FCC RF Test Report

APPLICANT	: Quanta Computer Inc.
EQUIPMENT	: 7" Tablet PC
BRAND NAME	: Verizon
MODEL NAME	: QMV7A
FCC ID	: HFS-QMV7A
STANDARD	: 47 CFR Part 2, 27
CLASSIFICATION	: PCS Licensed Transmitter (PCB)

The product was received on Aug. 06, 2013 and completely tested on Aug. 28, 2013. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown compliance with the applicable technical standards.

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

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory 1190

TABLE OF CONTENTS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG380603	Rev. 01	Initial issue of report	Sep. 04, 2013

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	§2.1046	RSS-139(6.4)	Conducted Output Power	Reporting Only	PASS	-
3.2	27.53(d)(5)	RSS-139(6.4)	Peak-to-Average Ratio	<13 dB	PASS	-
3.3	§27.50(c)(10)	N/A	Effective Radiated Power (Band 13)	ERP < 3 Watts	PASS	-
3.4	§2.1049 §27.53(h)(3)	RSS-GEN(4.6.1) RSS-139 (3.1)	Occupied Bandwidth	Reporting Only	PASS	-
3.5	§2.1049 §27.53(c)	RSS-139 (6.5)	Conducted Band Edge Measurement (Band 13)	< 43+10log10(P[Watts])	PASS	-
3.6	§2.1051 §27.53(c)	RSS-139 (6.5)	Conducted Spurious Emission (Band 13)	< $43+10\log_{10}$(P[Watts])	PASS	-
3.7	§2.1053 §27.53(c)	RSS-139 (6.5)	Radiated Spurious Emission (Band 13)	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 36.18 dB at 3108.000 MHz
3.8	§2.1055 §27.54	RSS-139 (6.3)	Frequency Stability Temperature & Voltage	< 2.5 ppm	PASS	

1 General Description

1.1 Applicant

Quanta Computer Inc.
211, Wen Hwa 2nd Rd., Kuei Shan, Tao Yuan 33377, Taiwan

1.2 Manufacturer

Quanta Computer Inc.
211, Wen Hwa 2nd Rd., Kuei Shan, Tao Yuan 33377, Taiwan

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	7" Tablet PC
Brand Name	Verizon
Model Name	QMV7A
FCC ID	HFS-QMV7A
HW Version	N/A
SW Version	MV7A_21C28_422
EUT supports Radios application	LTE/ WLAN 11bgn / Bluetooth v3.0
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 of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	LTE Band 13 : 779.5 MHz ~ 784.5 MHz
Rx Frequency	LTE Band 13 : 748.5 MHz ~ 753.5 MHz
Bandwidth	5MHz / 10MHz (Band 13)
Maximum Output Power to Antenna	LTE Band 13 : 23.74 dBm / 0.2366 W
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 Emission Designator

FCC Rule	System	Type of Modulation	BW	Emission Designator	Frequency Tolerance (%, Hz, ppm)	Maximum ERP/EIRP
Part 27	LTE Band 13	QPSK	5MHz	4M54G7D	0.016 ppm	0.0473 W
Part 27	LTE Band 13	16QAM	5MHz	4M55D7W	0.016 ppm	0.0493 W
Part 27	LTE Band 13	QPSK	10MHz	9M13G7D	0.017 ppm	0.0455 W
Part 27	LTE Band 13	16QAM	10MHz	9M17D7W	0.017 ppm	0.0523 W

1.7 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	TH02-HY	03CH07-HY	722060/4086B-1

1.8 Applied Standards

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

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

Remark:

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

2 Test Configuration of Equipment Under Test

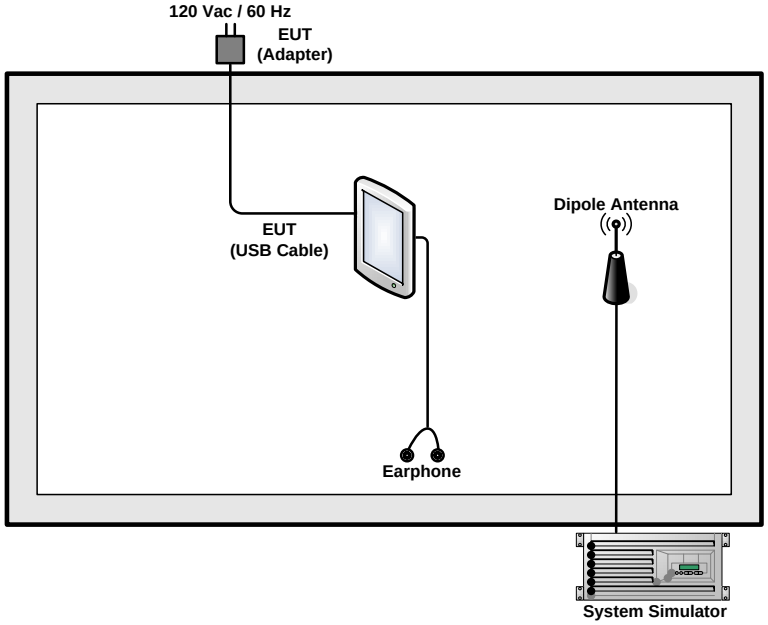
2.1 Test Mode

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

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

Test Modes			
Band		**Radiated TCs**	**Conducted TCs**
LTE Band 13	**BW 5MHz**	■ LTE (RB Size 1, RB Offset 0) Link	■ LTE (RB Size 1) Link ■ LTE (RB Size 12) Link ■ LTE (RB Size 25) Link
	BW 10MHz	■ LTE (RB Size 1, RB Offset 0) Link	■ LTE (RB Size 1) Link ■ LTE (RB Size 25) Link ■ LTE (RB Size 50) Link

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.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	iPod Earphone	Apple	N/A	FCC DoC	Unshielded, 1.0 m	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 4.2 dB and 10dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

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

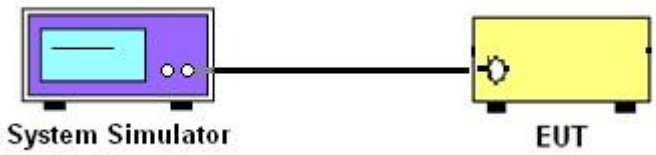
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

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

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

<LTE Band 13 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel					**23230**	
Frequency (MHz)					**782**	
10	QPSK	1	0		**23.74**	
10	QPSK	1	24		23.57	
10	QPSK	1	49		23.43	
10	QPSK	25	0		23.73	
10	QPSK	25	12		23.62	
10	QPSK	25	24		23.56	
10	QPSK	50	0		23.34	
10	16QAM	1	0		23.72	
10	16QAM	1	24		23.66	
10	16QAM	1	49		23.60	
10	16QAM	25	0		23.70	
10	16QAM	25	12		23.68	
10	16QAM	25	24		23.64	
10	16QAM	50	0		23.50	
Channel				**23205**	**23230**	**23255**
Frequency (MHz)				**779.5**	**782**	**784.5**
5	QPSK	1	0	22.43	22.62	22.46
5	QPSK	1	12	22.31	22.51	22.38
5	QPSK	1	24	22.28	22.49	22.00
5	QPSK	12	0	22.05	22.13	22.06
5	QPSK	12	6	22.00	22.26	22.05
5	QPSK	12	11	22.06	22.34	22.00
5	QPSK	25	0	22.00	22.29	22.07
5	16QAM	1	0	22.32	22.24	22.40
5	16QAM	1	12	22.31	22.18	22.00
5	16QAM	1	24	22.19	22.16	22.16
5	16QAM	12	0	22.15	22.20	22.10
5	16QAM	12	6	22.00	22.17	22.13
5	16QAM	12	11	22.12	22.21	22.14
5	16QAM	25	0	22.13	22.16	22.09

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.

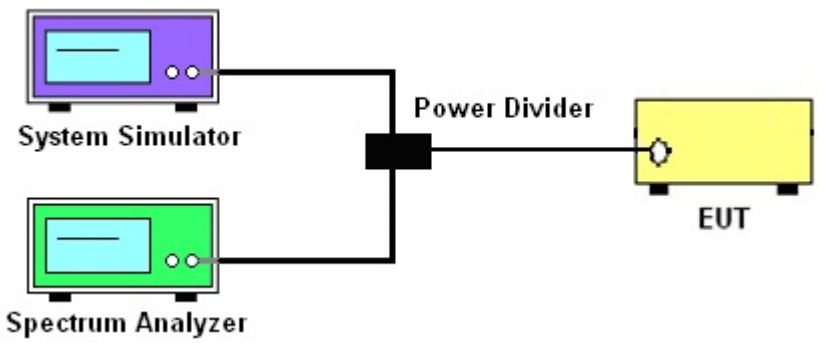
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. For LTE operating modes:
   a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
   b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
3. Record the deviation as Peak to Average Ratio.

