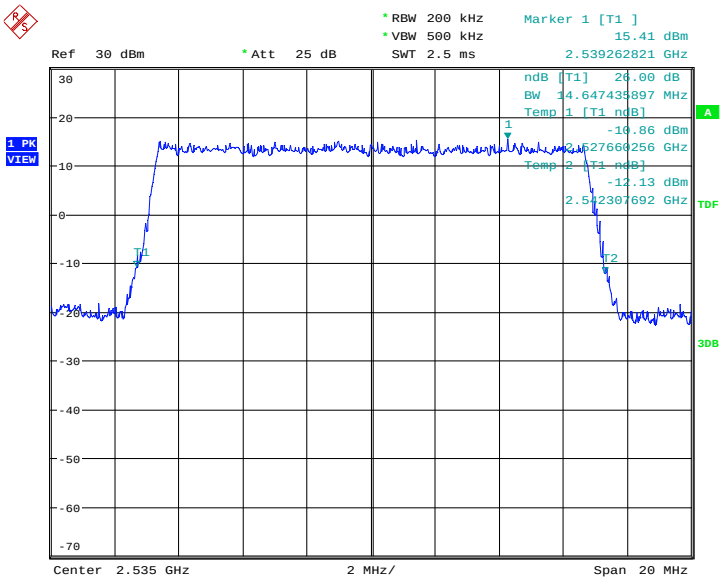


Date: 20.NOV.2013 17:26:55

LTE band 7, 15MHz (100% BW)

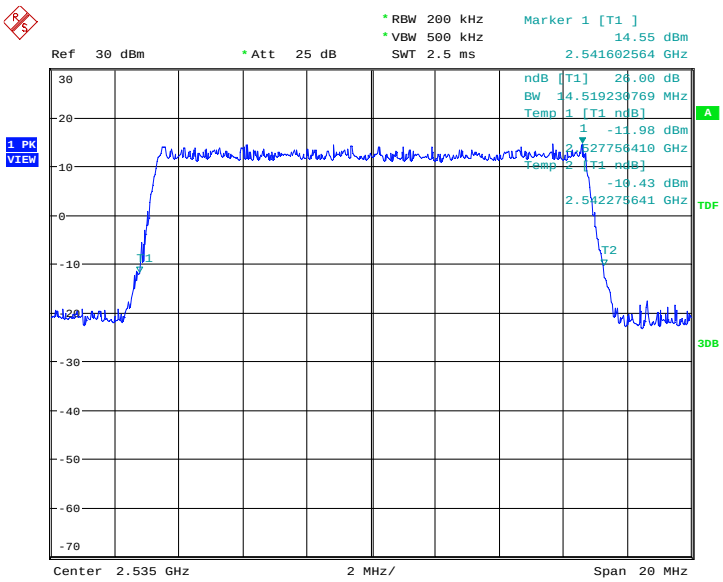
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
2535	14647.436	14519.231

LTE band 7, 15MHz Bandwidth, QPSK (100% BW)



Date: 20.NOV.2013 17:50:55

LTE band 7, 15MHz Bandwidth, 16QAM (100% BW)

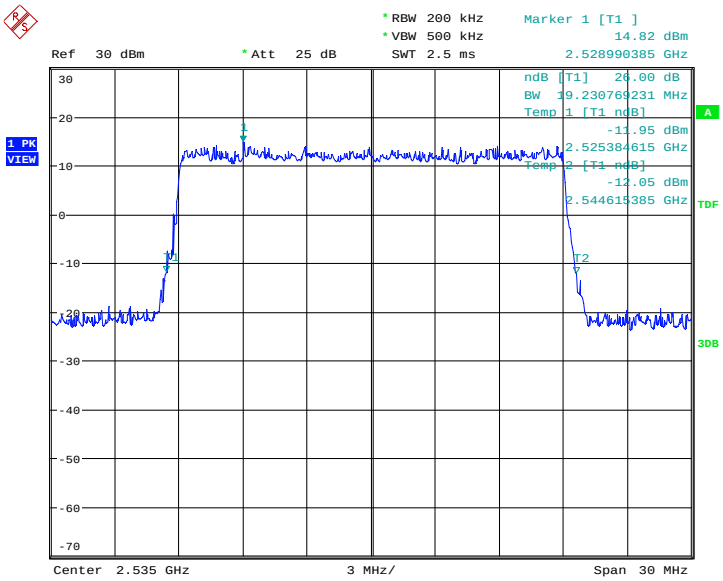


Date: 20.NOV.2013 17:51:10

LTE band 7, 20MHz (100% BW)

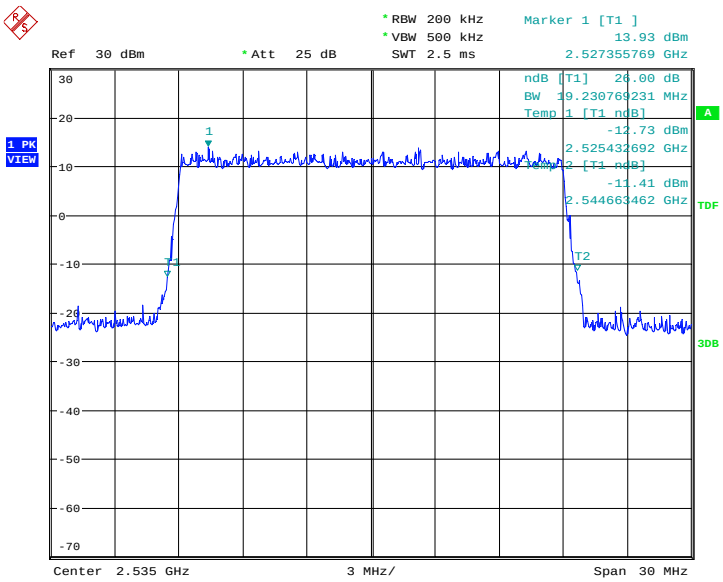
Frequency (MHz)	Occupied Bandwidth (100% BW)(kHz)	
	QPSK	16QAM
2535	19230.769	19230.769

LTE band 7, 20MHz Bandwidth, QPSK (100% BW)



Date: 20.NOV.2013 18:14:57

LTE band 7, 20MHz Bandwidth, 16QAM (100% BW)



Date: 20.NOV.2013 18:15:12

A.7 BAND EDGE COMPLIANCE

Reference

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

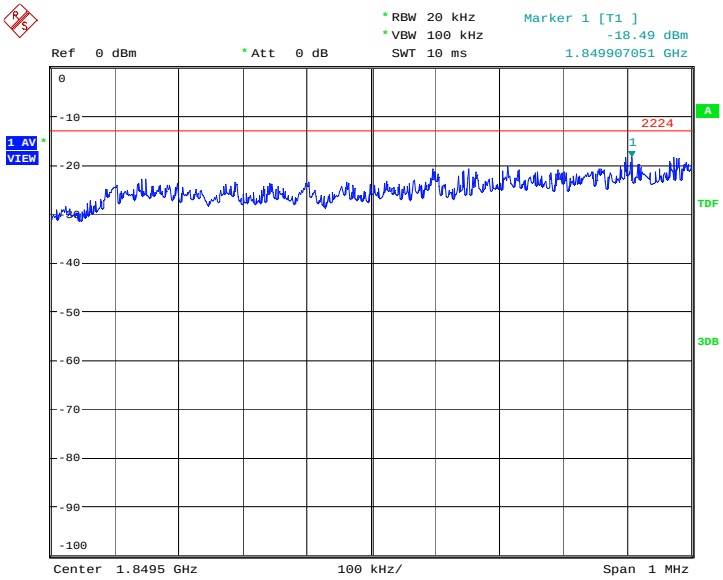
A.7.1 Measurement limit

On any frequency outside frequency band of the LTE FDD bands 2, 4, 5 and 7 spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log (P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

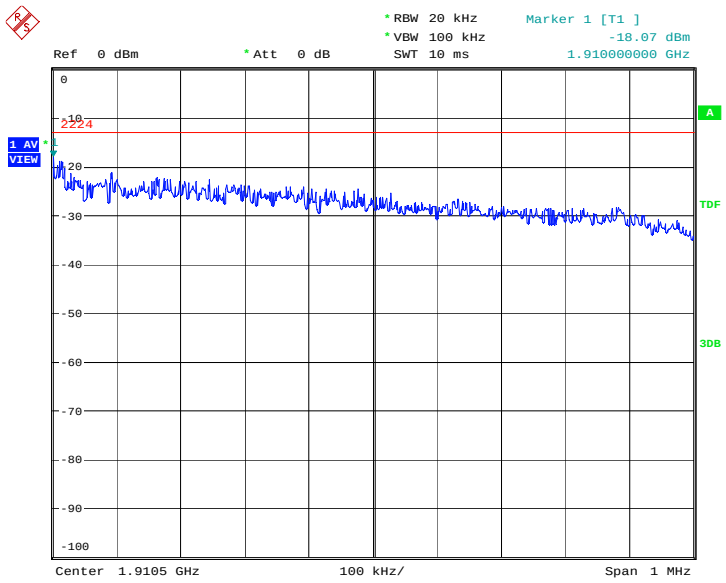
A.7.2 Measurement result

LTE band 2, 1.4MHz

LOW BAND EDGE BLOCK-QPSK

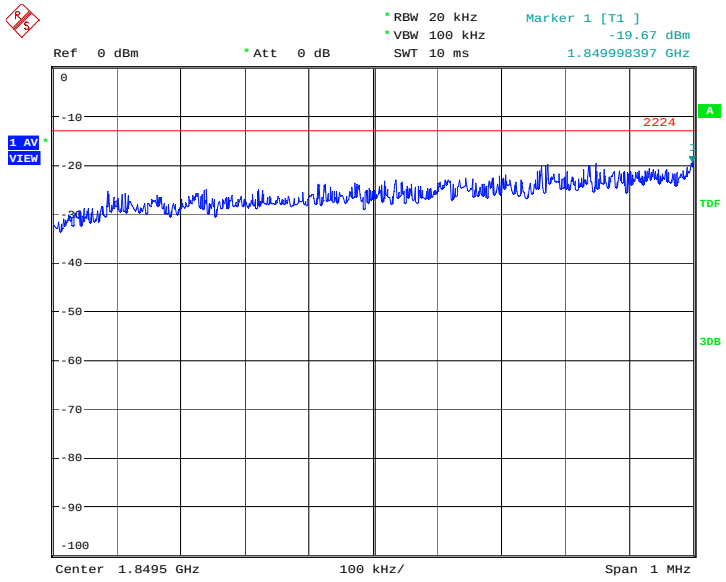


HIGH BAND EDGE BLOCK-QPSK



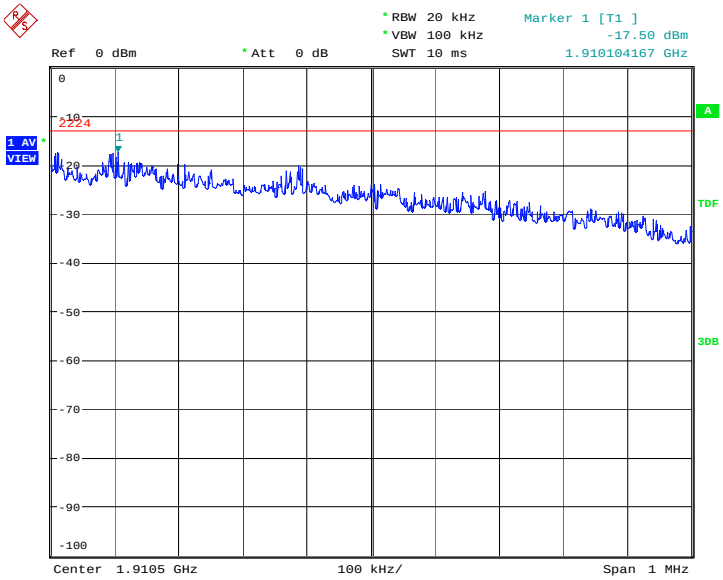
Date: 2.NOV.2013 15:56:37

LOW BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 15:53:27

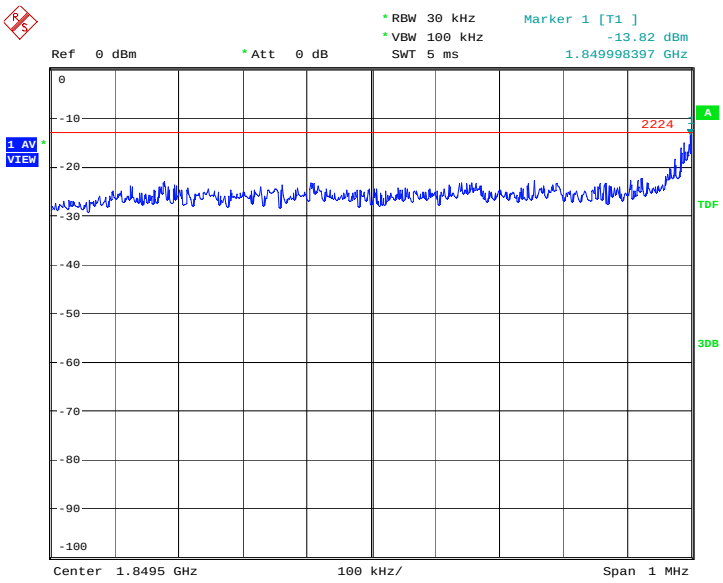
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 15:56:47

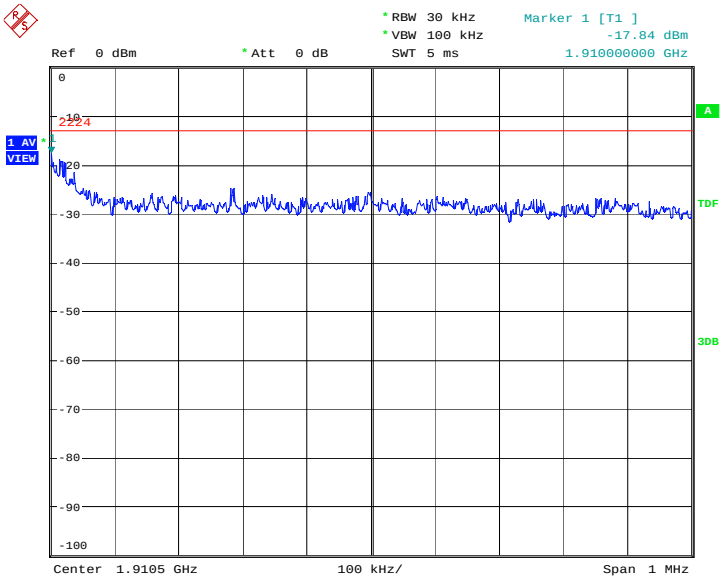
LTE band 2, 3MHz

LOW BAND EDGE BLOCK-QPSK



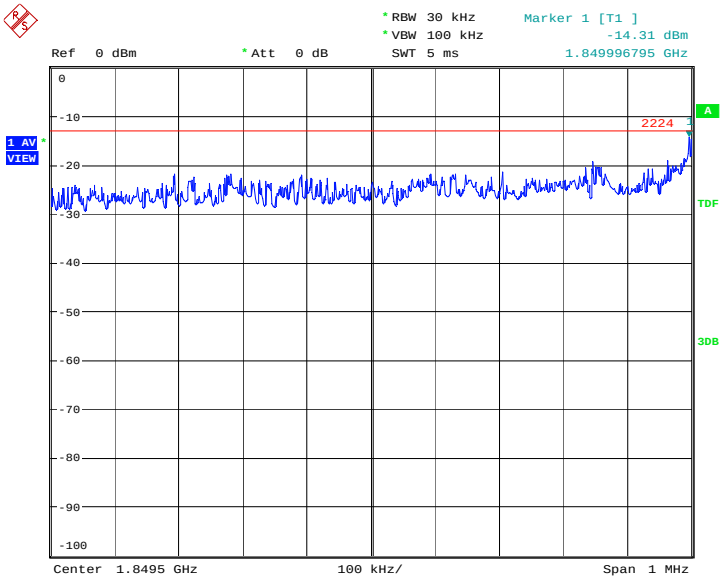
Date: 2.NOV.2013 15:58:46

HIGH BAND EDGE BLOCK-QPSK



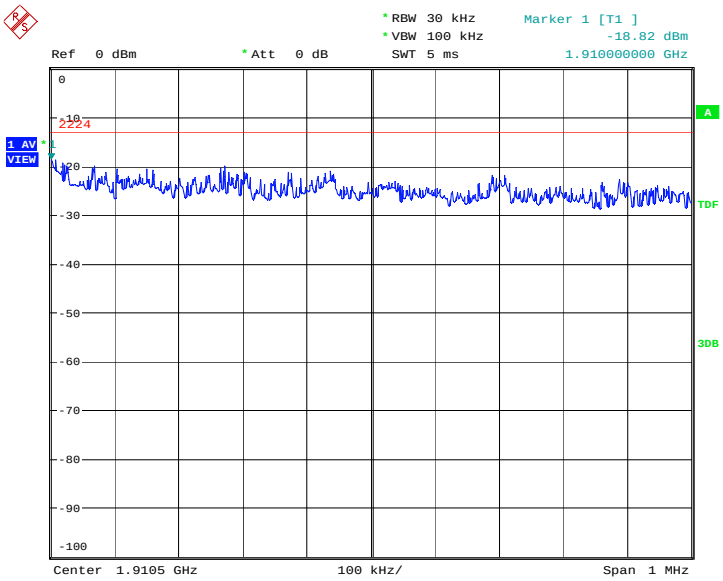
Date: 2.NOV.2013 16:02:06

LOW BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 15:58:57

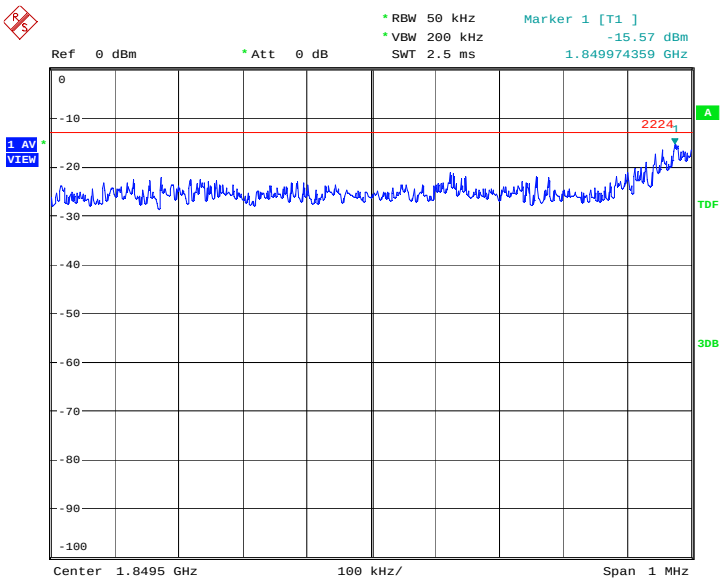
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:02:17

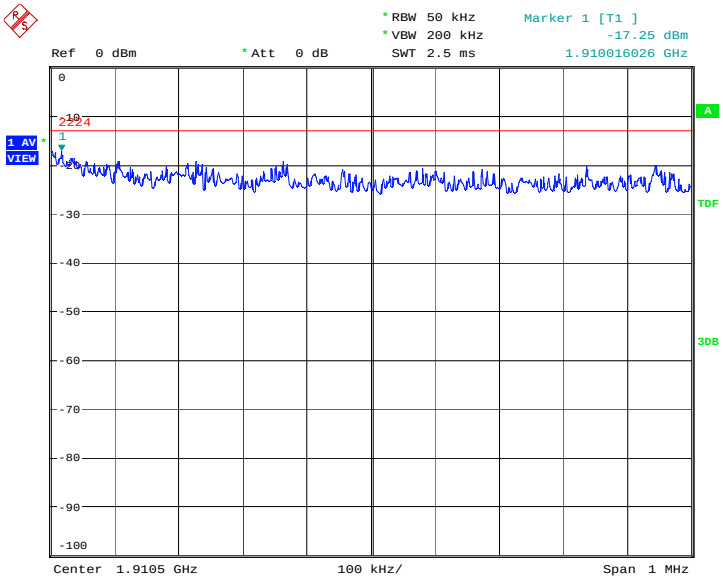
LTE band 2, 5MHz

LOW BAND EDGE BLOCK-QPSK



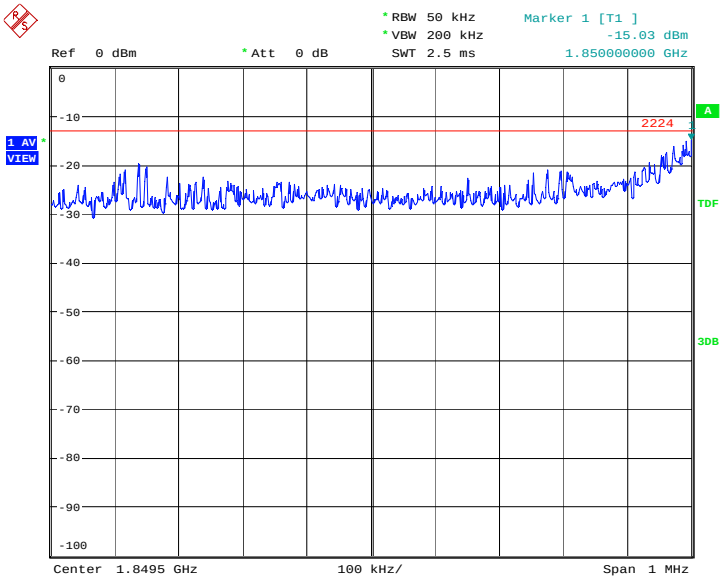
Date: 2.NOV.2013 16:04:16

HIGH BAND EDGE BLOCK-QPSK



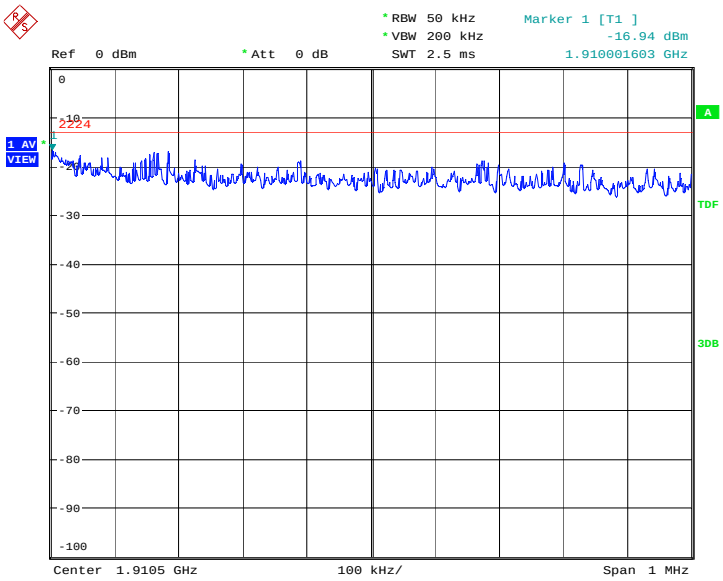
Date: 2.NOV.2013 16:07:36

LOW BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:04:26

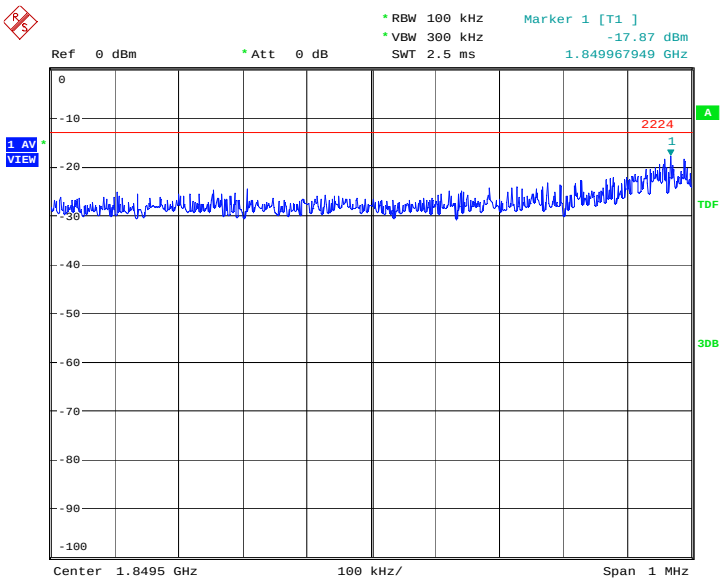
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:07:46

