FCC TEST REPORT

(PART 24)

REPORT NO.: RF141216C28-1

MODEL NO.: Z00D

FCC ID: MSQZ00D

RECEIVED: Dec. 16, 2014

TESTED: Dec. 26, 2014 ~ Jan. 07, 2015

ISSUED: Jan. 16, 2015

APPLICANT: ASUSTek COMPUTER INC.

ADDRESS: 4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN

ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, 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
RF141216C28-1	Original release	Jan. 16, 2015

1 CERTIFICATION

PRODUCT: ASUS Phone
MODEL: Z00D
BRAND: ASUS
APPLICANT: ASUSTek COMPUTER INC.
TESTED: Dec. 26, 2014 ~ Jan. 07, 2015
TEST SAMPLE: Production Unit
STANDARDS: **FCC Part 24, Subpart E**

The above equipment (model: Z00D) 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 : Gina Liu **, DATE :** Jan. 16, 2015
Gina Liu / Specialist

APPROVED BY : Sam chen **, DATE :** Jan. 16, 2015
Sam Chen / Senior Project Engineer

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 -19.11dB at 5640MHz.

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	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 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.

2.2 TEST SITE AND INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 15, 2014	Apr. 14, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 10, 2014	Dec. 09, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Feb. 27. 2014	Feb. 26, 2015
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Feb. 19, 2014	Feb. 18, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Aug. 27, 2014	Aug. 26, 2015
Preamplifier EMCI	EMC 012645	980115	Dec. 12, 2014	Dec. 11, 2015
Preamplifier EMCI	EMC 184045	980116	Jan. 13, 2014	Jan. 12, 2015
Preamplifier EMCI	EMC 330H	980071	Feb. 27, 2014	Feb. 26, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 18, 2014	Oct. 17, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 18, 2014	Oct. 17, 2015
RF signal cable Worken	RG-213	NA	Nov. 07, 2014	Nov. 06, 2015
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
Power Splitter Woken	2-18GHz 2Way SMA Fwd.:30W/Rev.:2W Isolated Power	COM412W5E3	Apr. 17, 2014	Apr. 16, 2015
JFW 20dB attenuation	50HF-020-SMA	NA	NA	NA
Communications Tester-Wireless	E5515C	MY52102544	Sep. 11, 2014	Sep. 10, 2016
Radio Communication Analyzer	MT8820C	6201300640	Aug. 01, 2013	Jul. 31, 2015

NOTE: 1. The calibration interval of the above test instruments is 12 / 24 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	ASUS Phone	
MODEL NO.	Z00D	
POWER SUPPLY	3.8Vdc (Battery) 5.2Vdc (Adapter)	
MODULATION TYPE	**GSM/GPRS**	GMSK
	EDGE	GMSK, 8PSK
	WCDMA	BPSK
	LTE Band 2	QPSK, 16QAM
FREQUENCY RANGE	**GSM/EDGE/GPRS**	1850.2MHz ~ 1909.8MHz
	WCDMA	1852.4MHz ~ 1907.6MHz
	LTE Band 2 (Channel Bandwidth: 1.4MHz)	1850.7MHz ~ 1909.3MHz
	LTE Band 2 (Channel Bandwidth: 3MHz)	1851.5MHz ~ 1908.5MHz
	LTE Band 2 (Channel Bandwidth: 5MHz)	1852.5MHz ~ 1907.5MHz
	LTE Band 2 (Channel Bandwidth: 10MHz)	1855.0MHz ~ 1905.0MHz
	LTE Band 2 (Channel Bandwidth: 15MHz)	1857.5MHz ~ 1902.5MHz
	LTE Band 2 (Channel Bandwidth: 20MHz)	1860.0MHz ~ 1900.0MHz
MAX. EIRP POWER	**GSM**	1403.78mW
	EDGE	618.44mW
	WCDMA	208.93mW
	LTE Band 2 (Channel Bandwidth: 1.4MHz)	197.38mW
	LTE Band 2 (Channel Bandwidth: 3MHz)	193.64mW
	LTE Band 2 (Channel Bandwidth: 5MHz)	198.15mW
	LTE Band 2 (Channel Bandwidth: 10MHz)	199.07mW
	LTE Band 2 (Channel Bandwidth: 15MHz)	206.54mW
	LTE Band 2 (Channel Bandwidth: 20MHz)	203.70mW
EMISSION DESIGNATOR	**GSM**	244KGXW
	EDGE	250KG7W
	WCDMA	4M12F9W
	LTE Band 2 (Channel Bandwidth: 1.4MHz)	1M09G7D
	LTE Band 2 (Channel Bandwidth: 3MHz)	2M70G7D
	LTE Band 2 (Channel Bandwidth: 5MHz)	4M49G7D
	LTE Band 2 (Channel Bandwidth: 10MHz)	8M98G7D
	LTE Band 2 (Channel Bandwidth: 15MHz)	13M5W7D
	LTE Band 2 (Channel Bandwidth: 20MHz)	18M0W7D

ANTENNA TYPE	Fixed Internal Antenna
I/O PORTS	Refer to users' manual
DATA CABLE	Refer to NOTE as below
ACCESSORY DEVICES	Refer to NOTE as below

NOTE:

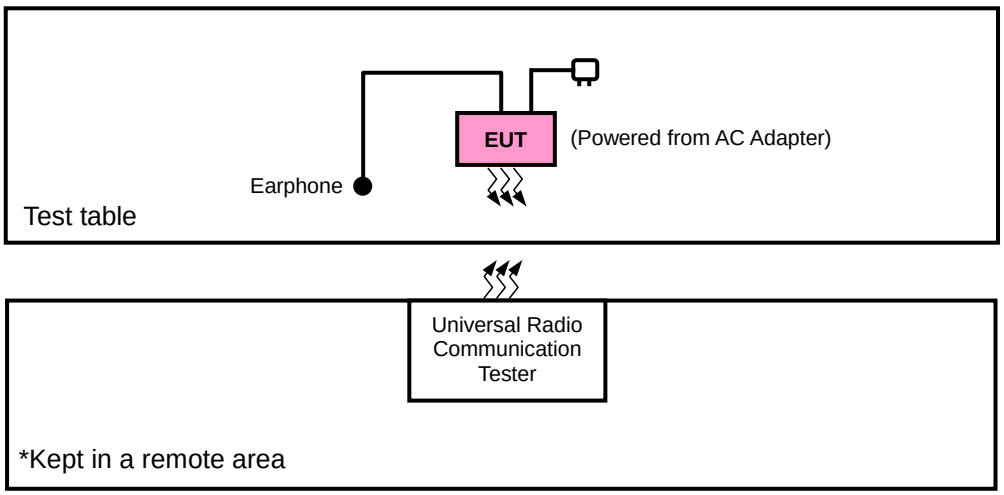
1. The EUT contains following accessory devices.

ITEM	BRAND	MODEL	SPECIFICATION
Adapter 1	ASUS	PA-1070-07	I/P: 100-240Vac, 50/60Hz, 0.25A O/P: 5.2Vdc, 1.35A
Adapter 2	ASUS	PSM06A-050Q	I/P: 100-240Vac, 50/60Hz, 0.25A O/P: 5.2Vdc, 1.35A
Adapter 3	ASUS	AD2005320	I/P: 100-240Vac, 50/60Hz, 0.25A O/P: 5.2Vdc, 1.35A
Battery	ASUS	C11P1423	3.8Vdc, 9.5Wh
USB Cable 1	ASUS	L65U-2009-CS-B	0.9m shielded cable w/o core
USB Cable 2	ASUS	AA781000	0.85m shielded cable w/o core
USB Cable 3	ASUS	CUBB04M-AS0D0-EF	0.88m shielded cable w/o core
Earphone	ASUS	EPA1342-1BA03-EH	1.17m non-shielded cable w/o core
CPU	INTEL	CPU G8065101274708927907	1.6G/760pin
LCD Panel	AUO	H499TAN04.0	--
Front Camera	Chicony	CCFE21520003870LH	--
Rear Camera	Chicony	CBAE82620003873LH	--
WWAN Module	Intel	Modem: XGLOD716G Transceiver: SMARTi4G PMB5740	--
WLAN/BT Module	BROADCOM	BCM4343S	--
EMMC	HYNIX	H26M41103HPR	8GB

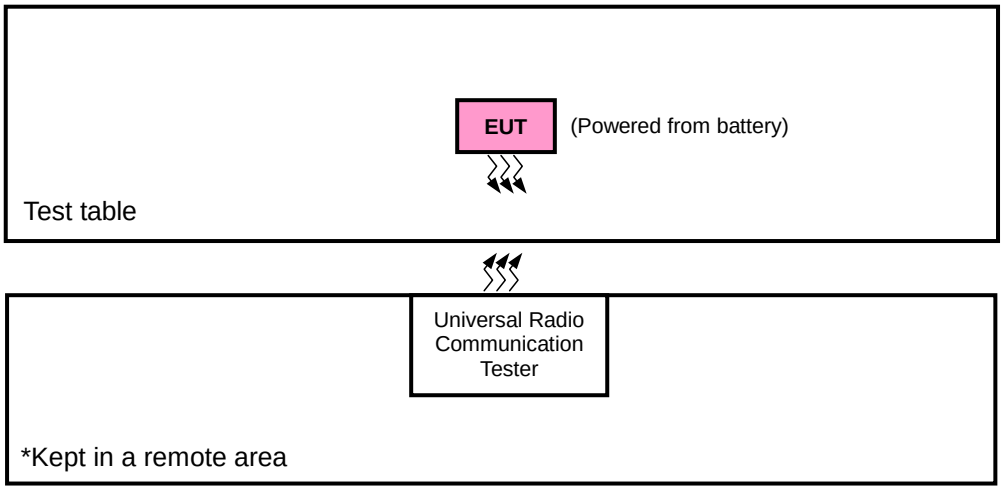
2. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

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 Z-plane for EIRP and X-axis for radiated emission. 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
-	CONDUCTED 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
-	CONDUCTED 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	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	FREQUENCY STABILITY	18607 to 19193	18900	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18900	3MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18900	5MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18900	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18900	15MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18900	20MHz	QPSK	1 RB / 0 RB Offset
-	OCCUPIED BANDWIDTH	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM	6 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK, 16QAM	15 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	PEAK TO AVERAGE RATIO	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	BAND EDGE	18607 to 19193	18607	1.4MHz	QPSK	1 RB / 0 RB Offset
						6 RB / 0 RB Offset
			19193	1.4MHz	QPSK	1 RB / 5 RB Offset
						6 RB / 0 RB Offset
		18615 to 19185	18615	3MHz	QPSK	1 RB / 0 RB Offset
						15 RB / 0 RB Offset
			19185	3MHz	QPSK	1 RB / 14 RB Offset
						15 RB / 0 RB Offset
		18625 to 19175	18625	5MHz	QPSK	1 RB / 0 RB Offset
						25 RB / 0 RB Offset
			19175	5MHz	QPSK	1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		18650 to 19150	18650	10MHz	QPSK	1 RB / 0 RB Offset
						50 RB / 0 RB Offset
			19150	10MHz	QPSK	1 RB / 49 RB Offset
						50 RB / 0 RB Offset
		18675 to 19125	18675	15MHz	QPSK	1 RB / 0 RB Offset
						75 RB / 0 RB Offset
			19125	15MHz	QPSK	1 RB / 74 RB Offset
						75 RB / 0 RB Offset

-	BAND EDGE	18700 to 19100	18700	20MHz	QPSK	1 RB / 0 RB Offset
						100 RB / 0 RB Offset
			19100	20MHz	QPSK	1 RB / 99 RB Offset
						100 RB / 0 RB Offset
-	CONDUCTED EMISSION	18607 to 19193	18900	1.4MHz	QPSK	1 RB / 0 RB Offset
		18615 to 19185	18900	3MHz	QPSK	1 RB / 0 RB Offset
		18625 to 19175	18900	5MHz	QPSK	1 RB / 0 RB Offset
		18650 to 19150	18900	10MHz	QPSK	1 RB / 0 RB Offset
		18675 to 19125	18900	15MHz	QPSK	1 RB / 0 RB Offset
		18700 to 19100	18900	20MHz	QPSK	1 RB / 0 RB Offset
-	RADIATED EMISSION	18700 to 19100	18900	20MHz	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	Taylor Liu
FREQUENCY STABILITY	26deg. C, 58%RH	3.8Vdc	Taylor Liu
OCCUPIED BANDWIDTH	26deg. C, 58%RH	3.8Vdc	Taylor Liu
PEAK TO AVERAGE RATIO	26deg. C, 58%RH	3.8Vdc	Taylor Liu
BAND EDGE	26deg. C, 58%RH	3.8Vdc	Taylor Liu
CONDUCTED EMISSION	26deg. C, 58%RH	3.8Vdc	Taylor Liu
RADIATED EMISSION	25deg. C, 65%RH	120Vac, 60Hz	Charles Hsiao

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:

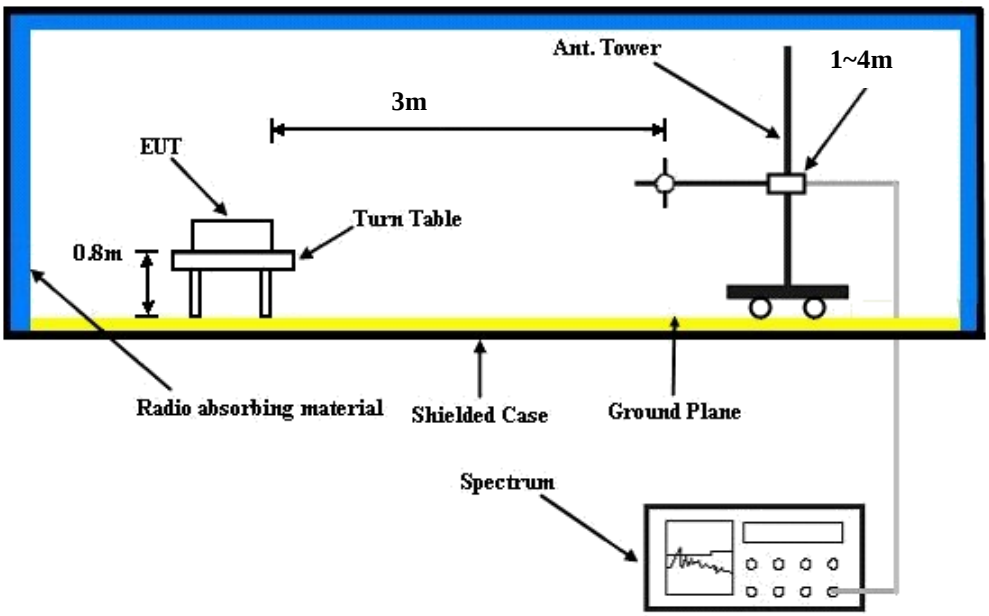
a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 1MHz for GSM, GPRS & EDGE, 5MHz for CDMA & WCDMA, and 10MHz for LTE mode.
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, 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:

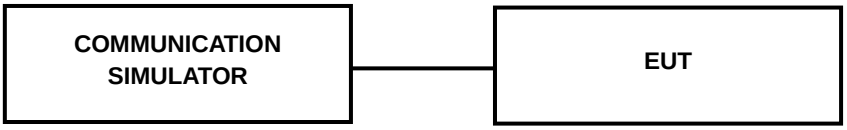
The EUT was set up for the maximum power with GSM, GPRS, EDGE & WCDMA & LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

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)	**30.03**	29.49	29.52
GPRS 8 (GMSK, 1 slot)	29.93	29.39	29.42
GPRS 10 (GMSK, 2 slot)	29.98	29.44	29.52
EDGE 8 (GMSK, 1 Uplink)	26.71	26.17	26.20
EDGE 10 (GMSK, 2 Uplink)	26.70	26.16	26.19

Band	WCDMA II		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
RMC 12.2K	**22.50**	22.44	22.30
HSDPA Subtest-1	21.80	21.74	21.60
HSDPA Subtest-2	21.79	21.73	21.59
HSDPA Subtest-3	21.28	21.23	21.10
HSDPA Subtest-4	21.27	21.21	21.08
HSUPA Subtest-1	22.36	22.30	22.16
HSUPA Subtest-2	20.80	20.74	20.60
HSUPA Subtest-3	21.35	21.29	21.15
HSUPA Subtest-4	20.53	20.47	20.33
HSUPA Subtest-5	21.51	21.45	21.31

