Test Lab
Cert 2951.01

FCC TEST REPORT
(PART 22)

Product:	LTE Smartphone
Model No.:	Ex-Handy 09
FCC ID:	XAM500055GR01
Applicant:	ecom instruments GmbH
Address:	Industriestraße. 2, 97959 Assamstadt, Germany
Manufacturer:	ecom instruments GmbH
Address:	Industriestraße. 2, 97959 Assamstadt, Germany
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Report No.:	RF140812N017-4
Received Date:	Aug. 12, 2014
Test Date:	Aug. 12, 2014 ~ Oct. 12, 2014
Issued Date:	Oct. 15, 2014

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140812N017-4	Original release	Oct. 15, 2014

1 CERTIFICATION

PRODUCT:	LTE Smartphone
BRAND:	ecom MOBILE SAFETY
MODEL NO.:	Ex-Handy 09
APPLICANT:	ecom instruments GmbH
TESTED:	Aug. 12, 2014~ Oct. 12, 2014
TEST SAMPLE:	Identical Prototype
STANDARDS:	**FCC PART 22, Subpart H**

The above equipment has been tested by **Bureau Veritas Shenzhen Co., Ltd. Dongguan 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.

TESTED BY : _____ **DATE :** Oct. 15, 2014

Glyn He/ Project Engineer

APPROVED BY : _____ **DATE :** Oct. 15, 2014

Sam Tung / Technical Manager

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 22 & Part 2			
STANDARD SECTION	**1.1.1.1.1.1TEST TYPE**	**RESULT**	**REMARK**
2.1046 22.913 (a)	Effective Radiated Power	PASS	Meet the requirement of limit.
2.1055 22.355	Frequency Stability	PASS	Meet the requirement of limit.
2.1049	Occupied Bandwidth	PASS	Meet the requirement of limit.
22.917	Band Edge Measurements	PASS	Meet the requirement of limit.
2.1051 22.917	Conducted Spurious Emissions	PASS	Meet the requirement of limit.
2.1053 22.917	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -32.87dB at 3345MHz.

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	2.66dB
Radiated emissions	9KHz ~ 30MHz	2.74dB
	30MHz ~ 1GHz	3.55dB
	1GHz ~ 18GHz	4.84dB
	18GHz ~ 40GHz	1.94dB

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

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer	Agilent	E4446A	MY46180622	Apr. 29,14	Apr. 28,15
Spectrum Analyzer (10Hz–40GHz)	Rohde&Schwarz	FSV40	101003	Apr. 09,14	Apr. 08,15
Signal Analyzer	Rohde&Schwarz	FSV7	102331	Nov. 25,13	Nov. 24,14
EMI Test Receiver	Rohde&Schwarz	ESVD	ESVS10	May 17,14	May 16,15
Loop antenna (9kHz~30MHz)	Daze	ZN30900A	0708	Nov. 27,14	Nov. 26,15
Bilog Antenna (20MHz~2GHz)	Teseq	CBL 6111D	30643	Jul. 27, 14	Jul. 26, 15
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	Oct. 18, 12	Oct. 17, 14
Horn Antenna (15GHz-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170242	Feb. 13,14	Feb. 12,15
Signal Amplifier	Agilent	8447D	2944A10488	Jun. 25,14	Jun. 24,15
Pre-Amplifier (100MHz-26.5GHz)	Agilent	8449B	3008A00409	May 13,14	May 12,15
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 04,13	Nov. 03,14
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 30, 13	Oct. 29, 14
Power Sensor	Anritsu	MA2411B	1126068	Feb. 21,14	Feb. 20,15
Power Meter	Anritsu	ML2495A	1139001	Feb. 21,14	Feb. 20,15
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Apr. 19,14	Apr. 18,15
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep. 16,14	Sep. 15,15
Signal Generator	Agilent	N5183A	MY50140980	Nov. 04,13	Nov. 03,14
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Mar.14, 14	Mar.13, 15
Test Software	ADT	ADT_Radiated _V7.6.15.9.2	N/A	N/A	N/A
Bluetooth Tester	Rohde&Schwarz	CBT32	N/A	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in Dongguan 966 Chamber

3. The horn antenna are used only for the measurement of emission frequency above 1GHz if tested.

4. The FCC Site Registration No. is 502831.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	LTE Smartphone	
MODEL NO.	Ex-Handy 09	
TYPE NUMBER	L12V011BB, L12V011AB, L13V011AB	
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.7Vdc (battery)	
MODULATION TYPE	**GSM/GPRS**	GMSK
	EDGE	GMSK, 8PSK
	WCDMA	BPSK
	LTE	QPSK, 16QAM
FREQUENCY RANGE	**GSM/GPRS/EDGE**	824.2MHz ~ 848.8MHz
	WCDMA	826.4MHz ~ 846.6MHz
	LTE Band 5 (Channel Bandwidth: 1.4MHz)	824.7MHz ~ 848.3MHz
	LTE Band 5 (Channel Bandwidth: 3MHz)	825.5MHz ~ 847.5MHz
	LTE Band 5 (Channel Bandwidth: 5MHz)	826.5MHz ~ 846.5MHz
	LTE Band 5 (Channel Bandwidth: 10MHz)	829MHz ~ 844MHz
MAX. ERP POWER	**GSM**	366mW
	EDGE	170mW
	WCDMA	74mW
	LTE Band 5 (Channel Bandwidth: 1.4MHz)	311mW
	LTE Band 5 (Channel Bandwidth: 3MHz)	282mW
	LTE Band 5 (Channel Bandwidth: 5MHz)	279mW
	LTE Band 5 (Channel Bandwidth: 10MHz)	333mW
EMISSION DESIGNATOR	**GSM**	245KGXW
	EDGE	243KG7W
	WCDMA	4M16F9W
	LTE Band 5 (Channel Bandwidth: 1.4MHz)	1M09W7D
	LTE Band 5 (Channel Bandwidth: 3MHz)	2M69W7D
	LTE Band 5 (Channel Bandwidth: 5MHz)	4M47W7D

	LTE Band 5 (Channel Bandwidth: 10MHz)	8M97W7D
ANTENNA TYPE	Fixed Internal antenna with 1dBi gain	
HW VERSION	A	
SW VERSION	6A.2.0-01-4.4.2-16.02.11	
I/O PORTS	Refer to user's manual	
DATA CABLE	See note 3	

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT was powered by the following adapter:

ADAPTER	
BRAND:	Sonim
MODEL:	S11C02
INPUT:	AC 100-240V, 450mA
OUTPUT:	DC 5V, 2100mA

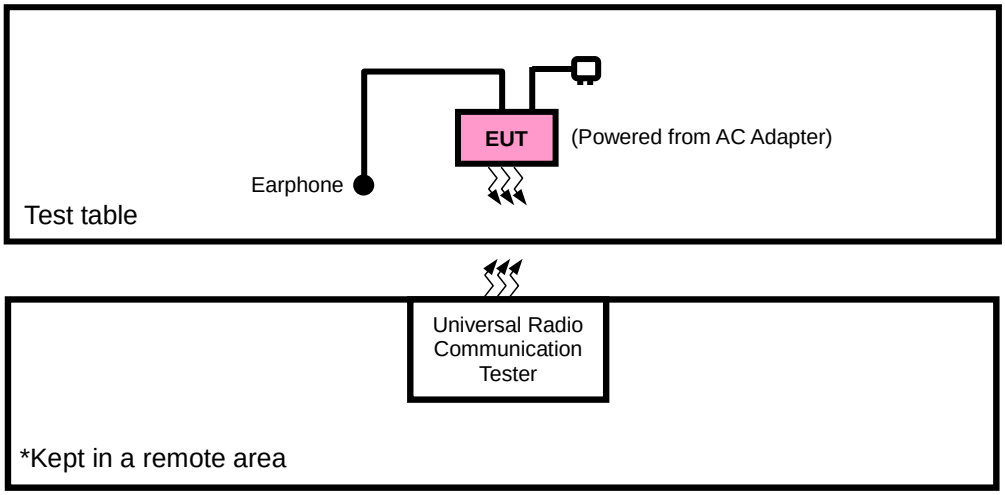
3. The EUT matched the following USB cable:

USB CABLE	
BRAND:	ecom MOBILE SAFETY
MODEL:	Safety Box SB S01
SIGNAL LINE:	1.1 METER

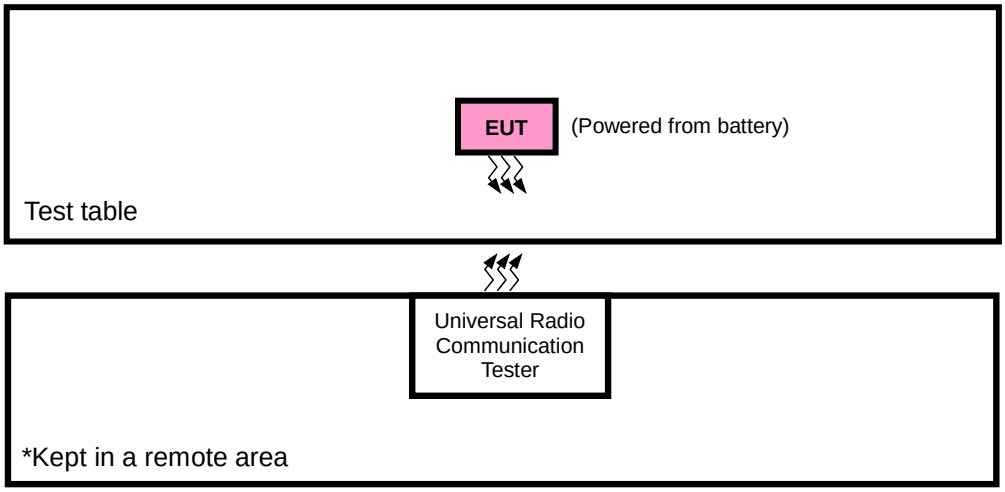
4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



FOR E.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. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A
2	PC	HP	A6608CN	3CR83825X3	N/A
3	Earphone	Minami	ME-816B5-E	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m
2	AC Line: Unshielded, Detachable 1.5m
3	DC Line: Unshielded, Detachable 1.2m

NOTE:

1. All power cords of the above support units are non shielded (1.8m).

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 Y-plane for ERP and X-axis for radiated emission. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	**EUT + Adapter + Earphone with GSM ,WCDMA or LTE link**
B	EUT + Battery + Earphone with **GSM ,WCDMA or LTE link**

GSM MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
B	ERP	128 to 251	128, 190, 251	GSM, EDGE
B	FREQUENCY STABILITY	128 to 251	190	GSM, EDGE
B	OCCUPIED BANDWIDTH	128 to 251	128, 190, 251	GSM, GPRS, EDGE
B	BAND EDGE	128 to 251	128, 251	GSM, GPRS, EDGE
B	CONDCUDETED EMISSION	128 to 251	128, 190, 251	GSM
A	RADIATED EMISSION	128 to 251	190	GSM, EDGE

WCDMA MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODE
B	ERP	4132 to 4233	4132, 4182, 4233	WCDMA
B	FREQUENCY STABILITY	4132 to 4233	4182	WCDMA
B	OCCUPIED BANDWIDTH	4132 to 4233	4132, 4182, 4233	WCDMA
B	BAND EDGE	4132 to 4233	4132, 4233	WCDMA
B	CONDCUDETED EMISSION	4132 to 4233	4132, 4182, 4233	WCDMA
A	RADIATED EMISSION	4132 to 4233	4182	WCDMA

LTE BAND 5 MODE

TEST ITEM	Available Channel	Tested Channel	Channel bandwidth	modulation	mode
ERP	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
FREQUENCY STABILITY	20407 to 20643	20525	1.4MHz	QPSK	1 RB / 0 RB Offset
	20415 to 20635	20525	3MHz	QPSK	1 RB / 0 RB Offset
	20425 to 20625	20525	5MHz	QPSK	1 RB / 0 RB Offset
	20450 to 20600	20525	10MHz	QPSK	1 RB / 0 RB Offset
OCCUPIED BANDWIDTH	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK	6 RB / 0 RB Offset
				16QAM	6 RB / 0 RB Offset
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK	15 RB / 0 RB Offset
				16QAM	15 RB / 0 RB Offset
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK	25 RB / 0 RB Offset
				16QAM	25 RB / 0 RB Offset
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK	50 RB / 0 RB Offset
				16QAM	50 RB / 0 RB Offset

BAND EDGE	20407 to 20643	20407	1.4 MHz	QPSK	1 RB / 0 RB Offset
					6 RB / 0 RB Offset
	20407 to 20643	20643	1.4 MHz	QPSK	1 RB / 5 RB Offset
					6 RB / 0 RB Offset
	20415 to 20635	20415	3 MHz	QPSK	1 RB / 0 RB Offset
					15 RB / 0 RB Offset
	20415 to 20635	20635	3 MHz	QPSK	1 RB / 14 RB Offset
					15 RB / 0 RB Offset
	20425 to 20625	20425	5MHz	QPSK	1 RB / 0 RB Offset
					25 RB / 0 RB Offset
	20425 to 20625	20625	5MHz	QPSK	1 RB / 24 RB Offset
					25 RB / 0 RB Offset
	20450 to 20600	20450	10MHz	QPSK	1 RB / 0 RB Offset
					50 RB / 0 RB Offset
	20450 to 20600	20600	10MHz	QPSK	1 RB / 49 RB Offset
					50 RB / 0 RB Offset
CONDCUDETED EMISSION	20407 to 20643	20525	1.4MHz	QPSK	1 RB / 0 RB Offset
	20415 to 20635	20525	3MHz	QPSK	1 RB / 0 RB Offset
	20425 to 20625	20525	5MHz	QPSK	1 RB / 0 RB Offset
	20450 to 20600	20525	10MHz	QPSK	1 RB / 0 RB Offset
RADIATED EMISSION	20407 to 20643	20525	1.4MHz	QPSK	1 RB / 0 RB Offset
	20415 to 20635	20525	3MHz	QPSK	1 RB / 0 RB Offset
	20425 to 20625	20525	5MHz	QPSK	1 RB / 0 RB Offset
	20450 to 20600	20525	10MHz	QPSK	1 RB / 0 RB Offset

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	23deg. C, 62%RH	3.7Vdc from Battery	Yuqiang Yin
FREQUENCY STABILITY	23deg. C, 62%RH	3.7Vdc from Battery	Yuqiang Yin
OCCUPIED BANDWIDTH	23deg. C, 62%RH	3.7Vdc from Battery	Yuqiang Yin
BAND EDGE	23deg. C, 62%RH	3.7Vdc from Battery	Yuqiang Yin
CONDCUDETED EMISSION	23deg. C, 62%RH	5Vdc from adapter	Yuqiang Yin
RADIATED EMISSION	25deg. C, 63.6%RH	5Vdc from adapter	Blue Zheng

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 22

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 / Portable station are limited to 7 watts e.r.p.

