FCC RF Test Report

APPLICANT	:	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd.
EQUIPMENT	:	mobile phone
BRAND NAME	:	Vodafone
MODEL NAME	:	Vodafone 990N
MARKING NAME	:	Vodafone Smart 4 max
FCC ID	:	R38YL990N
STANDARD	:	47 CFR Part 2, 27(M)
CLASSIFICATION	:	PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Jan. 26, 2014 and testing was completed on Aug. 15, 2014. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-C-2004 and the testing has shown the tested sample to be in 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 (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL (SHENZHEN) INC.
No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C.

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG412407-06B	Rev. 01	Initial issue of report	Aug. 22, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	Reporting Only	PASS	-
3.2	N/A	Peak-to-Average Ratio	Reporting Only	PASS	-
3.3	§27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 7)	EIRP < 2Watt	PASS	-
3.4	§2.1049 §27.53(m)(6)	Occupied Bandwidth	Reporting Only	PASS	-
3.5	§2.1051 §27.53(m)(4)	Conducted Band Edge Measurement (Band 7)	< 43+10log10(P[Watt])	PASS	-
3.6	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (Band 7)	< 55+10log10(P[Watts])	PASS	-
3.7	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 7)	< $55+10\log_{10}$(P[Watts])	PASS	Under limit 22.78 dB at 7591.770 MHz
3.8	§2.1055 §27.54	Frequency Stability Temperature & Voltage	< 2.5 ppm	PASS	

1 General Description

1.1 Applicant

Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd.
Coolpad Information Harbor, 2nd Mengxi Road, Northern Part of Science & Technology Park, Nanshan district, Shenzhen, P.R.China

1.2 Manufacturer

Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd.
Coolpad Information Harbor, 2nd Mengxi Road, Northern Part of Science & Technology Park, Nanshan district, Shenzhen, P.R.China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	mobile phone
Brand Name	Vodafone
Model Name	Vodafone 990N
FCC ID	R38YL990N
EUT supports Radios application	GSM/GPRS/EGPRS/LTE/NFC WLAN2.4GHz 802.11b/g/n HT20 Bluetooth v3.0+EDR Bluetooth v4.0 LE
HW Version	T3
SW Version	4.4.352.00.T3.140719.KTU84P.VF.DE
EUT Stage	Production Unit

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 subjective to this standard

Product Specification subjective to this standard	
Tx Frequency	LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz
Rx Frequency	LTE Band 7 : 2622.5MHz ~ 2687.5 MHz
Bandwidth	LTE Band 7 : 5MHz/ 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	LTE Band 7 : 20.59 dBm
Antenna Type	PIFA 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 ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	BW	Emission Designator	Frequency Tolerance (ppm)	Maximum EIRP
Part 27	LTE Band 7	QPSK	5MHz	4M50G7D	-	0.34 W
Part 27	LTE Band 7	16QAM	5MHz	4M50D7W	-	0.27 W
Part 27	LTE Band 7	QPSK	10MHz	9M09G7D	0.0016 ppm	-
Part 27	LTE Band 7	16QAM	10MHz	9M03D7W	-	-
Part 27	LTE Band 7	QPSK	15MHz	13M5G7D	-	-
Part 27	LTE Band 7	16QAM	15MHz	13M4D7W	-	-
Part 27	LTE Band 7	QPSK	20MHz	18M4G7D	-	0.31 W
Part 27	LTE Band 7	16QAM	20MHz	18M3D7W	-	0.27 W

1.7 Testing Location

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.		
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755- 3320-2398		
Test Site No.	**Sporton Site No.**		**FCC Registration No.**
	TH01-SZ	03CH01-SZ	831040

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
Test Site Location	No. 101, Complex Building C, Guanlong Village, Xili Town, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL:+86-755-8637-9589 FAX: +86-755-8637-9595
Test Site No.	**Sporton Site No.**
	OTA01-SZ

1.8 Applicable 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

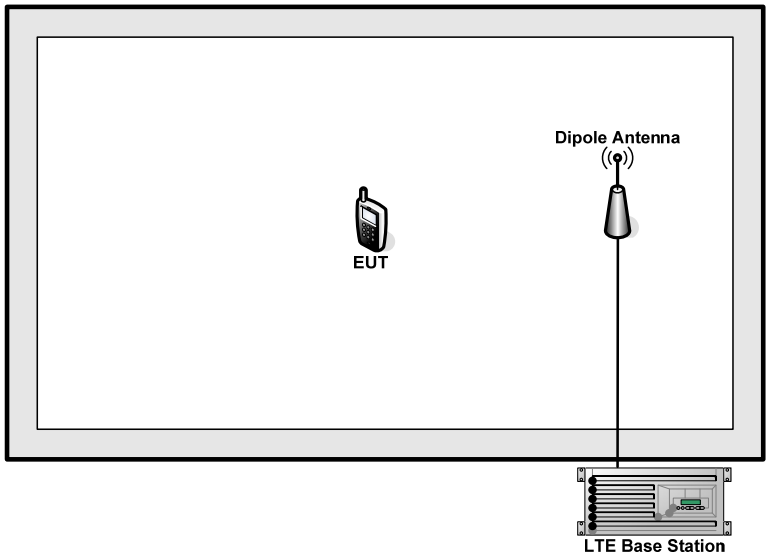
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	7	-	-	v	v	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	7	-	-				v		v	v		v	v	v	v
26dB and 99% Bandwidth	7	-	-	v	v	v	v	v	v			v		v	
Conducted Band Edge	7	-	-	v	v	v	v	v	v	v		v	v		v
Conducted Spurious Emission	7	-	-	v	v	v	v	v	v	v			v	v	v
Frequency Stability	7	-	-		v			v				v		v	
E.I.R.P.	7	-	-	v			v	v	v	v			v	v	v
Radiated Spurious Emission	7	-	-	v	v	v	v	v		v			v	v	v
Note	1. The mark "v " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. For E.R.P/E.I.R.P. measurement, the widest bandwidth of each band is chosen for testing due to highest conducted power. Besides, the lowest bandwidth of each band is also measured for reporting only. 4. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.														

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	TOPWORD	3303DR	N/A	N/A	N/A

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 7.5 dB and 10dB attenuator.

Example :
Offset(dB) = RF cable loss(dB) + attenuator factor(dB).
= 7.5 + 10 = 17.5 (dB)

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

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

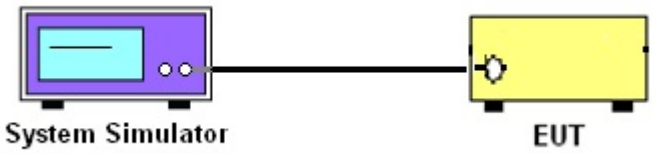
3.1.2 Measuring Instruments

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 the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

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	20.49	20.48	20.57
20	QPSK	1	49	20.43	20.50	20.51
20	QPSK	1	99	20.57	**20.59**	**20.59**
20	QPSK	50	0	19.27	19.34	19.52
20	QPSK	50	24	19.22	19.32	19.43
20	QPSK	50	49	19.29	19.33	19.37
20	QPSK	100	0	19.27	19.38	19.40
20	16QAM	1	0	19.60	19.42	19.39
20	16QAM	1	49	19.44	19.37	19.08
20	16QAM	1	99	19.44	19.41	19.09
20	16QAM	50	0	18.17	18.33	18.50
20	16QAM	50	24	18.13	18.42	18.55
20	16QAM	50	49	18.38	18.49	18.36
20	16QAM	100	0	18.23	18.43	18.36
Channel				**20825**	**21100**	**21375**
Frequency (MHz)				**2507.5**	**2535**	**2562.5**
15	QPSK	1	0	20.11	20.50	20.53
15	QPSK	1	37	20.26	20.54	20.43
15	QPSK	1	74	20.36	20.56	20.31
15	QPSK	36	0	19.20	19.36	19.46
15	QPSK	36	18	19.10	19.33	19.41
15	QPSK	36	37	19.31	19.48	19.47
15	QPSK	75	0	19.25	19.39	19.40
15	16QAM	1	0	19.35	19.25	19.22
15	16QAM	1	37	19.12	19.24	19.23
15	16QAM	1	74	19.53	19.27	19.26
15	16QAM	36	0	18.13	18.37	18.39
15	16QAM	36	18	18.09	18.47	18.30
15	16QAM	36	37	18.29	18.52	18.36
15	16QAM	75	0	18.19	18.47	18.43

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	20.20	20.49	20.40
10	QPSK	1	24	20.17	20.51	20.39
10	QPSK	1	49	20.28	20.54	20.41
10	QPSK	25	0	19.08	19.29	19.34
10	QPSK	25	12	19.14	19.38	19.33
10	QPSK	25	24	19.09	19.47	19.32
10	QPSK	50	0	19.07	19.36	19.36
10	16QAM	1	0	18.99	19.22	19.31
10	16QAM	1	24	19.28	19.38	19.40
10	16QAM	1	49	19.09	19.33	18.83
10	16QAM	25	0	18.14	18.32	18.40
10	16QAM	25	12	18.12	18.50	18.39
10	16QAM	25	24	18.06	18.52	18.29
10	16QAM	50	0	18.12	18.53	18.26
Channel				**20775**	**21100**	**21425**
Frequency (MHz)				**2502.5**	**2535**	**2567.5**
5	QPSK	1	0	20.07	20.46	20.29
5	QPSK	1	12	20.21	20.40	20.26
5	QPSK	1	24	20.23	20.47	20.37
5	QPSK	12	0	19.12	19.30	19.37
5	QPSK	12	6	19.13	19.40	19.30
5	QPSK	12	11	19.19	19.42	19.31
5	QPSK	25	0	19.24	19.40	19.31
5	16QAM	1	0	18.94	19.60	19.26
5	16QAM	1	12	19.35	19.65	19.36
5	16QAM	1	24	19.19	19.19	19.32
5	16QAM	12	0	18.12	18.59	18.35
5	16QAM	12	6	18.15	18.62	18.24
5	16QAM	12	11	18.14	18.56	18.32
5	16QAM	25	0	18.15	18.52	18.42

Note: maximum average power for LTE.

3.2 Peak-to-Average Ratio

3.2.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

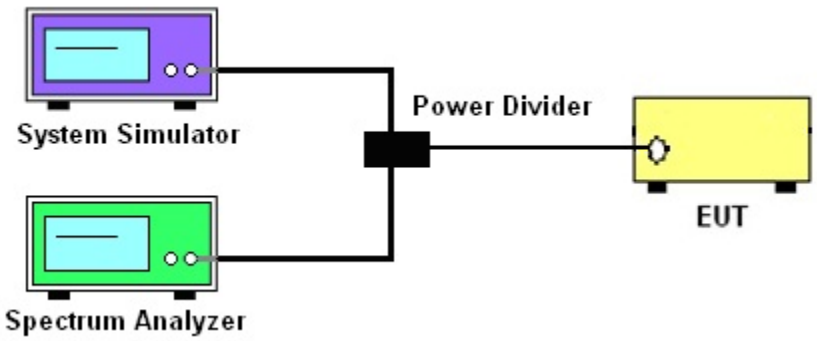
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

3.2.4 Test Setup



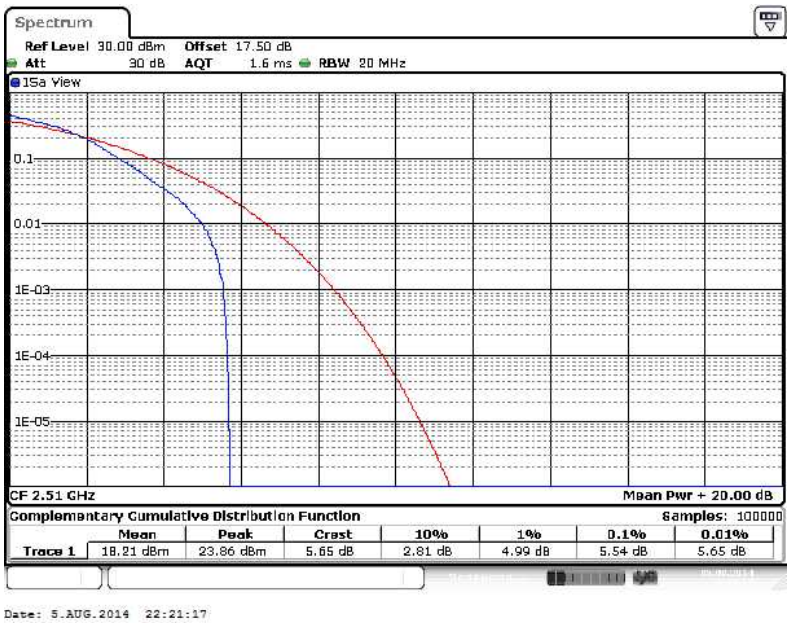
3.2.5 Test Result of Peak-to-Average Ratio

LTE Band 7						
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	16QAM	1	0	5.54	5.74	4.90
20	16QAM	100	0	5.97	5.65	5.86

3.2.6 Peak to Average Power Ratio

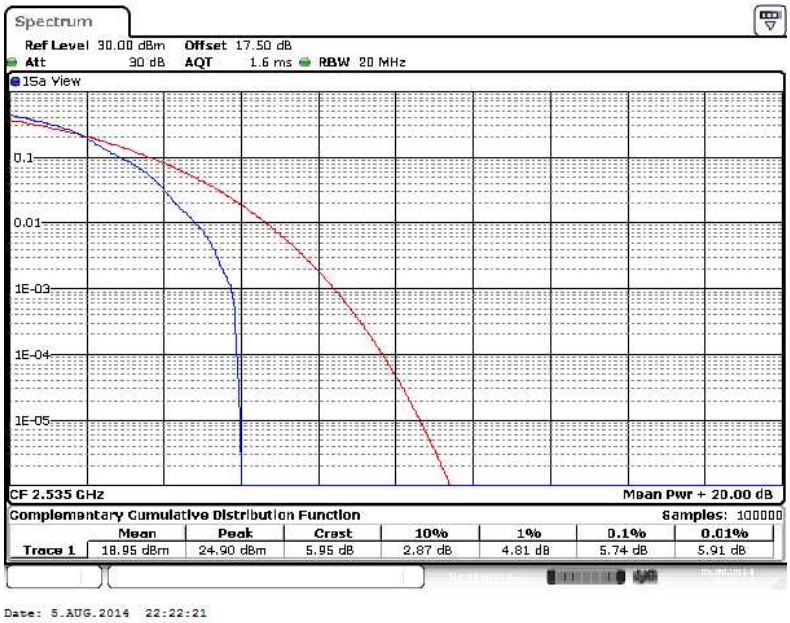
Peak-to-Average Ratio on LTE Band 7

20MHz / 16QAM in Ch. 20850 (1RB Size)



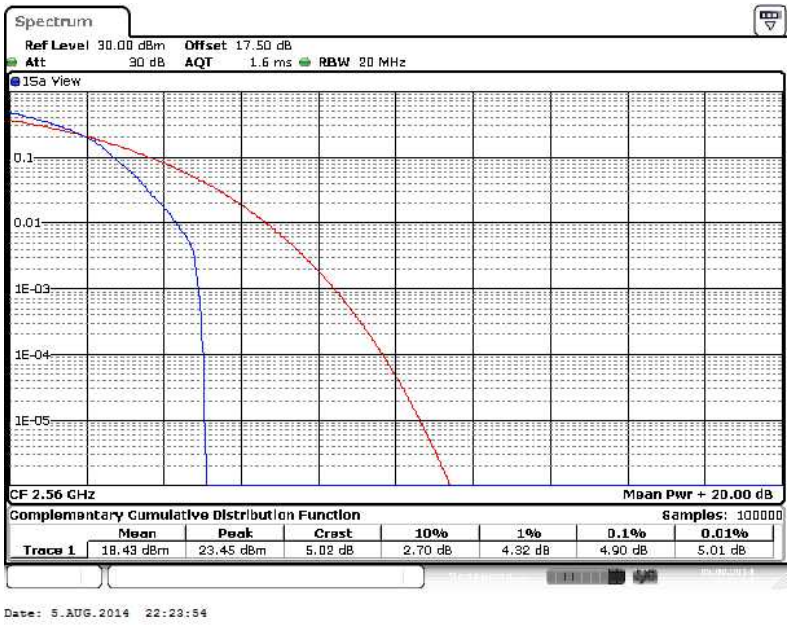
Peak-to-Average Ratio on LTE Band 7

20MHz / 16QAM in Ch. 21100 (1RB Size)



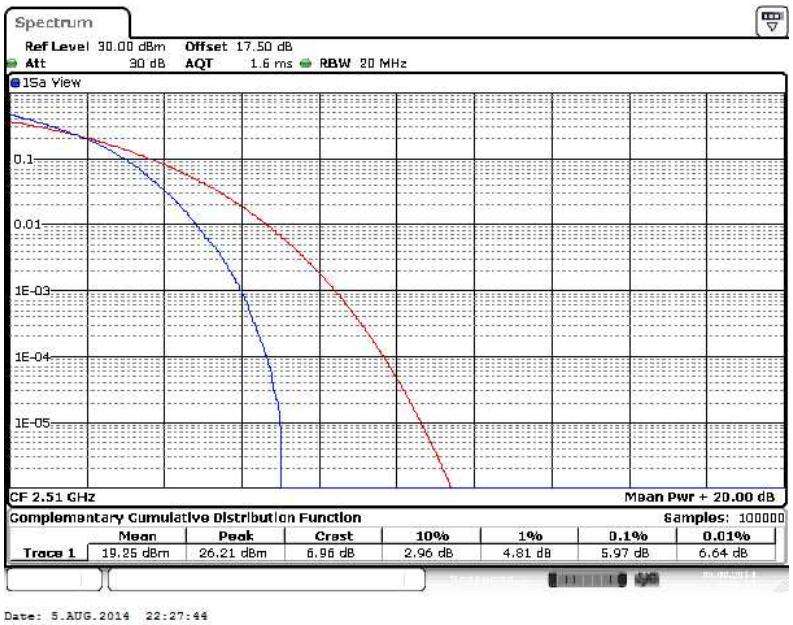
Peak-to-Average Ratio on LTE Band 7

20MHz / 16QAM in Ch. 21350 (1RB Size)



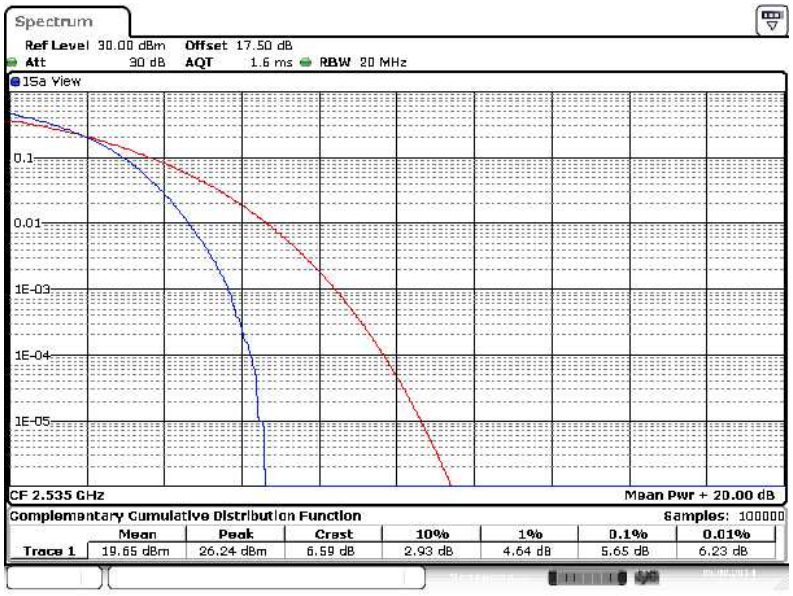
Peak-to-Average Ratio on LTE Band 7

20MHz / 16QAM in Ch. 20850 (100RB Size)



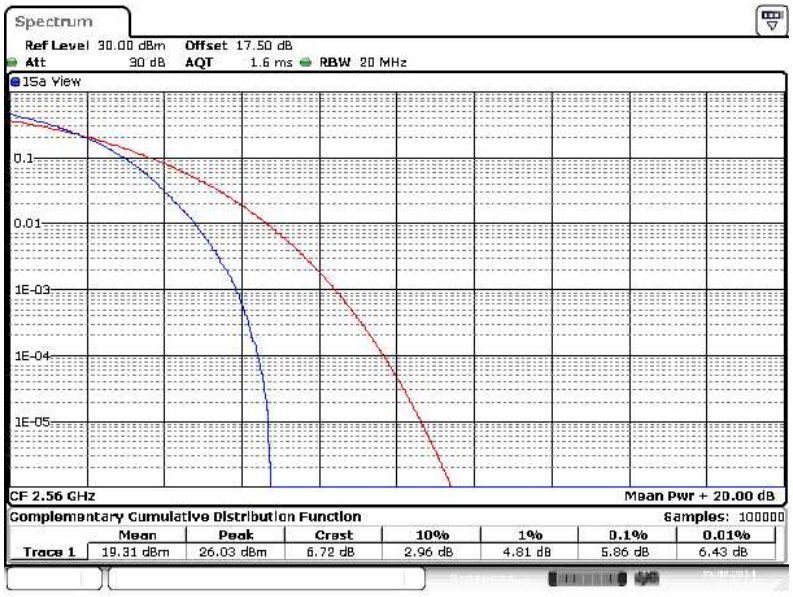
Peak-to-Average Ratio on LTE Band 7

20MHz / 16QAM in Ch. 21100 (100RB Size)



Peak-to-Average Ratio on LTE Band 7

20MHz / 16QAM in Ch. 21350 (100RB Size)



3.3 Equivalent Isotropic Radiated Power Measurement

3.3.1 Description of the EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r01. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

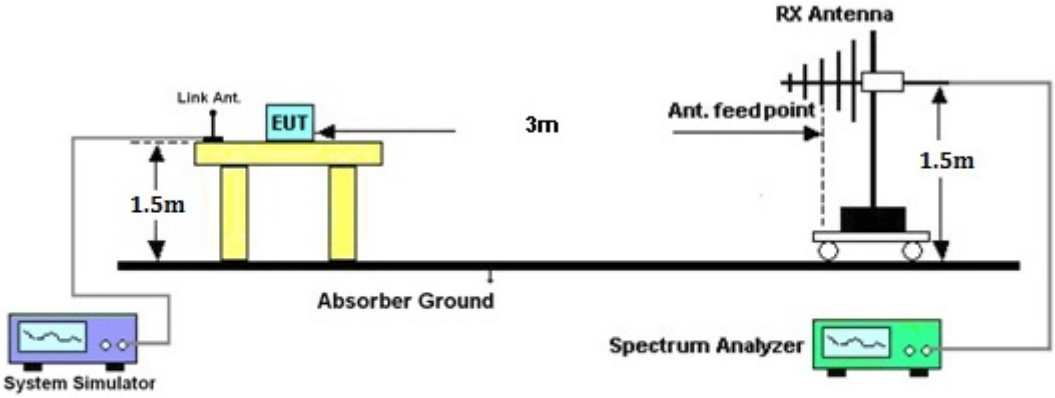
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

1. The EUT was placed on a turntable 1.5 meters high in a fully anechoic chamber.
2. The EUT was placed 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 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 = Ps + Et – Es + Gs = Ps + Rt – Rs + Gs
    Ps (dBm)：Input power to substitution antenna.
    Gs (dBi or dBd)：Substitution antenna Gain.
    Et = Rt + AF
    Es = Rs + AF
    AF (dB/m)：Receive antenna factor
    Rt：The highest received signal in spectrum analyzer for EUT.
    Rs：The highest received signal in spectrum analyzer for substitution antenna.

