Test Report

Product Name ： GSM 850/1900 Mobile Phone

Model No. ： T330

FCC ID ： QIST330

Applicant ： HUAWEI TECHNOLOGIES CO., LTD

Address ： Huawei Base BanTian Longgang Shenzhen 518129 P.R.C

Date of Receipt ： 2008/01/25

Issued Date ： 2008/02/25

Report No. ： 082S019-HP-US-P07V01

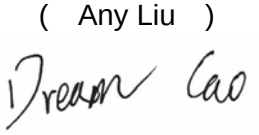
Test Report Certification

Issued Date : 2008/02/25
Report No. : 082S019-HP-US-P07V01

QuieTek

Product Name	:	GSM 850/1900 Mobile Phone
Applicant	:	HUAWEI TECHNOLOGIES CO., LTD
Address	:	Huawei Base BanTian Longgang Shenzhen 518129 P.R.C
Manufacturer	:	HUAWEI TECHNOLOGIES CO., LTD
Model No.	:	T330
FCC ID	:	QIST330
Rated Voltage	:	AC 120 V / 60 Hz
EUT Voltage	:	DC 3.7V
Trade Name	:	Huawei
Applicable Standard	:	FCC CFR Title 47 Part 2, Part 22H and Part 24E EIA/TIA 603-C
Test Result	:	Complied
Performed Location	:	SuZhou EMC laboratory No.99 Hongye Rd., Suzhou Industrial Park Loufeng Hi-Tech Development Zone., SuZhou, China TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098 FCC Registration Number: 800392

Documented By : 
(Any Liu)

Reviewed By : 
(Dream Cao)

Approved By : 
(Murphy Wang)

Laboratory Information

We , **QuieTek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited by the following accreditation Bodies in compliance with ISO 17025, EN 45001 and Guide 25:

Taiwan R.O.C.	**:**	**BSMI, DGT, CNLA**
Germany	**:**	**TUV Rheinland**
Norway	**:**	**Nemko, DNV**
USA	**:**	**FCC, NVLAP**
Japan	**:**	**VCCI**

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site : http://tw.quietek.com/modules/myalbum/
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/
If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

HsinChu Testing Laboratory :

No.75-2, 3rd Lin, Wangye Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan, R.O.C.
TEL:+886-3-592-8858 / FAX:+886-3-592-8859 E-Mail : service@quietek.com

NVLAP Lab Code : 200347-0 — Testing Laboratory 1313

LinKou Testing Laboratory :

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TEL : +886-2-8601-3788 / FAX : 886-2-8601-3789 E-Mail : service@quietek.com

NVLAP Lab Code: 200533-0 — Testing Laboratory 0914

Suzhou Testing Laboratory :

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TEL : +86-512-6251-5088 / FAX : 86-512-6251-5098 E-Mail : service@quietek.com

NVLAP Lab Code : 200743-0 — Testing Laboratory 1596

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1. General Information

1.1. EUT Description

Product Name	GSM 850/1900 Mobile Phone
Trade Name	Huawei
Model No.	T330
FCC ID	QIST330
IME No.	011490000000034
Tx Frequency Range	GSM 850: 824MHz to 849MHz PCS 1900: 1850MHz to 1910MHz
Rx Frequency Range	GSM 850: 869MHz to 894MHz PCS 1900: 1930MHz to 1990MHz
Channel Number	GSM 850: 124 PCS 1900: 299
Type of Modulation	GMSK
Channel Control	Auto
Antenna type	Fixed
Hardware version	Ver.C
Software version	MAUI.07A.W07.36.MP.V23
DC voltages and DC currents	EUT Transmitting (in maximum power): DC voltage: 3.7V, DC current: 0.293A
	EUT Standby: DC voltage: 3.7V, DC current: 0.076A

Component	
Travel Charger	Manufacturer: Huawei Technology Co., Ltd. M/N: DSA-31SFUS Input: AC 100-240V~, 50/60Hz, 0.2A Output: 5.2V, 0.55A
Earphone	Manufacturer: Hongsheng M/N: HSE799LA

1.2. Mode of Operation

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: GSM 850
Mode 2: PCS 1900

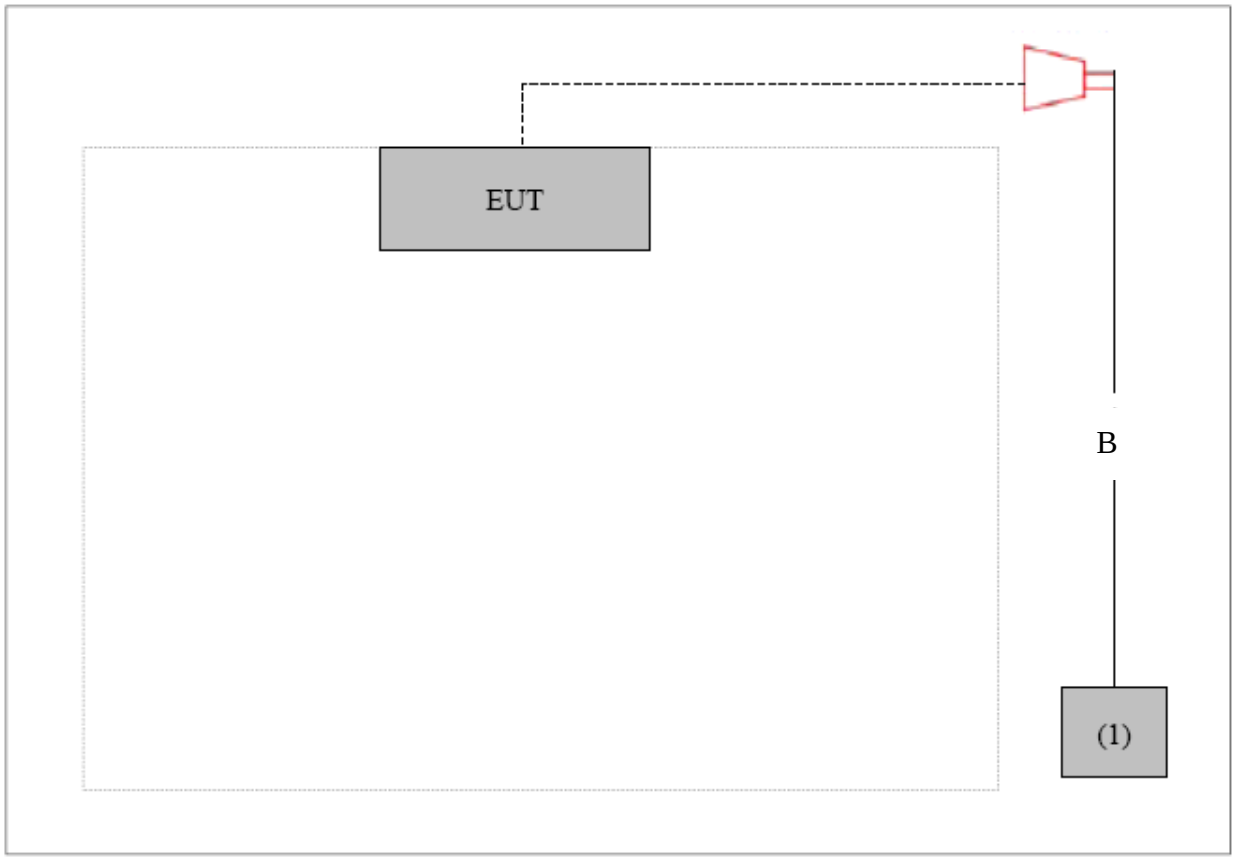
1.3. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Radio Communication Tester	R&S	CMU200	106388	Non-Shielded, 1.8m

1.4. Configuration of Tested System

Connection Diagram



Signal Cable Type		Signal cable Description
B	Coaxial Cable	Shielded, >5m

1.5. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of al equipment, and link EUT to communication tester CMU200.
3	Set EUT working at maximum power output mode through CMU200, then calling all the time.
4	Change to another mode (PCS1900) and then test it.

2. Technical Test

2.1. Summary of Test Result

☒ No deviations from the test standards

☐ Deviations from the test standards as below description:

For GSM 850 (FCC Part 22H & Part 2)

Emission			
Performed Item	Normative References	Test Performed	Deviation
Peak Output Power	FCC Part 22.913(a)(2) and Part 2.1046 EIA/TIA 603-C	Yes	No
Modulation Characteristic	FCC Part 2.1047(d)	Yes	No
Occupied Bandwidth	FCC Part 2.1049	Yes	No
Spurious Emission At Antenna Terminals (+/- 1MHz)	FCC Part 22.917(a) and Part 2.1049	Yes	No
Spurious Emission	FCC Part 22.917(b) and Part 2.1051, 2.1053 EIA/TIA 603-C	Yes	No
Frequency Stability Under Temperature & Voltage Variations	FCC Part 22.355 and 2.1055 EIA/TIA 603-C	Yes	No

For PCS 1900 (FCC Part 24E & Part 2)

Emission			
Performed Item	Normative References	Test Performed	Deviation
Peak Output Power	FCC Part 24.232(b) and Part 2.1046 EIA/TIA 603-C	Yes	No
Modulation Characteristic	FCC Part 2.1047(d)	Yes	No
Occupied Bandwidth	FCC Part 24.238(b) and Part 2.1049	Yes	No
Spurious Emission At Antenna Terminals (+/- 1MHz)	FCC Part 24.238(a) and Part 2.1049	Yes	No
Spurious Emission	FCC Part 24.238(b) and Part 2.1051, 2.1053 EIA/TIA 603-C	Yes	No

Frequency Stability Under Temperature & Voltage Variations	FCC Part 24.235 and 2.1055 EIA/TIA 603-C	Yes	No

2.2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	23
Humidity (%RH)	25-75	52
Barometric pressure (mbar)	860-1060	950-1000

3. Peak Output Power

3.1. Test Equipment

Conducted Output Power / AC-4

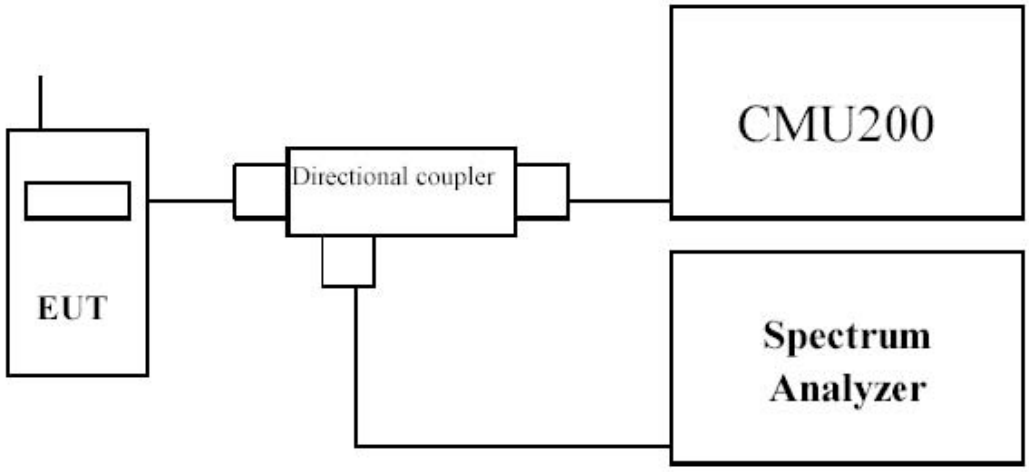
Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2007/06/11
Radio Communication Tester	R&S	CMU 200	106388	2007/10/30
Dual Directional Coupler	Agilent	778D	20160	2007/04/20
10dB Coaxial Coupler	Agilent	87300C	MY44300299	2007/04/20
Coaxial Cable	Huber+Suhner	AC4-RF-H	10	2007/11/25
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH007	2007/11/30

Radiated Output Power / AC-2

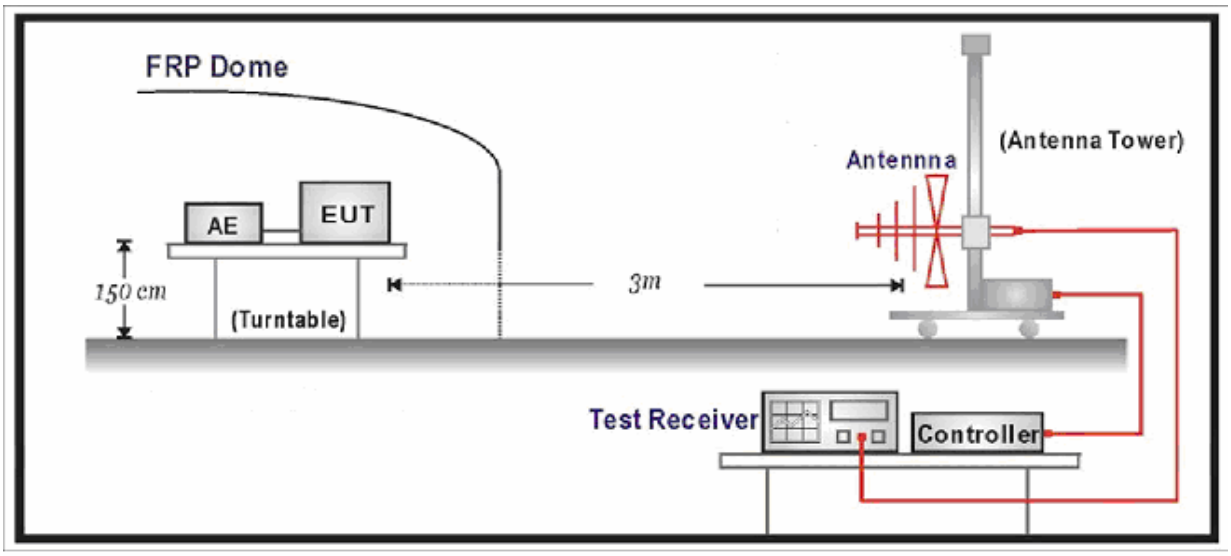
Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4408B	MY45102679	2007/11/12
Radio Communication Tester	R&S	CMU 200	106388	2007/10/30
PSG Analog S.G.	Agilent	E8257D	MY44321116	2007/06/11
Preamplifier	QuieTek	AP-025C	QT-AP003	2007/11/25
Preamplifier	QuieTek	AP-180C	CHM-0602012	2007/11/25
Bilog Type Antenna	Schaffner	CBL6112B	2932	2007/11/22
Half Wave Tuned Dipole Antenna	COM-POWER	AD-100	40137	2007/11/25
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	496	2007/11/25
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2007/11/25
Coaxial Cable	Huber+Suhner	AC2-R	04	2007/11/25
Coaxial Cable	Huber+Suhner	AC2-T	05	2007/11/25
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH002	2007/03/31

3.2. Test Setup

Conducted Power Measurement:



Radiated Power Measurement:



3.3. Limit

For FCC Part 22.913(a)(2):

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

For FCC Part 24.232(b):

The EIRP of mobile transmitters and auxiliary test transmitters must not exceed 2 Watts.

3.4. Test Procedure

The EUT was setup according to EIA/TIA 603C

Conducted Power Measurement:

a) Place the EUT on a bench and set it in transmitting mode.
b) Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.
c) EUT Communicate with CMU200, then select a channel for testing.
d) Add a correction factor to the display of spectrum, and then test.

Radiated Power Measurement:

a) The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
b) The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
c) The output of the test antenna shall be connected to the measuring receiver.
d) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
e) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
f) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
h) The maximum signal level detected by the measuring receiver shall be noted.
i) The transmitter shall be replaced by a substitution antenna.
j) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
k) The substitution antenna shall be connected to a calibrated signal generator.
l) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
m) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
n) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
o) The measurement shall be repeated with the test antenna and the substitution antenna

orientated for horizontal polarization.

p) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

3.5. Uncertainty

The measurement uncertainty is defined as for Conducted Power Measurement ± 1.2 dB, for Radiated Power Measurement ± 3.2 dB

3.6. Test Result

Product	GSM 850/1900 Mobile Phone		
Test Item	Peak Output Power		
Test Mode	Mode 1: GSM 850		
Date of Test	2008/02/15	Test Site	AC-2

Channel No.	Frequency (MHz)	Modulation	Conducted Peak Output Power Measurement (dBm)	Radiated Peak Output Power Measurement (dBm)	Limit (dBm)	Result
128	824.2	GSM	32.10	25.73	38.50	Pass
189	836.4	GSM	32.10	25.96	38.50	Pass
251	848.8	GSM	32.00	27.36	38.50	Pass

Radiated Measurement

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 128 (824.20MHz)								
824.20	-15.50	H	25.91	2.56	-0.02	23.33	38.50	-15.17
824.20	-16.00	V	28.31	2.56	-0.02	25.73	38.50	-14.77
Middle Channel 380 (836.40MHz)								
836.40	-15.47	H	26.44	2.59	0.10	23.95	38.50	-14.55
836.40	-14.84	V	28.45	2.59	0.10	25.96	38.50	-12.54
High Channel 773 (848.80MHz)								
848.80	-14.92	H	26.68	2.54	0.13	24.27	38.50	-14.23
848.80	-13.51	V	29.77	2.54	0.13	27.36	38.50	-11.14

Product	GSM 850/1900 Mobile Phone		
Test Item	Peak Output Power		
Test Mode	Mode 2: PCS 1900		
Date of Test	2008/02/15	Test Site	AC-2

Channel No.	Frequency (MHz)	Modulation	Conducted Peak Output Power Measurement (dBm)	Radiated Peak Output Power Measurement (dBm)	Limit (dBm)	Result
512	1850.2	GSM	29.70	23.54	33.00	Pass
661	1880.0	GSM	29.80	23.28	33.00	Pass
810	1909.8	GSM	29.70	23.95	33.00	Pass

