

FCC RF Test Report

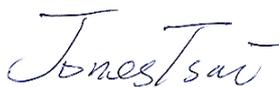
APPLICANT : ZTE CORPORATION
EQUIPMENT : LTE USB Modem
BRAND NAME : ZTE
MODEL NAME : MF823L
MARKETING NAME : MF823L LTE USB Modem
FCC ID : SRQ-MF823L
STANDARD : 47 CFR Part 2, 27(M)
CLASSIFICATION : PCS Licensed Transmitter (PCB)

The product was received on Mar. 17, 2014 and testing was completed on Mar. 31, 2014. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.



Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.



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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	Reporting Only	PASS	-
3.2	§27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 7)	EIRP < 2Watt	PASS	-
3.3	§2.1049 §27.53(l)(6)	99% Occupied Bandwidth and 26dB Bandwidth	Reporting Only	PASS	-
3.4	§2.1033 §27.53(l)(4)	Conducted Band Edge Measurement (Band 7)	< 5.5MHz: -13 dBm ≥5.5MHz: -25 dBm	PASS	-
3.5	§2.1051 §27.53(l)(4)	Conducted Spurious Emission (Band 7)	< 55+10log ₁₀ (P[Watts])	PASS	-
3.6	§2.1053 §27.53(l)(4)	Radiated Spurious Emission (Band 7)	< 55+10log ₁₀ (P[Watts])	PASS	Under limit 23.10 dB at 5102.000 MHz
3.7	§2.1055 §27.54	Frequency Stability Temperature & Voltage	< 2.5 ppm	PASS	

1 General Description

1.1 Applicant

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.2 Manufacturer

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	LTE USB Modem
Brand Name	ZTE
Model Name	MF823L
Marketing Name	MF823L LTE USB Modem
FCC ID	SRQ-MF823L
EUT supports Radios application	GPRS/EGPRS/WCDMA/HSPA/HSPA+/DC-HSDPA/LTE
HW Version	xm6B
SW Version	EN_ZTE_MF823LV1.0.0B03
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz
Rx Frequency	LTE Band 7 : 2622.5 MHz ~ 2687.5 MHz
Bandwidth	5MHz/10MHz/15MHz/20MHz
Maximum Output Power to Antenna	LTE Band 7 : 21.78 dBm
Antenna Type	PCB Antenna
Type of Modulation	QPSK / 16QAM



1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Maximum EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	BW	Maximum EIRP (W)	Frequency Tolerance (ppm)	Emission Designator
Part 27M	LTE Band 7	QPSK	5MHz	0.13	0.005	4M52G7D
Part 27M	LTE Band 7	16QAM	5MHz	0.11	0.005	4M52D7W
Part 27M	LTE Band 7	QPSK	10MHz	0.13	0.004	9M16G7D
Part 27M	LTE Band 7	16QAM	10MHz	0.12	0.005	9M12D7W
Part 27M	LTE Band 7	QPSK	15MHz	0.11	0.004	13M5G7D
Part 27M	LTE Band 7	16QAM	15MHz	0.10	0.004	13M6D7W
Part 27M	LTE Band 7	QPSK	20MHz	0.12	0.005	18M7G7D
Part 27M	LTE Band 7	16QAM	20MHz	0.11	0.005	18M6D7W



1.7 Testing Site

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.			
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
Test Site No.	Sporton Site No.			FCC Registration No.
	TH01-KS	03CH01-KS	OTA01-KS	149928

1.8 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2, 27(M)
- ♦ ANSI / TIA / EIA-603-C-2004
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v02r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

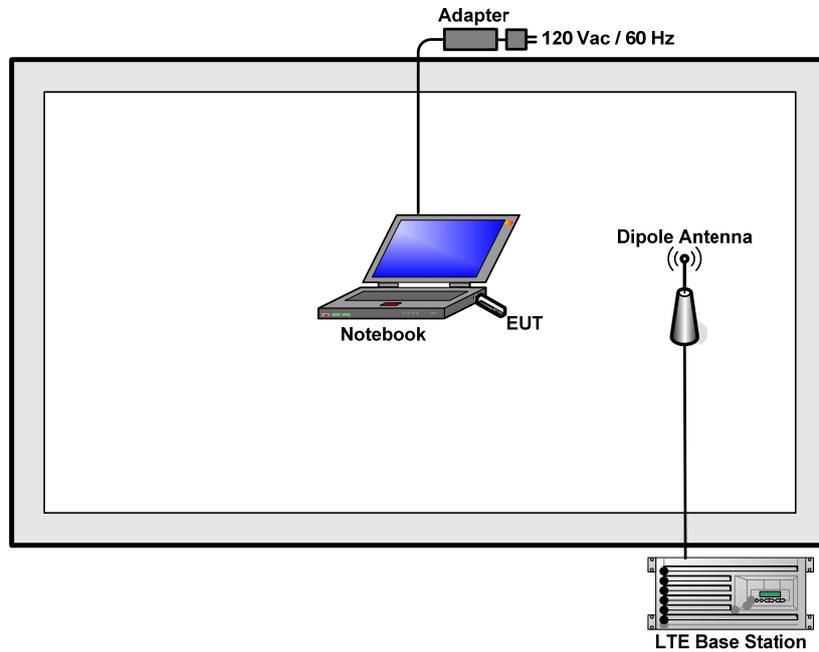
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.

Frequency range investigated for radiated emission: 30MHz to 10th harmonic.

Test Modes			
Band		Radiated TCs	Conducted TCs
LTE Band 7	BW 5MHz	<ul style="list-style-type: none"> ■ LTE (RB Size 1, RB Offset 0) QPSK Link 	<ul style="list-style-type: none"> ■ LTE (RB Size 1) Link ■ LTE (RB Size 12) Link ■ LTE (RB Size 25) Link
	BW 10MHz	<ul style="list-style-type: none"> ■ LTE (RB Size 1, RB Offset 0) QPSK Link 	<ul style="list-style-type: none"> ■ LTE (RB Size 1) Link ■ LTE (RB Size 25) Link ■ LTE (RB Size 50) Link
	BW 15MHz	<ul style="list-style-type: none"> ■ LTE (RB Size 1, RB Offset 0) QPSK Link 	<ul style="list-style-type: none"> ■ LTE (RB Size 1) Link ■ LTE (RB Size 36) Link ■ LTE (RB Size 75) Link
	BW 20MHz	<ul style="list-style-type: none"> ■ LTE (RB Size 1, RB Offset 0) QPSK Link 	<ul style="list-style-type: none"> ■ LTE (RB Size 1) Link ■ LTE (RB Size 50) Link ■ LTE (RB Size 100) Link

Note: The spurious emission was performed by conducted and radiated methods. From conducted spurious emission measurement (QPSK and 16QAM), the modulation related spurious emission out of the band was not identified and the radiated spurious emissions results on 16QAM were not worse than QSPK mode during exploratory test.

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GWINSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 6 dB.

Offset(dB) = RF cable loss(dB) = 6 (dB)

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

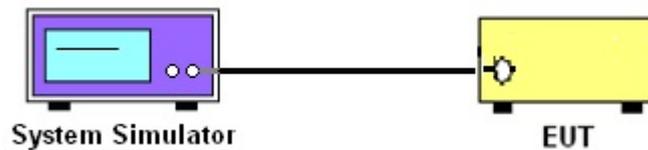
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.

3.1.4 Test Setup





3.1.5 Test Result of Conducted Output Power

<LTE Band 7 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				20850	21100	21350
Frequency (MHz)				2510	2535	2560
20	QPSK	1	0	21.57	21.45	21.78
20	QPSK	1	49	21.50	21.41	21.69
20	QPSK	1	99	21.40	21.44	21.71
20	QPSK	50	0	20.37	20.35	20.51
20	QPSK	50	24	20.27	20.31	20.49
20	QPSK	50	49	20.32	20.34	20.50
20	QPSK	100	0	20.42	20.38	20.50
20	16QAM	1	0	20.72	20.74	20.90
20	16QAM	1	49	20.67	20.69	20.86
20	16QAM	1	99	20.61	20.68	20.76
20	16QAM	50	0	19.45	19.43	19.42
20	16QAM	50	24	19.41	19.36	19.47
20	16QAM	50	49	19.43	19.40	19.51
20	16QAM	100	0	19.46	19.46	19.63
Channel				20825	21100	21375
Frequency (MHz)				2507.5	2535	2562.5
15	QPSK	1	0	21.67	21.53	21.75
15	QPSK	1	37	21.55	21.52	21.71
15	QPSK	1	74	21.54	21.49	21.74
15	QPSK	36	0	20.29	20.36	20.53
15	QPSK	36	18	20.32	20.38	20.54
15	QPSK	36	37	20.30	20.44	20.60
15	QPSK	75	0	20.26	20.36	20.49
15	16QAM	1	0	20.36	20.45	20.58
15	16QAM	1	37	20.21	20.22	20.46
15	16QAM	1	74	20.33	20.35	20.51
15	16QAM	36	0	19.61	19.46	19.47
15	16QAM	36	18	19.52	19.44	19.56
15	16QAM	36	37	19.53	19.43	19.61
15	16QAM	75	0	19.38	19.35	19.60



BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				20800	21100	21400
Frequency (MHz)				2505	2535	2565
10	QPSK	1	0	21.60	21.52	21.46
10	QPSK	1	24	21.48	21.30	21.45
10	QPSK	1	49	21.51	21.45	21.41
10	QPSK	25	0	20.32	20.33	20.48
10	QPSK	25	12	20.46	20.47	20.56
10	QPSK	25	24	20.37	20.48	20.51
10	QPSK	50	0	20.33	20.34	20.39
10	16QAM	1	0	20.61	20.50	20.75
10	16QAM	1	24	20.57	20.49	20.73
10	16QAM	1	49	20.44	20.42	20.67
10	16QAM	25	0	19.42	19.35	19.58
10	16QAM	25	12	19.58	19.35	19.68
10	16QAM	25	24	19.50	19.37	19.53
10	16QAM	50	0	19.38	19.27	19.44
Channel				20775	21100	21425
Frequency (MHz)				2502.5	2535	2567.5
5	QPSK	1	0	21.66	21.54	21.63
5	QPSK	1	12	21.65	21.48	21.53
5	QPSK	1	24	21.63	21.45	21.44
5	QPSK	12	0	20.53	20.49	20.57
5	QPSK	12	6	20.58	20.59	20.56
5	QPSK	12	11	20.50	20.54	20.65
5	QPSK	25	0	20.39	20.44	20.61
5	16QAM	1	0	20.31	20.25	20.60
5	16QAM	1	12	20.30	20.23	20.59
5	16QAM	1	24	20.28	20.20	20.48
5	16QAM	12	0	19.65	19.49	19.82
5	16QAM	12	6	19.87	19.51	19.72
5	16QAM	12	11	19.59	19.52	19.67
5	16QAM	25	0	19.43	19.34	19.47

Note: Maximum average power for LTE.

3.2 Equivalent Isotropic Radiated Power Measurement

3.2.1 Description of the EIRP Measurement

Equivalent isotropic radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-C-2004, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r01. Mobile and portable (hand-held) stations operating are limited to average EIRP of 2 watts with LTE band 7.

3.2.2 Measuring Instruments

Measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The EUT was placed on a turntable with 1.5 meter height in a fully anechoic chamber.
2. The EUT was set at 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer which used a channel power option across EUT's signal bandwidth per section 4.0 of KDB 971168 D01.
4. The table was rotated 360 degrees to determine the position of the highest radiated power.
5. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
6. Taking the record of maximum ERP/EIRP.
7. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
8. The conducted power at the terminal of the dipole antenna is measured.
9. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
10. $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$

P_s (dBm) : Input power to substitution antenna.

G_s (dBi or dBd) : Substitution antenna Gain.

$E_t = R_t + AF$

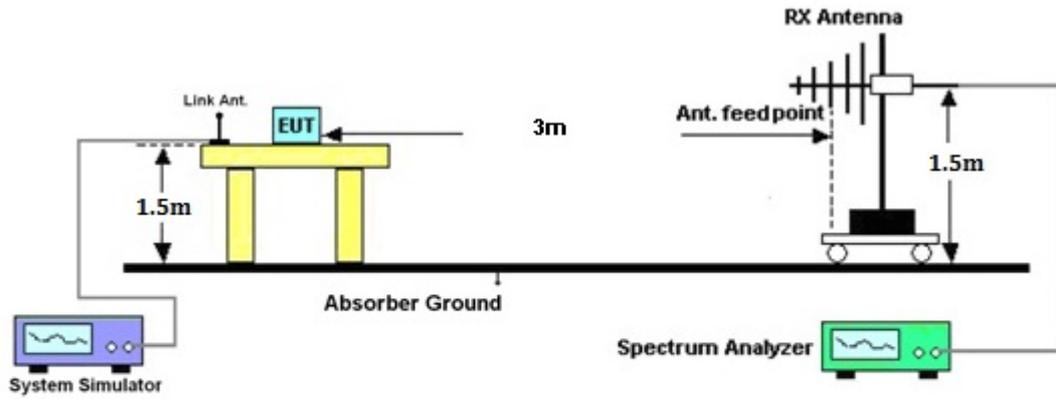
$E_s = R_s + AF$

AF (dB/m) : Receive antenna factor

R_t : The highest received signal in spectrum analyzer for EUT.

R_s : The highest received signal in spectrum analyzer for substitution antenna.

3.2.4 Test Setup



3.2.5 Test Result of EIRP

LTE Band 7 Radiated Power EIRP								
LTE Band	Channel BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	EIRP (dBm)	EIRP (W)	H/V
			RB Size	RB Offset				
7	5	QPSK	1	0	2502.5	16.34	0.04	H
7	5	QPSK	1	0	2535	17.80	0.06	H
7	5	QPSK	1	0	2567.5	16.68	0.05	H
7	5	QPSK	1	0	2502.5	20.05	0.10	V
7	5	QPSK	1	0	2535	21.01	0.13	V
7	5	QPSK	1	0	2567.5	20.53	0.11	V
7	5	16QAM	1	0	2502.5	15.47	0.04	H
7	5	16QAM	1	0	2535	16.30	0.04	H
7	5	16QAM	1	0	2567.5	15.65	0.04	H
7	5	16QAM	1	0	2502.5	19.08	0.08	V
7	5	16QAM	1	0	2535	20.30	0.11	V
7	5	16QAM	1	0	2567.5	19.35	0.09	V
7	10	QPSK	1	0	2505	15.68	0.04	H
7	10	QPSK	1	0	2535	17.49	0.06	H
7	10	QPSK	1	0	2565	17.34	0.05	H
7	10	QPSK	1	0	2505	19.41	0.09	V
7	10	QPSK	1	0	2535	21.16	0.13	V
7	10	QPSK	1	0	2565	21.12	0.13	V
7	10	16QAM	1	0	2505	15.18	0.03	H
7	10	16QAM	1	0	2535	16.65	0.05	H
7	10	16QAM	1	0	2565	16.88	0.05	H
7	10	16QAM	1	0	2505	18.91	0.08	V
7	10	16QAM	1	0	2535	20.19	0.10	V
7	10	16QAM	1	0	2565	20.75	0.12	V



LTE Band 7 Radiated Power EIRP								
LTE Band	Channel BW (MHz)	Modulation	RB Configuration		Freq. (MHz)	EIRP (dBm)	EIRP (W)	H/V
			RB Size	RB Offset				
7	15	QPSK	1	0	2507.5	15.37	0.03	H
7	15	QPSK	1	0	2535	17.24	0.05	H
7	15	QPSK	1	0	2562.5	17.21	0.05	H
7	15	QPSK	1	0	2507.5	19.26	0.08	V
7	15	QPSK	1	0	2535	20.59	0.11	V
7	15	QPSK	1	0	2562.5	20.35	0.11	V
7	15	16QAM	1	0	2507.5	14.18	0.03	H
7	15	16QAM	1	0	2535	16.31	0.04	H
7	15	16QAM	1	0	2562.5	16.40	0.04	H
7	15	16QAM	1	0	2507.5	18.52	0.07	V
7	15	16QAM	1	0	2535	19.78	0.10	V
7	15	16QAM	1	0	2562.5	19.61	0.09	V
7	20	QPSK	1	0	2510	15.35	0.03	H
7	20	QPSK	1	0	2535	17.04	0.05	H
7	20	QPSK	1	0	2560	17.63	0.06	H
7	20	QPSK	1	0	2510	18.81	0.08	V
7	20	QPSK	1	0	2535	20.57	0.11	V
7	20	QPSK	1	0	2560	20.83	0.12	V
7	20	16QAM	1	0	2510	14.92	0.03	H
7	20	16QAM	1	0	2535	16.53	0.04	H
7	20	16QAM	1	0	2560	17.33	0.05	H
7	20	16QAM	1	0	2510	17.95	0.06	V
7	20	16QAM	1	0	2535	19.68	0.09	V
7	20	16QAM	1	0	2560	20.24	0.11	V

3.3 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.3.1 Description of 99% Occupied Bandwidth and 26dB Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26dB occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal 26 dB.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

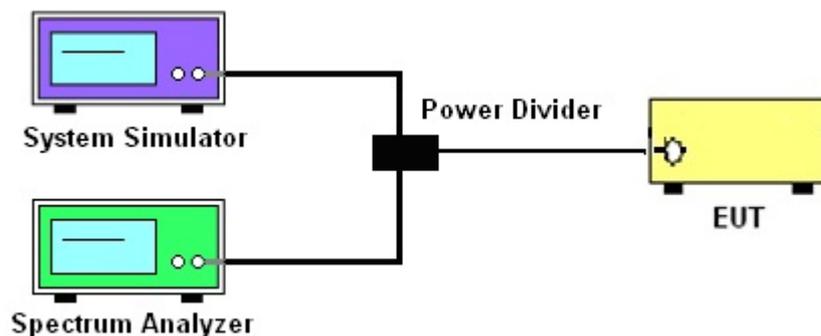
3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF powers with full RB sizes were measured.