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 18607 1850.7 MHz	Mid CH 18900 1880.0 MHz	High CH 19193 1909.3 MHz		Low CH 18607 1850.7 MHz	Mid CH 18900 1880.0 MHz	High CH 19193 1909.3 MHz	
2 / 1.4M	1	0	21.23	21.32	21.26	0	20.22	20.31	20.25	1
	1	2	20.91	20.88	20.90	0	19.90	19.87	19.89	1
	1	5	20.46	20.43	20.45	0	19.45	19.42	19.44	1
	3	0	20.14	20.17	20.16	0	19.13	19.16	19.15	1
	3	1	19.99	19.96	19.98	0	18.98	18.95	18.97	1
	3	3	19.84	19.81	19.83	0	18.83	18.80	18.82	1
	6	0	19.96	19.97	19.95	1	18.95	18.95	18.94	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 18615 1851.5 MHz	Mid CH 18900 1880.0 MHz	High CH 19185 1908.5 MHz		Low CH 18615 1851.5 MHz	Mid CH 18900 1880.0 MHz	High CH 19185 1908.5 MHz	
2 / 3M	1	0	21.35	21.44	21.38	0	20.34	20.43	20.37	1
	1	7	21.03	21.00	21.02	0	20.02	19.99	20.01	1
	1	14	20.58	20.55	20.57	0	19.57	19.54	19.56	1
	8	0	20.26	20.29	20.28	1	19.25	19.28	19.27	2
	8	3	20.11	20.08	20.10	1	19.10	19.07	19.09	2
	8	7	19.96	19.93	19.95	1	18.95	18.92	18.94	2
	15	0	20.08	20.09	20.07	1	19.07	19.08	19.06	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 18625 1852.5 MHz	Mid CH 18900 1880.0 MHz	High CH 19175 1907.5 MHz		Low CH 18625 1852.5 MHz	Mid CH 18900 1880.0 MHz	High CH 19175 1907.5 MHz	
2 / 5M	1	0	21.47	21.56	21.50	0	20.46	20.55	20.49	1
	1	12	21.15	21.12	21.14	0	20.14	20.11	20.13	1
	1	24	20.70	20.67	20.69	0	19.69	19.66	19.68	1
	12	0	20.38	20.41	20.40	1	19.37	19.40	19.39	2
	12	6	20.23	20.20	20.22	1	19.22	19.19	19.21	2
	12	13	20.08	20.05	20.07	1	19.07	19.04	19.06	2
	25	0	20.20	20.21	20.19	1	19.19	19.20	19.18	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 18650 1855.0 MHz	Mid CH 18900 1880.0 MHz	High CH 19150 1905.0 MHz		Low CH 18650 1855.0 MHz	Mid CH 18900 1880.0 MHz	High CH 19150 1905.0 MHz	
2 / 10M	1	0	21.59	21.68	21.62	0	20.58	20.67	20.61	1
	1	24	21.27	21.24	21.26	0	20.26	20.23	20.25	1
	1	49	20.82	20.79	20.81	0	19.81	19.78	19.80	1
	25	0	20.50	20.53	20.52	1	19.49	19.52	19.51	2
	25	12	20.35	20.32	20.34	1	19.34	19.31	19.33	2
	25	25	20.20	20.17	20.19	1	19.19	19.16	19.18	2
	50	0	20.32	20.33	20.31	1	19.31	19.32	19.30	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 18675 1857.5 MHz	Mid CH 18900 1880.0 MHz	High CH 19125 1902.5 MHz		Low CH 18675 1857.5 MHz	Mid CH 18900 1880.0 MHz	High CH 19125 1902.5 MHz	
2 / 15M	1	0	21.71	21.80	21.74	0	20.70	20.79	20.73	1
	1	37	21.39	21.36	21.38	0	20.38	20.35	20.37	1
	1	74	20.94	20.91	20.93	0	19.93	19.90	19.92	1
	36	0	20.62	20.65	20.64	1	19.61	19.64	19.63	2
	36	19	20.47	20.44	20.46	1	19.46	19.43	19.45	2
	36	39	20.32	20.29	20.31	1	19.31	19.28	19.30	2
	75	0	20.44	20.45	20.43	1	19.43	19.44	19.42	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 18700 1860.0 MHz	Mid CH 18900 1880.0 MHz	High CH 19100 1900.0 MHz		Low CH 18700 1860.0 MHz	Mid CH 18900 1880.0 MHz	High CH 19100 1900.0 MHz	
2 / 20M	1	0	21.83	21.92	21.86	0	20.82	20.91	20.85	1
	1	50	21.51	21.48	21.50	0	20.50	20.47	20.49	1
	1	99	21.06	21.03	21.05	0	20.05	20.02	20.04	1
	50	0	20.74	20.77	20.76	1	19.73	19.76	19.75	2
	50	25	20.59	20.56	20.58	1	19.58	19.55	19.57	2
	50	50	20.44	20.41	20.43	1	19.43	19.40	19.42	2
	100	0	20.56	20.57	20.55	1	19.55	19.56	19.54	2

EIRP POWER (dBm)

GSM							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	512	1850.2	-18.84	44.70	25.86	385.48	H
	661	1880.0	-18.35	44.70	26.35	431.52	H
	810	1909.8	-18.45	44.57	26.12	409.54	H
	512	1850.2	-13.60	44.27	30.67	1166.81	V
	661	1880.0	-13.60	44.87	31.27	1339.68	V
	810	1909.8	-13.14	44.61	31.47	1403.78	V

EDGE							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	512	1850.2	-21.60	44.70	23.10	204.17	H
	661	1880.0	-21.35	44.70	23.35	216.27	H
	810	1909.8	-21.51	44.57	23.06	202.44	H
	512	1850.2	-16.53	44.27	27.74	594.29	V
	661	1880.0	-17.27	44.87	27.60	575.44	V
	810	1909.8	-16.70	44.61	27.91	618.44	V

WCDMA							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	9262	1852.4	-25.72	44.70	18.98	79.07	H
	9400	1880.0	-25.59	44.70	19.11	81.47	H
	9538	1907.6	-25.68	44.57	18.89	77.50	H
	9262	1852.4	-21.07	44.27	23.20	208.93	V
	9400	1880.0	-21.84	44.87	23.03	200.91	V
	9538	1907.6	-21.59	44.61	23.02	200.59	V

LTE Band 2							
Channel Bandwidth: 1.4MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	18607	1850.7	-26.75	44.70	17.95	62.37	H
	18900	1880.0	-26.86	44.70	17.84	60.81	H
	19193	1909.3	-27.17	44.57	17.40	54.99	H
	18607	1850.7	-21.44	44.27	22.83	191.87	V
	18900	1880.0	-22.06	44.87	22.81	190.99	V
	19193	1909.3	-21.66	44.61	22.95	197.38	V

LTE Band 2							
Channel Bandwidth: 1.4MHz / 16QAM							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	18607	1850.7	-28.45	44.70	16.25	42.17	18607
	18900	1880.0	-28.43	44.70	16.27	42.36	18900
	19193	1909.3	-27.68	44.57	16.89	48.90	19193
	18607	1850.7	-22.29	44.27	21.98	157.76	18607
	18900	1880.0	-22.72	44.87	22.15	164.06	18900
	19193	1909.3	-23.09	44.61	21.52	142.00	19193

LTE Band 2							
Channel Bandwidth: 3MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	18615	1851.5	-26.72	44.70	17.98	62.81	H
	18900	1880.0	-26.65	44.70	18.05	63.83	H
	19185	1908.5	-27.05	44.57	17.52	56.53	H
	18615	1851.5	-21.44	44.27	22.83	191.87	V
	18900	1880.0	-22.00	44.87	22.87	193.64	V
	19185	1908.5	-22.29	44.61	22.32	170.73	V

LTE Band 2							
Channel Bandwidth: 3MHz / 16QAM							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	18615	1851.5	-28.59	44.70	16.11	40.83	H
	18900	1880.0	-28.27	44.70	16.43	43.95	H
	19185	1908.5	-27.75	44.57	16.82	48.12	H
	18615	1851.5	-22.11	44.27	22.16	164.44	V
	18900	1880.0	-22.69	44.87	22.18	165.20	V
	19185	1908.5	-22.96	44.61	21.65	146.32	V

LTE Band 2							
Channel Bandwidth: 5MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	18625	1852.5	-26.71	44.70	17.99	62.95	H
	18900	1880.0	-26.37	44.70	18.33	68.08	H
	19175	1907.5	-26.72	44.57	17.85	61.00	H
	18625	1852.5	-21.45	44.27	22.82	191.43	V
	18900	1880.0	-21.90	44.87	22.97	198.15	V
	19175	1907.5	-21.86	44.61	22.75	188.50	V

LTE Band 2							
Channel Bandwidth: 5MHz / 16QAM							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	18625	1852.5	-28.33	44.70	16.37	43.35	H
	18900	1880.0	-28.77	44.70	15.93	39.17	H
	19175	1907.5	-28.28	44.57	16.29	42.59	H
	18625	1852.5	-22.03	44.27	22.24	167.49	V
	18900	1880.0	-22.40	44.87	22.47	176.60	V
	19175	1907.5	-22.33	44.61	22.28	169.16	V

LTE Band 2							
Channel Bandwidth: 10MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	18650	1855.0	-26.72	44.70	17.98	62.81	H
	18900	1880.0	-26.63	44.70	18.07	64.12	H
	19150	1905.0	-26.79	44.57	17.78	60.02	H
	18650	1855.0	-21.41	44.27	22.86	193.20	V
	18900	1880.0	-21.88	44.87	22.99	199.07	V
	19150	1905.0	-22.40	44.61	22.21	166.46	V

LTE Band 2							
Channel Bandwidth: 10MHz / 16QAM							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	18650	1855.0	-28.29	44.70	16.41	43.75	H
	18900	1880.0	-28.05	44.70	16.65	46.24	H
	19150	1905.0	-28.37	44.57	16.20	41.72	H
	18650	1855.0	-21.82	44.27	22.45	175.79	V
	18900	1880.0	-22.50	44.87	22.37	172.58	V
	19150	1905.0	-22.02	44.61	22.59	181.68	V

LTE Band 2							
Channel Bandwidth: 15MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	18675	1857.5	-26.42	44.70	18.28	67.30	H
	18900	1880.0	-26.18	44.70	18.52	71.12	H
	19125	1902.5	-26.01	44.57	18.56	71.83	H
	18675	1857.5	-21.12	44.27	23.15	206.54	V
	18900	1880.0	-22.12	44.87	22.75	188.36	V
	19125	1902.5	-22.20	44.61	22.41	174.30	V

LTE Band 2							
Channel Bandwidth: 15MHz / 16QAM							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	18675	1857.5	-27.98	44.70	16.72	46.99	H
	18900	1880.0	-27.63	44.70	17.07	50.93	H
	19125	1902.5	-28.35	44.57	16.22	41.91	H
	18675	1857.5	-21.75	44.27	22.52	178.65	V
	18900	1880.0	-22.47	44.87	22.40	173.78	V
	19125	1902.5	-22.73	44.61	21.88	154.28	V

LTE Band 2							
Channel Bandwidth: 20MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	18700	1860.0	-26.46	44.70	18.24	66.68	H
	18900	1880.0	-26.15	44.70	18.55	71.61	H
	19100	1900.0	-25.70	44.57	18.87	77.14	H
	18700	1860.0	-21.18	44.27	23.09	203.70	V
	18900	1880.0	-21.90	44.87	22.97	198.15	V
	19100	1900.0	-21.84	44.61	22.77	189.37	V

LTE Band 2							
Channel Bandwidth: 20MHz / 16QAM							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	EIRP(dBm)	EIRP(mW)	Polarization (H/V)
Z	18700	1860.0	-28.02	44.70	16.68	46.56	H
	18900	1880.0	-27.62	44.70	17.08	51.05	H
	19100	1900.0	-28.06	44.57	16.51	44.80	H
	18700	1860.0	-21.88	44.27	22.39	173.38	V
	18900	1880.0	-22.39	44.87	22.48	177.01	V
	19100	1900.0	-22.10	44.61	22.51	178.36	V

4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

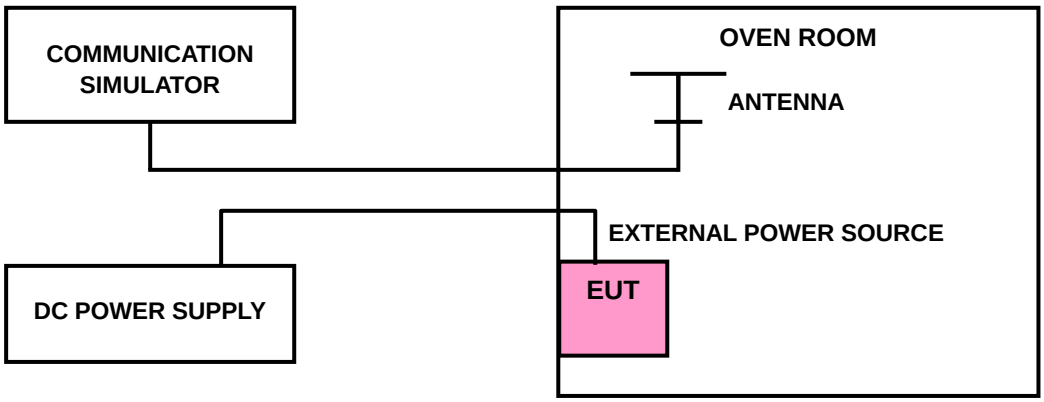
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

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 ±0.5℃ 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



4.2.4 TEST RESULTS

FREQUENCY ERROR vs. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)			LIMIT (ppm)
	GSM	EDGE	WCDMA	
3.8	0.002	0.002	0.002	2.5
3.6	0.001	0.001	0.001	2.5
4.2	0.002	0.001	0.001	2.5

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

FREQUENCY ERROR vs. TEMPERATURE

TEMP. (℃)	FREQUENCY ERROR (ppm)			LIMIT (ppm)
	GSM	EDGE	WCDMA	
-30	0.001	0.001	0.002	2.5
-20	0.001	0.002	0.002	2.5
-10	-0.002	0.002	0.001	2.5
0	-0.001	-0.001	-0.001	2.5
10	-0.001	-0.001	-0.002	2.5
20	-0.002	-0.002	-0.001	2.5
30	-0.001	-0.001	-0.002	2.5
40	0.001	0.001	0.001	2.5
55	0.002	0.002	0.001	2.5

Note:

1. The applicant declared that the normal operating temperature of the EUT is from -30°C to 55°C.

FREQUENCY ERROR vs. VOLTAGE

VOLTAGE (Volts)	FREQUENCY ERROR (ppm)						LIMIT (ppm)
	LTE Band 2						
	1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz	
3.8	0.001276596	0.001648936	0.001010638	0.001117021	0.000957447	0.001117021	2.5
3.6	0.001648936	0.000531915	0.001914894	0.001542553	0.001808511	0.001914894	2.5
4.2	0.000904255	0.001170213	0.001117021	0.000744681	0.00106383	0.00143617	2.5

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

FREQUENCY ERROR vs. TEMPERATURE

TEMP. (℃)	FREQUENCY ERROR (ppm)						LIMIT (ppm)
	LTE Band 2						
	1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz	
-30	0.001010638	0.001702128	0.000851064	0.001861702	0.001755319	0.001595745	2.5
-20	0.000744681	0.000904255	0.001276596	0.000744681	0.000851064	0.000797872	2.5
-10	0.001170213	-0.001542553	0.001489362	0.001489362	0.00143617	-0.001170213	2.5
0	-0.001808511	-0.001755319	0.001914894	0.000904255	0.001542553	-0.002180851	2.5
10	-0.00143617	-0.000851064	-0.001702128	-0.00106383	-0.000638298	-0.000744681	2.5
20	-0.001117021	-0.001489362	-0.001170213	-0.000904255	-0.002021277	-0.001755319	2.5
30	-0.000851064	0.000797872	-0.000957447	-0.001755319	-0.001223404	0.001329787	2.5
40	0.001968085	0.001276596	-0.00212766	-0.002446809	-0.000957447	0.001702128	2.5
55	0.00212766	0.001968085	-0.001914894	0.002659574	-0.001808511	0.001808511	2.5

Note:

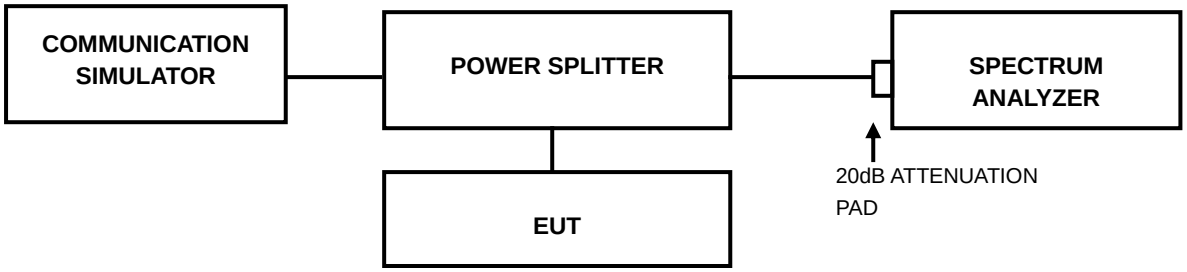
1. The applicant declared that the normal operating temperature of the EUT is from -30°C to 55°C.

