

HCT CO., LTD.



SAN 136-1, AMI-RI , BUBAL-EUP, ICHEON-SI, KYOUNGKI-DO, 467-701, KOREA

TEL: +82 31 639 8565 FAX: +82 31 639 8525 www.hct.co.kr

CERTIFICATE OF COMPLIANCE

TEST REPORT

LG Electronics Inc.

LG R&D Complex 533, Hogye-1dong, Dongan-gu,

Anyang-Shi, Kyungki-Do, 431-080 Korea

Date of Issue: May 11, 2009

Test Report No.: HCT-RF09-0512

Test Site: HCT CO., LTD.

FCC :

APPLICANT :

BEJLEO3-BAND13
LG Electronics Inc.

EUT Type:	LTE User Equipment
Tx Frequency:	777 – 787 MHz
Rx Frequency:	746 – 756 MHz
Max. RF Output Power:	23 dBm (200 mW)
Trade Name/Model(s):	LG Electronics Inc. / LEO3
FCC Classification:	Licensed Non-Broadcast Station Transmitter (TNB)
Application Type:	Certification
FCC Rule Part(s):	§2, §15 Subpart B, §27 Subpart L
Antenna Specifications:	Manufacturer: Hanwool Technology Gain : -2.3 dBi
Emission Designator(s):	8M61G7D (QPSK), 8M61D7D (16QAM)

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in § 2.947.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HCT Co., Ltd. Certifies that no party to this application has been denied FCC benefits pursuant to section 5301 of the Anti- Drug Abuse Act of 1998, 21 U.S. C. 853(a)

Report prepared by

: Chang Seok Choi

Test engineer of RF Part

Approved by

: Sang Jun Lee

Manager of RF Part

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MEASUREMENT REPORT

1. SCOPE

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

General Information

Company Name:	LG Electronics Inc.
Address:	LG R&D Complex 533, Hogye-1dong, Dongan-gu, Anyang-Shi, Kyungki-Do, 431-080 Korea
Tel. / Fax :	+ 82-31-450-7984 / + 82-31-450-4049
E-Mail:	frank.lee@lge.com

- FCC: BEJLEO3-BAND13
- EUT Type: LTE User Equipment
- Trade Name: LG Electronics Inc.
- Model(s): LEO3-BAND13
- Tx Frequency: 777 - 787 MHz
- Rx Frequency: 746 - 756 MHz
- Application Type: Certification
- FCC Classification: Licensed Non-Broadcast Station Transmitter (TNB)
- FCC Rule Part(s): §2, §15 Subpart B, §27 Subpart L
- Modulation(s): QPSK, 16QAM
- Antenna Type: Helical
- Date(s) of Tests: February 23, 2009 ~ February 26, 2009
- Place of Tests: HCT CO., LTD.
Icheon, Kyounki-Do, KOREA

2. INTRODUCTION

EUT DESCRIPTION

The LG Electronics Inc. LEO3-BAND13 LTE User Equipment.

Its basic purpose is used for communications.

It transmits from 777 ~ 787 MHz and receives from 746 ~ 756 MHz.

The RF power is rated at 0.2 W (23 dBm).

MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data are located at the 254-1, Maekok-Ri, Hobup-Myun, Ichon-Si, Kyoungki-Do, 467-701, KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 6, 2006(Registration Number: 90661)

3. DESCRIPTION OF TESTS

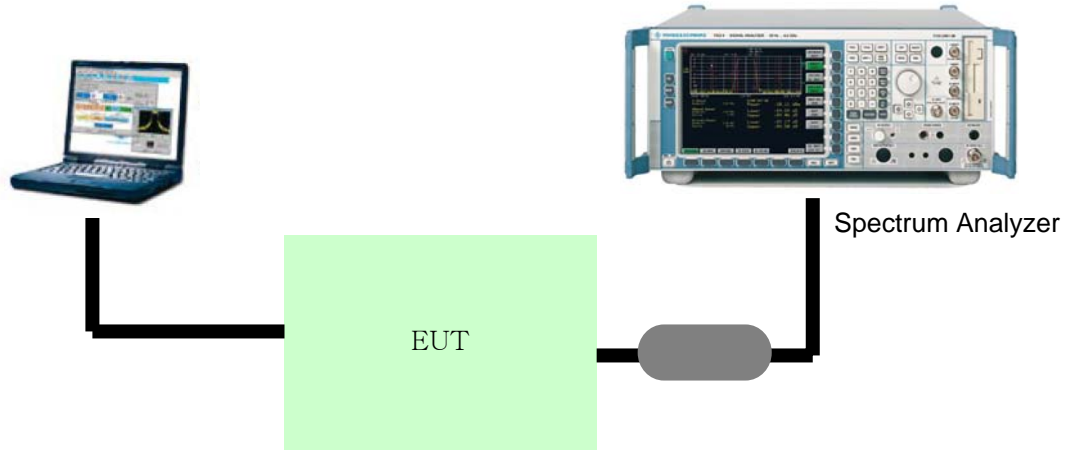
Test Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1046 27.50(d)	RF Power Output	N/A	Conducted	PASS	3.1
2.1049(i)	Occupied Bandwidth	N/A		PASS	3.2
2.1051 27.53(g)	Conducted Spurious Emissions at Antenna Terminals	$< 43 + 10\log_{10}(P[\text{Watt}])$		PASS	3.3
27.50(d)	Equivalent Isotropic Radiated Power	$< 1\text{Watt max EIRP}$	Radiated	PASS	3.4
2.1053 27.53(g)	Field Strength of Spurious Radiation	$< 43 + 10\log_{10}(P[\text{Watt}])$		PASS	3.5
2.1055 27.54	Frequency Stability	Within the allotted band	Conducted	PASS	3.6
15.107	Conducted Emissions	$< \text{FCC 15.107 Limits}$	Line Conducted	PASS	3.7
15.109	Radiated Emissions	$< \text{FCC 15.109 Limits}$	Radiated (30MHz~1GHz) (1GHz~18GHz)	PASS	3.8
2.1091 2.1093	RF Exposure	1.0 mW/cm ²	SAR	PASS	3.9

Test Result: The product presented for testing complied with test requirements as shown above.

3.1 Conducted RF Power Test

Test Set-up



Test Procedure

According to FCC §2.1046 (A), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

- 1) The EUT was coupled to the spectrum analyzer and the base station simulator through a power divider. The radio frequency load attached to the EUT antenna terminal was 50 Ohm. The loss of the cables the test system is calibrated to correct the reading.
- 2) The spectrum analyzer was set to Maxpeak Detector function and Maximum hold mode.
- 3) The resolution bandwidth of the spectrum analyzer was comparable to the emission bandwidth.

