FCC RF Test Report

APPLICANT	:	ZTE CORPORATION
EQUIPMENT	:	LTE Mobile Hotspot
BRAND NAME	:	ZTE
MODEL NAME	:	EuFi890
FCC ID	:	Q78-EUFI890
STANDARD	:	47 CFR Part 2, 27
CLASSIFICATION	:	PCS Licensed Transmitter (PCB)
TX FREQUENCY RANGE	:	777 MHz ~ 787 MHz (LTE – Band 13)
RX FREQUENCY RANGE	:	746 MHz ~ 756 MHz (LTE – Band 13)
MAX. ERP POWER	:	0.05 W (QPSK, BW 10MHz) 0.05 W (16QAM, BW 10MHz)
EMISSION DESIGNATOR	:	8M92G7D (QPSK, BW 10MHz) 8M92D7W (16QAM, BW 10MHz)

The product was received on Dec. 28, 2010 and completely tested on Jun. 15, 2011. 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:

Jones Tsai

Jones Tsai / Manager

Testing Laboratory 1190

SPORTON INTERNATIONAL INC.
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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG0D2830C	Rev. 01	Initial issue of report	Jun. 24, 2011

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	NA	PASS	
3.2	§27.50(b)(10)	Effective Radiated Power	< 3 Watts	PASS	-
3.3	§2.1049	Occupied Bandwidth	NA	PASS	-
3.4	§2.1049 §27.53(c)(2)	Emission Mask Measurement	< $65+10\log_{10}$(P[Watts]) in a 6.25 kHz bandwidth for emissions in the 763 ~ 805 MHz bands	PASS	-
3.5	§2.1051 §27.53(c)	Conducted Emission	< $43+10\log_{10}$(P[Watts])	PASS	-
3.6	§2.1053 §27.53(c)(2) §27.53(c)(4)	Undesirable Out of Band Emissions	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 32.48 dB at 1564 MHz
3.7	§2.1055 §27.54	Frequency Stability Temperature & Voltage	< 2.5 ppm	PASS	-

1 General Description

1.1 Applicant

ZTE CORPORATION

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

1.2 Manufacturer

ZTE CORPORATION

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

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	LTE Mobile Hotspot
Brand Name	ZTE
Model Name	EuFi890
FCC ID	Q78-EUFI890
Tx Frequency	777 ~ 787 MHz
Maximum Output Power to Antenna	28.61 dBm
Maximum ERP	0.05 W (17.13 dBm) (QPSK, BW 10MHz) 0.05 W (16.17 dBm) (16QAM, BW 10MHz)
Antenna Type	PIFA Antenna
HW Version	NA
SW Version	NA
Type of Modulation	9M40G7D (QPSK, BW 10MHz) 9M40D7W (16QAM, BW 10MHz)
Type of Emission	8M92G7D (QPSK, BW 10MHz) 8M92D7W (16QAM, BW 10MHz)
EUT Stage	Identical Prototype

Remark: For other wireless features of this EUT, the test report will be issued separately.

1.4 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	03CH06-HY	TW1022/4086B-1

1.5 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

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 (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMW500	N/A	N/A	Unshielded, 1.8 m

2 Test Configuration of Equipment Under Test

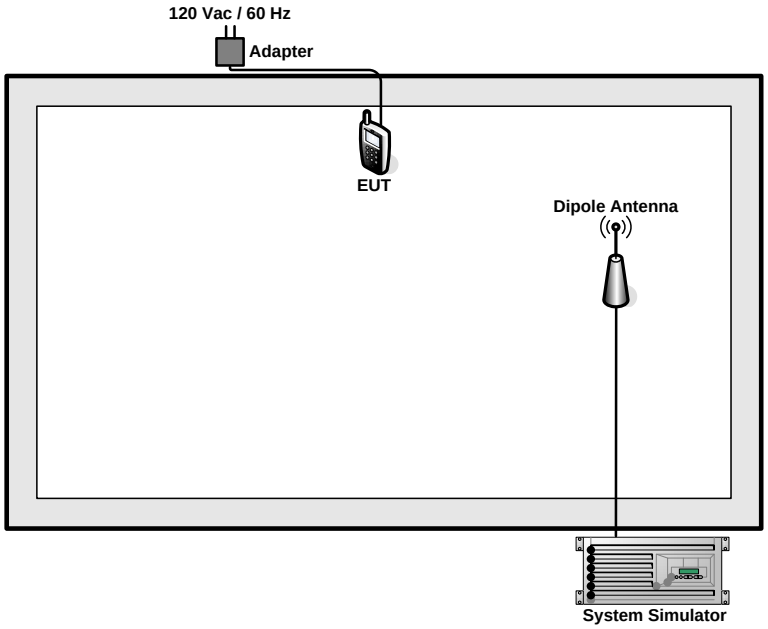
2.1 Test Mode

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 8000 MHz.

Test Modes			
Band		**Radiated TCs**	**Conducted TCs**
LTE Band 13	**QPSK**	■ LTE (RB Size 1, RB Offset 49) Link + TC	■ LTE (RB Size 1, RB Offset 0) Link ■ LTE (RB Size 1, RB Offset 49) Link ■ LTE (RB Size 25, RB Offset 13) Link ■ LTE (RB Size 50, RB Offset 0) Link
	16QAM	■ LTE (RB Size 1, RB Offset 0) Link + TC	■ LTE (RB Size 1, RB Offset 0)Link ■ LTE (RB Size 1, RB Offset 49)Link ■ LTE (RB Size 25, RB Offset 13)Link ■ LTE (RB Size 50, RB Offset 0)Link
Remark: TC stands for Test Configuration, and consists of Battery, USB Cable, and Adapter.			

2.2 Connection Diagram of Test System



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.

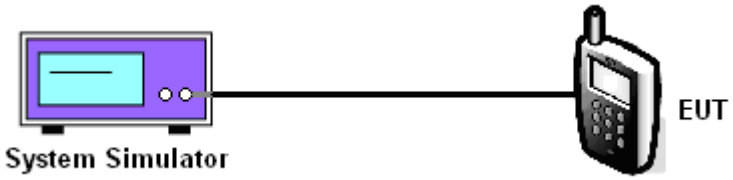
3.1.2 Measuring Instruments

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

Mode	Channel	Frequency (MHz)	Modulation	RB Configuration		Conducted Power (dBm)	Conducted Power (Watts)
				RB Size	RB Offset		
LTE Band 13	23230	782	QPSK	1	0	22.91	0.195
				1	49	23.00	0.200
				25	13	22.15	0.164
				50	0	22.14	0.164
			16QAM	1	0	22.15	0.164
				1	49	22.21	0.166
				25	13	22.11	0.163
				50	0	22.12	0.163

3.2 Effective Radiated Power Measurement

3.2.1 Description of the ERP Measurement

Effective radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-C-2004. Mobile and portable (hand-held) stations operating in the 782 MHz band are limited to a peak ERP of 3 watt.

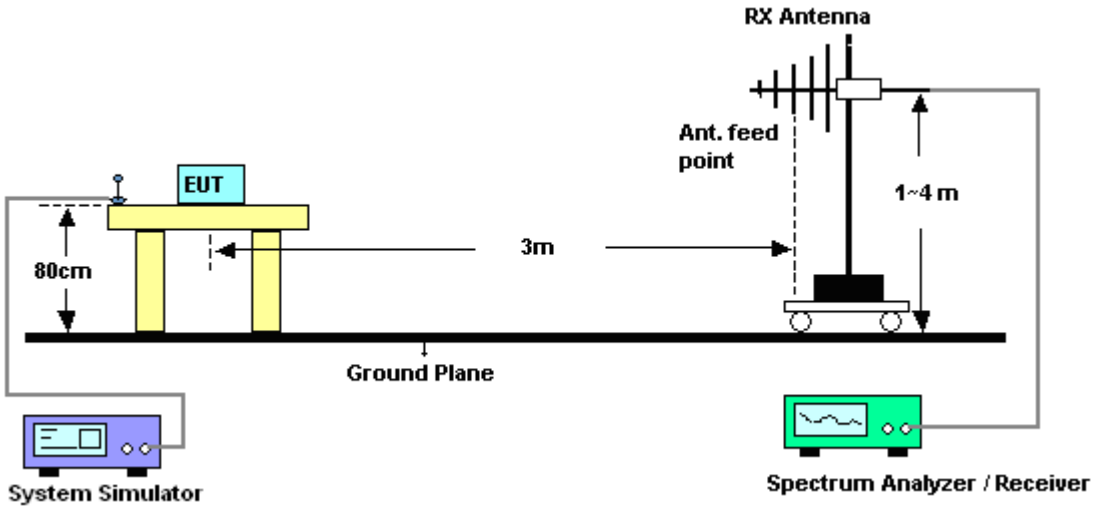
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The EUT was placed on an 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 with RBW= 300kHz, VBW= 1MHz, RMS detector, and used Channel Power function with measurement bandwidth = 10MHz.
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.