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

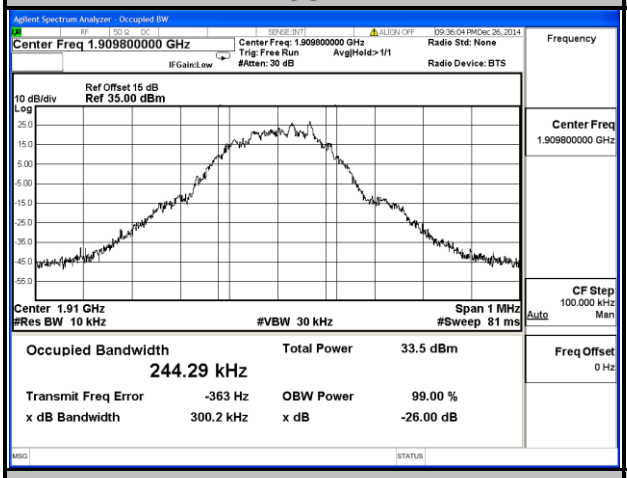


4.3.3 TEST RESULTS

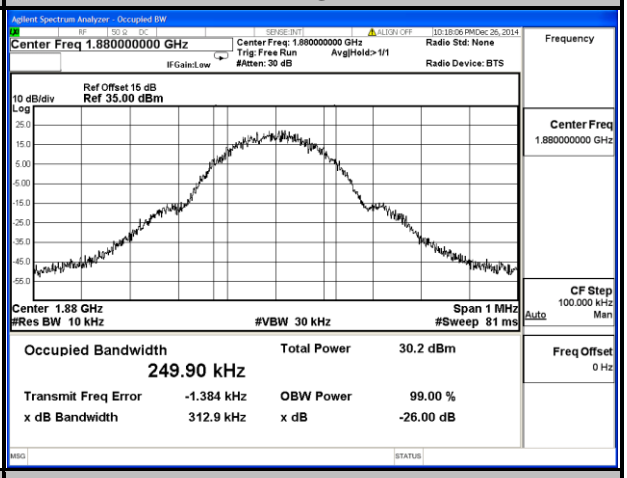
CHANNEL	FREQUENCY	99% OCCUPIED BANDWIDTH (kHz)		CHANNEL	FREQUENCY	99% OCCUPIED BANDWIDTH (MHz)
		GSM	EDGE			WCDMA
512	1850.2	241.63	246.41	9262	1852.4	4.12
661	1880.0	240.35	249.90	9400	1880.0	4.08
810	1909.8	244.29	249.03	9538	1907.6	4.09
CHANNEL	**FREQUENCY**	**26dB BANDWIDTH (kHz)**		**CHANNEL**	**FREQUENCY**	**26dB BANDWIDTH (MHz)**
		GSM	EDGE			WCDMA
512	1850.2	301.60	313.80	9262	1852.4	4.78
661	1880.0	302.00	312.90	9400	1880.0	4.65
810	1909.8	300.20	315.90	9538	1907.6	4.67

SPECTRUM PLOT OF WORST VALUE

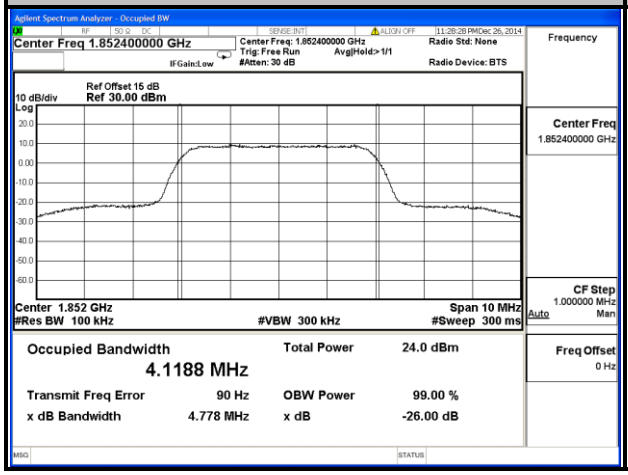
GSM



EDGE



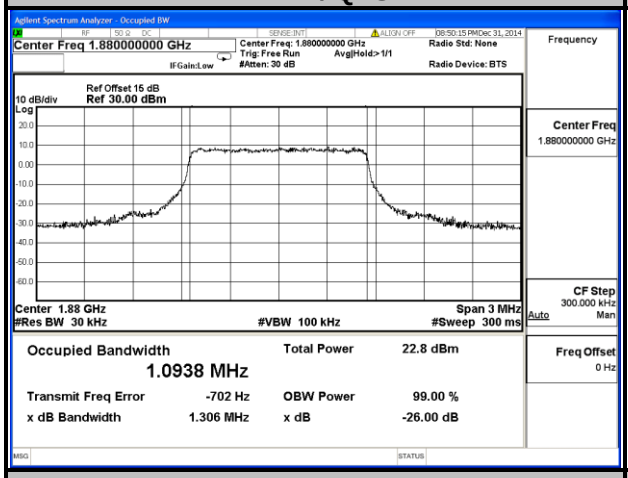
WCDMA



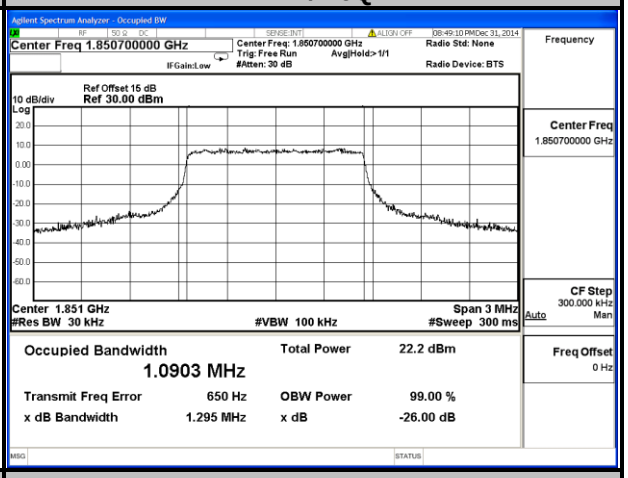
LTE BAND 2							
CHANNEL BANDWIDTH: 1.4MHz				CHANNEL BANDWIDTH: 3MHz			
CHANNEL	FREQUENCY	99% OCCUPIED BANDWIDTH (MHz)		CHANNEL	FREQUENCY	99% OCCUPIED BANDWIDTH (MHz)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	1.09	1.09	18615	1851.5	2.70	2.70
18900	1880.0	1.09	1.09	18900	1880.0	2.69	2.70
19193	1909.3	1.09	1.09	19185	1908.5	2.70	2.70
CHANNEL	FREQUENCY	26dB BANDWIDTH (MHz)		CHANNEL	FREQUENCY	26dB BANDWIDTH (MHz)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	1.29	1.30	18615	1851.5	2.90	2.93
18900	1880.0	1.31	1.28	18900	1880.0	2.91	2.94
19193	1909.3	1.30	1.30	19185	1908.5	2.92	2.94

SPECTRUM PLOT OF WORST VALUE

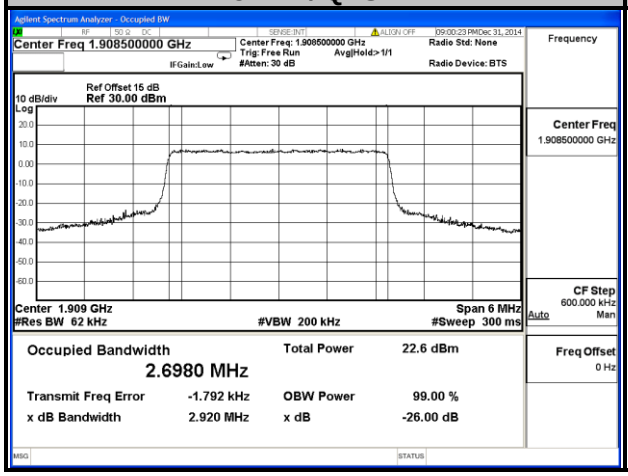
1.4MHz / QPSK



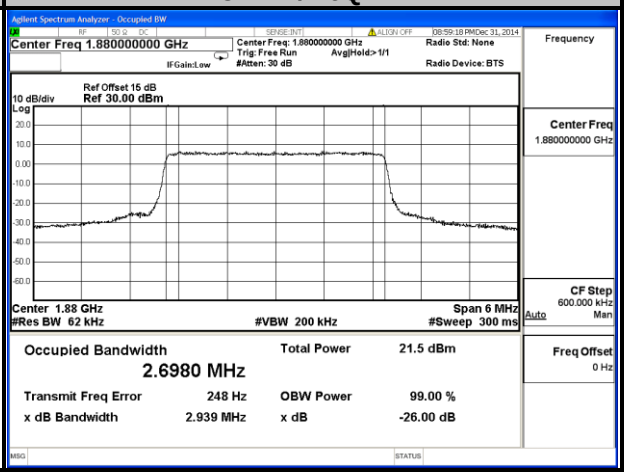
1.4MHz / 16QAM



3MHz / QPSK



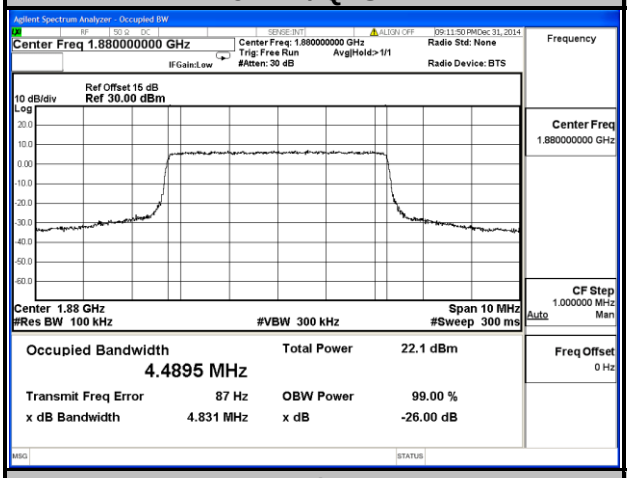
3MHz / 16QAM



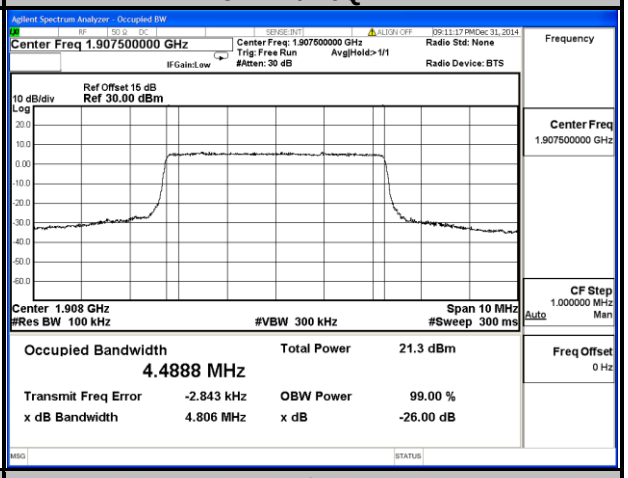
LTE BAND 2							
CHANNEL BANDWIDTH: 5MHz				CHANNEL BANDWIDTH: 10MHz			
CHANNEL	FREQUENCY	99% OCCUPIED BANDWIDTH (MHz)		CHANNEL	FREQUENCY	99% OCCUPIED BANDWIDTH (MHz)	
		QPSK	16QAM			QPSK	16QAM
18625	1852.5	4.49	4.48	18650	1855.0	8.97	8.96
18900	1880.0	4.49	4.49	18900	1880.0	8.98	8.98
19175	1907.5	4.49	4.49	19150	1905.0	8.98	8.97
CHANNEL	FREQUENCY	26dB BANDWIDTH (MHz)		CHANNEL	FREQUENCY	26dB BANDWIDTH (MHz)	
		QPSK	16QAM			QPSK	16QAM
18625	1852.5	4.84	4.82	18650	1855.0	9.55	9.56
18900	1880.0	4.83	4.82	18900	1880.0	9.60	9.58
19175	1907.5	4.83	4.81	19150	1905.0	9.55	9.60

SPECTRUM PLOT OF WORST VALUE

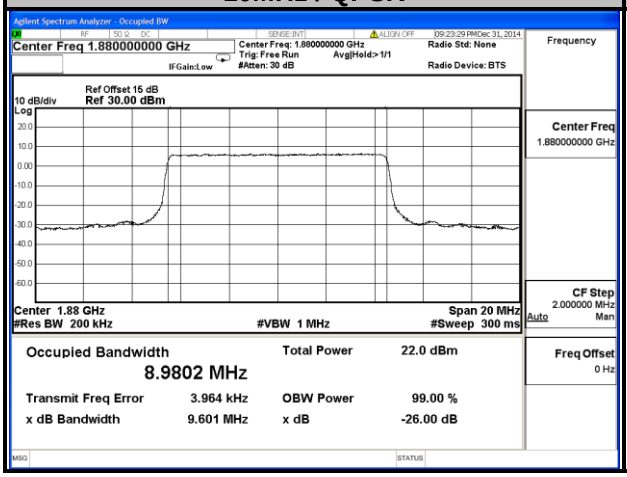
5MHz / QPSK



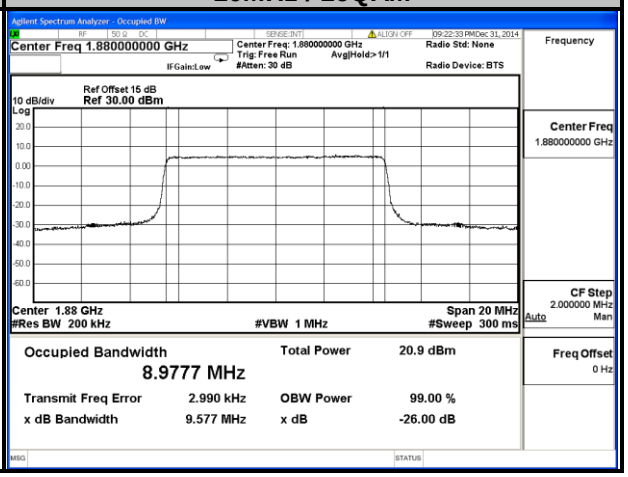
5MHz / 16QAM



10MHz / QPSK



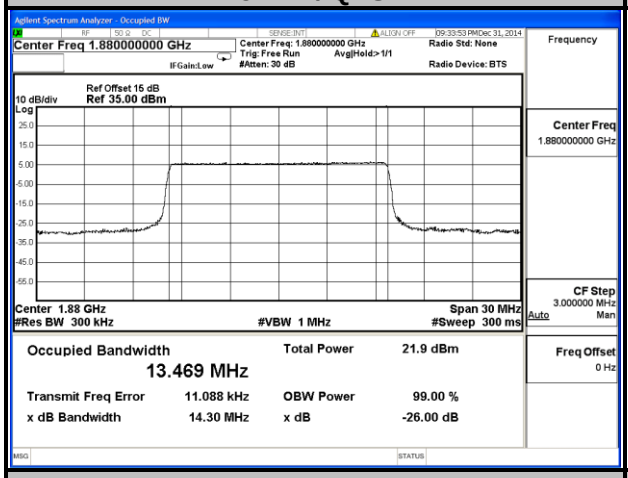
10MHz / 16QAM



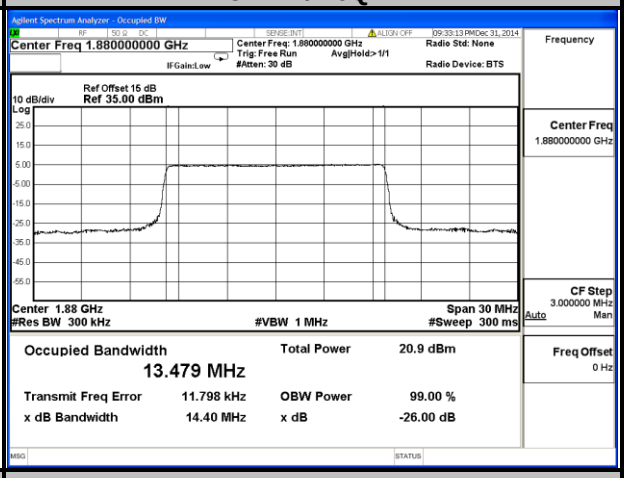
LTE BAND 2							
CHANNEL BANDWIDTH: 15MHz				CHANNEL BANDWIDTH: 20MHz			
CHANNEL	FREQUENCY	99% OCCUPIED BANDWIDTH (MHz)		CHANNEL	FREQUENCY	99% OCCUPIED BANDWIDTH (MHz)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	13.44	13.43	18700	1860.0	17.91	17.91
18900	1880.0	13.47	13.48	18900	1880.0	17.99	18.00
19125	1902.5	13.45	13.44	19100	1900.0	17.90	17.91
CHANNEL	FREQUENCY	26dB BANDWIDTH (MHz)		CHANNEL	FREQUENCY	26dB BANDWIDTH (MHz)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	14.29	14.30	18700	1860.0	19.02	19.01
18900	1880.0	14.30	14.40	18900	1880.0	19.10	19.08
19125	1902.5	14.24	14.38	19100	1900.0	19.03	19.02