3.3.4 Test Setup



3.3.5 Test Result of 99% Occupied Bandwidth and 26dB Bandwidth

Modes	LTE Band 7			
	BW / Mod.	5MHz / QPSK	5MHz / 16QAM	10MHz / QPSK
99% OBW (MHz)	4.5200	4.5200	9.1600	9.1200
26dB BW (MHz)	5.1200	5.0200	10.0400	10.0000
BW / Mod.	15MHz / QPSK	15MHz / 16QAM	20MHz / QPSK	20MHz / 16QAM
99% OBW (MHz)	13.5000	13.5600	18.7200	18.6400
26dB BW (MHz)	14.6400	14.7000	21.1200	21.2800

Note:

The maximum RB configurations of the 99% Occupied Bandwidth and 26dB Bandwidth summary as below:

BW5MHz RB setting : RB Size 25, RB offset 0

BW10MHz RB setting : RB Size 50, RB offset 0

BW15MHz RB setting : RB Size 75, RB offset 0

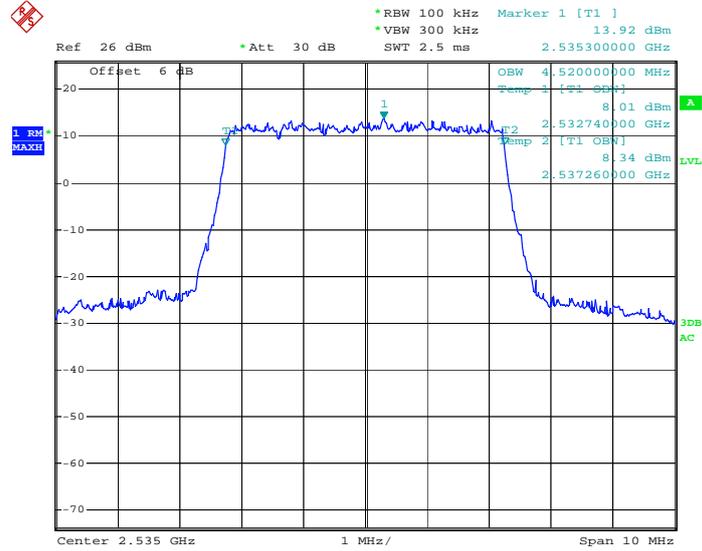
BW20MHz RB setting : RB Size 100, RB offset 0



3.3.6 Test Result (Plots) of Occupied Bandwidth

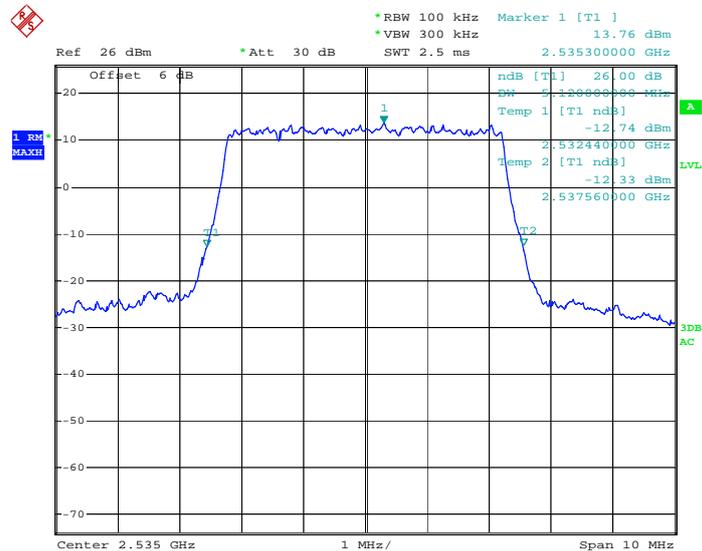
Band :	LTE Band 7	BW / Mod. :	5MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 21100



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26dB Bandwidth Plot on Channel 21100

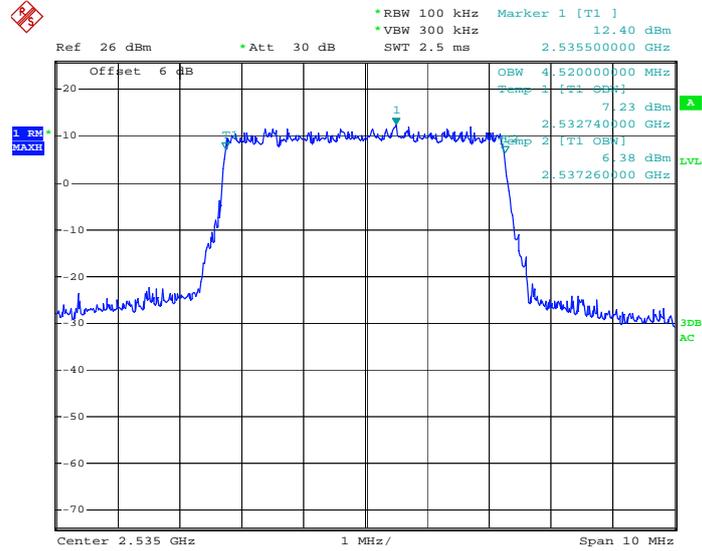


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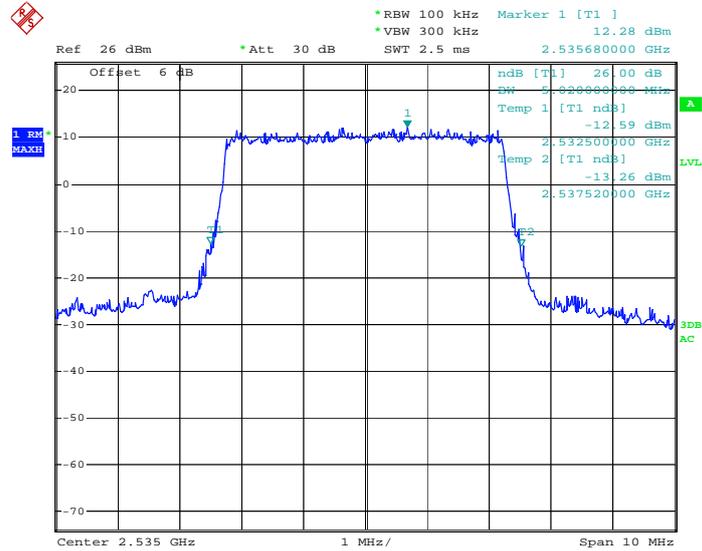
Band :	LTE Band 7	BW / Mod. :	5MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 21100



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26dB Bandwidth Plot on Channel 21100

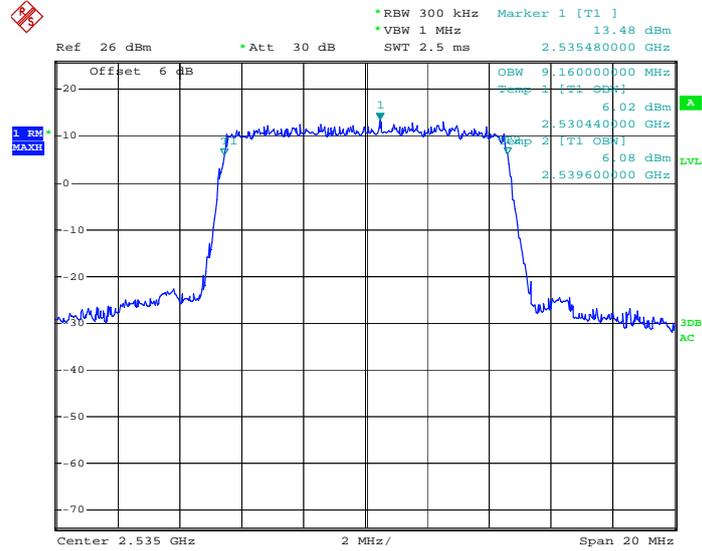


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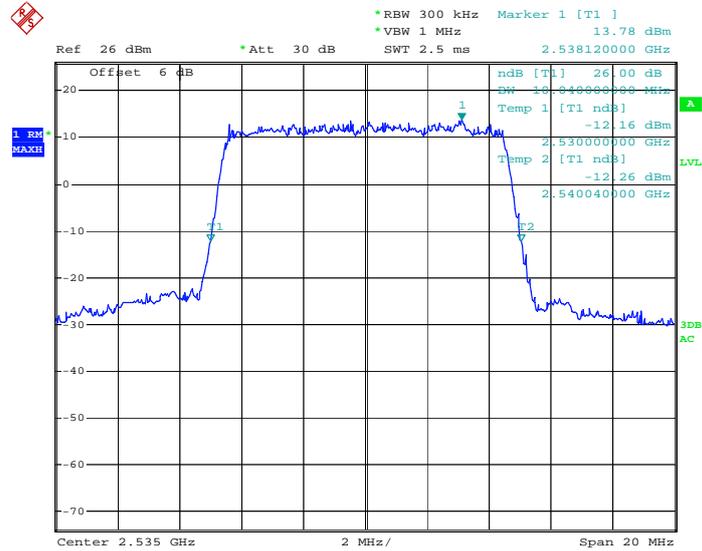
Band :	LTE Band 7	BW / Mod. :	10MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 21100



Date: 27.MAR.2014 02:58:30

26dB Bandwidth Plot on Channel 21100

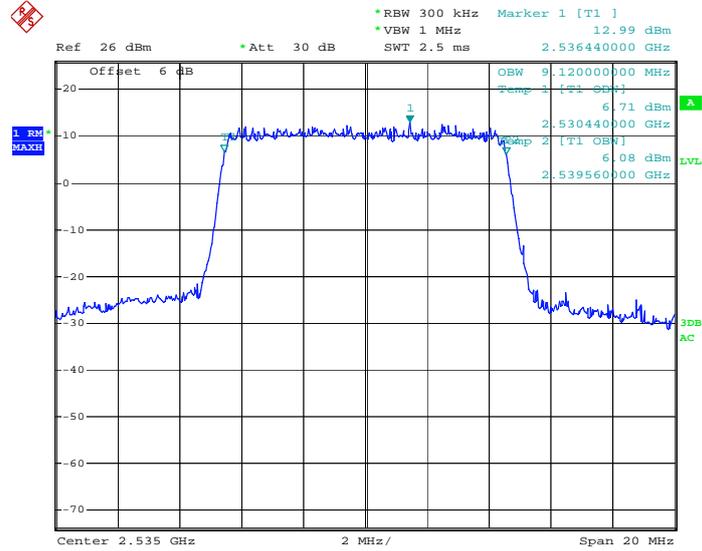


Date: 27.MAR.2014 02:53:50



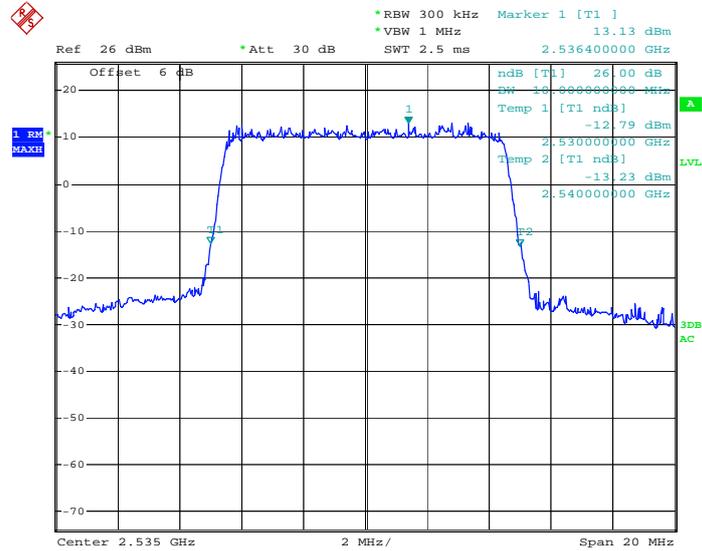
Band :	LTE Band 7	BW / Mod. :	10MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 21100



Date: 27.MAR.2014 02:58:19

26dB Bandwidth Plot on Channel 21100

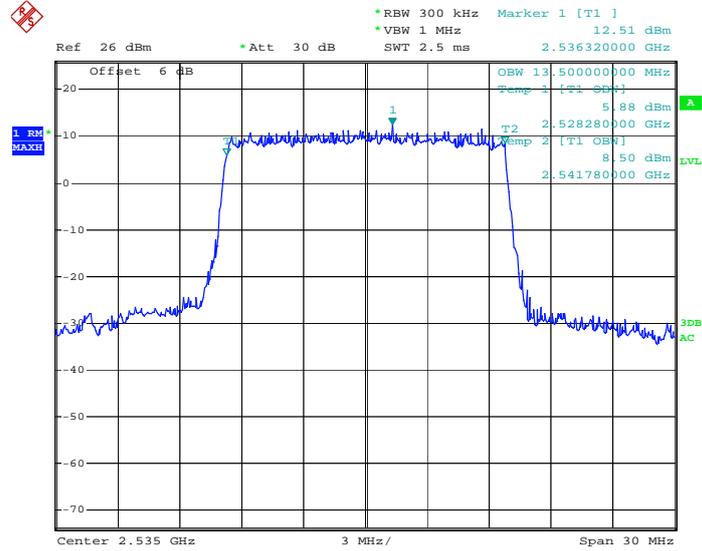


Date: 27.MAR.2014 02:53:21



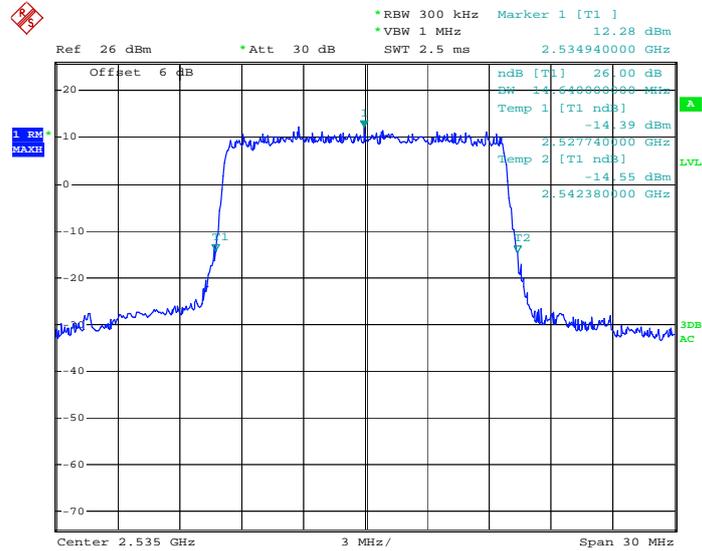
Band :	LTE Band 7	BW / Mod. :	15MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 21100



Date: 27.MAR.2014 02:58:44

26dB Bandwidth Plot on Channel 21100

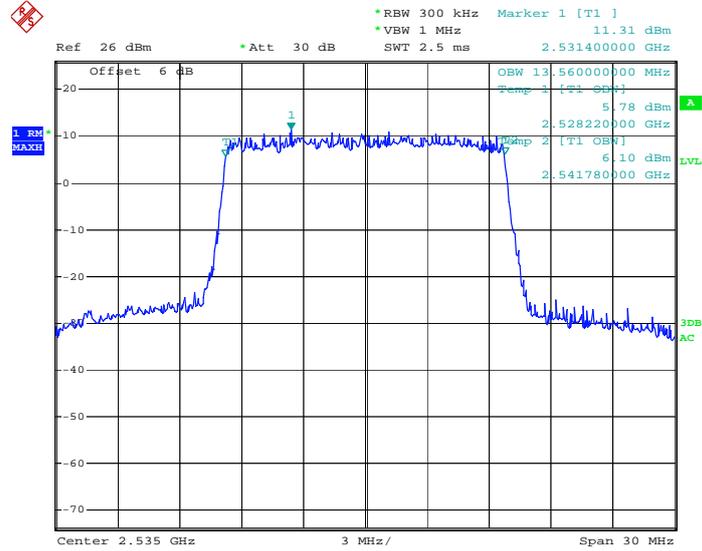


Date: 27.MAR.2014 02:54:15



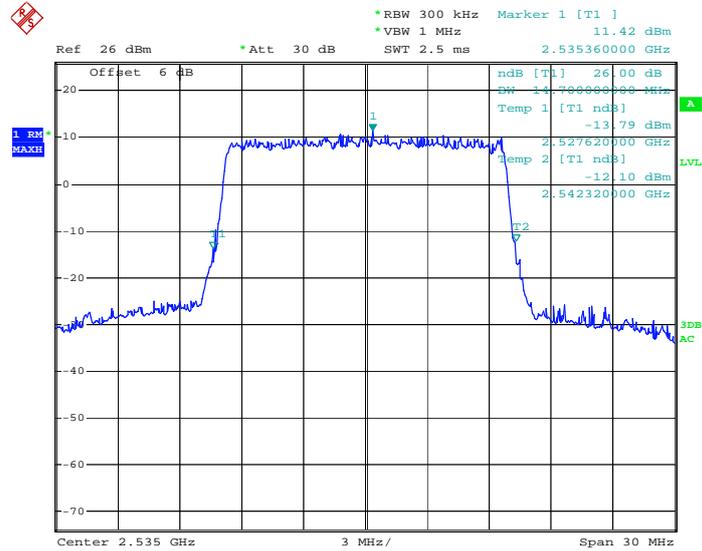
Band :	LTE Band 7	BW / Mod. :	15MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 21100



Date: 27.MAR.2014 02:59:01

26dB Bandwidth Plot on Channel 21100

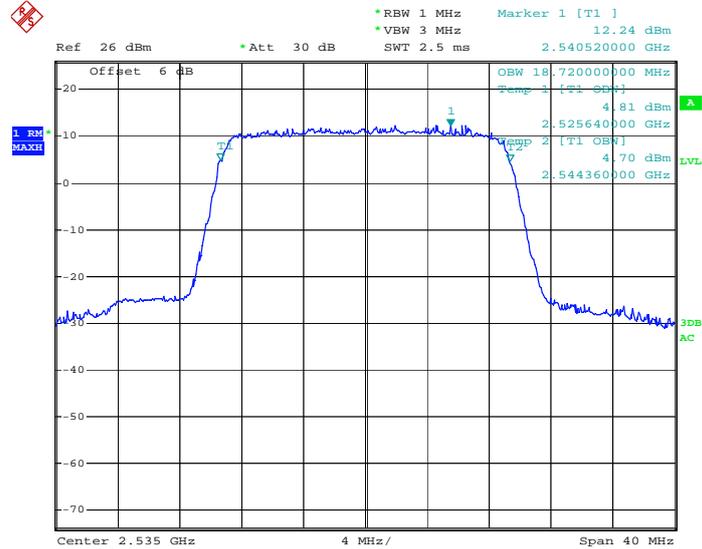


Date: 27.MAR.2014 02:54:35



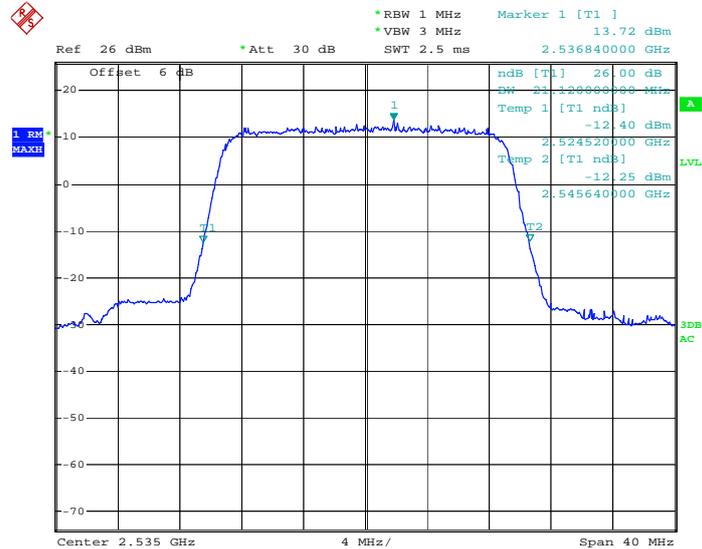
Band :	LTE Band 7	BW / Mod. :	20MHz / QPSK
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99% Occupied Bandwidth Plot on Channel 21100



Date: 27.MAR.2014 03:00:22

26dB Bandwidth Plot on Channel 21100

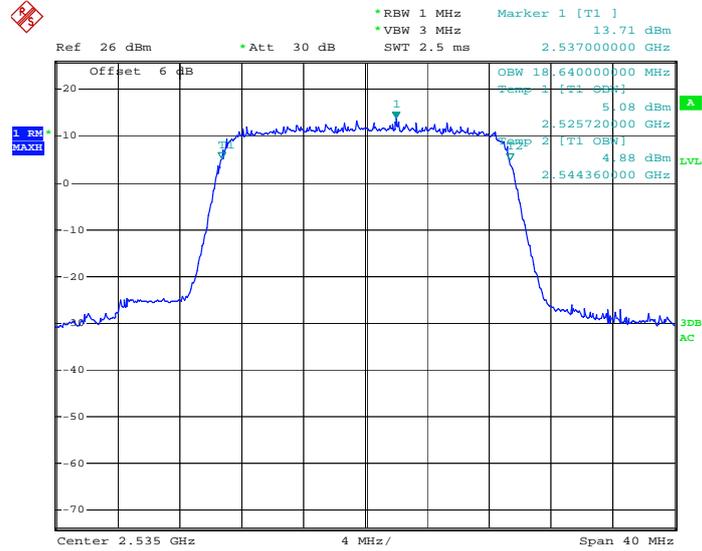


Date: 27.MAR.2014 02:55:41



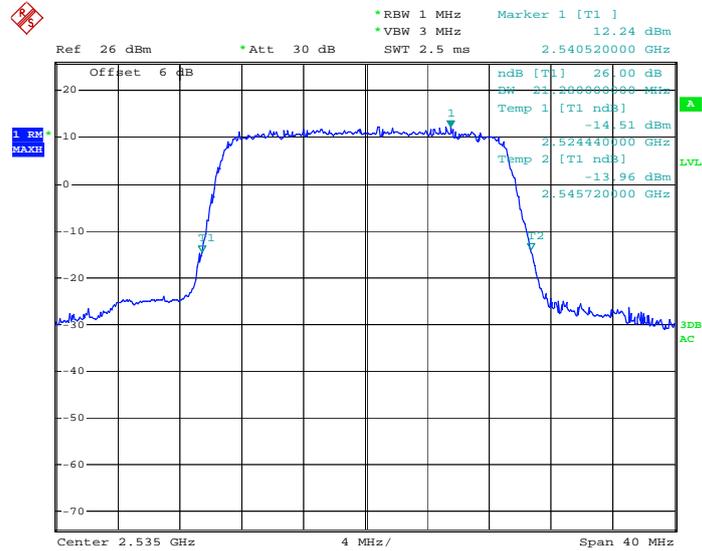
Band :	LTE Band 7	BW / Mod. :	20MHz / 16QAM
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99% Occupied Bandwidth Plot on Channel 21100



Date: 27.MAR.2014 03:00:53

26dB Bandwidth Plot on Channel 21100



Date: 27.MAR.2014 02:55:16

3.4 Conducted Band Edge Measurement

3.4.1 Description of Conducted Band Edge Measurement

27.53(l) (4) For Band 7

The emissions be operated in the 2496-2690 MHz band, the attenuation factor of transmitter Power (P) shall be not less than $43 + 10 \log (P)$ dB at the channel edge and $55 + 10 \log (P)$ dB at 5.5 MHz from the channel edges.