3.2.4 Test Setup



3.2.5 Test Result of ERP

LTE Band 13 Radiated Power ERP for QPSK				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
782.0	-9.00	28.28	17.13	0.05
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
782.0	-15.61	31.89	14.13	0.03

* EIRP = LVL (dBm) + Correction Factor (dB)

LTE Band 13 Radiated Power ERP for 16QAM				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
782.0	-9.42	28.28	16.71	0.05
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
782.0	-15.59	31.89	14.15	0.03

* EIRP = LVL (dBm) + Correction Factor (dB)

3.3 Occupied Bandwidth

3.3.1 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.

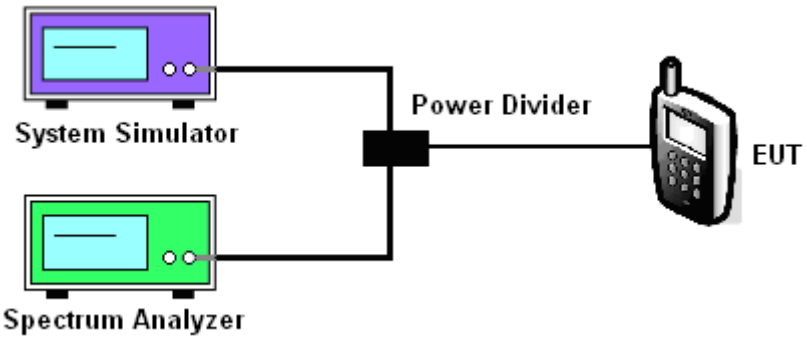
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

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

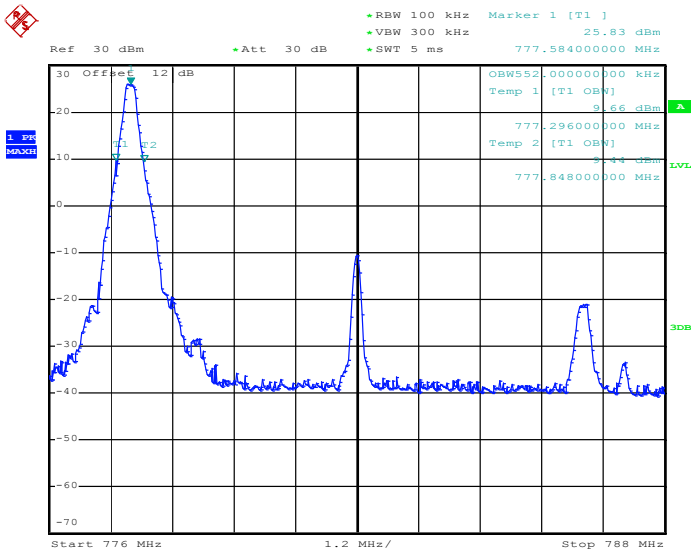
3.3.4 Test Setup



3.3.5 Test Result (Plots) of Occupied Bandwidth

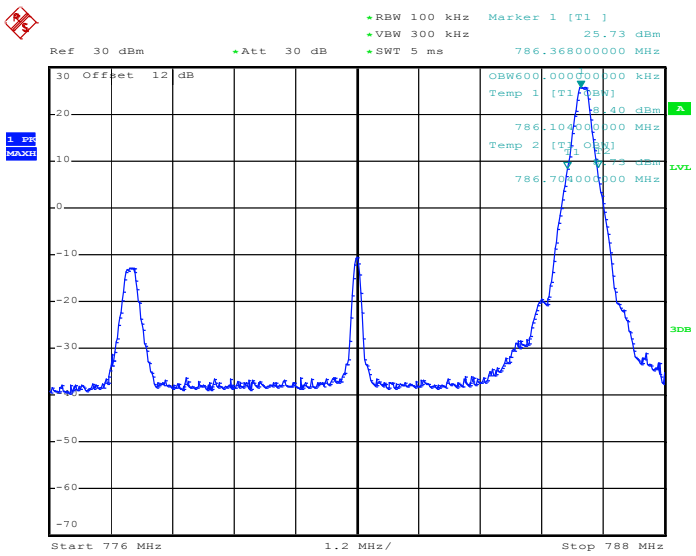
Band :	LTE Band 13	Power Stage :	High
Test Mode :	RB Size 1 RB Offset 0	Modulation :	QPSK

99% Occupied Bandwidth Plot on Channel 23230



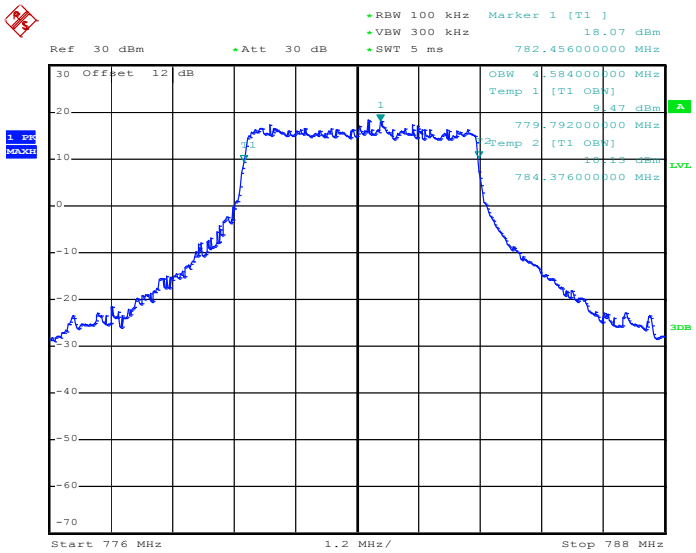
Band :	LTE Band 13	Power Stage :	High
Test Mode :	RB Size 1 RB Offset 49	Modulation :	QPSK

99% Occupied Bandwidth Plot on Channel 23230



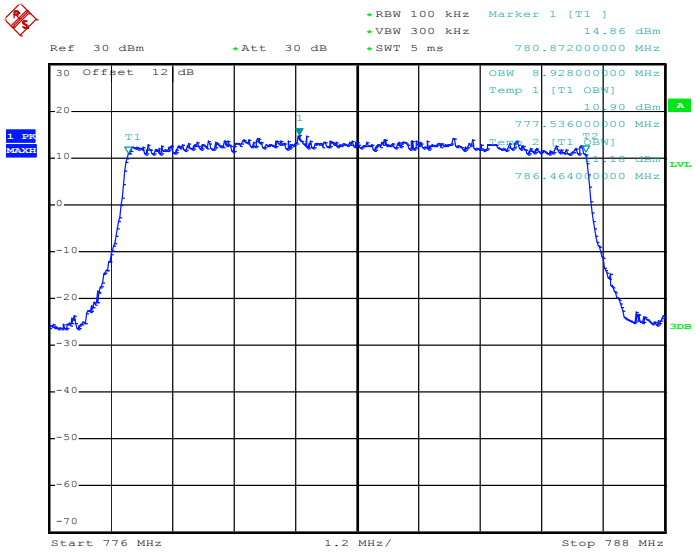
Band :	LTE Band 13	Power Stage :	High
Test Mode :	RB Size 25 RB Offset 13	Modulation :	QPSK

