

TEST Report

Applicant: OPTIKS SOLUTIONS, INC
Address of Applicant: 15 CORPORATE PLACE SOUTH, SUITE 105, PISCATAWAY,
New Jersey 08854, United States
Manufacturer: OPTIKS SOLUTIONS, INC
Address of Manufacturer: 15 CORPORATE PLACE SOUTH, SUITE 105, PISCATAWAY,
New Jersey 08854, United States
Equipment Under Test (EUT)
Product Name: Swittons IoT Edge-G
Model No.: SWIT400CN
Trade mark: 
FCC ID: 2AUJP-SWIT400CN
Applicable standards: FCC CFR Title 47 Part 2
FCC CFR Title 47 Part 22 Subpart H
FCC CFR Title 47 Part 24 Subpart E
Date of sample receipt: September 17, 2019
Date of Test: September 18, 2019-October 08, 2019
Date of report issued: October 09, 2019
Test Result : PASS *

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

Authorized Signature:



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.

1 Version

Version No.	Date	Description
00	October 09, 2019	Original

Prepared By:

Bill. Yuan

Date:

October 09, 2019

Project Engineer

Check By:

Robinson

Date:

October 09, 2019

Reviewer

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3 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) Part 24.232(c)	Pass
Peak-to-Average Ratio	Part 2.1046 Part 22.913(d) Part 24.232(d)	Pass
Modulation Characteristics	Part 2.1047	Pass
99% Occupied Bandwidth & 26dB Bandwidth	Part 2.1049 Part 22.917(b) Part 24.238(b)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 Part 24.238	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 Part 24.238	Pass
Out of band emission, Band Edge	Part 2.1051 Part 22.917 Part 24.238	Pass
ERP and EIRP	Part 22.913(a) Part 24.232(b)	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b) Part 22.355 Part 24.235	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2) Part 22.355 Part 24.235	Pass

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

4 General Information

4.1 General Description of EUT

Product Name:	Swittons IoT Edge-G
Model No.:	SWIT400CN
Test sample(s) ID:	GTS201909000109-1
Sample(s) Status:	Engineer sample
Serial No.:	N/A
Hardware Version:	GSM-02-REV 1.1
Software Version:	V1.0
Support Networks:	GPRS
Support Bands:	GSM850, PCS1900
TX Frequency:	GSM850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz
GPRS Class:	10
Release	R99
Modulation type:	GMSK
Antenna type:	PCB antenna
Antenna gain:	GSM850: 0dBi PCS1900: 0dBi
Power supply:	Adaptor Model: EP19-050100WULA Input: AC 100-240V, 50/60Hz, 200mA Max Output: DC 5.0V, 1.0A Or Battery: DC 3.7V, 1400mAh, 4.81Wh

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

4.2 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.

4.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on ANSI C63.26:2015 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Test Facility

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

- **FCC —Registration No.: 381383**

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 381383.

- **IC —Registration No.: 9079A**

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

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

4.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5 Test Instruments list

Radiated Emission:						
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. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 20 2018	Oct. 19 2019
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 20 2018	Oct. 19 2019
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 20 2018	Oct. 19 2019
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

6 System test configuration

6.1 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.

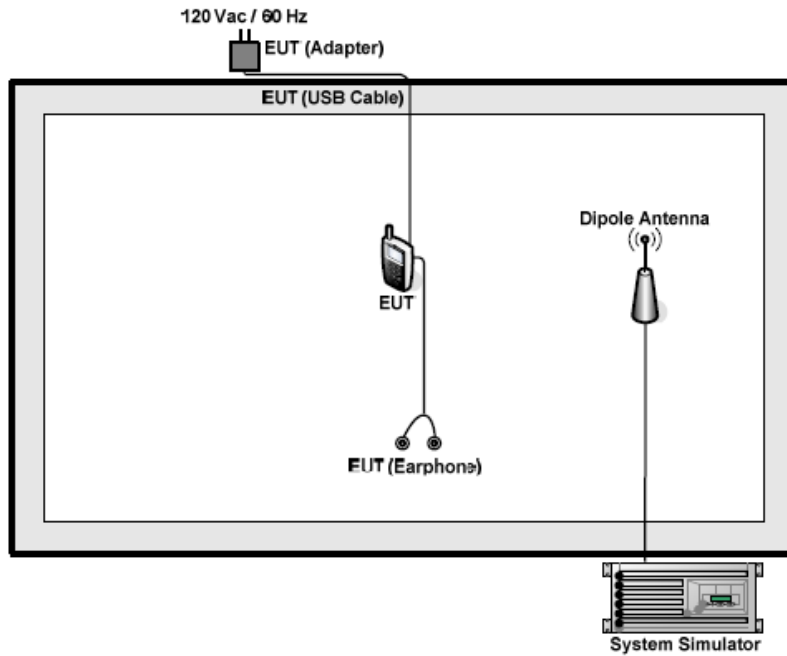
Test modes		
Band	Radiated	Conducted
GSM 850	■ GPRS 1 link	■ GPRS 1 link
PCS 1900	■ GPRS 1 link	■ GPRS 1 link

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

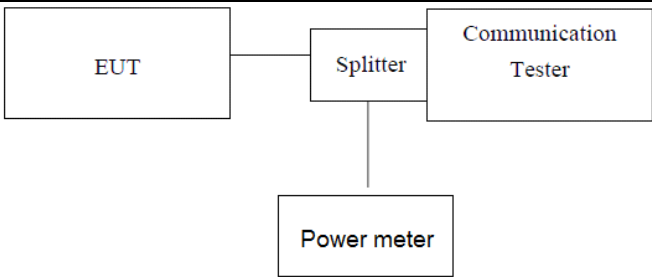
The conducted power tables are as follows:

