

FCC TEST REPORT (PART 24)

REPORT NO.: RF130408C19-1

MODEL NO.: PO58220

FCC ID: NM8PO58220

RECEIVED: Apr. 08, 2013

TESTED: Apr. 27, 2013 ~ May 06, 2013

ISSUED: May 23, 2013

APPLICANT: HTC Corporation

ADDRESS: 23, Xinghua Rd., Taoyuan 330, Taiwan, R.O.C.

ISSUED BY: Bureau Veritas Consumer Products Services

(H.K.) Ltd., Taoyuan Branch

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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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6 7	INFORMATION ON THE TESTING LABORATORIES



RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130408C19-1	Original release	May 23, 2013



1 CERTIFICATION

PRODUCT: Smartphone

MODEL: PO58220

BRAND: HTC

APPLICANT: HTC Corporation

TESTED: Apr. 27, 2013 ~ May 06, 2013

TEST SAMPLE: Production Unit

STANDARDS: FCC Part 24, Subpart E

The above equipment (model: PO58220) 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: , DATE: May 23, 2013

Ivonne Wu / Senior Specialist

APPROVED BY: , DATE: May 23, 2013

Sam Chen / Assistant Manager



2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 24 & Part 2						
STANDARD SECTION	TEST TYPE	RESULT	REMARK			
2.1046 24.232	Equivalent isotropically radiated power	PASS	Meet the requirement of limit.			
2.1055 24.235	Frequency Stability	PASS	Meet the requirement of limit.			
2.1049 24.238(b)	Occupied Bandwidth	PASS	Meet the requirement of limit.			
24.232(d)	Peak to average ratio	PASS	Meet the requirement of limit.			
24.238(b)	Band Edge Measurements	PASS	Meet the requirement of limit.			
2.1051 24.238	Conducted Spurious Emissions	PASS	Meet the requirement of limit.			
2.1053 24.238	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -23.49dB at 42.42MHz.			

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
Conducted emissions	150kHz~30MHz	2.44 dB
	30MHz ~ 200MHz	2.93 dB
Radiated emissions	200MHz ~1000MHz	2.95 dB
Radiated emissions	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.



2.2 TEST SITE AND INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 16, 2012	Nov. 15, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2012	Dec. 16, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 07, 2013	Jan. 06, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 25, 2012	Dec. 24, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier EMCI	EMC 012645	980115	Dec. 28, 2012	Dec. 27, 2013
Preamplifier EMCI	EMC 184045	980116	Dec. 28, 2012	Dec. 27, 2013
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2012	Dec. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 19, 2012	Oct. 18, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 19, 2012	Oct. 18, 2013
RF signal cable Worken	RG-213	NA	Dec. 29, 2012	Dec. 28, 2013
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Mini-Circuits Power Splitter	ZN2PD-9G	NA	Jun. 13, 2012	Jun. 12, 2013
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
Communications Tester-Wireless	E5515C	MY52102049	Jun. 11, 2012	Jun. 10, 2013
Radio Communication Analyzer	MT8820C	6201168830	Jul. 17, 2012	Jul. 16, 2013

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 10.
- 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 690701.
- 5. The IC Site Registration No. is IC 7450F-10.



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Smartphone				
MODEL NO.	PO58220				
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.8Vdc (battery)				
	GSM/GPRS	GMSK			
MODULATION TYPE	EDGE	8PSK			
WODULATION TIPE	WCDMA	BPSK			
	LTE Band 2	QPSK, 16QAM			
	GSM/GPRS/EDGE	1850.2MHz ~ 1909.8MHz			
	WCDMA	1852.4MHz ~ 1907.6MHz			
FREQUENCY RANGE	LTE Band 2 (Channel Bandwidth: 5MHz)	1852.5MHz ~ 1907.5MHz			
	LTE Band 2 (Channel Bandwidth: 10MHz)	1855MHz ~ 1905MHz			
	GSM	580.76mW			
	EDGE	483.06mW			
	WCDMA	152.76mW			
MAX. EIRP POWER	LTE Band 2 (Channel Bandwidth: 5MHz)	98.86mW			
	LTE Band 2 (Channel Bandwidth: 10MHz)	99.31mW			
	GSM	248KGXW			
	EDGE	249KG7W			
EMISSION	WCDMA	4M18F9W			
DESIGNATOR	LTE Band 2 (Channel Bandwidth: 5MHz)	4M49G7D			
	LTE Band 2 (Channel Bandwidth: 10MHz)	8M92W7D			
MULTI-SLOTS CLASS	10				
WCDMA RELEASE VERSION	6				
ANTENNA TYPE	Fixed Internal Antenna				
I/O PORTS	Refer to users' manual				
DATA CABLE	Refer to NOTE as below				
ACCESSORY DEVICES	DEVICES Refer to NOTE as below				



NOTE:

1. The device has 2 configurations as below.

Main sample (A): Battery 1 + LCD Panel 1 + Photo Camera 1

2nd sample (B): Battery 2 + LCD Panel 2 + Photo Camera 2

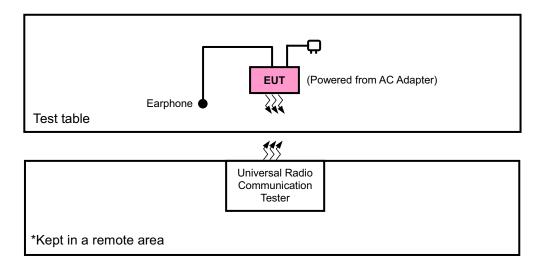
- Only the test data for main sample was presented in the report, since the verified data for 2nd sample was not worse than the main sample.
- 2. The EUT's accessories list refers to EUT photo.
- 3. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

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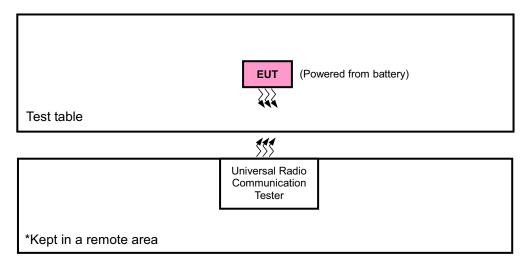


3.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



FOR E.I.R.P. TEST



3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units.