4.1.2 TEST PROCEDURES

EIRP / ERP 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 mode, 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

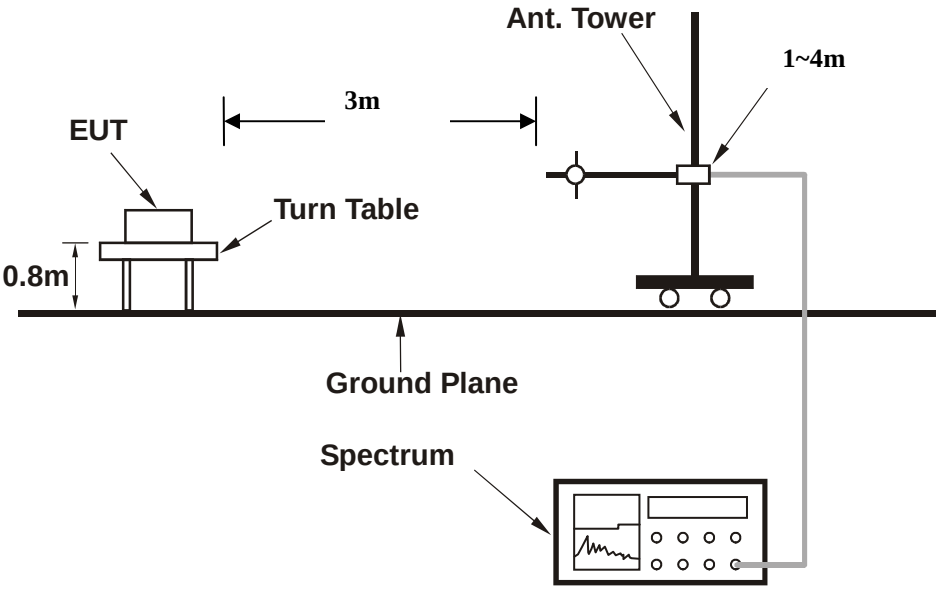
d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

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.

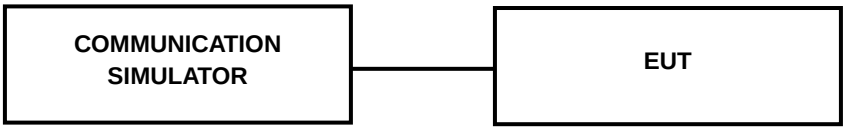
4.1.3 TEST SETUP

EIRP / ERP MEASUREMENT:



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

CONDUCTED POWER MEASUREMENT:



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

4.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm)

Band	GSM850		
Channel	128	190	251
Frequency (MHz)	824.2	836.6	848.8
GSM	31.46	31.51	31.47
GPRS 8	31.44	31.49	31.41
GPRS 10	31.36	31.41	31.35
EDGE 8 (MCS1)	31.41	31.50	31.38
EDGE 10 (MCS1)	31.35	31.40	31.31
EDGE 8 (MCS9)	26.41	26.30	26.31
EDGE 10 (MCS9)	25.84	25.77	25.76

Band	WCDMA V		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	23.75	23.63	23.62
HSPA			
HSDPA Subtest-1	22.23	22.16	22.23
HSDPA Subtest-2	22.26	22.26	22.14
HSDPA Subtest-3	21.76	21.80	21.80
HSDPA Subtest-4	21.85	21.85	21.74
HSUPA Subtest-1	22.59	22.58	22.53
HSUPA Subtest-2	20.77	20.51	20.41
HSUPA Subtest-3	21.65	21.66	21.53
HSUPA Subtest-4	20.80	20.83	20.75
HSUPA Subtest-5	22.78	22.76	22.68

Band/BW	Modulation	RB Size	RB Offset	Low CH 20407 Frequency 824.7 MHz	Mid CH 20525 Frequency 836.5 MHz	High CH 20643 Frequency 848.3 MHz	3GPP MPR (dB)
5/1.4	QPSK	1	0	**22.74**	22.61	22.7	0
		1	2	22.6	22.58	22.65	0
		1	5	22.72	22.59	22.68	0
		3	0	22.67	**22.71**	22.61	0
		3	1	22.66	22.67	22.6	0
		3	3	22.59	22.65	22.57	0
		6	0	**21.69**	21.67	21.58	1
	16QAM	1	0	**21.67**	21.54	21.63	1
		1	2	21.53	21.51	21.58	1
		1	5	21.65	21.52	21.61	1
		3	0	21.64	**21.68**	21.58	1
		3	1	21.63	21.64	21.57	1
		3	3	21.56	21.62	21.54	1
		6	0	**20.62**	20.6	20.51	2

Band/BW	Modulation	RB Size	RB Offset	Low CH 20415 Frequency 825.5 MHz	Mid CH 20525 Frequency 836.5 MHz	High CH 20635 Frequency 847.5 MHz	3GPP MPR (dB)
5/3	QPSK	1	0	**22.8**	22.67	22.76	0
		1	7	22.66	22.64	22.71	0
		1	14	22.78	22.65	22.74	0
		8	0	21.77	**21.81**	21.71	1
		8	3	21.76	21.77	21.7	1
		8	7	21.69	21.75	21.67	1
		15	0	**21.75**	21.73	21.64	1
	16QAM	1	0	**21.73**	21.6	21.69	1
		1	7	21.59	21.57	21.64	1
		1	14	21.71	21.58	21.67	1
		8	0	20.7	**20.74**	20.64	2
		8	3	20.69	20.7	20.63	2
		8	7	20.62	20.68	20.6	2
		15	0	**20.68**	20.66	20.57	2

Band/BW	Modulation	RB Size	RB Offset	Low CH 20425	Mid CH 20525	High CH 20625	3GPP MPR (dB)
				Frequency 826.5 MHz	Frequency 836.5 MHz	Frequency 846.5 MHz	
5/5	QPSK	1	0	**22.84**	22.71	22.8	0
		1	12	22.7	22.68	22.75	0
		1	24	22.82	22.69	22.78	0
		12	0	21.81	**21.85**	21.75	1
		12	6	21.8	21.81	21.74	1
		12	13	21.73	21.79	21.71	1
		25	0	**21.79**	21.77	21.68	1
	16QAM	1	0	**21.77**	21.64	21.73	1
		1	12	21.63	21.61	21.68	1
		1	24	21.75	21.62	21.71	1
		12	0	20.74	**20.78**	20.68	2
		12	6	20.73	20.74	20.67	2
		12	13	20.66	20.72	20.64	2
		25	0	**20.72**	20.7	20.61	2

Band/BW	Modulation	RB Size	RB Offset	Low CH 20450	Mid CH 20525	High CH 20600	3GPP MPR (dB)
				Frequency 829 MHz	Frequency 836.5 MHz	Frequency 844 MHz	
5/10	QPSK	1	0	**22.86**	22.73	22.82	0
		1	24	22.72	22.7	22.77	0
		1	49	22.84	22.71	22.8	0
		25	0	21.83	**21.87**	21.77	1
		25	12	21.82	21.83	21.76	1
		25	25	21.75	21.81	21.73	1
		50	0	**21.81**	21.79	21.7	1
	16QAM	1	0	**21.79**	21.66	21.75	1
		1	24	21.65	21.63	21.7	1
		1	49	21.77	21.64	21.73	1
		25	0	20.76	**20.8**	20.7	2
		25	12	20.75	20.76	20.69	2
		25	25	20.68	20.74	20.66	2
		50	0	**20.74**	20.72	20.63	2

ERP POWER (dBm)

GSM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
128	824.2	-10.26	35.85	23.44	220.80	H
189	836.4	-10.28	37.09	24.66	292.42	H
251	848.8	-10.27	36.96	24.54	284.45	H
128	824.2	-9.95	36.88	24.78	300.61	V
189	836.4	-9.91	37.56	25.50	354.81	V
251	848.8	-9.93	37.72	25.64	**366.44**	V

EDGE

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
128	824.2	-13.20	35.85	20.50	112.20	H
189	836.4	-13.10	37.09	21.84	152.76	H
251	848.8	-13.42	36.96	21.39	137.72	H
128	824.2	-13.30	36.88	21.43	139.00	V
189	836.4	-13.10	37.56	22.31	**170.22**	V
251	848.8	-13.42	37.72	22.15	164.06	V

WCDMA

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)
4132	826.4	-17.21	35.85	16.49	44.57	H
4182	836.4	-17.08	37.09	17.86	61.09	H
4233	846.6	-17.15	37	17.70	58.88	H
4132	826.4	-16.93	36.85	17.77	59.84	V
4182	836.4	-16.94	37.56	18.47	70.31	V
4233	846.6	-16.95	37.77	18.67	**73.62**	V

LTE BAND 5

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
20407	824.7	-10.66	35.47	22.66	184.50	H	1
20525	836.5	-10.76	36.88	23.97	249.46	H	1
20643	848.3	-10.29	36.92	24.48	280.54	H	1
20407	824.7	-10.36	36.59	24.08	255.86	V	1
20525	836.5	-10.85	37.35	24.35	272.27	V	1
20643	848.3	-10.63	37.71	24.93	**311.17**	V	1

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
20407	824.7	-12.09	35.47	21.23	132.74	H	1
20525	836.5	-12.75	36.88	21.98	157.76	H	1
20643	848.3	-12.66	36.92	22.11	162.55	H	1
20407	824.7	-11.57	36.59	22.87	193.64	V	1
20525	836.5	-11.63	37.35	23.57	227.51	V	1
20643	848.3	-11.23	37.71	24.33	271.02	V	1

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
20415	825.5	-10.69	35.45	22.61	182.39	H	1
20525	836.5	-10.47	36.88	24.26	266.69	H	1
20635	847.5	-10.66	36.82	24.01	251.77	H	1
20415	825.5	-11.06	36.54	23.33	215.28	V	1
20525	836.5	-11.08	37.35	24.12	258.23	V	1
20635	847.5	-10.99	37.64	24.50	**281.84**	V	1

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
20415	825.5	-12.56	35.45	20.74	118.58	H	1
20525	836.5	-12.74	36.88	21.99	158.12	H	1
20635	847.5	-12.66	36.82	22.01	158.85	H	1
20415	825.5	-11.75	36.54	22.64	183.65	V	1
20525	836.5	-11.69	37.35	23.51	224.39	V	1
20635	847.5	-11.72	37.64	23.77	238.23	V	1

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
20425	826.5	-10.84	35.59	22.60	181.97	H	1
20525	836.5	-10.34	36.88	24.39	274.79	H	1
20625	846.5	-10.73	36.9	24.02	252.35	H	1
20425	826.5	-10.98	36.51	23.38	217.77	V	1
20525	836.5	-10.75	37.35	24.45	**278.61**	V	1
20625	846.5	-11.09	37.62	24.38	274.16	V	1

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
20425	826.5	-12.85	35.59	20.59	114.55	H	1
20525	836.5	-12.87	36.88	21.86	153.46	H	1
20625	846.5	-12.63	36.9	22.12	162.93	H	1
20425	826.5	-11.85	36.51	22.51	178.24	V	1
20525	836.5	-11.67	37.35	23.53	225.42	V	1
20625	846.5	-11.98	37.62	23.49	223.36	V	1

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
20450	829	-10.25	35.71	23.31	214.29	H	1
20525	836.5	-10.54	36.85	24.16	260.62	H	1
20600	844	-10.69	37.01	24.17	261.22	H	1
20450	829	-10.52	36.56	23.89	244.91	V	1
20525	836.5	-10.13	37.32	25.04	319.15	V	1
20600	844	-10.25	37.62	25.22	**332.66**	V	1

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	LVL (dBm)	Correction Factor(dB)	ERP(dBm)	ERP(mW)	Polarization (H/V)	LIMIT (W)
20450	829	-12.75	35.71	20.81	120.50	H	1
20525	836.5	-12.57	36.85	22.13	163.31	H	1
20600	844	-12.65	37.01	22.21	166.34	H	1
20450	829	-11.28	36.56	23.13	205.59	V	1
20525	836.5	-11.85	37.32	23.32	214.78	V	1
20600	844	-11.55	37.62	23.92	246.60	V	1

REMARKS: 1. ERP Output Power (dBm) = SPA Reading (dBm) + Correction Factor (dB).
2. Correction factor (dB) = Free Space Loss + Antenna Factor + Cable Loss.

4.2 FREQUENCY STABILITY MEASUREMENT

4.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

1.5 ppm is for base and fixed station. 2.5 ppm is for mobile station.

4.2.2 TEST PROCEDURE

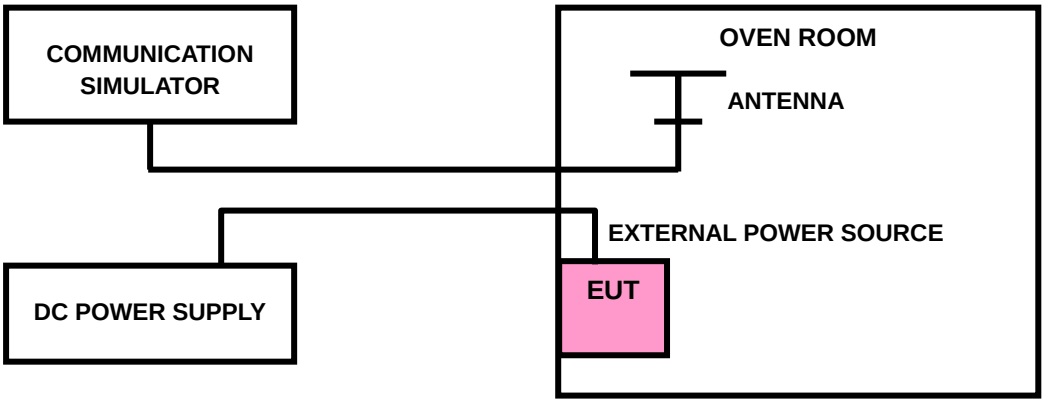
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

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	LTE Band 5				
				1.4 MHz	3 MHz	5 MHz	10MHz	
3.8	0.0007	0.0007	0.0008	-0.020	-0.015	-0.015	-0.010	2.5
3.5	-0.0034	-0.0046	-0.0043	-0.018	-0.007	-0.009	-0.007	2.5
4.35	0.0043	0.0051	0.0057	-0.013	-0.008	-0.014	-0.009	2.5

NOTE: The applicant defined the normal working voltage of the battery is from 3.5Vdc to 4.35Vdc.

