TEST REPORT

No. 2013TAR897

for

Sony Mobile Communications AB

GSM/WCDMA/LTE Mobile Phone

Type: PM-0763-BV

FCC ID: PY7PM-0763

IC No.: 4170B-PM0763

with

Hardware Version: AP1

Software Version: 19.0.A.0.261

Issued Date: Feb. 10th, 2014

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.

CONTENTS

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	Jan. 06th, 2014
Testing Start Date:	Jan. 08th, 2014
Testing End Date:	Jan. 27th, 2014

1.4. Signature

Qu Pengfei

(Prepared this test report)
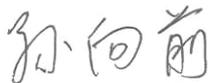
Sun Xiangqian

(Reviewed this test report)
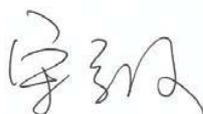
Song Chongwen

(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 2/4/7/17, Bluetooth (EDR and 4.0), ANT+, WLAN (802.11 a/b/g/n), NFC, FM, GPS mobile phone
Type	PM-0763-BV
FCC ID	PY7PM-0763
IC No.	4170B-PM0763
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 2 / FDD Band 4 / FDD Band 7 / FDD Band 17
Output power	26.01 dBm maximum EIRP measured for LTE FDD Band 2 25.01 dBm maximum EIRP measured for LTE FDD Band 4 22.46 dBm maximum EIRP measured for LTE FDD Band 7 18.44 dBm maximum ERP measured for LTE FDD Band 17
Antenna	Internal
Power supply	Battery (charged by travel adapter or vehicle charger)
Extreme vol. Limits	3.5VDC to 4.1VDC (nominal: 3.7VDC)
Extreme temp. Tolerance	-20°C to +55°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN	IMEI	HW Version	SW Version
EUT2	CB51268CHN	004402451853752	AP1	19.0.A.0.261
EUT3	CB51268CUC	004402451853299	AP1	19.0.A.0.261

*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
AE1	Travel Charger	4413W 18 511285	1
AE3	USB Cable	131307D20BE8904	1
AE4	Embedded Battery	/	1C

AE1

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

AE3

    Commercial name   EC801

    Type   AI-0401

    Manufacturer   Sony Mobile

    Length of cable   98.5 cm

AE4

    Model name   1277-4767

    Manufacturer   Sony Mobile

    Minimum Capacitance   3000 mAh

    Nominal Voltage   3.8V

*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 embedded battery.

The EUT supports GSM 850/900/1800/1900MHz bands, WCDMA FDD bands 1/2/4/5/8 and LTE FDD bands 2/4/7/17. It supports GPRS service with multi-slots class 33 and EGPRS service with multi-slots class 33. The HSDPA and HSUPA (Cat 6) features are also supported.

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

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	EUT2 + AE1 + AE3 + AE4	Tests with travel charger
Set.4	EUT2 + AE4	ERP/EIRP/RSE tests
Set.5	EUT3 + AE4	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 15	Radio frequency devices	10-1-12 Edition
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	10-1-13 Edition
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	10-1-13 Edition
RSS-Gen	General Requirements and Information for the Certification of Radiocommunication Equipment	Issue 3
RSS-130	Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz	Issue 1
RSS-133	2 GHz Personal Communications Services	Issue 6
RSS-139	Advanced Wireless Services Equipment Operating in the Bands 1710-1755 MHz and 2110-2155 MHz	Issue 2
RSS-199	Broadband Radio Service (BRS) Equipment Operating in the Band 2500-2690 MHz	Issue 1
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. <u>LABORATORY ENVIRONMENT</u>

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	Clause in IC rules	Section in this report	Verdict	Test Location
1	Output Power	24.232(c)	6.4	A.1	P	B
2	Emission Limit	24.238(a), 2.1051	6.5	A.2	P	B
3	Conducted Emission	15.107/207	7.2.2	A.3	P	A
4	Frequency Stability	24.235, 2.1055	6.3	A.4	P	B
5	Occupied Bandwidth	2.1049(h)(i)	6.5	A.5	P	B
6	Emission Bandwidth	24.238(a)	6.5	A.6	P	B
7	Band Edge Compliance	24.238(a)	6.5	A.7	P	B
8	Conducted Spurious Emission	24.238, 2.1057	6.5	A.8	P	B
9	Receiver Spurious Emissions	15.109 , 2.1053	6.6	A.9	P	A

LTE Band 4

Items	Test Name	Clause in FCC rules	Clause in IC rules	Section in this report	Verdict	Test Location
1	Output Power	27.50(d)(4)	6.4	A.1	P	B
2	Emission Limit	27.53(h), 2.1051	6.5	A.2	P	B
3	Conducted Emission	15.107/15.207	7.2.2	A.3	P	A
4	Frequency Stability	27.54, 2.1055	6.3	A.4	P	B
5	Occupied Bandwidth	2.1049(h)(i)	6.5	A.5	P	B
6	Emission Bandwidth	27.53(h)	6.5	A.6	P	B
7	Band Edge Compliance	27.53(h)	6.5	A.7	P	B
8	Conducted Spurious Emission	27.53(h), 2.1057	6.5	A.8	P	B
9	Receiver Spurious Emissions	15.109 , 2.1053	6.6	A.9	P	A

LTE Band 7

Items	Test Name	Clause in FCC rules	Clause in IC rules	Section in this report	Verdict	Test Location
1	Output Power	27.50(h)(2)	4.4	A.1	P	B
2	Emission Limit	27.53(m), 2.1051	4.5	A.2	P	B
3	Conducted Emission	15.107/15.207	7.2.2	A.3	P	A
4	Frequency Stability	27.54, 2.1055	4.3	A.4	P	B
5	Occupied Bandwidth	2.1049(h)(i)	4.5	A.5	P	B
6	Emission Bandwidth	27.53(m)	4.5	A.6	P	B
7	Band Edge Compliance	27.53(m)	4.5	A.7	P	B
8	Conducted Spurious Emission	27.53(m), 2.1057	4.5	A.8	P	B
9	Receiver Spurious Emissions	15.109 , 2.1053	4.6	A.9	P	A

LTE Band 17

Items	Test Name	Clause in FCC rules	Clause in IC rules	Section in this report	Verdict	Test Location
1	Output Power	27.50(c)(10)	4.4	A.1	P	B
2	Emission Limit	27.53(g), 2.1051	4.6	A.2	P	B
3	Conducted Emission	15.107/15.207	7.2.2	A.3	P	A
4	Frequency Stability	27.54, 2.1055	4.3	A.4	P	B
5	Occupied Bandwidth	2.1049(h)(i)	4.6	A.5	P	B
6	Emission Bandwidth	27.53(g)	4.6	A.6	P	B
7	Band Edge Compliance	27.53(g)	4.6	A.7	P	B
8	Conducted Spurious Emission	27.53(g), 2.1057	4.6	A.8	P	B
9	Receiver Spurious Emissions	15.109 , 2.1053	6	A.9	P	A

6.2. Statements

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

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

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

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
1.	Test Receiver	ESCI	100344	R&S	2014-03-28
2.	Test Receiver	ESCI 7	100948	R&S	2014-07-18
3.	Spectrum Analyzer	FSV40	101047	R&S	2014-06-30
4.	Spectrum Analyzer	E4440A	MY48250642	Agilent	2014-03-04
5.	LISN	ESH2-Z5	829991/012	R&S	2014-04-14
6.	EMI Antenna	VULB 9163	9163-482	Schwarzbeck	2014-02-17
7.	EMI Antenna	VULB 9163	9163-483	Schwarzbeck	2014-02-17
8.	EMI Antenna	3117	00119024	ETS-Lindgren	2014-02-02
9.	EMI Antenna	3117	00058889	ETS-Lindgren	2014-02-02
10.	EMI Antenna	3115	6914	ETS-Lindgren	2014-12-16
11.	EMI Antenna	VUBA 9117	177	Schwarzbeck	2014-06-29
12.	Signal Generator	N5183A	MY49060052	Agilent	2014-03-19
13.	Power Amplifier	5S1G4	0341863	AR	2016-03-01
14.	Climatic chamber	SH-241	92003546	ESPEC	2014-05-11
15.	Universal Radio Communication Tester	CMW500	116588	R&S	2014-11-04
16.	Universal Radio Communication Tester	CMW500	127406	R&S	2015-1-28

ANNEX A: MEASUREMENT RESULTS

A.1   OUTPUT POWER

Reference
FCC: 24.232(c), 27.50(d)(4), 27.50(h)(2), 27.50(c)(10).
IC: RSS-133 Issue 6, Section 6.4. RSS-139 Issue 2, Section 6.4. RSS-199 Issue 1, Section 4.4.
RSS-130 Issue 1, Section 4.4.

A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation.
This result contains peak output power, ERP/EIRP measurements and peak-to-average power ratio (PAPR) for the EUT.
In all cases, output power is within the specified limits.

A.1.2 Conducted
A.1.2.1 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.
The power was measured with spectrum analyzer's RMS detector.
These measurements were done at 3 frequencies (bottom, middle and top of operational frequency range) for each bandwidth.

A.1.2.2 Measurement result
LTE band 2

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	1850.7	22.92	22.02
		1880.0	22.64	21.83
		1909.3	22.73	21.89
	1 RB low	1850.7	22.86	22.02
		1880.0	22.64	21.79
		1909.3	22.76	21.87
	50% RB mid	1850.7	22.90	21.91
		1880.0	22.67	21.58
		1909.3	22.73	21.65
	100% RB	1850.7	21.92	21.02
		1880.0	21.71	20.81
		1909.3	21.74	20.77

(continued)

3MHz	1 RB high	1851.5	22.79	22.29
		1880.0	22.55	21.94
		1908.5	22.67	22.09
	1 RB low	1851.5	22.70	22.19
		1880.0	22.60	21.99
		1908.5	22.65	22.01
	50% RB mid	1851.5	21.86	20.88
		1880.0	21.62	20.69
		1908.5	21.69	20.67
	100% RB	1851.5	21.85	20.91
		1880.0	21.68	20.73
		1908.5	21.69	20.67
5MHz	1 RB high	1852.5	22.86	21.86
		1880.0	22.61	21.64
		1907.5	22.73	21.77
	1 RB low	1852.5	22.64	21.62
		1880.0	22.56	21.58
		1907.5	22.62	21.65
	50% RB mid	1852.5	21.75	20.89
		1880.0	21.66	20.74
		1907.5	21.72	20.71
	100% RB	1852.5	21.81	20.93
		1880.0	21.68	20.78
		1907.5	21.76	20.79
10MHz	1 RB high	1855.0	22.88	22.14
		1880.0	22.57	22.01
		1905.0	22.71	22.04
	1 RB low	1855.0	22.56	21.91
		1880.0	22.52	21.96
		1905.0	22.59	21.95
	50% RB mid	1855.0	21.74	20.72
		1880.0	21.69	20.74
		1905.0	21.81	20.76
	100% RB	1855.0	21.74	20.78
		1880.0	21.73	20.75
		1905.0	21.84	20.82

(continued)

15MHz	1 RB high	1857.5	22.83	22.23
		1880.0	22.61	21.98
		1902.5	22.74	22.11
	1 RB low	1857.5	22.49	21.89
		1880.0	22.51	21.95
		1902.5	22.54	21.96
	50% RB mid	1857.5	21.50	20.85
		1880.0	21.56	20.94
		1902.5	21.68	21.04
	100% RB	1857.5	21.66	20.70
		1880.0	21.77	20.70
		1902.5	21.86	20.78
20MHz	1 RB high	1860.0	**23.01**	21.98
		1880.0	22.84	21.88
		1900.0	22.65	21.79
	1 RB low	1860.0	22.67	21.62
		1880.0	22.55	21.62
		1900.0	22.66	21.71
	50% RB mid	1860.0	21.56	20.65
		1880.0	21.75	20.80
		1900.0	21.88	20.87
	100% RB	1860.0	21.66	20.73
		1880.0	21.68	20.74
		1900.0	21.88	20.86

LTE band 4

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
1.4MHz	1 RB high	1754.3	22.67	21.79
		1732.5	22.47	21.57
		1710.7	22.51	21.68
	1 RB low	1754.3	22.69	21.91
		1732.5	22.47	21.53
		1710.7	22.40	21.68
	50% RB mid	1754.3	22.65	21.57
		1732.5	22.39	21.31
		1710.7	22.34	21.32
	100% RB	1754.3	21.64	20.74
		1732.5	21.41	20.52
		1710.7	21.39	20.51
3MHz	1 RB high	1753.5	22.58	21.84
		1732.5	22.24	21.68
		1711.5	22.63	21.95
	1 RB low	1753.5	22.43	21.95
		1732.5	22.47	21.84
		1711.5	22.34	21.77
	50% RB mid	1753.5	21.55	20.61
		1732.5	21.35	20.44
		1711.5	21.43	20.55
	100% RB	1753.5	21.61	20.67
		1732.5	21.41	20.49
		1711.5	21.49	20.57
5MHz	1 RB high	1752.5	22.59	21.59
		1732.5	22.32	21.34
		1712.5	22.43	21.47
	1 RB low	1752.5	22.52	21.45
		1732.5	22.44	21.41
		1712.5	22.30	21.31
	50% RB mid	1752.5	21.57	20.61
		1732.5	21.36	20.50
		1712.5	21.61	20.67
	100% RB	1752.5	21.59	20.68
		1732.5	21.39	20.52
		1712.5	21.69	20.72

(continued)

10MHz	1 RB high	1750	22.58	21.93
		1732.5	22.33	21.73
		1715	22.42	21.76
	1 RB low	1750	22.51	21.87
		1732.5	22.37	21.76
		1715	22.27	21.66
	50% RB mid	1750	21.55	20.56
		1732.5	21.41	20.47
		1715	21.57	20.56
	100% RB	1750	21.55	20.64
		1732.5	21.44	20.49
		1715	21.52	20.58
15MHz	1 RB high	1747.5	22.64	21.99
		1732.5	22.40	21.72
		1717.5	22.31	21.66
	1 RB low	1747.5	22.32	21.67
		1732.5	22.25	21.65
		1717.5	22.36	21.77
	50% RB mid	1747.5	21.37	20.85
		1732.5	21.26	20.65
		1717.5	21.47	20.64
	100% RB	1747.5	21.60	20.56
		1732.5	21.43	20.48
		1717.5	21.49	20.54
20MHz	1 RB high	1745	**22.74**	21.89
		1732.5	22.58	21.53
		1720	22.58	21.63
	1 RB low	1745	22.32	21.37
		1732.5	22.32	21.36
		1720	22.47	21.45
	50% RB mid	1745	21.54	20.70
		1732.5	21.40	20.54
		1720	21.48	20.58
	100% RB	1745	21.48	20.58
		1732.5	21.42	20.53
		1720	21.47	20.55

LTE band 7

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
5MHz	1 RB high	2502.5	22.48	21.49
		2535	22.89	21.94
		2567.5	23.03	22.08
	1 RB low	2502.5	22.56	21.56
		2535	22.89	21.94
		2567.5	22.89	21.85
	50% RB mid	2502.5	21.51	20.59
		2535	21.91	20.98
		2567.5	21.80	20.89
	100% RB	2502.5	21.51	20.64
		2535	21.92	21.05
		2567.5	21.78	20.94
10MHz	1 RB high	2505	22.47	21.76
		2535	22.87	22.21
		2565	22.92	22.29
	1 RB low	2505	22.57	21.95
		2535	22.83	22.21
		2565	22.72	22.08
	50% RB mid	2505	21.60	20.74
		2535	21.89	21.11
		2565	21.92	20.93
	100% RB	2505	21.47	20.62
		2535	21.96	21.03
		2565	21.92	20.97
15MHz	1 RB high	2507.5	22.40	21.74
		2535	22.95	22.22
		2562.5	22.87	22.16
	1 RB low	2507.5	22.62	21.95
		2535	22.75	22.10
		2562.5	22.70	22.02
	50% RB mid	2507.5	21.40	20.81
		2535	21.60	21.14
		2562.5	21.94	21.15
	100% RB	2507.5	21.56	20.60
		2535	21.94	20.97
		2562.5	22.03	21.06

(Continued)

20MHz	1 RB high	2510	22.50	21.56
		2535	**23.21**	22.16
		2560	22.94	22.06
	1 RB low	2510	22.83	21.87
		2535	22.82	21.86
		2560	22.76	21.86
	50% RB mid	2510	21.58	20.71
		2535	21.91	21.01
		2560	21.95	20.95
	100% RB	2510	21.58	20.76
		2535	21.88	20.96
		2560	21.99	21.01

LTE band 17

Bandwidth	RB size/offset	Frequency (MHz)	Power(dBm)	
			QPSK	16QAM
5MHz	1 RB high	706.5	23.03	22.05
		710.0	23.09	22.08
		713.5	23.07	22.09
	1 RB low	706.5	23.02	22.03
		710.0	22.99	22.03
		713.5	22.98	22.03
	50% RB mid	706.5	22.05	21.09
		710.0	22.12	21.12
		713.5	22.08	21.12
	100% RB	706.5	22.11	21.13
		710.0	22.07	21.20
		713.5	22.15	21.14

(Continued)

10MHz	1 RB high	709	**23.10**	22.32
		710	23.05	22.34
		711	23.06	22.29
	1 RB low	709	23.00	22.35
		710	22.96	22.25
		711	22.91	22.25
	50% RB mid	709	22.09	21.08
		710	22.15	21.10
		711	22.11	21.03
	100% RB	709	22.12	21.09
		710	22.14	21.15
		711	22.14	21.06

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

A.1.3 Radiated

A.1.3.1 Description

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

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

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

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

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

A.1.3.2 Method of Measurement

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

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
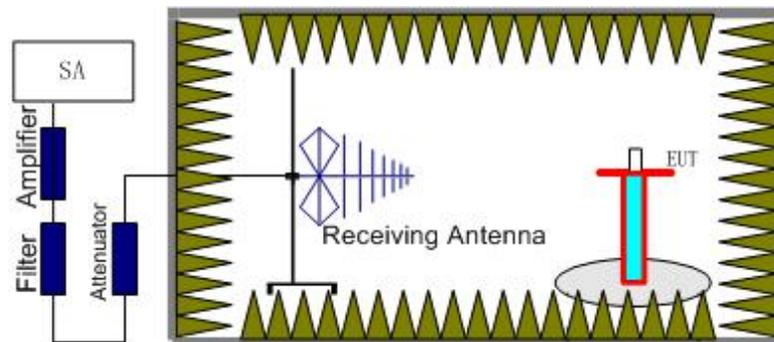
2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.
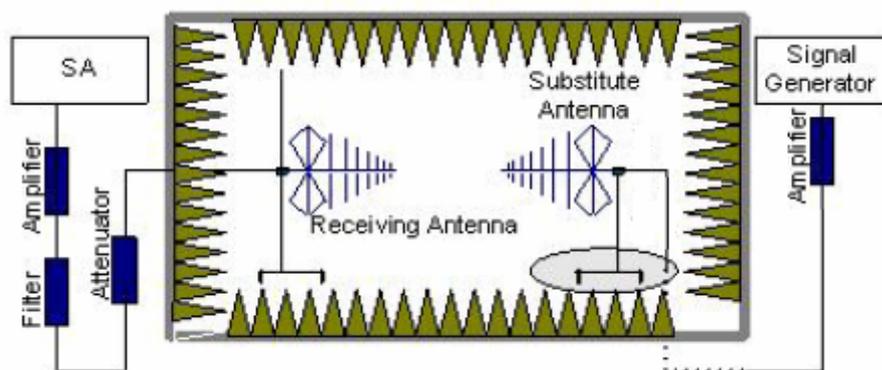
In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. An amplifier should be connected to the Signal Source output port. And the cable should be connected between the amplifier and the substitution antenna.

    The cable loss (P_{cl}), the substitution antenna Gain (G_a) and the amplifier Gain (P_{Ag}) should be recorded after test.

    The measurement results are obtained as described below:

    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
1850.7	-27.41	3.18	-50.00	-4.56	23.97	Horizontal
1880.0	-27.00	3.11	-50.00	-4.43	24.32	Horizontal
1909.3	-25.46	3.18	-50.00	-4.30	25.66	Horizontal

LTE Band 2_3MHz_QPSK

Frequency (MHz)	P_Mea (dBm)	Cable Loss (dB)	P_Ag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1851.5	-27.00	3.18	-50.00	-4.55	24.37	Horizontal
1880.0	-26.94	3.11	-50.00	-4.43	24.38	Horizontal
1908.5	-25.11	3.18	-50.00	-4.30	**26.01**	Horizontal

LTE Band 2_5MHz_QPSK

Frequency (MHz)	P_Mea (dBm)	Cable Loss (dB)	P_Ag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1852.5	-27.21	3.18	-50.00	-4.55	24.16	Horizontal
1880.0	-27.01	3.11	-50.00	-4.43	24.31	Horizontal
1907.5	-25.22	3.18	-50.00	-4.31	25.91	Horizontal

LTE Band 2_10MHz_QPSK

Frequency (MHz)	P_Mea (dBm)	Cable Loss (dB)	P_Ag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1855.0	-27.63	3.16	-50.00	-4.54	23.75	Horizontal
1880.0	-26.98	3.11	-50.00	-4.43	24.34	Horizontal
1905.0	-25.35	3.17	-50.00	-4.32	25.80	Horizontal

LTE Band 2_15MHz_QPSK

Frequency (MHz)	P_Mea (dBm)	Cable Loss (dB)	P_Ag (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1857.5	-28.39	3.15	-50.00	-4.53	22.99	Horizontal
1880.0	-26.96	3.11	-50.00	-4.43	24.36	Horizontal
1902.5	-26.11	3.16	-50.00	-4.33	25.06	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
1860.0	-29.47	3.14	-50.00	-4.52	21.91	Horizontal
1880.0	-26.97	3.11	-50.00	-4.43	24.35	Horizontal
1900.0	-27.15	3.16	-50.00	-4.34	24.03	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
1850.7	-35.53	-4.56	-50.00	-4.56	23.59	Horizontal
1880.0	-34.70	-4.43	-50.00	-4.43	24.16	Horizontal
1909.3	-32.92	-4.30	-50.00	-4.30	25.68	Horizontal

LTE Band 2_3MHz_16QAM

Frequency (MHz)	P$_{Mea}$ (dBm)	Cable Loss (dB)	P$_{Ag}$ (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1851.5	-27.34	3.18	-50.00	-4.55	24.03	Horizontal
1880.0	-27.12	3.11	-50.00	-4.43	24.20	Horizontal
1908.5	-25.38	3.18	-50.00	-4.30	25.74	Horizontal

LTE Band 2_5MHz_16QAM

Frequency (MHz)	P$_{Mea}$ (dBm)	Cable Loss (dB)	P$_{Ag}$ (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1852.5	-27.37	3.18	-50.00	-4.55	24.00	Horizontal
1880.0	-27.17	3.11	-50.00	-4.43	24.15	Horizontal
1907.5	-25.75	3.18	-50.00	-4.31	25.38	Horizontal

LTE Band 2_10MHz_16QAM

Frequency (MHz)	P$_{Mea}$ (dBm)	Cable Loss (dB)	P$_{Ag}$ (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1855.0	-28.07	3.16	-50.00	-4.54	23.31	Horizontal
1880.0	-27.17	3.11	-50.00	-4.43	24.15	Horizontal
1905.0	-25.55	3.17	-50.00	-4.32	25.60	Horizontal

LTE Band 2_15MHz_16QAM

Frequency (MHz)	P$_{Mea}$ (dBm)	Cable Loss (dB)	P$_{Ag}$ (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
1857.5	-28.61	3.15	-50.00	-4.53	22.77	Horizontal
1880.0	-27.11	3.11	-50.00	-4.43	24.21	Horizontal
1902.5	-26.12	3.16	-50.00	-4.33	25.05	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
1860.0	-29.72	3.14	-50.00	-4.52	21.66	Horizontal
1880.0	-27.13	3.11	-50.00	-4.43	24.19	Horizontal
1900.0	-27.17	3.16	-50.00	-4.34	24.01	Horizontal

Sample calculation: LTE Band 2, 3MHz bandwidth, frequency 1908.5 MHz, QPSK

Peak EIRP(dBm) = P$_{Mea}$(-25.11 dBm) - G$_a$ (-4.35 dBi) - P$_{Ag}$ (-50.00 dB) - P$_{cl}$ (3.18 dB)

　　　　　 = 26.01 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	-28.85	2.96	-50.00	-5.17	23.36	Horizontal
1732.50	-27.89	2.99	-50.00	-5.08	24.20	Horizontal
1754.30	-27.15	3.01	-50.00	-4.98	24.82	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	-29.22	2.96	-50.00	-5.17	22.99	Horizontal
1732.50	-27.95	2.99	-50.00	-5.08	24.14	Horizontal
1753.50	-26.96	3.01	-50.00	-4.98	**25.01**	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	-28.82	2.97	-50.00	-5.17	23.38	Horizontal
1732.50	-28.23	2.99	-50.00	-5.08	23.86	Horizontal
1752.50	-28.24	3.01	-50.00	-4.99	23.74	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	-29.66	2.97	-50.00	-5.15	22.52	Horizontal
1732.50	-27.98	2.99	-50.00	-5.08	24.11	Horizontal
1750.00	-27.11	3.00	-50.00	-5.00	24.89	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	-30.45	2.97	-50.00	-5.14	21.72	Horizontal
1732.50	-27.94	2.99	-50.00	-5.08	24.15	Horizontal
1747.50	-28.17	3.00	-50.00	-5.01	23.84	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	-32.22	2.97	-50.00	-5.13	19.94	Horizontal
1732.50	-27.91	2.99	-50.00	-5.08	24.18	Horizontal
1745.00	-29.51	3.00	-50.00	-5.02	22.51	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	-28.97	2.96	-50.00	-5.17	23.24	Horizontal
1732.50	-28.08	2.99	-50.00	-5.08	24.01	Horizontal
1754.30	-27.24	3.01	-50.00	-4.98	24.73	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	-29.36	2.96	-50.00	-5.17	22.85	Horizontal
1732.50	-28.03	2.99	-50.00	-5.08	24.06	Horizontal
1753.50	-27.10	3.01	-50.00	-4.98	24.87	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	-29.39	2.97	-50.00	-5.17	22.81	Horizontal
1732.50	-27.99	2.99	-50.00	-5.08	24.10	Horizontal
1752.50	-27.49	3.01	-50.00	-4.99	24.49	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	-29.96	2.97	-50.00	-5.15	22.22	Horizontal
1732.50	-28.05	2.99	-50.00	-5.08	24.04	Horizontal
1750.00	-27.62	3.00	-50.00	-5.00	24.38	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	-30.94	2.97	-50.00	-5.14	21.23	Horizontal
1732.50	-28.10	2.99	-50.00	-5.08	23.99	Horizontal
1747.50	-28.38	3.00	-50.00	-5.01	23.63	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	-32.40	2.97	-50.00	-5.13	19.76	Horizontal
1732.50	-28.11	2.99	-50.00	-5.08	23.98	Horizontal
1745.00	-29.37	3.00	-50.00	-5.02	22.65	Horizontal

Sample calculation: LTE Band 4, 3MHz bandwidth, frequency 1753.50 MHz, QPSK

Peak EIRP(dBm) = P_{Mea}(-26.96 dBm) - G_a (-4.98 dBi) - P_{Ag} (-50.00 dB) - P_{cl} (3.01 dB)

= 25.01 dBm

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

Limits: ≤33 dBm (2W)

LTE Band 7_5MHz_QPSK

Frequency (MHz)	P$_{Mea}$ (dBm)	Cable Loss (dB)	P$_{Ag}$ (dB)	Antenna Gain(dBi)	RMS EIRP(dBm)	Polarization
2502.50	-29.36	3.59	-50.00	-5.41	**22.46**	Horizontal
2535.00	-29.73	3.62	-50.00	-5.49	22.14	Horizontal
2567.50	-30.17	3.65	-50.00	-5.58	21.76	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	-30.19	3.59	-50.00	-5.41	21.63	Horizontal
2535.00	-29.70	3.62	-50.00	-5.49	22.17	Horizontal
2565.00	-30.49	3.65	-50.00	-5.57	21.43	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	-30.80	3.59	-50.00	-5.42	21.03	Horizontal
2535.00	-29.68	3.62	-50.00	-5.49	22.19	Horizontal
2562.50	-31.18	3.64	-50.00	-5.56	20.74	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	-32.00	3.59	-50.00	-5.43	19.84	Horizontal
2535.00	-29.64	3.62	-50.00	-5.49	22.23	Horizontal
2560.00	-32.01	3.64	-50.00	-5.56	19.91	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	-29.66	3.59	-50.00	-5.41	22.16	Horizontal
2535.00	-29.70	3.62	-50.00	-5.49	22.17	Horizontal
2567.50	-30.92	3.65	-50.00	-5.58	21.01	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	-30.53	3.59	-50.00	-5.41	21.29	Horizontal
2535.00	-29.79	3.62	-50.00	-5.49	22.08	Horizontal
2565.00	-30.69	3.65	-50.00	-5.57	21.23	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	-30.71	3.59	-50.00	-5.42	21.12	Horizontal
2535.00	-29.78	3.62	-50.00	-5.49	22.09	Horizontal
2562.50	-31.55	3.64	-50.00	-5.56	20.37	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	-32.22	3.59	-50.00	-5.43	19.62	Horizontal
2535.00	-29.75	3.62	-50.00	-5.49	22.12	Horizontal
2560.00	-31.98	3.64	-50.00	-5.56	19.94	Horizontal

Sample calculation: LTE Band 7, 5 MHz bandwidth, frequency 2502.50 MHz, QPSK

Peak EIRP(dBm) = P$_{Mea}$(-29.36 dBm) - G$_a$ (-5.41 dBi) - P$_{Ag}$ (-50.00 dB) - P$_{cl}$ (3.59 dB)

= 22.46 dBm

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

Limits: ≤34.77dBm (3W)

LTE Band 17_5MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
706.50	-30.85	1.91	-53.00	0.30	2.15	17.79	Horizontal
710.00	-30.28	1.92	-53.00	0.32	2.15	18.33	Horizontal
713.50	-30.61	1.93	-53.00	0.34	2.15	17.97	Horizontal

LTE Band 17_10MHz_QPSK

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
709.00	-31.29	1.92	-53.00	0.32	2.15	17.32	Horizontal
710.00	-30.17	1.92	-53.00	0.32	2.15	**18.44**	Horizontal
711.00	-30.66	1.92	-53.00	0.33	2.15	17.94	Horizontal

LTE Band 17_5MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
706.50	-30.96	1.91	-53.00	0.30	2.15	17.68	Horizontal
710.00	-30.33	1.92	-53.00	0.32	2.15	18.28	Horizontal
713.50	-31.30	1.93	-53.00	0.34	2.15	17.28	Horizontal

LTE Band 17_10MHz_16QAM

Frequency (MHz)	P_{Mea} (dBm)	Cable Loss (dB)	P_{Ag} (dB)	Antenna Gain(dBi)	Correction (dB)	RMS ERP (dBm)	Polarization
709.00	-31.62	1.92	-53.00	0.32	2.15	16.99	Horizontal
710.00	-30.65	1.92	-53.00	0.32	2.15	17.96	Horizontal
711.00	-30.98	1.92	-53.00	0.33	2.15	17.62	Horizontal

Sample calculation: LTE Band 17, 10 MHz bandwidth, frequency 710.0 MHz, QPSK

Peak ERP(dBm) = P_{Mea}(-30.17 dBm) - G_a (0.32 dBi) - P_{Ag} (-53.00 dB) - P_{cl} (1.92 dB) -2.15 dB

= 18.44 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.1.4 Peak-to-Average Power Ratio (PAPR)

A1.4.1 Description

According to RSS-130/133/139/199, the transmitter's peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

The parameter of spectrum analyzer: RBW = 10MHz, detector = sample

A.1.4.2 Measurement results

LTE band 2, 20MHz (worst case)

Frequency(MHz)	PAPR(dB)	
1880.0	QPSK	16QAM
	6.60	7.28

LTE band 4, 20MHz (worst case)

Frequency(MHz)	PAPR(dB)	
1732.5	QPSK	16QAM
	6.60	7.37

LTE band 7, 20MHz (worst case)

Frequency(MHz)	PAPR(dB)	
2535.0	QPSK	16QAM
	6.63	7.28

LTE band 17,10MHz (worst case)

Frequency(MHz)	PAPR(dB)	
710.0	QPSK	16QAM
	5.35	6.06

Note: Expanded measurement uncertainty for PCS1900 is U =0.83 dB, k = 2.

A.2 EMISSION LIMT

Reference

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

IC: RSS-133 Issue 6, Section 6.5. RSS-139 Issue 2, Section 6.5. RSS-199 Issue 1, Section 4.5. RSS-130 Issue 1, Section 4.6.

A.2.1 Measurement Method

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

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

The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.
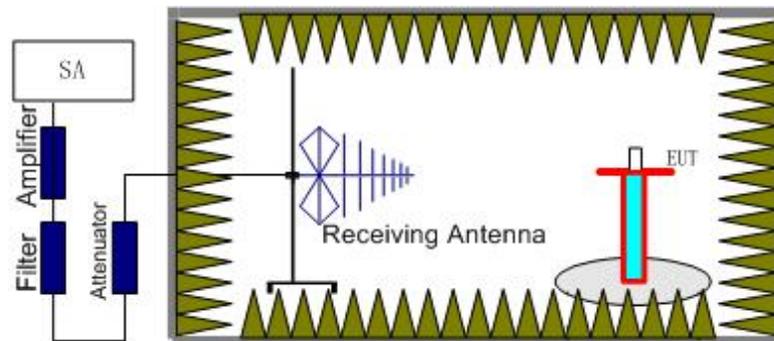
2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.
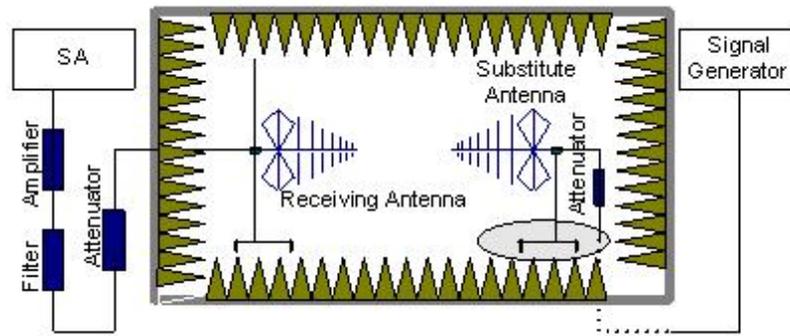
In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test.

    An amplifier should be connected in for the test.

    The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.

    The measurement results are obtained as described below:

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

A.2.3 Measurement Results

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

must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

LTE Band 2, 1.4MHz, QPSK, Channel 18607

Frequency (MHz)	P_Mea (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP(dBm)	Limit （dBm）	Polarization
4289.22	-66.67	4.79	-8.67	-62.79	-13.00	Vertical
5919.26	-65.50	5.57	-10.17	-60.90	-13.00	Horizontal
8102.03	-68.06	6.90	-11.96	-63.00	-13.00	Vertical
9110.57	-67.30	7.59	-12.60	-62.29	-13.00	Vertical
10124.63	-63.95	8.03	-12.42	-59.56	-13.00	Horizontal
12964.01	-63.03	8.91	-13.26	-58.68	-13.00	Horizontal

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
4321.07	-68.90	4.87	-8.69	-65.08	-13.00	Vertical
5096.37	-67.46	5.21	-9.76	-62.91	-13.00	Horizontal
7258.66	-67.65	6.38	-11.26	-62.77	-13.00	Horizontal
8631.55	-64.71	7.36	-12.31	-59.76	-13.00	Vertical
10249.31	-62.95	7.50	-12.45	-58.00	-13.00	Horizontal
13137.56	-61.06	9.23	-13.44	-56.85	-13.00	Vertical

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
3833.16	-67.64	4.52	-8.30	-63.86	-13.00	Vertical
5034.59	-65.20	5.17	-9.72	-60.65	-13.00	Vertical
8907.53	-65.97	7.36	-12.53	-60.80	-13.00	Vertical
10218.78	-63.43	7.57	-12.44	-58.56	-13.00	Vertical
11638.81	-61.48	8.65	-12.43	-57.70	-13.00	Vertical
12545.65	-62.71	9.00	-12.75	-58.96	-13.00	Vertical

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
4090.73	-67.64	4.73	-8.55	-63.82	-13.00	Horizontal
5043.75	-67.44	5.22	-9.73	-62.93	-13.00	Vertical
7084.33	-68.25	6.49	-11.15	-63.59	-13.00	Vertical
9602.98	-65.05	7.94	-12.56	-60.43	-13.00	Vertical
12017.03	-63.28	8.83	-12.51	-59.60	-13.00	Vertical
14805.82	-59.18	9.68	-13.54	-55.32	-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
3760.24	-66.58	4.52	-8.21	-62.89	-13.00	Horizontal
5144.18	-64.82	5.24	-9.79	-60.27	-13.00	Vertical
6504.80	-66.82	5.99	-10.60	-62.21	-13.00	Vertical
9057.06	-65.40	7.52	-12.60	-60.32	-13.00	Horizontal
10342.23	-64.80	7.97	-12.47	-60.30	-13.00	Vertical
13753.51	-63.03	9.14	-13.90	-58.27	-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
4054.37	-66.80	4.68	-8.53	-62.95	-13.00	Vertical
5728.02	-63.97	5.54	-10.09	-59.42	-13.00	Vertical
7063.70	-66.06	6.55	-11.14	-61.47	-13.00	Vertical
10168.34	-63.45	7.80	-12.43	-58.82	-13.00	Horizontal
12084.94	-61.76	8.93	-12.53	-58.16	-13.00	Horizontal
14529.72	-59.62	9.39	-13.59	-55.42	-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
3421.36	-56.19	4.19	-7.71	-52.67	-13.00	Horizontal
5178.08	-67.28	5.20	-9.81	-62.67	-13.00	Vertical
7202.62	-64.33	6.38	-11.22	-59.49	-13.00	Vertical
9042.22	-66.36	7.49	-12.60	-61.25	-13.00	Horizontal
10726.32	-64.01	7.93	-12.45	-59.49	-13.00	Horizontal
13143.97	-58.13	9.15	-13.44	-53.84	-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
3465.31	-58.18	4.24	-7.82	-54.60	-13.00	Horizontal
5058.68	-66.19	5.23	-9.74	-61.68	-13.00	Horizontal
6889.97	-66.48	6.08	-10.99	-61.57	-13.00	Horizontal
10094.75	-64.06	8.23	-12.42	-59.87	-13.00	Vertical
13860.42	-59.72	9.20	-13.94	-54.98	-13.00	Vertical
14829.89	-60.13	9.65	-13.53	-56.25	-13.00	Vertical

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
3366.97	-67.67	4.23	-7.58	-64.32	-13.00	Vertical
5087.07	-68.40	5.20	-9.75	-63.85	-13.00	Horizontal
7335.07	-66.30	6.46	-11.30	-61.46	-13.00	Vertical
10162.23	-65.30	7.82	-12.43	-60.69	-13.00	Vertical
11791.00	-63.91	9.03	-12.46	-60.48	-13.00	Vertical
13578.64	-60.34	9.22	-13.83	-55.73	-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
3380.55	-66.60	4.23	-7.61	-63.22	-13.00	Horizontal
5073.67	-69.92	5.20	-9.74	-65.38	-13.00	Vertical
6298.86	-66.06	5.90	-10.44	-61.52	-13.00	Horizontal
8957.97	-67.54	7.31	-12.57	-62.28	-13.00	Vertical
10121.20	-62.92	8.06	-12.42	-58.56	-13.00	Horizontal
13686.20	-56.86	9.01	-13.87	-52.00	-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
3464.92	-57.96	4.24	-7.82	-54.38	-13.00	Horizontal
5105.76	-67.54	5.23	-9.76	-63.01	-13.00	Vertical
6676.31	-65.78	6.13	-10.78	-61.13	-13.00	Vertical
9018.85	-66.37	7.42	-12.60	-61.19	-13.00	Vertical
10054.50	-62.77	8.24	-12.41	-58.60	-13.00	Horizontal
13045.73	-62.95	9.15	-13.35	-58.75	-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
3508.85	-57.62	4.33	-7.91	-54.04	-13.00	Horizontal
5167.40	-66.19	5.20	-9.80	-61.59	-13.00	Horizontal
6409.27	-66.48	5.82	-10.53	-61.77	-13.00	Vertical
10351.91	-63.71	8.00	-12.47	-59.24	-13.00	Vertical
12451.03	-62.03	8.77	-12.68	-58.12	-13.00	Vertical
13769.53	-62.55	9.14	-13.91	-57.78	-13.00	Horizontal

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
5005.57	-57.16	5.17	-9.70	-52.63	-13.00	Horizontal
6855.44	-67.29	6.13	-10.96	-62.46	-13.00	Horizontal
9065.01	-65.88	7.53	-12.60	-60.81	-13.00	Vertical
10010.42	-54.60	7.96	-12.40	-50.16	-13.00	Horizontal
10856.33	-63.59	8.21	-12.43	-59.37	-13.00	Vertical
12877.93	-61.85	8.69	-13.15	-57.39	-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
4325.14	-66.17	4.84	-8.70	-62.31	-13.00	Horizontal
5768.64	-66.31	5.69	-10.11	-61.89	-13.00	Vertical
7162.65	-67.79	6.35	-11.20	-62.94	-13.00	Horizontal
10140.76	-54.59	7.92	-12.43	-50.08	-13.00	Horizontal
11339.46	-62.68	8.57	-12.40	-58.85	-13.00	Vertical
13568.45	-60.34	9.23	-13.83	-55.74	-13.00	Horizontal

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
5135.36	-47.17	5.24	-9.78	-42.63	-13.00	Horizontal
7693.34	-66.62	6.57	-11.59	-61.60	-13.00	Horizontal
8961.18	-67.10	7.30	-12.57	-61.83	-13.00	Horizontal
10553.77	-64.38	8.18	-12.49	-60.07	-13.00	Horizontal
12838.60	-51.55	9.02	-13.11	-47.46	-13.00	Vertical
13863.52	-63.39	9.22	-13.95	-58.66	-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
5005.35	-55.34	5.17	-9.70	-50.81	-13.00	Horizontal
6880.88	-67.36	6.07	-10.98	-62.45	-13.00	Vertical
8607.79	-65.09	7.48	-12.29	-60.28	-13.00	Vertical
10599.94	-65.91	8.28	-12.48	-61.71	-13.00	Vertical
12489.39	-62.13	8.76	-12.70	-58.19	-13.00	Vertical
16126.52	-58.20	10.31	-12.85	-55.66	-13.00	Vertical

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
5070.49	-61.18	5.21	-9.74	-56.65	-13.00	Horizontal
7142.52	-68.20	6.39	-11.19	-63.40	-13.00	Horizontal
8619.95	-67.42	7.42	-12.30	-62.54	-13.00	Vertical
10140.55	-60.36	7.92	-12.43	-55.85	-13.00	Horizontal
11542.56	-63.47	8.58	-12.41	-59.64	-13.00	Vertical
13175.89	-61.33	9.26	-13.48	-57.11	-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
5135.27	-46.28	5.24	-9.78	-41.74	-13.00	Horizontal
7702.75	-64.89	6.52	-11.60	-59.81	-13.00	Vertical
8729.68	-66.80	7.40	-12.38	-61.82	-13.00	Vertical
10119.70	-66.20	8.07	-12.42	-61.85	-13.00	Vertical
11838.61	-61.46	8.76	-12.47	-57.75	-13.00	Vertical
12838.33	-54.04	9.02	-13.11	-49.95	-13.00	Vertical

LTE Band 17, 5MHz, QPSK, Channel 23755

Frequency (MHz)	P_Mea (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
2119.81	-60.17	3.29	-4.26	2.15	-61.35	-13.00	Vertical
3533.68	-66.71	4.32	-7.94	2.15	-65.24	-13.00	Horizontal
4355.68	-68.88	4.87	-8.71	2.15	-67.19	-13.00	Vertical
5037.82	-67.00	5.19	-9.72	2.15	-64.62	-13.00	Horizontal
5747.02	-67.77	5.67	-10.10	2.15	-65.49	-13.00	Horizontal
6519.42	-68.87	6.03	-10.62	2.15	-66.43	-13.00	Horizontal

LTE Band 17, 5MHz, QPSK, Channel 23790

Frequency (MHz)	P_Mea (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit (dBm)	Polarization
2054.02	-60.85	3.25	-4.06	2.15	-62.19	-13.00	Vertical
4181.84	-68.96	4.68	-8.61	2.15	-67.18	-13.00	Horizontal
4601.77	-67.32	4.99	-8.98	2.15	-65.48	-13.00	Vertical
5561.91	-67.13	5.43	-10.02	2.15	-64.69	-13.00	Horizontal
6823.38	-64.15	6.18	-10.92	2.15	-61.56	-13.00	Horizontal
8437.57	-65.57	7.03	-12.16	2.15	-62.59	-13.00	Horizontal

LTE Band 17, 5MHz, QPSK, Channel 23825

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
1539.49	-66.65	2.83	-5.93	2.15	-65.70	-13.00	Horizontal
2261.51	-58.47	3.45	-4.68	2.15	-59.39	-13.00	Vertical
3559.34	-69.33	4.32	-7.97	2.15	-67.83	-13.00	Horizontal
4332.81	-67.73	4.81	-8.70	2.15	-65.99	-13.00	Horizontal
5115.42	-65.36	5.24	-9.77	2.15	-62.98	-13.00	Vertical
6801.37	-65.99	6.16	-10.90	2.15	-63.40	-13.00	Horizontal

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
1409.04	-64.25	2.69	-5.24	2.15	-63.85	-13.00	Horizontal
3558.00	-66.88	4.32	-7.97	2.15	-65.38	-13.00	Vertical
4358.66	-70.94	4.88	-8.72	2.15	-69.25	-13.00	Horizontal
4936.78	-68.28	5.12	-9.59	2.15	-65.96	-13.00	Vertical
6334.60	-65.97	5.84	-10.47	2.15	-63.49	-13.00	Horizontal
7106.51	-64.51	6.38	-11.16	2.15	-61.88	-13.00	Vertical

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
2130.69	-42.60	3.32	-4.29	2.15	-43.78	-13.00	Vertical
3550.86	-54.02	4.31	-7.96	2.15	-52.52	-13.00	Horizontal
4135.29	-68.56	4.68	-8.58	2.15	-66.81	-13.00	Horizontal
5509.76	-66.45	5.48	-10.00	2.15	-64.08	-13.00	Vertical
6432.44	-67.43	5.84	-10.55	2.15	-64.87	-13.00	Vertical
7140.61	-66.53	6.40	-11.18	2.15	-63.90	-13.00	Horizontal

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

Frequency (MHz)	P_{Mea} (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Correction (dB)	Peak ERP(dBm)	Limit （dBm）	Polarization
1474.35	-64.72	2.76	-5.86	2.15	-63.77	-13.00	Horizontal
2205.88	-60.30	3.38	-4.52	2.15	-61.31	-13.00	Horizontal
3562.79	-65.06	4.33	-7.98	2.15	-63.56	-13.00	Horizontal
5681.10	-66.24	5.50	-10.07	2.15	-63.82	-13.00	Horizontal
6246.99	-68.97	5.82	-10.40	2.15	-66.54	-13.00	Horizontal
8526.87	-66.83	7.11	-12.22	2.15	-63.87	-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
IC: RSS-Gen Issue 3, Section 7.2.2.

The measurement procedure in ANSI C63.4-2009 is used. Conducted emission is measured with travel charger. The EUT is working under LTE FDD bands 2/4/7/17 traffic mode which is the worst case of conducted emission measurement.
For test layout photo, please refer to Pic.2 in Annex B.

