TESTING
No. L2264

Part 22

TEST REPORT

Product Name	PV GPRS Data Logger
Model Name	TK-G10-01,TK-G10-08,TK-G10-16,TK-G10-08S,TK-G10-16S
FCC ID	A69GPRS01
Client	Shanghai Taoke Network Co.,Ltd

TA Technology (Shanghai) Co., Ltd.

GENERAL SUMMARY

Product Name	PV GPRS Data Logger	**Model Name**	TK-G10-01,TK-G10-08,TK-G10-16,TK-G10-08S,TK-G10-16S
FCC ID	A69GPRS01		
Report No.	RZA1108-1392RF01R1		
Client	Shanghai Taoke Network Co.,Ltd		
Manufacturer	Shanghai Taoke Network Co.,Ltd		
Reference Standard(s)	**FCC CFR47 Part 2 (2010-12)** Frequency Allocations And Radio Treaty Matters; General Rules And Regulations **FCC CFR 47 Part 22H (2010-12)** Public Mobile Services(850MHz) **ANSI/TIA-603-C(2004)** Land mobile FM or PM Communications Equipment Measurements and Performance Standards.		
Conclusion	Test results in Chapter 2 of this test report are below limits specified in the relevant standards. General Judgment: **Pass** (Stamp) **Date of issue: December 12th, 2011**		
Comment	The test result only responds to the measured sample.		

Approved by 杨伟中 Director **Revised by** 徐凯 RF Manager **Performed by** RF Engineer

TABLE OF CONTENT

1. General Information

1.1. Notes of the test report

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

TA Technology (Shanghai) Co., Ltd. is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test. This report only refers to the item that has undergone the test.

This report standalone dose not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities. This report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of **TA Technology (Shanghai) Co., Ltd.** and the Accreditation Bodies, if it applies.

If the electrical report is inconsistent with the printed one, it should be subject to the latter.

1.2. Testing laboratory

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Yang Weizhong
Telephone:	+86-021-50791141/2/3
Fax:	+86-021-50791141/2/3-8000
Website:	http://www.ta-shanghai.com
E-mail:	yangweizhong@ta-shanghai.com

1.3. Applicant Information

Company:	Shanghai Taoke Network Co.,Ltd
Address:	Room 201, Building.2, No.215, Rd Yaohua, Dist.Pudong
City:	Shanghai
Postal Code:	/
Country:	P.R.China
Contact:	Lu Jianzhou
Telephone:	+86 013916398386
Fax:	+86 21 60936519

1.4. Manufacturer Information

Company:	Shanghai Taoke Network Co.,Ltd
Address:	Room 201, Building.2, No.215, Rd Yaohua, Dist.Pudong
City:	Shanghai
Postal Code:	/
Country:	P.R.China
Telephone:	+86 013916398386
Fax:	+86 21 60936519

1.5. Information of EUT

General information

Name of EUT:	PV GPRS Data Logger		
IMEI :	/		
Hardware Version:	DAU-SPS-ENT V0.02		
Software Version:	V1.00.ENT.002		
Antenna Type:	External Antenna		
Device Operating Configurations:			
Operating Mode(s):	GSM 850:(tested)		
Test Modulation:	(GSM)GMSK		
GPRS Multislot Class:	10		
Maximum E.R.P.	32.33 dBm		
Power Supply:	Battery or Charger (AC adaptor)		
Rated Power Supply Voltage:	12V		
Extreme Temperature:	Lowest: -10°C Highest: +55°C		
Test Channel: (Low - Middle - High)	128 - 190 - 251 (GSM 850) (tested)		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM850	824.2 ~ 848.8	869.2 ~ 893.8

Auxiliary Equipment Details

AE: Charger

Model:	YH-S15AV1201000
Manufacture:	Yuhang Electric Appliance Co.,Ltd.
S/N:	/

Equipment Under Test (EUT) is PV GPRS Data Logger. The EUT is tested GSM 850 band in this report.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. Test Date

The test is performed from September 9, 2011 to September 16, 2011.

2. Test Information

2.1. Summary of test results

Number	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Radiated Power	22.913(a)(2)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	22.917	PASS
5	Frequency Stability	2.1055 / 22.355	PASS
6	Spurious Emissions at Antenna Terminals	2.1051 / 22.917(a)	PASS
7	Radiates Spurious Emission	2.1053 / 22.917 (a)	PASS

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

FAIL: The EUT does not comply with the essential requirements in the standard.

2.2. RF Power Output

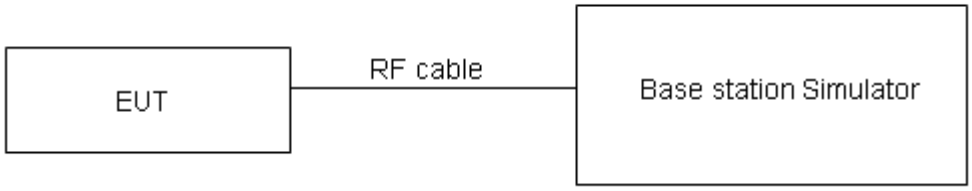
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

Limits

No specific RF power output requirements in part 2.1046.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the

normal distribution is with the coverage factor k = 2, U= 0.4 dB.

Test Results

GSM 850		Conducted Power(dBm)		
		Channel 128	Channel 190	Channel 251
		824.2 (MHz)	836.6 (MHz)	848.8 (MHz)
GPRS (GMSK)	1TXslot	**31.63**	**31.63**	**31.65**
	2TXslots	31.52	31.51	31.54

Note:

1) The maximum RF Output Power numbers are marks in bold.

2)The following testing is set to 1TXslot based on the maximum RF Output Power.

