

FCC RF Test Report

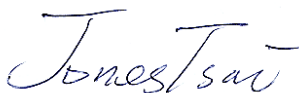
APPLICANT : ZTE CORPORATION
EQUIPMENT : 4G Wireless Router
BRAND NAME : ZTE
MODEL NAME : MF253
FCC ID : SRQZTEMF253
STANDARD : 47 CFR Part 2, 27(M)
CLASSIFICATION : PCS Licensed Transmitter (PCB)

The product was received on Oct. 09, 2013 and testing was completed on Oct. 24, 2013. 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.

TABLE OF CONTENTS

REVISION HISTORY.....	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant.....	5
1.2 Manufacturer.....	5
1.3 Feature of Equipment Under Test	5
1.4 Product Specification of Equipment Under Test.....	5
1.5 Modification of EUT	6
1.6 Maximum EIRP Power, Frequency Tolerance, and Emission Designator	6
1.7 Testing Site.....	7
1.8 Applied Standards	7
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	8
2.1 Test Mode.....	8
2.2 Connection Diagram of Test System.....	9
2.3 Support Unit used in test configuration and system	9
2.4 Measurement Results Explanation Example.....	10
3 TEST RESULT.....	11
3.1 Maximum Output Power and Effective Isotropic Radiated Power Measurement	11
3.2 99% Occupied Bandwidth and 26dB Bandwidth Measurement.....	17
3.3 Conducted Band Edge and Spurious Emission Measurement	27
3.4 Radiated Emissions Measurement.....	64
3.5 Frequency Stability Measurement.....	74
4 UNCERTAINTY OF EVALUATION	79
APPENDIX A. SETUP PHOTOGRAPHS	

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FW3O0907	Rev. 01	Initial issue of report	Dec. 04, 2013

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1033 §2.1046 §27.50	Maximum Output Power	Output Power < 2 Watts	PASS	-
3.1	§27.50	Equivalent Isotropic Radiated Power	< 33 dBW + 10 log(X/Y) dBW + 10 log(360/beamwidth) dBW	PASS	-
3.2	§2.1049 §27.53	Emissions Bandwidth	N/A	PASS	-
3.3	§2.1033 §2.1046 §27.50	Conducted Band Edge Emissions and Spurious Emissions	< 5.5MHz: -13 dBm ≥5.5MHz: -25 dBm	PASS	-
3.4	§2.1053 §27.53	Field Strength of Spurious Radiation	-25 dBm	PASS	Under limit 1.33 dB at 10016.000 MHz
3.5	§2.1055 §27.54	Frequency Stability for 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	4G Wireless Router
Brand Name	ZTE
Model Name	MF253
FCC ID	SRQZTEMF253
EUT supports Radios application	WCDMA/HSPA/HSPA+/DC-HSDPA/LTE/ WLAN 2.4GHz 802.11bgn
HW Version	D68a
SW Version	EN_ZTE_MF253V1.0.0B05
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	2506.5 MHz ~ 2534.5 MHz, 2562.5 MHz ~ 2567.5 MHz
Rx Frequency	2626.5 MHz ~ 2654.5 MHz, 2666.5 MHz ~ 2687.5 MHz
Bandwidth	5MHz/10MHz/15MHz/20MHz
Maximum Output Average Power to Antenna	21.65 dBm
Antenna Type	Monopole 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	Frequency Tolerance (% , Hz, ppm)	Emission Designator
Part 27	LTE Band 7	QPSK	5MHz	0.25	0.005 ppm	4M52G7D
Part 27	LTE Band 7	16QAM	5MHz	0.21	0.005 ppm	4M52D7W
Part 27	LTE Band 7	QPSK	10MHz	0.25	0.004 ppm	9M16G7D
Part 27	LTE Band 7	16QAM	10MHz	0.21	0.005 ppm	9M16D7W
Part 27	LTE Band 7	QPSK	15MHz	0.25	0.004 ppm	13M6G7D
Part 27	LTE Band 7	16QAM	15MHz	0.19	0.004 ppm	13M6D7W
Part 27	LTE Band 7	QPSK	20MHz	0.21	0.005 ppm	18M8G7D
Part 27	LTE Band 7	16QAM	20MHz	0.17	0.005 ppm	18M8D7W

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

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

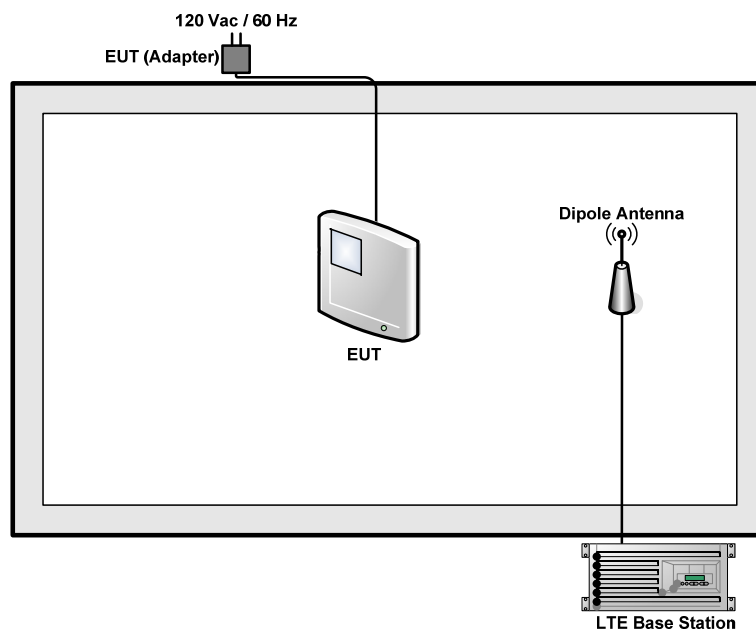
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission: 30MHz to 26000 MHz.

Test Modes			
Band		Radiated TCs	Conducted TCs
		Modulation : QPSK	Modulation : QPSK / 16QAM
LTE Band 7	BW 5MHz	■ LTE (RB Size 1, RB Offset 0) QPSK Link	■ LTE (RB Size 1) Link ■ LTE (RB Size 12) Link ■ LTE (RB Size 25) Link
	BW 10MHz	■ LTE (RB Size 1, RB Offset 0) QPSK Link	■ LTE (RB Size 1) Link ■ LTE (RB Size 25) Link ■ LTE (RB Size 50) Link
	BW 15MHz	■ LTE (RB Size 1, RB Offset 0) QPSK Link	■ LTE (RB Size 1) Link ■ LTE (RB Size 36) Link ■ LTE (RB Size 75) Link
	BW 20MHz	■ LTE (RB Size 1, RB Offset 0) QPSK Link	■ 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 QPSK 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

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 and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5.6 dB and 10dB attenuator.

Example :

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 5.6 + 10 = 15.6 \text{ (dB)}\end{aligned}$$

3 Test Result

3.1 Maximum Output Power and Effective Isotropic Radiated Power Measurement

3.1.1 Limit

For mobile and other user stations, mobile stations are limited to 2.0 watts EIRP and all user stations are limited to 2.0 watts transmitter output power. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (p) by a factor of mobile digital stations, the attenuation factor 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.

3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

For Conducted Power Measurement:

1. The RF output of the transmitter was connected to base station simulator.
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. Set EUT at maximum average power by base station simulator.
4. Measure lowest, middle, and highest channels for each bandwidth and different modulation.

For Effective Isotropic Radiated Power Measurement:

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. LTE operating modes: Set RBW= 100 KHz, VBW= 300 KHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, 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 EIRP.
6. Taking the record of maximum 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 EIRP of the substitution antenna.
10. $EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$
Ps (dBm) : Input power to substitution antenna.

Gs (dBi or dBd) : Substitution antenna Gain.

$E_t = R_t + AF$

$E_s = R_s + AF$

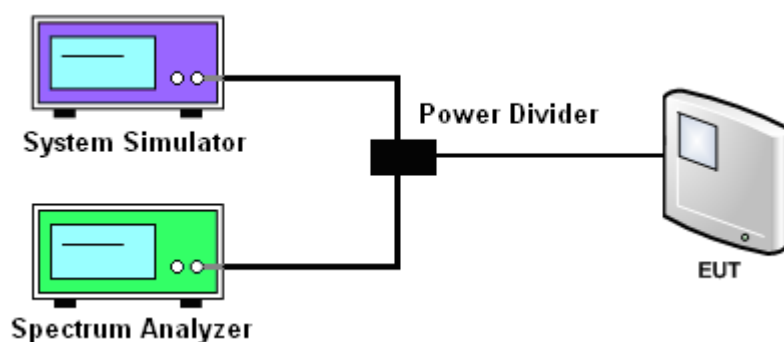
AF (dB/m) : Receive antenna factor

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

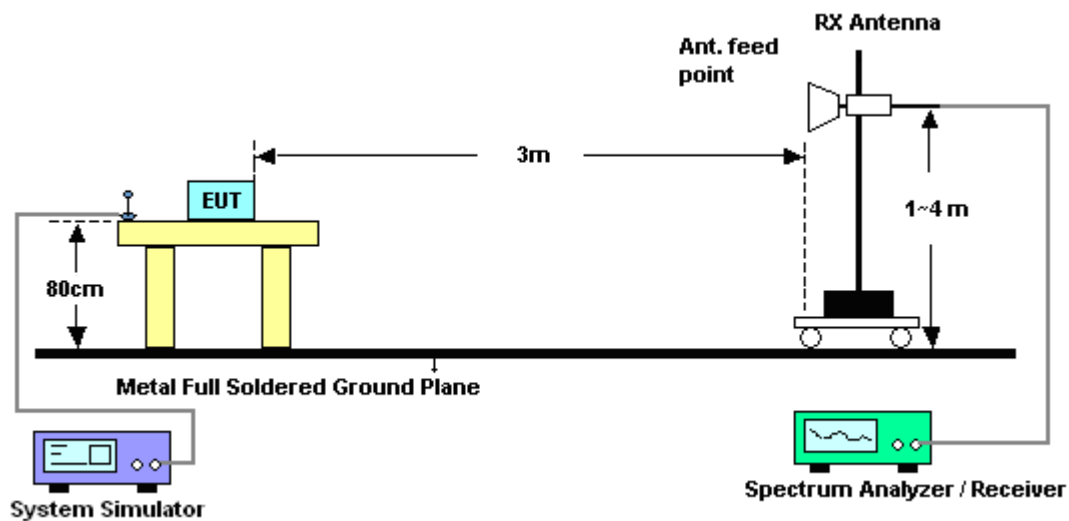
R_s : The highest received signal in spectrum analyzer for substitution antenna.

3.1.4 Test Setup

<Conducted Power and Band Edge Measurement>



<Effective Isotropic Radiated Power Measurement>



3.1.5 Test Result of Conducted Output Power

BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				20890	21020	
Frequency (MHz)				2514	2527	
20	QPSK	1	0	21.34	21.40	
20	QPSK	1	49	21.23	21.34	
20	QPSK	1	99	21.31	21.37	
20	QPSK	50	0	20.17	20.10	
20	QPSK	50	24	20.07	20.07	
20	QPSK	50	49	20.14	20.09	
20	QPSK	100	0	20.06	20.08	
20	16QAM	1	0	20.57	20.49	
20	16QAM	1	49	20.41	20.46	
20	16QAM	1	99	20.45	20.48	
20	16QAM	50	0	19.15	19.15	
20	16QAM	50	24	19.12	19.12	
20	16QAM	50	49	19.17	19.19	
20	16QAM	100	0	19.14	19.17	
Channel				20865	21045	21375
Frequency (MHz)				2511.5	2529.5	2562.5
15	QPSK	1	0	21.59	21.34	21.65
15	QPSK	1	37	21.53	21.26	21.42
15	QPSK	1	74	21.44	21.33	21.48
15	QPSK	36	0	20.17	20.02	20.17
15	QPSK	36	18	20.25	20.05	20.22
15	QPSK	36	37	20.30	20.10	20.12
15	QPSK	75	0	20.16	20.05	20.20
15	16QAM	1	0	20.75	20.77	20.61
15	16QAM	1	37	20.65	20.47	20.54
15	16QAM	1	74	20.70	20.75	20.53
15	16QAM	36	0	19.28	19.15	19.30
15	16QAM	36	18	19.34	19.11	19.23
15	16QAM	36	37	19.50	19.21	19.32
15	16QAM	75	0	19.36	19.08	19.26

BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				20840	21070	21400
Frequency (MHz)				2509	2532	2565
10	QPSK	1	0	21.52	21.36	21.35
10	QPSK	1	24	21.46	21.21	21.26
10	QPSK	1	49	21.39	21.34	21.33
10	QPSK	25	0	20.53	19.95	20.30
10	QPSK	25	12	20.46	19.91	20.26
10	QPSK	25	24	20.12	19.89	20.24
10	QPSK	50	0	20.14	19.95	20.23
10	16QAM	1	0	20.68	20.47	20.55
10	16QAM	1	24	20.58	20.32	20.46
10	16QAM	1	49	20.67	20.44	20.49
10	16QAM	25	0	19.63	19.04	19.39
10	16QAM	25	12	19.56	19.03	19.34
10	16QAM	25	24	19.22	19.02	19.35
10	16QAM	50	0	19.25	19.07	19.21
Channel				20815	21095	21425
Frequency (MHz)				2506.5	2534.5	2567.5
5	QPSK	1	0	21.53	21.39	21.61
5	QPSK	1	12	21.48	21.35	21.60
5	QPSK	1	24	21.51	21.36	21.47
5	QPSK	12	0	20.45	20.28	20.48
5	QPSK	12	6	20.39	20.31	20.49
5	QPSK	12	11	20.46	20.28	20.42
5	QPSK	25	0	20.45	20.29	20.36
5	16QAM	1	0	20.70	20.44	20.64
5	16QAM	1	12	20.63	20.42	20.51
5	16QAM	1	24	20.69	20.39	20.58
5	16QAM	12	0	19.61	19.48	19.57
5	16QAM	12	6	19.53	19.44	19.55
5	16QAM	12	11	19.55	19.38	19.49
5	16QAM	25	0	19.52	19.40	19.38

Note: Maximum average power for LTE.

3.1.6 Test Result of Effective Isotropic Radiated Power

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	2506.5	22.18	0.17	H
7	5	QPSK	1	0	2534.5	23.01	0.20	H
7	5	QPSK	1	0	2567.5	22.91	0.20	H
7	5	QPSK	1	0	2506.5	23.17	0.21	V
7	5	QPSK	1	0	2534.5	23.36	0.22	V
7	5	QPSK	1	0	2567.5	24.03	0.25	V
7	5	16QAM	1	0	2506.5	21.14	0.13	H
7	5	16QAM	1	0	2534.5	21.90	0.15	H
7	5	16QAM	1	0	2567.5	22.04	0.16	H
7	5	16QAM	1	0	2506.5	22.16	0.16	V
7	5	16QAM	1	0	2534.5	22.12	0.16	V
7	5	16QAM	1	0	2567.5	23.15	0.21	V
7	10	QPSK	1	0	2509	22.16	0.16	H
7	10	QPSK	1	0	2532	22.82	0.19	H
7	10	QPSK	1	0	2565	23.00	0.20	H
7	10	QPSK	1	0	2509	23.06	0.20	V
7	10	QPSK	1	0	2532	22.99	0.20	V
7	10	QPSK	1	0	2565	24.03	0.25	V
7	10	16QAM	1	0	2509	21.06	0.13	H
7	10	16QAM	1	0	2532	21.78	0.15	H
7	10	16QAM	1	0	2565	22.06	0.16	H
7	10	16QAM	1	0	2509	22.03	0.16	V
7	10	16QAM	1	0	2532	21.93	0.16	V
7	10	16QAM	1	0	2565	23.14	0.21	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	2511.5	22.17	0.16	H
7	15	QPSK	1	0	2529.5	22.93	0.20	H
7	15	QPSK	1	0	2562.5	23.05	0.20	H
7	15	QPSK	1	0	2511.5	23.20	0.21	V
7	15	QPSK	1	0	2529.5	23.04	0.20	V
7	15	QPSK	1	0	2562.5	24.00	0.25	V
7	15	16QAM	1	0	2511.5	21.19	0.13	H
7	15	16QAM	1	0	2529.5	21.83	0.15	H
7	15	16QAM	1	0	2562.5	21.98	0.16	H
7	15	16QAM	1	0	2511.5	22.15	0.16	V
7	15	16QAM	1	0	2529.5	21.94	0.16	V
7	15	16QAM	1	0	2562.5	22.87	0.19	V
7	20	QPSK	1	0	2514	22.19	0.17	H
7	20	QPSK	1	0	2527	23.05	0.20	H
7	20	QPSK	1	0	2514	23.16	0.21	V
7	20	QPSK	1	0	2527	23.08	0.20	V
7	20	16QAM	1	0	2514	21.19	0.13	H
7	20	16QAM	1	0	2527	21.82	0.15	H
7	20	16QAM	1	0	2514	22.19	0.17	V
7	20	16QAM	1	0	2527	22.00	0.16	V

3.2 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.2.1 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 emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

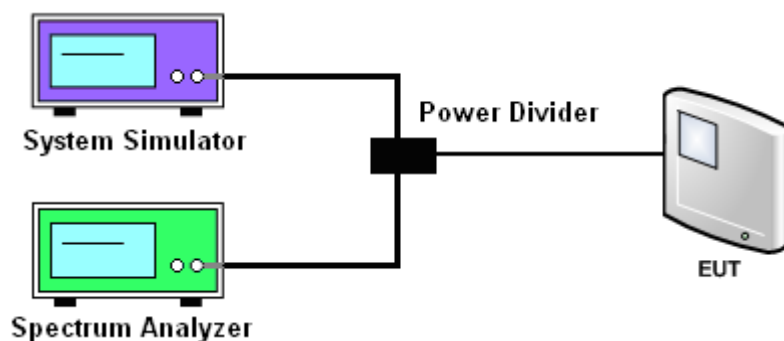
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 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 99% occupied bandwidth and 26 dB bandwidth of the middle channel for the highest RF powers were measured.