3.3.4 Test Setup



3.3.5 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	24	2502.5	25.26	0.34	H
7	5	QPSK	1	24	2535.0	25.09	0.32	H
7	5	QPSK	1	24	2567.5	23.97	0.25	H
7	5	QPSK	1	24	2502.5	25.15	0.33	V
7	5	QPSK	1	24	2535.0	24.82	0.30	V
7	5	QPSK	1	24	2567.5	24.11	0.26	V
7	5	16QAM	1	12	2502.5	24.29	0.27	H
7	5	16QAM	1	12	2535.0	23.91	0.25	H
7	5	16QAM	1	12	2567.5	22.96	0.20	H
7	5	16QAM	1	12	2502.5	24.02	0.25	V
7	5	16QAM	1	12	2535.0	23.71	0.23	V
7	5	16QAM	1	12	2567.5	23.07	0.20	V
7	20	QPSK	1	99	2510.0	24.92	0.31	H
7	20	QPSK	1	99	2535.0	24.73	0.30	H
7	20	QPSK	1	99	2560.0	24.05	0.25	H
7	20	QPSK	1	99	2510.0	24.80	0.30	V
7	20	QPSK	1	99	2535.0	24.78	0.30	V
7	20	QPSK	1	99	2560.0	24.06	0.25	V
7	20	16QAM	1	0	2510.0	24.35	0.27	H
7	20	16QAM	1	0	2535.0	24.04	0.25	H
7	20	16QAM	1	0	2560.0	23.60	0.23	H
7	20	16QAM	1	0	2510.0	24.03	0.25	V
7	20	16QAM	1	0	2535.0	23.74	0.24	V
7	20	16QAM	1	0	2560.0	23.50	0.22	V

3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement

3.4.1 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 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.

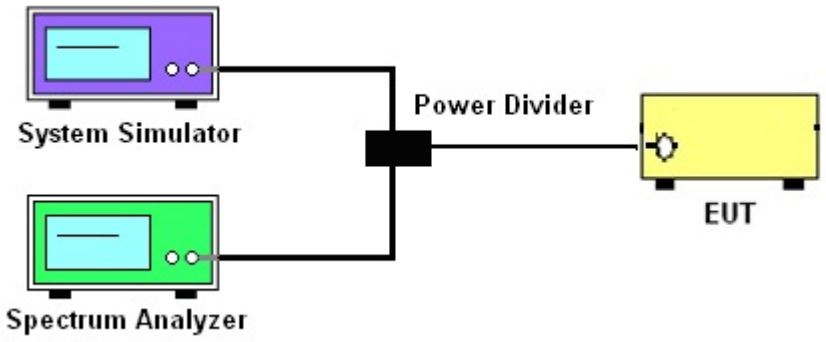
3.4.2 Measuring Instruments

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 system simulator via a power divider.
2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF power with full RB sizes were measured.

3.4.4 Test Setup



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

Modes	LTE Band 7			
BW / Mod.	**5MHz / QPSK**	**5MHz / 16QAM**	**10MHz / QPSK**	**10MHz / 16QAM**
99% OBW (MHz)	4.50	4.50	9.09	9.03
26dB BW (MHz)	5.08	5.05	10.05	9.99
BW / Mod.	**15MHz / QPSK**	**15MHz / 16QAM**	**20MHz / QPSK**	**20MHz / 16QAM**
99% OBW (MHz)	13.46	13.43	18.38	18.34
26dB BW (MHz)	14.78	14.84	20.46	20.42

Note:

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

BW5.0MHz RB setting：RB Size 25, RB offset 0

BW10MHz RB setting：RB Size 50, RB offset 0

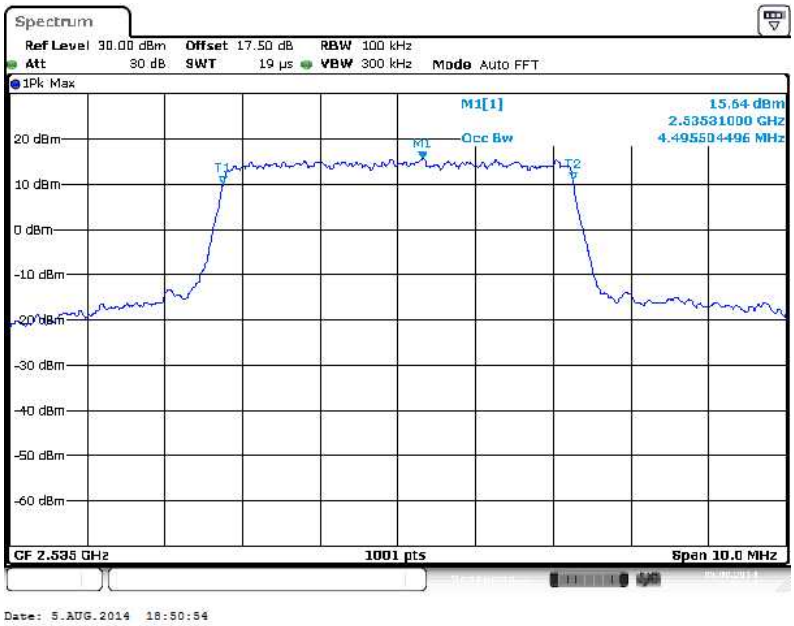
BW15MHz RB setting：RB Size 75, RB offset 0

BW20MHz RB setting：RB Size 100, RB offset 0

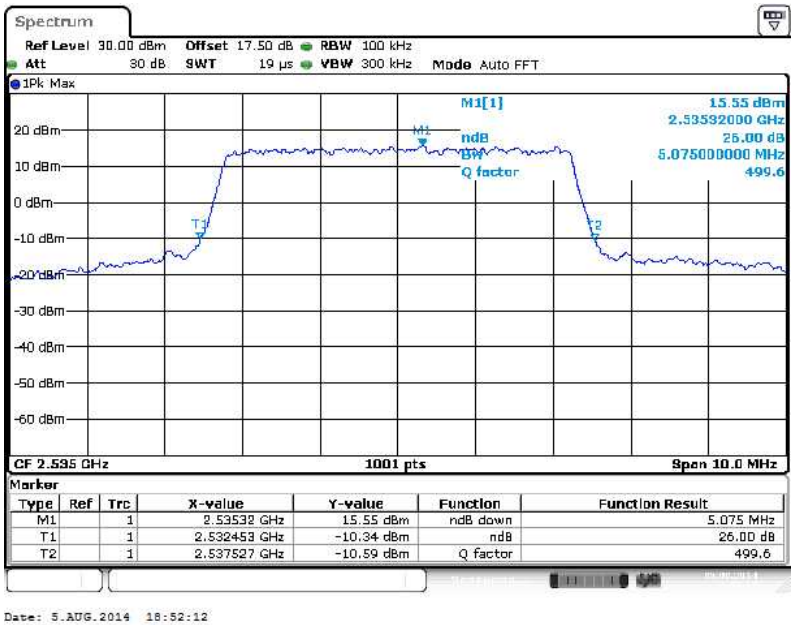
3.4.6 Test Result (Plots) of Occupied Bandwidth