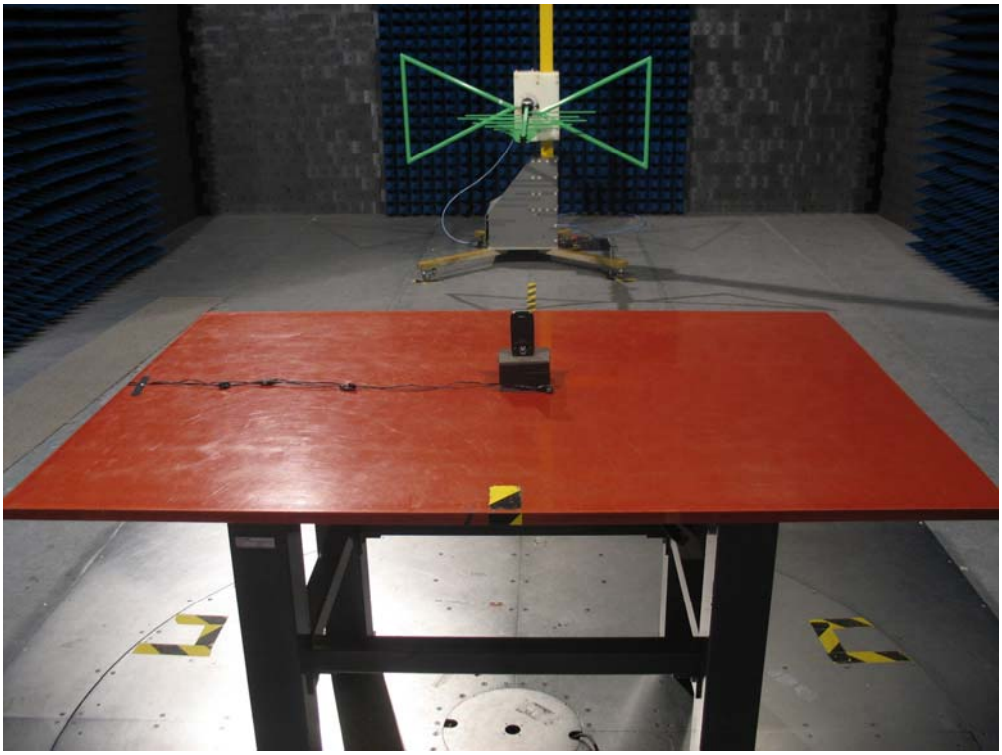
Radiated Measurement

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 512 (1850.20MHz)								
1850.20	-23.05	H	13.60	3.55	10.40	20.45	33.00	-12.55
1850.20	-19.07	V	16.69	3.55	10.40	23.54	33.00	-9.46
Middle Channel 661 (1880.00MHz)								
1880.00	-23.58	H	13.48	3.53	10.43	20.38	33.00	-12.62
1880.00	-19.89	V	16.41	3.53	10.43	23.28	33.00	-9.72
High Channel 810 (1909.80MHz)								
1909.80	-22.35	H	15.00	3.56	10.44	21.88	33.00	-11.12
1909.80	-19.87	V	17.07	3.56	10.44	23.95	33.00	-9.05

3.7. Test Photograph

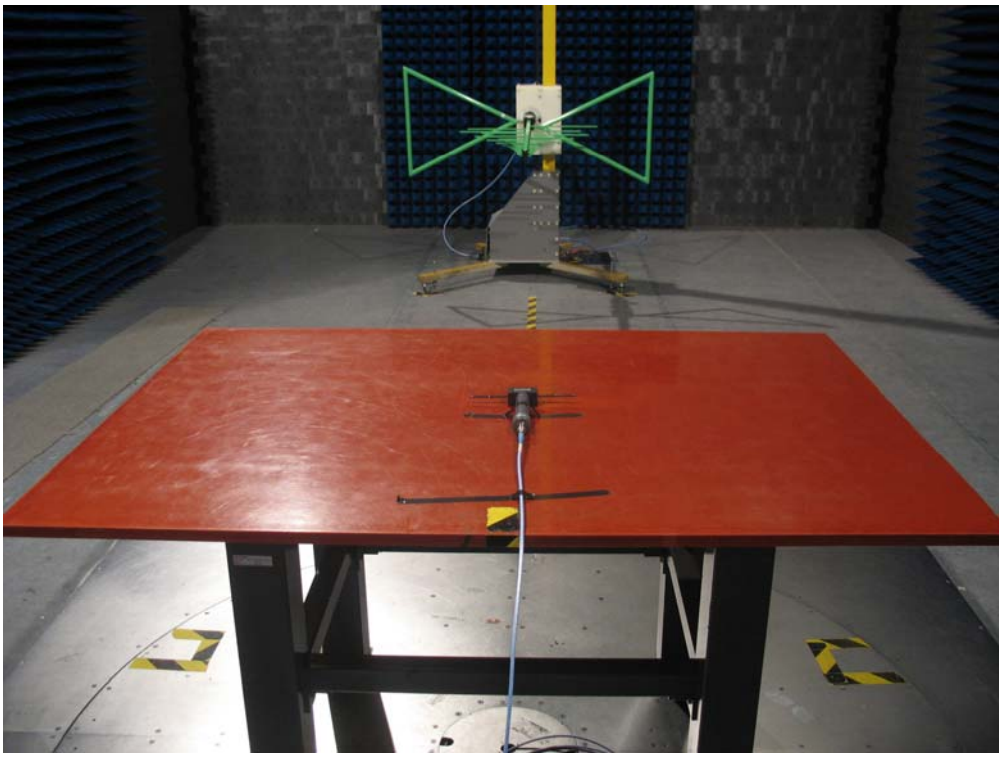
Test Mode: Mode 1: GSM 850

Description: Radiated Peak Output Power Test Setup for EUT



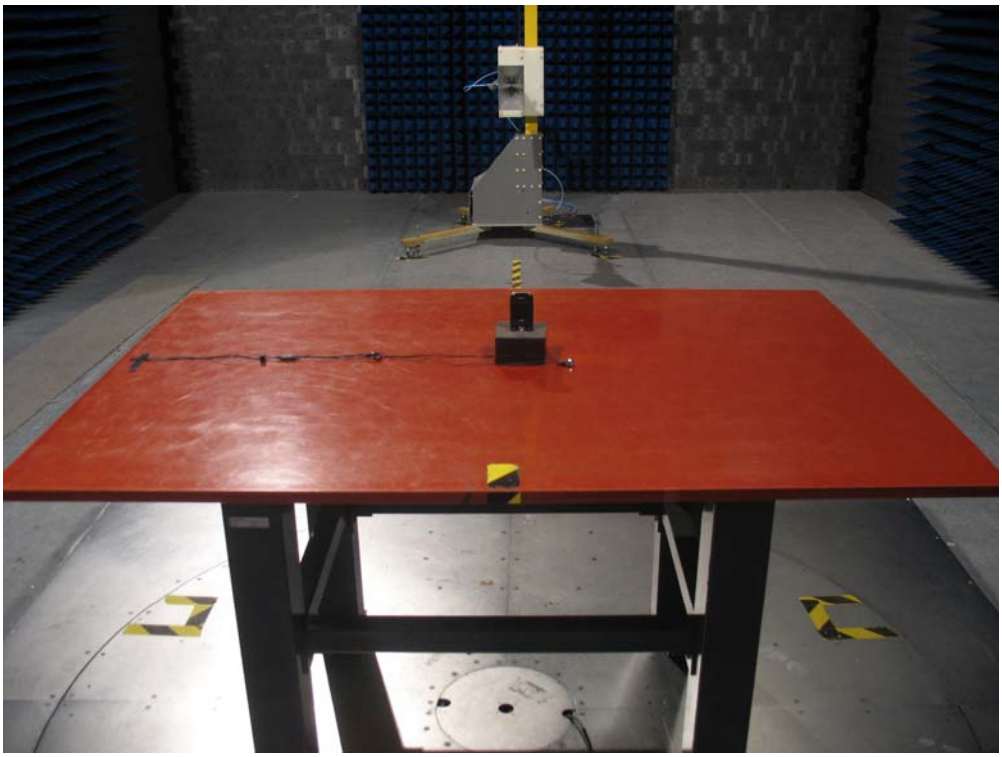
Test Mode: Mode 1: GSM 850

Description: Radiated Peak Output Power Test Setup for Substitution Antenna



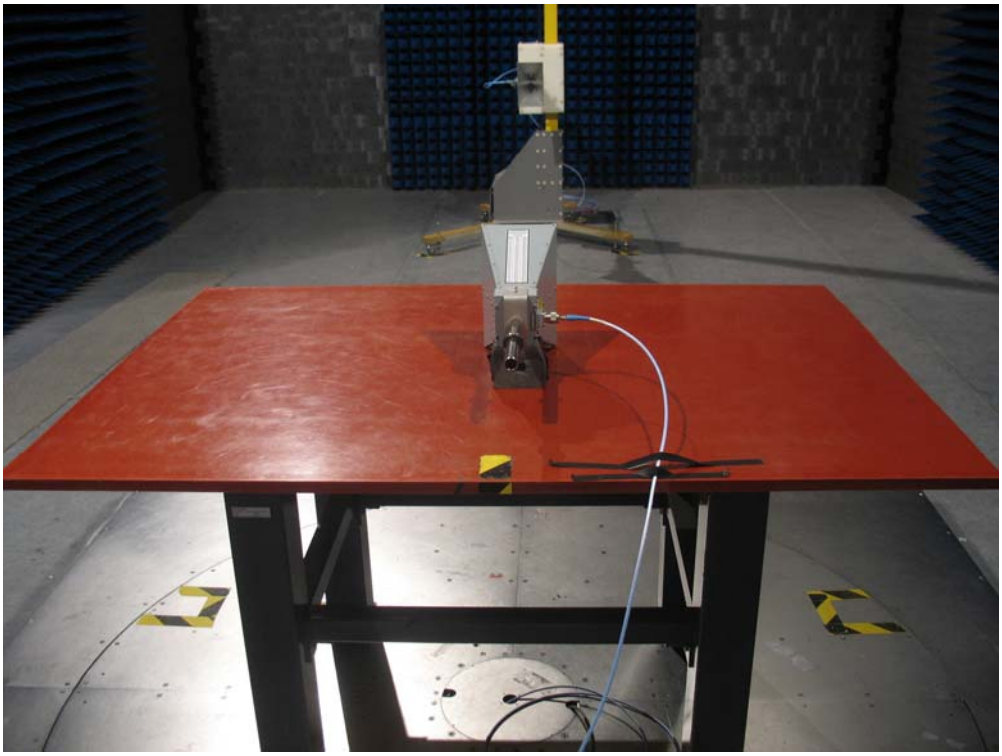
Test Mode: Mode 2: PCS 1900

Description: Radiated Peak Output Power Test Setup for EUT



Test Mode: Mode 2: PCS 1900

Description: Radiated Peak Output Power Test Setup for Substitution Antenna



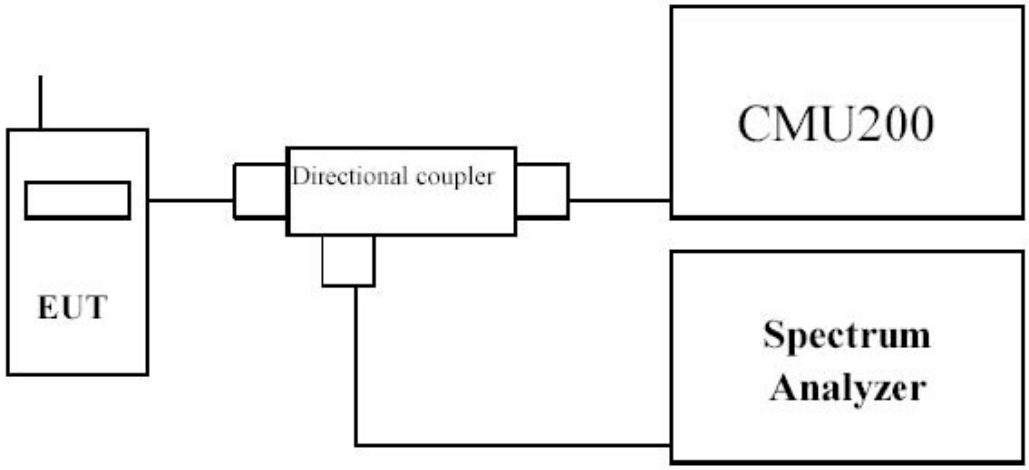
4. Modulation Characteristic

4.1. Test Equipment

Modulation Characteristic / AC-4

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2007/06/11
Radio Communication Tester	R&S	CMU 200	106388	2007/10/30
Dual Directional Coupler	Agilent	778D	20160	2007/04/20
10dB Coaxial Coupler	Agilent	87300C	MY44300299	2007/04/20
Coaxial Cable	Huber+Suhner	AC4-RF-H	10	2007/11/25
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH007	2007/11/30

4.2. Test Setup



4.3. Limit

N/A

4.4. Test Procedure

GMSK is a form of binary signaling schemes which represent digital states as a shift between discrete sinusoidal frequencies called Frequency Shift Keying (FSK). Minimum Shift Keying (MSK) is continuous phase FSK with the smallest possible modulation index h. Modulation index is defined as: h = 2*F*Tb
where F = Peak frequency deviation in Hz and Tb = Bit period in seconds

Two discrete frequencies, representing two distinct digital states, with equal phases at switch time t = 0 requires a minimum value of h = 0.5. The Gaussian part of GMSK describes the fact that the digital pulses are filtered in the time domain. This results in bits which are sinusoidal rather than square. The effective spectrum is then compressed with the average carrier frequency in the center of the passband. This is a great advantage because of the significantly reduced bandwidth. GMSK is utilized because of these bandwidth conservation properties.

The bandwidth for GSM is a 60 MHz up-link at 1850-1910 MHz and down-link at 1930-1990 MHz. The 65 MHz is divided into 299 channels, each of which is 200 kHz wide. Slight spectral spillage is allowed into neighboring channels (which is minimized by GMSK). This separated transmit/receive frequencies scheme under GSM enables easier duplex filtering.

Within the bandwidth, individual channels are subdivided into multiframes (made of 26 frames), frames (made of 8 time slots), and time slots (made of 8 fields). The time slots are 0.57 ms long allowing 156.25 bits of information including overhead.

4.5. Uncertainty

The measurement uncertainty is defined as 0.1%

4.6. Test Result

Product	GSM 850/1900 Mobile Phone		
Test Item	Modulation Characteristic		
Test Mode	Mode 1: GSM 850		
Date of Test	2008/02/15	Test Site	AC-4

Figure (GSM 850-Channel 128)

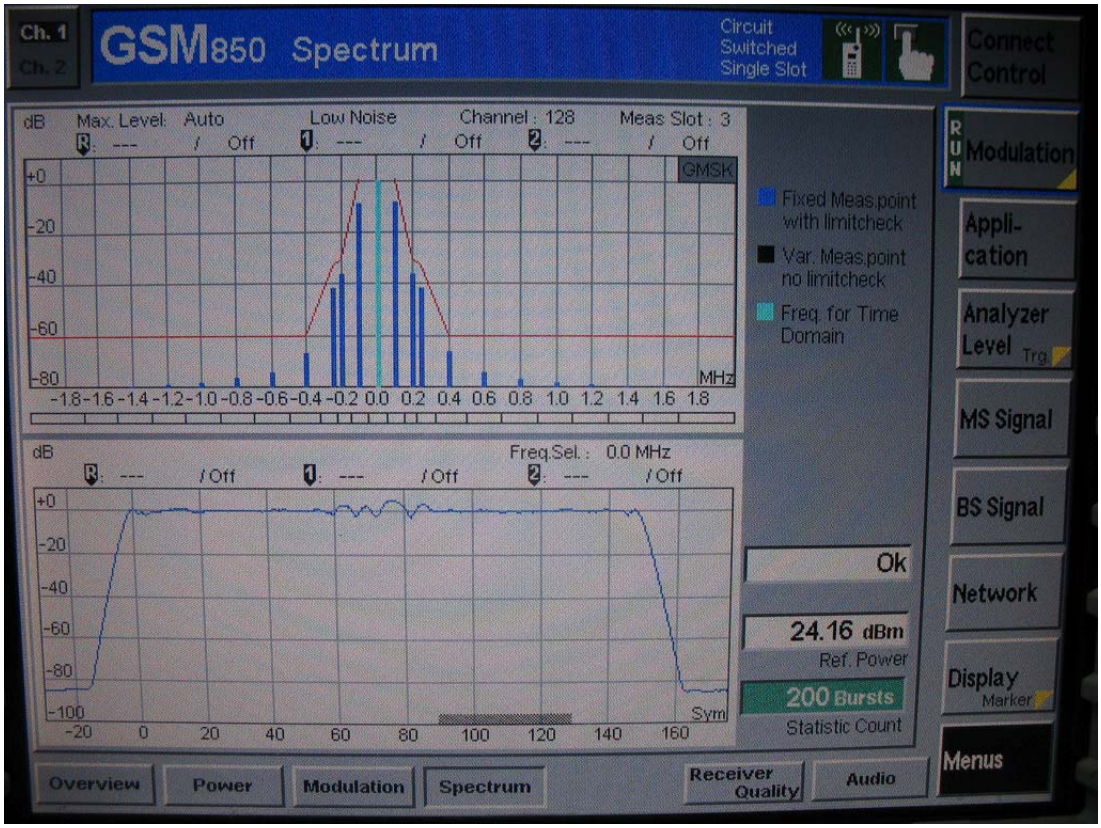


Figure (GSM 850-Channel 189)