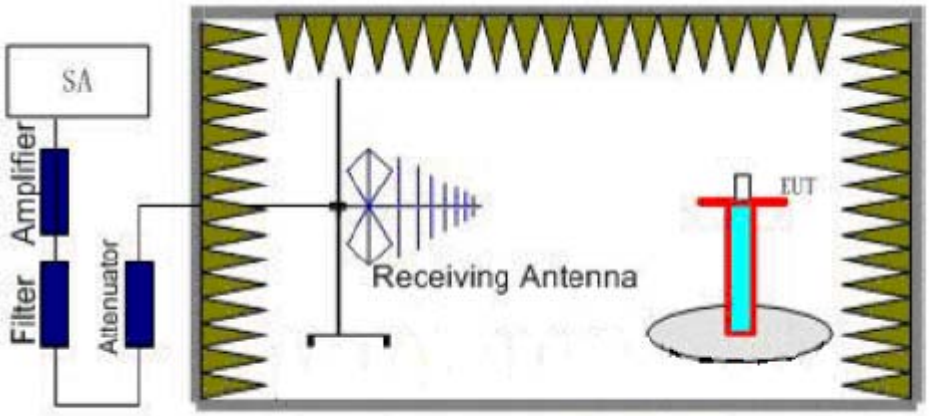
2.3. Effective Radiated Power

Ambient condition

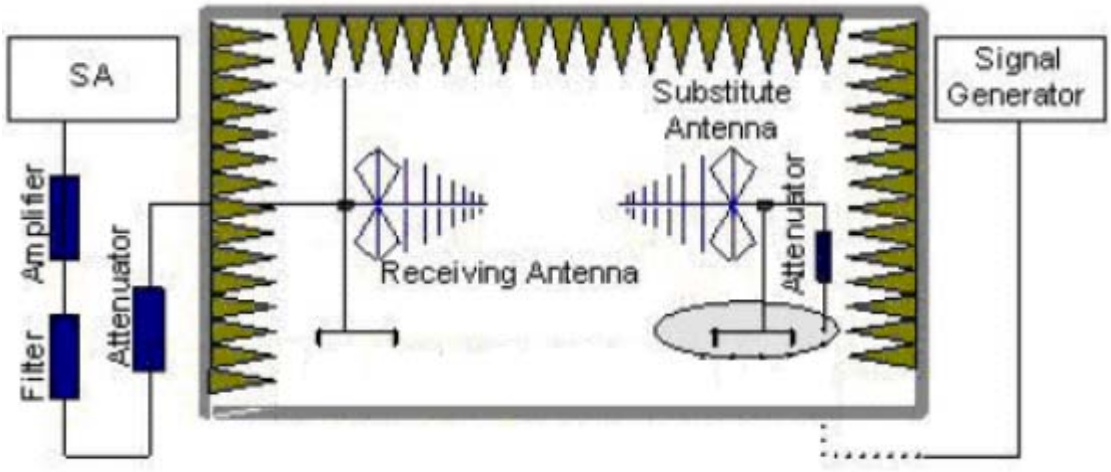
Temperature	Relative humidity
21°C ~25°C	40%~60%

Methods of Measurement

The measurement procedures in TIA- 603C are used.
Step 1:
The measurement is carried out in the semi-anechoic chamber. EUT was placed on a 0.8 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used while RBW and VBW are both set to 3MHz. During the measurement, the highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna moved up and down over a range from 1 to 4 meters in both horizontally and vertically polarized orientations. The test setup refers to figure below.



Step 2:
A dipole antenna shall be substituted in place of the EUT. The antenna will be driven by a signal generator with a adjustable S.G. applied through a 30dB amplifier and a Tx cable. Then the Analyzer reading which is equal to LVL is recorded while the antenna was moving up and down. The E.R.P. /E.I.R.P. of the EUT can be calculated through the level of the signal generator, Tx cable loss and the gain of the substitution antenna. The test setup refers to figure below.



E.R.P =S.G+30. - Tx Cable loss + Substitution antenna gain – 2.15.
EIRP= E.R.P+2.15

Limits

Rule Part 22.913(a) specifies that "Mobile/portable stations are limited to 7 watts ERP".

Limit	≤ 7 W (38.45 dBm)

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 1.19 dB

Test Results: Pass

	Channel	Polarization	LVL (dBm)	SG+30 (dBm)	Gain (dBi)	Cable Loss (dBm)	E.R.P. (dBm)
GSM 850 GPRS(GMSK)	128	Vertical	-16.38	45.70	1.06	15.17	29.44
	190	Vertical	-17.09	47.26	1.24	15.2	31.15
	251	Vertical	-15.33	48.34	1.38	15.24	32.33

Note: 1. E.R.P =S.G+30. - Tx Cable loss + Substitution antenna gain – 2.15.

2. EIRP= E.R.P+2.15

2.4. Occupied Bandwidth

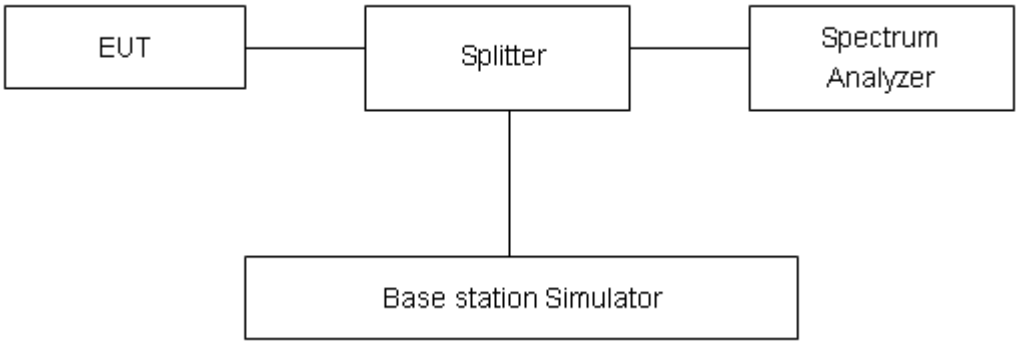
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 3kHz, VBW is set to 100kHz for GSM 850. 99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

