FCC Report

(PCS1900)

Applicant:	Vitall Inc.
Address of Applicant:	4539 Metropolitan Court, Frederick, MD 21704
Equipment Under Test (EUT)	
Product Name:	Vitall
Trade mark:	Vitall
Model No.:	V-HM011
FCC ID:	2ABMUV-HM011
Applicable standards:	FCC CFR Title 47 Part 2: 2012 FCC CFR Title 47 Part24 Subpart E: 2012
Date of sample receipt:	December 10, 2013
Date of Test:	December 10, 2013-January 03, 2014
Date of report issued:	January 03, 2014
Test Result :	PASS *

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

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*January 03, 2014*	*Original*

Prepared By: hank. yan ***Date:*** *January 03, 2014*

Project Engineer

Check By: Hans. Hu ***Date:*** *January 03, 2014*

Reviewer

3 Contents

4 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Pass* (Please refer to SAR Report)
Conducted emission	Part15.207	Pass
RF Output Power	Part 2.1046 Part 24.232 (c)	Pass
Modulation Characteristics	Part 2.1047	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 24.238	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 24.238 (a)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 24.238 (a)	Pass
Out of band emission, Band Edge	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 Client Information

Applicant:	Vitall Inc.
Address of Applicant:	4539 Metropolitan Court, Frederick, MD 21704
Manufacturer:	JXJ Technologies, Inc.
Address of Manufacturer:	One Meca Way, Norcross, GA 30093, USA
Factory:	JXJ Technologies, Inc.
Address of Factory:	One Meca Way, Norcross, GA 30093, USA

5.2 General Description of EUT

Product Name:	Vitall
Trade mark:	Vitall
Model No.:	V-HM011
Hardware Version:	MT6250
Software Version:	MAUI.11B.W11.32.SP.V2.F3.P1
Support Networks:	GSM, GPRS,
Support Bands:	PCS1900
TX Frequency:	1850.20MHz-1909.80MHz
GPRS Class:	12
Modulation type:	GMSK
Antenna type:	Integral antenna
Antenna gain:	1dBi
Power supply:	Type: lithium-ion 3.7V Voltage: DC 3.7V

Operation Frequency List:

PCS1900	
Channel	Frequency (MHz)
512	1850.20
513	1850.40
⋮	⋮
660	1879.80
661	1880.00
662	1880.20
⋮	⋮
809	1909.60
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:

PCS1900	
Channel	Frequency (MHz)
512	1850.20
661	1880.00
810	1909.80

5.3 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.

5.4 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

5.5 Test Facility

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

- **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly 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.

5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

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	Mar. 29 2013	Mar. 28 2014
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	Jul. 02 2013	Jul. 01 2014
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 24 2013	Feb. 23 2014
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 28 2013	June 27 2014
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 29 2013	Mar. 28 2014
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	Mar. 30 2013	Mar. 29 2014
9	Coaxial Cable	GTS	N/A	GTS211	Mar. 30 2013	Mar. 29 2014
10	Coaxial cable	GTS	N/A	GTS210	Mar. 30 2013	Mar. 29 2014
11	Coaxial Cable	GTS	N/A	GTS212	Mar. 30 2013	Mar. 29 2014
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 02 2013	Jul. 01 2014
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 02 2013	Jul. 01 2014
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 28 2013	June 27 2014
15	Band filter	Amindeon	82346	GTS219	Mar. 30 2013	Mar. 29 2014
16	Universal radio communication tester	Rohde & Schwarz	CMU200	GTS235	May 10 2013	May 09 2014
17	Signal Generator	Rohde & Schwarz	SML03	GTS236	May 10 2013	May 09 2014
18	Temp. Humidity/ Barometer	Oregon Scientific	BA-888	GTS248	May 10 2013	May 09 2014
19	D.C. Power Supply	Instek	PS-3030	GTS232	NA	NA
20	Splitter	Agilent	11636B	GTS237	May 10 2013	May 09 2014
21	Power meter	Rohde & Schwarz	NRVS	GTS238	May 10 2013	May 09 2014
22	Spectrum Analyzer	Agilent	E4440A	GTS533	Dec. 6, 2012	Dec. 5, 2014

7 System test configuration

7.1 Test mode

GTS has verified the construction and function in typical operation, all the test modes were carried out with the EUT in normal operation, which was shown in this test report.

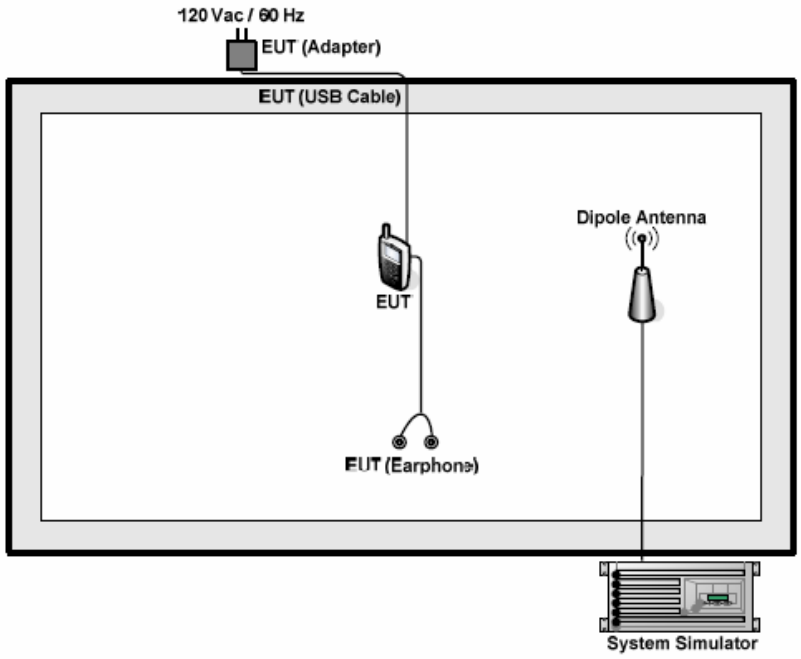
Test mode	PCS 1900 Link

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.