A.3.1 Limit

Frequency of Emission (MHz)	Conducted Limit (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
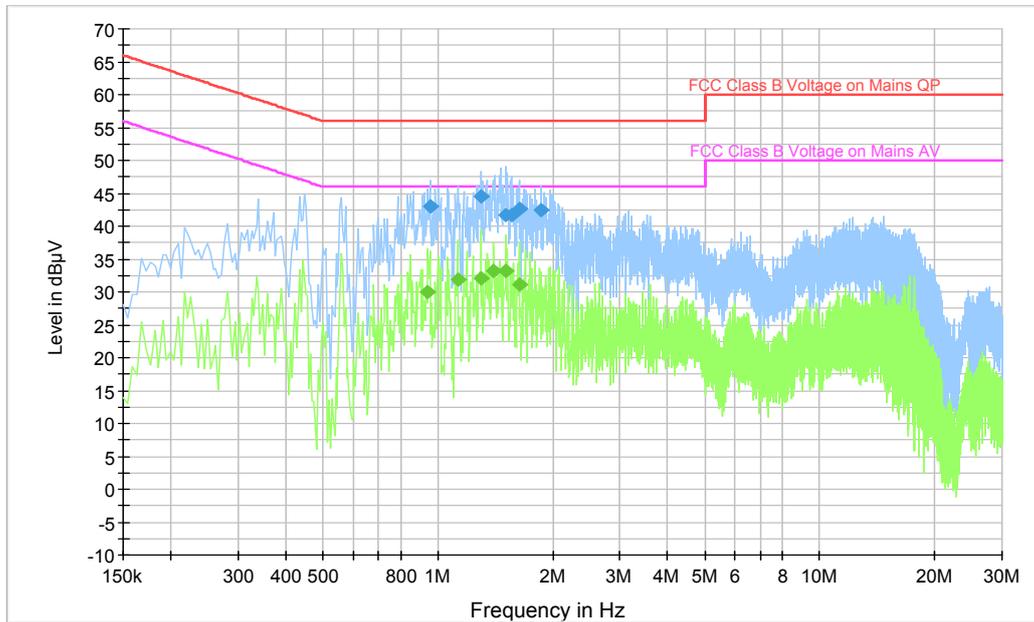
IF bandwidth 9 kHz

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)
0.955500	43.1	GND	L1	9.7	12.9	56.0
1.297500	44.6	GND	L1	9.7	11.4	56.0
1.504500	41.6	GND	N	9.7	14.4	56.0
1.558500	41.7	GND	L1	9.7	14.3	56.0
1.630500	42.7	GND	L1	9.7	13.3	56.0
1.860000	42.5	GND	L1	9.7	13.5	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.942000	30.0	GND	L1	9.7	16.0	46.0
1.126500	31.9	GND	L1	9.7	14.1	46.0
1.297500	32.2	GND	L1	9.7	13.8	46.0
1.401000	33.2	GND	L1	9.7	12.8	46.0
1.509000	33.2	GND	L1	9.7	12.8	46.0
1.630500	31.1	GND	L1	9.7	14.9	46.0

LTE Band 4, 1.4 MHz bandwidth
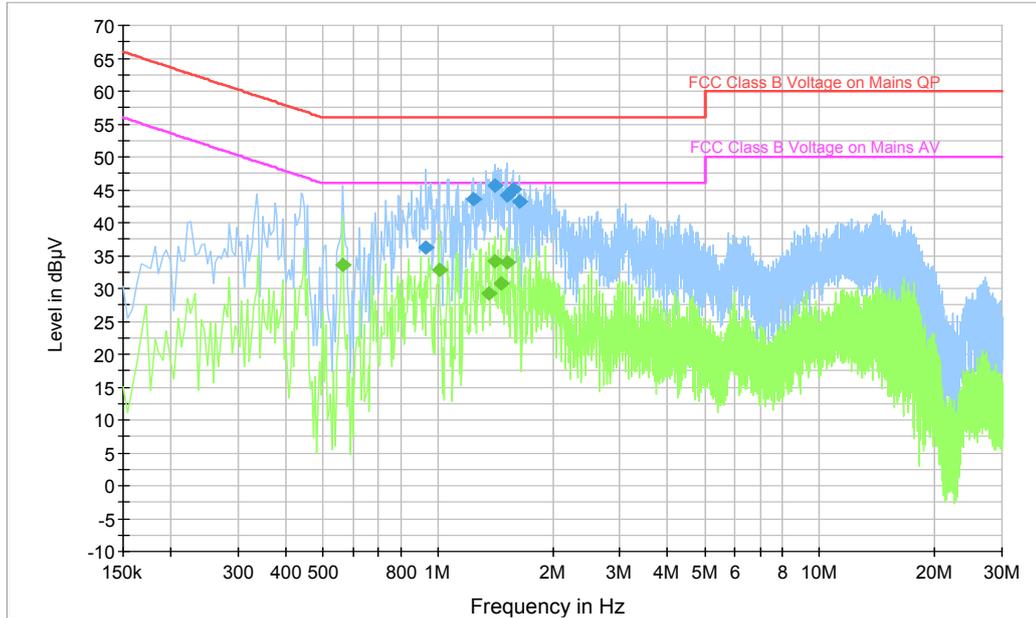
IF bandwidth 9 kHz

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)
0.933000	36.1	GND	N	9.7	19.9	56.0
1.239000	43.5	GND	L1	9.7	12.5	56.0
1.405500	45.7	GND	L1	9.7	10.3	56.0
1.513500	44.2	GND	L1	9.7	11.8	56.0
1.576500	45.1	GND	L1	9.7	10.9	56.0
1.635000	43.2	GND	L1	9.7	12.8	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.564000	33.6	GND	L1	9.8	12.4	46.0
1.009500	32.9	GND	L1	9.7	13.1	46.0
1.365000	29.3	GND	L1	9.7	16.7	46.0
1.405500	34.1	GND	L1	9.7	11.9	46.0
1.468500	30.8	GND	L1	9.7	15.2	46.0
1.513500	33.9	GND	L1	9.7	12.1	46.0

LTE Band 7, 5 MHz bandwidth
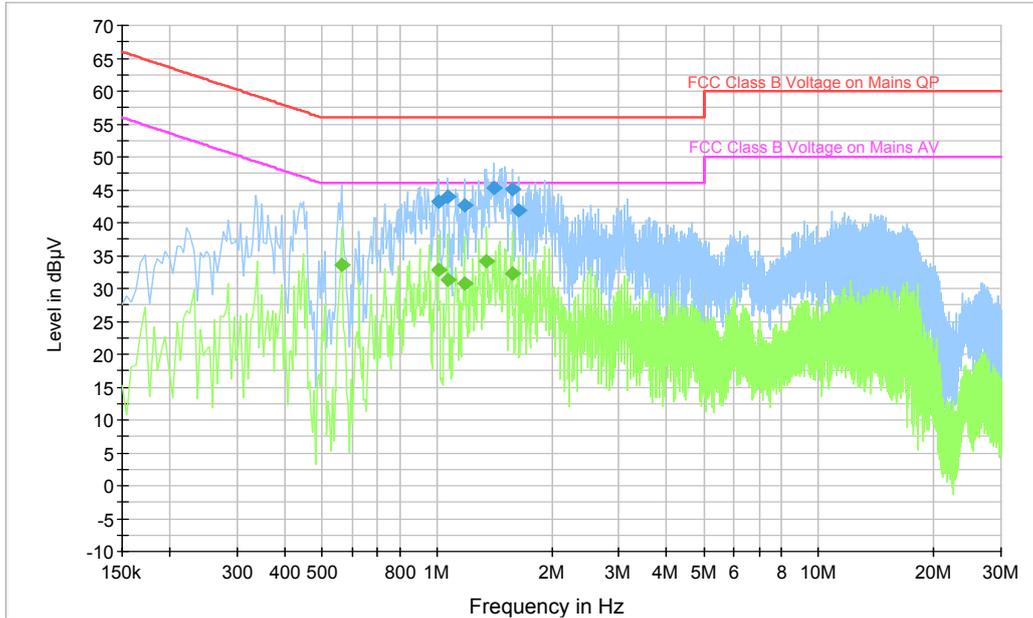
IF bandwidth 9 kHz

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)
1.009500	43.2	GND	L1	9.7	12.8	56.0
1.072500	44.0	GND	L1	9.7	12.0	56.0
1.180500	42.7	GND	L1	9.7	13.3	56.0
1.405500	45.3	GND	L1	9.7	10.7	56.0
1.576500	45.0	GND	L1	9.7	11.0	56.0
1.639500	41.9	GND	L1	9.7	14.1	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.564000	33.6	GND	L1	9.8	12.4	46.0
1.009500	32.8	GND	L1	9.7	13.2	46.0
1.072500	31.4	GND	L1	9.7	14.6	46.0
1.180500	30.7	GND	L1	9.7	15.3	46.0
1.351500	34.2	GND	L1	9.7	11.8	46.0
1.576500	32.3	GND	L1	9.7	13.7	46.0

LTE Band 17, 5 MHz bandwidth
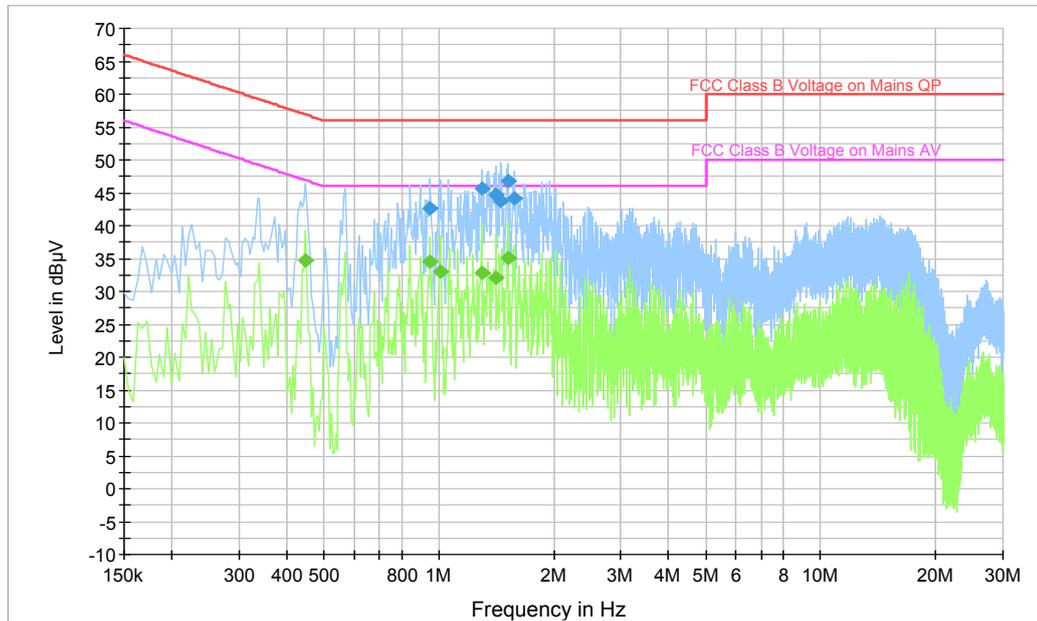
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.951000	42.7	GND	L1	9.7	13.3	56.0
1.293000	45.6	GND	L1	9.7	10.4	56.0
1.410000	44.8	GND	L1	9.7	11.2	56.0
1.455000	43.7	GND	L1	9.7	12.3	56.0
1.518000	46.9	GND	L1	9.7	9.1	56.0
1.581000	44.1	GND	L1	9.7	11.9	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.447000	34.8	GND	L1	9.8	12.2	46.9
0.951000	34.5	GND	L1	9.7	11.5	46.0
1.014000	33.1	GND	L1	9.7	12.9	46.0
1.293000	32.8	GND	L1	9.7	13.2	46.0
1.410000	32.0	GND	L1	9.7	14.0	46.0
1.518000	35.1	GND	L1	9.7	10.9	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, 24.235, 27.54.
IC: RSS-133 Issue 6, Section 6.3. RSS-139 Issue 2, Section 6.3. RSS-199 Issue 1, Section 4.3.
     RSS-130 Issue 1, Section 4.3.

A.4.1 Method of Measurement

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

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30℃.
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 3.5VDC and 4.1VDC, with a nominal voltage of 3.7VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance from -5.4% to 10.8%. For the purposes of measuring frequency stability these voltage limits are to be used.

A.4.3 Measurement results

Room Temperature: 24

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

Frequency Error vs Voltage

Voltage	Frequency error (Hz)		Frequency error (ppm)	
(V)	QPSK	16QAM	QPSK	16QAM
3.7	1	23	0.001	0.012
4.1	-1	18	0.001	0.010
3.5	0	22	0.000	0.012

Frequency Error vs Temperature

Temperature	Frequency error (Hz)		Frequency error (ppm)	
(℃)	QPSK	16QAM	QPSK	16QAM
50°	1	20	0.001	0.011
40°	2	19	0.001	0.010
30°	3	23	0.001	0.012
20°	0	18	0.000	0.010
10°	0	20	0.000	0.010
0°	2	26	0.001	0.014
‑10°	7	18	0.004	0.010
‑20°	0	21	0.000	0.011
‑30°	5	19	0.003	0.010

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

Frequency Error vs Voltage

Voltage	Frequency error (Hz)		Frequency error (ppm)	
(V)	QPSK	16QAM	QPSK	16QAM
3.7	-1	23	0.001	0.013
4.1	1	18	0.001	0.010
3.5	-1	20	0.001	0.012

Frequency Error vs Temperature

Temperature	Frequency error (Hz)		Frequency error (ppm)	
(℃)	QPSK	16QAM	QPSK	16QAM
50°	2	21	0.001	0.012
40°	4	22	0.002	0.013
30°	7	20	0.004	0.011
20°	1	19	0.000	0.011
10°	3	23	0.002	0.013
0°	-2	21	0.001	0.012
‑10°	0	25	0.000	0.014
‑20°	3	19	0.002	0.011
‑30°	3	23	0.002	0.013

LTE Band 7, 10 MHz bandwidth (worst case of all bandwidths)
Frequency Error vs Voltage

Voltage	Frequency error (Hz)		Frequency error (ppm)	
(V)	QPSK	16QAM	QPSK	16QAM
3.7	-12	8	0.005	0.003
4.1	-5	-14	0.002	0.006
3.5	-8	-13	0.003	0.005

Frequency Error vs Temperature

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

LTE Band 17, 5 MHz bandwidth (worst case of all bandwidths)
Frequency Error vs Voltage

Voltage	Frequency error (Hz)		Frequency error (ppm)	
(V)	QPSK	16QAM	QPSK	16QAM
3.7	0	-3	0.000	0.004
4.1	3	31	0.005	0.044
3.5	1	-2	0.001	0.003

Frequency Error vs Temperature

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

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

A.5   OCCUPIED BANDWIDTH

Reference

FCC: CFR Part 2.1049(h)(i)

IC: RSS-133 Issue 6, Section 6.5. RSS-139 Issue 2, Section 6.5. RSS-199 Issue 1, Section 4.5.
     RSS-130 Issue 1, Section 4.6.

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, 7 and 17. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

A.5.1.1 Measurement results per FCC rules

LTE band 2, 1.4MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	1091.346	1096.154

LTE band 2, 1.4MHz Bandwidth, QPSK (99% BW)
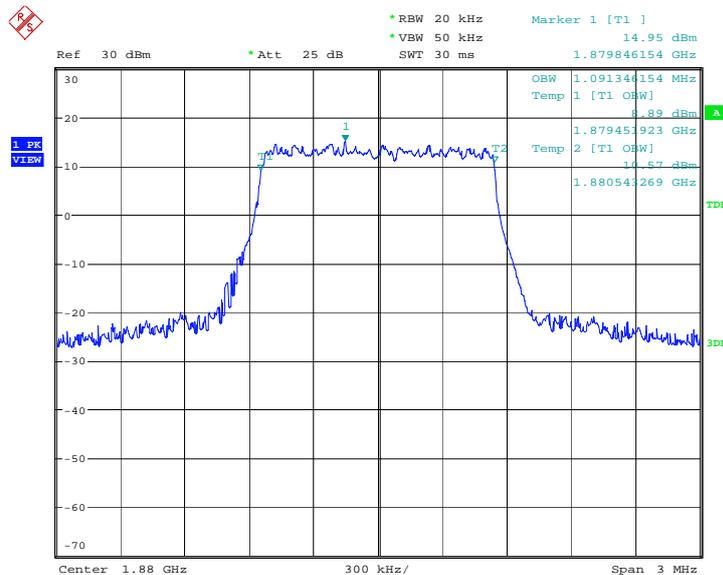
Date: 14.JAN.2014 18:55:16

LTE band 2, 1.4MHz Bandwidth, 16QAM (99% BW)
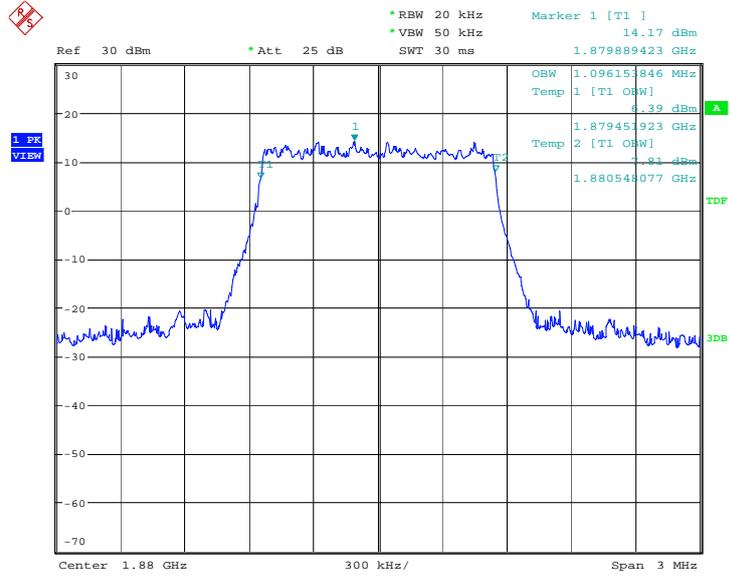
Date: 14.JAN.2014 18:55:29

LTE band 2, 3MHz (99% BW)

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

LTE band 2, 3MHz Bandwidth, QPSK (99% BW)
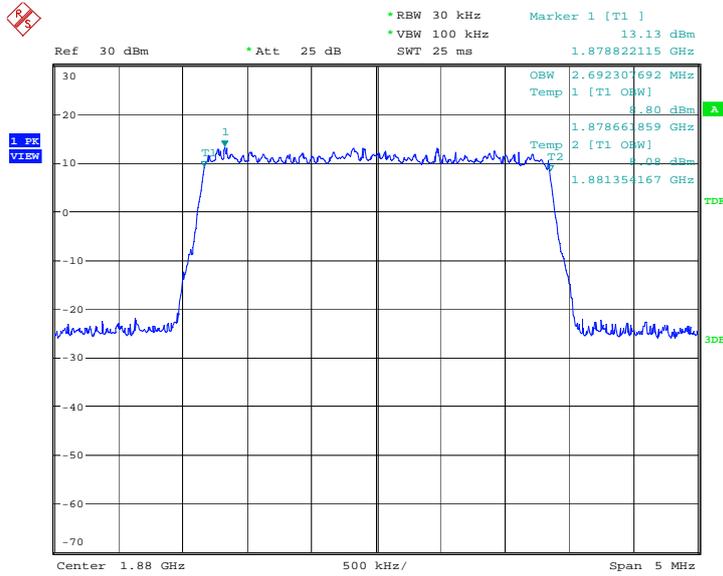
Date: 14.JAN.2014 19:23:14

LTE band 2, 3MHz Bandwidth, 16QAM (99% BW)
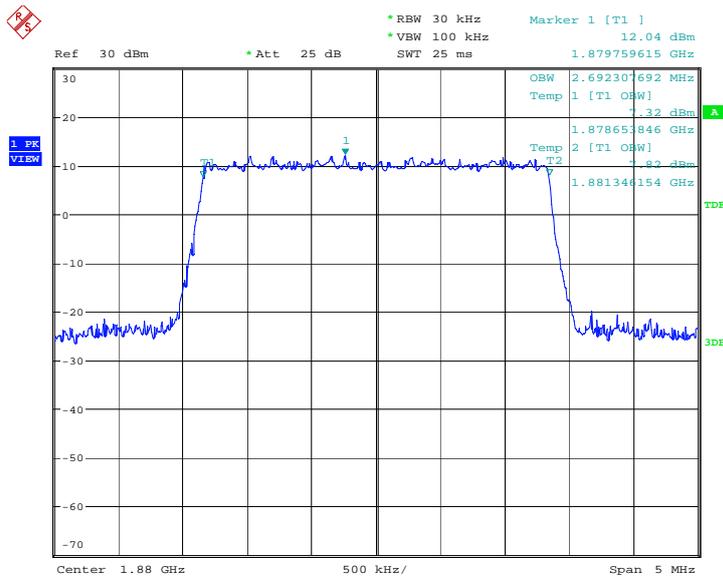
Date: 14.JAN.2014 19:23:27

LTE band 2, 5MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	4487.179	4503.205

LTE band 2, 5MHz Bandwidth, QPSK (99% BW)
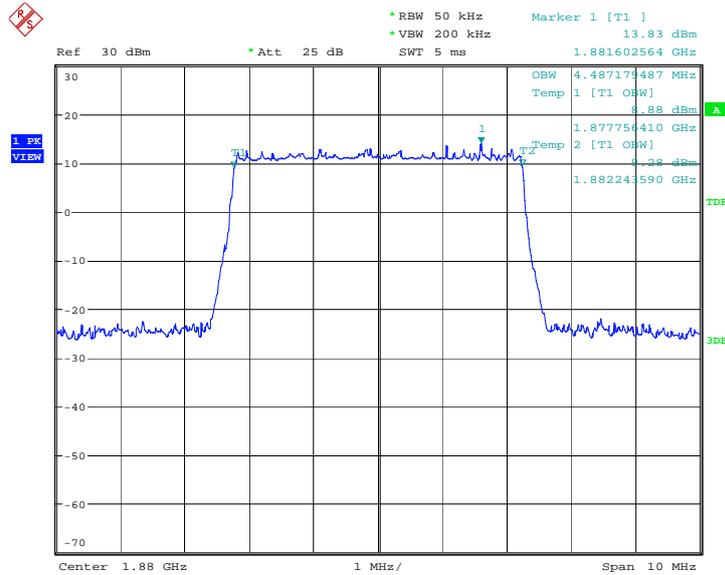
Date: 14.JAN.2014 19:51:25

LTE band 2, 5MHz Bandwidth,16QAM (99% BW)
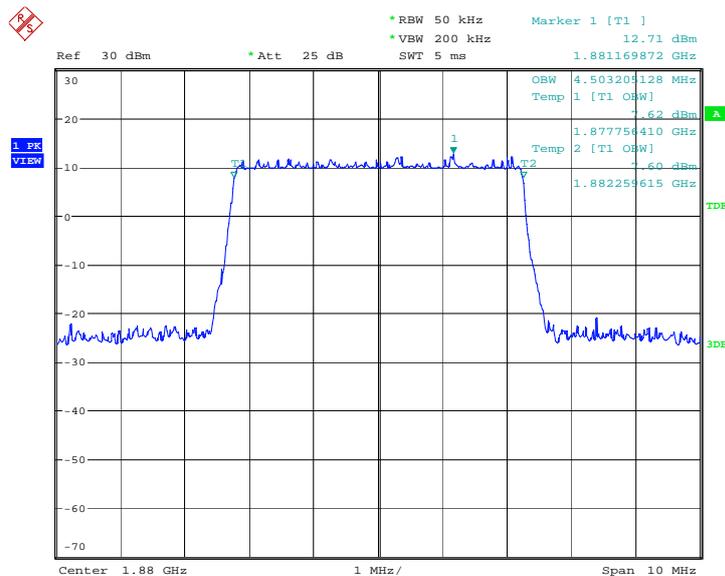
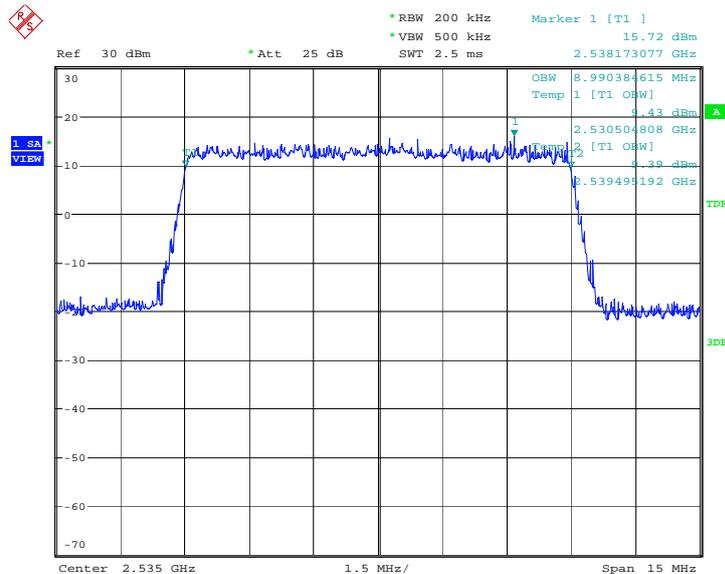Date: 14.JAN.2014 19:51:38

LTE band 2, 10MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	8942.308	8942.308

LTE band 2, 10MHz Bandwidth, QPSK (99% BW)
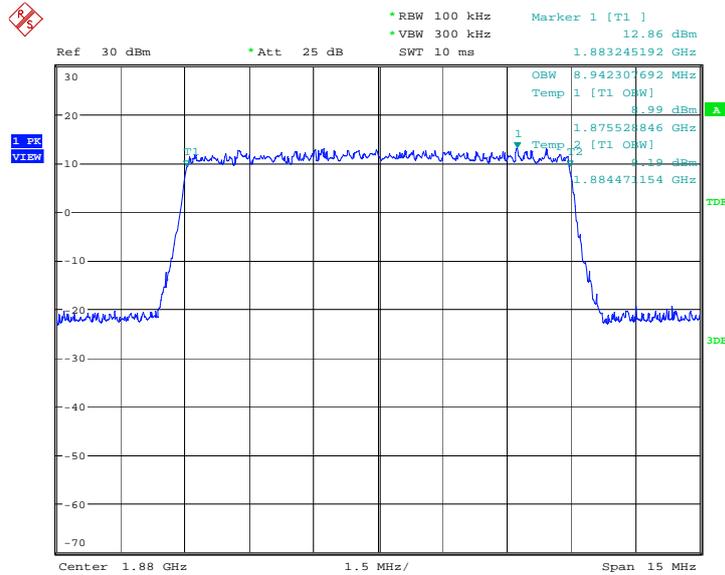
Date: 14.JAN.2014 20:19:23

LTE band 2, 10MHz Bandwidth, 16QAM (99% BW)
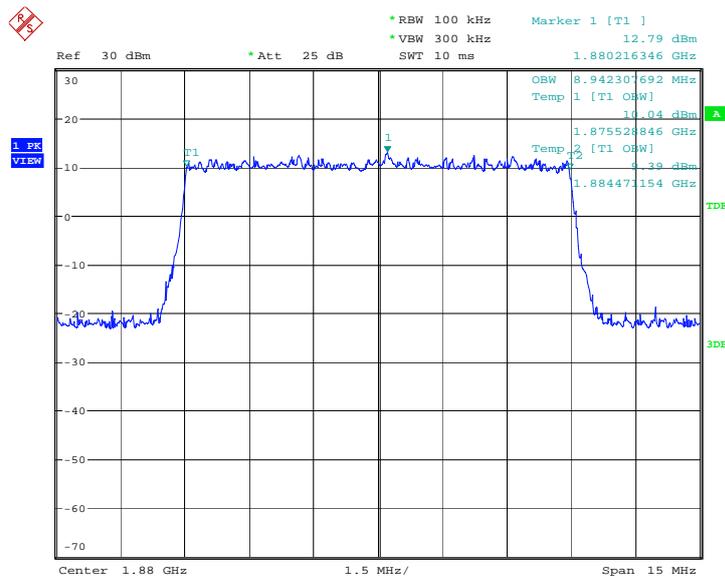
Date: 14.JAN.2014 20:19:36

LTE band 2, 15MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	13461.538	13429.487

LTE band 2, 15MHz Bandwidth, QPSK (99% BW)
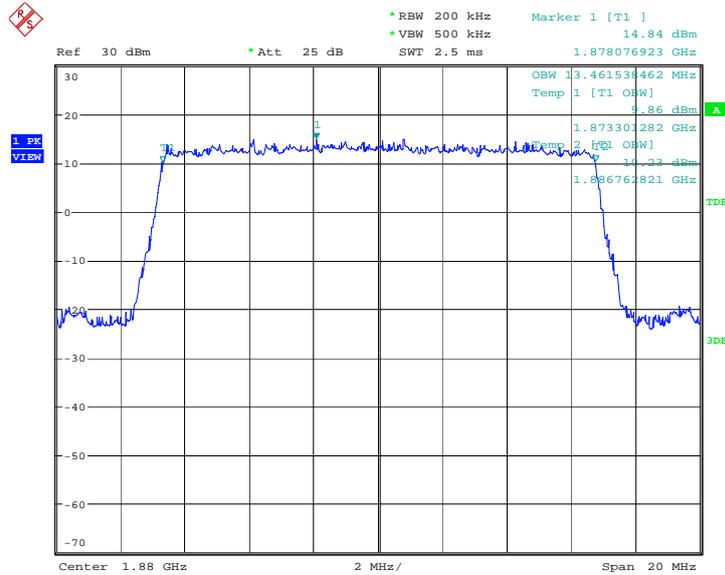
Date: 14.JAN.2014 20:47:27

LTE band 2, 15MHz Bandwidth, 16QAM (99% BW)
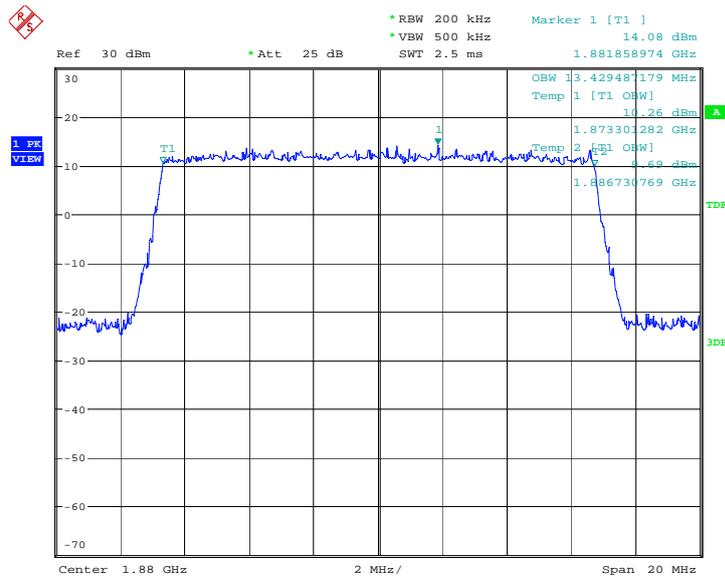
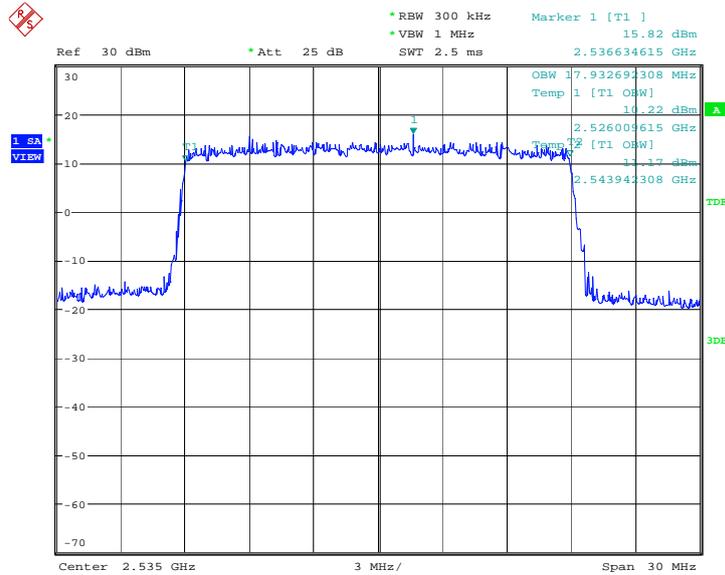Date: 14.JAN.2014 20:47:40

LTE band 2, 20MHz (99% BW)

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

LTE band 2, 20MHz Bandwidth, QPSK (99% BW)
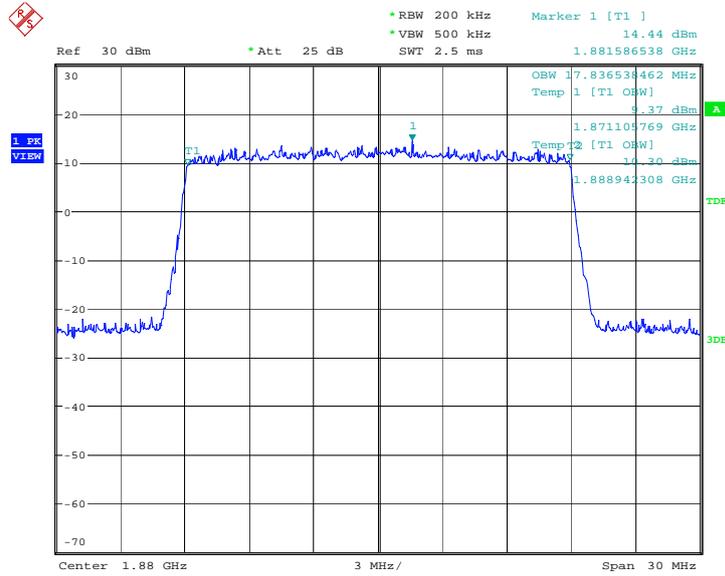
Date: 14.JAN.2014 21:15:38

LTE band 2, 20MHz Bandwidth, 16QAM (99% BW)
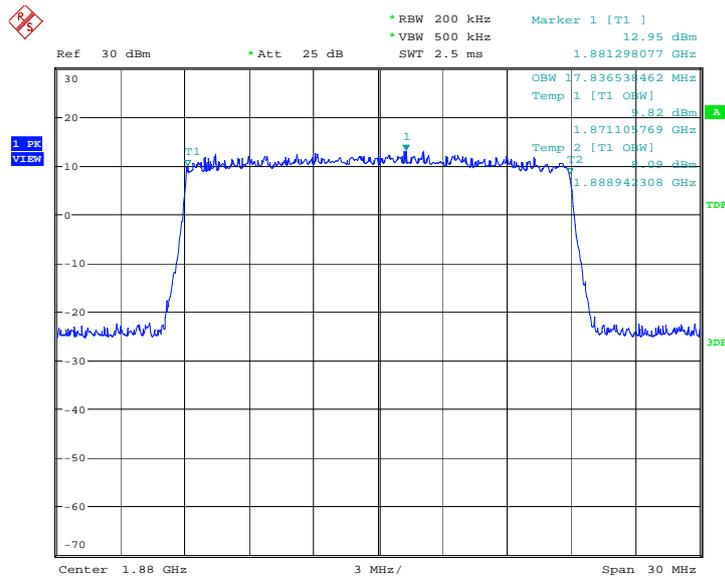
Date: 14.JAN.2014 21:15:52

LTE band 4, 1.4MHz (99% BW)

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

LTE band 4, 1.4MHz Bandwidth, QPSK (99% BW)
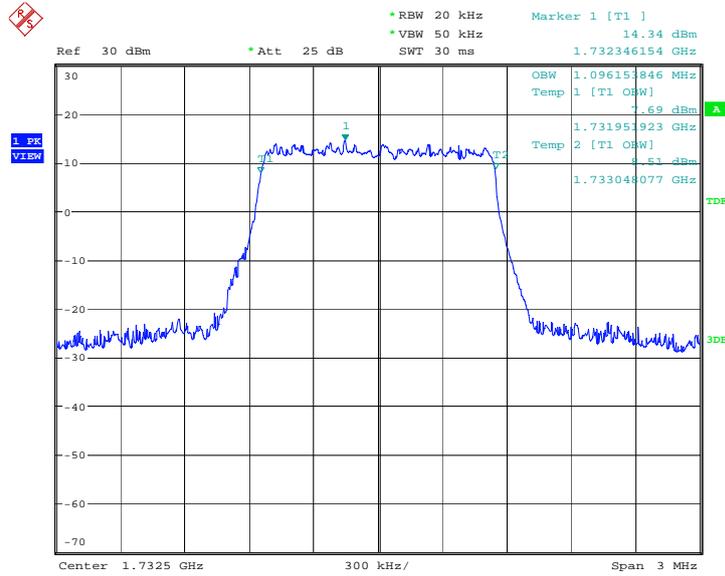
Date: 14.JAN.2014 21:43:44

LTE band 4, 1.4MHz Bandwidth, 16QAM (99% BW)
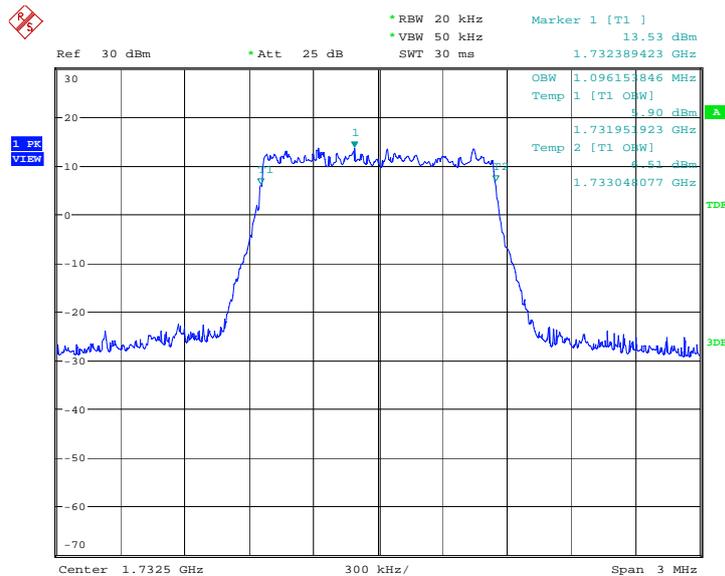
Date: 14.JAN.2014 21:43:57

LTE band 4, 3MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1732.5	2692.307692	2700.320513

LTE band 4, 3MHz Bandwidth, QPSK (99% BW)
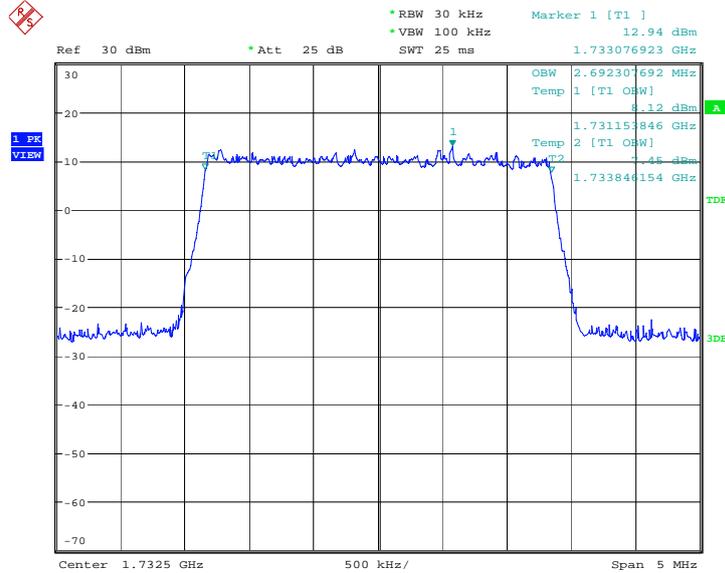
Date: 14.JAN.2014 22:11:44

LTE band 4, 3MHz Bandwidth, 16QAM (99% BW)
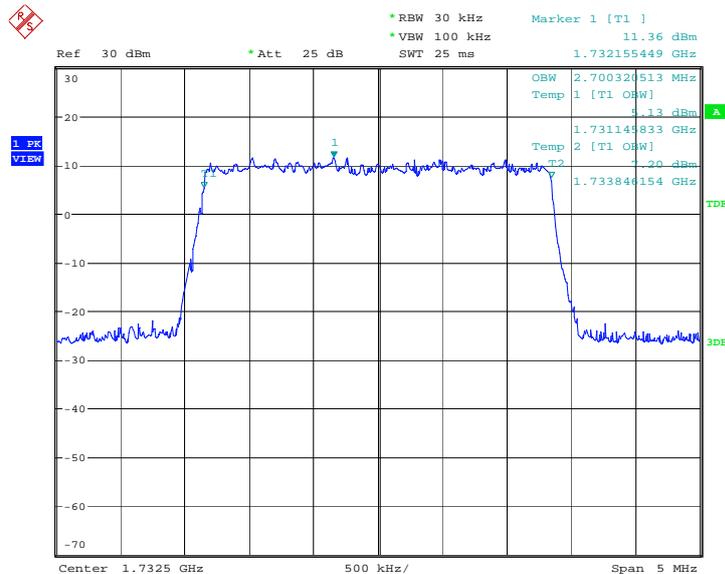
Date: 14.JAN.2014 22:11:57

LTE band 4, 5MHz (99% BW)

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

LTE band 4, 5MHz Bandwidth, QPSK (99% BW)
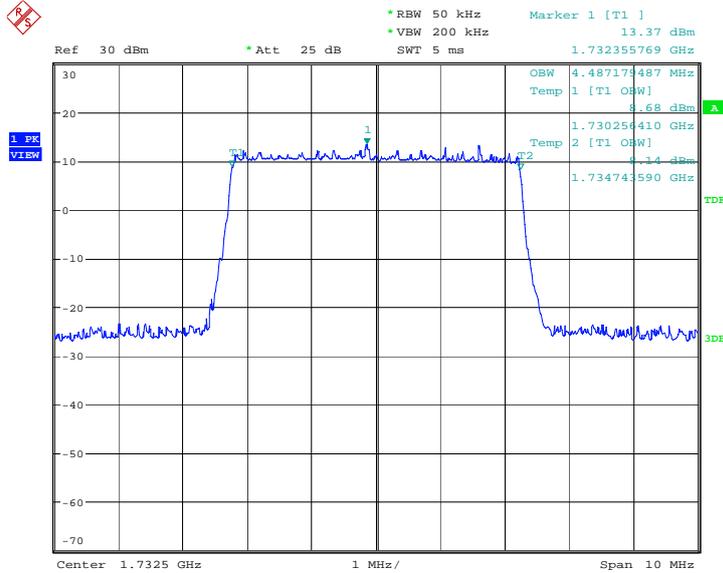
Date: 14.JAN.2014 22:39:47

LTE band 4, 5MHz Bandwidth,16QAM (99% BW)
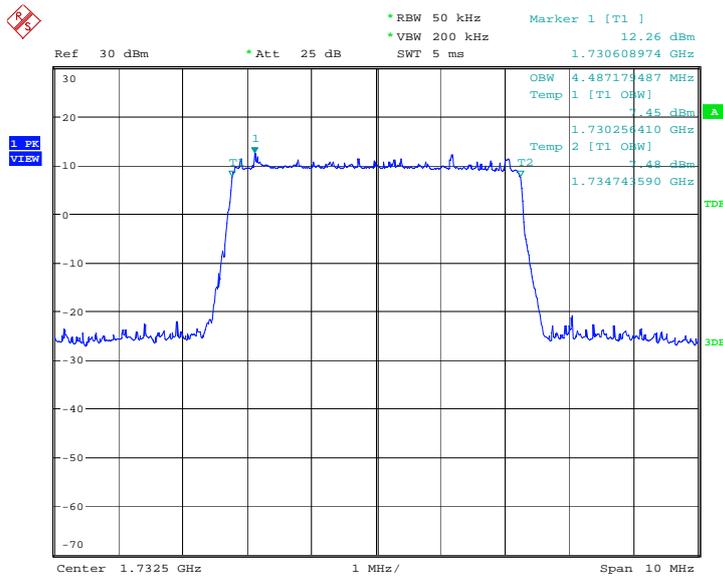
Date: 14.JAN.2014 22:40:00

LTE band 4, 10MHz (99% BW)

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

LTE band 4, 10MHz Bandwidth, QPSK (99% BW)
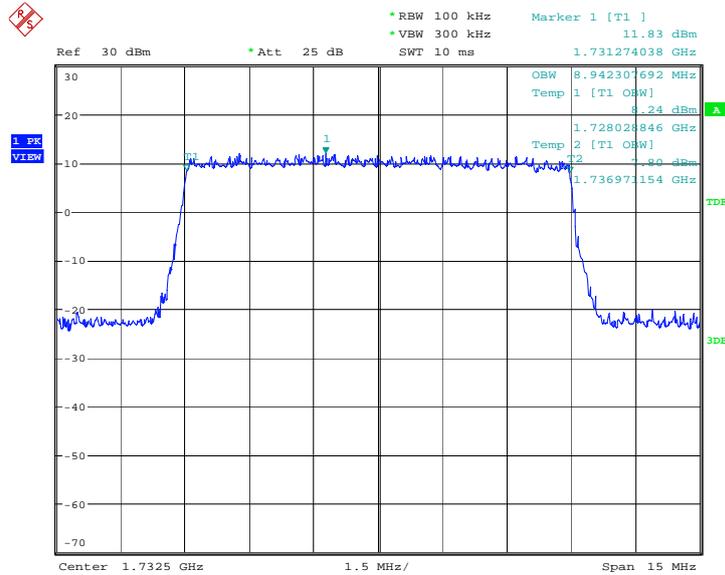
Date: 22.JAN.2014 14:01:47

LTE band 4, 10MHz Bandwidth, 16QAM (99% BW)
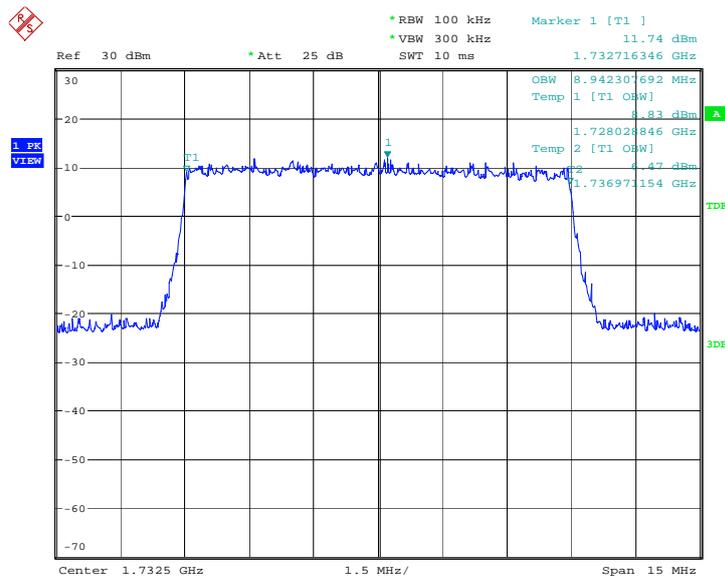
Date: 22.JAN.2014 14:02:00

LTE band 4, 15MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1732.5	13397.436	13429.487

LTE band 4, 15MHz Bandwidth, QPSK (99% BW)
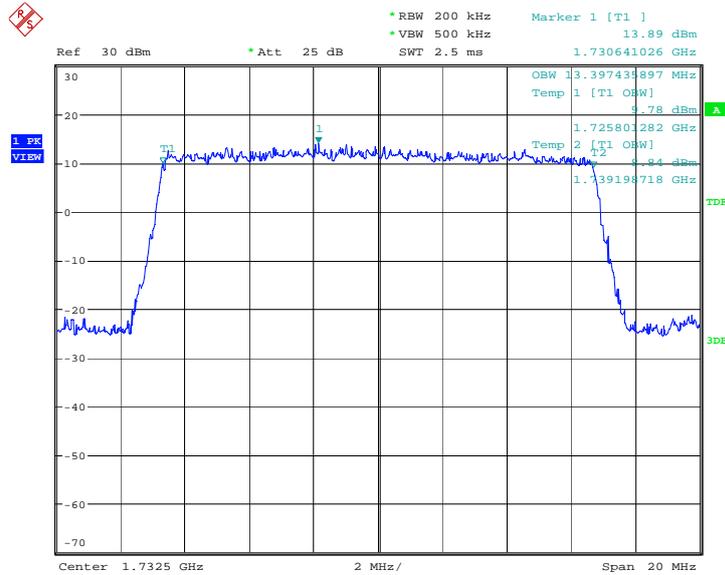
Date: 22.JAN.2014 14:07:33

LTE band 4, 15MHz Bandwidth, 16QAM (99% BW)
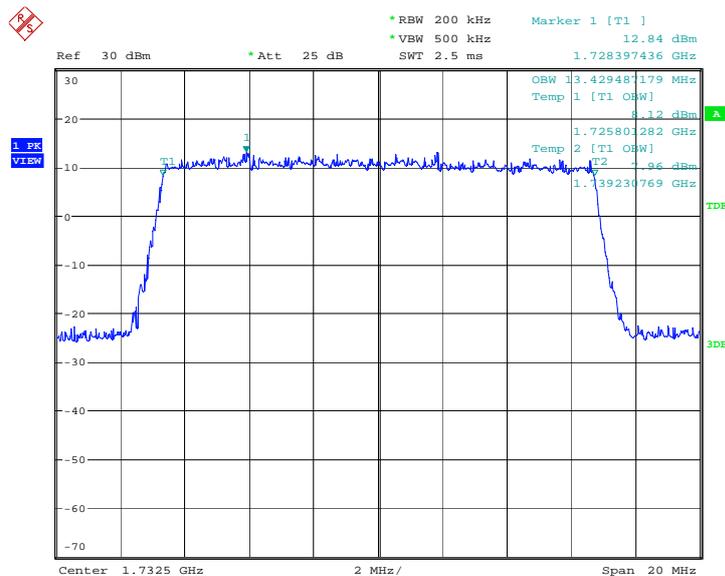
Date: 22.JAN.2014 14:07:47

LTE band 4, 20MHz (99% BW)

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

LTE band 4, 20MHz Bandwidth, QPSK (99% BW)
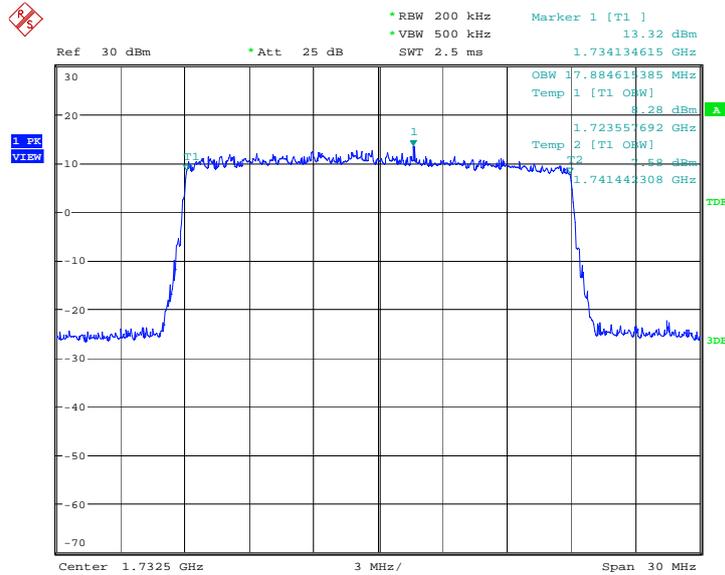
Date: 22.JAN.2014 14:13:23

LTE band 4, 20MHz Bandwidth, 16QAM (99% BW)
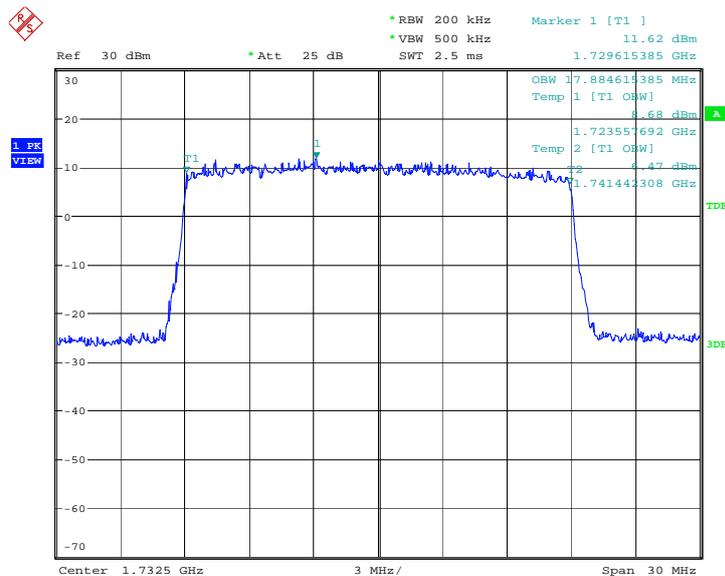
Date: 22.JAN.2014 14:13:37

LTE band 7, 5MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
2535	4487.179	4471.154

LTE band 7, 5MHz Bandwidth, QPSK (99% BW)
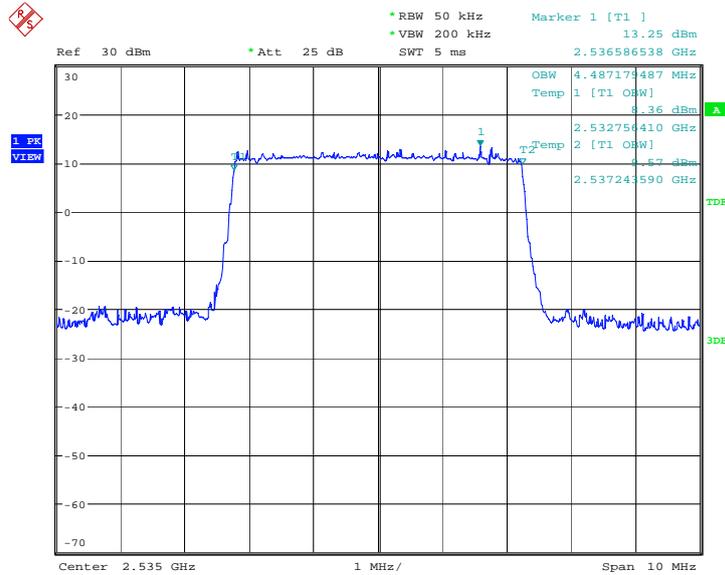
Date: 14.JAN.2014 16:52:03

LTE band 7, 5MHz Bandwidth,16QAM (99% BW)
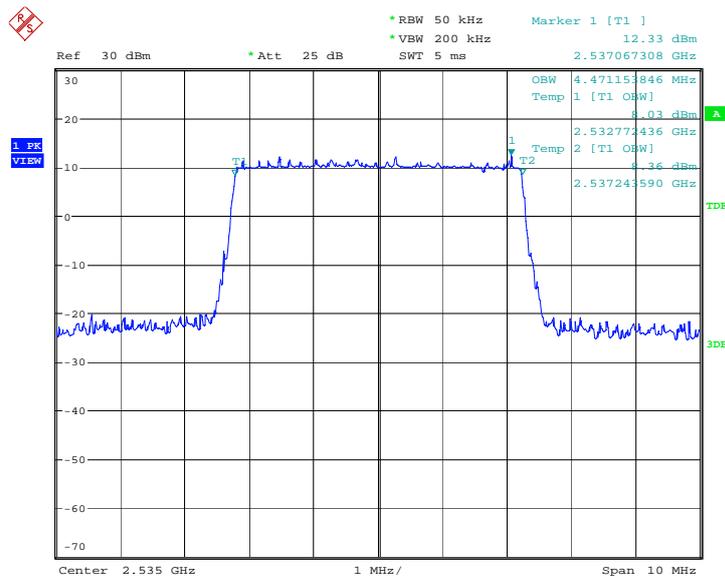
Date: 14.JAN.2014 16:52:16

