



FCC 47 CFR PART 24 SUBPART E

TEST REPORT

For

Mobile

Model: T400

Trade Name: TMobile

Issued to

YA HSIN INDUSTRIAL CO., LTD
No.268 Xin Hu 3rd Road. Neihu District. 11490, Taipei, Taiwan

Issued by

COMPLIANCE CERTIFICATION SERVICES (KUNSHAN) INC.
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NVLAP[®]
Lab. Code: 200581-0

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1. TEST RESULT CERTIFICATION

Applicant: YA HSIN INDUSTRIAL CO., LTD
No.268 Xin Hu 3rd Road. Neihu District. 11490, Taipei, Taiwan

Equipment Under Test: Mobile

Trade Name: TMobile

Model Number: T400

Date of Test: Oct.17~Nov 3, 2005

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR PART 24 SUBPART E	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI/TIA/EIA-603-A-2001 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rule FCC PART 24 Subpart E.

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

Approved by:


Denny Yang
Vice General Manager of Kunshan Laboratory
Compliance Certification Services Inc.

Reviewed by:


Eric Lin
Section Manager of Kunshan Laboratory
Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	Mobile
Trade Name	TMobile
Model Number	T400
Model Discrepancy	N/A
Power Supply	Adapter: TMobile / SP05500600-U AC100-240V, 50-60Hz, 0.3A DC5.5V, 600mA Battery: 3.7V/ 600mAh
Frequency Range	1850 ~ 1910 MHz
Transmit Power	29.95 dBm
Cellular Phone Protocol	GSM (PCS)
Type of Emission	253KGXW

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: TCYFP-5926A filing to comply with Part 24 of the FCC 47 CFR Rules.



3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of ANSI C63.4 and FCC CFR 47, 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

3.1 EUT CONFIGURATION

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

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.

3.4 DESCRIPTION OF TEST MODES

The EUT (model: T400) had been tested under operating condition.

EUT staying in continuous transmitting mode was programmed. Channel Low, Mid and High were chosen for full testing.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

The field strength of spurious emission was measured as EUT stand-up position (H mode) and lie-down position (E1, E2 mode) for both GSM and GPRS with all power adaptors. The worst emission was found in lie-down position (E1 mode) and the worst case was recorded.



4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at CCS China Kunshan Lab at 10#, Weiye Rd, Innovation Park Eco. & Tec. Development Zone Kunshan city JiangSu, (215300)CHINA.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.




Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200581-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (Registration no: 93105 and 90471).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP	EN 55022, EN 61000-3-2, EN 61000-3-3, EN550024, EN 61000-4-2, EN 61000-4-3, EN61000-4-4, EN 61000-4-5, EN 61000-4-6, IEC 61000-4-8, EN 61000-4-11 ANSI C63.4, CISPR16-1, IEC61000-3-2, IEC61000-3-3, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11	 Lab. Code: 200581-0
USA	FCC	3/10 meter Sites to perform FCC Part 15/18 measurements	 93105, 90471
Japan	VCCI	3/10 meter Sites and conducted test sites to perform radiated/conducted measurements	VCCI R-1600 C-1707
Norway	NEMKO	EN61000-6-1/2/3/4, EN 50082-1/2, IEC 61000-6-1/2/3/4, EN 50091-2, EN 55011, EN 55022, EN 55024, EN 61000-3-2/3, EN 61000-11, IEC 61000-4-2/3/4/5/6/8/11, CISPR16-1/2/3/4	 ELA 105

** No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.*



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

6.2 LOCAL SUPPORT EQUIPMENT LIST AND DETAILS

No	Equipment	Model	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1	N/A						



7. FCC PART 22 & 24 REQUIREMENTS

7.1 PEAK POWER

LIMIT

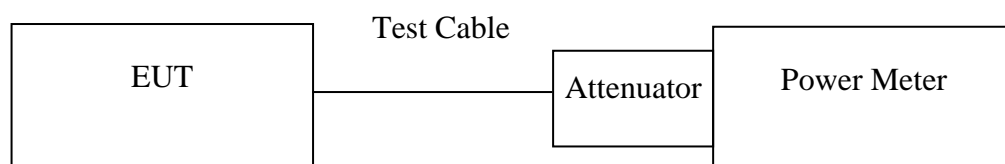
According to FCC §2.1046.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Peak and Avg Power Sensor	Agilent	E9327A	US40441788	04/15/2006
EPM-P Series Power Meter	Agilent	E4416A	QB41292714	04/13/2006
Spectrum Analyzer	Agilent	E4446A	MY44020154	03/05/2006
Wireless communication test set	Agilent	8960	QB44051695	07/29/2006

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



Remark: Measurement setup for testing on Antenna connector

TEST PROCEDURE

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



TEST RESULTS

No non-compliance noted.

Test Data

Test Mode	CH	Frequency (MHz)	Power Meter Reading (dBm)	Factor (dB)	Average Power (dBm)
GSM 1900	512	1850.20	13.55	16.40	29.95
	661	1880.00	12.91		29.31
	810	1910.00	11.84		28.24

Remark: *The value of factor includes both the loss of cable and external attenuator*

7.2 ERP & EIRP MEASUREMENT

LIMIT

According to FCC §2.1046

FCC 22.913(b): The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.

FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

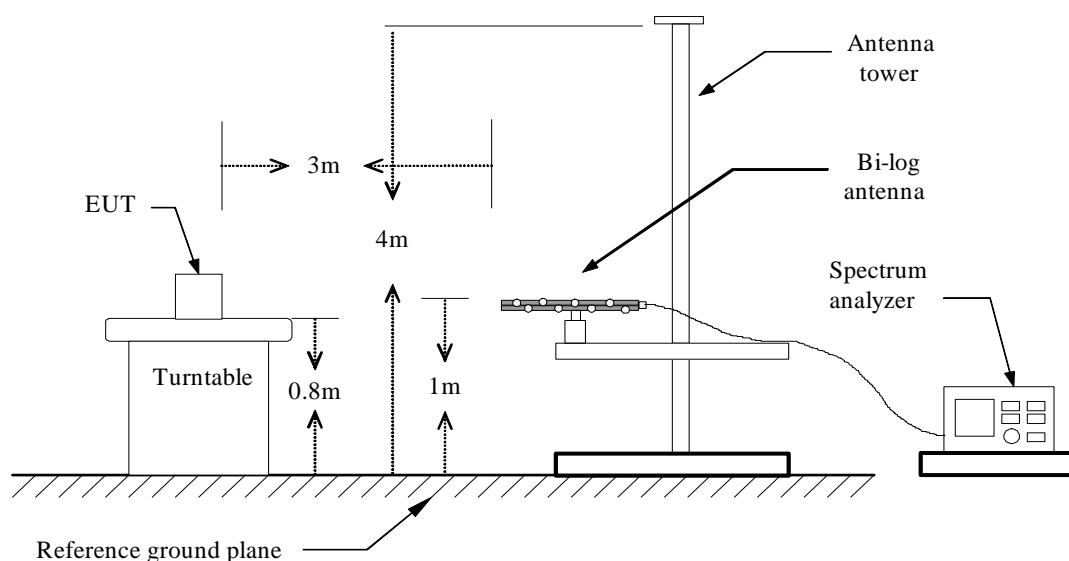
MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	03/05/2006
EMI Test Receiver	R&S	ESPI3	101026	11/07/2006
BroadBand Pre-Amplifier	Miteq	NSP4000-NF	870731	0402/2006
Bilog Antenna	Sunol	JB1	A110204-2	11/22/2006
Horn-antenna	SCHWARZBECK	BBHA9120D	D:266	02/01/2006
Turn Table	CT	CT123	4165	N.C.R
Antenna Tower	CT	CTERG23	3256	N.C.R
Controller	CT	CT100	95637	N.C.R
PSG Analog Signal Generator	Agilent	E8257C	MY43321570	12/19/2005
Wireless communication test set	Agilent	8960	QB44051695	07/29/2006
Site NSA	CCS	N/A	N/A	04/06/2006

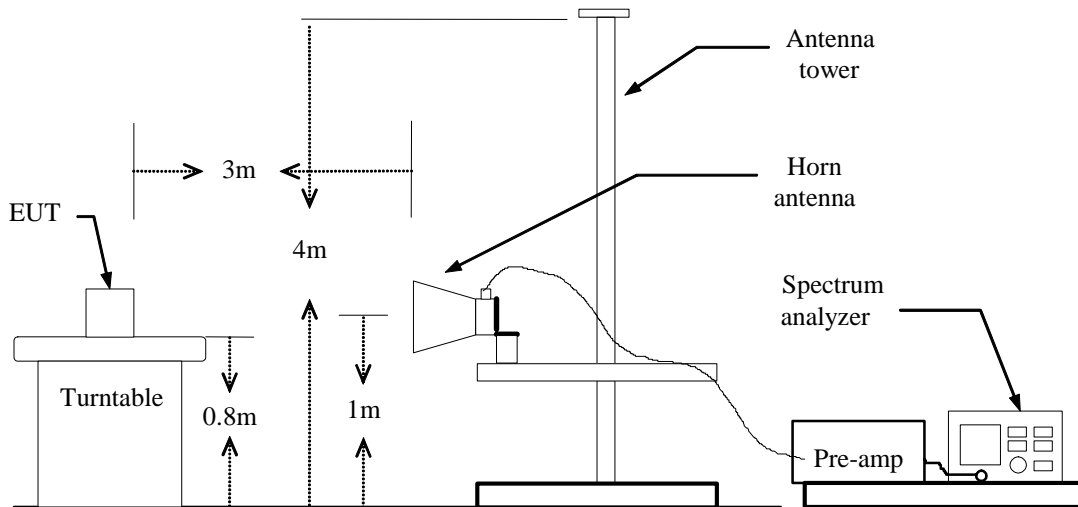
Remark: Each piece of equipment is scheduled for calibration once a year.

