FCC TEST REPORT

(PART 27)

REPORT NO.:	RF110705C18-6
MODEL NO.:	PH98100
FCC ID:	NM8PH98100
RECEIVED:	Jul. 05, 2011
TESTED:	Jul. 08 ~ Jul. 28, 2011
ISSUED:	Aug. 01, 2011

APPLICANT:	HTC Corporation
ADDRESS:	6-3, Baoquang Rd., Xindian City, Taipei County, Taiwan

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS:	No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang, Taipei Hsien 244, Taiwan, R.O.C.
TEST LOCATION:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	Aug. 01, 2011

1 CERTIFICATION

PRODUCT:	Smartphone
Model No.:	PH98100
BRAND:	HTC
APPLICANT:	HTC Corporation
TEST SAMPLE:	Production Unit
TESTED:	Jul. 08 ~ Jul. 28, 2011
TEST STANDARDS :	**FCC Part 27**
	FCC Part 2
	ANSI C63.4-2003

The above equipment (model: PH98100) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch,** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : Andrea Hsia / Specialist , **DATE :** Aug. 01, 2011

APPROVED BY : Gary Chang / Assistant Manager , **DATE :** Aug. 01, 2011

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

OPERATING BAND			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
2.1046 27.50(b)(10)	Maximum Peak Output Power Limit: max. 3 watts e.r.p peak power	PASS	Meet the requirement of limit. Minimum passing margin is 20.1dBm at 782.0MHz.
2.1055 27.54	Frequency Stability	PASS	Meet the requirement of limit.
2.1049	Occupied Bandwidth	PASS	Meet the requirement of limit.
27.50(d)(5)	Peak to average ratio	PASS	Meet the requirement of limit.
27.53(c)(2)	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 27.53(c)(2)	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1051 27.53(c)(4)	Emission in the 736–775 MHz and 793–805 MHz band	PASS	Meet the requirement of limit.
2.1053 27.53(c)(2)	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -35.7dB at 261.27MHz.
2.1053 27.53(f)	Emissions in the band 1559–1610 MHz	PASS	Meet the requirement of limit. Minimum passing margin is -3.7dB at 1572.8MHz.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	30MHz ~ 200MHz	3.19 dB
	200MHz ~1000MHz	3.21 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Smartphone
MODEL NO.	PH98100
FCC ID	NM8PH98100
NOMINAL VOLTAGE	3.8Vdc (Li-Lon battery) 3.7Vdc (Li-Lon battery) 5Vdc (Adapter & host equipment)
MODULATION TECHNOLOGY	QPSK, 16QAM
MULTIPLE ACCESS METHOD	FDD
DUPLEX METHOD	FDD
FREQUENCY RANGE	777-787MHz
CHANNEL BANDWIDTH	10MHz
MAX. ERP POWER	20.1dBm (102.3mW)
ANTENNA TYPE	Fixed internal antenna with -1dBi gain
OPERATION TEMPERATURE RANGE	-30°C ~ 50°C
I/O PORTS	Refer to user's manual
DATA CABLE	Refer to note as below
ACCESSORY DEVICES	Refer to note as below

NOTE:

1. The EUT's accessories list refers to Ext Pho_ NM8PH98100.pdf.
   *Items 1, 3, 7, 8 were used for the test.
   **After pretest of ERP for standard (No.3) and extend battery (No.5) and found standard battery (No.3) has worse value than extend battery. Therefore, standard battery (No.3) is performed for all test items.
2. After pretest of output power and spurious emission under below configurations, QPSK with 1RB at upper edge was found to be worst case and was selected for the final test.

MODULATION	RB SETTING
QPSK	1 RB allocated at the lower edge
QPSK	1 RB allocated at the upper edge
QPSK	50% RB allocation centered
QPSK	100% RB allocation
16QAM	1 RB allocated at the lower edge
16QAM	1 RB allocated at the upper edge
16QAM	50% RB allocation centered
16QAM	100% RB allocation

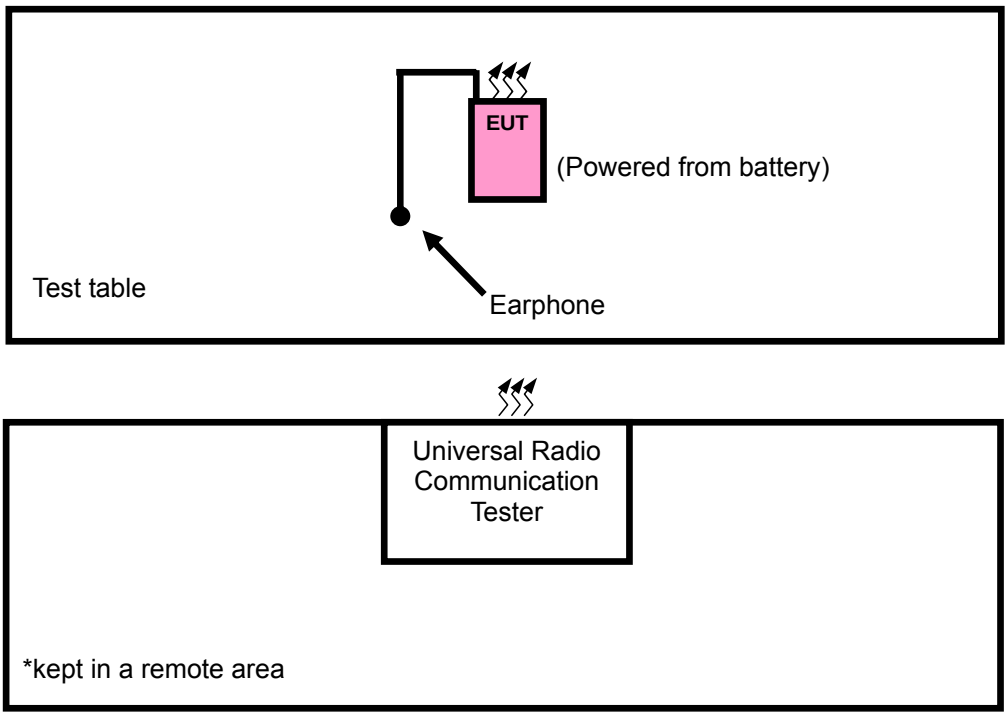
3. The above EUT information is declared by manufacturer and for more detailed feature description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

One channel had been tested.

CHANNEL BANDWIDTH	10MHz
CHANNEL	23230
FREQUENCY (MHz)	782.0

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO								DESCRIPTION
	OP	FS	OB	PA	BE	CE	RE<1G	RE≥1G	
-	V	V	V	V	V	V	V	V	-

Where **OP:** Output power
FS: Frequency stability
OB: Occupied bandwidth
PA: Peak to Average Ratio
BE: Band edge
CE: Conducted spurious emissions
RE<1G: Radiated emission below 1GHz
RE≥1G: Radiated emission above 1GHz

OUTPUT POWER MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	OPERATING BAND	FREQUENCY BAND (MHz)	TESTED FREQUENCY (MHz)	MODULATION TECHNOLOGY	AXIS
-	LTE	777-787	782.0	QPSK, 16QAM	X

FREQUENCY STABILITY MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	OPERATING BAND	FREQUENCY BAND (MHz)	TESTED FREQUENCY (MHz)	MODULATION TECHNOLOGY
-	LTE	777-787	782.0	QPSK

OCCUPIED BANDWIDTH MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	OPERATING BAND	FREQUENCY BAND (MHz)	TESTED FREQUENCY (MHz)	MODULATION TECHNOLOGY
-	LTE	777-787	782.0	QPSK, 16QAM