3.2.4 Test Setup



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

Modes	LTE Band 7			
BW / Modulation	5MHz / QPSK	5MHz / 16QAM	10MHz / QPSK	10MHz / 16QAM
99% OBW (MHz)	4.52	4.52	9.16	9.16
26dB BW (MHz)	5.16	5.12	10.08	10.08

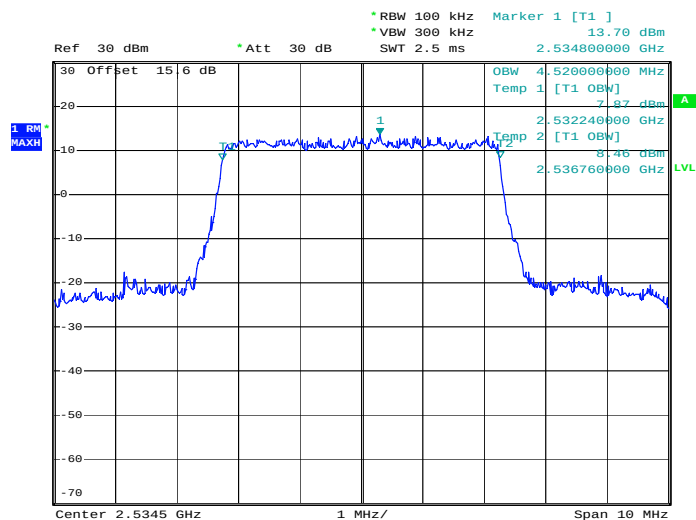
Modes	LTE Band 7			
BW / Modulation	15MHz / QPSK	15MHz / 16QAM	20MHz / QPSK	20MHz / 16QAM
99% OBW (MHz)	13.56	13.56	18.80	18.80
26dB BW (MHz)	14.70	14.94	21.36	21.20

3.2.7 Test Plots of 99% Occupied Bandwidth and 26dB Bandwidth

Band :	LTE Band 7	BW / Mod. :	5MHz / QPSK
---------------	------------	--------------------	-------------

99% Occupied Bandwidth Plot on Channel 21095

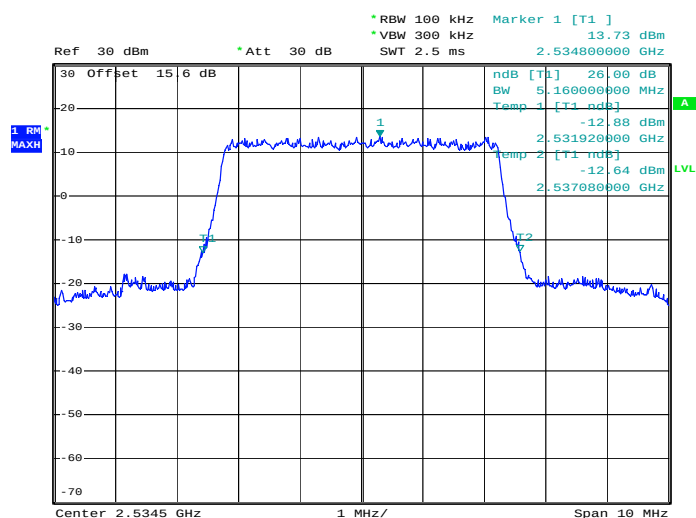
for RB Size 25, RB Offset 0



Date: 27.SEP.2013 11:35:55

26dB Bandwidth Plot on Channel 21095

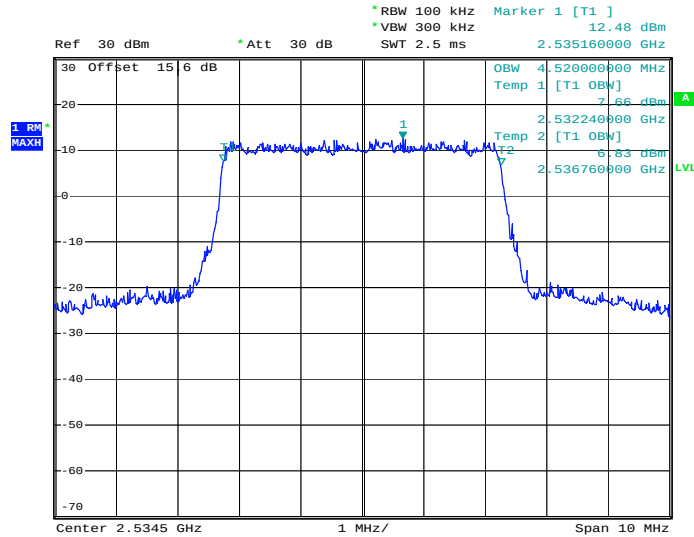
for RB Size 25, RB Offset 0



Date: 27.SEP.2013 10:41:27

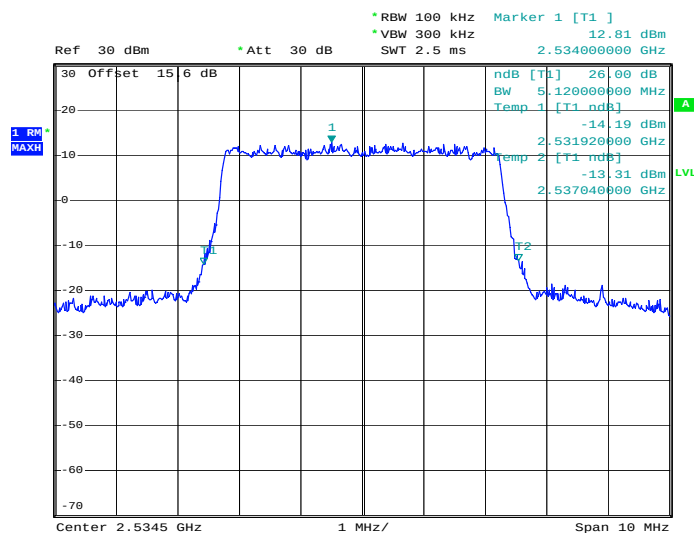
Band :	LTE Band 7	BW / Mod. :	5MHz / 16QAM
---------------	------------	--------------------	--------------

**99% Occupied Bandwidth Plot on Channel 21095
for RB Size 25, RB Offset 0**



Date: 27.SEP.2013 11:35:00

**26dB Bandwidth Plot on Channel 21095
for RB Size 25, RB Offset 0**

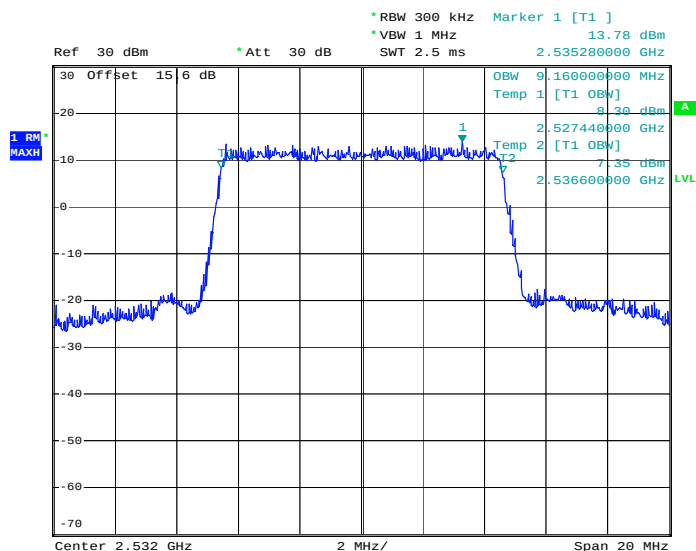


Date: 27.SEP.2013 10:43:13



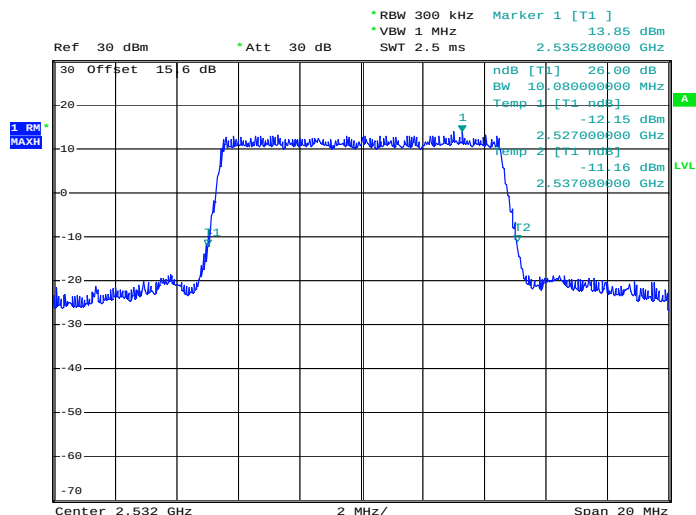
Band :	LTE Band 7	BW / Mod. :	10MHz / QPSK
--------	------------	-------------	--------------

99% Occupied Bandwidth Plot on Channel 21070
for RB Size 50, RB Offset 0



Date: 27.SEP.2013 11:44:30

26dB Bandwidth Plot on Channel 21070
for RB Size 50, RB Offset 0

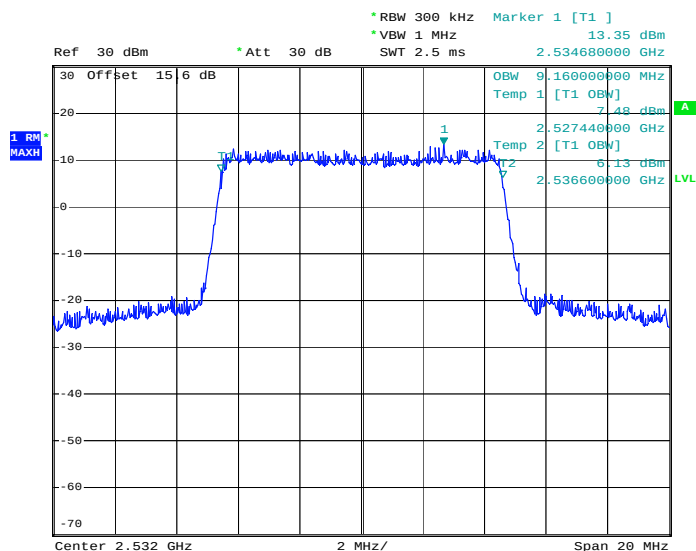


Date: 27.SEP.2013 10:46:43



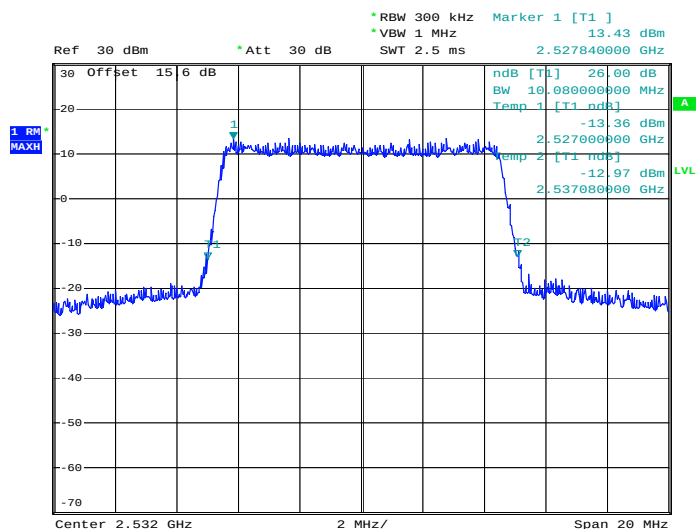
Band :	LTE Band 7	BW / Mod. :	10MHz / 16QAM
--------	------------	-------------	---------------

99% Occupied Bandwidth Plot on Channel 21070
for RB Size 50, RB Offset 0



Date: 27.SEP.2013 11:43:54

26dB Bandwidth Plot on Channel 21070
for RB Size 50, RB Offset 0

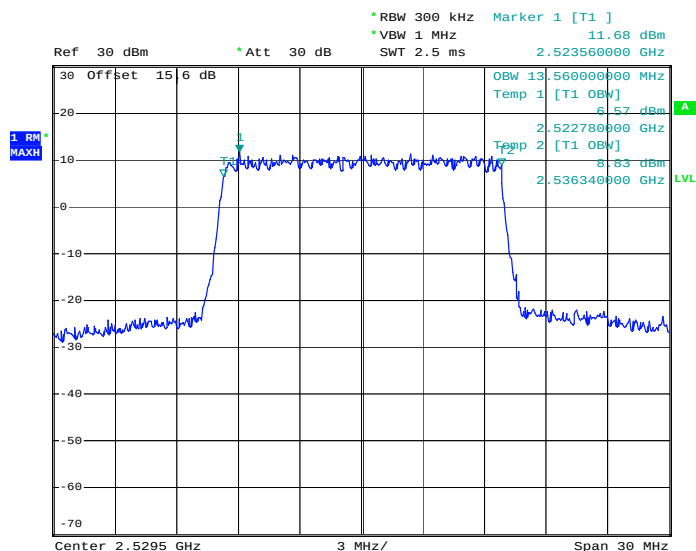


Date: 27.SEP.2013 10:45:47



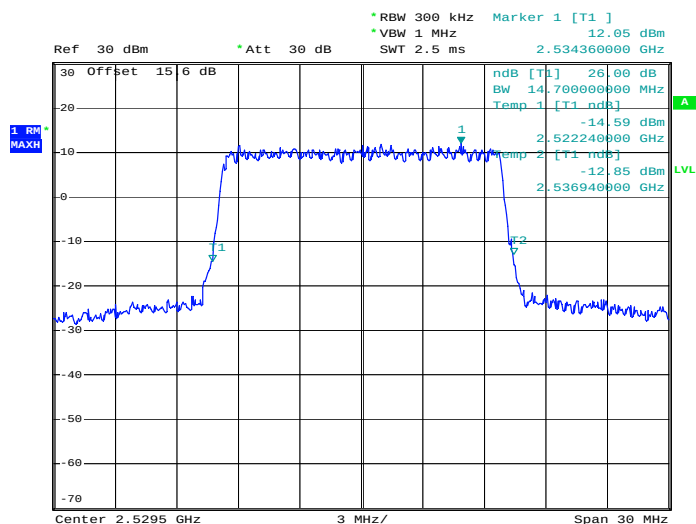
Band :	LTE Band 7	BW / Mod. :	15MHz / QPSK
--------	------------	-------------	--------------

99% Occupied Bandwidth Plot on Channel 21045
for RB Size 75, RB Offset 0



Date: 27.SEP.2013 11:53:33

26dB Bandwidth Plot on Channel 21045
for RB Size 75, RB Offset 0

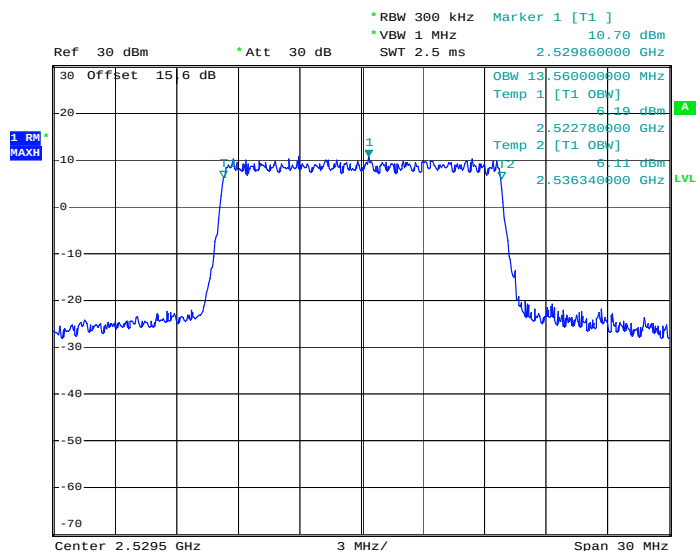


Date: 27.SEP.2013 10:48:10



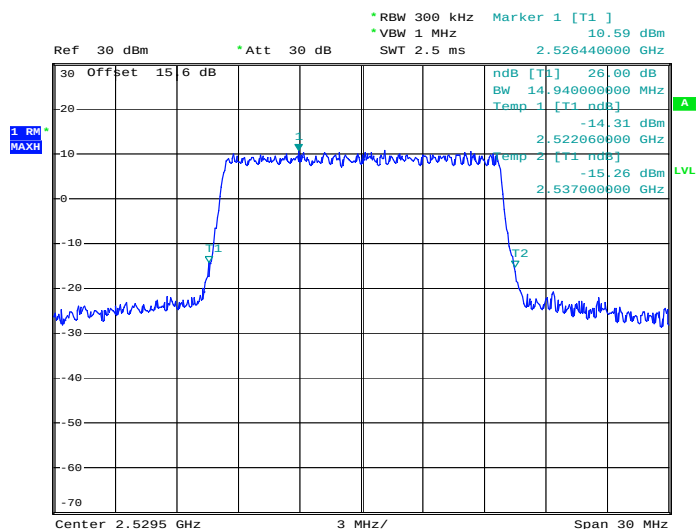
Band :	LTE Band 7	BW / Mod. :	15MHz / 16QAM
--------	------------	-------------	---------------

99% Occupied Bandwidth Plot on Channel 21045
for RB Size 75, RB Offset 0



Date: 27.SEP.2013 11:52:57

26dB Bandwidth Plot on Channel 21045
for RB Size 75, RB Offset 0

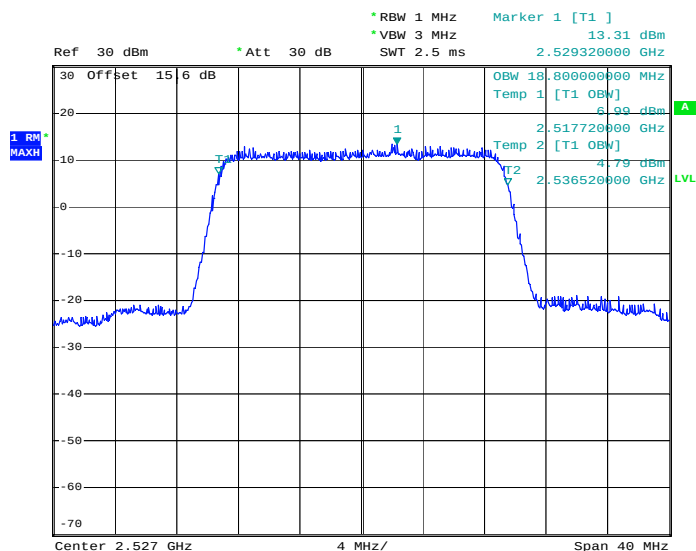


Date: 27.SEP.2013 10:49:03



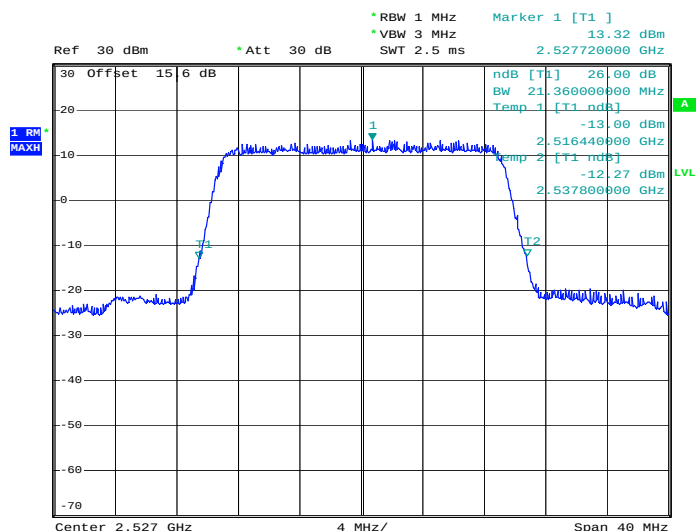
Band :	LTE Band 7	BW / Mod. :	20MHz / QPSK
--------	------------	-------------	--------------

99% Occupied Bandwidth Plot on Channel 21020
for RB Size 100, RB Offset 0



Date: 27.SEP.2013 13:15:40

26dB Bandwidth Plot on Channel 21020
for RB Size 100, RB Offset 0

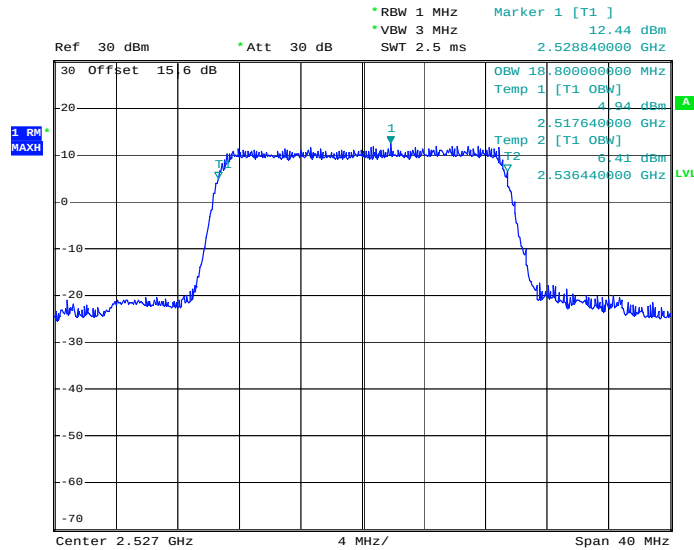


Date: 27.SEP.2013 10:51:35



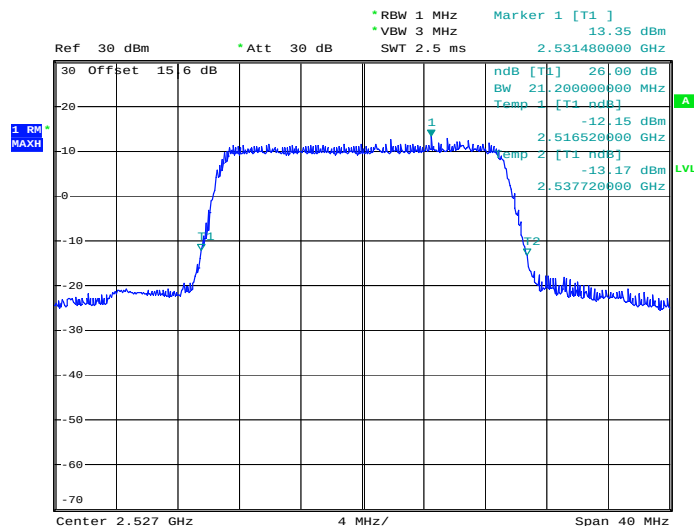
Band :	LTE Band 7	BW / Mod. :	20MHz / 16QAM
--------	------------	-------------	---------------

99% Occupied Bandwidth Plot on Channel 21020
for RB Size 100, RB Offset 0



Date: 27.SEP.2013 13:14:59

26dB Bandwidth Plot on Channel 21020 for
RB Size 100, RB Offset 0



Date: 27.SEP.2013 10:50:45

3.3 Conducted Band Edge and Spurious Emission Measurement

3.3.1 Description of Conducted Band Edge and Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of mobile digital stations, the attenuation factor 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. It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

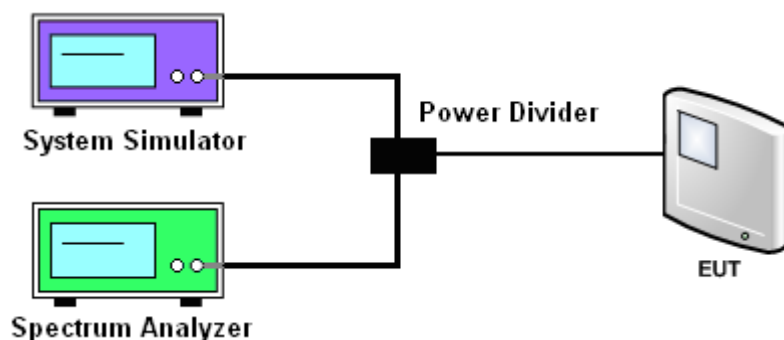
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The EUT was connected to spectrum analyzer and System Simulator 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 conducted spurious emission for the whole frequency range was taken.

