FCC 47 CFR PART 24 SUBPART E

TEST REPORT

For

Tri-band Mobile Phone

Model: CL75

Trade Name: Siemens

Issued to

SIEMENS Limited
8F, No. 19-13, Sanchoung Rd., Nan Gang District,
Taipei, 115 Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang,
Taoyuan Hsien, (338) Taiwan, R.O.C.
TEL: 886-3-324-0332
FAX: 886-3-324-5235

CNLA
0363
ILAC MRA

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION

Applicant: SIEMENS Limited
8F, No. 19-13, Sanchoung Rd., Nan Gang District,
Taipei, 115 Taiwan, R.O.C.

Equipment Under Test: Tri-band Mobile Phone

Trade Name: Siemens

Model Number: CL75

Date of Test: February 24 ~ March 2, 2005

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

We hereby certify that:

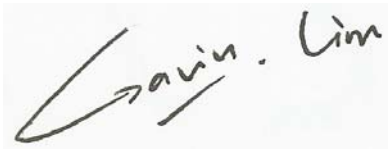
The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-A-2001 and the energy emitted by the sample EUT tested as described 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:

Harris W. Lai
Executive Vice President
Compliance Certification Services Inc.

Reviewed by:



Gavin Lim
Section Manager
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Tri-band Mobile Phone
Trade Name	Siemens
Model Number	CL75
Model Discrepancy	N/A
Power Supply	Model Number: T45/E IP40 I/P: AC 100-240, 50-60Hz, 100mA, O/P: DC 5V, 620mA
Frequency Range	TX: 1850 MHz – 1910 MHz RX: 1930 MHz – 1989.8 MHz
Transmit Power	29.60 dBm (Max)
Cellular Phone Protocol	GSM (PCS), GPRS
Type of Emission	247KGXW--
Antenna Gain	1 dBi
Antenna Type	Embedded Antenna

Remark: *This submittal(s) (test report) is intended for FCC ID: PWX-CL75 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 max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4.

3.4 DESCRIPTION OF TEST MODES

The EUT can work on either charging mode or earphone mode. After pretest, EUT work on charging mode was chose as the worst configuration for final testing. All the test modes are listed as below.

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

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

☒ No. 81-1, Lane 210, Bade Rd. 2, Luchu Hsiang, Taoyuan Hsien, Taiwan, R.O.C.

☐ No. 199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

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: 200600-0 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 55011, EN 55014-1, AS/NZS 1044, CNS 13783-1, EN 55022, CNS 13438, EN 61000-3-2, EN 61000-3-3, ANSI C63.4, FCC OST/MP-5, AS/NZS CISPR 22, 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	NVLAP 200600-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	FC 93105, 90471
Japan	VCCI	4 3/10 meter Open Area Test Sites to perform conducted/radiated measurements	VCCI R-393/1066/725/879 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328-2, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	N ELA 124a ELA 124b ELA 124c
Taiwan	CNLA	EN 300 328-1/2, EN 300 220-1/2/3, EN 300 440-1/2, EN 61000-3-2, EN 61000-3-3, 47 CFR FCC Part 15 Subpart C/D/E, EN 55013, CNS 13439, EN 55014-1, CNS 13783-1, EN 55022, CNS 13438, CISPR 22, AS/NZS 3548, EN 61000-4-2/3/4/5/6/8/11, ENV 50204, IEEE Std 1528, FCC OET Bulletin, 65+Supplement C, EN50360, EN50361, EN50371, RSS102	CNLA 0363 ILAC MRA
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	SL2-IS-E-0014 SL2-IN-E-0014 SL2-A1-E-0014 SL2-R1-E-0014 SL2-R2-E-0014 SL2-L1-E-0014
Canada	Industry Canada	RSS212, Issue 1	Canada IC 3991-3 IC 3991-4

** 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 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	FCC ID	Series No.	Data Cable	Power Cord
	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Remark:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

7. FCC PART 24 REQUIREMENTS

7.1 PEAK POWER

LIMIT

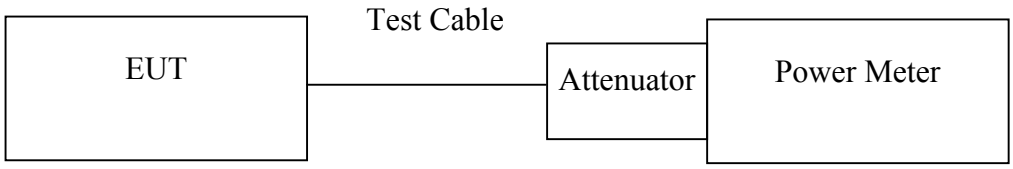
According to FCC §2.1046.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Agilant	E4416A	GB41291611	06/01/2005
Power Sensor	Agilant	E9327A	VS40441097	03/15/2005
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

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)	Attenuator (dB)	Average Power (dBm)
GSM 1900	512	1850.20	23.90	5.20	29.10
	661	1880.00	23.50		28.70
	810	1910.00	24.40		29.60
GPRS 1900 (Class 10)	512	1850.20	23.90		29.10
	661	1880.00	23.50		28.70
	810	1910.00	24.40		29.60

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

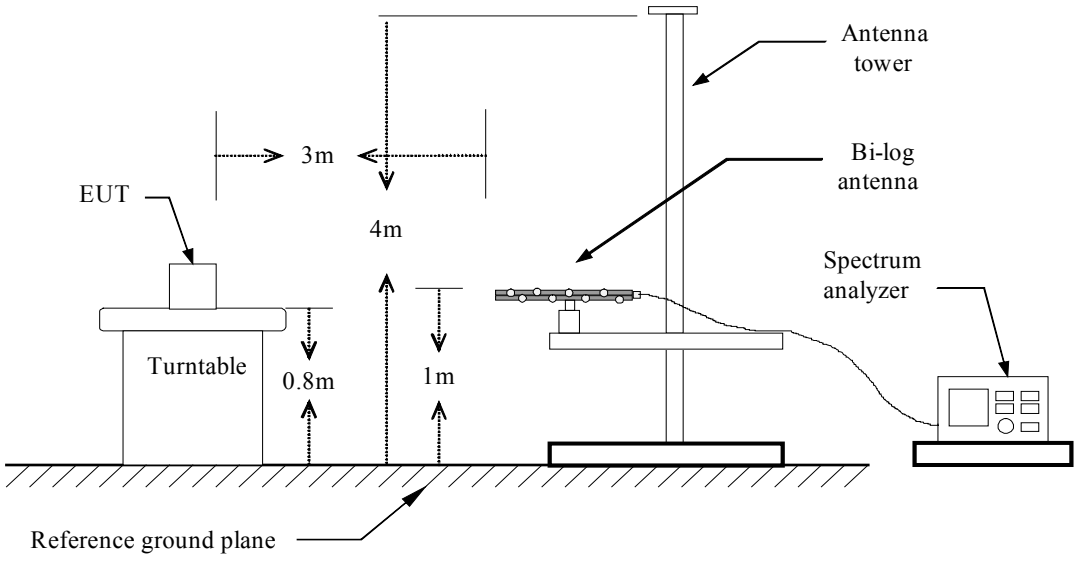
FCC 24.232(b): The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

MEASUREMENT EQUIPMENT USED

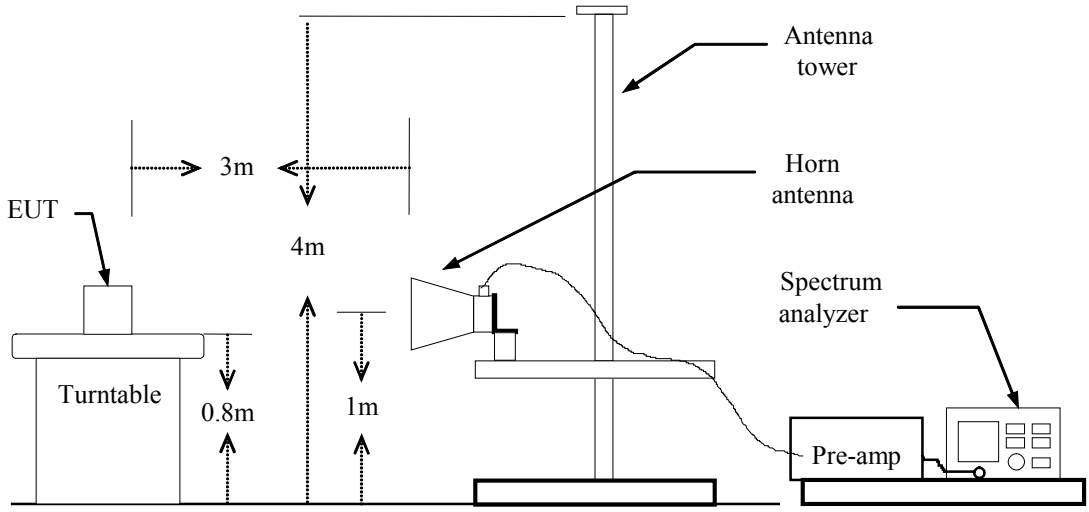
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006
Spectrum Analyzer	R&S	FSP30	100112	08/03/2005
Pre-Amplifier	HP	8447D	2944A09173	03/03/2005
Horn antenna	EMCO	3115	00022250	02/26/2006
Pre-Amplifier	HP	8449B	3008B00965	10/02/2005
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R
Site NSA	C&C	N/A	N/A	09/06/2005
S.G.	HP	83630B	3844A01022	01/14/2006
Substituted Horn	EMCO	3115	00022256	02/26/2006

TEST CONFIGURATION

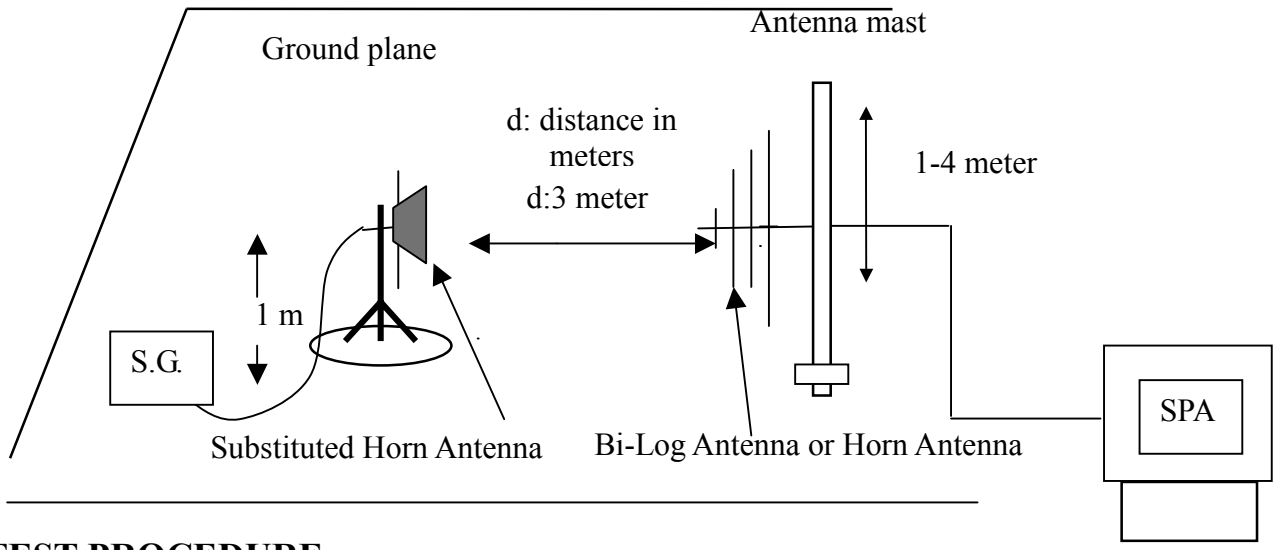
Below 1 GHz



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.