PEAK TO AVERAGE RATIO:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	OPERATING BAND	FREQUENCY BAND (MHz)	TESTED FREQUENCY (MHz)	MODULATION TECHNOLOGY
-	LTE	777-787	782.0	QPSK, 16QAM

BAND EDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	OPERATING BAND	FREQUENCY BAND (MHz)	TESTED FREQUENCY (MHz)	MODULATION TECHNOLOGY
-	LTE	777-787	782.0	QPSK

CONDUCTED SPURIOUS EMISSIONS MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	OPERATING BAND	FREQUENCY BAND (MHz)	TESTED FREQUENCY (MHz)	MODULATION TECHNOLOGY
-	LTE	777-787	782.0	QPSK

RADIATED EMISSION MEASUREMENT (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	OPERATING BAND	FREQUENCY BAND (MHz)	TESTED FREQUENCY (MHz)	MODULATION TECHNOLOGY	AXIS
-	LTE	777-787	782.0	QPSK	X

RADIATED EMISSION MEASUREMENT (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	OPERATING BAND	FREQUENCY BAND (MHz)	TESTED FREQUENCY (MHz)	MODULATION TECHNOLOGY	AXIS
-	LTE	777-787	782.0	QPSK	X

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
OP	23deg. C, 65%RH	120Vac, 60Hz	Long Chen
FS	23deg. C, 65%RH	120Vac, 60Hz	Long Chen
OB	23deg. C, 65%RH	120Vac, 60Hz	Long Chen
PA	23deg. C, 65%RH	120Vac, 60Hz	Long Chen
BE	23deg. C, 65%RH	120Vac, 60Hz	Long Chen
CE	23deg. C, 65%RH	120Vac, 60Hz	Long Chen
RE < 1G	27deg. C, 65%RH	120Vac, 60Hz	Sun Lin
RE ≥ 1G	27deg. C, 65%RH	120Vac, 60Hz	Sun Lin

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a LTE product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 27

ANSI C63.4-2003

ANSI/TIA/EIA-603-C 2004

NOTE: All test items have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Universal Radio Communication Tester	Anritsu	MT8820C	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

NOTE:

1. All power cords of the above support units are non shielded (1.8m).
2. Item 1 acted as a communication partner to transfer data.

4 TEST TYPES AND RESULTS

4.1 OUTPUT POWER MEASUREMENT

4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Portable stations (hand-held devices) operating in the 776-793 MHz band are limited to 3 watts ERP

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESI7	838496/016	Dec. 27, 2010	Dec. 26, 2011
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	100115	Aug. 02, 2010	Aug. 01, 2011
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 06, 2011	Jan. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01961	Nov. 02, 2010	Nov. 01, 2011
Preamplifier Agilent	8447D	2944A10738	Nov. 02, 2010	Nov. 01, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250792/4	Sep. 03, 2010	Sep. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	283397/4	Sep. 03, 2010	Sep. 02, 2011
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Sep. 03, 2010	Sep. 02, 2011
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table ADT.	TT100.	TT93021704	NA	NA
Turn Table Controller ADT.	SC100.	SC93021704	NA	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 4.

3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 988962.

5. The IC Site Registration No. is IC7450F-4.

4.1.3 TEST PROCEDURES

ERP MEASUREMENT:

a. The EUT was set up for the maximum power with LTE link data modulation. The power was measured with Angilent Spectrum Analyzer. All measurements were done at specific channel. RWB and VBW is 5MHz for LTE.

b. E.I.R.P power measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step a. Record the power level of S.G

d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn

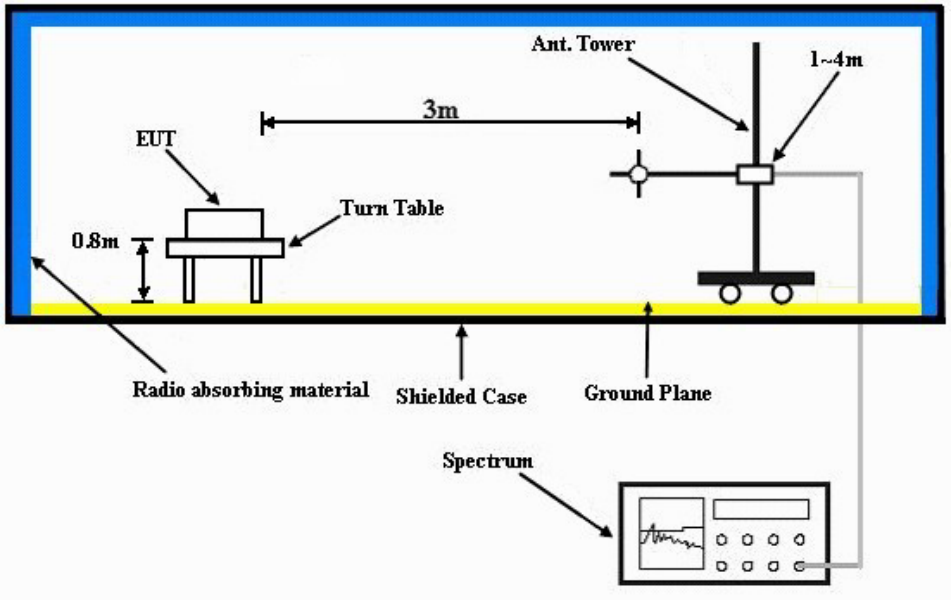
e. E.R.P = E.I.R.P- 2.15 dB

CONDUCTED POWER MEASUREMENT:

a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.

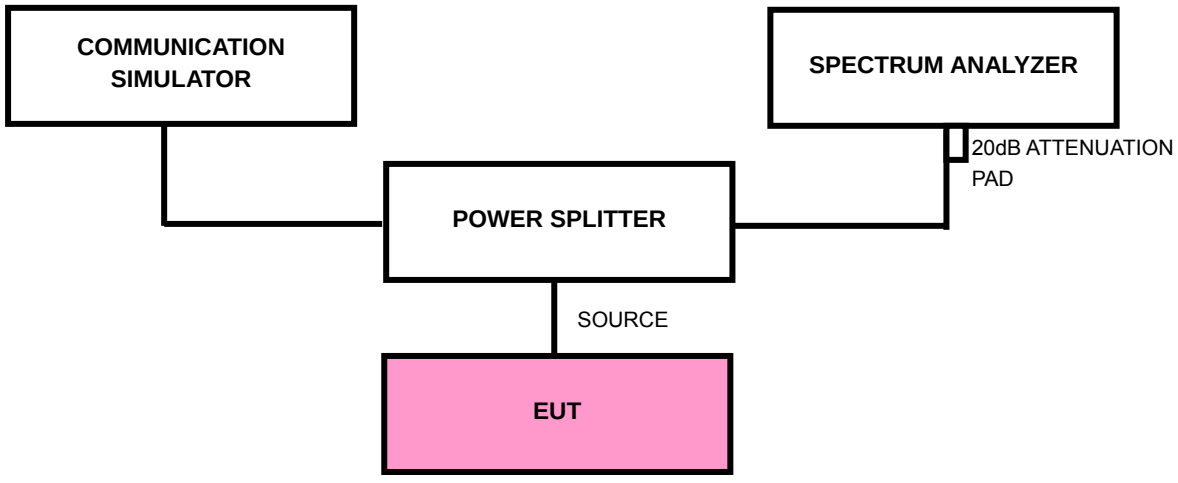
b. Set the EUT to transmit under specific channel and record the power level shown on simulator.

