Microtest
微测检测

Test Report

FCC ID: 2AP26LITE

Date of issue: June 11, 2018

Report Number:	MTi180611E042
Sample Description:	Intelligent Vehicle Terminal
Model(s):	GID LITE+
Applicant:	Jiangsu Digital DiNA Technology Co., LTD
Address:	No.40, Gongjianfang, Qinhuai District, Nanjing, Jiangsu Province
Date of Test:	June 04, 2018 to June 11, 2018

Shenzhen Microtest Co., Ltd.
http://www.mtitest.com

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Test Result Certification

Applicant's name:	Jiangsu Digital DiNA Technology Co., LTD
Address:	No.40, Gongjianfang, Qinhuai District, Nanjing, Jiangsu Province
Manufacture's Name:	Jiangsu Digital DiNA Technology Co., LTD
Address:	No.40, Gongjianfang, Qinhuai District, Nanjing, Jiangsu Province
Product name:	Intelligent Vehicle Terminal
Trademark:	DashPal
Model name:	GID LITE+
Standards:	FCC Part 22 Subpart H FCC Part 24 Subpart E
Test Procedure:	FCC Part 2 ANSI TIA-603-D: 2010 KDB 971168 D01 v02r02

This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Tested by:	Leo Su	June 11,2018
Reviewed by:	Blue.Zheng	June 11,2018
Approved by:	Smith Chen	June 11,2018

1 General description

1.1 Feature of equipment under test (EUT)

Product name:	Intelligent Vehicle Terminal
Trade Name	DashPal
Model Name:	GID LITE+
Model Difference	N/A
Frequency range:	GSM 850: TX824.2MHz~848.8MHz,RX869.2MHz~893.8MHz GSM 1900: TX1850.2MHz~1909.8MHzRX1930.2MHz~1989.8MHz
Modulation type:	GSM 850/1900:GMSK for GPRS
Power Class	GSM 850: 5 / GPRS 850:3 / EGPRS 850: E2
Multislot Class	GPRS: 12
Antenna Type	FPCB Antenna
Antenna Gain	Gain: 0.32dBi
Hardware Version	LITE_MAIN 17.01.19 V3.81
Software Version	V1.0
Power Supply:	DC 3.7V from battery or DC14V from DC power supply
Battery:	DC 3.7V/140mAh
Adapter information:	N/A

1.2 Test frequency channel

Frequency Band	Frequency	Channel	Frequency(MHz)
GSM 850	Low	128	824.2
	Middle	190	836.6
	High	251	848.8
GSM 1900	Low	512	1850.2
	Middle	661	1880
	High	810	1909.8

1.3 EUT operation mode

During testing, RF test program provided by the manufacture to control the Tx operation followed the test requirement. The EUT is configured to transmit continuously (duty cycle > 98 %) at the maximum power control level.

1.4 Test conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 20ºC~30ºC
- Humidity: 30%~70%
- Atmospheric pressure: 98kPa~101kPa

1.5 Testing site

Test Site	Shenzhen Microtest Co., Ltd.
Test Site Location	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.:	448573

1.6 Ancillary equipment list

Equipment	Model	S/N	Manufacturer	Certificate type
DC power supply	QJ3020E	015170	QJE	/

1.7 Measurement uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, U=2xUc(y)

RF frequency	1 x 10-7
RF power, conducted	± 1 dB
Conducted emission(150kHz~30MHz)	± 2.5 dB
Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	±1 degree
Humidity	± 5 %

2 Summary of Test Result

Item	FCC Part No.	Description of Test	Result
1	2.1046, 22.913(a); 24.232(c)	Maximum output power	Pass
2	2.1046, 22.913(a); 24.232(c)	Peak to average power radio(PAPR)	Pass
3	2.1046, 22.913(a); 24.232(c)	Transmitter Radiated Power (EIRP/ERP)	Pass
4	2.1049; 22.917(b); 24.238(b)	Occupied Bandwidth	Pass
5	2.1051; 22.917(a); 24.238(a)	Conducted spurious emissions	Pass
6	2.1051; 22.917(b); 24.238(b)	Spurious emissions at band edge	Pass
7	2.1053; 22.917(a); 24.238(a)	Radiated spurious emissions	Pass
8	2.1055; 22.355; 24.235	Frequency Stability	Pass

3 Test facilities and accreditations

3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd
Location	No.102A & 302A, East Block, Hengfang Industrial Park, Xingye Road, Xixiang, Bao'an District, Shenzhen, Guangdong, China
FCC Registration No.:	FCC Registration No.: 448573

3.2 Environmental conditions

Temperature:	20ºC~30ºC
Humidity	30%~70%
Atmospheric pressure	98kPa~101kPa

3.3 Measurement uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, U=2xUc(y)

RF frequency	1 x 10-7
RF power, conducted	± 1 dB
Conducted emission(150kHz~30MHz)	± 2.5 dB
Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	±1 degree
Humidity	± 5 %

3.4 Test software

Software Name	Manufacturer	Model	Version
RF Test System	Farad	LZ-RF	Lz_Rf 3A3

4 List of test equipment

Equipment No.	Equipment Name	Manufacturer	Model	Serial No.	Calibration date	Due date
MTI-E001	Spectrum Analyzer	Agilent	E4407B	MY41441082	2017/09/18	2018/09/17
MTI-E002	CMU 200 universal radio communication tester	Rohde&schwarz	CMU 200	114587	2017/09/18	2018/09/17
MTI-E004	EMI Test Receiver	Rohde&schwarz	ESPI	1000314	2017/09/18	2018/09/17
MTI-E006	Broadband antenna	schwarabeck	VULB9163	872	2017/09/18	2018/09/17
MTI-E007	Horn antenna	schwarabeck	BBHA9120D	1201	2017/09/18	2018/09/17
MTI-E014	amplifier	America	8447D	3113A06150	2017/09/18	2018/09/17
MTI-E015	Conduction Immunity Signal Generator	Schloder	CDG6000	126A1343/2015	2017/09/18	2018/09/17
MTI-E016	Coupled decoupling network	Schloder	CDA M2/M3	A2210332/2015	2017/09/18	2018/09/17
MTI-E032	Comprehensive test instrument	Rohde&schwarz	CMW500	124192	2017/09/13	2018/09/12
MTI-E034	amplifier	Agilent	8449B	3008A02400	2017/08/22	2018/08/21
MTI-E040	Spectrum analyzer	Agilent	N9020A	MY49100060	2017/09/05	2018/09/04
MTI-E041	Signal generator	Agilent	N5182A	MY49060455	2017/09/23	2018/09/22
MTI-E042	Analog signal generator	Agilent	E4421B	GB40051240	2017/09/23	2018/09/22
MTI-E043	Power probe	Dare Instruments	RPR3006W	16I00054SNO16	2017/09/29	2018/09/28
MTI-E047	10dB attenuator	Mini-Circuits	UNAT-10+	15542	2017/09/24	2018/09/23
MTI-E049	spectrum analyzer	Rohde&schwarz	FSP-38	100019	2017/09/18	2018/09/17
MTI-E050	PSG Signal generator	Agilent	E8257D	MY46520873	2017/09/24	2018/09/23
MTI-E051	Active Loop Antenna 9kHz - 30MHz	Schwarzbeek	FMZB 1519 B	00044	2017/09/26	2018/09/25
MTI-E052	18-40GHz amplifier	Chengdu step Micro Technology	ZLNA-18-40G-21	1608001	2017/09/18	2018/09/17
MTI-E053	15-40G Antenna	Schwarzbeek	BBHA9170	BBHA9170582	2017/09/18	2018/09/17
MTI-B046	DC power supply	QJE	QJ3020E	015170	2017/09/18	2018/09/17

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

5 Test Result

5.1 Maximum output power and peak to average ratio

5.1.1 Limit

For FCC 22.913: The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

For FCC 24.234: Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

5.1.2 Test method

For Conducted output power:

1.Use a universal radio communication tester, the output power of EUT was measured at the antenna terminal. The path loss was calibrated and entered as an offset into the test equipment.

