360 Herndon Parkway
Suite 1400
Herndon, VA 20170
http://www.rheintech.com

RTL Work Order: 2001342
RTL Quote Number: QRTL01-378
PO Number: 0070020947
Date of Tests: December 7, 2001

CERTIFICATE OF COMPLIANCE
FCC PART 22 & 24 CERTIFICATION & INDUSTRY CANADA CERTIFICATION

Test Lab:	Applicant Information
Rhein Tech Laboratories, Inc. 360 Herndon Parkway Suite 1400 Herndon, VA 20170 Phone: 703-689-0368 Fax: 703-689-2056 Web Site: www.rheintech.com	Sony Ericsson Mobile Communications (USA, Inc.) 7001 Development Drive P.O. Box 13969 Research Triangle Park, NC 27709 USA Phone: 919-472-1697 (Pierre Chery)

FCC ID:	PXITR-419-A2	**FRN NUMBER:**	0005-0294-00
EQUIPMENT TYPE:	GSM	**MODEL(S):**	T61g and T61z
RTL WORK ORDER NUMBER:	2001342	**RTL QUOTE NUMBER:**	QRTL01-378
DATE OF TEST REPORT:	February 14, 2002		

FCC Classification:	☐ PCB – Licensed Base Station for Part 24 ☒ PCE – Part 24 Licensed Portable Transmitter held to ear ☐ PCF – Part 24 Licensed Portable Transmitter held to face ☐ PCT – Part 24 Licensed Portable Transmitter held to body	
FCC Rule Part(s):	Part 22: Public Mobile Services ☐ Subpart E – Paging and Radiotelephone Services ☐ Subpart F – Rural Radiotelephone Services ☐ Subpart G – Air-Ground Radiotelephone Services ☒ Subpart H – Cellular Radiotelephone Services ☐ Subpart I – Offshore Radiotelephone Services	Part 24: Personal Communications Services ☐ Subpart D – Narrowband PCS ☒ Subpart E – Broadband PCS
Industry Canada Standard:	☐ RSS-118: Land and Subscriber Stations: Voice, Data and Tone Modulated, Angle Modulation Radiotelephone Transmitters and Receivers Operating in the Cellular Mobile Bands 824-849 MHz and 869-894 MHz ☐ RSS-128: 800 MHz Dual-Mode TDMA Cellular Telephones ☐ RSS-129: 800 MHz Dual Mode CDMA Cellular Telephones ☒ RSS-133: 2 GHz Personal Communications Services	

Frequency Range (MHz)	Output Power (W)	Freq. Tolerance (ppm, %, or Hz)	Emission Designator
824-849	0.733 W ERP	0.1 ppm	256KGXW
1850-1910	0.811 W EIRP	0.1 ppm	246KGXW

We, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. No modifications were made to the equipment during testing in order to achieve compliance with these standards.

Furthermore, there was no deviation from, additions to or exclusions from the FCC Part 2, FCC Part 15, FCC Part 22, FCC Part 24, Industry Canada RSS-133, ANSI C63.4, ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1.

Signature: _____

Date: February 14, 2002

Typed/Printed Name: Bruno Clavier

Position: Vice President of Operations
(NVLAP Signatory)

NVLAP *Accredited by the National Voluntary Accreditation Program for the specific scope of accreditation under Lab Code 200061-0.*

Note: This report may not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

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1 GENERAL INFORMATION

1.1 SCOPE

FCC Rules Part 22.901: The rules in this subpart govern the licensing and operation of cellular radiotelephone systems.

FCC Rules Part 24 (E): The rules in this subpart govern Personal Communications Services – Broadband PCS.

IC RSS-133: This Radio Standards Specification (RSS) sets out standards for transmitters and receivers for the Personal Communications Services (PCS) in the 2 GHz band. The bands available are 1850-1910 MHz and 1930-1990 MHz.

All measurements contained in this application were conducted in accordance with the FCC Rules and Regulations CFR47, Industry Canada RSS-133 and ANSI/TIA/EIA603-1992/-1-1998 Land Mobile FM or PM Communications Equipment Measurement and Performance Standards. The instrumentation utilized for the measurements conforms to the ANSI C63.4 standard for EMI and Field Strength Instrumentation. Calibration checks are performed regularly on the instruments, and all accessories including high pass filter, coaxial attenuator, preamplifier and cables.

1.2 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communication Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 1992).

1.3 RELATED SUBMITAL(S)/GRANT(S)

This is an original application for Certification.

2 EQUIPMENT INFORMATION

2.1 APPLICANT AND EQUIPMENT INFORMATION

Test Lab:	Applicant Information
Rhein Tech Laboratories, Inc. 360 Herndon Parkway Suite 1400 Herndon, VA 20170 Phone: 703-689-0368 Fax: 703-689-2056 Web Site: www.rheintech.com	Sony Ericsson Mobile Communications (USA, Inc.) 7001 Development Drive P.O. Box 13969 Research Triangle Park, NC 27709 USA Phone: 919-472-1697 (Pierre Chery)

FCC ID:	PXITR-419-A2	**FRN NUMBER:**	0005-0294-00
EQUIPMENT TYPE:	GSM	**MODEL(S):**	T61g and T61z
RTL WORK ORDER NUMBER:	2001342	**RTL QUOTE NUMBER:**	QRTL01-378
DATE OF TEST REPORT:	December 21, 2001		