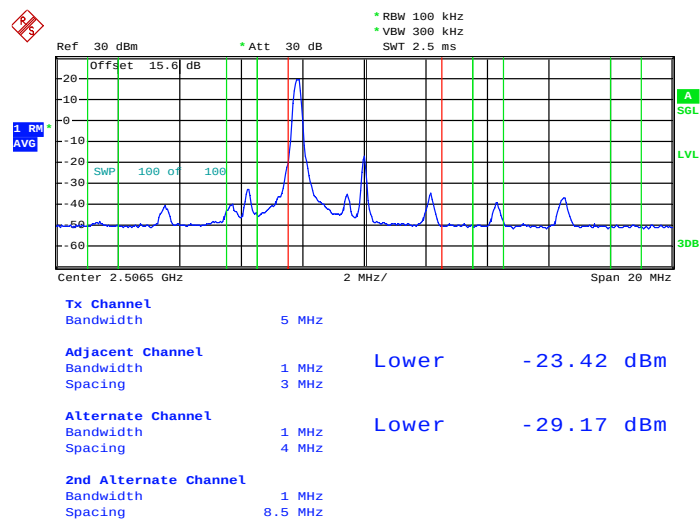
3.3.4 Test Setup



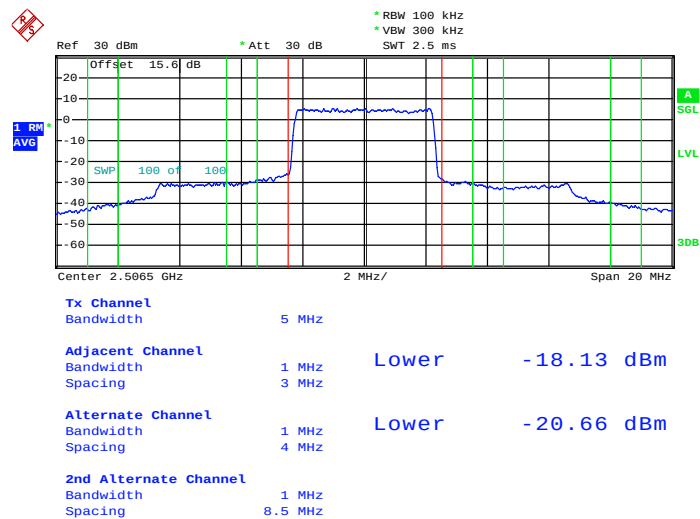
3.3.5 Test Plots of Conducted Band-Edge Emission

Band :	LTE Band 7	Band Width	5MHz / QPSK
--------	------------	------------	-------------

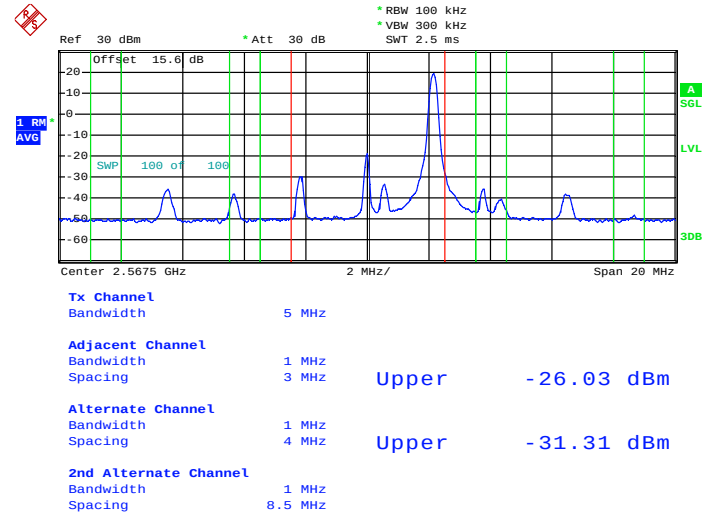
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



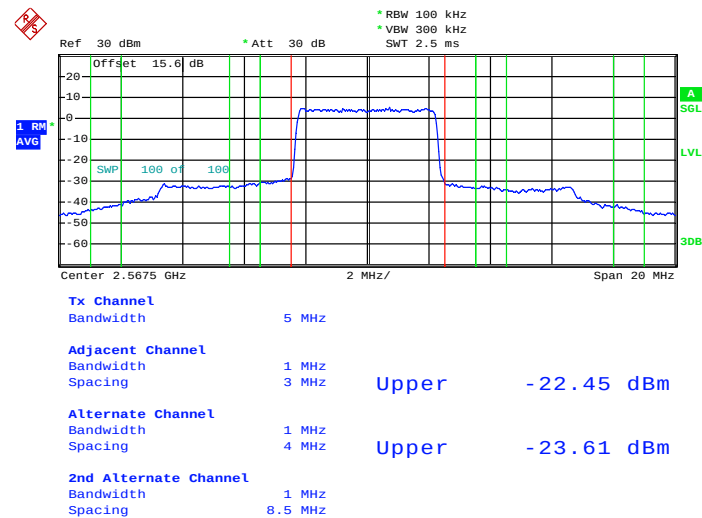
Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0



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



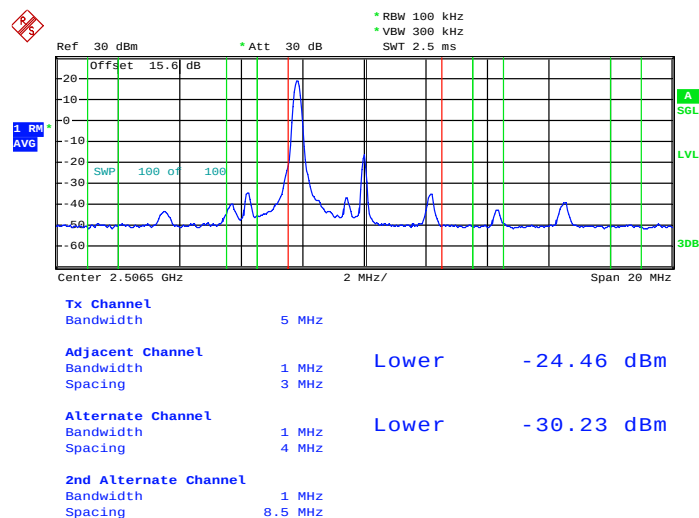
Higher Band Edge Plot for QPSK-RB Size 25, RB Offset 0



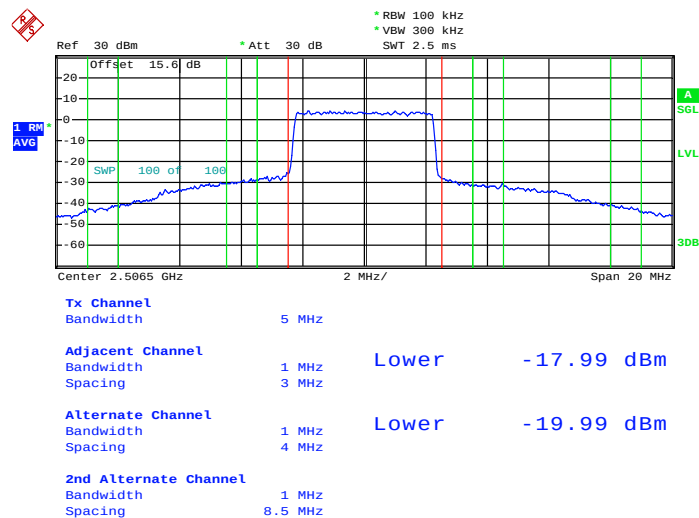


Band :	LTE Band 7	Band Width	5MHz / 16QAM
--------	------------	------------	--------------

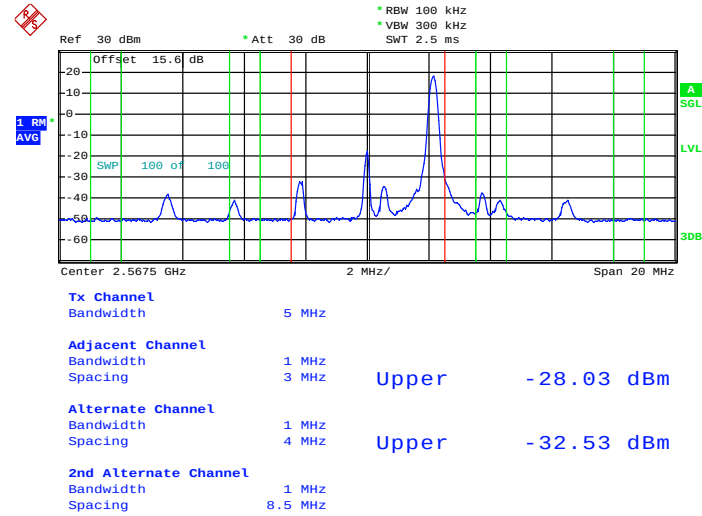
Lower Band Edge Plot for 16QAM -RB Size 1, RB Offset 0



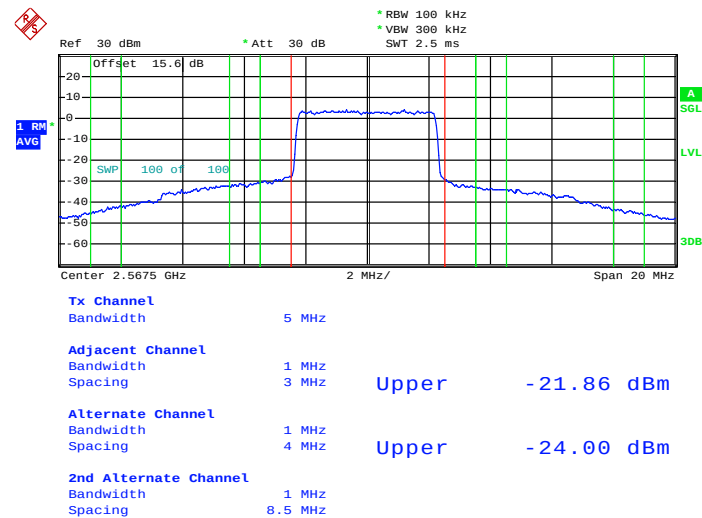
Lower Band Edge Plot for 16QAM -RB Size 25, RB Offset 0



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

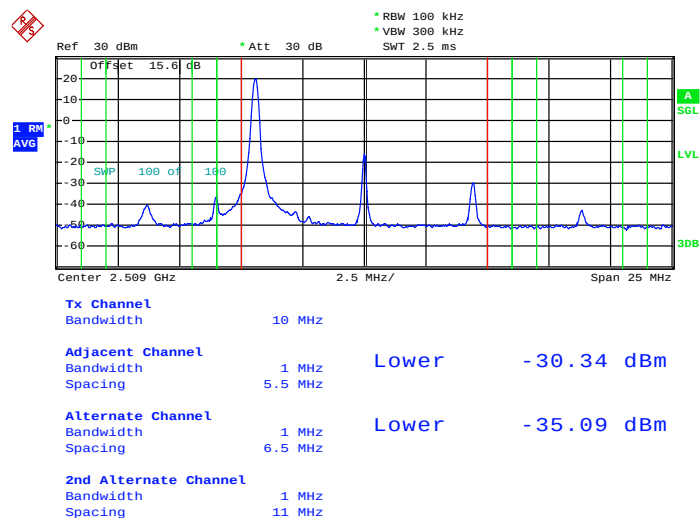


Higher Band Edge Plot for 16QAM -RB Size 25, RB Offset 0

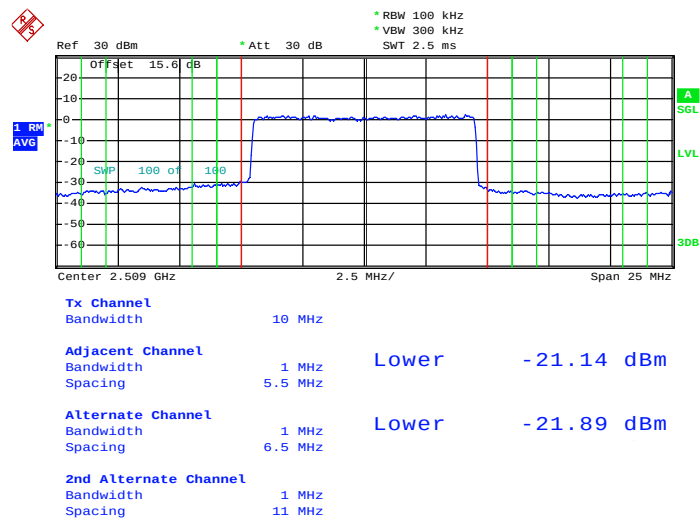


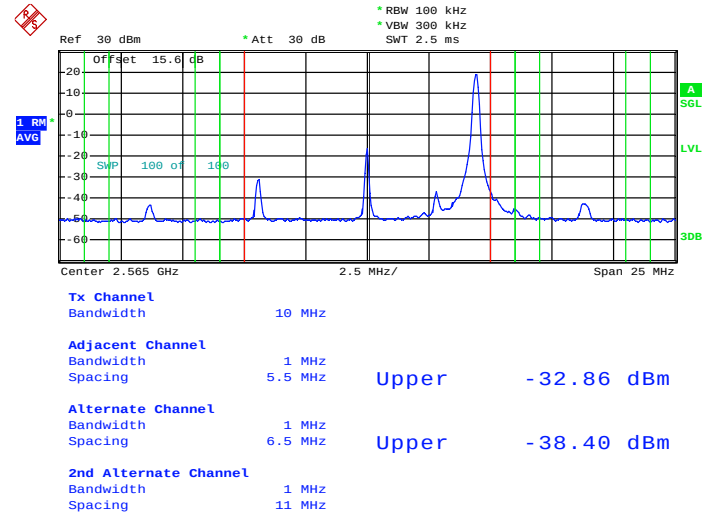
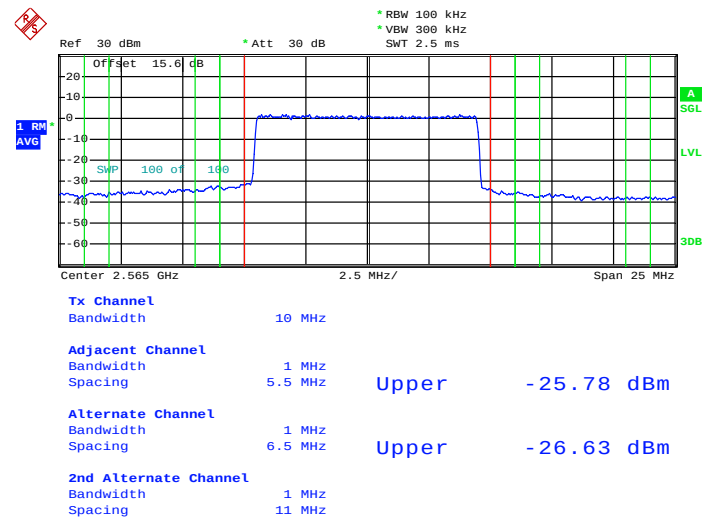
Band :	LTE Band 7	Band Width	10MHz / QPSK
--------	------------	------------	--------------

Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



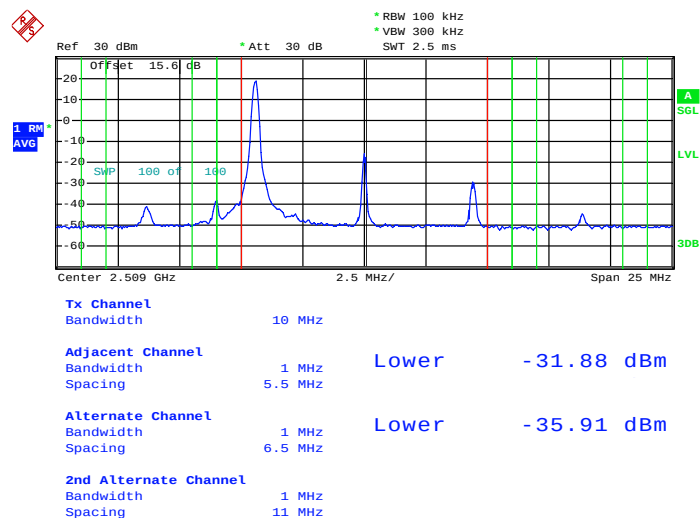
Lower Band Edge Plot for QPSK-RB Size 50, RB Offset 0



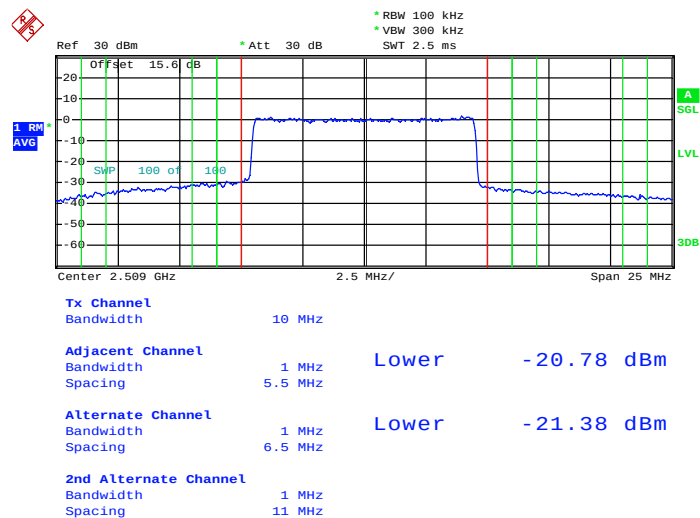
Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 49

