



FCC RF Test Report

APPLICANT : Samsung Electronics Co., Ltd.
EQUIPMENT : Mobile Phone
BRAND NAME : SAMSUNG
MODEL NAME : SM-G530Y
FCC ID : A3LSMG530Y
STANDARD : 47 CFR Part 2, 22(H)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Aug. 25, 2014 and testing was completed on Sep. 16, 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.....	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant.....	5
1.2 Manufacturer.....	5
1.3 Product Feature of Equipment Under Test.....	5
1.4 Product Specification subjective to this standard	5
1.5 Modification of EUT	5
1.6 Maximum ERP Power, Frequency Tolerance, and Emission Designator	6
1.7 Testing Location	7
1.8 Applicable 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.....	9
3 TEST RESULT.....	10
3.1 Conducted Output Power Measurement	10
3.2 Peak-to-Average Ratio	13
3.3 Effective Radiated Power Measurement	16
3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement.....	20
3.5 Conducted Band Edge Measurement	30
3.6 Conducted Spurious Emission Measurement	48
3.7 Radiated Spurious Emission Measurement	61
3.8 Frequency Stability Measurement.....	67
4 LIST OF MEASURING EQUIPMENT	69
5 UNCERTAINTY OF EVALUATION	70



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG482503B	Rev. 01	Initial issue of report	Sep. 19, 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	§22.913(a)(2)	Effective Radiated Power (Band 5)	ERP < 7 Watt	PASS	-
3.4	§2.1049 §22.917(b)	Occupied Bandwidth & 26dB Bandwidth	Reporting Only	PASS	-
3.5	§2.1051 §22.917(a)	Conducted Band Edge Measurement (Band 5)	$< 43 + 10 \log_{10}(P[\text{Watt}])$	PASS	-
3.6	§2.1051 §22.917(a)	Conducted Spurious Emission (Band 5)	$< 43 + 10 \log_{10}(P[\text{Watts}])$	PASS	-
3.7	§2.1053 §22.917(a)	Radiated Spurious Emission (Band 5)	$< 43 + 10 \log_{10}(P[\text{Watts}])$	PASS	Under limit 30.32 dB at 7488.000 MHz
3.8	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm	PASS	



1 General Description

1.1 Applicant

Samsung Electronics Co., Ltd.

No.9 WeiWu Rd, Micro Electronic Industrial Park, Jingang Highway, Xiqing District, Tianjin, China

1.2 Manufacturer

Samsung Electronics Co., Ltd.

No.9 WeiWu Rd, Micro Electronic Industrial Park, Jingang Highway, Xiqing District, Tianjin, China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	SAMSUNG
Model Name	SM-G530Y
FCC ID	A3LSMG530Y
GSM Operating Band(s)	GSM 900/1800/1900/850MHz
GPRS/EGPRS Multi-slot Class	GPRS Class 33, EGPRS Class 33
WCDMA Operating Band(s)	FDD Band I/II/V/VIII
LTE Operating Band(s)	FDD Band 1/3/5/8/28
Wi-Fi Specification	2.4GHz 802.11b/g/n HT20
Bluetooth Version	Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
NFC Specification	Type A/B/F/V
HW Version	REV1.0
SW Version	G530Y.001
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 subjective to this standard

Product Specification subjective to this standard	
Tx Frequency	LTE Band 5 : 824.7 MHz ~ 848.3 MHz
Rx Frequency	LTE Band 5 : 869.7 MHz ~ 893.3 MHz
Bandwidth	LTE Band 5 : 1.4MHz / 3MHz / 5MHz / 10MHz
Maximum Output Power to Antenna	LTE Band 5 : 23.38 dBm
Antenna Type	LDS Antenna
Antenna Gain	-5.10 dBi
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 Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	BW	Emission Designator	Frequency Tolerance	Maximum ERP
Part 22H	LTE Band 5	QPSK	1.4 MHz	1M10G7D	-	0.1081 W
Part 22H	LTE Band 5	16QAM	1.4 MHz	1M10W7D	-	0.0757 W
Part 22H	LTE Band 5	QPSK	3 MHz	2M73G7D	-	-
Part 22H	LTE Band 5	16QAM	3 MHz	2M72W7D	-	-
Part 22H	LTE Band 5	QPSK	5 MHz	4M49G7D	-	-
Part 22H	LTE Band 5	16QAM	5 MHz	4M50W7D	-	-
Part 22H	LTE Band 5	QPSK	10 MHz	9M09G7D	0.0048	0.0755 W
Part 22H	LTE Band 5	16QAM	10 MHz	9M01W7D	-	0.0678 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	831040

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.
	03CH01-KS	149928

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, 22(H)
- ♦ 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

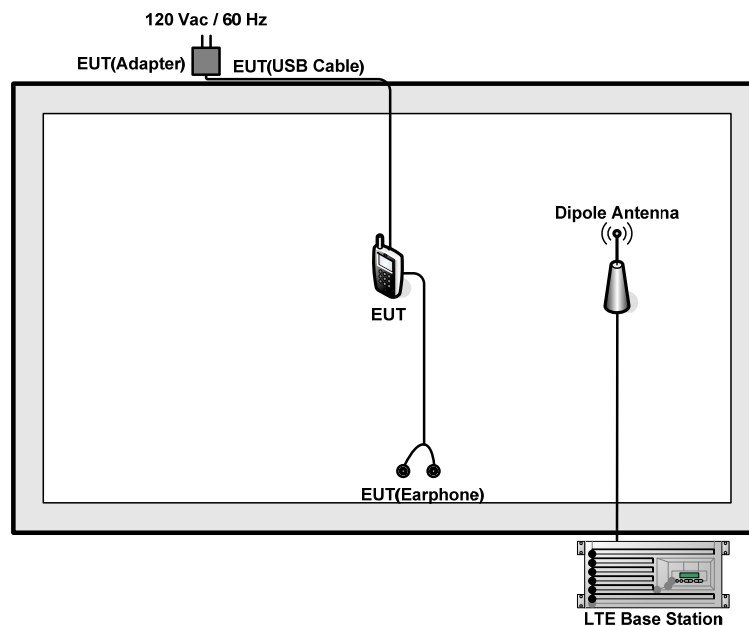
2.1 Test Mode

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	5	v	v	v	v	-	-	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	5				v	-	-		v	v		v		v	
26dB and 99% Bandwidth	5	v	v	v	v	-	-	v	v			v		v	
Conducted Band Edge	5	v	v	v	v	-	-	v	v	v		v	v		v
Conducted Spurious Emission	5	v	v	v	v	-	-	v	v	v			v	v	v
Frequency Stability	5				v	-	-	v				v		v	
E.R.P./ E.I.R.P.	5	v			v	-	-	v	v	v			v	v	v
Radiated Spurious Emission	5	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 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	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 8 dB and 10dB attenuator.

Example :

$$\begin{aligned}
 \text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)}. \\
 &= 8 + 10 = 18 \text{ (dB)}
 \end{aligned}$$

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.

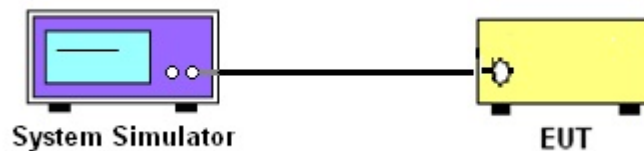
3.1.2 Measuring Instruments

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 5 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				20450	20525	20600
Frequency (MHz)				829	836.5	844
10	QPSK	1	0	23.32	23.15	23.17
10	QPSK	1	24	23.38	23.30	23.24
10	QPSK	1	49	23.28	23.19	23.10
10	QPSK	25	0	22.27	22.25	22.18
10	QPSK	25	12	22.12	22.22	22.08
10	QPSK	25	24	22.17	22.21	22.04
10	QPSK	50	0	22.07	22.05	22.08
10	16QAM	1	0	22.55	22.52	22.26
10	16QAM	1	24	22.42	22.24	22.24
10	16QAM	1	49	22.52	22.19	22.21
10	16QAM	25	0	21.20	21.03	21.11
10	16QAM	25	12	20.97	21.08	21.02
10	16QAM	25	24	21.15	21.06	21.07
10	16QAM	50	0	21.03	21.04	21.10
Channel				20425	20525	20625
Frequency (MHz)				826.5	836.5	846.5
5	QPSK	1	0	23.26	23.23	23.15
5	QPSK	1	12	23.24	23.20	23.09
5	QPSK	1	24	23.21	23.18	23.13
5	QPSK	12	0	22.35	22.24	22.14
5	QPSK	12	6	22.40	22.27	22.19
5	QPSK	12	11	22.33	22.29	22.16
5	QPSK	25	0	22.24	22.17	22.04
5	16QAM	1	0	22.24	22.24	21.92
5	16QAM	1	12	22.25	22.14	21.90
5	16QAM	1	24	22.07	22.10	22.03
5	16QAM	12	0	21.38	21.24	21.22
5	16QAM	12	6	21.33	21.24	21.24
5	16QAM	12	11	21.38	21.29	21.15
5	16QAM	25	0	21.19	21.17	21.15



BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Low Ch. / Freq.	Power (dBm) Middle Ch. / Freq.	Power (dBm) High Ch. / Freq.
Channel				20415	20525	20635
Frequency (MHz)				825.5	836.5	847.5
3	QPSK	1	0	23.28	23.28	23.22
3	QPSK	1	7	23.34	23.25	23.21
3	QPSK	1	14	23.36	23.14	23.20
3	QPSK	8	0	22.39	22.29	22.11
3	QPSK	8	4	22.31	22.26	22.23
3	QPSK	8	7	22.45	22.29	22.27
3	QPSK	15	0	22.39	22.33	22.17
3	16QAM	1	0	22.07	21.92	22.05
3	16QAM	1	7	22.09	21.92	22.10
3	16QAM	1	14	22.07	21.94	21.97
3	16QAM	8	0	21.28	21.20	21.24
3	16QAM	8	4	21.54	21.32	21.31
3	16QAM	8	7	21.36	21.30	21.18
3	16QAM	15	0	21.38	21.33	21.15
Channel				20407	20525	20643
Frequency (MHz)				824.7	836.5	848.3
1.4	QPSK	1	0	23.30	23.15	23.10
1.4	QPSK	1	2	23.25	23.14	23.12
1.4	QPSK	1	5	23.28	23.19	23.19
1.4	QPSK	3	0	23.29	23.24	23.22
1.4	QPSK	3	1	23.31	23.22	23.18
1.4	QPSK	3	2	23.29	23.19	23.13
1.4	QPSK	6	0	22.37	22.26	22.26
1.4	16QAM	1	0	22.18	22.08	22.07
1.4	16QAM	1	2	22.24	22.20	22.08
1.4	16QAM	1	5	22.26	22.26	22.02
1.4	16QAM	3	0	22.47	22.39	22.27
1.4	16QAM	3	1	22.42	22.36	22.28
1.4	16QAM	3	2	22.40	22.35	22.30
1.4	16QAM	6	0	21.45	21.37	21.39

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.

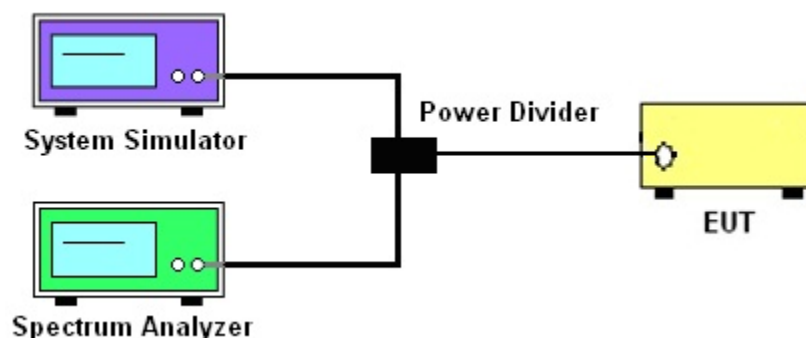
3.2.2 Measuring Instruments

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



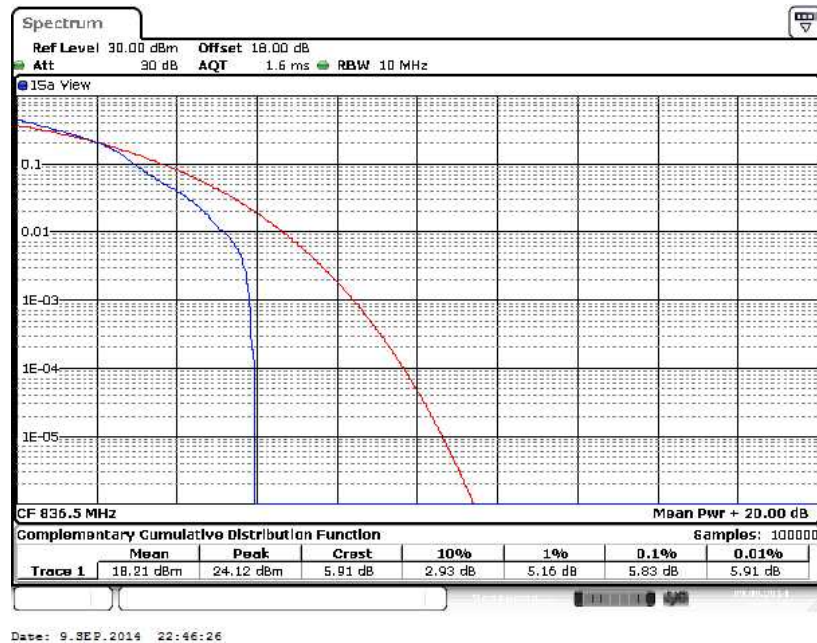
**3.2.5 Test Result of Peak-to-Average Ratio**

LTE Band 5				
BW [MHz]	Modulation	RB Size	RB Offset	Power (dBm) Middle Ch. / Freq.
Channel				20525
Frequency (MHz)				836.5
10	16QAM	1	0	5.83
10	16QAM	50	0	5.97

3.2.6 Peak to Average Power Ratio

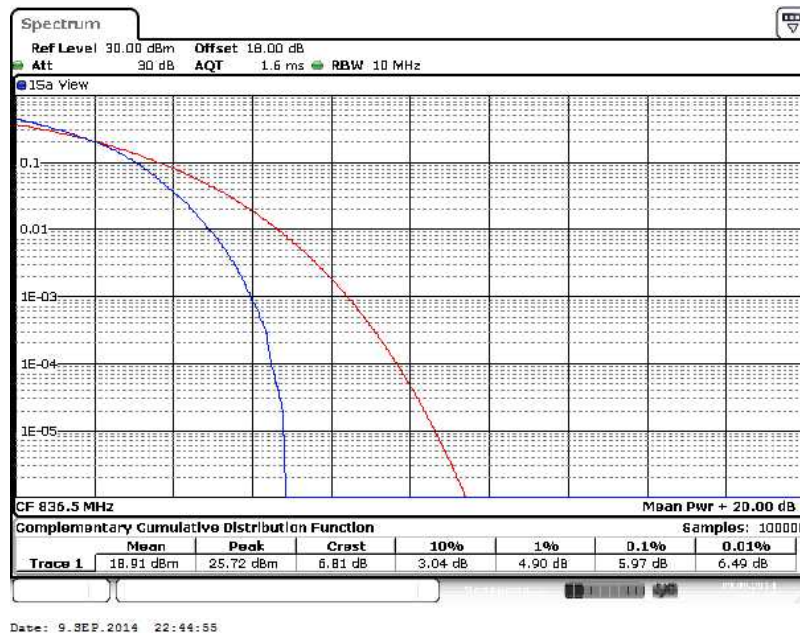
Peak-to-Average Ratio on LTE Band 5

10MHz / 16QAM in Ch. 20525 (1RB Size)



Peak-to-Average Ratio on LTE Band 5

10MHz / 16QAM in Ch. 20525 (50RB Size)



3.3 Effective Radiated Power Measurement

3.3.1 Description of the ERP Measurement

Effective radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-C-2004, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r01. Mobile and portable (hand-held) stations operating are limited to average ERP of 7 watts with LTE band 5.

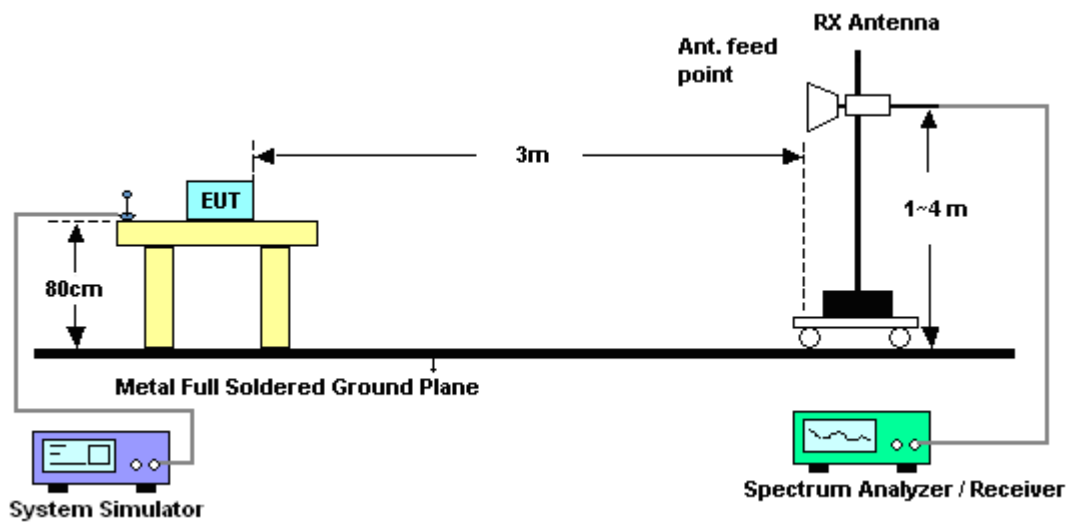
3.3.2 Measuring Instruments

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 non-conductive rotating platform 0.8 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01.
2. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, $EIRP = LVL + \text{Correction factor}$ and $ERP = EIRP - 2.15$.

3.3.4 Test Setup



3.3.5 Test Result of ERP

LTE Band 5 Radiated Power ERP for BW 1.4MHz / QPSK				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
824.7	-18.08	29.11	8.88	0.0077
836.5	-17.89	29.2	9.16	0.0082
848.3	-17.94	29.4	9.31	0.0085
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
824.7	-11.50	33.23	19.58	0.0908
836.5	-10.51	33	20.34	0.1081
848.3	-11.68	32.95	19.12	0.0817

LTE Band 5 Radiated Power ERP for BW 1.4MHz / 16QAM				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
824.7	-20.49	29.11	6.47	0.0044
836.5	-18.66	29.2	8.39	0.0069
848.3	-20.58	29.4	6.67	0.0046
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
824.7	-13.13	33.23	17.95	0.0624
836.5	-12.06	33	18.79	0.0757
848.3	-13.11	32.95	17.69	0.0587

* ERP = LVL (dBm) + Correction Factor (dB) - 2.15

LTE Band 5 Radiated Power ERP for BW 10MHz / QPSK				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
829	-17.17	29.11	9.79	0.0095
836.5	-14.54	29.2	12.51	0.0178
844	-17.02	29.4	10.23	0.0105
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
829	-12.30	33.23	18.78	0.0755
836.5	-12.27	33	18.58	0.0721
844	-12.66	32.95	18.14	0.0652

LTE Band 5 Radiated Power ERP for BW 10MHz / 16QAM				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
829	-15.00	29.11	11.96	0.0157
836.5	-17.97	29.2	9.08	0.0081
844	-14.35	29.4	12.9	0.0195
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
829	-13.69	33.23	17.39	0.0548
836.5	-12.54	33	18.31	0.0678
844	-13.13	32.95	17.67	0.0585

* ERP = LVL (dBm) + Correction Factor (dB) - 2.15

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.