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

99% Occupied Bandwidth Plot on Channel 21100

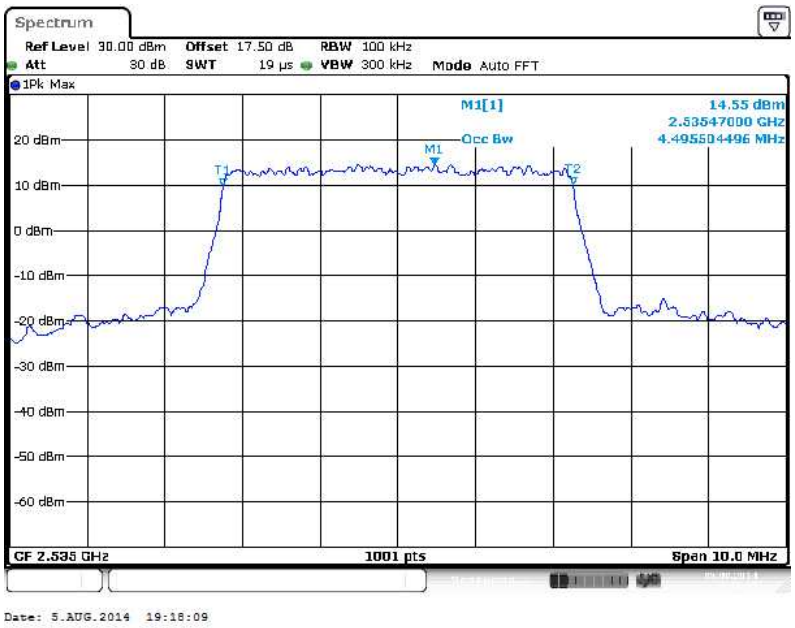


26dB Bandwidth Plot on Channel 21100

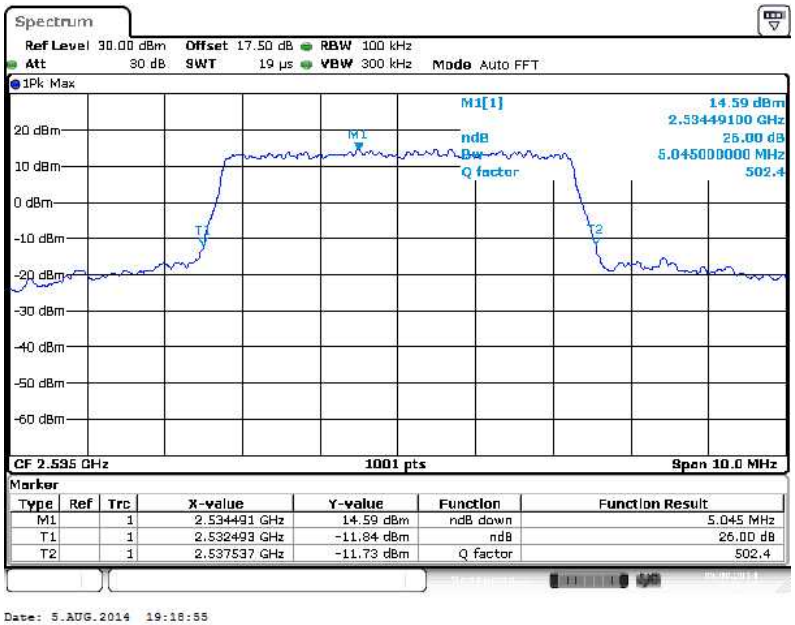


Band :	LTE Band 7	BW / Mod. :	5MHz / 16QAM

99% Occupied Bandwidth Plot on Channel 21100

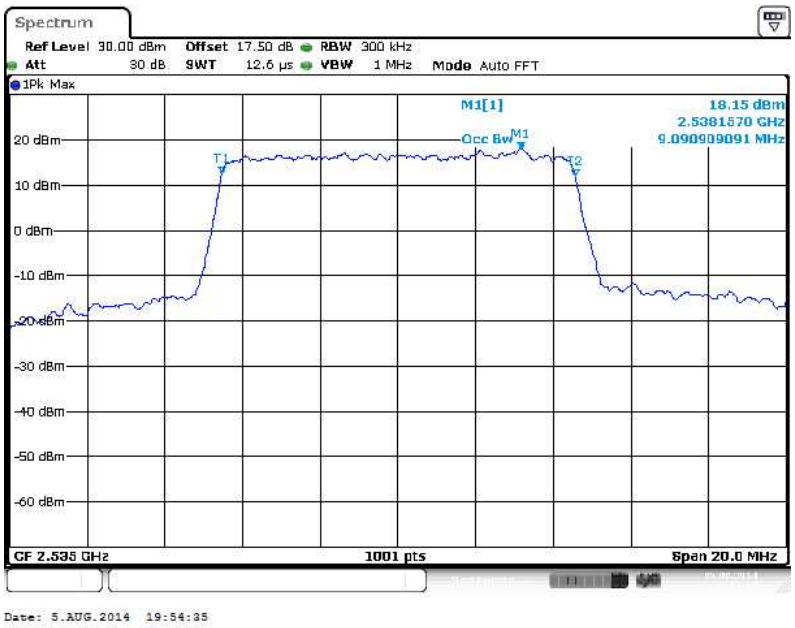


26dB Bandwidth Plot on Channel 21100

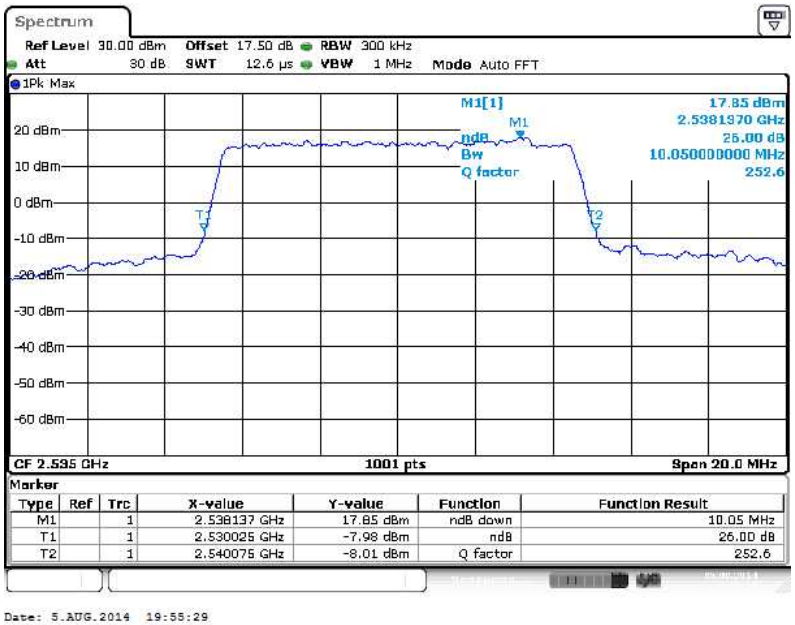


Band :	LTE Band 7	BW / Mod. :	10MHz / QPSK

99% Occupied Bandwidth Plot on Channel 21100

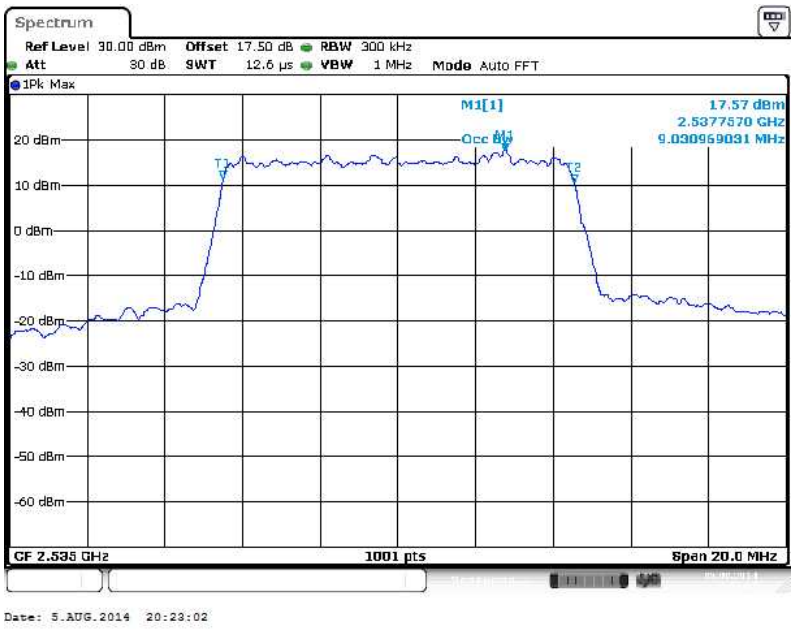


26dB Bandwidth Plot on Channel 21100

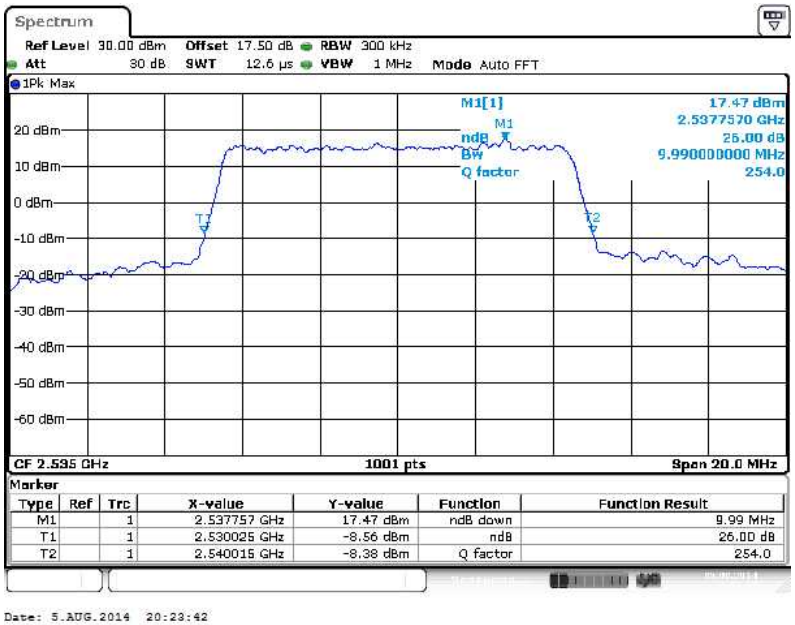


Band :	LTE Band 7	BW / Mod. :	10MHz / 16QAM

99% Occupied Bandwidth Plot on Channel 21100

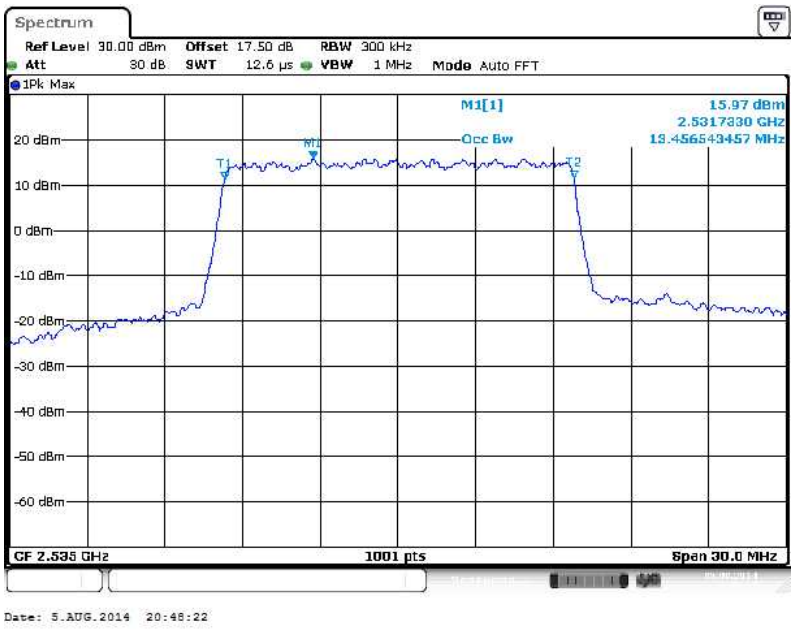


26dB Bandwidth Plot on Channel 21100

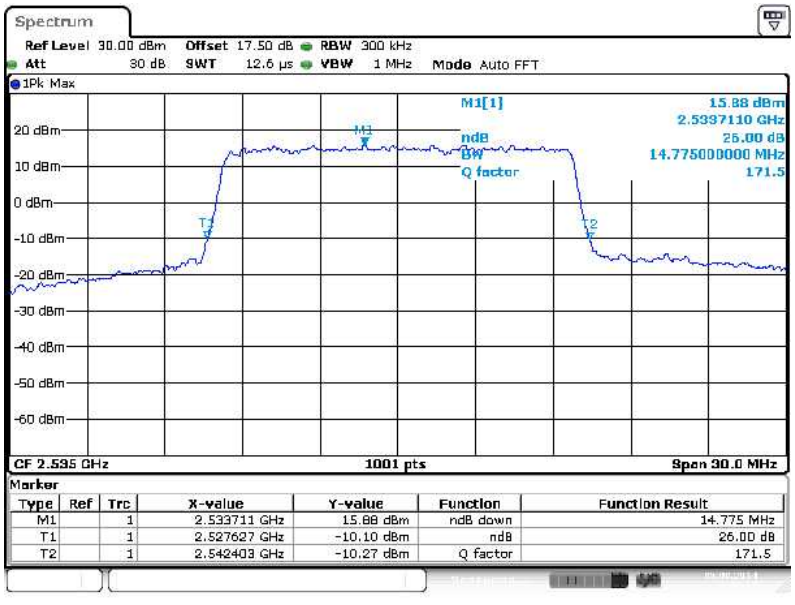


Band :	LTE Band 7	BW / Mod. :	15MHz / QPSK

99% Occupied Bandwidth Plot on Channel 21100

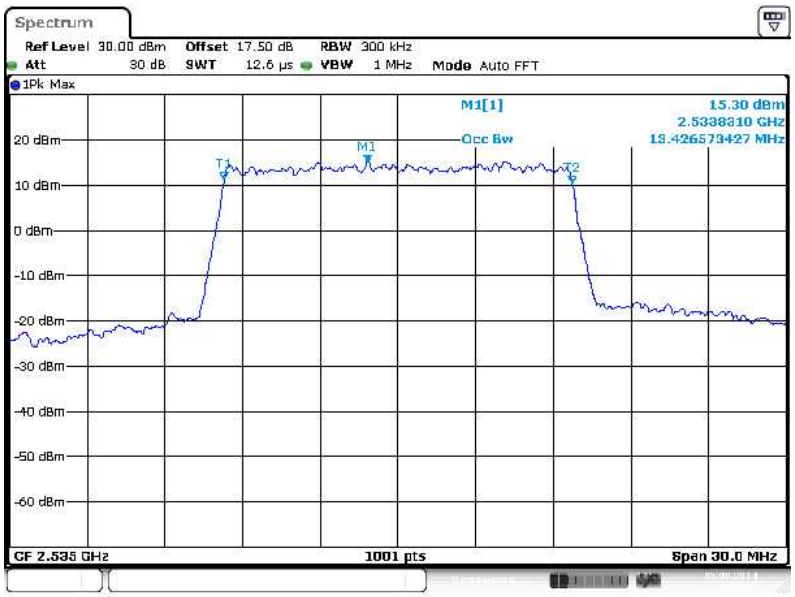


26dB Bandwidth Plot on Channel 21100

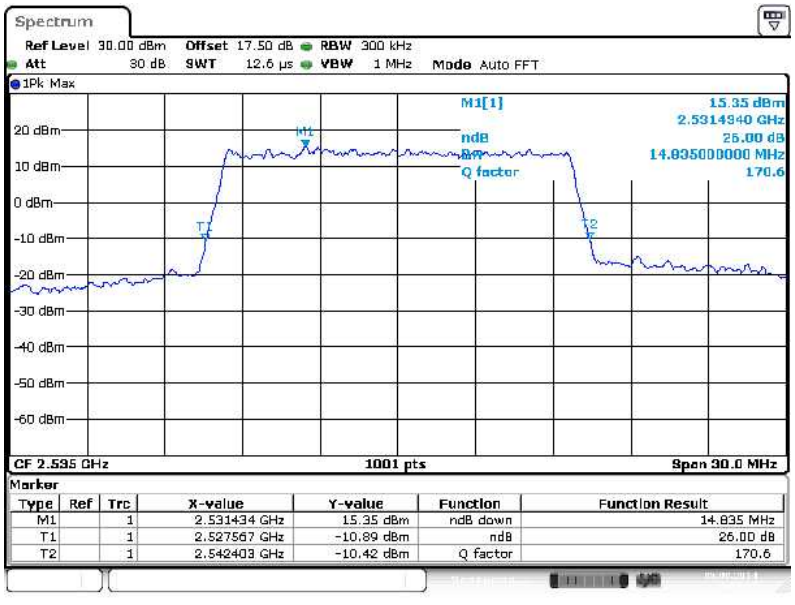


Band :	LTE Band 7	BW / Mod. :	15MHz / 16QAM

99% Occupied Bandwidth Plot on Channel 21100

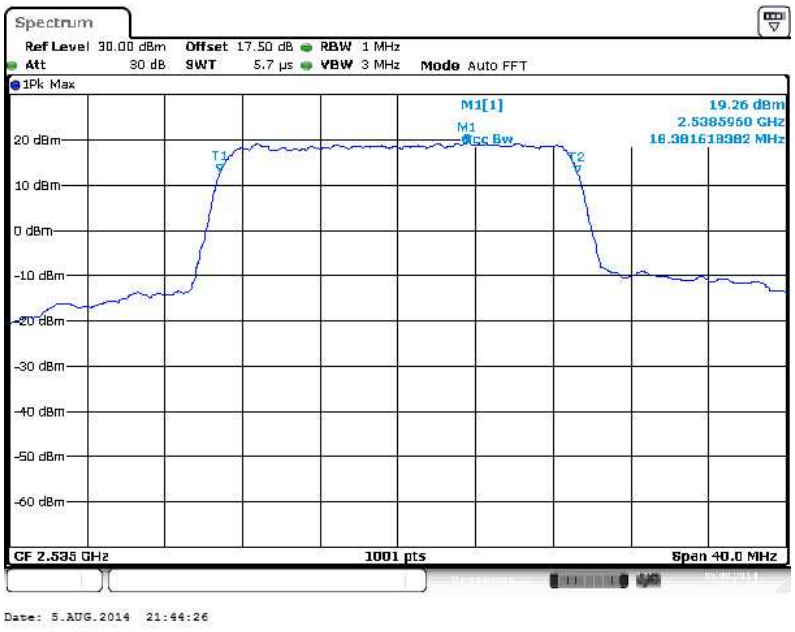


26dB Bandwidth Plot on Channel 21100

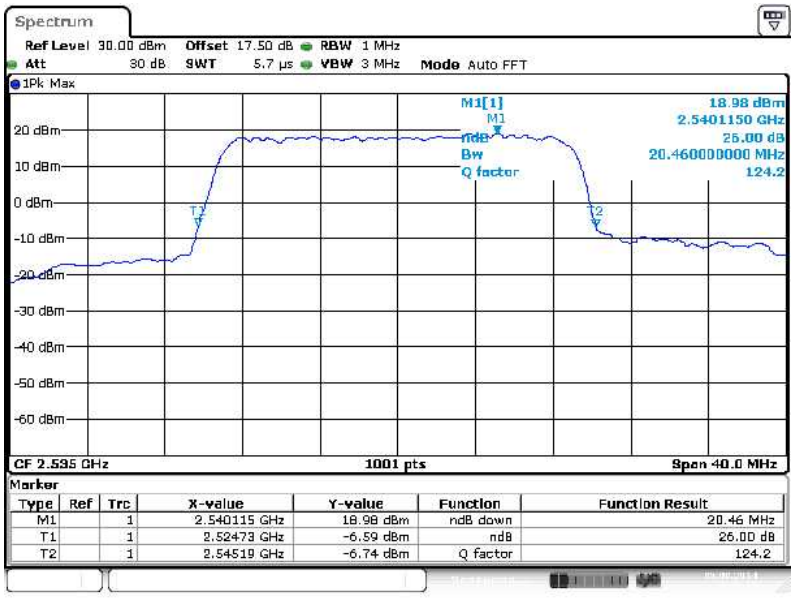


Band :	LTE Band 7	BW / Mod. :	20MHz / QPSK

99% Occupied Bandwidth Plot on Channel 21100



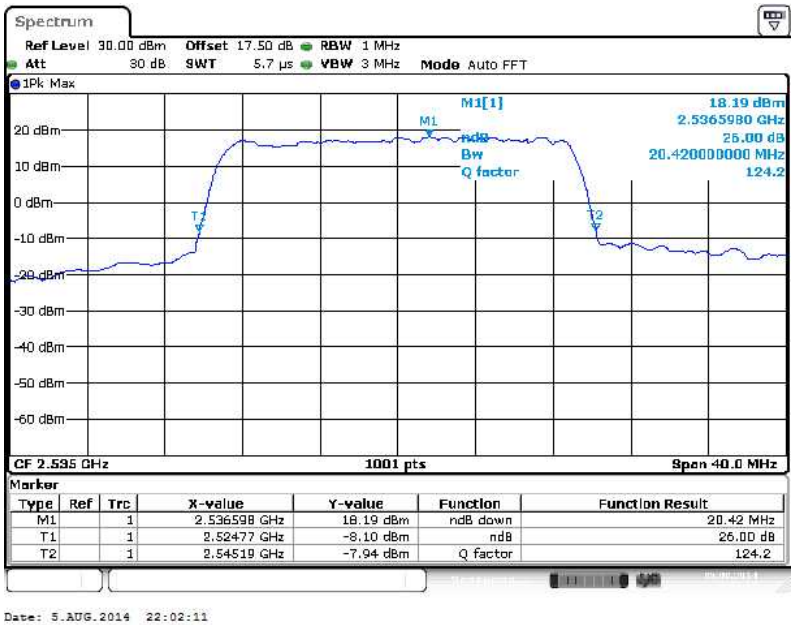
26dB Bandwidth Plot on Channel 21100



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

99% Occupied Bandwidth Plot on Channel 21100

26dB Bandwidth Plot on Channel 21100



3.5 Conducted Band Edge Measurement

3.5.1 Description of Conducted Band Edge Measurement

27.53(m)(4):

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

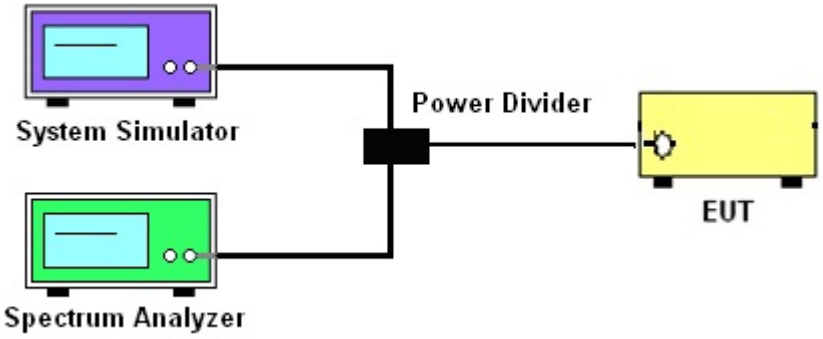
3.5.2 Measuring Instruments

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 system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
3. Set spectrum analyzer with RMS detector.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
5. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

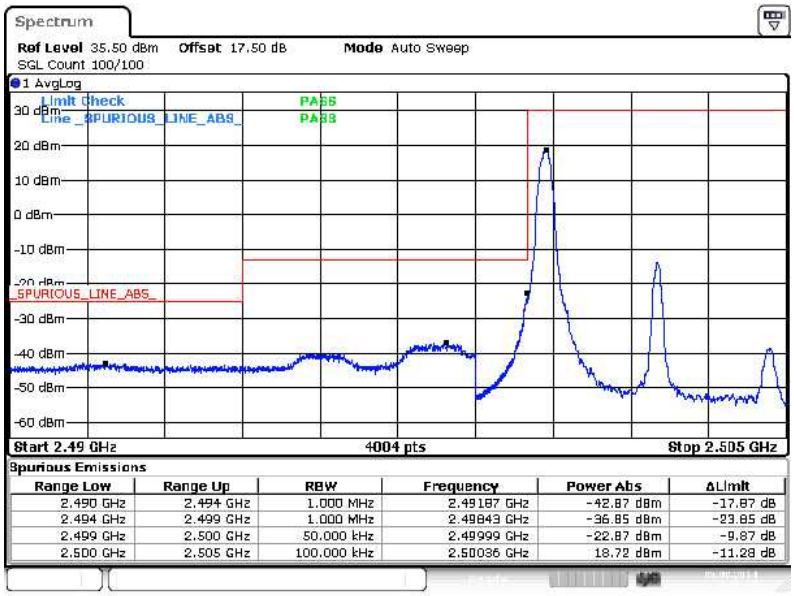
3.5.4 Test Setup



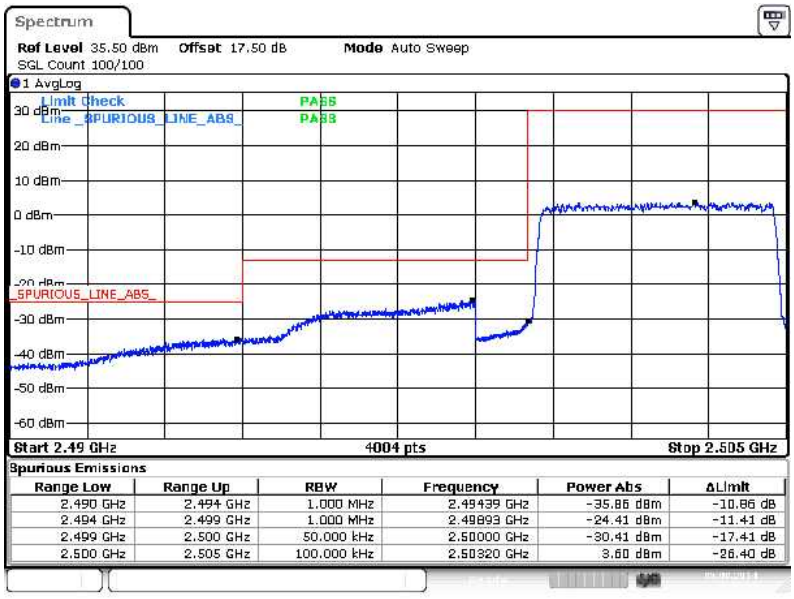
3.5.5 Test Result (Plots) of Conducted Band Edge

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

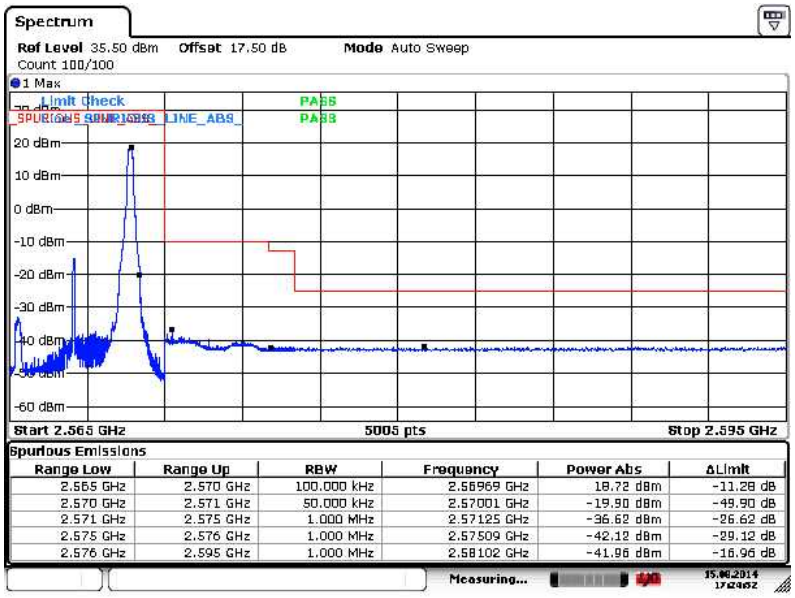
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



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

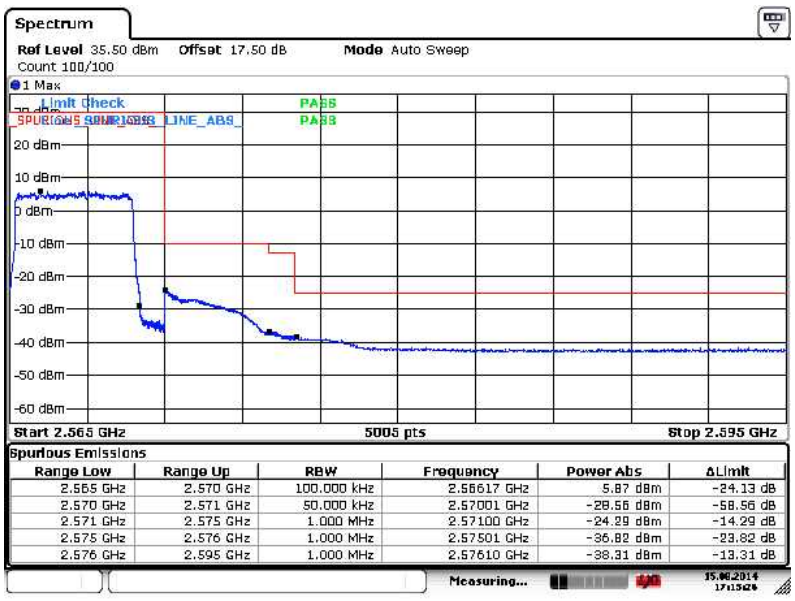


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24



Date: 15.AUG.2014 17:24:52

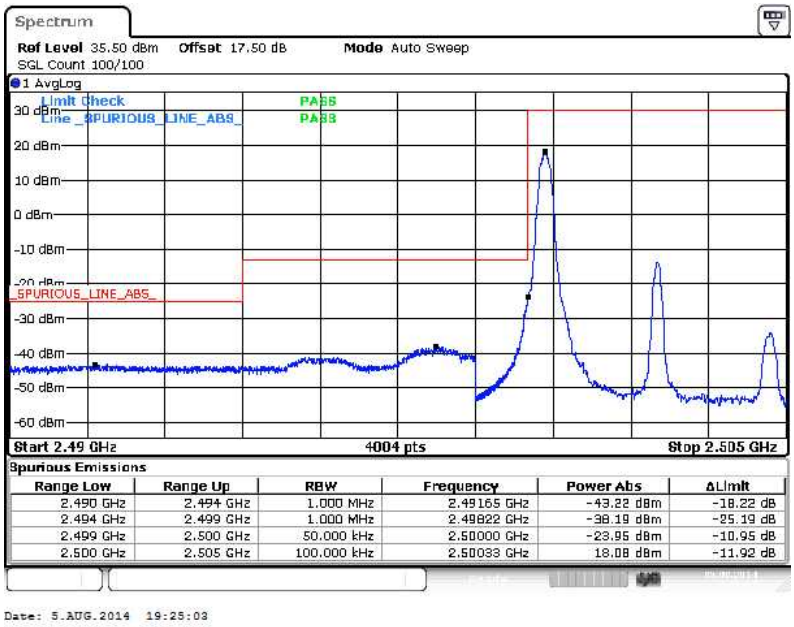
Higher Band Edge Plot for QPSK-RB Size 25, RB Offset 0