TEST CONFIGURATION

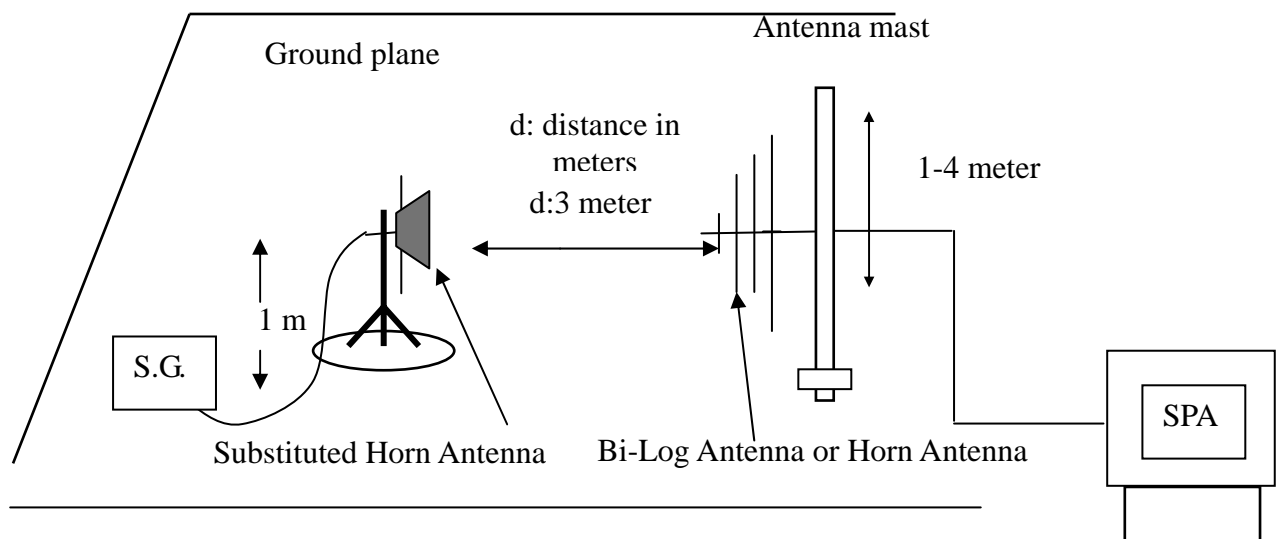
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



TEST PROCEDURE

The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement of the EUT, the resolution bandwidth was set to 3MHz and the average bandwidth was set to 3MHz. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824-849MHz, and EIRP in frequency band 1851.25 –1910MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (824-849MHz) or horn antenna (1851.25-1910MHz) connected to a signal generator. The spectrum analyzer reading was recorded and ERP/EIRP was calculated as follows:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$



TEST RESULTS

No non-compliance noted.

GSM 1900 Test Data

EUT Pol.	Channel	Frequency (MHz)	Reading level (dBuV)	Antenna Pol.	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
E1	512	1850.20	97.95	V	22.27	3.72	8.45	27.00	33.00	-6.00
		1850.20	107.86	H	24.56	3.72	8.45	29.29	33.00	-3.71
	661	1880.00	96.66	V	22.24	3.78	8.48	26.94	33.00	-6.06
		1880.00	107.10	H	24.18	3.78	8.48	28.88	33.00	-4.12
	810	1909.80	95.00	V	22.68	3.85	8.52	27.35	33.00	-5.65
		1909.80	103.53	H	24.44	3.85	8.52	28.41	33.00	-4.59



7.3 OCCUPIED BANDWIDTH MEASUREMENT

LIMIT

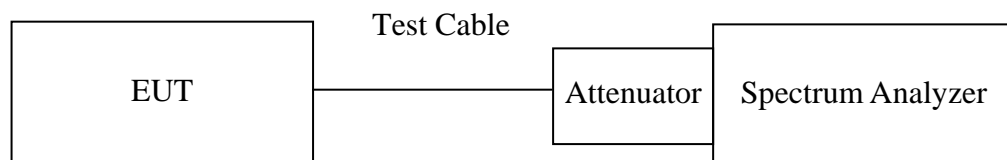
According to §FCC 2.1049.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	03/05/2006
Wireless communication test set	Agilent	8960	QB44051695	07/29/2006

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



Remark: Measurement setup for testing on Antenna connector

TEST PROCEDURE

The EUT's output RF connector was connected with a short cable to the spectrum analyzer, RBW was set to about 1% of emission BW, VBW is set to 3 times the RBW, -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.



TEST RESULTS

No non-compliance noted

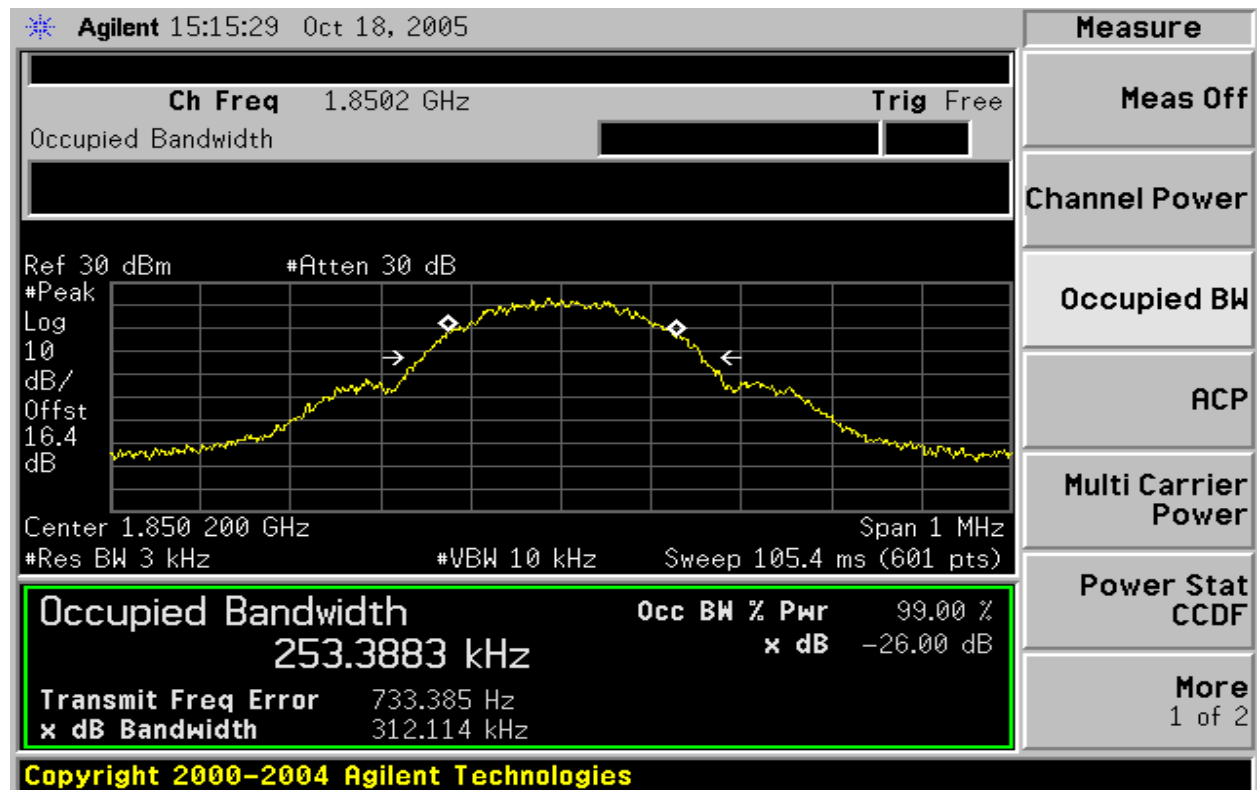
Test Data

Test Mode	CH	Frequency (MHz)	Bandwidth (kHz)
GSM 1900	512	1850.20	253.39
	661	1880.00	250.83
	810	1909.80	250.86

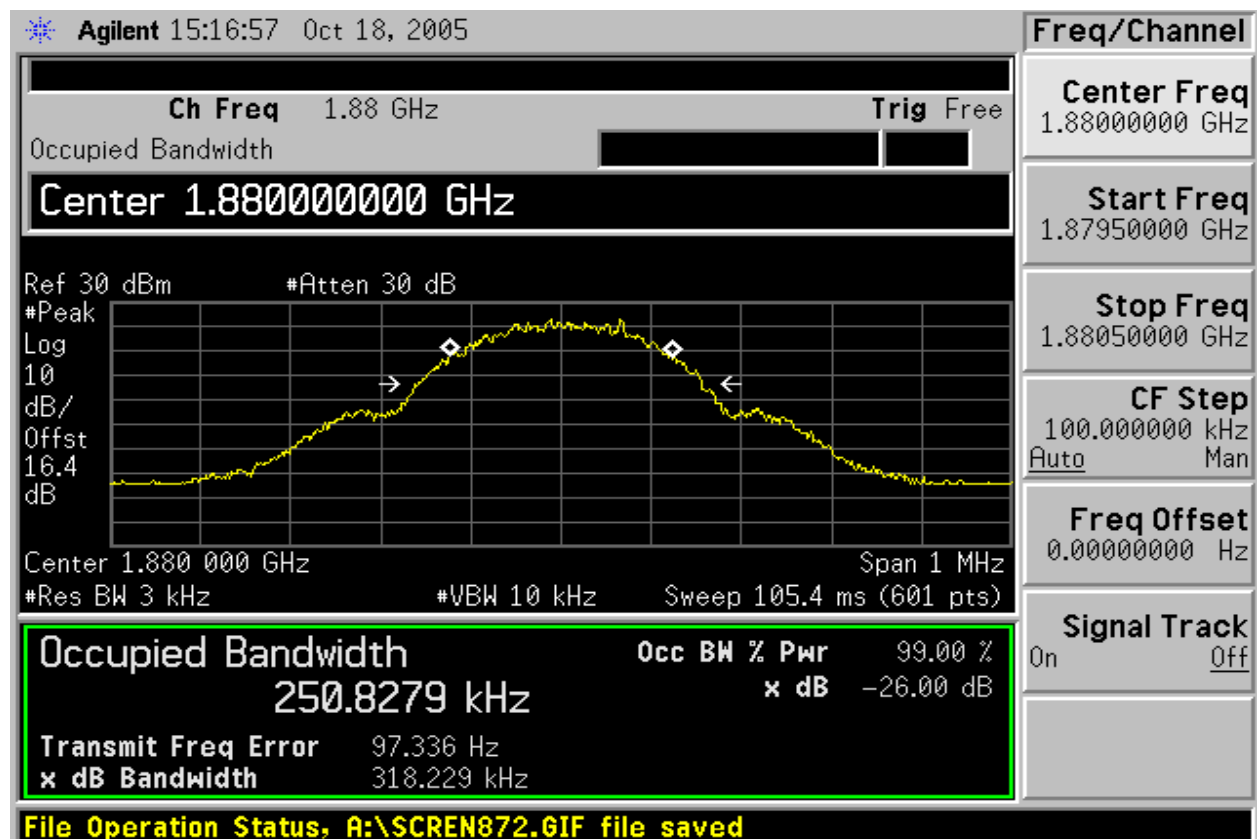


Test Plot

GSM 1900 (CH Low)