2. The EUT was configured to transmit on maximum power by the radio communication tester.

3. Measured the peak and average powers.

For EIRP & ERP:

1.In many cases, the RF output power limits for licensed digital transmission devices is specified in terms of effective radiated power (ERP) or equivalent isotropic radiated power (EIRP). Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are determined by adding the transmit antenna gain to the conducted RF output power with the primary difference between the two being that when determining the ERP, the transmit antenna gain is referenced to a dipole antenna (i.e., dBd) whereas when determining the EIRP, the transmit antenna gain is referenced to an isotropic antenna (dBi).

2.The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$ERP/EIRP = P_{Meas} + GT - LC$

where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as P_{Meas}, typically dBW or dBm);

PMeas = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

dBd (ERP)=dBi (EIRP) -2.15 dB

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

5.1.3 Test Result

For Conducted output power:

Output Power for GSM850

Mode	Frequency(MHz)	Maximum Burst average Power
GPRS850 (1 Slot)	824.2	32.24
	836.6	32.16
	848.8	32.15
GPRS850 (2 Slot)	824.2	31.53
	836.6	31.49
	848.8	31.56
GPRS850 (3 Slot)	824.2	29.81
	836.6	29.74
	848.8	29.73
GPRS850 (4 Slot)	824.2	28.66
	836.6	28.59
	848.8	28.47

Output Power for PCS1900

Mode	Frequency(MHz)	Maximum conducted Power
GPRS1900 (1 Slot)	1850.2	30.35
	1880	30.26
	1909.8	30.14
GPRS1900 (2 Slot)	1850.2	29.49
	1880	29.42
	1909.8	29.19
GPRS1900 (3 Slot)	1850.2	27.74
	1880	27.63
	1909.8	27.35
GPRS1900 (4 Slot)	1850.2	26.81
	1880	26.80
	1909.8	26.74

For EIRP & ERP:

For GSM 850

Frequency	Polarization	SG Level	Pcl	Ga Antenna Gain	Correction	ERP	ERP
(MHz)		(dBm)	(dB)	(dB)	(dB)	(dBm)	(W)
824.2	H	23.48	1.33	7.53	2.15	27.53	0.56624
836.6	H	23.52	1.4	7.48	2.15	27.45	0.55590
848.8	H	23.94	1.39	7.57	2.15	27.97	0.62661
824.2	V	23.69	1.33	7.53	2.15	27.74	0.59429
836.6	V	23.62	1.4	7.48	2.15	27.55	0.56885
848.8	V	23.81	1.39	7.57	2.15	27.84	0.60814

For GSM 1900

Frequency	Polarization	SG Level	Pcl	Ga Antenna Gain	EIRP	EIRP
(MHz)		(dBm)	(dB)	(dB)	(dBm)	(W)
1850.2	H	17.76	2.33	10.05	25.48	0.35318
1880	H	17.14	2.37	10.24	25.01	0.31696
1909.8	H	17.68	2.39	10.32	25.61	0.36392
1850.2	V	17.69	2.33	10.05	25.41	0.34754
1880	V	17.72	2.37	10.24	25.59	0.36224
1909.8	V	17.69	2.39	10.32	25.62	0.36475

5.2 Peak to average power ratio(PAPR)

5.2.1 Limit

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

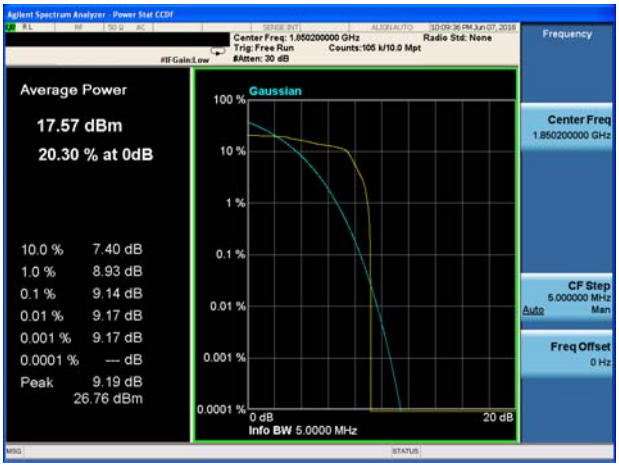
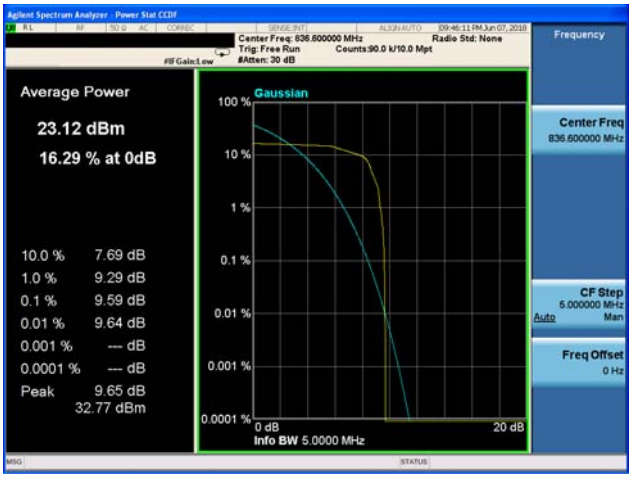
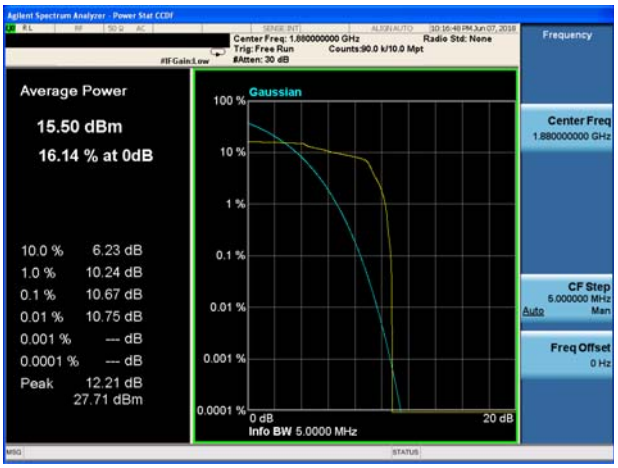
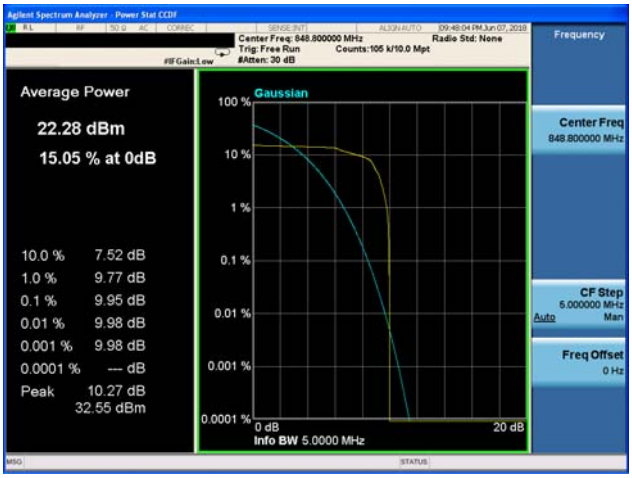
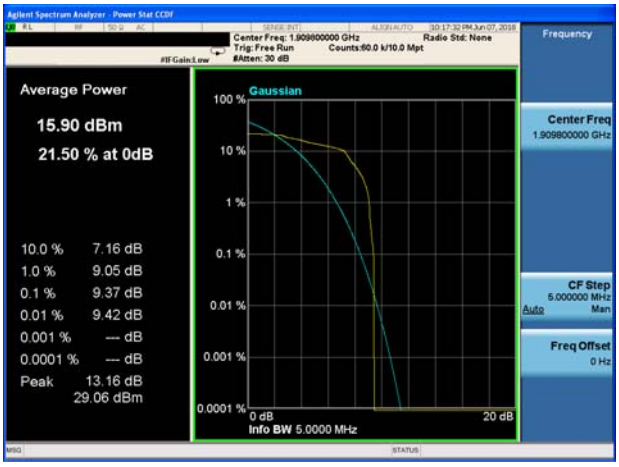
5.2.2 Test method

The EUT was connected to Spectrum Analyzer and Base Station via power divider.
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
Set the number of counts to a value that stabilizes the measured CCDF curve.
Set the measurement interval to 1 ms.
Record the maximum PAPR level associated with a probability of 0.1%.
a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
c) Set the number of counts to a value that stabilizes the measured CCDF curve;
d) Set the measurement interval as follows:
1) for continuous transmissions, set to 1 ms,
2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
e) Record the maximum PAPR level associated with a probability of 0.1%.