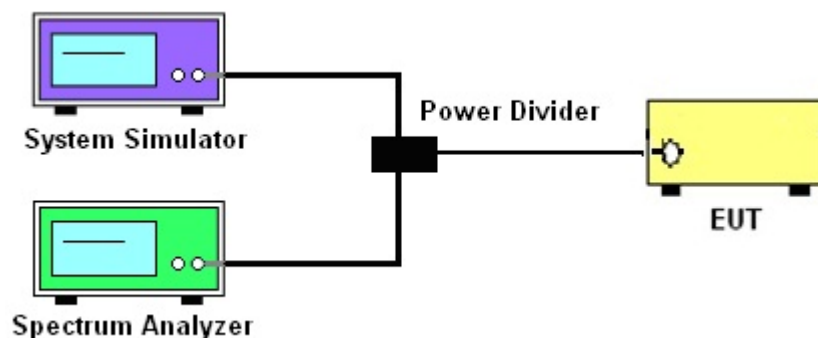
3.4.2 Measuring Instruments

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 5			
BW / Mod.	1.4MHz / QPSK	1.4MHz / 16QAM	3MHz / QPSK	3MHz / 16QAM
99% OBW (MHz)	1.097	1.104	2.733	2.721
26dB BW (MHz)	1.301	1.295	3.063	3.057
BW / Mod.	5MHz / QPSK	5MHz / 16QAM	10MHz / QPSK	10MHz / 16QAM
99% OBW (MHz)	4.486	4.496	9.091	9.011
26dB BW (MHz)	5.045	5.025	10.070	10.030

Note:

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

BW1.4MHz RB setting : RB Size 6, RB offset 0

BW3.0MHz RB setting : RB Size 15, RB offset 0

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

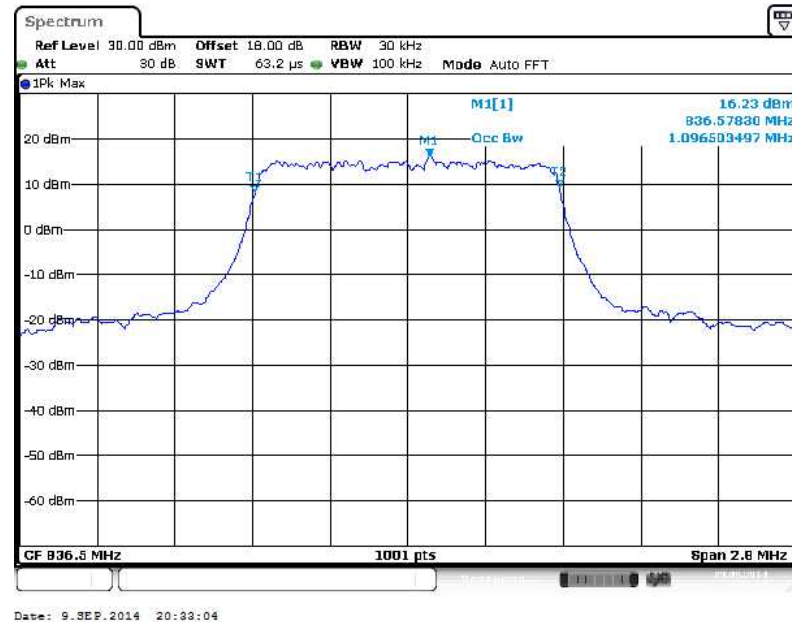
BW10MHz RB setting : RB Size 50, RB offset 0



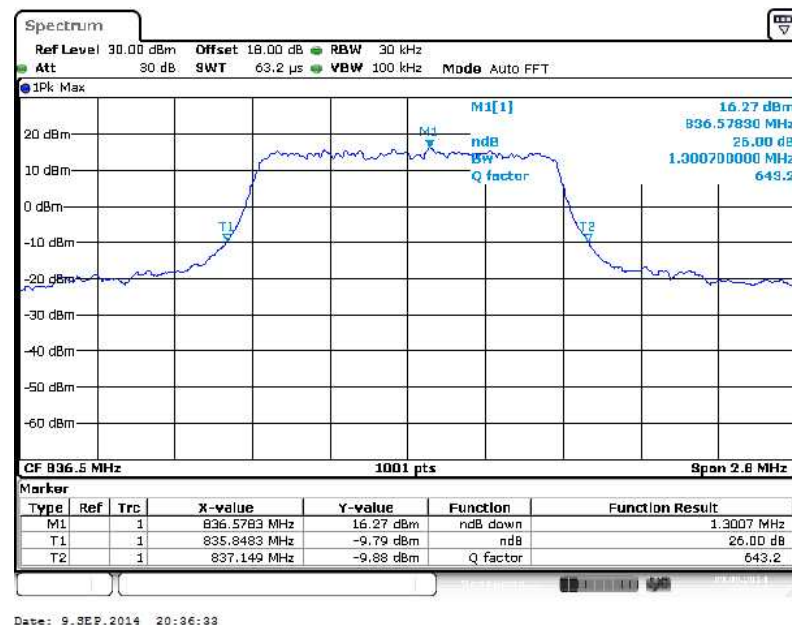
3.4.6 Test Result (Plots) of 99% Occupied Bandwidth and 26dB Bandwidth

Band :	LTE Band 5	BW / Mod. :	1.4MHz / QPSK
--------	------------	-------------	---------------

99% Occupied Bandwidth Plot on Channel 20525



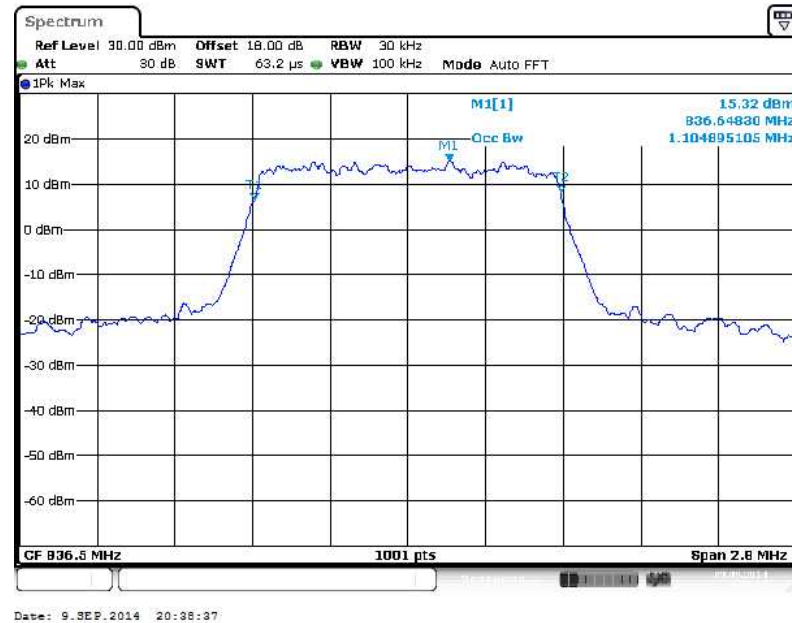
26dB Bandwidth Plot on Channel 20525



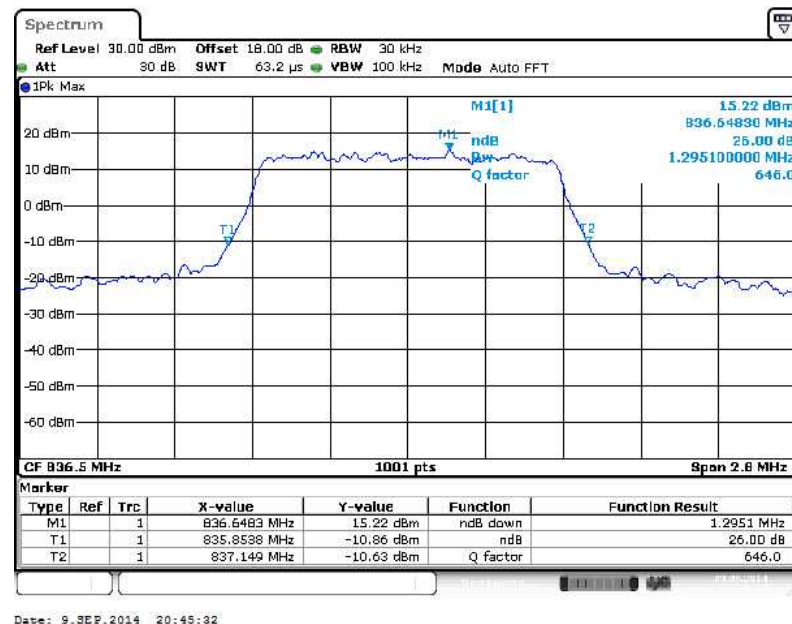


Band :	LTE Band 5	BW / Mod. :	1.4MHz / 16QAM
--------	------------	-------------	----------------

99% Occupied Bandwidth Plot on Channel 20525



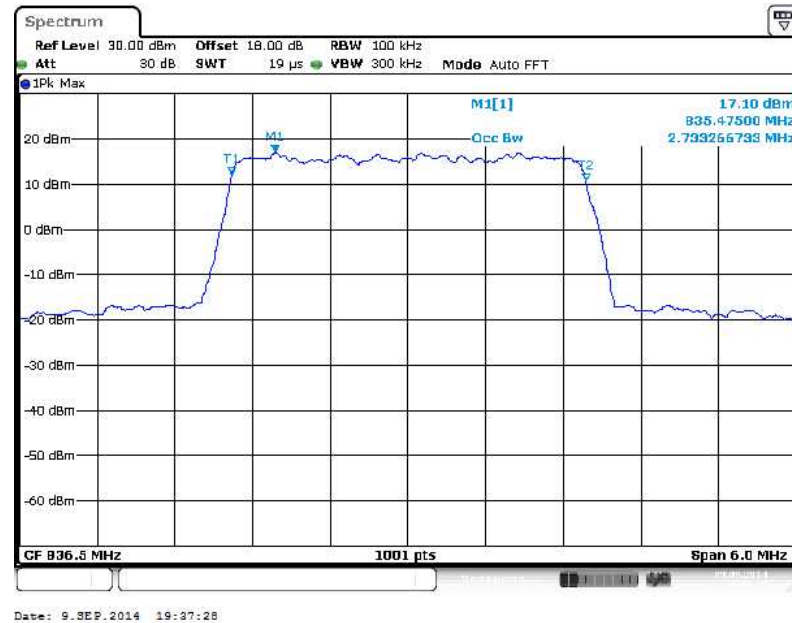
26dB Bandwidth Plot on Channel 20525



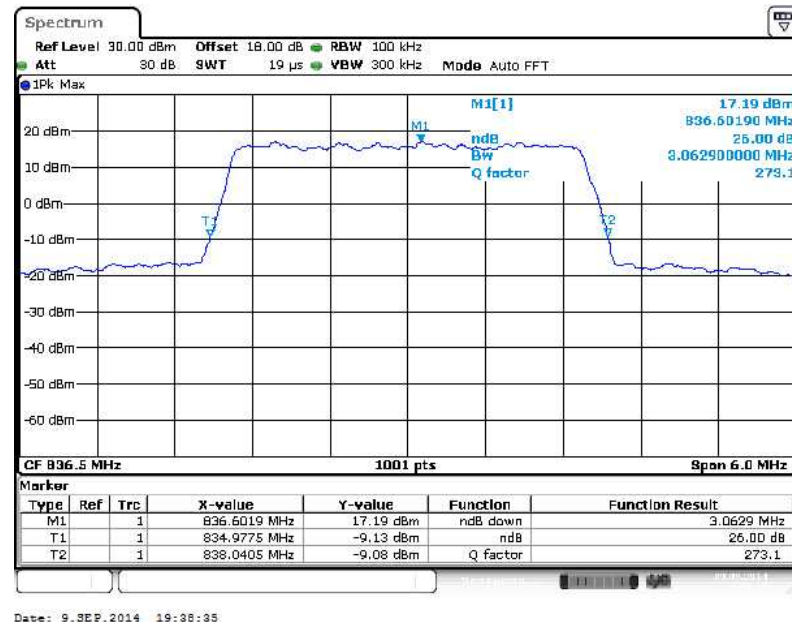


Band :	LTE Band 5	BW / Mod. :	3MHz / QPSK
--------	------------	-------------	-------------

99% Occupied Bandwidth Plot on Channel 20525



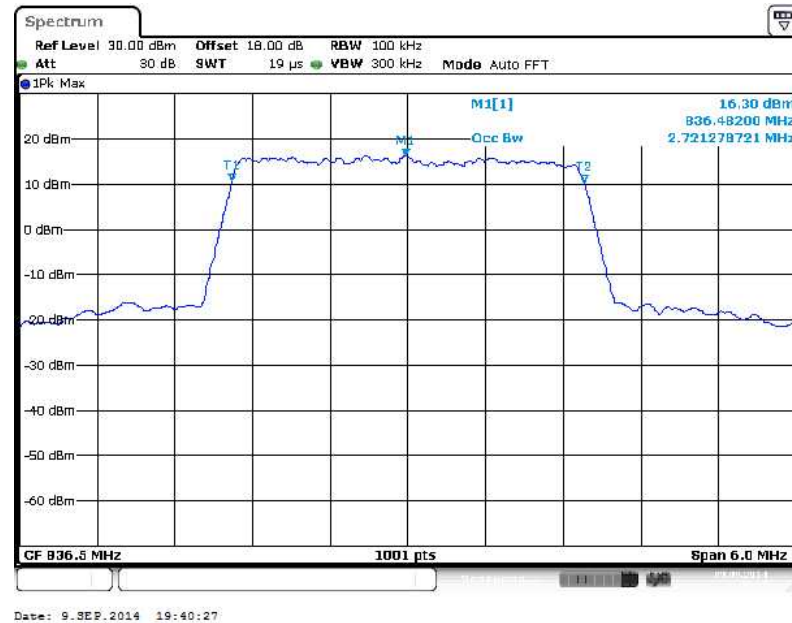
26dB Bandwidth Plot on Channel 20525



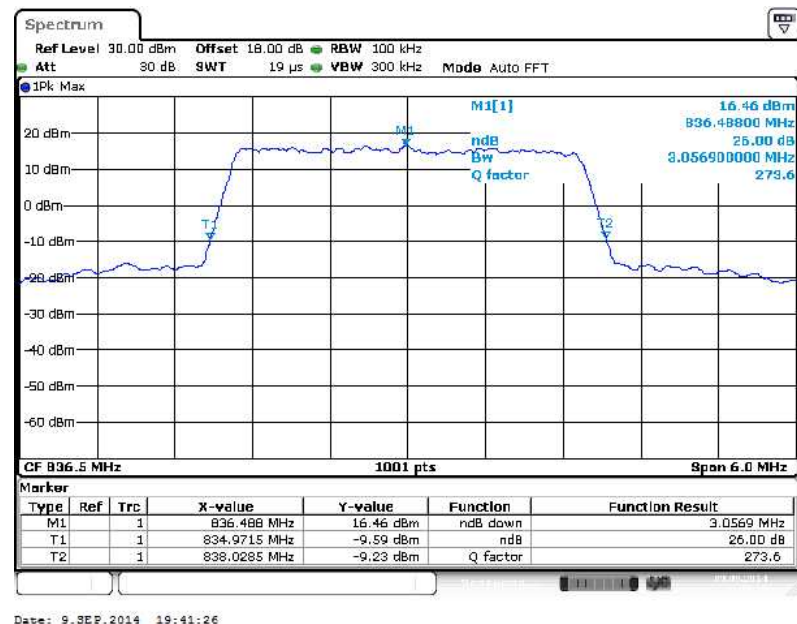


Band :	LTE Band 5	BW / Mod. :	3MHz / 16QAM
--------	------------	-------------	--------------

99% Occupied Bandwidth Plot on Channel 20525



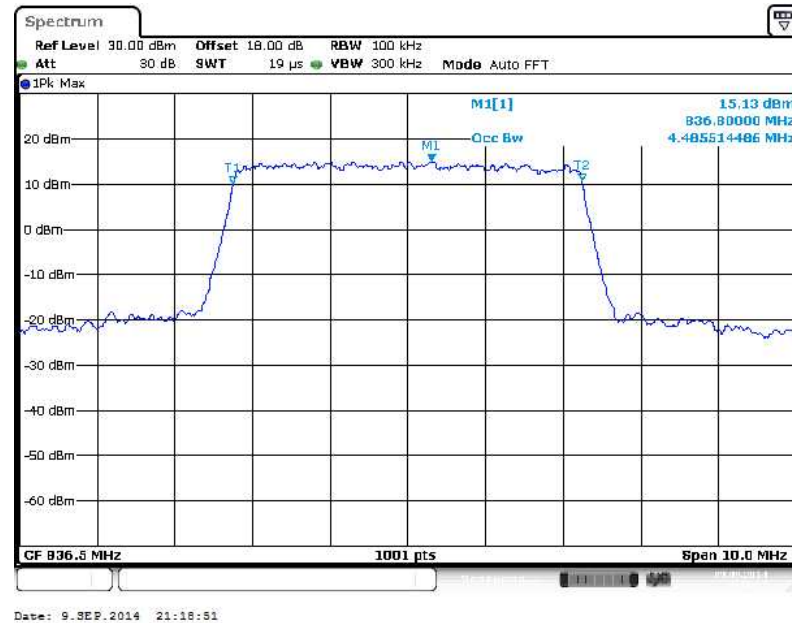
26dB Bandwidth Plot on Channel 20525



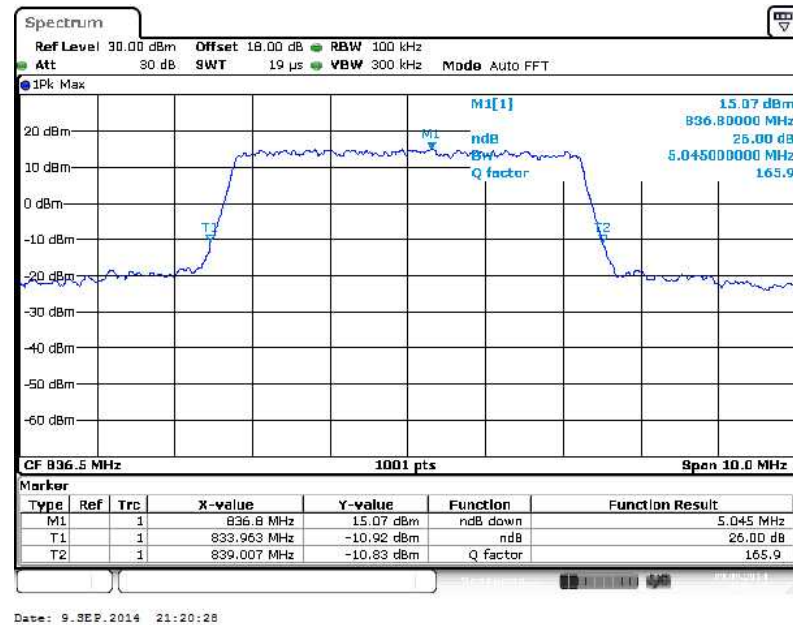


Band :	LTE Band 5	BW / Mod. :	5MHz / QPSK
--------	------------	-------------	-------------