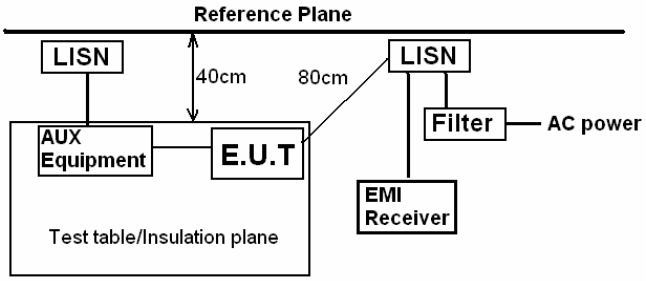
The conducted power tables are as follows:

Band	PCS1900		
Channel	512	661	810
Frequency	1850.20	1880.00	1909.80
GSM (GMSK, 1 TX slot)	28.90	28.45	28.96
GPRS (GMSK, 1 TX slot)	28.69	28.32	28.90
GPRS (GMSK, 2 TX slot)	28.29	28.14	28.83
GPRS (GMSK, 3 TX slot)	27.83	27.36	28.12
GPRS (GMSK, 4 TX slot)	26.84	26.20	26.84

7.2 Configuration of Tested System

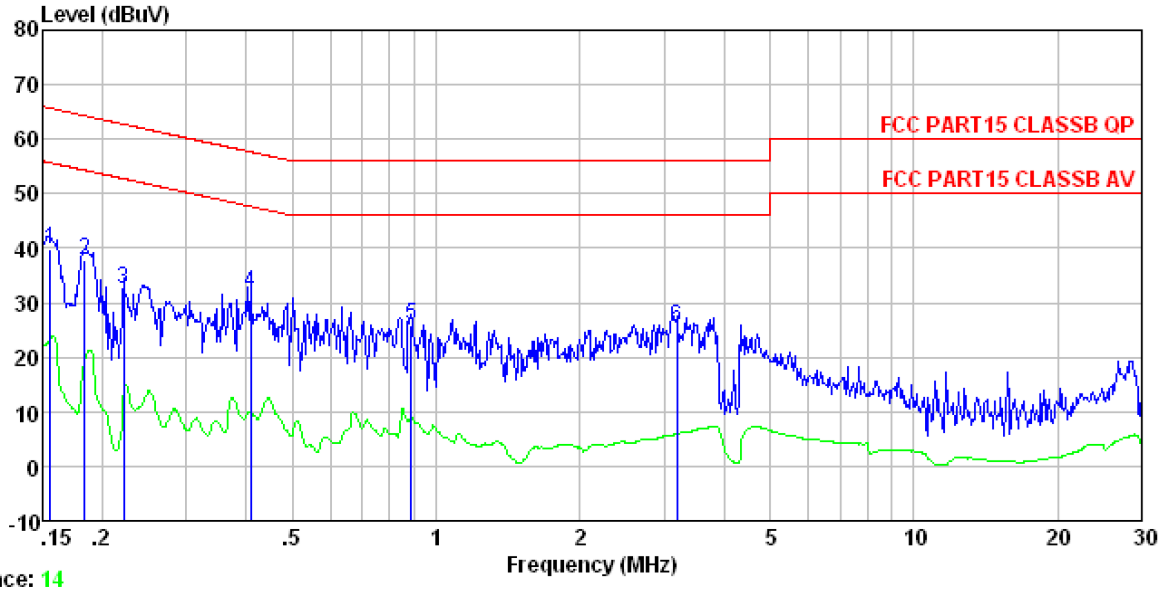


7.3 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.4:2003
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Charging + PCS1900 mode
Test results:	Pass

Measurement data:

Line:

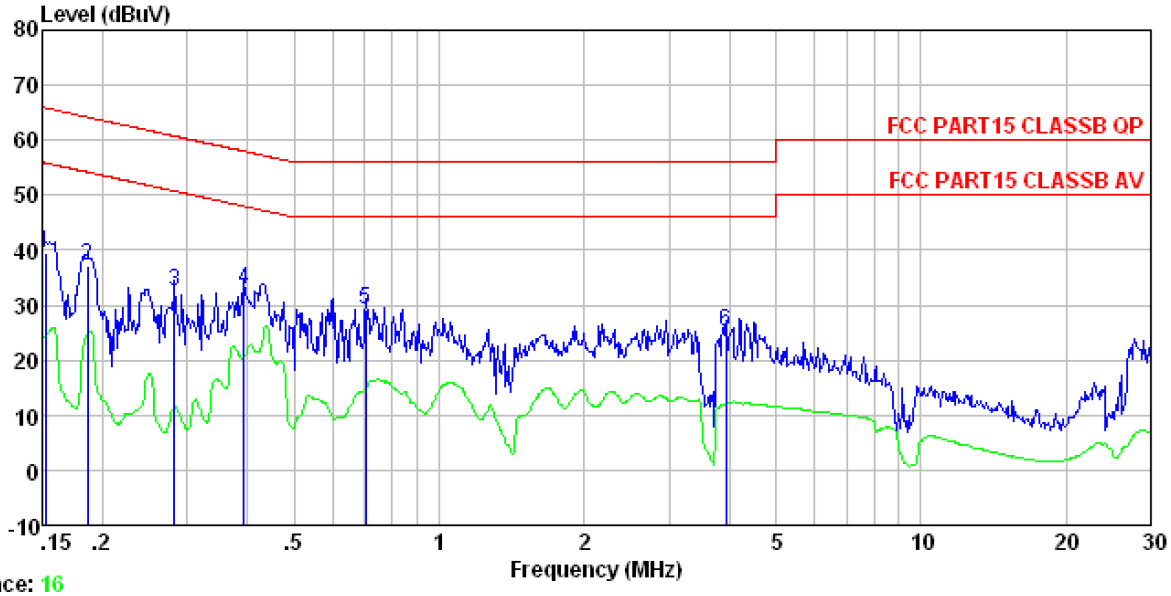


Trace: 14

Condition : FCC PART15 CLASSB QP LISN-2013 LINE
Job No. : 1969RF
Test mode : GSM mode
Test Engineer: Bing

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.156	39.67	0.15	0.12	39.94	65.69	-25.75	QP
2	0.183	37.50	0.14	0.13	37.77	64.33	-26.56	QP
3	0.222	32.40	0.13	0.12	32.65	62.74	-30.09	QP
4	0.408	31.54	0.11	0.11	31.76	57.68	-25.92	QP
5	0.885	25.70	0.14	0.13	25.97	56.00	-30.03	QP
6	3.190	25.36	0.17	0.15	25.68	56.00	-30.32	QP

Neutral:



Trace: 16

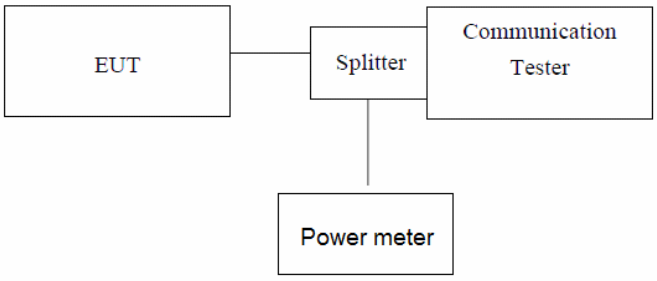
Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
Job No. : 1969RF
Test mode : GSM mode
Test Engineer: Bing

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.152	39.29	0.07	0.12	39.48	65.87	-26.39	QP
2	0.186	37.10	0.07	0.13	37.30	64.20	-26.90	QP
3	0.282	32.47	0.06	0.10	32.63	60.76	-28.13	QP
4	0.393	32.61	0.06	0.11	32.78	57.99	-25.21	QP
5	0.705	29.11	0.07	0.13	29.31	56.00	-26.69	QP
6	3.943	24.89	0.14	0.15	25.18	56.00	-30.82	QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

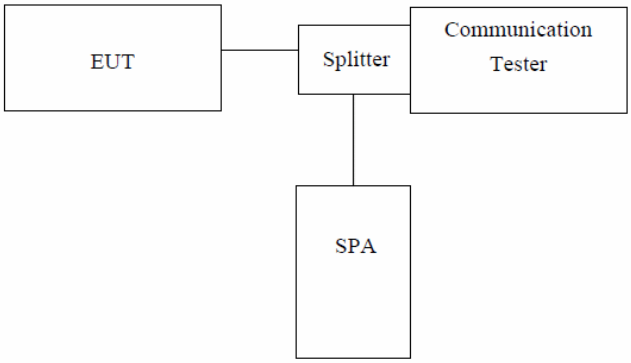
7.4 Conducted Peak Output Power

Test Requirement:	FCC part24.232(b)
Test Method:	FCC part2.1046
Limit:	2W
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
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 average power.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

EUT Mode	Channel	Frequency (MHz)	PK power (dBm)	Limit (dBm)	Result
PCS 1900 (GSM link)	512	1850.20	28.90	33.01	Pass
	661	1880.00	28.45		
	810	1909.80	28.96		

7.5 Occupy Bandwidth

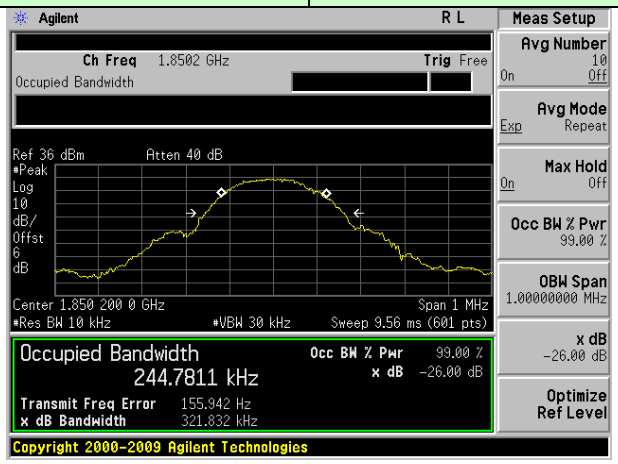
Test Requirement:	FCC part24.232(b)
Test Method:	FCC part2.1049
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% of emission BW, VBW= 3 times RBW. 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 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