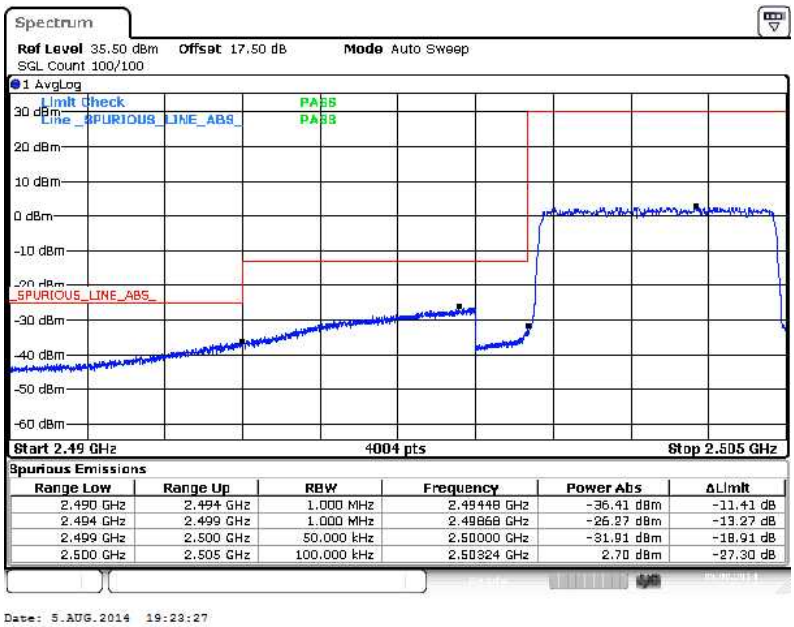
Date: 15.AUG.2014 17:15:25

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

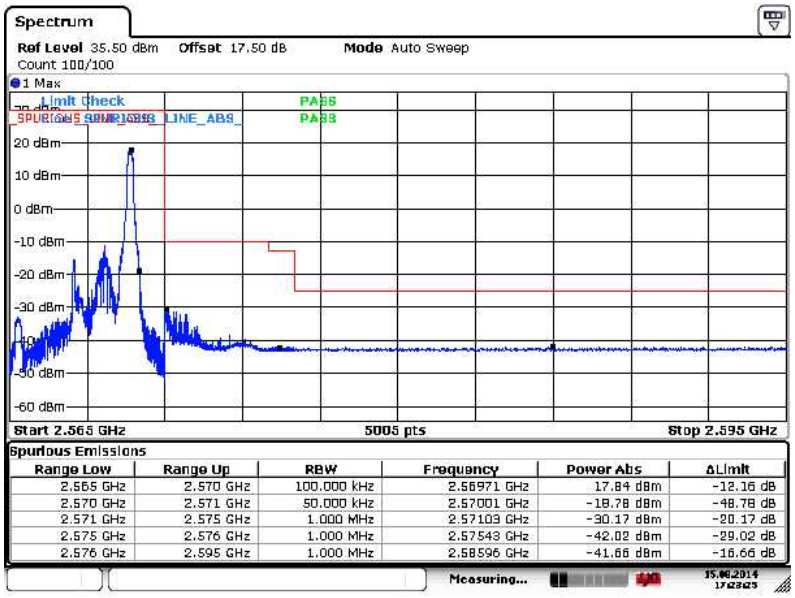
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



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

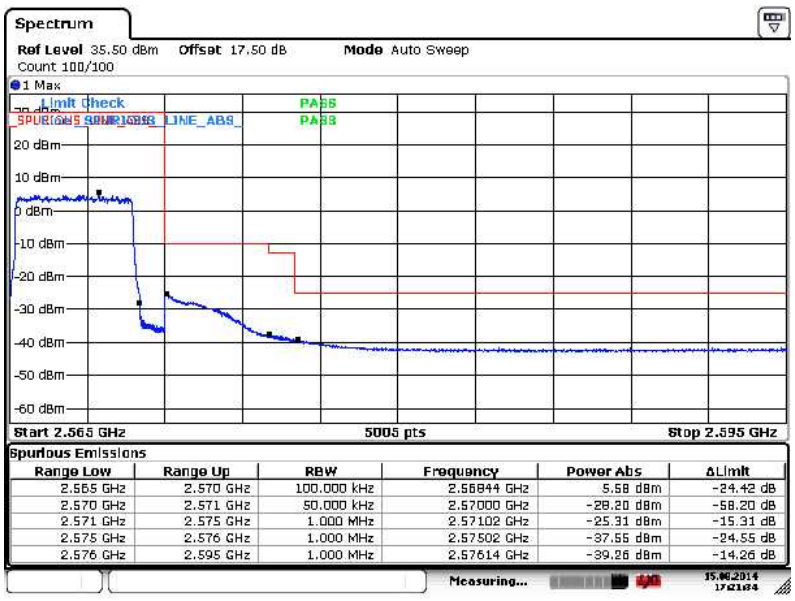


Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 24



Date: 15.AUG.2014 17:23:24

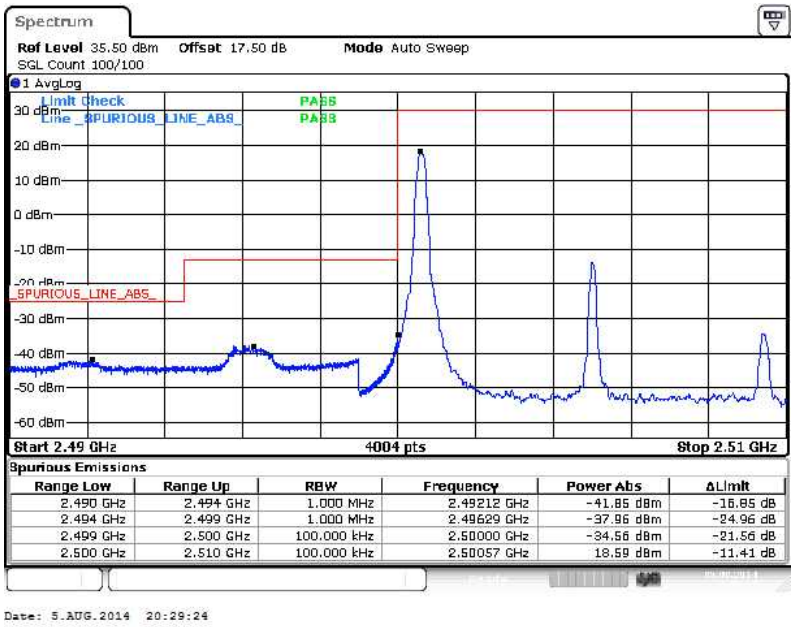
Higher Band Edge Plot for 16QAM-RB Size 25, RB Offset 0



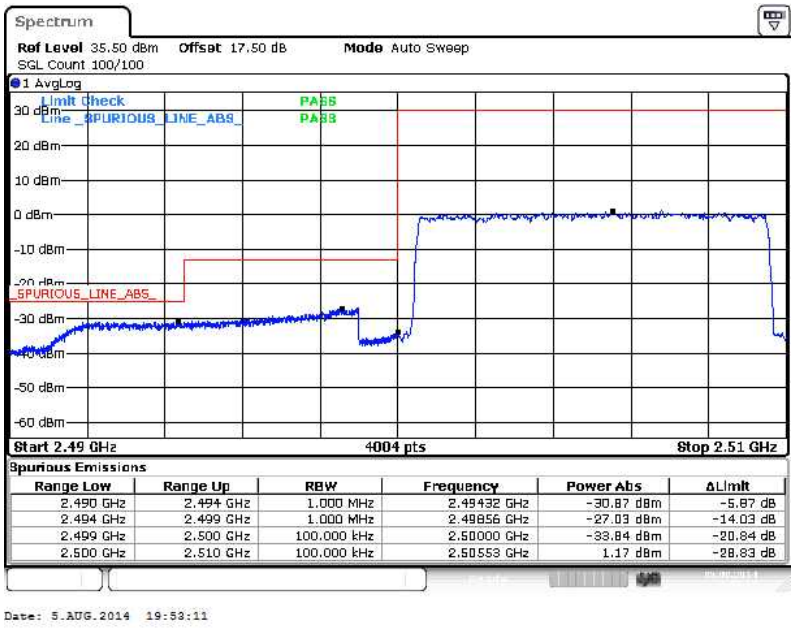
Date: 15.AUG.2014 17:21:34

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

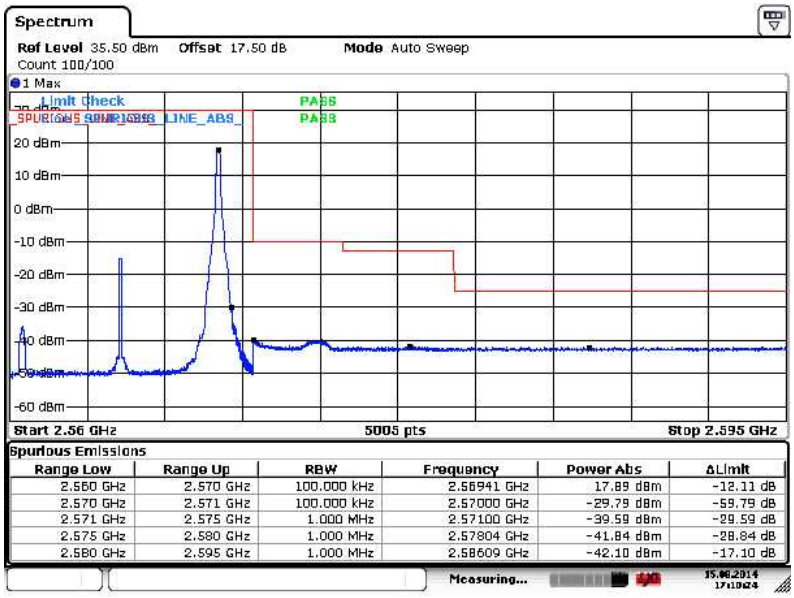
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



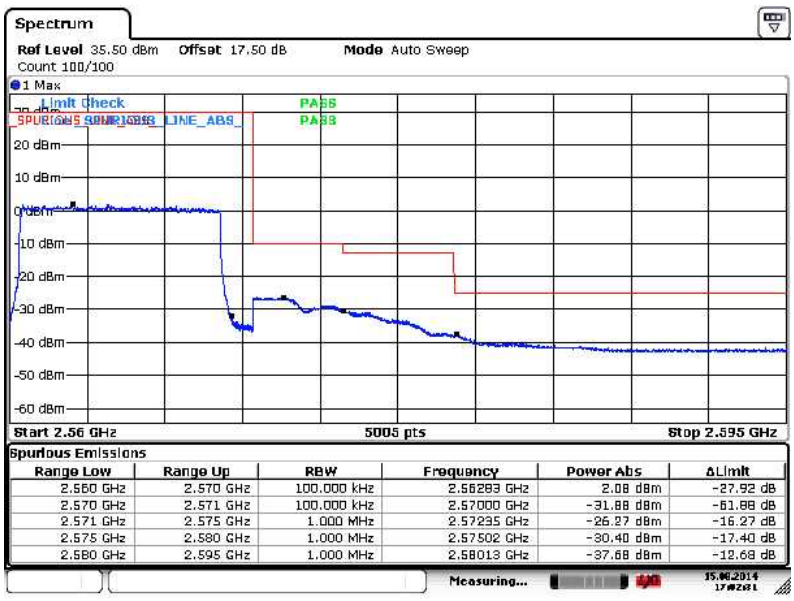
Lower Band Edge Plot for QPSK-RB Size 50, RB Offset 0



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

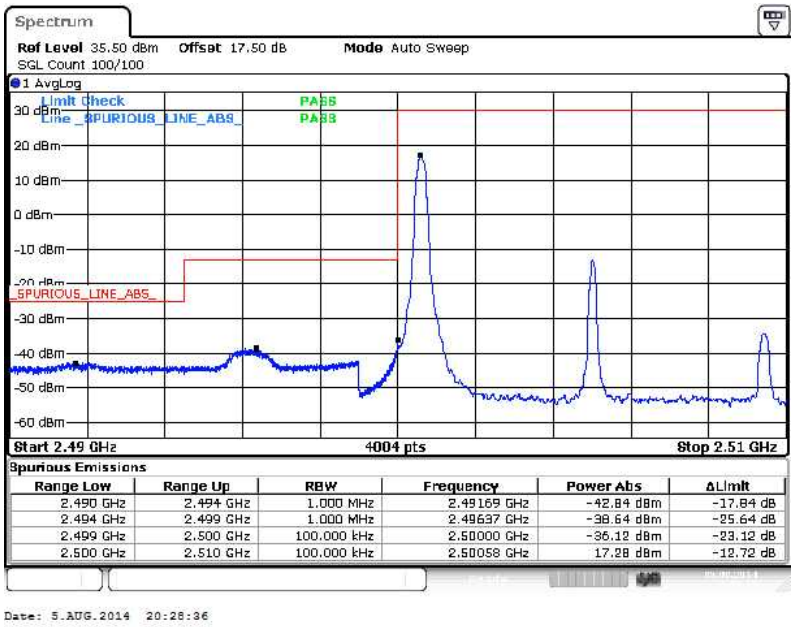


Higher Band Edge Plot for QPSK-RB Size 50, RB Offset 0



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

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

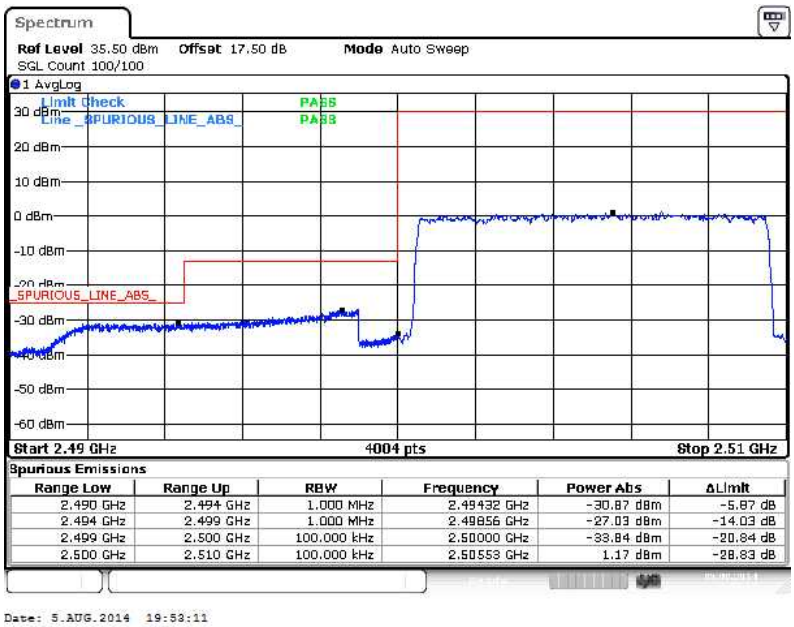


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.490 GHz	2.494 GHz	1.000 MHz	2.49169 GHz	-42.84 dBm	-17.84 dB
2.494 GHz	2.499 GHz	1.000 MHz	2.49637 GHz	-38.64 dBm	-25.64 dB
2.499 GHz	2.500 GHz	100.000 kHz	2.50000 GHz	-36.12 dBm	-23.12 dB
2.500 GHz	2.510 GHz	100.000 kHz	2.50058 GHz	17.28 dBm	-12.72 dB

Date: 5.AUG.2014 20:28:36

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

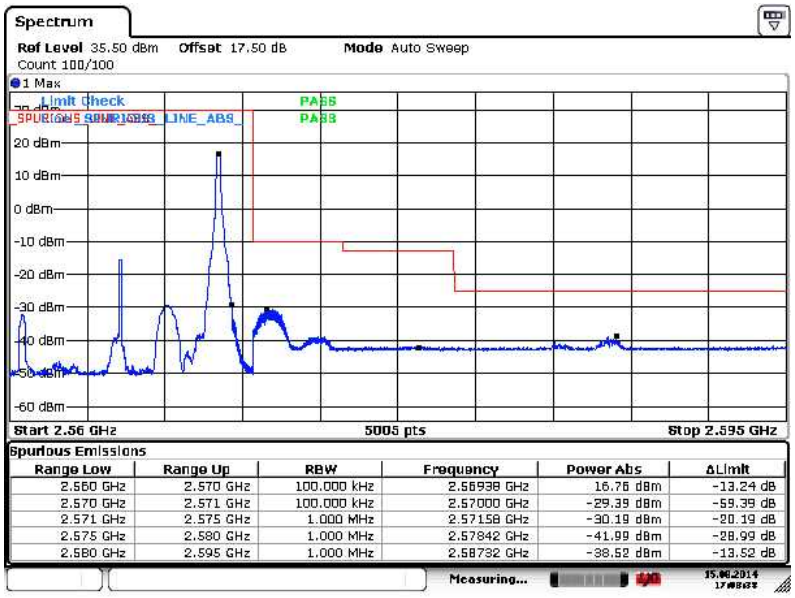


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
2.490 GHz	2.494 GHz	1.000 MHz	2.49432 GHz	-30.87 dBm	-5.87 dB
2.494 GHz	2.499 GHz	1.000 MHz	2.49856 GHz	-27.03 dBm	-14.03 dB
2.499 GHz	2.500 GHz	100.000 kHz	2.50000 GHz	-33.84 dBm	-20.84 dB
2.500 GHz	2.510 GHz	100.000 kHz	2.50553 GHz	1.17 dBm	-28.83 dB

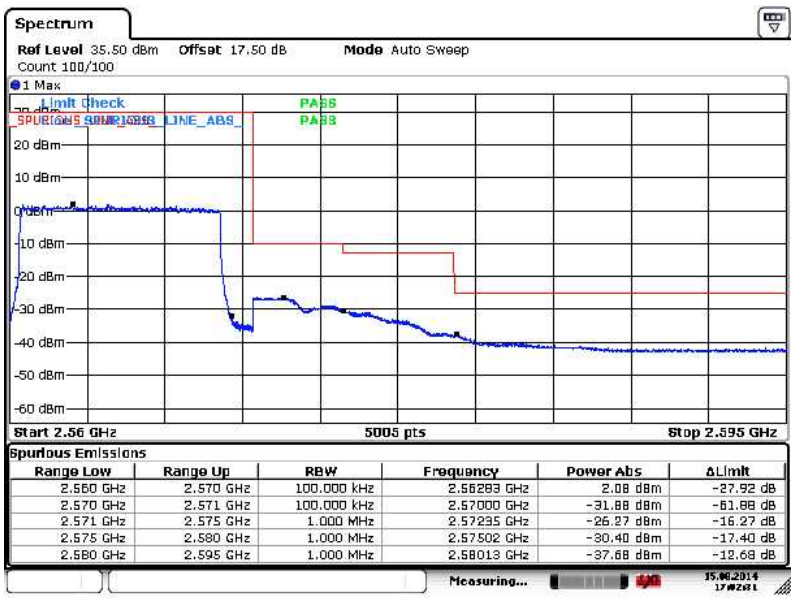
Date: 5.AUG.2014 19:53:11

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



Date: 15.AUG.2014 17:08:38

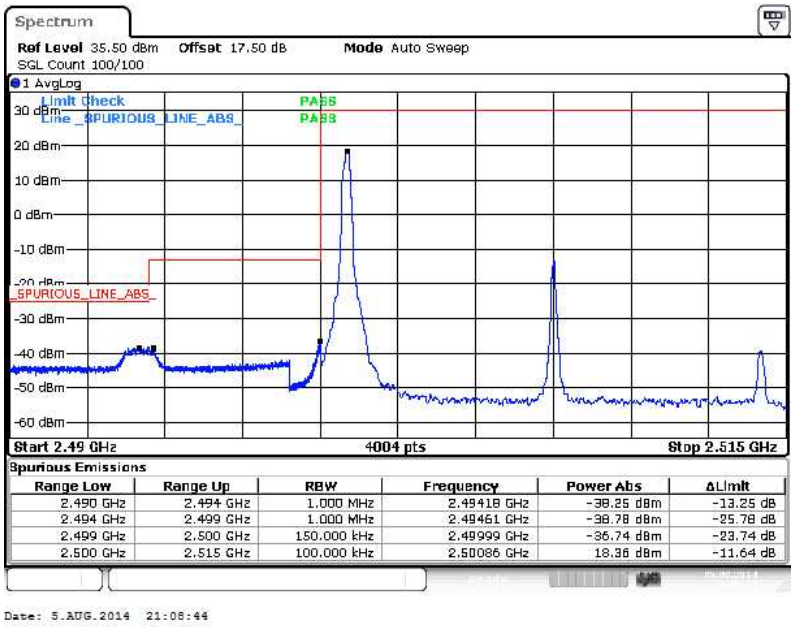
Higher Band Edge Plot for 16QAM-RB Size 50, RB Offset 0