5.2.3 Test Result

Cellular Band						
Modes	GPRS850			GPRS1900		
Channel	128 (Low)	190 (Mid)	251 (High)	512 (Low)	661 (Mid)	810 (High)
Frequency(MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
Peak-to-Average Ratio (dB)	8.74	9.51	9.59	8.47	8.49	8.28

Test plot

(GPRS850)	(GPRS1900)
Peak-to-Average Ratio on channel 128	Peak-to-Average Ratio on channel 512
	
Peak-to-Average Ratio on channel 190	Peak-to-Average Ratio on channel 661
	
Peak-to-Average Ratio on channel 251	Peak-to-Average Ratio on channel 810
	

5.3 Occupied bandwidth

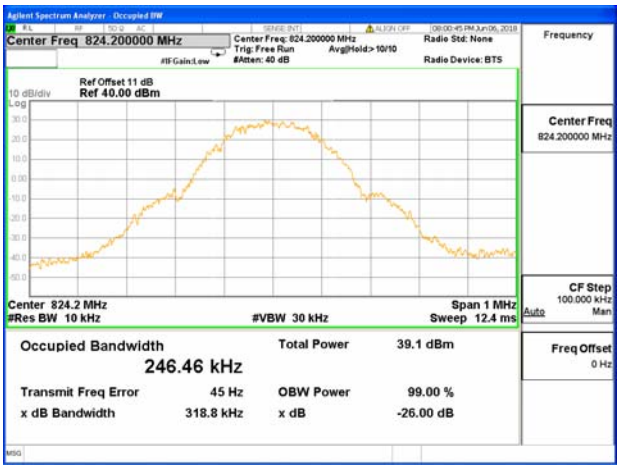
5.3.1 Test method

1. The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
2. The resolution bandwidth of the Spectrum Analyzer is set to at least 1% of the occupied bandwidth.
3. The low, middle and the high channels are selected to perform tests respectively.
4. Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak; make a line whose value is 26dB lower than the peak; mark two points which the line intersected the waveform at; finally record the delta of the two points as the occupied bandwidth and the plot.
5. Set the Spectrum Analyzer Occupied bandwidth function to measure the 99% occupied bandwidth.

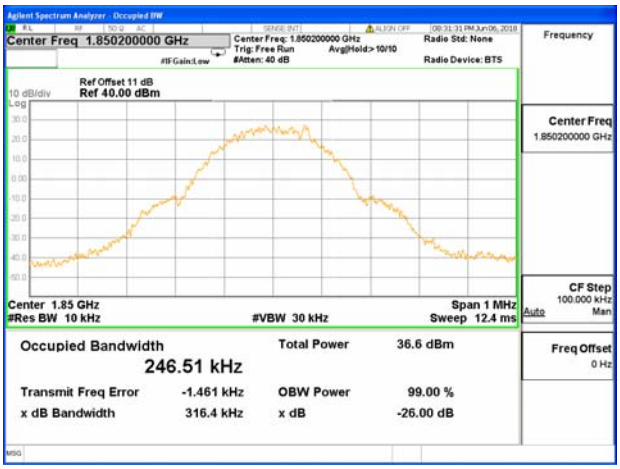
5.3.2 **Test result**

Channel	Channel Frequency (MHz)	26dB emission bandwidth (KHz)	99% occupied bandwidth (KHz)
GSM 850			
128	824.2	318.8	246.46
190	836.6	315.5	247.37
251	848.8	317.7	246.45
GSM 1900			
512	1850.2	316.4	246.51
661	1880	315.5	245.45
810	1909.8	312.2	249.34

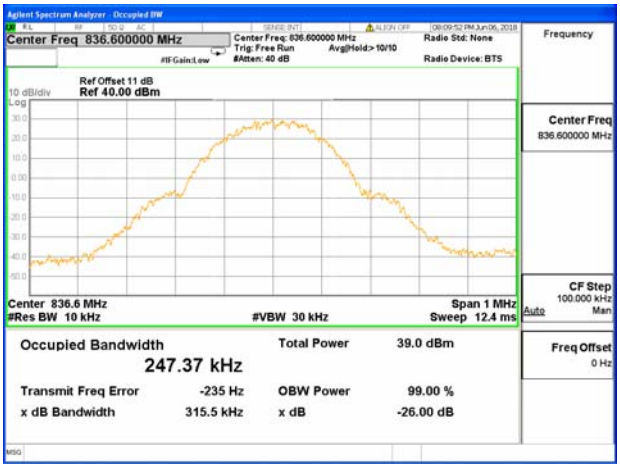
GSM 850 – 824.2MHz



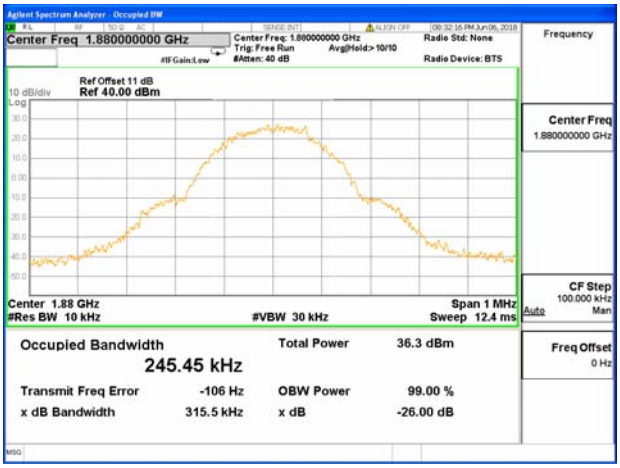
GSM 1900 - 1850MHz



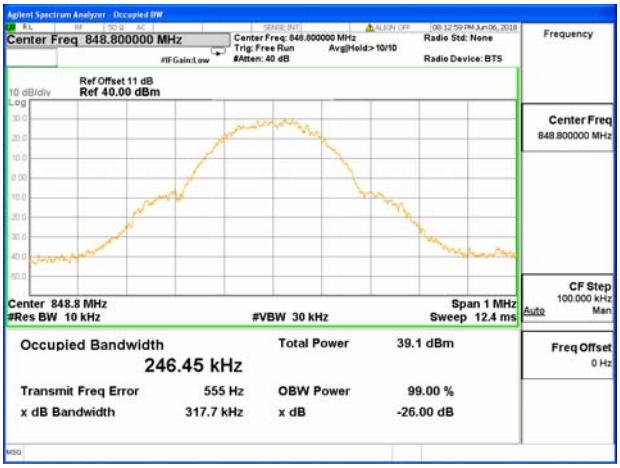
GSM 850 – 836.6MHz



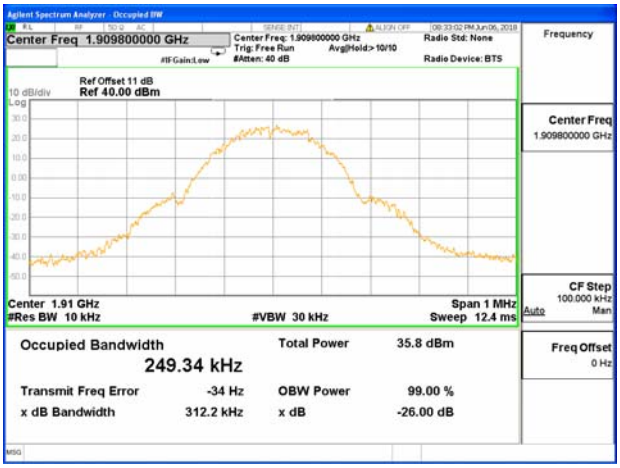
GSM 1900 - 1880MHz



GSM 850 –848.8MHz



GSM 1900 - 1909.8MHz



5.4 Conducted spurious emissions

5.4.1 Limits

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+10log (P) dB

5.4.2 Test method

1, The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.