4.1.4 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

CONDUCTED POWER MEASUREMENT:



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.5 EUT OPERATING CONDITIONS

a. The EUT makes a call to the communication simulator.

b. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

4.1.6 TEST RESULTS

CONDUCTED AVERAGE POWER TABLE, QPSK

CONDUCTED OUTPUT POWER (QPSK 1 RB ALLOCATED AT THE LOWER EDGE)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	OUTPUT POWER	
				dBm	mW
23230	782.0	19.08	3.80	22.88	194.1

CONDUCTED OUTPUT POWER (QPSK 1 RB ALLOCATED AT THE UPPER EDGE)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	OUTPUT POWER	
				dBm	mW
23230	782.0	19.16	3.80	22.96	197.7

CONDUCTED OUTPUT POWER (QPSK 50% RB ALLOCATION CENTERED)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	OUTPUT POWER	
				dBm	mW
23230	782.0	18.54	3.80	22.34	171.4

CONDUCTED OUTPUT POWER (QPSK 100% RB ALLOCATION)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	OUTPUT POWER	
				dBm	mW
23230	782.0	18.42	3.80	22.22	166.7

CONDUCTED AVERAGE POWER TABLE, 16QAM

CONDUCTED OUTPUT POWER (16QAM 1 RB ALLOCATED AT THE LOWER EDGE)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	OUTPUT POWER	
				dBm	mW
23230	782.0	18.52	3.80	22.32	170.6

CONDUCTED OUTPUT POWER (16QAM 1 RB ALLOCATED AT THE UPPER EDGE)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	OUTPUT POWER	
				dBm	mW
23230	782.0	18.71	3.80	22.51	178.2

CONDUCTED OUTPUT POWER (16QAM 50% RB ALLOCATION CENTERED)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	OUTPUT POWER	
				dBm	mW
23230	782.0	17.74	3.80	21.54	142.6

CONDUCTED OUTPUT POWER (16QAM 100% RB ALLOCATION)					
CHANNEL NO.	FREQUENCY (MHz)	RAW VALUE (dBm)	CORRECTION FACTOR (dB)	OUTPUT POWER	
				dBm	mW
23230	782.0	17.50	3.80	21.30	134.9

REMARKS: 1. Output Power (dBm) = Raw Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Power Splitter Loss (dB) + Cable Loss (dB).

ERP

ERP POWER (QPSK 1 RB ALLOCATED AT THE UPPER EDGE)					
CHANNEL NO.	FREQUENCY (MHz)	S.G LEVEL (dBm)	CORRECTION FACTOR (dB)	OUTPUT POWER	
				dBm	mW
23230	**782.0**	**28.4**	**-8.3**	**20.1**	**102.3**

REMARKS: 1. Output Power (dBm) = S.G Level (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Gain of Substitution horn + TX cable loss.
3. The value in bold is the worst.

4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

According to the FCC part 27.54 shall be tested the frequency stability. The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation. The test extreme voltage is according to the 2.1055(d)(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment and the extreme temperature rule is comply with the 2.1055(a)(1) –30℃~50℃.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer Agilent	E4446A	MY44360124	Dec. 29, 2010	Dec. 28, 2011
Signal Generator Agilent	E4438C	MY47271120	Feb. 18, 2011	Feb. 18, 2012
RF cable	SUCOFLEX 104	274403/4	Aug. 20, 2010	Aug. 19, 2011
WIT Standard Temperature & Humidity Chamber	MHU-225AU	920842	Jun. 15, 2011	Jun. 14, 2012

NOTE: The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

4.2.3 TEST PROCEDURE

a. The oven room could control the temperatures and humidity.

b. Power must be removed when changing from one temperature to another or one voltage to another voltage. Power warm up is at least 15 min and power applied should perform before recording frequency error.

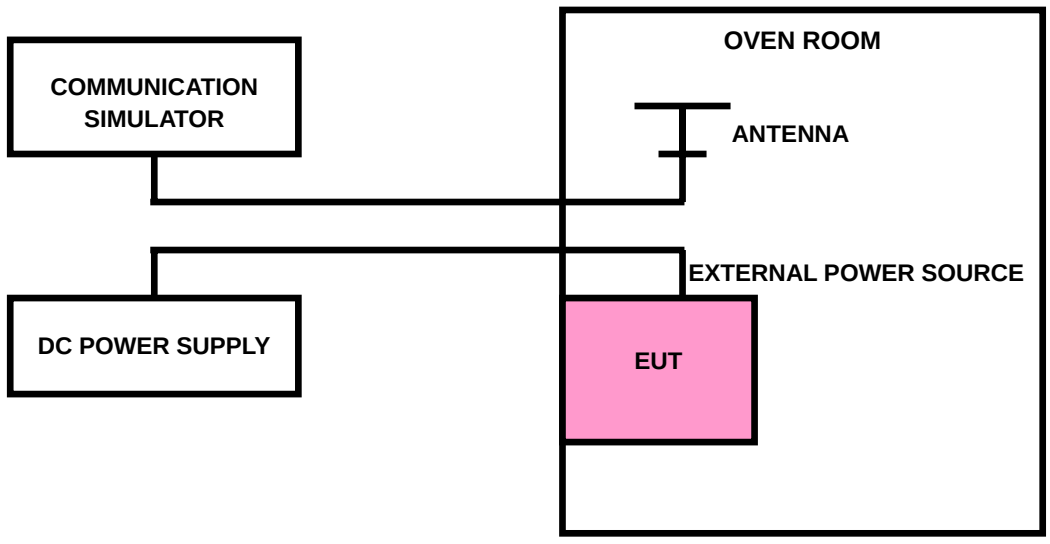
c. Laptop pc is connected the external power supply to control the DC input power. The various Volts from the minimum 3.6 Volts to 4.2 Volts. Each step shall be record the frequency error rate.

d. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing.

e. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

4.2.4 TEST SETUP



4.2.5 EUT OPERATING CONDITIONS

Same as 4.1.5.

4.2.6 TEST RESULTS

AFC FREQUENCY ERROR VS. VOLTAGE		
VOLTAGE (Volts)	**MEASURED ERROR (ppm)**	**LIMIT (ppm)**
3.6	0.020	**2.5**
4.2	0.028	

NOTE: The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.2Vdc.

AFC FREQUENCY ERROR VS. TEMP.		
TEMP. (℃	**MEASURED ERROR (ppm)**	**LIMIT (ppm)**
50	0.029	**2.5**
40	0.056	
30	0.026	
20	0.022	
10	0.040	
0	0.027	
-10	0.037	
-20	0.022	
-30	0.038	

4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

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 power of a given emission.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Mini-Circuits Power Splitter	ZAPD-4	NA	Mar. 04, 2011	Mar. 03, 2012
Hewlett Packard RF cable	8120-6192	274388	Oct. 22, 2010	Oct. 21, 2011
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
Suhner RF cable	SUCOFLEX 104	274403/4	Aug. 20, 2010	Aug. 19, 2011
Agilent Spectrum Analyzer	E4446A	MY44360124	Dec. 29, 2010	Dec. 28, 2011
Signal Generator Agilent	E4438C	MY47271120	Feb. 18, 2011	Feb. 18, 2012