3.2.4 Test Setup



3.2.5 Test Result of Peak-to-Average Ratio

Modes	LTE Band 13			
BW / Mod.	5MHz / QPSK	5MHz / 16QAM	10MHz / QPSK	10MHz / 16QAM
Peak-to-Average Ratio (dB)	5.48	6.09	5.45	6.19

Note:

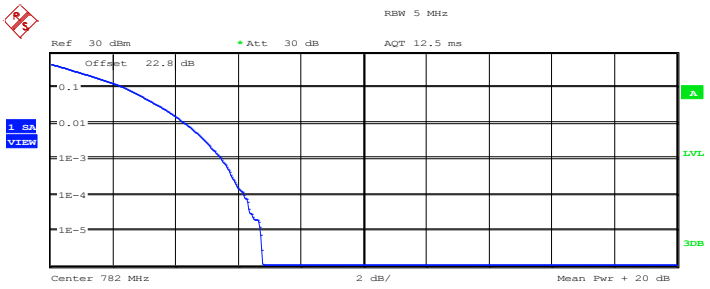
The maximum RB configurations of the PAPR summary as below:

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

BW10M RB setting：RB Size 50, RB offset 0

3.2.6 Peak to Average Power Ratio

Peak-to-Average Ratio on LTE Band 13 5MHz / QPSK



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 7.1MHz

	Trace 1
Mean	20.52 dBm
Peak	27.29 dBm
Crest	6.77 dB
10 %	2.40 dB
1 %	4.29 dB
.1 %	5.48 dB
.01 %	6.19 dB

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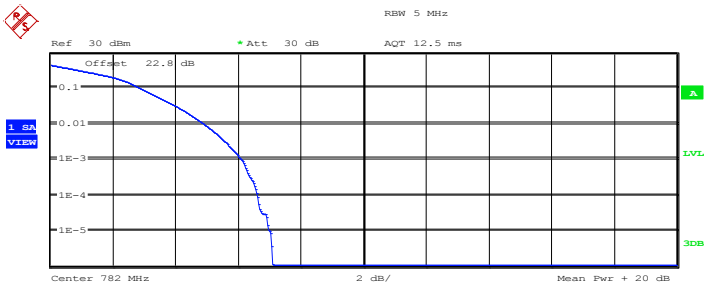
Peak-to-Average Ratio on LTE Band 13 5MHz / 16QAM



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 7.1MHz

	Trace 1
Mean	20.76 dBm
Peak	27.86 dBm
Crest	7.10 dB
10 %	2.85 dB
1 %	4.90 dB
.1 %	6.09 dB
.01 %	6.60 dB

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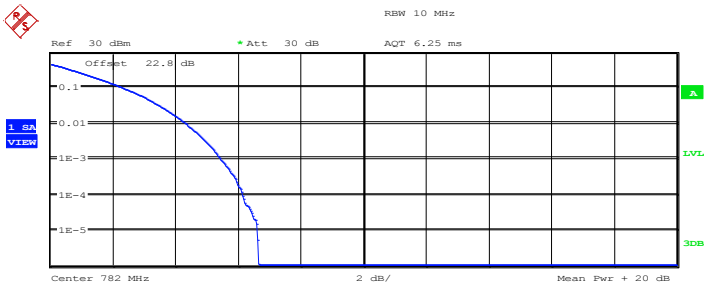
Peak-to-Average Ratio on LTE Band 13 10MHz / QPSK



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	20.94 dBm
Peak	27.58 dBm
Crest	6.64 dB
10 %	2.34 dB
1 %	4.33 dB
.1 %	5.45 dB
.01 %	6.15 dB

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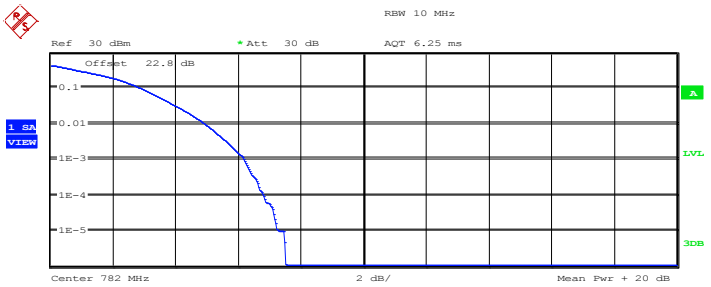
Peak-to-Average Ratio on LTE Band 13 10MHz / 16QAM



Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz

	Trace 1
Mean	21.26 dBm
Peak	28.78 dBm
Crest	7.52 dB
10 %	2.88 dB
1 %	4.94 dB
.1 %	6.19 dB
.01 %	6.79 dB

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3.3 Effective Radiated Power and Equivalent Isotropic Radiated Power Measurement

3.3.1 Description of the ERP/EIRP 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 v01. Mobile and portable (hand-held) stations operating are limited to average ERP of 3 watt with LTE 13

3.3.2 Measuring Instruments

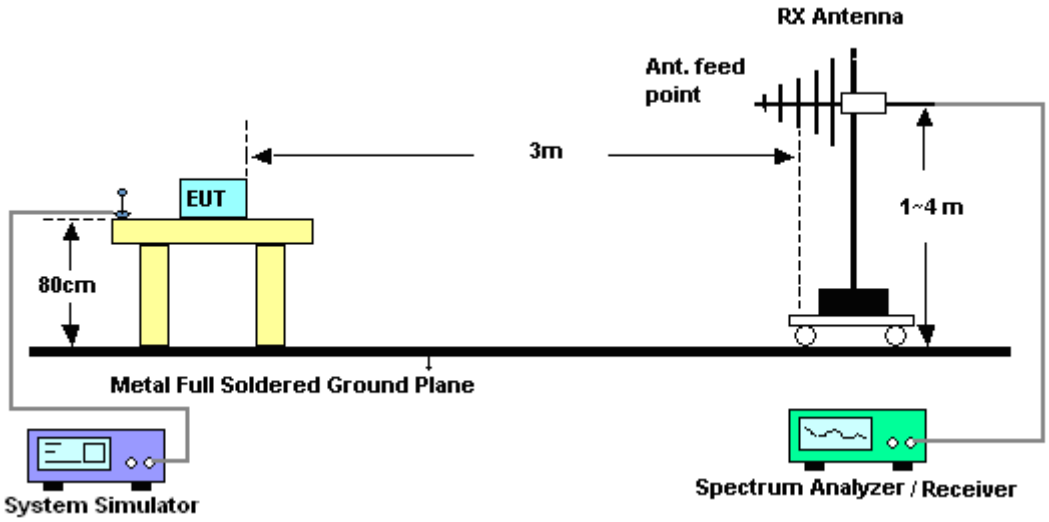
See list of measuring instruments of this test report.

3.3.3 Test Procedures

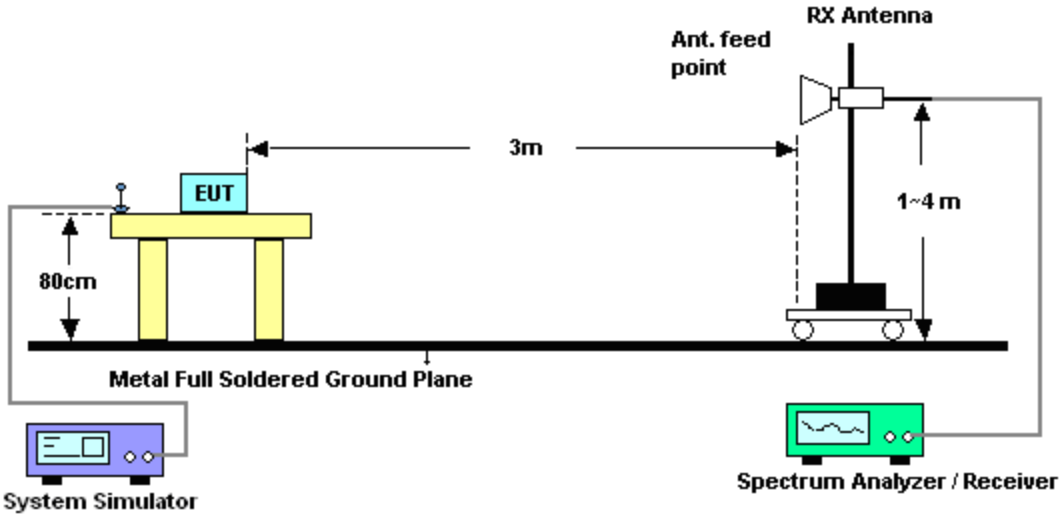
1. The EUT was placed on a non-conductive rotating platform with 0.8 meter height in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer which used a channel power option across EUT's signal bandwidth per section 4.0 of KDB 971168 D01.
2. During the measurement, the EUT was enforced in maximum power and linked with a base station. The highest 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 + Correction factor and ERP = EIRP – 2.15.

3.3.4 Test Setup

For Effective Radiated Power



For Equivalent Isotropic Radiated Power



3.3.5 Test Result of ERP/EIRP

LTE Band 13 Radiated Power ERP for BW 5MHz / QPSK				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
779.5	-33.31	52.21	16.75	0.0473
782	-33.74	52.18	16.29	0.0426
784.5	-34.68	52.05	15.22	0.0332
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
779.5	-35.02	52.21	15.04	0.0319
782	-35.45	52.18	14.58	0.0287
784.5	-36.39	52.05	13.51	0.0224

LTE Band 13 Radiated Power ERP for BW 5MHz / 16QAM				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
779.5	-33.13	52.21	16.93	0.0493
782	-33.59	52.18	16.44	0.0440
784.5	-34.49	52.05	15.41	0.0347
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
779.5	-34.86	52.21	15.20	0.0331
782	-35.50	52.18	14.53	0.0284
784.5	-36.16	52.05	13.74	0.0236

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

LTE Band 13 Radiated Power ERP for BW 10MHz / QPSK				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
782	-33.45	52.18	16.58	0.0455
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
782	-35.15	52.18	14.88	0.0307

LTE Band 13 Radiated Power ERP for BW 10MHz / 16QAM				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
782	-32.85	52.18	17.18	0.0523
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
782	-34.53	52.18	15.50	0.0355

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

3.4 Occupied Bandwidth

3.4.1 Description of Occupied Bandwidth Measurement

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

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

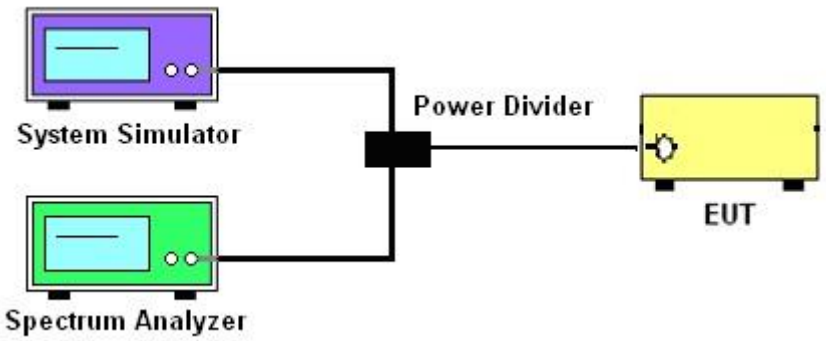
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