LTE band 7, 10MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
2535	8942.308	8966.346

LTE band 7, 10MHz Bandwidth, QPSK (99% BW)
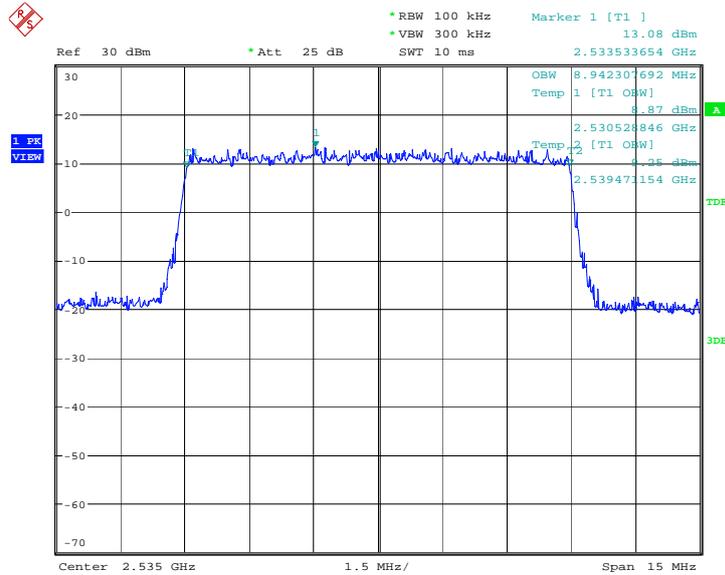
Date: 14.JAN.2014 17:23:38

LTE band 7, 10MHz Bandwidth, 16QAM (99% BW)
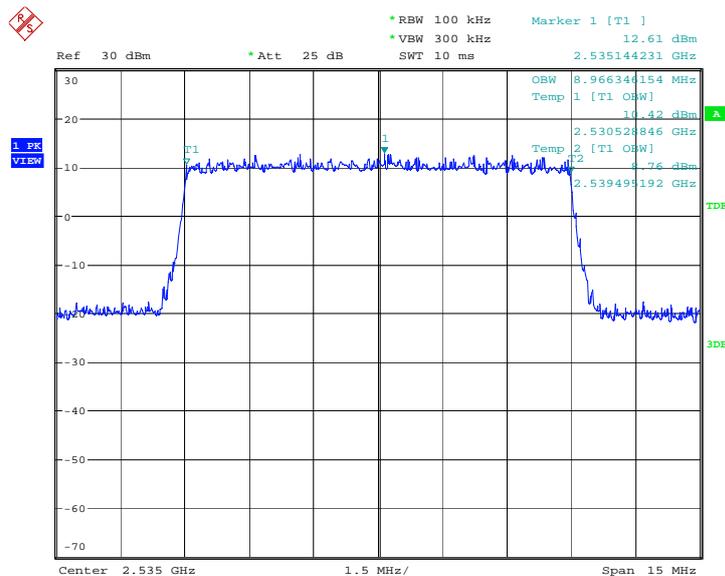
Date: 14.JAN.2014 17:23:51

LTE band 7, 15MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
2535	13429.487	13429.487

LTE band 7, 15MHz Bandwidth, QPSK (99% BW)
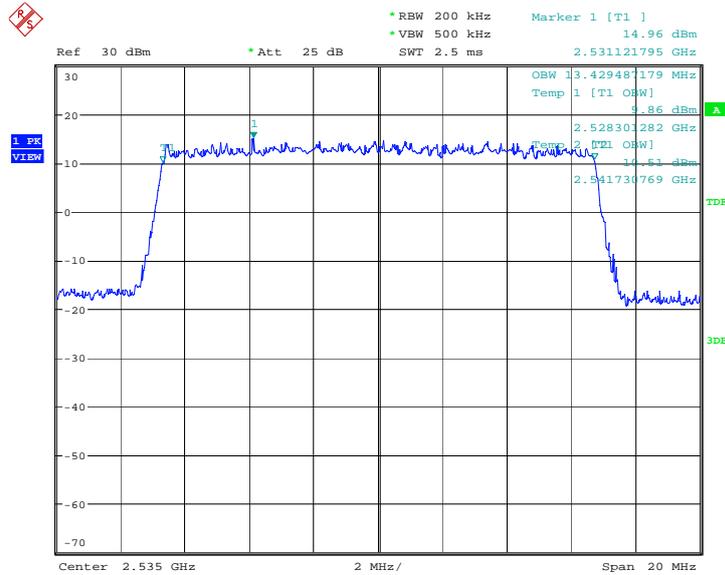
Date: 14.JAN.2014 17:55:27

LTE band 7, 15MHz Bandwidth, 16QAM (99% BW)
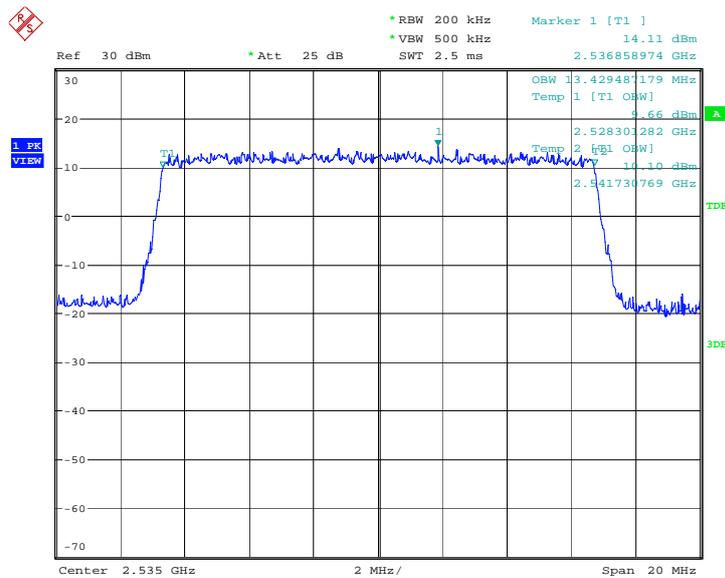
Date: 14.JAN.2014 17:55:41

LTE band 7, 20MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
2535	17884.615	17884.615

LTE band 7, 20MHz Bandwidth, QPSK (99% BW)
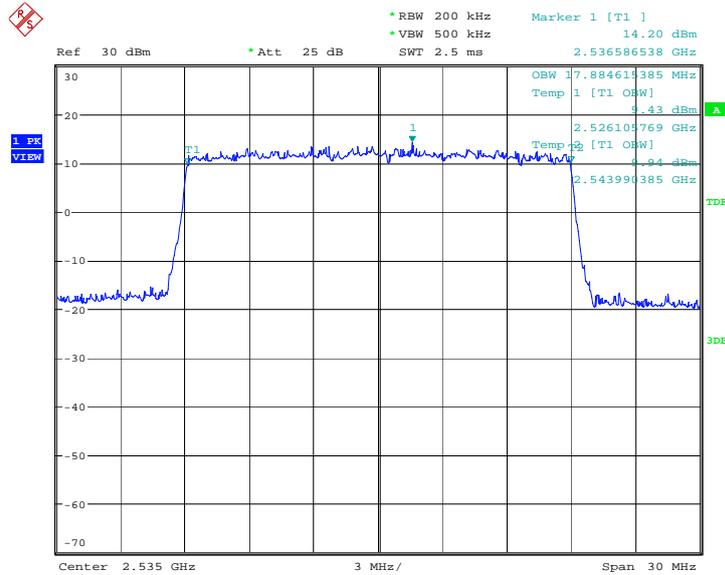
Date: 14.JAN.2014 18:25:21

LTE band 7, 20MHz Bandwidth, 16QAM (99% BW)
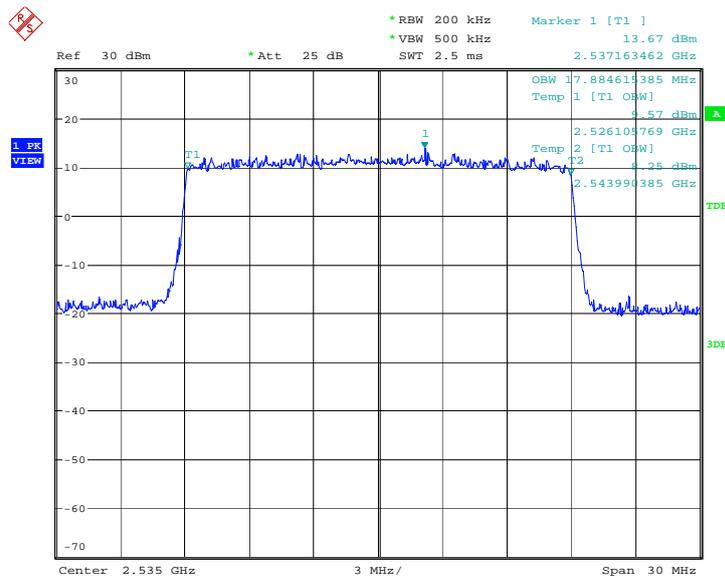
Date: 14.JAN.2014 18:25:34

LTE band 17, 5MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
710	4471.154	4487.179

LTE band 17, 5MHz Bandwidth, QPSK (99% BW)
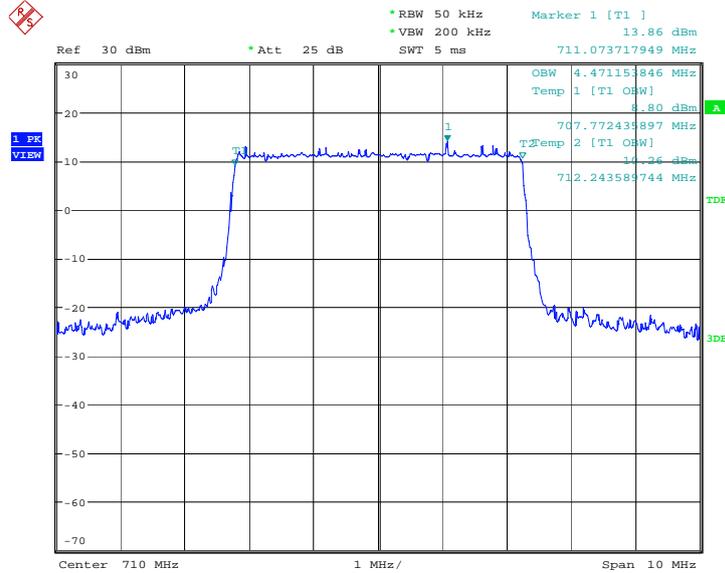
Date: 15.JAN.2014 08:33:53

LTE band 17, 5MHz Bandwidth,16QAM (99% BW)
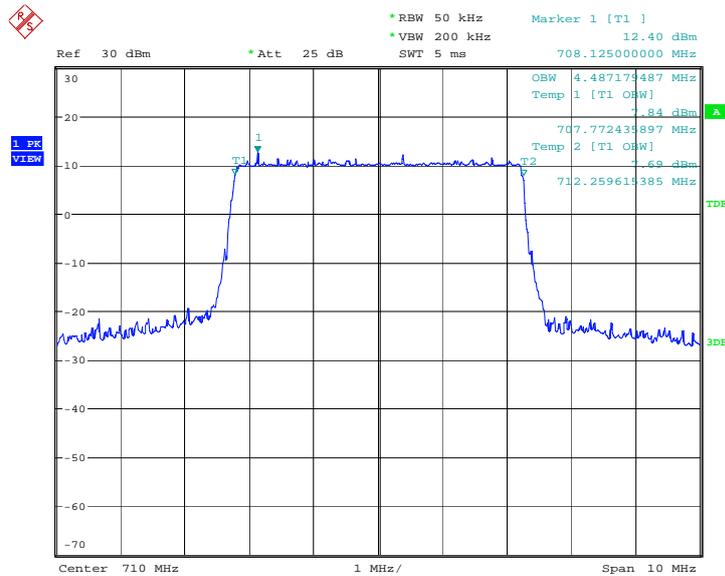
Date: 15.JAN.2014 08:34:07

LTE band 17, 10MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
710	8966.346	8942.308

LTE band 17, 10MHz Bandwidth, QPSK (99% BW)
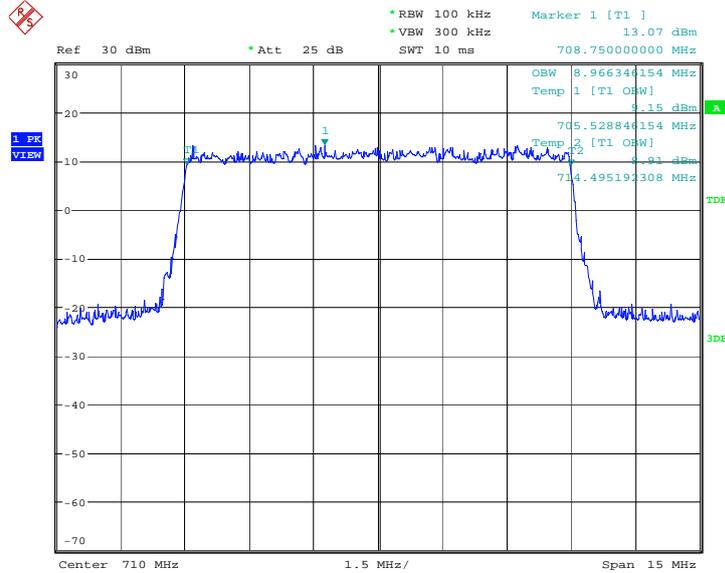
Date: 20.JAN.2014 14:01:06

LTE band 17, 10MHz Bandwidth, 16QAM (99% BW)
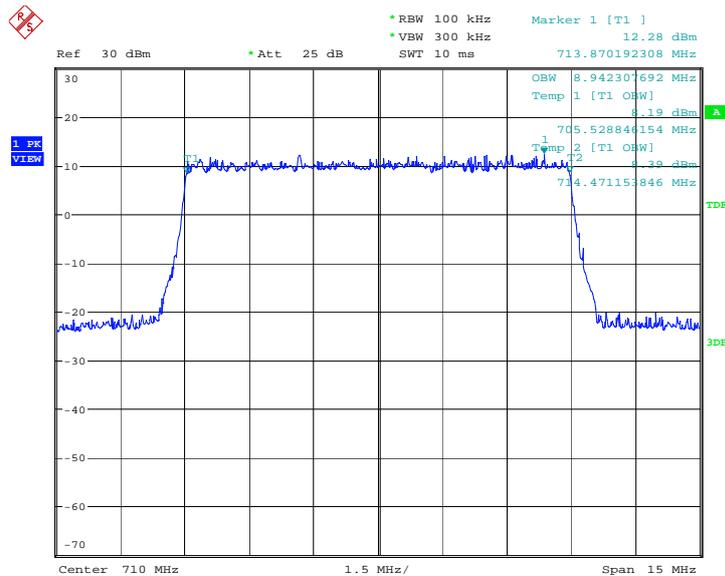
Date: 20.JAN.2014 14:01:19

A.5.1.2 Measurement results per IC rules

LTE band 2, 1.4MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	1105.769	1105.769

LTE band 2, 1.4MHz Bandwidth, QPSK (99% BW)
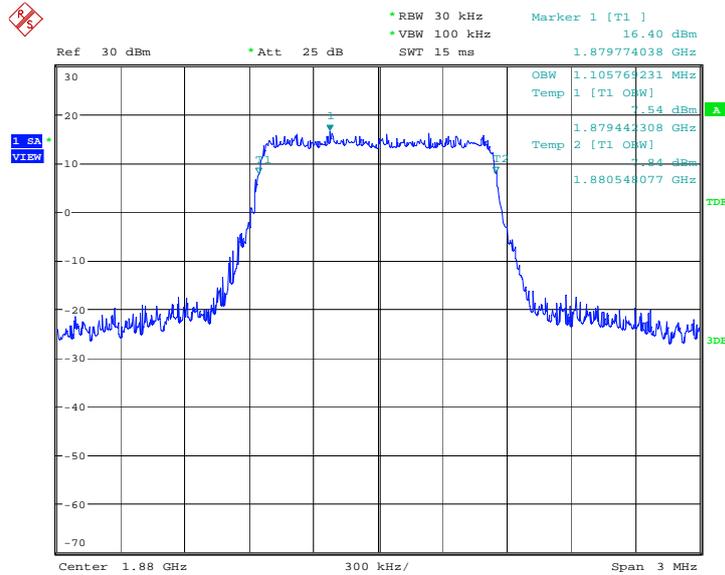
Date: 14.JAN.2014 19:14:11

LTE band 2, 1.4MHz Bandwidth, 16QAM (99% BW)
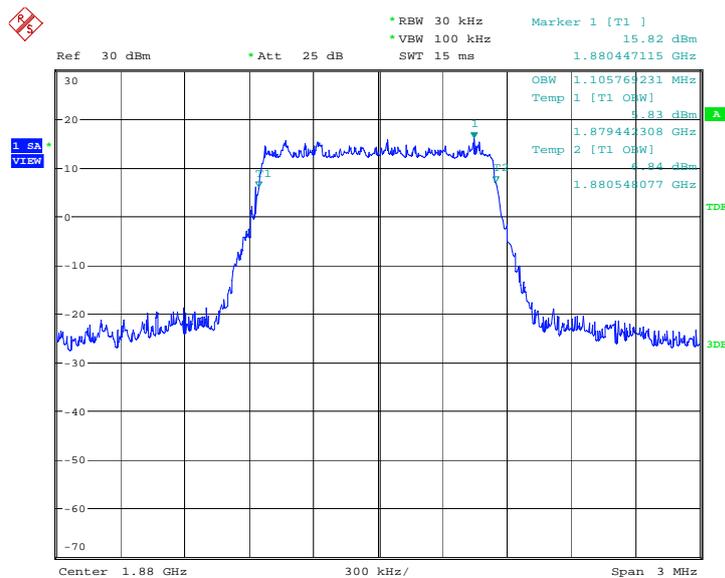
Date: 14.JAN.2014 19:14:24

LTE band 2, 3MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	2700.321	2692.308

LTE band 2, 3MHz Bandwidth, QPSK (99% BW)
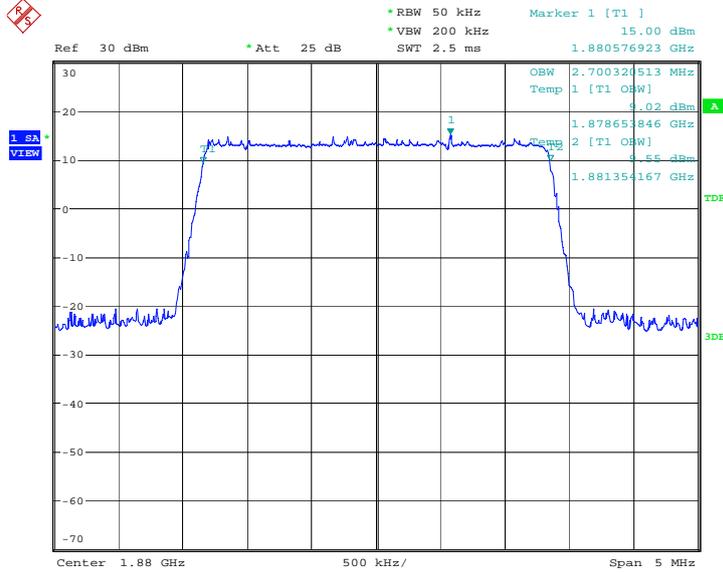
Date: 14.JAN.2014 19:42:22

LTE band 2, 3MHz Bandwidth, 16QAM (99% BW)
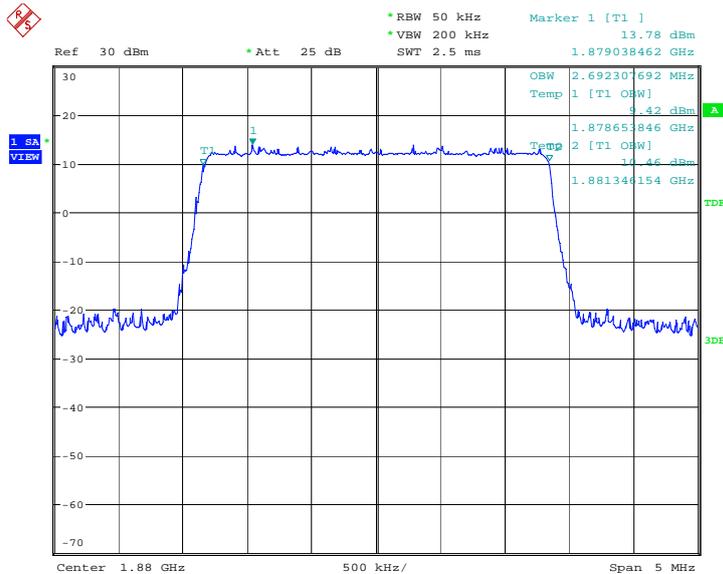
Date: 14.JAN.2014 19:42:36

LTE band 2, 5MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	4503.205	4503.205

LTE band 2, 5MHz Bandwidth, QPSK (99% BW)
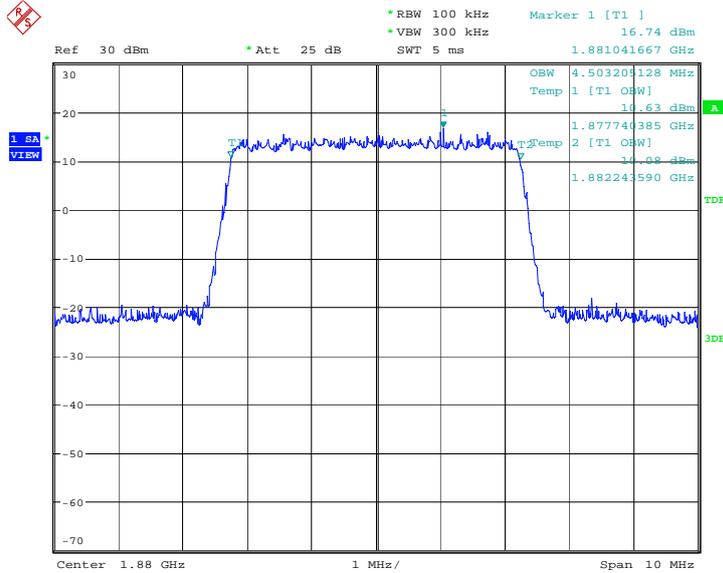
Date: 14.JAN.2014 20:10:20

LTE band 2, 5MHz Bandwidth,16QAM (99% BW)
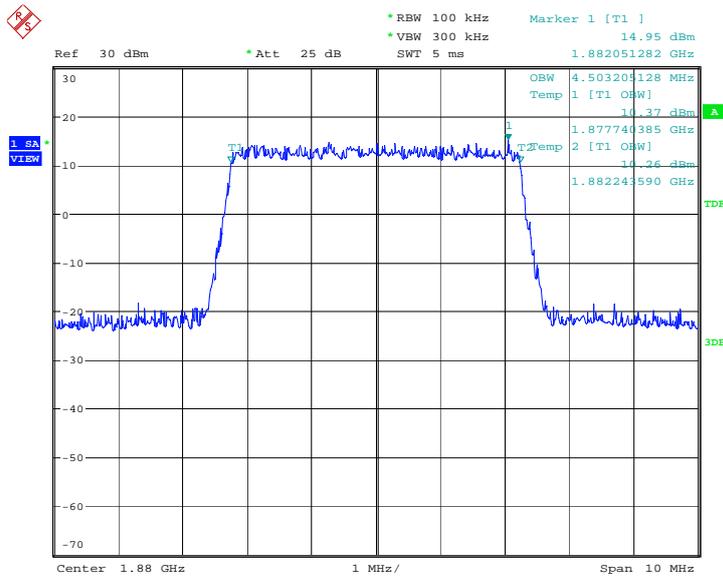
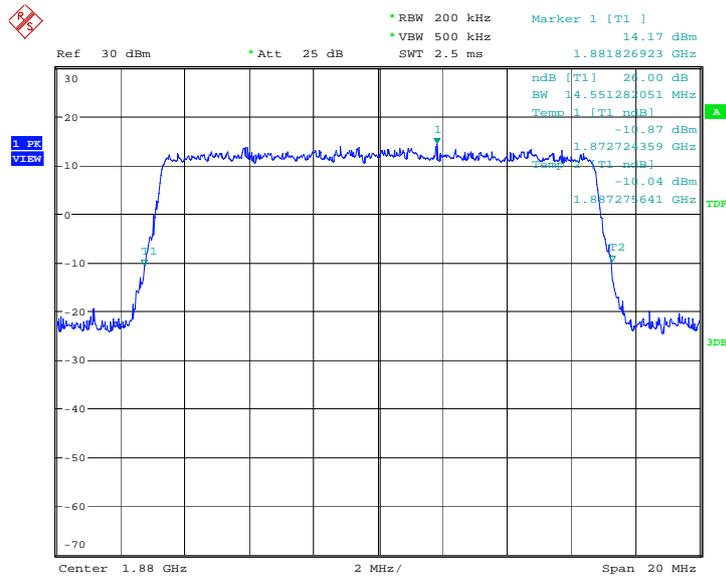Date: 14.JAN.2014 20:10:33

LTE band 2, 10MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	8990.385	8990.385

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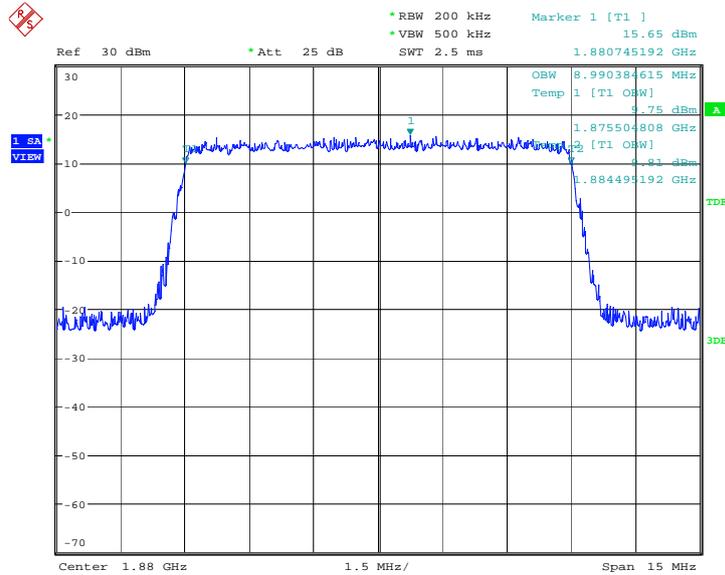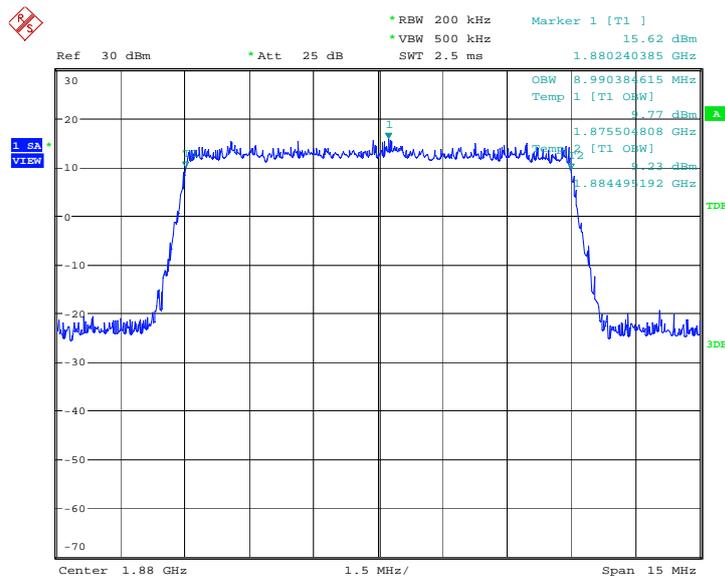
LTE band 2, 10MHz Bandwidth, 16QAM (99% BW)

LTE band 2, 15MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	13429.487	13461.538

LTE band 2, 15MHz Bandwidth, QPSK (99% BW)
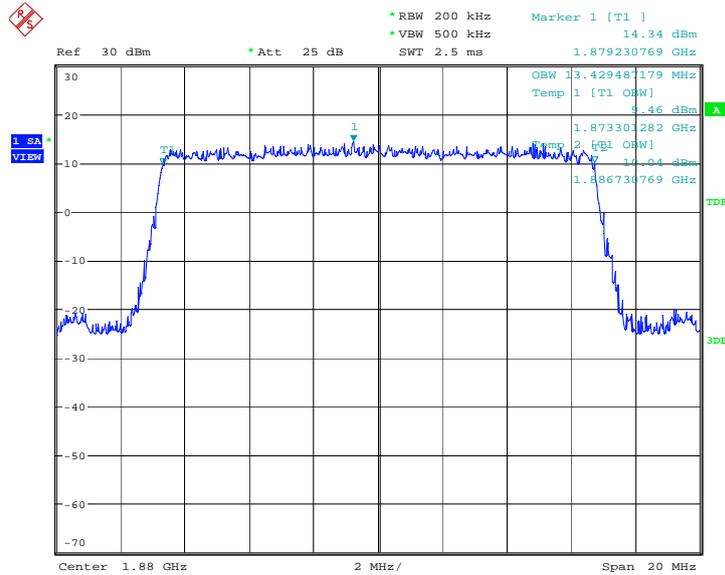
Date: 14.JAN.2014 21:06:27

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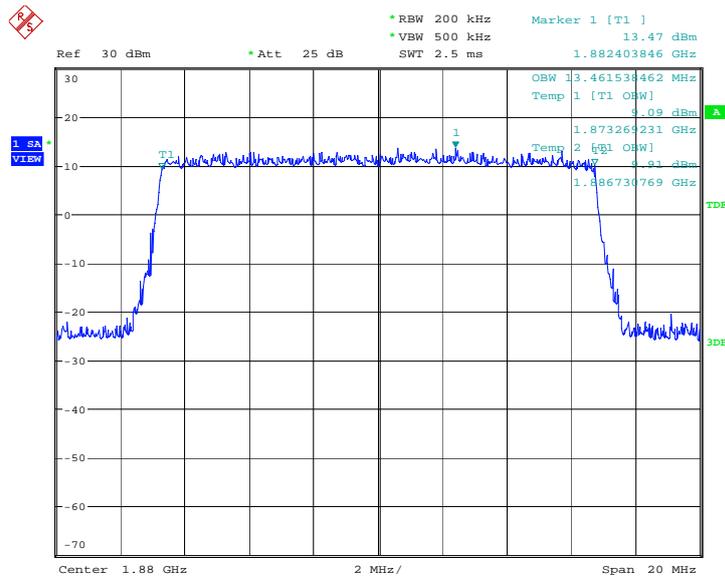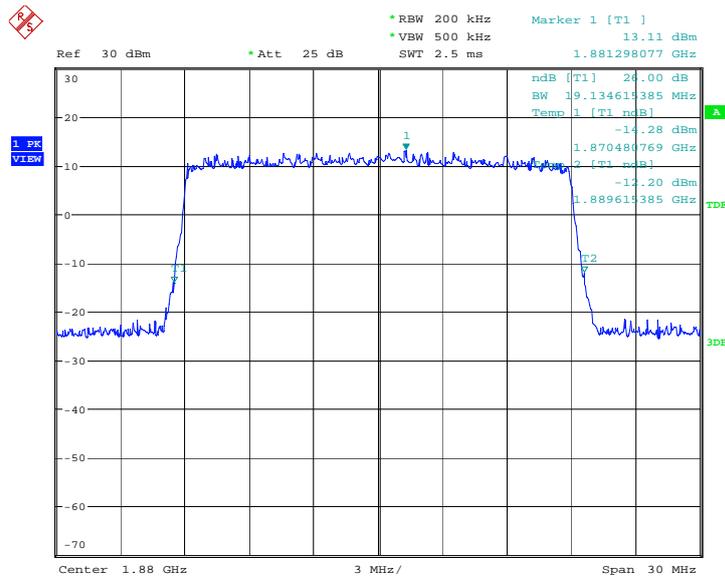

Date: 14.JAN.2014 21:06:40

LTE band 2, 20MHz (99% BW)

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

LTE band 2, 20MHz Bandwidth, QPSK (99% BW)
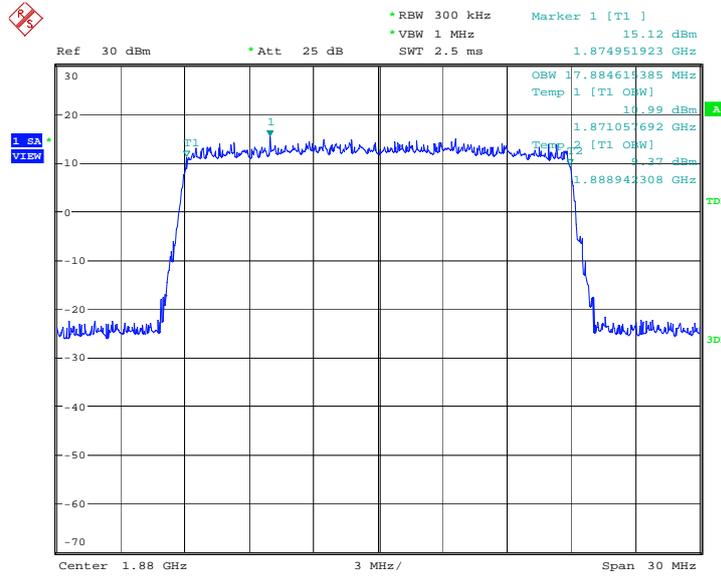
Date: 14.JAN.2014 21:34:36

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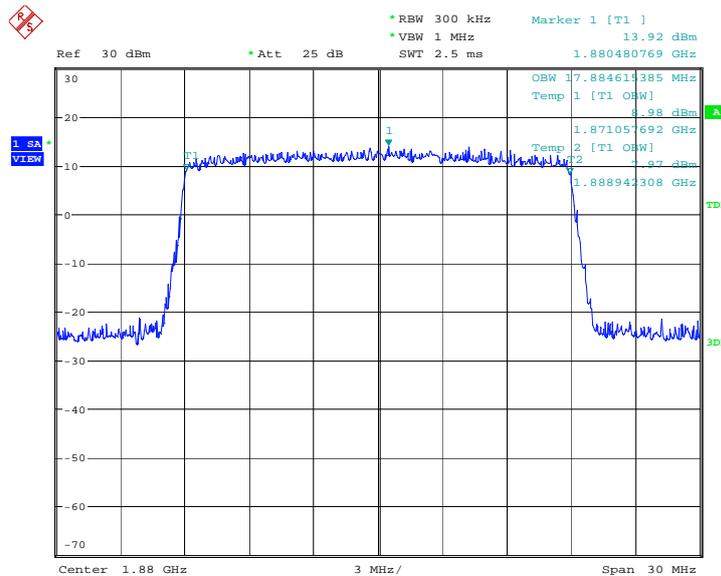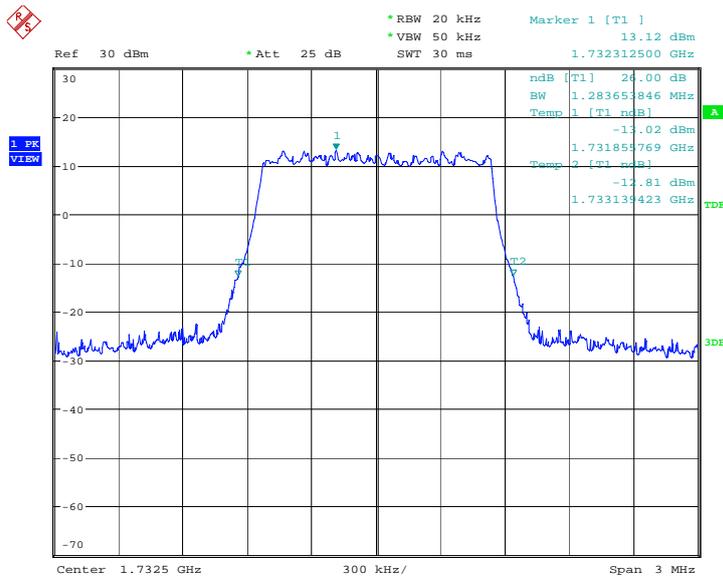

Date: 14.JAN.2014 21:34:50

LTE band 4, 1.4MHz (99% BW)

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

LTE band 4, 1.4MHz Bandwidth, QPSK (99% BW)
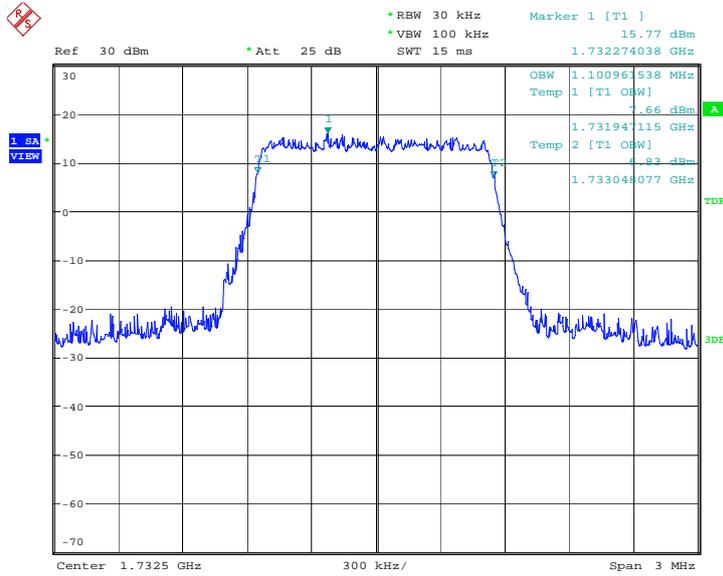
Date: 14.JAN.2014 22:02:42

LTE band 4, 1.4MHz Bandwidth, 16QAM (99% BW)
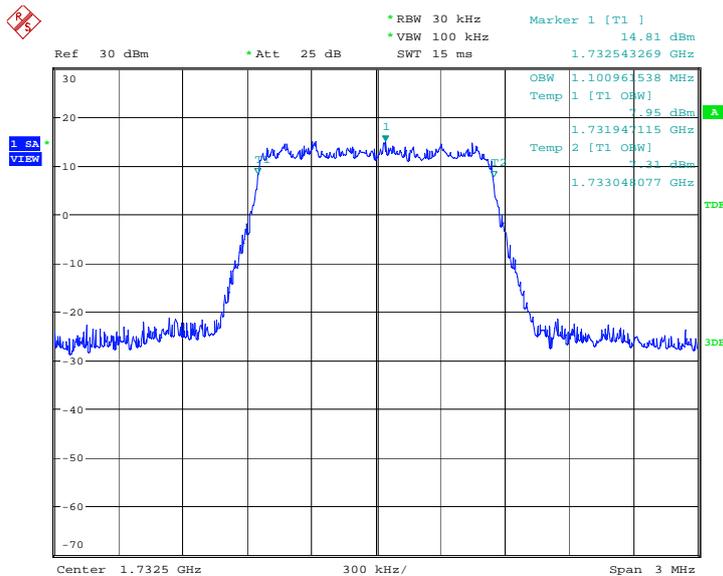
Date: 14.JAN.2014 22:02:55

LTE band 4, 3MHz (99% BW)

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

LTE band 4, 3MHz Bandwidth, QPSK (99% BW)
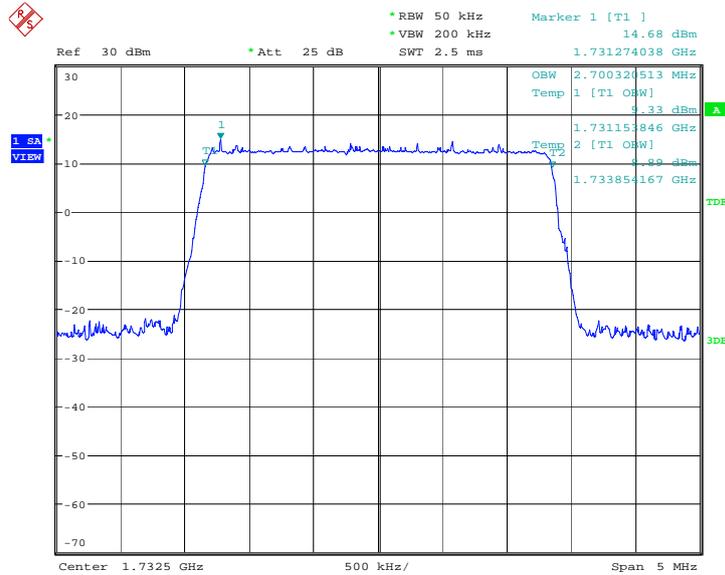
Date: 14.JAN.2014 22:30:44

LTE band 4, 3MHz Bandwidth, 16QAM (99% BW)
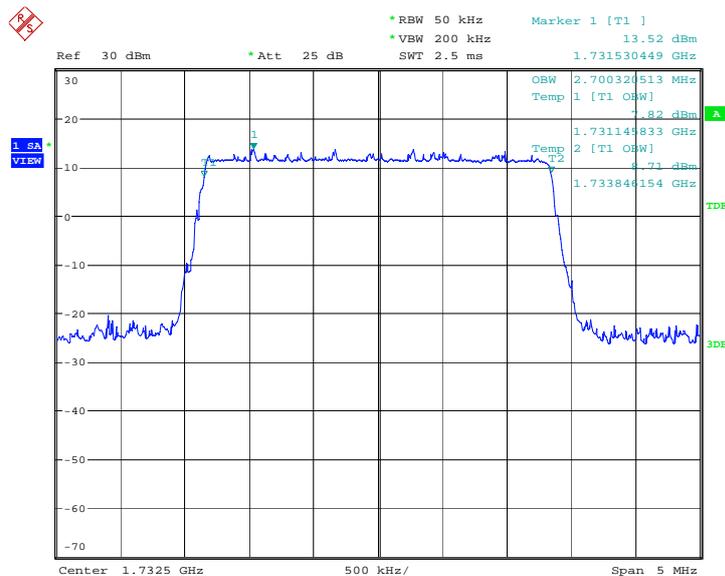
Date: 14.JAN.2014 22:30:57

LTE band 4, 5MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1732.5	4503.205	4519.231

LTE band 4, 5MHz Bandwidth, QPSK (99% BW)
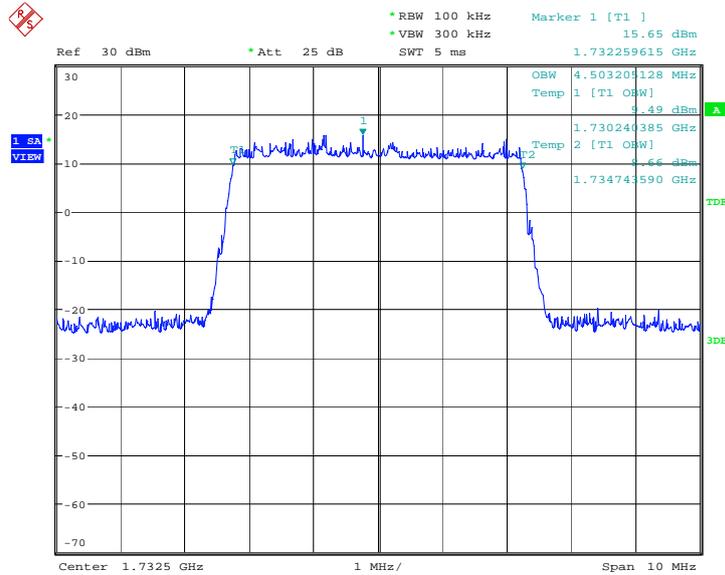
Date: 22.JAN.2014 14:17:13

LTE band 4, 5MHz Bandwidth,16QAM (99% BW)
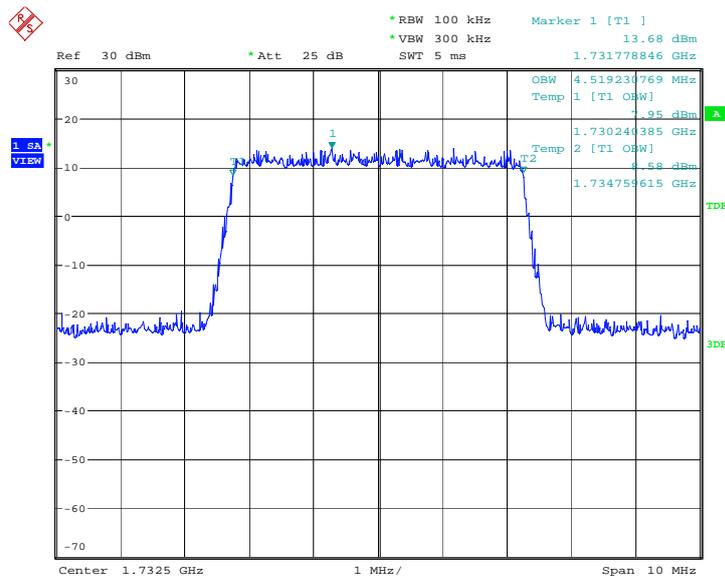
Date: 22.JAN.2014 14:17:26

LTE band 4, 10MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1732.5	8990.385	8990.385

LTE band 4, 10MHz Bandwidth, QPSK (99% BW)
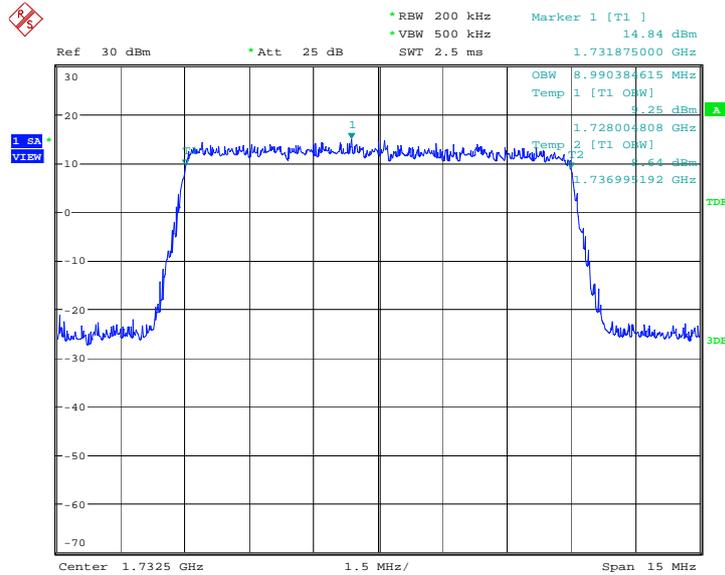
Date: 22.JAN.2014 14:20:32

LTE band 4, 10MHz Bandwidth, 16QAM (99% BW)
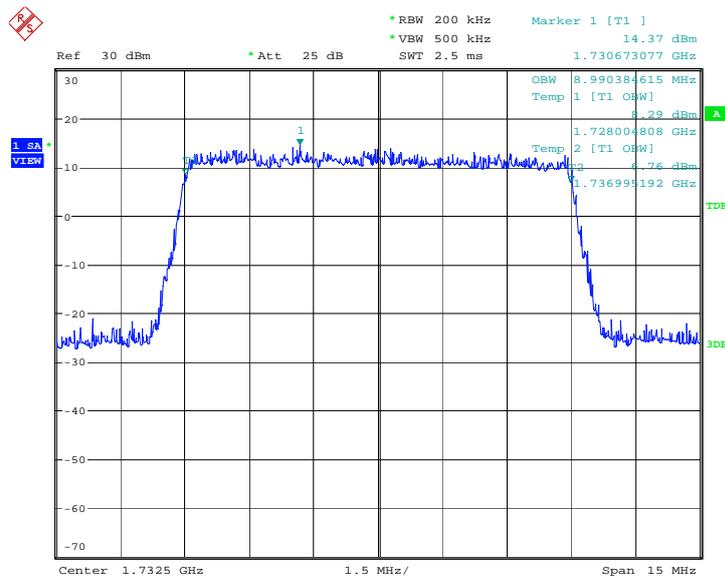
Date: 22.JAN.2014 14:20:46

LTE band 4, 15MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
1732.5	13397.436	13397.436

LTE band 4, 15MHz Bandwidth, QPSK (99% BW)
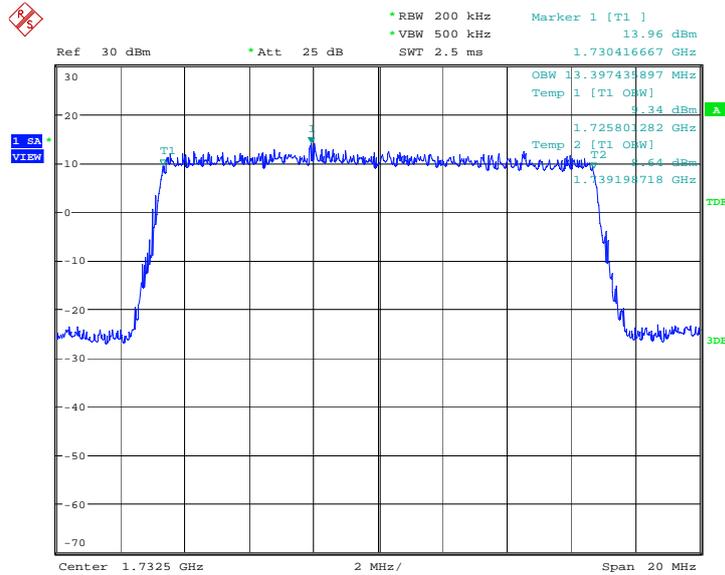
Date: 22.JAN.2014 14:21:39

LTE band 4, 15MHz Bandwidth, 16QAM (99% BW)
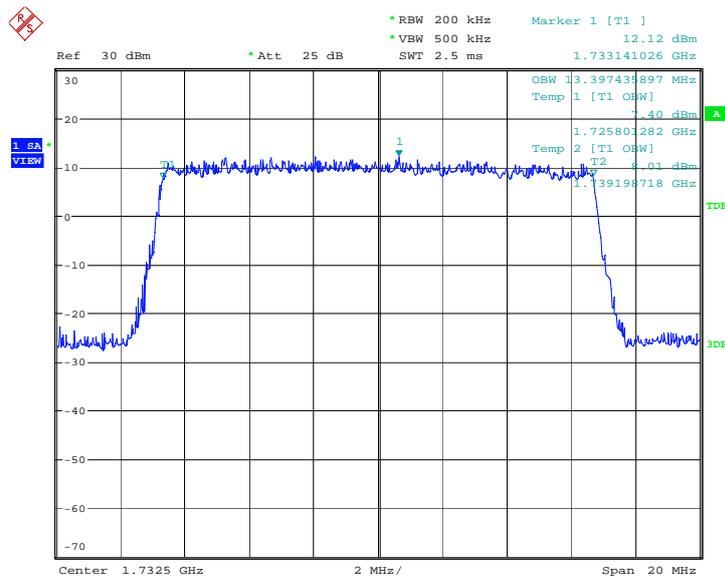
Date: 22.JAN.2014 14:21:53

LTE band 4, 20MHz (99% BW)