FCC Classification:	☐ PCB – Licensed Base Station for Part 24 ☒ PCE – Part 24 Licensed Portable Transmitter held to ear ☐ PCF – Part 24 Licensed Portable Transmitter held to face ☐ PCT – Part 24 Licensed Portable Transmitter held to body	
FCC Rule Part(s):	Part 22: Public Mobile Services ☐ Subpart E – Paging and Radiotelephone Services ☐ Subpart F – Rural Radiotelephone Services ☐ Subpart G – Air-Ground Radiotelephone Services ☒ Subpart H – Cellular Radiotelephone Services ☐ Subpart I – Offshore Radiotelephone Services	Part 24: Personal Communications Services ☐ Subpart D – Narrowband PCS ☒ Subpart E – Broadband PCS
Industry Canada Standard:	☐ RSS-118: Land and Subscriber Stations: Voice, Data and Tone Modulated, Angle Modulation Radiotelephone Transmitters and Receivers Operating in the Cellular Mobile Bands 824-849 MHz and 869-894 MHz ☐ RSS-128: 800 MHz Dual-Mode TDMA Cellular Telephones ☐ RSS-129: 800 MHz Dual Mode CDMA Cellular Telephones ☒ RSS-133: 2 GHz Personal Communications Services	

Frequency Range (MHz)	Output Power (W)	Freq. Tolerance (ppm, %, or Hz)	Emission Designator
824-849	0.733 W ERP	0.1 ppm	256KGXW
1850-1910	0.811 W EIRP	0.1 ppm	246KGXW

2.2 JUSTIFICATION

To complete the test configuration required by the FCC, the receiver was connected to an external antenna, which receives a signal from a signal generator output. With the antenna installed, the receiver indicator was used to determine optional reception. The T61g crystal oscillators and harmonics of each were investigated. All modes were investigated and tested including standby mode and receiving mode. The final radiated data was taken with the EUT locked to a set frequency in a receive mode for Part 15 data. The use of direct modulation means that there is no intermediate frequency (IF) in the transmitter chain. The transmitter was tested at a high, mid, and low channel in the following frequency range (824 – 849 MHz and 1930 - 1990 MHz). The following frequencies were tested: 824.2, 836.4, 848.8, 1850.2, 1879.8, and 1909.8 MHz. Each transmitter frequency was measured independently in 3 orthogonal planes at 360º rotation.

The final radiated data was taken with the EUT locked to a set frequency.

Model T61g (850/1900MHZ) is dual band and Model T61z (1900MHz only) the 850MHz mode will be disabled via software, otherwise this model is identical to T61g.

2.3 EXERCISING THE EUT

The T61g was tested using client based software to set all the parameters required for testing, such as power level, modulation type, frequency, and receive modes.

2.4 TEST SYSTEM DETAILS

The FCC Identifiers for all equipment, plus descriptions of all cables used in the tested system are:

TABLE 2-1: EQUIPMENT UNDER TEST (EUT)

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BARCODE
T61g MODULE	SONY ERICSSON MOBILE COMMUNICATIONS	T61g	UA2020LXSM	SAMPLE	UNSHIELDED	14012
T61g MODULE	SONY ERICSSON MOBILE COMMUNICATIONS	T61g	UA2020LXVN	SAMPLE	UNSHIELDED	14005

2.5 CONFIGURATION OF TESTED SYSTEM

PHOTOGRAPH 1: CONFIGURATION OF TESTED SYSTEM (FRONT VIEW)

PHOTOGRAPH 2: CONFIGURATION OF TESTED SYSTEM (REAR VIEW)

3 DC VOLTAGES AND CURRENTS - PART §2.1033(C)(8)

The dc voltages applied to and dc currents into the several elements of the final radio frequency amplifying device for normal operation over the power range.

800 Band PA

	Minimum	Typical	Maximum
Voltage (DC)	3.06	3.60	4.14
Current (Amps)	0.71	0.96	1.01

1900 Band PA

	Minimum	Typical	Maximum
Voltage (DC)	3.06	3.60	4.14
Current (Amps)	0.73	0.91	1.09

4 RF POWER OUTPUT - §2.1046

4.1 POWER OUTPUT TEST PROCEDURES

4.1.1 ANSI/TIA/EIA-603-1992, SECTION 2.2.1 TEST PROCEDURE

Connect the equipment as illustrated below. Measure the transmitter output power during the defined duty cycle. The EUT was connected to a coaxial attenuator having a 50 Ω load impedance.

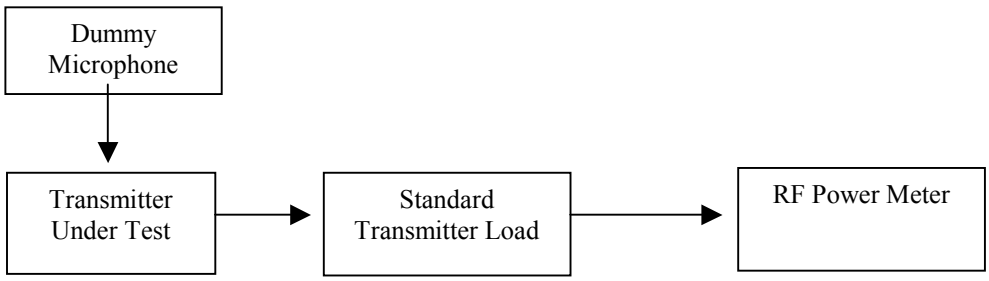


FIGURE 4-1: ILLUSTRATION OF HOW THE EQUIPMENT IS CONNECTED

4.1.2 MEASUREMENTS REQUIRED: RF POWER OUTPUT - §2.1046

Transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in §2.1033(c)(8) of the FCC rules and regulations. The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

In addition, transmitters that are single sideband, independent sideband and controlled carrier radiotelephone the transmitter shall be modulated during the test as follows. In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.

4.1.3 EFFECTIVE RADIATED POWER LIMITS - §22.913

Maximum ERP – The ERP of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

4.2 POWER AND ANTENNA HEIGHT LIMITS - §24.232

HAAT is determined by subtracting average terrain elevation from antenna height above mean sea level.