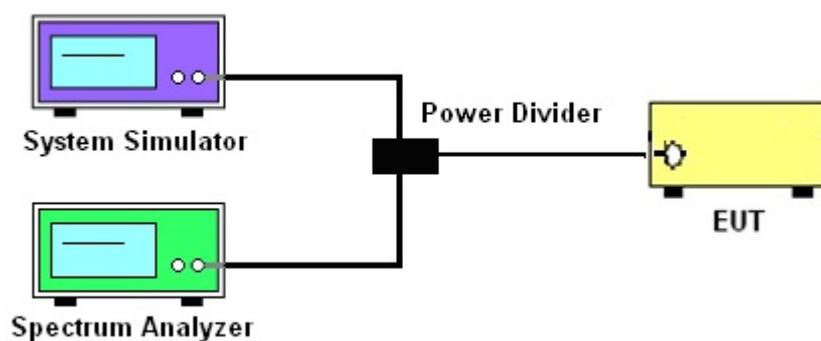
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Setting $RBW \geq 1\%$ EBW, and measuring bandwidth = 1MHz.
3. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.4.4 Test Setup

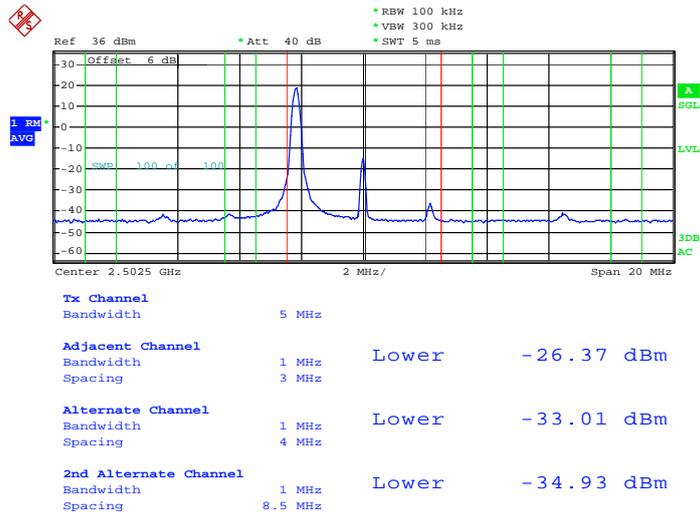




3.4.5 Test Result (Plots) of Conducted Band Edge

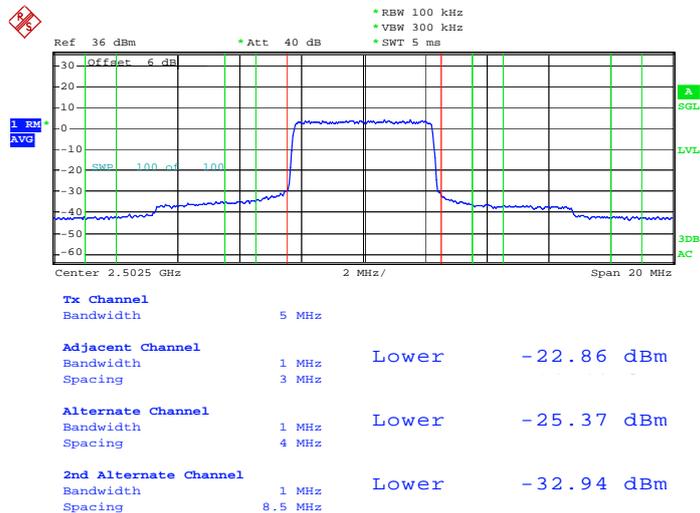
Band :	LTE Band 7	Band Width :	5MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 27.MAR.2014 03:50:38

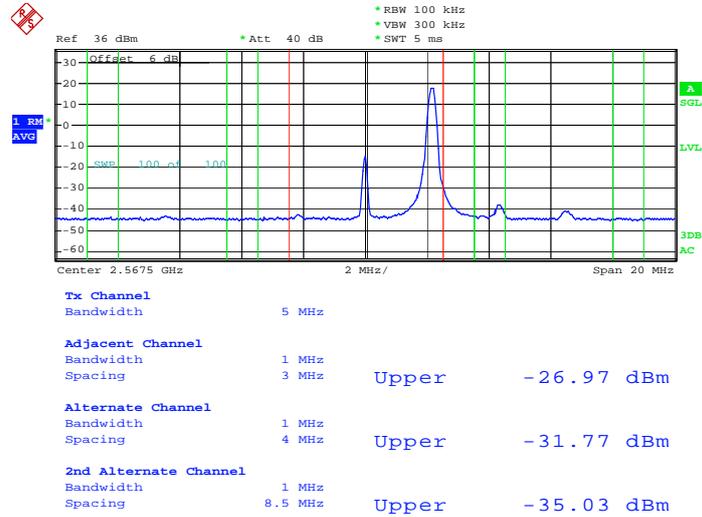
Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0



Date: 27.MAR.2014 03:50:58

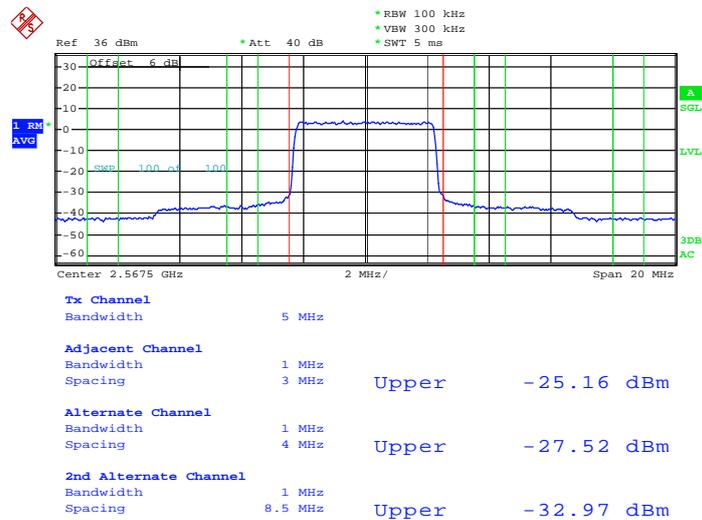


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24



Date: 27.MAR.2014 04:04:41

Higher Band Edge Plot for QPSK-RB Size 25, RB Offset 0

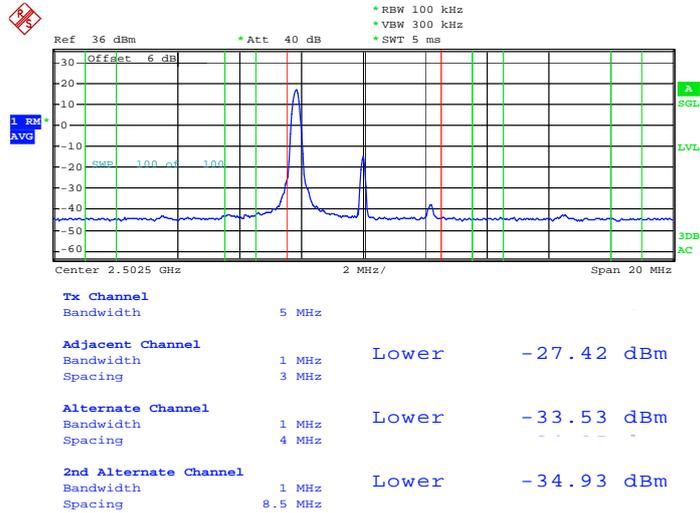


Date: 27.MAR.2014 04:06:51



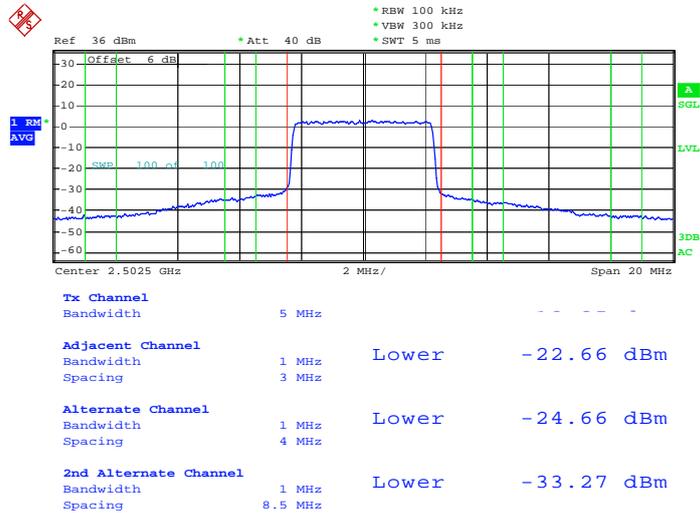
Band :	LTE Band 7	Band Width :	5MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 27.MAR.2014 03:50:15

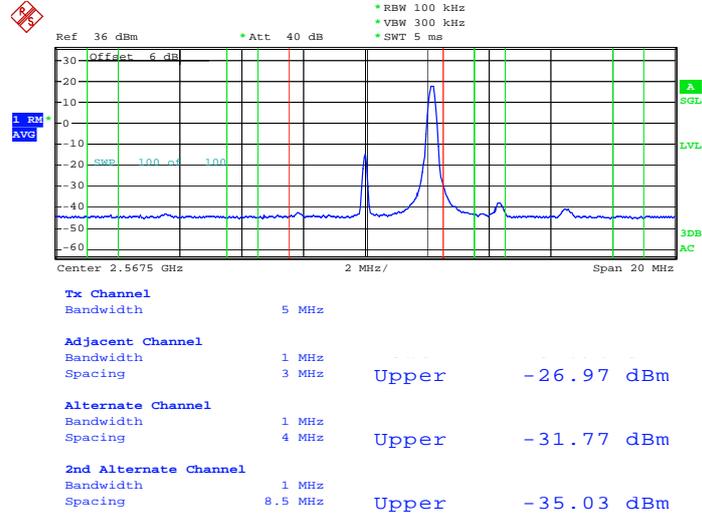
Lower Band Edge Plot for 16QAM-RB Size 25, RB Offset 0



Date: 27.MAR.2014 03:51:11

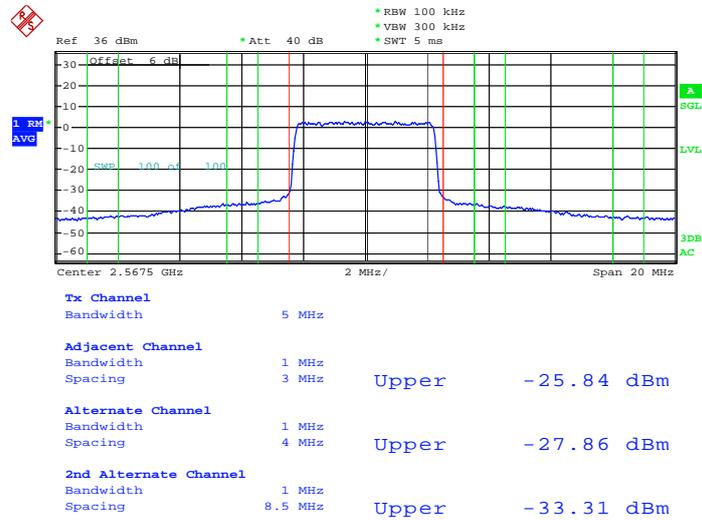


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 24



Date: 27.MAR.2014 04:05:14

Higher Band Edge Plot for 16QAM-RB Size 25, RB Offset 0

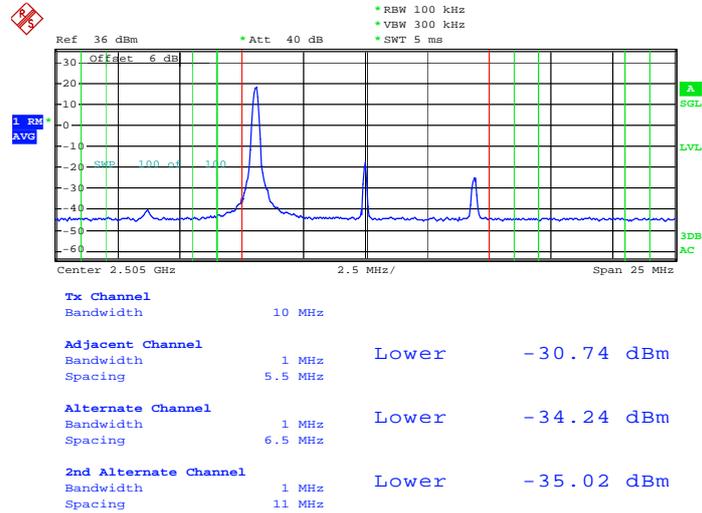


Date: 27.MAR.2014 04:07:02



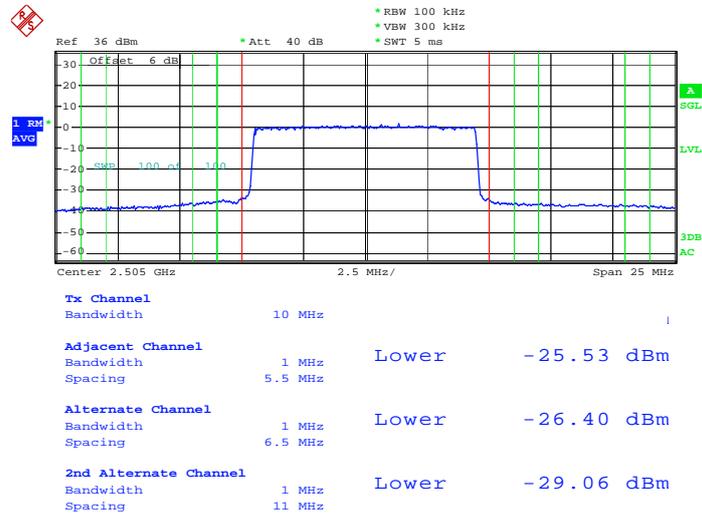
Band :	LTE Band 7	Band Width :	10MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 27.MAR.2014 04:11:34

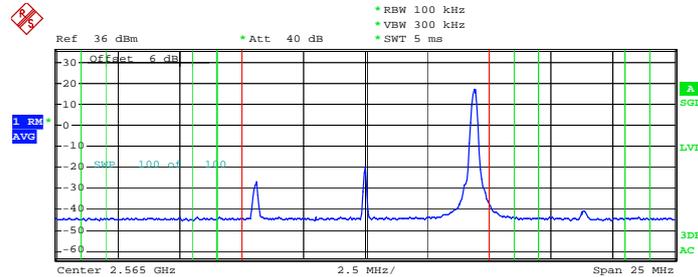
Lower Band Edge Plot for QPSK-RB Size 50, RB Offset 0



Date: 27.MAR.2014 04:13:20



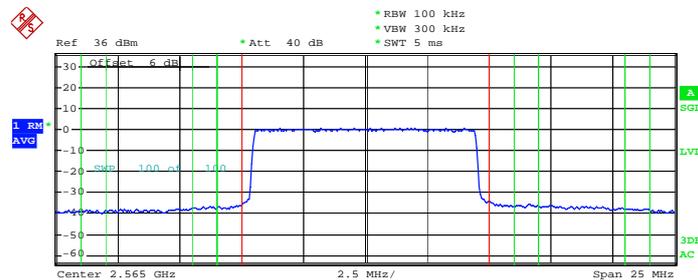
Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 49



Tx Channel	Bandwidth	10 MHz		
Adjacent Channel	Bandwidth	1 MHz		
	Spacing	5.5 MHz	Upper	-32.20 dBm
Alternate Channel	Bandwidth	1 MHz		
	Spacing	6.5 MHz	Upper	-34.72 dBm
2nd Alternate Channel	Bandwidth	1 MHz		
	Spacing	11 MHz	Upper	-34.80 dBm

Date: 27.MAR.2014 04:15:17

Higher Band Edge Plot for QPSK-RB Size 50, RB Offset 0



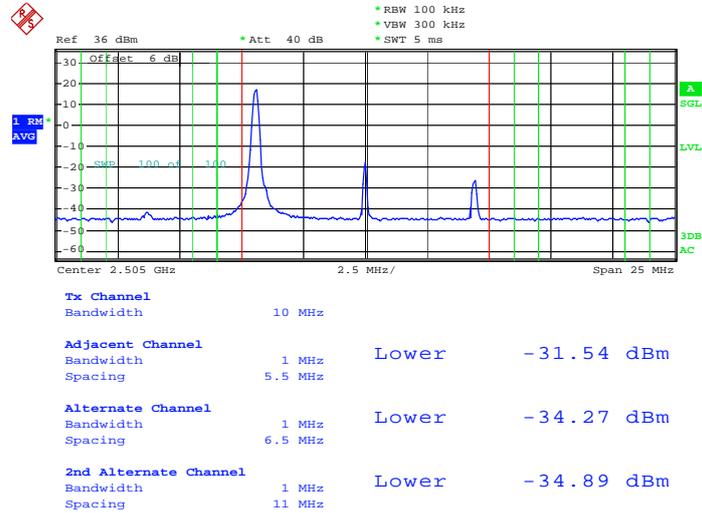
Tx Channel	Bandwidth	10 MHz		
Adjacent Channel	Bandwidth	1 MHz		
	Spacing	5.5 MHz	Upper	-26.04 dBm
Alternate Channel	Bandwidth	1 MHz		
	Spacing	6.5 MHz	Upper	-26.54 dBm
2nd Alternate Channel	Bandwidth	1 MHz		
	Spacing	11 MHz	Upper	-28.43 dBm

Date: 27.MAR.2014 04:14:31



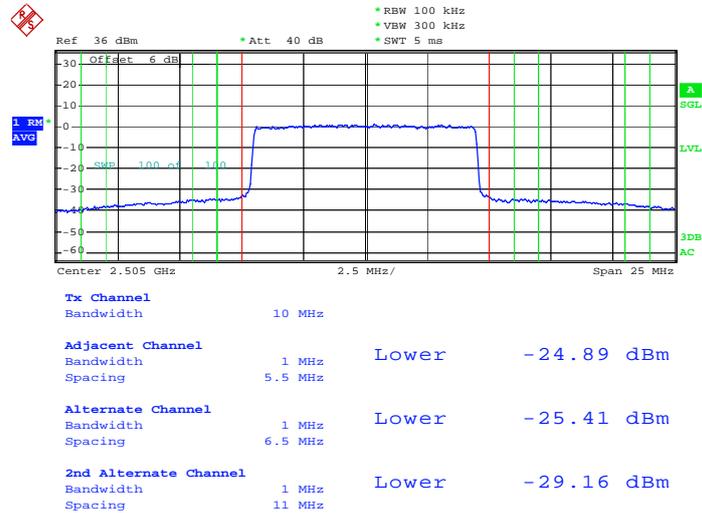
Band :	LTE Band 7	Band Width :	10MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 27.MAR.2014 04:11:13

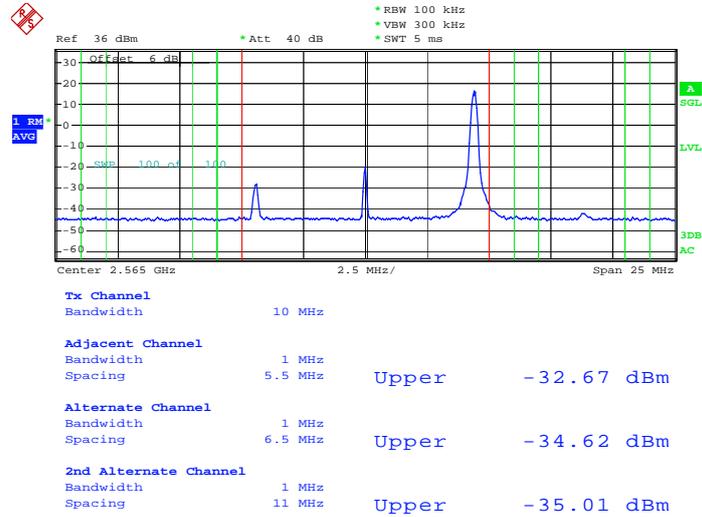
Lower Band Edge Plot for 16QAM-RB Size 50, RB Offset 0