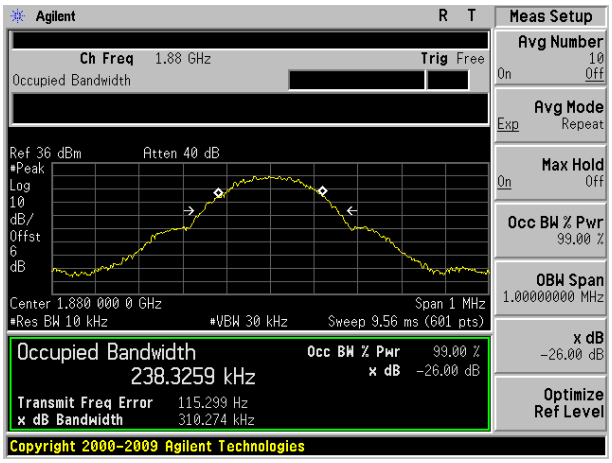
EUT Mode	Channel	Frequency (MHz)	99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
PCS 1900 (GSM link)	512	1850.20	244.78	321.83
	661	1880.00	238.33	310.27
	810	1909.80	239.73	315.86

Test plot as follows:

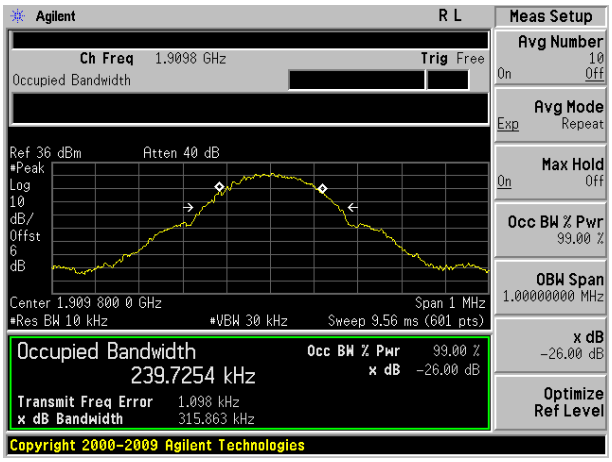
Test band:	PCS 1900 (GSM link)



Lowest channel



Middle channel

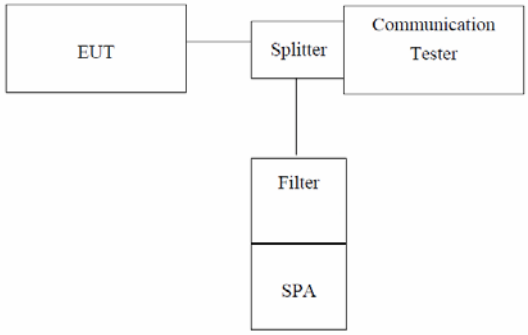


Highest channel:

7.6 MODULATION CHARACTERISTIC

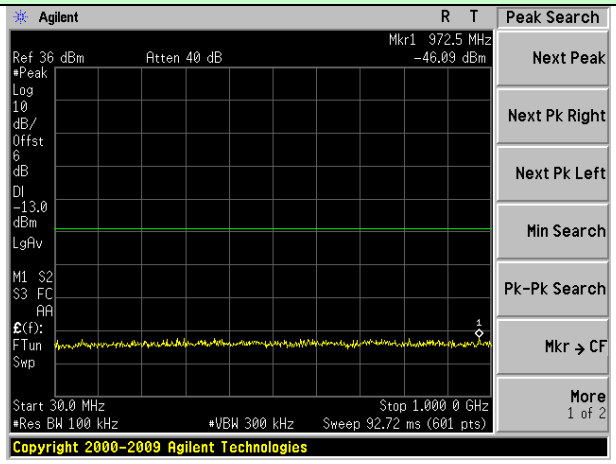
According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

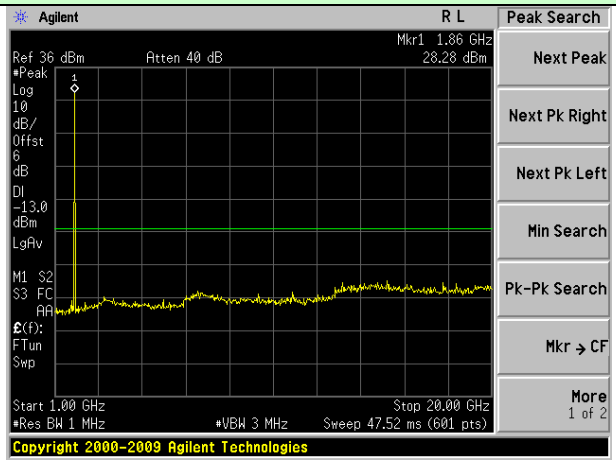
7.7 Out of band emission at antenna terminals

Test Requirement:	FCC part24.238(a)
Test Method:	FCC part2.1051
Limit:	-13dBm
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
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 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

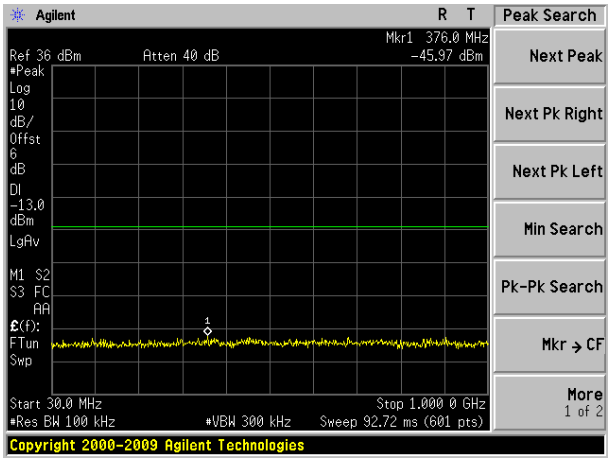
Test plot as follows:

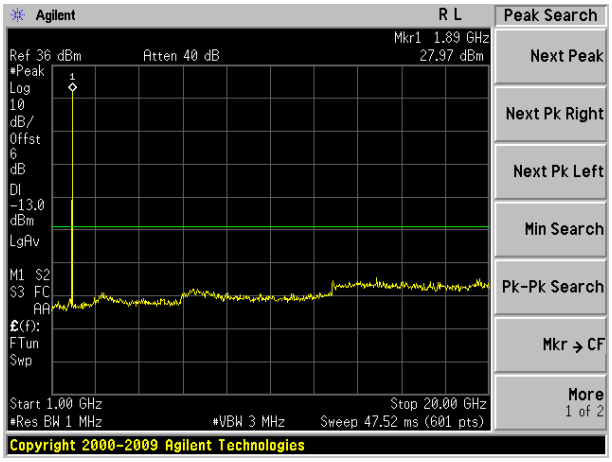
Test Mode:	PCS1900 (GSM link)



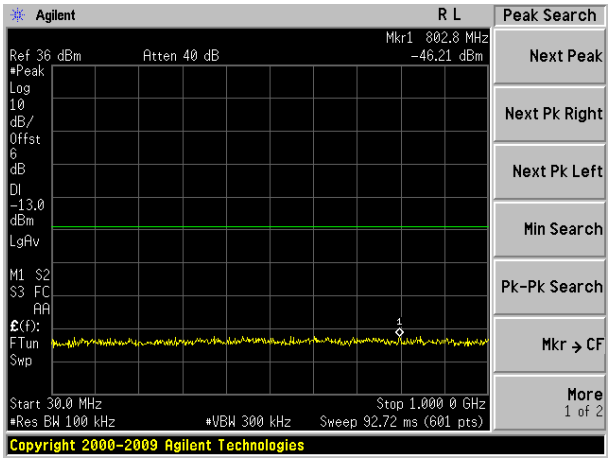


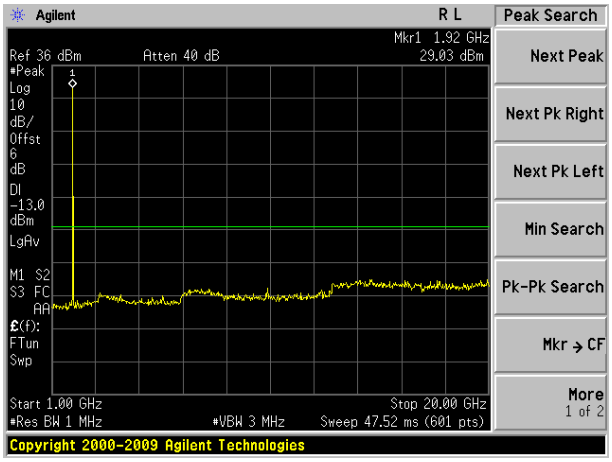
Lowest channel





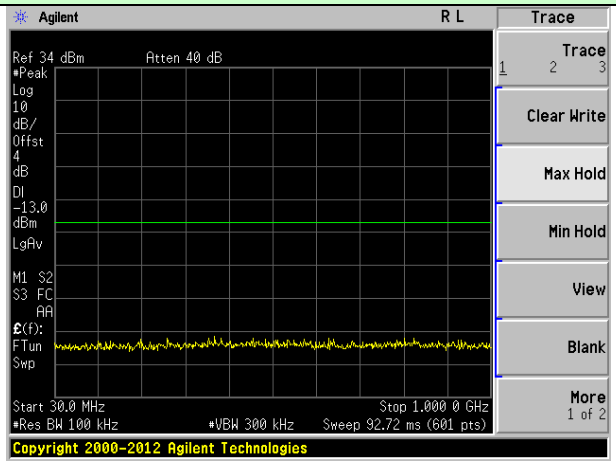
Middle channel

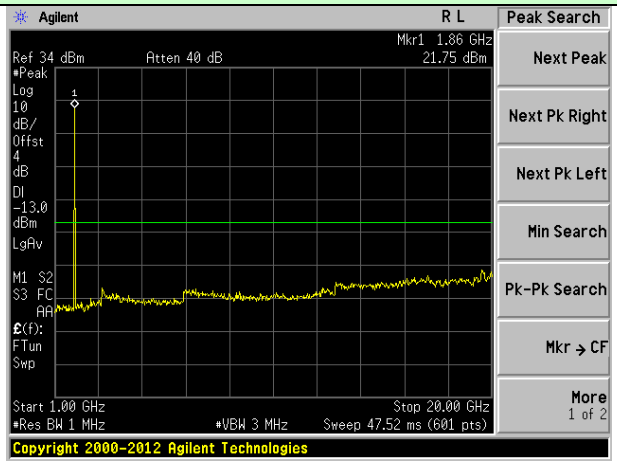




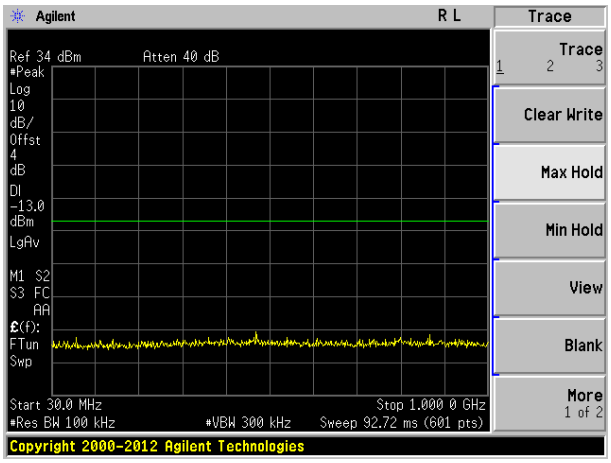
Highest channel

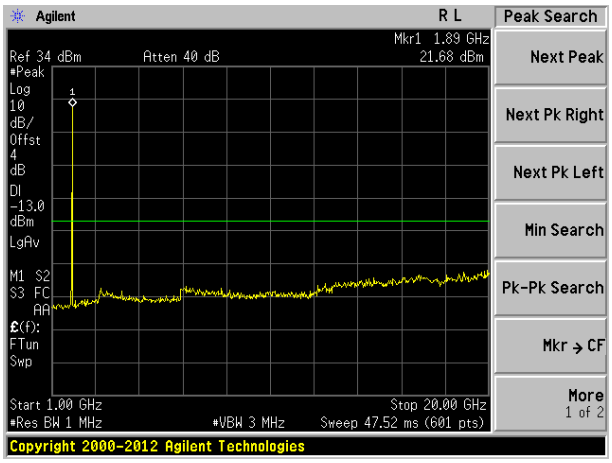
Test Mode:	WCDMA Band II (RMC 12.2Kbps link)