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)	33.37	33.29	33.40	30.46	30.41	30.47
GPRS (GMSK, 2 TX slot)	33.16	33.11	33.09	29.87	29.84	29.82
GPRS (GMSK, 3 TX slot)	32.45	32.48	32.46	29.26	29.21	29.23
GPRS (GMSK, 4 TX slot)	31.68	31.73	31.79	28.45	28.62	28.59

6.2 Configuration of Tested System



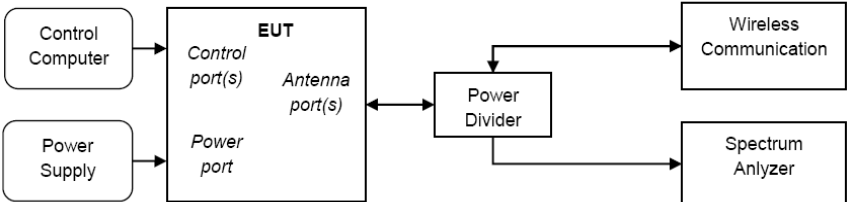
6.3 Conducted Peak Output Power

Test Requirement:	FCC part 22.913(a) and FCC part 24.232(c)
Test Method:	FCC part 2.1046
Limit:	GSM850: 7W(38.45dBm) PCS1900: 2W(33dBm)
Test setup:	 <i>Note: Measurement setup for testing on Antenna connector</i>
Test Procedure:	1. The transmitter output port was connected to base station. 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. 3. Set EUT at maximum power through base station. 4. Select lowest, middle, and highest channels for each band and different modulation. 5. Measure the maximum burst peak power.
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 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	33.37	38.45	Pass
	190	836.60	33.29		
	251	848.80	33.40		
PCS 1900 (GPRS 1 link)	512	1850.20	30.46	33.01	Pass
	661	1880.00	30.41		
	810	1909.80	30.47		

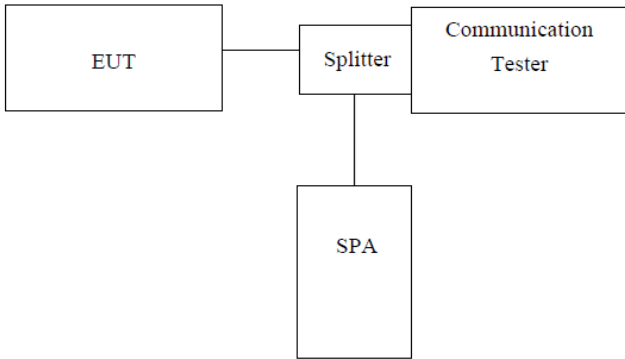
6.4 Peak-to-Average Ratio

Test Requirement:	FCC Part 22.913(d) and FCC Part 24.232(d)
Test Method:	FCC part2.1046
Limit:	13db
Test setup:	 <pre> graph LR CC[Control Computer] --> EUT[EUT] PS[Power Supply] --> EUT subgraph EUT_ports [EUT] direction TB CP[Control port(s)] AP[Antenna port(s)] PP[Power port] end AP <--> PD[Power Divider] PD --> WC[Wireless Communication] PD --> SA[Spectrum Analyzer] </pre>
Test Procedure:	A peak to average ratio measurement is performed at the conducted port of the EUT. For WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. The traces are generated with the spectrum analyzer set to zero span mode. Test Settings 1. The signal analyzer's CCDF measurement profile enabled 2. Frequency= carrier center frequency 3. Measurement BW > EBW of signal 4. for continuous transmissions, set to 1ms 5. Record the maximum PAPR level associated with a probability of 0.1%.
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

Measurement data

Test Band	Peak to Average Ratio (dB)			Limit (dB)	Result
	Low Ch.	Middle Ch.	High Ch.		
GSM850	0.24	0.27	0.25	13	PASS
PCS 1900	0.25	0.29	0.26	13	PASS

6.5 Occupy Bandwidth

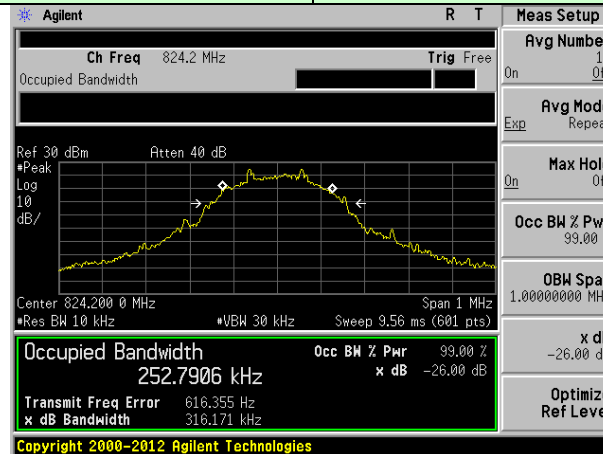
Test Requirement:	FCC part 22.917(b) and FCC part 24.238(b)
Test Method:	FCC part2.1049
Test setup:	 <i>Note: Measurement setup for testing on Antenna connector</i>
Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% of emission BW, VBW= 3 times RBW. 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.
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

Measurement Data

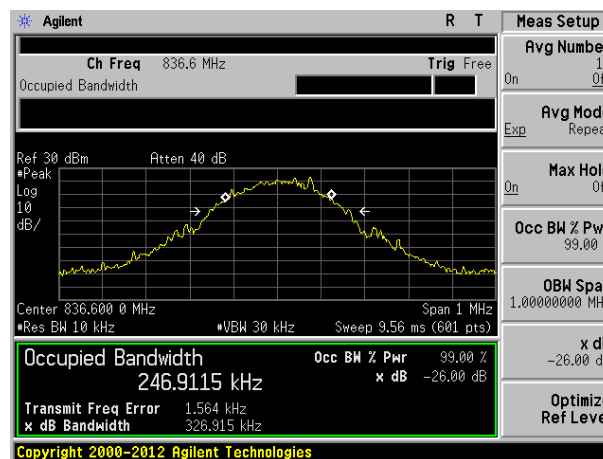
EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
GSM 850 (GPRS 1 link)	128	824.20	252.7906	316.171
	190	836.60	246.9115	326.915
	251	848.80	241.0921	314.192
PCS 1900 (GPRS 1 link)	512	1850.20	250.2216	325.792
	661	1880.00	245.9260	316.488
	810	1909.80	242.3777	326.238