Date: 27.MAR.2014 04:13:06

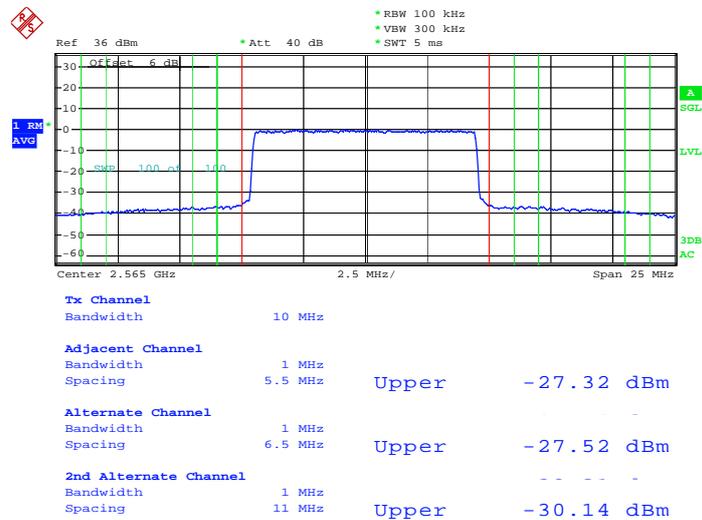


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 49



Date: 27.MAR.2014 04:15:05

Higher Band Edge Plot for 16QAM-RB Size 50, RB Offset 0

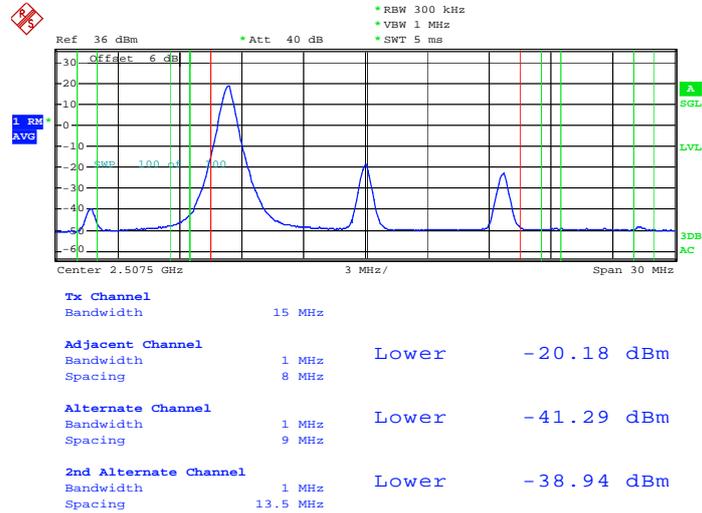


Date: 27.MAR.2014 04:14:44



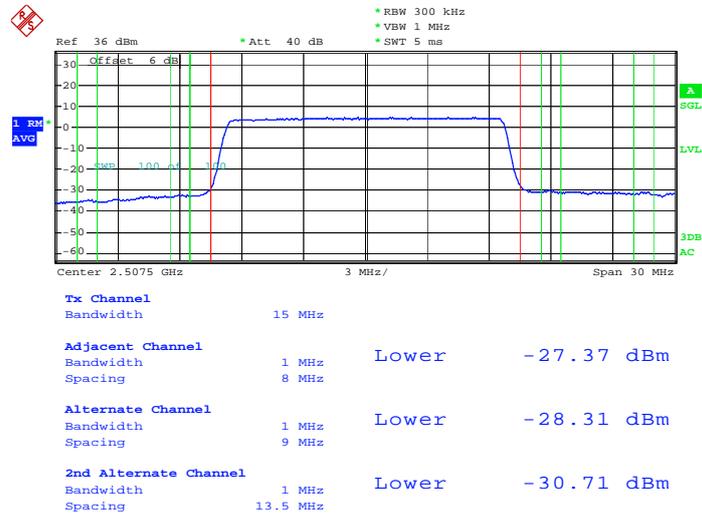
Band :	LTE Band 7	Band Width :	15MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 27.MAR.2014 04:18:25

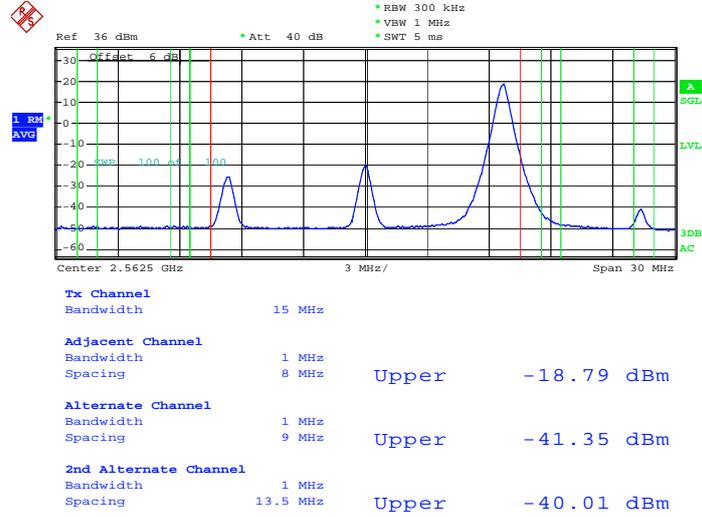
Lower Band Edge Plot for QPSK-RB Size 75, RB Offset 0



Date: 27.MAR.2014 04:19:03

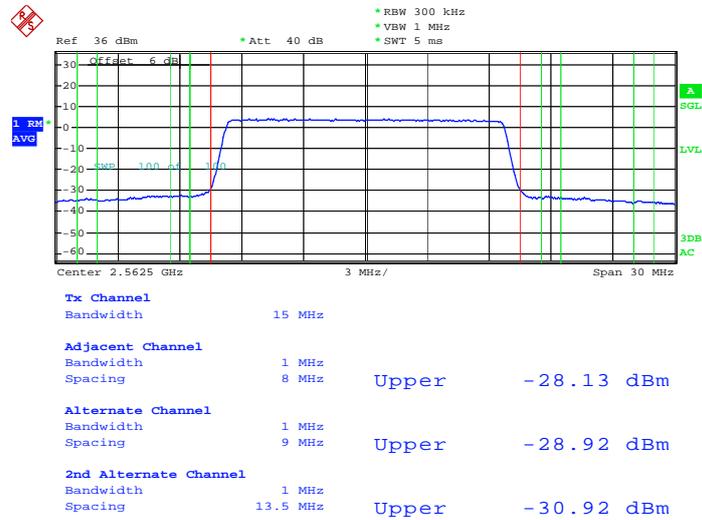


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 74



Date: 27.MAR.2014 04:20:37

Higher Band Edge Plot for QPSK-RB Size 75, RB Offset 0

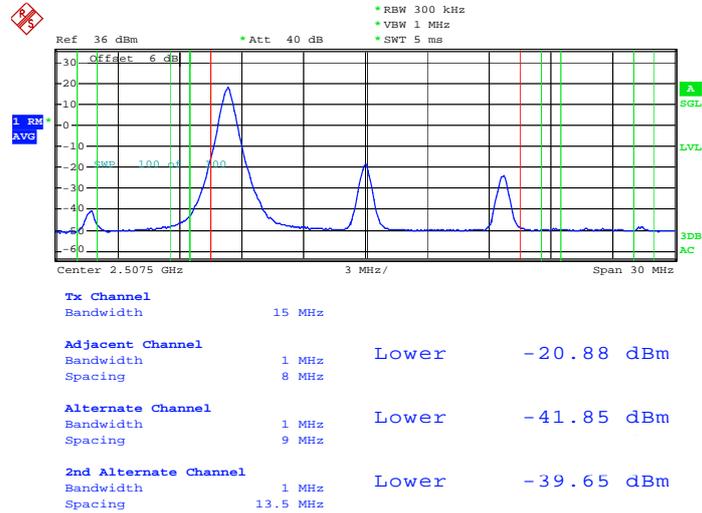


Date: 27.MAR.2014 04:21:17



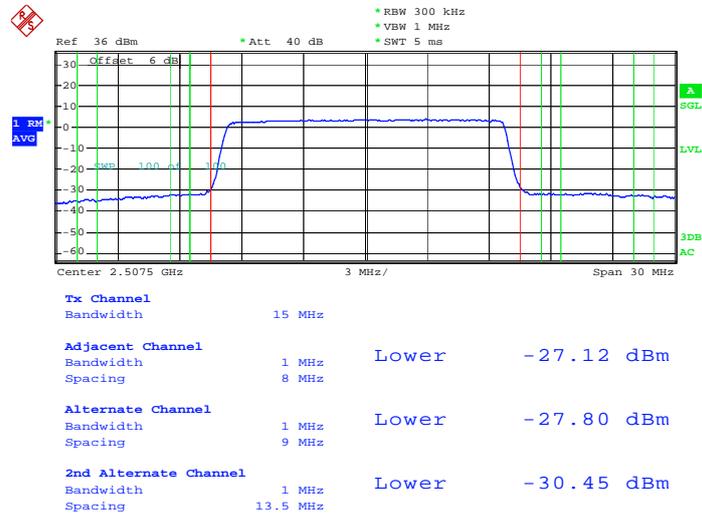
Band :	LTE Band 7	Band Width :	15MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 27.MAR.2014 04:18:36

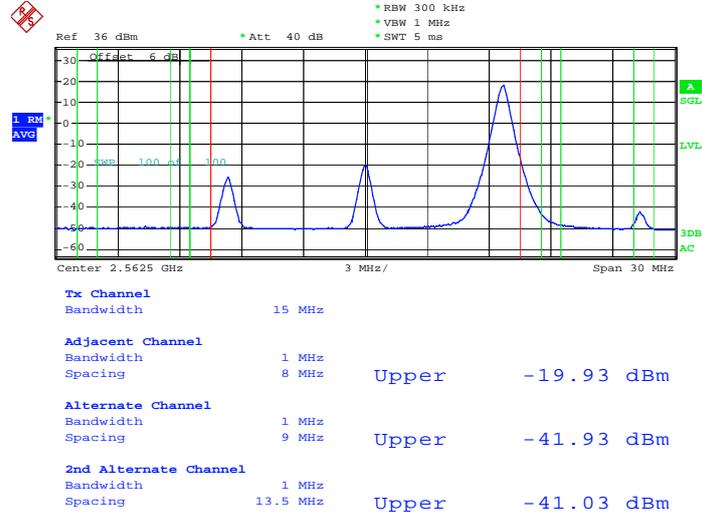
Lower Band Edge Plot for 16QAM-RB Size 75, RB Offset 0



Date: 27.MAR.2014 04:18:51

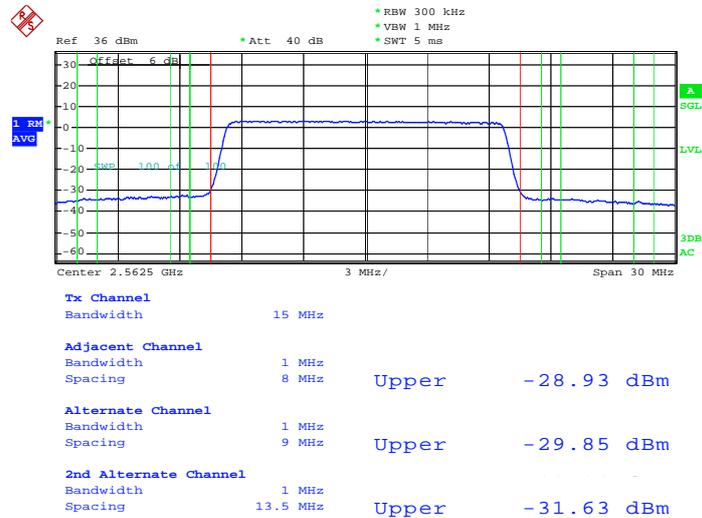


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 74



Date: 27.MAR.2014 04:20:48

Higher Band Edge Plot for 16QAM-RB Size 75, RB Offset 0

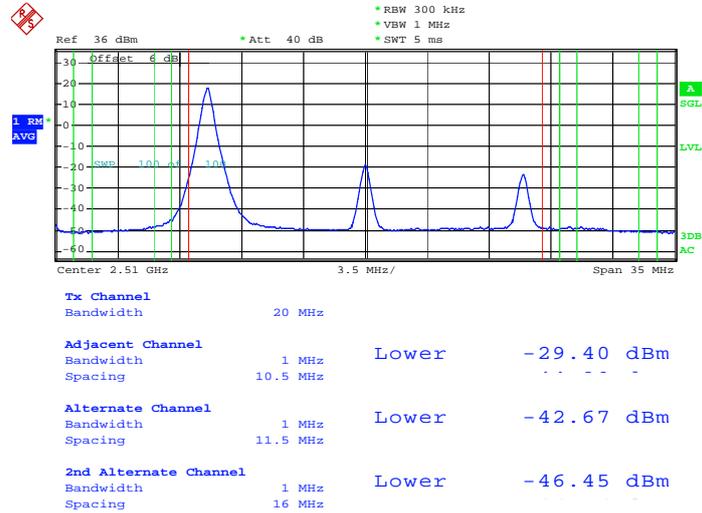


Date: 27.MAR.2014 04:21:06



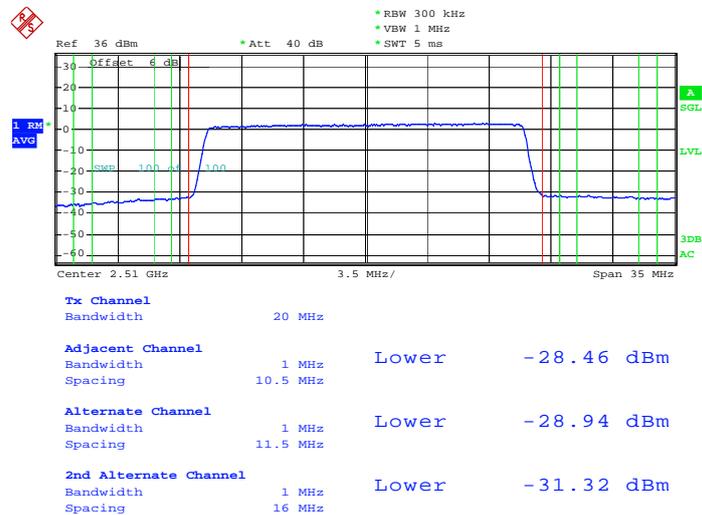
Band :	LTE Band 7	Band Width :	20MHz / QPSK
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Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Date: 27.MAR.2014 04:25:27

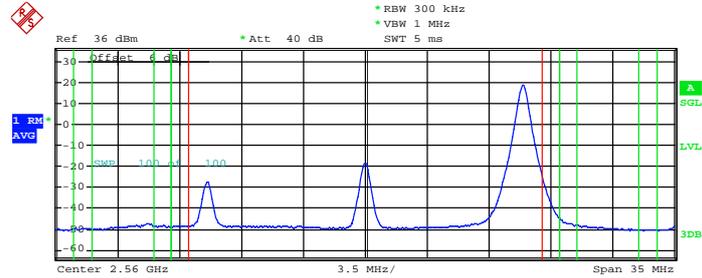
Lower Band Edge Plot for QPSK-RB Size 100, RB Offset 0



Date: 27.MAR.2014 04:25:48



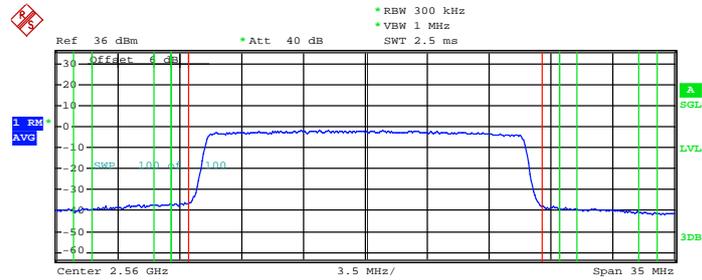
Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 99



Tx Channel			
Bandwidth	20 MHz		
Adjacent Channel			
Bandwidth	1 MHz		
Spacing	10.5 MHz	Upper	-27.91 dBm
Alternate Channel			
Bandwidth	1 MHz		
Spacing	11.5 MHz	Upper	-42.42 dBm
2nd Alternate Channel			
Bandwidth	1 MHz		
Spacing	16 MHz	Upper	-45.63 dBm

Date: 27.MAR.2014 14:55:31

Higher Band Edge Plot for QPSK-RB Size 100, RB Offset 0



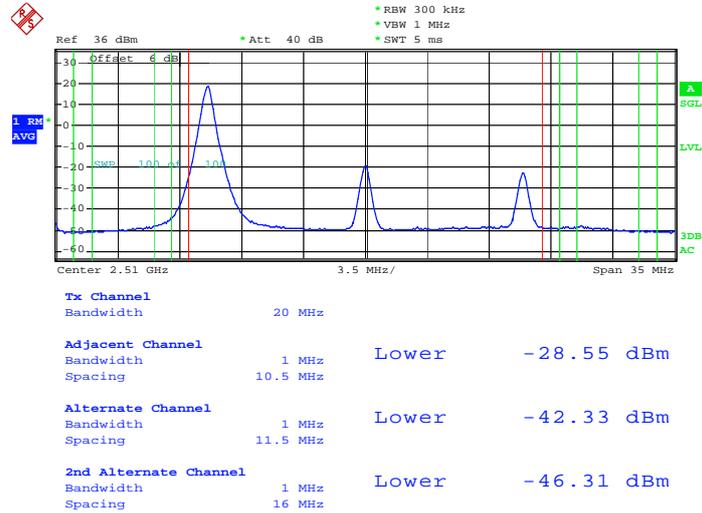
Tx Channel			
Bandwidth	20 MHz		
Adjacent Channel			
Bandwidth	1 MHz		
Spacing	10.5 MHz	Upper	-34.13 dBm
Alternate Channel			
Bandwidth	1 MHz		
Spacing	11.5 MHz	Upper	-34.70 dBm
2nd Alternate Channel			
Bandwidth	1 MHz		
Spacing	16 MHz	Upper	-36.80 dBm

Date: 31.MAR.2014 18:22:44



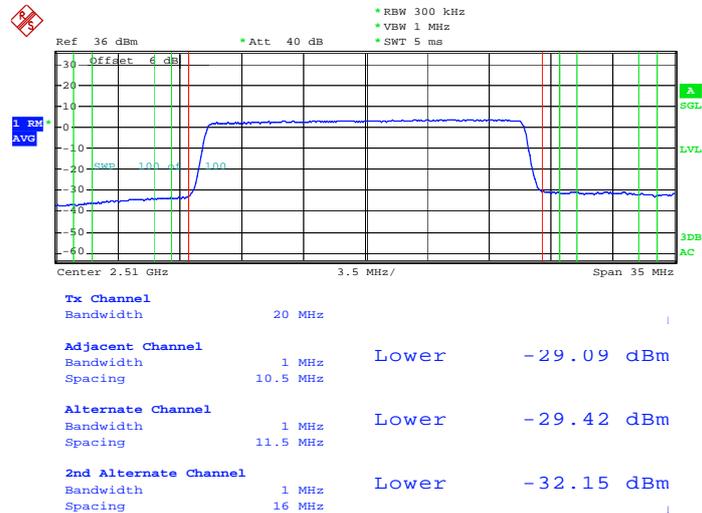
Band :	LTE Band 7	Band Width :	20MHz / 16QAM
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Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Date: 27.MAR.2014 04:25:15

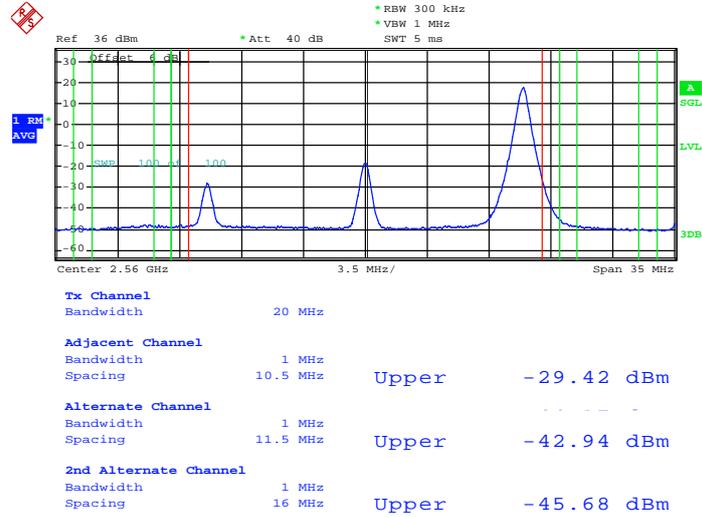
Lower Band Edge Plot for 16QAM-RB Size 100, RB Offset 0



Date: 27.MAR.2014 04:26:07

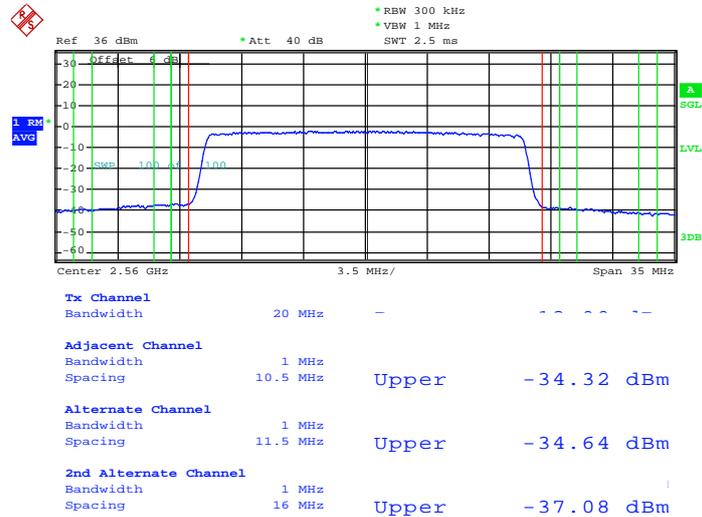


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 99



Date: 27.MAR.2014 14:55:16

Higher Band Edge Plot for 16QAM-RB Size 100, RB Offset 0



Date: 31.MAR.2014 18:22:32

3.5 Conducted Spurious Emission Measurement

3.5.1 Description of Conducted Spurious Emission Measurement

For Band 7

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 9 kHz up to a frequency including its 10th harmonic.