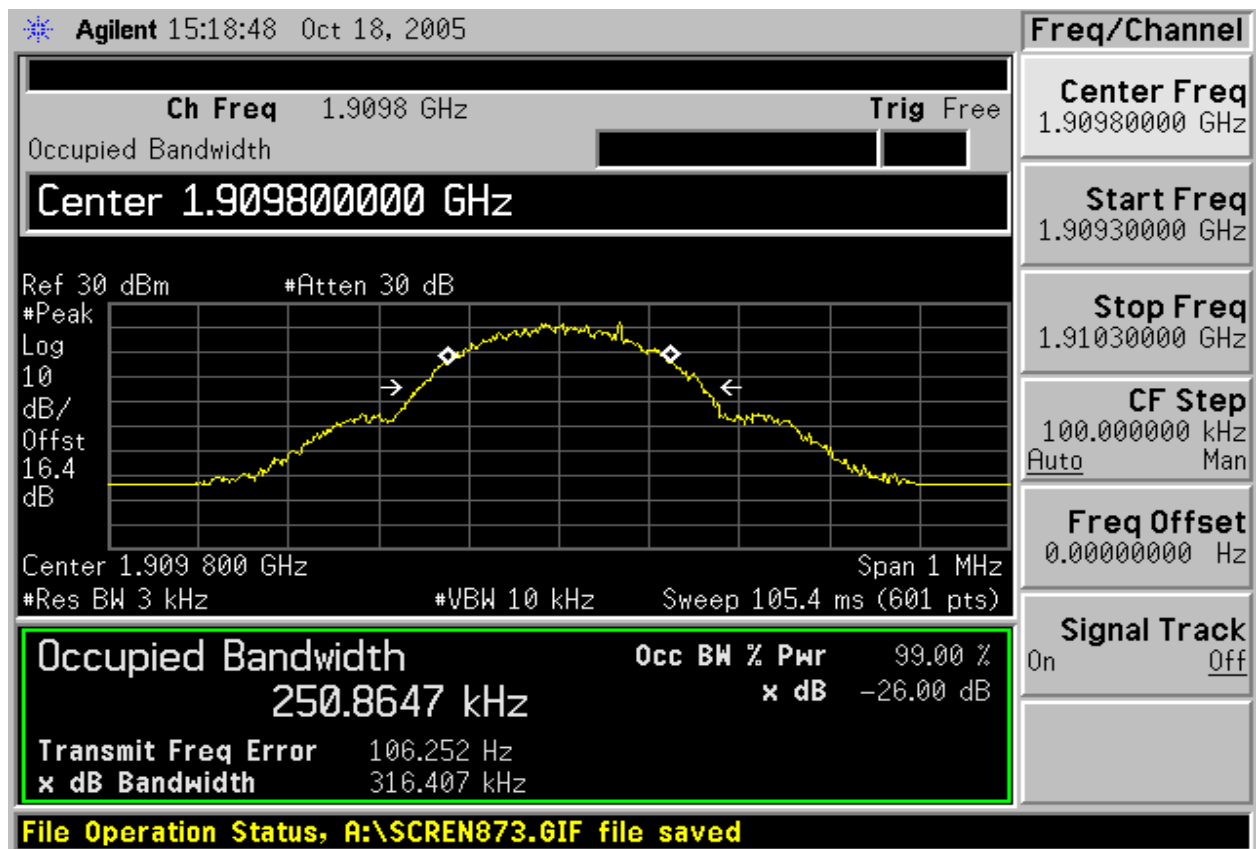


GSM 1900 (CH Mid)





GSM 1900 (CH High)





7.4 OUT OF BAND EMISSION AT ANTENNA TERMINALS

LIMIT

According to FCC §2.1051, FCC §2.2917(f), FCC §22.917(f), FCC §24.238(a).

Out of Band Emissions: The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least $43 + 10 \log P$ dB.

Mobile Emissions in Base Frequency Range: The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitters operated must be attenuated to a level not exceed -80 dBm at the transmit antenna connector.

Band Edge Requirements: In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the Out of band Emission

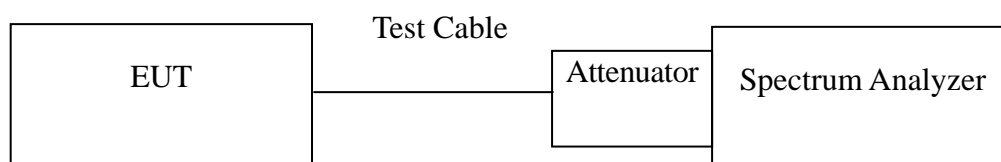
MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	03/05/2006
Wireless communication test set	Agilent	8960	QB44051695	07/29/2006

Remark: Each piece of equipment is scheduled for calibration once a year.

TEST CONFIGURATION

Out of band emission at antenna terminals:



TEST PROCEDURE

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

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

Band Edge Requirements (1850MHz and 1910MHz): In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions. Limit, -13dBm.



TEST RESULTS

No non-compliance noted.

Test Data

Mode	CH	Location	Description
GSM 1900	512	Figure1	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure2	Conducted spurious emissions, 2.5GHz - 20GHz
	661	Figure 3	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 4	Conducted spurious emissions, 2.5GHz - 20GHz
	810	Figure 5	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 6	Conducted spurious emissions, 2.5GHz - 20GHz

Mode	CH	Location	Description
GSM 1900	512	Figure 7	Band Edge emissions
	810	Figure 8	Band Edge emissions