Base stations are limited to 1640 watts peak equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT. Base station antenna heights may exceed 300 meters with a corresponding reduction in power.

TABLE 4-1: REDUCED POWER FOR BASE STATION ANTENNA HEIGHTS OVER 300 METERS

HAAT in meters	Maximum EIRP (Watts)
≤ 300	1640
≤500	1070
≤ 1000	490
≤ 1500	270
≤ 2000	160

Mobile/Portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

4.3 RF POWER OUTPUT TEST EQUIPMENT

TABLE 4-2: RF POWER OUTPUT TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901053	Schaffner Chase	CBL6112B	Bi-Log Antenna (20 MHz – 2 GHz)	2648	5/22/02
901184	Agilent Technologies	E4416A	EPM-P Power Meter, single channel	GB41050573	7/5/02
901186	Agilent Technologies	E9323A (50MHz-6GHz)	Peak & Avg. Power Sensor	US40410380	6/25/02
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz – 22 GHz)	3138A07771	5/16/02
900917	Hewlett Packard	8648C	Signal Generator (100kHz – 3200 MHz)	3537A01741	4/10/02
900928	Hewlett Packard	83752A	Syntesized Sweeper (0.01 GHz – 20 GHz)	3610A00866	5/11/02

4.4 POWER OUTPUT TEST DATA- §2.1046

TABLE 4-3: ANTENNA CONDUCTED POWER OUTPUT DATA - §2.1046

(800 MHz GSM mode)

Channel Number	Frequency Tuned (MHz)	EUT Conducted Power (dBm)
128	824.2	29.41
189	836.4	29.78
251	848.8	29.74

(1900 MHz GSM mode)

Channel Number	Frequency Tuned (MHz)	EUT Conducted Power (dBm)
512	1850.2	30.86
660	1879.8	30.85
810	1909.8	30.73

5 PART 2.1046 (A); RF POWER OUTPUT: RADIATED ERP PER PART 22.913

5.1 TEST PROCEDURE

Substitution Method:

The EUT was setup at an antenna to EUT distance of 3 meters on an open area test site. The EUT was placed on a nonconductive turntable 1.0 meter above the ground plane. The physical arrangement of the EUT was varied through three orthogonal planes in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters in order to determine the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarizations. The worst-case, maximum radiated emission was recorded and used as reference for the measurement. The EUT was then replaced by a ½ wave dipole antenna and polarized in accordance with the EUT's antenna polarization. The ½ wave dipole antenna was connected to a RF signal generator with a coaxial cable. The search antenna height, and search antenna polarity was set to levels that produced the maximum reading obtained. The signal generator was adjusted to a level that produced that maximum radiated emission level. The signal generator level was recorded and corrected by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal ½ wave dipole antenna. The signal generator corrected level is the ERP level. The EIRP calculation used the gain of the transmitting antenna.

TABLE 5-1: RADIATED POWER OUTPUT DATA - §2.1046 (800 MHZ GSM MODE)

Channel Number	Frequency (MHz)	Signal Generator (dBm)	Cable Loss* (dB)	TX Antenna Gain (dBd)	Corrected Signal Generator (dBm)	ERP (mW)
128	824.2	30.14	0.7	-1.3	28.14	651.6
189	836.4	30.18	0.7	-1.2	28.28	673.0
251	848.8	30.55	0.7	-1.2	28.65	732.8

TABLE 5-2: RADIATED POWER OUTPUT DATA - §2.1046 (1900 MHZ GSM MODE)

Channel Number	Frequency (MHz)	Signal Generator (dBm)	Cable Loss* (dB)	TX Antenna Gain (dBi)	Corrected Signal Generator (dBm)	EIRP (mW)
512	1850.2	22.09	0.9	6.94	28.13	650.1
660	1879.8	21.40	0.8	6.95	27.55	569.1
810	1909.8	22.93	0.8	6.96	29.09	811.7

*cable loss from transmitting antenna to signal generator
Measurement accuracy is +/- .5 dB

6 OCCUPIED BANDWIDTH - §2.1049

6.1 OCCUPIED BANDWIDTH - §2.1049 TEST PROCEDURE

The antenna output terminal of the EUT was connected to the input of a 50W spectrum analyzer through a matched 30dB attenuator. The radio transmitter was operating at maximum output power with and without internal data modulation. 100% of the in-band modulation was below the specified mask per §22.917 (C). Specified Limits:

A. On any frequency removed from the assigned carrier frequency by more than 20kHz, up to and including 45kHz, the sideband was at least 26dB below the carrier.
B. On any frequency removed from the assigned carrier frequency by more than 45kHz, up to and including 90kHz, the sideband was at least 45dB below the carrier.
C. On any frequency removed from the assigned carrier frequency by more than 90kHz, up to the first multiple of the carrier frequency, the sideband was at least 60dB below the carrier of 43 + log10 (mean power output in Watts) dB, whichever was the smaller attenuation.

6.2 OCCUPIED BANDWIDTH - §24.238 EMISSION LIMITS.

(a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB.