3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. For Band 7

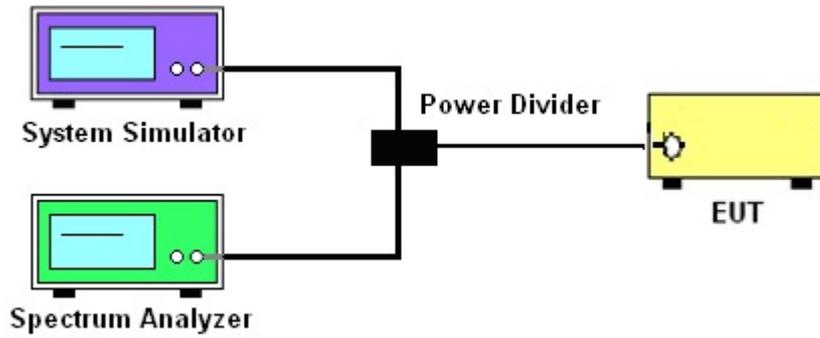
The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [55 + 10\log(P)] \text{ (dB)}$$

$$= [30 + 10\log(P)] \text{ (dBm)} - [55 + 10\log(P)] \text{ (dB)}$$

$$= -25\text{dBm.}$$

3.5.4 Test Setup

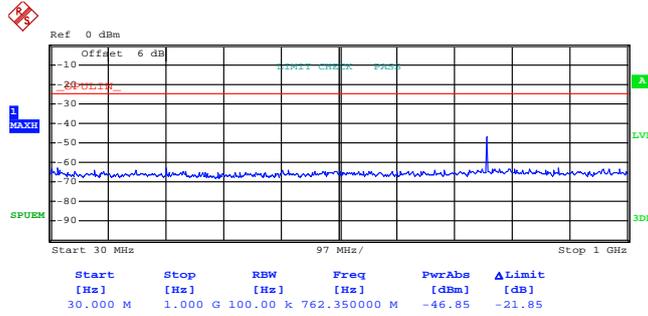




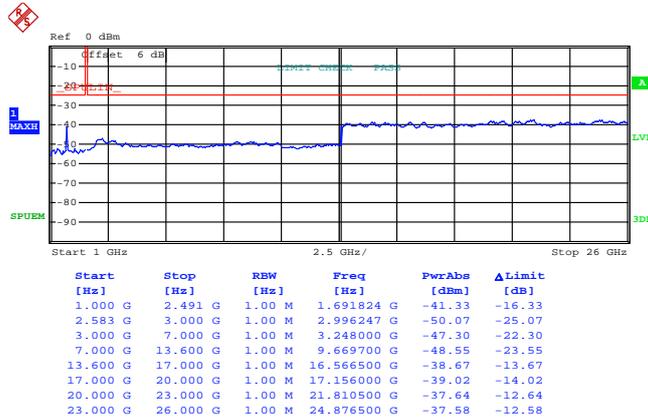
3.5.5 Test Result (Plots) of Conducted Spurious Emission

Band :	LTE Band 7	Channel :	CH20775 (Low)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



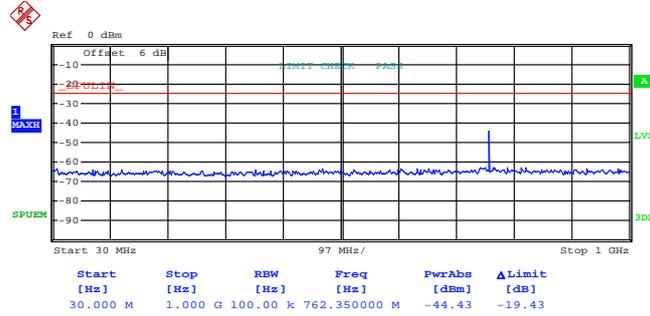
Date: 27.MAR.2014 13:56:34



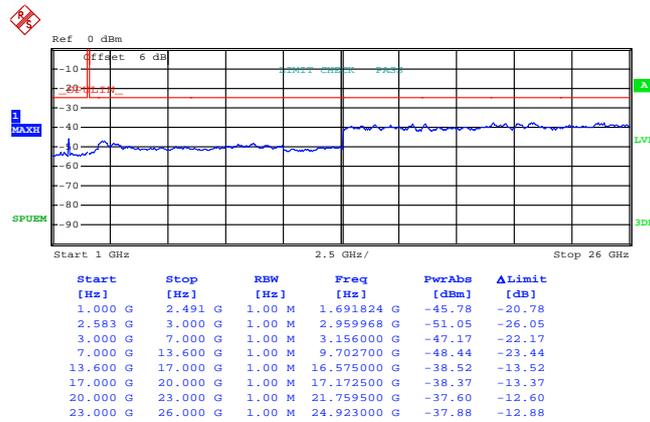
Date: 27.MAR.2014 13:57:24



16QAM (RB Size 1, RB Offset 0)



Date: 27.MAR.2014 13:56:22

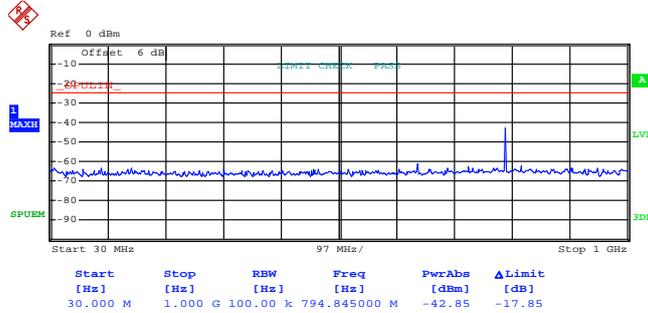


Date: 27.MAR.2014 13:57:34

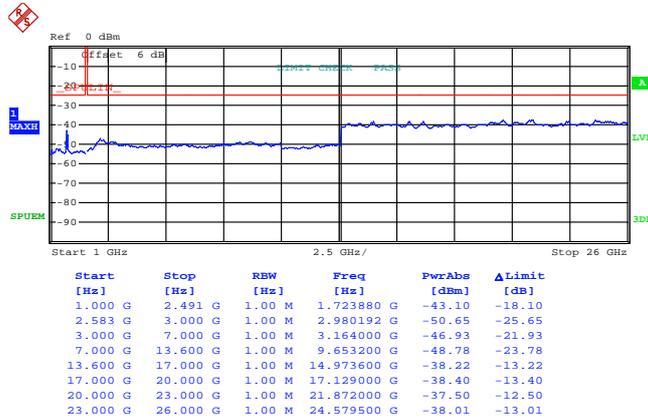


Band :	LTE Band 7	Channel :	CH21100 (Middle)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



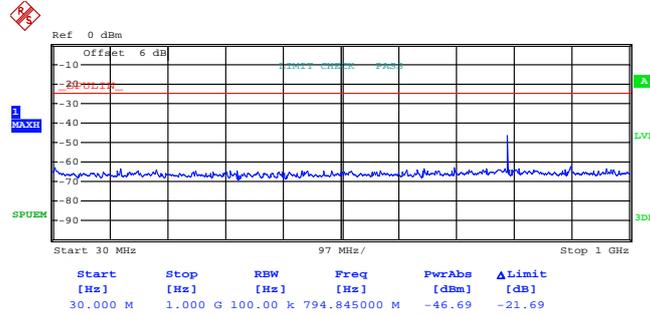
Date: 27.MAR.2014 13:58:52



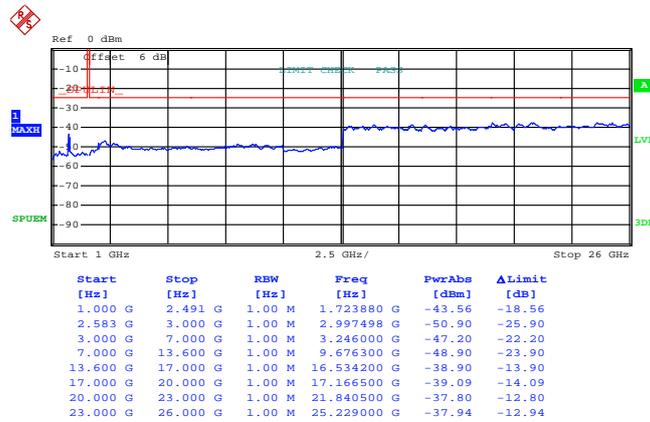
Date: 27.MAR.2014 13:58:29



16QAM (RB Size 1, RB Offset 0)



Date: 27.MAR.2014 13:59:05

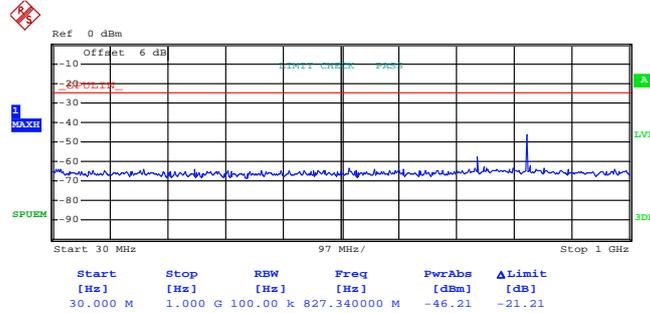


Date: 27.MAR.2014 13:58:18

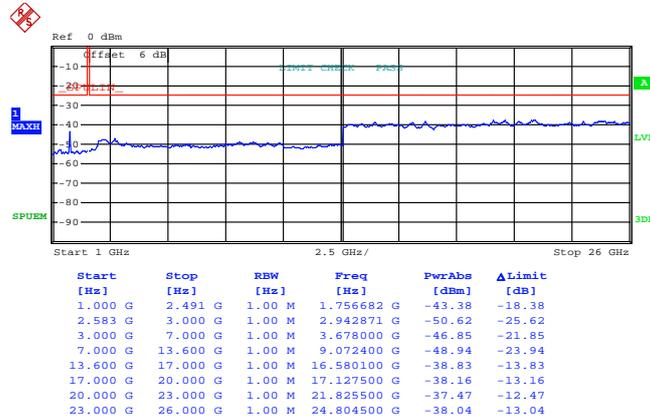


Band :	LTE Band 7	Channel :	CH21425 (High)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



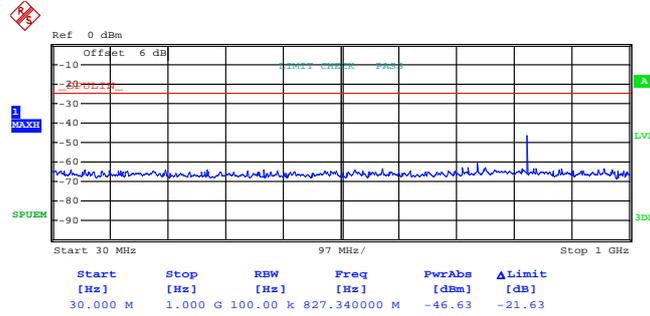
Date: 27.MAR.2014 14:01:19



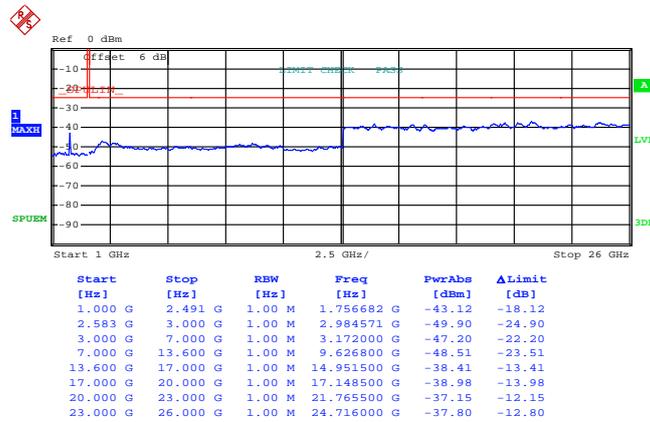
Date: 27.MAR.2014 14:03:30



16QAM (RB Size 1, RB Offset 0)



Date: 27.MAR.2014 14:01:12

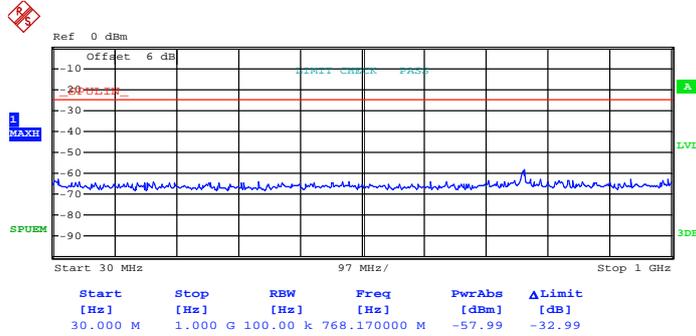


Date: 27.MAR.2014 14:03:19

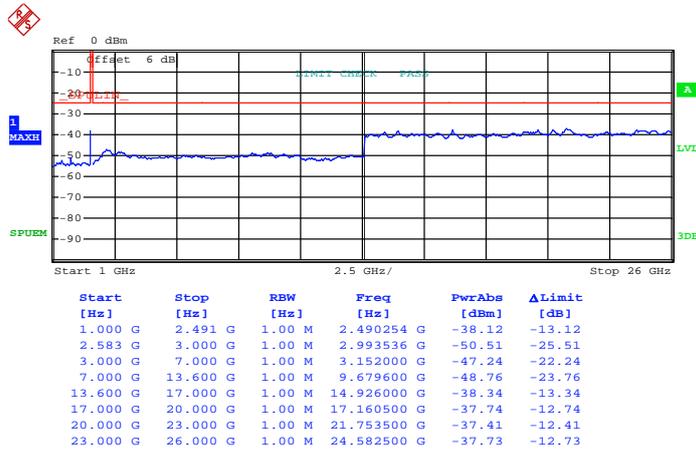


Band :	LTE Band 7	Channel :	CH20800 (Low)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)



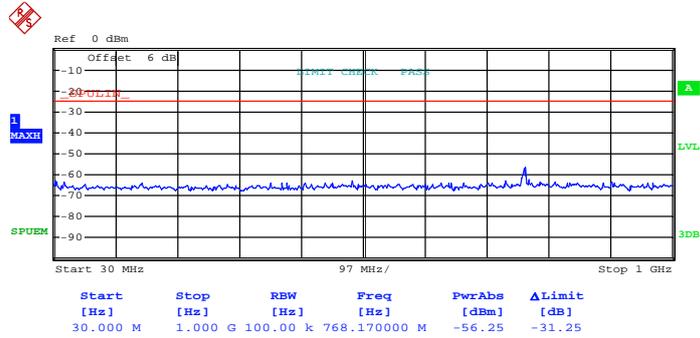
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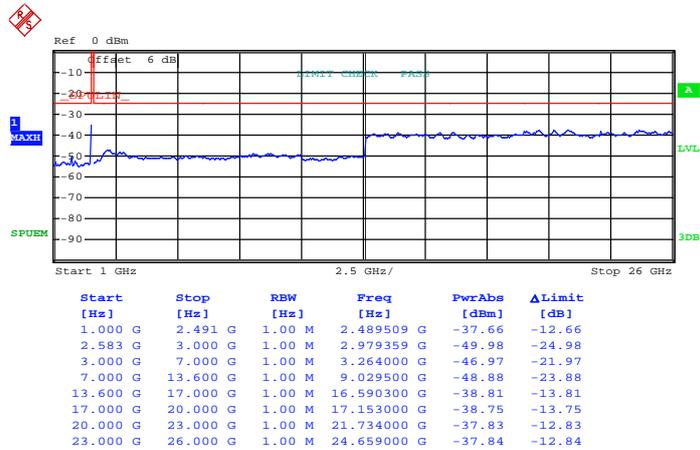
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16QAM (RB Size 1, RB Offset 0)



Date: 27.MAR.2014 14:07:37

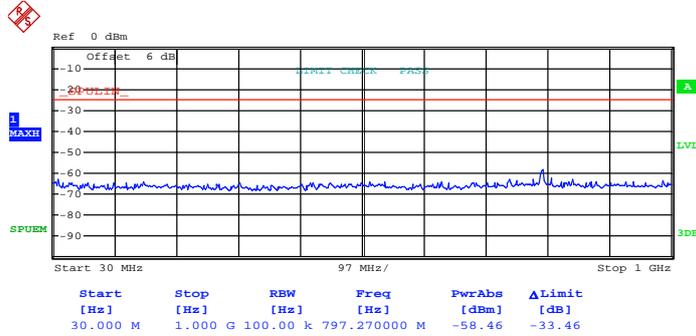


Date: 27.MAR.2014 14:07:20

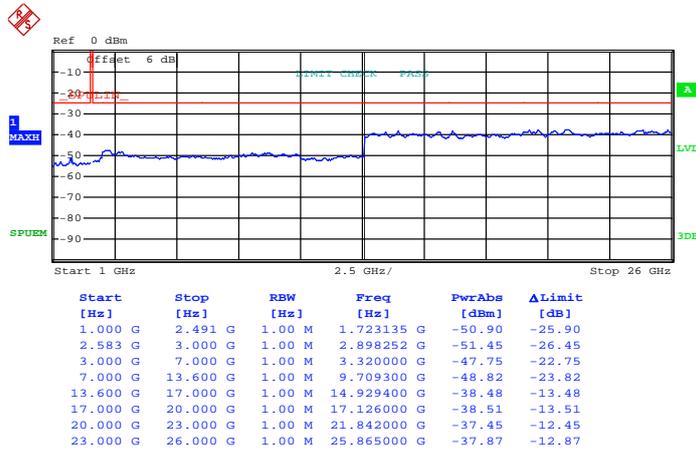


Band :	LTE Band 7	Channel :	CH21100 (Middle)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)



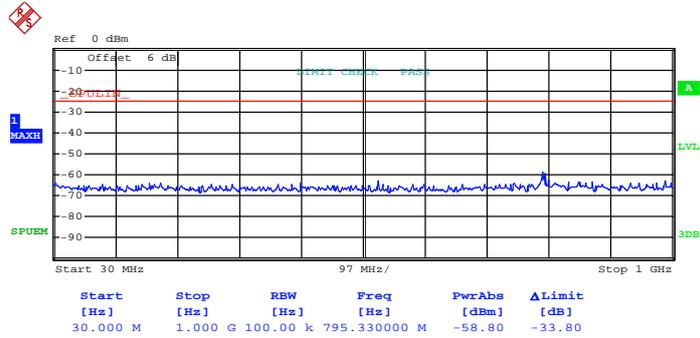
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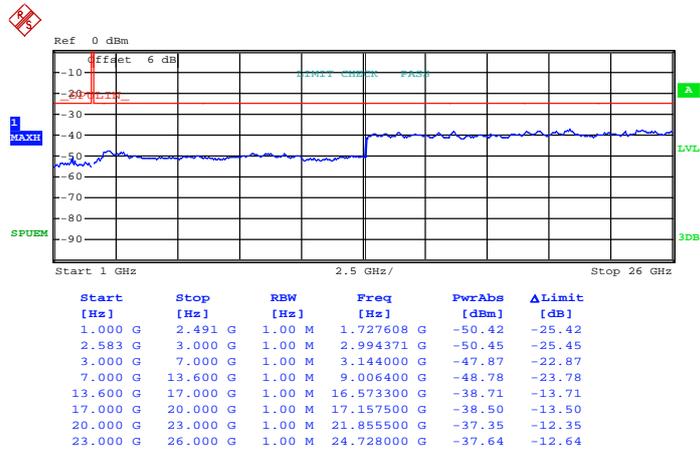
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16QAM (RB Size 1, RB Offset 0)