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


Band :	LTE Band 7	Band Width	10MHz / 16QAM
--------	------------	------------	---------------

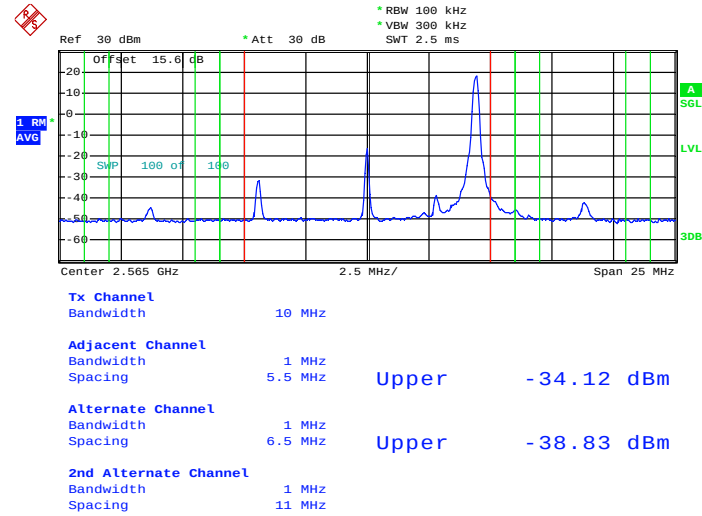
Lower Band Edge Plot for 16QAM -RB Size 1, RB Offset 0



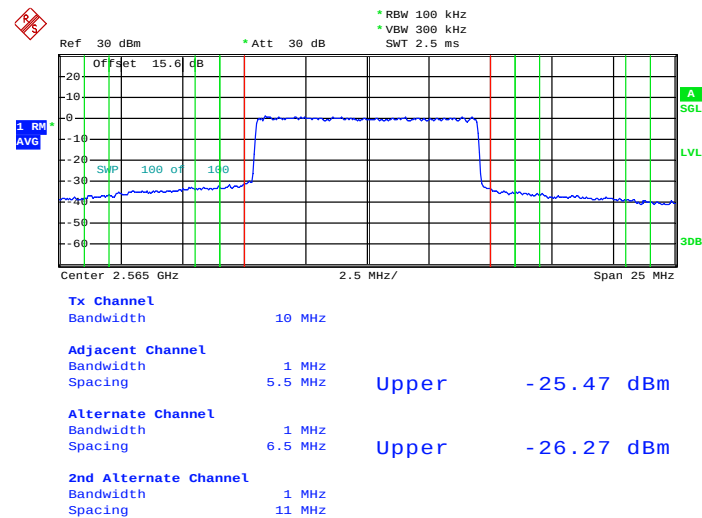
Lower Band Edge Plot for 16QAM -RB Size 50, RB Offset 0



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

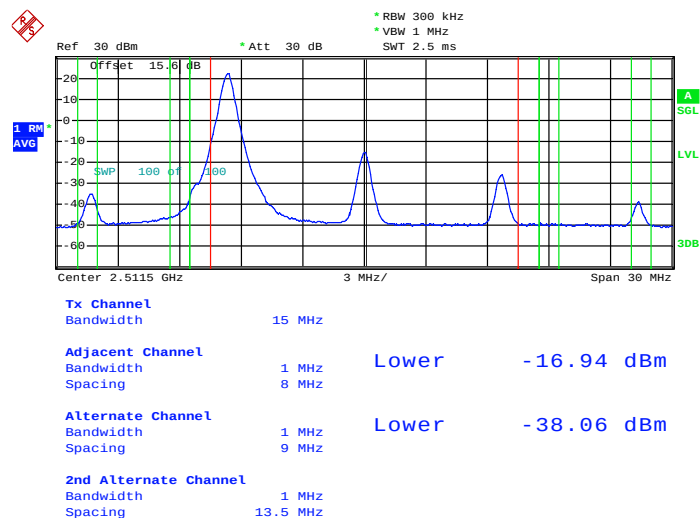


Higher Band Edge Plot for 16QAM -RB Size 50, RB Offset 0

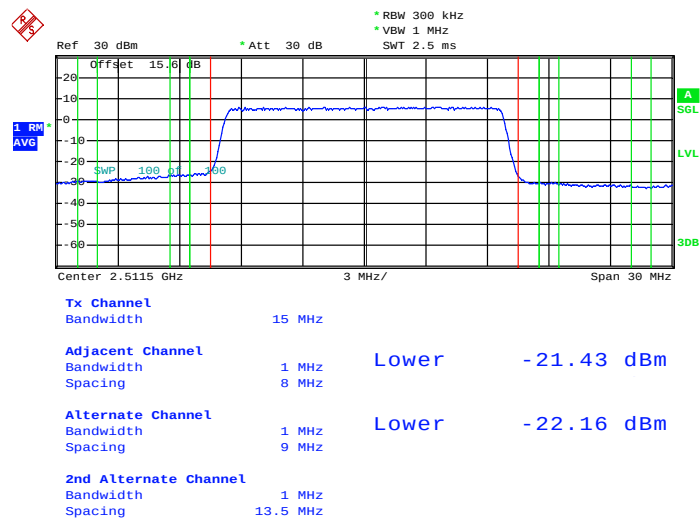


Band :	LTE Band 7	Band Width	15MHz / QPSK
--------	------------	------------	--------------

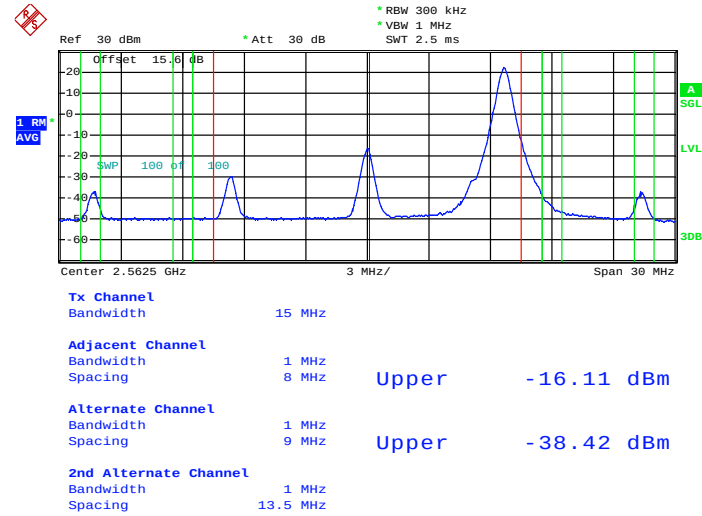
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



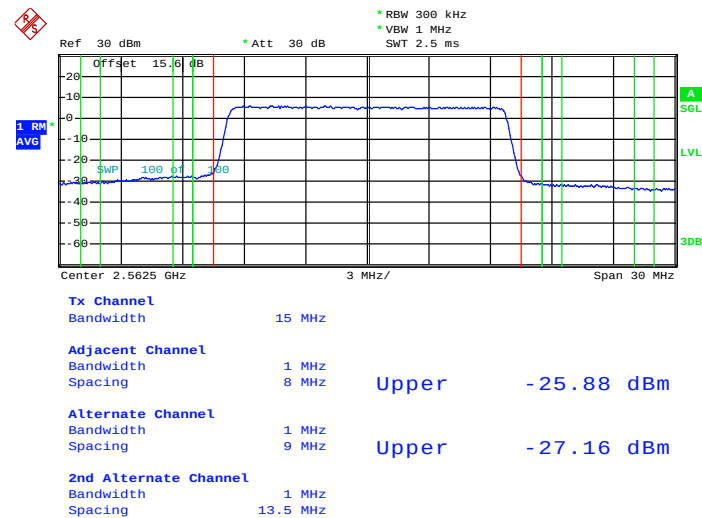
Lower Band Edge Plot for QPSK-RB Size 75, RB Offset 0



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

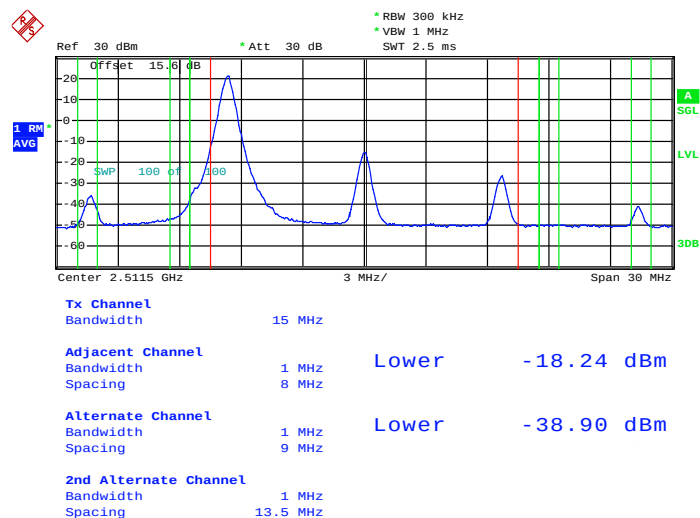


Higher Band Edge Plot for QPSK-RB Size 75, RB Offset 0

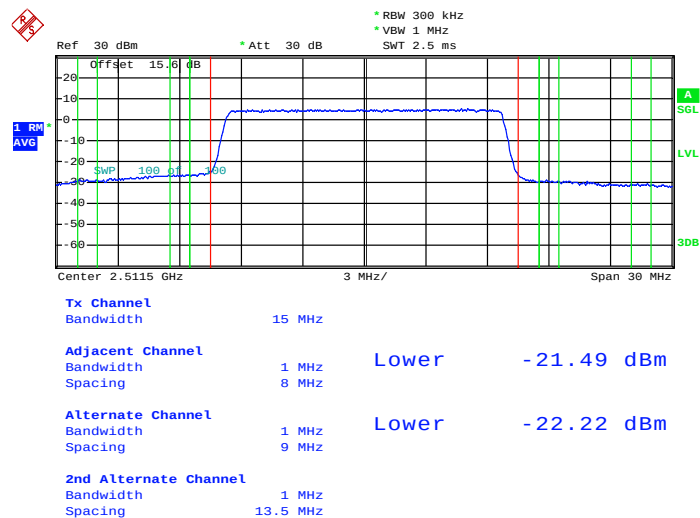


Band :	LTE Band 7	Band Width	15MHz / 16QAM
--------	------------	------------	---------------

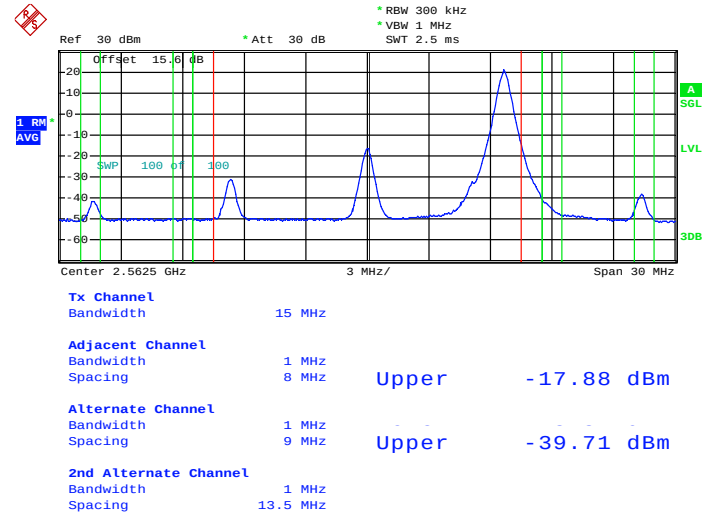
Lower Band Edge Plot for 16QAM -RB Size 1, RB Offset 0



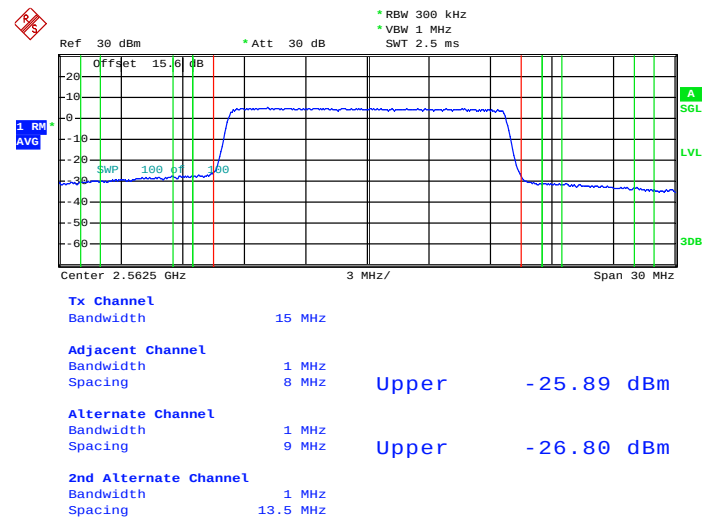
Lower Band Edge Plot for 16QAM -RB Size 75, RB Offset 0



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

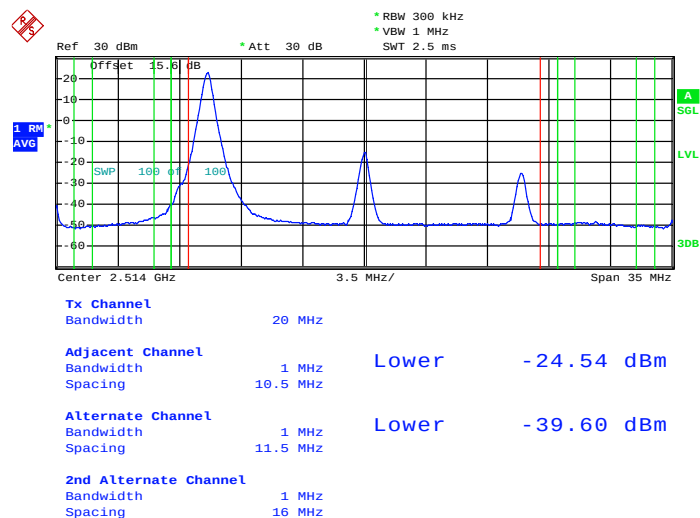


Higher Band Edge Plot for 16QAM-RB Size 75, RB Offset 0

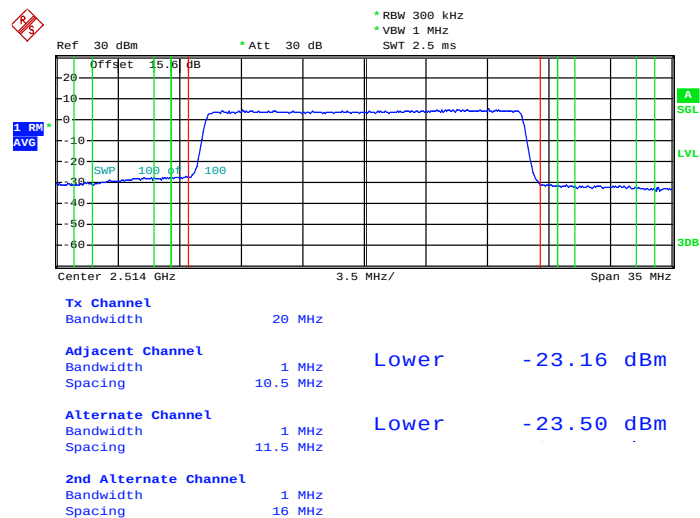


Band :	LTE Band 7	Band Width	20MHz / QPSK
--------	------------	------------	--------------

Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



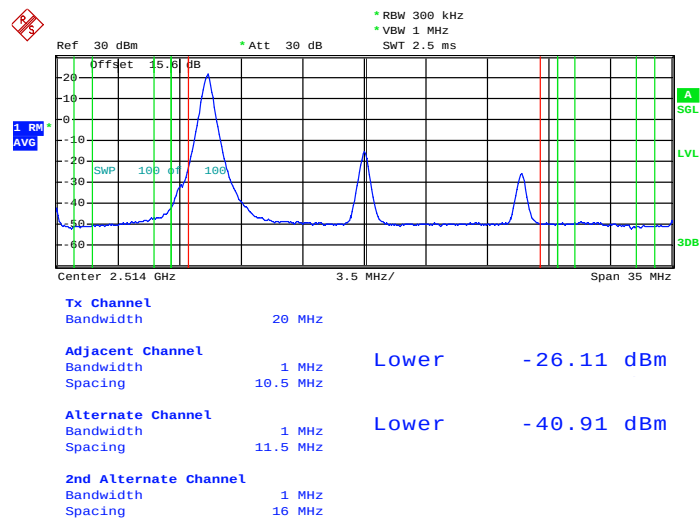
Lower Band Edge Plot for QPSK-RB Size 100, RB Offset 0



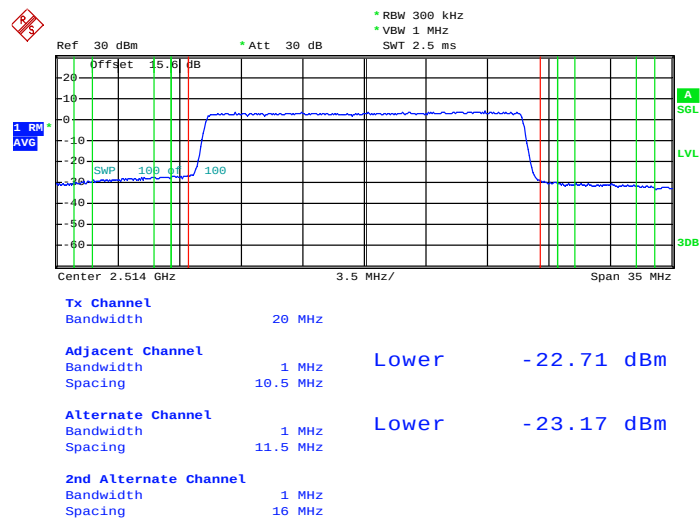


Band :	LTE Band 7	Band Width	20MHz / 16QAM
--------	------------	------------	---------------

Lower Band Edge Plot for 16QAM -RB Size 1, RB Offset 0



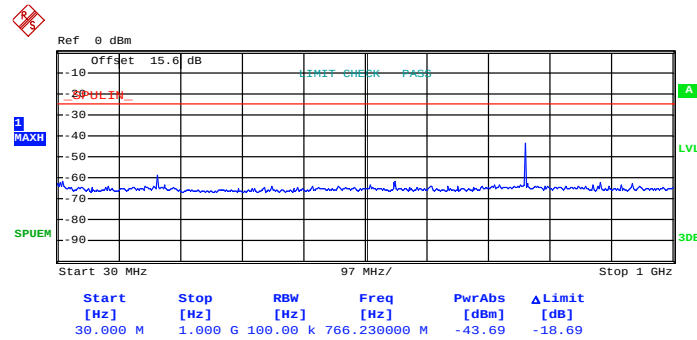
Lower Band Edge Plot for 16QAM -RB Size 100, RB Offset 0