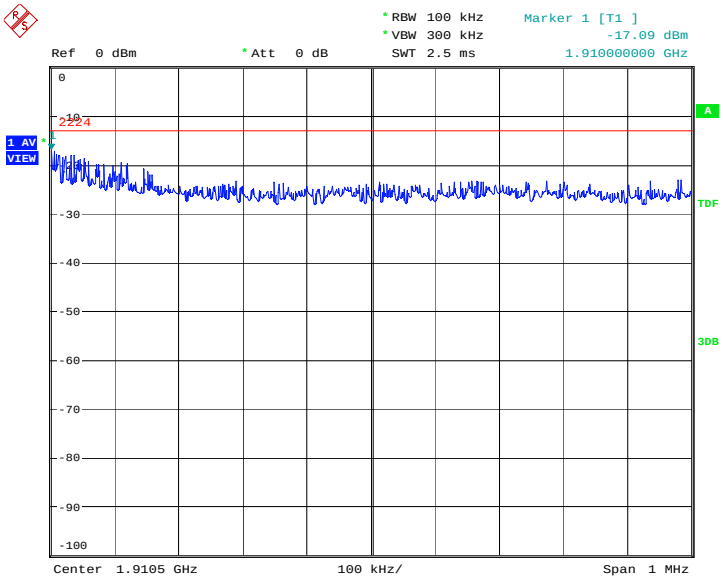
LTE band 2, 10MHz

LOW BAND EDGE BLOCK-QPSK



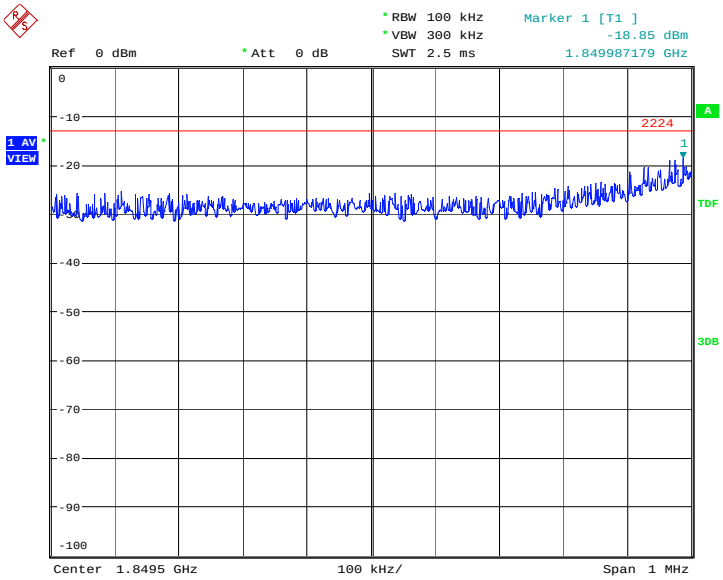
Date: 2.NOV.2013 16:09:45

HIGH BAND EDGE BLOCK-QPSK



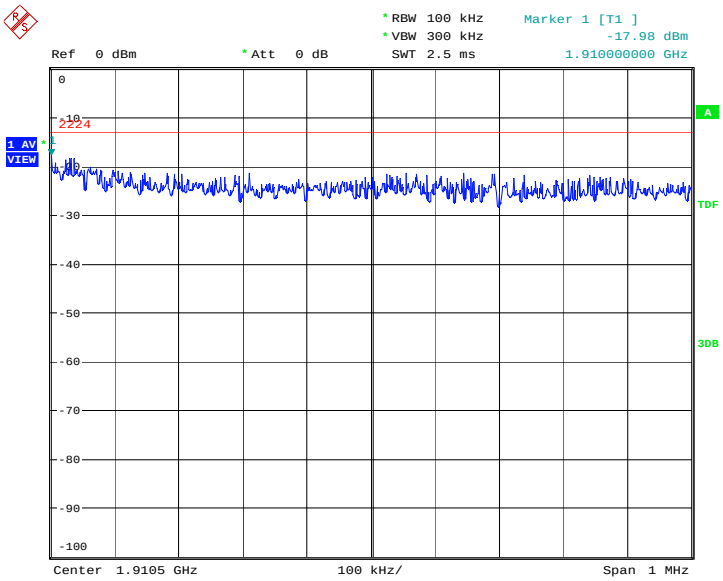
Date: 2.NOV.2013 16:13:06

LOW BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:09:56

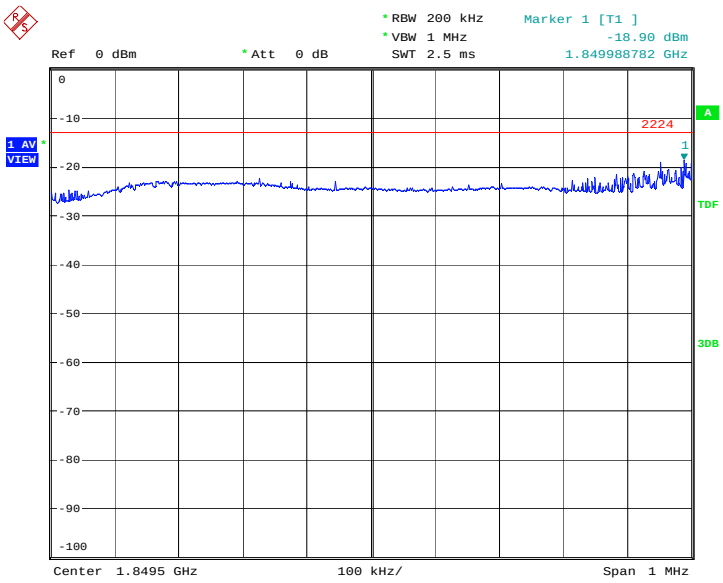
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:13:16

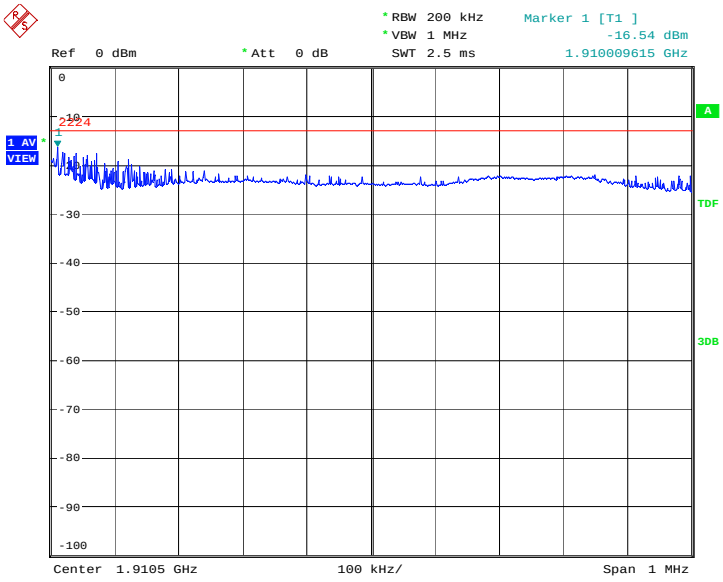
LTE band 2, 15MHz

LOW BAND EDGE BLOCK-QPSK



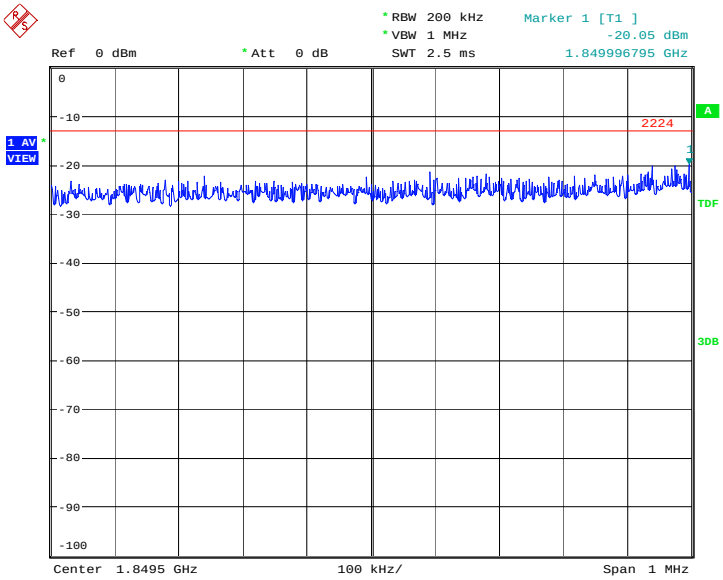
Date: 2.NOV.2013 16:15:15

HIGH BAND EDGE BLOCK-QPSK



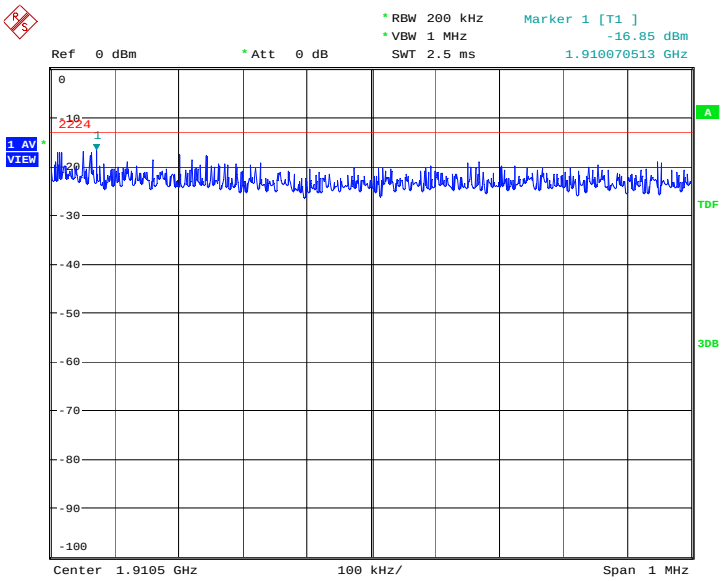
Date: 2.NOV.2013 16:18:36

LOW BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:15:25

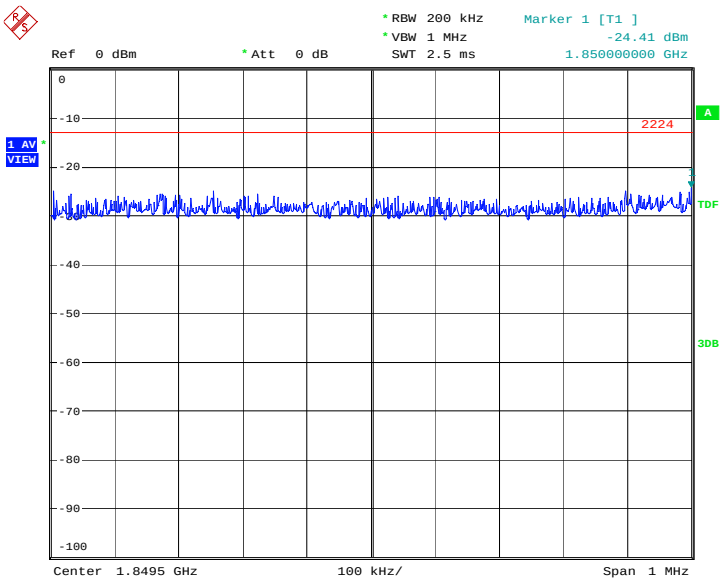
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:18:46

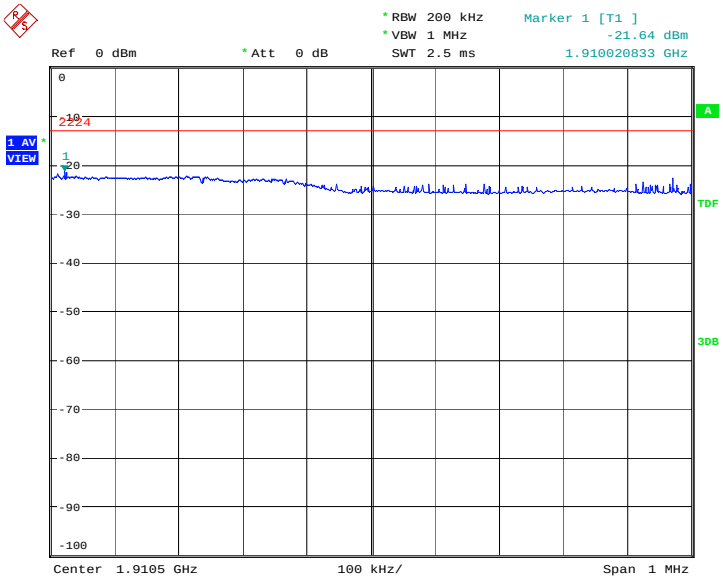
LTE band 2, 20MHz

LOW BAND EDGE BLOCK-QPSK



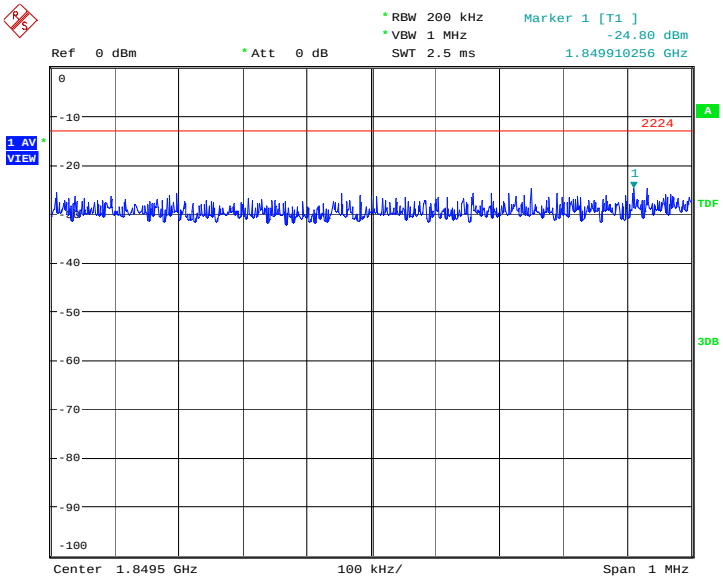
Date: 2.NOV.2013 16:20:45

HIGH BAND EDGE BLOCK-QPSK



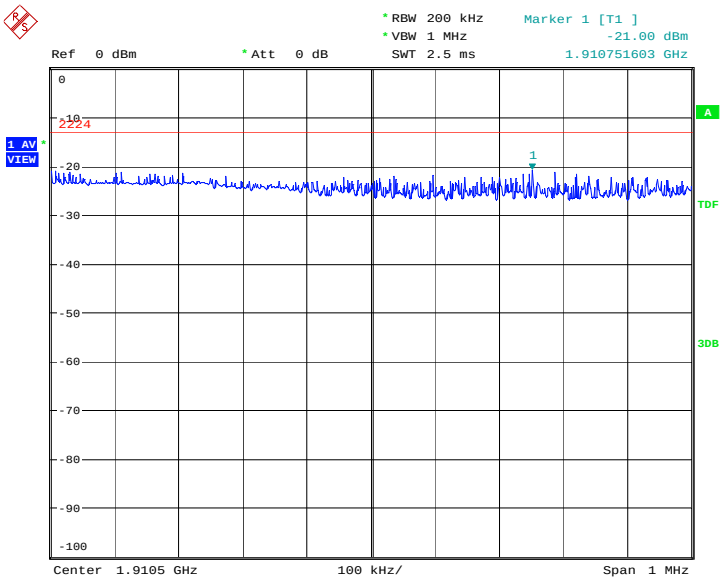
Date: 2.NOV.2013 16:24:06

LOW BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:20:56

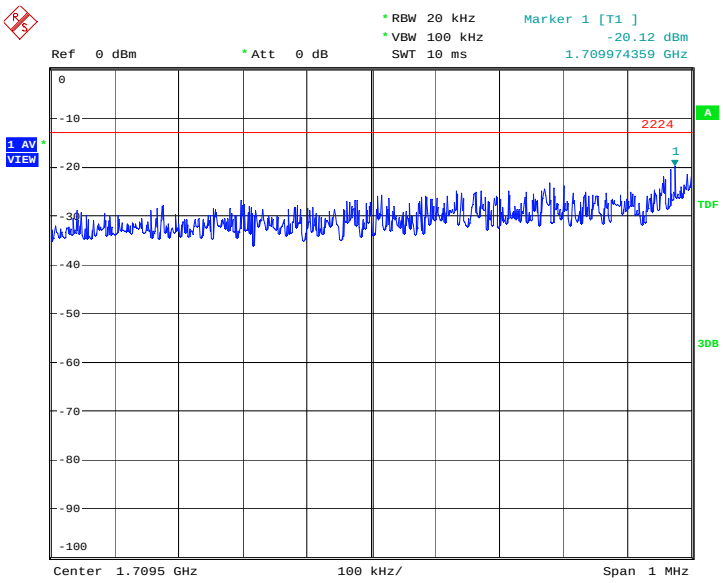
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:24:16

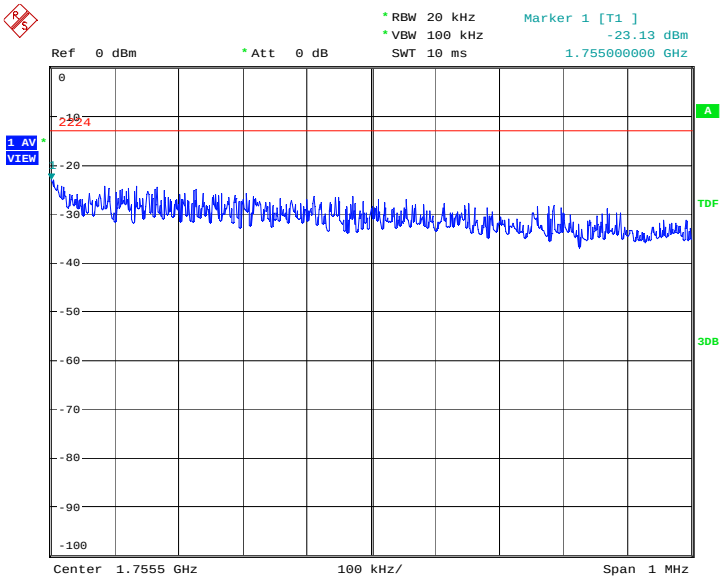
LTE band 4, 1.4MHz

LOW BAND EDGE BLOCK-QPSK



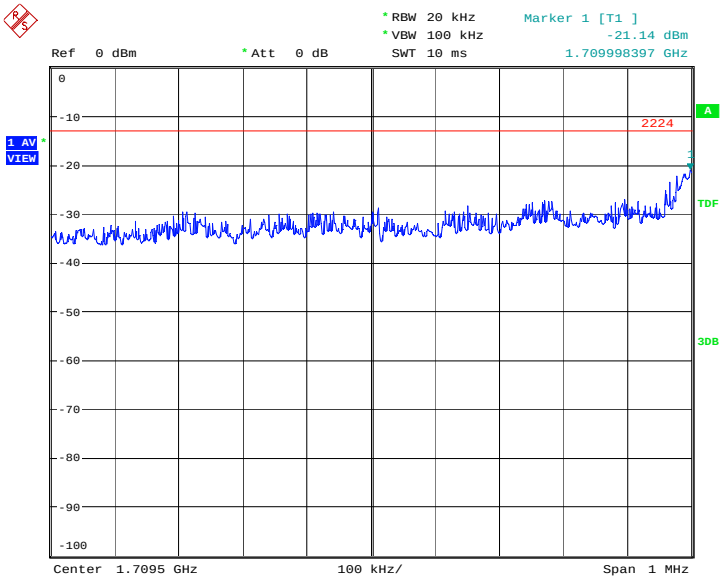
Date: 2.NOV.2013 16:26:17

HIGH BAND EDGE BLOCK-QPSK



Date: 2.NOV.2013 16:29:37

LOW BAND EDGE BLOCK-16QAM



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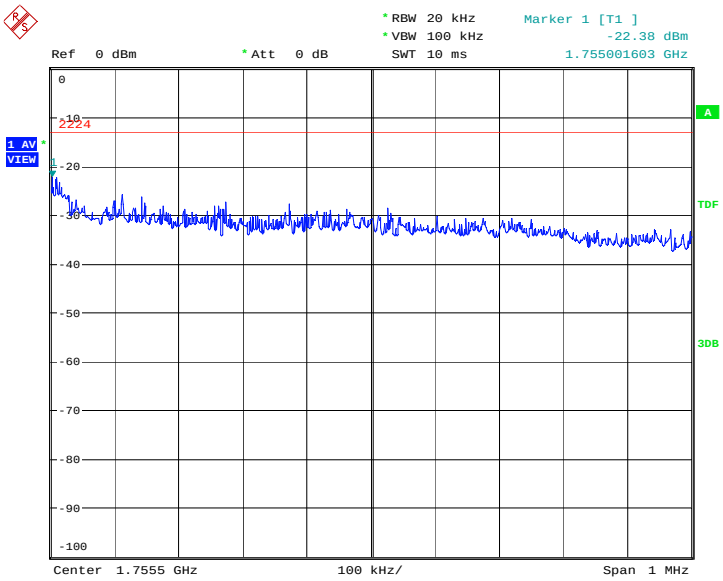
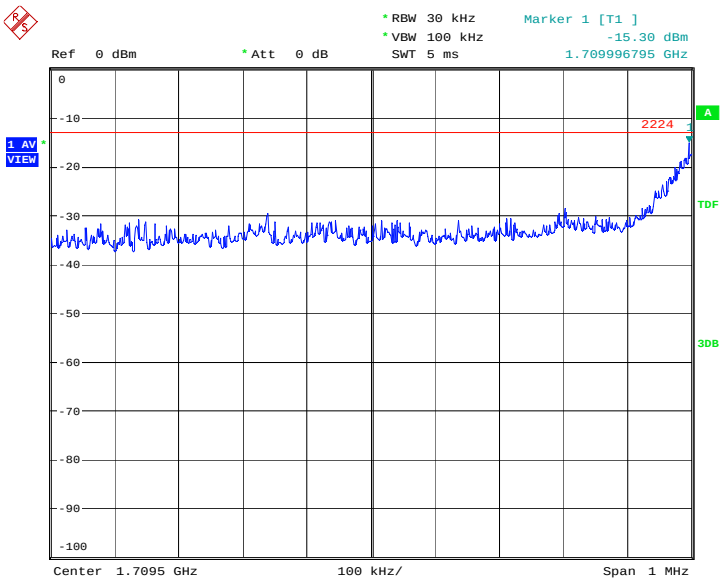
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:29:47