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

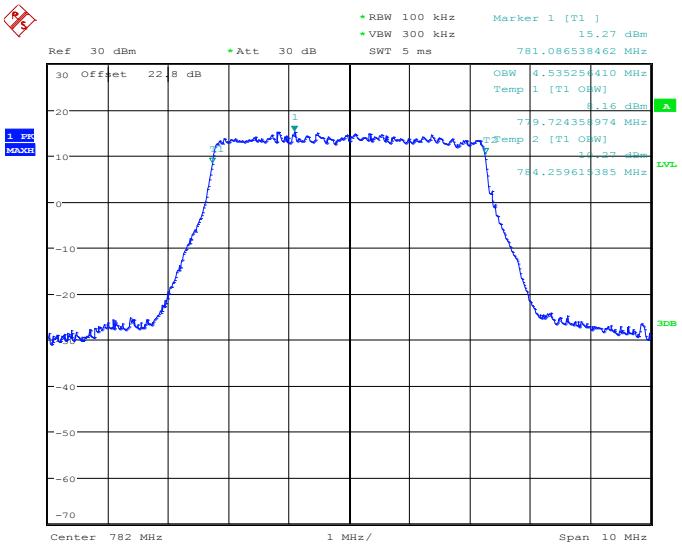
3.4.4 Test Setup



3.4.5 Test Result (Plots) of Occupied Bandwidth

Band :	LTE Band 13	BW / Mod. :	5MHz / QPSK

99% Occupied Bandwidth Plot on Channel 23230



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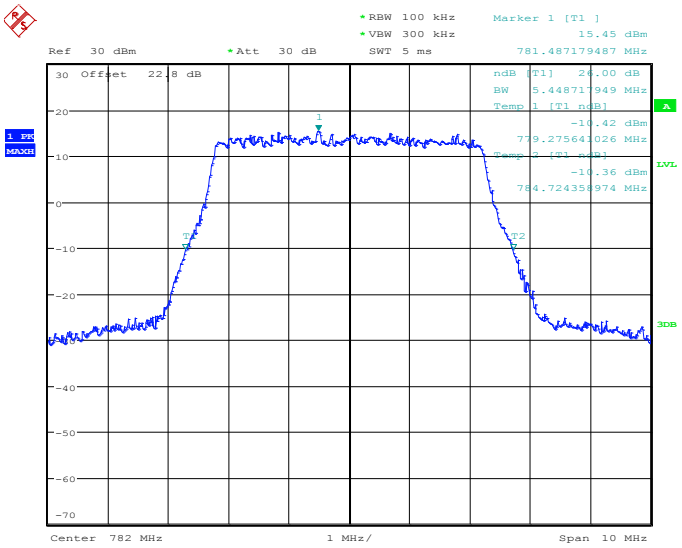
26dB Bandwidth Plot on Channel 23230



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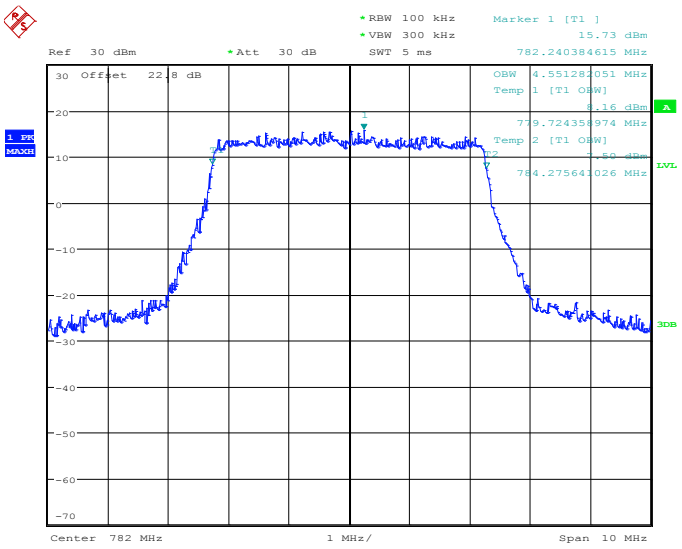
Band :	LTE Band 13	BW / Mod. :	5MHz / 16QAM

99% Occupied Bandwidth Plot on Channel 23230



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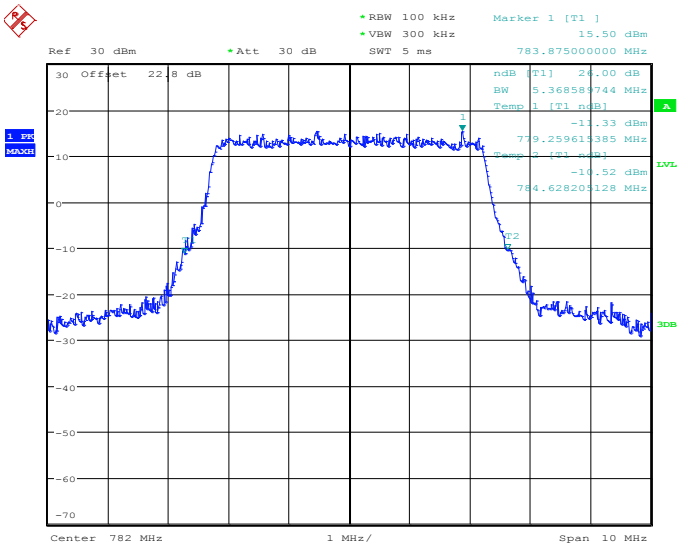
26dB Bandwidth Plot on Channel 23230



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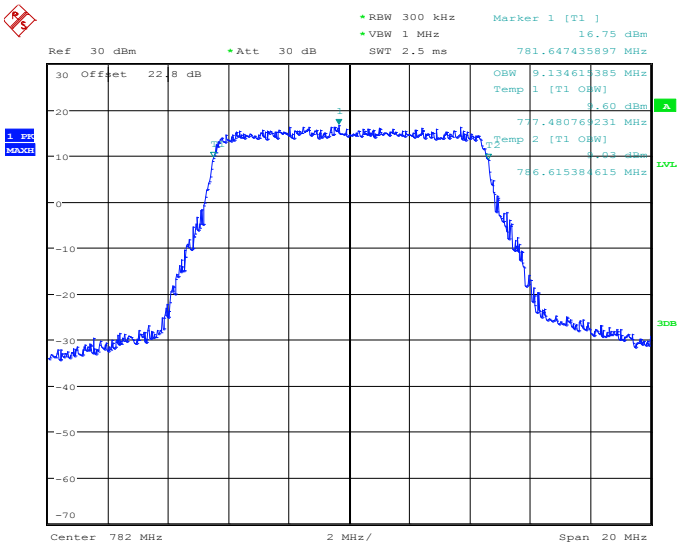
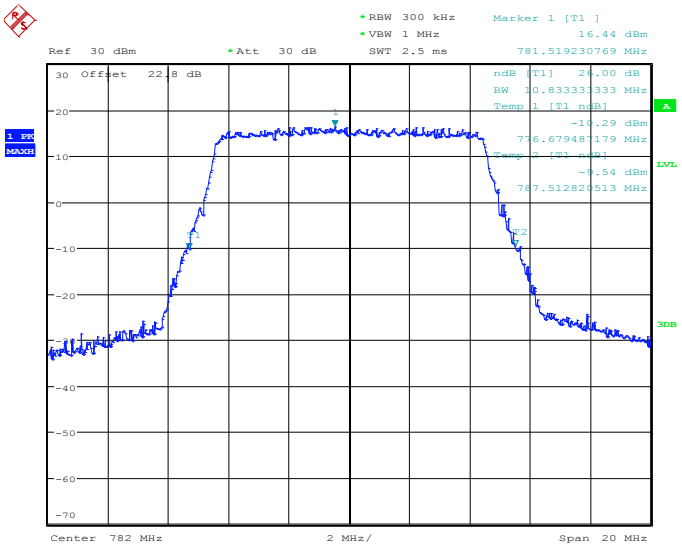
Band :	LTE Band 13	BW / Mod. :	10MHz / QPSK

99% Occupied Bandwidth Plot on Channel 23230

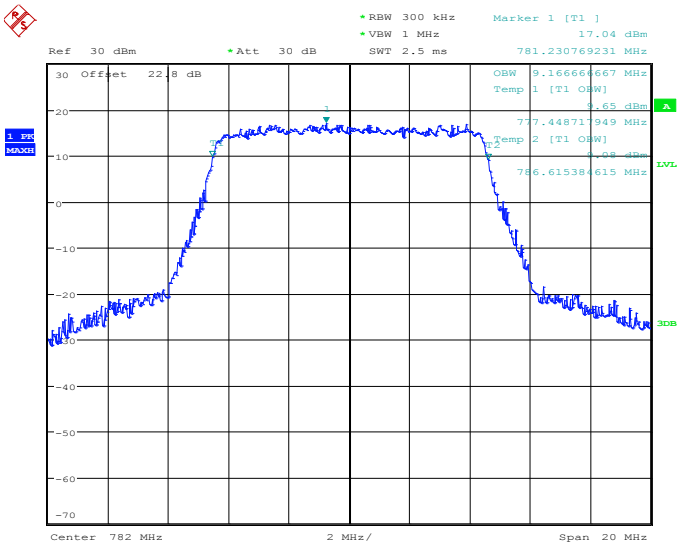


26dB Bandwidth Plot on Channel 23230



Band :	LTE Band 13	BW / Mod. :	10MHz / 16QAM

99% Occupied Bandwidth Plot on Channel 23230



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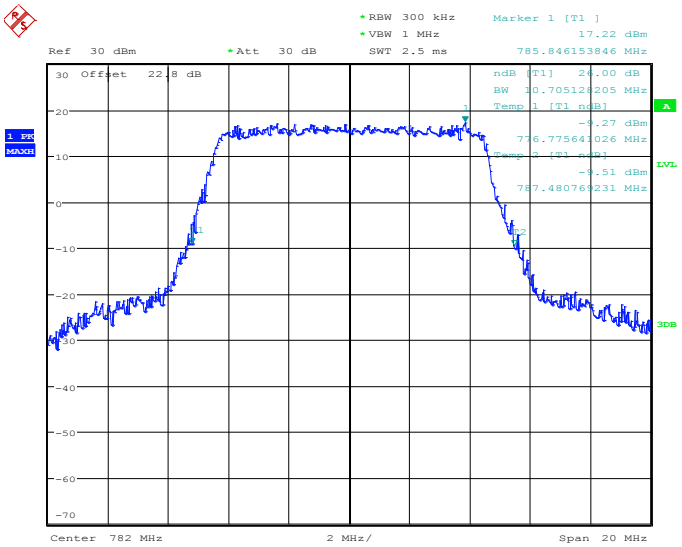
26dB Bandwidth Plot on Channel 23230



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3.5 Conducted Band Edge Measurement

3.5.1 Description of Conducted Band Edge Measurement

27.53 (c)

For operations in the 776-788 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed.