FREQUENCY ERROR vs. TEMPERATURE.

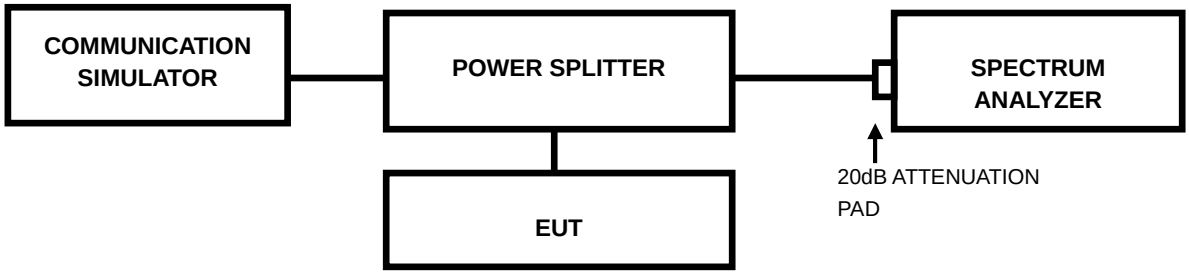
Voltage (Volts)	Frequency Error (ppm)							Limit (ppm)
	GSM	EDGE	WCDMA	LTE Band 5				
				1.4 MHz	3 MHz	5 MHz	10MHz	
-30	-0.0156	-0.0156	-0.0167	-0.024	-0.019	-0.017	-0.021	2.5
-20	-0.0121	-0.0123	-0.0133	-0.018	-0.017	-0.014	-0.019	2.5
-10	-0.0090	0.0097	-0.0103	-0.016	-0.014	-0.012	-0.017	2.5
0	-0.0075	-0.0088	-0.0081	-0.015	-0.010	-0.007	-0.016	2.5
10	-0.0062	-0.0069	-0.0046	-0.013	-0.009	-0.003	-0.015	2.5
20	-0.0017	0.0040	-0.0015	-0.010	-0.007	-0.003	-0.012	2.5
30	0.0003	-0.0002	0.0019	-0.009	-0.004	0.006	-0.004	2.5
40	0.0041	0.0033	0.0042	0.003	0.005	0.007	0.002	2.5
50	0.0061	0.0070	0.0050	0.006	0.008	0.012	0.006	2.5
60	0.0074	0.0090	0.0073	0.010	0.014	0.016	0.009	2.5

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

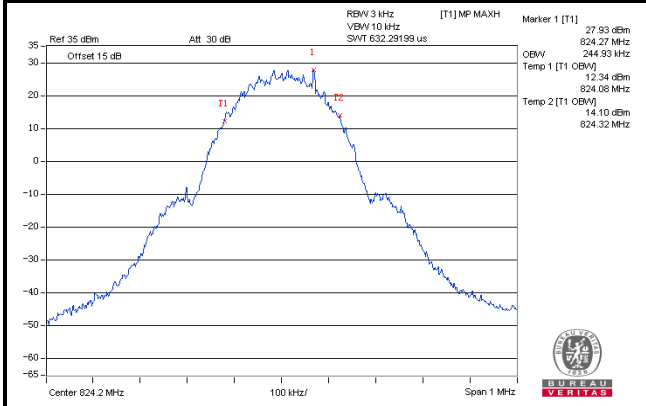


4.3.3 TEST RESULTS

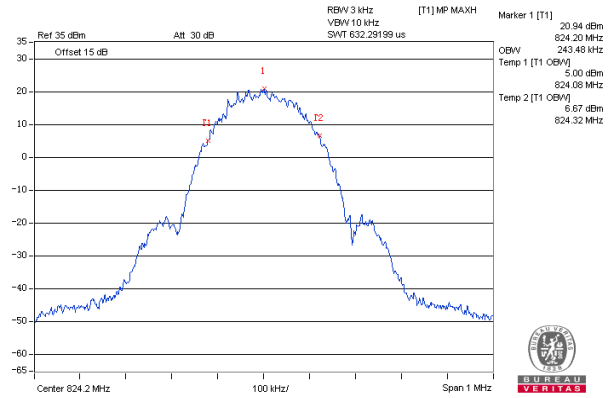
CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (kHz)		CHANNEL	Frequency (MHz)	99% OCCUPIED Bandwidth (MHz)
		GSM	EDGE			WCDMA
128	824.2	244.93	243.48	4132	826.4	4.16
190	836.6	244.93	242.03	4182	836.4	4.14
251	848.8	243.48	243.48	4233	846.6	4.16

SPECTRUM PLOT OF WORST VALUE

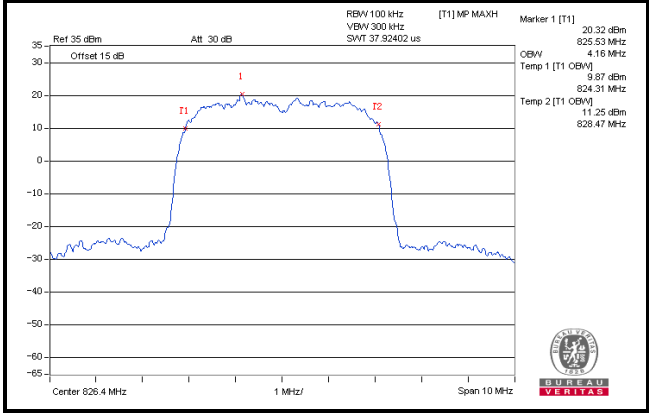
GSM



EDGE



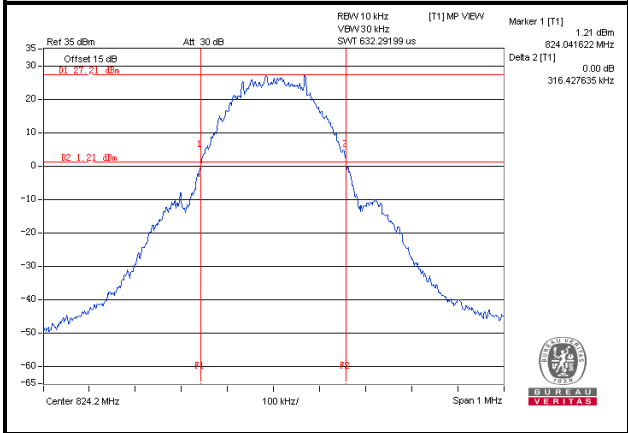
WCDMA



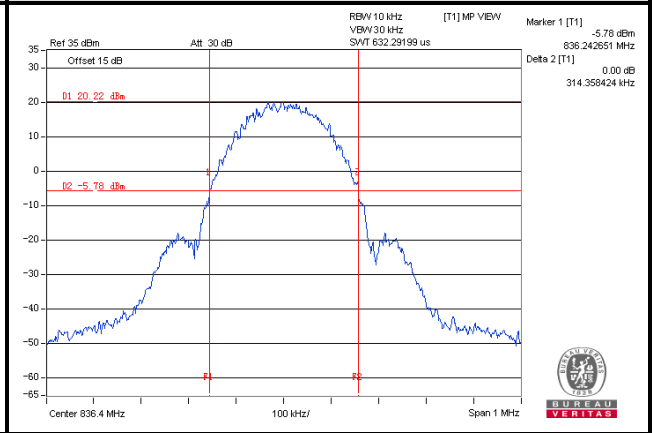
CHANNEL	Frequency (MHz)	26dB Bandwidth (kHz)		CHANNEL	Frequency (MHz)	26dB Bandwidth (MHz)
		GSM	EDGE			WCDMA
128	824.2	316.43	310.2	4132	826.4	4.66
190	836.6	315.05	314.36	4182	836.4	4.67
251	848.8	315.96	310.43	4233	846.6	4.66

SPECTRUM PLOT OF WORST VALUE

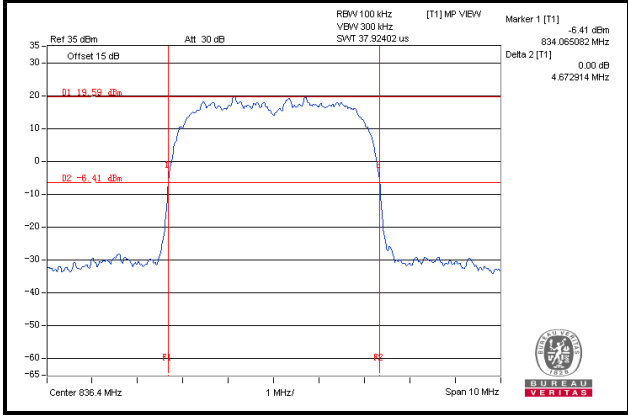
GSM



EDGE



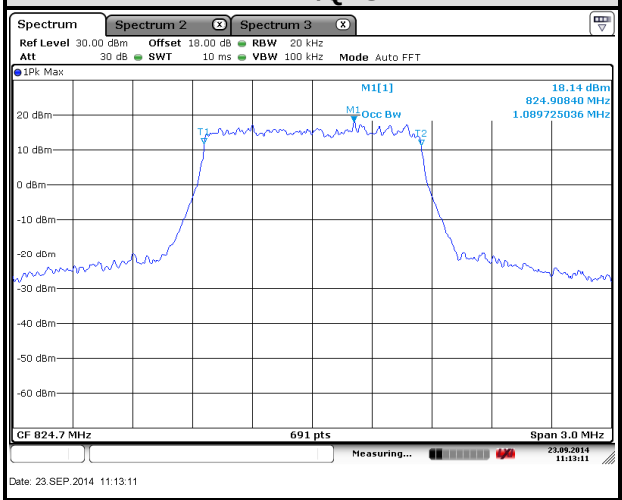
WCDMA



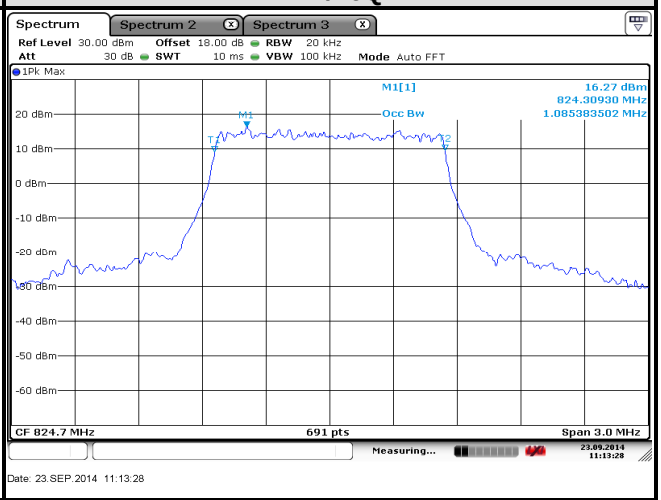
LTE band 5							
Channel Bandwidth : 1.4MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26 dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
20407	824.7	1.09	1.09	20407	824.7	1.26	1.27
20525	836.5	1.09	1.09	20525	836.5	1.27	1.29
20643	848.3	1.09	1.09	20643	848.3	1.27	1.27

SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth

1.4MHz/QPSK

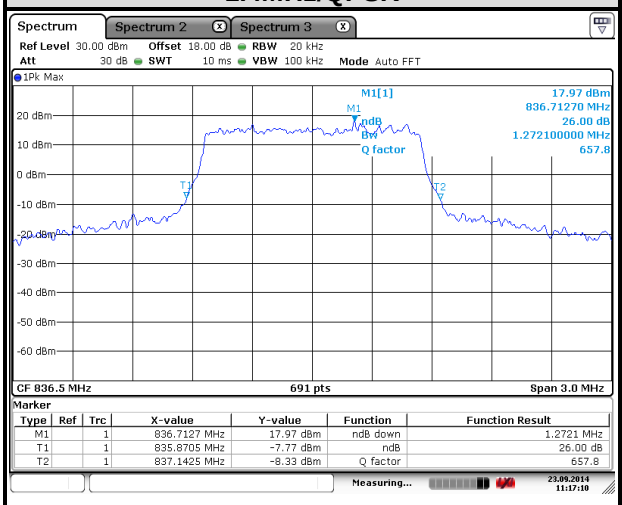


1.4MHz/16QAM

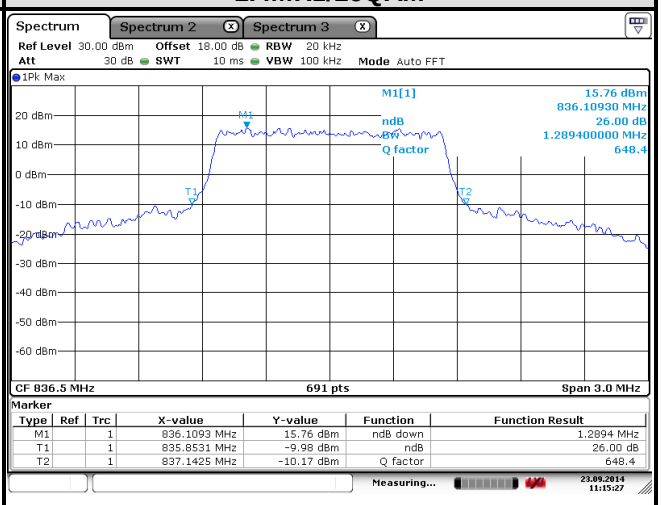


SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth

1.4MHz/QPSK



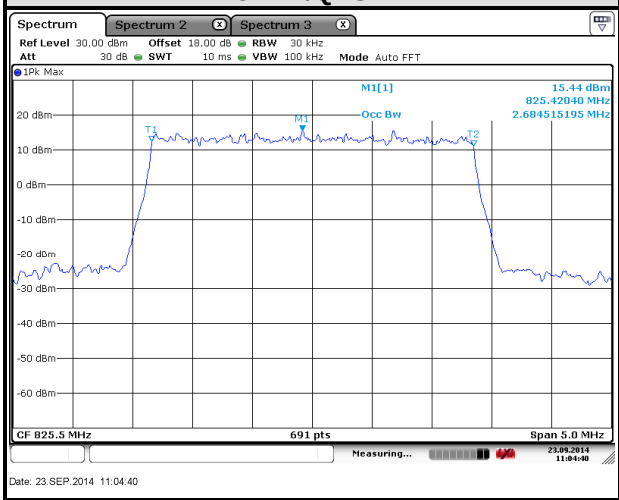
1.4MHz/16QAM



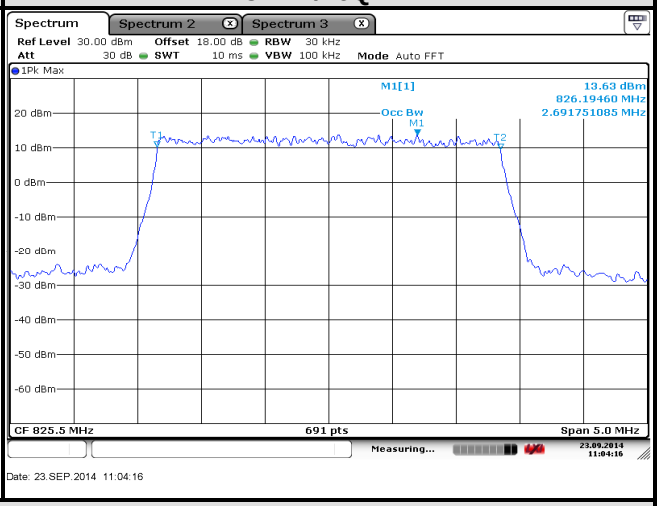
LTE band 5							
Channel Bandwidth : 3MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26 dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
20415	825.5	2.68	2.69	20415	825.5	2.94	2.97
20525	836.5	2.68	2.69	20525	836.5	2.96	2.93
20635	847.5	2.68	2.68	20635	847.5	2.92	2.92

SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth

3MHz/QPSK

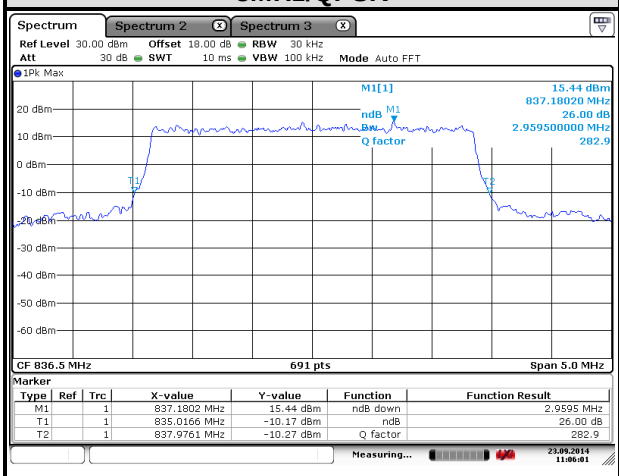


3MHz/16QAM

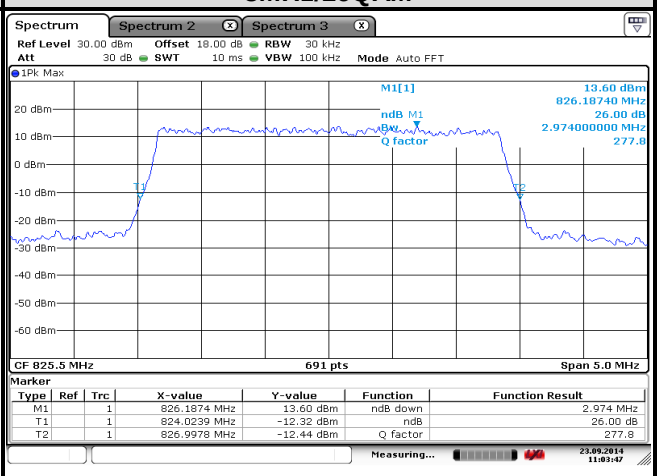


SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth

3MHz/QPSK



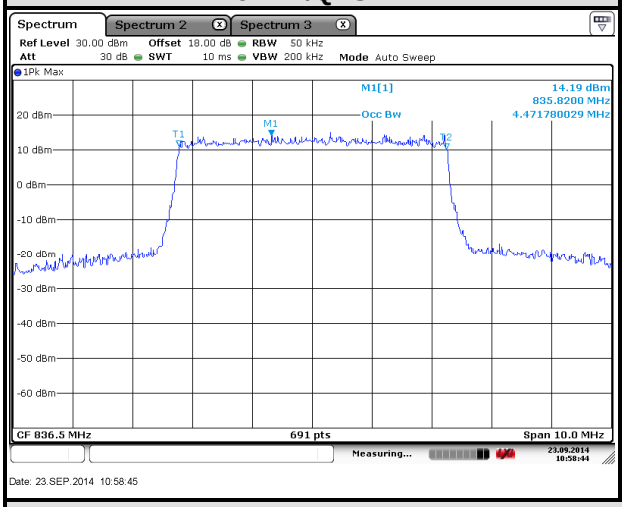
3MHz/16QAM



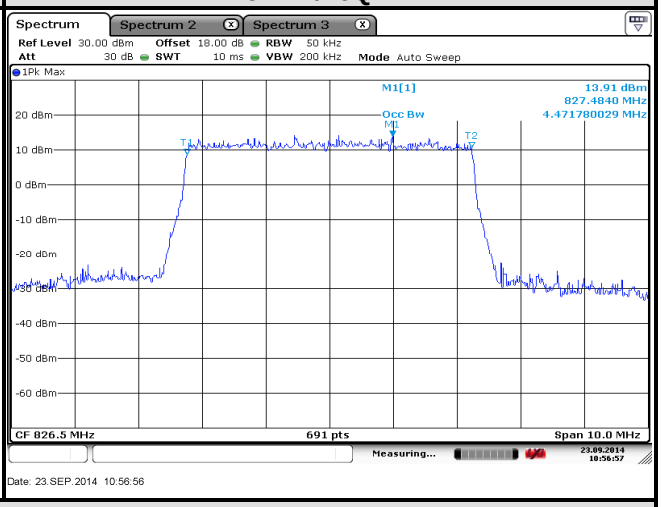
LTE band 5							
Channel Bandwidth : 5 MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26 dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
20425	826.5	4.46	4.47	20425	826.5	4.91	4.85
20525	836.5	4.47	4.46	20525	836.5	4.86	4.86
20625	846.5	4.46	4.46	20625	846.5	4.94	4.85

SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth

5MHz/QPSK

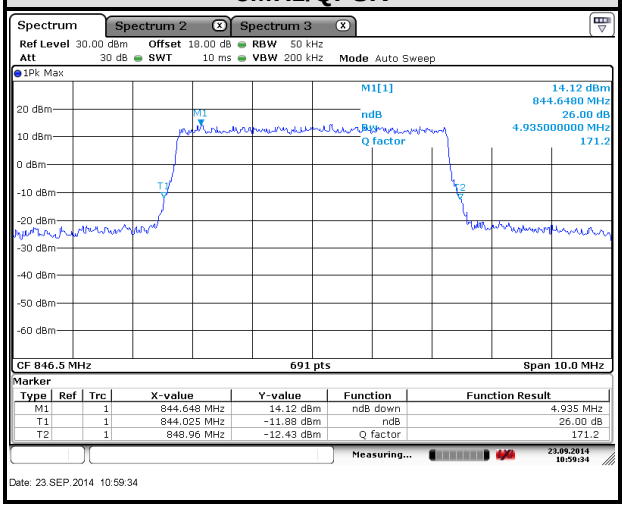


5MHz/16QAM

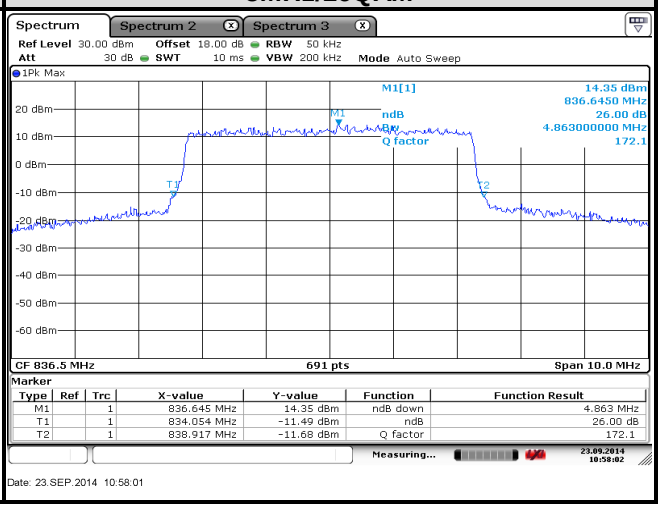


SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth

5MHz/QPSK



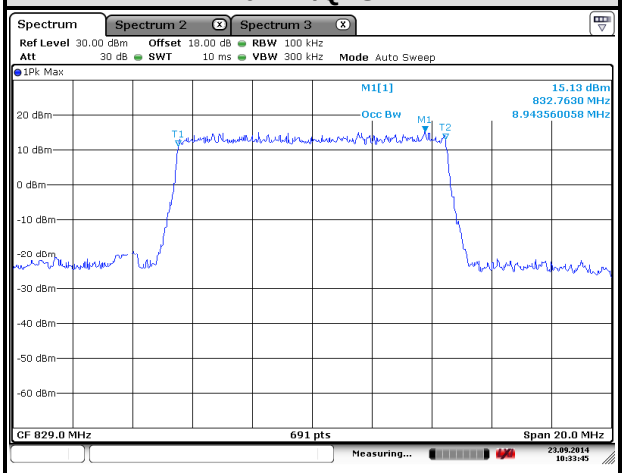
5MHz/16QAM



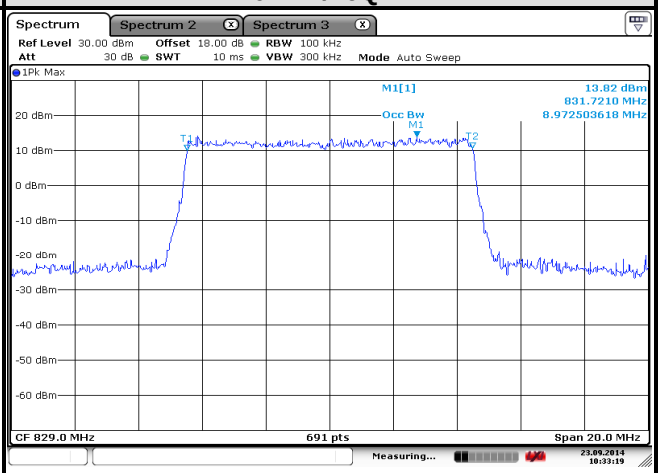
LTE band 5							
Channel Bandwidth : 10 MHz							
Channel	Frequency (MHz)	99% Occupied bandwidth (MHz)		Channel	Frequency (MHz)	26 dB bandwidth (MHz)	
		QPSK	16QAM			QPSK	16QAM
20450	829	8.94	8.97	20450	829	9.73	9.81
20525	836.5	8.91	8.94	20525	836.5	9.73	9.75
20600	844	8.94	8.97	20600	844	9.78	9.75

SPECTRUM PLOT OF WORST VALUE of 99% Occupied Bandwidth

10MHz/QPSK

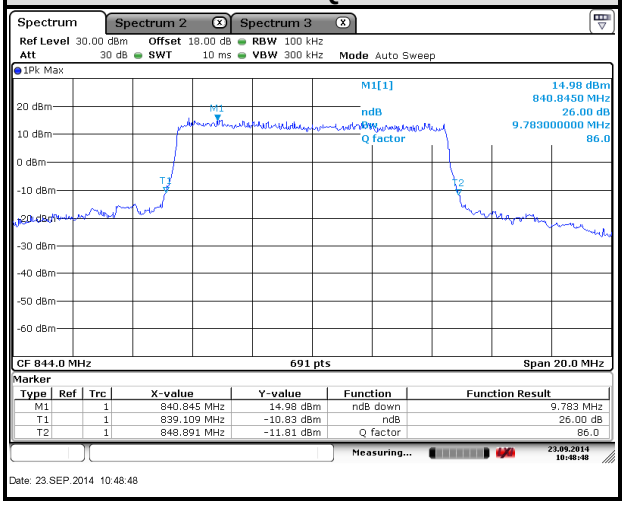


10MHz/16QAM

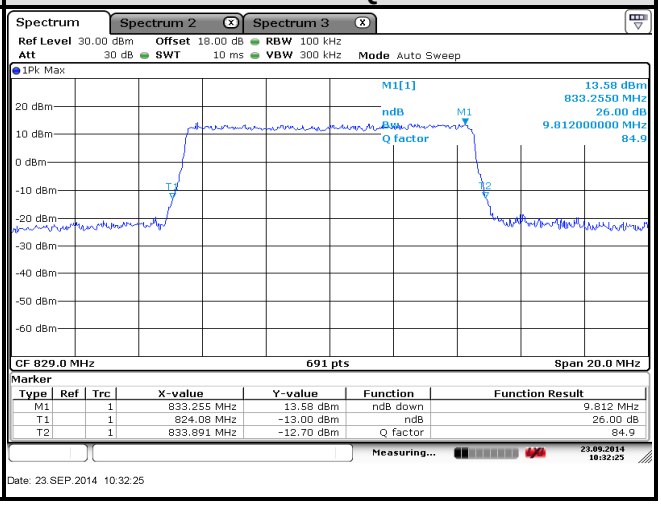


SPECTRUM PLOT OF WORST VALUE of 26dB Occupied Bandwidth

10MHz/QPSK



10MHz/16QAM

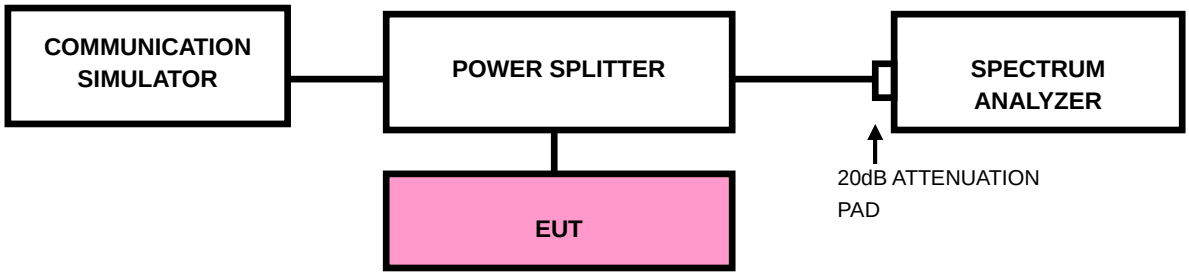


4.4 BAND EDGE MEASUREMENT

4.4.1 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.