Modulation Type	Frequency (MHz)	Output Power (dBm)	Output Power (W)	CCDF (dB)	Limit
QPSK	782	23.30	0.213	6.53	-
16QAM	782	23.31	0.214	7.37	-

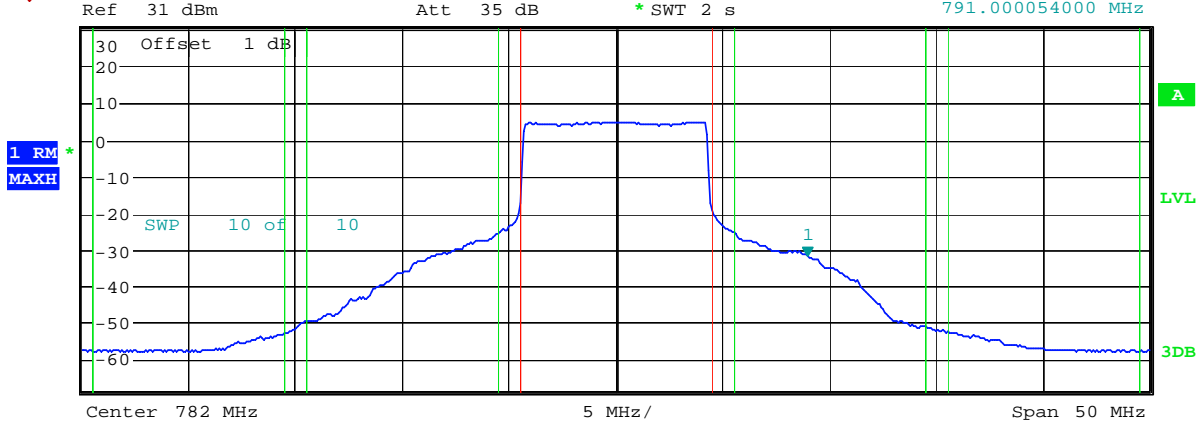
(Test Result)

Test Plots

[QPSK]



* RBW 100 kHz
 * VBW 1 MHz
 * SWT 2 s
 Marker 1 [T1]
 -32.26 dBm
 791.000054000 MHz



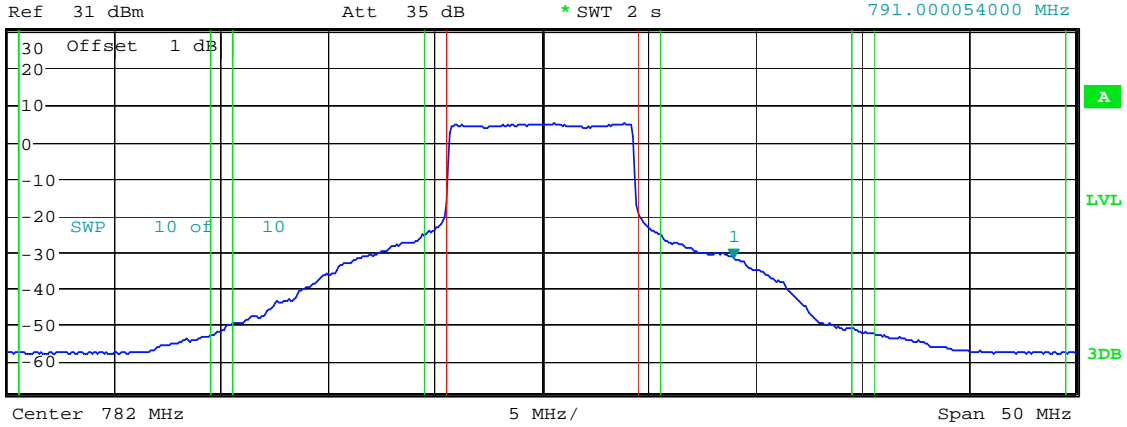
Tx Channel		Bandwidth	9 MHz	Power	23.30 dBm
Adjacent Channel		Bandwidth	9 MHz	Lower	-36.89 dB
		Spacing	10 MHz	Upper	-36.79 dB
Alternate Channel		Bandwidth	9 MHz	Lower	-60.97 dB
		Spacing	20 MHz	Upper	-60.49 dB

Date: 21.APR.2009 13:11:59

[160QAM]



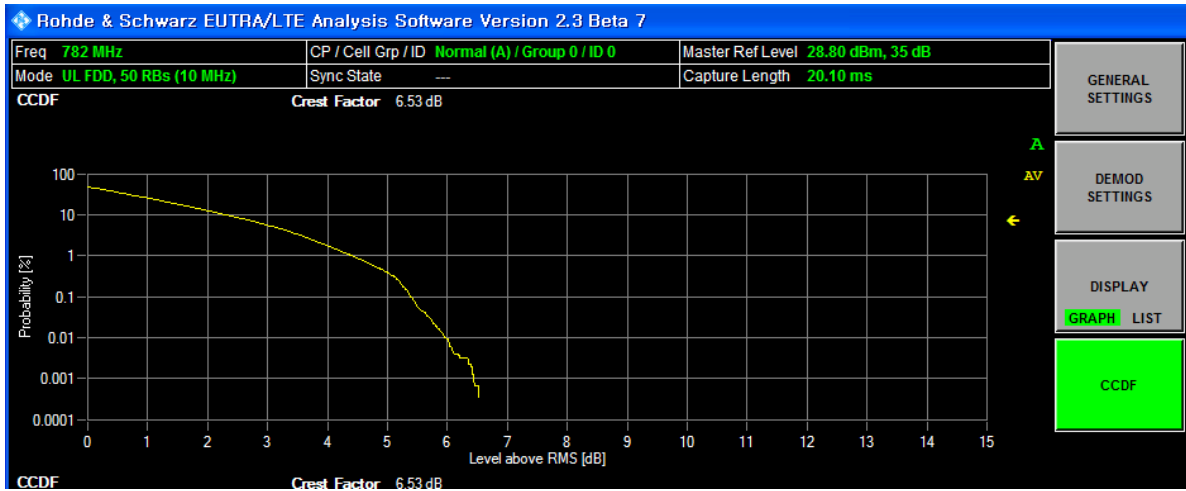
* RBW 100 kHz
 * VBW 1 MHz
 * SWT 2 s
 Marker 1 [T1]
 -32.22 dBm
 791.000054000 MHz



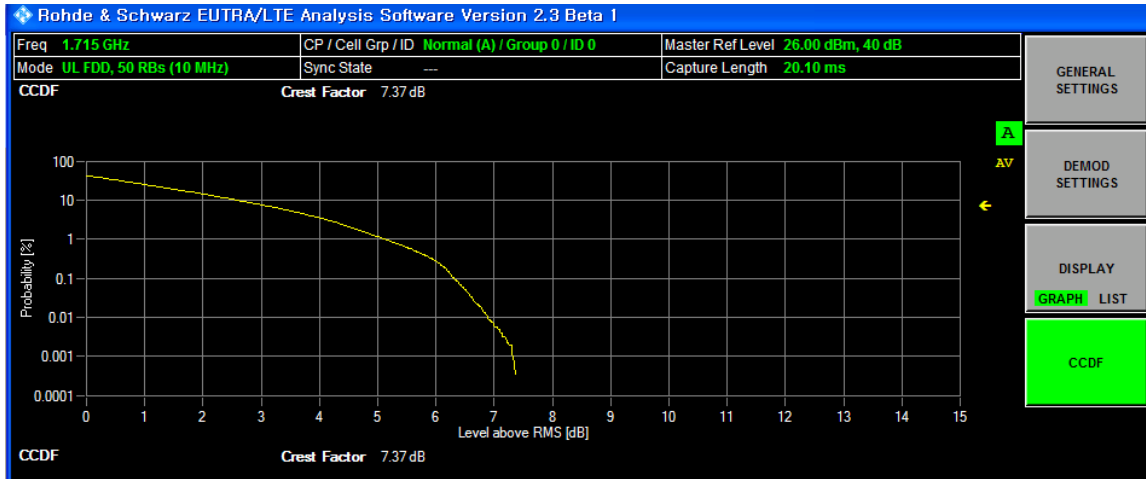
Tx Channel		Bandwidth	9 MHz	Power	23.31 dBm
Adjacent Channel		Bandwidth	9 MHz	Lower	-36.85 dB
		Spacing	10 MHz	Upper	-36.78 dB
Alternate Channel		Bandwidth	9 MHz	Lower	-60.98 dB
		Spacing	20 MHz	Upper	-60.46 dB