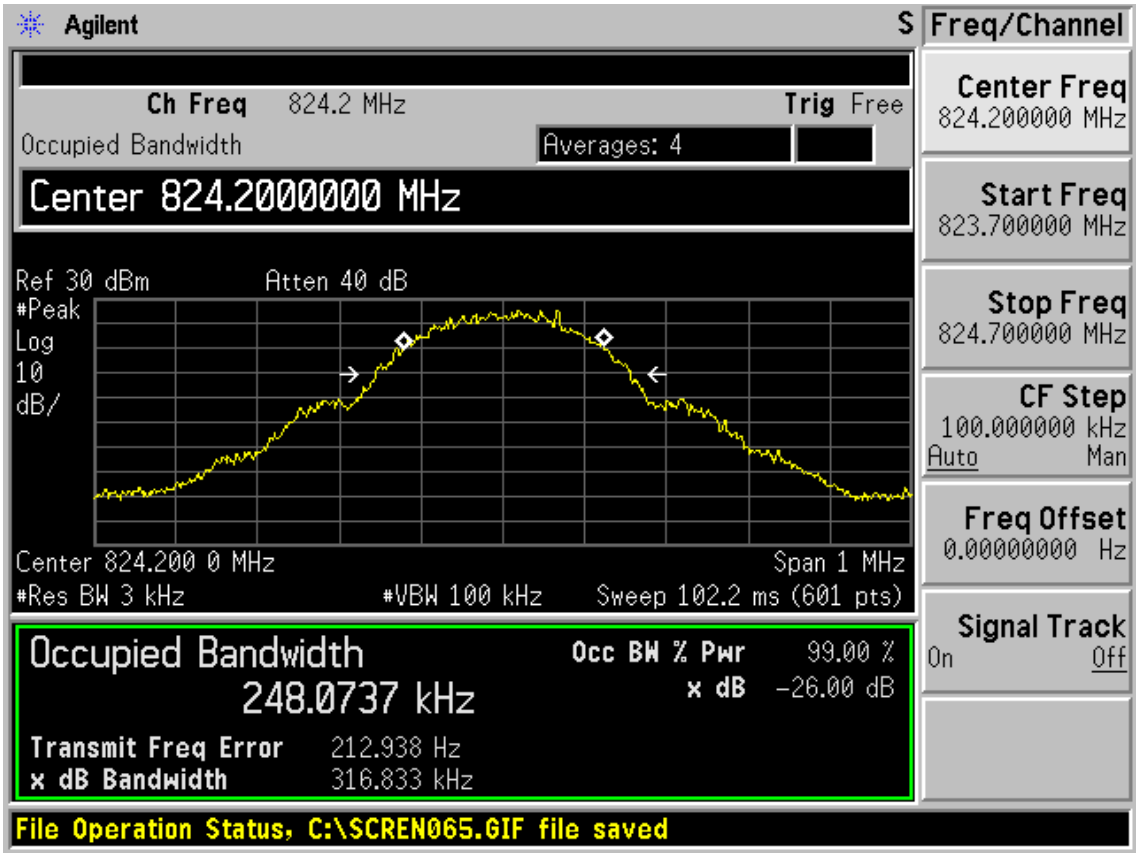
No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

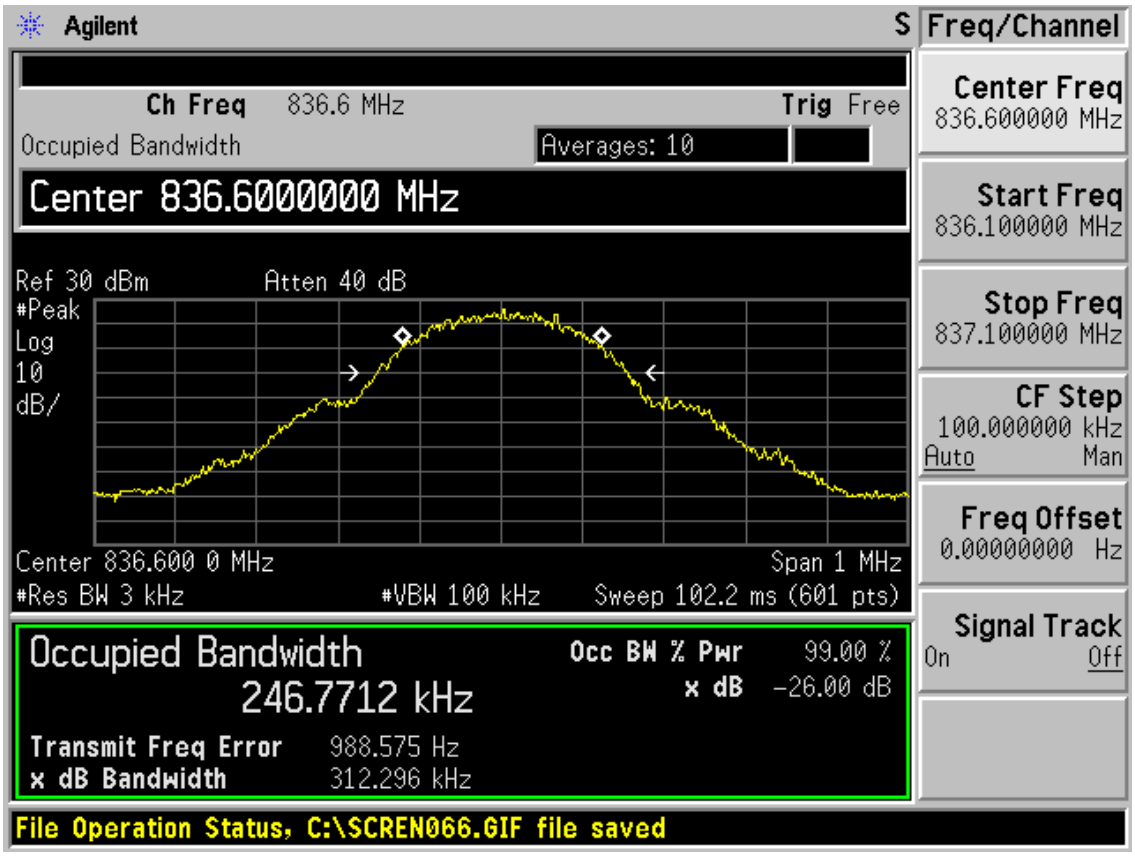
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 624Hz.