SPECTRUM PLOT OF WORST VALUE

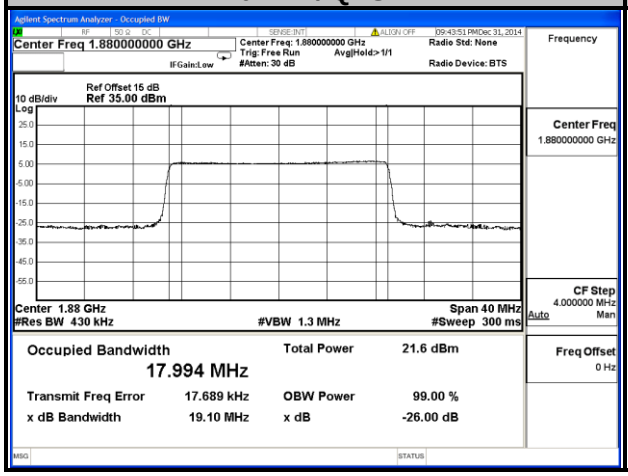
15MHz / QPSK



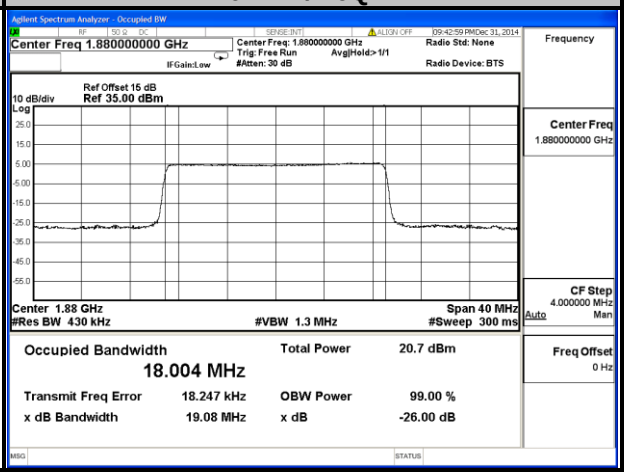
15MHz / 16QAM



20MHz / QPSK



20MHz / 16QAM

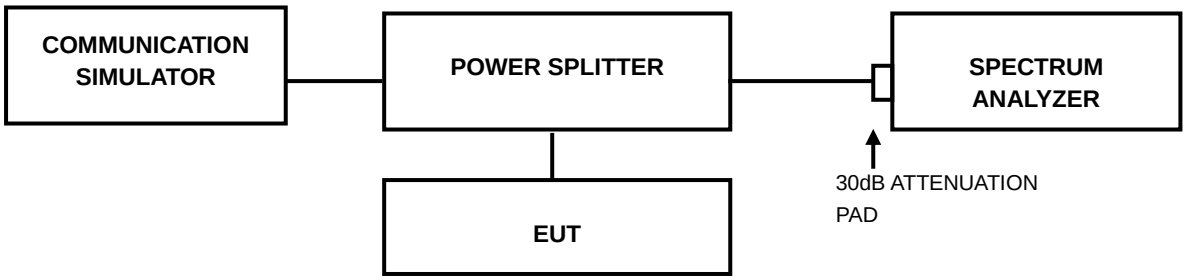


4.4 PEAK TO AVERAGE RATIO

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

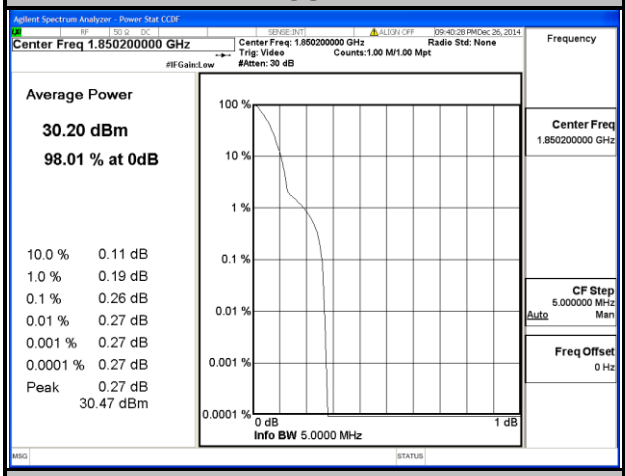
1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

4.4.4 TEST RESULTS

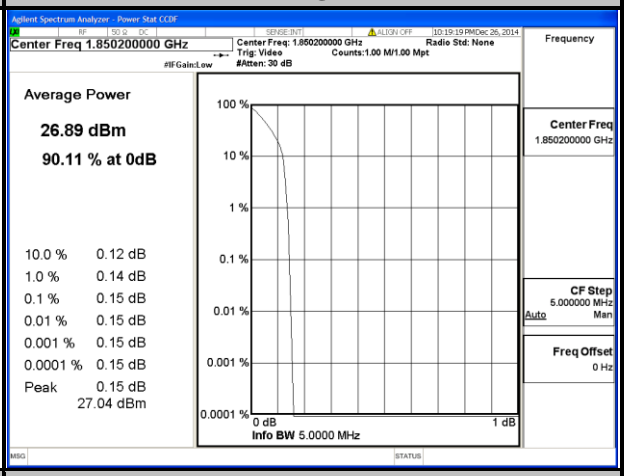
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
		GSM	EDGE			WCDMA
512	1850.2	0.26	0.15	9262	1852.4	2.27
661	1880.0	0.22	0.14	9400	1880.0	3.10
810	1909.8	0.22	0.14	9538	1907.6	3.01

SPECTRUM PLOT OF WORST VALUE

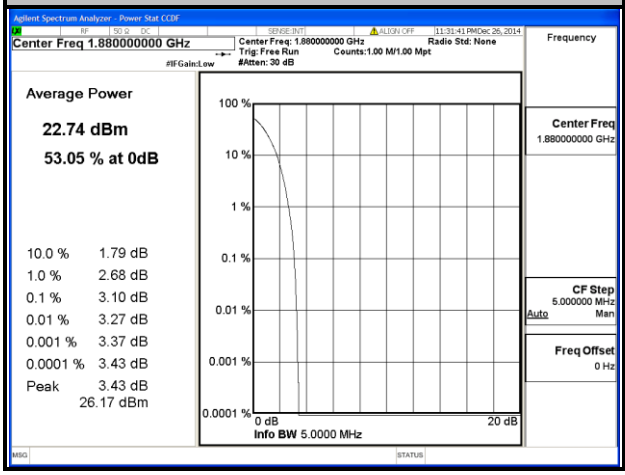
GSM



EDGE



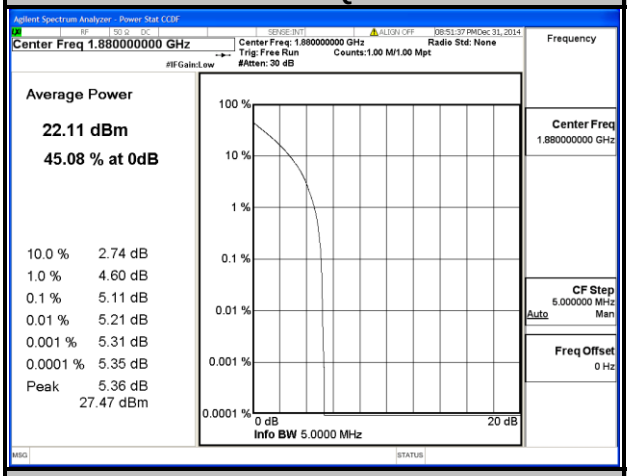
WCDMA



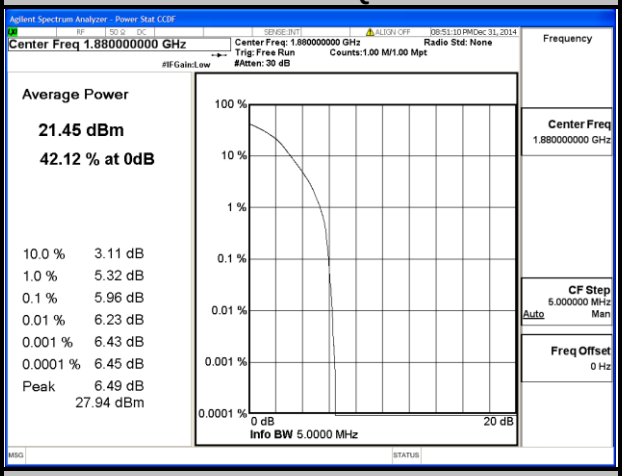
LTE BAND 2							
CHANNEL BANDWIDTH: 1.4MHz				CHANNEL BANDWIDTH: 3MHz			
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM			QPSK	16QAM
18607	1850.7	4.75	5.67	18615	1851.5	4.62	5.47
18900	1880.0	5.11	5.96	18900	1880.0	5.01	5.83
19193	1909.3	5.07	5.96	19185	1908.5	5.03	5.91

SPECTRUM PLOT OF WORST VALUE

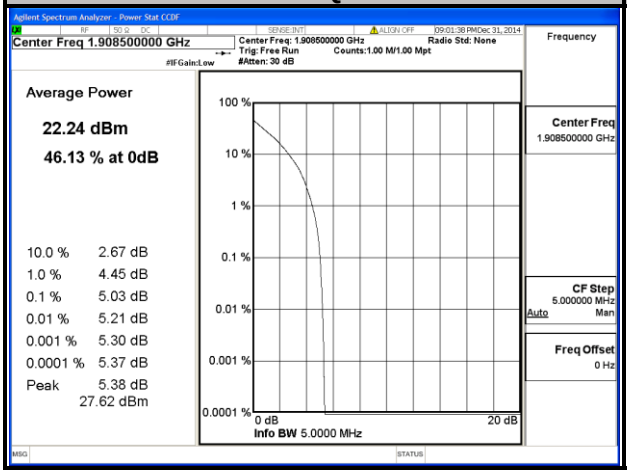
1.4MHz / QPSK



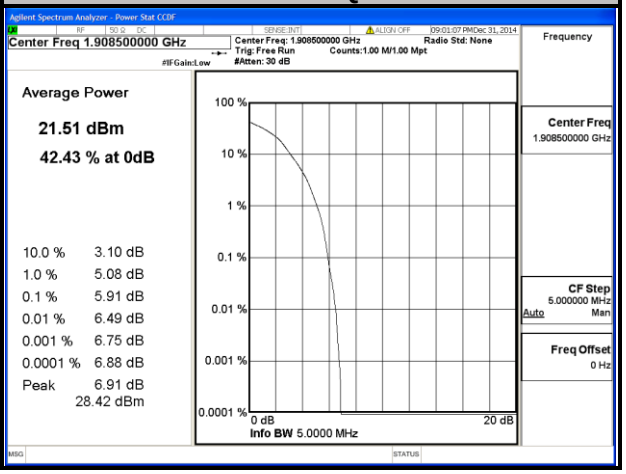
1.4MHz / 16QAM



3MHz / QPSK



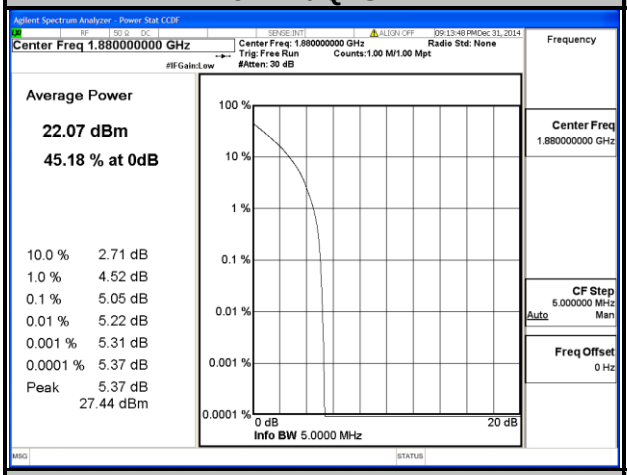
3MHz / 16QAM



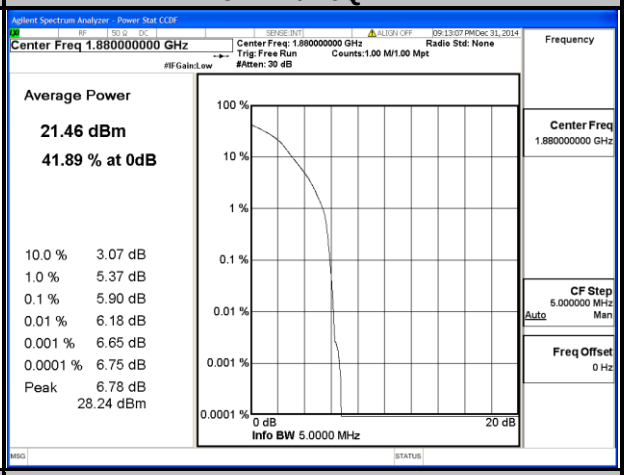
LTE BAND 2							
CHANNEL BANDWIDTH: 5MHz				CHANNEL BANDWIDTH: 10MHz			
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM			QPSK	16QAM
18625	1852.5	4.75	5.53	18650	1855.0	4.61	5.49
18900	1880.0	5.05	5.90	18900	1880.0	4.86	5.79
19175	1907.5	5.05	5.89	19150	1905.0	4.54	5.59

SPECTRUM PLOT OF WORST VALUE

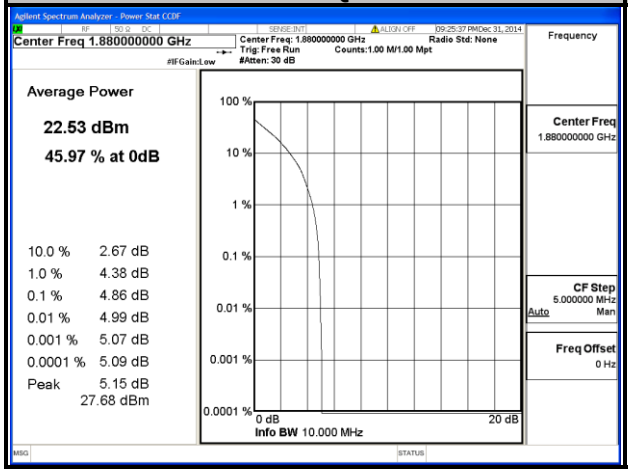
5MHz / QPSK



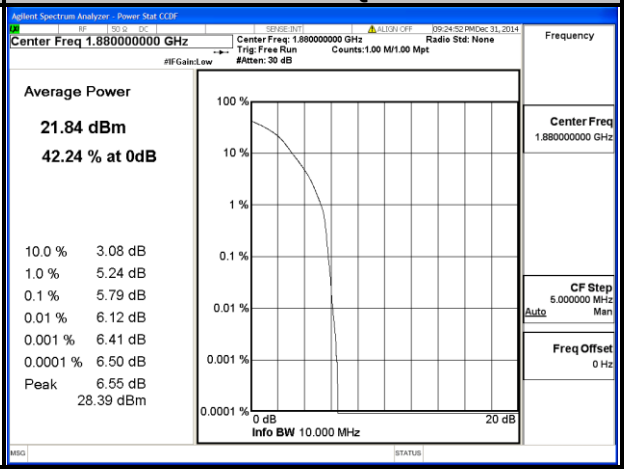
5MHz / 16QAM



10MHz / QPSK



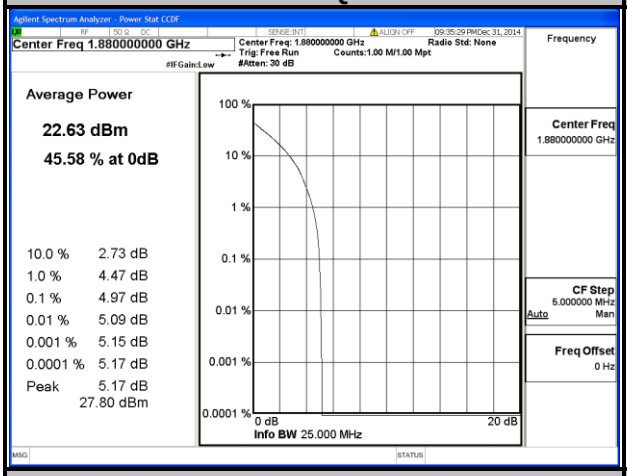
10MHz / 16QAM



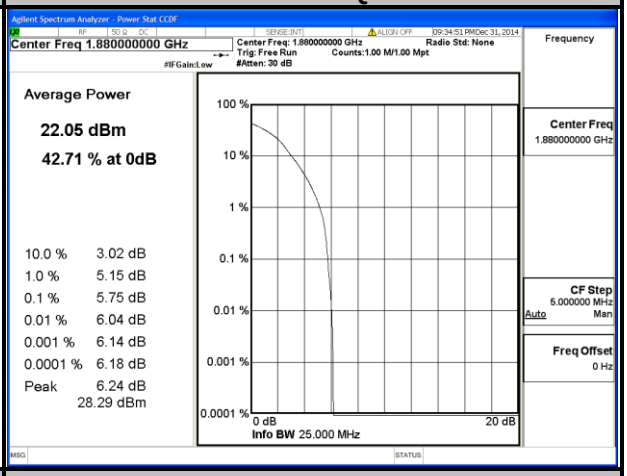
LTE BAND 2							
CHANNEL BANDWIDTH: 15MHz				CHANNEL BANDWIDTH: 20MHz			
CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)		CHANNEL	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)	
		QPSK	16QAM			QPSK	16QAM
18675	1857.5	4.44	5.37	18700	1860.0	4.51	5.21
18900	1880.0	4.97	5.75	18900	1880.0	5.04	5.84
19125	1902.5	4.40	5.27	19100	1900.0	4.61	5.58