2, Spectrum Setting:

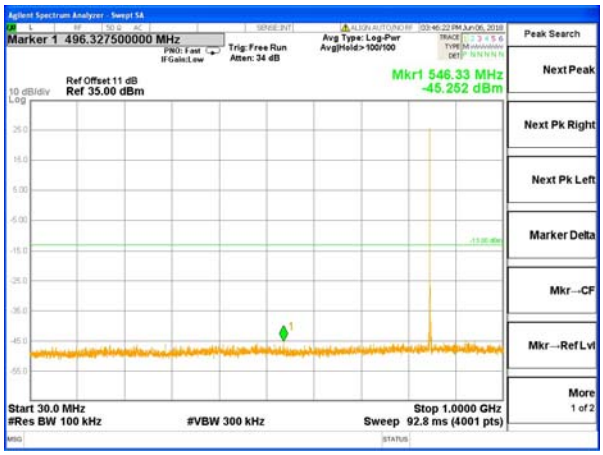
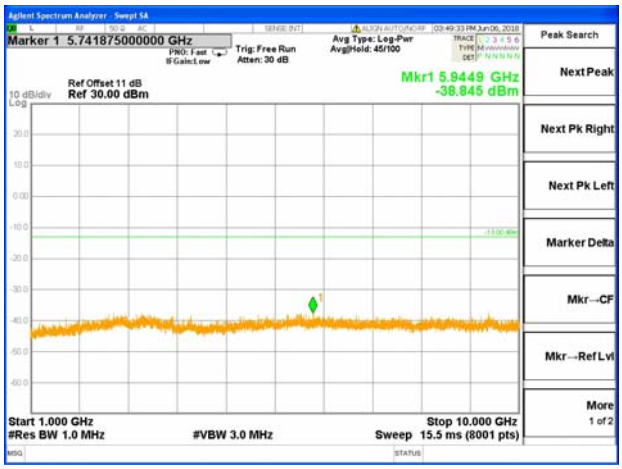
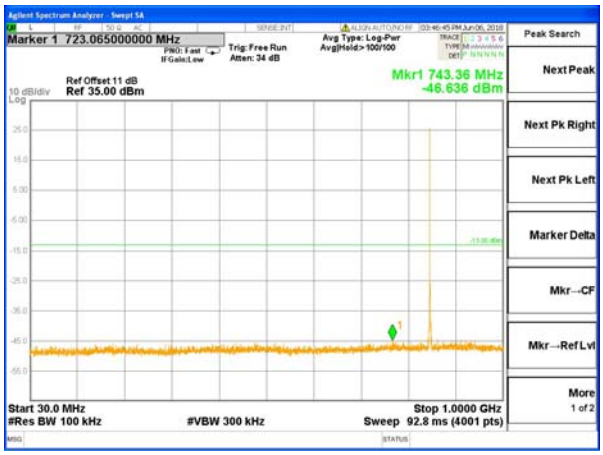
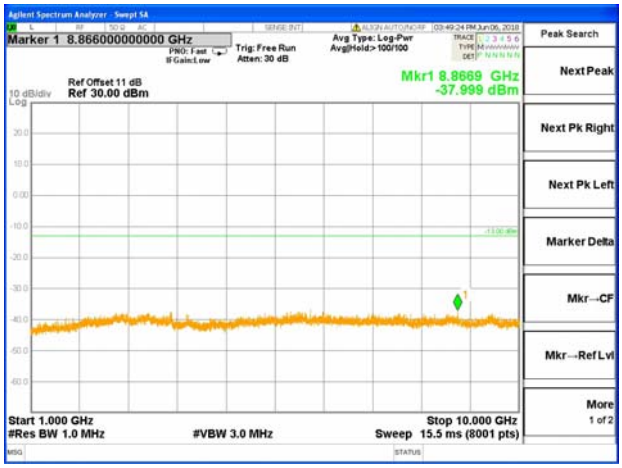
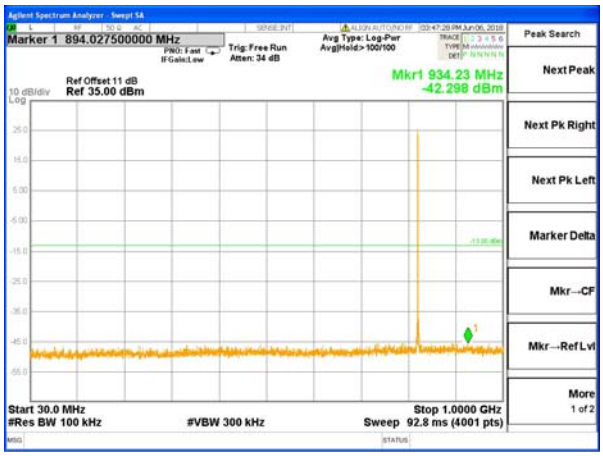
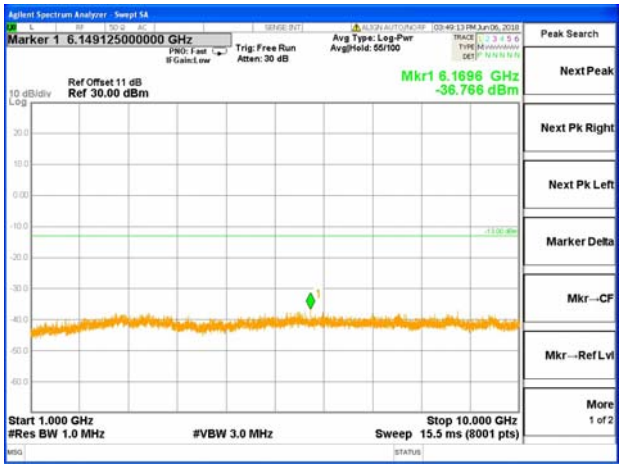
Frequency bellow 1 GHz: RBW=100 kHz, VBW=300 kHz.

Frequency above 1 GHz: RBW=1 MHz, VBW=3 MHz.