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

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable (dB)
EIRP = S.G. output (dBm) + Antenna Gain (dBi) – 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)
X	512	1850.20	121.67	V	18.28	4.49	8.45	22.24	33.00	-10.76
		1850.20	130.50	H	27.61	4.49	8.45	31.57	33.00	-1.43
	661	1880.00	123.33	V	20.11	4.53	8.48	24.06	33.00	-8.94
		1880.00	130.83	H	28.11	4.53	8.48	32.06	33.00	-0.94
	810	1909.80	123.17	V	20.07	4.55	8.50	24.01	33.00	-8.99
		1909.80	130.17	H	27.57	4.55	8.50	31.51	33.00	-1.49
Y	512	1850.20	124.00	V	20.61	4.49	8.45	24.57	33.00	-8.43
		1850.20	130.67	H	27.78	4.49	8.45	31.74	33.00	-1.26
	661	1880.00	123.17	V	19.95	4.53	8.48	23.90	33.00	-9.10
		1880.00	130.00	H	27.28	4.53	8.48	31.23	33.00	-1.77
	810	1909.80	124.17	V	21.07	4.55	8.50	25.01	33.00	-7.99
		1909.80	129.83	H	27.23	4.55	8.50	31.17	33.00	-1.83
Z	512	1850.20	130.50	V	27.11	4.49	8.45	31.07	33.00	-1.93
		1850.20	122.17	H	19.28	4.49	8.45	23.24	33.00	-9.76
	661	1880.00	129.17	V	25.95	4.53	8.48	29.90	33.00	-3.10
		1880.00	122.00	H	19.28	4.53	8.48	23.23	33.00	-9.77
	810	1909.80	130.00	V	26.90	4.55	8.50	30.84	33.00	-2.16
		1909.80	122.17	H	19.57	4.55	8.50	23.51	33.00	-9.49

GPRS 1900 Test Data (Class 10)

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)
X	512	1850.20	120.83	V	17.44	4.49	8.45	21.40	33.00	-11.60
		1850.20	130.00	H	27.11	4.49	8.45	31.07	33.00	-1.93
	661	1880.00	122.17	V	18.95	4.53	8.48	22.90	33.00	-10.10
		1880.00	130.67	H	27.95	4.53	8.48	31.90	33.00	-1.10
	810	1909.80	122.50	V	19.40	4.55	8.50	23.34	33.00	-9.66
		1909.80	130.17	H	27.57	4.55	8.50	31.51	33.00	-1.49
Y	512	1850.20	131.00	V	27.61	4.49	8.45	31.57	33.00	-1.43
		1850.20	130.83	H	27.94	4.49	8.45	31.90	33.00	-1.10
	661	1880.00	130.33	V	27.11	4.53	8.48	31.06	33.00	-1.94
		1880.00	130.00	H	27.28	4.53	8.48	31.23	33.00	-1.77
	810	1909.80	129.83	V	26.73	4.55	8.50	30.67	33.00	-2.33
		1909.80	129.83	H	27.23	4.55	8.50	31.17	33.00	-1.83
Z	512	1850.20	130.50	V	27.11	4.49	8.45	31.07	33.00	-1.93
		1850.20	122.33	H	19.44	4.49	8.45	23.40	33.00	-9.60
	661	1880.00	129.33	V	26.11	4.53	8.48	30.06	33.00	-2.94
		1880.00	121.67	H	18.95	4.53	8.48	22.90	33.00	-10.10
	810	1909.80	130.00	V	26.90	4.55	8.50	30.84	33.00	-2.16
		1909.80	122.00	H	19.40	4.55	8.50	23.34	33.00	-9.66

7.3 OCCUPIED BANDWIDTH MEASUREMENT

LIMIT

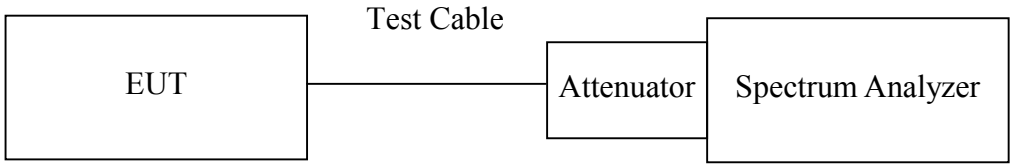
According to §FCC 2.1049.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006
Spectrum Analyzer	R&S	FSP30	100112	08/03/2005

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

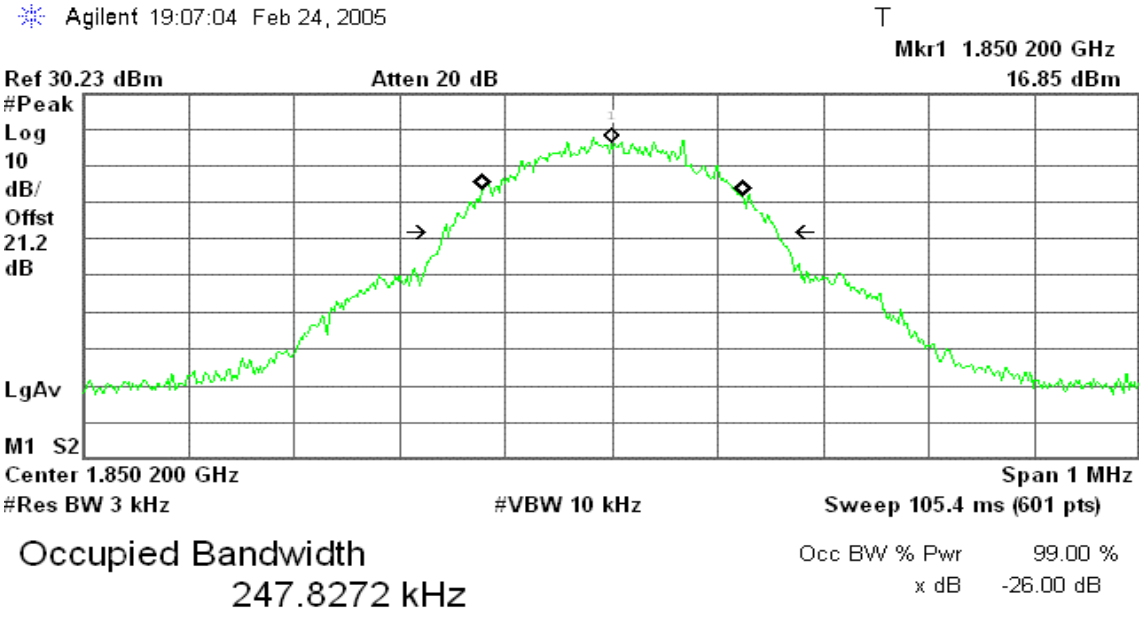
No non-compliance noted

Test Data

Test Mode	CH	Frequency (MHz)	Bandwidth (kHz)
GSM 1900	512	1850.20	247.8272
	661	1880.00	241.6870
	810	1909.80	246.2912
GPRS 1900 (Class 10)	512	1850.20	242.7624
	661	1880.00	242.6937
	810	1909.80	244.5790

Test Plot

GSM 1900 (CH Low)

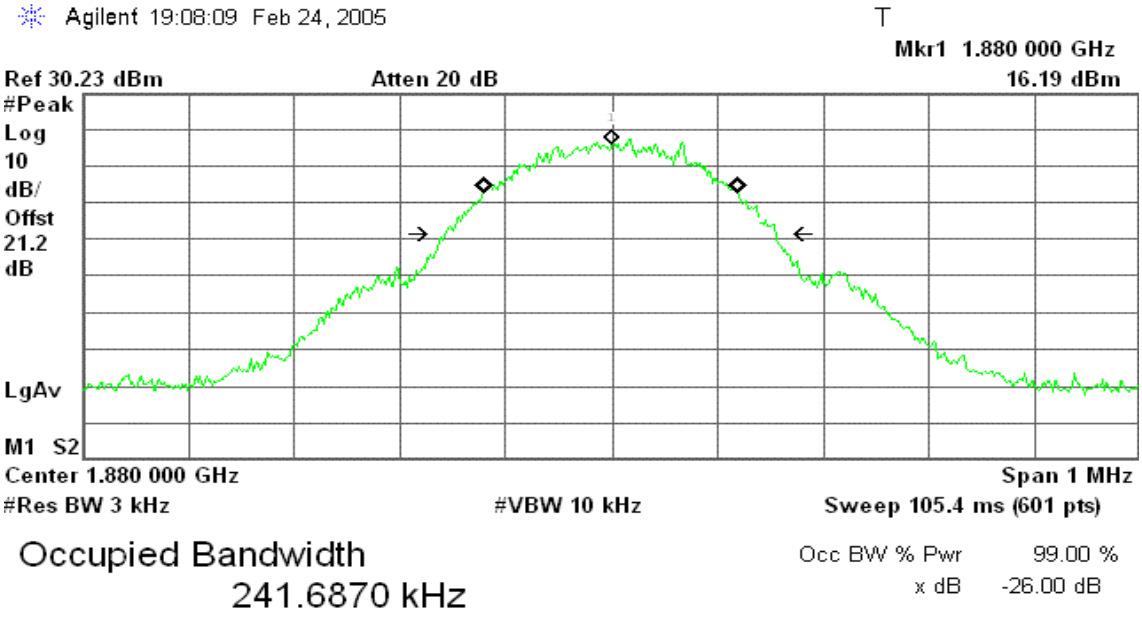


Occupied Bandwidth
247.8272 kHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 954.224 Hz
x dB Bandwidth 317.945 kHz

GSM 1900 (CH Mid)

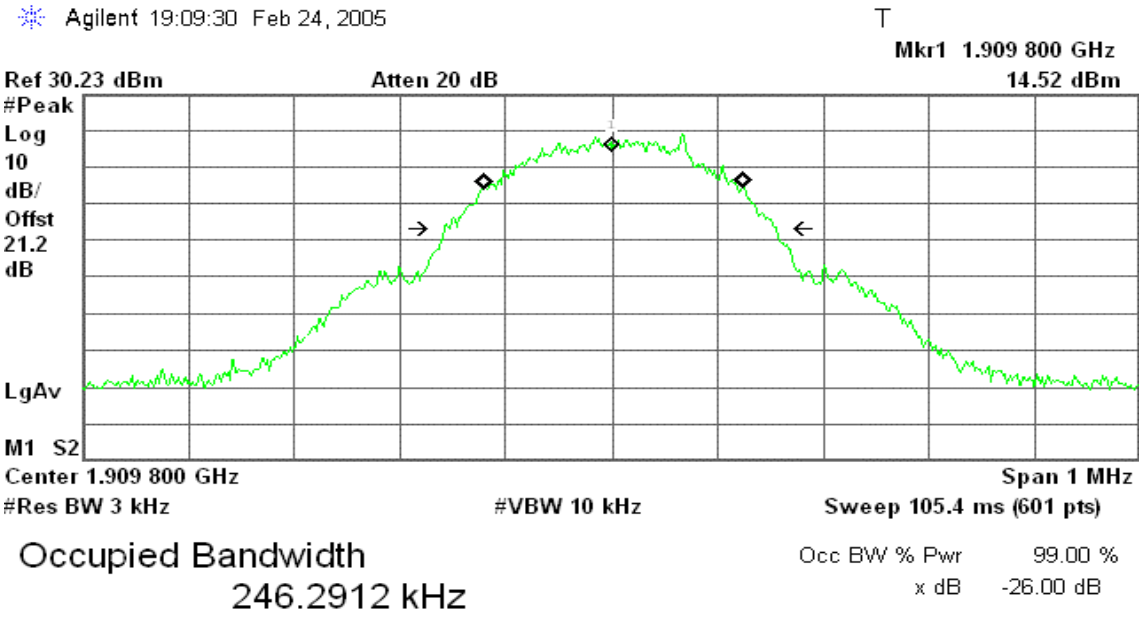


Occupied Bandwidth
241.6870 kHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error -543.521 Hz
x dB Bandwidth 314.522 kHz

GSM 1900 (CH High)

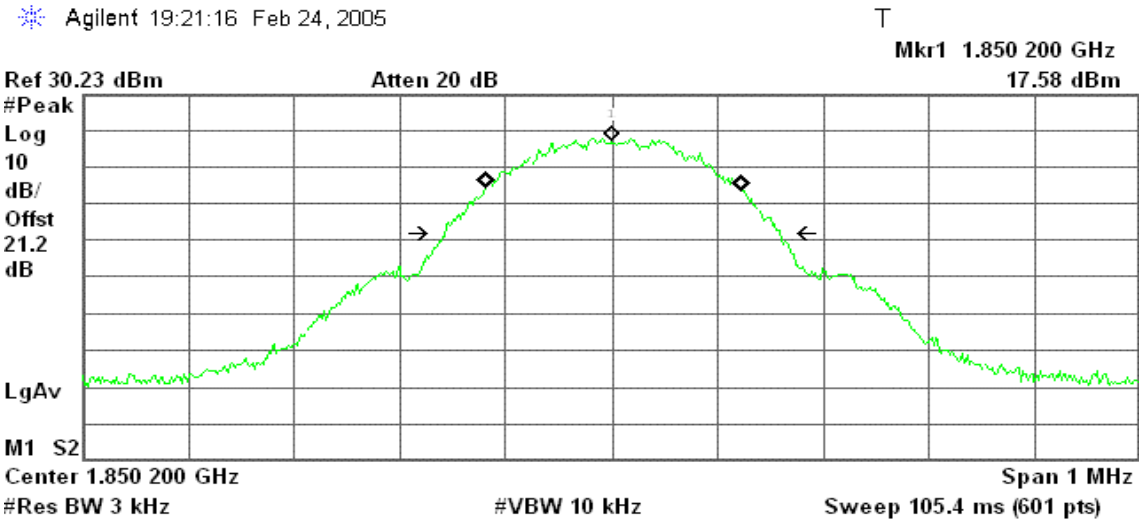


Occupied Bandwidth
246.2912 kHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 1.435 kHz
x dB Bandwidth 316.862 kHz