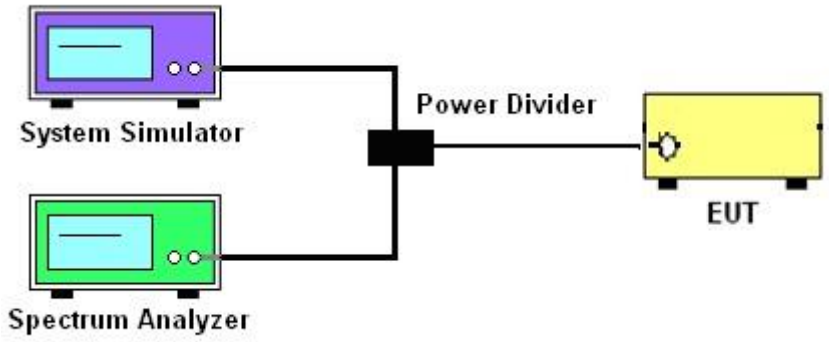
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Setting RBW ≥ 1% EBW, and measuring bandwidth = 1MHz.
3. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
4. 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.

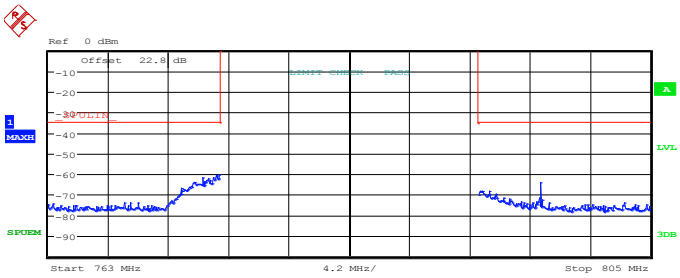
3.5.4 Test Setup



3.5.5 Test Result (Plots) of Conducted Band Edge

Band :	LTE Band 13	Band Width :	5MHz / QPSK

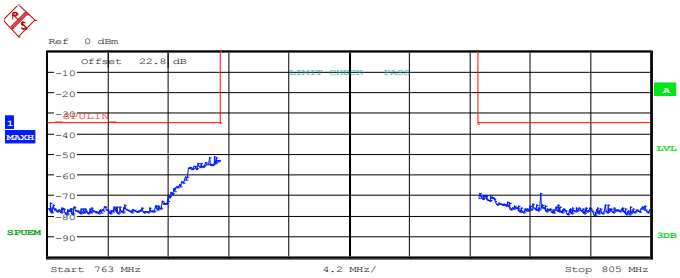
Lower Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	774.958000 M	-60.14	-25.14
793.000 M	805.000 M	6.25 k	797.332000 M	-64.16	-29.16

Date: 26.AUG.2013 15:18:34

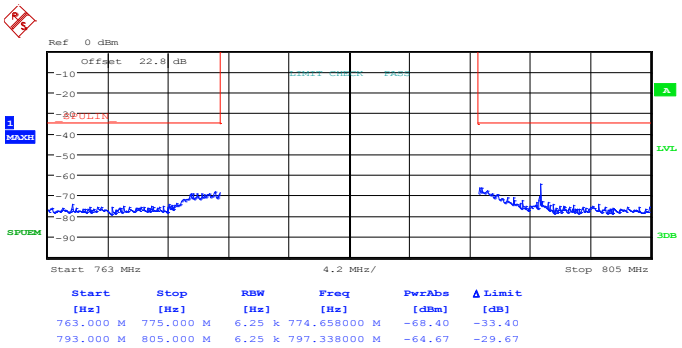
Lower Band Edge Plot for QPSK-RB Size 25, RB Offset 0



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	774.586000 M	-51.47	-16.47
793.000 M	805.000 M	6.25 k	793.060000 M	-69.29	-34.29

Date: 26.AUG.2013 15:19:14

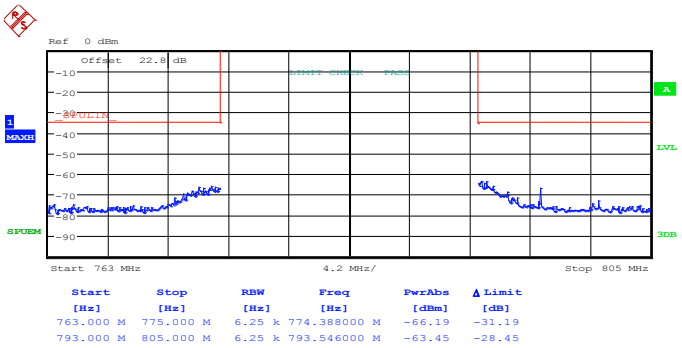
Higher Band Edge Plot for QPSK-RB Size 1, RB Offset 24



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	774.658000 M	-68.40	-33.40
793.000 M	805.000 M	6.25 k	797.338000 M	-64.67	-29.67

Date: 26.AUG.2013 15:21:12

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

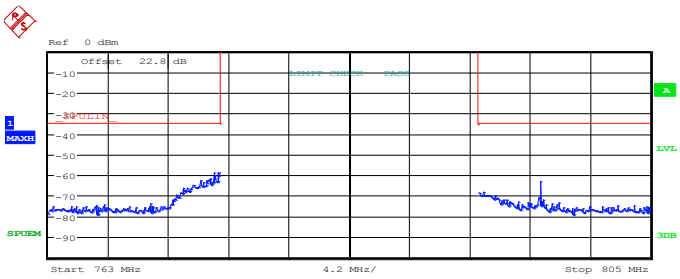


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	774.388000 M	-66.19	-31.19
793.000 M	805.000 M	6.25 k	793.546000 M	-63.45	-28.45

Date: 26.AUG.2013 15:20:22

Band :	LTE Band 13	Band Width :	5MHz / 16QAM

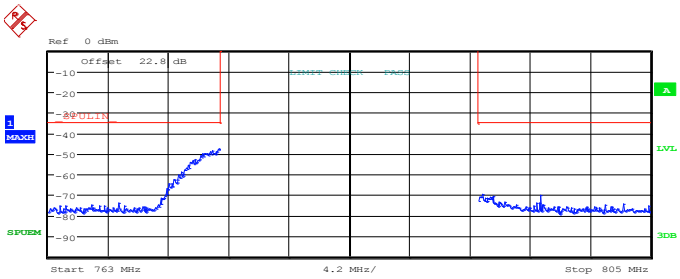
Lower Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	774.574000 M	-59.03	-24.03
793.000 M	805.000 M	6.25 k	797.332000 M	-63.07	-28.07

Date: 26.AUG.2013 15:18:50

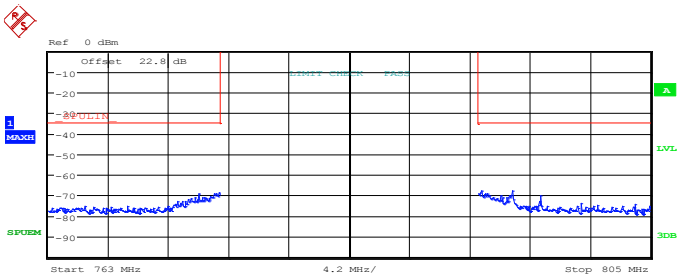
Lower Band Edge Plot for 16QAM-RB Size 25, RB Offset 0



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	774.934000 M	-47.44	-12.44
793.000 M	805.000 M	6.25 k	793.270000 M	-69.88	-34.88

Date: 26.AUG.2013 15:19:04

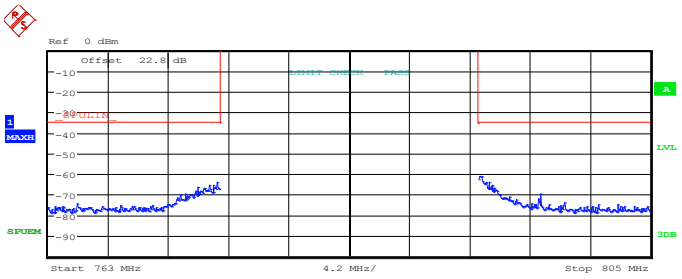
Higher Band Edge Plot for 16QAM-RB Size 1, RB Offset 24



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	774.916000 M	-68.90	-33.90
793.000 M	805.000 M	6.25 k	795.358000 M	-67.74	-32.74

Date: 26.AUG.2013 15:21:00

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

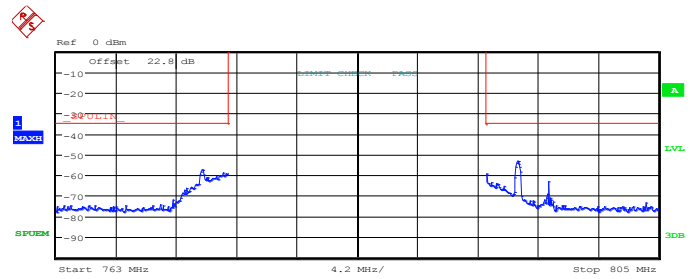


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	774.766000 M	-63.97	-28.97
793.000 M	805.000 M	6.25 k	793.228000 M	-61.04	-26.04