99% Occupied Bandwidth Plot on Channel 23230



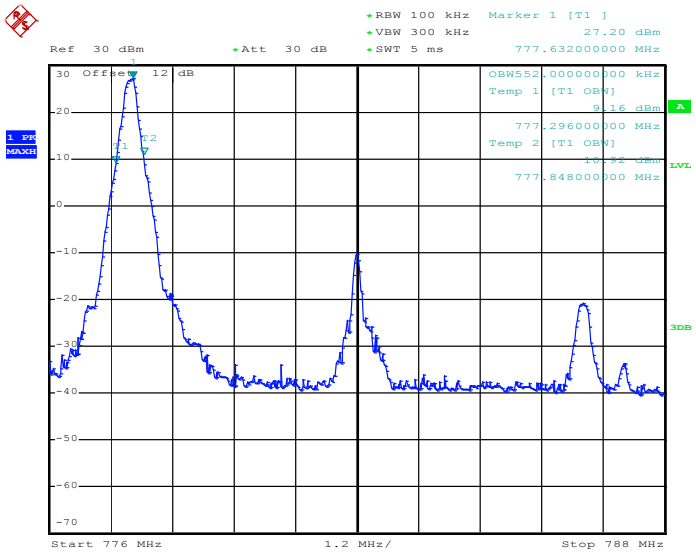
Band :	LTE Band 13	Power Stage :	High
Test Mode :	RB Size 50 RB Offset 0	Modulation :	QPSK

99% Occupied Bandwidth Plot on Channel 23230



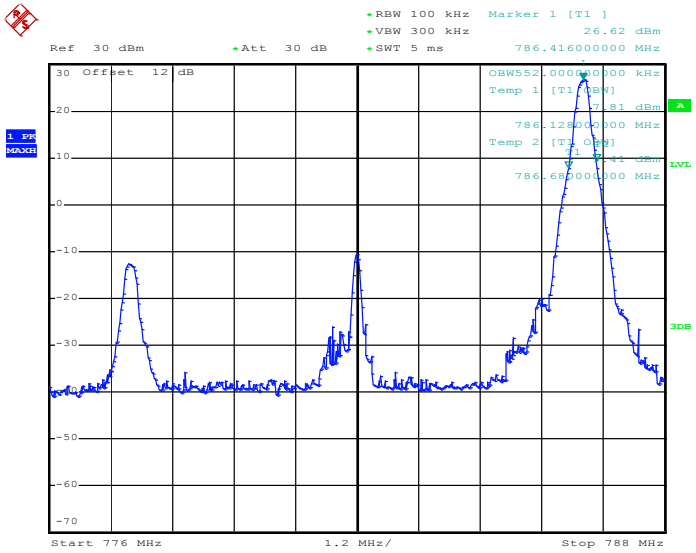
Band :	LTE Band 13	Power Stage :	High
Test Mode :	RB Size 1 RB Offset 0	Modulation :	16QAM

99% Occupied Bandwidth Plot on Channel 23230



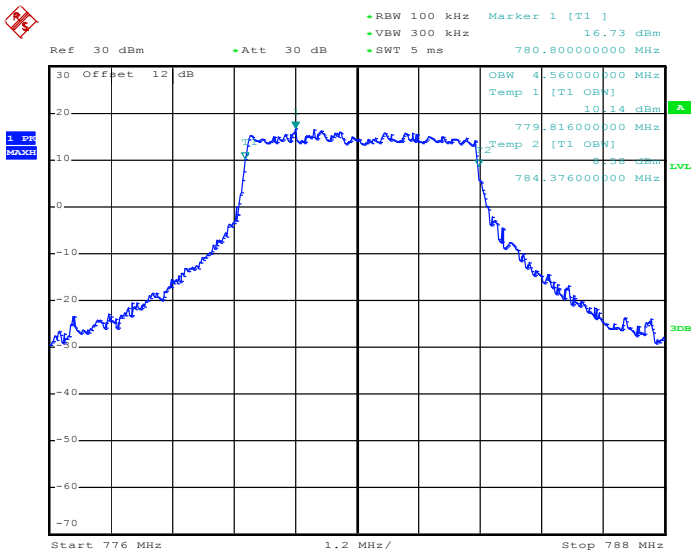
Band :	LTE Band 13	Power Stage :	High
Test Mode :	RB Size 1 RB Offset 49	Modulation :	16QAM

99% Occupied Bandwidth Plot on Channel 23230



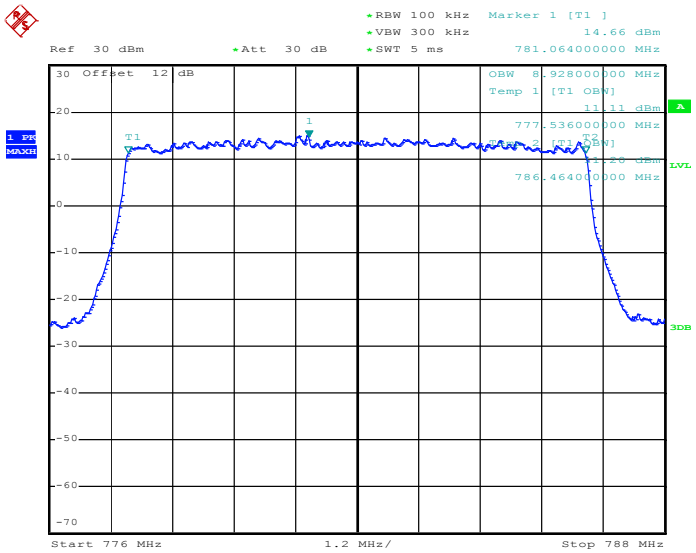
Band :	LTE Band 13	Power Stage :	High
Test Mode :	RB Size 25 RB Offset 13	Modulation :	16QAM

99% Occupied Bandwidth Plot on Channel 23230



Band :	LTE Band 13	Power Stage :	High
Test Mode :	RB Size 50 RB Offset 0	Modulation :	16QAM

99% Occupied Bandwidth Plot on Channel 23230



3.4 Emission Mask Measurement

3.4.1 Limit

The emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit is 65 + 10log10(P[Watts]) = -35dBm in a 6.25kHz bandwidth.

3.4.2 Measuring Instruments

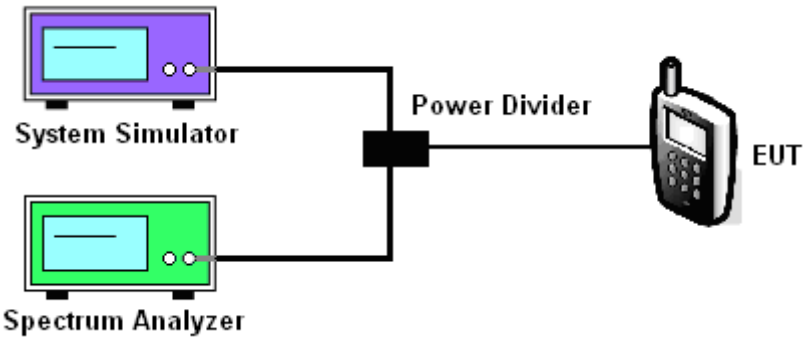
See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The band edges of low and high channels for the highest RF powers were measured. Setting RBW = 10kHz
3. RealPwr(dBm) = PwrAbs(dBm) – 10*LOG(10k/6.5k)(dB)
   Real △Limit(dB) = △Limit(dB) – 10*LOG(10k/6.5k)(dB)
   10*LOG(10k/6.5k) ~ 1.87dB

3.4.4 Test Setup

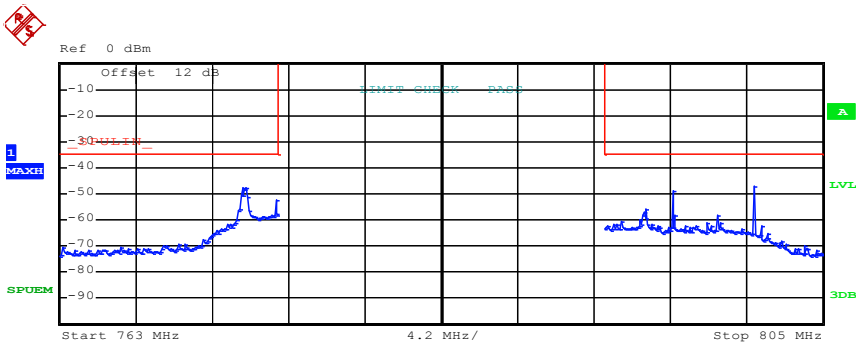
<Conducted Mask Measurement>



3.4.5 Test Result (Plots) of Conducted Emission Mask

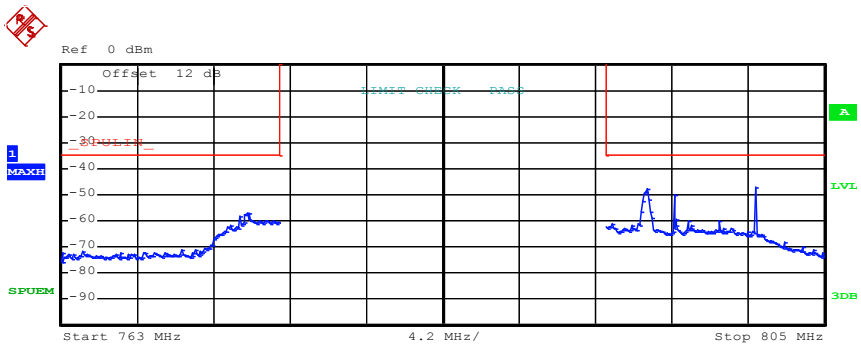
Band :	LTE Band 13	Power Stage :	High
		Modulation :	QPSK