GPRS 1900 (CH Low)

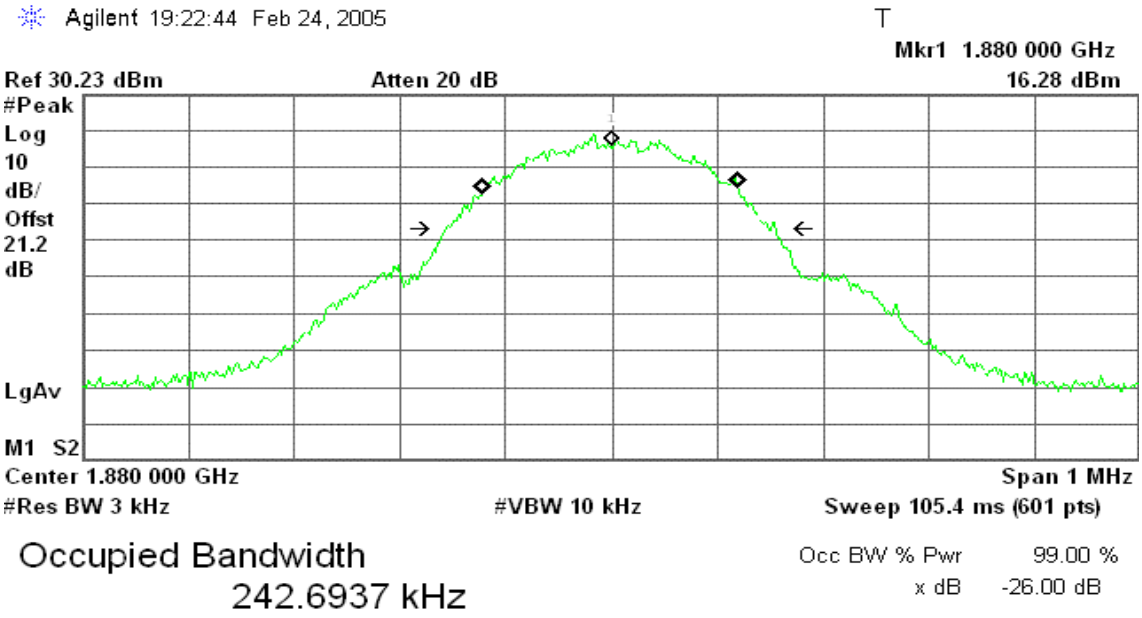


Occupied Bandwidth
242.7624 kHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error 1.477 kHz
x dB Bandwidth 319.059 kHz

GPRS 1900 (CH Mid)

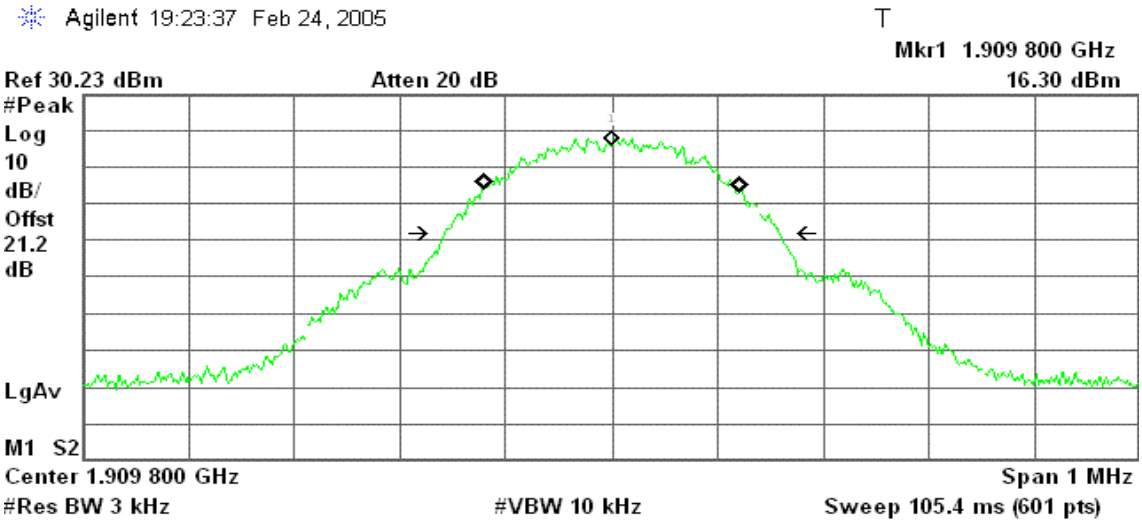


Occupied Bandwidth
242.6937 kHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error	-1.377 kHz
x dB Bandwidth	313.655 kHz

GPRS 1900 (CH High)



Occupied Bandwidth
244.5790 kHz

Occ BW % Pwr 99.00 %
x dB -26.00 dB

Transmit Freq Error	7.972 Hz
x dB Bandwidth	318.577 kHz

7.4 OUT OF BAND EMISSION AT ANTENNA TERMINALS

LIMIT

According to FCC §2.1051, FCC §2.2917(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 lease 43 + 10 log P dB.

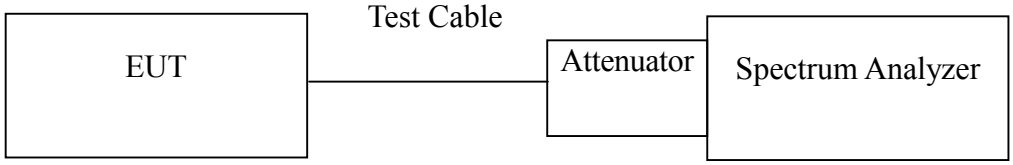
Band Edge Requirements: In the 1MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at lease 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the Out of band Emission

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006
Spectrum Analyzer	R&S	FSP30	100112	08/03/2005

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

Test Mode	CH	Location	Description
GSM 1900	512	Figure 7-1	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 7-2	Conducted spurious emissions, 2.5GHz - 20GHz
	661	Figure 7-3	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 7-4	Conducted spurious emissions, 2.5GHz - 20GHz
	810	Figure 7-5	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 7-6	Conducted spurious emissions, 2.5GHz - 20GHz
GPRS 1900 (Class 10)	512	Figure 7-7	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 7-8	Conducted spurious emissions, 2.5GHz - 20GHz
	661	Figure 7-9	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 7-10	Conducted spurious emissions, 2.5GHz - 20GHz
	810	Figure 7-11	Conducted spurious emissions, 30MHz - 2.5GHz
		Figure 7-12	Conducted spurious emissions, 2.5GHz - 20GHz

Test Mode	CH	Location	Description
GSM 1900	512	Figure 8-1	Band Edge emissions
	810	Figure 8-2	Band Edge emissions
GPRS 1900 (Class 10)	512	Figure 8-3	Band Edge emissions
	810	Figure 8-4	Band Edge emissions