SPECTRUM PLOT OF WORST VALUE

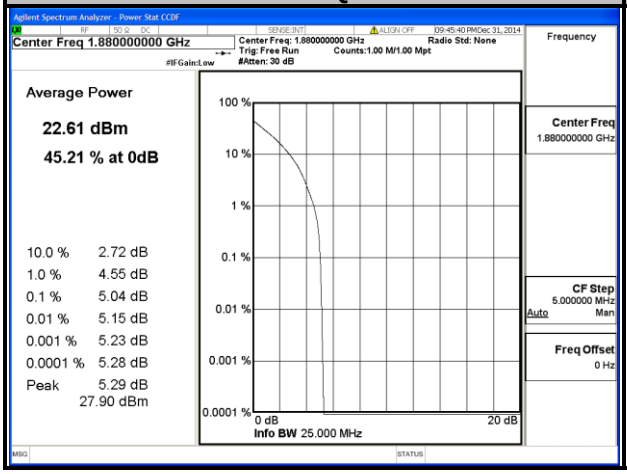
15MHz / QPSK



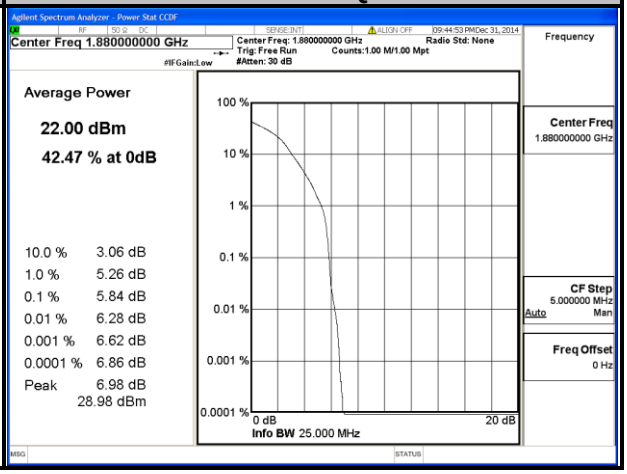
15MHz / 16QAM



20MHz / QPSK



20MHz / 16QAM

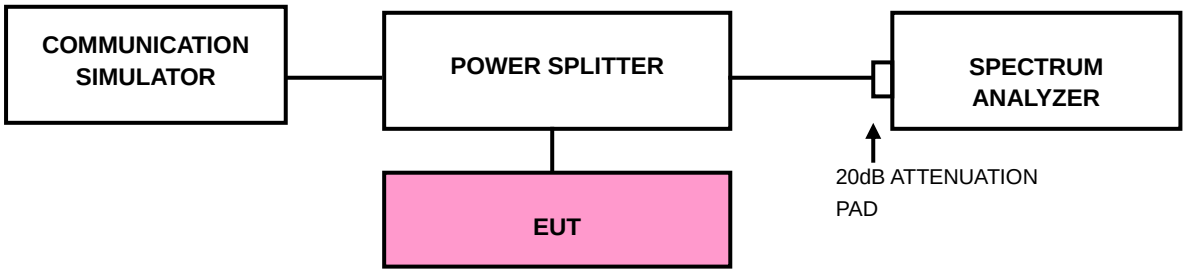


4.5 BAND EDGE MEASUREMENT

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

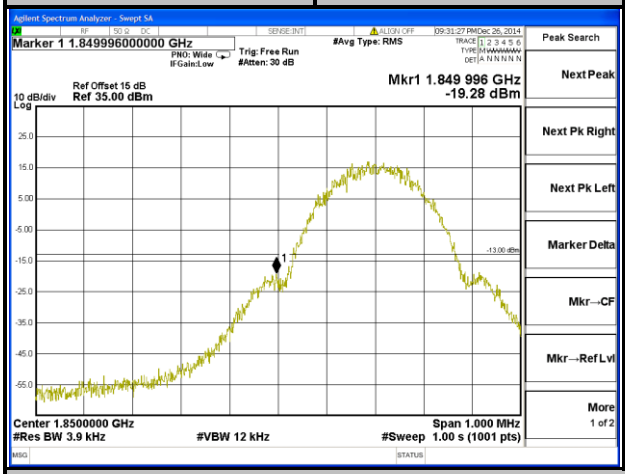


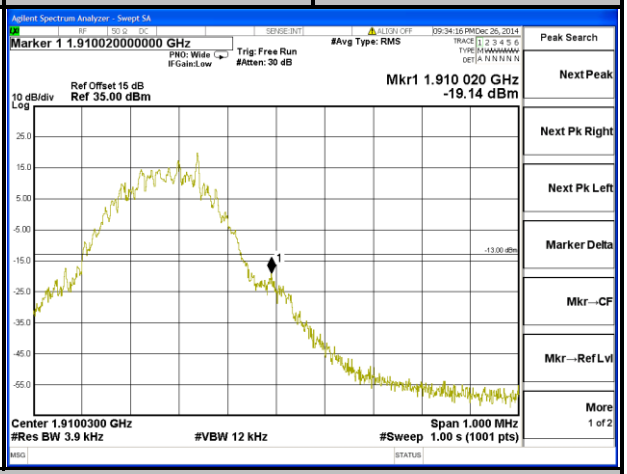
4.5.3 TEST PROCEDURES

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 1MHz. 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.

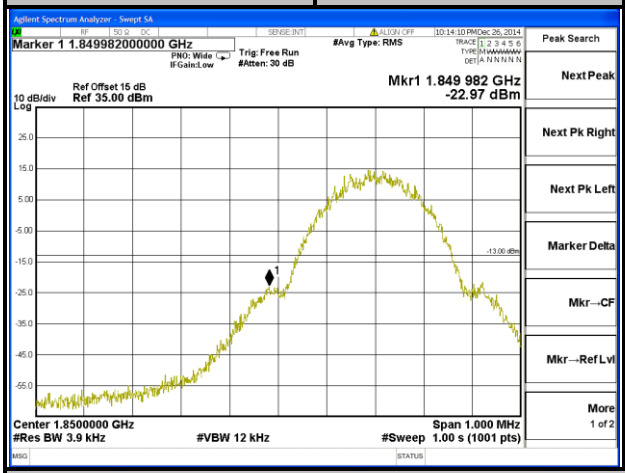
4.5.4 TEST RESULTS

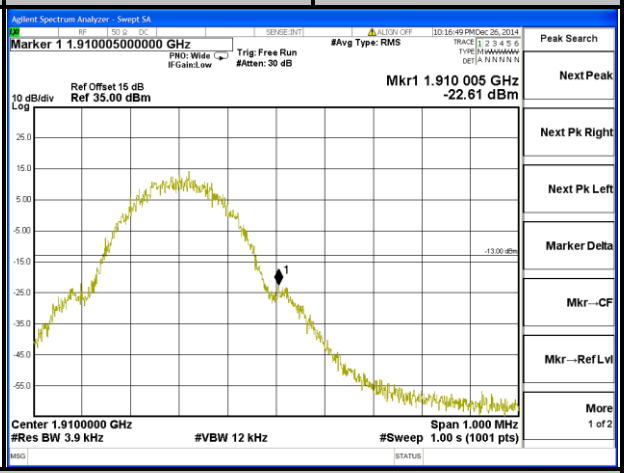
GSM			
CHANNEL	512	CHANNEL	810



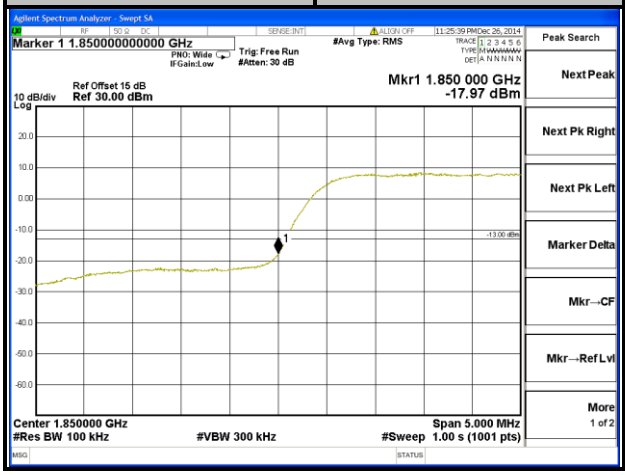


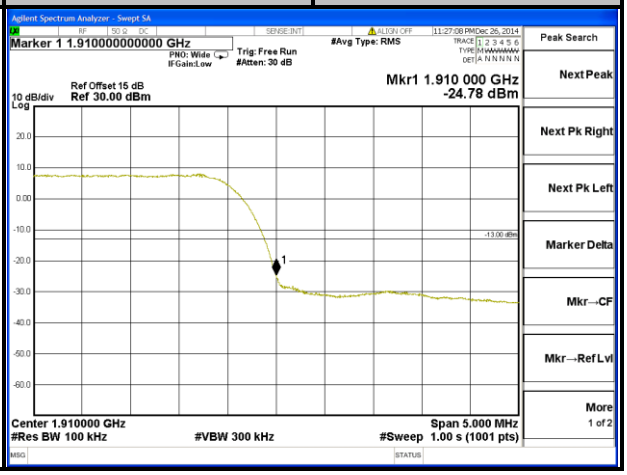
EDGE			
CHANNEL	512	CHANNEL	810

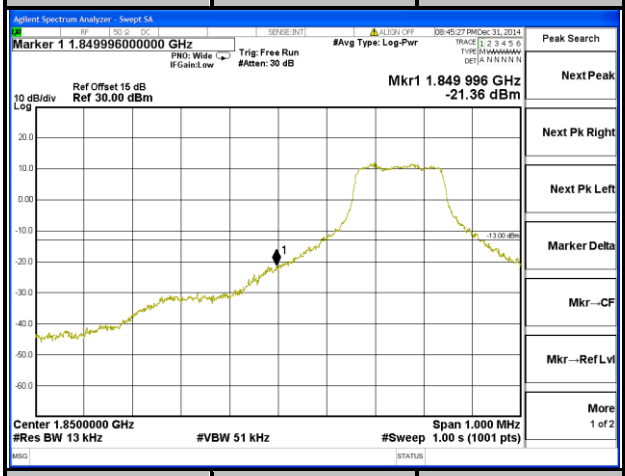
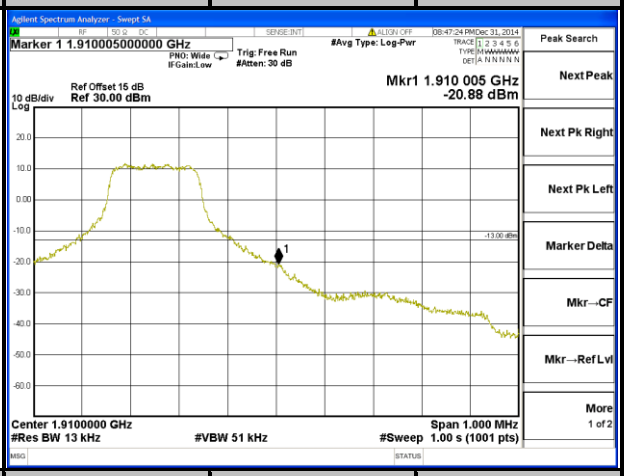
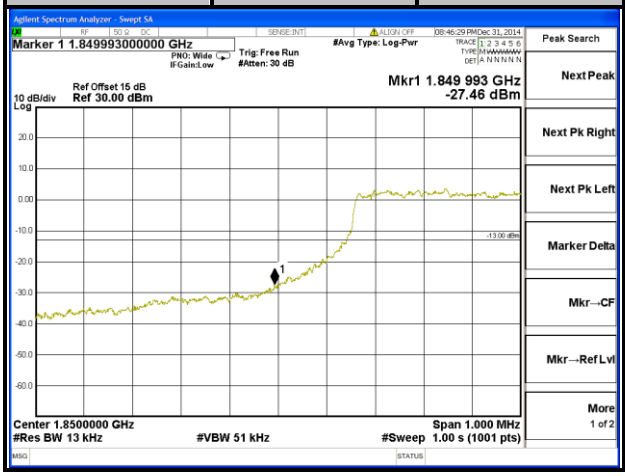
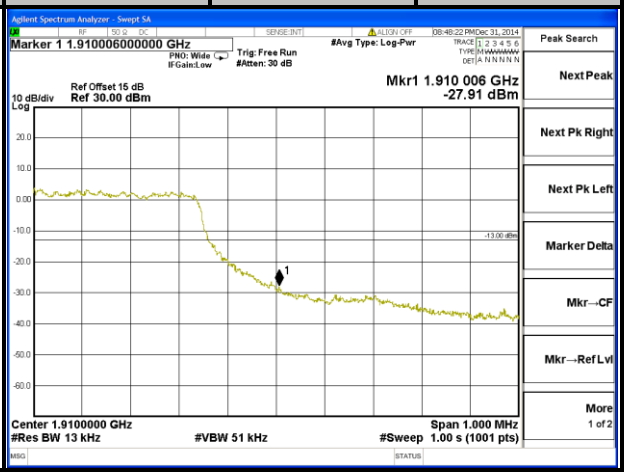


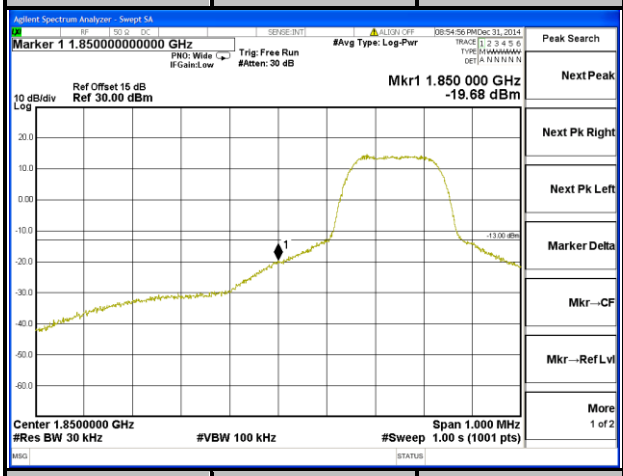
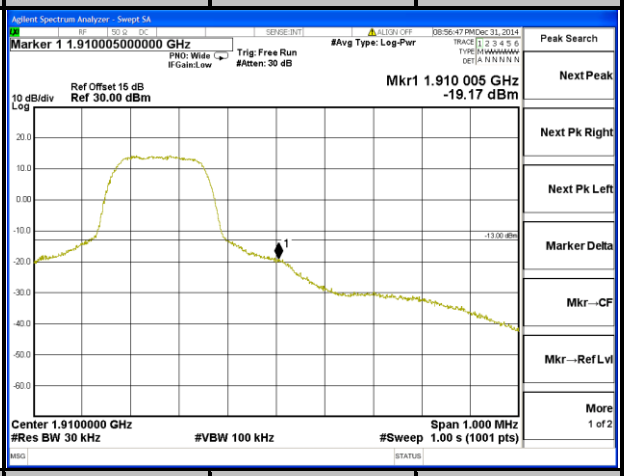
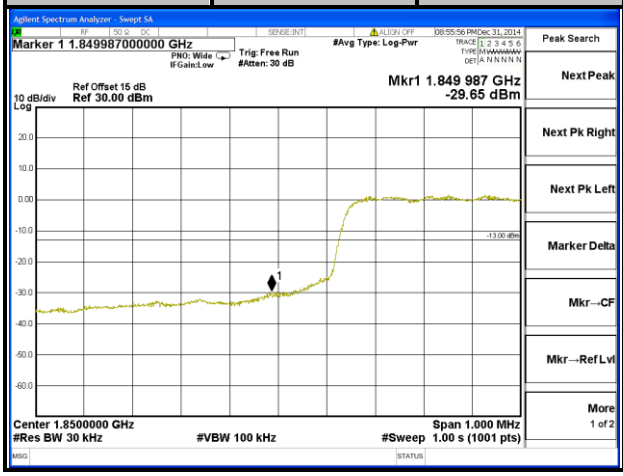
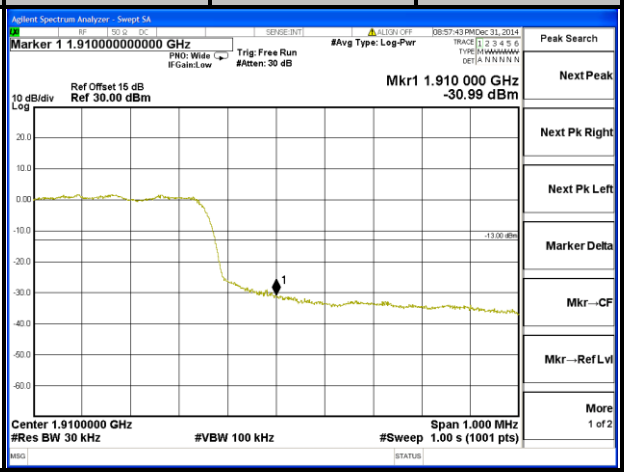