Test Result

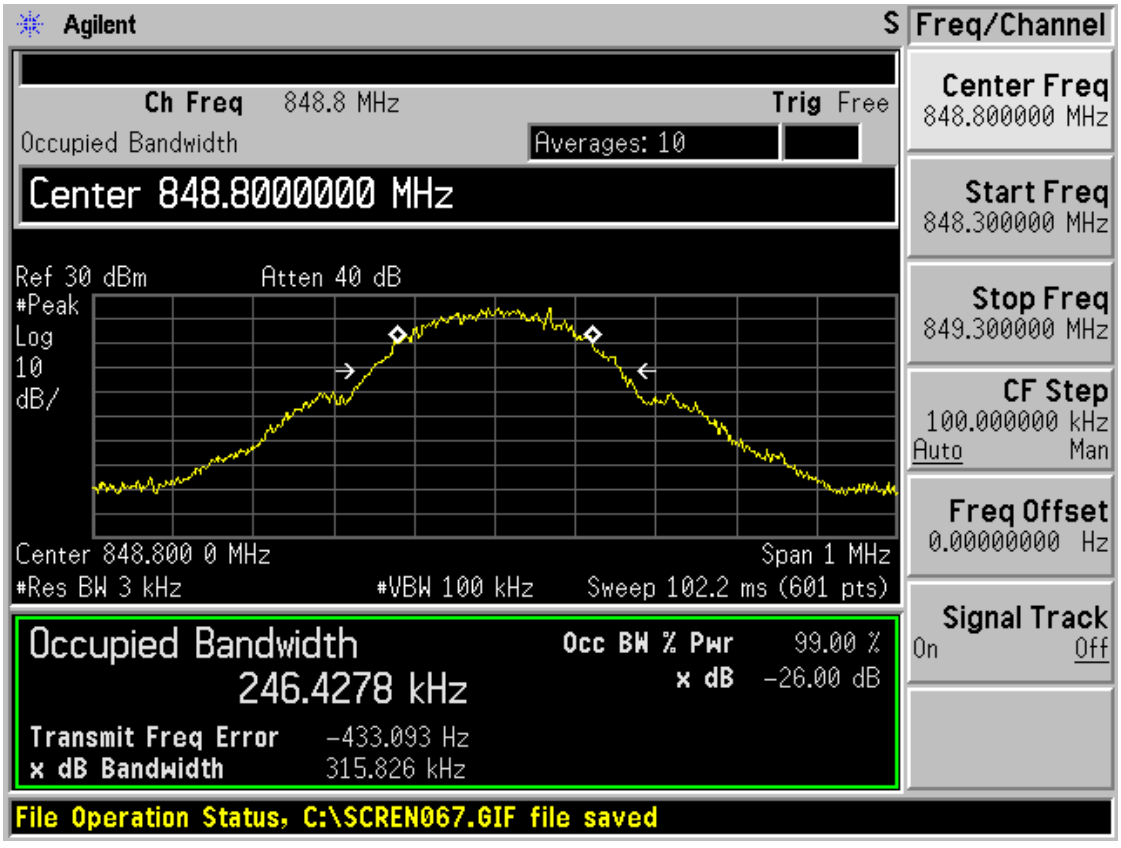
	Channel	Frequency (MHz)	99% Power Bandwidth (kHz)	-26dBc Bandwidth(kHz)
GSM 850+GPRS	128	824.2	248.0737	316.833
	190	836.6	246.7712	312.296
	251	848.8	246.4278	315.826



GSM 850 GPRS CH128 Occupied Bandwidth



GSM 850 GPRS CH190 Occupied Bandwidth



GSM 850 GPRS CH251 Occupied Bandwidth

2.5. Band Edge Compliance

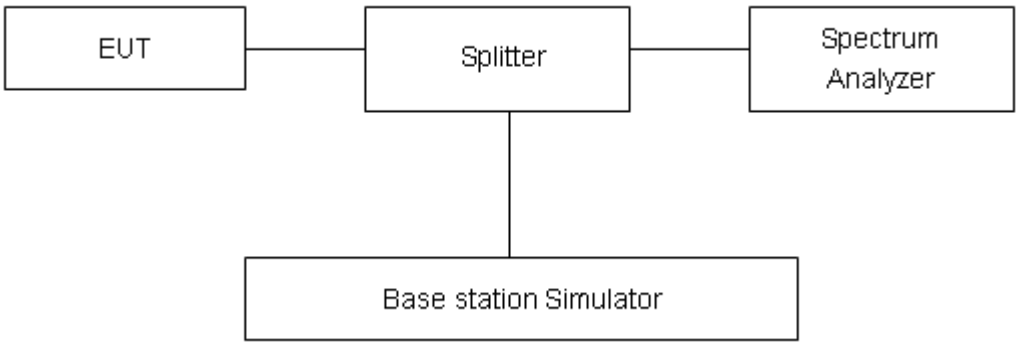
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The average detector is used. RBW is set to 3kHz, VBW is set to 10kHz for GSM 850. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

Rule Part 22.917(a) specifies that “The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.”

