ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 22 SUBPART H and PART 24 SUBPART E

OF

Product Name:	**Waterproof Tracker**
Brand Name:	**ARKNAV**
Model Name:	**R-35W**
Model Differences:	**N/A**
FCC ID:	**XXFR35W**
Report No.:	**EH/2009/A0007**
Issue Date:	**Nov. 15, 2009**
FCC Rule Part:	**2 , 22H & 24E**
Prepared for:	**ARKNAV International Inc** **8F-1,No.152,Sec.1,Jungshan Rd,** **Shulin City,Taipei County,Taiwan 238,R.O.C**
Prepared by:	**SGS Taiwan Ltd.** **Electronics & Communication Laboratory** **No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei County, Taiwan.**

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VERIFICATION OF COMPLIANCE

Applicant:	ARKNAV International Inc 8F-1,No.152,Sec.1,Jungshan Rd, Shulin City,Taipei County,Taiwan 238,R.O.C
Product Description:	Waterproof Tracker
Brand Name:	ARKNAV
FCC ID:	XXFR35W
Model No.:	R-35W
Model Difference:	N/A
File Number:	EH/2009/A0007
Date of test:	Oct. 12, 2009 ~ Nov. 05, 2009
Date of EUT Received:	Oct. 12, 2009

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-C-2004 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rule FCC PART 22 subpart H and FCC PART 24 subpart E.

The test results of this report relate only to the tested sample identified in this report.

Test By:		***Date:***	Nov. 15, 2009
	Jason Wu / Sr.Engineer		
Prepared By:		***Date:***	Nov. 15, 2009
	Mark Chung / Project Engineer		
Approved By		***Date:***	Nov. 15, 2009
	Vincent Su/Manager		

Version

Version No.	Date	Description
00	Nov. 15, 2009	Initial creation of document

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1. GENERAL INFORMATION

General:

Product Name:	Waterproof Tracker	
Brand Name:	ARKNAV	
Model Name:	R-35W	
Model Difference:	N/A	
Power Supply:	3.7Vdc by battery or 12/24Vdc by car battery	
	Battery:	Model: UF553450F Supplier: Sanyo

GSM:

GSM Modular Report:	ShenZhen Electronic Product Quality Testing Center Report no: FCC06-8038 Model Number: SIM340		
Cellular Phone Standards Frequency Range and Power:	GSM/GPRS, 850, Class 10	824.2 MHz– 848.8 MHz	33 dBm
	GSM/GPRS, 900, Class 10	880.2 MHz– 914.8 MHz	33 dBm
	GSM/GPRS, 1800, Class 10	1710.2MHz-1784.8MHz	30 dBm
	GSM/GPRS, 1900, Class 10	1850.2MHz-1909.8MHz	30 dBm
Type of Emission:	GSM 850: 276KG7W，PCS 1900: 284KGXW		
Hardware Version:	V2		
Software Version:	V2		
IMEI:	354779030684709		
Antenna Designation:	Printed Antenna ; Gain: -0.94dBi		

GPS:

Receiver Frequency:	L1 Band, 1575.42MHz
Frequency Conversion Oscillator:	32.768KHz
Antenna Designation:	Patch Antenna

This test report applies for GSM /GPRS 850 and GSM/ GPRS 1900

1.1 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **XXFR35W** filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules.

1.2 Test Methodology

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

1.3 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-1

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

All equipment is calibrated externally and traceable to SI (International System of Unit).

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

2. SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 AC Power Line Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in TIA/EIA 603-C. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz us- ing CISPR Quasi-Peak and Average detector mode.

2.3.2 Conducted Measurement at Antenna Port:

According to measurement procured TIA/EIA 603C, the EUT is placed on a turn table which is 0.8 m above ground plane. A low loss of RF cable was used to con- nect the antenna port of EUT to measurement equipment.

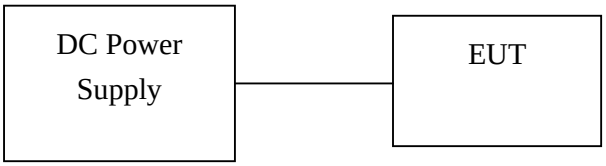
2.3.3 Radiated Emissions (ERP/EIRP):

According to measurement procured TIA/EIA 603C. The EUT is placed on a turn table which is 1.0 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements.

A standard antenna was used to replace the EUT and connect to the SG. Adjust the SG output level to reach the max emission level which were measured above.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed Channel)



Remote Side

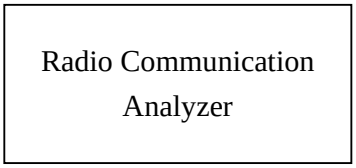


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	Universal Radio Communication Tester	R &S	CMU200	102189	N/A	shielded
2.	DC Power Supply	Topward	3303A	715856	N/A	shielded

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§2.1046(a) §22.913(a) §24.232(c)(d)	RF Power Output	Compliant
§2.1046(a) §22.913(a)(2) §24.232(c)	ERP/ EIRP measurement	Compliant
§2.1049(h)	99% Occupied Bandwidth	N/A
§2.1051 §22.917(a) §24.238(a)	Out of Band Emissions at Antenna Terminals and Band Edge	N/A
§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	Compliant
§2.1055(a)(1) $22.355 $24.235	Frequency Stability vs. Temperature	Refer to test Report: FCC06-8038
§2.1055(d)(1)(2) $22.355 $24.235	Frequency Stability vs. Voltage	Refer to test Report: FCC06-8038
§15.107;§15.207	AC Power Line Conducted Emission	N/A

4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

EUT staying in continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing.

The field strength of spurious radiation emission was measured for GPRS 850 and 1900 bands, respectively.