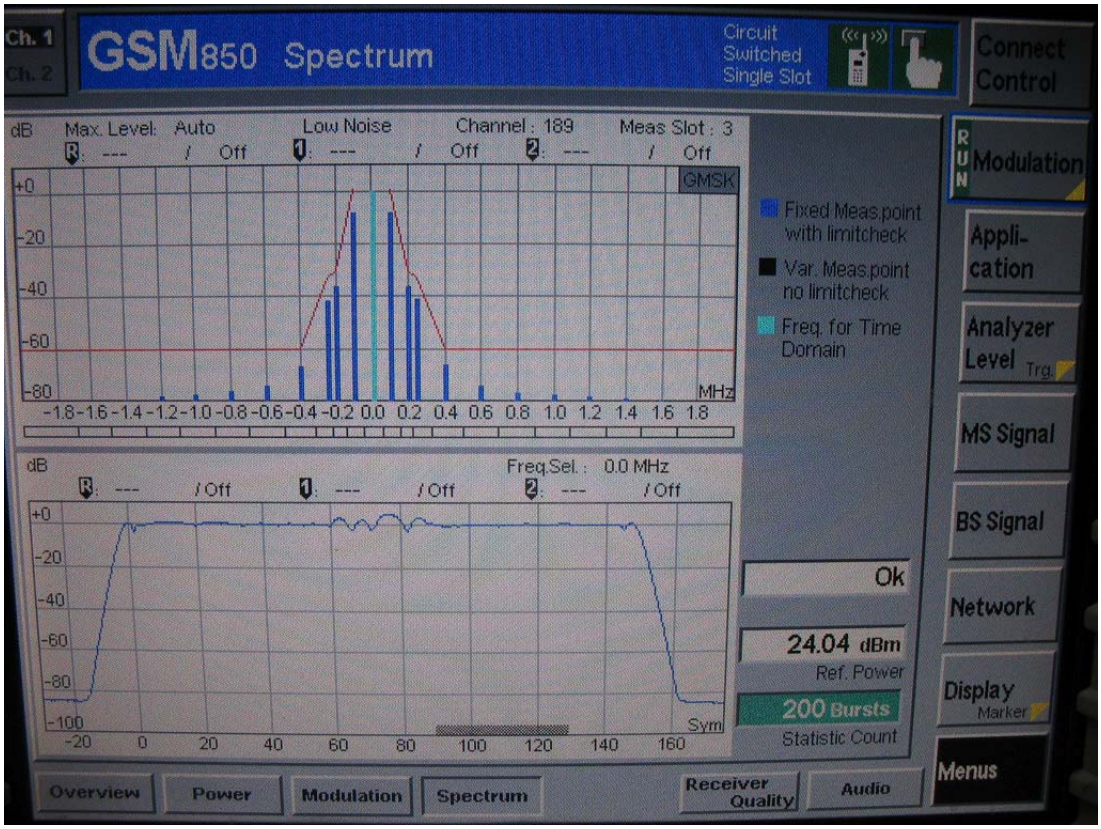
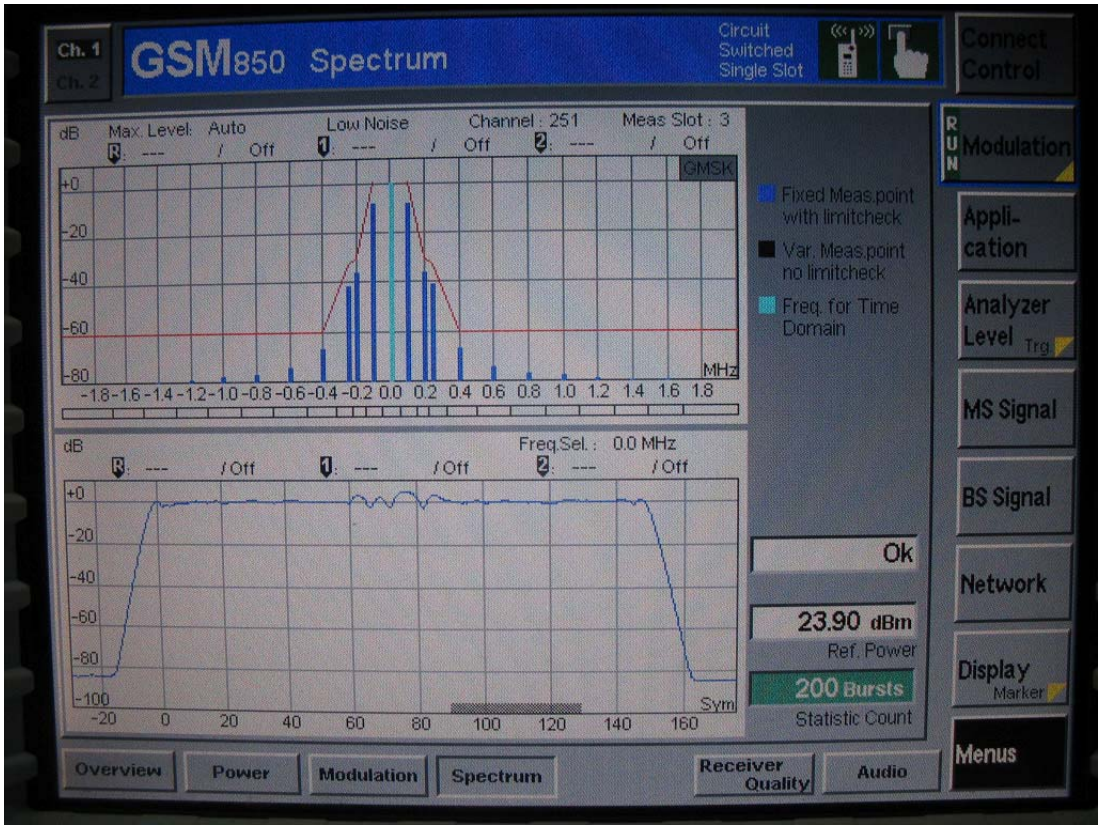


Figure (GSM 850-Channel 251)



Product	GSM 850/1900 Mobile Phone		
Test Item	Modulation Characteristic		
Test Mode	Mode 2: PCS 1900		
Date of Test	2008/02/15	Test Site	AC-4

Figure (GSM 1900-Channel 512)

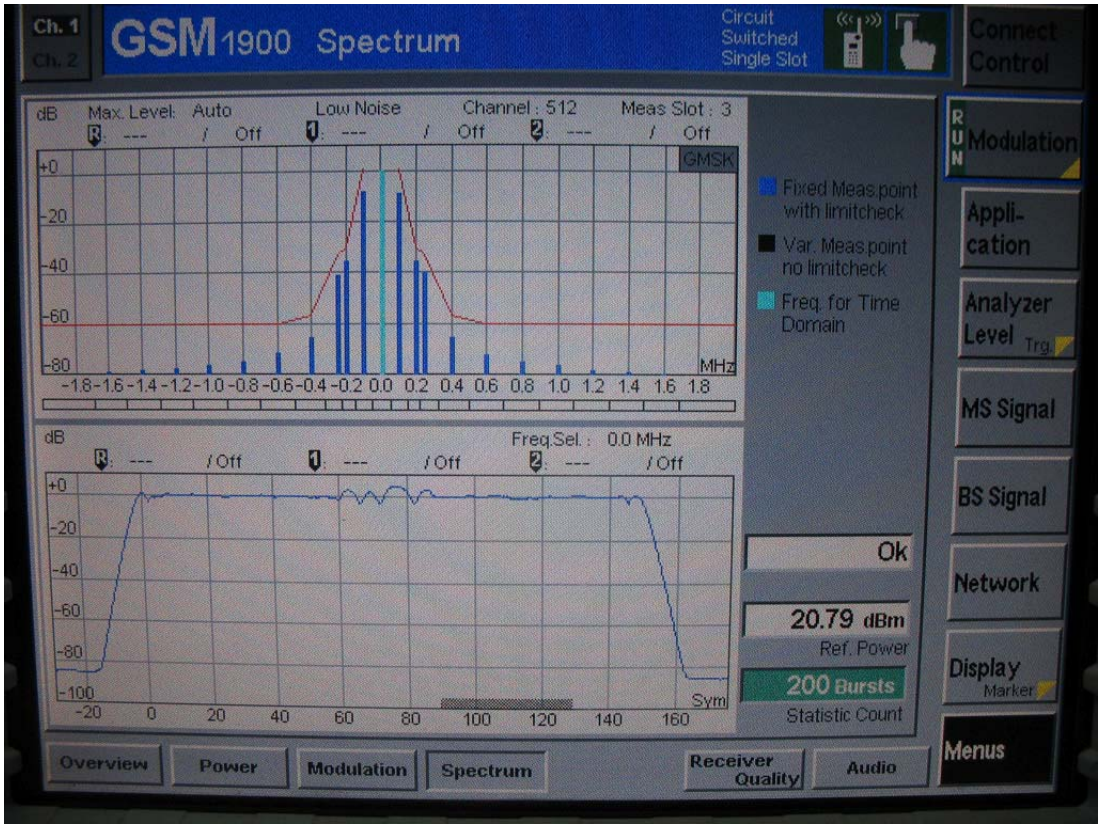


Figure (GSM 1900-Channel 661)

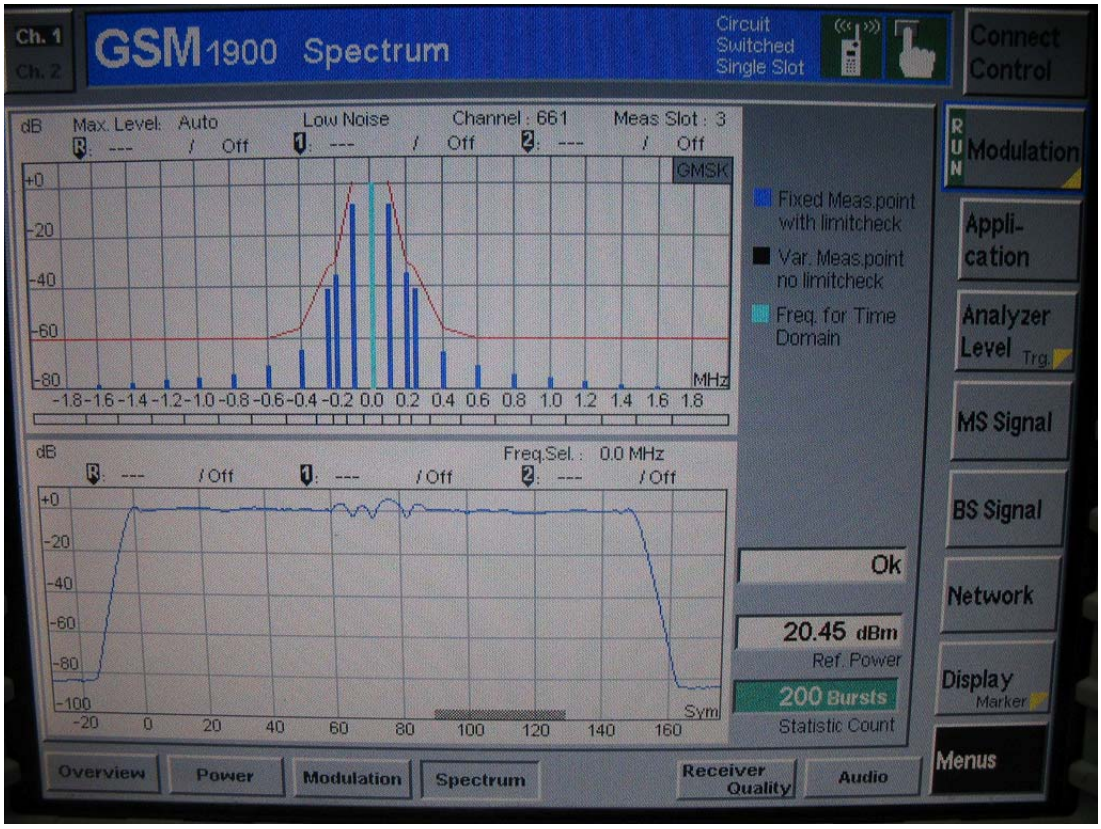
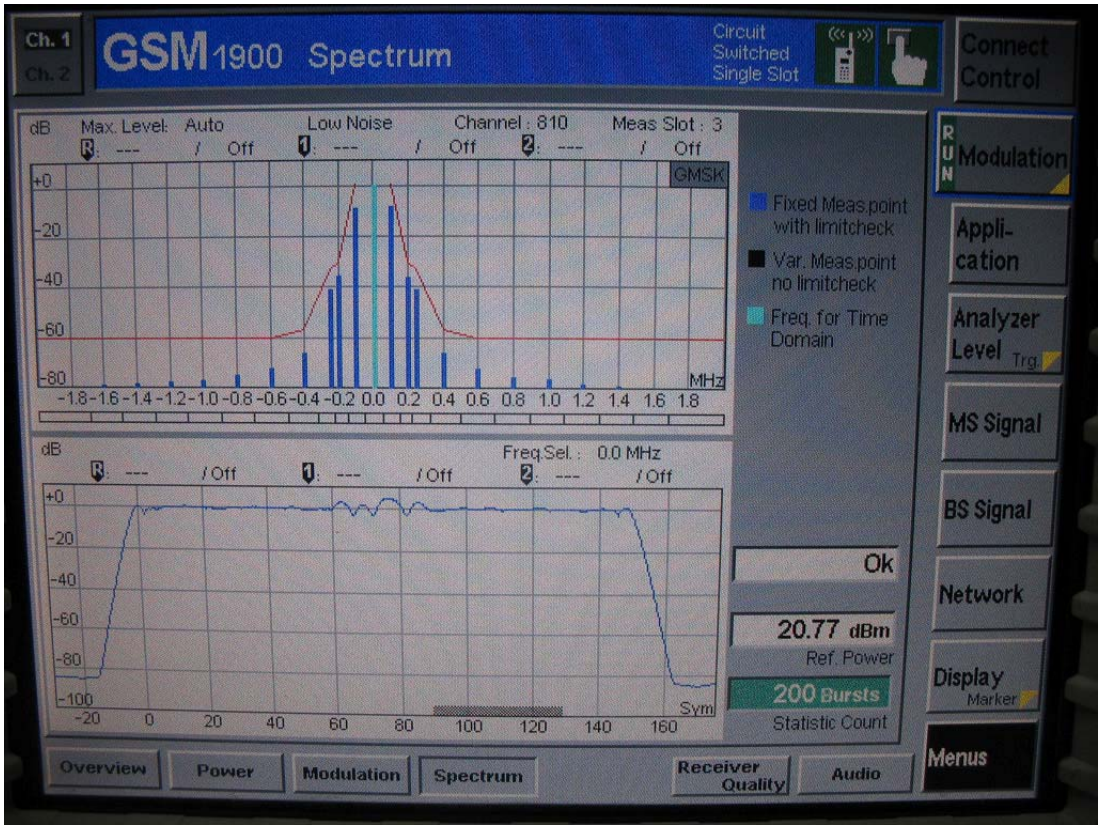


Figure (GSM 1900-Channel 810)



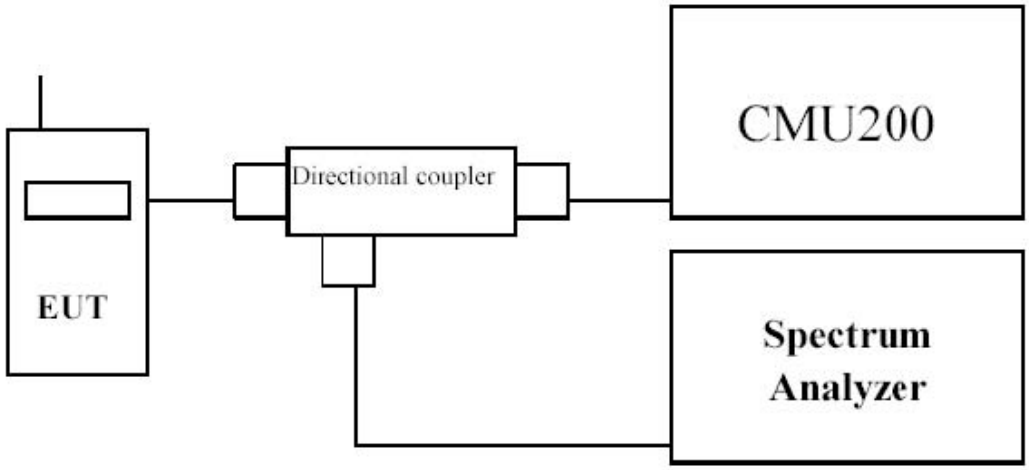
5. Occupied Bandwidth

5.1. Test Equipment

Occupied Bandwidth / AC-4

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2007/06/11
Radio Communication Tester	R&S	CMU 200	106388	2007/10/30
Dual Directional Coupler	Agilent	778D	20160	2007/04/20
10dB Coaxial Coupler	Agilent	87300C	MY44300299	2007/04/20
Coaxial Cable	Huber+Suhner	AC4-RF-H	10	2007/11/25
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH007	2007/11/30

5.2. Test Setup



5.3. Limit

N/A

5.4. Test Procedure

Using a resolution bandwidth of 3kHz and a video bandwidth of 10kHz, the -26dBc points were established and the emission bandwidth determined. The plots below show the resultant display from the Spectrum Analyzer.