Test Plot

GSM 1900

Figure 7-1: Out of Band emission at antenna terminals– GSM CH Low

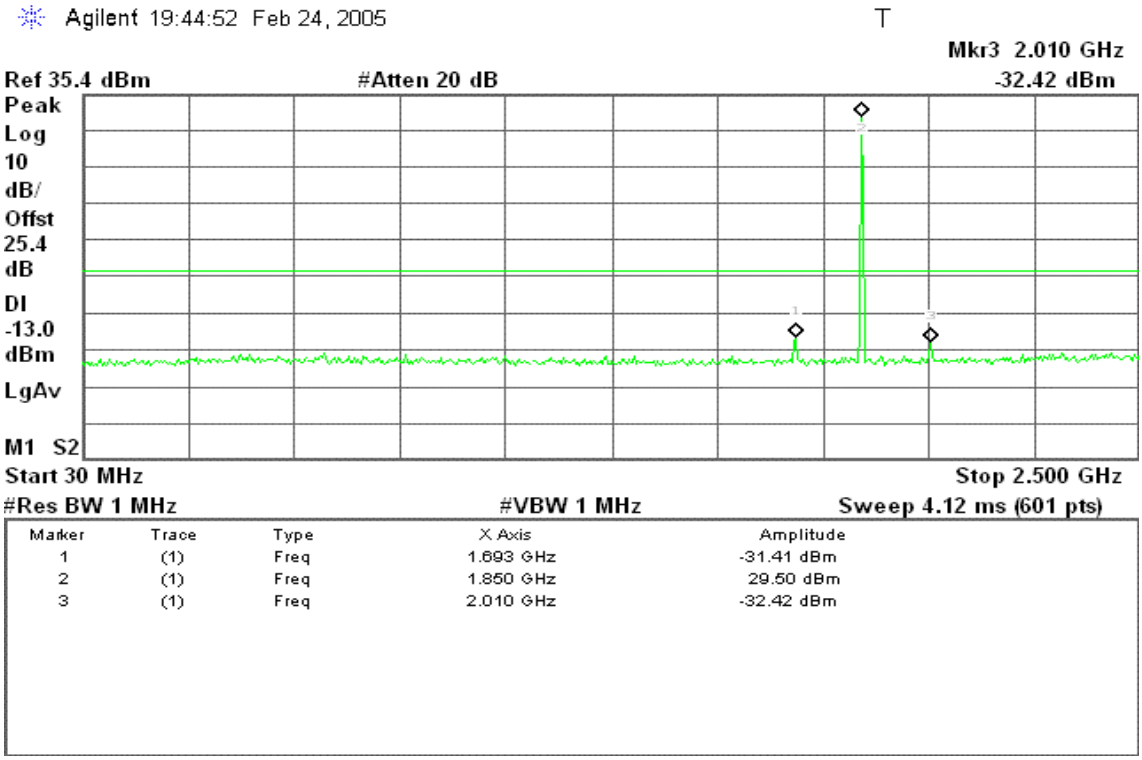


Figure 7-2: Out of Band emission at antenna terminals – GSM CH Low

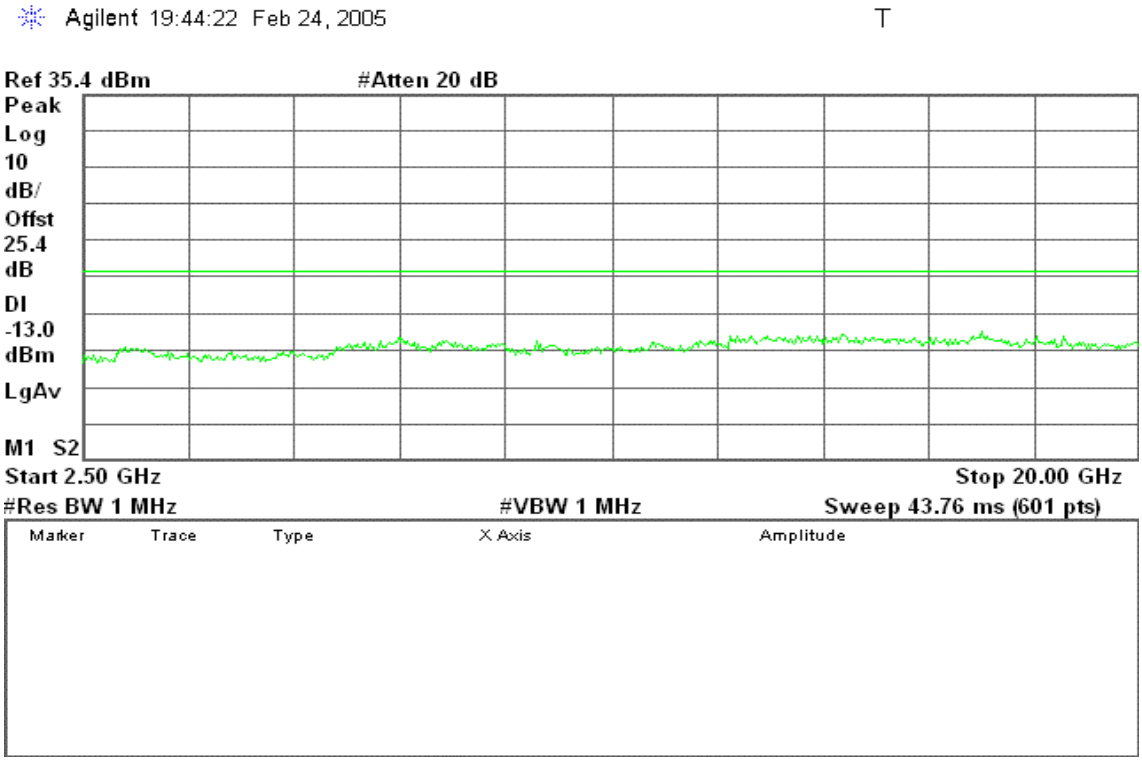


Figure 7-3: Out of Band emission at antenna terminals – GSM CH Mid

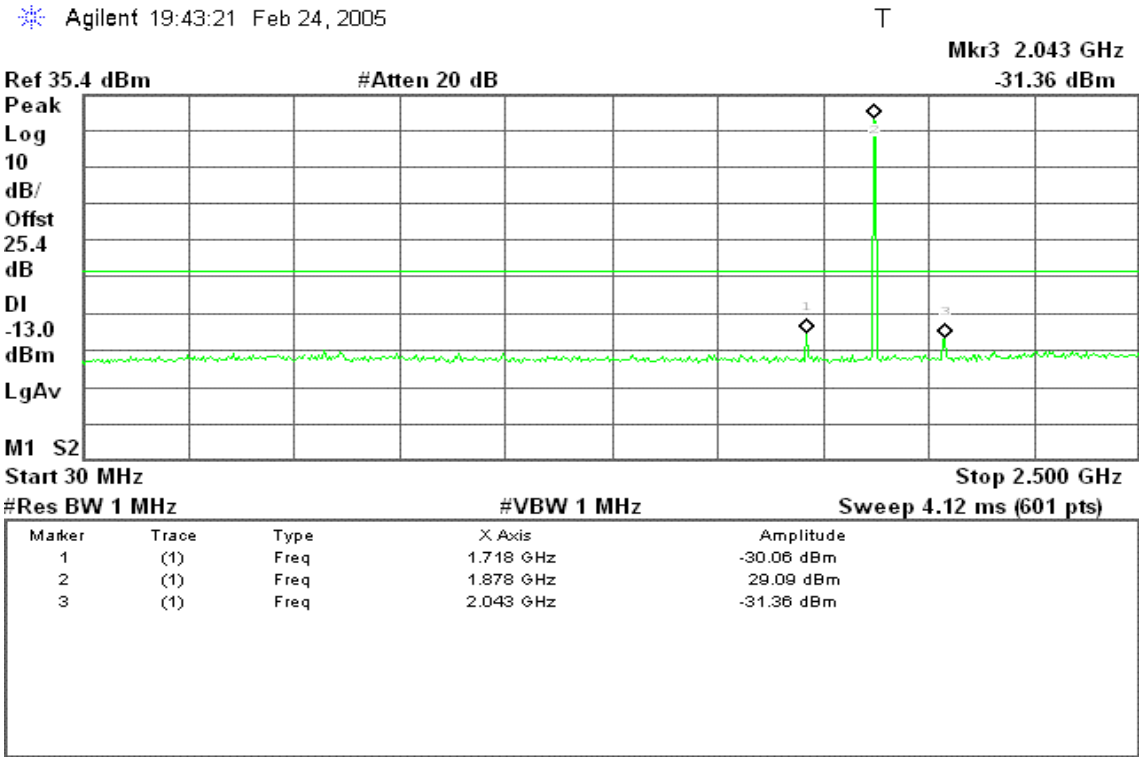


Figure 7-4: Out of Band emission at antenna terminals – GSM CH Mid

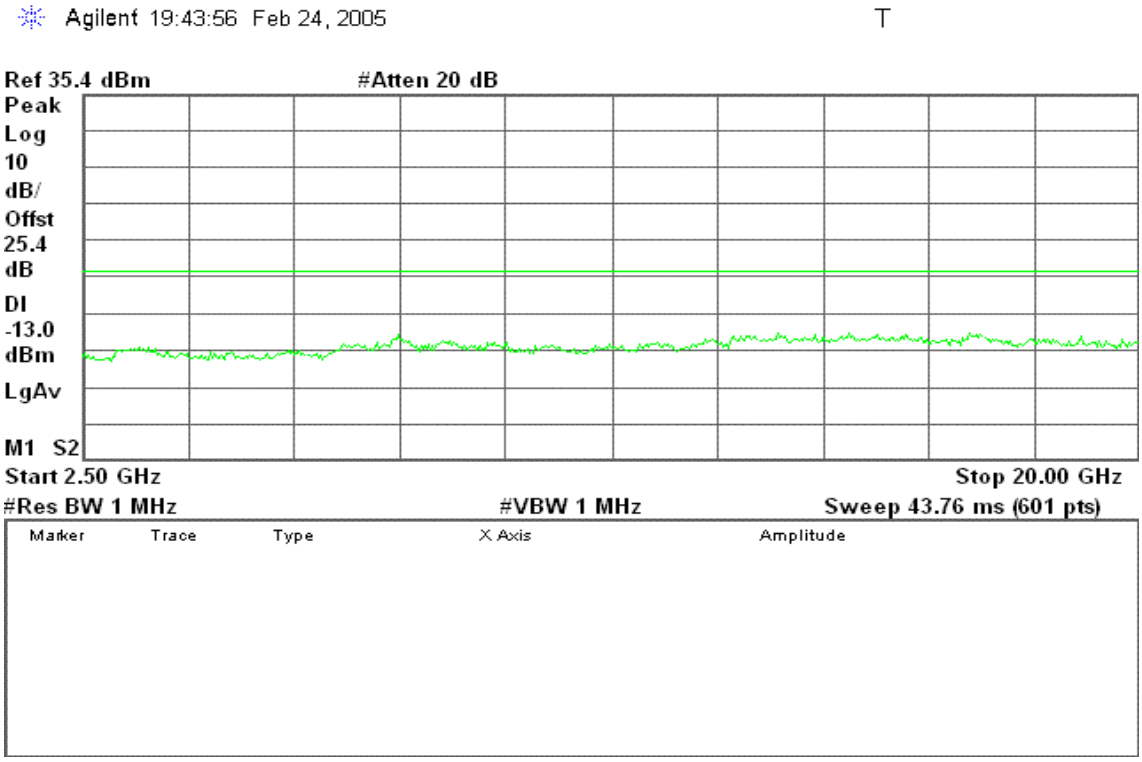


Figure 7-5: Out of Band emission at antenna terminals – GSM CH High

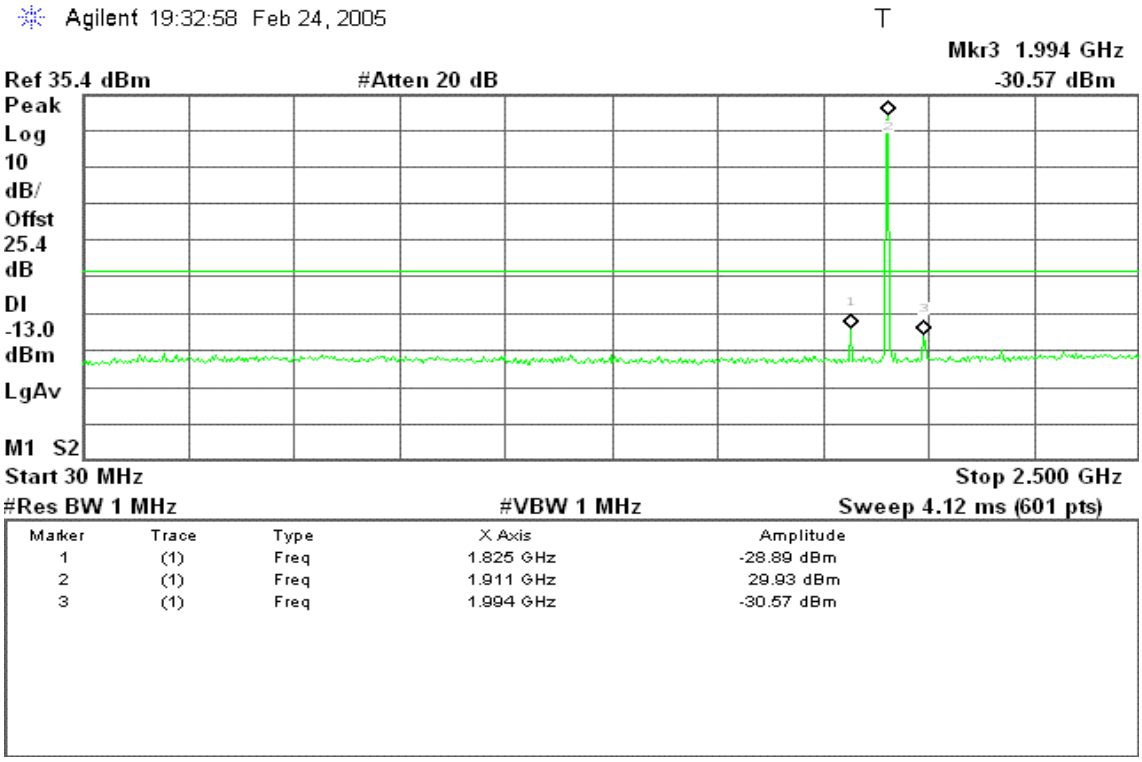
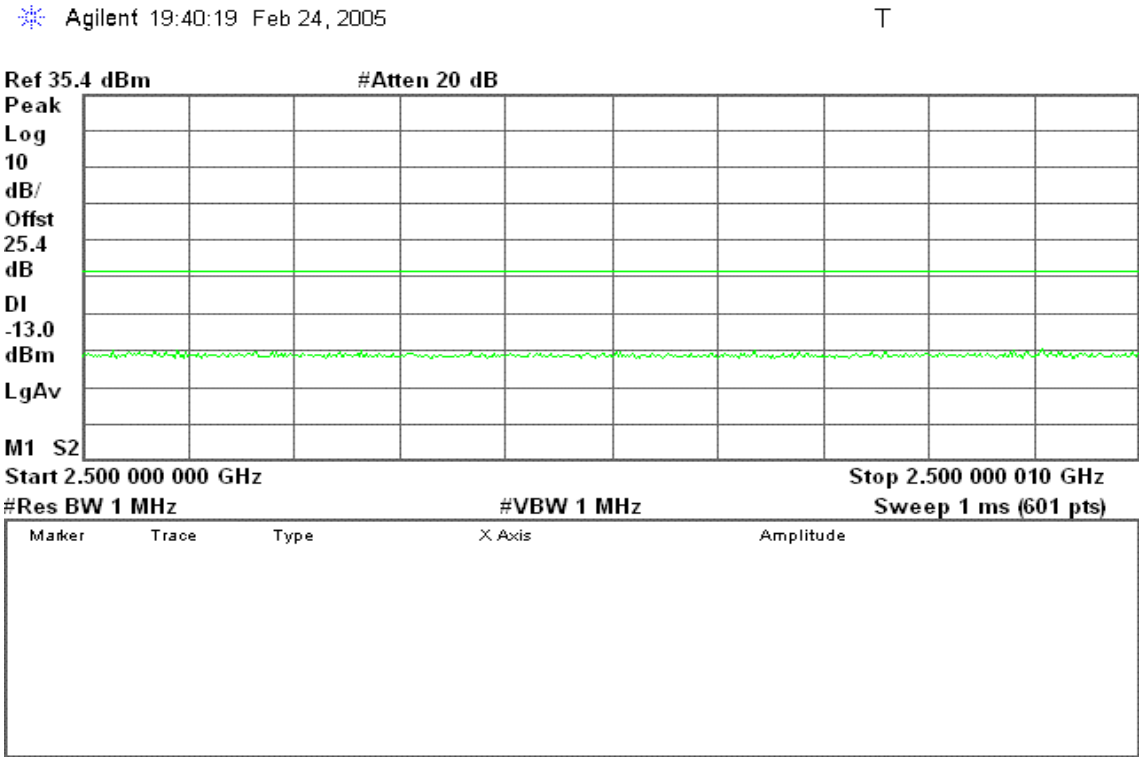