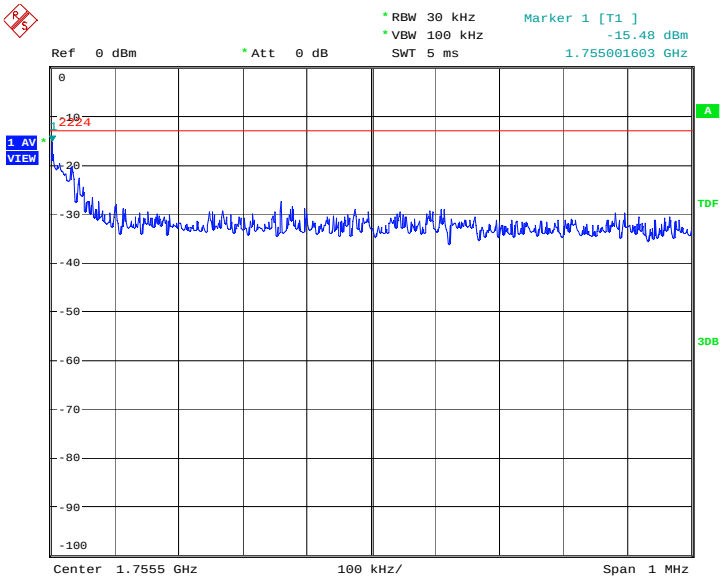
LTE band 4, 3MHz

LOW BAND EDGE BLOCK-QPSK



Date: 2.NOV.2013 16:31:46

HIGH BAND EDGE BLOCK-QPSK



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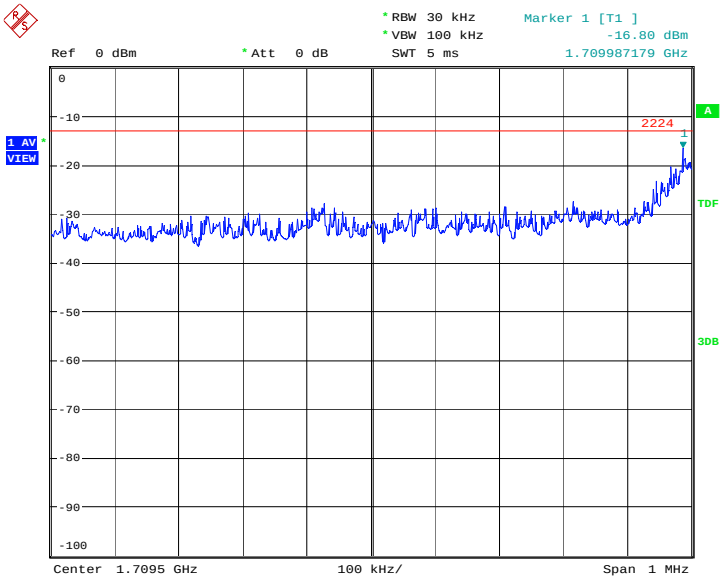
LOW BAND EDGE BLOCK-16QAM



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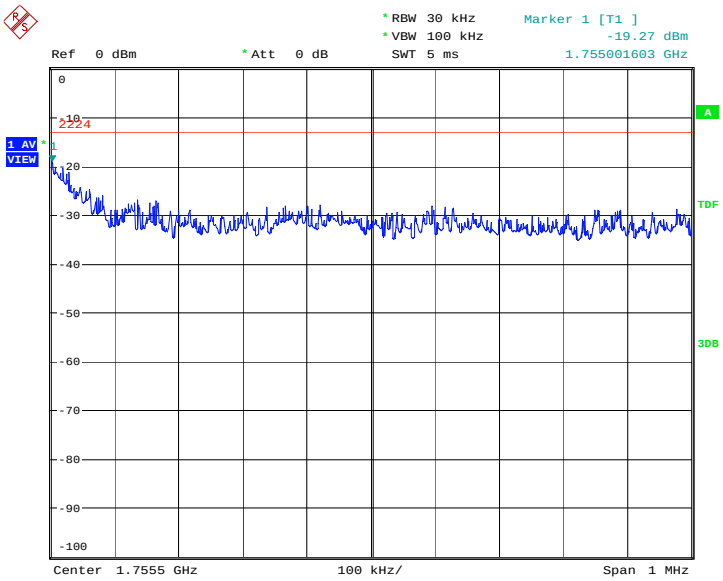
HIGH BAND EDGE BLOCK-16QAM



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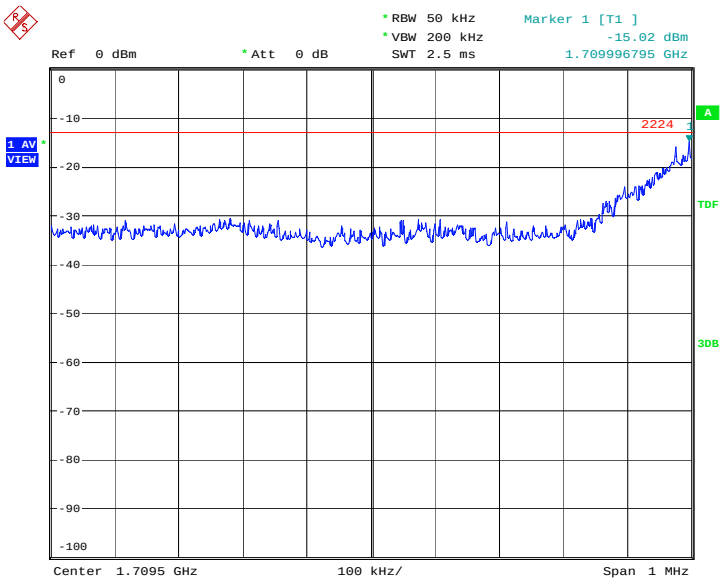
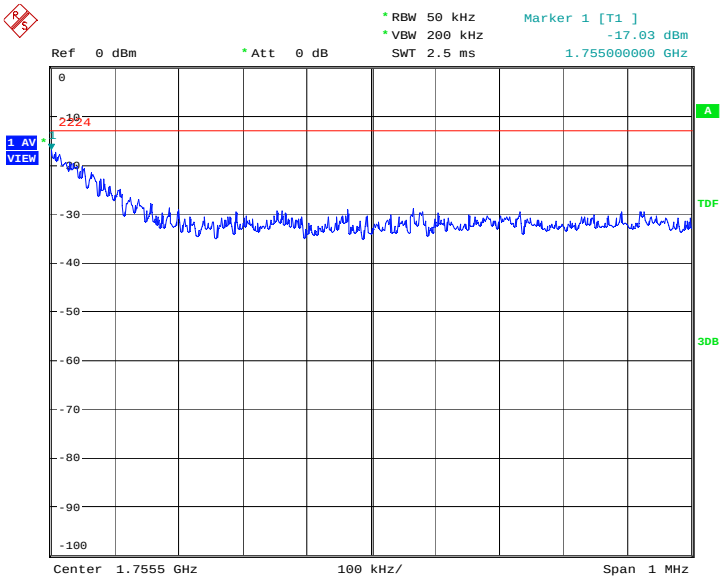
LTE band 4, 5MHz

LOW BAND EDGE BLOCK-QPSK



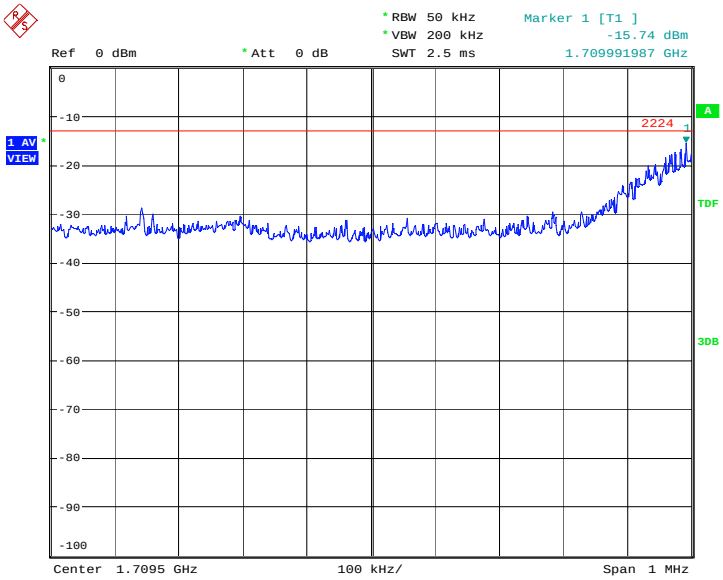
Date: 2.NOV.2013 16:37:16

HIGH BAND EDGE BLOCK-QPSK



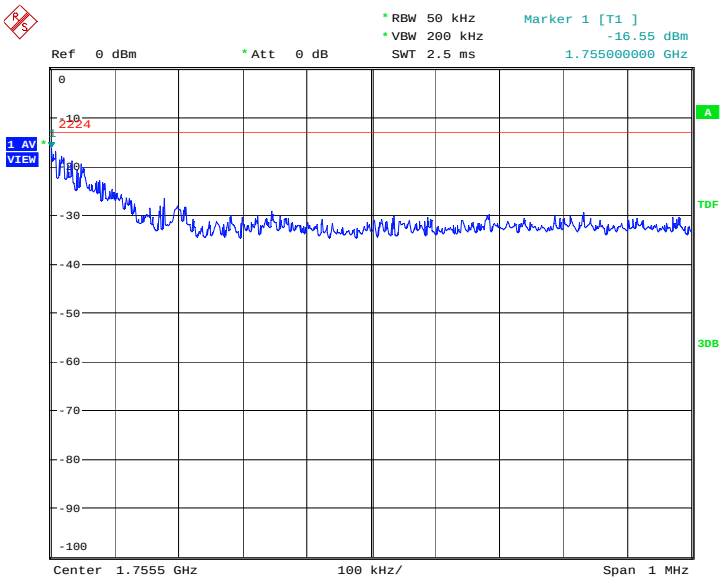
Date: 2.NOV.2013 16:40:36

LOW BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:37:26

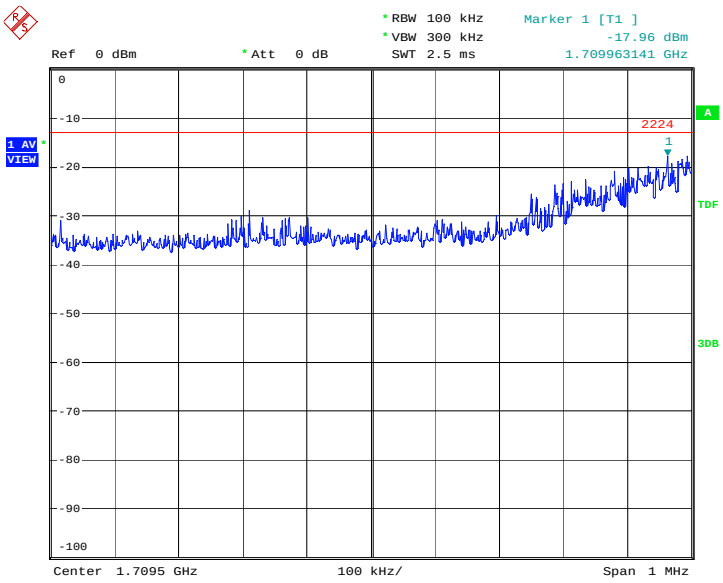
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:40:46

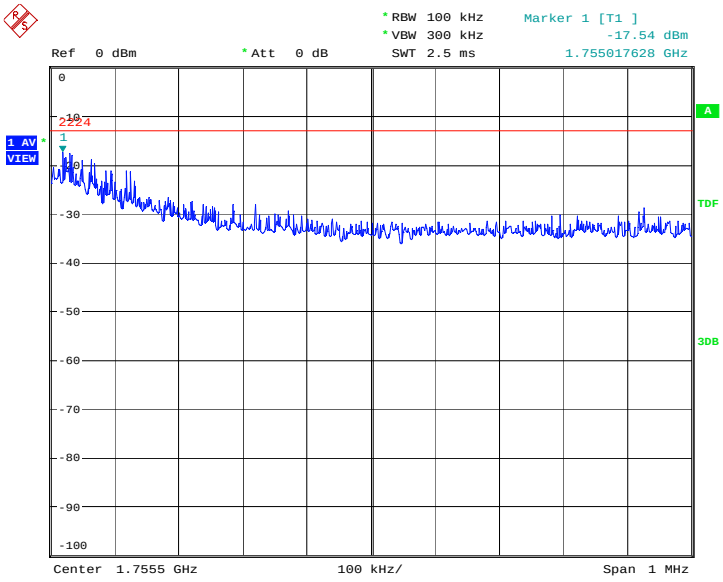
LTE band 4, 10MHz

LOW BAND EDGE BLOCK-QPSK



Date: 2.NOV.2013 16:42:45

HIGH BAND EDGE BLOCK-QPSK



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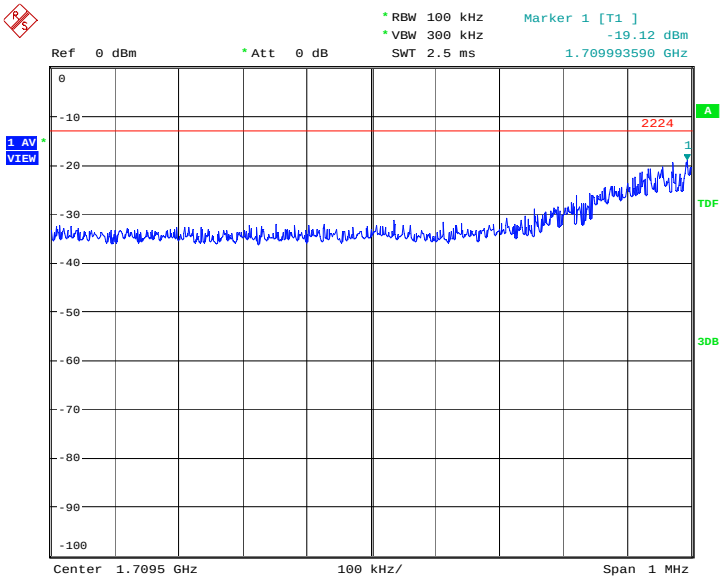
LOW BAND EDGE BLOCK-16QAM



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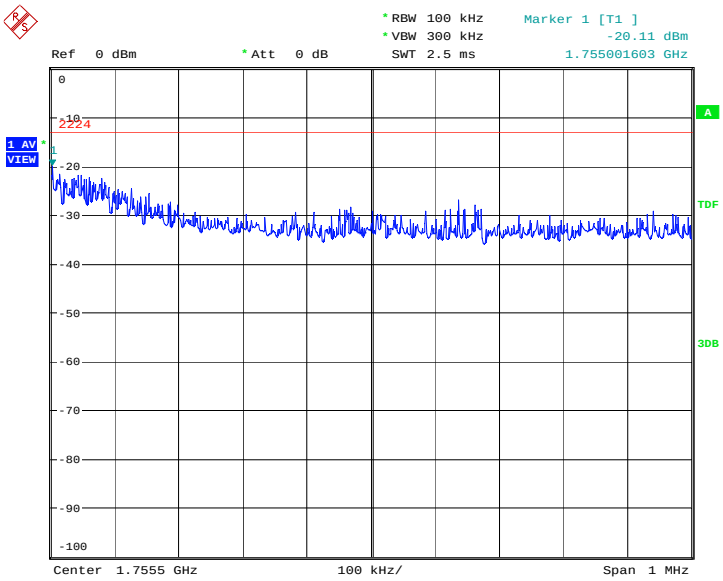
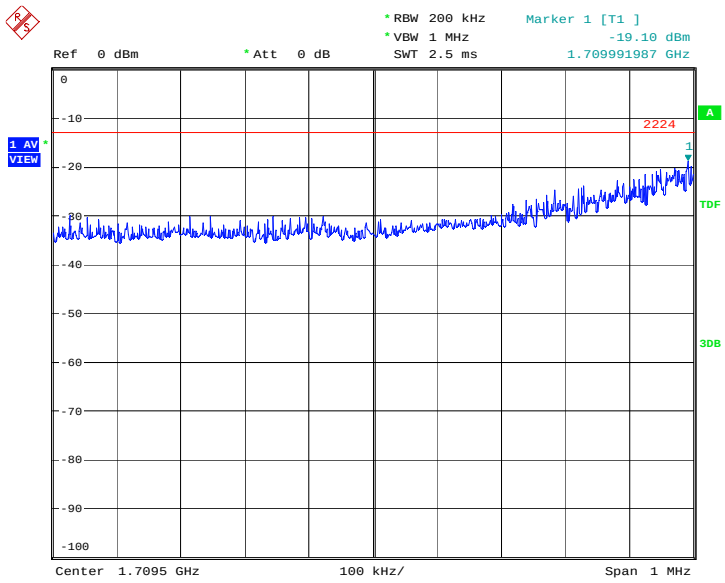
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:46:16

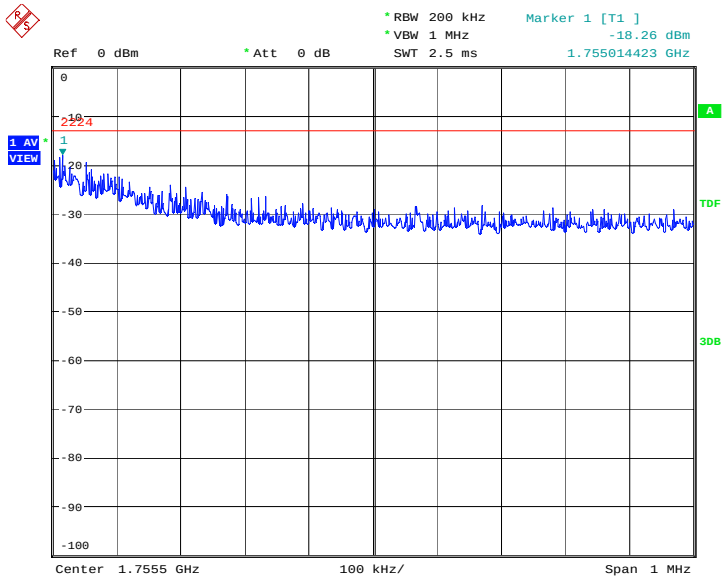
LTE band 4, 15MHz

LOW BAND EDGE BLOCK-QPSK



Date: 2.NOV.2013 16:48:15

HIGH BAND EDGE BLOCK-QPSK



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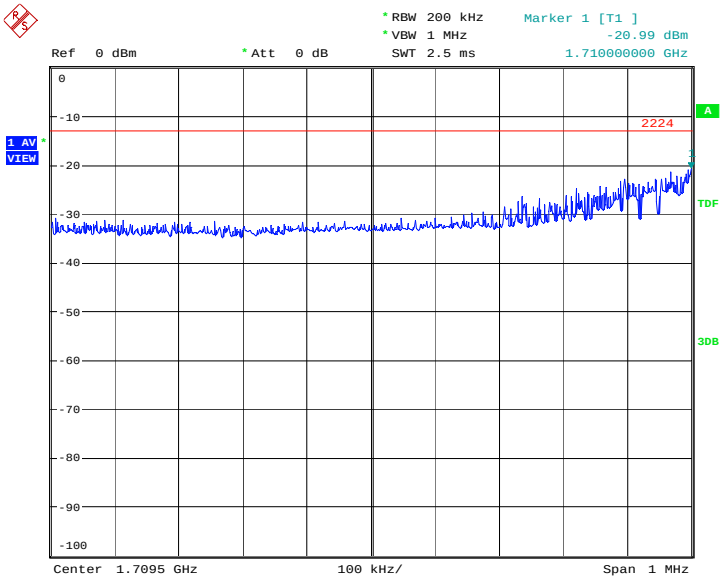
LOW BAND EDGE BLOCK-16QAM



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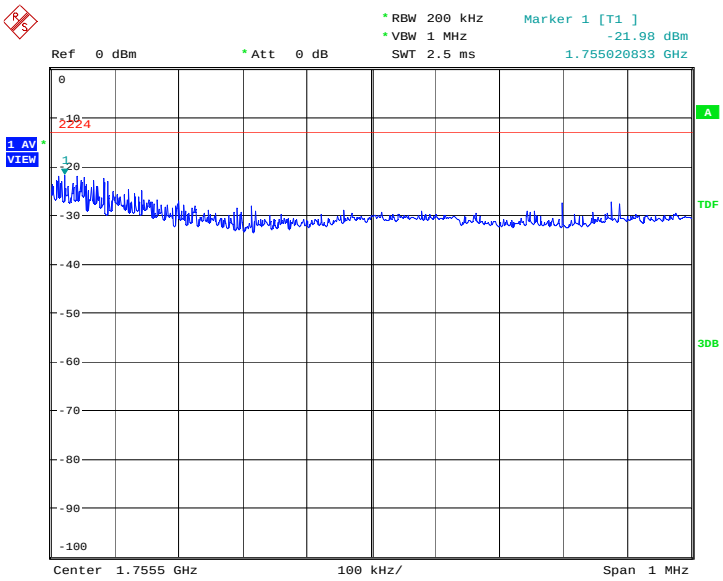
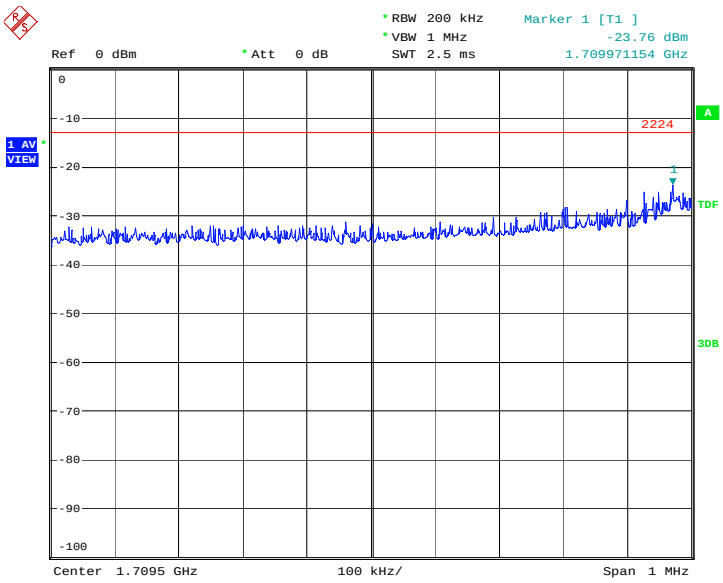
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 16:51:46