5. RF POWER OUTPUT MEASUREMENT

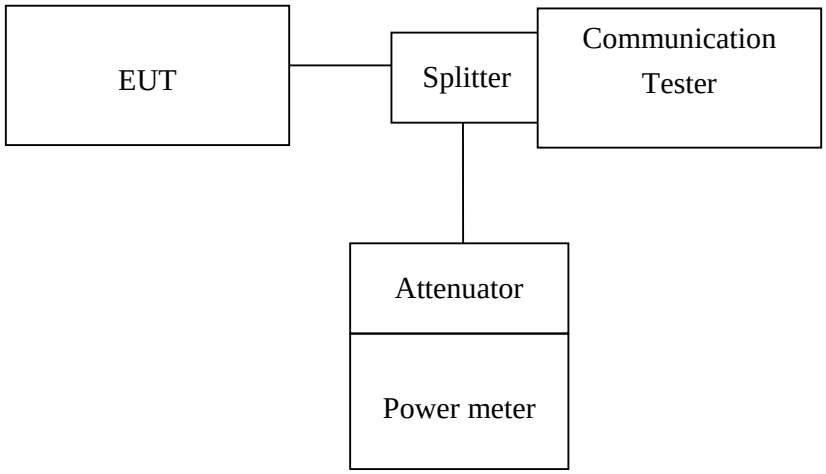
5.1 Standard Applicable

According to FCC §2.1046.

FCC 22.913(a) Mobile station are limited to 7W.

FCC 24.232(c) Mobile station are limited to 2W.

5.2 Test Set-up:



Note: *Measurement setup for testing on Antenna connector*

5.3 Measurement Procedure

The transmitter output was connected to a calibrated attenuator, the other end of which was connected to a power meter. Transmitter output was read off the power meter in dBm. The power output at the transmitter antenna port was determined by adding the value of the attenuator to the power meter reading. was used for EUT and Base station setting.

5.4 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2009	04/18/2010
Spectrum Analyzer	Agilent	E4440A	US41160416	01/23/2008	01/22/2010
Spectrum Analyzer	R&S	FSP 40	100034	02/22/2009	02/21/2010
Radio Communication Analyzer	R&S	CMU200	102189	05/13/2008	05/13/2010
800 – 1000MHz Filter	Micro-Tronics	BRM13462	001	01/05/2009	01/04/2010
1800 – 2000MHz Filter	Micro-Tronics	BRM13463	001	01/05/2009	01/04/2010
Power Sensor	Anritsu	MA2490A	31431	07/07/2009	07/06/2010
Power Meter	Anritsu	ML2487A	6K00002070	07/07/2008	07/06/2010
Temperature Chamber	TERCHY	MHG-120LF	911009	04/14/2008	04/13/2010
Temperature Chamber	GIANT FORCE	GTH-150-40-CP-AR	MAA0512-018	02/05/2008	02/04/2010
Attenuator	Mini-Circuit	BW-S20W5	N/A	07/05/2009	07/04/2010
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2009	07/04/2010
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2009	07/04/2010
Splitter	Agilent	11636B	N/A	07/05/2009	07/04/2010
Signal Generator	R&S	SMR40	100210	01/22/2009	01/21/2010
Diode Detector	Agilent	8471E	MY4224	N/A	N/A
DC Power Supply	HP	6038A	2929A-07548	06/27/2009	06/26/2010
DC Power Supply	Topward	3303D	981327	10/26/2009	10/25/2010

5.5 Measurement Result

EUT Mode	Frequency (MHz)	CH	Avg. Power (1DN 1UP) (dBm)	Avg. Power (1DN 2UP) (dBm)
GPRS 850 (Class 10)	824.2	128	31.70	31.60
	836.6	190	31.90	31.80
	848.8	251	31.90	31.80

EUT Mode	Frequency (MHz)	CH	Avg. Power (1DN 1UP) (dBm)	Avg. Power (1DN 2UP) (dBm)
GPRS 1900 (Class 10)	1850.2	512	28.80	28.80
	1880	661	28.90	28.80
	1909.8	810	29.00	29.00

Maximum Power Reduction: PCS1900 band

PCL	0	1	2	3	4	5	6	7	8
Output power (dBm)	28.9	26.1	24.2	22.2	20.2	18.4	16.4	14.4	12.2
PCL	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**
Output power (dBm)	10.2	8.2	6.2	4.2	2.2	0.1			

Note: Path Loss = 0.3dB

6. ERP, EIRP MEASUREMENT

6.1 Standard Applicable

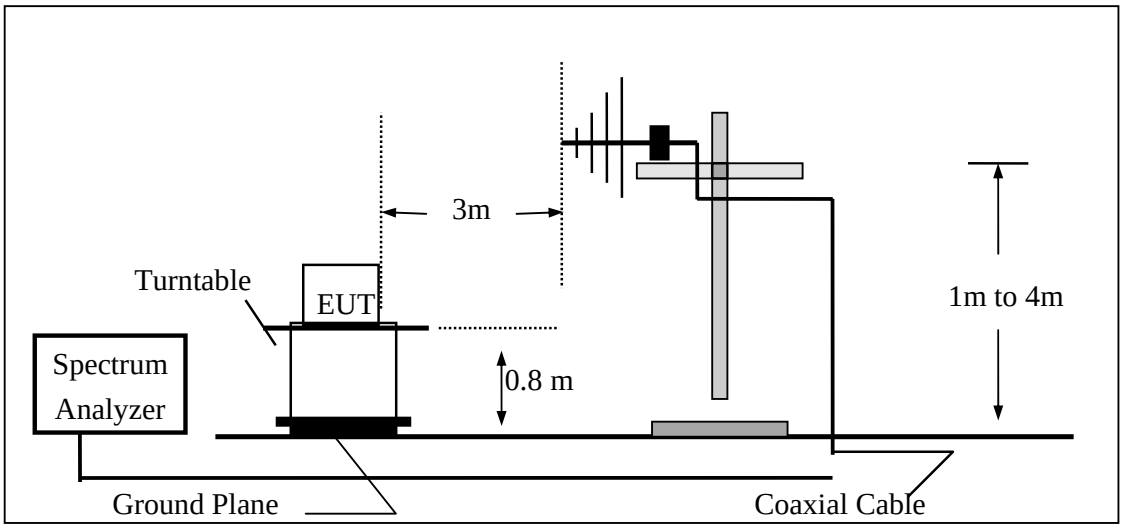
According to FCC §2.1046

FCC 22.913(a) Mobile station are limited to 7W ERP.

