

### FCC Report (GSM)

**Applicant:** Wuhan KQ GEO INSTRUMENTS CO., LTD.

**Address of Applicant:** 1401-A1, Hangyu Bld., Wuhan University Sci & Tech Park,  
Wuhan, China

**Manufacturer:** Wuhan KQ GEO INSTRUMENTS CO., LTD.

**Address of Manufacturer:** 1401-A1, Hangyu Bld., Wuhan University Sci & Tech Park,  
Wuhan, China

**Equipment Under Test (EUT)**

Product Name: satellite signals receiver

Model No.: M8

Trade Mark: KQ GEO

**FCC ID:** 2AMQ4-KQGEOM8

**Applicable standards:** FCC CFR Title 47 Part 2: 2016  
FCC CFR Title 47 Part22 Subpart H: 2016  
FCC CFR Title 47 Part24 Subpart E: 2016

**Date of sample receipt:** June 08, 2017

**Date of Test:** June 09-24, 2017

**Date of report issued:** June 26, 2017

**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

A circular blue ink stamp from GTS Global Testing Services Co., Ltd. is visible. The stamp contains the text 'GTS', 'GLOBAL TESTING', and 'UNITED TECHNOLOGY SERVICES CO., LTD.' around the perimeter. A handwritten signature in black ink is written over the stamp.

**Robinson Lo**

**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

Version No.	Date	Description
00	June 26, 2017	Original

**Prepared By:**

*Edward Pan*

**Date:**

*June 26, 2017*

**Project Engineer**

**Check By:**

*Andy Wu*

**Date:**

*June 26, 2017*

**Reviewer**

## 3 Contents

Page

<b>1</b>	<b>COVER PAGE .....</b>	<b>1</b>
<b>2</b>	<b>VERSION .....</b>	<b>2</b>
<b>3</b>	<b>CONTENTS .....</b>	<b>3</b>
<b>4</b>	<b>TEST SUMMARY .....</b>	<b>4</b>
<b>5</b>	<b>GENERAL INFORMATION .....</b>	<b>5</b>
5.1	GENERAL DESCRIPTION OF EUT .....	5
5.2	RELATED SUBMITTAL(S) / GRANT (S) .....	7
5.3	TEST METHODOLOGY.....	7
5.4	TEST FACILITY .....	7
5.5	TEST LOCATION.....	7
<b>6</b>	<b>TEST INSTRUMENTS LIST .....</b>	<b>8</b>
<b>7</b>	<b>SYSTEM TEST CONFIGURATION .....</b>	<b>9</b>
7.1	TEST MODE .....	9
7.2	CONFIGURATION OF TESTED SYSTEM .....	9
7.3	CONDUCTED PEAK OUTPUT POWER .....	10
7.4	PEAK-TO-AVERAGE RATIO .....	12
7.5	OCCUPY BANDWIDTH.....	14
7.6	MODULATION CHARACTERISTIC.....	18
7.7	OUT OF BAND EMISSION AT ANTENNA TERMINALS.....	18
7.8	ERP, EIRP MEASUREMENT .....	22
7.9	FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT.....	26
7.10	FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT.....	30
7.11	FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT.....	32
<b>8</b>	<b>TEST SETUP PHOTO .....</b>	<b>34</b>
<b>9</b>	<b>EUT CONSTRUCTIONAL DETAILS .....</b>	<b>34</b>

## 4 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Pass* (Please refer to MPE Report)
RF Output Power	Part 2.1046 Part 22.913 (a)(2) Part 24.232 (c)	Pass
Peak-to-Average Ratio	Part 2.1046 Part 24.232 (d)	Pass
Modulation Characteristics	Part 2.1047	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917 Part 24.238	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a)	Pass
Out of band emission, Band Edge	Part 22.917 (a) Part 24.238 (a)	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2)	Pass

*Pass: The EUT complies with the essential requirements in the standard.*

## 5 General Information

### 5.1 General Description of EUT

Product Name:	satellite signals receiver
Model No.:	M8
Support Networks:	GPRS
Support Bands:	GSM850, PCS1900
TX Frequency:	GSM850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz
GPRS Class:	10
Modulation type:	GMSK
Antenna type:	Integral antenna
Antenna gain:	2.0dBi
Power supply:	DC 7.4V 6800mAh lithium battery Battery charge by DC 8.4V

**Operation Frequency List:**

GSM 850		PCS1900	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20
129	824.40	513	1850.40
· ∴	· ∴	· ∴	· ∴
189	836.40	660	1879.80
190	836.60	661	1880.00
191	836.80	662	1880.20
· ∴	· ∴	· ∴	· ∴
250	848.60	809	1909.60
251	848.80	810	1909.80

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

**Final test channel:**

GSM 850		PCS1900	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20
190	836.60	661	1880.00
251	848.80	810	1909.80

## 5.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules.

## 5.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

## 5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 28, 2013.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, June 26, 2013.

## 5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

## 6 Test Instruments list

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June 29 2016	June 28 2017
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June 29 2016	June 28 2017
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 29 2016	June 28 2017
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 29 2016	June 28 2017
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June 29 2016	June 28 2017
9	Coaxial Cable	GTS	N/A	GTS211	June 29 2016	June 28 2017
10	Coaxial cable	GTS	N/A	GTS210	June 29 2016	June 28 2017
11	Coaxial Cable	GTS	N/A	GTS212	June 29 2016	June 28 2017
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June 29 2016	June 28 2017
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	June 29 2016	June 28 2017
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 29 2016	June 28 2017
15	Band filter	Amindeon	82346	GTS219	June 29 2016	June 28 2017
16	Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	June 29 2016	June 28 2017
17	Signal Generator	Rohde & Schwarz	SML03	GTS236	June 29 2016	June 28 2017
18	Temp. Humidity/ Barometer	Oregon Scientific	BA-888	GTS248	June 29 2016	June 28 2017
19	D.C. Power Supply	Instek	PS-3030	GTS232	NA	NA
20	Splitter	Agilent	11636B	GTS237	June 29 2016	June 28 2017
21	Power meter	Rohde & Schwarz	NRVS	GTS238	June 29 2016	June 28 2017
22	Spectrum Analyzer	Agilent	E4440A	GTS533	June 29 2016	June 28 2017
23	Temp.&Humidity chamber	Chuang wei	GDS-225	GTS005-1	June 29 2016	June 28 2017
24	Highpass filter	Micro-Tronics	HPM50108	GTS549	June 29 2016	June 28 2017
25	Highpass filter	Micro-Tronics	HPM50111	GTS550	June 29 2016	June 28 2017