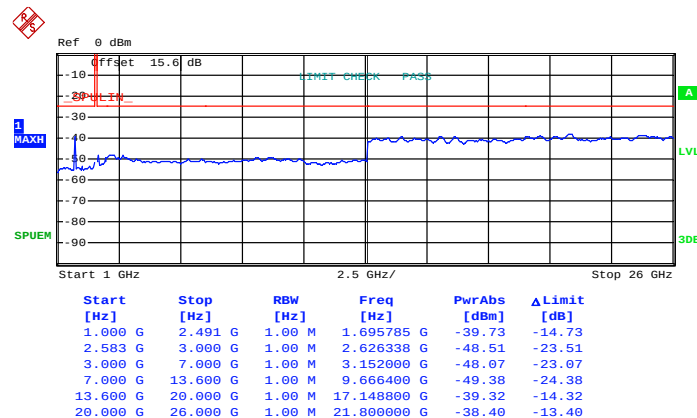
3.3.6 Test Plots of Spurious Emission

Band :	LTE Band 7	Bandwidth :	5MHz / QPSK
Frequency :	2506.5	Channel :	20815

**Conducted Emission Plot (30MHz ~ 1GHz) for
QPSK (RB Size 1, RB Offset 0)**

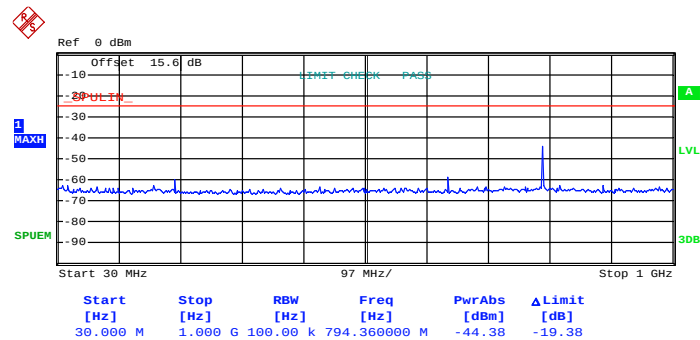


**Conducted Emission Plot (1GHz ~ 26GHz) for
QPSK (RB Size 1, RB Offset 0)**

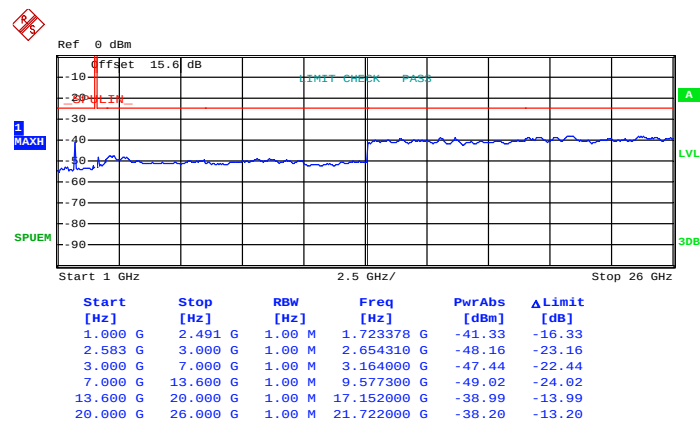


Band :	LTE Band 7	Bandwidth :	5MHz / QPSK
Frequency :	2534.5	Channel :	21095

**Conducted Emission Plot (30MHz ~ 1GHz) for
QPSK (RB Size 1, RB Offset 0)**

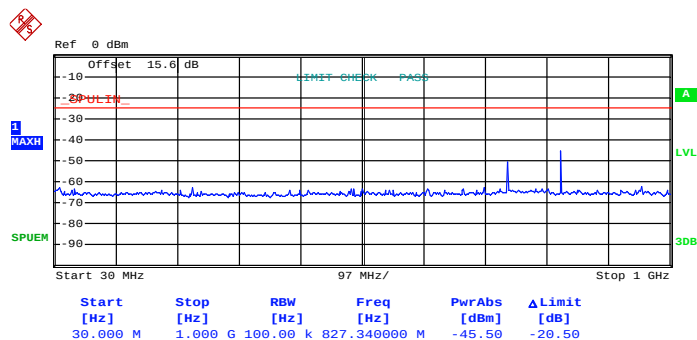


**Conducted Emission Plot (1GHz ~ 26GHz) for
QPSK (RB Size 1, RB Offset 0)**

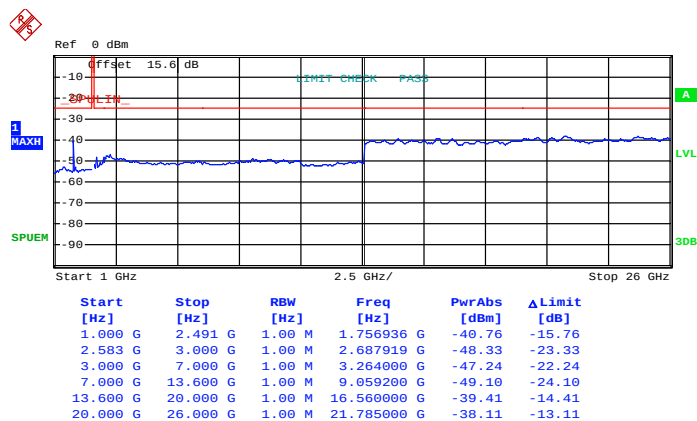


Band :	LTE Band 7	Bandwidth :	5MHz / QPSK
Frequency :	2567.5	Channel :	21425

**Conducted Emission Plot (30MHz ~ 1GHz) for
QPSK (RB Size 1, RB Offset 0)**

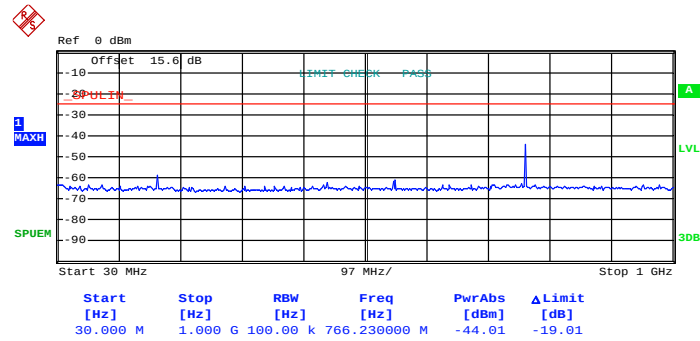


**Conducted Emission Plot (1GHz ~ 26GHz) for
QPSK (RB Size 1, RB Offset 0)**

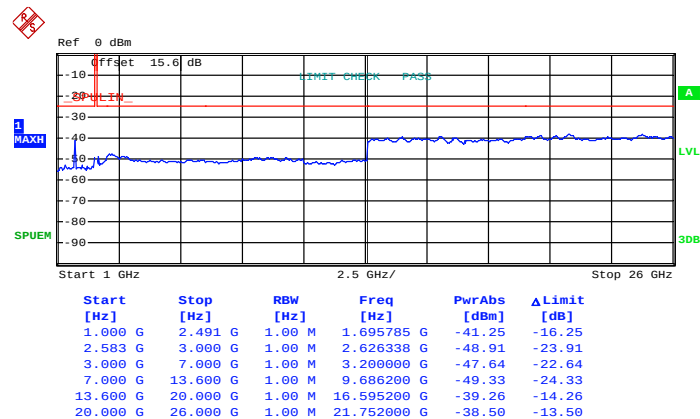


Band :	LTE Band 7	Bandwidth :	5MHz / 16QAM
Frequency :	2506.5	Channel :	20815

**Conducted Emission Plot (30MHz ~ 1GHz) for
16-QAM (RB Size 1, RB Offset 0)**

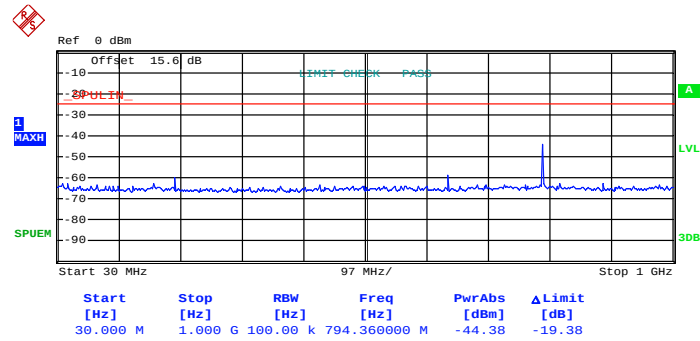


**Conducted Emission Plot (1GHz ~ 26GHz) for
16-QAM (RB Size 1, RB Offset 0)**

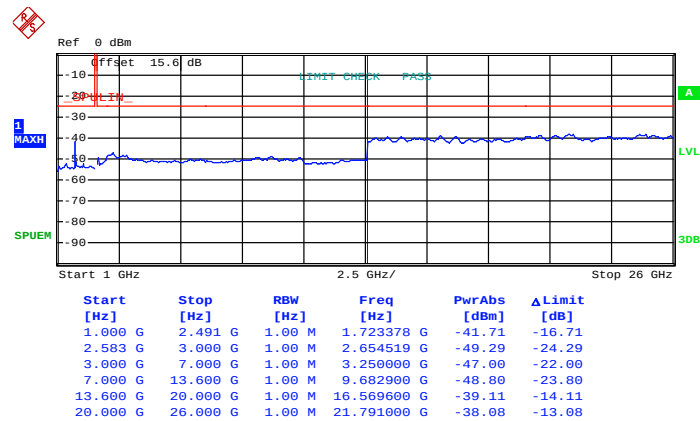


Band :	LTE Band 7	Bandwidth :	5MHz / 16QAM
Frequency :	2534.5	Channel :	21095

**Conducted Emission Plot (30MHz ~ 1GHz) for
16-QAM (RB Size 1, RB Offset 0)**

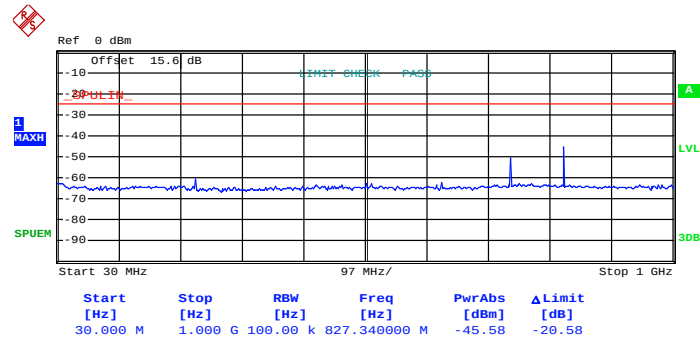


**Conducted Emission Plot (1GHz ~ 26GHz) for
16-QAM (RB Size 1, RB Offset 0)**

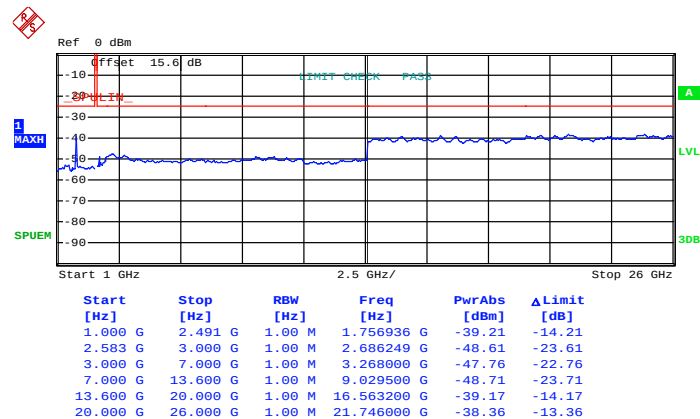


Band :	LTE Band 7	Bandwidth :	5MHz / 16QAM
Frequency :	2567.5	Channel :	21425

**Conducted Emission Plot (30MHz ~ 1GHz) for
16-QAM (RB Size 1, RB Offset 0)**

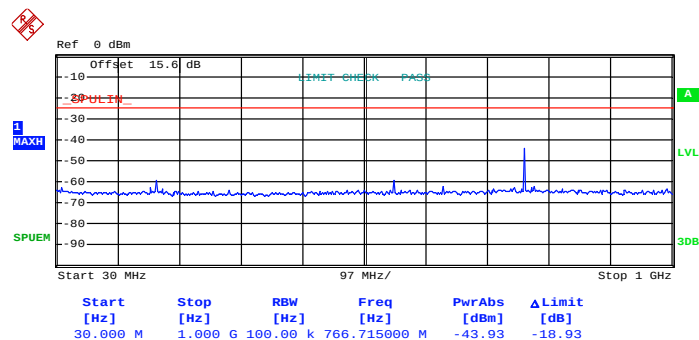


**Conducted Emission Plot (1GHz ~ 26GHz) for
16-QAM (RB Size 1, RB Offset 0)**

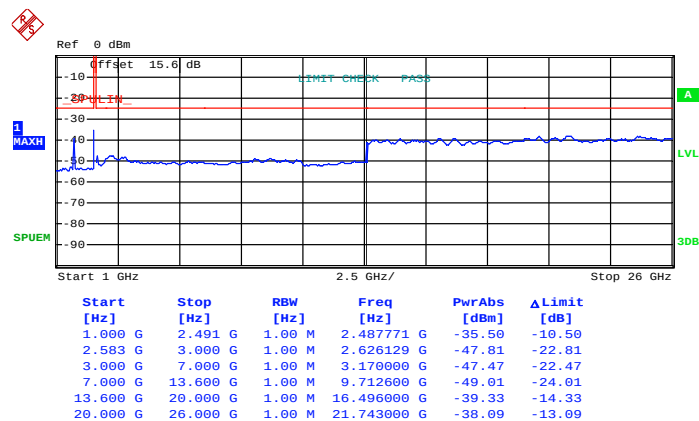


Band :	LTE Band 7	Bandwidth:	10MHz / QPSK
Frequency :	2509	Channel :	20840

**Conducted Emission Plot (30MHz ~ 1GHz) for
QPSK (RB Size 1, RB Offset 0)**

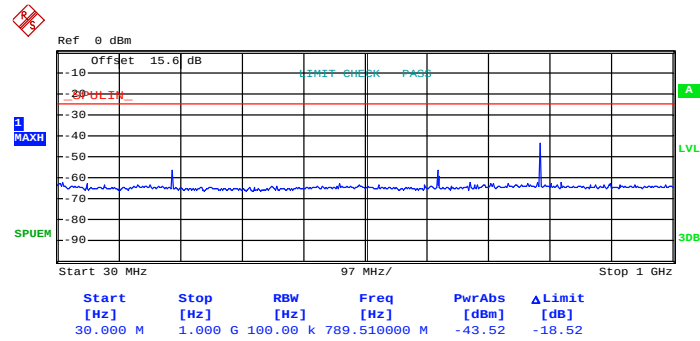


**Conducted Emission Plot (1GHz ~ 26GHz) for
QPSK (RB Size 1, RB Offset 0)**

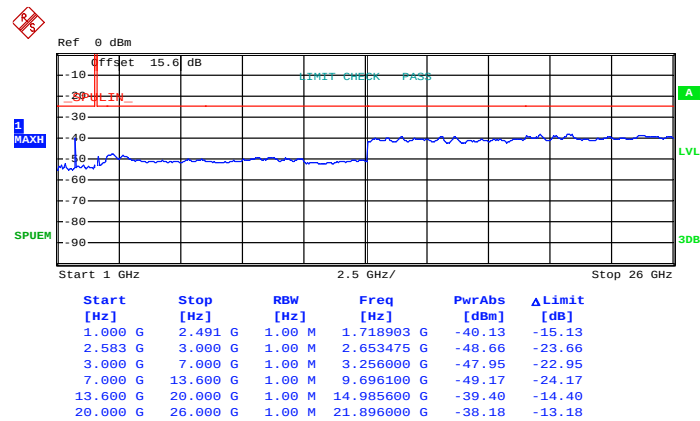


Band :	LTE Band 7	Bandwidth:	10MHz / QPSK
Frequency :	2532	Channel :	21070

**Conducted Emission Plot (30MHz ~ 1GHz) for
QPSK (RB Size 1, RB Offset 0)**

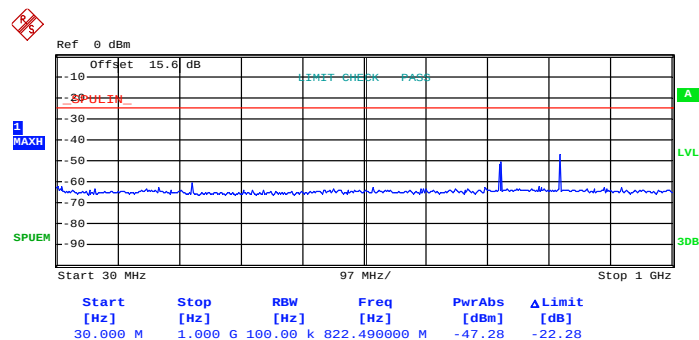


**Conducted Emission Plot (1GHz ~ 26GHz) for
QPSK (RB Size 1, RB Offset 0)**

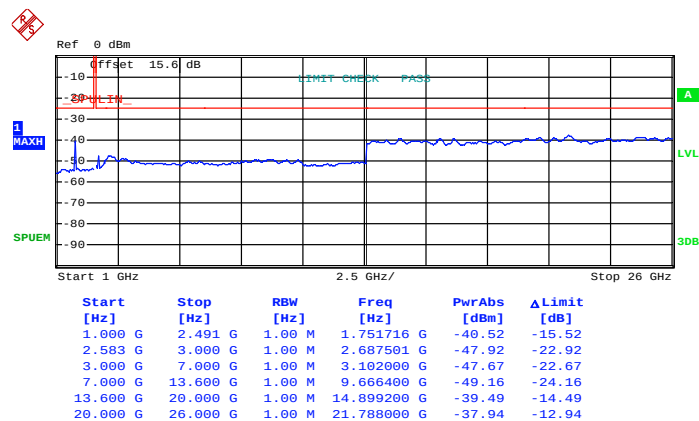


Band :	LTE Band 7	Bandwidth:	10MHz / QPSK
Frequency :	2565	Channel :	21400

**Conducted Emission Plot (30MHz ~ 1GHz) for
QPSK (RB Size 1, RB Offset 0)**

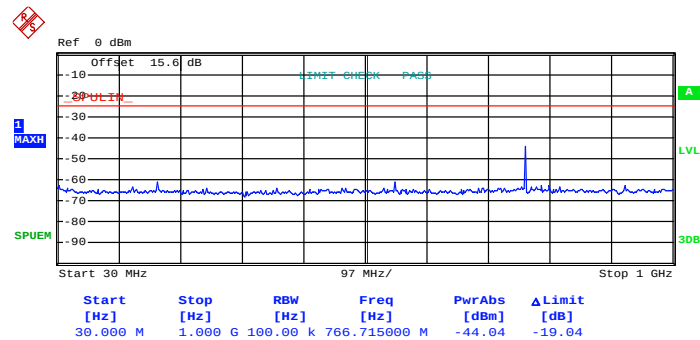


**Conducted Emission Plot (1GHz ~ 26GHz) for
QPSK (RB Size 1, RB Offset 0)**

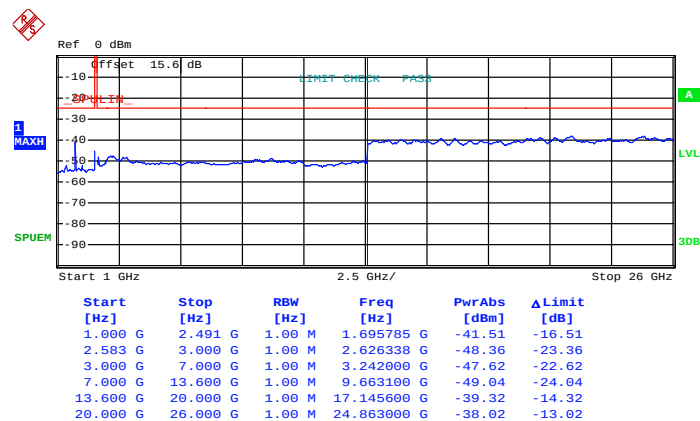


Band :	LTE Band 7	Bandwidth:	10MHz / 16QAM
Frequency :	2509	Channel :	20840

**Conducted Emission Plot (30MHz ~ 1GHz) for
16-QAM (RB Size 1, RB Offset 0)**