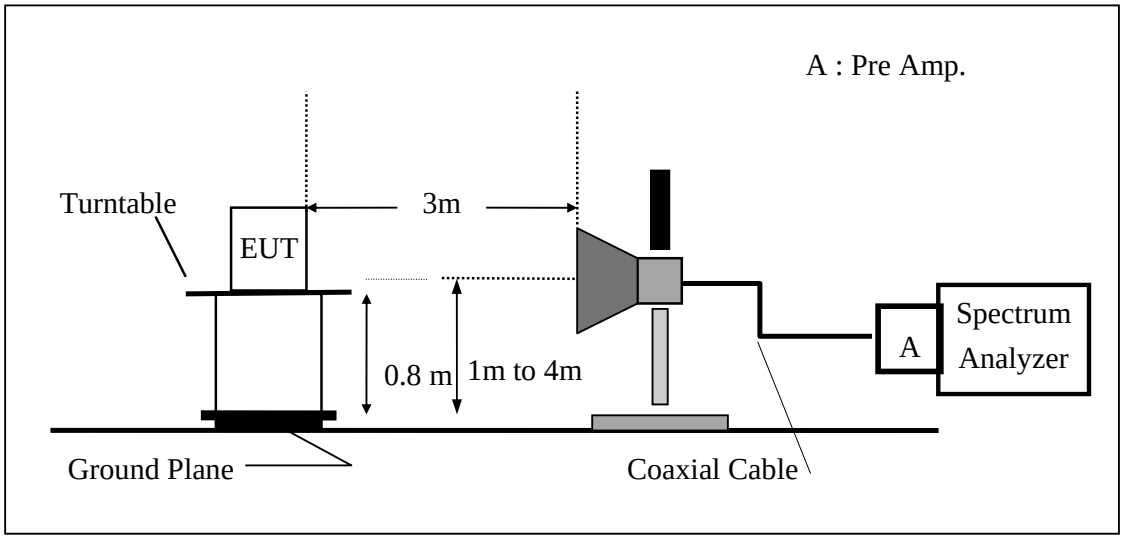
FCC 24.232(c) Mobile station are limited to 2W EIRP.

6.2 Test SET-UP (Block Diagram of Configuration)

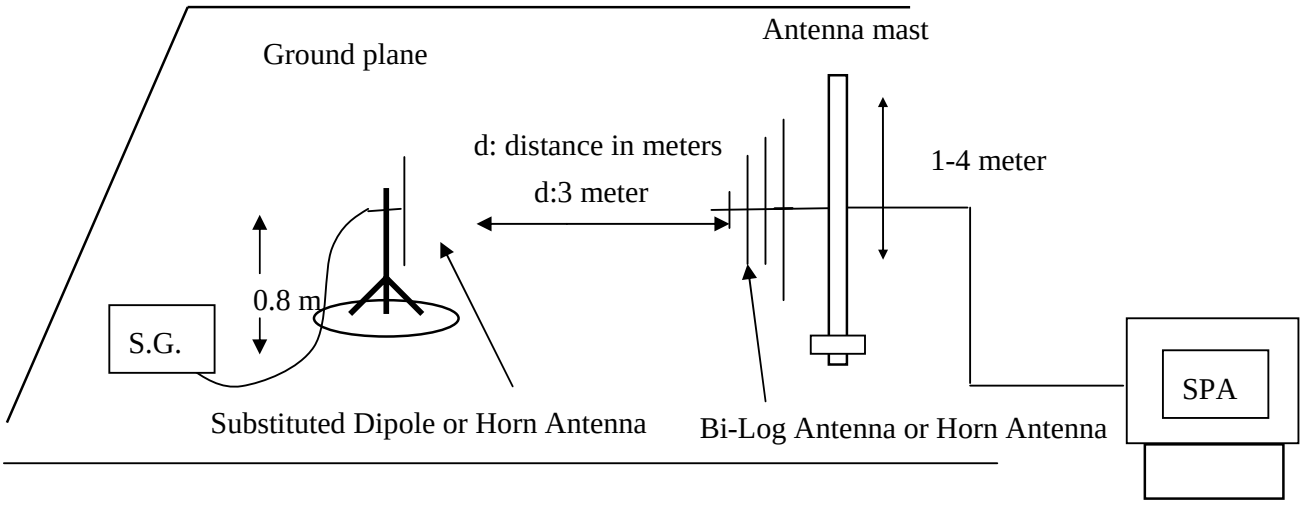
(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



(C) Substituted Method Test Set-UP



6.3 Measurement Procedure

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.

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.