## 7 System test configuration

### 7.1 Test mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

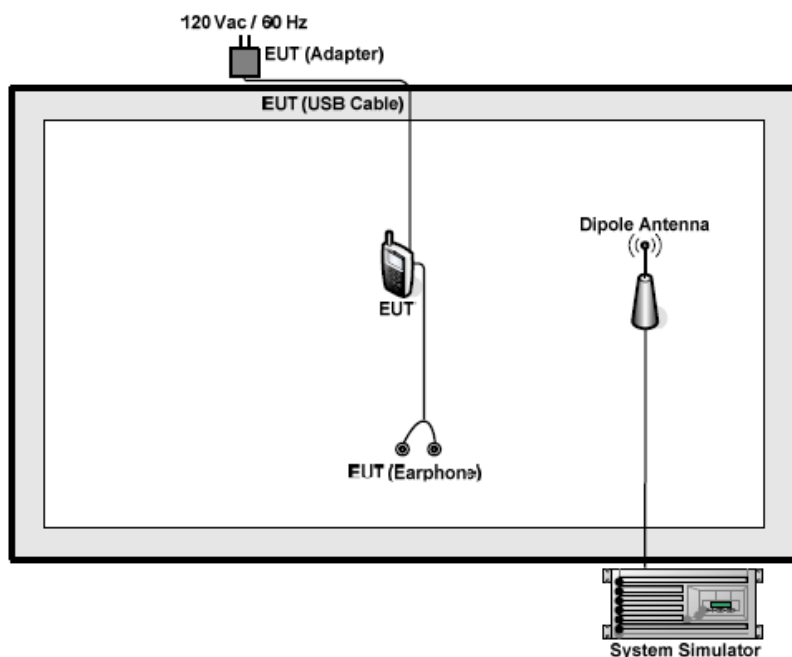
Test modes		
Band	Radiated	Conducted
<b>GSM 850</b>	■ GPRS 1 link	■ GPRS 1 link
<b>PCS 1900</b>	■ GPRS 1 link	■ GPRS 1 link

Note: The maximum power levels is GPRS multi-slot class 10 mode for GSM link. only these modes were used for all tests.

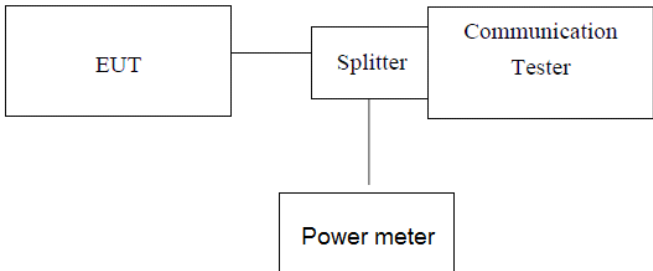
The conducted power tables are as follows:

Conducted Power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency	824.20	836.60	848.80	1850.20	1880.00	1909.80
GPRS (GMSK, 1 TX slot)	32.35	32.47	32.36	29.09	28.97	28.86
GPRS (GMSK, 2 TX slot)	31.34	31.49	31.41	28.24	28.03	27.98

### 7.2 Configuration of Tested System



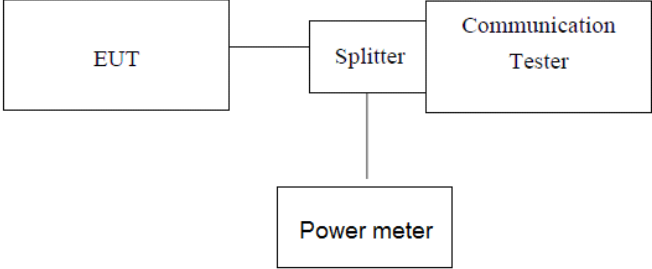
## 7.3 Conducted Peak Output Power

Test Requirement:	FCC part22.913(a) and FCC part24.232(b) and FCC part 27.50
Test Method:	FCC part2.1046
Limit:	GSM850, WCDMA Band V: 7W PCS1900, WCDMA Band II: 2W WCDMA Band IV: 1W
Test setup:	 <p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Test Procedure:	<ol style="list-style-type: none"> <li>1. The transmitter output port was connected to base station.</li> <li>2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.</li> <li>3. Set EUT at maximum power through base station.</li> <li>4. Select lowest, middle, and highest channels for each band and different modulation.</li> <li>5. Measure the maximum burst average power.</li> </ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

Measurement Data

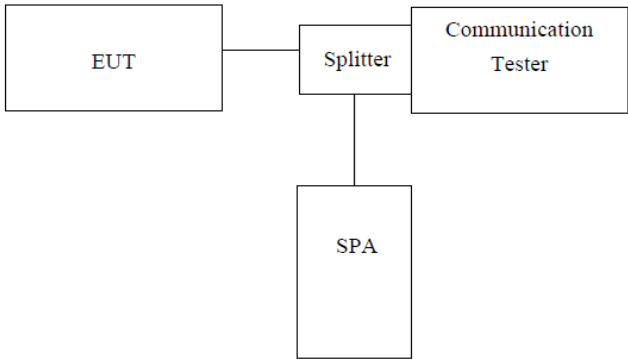
EUT Mode	Channel	Frequency (MHz)	PK power (dBm)	Limit (dBm)	Result
GSM 850 (GPRS 1 link)	128	824.20	32.35	38.45	Pass
	190	836.60	32.47		
	251	848.80	32.36		
PCS 1900 (GPRS 1 link)	512	1850.20	29.08	33.01	Pass
	661	1880.00	28.97		
	810	1909.80	28.86		

## 7.4 Peak-to-Average Ratio

Test Requirement:	FCC part24.232(d)
Test Method:	FCC part2.1046
Limit:	13db
Test setup:	 <p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Test Procedure:	<ol style="list-style-type: none"> <li>1. The transmitter output port was connected to base station.</li> <li>2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.</li> <li>3. Set EUT at maximum power through base station.</li> <li>4. Select lowest, middle, and highest channels for each band and different modulation.</li> <li>5. Measure the maximum burst average power.</li> <li>6. Record the maximum peak-to-average ratio value.</li> </ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

Test mode	Peak to Average Ratio (dB)			Limit (dB)	Result
	Low Ch.	Middle Ch.	High Ch.		
GSM	0.89	0.83	0.72	13	PASS