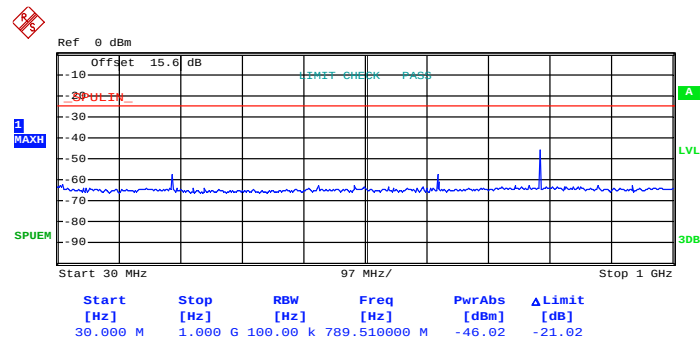


**Conducted Emission Plot (1GHz ~ 26GHz) for
16-QAM (RB Size 1, RB Offset 0)**

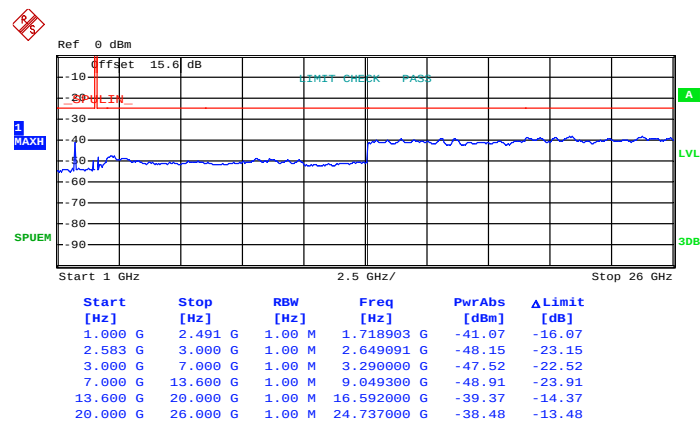


Band :	LTE Band 7	Bandwidth:	10MHz / 16QAM
Frequency :	2532	Channel :	21070

**Conducted Emission Plot (30MHz ~ 1GHz) for
16-QAM (RB Size 1, RB Offset 0)**

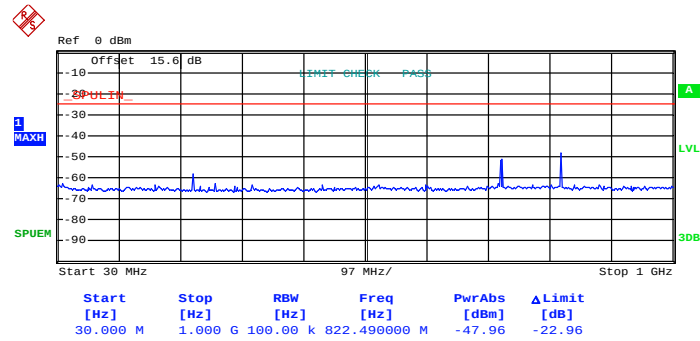


**Conducted Emission Plot (1GHz ~ 26GHz) for
16-QAM (RB Size 1, RB Offset 0)**

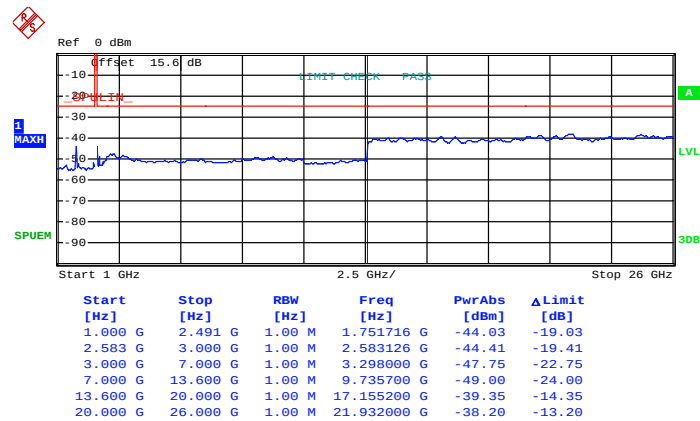


Band :	LTE Band 7	Bandwidth:	10MHz / 16QAM
Frequency :	2565	Channel :	21400

**Conducted Emission Plot (30MHz ~ 1GHz) for
16-QAM (RB Size 1, RB Offset 0)**

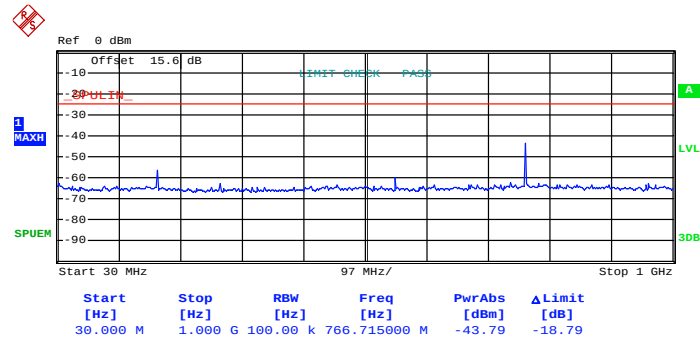


**Conducted Emission Plot (1GHz ~ 26GHz) for
16-QAM (RB Size 1, RB Offset 0)**

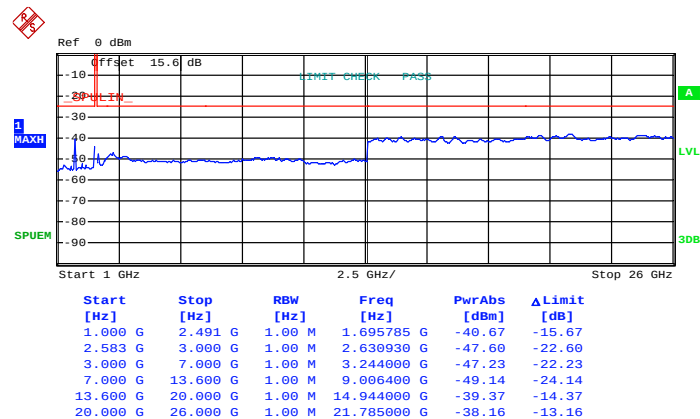


Band :	LTE Band 7	Bandwidth:	15MHz / QPSK
Frequency :	2511.5	Channel :	20865

**Conducted Emission Plot (30MHz ~ 1GHz) for
QPSK (RB Size 1, RB Offset 0)**

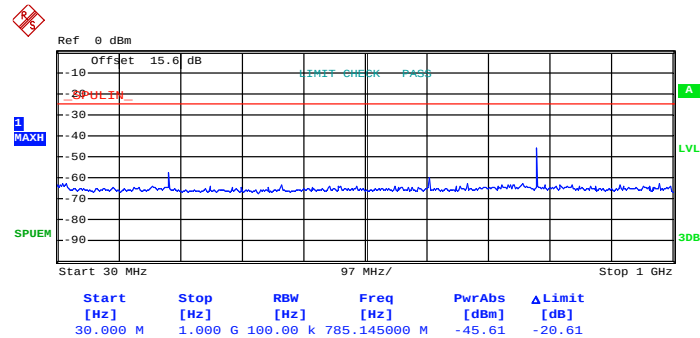


**Conducted Emission Plot (1GHz ~ 26GHz) for
QPSK (RB Size 1, RB Offset 0)**

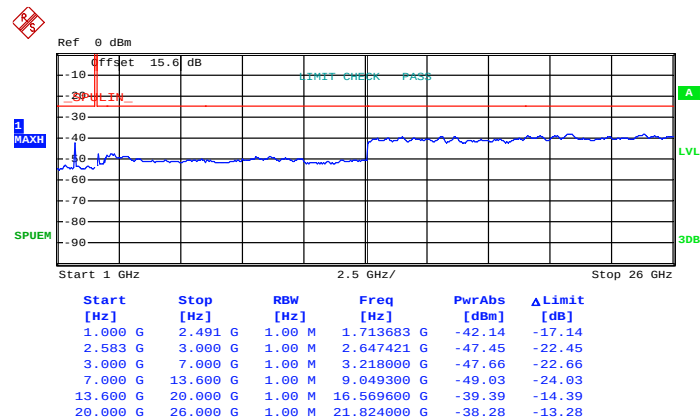


Band :	LTE Band 7	Bandwidth:	15MHz / QPSK
Frequency :	2529.5	Channel :	21045

**Conducted Emission Plot (30MHz ~ 1GHz) for
QPSK (RB Size 1, RB Offset 0)**

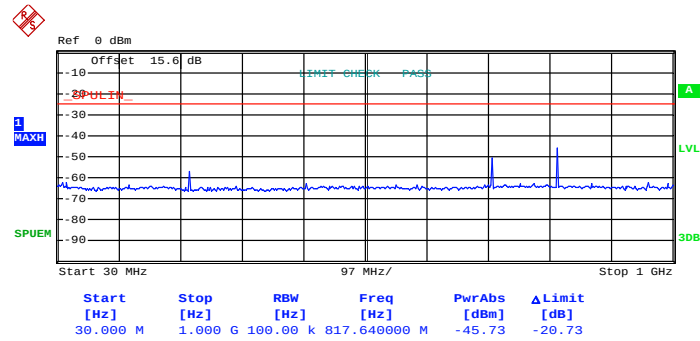


**Conducted Emission Plot (1GHz ~ 26GHz) for
QPSK (RB Size 1, RB Offset 0)**

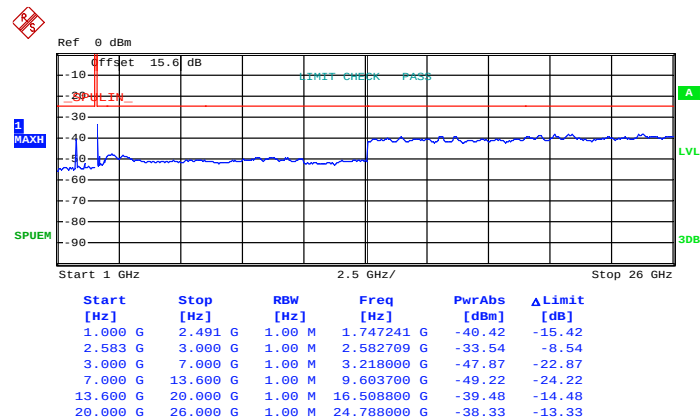


Band :	LTE Band 7	Bandwidth:	15MHz / QPSK
Frequency :	2562.5	Channel :	21375

**Conducted Emission Plot (30MHz ~ 1GHz) for
QPSK (RB Size 1, RB Offset 0)**

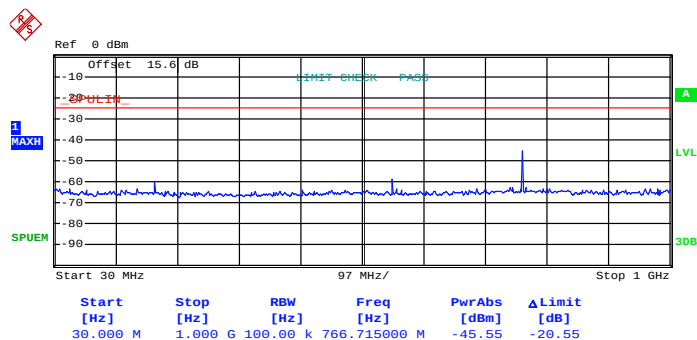


**Conducted Emission Plot (1GHz ~ 26GHz) for
QPSK (RB Size 1, RB Offset 0)**

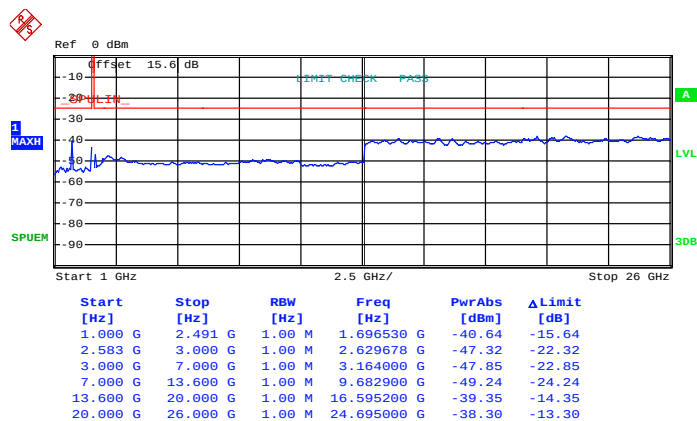


Band :	LTE Band 7	Bandwidth:	15MHz / 16QAM
Frequency :	2511.5	Channel :	20865

**Conducted Emission Plot (30MHz ~ 1GHz) for
16-QAM (RB Size 1, RB Offset 0)**

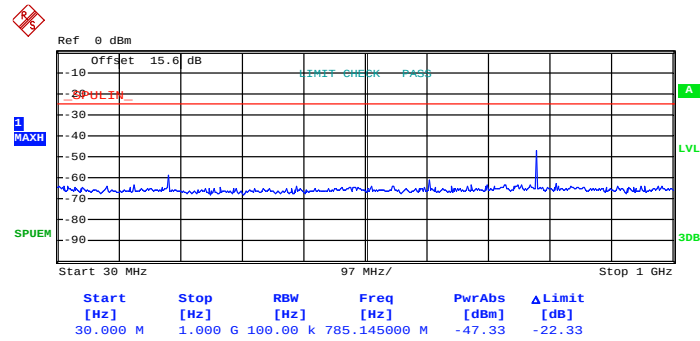


**Conducted Emission Plot (1GHz ~ 26GHz) for
16-QAM (RB Size 1, RB Offset 0)**

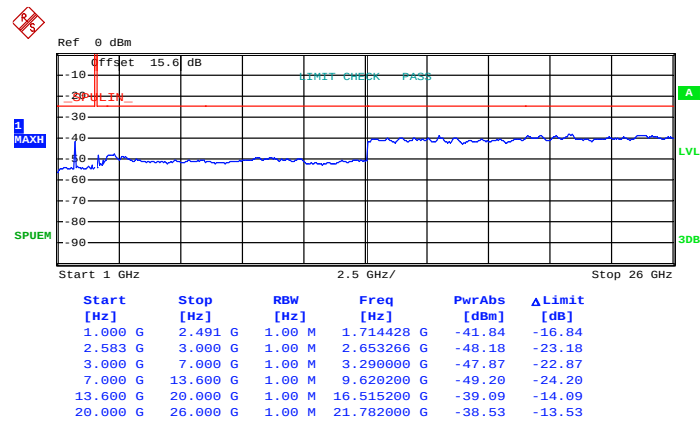


Band :	LTE Band 7	Bandwidth:	15MHz / 16QAM
Frequency :	2529.5	Channel :	21045

**Conducted Emission Plot (30MHz ~ 1GHz) for
16-QAM (RB Size 1, RB Offset 0)**

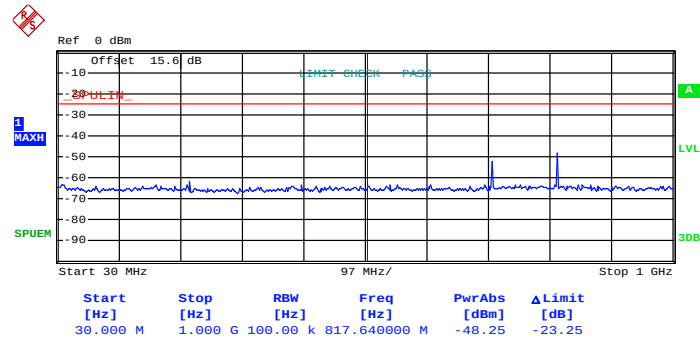


**Conducted Emission Plot (1GHz ~ 26GHz) for
16-QAM (RB Size 1, RB Offset 0)**

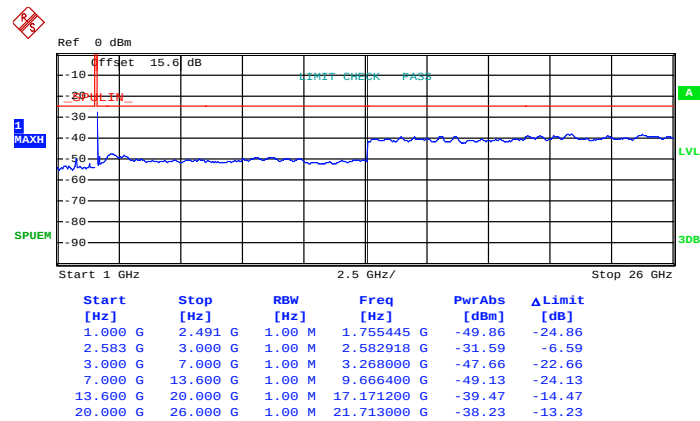


Band :	LTE Band 7	Bandwidth:	15MHz / 16QAM
Frequency :	2562.5	Channel :	21375

**Conducted Emission Plot (30MHz ~ 1GHz) for
16-QAM (RB Size 1, RB Offset 0)**

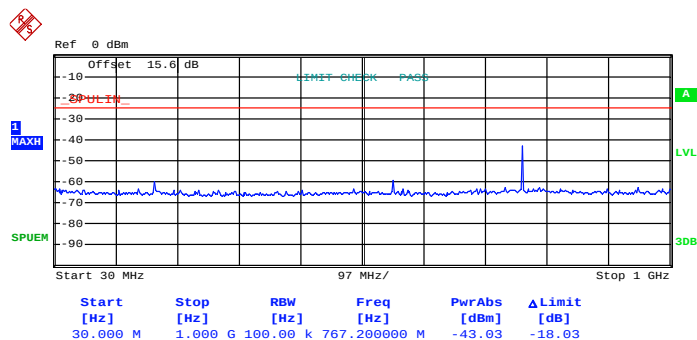


**Conducted Emission Plot (1GHz ~ 26GHz) for
16-QAM (RB Size 1, RB Offset 0)**

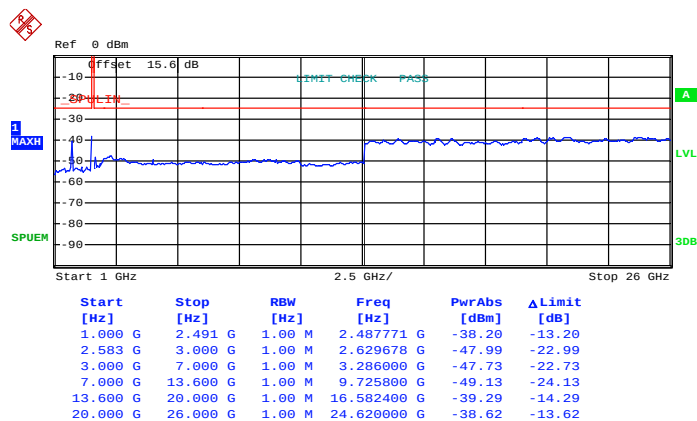


Band :	LTE Band 7	Bandwidth:	20MHz / QPSK
Frequency :	2514	Channel :	20890

**Conducted Emission Plot (30MHz ~ 1GHz) for
QPSK (RB Size 1, RB Offset 0)**

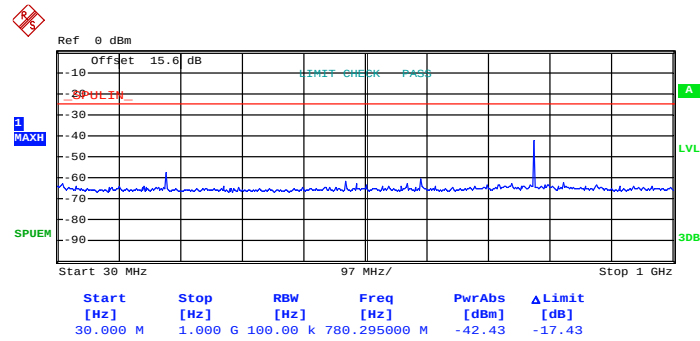


**Conducted Emission Plot (1GHz ~ 26GHz) for
QPSK (RB Size 1, RB Offset 0)**

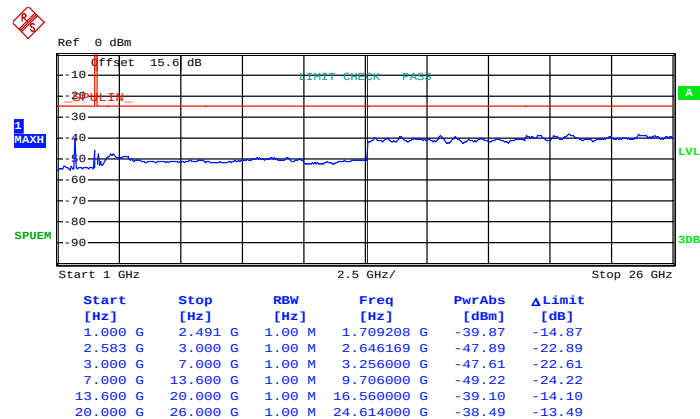