Figure 7-6: Out of Band emission at antenna terminals – GSM CH High



GPRS 1900

Figure 7-7: Out of Band emission at antenna terminals–GPRS CH Low

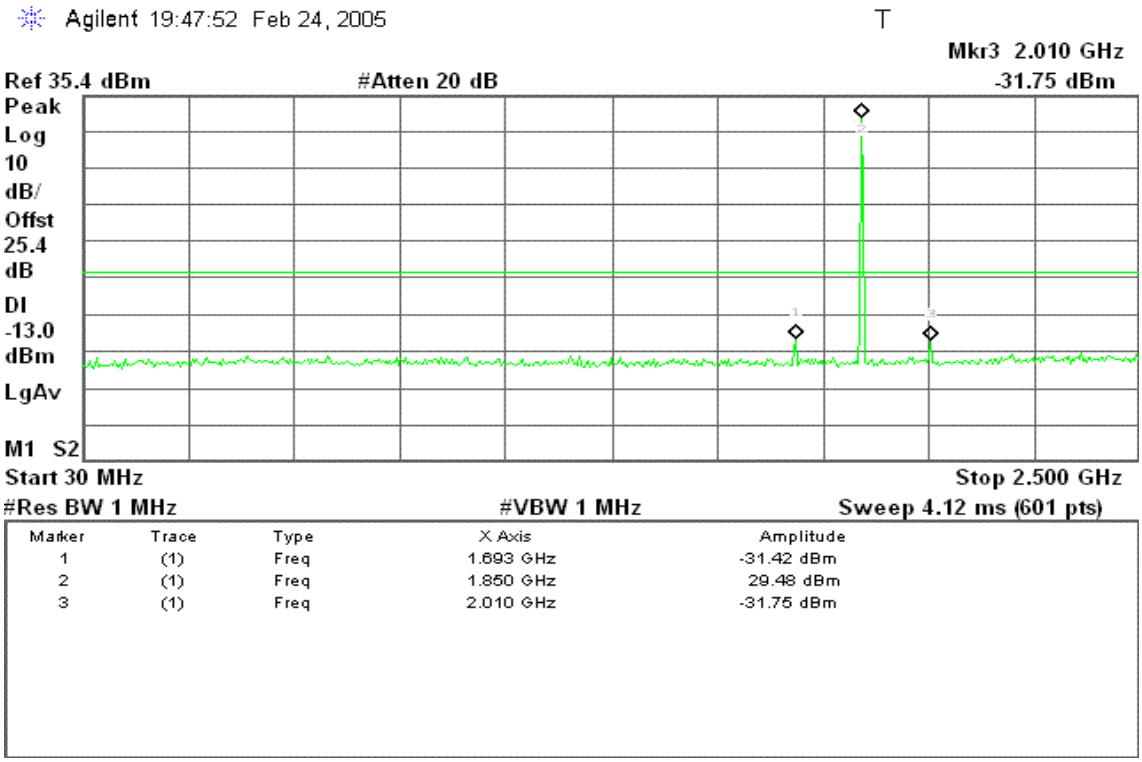


Figure 7-8: Out of Band emission at antenna terminals–GPRS CH Low

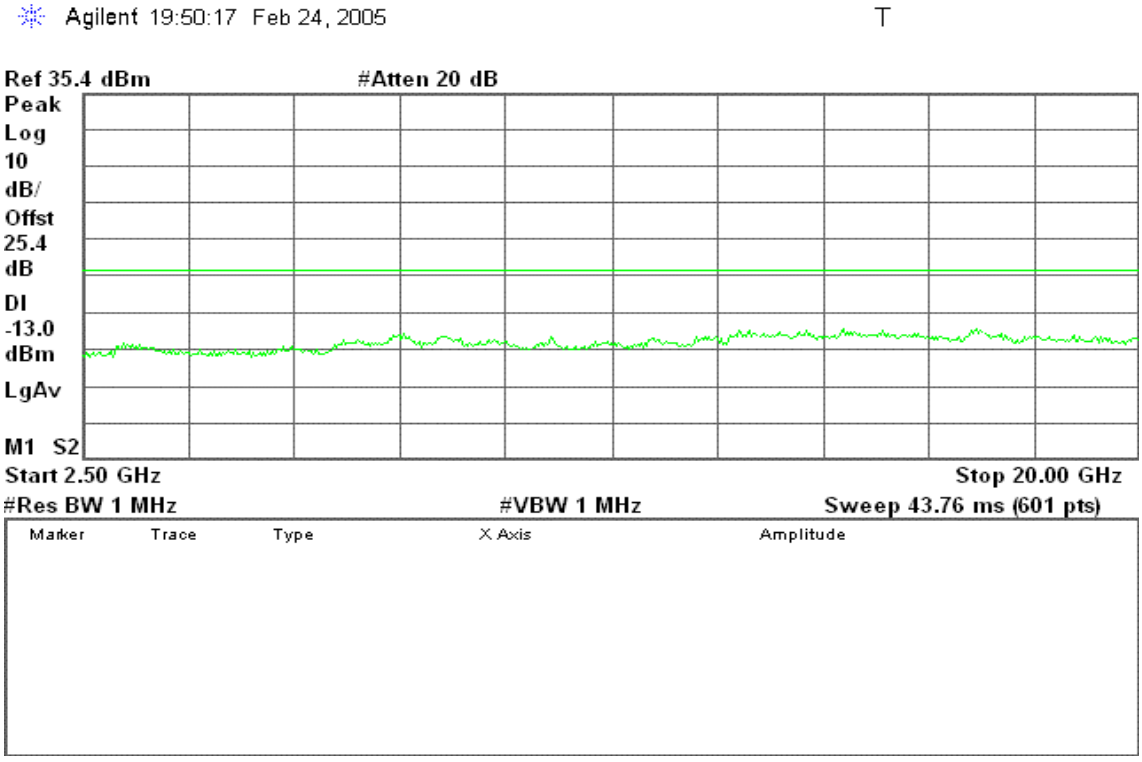


Figure 7-9: Out of Band emission at antenna terminals –GPRS CH Mid

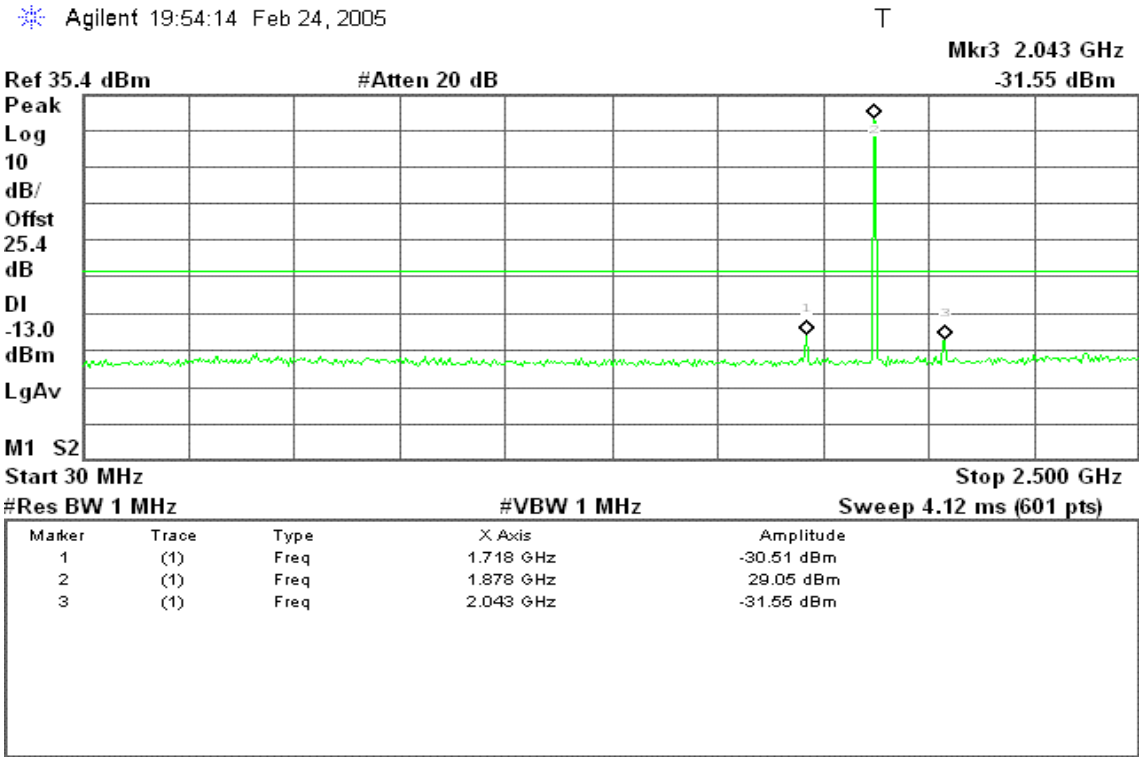