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[Peak to Average Ratio-QPSK]

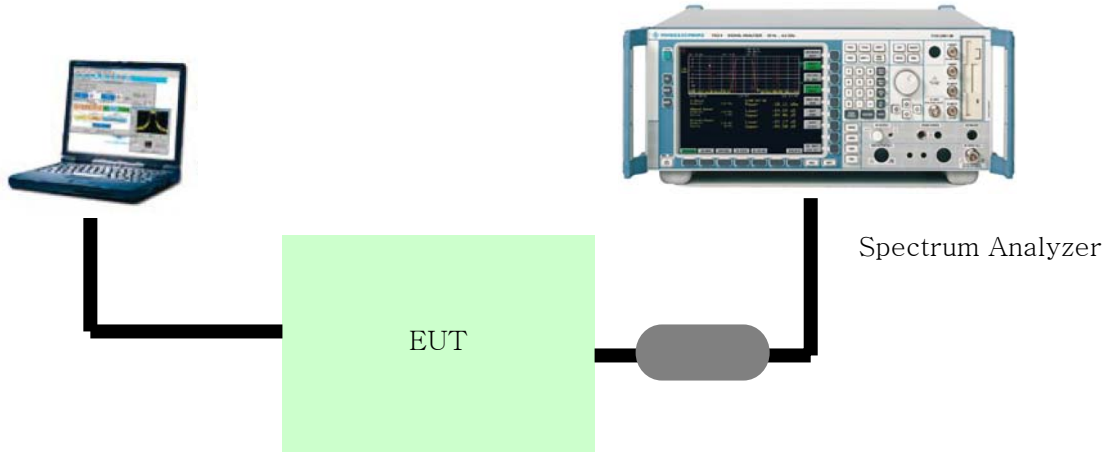


[Peak to Average Ratio-16QAM]



3.2 Occupied bandwidth

Test Set-up



Test Procedure

The EUT was setup to maximum output power at its lowest channel. The occupied bandwidth was measured using a spectrum analyzer. The measurements are repeated for the highest, lowest and a middle channel. The EUT's occupied bandwidth is measured by 99% bandwidth. Plots of the EUT's occupied bandwidth are shown herein.

Modulation Type	Frequency (MHz)	Occupied BandWidth (MHz)	Limit
QPSK	782	8.605	-
16QAM	782	8.605	-

(Test Result)

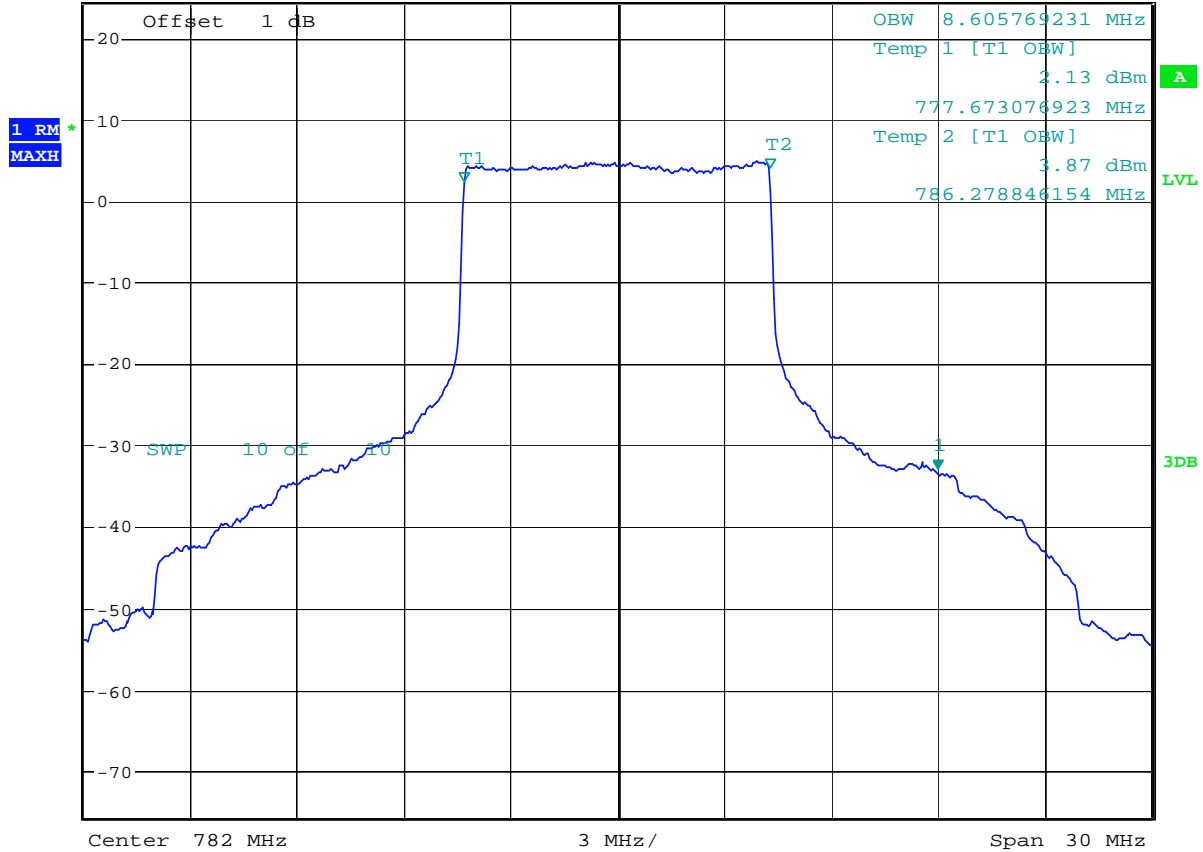
Test Plots

[QPSK]