Test Plot

GSM 1900

Figure 1: Out of Band emission at antenna terminals – GSM CH Low

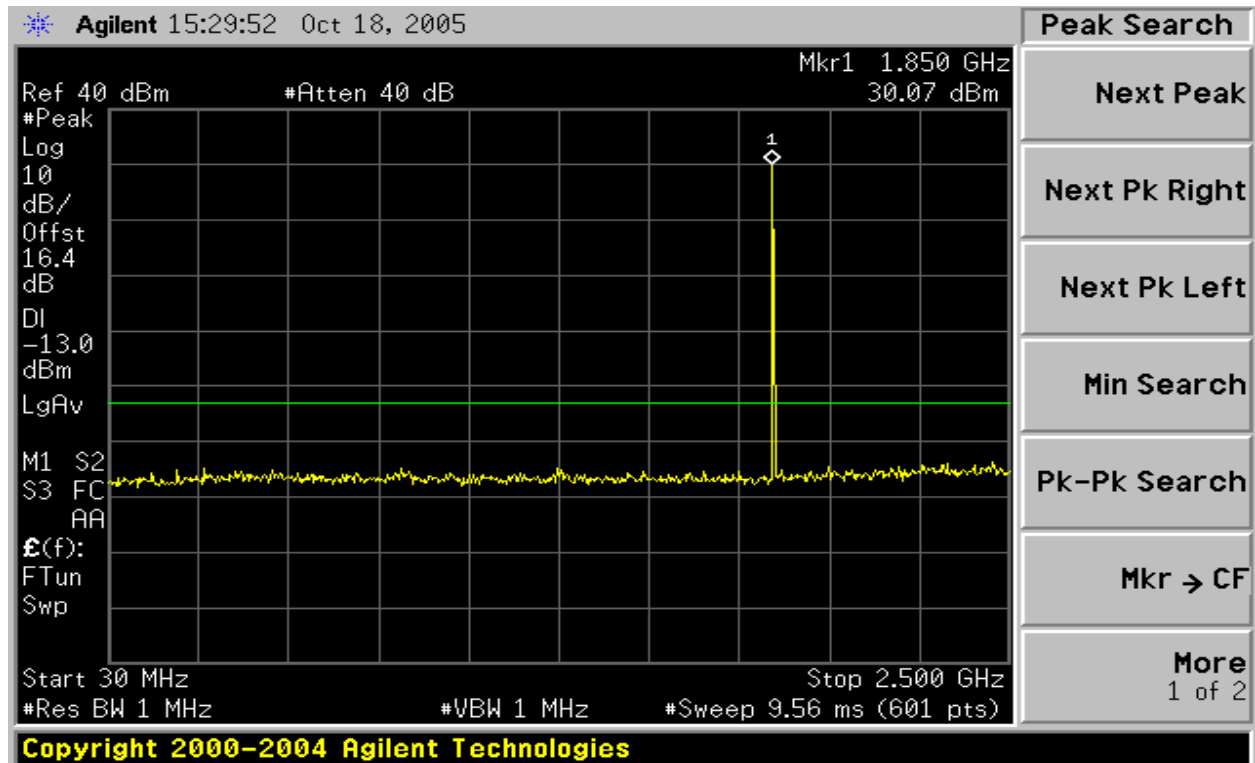


Figure2: Out of Band emission at antenna terminals – GSM CH Low

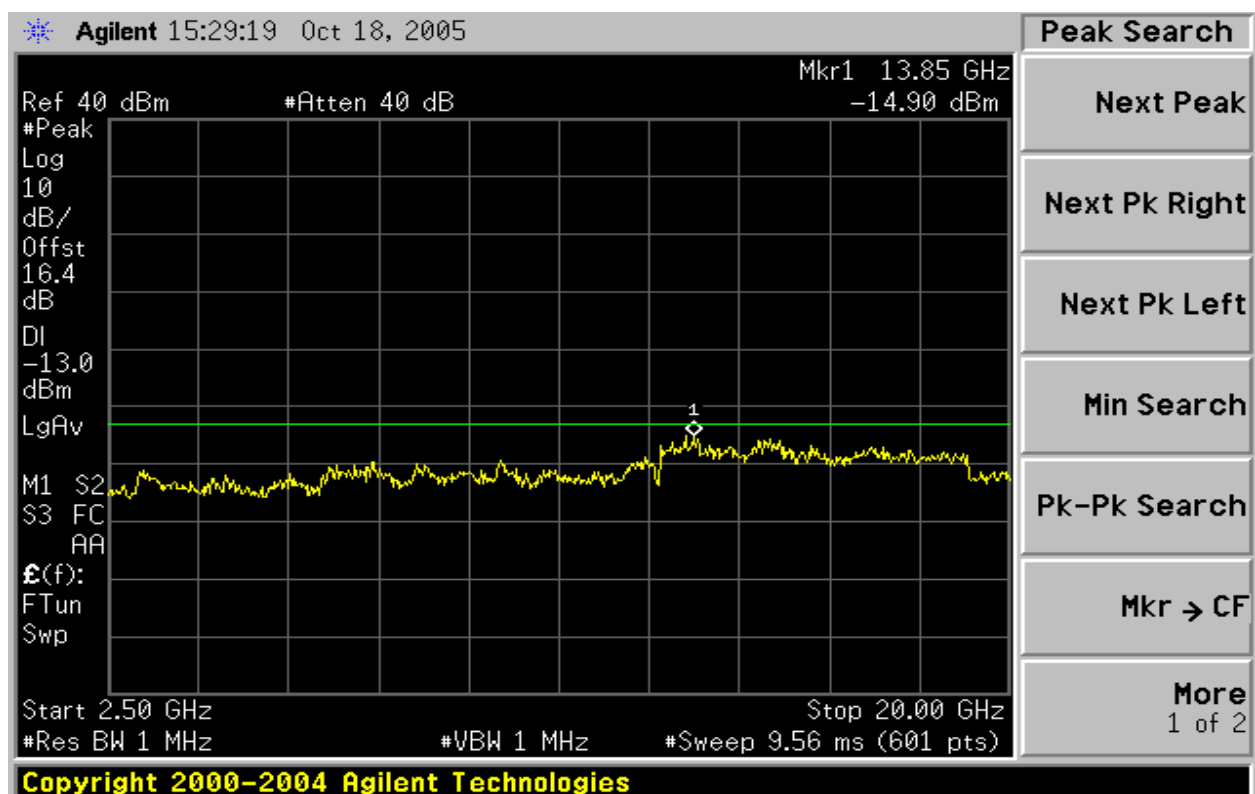


Figure3: Out of Band emission at antenna terminals – GSM CH Mid