## 7.5 Occupy Bandwidth

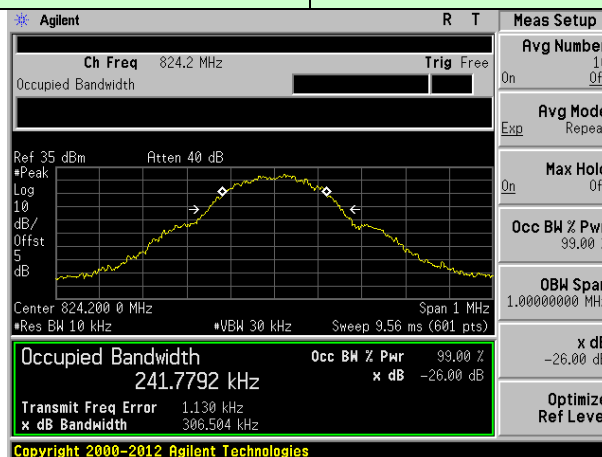
Test Requirement:	FCC part22.913(a) and FCC part24.232(b) and FCC part27.53(a)
Test Method:	FCC part2.1049
Test setup:	 <p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Test Procedure:	<ol style="list-style-type: none"> <li>1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer</li> <li>2. RBW was set to about 1% of emission BW, VBW= 3 times RBW.</li> <li>3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.</li> </ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

Measurement Data

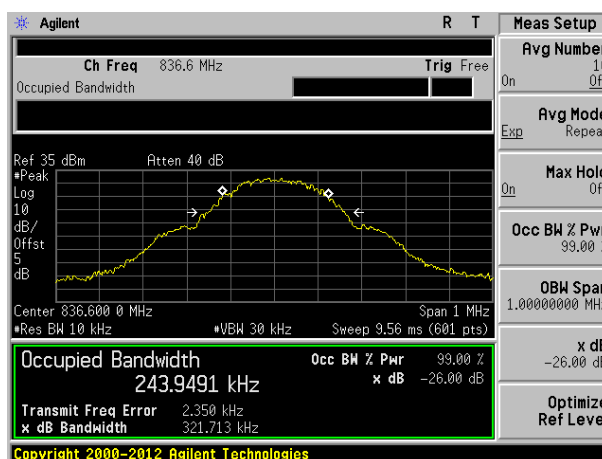
EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
GSM 850 (GPRS 1 link)	128	824.20	241.779	306.504
	190	836.60	243.949	321.713
	251	848.80	247.890	319.439
PCS 1900 (GPRS 1 link)	512	1850.20	254.113	322.540
	661	1880.00	241.105	320.422
	810	1909.80	252.777	327.916

Test plot as follows:

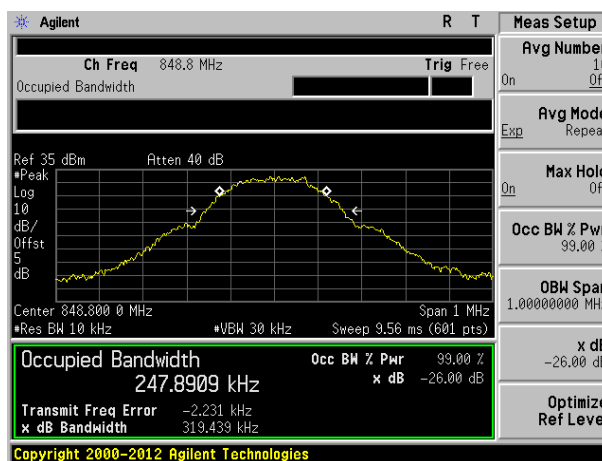
Test band:	GSM 850 (GPRS 1 link)
------------	-----------------------



Lowest channel



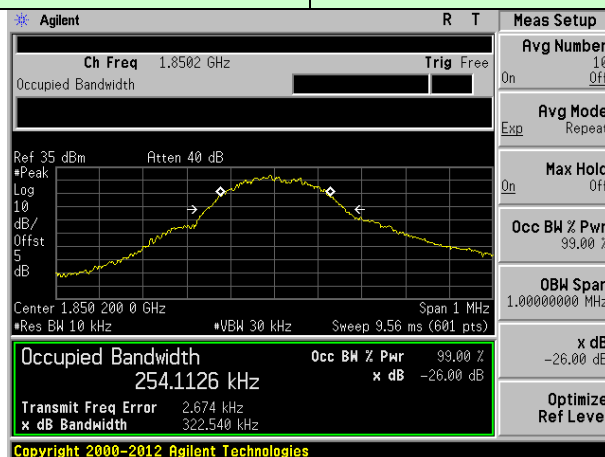
Middle channel



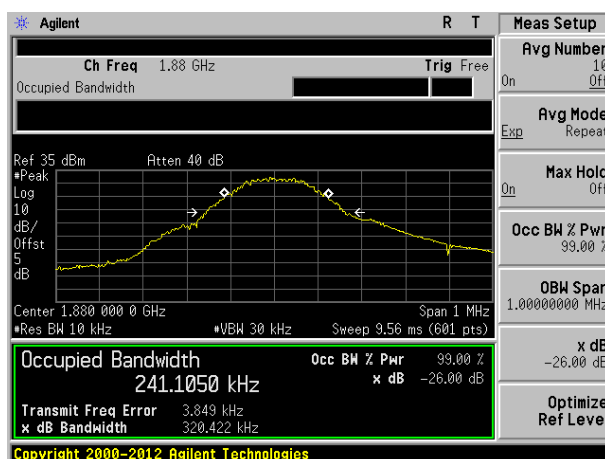
Highest channel



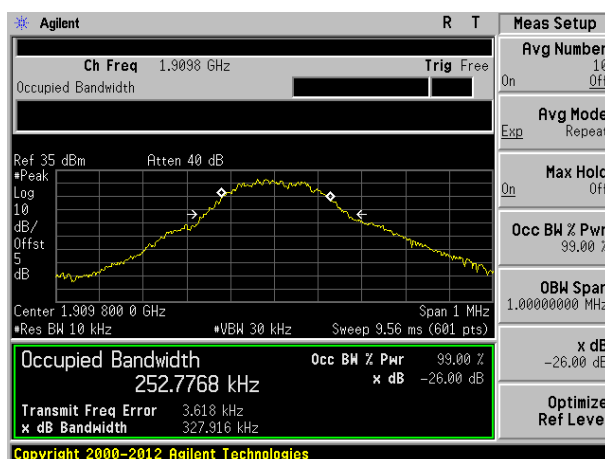
Test band:	PCS 1900 (GPRS 1 link)
------------	------------------------