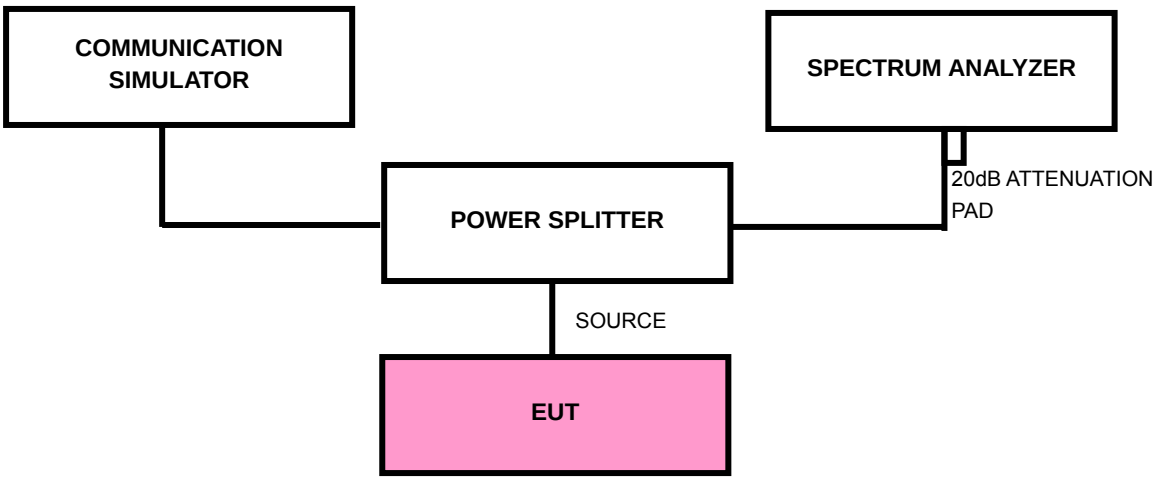
NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST PROCEDURES

a. The conducted occupied bandwidth used the power splitter via EUT RF power connector between signal generator and spectrum analyzer.

b. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.3.4 TEST SETUP



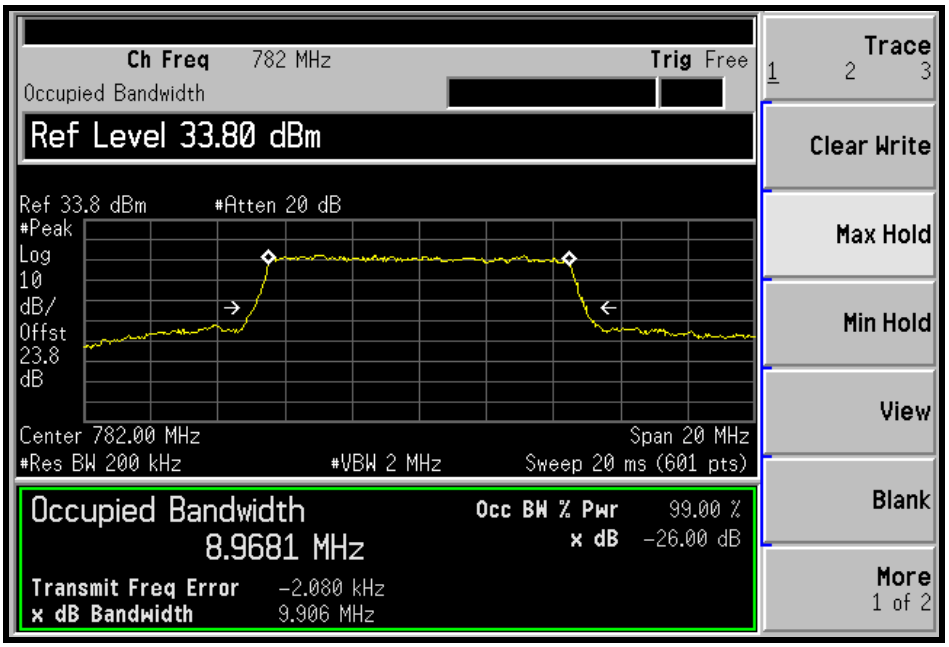
4.3.5 EUT OPERATING CONDITIONS

Same as 4.1.5.

4.3.6 TEST RESULTS

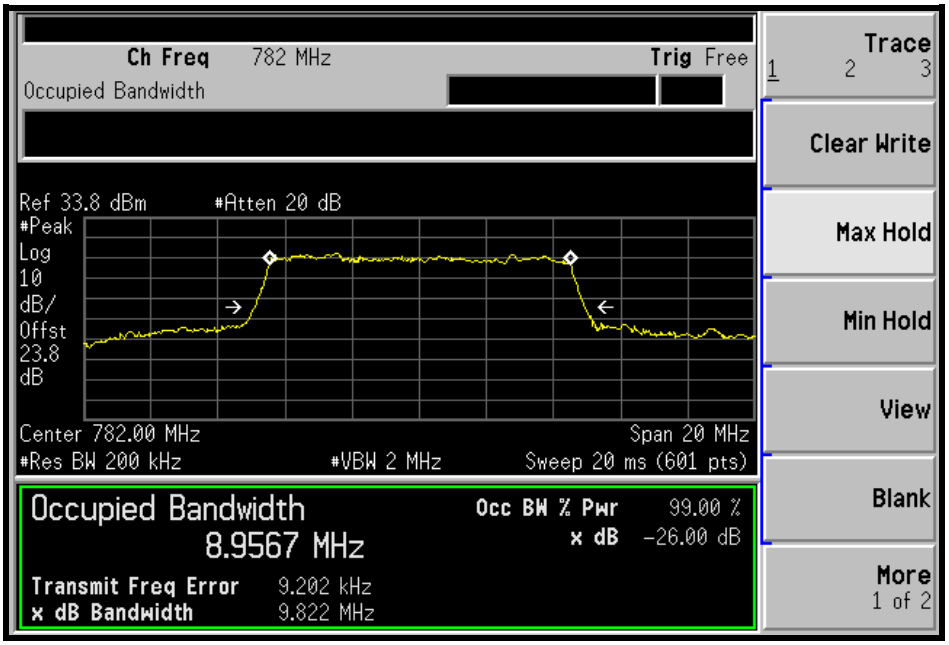
QPSK

FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)
782.0	8.9681



16QAM

FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)
782.0	8.9567



4.4 PEAK TO AVERAGE RATIO

4.4.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

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.

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Mini-Circuits Power Splitter	ZAPD-4	NA	Mar. 04, 2011	Mar. 03, 2012
Hewlett Packard RF cable	8120-6192	274388	Oct. 22, 2010	Oct. 21, 2011
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
Suhner RF cable	SUCOFLEX 104	274403/4	Aug. 20, 2010	Aug. 19, 2011
Agilent Spectrum Analyzer	E4446A	MY44360124	Dec. 29, 2010	Dec. 28, 2011
Signal Generator Agilent	E4438C	MY47271120	Feb. 18, 2011	Feb. 18, 2012

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

4.4.4 TEST SETUP

Same as Item 4.2.4 (Conducted Power Setup)