Date: 27.MAR.2014 14:09:13

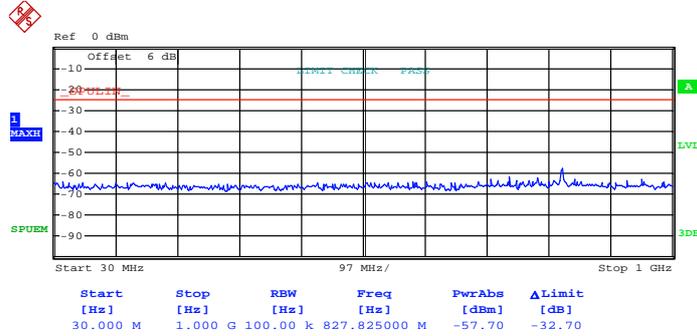


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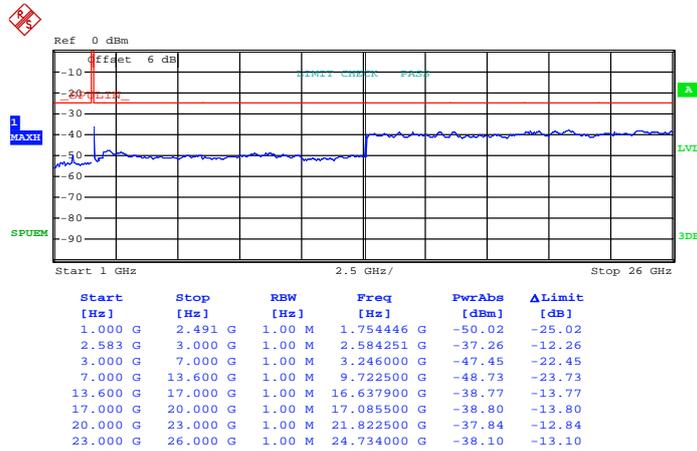


Band :	LTE Band 7	Channel :	CH21400 (High)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)



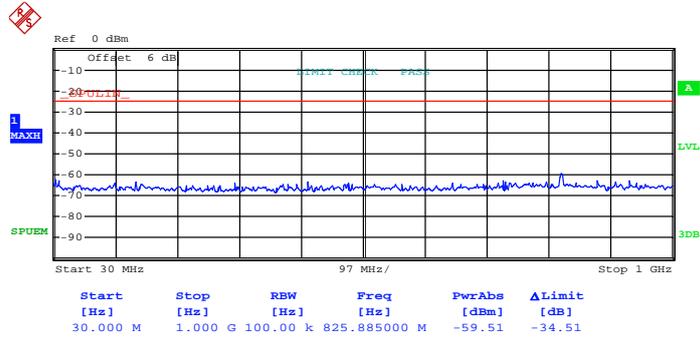
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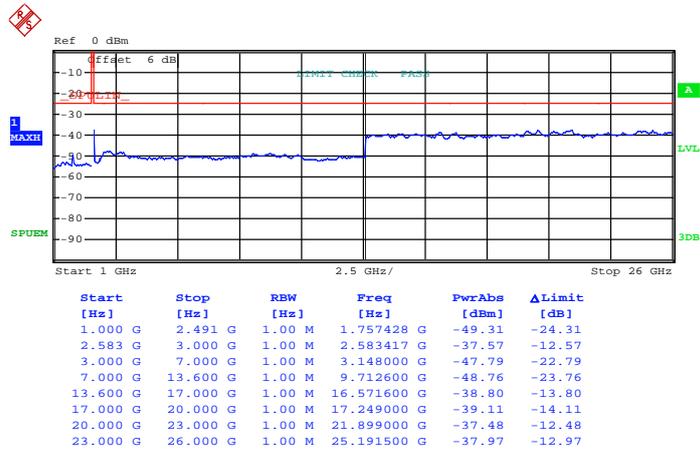
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16QAM (RB Size 1, RB Offset 0)



Date: 27.MAR.2014 14:13:44

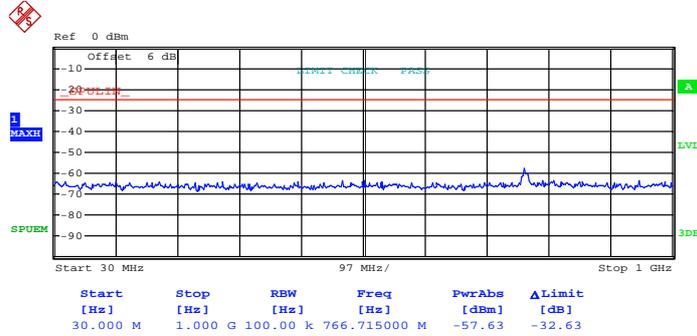


Date: 27.MAR.2014 14:14:42

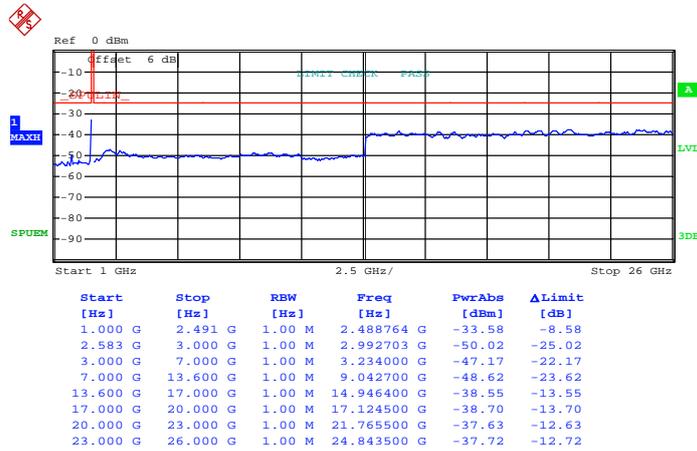


Band :	LTE Band 7	Channel :	CH20825 (Low)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 0)



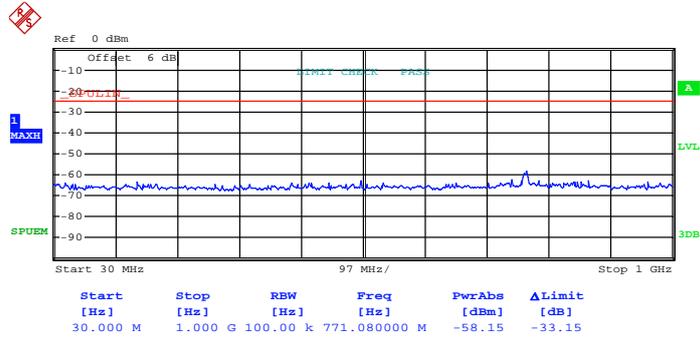
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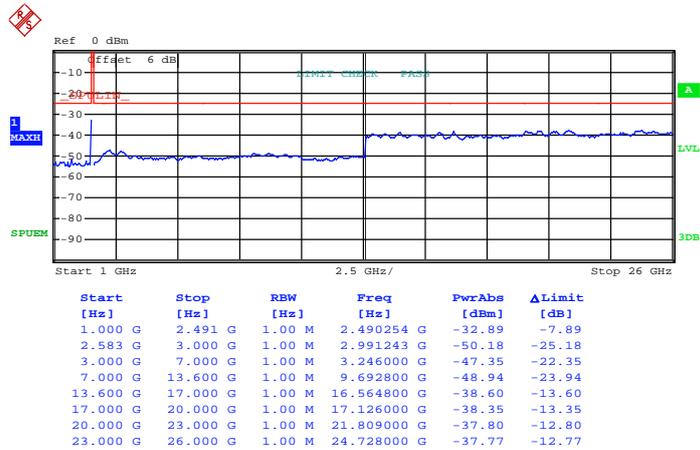
Date: 27.MAR.2014 14:21:08



16QAM (RB Size 1, RB Offset 0)



Date: 27.MAR.2014 14:20:34

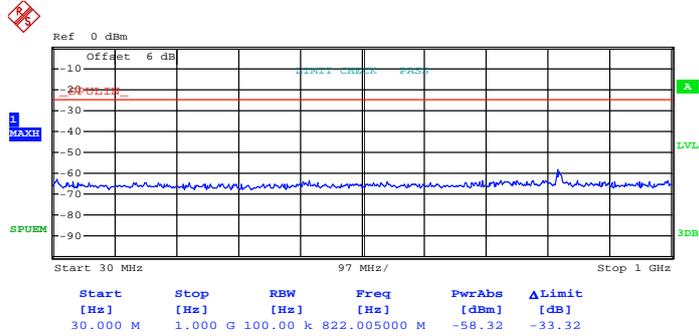


Date: 27.MAR.2014 14:21:21

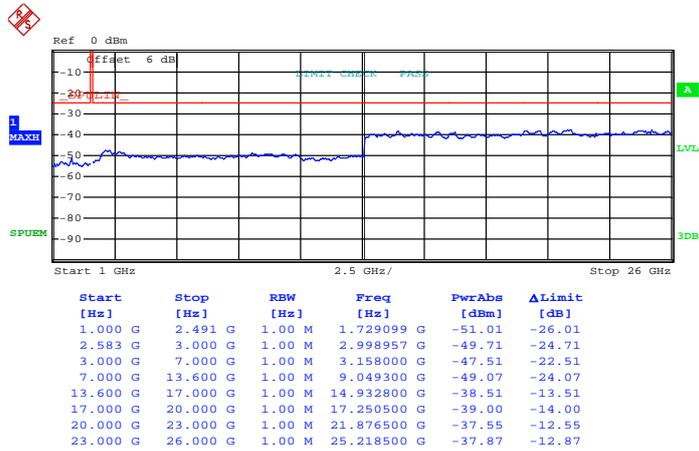


Band :	LTE Band 7	Channel :	CH21100 (Middle)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 0)



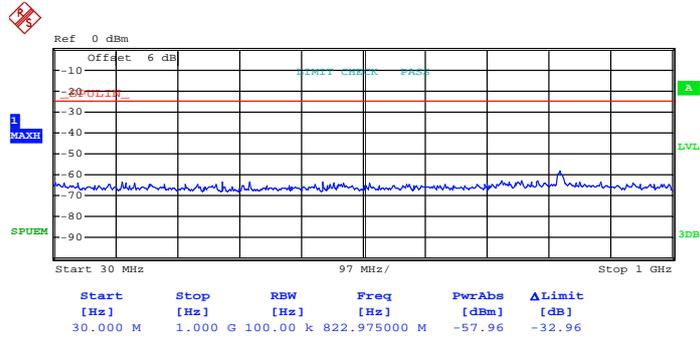
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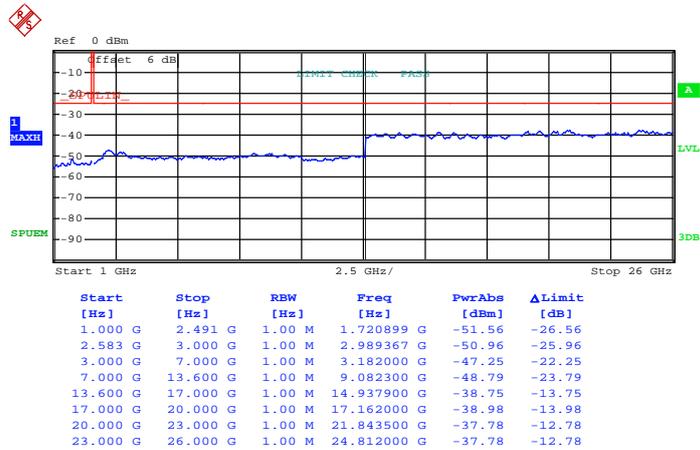
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16QAM (RB Size 1, RB Offset 0)



Date: 27.MAR.2014 14:22:44

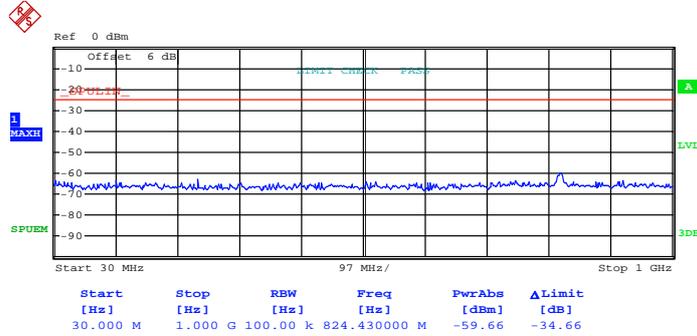


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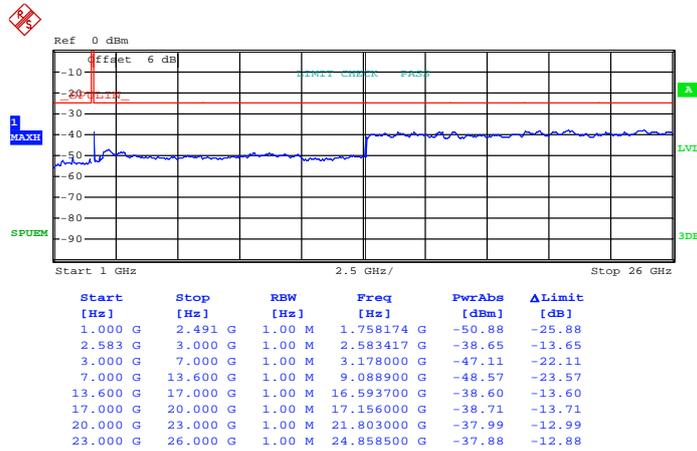


Band :	LTE Band 7	Channel :	CH21375 (High)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 0)



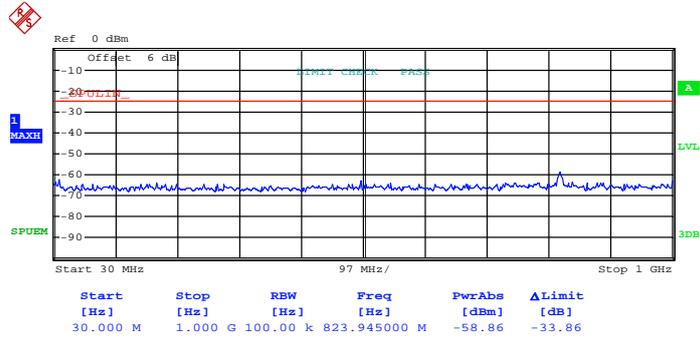
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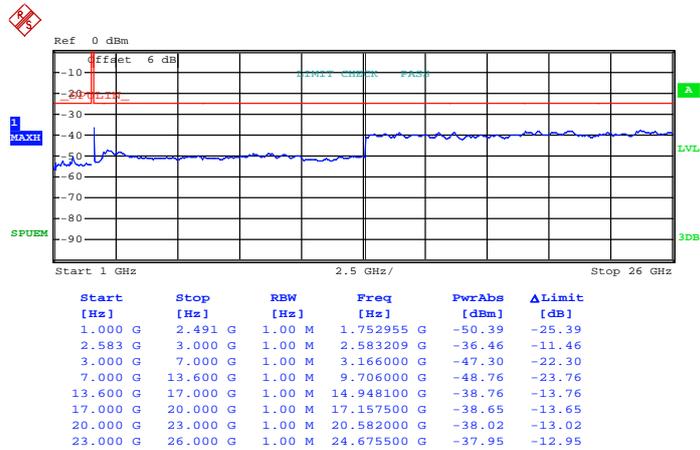
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16QAM (RB Size 1, RB Offset 0)



Date: 27.MAR.2014 14:23:01

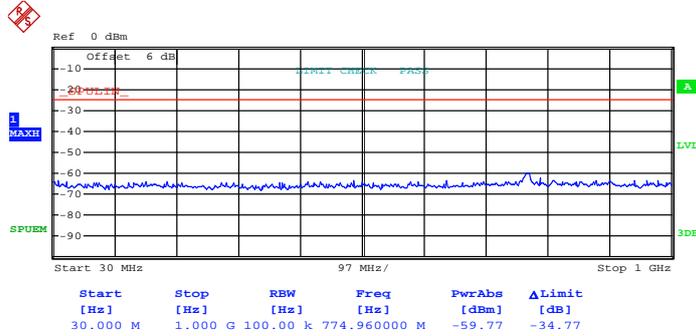


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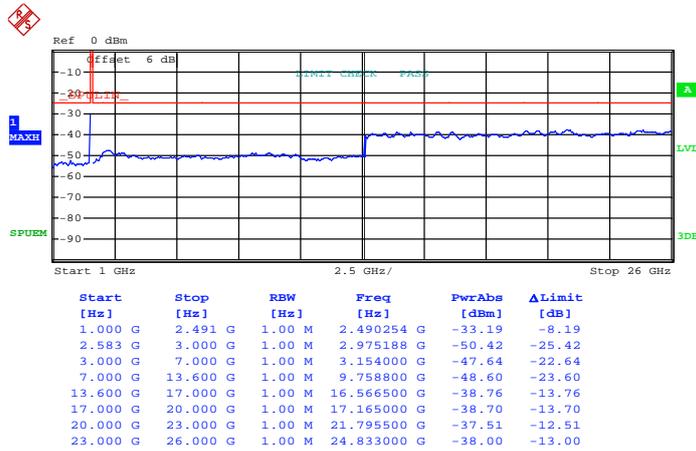


Band :	LTE Band 7	Channel :	CH20850 (Low)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



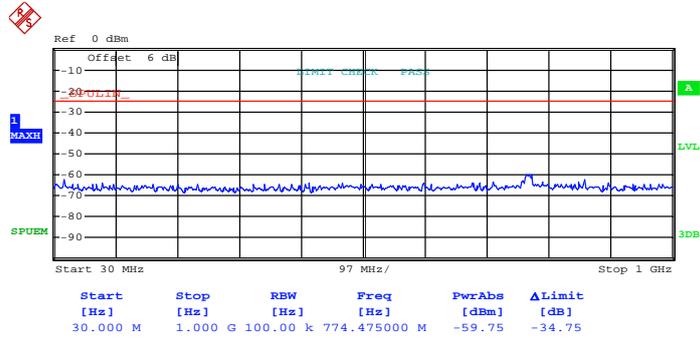
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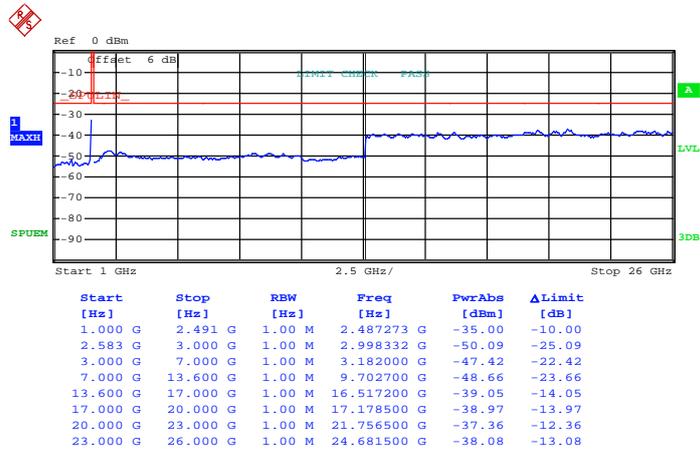
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16QAM (RB Size 1, RB Offset 0)