(b) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. How-ever, in the 1 MHz 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. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(c) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(d) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

(e) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

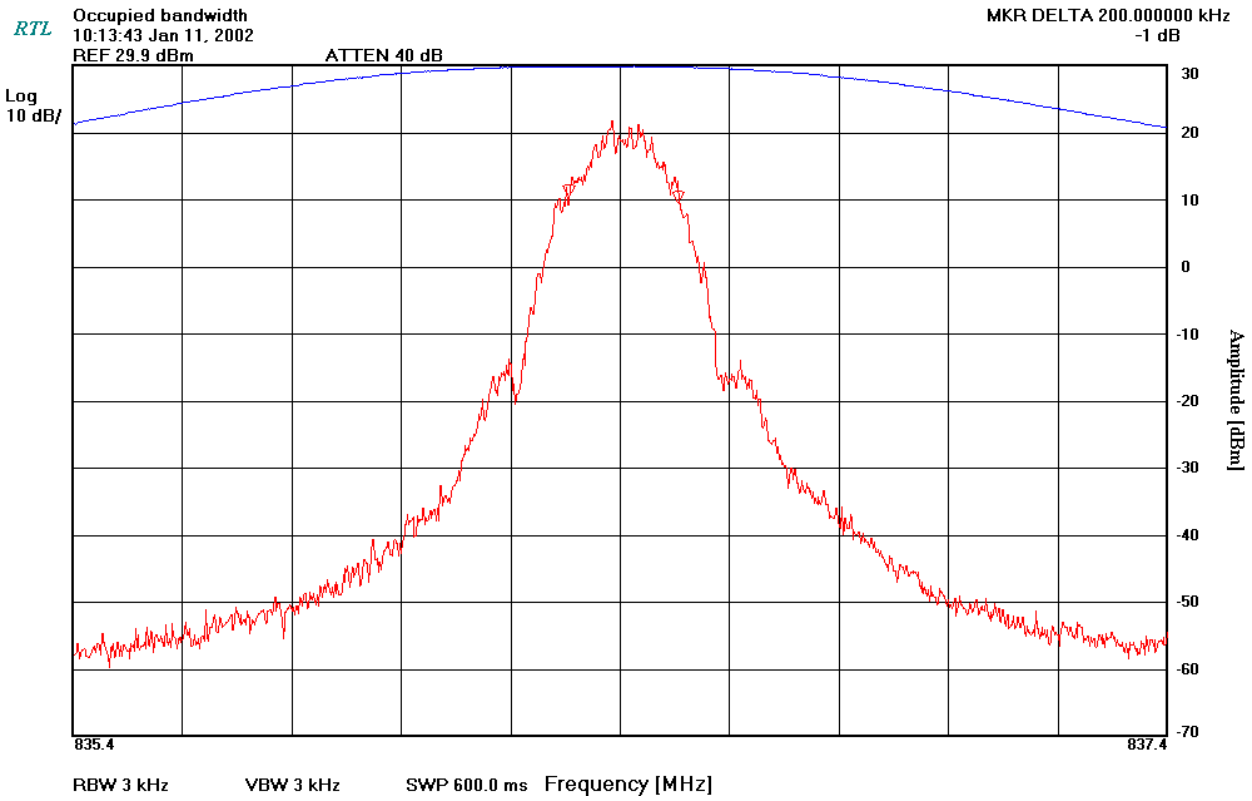
6.3 OCCUPIED BANDWIDTH TEST EQUIPMENT

TABLE 6-1: OCCUPIED BANDWIDTH TEST EQUIPMENT

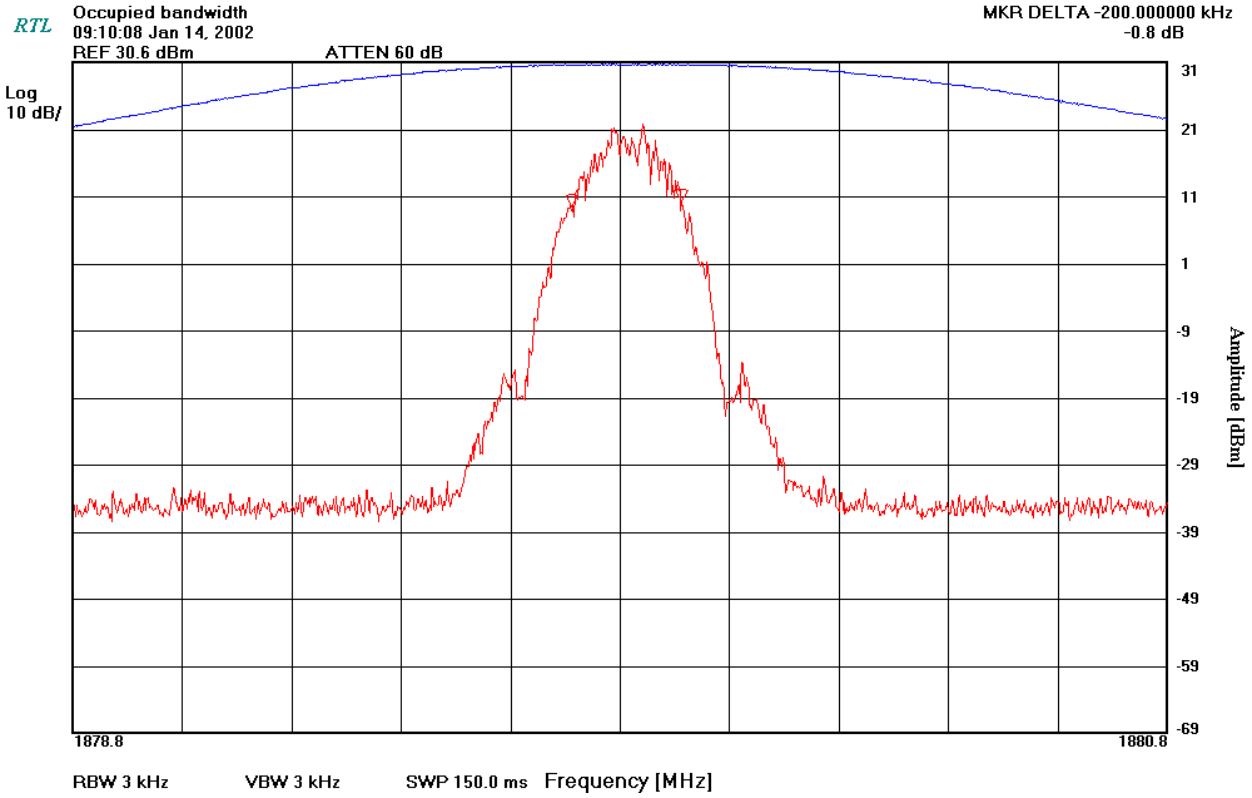
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9kHz – 40 GHz)	3943A01719	6/7/02