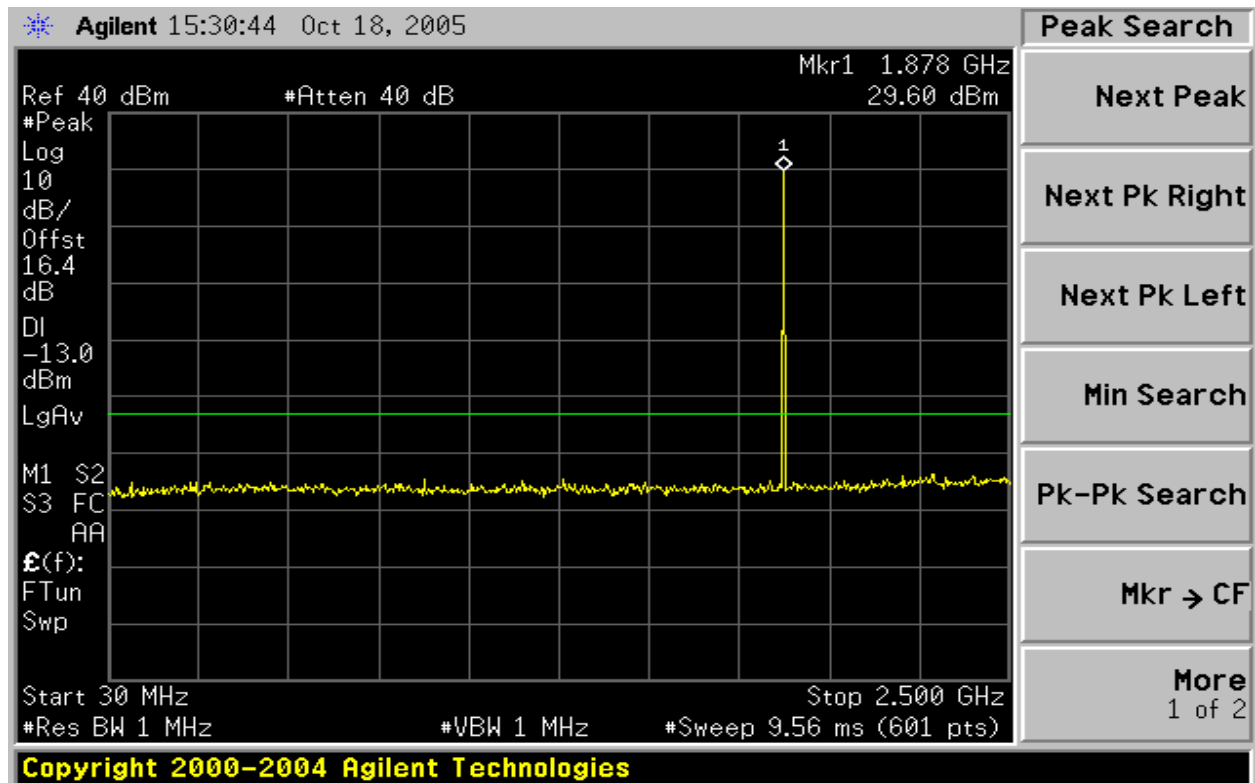


Figure4: Out of Band emission at antenna terminals – GSM CH Mid

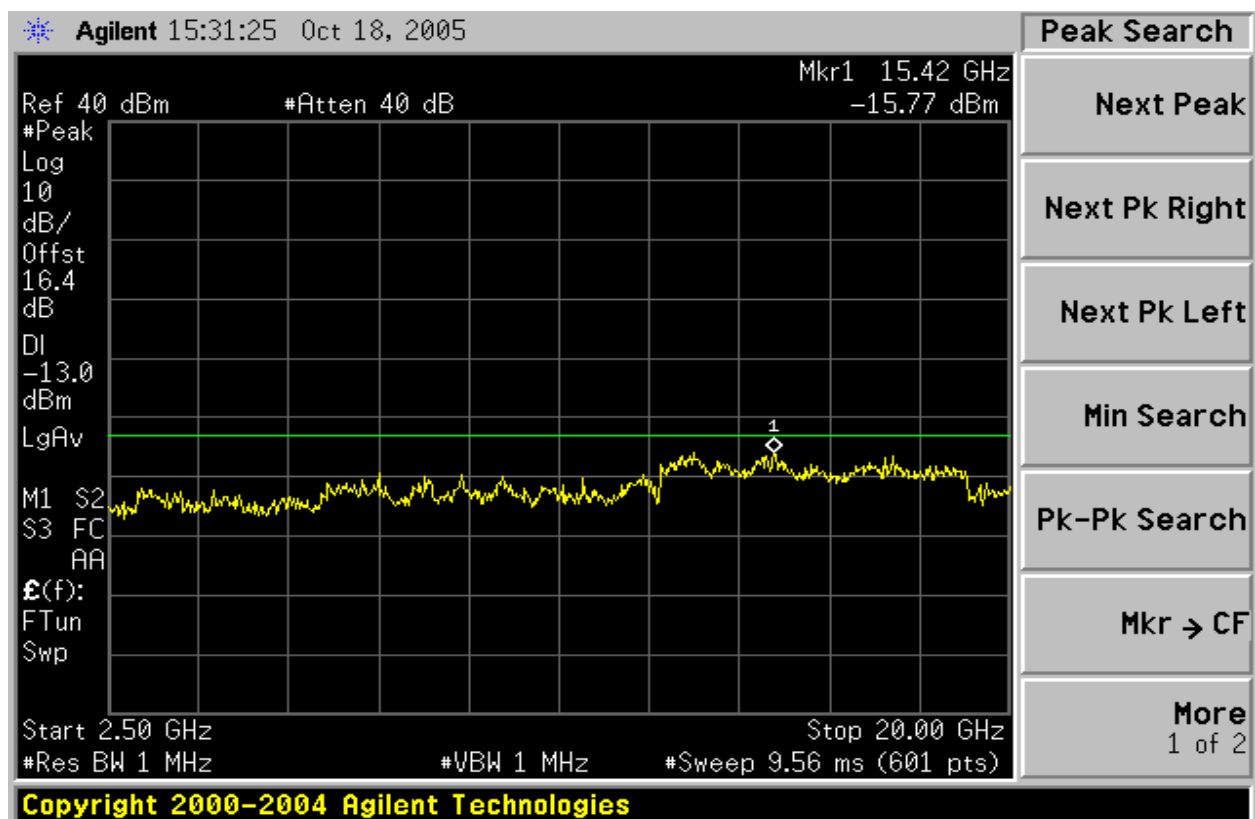


Figure5: Out of Band emission at antenna terminals – GSM CH High

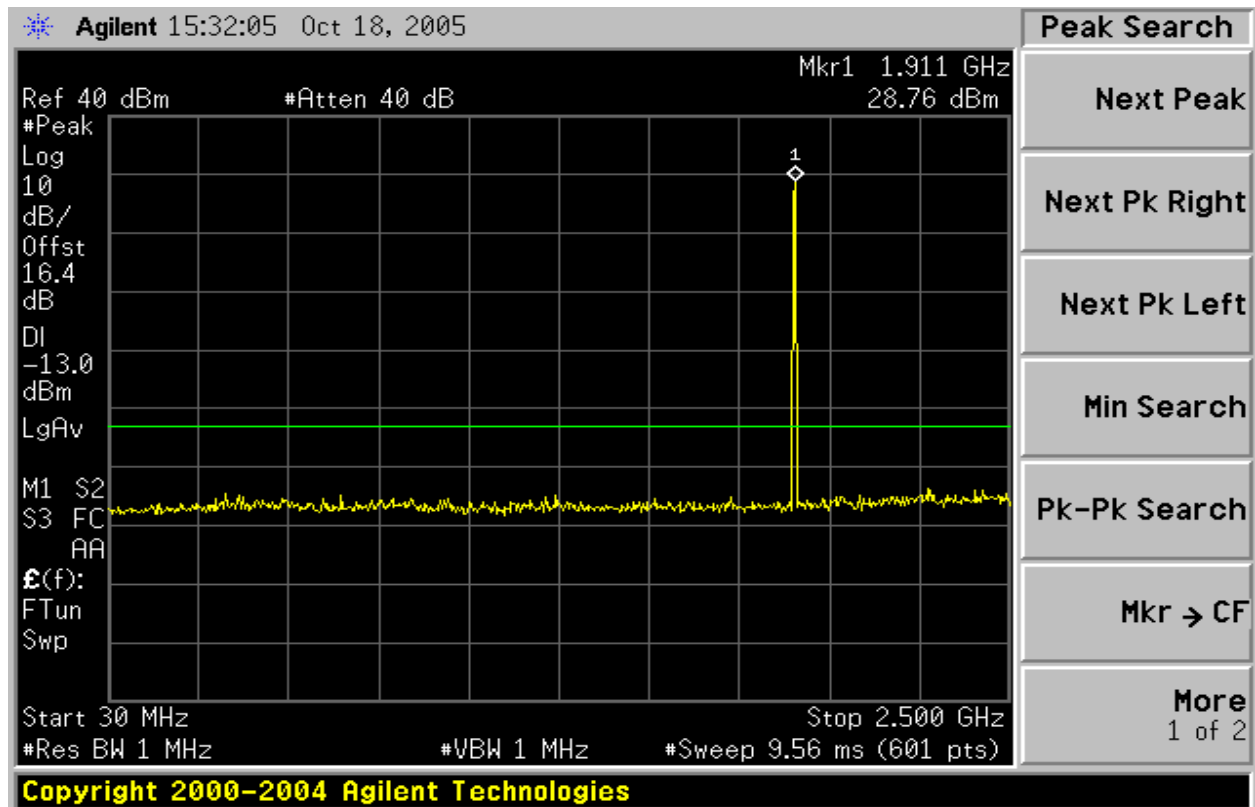
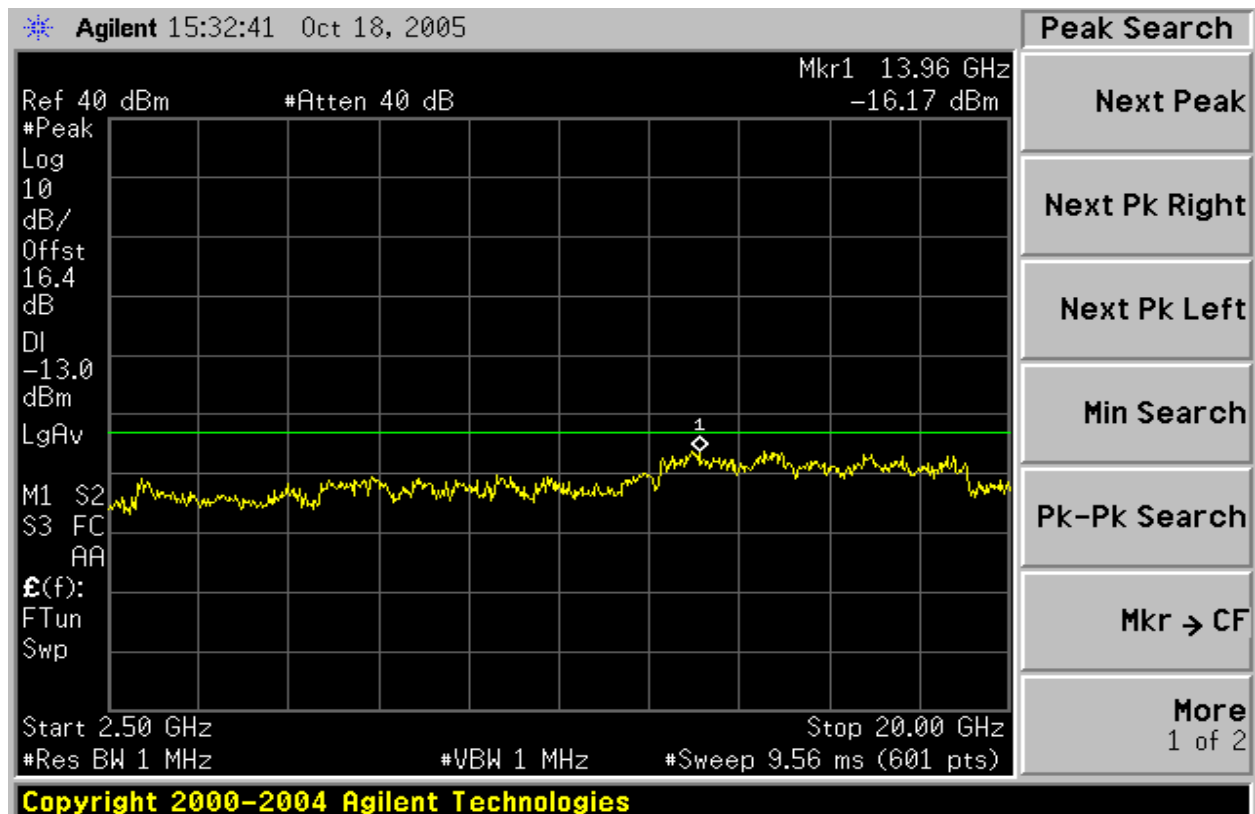