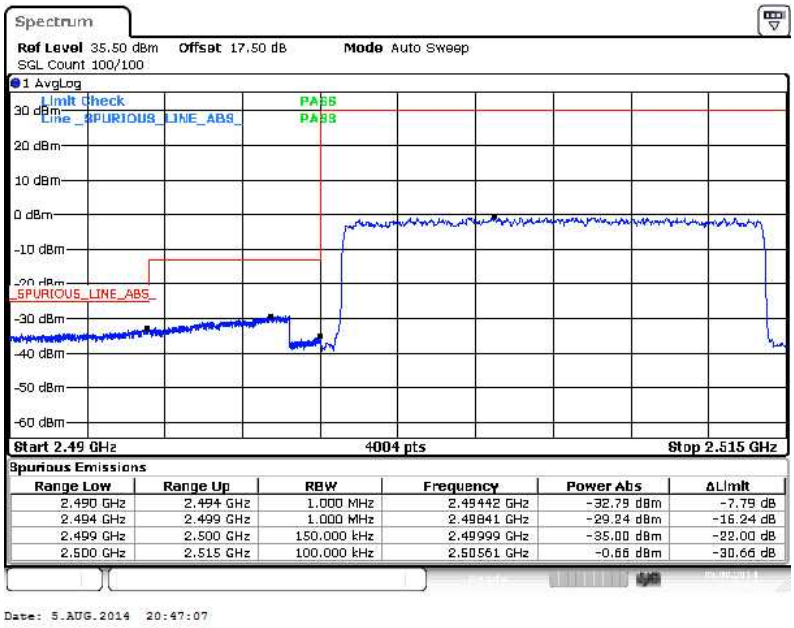
Date: 15.AUG.2014 17:02:31

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

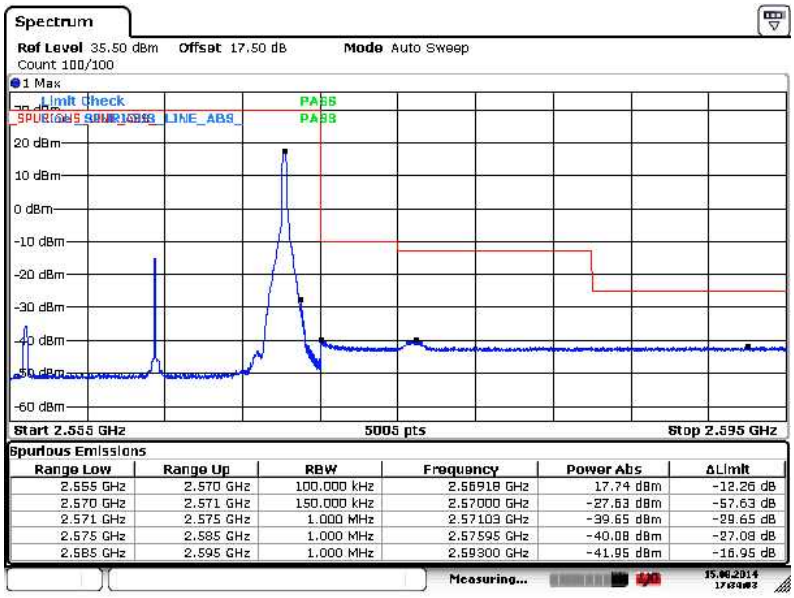
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



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

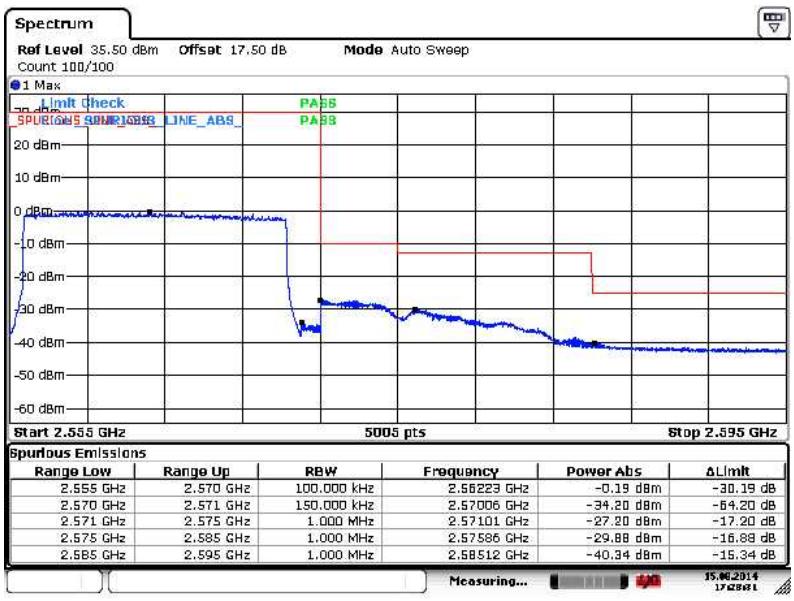


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 74



Date: 15.AUG.2014 17:34:02

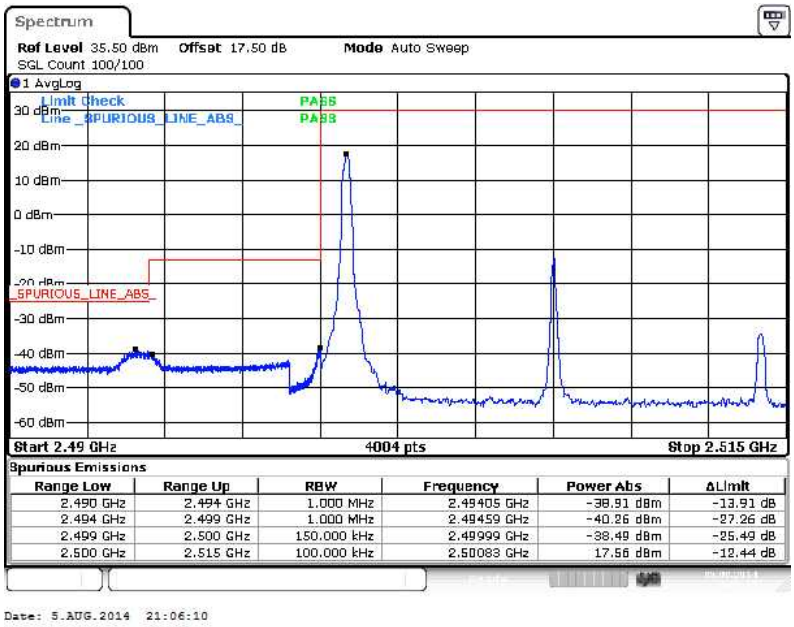
Higher Band Edge Plot for QPSK-RB Size 75, RB Offset 0



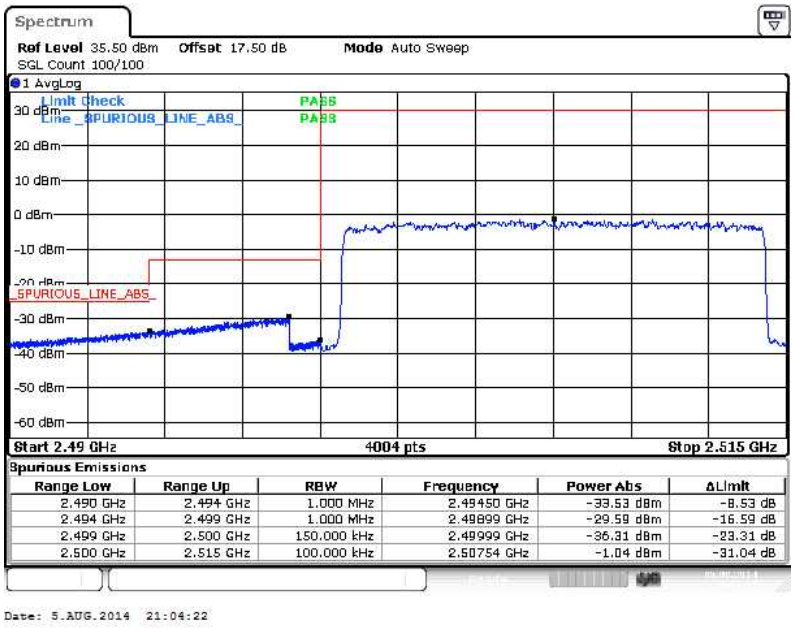
Date: 15.AUG.2014 17:28:31

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

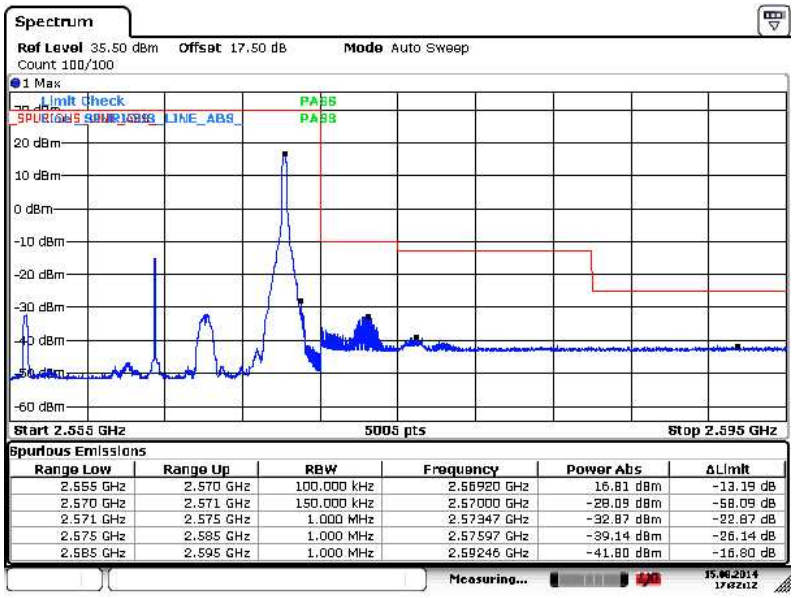
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



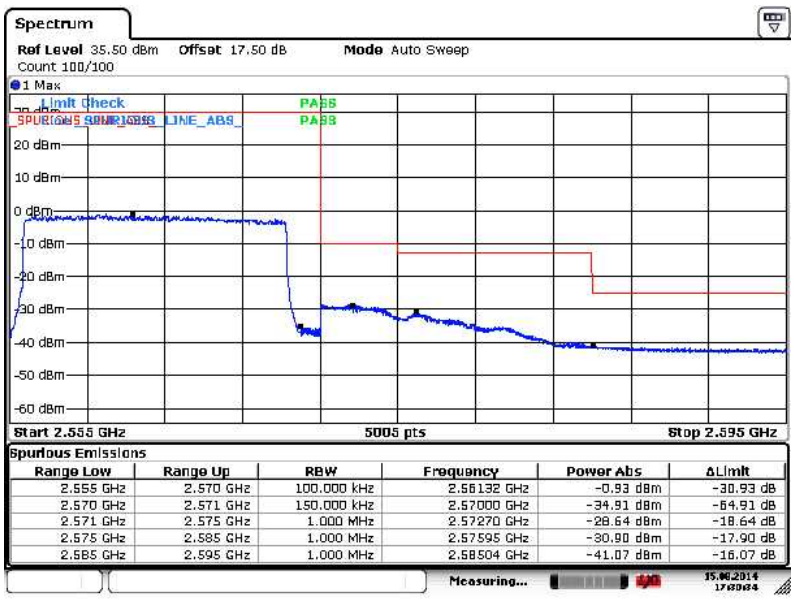
Lower Band Edge Plot for 16QAM-RB Size 75, RB Offset 0



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

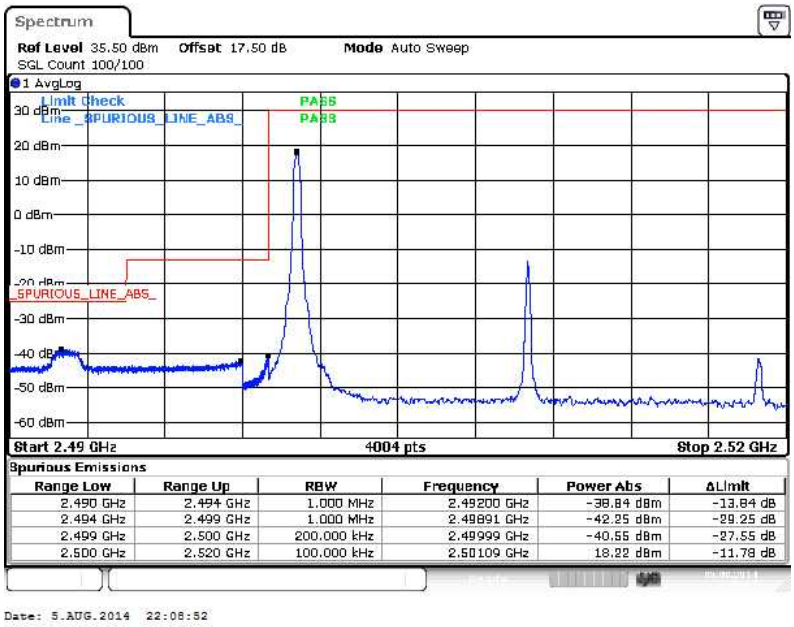


Higher Band Edge Plot for 16QAM-RB Size 75, RB Offset 0

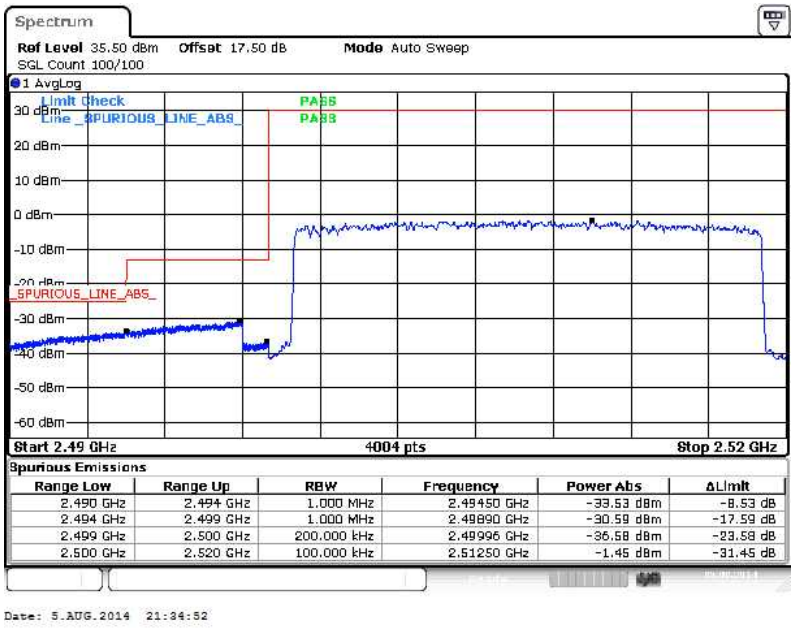


Band :	LTE Band 7	Band Width :	20MHz / QPSK

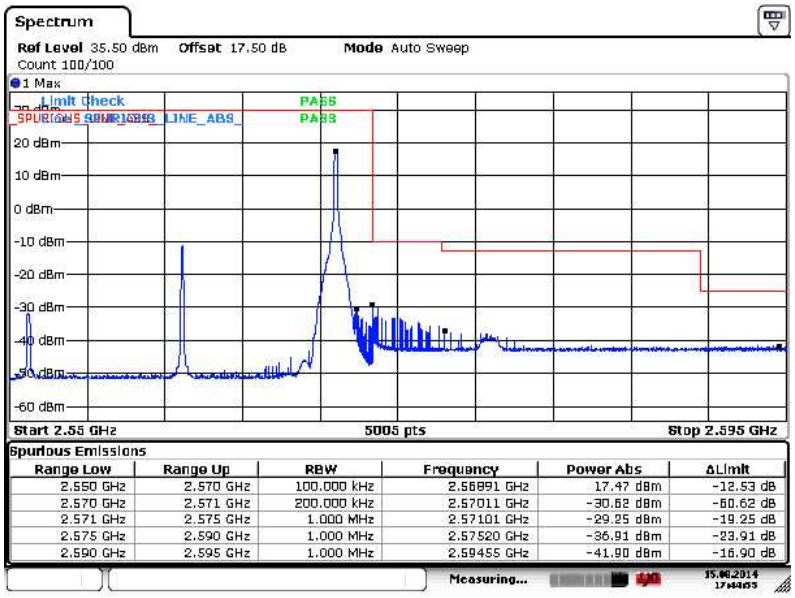
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



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

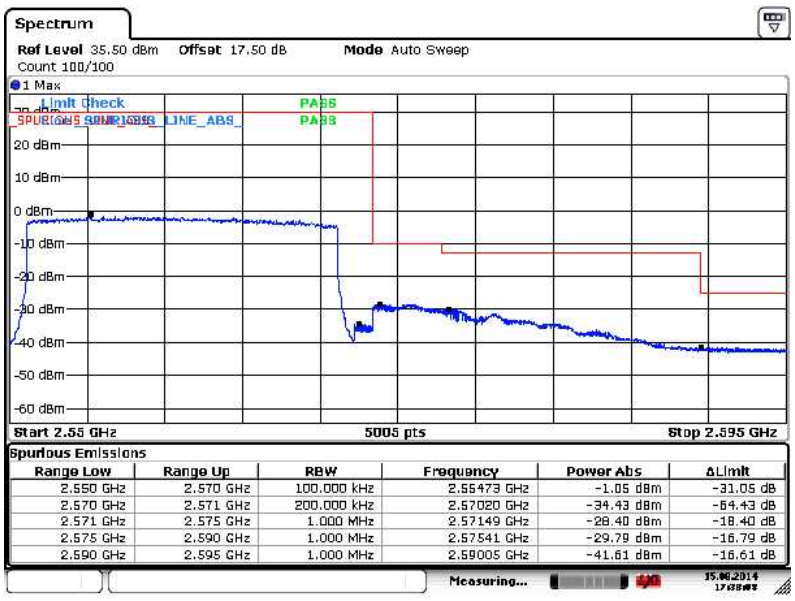


Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 99



Date: 15.AUG.2014 17:44:55

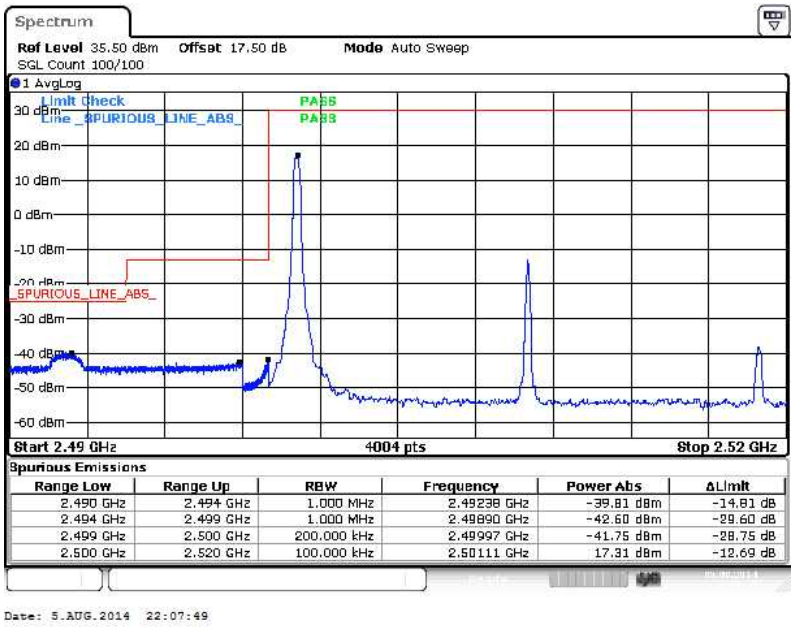
Higher Band Edge Plot for QPSK-RB Size 100, RB Offset 0



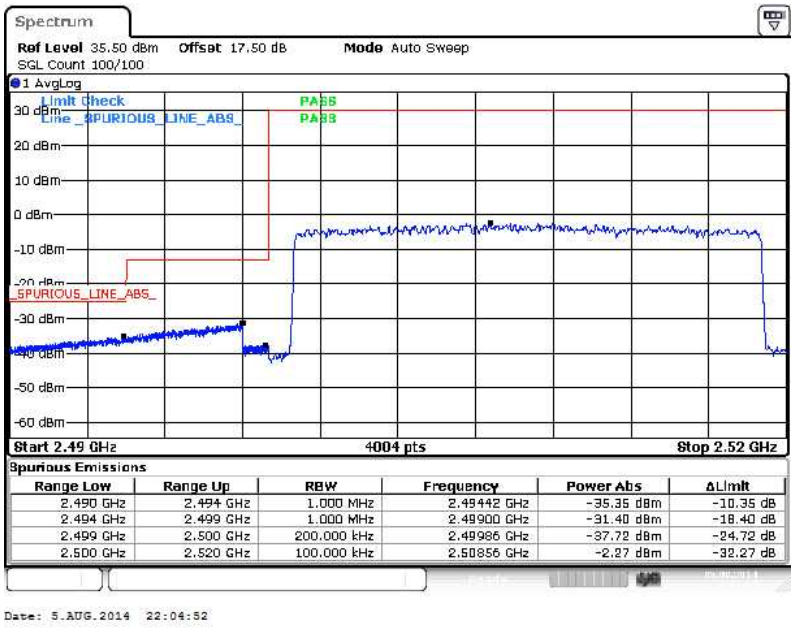
Date: 15.AUG.2014 17:38:08

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

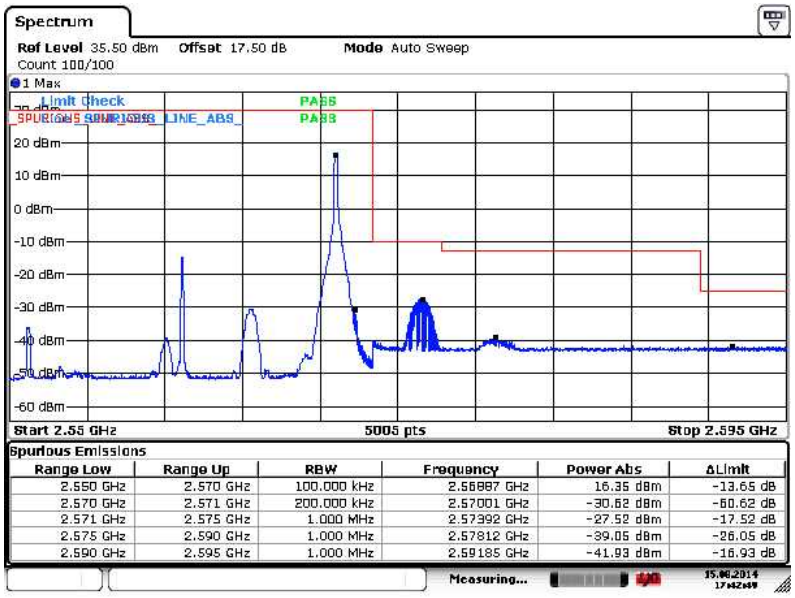
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