6.4 OCCUPIED BANDWIDTH - §24.238 TEST DATA

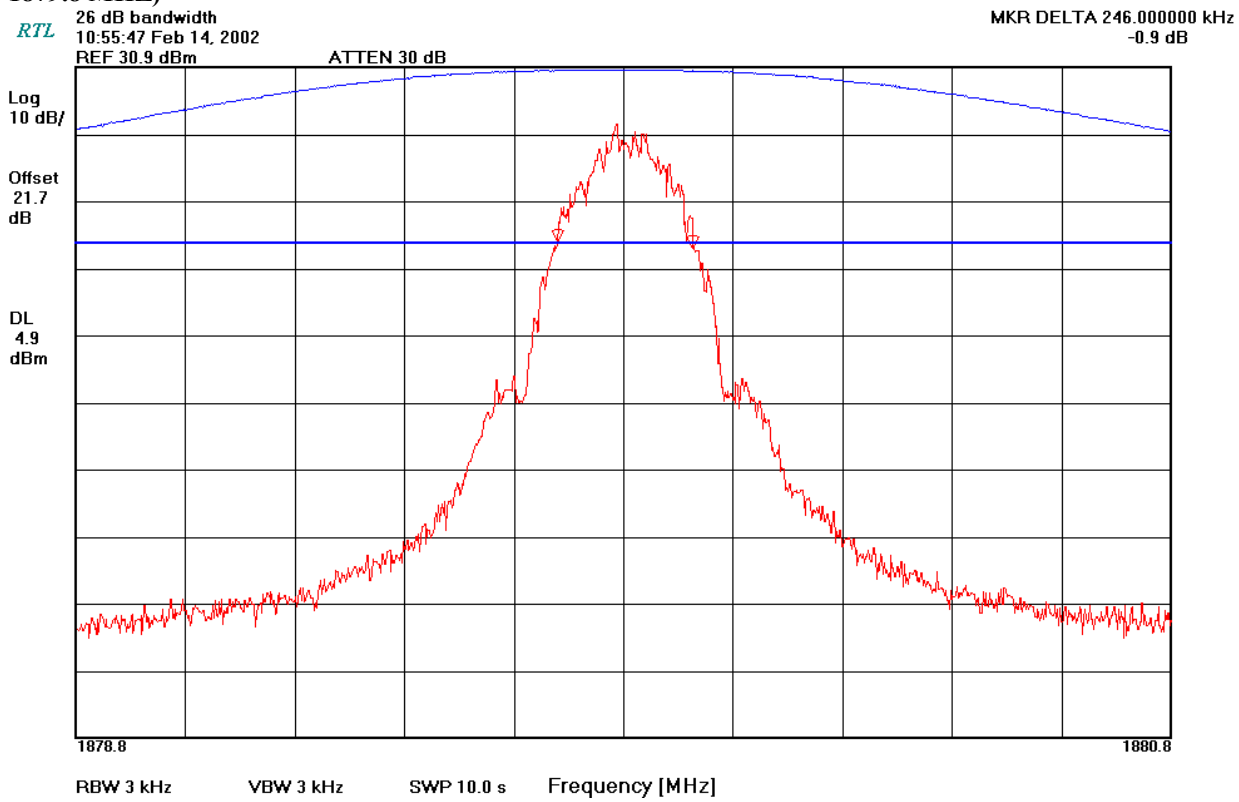
PLOT 6-1: OCCUPIED BANDWIDTH - §24.238 (800 MHZ GSM OCCUPIED BANDWIDTH (200 KHZ): 836.400 MHZ)



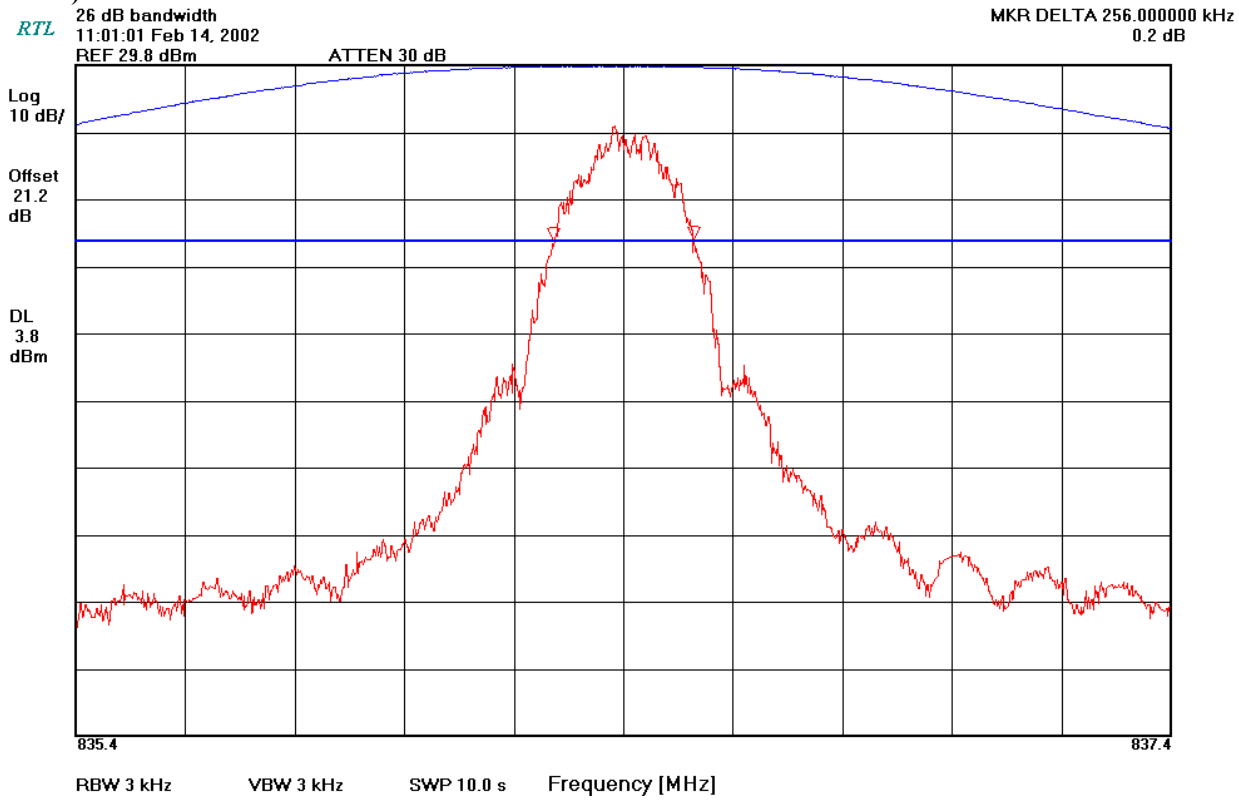
PLOT 6-2: OCCUPIED BANDWIDTH - §24.238 (1900 MHZ GSM OCCUPIED BANDWIDTH (200 KHZ): 1879.8 MHZ)