Emission Mask Plot for QPSK (RB Size 1, RB Offset 0)



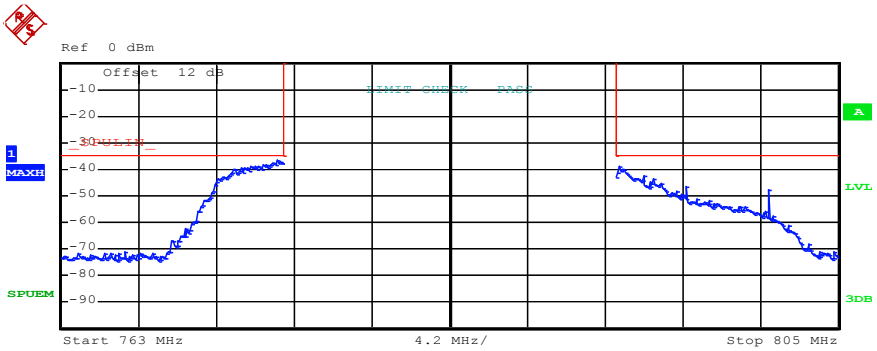
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]	RealPwr [dBm]	RealΔLimits [dB]
763.000 M	775.000 M	10.00 k	773.218000 M	-47.74	-12.74	-49.61	-14.61
793.000 M	805.000 M	10.00 k	801.202000 M	-46.94	-11.94	-48.81	-11.94

Emission Mask Plot for QPSK (RB Size 1, RB Offset 49)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]	RealPwr [dBm]	RealΔLimits [dB]
763.000 M	775.000 M	10.00 k	773.248000 M	-56.88	-21.88	-58.75	-23.75
793.000 M	805.000 M	10.00 k	801.202000 M	-47.19	-12.19	-49.06	-14.06

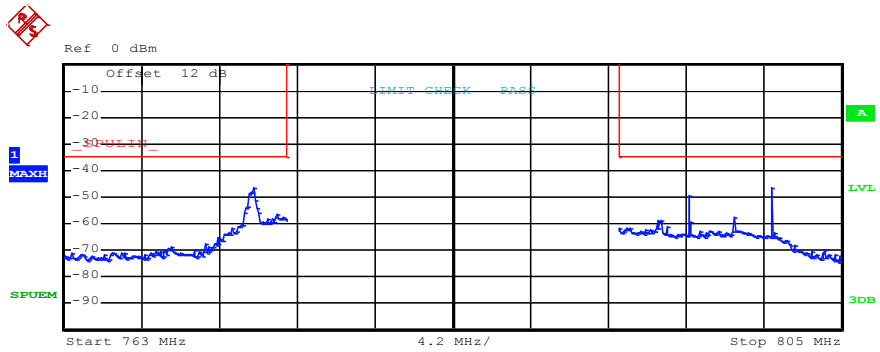
Emission Mask Plot for QPSK (RB Size 50, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]	RealPwr [dBm]	RealΔLimits [dB]
763.000 M	775.000 M	10.00 k	774.640000 M	-36.54	-1.54	-38.41	-3.41
793.000 M	805.000 M	10.00 k	793.192000 M	-38.92	-3.92	-40.79	-5.79

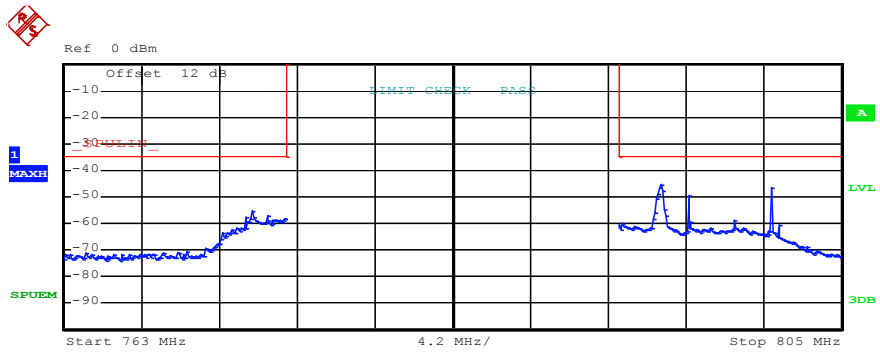
Band :	LTE Band 13	Power Stage :	High
		Modulation :	16QAM

Emission Mask Plot for 16QAM (RB Size 1, RB Offset 0)



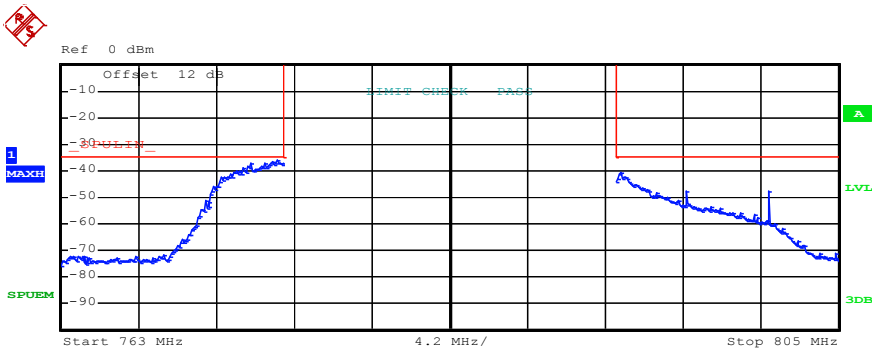
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]	RealPwr [dBm]	RealΔLimits [dB]
763.000 M	775.000 M	10.00 k	773.272000 M	-46.62	-11.62	-48.49	-13.49
793.000 M	805.000 M	10.00 k	801.202000 M	-46.69	-11.69	-48.56	-13.56

Emission Mask for 16QAM (RB Size 1, RB Offset 49)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]	RealPwr [dBm]	RealΔLimits [dB]
763.000 M	775.000 M	10.00 k	773.164000 M	-55.22	-20.22	-57.09	-22.09
793.000 M	805.000 M	10.00 k	795.250000 M	-45.61	-10.61	-47.48	-12.48

Emission Mask for 16QAM (RB Size 50, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]	RealPwr [dBm]	RealΔLimits [dB]
763.000 M	775.000 M	10.00 k	774.676000 M	-35.92	-0.92	-37.79	-2.79
793.000 M	805.000 M	10.00 k	793.222000 M	-40.85	-5.85	-42.22	-7.22

3.5 Conducted Emission Measurement

3.5.1 Description of Conducted 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 30 MHz up to a frequency including its 10^{th} harmonic.

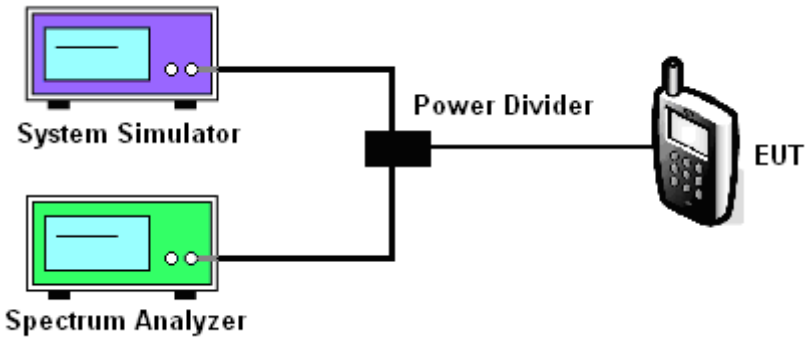
3.5.2 Measuring Instruments

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 middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.