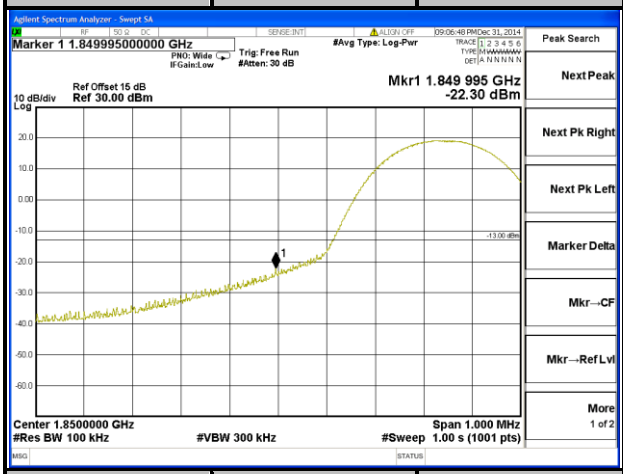
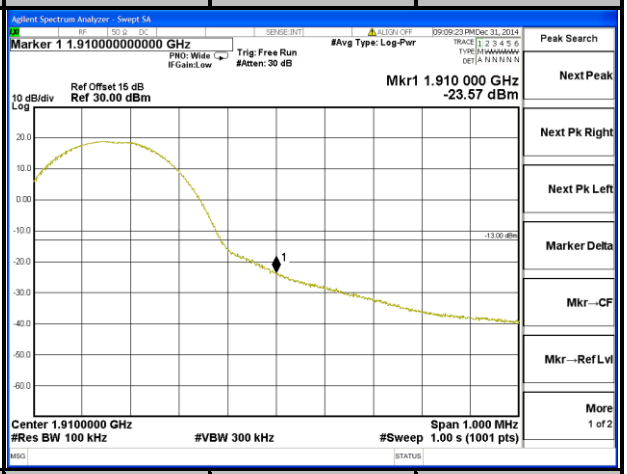
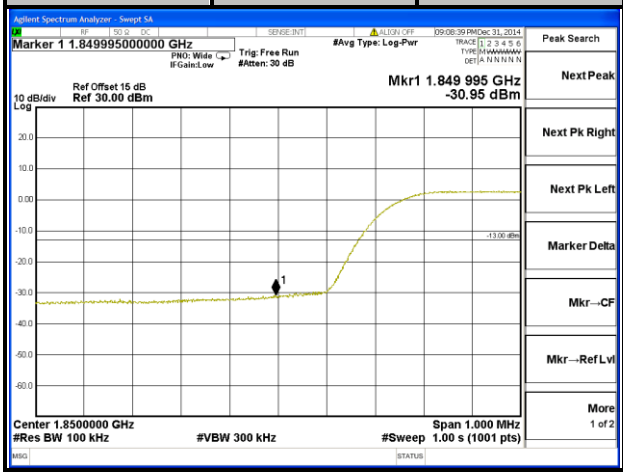
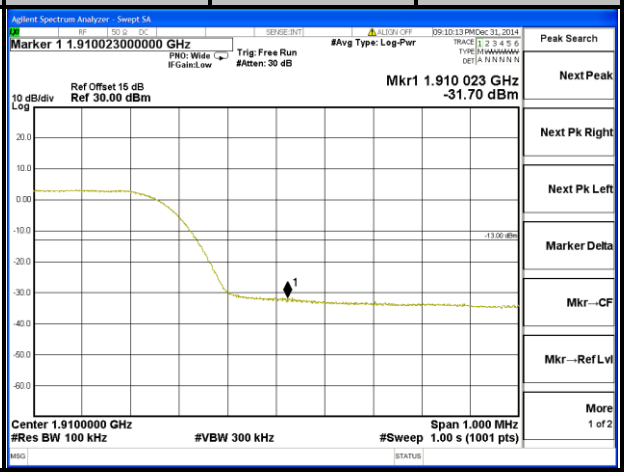
WCDMA			
CHANNEL	9262	CHANNEL	9538

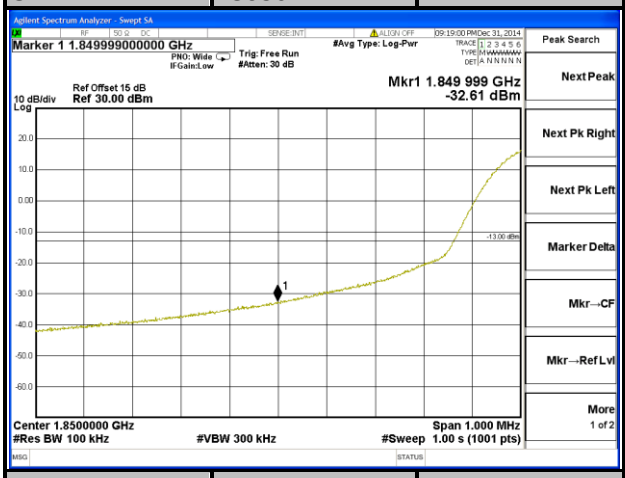
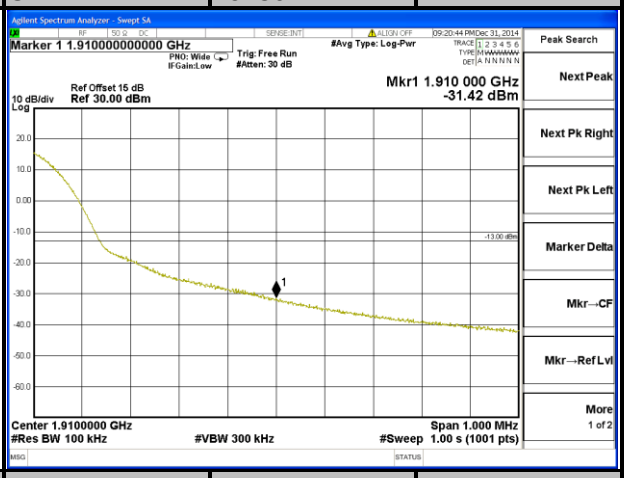
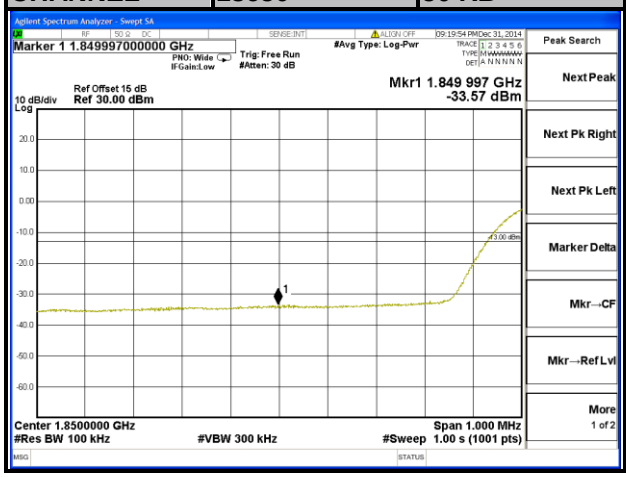
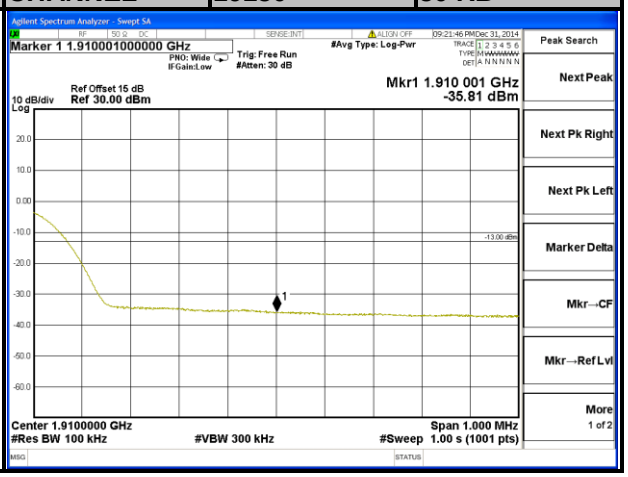


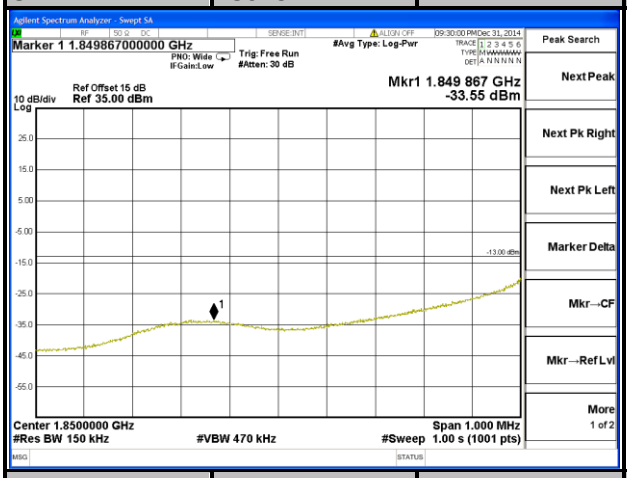
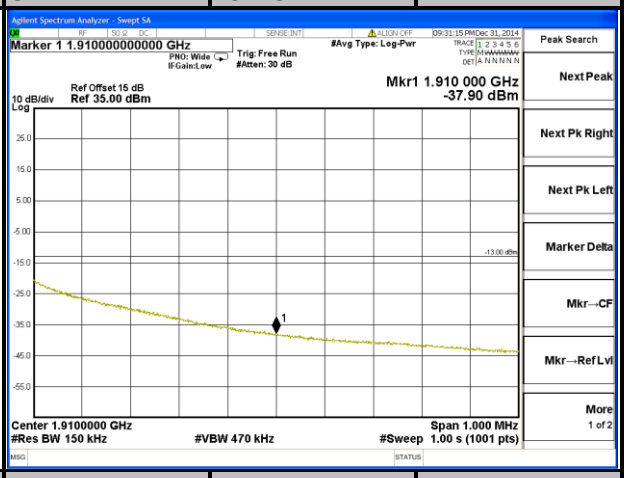
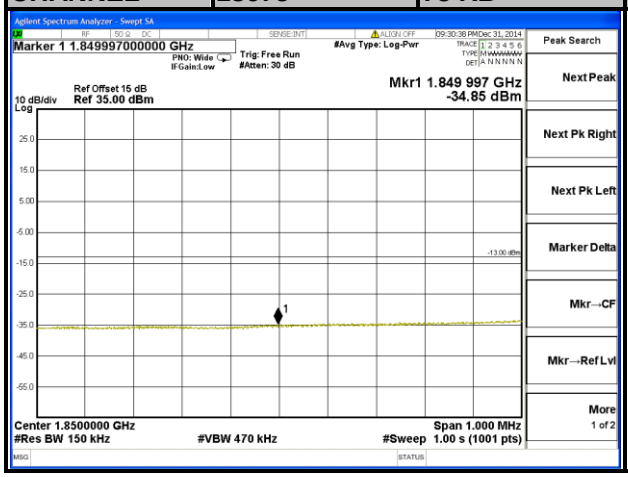
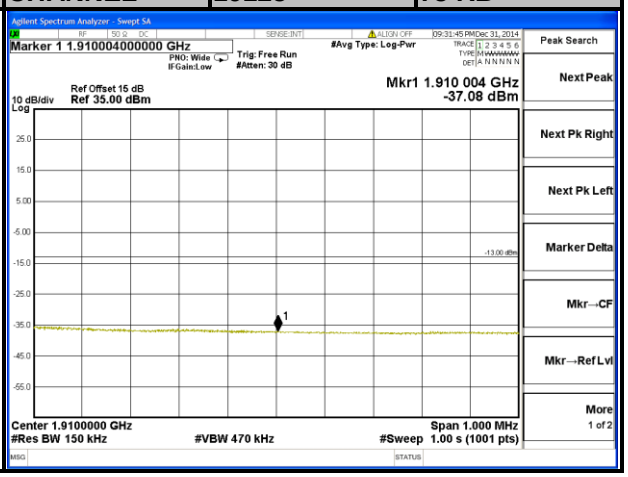


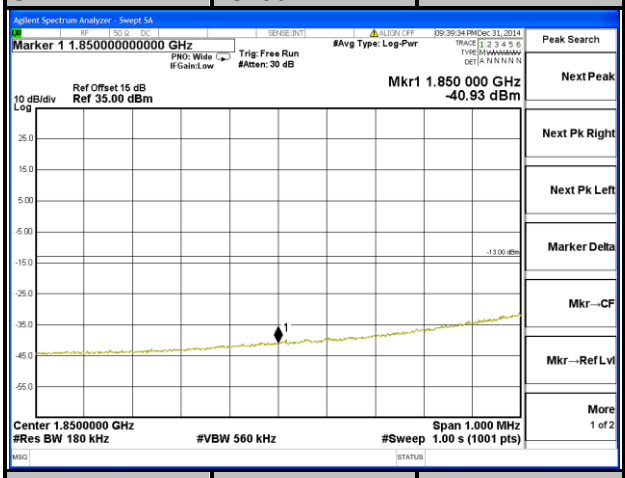
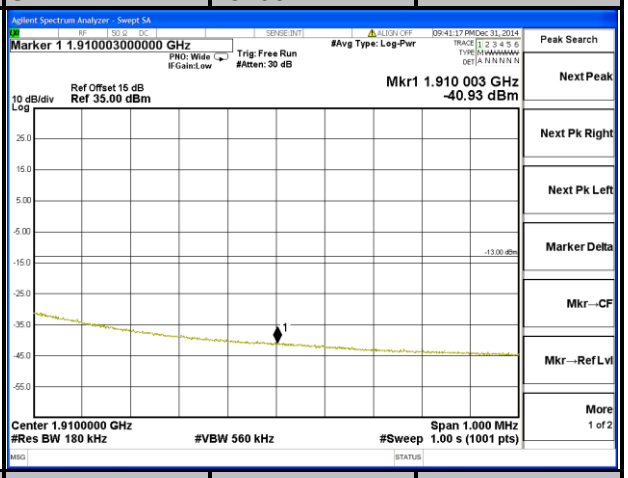
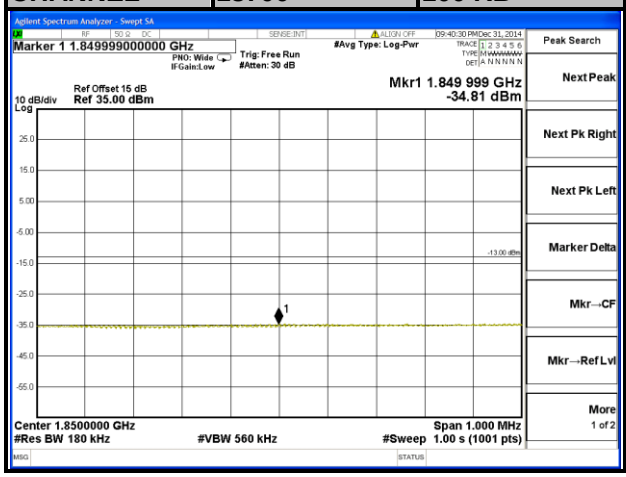
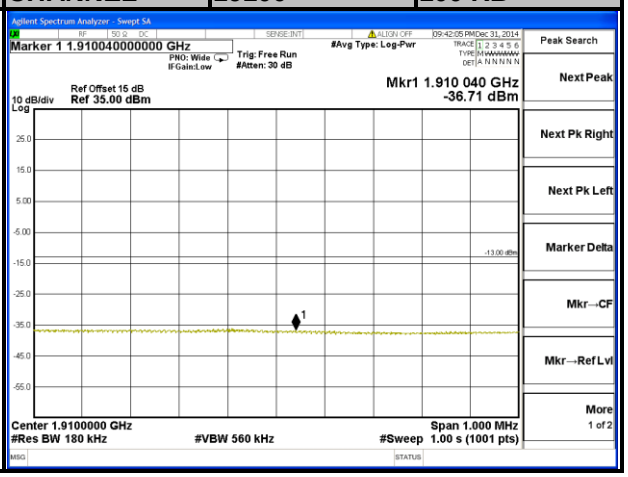
LTE BAND 2					
CHANNEL BANDWIDTH: 1.4MHz					
CHANNEL	18607	1 RB	CHANNEL	19193	1 RB
					
CHANNEL	18607	6 RB	CHANNEL	19193	6 RB
					

LTE BAND 2					
CHANNEL BANDWIDTH: 3MHz					
CHANNEL	18615	1 RB	CHANNEL	19185	1 RB
					
CHANNEL	18615	15 RB	CHANNEL	19185	15 RB
					

LTE BAND 2					
CHANNEL BANDWIDTH: 5MHz					
CHANNEL	18625	1 RB	CHANNEL	19175	1 RB
					
CHANNEL	18625	25 RB	CHANNEL	19175	25 RB
					

LTE BAND 2					
CHANNEL BANDWIDTH: 10MHz					
CHANNEL	18650	1 RB	CHANNEL	19150	1 RB
					
CHANNEL	18650	50 RB	CHANNEL	19150	50 RB
					

LTE BAND 2					
CHANNEL BANDWIDTH: 15MHz					
CHANNEL	18675	1 RB	CHANNEL	19125	1 RB
					
CHANNEL	18675	75 RB	CHANNEL	19125	75 RB
					

LTE BAND 2					
CHANNEL BANDWIDTH: 20MHz					
CHANNEL	18700	1 RB	CHANNEL	19100	1 RB
					
CHANNEL	18700	100 RB	CHANNEL	19100	100 RB
					

4.6 CONDUCTED SPURIOUS EMISSIONS

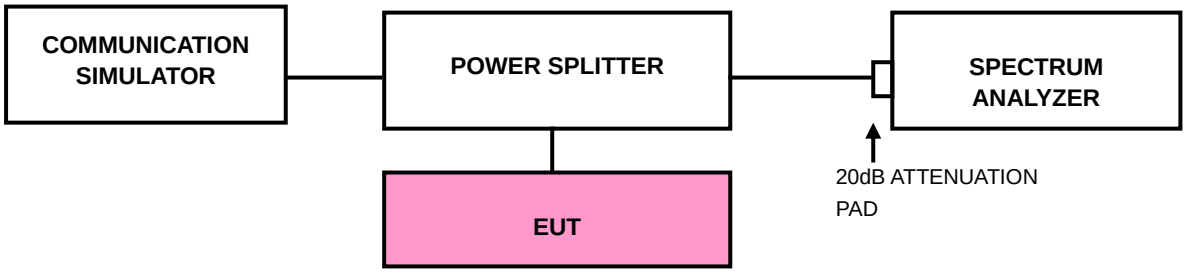
4.6.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

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 is equal to -13dBm.