LTE band 4, 20MHz

LOW BAND EDGE BLOCK-QPSK



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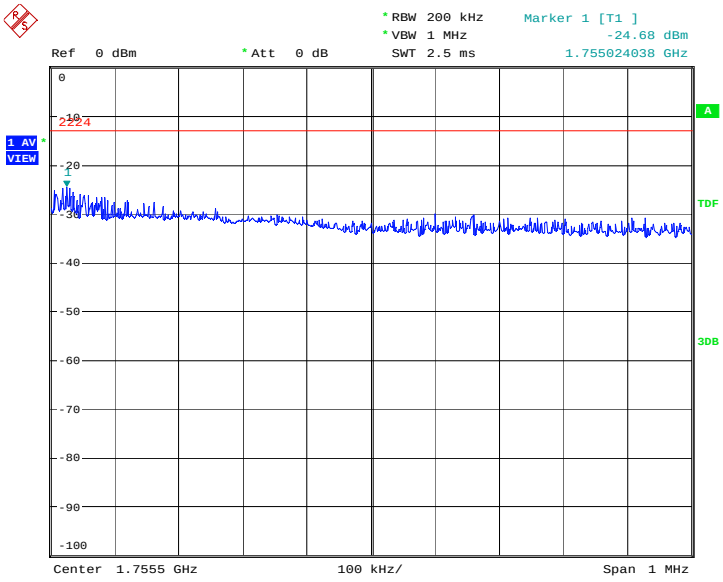
HIGH BAND EDGE BLOCK-QPSK



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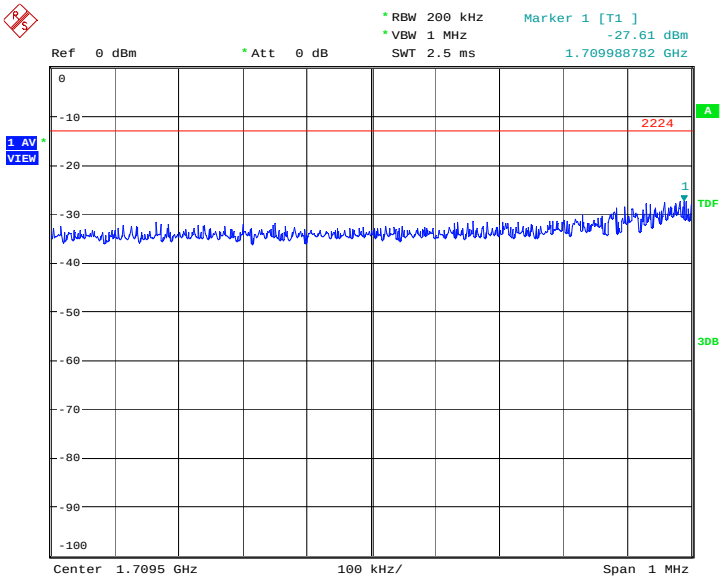

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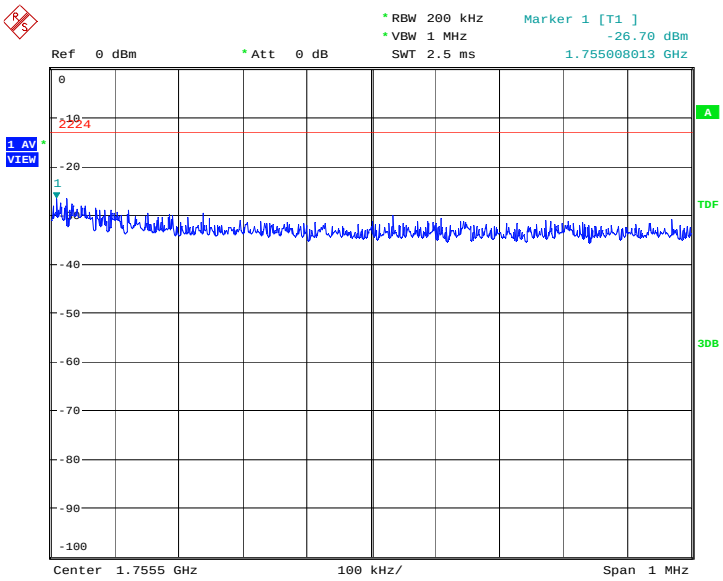
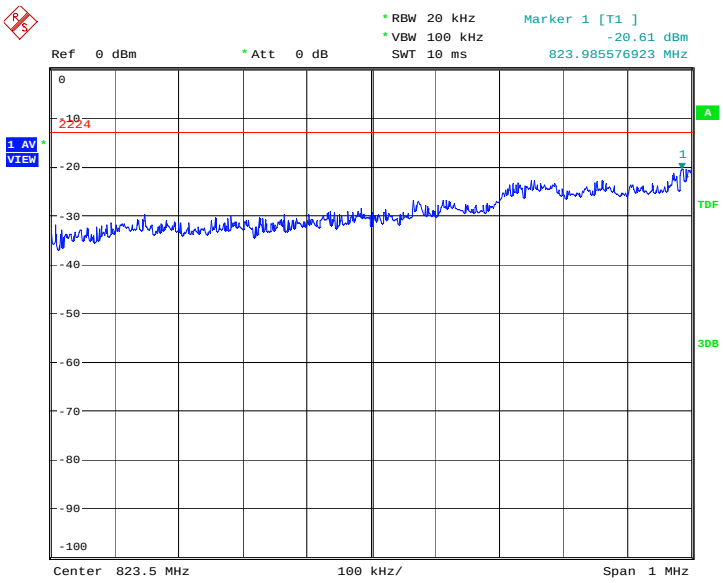


Date: 2.NOV.2013 16:57:17

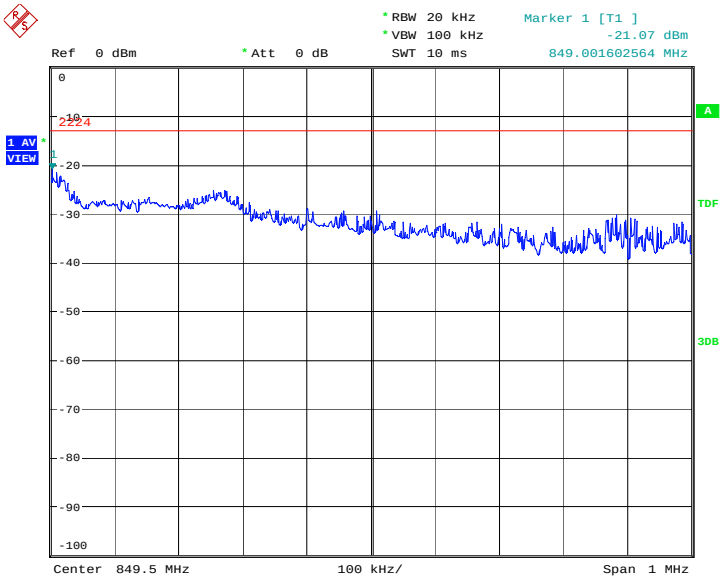
LTE band 5, 1.4MHz

LOW BAND EDGE BLOCK-QPSK



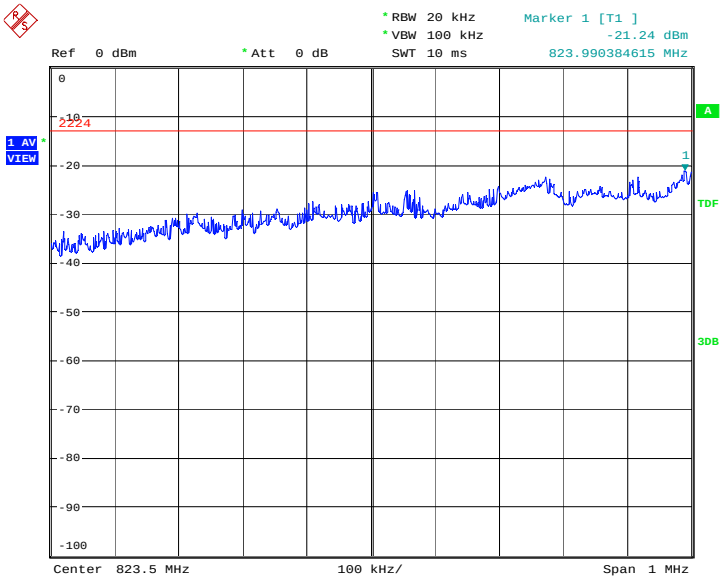
Date: 2.NOV.2013 15:31:16

HIGH BAND EDGE BLOCK-QPSK



Date: 2.NOV.2013 15:34:36

LOW BAND EDGE BLOCK-16QAM



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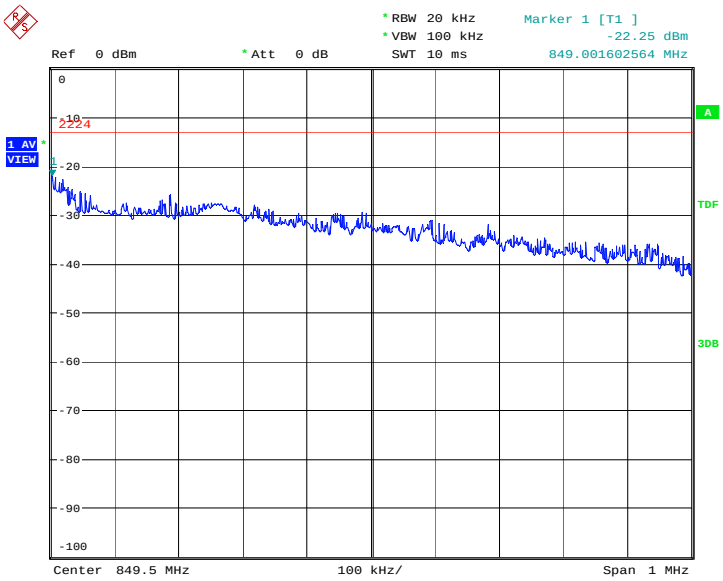
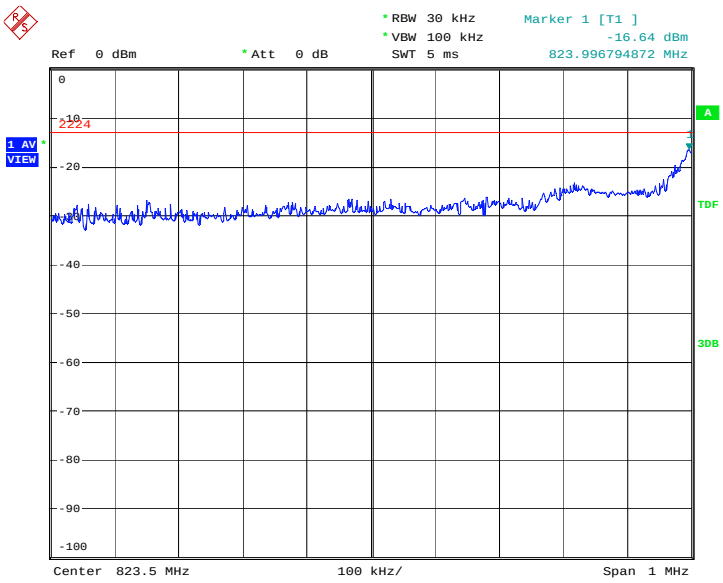


Date: 2.NOV.2013 15:34:46

LTE band 5, 3MHz

LOW BAND EDGE BLOCK-QPSK



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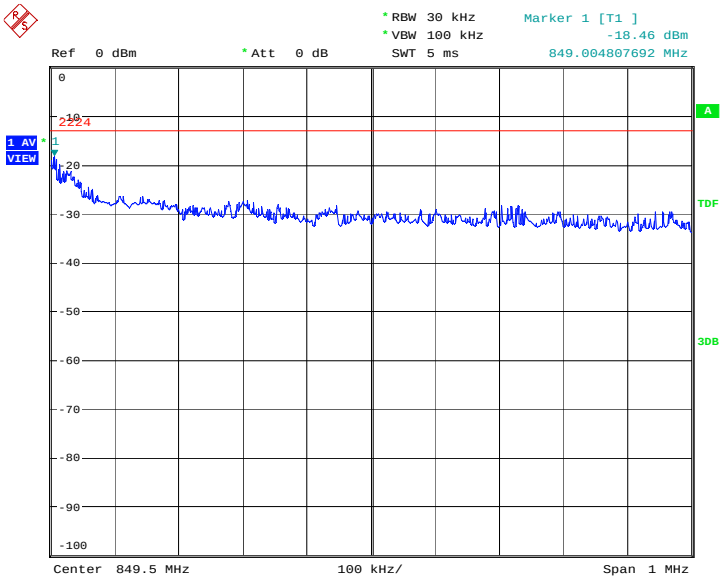
HIGH BAND EDGE BLOCK-QPSK



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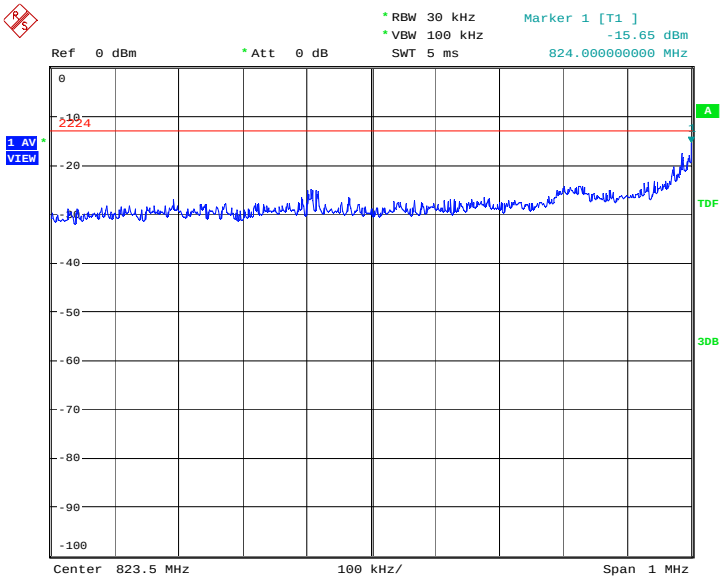
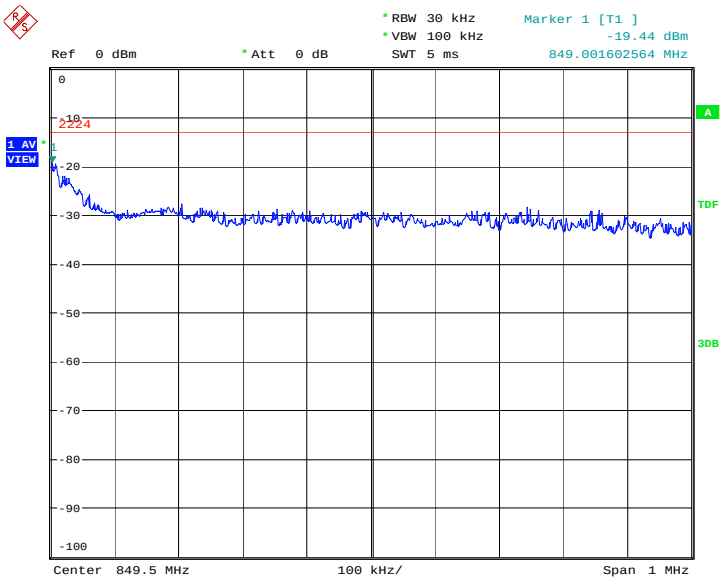
LOW BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 15:36:55

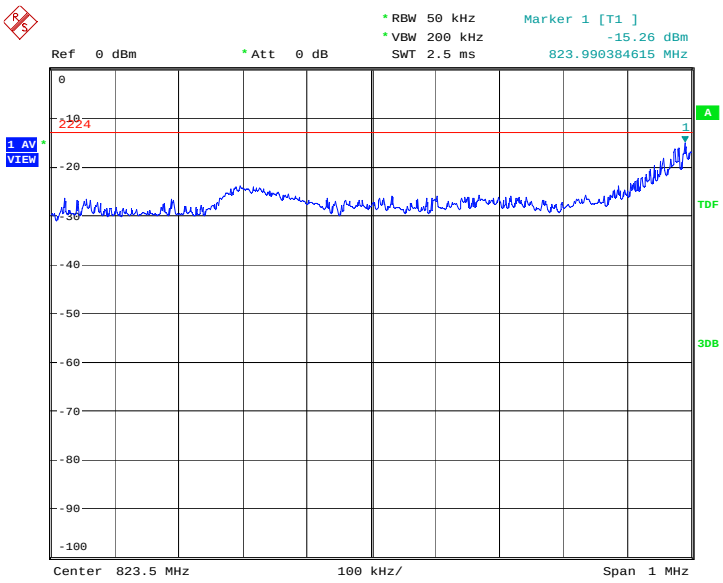
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 15:40:16

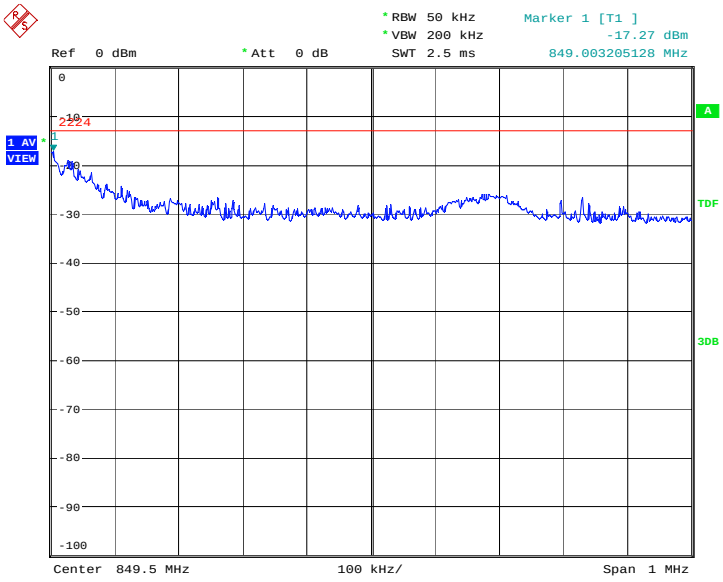
LTE band 5, 5MHz

LOW BAND EDGE BLOCK-QPSK



Date: 2.NOV.2013 15:42:15

HIGH BAND EDGE BLOCK-QPSK



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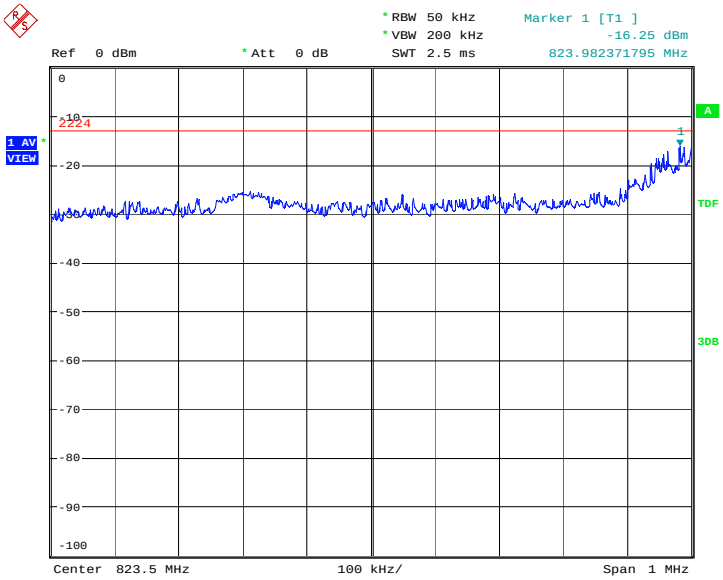
LOW BAND EDGE BLOCK-16QAM



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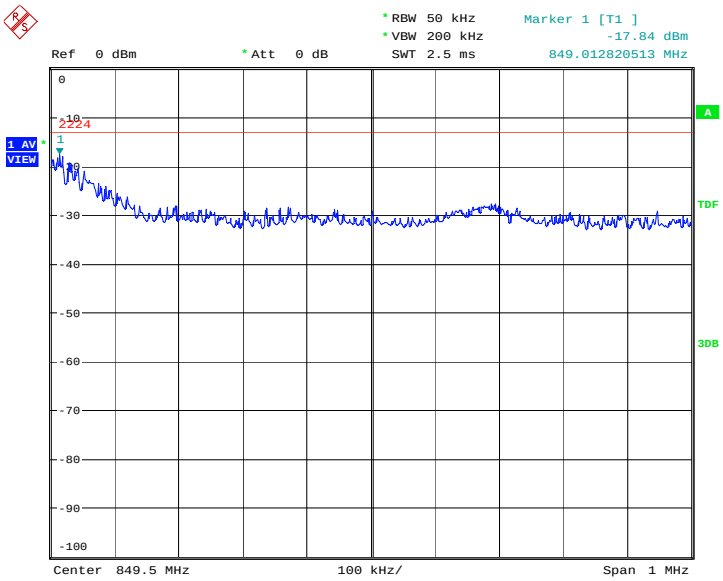
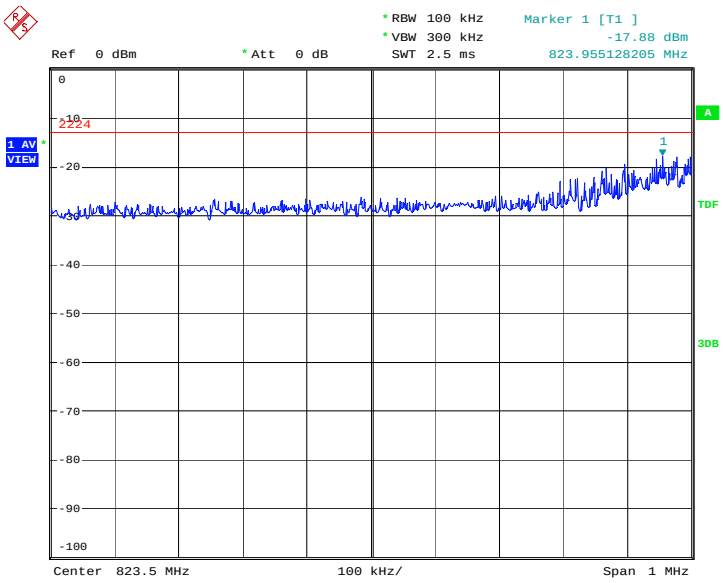
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 15:45:45