99% Occupied Bandwidth Plot on Channel 20525



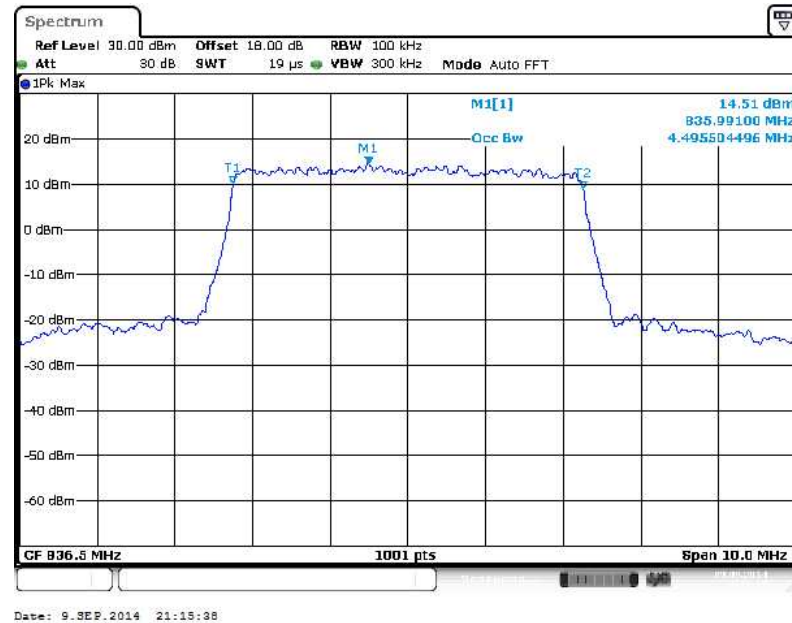
26dB Bandwidth Plot on Channel 20525



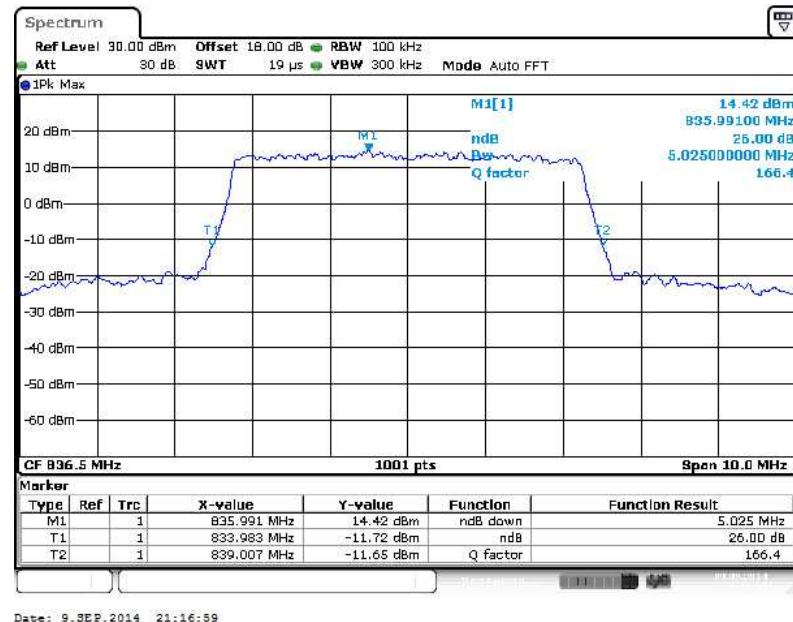


Band :	LTE Band 5	BW / Mod. :	5MHz / 16QAM
--------	------------	-------------	--------------

99% Occupied Bandwidth Plot on Channel 20525



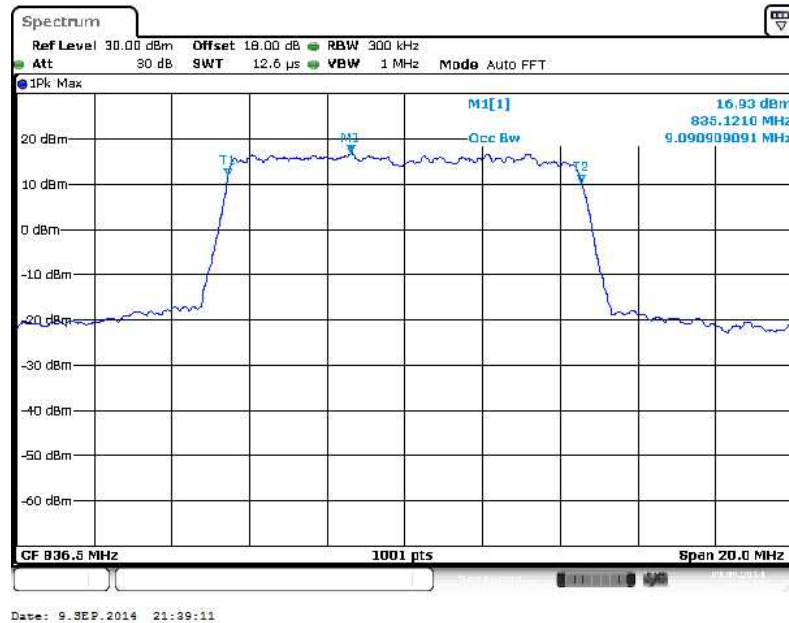
26dB Bandwidth Plot on Channel 20525



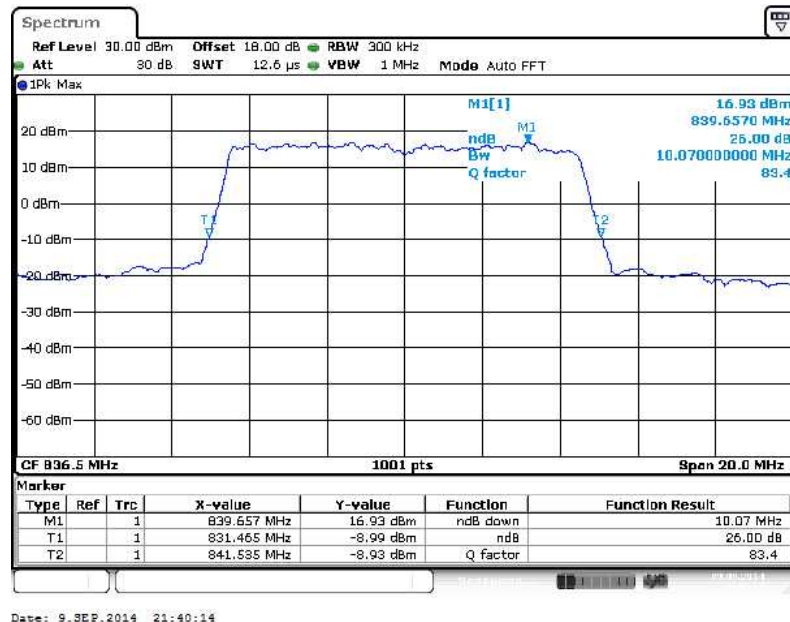


Band :	LTE Band 5	BW / Mod. :	10MHz / QPSK
--------	------------	-------------	--------------

99% Occupied Bandwidth Plot on Channel 20525



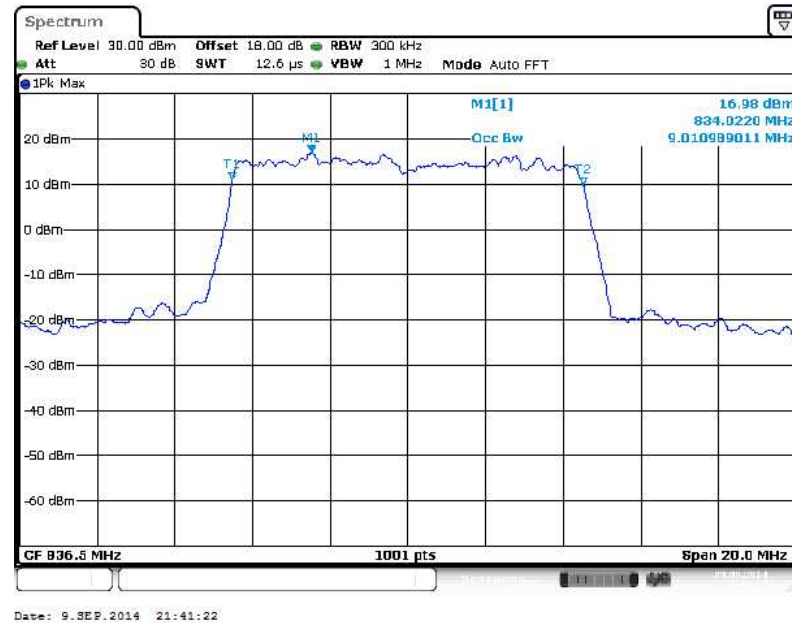
26dB Bandwidth Plot on Channel 20525



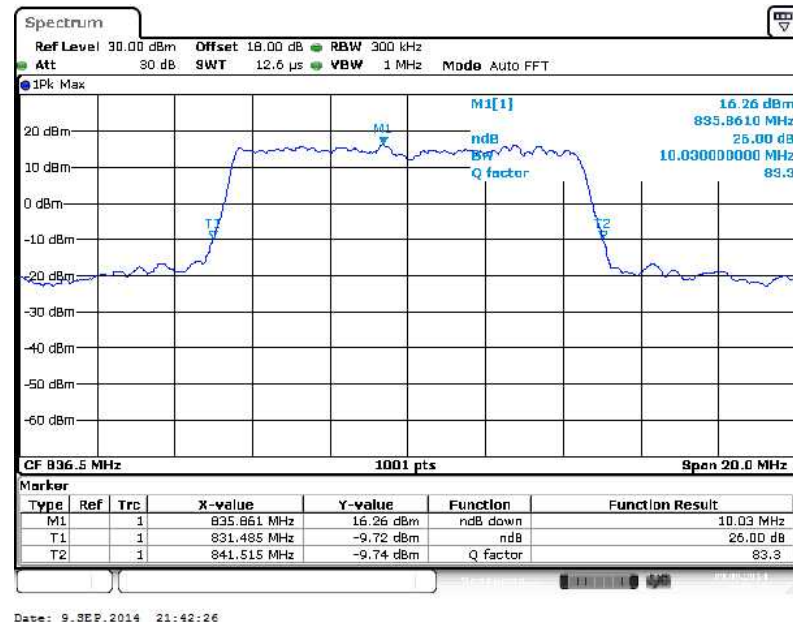


Band :	LTE Band 5	BW / Mod. :	10MHz / 16QAM
--------	------------	-------------	---------------

99% Occupied Bandwidth Plot on Channel 20525



26dB Bandwidth Plot on Channel 20525



3.5 Conducted Band Edge Measurement

3.5.1 Description of Conducted Band Edge Measurement

22.917(a) for Band 5

For operations in the 824 – 849 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

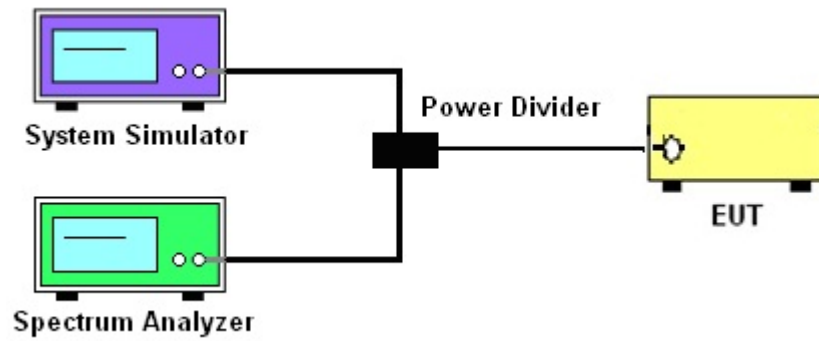
3.5.2 Measuring Instruments

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 $\geq 1\%$ 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 $43 + 10\log(P)\text{dB}$ below the transmitter power $P(\text{Watts})$
 $= P(\text{W}) - [43 + 10\log(P)] (\text{dB})$
 $= [30 + 10\log(P)] (\text{dBm}) - [43 + 10\log(P)] (\text{dB})$
 $= -13\text{dBm}.$

3.5.4 Test Setup

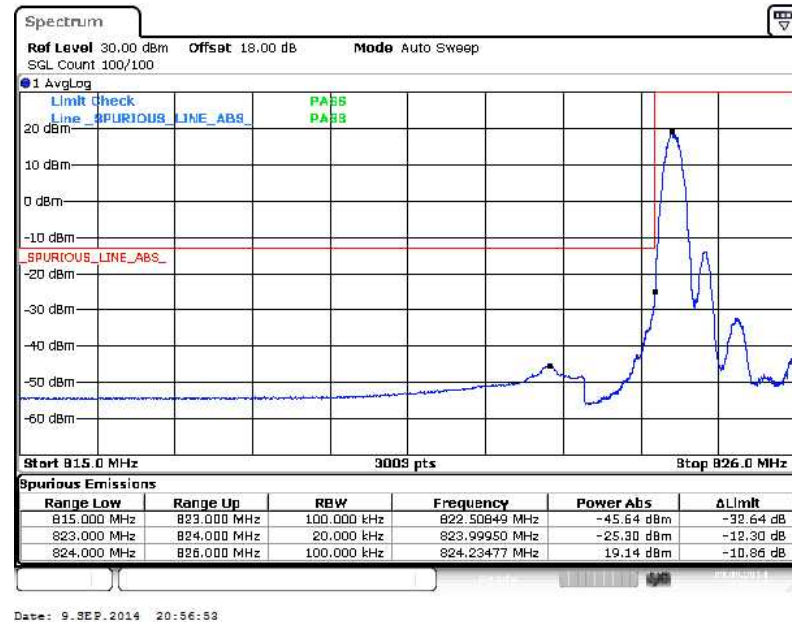




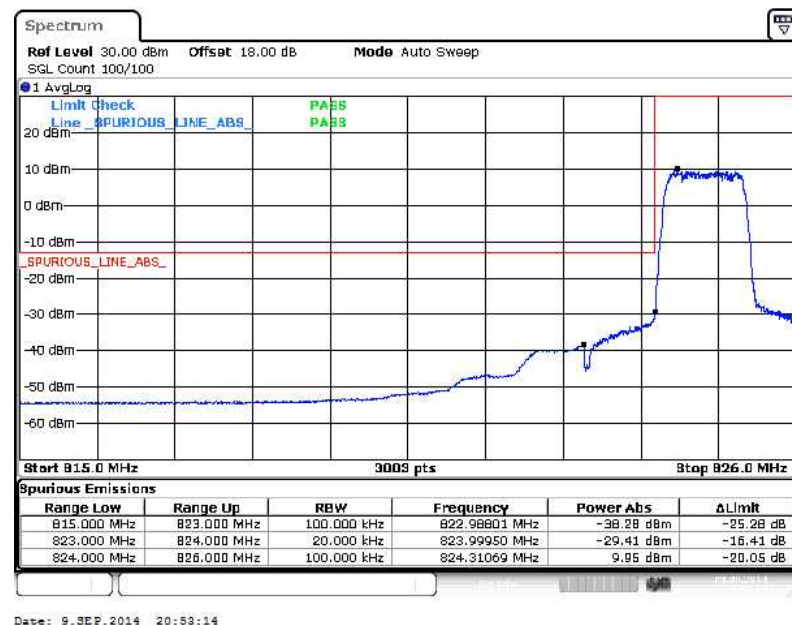
3.5.5 Test Result (Plots) of Conducted Band Edge

Band :	LTE Band 5	Band Width :	1.4MHz / QPSK
--------	------------	--------------	---------------