ERP in frequency band 824.2 –848.8MHz 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:

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:

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)

EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)

6.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E7405A	US41160416	07/04/2009	07/03/2010
Spectrum Analyzer	Agilent	E4446A	MY43360126	04/19/2009	04/18/2010
Signal Generator	R&S	SMR40	100210	01/22/2008	01/21/2010
Signal Generator	Agilent	E4438C	MY45093613	05/22/2009	05/21/2010
Pre-Amplifier	HP	8447F	3113A06892	01/05/2009	01/04/2010
Pre-Amplifier	HP	8449B	3008A01973	01/05/2009	01/04/2010
Attenuator	Mini-Circuit	BW-S20W5	N/A	07/05/2009	07/04/2010
Attenuator	Mini-Circuit	BW-S10W5	N/A	07/05/2009	07/04/2010
Attenuator	Mini-Circuit	BW-S6W5	N/A	07/05/2009	07/04/2010
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-13M	13m (TX)	01/05/2009	01/04/2010
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-13M	13m (RX)	01/05/2009	01/04/2010
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-0.5M	0.5m	01/05/2009	01/04/2010
Dipole Antenna	SCHWAZBECK	VHAP	908/909	07/10/2008	07/09/2010
Dipole Antenna	SCHWAZBECK	UHAP	891/892	07/10/2008	07/09/2010
Horn antenna	SCHWAZBECK	BBHA 9120D	673	05/09/2008	05/10/2010
Horn antenna	SCHWAZBECK	BBHA 9120D	309/320	05/09/2008	05/10/2010
Bi-log Antenna	SCHWAZBECK	VULB9160	9160-3158	11/29/2008	11/28/2009
3m Site	SGS	966 chamber	N/A	11/08/2009	11/09/2010

6.5 Measurement Result

EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	ERP (dBm)	Limit (dBm)
GPRS 850	824.20	1013	H	V	113.17	26.79	-7.87	3.62	15.29	38.45
				H	120.96	34.69	-7.87	3.62	**23.19**	38.45
	836.60	384	H	V	111.64	25.38	-7.88	3.65	13.86	38.45
				H	118.19	31.96	-7.88	3.65	20.43	38.45
	848.80	777	H	V	111.86	25.73	-7.88	3.68	14.18	38.45
				H	118.17	31.97	-7.88	3.68	20.42	38.45

Remark：

(1) The RBW,VBW of SPA for frequency

RBW=300 KHz, VBW=1MHz,

EUT Mode	Frequency (MHz)	CH	EUT Pol.	Antenna Pol.	SPA Reading (dBuV)	S.G. Output (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)
GPRS 1900	1850.20	512	H	V	112.70	8.31	9.90	5.56	12.65	33.00
				H	117.26	13.08	9.90	5.56	17.42	33.00
	1880.00	661	H	V	114.10	9.74	9.99	5.61	14.12	33.00
				H	114.99	10.85	9.99	5.61	15.22	33.00
	1909.80	810	H	V	113.45	9.12	10.07	5.66	13.54	33.00
				H	117.86	13.75	10.07	5.66	**18.16**	33.00

Remark：

(1) The RBW,VBW of SPA for frequency

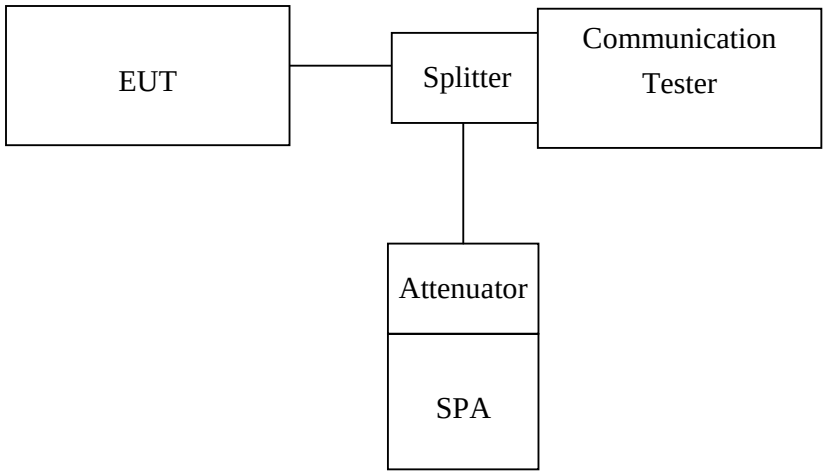
RBW=300 KHz, VBW=1000KHz,

7. 99% OCCUPIED BANDWIDTH MEASUREMENT

7.1 Standard Applicable

According to §FCC 2.1049.

7.2 Test Set-up:



Note: *Measurement setup for testing on Antenna connector*

7.3 Measurement Procedure

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW (10/30KHz) was set to about 1% of emission BW, VBW= 3 times RBW 43KHz, -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.

7.4 Measurement Equipment Used:

Please Refer to section 2.4 in this report

7.5 Measurement Result:

Please Refer to test report: FCC06-8038

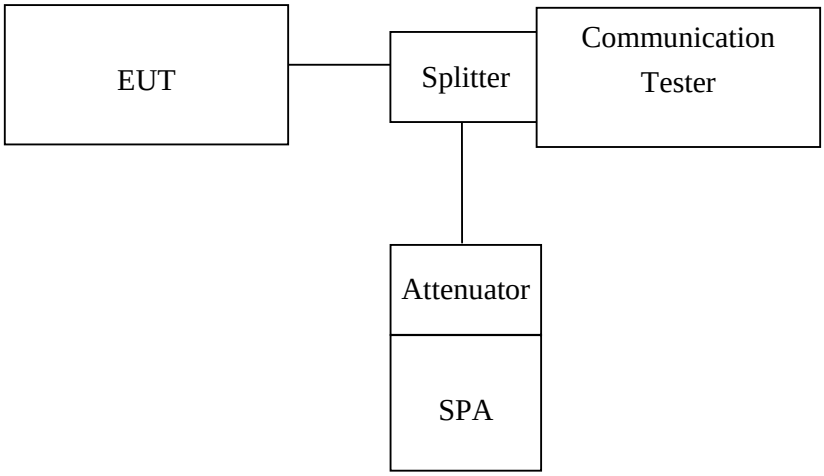
8. OUT OF BAND EMISSION AT ANTENNA TERMINALS

8.1 Standard Applicable

According to FCC §2.1051.

