RADIO TEST REPORT

Report No: STS1607196F01

Issued for

SHENZHEN HENG FENG ELECTRONIC CO; LTD

16Floor, Room 16H,Block A Moderm of window Building Futian District ShenZhen,China

Product Name:	Feature phone
Brand Name:	JOO
Model Name:	230
Series Model:	Q22,Q2,Q33
FCC ID:	2AI8M23
Test Standard:	FCC Part 22H and 24E

Shenzhen STS Test Services Co., Ltd.
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TEST RESULT CERTIFICATION

Applicant's name ..... :	SHENZHEN HENG FENG ELECTRONIC CO; LTD
Address..... :	16Floor, Room 16H,Block A Moderm of window Building Futian District ShenZhen,China
Manufacture's Name..... :	SHENZHEN HENG FENG ELECTRONIC CO; LTD
Address..... :	16Floor, Room 16H,Block A Moderm of window Building Futian District ShenZhen,China
Product name..... :	Feature phone
Brand name ..... :	JOO
Model and/or type reference .. :	230
Standards ..... :	FCC Part 22H and 24E
Test procedure	ANSI/TIA 603-D (2010)

This device described above has been tested by STS and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test .....

Date of performance of tests..... 22 July. 2016 ~01 Aug. 2016

Date of Issue ..... 02 Aug. 2016

Test Result ..... **Pass**

Testing Engineer : (Tony Liu)

Technical Manager : (Vita Li)

Authorized Signatory : (Bovey Yang)

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	02 Aug. 2016	STS1607196F01	ALL	Initial Issue

SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

The radiated emission testing was performed according to the procedures of ANSI/TIA-603-D: 2010,KDB 971168 D01 v02r02 and KDB 648474 D03 v01r04

FCC Rules	Test Description	Test Limit	Test Result	Reference
2.1049	Conducted OutputPower	Reporting Only	PASS	
2.0146 24.232	Peak-to-AverageRatio	< 13 dB	PASS	
2.1046 22.913 24.232	Effective Radiated Power/Equivalent Isotropic Radiated Power	< 7 Watts max. ERP(Part 22) < 2 Watts max. EIRP(Part 24)	PASS	
2.1049 22.917 24.238	Occupied Bandwidth	Reporting Only	PASS	
2.1055 22.355 24.235	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24)	PASS	
2.1051 22.917 24.238	Spurious Emission at Antenna Terminals	< 43+10log10(P[Watts])	PASS	
2.1053 22.917 24.238	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	
2.1051 22.917 24.238	Band Edge	< 43+10log10(P[Watts])	PASS	

1 INTRODUCTION

1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd.
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Fuyong Street, Bao'an District, Shenzhen, Guangdong,China
CNAS Registration No.: L7649;
FCC Registration No.: 842334; IC Registration No.: 12108A-1

1.2 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements ofANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 toindicate a 95% level of confidence. The measurement data shown herein meets or exceeds the UCISPRmeasurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly tospecified limits to determine compliance.。

No.	Item	Uncertainty
1	RF power,conducted	±0.70dB
2	Spurious emissions,conducted	±1.19dB
5	All emissions,radiated(<1G) 30MHz-200MHz	±2.83dB
6	All emissions,radiated(<1G) 200MHz-1000MHz	±2.94dB
7	All emissions,radiated(>1G)	±3.03dB
8	Temperature	±0.5°C
9	Humidity	±2%

2 PRODUCT INFORMATION

Product Designation:	Feature phone
Hardware version number	G938V30-KF-00
Software version number	G938_JSY_G14_SC6531_3232_PCB10_QVGA_ENG_FRE_POR_mSPA_WELCOME_V02
FCC ID:	2AI8M23
Tx Frequency:	GSM/GPRS: 850: 824.2 MHz ~ 848.8 MHz 1900: 1850.2 MHz ~ 1909.8MHz
Rx Frequency	GSM/GPRS: 850: 869.2 MHz ~ 893.8 MHz 1900: 1930.2 MHz ~ 1989.8 MHz
Max RF Output Power:	GSM850:31.89dBm,PCS1900:26.10dBm GPRS850:31.78dBm,GPRS1900:26.01dBm
Type of Emission:	GSM(850):316KGXW: GSM(1900):321KGXW GPRS(850):323KGXW: GPRS(1900):317KGXW
SIM Card	SIM 1 and SIM 2 is a chipset unit and tested as single chipset,SIM 1 is used to tested
Antenna:	PIFA Antenna
Antenna gain:	GSM 850:-0.5dBi ,PCS 1900:-0.5dBi
Power Supply:	DC 3.7V by battery
Battery parameter:	Capacity:850mAh, Rated Voltage: 3.7V
GPRS/EDGE Class	Multi-Class12
Extreme Vol. Limits:	DC3.6 V to 4.2 V (Nominal DC3.7V)
Extreme Temp. Tolerance	-20℃ to +45℃
*** Note: The High Voltage 4.2 V and Low Voltage 3.6 V was declared by manufacturer, The EUT couldn't be operate normally with higher or lower voltage.*	

3 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 10th harmonic for GSM850

2. 30 MHz to 10th harmonic for GSM1900

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

	TEST MODES	
BAND	RADIATED TCS	CONDUCTED TCS
GSM 850	GSM LINK GPRS CLASS 12 LINK	GSM LINK GPRS CLASS 12 LINK
GSM 1900	GSM LINK GPRS CLASS 12 LINK	GSM LINK GPRS CLASS 12 LINK

4 MEASUREMENT INSTRUMENTS

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2015.10.25	2016.10.24
Signal Analyzer	Agilent	N9020A	MY49100060	2015.11.18	2016.11.17
Test Receiver	R&S	ESCI	101427	2015.10.25	2016.10.24
Communication Tester	Agilent	8960	MY48360751	2015.11.20	2016.11.19
Communication Tester	R&S	CMU200	112012	2015.10.25	2016.10.24
Test Receiver	R&S	ESCI	102086	2015.10.25	2016.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2015.11.25	2016.11.24
Bilog Antenna (Calibration antenna)	TESEQ	CBL6111D	34678	2015.11.25	2016.11.24
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1343	2016.03.06	2017.03.05
Horn Antenna (Calibration antenna)	Schwarzbeck	BBHA 9170D	9120D-1344	2016.03.06	2017.03.05
MXA SIGNAL Analyzer	Agilent	N9020A	MY49100060	2015.10.25	2016.10.24
Double Ridge Horn Antenna	COM-POWER CORPORATION	AH-840	AHA-840	2016.03.06	2017.03.05
Low frequency cable	N/A	R01	N/A	N/A	N/A
High frequency cable	SCHWARZBECK	AK9515H	SN-96286/96287	N/A	N/A
Vector signal generator	Agilent	E8257D-521	MY45141029	2015.10.16	2016.10.14
Power amplifier	DESAY	ZHL-42W	9638	2015.10.24	2016.10.23

Equipment with a calibration date of “N/A” shown in this list was not used to make direct calibrated measurements.

5 TEST ITEMS

5.1 CONDUCTED OUTPUT POWER

Test overview

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

Test procedures

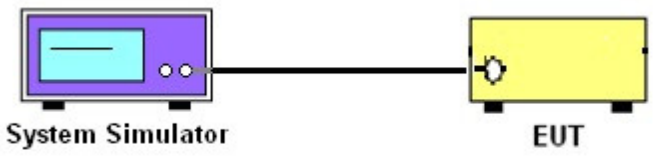
1. The transmitter output port was connected to the system simulator.

2. Set eut at maximum power through the system simulator.

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Measure and record the power level from the system simulator.

Test setup



5.2 PEAK TO AVERAGE RATIO

TEST OVERVIEW

According to §24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 db.

TEST PROCEDURES

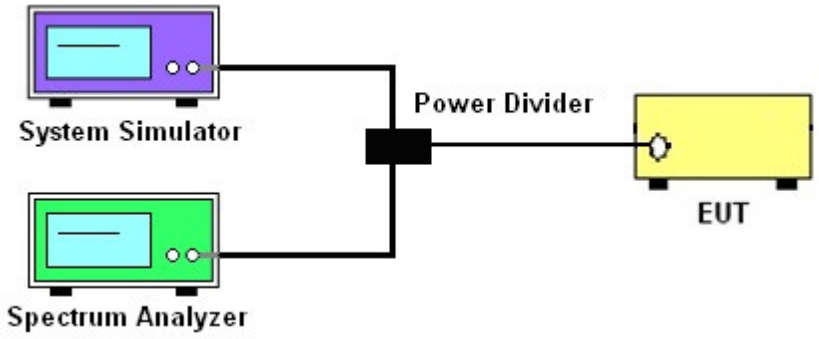
1. The testing follows fcckdb 971168 v02r02 section

2. The eut was connected to the and peak and av system simulator& spectrum analysis reads

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Set the test probe and measure average power of the spectrum analysis

TEST SETUP



5.3 TRANSMITTER RADIATED POWER (EIRP/ERP)

TEST OVERVIEW

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

TEST PROCEDURE

1. The testing follows FCC KDB 971168 D01
Section 5.2.2 (for GSM/GPRS/EDGE) and ANSI / TIA-603-D-2010 Section 2.2.17.
2. The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.
3. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
4. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
5. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a nonradiating cable. The absolute levels of the spurious emissions were measured by the substitution.
6. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-D. The EUT was replaced by the substitution antenna at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP/ERP was calculated with the correction factor,
ERP/EIRP = P.SG + GT – LC
ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm);
PMeas(PK) = measured transmitter output power or PSD, in dBm or dBW;
GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