Date: 26.AUG.2013 15:20:39

Band :	LTE Band 13	Band Width :	10MHz / QPSK

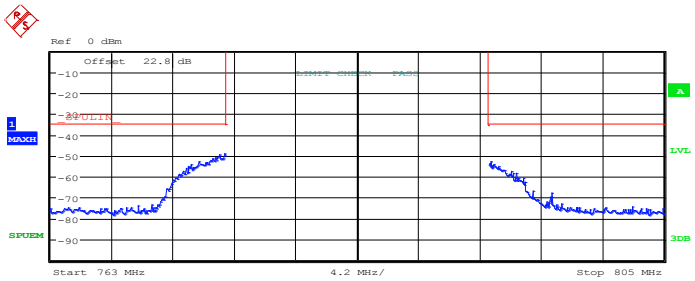
Middle Band Edge Plot for QPSK-RB Size 1, RB Offset 0



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	773.248000 M	-57.28	-22.28
793.000 M	805.000 M	6.25 k	795.256000 M	-53.28	-18.28

Date: 26.AUG.2013 15:16:38

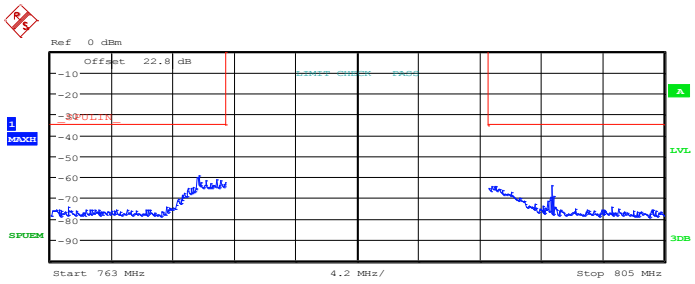
Middle Band Edge Plot for QPSK-RB Size 50, RB Offset 0



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	774.898000 M	-49.21	-14.21
793.000 M	805.000 M	6.25 k	793.120000 M	-52.94	-17.94

Date: 26.AUG.2013 15:17:43

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

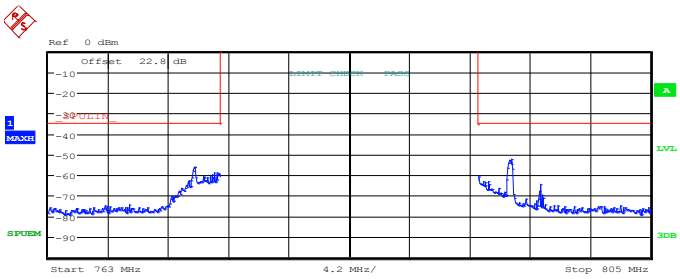


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	773.158000 M	-59.17	-24.17
793.000 M	805.000 M	6.25 k	797.338000 M	-64.23	-29.23

Date: 26.AUG.2013 15:17:18

Band :	LTE Band 13	Band Width :	10MHz / 16QAM

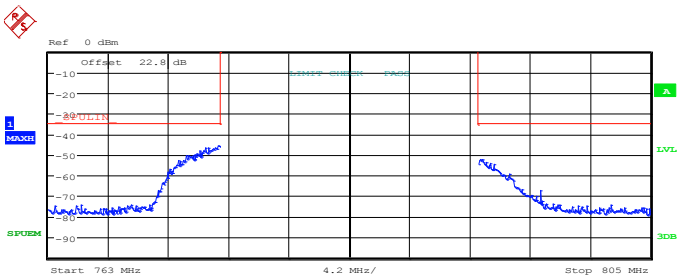
Middle Band Edge Plot for 16QAM-RB Size 1, RB Offset 0



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	773.194000 M	-56.01	-21.01
793.000 M	805.000 M	6.25 k	795.298000 M	-52.50	-17.50

Date: 26.AUG.2013 15:16:50

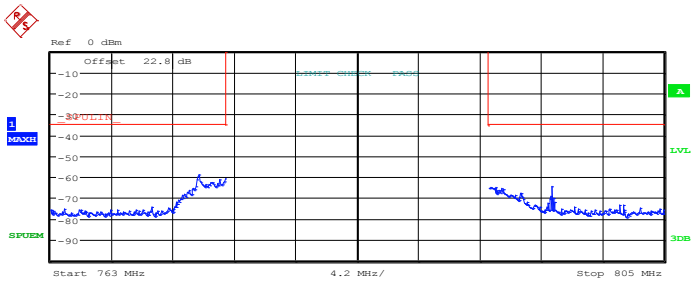
Middle Band Edge Plot for 16QAM-RB Size 50, RB Offset 0



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	774.934000 M	-45.57	-10.57
793.000 M	805.000 M	6.25 k	793.138000 M	-52.14	-17.14

Date: 26.AUG.2013 15:17:56

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



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
763.000 M	775.000 M	6.25 k	773.146000 M	-58.77	-23.77
793.000 M	805.000 M	6.25 k	797.338000 M	-64.65	-29.65

Date: 26.AUG.2013 15:17:08

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 9 kHz up to a frequency including its 10th harmonic.

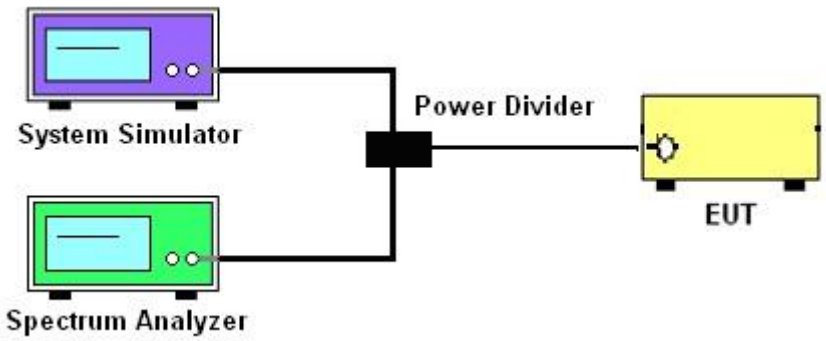
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

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

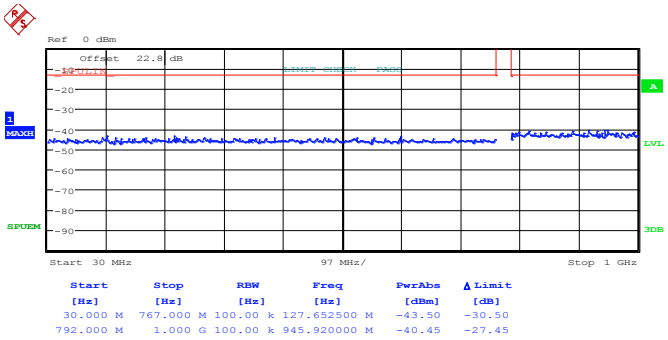
3.6.4 Test Setup



3.6.5 Test Result (Plots) of Conducted Spurious Emission

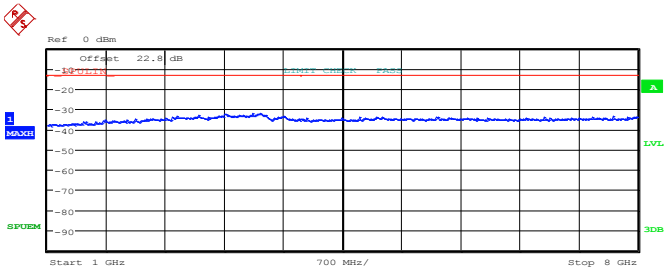
Band :	LTE Band 13	Channel :	CH23205 (Low)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	767.000 M	100.00 k	127.652500 M	-43.50	-30.50
792.000 M	1.000 G	100.00 k	945.920000 M	-40.45	-27.45

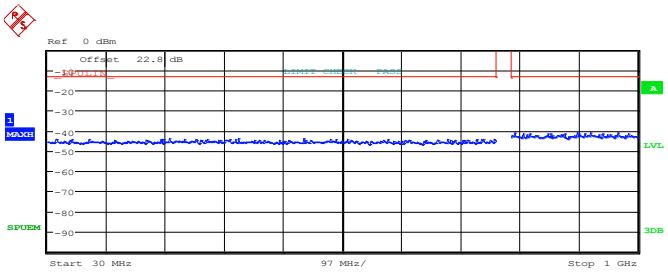
Date: 26.AUG.2013 15:11:19



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
1.000 G	4.000 G	1.00 M	3.521500 G	-32.19	-19.19
4.000 G	8.000 G	1.00 M	7.706000 G	-33.68	-20.68

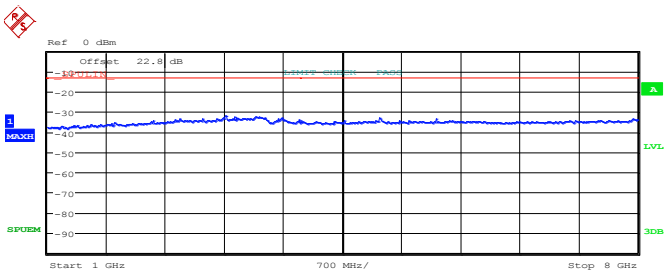
Date: 26.AUG.2013 15:10:43

16QAM (RB Size 1, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	767.000 M	100.00 k	451.195500 M	-43.69	-30.69
792.000 M	1.000 G	100.00 k	922.832000 M	-40.87	-27.87

Date: 26.AUG.2013 15:11:08

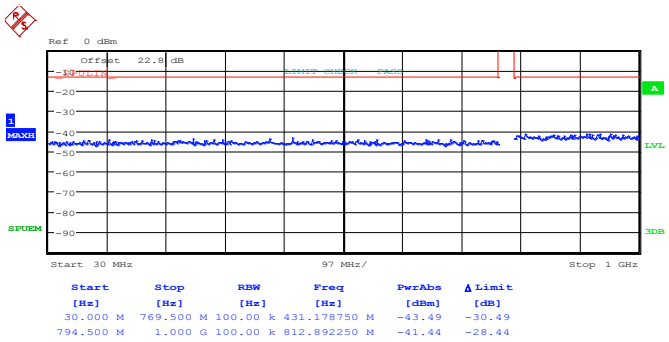


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
1.000 G	4.000 G	1.00 M	3.109000 G	-32.10	-19.10
4.000 G	8.000 G	1.00 M	4.934000 G	-33.28	-20.28