Test plot as follows:

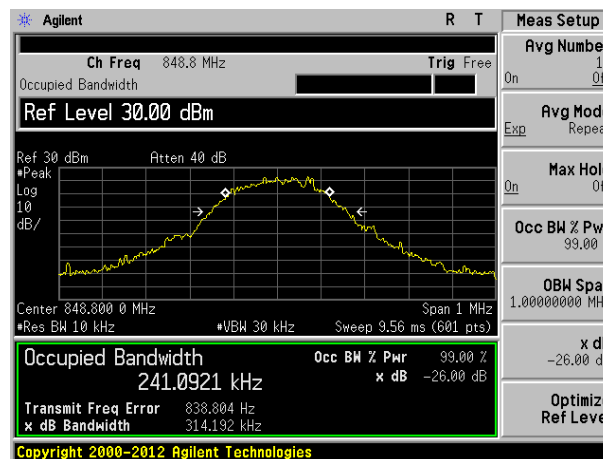
Test band:	GSM 850 (GPRS 1 link)
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Lowest channel

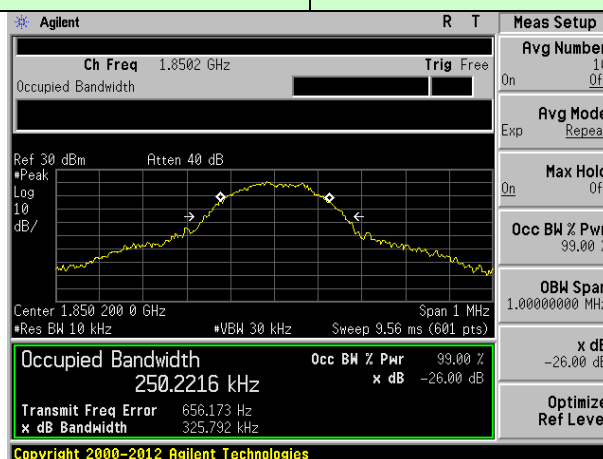


Middle channel

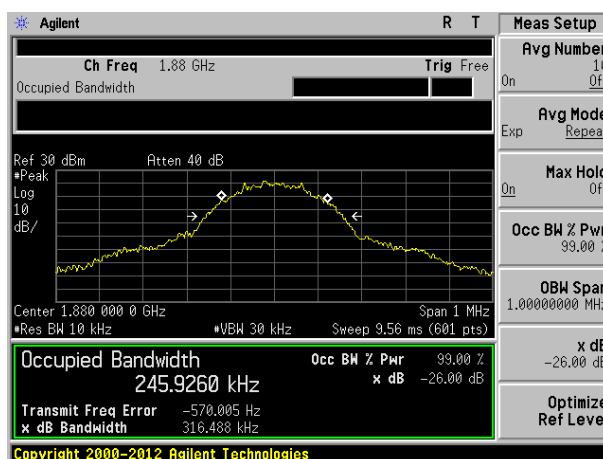


Highest channel

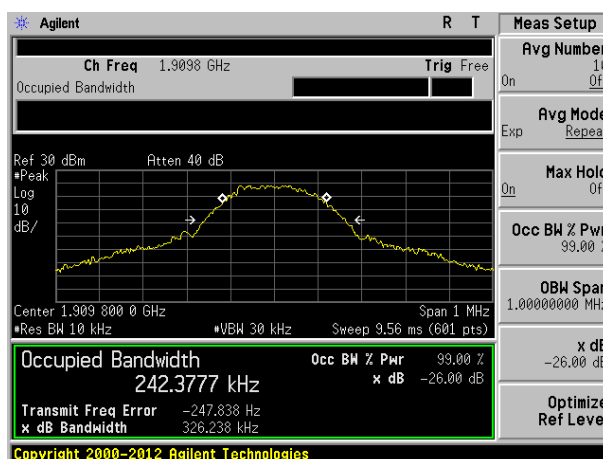
Test band:	PCS 1900 (GPRS 1 link)
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Lowest channel



Middle channel

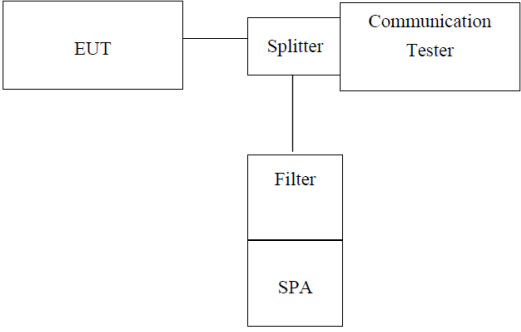


Highest channel

6.6 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.