4.4.2 TEST SETUP



4.4.3 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 1.5MHz. RBW of the spectrum is 10kHz and VBW of the spectrum is 30kHz (GSM/GPRS/ EDGE).

c. The center frequency of spectrum is the band edge frequency and span is 10MHz. RBW of the spectrum is 100kHz and VBW of the spectrum is 300kHz (WCDMA).

d. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 20kHz and VB of the spectrum is 100 kHz. (LTE bandwidth 1.4MHz).

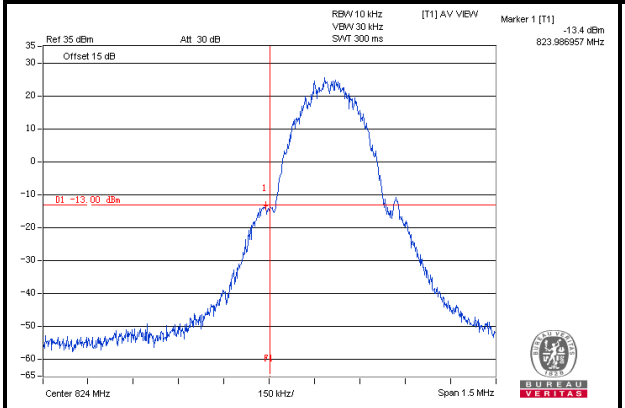
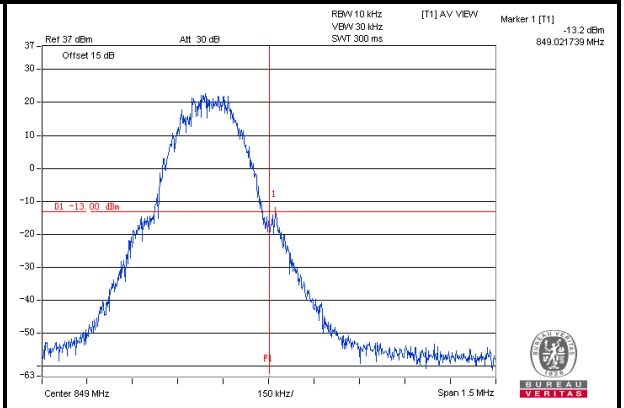
e. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 30kHz and VB of the spectrum is 100kHz. (LTE bandwidth 3MHz)

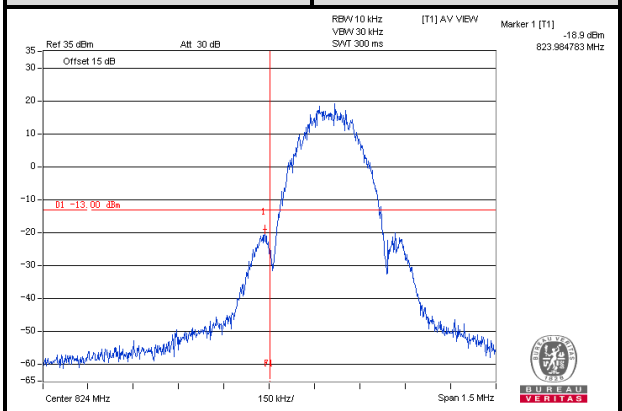
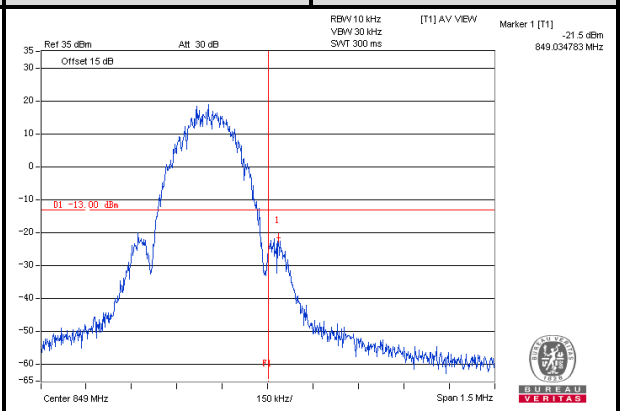
f. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 50kHz and VB of the spectrum is 200kHz. (LTE bandwidth 5MHz)

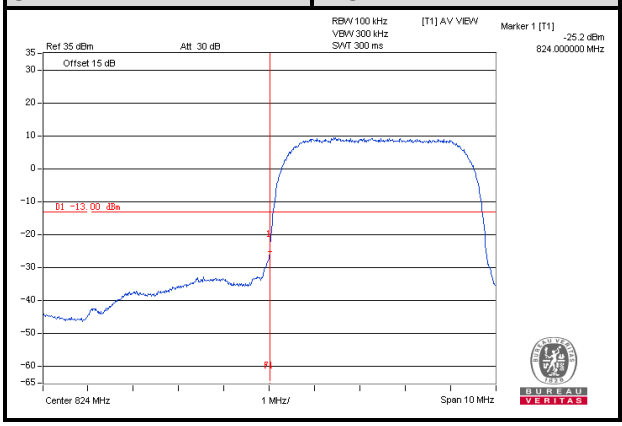
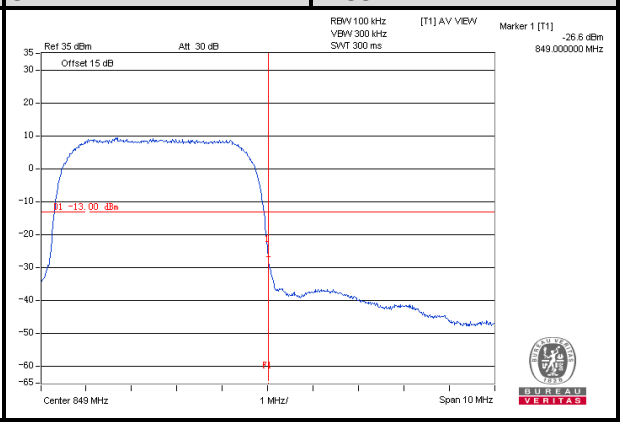
g. The center frequency of spectrum is the band edge frequency and span is 1~5 MHz. RB of the spectrum is 100kHz and VB of the spectrum is 300kHz. (LTE bandwidth 10MHz)