*RBW 100 kHz Marker 1 [T1]
 VBW 1 MHz -33.19 dBm
 *SWT 1 s 791.000054000 MHz

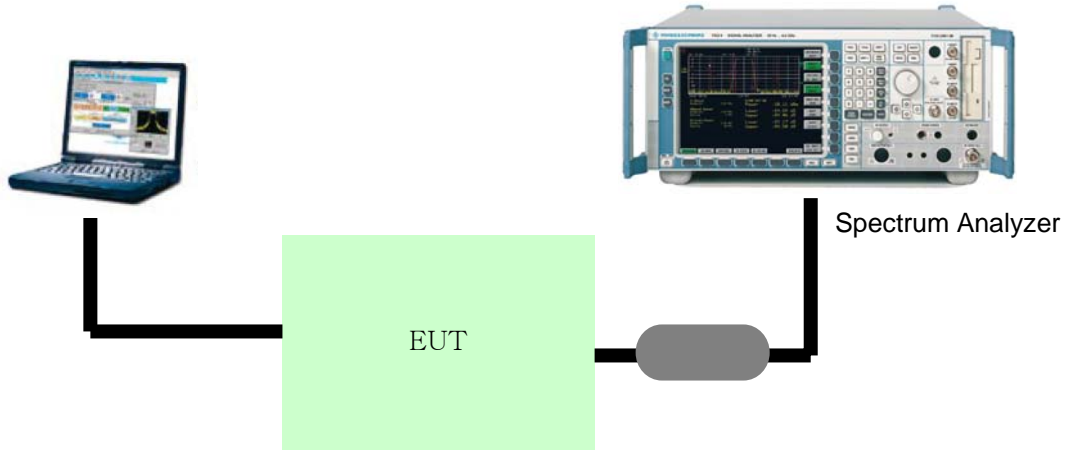
Ref 24.3 dBm *Att 35 dB



Date: 21.APR.2009 12:27:33

3.3 Spurious Emissions at Antenna Terminal

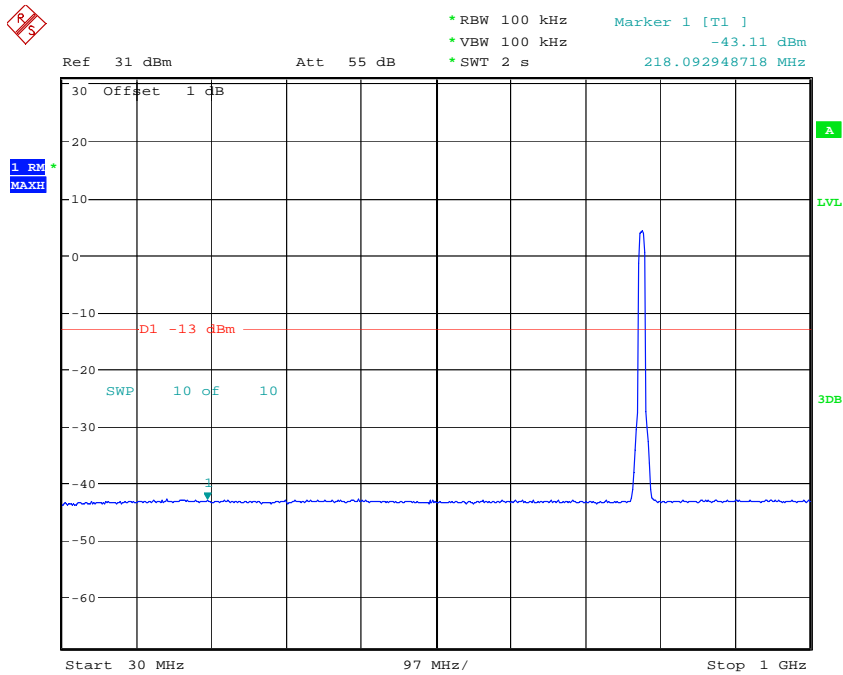
Test Set-up



Test Procedure

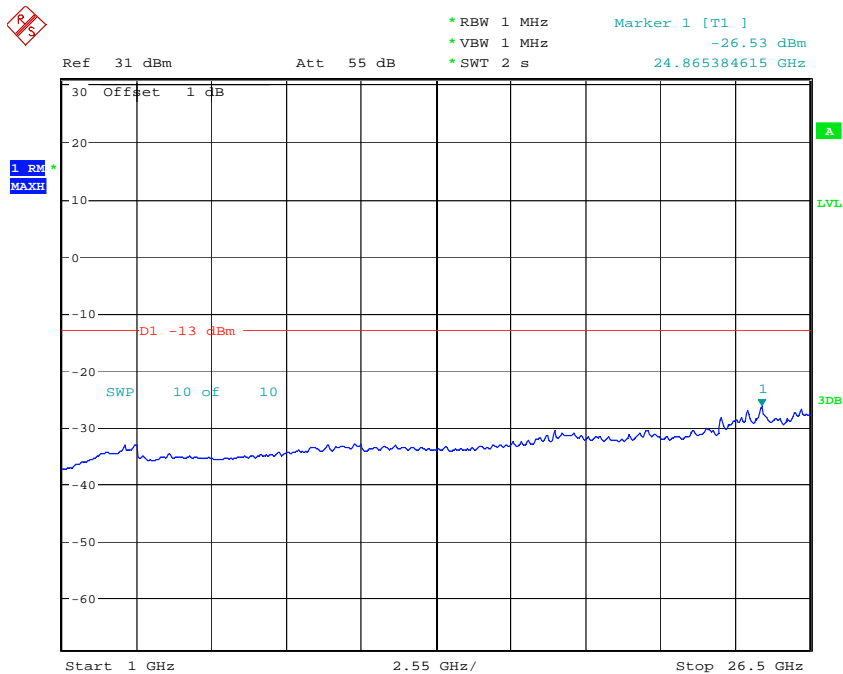
The EUT was setup to maximum output power at its lowest channel. The Resolution BW of the analyzer is set to 1 % of the emission bandwidth to show compliance with the - 13 dBm limit, in the 1 MHz bands immediately outside and adjacent to the edge of the frequency block. The 1 MHz RBW was used to scan from 10 MHz to 10 GHz.. A display line was placed at - 13 dBm to show compliance. The high, lowest and a middle channel were tested for out of band measurements.

[Spurious Emission – 16QAM]



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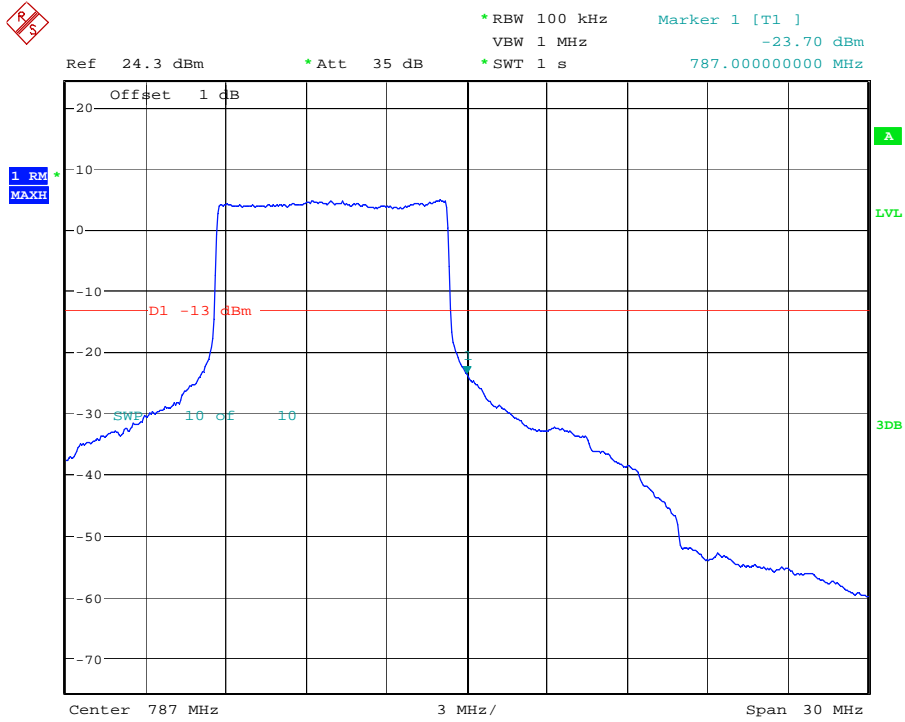
[30 MHz ~ 1 GHz]