FCC §22.917(a),§24.238(a), the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than 43 + 10 log (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)

8.2 Test SET-UP



Note: *Measurement setup for testing on Antenna connector*

8.3 Measurement Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 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.

For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10 th harmonic. Limit = -13dBm

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. Limit, -13dBm.

8.4 Measurement Equipment Used:

Please refer to section 2.4 in this report

8.5 Measurement Result:

Please refer to module test Report: FCC06-8038

9. FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

9.1 Standard Applicable

According to FCC §2.1053,

FCC §22.917(a),§24.238(a), the magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specified in the instruction manual and/ or alignment procedure, shall not be less than 43 + 10 log (mean output power in watts) dBc below the mean power output outside a license's frequency block (-13dBm)

9.2 EUT Setup (Block Diagram of Configuration)

Please refer to section 6.2

9.3 Measurement Procedure

The EUT was placed on a non-conductive, The measurement antenna was placed at a distance of 3 meters from the EUT. 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.

The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission were identified, the power of the emission was determined using the substitution method.

The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)

EIRP = S.G. output (dBm) + Antenna Gain(dBi) – Cable Loss (dB)

9.4 Measurement Equipment Used:

Refer to section 2.4 in this report

9.5 Measurement Result

Refer to attach tabular data sheets.

Radiated Spurious Emission Measurement Result: GPRS 850 Mode

Operation Mode	: TX CH Low H Mode	Test Date:	Nov. 05, 2009
Fundamental Frequency	: 824.20 MHz	Test By:	Jason
Temperature	: 25℃	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
38.73	48.19	V	-53.98	-3.25	0.90	-58.12	-13.00	-45.12
67.83	41.01	V	-70.68	-0.95	1.14	-72.77	-13.00	-59.77
90.14	49.13	V	-54.05	-7.75	1.27	-63.07	-13.00	-50.07
353.98	34.62	V	-62.84	-7.64	2.37	-72.85	-13.00	-59.85
909.78	39.53	V	-45.19	-7.96	3.81	-56.96	-13.00	-43.96
824.00	64.03	V	-22.36	-7.87	3.62	-33.86	-13.00	-20.86
1648.40	62.18	V	-42.40	9.29	5.23	-38.34	-13.00	-25.34
2472.60	44.43	V	-56.58	10.08	6.53	-53.03	-13.00	-40.03
3296.80	44.16	V	-54.71	12.17	7.71	-50.26	-13.00	-37.26
4121.00	---	V		12.61	8.86		-13.00	
4945.20	---	V		12.65	9.74		-13.00	
5769.40	---	V		13.55	10.54		-13.00	
6593.60	---	V		12.05	11.30		-13.00	
7417.80	---	V		11.49	12.10		-13.00	
8242.00	---	V		11.48	12.71		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz - 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GPRS 850 Mode

Operation Mode	: TX CH Low H Mode	Test Date:	Nov. 05, 2009
Fundamental Frequency	: 824.20 MHz	Test By:	Jason
Temperature	: 25℃	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
38.73	48.72	H	-54.47	-3.25	0.90	-58.62	-13.00	-45.62
92.08	39.96	H	-63.63	-7.75	1.29	-72.67	-13.00	-59.67
240.49	37.29	H	-62.39	-7.88	1.94	-72.21	-13.00	-59.21
358.83	36.31	H	-60.75	-7.64	2.39	-70.78	-13.00	-57.78
531.49	35.77	H	-56.59	-7.75	2.90	-67.24	-13.00	-54.24
824.00	72.53	H	-13.74	-7.87	3.62	-25.24	-13.00	-12.24
1648.40	63.66	H	-40.74	9.29	5.23	-36.68	-13.00	-23.68
2472.60	45.02	H	-55.89	10.08	6.53	-52.34	-13.00	-39.34
3296.80	42.95	H	-56.15	12.17	7.71	-51.69	-13.00	-38.69
4121.00	---	H		12.61	8.86		-13.00	
4945.20	---	H		12.65	9.74		-13.00	
5769.40	---	H		13.55	10.54		-13.00	
6593.60	---	H		12.05	11.30		-13.00	
7417.80	---	H		11.49	12.10		-13.00	
8242.00	---	H		11.48	12.71		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz - 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GPRS 850 Mode

Operation Mode	: TX CH Mid H Mode	Test Date:	Nov. 05, 2009
Fundamental Frequency	: 836.60 MHz	Test By:	Jason
Temperature	: 25℃	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
38.73	47.84	V	-54.33	-3.25	0.90	-58.47	-13.00	-45.47
75.59	43.12	V	-68.40	-1.85	1.19	-71.45	-13.00	-58.45
90.14	49.05	V	-54.13	-7.75	1.27	-63.15	-13.00	-50.15
153.19	32.85	V	-64.73	-7.80	1.60	-74.13	-13.00	-61.13
353.98	34.55	V	-62.91	-7.64	2.37	-72.92	-13.00	-59.92
1673.20	63.79	V	-40.77	9.36	5.27	-36.67	-13.00	-23.67
2509.80	47.05	V	-53.73	10.09	6.58	-50.23	-13.00	-37.23
3346.40	42.69	V	-56.17	12.28	7.79	-51.69	-13.00	-38.69
4183.00	---	V		12.62	8.93		-13.00	
5019.60	35.54	V	-56.61	12.67	9.81	-53.75	-13.00	-40.75
5856.20	---	V		13.68	10.62		-13.00	
6692.80	---	V		11.95	11.39		-13.00	
7529.40	---	V		11.45	12.20		-13.00	
8366.00	---	V		11.59	12.81		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz - 13GHz: 4.45dB