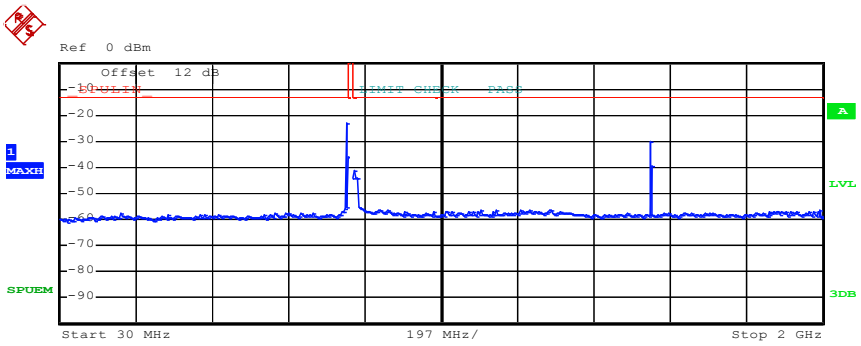
3.5.4 Test Setup



3.5.5 Test Result (Plots) of Conducted Emission

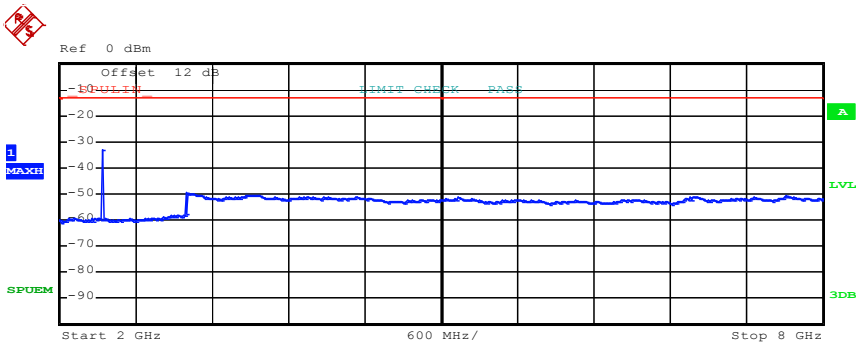
Band :	LTE Band 13	Channel :	CH23230
		Modulation :	QPSK

Conducted Emission Plot (30MHz ~ 2GHz) for QPSK (RB Size 1, RB Offset 0)



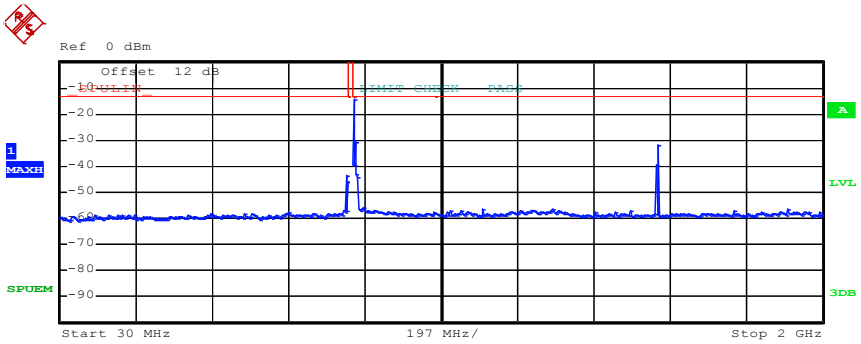
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	774.000 M	1.00 M	774.000000 M	-22.99	-9.99
774.000 M	776.000 M	100.00 k	775.959000 M	-36.22	-23.22
788.000 M	790.000 M	100.00 k	789.037000 M	-44.12	-31.12
790.000 M	1.000 G	1.00 M	792.100000 M	-41.08	-28.08
1.000 G	2.000 G	1.00 M	1.555500 G	-30.19	-17.19

Conducted Emission Plot (2GHz ~ 8GHz) for QPSK (RB Size 1, RB Offset 0)



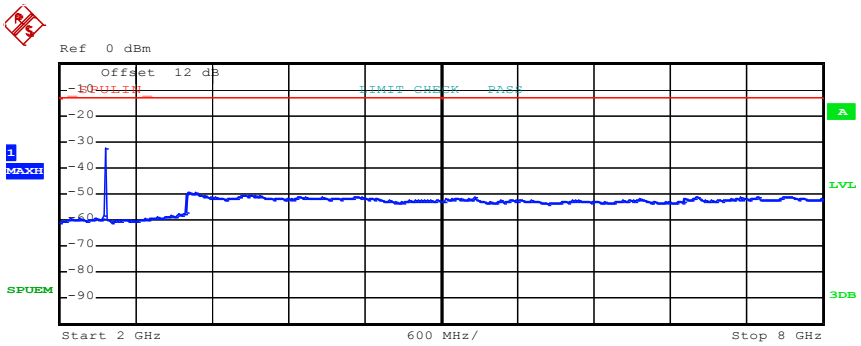
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.000 G	5.000 G	1.00 M	2.333000 G	-32.92	-19.92
5.000 G	8.000 G	1.00 M	7.709000 G	-50.87	-37.87

Conducted Emission Plot (30MHz ~ 2GHz) for QPSK (RB Size 1, RB Offset 49)



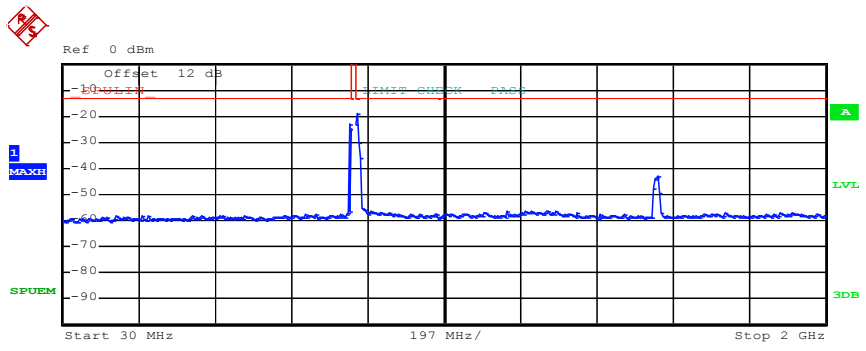
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	774.000 M	1.00 M	773.628000 M	-43.31	-30.31
774.000 M	776.000 M	100.00 k	775.443000 M	-46.14	-33.14
788.000 M	790.000 M	100.00 k	788.699000 M	-39.36	-26.36
790.000 M	1.000 G	1.00 M	790.105000 M	-14.21	-1.21
1.000 G	2.000 G	1.00 M	1.573000 G	-32.09	-19.09

Conducted Emission Plot (2GHz ~ 8GHz) for QPSK (RB Size 1, RB Offset 49)



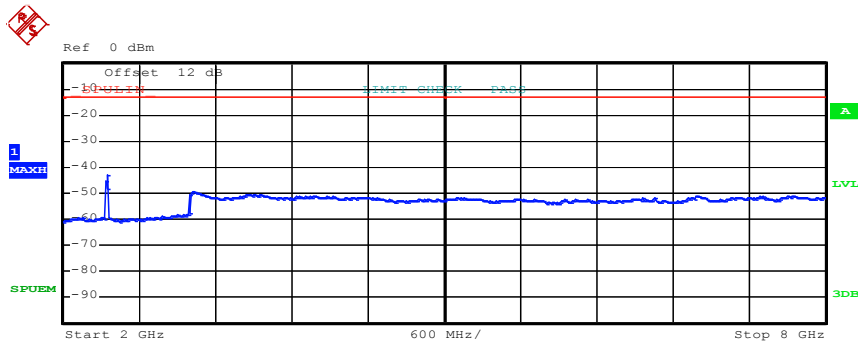
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.000 G	5.000 G	1.00 M	2.358500 G	-32.53	-19.53
5.000 G	8.000 G	1.00 M	7.703000 G	-50.91	-37.91