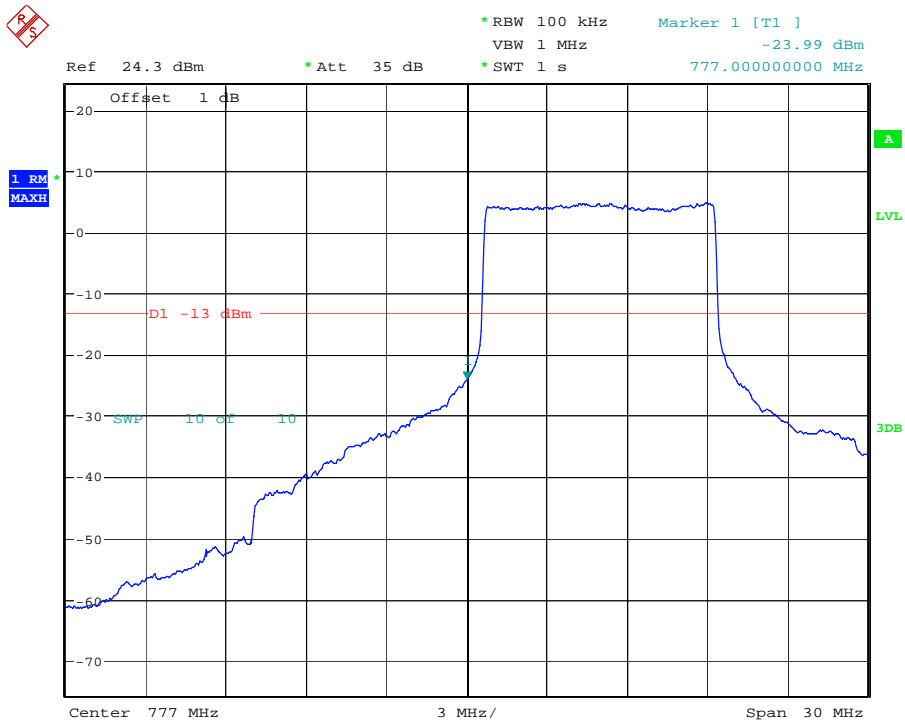
Date: 21.APR.2009 13:17:36

[1 GHz ~ 26.5 GHz]

[Band Edge - QPSK]

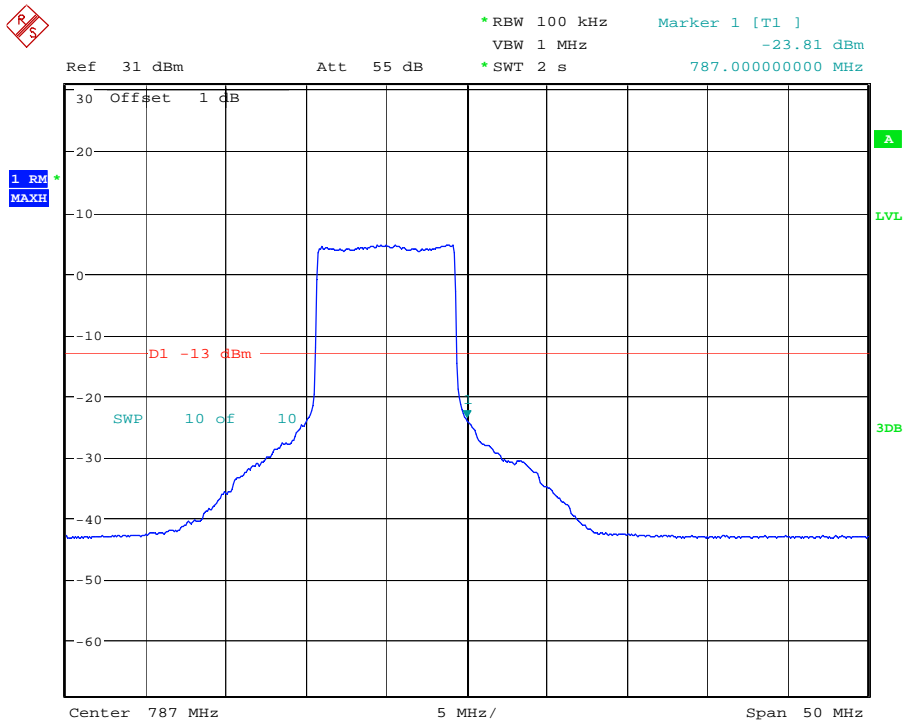


Date: 21.APR.2009 12:29:33

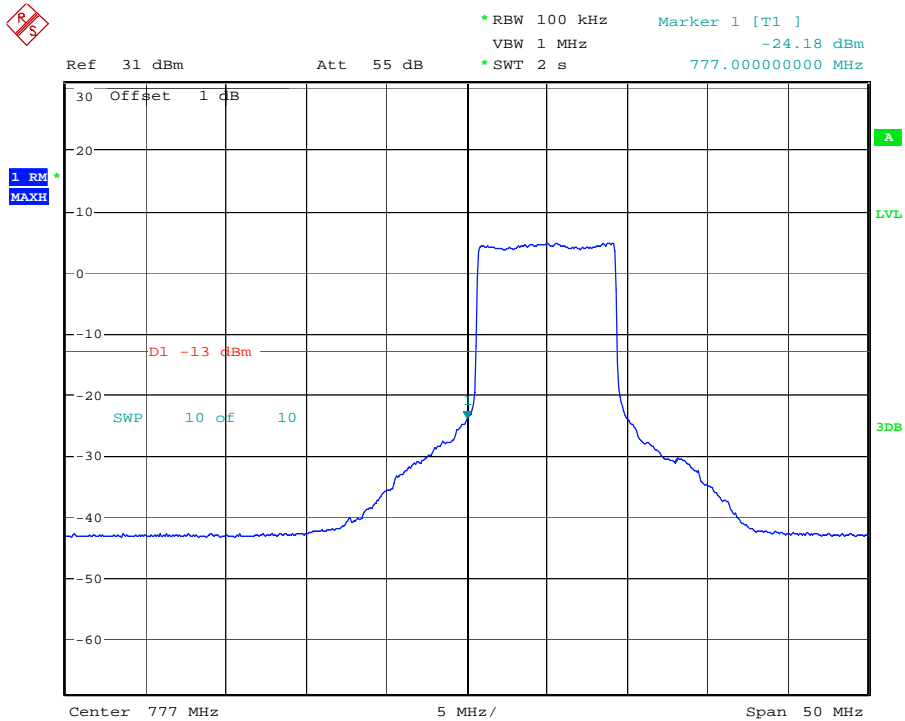


Date: 21.APR.2009 12:32:43

[Band Edge – 16QAM]