5.4 OCCUPIED BANDWIDTH

TEST OVERVIEW

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

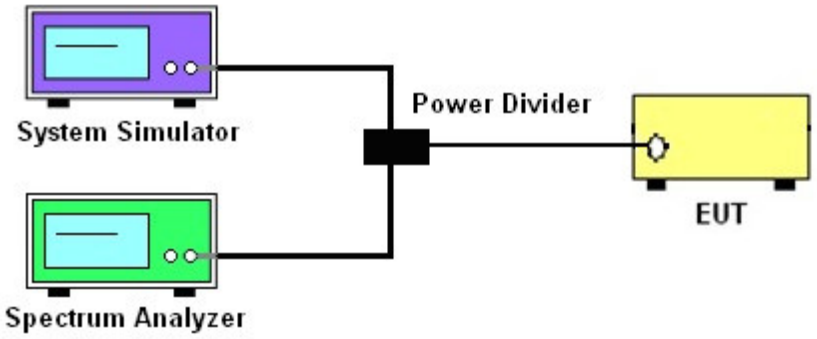
The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

All modes of operation were investigated and the worst case configuration results are reported in this section.

TEST PROCEDURE

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

TEST SETUP



5.5 FREQUENCY STABILITY

Test Overview

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-D-2010. The frequency stability of the transmitter is measured by:

a.) Temperature: The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.

b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency. For Part 24 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure

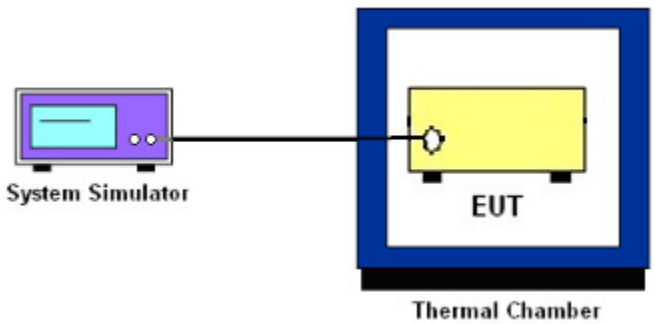
Temperature Variation

1. The testing follows fcckdb 971168 D01 section 9.0
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C steps up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

Voltage Variation

1. The testing follows FCC KDB 971168 D01 Section 9.0.
2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

TEST SETUP



5.6 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Overview

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

Test procedure

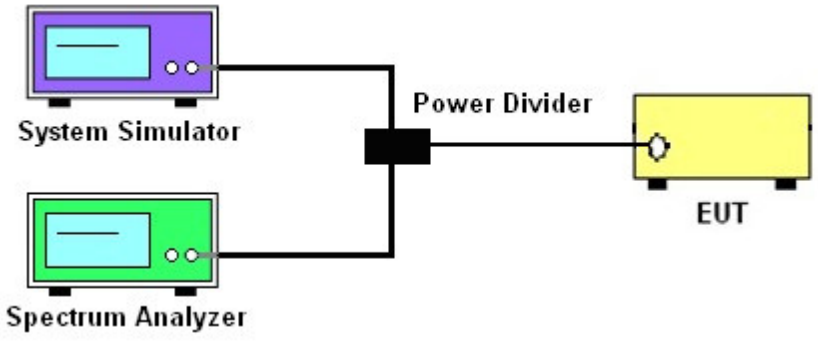
1. The testing follows FCC KDB 971168 D01 v02r02 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

= P(W) - [43 + 10log(P)] (dB)

= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

= -13dBm.

Test Setup



5.7 BAND EDGE

OVERVIEW

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

TEST PROCEDURE

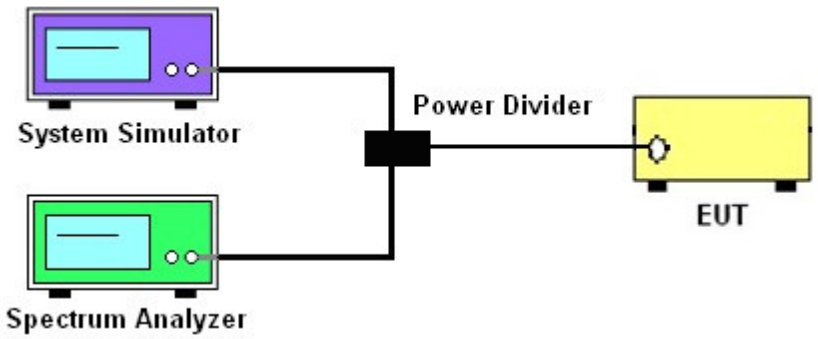
1. Start and stop frequency were set such that the band edge would be placed in the center of the Plot.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The band edges of low and high channels for the highest RF powers were measured.
5.The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6.The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

= P(W) - [43 + 10log(P)] (dB)

= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

= -13dBm.

TEST SETUP



5.8 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

Test overview

Radiated spurious emissions measurements are performed using the substitution method described inANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signalsoperating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas.Measurements on signals operating above 1GHz are performed using vertically and horizontally polarizedhorn antennas. All measurements are performed as peak measurements while the EUT isoperating at maximum power and at the appropriate frequencies.

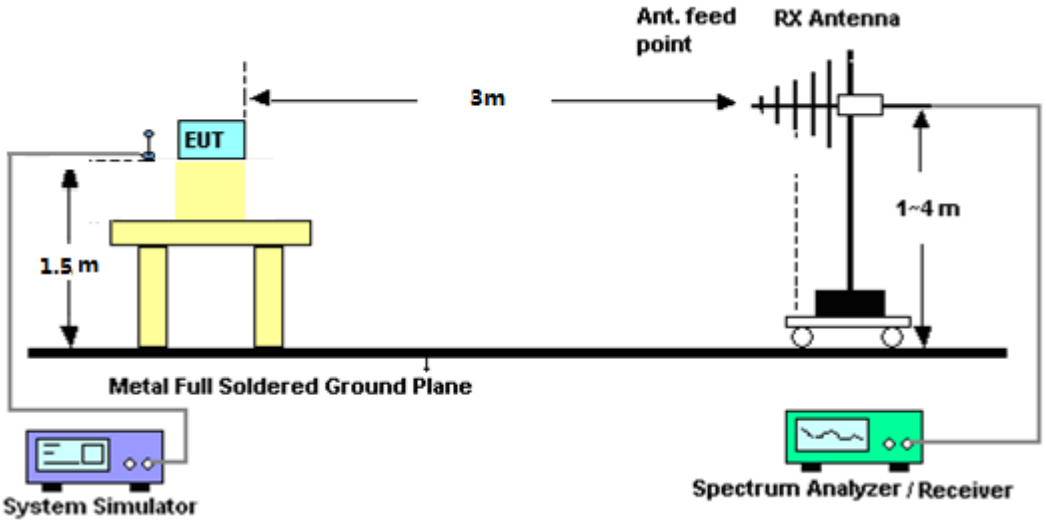
It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

Test procedure

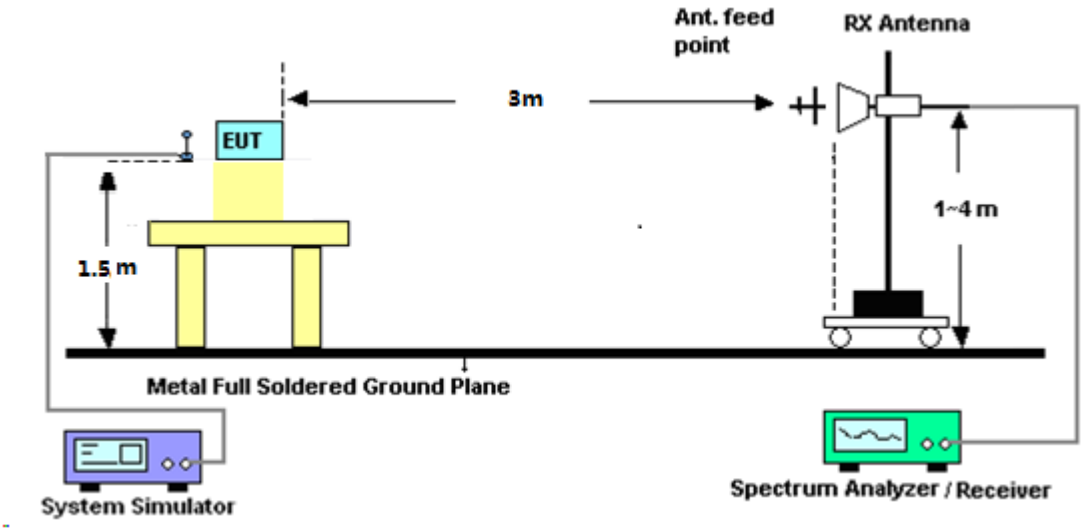
1. The testing follows FCC KDB 971168 D01 Section 5.8 and ANSI/TIA-603-D-2010 – Section 2.2.12
2. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5.No. of sweep points > 2 x span/RBW
6. Detector = Peak
7. Trace mode = max hold
8. The trace was allowed to stabilize