Figure 7-10: Out of Band emission at antenna terminals –GPRS CH Mid

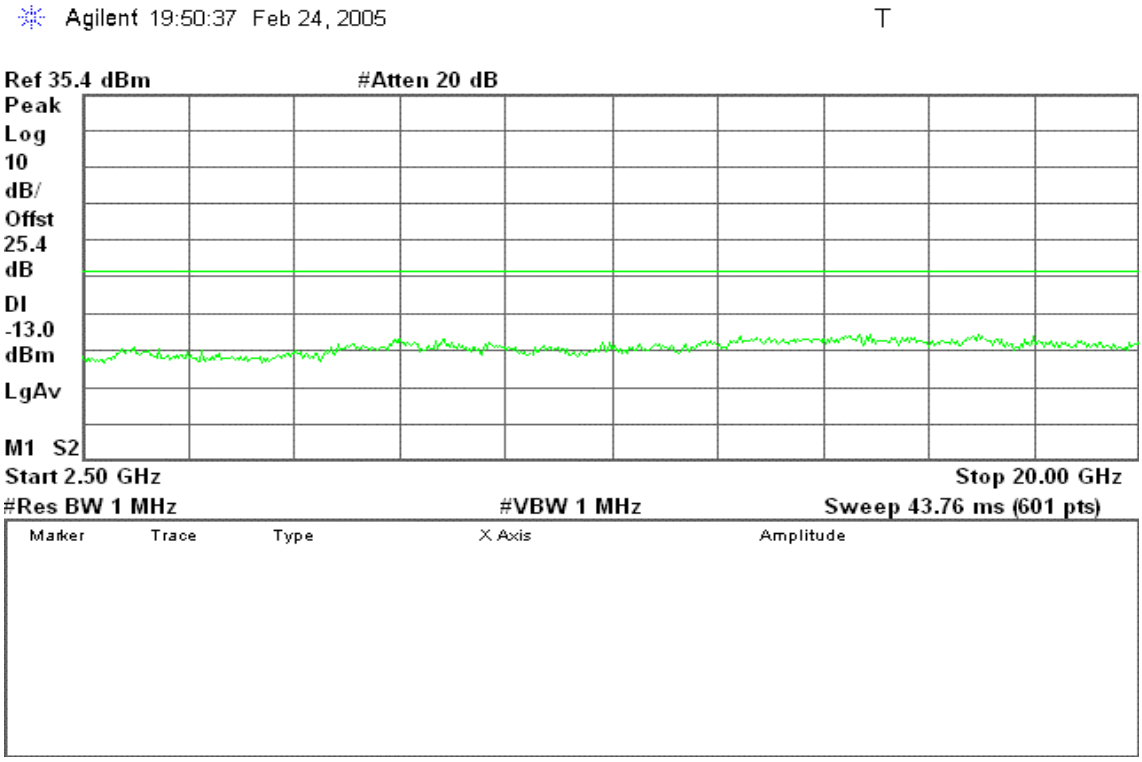


Figure 7-11: Out of Band emission at antenna terminals–GPRS CH High

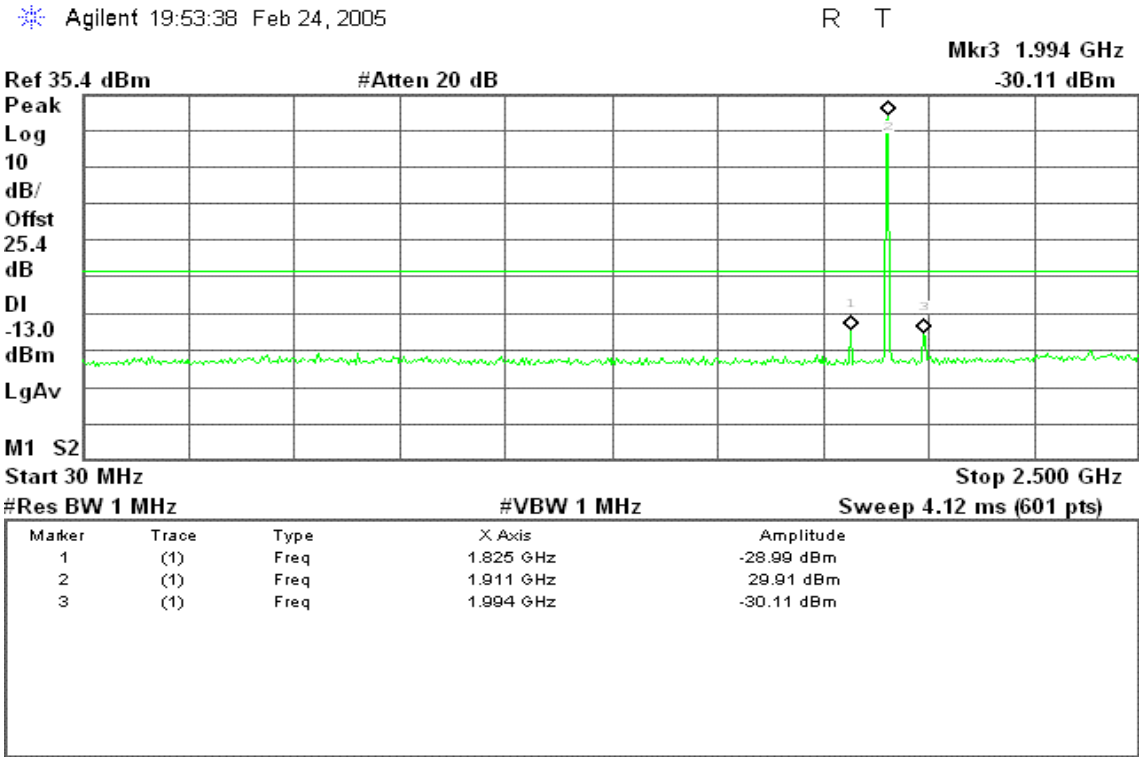
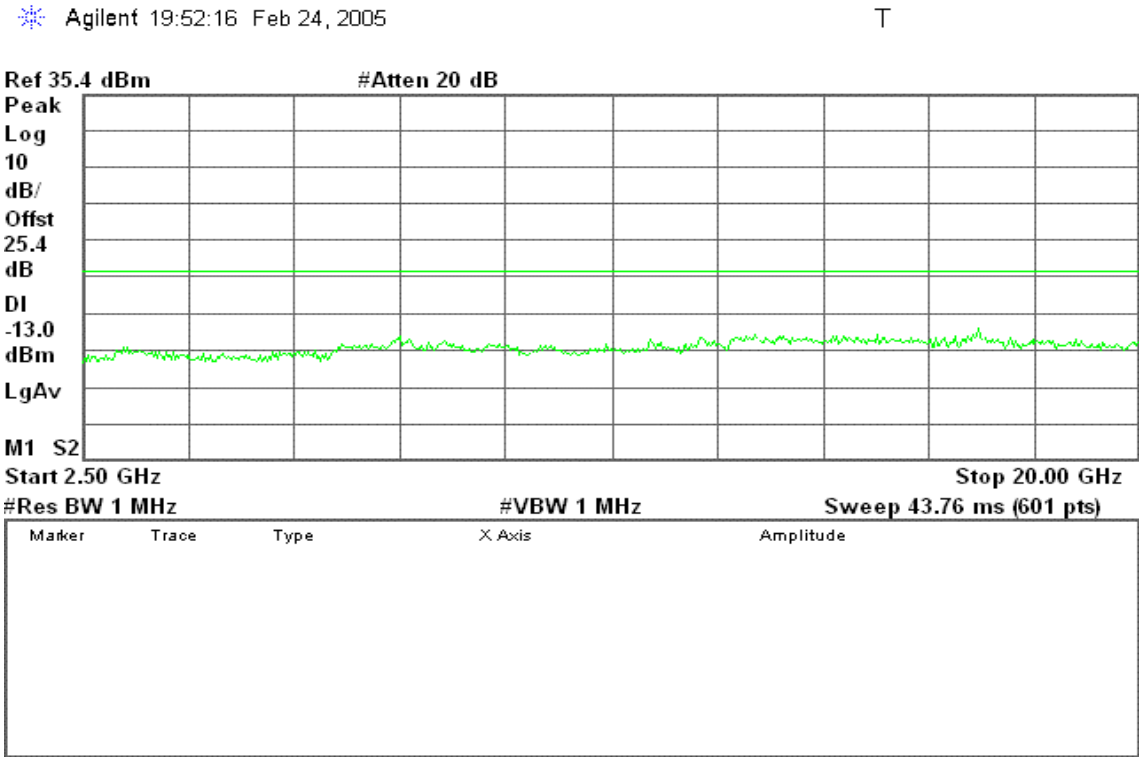


Figure 7-12: Out of Band emission at antenna terminals–GPRS CH High



GSM 1900

Figure 8-1: Band Edge emissions– GSM CH Low

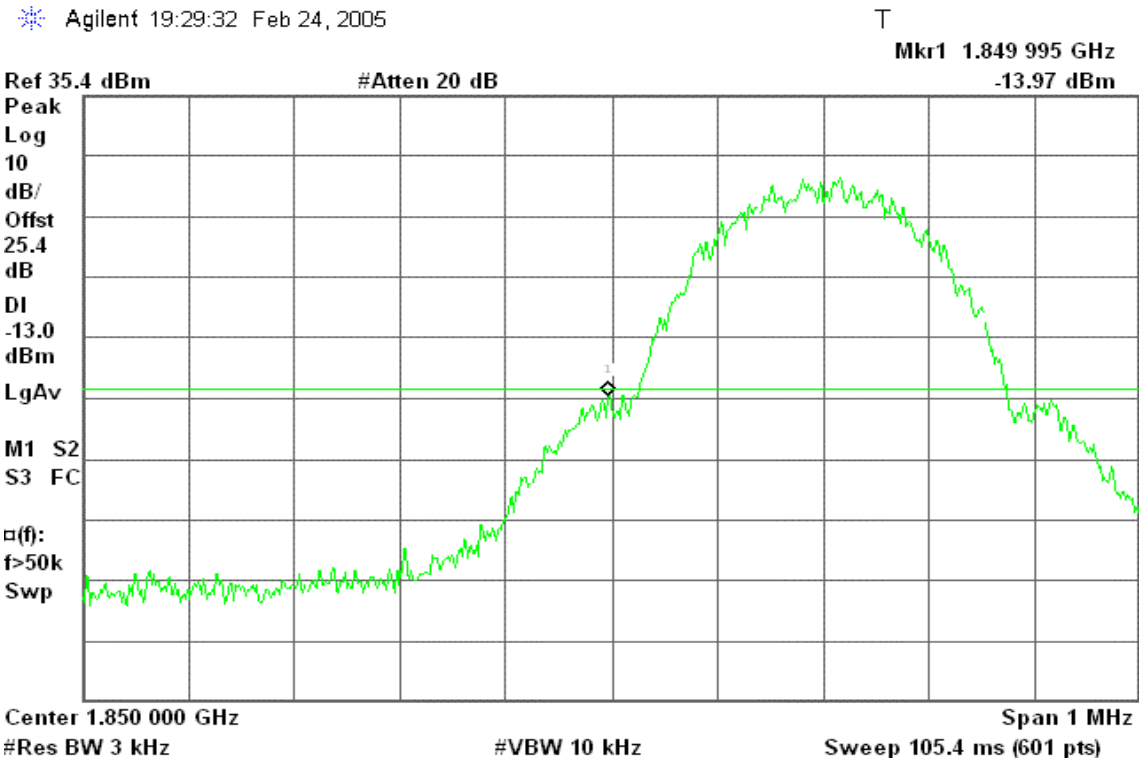
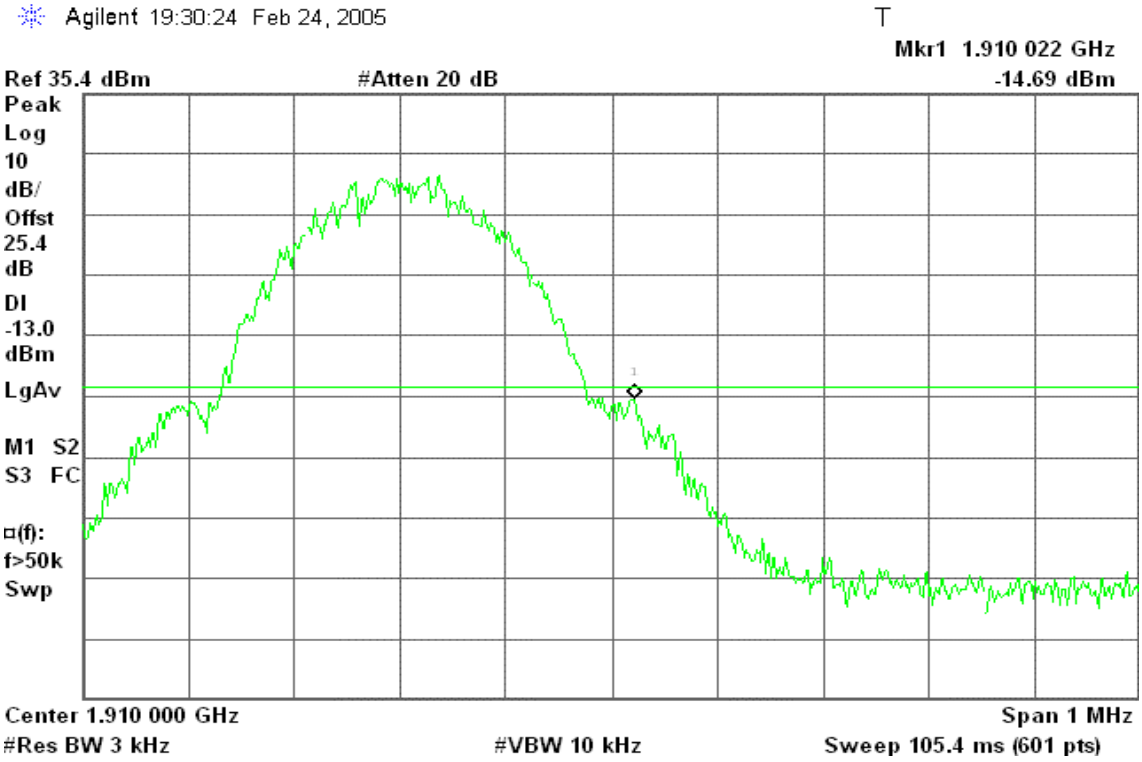