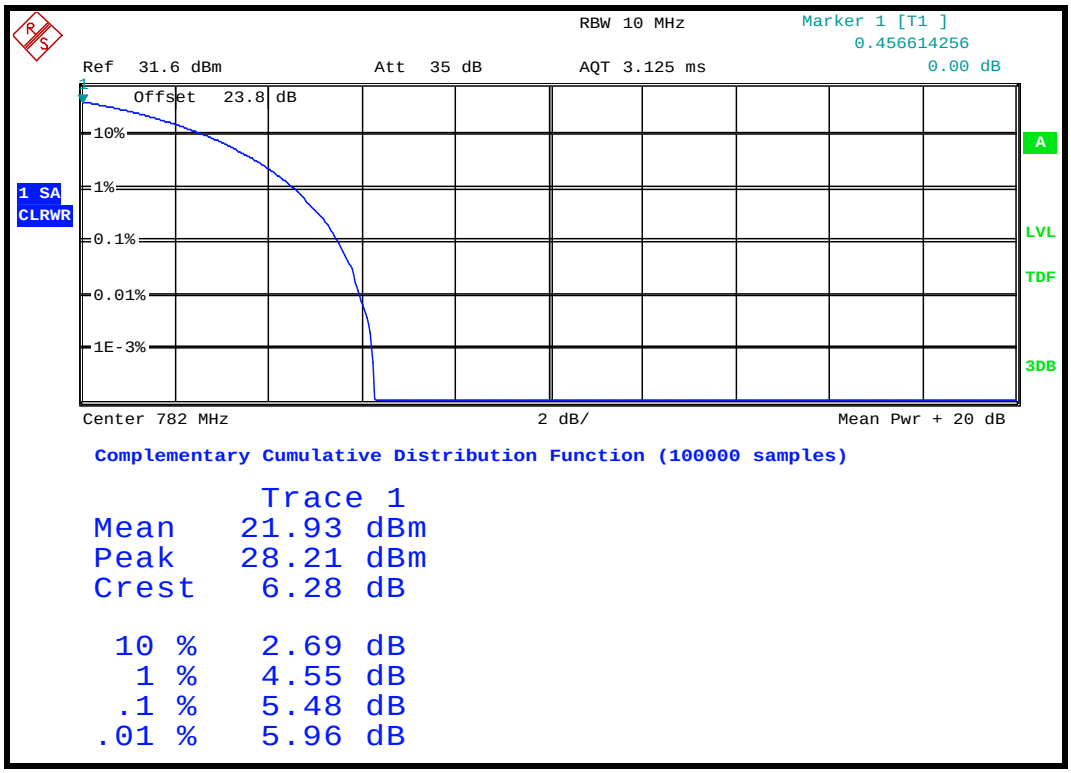
4.4.5 EUT OPERATING CONDITION

Same as Item 4.1.5

4.4.6 TEST RESULTS

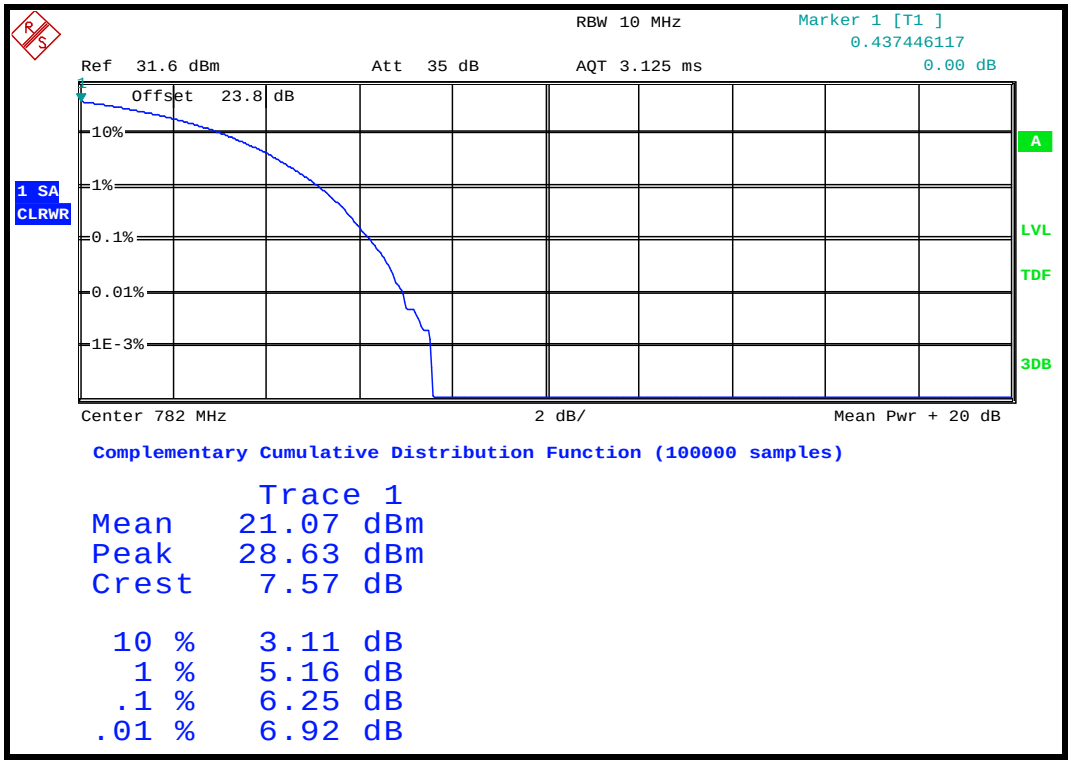
QPSK

FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)			
	1RB LOWER	1RB UPPER	50% RB	100% RB
782.0	4.07	4.23	5.26	5.48



16QAM

FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)			
	1RB LOWER	1RB UPPER	50% RB	100% RB
782.0	4.84	5.03	6.03	6.25



4.5 BAND EDGE MEASUREMENT

4.5.1 LIMITS OF BAND EDGE MEASUREMENT

On any frequency outside the 777–787 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Mini-Circuits Power Splitter	ZAPD-4	NA	Mar. 04, 2011	Mar. 03, 2012
Hewlett Packard RF cable	8120-6192	274388	Oct. 22, 2010	Oct. 21, 2011
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
Suhner RF cable	SUCOFLEX 104	274403/4	Aug. 20, 2010	Aug. 19, 2011
Agilent Spectrum Analyzer	E4446A	MY44360124	Dec. 29, 2010	Dec. 28, 2011

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.5.3 TEST PROCEDURES

a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Agilent Spectrum Analyzer. All measurements were done at specific channel.

b. The band edge measurement used the power splitter via EUT RF power connector between simulator and spectrum analyzer.

c. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz.

d. Record the max trace plot into the test report.

4.5.4 TEST SETUP

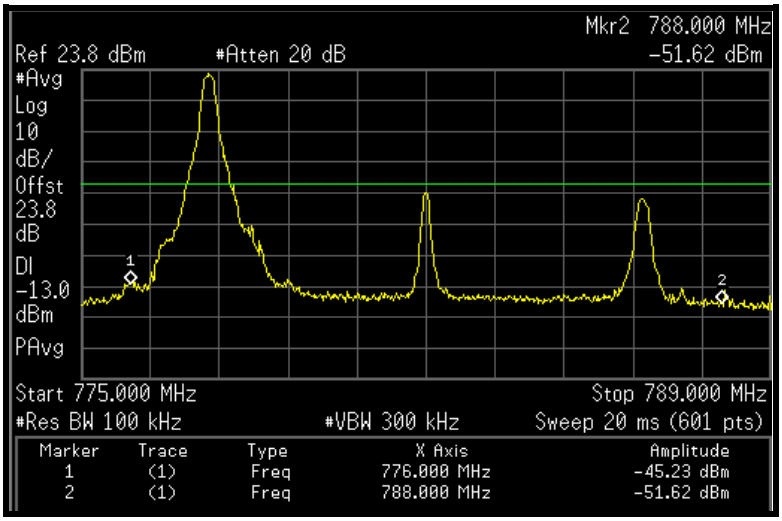
Same as Item 4.1.4 (Conducted Power Setup)

4.5.5 EUT OPERATING CONDITIONS

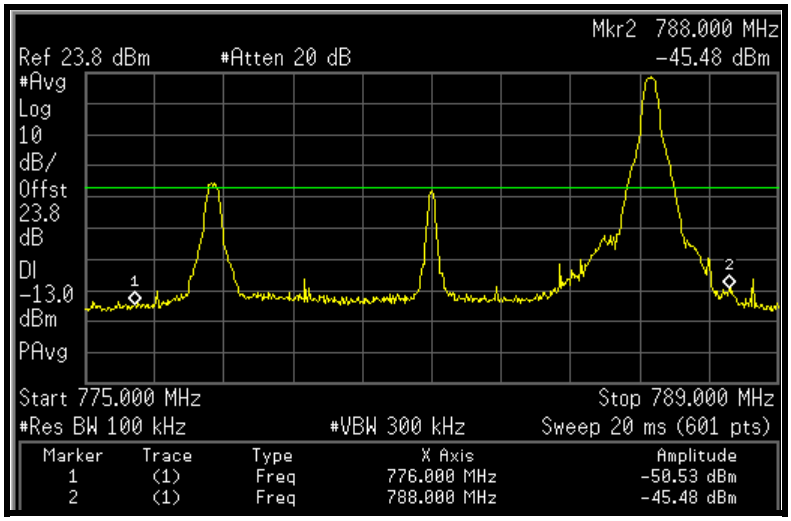
Same as 4.1.5.