3.4 TEST ITEM AND TEST CONFIGURATION

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. The worst case was found when positioned on X-plane for EIRP and X-axis for WWAN and Y-axis for LTE for radiated emission for antenna 0. Following channel(s) was (were) selected for the final test as listed below:

GSM MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
-	EIRP	512 to 810	512, 661, 810	GSM, EDGE
-	FREQUENCY STABILITY	512 to 810	661	GSM, EDGE
-	OCCUPIED BANDWIDTH	512 to 810	512, 661, 810	GSM, EDGE
-	PEAK TO AVERAGE RATIO	512 to 810	512, 661, 810	GSM, EDGE
-	BAND EDGE	512 to 810	512, 810	GSM, EDGE
-	CONDCUDETED EMISSION	512 to 810	661	GSM, EDGE
-	RADIATED EMISSION	512 to 810	661	GSM, EDGE

WCDMA MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
-	EIRP	9262 to 9538	9262, 9400, 9538	WCDMA
-	FREQUENCY STABILITY	9262 to 9538	9400	WCDMA
-	OCCUPIED BANDWIDTH	9262 to 9538	9262, 9400, 9538	WCDMA
-	PEAK TO AVERAGE RATIO	9262 to 9538	9262, 9400, 9538	WCDMA
-	BAND EDGE	9262 to 9538	9262, 9538	WCDMA
-	CONDCUDETED EMISSION	9262 to 9538	9400	WCDMA
-	RADIATED EMISSION	9262 to 9538	9400	WCDMA



LTE BAND 2 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE														
	EIRP	18625 to 19175	18625, 18800, 19175	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset														
-	LIKE	18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset														
	FREQUENCY	18625 to 19175	18900	5MHz	QPSK	1 RB / 0 RB Offset														
-	STABILITY	18650 to 19150	18900	10MHz	QPSK	1 RB / 0 RB Offset														
		18625 to 19175	18625, 18800, 19175	5MHz	QPSK	25 RB / 0 RB Offset														
	OCCUPIED	10023 to 19173	10023, 10000, 19173	JIVII IZ	16QAM	25 RB / 0 RB Offset														
_	BANDWIDTH	18650 to 19150	18650, 18900, 19150	10MHz	QPSK	50 RB / 0 RB Offset														
		10030 to 13130	10000, 10000, 10100	TOWNIZ	16QAM	50 RB / 0 RB Offset														
		18625 to 19175	18625, 18800, 19175	5MHz	QPSK	1 RB / 0 RB Offset														
_	PEAK TO AVERAGE	OIVII 12	16QAM	1 RB / 0 RB Offset																
	RATIO		18650, 18900, 19150	10MHz	QPSK	1 RB / 0 RB Offset														
		10000 to 10100 10000, 10000, 1010	10000, 10000, 10100		16QAM	1 RB / 0 RB Offset														
			18625 5MHz	5MHz	QPSK	1 RB / 0 RB Offset														
		18625 to 19175	10023		QPSK	25 RB / 0 RB Offset														
		10023 to 19173	19175	5 5MHz	QPSK	1 RB / 24 RB Offset														
	BAND EDGE		19173		QFSK	25 RB / 0 RB Offset														
_	BAND EDGE		19650	10MHz	QPSK	1 RB / 0 RB Offset														
	18650	10000	ΙΟΙΝΙΠΖ	QFSK	50 RB / 0 RB Offset															
		18650 to 19150		40141-	ODCK	1 RB / 49 RB Offset														
		19150 1UMHZ	19150 TOMH2	19150 10MHz	19150 10MHZ	19150 TUMHZ	19150 TUMHZ	19150 10MHz	19150	19150 10MHZ	19150 TUMHZ	19150 TUMHZ	19150 TOWHZ	19150 TOMHZ	19150 TUMHZ	19150 10MHZ	19150 10MHz	19150 10MHz	QPSK	50 RB / 0 RB Offset
	CONDCUDETED	18625 to 19175	18900	5MHz	QPSK	1 RB / 0 RB Offset														
	EMISSION	18650 to 19150	18900	10MHz	QPSK	1 RB / 0 RB Offset														
	DADIATED EMISSION	18625 to 19175	18900	5MHz	QPSK	1 RB / 0 RB Offset														
-	RADIATED EMISSION	18650 to 19150	18900	10MHz	QPSK	1 RB / 0 RB Offset														

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
EIRP	26deg. C, 58%RH	3.8Vdc	Howard Kao
FREQUENCY STABILITY	26deg. C, 58%RH	3.8Vdc	Howard Kao
OCCUPIED BANDWIDTH	26deg. C, 58%RH	3.8Vdc	Howard Kao
BAND EDGE	26deg. C, 58%RH	3.8Vdc	Howard Kao
CONDCUDETED EMISSION	26deg. C, 58%RH	3.8Vdc	Howard Kao
RADIATED EMISSION	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao



3.5 EUT OPERATING CONDITIONS

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

3.6 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF 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 24 ANSI/TIA/EIA-603-C 2004

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



4 TEST TYPES AND RESULTS

4.1 OUTPUT POWER MEASUREMENT

4.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Mobile and portable stations are limited to 2 watts EIRP

4.1.2 TEST PROCEDURES

EIRP MEASUREMENT:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, GPRS & EDGE, 5MHz for WCDMA, and 10MHz for LTE mode.
- b. Substitution method is used for E.I.R.P 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 b. Record the power level of S.G
- d. EIRP = Output power level of S.G TX cable loss + Antenna gain of substitution horn.

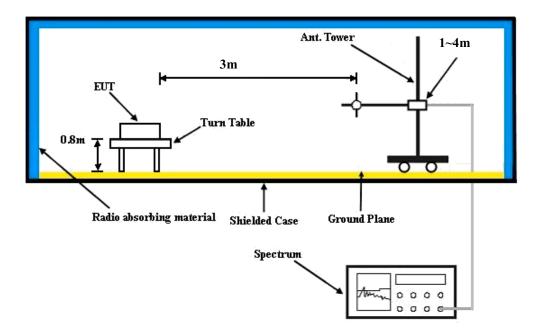
CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with GSM, GPRS, EDGE & WCDMA link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

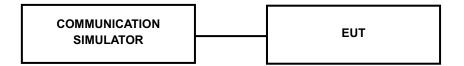


4.1.3 TEST SETUP

EIRP / ERP MEASUREMENT:



CONDUCTED POWER MEASUREMENT:





4.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

Band	GSM1900		
Channel	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8
GSM (1 Uplink)	29.83	30.09	29.92
GPRS 8 (GMSK, 1 slot)	29.77	30.03	29.86
GPRS 10 (GMSK, 2 slot)	28.73	28.99	28.82
EDGE 8 (GMSK, 1 Uplink)	29.79	30.05	29.88
EDGE 10 (GMSK, 2 Uplink)	28.71	28.97	28.80
EDGE 8 (8PSK, 1 Uplink)	25.30	25.56	25.39
EDGE 10 (8PSK, 2 Uplink)	25.32	25.58	25.41