TEST SETUP

For radiated test from 30MHz to 1GHz



For radiated test from above 1GHz



APPENDIX ATESTRESULT
A1CONDUCTED OUTPUT POWER

GSM 850:

Mode	Frequency (MHz)	AVG Power
GSM850	824.2	31.67
	836.6	31.77
	848.8	**31.89**
GPRS850	824.2	31.57
	836.6	31.68
	848.8	**31.78**

PCS 1900:

Mode	Frequency (MHz)	AVG Power
GSM1900	1850.2	**26.10**
	1880	25.80
	1909.8	25.73
GPRS1900	1850.2	**26.01**
	1880	25.71
	1909.8	25.68

A2 PEAK-TO-AVERAGE RADIO

PCS 1900:

Mode	Frequency (MHz)	PEAK Power	AVG Power	PAR
PCS1900	1850.2	**26.70**	**26.10**	0.60
	1880	26.59	25.80	0.79
	1909.8	26.48	25.73	0.75
GPRS1900	1850.2	26.52	26.01	0.51
	1880	26.29	25.71	0.58
	1909.8	26.46	25.68	0.78

A3 TRANSMITTER RADIATED POWER (EIRP/ERP)

Radiated Power (ERP) for GSM 850 MHZ							
Mode	**Frequency**	**Result**					**Conclusion**
		S G.Level (dBm)	**Cable loss**	**Gain (dBi)**	**PMeas E.R.P(dBm)**	**Polarization Of Max. ERP**	
GSM850	824.2	23.63	0.44	6.5	29.69	Horizontal	Pass
	824.2	25.61	0.44	6.5	31.67	Vertical	Pass
	836.6	23.79	0.45	6.5	29.84	Horizontal	Pass
	836.6	25.72	0.45	6.5	31.77	Vertical	Pass
	848.8	23.64	0.46	6.5	29.68	Horizontal	Pass
	848.8	25.85	0.46	6.5	31.89	Vertical	Pass
GPRS850	824.2	23.57	0.44	6.5	29.63	Horizontal	Pass
	824.2	25.51	0.44	6.5	31.57	Vertical	Pass
	836.6	23.42	0.45	6.5	29.47	Horizontal	Pass
	836.6	25.63	0.45	6.5	31.68	Vertical	Pass
	848.8	23.31	0.46	6.5	29.35	Horizontal	Pass
	848.8	25.74	0.46	6.5	31.78	Vertical	Pass

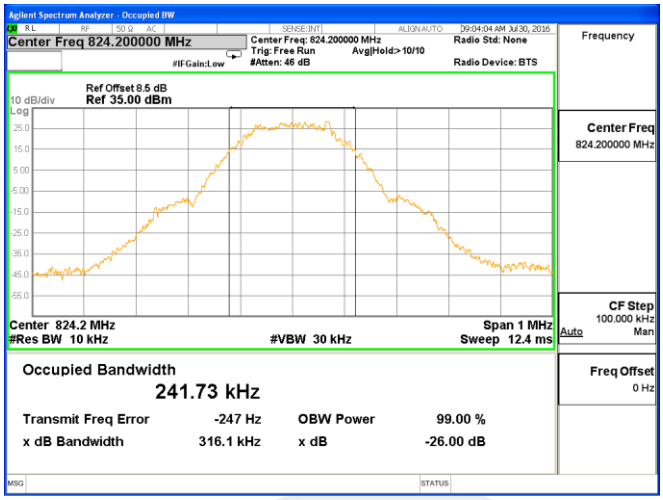
Radiated Power (EIRP) for PCS 1900 MHZ							
Mode	Frequency	Result					Conclusion
		S G.Level (dBm)	Cable loss	Gain (dBi)	PMeas E.I.R.P.(dBm)	Polarization Of Max.EIRP.	
PCS1900	1850.2	16.17	2.41	10.35	24.11	Horizontal	Pass
	1850.2	18.16	2.41	10.35	26.10	Vertical	Pass
	1880.0	15.95	2.42	10.35	23.88	Horizontal	Pass
	1880.0	17.87	2.42	10.35	25.80	Vertical	Pass
	1909.8	15.77	2.43	10.35	23.69	Horizontal	Pass
	1909.8	17.81	2.43	10.35	25.73	Vertical	Pass
GPRS1900	1850.2	16.27	2.41	10.35	24.21	Horizontal	Pass
	1850.2	18.07	2.41	10.35	26.01	Vertical	Pass
	1880.0	15.98	2.42	10.35	23.91	Horizontal	Pass
	1880.0	17.78	2.42	10.35	25.71	Vertical	Pass
	1909.8	15.93	2.43	10.35	23.85	Horizontal	Pass
	1909.8	17.76	2.43	10.35	25.68	Vertical	Pass

A4 OCCUPIED BANDWIDTH(99% OCCUPIED BANDWIDTH/26DB BANDWIDTH)

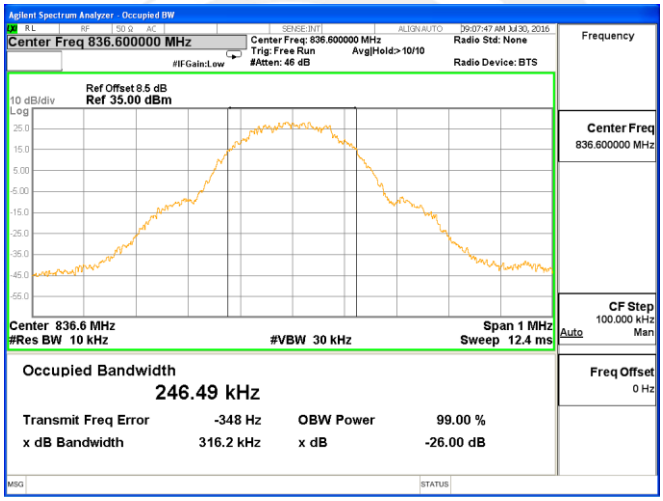
Occupied Bandwidth for GSM 850 band			
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	824.2	241.73	316.1
Middle Channel	836.6	246.49	316.2
High Channel	848.8	244.93	315.4
Occupied Bandwidth for GPRS 850 band			
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	824.2	249.39	322.8
Middle Channel	836.6	249.21	318.6
High Channel	848.8	251.07	311.8

Occupied Bandwidth for GSM1900 band			
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	1850.2	242.79	315.8
Middle Channel	1880.0	243.47	311.7
High Channel	1909.8	247.65	320.7
Occupied Bandwidth for GPRS 1900 band			
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(kHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	1850.2	242.30	316.6
Middle Channel	1880.0	244.41	314.1
High Channel	1909.8	246.79	317.3