Date: 27.MAR.2014 14:25:08

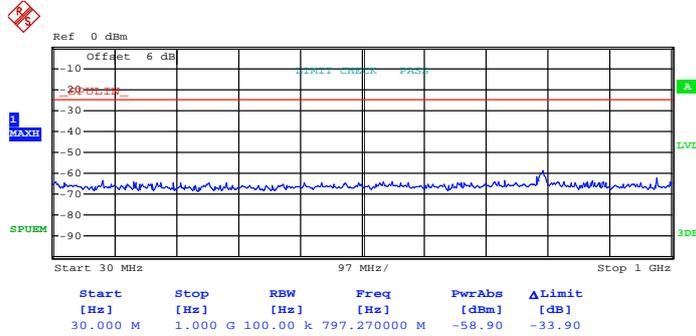


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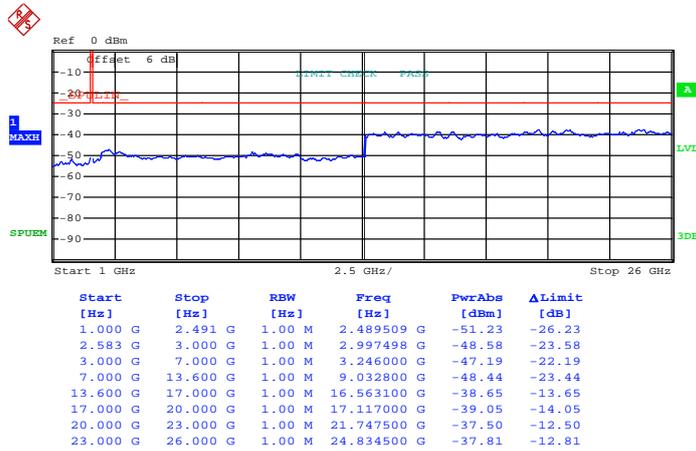


Band :	LTE Band 7	Channel :	CH21100 (Middle)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



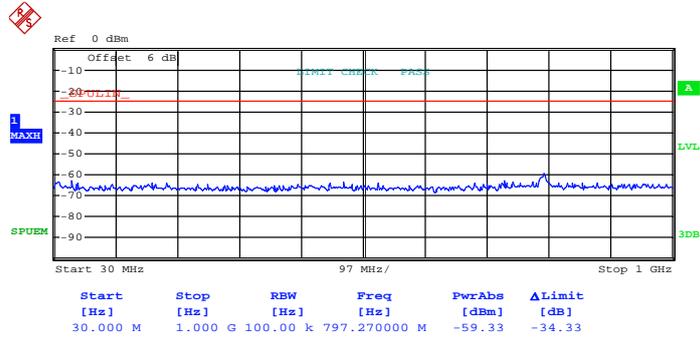
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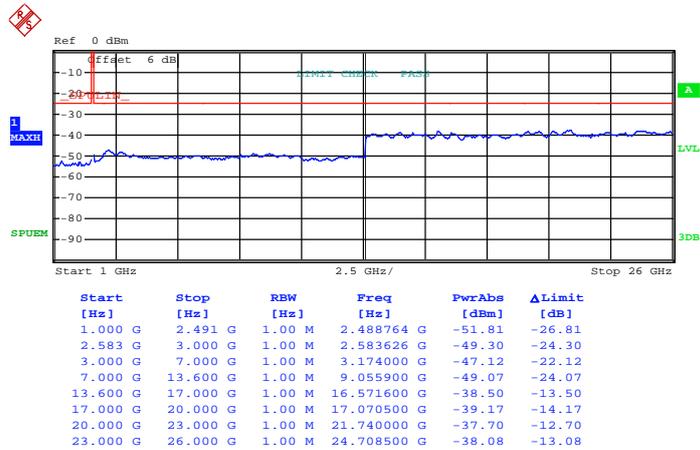
Date: 27.MAR.2014 14:26:08



16QAM (RB Size 1, RB Offset 0)



Date: 27.MAR.2014 14:25:35

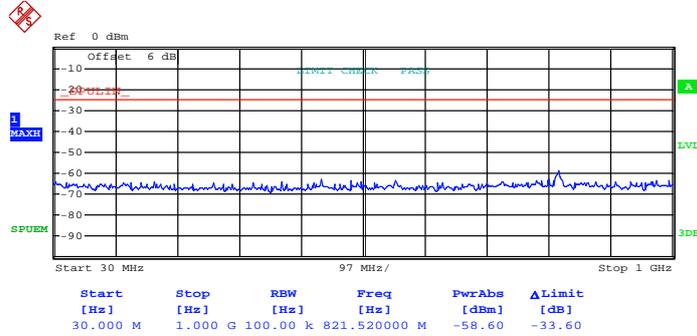


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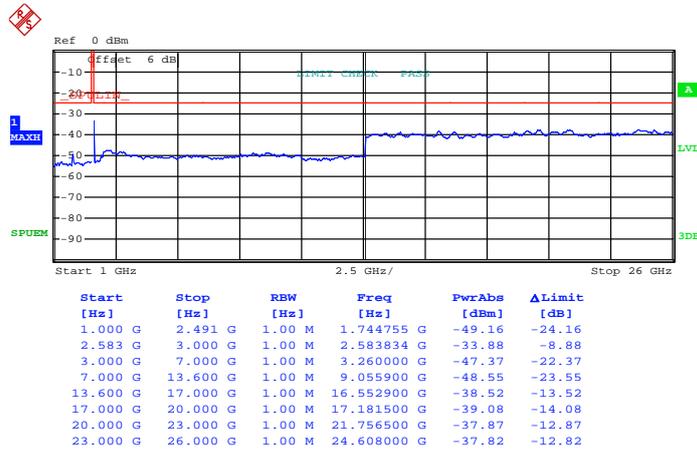


Band :	LTE Band 7	Channel :	CH21350 (High)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



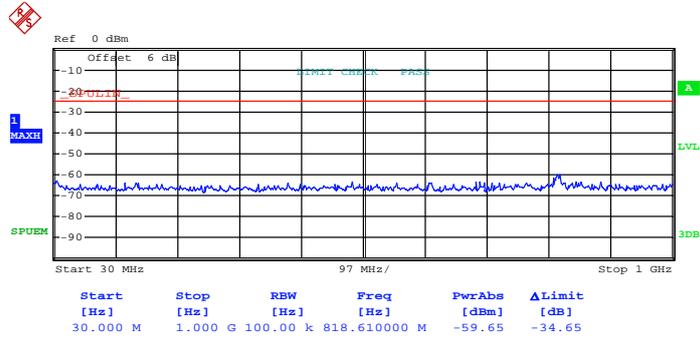
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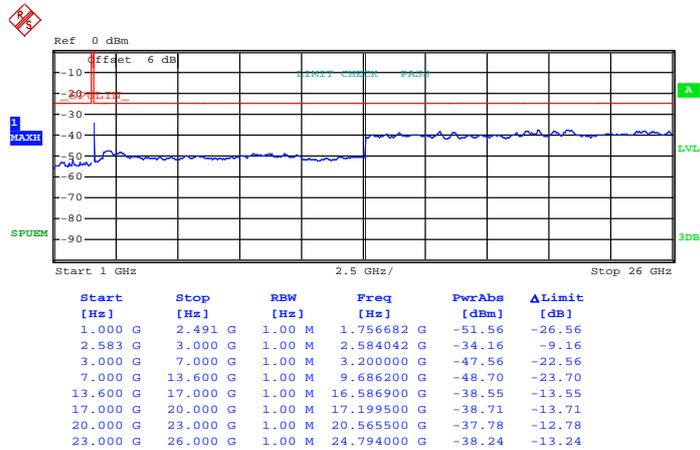
Date: 27.MAR.2014 14:27:05



16QAM (RB Size 1, RB Offset 0)



Date: 27.MAR.2014 14:33:04



Date: 27.MAR.2014 14:26:48



3.6 Radiated Spurious Emission Measurement

3.6.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-C-2004.

For Band 7

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.



3.6.3 Test Procedures

1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

For Band 7

The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [55 + 10\log(P)] \text{ (dB)}$$

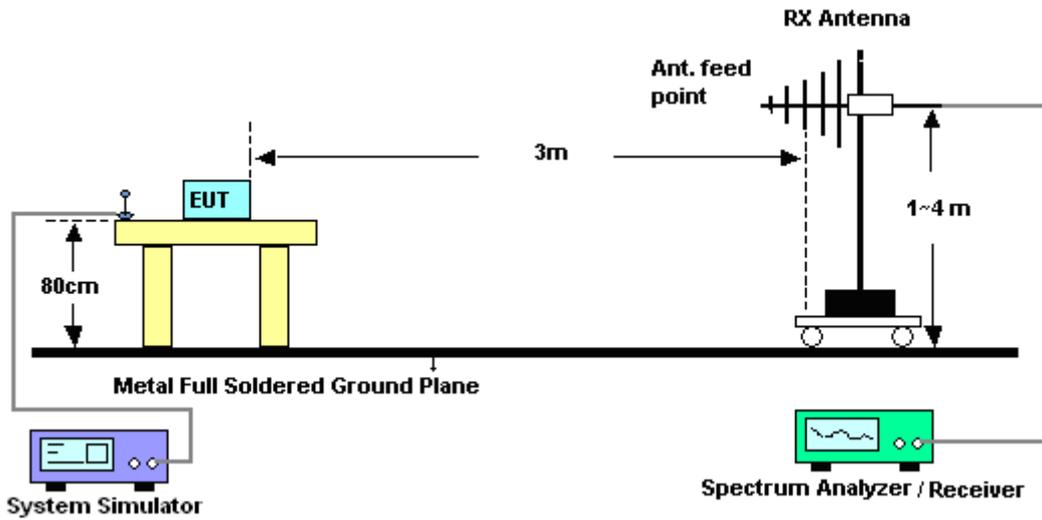
$$= [30 + 10\log(P)] \text{ (dBm)} - [55 + 10\log(P)] \text{ (dB)}$$

$$= -25\text{dBm.}$$

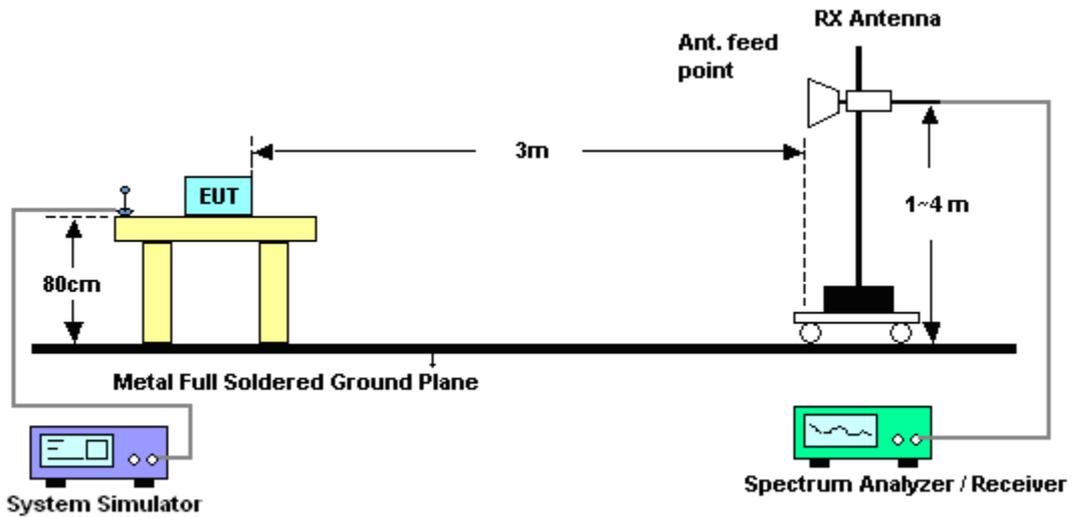
11. $\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$
12. $\text{ERP (dBm)} = \text{EIRP} - 2.15$

3.6.4 Test Setup

For radiated emissions from 30MHz to 1GHz



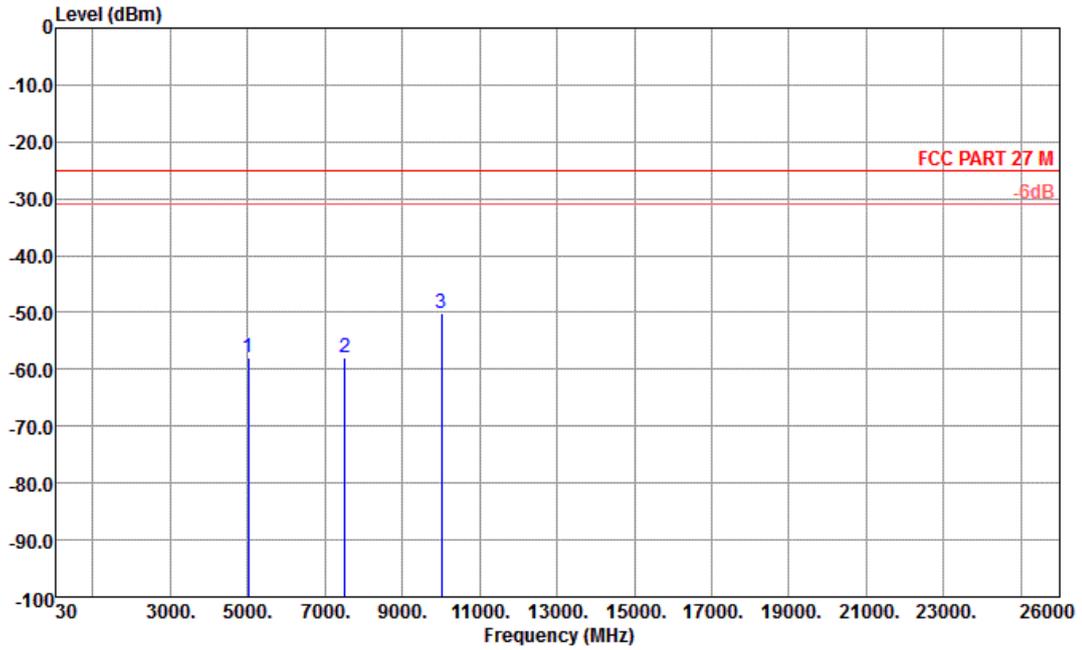
For radiated emissions above 1GHz





3.6.5 Test Result of Field Strength of Spurious Radiated

Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

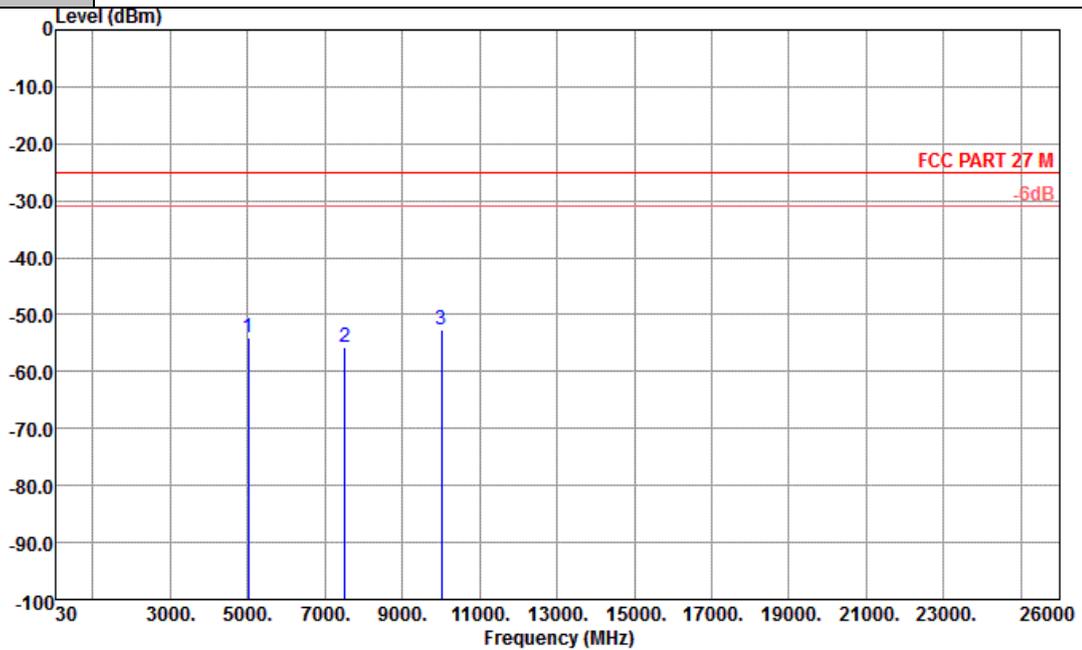


Site : 03CH01-KS
 Condition : FCC PART 27 M HF_EIRP_FACTOR130726 HORIZONTAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5008	-57.85	-25	-32.85	-60.97	-64.23	0.78	7.16	H	Pass
7501	-57.97	-25	-32.97	-65.97	-66.51	1.04	9.58	H	Pass
10001	-50.02	-25	-25.02	-64.86	-60.13	1.35	11.46	H	Pass



Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

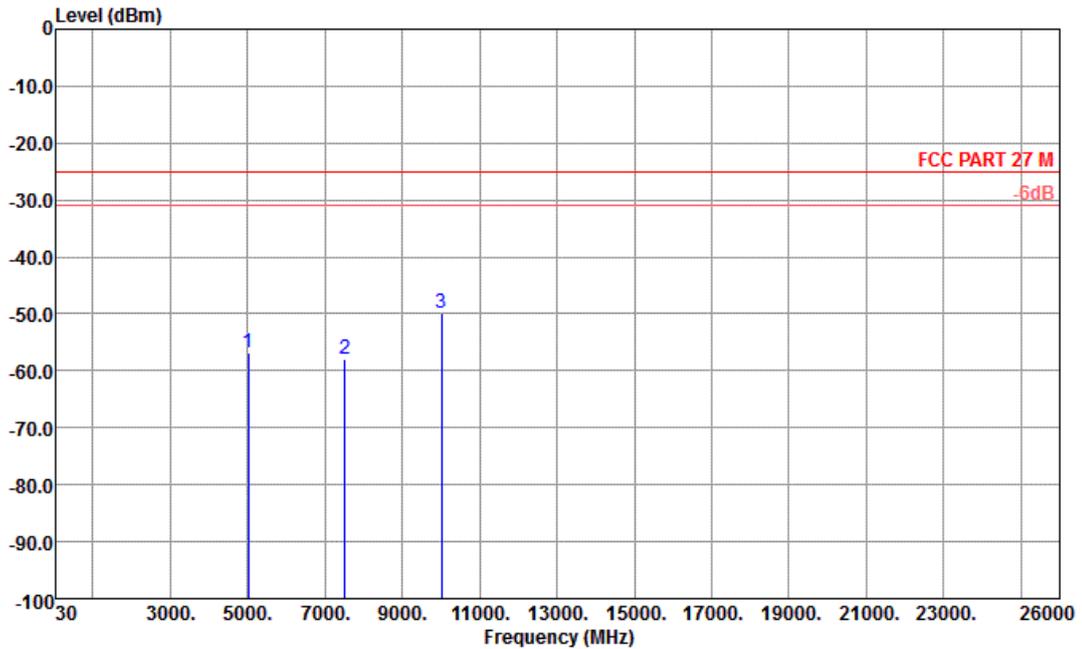


Site : 03CH01-KS
 Condition : FCC PART 27 M HF_EIRP_FACTOR130726 VERTICAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5008	-54.10	-25	-29.10	-61.83	-60.48	0.78	7.16	V	Pass
7501	-55.83	-25	-30.83	-65.63	-64.37	1.04	9.58	V	Pass
10001	-52.70	-25	-27.70	-65.35	-62.81	1.35	11.46	V	Pass



Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

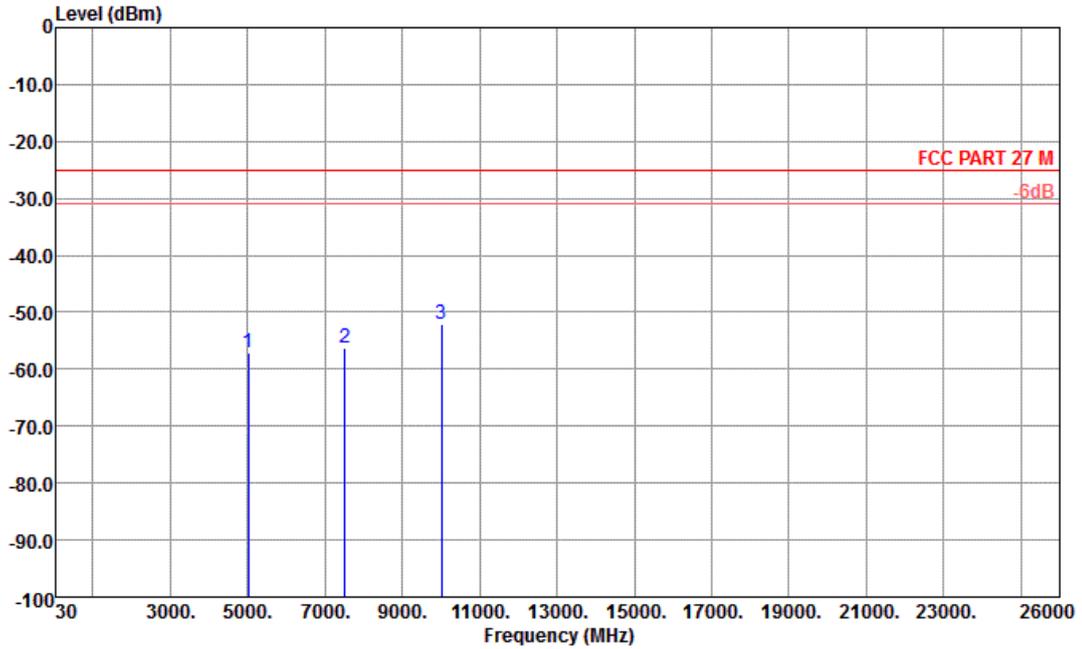


Site : 03CH01-KS
 Condition : FCC PART 27 M HF_EIRP_FACTOR130726 HORIZONTAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5001	-56.76	-25	-31.76	-60.67	-63.14	0.78	7.16	H	Pass
7501	-58.04	-25	-33.04	-66.04	-66.58	1.04	9.58	H	Pass
10002	-49.74	-25	-24.74	-64.58	-59.85	1.35	11.46	H	Pass



Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

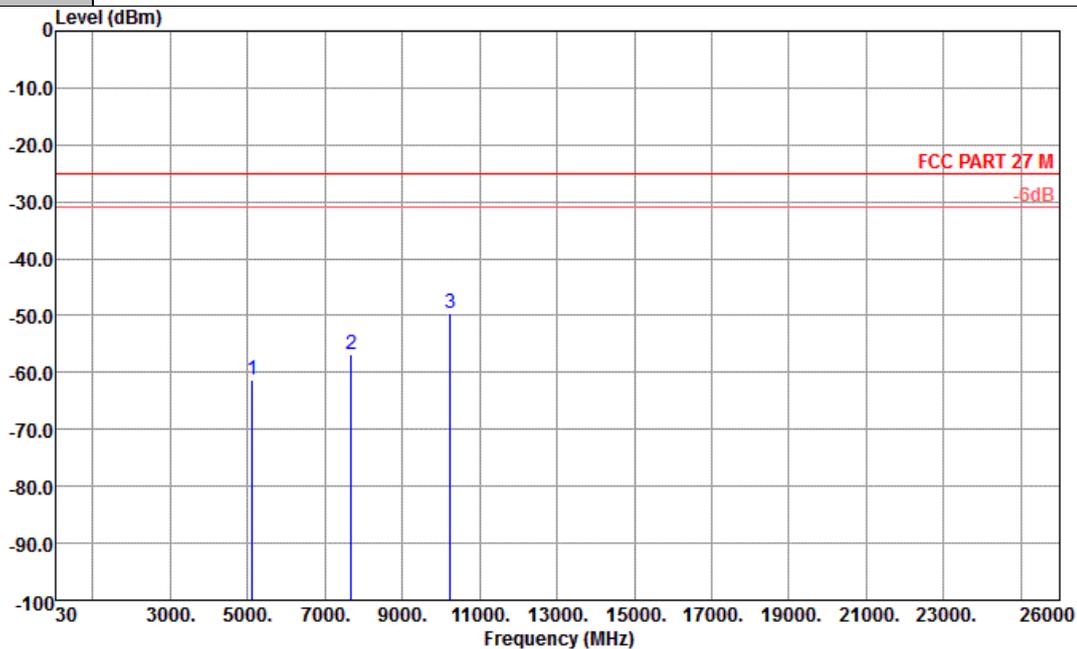


Site : 03CH01-KS
 Condition : FCC PART 27 M HF_EIRP_FACTOR130726 VERTICAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5001	-56.97	-25	-31.97	-63.52	-63.35	0.78	7.16	V	Pass
7501	-56.39	-25	-31.39	-66.19	-64.93	1.04	9.58	V	Pass
10002	-52.12	-25	-27.12	-64.77	-62.23	1.35	11.46	V	Pass



Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

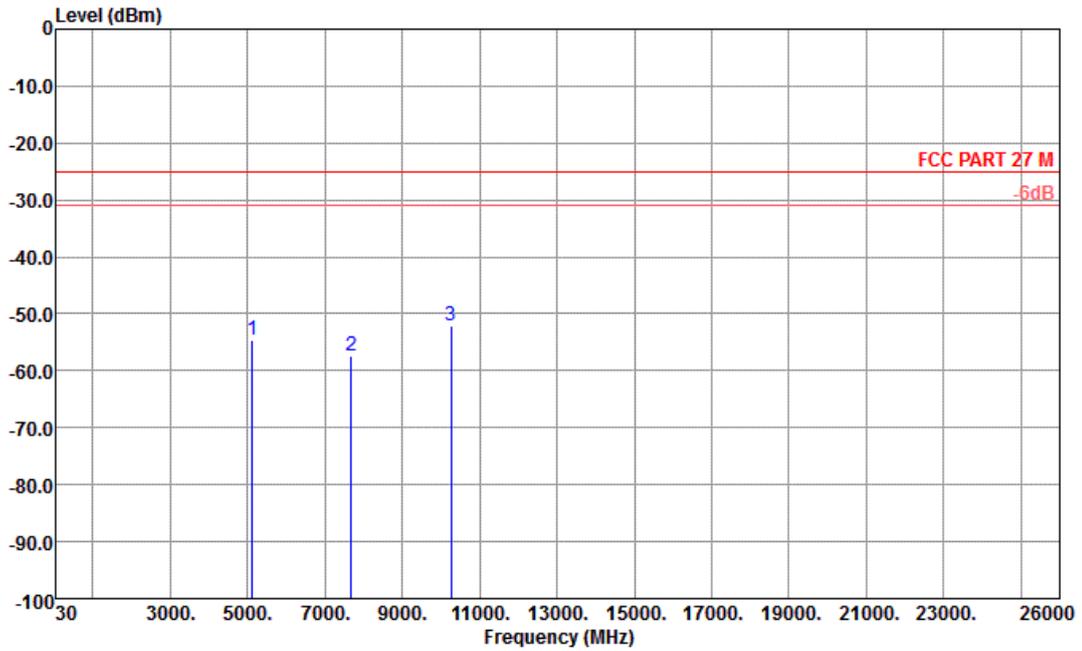


Site : 03CH01-KS
 Condition : FCC PART 27 M HF_EIRP_FACTOR130726 HORIZONTAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5112	-61.34	-25	-36.34	-62.98	-67.72	0.78	7.16	H	Pass
7667	-56.82	-25	-31.82	-64.82	-65.36	1.04	9.58	H	Pass
10223	-49.62	-25	-24.62	-64.46	-59.73	1.35	11.46	H	Pass



Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

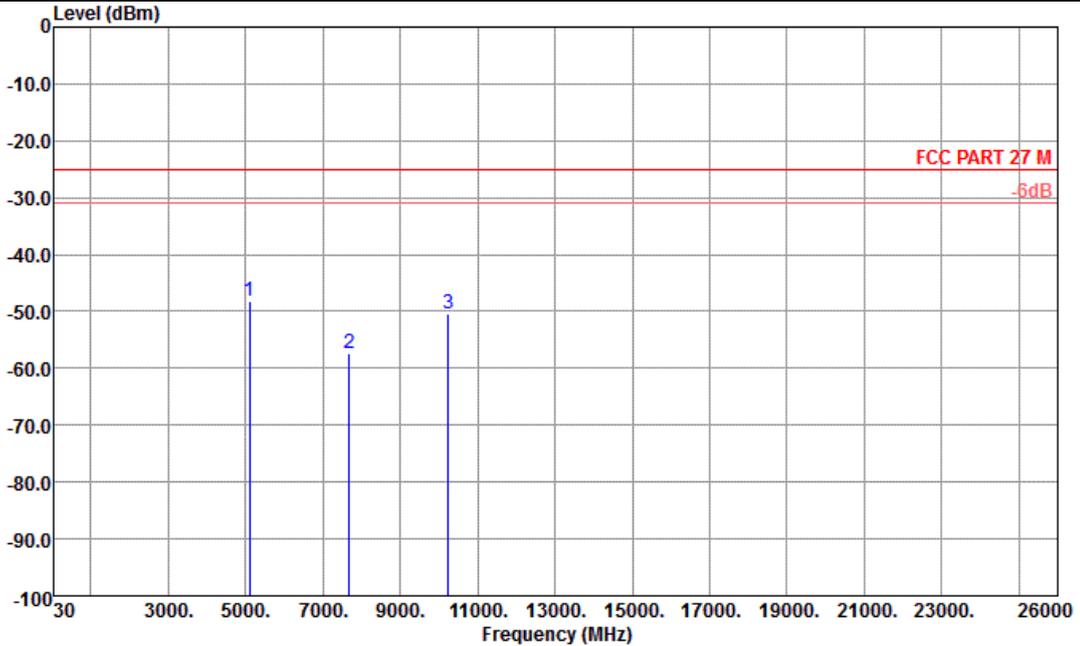


Site : 03CH01-KS
 Condition : FCC PART 27 M HF_EIRP_FACTOR130726 VERTICAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5112	-54.47	-25	-29.47	-61.98	-60.85	0.78	7.16	V	Pass
7667	-57.45	-25	-32.45	-67.25	-65.99	1.04	9.58	V	Pass
10223	-52.15	-25	-27.15	-64.8	-62.26	1.35	11.46	V	Pass



Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



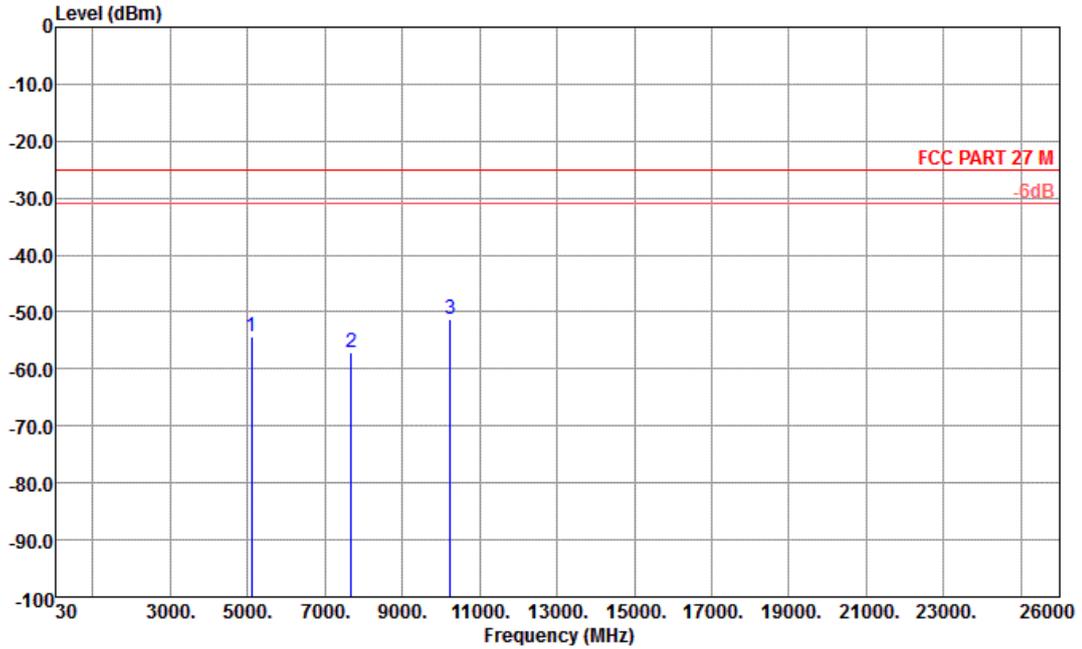
Site : 03CH01-KS

Condition : FCC PART 27 M HF_EIRP_FACTOR130726 HORIZONTAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5102	-48.10	-25	-23.10	-56.21	-54.48	0.78	7.16	H	Pass
7653	-57.26	-25	-32.26	-65.26	-65.80	1.04	9.58	H	Pass
10204	-50.45	-25	-25.45	-65.29	-60.56	1.35	11.46	H	Pass



Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	40~41%
Test Engineer :	Jun Liu	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



Site : 03CH01-KS
 Condition : FCC PART 27 M HF_EIRP_FACTOR130726 VERTICAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
5102	-54.40	-25	-29.40	-61.95	-60.78	0.78	7.16	V	Pass
7653	-57.13	-25	-32.13	-66.93	-65.67	1.04	9.58	V	Pass
10204	-51.27	-25	-26.27	-63.92	-61.38	1.35	11.46	V	Pass

3.7 Frequency Stability Measurement

3.7.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

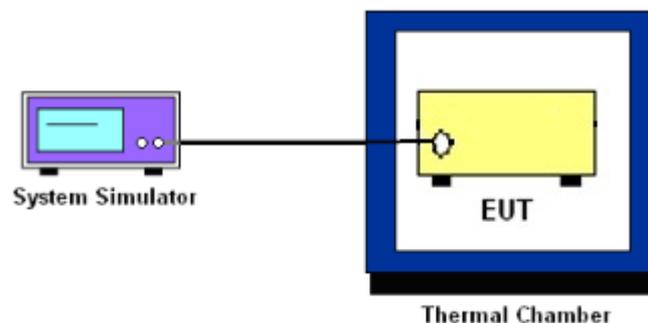
3.7.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.7.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the base station.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

3.7.5 Test Setup



3.7.6 Test Result of Temperature Variation (FCC)

Band :	LTE Band 7 (QPSK)		Limit (ppm) :	2.5	
Temperature (°C)	BW 5MHz		BW 10MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-5.4	-0.002	5.6	+0.002	PASS
-20	-2.5	-0.001	3.9	+0.002	
-10	-11.5	-0.005	-5.6	-0.002	
0	-2.9	-0.001	-3.6	-0.001	
10	-11.0	-0.004	-9.0	-0.004	
20	-2.0	-0.001	-2.5	-0.001	
30	3.8	+0.001	6.9	+0.003	
40	9.1	+0.004	-5.4	-0.002	
50	-8.0	-0.003	4.0	+0.002	

Band :	LTE Band 7 (QPSK)		Limit (ppm) :	2.5	
Temperature (°C)	BW 15MHz		BW 20MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	3.6	+0.001	8.2	+0.003	PASS
-20	-8.2	-0.003	-11.0	-0.004	
-10	-6.7	-0.003	-10.0	-0.004	
0	8.2	+0.003	-8.2	-0.003	
10	-11.0	-0.004	8.2	+0.003	
20	5.9	+0.002	-11.0	-0.004	
30	9.1	+0.004	-4.7	-0.002	
40	-5.6	-0.002	3.6	+0.001	
50	-2.5	-0.001	8.2	+0.003	



Band :	LTE Band 7 (16QAM)		Limit (ppm) :	2.5	
Temperature (°C)	BW 5MHz		BW 10MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	6.0	+0.002	-5.4	-0.002	PASS
-20	11.3	+0.004	-2.5	-0.001	
-10	-10.0	-0.004	-11.5	-0.005	
0	-8.2	-0.003	-5.6	-0.002	
10	8.0	+0.003	-3.6	-0.001	
20	-6.7	-0.003	3.8	+0.001	
30	-9.8	-0.004	4.9	+0.002	
40	-10.0	-0.004	-2.5	-0.001	
50	7.0	+0.003	-5.6	-0.002	

Band :	LTE Band 7 (16QAM)		Limit (ppm) :	2.5	
Temperature (°C)	BW 15MHz		BW 20MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	6.3	+0.002	5.0	+0.002	PASS
-20	4.9	+0.002	-11.0	-0.004	
-10	-5.6	-0.002	8.0	+0.003	
0	-3.6	-0.001	-10.0	-0.004	
10	-10.0	-0.004	-5.6	-0.002	
20	3.6	+0.001	-3.6	-0.001	
30	8.2	+0.003	-11.5	-0.005	
40	3.6	+0.001	-5.6	-0.002	
50	8.2	+0.003	3.8	+0.001	

3.7.7 Test Result of Voltage Variation (FCC)

Band	Bandwidth	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 7 (QPSK)	5M	5.25	3.0	+0.001	2.5	PASS
		5.00	3.2	+0.001		
		4.75	5.6	+0.002		
	10M	5.25	3.9	+0.002		
		5.00	-5.6	-0.002		
		4.75	-2.5	-0.001		
	15M	5.25	-5.6	-0.002		
		5.00	-2.5	-0.001		
		4.75	5.6	+0.002		
	20M	5.25	-11.5	-0.005		
		5.00	7.1	+0.003		
		4.75	10.3	+0.004		
LTE Band 7 (16QAM)	5M	5.25	-11.5	-0.005	2.5	PASS
		5.00	-2.9	-0.001		
		4.75	3.8	+0.001		
	10M	5.25	4.9	+0.002		
		5.00	-2.5	-0.001		
		4.75	-10.0	-0.004		
	15M	5.25	-5.6	-0.002		
		5.00	3.8	+0.001		
		4.75	3.2	+0.001		
	20M	5.25	4.9	+0.002		
		5.00	5.8	+0.002		
		4.75	6.0	+0.002		

Remark:

1. Normal Voltage = 5.00V.
2. The manufacturer declared that the EUT could work properly between voltage 4.75V ~ 5.25V.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Dec. 28, 2013	Mar. 27, 2014~ Mar. 31, 2014	Dec. 27, 2014	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	30MHz~40GHz	Feb. 27, 2014	Mar. 27, 2014~ Mar. 31, 2014	Feb. 26, 2015	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Feb. 27, 2014	Mar. 27, 2014~ Mar. 31, 2014	Feb. 26, 2015	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	(-40~+150)	Dec. 10, 2013	Mar. 27, 2014~ Mar. 31, 2014	Dec. 09, 2014	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 05, 2013	Mar. 21, 2014	Nov. 04, 2014	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 23, 2013	Mar. 21, 2014	May 22, 2014	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 06, 2013	Mar. 21, 2014	Dec. 05, 2014	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Dec. 06, 2013	Mar. 21, 2014	Dec. 05, 2014	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA17024 9	15GHz~40GHz	Nov. 22, 2013	Mar. 21, 2014	Nov. 21, 2014	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 18, 2013	Mar. 21, 2014	Nov. 17, 2014	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1GHz	May 23, 2013	Mar. 21, 2014	May 22, 2014	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Dec. 28, 2013	Mar. 21, 2014	Dec. 27, 2014	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Mar. 21, 2014	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Mar. 21, 2014	NCR	Radiation (03CH01-KS)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP 7	100819	9kHz~7GHz	May 23, 2013	Mar. 21, 2014	May 22, 2014	ERP/EIRP (OTA01-KS)
Switch Control Manframe	Agilent	3499A	MY42005452	N/A	N/A	Mar. 21, 2014	N/A	ERP/EIRP (OTA01-KS)
Dual 1-to-6(4) MW MUX	Agilent	N2276A	MY42000841	N/A	N/A	Mar. 21, 2014	N/A	ERP/EIRP (OTA01-KS)
Microwave Switch	Agilent	44476A	MY42002573	N/A	N/A	Mar. 21, 2014	N/A	ERP/EIRP (OTA01-KS)
Microwave Switch	Agilent	44476A	MY42002586	N/A	N/A	Mar. 21, 2014	N/A	ERP/EIRP (OTA01-KS)
Diagonal Dual Polarized Horn	ETS-Lindgren	3164-04	00066993	700MHz~6GHz	N/A	Mar. 21, 2014	N/A	ERP/EIRP (OTA01-KS)
Multi-Devices Controller	ETS-Lindgren	2090-OPT1	00066604	N/A	N/A	Mar. 21, 2014	N/A	ERP/EIRP (OTA01-KS)
Conical Log Spiral (Small)	ETS-Lindgren	3102	00066951	1~10GHz	N/A	Mar. 21, 2014	N/A	ERP/EIRP (OTA01-KS)
Turn Table	ETS-Lindgren	2088	N/A	Resolution : 0.1degree	N/A	Mar. 21, 2014	N/A	ERP/EIRP (OTA01-KS)
Limiting Amplifier	ETS-Lindgren	109643	920326	10MHz~2.5GHz	N/A	Mar. 21, 2014	N/A	ERP/EIRP (OTA01-KS)
EMQuest	ETS-Lindgren	EMQ-100	1125	N/A	N/A	Mar. 21, 2014	N/A	ERP/EIRP (OTA01-KS)
Medium Duty Holder	ETS-Lindgren	2015	N/A	N/A	N/A	Mar. 21, 2014	N/A	ERP/EIRP (OTA01-KS)



5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.54
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