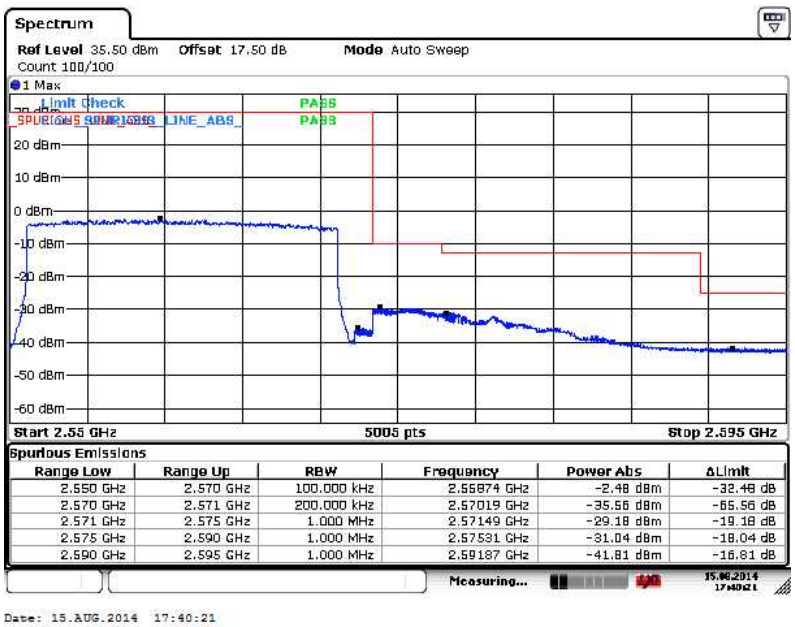
Lower Band Edge Plot for 16QAM-RB Size 100, RB Offset 0



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



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



3.6 Conducted Spurious Emission Measurement

3.6.1 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 30MHz up to a frequency including its 10^{th} harmonic.

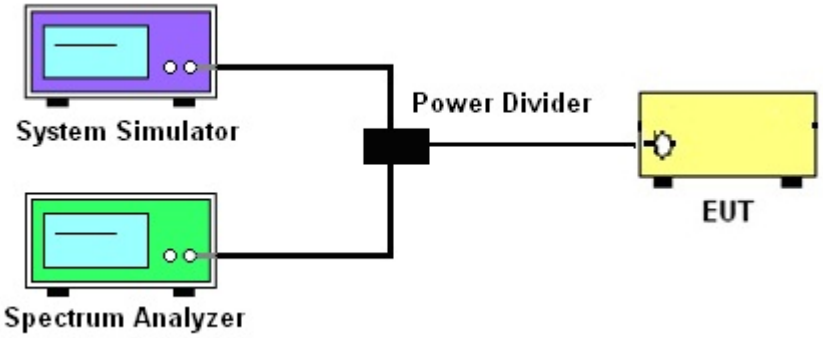
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a 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. The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [55 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [55 + 10log(P)] (dB)
   = -25dBm.

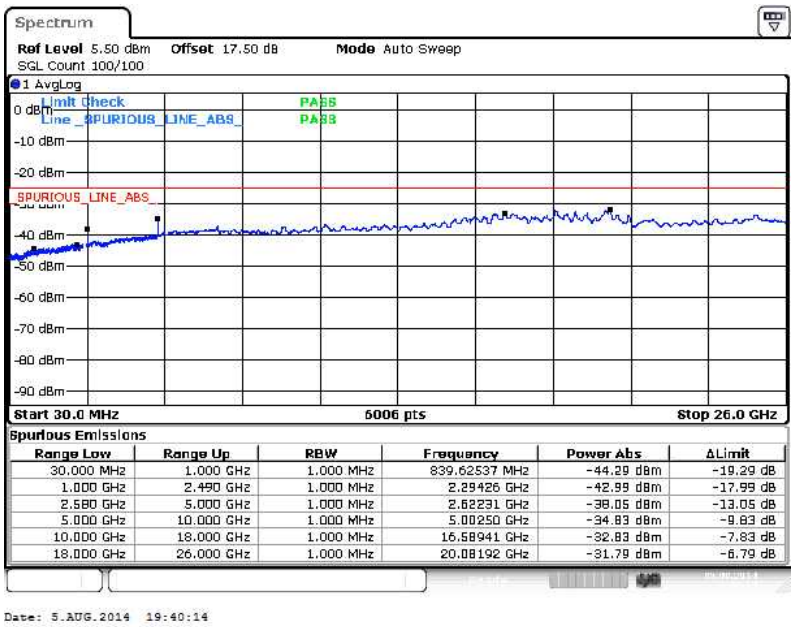
3.6.4 Test Setup



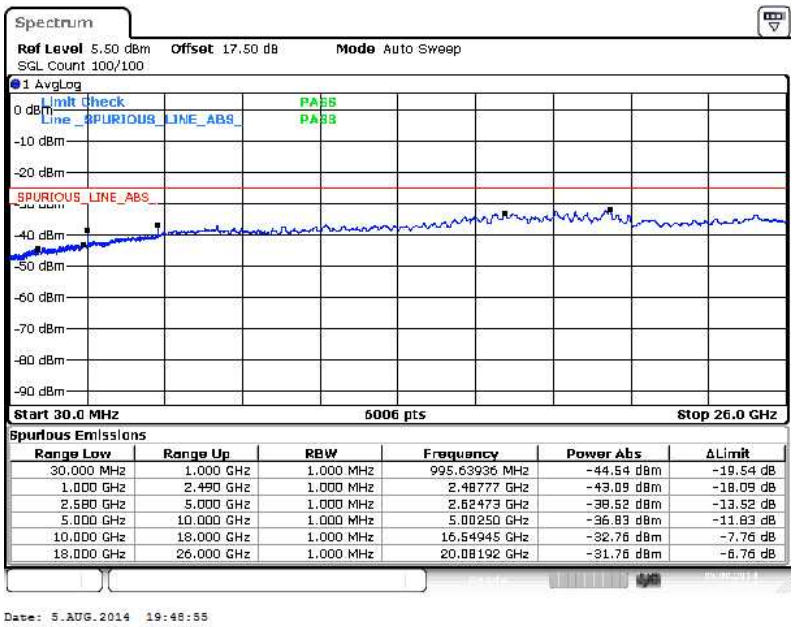
3.6.5 Test Result (Plots) of Conducted Spurious Emission

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

QPSK (RB Size 1, RB Offset 0)

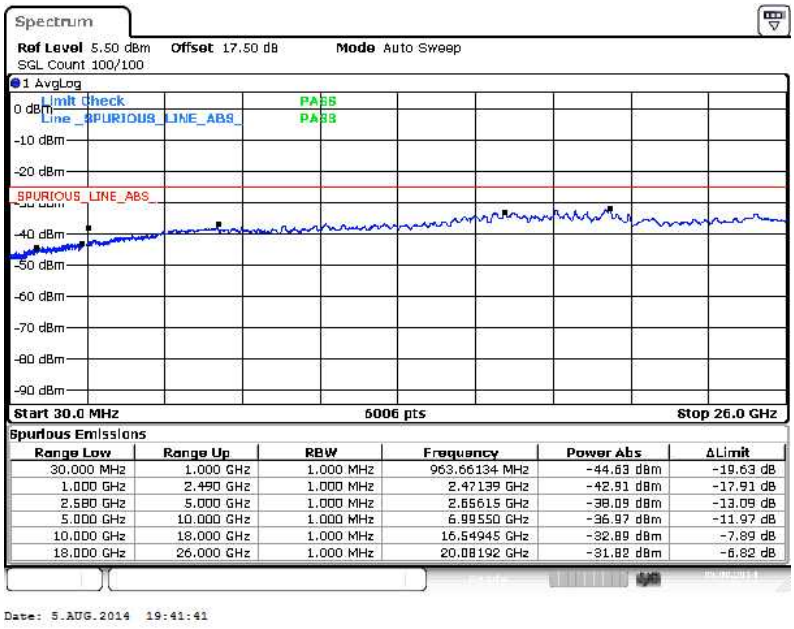


16QAM (RB Size 1, RB Offset 0)



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

QPSK (RB Size 1, RB Offset 0)

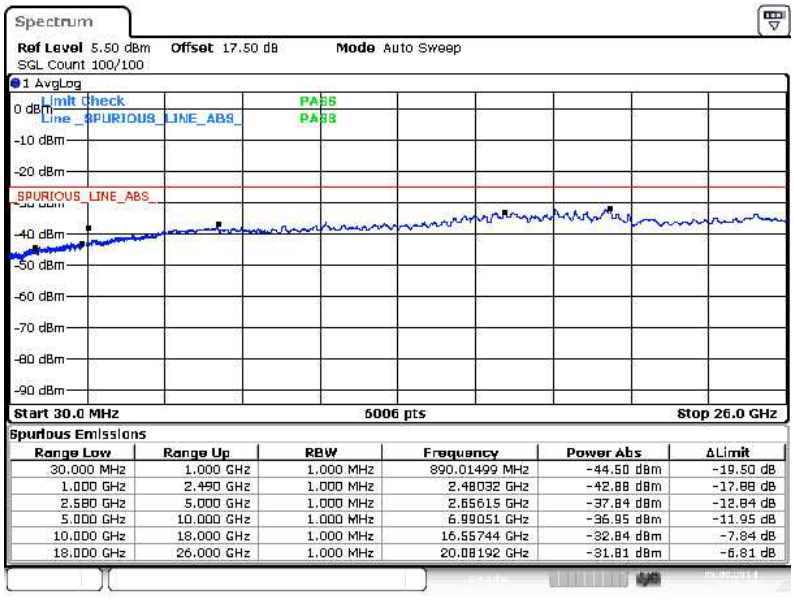


Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	963.66134 MHz	-44.63 dBm	-19.63 dB
1.000 GHz	2.490 GHz	1.000 MHz	2.47139 GHz	-42.91 dBm	-17.91 dB
2.580 GHz	5.000 GHz	1.000 MHz	2.65615 GHz	-38.09 dBm	-13.09 dB
5.000 GHz	10.000 GHz	1.000 MHz	6.99550 GHz	-36.97 dBm	-11.97 dB
10.000 GHz	18.000 GHz	1.000 MHz	16.54945 GHz	-32.89 dBm	-7.89 dB
18.000 GHz	26.000 GHz	1.000 MHz	20.08192 GHz	-31.82 dBm	-6.82 dB

Date: 5.AUG.2014 19:41:41

16QAM (RB Size 1, RB Offset 0)



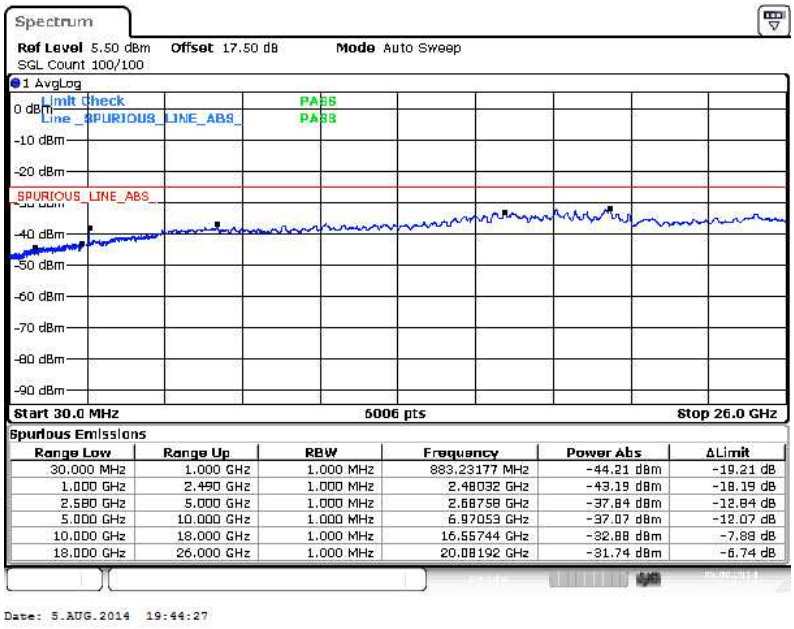
Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	1.000 GHz	1.000 MHz	890.01499 MHz	-44.50 dBm	-19.50 dB
1.000 GHz	2.490 GHz	1.000 MHz	2.48032 GHz	-42.88 dBm	-17.88 dB
2.580 GHz	5.000 GHz	1.000 MHz	2.65615 GHz	-37.84 dBm	-12.84 dB
5.000 GHz	10.000 GHz	1.000 MHz	6.99051 GHz	-36.95 dBm	-11.95 dB
10.000 GHz	18.000 GHz	1.000 MHz	16.55744 GHz	-32.84 dBm	-7.84 dB
18.000 GHz	26.000 GHz	1.000 MHz	20.08192 GHz	-31.81 dBm	-6.81 dB

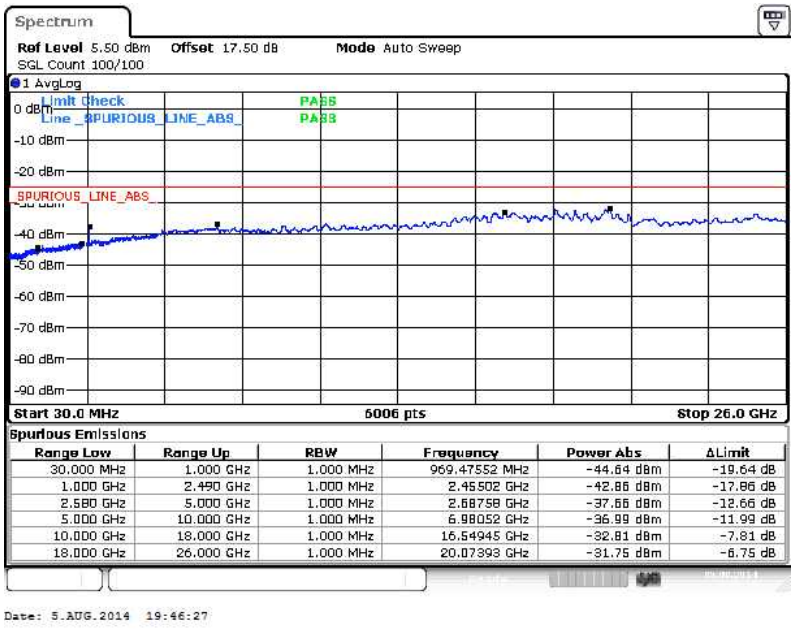
Date: 5.AUG.2014 19:47:47

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

QPSK (RB Size 1, RB Offset 0)

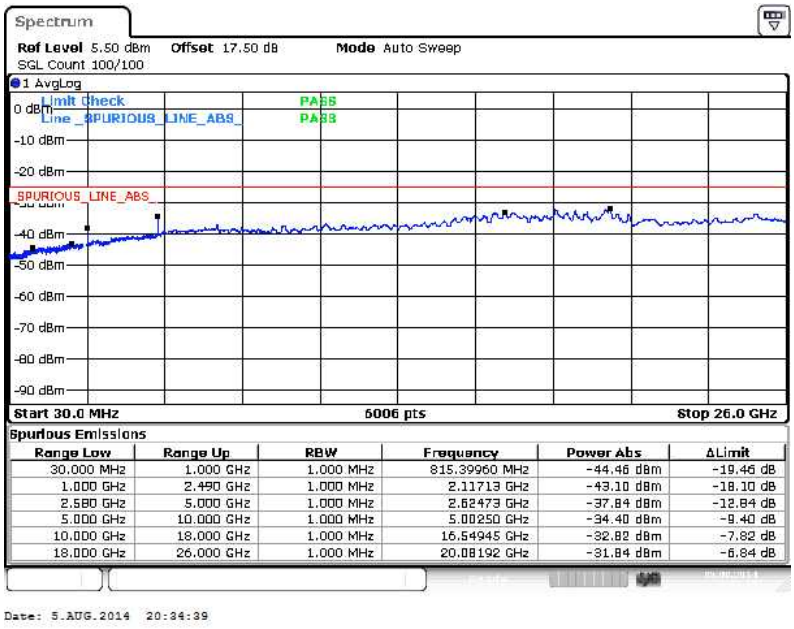


16QAM (RB Size 1, RB Offset 0)

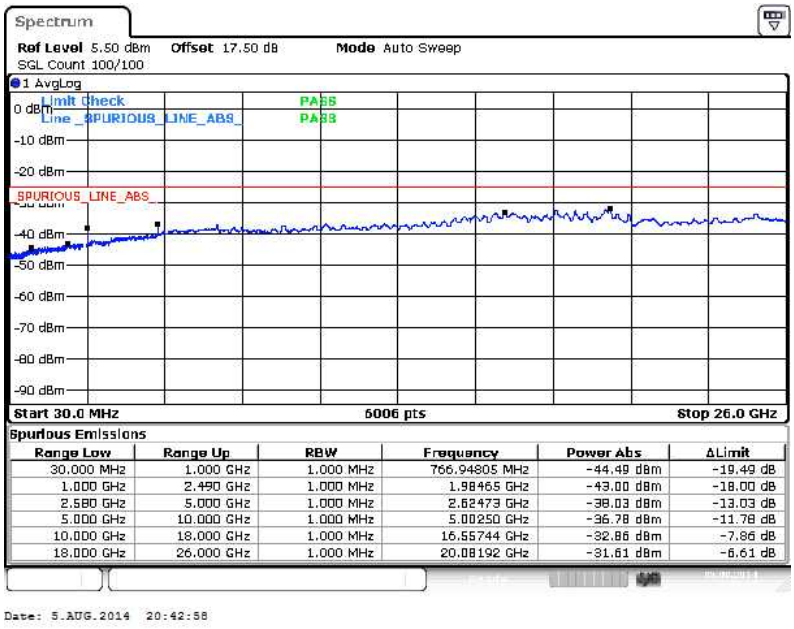


Band :	LTE Band 7	Channel :	CH20800 (Low)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)

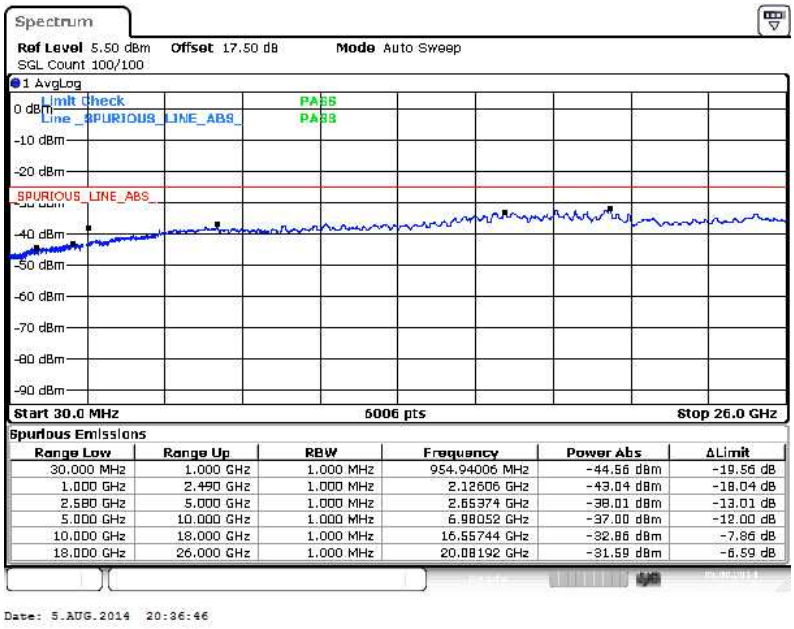


16QAM (RB Size 1, RB Offset 0)