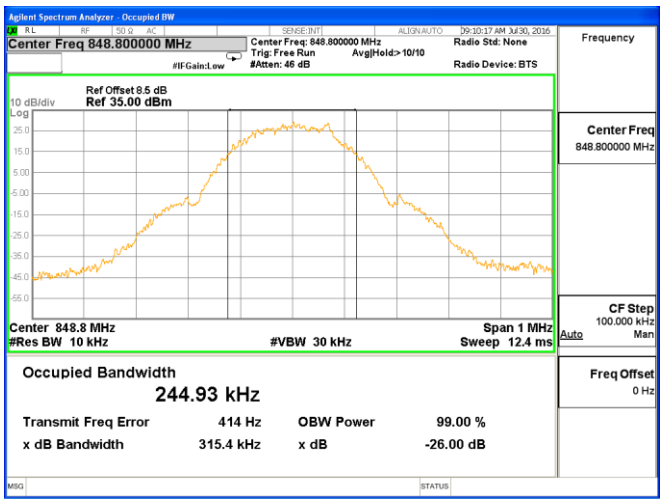
GSM 850 CH 128



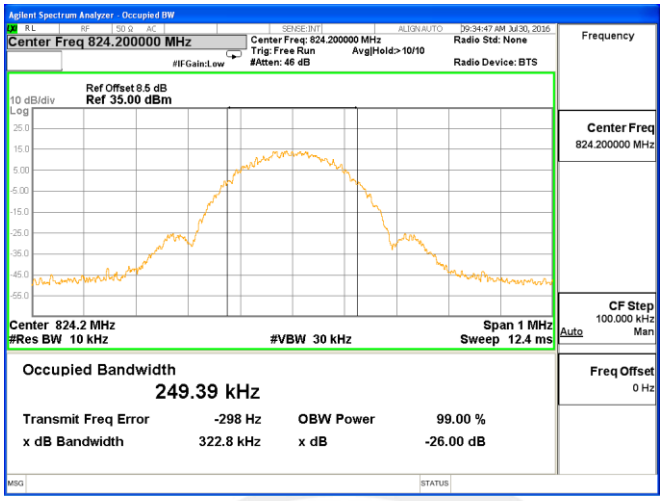
GSM 850 CH 190



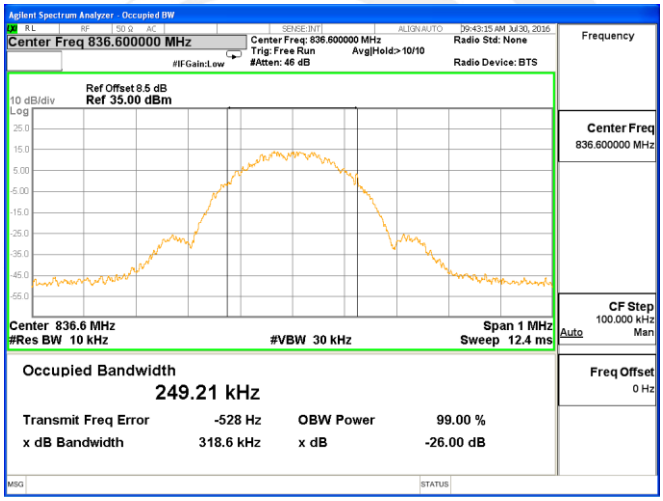
GSM 850 CH 251



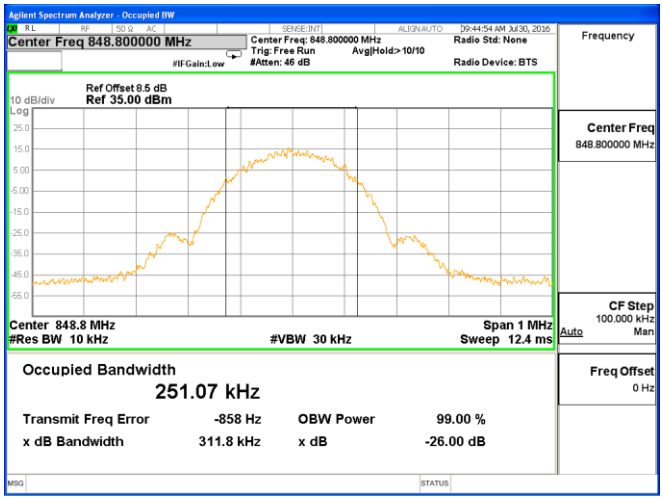
GPRS 850 CH 128



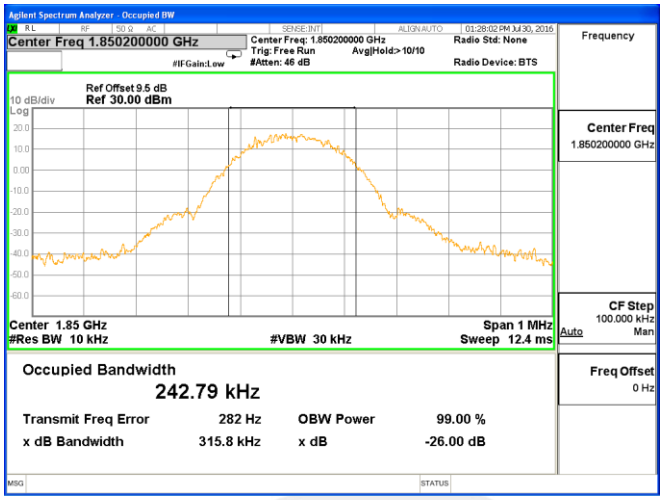
GPRS 850 CH 190



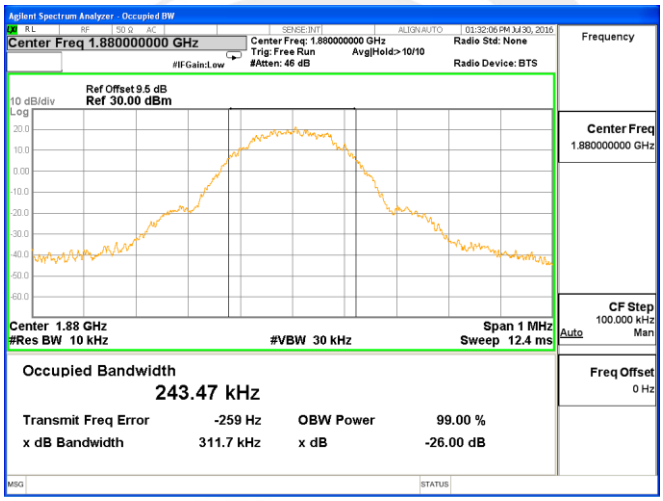
GPRS 850 CH 251



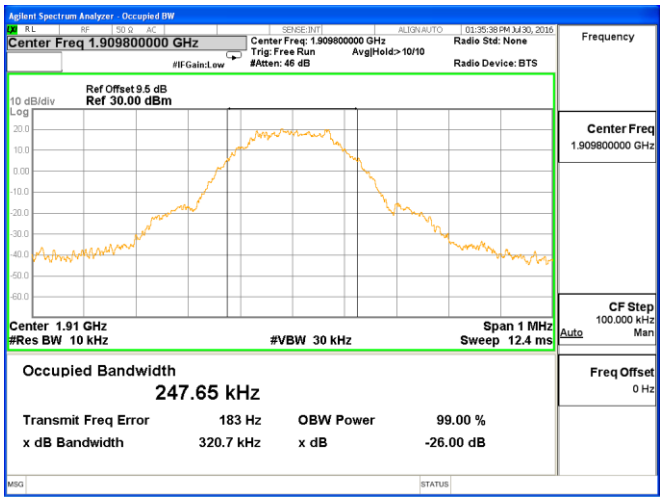
PCS 1900 CH 512



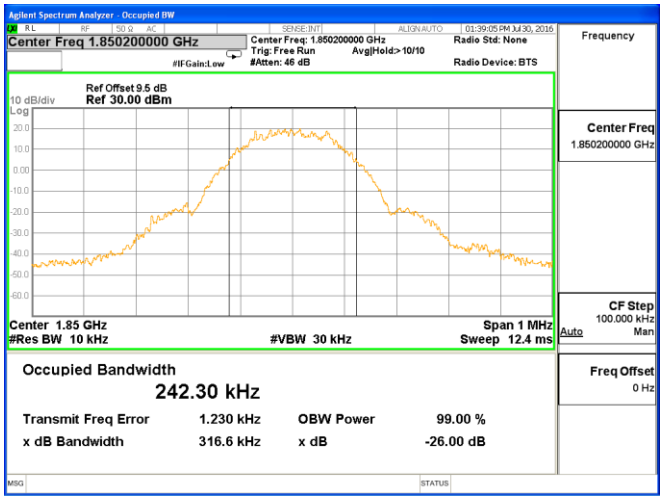
PCS 1900 CH 661



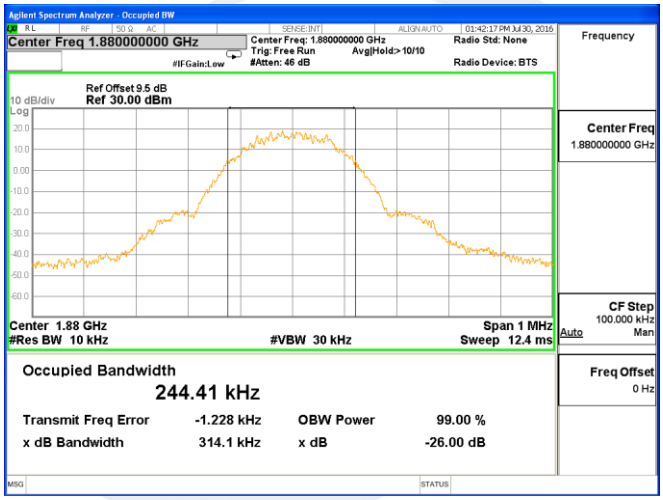
PCS 1900 CH 810



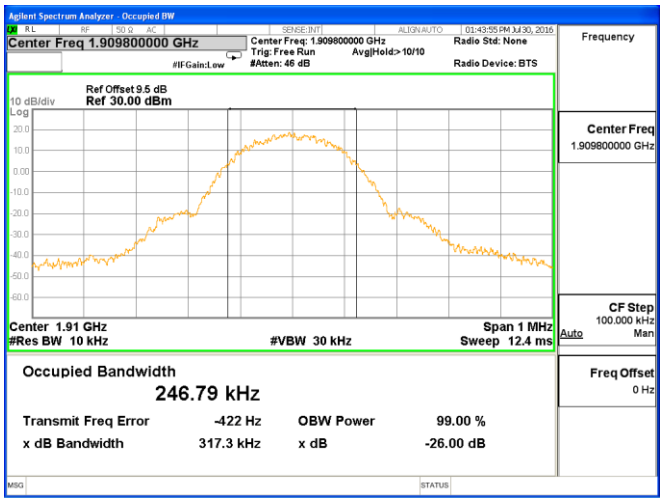
GPRS 1900 CH 512



GPRS 1900 CH 661



GPRS 1900 CH 810



A5 FREQUENCY STABILITY

Normal Voltage = 3.7V. ； Battery End Point (BEP) = 3.6 V.； Maximum Voltage =4.2 V

GSM 850Middle Channel					
Temperature (°C)	**Voltage (Volt)**	**Freq. Dev. (Hz)**	**Freq. Dev. (ppm)**	**Limit**	**Result**
50	Normal Voltage	13.509	0.016	2.5ppm	PASS
40		26.454	0.032		
30		23.698	0.028		
20		27.918	0.033		
10		18.272	0.022		
0		13.535	0.016		
-10		17.430	0.021		
-20		15.945	0.019		
-30		16.206	0.019		
25	Maximum Voltage	19.866	0.024		
25	BEP	11.631	0.014		