LTE band 5, 10MHz

LOW BAND EDGE BLOCK-QPSK



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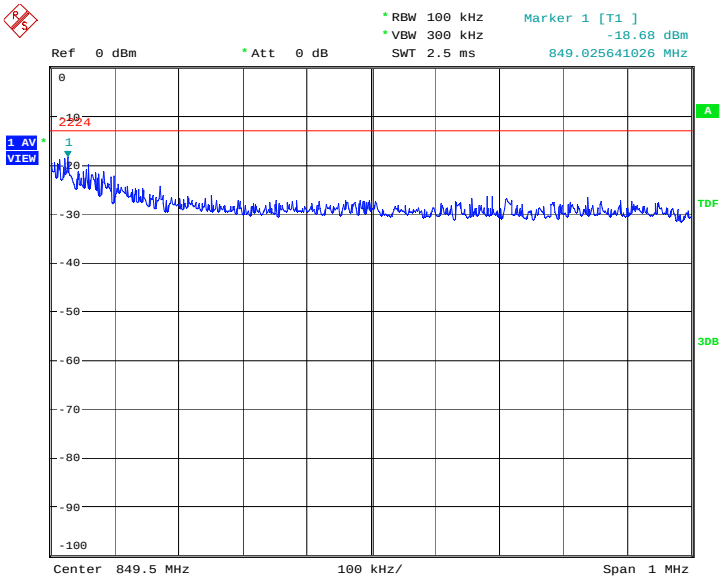
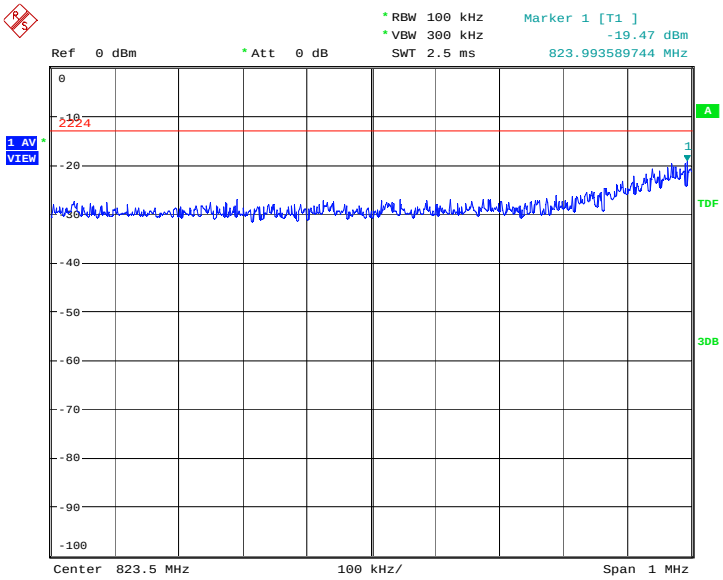
HIGH BAND EDGE BLOCK-QPSK



Date: 2.NOV.2013 15:51:04

LOW BAND EDGE BLOCK-16QAM



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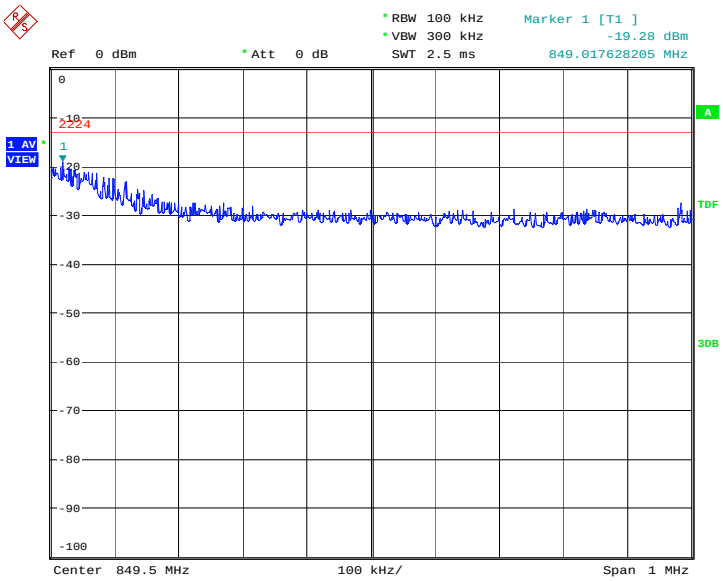
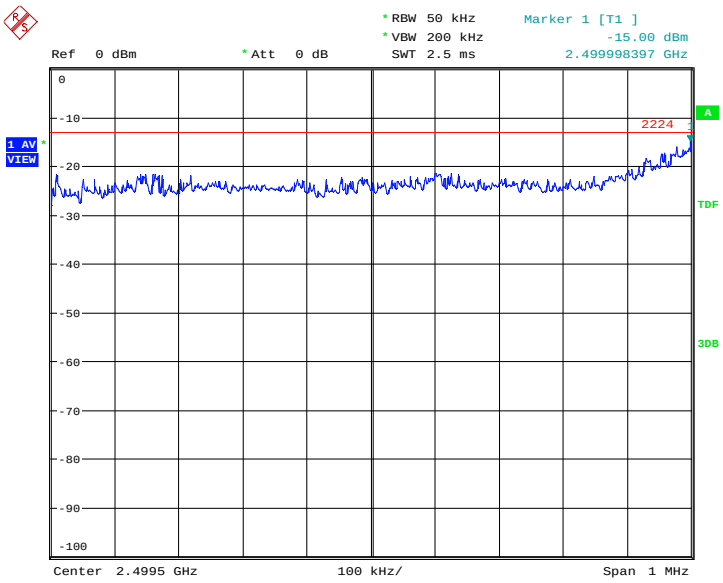
HIGH BAND EDGE BLOCK-16QAM



Date: 2.NOV.2013 15:51:14

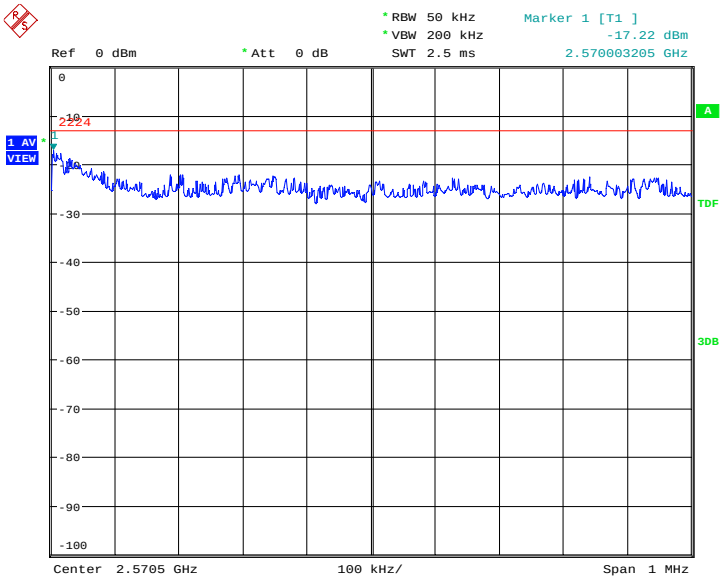
LTE band 7, 5MHz

LOW BAND EDGE BLOCK-QPSK



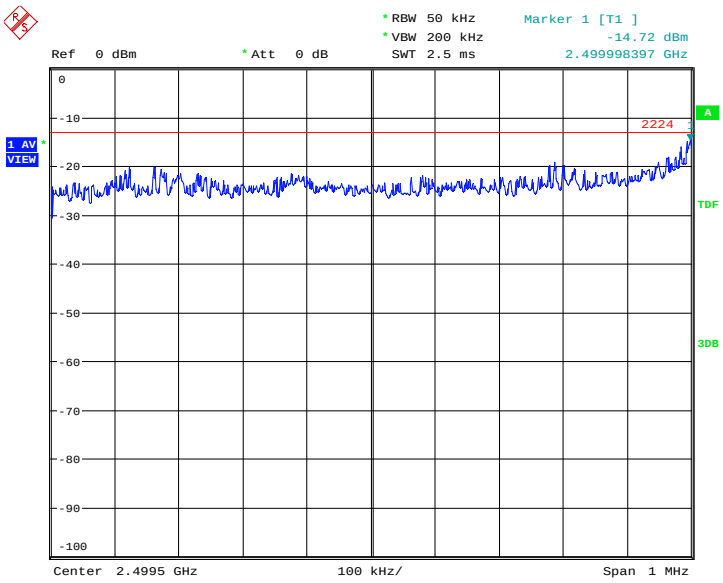
Date: 20.NOV.2013 17:01:33

HIGH BAND EDGE BLOCK-QPSK



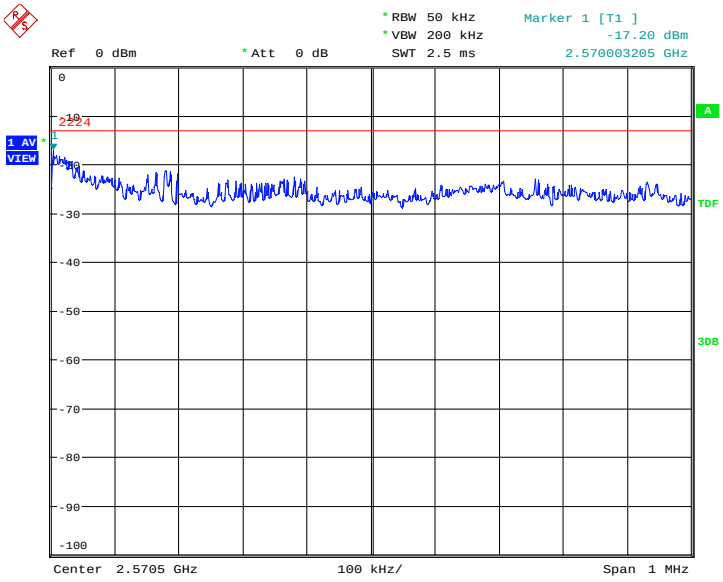
Date: 20.NOV.2013 17:04:47

LOW BAND EDGE BLOCK-16QAM



Date: 20.NOV.2013 17:01:42

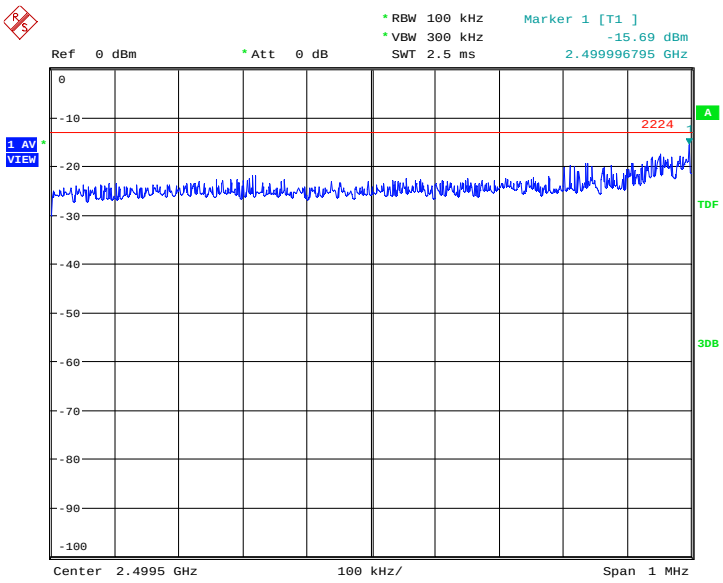
HIGH BAND EDGE BLOCK-16QAM



Date: 20.NOV.2013 17:04:56

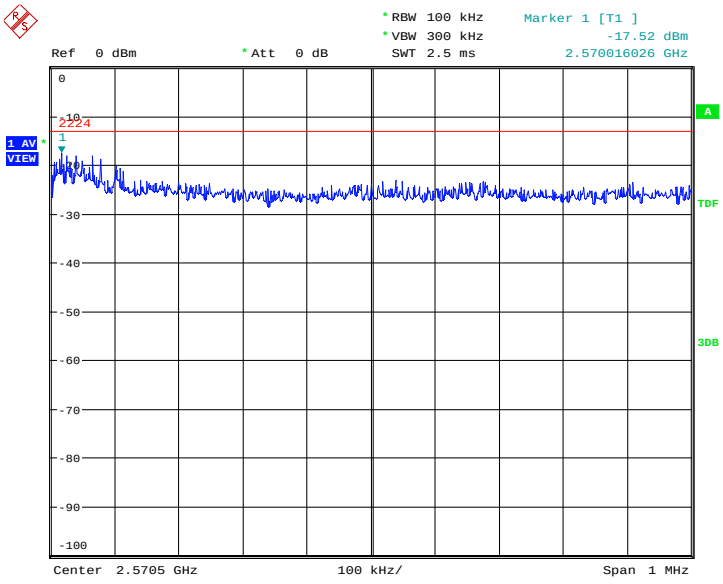
LTE band 7, 10MHz

LOW BAND EDGE BLOCK-QPSK



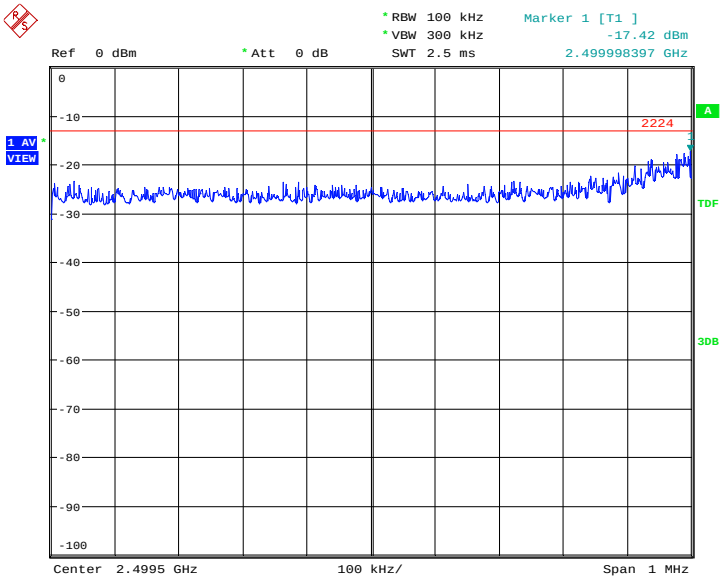
Date: 20.NOV.2013 17:25:37

HIGH BAND EDGE BLOCK-QPSK



Date: 20.NOV.2013 17:28:51

LOW BAND EDGE BLOCK-16QAM



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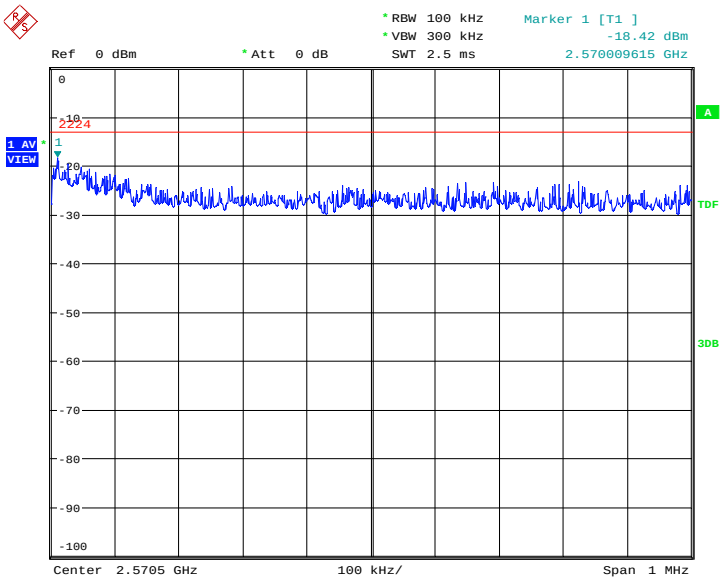
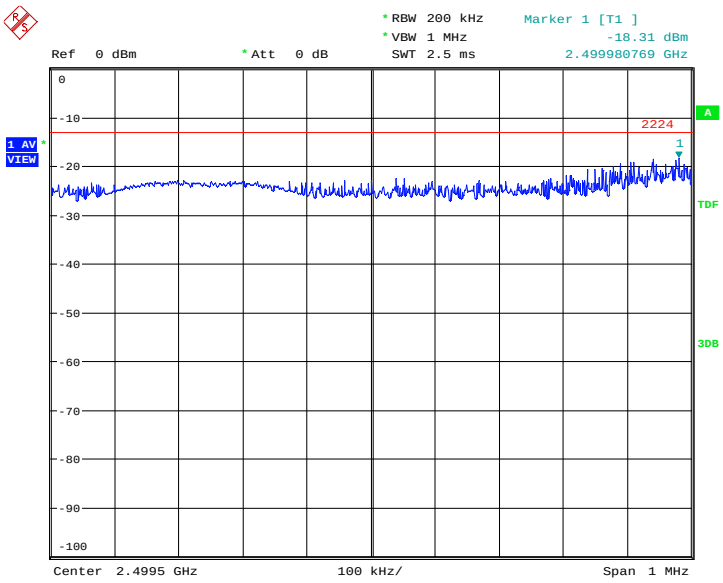
HIGH BAND EDGE BLOCK-16QAM



Date: 20.NOV.2013 17:29:00

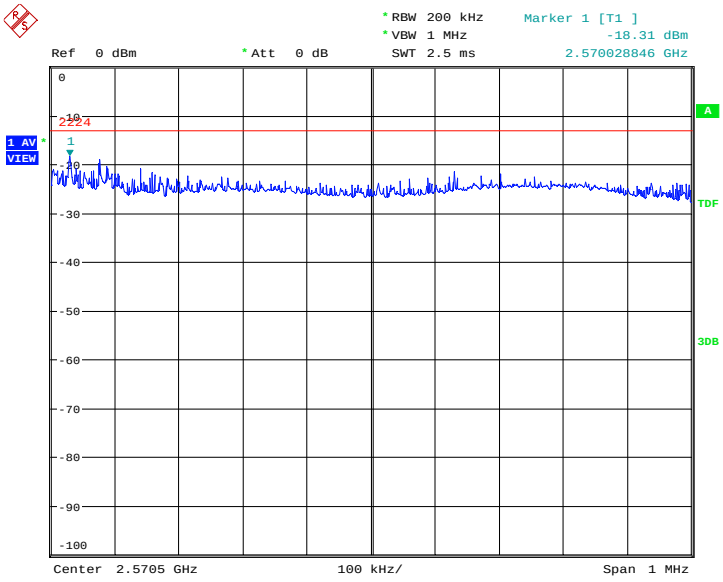
LTE band 7, 15MHz

LOW BAND EDGE BLOCK-QPSK



Date: 20.NOV.2013 17:49:53

HIGH BAND EDGE BLOCK-QPSK



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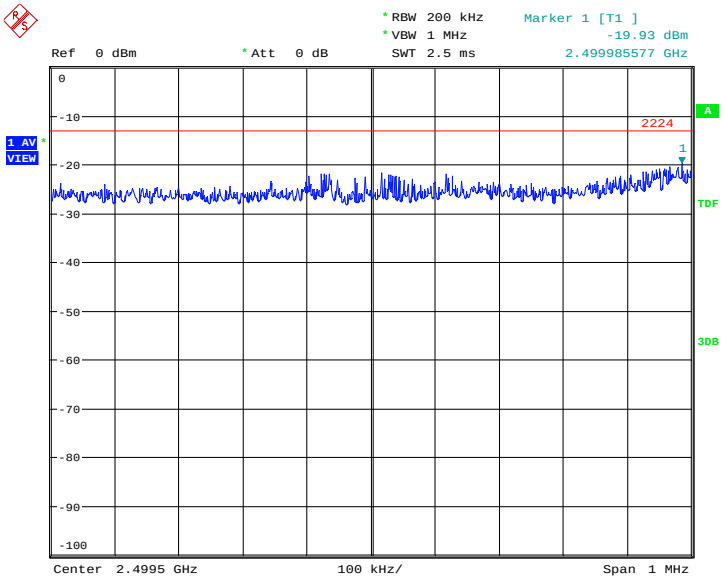
LOW BAND EDGE BLOCK-16QAM



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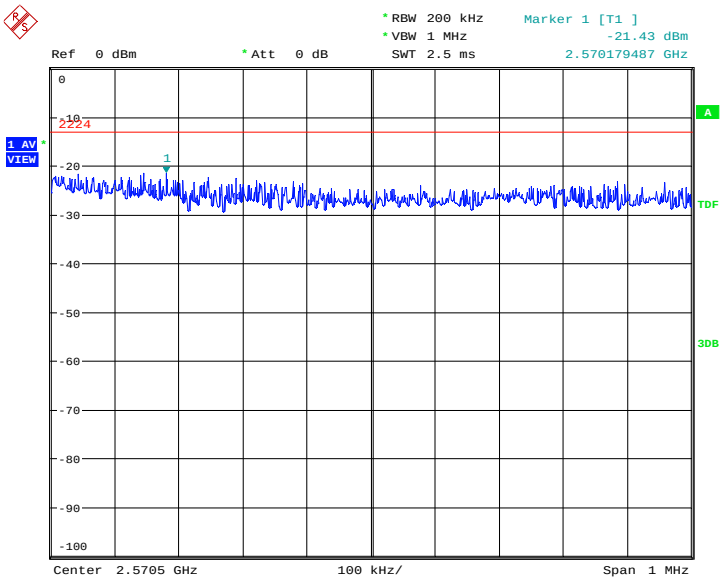
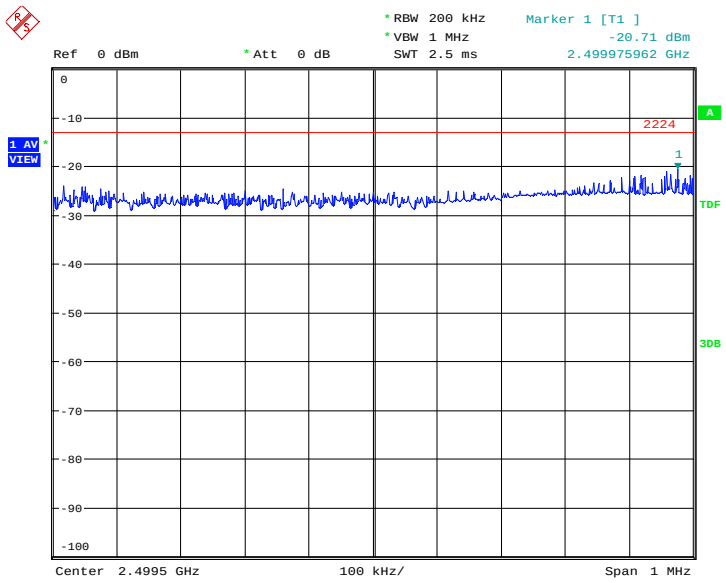
HIGH BAND EDGE BLOCK-16QAM