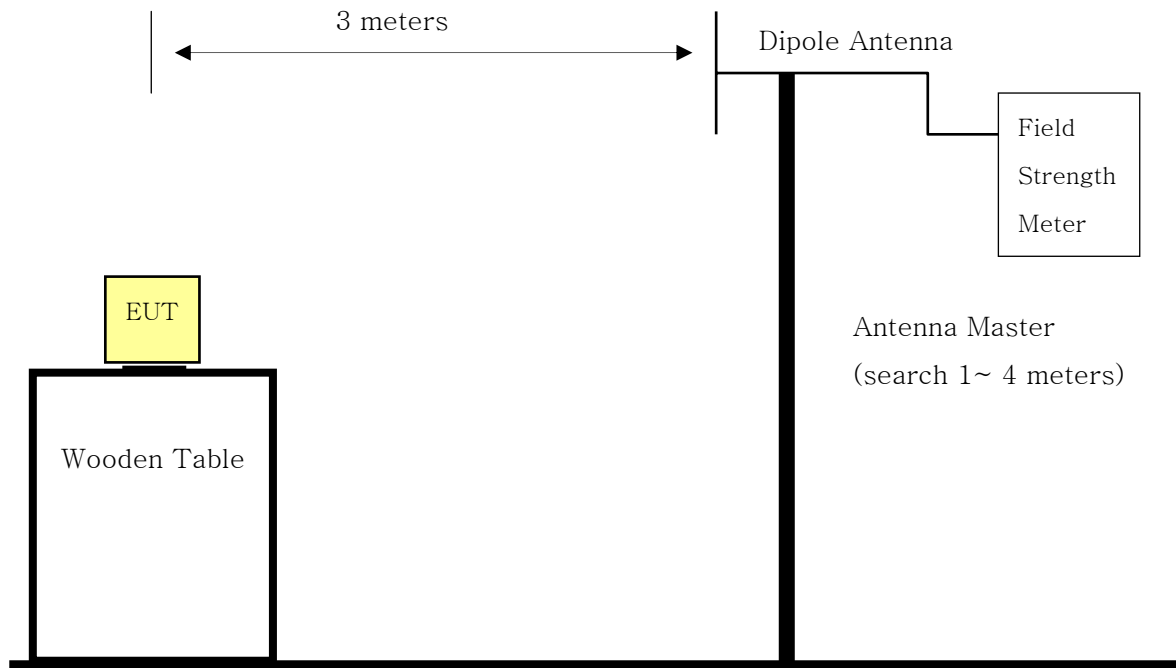
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Date: 21.APR.2009 13:12:52

3.4 Equivalent Isotropic Radiated Power

Test Set-up



[Open Field Test Site]

Test Procedure

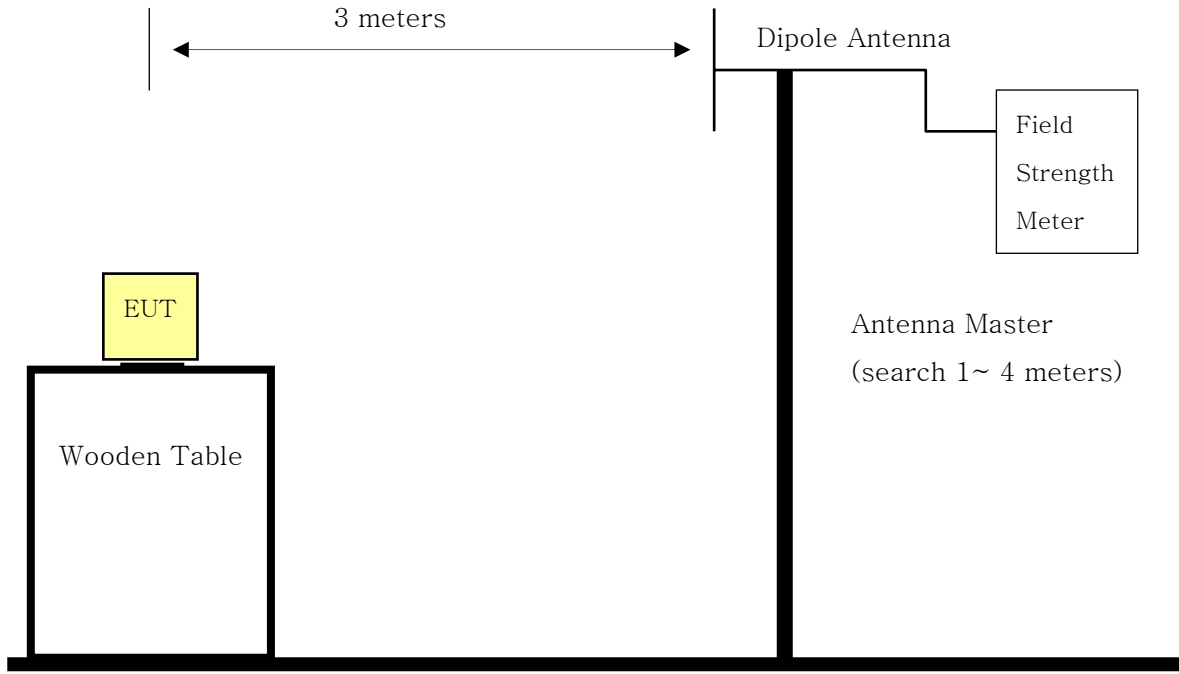
The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section 2.948.

The open field test site is situated in open field with ground screen whose site attenuation characteristics meet ANSI C63.4 –2003. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a turn-able wooden platform mounted at three from the antenna mast.

- 1) The EUT mounted on a wooden tripod is 0.8 meter above test site ground level.
- 2) During the test, the turn table is rotated and the antenna height is also varied from 1 to 4 meters until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with $\lambda/2$ dipole antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (4).
- 6) The signal generator output level is the rating of effective radiated power (ERP).
- 7) The instrument settings used (RBW/ VBW) during ERP/ EIRP output power measurement are as Below;

3.5 Field strength of spurious radiation

Test Set-up



[Open Field Test Site]

Test Procedure

The measurement facilities used for this test have been documented in previous filings with the commission pursuant to section 2.948.

The open field test site is situated in open field with ground screen whose site attenuation characteristics meet ANSI/TIA-603-C-2004. A mast capable of lifting the receiving antenna from a height of one to four meters is used together with a turn-able wooden platform mounted at three from the antenna mast.