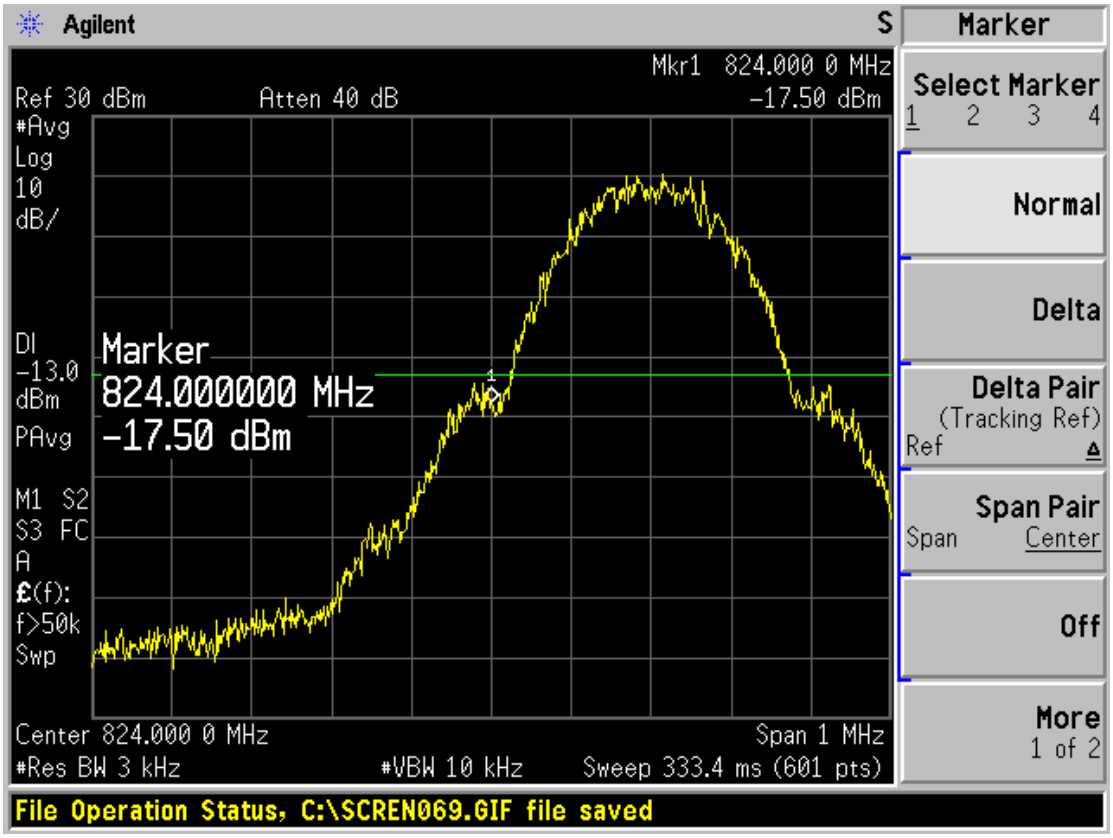
Limit	-13 dBm

Measurement Uncertainty

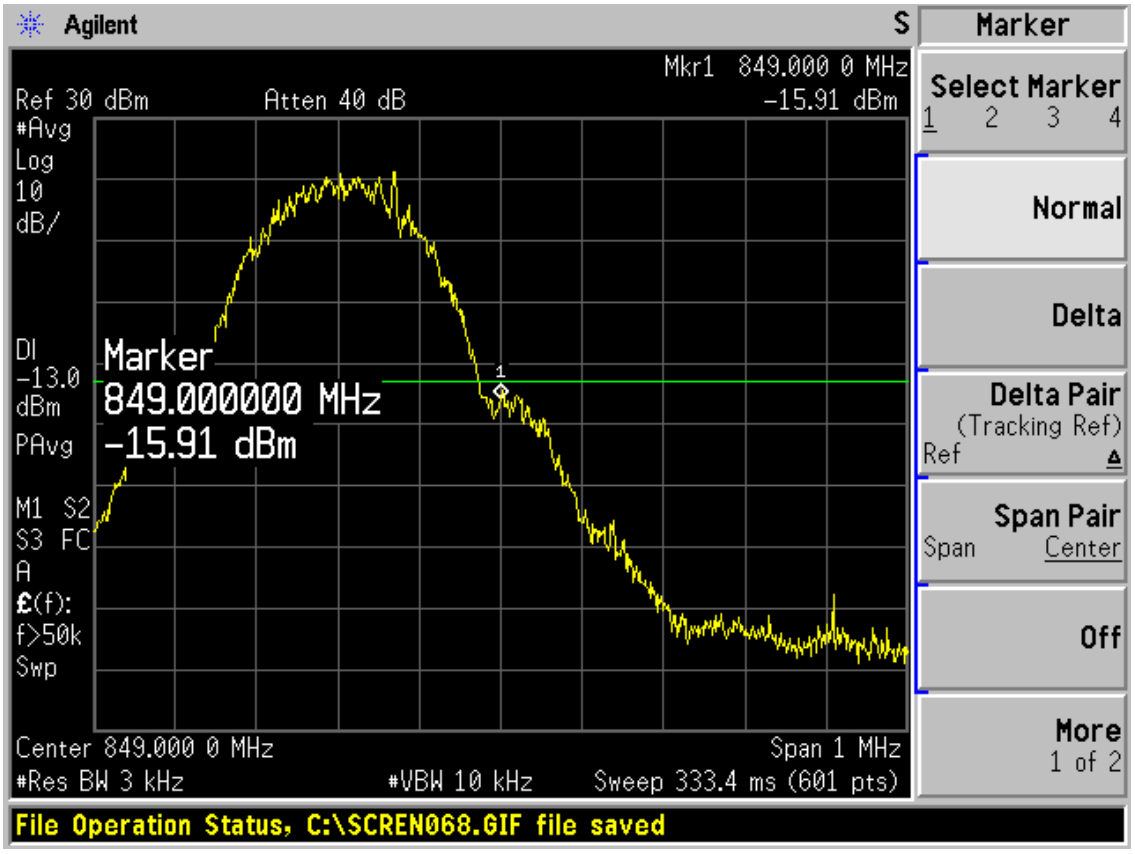
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96, U=0.684dB.

Test Result:

	Carrier frequency (MHz)	Reference value (dBm)	Limit	Conclusion
GSM 850+GPRS	824.0	-17.50	-13	PASS
	849.0	-15.91	-13	PASS



GSM 850 GPRS 128 Channel



GSM 850 GPRS 251 Channel

2.6. Frequency Stability

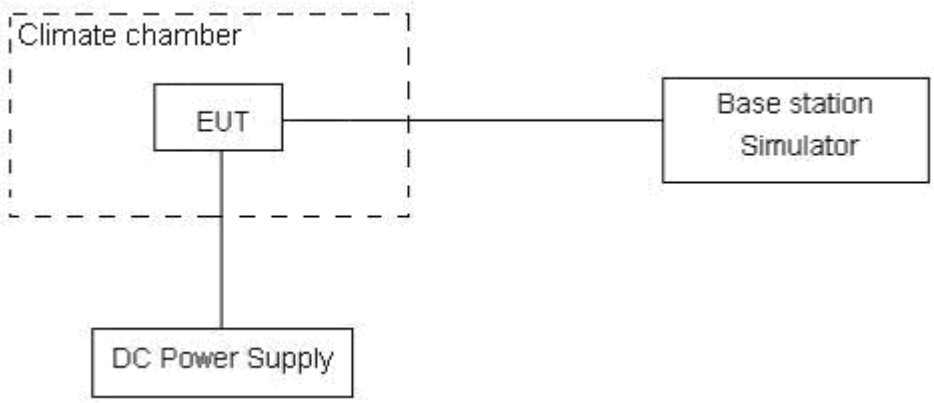
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

1. Frequency Stability (Temperature Variation)
   The temperature inside the climate chamber is varied from -30°C to +50°C in 10°C step size,
   (1) With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours.
   (2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.
   (3) Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.
2. Frequency Stability (Voltage Variation)
   The frequency stability shall be measured with variation of primary supply voltage as follows:
   (1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
   (2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.
   This transceiver is specified to operate with an input voltage of 12V.

Test setup



Limits

According to the Sec. 22.355, the frequency stability of the carrier shall be accurate to within 2.5 ppm of the received frequency from the base station.

Limits	≤ 2.5 ppm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75％ confidence level for the normal distribution is with the coverage factor *k* = 3,*U*= 0.01ppm.

Test Result

Temperature (°C)	Test Results (ppm) / 12 V Power supply
	Channel 190
-30	1.3524
-20	1.0265
-10	0.5564
0	0.3568
10	0.2654
20	0.6825
30	0.7845
40	0.8656
50	0.7864

Voltage (V)	Test Results(ppm) / 20°C
	Channel 190
12	0.6825

2.7. Spurious Emissions at Antenna Terminals

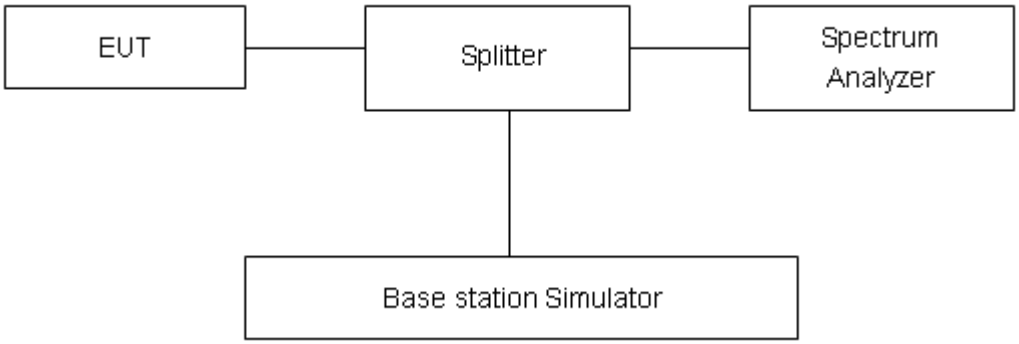
Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. For GSM 850,RBW and VBW are set to 100 kHz, Sweep is set to ATUO.