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

4.4.4 TEST RESULTS

GSM			
CHANNEL	128	CHANNEL	251
			

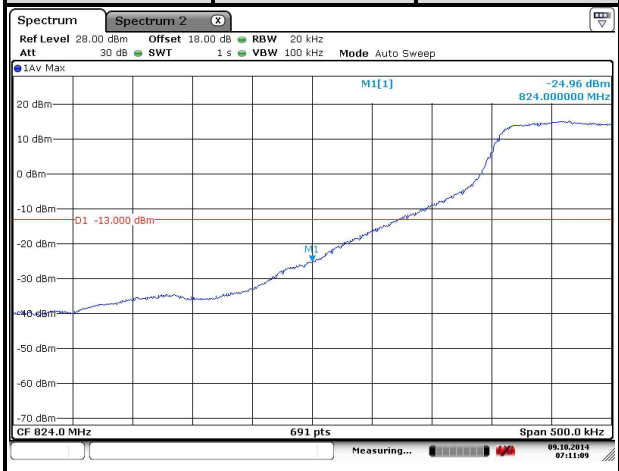
EDGE			
CHANNEL	128	CHANNEL	251
			

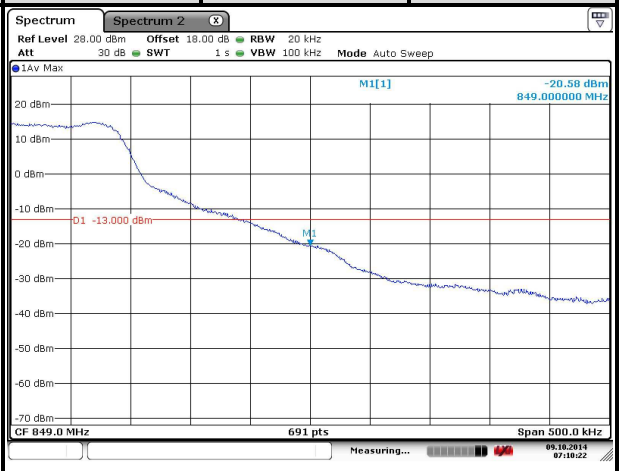
WCDMA			
CHANNEL	4132	CHANNEL	4233
			

LTE Band5

Channel Bandwidth: 1.4MHz

CHANNEL	20407	1 RB	CHANNEL	20643	1 RB

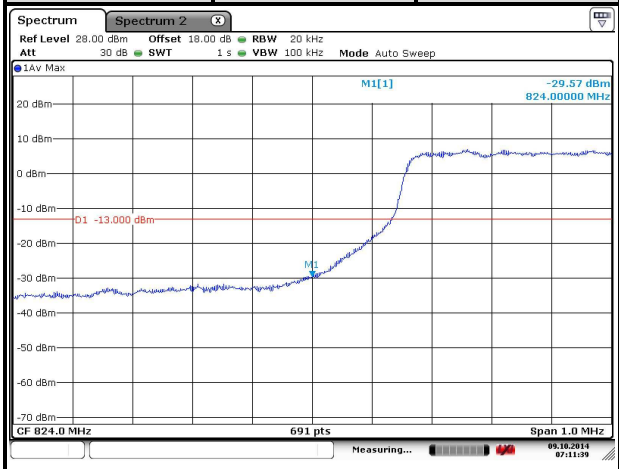


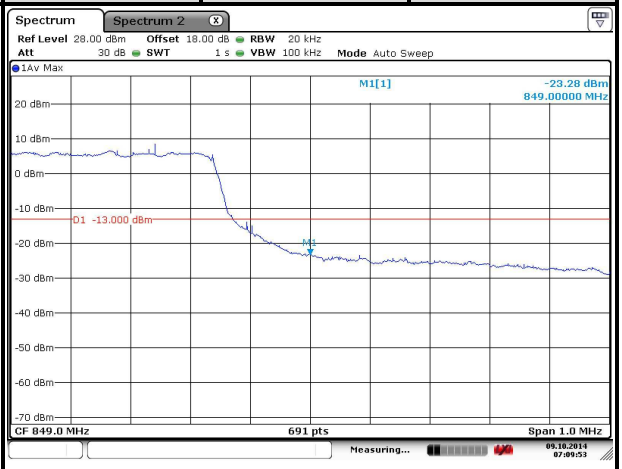


LTE Band5

Channel Bandwidth: 1.4MHz

CHANNEL	20407	Full RB	CHANNEL	20643	Full RB

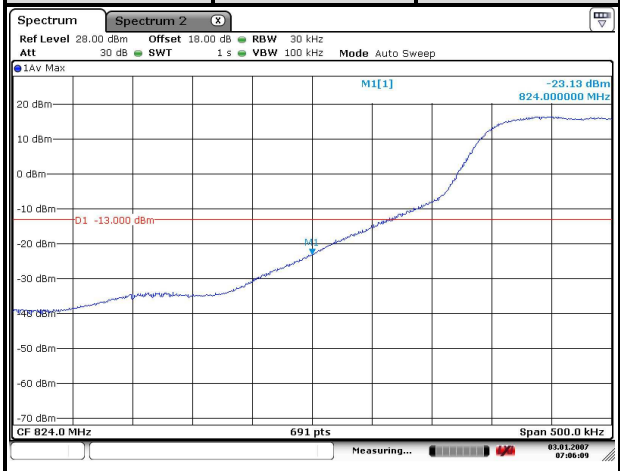


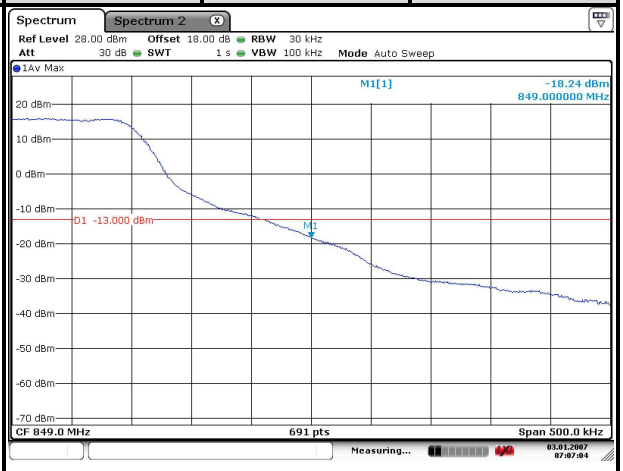


LTE Band5

Channel Bandwidth: 3MHz

CHANNEL	20415	1 RB	CHANNEL	20635	1 RB

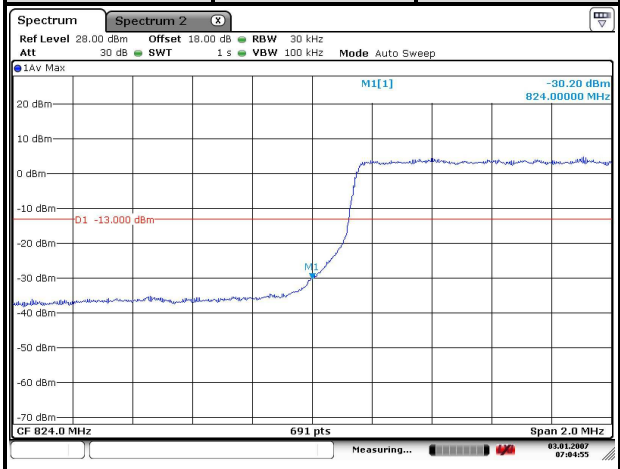


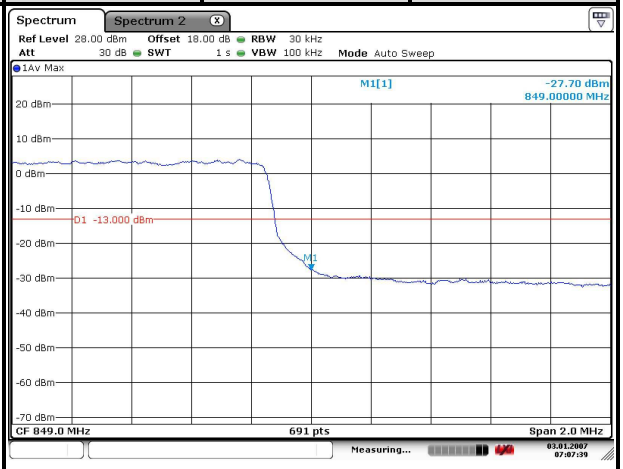


LTE Band5

Channel Bandwidth: 3MHz

CHANNEL	20415	Full RB	CHANNEL	20635	Full RB

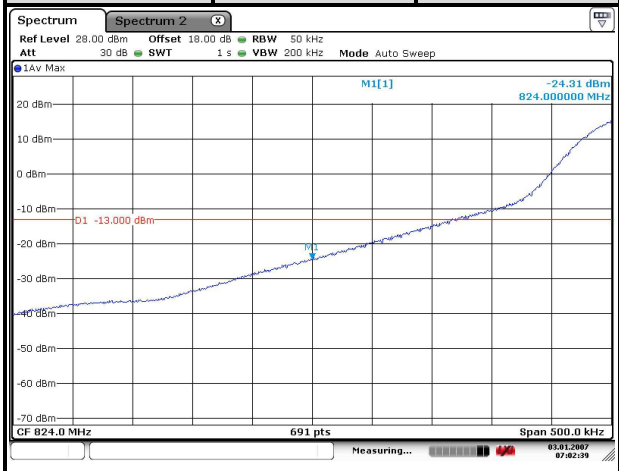


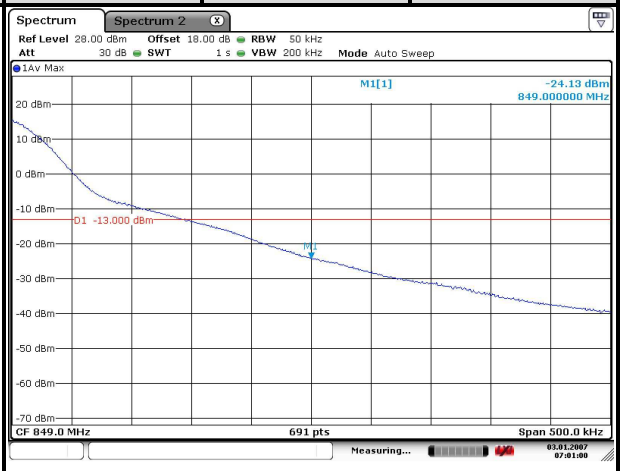


LTE Band5

Channel Bandwidth: 5MHz

CHANNEL	20425	1 RB	CHANNEL	20625	1 RB

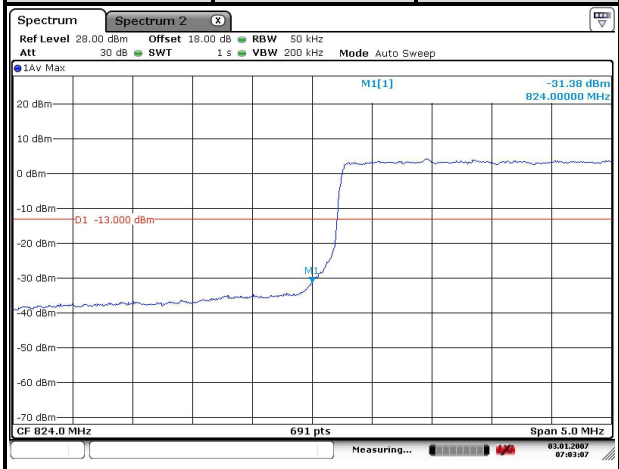


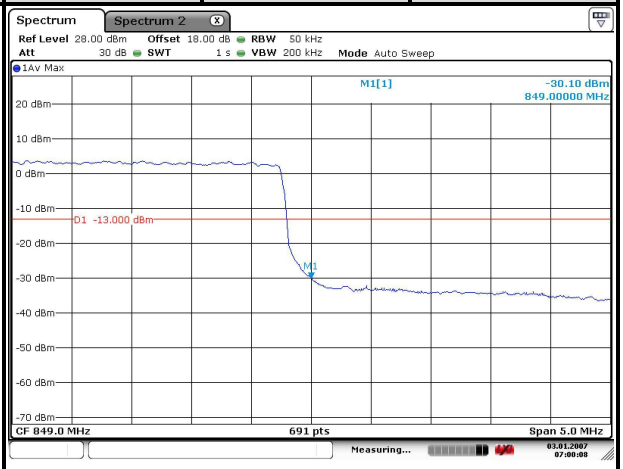


LTE Band5

Channel Bandwidth: 5MHz

CHANNEL	20425	Full RB	CHANNEL	20625	Full RB

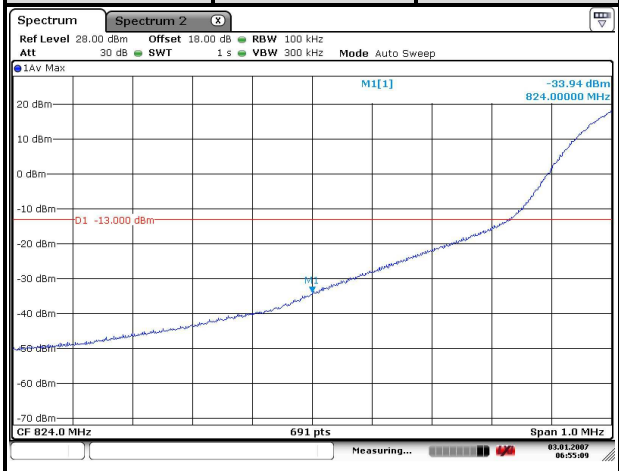


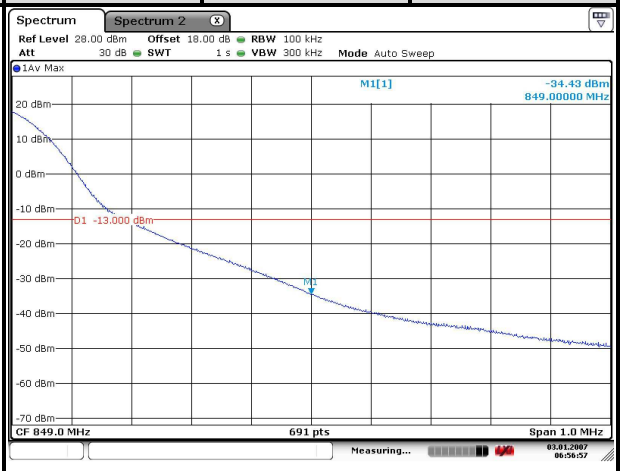


LTE Band5

Channel Bandwidth: 10MHz

CHANNEL	20450	1 RB	CHANNEL	20600	1 RB

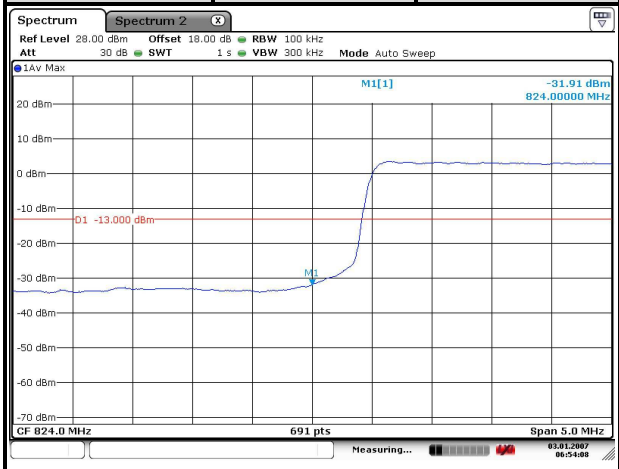


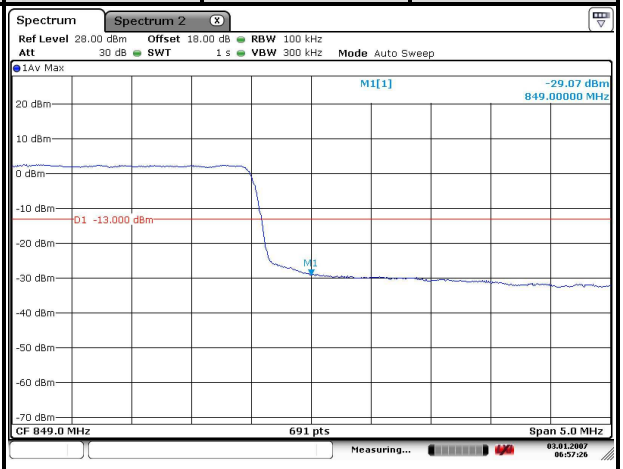


LTE Band5

Channel Bandwidth: 10MHz

CHANNEL	20450	Full RB	CHANNEL	20600	Full RB





4.5 CONDUCTED SPURIOUS EMISSIONS

4.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

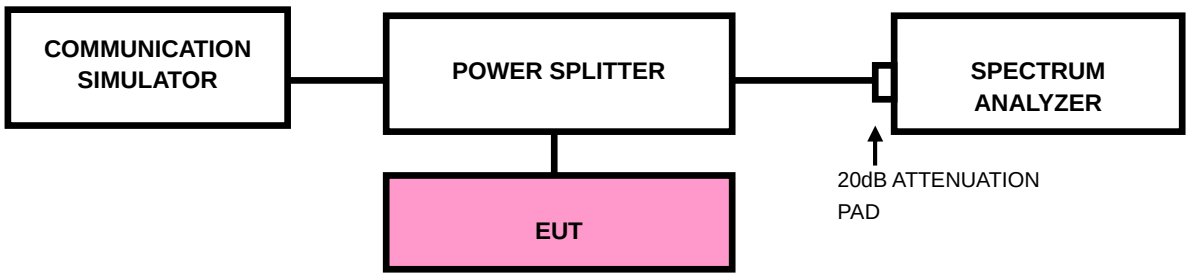
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

4.5.2 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 9 kHz to 9GHz. 20dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