Figure 6: Out of Band emission at antenna terminals – GSM CH High



GSM 1900

Figure 7: Band Edge emissions – GSM CH Low

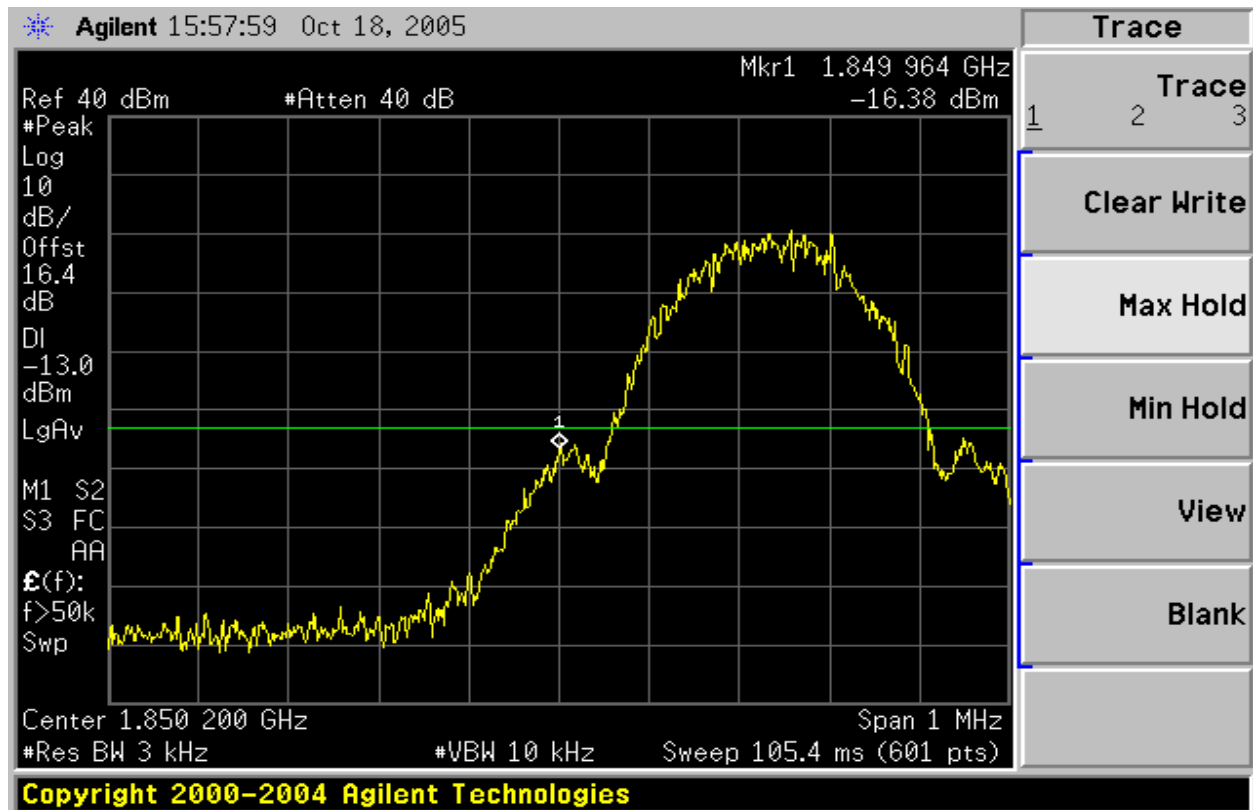


Figure 8: Band Edge emissions – GSM CH High





7.5 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

According to FCC §2.1053

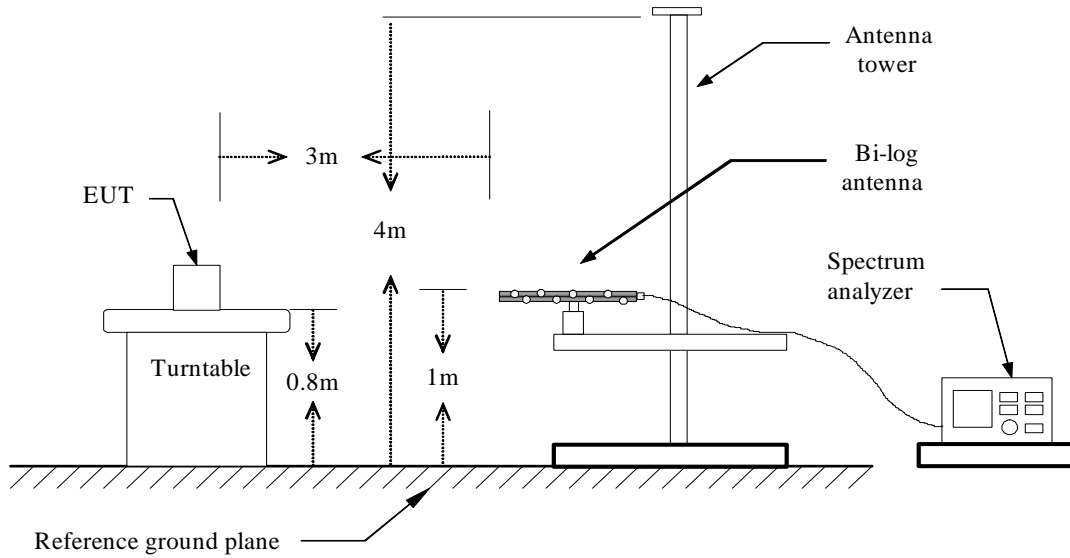
MEASUREMENT EQUIPMENT USED

Test Site A (10m chamber)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	03/05/2006
Bilog Antenna	Sunol	JB1	A110204-1	11/10/2006
Horn Antenna	SCHWARZBECK	BBHA9120D	D:267	02/04/2006
AMPLIFIER	MITEQ	AFS42-00102650-42-10P-42	1038328	05/04/2006
Wireless communication test set	Agilent	8960	QB44051695	07/29/2006
PSG Analog Signal Generator	Agilent	E8257C	MY43321570	12/19/2005
System Controller	Sunol	SC99V	121501-1	N/A
Turn Table	Sunol	FM3022HS	N/A	N/A
Antenna Mast	Sunol	TWR 99-4	121501-3	N/A
Coax Switch	Anitsu	MP 598	M 80094	N/A
Site NSA	CCS Lab.	N/A	N/A	02/16/2006

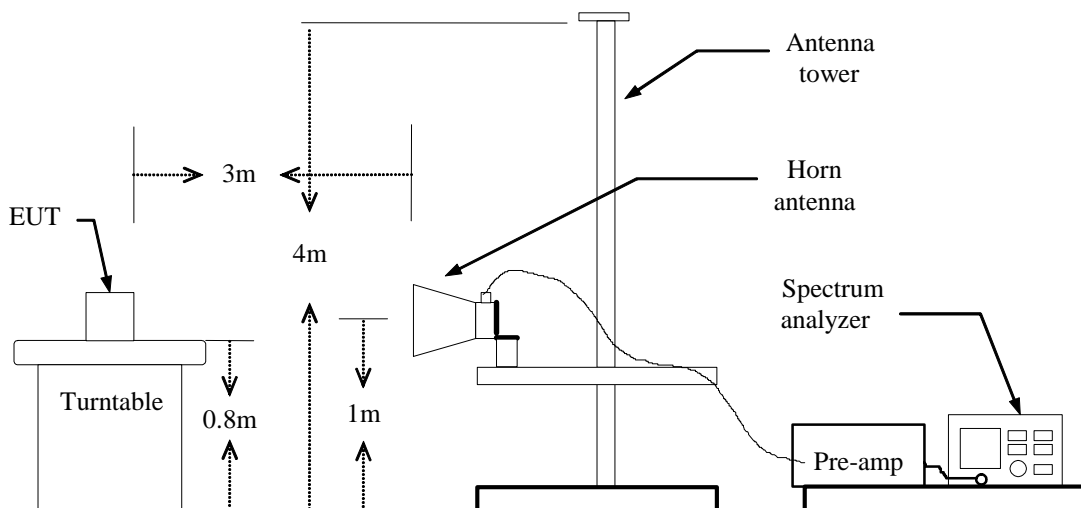
Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration

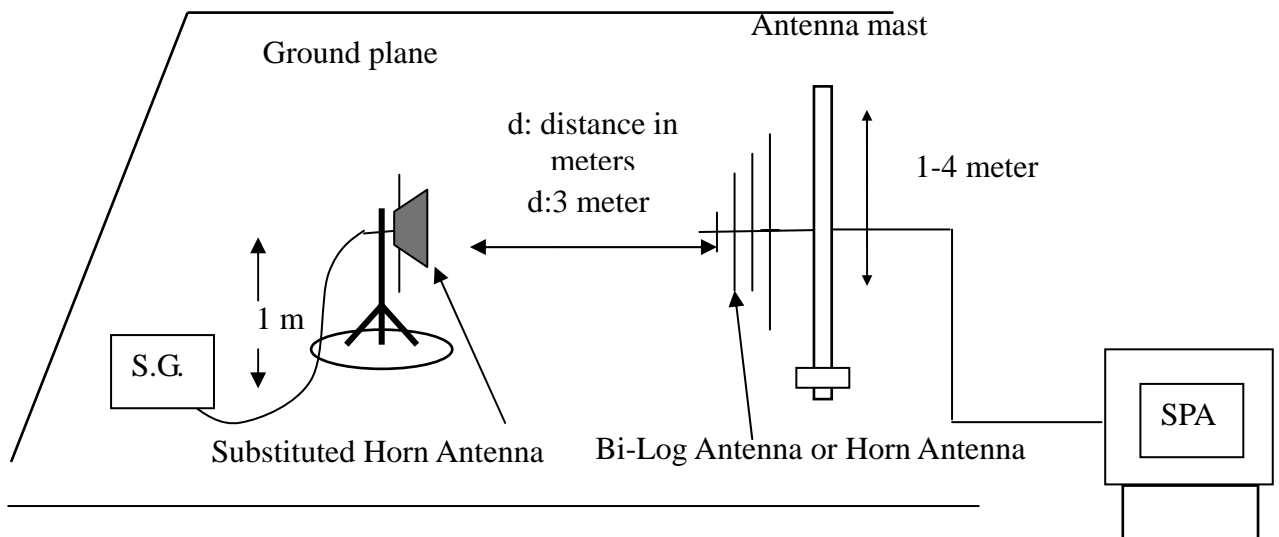
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up





TEST PROCEDURE

The EUT was placed on a non-conductive, the measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

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

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

$ERP = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable (dB)}$

$EIRP = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$

TEST RESULTS

Refer to the attached tabular data sheets.



Radiated Spurious Emission Measurement Result

Below 1GHz

No emissions to be recorded.

(Since no specific emission noted beyond the background noise floor)

Above 1GHz

Operation Mode: GSM 1900 / TX / CH 512

Test Date: Oct. 18, 2005

Temperature: 25°C

Tested by: Spring

Humidity: 55 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3760.00	38.01	V	-76.16	2.18	13.40	-64.93	-13.00	-51.93
5640.00	37.82	V	-72.74	2.36	14.35	-60.76	-13.00	-47.76
7520.00	36.86	V	-70.74	2.55	15.29	-58.01	-13.00	-45.01
		V					-13.00	
		V					-13.00	
		V					-13.00	
3760.00	37.37	H	-76.86	2.18	13.40	-65.64	-13.00	-52.64
5640.00	37.10	H	-73.46	2.36	14.34	-61.49	-13.00	-48.49
7520.00	37.99	H	-69.61	2.55	15.29	-56.88	-13.00	-43.88
		H					-13.00	
		H					-13.00	
		H					-13.00	

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
5. Spectrum setting:
 - a. Peak Setting 1GHz to 10th harmonics of fundamental, RBW = 1MHz, VBW = 1MHz, Sweep time = Auto.
 - b. AV Setting 1GHz to 10th harmonics of fundamental, RBW = 1MHz, VBW = 10Hz, Sweep time = Auto.



Operation Mode: GSM 1900 / TX / CH 661

Test Date: Oct. 18, 2005

Temperature: 25°C

Tested by: Spring

Humidity: 55 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3760.00	44.97	V	-72.77	2.18	13.40	-61.55	-13.00	--48.55
5640.00	39.38	V	-77.44	2.36	14.35	-65.45	-13.00	-52.45
7520.00	38.68	V	-74.43	2.55	15.29	-61.69	-13.00	-48.69
		V					-13.00	
		V					-13.00	
		V					-13.00	
3760.00	39.07	H	-75.16	2.18	13.40	-63.94	-13.00	-50.94
5640.00	37.61	H	-71.86	2.45	14.79	-59.53	-13.00	-46.53
7520.00	37.28	H	-70.32	2.55	15.29	-57.59	-13.00	-44.59
		H					-13.00	
		H					-13.00	
		H					-13.00	

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
5. Spectrum setting:
 - a. Peak Setting 1GHz to 10th harmonics of fundamental, RBW = 1MHz, VBW = 1MHz, Sweep time = Auto.
 - b. AV Setting 1GHz to 10th harmonics of fundamental, RBW = 1MHz, VBW = 10Hz, Sweep time = Auto.



Operation Mode: GSM 1900 / TX / CH 810

Test Date: Oct. 18, 2005

Temperature: 25°C

Tested by: Spring

Humidity: 55 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading level (dBuV)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)
3762.00	38.06	V	-76.16	2.19	13.47	-64.88	-13.00	-51.88
5640.00	36.93	V	-73.84	2.33	14.17	-62.01	-13.00	-49.01
7526.89	37.28	V	-71.40	2.57	15.36	-58.61	-13.00	-45.61
		V					-13.00	
		V					-13.00	
		V					-13.00	
3760.00	37.70	H	-76.58	2.18	13.40	-65.36	-13.00	-52.36
5640.00	37.93	H	72.99	2.36	14.34	-61.01	-13.00	-48.01
7520.00	38.17	H	-69.50	2.55	15.29	-56.76	-13.00	-43.76
		H					-13.00	
		H					-13.00	
		H					-13.00	

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
5. Spectrum setting:
 - a. Peak Setting 1GHz to 10th harmonics of fundamental, RBW = 1MHz, VBW = 1MHz, Sweep time = Auto.
 - b. AV Setting 1GHz to 10th harmonics of fundamental, RBW = 1MHz, VBW = 10Hz, Sweep time = Auto.

7.6 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §24.235.