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

LTE band 4, 20MHz Bandwidth, QPSK (99% BW)
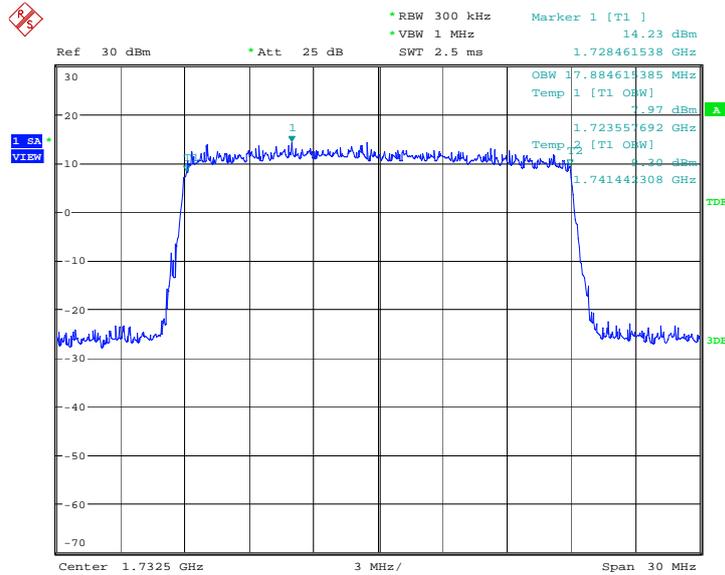
Date: 22.JAN.2014 14:18:20

LTE band 4, 20MHz Bandwidth, 16QAM (99% BW)
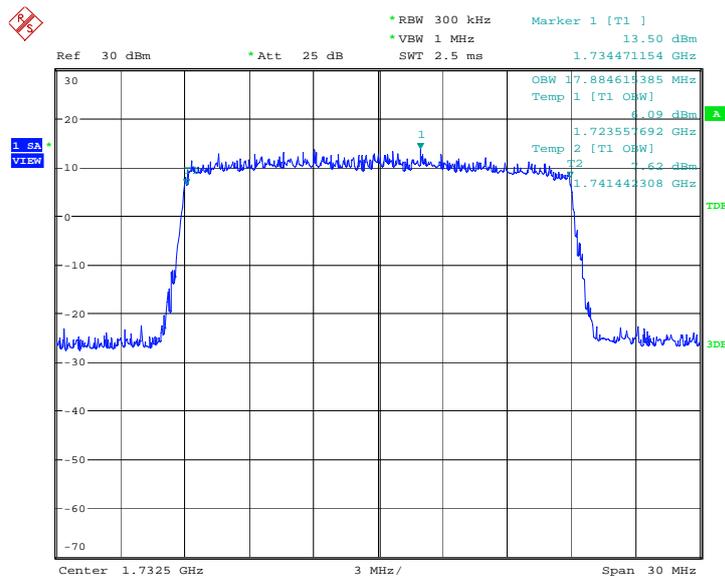
Date: 22.JAN.2014 14:18:33

LTE band 7, 5MHz (99% BW)

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

LTE band 7, 5MHz Bandwidth, QPSK (99% BW)
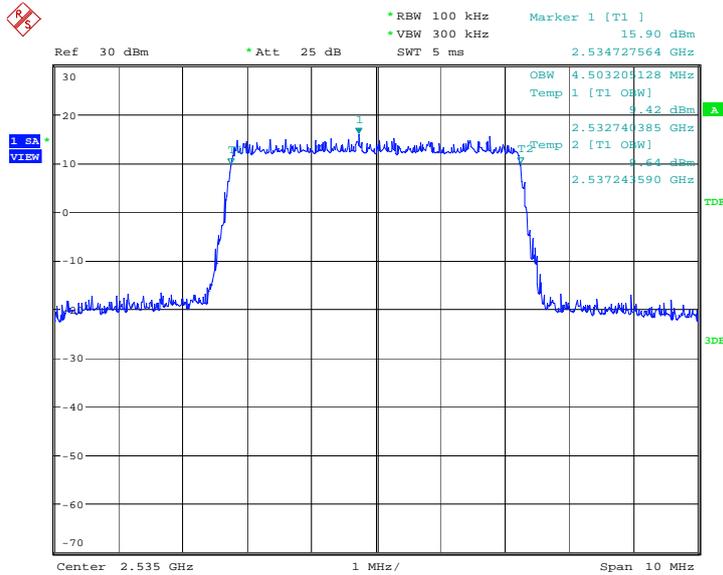
Date: 14.JAN.2014 17:14:27

LTE band 7, 5MHz Bandwidth,16QAM (99% BW)
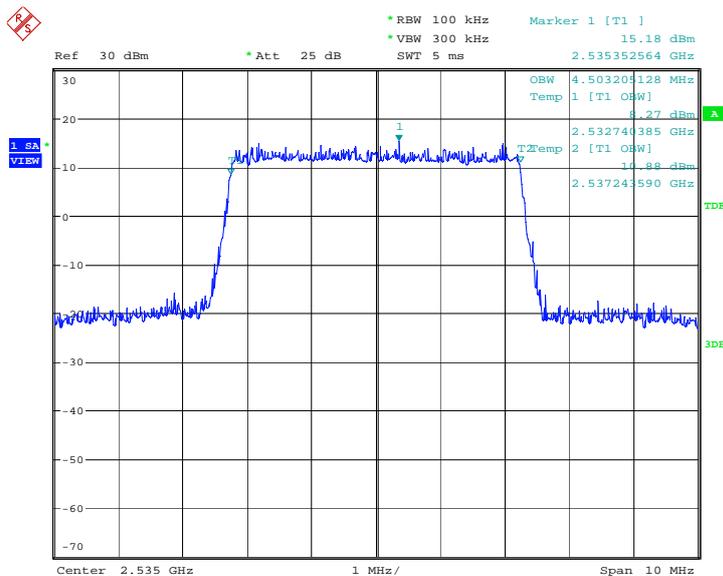
Date: 14.JAN.2014 17:14:40

LTE band 7, 10MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
2535	8990.385	8990.385

LTE band 7, 10MHz Bandwidth, QPSK (99% BW)
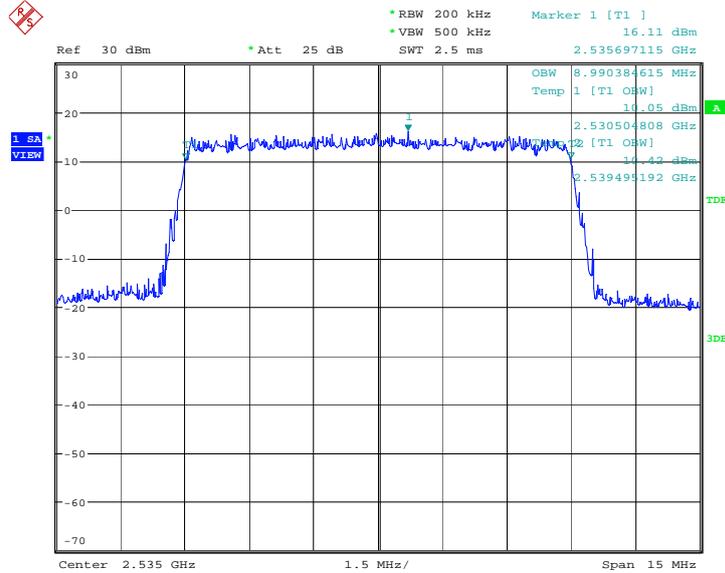
Date: 14.JAN.2014 17:46:10

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

Date: 14.JAN.2014 17:46:24

LTE band 7, 15MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
2535	13461.538	13429.487

LTE band 7, 15MHz Bandwidth, QPSK (99% BW)
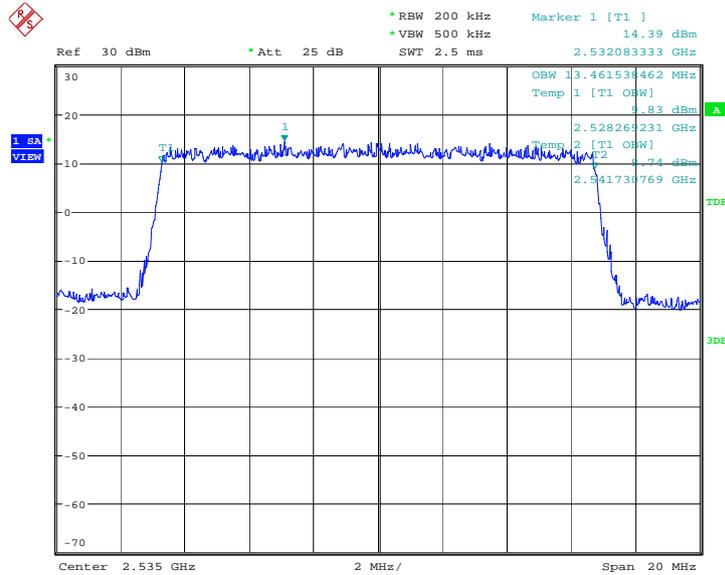
Date: 14.JAN.2014 18:16:10

LTE band 7, 15MHz Bandwidth, 16QAM (99% BW)
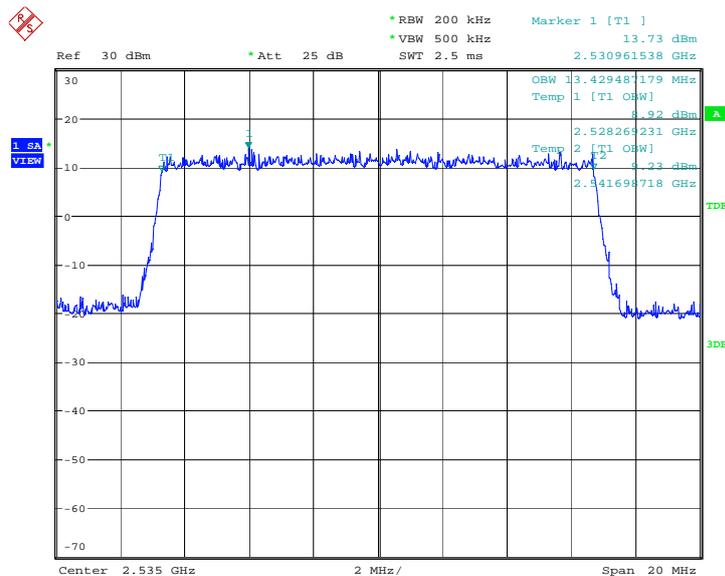
Date: 14.JAN.2014 18:16:23

LTE band 7, 20MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
2535	17932.692	17884.615

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

Date: 14.JAN.2014 18:46:09

LTE band 7, 20MHz Bandwidth, 16QAM (99% BW)
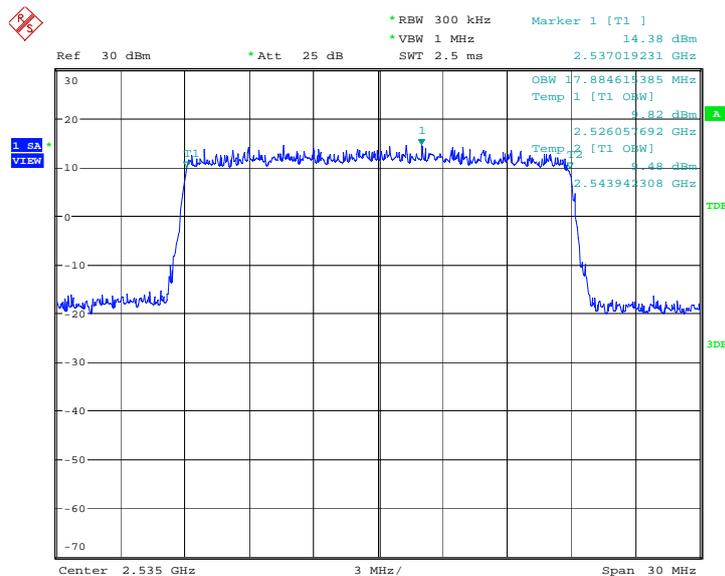
Date: 14.JAN.2014 18:46:23

LTE band 17, 5MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
710	4519.231	4519.231

LTE band 17, 5MHz Bandwidth, QPSK (99% BW)
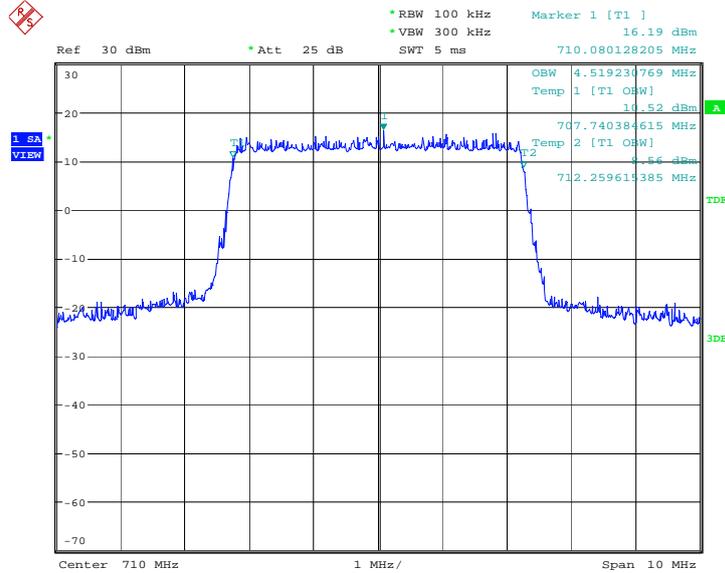
Date: 15.JAN.2014 08:36:09

LTE band 17, 5MHz Bandwidth,16QAM (99% BW)
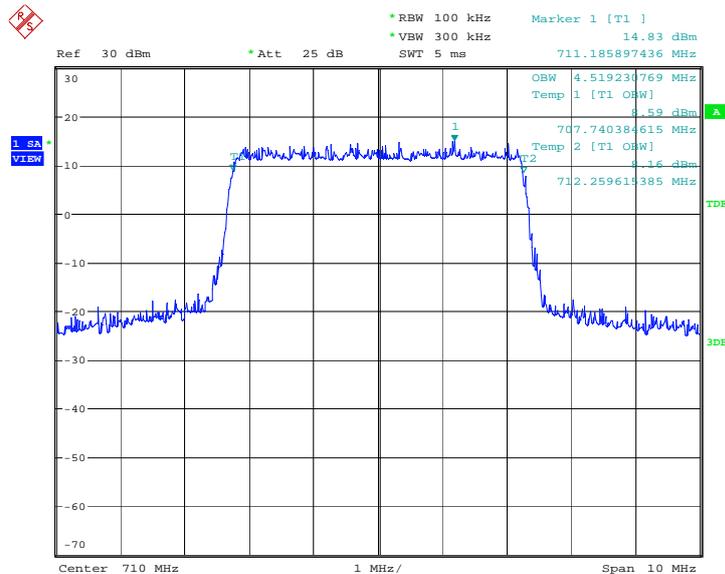
Date: 15.JAN.2014 08:36:23

LTE band 17, 10MHz (99% BW)

Frequency	Occupied Bandwidth (99% BW)(kHz)	
(MHz)	QPSK	16QAM
710	9038.462	9014.423

LTE band 17, 10MHz Bandwidth, QPSK (99% BW)
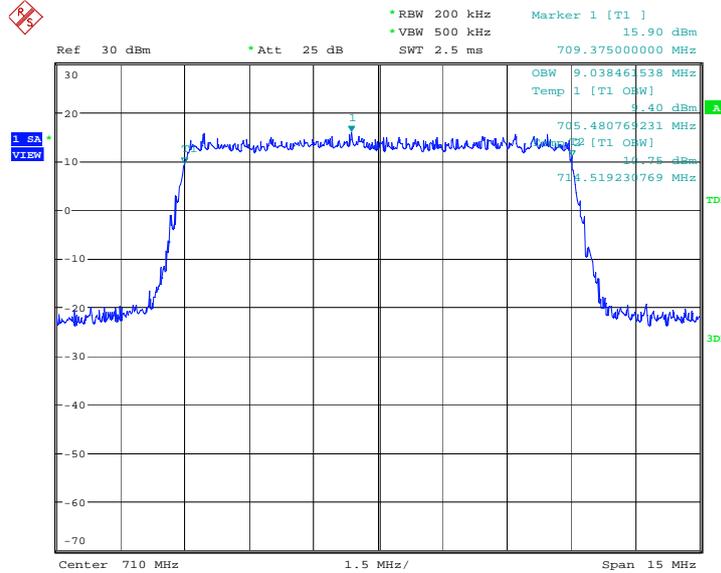
Date: 20.JAN.2014 14:04:25

LTE band 17, 10MHz Bandwidth, 16QAM (99% BW)
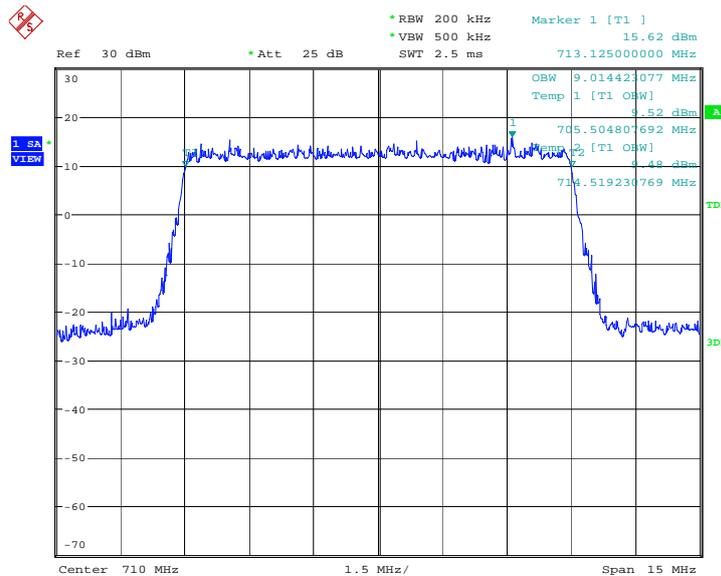
Date: 20.JAN.2014 14:04:39

A.6   EMISSION BANDWIDTH

Reference

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

IC: RSS-133 Issue 6, Section 6.5. RSS-139 Issue 2, Section 6.5. RSS-199 Issue 1, Section 4.5.
    RSS-130 Issue 1, Section 4.6.

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, 7 and 17. Table below lists the measured 100% BW. Spectrum analyzer plots are included on the following pages.

LTE band 2, 1.4MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	1307.692	1307.692

LTE band 2, 1.4MHz Bandwidth, QPSK (100% BW)
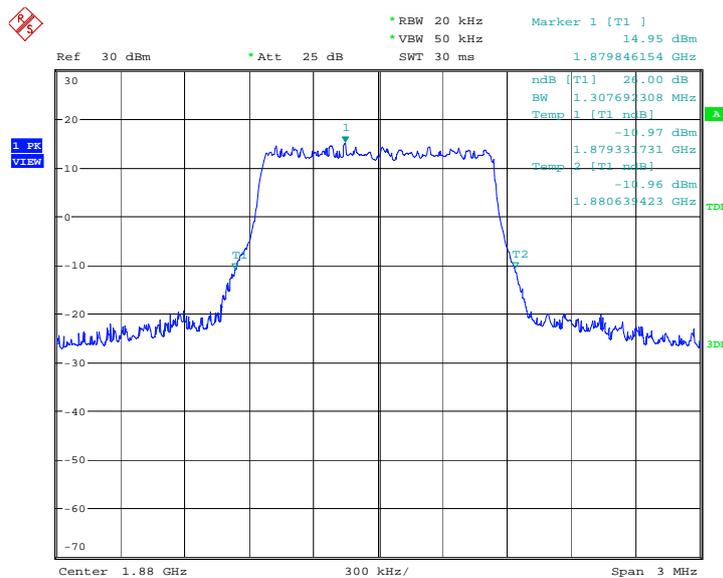
Date: 14.JAN.2014 18:59:28

LTE band 2, 1.4MHz Bandwidth, 16QAM (100% BW)
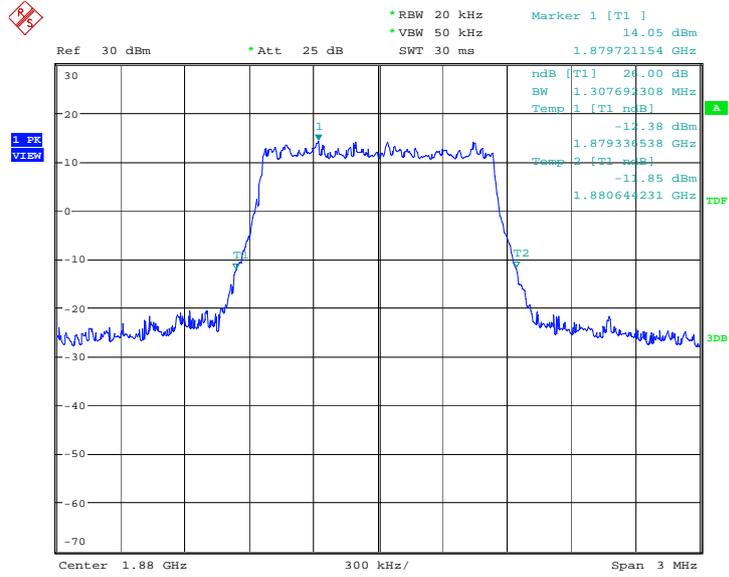
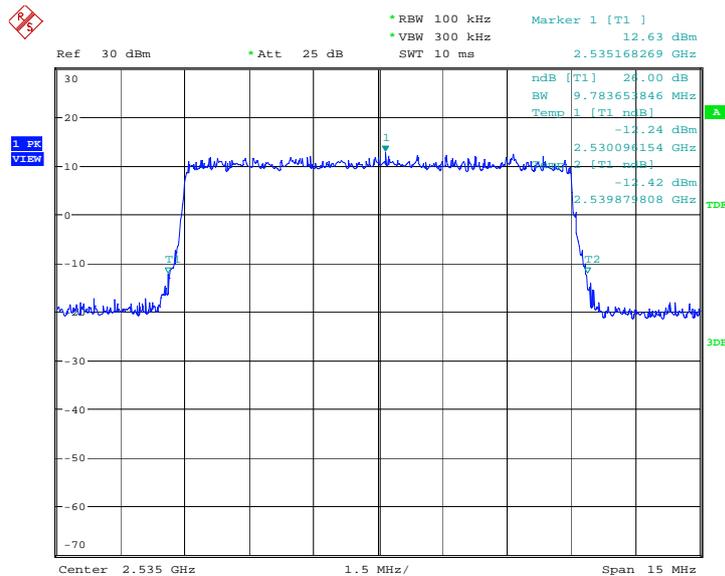Date: 14.JAN.2014 18:59:43

LTE band 2, 3MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	2964.744	2956.731

LTE band 2, 3MHz Bandwidth, QPSK (100% BW)
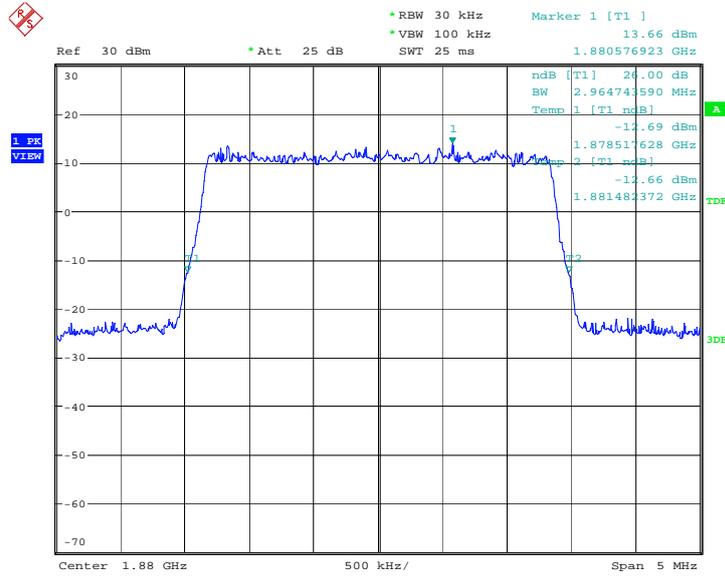
Date: 14.JAN.2014 19:27:27

LTE band 2, 3MHz Bandwidth, 16QAM (100% BW)
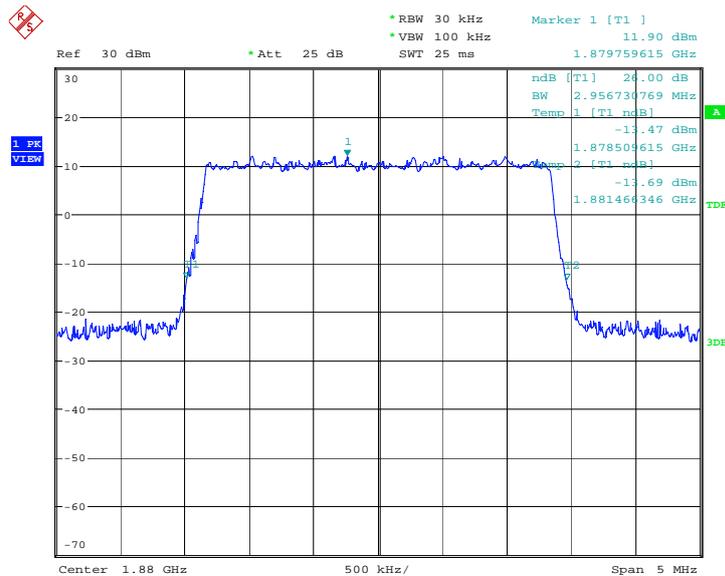
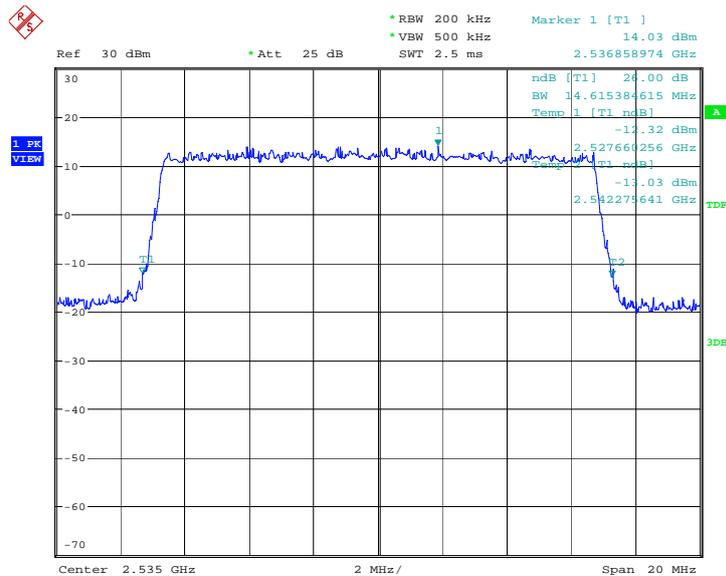Date: 14.JAN.2014 19:27:42

LTE band 2, 5MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	4887.821	4903.846

LTE band 2, 5MHz Bandwidth, QPSK (100% BW)
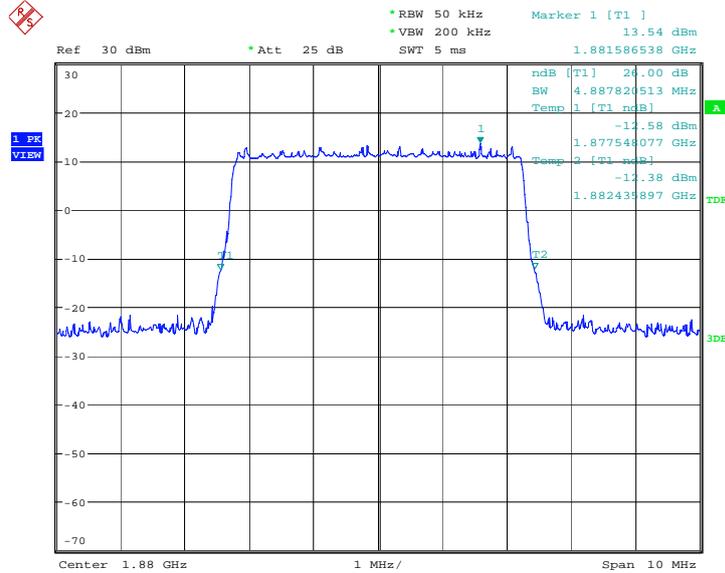
Date: 14.JAN.2014 19:55:37

LTE band 2, 5MHz Bandwidth,16QAM (100% BW)
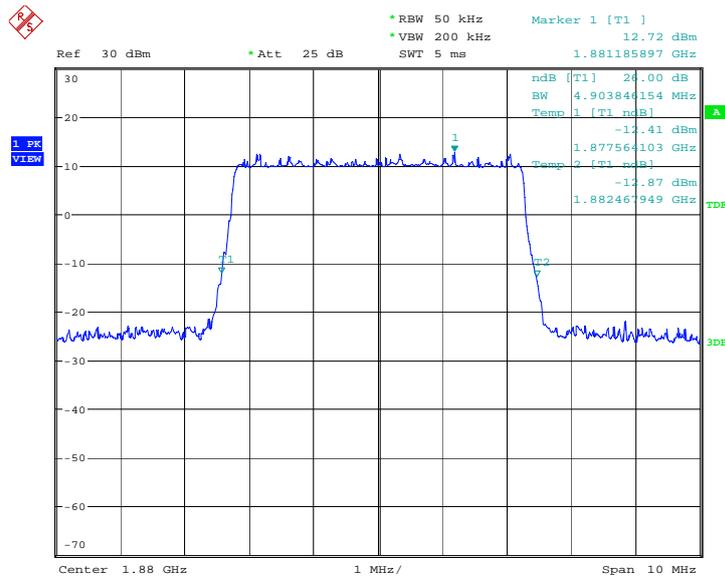
Date: 14.JAN.2014 19:55:53
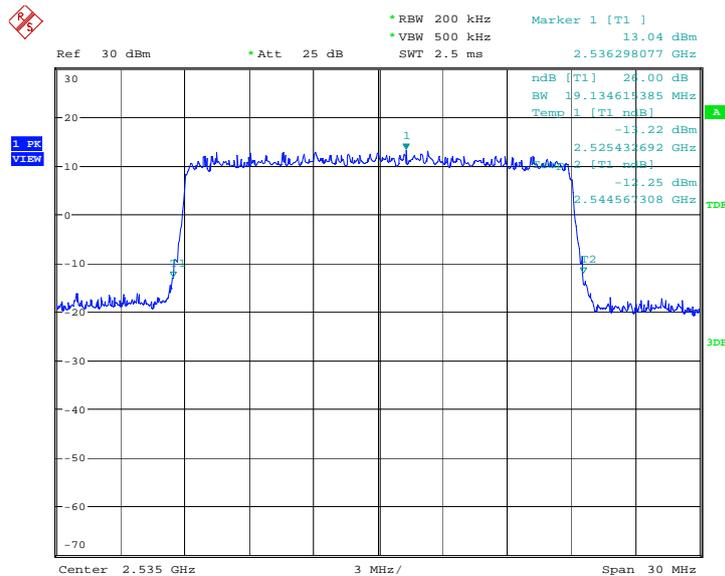
LTE band 2, 10MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
1880.0	9807.692	9735.577

LTE band 2, 10MHz Bandwidth, QPSK (100% BW)
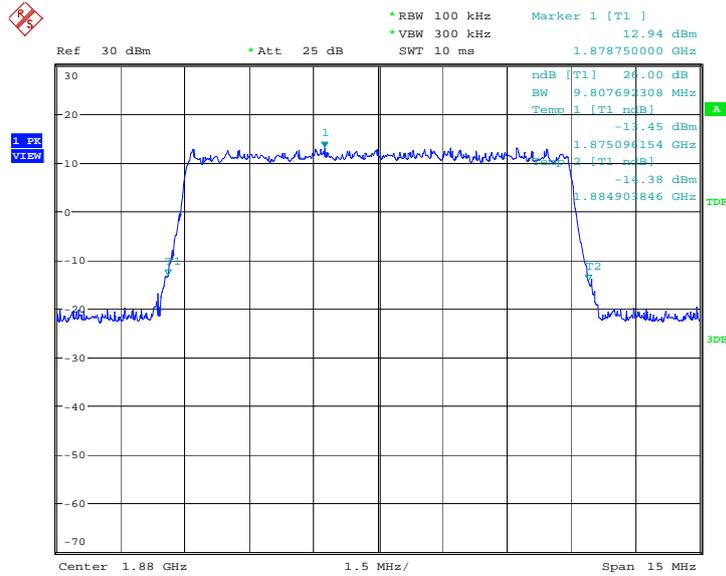
Date: 14.JAN.2014 20:23:35

LTE band 2, 10MHz Bandwidth, 16QAM (100% BW)
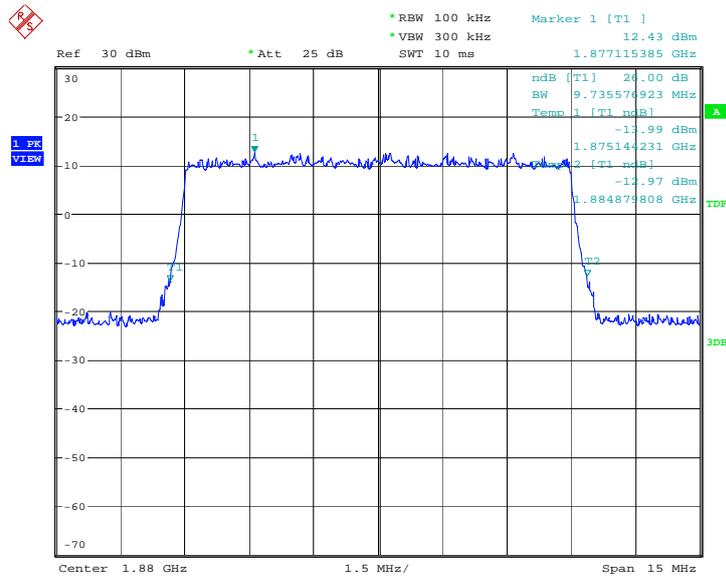
Date: 14.JAN.2014 20:23:51

LTE band 2, 15MHz (100% BW)

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

LTE band 2, 15MHz Bandwidth, QPSK (100% BW)
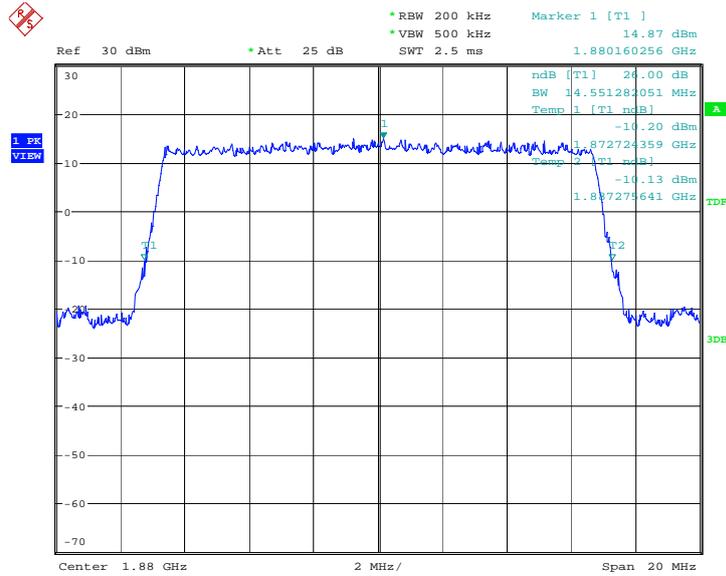
Date: 14.JAN.2014 20:51:40

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

Date: 14.JAN.2014 20:51:55

LTE band 2, 20MHz (100% BW)

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

LTE band 2, 20MHz Bandwidth, QPSK (100% BW)
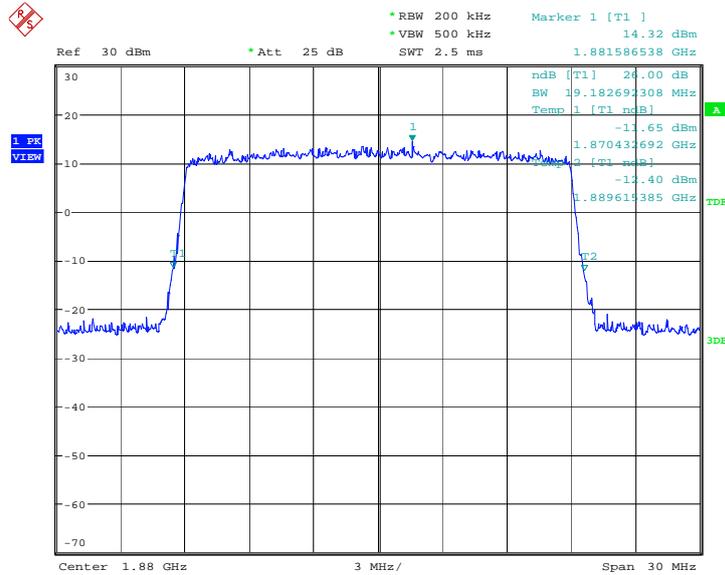
Date: 14.JAN.2014 21:19:51
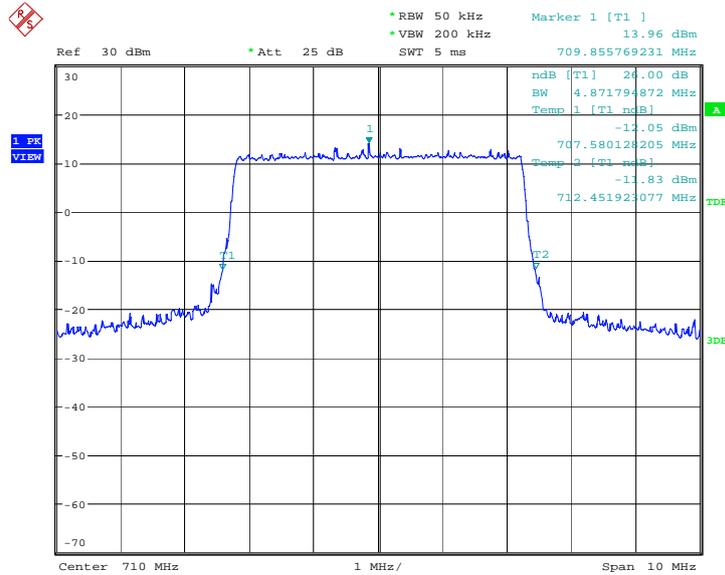
LTE band 2, 20MHz Bandwidth, 16QAM (100% BW)

Date: 14.JAN.2014 21:20:06

LTE band 4, 1.4MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
1732.5	1288.462	1283.654

LTE band 4, 1.4MHz Bandwidth, QPSK (100% BW)
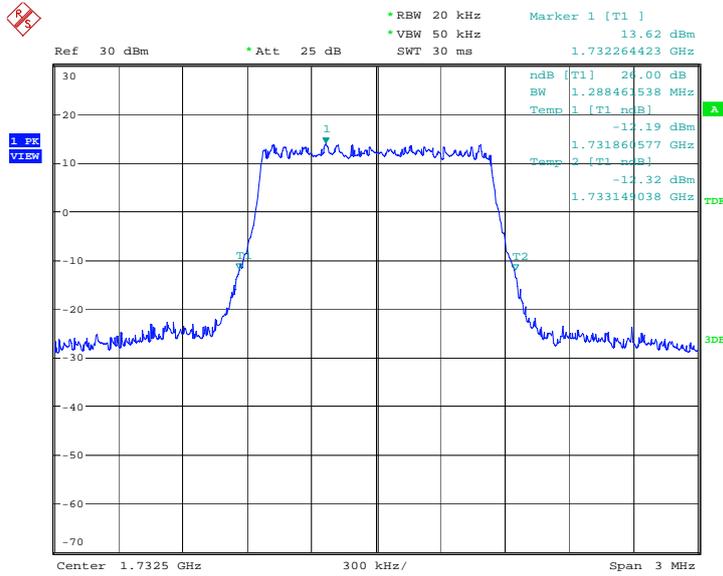
Date: 14.JAN.2014 21:47:57

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

Date: 14.JAN.2014 21:48:12

LTE band 4, 3MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
1732.5	2964.744	2964.744

LTE band 4, 3MHz Bandwidth, QPSK (100% BW)
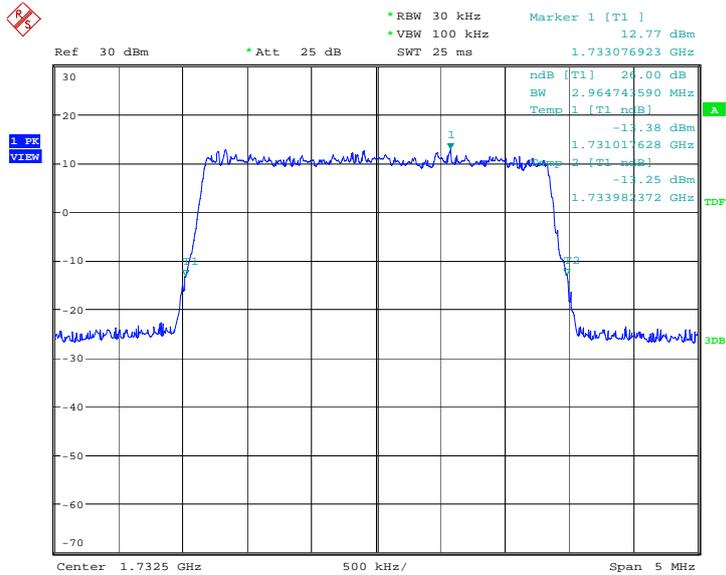
Date: 14.JAN.2014 22:15:57

LTE band 4, 3MHz Bandwidth, 16QAM (100% BW)
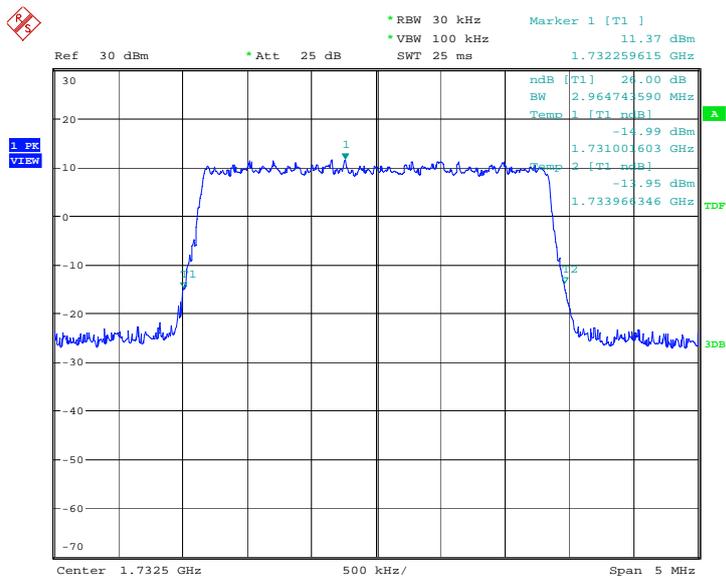
Date: 14.JAN.2014 22:16:12

LTE band 4, 5MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
1732.5	4887.821	4935.897

LTE band 4, 5MHz Bandwidth, QPSK (100% BW)
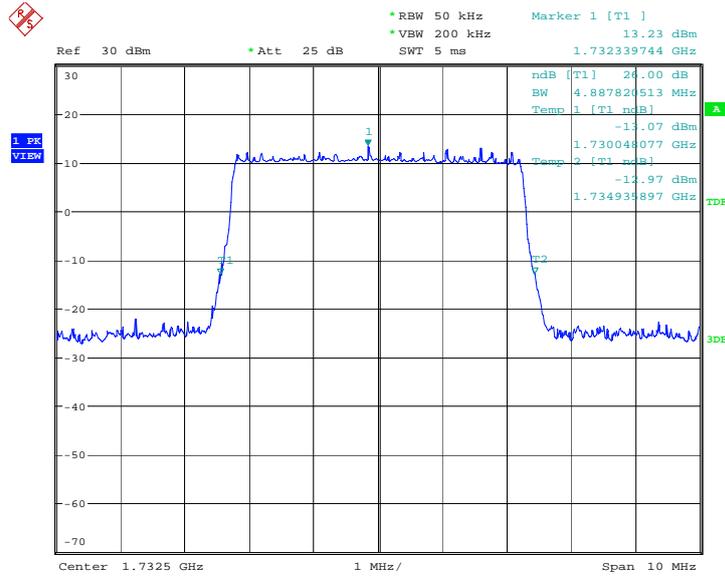
Date: 14.JAN.2014 22:43:59

LTE band 4, 5MHz Bandwidth,16QAM (100% BW)
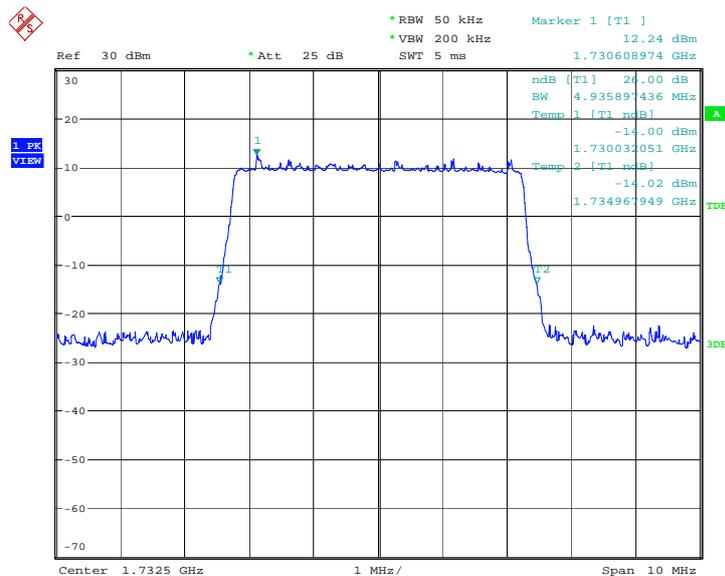
Date: 14.JAN.2014 22:44:14

LTE band 4, 10MHz (100% BW)

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

LTE band 4, 10MHz Bandwidth, QPSK (100% BW)
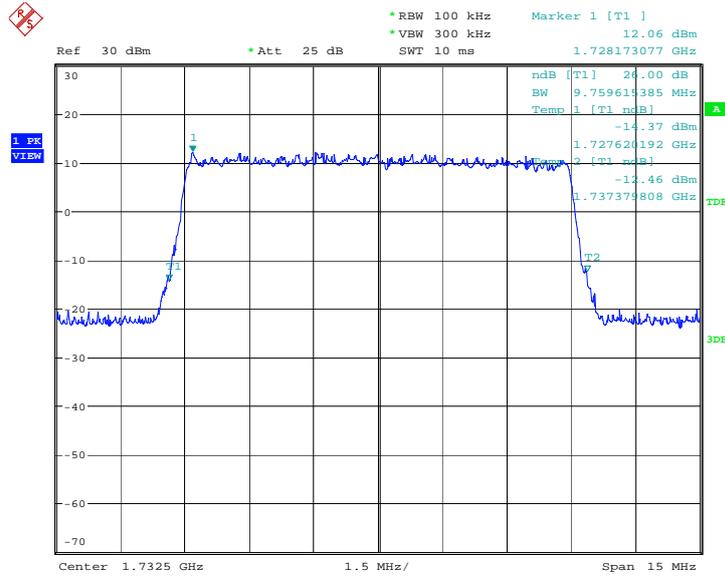
Date: 22.JAN.2014 14:02:54

LTE band 4, 10MHz Bandwidth, 16QAM (100% BW)
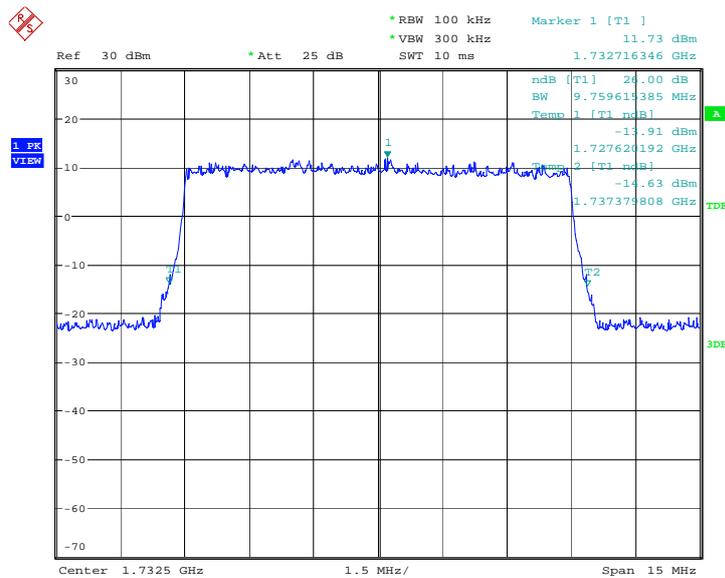
Date: 22.JAN.2014 14:03:09

LTE band 4, 15MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
1732.5	14487.179	14551.282

LTE band 4, 15MHz Bandwidth, QPSK (100% BW)
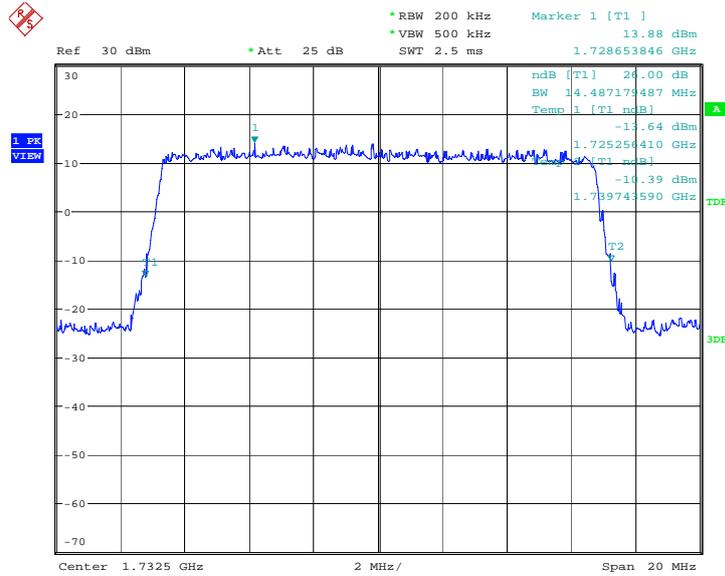
Date: 22.JAN.2014 14:08:40

LTE band 4, 15MHz Bandwidth, 16QAM (100% BW)
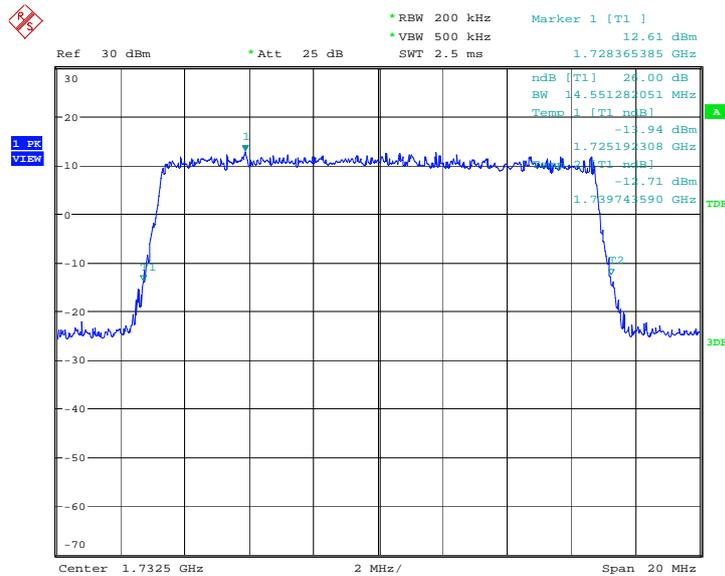
Date: 22.JAN.2014 14:08:56