5.5. Uncertainty

The measurement uncertainty is defined as ± 10 Hz

5.6. Test Result

Product	GSM 850/1900 Mobile Phone		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: GSM 850		
Date of Test	2008/02/16	Test Site	AC-4

Channel No.	Frequency (MHz)	Measurement of -26dB Bandwidth (kHz)
128	824.20	313.00
189	836.40	313.00
251	848.80	310.00

Figure Channel 128 (824.20MHz)

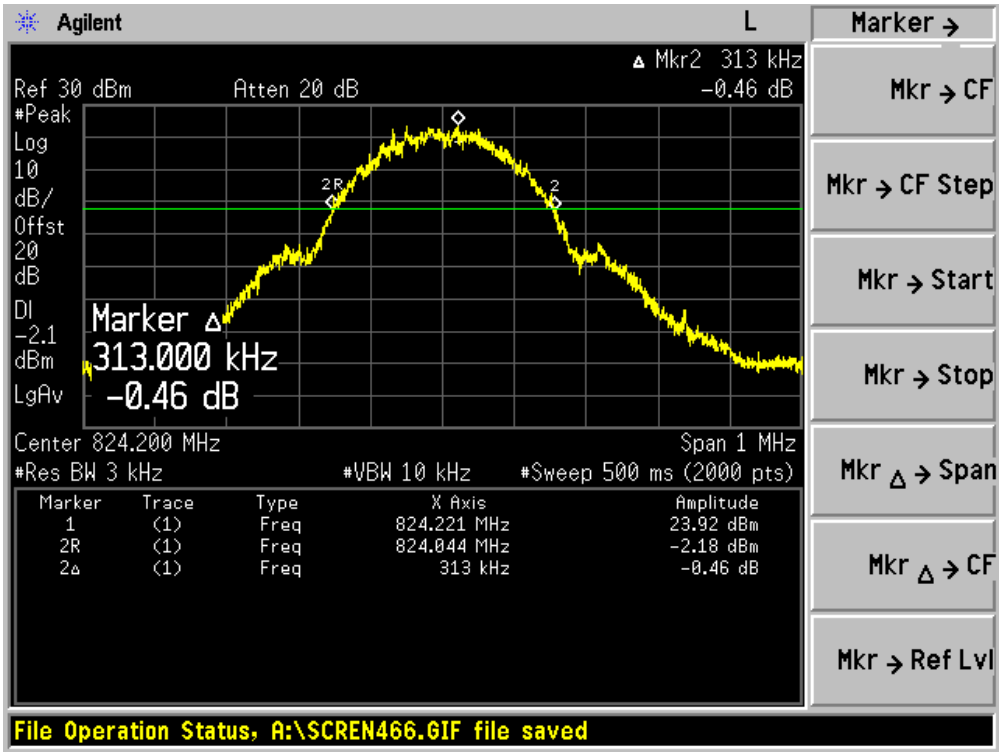


Figure Channel 189 (836.40MHz)

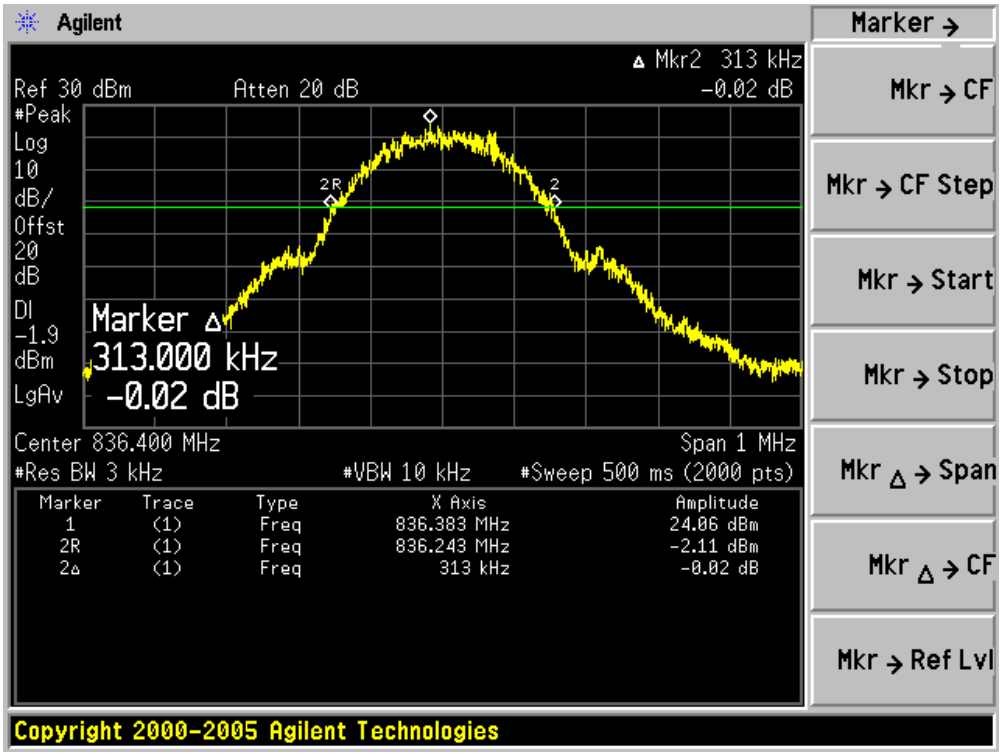
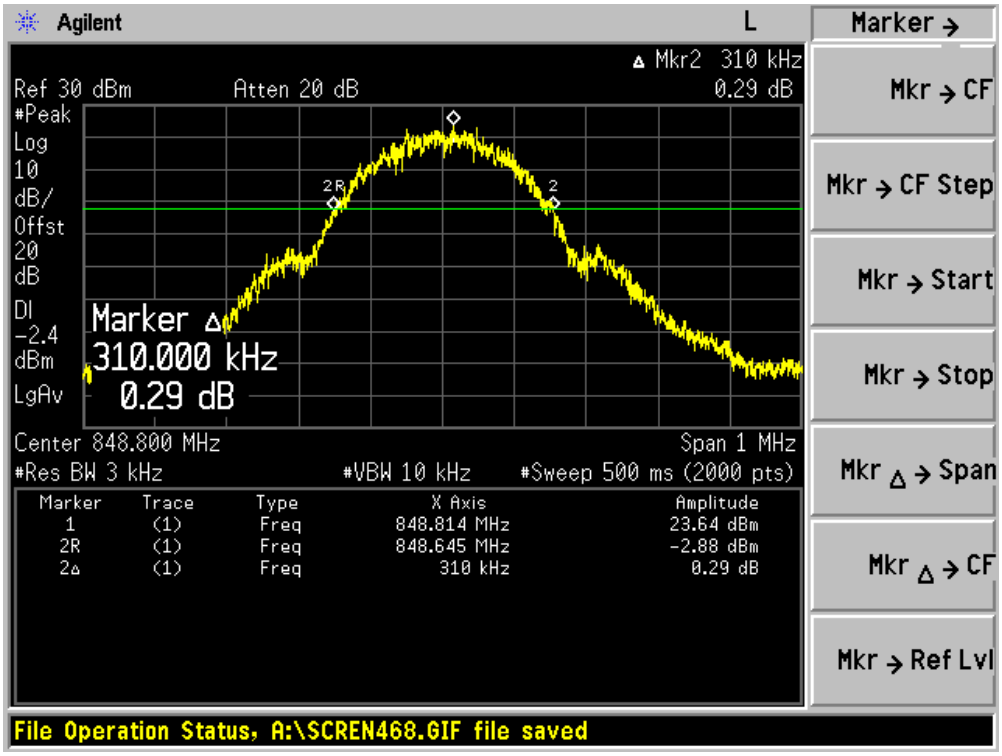


Figure Channel 251 (848.80MHz)



Product	GSM 850/1900 Mobile Phone		
Test Item	Occupied Bandwidth		
Test Mode	Mode 2: PCS 1900		
Date of Test	2008/02/26	Test Site	AC-4

Channel No.	Frequency (MHz)	Measurement of -26dB Bandwidth (kHz)
512	1850.20	315.00
661	1880.00	316.00
810	1909.80	309.00

Figure Channel 512 (1850.20MHz)

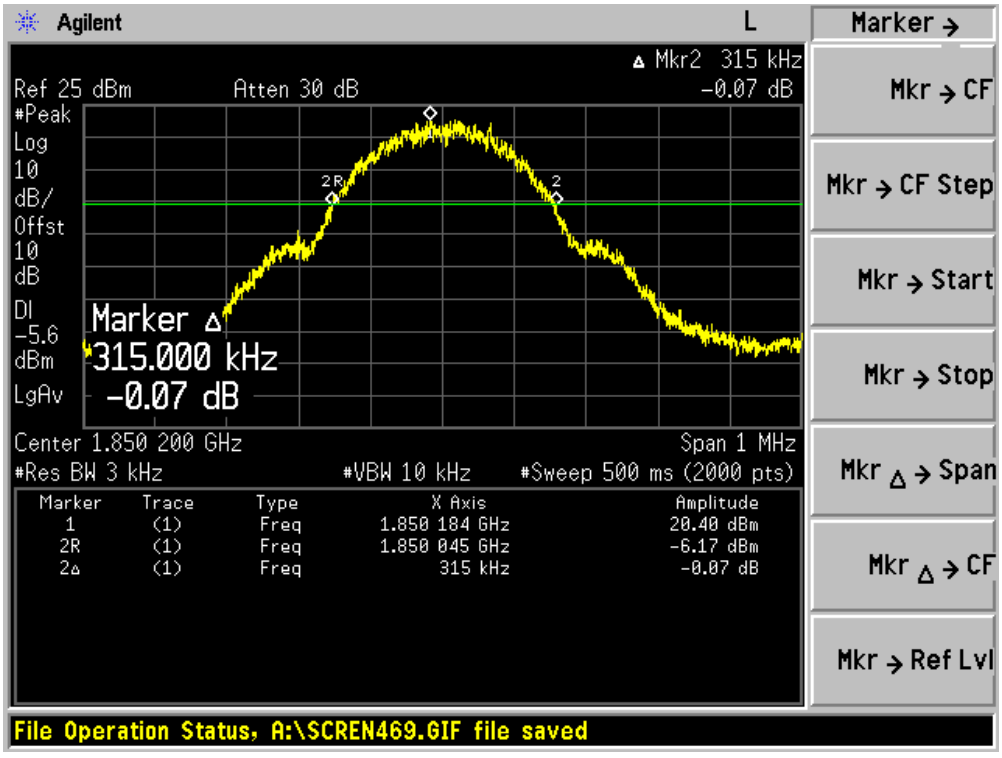


Figure Channel 661 (1880.00MHz)

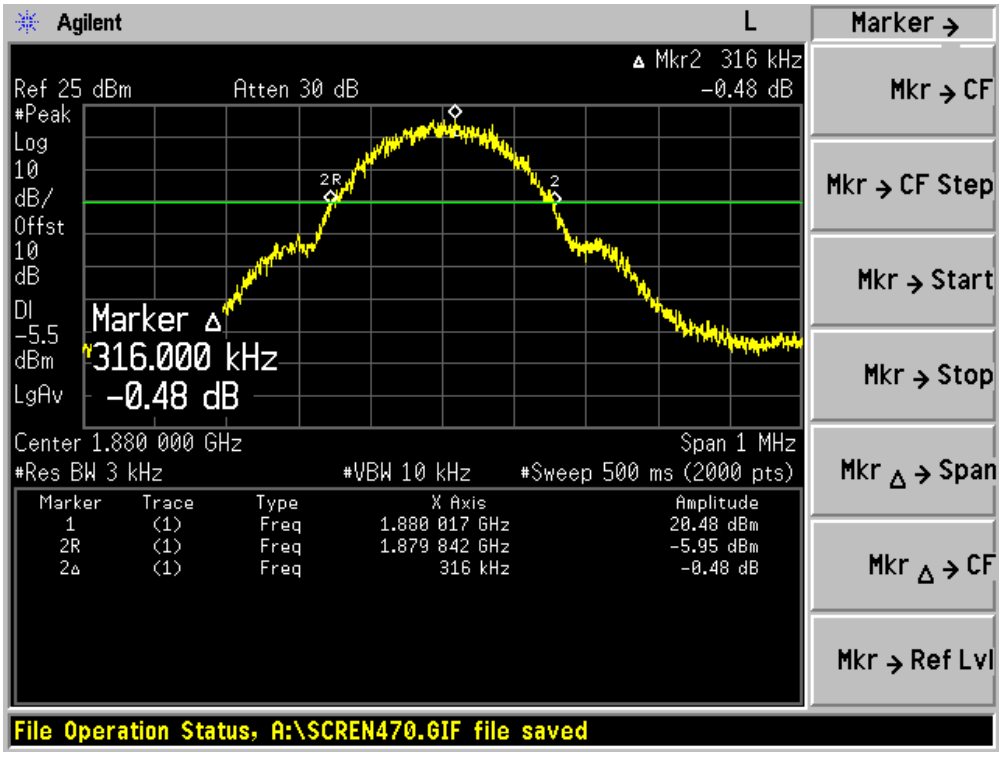
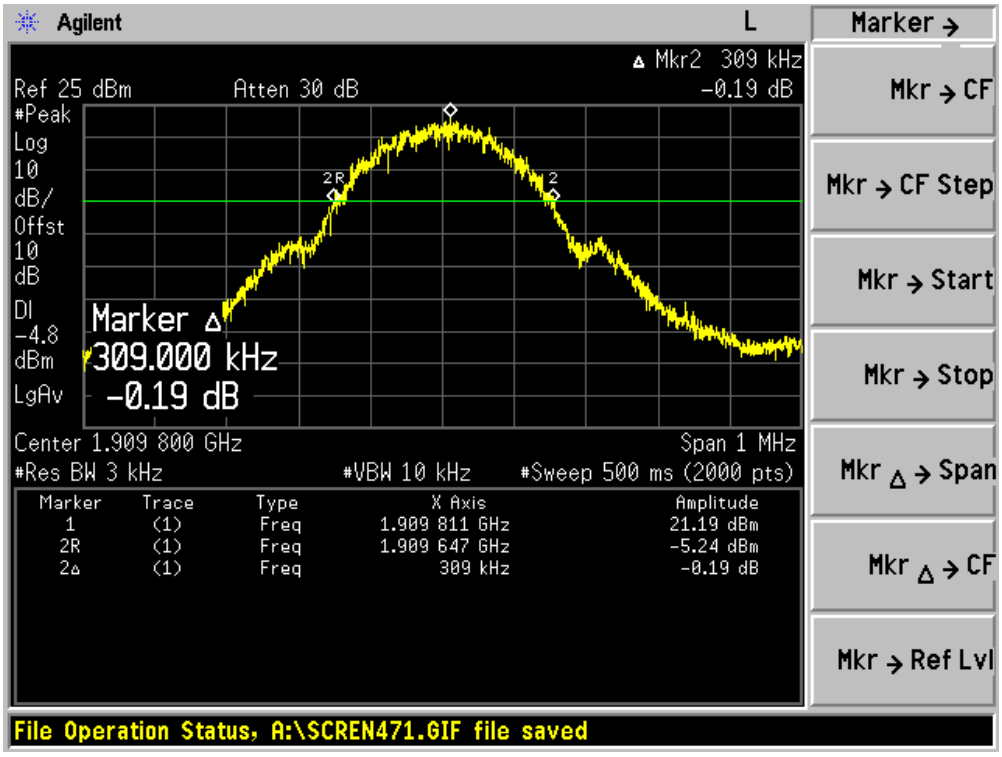


Figure Channel 810 (1909.80MHz)



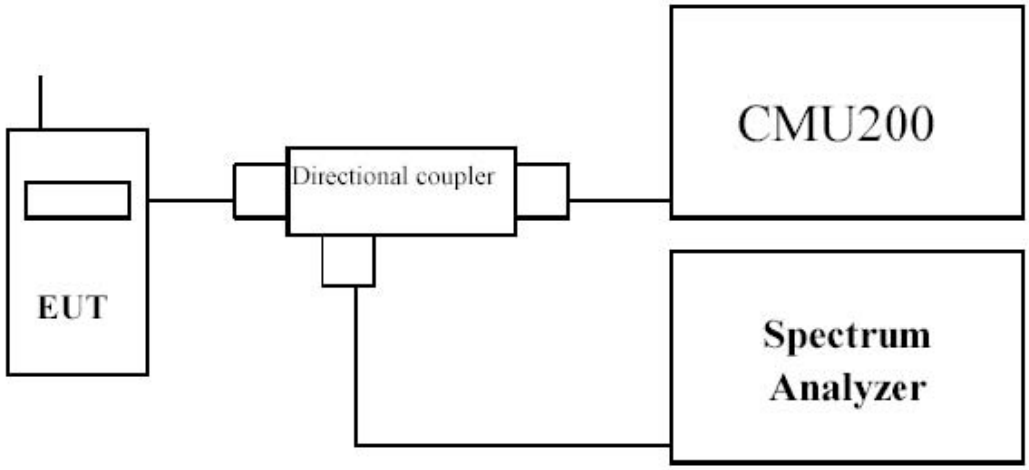
6. Spurious Emission At Antenna Terminals (+/- 1MHz)

6.1. Test Equipment

Spurious Emission At Antenna Terminals (+/- 1MHz) / AC-4

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2007/06/11
Radio Communication Tester	R&S	CMU 200	106388	2007/10/30
Dual Directional Coupler	Agilent	778D	20160	2007/04/20
10dB Coaxial Coupler	Agilent	87300C	MY44300299	2007/04/20
Coaxial Cable	Huber+Suhner	AC4-RF-H	10	2007/11/25
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH007	2007/11/30

6.2. Test Setup



6.3. Limit

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 + 10log(P) dB.

6.4. Test Procedure

In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

6.5. Uncertainty

The measurement uncertainty is defined as ± 1.2 dB.