PLOT 6-3: EMISSION BANDWIDTH - §24.238 (1900 MHZ GSM 26 DB BANDWIDTH (246 KHZ): 1879.8 MHZ)



PLOT 6-4: EMISSION BANDWIDTH - (800 MHZ GSM 26 DB BANDWIDTH (256 KHZ): 836.4 MHZ)



7 SPURIOUS EMISSIONS AT ANTENNA TERMINAL - §2.1051

7.1 SPURIOUS EMISSIONS TEST PROCEDURES

7.1.1 SPURIOUS EMISSIONS AT ANTENNA TERMINAL - §2.1051

The level of the carrier and the various conducted spurious frequencies was measured by means of a calibrated spectrum analyzer. The antenna output terminal of the EUT was connected to the input of a 50 Ω spectrum analyzer through a matched 30dB attenuator and coaxial cable. The transmitter was operating at maximum power with internal data modulation.

7.1.2 EMISSION LIMITATIONS FOR CELLULAR - §22.917

(d) *F1D emission mask.* For F1D emissions, the mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) as follows:

(1) On any frequency removed from the carrier frequency by more than 20 kHz but not more than 45 kHz: at least 26 dB;

(2) On any frequency removed from the carrier frequency by more than 45 kHz, up to the first multiple of the carrier frequency: at least 60 dB or 43 + 10 log P dB, whichever is the lesser attenuation.

7.1.3 MEASUREMENT PROCEDURE

The following spectrum analyzer bandwidth settings should be used for measurement of spurious emissions. When operating in the radiotelephony mode or the supervisory audio tone mode: (1) Any emission not more than 45 kHz removed from the carrier frequency, 300 Hz. (2) Any emission more than 45 kHz removed from the carrier frequency, 30 kHz. When operating in the wideband data mode or the signaling tone mode: (1) Any emission not more than 60 kHz removed from the carrier frequency, 300 Hz. (2) Any emission more than 60 kHz removed from the carrier frequency, 30 kHz.

7.1.4 EMISSION LIMITS - §24.133

The power of any emission shall be attenuated below the transmitter power, as measure in accordance with FCC §24.132.

7.2 SPURIOUS EMISSIONS AT ANTENNA TERMINAL TEST EQUIPMENT

TABLE 7-1: SPURIOUS EMISSIONS AT ANTENNA TERMINAL TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	6/7/02
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585	7/13/02
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 KHz – 6.5 GHz)	3325A00159	12/5/02

7.3 SPURIOUS EMISSIONS TEST DATA

800 MHz GSM
824.200 MHz
Channel 128
Conducted power = 29.41 dBm
Limit = 42.41 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
1648.4	-81.1	1.3	109.2	-66.80
2472.6	-82.9	7.2	105.1	-62.70
3296.8	-84.5	1.8	112.1	-69.70
4121.0	-85.5	1.9	113.0	-70.60
4945.2	-85.6	1.5	113.5	-71.10
5769.4	-85.9	10.4	104.9	-62.50
6593.6	-85.6	6.3	108.7	-66.30
7417.8	-81.5	4.0	106.9	-64.50
8242.0	-83.4	6.3	106.5	-64.10

800 MHz GSM
836.400 MHz
Channel 189
Conducted power = 29.78 dBm
Limit = 42.78 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
1672.8	-82.3	0.8	111.3	-68.5
2509.2	-85.7	6.3	109.2	-66.4
3345.6	-85.4	0.0	115.2	-72.4
4182.0	-85.9	1.9	113.8	-71.0
5018.4	-85.1	0.0	114.9	-72.1
5854.8	-82.0	5.6	106.2	-63.4
6691.2	-82.4	11.2	101.0	-58.2
7527.6	-81.5	1.1	110.2	-67.4
8242.0	-83.2	3.0	110.0	-67.2

800 MHz GSM
848.800 MHz
Channel 251
Conducted power = 29.74 dBm
Limit = 42.74 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
1697.6	-82.6	0.8	111.5	-68.8
2546.4	-83.7	4.1	109.3	-66.6
3395.2	85.8	0.2	-56.3	99.0
4244.0	-85.9	1.7	113.9	-71.2
5092.8	-85.3	0.1	114.9	-72.2
5941.6	-80.7	4.8	105.6	-62.9
6790.4	-82.2	17.2	94.7	-52.0
7639.2	-82.1	0.1	111.7	-69.0
8488.0	-83.6	4.4	108.9	-66.2