Lowest channel



Middle channel



Highest channel

## 7.6 MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

## 7.7 Out of band emission at antenna terminals

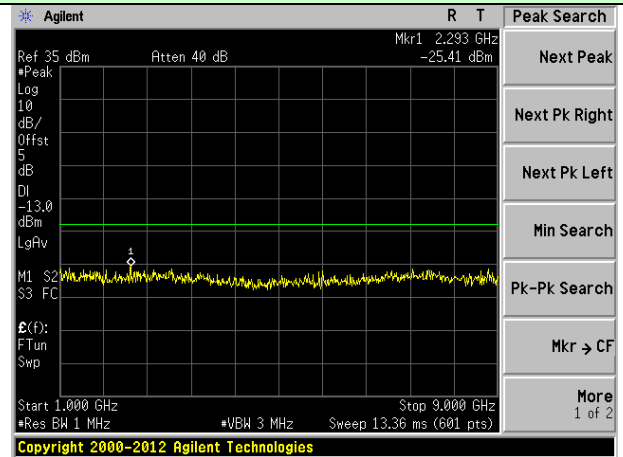
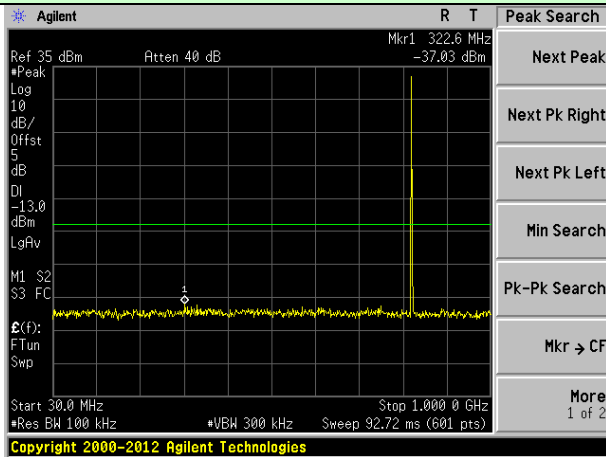
Test Requirement:	FCC part22.917(a) and FCC part24.238(a) and FCC part27.53(h)
Test Method:	FCC part2.1051
Limit:	-13dBm
Test setup:	<p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Test Procedure:	<ol style="list-style-type: none"> <li>1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.</li> <li>2 The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.</li> <li>3 For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10th harmonic.</li> <li>4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.</li> </ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

Test plot as follows:

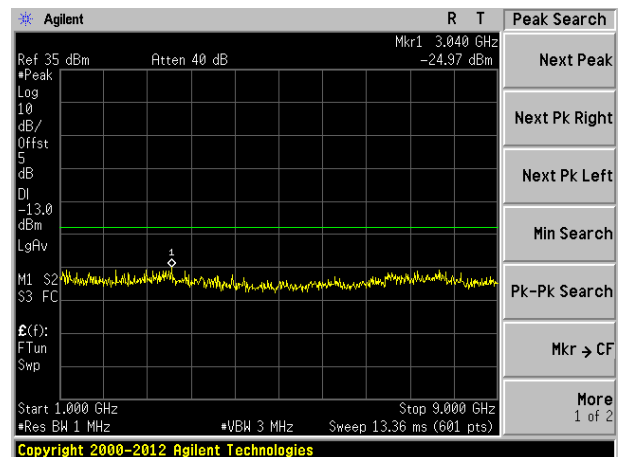
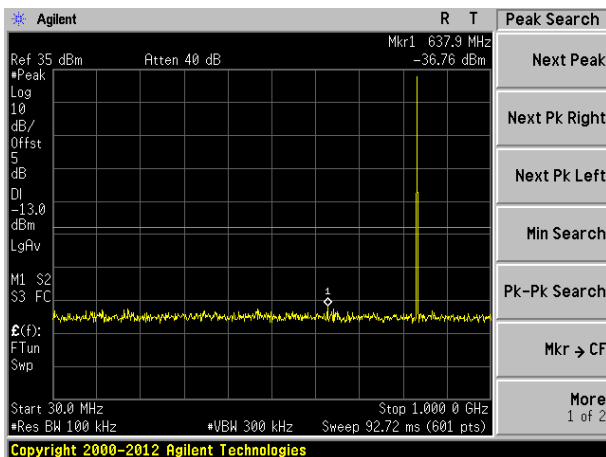
Note: During the conducted spurious emission test, a band filter was used. The information of the filter is reported at section 6.0 (refer to item 24, 25).

Test Mode: Traffic mode

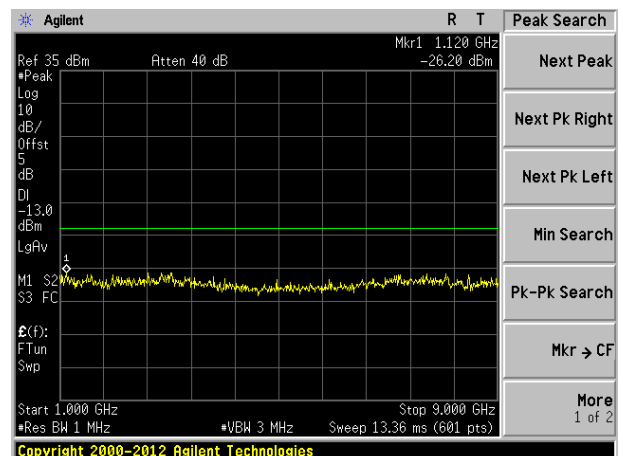
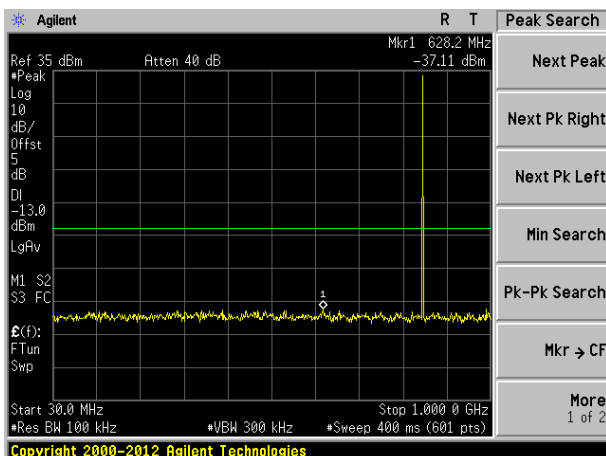
GSM 850 (GPRS 1 link)