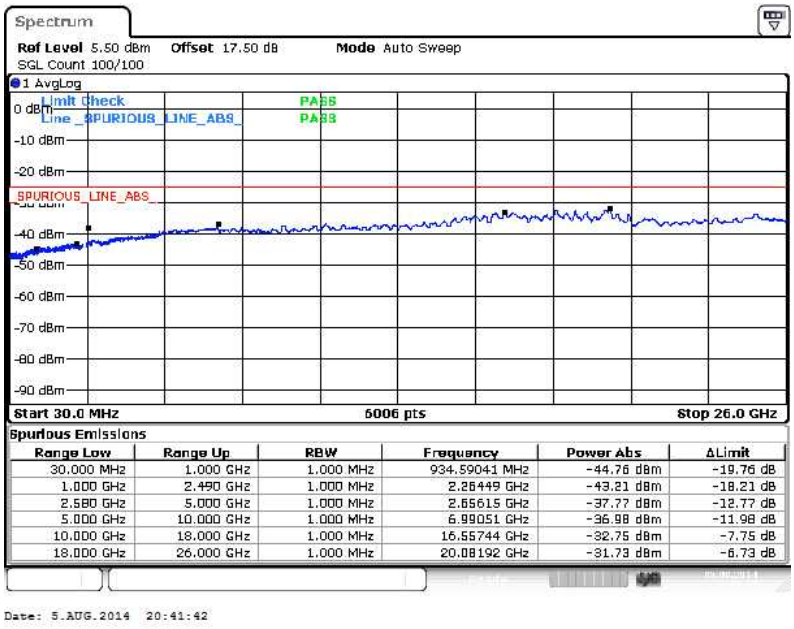


Band :	LTE Band 7	Channel :	CH21100 (Middle)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)

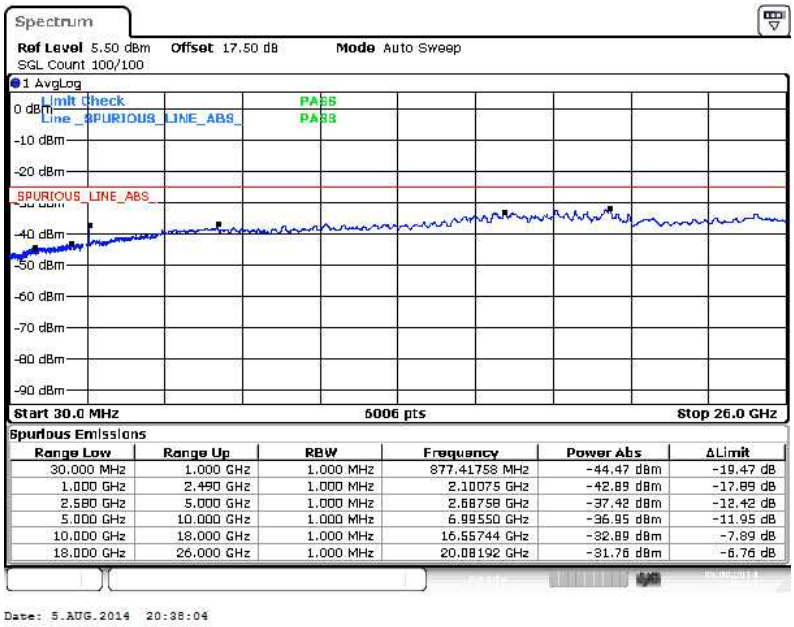


16QAM (RB Size 1, RB Offset 0)

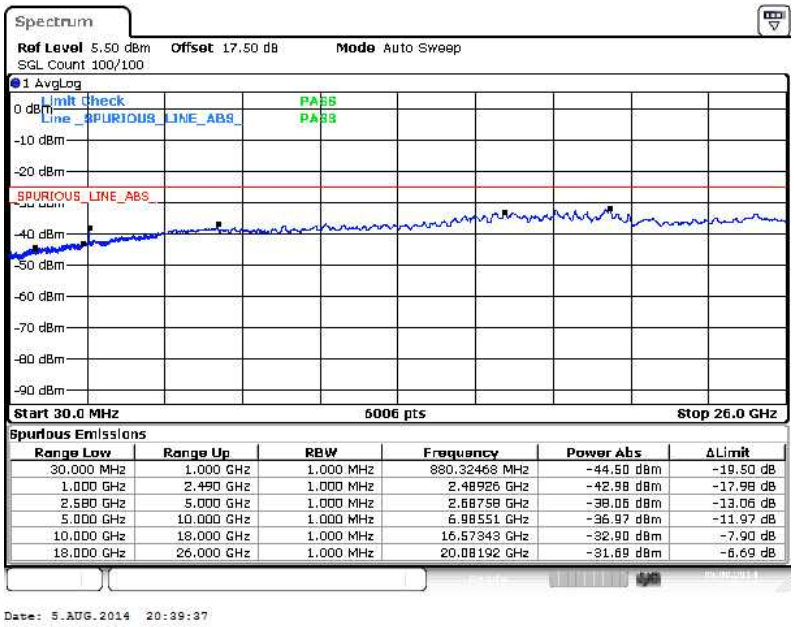


Band :	LTE Band 7	Channel :	CH21400 (High)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)

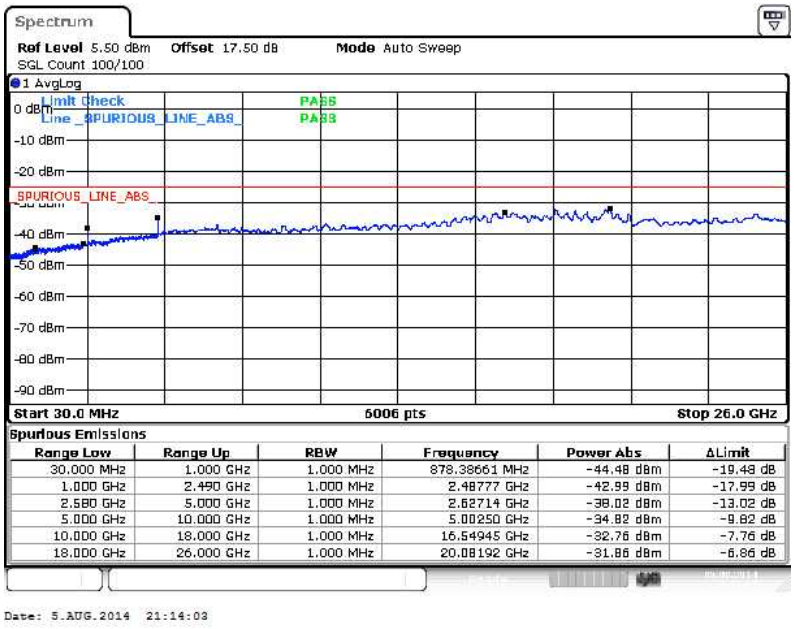


16QAM (RB Size 1, RB Offset 0)

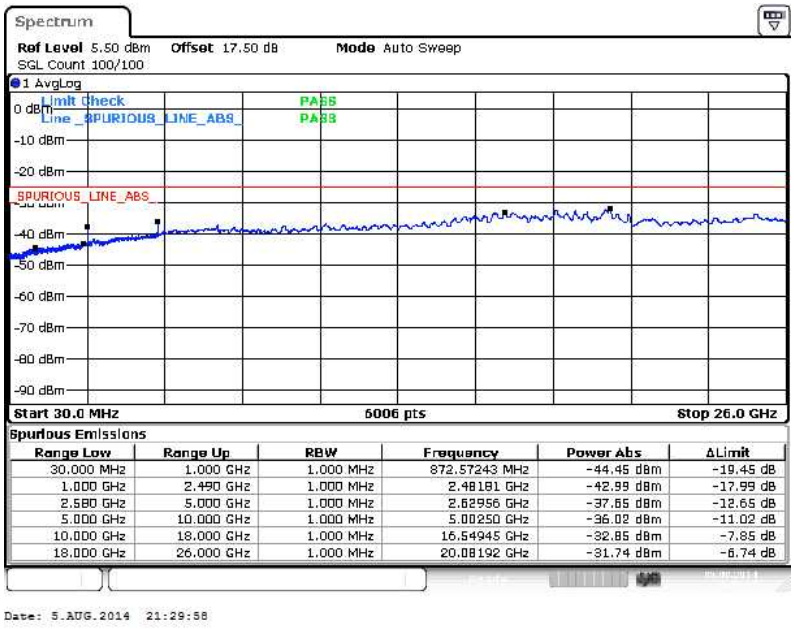


Band :	LTE Band 7	Channel :	CH20825 (Low)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 0)

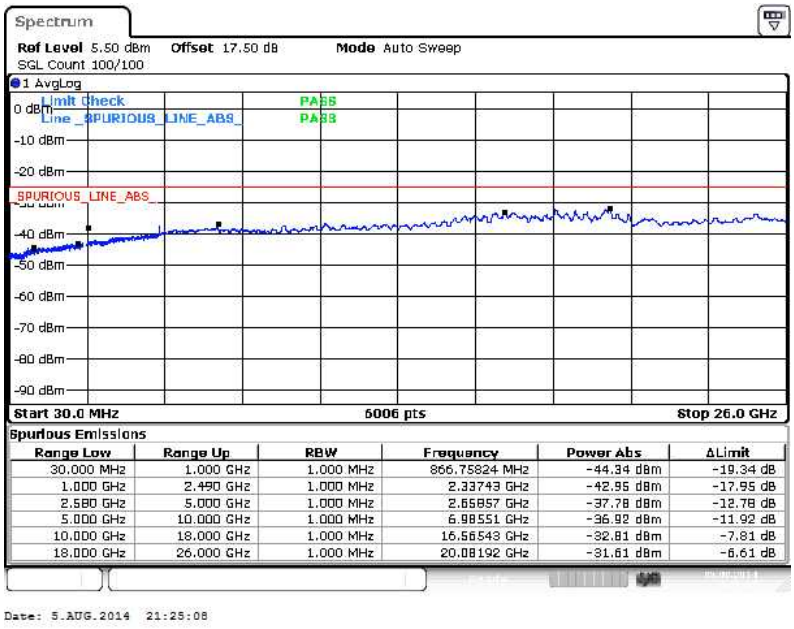


16QAM (RB Size 1, RB Offset 0)

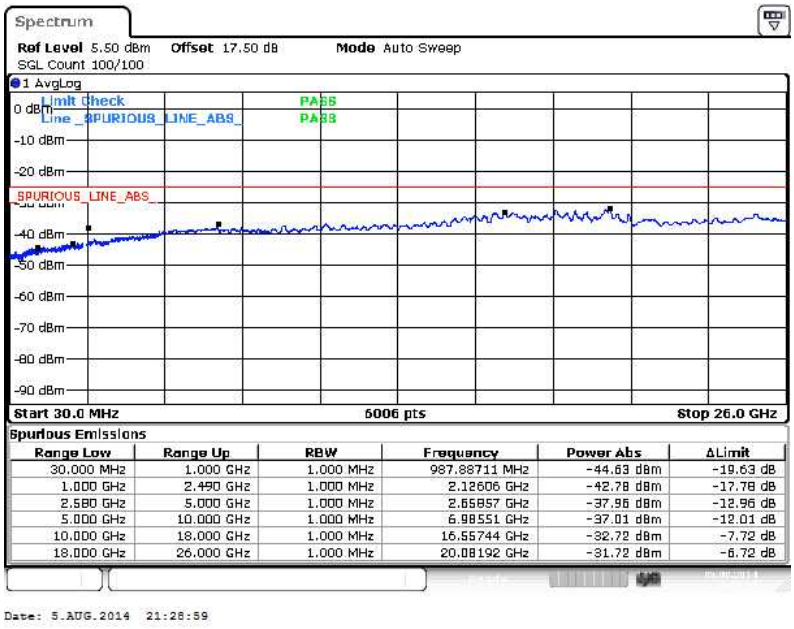


Band :	LTE Band 7	Channel :	CH21100 (Middle)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 0)

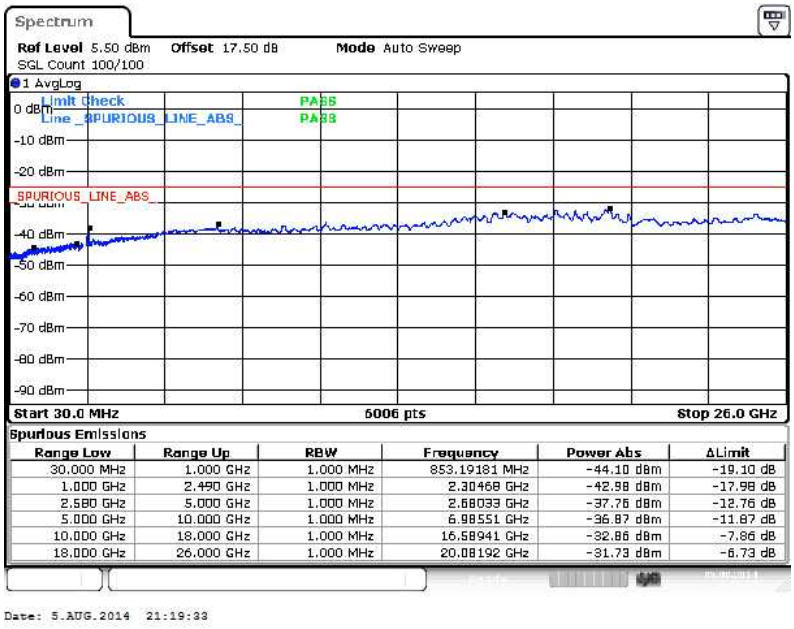


16QAM (RB Size 1, RB Offset 0)

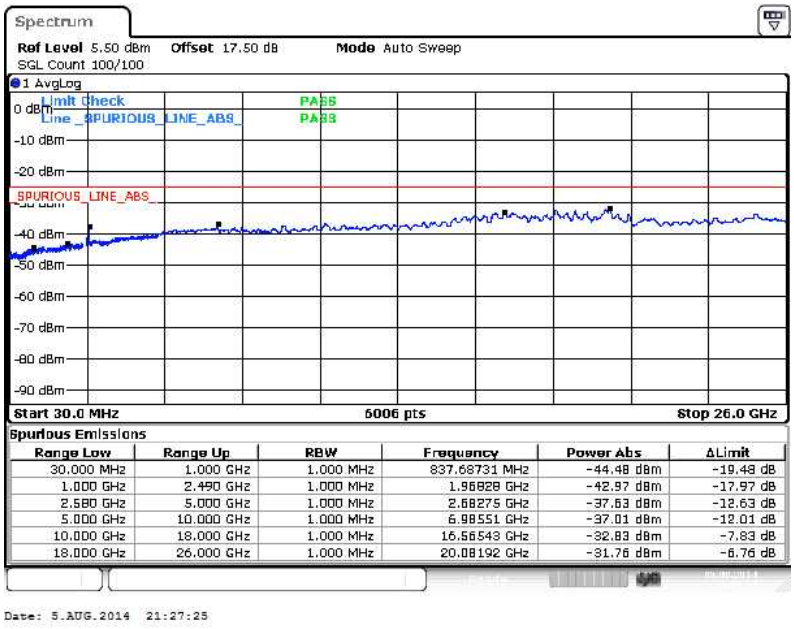


Band :	LTE Band 7	Channel :	CH21375 (High)
Band Width :	15MHz		

QPSK (RB Size 1, RB Offset 0)

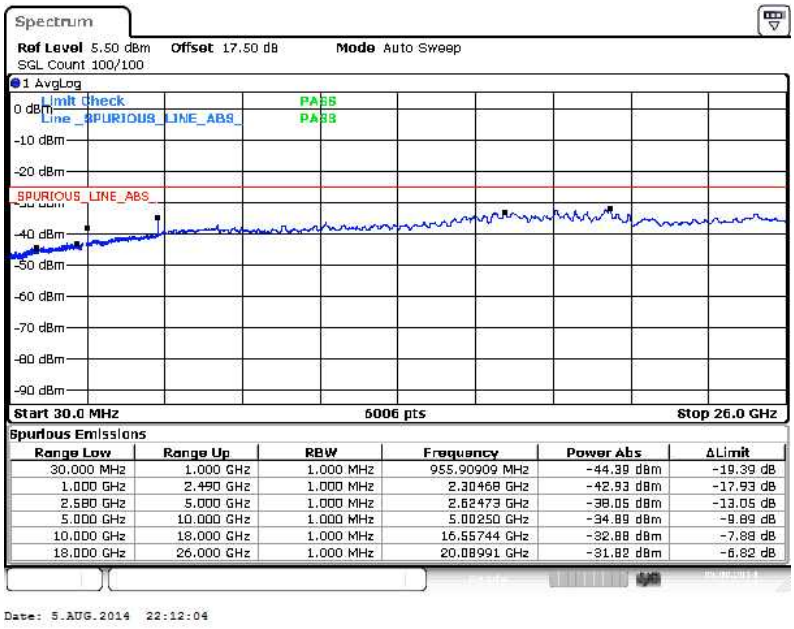


16QAM (RB Size 1, RB Offset 0)

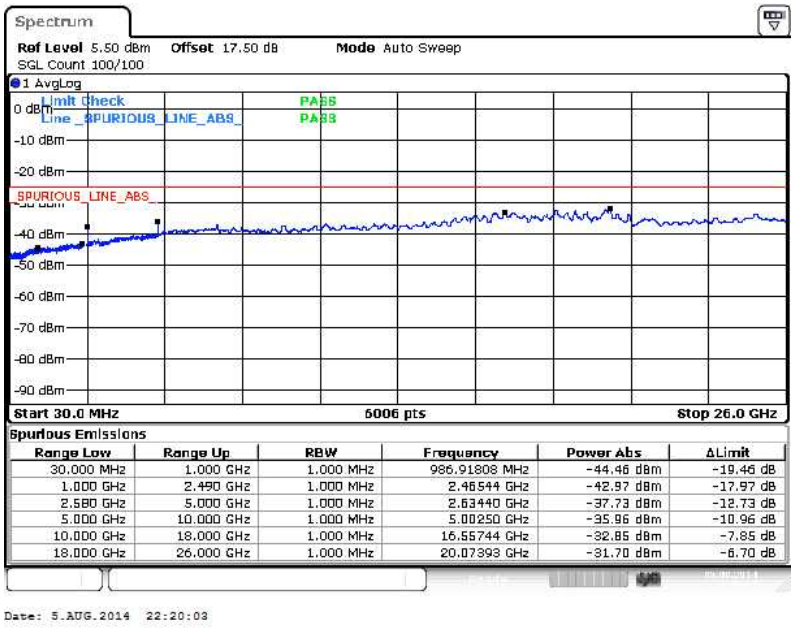


Band :	LTE Band 7	Channel :	CH20850 (Low)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)

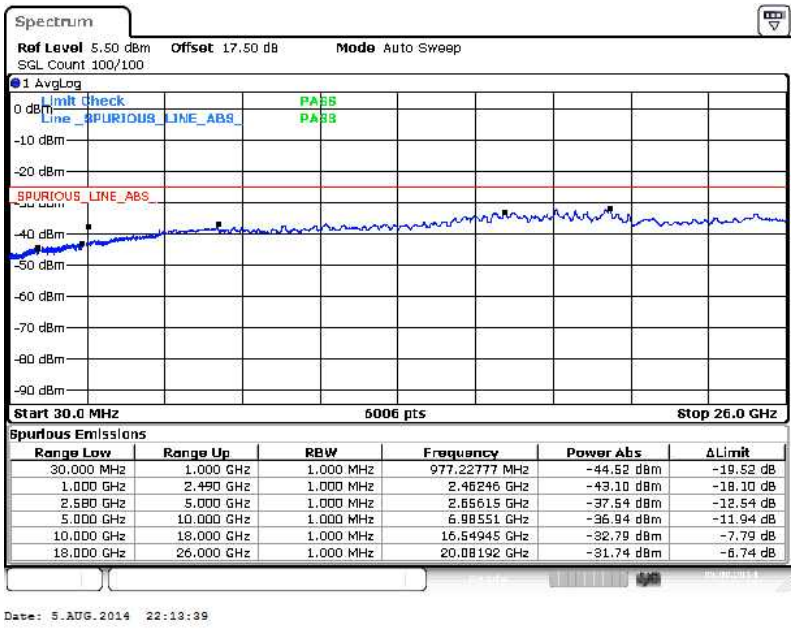


16QAM (RB Size 1, RB Offset 0)