4.5.6 TEST RESULTS

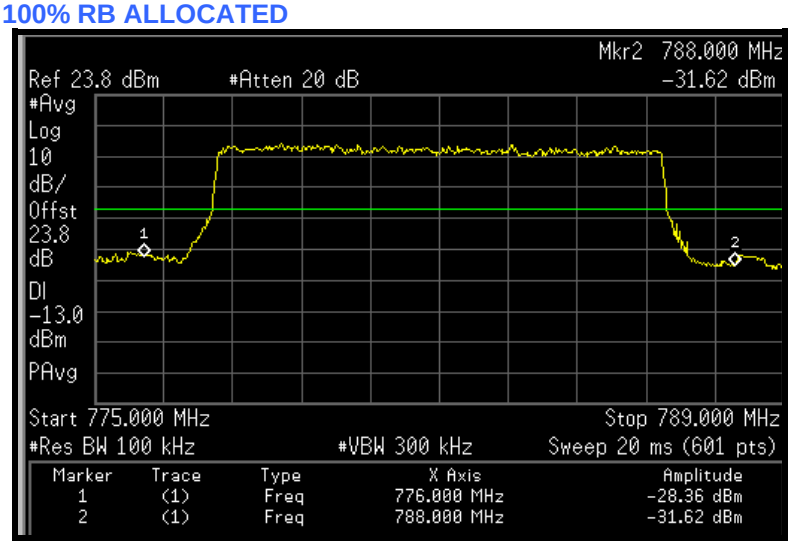
1RB ALLOCATED AT THE LOWER EDGE:



1RB ALLOCATED AT THE UPPER EDGE



100% RB ALLOCATED



4.6 CONDUCTED SPURIOUS EMISSIONS

4.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm.
On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Mini-Circuits Power Splitter	ZAPD-4	NA	Mar. 04, 2011	Mar. 03, 2012
Hewlett Packard RF cable	8120-6192	274388	Oct. 22, 2010	Oct. 21, 2011
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
Suhner RF cable	SUCOFLEX 104	274403/4	Aug. 20, 2010	Aug. 19, 2011
Agilent Spectrum Analyzer	E4446A	MY44360124	Dec. 29, 2010	Dec. 28, 2011
Wainwright Instruments Band Reject Filter	WHKS1000-6SS	SN1	Mar. 23, 2011	Mar. 22, 2012
Wainwright Instruments High Pass Filter	WHK3.1/18G-10SS	SN3	Oct. 29, 2010	Oct. 28, 2011
Signal Generator Agilent	E4438C	MY47271120	Feb. 18, 2011	Feb. 18, 2012

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.6.3 TEST PROCEDURE

a. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Angilent Spectrum Analyzer. All measurements were done at specific channel.

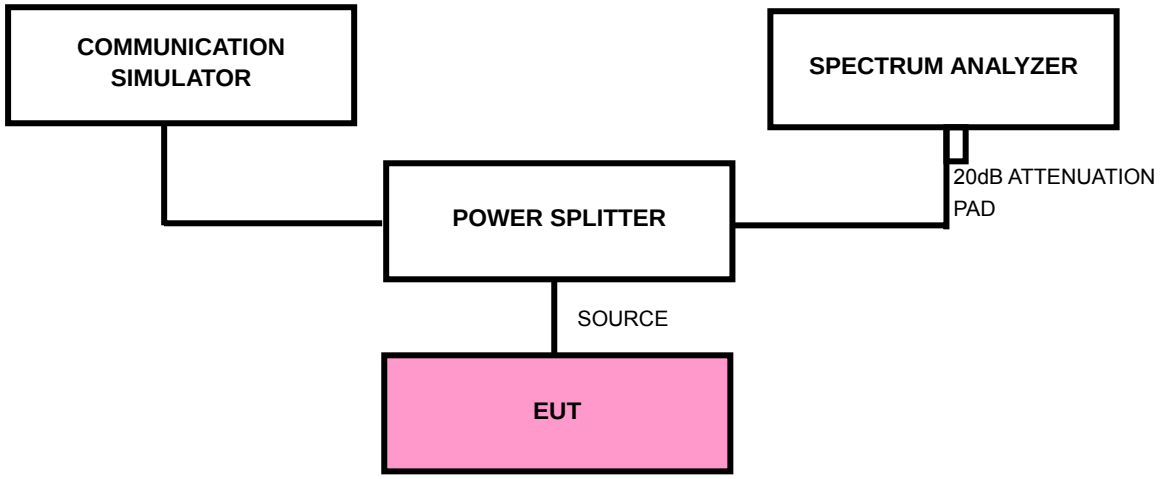
b. The conducted spurious emission used the power splitter via EUT RF power connector between signal generator and spectrum analyzer.

c. EUT connected to spectrum analyzer with a 20 dB pad.

d. RBW=1MHz and VBW=3MHz is used for measuring emission from 30MHz to 8GHz.

e. RBW=10kHz and VBW=30kHz is used for measuring emission form 763~775 and 793~805MHz

4.6.4 TEST SETUP



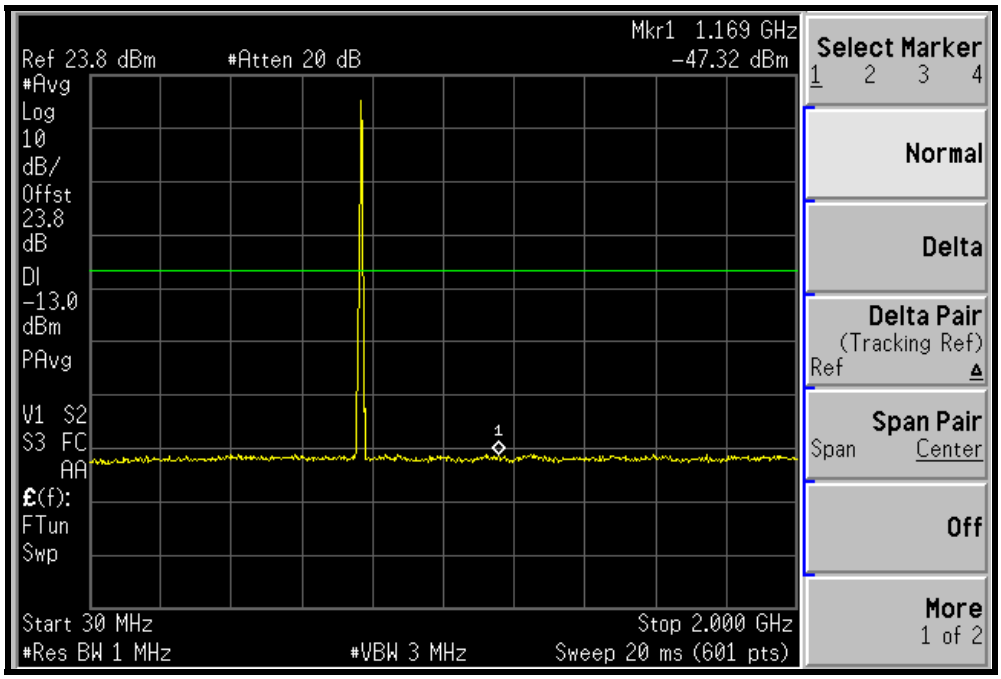
4.6.5 EUT OPERATING CONDITIONS

Same as 4.1.5.