Lowest channel

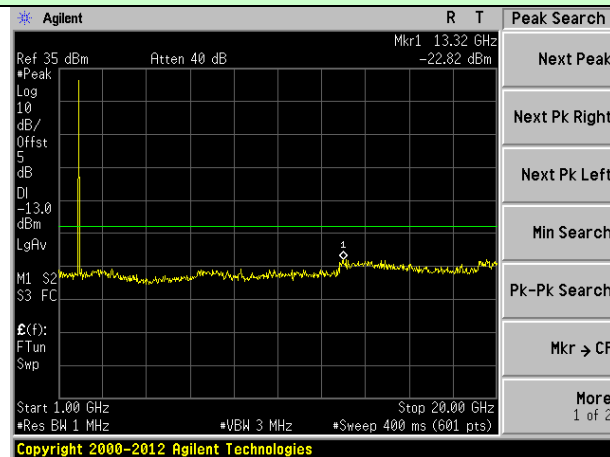
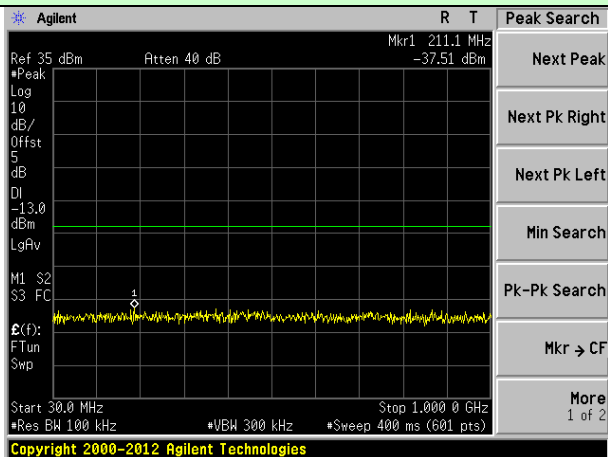


Middle channel

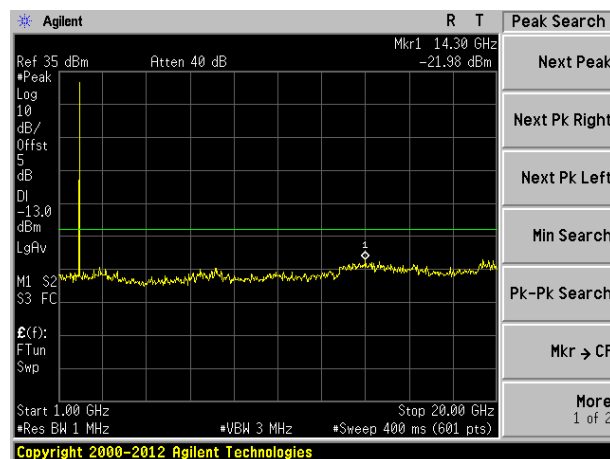
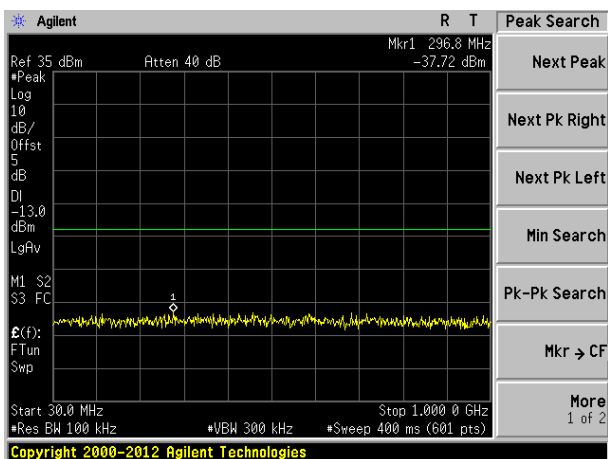


Highest channel

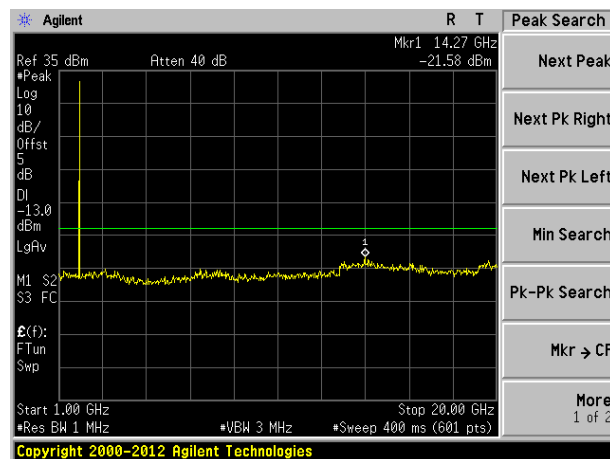
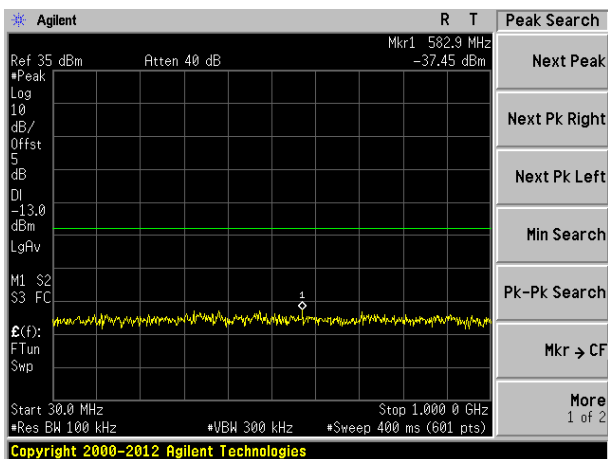
Test Mode: Traffic mode	PCS1900 (GPRS 1 link)
-------------------------	-----------------------