4.5.3 TEST SETUP

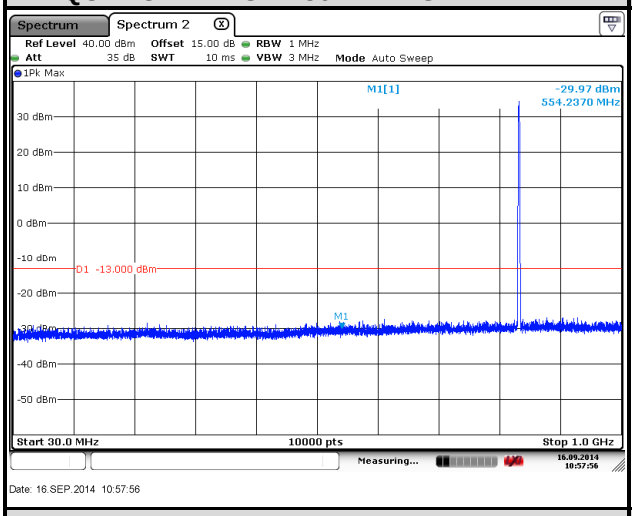


4.5.4 TEST RESULTS

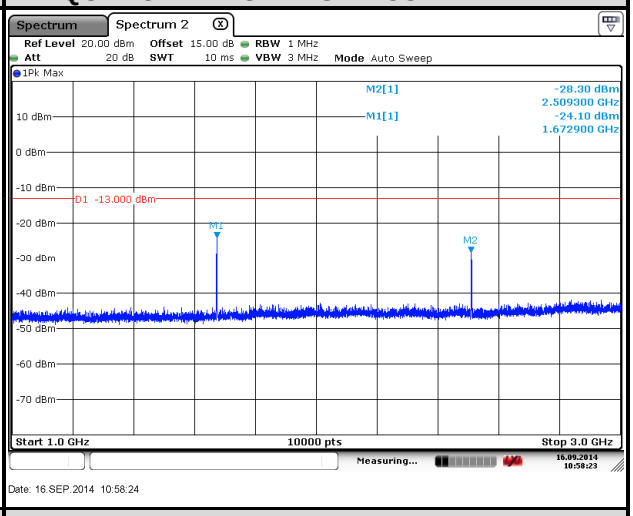
GSM

CHANNEL 189

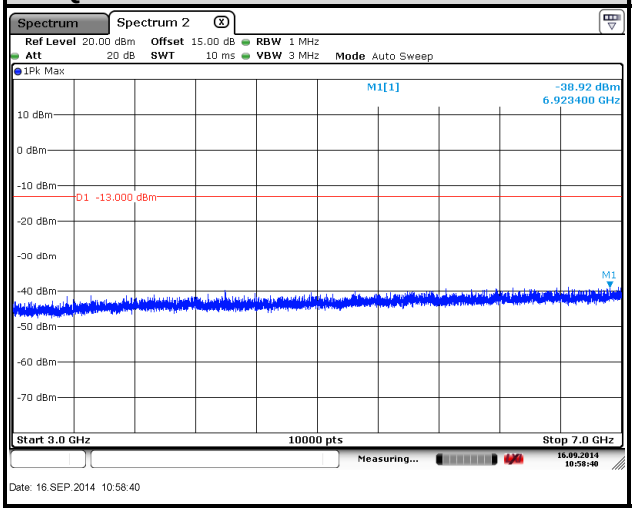
FREQUENCY RANGE : 30MHz~1GHz



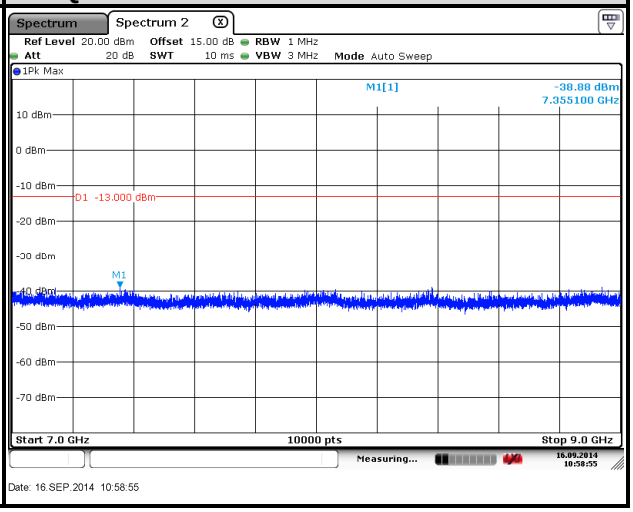
FREQUENCY RANGE : 1GHz~3GHz



FREQUENCY RANGE : 3GHz~7GHz



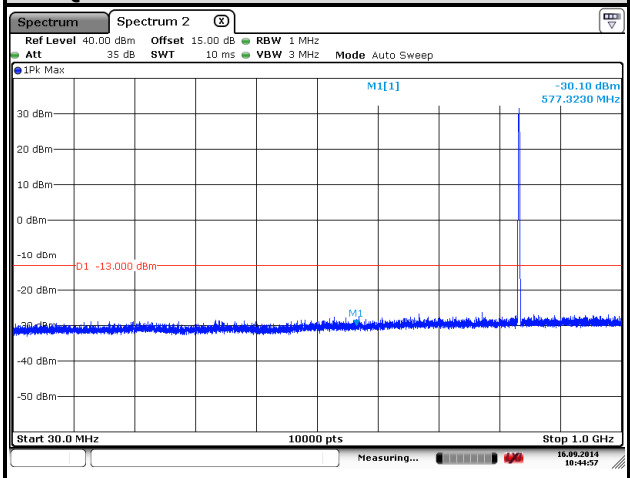
FREQUENCY RANGE : 7GHz~9GHz



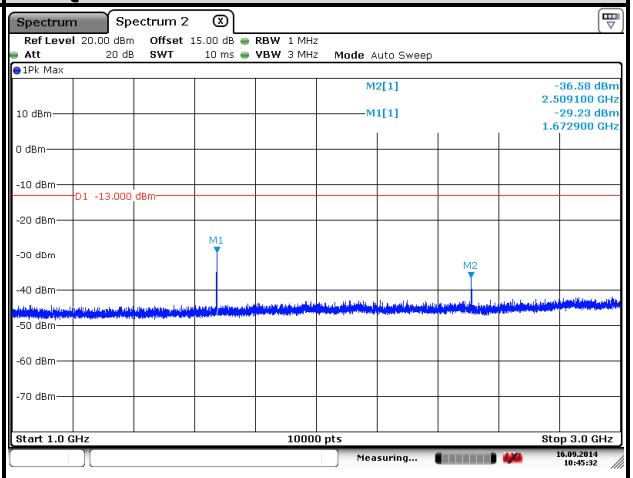
EDGE

CHANNEL 189

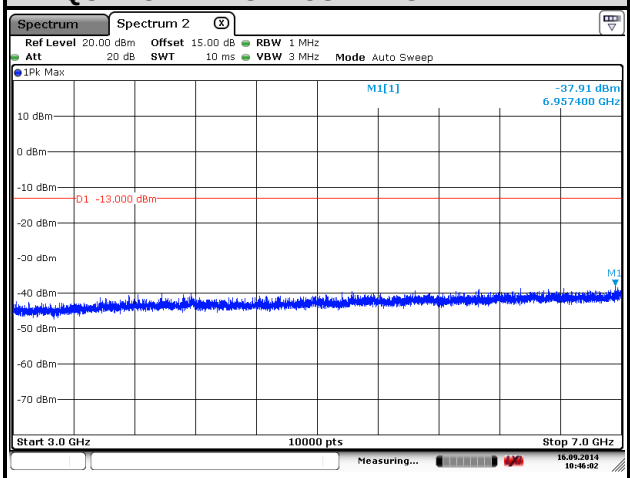
FREQUENCY RANGE : 30MHz~1GHz



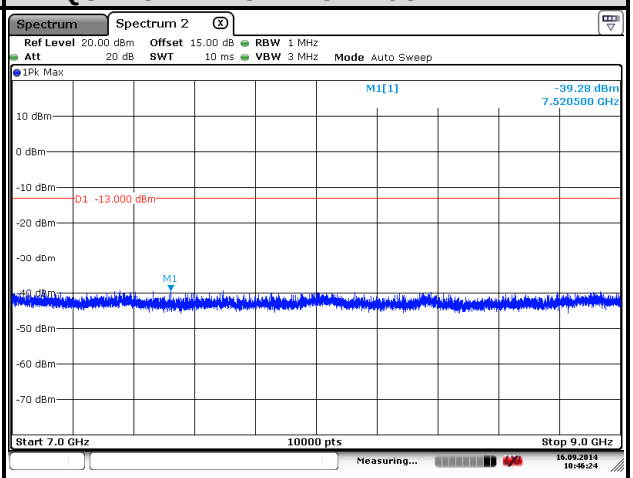
FREQUENCY RANGE : 1GHz~3GHz



FREQUENCY RANGE : 3GHz~7GHz



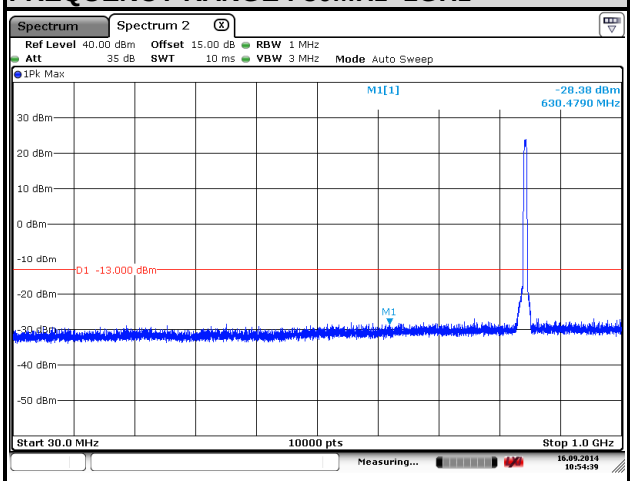
FREQUENCY RANGE : 7GHz~9GHz



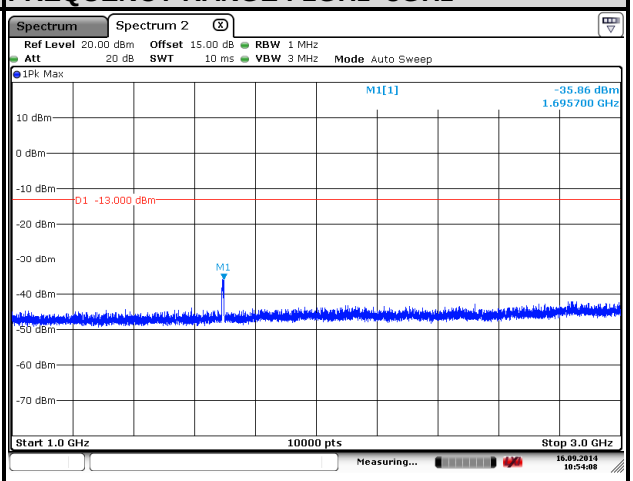
WCDMA

CHANNEL 4182

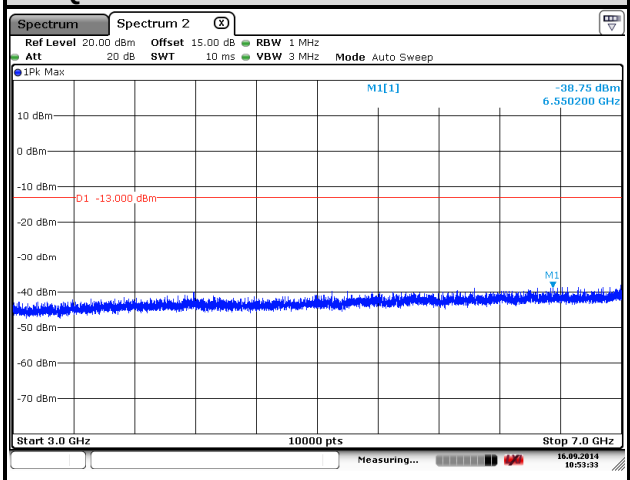
FREQUENCY RANGE : 30MHz~1GHz



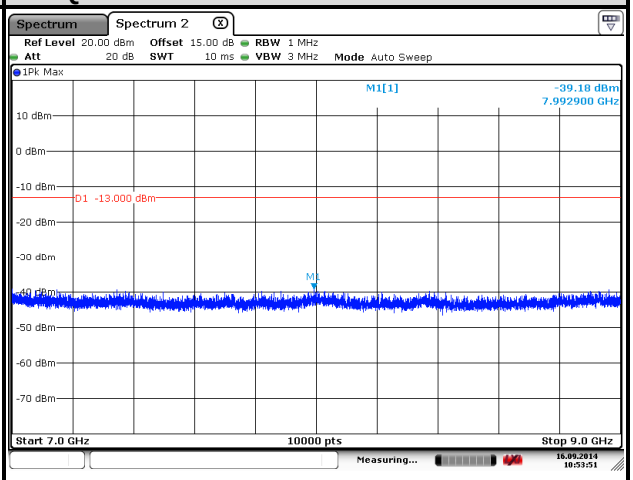
FREQUENCY RANGE : 1GHz~3GHz

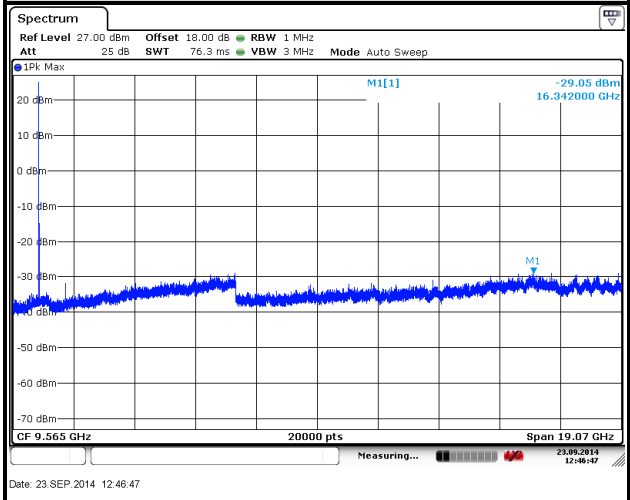
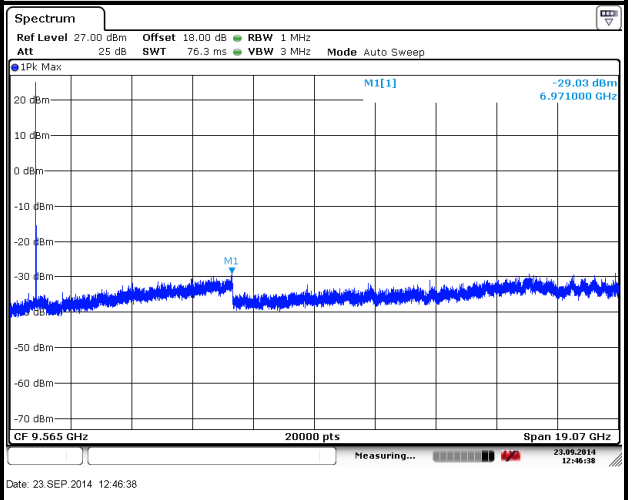
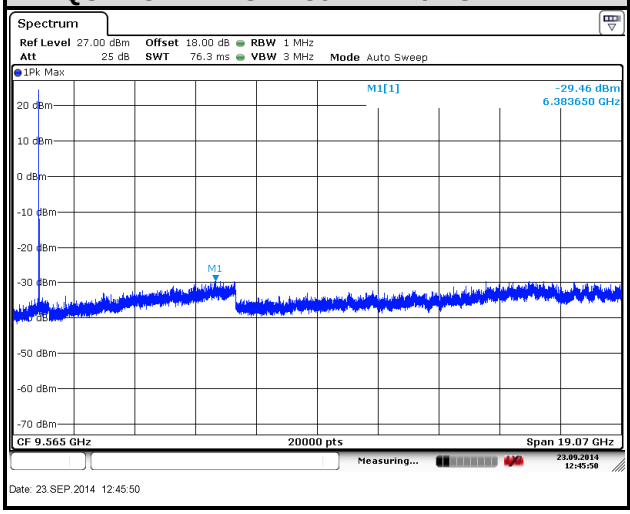
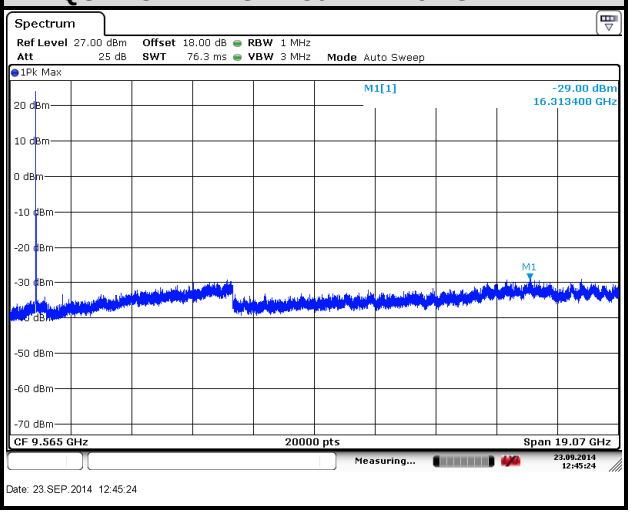


FREQUENCY RANGE : 3GHz~7GHz



FREQUENCY RANGE : 7GHz~9GHz



LTE Band 5 (Channel Bandwidth: 1.4MHz)	LTE Band 5 (Channel Bandwidth: 3MHz)
CHANNEL 20525	CHANNEL 20525
FREQUENCY RANGE : 30MHz~19.1GHz	FREQUENCY RANGE : 30MHz~19.1GHz
	
LTE Band 5 (Channel Bandwidth: 5MHz)	LTE Band 5 (Channel Bandwidth: 10MHz)
CHANNEL 20525	CHANNEL 20525
FREQUENCY RANGE : 30MHz~19.1GHz	FREQUENCY RANGE : 30MHz~19.1GHz
	

4.6 RADIATED EMISSION MEASUREMENT

4.6.1 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.