LTE band 4, 20MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
1732.5	19134.615	18990.385

LTE band 4, 20MHz Bandwidth, QPSK (100% BW)
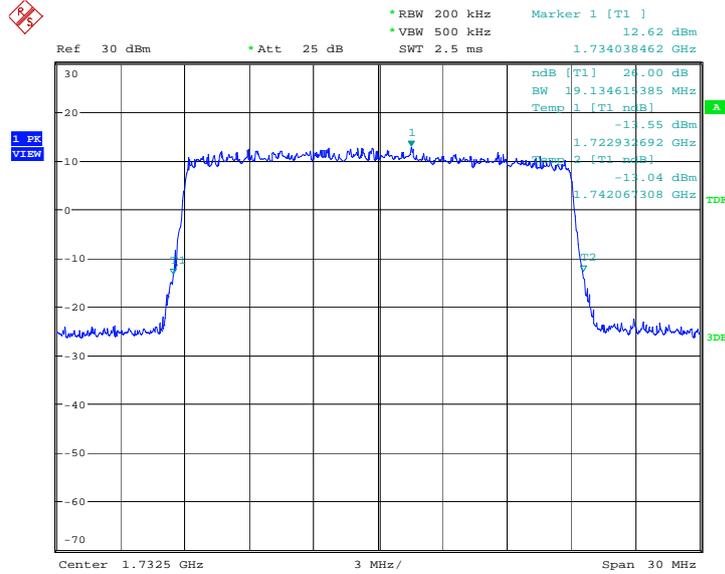
Date: 22.JAN.2014 14:14:30

LTE band 4, 20MHz Bandwidth, 16QAM (100% BW)
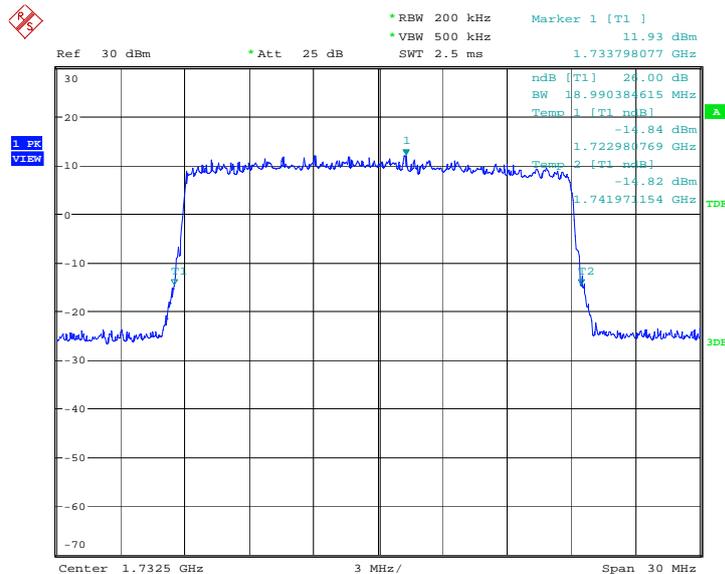
Date: 22.JAN.2014 14:14:46

LTE band 7, 5MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
2535	4887.821	4919.872

LTE band 7, 5MHz Bandwidth, QPSK (100% BW)
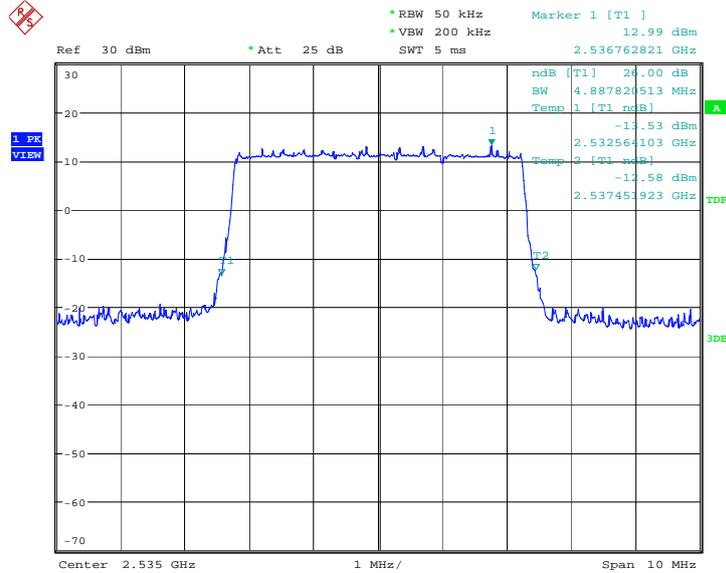
Date: 14.JAN.2014 16:56:24

LTE band 7, 5MHz Bandwidth,16QAM (100% BW)
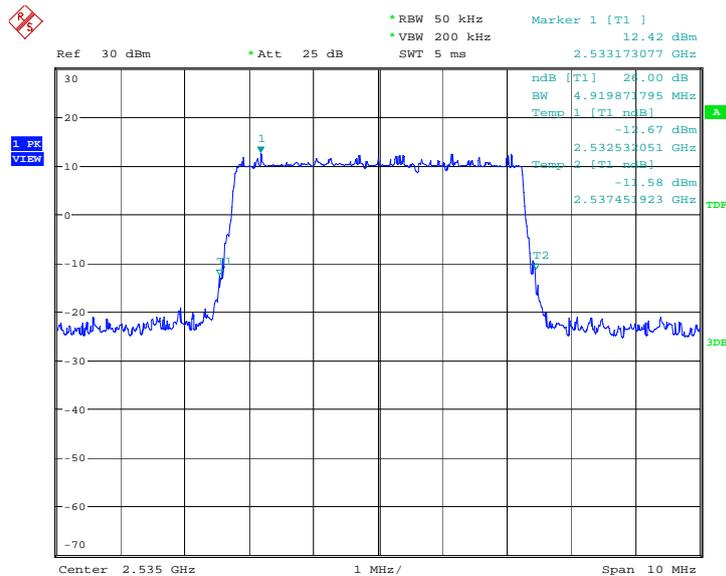
Date: 14.JAN.2014 16:56:39

LTE band 7, 10MHz (100% BW)

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

LTE band 7, 10MHz Bandwidth, QPSK (100% BW)
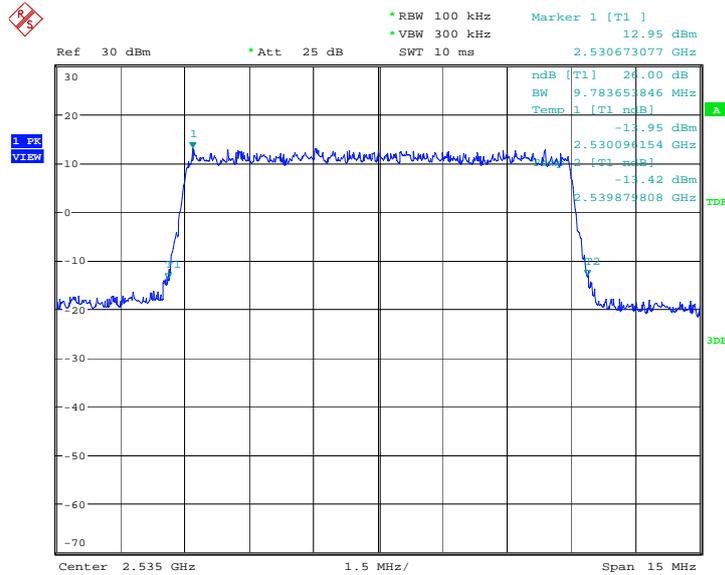
Date: 14.JAN.2014 17:27:58

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

Date: 14.JAN.2014 17:28:14

LTE band 7, 15MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
2535	14583.333	14615.385

LTE band 7, 15MHz Bandwidth, QPSK (100% BW)
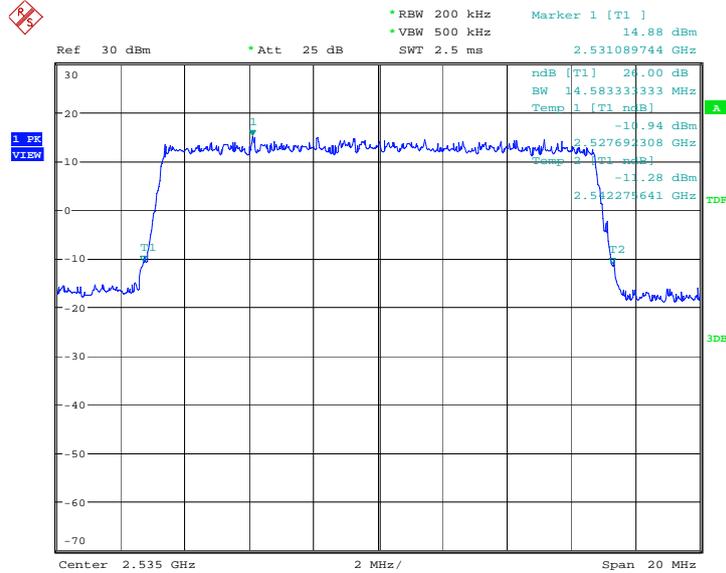
Date: 14.JAN.2014 17:59:49

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

Date: 14.JAN.2014 18:00:05

LTE band 7, 20MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
2535	19326.923	19134.615

LTE band 7, 20MHz Bandwidth, QPSK (100% BW)
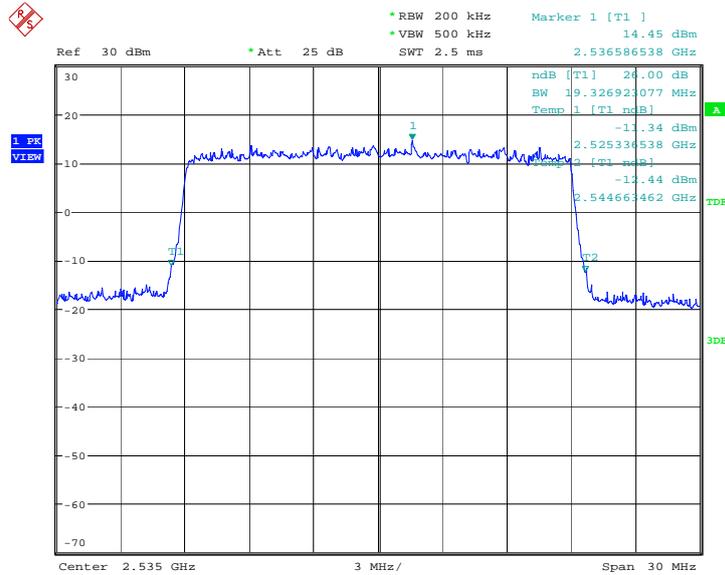
Date: 14.JAN.2014 18:29:34

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

Date: 14.JAN.2014 18:29:49

LTE band 17, 5 MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
710	4871.795	4951.923

LTE band 17, 5 MHz Bandwidth, QPSK (100% BW)

Date: 15.JAN.2014 08:35:00

LTE band 17, 5 MHz Bandwidth,16QAM (100% BW)
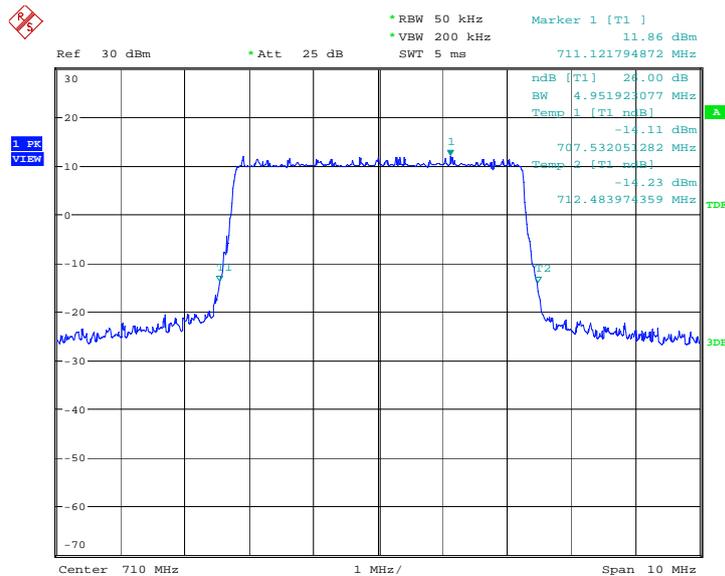
Date: 15.JAN.2014 08:35:16

LTE band 17, 10 MHz (100% BW)

Frequency	Occupied Bandwidth (100% BW)(kHz)	
(MHz)	QPSK	16QAM
710	9759.615	9759.615

LTE band 17, 10 MHz Bandwidth, QPSK (100% BW)
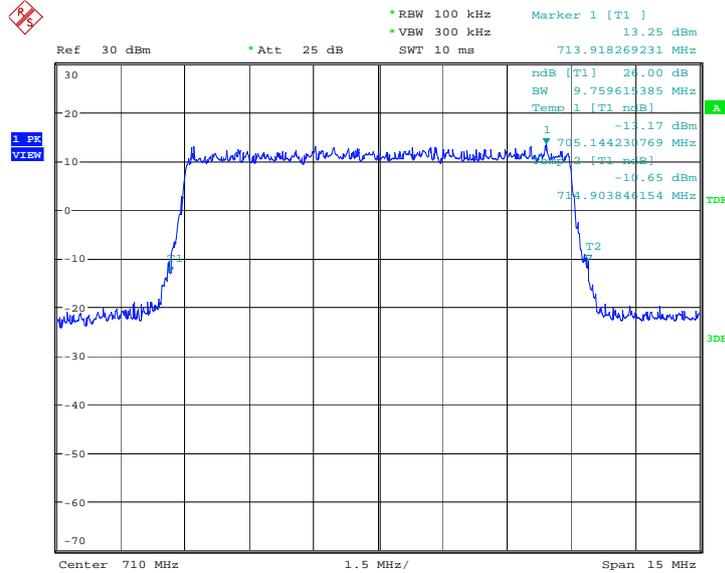
Date: 20.JAN.2014 14:02:13

LTE band 17, 10 MHz Bandwidth, 16QAM (100% BW)
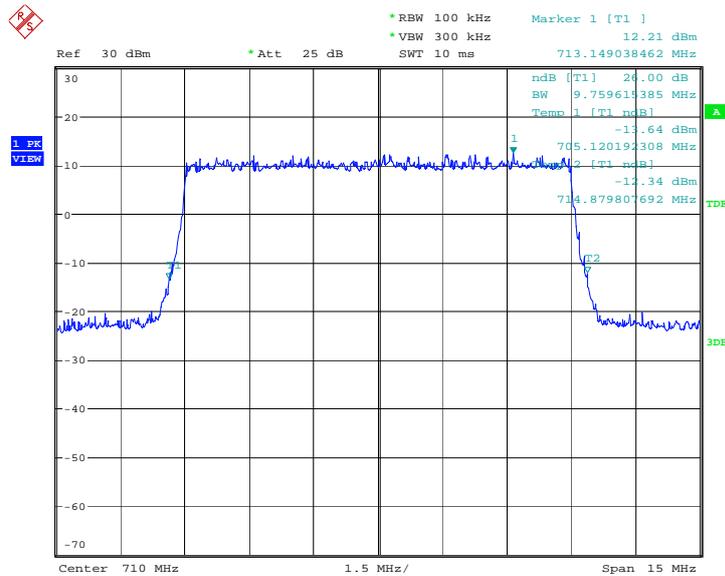
Date: 20.JAN.2014 14:02:28

A.7   BAND EDGE COMPLIANCE

Reference

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

IC: RSS-133 Issue 6, Section 6.5. RSS-139 Issue 2, Section 6.5. RSS-199 Issue 1, Section 4.5.
    RSS-130 Issue 1, Section 4.6.

A.7.1 Measurement limit

On any frequency outside frequency band of the LTE FDD bands 2, 4, 7 and 17 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
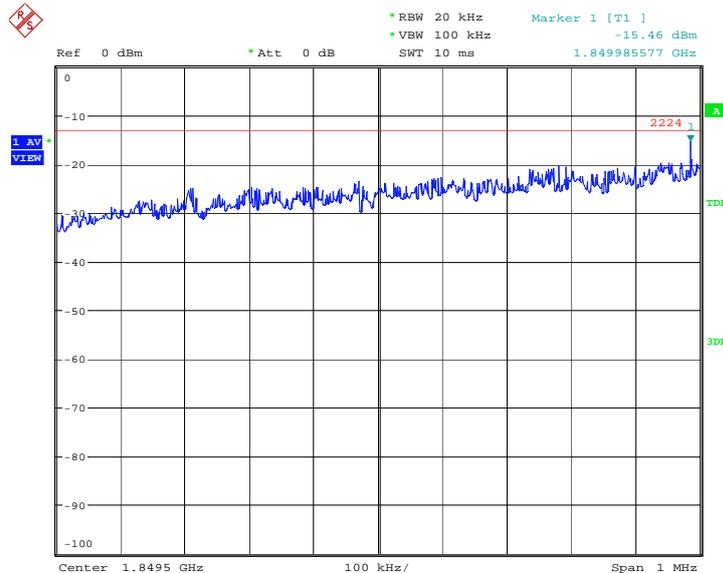
Date: 14.JAN.2014 18:58:26

HIGH BAND EDGE BLOCK-QPSK

```
*RBW  20 kHz        Marker 1 [T1 ]
*VBW  100 kHz           -17.92 dBm
Ref   0 dBm        *Att   0 dB      SWT  10 ms        1.910014423 GHz
```

Center 1.9105 GHz   100 kHz/   Span 1 MHz
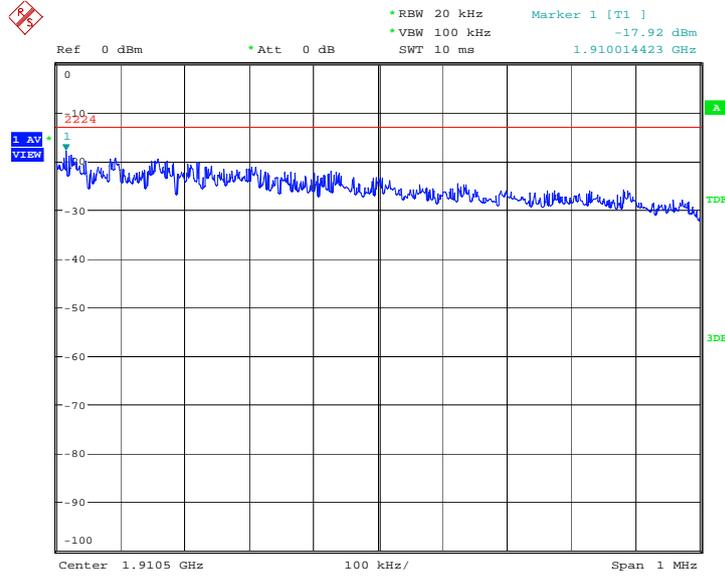
Date: 14.JAN.2014 19:01:39

LOW BAND EDGE BLOCK-16QAM

```
*RBW  20 kHz        Marker 1 [T1 ]
*VBW  100 kHz           -19.35 dBm
Ref   0 dBm        *Att   0 dB      SWT  10 ms        1.849996795 GHz
```

Center 1.8495 GHz   100 kHz/   Span 1 MHz
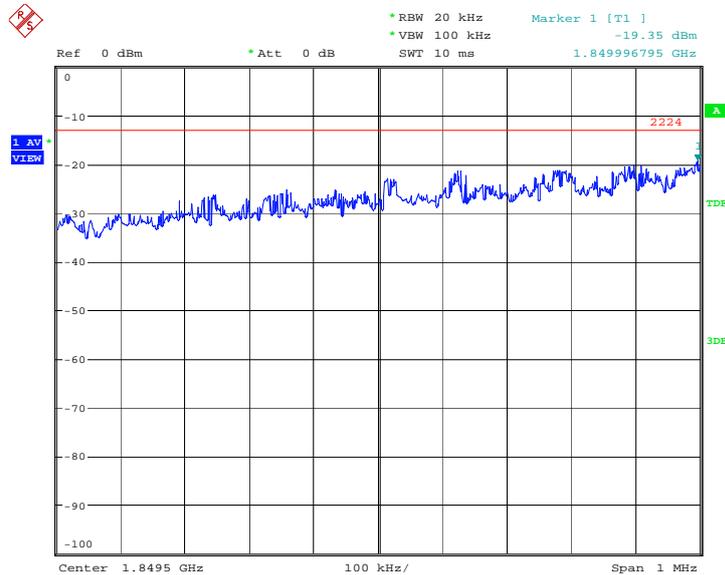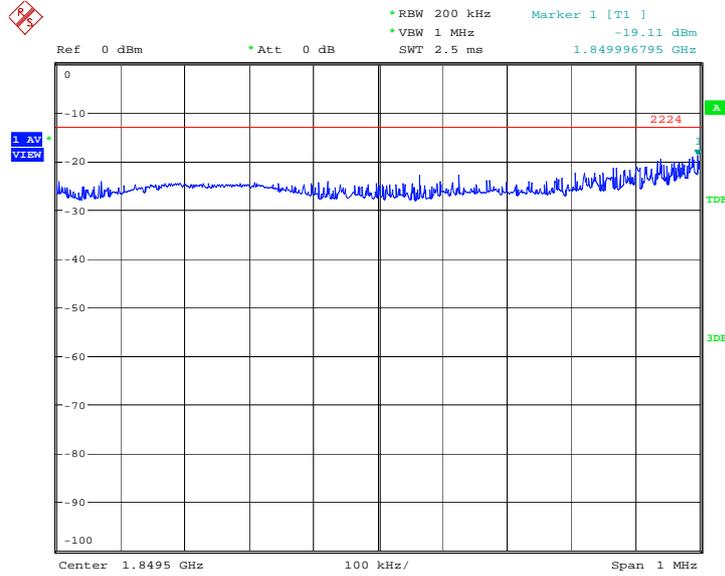
Date: 14.JAN.2014 18:58:34

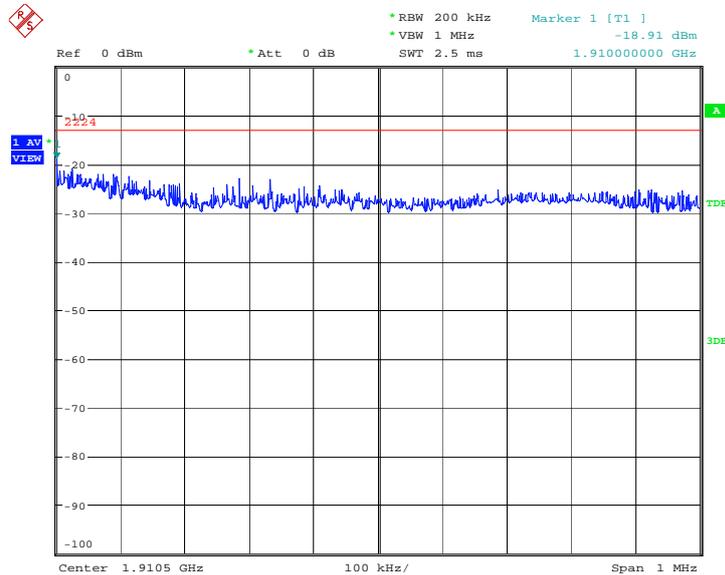## HIGH BAND EDGE BLOCK-16QAM
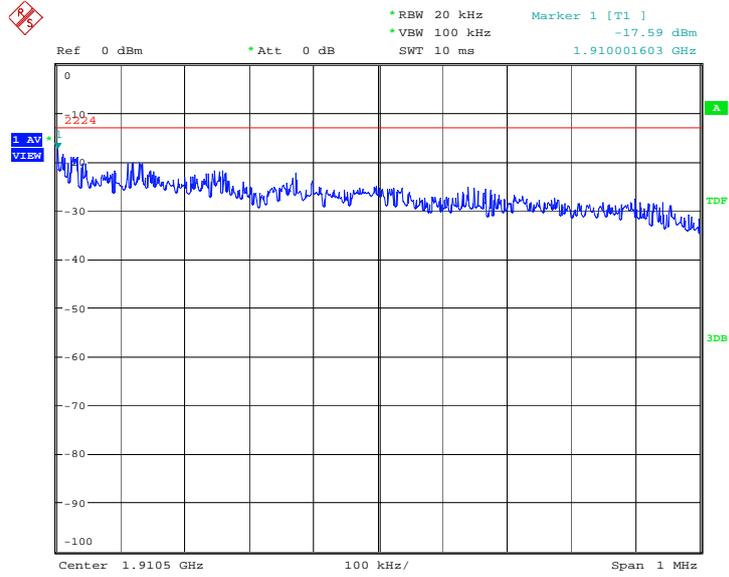
Date: 14.JAN.2014 19:01:48

LTE band 2, 3MHz

LOW BAND EDGE BLOCK-QPSK
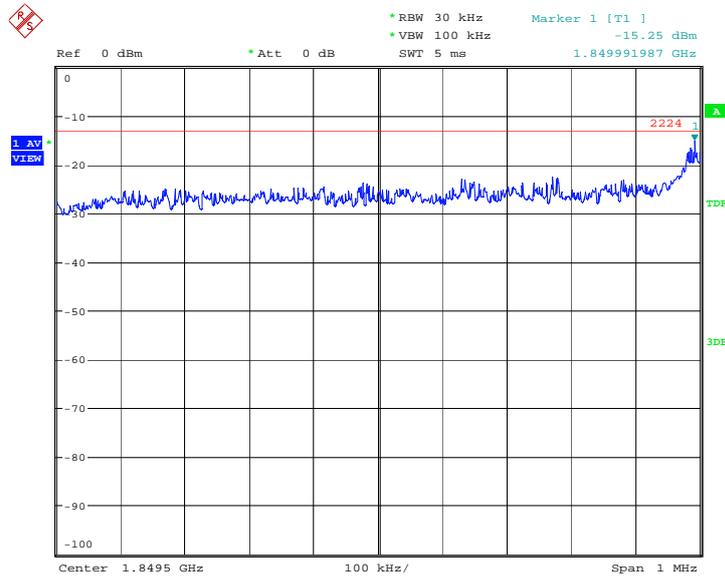
Date: 14.JAN.2014 19:26:24

HIGH BAND EDGE BLOCK-QPSK
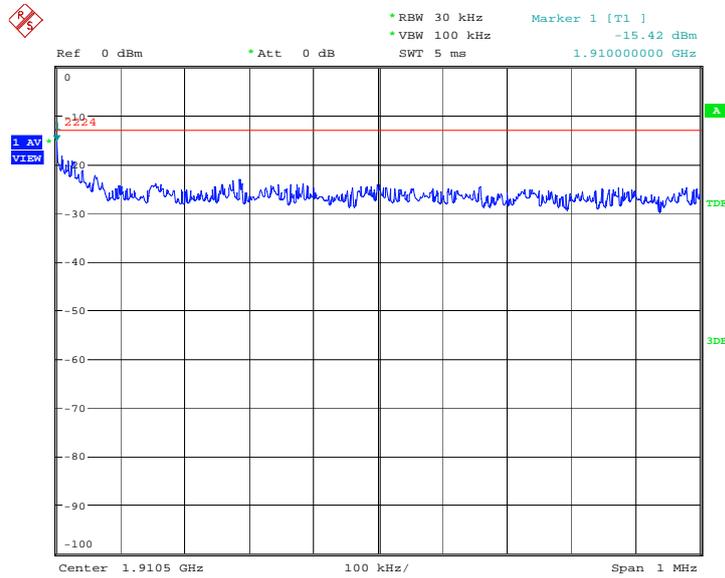
Date: 14.JAN.2014 19:29:38

LOW BAND EDGE BLOCK-16QAM
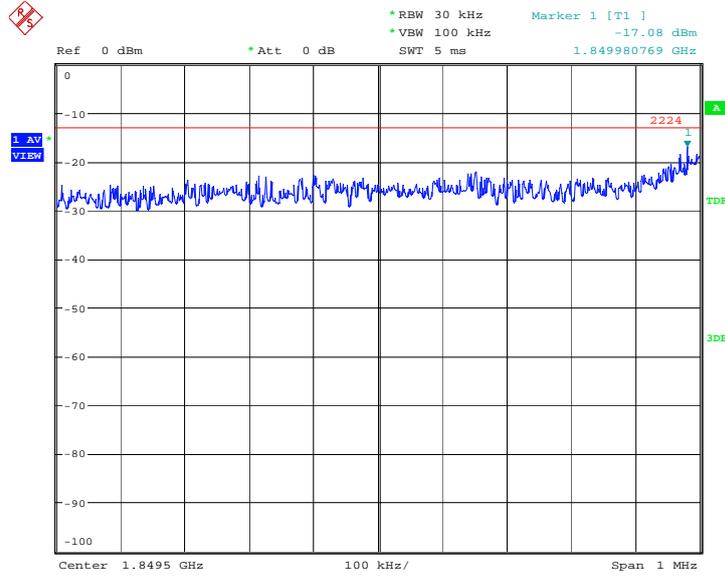
Date: 14.JAN.2014 19:26:33

HIGH BAND EDGE BLOCK-16QAM
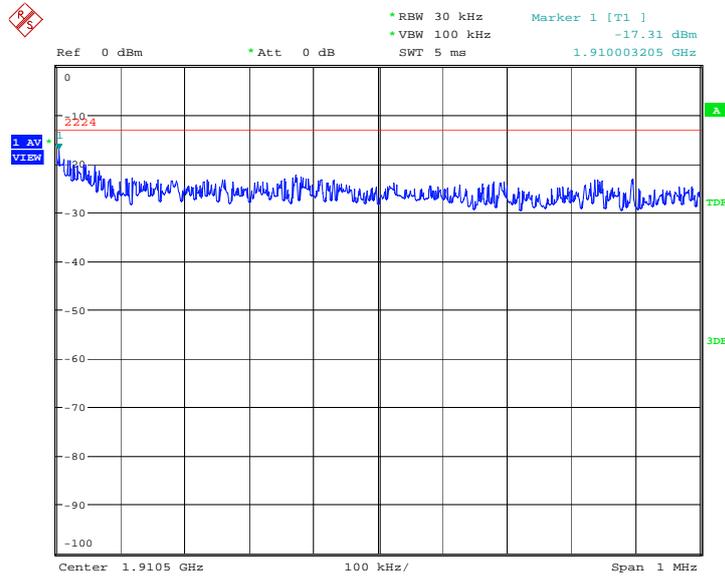
Date: 14.JAN.2014 19:29:46

LTE band 2, 5MHz

LOW BAND EDGE BLOCK-QPSK

```
                                    * RBW  50 kHz        Marker 1 [T1 ]
                                    * VBW  200 kHz              -15.51 dBm
      Ref   0 dBm      * Att   0 dB   SWT  2.5 ms        1.850000000 GHz
```
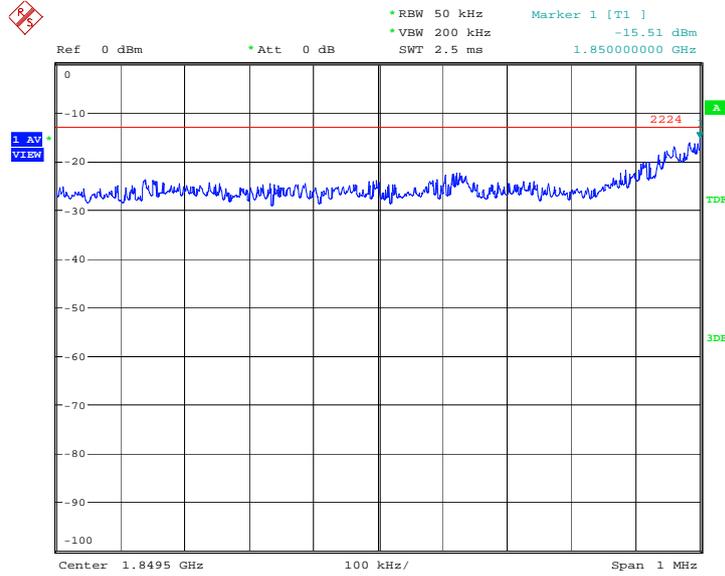
Date: 14.JAN.2014 19:54:35

HIGH BAND EDGE BLOCK-QPSK

```
                                    * RBW  50 kHz        Marker 1 [T1 ]
                                    * VBW  200 kHz              -17.41 dBm
      Ref   0 dBm      * Att   0 dB   SWT  2.5 ms        1.910012821 GHz
```
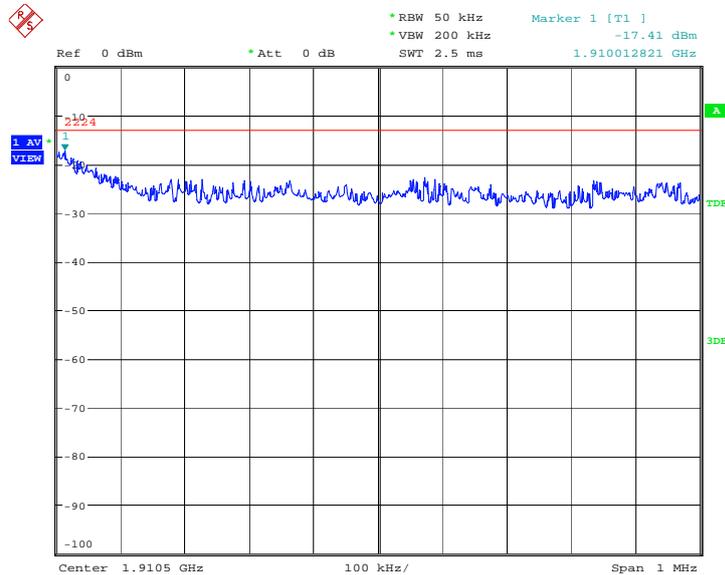
Date: 14.JAN.2014 19:57:49

LOW BAND EDGE BLOCK-16QAM
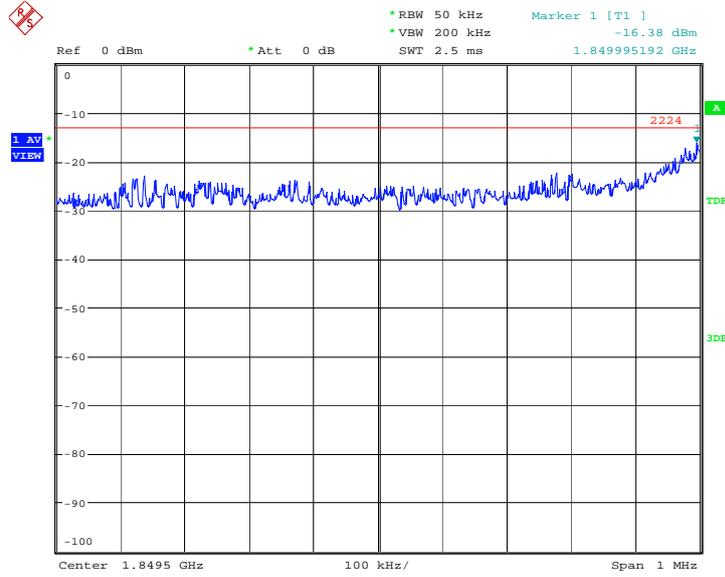
Date: 14.JAN.2014 19:54:44

HIGH BAND EDGE BLOCK-16QAM
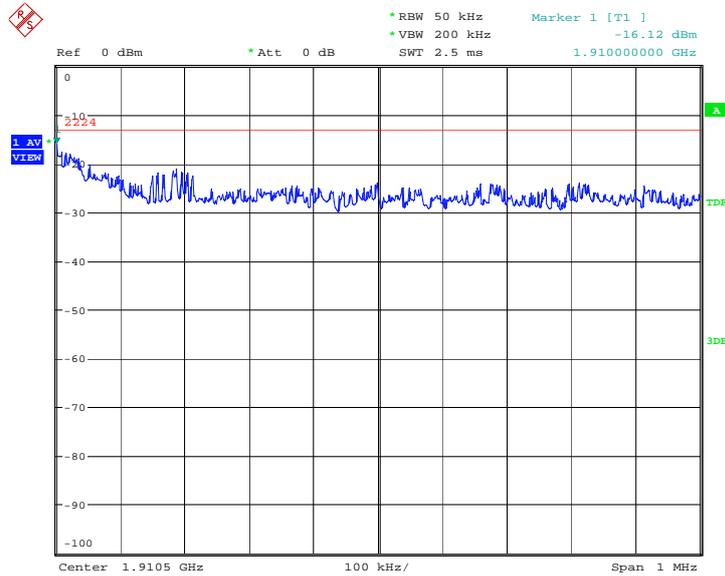
Date: 14.JAN.2014 19:57:57
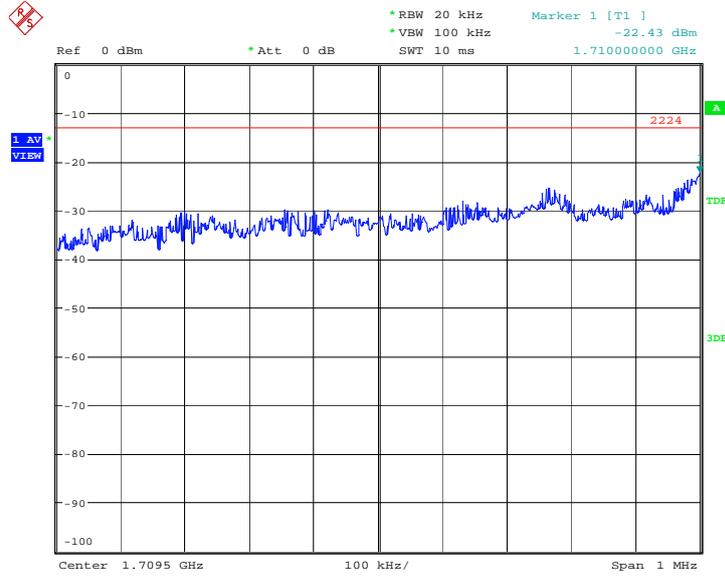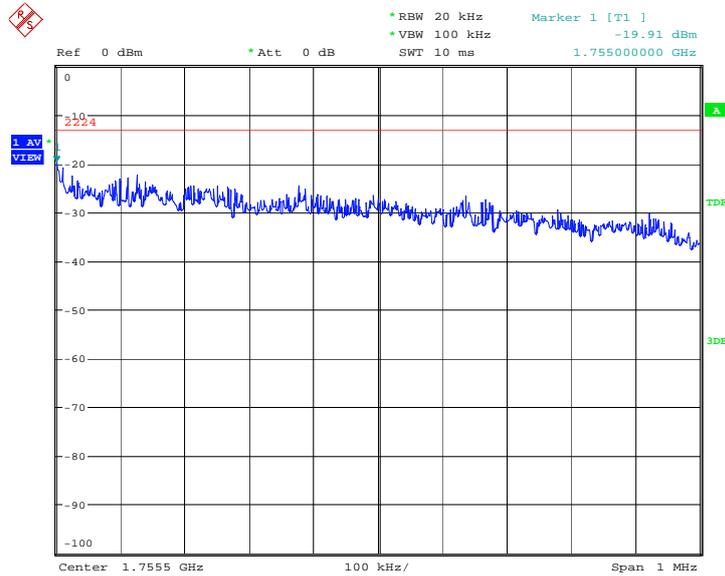
LTE band 2, 10MHz
LOW BAND EDGE BLOCK-QPSK

```
                                    * RBW 100 kHz      Marker 1 [T1 ]
                                    * VBW 300 kHz            -16.57 dBm
           Ref   0 dBm      * Att   0 dB    SWT 2.5 ms    1.849991987 GHz
        0
                                                                            A
      -10                                                         2224
 1 AV
 VIEW -20
                                                                            TDF
      -30

      -40

      -50

      -60                                                                  3DB

      -70

      -80

      -90

     -100
       Center  1.8495 GHz           100 kHz/            Span  1 MHz
```
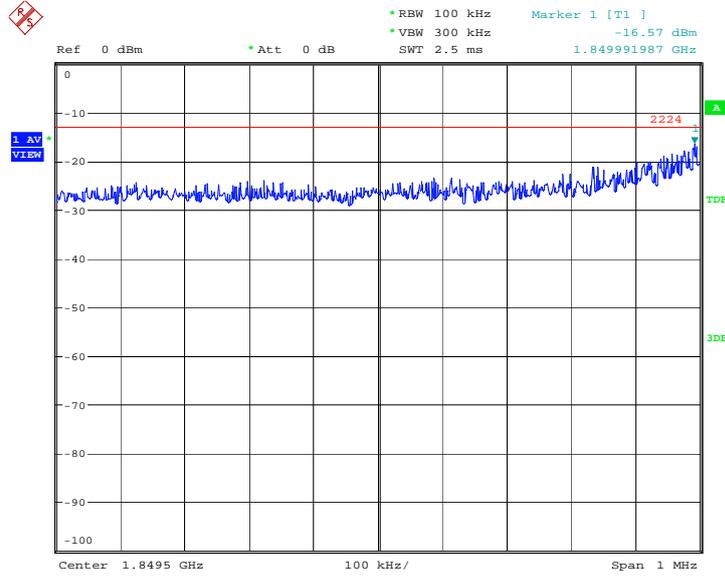
Date: 14.JAN.2014 20:22:33

HIGH BAND EDGE BLOCK-QPSK

```
                                    * RBW 100 kHz      Marker 1 [T1 ]
                                    * VBW 300 kHz            -18.23 dBm
           Ref   0 dBm      * Att   0 dB    SWT 2.5 ms    1.910011218 GHz
        0
                                                                            A
      -10
 1 AV 2224
 VIEW
      -20
                                                                            TDF
      -30

      -40

      -50

      -60                                                                  3DB

      -70

      -80

      -90

     -100
       Center  1.9105 GHz           100 kHz/            Span  1 MHz
```
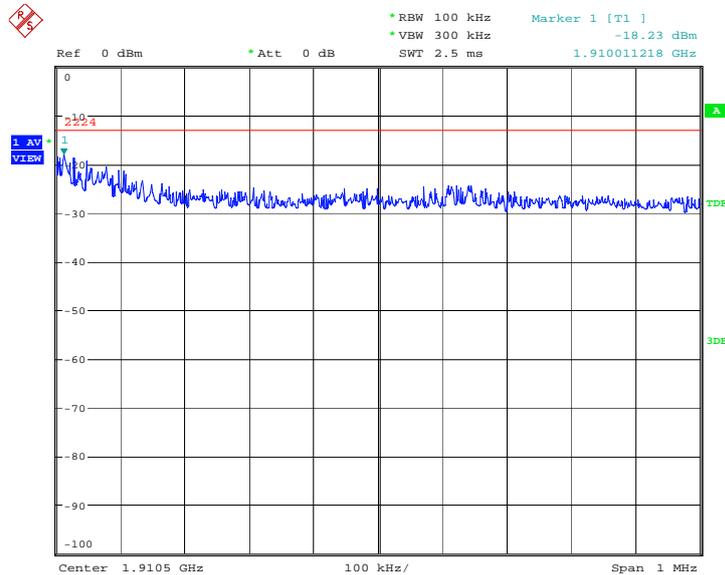
Date: 14.JAN.2014 20:25:47

LOW BAND EDGE BLOCK-16QAM


```
* RBW 100 kHz    Marker 1 [T1 ]
* VBW 300 kHz           -17.35 dBm
Ref   0 dBm      * Att  0 dB   SWT 2.5 ms    1.849996795 GHz
```

Center 1.8495 GHz   100 kHz/   Span 1 MHz
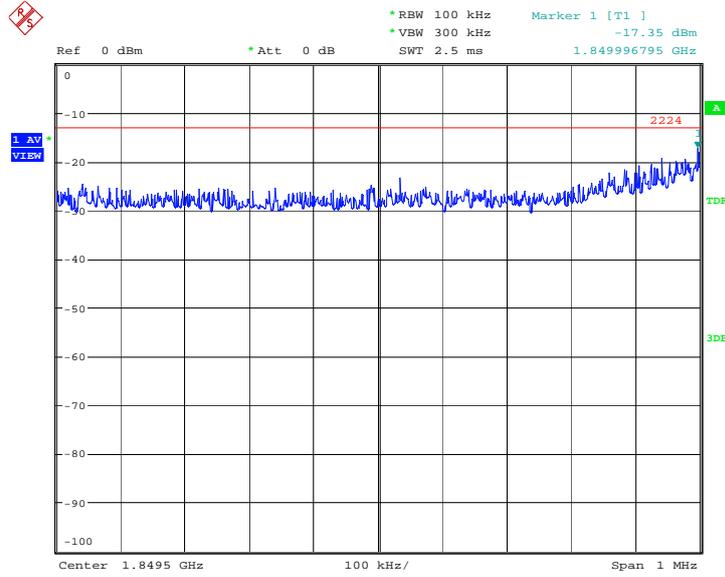
Date: 14.JAN.2014 20:22:42

HIGH BAND EDGE BLOCK-16QAM


```
* RBW 100 kHz    Marker 1 [T1 ]
* VBW 300 kHz           -19.02 dBm
Ref   0 dBm      * Att  0 dB   SWT 2.5 ms    1.910017628 GHz
```

Center 1.9105 GHz   100 kHz/   Span 1 MHz
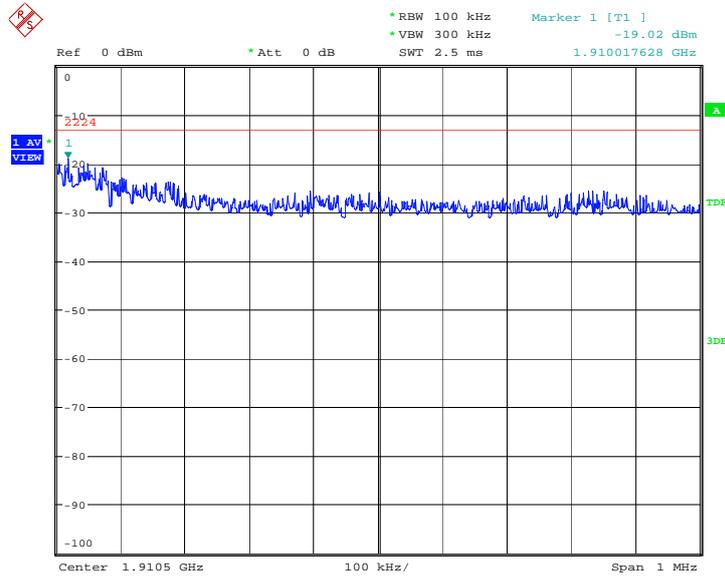
Date: 14.JAN.2014 20:25:55

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

Date: 14.JAN.2014 20:50:37

HIGH BAND EDGE BLOCK-QPSK

Date: 14.JAN.2014 20:53:51

LOW BAND EDGE BLOCK-16QAM
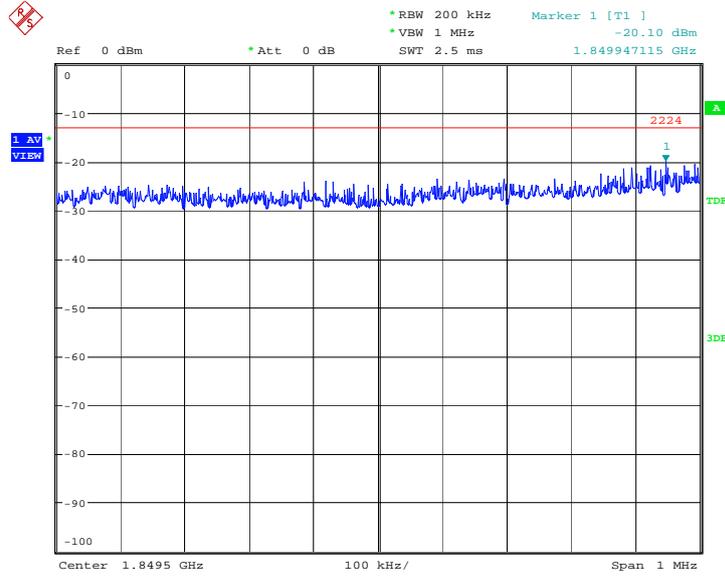
Date: 14.JAN.2014 20:50:46

HIGH BAND EDGE BLOCK-16QAM
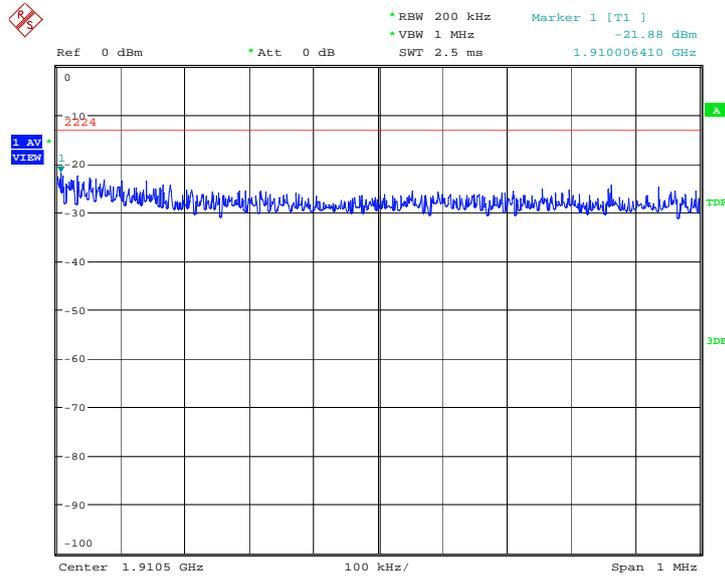
Date: 14.JAN.2014 20:54:00
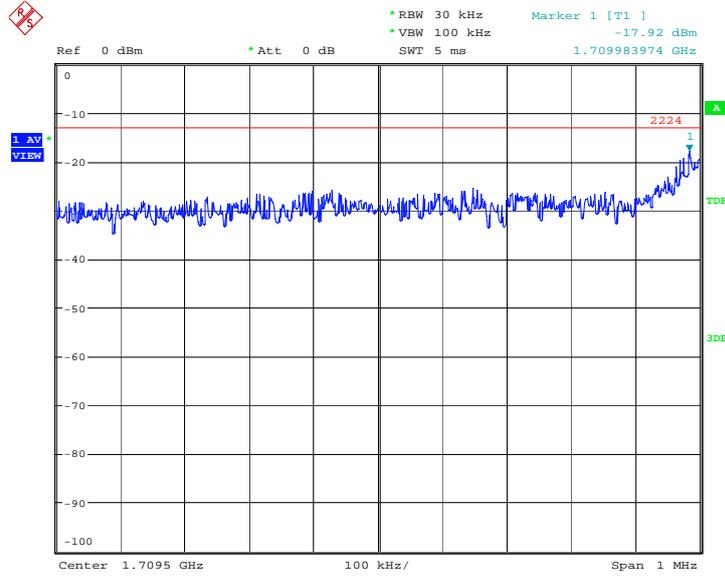
LTE band 2, 20MHz
LOW BAND EDGE BLOCK-QPSK
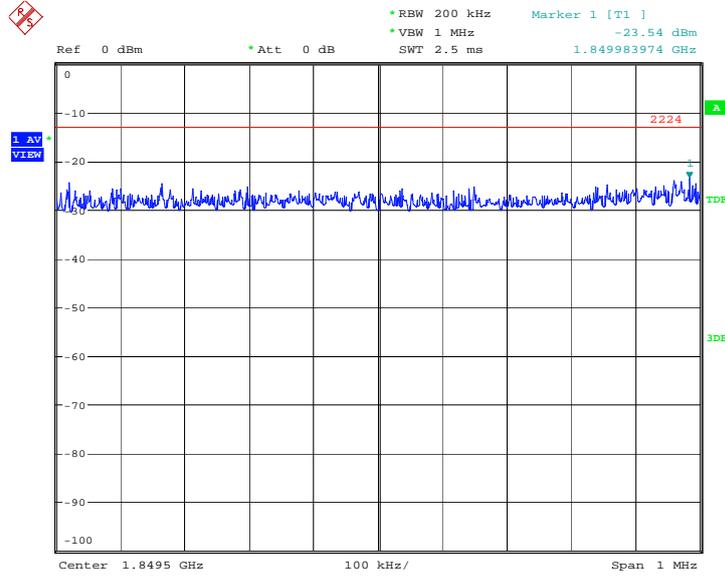
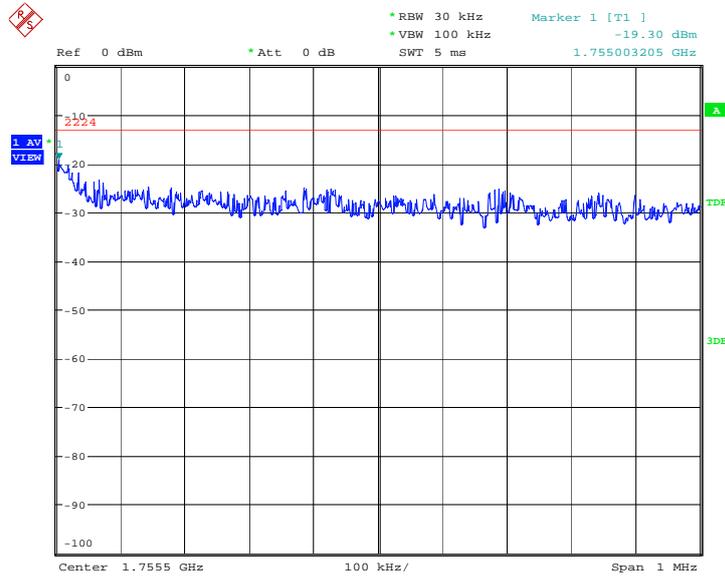Date: 14.JAN.2014 21:18:49