6.6. Test Result

Figure Channel 128 (Mode 1: GSM850--824.20MHz)

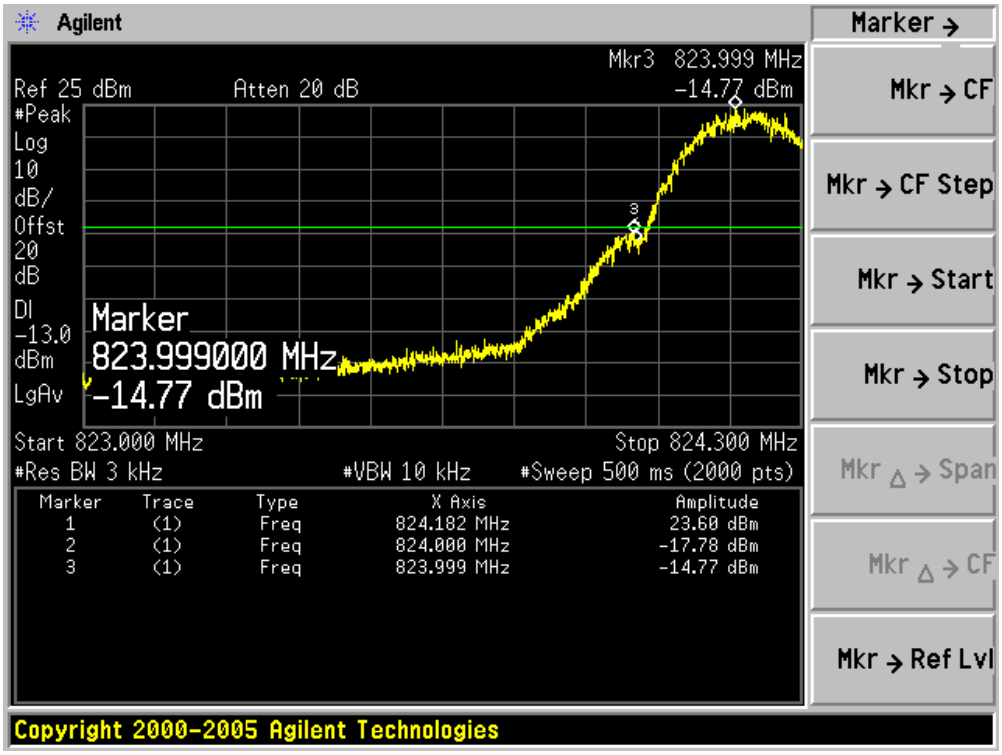


Figure Channel 251 (Mode 1: GSM850--848.80MHz)

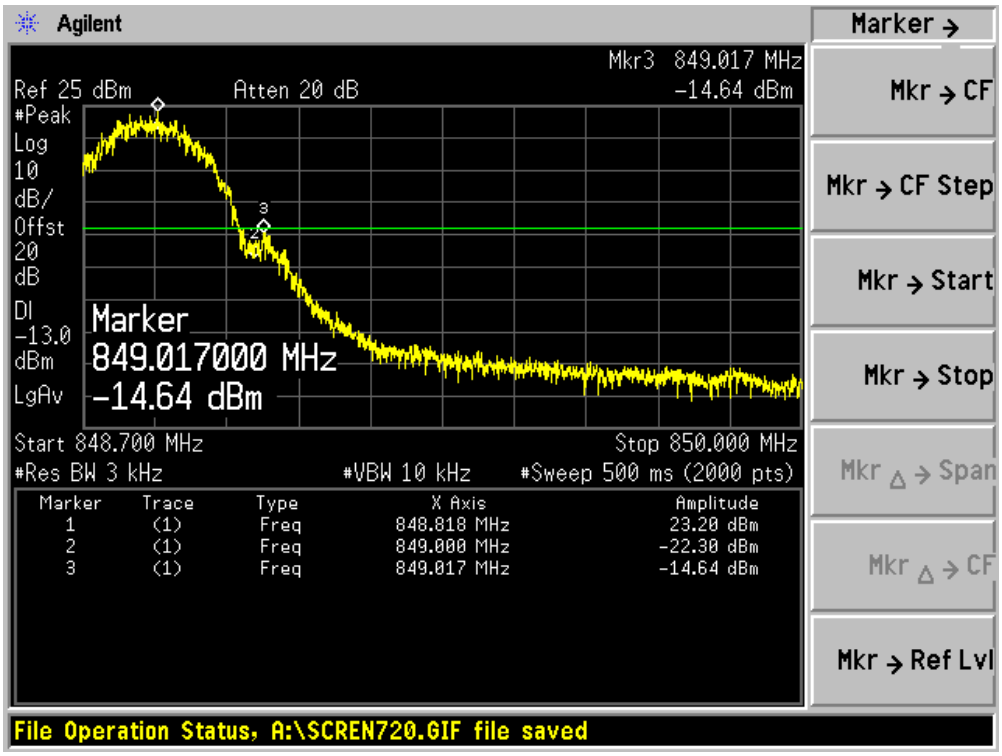


Figure Channel 512 (Mode 2: PCS1900--1850.20MHz)

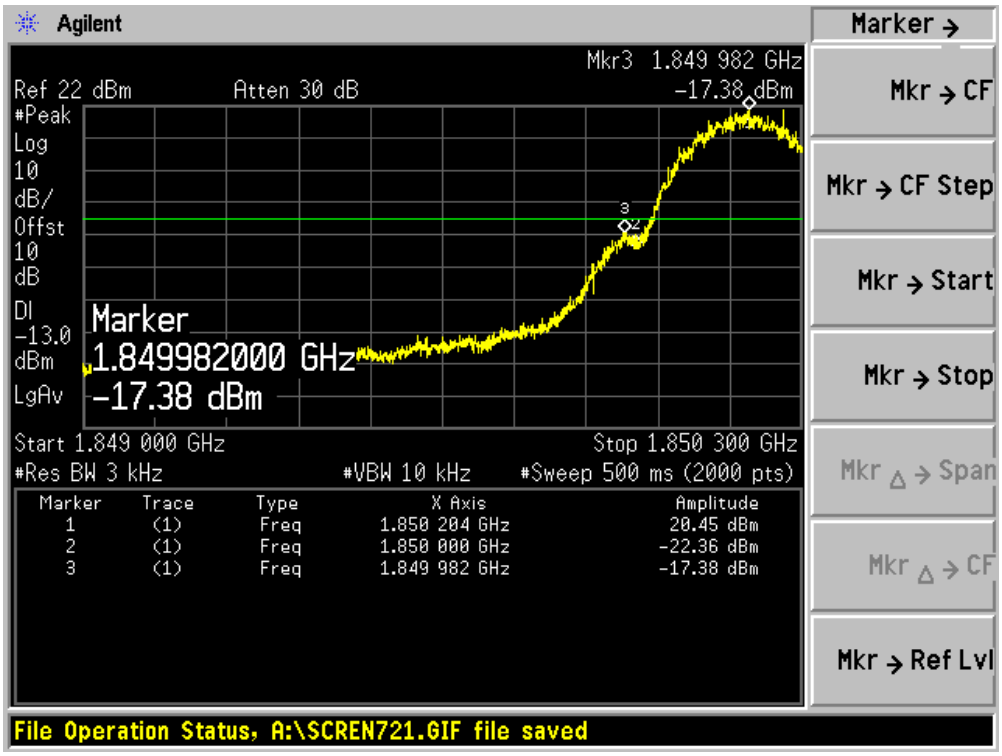
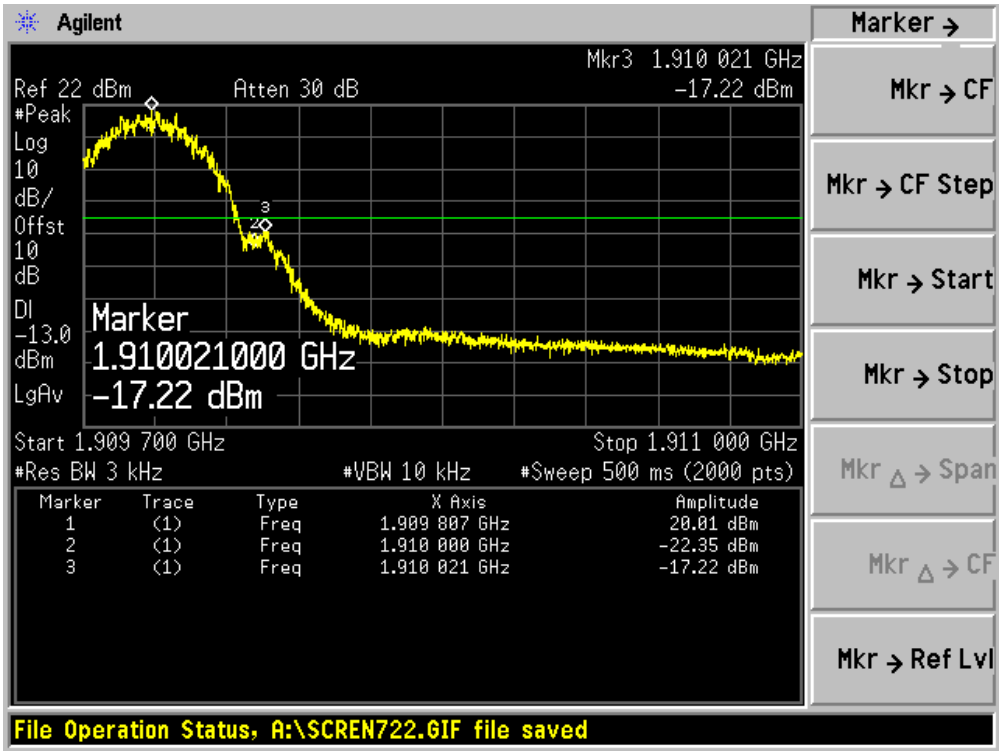


Figure Channel 810 (Mode 2: PCS1900--1909.80MHz)



7. Spurious Emission

7.1. Test Equipment

Conducted Spurious Emission / AC-4

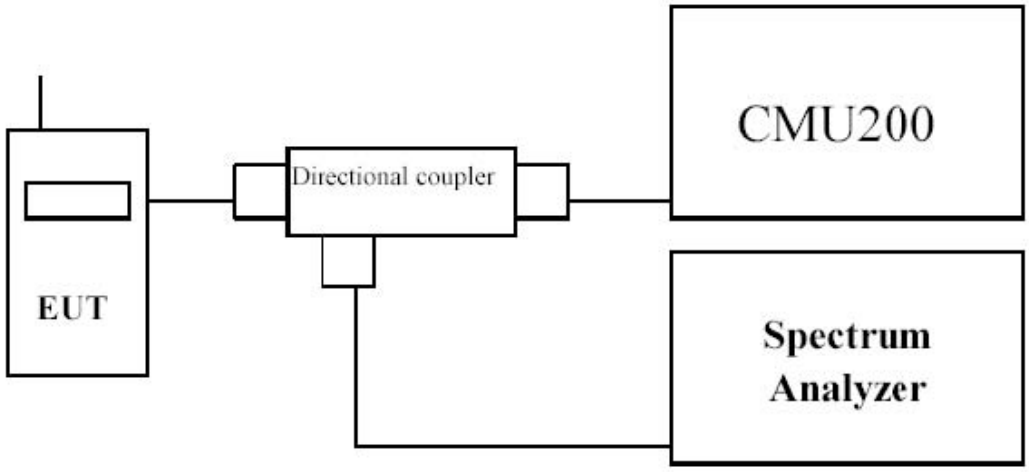
Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2007/06/11
Radio Communication Tester	R&S	CMU 200	106388	2007/10/30
Dual Directional Coupler	Agilent	778D	20160	2007/04/20
10dB Coaxial Coupler	Agilent	87300C	MY44300299	2007/04/20
Coaxial Cable	Huber+Suhner	AC4-RF-H	10	2007/11/25
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH007	2007/11/30

Radiated Spurious Emission / AC-2

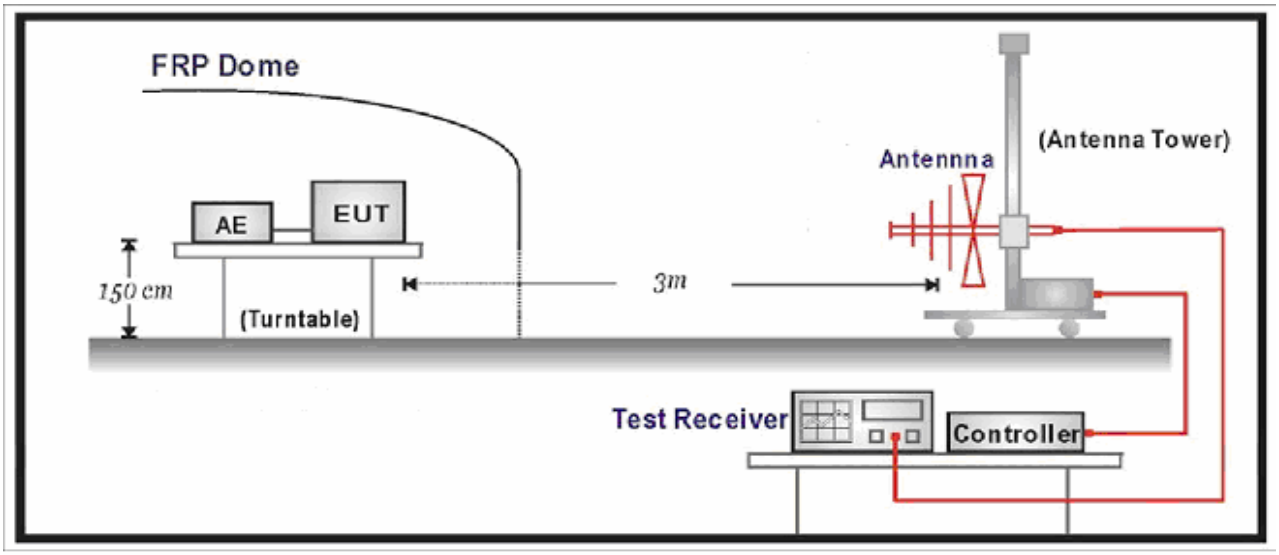
Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4408B	MY45102679	2007/11/12
Radio Communication Tester	R&S	CMU 200	106388	2007/10/30
PSG Analog S.G.	Agilent	E8257D	MY44321116	2007/06/11
Preamplifier	QuieTek	AP-025C	QT-AP003	2007/11/25
Preamplifier	QuieTek	AP-180C	CHM-0602012	2007/11/25
Bilog Type Antenna	Schaffner	CBL6112B	2932	2007/11/22
Half Wave Tuned Dipole Antenna	COM-POWER	AD-100	40137	2007/11/25
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	496	2007/11/25
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	499	2007/11/25
Coaxial Cable	Huber+Suhner	AC2-R	04	2007/11/25
Coaxial Cable	Huber+Suhner	AC2-T	05	2007/11/25
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH002	2007/03/31

7.2. Test Setup

Conducted Spurious Measurement:



Radiated Spurious Measurement:



7.3. Limit

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 + 10log(P) dB.

7.4. Test Procedure

The EUT was setup according to EIA/TIA 603C

Conducted Spurious Measurement:

a) Place the EUT on a bench and set it in transmitting mode.
b) Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.
c) EUT Communicate with CMU200, then select a channel for testing.
d) Add a correction factor to the display of spectrum, and then test.
e) The resolution bandwidth of the spectrum analyzer was set at 100 kHz for Part 22 and 1 MHz for Part 24, sufficient scans were taken to show the out of band Emission if any up to 10^{th} harmonic.

Radiated Spurious Measurement:

a) The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
b) The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
c) The output of the test antenna shall be connected to the measuring receiver.
d) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
e) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
f) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
q) The maximum signal level detected by the measuring receiver shall be noted.
h) The transmitter shall be replaced by a substitution antenna.
i) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
j) The substitution antenna shall be connected to a calibrated signal generator.
k) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
l) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
m) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the

transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.

n) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

o) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

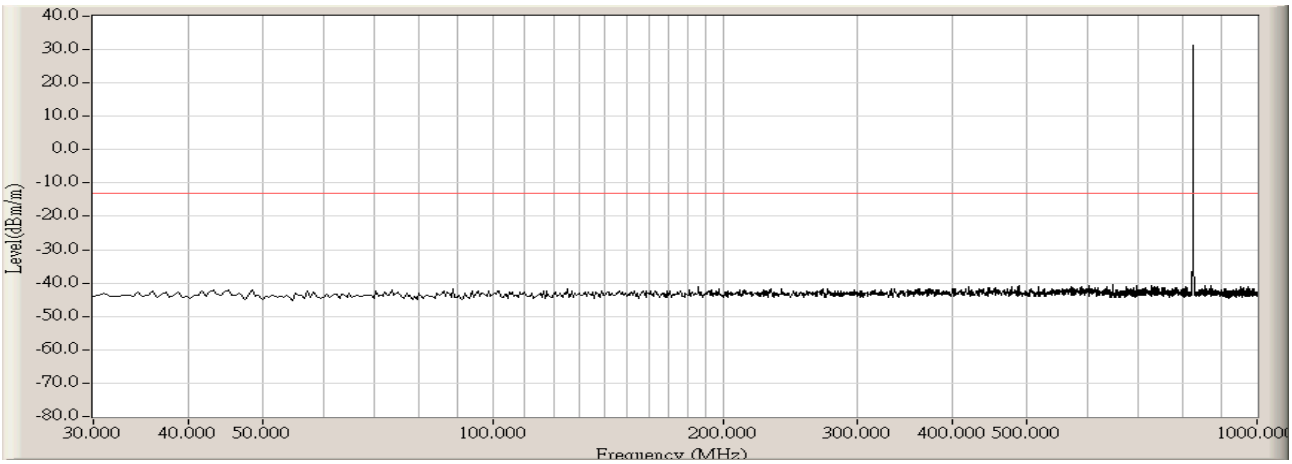
p) The resolution bandwidth of the spectrum analyzer was set at 100 kHz for Part 22 and 1 MHz for Part 24. The frequency range was checked up to 10^{th} harmonic.