4.6.2 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.

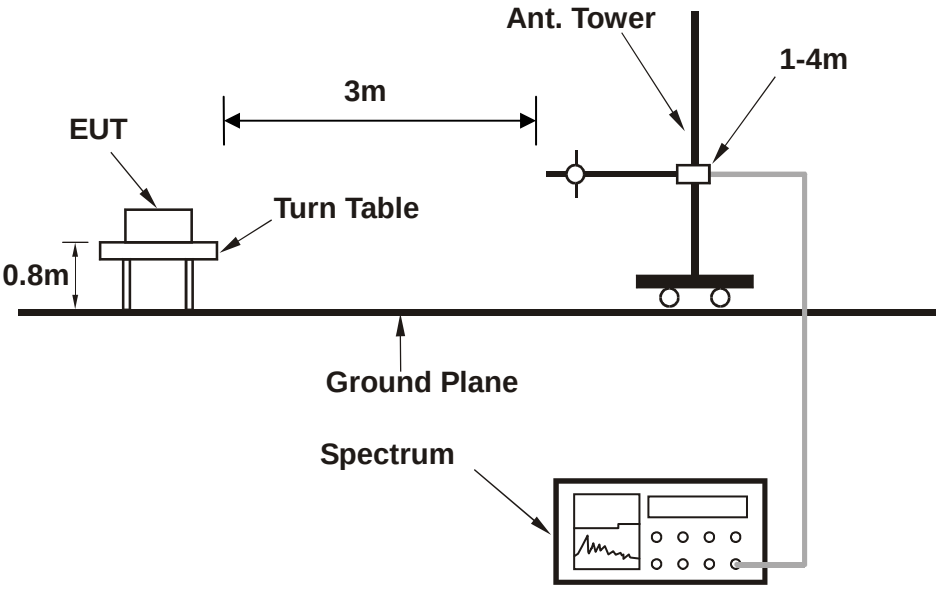
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

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

4.6.3 DEVIATION FROM TEST STANDARD

No deviation

4.6.4 TEST SETUP



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

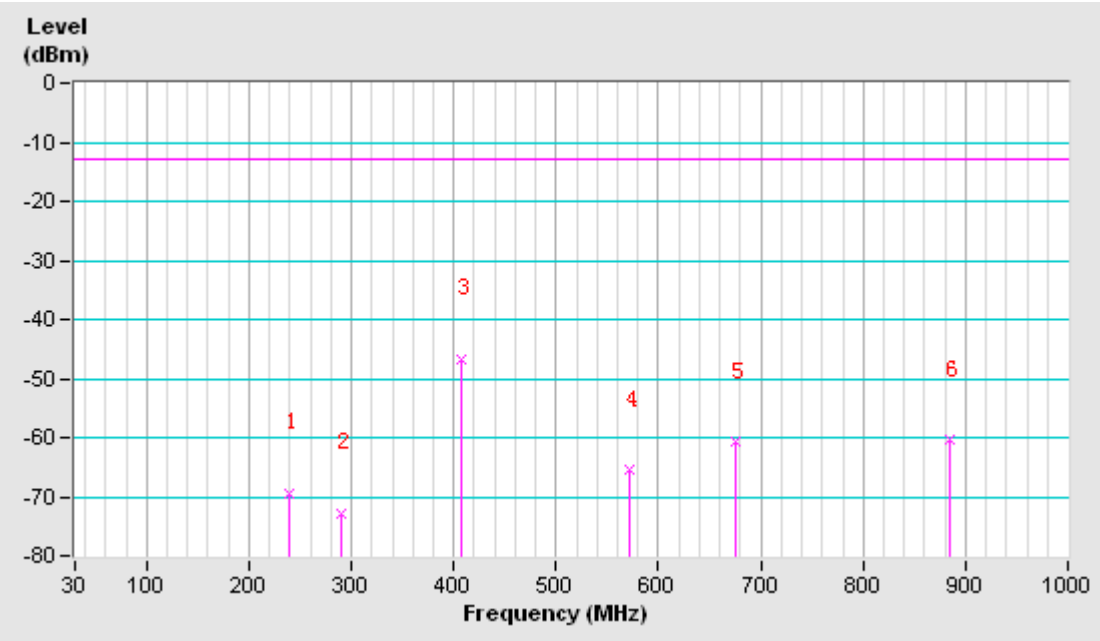
4.6.5 TEST RESULTS

BELOW 1GHz WORST-CASE DATA：LTE BAND 5

SPURIOUS EMISSION FREQUENCY RANGE	Below 1000MHz	OPERATING CHANNEL	Channel 20525

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
238.6	H	-69.57	-13	-56.57
290.3	H	-72.86	-13	-59.86
406.7	H	-46.66	-13	-33.66
571.6	H	-65.59	-13	-52.59
675.0	H	-60.81	-13	-47.81
885.2	H	-60.46	-13	-47.46

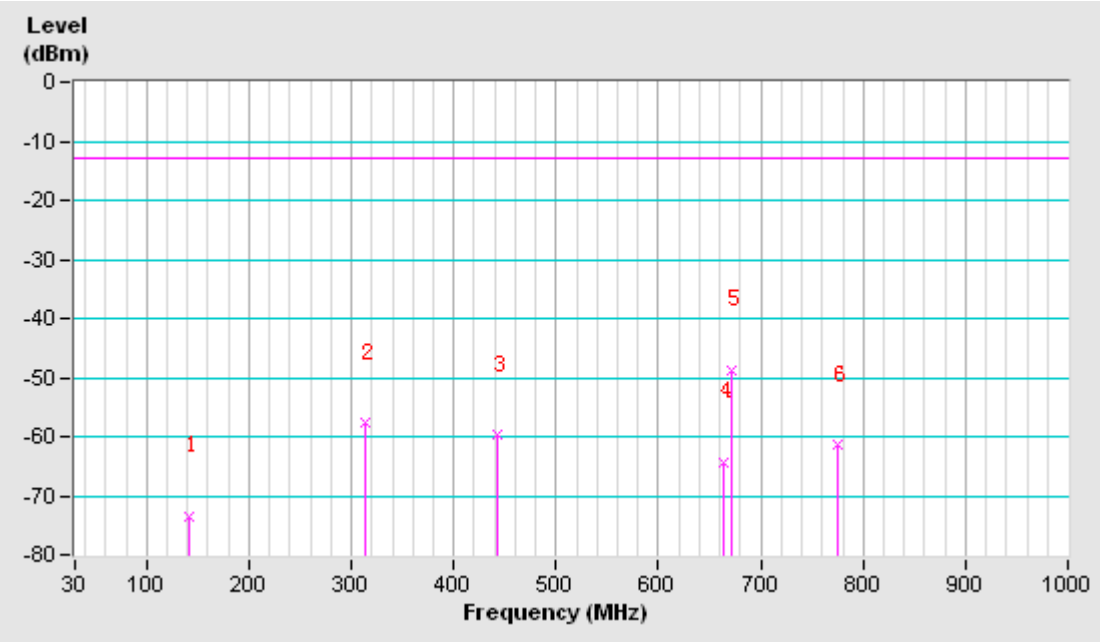
REMARKS: Margin value = Emission level – Limit value.



SPURIOUS EMISSION FREQUENCY RANGE	Below 1000MHz	OPERATING CHANNEL	Channel 20525

SPURIOUS EMISSION LEVEL				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
141.6	V	-73.51	-13	-60.51
312.9	V	-57.73	-13	-44.73
442.2	V	-59.79	-13	-46.79
663.7	V	-64.27	-13	-51.27
671.8	V	-48.77	-13	-35.77
775.3	V	-61.48	-13	-48.48

REMARKS: Margin value = Emission level – Limit value.



ABOVE 1GHz DATA

GSM:

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	SPA READING (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1672	-62.85	-13	-56.34	0.11	-56.23	-43.23
2	2509	-61.54	-13	-51.42	-0.06	-51.48	-38.48
3	3345	-61.25	-13	-49.64	0.69	-48.95	-35.95
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	SPA READING (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1672	-61.32	-13	-50.37	0.11	-50.26	-37.26
2	2509	-61.24	-13	-49.44	-0.06	-49.50	-36.50
3	3345	-61.35	-13	-48.94	0.69	-48.25	-35.25

REMARKS:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB) - 2.15 (dB)

EDGE:

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1672	-61.22	-13	-54.69	0.11	-54.58	-41.58
2	2509	-62.27	-13	-52.16	-0.06	-52.22	-39.22
3	3345	-61.52	-13	-49.91	0.69	-49.22	-36.22
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Emission Level (dBuV)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1672	-60.25	-13	-49.30	0.11	-49.19	-36.19
2	2509	-62.32	-13	-50.54	-0.06	-50.60	-37.60
3	3345	-61.44	-13	-49.03	0.69	-48.34	-35.34

REMARKS:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB) - 2.15 (dB)

WCDMA:

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	**Freq. (MHz)**	**SPA READING (dBm)**	**Limit (dBm)**	**S.G Power Value (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**Margin (dB)**
1	1672	-57.24	-13	-50.68	0.11	-50.57	-37.57
2	2509	-59.93	-13	-49.81	-0.06	-49.87	-36.87
3	3345	-58.59	-13	-46.97	0.69	-46.28	-33.28
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	**Freq. (MHz)**	**SPA READING (dBm)**	**Limit (dBm)**	**S.G Power Value (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**Margin (dB)**
1	1672	-62.81	-13	-51.86	0.11	-51.75	-38.75
2	2509	-61.29	-13	-49.49	-0.06	-49.55	-36.55
3	**3345**	**-58.98**	**-13**	**-46.56**	**0.69**	**-45.87**	**-32.87**

REMARKS:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB) - 2.15 (dB)

LTE BAND 5

CHANNEL BANDWIDTH: 1.4MHz / QPSK

MODE	TX channel 20525	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH	**INPUT POWER**	DC 5V from adapter
TESTED BY	Blue Zheng		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	**Freq. (MHz)**	**Reading (dBm)**	**Limit (dBm)**	**S.G Power Value (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**Margin (dB)**
1	1672	-69.46	-13	-63.00	0.11	-62.89	-49.89
2	2509	-68.32	-13	-58.23	-0.06	-58.29	-45.29
3	3345	-67.04	-13	-55.46	0.69	-54.77	-41.77
4	4182	-65.76	-13	-51.91	0.12	-51.79	-38.79
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	**Freq. (MHz)**	**Reading (dBm)**	**Limit (dBm)**	**S.G Power Value (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**Margin (dB)**
1	1672	-68.46	-13	-57.51	0.11	-57.40	-44.40
2	2509	-68.25	-13	-56.58	-0.06	-56.64	-43.64
3	3345	-68.17	-13	-55.80	0.69	-55.11	-42.11
4	4182	-67.16	-13	-50.05	0.12	-49.93	-36.93

REMARKS:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB) - 2.15 (dB)

CHANNEL BANDWIDTH: 3MHz / QPSK

MODE	TX channel 20525	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Blue Zheng		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1672	-68.59	-13	-62.12	0.11	-62.01	-49.01
2	2509	-68.76	-13	-58.67	-0.06	-58.73	-45.73
3	3345	-67.34	-13	-55.76	0.69	-55.07	-42.07
4	4182	-66.94	-13	-53.10	0.12	-52.98	-39.98
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1672	-67.34	-13	-56.39	0.11	-56.28	-43.28
2	2509	-66.53	-13	-54.82	-0.06	-54.88	-41.88
3	3345	-68.46	-13	-56.09	0.69	-55.40	-42.40
4	4182	-68.16	-13	-51.05	0.12	-50.93	-37.93

REMARKS:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB) - 2.15 (dB)

CHANNEL BANDWIDTH: 5MHz / QPSK

MODE	TX channel 20525	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Blue Zheng		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1672	-68.25	-13	-61.78	0.11	-61.67	-48.67
2	2509	-68.32	-13	-58.23	-0.06	-58.29	-45.29
3	3345	-67.22	-13	-55.64	0.69	-54.95	-41.95
4	4182	-65.39	-13	-51.54	0.12	-51.42	-38.42
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1672	-67.68	-13	-56.73	0.11	-56.62	-43.62
2	2509	-66.42	-13	-54.71	-0.06	-54.77	-41.77
3	3345	-68.49	-13	-56.12	0.69	-55.43	-42.43
4	4182	-68.99	-13	-51.88	0.12	-51.76	-38.76

REMARKS:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB) - 2.15 (dB)

CHANNEL BANDWIDTH: 10MHz / QPSK

MODE	TX channel 20525	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	24deg. C, 60%RH	INPUT POWER	DC 5V from adapter
TESTED BY	Blue Zheng		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1672	-70.36	-13	-63.91	0.11	-63.80	-50.80
2	2509	-69.85	-13	-59.77	-0.06	-59.83	-46.83
3	3345	-66.98	-13	-55.40	0.69	-54.71	-41.71
4	4182	-65.75	-13	-51.90	0.12	-51.78	-38.78
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M							
No.	Freq. (MHz)	Reading (dBm)	Limit (dBm)	S.G Power Value (dBm)	Correction Factor (dB)	ERP (dBm)	Margin (dB)
1	1672	-69.87	-13	-58.92	0.11	-58.81	-45.81
2	2509	-67.25	-13	-55.56	-0.06	-55.62	-42.62
3	3345	-68.49	-13	-56.12	0.69	-55.43	-42.43
4	4182	-68.44	-13	-51.33	0.12	-51.21	-38.21

REMARKS:

1. ERP (dBm) = S.G Value (dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Substitution Antenna Gain (dB) + Cable Loss (dB) - 2.15 (dB)

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch, were founded in 2002 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 are made to the EUT by the lab during the test.

---END---