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

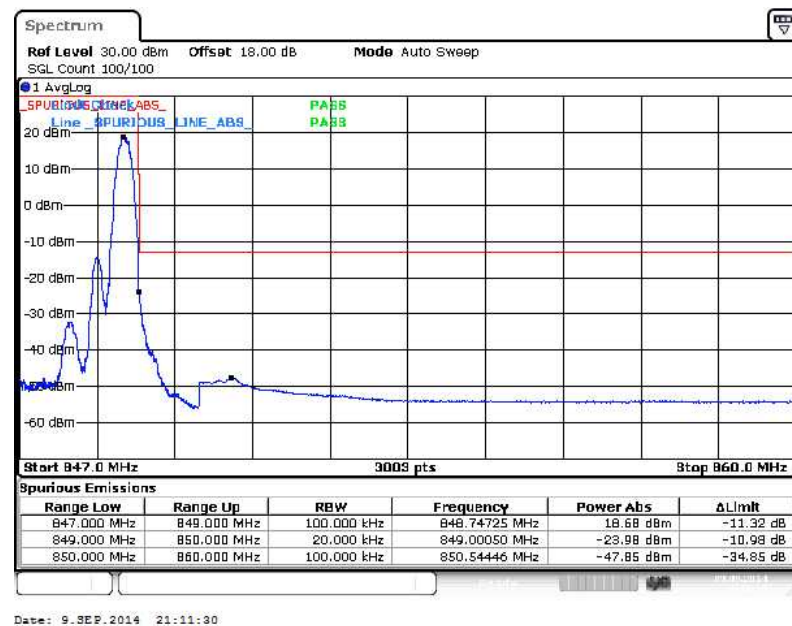


Lower Band Edge Plot for QPSK-RB Size 6, RB Offset 0

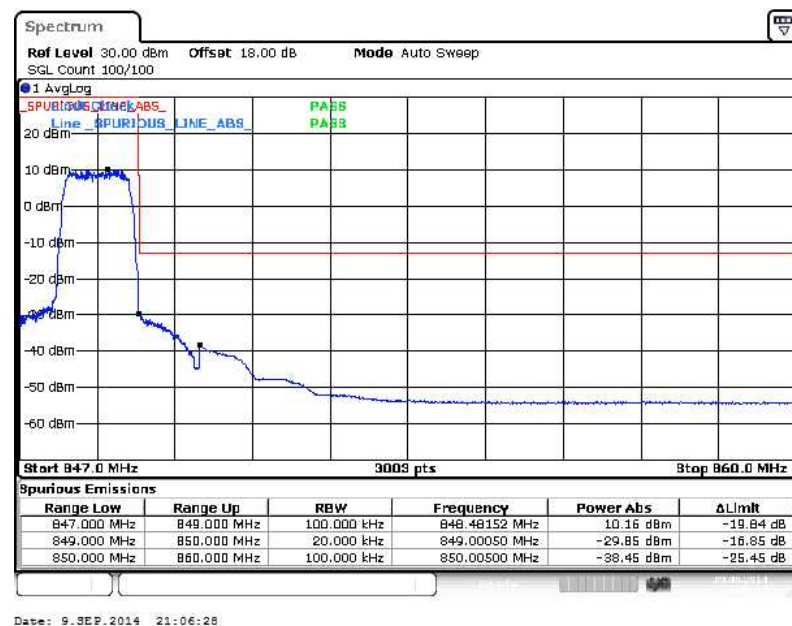




Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 5



Higher Band Edge Plot for QPSK-RB Size 6, RB Offset 0

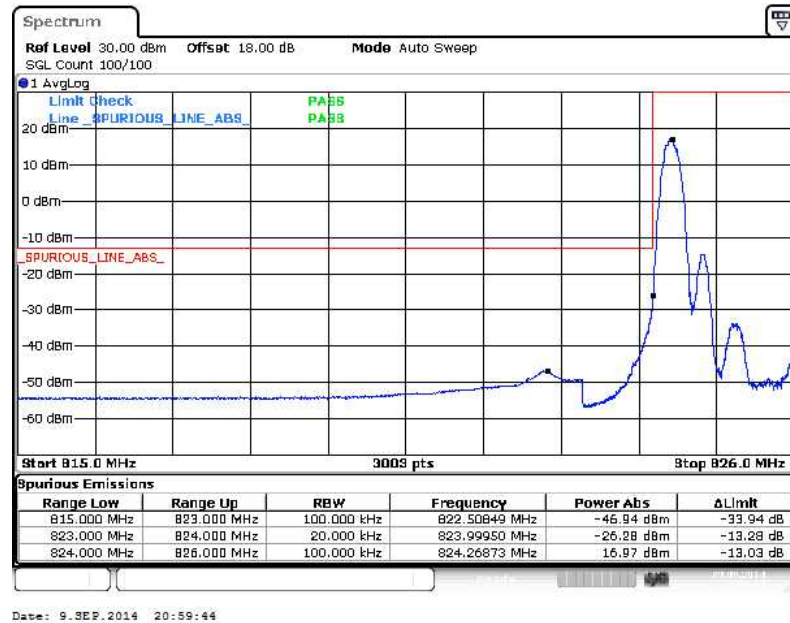




Band : LTE Band 5

Band Width : 1.4MHz / 16QAM

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

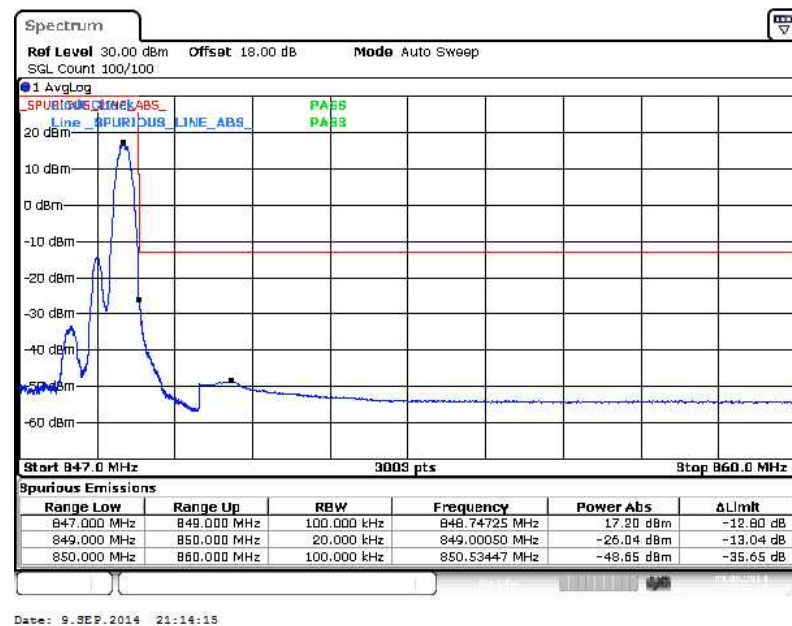


Lower Band Edge Plot for 16QAM -RB Size 6, RB Offset 0

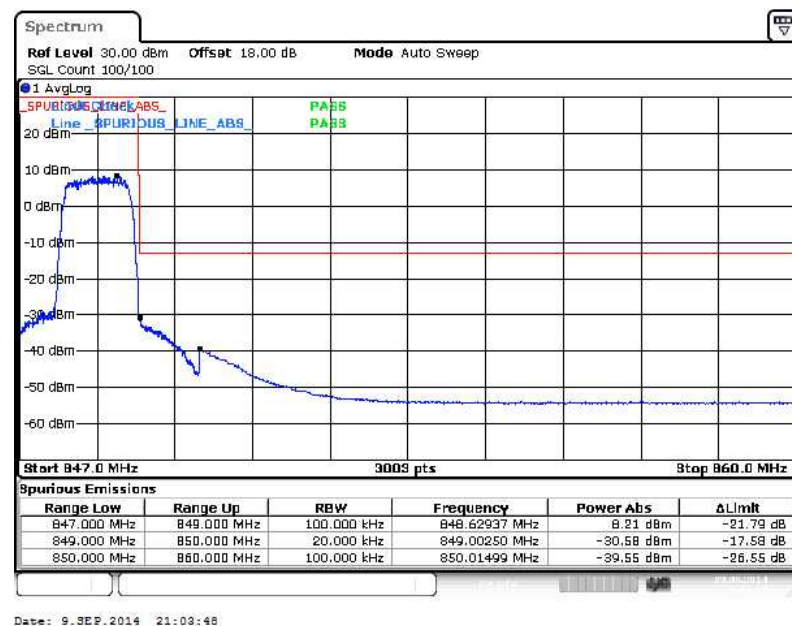




Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 5



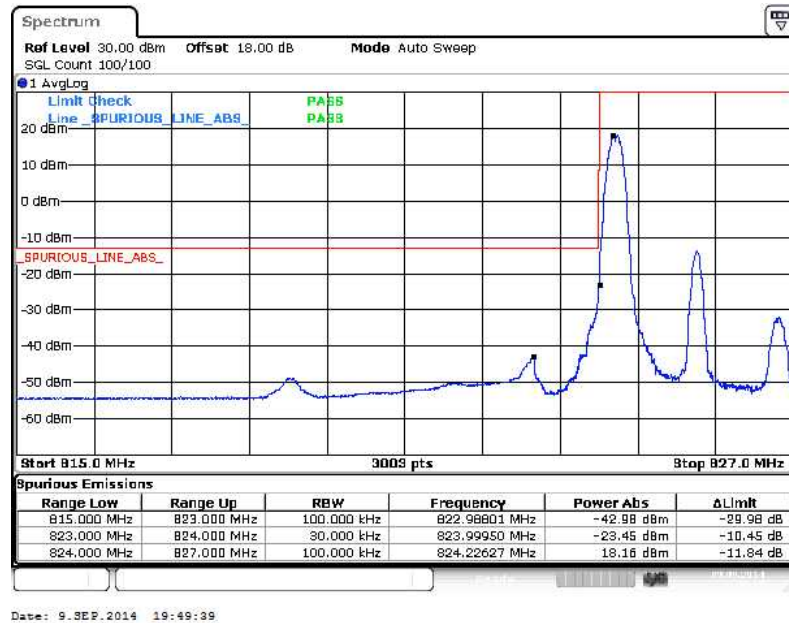
Higher Band Edge Plot for 16QAM -RB Size 6, RB Offset 0



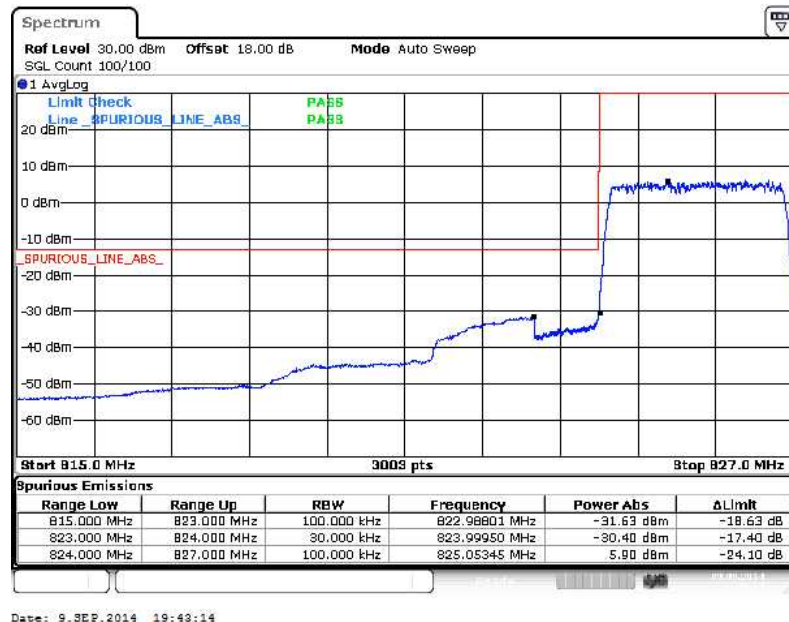


Band :	LTE Band 5	Band Width :	3MHz / QPSK
--------	------------	--------------	-------------

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

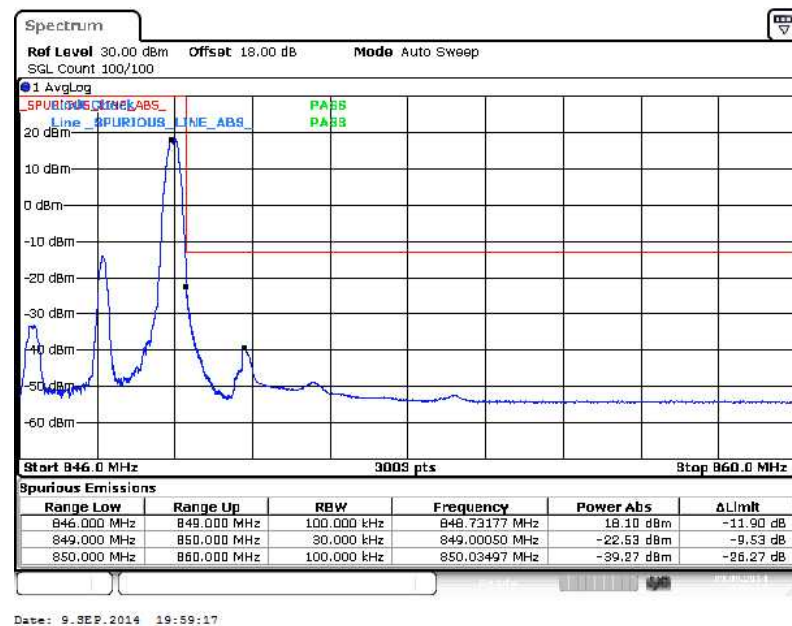


Lower Band Edge Plot for QPSK-RB Size 15, RB Offset 0

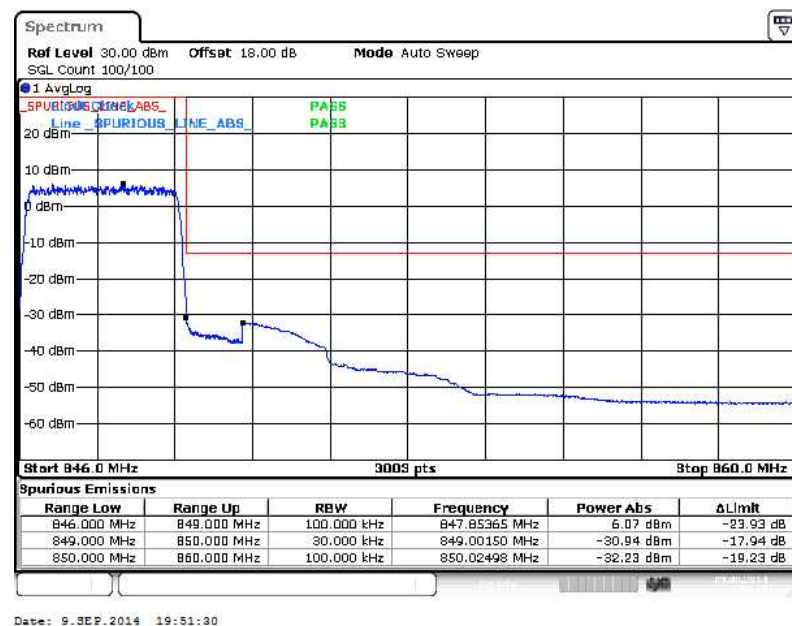




Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 14



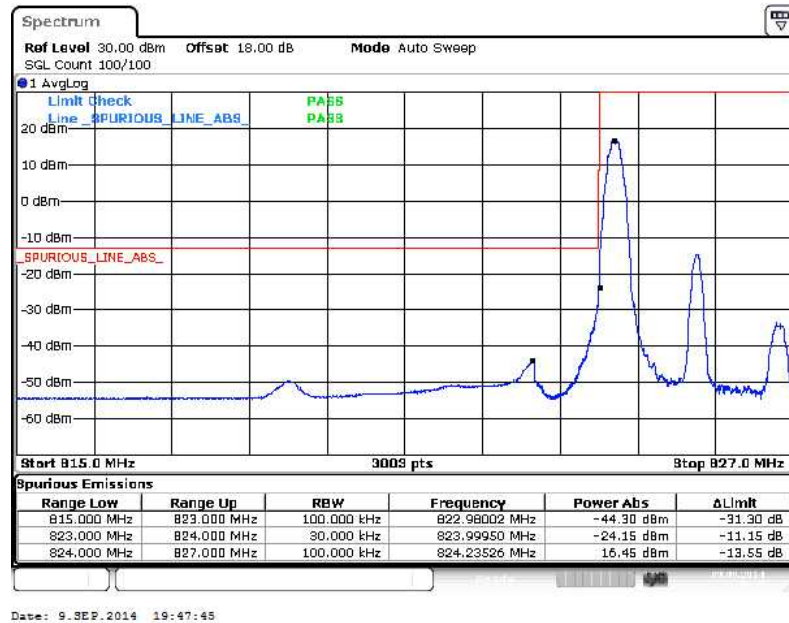
Higher Band Edge Plot for QPSK-RB Size 15, RB Offset 0



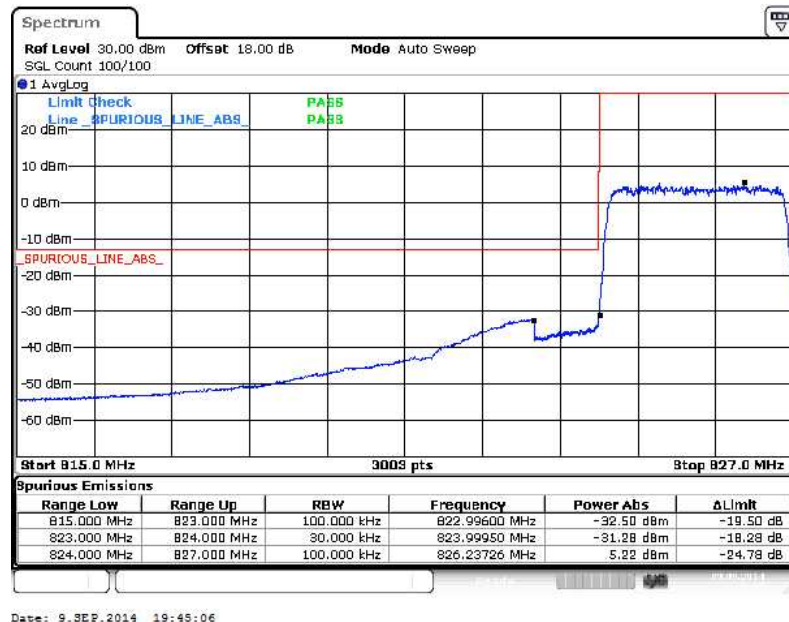


Band :	LTE Band 5	Band Width :	3MHz / 16QAM
--------	------------	--------------	--------------

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

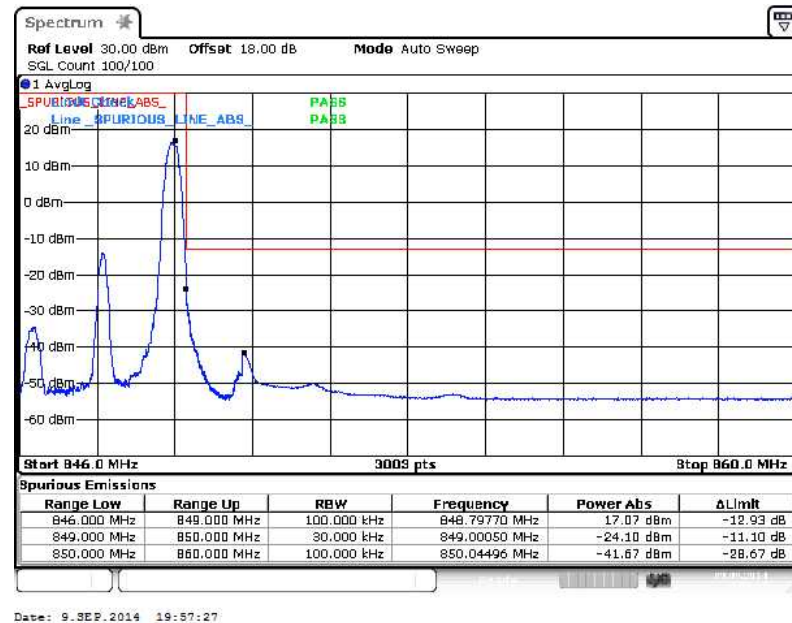


Lower Band Edge Plot for 16QAM -RB Size 15, RB Offset 0

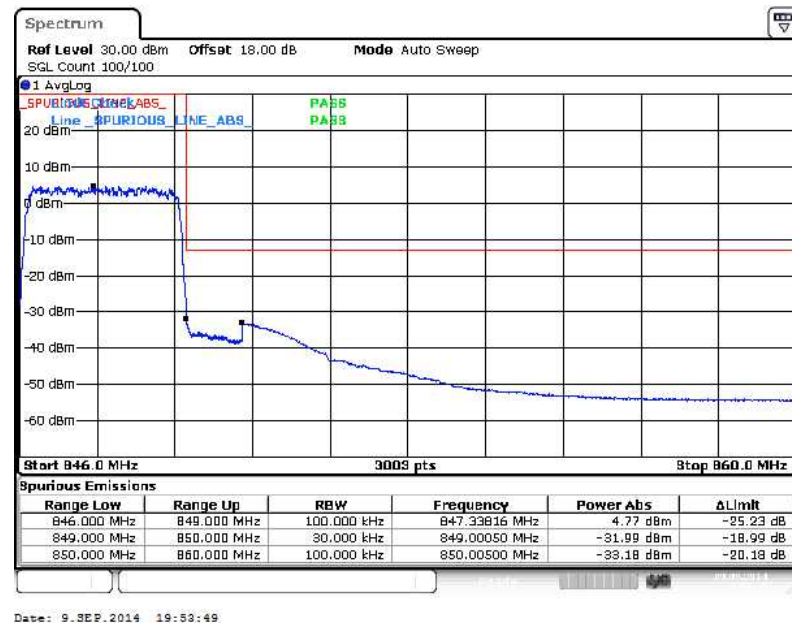




Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 14



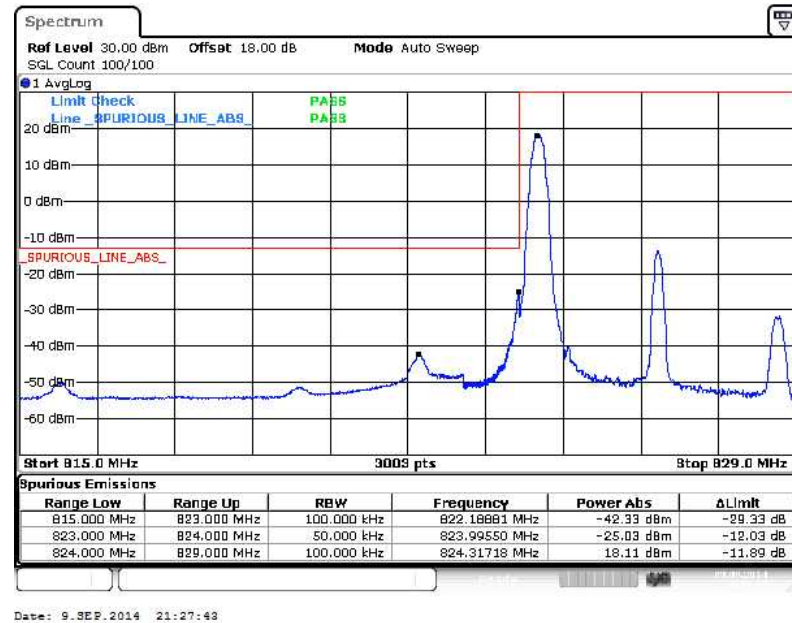
Higher Band Edge Plot for 16QAM -RB Size 15, RB Offset 0



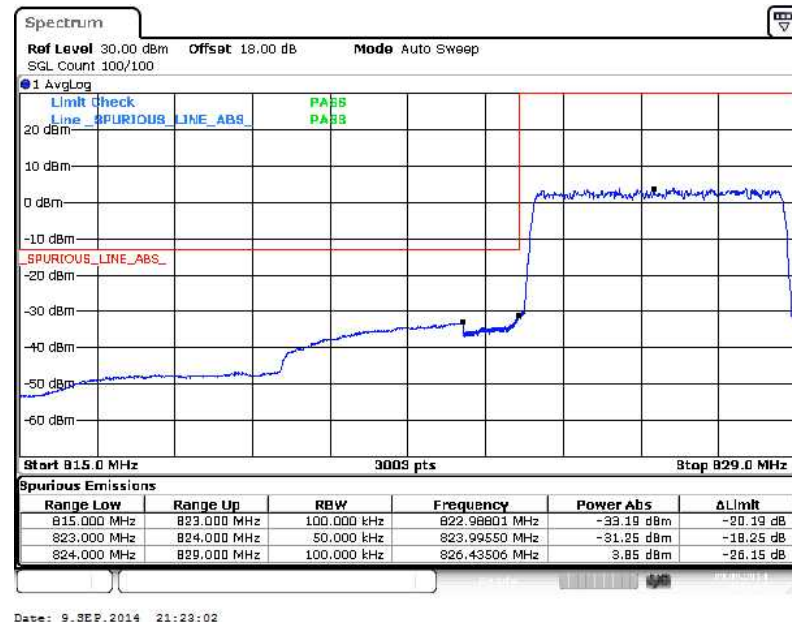


Band :	LTE Band 5	Band Width :	5MHz / QPSK
--------	------------	--------------	-------------