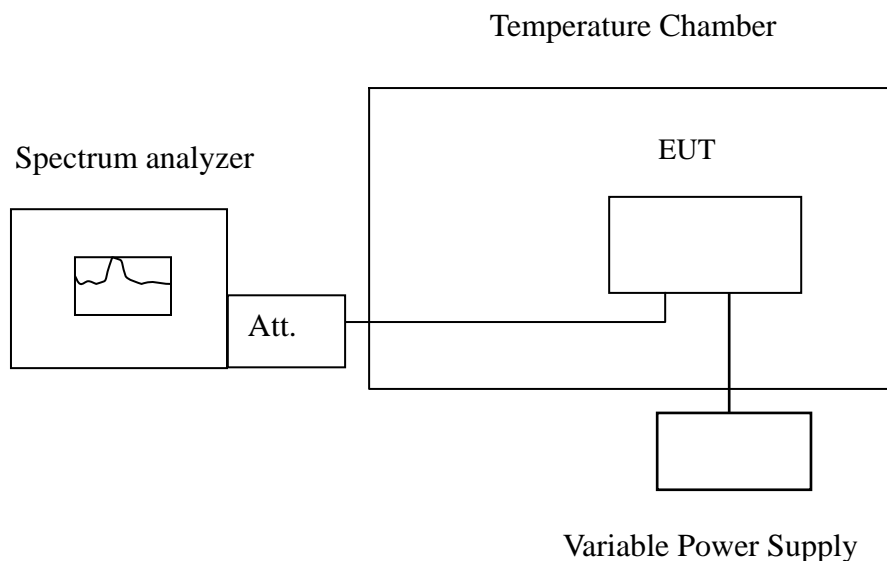
Frequency Tolerance: ± 2.5 ppm

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
DC POWER SUPPLY	GW instek	GPS-3303C	E903131	04/15/2006
Spectrum Analyzer	Agilent	E4446A	MY44020154	03/05/2006
Wireless communication test set	Agilent	8960	QB44051695	07/29/2006
Temp. / Humidity Chamber	Kingson	THS-M1	242	05/26/2006

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



Remark: Measurement setup for testing on Antenna connector



TEST PROCEDURE

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

TEST RESULTS

No non-compliance noted.

Reference Frequency: GSM Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	PPM	Limit
3.7	50	1879999890	-0.06	± 2.5 ppm
	40	1879999920	-0.04	
	30	1879999961	-0.02	
	20	1879999942	-0.03	
	10	1879999951	-0.03	
	0	1880000096	0.05	
	-10	1880000075	0.04	
	-20	1880000182	0.10	
	-30	1880000284	0.15	

7.7 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §24.235,

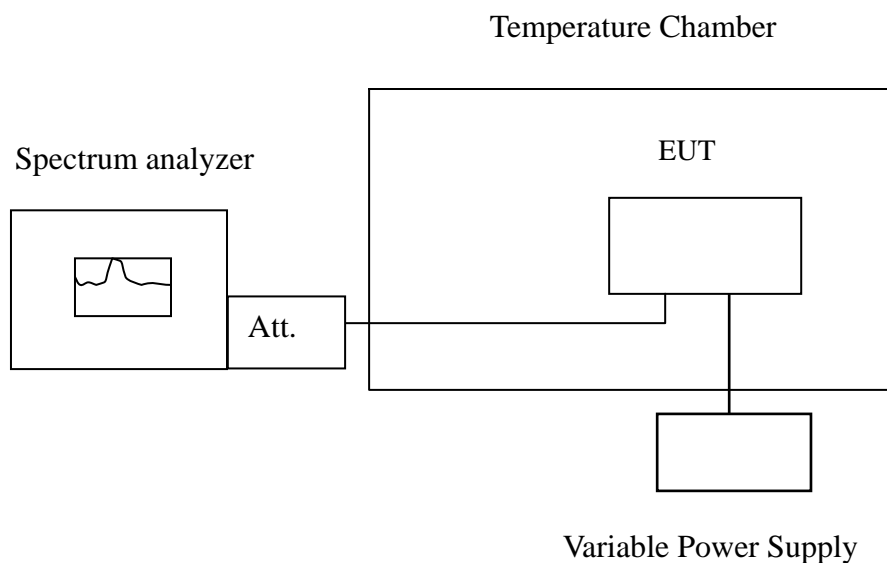
Frequency Tolerance: ± 2.5 ppm.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
DC POWER SUPPLY	GW instek	GPS-3303C	E903131	04/15/2006
Spectrum Analyzer	Agilent	E4446A	MY44020154	03/05/2006
Wireless communication test set	Agilent	8960	QB44051695	07/29/2006
Temp. / Humidity Chamber	Kingson	THS-M1	242	05/26/2006

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration



Remark: Measurement setup for testing on Antenna connector.



TEST PROCEDURE

Set chamber temperature to 20°C. 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 ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

No non-compliance noted.

Reference Frequency: GSM Mid Channel 1880 MHz @ 20°C				
Limit: ± 2.5 ppm				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	PPM	Limit
4.3	20	1880000026	0.01	± 2.5 ppm
3.7		1879999942	-0.03	
3.45 (End Point)		1879999954	-0.02	

Note: Battery end point:3.45Vdc.

7.8 POWERLINE CONDUCTED EMISSIONS

LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

MEASUREMENT EQUIPMENT USED

Conducted Emission Test Site CE (2)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESI26	100068	02/11/2006
EMI Receiver	SCHAFFNER	SCR3501	343	02/25/2006
LISN(EUT)	SCHAFFNER	NNB42	2001/001	07/29/2006
V-LISN	Schwarzbeck	NNLK 8129	143	07/29/2006
Wireless communication test set	Agilent	8960	QB44051695	07/29/2006

Remark: Each piece of equipment is scheduled for calibration once a year.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete..



TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Operation Mode: GSM 1900 /LINK/ CH 810 **Test Date:** Oct. 18, 2005
Temperature: 25°C **Tested by:** Spring
Humidity: 55 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	PEAK. Raw (dBuV)	Q.P. Raw (dBuV)	AVG Raw (dBuV)	Q.P. Limit (dBuV)	AVG Limit (dBuV)	Margin (dB)	Factor (dB)	Remark
0.230	42.35	36.20	36.27	63.71	53.71	-17.44	10.37	L1
0.400	46.89	33.30	33.12	58.86	48.86	-15.74	10.41	L1
0.870	46.12	19.93	31.96	56.00	46.00	-14.04	10.42	L1
1.385	42.16	31.34	33.88	56.00	46.00	-12.12	10.46	L1
2.140	43.45	34.95	34.46	56.00	46.00	-11.54	10.52	L1
2.605	43.53	15.45	29.50	56.00	46.00	-16.50	10.55	L1
3.235	42.94	29.15	29.94	56.00	46.00	-16.06	10.59	L1
3.815	41.90	27.69	29.10	56.00	46.00	-16.90	10.62	L1
0.230	37.80	31.40	31.38	63.71	53.71	-15.91	10.39	L2
0.290	39.70	33.64	33.67	62.00	52.00	-12.30	10.40	L2
0.405	40.81	37.95	37.38	58.71	48.71	-7.90	10.40	L2
0.865	40.00	34.57	33.11	56.00	46.00	-6.00	10.41	L2
1.210	40.30	24.85	24.06	56.00	46.00	-5.70	10.44	L2
2.365	42.82	28.48	28.09	56.00	46.00	-3.18	10.52	L2
3.400	37.94	25.05	23.72	56.00	46.00	-8.06	10.60	L2

L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

Remark:

1. The measuring frequencies range between 0.15 MHz and 30 MHz.
2. The emissions measured in the frequency range between 0.15 MHz and 30MHz were made with an instrument using Quasi-peak detector and Average detector.
3. "---" denotes the emission level was or more than 2dB below the Average limit, and no re-check was made.
4. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10KHz. The IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz.

Note:

Freq. = Emission frequency in KHz



Factor (dB) = cable loss + Insertion loss of LISN+ Insertion loss of TRANSIENT LIMITER (The TRANSIENT LIMITER included 10 dB ATTENUATION)

Amptd dBuV = Uncorrected Analyzer/Receiver reading + cable loss + Insertion loss of LISN+ Insertion loss of TRANSIENT LIMITER, if it > 0.5 dB

Limit dBuV = Limit stated in standard

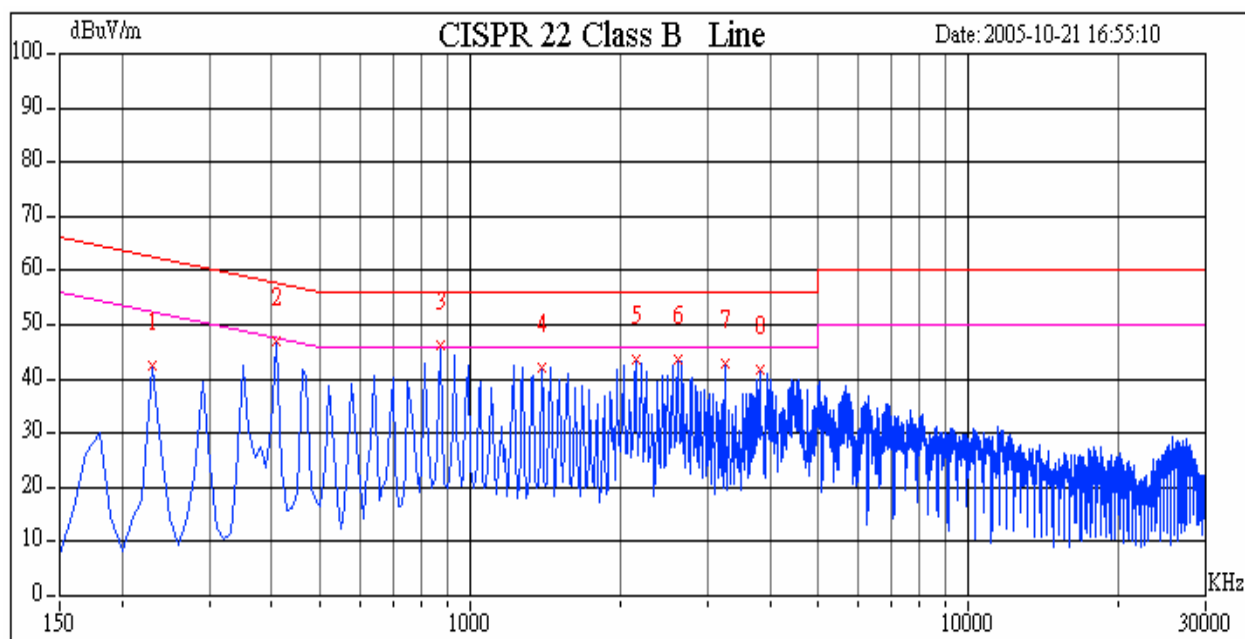
Margin dB = Reading in reference to limit