Lowest channel

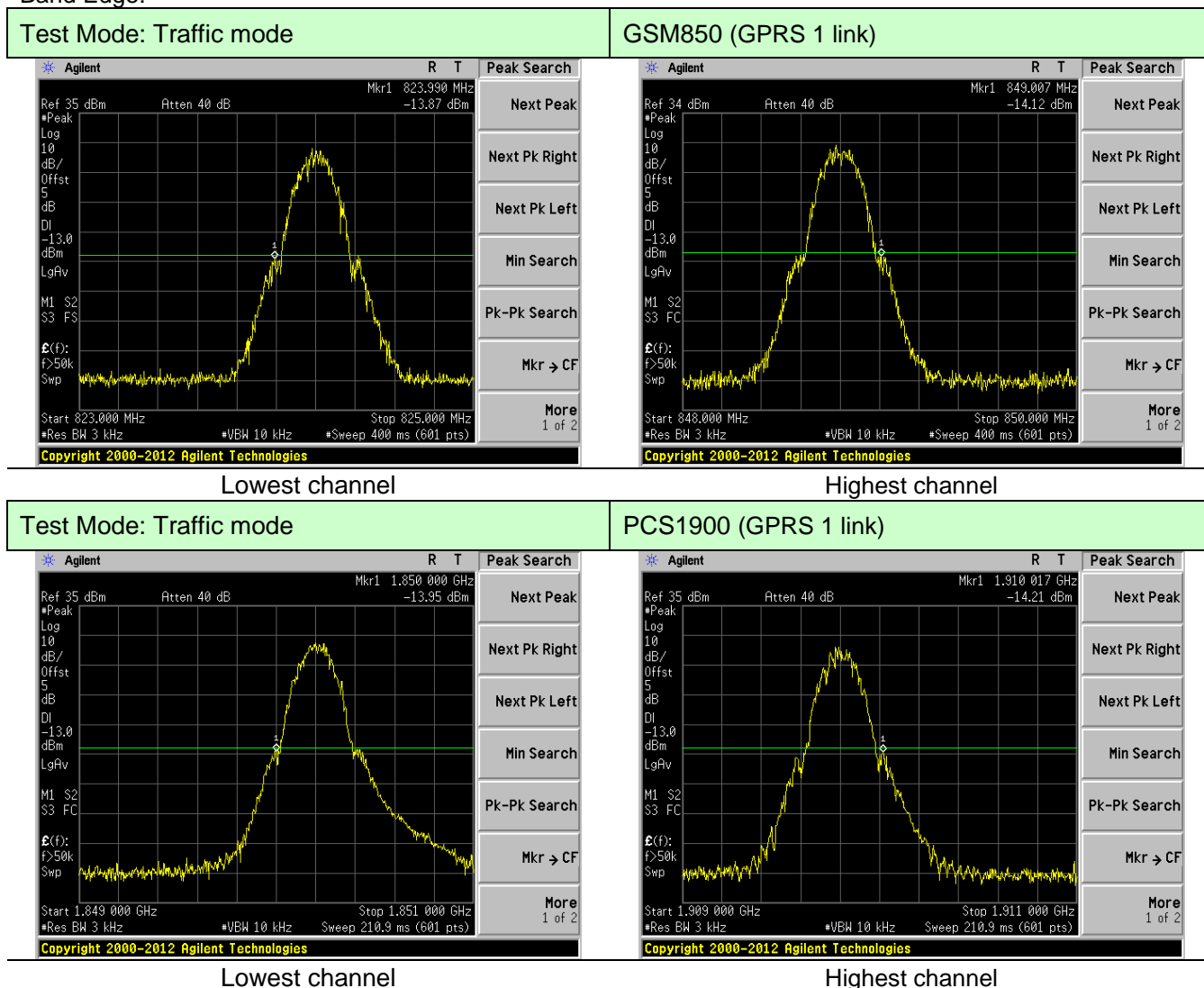


Middle channel

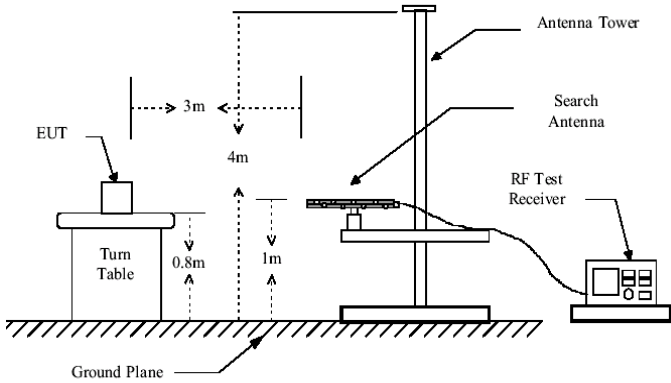
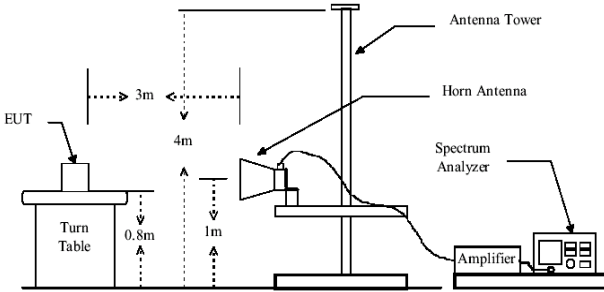
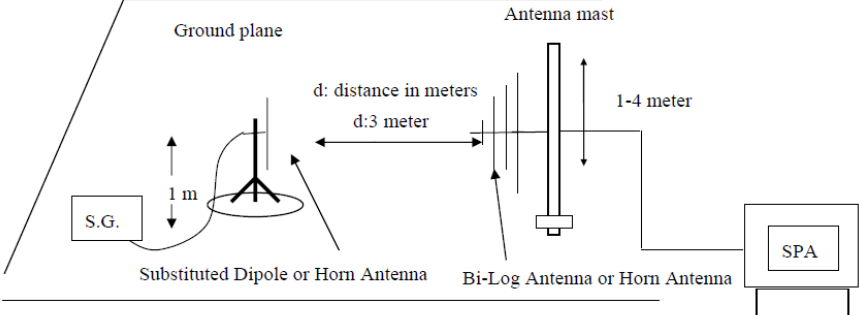


Highest channel

Band Edge:



## 7.8 ERP, EIRP Measurement

Test Requirement:	FCC part22.913(a) and FCC part24.232(b) and FCC part27.50
Test Method:	FCC part2.1046
Limit:	GSM850, WCDMA Band V: 7W PCS1900, WCDMA Band II: 2W WCDMA Band IV: 1W
Test setup:	<p>Below 1GHz</p>  <p>Above 1GHz</p>  <p>Substituted method:</p> 