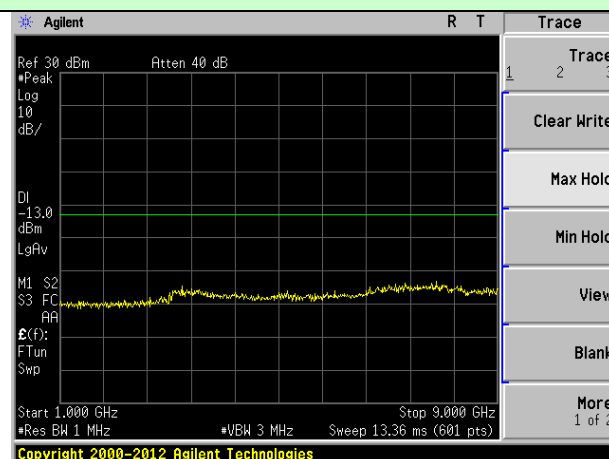
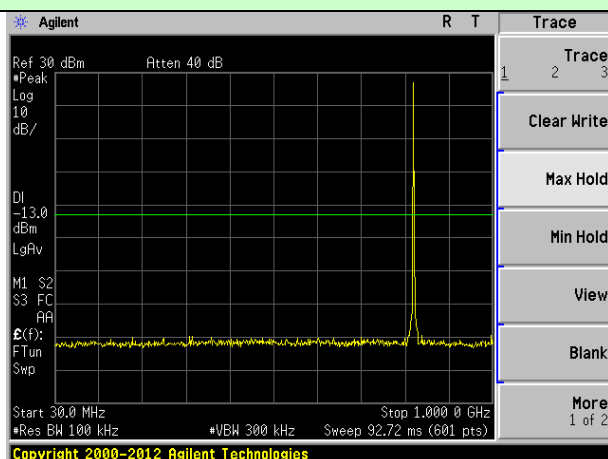
6.7 Out of band emission at antenna terminals

Test Requirement:	FCC part 22.917 and FCC part 24.238
Test Method:	FCC part 2.1051
Limit:	-13dBm
Test setup:	 <i>Note: Measurement setup for testing on Antenna connector</i>
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 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. 3 For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10th harmonic. 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.
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

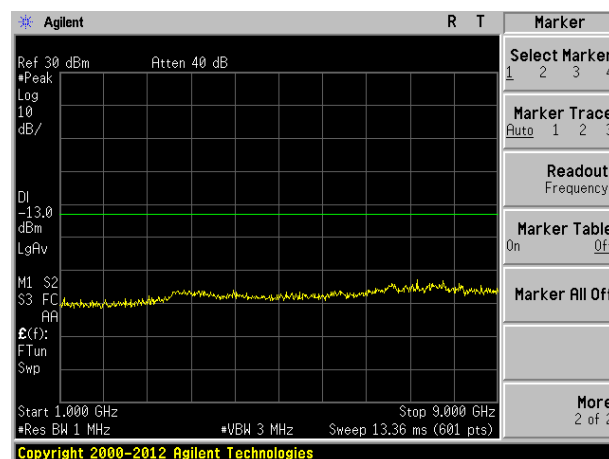
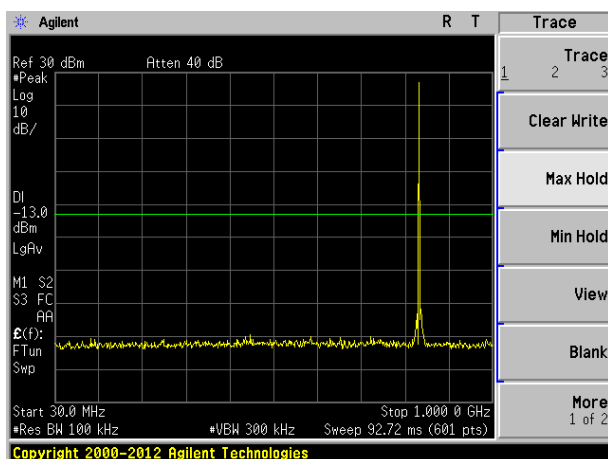
Test plot as follows:

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).

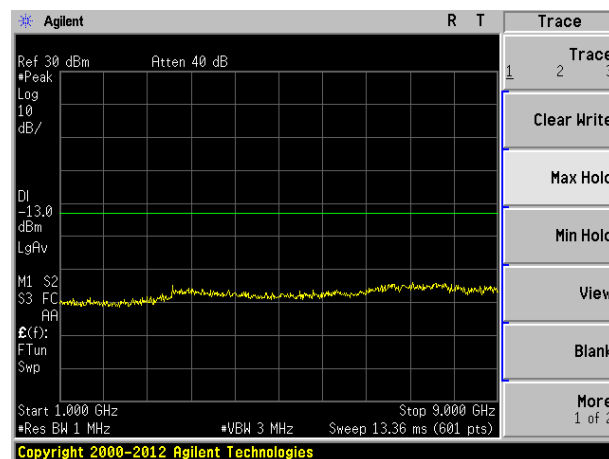
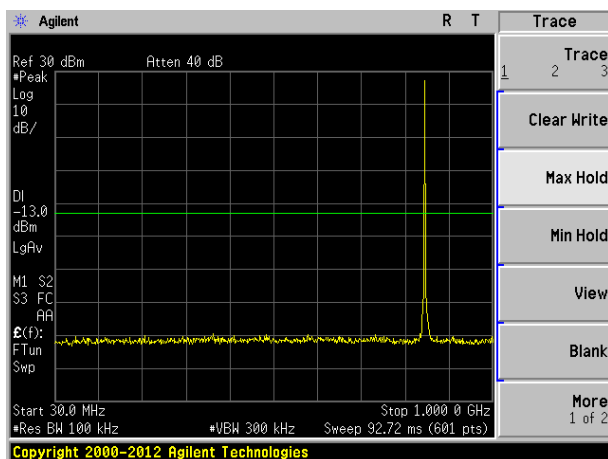
Test Mode: Traffic mode	GSM 850 (GPRS 1 link)
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Lowest channel