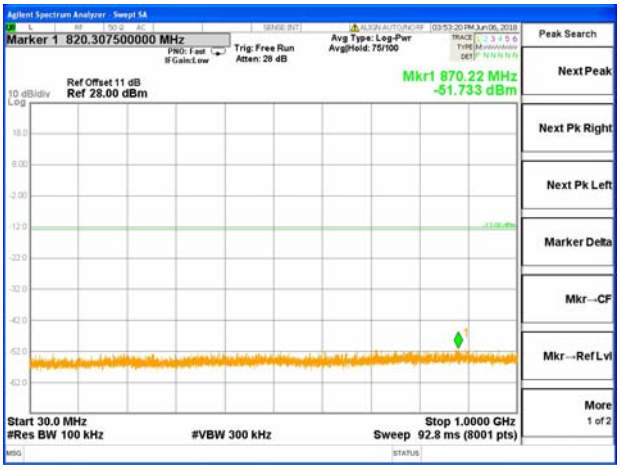
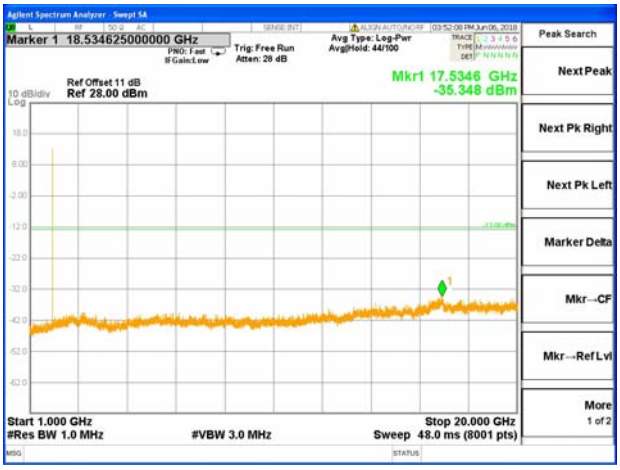
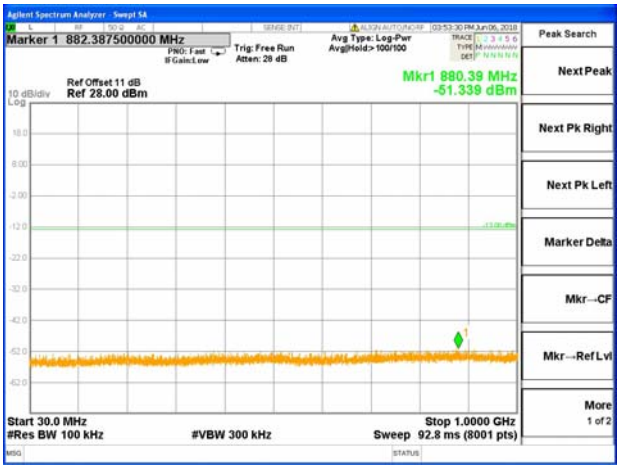
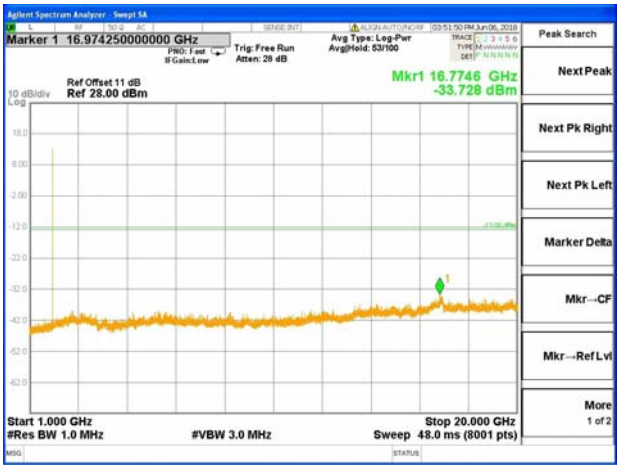
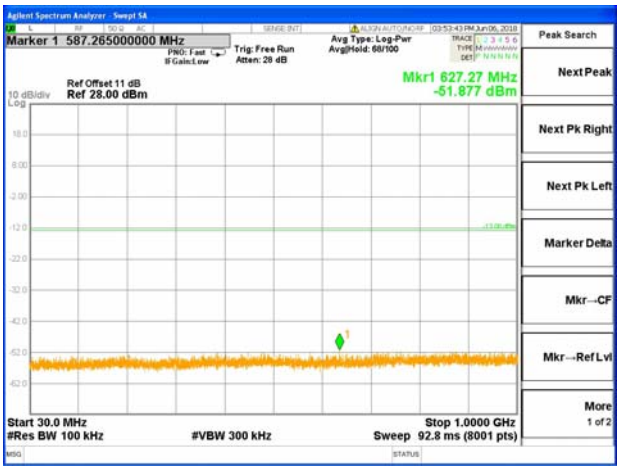
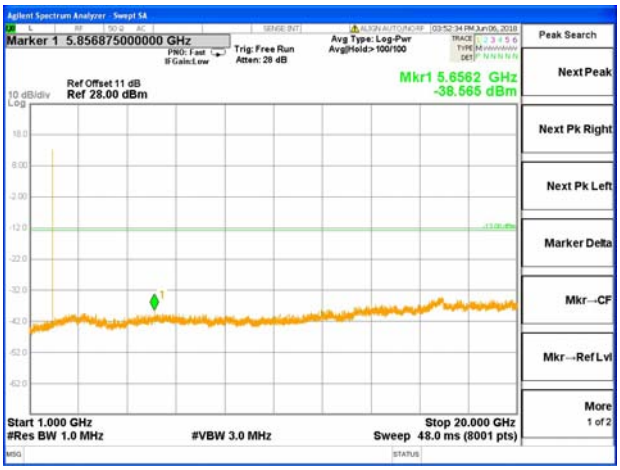
3, The low, middle and high channels of each band and mode's spurious emissions for 30 MHz to 10th Harmonic were measured by Spectrum analyzer.

5.4.3 Test result

GSM 850

Low Channel – 30MHz-1GHz	Low Channel –1GHz - 10GHz
	
Middle Channel–30MHz-1GHz	Middle Channel–1GHz - 10GHz
	
High Channel–30MHz-1GHz	High Channel–1GHz - 10GHz
	

GSM 1900

Low Channel – 30MHz-1GHz	Low Channel –1GHz - 20GHz
	
Middle Channel– 30MHz-1GHz	Middle Channel–1GHz - 20GHz
	
High Channel– 30MHz-1GHz	High Channel–1GHz - 20GHz
	

5.5 Band edge

5.5.1 Limits

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+10log (P) dB, for all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm

5.5.2 Test method

1. The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
2. Spectrum Setting:

For GSM system:

RBW=3 kHz
VBW=10 kHz
Span 1 MHz
Detector: Peak Mode

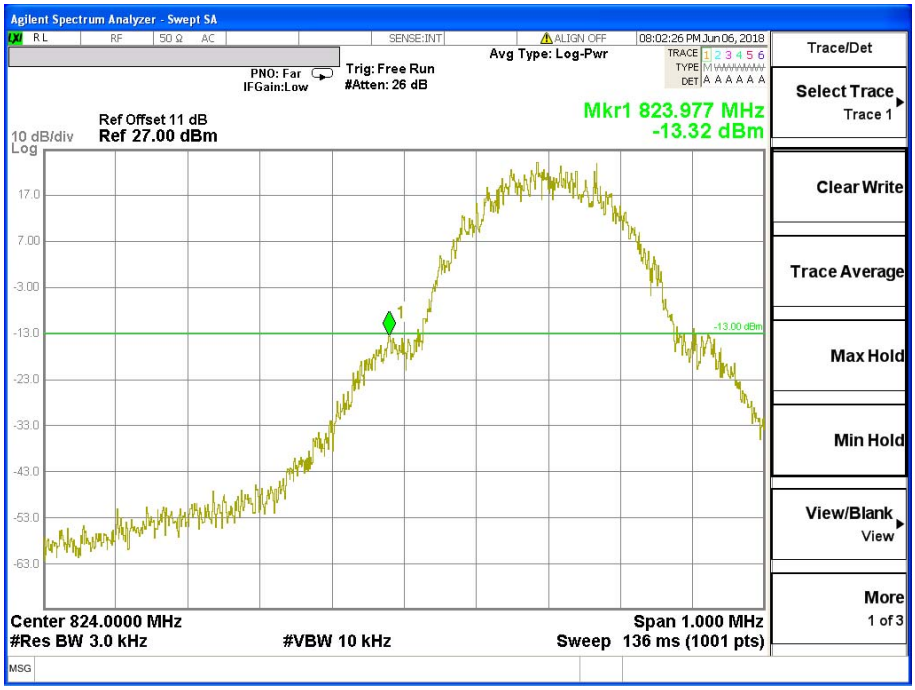
For WCDMA:

RBW=100 kHz
VBW=300 kHz
Span 5 MHz
Detector: Peak Mode

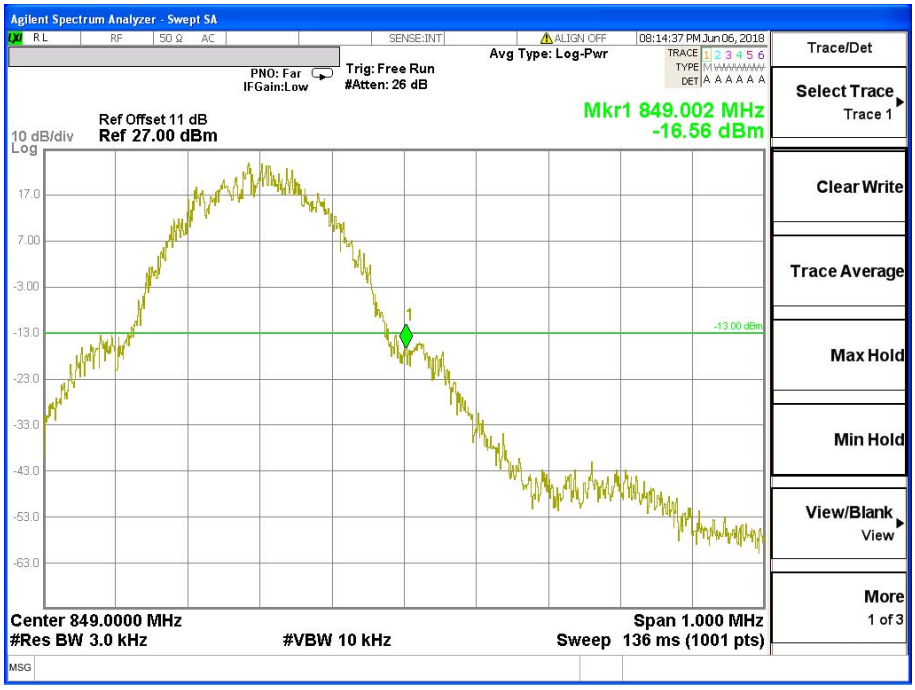
3. The band edges of low and high channels for the highest RF powers were measured.

5.5.3 Test result

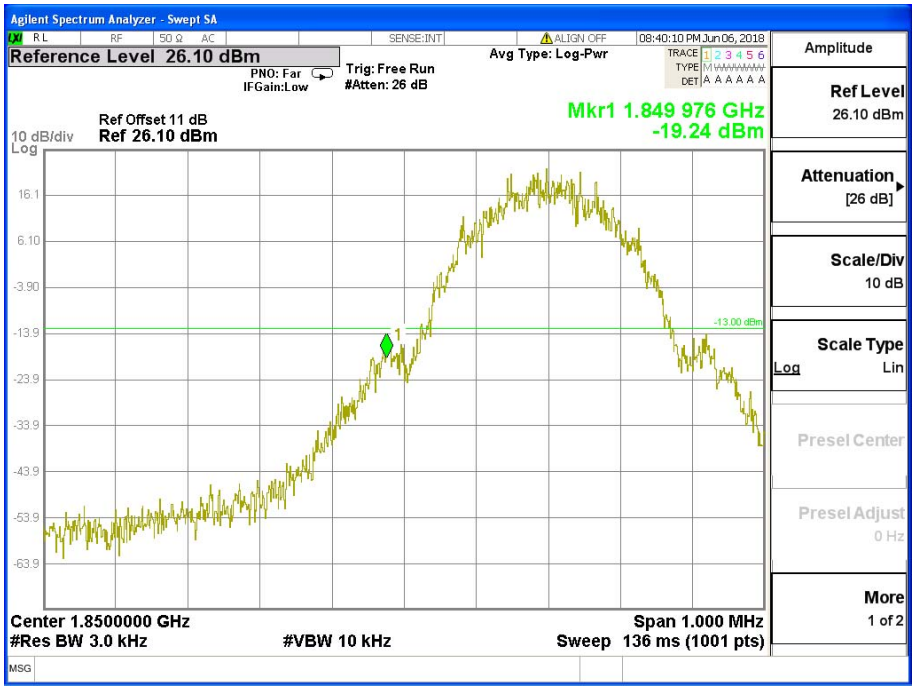
GSM 850 – Left band



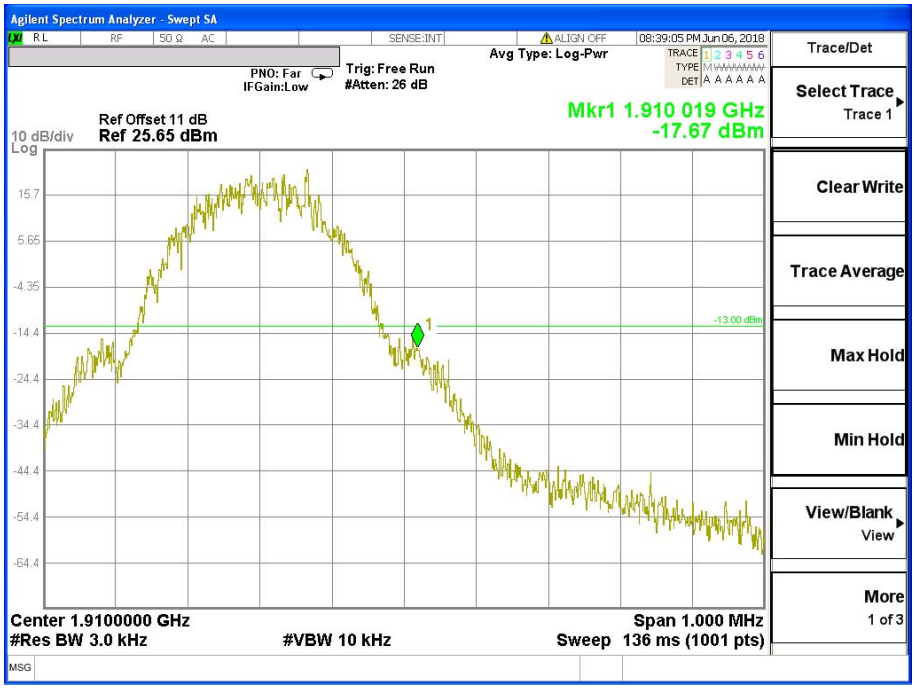
GSM 850 – Right band



GSM 1900 – Left band



GSM 1900 – Right band



5.6 Radiated spurious emission

5.6.1 Limit

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+10log (P) dB

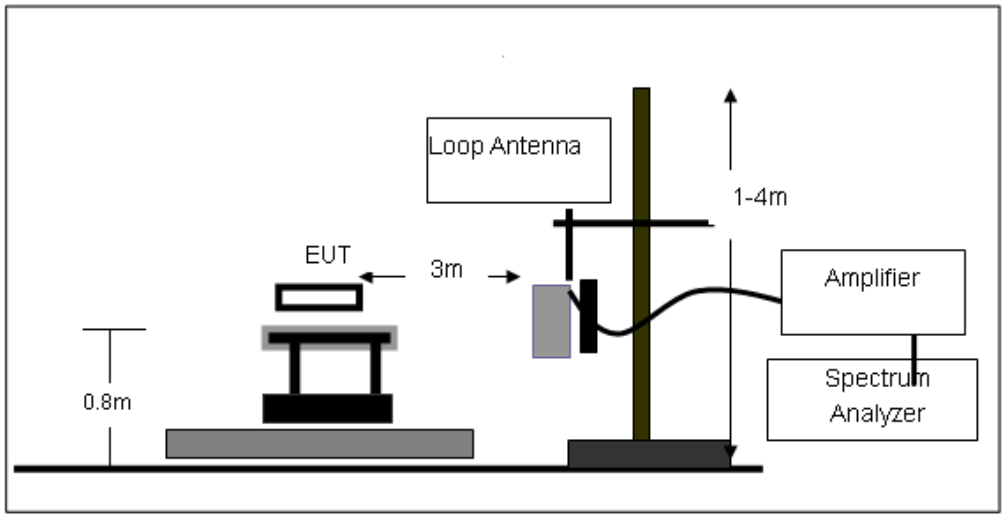
5.6.2 Test method

1. The test system setup as show in the block diagram above.
2. The EUT was placed on an non-conductive rotating platform in an anechoic chamber. The radiated spurious emissions from 30MHz to 10th harmonious of fundamental frequency were measured at 3 m with a test antenna and a spectrum analyzer with RBW=1 MHz, VBW=1 MHz, peak detector settings.
3. During the measurement, the EUT was enforced in maximum power and linked with a base station. All the spurious emissions at 3m were measured by rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
4. When found the maximum level of emissions from the EUT. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