Test Procedure:	<ol style="list-style-type: none"> <li>1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.</li> <li>2. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.</li> <li>3. ERP in frequency band 824.2 –848.80.8MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:  <math display="block">\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}</math> </li> <li>4. EIRP in frequency band 1850.2 –1909.8MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:  <math display="block">\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}</math> </li> </ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

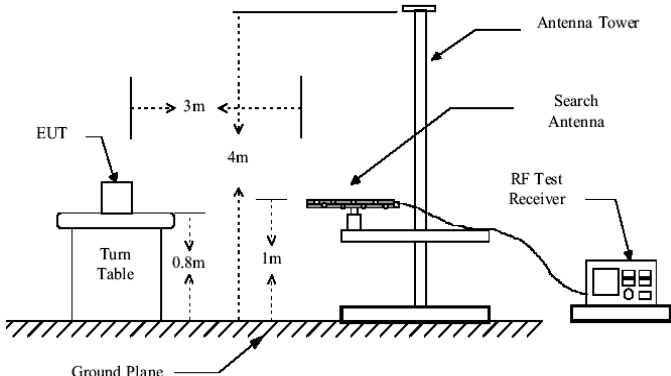
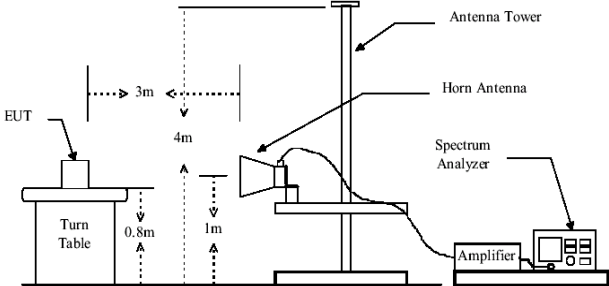
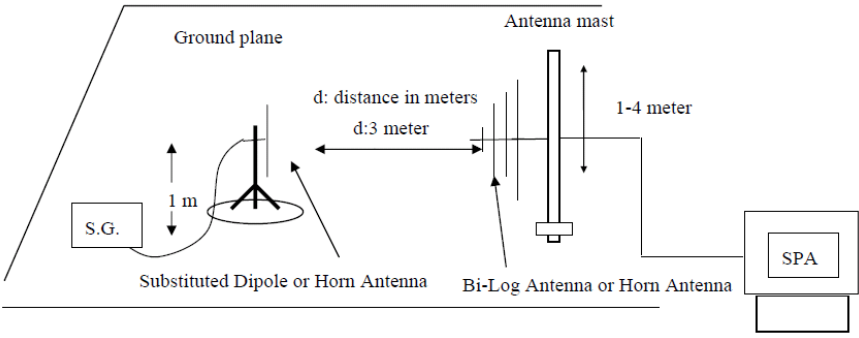
## Measurement Data

EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
GSM850 (GPRS 1 link)	Lowest	H	V	31.66	38.45	Pass
			H	28.52		
		E1	V	23.15		
			H	28.66		
		E2	V	22.17		
			H	26.25		
	Middle	H	V	31.48	38.45	Pass
			H	28.29		
		E1	V	22.99		
			H	28.54		
		E2	V	23.77		
			H	26.76		
	Highest	H	V	31.90	38.45	Pass
			H	28.13		
		E1	V	23.05		
			H	27.56		
		E2	V	22.11		
			H	27.48		



EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP (dBm)	Limit (dBm)	Result
PCS1900 (GPRS 1 link)	Lowest	H	V	27.93	33.01	Pass
			H	25.12		
		E1	V	20.30		
			H	25.26		
		E2	V	19.44		
			H	23.09		
	Middle	H	V	27.83	33.01	Pass
			H	24.97		
		E1	V	20.23		
			H	25.21		
		E2	V	20.92		
			H	23.60		
	Highest	H	V	28.31	33.01	Pass
			H	24.92		
		E1	V	20.39		
			H	24.42		
		E2	V	19.54		
			H	24.35		

## 7.9 Field strength of spurious radiation measurement

Test Requirement:	FCC part22.917(a) and FCC part24.238(a)
Test Method:	FCC part2.1053
Limit:	-13dBm
Test setup:	<p>Below 1GHz</p>  <p>Above 1GHz</p>  <p>Substituted method:</p> 

Test Procedure:	<ol style="list-style-type: none"> <li>1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.</li> <li>2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.</li> <li>3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.</li> <li>4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.  <math display="block">\text{ERP / EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dB/dBi)} - \text{Cable Loss (dB)}</math> </li> </ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

## Measurement Data

Test mode:	GSM850		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1648.40	Vertical	-36.08	-13.00	Pass
2472.60	V	-38.81		
3296.80	V	-41.07		
4121.00	V	-43.22		
4945.20	V	---		
1648.40	Horizontal	-41.31	-13.00	Pass
2472.60	H	-45.17		
3296.80	H	-46.73		
4121.00	H	-49.46		
4945.20	H	---		
Test mode:	GSM850		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.20	Vertical	-37.16	-13.00	Pass
2509.80	V	-39.44		
3346.40	V	-41.34		
4183.00	V	-43.15		
5019.60	V	---		
1673.20	Horizontal	-41.54	-13.00	Pass
2509.80	H	-44.78		
3346.40	H	-46.09		
4183.00	H	-48.38		
5019.60	H	---		
Test mode:	GSM850		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1697.60	Vertical	-37.48	-13.00	Pass
2546.40	V	-39.51		
3395.20	V	-41.18		
4244.00	V	-42.80		
5092.80	V	---		
1697.60	Horizontal	-41.37	-13.00	Pass
2546.40	H	-44.25		
3395.20	H	-45.41		
4244.00	H	-47.44		
5092.80	H	---		

Remark :

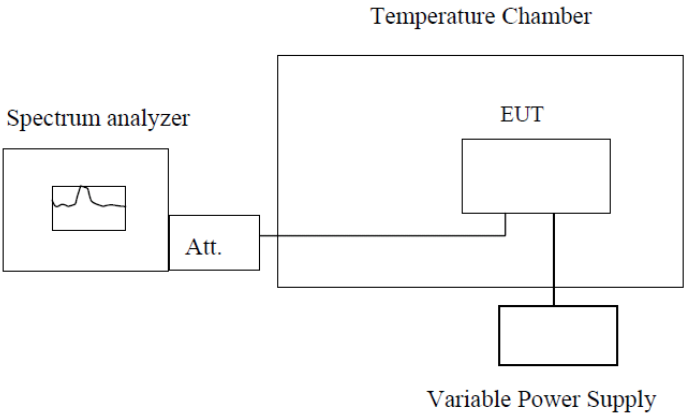
1. The emission behaviour belongs to narrowband spurious emission.
2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