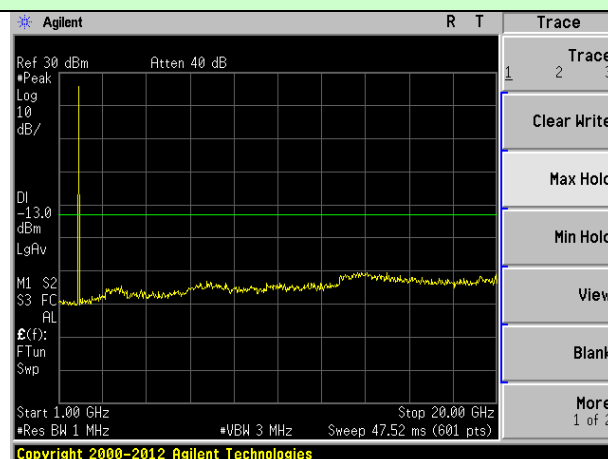
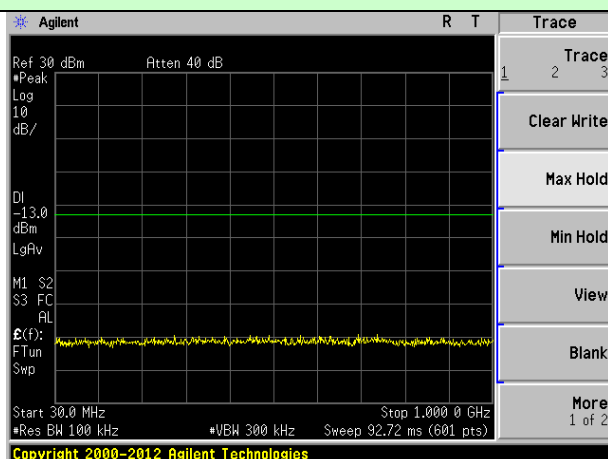


Middle channel

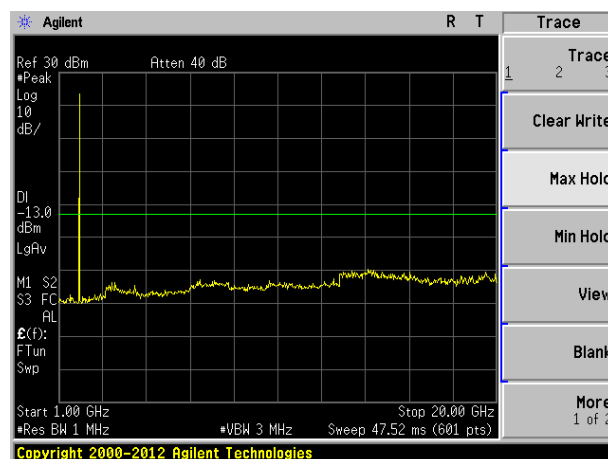
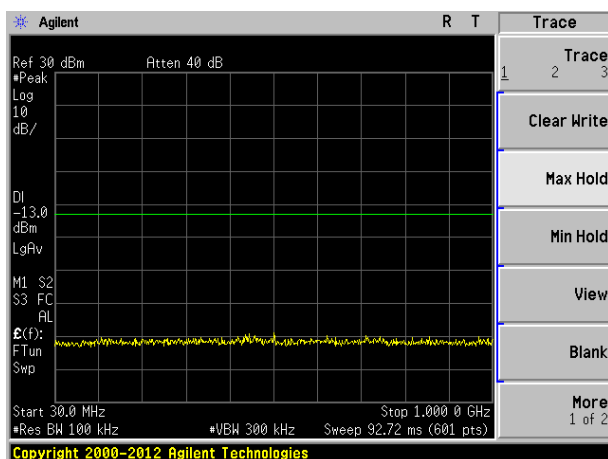


Highest channel

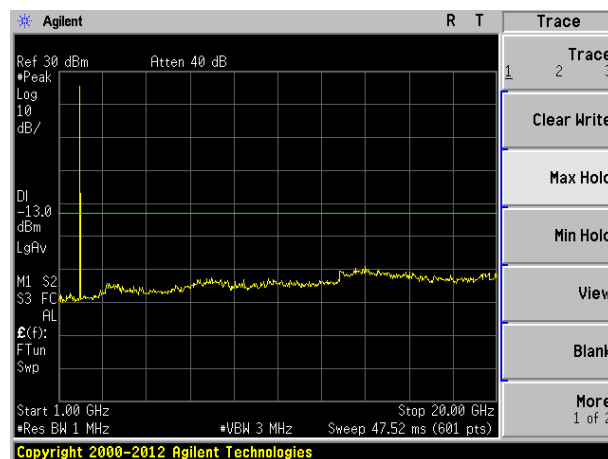
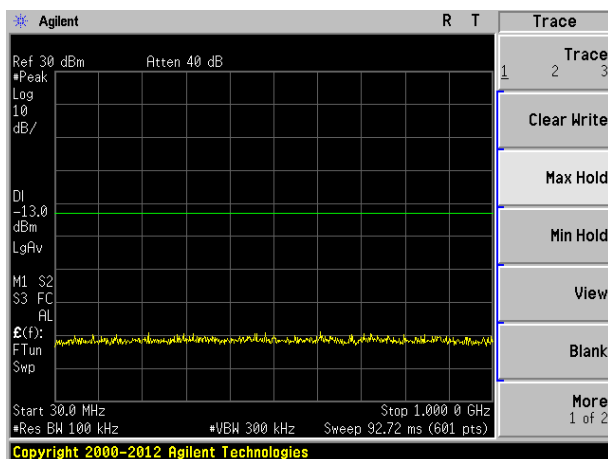
Test Mode: Traffic mode	PCS1900 (GPRS 1 link)
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Lowest channel