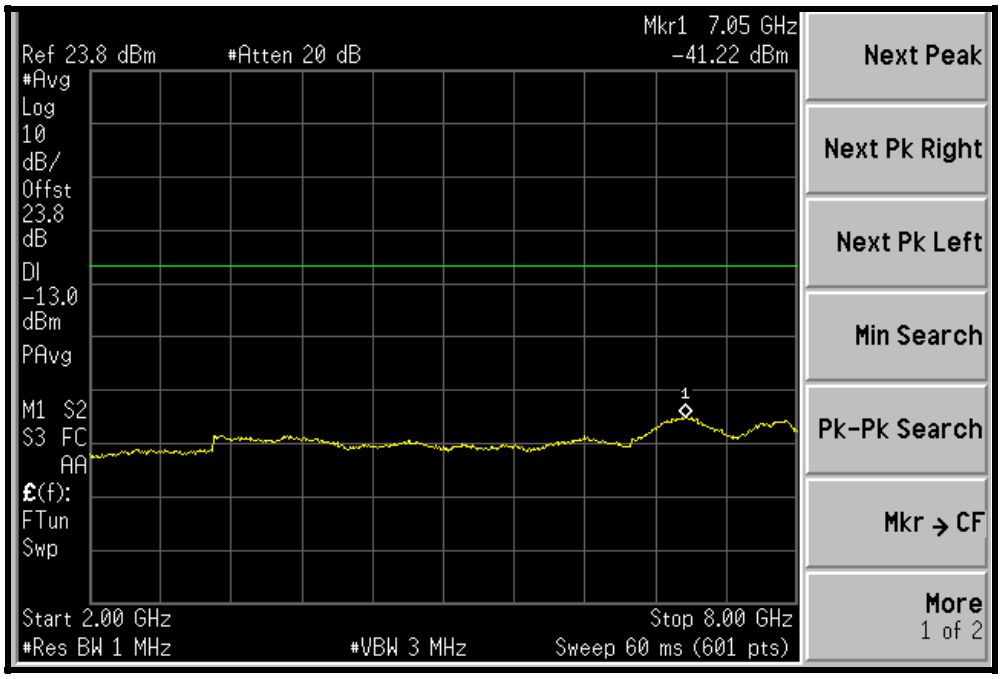
4.6.6 TEST RESULTS

1 RB ALLOCATED AT THE UPPER EDGE

30MHz ~ 2GHz

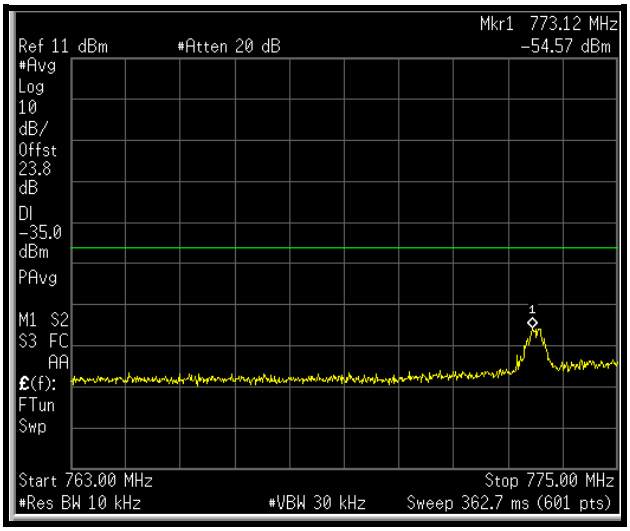


2GHz ~ 8GHz

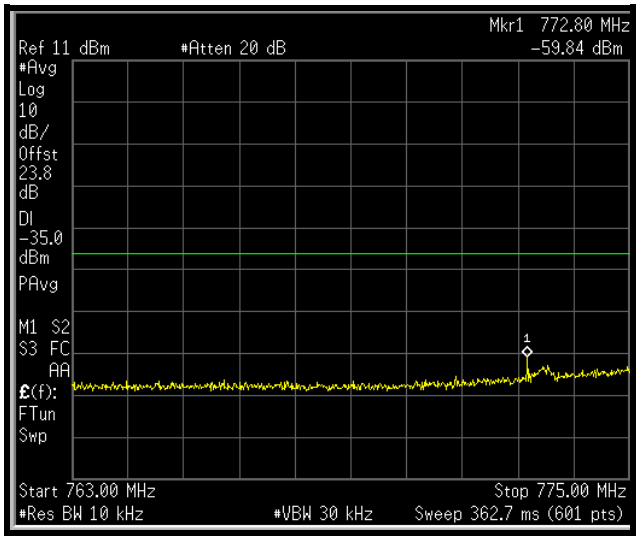


Emission in the 763–775 MHz band

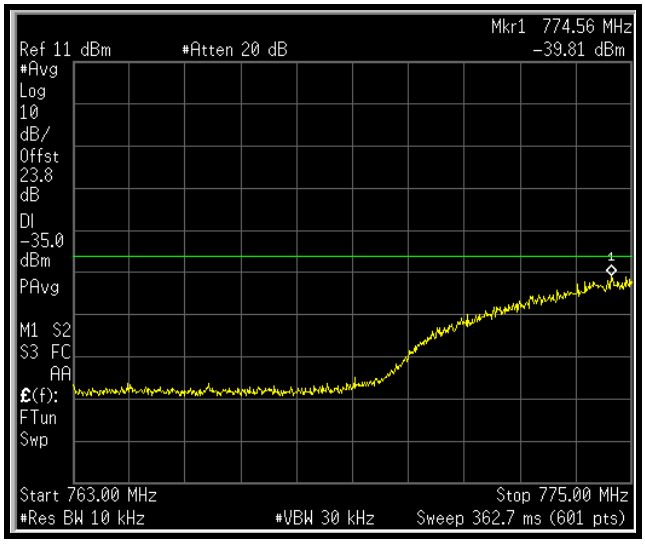
1 RB ALLOCATED AT THE LOWER EDGE



1 RB ALLOCATED AT THE UPPER EDGE

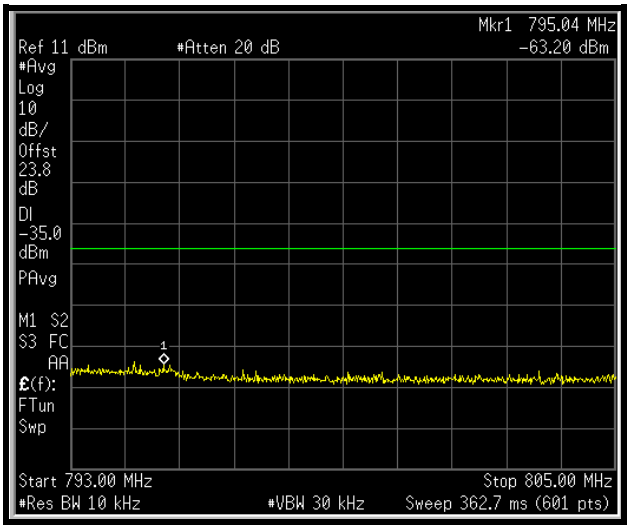


100% RB ALLOCATED

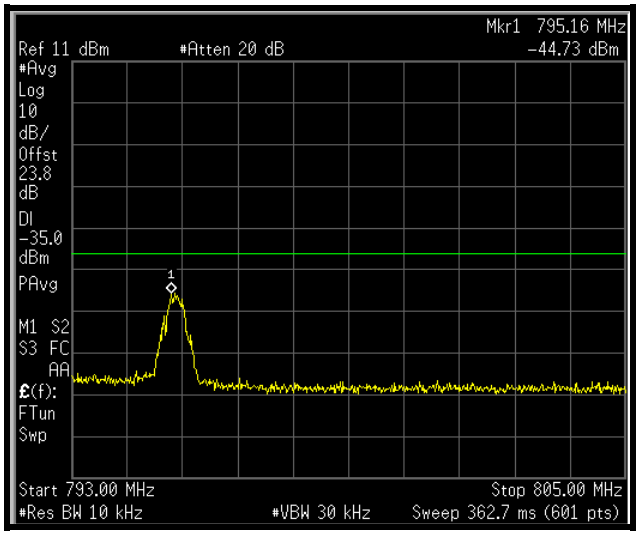


Emission in the 793–805 MHz band

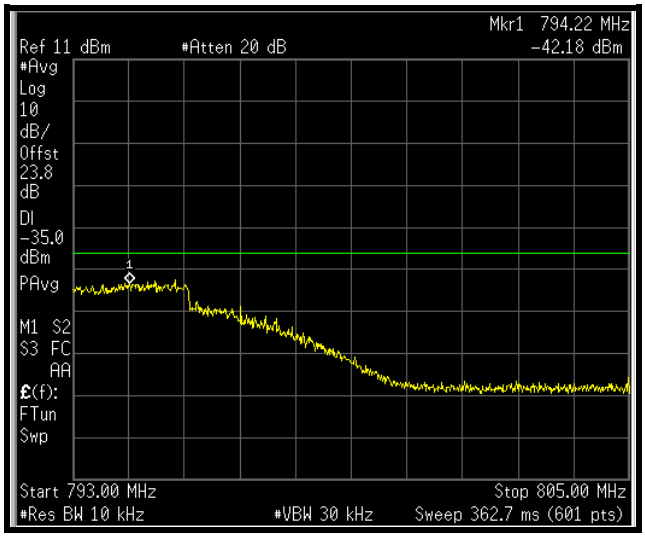
1 RB ALLOCATED AT THE LOWER EDGE



1 RB ALLOCATED AT THE UPPER EDGE



100% RB ALLOCATED



4.7 RADIATED EMISSION MEASUREMENT

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log10(P) dB. The limit of emission equal to –13dBm

4.7.2 TEST INSTRUMENTS

Same as 4.1.2.

4.7.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.

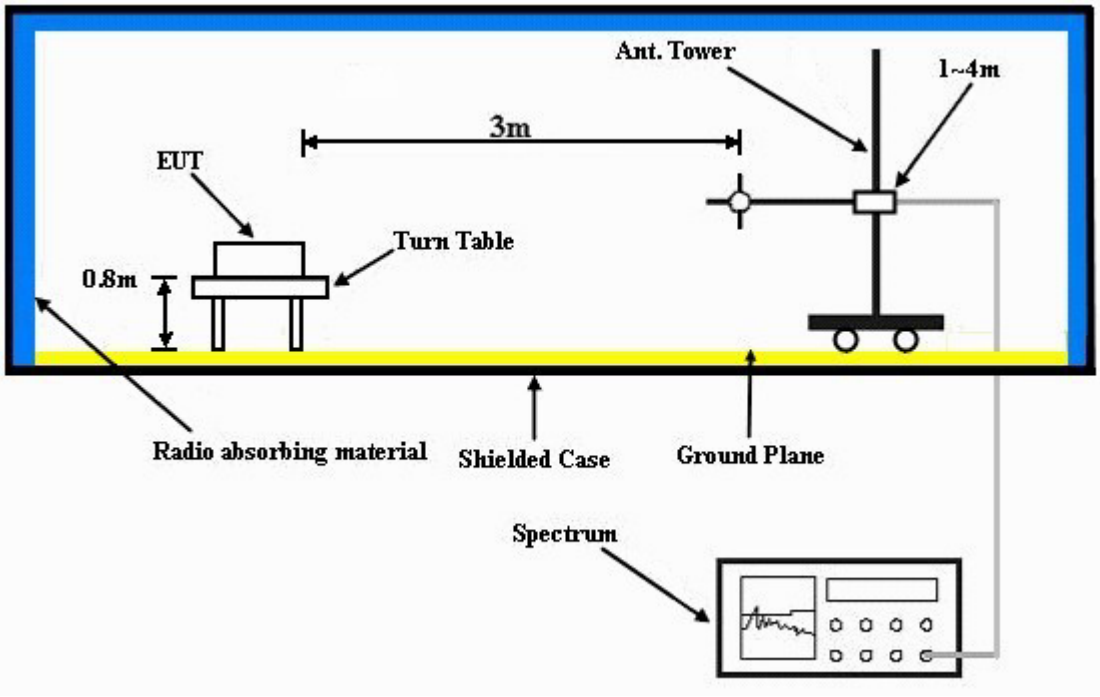
b. The EUT was set 3 meters away from the receiving antenna, which was mounted on antenna tower and its position at 0.8 m above the ground.

c. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.

d. Repeat step a ~ c for horizontal polarization.

NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.7.4 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.5 DEVIATION FROM TEST STANDARD

No deviation

4.7.6 EUT OPERATING CONDITIONS

Same as 4.1.5.

4.7.7 TEST RESULTS

FOR OUTBAND EMISSION

WORST AT QPSK, 1RB ALLOCATED AT THE UPPER EDGE

BELOW 1GHz DATA:

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	31.84	40.0	-13.0	-46.8	-7.7	-54.5
2	86.28	40.8	-13.0	-45.8	-7.7	-53.5
3	131.00	42.0	-13.0	-44.4	-7.7	-52.1
4	**261.27**	**45.5**	**-13.0**	**-41.0**	**-7.7**	**-48.7**
5	718.18	42.1	-13.0	-44.8	-7.9	-52.7
6	879.55	41.9	-13.0	-44.4	-7.9	-52.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	62.95	42.7	-13.0	-44.3	-7.7	-52.0