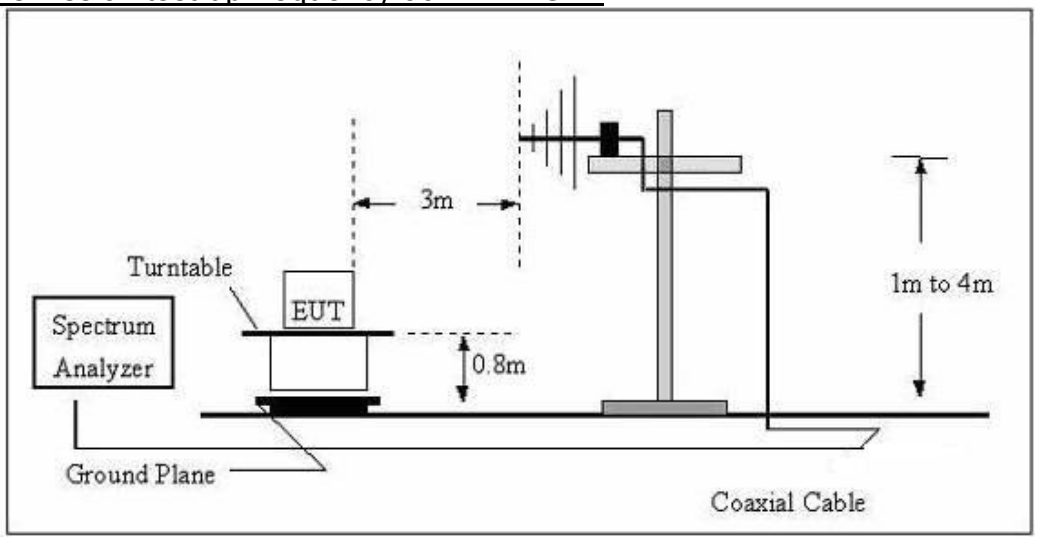
Spurious emissions in dB=10 log(TX power in Watts/0.001)-the absolute level
Spurious attenuation limit in dB=43+10 log(power out in Watts).

5.6.3 Test setup

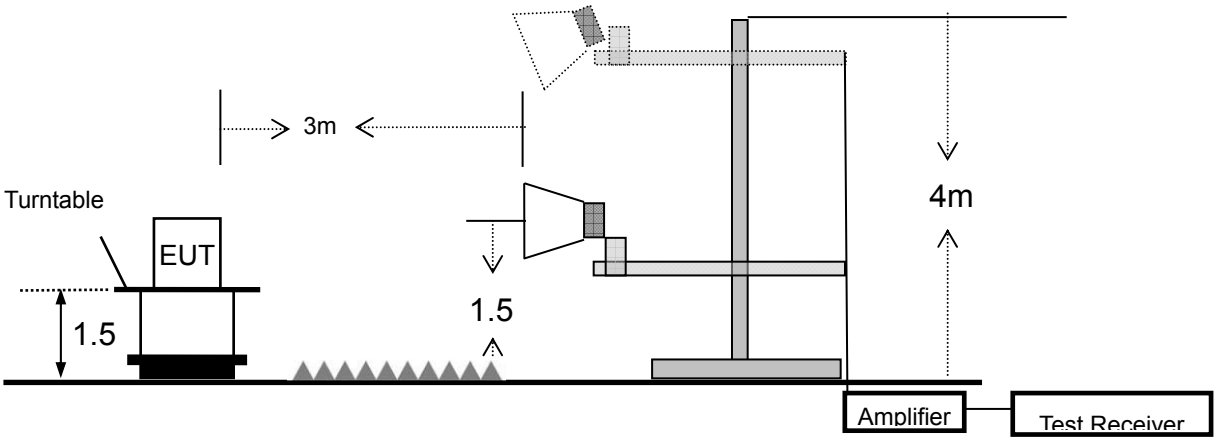
Radiated emission test-up frequency below 30MHz



Radiated emission test-up frequency 30MHz~1GHz



Radiated emission test-up frequency above 1GHz



5.6.4 Test Result

Note: All the configuration was tested and only the worse case was reported

For GSM850(30MHz – 9GHz)

Low Channel

No.	Frequency (MHz)	Meter Reading (dBuV)	Factor dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Polar (H)
1	76.1616	-68.14	20.34	-47.80	-13	-34.80	Horizontal
2	116.0968	-68.00	22.89	-45.11	-13	-32.11	Horizontal
3	260.8535	-68.96	24.8	-44.16	-13	-31.16	Horizontal
4	4175.160	-50.26	8.56	-41.70	-13	-28.70	Horizontal
5	5817.566	-52.04	4.55	-47.49	-13	-34.49	Horizontal
6	72167.138	-51.67	10.08	-41.59	-13	-28.59	Horizontal

No.	Frequency (MHz)	Meter Reading (dBuV)	Factor dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Polar (V)
1	74.0493	-69.50	22.04	-47.46	-13	-34.46	Vertical
2	221.3898	-68.94	24.5	-44.44	-13	-31.44	Vertical
3	358.0759	-68.91	27.9	-41.01	-13	-28.01	Vertical
4	6014.282	-48.96	3.3	-45.66	-13	-32.66	Vertical
5	7494.831	-49.45	8.71	-40.74	-13	-27.74	Vertical
6	8017.428	-49.98	9.93	-40.05	-13	-27.05	Vertical

Middle Channel

No.	Frequency (MHz)	Meter Reading (dBuV)	Factor dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Polar (H)
1	145.4627	-69.98	19.85	-50.13	-13	-37.13	Horizontal
2	222.7346	-69.45	23.83	-45.62	-13	-32.62	Horizontal
3	249.1505	-66.44	24.71	-41.73	-13	-28.73	Horizontal
4	6069.633	-50.24	5.4	-44.84	-13	-31.84	Horizontal
5	7422.626	-50.21	10.16	-40.05	-13	-27.05	Horizontal
6	8793.253	-51.72	10.05	-41.67	-13	-28.67	Horizontal

No.	Frequency (MHz)	Meter Reading (dBuV)	Factor dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Polar (V)
1	137.9576	-71.32	21.36	-49.96	-13	-36.96	Vertical
2	194.0193	-72.17	24.05	-48.12	-13	-35.12	Vertical
3	277.0258	-72.13	26.34	-45.79	-13	-32.79	Vertical
4	6429.656	-48.68	5.36	-43.32	-13	-30.32	Vertical
5	7403.501	-48.76	8.51	-40.25	-13	-27.25	Vertical
6	8106.285	-48.61	9.79	-38.82	-13	-25.82	Vertical

Hihg Channel

No.	Frequency (MHz)	Meter Reading (dBuV)	Factor dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Polar (H)
1	67.7339	-69.83	22.52	-47.31	-13	-34.31	Horizontal
2	136.5856	-70.33	19.76	-50.57	-13	-37.57	Horizontal
3	167.6642	-68.88	20.41	-48.47	-13	-35.47	Horizontal
4	5906.222	-51.45	4.83	-46.62	-13	-33.62	Horizontal
5	6682.572	-50.23	8.01	-42.22	-13	-29.22	Horizontal
6	8162.309	-51.18	11.26	-39.92	-13	-26.92	Horizontal