Band		WCDMA II	
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
RMC 12.2K	24.18	24.25	24.11
HSDPA Subtest-1	23.21	23.28	23.14
HSDPA Subtest-2	23.19	23.26	23.12
HSDPA Subtest-3	22.71	22.78	22.64
HSDPA Subtest-4	22.73	22.80	22.66
HSUPA Subtest-1	23.21	23.28	23.14
HSUPA Subtest-2	21.24	21.31	21.17
HSUPA Subtest-3	22.19	22.26	22.12
HSUPA Subtest-4	21.31	21.38	21.24
HSUPA Subtest-5	23.28	23.35	23.21



				LTE Band	12			
			Frequency				Target	Measured
BW	Modulation	СН	(MHz)	RB	RB Offset	MPR	Power	Power
		18625	1852.5	1	0	0	23	22.35
		18900	1880	1	0	0	23	22.46
		19175	1907.5	1	0	0	23	22.39
		18625	1852.5	1	12	0	23	22.32
		18900	1880	1	12	0	23	22.43
		19175	1907.5	1	12	0	23	22.36
		18625	1852.5	1	24	0	23	22.22
		18900	1880	1	24	0	23	22.33
		19175	1907.5	1	24	0	23	22.26
		18625	1852.5	12	0	1	23	21.38
	QPSK	18900	1880	12	0	1	23	21.49
		19175	1907.5	12	0	1	23	21.42
		18625	1852.5	12	6	1	23	21.14
		18900	1880	12	6	1	23	21.25
		19175	1907.5	12	6	1	23	21.18
		18625	1852.5	12	13	1	23	21.07
		18900	1880	12	13	1	23	21.18
		19175	1907.5	12	13	1	23	21.11
		18625	1852.5	25	0	1	23	21.18
		18900	1880	25	0	1	23	21.29
		19175	1907.5	25	0	1	23	21.22
5 MHz		18625	1852.5	1	0	1	23	21.85
		18900	1880	1	0	1	23	21.96
		19175	1907.5	1	0	1	23	21.89
		18625	1852.5	1	12	1	23	21.82
		18900	1880	1	12	1	23	21.93
		19175	1907.5	1	12	1	23	21.86
		18625	1852.5	1	24	1	23	21.72
		18900	1880	1	24	1	23	21.83
		19175	1907.5	1	24	1	23	2.76
		18625	1852.5	12	0	2	23	20.88
	16QAM	18900	1880	12	0	2	23	20.99
		19175	1907.5	12	0	2	23	20.92
		18625	1852.5	12	6	2	23	20.64
		18900	1880	12	6	2	23	20.75
		19175	1907.5	12	6	2	23	20.68
		18625	1852.5	12	13	2	23	20.57
		18900	1880	12	13	2	23	20.68
		19175	1907.5	12	13	2	23	20.61
		18625	1852.5	25	0	2	23	20.68
		18900	1880	25	0	2	23	20.79
		19175	1907.5	25	0	2	23	20.72



				LTE Band	1 2			
			Frequency				Target	Measured
BW	Modulation	СН	(MHz)	RB	RB Offset	MPR	Power	Power
		18650	1855	1	0	0	23	22.55
		18900	1880	1	0	0	23	22.66
		19150	1905	1	0	0	23	22.59
		18650	1855	1	24	0	23	22.52
		18900	1880	1	24	0	23	22.63
		19150	1905	1	24	0	23	22.56
		18650	1855	1	49	0	23	22.42
		18900	1880	1	49	0	23	22.53
		19150	1905	1	49	0	23	22.46
		18650	1855	25	0	1	23	21.58
	QPSK	18900	1880	25	0	1	23	21.69
		19150	1905	25	0	1	23	21.62
		18650	1855	25	12	1	23	21.34
		18900	1880	25	12	1	23	21.45
		19150	1905	25	12	1	23	21.38
		18650	1855	25	25	1	23	21.27
		18900	1880	25	25	1	23	21.38
		19150	1905	25	25	1	23	21.31
		18650	1855	50	0	1	23	21.38
		18900	1880	50	0	1	23	21.49
403411		19150	1905	50	0	1	23	21.42
10MHz		18650	1855	1	0	1	23	21.85
		18900	1880	1	0	1	23	21.96
		19150	1905	1	0	1	23	21.89
		18650	1855	1	24	1	23	21.82
		18900	1880	1	24	1	23	21.93
		19150	1905	1	24	1	23	21.86
		18650	1855	1	49	1	23	21.72
		18900	1880	1	49	1	23	21.83
		19150	1905	1	49	1	23	21.76
		18650	1855	25	0	2	23	20.88
	16QAM	18900	1880	25	0	2	23	20.99
		19150	1905	25	0	2	23	20.92
		18650	1855	25	12	2	23	20.64
		18900	1880	25	12	2	23	20.75
		19150	1905	25	12	2	23	20.68
		18650	1855	25	25	2	23	20.57
		18900	1880	25	25	2	23	20.68
		19150	1905	25	25	2	23	20.61
		18650	1855	50	0	2	23	20.68
		18900	1880	50	0	2	23	20.79
		19150	1905	50	0	2	23	20.72



EIRP POWER (dBm)

GSM

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
	512	1850.2	-11.09	38.19	27.10	512.86	Н
	661	1880.0	-11.63	38.70	27.07	509.33	Н
x	810	1909.8	-10.79	38.43	27.64	580.76	Н
^	512	1850.2	-21.54	38.48	16.94	49.43	V
	661	1880.0	-21.74	38.59	16.85	48.42	V
	810	1909.8	-22.14	38.87	16.73	47.10	V

EDGE

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
	512	1850.2	-11.38	38.19	26.81	479.73	Н
	661	1880.0	-11.86	38.70	26.84	483.06	Н
l x	810	1909.8	-12.13	38.43	26.30	426.58	Н
^	512	1850.2	-21.88	38.48	16.60	45.71	V
	661	1880.0	-21.82	38.59	16.77	47.53	V
	810	1909.8	-22.70	38.87	16.17	41.40	V

WCDMA

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
	9262	1852.4	-16.35	38.19	21.84	152.76	Н
	9400	1880.0	-17.59	38.70	21.11	129.12	Н
l x	9538	1907.6	-16.63	38.43	21.80	151.36	Н
^	9262	1852.4	-25.76	38.48	12.72	18.71	V
	9400	1880.0	-26.38	38.59	12.21	16.63	V
	9538	1907.6	-26.57	38.87	12.30	16.98	V