HIGH BAND EDGE BLOCK-QPSK
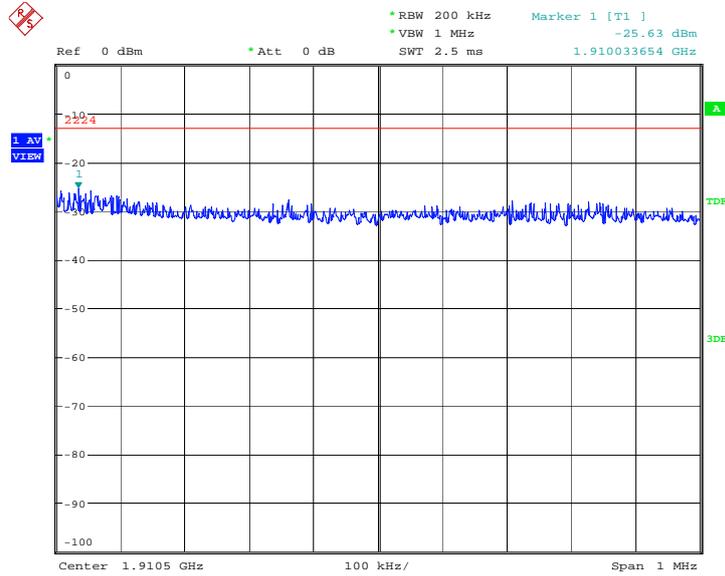
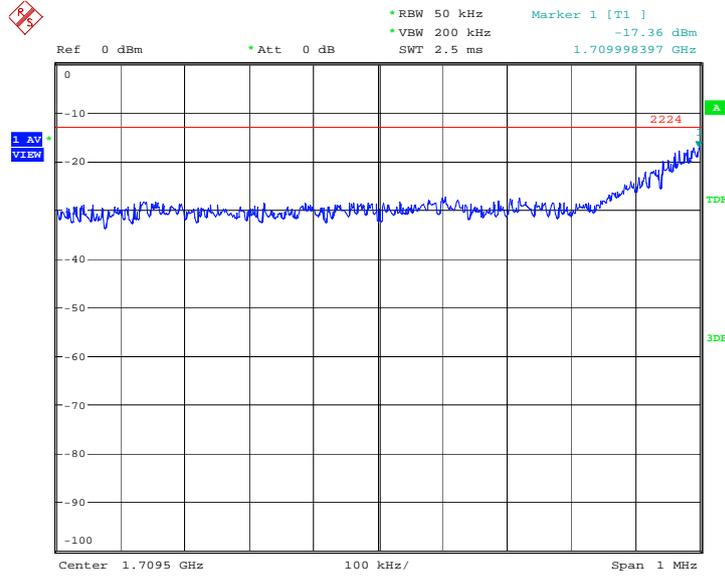

Date: 14.JAN.2014 21:22:02

LOW BAND EDGE BLOCK-16QAM
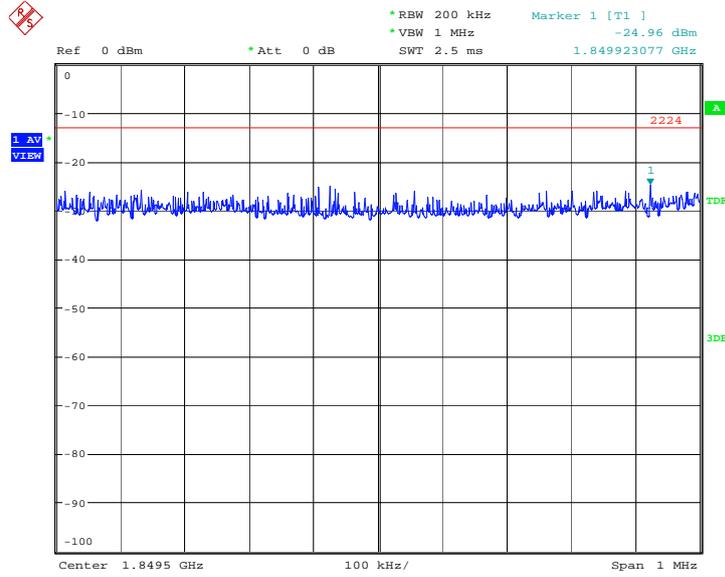
Date: 14.JAN.2014 21:18:57
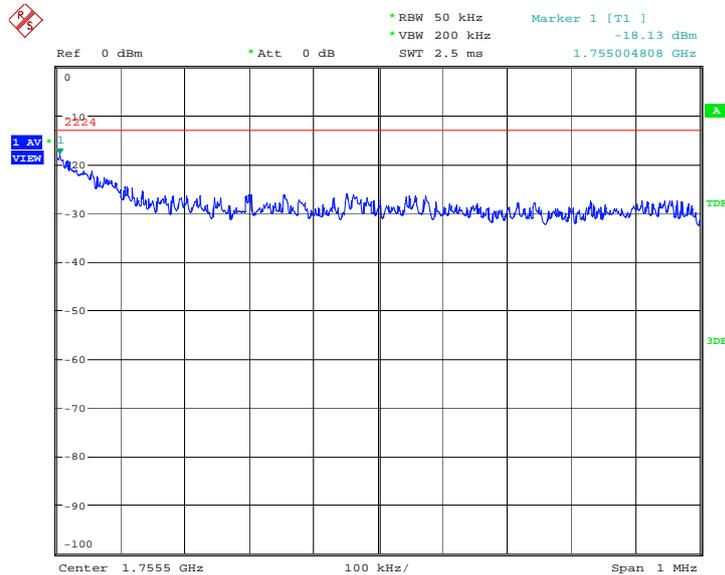
HIGH BAND EDGE BLOCK-16QAM
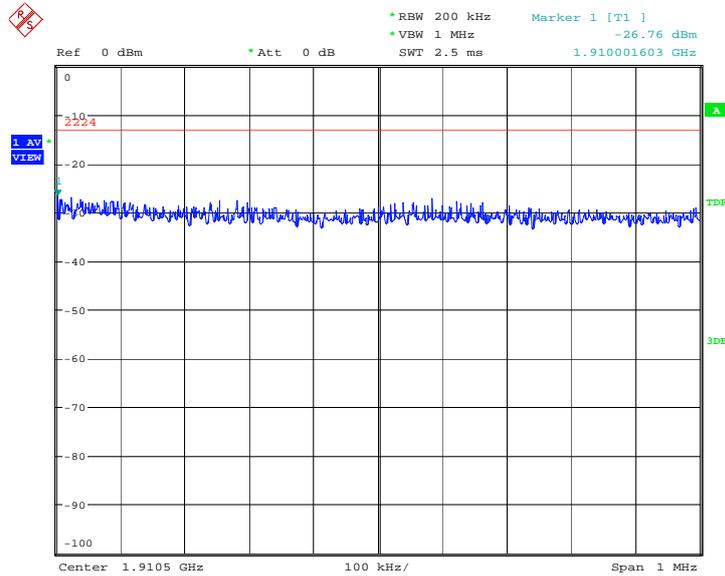
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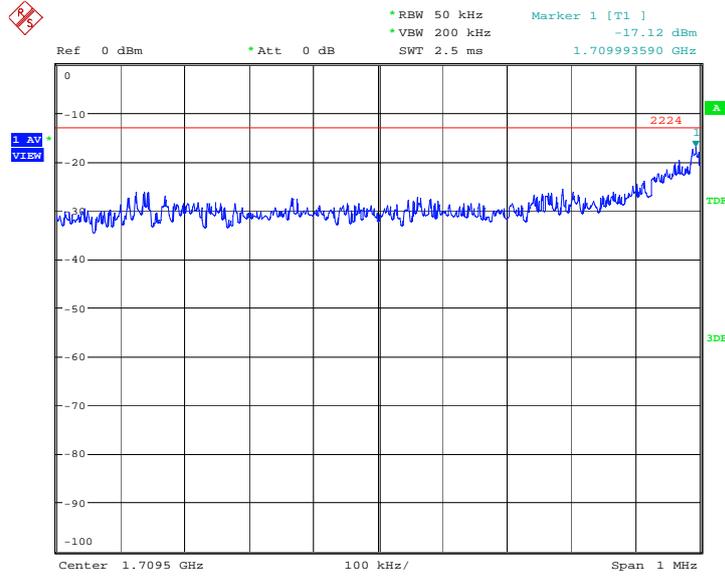
LTE band 4, 1.4MHz
LOW BAND EDGE BLOCK-QPSK
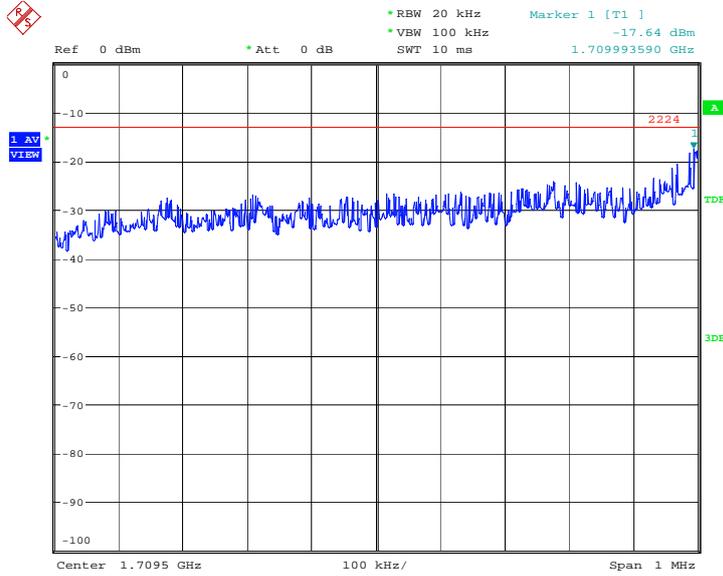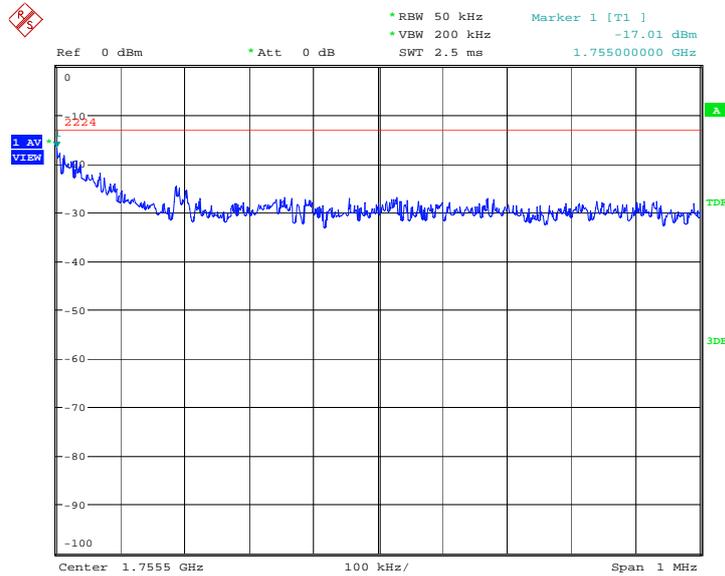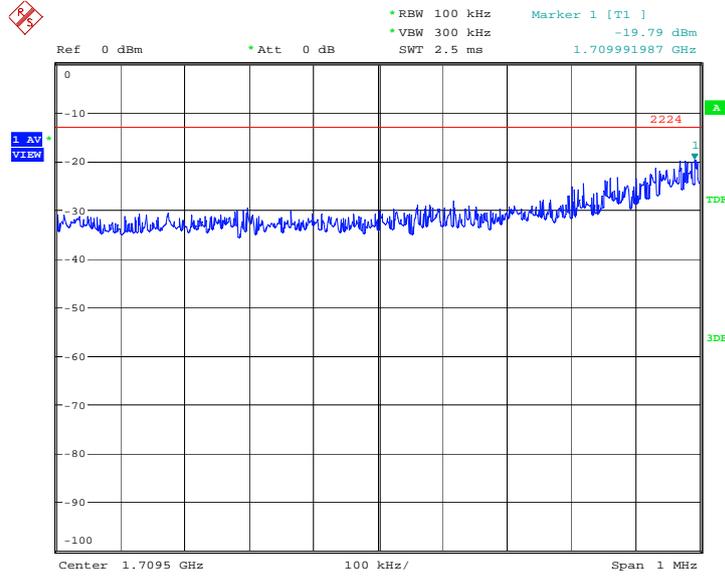

Date: 14.JAN.2014 21:46:55

HIGH BAND EDGE BLOCK-QPSK
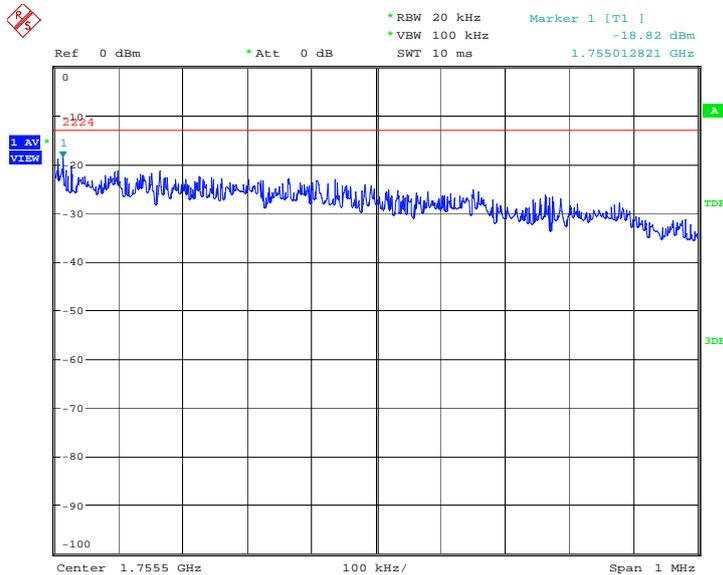
Date: 14.JAN.2014 21:50:08

LOW BAND EDGE BLOCK-16QAM

```
                              * RBW  20 kHz      Marker 1 [T1 ]
                              * VBW 100 kHz           -22.43 dBm
Ref   0 dBm      * Att   0 dB   SWT 10 ms        1.710000000 GHz
```

Date: 14.JAN.2014 21:47:04

HIGH BAND EDGE BLOCK-16QAM

```
                              * RBW  20 kHz      Marker 1 [T1 ]
                              * VBW 100 kHz           -19.91 dBm
Ref   0 dBm      * Att   0 dB   SWT 10 ms        1.755000000 GHz
```
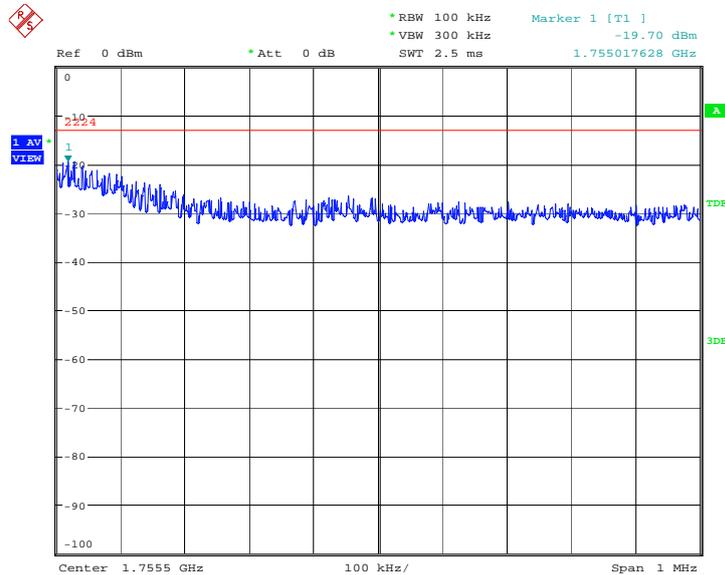
Date: 14.JAN.2014 21:50:17

LTE band 4, 3MHz
LOW BAND EDGE BLOCK-QPSK
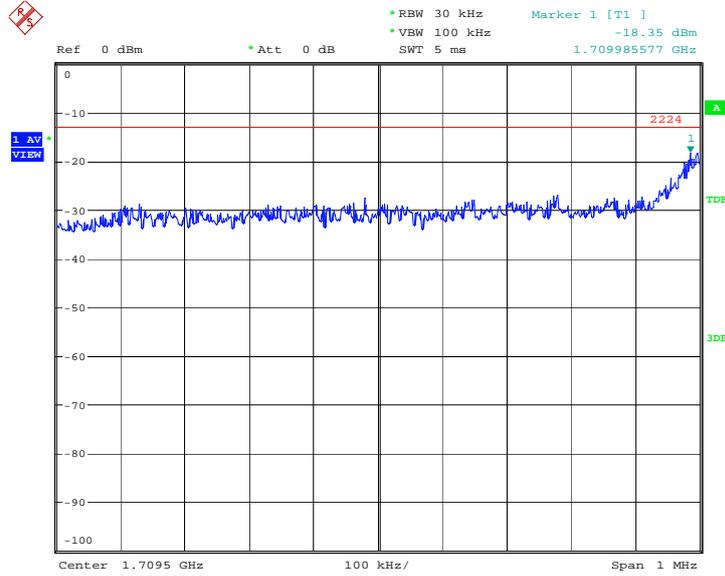
Date: 14.JAN.2014 22:14:54

HIGH BAND EDGE BLOCK-QPSK
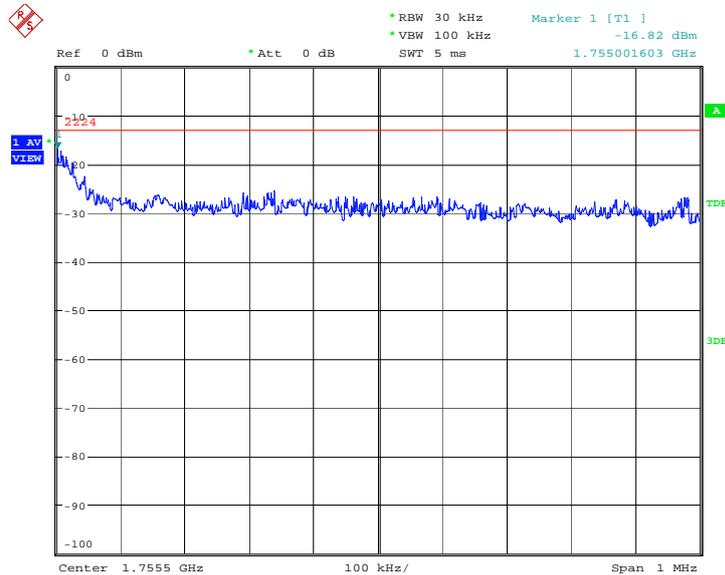
Date: 14.JAN.2014 22:18:08

LOW BAND EDGE BLOCK-16QAM

* RBW 30 kHz	Marker 1 [T1]
* VBW 100 kHz	-17.92 dBm
Ref 0 dBm * Att 0 dB SWT 5 ms	1.709983974 GHz

Center 1.7095 GHz   100 kHz/   Span 1 MHz

Date: 14.JAN.2014 22:15:03

HIGH BAND EDGE BLOCK-16QAM

* RBW 30 kHz	Marker 1 [T1]
* VBW 100 kHz	-19.30 dBm
Ref 0 dBm * Att 0 dB SWT 5 ms	1.755003205 GHz

Center 1.7555 GHz   100 kHz/   Span 1 MHz

Date: 14.JAN.2014 22:18:16

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


```
                                    * RBW  50 kHz      Marker 1 [T1 ]
                                    * VBW 200 kHz              -17.36 dBm
           Ref  0 dBm    * Att  0 dB  SWT 2.5 ms         1.709998397 GHz
```

Date: 14.JAN.2014 22:42:57

HIGH BAND EDGE BLOCK-QPSK


```
                                    * RBW  50 kHz      Marker 1 [T1 ]
                                    * VBW 200 kHz              -18.13 dBm
           Ref  0 dBm    * Att  0 dB  SWT 2.5 ms         1.755004808 GHz
```

Date: 14.JAN.2014 22:46:11

LOW BAND EDGE BLOCK-16QAM

		* RBW 50 kHz	Marker 1 [T1]
		* VBW 200 kHz	-17.12 dBm
Ref 0 dBm	* Att 0 dB	SWT 2.5 ms	1.709993590 GHz

Center 1.7095 GHz   100 kHz/   Span 1 MHz

Date: 14.JAN.2014 22:43:06

HIGH BAND EDGE BLOCK-16QAM

		* RBW 50 kHz	Marker 1 [T1]
		* VBW 200 kHz	-17.01 dBm
Ref 0 dBm	* Att 0 dB	SWT 2.5 ms	1.755000000 GHz

Center 1.7555 GHz   100 kHz/   Span 1 MHz

Date: 14.JAN.2014 22:46:19

LTE band 4, 10MHz

LOW BAND EDGE BLOCK-QPSK

```
* RBW 100 kHz        Marker 1 [T1 ]
* VBW 300 kHz            -19.79 dBm
Ref   0 dBm      * Att   0 dB    SWT 2.5 ms      1.709991987 GHz
```

Center 1.7095 GHz   100 kHz/   Span 1 MHz

Date: 22.JAN.2014 14:27:00

HIGH BAND EDGE BLOCK-QPSK

```
* RBW 100 kHz        Marker 1 [T1 ]
* VBW 300 kHz            -19.70 dBm
Ref   0 dBm      * Att   0 dB    SWT 2.5 ms      1.755017628 GHz
```

Center 1.7555 GHz   100 kHz/   Span 1 MHz

Date: 22.JAN.2014 14:29:09

LOW BAND EDGE BLOCK-16QAM
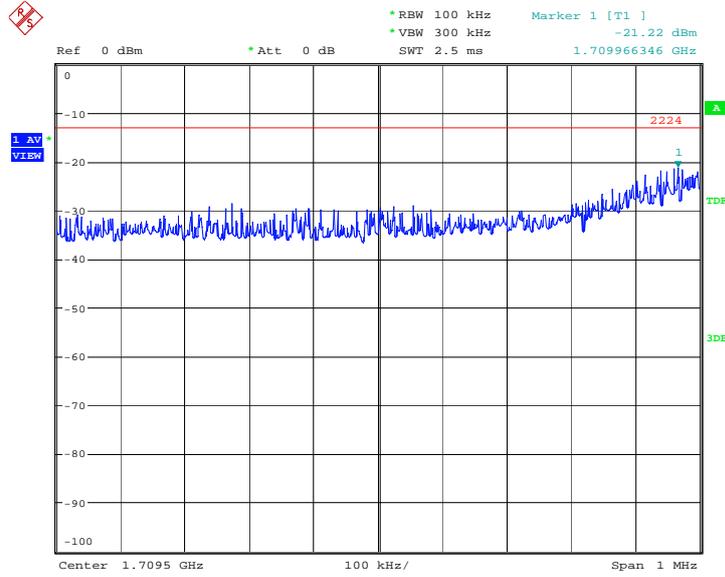
Date: 22.JAN.2014 14:27:10

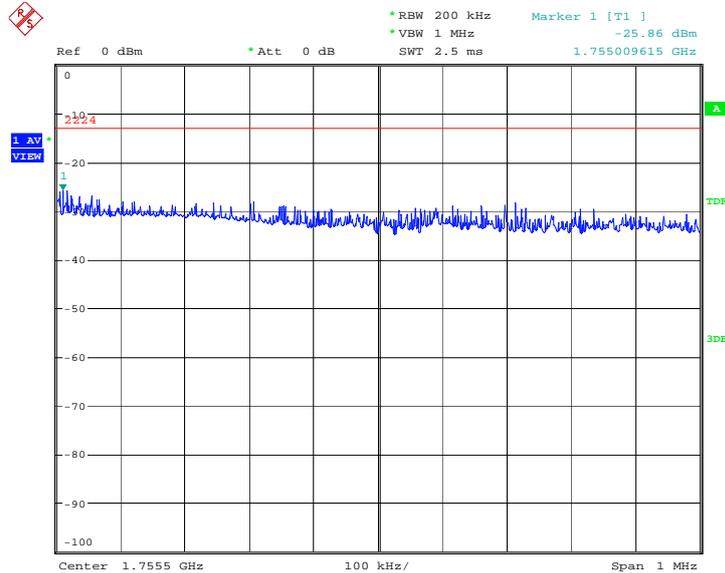## HIGH BAND EDGE BLOCK-16QAM
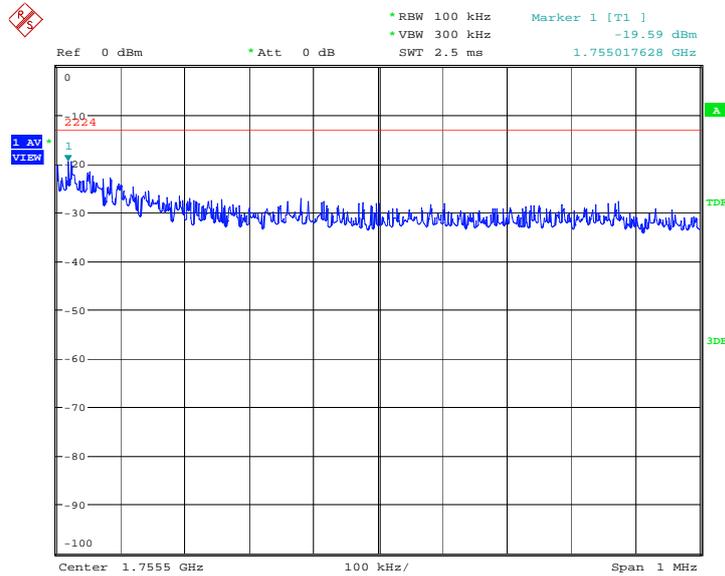
Date: 22.JAN.2014 14:29:20

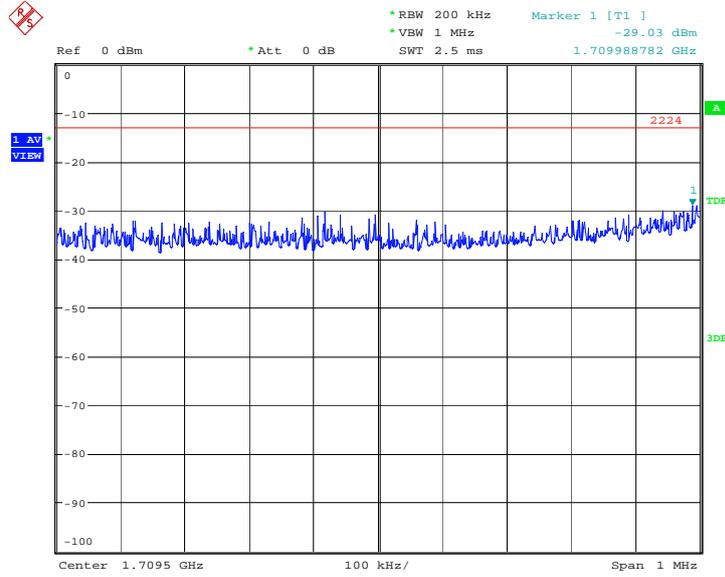**LTE band 4, 15MHz**
LOW BAND EDGE BLOCK-QPSK
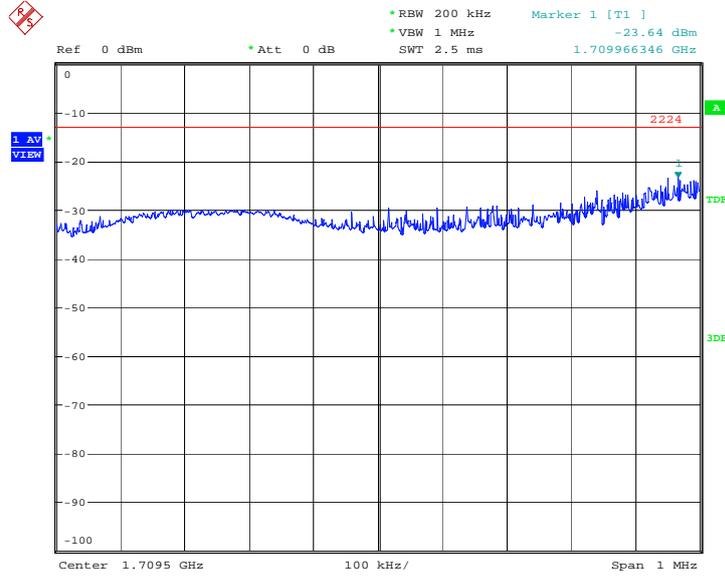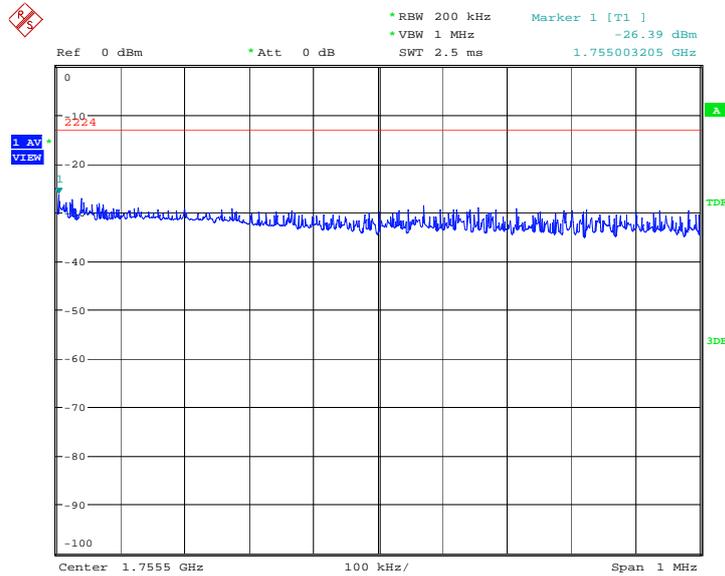

Date: 22.JAN.2014 14:36:27

HIGH BAND EDGE BLOCK-QPSK
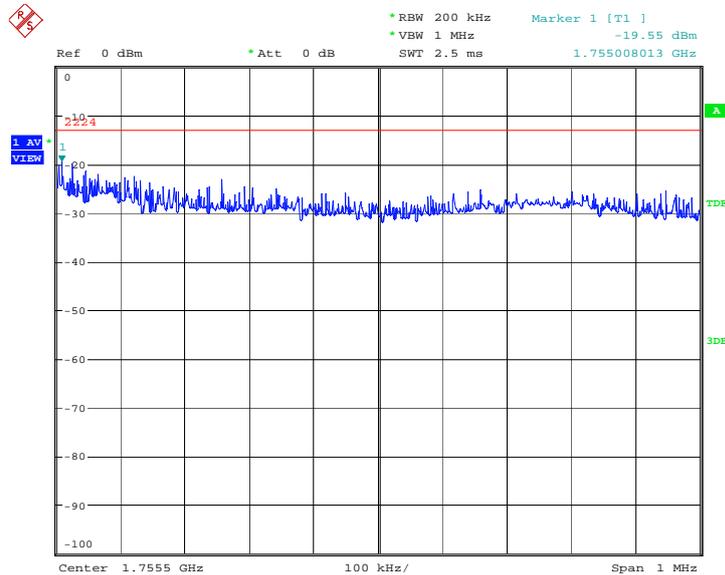
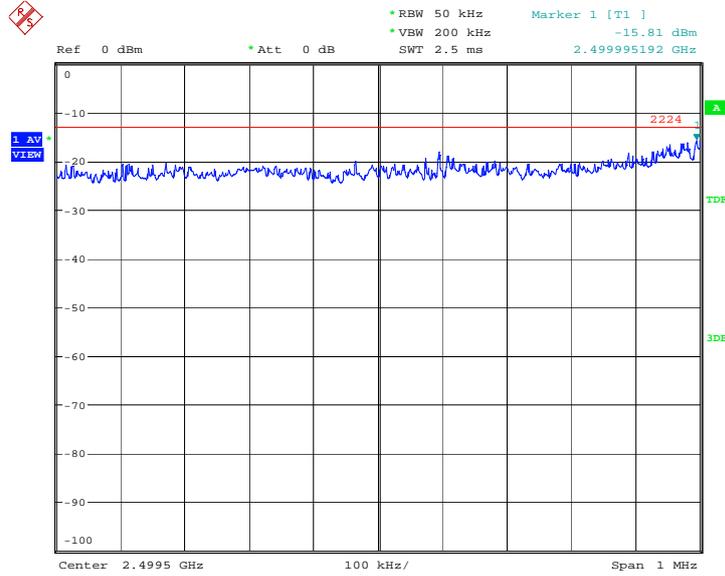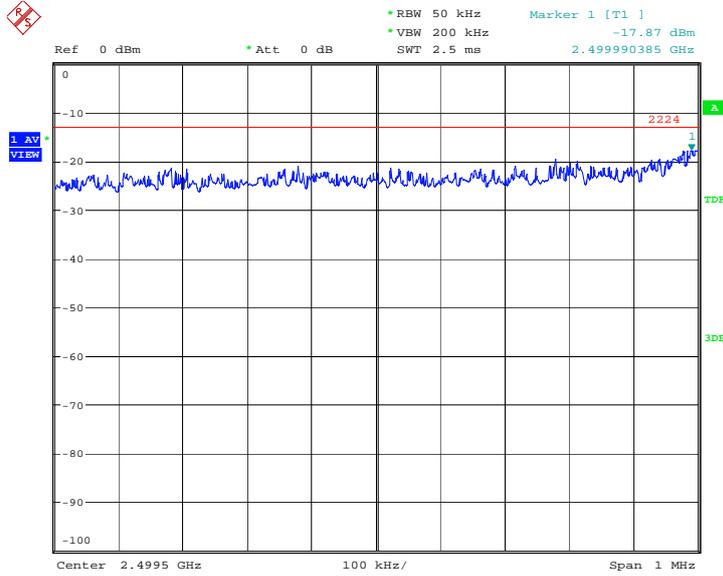

Date: 22.JAN.2014 14:38:37

LOW BAND EDGE BLOCK-16QAM

```
                                    * RBW 200 kHz    Marker 1 [T1 ]
                                    * VBW 1 MHz              -23.68 dBm
Ref   0 dBm        * Att  0 dB      SWT 2.5 ms       1.709966346 GHz
```

Center 1.7095 GHz   100 kHz/   Span 1 MHz
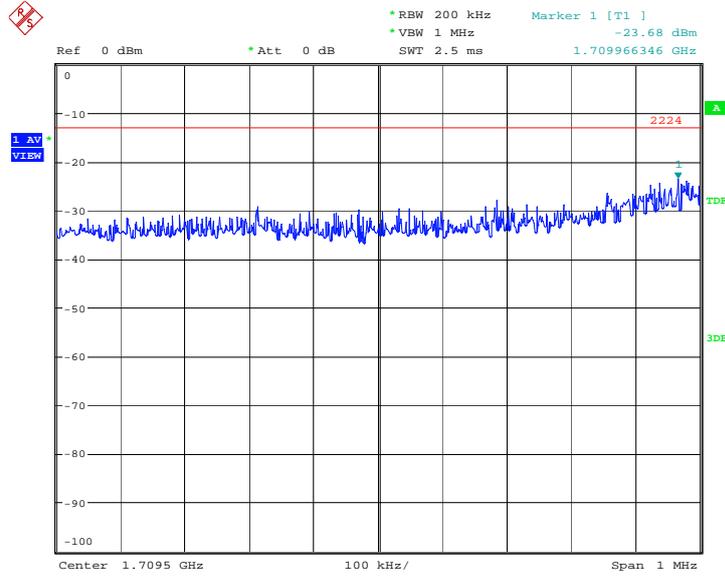
Date: 22.JAN.2014 14:36:38

HIGH BAND EDGE BLOCK-16QAM

```
                                    * RBW 200 kHz    Marker 1 [T1 ]
                                    * VBW 1 MHz              -21.63 dBm
Ref   0 dBm        * Att  0 dB      SWT 2.5 ms       1.755004808 GHz
```

Center 1.7555 GHz   100 kHz/   Span 1 MHz
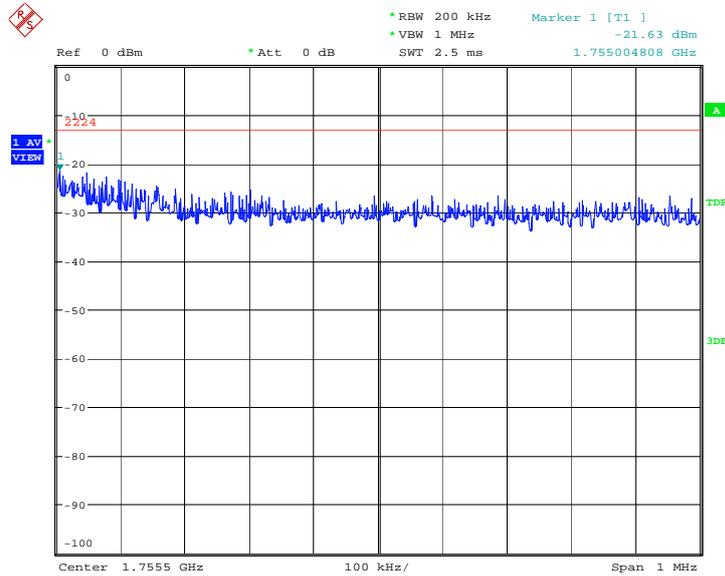
Date: 22.JAN.2014 14:38:47

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

```
                                    * RBW 200 kHz    Marker 1 [T1 ]
                                    * VBW 1 MHz           -27.64 dBm
        Ref  0 dBm      * Att  0 dB   SWT 2.5 ms      1.709985577 GHz
```
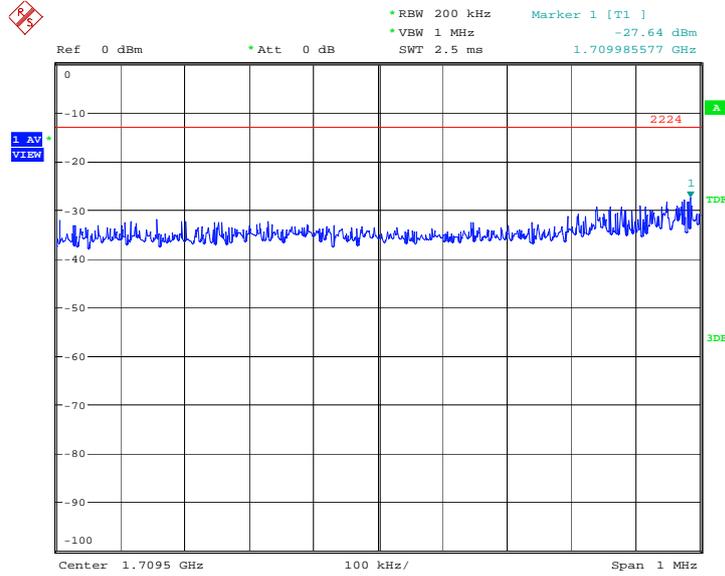
Date: 22.JAN.2014 14:42:25

HIGH BAND EDGE BLOCK-QPSK

```
                                    * RBW 200 kHz    Marker 1 [T1 ]
                                    * VBW 1 MHz           -25.86 dBm
        Ref  0 dBm      * Att  0 dB   SWT 2.5 ms      1.755009615 GHz
```

Date: 22.JAN.2014 14:47:35

LOW BAND EDGE BLOCK-16QAM

```
                                    * RBW  200 kHz     Marker 1 [T1 ]
                                    * VBW  1 MHz               -29.03 dBm
        Ref   0 dBm     * Att   0 dB    SWT  2.5 ms      1.709988782 GHz
```

Spectrum analyzer plot — Center 1.7095 GHz, 100 kHz/, Span 1 MHz

```
Date: 22.JAN.2014  14:42:35
```

HIGH BAND EDGE BLOCK-16QAM

```
                                    * RBW  200 kHz     Marker 1 [T1 ]
                                    * VBW  1 MHz               -26.39 dBm
        Ref   0 dBm     * Att   0 dB    SWT  2.5 ms      1.755003205 GHz
```

Spectrum analyzer plot — Center 1.7555 GHz, 100 kHz/, Span 1 MHz

```
Date: 22.JAN.2014  14:47:45
```

LTE band 7, 5MHz

LOW BAND EDGE BLOCK-QPSK

Date: 14.JAN.2014 16:55:18

HIGH BAND EDGE BLOCK-QPSK
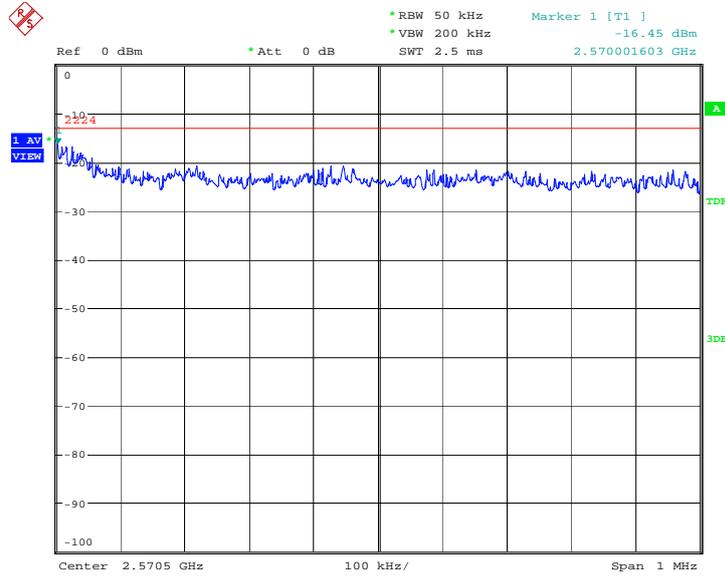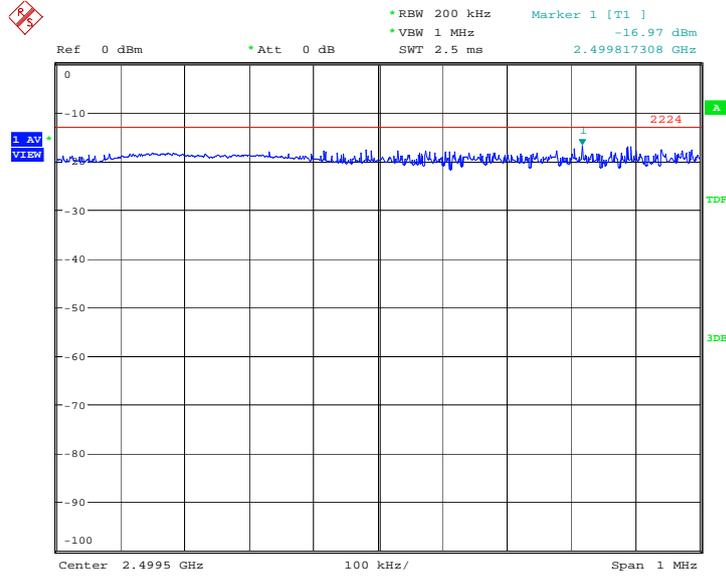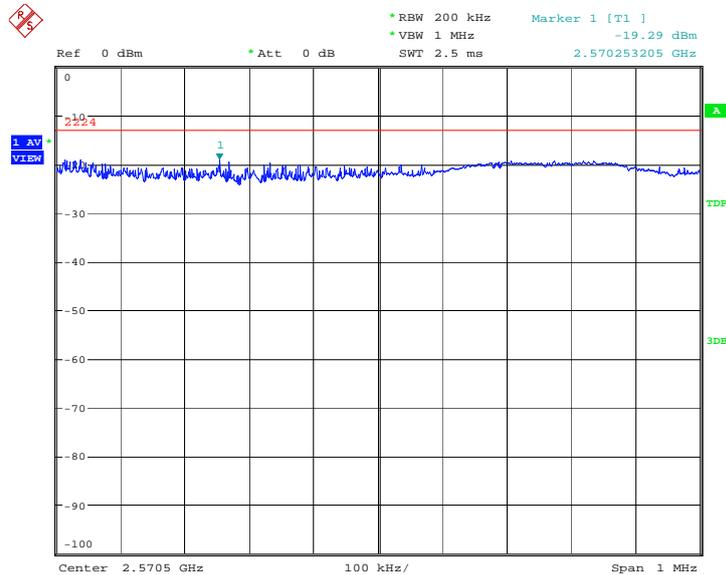

Date: 14.JAN.2014 16:58:39

LOW BAND EDGE BLOCK-16QAM

```
                                        * RBW 50 kHz      Marker 1 [T1 ]
                                        * VBW 200 kHz         -17.87 dBm
     Ref   0 dBm        * Att   0 dB    SWT 2.5 ms        2.499990385 GHz
```

Date: 14.JAN.2014 16:55:29

HIGH BAND EDGE BLOCK-16QAM

```
                                        * RBW 50 kHz      Marker 1 [T1 ]
                                        * VBW 200 kHz         -16.86 dBm
     Ref   0 dBm        * Att   0 dB    SWT 2.5 ms        2.570004808 GHz
```
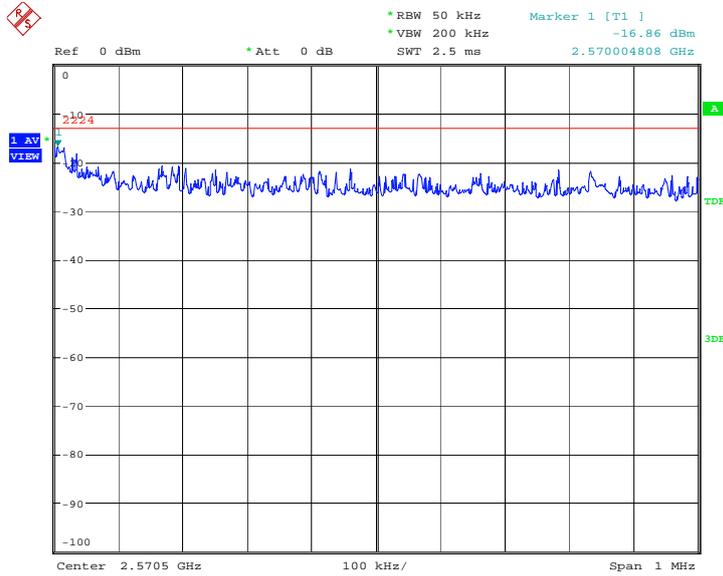
Date: 14.JAN.2014 16:58:49

LTE band 7, 10MHz
LOW BAND EDGE BLOCK-QPSK
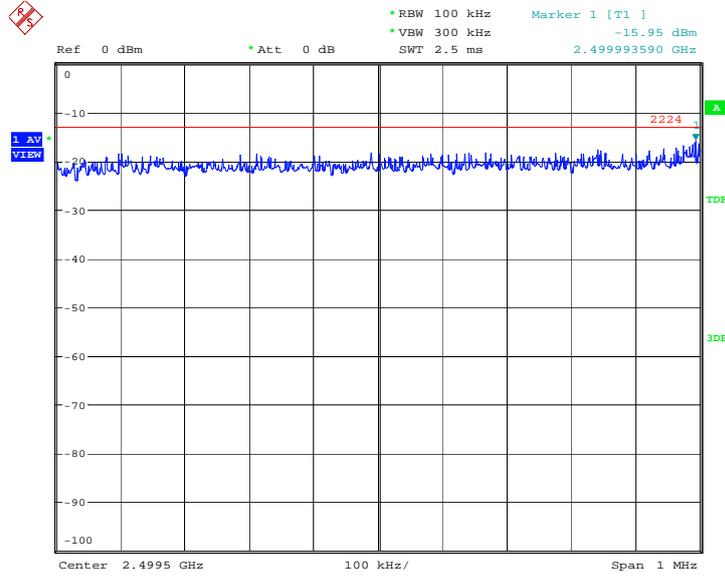
Date: 14.JAN.2014 17:26:53

HIGH BAND EDGE BLOCK-QPSK
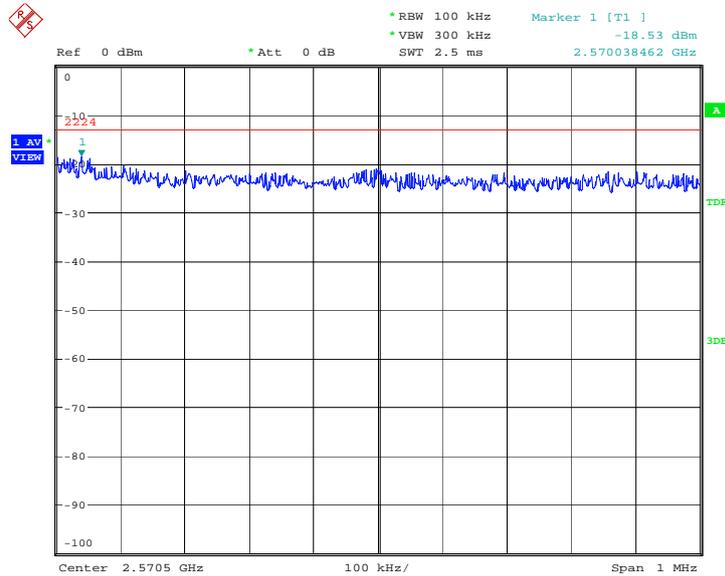
Date: 14.JAN.2014 17:30:13