- 1) The unit mounted on a wooden table 1.5 m × 1.0 m × 0.80 m is 0.8 meter above test site ground level.
- 2) During the emission test, the turn table is rotated and the EUT is manipulated to find the configuration resulting in maximum emission under normal condition of installation and operation.
- 3) The antenna height and polarization are also varied from 1 to 4 meters until the maximum signal is found.
- 4) The spectrum shall be scanned up to the 10th harmonic of the fundamental frequency.
- 5) The instrument settings used (RBW/ VBW) during ERP/ EIRP output power measurement are as below ;

Test Result

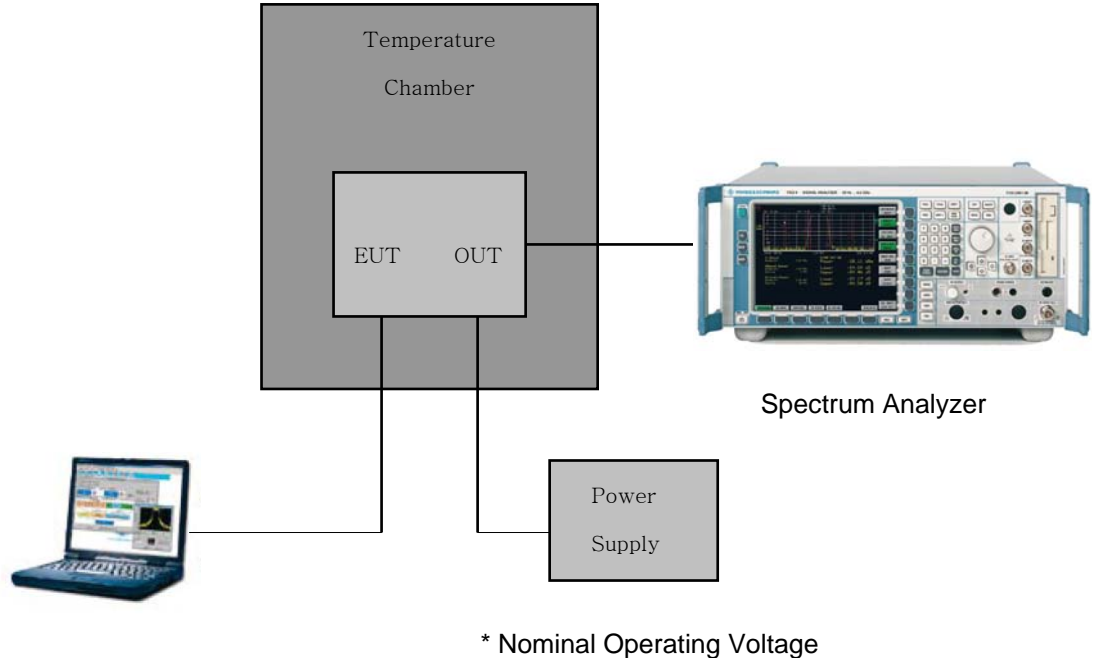
- OPERATING FREQUENCY: 782 MHz
- MEASURED OUTPUT POWER: 17.75 dBm
- DISTANCE: 3 meters
- LIMIT: $43 + 10 \log_{10} (W) =$ 71.99 dBc

Freq. (MHz)	LEVEL@ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	CORRECT GENERATOR LEVEL (dBm)	POL (H/V)	(dBc)
1564	-60.89	6.65	-54.24	H	71.99
3910	-64.12	10.40	-53.72	V	71.47
5474	-58.83	9.41	-49.42	V	67.17

※ This device was tested under all configurations and the worst case is reported with 16QAM.
This unit was tested with its external Adapter.

3.6 Frequency stability

Test Set-up



Test Procedure

The frequency stability of the transmitter is measured by:

- Temperature:** The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.
- Primary Supply Voltage:** The primary supply voltage is varied from battery end point to 115 % of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification — The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25 °C to 27 °C to provide a reference).
2. The equipment is subjected to an overnight “soak” at - 30 °C without any power applied.
3. After the overnight “soak” at 30 °C (usually 14-16 hours), the equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements are made at 10 °C interval up to room temperature. At least a period of one and one half-hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency were made at 10 °C intervals starting at - 30 °C up to + 50 °C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

NOTE: The EUT is tested 782 MHz, 16QAM.

Main Power [V]	Freq. Error [Hz]	Difference [Hz]	ppm
10.2	-8.87	-17.94	-0.01134
12.0	9.07	0	0.011598
13.8	-3.3	-12.37	-0.00422

(Frequency Drift with Supply Voltage Variation)

Temp. [Celsius]	Freq. Error [Hz]	Difference [Hz]	ppm
50	2.05	33.59	0.002621
40	-34.09	-2.55	-0.04359
30	-49.88	-18.34	-0.06379
20	-31.54	0	-0.04033
10	-65.42	-33.88	-0.08366
0	18.49	50.03	0.023645
-10	-73.93	-73.93	-0.09454
-20	68.36	118.24	0.087417

(Frequency Drift with Temperature Variation)

3.7 Conducted Emissions

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolt

The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	79	66
0.50 to 30	73	60

Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

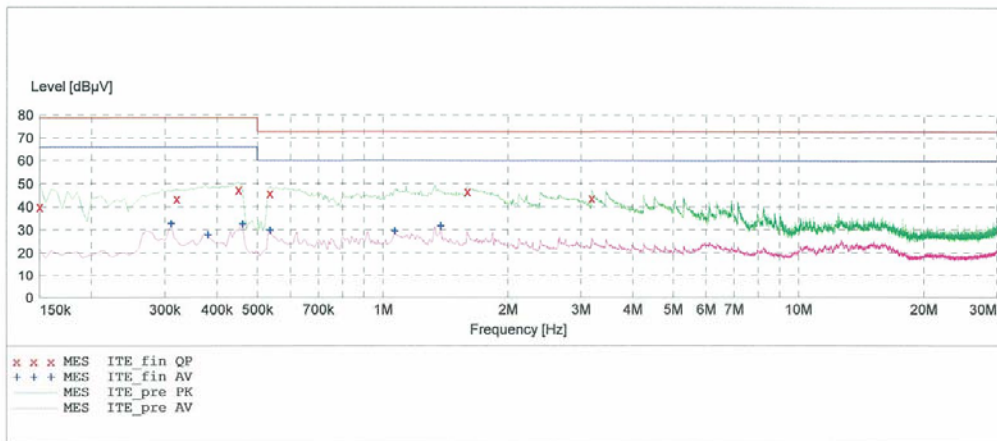
HCT

EMC TEST LAB

EUT: LEO3_BAND13
 Manufacturer: LG Electronics
 Operating Condition: NORMAL
 Test Site: SHIELD ROOM
 Operator: JP-HONG
 Test Specification: CISPR22 CLASS A
 Comment: H

SCAN TABLE: "CISPR22 CLASS A"

Start	Stop	Step	EN	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	55022 Voltage	MaxPeak	10.0 ms	9 kHz	None
500.0 kHz	30.0 MHz	5.0 kHz		Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "ITE_fin QP"

4/21/2009 3:06PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.150000	40.30	10.1	79	38.7	---	---
0.320000	43.70	10.1	79	35.3	---	---
0.450000	47.70	10.2	79	31.3	---	---
0.535000	46.10	10.2	73	26.9	---	---
1.595000	47.00	10.3	73	26.0	---	---
3.185000	44.10	10.5	73	28.9	---	---