Test setup



Limits

Rule Part 22.917(a) specifies that “The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.”

Limit	-13 dBm

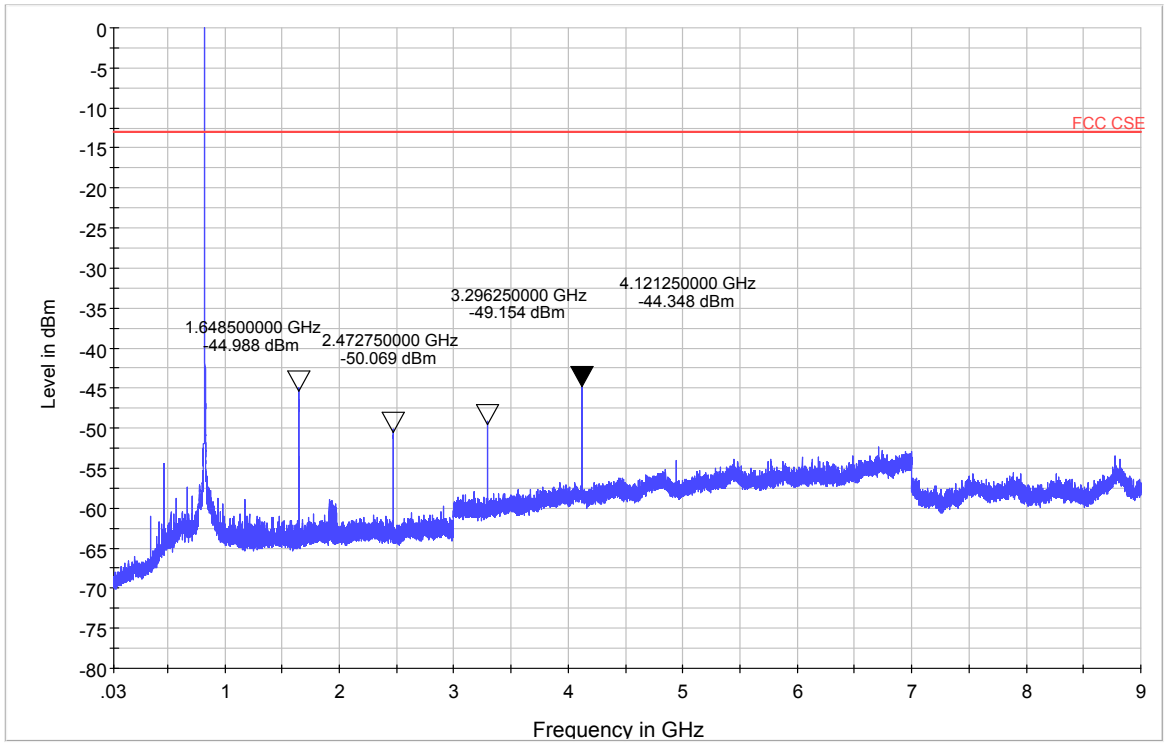
Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75％ confidence level for the normal distribution is with the coverage factor *k* = 1.96.

Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-12.75GHz	1.407 dB

Test Result

GSM 850 GPRS CH128



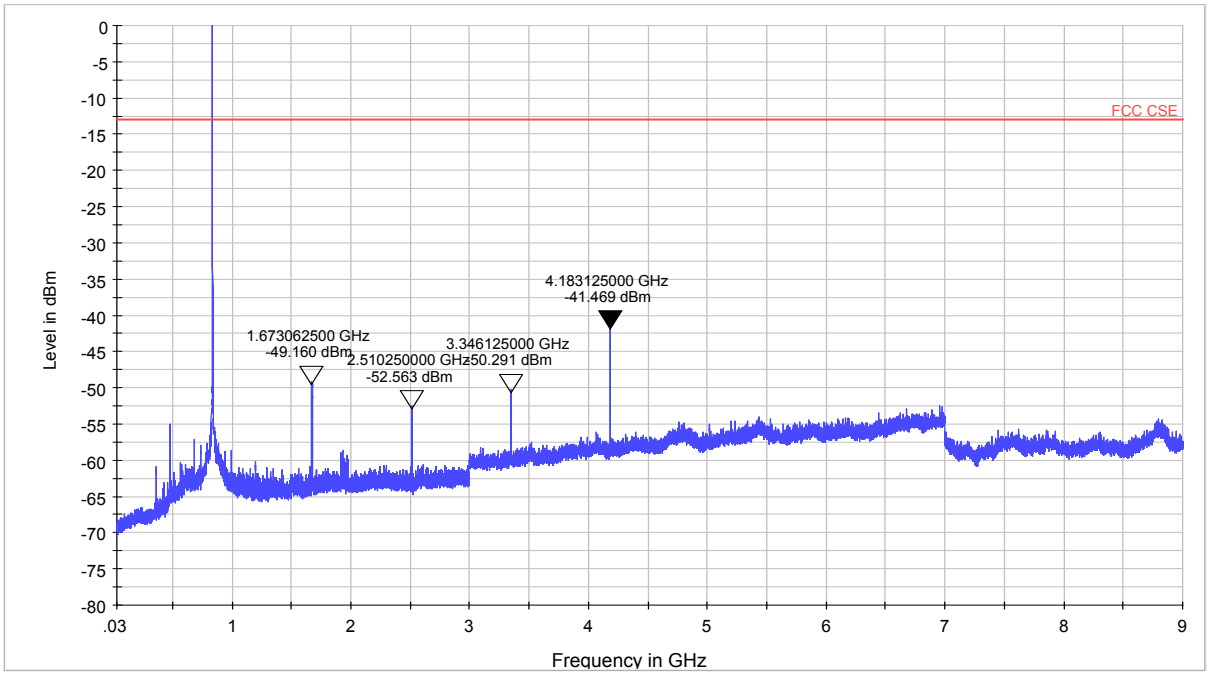
Note: The signal beyond the limit is carrier

GSM 850 GPRS 128 Channel 30MHz~9GHz

Harmonic	TX ch.128 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	1648.5	-44.988	-13	31.988
3	2472.75	-50.069	-13	27.069
4	3296.25	-49.154	-13	36.154
5	4121.25	-44.348	-13	31.348
6	4945.2	Nf	-13	/
7	5769.4	Nf	-13	/
8	6593.6	Nf	-13	/
9	7417.8	Nf	-13	/
10	8242	Nf	-13	/
Nf: noise floor				

Note: The other Spurious RF conducted emissions level is no more than noise floor.