Date: 20.NOV.2013 17:53:16

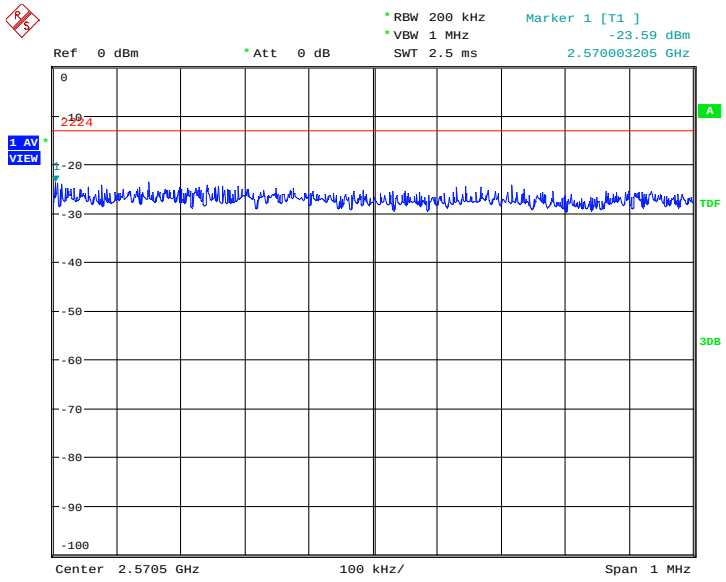
LTE band 7, 20MHz

LOW BAND EDGE BLOCK-QPSK



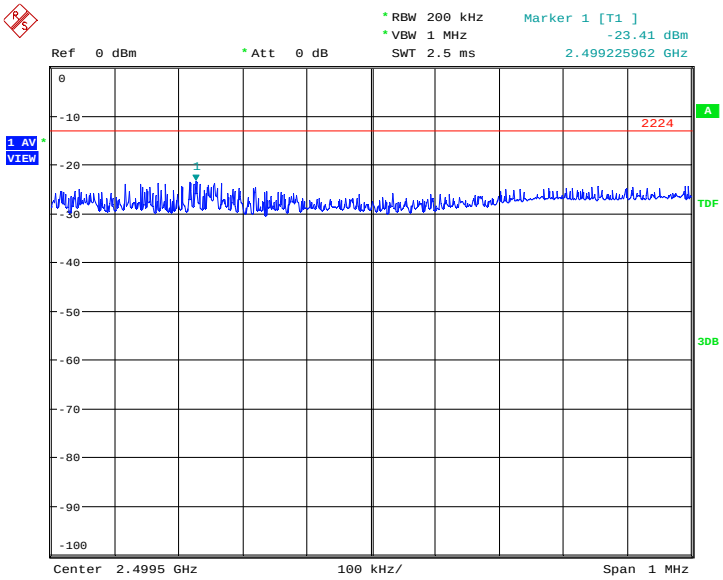
Date: 20.NOV.2013 18:13:54

HIGH BAND EDGE BLOCK-QPSK



Date: 20.NOV.2013 18:17:09

LOW BAND EDGE BLOCK-16QAM



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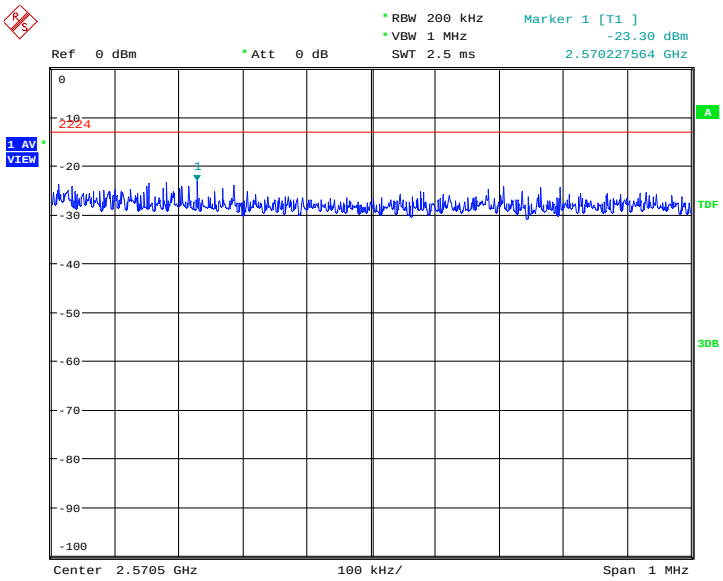
HIGH BAND EDGE BLOCK-16QAM



Date: 20.NOV.2013 18:17:18

A.8 CONDUCTED SPURIOUS EMISSION

Reference

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

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.
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.

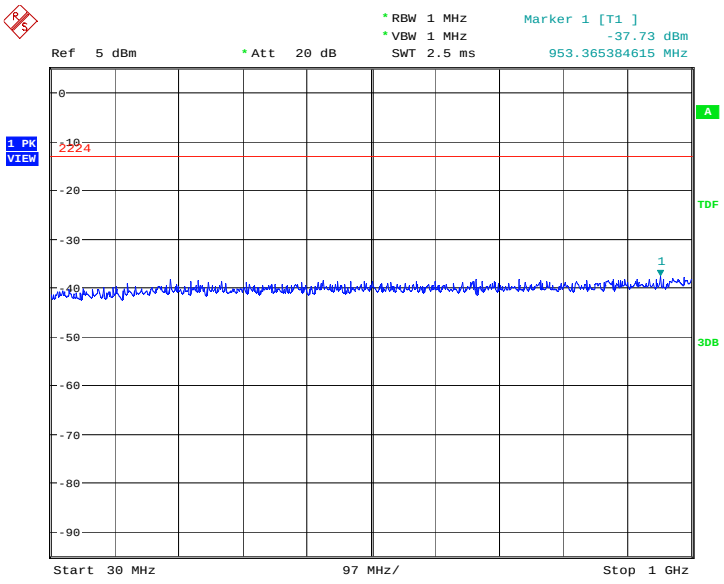
A. 8.3 Measurement result

Measurement Uncertainty: 0.3dB

LTE band 2, 1.4MHz bandwidth

QPSK: 30MHz – 1GHz

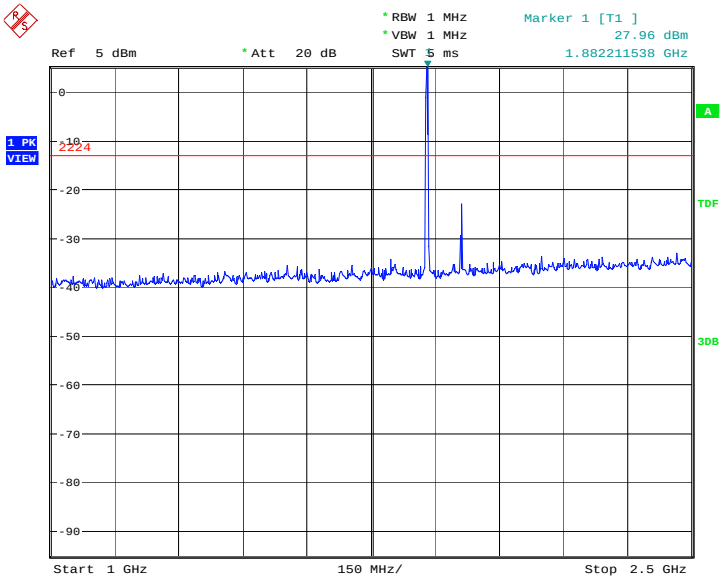
Spurious emission limit –13dBm.



Date: 3.NOV.2013 14:58:09

QPSK: 1GHz – 2.5GHz

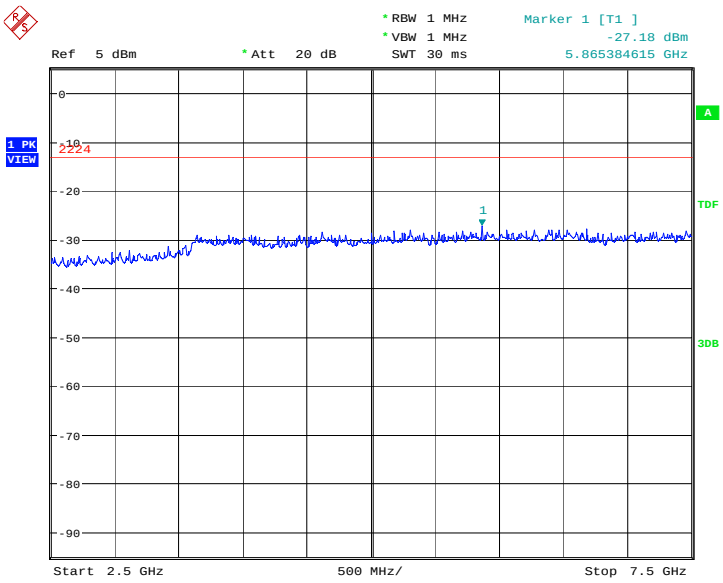
Spurious emission limit –13dBm.



Date: 3.NOV.2013 14:58:17

QPSK: 2.5GHz – 7.5GHz

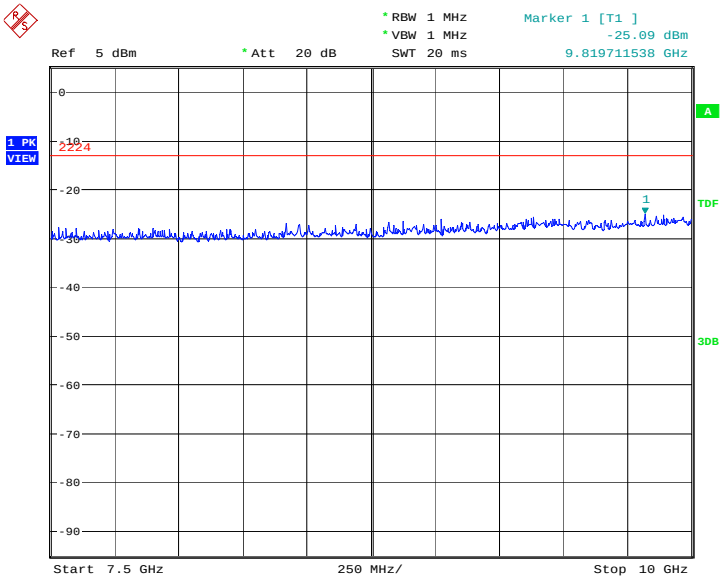
Spurious emission limit –13dBm.



Date: 3.NOV.2013 14:58:25

QPSK: 7.5GHz –10GHz

Spurious emission limit –13dBm.



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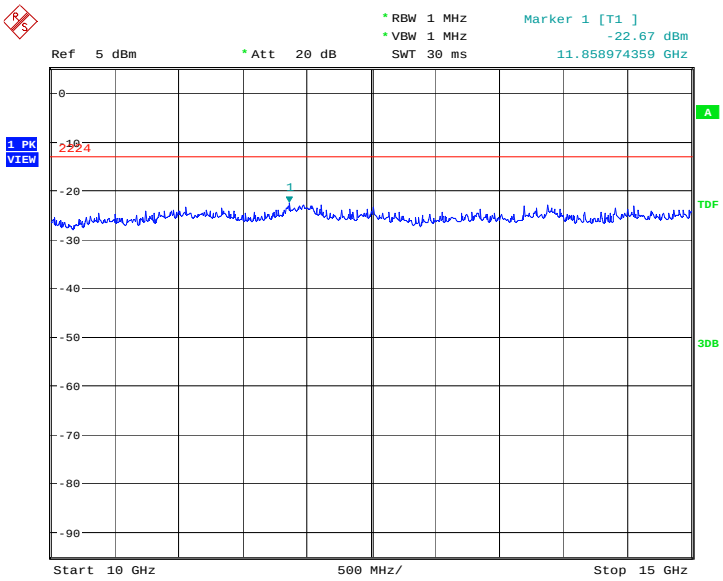
QPSK: 10GHz –15GHz

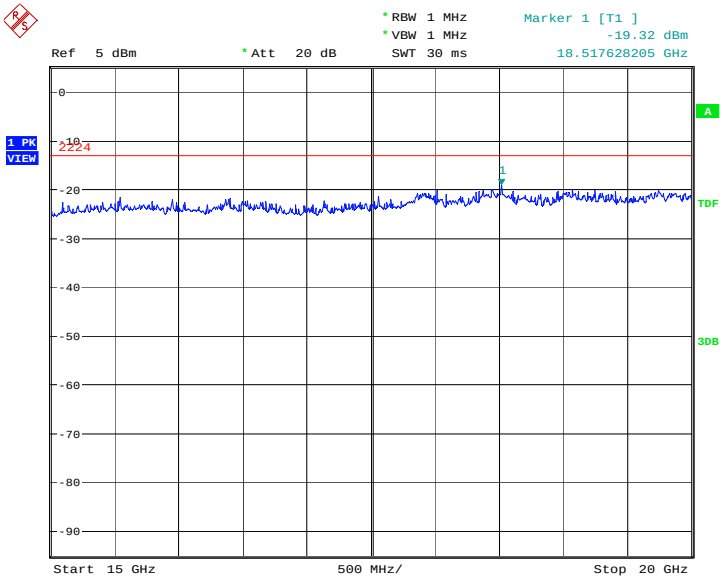
Spurious emission limit –13dBm.



Date: 3.NOV.2013 14:58:41

QPSK: 15GHz –20GHz

Spurious emission limit –13dBm.



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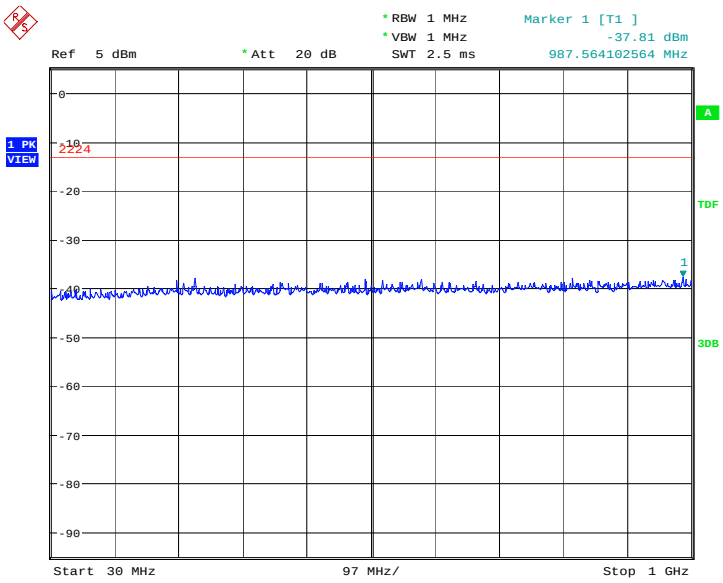
16QAM: 30MHz – 1GHz

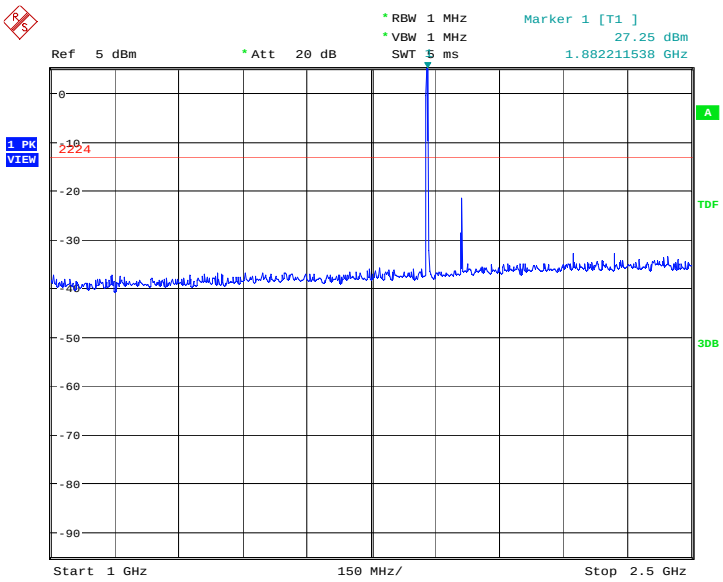
Spurious emission limit –13dBm.



Date: 3.NOV.2013 14:58:59

16QAM: 1GHz – 2.5GHz

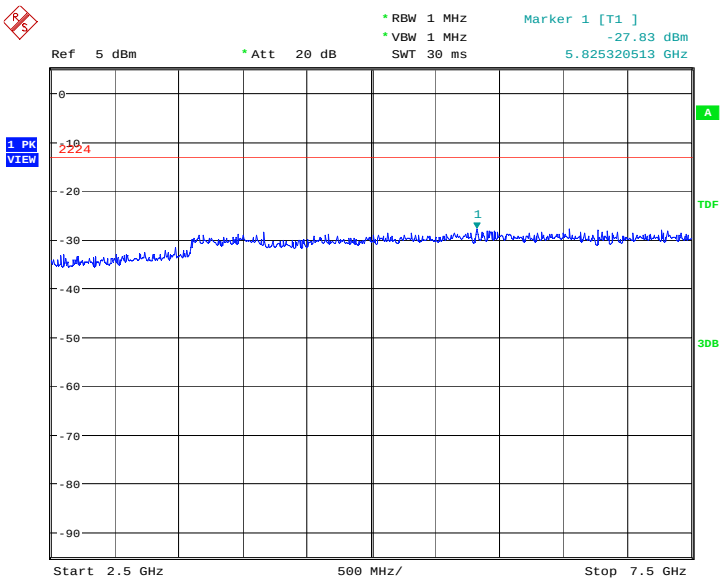
Spurious emission limit –13dBm.



Date: 3.NOV.2013 14:59:07

16QAM: 2.5GHz – 7.5GHz

Spurious emission limit –13dBm.



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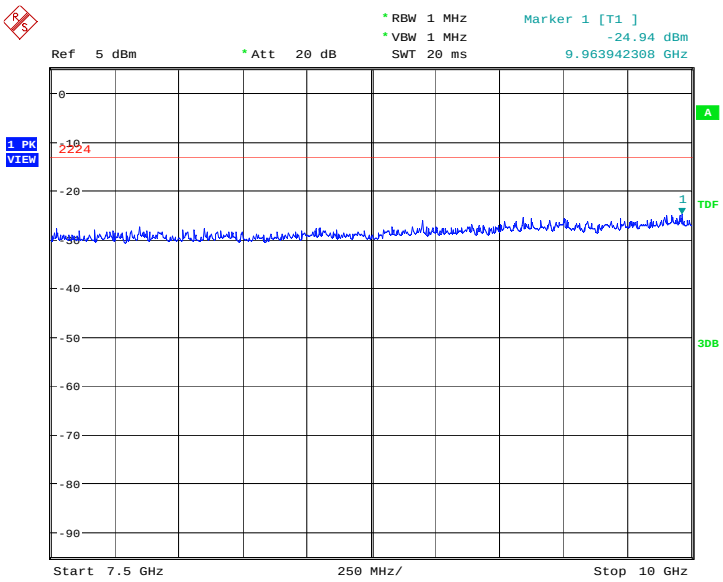
16QAM: 7.5GHz –10GHz

Spurious emission limit –13dBm.



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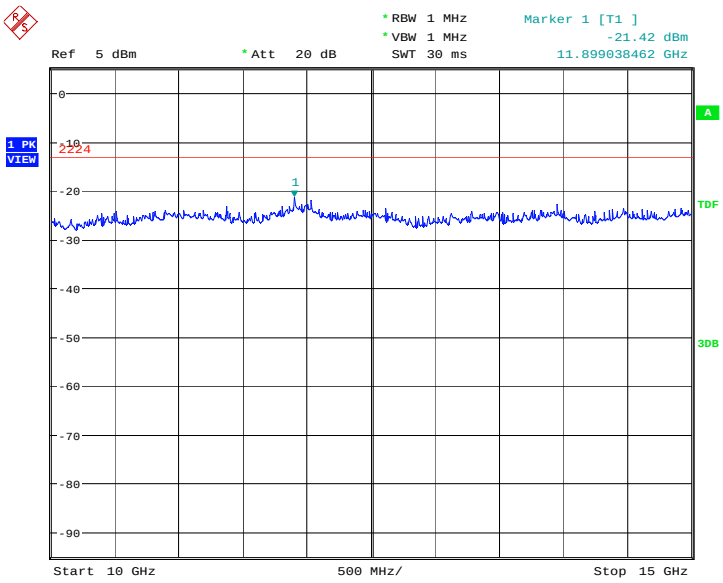
16QAM: 10GHz –15GHz

Spurious emission limit –13dBm.



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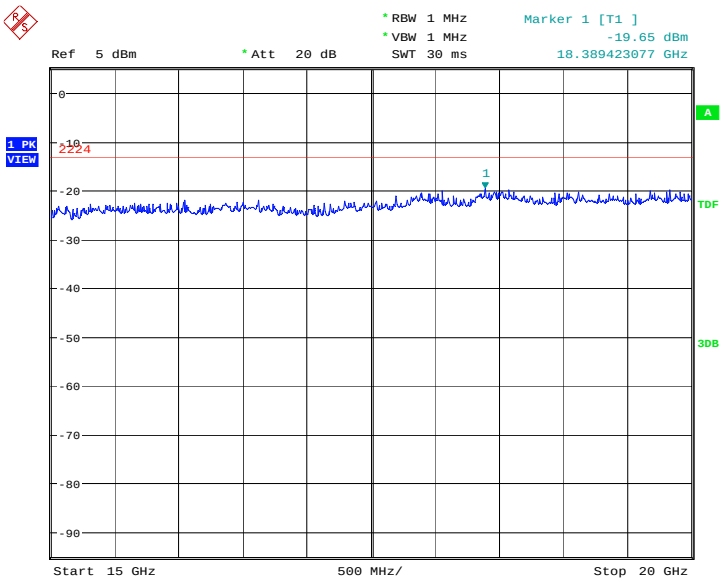
16QAM: 15GHz –20GHz

Spurious emission limit –13dBm.



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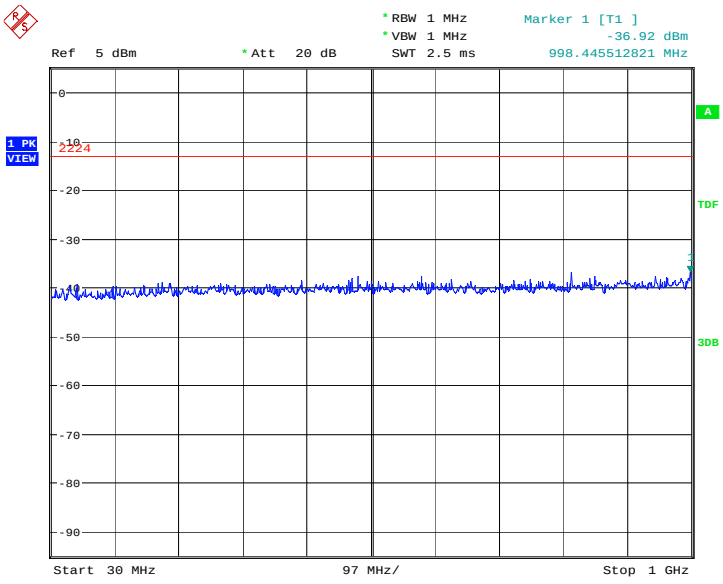
LTE band 4, 1.4MHz bandwidth

QPSK: 30MHz – 1GHz

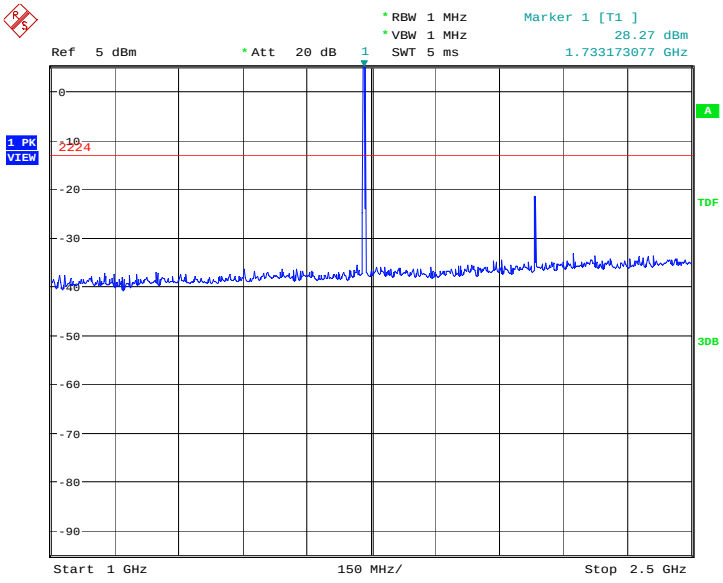
Spurious emission limit –13dBm.