LOW BAND EDGE BLOCK-16QAM
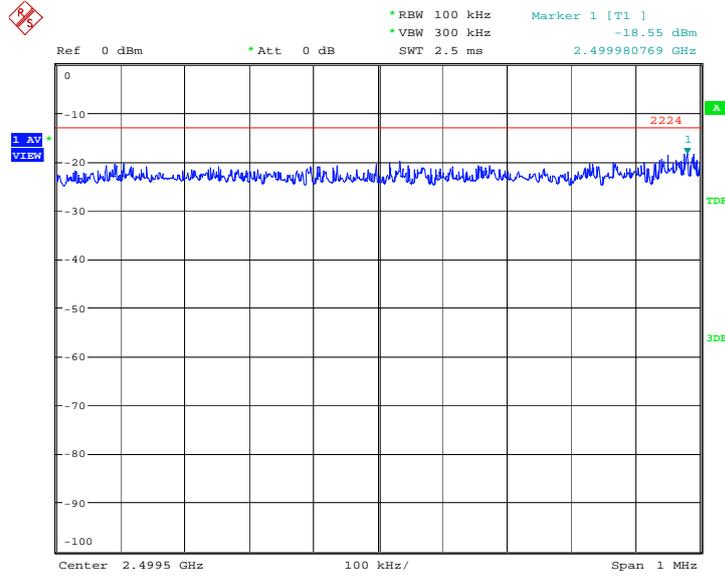
Date: 14.JAN.2014 17:27:03

HIGH BAND EDGE BLOCK-16QAM
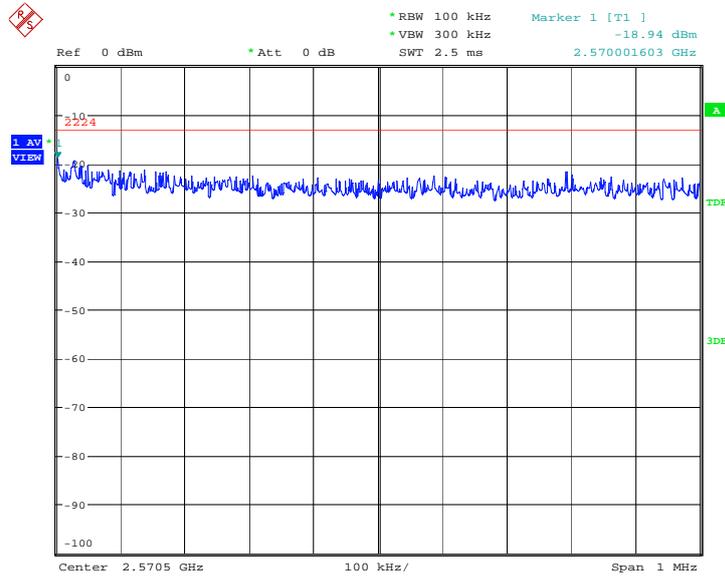
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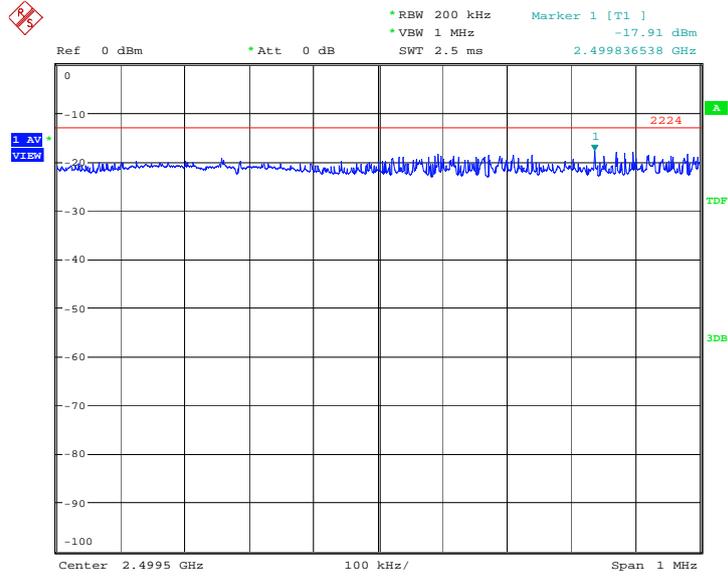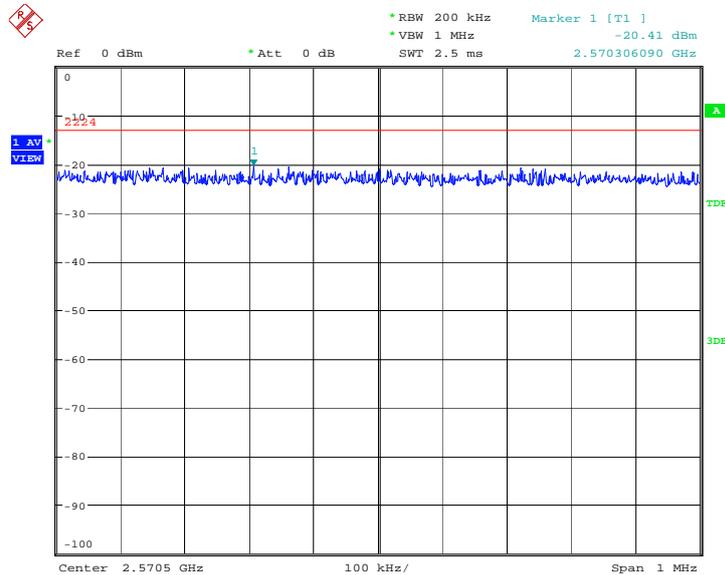
LTE band 7, 15MHz
LOW BAND EDGE BLOCK-QPSK


```
                              * RBW 200 kHz    Marker 1 [T1 ]
                              * VBW 1 MHz           -16.97 dBm
    Ref  0 dBm   * Att  0 dB   SWT 2.5 ms       2.499817308 GHz
```

Center 2.4995 GHz   100 kHz/   Span 1 MHz

Date: 14.JAN.2014 17:58:44

HIGH BAND EDGE BLOCK-QPSK


```
                              * RBW 200 kHz    Marker 1 [T1 ]
                              * VBW 1 MHz           -19.29 dBm
    Ref  0 dBm   * Att  0 dB   SWT 2.5 ms       2.570253205 GHz
```

Center 2.5705 GHz   100 kHz/   Span 1 MHz

Date: 14.JAN.2014 18:02:04

LOW BAND EDGE BLOCK-16QAM

Date: 14.JAN.2014 17:58:54

HIGH BAND EDGE BLOCK-16QAM
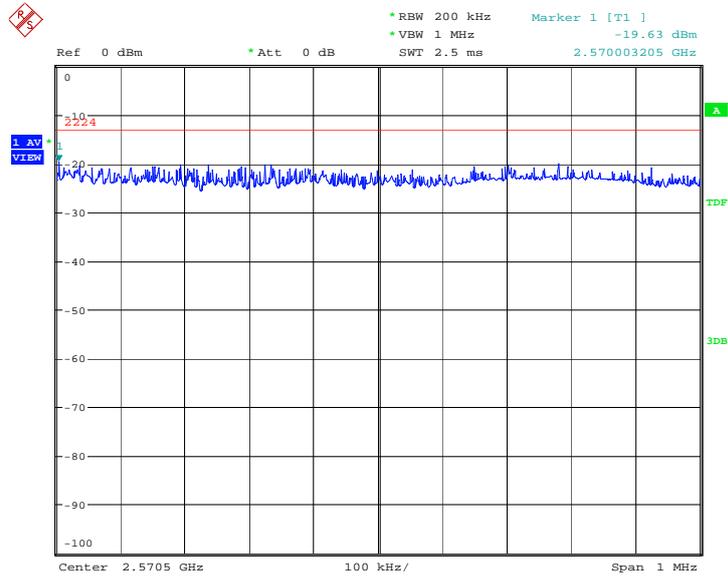
Date: 14.JAN.2014 18:02:14

LTE band 7, 20MHz
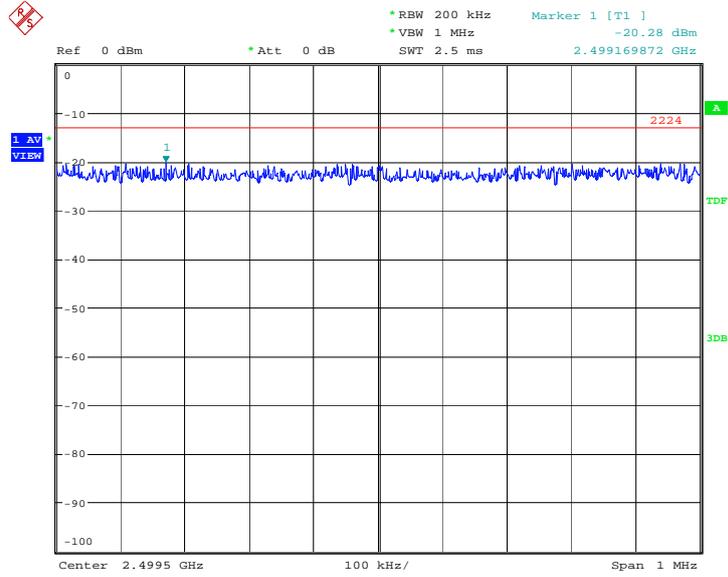**LOW BAND EDGE BLOCK-QPSK**
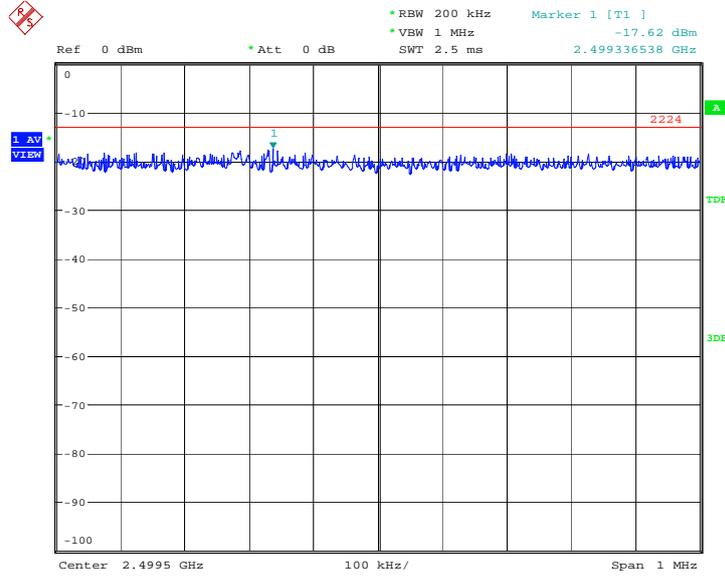
Date: 14.JAN.2014 18:28:31
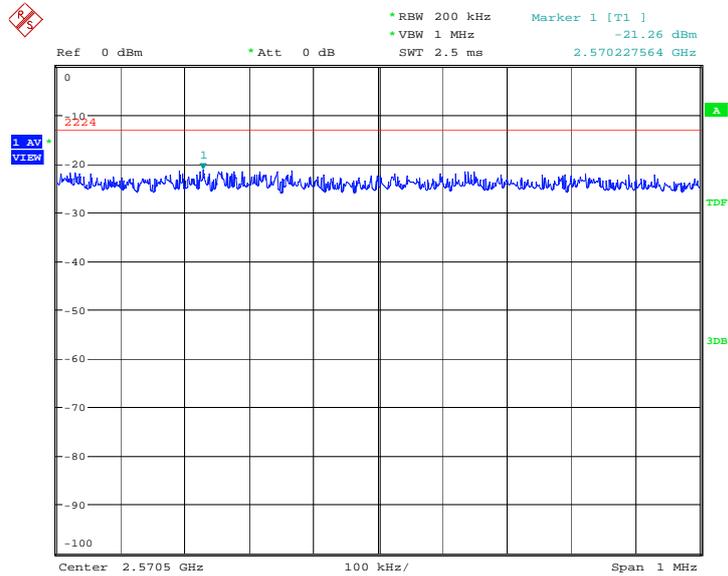
HIGH BAND EDGE BLOCK-QPSK

Date: 14.JAN.2014 18:31:45
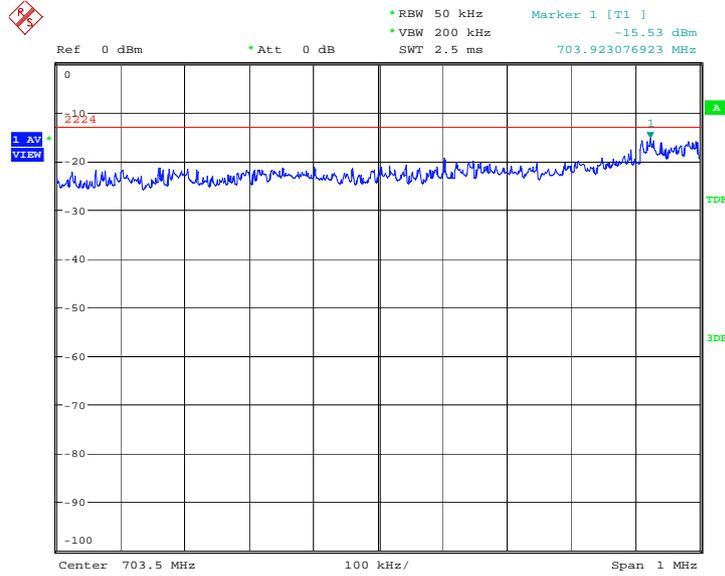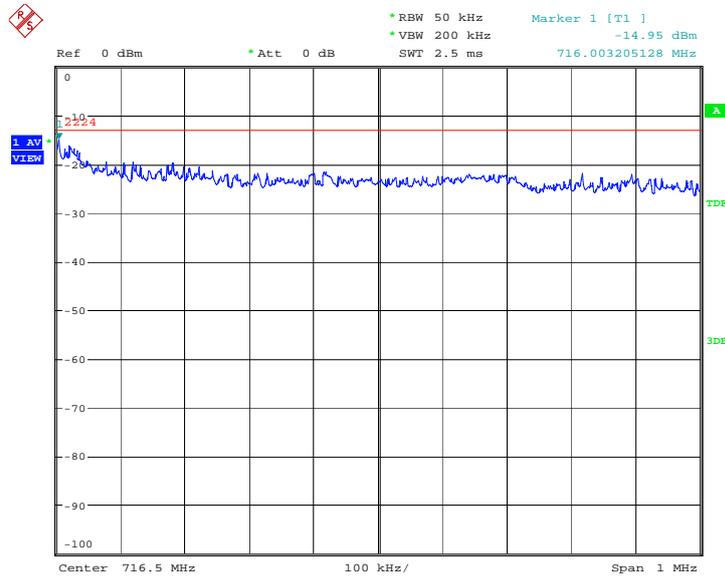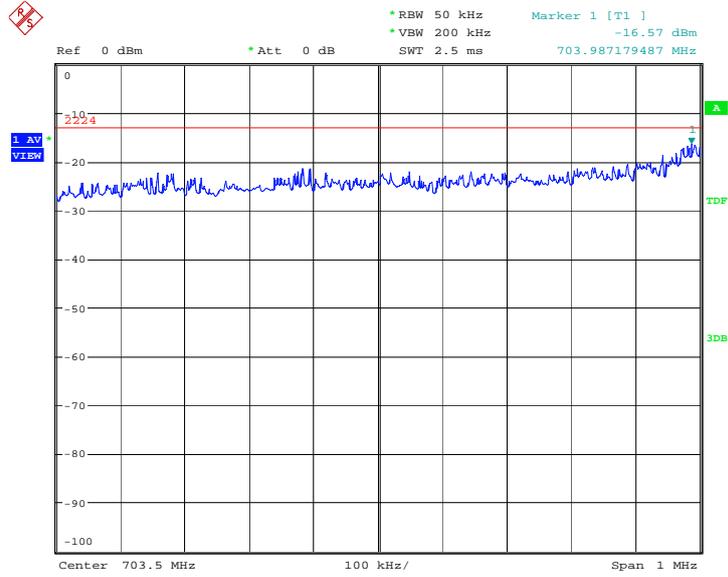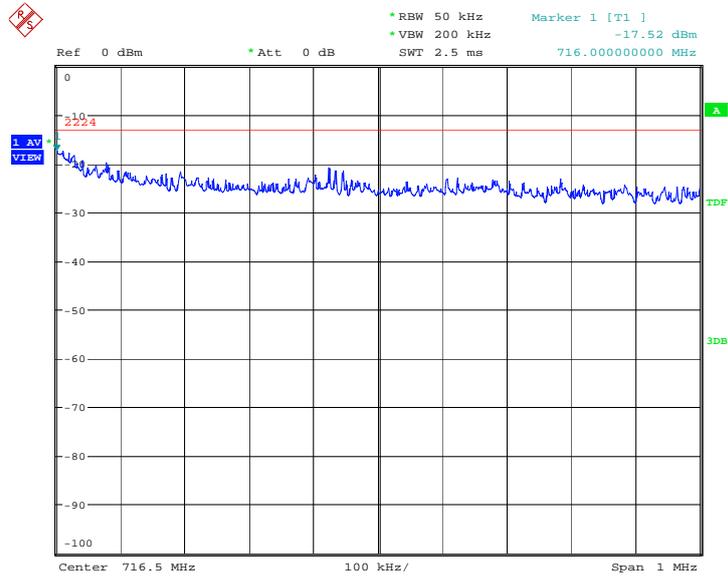
LOW BAND EDGE BLOCK-16QAM

```
* RBW 200 kHz    Marker 1 [T1 ]
* VBW 1 MHz            -20.28 dBm
Ref  0 dBm        * Att  0 dB    SWT 2.5 ms    2.499169872 GHz
```

Center 2.4995 GHz   100 kHz/   Span 1 MHz

Date: 14.JAN.2014 18:28:40

HIGH BAND EDGE BLOCK-16QAM

```
* RBW 200 kHz    Marker 1 [T1 ]
* VBW 1 MHz            -21.26 dBm
Ref  0 dBm        * Att  0 dB    SWT 2.5 ms    2.570227564 GHz
```

Center 2.5705 GHz   100 kHz/   Span 1 MHz

Date: 14.JAN.2014 18:31:54

LTE band 17, 5MHz

LOW BAND EDGE BLOCK-QPSK

```
                                    * RBW 50 kHz      Marker 1 [T1 ]
                                    * VBW 200 kHz              -15.53 dBm
      Ref   0 dBm       * Att   0 dB    SWT 2.5 ms      703.923076923 MHz
```

Center 703.5 MHz   100 kHz/   Span 1 MHz

Date: 20.JAN.2014 13:29:16

HIGH BAND EDGE BLOCK-QPSK

```
                                    * RBW 50 kHz      Marker 1 [T1 ]
                                    * VBW 200 kHz              -14.95 dBm
      Ref   0 dBm       * Att   0 dB    SWT 2.5 ms      716.003205128 MHz
```

Center 716.5 MHz   100 kHz/   Span 1 MHz
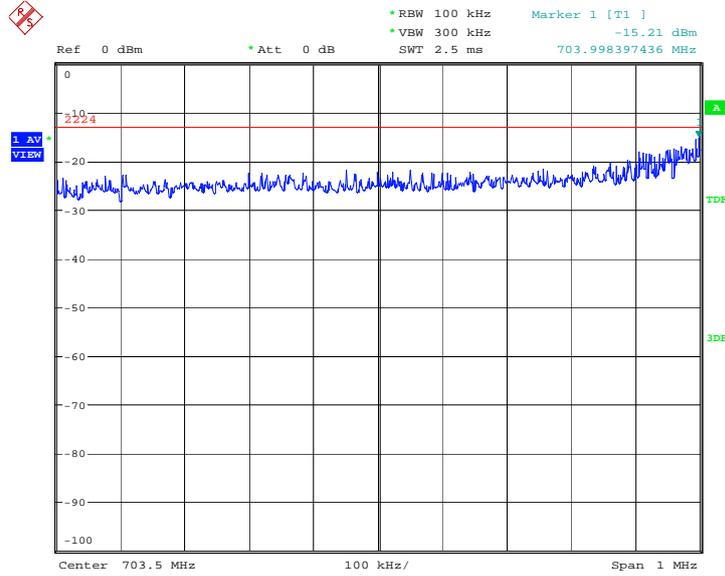
Date: 20.JAN.2014 13:31:26

LOW BAND EDGE BLOCK-16QAM

Date: 20.JAN.2014 13:29:26

HIGH BAND EDGE BLOCK-16QAM

Date: 20.JAN.2014 13:31:36
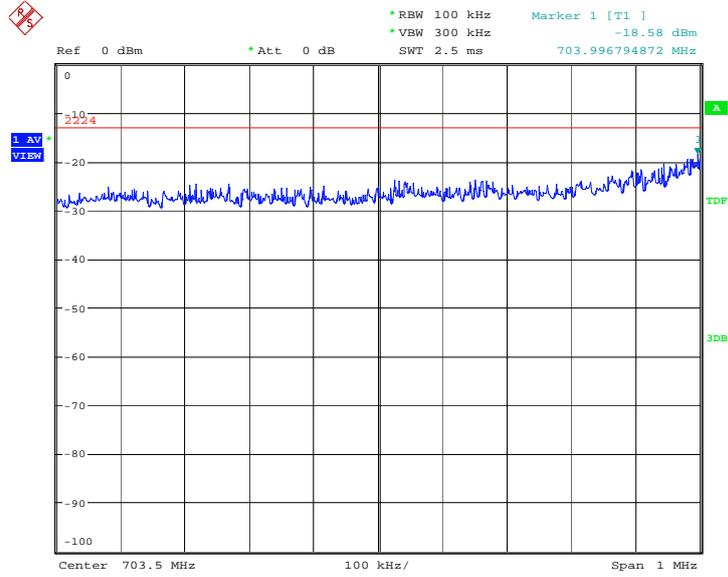
LTE band 17, 10MHz
LOW BAND EDGE BLOCK-QPSK

```
                                              *RBW 100 kHz     Marker 1 [T1 ]
                                              *VBW 300 kHz          -15.21 dBm
         Ref   0 dBm        *Att   0 dB       SWT 2.5 ms       703.998397436 MHz
```
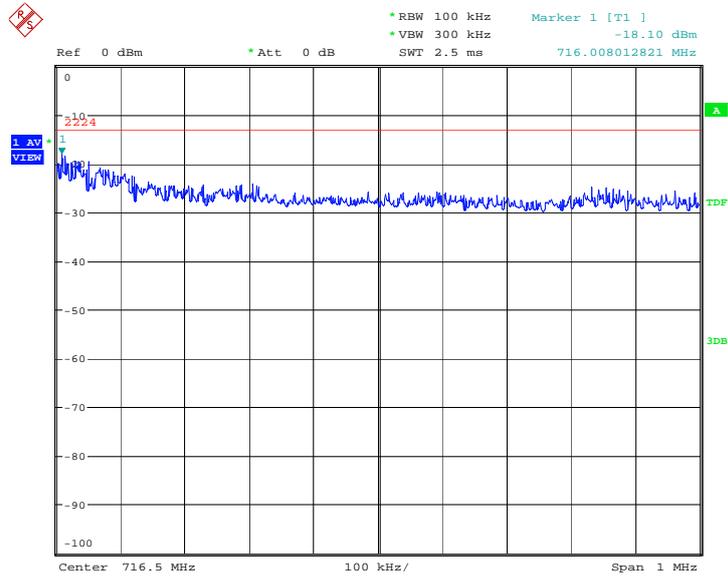
Center 703.5 MHz   100 kHz/   Span 1 MHz

Date: 20.JAN.2014 14:06:55

HIGH BAND EDGE BLOCK-QPSK

```
                                              *RBW 100 kHz     Marker 1 [T1 ]
                                              *VBW 300 kHz          -16.21 dBm
         Ref   0 dBm        *Att   0 dB       SWT 2.5 ms       716.000000000 MHz
```

Center 716.5 MHz   100 kHz/   Span 1 MHz
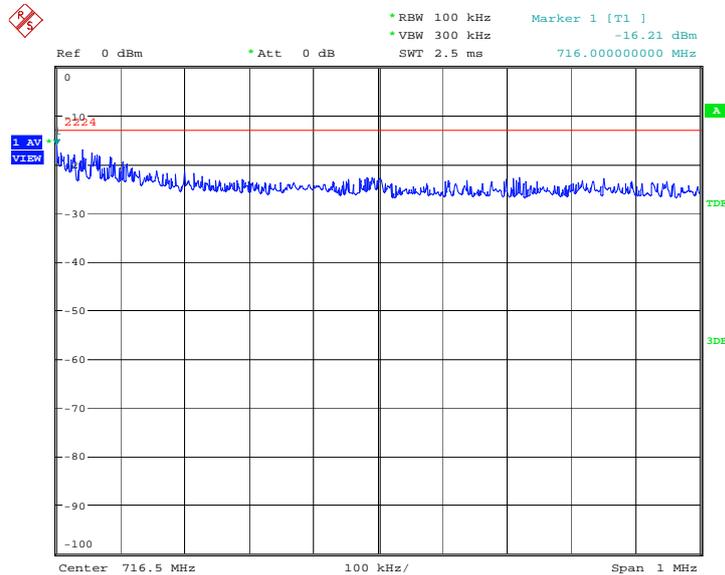
Date: 20.JAN.2014 14:09:04

LOW BAND EDGE BLOCK-16QAM

	*RBW 100 kHz	Marker 1 [T1]
	*VBW 300 kHz	-18.58 dBm
Ref 0 dBm	*Att 0 dB SWT 2.5 ms	703.996794872 MHz

Center 703.5 MHz   100 kHz/   Span 1 MHz

Date: 20.JAN.2014 14:07:05

HIGH BAND EDGE BLOCK-16QAM

	*RBW 100 kHz	Marker 1 [T1]
	*VBW 300 kHz	-18.10 dBm
Ref 0 dBm	*Att 0 dB SWT 2.5 ms	716.008012821 MHz

Center 716.5 MHz   100 kHz/   Span 1 MHz

Date: 20.JAN.2014 14:09:14

A.8   CONDUCTED SPURIOUS EMISSION

Reference
FCC: CFR Part 24.238(a), 27.53(h) , 27.53(m), 27.53(g)
IC: RSS-133 Issue 6, Section 6.5. RSS-139 Issue 2, Section 6.5. RSS-199 Issue 1, Section 4.5.
　RSS-130 Issue 1, Section 4.6.

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 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.
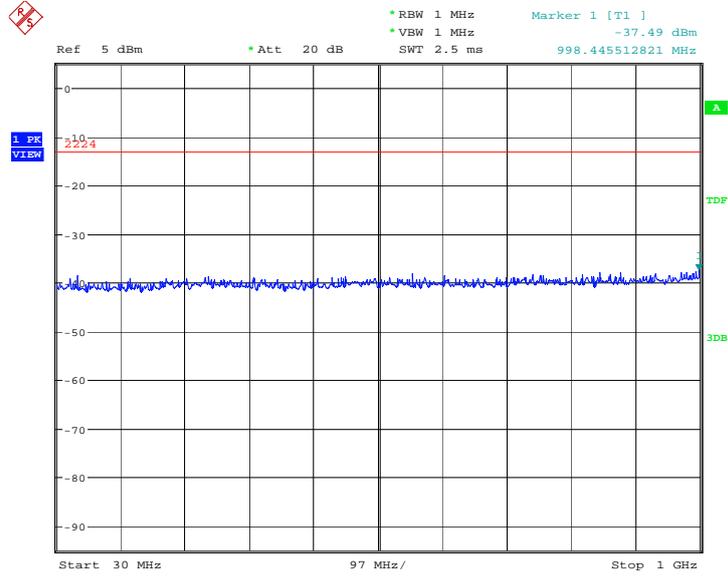
A. 8.3 Measurement result

Measurement Uncertainty: 0.3dB

LTE band 2, 1.4MHz bandwidth
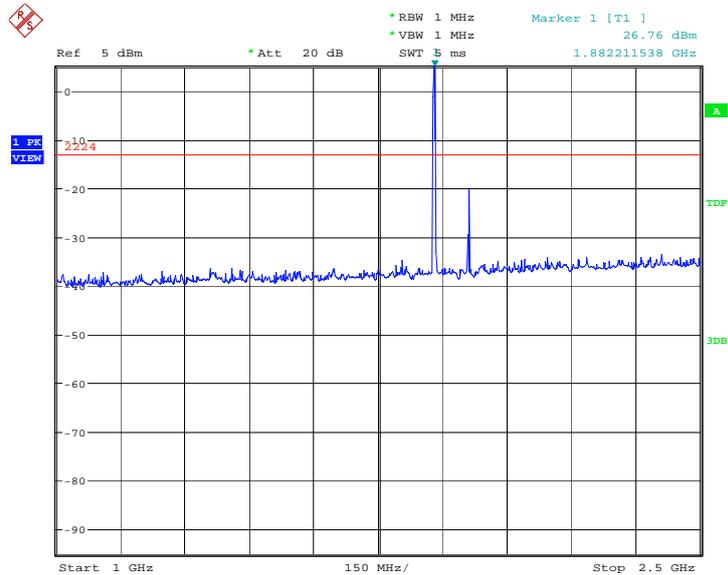
QPSK: 30MHz – 1GHz

Spurious emission limit –13dBm.
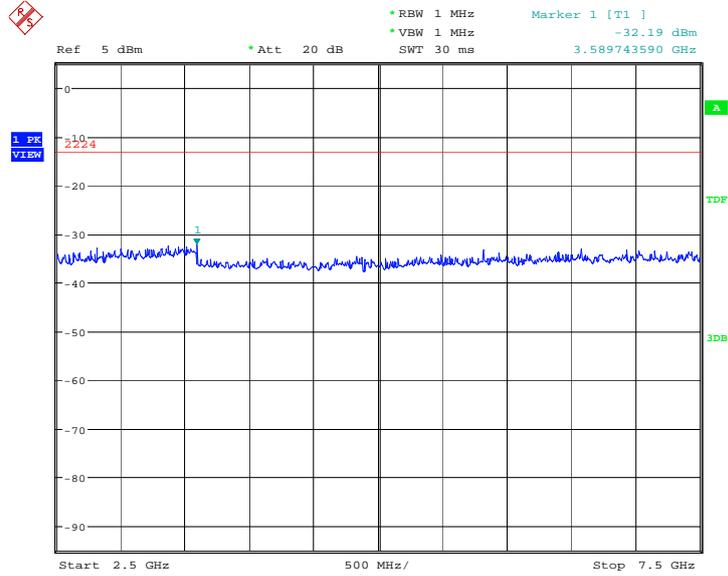

Date: 14.JAN.2014 19:06:03
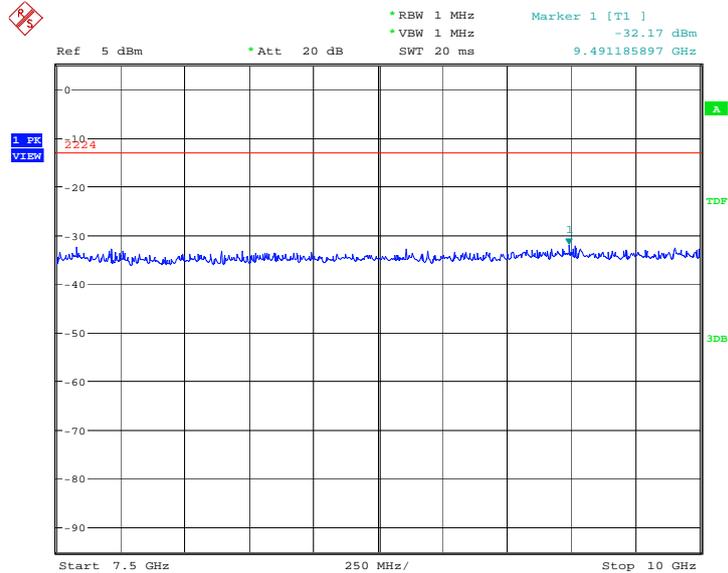
QPSK: 1GHz – 2.5GHz

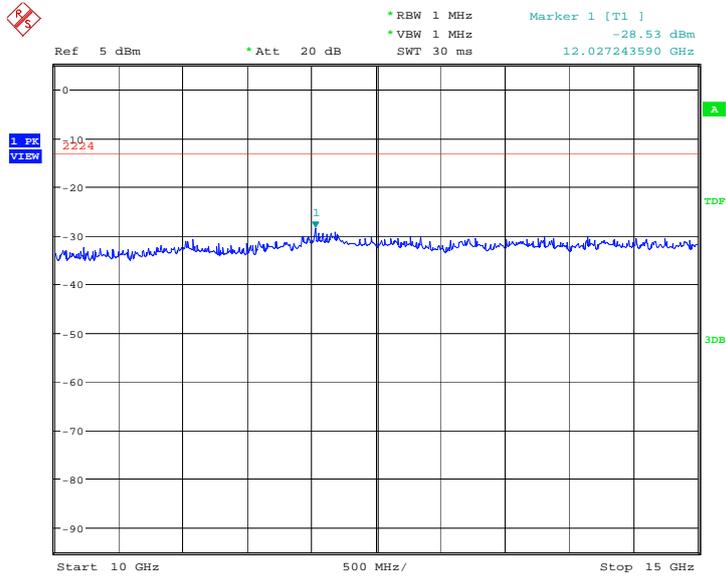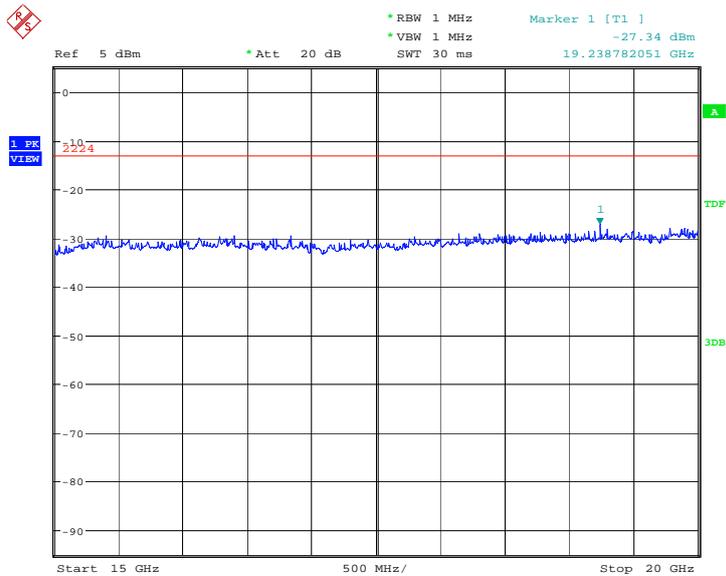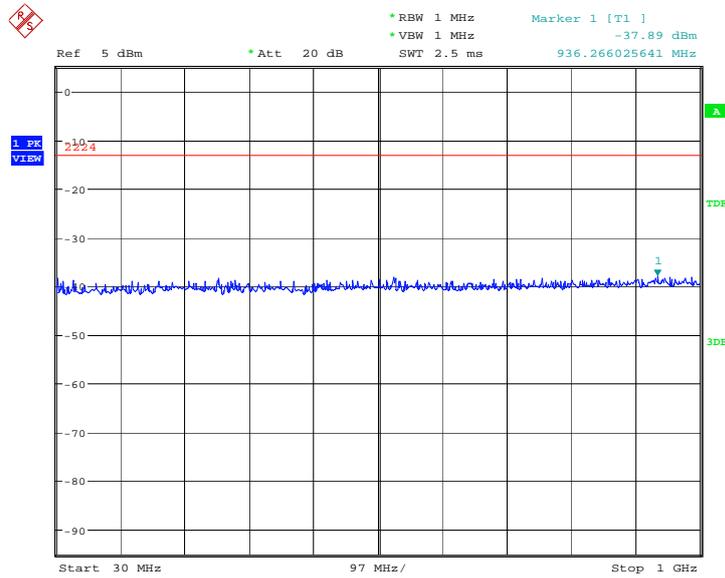Spurious emission limit –13dBm.

Date: 14.JAN.2014 19:06:10

QPSK: 2.5GHz – 7.5GHz

Spurious emission limit –13dBm.

```
                              * RBW 1 MHz        Marker 1 [T1 ]
                              * VBW 1 MHz              -32.19 dBm
Ref  5 dBm        * Att  20 dB   SWT 30 ms        3.589743590 GHz
```

```
1 PK
VIEW
```

Start 2.5 GHz   500 MHz/   Stop 7.5 GHz

Date: 14.JAN.2014 19:06:16

QPSK: 7.5GHz –10GHz

Spurious emission limit –13dBm.

```
                              * RBW 1 MHz        Marker 1 [T1 ]
                              * VBW 1 MHz              -32.17 dBm
Ref  5 dBm        * Att  20 dB   SWT 20 ms        9.491185897 GHz
```

```
1 PK
VIEW
```

Start 7.5 GHz   250 MHz/   Stop 10 GHz

Date: 14.JAN.2014 19:06:23

QPSK: 10GHz –15GHz

Spurious emission limit –13dBm.

Date: 14.JAN.2014 19:06:30

QPSK: 15GHz –20GHz

Spurious emission limit –13dBm.

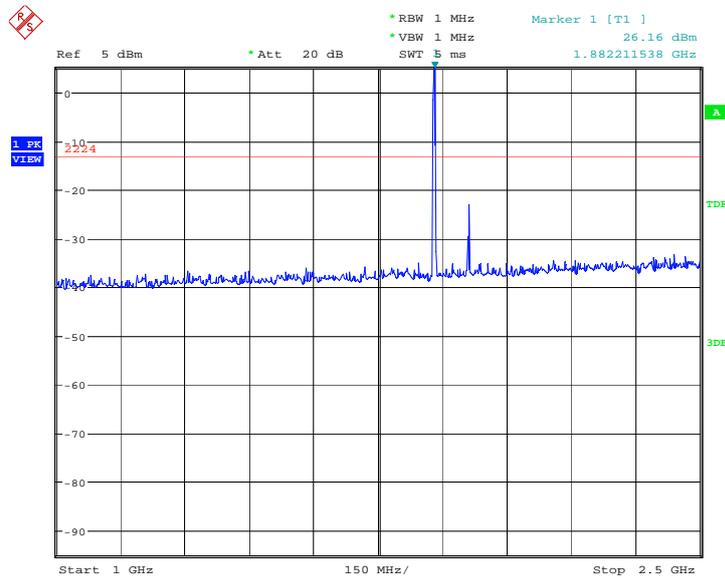Date: 14.JAN.2014 19:06:37

16QAM: 30MHz – 1GHz

Spurious emission limit –13dBm.

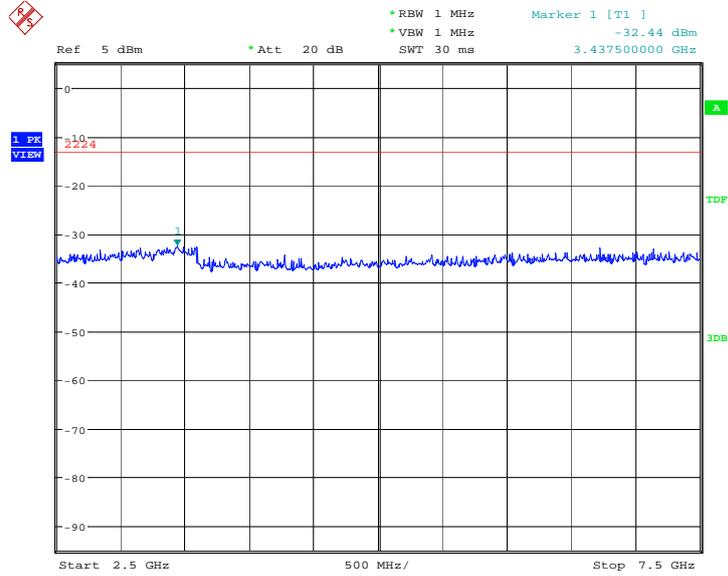Date: 14.JAN.2014 19:07:28

16QAM: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

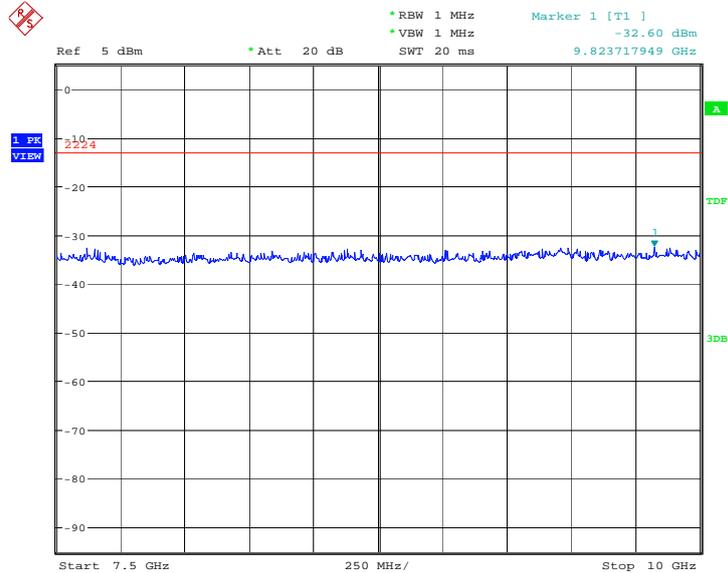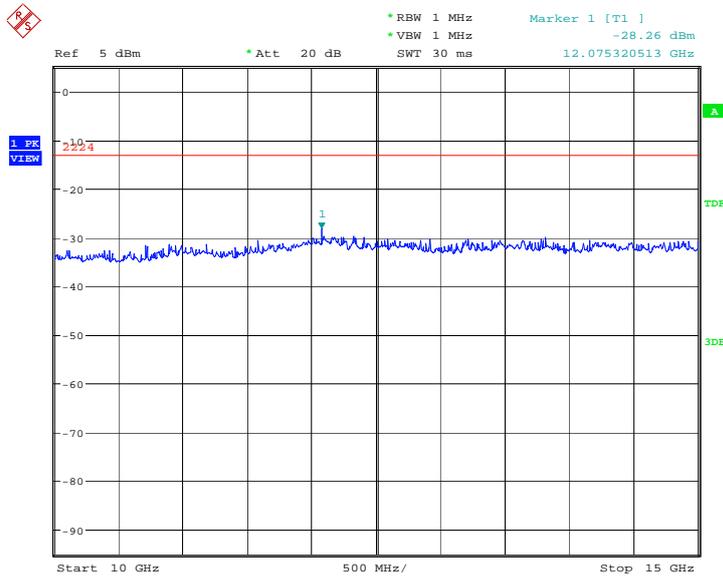Date: 14.JAN.2014 19:07:35

16QAM: 2.5GHz – 7.5GHz

Spurious emission limit –13dBm.

```
                                    * RBW  1 MHz      Marker 1 [T1 ]
                                    * VBW  1 MHz            -32.44 dBm
   Ref  5 dBm         * Att  20 dB   SWT 30 ms         3.437500000 GHz
```



```
   Start  2.5 GHz          500 MHz/              Stop  7.5 GHz
```

Date: 14.JAN.2014 19:07:41

16QAM: 7.5GHz –10GHz

Spurious emission limit –13dBm.

```
                                    * RBW  1 MHz      Marker 1 [T1 ]
                                    * VBW  1 MHz            -32.60 dBm
   Ref  5 dBm         * Att  20 dB   SWT 20 ms         9.823717949 GHz
```



```
   Start  7.5 GHz          250 MHz/              Stop  10 GHz
```

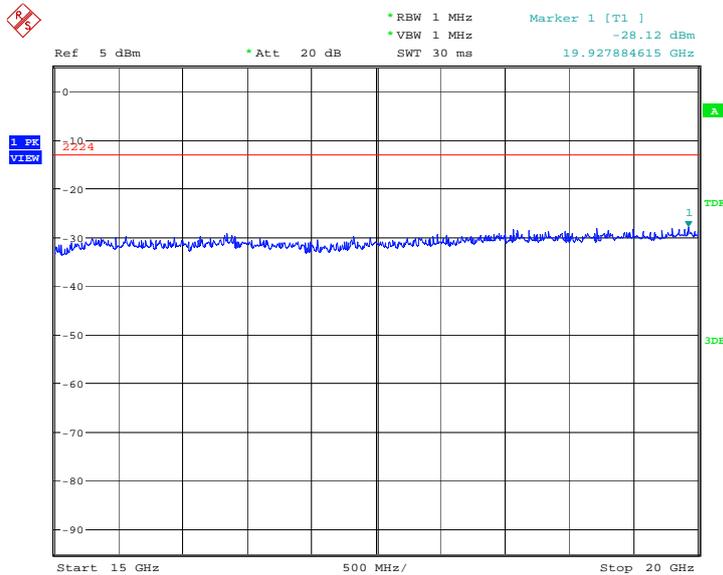Date: 14.JAN.2014 19:07:48

16QAM: 10GHz –15GHz

Spurious emission limit –13dBm.

Date: 14.JAN.2014 19:07:55

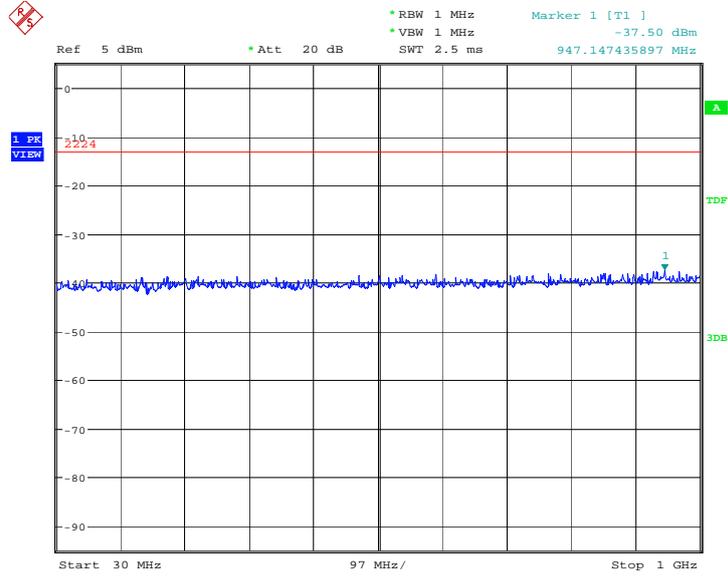### 16QAM: 15GHz –20GHz

Spurious emission limit –13dBm.

Date: 14.JAN.2014 19:08:02

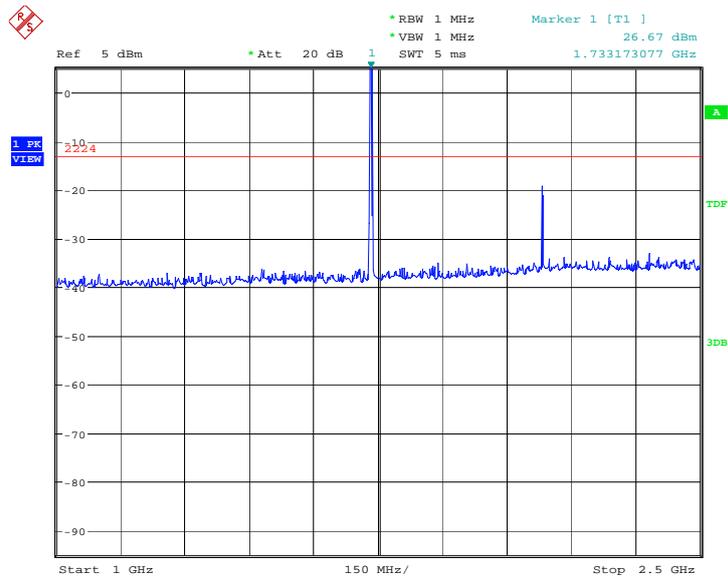**LTE band 4, 1.4MHz bandwidth**

QPSK: 30MHz – 1GHz
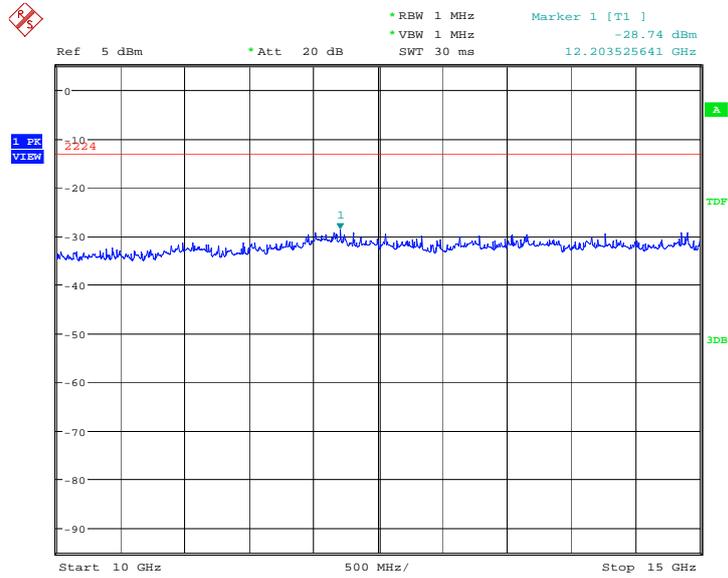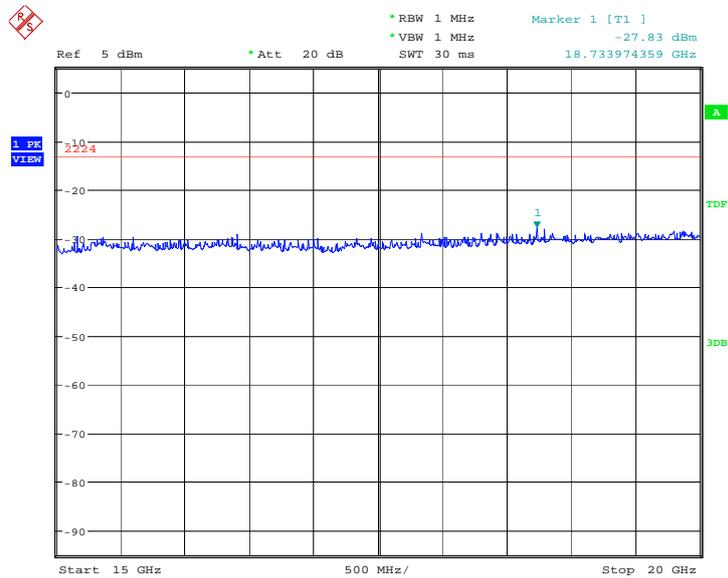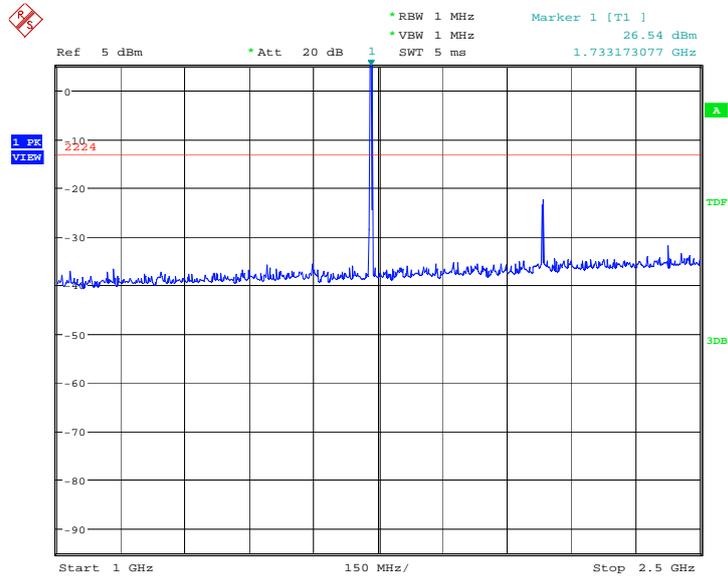
Spurious emission limit –13dBm.