GSM 850 GPRS CH190

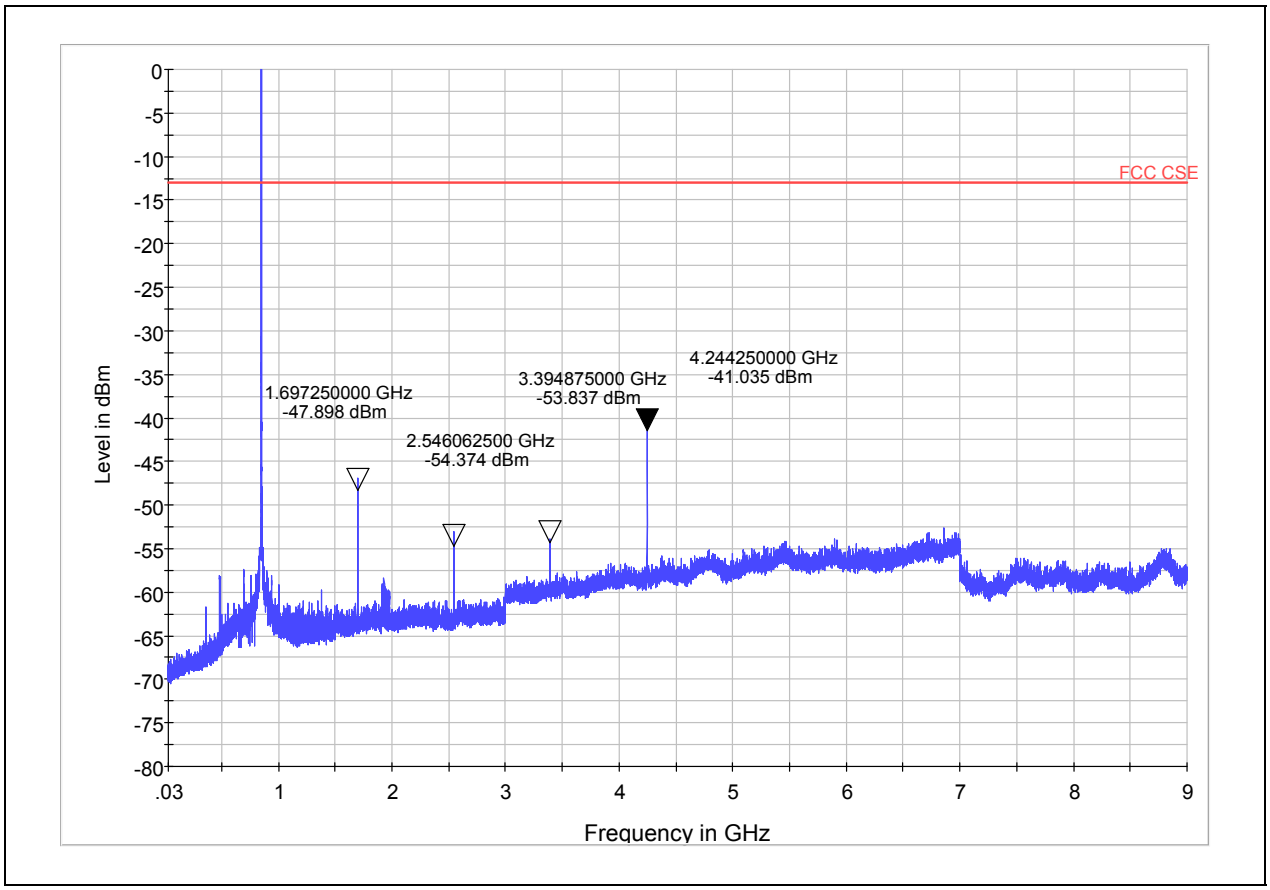


Note: The signal beyond the limit is carrier
GSM 850 GPRS 190 Channel 30MHz~9GHz

Harmonic	TX ch.190 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	1673.0625	-49.160	-13	36.160
3	2510.25	-52.563	-13	39.563
4	3346.125	-50.291	-13	37.291
5	4183.125	-41.469	-13	28.469
6	5019.6	Nf	-13	/
7	5856.2	Nf	-13	/
8	6692.8	Nf	-13	/
9	7529.4	Nf	-13	/
10	8366	Nf	-13	/
Nf: noise floor				

Note: The other Spurious RF conducted emissions level is no more than noise floor.

GSM 850 GPRS CH251



Note: The signal beyond the limit is carrier
GSM 850 GPRS 251 Channel 30MHz~9GHz

Harmonic	TX ch.251 Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
2	1697.25	-47.898	-13	34.898
3	2546.0625	-54.374	-13	41.374
4	3394.875	-53.837	-13	40.837
5	4244.25	-41.035	-13	28.035
6	5092.8	Nf	-13	/
7	5941.6	Nf	-13	/
8	6790.4	Nf	-13	/
9	7639.2	Nf	-13	/
10	8488	Nf	-13	/
Nf: noise floor				

Note: The other Spurious RF conducted emissions level is no more than noise floor.