Conducted Emission Plot (30MHz ~ 2GHz) for QPSK (RB Size 50, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	774.000 M	1.00 M	773.628000 M	-23.23	-10.23
774.000 M	776.000 M	100.00 k	775.570000 M	-24.63	-11.63
788.000 M	790.000 M	100.00 k	788.182000 M	-22.96	-9.96
790.000 M	1.000 G	1.00 M	790.000000 M	-18.89	-5.89
1.000 G	2.000 G	1.00 M	1.564500 G	-43.12	-30.12

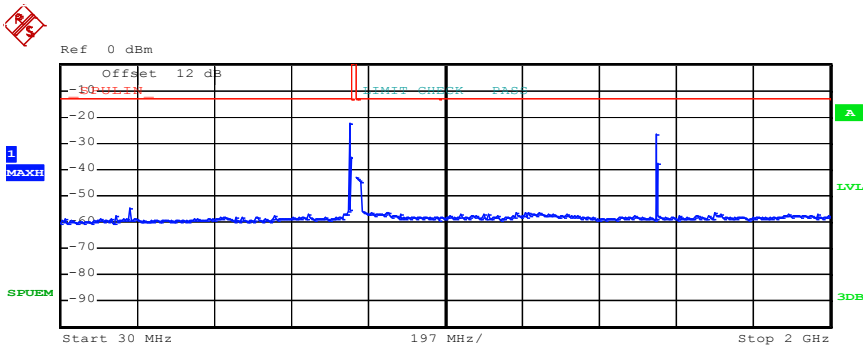
Conducted Emission Plot (2GHz ~ 8GHz) for QPSK (RB Size 50, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.000 G	5.000 G	1.00 M	2.346500 G	-43.08	-30.08
5.000 G	8.000 G	1.00 M	7.694000 G	-50.93	-37.93

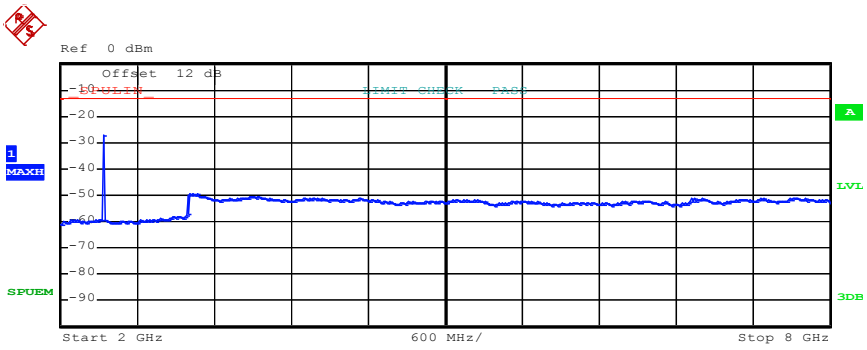
Band :	LTE Band 13	Channel :	CH23230
		Modulation :	16QAM

Conducted Emission Plot (30MHz ~ 2GHz) for 16QAM (RB Size 1, RB Offset 0)



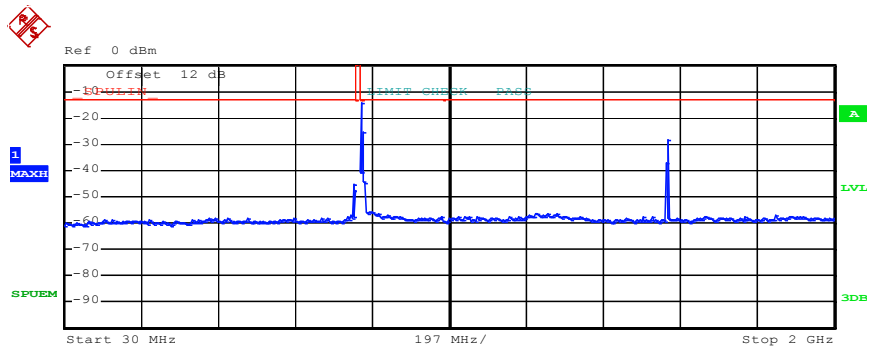
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	774.000 M	1.00 M	774.000000 M	-22.73	-9.73
774.000 M	776.000 M	100.00 k	775.948000 M	-35.09	-22.09
788.000 M	790.000 M	100.00 k	788.993000 M	-42.82	-29.82
790.000 M	1.000 G	1.00 M	791.575000 M	-43.63	-30.63
1.000 G	2.000 G	1.00 M	1.555500 G	-26.48	-13.48

Conducted Emission Plot (2GHz ~ 8GHz) for 16QAM (RB Size 1, RB Offset 0)



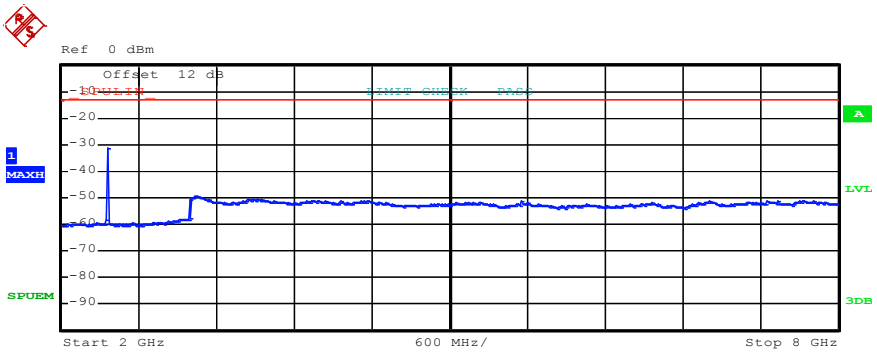
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.000 G	5.000 G	1.00 M	2.333000 G	-27.03	-14.03
5.000 G	8.000 G	1.00 M	7.746500 G	-50.92	-37.92

Conducted Emission Plot (30MHz ~ 2GHz) for 16QAM (RB Size 1, RB Offset 49)



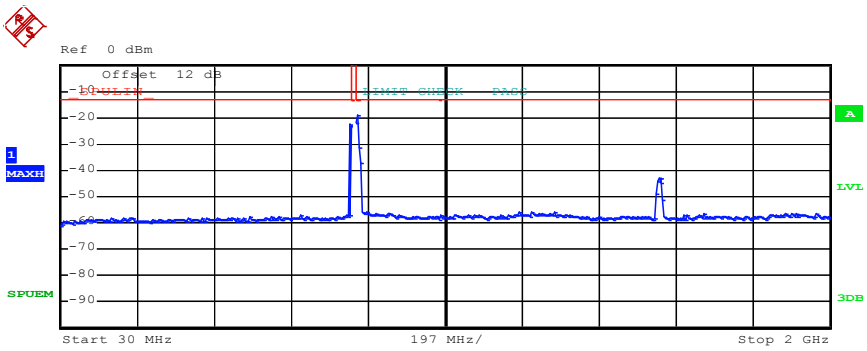
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	774.000 M	1.00 M	773.628000 M	-45.23	-32.23
774.000 M	776.000 M	100.00 k	775.051000 M	-47.69	-34.69
788.000 M	790.000 M	100.00 k	788.128000 M	-40.65	-27.65
790.000 M	1.000 G	1.00 M	790.000000 M	-14.33	-1.33
1.000 G	2.000 G	1.00 M	1.573000 G	-28.45	-15.45

Conducted Emission Plot (2GHz ~ 8GHz) for 16QAM (RB Size 1, RB Offset 49)



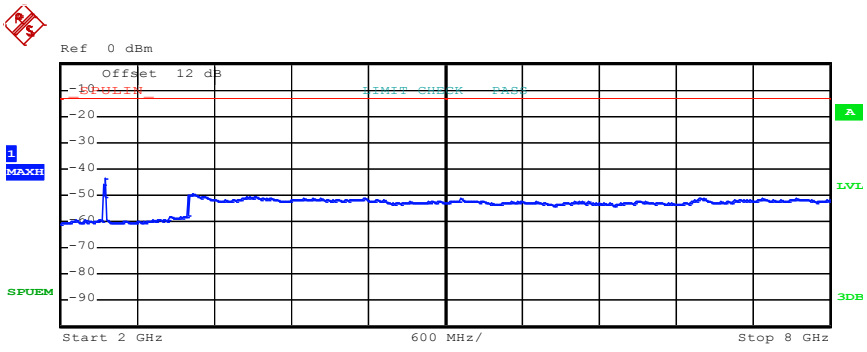
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
2.000 G	5.000 G	1.00 M	2.358500 G	-31.53	-18.53
5.000 G	8.000 G	1.00 M	7.724000 G	-51.00	-38.00

Conducted Emission Plot (30MHz ~ 2GHz) for 16QAM (RB Size 50, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
30.000 M	774.000 M	1.00 M	772.512000 M	-22.71	-9.71
774.000 M	776.000 M	100.00 k	775.762000 M	-23.38	-10.38
788.000 M	790.000 M	100.00 k	788.009000 M	-22.19	-9.19
790.000 M	1.000 G	1.00 M	790.210000 M	-19.12	-6.12
1.000 G	2.000 G	1.00 M	1.564000 G	-43.15	-30.15

Conducted Emission Plot (2GHz ~ 8GHz) for 16QAM (RB Size 50, RB Offset 0)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.000 G	5.000 G	1.00 M	2.345000 G	-43.46	-30.46
5.000 G	8.000 G	1.00 M	7.010000 G	-51.10	-38.10

3.6 Field Strength of Spurious Radiation Measurement

3.6.1 Description of Field Strength of Spurious Radiated Measurement

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.