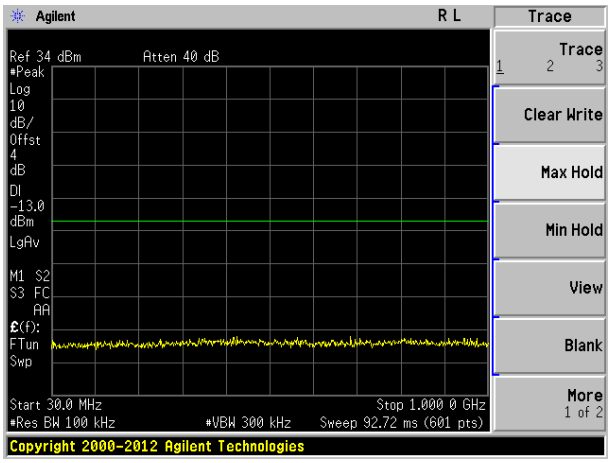


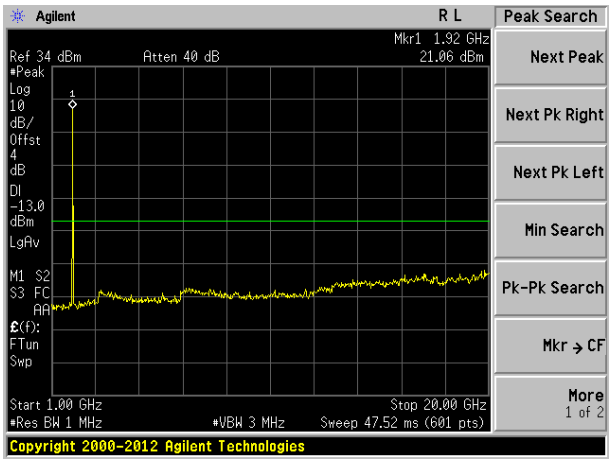
Lowest channel





Middle channel

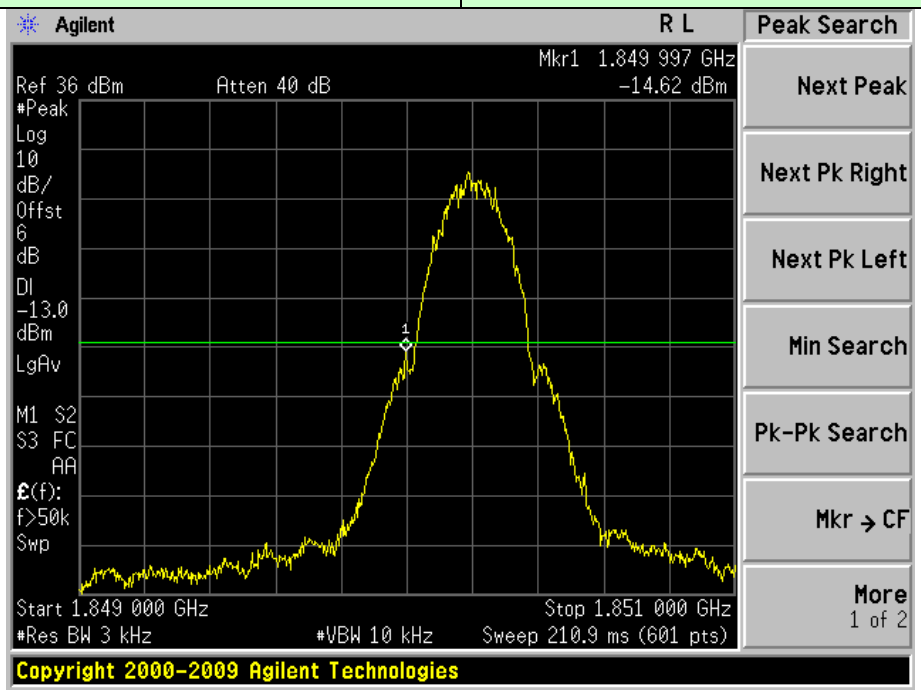




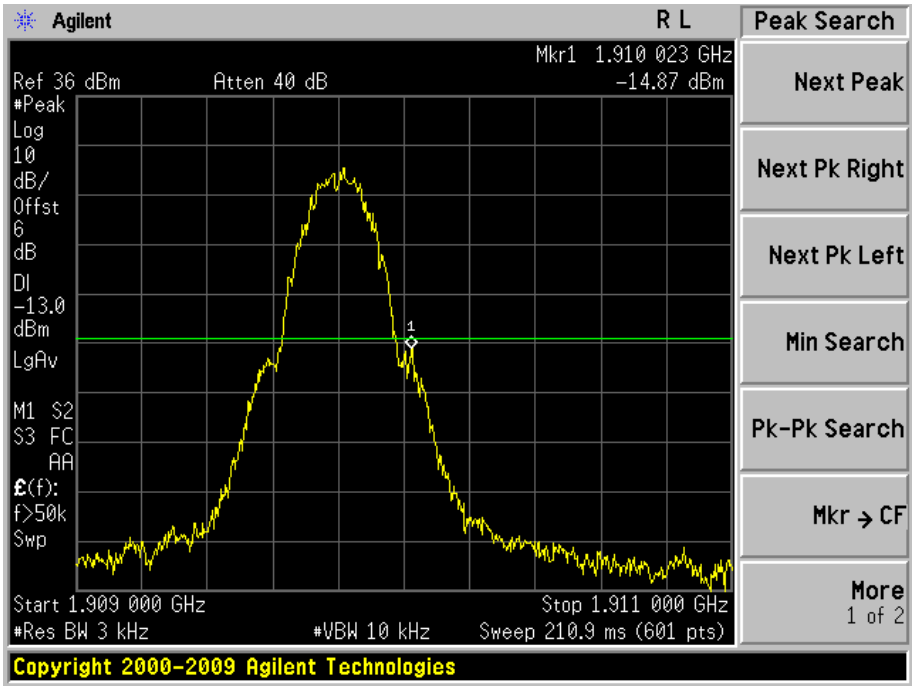
Highest channel

Band Edge:

Test Mode:	PCS1900 (GSM link)

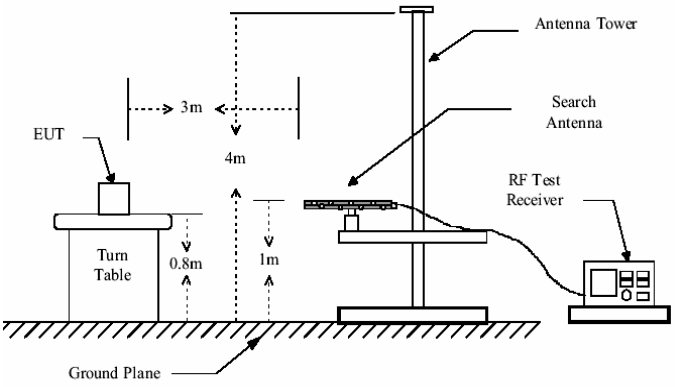
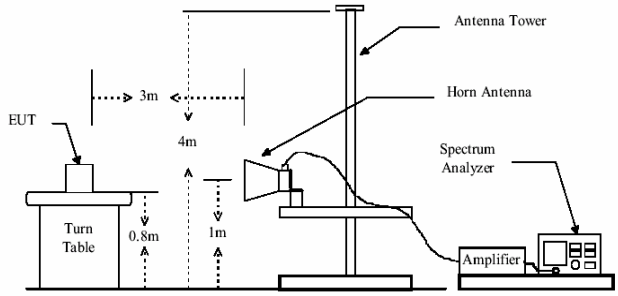