LTE Band 2

CHANNEL BANDWIDTH: 5MHz QPSK

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
	18625	1852.5	-18.04	37.99	19.95	98.86	Н
	18900	1880	-18.91	37.99	19.08	80.91	Н
x	19175	1907.5	-19.28	38.36	19.08	80.91	Н
^	18625	1852.5	-27.96	37.91	9.95	9.89	V
	18900	1880	-28.68	38.00	9.32	8.55	V
	19175	1907.5	-28.39	38.28	9.89	9.75	V

CHANNEL BANDWIDTH: 5MHz 16QAM

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
	18625	1852.5	-18.44	37.90	19.46	88.31	Н
	18900	1880	-18.23	37.99	19.76	94.62	Н
l x	19175	1907.5	-18.58	38.31	19.73	93.97	Н
^	18625	1852.5	-27.91	37.81	9.90	9.77	V
	18900	1880	-28.76	38.00	9.24	8.39	V
	19175	1907.5	-28.58	38.22	9.64	9.20	V



CHANNEL BANDWIDTH: 10MHz QPSK

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
	18650	1855	-18.83	37.90	19.07	80.72	Н
	18900	1880	-18.11	37.99	19.88	97.27	Н
x	19150	1905	-18.75	38.31	19.56	90.36	Н
^	18650	1855	-28.54	37.81	9.27	8.45	V
	18900	1880	-28.90	38.00	9.10	8.13	V
	19150	1905	-28.69	38.22	9.53	8.97	V

CHANNEL BANDWIDTH: 10MHz 16QAM

Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
	18650	1855	-18.13	37.99	19.86	96.83	Н
	18900	1880	-18.02	37.99	19.97	99.31	Н
l x	19150	1905	-19.87	38.36	18.49	70.63	Н
^	18650	1855	-27.94	37.91	9.97	9.93	V
	18900	1880	-28.02	38.00	9.98	9.95	V
	19150	1905	-29.24	38.28	9.04	8.02	V



4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

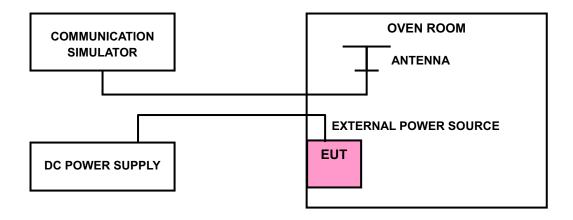
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

4.2.2 TEST PROCEDURE

- a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}$ C during the measurement testing. 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.

4.2.3 TEST SETUP



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4.2.4 TEST RESULTS

FREQUENCY ERROR vs. VOLTAGE

VOLTAGE (Volts)	CSM		WCDMA	LTE B	and 2	LIMIT (ppm)
	GSM	EDGE	VVCDIVIA	5MHz	10MHz	
3.8	-0.007	0.009	-0.004	-0.011	0.005	2.5
3.6	-0.006	0.009	-0.005	-0.017	-0.019	2.5
4.35	-0.006	0.011	-0.004	-0.012	-0.020	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.6Vdc to 4.35Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

		FREQU	ENCY ERRO	R (ppm)		
TEMP. (℃)	CCM	EDCE	WCDMA	LTE B	and 2	LIMIT (ppm)
	GSM	EDGE	WCDIVIA	5MHz	10MHz	
-10	-0.006	0.012	-0.005	0.037	-0.018	2.5
0	-0.009	0.013	-0.005	0.011	0.033	2.5
10	-0.008	0.013	-0.005	-0.017	-0.019	2.5
20	-0.009	0.013	-0.004	-0.035	-0.009	2.5
30	-0.009	0.015	-0.005	-0.012	-0.008	2.5
40	-0.010	0.014	-0.006	-0.013	-0.019	2.5
50	-0.007	0.010	-0.005	-0.013	-0.009	2.5

Note:

- 1. The applicant declared that the normal operating temperature of the EUT is from -10°C to 50°C.
- 2. The EUT would shut down automatically as below -10°C.

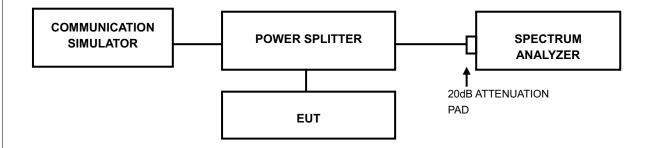


4.3 OCCUPIED BANDWIDTH MEASUREMENT

4.3.1 TEST PROCEDURES

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

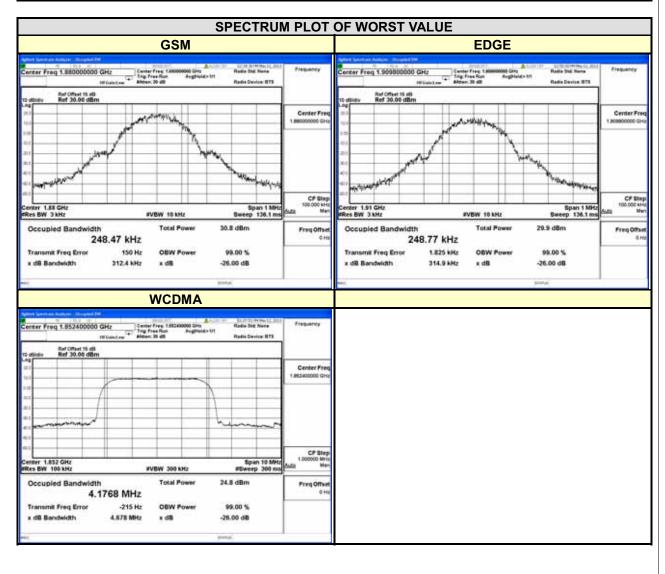
4.3.2 TEST SETUP





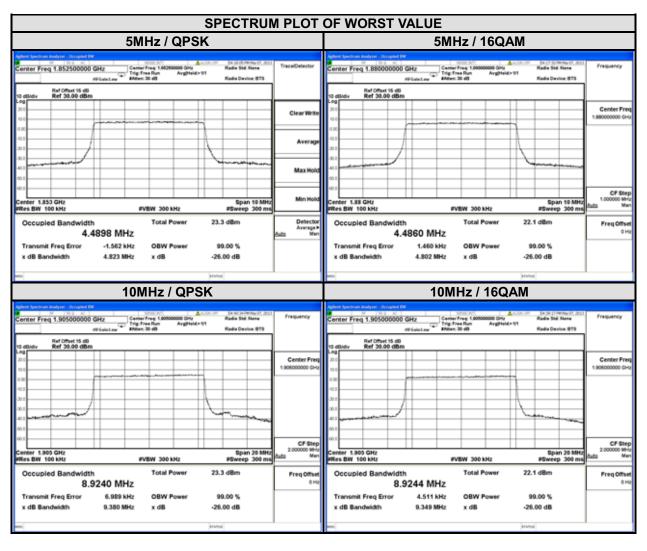
4.3.3 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (kHz)		CHANNEL		99% OCCUPIED BANDWIDTH (MHz)	
		GSM	EDGE		(MHz)	WCDMA	
512	1850.2	246.40	246.52	9262	1852.4	4.1768	
661	1880.0	248.47	247.53	9400	1880.0	4.17	
810	1909.8	246.09	248.77	9538	1907.6	4.1726	