Date: 3.NOV.2013 15:00:28

QPSK: 1GHz – 2.5GHz

Spurious emission limit –13dBm.



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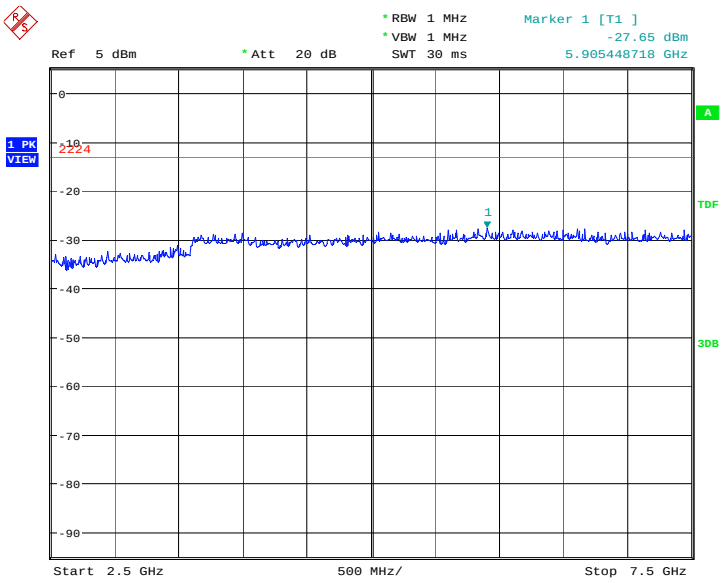
QPSK: 2.5GHz – 7.5GHz

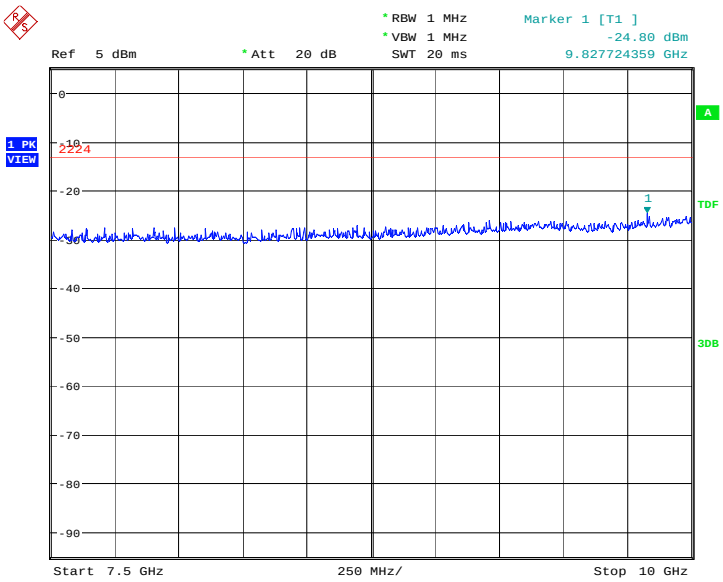
Spurious emission limit –13dBm.



Date: 3.NOV.2013 15:00:44

QPSK: 7.5GHz –10GHz

Spurious emission limit –13dBm.



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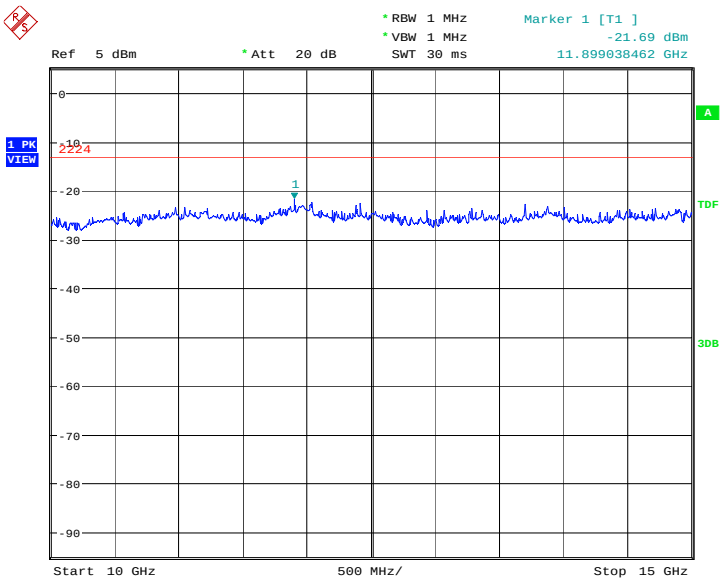
QPSK: 10GHz –15GHz

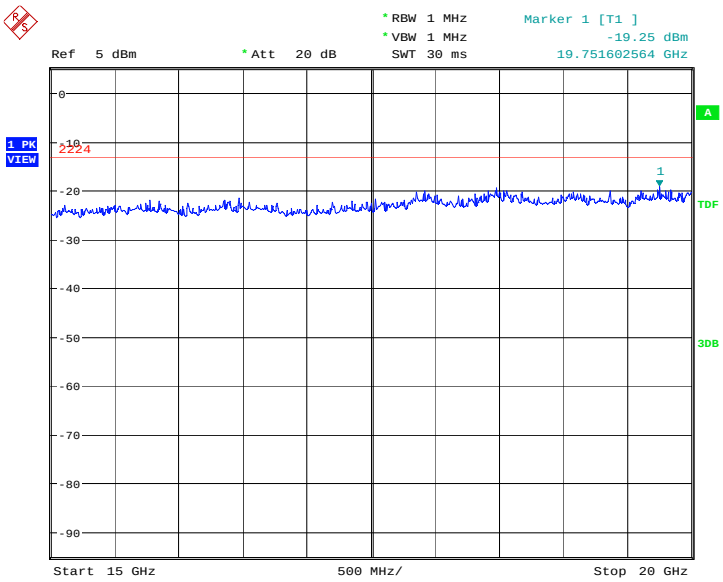
Spurious emission limit –13dBm.



Date: 3.NOV.2013 15:01:00

QPSK: 15GHz –20GHz

Spurious emission limit –13dBm.



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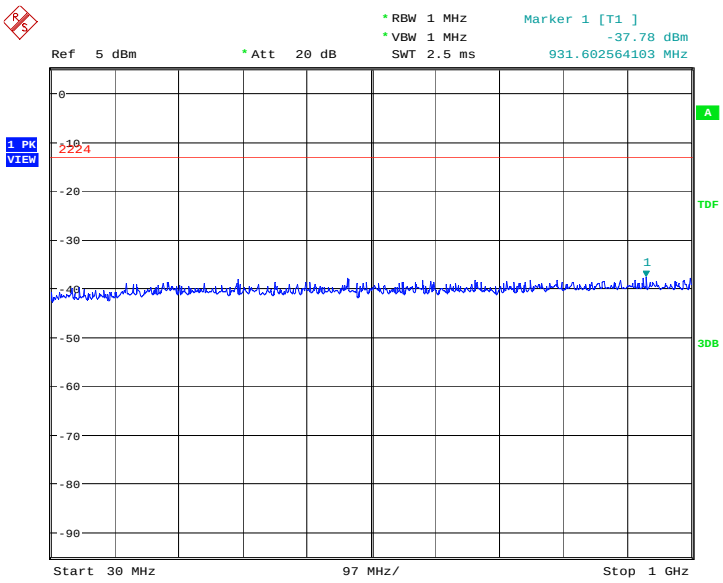
16QAM: 30MHz – 1GHz

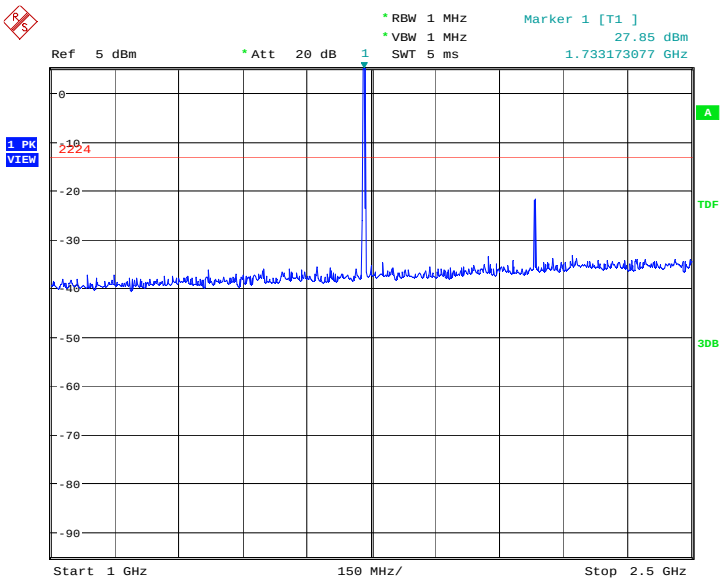
Spurious emission limit –13dBm.



Date: 3.NOV.2013 15:01:18

16QAM: 1GHz – 2.5GHz

Spurious emission limit –13dBm.



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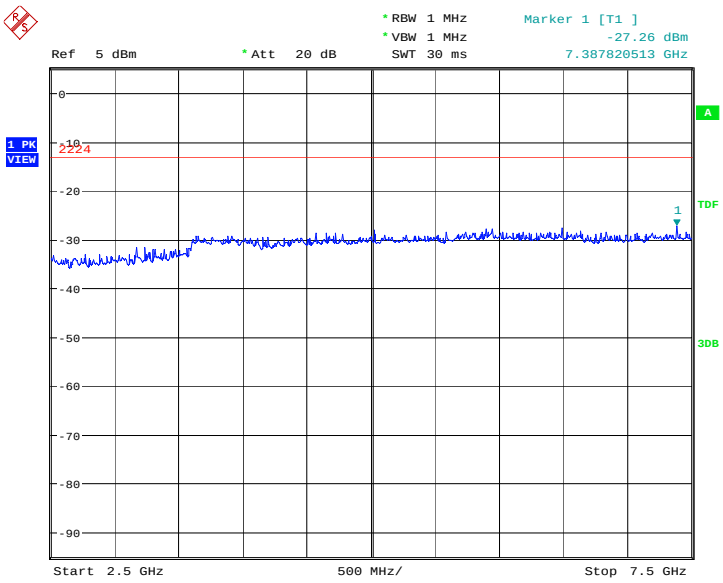
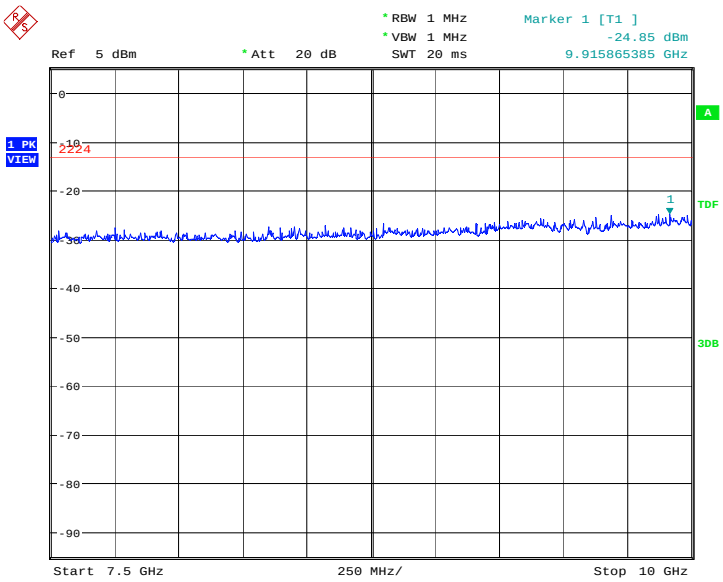
16QAM: 2.5GHz – 7.5GHz

Spurious emission limit –13dBm.



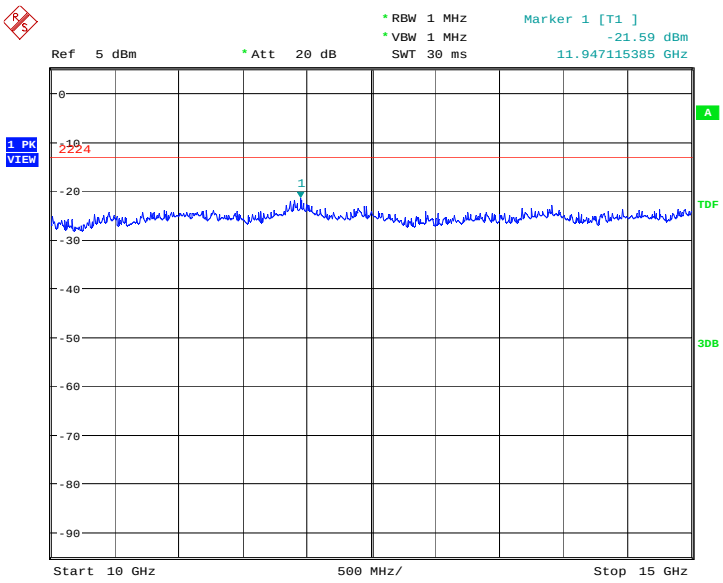
16QAM: 7.5GHz –10GHz

Spurious emission limit –13dBm.



16QAM: 10GHz –15GHz

Spurious emission limit –13dBm.



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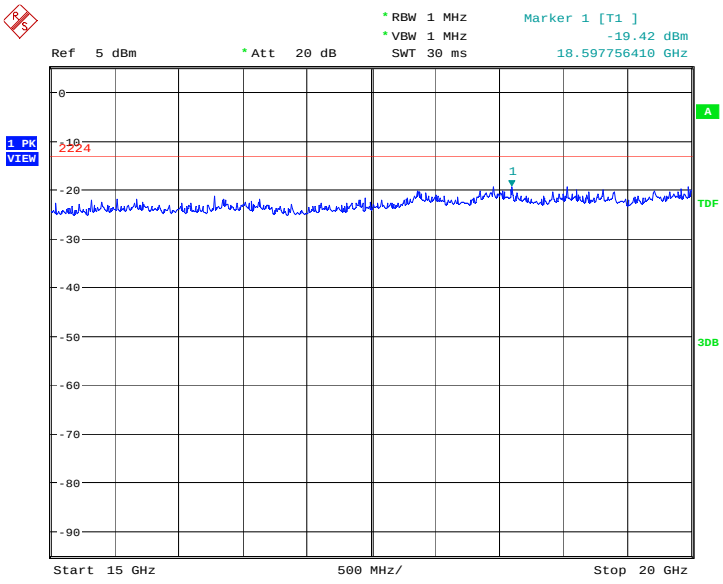
16QAM: 15GHz –20GHz

Spurious emission limit –13dBm.



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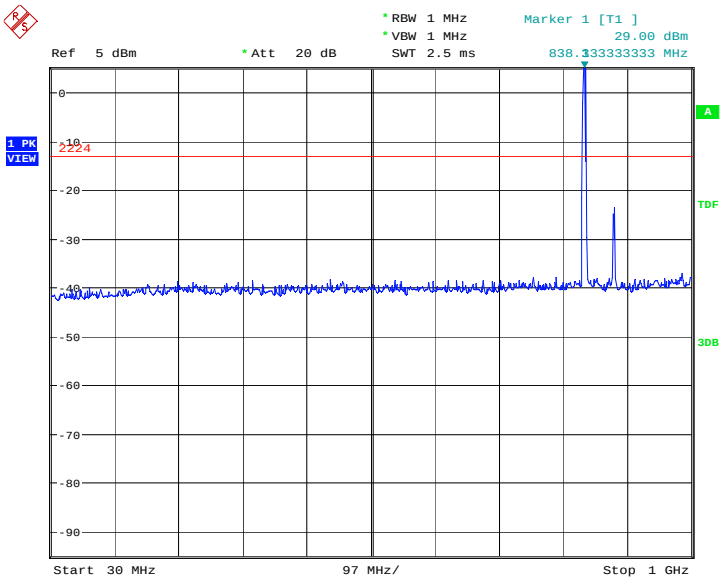
LTE band 5, 1.4MHz bandwidth

QPSK: 30MHz – 1GHz

Spurious emission limit –13dBm.



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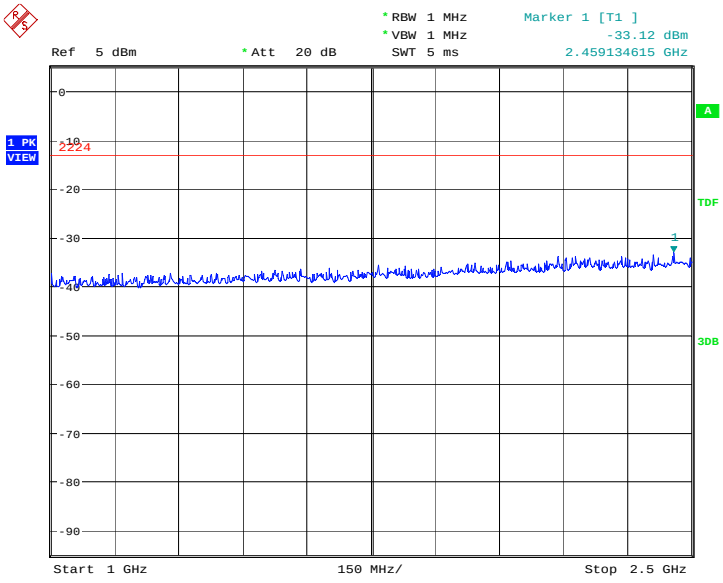
QPSK: 1GHz – 2.5GHz

Spurious emission limit –13dBm.



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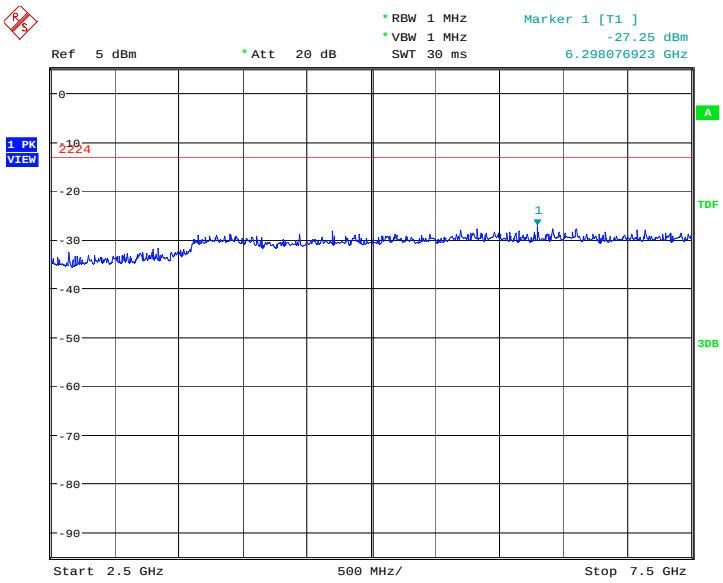
QPSK: 2.5GHz – 7.5GHz

Spurious emission limit –13dBm.



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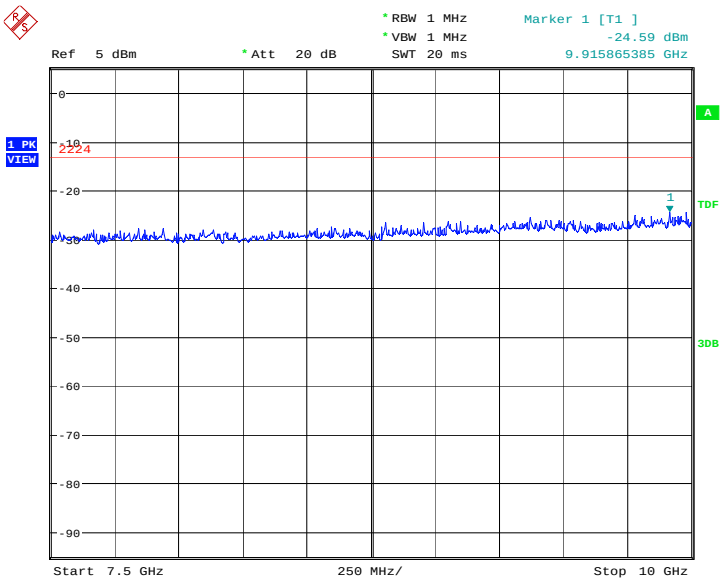
QPSK: 7.5GHz –10GHz

Spurious emission limit –13dBm.



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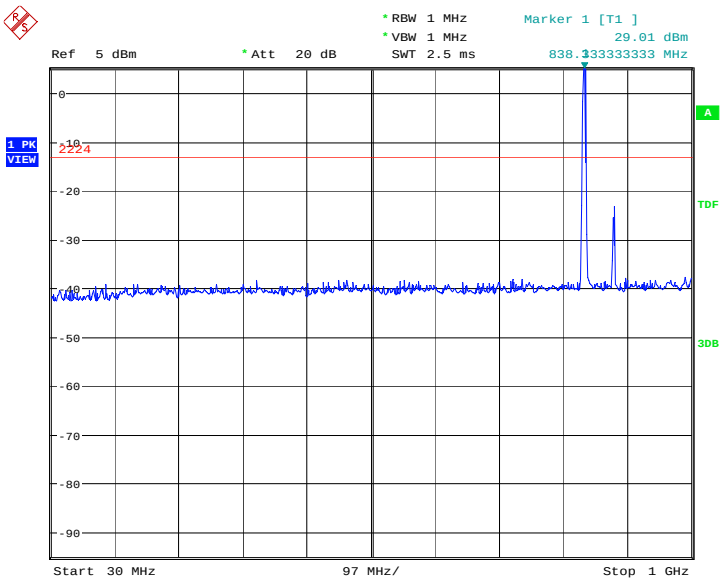
16QAM: 30MHz – 1GHz

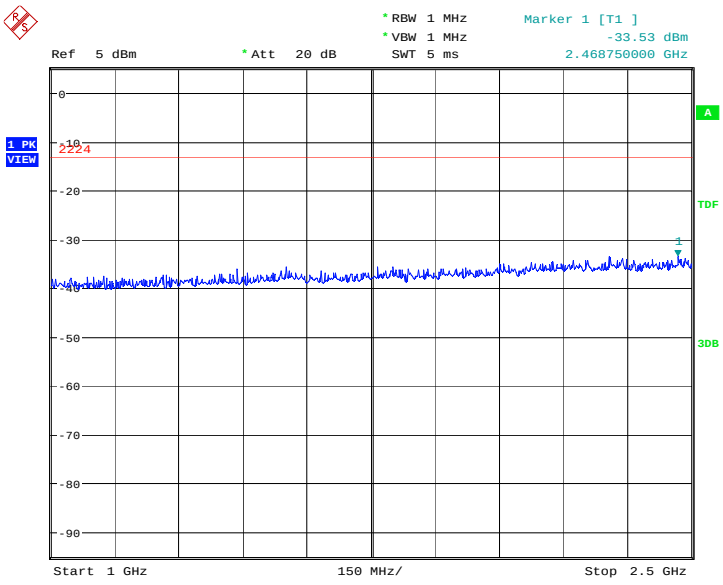
Spurious emission limit –13dBm.