1900 MHz GSM
1850.2 MHz
Channel 512
Conducted power = 30.86 dBm
Limit = 43.86 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
3700.4	-83.5	1.2	158.5	-69.3
5550.6	-85.9	2.3	113.2	-70.6
7400.8	-81.9	6.2	114.5	-62.7
9251.0	-81.6	6.5	106.6	-62.1
11101.2	-83.4	3.4	106.0	-67.0
12951.4	<85.0			
14801.6	<85.0			
16651.8	<85.0			
18502.0	<85.0			

1900 MHz GSM
1879.8 MHz
Channel 660
Conducted power = 30.85 dBm
Limit = 43.85 dBc

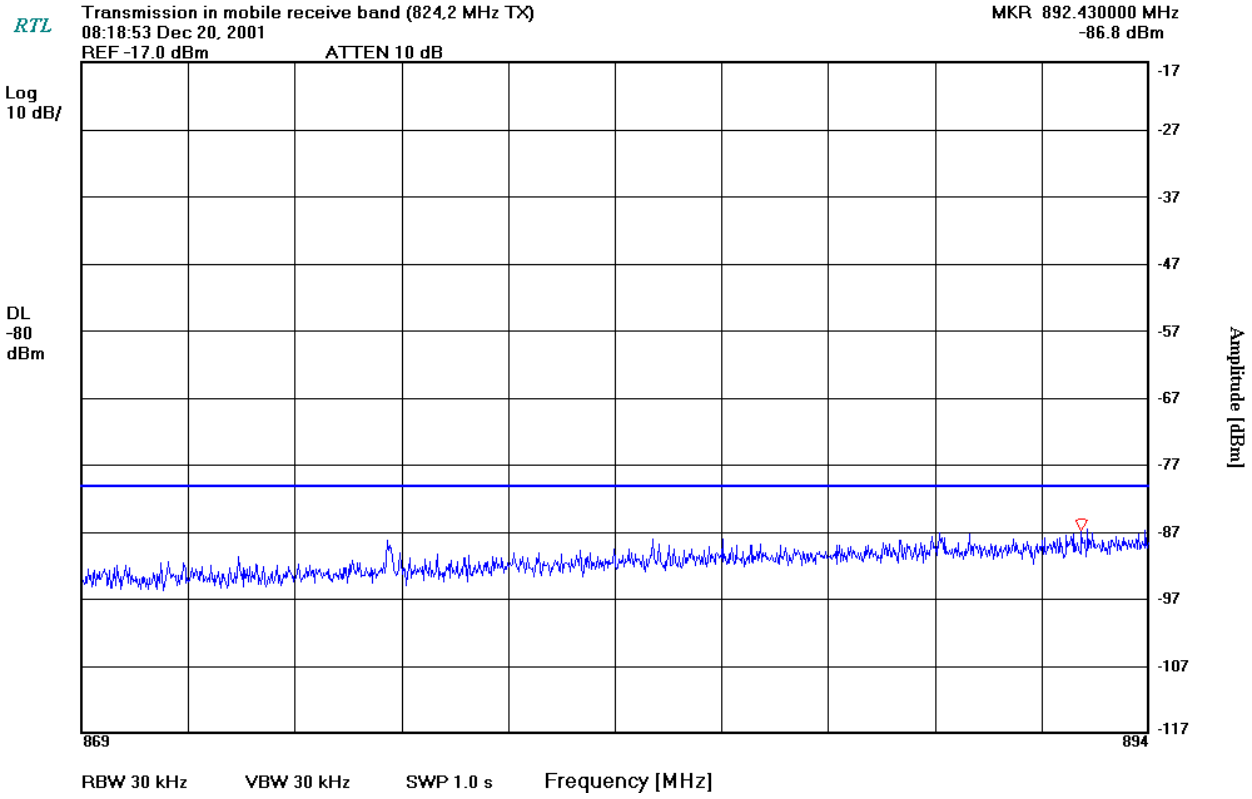
Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
3759.6	-79.1	0.7	65.7	-69.4
5639.4	-83.1	0.8	113.3	-70.8
7519.2	-84.6	13.5	114.7	-55.9
9399.0	-82.4	9.6	99.8	-59.7
11278.8	-82.3	3.5	103.6	-66.8
13158.6	<85.0			
15038.4	<85.0			
16918.2	<85.0			
18798.0	<85.0			