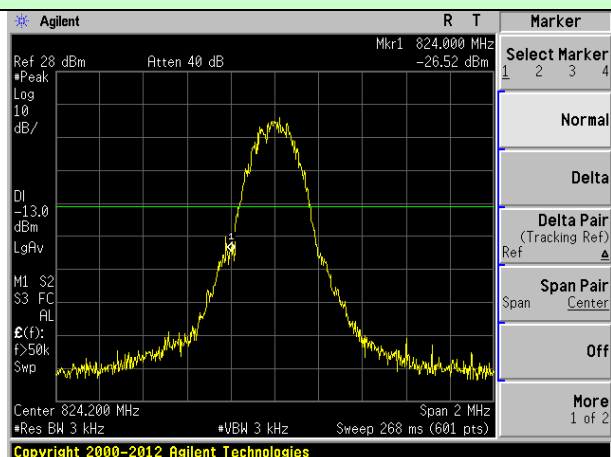
Middle channel



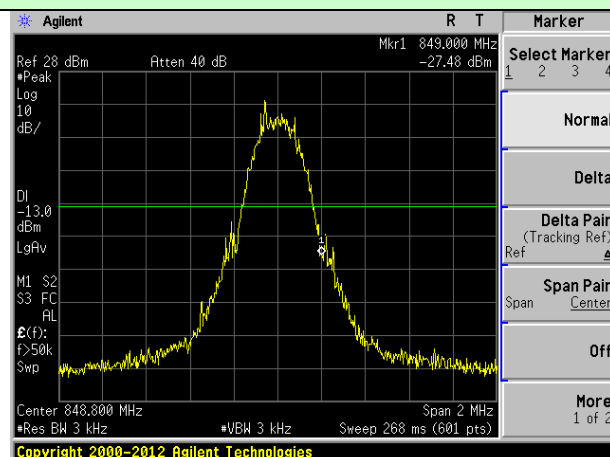
Highest channel

Band Edge:

Test Mode: Traffic mode	GSM850 (GPRS 1 link)
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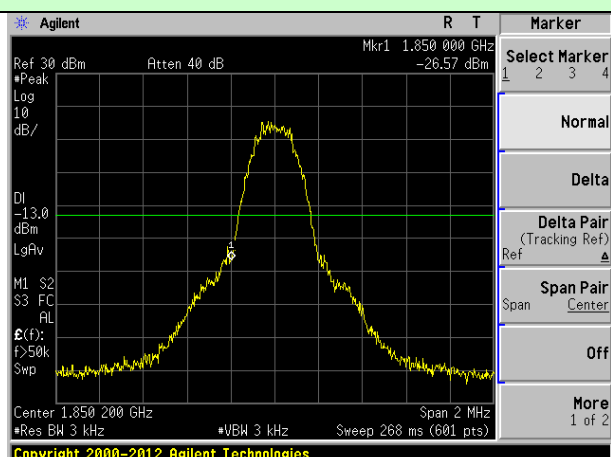


Lowest channel

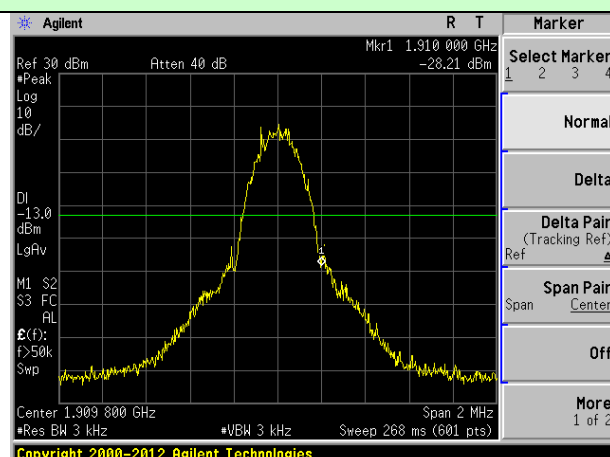


Highest channel

Test Mode: Traffic mode	PCS1900 (GPRS 1 link)
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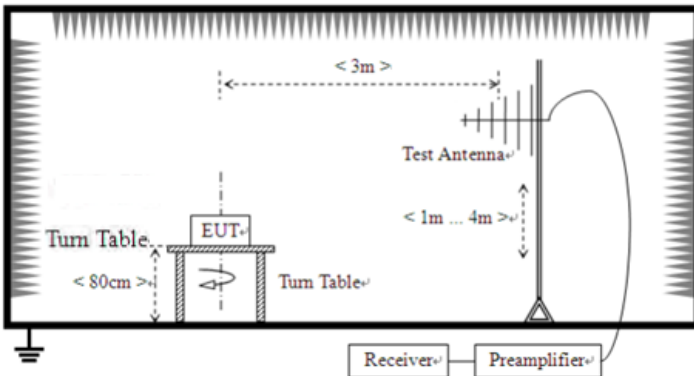
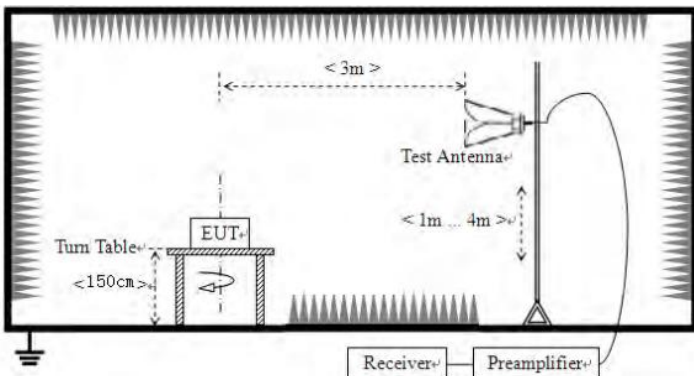
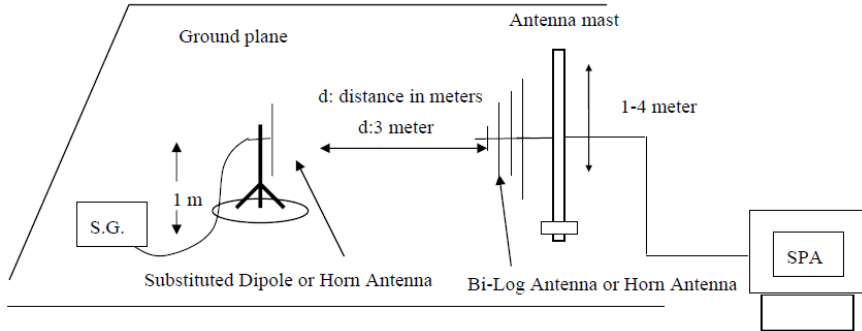