Date: 26.AUG.2013 15:10:54

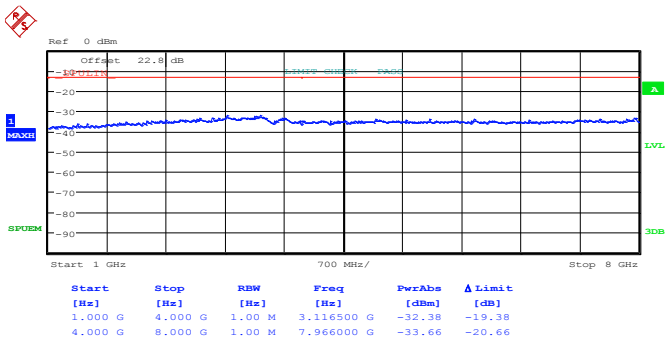
Band :	LTE Band 13	Channel :	CH20230 (Middle)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	769.500 M	100.00 k	431.178750 M	-43.49	-30.49
794.500 M	1.000 G	100.00 k	812.892250 M	-41.44	-28.44

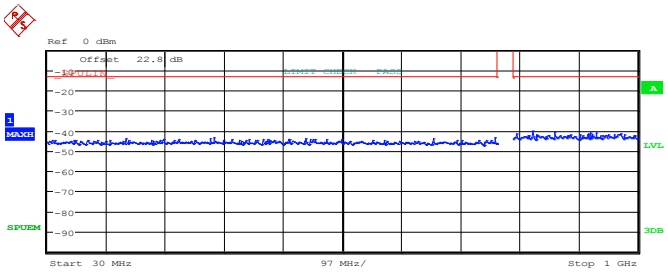
Date: 26.AUG.2013 15:12:52



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
1.000 G	4.000 G	1.00 M	3.116500 G	-32.38	-19.38
4.000 G	8.000 G	1.00 M	7.966000 G	-33.66	-20.66

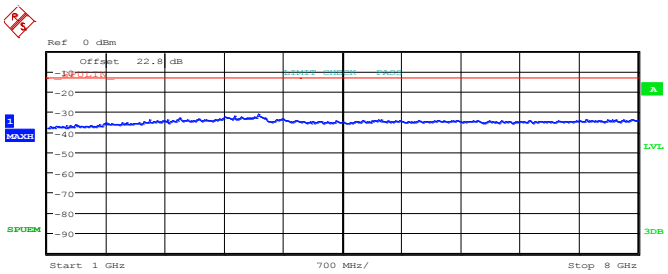
Date: 26.AUG.2013 15:13:41

16QAM (RB Size 1, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	769.500 M	100.00 k	302.875500 M	-43.41	-30.41
794.500 M	1.000 G	100.00 k	826.660750 M	-40.05	-27.05

Date: 26.AUG.2013 15:12:42

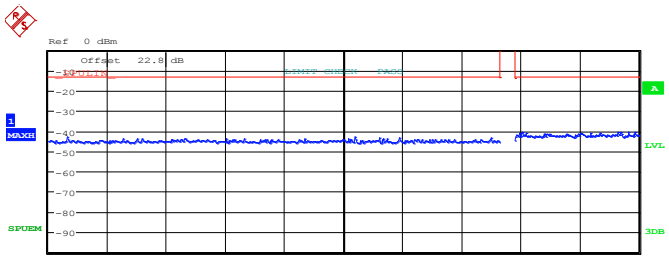


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
1.000 G	4.000 G	1.00 M	3.505000 G	-31.26	-18.26
4.000 G	8.000 G	1.00 M	7.396000 G	-33.88	-20.88

Date: 26.AUG.2013 15:13:33

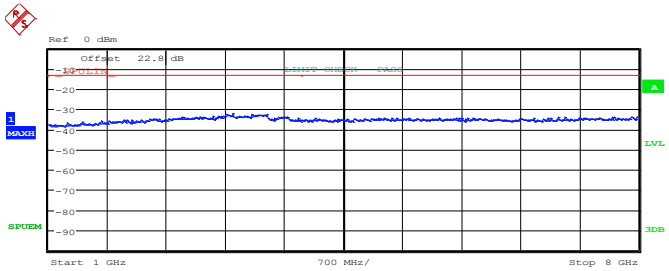
Band :	LTE Band 13	Channel :	CH23255 (High)
Band Width :	5MHz		

QPSK (RB Size 1, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	772.000 M	100.00 k	60.422000 M	-43.04	-30.04
797.000 M	1.000 G	100.00 k	982.643500 M	-40.44	-27.44

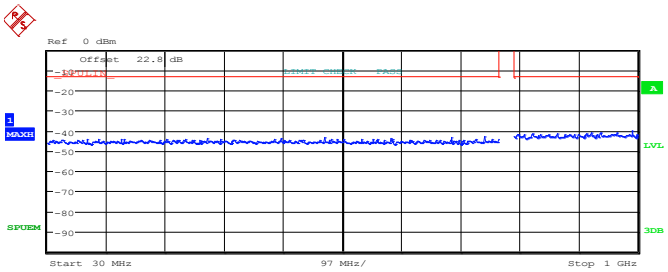
Date: 26.AUG.2013 15:06:43



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
1.000 G	4.000 G	1.00 M	3.185500 G	-32.20	-19.20
4.000 G	8.000 G	1.00 M	7.916000 G	-33.89	-20.89

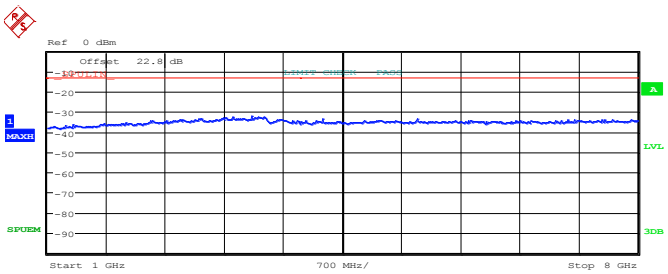
Date: 26.AUG.2013 15:07:25

16QAM (RB Size 1, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	772.000 M	100.00 k	747.885000 M	-42.90	-29.90
797.000 M	1.000 G	100.00 k	990.053000 M	-40.33	-27.33

Date: 26.AUG.2013 15:06:59

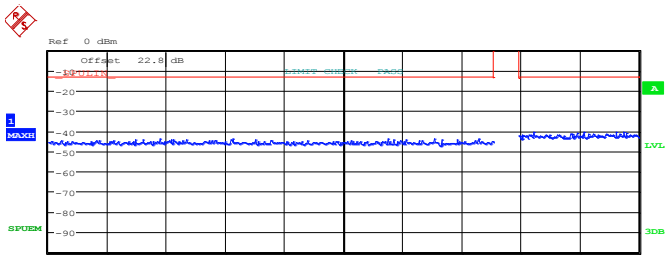


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
1.000 G	4.000 G	1.00 M	3.424000 G	-31.94	-18.94
4.000 G	8.000 G	1.00 M	5.382000 G	-33.59	-20.59

Date: 26.AUG.2013 15:07:16

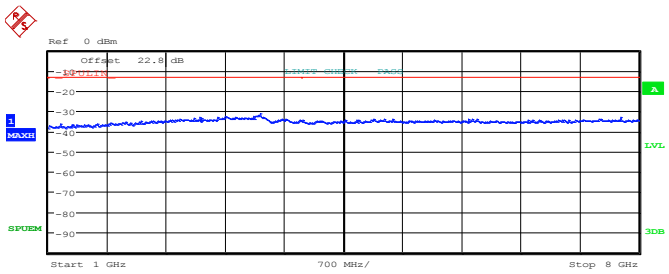
Band :	LTE Band 13	Channel :	CH23230 (Middle)
Band Width :	10MHz		

QPSK (RB Size 1, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	762.000 M	100.00 k	587.784000 M	-43.67	-30.67
802.000 M	1.000 G	100.00 k	909.019000 M	-40.56	-27.56

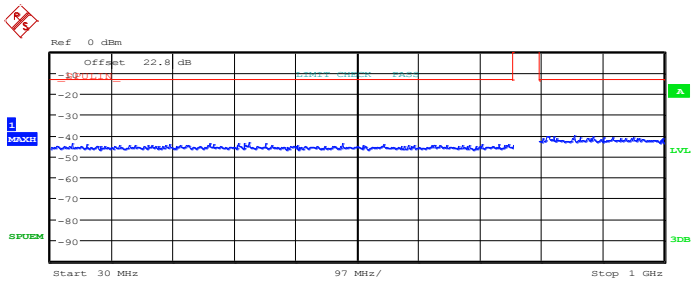
Date: 26.AUG.2013 15:14:48



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
1.000 G	4.000 G	1.00 M	3.511000 G	-31.31	-18.31
4.000 G	8.000 G	1.00 M	7.786000 G	-33.10	-20.10

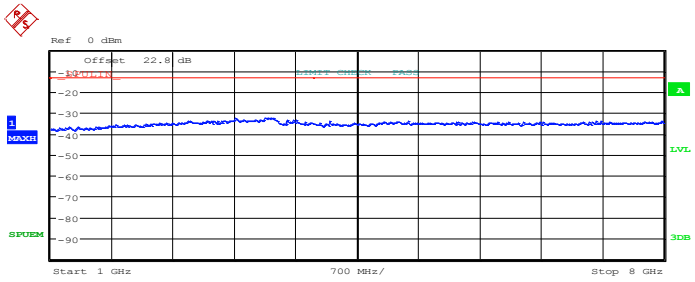
Date: 26.AUG.2013 15:14:13

16QAM (RB Size 1, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	762.000 M	100.00 k	343.296000 M	-43.66	-30.66
802.000 M	1.000 G	100.00 k	858.430000 M	-40.19	-27.19