MEASUREMENT RESULT: "ITE_fin AV"

4/21/2009 3:06PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.310000	32.80	10.1	66	33.2	---	---
0.380000	28.00	10.1	66	38.0	---	---
0.460000	32.60	10.2	66	33.4	---	---

MEASUREMENT RESULT: "ITE_fin AV"

(continued)

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.535000	30.00	10.2	60	30.0	---	---
1.065000	29.70	10.2	60	30.3	---	---
1.375000	31.80	10.3	60	28.2	---	---

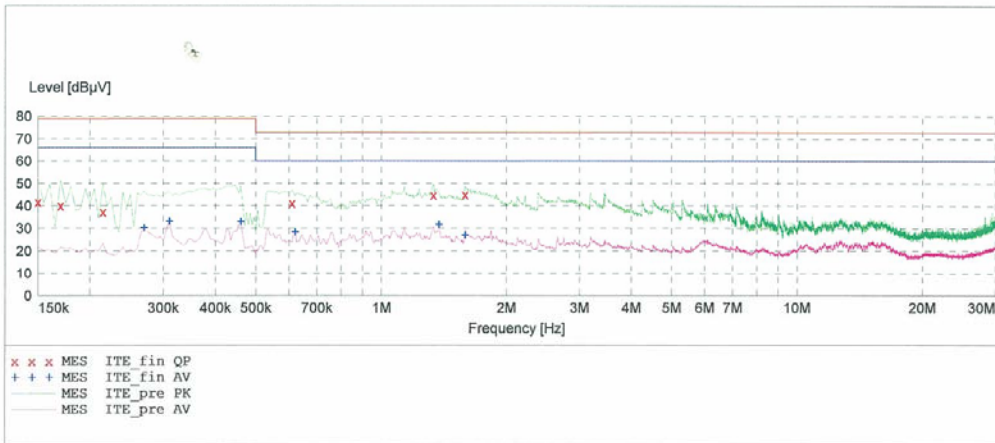
HCT

EMC TEST LAB

EUT: LEO3_BAND13
 Manufacturer: LG Electronics
 Operating Condition: NORMAL
 Test Site: SHIELD ROOM
 Operator: JP-HONG
 Test Specification: CISPR22 CLASS A
 Comment: N

SCAN TABLE: "CISPR22 CLASS A"

Start	Stop	Step	EN	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	5.0 kHz	55022 Voltage	MaxPeak	10.0 ms	9 kHz	None
500.0 kHz	30.0 MHz	5.0 kHz		Average	10.0 ms	9 kHz	None
				MaxPeak			
				Average			



MEASUREMENT RESULT: "ITE_fin_QP"

4/21/2009 3:03PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.150000	41.90	10.1	79	37.1	---	---
0.170000	40.40	10.1	79	38.6	---	---
0.215000	37.60	10.1	79	41.4	---	---
0.610000	41.50	10.2	73	31.5	---	---
1.335000	45.10	10.3	73	27.9	---	---
1.590000	45.30	10.3	73	27.7	---	---

MEASUREMENT RESULT: "ITE_fin_AV"

4/21/2009 3:03PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.270000	30.60	10.1	66	35.4	---	---
0.310000	33.50	10.1	66	32.5	---	---
0.460000	33.20	10.2	66	32.8	---	---

MEASUREMENT RESULT: "ITE_fin AV"

(continued)

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.620000	28.60	10.2	60	31.4	---	---
1.375000	32.00	10.3	60	28.0	---	---
1.590000	27.30	10.3	60	32.7	---	---

3.8 Radiated Emissions

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (microvolts/meter)
30-88	100
88-216	150
216-960	200
Above 960	500

Test Result

Frequency MHz	Reading dBuV	Ant. Factor dB/m	Cable Loss dB	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
122.9	22.0	10.9	2.6	V	35.5	43.5	-8.0
553.0	16.3	18.4	5.5	V	40.2	46.0	-5.8
553.0	16.7	18.4	5.5	H	40.6	46.0	-5.4
798.7	10.9	22.2	6.7	H	39.8	46.0	-6.2
798.7	12.4	22.2	6.7	V	41.3	46.0	-4.7
921.6	9.7	23.5	7.4	V	40.6	46.0	-5.4

(30 MHz ~ 1 GHz)

3.9 RF Exposure Statement

1. LIMITS

According to §1.1310 and §2.1091 RF exposure is calculated.

(B) Limits for General Population/Uncontrolled Exposures

Frequency range (MHz)	Electric field Strength (V/m)	Magnetic field Strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
0.3 - 1.34.....	614	1.63	*(100)	30
1.34 - 30.....	824/f	2.19/f	*(180/ f ²)	30
30 - 300.....	27.5	0.073	0.2	30
300 - 1500.....	f/1500	30
1500 - 100.000.....	1.0	30

F = frequency in MHz

* = Plane-wave equivalent power density

2. MAXIMUM PERMISSIBLE EXPOSURE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

S = Power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Max Peak output Power at antenna input terminal	23.310	dBm
Max Peak output Power at antenna input terminal	214.289	mW
Prediction distance	20.000	cm
Prediction frequency	782.000	MHz
Antenna Gain(typical)	-2.300	dBi
Antenna Gain(numeric)	0.589	-
Power density at prediction frequency(S)	0.025	mW/cm ²
MPE limit for uncontrolled exposure at prediction frequency	0.521	mW/cm ²

3. RESULTS

The power density level at 20 cm is 0.025 mW/cm², which is below the uncontrolled exposure limit of 0.521 mW/cm² at 782 MHz

4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Interval	Calibration Due
R&S	ESI40 / Spectrum Analyzer	831564/003	Annual	10/31/2009
R&S	FSQ26 / Spectrum Analyzer	200542	Annual	11/10/2009
Agilent	E4416A / Power Meter	MY41291412	Annual	01/21/2010
Agilent	E9327A / Power Sensor	MY4442009	Annual	07/28/2009
MITEQ	AMF-6D-01180-35-20P/ AMP	990893	Annual	05/20/2009
Wainwright	WHK1.2/15G-10EF/H.P.F	2	Annual	06/28/2009
Wainwright	WHK3.3/18G-10EF/H.P.F	1	Annual	06/28/2009
Agilent	775D / Dual Directional Coupler	16072	Annual	12/24/2009
Agilent	1506A / Power Divider	99441	Annual	12/24/2009
Digital	EP-3010 / Power Supply	3110117	Annual	01/07/2010
Korea Engineering	KR-1005L / Chamber	KRAB07063-2CH	Annual	12/31/2009
Schwarzbeck	VULB9160/ TRILOG Antenna	3150	Biennial	12/18/2010
Schwarzbeck	VULB9160/ TRILOG Antenna	3125	Biennial	05/16/2009
Schwarzbeck	BBHA 9120D/ Horn Antenna	147	Biennial	03/26/2010

5. CONCLUSION

The data collected shows that the LTE User Equipment **FCC ID: BEJLEO3-BAND13** complies with all the requirements of Parts 27 of the FCC rules.