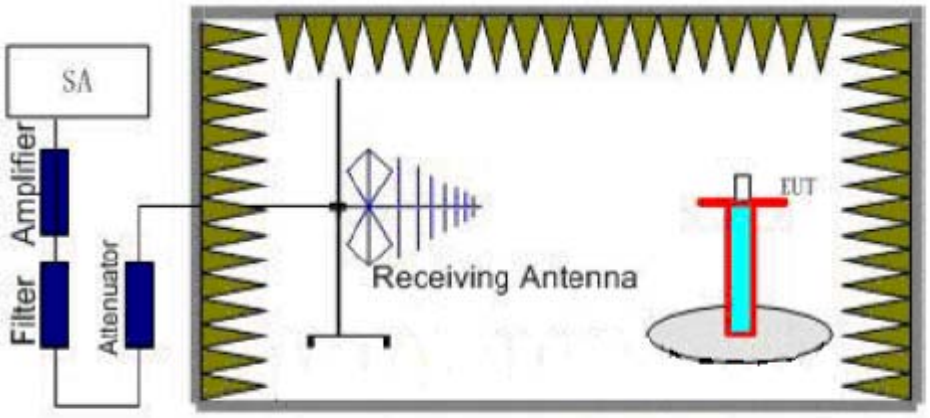
2.8. Radiates Spurious Emission

Ambient condition

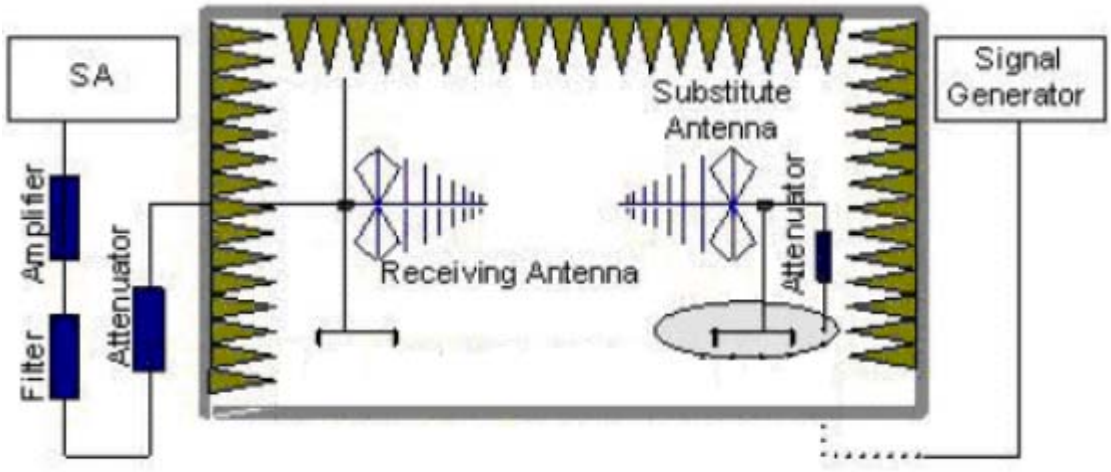
Temperature	Relative humidity
21°C ~25°C	40%~60%

Method of Measurement

The measurements procedures in TIA -603C are used.
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment.
The procedure of Radiates Spurious Emission is as follows:
Step 1:
The measurement is carried out in the semi-anechoic chamber.. EUT was placed on a 0.8 meters high non-conductive table at a 3 meters test distance from the test receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT. A radio link shall be established between EUT and Tester. The output power of the cell signal of the tester will be decreased until the output power of the EUT reach a maximum value. A peak detector is used while RBW and VBW are both set to 3MHz. During the measurement, the highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna moved up and down over a range from 1 to 4 meters in both horizontally and vertically polarized orientations. The test setup refers to figure below.



Step 2:
A dipole antenna shall be substituted in place of the EUT. The antenna will be driven by a signal generator with a adjustable S.G. applied through a Tx cable. Adjust the level of the signal generator output until the value of the receiver reach the previously recorded analyzer power level (LVL).Then The E.R.P. /E.I.R.P. of the EUT can be calculated through the level of the signal generator, Tx cable loss and the gain of the substitution antenna. The test setup refers to figure below.



E.R.P（peak power）=S.G. - Tx Cable loss + Substitution antenna gain – 2.15.
EIRP= E.R.P+2.15

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the antenna is vertical.

Limits

Rule Part 22.917(a) specifies that “The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.”

Limit	-13 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95％ confidence level for the normal distribution is with the coverage factor *k* = 1.96, *U*= 3.55 dB.

Test Result

GSM 850 GPRS CH128

Harmonic	TX ch.128 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1648.4	-40.33	17.1	10.37	-49.21	-13	36.21	180
3	2472.6	-45.18	16.9	11.15	-53.08	-13	40.08	90
4	3296.8	-43.80	16.5	11.95	-50.50	-13	37.50	225
5	4121	-39.75	17.2	11.42	-47.68	-13	34.68	180
6	4945.2	-45.95	17.4	11.49	-54.01	-13	41.01	135
7	5769.4	/	/	/	Nf	-13	/	/
8	6593.6	/	/	/	Nf	-13	/	/
9	7417.8	/	/	/	Nf	-13	/	/
10	8242	/	/	/	Nf	-13	/	/
Nf: noise floor								

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

GSM 850 GPRS CH190

Harmonic	TX ch.190 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.2	-37.09	16.1	10.75	-44.59	-13	31.59	180
3	2509.8	-40.75	16.4	11.15	-48.15	-13	35.15	180
4	3346.4	-40.33	16.5	11.95	-47.03	-13	34.03	0
5	4183	-40.23	17.2	11.37	-48.21	-13	35.21	270
6	5019.6	-47.31	17.4	11.49	-55.37	-13	42.37	135
7	5856.2	-46.81	17.6	12.55	-54.01	-13	41.01	225
8	6692.8	/	/	/	Nf	-13	/	/
9	7529.4	/	/	/	Nf	-13	/	/
10	8366	/	/	/	Nf	-13	/	/
Nf: noise floor								

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

GSM 850 GPRS CH251

Harmonic	TX ch.251 Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1697.6	-36.46	16.3	10.31	-44.60	-13	31.60	125
3	2546.4	-38.20	16.7	11.19	-45.86	-13	32.86	90
4	3395.2	-40.74	16.5	11.91	-47.48	-13	34.48	90
5	4244	-40.55	17.2	11.42	-48.48	-13	35.48	235
6	5092.8	/	/	/	Nf	-13	/	/
7	5941.6	/	/	/	Nf	-13	/	/
8	6790.4	/	/	/	Nf	-13	/	/
9	7639.2	/	/	/	Nf	-13	/	/
10	8488	/	/	/	Nf	-13	/	/
Nf: noise floor								

Note: The other Spurious RF Radiated emissions level is no more than noise floor.

3. Main Test Instruments

No.	Name	Type	Manufacturer	Serial Number	Calibration Date	Valid Period
01	Power Splitter	SHX-GF2-2-13	Hua Xiang	10120101	NA	NA
02	Spectrum Analyzer	E4445A	Agilent	MY46181146	2011-06-07	One year
03	Universal Radio Communication Tester	E5515C	Agilent	MY48367192	2011-06-03	One year
04	Signal Analyzer	FSV	R&S	100815	2011-06-27	One year
05	Signal generator	SMR27	R&S	1606.6000.02	2011-06-27	One year
06	EMI Test Receiver	ESCI	R&S	100948	2011-06-30	One year
07	Trilog Antenna	VUBL 9163	SCHWARZBECK	9163-201	2010-06-29	Two years
08	Horn Antenna	HF907	R&S	100126	2011-07-01	Two years
09	Climatic Chamber	PT-30B	Re Ce	20101891	2010-09-10	Three years
10	Semi-Anechoic Chamber	9.6*6.7*6.6m	ETS-Lindgren	NA	NA	NA
11	EMI test software	ES-K1	R&S	NA	NA	NA

*******END OF REPORT BODY*******