LTE BAND 2									
С	HANNEL BAND	WIDTH: 5MH	lz	CHANNEL BANDWIDTH: 10MHz					
CHANNEL	FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH (MHz)		CHANNEL	FREQUENCY	99% OCCUPIED BANDWIDTH (MHz)			
		QPSK	16QAM		(MHz)	QPSK	16QAM		
18625	1852.5	4.4898	4.4851	18650	1855	8.9222	8.9216		
18900	1880	4.4872	4.4860	18900	1880	8.9215	8.9219		
19175	1907.5	4.4888	4.4811	19150	1905	8.9240	8.9244		



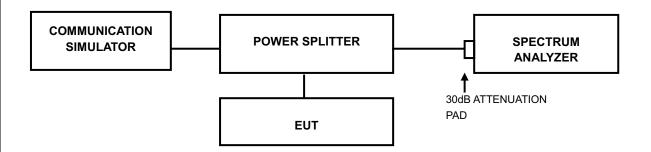


4.4 PEAK TO AVERAGE RATIO

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 SETUP



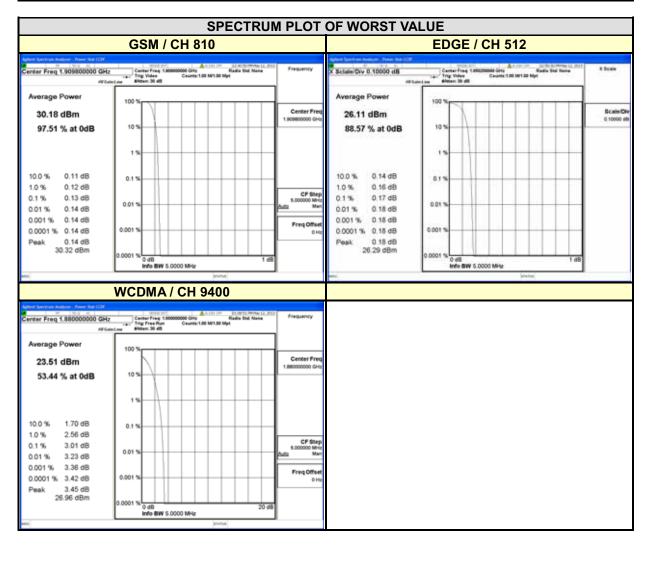
4.4.3 TEST PROCEDURES

- 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%.



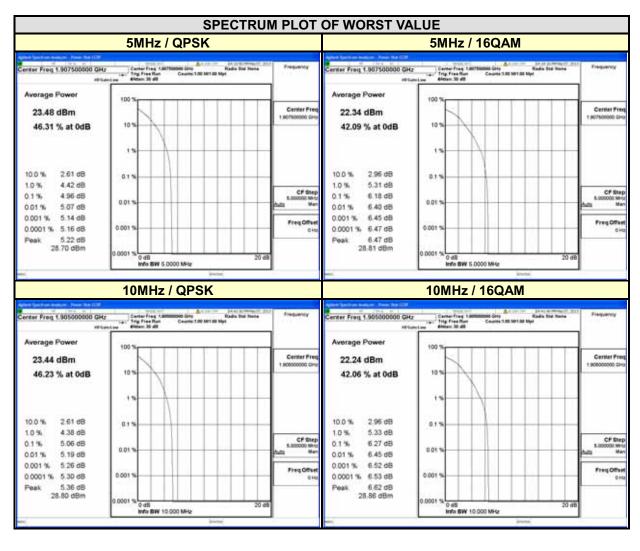
4.4.4 TEST RESULTS

CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		GSM	EDGE		, ,	WCDMA	
512	1850.2	0.12	0.17	9262	1852.4	2.83	
661	1880.0	0.12	0.16	9400	1880.0	3.01	
810	1909.8	0.13	0.17	9538	1907.6	2.90	





LTE BAND 2									
С	HANNEL BAND	WIDTH: 5MH	lz	CHANNEL BANDWIDTH: 10MHz					
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY	PEAK TO AVERAGE RATIO (dB)			
		QPSK	16QAM		(MHz)	QPSK	16QAM		
18625	1852.5	4.28	5.43	18650	1855	4.24	5.39		
18900	1880	4.75	5.90	18900	1880	4.74	5.88		
19175	1907.5	4.96	6.18	19150	1905	5.06	6.27		