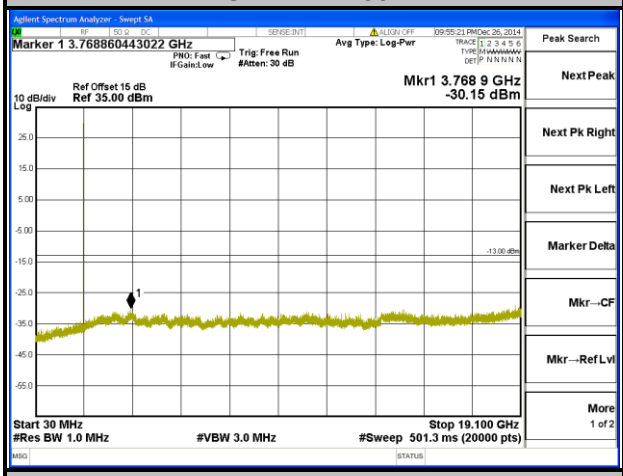
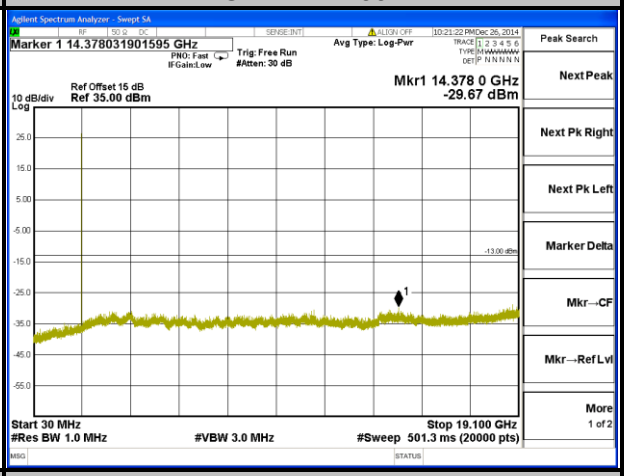
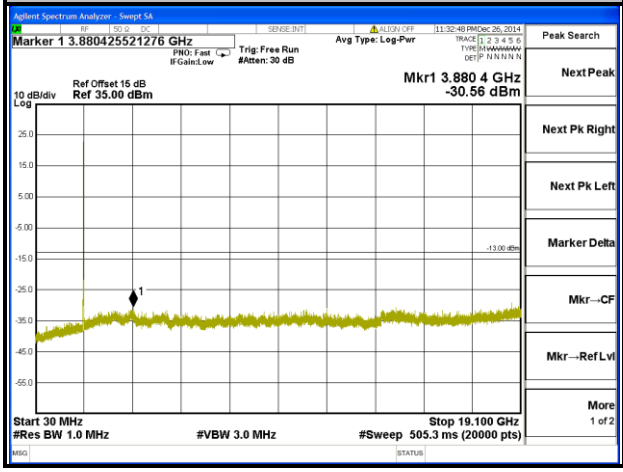
4.6.2 TEST PROCEDURE

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



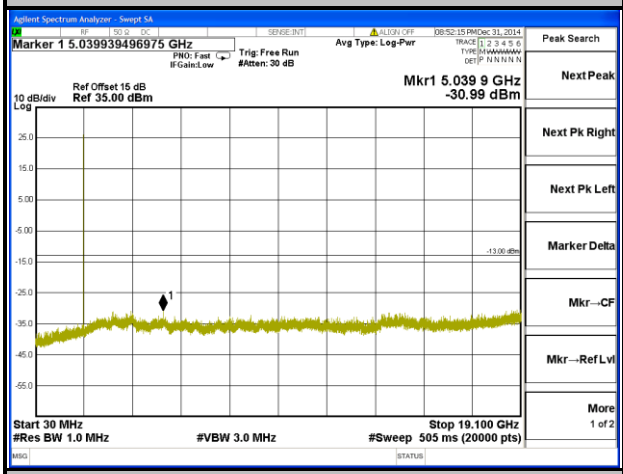
4.6.4 TEST RESULTS

GSM	EDGE
CHANNEL 661	**CHANNEL 661**
	
WCDMA	
CHANNEL 9400	
	

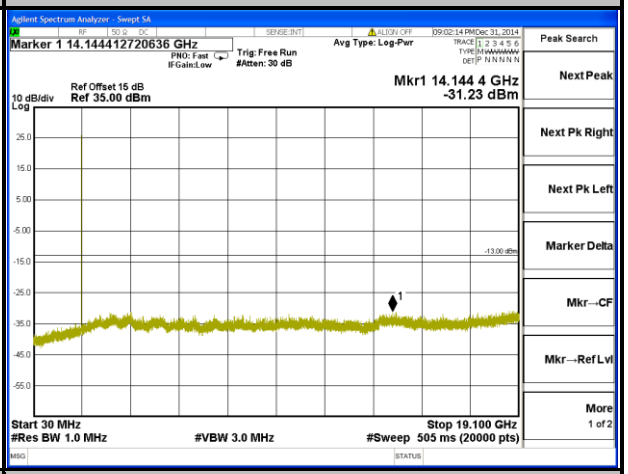
LTE BAND 2

CHANNEL 18900

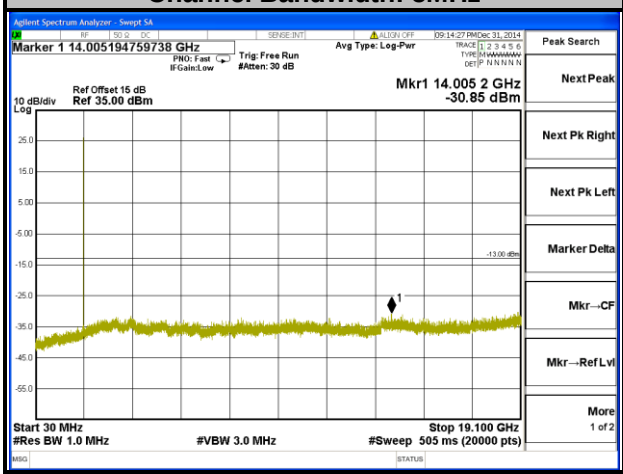
Channel Bandwidth: 1.4MHz



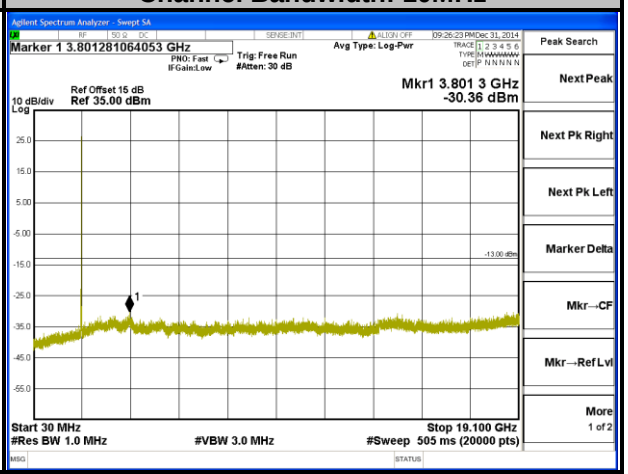
Channel Bandwidth: 3MHz



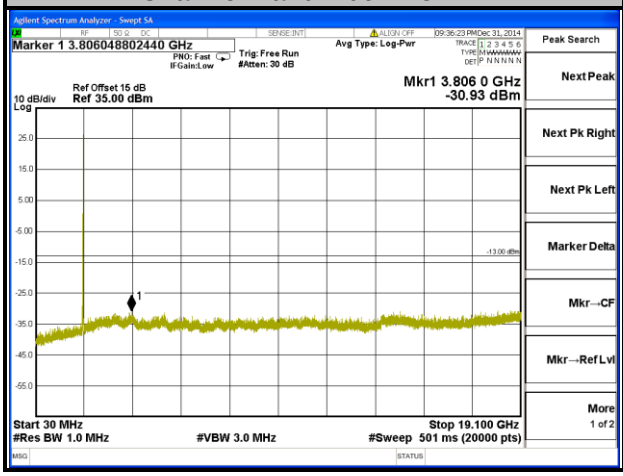
Channel Bandwidth: 5MHz



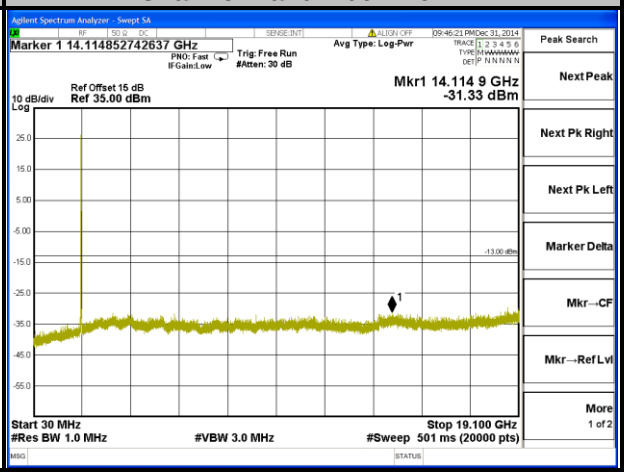
Channel Bandwidth: 10MHz



Channel Bandwidth: 15MHz



Channel Bandwidth: 20MHz



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 is equal to -13dBm.

4.7.2 TEST PROCEDURES

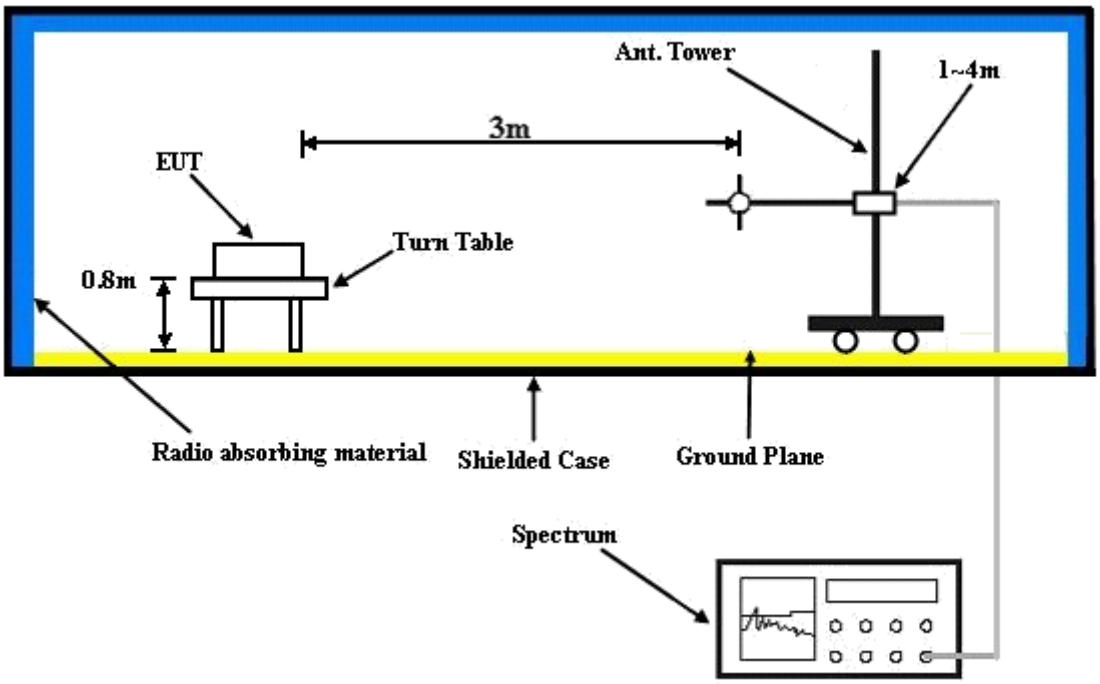
a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 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:

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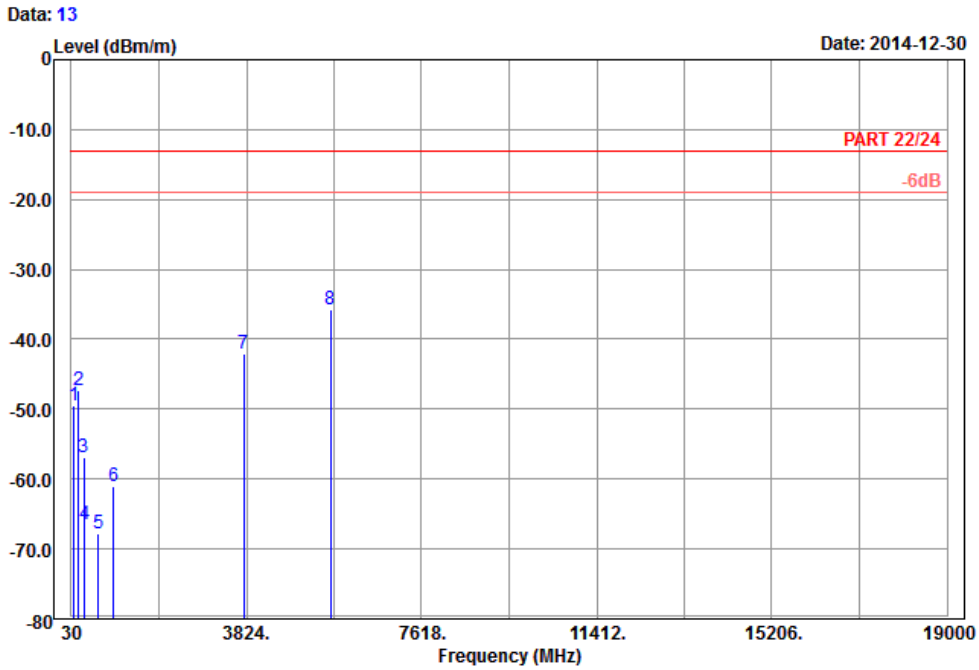

Site : 966 chamber 1
Condition: PART 22/24 3m Horizontal
Remark : PCS 1900_Link_CH661
Tested by: Charles Hsiao
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	93.72	-49.58	-39.13	-13.00	-36.58	-10.45	Peak
2	183.09	-47.40	-41.78	-13.00	-34.40	-5.62	Peak
3	294.06	-56.87	-50.96	-13.00	-43.87	-5.91	Peak
4	320.30	-66.45	-60.73	-13.00	-53.45	-5.72	Peak
5	613.60	-67.83	-68.10	-13.00	-54.83	0.27	Peak
6	940.50	-60.97	-65.68	-13.00	-47.97	4.71	Peak
7	3760.00	-42.00	-58.14	-13.00	-29.00	16.14	Peak
8 pp	5640.00	-35.71	-56.18	-13.00	-22.71	20.47	Peak

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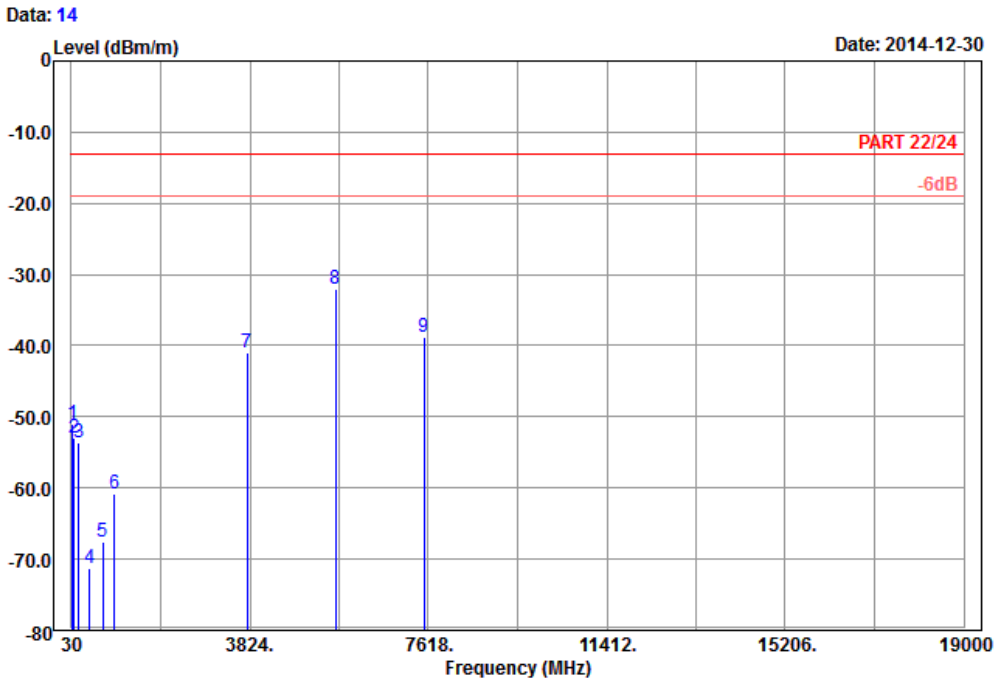