Remark：

1 The emission behaviors belongs to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GPRS 850 Mode

Operation Mode	: TX CH Mid H Mode	Test Date:	Nov. 05, 2009
Fundamental Frequency	: 836.60 MHz	Test By:	Jason
Temperature	: 25℃	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
38.73	47.66	H	-55.53	-3.25	0.90	-59.68	-13.00	-46.68
90.14	49.62	H	-54.11	-7.75	1.27	-63.13	-13.00	-50.13
104.69	44.38	H	-58.13	-7.76	1.38	-67.27	-13.00	-54.27
153.19	32.30	H	-65.72	-7.80	1.60	-75.12	-13.00	-62.12
353.98	34.86	H	-62.28	-7.64	2.37	-72.29	-13.00	-59.29
1673.20	61.91	H	-42.47	9.36	5.27	-38.37	-13.00	-25.37
2509.80	48.67	H	-52.03	10.09	6.58	-48.53	-13.00	-35.53
3346.40	46.23	H	-52.83	12.28	7.79	-48.35	-13.00	-35.35
4183.00	40.28	H	-55.75	12.62	8.93	-52.06	-13.00	-39.06
5019.60	---	H		12.67	9.81		-13.00	
5856.20	---	H		13.68	10.62		-13.00	
6692.80	---	H		11.95	11.39		-13.00	
7529.40	---	H		11.45	12.20		-13.00	
8366.00	---	H		11.59	12.81		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz - 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GPRS 850 Mode

Operation Mode	: TX CH High H Mode	Test Date:	Nov. 05, 2009
Fundamental Frequency	: 848.80 MHz	Test By:	Jason
Temperature	: 25℃	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
38.73	47.66	V	-54.51	-3.25	0.90	-58.65	-13.00	-45.65
90.14	49.62	V	-53.56	-7.75	1.27	-62.58	-13.00	-49.58
104.69	44.38	V	-57.11	-7.76	1.38	-66.25	-13.00	-53.25
153.19	32.30	V	-65.28	-7.80	1.60	-74.68	-13.00	-61.68
353.98	34.86	V	-62.60	-7.64	2.37	-72.61	-13.00	-59.61
850.00	64.42	V	-21.69	-7.88	3.68	-33.25	-13.00	-20.25
1697.60	68.24	V	-36.30	9.44	5.31	-32.17	-13.00	-19.17
2546.40	49.47	V	-51.17	10.20	6.63	-47.61	-13.00	-34.61
3395.20	48.35	V	-50.50	12.38	7.87	-45.99	-13.00	-32.99
4244.00	37.88	V	-57.78	12.63	9.00	-54.15	-13.00	-41.15
5092.80	35.93	V	-56.05	12.74	9.88	-53.18	-13.00	-40.18
5941.60	---	V		13.81	10.70		-13.00	
6790.40	---	V		11.86	11.48		-13.00	
7639.20	---	V		11.40	12.27		-13.00	
8488.00	---	V		11.70	12.91		-13.00	

Measurement uncertainty	30MHz - 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz - 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GPRS 850 Mode

Operation Mode	: TX CH High H Mode	Test Date:	Nov. 05, 2009
Fundamental Frequency	: 848.80 MHz	Test By:	Jason
Temperature	: 25℃	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
41.64	48.30	H	-55.21	-2.31	0.93	-58.45	-13.00	-45.45
58.13	37.63	H	-72.80	-0.49	1.08	-74.37	-13.00	-61.37
240.49	36.84	H	-62.84	-7.88	1.94	-72.66	-13.00	-59.66
353.98	35.96	H	-61.18	-7.64	2.37	-71.19	-13.00	-58.19
538.28	34.74	H	-57.39	-7.75	2.92	-68.06	-13.00	-55.06
850.00	73.24	H	-12.95	-7.88	3.68	-24.51	-13.00	-11.51
1697.60	70.90	H	-33.45	9.44	5.31	-29.32	-13.00	-16.32
2546.40	50.18	H	-50.42	10.20	6.63	-46.86	-13.00	-33.86
3395.20	39.38	H	-59.65	12.38	7.87	-55.13	-13.00	-42.13
4244.00	39.88	H	-55.93	12.63	9.00	-52.31	-13.00	-39.31
5092.80	37.32	H	-54.83	12.74	9.88	-51.97	-13.00	-38.97
5941.60	35.66	H	-54.08	13.81	10.70	-50.97	-13.00	-37.97
6790.40	---	H		11.86	11.48		-13.00	
7639.20	---	H		11.40	12.27		-13.00	
8488.00	---	H		11.70	12.91		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GPRS 1900 Mode

Operation Mode	: TX CH Low H Mode	Test Date:	Nov. 05, 2009
Fundamental Frequency	: 1850.20MHz	Test By:	Jason
Temperature	: 25℃	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
38.73	47.30	V	-54.87	-3.25	0.90	-59.01	-13.00	-46.01
62.98	39.88	V	-71.57	-0.64	1.10	-73.31	-13.00	-60.31
90.14	49.60	V	-53.58	-7.75	1.27	-62.60	-13.00	-49.60
104.69	43.95	V	-57.54	-7.76	1.38	-66.68	-13.00	-53.68
353.98	35.27	V	-62.19	-7.64	2.37	-72.20	-13.00	-59.20
1850.00	63.93	V	-40.46	9.90	5.56	-36.12	-13.00	-23.12
3700.40	57.37	V	-40.56	12.61	8.31	-36.26	-13.00	-23.26
5550.60	54.65	V	-36.19	13.23	10.33	-33.29	-13.00	-20.29
7400.80	40.89	V	-40.35	11.50	12.08	-40.93	-13.00	-27.93
9251.00	---	V		11.92	13.50		-13.00	
11101.20	---	V		11.66	15.11		-13.00	
12951.40	---	V		13.63	16.60		-13.00	
14801.60	---	V		12.76	17.95		-13.00	
16651.80	---	V		15.92	19.14		-13.00	
18502.00	---	V		18.75	10.40		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GPRS 1900 Mode