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

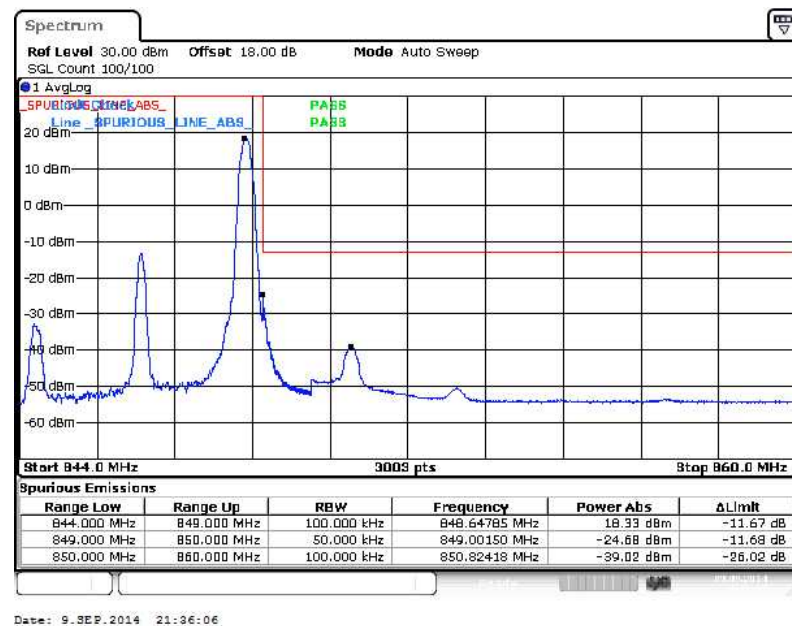


Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0

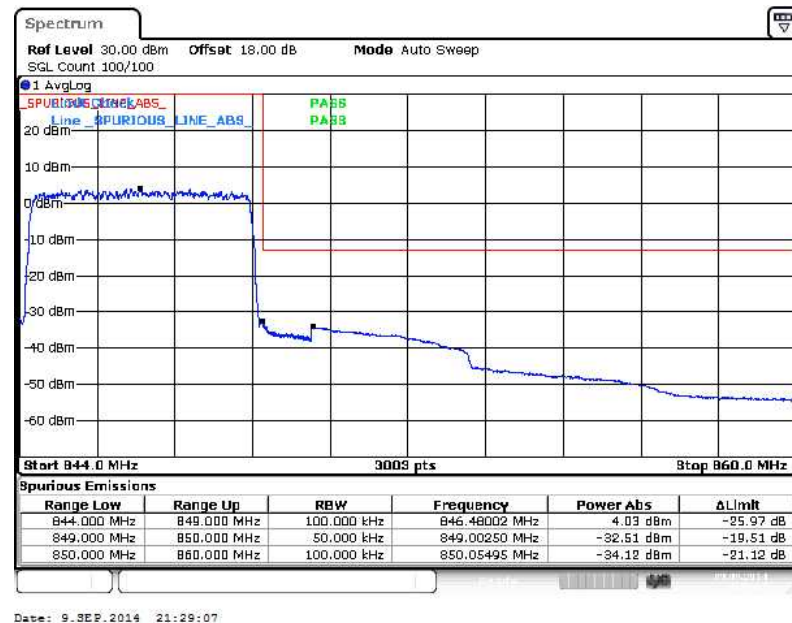




Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24



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

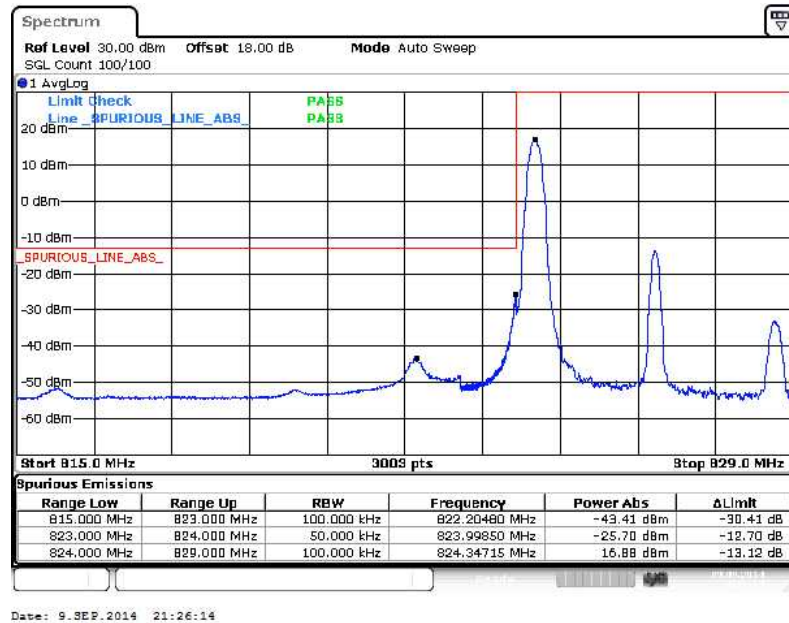




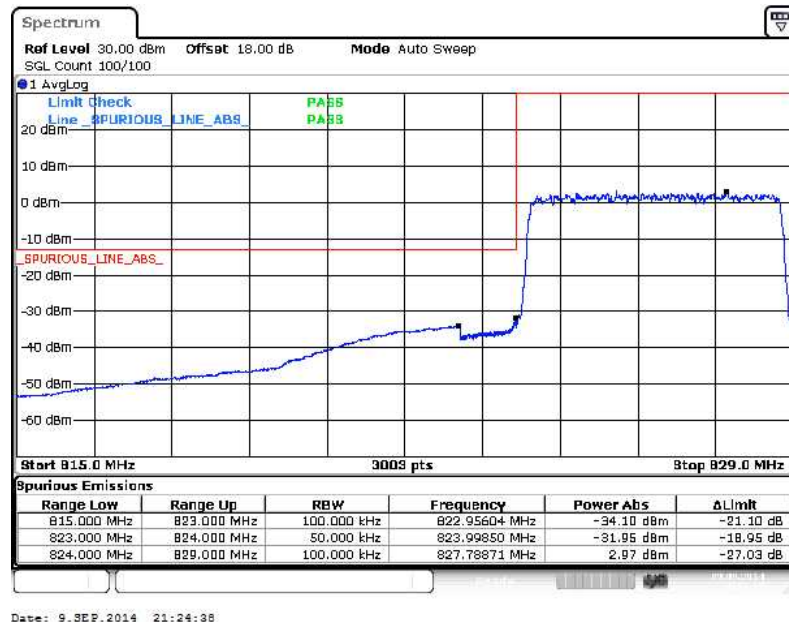
Band : LTE Band 5

Band Width : 5MHz / 16QAM

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

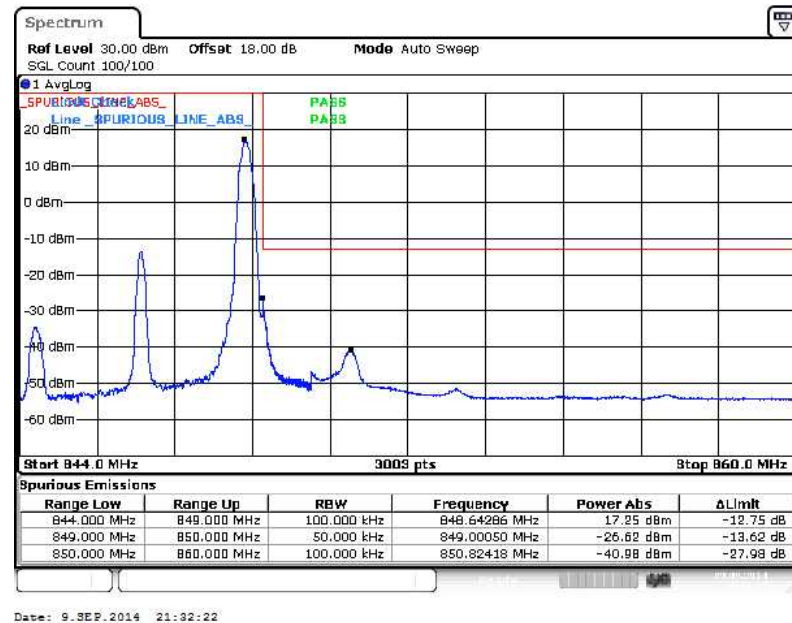


Lower Band Edge Plot for 16QAM -RB Size 25, RB Offset 0

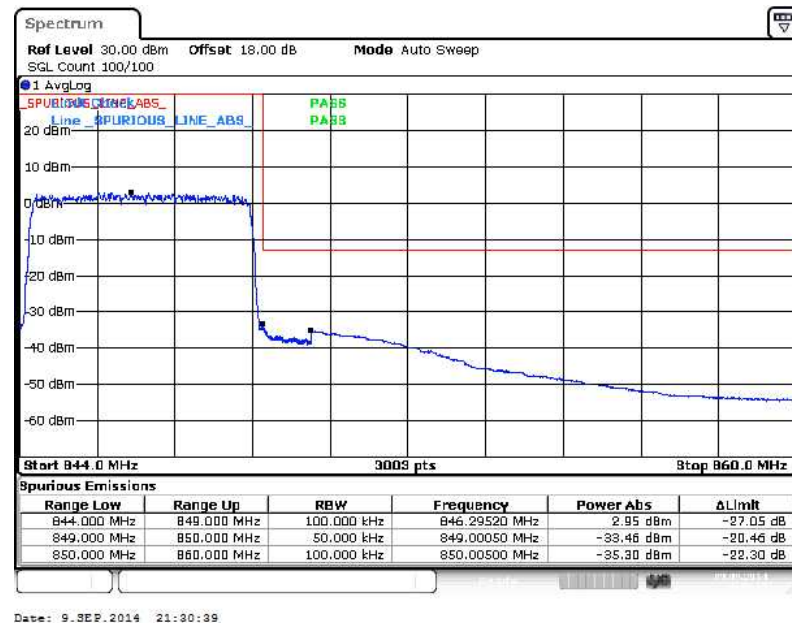




Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 24



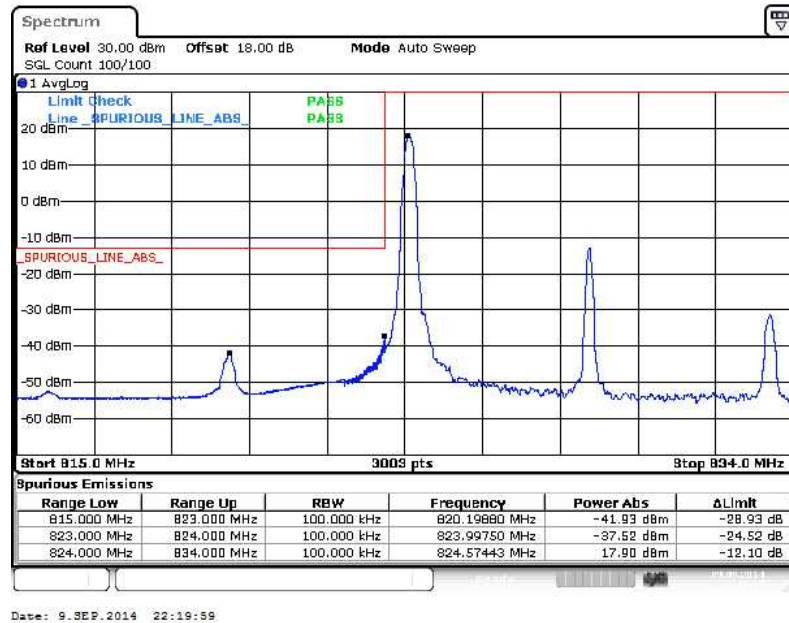
Higher Band Edge Plot for 16QAM -RB Size 25, RB Offset 0



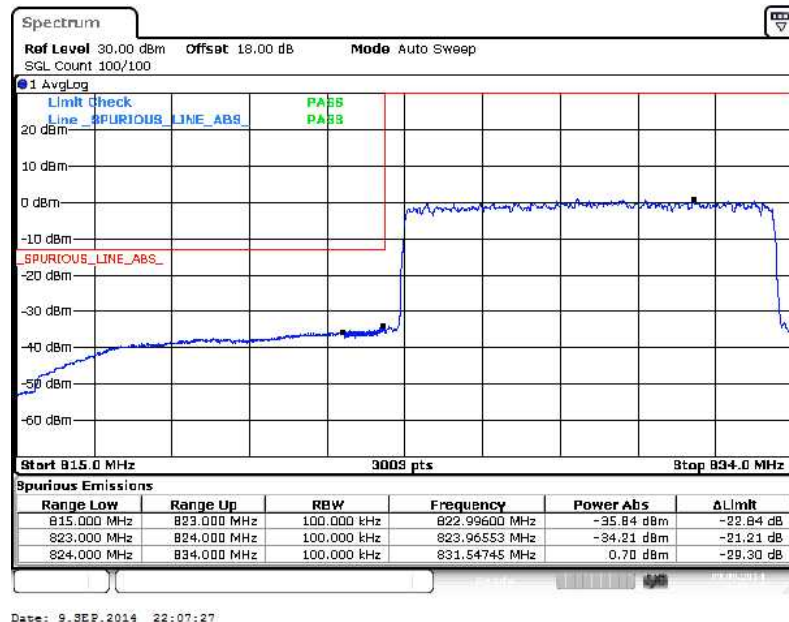


Band :	LTE Band 5	Band Width :	10MHz / QPSK
--------	------------	--------------	--------------

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

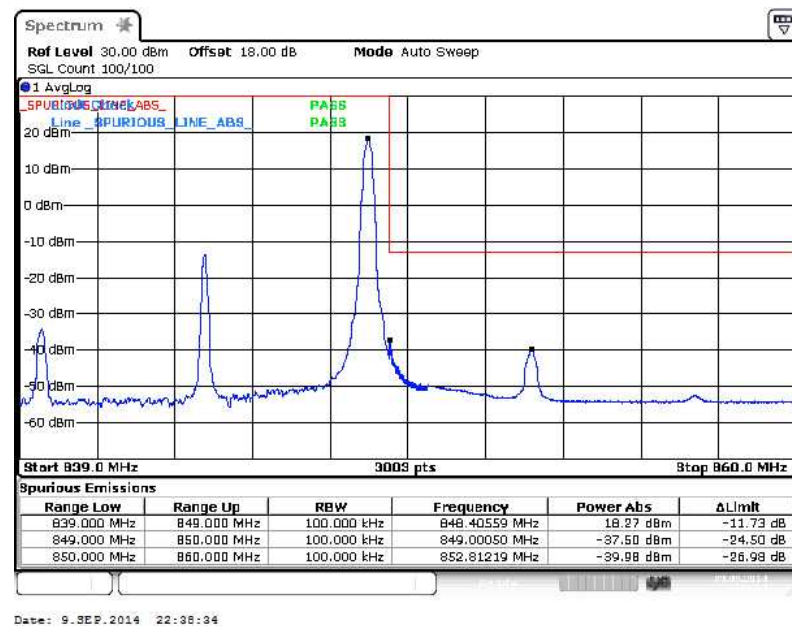


Lower Band Edge Plot for QPSK-RB Size 50, RB Offset 0

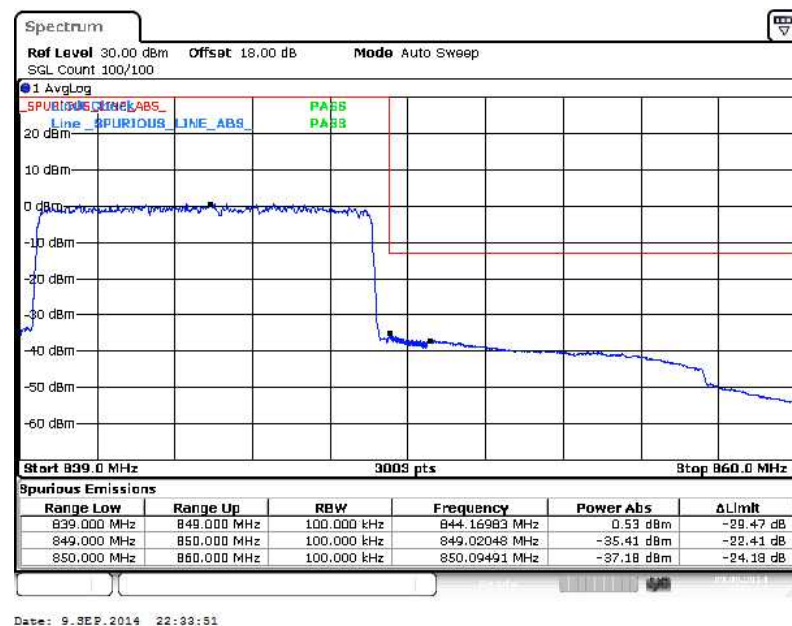




Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 49



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

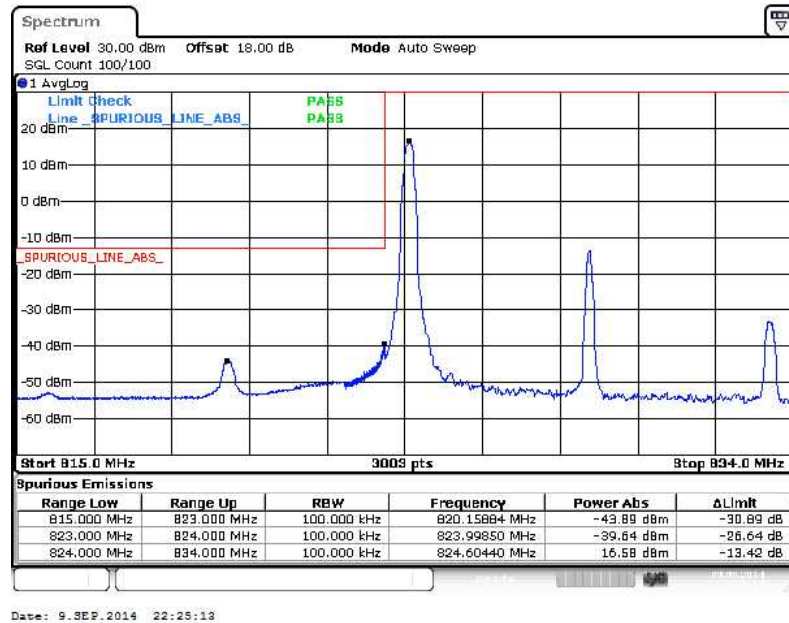




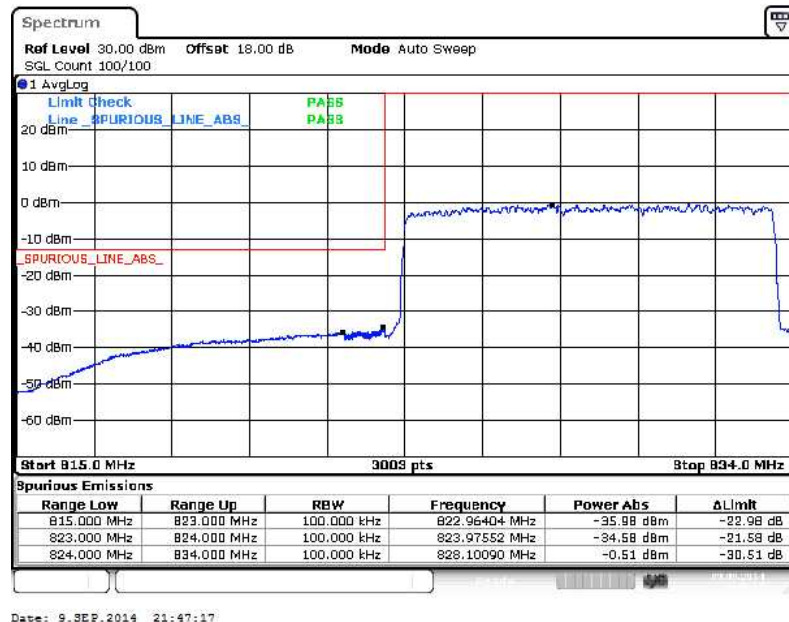
Band : LTE Band 5

Band Width : 10MHz / 16QAM

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

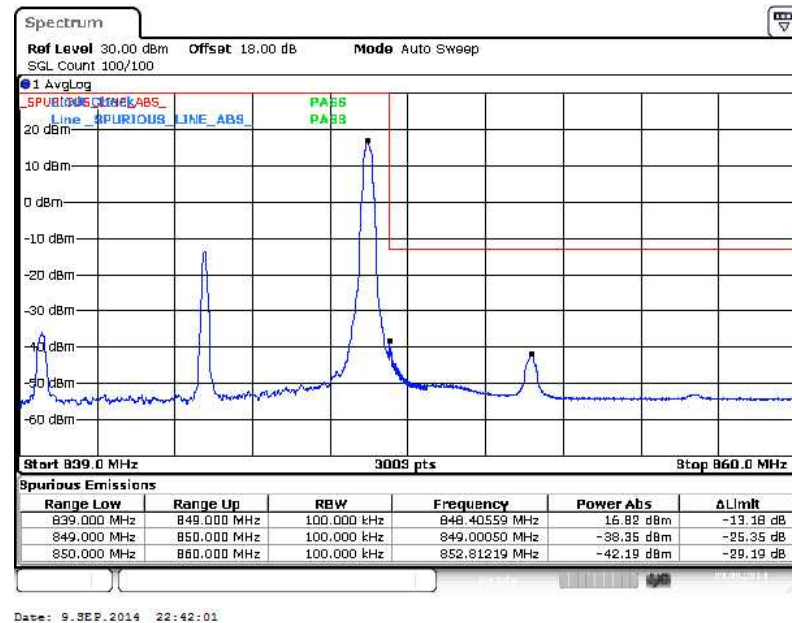


Lower Band Edge Plot for 16QAM -RB Size 50, RB Offset 0

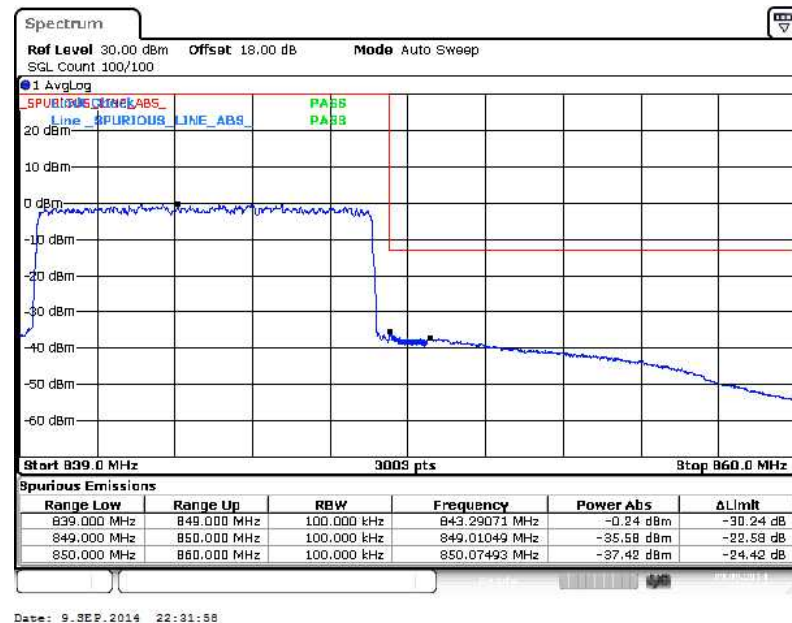




Higher Band Edge Plot for 16QAM -RB Size 1, RB Offset 49



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



3.6 Conducted Spurious Emission Measurement

3.6.1 Description of Conducted 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 at least $43 + 10 \log (P)$ dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30MHz up to a frequency including its 10th harmonic.