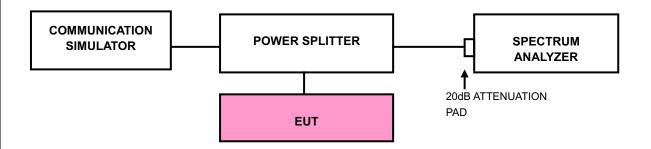


4.5 BAND EDGE MEASUREMENT

4.5.1 LIMITS OF BAND EDGE MEASUREMENT

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

4.5.2 TEST SETUP

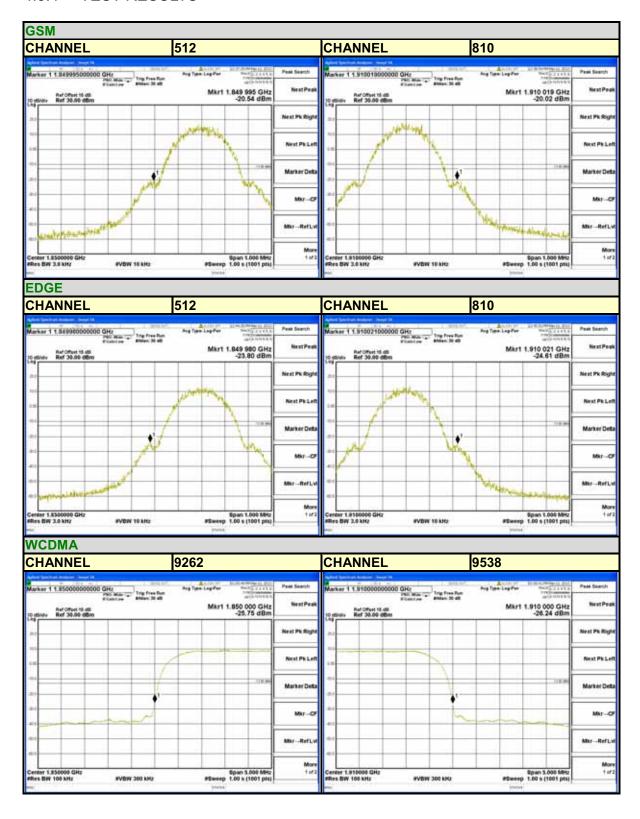


4.5.3 TEST PROCEDURES

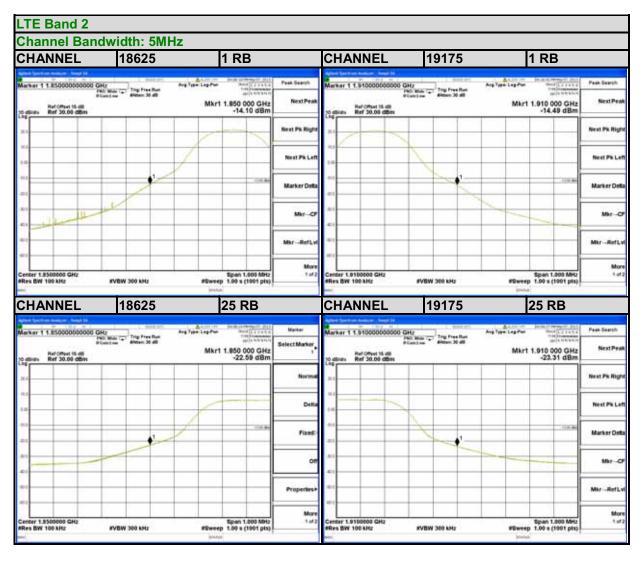
- a. All measurements were done at low and high operational frequency range.
- b. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 3kHz and VB of the spectrum is 10kHz (GSM/GPRS/ EDGE).
- c. The center frequency of spectrum is the band edge frequency and span is 5MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz (WCDMA/LTE).
- d. Record the max trace plot into the test report.



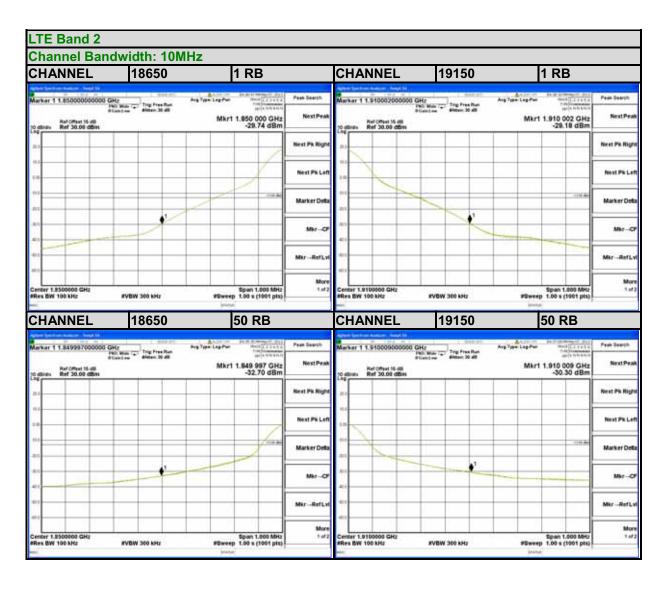
4.5.4 TEST RESULTS













4.6 CONDUCTED SPURIOUS EMISSIONS

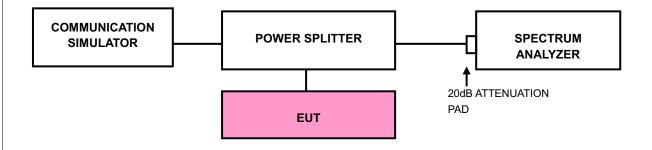
4.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P) dB$. The emission limit equal to -13dBm.

4.6.2 TEST PROCEDURE

- a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- b. Measuring frequency range is from 30 MHz to 19.1GHz. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

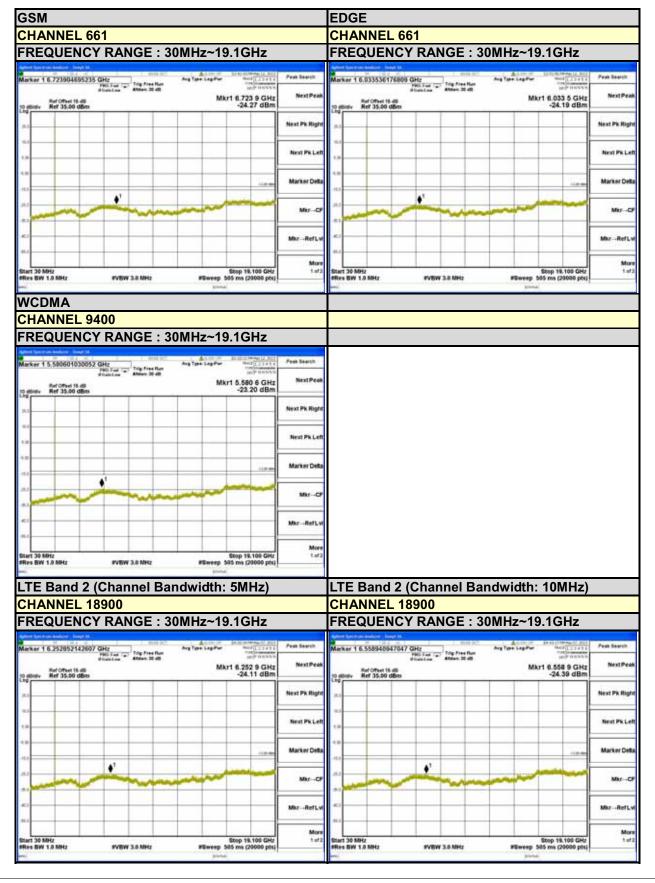
4.6.3 TEST SETUP



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4.6.4 TEST RESULTS





4.7 RADIATED EMISSION MEASUREMENT

4.7.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P) dB$. The emission limit equal to -13dBm.

4.7.2 TEST PROCEDURES

- a. Substitution method is used for E.I.R.P 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.
- b. 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
- c. EIRP = Output power level of S.G TX cable loss + Antenna gain of substitution horn.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.R.P power 2.15dBi.