Date: 26.AUG.2013 15:14:37



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
1.000 G	4.000 G	1.00 M	3.482500 G	-32.44	-19.44
4.000 G	8.000 G	1.00 M	7.280000 G	-33.82	-20.82

Date: 26.AUG.2013 15:14:22

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

3.7.2 Measuring Instruments

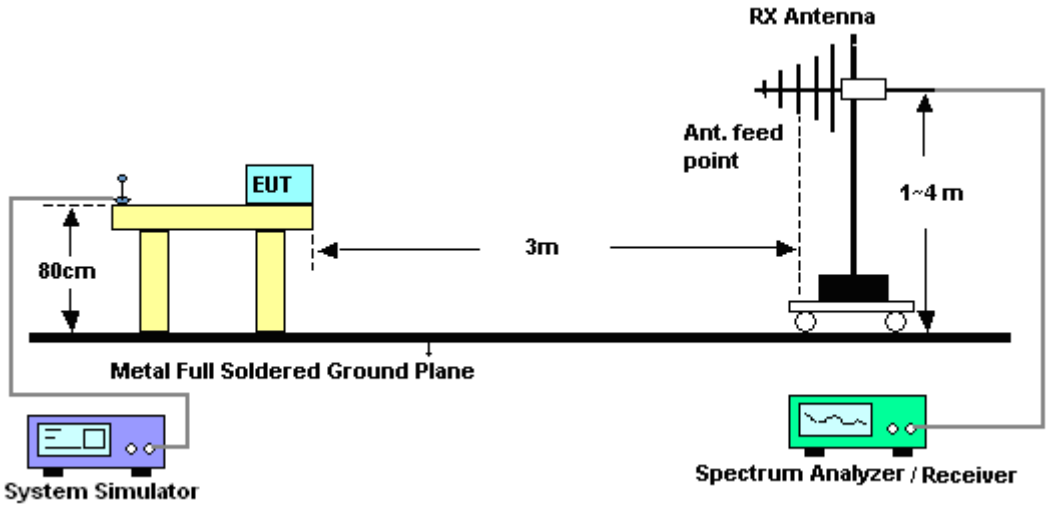
See list of measuring instruments of this test report.

3.7.3 Test Procedures

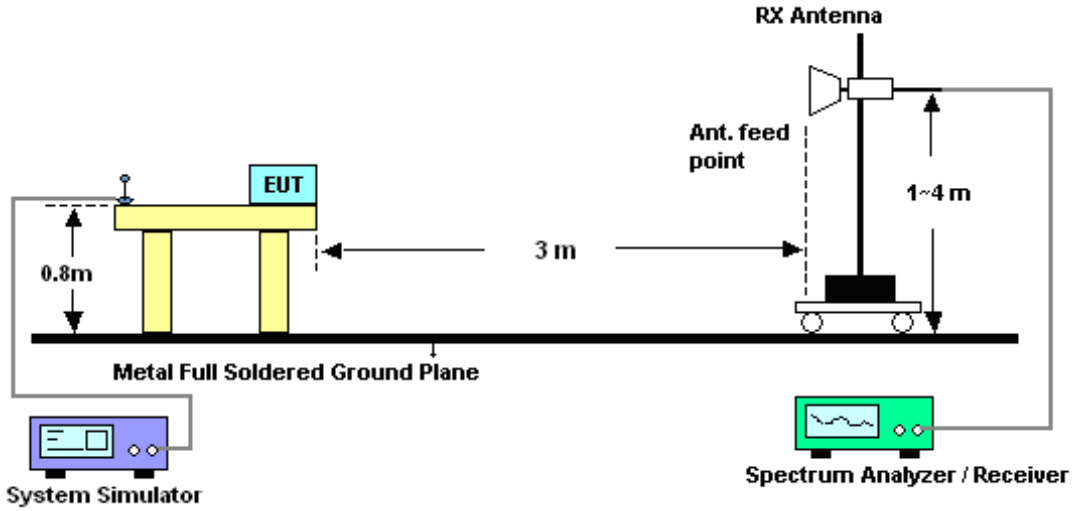
1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving 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, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    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.
11. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (dBm) = EIRP - 2.15

3.7.4 Test Setup

For radiated emissions from 30MHz to 1GHz

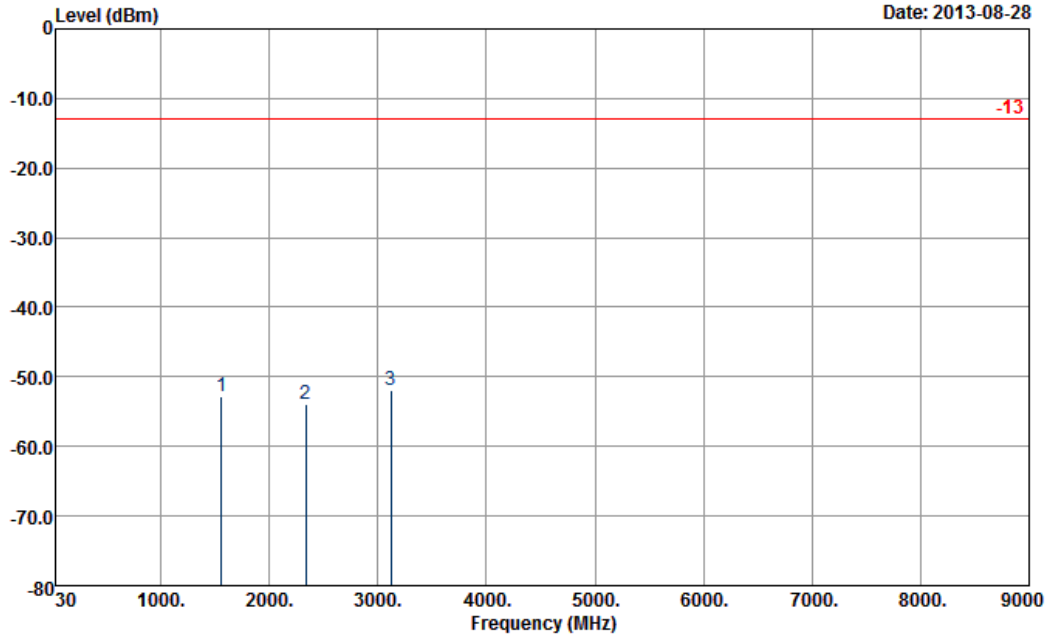


For radiated emissions above 1GHz



3.7.5 Test Result of Field Strength of Spurious Radiated

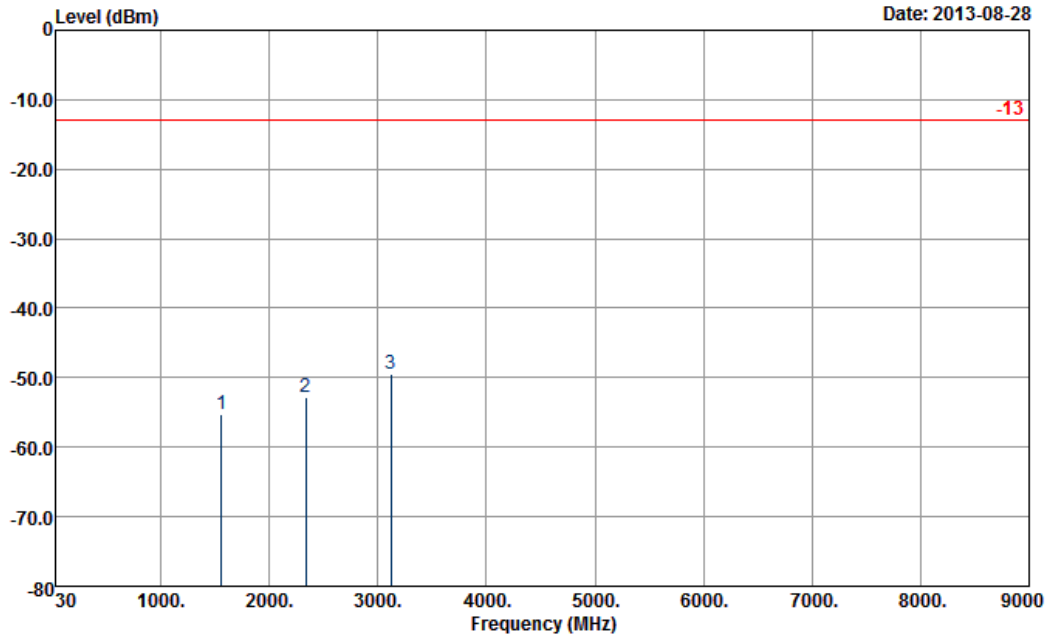
Band :	LTE Band 13	**Temperature :**	21~24°C
Test Mode :	5MHz, QPSK RB Size 1 Offset 0	**Relative Humidity :**	51~53%
Test Engineer :	Eric Shih	**Polarization :**	Horizontal
Remark :	Spurious emissions were found more than 20dB below limit line.		