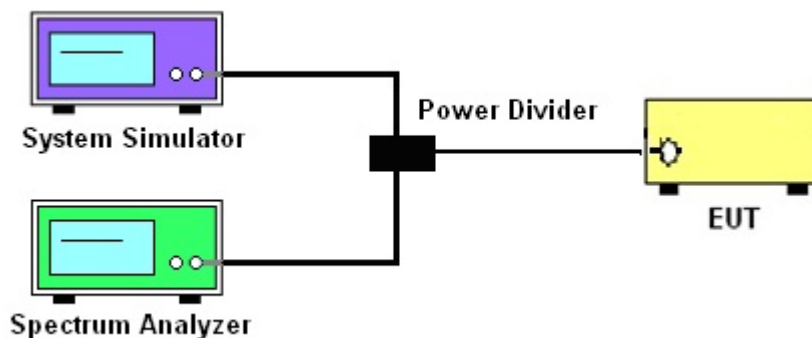
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

1. The EUT was 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 $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

3.6.4 Test Setup

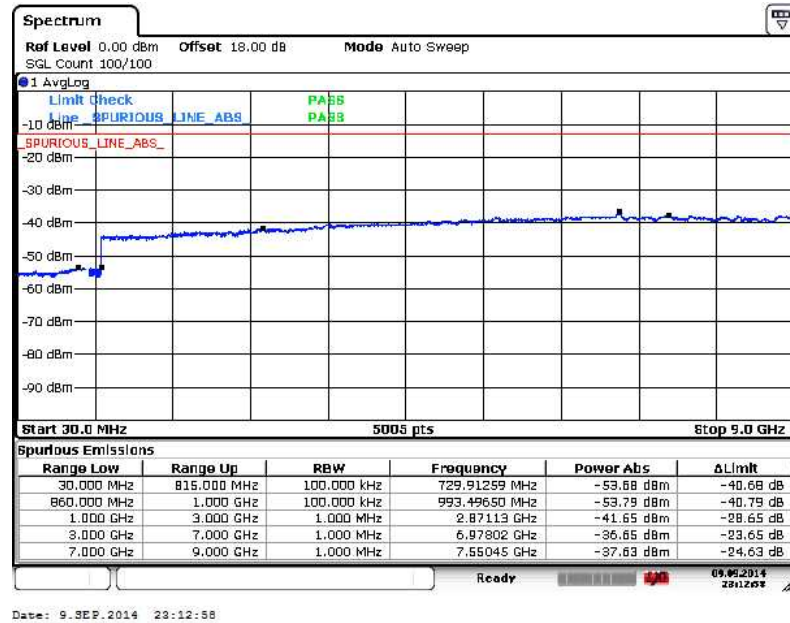




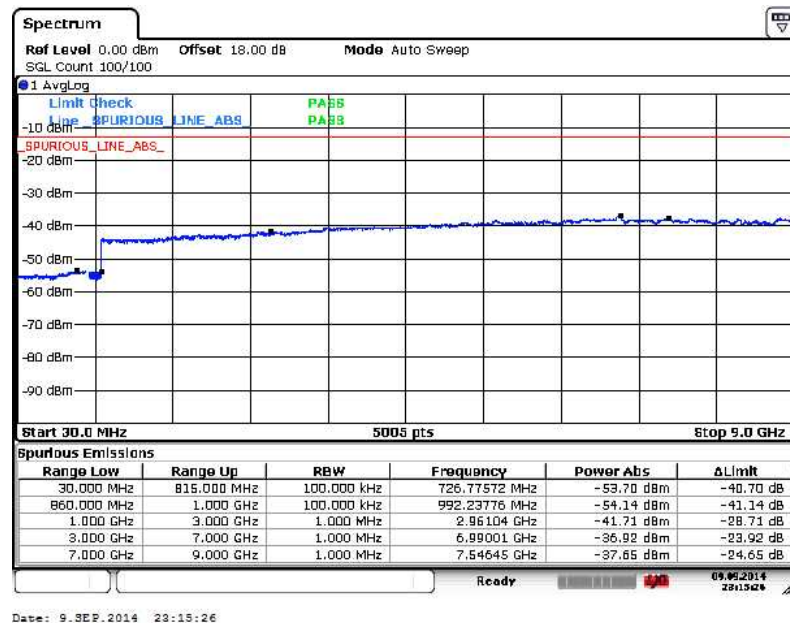
3.6.5 Test Result (Plots) of Conducted Spurious Emission

Band :	LTE Band 5	Channel :	CH20407 (Low)
Band Width :	1.4MHz		

QPSK (RB Size 1, RB Offset 0)



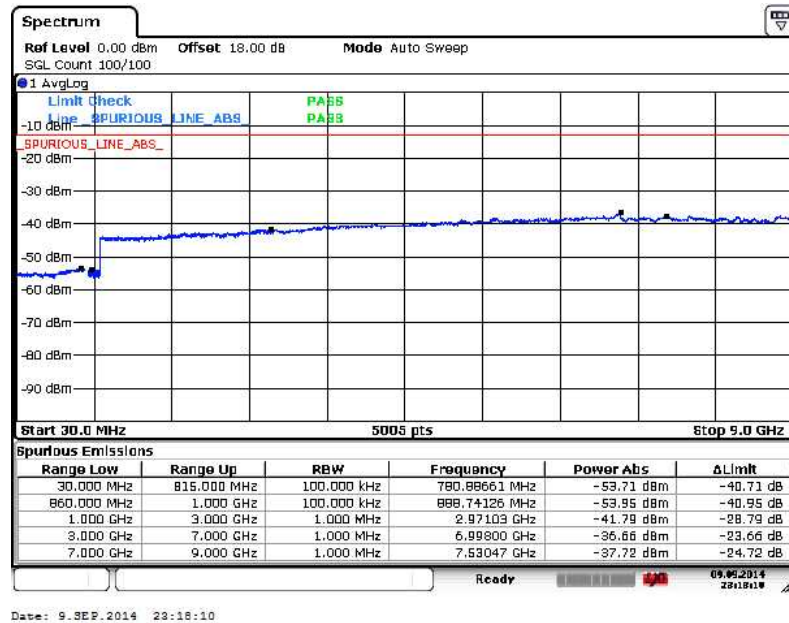
16QAM (RB Size 1, RB Offset 0)



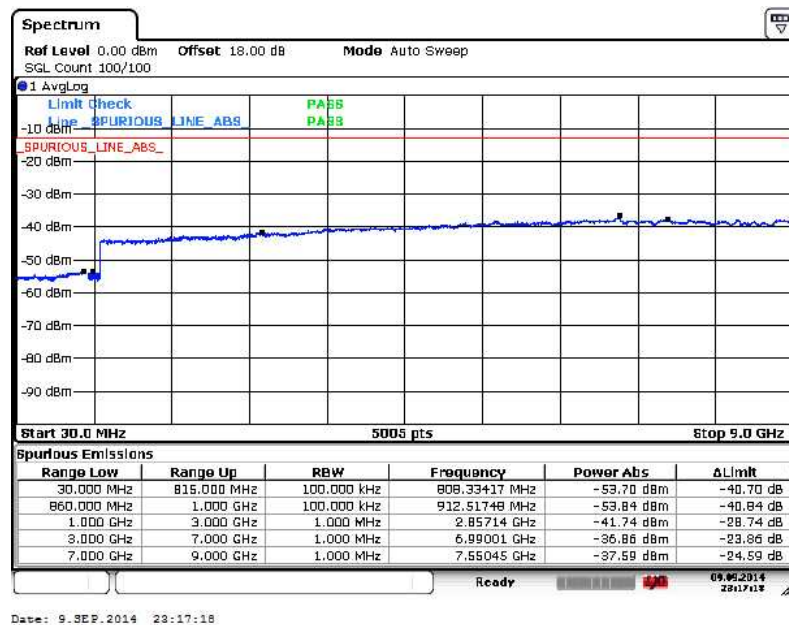


Band :	LTE Band 5	Channel :	CH20525 (Middle)
Band Width :	1.4MHz		

QPSK (RB Size 1, RB Offset 0)



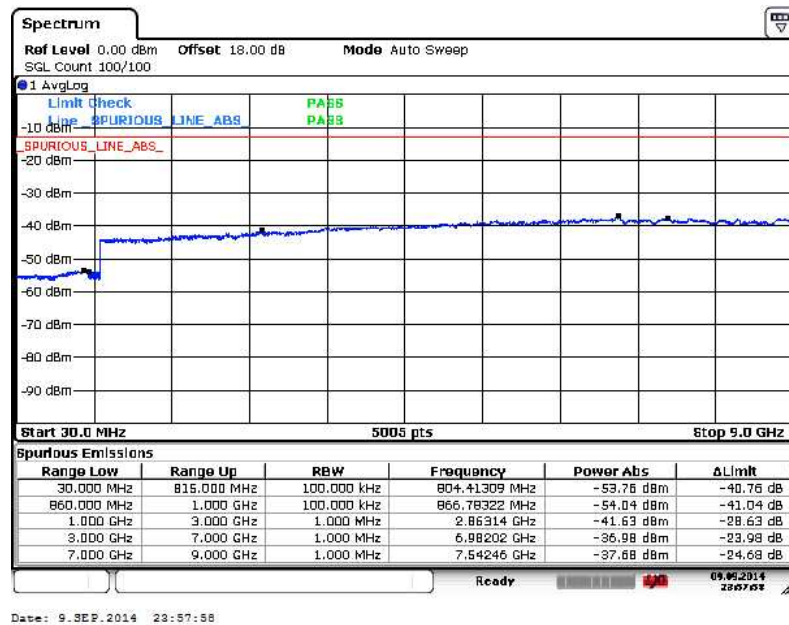
16QAM (RB Size 1, RB Offset 0)



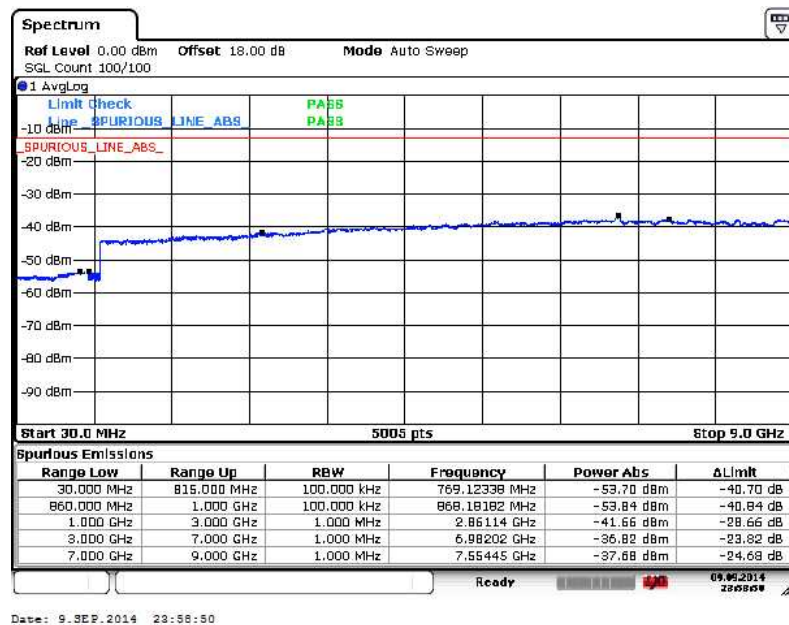


Band :	LTE Band 5	Channel :	CH20643 (High)
Band Width :	1.4MHz		

QPSK (RB Size 1, RB Offset 0)



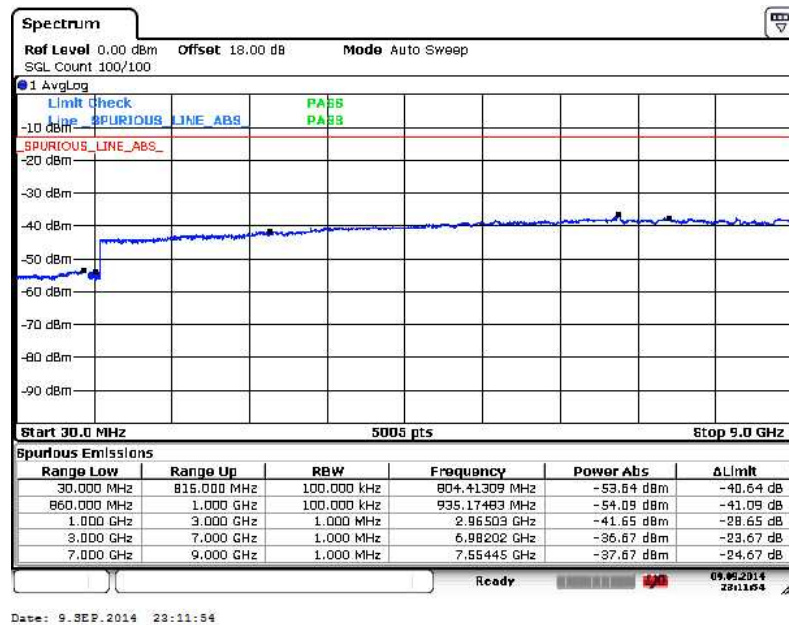
16QAM (RB Size 1, RB Offset 0)



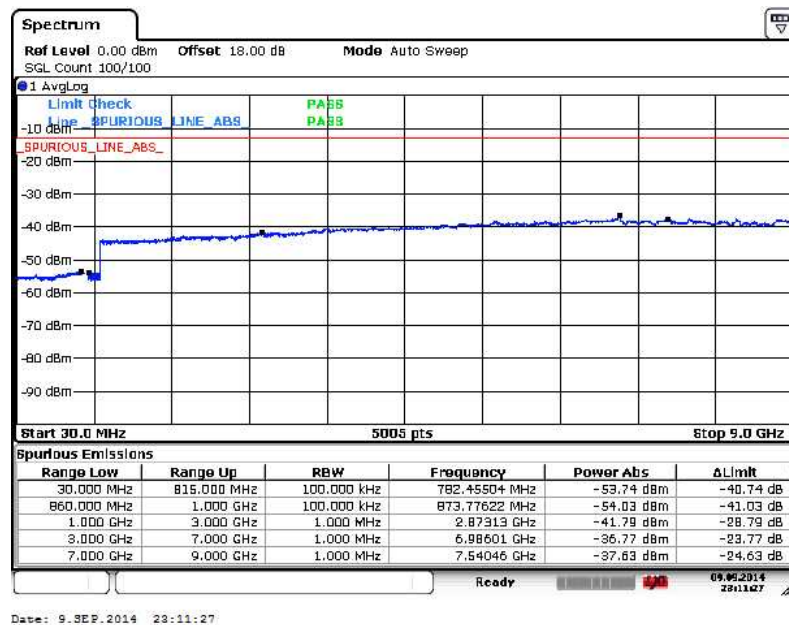


Band :	LTE Band 5	Channel :	CH20415 (Low)
Band Width :	3MHz		

QPSK (RB Size 1, RB Offset 0)



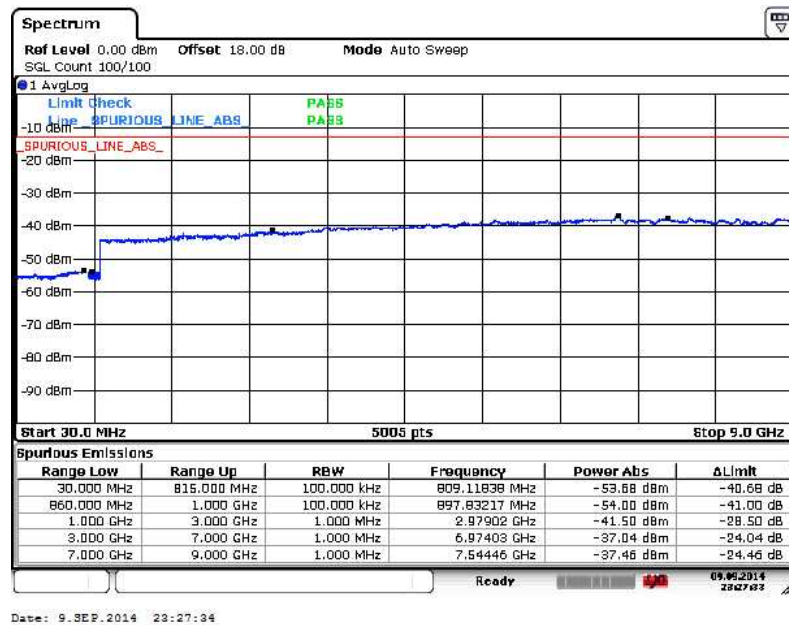
16QAM (RB Size 1, RB Offset 0)