Figure 8-2: Band Edge emissions– GSM CH High



GPRS 1900

Figure 8-3: Band Edge emissions– GPRS CH Low

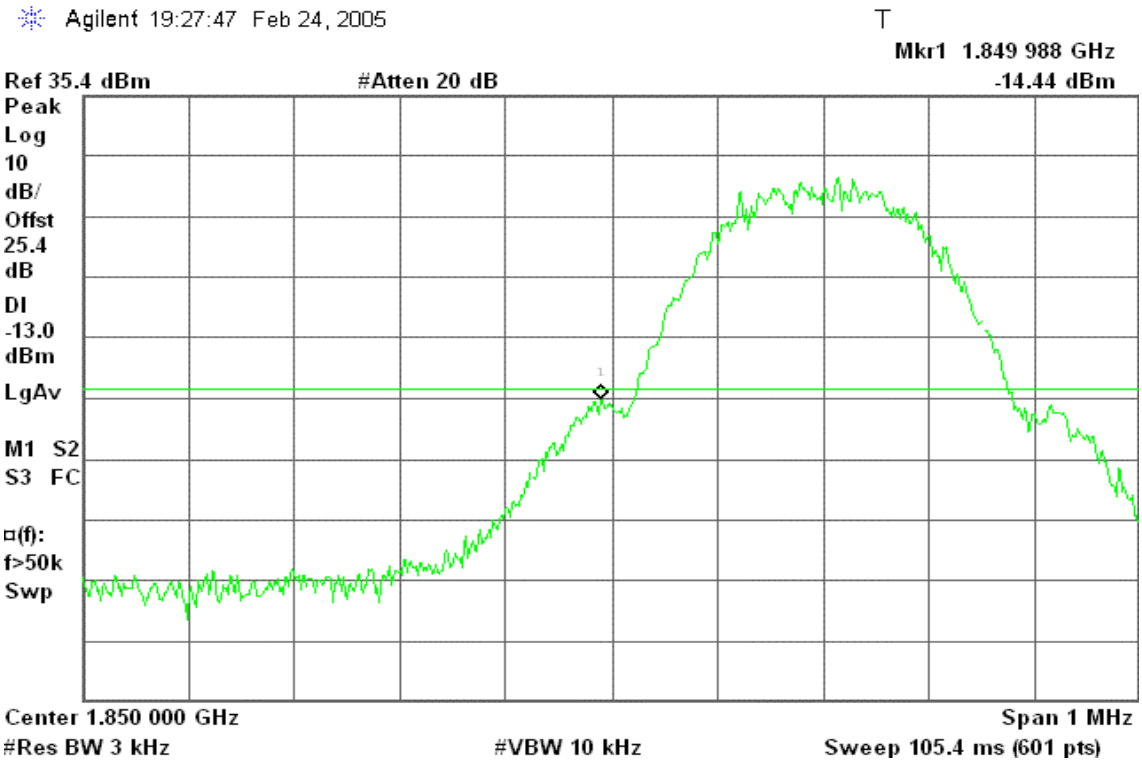
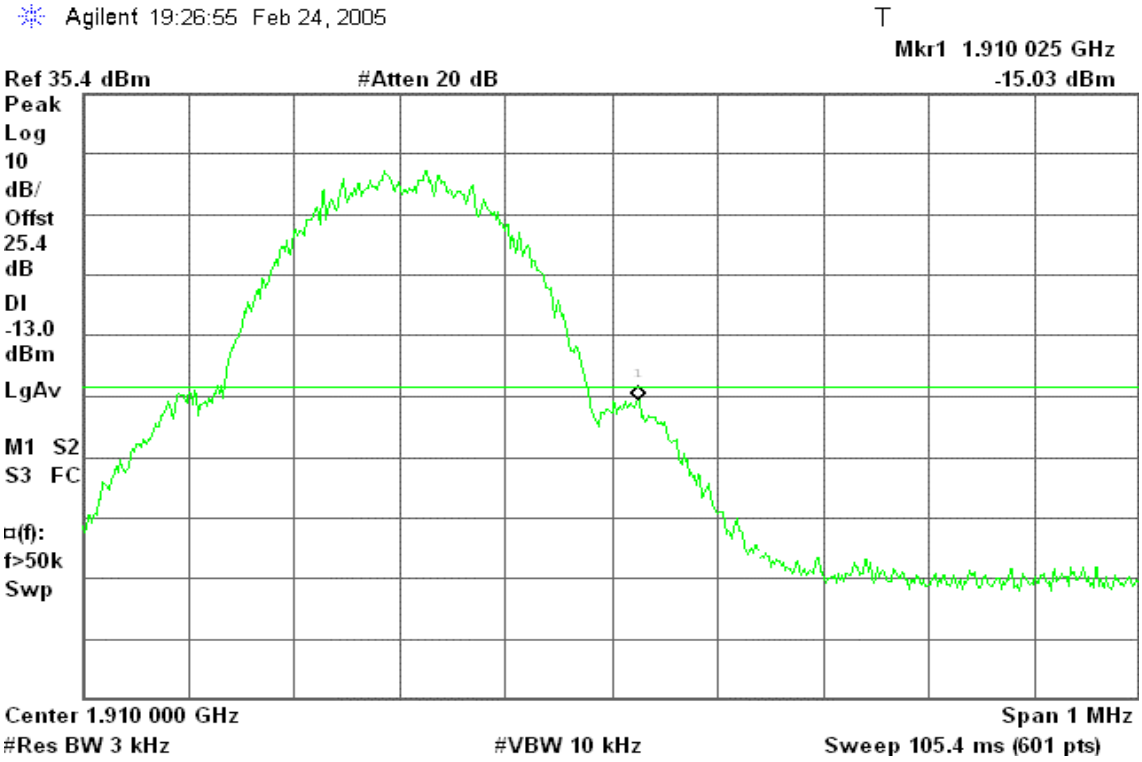


Figure 8-4: Band Edge emissions–GPRS CH High



7.5 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT

LIMIT

According to FCC §2.1053

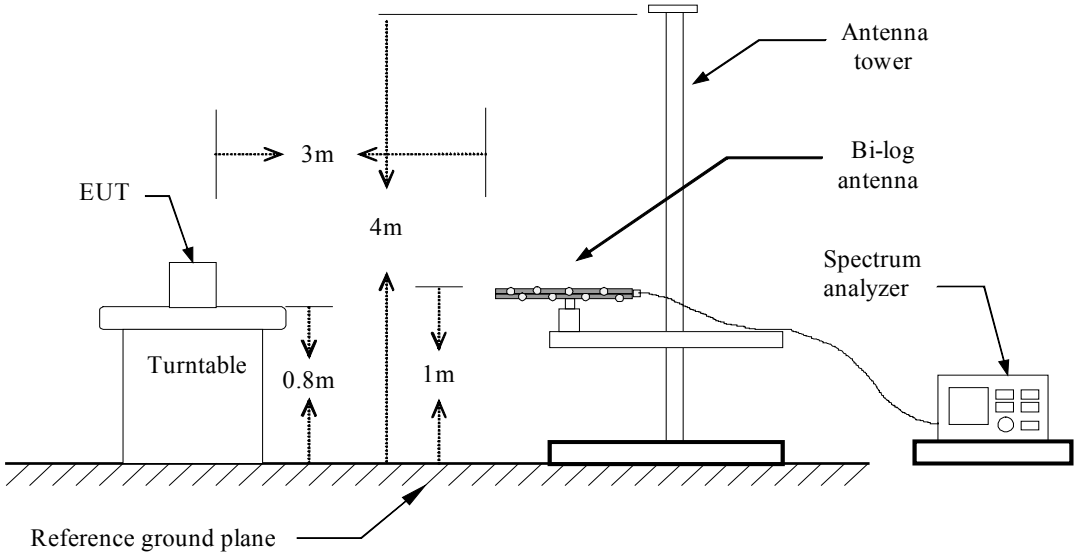
MEASUREMENT EQUIPMENT USED

Open Area Test Site # 3				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESVS20	838804/004	01/08/2006
Spectrum Analyzer	R&S	FSP30	100112	09/23/2005
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006
Pre-Amplifier	MITEC	AFS42-00102650	924206	N.C.R.
Pre-Amplifier	MITEC	AMF-6F-260400	945377	N.C.R.
Bilog Antenna	SCHWAZBECK	VULB9163	145	07/05/2005
Horn Antenna	EMCO	3115	00022250	03/15/2005
Horn Antenna	EMCO	3116	2487	12/08/2005
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R
RF Switch	ANRITSU	MP59B	M53867	N.C.R
Site NSA	C&C	N/A	N/A	09/06/2005

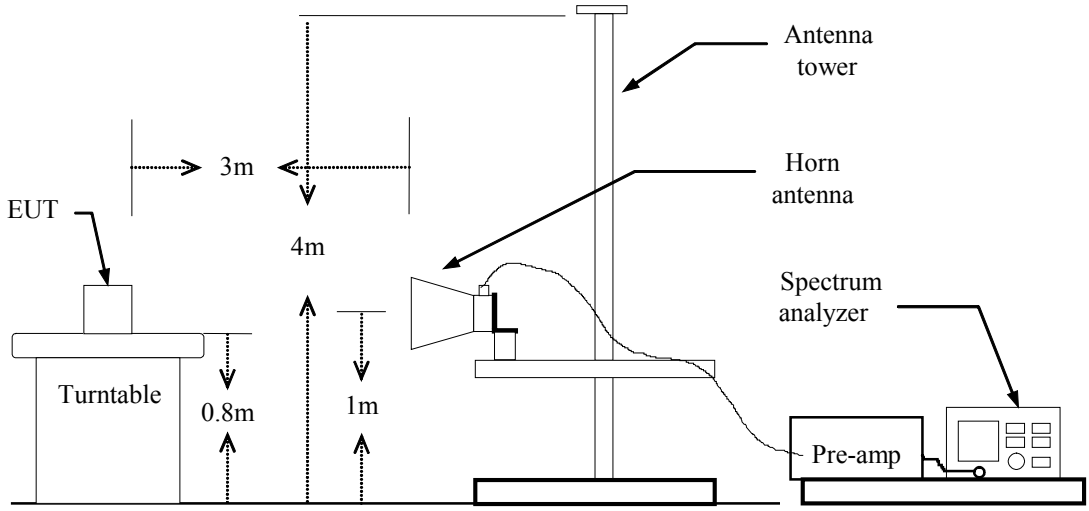
Remark: *Each piece of equipment is scheduled for calibration once a year.*

Test Configuration

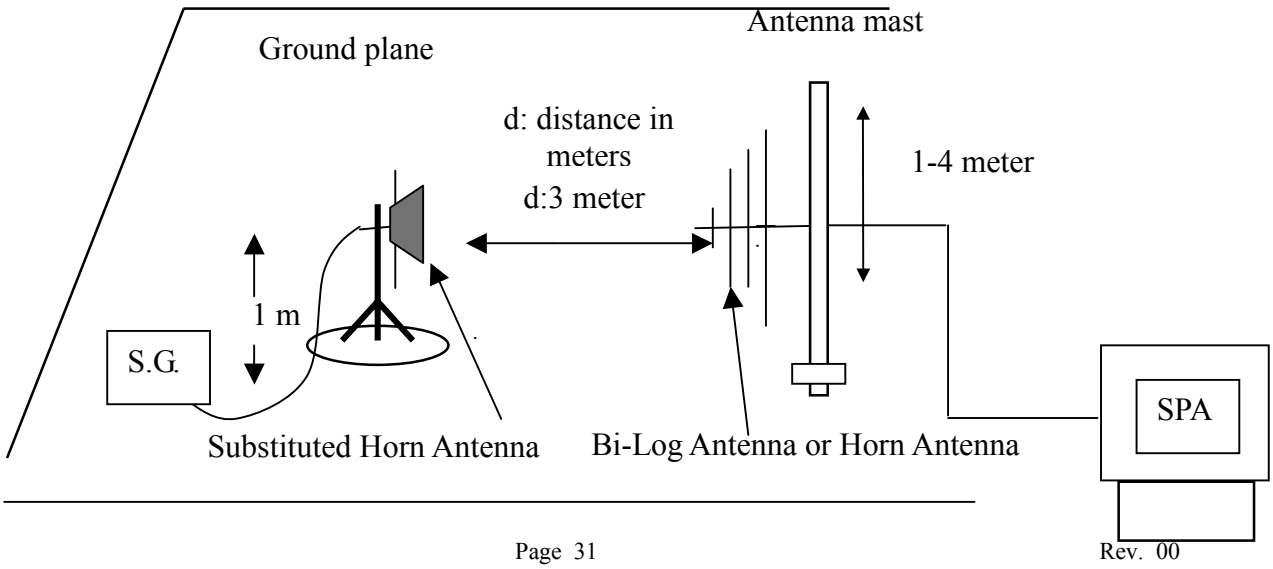
Below 1 GHz



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

EIRP = S.G. output (dBm) + Antenna Gain (dBi) – 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:** February 25, 2005

Temperature: 12°C **Tested by:** Max Yao

Humidity: 68 % 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)
3700.43	54.50	V	-41.50	6.21	9.36	-38.35	-13.00	-25.35
5550.83	51.17	V	-39.33	8.11	10.35	-37.09	-13.00	-24.09
7400.29	47.00	V	-39.40	9.46	10.48	-38.38	-13.00	-25.38
N/A								
3700.58	53.67	H	-41.50	6.21	9.36	-38.35	-13.00	-25.35
5550.47	50.33	H	-40.00	8.11	10.35	-37.76	-13.00	-24.76
7401.16	47.67	H	-38.23	9.46	10.48	-37.21	-13.00	-24.21
N/A								

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 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. *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.*

Operation Mode: GSM 1900 / TX / CH 661 **Test Date:** February 25, 2005

Temperature: 12°C **Tested by:** Max Yao

Humidity: 68 % 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)
3760.26	55.17	V	-40.53	6.32	9.35	-37.50	-13.00	-24.50
5640.01	51.83	V	-38.54	8.17	10.44	-36.27	-13.00	-23.27
7519.50	46.67	V	-38.81	9.62	10.41	-38.02	-13.00	-25.02
N/A								
3759.98	53.83	H	-41.09	6.30	9.35	-38.04	-13.00	-25.04
5639.92	53.13	H	-37.08	8.17	10.43	-34.82	-13.00	-21.82
7519.09	46.50	H	-38.98	9.62	10.41	-38.19	-13.00	-25.19
N/A								

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 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. *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.*

Operation Mode: GSM 1900 / TX / CH 810 **Test Date:** February 25, 2005

Temperature: 12°C **Tested by:** Max Yao

Humidity: 68 % 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)
3819.68	56.17	V	-39.28	6.41	9.34	-36.35	-13.00	-23.35
5729.13	53.50	V	-36.75	8.23	10.52	-34.45	-13.00	-21.45
7639.31	46.00	V	-39.26	9.66	10.53	-38.38	-13.00	-25.38
N/A								
3819.69	56.50	H	-38.12	6.41	9.34	-35.19	-13.00	-22.19
5729.48	52.50	H	-37.58	8.23	10.52	-35.28	-13.00	-22.28
7638.66	46.00	H	-39.26	9.66	10.53	-38.38	-13.00	-25.38
N/A								

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 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. *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.*