Test mode:	PCS1900		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3700.40	Vertical	-36.88	-13.00	Pass
5550.60	V	-39.26		
7400.80	V	-41.24		
9251.00	V	-43.14		
11101.20	V	---		
3700.40	Horizontal	-41.46	-13.00	Pass
5550.60	H	-44.85		
7400.80	H	-46.21		
9251.00	H	-48.59		
11101.20	H	---		
Test mode:	PCS1900		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-34.63	-13.00	Pass
5640.00	V	-37.09		
7520.00	V	-39.13		
9400.00	V	-41.10		
11280.00	V	---		
3760.00	Horizontal	-39.37	-13.00	Pass
5640.00	H	-42.86		
7520.00	H	-44.27		
9400.00	H	-46.73		
11280.00	H	---		
Test mode:	PCS1900		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3819.60	Vertical	-35.85	-13.00	Pass
5729.40	V	-38.24		
7639.20	V	-40.22		
9549.00	V	-42.12		
11458.80	V	---		
3819.60	Horizontal	-40.44	-13.00	Pass
5729.40	H	-43.83		
7639.20	H	-45.19		
9549.00	H	-47.57		
11458.80	H	---		

Remark:

1. The emission behaviour belongs to narrowband spurious emission.
2. Remark"---" means that the emission level is too low to be measured
3. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

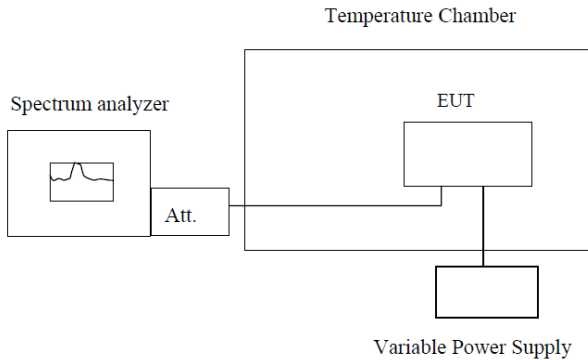
## 7.10 Frequency stability V.S. Temperature measurement

Test Requirement:	FCC Part2.1055(a)(1)(b)
Test Method:	FCC Part2.1055(a)(1)(b)
Limit:	2.5ppm
Test setup:	 <p><b>Note :</b> Measurement setup for testing on Antenna connector</p>
Test procedure:	<ol style="list-style-type: none"> <li>1. The equipment under test was connected to an external DC power supply and input rated voltage.</li> <li>2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.</li> <li>3. The EUT was placed inside the temperature chamber.</li> <li>4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.</li> <li>5. Turn EUT off and set the chamber temperature to –20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.</li> <li>6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.</li> </ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

### Measurement Data

Reference Frequency: GSM850 (GPRS 1 link) Middle channel=190 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
3.70	-30	50	0.0597	2.5	Pass
	-20	58	0.0697		
	-10	48	0.0576		
	0	41	0.0494		
	10	47	0.0560		
	20	40	0.0481		
	30	71	0.0846		
	40	61	0.0730		
	50	58	0.0689		
Reference Frequency: PCS1900 (GPRS 1 link) Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error			Result
		Hz	ppm		
3.70	-30	104	0.0555	2.5	Pass
	-20	124	0.0657		
	-10	100	0.0532		
	0	82	0.0435		
	10	101	0.0539		
	20	84	0.0449		
	30	139	0.0740		
	40	116	0.0616		
	50	122	0.0648		

## 7.11 Frequency stability V.S. Voltage measurement

Test Requirement:	FCC Part2.1055(d)(1)(2)
Test Method:	FCC Part2.1055(d)(1)(2)
Limit:	2.5ppm
Test setup:	 <p>Note : Measurement setup for testing on Antenna connector</p>
Test procedure:	<ol style="list-style-type: none"> <li>1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage.</li> <li>2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.</li> <li>3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.</li> </ol>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 7.1 for details
Test results:	Pass

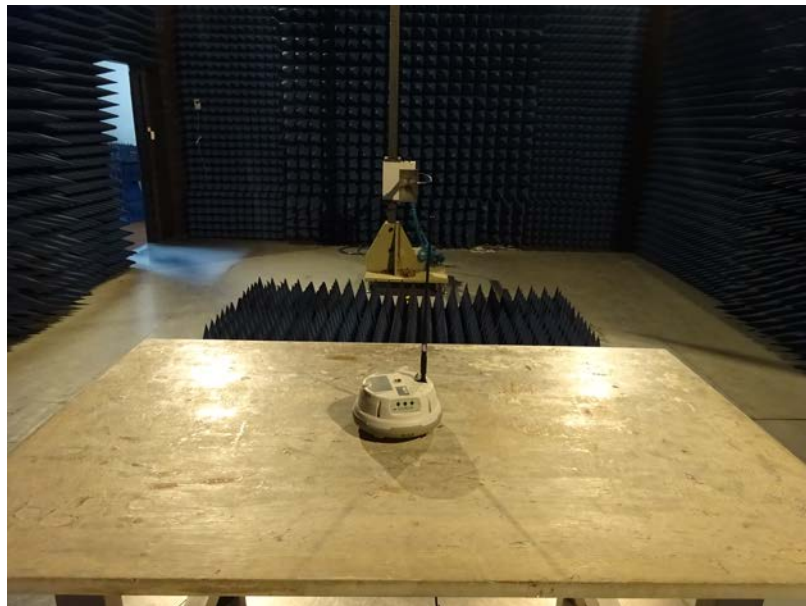


## Measurement Data

Reference Frequency: GSM850 (GPRS 1 link) Middle channel=190 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	30	0.0359	2.5	Pass
	3.70	35	0.0416		
	3.40	39	0.0471		
Reference Frequency: PCS1900 (GPRS 1 link) Middle channel=661 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	61	0.0325	2.5	Pass
	3.70	69	0.0369		
	3.40	70	0.0370		

## 8 Test Setup Photo

Radiated Emission



## 9 EUT Constructional Details

Reference to the test report No. GTS201706000003F01

-----End-----