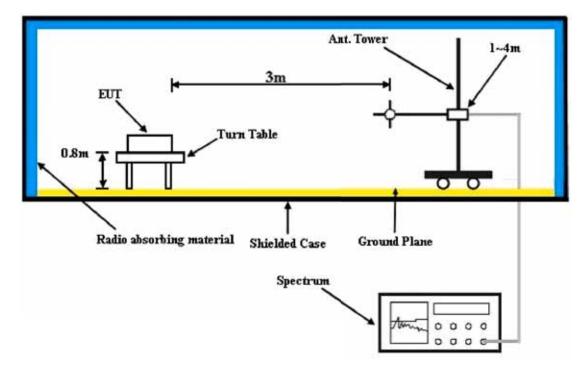
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.7.3 DEVIATION FROM TEST STANDARD

No deviation



4.7.4 TEST SETUP



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

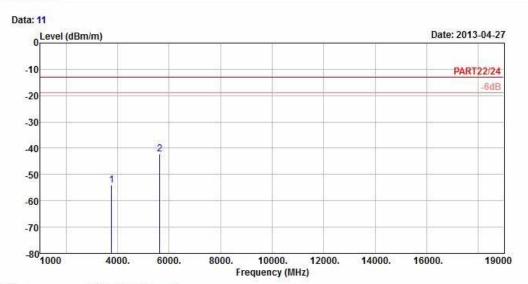


4.7.5 TEST RESULTS

GSM:



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 Chamber 5

Condition : PART22/24 3m HORIZONTAL

Brand/Model: PO58220 Remark : PC51900 Link Tested by : Johnson Liao

Temprature : 25℃ Humidity : 65% Plane : X

Read Limit Over
Freq Level Level Line Limit Factor Remark

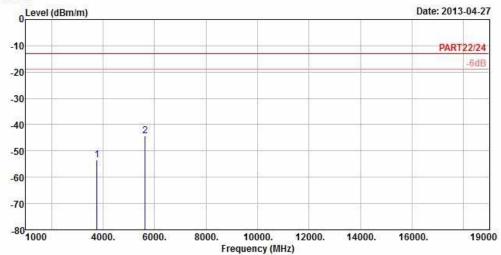
MHz dBm/m dBm dBm/m dB dB/m

1 3760.00 -54.12 -47.39 -13.00 -41.12 -6.73 Peak 2 pp 5640.00 -42.15 -42.36 -13.00 -29.15 0.21 Peak









Site : 966 Chamber 5

Condition : PART22/24 3m VERTICAL

Brand/Model: PO58220 Remark : PC51900 Link Tested by : Johnson Liao

Temprature : 25℃ Humidity : 65% Plane : X

Read Limit Over
Freq Level Level Line Limit Factor Remark

MHz dBm/m dBm dBm/m dB dB/m

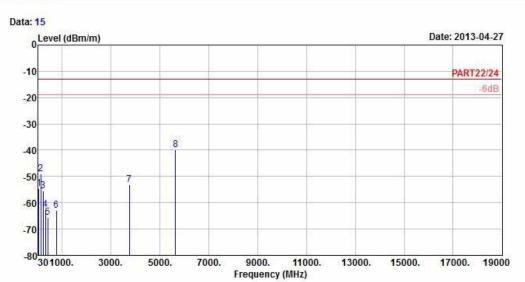
1 3760.00 -53.47 -46.74 -13.00 -40.47 -6.73 Peak 2 pp 5640.00 -44.36 -44.57 -13.00 -31.36 0.21 Peak



EDGE:



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 Chamber 5

Condition : PART22/24 3m HORIZONTAL

Brand/Model: P058220

Remark : EDGE 1900 Link Tested by : Johnson Liao

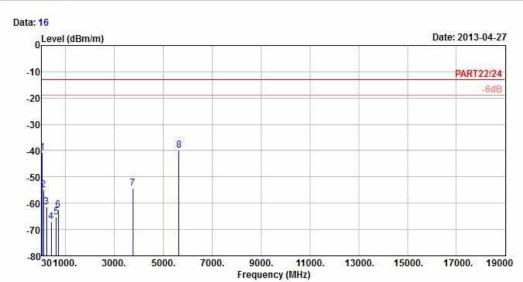
Temprature : 25°C Humidity : 65% Plane : X

	Freq	Level	Level	Line	Limit	Factor	Remark
197	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	43.50	-54.62	-53.36	-13.00	-41.62	-1.26	Peak
2	138.00	-48.96	-42.77	-13.00	-35.96	-6.19	Peak
3	231.42	-55.63	-49.12	-13.00	-42.63	-6.51	Peak
4	315.40	-62.63	-56.36	-13.00	-49.63	-6.27	Peak
5	421.80	-65.52	-60.44	-13.00	-52.52	-5.08	Peak
6	760.60	-62.85	-64.71	-13.00	-49.85	1.86	Peak
7	3760.00	-53.14	-46.41	-13.00	-40.14	-6.73	Peak
8 pp	5640.00	-39.86	-40.07	-13.00	-26.86	0.21	Peak

Read Limit Over







Site : 966 Chamber 5

Condition : PART22/24 3m VERTICAL

Brand/Model: P058220

Remark : EDGE 1900 Link Tested by : Johnson Liao

Temprature : 25℃ Humidity : 65% Plane : X

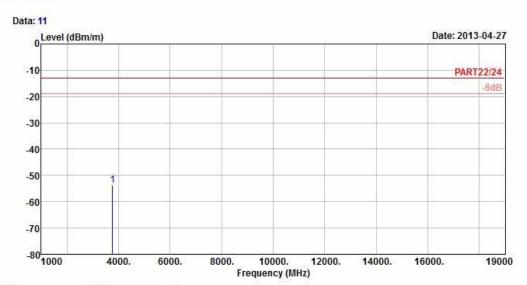
	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
152	MHz	dBm/m	dBm	dBm/m	dB	dB/m	17
1	43.77	-40.80	-39.54	-13.00	-27.80	-1.26	Peak
2	105.06	-54.76	-44.26	-13.00	-41.76	-10.50	Peak
3	231.69	-61.26	-54.75	-13.00	-48.26	-6.51	Peak
4	416.90	-67.03	-61.83	-13.00	-54.03	-5.20	Peak
5	615.70	-65.25	-65.18	-13.00	-52.25	-0.07	Peak
6	707.40	-62.44	-63.94	-13.00	-49.44	1.50	Peak
7	3760.00	-54.35	-47.62	-13.00	-41.35	-6.73	Peak
8 pp	5640.00	-39.77	-39.98	-13.00	-26.77	0.21	Peak



WCDMA:



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 Chamber 5

Condition : PART22/24 3m HORIZONTAL

Brand/Model: P058220 Remark : Band II Link Tested by : Johnson Liao

Temprature : 25℃ Humidity : 65% Plane : X

Read Limit Over

Freq Level Line Limit Factor Remark

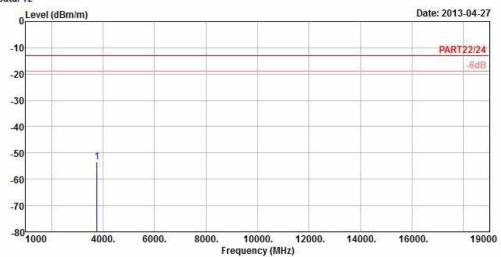
MHz dBm/m dBm dBm/m dB dB/m

1 pp 3760.00 -53.68 -46.95 -13.00 -40.68 -6.73 Peak









Site : 966 Chamber 5

Condition : PART22/24 3m VERTICAL

Brand/Model: P058220 Remark : Band II Link Tested by : Johnson Liao

Temprature : 25℃ Humidity : 65% Plane : X

Read Limit Over

Freq Level Level Line Limit Factor Remark

MHz dBm/m dBm dBm/m dB dB/m

1 pp 3760.00 -53.46 -46.73 -13.00 -40.46 -6.73 Peak

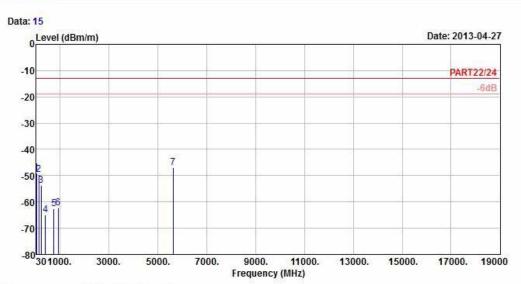


LTE BAND 2

CHANNEL BANDWIDTH: 5MHz / QPSK



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 Chamber 5

Condition : PART22/24 3m HORIZONTAL

Brand/Model: P058220

Remark : Band 2_5M_(QPSK 1,0) Link

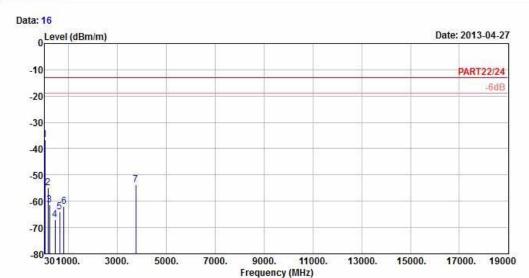
Tested by : David Huang

Temprature : 25°C Humidity : 65% Plane : Y

	Freq	Level		Limit Line		Factor	Remark
18 <u>2</u>	MHz	dBm/m	dBm	dBm/m	dB	dB/m	1
1	35.94	-48.89	-46.53	-13.00	-35.89	-2.36	Peak
2	136.65	-49.47	-43.02	-13.00	-36.47	-6.45	Peak
3	228.72	-53.66	-47.02	-13.00	-40.66	-6.64	Peak
2 3 4	405.70	-64.85	-59.36	-13.00	-51.85	-5.49	Peak
5	750.80	-62.52	-64.31	-13.00	-49.52	1.79	Peak
6	923.70	-62.22	-65.38	-13.00	-49.22	3.16	Peak
7 pp	5633.40	-46.91	-47.09	-13.00	-33.91	0.18	Peak







Site : 966 Chamber 5

Condition : PART22/24 3m VERTICAL

Brand/Model: P058220

Remark : Band 2_5M_(QPSK 1,0) Link Tested by : David Huang

Temprature : 25℃ Humidity : 65% : Y Plane

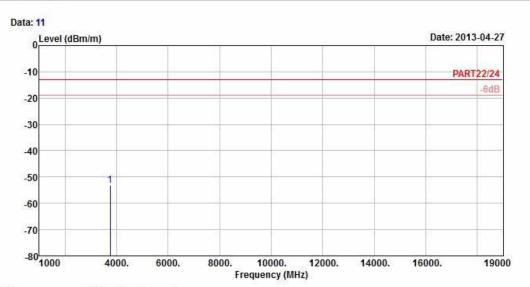
	1.51		Read	Limit	Over		
	Freq	Level					Remark
17	MHz	dBm/m	dBm	dBm/m	dB	dB/m	2
1 pp	42.42	-36.49	-35.16	-13.00	-23.49	-1.33	Peak
2	156.09	-55.03	-48.58	-13.00	-42.03	-6.45	Peak
3	221.16	-61.50	-54.51	-13.00	-48.50	-6.99	Peak
4	444.90	-66.92	-62.43	-13.00	-53.92	-4.49	Peak
5	640.90	-64.17	-64.55	-13.00	-51.17	0.38	Peak
6	808.20	-62.09	-64.26	-13.00	-49.09	2.17	Peak
7	3755.60	-53.63	-46.90	-13.00	-40.63	-6.73	Peak



CHANNEL BANDWIDTH: 10MHz / QPSK



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch



Site : 966 Chamber 5

Condition : PART22/24 3m HORIZONTAL

Brand/Model: P058220

Remark : Band 2_10M_(QPSK 1,0) Link Tested by : David Huang

Temprature : 25℃ Humidity : 65% Plane : Y

Read Limit Over

Freq Level Level Line Limit Factor Remark

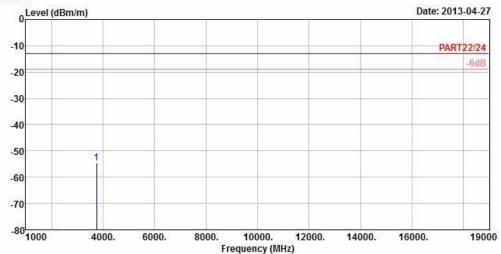
MHz dBm/m dBm dBm/m dB dB/m

1 pp 3755.60 -53.21 -46.48 -13.00 -40.21 -6.73 Peak









Site : 966 Chamber 5

Condition : PART22/24 3m VERTICAL

Brand/Model: P058220

Remark : Band 2_10M_(QPSK 1,0) Link Tested by : David Huang

Temprature : 25℃ Humidity : 65% Plane : Y

Read Limit Over

Freq Level Level Line Limit Factor Remark

MHz dBm/m dBm dBm/m dB dB/m

1 pp 3755.60 -54.69 -47.96 -13.00 -41.69 -6.73 Peak



5 PHOTOGRAPHS OF THE TEST CONFIGURATION
Please refer to the attached file (Test Setup Photo).



6 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.

If you have any comments, please feel free to contact us at the following:

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



7 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB
No any modifications were made to the EUT by the lab during the test.
END

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