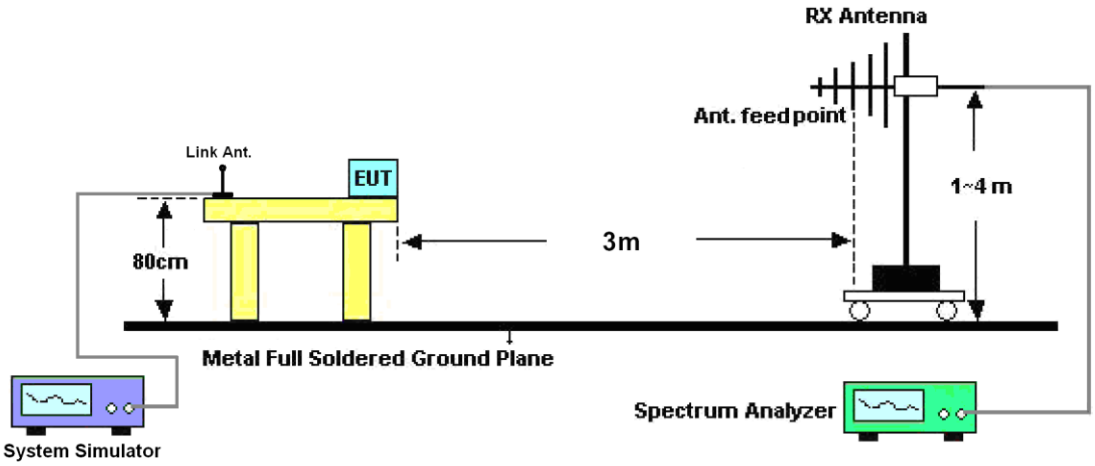
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

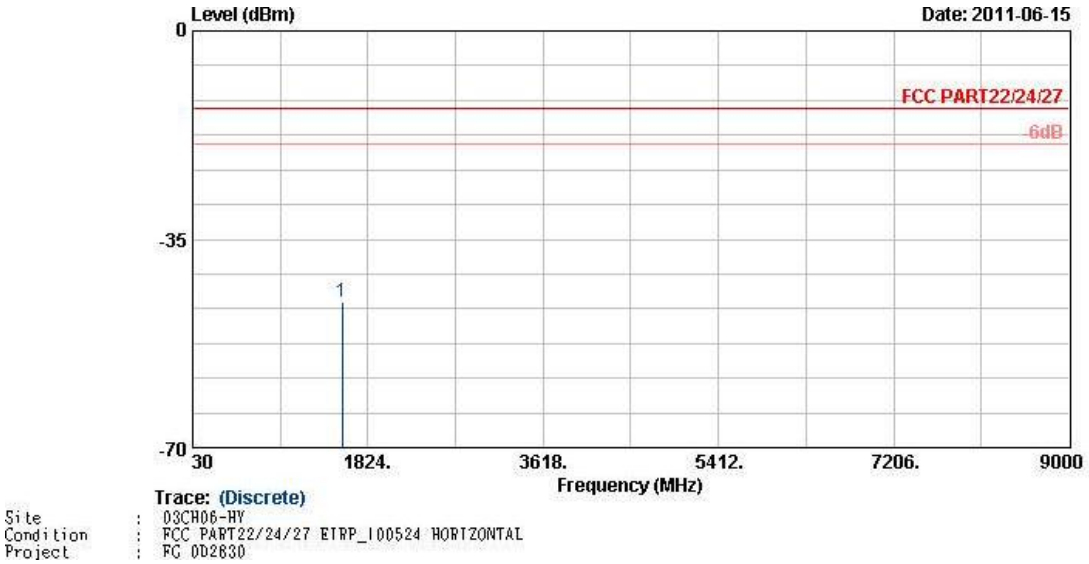
1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving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

3.6.4 Test Setup



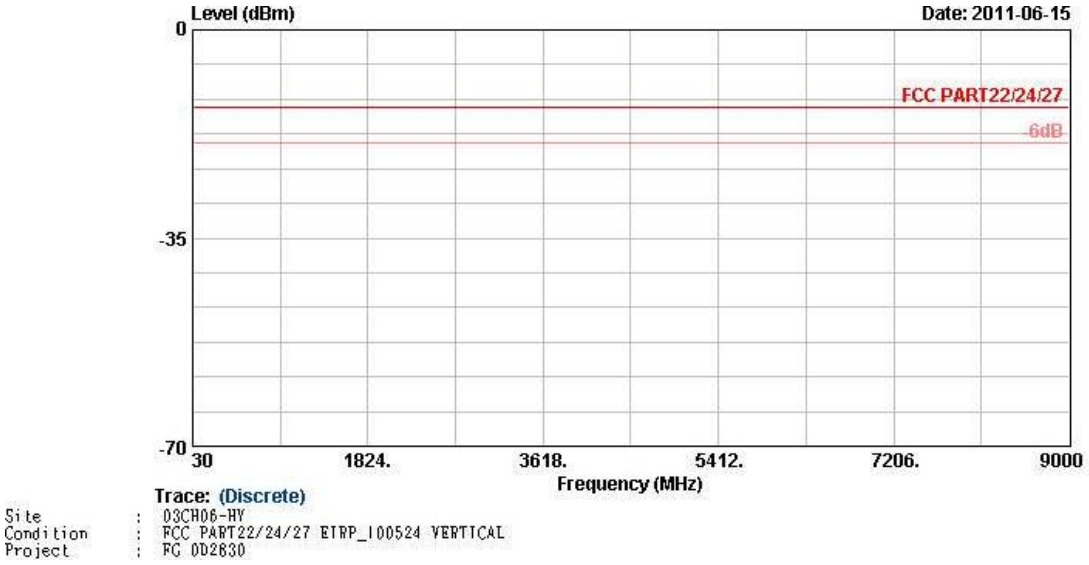
3.6.5 Test Result of Field Strength of Spurious Radiated

Band :	LTE Band 13	**Temperature :**	23~24°C
Test Mode :	QPSK (RB Size 1, RB Offset 49)	**Relative Humidity :**	46~47%
Test Engineer :	Kai Wang	**Polarization :**	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