Operation Mode : TX CH Low H Mode
Fundamental Frequency : 1850.20MHz
Temperature : 25℃
Humidity : 65%

Test Date: Nov. 05, 2009
Test By: Jason
Pol: Hor

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
39.70	47.98	H	-54.91	-2.79	0.89	-58.60	-13.00	-45.60
58.13	37.48	H	-72.95	-0.49	1.08	-74.52	-13.00	-61.52
94.99	39.06	H	-64.31	-7.75	1.31	-73.38	-13.00	-60.38
353.98	35.86	H	-61.28	-7.64	2.37	-71.29	-13.00	-58.29
531.94	35.33	H	-57.01	-7.75	2.90	-67.66	-13.00	-54.66
1850.00	68.78	H	-35.40	9.90	5.56	-31.06	-13.00	-18.06
3700.40	55.23	H	-42.81	12.61	8.31	-38.51	-13.00	-25.51
5550.60	50.96	H	-40.09	13.23	10.33	-37.19	-13.00	-24.19
7400.80	38.72	H	-42.51	11.50	12.08	-43.09	-13.00	-30.09
9251.00	---	H		11.92	13.50		-13.00	
11101.20	---	H		11.66	15.11		-13.00	
12951.40	---	H		13.63	16.60		-13.00	
14801.60	---	H		12.76	17.95		-13.00	
16651.80	---	H		15.92	19.14		-13.00	
18502.00	---	H		18.75	10.40		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GPRS 1900 Mode

Operation Mode	: TX CH Mid H Mode	Test Date:	Nov. 05, 2009
Fundamental Frequency	: 1880MHz	Test By:	Jason
Temperature	: 25℃	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
38.73	47.81	V	-54.36	-3.25	0.90	-58.50	-13.00	-45.50
64.92	40.14	V	-71.41	-0.77	1.11	-73.29	-13.00	-60.29
90.14	49.80	V	-53.38	-7.75	1.27	-62.40	-13.00	-49.40
104.69	44.73	V	-56.76	-7.76	1.38	-65.90	-13.00	-52.90
353.98	35.60	V	-61.86	-7.64	2.37	-71.87	-13.00	-58.87
3760.00	61.28	V	-36.38	12.60	8.39	-32.16	-13.00	-19.16
5640.00	57.59	V	-32.99	13.36	10.41	-30.04	-13.00	-17.04
7520.00	45.49	V	-35.17	11.45	12.19	-35.91	-13.00	-22.91
9400.00	---	V		11.93	13.61		-13.00	
11280.00	---	V		11.92	15.27		-13.00	
13160.00	---	V		13.33	16.71		-13.00	
15040.00	---	V		13.76	18.15		-13.00	
16920.00	---	V		15.27	19.32		-13.00	
18800.00	---	V		18.68	16.58		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GPRS 1900 Mode

Operation Mode	: TX CH Mid H Mode	Test Date:	Nov. 05, 2009
Fundamental Frequency	: 1880MHz	Test By:	Jason
Temperature	: 25℃	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
38.73	48.24	H	-54.95	-3.25	0.90	-59.10	-13.00	-46.10
58.13	38.10	H	-72.33	-0.49	1.08	-73.90	-13.00	-60.90
104.69	39.70	H	-62.81	-7.76	1.38	-71.95	-13.00	-58.95
353.98	35.67	H	-61.47	-7.64	2.37	-71.48	-13.00	-58.48
531.49	35.44	H	-56.92	-7.75	2.90	-67.57	-13.00	-54.57
3760.00	53.87	H	-43.90	12.60	8.39	-39.69	-13.00	-26.69
5640.00	58.15	H	-32.60	13.36	10.41	-29.65	-13.00	-16.65
7520.00	42.06	H	-38.58	11.45	12.19	-39.33	-13.00	-26.33
9400.00	---	H		11.93	13.61		-13.00	
11280.00	---	H		11.92	15.27		-13.00	
13160.00	---	H		13.33	16.71		-13.00	
15040.00	---	H		13.76	18.15		-13.00	
16920.00	---	H		15.27	19.32		-13.00	
18800.00	---	H		18.68	16.58		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GPRS 1900 Mode

Operation Mode	: TX CH High H Mode	Test Date:	Nov. 05, 2009
Fundamental Frequency	: 1909.8 MHz	Test By:	Jason
Temperature	: 25℃	Pol:	Ver
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
38.73	47.15	V	-55.02	-3.25	0.90	-59.16	-13.00	-46.16
75.59	44.09	V	-67.43	-1.85	1.19	-70.48	-13.00	-57.48
90.14	49.94	V	-53.24	-7.75	1.27	-62.26	-13.00	-49.26
104.69	44.87	V	-56.62	-7.76	1.38	-65.76	-13.00	-52.76
353.98	34.62	V	-62.84	-7.64	2.37	-72.85	-13.00	-59.85
1910.00	70.27	V	-34.06	10.08	5.66	-29.64	-13.00	-16.64
3819.60	62.62	V	-34.77	12.60	8.47	-30.64	-13.00	-17.64
5494.00	---	V		13.14	10.27		-13.00	
5729.40	62.31	V	-28.01	13.49	10.50	-25.01	-13.00	-12.01
7639.20	52.46	V	-28.02	11.40	12.27	-28.89	-13.00	-15.89
9549.00	---	V		11.95	13.74		-13.00	
11458.80	---	V		12.17	15.43		-13.00	
13368.60	---	V		12.97	16.82		-13.00	
15278.40	---	V		15.00	18.29		-13.00	
17188.20	---	V		14.47	19.52		-13.00	
19098.00	---	V		18.66	20.78		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark"---" means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

Radiated Spurious Emission Measurement Result: GPRS 1900 Mode

Operation Mode	: TX CH High H Mode	Test Date:	Nov. 05, 2009
Fundamental Frequency	: 1909.8 MHz	Test By:	Jason
Temperature	: 25℃	Pol:	Hor
Humidity	: 65%		