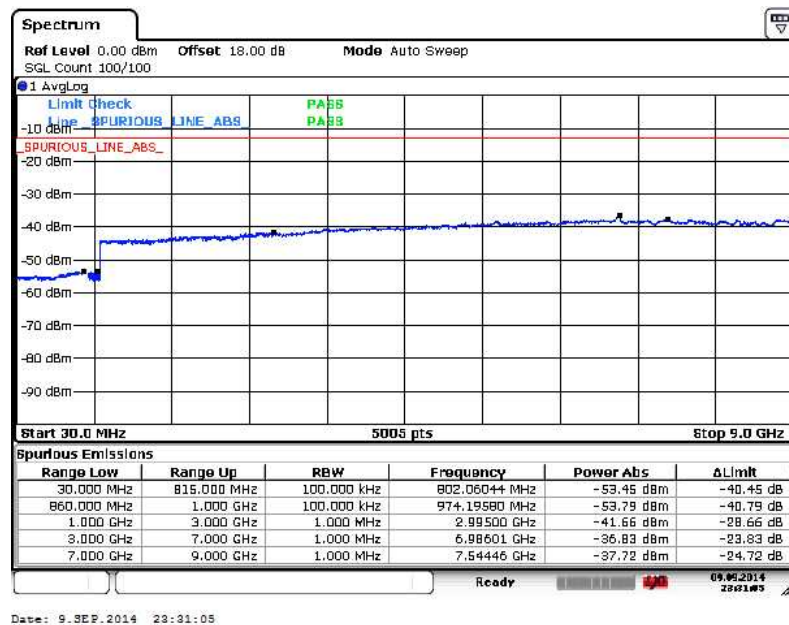


Band :	LTE Band 5	Channel :	CH20525 (Middle)
Band Width :	3MHz		

QPSK (RB Size 1, RB Offset 0)



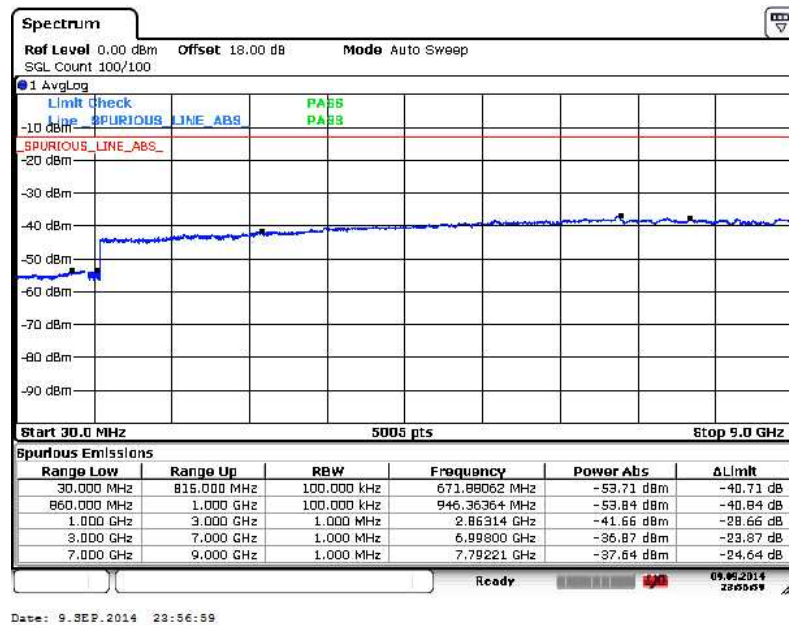
16QAM (RB Size 1, RB Offset 0)



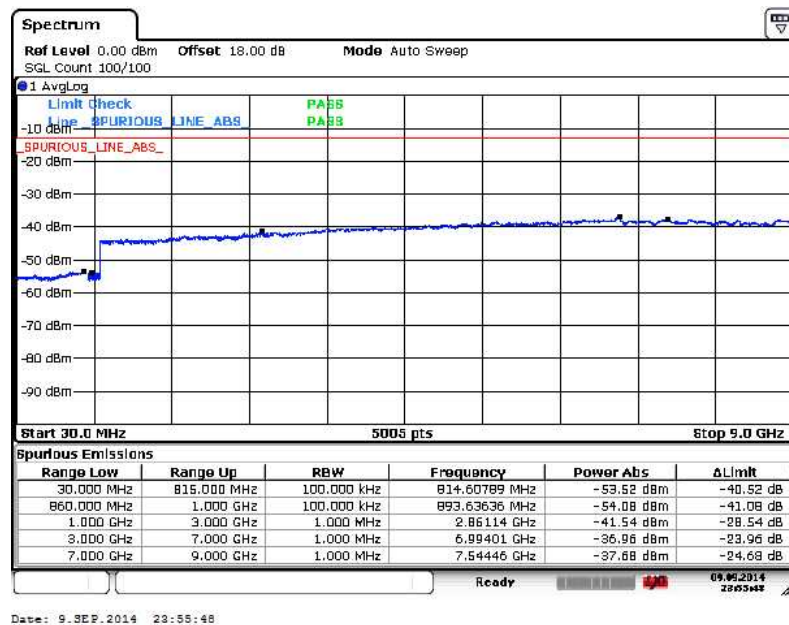


Band :	LTE Band 5	Channel :	CH20635 (High)
Band Width :	3MHz		

QPSK (RB Size 1, RB Offset 0)



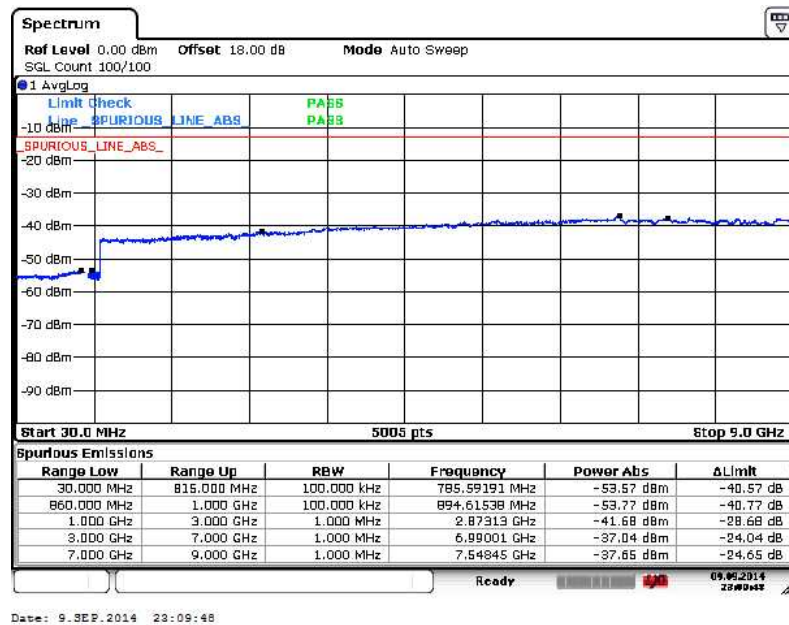
16QAM (RB Size 1, RB Offset 0)



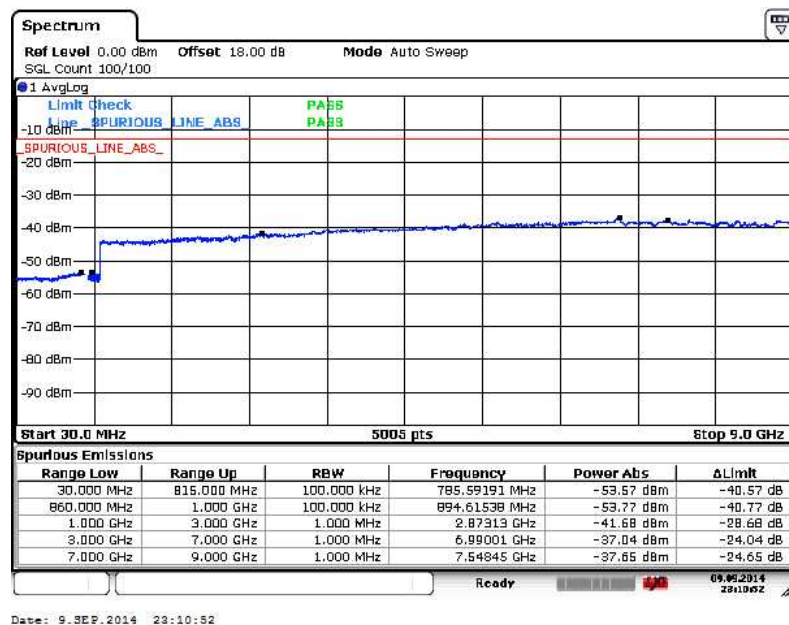


Band :	LTE Band 5	Channel :	CH20425 (Low)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



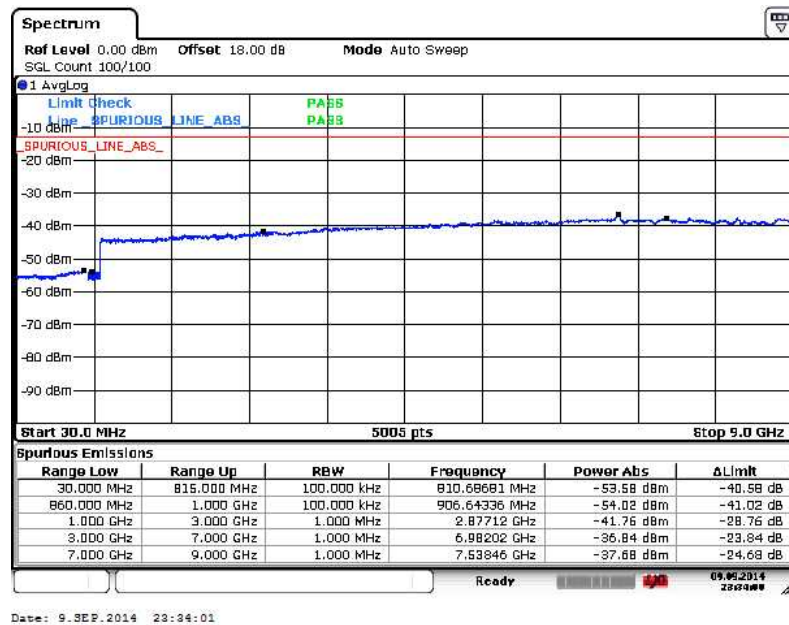
16QAM (RB Size 1, RB Offset 0)



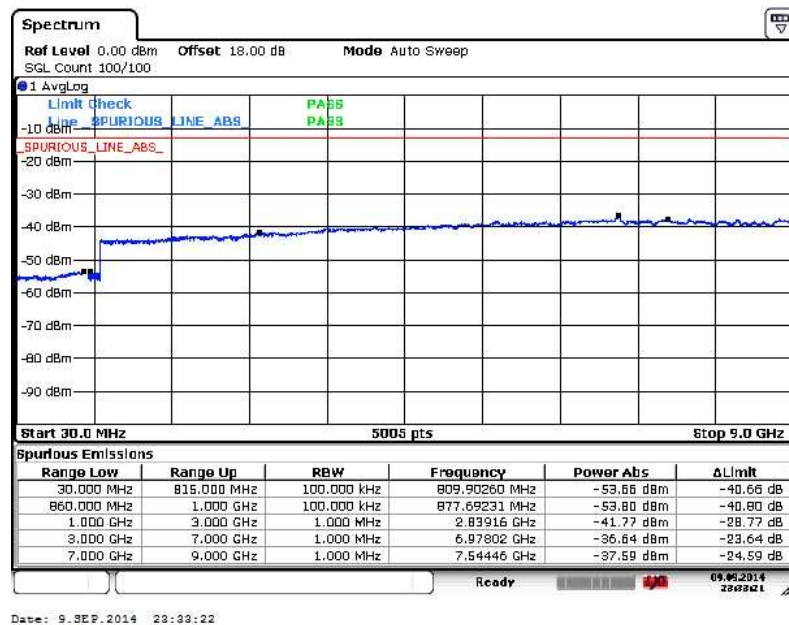


Band :	LTE Band 5	Channel :	CH20525 (Middle)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



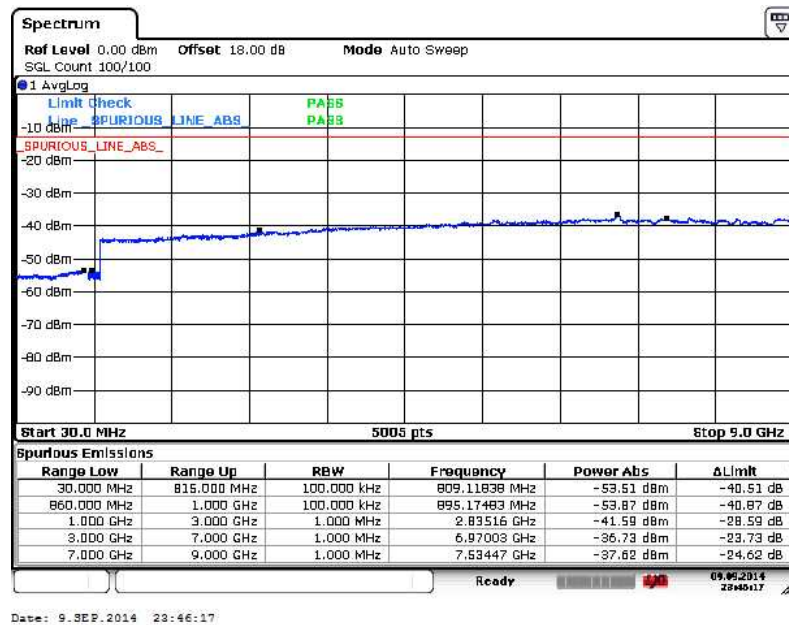
16QAM (RB Size 1, RB Offset 0)



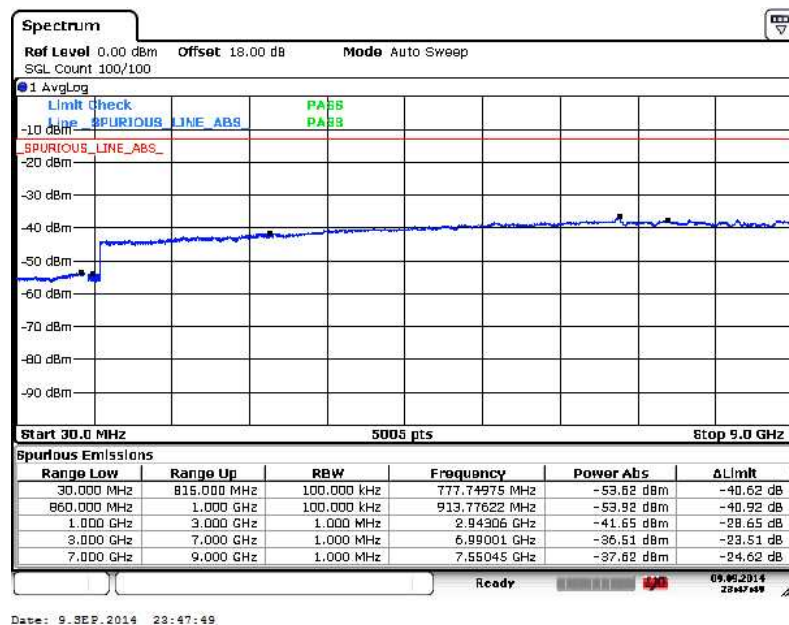


Band :	LTE Band 5	Channel :	CH20625 (High)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



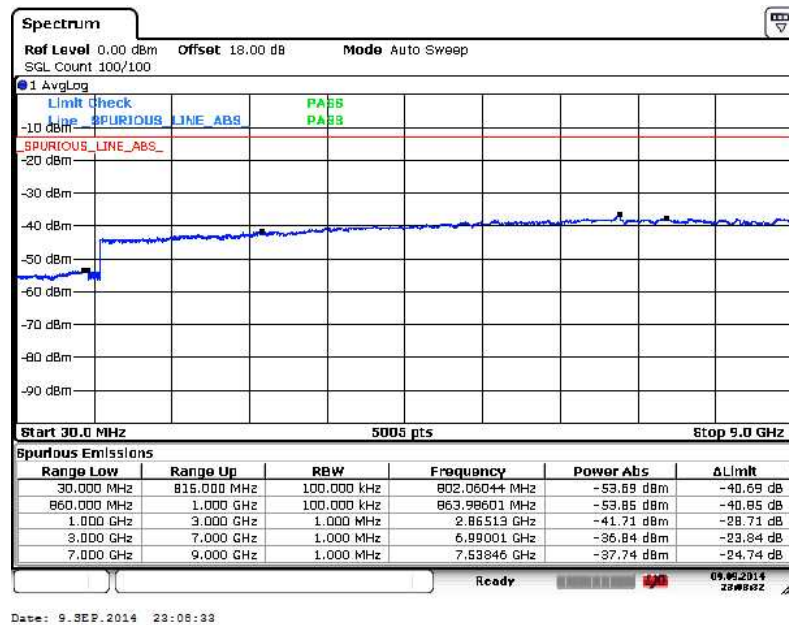
16QAM (RB Size 1, RB Offset 0)



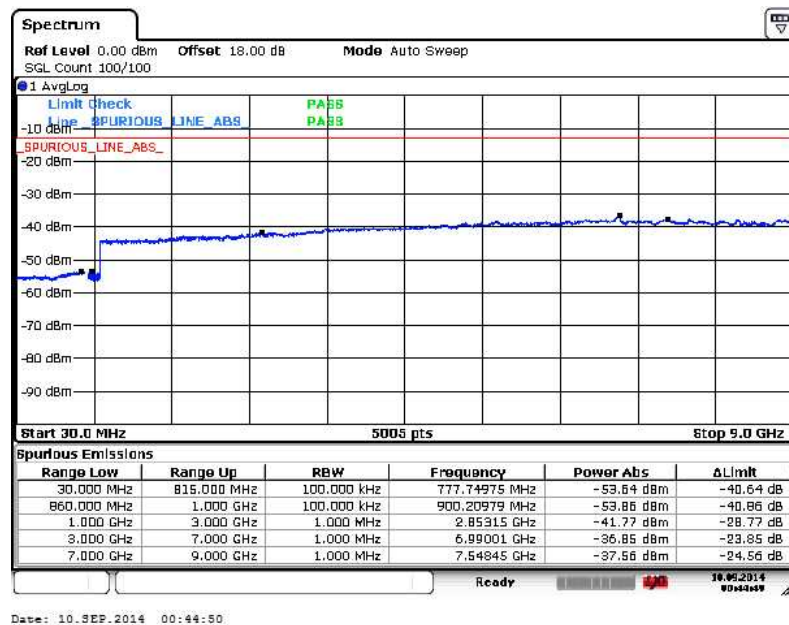


Band :	LTE Band 5	Channel :	CH20450 (Low)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)



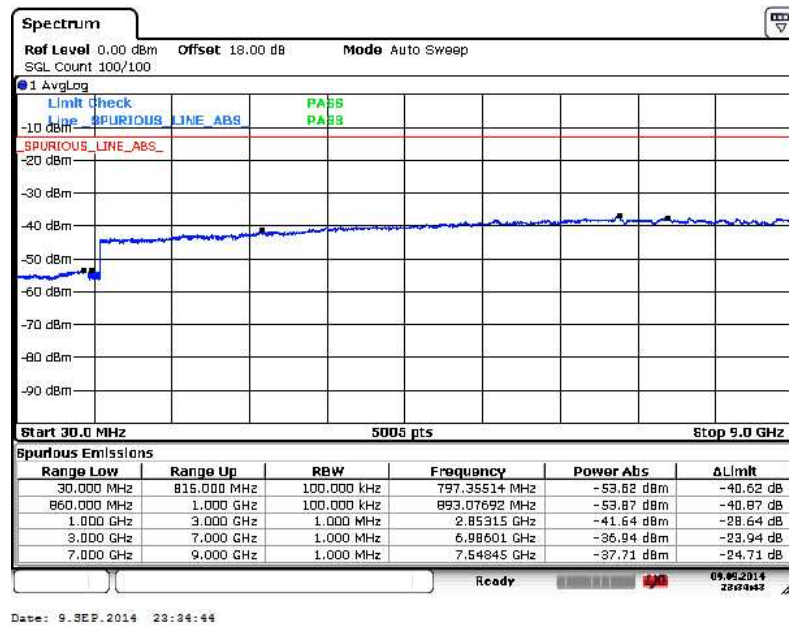
16QAM (RB Size 1, RB Offset 0)