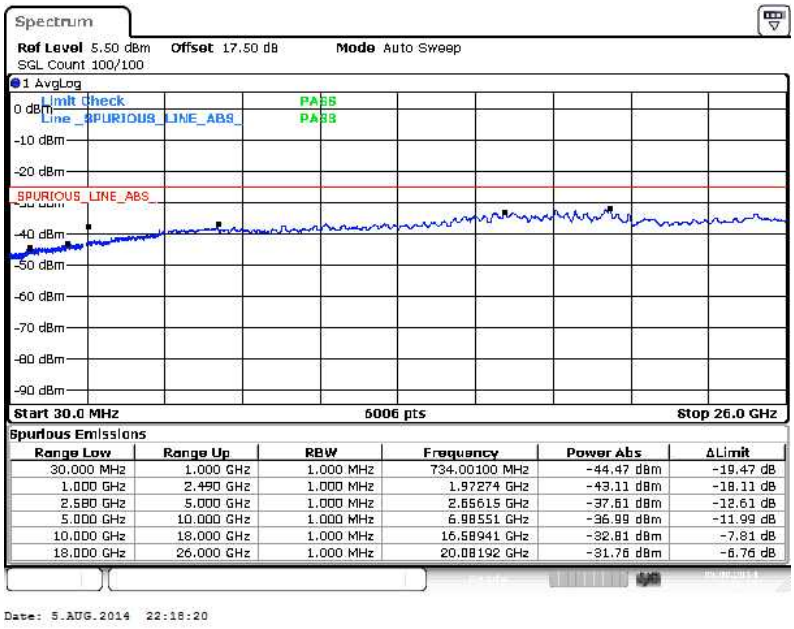


Band :	LTE Band 7	Channel :	CH21100 (Middle)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)

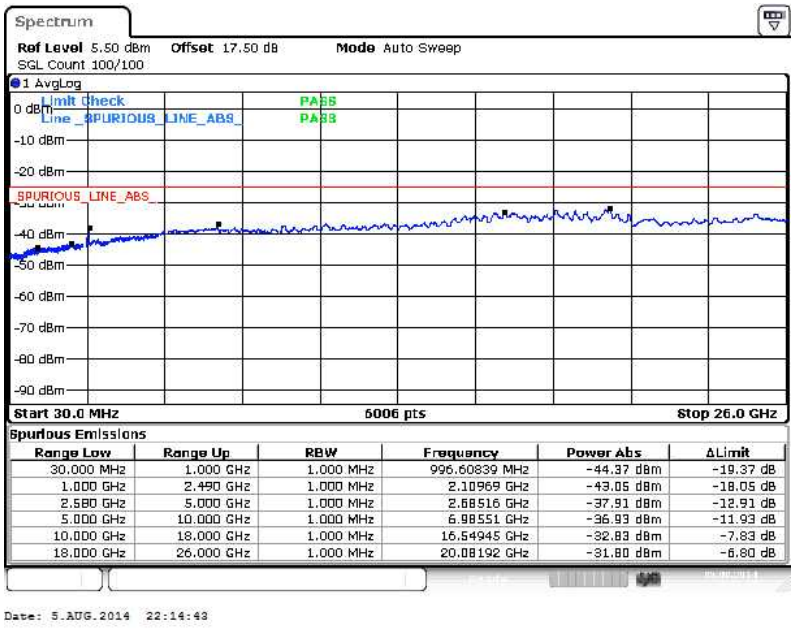


16QAM (RB Size 1, RB Offset 0)

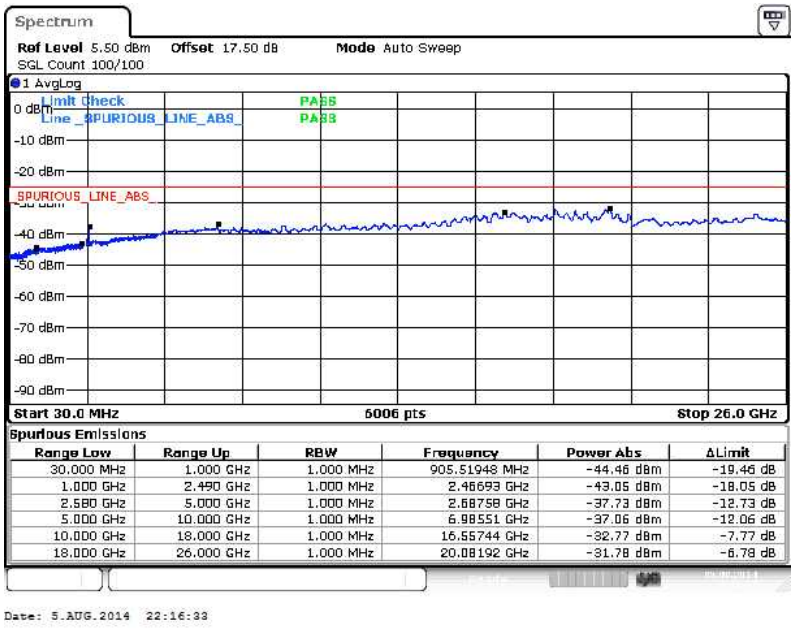


Band :	LTE Band 7	Channel :	CH21350 (High)
Band Width :	20MHz		

QPSK (RB Size 1, RB Offset 0)



16QAM (RB Size 1, RB Offset 0)



3.7 Radiated Spurious Emission Measurement

3.7.1 Description of Radiated Spurious Emission

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

3.7.2 Measuring Instruments

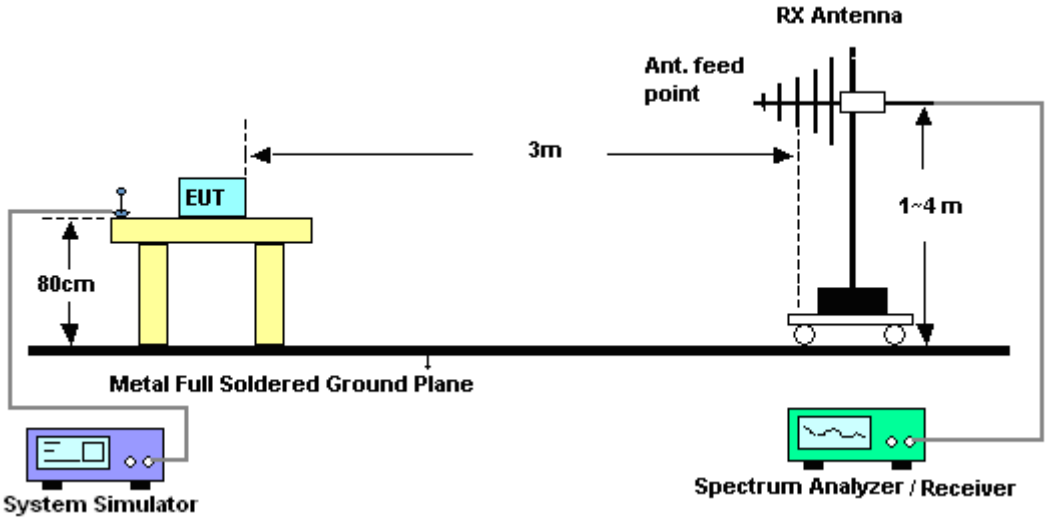
The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedures

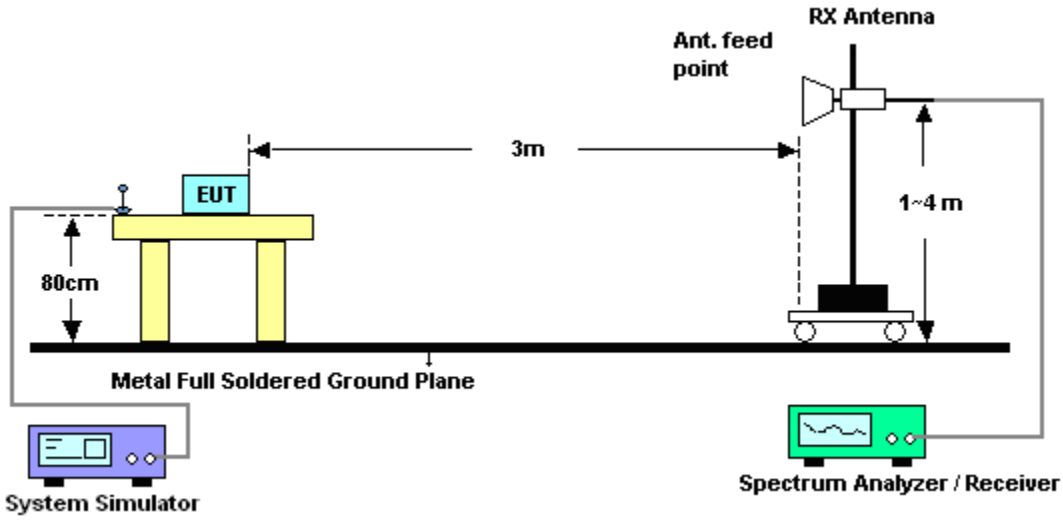
1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving 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.
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [55 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [55 + 10log(P)] (dB)
    = -25dBm.
11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain

3.7.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.7.5 Test Result of Field Strength of Spurious Radiated

Band :	LTE Band 7 for CH20775	**Temperature :**	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	**Relative Humidity :**	48~52%
Test Engineer :	Rock Tang	**Polarization :**	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5000.68	-52.92	-25	-27.92	-63.86	-38.20	1.20	7.60	H	Pass
7501.02	-50.45	-25	-25.45	-69.26	-68.60	1.56	9.90	H	Pass
10001.36	-53.74	-25	-28.74	-77.26	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 7 for CH20775	**Temperature :**	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	**Relative Humidity :**	48~52%
Test Engineer :	Rock Tang	**Polarization :**	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5000.68	-49.07	-25	-24.07	-61.79	-43.20	1.20	7.60	V	Pass
7501.02	-53.55	-25	-28.55	-72.8	-70.30	1.56	9.90	V	Pass
10001.36	-53.89	-25	-28.89	-77.12	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 7 for CH21100	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5065.68	-60.94	-25	-35.94	-71.88	-38.20	1.20	7.60	H	Pass
7598.52	-49.30	-25	-24.30	-68.11	-68.60	1.56	9.90	H	Pass
10131.36	-53.93	-25	-28.93	-77.45	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 7 for CH21100	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5065.68	-55.34	-25	-30.34	-68.06	-43.20	1.20	7.60	V	Pass
7598.52	-51.90	-25	-26.90	-71.15	-70.30	1.56	9.90	V	Pass
10131.36	-53.51	-25	-28.51	-76.74	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 7 for CH21425	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5130.68	-61.19	-25	-36.19	-72.13	-38.20	1.20	7.60	H	Pass
7696.02	-49.53	-25	-24.53	-68.34	-68.60	1.56	9.90	H	Pass
10261.36	-53.89	-25	-28.89	-77.41	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 7 for CH21425	Temperature :	23~25°C
Test Mode :	5MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5130.68	-57.01	-25	-32.01	-69.73	-43.20	1.20	7.60	V	Pass
7696.02	-53.84	-25	-28.84	-73.09	-70.30	1.56	9.90	V	Pass
10261.36	-53.71	-25	-28.71	-76.94	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 7 for CH20800	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5001.18	-52.71	-25	-27.71	-63.65	-38.20	1.20	7.60	H	Pass
7501.77	-50.06	-25	-25.06	-68.87	-68.60	1.56	9.90	H	Pass
10002.36	-54.31	-25	-29.31	-77.83	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 7 for CH20800	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5001.18	-51.34	-25	-26.34	-64.06	-43.20	1.20	7.60	V	Pass
7501.77	-53.21	-25	-28.21	-72.46	-70.30	1.56	9.90	V	Pass
10002.36	-54.17	-25	-29.17	-77.4	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 7 for CH21100	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5060.00	-60.39	-25	-35.39	-71.33	-38.20	1.20	7.60	H	Pass
7591.77	-47.78	-25	-22.78	-66.59	-68.60	1.56	9.90	H	Pass
10122.36	-54.32	-25	-29.32	-77.84	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 7 for CH21100	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5060	-56.43	-25	-31.43	-69.15	-43.20	1.20	7.60	V	Pass
7591.77	-52.05	-25	-27.05	-71.3	-70.30	1.56	9.90	V	Pass
10122.36	-54.10	-25	-29.10	-77.33	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 7 for CH21400	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5121.18	-61.62	-25	-36.62	-72.56	-38.20	1.20	7.60	H	Pass
7681.77	-50.56	-25	-25.56	-69.37	-68.60	1.56	9.90	H	Pass
10242.36	-52.95	-25	-27.95	-76.47	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 7 for CH21400	Temperature :	23~25°C
Test Mode :	10MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5121.18	-56.32	-25	-31.32	-69.04	-43.20	1.20	7.60	V	Pass
7681.77	-52.98	-25	-27.98	-72.23	-70.30	1.56	9.90	V	Pass
10242.36	-54.60	-25	-29.60	-77.83	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 7 for CH20825	Temperature :	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5001.68	-52.34	-25	-27.34	-63.28	-38.20	1.2	7.60	H	Pass
7502.52	-48.34	-25	-23.34	-67.15	-68.60	1.56	9.90	H	Pass
10003.36	-53.37	-25	-28.37	-76.89	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 7 for CH20825	Temperature :	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5001.68	-51.00	-25	-26.00	-63.72	-43.20	1.20	7.60	V	Pass
7502.52	-55.54	-25	-30.54	-74.79	-70.30	1.56	9.90	V	Pass
10003.36	-54.68	-25	-29.68	-77.91	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 7 for CH21100	Temperature :	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5056.68	-58.99	-25	-33.99	-69.93	-38.20	1.20	7.60	H	Pass
7585.02	-51.82	-25	-26.82	-70.63	-68.60	1.56	9.90	H	Pass
10113.36	-53.98	-25	-28.98	-77.50	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 7 for CH21100	Temperature :	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5056.68	-54.12	-25	-29.12	-66.84	-43.20	1.20	7.60	V	Pass
7585.02	-55.00	-25	-30.00	-74.25	-70.30	1.56	9.90	V	Pass
10113.36	-53.66	-25	-28.66	-76.89	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 7 for CH21375	Temperature :	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5111.68	-62.66	-25	-37.66	-73.60	-38.20	1.20	7.60	H	Pass
7667.52	-53.42	-25	-28.42	-72.23	-68.60	1.56	9.90	H	Pass
10223.36	-54.35	-25	-29.35	-77.87	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 7 for CH21375	Temperature :	23~25°C
Test Mode :	15MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5111.68	-60.08	-25	-35.08	-72.8	-43.20	1.20	7.60	V	Pass
7667.52	-54.99	-25	-29.99	-74.24	-70.30	1.56	9.90	V	Pass
10223.36	-54.86	-25	-29.86	-78.09	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 7 for CH20850	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5002.18	-52.39	-25	-27.39	-63.33	-38.20	1.20	7.60	H	Pass
7503.27	-52.08	-25	-27.08	-70.89	-68.60	1.56	9.90	H	Pass
10004.36	-54.08	-25	-29.08	-77.60	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 7 for CH20850	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5002.18	-50.19	-25	-25.19	-62.91	-43.20	1.20	7.60	V	Pass
7503.27	-54.13	-25	-29.13	-73.38	-70.30	1.56	9.90	V	Pass
10004.36	-54.84	-25	-29.84	-78.07	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 7 for CH21100	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5052.18	-58.02	-25	-33.02	-68.96	-38.20	1.20	7.60	H	Pass
7578.27	-52.96	-25	-27.96	-71.77	-68.60	1.56	9.90	H	Pass
10104.36	-53.85	-25	-28.85	-77.37	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 7 for CH21100	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5052.18	-53.30	-25	-28.30	-66.02	-43.20	1.20	7.60	V	Pass
7578.27	-55.60	-25	-30.60	-74.85	-70.30	1.56	9.90	V	Pass
10104.36	-53.73	-25	-28.73	-76.96	-64.60	1.78	11.60	V	Pass

Band :	LTE Band 7 for CH21350	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5102.18	-61.13	-25	-36.13	-72.07	-38.20	1.20	7.60	H	Pass
7653.27	-52.73	-25	-27.73	-71.54	-68.60	1.56	9.90	H	Pass
10204.36	-54.74	-25	-29.74	-78.26	-67.90	1.78	11.60	H	Pass

Band :	LTE Band 7 for CH21350	Temperature :	23~25°C
Test Mode :	20MHz QPSK RB Size 1 Offset 0	Relative Humidity :	48~52%
Test Engineer :	Rock Tang	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		

Frequency (MHz)	ERP (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
5102.18	-59.77	-25	-34.77	-72.49	-43.20	1.20	7.60	V	Pass
7653.27	-54.42	-25	-29.42	-73.67	-70.30	1.56	9.90	V	Pass
10204.36	-54.86	-25	-29.86	-78.09	-64.60	1.78	11.60	V	Pass

3.8 Frequency Stability Measurement

3.8.1 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 ±0.00025% (±2.5ppm) of the center frequency.

3.8.2 Measuring Instruments

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

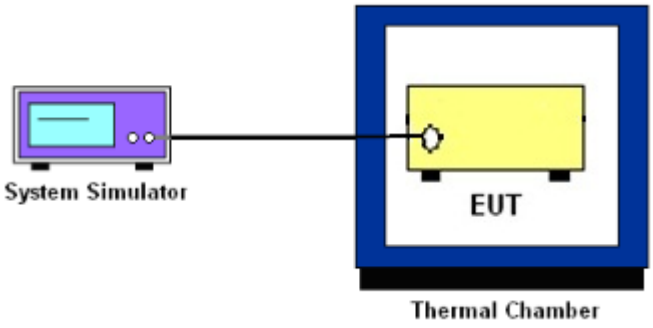
3.8.3 Test Procedures for Temperature Variation

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.

3.8.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at 25±5° 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.

3.8.5 Test Setup



3.8.6 Test Result of Temperature Variation (FCC)

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

Temperature (°C)	BW 10MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
50	31	0.0016	PASS
40	29	0.0008	
30	27	0.0000	
20(Ref.)	27	0.0000	
10	26	0.0004	
0	28	0.0004	
-10	29	0.0008	
-20	30	0.0012	
-30	30	0.0012	

3.8.7 Test Result of Voltage Variation (FCC)

Band	Bandwidth	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 5	10M	4.35	28	0.0004	2.5	PASS
		Normal	27	0.0000		
		3.60	28	0.0004		

Remark:

1. Normal Voltage = 3.80V.
2. The manufacturer declared that the EUT could work properly between voltage 3.60V ~ 4.35V.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	May 08, 2014	Aug. 05, 2014~ Aug. 15, 2014	May 07, 2015	Conducted (TH01-SZ)
Thermal Chamber	Hongzhangroup	LP-150U	HD20120425	-40℃~150℃	Feb. 21, 2014	Aug. 05, 2014~ Aug. 15, 2014	Feb. 20, 2015	Conducted (TH01-SZ)
ESCIO TEST Receiver	R&S	ESCI	100724	9kHz~3GHz	Feb. 21, 2014	Aug. 14, 2014	Feb. 20, 2015	Radiation (03CH01-SZ)
Spectrum Analyzer	Agilent	N9038A	MY5226018	20Hz~26.5GHz	May 26, 2014	Aug. 14, 2014	May 25, 2015	Radiation (03CH01-SZ)
Bilog Antenna	TESEQ	CBL 6112D	23188	30MHz~2GHz	Oct. 26, 2013	Aug. 14, 2014	Oct. 25, 2014	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 26, 2013	Aug. 14, 2014	Oct. 25, 2014	Radiation (03CH01-SZ)
Double Ridged Horn Antenna	COM-POWER	AH-840	101073	18GHz~40GHz	Jan. 27, 2014	Aug. 14, 2014	Jan. 26, 2015	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz~3000MHz	Feb. 21, 2014	Aug. 14, 2014	Feb. 20, 2015	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	May 08, 2014	Aug. 14, 2014	May 07, 2015	Radiation (03CH01-SZ)
AC Source(AVR)	Chroma	61601	616010001985	100Vac~250Vac	Mar. 25, 2014	Aug. 14, 2014	Mar. 24, 2015	Radiation (03CH01-SZ)
Turn Table	EM Electronics	EM 1000	N/A	0~360 degree	NCR	Aug. 14, 2014	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM Electronics	EM 1000	N/A	1 m~4 m	NCR	Aug. 14, 2014	NCR	Radiation (03CH01-SZ)
Spectrum Analyzer	R&S	FSP 7	100818	9kHz~7GHz	Sep. 03, 2013	Aug. 06, 2014	Sep. 02, 2014	ERP/EIRP (OTA01-SZ)
Quad-Ridged Horn	ETS-Lindgren	3164-08	00102954	700MHz~10000MHz	N/A	Aug. 06, 2014	N/A	ERP/EIRP (OTA01-SZ)
Multi-Devices Controller	ETS-Lindgren	2090-OPT1	00108147	N/A	N/A	Aug. 06, 2014	N/A	ERP/EIRP (OTA01-SZ)
Switch Control Mainframe	Agilent	3499A	MY42005451	N/A	N/A	Aug. 06, 2014	N/A	ERP/EIRP (OTA01-SZ)

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))	**3.9**