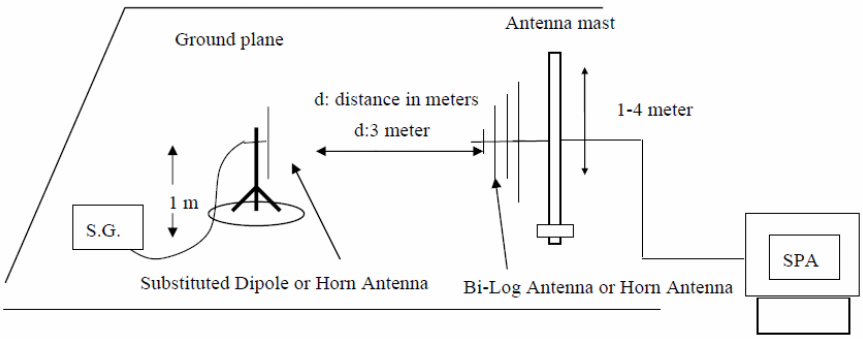


Lowest channel



Highest channel

7.8 EIRP Measurement

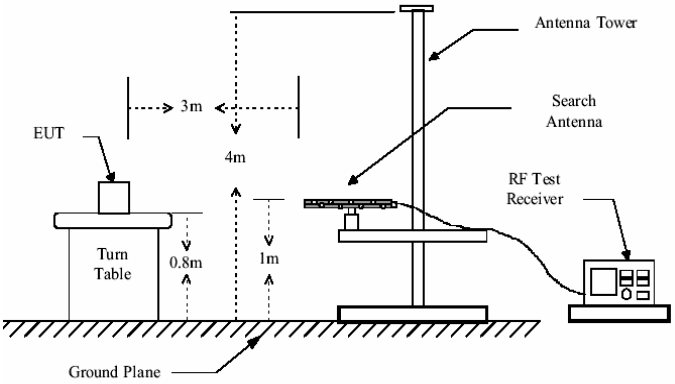
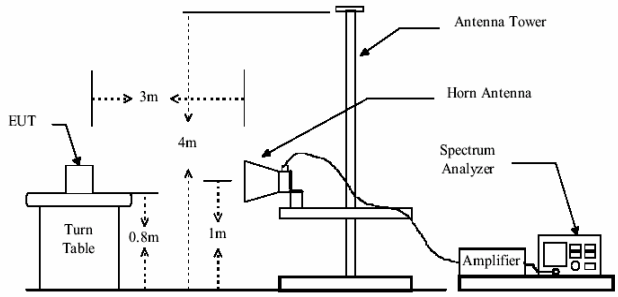
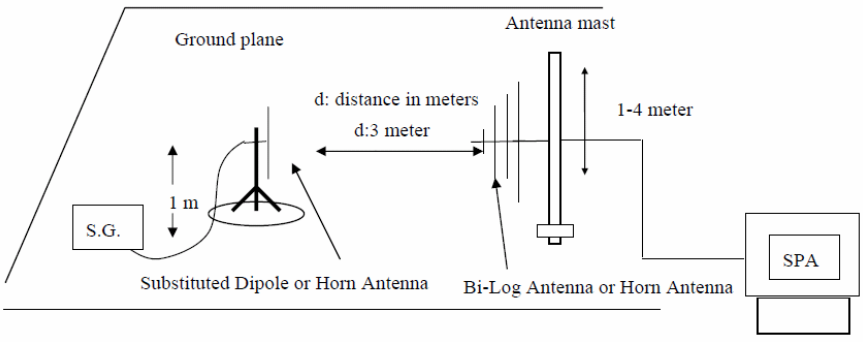
Test Requirement:	FCC part24.232(b)
Test Method:	FCC part2.1046
Limit:	PCS1900 2W EIRP
Test setup:	Below 1GHz  Above 1GHz  Substituted method: 