Calculation Formula

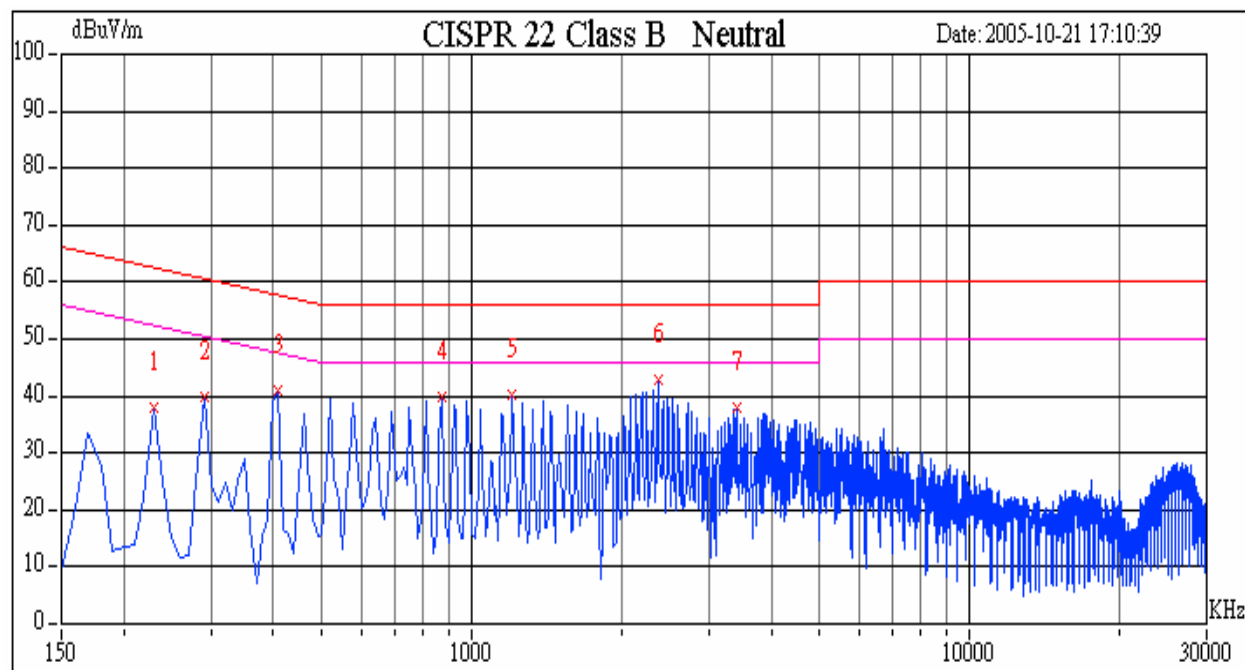
Margin (dB) = Amptd (dBuV) – Limit (dBuV)

Test Plots

Conducted emissions (Line 1)

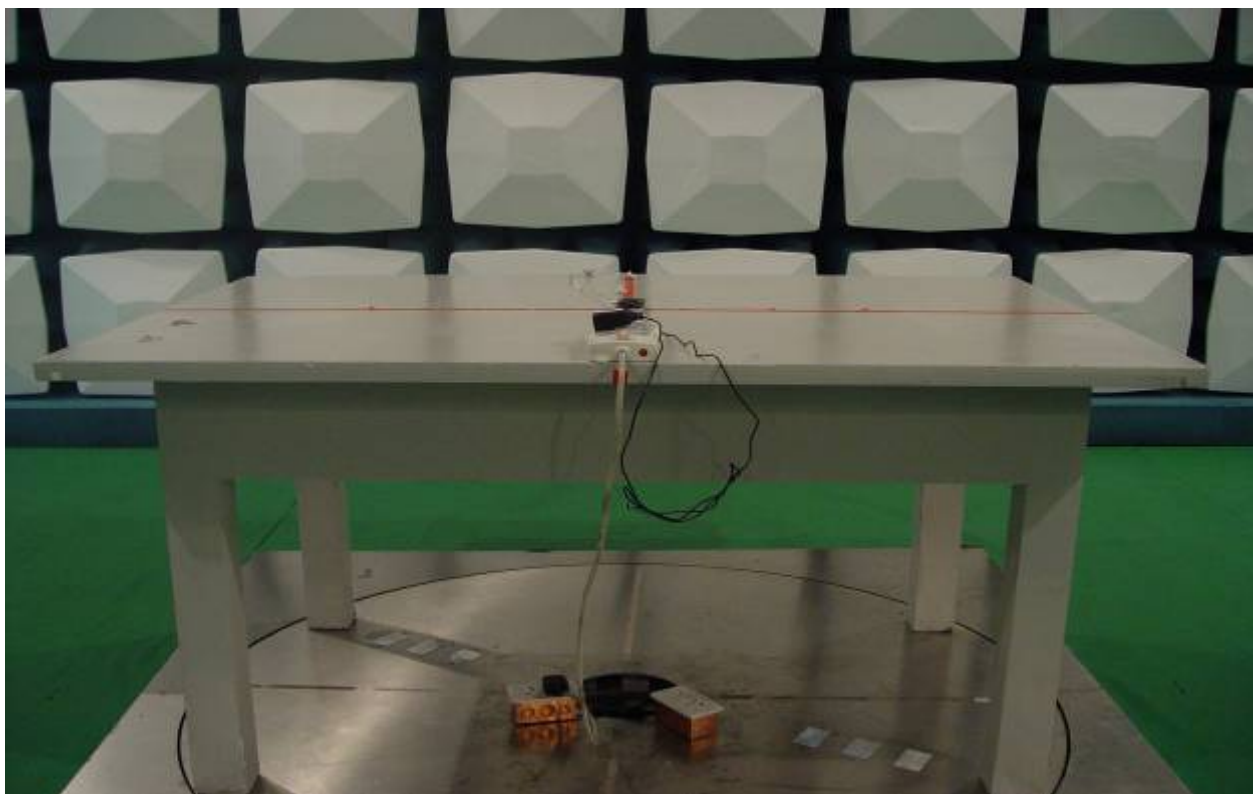
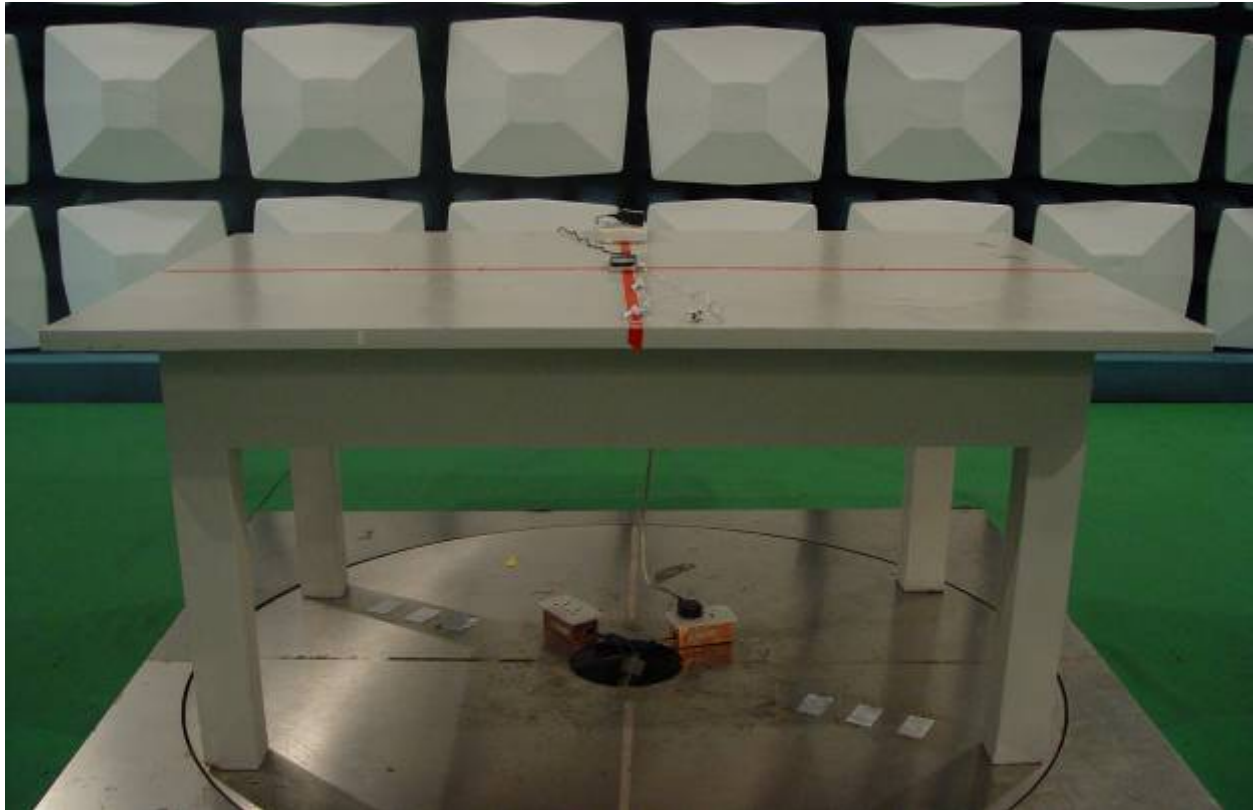


Conducted emissions (Line 2)



APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Radiated Emission Setup Photos



Conducted Emission Setup Photos