Site : 966 chamber 1
Condition: PART 22/24 3m Vertical
Remark : PCS 1900_Link_CH661
Tested by: Charles Hsiao
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	47.28	-51.08	-37.97	-13.00	-38.08	-13.11	Peak
2	93.18	-53.01	-42.50	-13.00	-40.01	-10.51	Peak
3	182.55	-53.58	-47.97	-13.00	-40.58	-5.61	Peak
4	412.70	-71.22	-68.18	-13.00	-58.22	-3.04	Peak
5	700.40	-67.59	-67.21	-13.00	-54.59	-0.38	Peak
6	940.50	-60.84	-65.55	-13.00	-47.84	4.71	Peak
7	3760.00	-41.02	-57.16	-13.00	-28.02	16.14	Peak
8 pp	5640.00	-32.11	-52.58	-13.00	-19.11	20.47	Peak
9	7520.00	-38.86	-61.54	-13.00	-25.86	22.68	Peak

EDGE:

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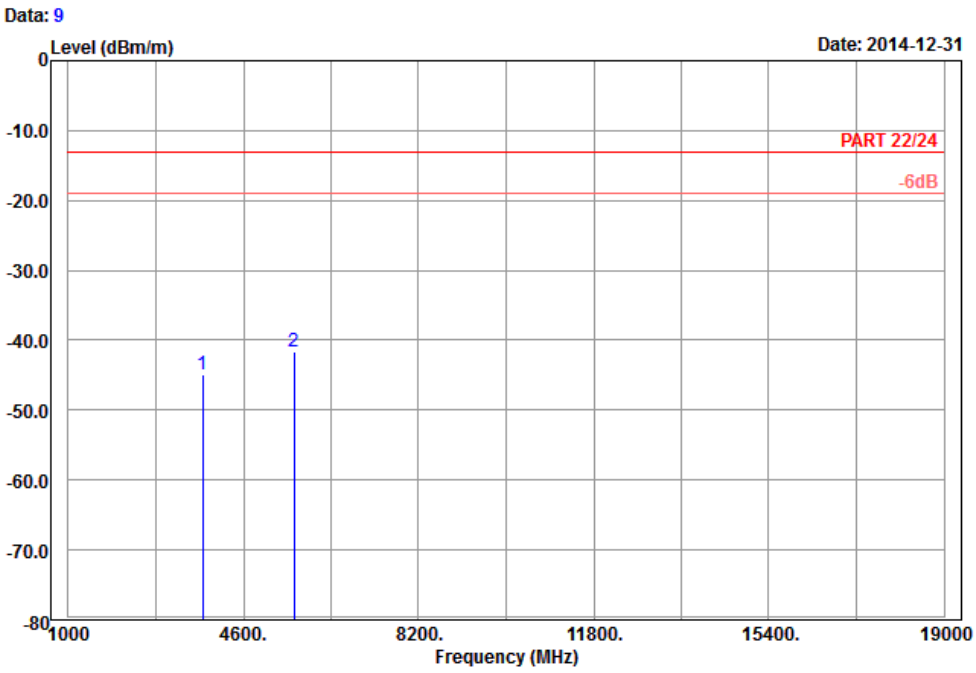
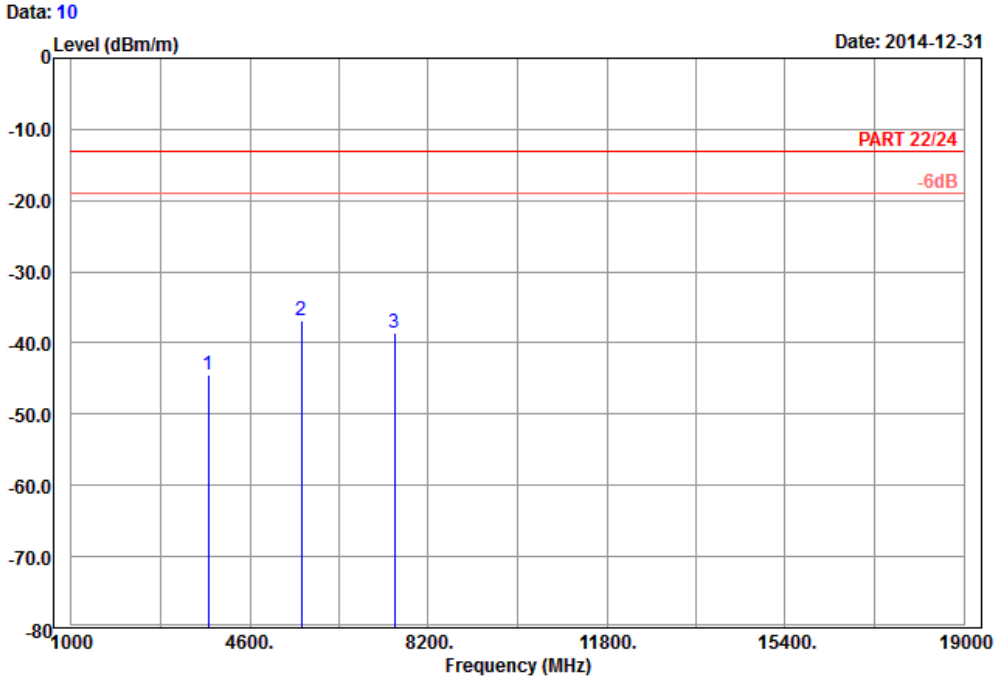


Site : 966 chamber 1
Condition: PART 22/24 3m Horizontal
Remark : EDGE 1900_Link_CH661
Tested by: Charles Hsiao
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	3760.00	-45.00	-61.14	-13.00	-32.00	16.14	Peak
2 pp	5640.00	-41.58	-62.05	-13.00	-28.58	20.47	Peak



Site : 966 chamber 1
Condition: PART 22/24 3m Vertical
Remark : EDGE 1900_Link_CH661
Tested by: Charles Hsiao
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	3760.00	-44.51	-60.65	-13.00	-31.51	16.14	Peak
2 pp	5640.00	-36.94	-57.41	-13.00	-23.94	20.47	Peak
3	7520.00	-38.63	-61.31	-13.00	-25.63	22.68	Peak

WCDMA:

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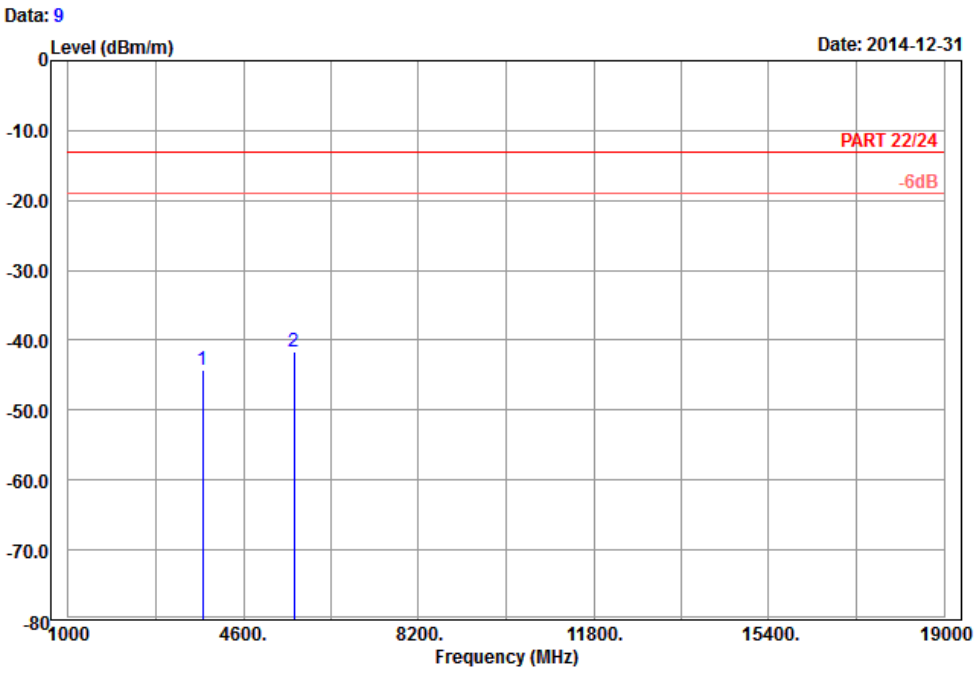

Site : 966 chamber 1
Condition: PART 22/24 3m Horizontal
Remark : WCDMA Band II_Link_CH9400
Tested by: Karl Lee
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	3760.00	-44.16	-60.30	-13.00	-31.16	16.14	Peak
2 pp	5640.00	-41.74	-62.21	-13.00	-28.74	20.47	Peak

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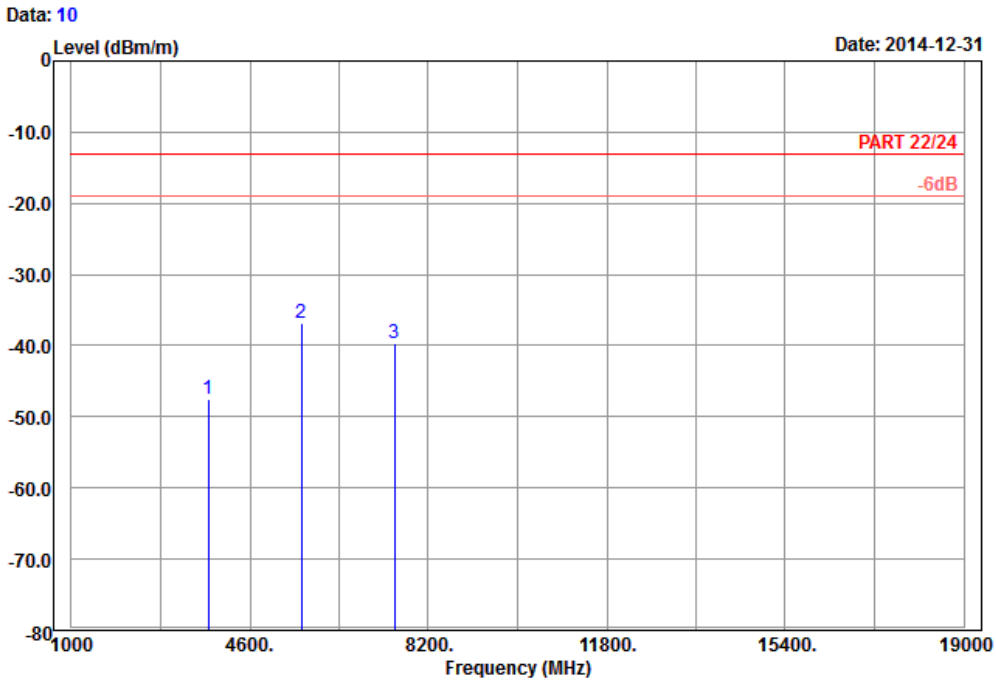

Site : 966 chamber 1
Condition: PART 22/24 3m Vertical
Remark : WCDMA Band II_Link_CH9400
Tested by: Karl Lee
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	3760.00	-47.48	-63.62	-13.00	-34.48	16.14	Peak
2 pp	5640.00	-36.80	-57.27	-13.00	-23.80	20.47	Peak
3	7520.00	-39.75	-62.43	-13.00	-26.75	22.68	Peak

LTE BAND 2

CHANNEL BANDWIDTH: 20MHz / QPSK

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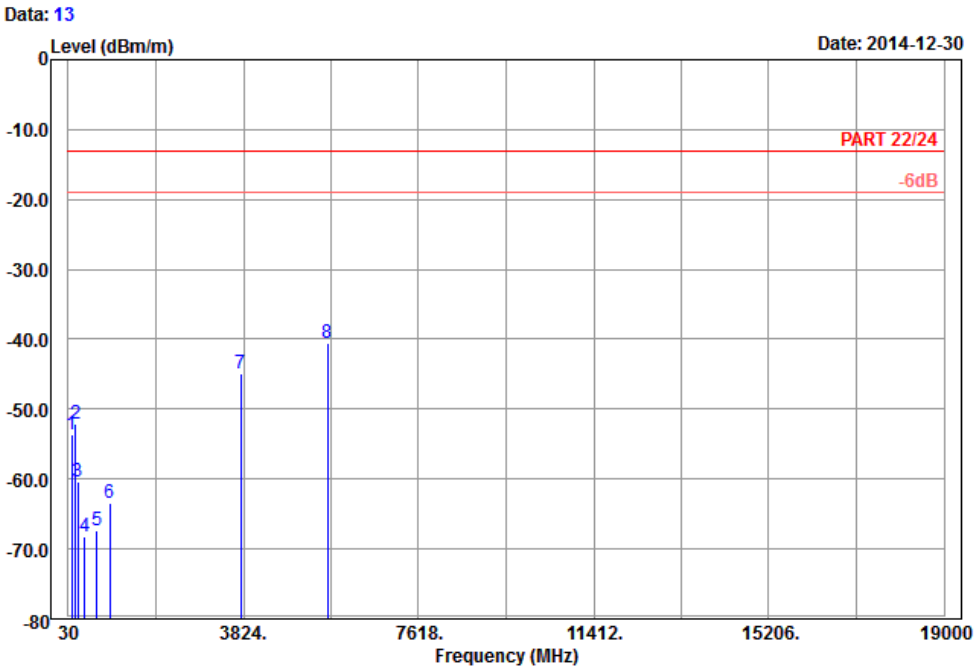
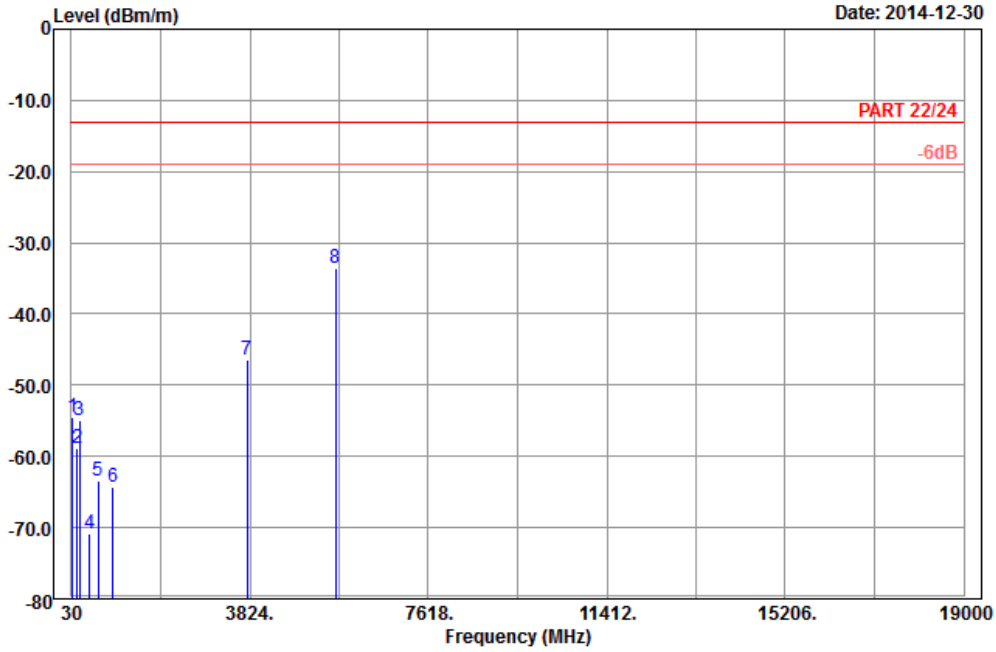



```
Site      : 966 chamber 1
Condition: PART 22/24 3m Horizontal
Remark    : LTE_Band 2_QPSK(1,0)_20M_CH18900
Tested by: Charles Hsiao
Plane     : X
```

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	98.58	-53.55	-43.37	-13.00	-40.55	-10.18	Peak
2	183.09	-52.07	-46.45	-13.00	-39.07	-5.62	Peak
3	241.14	-60.36	-54.74	-13.00	-47.36	-5.62	Peak
4	385.40	-68.12	-64.60	-13.00	-55.12	-3.52	Peak
5	651.40	-67.36	-67.22	-13.00	-54.36	-0.14	Peak
6	929.30	-63.46	-67.65	-13.00	-50.46	4.19	Peak
7	3760.00	-44.89	-61.03	-13.00	-31.89	16.14	Peak
8 pp	5640.00	-40.59	-61.06	-13.00	-27.59	20.47	Peak

Data: 14



Site : 966 chamber 1
Condition: PART 22/24 3m Vertical
Remark : LTE_Band 2_QPSK(1,0)_20M_CH18900
Tested by: Charles Hsiao
Plane : X

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark
	MHz	dBm/m	dBm	dBm/m	dB	dB/m	
1	47.82	-54.49	-41.38	-13.00	-41.49	-13.11	Peak
2	152.58	-58.77	-50.88	-13.00	-45.77	-7.89	Peak
3	209.55	-55.01	-48.96	-13.00	-42.01	-6.05	Peak
4	413.40	-70.81	-67.77	-13.00	-57.81	-3.04	Peak
5	600.30	-63.48	-63.91	-13.00	-50.48	0.43	Peak
6	918.80	-64.26	-67.97	-13.00	-51.26	3.71	Peak
7	3760.00	-46.41	-62.55	-13.00	-33.41	16.14	Peak
8 pp	5640.00	-33.64	-54.11	-13.00	-20.64	20.47	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---