Freq. (MHz)	SPA. Reading (dBuV)	Ant.Pol. H/V	S.G Out-put (dBm)	Antenna Gain (dB/dBi)	Cable Loss (dB)	ERP/ EIRP (dBm)	Limit (dBm)	Safe Margin (dBm)
38.73	48.25	H	-54.94	-3.25	0.90	-59.09	-13.00	-46.09
58.13	38.47	H	-71.96	-0.49	1.08	-73.53	-13.00	-60.53
92.08	39.48	H	-64.11	-7.75	1.29	-73.15	-13.00	-60.15
353.98	35.38	H	-61.76	-7.64	2.37	-71.77	-13.00	-58.77
531.49	35.24	H	-57.12	-7.75	2.90	-67.77	-13.00	-54.77
1910.00	73.72	H	-30.39	10.08	5.66	-25.97	-13.00	-12.97
3819.60	65.88	H	-31.63	12.60	8.47	-27.49	-13.00	-14.49
5729.40	61.09	H	-29.36	13.49	10.50	-26.37	-13.00	-13.37
7639.20	46.35	H	-34.08	11.40	12.27	-34.95	-13.00	-21.95
9549.00	---	H		11.95	13.74		-13.00	
11458.80	---	H		12.17	15.43		-13.00	
13368.60	---	H		12.97	16.82		-13.00	
15278.40	---	H		15.00	18.29		-13.00	
17188.20	---	H		14.47	19.52		-13.00	
19098.00	---	H		18.66	20.78		-13.00	

Measurement uncertainty	30MHz – 80MHz: 5.04dB
	80MHz -1000MHz: 3.76dB
	1GHz – 13GHz: 4.45dB

Remark：

1 The emission behaviors belong to narrowband spurious emission.

2 Remark”---“ means that the emission level is too low to be measured

3 The result basic equation calculation is as follows:

4 ERP/EIRP (dBm) = SG Setting(dBm) + Antenna Gain (dB/dBi) – Cable loss (dB)

10. FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

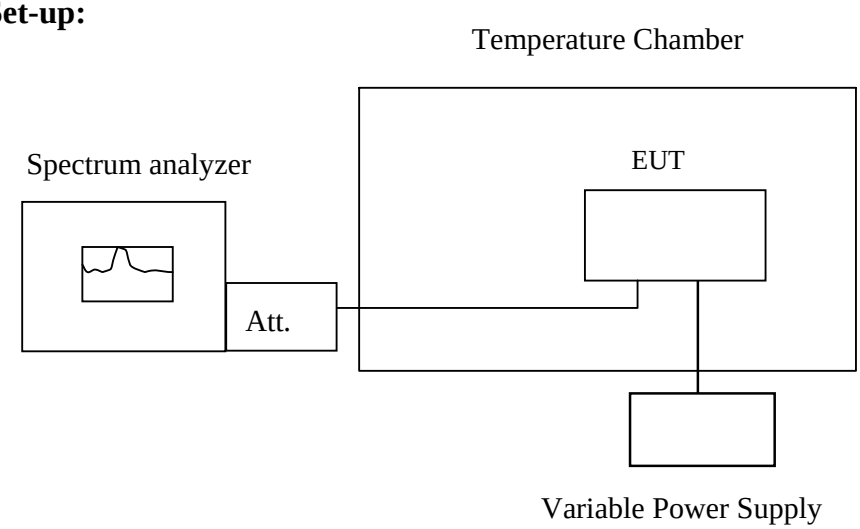
10.1 Standard Applicable

According to FCC §2.1055(a)(1)

Frequency Tolerance: +/-2.5ppm for 850MHz band

+/-2.5ppm for 1900MHz band

10.2 Test Set-up:



Note : Measurement setup for testing on Antenna connector

10.3 Measurement Procedure

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to –30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

10.4 Measurement Equipment Used:

Refer to section 2.4 in this report

10.5 Measurement Result:

Refer to module test Report: FCC06-8038

11. FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

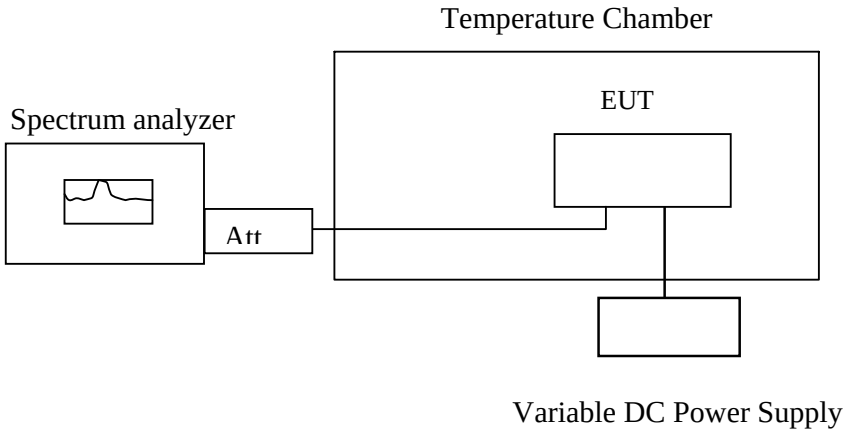
11.1 Standard Applicable

According to FCC §2.1055(d)(2)

Frequency Tolerance: +/-2.5ppm for 850MHz band

+/-2.5ppm for 1900MHz band

11.2 Test Set-up:



Note: *Measurement setup for testing on Antenna connector*

11.3 Measurement Procedure

Set chamber temperature to 25℃. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.

11.4 Measurement Equipment Used:

Refer to section 2.4 in this report

11.5 Measurement Result

Refer to module test Report: FCC06-8038