Band :	LTE Band 7	Bandwidth:	20MHz / QPSK
Frequency :	2527	Channel :	21020

**Conducted Emission Plot (30MHz ~ 1GHz) for
QPSK (RB Size 1, RB Offset 0)**

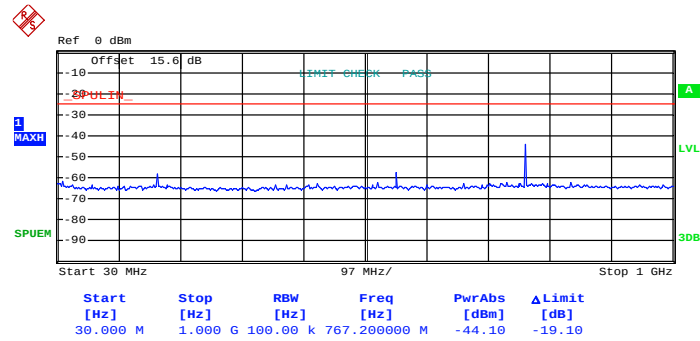


**Conducted Emission Plot (1GHz ~ 26GHz) for
QPSK (RB Size 1, RB Offset 0)**

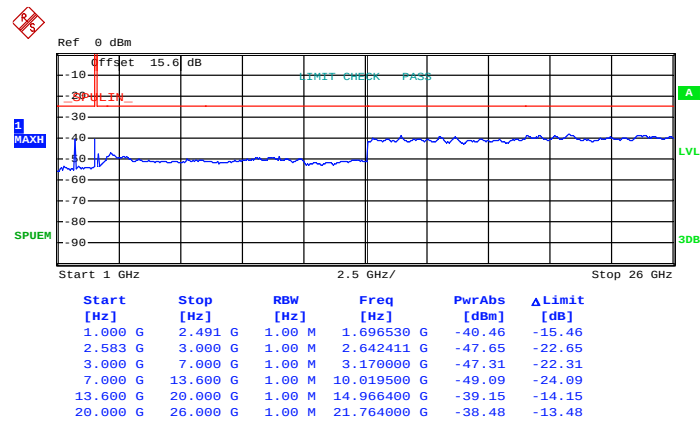


Band :	LTE Band 7	Bandwidth:	20MHz / 16QAM
Frequency :	2514	Channel :	20890

**Conducted Emission Plot (30MHz ~ 1GHz) for
QPSK (RB Size 1, RB Offset 0)**

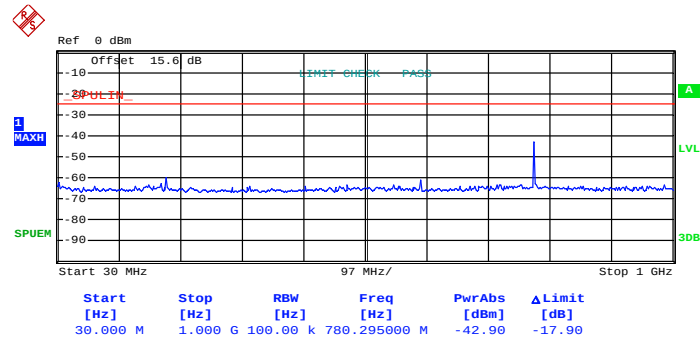


**Conducted Emission Plot (1GHz ~ 26GHz) for
QPSK (RB Size 1, RB Offset 0)**

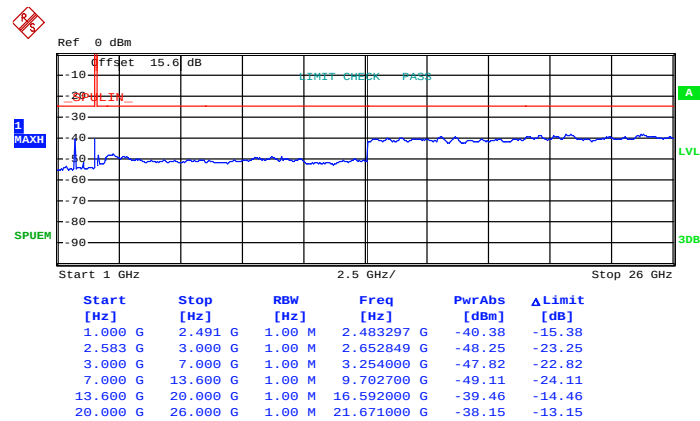


Band :	LTE Band 7	Bandwidth:	20MHz / 16QAM
Frequency :	2527	Channel :	21020

**Conducted Emission Plot (30MHz ~ 1GHz) for
16-QAM (RB Size 1, RB Offset 0)**



**Conducted Emission Plot (1GHz ~ 26GHz) for
16-QAM (RB Size 1, RB Offset 0)**



3.4 Radiated Emissions Measurement

3.4.1 Description of Radiated Emissions Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of mobile digital stations, the attenuation factor shall be not less than $55 + 10 \log (P)$ dB at 5.5 MHz from the channel edges. It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

3.4.2 Measuring Instruments

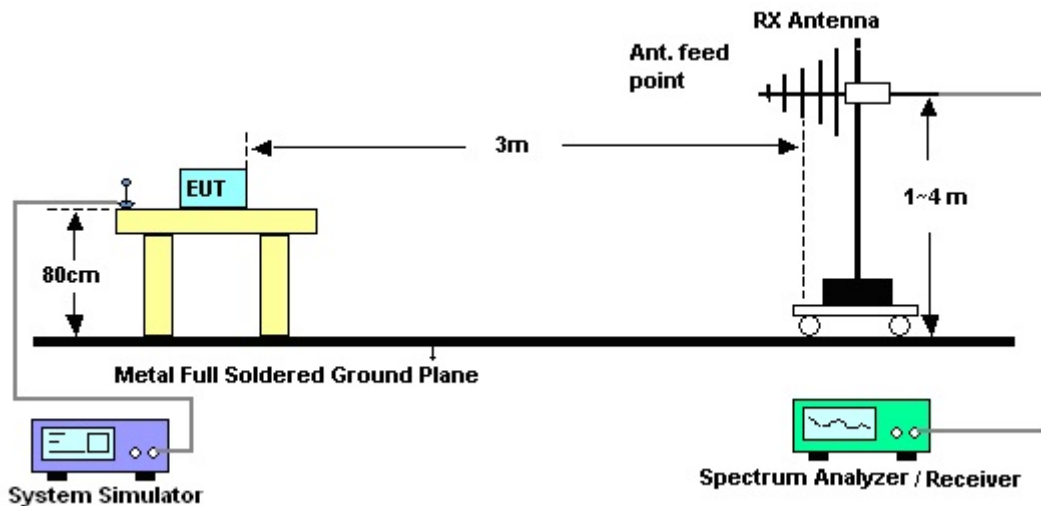
See list of measuring instruments of this test report.

3.4.3 Test Procedures

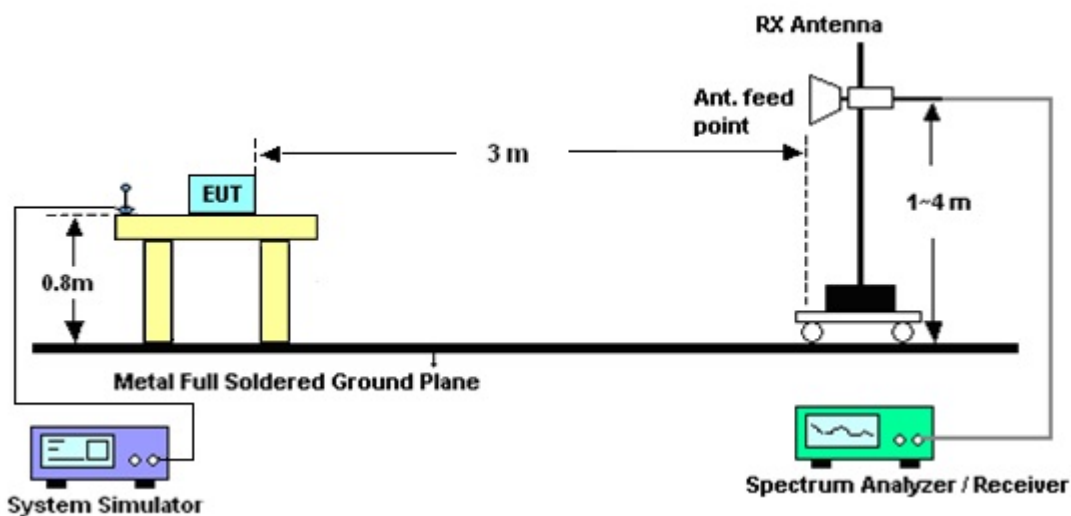
1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving 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 = 1MHz, Sweep = 500ms, 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. Emission level (dBm) = output power + substitution Gain.

3.4.4 Test Setup

For radiated emissions from 30MHz to 1GHz

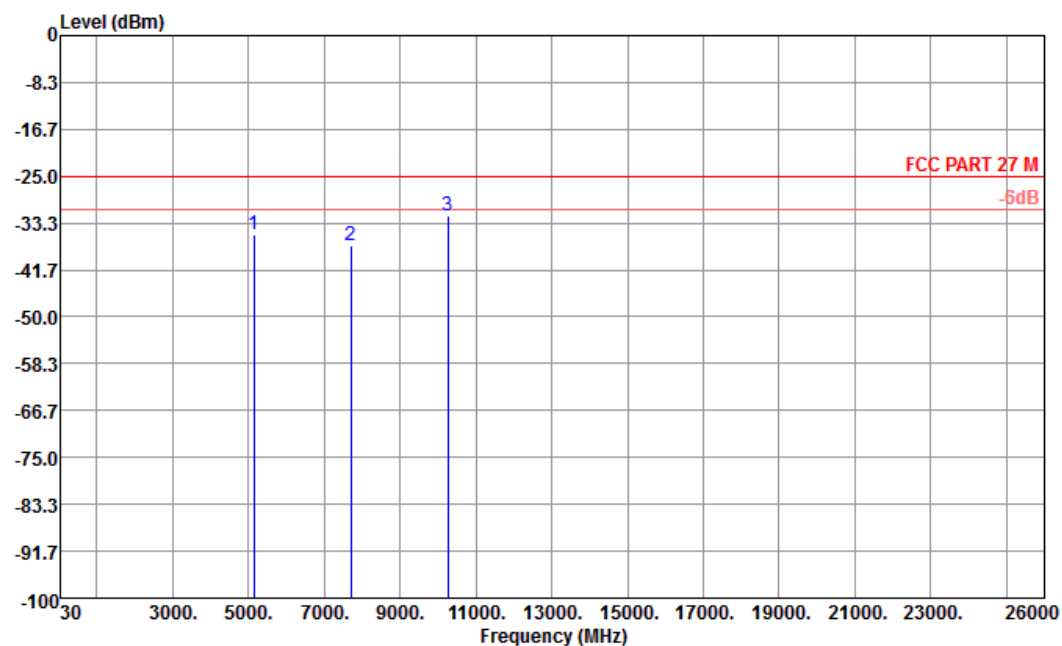


For radiated emissions above 1GHz



3.4.5 Test Result of Radiated Emissions

Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	5MHz, QPSK RB Size 1, RB Offset 0	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

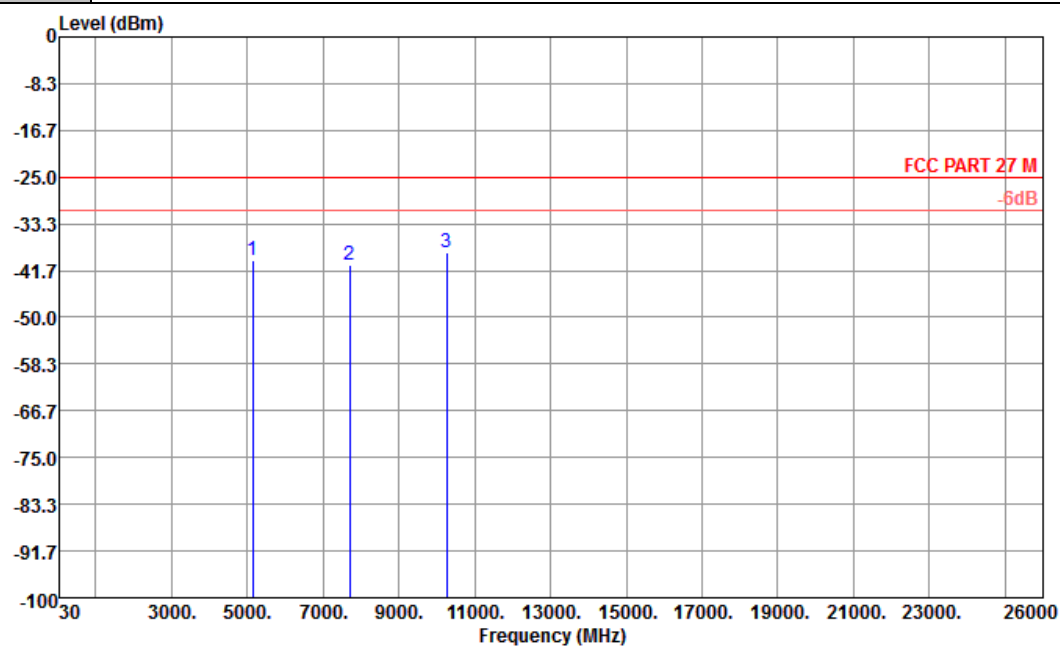


Site : 03CH01-KS

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
5130	-35.40	-25	-10.40	-54.55	-40.80	2.2	7.60	H	Pass
7696	-37.45	-25	-12.45	-60.15	-44.23	3.12	9.90	H	Pass
10263	-31.93	-25	-6.93	-59.69	-39.82	2.98	10.87	H	Pass

Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	5MHz, QPSK RB Size 1, RB Offset 0	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

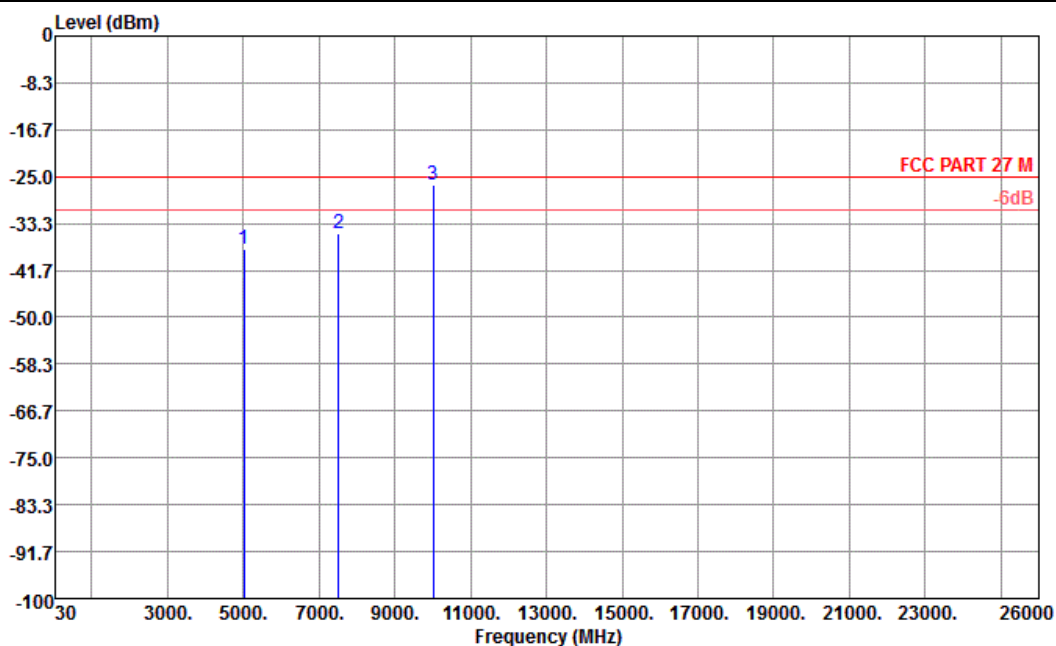


Site : 03CH01-KS

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
5130	-39.89	-25	-14.89	-58.11	-45.29	2.2	7.6	V	Pass
7696	-40.71	-25	-15.71	-62.25	-47.49	3.12	9.9	V	Pass
10269	-38.53	-25	-13.53	-63	-46.42	2.98	10.87	V	Pass

Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	10MHz, QPSK, RB Size 1, RB Offset 0	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

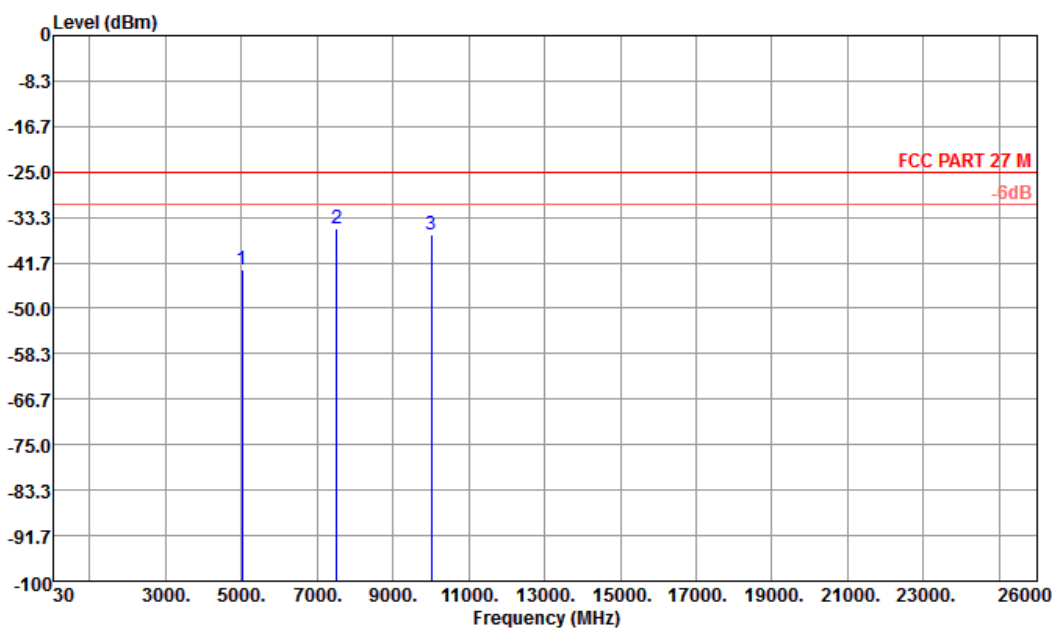


Site : 03CH01-KS

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	-37.93	-25	-12.93	-57.04	-43.33	2.2	7.60	H	Pass
7512	-35.00	-25	-10.00	-58.11	-41.78	3.12	9.90	H	Pass
10016	-26.33	-25	-1.33	-54.70	-34.22	2.98	10.87	H	Pass

Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	10MHz, QPSK, RB Size 1, RB Offset 0	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

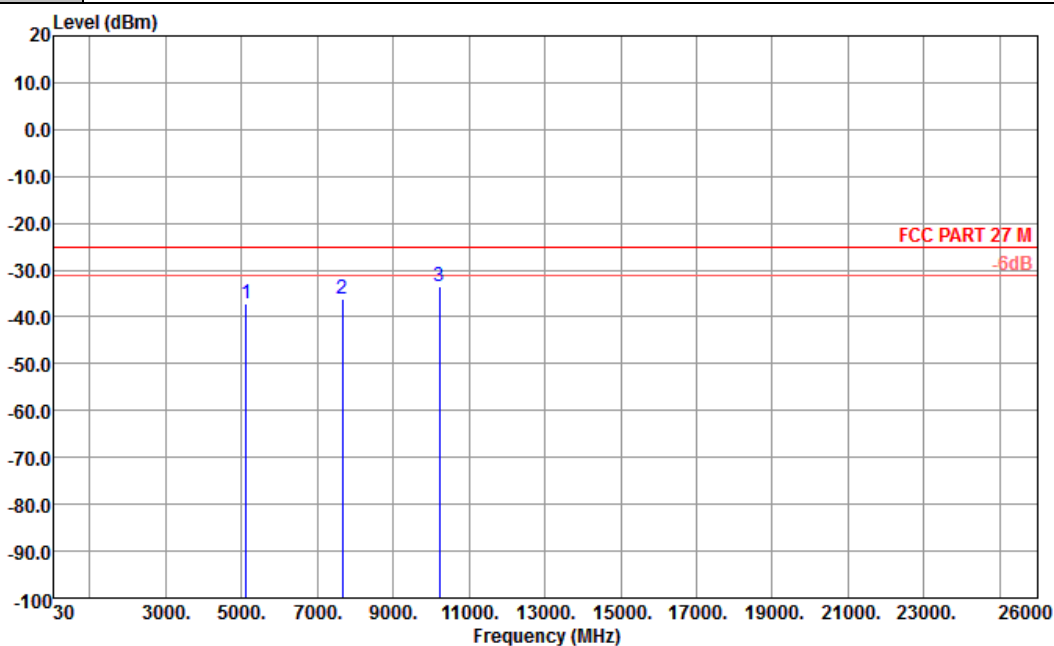


Site : 03CH01-KS

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	-42.91	-25	-17.91	-60.87	-48.31	2.2	7.6	V	Pass
7512	-35.35	-25	-10.35	-57.18	-42.13	3.12	9.9	V	Pass
10016	-36.56	-25	-11.56	-61.38	-44.45	2.98	10.87	V	Pass

Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	15MHz, QPSK, RB Size 1, RB Offset 0	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

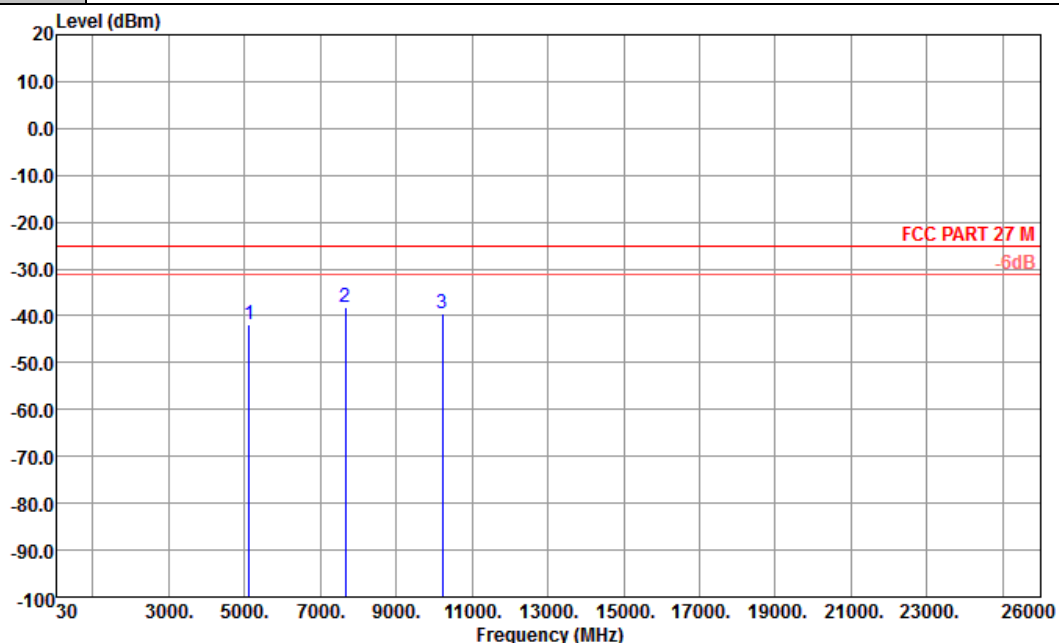


Site : 03CH01-KS

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	-37.17	-25	-12.17	-56.33	-42.57	2.2	7.60	H	Pass
7668	-36.20	-25	-11.20	-59.13	-42.98	3.12	9.90	H	Pass
10224	-33.32	-25	-8.32	-60.81	-41.21	2.98	10.87	H	Pass

Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	15MHz, QPSK, RB Size 1, RB Offset 0	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

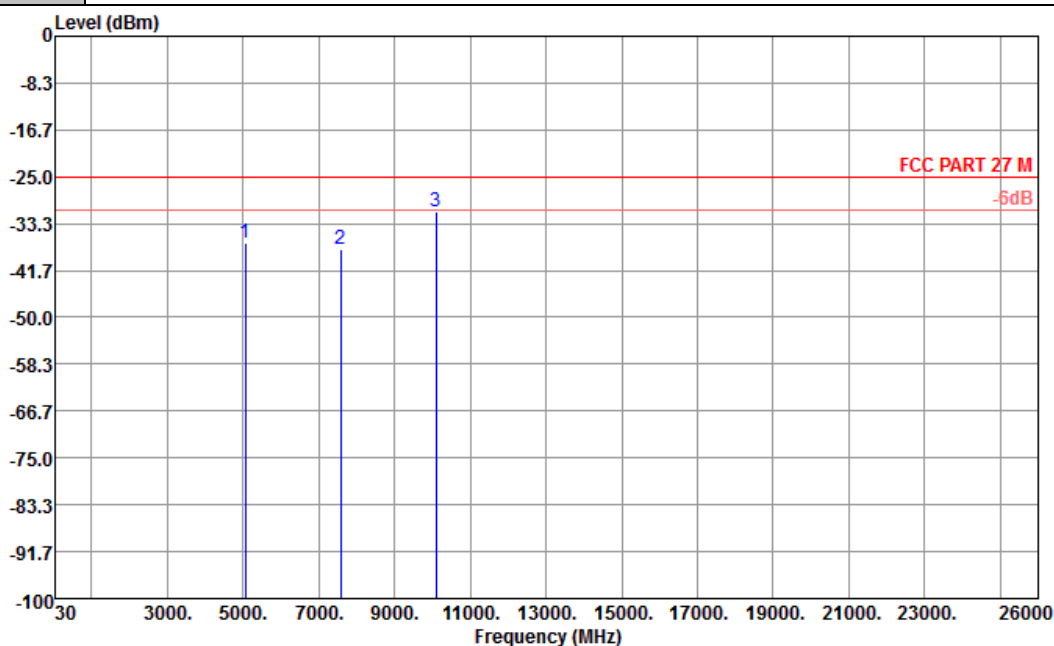


Site : 03CH01-KS

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	-41.83	-25	-16.83	-59.92	-47.23	2.2	7.6	V	Pass
7668	-38.28	-25	-13.28	-59.63	-45.06	3.12	9.9	V	Pass
10224	-39.60	-25	-14.60	-63.7	-47.49	2.98	10.87	V	Pass

Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	20MHz, QPSK, RB Size 1, RB Offset 0	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

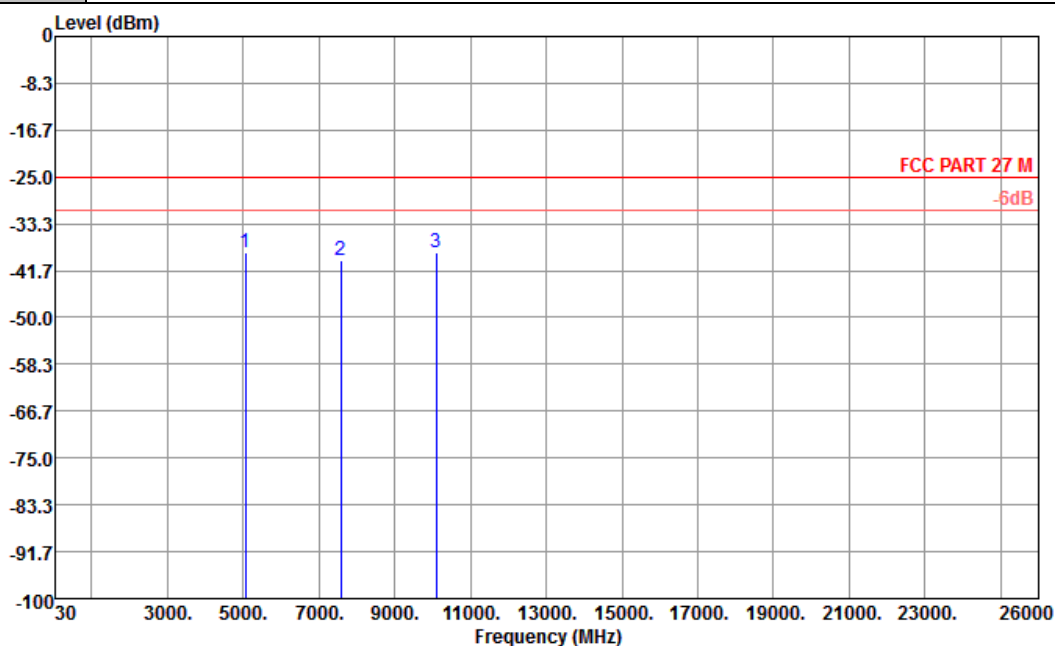


Site : 03CH01-KS

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
5052	-36.68	-25	-11.68	-55.83	-42.08	2.2	7.60	H	Pass
7578	-37.82	-25	-12.82	-60.49	-44.60	3.12	9.90	H	Pass
10104	-31.31	-25	-6.31	-59.17	-39.20	2.98	10.87	H	Pass

Band :	LTE Band 7	Temperature :	22~23°C
Test Mode :	20MHz, QPSK, RB Size 1, RB Offset 0	Relative Humidity :	42~43%
Test Engineer :	Star Wei	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz 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
5052	-38.36	-25	-13.36	-56.68	-43.76	2.2	7.6	V	Pass
7578	-39.97	-25	-14.97	-61.42	-46.75	3.12	9.9	V	Pass
10104	-38.35	-25	-13.35	-62.86	-46.24	2.98	10.87	V	Pass

3.5 Frequency Stability Measurement

3.5.1 Description of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency band. For equipment authorization purposes, this is a reporting requirement only.

3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

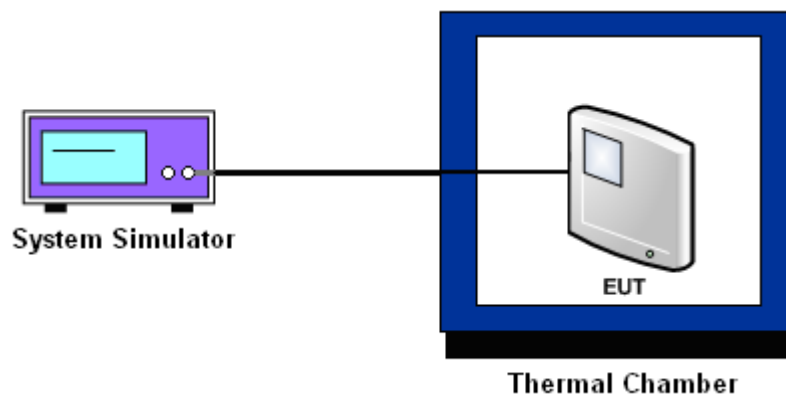
3.5.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the system simulator.
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.
4. If the EUT cannot be turned on at -30°C , the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.

3.5.4 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 system simulator.
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.

3.5.5 Test Setup



3.5.6 Test Result of Temperature Variation

Band :	LTE Band 7	Limit (ppm) :	2.5
Mode :	QPSK		

Temperature (°C)	5MHz		10MHz		15MHz		20MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-5.4	-0.002	5.6	+0.002	3.6	+0.001	8.2	+0.003	PASS
-20	-2.5	-0.001	3.9	+0.002	-8.2	-0.003	-11.0	-0.004	
-10	-11.5	-0.005	-5.6	-0.002	-6.7	-0.003	-10.0	-0.004	
0	-2.9	-0.001	-3.6	-0.001	8.2	+0.003	-8.2	-0.003	
10	-11.0	-0.004	-9.0	-0.004	-11.0	-0.004	8.2	+0.003	
20	-2.0	-0.001	-2.5	-0.001	5.9	+0.002	-11.0	-0.004	
30	3.8	+0.001	6.9	+0.003	9.1	+0.004	-4.7	-0.002	
40	9.1	+0.004	-5.4	-0.002	-5.6	-0.002	3.6	+0.001	
50	-8.0	-0.003	4.0	0.002	-2.5	-0.001	8.2	+0.003	

Band :	LTE Band 7	Limit (ppm) :	2.5
Mode :	16QAM		

Temperature (°C)	5MHz		10MHz		15MHz		20MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-5.7	-0.002	-5.4	-0.002	6.3	+0.002	5.0	+0.002	PASS
-20	11.3	+0.004	-2.5	-0.001	4.9	+0.002	-11.0	-0.004	
-10	-10.0	-0.004	-11.5	-0.005	-5.6	-0.002	8.0	+0.003	
0	-8.2	-0.003	-5.6	-0.002	-3.6	-0.001	-10.0	-0.004	
10	8.0	+0.003	-3.6	-0.001	-10.0	-0.004	-5.6	-0.002	
20	-6.7	-0.003	3.8	+0.002	3.6	+0.001	-3.6	-0.001	
30	-9.8	-0.004	4.9	+0.002	8.2	+0.003	-11.5	-0.005	
40	-10.0	-0.004	-2.5	-0.001	3.6	+0.001	-5.6	-0.002	
50	7.0	+0.003	-5.6	-0.002	8.2	+0.003	3.8	+0.002	

3.5.7 Test Result of Voltage Variation

Band	Mode	Band Width	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 7	QPSK	5MHz	276	3.0	+0.001	2.5	PASS
			240	3.2	+0.001		
			204	5.6	+0.002		
		10MHz	276	3.9	+0.002		
			240	-5.6	-0.002		
			204	-2.5	-0.001		
		15MHz	276	-5.6	-0.002		
			240	-2.5	-0.001		
			204	5.6	+0.002		
		20MHz	276	-11.5	-0.005		
			240	7.1	+0.003		
			204	10.3	+0.004		
	16QAM	5MHz	276	-11.5	-0.005		
			240	-2.9	-0.001		
			204	3.8	+0.001		
		10MHz	276	4.9	+0.002		
			240	-2.5	-0.001		
			204	-10.0	-0.004		
		15MHz	276	-5.6	-0.002		
			240	3.8	+0.002		
			204	3.2	+0.001		
		20MHz	276	4.9	+0.002		
			240	5.8	+0.002		
			204	6.0	+0.002		

3.5.8 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. 29, 2012	Sep. 27, 2013~ Oct. 24, 2013	Dec. 28, 2013	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	N/A	Feb. 28, 2013	Sep. 27, 2013~ Oct. 24, 2013	Feb. 27, 2014	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	N/A	Feb. 28, 2013	Sep. 27, 2013~ Oct. 24, 2013	Feb. 27, 2014	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	N/A	Dec. 29, 2012	Sep. 27, 2013~ Oct. 24, 2013	Dec. 28, 2013	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 08, 2012	Oct. 19, 2013	Nov. 07, 2013	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 23, 2013	Oct. 19, 2013	May 22, 2014	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Dec. 07, 2012	Oct. 19, 2013	Dec. 06, 2013	Radiation (03CH01-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 22, 2012	Oct. 19, 2013	Oct. 21, 2013	Radiation (03CH01-KS)
Double Ridge Horn Antenna	EMCO	3117	00075959	1GHz~18GHz	Jan. 06, 2013	Oct. 19, 2013	Jan. 05, 2014	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1GHz	May 23, 2013	Oct. 19, 2013	May 22, 2014	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Dec. 29, 2012	Oct. 19, 2013	Dec. 28, 2013	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701023	1GHz~18GHz	Nov. 07, 2012	Oct. 19, 2013	Nov. 06, 2013	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	9170249	15GHz~40GHz	Nov. 23, 2012	Oct. 19, 2013	Nov. 22, 2013	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	N/A	Oct. 19, 2013	N/A	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	N/A	Oct. 19, 2013	N/A	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	Oct. 16, 2013	May 22, 2014	EIRP (OTA01-KS)
Switch Control Manframe	Agilent	3499A	MY42005452	N/A	N/A	Oct. 16, 2013	N/A	EIRP (OTA01-KS)
Dual 1-to-6(4) MW MUX	Agilent	N2276A	MY42000841	N/A	N/A	Oct. 16, 2013	N/A	EIRP (OTA01-KS)
Microwave Switch	Agilent	44476A	MY42002573	N/A	N/A	Oct. 16, 2013	N/A	EIRP (OTA01-KS)
Microwave Switch	Agilent	44476A	MY42002586	N/A	N/A	Oct. 16, 2013	N/A	EIRP (OTA01-KS)
Diagonal Dual Polarized Horn	ETS-Lindgren	3164-04	00066993	700MHz~6GHz	N/A	Oct. 16, 2013	N/A	EIRP (OTA01-KS)
Multi-Devices Controller	ETS-Lindgren	2090-OPT1	00066604	N/A	N/A	Oct. 16, 2013	N/A	EIRP (OTA01-KS)
Conical Log Spiral (Small)	ETS-Lindgren	3102	00066951	1~10GHz	N/A	Oct. 16, 2013	N/A	EIRP (OTA01-KS)
Turn Table	ETS-Lindgren	2088	N/A	Resolution : 0.1degree	N/A	Oct. 16, 2013	N/A	EIRP (OTA01-KS)
Limiting Amplifier	ETS-lindgren	109643	920326	10MHz~2.5GHz	N/A	Oct. 16, 2013	N/A	EIRP (OTA01-KS)
EMQuest	ETS-Lindgren	EMQ-100	1125	N/A	N/A	Oct. 16, 2013	N/A	EIRP (OTA01-KS)
Medium Duty Holder	ETS-Lindgren	2015	N/A	N/A	N/A	Oct. 16, 2013	N/A	EIRP (OTA01-KS)

4 Uncertainty of Evaluation

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

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

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72
--	------