GPRS 850Middle Channel					
Temperature (°C)	**Voltage (Volt)**	**Freq. Dev. (Hz)**	**Freq. Dev. (ppm)**	**Limit**	**Result**
50	Normal Voltage	13.559	0.016	2.5ppm	PASS
40		26.446	0.032		
30		23.682	0.028		
20		27.886	0.033		
10		18.227	0.022		
0		13.501	0.016		
-10		17.413	0.021		
-20		15.904	0.019		
-30		16.264	0.019		
25	Maximum Voltage	19.897	0.024		
25	BEP	11.667	0.014		

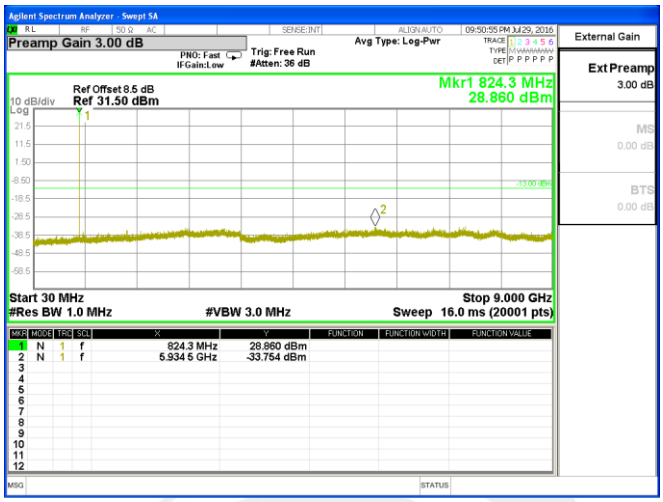
GSM 1900Middle Channel					
Temperature (°C)	**Voltage (Volt)**	**Freq. Dev. (Hz)**	**Freq. Dev. (ppm)**	**Limit**	**Result**
50	Normal Voltage	19.032	0.010	Within Authorized Band	PASS
40		11.202	0.006		
30		10.255	0.005		
20		22.304	0.012		
10		14.107	0.008		
0		10.075	0.005		
-10		15.438	0.008		
-20		20.668	0.011		
-30		24.082	0.013		
25	Maximum Voltage	12.468	0.007		
25	BEP	12.506	0.007		

GPRS 1900Middle Channel					
Temperature (°C)	**Voltage (Volt)**	**Freq. Dev. (Hz)**	**Freq. Dev. (ppm)**	**Limit**	**Result**
50	Normal Voltage	19.065	0.010	Within Authorized Band	PASS
40		11.202	0.006		
30		10.300	0.005		
20		22.263	0.012		
10		14.120	0.008		
0		10.003	0.005		
-10		15.419	0.008		
-20		20.695	0.011		
-30		24.105	0.013		
25	Maximum Voltage	12.444	0.007		
25	BEP	12.446	0.007		

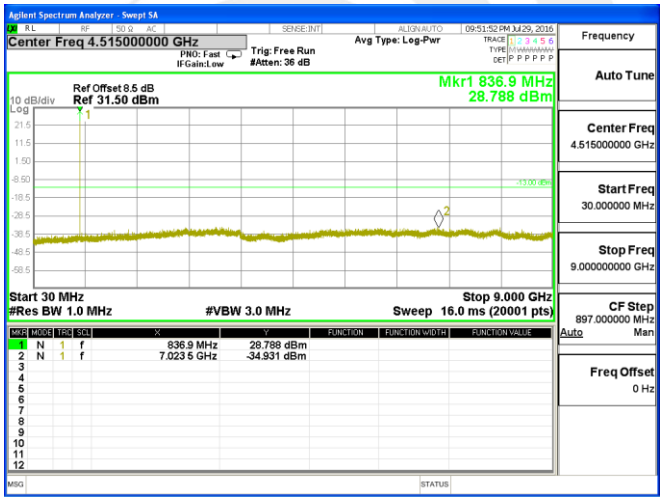
A6 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