Lowest channel



Highest channel

6.8 ERP, EIRP Measurement

Test Requirement:	FCC part22.913(a) and FCC part24.232(b)
Test Method:	FCC part 2.1046 and ANSI C63.26:2015
Limit:	GSM850: 7W(38.45dBm) ERP PCS1900: 2W(33dBm) EIRP
Test setup:	Below 1GHz  Above 1GHz  Substituted method: 

Test Procedure:	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. 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. 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: $\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$ 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: $\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

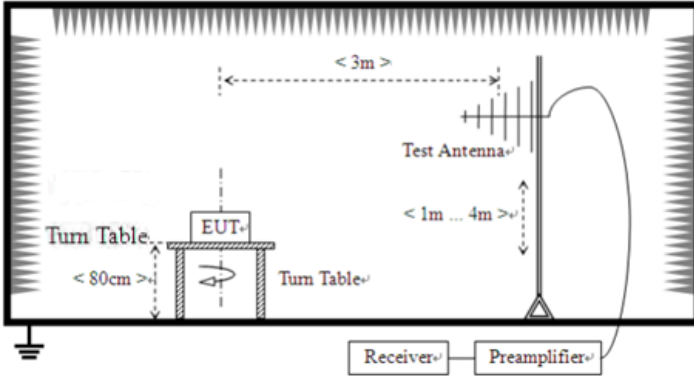
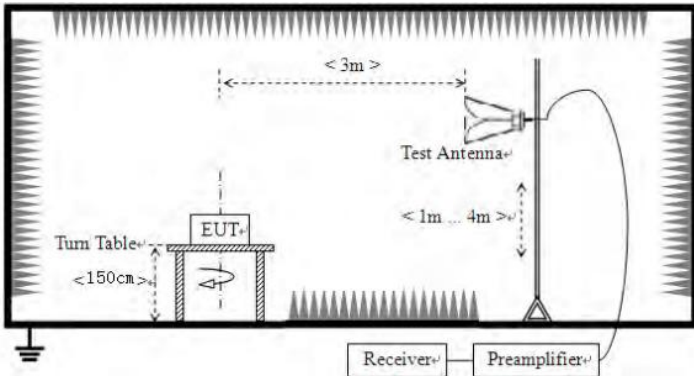
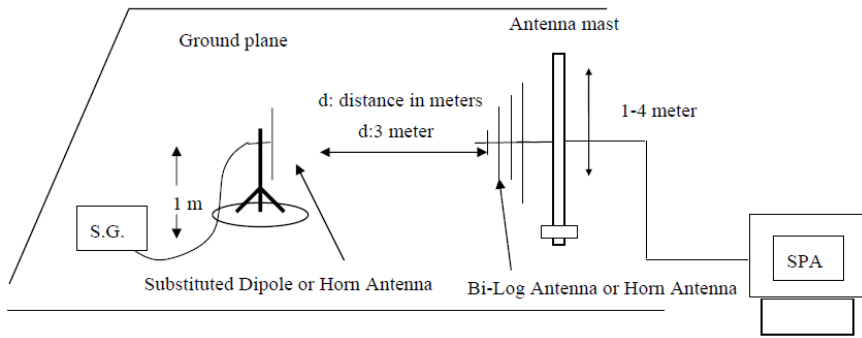
Measurement Data

Remark: All conditions have been considered and test, only the worst case report.

EUT mode	Channel	EUT Pol.	Antenna Pol.	ERP(dBm)	Limit (dBm)	Result
GSM850 (GPRS 1 link)	Lowest	H	V	32.87	38.45	Pass
			H	32.81		
		E1	V	32.61		
			H	31.96		
		E2	V	32.40		
			H	31.39		
	Middle	H	V	32.46	38.45	Pass
			H	31.18		
		E1	V	32.04		
			H	31.94		
		E2	V	32.29		
			H	31.18		
	Highest	H	V	32.51	38.45	Pass
			H	31.37		
		E1	V	32.26		
			H	31.14		
		E2	V	32.76		
			H	31.65		

EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP (dBm)	Limit (dBm)	Result
PCS1900 (GPRS 1 link)	Lowest	H	V	29.83	33.01	Pass
			H	28.62		
		E1	V	29.55		
			H	28.44		
		E2	V	29.21		
			H	28.19		
	Middle	H	V	29.68	33.01	Pass
			H	28.56		
		E1	V	29.81		
			H	28.96		
		E2	V	28.91		
			H	28.82		
	Highest	H	V	29.63	33.01	Pass
			H	28.56		
		E1	V	28.43		
			H	28.75		
		E2	V	29.39		
			H	28.46		

6.9 Field strength of spurious radiation measurement

Test Requirement:	FCC part22.917 and FCC part24.238
Test Method:	FCC part 2.1053 and ANSI C63.26:2015
Limit:	-13dBm
Test setup:	Below 1GHz  Above 1GHz  Substituted method: 