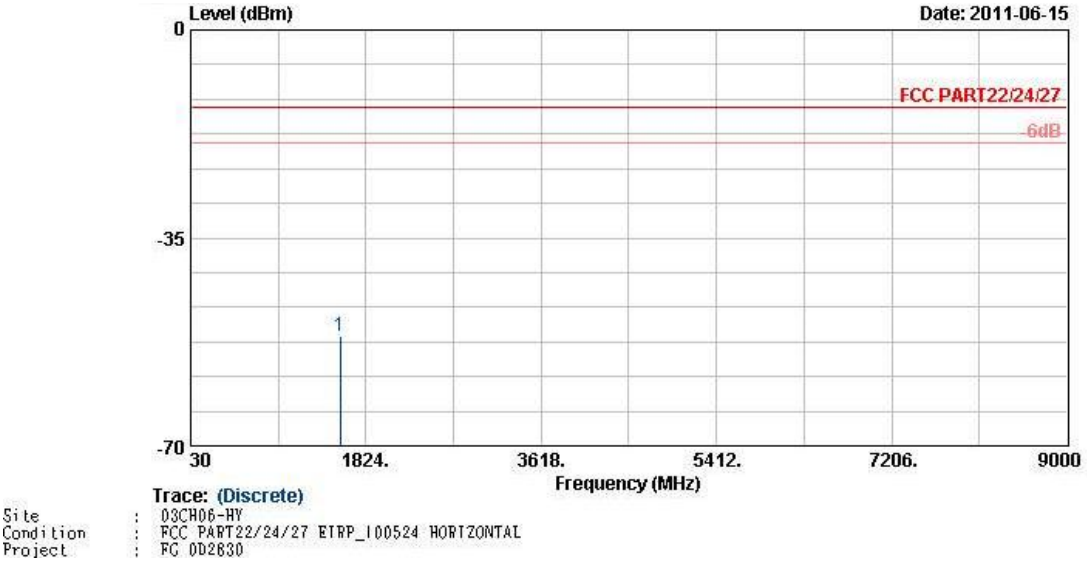


Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1564	-45.48	-13	-32.48	-55.21	-48.29	0.72	5.68	H	Pass

Band :	LTE Band 13	**Temperature :**	23~24°C
Test Mode :	QPSK (RB Size 1, RB Offset 49)	**Relative Humidity :**	46~47%
Test Engineer :	Kai Wang	**Polarization :**	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line. Spurious emissions within 1000MHz ~ 10th harmonic were not found any signals.		

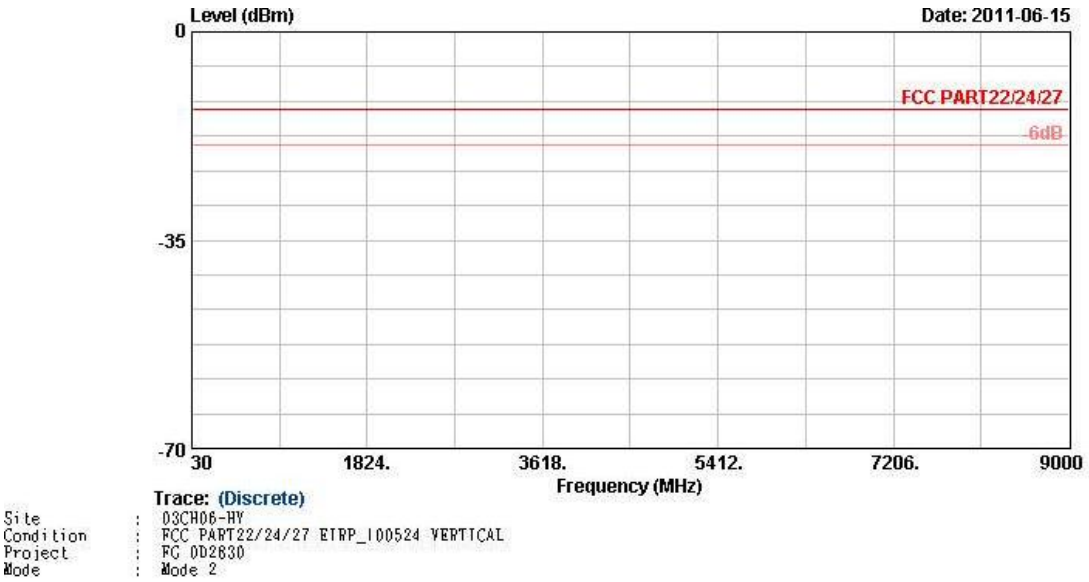


Band :	LTE Band 13	Temperature :	23~24°C
Test Mode :	16QAM (RB Size 1, RB Offset 0)	Relative Humidity :	46~47%
Test Engineer :	Kai Wang	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



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
1564	-51.45	-13	-38.45	-61.64	-54.26	0.72	5.68	H	Pass

Band :	LTE Band 13	**Temperature :**	23~24°C
Test Mode :	16QAM (RB Size 1, RB Offset 0)	**Relative Humidity :**	46~47%
Test Engineer :	Kai Wang	**Polarization :**	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



3.7 Frequency Stability Measurement

3.7.1 Description of Frequency Stability Measurement

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

3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

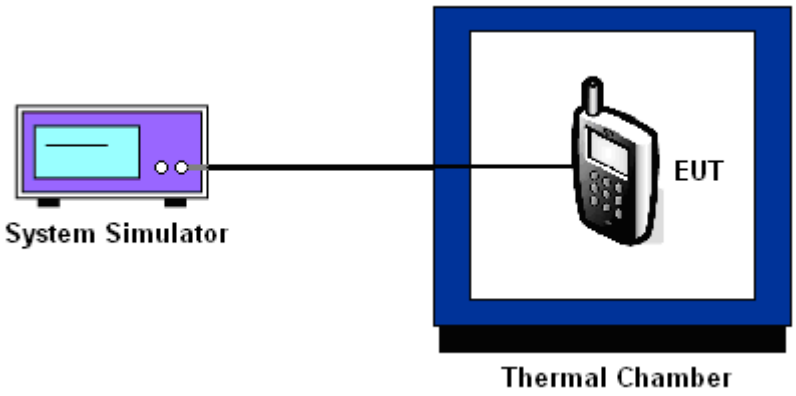
3.7.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized for three hours. 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.

3.7.4 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 BEP to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

3.7.5 Test Setup



3.7.6 Test Result of Temperature Variation

Band :	LTE Band 13	Channel :	23230
		Modulation :	QPSK

Temperature (°C)	QPSK (RB Size 50, RB Offset 0)		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	N/A	N/A	PASS
-20	N/A	N/A	
-10	3.78	0.0048338	
0	-4.59	-0.0058696	
10	-4.76	-0.006087	
20	5.06	0.0064706	
30	-3.56	-0.0045524	
40	-4.05	-0.005179	
50	-5.48	-0.0070077	

Note: The manufacturer declared that the EUT could work properly between temperatures -10°C~60°C.

Band :	LTE Band 13	Channel :	23230
		Modulation :	16QAM

Temperature (°C)	16QAM -RB Size 50, RB Offset 0		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	N/A	N/A	PASS
-20	N/A	N/A	
-10	7.65	0.0097826	
0	8.08	0.0103325	
10	8.15	0.010422	
20	8.74	0.0111765	
30	8.01	0.010243	
40	8.37	0.0107033	
50	-6.79	-0.0086829	

Note: The manufacturer declared that the EUT could work properly between temperatures -10°C~60°C.

3.7.7 Test Result of Voltage Variation

Band & Channel	Mode	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
LTE Band 13 CH23230	QPSK (RB Size 50, RB Offset 0)	3.7	-4.26	-0.0054476	±2.5	PASS
		BEP	-3.98	-0.0050895		
		4.2	-4.86	-0.0062148		
	16QAM (RB Size 50, RB Offset 0)	3.7	8.8	0.0112532		
		BEP	-8.75	-0.0111893		
		4.2	8.11	0.0103708		

Remark:

1. Normal Voltage = 3.7V.
2. Battery End Point (BEP) = 3.5 V.

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
System Simulator	R&S	CMW500	102159	N/A	Sep. 09, 2010	Sep. 08, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP30	101329	9kHz~30GHz	May. 03, 2011	May. 02, 2012	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Feb. 18, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 18, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 30, 2010	Jul. 29, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100057	9KHz-40GHz	Oct. 25, 2010	Oct. 24, 2011	Radiation (03CH06-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz~7GHz	Aug.19, 2010	Aug.19, 2011	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Oct. 31, 2010	Oct. 31, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz~18GHz	Aug. 02, 2010	Aug. 01, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Oct. 20, 2010	Oct. 19, 2011	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz~1GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH06-HY)
System Simulator	R&S	CMW500	102159	N/A	Sep. 09, 2010	Sep. 08, 2011	Conducted (TH02-HY)

5 Uncertainty of Evaluation

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

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty Uc(y)	**1.27**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**		

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

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR Γ1 = 0.197 Antenna VSWR Γ2 = 0.194 Uncertainty = 20Log(1-Γ1*Γ2)	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty Uc(y)	**2.36**				
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**				

Appendix A. Photographs of EUT

Please refer to Sporton report number EP0D2830 as below.