GSM 850 BAND

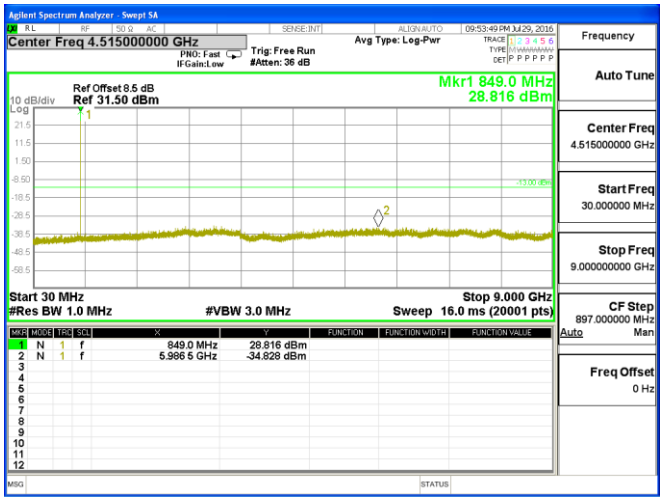
Lowest Channel



Middle Channel

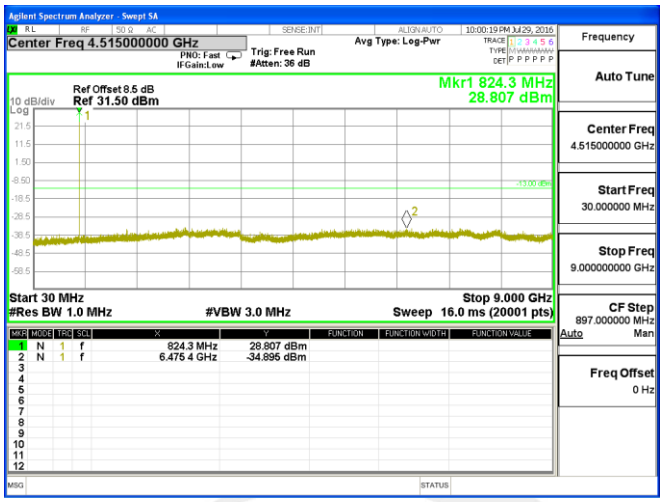


Highest Channel

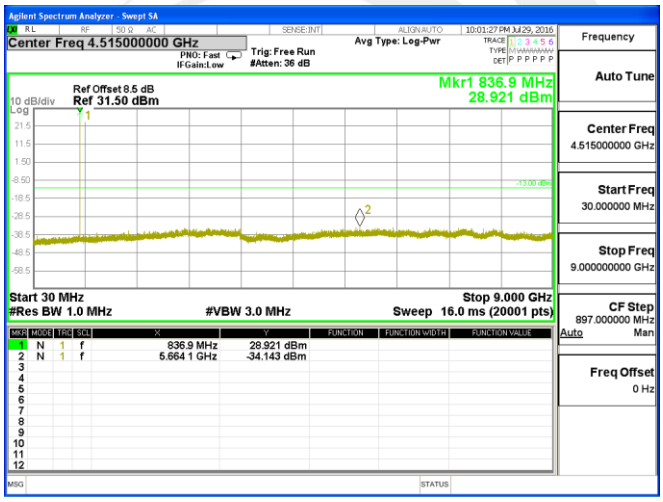


GPRS 850 BAND

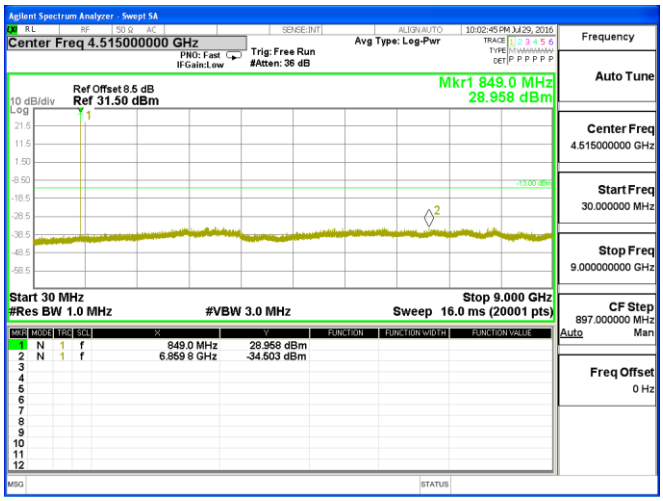
Lowest Channel



Middle Channel

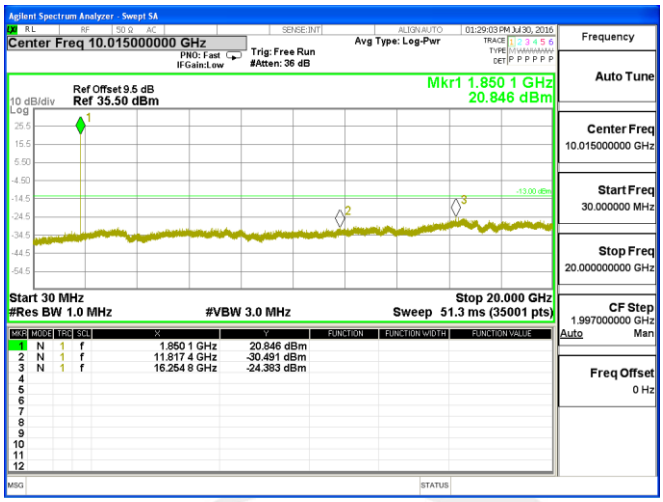


Highest Channel

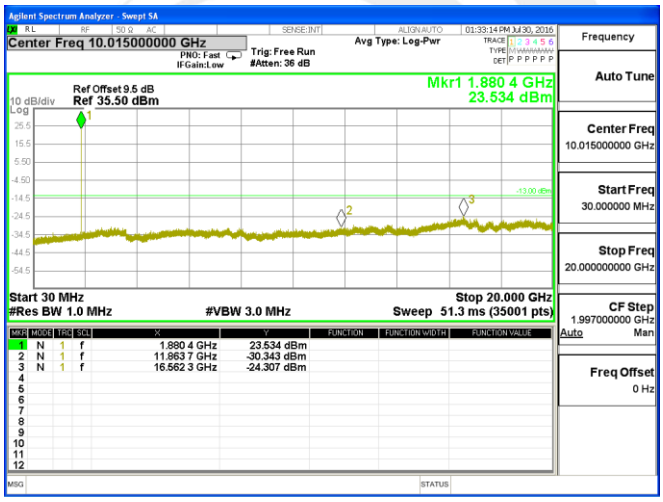


GSM1900 BAND(30M-20G)

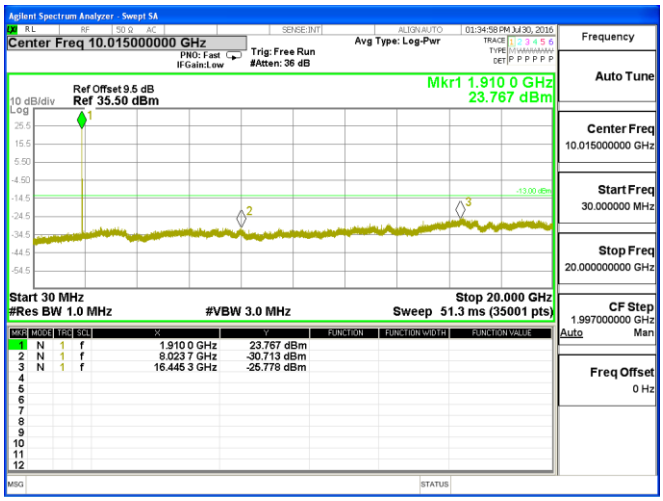
Lowest Channel



Middle Channel

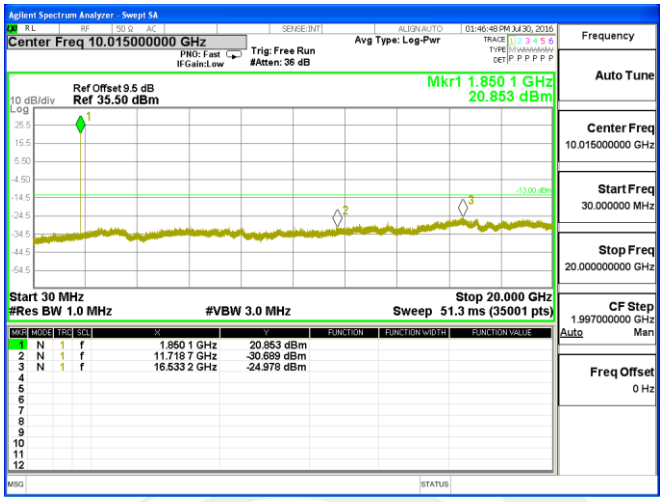


Highest Channel

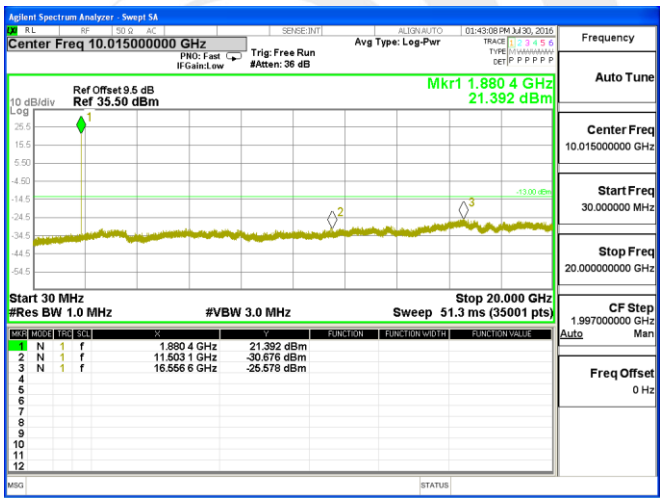


GPRS1900 BAND(30M-20G)