Test Procedure:	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. 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. 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. 4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. $\text{ERP / EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dB/dBi)} - \text{Cable Loss (dB)}$
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 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	-41.22	-13.00	Pass
2472.60	V	-44.08		
3296.80	V	-46.31		
4121.00	V	-49.46		
4945.20	V	---		
1648.40	Horizontal	-35.85	-13.00	Pass
2472.60	H	-38.45		
3296.80	H	-40.71		
4121.00	H	-42.36		
4945.20	H	---		
Test mode:	GSM850		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.20	Vertical	-37.03	-13.00	Pass
2509.80	V	-39.58		
3346.40	V	-41.29		
4183.00	V	-42.10		
5019.60	V	---		
1673.20	Horizontal	-41.38	-13.00	Pass
2509.80	H	-44.25		
3346.40	H	-45.34		
4183.00	H	-47.32		
5019.60	H	---		
Test mode:	GSM850		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1697.60	Vertical	-37.59	-13.00	Pass
2546.40	V	-39.20		
3395.20	V	-41.36		
4244.00	V	-43.08		
5092.80	V	---		
1697.60	Horizontal	-41.46	-13.00	Pass
2546.40	H	-44.28		
3395.20	H	-46.46		
4244.00	H	-48.25		
5092.80	H	---		

Remarks:

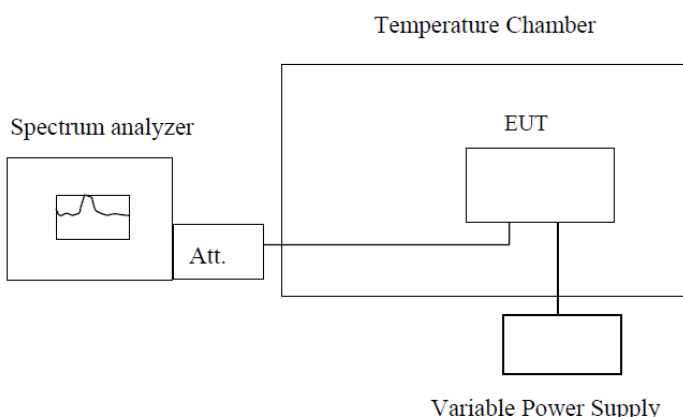
1. The emission behaviour belongs to narrowband spurious emission.
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

Test mode:	PCS1900		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3700.40	Vertical	-34.22	-13.00	Pass
5550.60	V	-37.14		
7400.80	V	-39.81		
9251.00	V	-41.21		
11101.20	V	---		
3700.40	Horizontal	-39.05	-13.00	Pass
5550.60	H	-42.14		
7400.80	H	-44.48		
9251.00	H	-46.75		
11101.20	H	---		
Test mode:	PCS1900		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-35.11	-13.00	Pass
5640.00	V	-38.28		
7520.00	V	-40.14		
9400.00	V	-42.65		
11280.00	V	---		
3760.00	Horizontal	-40.37	-13.00	Pass
5640.00	H	-43.18		
7520.00	H	-45.34		
9400.00	H	-47.25		
11280.00	H	---		
Test mode:	PCS1900		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3819.60	Vertical	-33.55	-13.00	Pass
5729.40	V	-36.04		
7639.20	V	-38.13		
9549.00	V	-40.06		
11458.80	V	---		
3819.60	Horizontal	-38.31	-13.00	Pass
5729.40	H	-41.84		
7639.20	H	-43.30		
9549.00	H	-45.83		
11458.80	H	---		

Remarks:

1. The emission behaviour belongs to narrowband spurious emission.
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

6.10 Frequency stability V.S. Temperature measurement

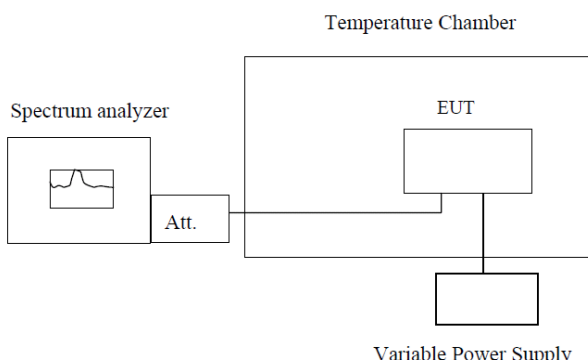
Test Requirement:	FCC part 22.355 and FCC part 24.235
Test Method:	FCC Part2.1055(a)(1)(b)
Limit:	2.5ppm
Test setup:	 Note : Measurement setup for testing on Antenna connector
Test procedure:	1. The equipment under test was connected to an external DC power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 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	21	0.0249	2.5	Pass
	-20	23	0.0276		
	-10	25	0.0294		
	0	20	0.0239		
	10	23	0.0280		
	20	20	0.0239		
	30	34	0.0404		
	40	24	0.0289		
	50	23	0.0276		

Reference Frequency: PCS1900 (GPRS 1 link) Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error			Result
		Hz	ppm		
3.70	-30	38	0.0203	2.5	Pass
	-20	44	0.0236		
	-10	25	0.0294		
	0	20	0.0239		
	10	23	0.0280		
	20	20	0.0239		
	30	34	0.0404		
	40	42	0.0223		
	50	44	0.0236		

6.11 Frequency stability V.S. Voltage measurement

Test Requirement:	FCC part 22.355 and FCC part 24.235
Test Method:	FCC Part2.1055(d)(1)(2)
Limit:	2.5ppm
Test setup:	 Note : Measurement setup for testing on Antenna connector
Test procedure:	1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 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	4.255	27	0.0323	2.5	Pass
	3.70	31	0.0373		
	3.145	35	0.0423		
Reference Frequency: PCS1900 (GPRS 1 link) Middle channel=661 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.255	38	0.0453	2.5	Pass
	3.70	48	0.0573		
	3.145	28	0.0333		

7 Test Setup Photo

Reference to the **appendix I** for details.

8 EUT Constructional Details

Reference to the **appendix II** for details.

-----End-----