Site : 03CH07-HY
Condition : -13 HF-EIRP(080306) HORIZONTAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1559	-52.87	-13	-39.87	-61.3	-54.7	1.51	5.49	H	Pass
2339	-53.98	-13	-40.98	-66.48	-55.9	1.98	6.05	H	Pass
3118	-51.88	-13	-38.88	-65.62	-54.9	2.39	7.56	H	Pass

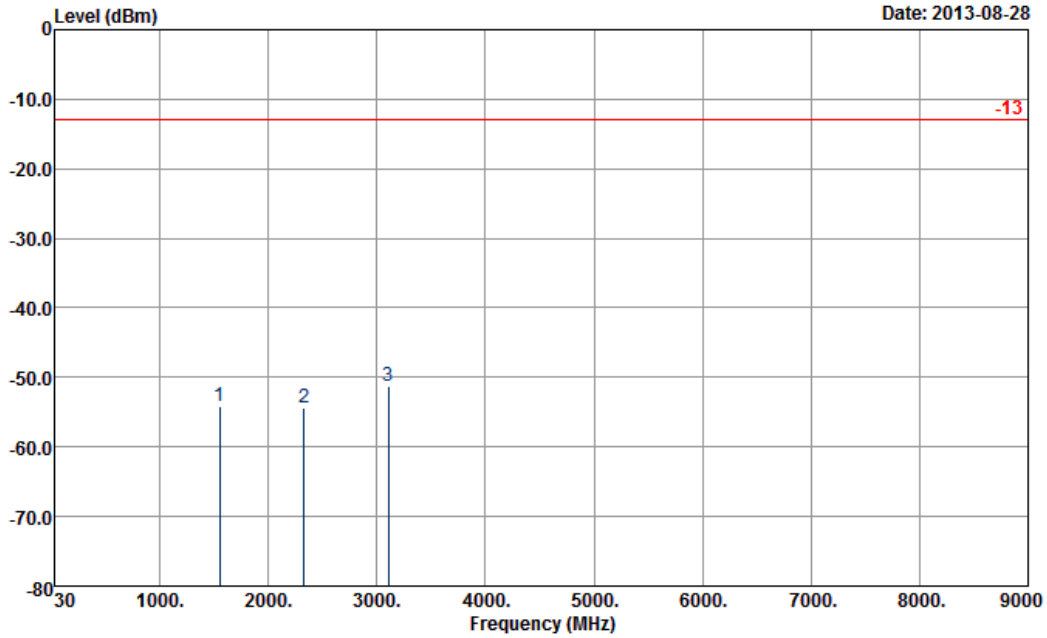
Band :	LTE Band 13	Temperature :	21~24°C
Test Mode :	5MHz, QPSK RB Size 1 Offset 0	Relative Humidity :	51~53%
Test Engineer :	Eric Shih	Polarization :	Vertical
Remark :	Spurious emissions were found more than 20dB below limit line.		



Site : 03CH07-HY
Condition : -13 HF-EIRP(080306) VERTICAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1558	-55.37	-13	-42.37	-66.18	-57.2	1.51	5.49	V	Pass
2339	-52.78	-13	-39.78	-6.23	-54.7	1.98	6.05	V	Pass
3118	-49.48	-13	-36.48	-65.29	-52.5	2.39	7.56	V	Pass

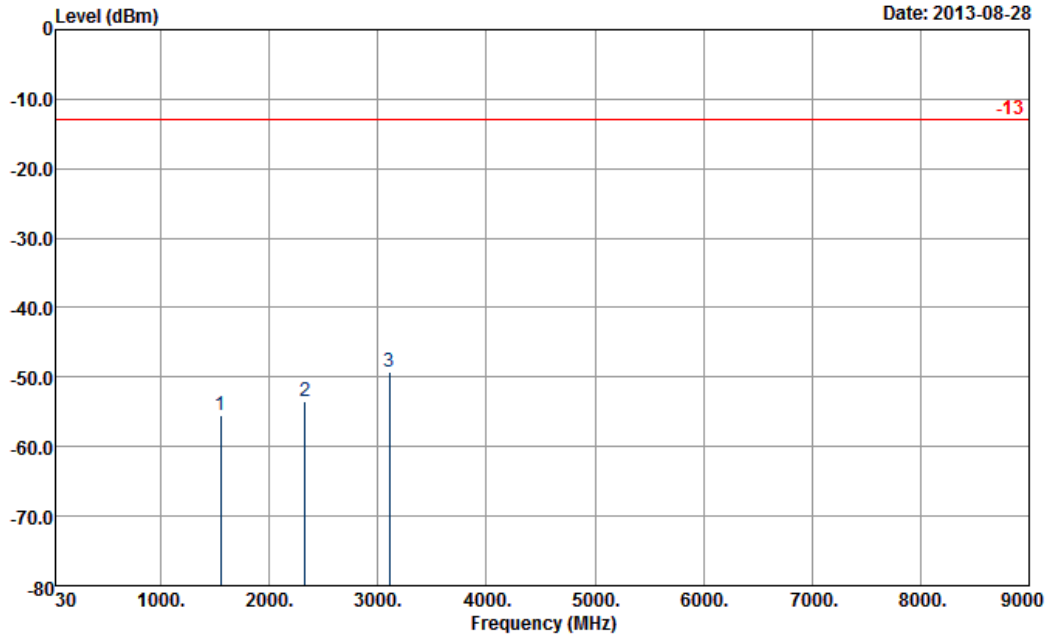
Band :	LTE Band 13	Temperature :	21~24°C
Test Mode :	10MHz, QPSK RB Size 1 Offset 0	Relative Humidity :	51~53%
Test Engineer :	Eric Shih	Polarization :	Horizontal
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



Site : 03CH07-HY
Condition : -13 HF-EIRP(080306) HORIZONTAL

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
1554	-54.07	-13	-41.07	-62.54	-55.9	1.51	5.49	H	Pass
2331	-54.28	-13	-41.28	-66.86	-56.2	1.98	6.05	H	Pass
3108	-51.28	-13	-38.28	-65.3	-54.3	2.39	7.56	H	Pass

Band :	LTE Band 13	Temperature :	21~24°C
Test Mode :	10MHz, QPSK RB Size 1 Offset 0	Relative Humidity :	51~53%
Test Engineer :	Eric Shih	Polarization :	Vertical
Remark :	Spurious emissions within 30-10th harmonic were found more than 20dB below limit line.		



Site : 03CH07-HY
Condition : -13 HF-EIRP(080306) VERTICAL

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
1554	-55.57	-13	-42.57	-66.28	-57.4	1.51	5.49	V	Pass
2331	-53.58	-13	-40.58	-67.12	-55.5	1.98	6.05	V	Pass
3108	-49.18	-13	-36.18	-64.83	-52.2	2.39	7.56	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

See list of measuring instruments of this test report.

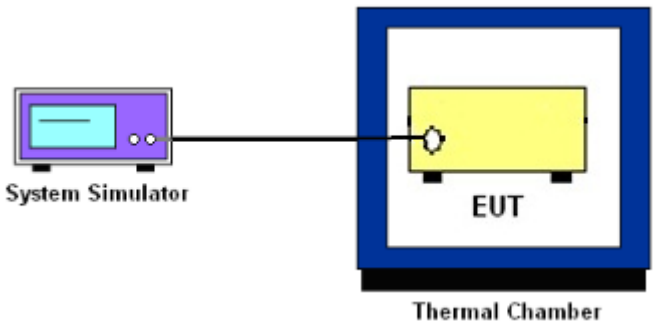
3.8.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. If the EUT can not be turned on at -30°C, the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.

3.8.4 Test Procedures for Voltage Variation

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

3.8.5 Test Setup



3.8.6 Test Result of Temperature Variation

Band :	LTE Band 13 (QPSK)	Limit (ppm) :	2.5

Temperature (°C)	BW 5MHz		BW 10MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-12.6	-0.016	9.4	0.012	PASS
-20	10.8	0.014	11.1	0.014	
-10	-8.4	-0.011	-10.8	-0.014	
0	10.5	0.013	-12.3	-0.016	
10	-9.4	-0.012	8.6	0.011	
20	-11.7	-0.015	11.5	0.015	
30	12.6	0.016	13.1	0.017	
40	10.9	0.014	-12.7	-0.016	
50	-8.1	-0.010	-10.3	-0.013	

Band :	LTE Band 13 (16QAM)	Limit (ppm) :	2.5

Temperature (°C)	BW 5MHz		BW 10MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	10.3	0.013	-9.8	-0.013	PASS
-20	-12.1	-0.015	13.2	0.017	
-10	-11.3	-0.014	10.5	0.013	
0	8.4	0.011	-12.1	-0.015	
10	7.9	0.010	-8.7	-0.011	
20	-10.6	-0.014	11.3	0.014	
30	-12.9	-0.016	-12.2	-0.016	
40	11.8	0.015	12.6	0.016	
50	8.5	0.011	-9.7	-0.012	

3.8.7 Test Result of Voltage Variation

Band	Bandwidth	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 13 (QPSK)	5M	4.2	-10.6	-0.014	2.5	PASS
		Normal	9.7	0.012		
		3.4	8.1	0.010		
	10M	4.2	-11.3	-0.014		
		Normal	-8.9	-0.011		
		3.4	9.4	0.012		

Band	Bandwidth	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 13 (16QAM)	5M	4.2	10.5	0.013	2.5	PASS
		Normal	-7.8	-0.010		
		3.4	-8.6	-0.011		
	10M	4.2	-9.3	-0.012		
		Normal	10.2	0.013		
		3.4	8.2	0.010		

Remark:

1. Normal Voltage = 3.7V.
2. The manufacturer declared that the EUT could work properly between voltage 3.4V ~ 4.2V.

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
System Simulator	Anritsu	MT8820C	6201026480	N/A	Jan. 04, 2013	Aug. 26, 2013	Jan. 03, 2014	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100055	9kHz~40GHz	Jun. 07, 2013	Aug. 26, 2013	Jun. 06, 2014	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D3SP	TBN-930701	N/A	Jul. 19, 2013	Aug. 26, 2013	Jul. 18, 2014	Conducted (TH02-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101067	9kHz~30GHz	Nov. 30, 2012	Aug. 28, 2013	Nov. 29, 2013	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz~1GHz	Oct. 06, 2012	Aug. 28, 2013	Oct. 05, 2013	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1GHz~18GHz	Aug. 22, 2013	Aug. 28, 2013	Aug. 21, 2014	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	30MHz~1GHz	Feb. 26, 2013	Aug. 28, 2013	Feb. 25, 2014	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~26.5GHz	Dec. 01, 2012	Aug. 28, 2013	Nov. 30, 2013	Radiation (03CH07-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	Aug. 28, 2013	N/A	Radiation (03CH07-HY)
Antenna Mast	ChainTek	ChainTek 3000	N/A	N/A	N/A	Aug. 28, 2013	N/A	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18G~40G	Sep. 28, 2012	Aug. 28, 2013	Sep. 27, 2013	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**