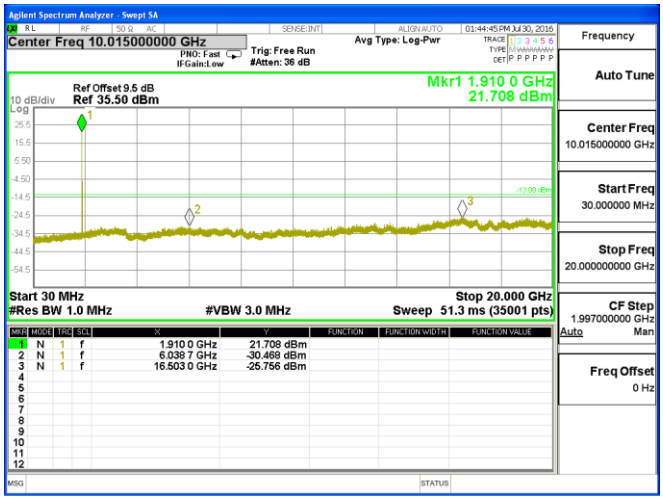
Lowest Channel



Middle Channel



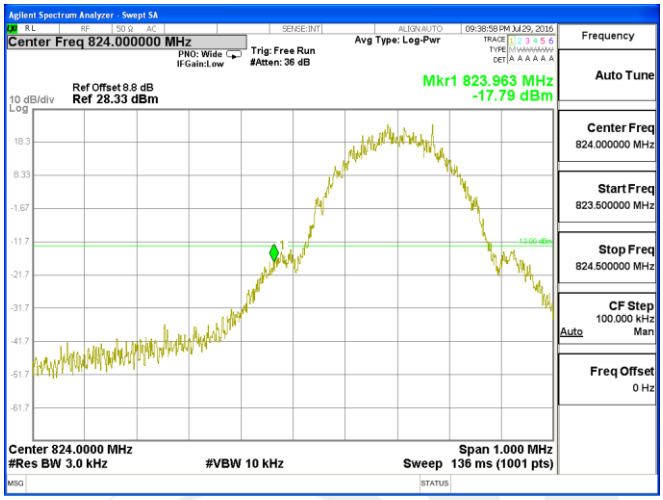
Highest Channel



A7 BAND EDGE

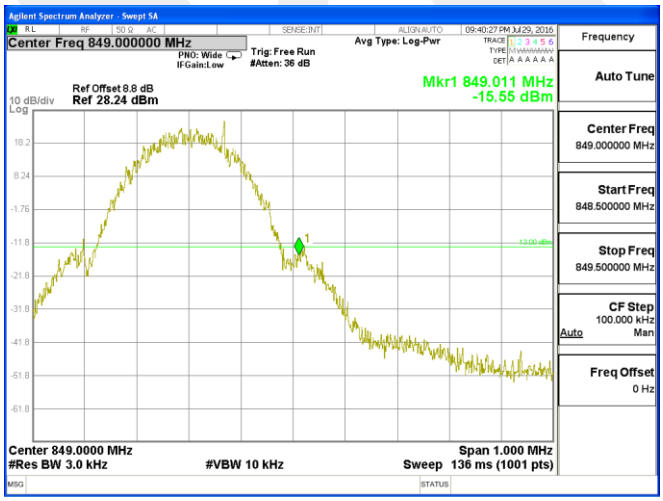
GSM 850

Lowest Band Edge



Note:Offset=Cable loss(8.5)+10log(3.2/3)=8.5+0.3=8.8 dB

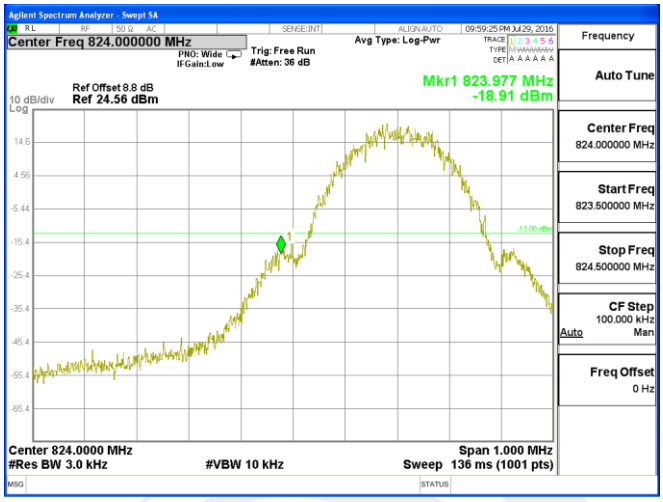
Highest Band Edge



Note:Offset=Cable loss(8.5)+10log(3.2/3)=8.5+0.3=8.8 dB

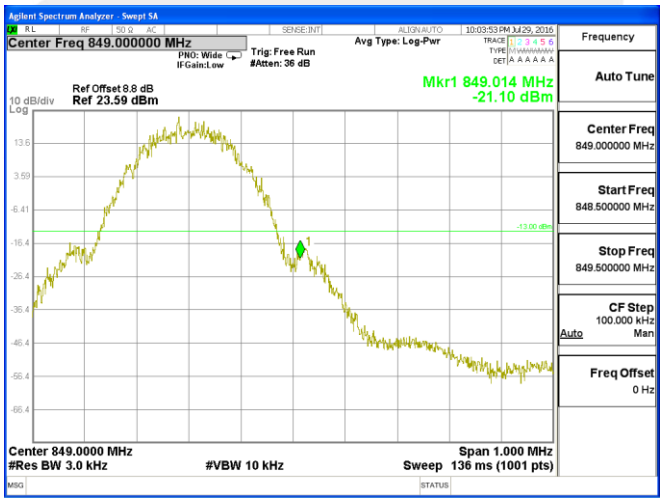
GPRS 850

Lowest Band Edge



Note:Offset=Cable loss(8.5)+10log(3.2/3)=8.5+0.3=8.8 dB

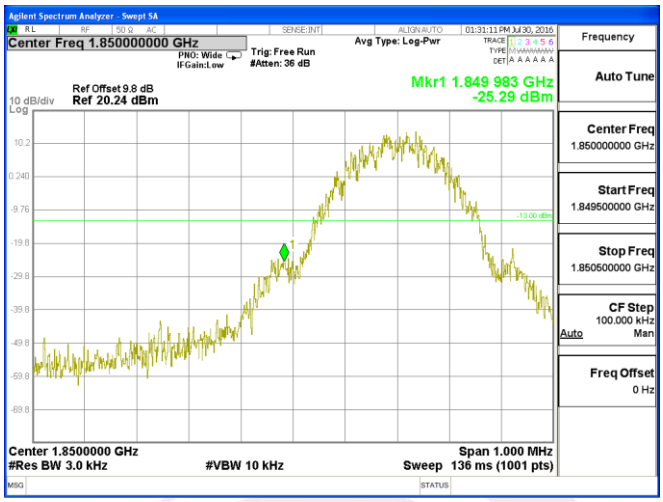
Highest Band Edge



Note:Offset=Cable loss(8.5)+10log(3.2/3)=8.5+0.3=8.8 dB

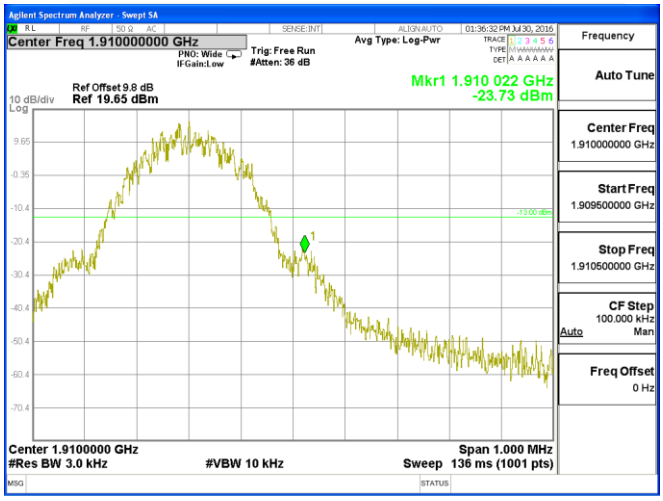
GSM 1900

Lowest Band Edge



Note:Offset=Cable loss(9.5)+10log(3.2/3)=9.5+0.3=9.8 dB

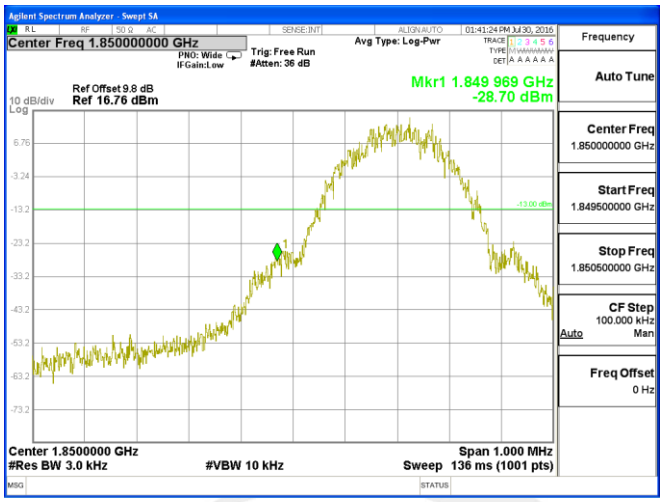
Highest Band Edge



Note:Offset=Cable loss(9.5)+10log(3.2/3)=9.5+0.3=9.8 dB

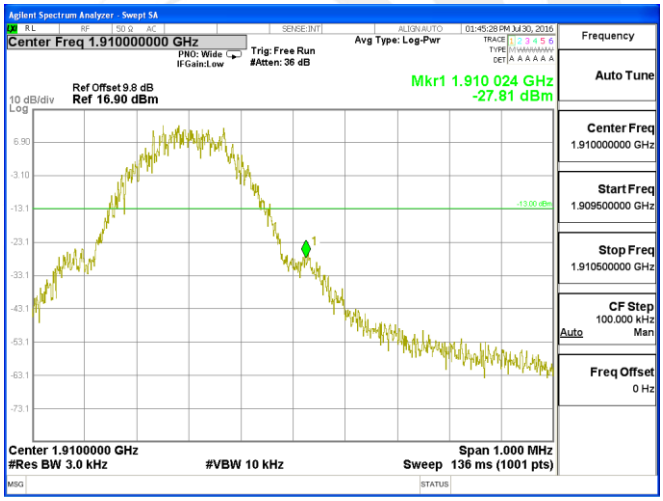
GPRS 1900

Lowest Band Edge



Note:Offset=Cable loss(9.5)+10log(3.2/3)=9.5+0.3=9.8 dB

Highest Band Edge



Note:Offset=Cable loss(9.5)+10log(3.2/3)=9.5+0.3=9.8 dB

A8 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

GSM 850: (30-9000)MHz

GSM 850: (30-9000)MHz							
The Worst Test Results Channel 128/824.2 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1648.14	-41.33	9.40	4.75	-36.68	-13.00	-23.68	H
2472.46	-40.25	10.60	8.39	-38.04	-13.00	-25.04	H
3296.55	-31.43	12.00	11.79	-31.22	-13.00	-18.22	H
1648.45	-44.17	9.40	4.75	-39.52	-13.00	-26.52	V
2472.34	-44.29	10.60	8.39	-42.08	-13.00	-29.08	V
3296.71	-43.87	12.00	11.79	-43.66	-13.00	-30.66	V
The Worst Test Results Channel 190/836.6 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1673.07	-41.20	9.50	4.76	-36.46	-13.00	-23.46	H
2509.76	-39.40	10.70	8.40	-37.10	-13.00	-24.10	H
3346.25	-31.64	12.20	11.80	-31.24	-13.00	-18.24	H
1673.00	-43.67	9.40	4.75	-39.02	-13.00	-26.02	V
2509.68	-44.02	10.60	8.39	-41.81	-13.00	-28.81	V
3346.07	-43.14	12.20	11.82	-42.76	-13.00	-29.76	V
The Worst Test Results Channel 251/848.8 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1697.43	-40.92	9.60	4.77	-36.09	-13.00	-23.09	H
2546.13	-39.86	10.80	8.50	-37.56	-13.00	-24.56	H
3395.18	-31.88	12.50	11.90	-31.28	-13.00	-18.28	H
1697.57	-43.52	9.60	4.77	-38.69	-13.00	-25.69	V
2546.45	-44.77	10.80	8.50	-42.47	-13.00	-29.47	V
3395.01	-42.75	12.50	11.90	-42.15	-13.00	-29.15	V

Note: (1)Below 30MHz no Spurious found is the worst condition.

(2)Above 3.5GHz amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has.