7.5. Uncertainty

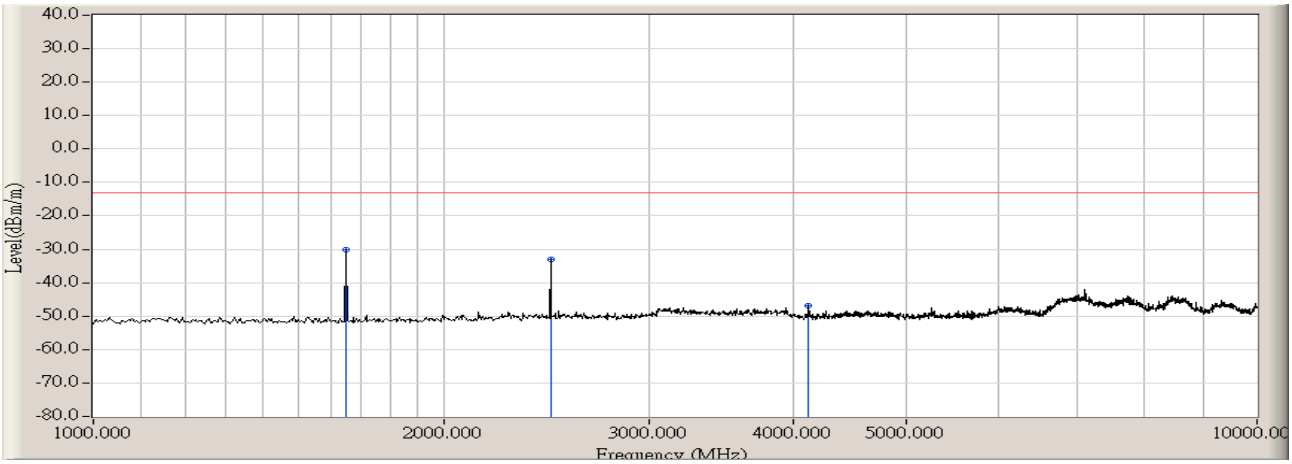
The measurement uncertainty is defined as for Conducted Power Measurement ± 1.2 dB, for Radiated Power Measurement ± 3.2 dB

7.6. Test Result

Engineer : Marlin	
Site : AC4	**Time : 2008/01/31 - 11:45**
Limit : FCC_22&24_Spurious_03M_PK	**Margin : 0**
EUT : GSM 850/1900 Mobile Phone	**Probe : - Line1**
Power : DC 3.7V	**Note : Mode 1: GSM 850MHz (Channel 128)**



Engineer : Marlin	
Site : AC4	**Time : 2008/01/31 - 11:32**
Limit : FCC_22&24_Spurious_03M_PK	**Margin : 0**
EUT : GSM 850/1900 Mobile Phone	**Probe : - Line1**
Power : DC 3.7V	**Note : Mode 1: GSM 850MHz (Channel 128)**

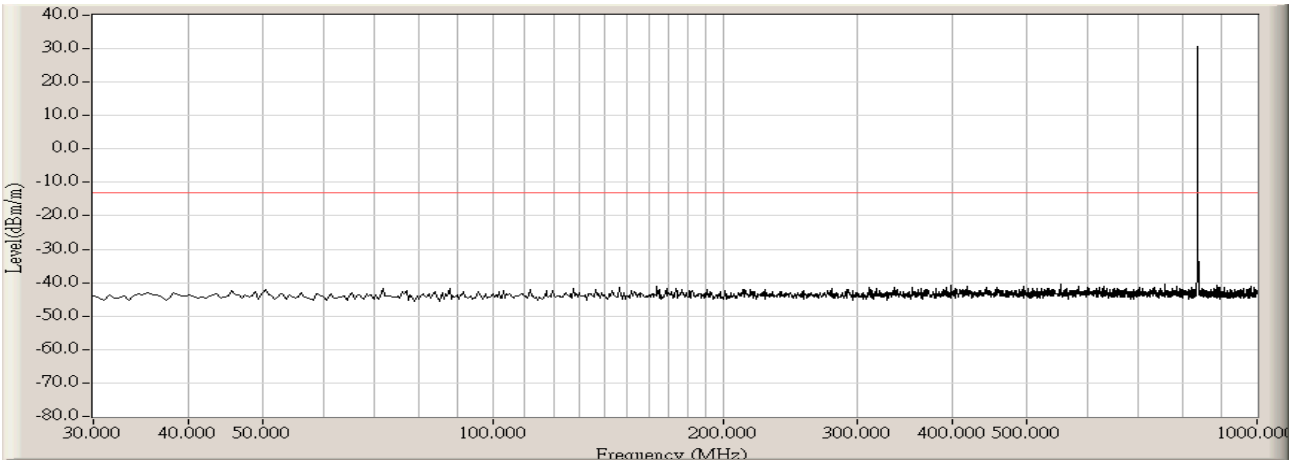


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm)	Margin (dB)	Limit (dBm)	Detector Type
1	*	1648.324	0.390	-30.570	-30.180	-17.180	-13.000	PEAK
2		2472.236	0.530	-33.428	-32.898	-19.898	-13.000	PEAK
3		4120.060	0.660	-47.498	-46.838	-33.838	-13.000	PEAK

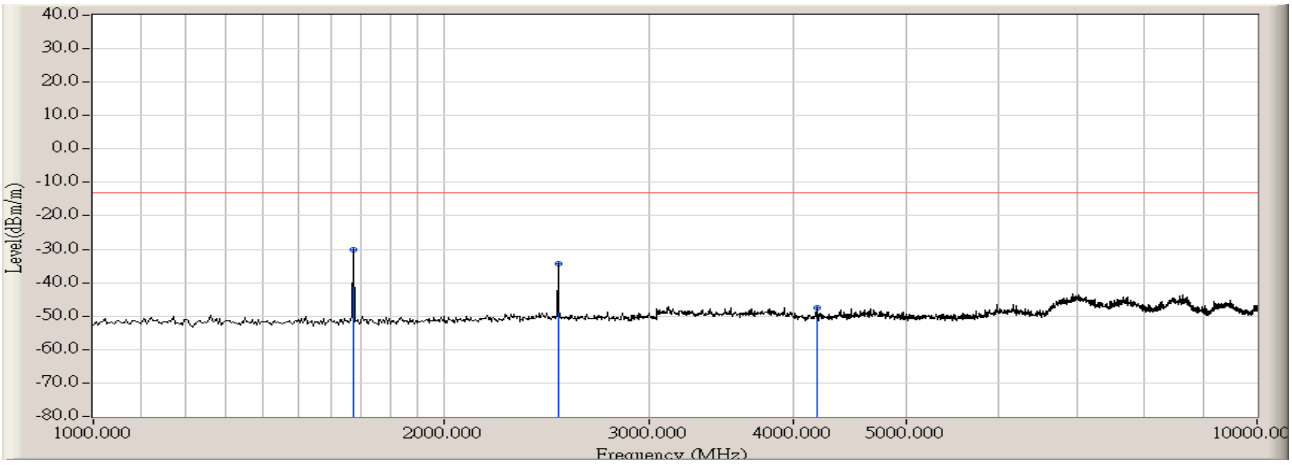
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Engineer : Marlin	
Site : AC4	**Time : 2008/01/31 - 11:45**
Limit : FCC_22&24_Spurious_03M_PK	**Margin : 0**
EUT : GSM 850/1900 Mobile Phone	**Probe : - Line1**
Power : DC 3.7V	**Note : Mode 1: GSM 850MHz (Channel 189)**



Engineer : Marlin	
Site : AC4	**Time : 2008/01/31 - 11:32**
Limit : FCC_22&24_Spurious_03M_PK	**Margin : 0**
EUT : GSM 850/1900 Mobile Phone	**Probe : - Line1**
Power : DC 3.7V	**Note : Mode 1: GSM 850MHz (Channel 189)**

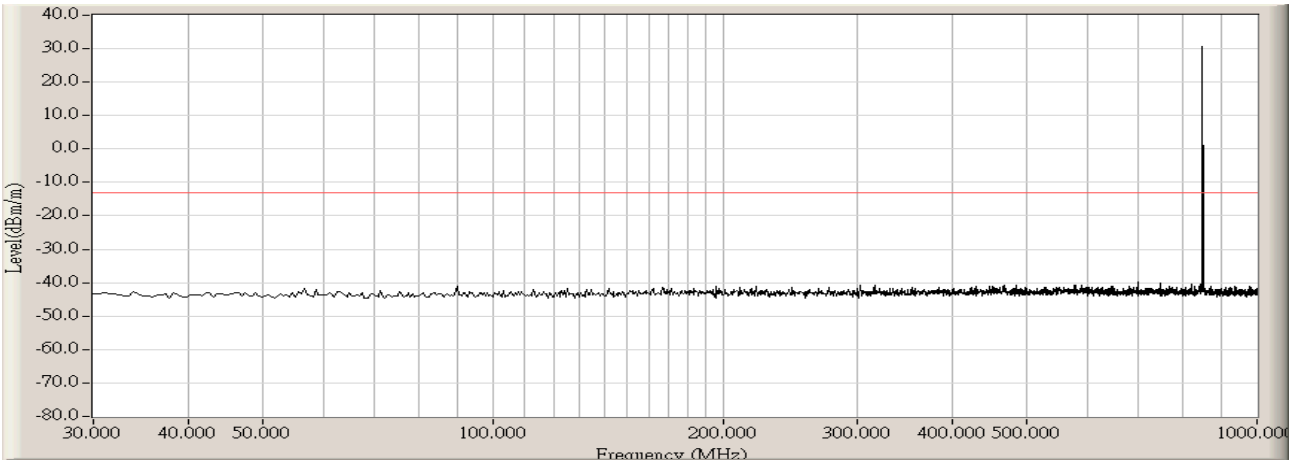


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm)	Margin (dB)	Limit (dBm)	Detector Type
1	*	1670.835	0.400	-30.564	-30.164	-17.164	-13.000	PEAK
2		2508.254	0.540	-34.890	-34.350	-21.350	-13.000	PEAK
3		4183.091	0.660	-48.295	-47.635	-34.635	-13.000	PEAK

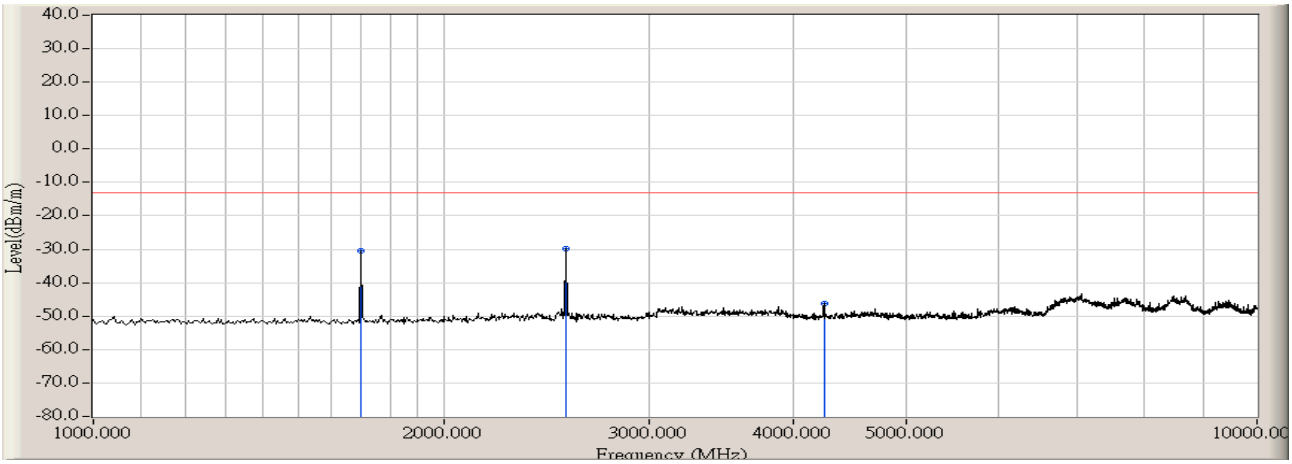
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Engineer : Marlin	
Site : AC4	**Time : 2008/01/31 - 11:46**
Limit : FCC_22&24_Spurious_03M_PK	**Margin : 0**
EUT : GSM 850/1900 Mobile Phone	**Probe : - Line1**
Power : DC 3.7V	**Note : Mode 1: GSM 850MHz (Channel 251)**



Engineer : Marlin	
Site : AC4	**Time : 2008/01/31 - 11:33**
Limit : FCC_22&24_Spurious_03M_PK	**Margin : 0**
EUT : GSM 850/1900 Mobile Phone	**Probe : - Line1**
Power : DC 3.7V	**Note : Mode 1: GSM 850MHz (Channel 251)**

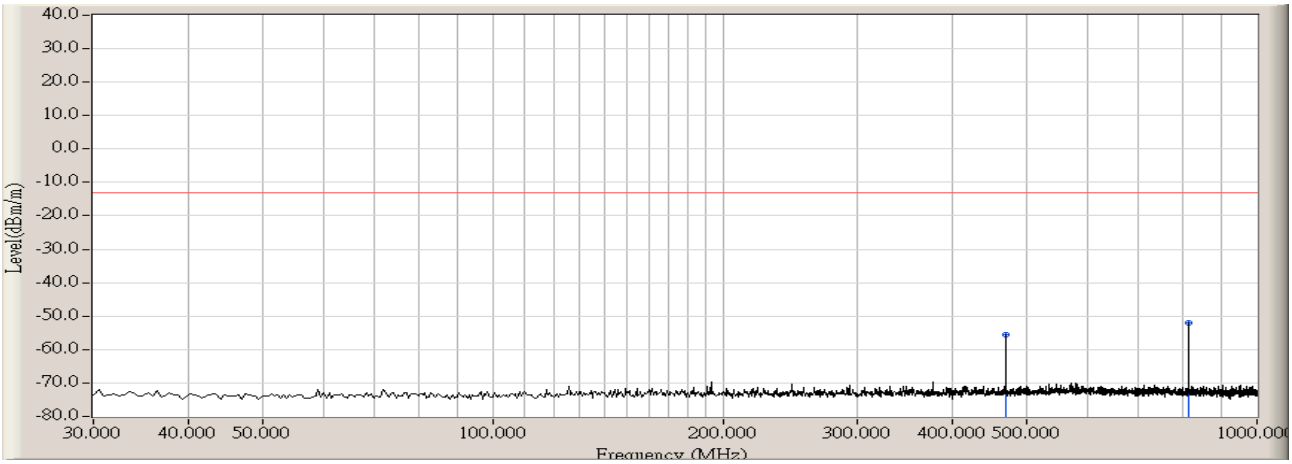


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm)	Margin (dB)	Limit (dBm)	Detector Type
1		1697.849	0.405	-30.789	-30.384	-17.384	-13.000	PEAK
2	*	2544.272	0.540	-30.281	-29.741	-16.741	-13.000	PEAK
3		4246.123	0.650	-46.942	-46.292	-33.292	-13.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Engineer : Marlin	
Site : AC4	**Time : 2008/01/31 - 11:41**
Limit : FCC_22&24_Spurious_03M_PK	**Margin : 0**
EUT : GSM 850/1900 Mobile Phone	**Probe : - Line1**
Power : DC 3.7V	**Note : Mode 2: PCS 1900MHz (Channel 512)**

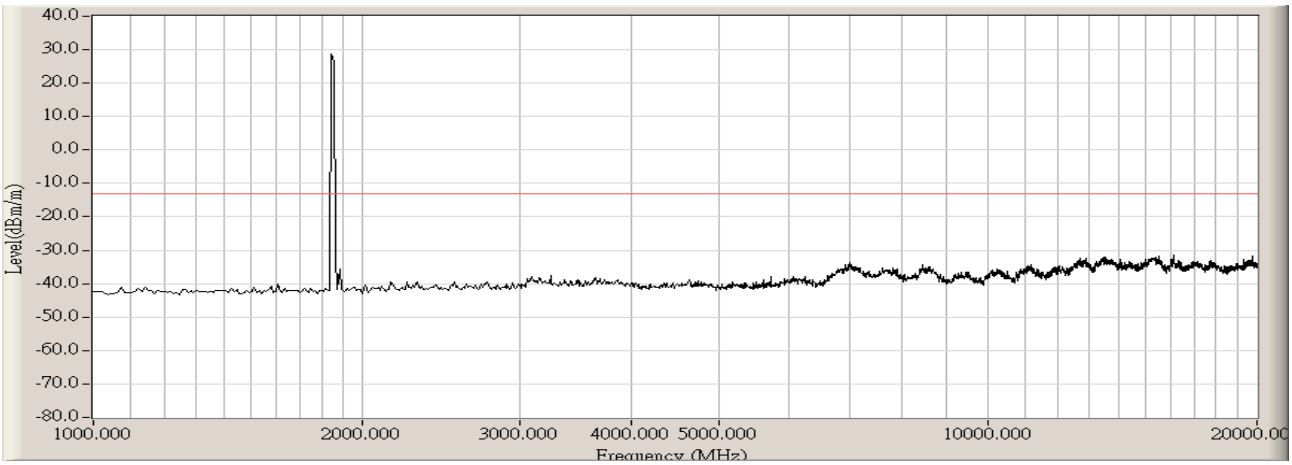


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm)	Margin (dB)	Limit (dBm)	Detector Type
1		469.145	0.100	-55.624	-55.524	-42.524	-13.000	PEAK
2	*	814.637	0.200	-52.124	-51.924	-38.924	-13.000	PEAK

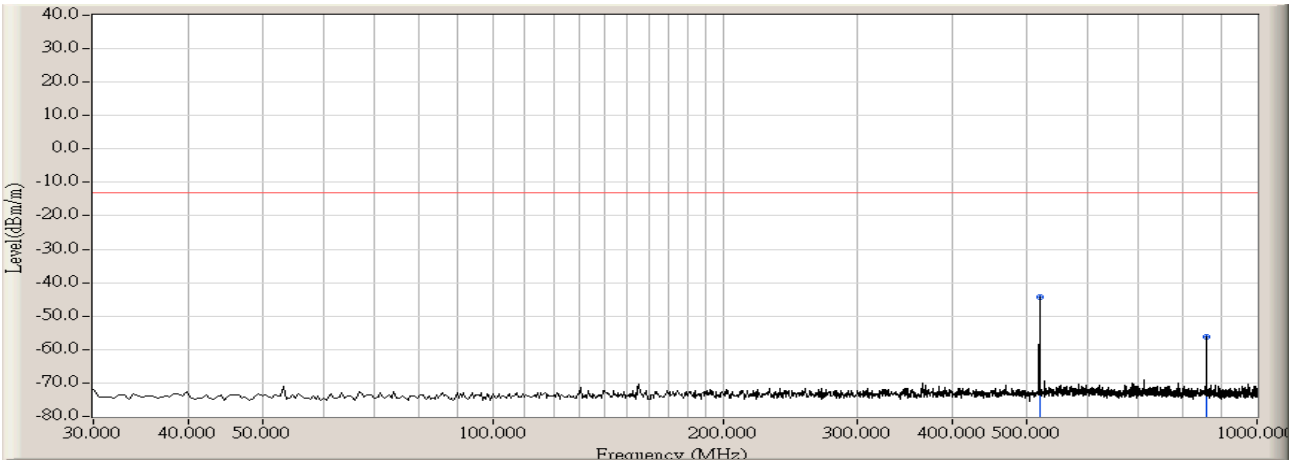
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Engineer : Marlin	
Site : AC4	**Time : 2008/01/31 - 11:22**
Limit : FCC_22&24_Spurious_03M_PK	**Margin : 0**
EUT : GSM 850/1900 Mobile Phone	**Probe : - Line1**
Power : DC 3.7V	**Note : Mode 2: PCS 1900MHz (Channel 512)**