QPSK: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

QPSK: 2.5GHz – 7.5GHz

Spurious emission limit –13dBm.

```
                              * RBW  1 MHz      Marker 1 [T1 ]
                              * VBW  1 MHz            -31.93 dBm
 Ref   5 dBm      * Att   20 dB   SWT  30 ms     3.493589744 GHz
```

Date: 14.JAN.2014 21:54:46

QPSK: 7.5GHz –10GHz

Spurious emission limit –13dBm.

```
                              * RBW  1 MHz      Marker 1 [T1 ]
                              * VBW  1 MHz            -31.89 dBm
 Ref   5 dBm      * Att   20 dB   SWT  20 ms     9.919871795 GHz
```

Date: 14.JAN.2014 21:54:52

QPSK: 10GHz –15GHz

Spurious emission limit –13dBm.

```
                                      *RBW 1 MHz        Marker 1 [T1 ]
                                      *VBW 1 MHz              -28.74 dBm
          Ref  5 dBm      *Att 20 dB   SWT 30 ms       12.203525641 GHz
```

Date: 14.JAN.2014 21:54:59

QPSK: 15GHz –20GHz

Spurious emission limit –13dBm.

```
                                      *RBW 1 MHz        Marker 1 [T1 ]
                                      *VBW 1 MHz              -27.83 dBm
          Ref  5 dBm      *Att 20 dB   SWT 30 ms       18.733974359 GHz
```

Date: 14.JAN.2014 21:55:06

16QAM: 30MHz – 1GHz
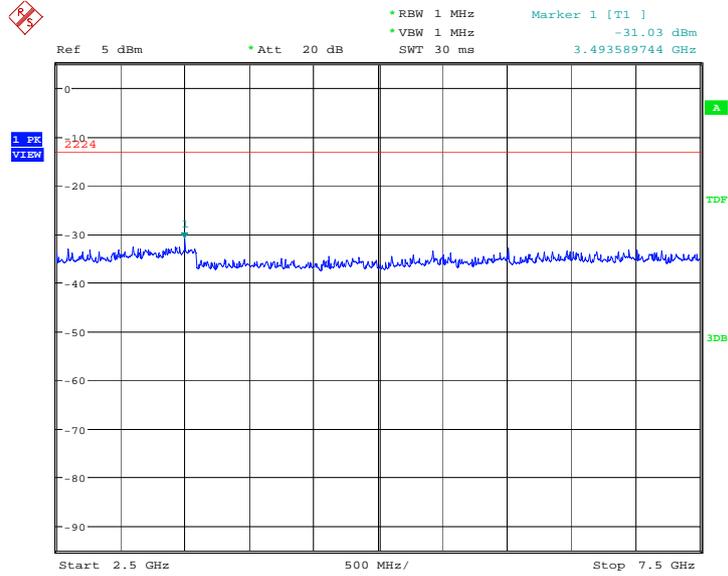
Spurious emission limit –13dBm.
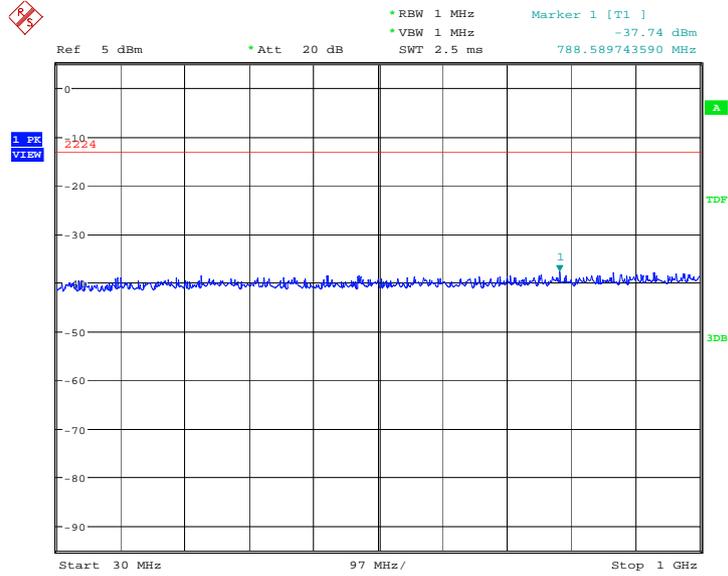
Date: 14.JAN.2014 21:55:57

16QAM: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

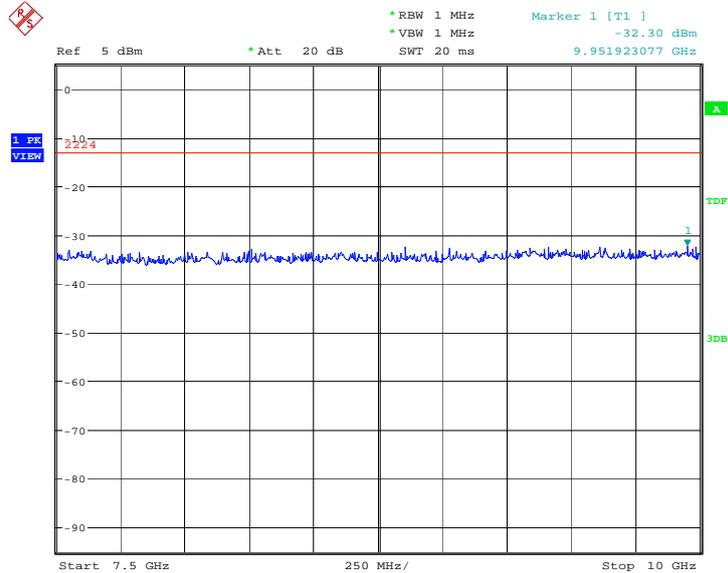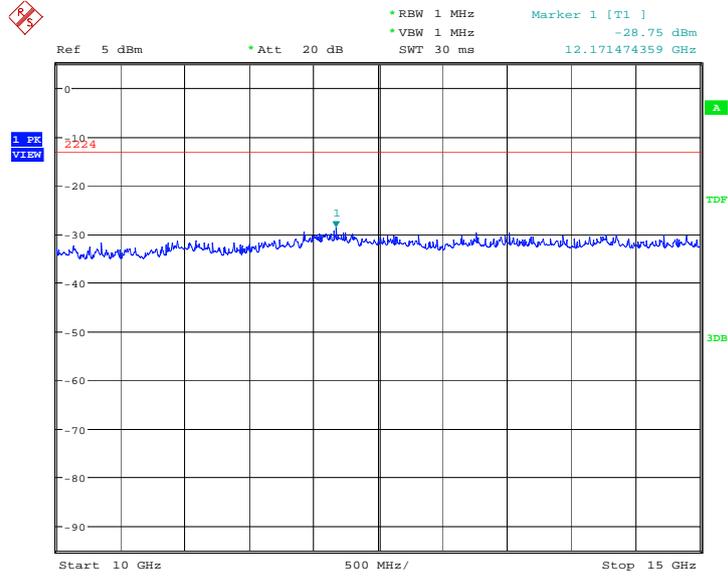Date: 14.JAN.2014 21:56:04

16QAM: 2.5GHz – 7.5GHz

Spurious emission limit –13dBm.

```
                                    *RBW 1 MHz        Marker 1 [T1 ]
                                    *VBW 1 MHz                -31.03 dBm
        Ref   5 dBm    *Att  20 dB   SWT 30 ms         3.493589744 GHz
```



```
Start  2.5 GHz            500 MHz/              Stop  7.5 GHz
```

Date: 14.JAN.2014 21:56:11

16QAM: 7.5GHz –10GHz

Spurious emission limit –13dBm.

```
                                    *RBW 1 MHz        Marker 1 [T1 ]
                                    *VBW 1 MHz                -32.30 dBm
        Ref   5 dBm    *Att  20 dB   SWT 20 ms         9.951923077 GHz
```



```
Start  7.5 GHz            250 MHz/              Stop  10 GHz
```

Date: 14.JAN.2014 21:56:17

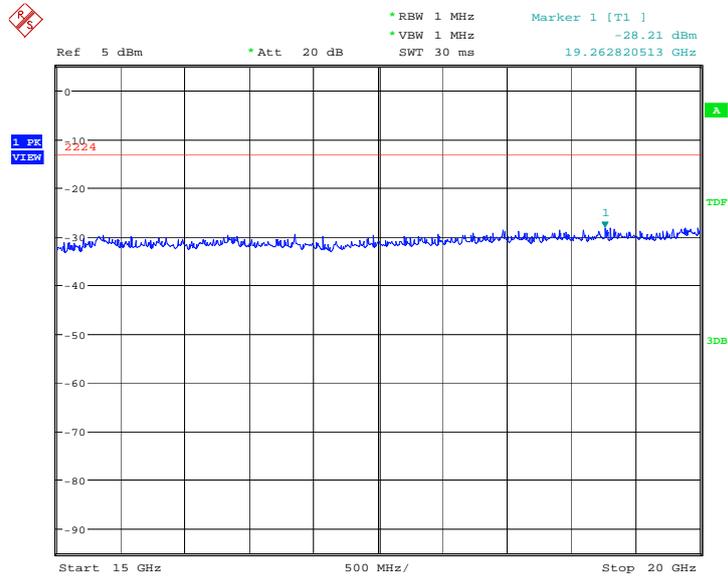### 16QAM: 10GHz –15GHz

Spurious emission limit –13dBm.

Date: 14.JAN.2014 21:56:24

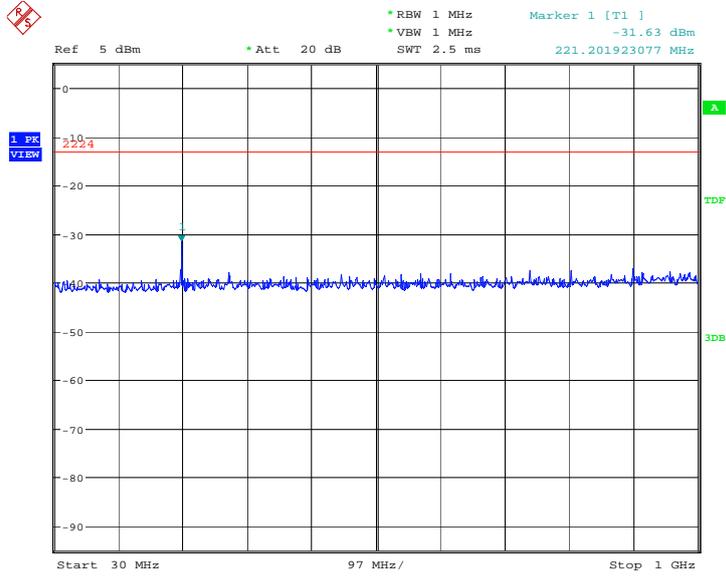### 16QAM: 15GHz –20GHz

Spurious emission limit –13dBm.

Date: 14.JAN.2014 21:56:31

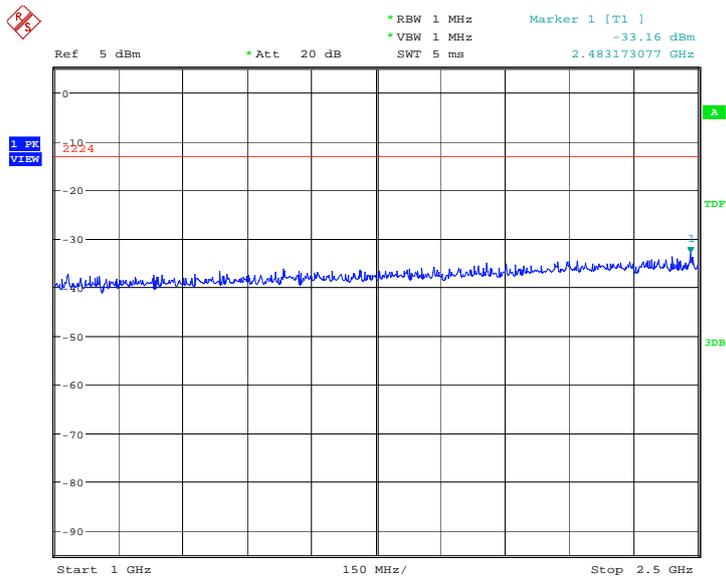**LTE band 7, 5MHz bandwidth**
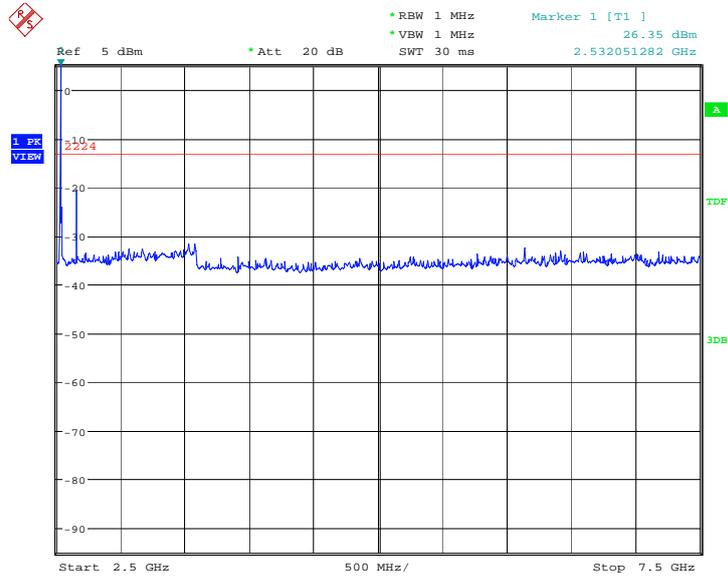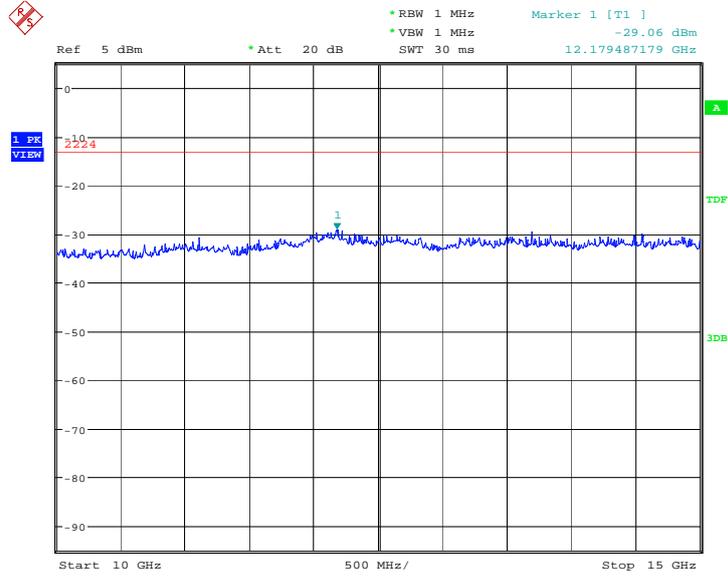
QPSK: 30MHz – 1GHz

Spurious emission limit –13dBm.

```
                                    * RBW 1 MHz        Marker 1 [T1 ]
                                    * VBW 1 MHz              -31.63 dBm
         Ref  5 dBm    * Att  20 dB  SWT 2.5 ms        221.201923077 MHz
```



```
Date: 14.JAN.2014  17:04:08
```

QPSK: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

```
                                    * RBW 1 MHz        Marker 1 [T1 ]
                                    * VBW 1 MHz              -33.16 dBm
         Ref  5 dBm    * Att  20 dB  SWT 5 ms          2.483173077 GHz
```



```
Date: 14.JAN.2014  17:04:16
```

QPSK: 2.5GHz – 7.5GHz

Spurious emission limit –13dBm.

```
                                    * RBW  1 MHz        Marker 1 [T1 ]
                                    * VBW  1 MHz                 26.35 dBm
Ref    5 dBm          * Att  20 dB   SWT  30 ms          2.532051282 GHz
```


Date: 14.JAN.2014 17:04:24

QPSK: 7.5GHz –10GHz

Spurious emission limit –13dBm.

```
                                    * RBW  1 MHz        Marker 1 [T1 ]
                                    * VBW  1 MHz                -30.88 dBm
Ref    5 dBm          * Att  20 dB   SWT  20 ms          9.971955128 GHz
```
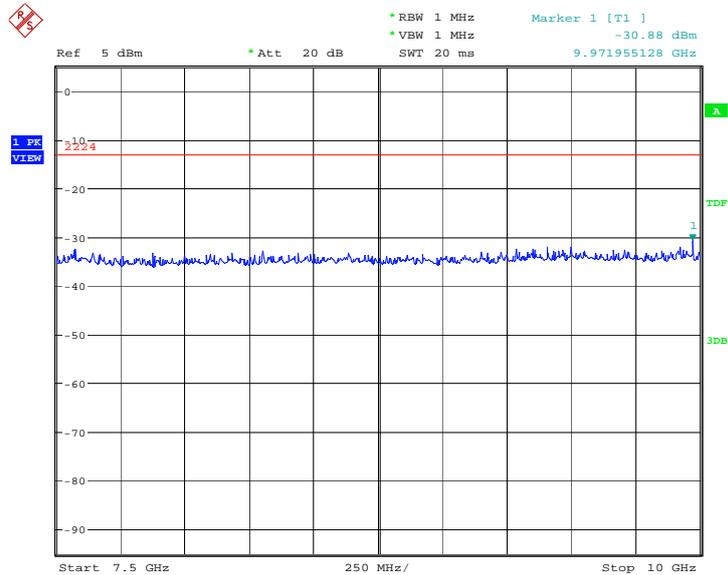

Date: 14.JAN.2014 17:04:32

QPSK: 10GHz –15GHz

Spurious emission limit –13dBm.

```
                                    * RBW  1 MHz      Marker 1 [T1 ]
                                    * VBW  1 MHz              -29.06 dBm
    Ref   5 dBm       * Att  20 dB   SWT  30 ms      12.179487179 GHz
```



```
Start 10 GHz              500 MHz/              Stop 15 GHz
```

Date: 14.JAN.2014 17:04:40

QPSK: 15GHz –20GHz

Spurious emission limit –13dBm.

```
                                    * RBW  1 MHz      Marker 1 [T1 ]
                                    * VBW  1 MHz              -28.21 dBm
    Ref   5 dBm       * Att  20 dB   SWT  30 ms      19.511217949 GHz
```



```
Start 15 GHz              500 MHz/              Stop 20 GHz
```
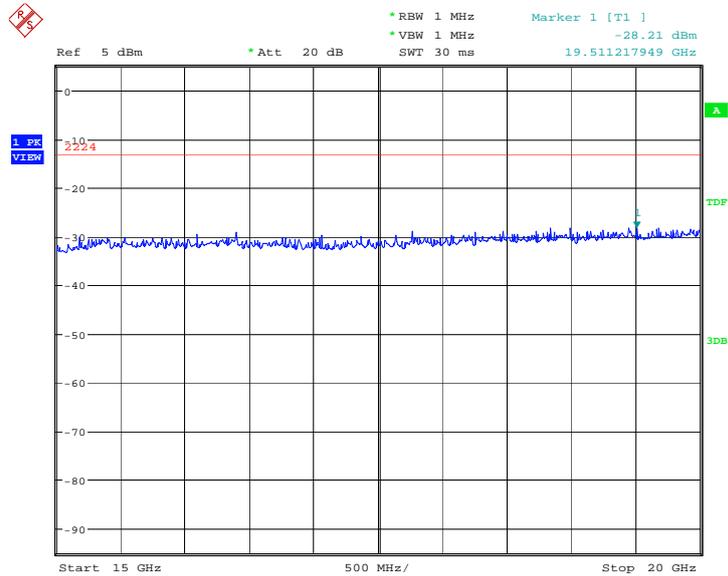
Date: 14.JAN.2014 17:04:48

QPSK: 20GHz –26GHz

Spurious emission limit –13dBm.

```
                                    * RBW 1 MHz        Marker 1 [T1 ]
                                    * VBW 1 MHz              -22.93 dBm
  Ref  5 dBm          * Att  20 dB   SWT 35 ms        26.000000000 GHz
```



```
Start 20 GHz              600 MHz/              Stop 26 GHz
```
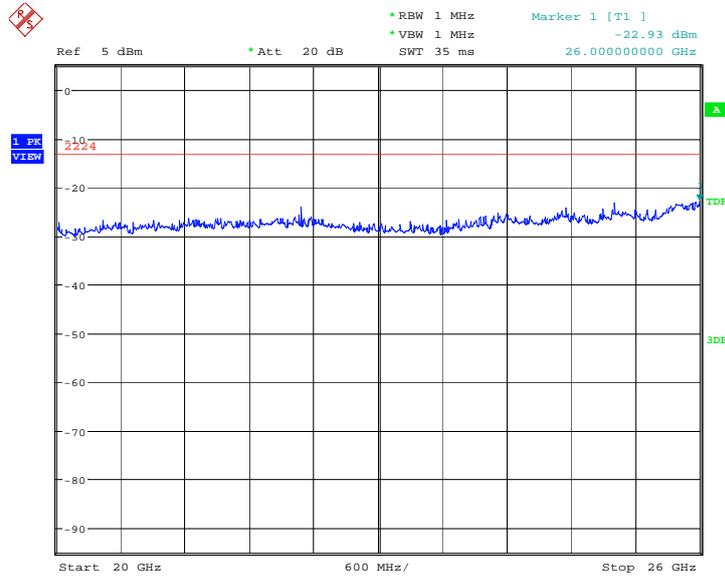
Date: 14.JAN.2014 17:04:56

16QAM: 30MHz – 1GHz

Spurious emission limit –13dBm.

```
                                    * RBW 1 MHz        Marker 1 [T1 ]
                                    * VBW 1 MHz              -31.46 dBm
  Ref  5 dBm          * Att  20 dB   SWT 2.5 ms      221.201923077 MHz
```



```
Start 30 MHz              97 MHz/               Stop 1 GHz
```
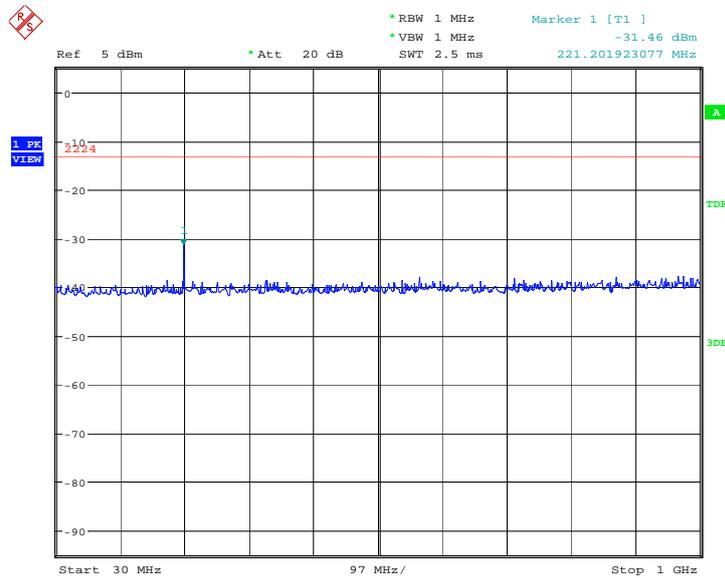
Date: 14.JAN.2014 17:06:05

16QAM: 1GHz – 2.5GHz

Spurious emission limit –13dBm.
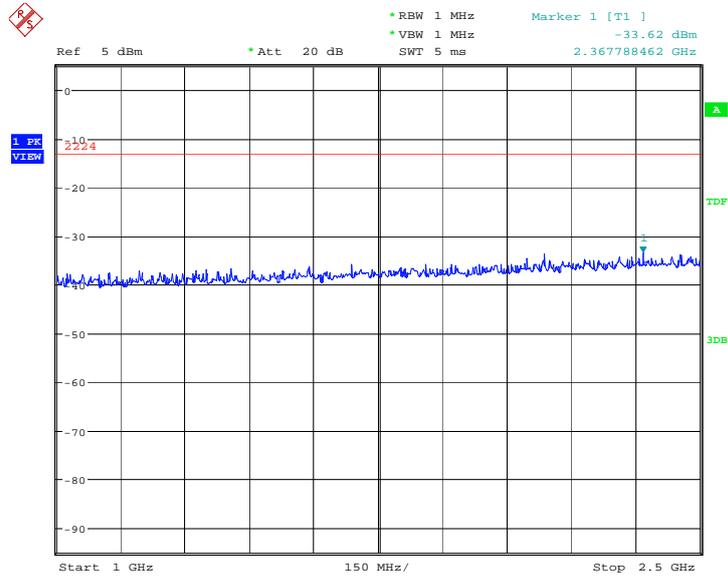
Date: 14.JAN.2014 17:06:13

16QAM: 2.5GHz – 7.5GHz

Spurious emission limit –13dBm.
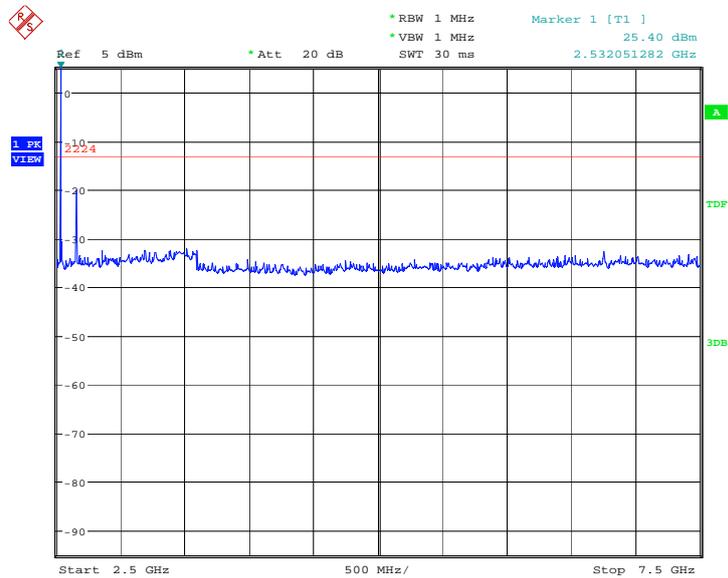
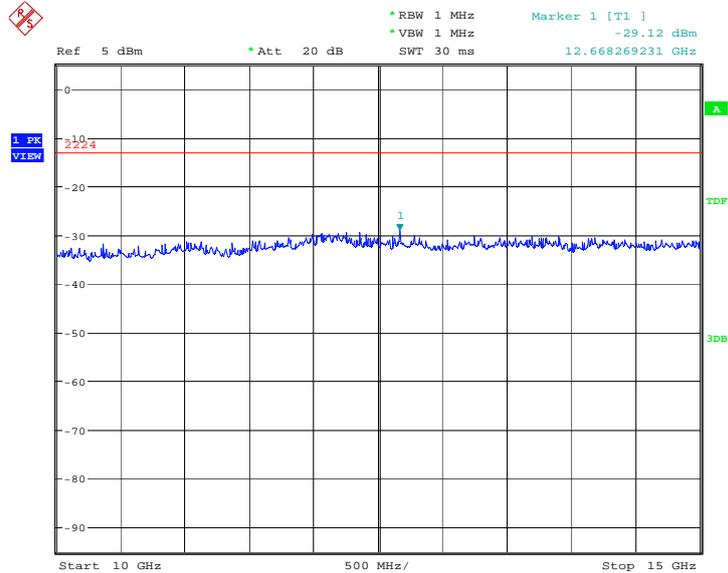Date: 14.JAN.2014 17:06:21

16QAM: 7.5GHz –10GHz

Spurious emission limit –13dBm.
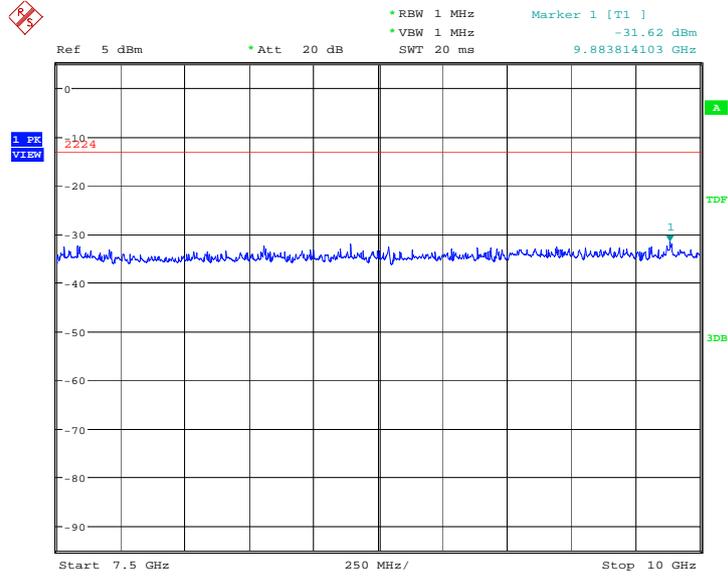
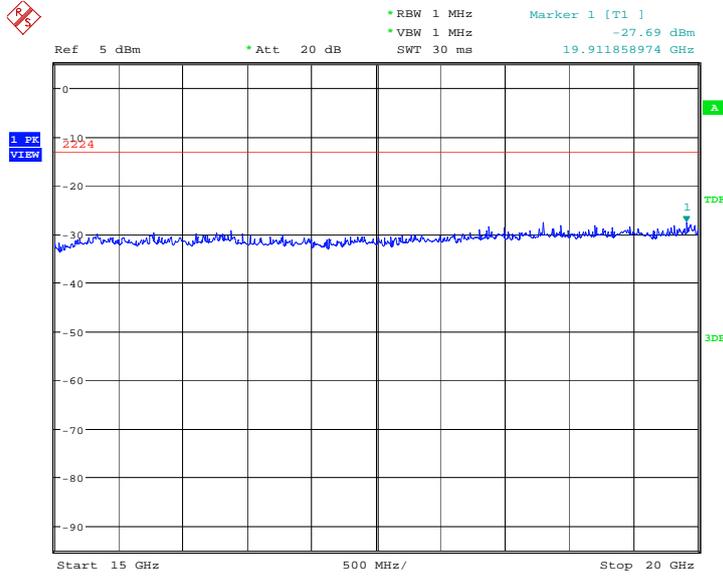Date: 14.JAN.2014 17:06:29

16QAM: 10GHz –15GHz

Spurious emission limit –13dBm.

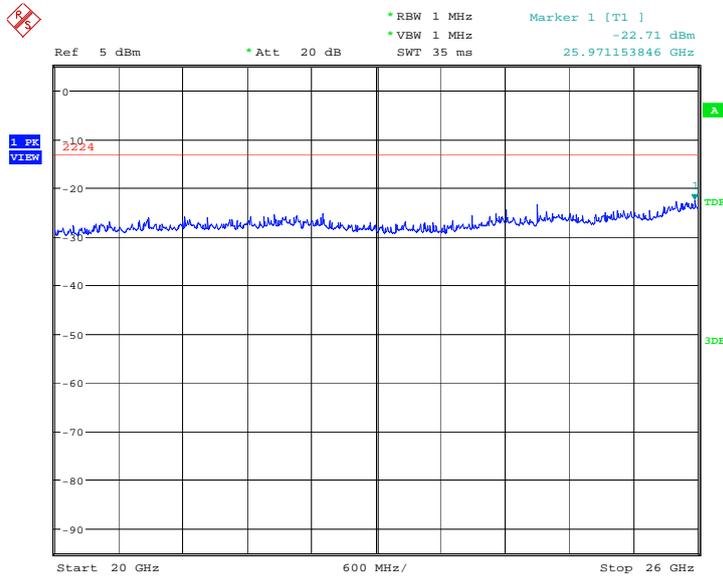Date: 14.JAN.2014 17:06:37

16QAM: 15GHz –20GHz

Spurious emission limit –13dBm.

Date: 14.JAN.2014 17:06:45
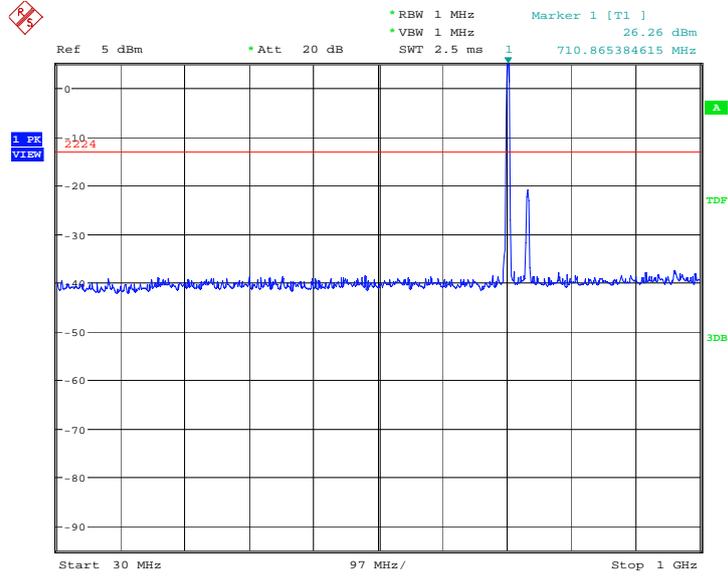
16QAM: 20GHz –26GHz

Spurious emission limit –13dBm.

Date: 14.JAN.2014 17:06:53
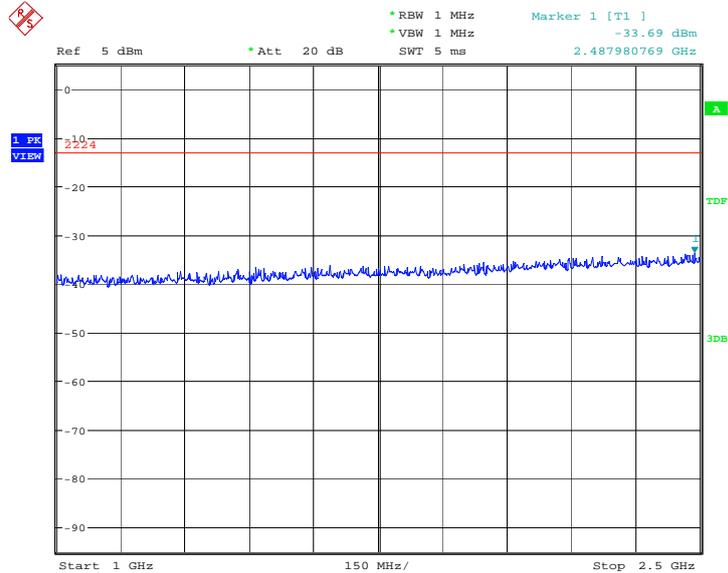
LTE band 17, 5MHz bandwidth

QPSK: 30MHz – 1GHz

Spurious emission limit –13dBm.

```
                                    * RBW  1 MHz        Marker 1 [T1 ]
                                    * VBW  1 MHz               26.26 dBm
     Ref   5 dBm      * Att   20 dB   SWT  2.5 ms    1    710.865384615  MHz
```

Date: 15.JAN.2014 07:59:06

QPSK: 1GHz – 2.5GHz

Spurious emission limit –13dBm.

```
                                    * RBW  1 MHz        Marker 1 [T1 ]
                                    * VBW  1 MHz              -33.69 dBm
     Ref   5 dBm      * Att   20 dB   SWT  5 ms           2.487980769 GHz
```
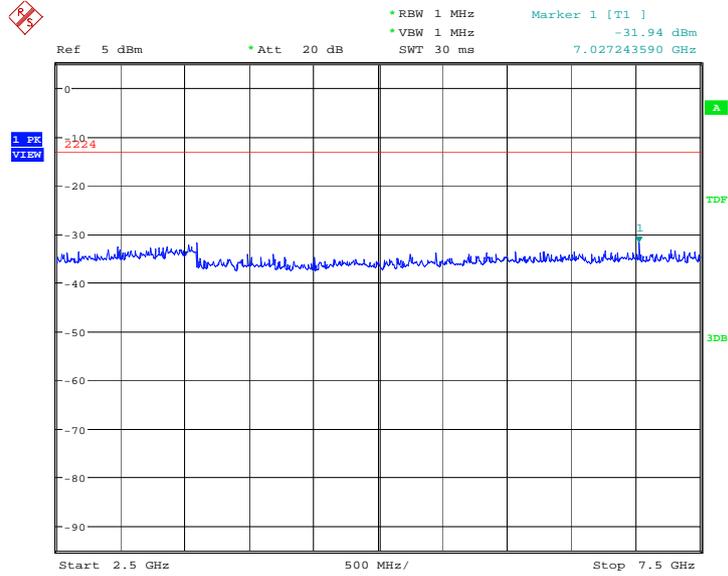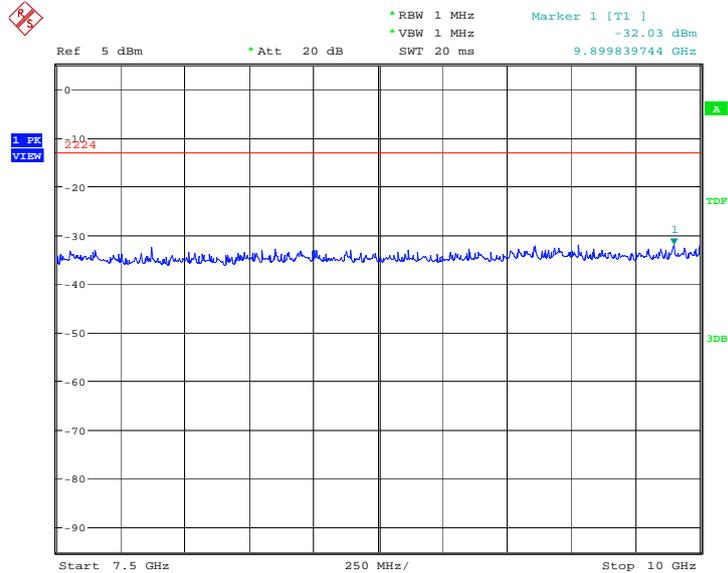
Date: 15.JAN.2014 07:59:14

QPSK: 2.5GHz – 7.5GHz

Spurious emission limit –13dBm.
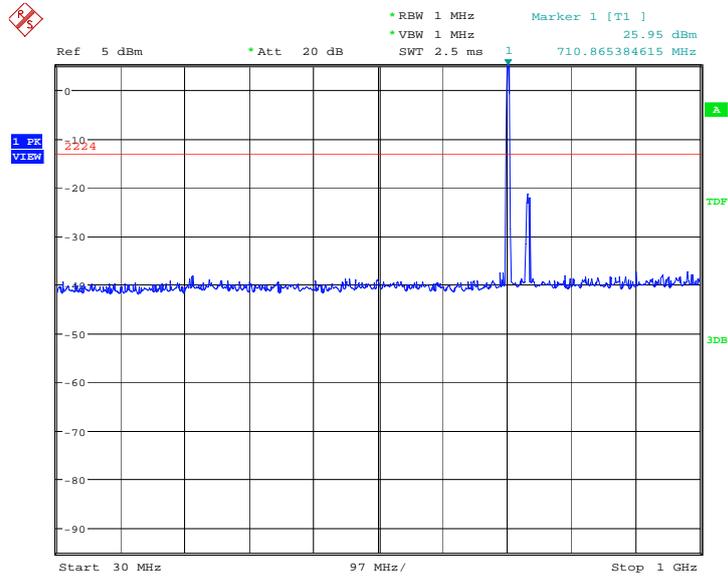

Date: 15.JAN.2014 07:59:22

QPSK: 7.5GHz –10GHz

Spurious emission limit –13dBm.
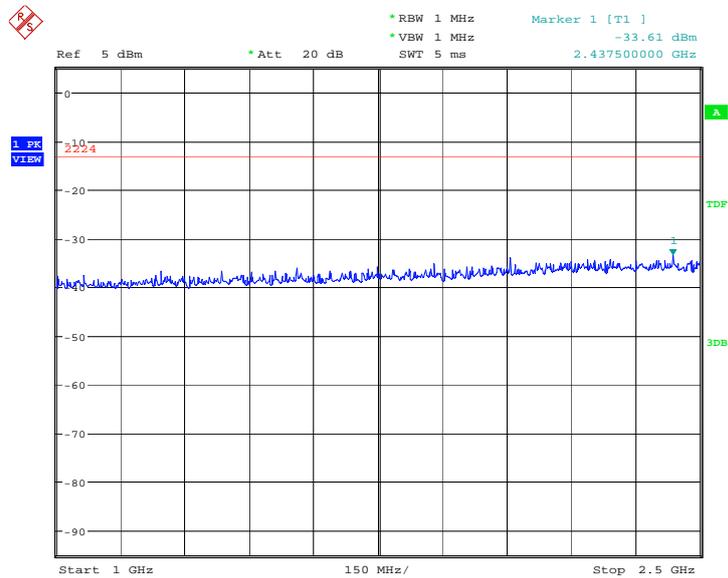

Date: 15.JAN.2014 07:59:30

16QAM: 30MHz – 1GHz

Spurious emission limit –13dBm.
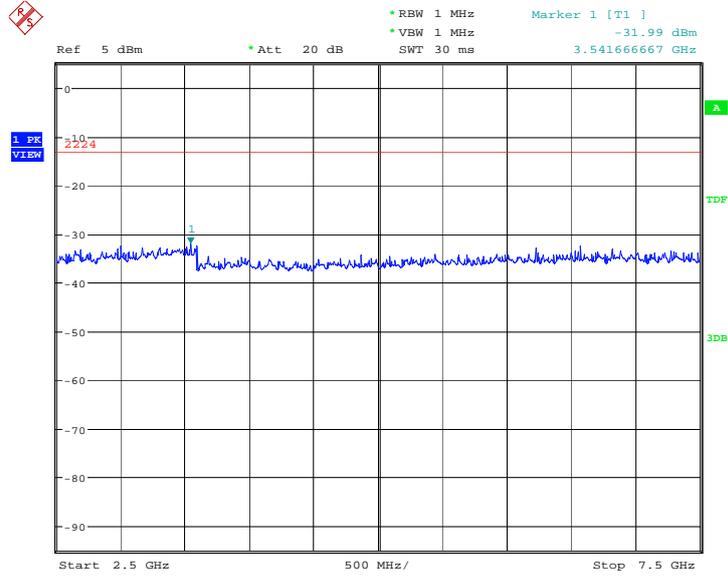

Date: 15.JAN.2014 08:00:15

16QAM: 1GHz – 2.5GHz

Spurious emission limit –13dBm.
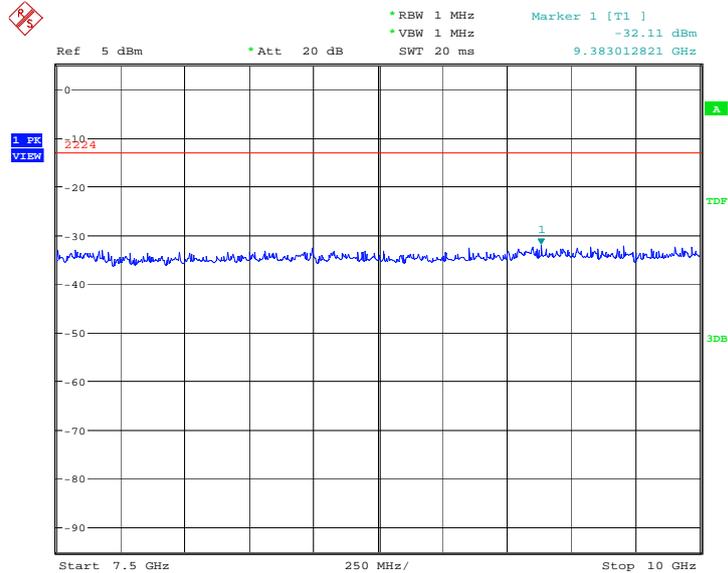

Date: 15.JAN.2014 08:00:23

16QAM: 2.5GHz – 7.5GHz

Spurious emission limit –13dBm.

```
                                    * RBW 1 MHz      Marker 1 [T1 ]
                                    * VBW 1 MHz              -31.99 dBm
          Ref  5 dBm      * Att  20 dB    SWT 30 ms         3.541666667 GHz
```

Date: 15.JAN.2014 08:00:31

16QAM: 7.5GHz –10GHz

Spurious emission limit –13dBm.

```
                                    * RBW 1 MHz      Marker 1 [T1 ]
                                    * VBW 1 MHz              -32.11 dBm
          Ref  5 dBm      * Att  20 dB    SWT 20 ms         9.383012821 GHz
```

Date: 15.JAN.2014 08:00:39

A.9   RECEIVER RADIATION EMISSION

Reference

FCC: CFR Part 2.1053, 15.109

IC: RSS-133 Issue 6, Section 6.6. RSS-139 Issue 2, Section 6.6. RSS-199 Issue 2, Section 4.6.

A.9.1 Method of Measurement

The measurement procedure in ANSI C63.4-2009 is used. The EUT is placed on an 80cm height non-conductive table locating on the center of turntable. From 30MHz-1GHz, the measurement distance is 10 m. For frequency range above 1GHz, the measurement distance is 3 m.

The EUT is measured with travel charger and the operating mode is idle without CMU200's signaling.
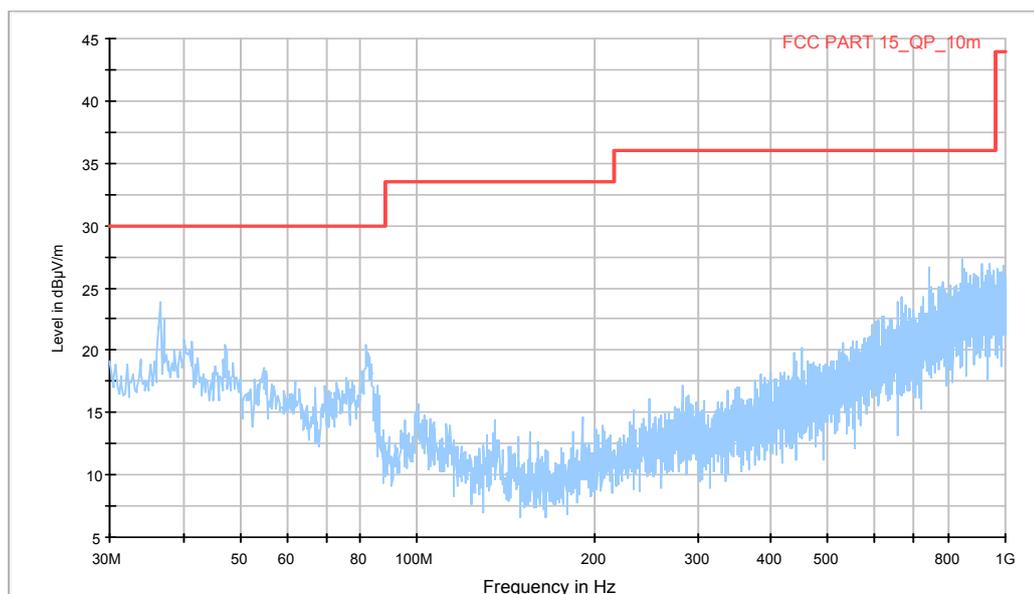
A.9.2 Measurement Limit

Limit from RSS-Gen

Frequency range (MHz)	Field strength limit (µV/m)		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

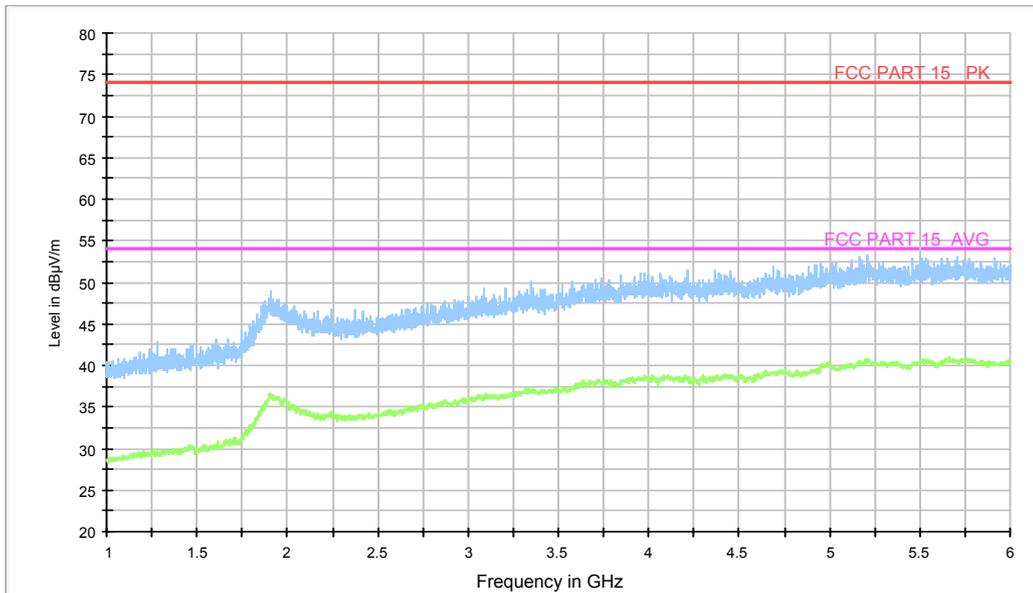### A. 9.3 Measurement results

Normal RE_30M-1GHz_10m

IF bandwidth: 120 kHz
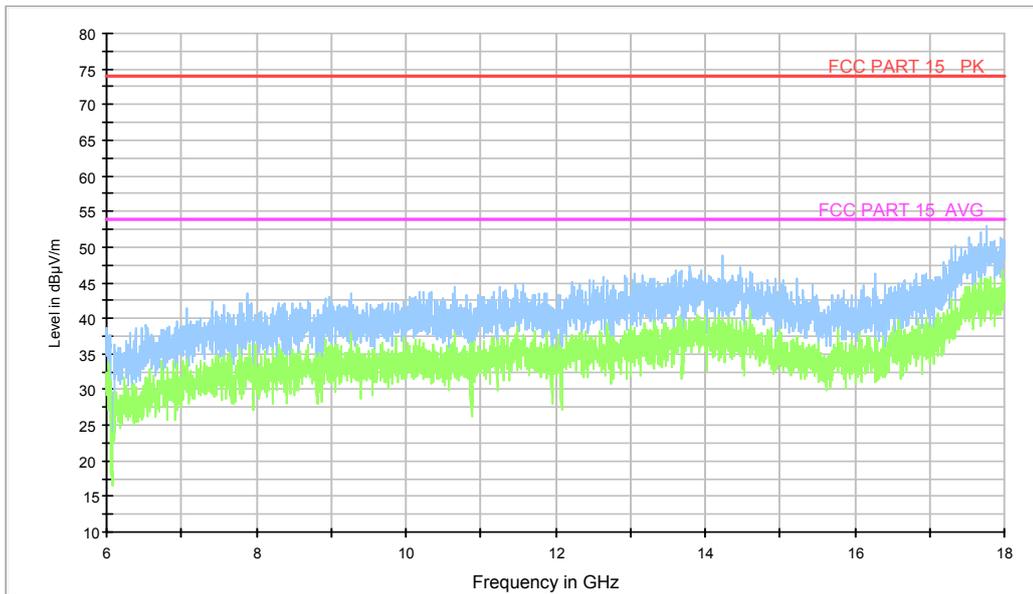
Idle Mode: 30MHz-1GHz

Normal RE_1G-6GHz

RBW 1MHz, VBW 3MHz

Idle Mode: 1GHz-6GHz

Normal RE_6G-18GHz

RBW 1MHz, VBW 3MHz

Idle Mode: 4GHz-18GHz

ANNEX B: TEST LAYOUT

No Display.

Pic.1 Radiated spurious emission

No Display.

Pic.2 Conducted emission

ANNEX C: EUT photograph

No Display.

Mobile Phone

No Display.

Mobile Phone

No Display.

Mobile Phone

No Display.

Mobile Phone

No Display.

Mobile Phone

No Display.

Mobile Phone

No Display.

Mobile Phone Disassembly and Inbuilt Battery

No Display.

Mobile Phone Disassembly and Inbuilt Battery

No Display.

Mobile Phone Disassembly and Inbuilt Battery

No display.

Mobile Phone Disassembly

No Display.

Mobile Phone Disassembly

No Display.

Mobile Phone Disassembly

No Display.

Travel Charger

No Display.

Label of Travel Charger

No Display.

USB Cable

END OF REPORT