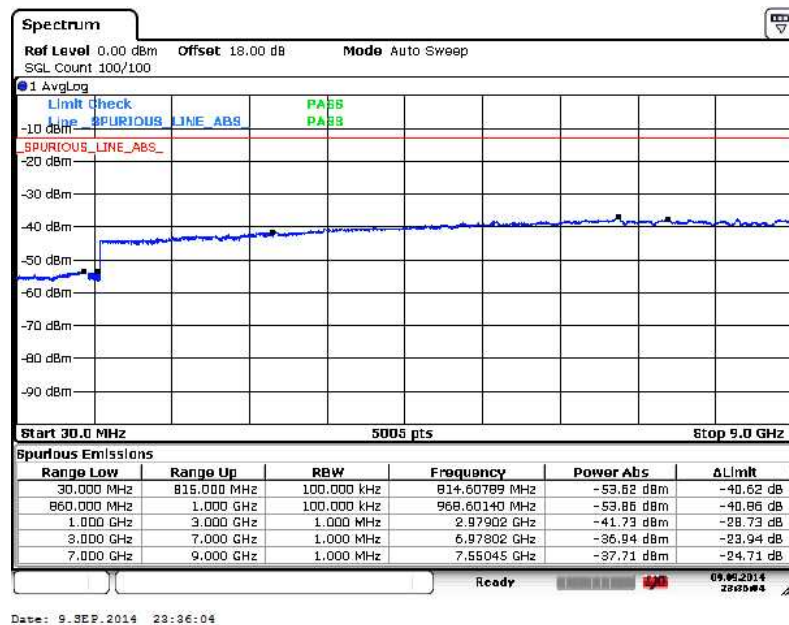


Band :	LTE Band 5	Channel :	CH20525 (Middle)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)



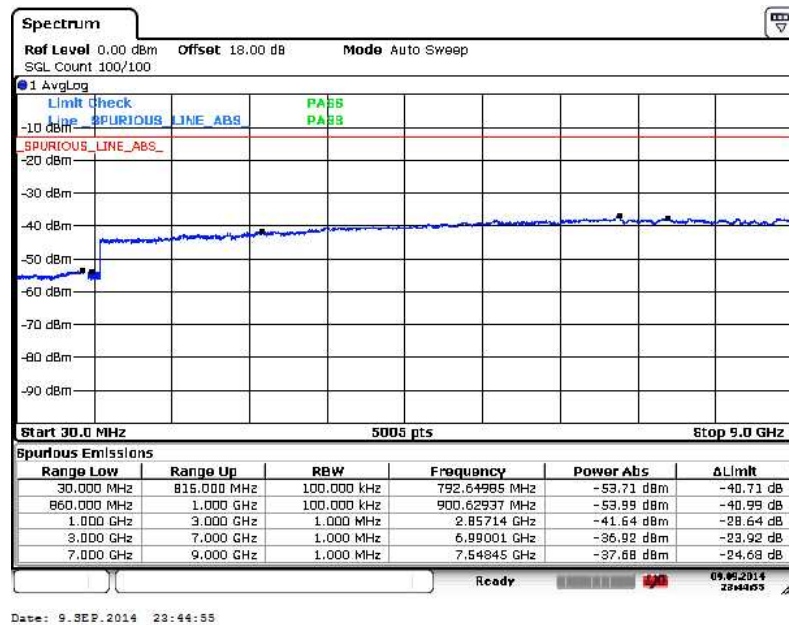
16QAM (RB Size 1, RB Offset 0)



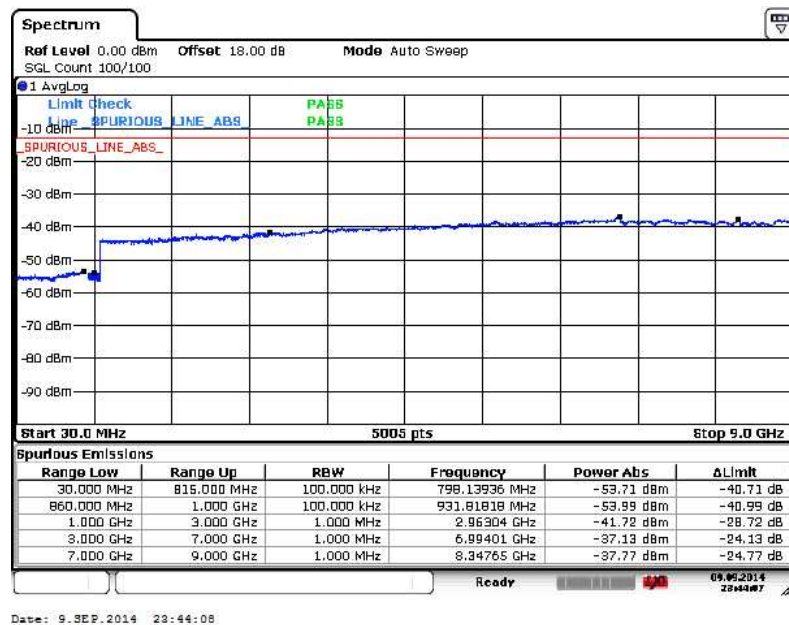


Band :	LTE Band 5	Channel :	CH20600 (High)
Band Width :	10MHz		

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 $43 + 10 \log (P)$ dB.

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 $43 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

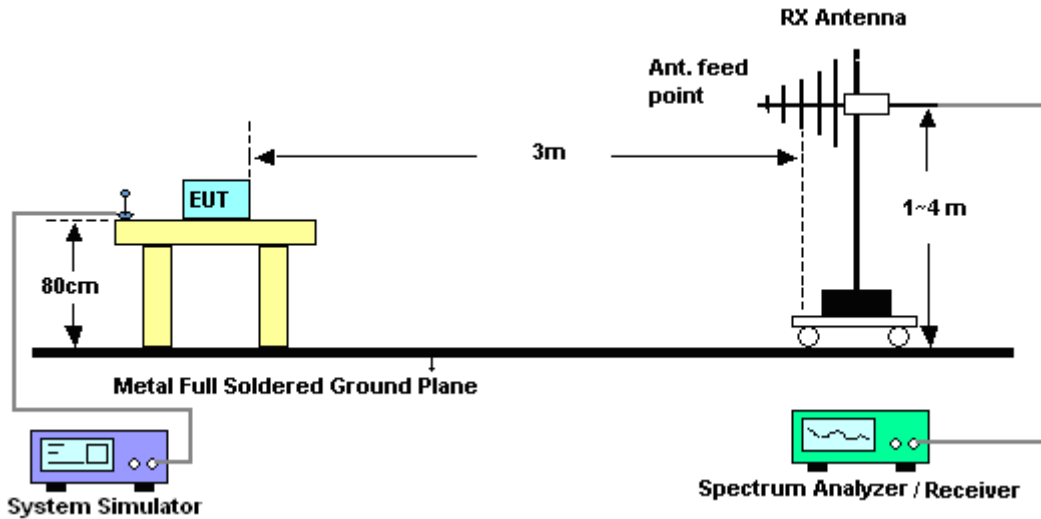
$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$

$$= -13\text{dBm}.$$

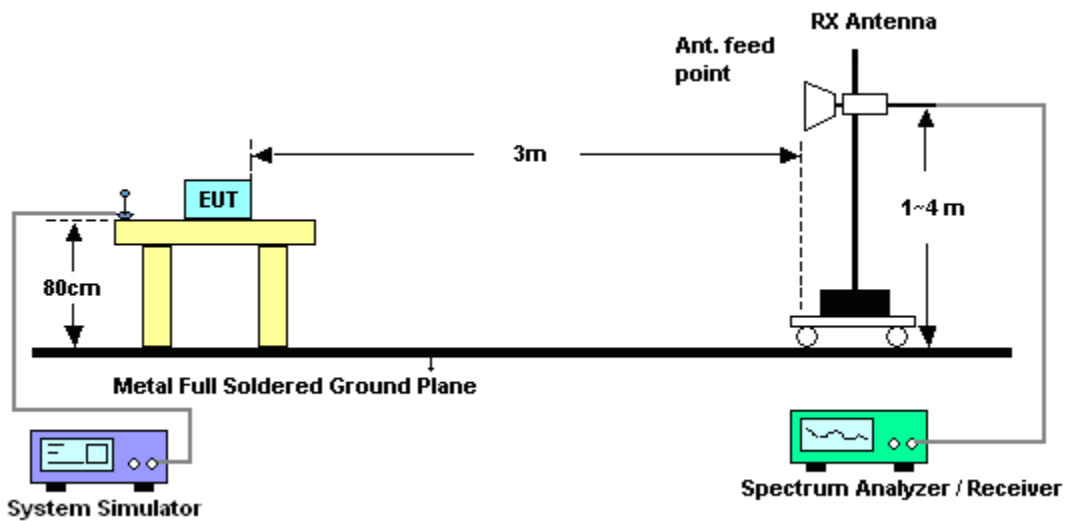
11. $\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$
12. $\text{ERP (dBm)} = \text{EIRP} - 2.15$

3.7.4 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 5				Temperature :	22~23°C			
Test Mode :	1.4MHz QPSK RB Size 1 Offset 0				Relative Humidity :	40~41%			
Test Engineer :	Jun Liu				Polarization :	Horizontal			
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1672	-63.94	-13	-50.94	-57.60	-64.59	0.57	3.37	H	Pass
2507	-66.86	-13	-53.86	-65.53	-69.09	0.78	5.16	H	Pass
3344	-61.50	-13	-48.50	-61.13	-65.14	0.87	6.66	H	Pass
4180	-64.09	-13	-51.09	-63.78	-69.25	1.04	8.35	H	Pass
5014	-63.73	-13	-50.73	-65.37	-70.39	1.19	10.00	H	Pass
5852	-54.09	-13	-41.09	-60.92	-62.25	1.34	11.64	H	Pass
6686	-56.87	-13	-43.87	-65.46	-66.52	1.49	13.29	H	Pass
7522	-58.55	-13	-45.55	-66.55	-69.69	1.64	14.93	H	Pass

Band :	LTE Band 5				Temperature :	22~23℃			
Test Mode :	1.4MHz QPSK RB Size 1 Offset 0				Relative Humidity :	40~41%			
Test Engineer :	Jun Liu				Polarization :	Vertical			
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1672	-57.08	-13	-44.08	-57.70	-57.73	0.57	3.37	V	Pass
2510	-60.36	-13	-47.36	-62.79	-62.59	0.78	5.16	V	Pass
3344	-59.59	-13	-46.59	-61.48	-63.23	0.87	6.66	V	Pass
4180	-61.09	-13	-48.09	-63.77	-66.25	1.04	8.35	V	Pass
5016	-59.70	-13	-46.70	-66.25	-66.35	1.19	10.00	V	Pass
5852	-53.40	-13	-40.40	-60.86	-61.55	1.34	11.64	V	Pass
6688	-47.92	-13	-34.92	-59.43	-57.57	1.49	13.29	V	Pass
7524	-52.73	-13	-39.73	-62.53	-63.87	1.64	14.93	V	Pass



Band :	LTE Band 5					Temperature :	22~23°C		
Test Mode :	3MHz QPSK RB Size 1 Offset 0					Relative Humidity :	42~43%		
Test Engineer :	Star Wei					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain	(H/V)	
1670	-63.00	-13	-50.00	-57.01	-63.65	0.57	3.37	H	Pass
2506	-62.50	-13	-49.50	-61.17	-64.73	0.78	5.16	H	Pass
3340	-62.00	-13	-49.00	-61.63	-65.64	0.87	6.66	H	Pass
4176	-63.10	-13	-50.10	-62.79	-68.26	1.04	8.35	H	Pass
5008	-64.41	-13	-51.41	-66.05	-71.07	1.19	10.00	H	Pass
5844	-55.00	-13	-42.00	-61.58	-63.15	1.34	11.64	H	Pass
6680	-56.98	-13	-43.98	-65.57	-66.63	1.49	13.29	H	Pass
7515	-57.35	-13	-44.35	-65.35	-68.49	1.64	14.93	H	Pass

Band :	LTE Band 5				Temperature :	22~23℃			
Test Mode :	3MHz QPSK RB Size 1 Offset 0				Relative Humidity :	40~41%			
Test Engineer :	Jun Liu				Polarization :	Vertical			
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1670	-56.76	-13	-43.76	-57.53	-57.41	0.57	3.37	V	Pass
2506	-56.56	-13	-43.56	-60.74	-58.79	0.78	5.16	V	Pass
3340	-55.12	-13	-42.12	-59.55	-58.76	0.87	6.66	V	Pass
4176	-55.00	-13	-42.00	-60.48	-60.16	1.04	8.35	V	Pass
5008	-60.03	-13	-47.03	-66.58	-66.68	1.19	10.00	V	Pass
5848	-52.42	-13	-39.42	-60.53	-60.57	1.34	11.64	V	Pass
6680	-46.56	-13	-33.56	-58.61	-56.21	1.49	13.29	V	Pass
7520	-53.40	-13	-40.40	-63.20	-64.54	1.64	14.93	V	Pass



Band :	LTE Band 5					Temperature :	23~25°C		
Test Mode :	5MHz QPSK RB Size 1 Offset 0					Relative Humidity :	48~52%		
Test Engineer :	Gavin Zhang					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1670	-63.06	-13	-50.06	-57.05	-63.71	0.57	3.37	H	Pass
2504	-60.54	-13	-47.54	-59.29	-62.77	0.78	5.16	H	Pass
3338	-60.62	-13	-47.62	-60.25	-64.26	0.87	6.66	H	Pass
4172	-62.29	-13	-49.29	-61.98	-67.45	1.04	8.35	H	Pass
5004	-64.01	-13	-51.01	-65.65	-70.67	1.19	10.00	H	Pass
5840	-54.26	-13	-41.26	-61.07	-62.42	1.34	11.64	H	Pass
6676	-55.67	-13	-42.67	-64.26	-65.32	1.49	13.29	H	Pass
7506	-58.28	-13	-45.28	-66.28	-69.42	1.64	14.93	H	Pass

Band :	LTE Band 5					Temperature :	22~23°C		
Test Mode :	5MHz QPSK RB Size 1 Offset 0					Relative Humidity :	40~41%		
Test Engineer :	Jun Liu					Polarization :	Vertical		
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1670	-57.75	-13	-44.75	-58.19	-58.40	0.57	3.37	V	Pass
2504	-52.49	-13	-39.49	-58.54	-54.72	0.78	5.16	V	Pass
3336	-53.51	-13	-40.51	-58.68	-57.15	0.87	6.66	V	Pass
4172	-54.96	-13	-41.96	-60.46	-60.12	1.04	8.35	V	Pass
5004	-59.88	-13	-46.88	-66.43	-66.53	1.19	10.00	V	Pass
5840	-52.26	-13	-39.26	-60.49	-60.42	1.34	11.64	V	Pass
6676	-44.34	-13	-31.34	-57.08	-53.99	1.49	13.29	V	Pass
7508	-49.23	-13	-36.23	-59.67	-60.37	1.64	14.93	V	Pass



Band :	LTE Band 5					Temperature :	23~25°C		
Test Mode :	10MHz QPSK RB Size 1 Offset 0					Relative Humidity :	48~52%		
Test Engineer :	Gavin Zhang					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1664	-64.22	-13	-51.22	-57.82	-64.87	0.57	3.37	H	Pass
2498	-65.09	-13	-52.09	-63.76	-67.32	0.78	5.16	H	Pass
3328	-62.80	-13	-49.80	-62.43	-66.44	0.87	6.66	H	Pass
4162	-65.56	-13	-52.56	-65.25	-70.72	1.04	8.35	H	Pass
4984	-63.05	-13	-50.05	-64.69	-69.71	1.19	10.00	H	Pass
5824	-57.70	-13	-44.70	-63.16	-65.85	1.34	11.64	H	Pass
6656	-55.96	-13	-42.96	-64.55	-65.61	1.49	13.29	H	Pass
7488	-53.90	-13	-40.90	-61.90	-65.04	1.64	14.93	H	Pass

Band :	LTE Band 5				Temperature :	22~23℃			
Test Mode :	10MHz QPSK RB Size 1 Offset 0				Relative Humidity :	40~41%			
Test Engineer :	Jun Liu				Polarization :	Vertical			
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1664	-60.81	-13	-47.81	-59.94	-61.46	0.57	3.37	V	Pass
2498	-52.43	-13	-39.43	-58.49	-54.66	0.78	5.16	V	Pass
3328	-60.50	-13	-47.50	-61.92	-64.14	0.87	6.66	V	Pass
4162	-62.25	-13	-49.25	-64.93	-67.41	1.04	8.35	V	Pass
4984	-59.96	-13	-46.96	-66.51	-66.61	1.19	10.00	V	Pass
5824	-54.09	-13	-41.09	-61.20	-62.24	1.34	11.64	V	Pass
6656	-48.08	-13	-35.08	-59.50	-57.72	1.49	13.29	V	Pass
7488	-43.32	-13	-30.32	-56.16	-54.46	1.64	14.93	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 $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

3.8.2 Measuring Instruments

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

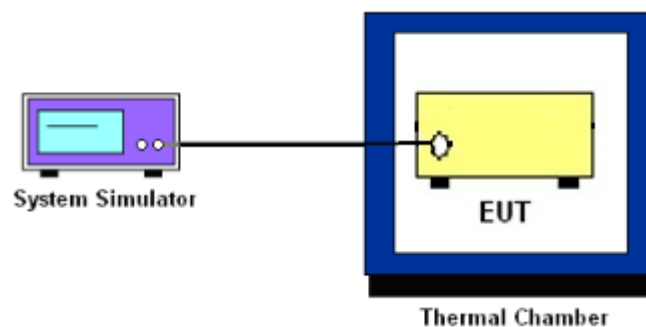
3.8.3 Test Procedures for Temperature Variation

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 $25\pm 5^{\circ}\text{C}$ 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.

3.8.5 Test Setup



3.8.6 Test Result of Temperature Variation (FCC)

Band :	LTE Band 5 (QPSK)	Limit (ppm) :	2.5
Temperature (°C)	BW 10MHz		Result
	Deviation (ppm)	Deviation (Hz)	
50	0.0048	11	PASS
40	0.0036	10	
30	0.0012	8	
20(Ref.)	0.0000	7	
10	0.0000	7	
0	0.0012	6	
-10	0.0012	8	
-20	0.0024	9	
-30	0.0036	10	

3.8.7 Test Result of Voltage Variation (FCC)

Band	Bandwidth	Voltage (Volt)	Deviation (ppm)	Deviation (Hz)	Limit (ppm)	Result
LTE Band 5	10M	3.6	0.0000	7	2.5	PASS
		Normal	0.0012	8		
		4.2	0.0012	8		

Remark:

1. Normal Voltage = 3.8V.
2. The manufacturer declared that the EUT could work properly between voltage 3.6V ~ 4.2V.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Signal Analyzer	R&S	FSV40	101078	10Hz~40GHz	May. 08, 2014	Sep. 09, 2014~ Sep. 10, 2014	May. 07, 2015	Conducted (TH01-SZ)
Thermal Chamber	Hongzhan	LP-150U	HD2012042 5	-40℃~150℃	Feb. 21, 2014	Sep. 09, 2014~ Sep. 10, 2014	Feb. 20, 2015	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Nov. 05, 2013	Sep. 16, 2014	Nov. 04, 2014	Radiation (03CH01-KS)
Spectrum Analyzer	R&S	FSP30	101399	9kHz~30GHz	May 04, 2014	Sep. 16, 2014	May 03, 2015	Radiation (03CH01-KS)
Bilog Antenna	SCHAFFNER	CBL6112D	23182	25MHz~2GHz	Jan. 08, 2014	Sep. 16, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 08, 2014	Sep. 16, 2014	Jan. 07, 2015	Radiation (03CH01-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 18, 2013	Sep. 16, 2014	Nov. 17, 2014	Radiation (03CH01-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA17024 9	15GHz~40GHz	Mar. 10, 2014	Sep. 16, 2014	Mar. 09, 2015	Radiation (03CH01-KS)
Amplifier	com-power	PA-103A	161073	1MHz~1GHz	May 04, 2014	Sep. 16, 2014	May 03, 2015	Radiation (03CH01-KS)
Amplifier	Agilent	8449B	3008A02371	1GHz~26.5GHz	Dec. 10, 2013	Sep. 16, 2014	Dec. 09, 2014	Radiation (03CH01-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Sep. 16, 2014	NCR	Radiation (03CH01-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Sep. 16, 2014	NCR	Radiation (03CH01-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Sep. 16, 2014	NCR	Radiation (03CH01-KS)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.5
---	-----