No.	Frequency (MHz)	Meter Reading (dBuV)	Factor dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Polar (V)
1	179.3074	-74.74	22.81	-51.93	-13	-38.93	Vertical
2	213.8968	-71.08	24.24	-46.84	-13	-33.84	Vertical
3	264.2487	-69.91	24.54	-45.37	-13	-32.37	Vertical
4	6088.197	-48.44	3.66	-44.78	-13	-31.78	Vertical
5	7386.891	-48.46	8.48	-39.98	-13	-26.98	Vertical
6	7836.132	-48.69	9.53	-39.16	-13	-26.16	Vertical

For GSM1900(30MHz – 20GHz)

Low Channel

No.	Frequency (MHz)	Meter Reading (dBuV)	Factor dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Polar (H)
1	128.8337	-65.98	11.76	-54.22	-13	-41.22	Horizontal
2	278.1066	-63.44	16.13	-47.31	-13	-34.31	Horizontal
3	410.8839	-64.53	19.5	-45.03	-13	-32.03	Horizontal
4	12504.024	-63.01	21.6	-41.41	-13	-28.41	Horizontal
5	15179.624	-50.47	4.26	-46.21	-13	-33.21	Horizontal
6	17055.365	-60.07	8.17	-51.90	-13	-38.90	Horizontal

No.	Frequency (MHz)	Meter Reading (dBuV)	Factor dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Polar (V)
1	101.3550	-63.36	14.67	-48.69	-13	-35.69	Vertical
2	149.6548	-64.41	12.37	-52.04	-13	-39.04	Vertical
3	479.5294	-62.31	20.86	-41.45	-13	-28.45	Vertical
4	14955.056	-58.13	16.17	-41.96	-13	-28.96	Vertical
5	16510.869	-59.36	6.49	-52.87	-13	-39.87	Vertical
6	17777.431	-57.14	12.85	-44.29	-13	-31.29	Vertical

Middle Channel

No.	Frequency (MHz)	Meter Reading (dBuV)	Factor dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Polar (H)
1	53.4392	-62.48	16.15	-46.33	-13	-33.33	Horizontal
2	106.5761	-62.18	14.64	-47.54	-13	-34.54	Horizontal
3	122.1255	-64.85	13.91	-50.94	-13	-37.94	Horizontal
4	13623.371	-58.80	16.01	-42.79	-13	-29.79	Horizontal
5	14170.075	-56.84	17.22	-39.62	-13	-26.62	Horizontal
6	14474.212	-56.78	16.66	-40.12	-13	-27.12	Horizontal

No.	Frequency (MHz)	Meter Reading (dBuV)	Factor dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Polar (V)
1	37.3308	-63.87	16.01	-47.86	-13	-34.86	Vertical
2	55.0287	-64.56	16.12	-48.44	-13	-35.44	Vertical
3	117.5564	-64.94	13.62	-51.32	-13	-38.32	Vertical
4	12102.443	-62.06	14.34	-47.72	-13	-34.72	Vertical
5	15002.034	-46.97	4.71	-42.26	-13	-29.26	Vertical
6	17248.286	-60.13	9.63	-50.50	-13	-37.50	Vertical

Hihg Channel

No.	Frequency (MHz)	Meter Reading (dBuV)	Factor dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Polar (H)
1	39.0529	-64.01	15.78	-48.23	-13	-35.23	Horizontal
2	90.2444	-64.11	12.93	-51.18	-13	-38.18	Horizontal
3	136.4074	-62.46	11.28	-51.18	-13	-38.18	Horizontal
4	14970.137	-57.48	16.62	-40.86	-13	-27.86	Horizontal
5	15837.555	-58.72	2.66	-56.06	-13	-43.06	Horizontal
6	16605.905	-58.25	5.41	-52.84	-13	-39.84	Horizontal

No.	Frequency (MHz)	Meter Reading (dBuV)	Factor dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Polar (V)
1	90.7632	-63.28	12.77	-50.51	-13	-37.51	Vertical
2	126.6338	-64.68	13.03	-51.65	-13	-38.65	Vertical
3	211.7785	-65.27	15.3	-49.97	-13	-36.97	Vertical
4	13447.716	-58.98	15.32	-43.66	-13	-30.66	Vertical
5	14234.592	-57.46	17.11	-40.35	-13	-27.35	Vertical
6	14907.246	-58.61	16.21	-42.40	-13	-29.40	Vertical

5.7 Frequency stability

5.7.1 Limit

For FCC part 22.355: the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances 2.5ppm for mobile ≤ 3W condition.

For FCC part 24.235: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.7.2 Test method

Test Procedures for Temperature Variation:

1, The EUT was set up in the thermal chamber and connected with the base station.
2, With power off, the temperature was decreased to -30℃ and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3, With power off, the temperature was raised in 10℃ set up to 50℃ and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
4, measure the carrier frequency error.

Test Procedures for Voltage Variation:

1, The EUT was placed in a temperature chamber at 25±5℃ and connected with the base station.
2, Reduce the primary supply voltage to the battery operating end point.
3, measure the carrier frequency error.

5.7.3 Test Result

Band	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
GSM 850	4.26	15	0.0179
	3.7	18	0.0215
	3.15	16	0.0191

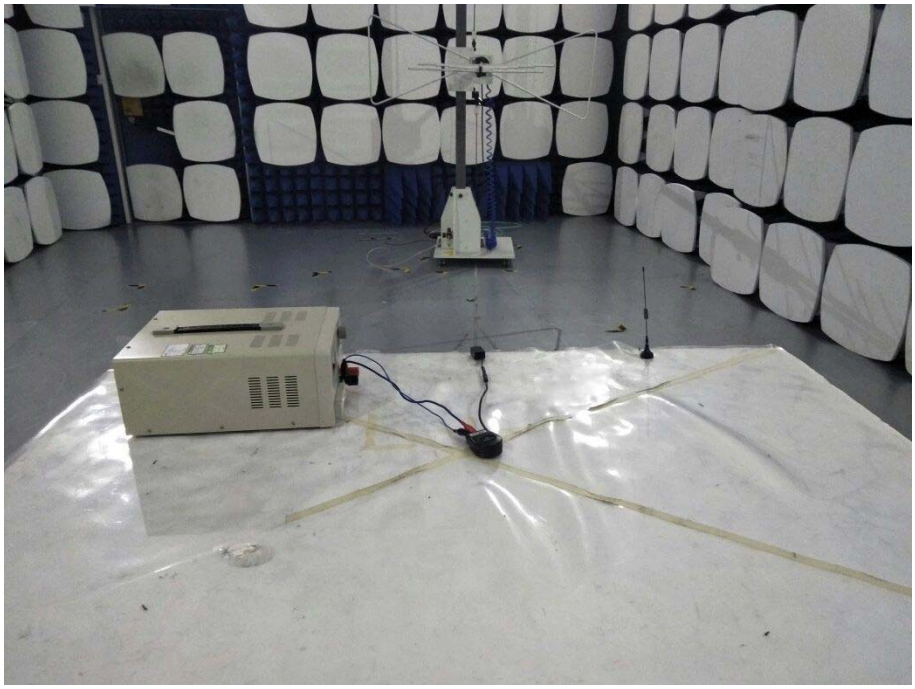
Band	Temperature (℃)	Frequency Error (Hz)	Frequency Error (ppm)
GSM 850	-30	26	0.0311
	-20	18	0.0215
	-10	17	0.0203
	0	21	0.0251
	10	15	0.0179
	20	14	0.0167
	30	12	0.0143
	40	21	0.0251
	50	25	0.0299

Band	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
GSM 1900	4.26	28	0.0149
	3.7	24	0.0128
	3.15	22	0.0117

Band	Temperature (℃)	Frequency Error (Hz)	Frequency Error (ppm)
GSM 1900	-30	27	0.0144
	-20	23	0.0122
	-10	14	0.0074
	0	15	0.0080
	10	17	0.0090
	20	21	0.0112
	30	16	0.0085
	40	14	0.0074
	50	12	0.0064

Note:
1. Normal Voltage = 3.7V; Battery End Point (BEP) = 3.15V; Maximum Voltage =4.26V

Photographs of the Test Setup

Radiated emission


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