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 asfollows: ERP = S.G. output (dBm) + Antenna Gain (dBd) – 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: EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

EUT mode	Channel	EUT Pol.	Antenna Pol.	EIRP (dBm)	Limit (dBm)	Result
PCS1900 (GSM link)	Lowest	H	V	29.86	33.01	Pass
			H	26.10		
		E1	V	19.50		
			H	26.64		
		E2	V	18.65		
			H	23.96		
	Middle	H	V	29.57	33.01	Pass
			H	25.96		
		E1	V	19.52		
			H	26.70		
		E2	V	20.22		
			H	24.18		
	Highest	H	V	30.02	33.01	Pass
			H	25.44		
		E1	V	19.23		
			H	25.09		
		E2	V	17.41		
			H	24.36		

7.9 Field strength of spurious radiation measurement

Test Requirement:	FCC part24.238(a)
Test Method:	FCC part2.1053
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. ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB)
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

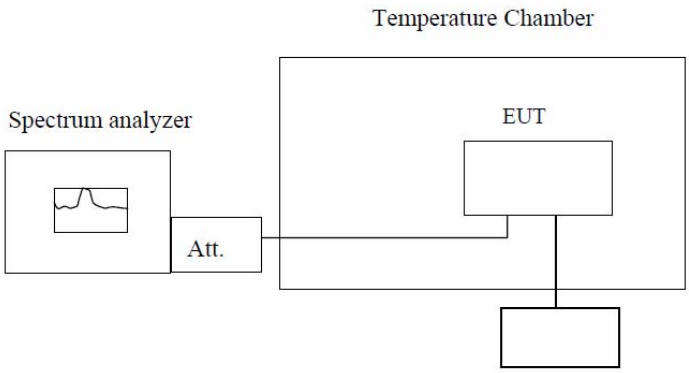
Measurement Data

Test mode:	PCS1900		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3700.40	Vertical	-36.19	-13.00	Pass
5550.60	V	-38.50		
7400.80	V	-40.40		
9251.00	V	-42.26		
11101.20	V	---		
3700.40	Horizontal	-40.63	-13.00	Pass
5550.60	H	-43.91		
7400.80	H	-45.21		
9251.00	H	-47.50		
11101.20	H	---		
Test mode:	**PCS1900**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-36.42	-13.00	Pass
5640.00	V	-39.45		
7520.00	V	-41.94		
9400.00	V	-44.37		
11280.00	V	---		
3760.00	Horizontal	-42.24	-13.00	Pass
5640.00	H	-46.53		
7520.00	H	-48.24		
9400.00	H	-51.24		
11280.00	H	---		
Test mode:	**PCS1900**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3819.60	Vertical	-36.13	-13.00	Pass
5729.40	V	-39.01		
7639.20	V	-41.37		
9549.00	V	-43.68		
11458.80	V	---		
3819.60	Horizontal	-41.66	-13.00	Pass
5729.40	H	-45.73		
7639.20	H	-47.36		
9549.00	H	-50.21		
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.

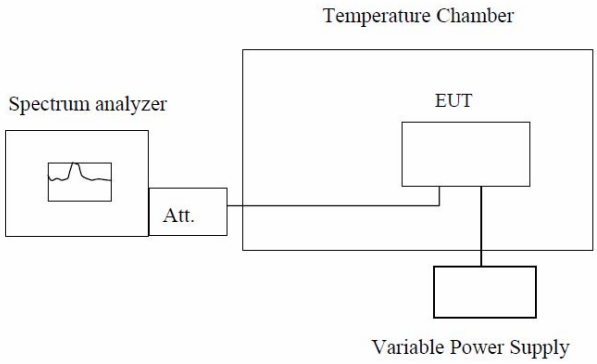
7.10 Frequency stability V.S. Temperature measurement

Test Requirement:	FCC Part2.1055(a)(1)(b)
Test Method:	FCC Part2.1055(a)(1)(b)
Limit:	2.5ppm
Test setup:	 **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℃ operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –20℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error			Result
		Hz	ppm		
3.70	-30	28	0.0335	2.5	Pass
	-20	26	0.0311		
	-10	23	0.0275		
	0	22	0.0263		
	10	21	0.0251		
	20	19	0.0227		
	30	22	0.0263		
	40	24	0.0287		
	50	23	0.0275		

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:	 **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. Set chamber temperature to 25℃. 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 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

Reference Frequency: PCS1900 (GSM link) Middle channel=661 channel=1880MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	4.25	26	0.0197	2.5	Pass
	3.70	20	0.0223		
	3.40	23	0.0207		

------End------