2	558.75	43.1	-13.0	-43.6	-7.8	-51.4
3	718.18	44.5	-13.0	-41.6	-7.9	-49.5
4	799.84	44.2	-13.0	-42.6	-7.9	-50.5
5	877.61	45.5	-13.0	-41.3	-7.9	-49.2
6	959.27	43.7	-13.0	-43.1	-7.9	-51.0

NOTE: ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
Correction Factor = gain of substitution antenna + cable loss

ABOVE 1GHz DATA:

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	2359.2	33.0	-13.0	-69.9	8.3	-61.6
2	3145.6	31.6	-13.0	-72.2	9.4	-62.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	2359.2	33.3	-13.0	-69.6	8.3	-61.3
2	3145.6	32.1	-13.0	-71.7	9.4	-62.3

NOTE: ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
Correction Factor = gain of substitution antenna + cable loss

Emissions in the band 1559–1610 MHz

FOR GPS BAND EMISSION

WORST AT QPSK, 1RB ALLOCATED AT THE UPPER EDGE

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3m						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	1572.8	48.2	-40.0	-53.5	7.0	-46.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3m						
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV)	LIMIT (dBm)	S.G POWER VALUE (dBm)	CORRECTION FACTOR (dB)	POWER VALUE (dBm)
1	**1572.8**	**51.0**	**-40.0**	**-50.7**	**7.0**	**-43.7**

NOTE: ERP(dBm) = S.G Power Value (dBm) + Correction Factor (dB).
Correction Factor = gain of substitution antenna + cable loss

5 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5.phtml.
If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
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Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
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Email: service.adt@tw.bureauveritas.com
Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.

6 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---