Operation Mode: GPRS 1900 / TX / CH 512 **Test Date:** February 25, 2005

Temperature: 12°C **Tested by:** Max Yao

Humidity: 68 % 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)
3700.53	51.17	V	-44.83	6.21	9.36	-41.68	-13.00	-28.68
5550.63	51.50	V	-39.00	8.11	10.35	-36.76	-13.00	-23.76
7400.67	47.83	V	-38.57	9.46	10.48	-37.55	-13.00	-24.55
9251.34	48.00	V	-34.85	10.42	11.40	-33.87	-13.00	-20.87
N/A								
3700.32	52.33	H	-42.84	6.21	9.36	-39.69	-13.00	-26.69
5550.42	51.33	H	-39.00	8.11	10.35	-36.76	-13.00	-23.76
7400.62	45.83	H	-40.07	9.46	10.48	-39.05	-13.00	-26.05
9251.40	47.33	H	-35.52	10.42	11.40	-34.54	-13.00	-21.54
N/A								

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 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. *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.*

Operation Mode: GPRS 1900 / TX / CH 661 **Test Date:** February 25, 2005

Temperature: 12°C **Tested by:** Max Yao

Humidity: 68 % 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)
3753.00	50.17	V	-45.58	6.30	9.35	-42.53	-13.00	-29.53
5639.65	53.83	V	-36.55	8.17	10.43	-34.29	-13.00	-21.29
7519.85	47.17	V	-38.31	9.62	10.41	-37.52	-13.00	-24.52
9399.98	48.00	V	-34.67	10.45	11.51	-33.61	-13.00	-20.61
N/A								
3759.81	53.83	H	-41.09	6.30	9.35	-38.04	-13.00	-25.04
5640.00	53.00	H	-37.20	8.17	10.44	-34.93	-13.00	-21.93
7520.76	46.83	H	-38.63	9.63	10.42	-37.84	-13.00	-24.84
9400.61	47.67	H	-34.99	10.45	11.52	-33.92	-13.00	-20.92
N/A								

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 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. *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.*

Operation Mode: GPRS 1900 / TX / CH 810 **Test Date:** February 25, 2005

Temperature: 12°C **Tested by:** Max Yao

Humidity: 68 % 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)
3819.49	57.00	V	-38.45	6.41	9.34	-35.52	-13.00	-22.52
5729.20	54.33	V	-35.92	8.23	10.52	-33.62	-13.00	-20.62
7639.69	47.67	V	-37.59	9.66	10.53	-36.71	-13.00	-23.71
9548.80	48.50	V	-34.16	10.52	11.62	-33.07	-13.00	-20.07
N/A								
3819.56	58.33	H	-36.29	6.41	9.34	-33.36	-13.00	-20.36
5729.09	52.00	H	-38.08	8.23	10.52	-35.78	-13.00	-22.78
7639.04	46.17	H	-39.09	9.66	10.53	-38.21	-13.00	-25.21
9548.47	47.50	H	-34.99	10.52	11.62	-33.90	-13.00	-20.90
N/A								

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 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. *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.*

7.6 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §24.235.

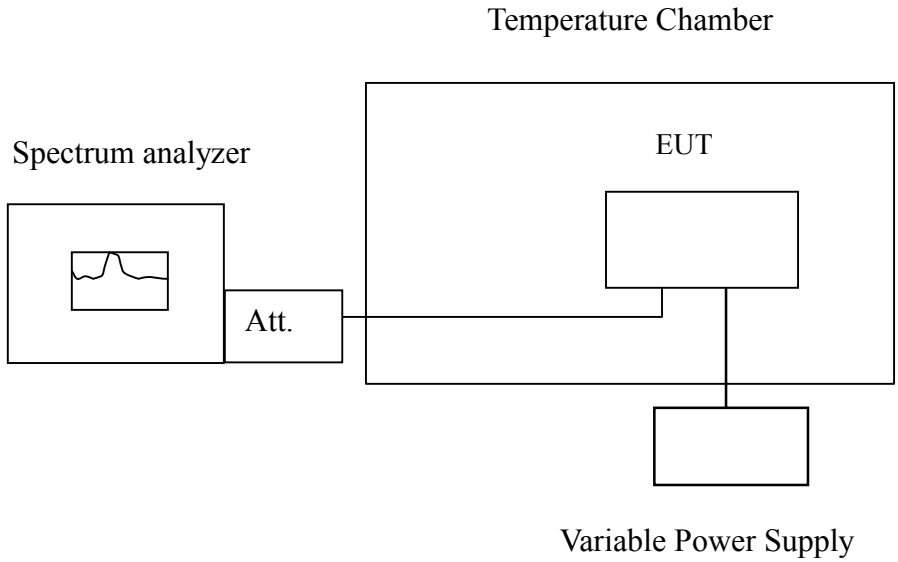
Frequency Tolerance: 2.5 ppm

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
DC Power Source	Agilent	E3640A	MY40001774	01/12/2006
Temperature Chamber	K.son	THS-M1	242	03/20/2005
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

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 = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
3.7	50	1879999983	-29	4700
	40	1879999989	-23	
	30	1879999986	-26	
	20	1880000012	0	
	10	1879999982	-30	
	0	1879999980	-32	
	-10	1880000011	-1	
	-20	1879999979	-33	
	-30	1879999975	-37	

7.7 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT

LIMIT

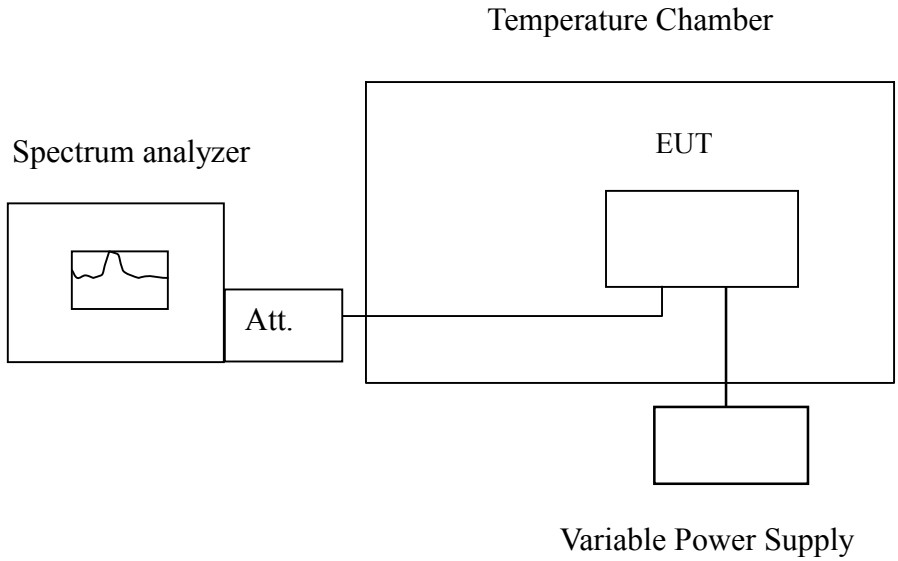
According to FCC §2.1055, FCC §24.235,
Frequency Tolerance: 2.5 ppm.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
DC Power Source	Agilent	E3640A	MY40001774	01/12/2006
Temperature Chamber	K.son	THS-M1	242	05/26/2005
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/10/2006

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 (± 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 = 4700 Hz				
Power Supply Vdc	Environment Temperature (°C)	Frequency (Hz)	Delta (Hz)	Limit (Hz)
4.3	20	1880000016	4	4700
3.7		1880000012	0	
3.2 (End Point)		1880000532	520	

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

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI TEST RECEIVER 9kHz-30MHz	ROHDE & SCHWARZ	ESHS30	828144/003	09/24/2005
TWO-LINE V-NETWORK 9kHz-30MHz	SCHAFFNER	NNB41	03/10013	06/11/2005
LISN 10kHz-100MHz	EMCO	3825/2	9106-1809	02/05/2006

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:	TX + RX mode	**Test Date:**	March 2, 2005
Temperature:	25°C	**Tested by:**	Jason Lin
Humidity:	55% RH		

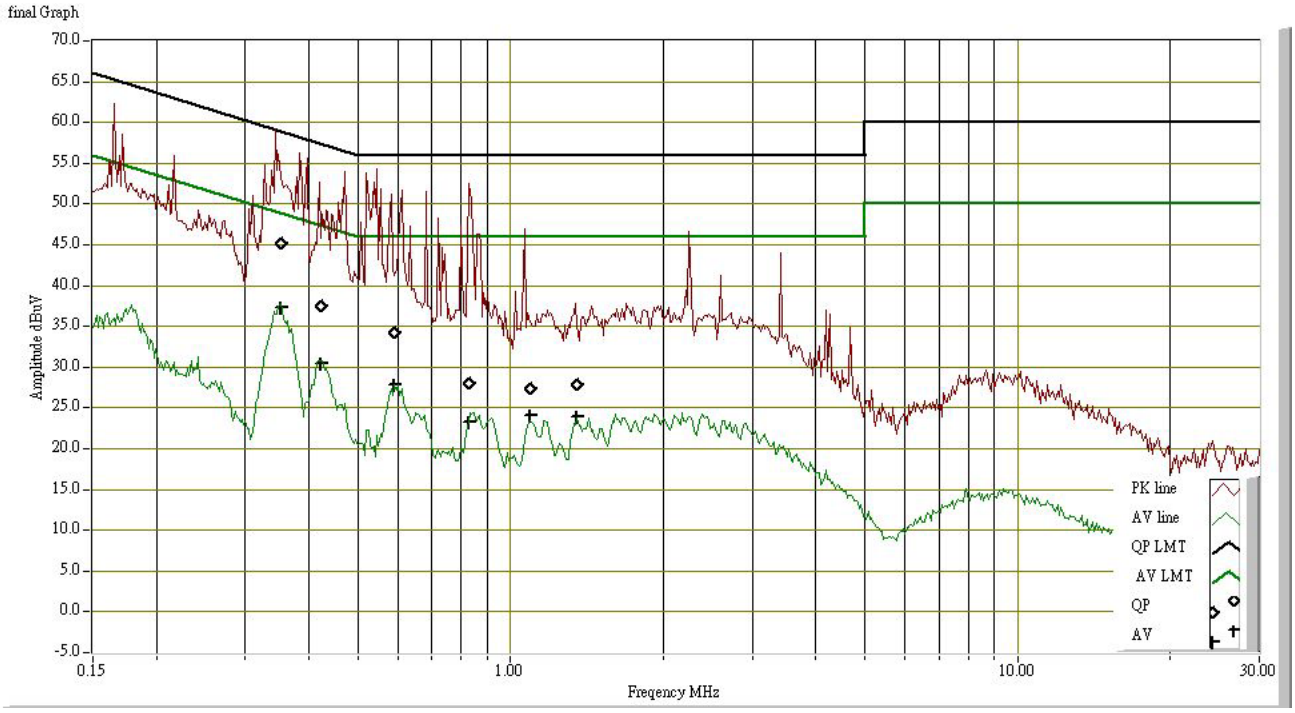
Freq. (MHz)	QP Reading	AV Reading	Corr. factor	QP Result	AV Result	QP Limit	AV Limit	QP Margin	AV Margin	Note
0.352	45.240	37.390	0.090	45.330	37.480	58.915	48.915	-13.585	-11.435	L1
0.423	37.560	30.460	0.095	37.655	30.555	57.389	47.389	-19.734	-16.834	L1
0.591	34.140	27.860	0.110	34.250	27.970	56.000	46.000	-21.750	-18.030	L1
0.825	28.000	23.300	0.110	28.110	23.410	56.000	46.000	-27.890	-22.590	L1
1.091	27.380	24.040	0.113	27.493	24.153	56.000	46.000	-28.507	-21.847	L1
1.353	27.780	23.970	0.121	27.901	24.091	56.000	46.000	-28.099	-21.909	L1
0.346	46.380	39.700	0.090	46.470	39.790	59.058	49.058	-12.588	-9.268	L2
0.419	39.720	33.600	0.098	39.818	33.698	57.468	47.468	-17.650	-13.770	L2
0.591	36.320	31.030	0.128	36.448	31.158	56.000	46.000	-19.552	-14.842	L2
0.832	33.760	29.010	0.123	33.883	29.133	56.000	46.000	-22.117	-16.867	L2
1.082	33.760	29.320	0.122	33.882	29.442	56.000	46.000	-22.118	-16.558	L2
1.353	32.500	28.770	0.127	32.627	28.897	56.000	46.000	-23.373	-17.103	L2

Remark:

1. *Measuring frequencies from 0.15 MHz to 30MHz.*
2. *The emissions measured in frequency range from 0.15 MHz to 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*
4. *The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;*
5. *L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)*

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)