Date: 3.NOV.2013 14:56:54

16QAM: 1GHz – 2.5GHz

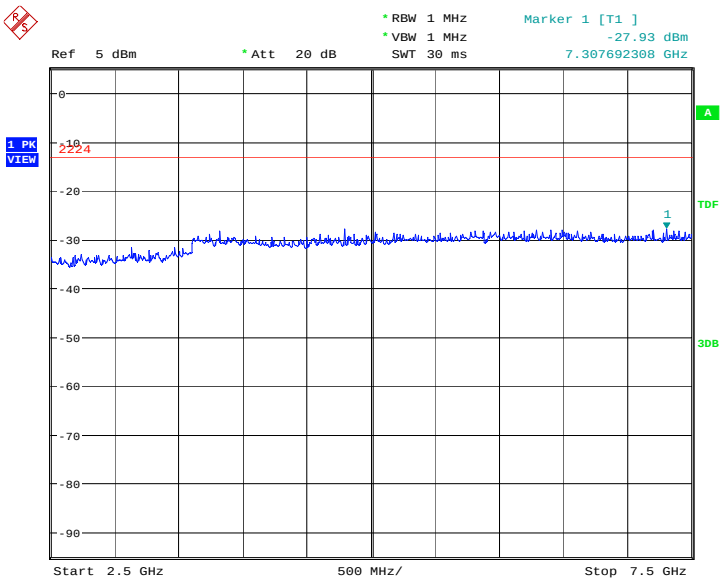
Spurious emission limit –13dBm.



Date: 3.NOV.2013 14:57:02

16QAM: 2.5GHz – 7.5GHz

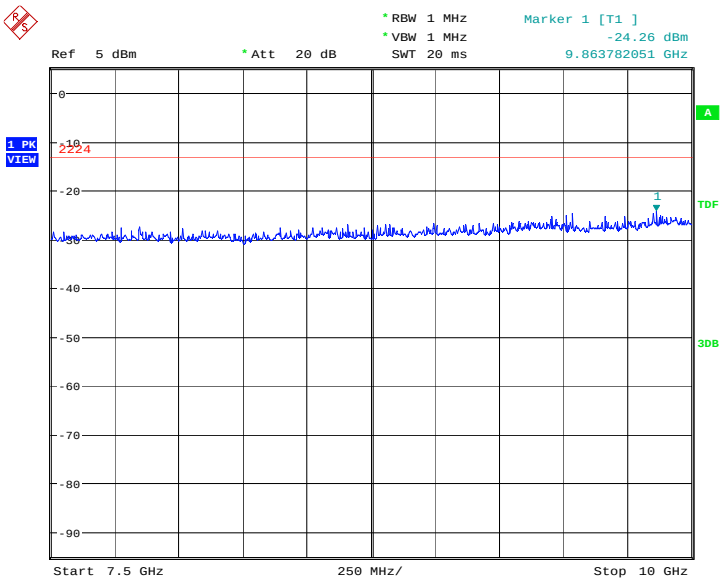
Spurious emission limit –13dBm.



Date: 3.NOV.2013 14:57:10

16QAM: 7.5GHz –10GHz

Spurious emission limit –13dBm.

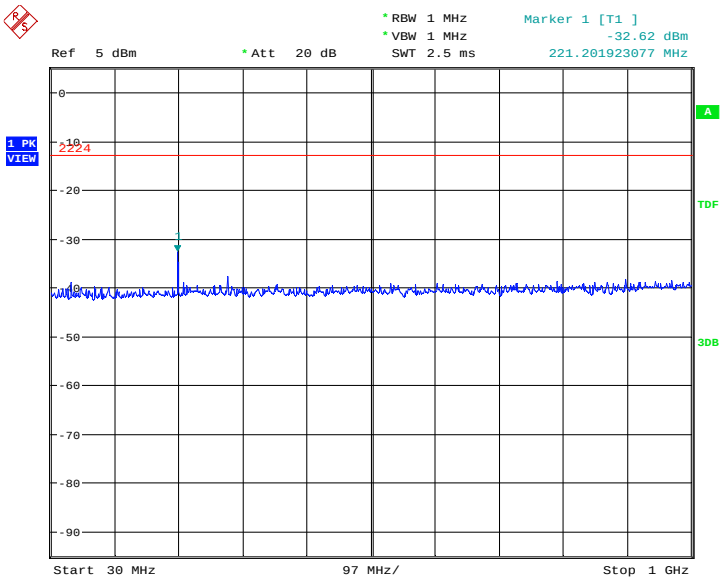


Date: 3.NOV.2013 14:57:18

LTE band 7, 5MHz bandwidth

QPSK: 30MHz – 1GHz

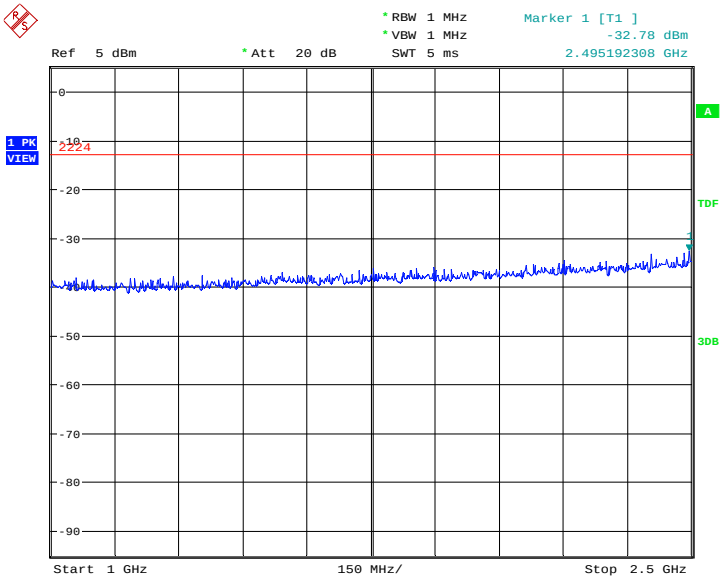
Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:09:42

QPSK: 1GHz – 2.5GHz

Spurious emission limit –13dBm.



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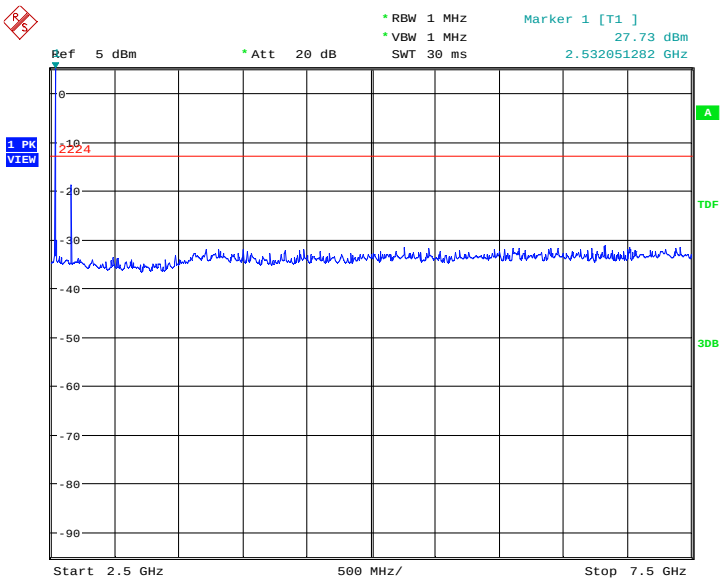
QPSK: 2.5GHz – 7.5GHz

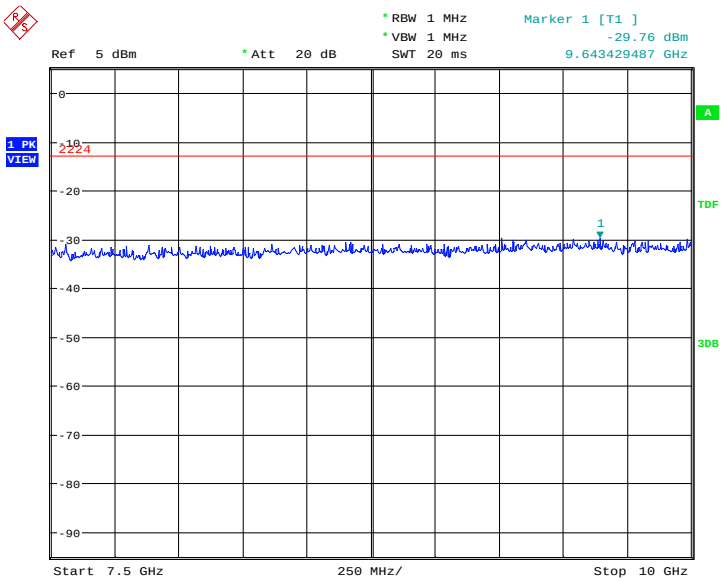
Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:09:56

QPSK: 7.5GHz –10GHz

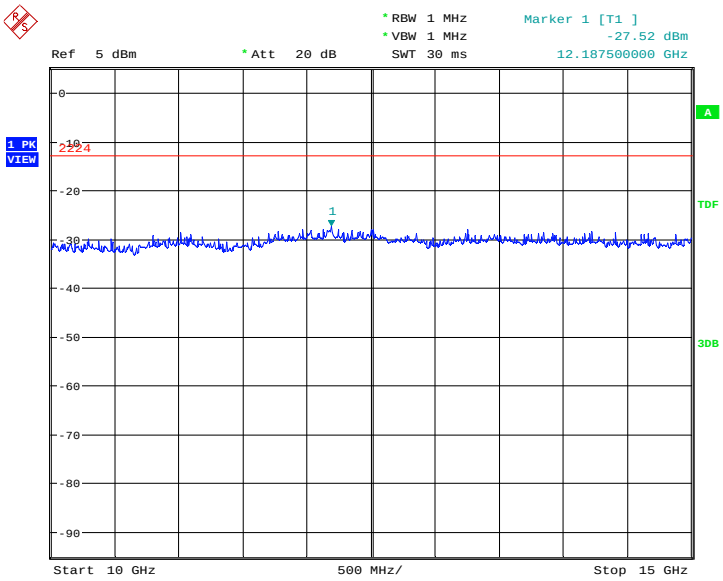
Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:10:02

QPSK: 10GHz –15GHz

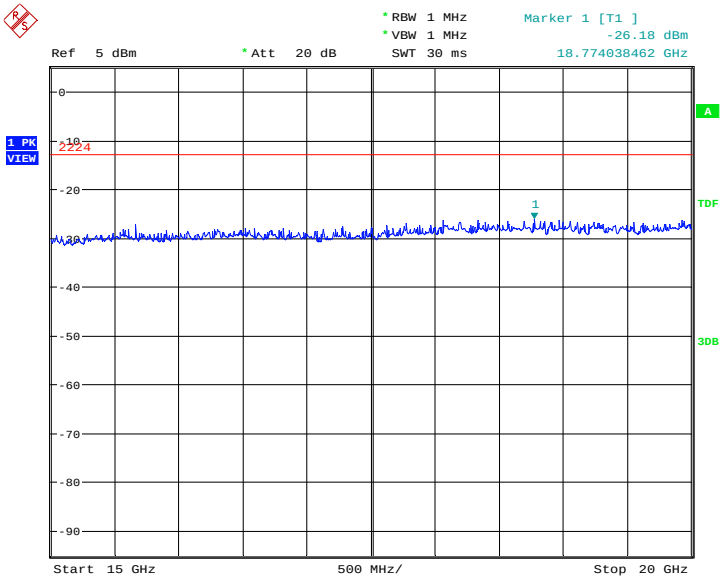
Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:10:09

QPSK: 15GHz –20GHz

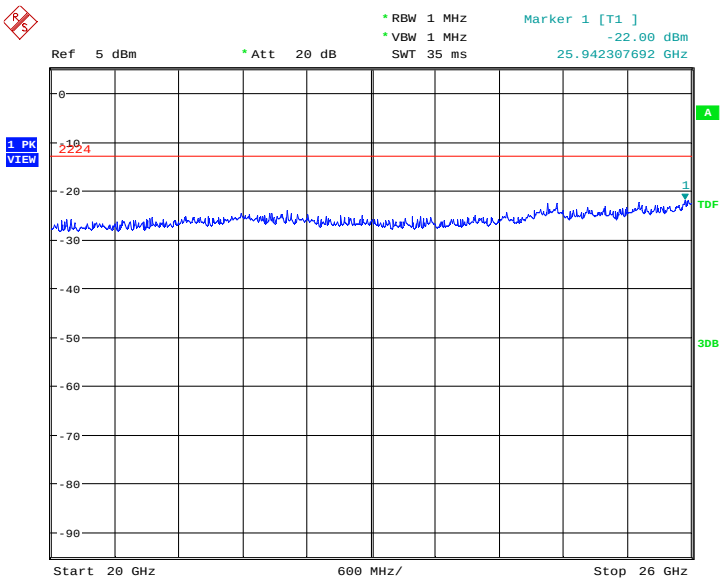
Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:10:16

QPSK: 20GHz –26GHz

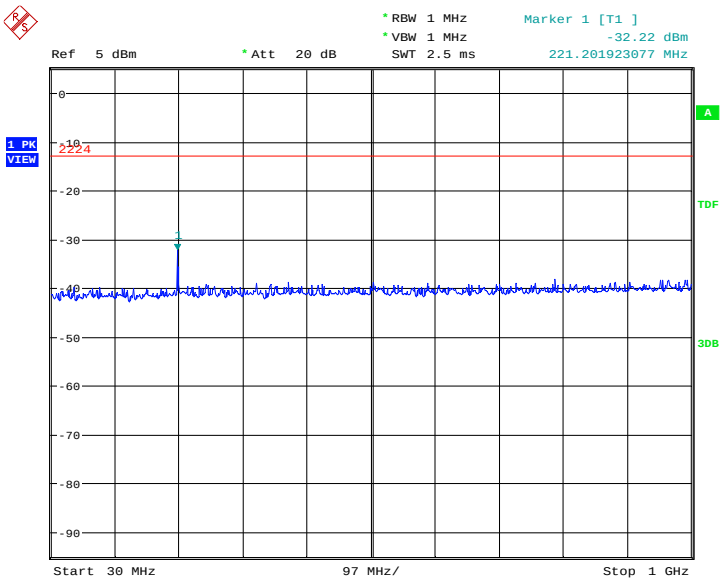
Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:10:23

16QAM: 30MHz – 1GHz

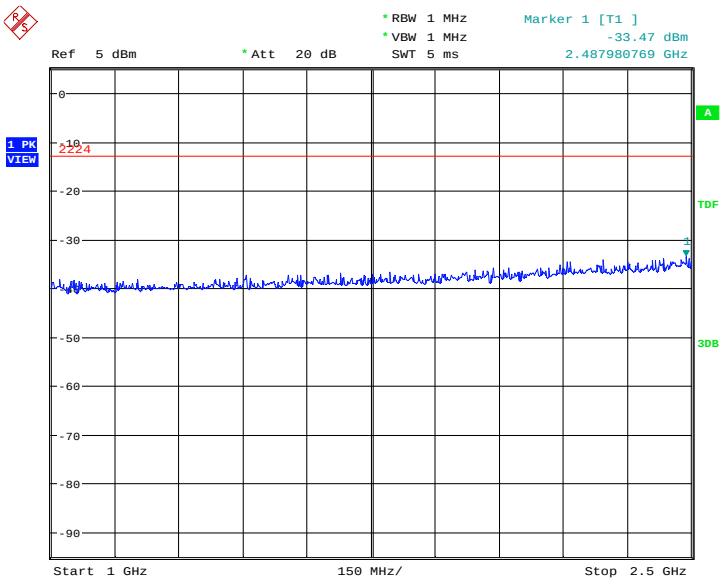
Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:11:22

16QAM: 1GHz – 2.5GHz

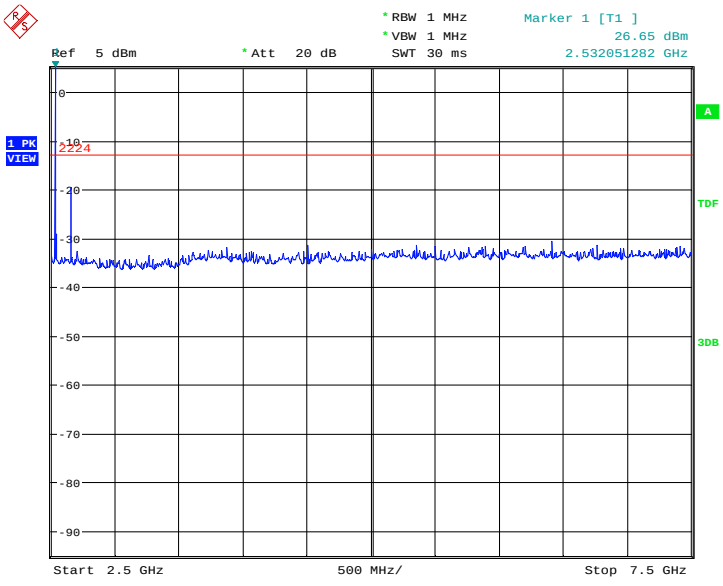
Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:11:29

16QAM: 2.5GHz – 7.5GHz

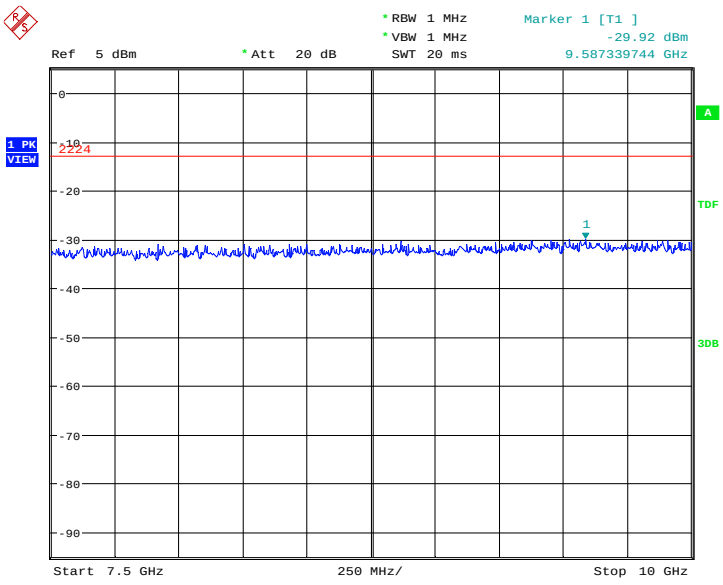
Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:11:36

16QAM: 7.5GHz –10GHz

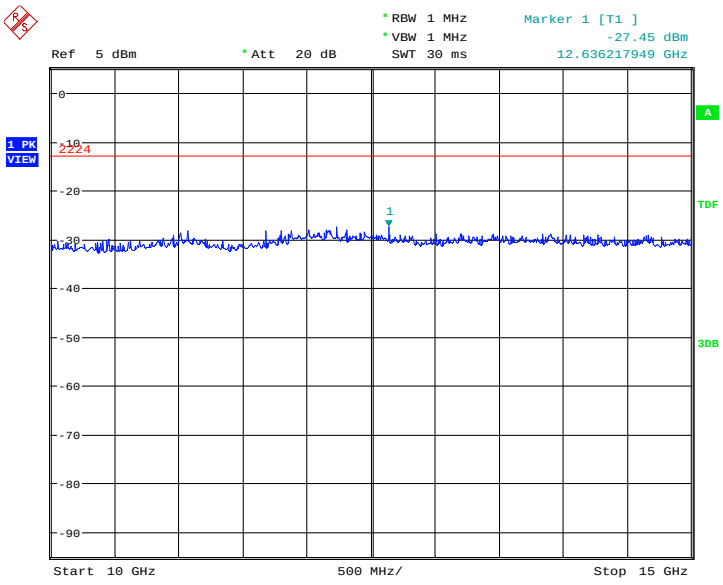
Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:11:42

16QAM: 10GHz –15GHz

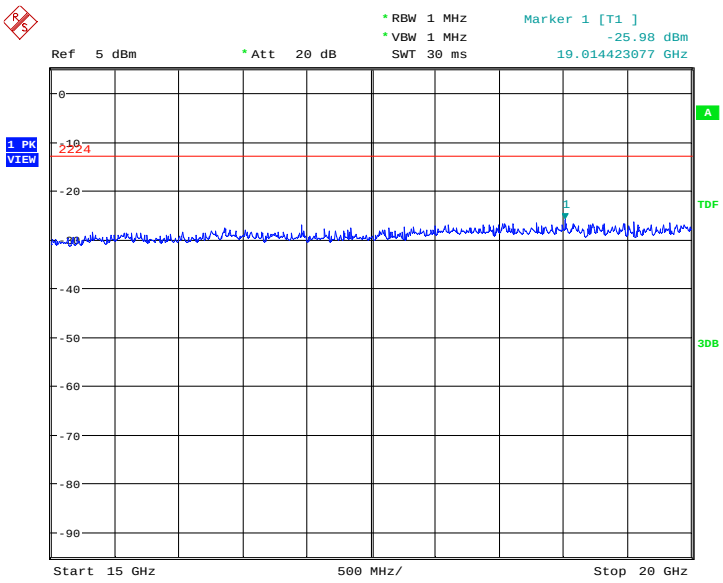
Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:11:49

16QAM: 15GHz –20GHz

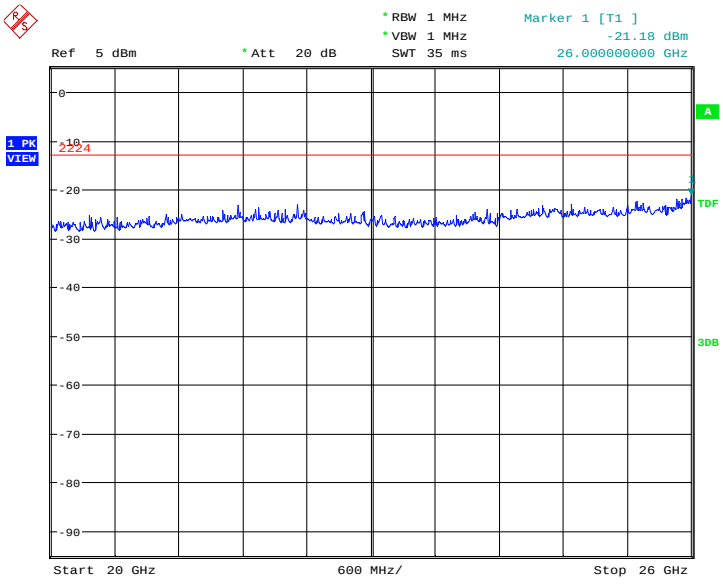
Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:11:56

16QAM: 20GHz –26GHz

Spurious emission limit –13dBm.



Date: 20.NOV.2013 17:12:03