Engineer : Marlin	
Site : AC4	**Time : 2008/01/31 - 11:42**
Limit : FCC_22&24_Spurious_03M_PK	**Margin : 0**
EUT : GSM 850/1900 Mobile Phone	**Probe : - Line1**
Power : DC 3.7V	**Note : Mode 2: PCS 1900MHz (Channel 661)**

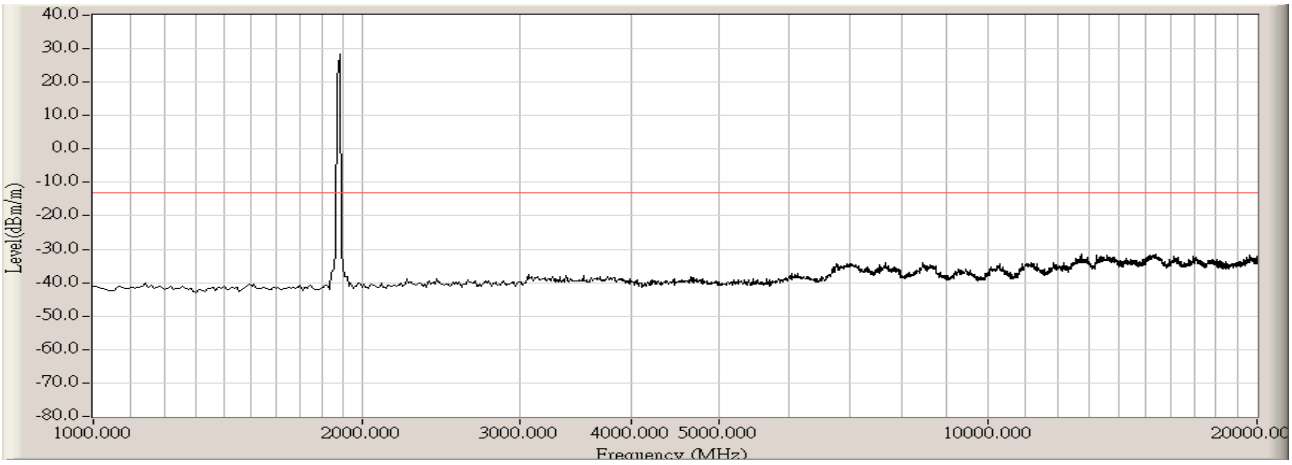


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm)	Margin (dB)	Limit (dBm)	Detector Type
1	*	519.125	0.120	-44.509	-44.389	-31.389	-13.000	PEAK
2		859.280	0.200	-56.477	-56.277	-43.277	-13.000	PEAK

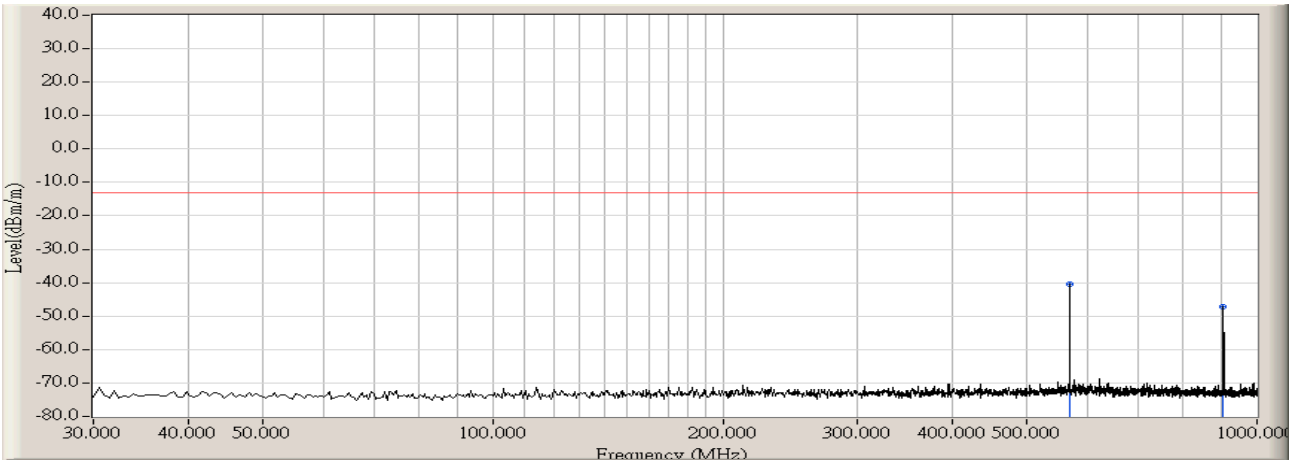
Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Engineer : Marlin	
Site : AC4	**Time : 2008/01/31 - 11:24**
Limit : FCC_22&24_Spurious_03M_PK	**Margin : 0**
EUT : GSM 850/1900 Mobile Phone	**Probe : - Line1**
Power : DC 3.7V	**Note : Mode 2: PCS 1900MHz (Channel 661)**



Engineer : Marlin	
Site : AC4	**Time : 2008/01/31 - 11:42**
Limit : FCC_22&24_Spurious_03M_PK	**Margin : 0**
EUT : GSM 850/1900 Mobile Phone	**Probe : - Line1**
Power : DC 3.7V	**Note : Mode 2: PCS 1900MHz (Channel 810)**

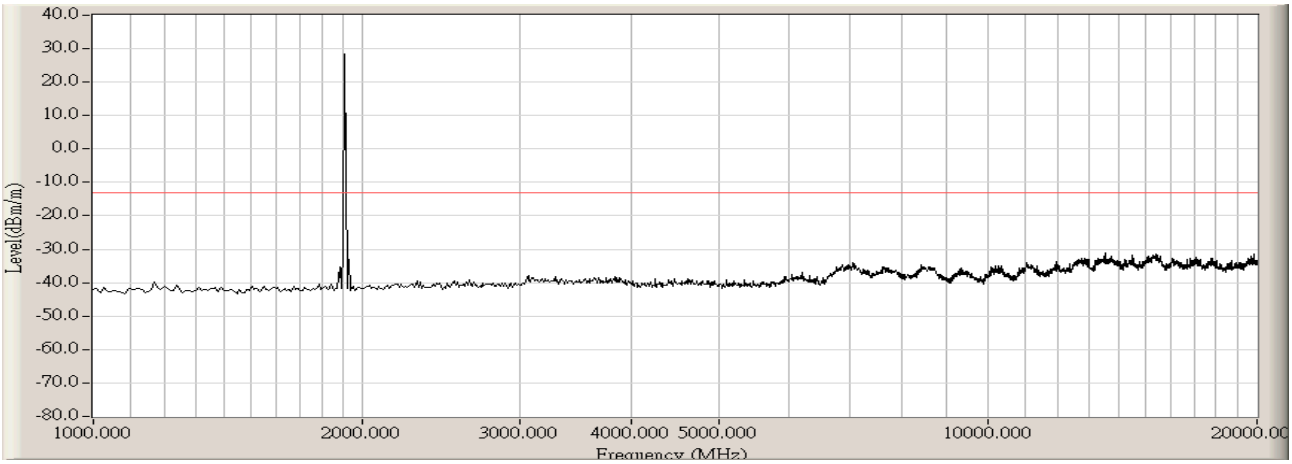


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm)	Margin (dB)	Limit (dBm)	Detector Type
1	*	568.619	0.169	-40.632	-40.463	-27.463	-13.000	PEAK
2		903.922	0.200	-47.492	-47.292	-34.292	-13.000	PEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Engineer : Marlin	
Site : AC4	**Time : 2008/01/31 - 11:25**
Limit : FCC_22&24_Spurious_03M_PK	**Margin : 0**
EUT : GSM 850/1900 Mobile Phone	**Probe : - Line1**
Power : DC 3.7V	**Note : Mode 2: PCS 1900MHz (Channel 810)**



Product	GSM 850/1900 Mobile Phone		
Test Item	Spurious Emission		
Test Mode	Mode 1: GSM 850		
Date of Test	2008/02/17	Test Site	AC-2

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 128 (824.20MHz)								
1645.00	-34.37	V	-34.50	3.28	9.75	-28.03	-13.00	-15.03
2470.00	-41.84	V	-37.99	4.10	10.48	-31.61	-13.00	-18.61
1645.00	-46.26	H	-45.93	3.28	9.75	-39.46	-13.00	-26.46
2470.00	-35.48	H	-31.61	4.10	10.48	-25.23	-13.00	-12.23
Middle Channel 189 (836.40MHz)								
1675.00	-31.06	V	-30.88	3.32	9.95	-24.25	-13.00	-11.25
2515.00	-33.69	V	-30.00	3.81	10.62	-23.19	-13.00	-10.19
1675.00	-41.39	H	-41.02	3.32	9.95	-34.39	-13.00	-21.39
2515.00	-35.51	H	-31.86	3.81	10.62	-25.05	-13.00	-12.05
High Channel 251 (848.80MHz)								
1690.00	-35.91	V	-35.53	3.35	10.06	-28.82	-13.00	-15.82
2545.00	-35.25	V	-31.29	4.19	10.68	-24.80	-13.00	-11.80
1705.00	-41.02	H	-40.54	3.35	10.06	-33.83	-13.00	-20.83
2545.00	-34.66	H	-30.91	4.19	10.68	-24.42	-13.00	-11.42

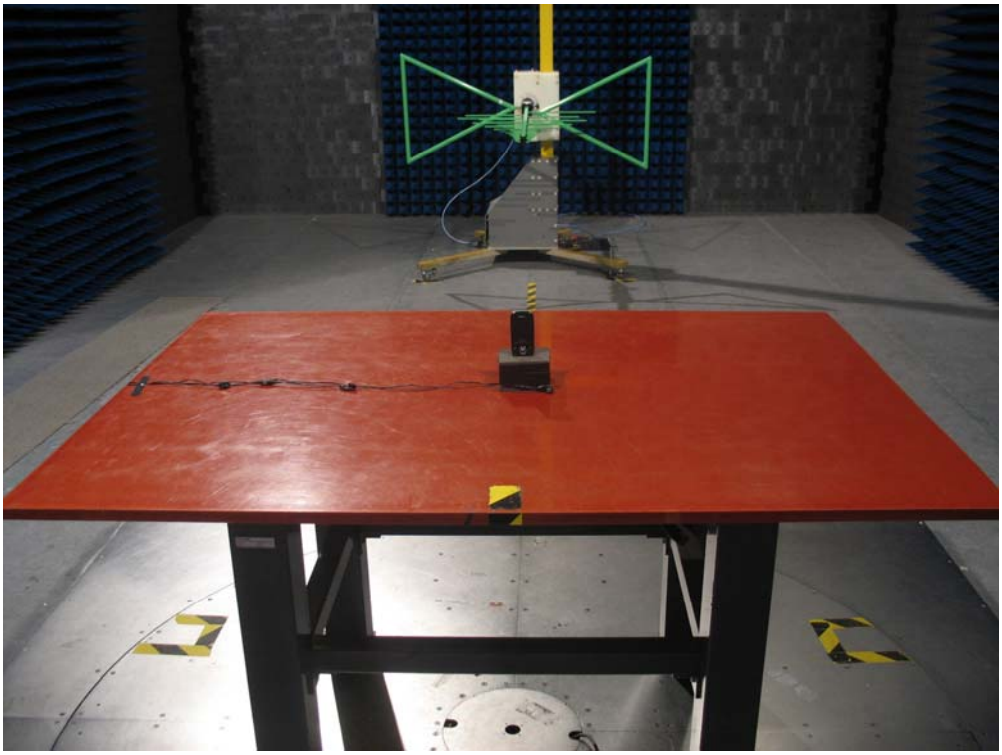
Product	GSM 850/1900 Mobile Phone		
Test Item	Spurious Emission		
Test Mode	Mode 2: PCS 1900		
Date of Test	2007/02/17	Test Site	AC-2

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 512 (1850.20MHz)								
3698.40	-46.52	V	-41.18	4.78	12.69	-33.27	-13.00	-20.27
5550.60	-53.14	V	-41.80	6.03	13.15	-34.68	-13.00	-21.68
3698.40	-50.38	H	-45.10	4.78	12.69	-37.19	-13.00	-24.19
5550.60	-53.99	H	-42.65	6.03	13.15	-35.53	-13.00	-22.53
Middle Channel 661 (1880.00MHz)								
3759.00	-47.85	V	-41.83	5.03	12.72	-34.14	-13.00	-21.14
5640.00	-53.83	V	-42.59	5.93	13.14	-35.38	-13.00	-22.38
3759.00	-48.99	H	-43.04	5.03	12.72	-35.35	-13.00	-22.35
5640.00	-57.24	H	-46.16	5.93	13.14	-38.95	-13.00	-25.95
High Channel 810 (1909.80MHz)								
3819.60	-53.01	V	-46.68	5.03	12.73	-38.98	-13.00	-25.98
5729.40	-63.42	V	-51.59	6.20	13.11	-44.68	-13.00	-31.68
3819.60	-50.86	H	-44.48	5.03	12.73	-36.78	-13.00	-23.78
5729.40	-62.12	H	-50.35	6.20	13.11	-43.44	-13.00	30.44

7.7. Test Photograph

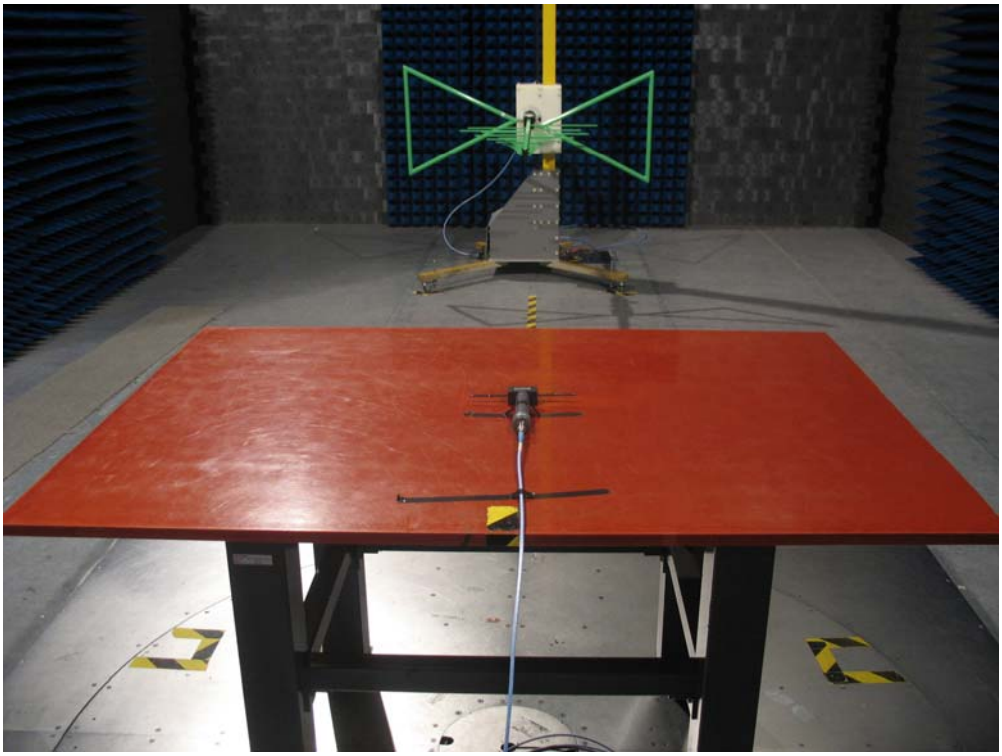
Test Mode: Mode 1: GSM 850

Description: Radiated Spurious Emission Test Setup for EUT (Below 1GHz)



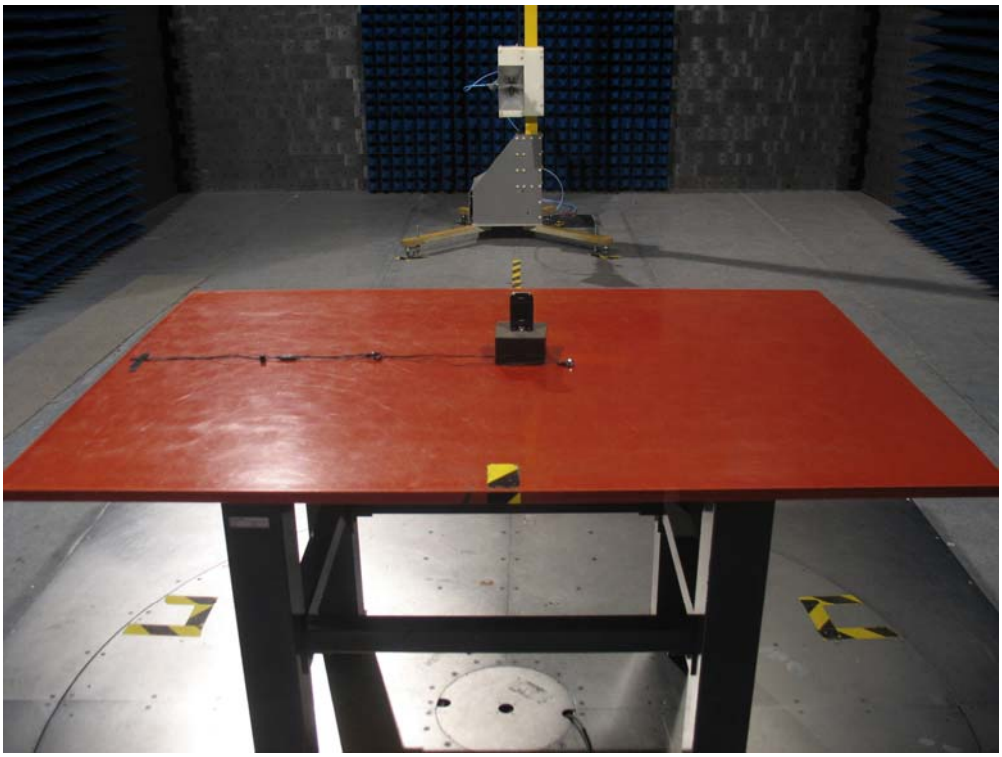
Test Mode: Mode 1: GSM 850

Description: Radiated Spurious Emission Test Setup for Substitution Antenna (Below 1GHz)