GPRS 850: (30-9000)MHz

GPRS 850: (30-9000)MHz							
The Worst Test Results Channel 128/824.2 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1648.17	-41.00	9.40	4.75	-36.35	-13.00	-23.35	H
2472.29	-39.43	10.60	8.39	-37.22	-13.00	-24.22	H
3296.43	-31.22	12.00	11.79	-31.01	-13.00	-18.01	H
1648.14	-43.74	9.40	4.75	-39.09	-13.00	-26.09	V
2472.65	-44.00	10.60	8.39	-41.79	-13.00	-28.79	V
3296.64	-43.57	12.00	11.79	-43.36	-13.00	-30.36	V
The Worst Test Results Channel 190/836.6 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1673.11	-40.18	9.50	4.76	-35.44	-13.00	-22.44	H
2509.78	-39.34	10.70	8.40	-37.04	-13.00	-24.04	H
3346.18	-31.37	12.20	11.80	-30.97	-13.00	-17.97	H
1672.86	-43.85	9.40	4.75	-39.20	-13.00	-26.20	V
2509.73	-45.34	10.60	8.39	-43.13	-13.00	-30.13	V
3346.27	-43.60	12.20	11.82	-43.22	-13.00	-30.22	V
The Worst Test Results Channel 251/848.8 MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1697.50	-41.63	9.60	4.77	-36.80	-13.00	-23.80	H
2546.08	-40.18	10.80	8.50	-37.88	-13.00	-24.88	H
3395.12	-31.54	12.50	11.90	-30.94	-13.00	-17.94	H
1697.58	-44.27	9.60	4.77	-39.44	-13.00	-26.44	V
2546.50	-44.65	10.80	8.50	-42.35	-13.00	-29.35	V
3395.26	-43.22	12.50	11.90	-42.62	-13.00	-29.62	V

Note: (1)Below 30MHz no Spurious found is the worst condition.

(2)Above 3.5GHz amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has.

PCS 1900: (30-20000)MHz

DCS 1900: (30-20000)MHz							
The Worst Test Results for Channel 512/1850.2MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3700.17	-33.90	12.60	12.93	-34.23	-13.00	-21.23	H
5550.54	-34.91	13.10	17.11	-38.92	-13.00	-25.92	H
7400.90	-32.79	11.50	22.20	-43.49	-13.00	-30.49	H
3700.51	-35.42	12.60	12.93	-35.75	-13.00	-22.75	V
5550.25	-34.84	13.10	17.11	-38.85	-13.00	-25.85	V
7400.66	-31.84	11.50	22.20	-42.54	-13.00	-29.54	V
The Worst Test Results for Channel 661/1880.0MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3760.16	-33.78	12.60	12.93	-34.11	-13.00	-21.11	H
5639.89	-34.86	13.10	17.11	-38.87	-13.00	-25.87	H
7520.27	-33.09	11.50	22.20	-43.79	-13.00	-30.79	H
3760.11	-35.03	12.60	12.93	-35.36	-13.00	-22.36	V
5639.90	-33.76	13.10	17.11	-37.77	-13.00	-24.77	V
7520.26	-32.28	11.50	22.20	-42.98	-13.00	-29.98	V
The Worst Test Results for Channel 810/1909.8MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3819.47	-33.60	12.60	12.93	-33.93	-13.00	-20.93	H
5729.12	-34.09	13.10	17.11	-38.10	-13.00	-25.10	H
7639.24	-32.69	11.50	22.20	-43.39	-13.00	-30.39	H
3819.74	-35.97	12.60	12.93	-36.30	-13.00	-23.30	V
5729.09	-34.41	13.10	17.11	-38.42	-13.00	-25.42	V
7639.34	-32.43	11.50	22.20	-43.13	-13.00	-30.13	V

Note: (1)Below 30MHz no Spurious found is the worst condition.

(2)Above 8GHz amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has.

GPRS 1900: (30-20000)MHz

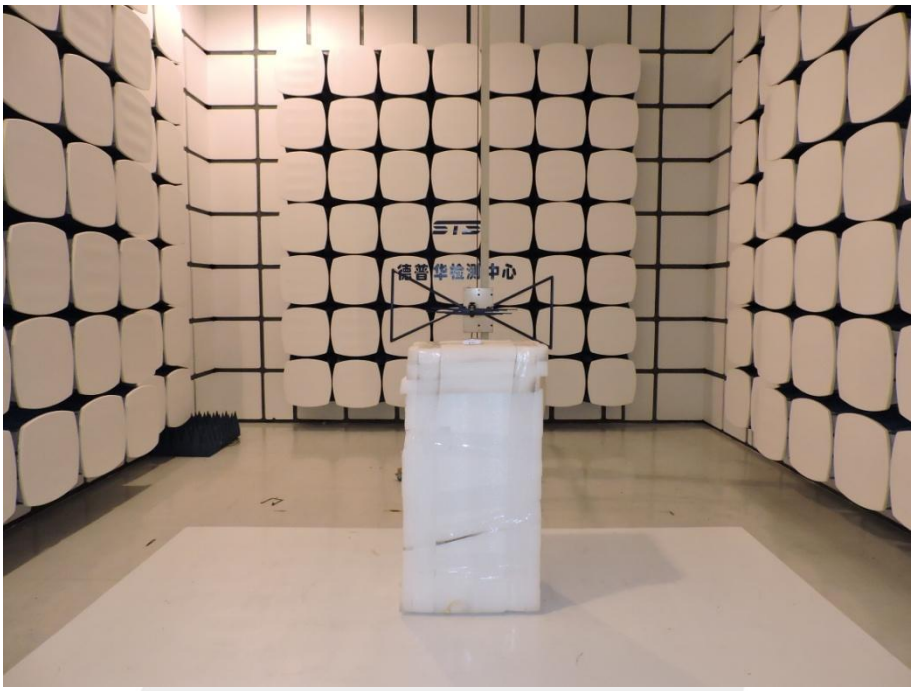
GPRS1900: (30-20000)MHz							
The Worst Test Results for Channel 512/1850.2MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3700.39	-33.97	12.60	12.93	-34.30	-13.00	-21.30	H
5550.47	-34.54	13.10	17.11	-38.55	-13.00	-25.55	H
7400.79	-32.52	11.50	22.20	-43.22	-13.00	-30.22	H
3700.51	-35.61	12.60	12.93	-35.94	-13.00	-22.94	V
5550.26	-34.48	13.10	17.11	-38.49	-13.00	-25.49	V
7400.67	-33.15	11.50	22.20	-43.85	-13.00	-30.85	V
The Worst Test Results for Channel 661/1880.0MHz							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3759.93	-34.61	12.60	12.93	-34.94	-13.00	-21.94	H
5639.81	-34.75	13.10	17.11	-38.76	-13.00	-25.76	H
7520.27	-32.40	11.50	22.20	-43.10	-13.00	-30.10	H
3760.05	-35.84	12.60	12.93	-36.17	-13.00	-23.17	V
5640.20	-35.07	13.10	17.11	-39.08	-13.00	-26.08	V
7520.02	-32.58	11.50	22.20	-43.28	-13.00	-30.28	V
The Worst Test Results for Channel 810/1909.8MHz							
Frequency(MHz)	S G.Level (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3819.56	-34.50	12.60	12.93	-34.83	-13.00	-21.83	H
5729.44	-34.84	13.10	17.11	-38.85	-13.00	-25.85	H
7639.11	-32.24	11.50	22.20	-42.94	-13.00	-29.94	H
3819.48	-35.87	12.60	12.93	-36.20	-13.00	-23.20	V
5729.53	-35.04	13.10	17.11	-39.05	-13.00	-26.05	V
7639.07	-33.08	11.50	22.20	-43.78	-13.00	-30.78	V

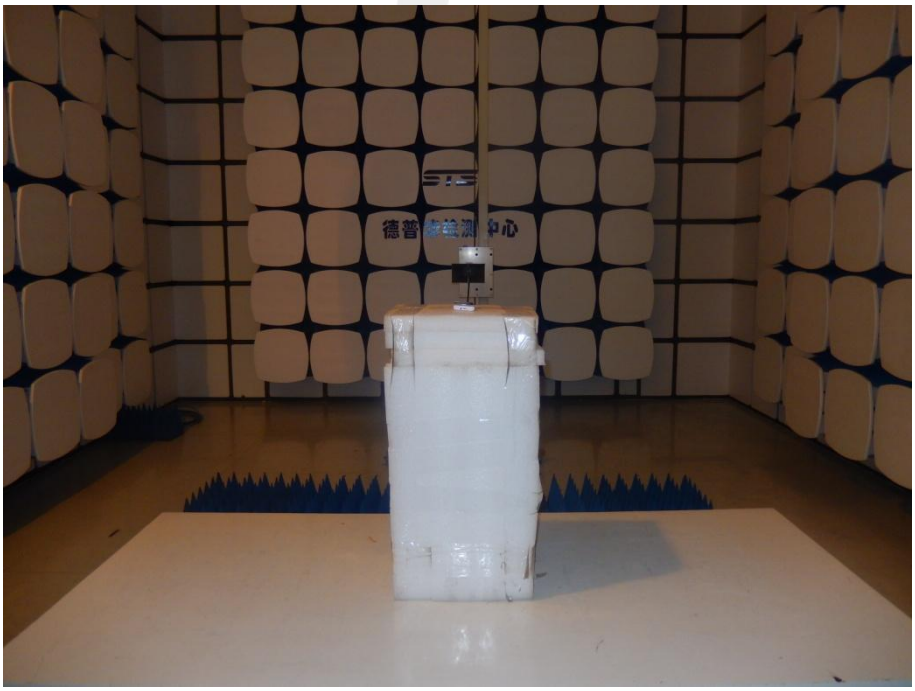
Note: (1)Below 30MHz no Spurious found is the worst condition.

(2)Above 8GHz amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has.

APPENDIX BPHOTOS OF TEST SETUP

RADIATED SPURIOUS EMISSION





※※※※※END OF THE REPORT※※※※※