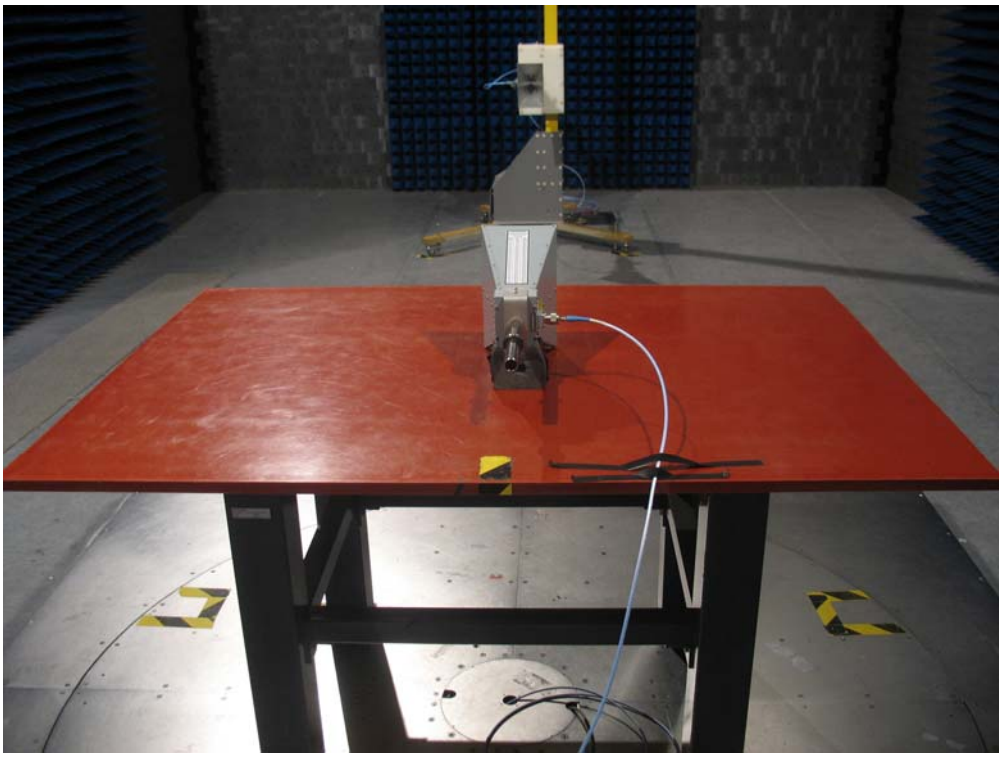
Test Mode: Mode 1: GSM 850

Description: Radiated Spurious Emission Test Setup for EUT (Above 1GHz)



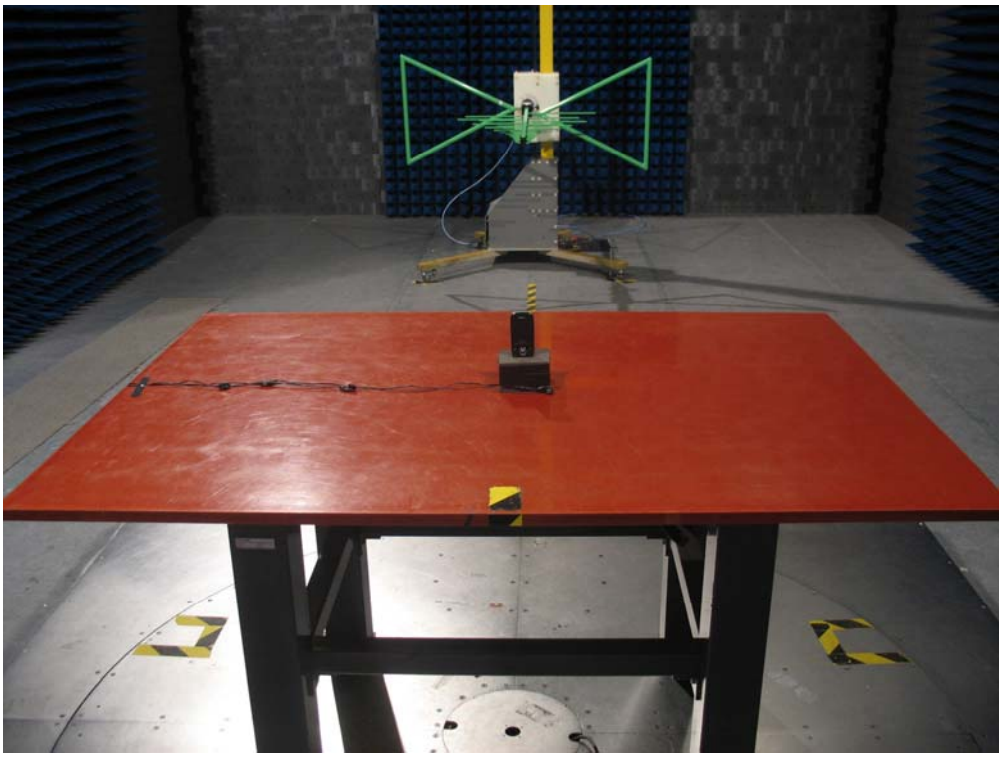
Test Mode: Mode 1: GSM 850

Description: Radiated Spurious Emission Test Setup for Substitution Antenna (Above 1GHz)



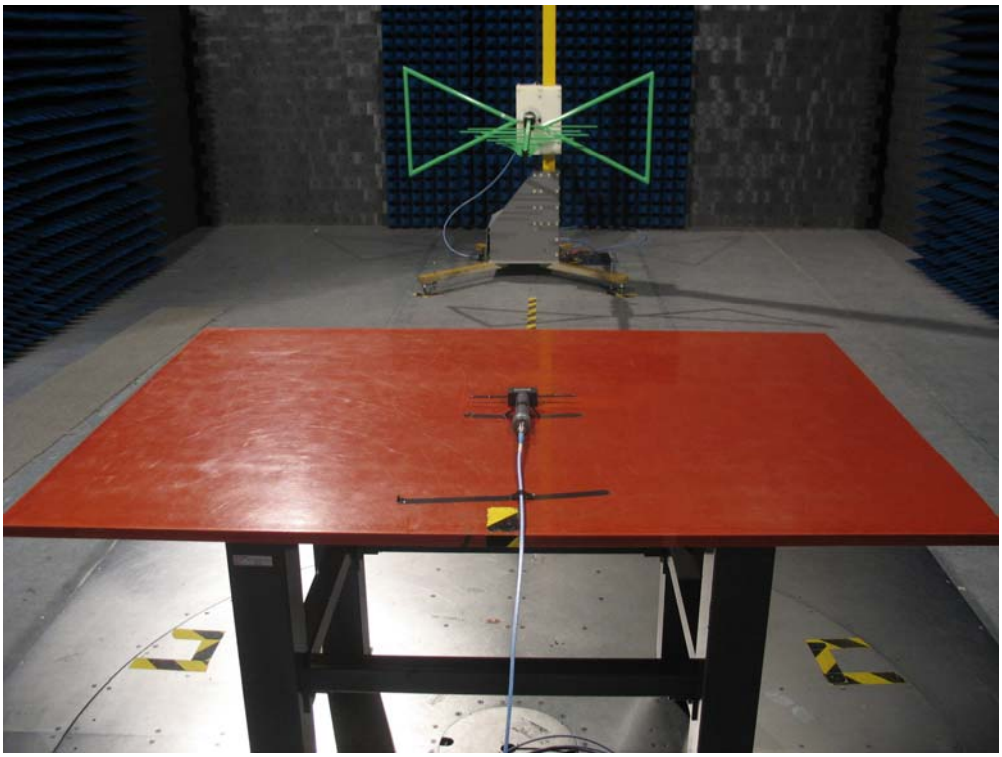
Test Mode: Mode 2: PCS 1900

Description: Radiated Spurious Emission Test Setup for EUT (Below 1GHz)



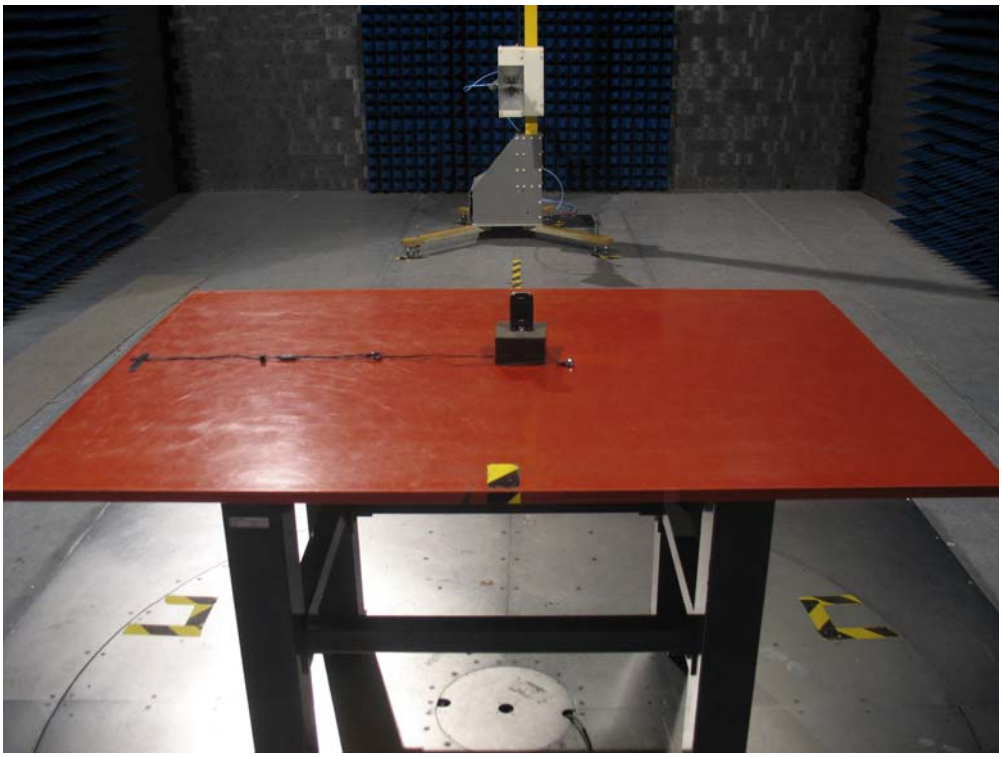
Test Mode: Mode 2: PCS 1900

Description: Radiated Spurious Emission Test Setup for Substitution Antenna (Below 1GHz)



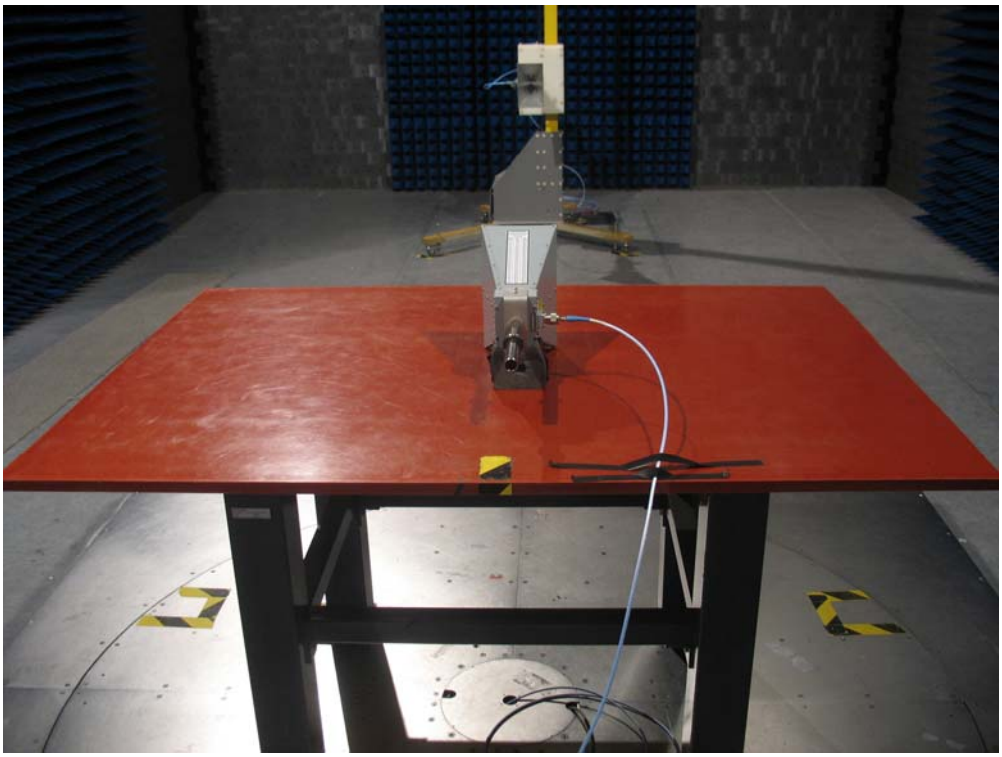
Test Mode: Mode 2: PCS 1900

Description: Radiated Spurious Emission Test Setup for EUT (Above 1GHz)



Test Mode: Mode 2: PCS 1900

Description: Radiated Spurious Emission Test Setup for Substitution Antenna (Above 1GHz)



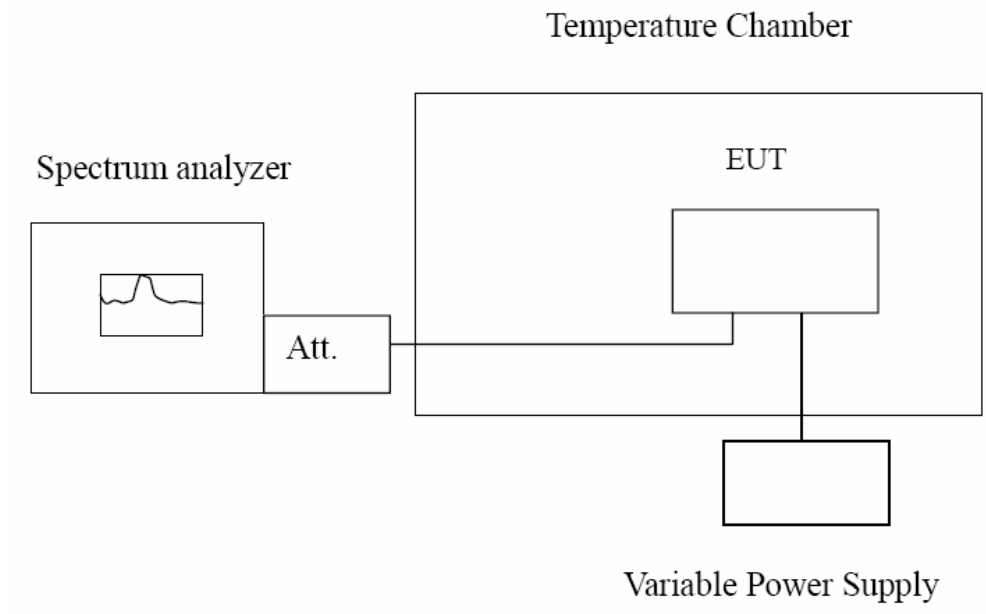
8. Frequency Stability Under Temperature & Voltage Variations

8.1. Test Equipment

Frequency Stability Under Temperature & Voltage Variations / AC-4

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2007/06/11
Radio Communication Tester	R&S	CMU 200	106388	2006/11/22
Dual Directional Coupler	Agilent	778D	20160	2007/04/20
10dB Coaxial Coupler	Agilent	87300C	MY44300299	2007/04/20
Coaxial Cable	Huber+Suhner	AC3-RF	08	2006/11/25
AC Power Supply	IDRC	CF-500TP	979422	2007/03/09
DC Power Supply	IDRC	CD-035-020PR	977272	2007/02/02
Programmable Temperature & Humidity Chamber	Gaoyu	TH-1P-B	WIT-05121302	2007/01/19
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH003	2007/03/30

8.2. Test Setup



8.3. Limit

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Limit	< ± 2.5 ppm

8.4. Test Procedure

The EUT was setup according to EIA/TIA 603C

Frequency Stability Under Temperature Variations:

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 20℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20℃. 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 specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

8.5. Uncertainty

The measurement uncertainty is defined as ± 10 Hz.

8.6. Test Result

Product	GSM 850/1900 Mobile Phone		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 1: GSM 850		
Date of Test	2008/01/31	Test Site	AC-3

Frequency Stability Under Temperature

Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	836.40	-45	± 2091
-20	836.40	-38	± 2091
-10	836.40	-33	± 2091
0	836.40	-20	± 2091
10	836.40	-15	± 2091
20	836.40	-16	± 2091
30	836.40	-17	± 2091
40	836.40	-28	± 2091
50	836.40	-30	± 2091

Frequency Stability Under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (KHz)
3.14	836.40	18	± 2091
3.70	836.40	-7	± 2091
4.25	836.40	28	± 2091

Product	GSM 850/1900 Mobile Phone		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 2: PCS 1900		
Date of Test	2008/01/31	Test Site	AC-3

Frequency Stability Under Temperature

Temperature Interval (℃)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	1880.00	-46	± 4700
-20	1880.00	-39	± 4700
-10	1880.00	-37	± 4700
0	1880.00	-38	± 4700
10	1880.00	-33	± 4700
20	1880.00	-34	± 4700
30	1880.00	-38	± 4700
40	1880.00	-42	± 4700
50	1880.00	-44	± 4700

Frequency Stability Under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (KHz)
3.14	1880.00	18	± 4700
3.70	1880.00	-6	± 4700
4.25	1880.00	26	± 4700