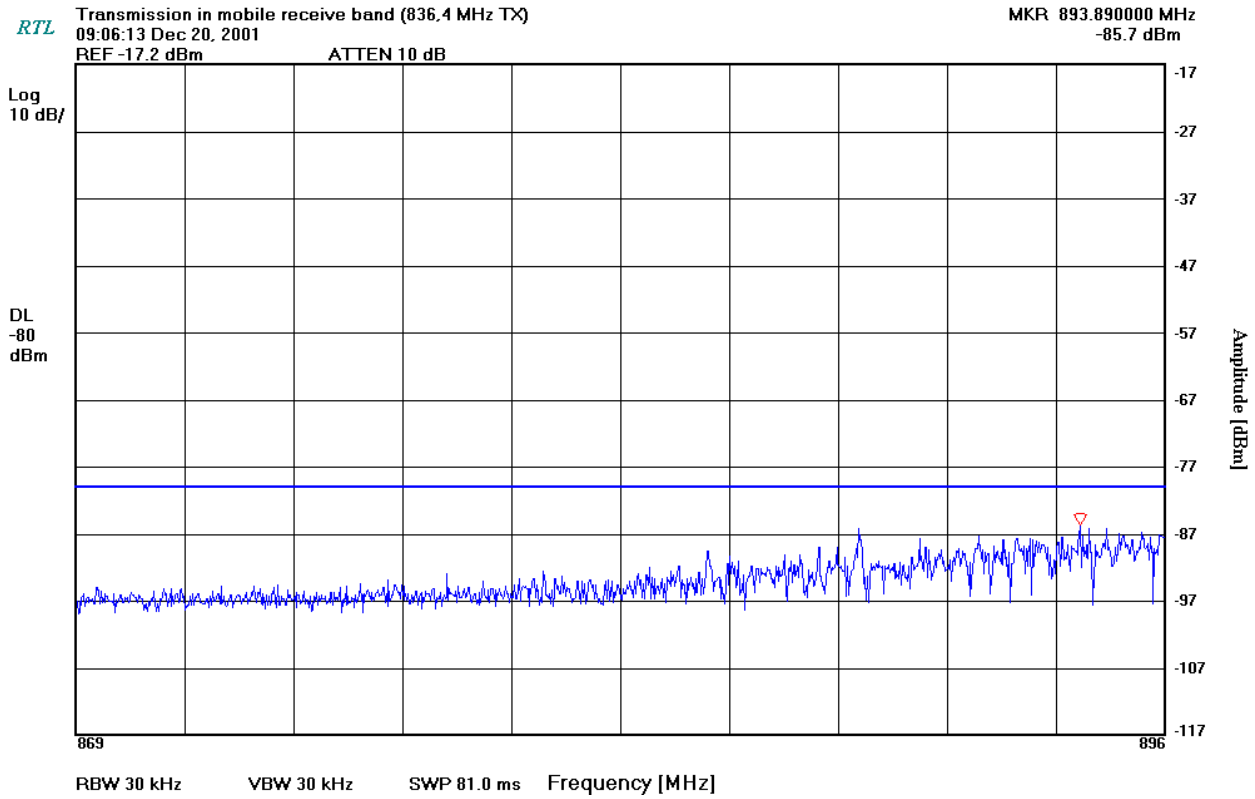
1900 MHz GSM
1909.8 MHz
Channel 810
Conducted power = 30.73 dBm
Limit = 43.73 dBc

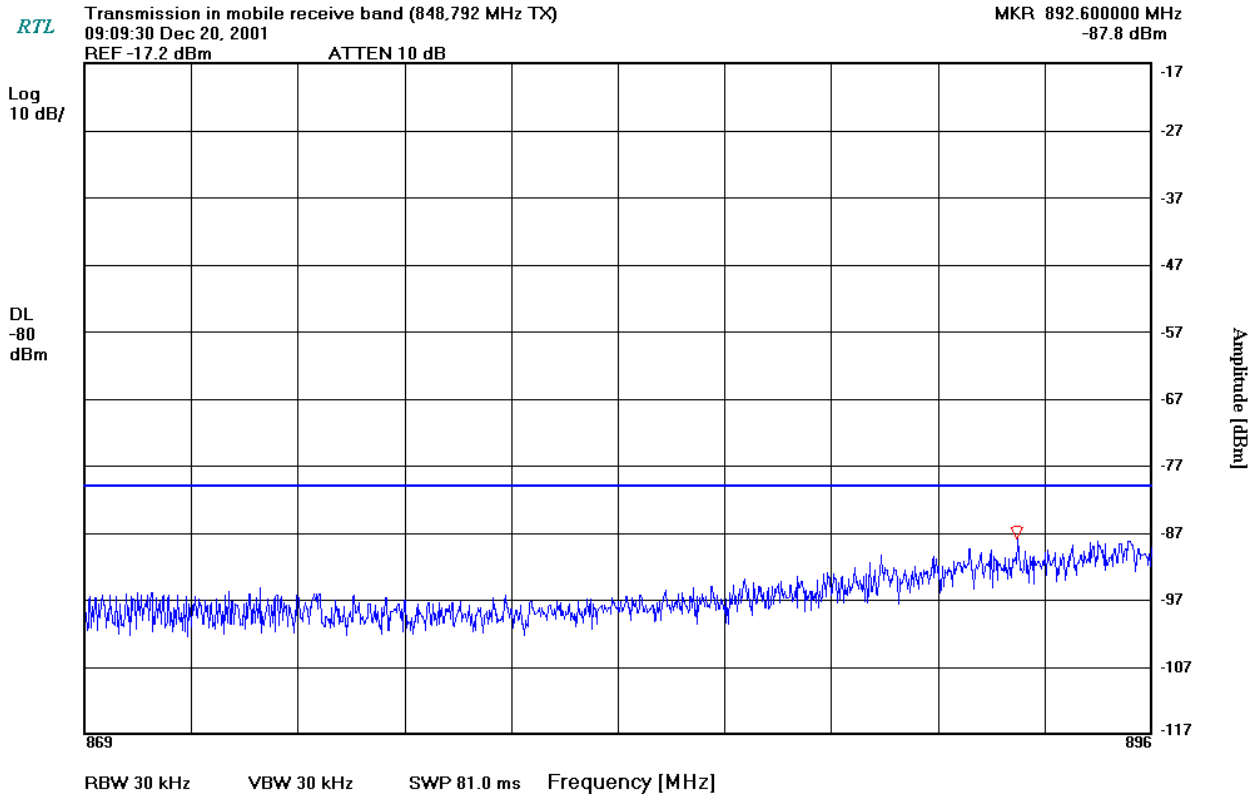
Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
3759.6	-80.0	0.6	157.5	-66.5
5639.4	-82.7	1.0	110.1	-68.8
7519.2	-83.0	16.6	112.4	-53.5
9399.0	-81.7	10.4	97.1	-58.4
11278.8	-83.1	3.9	102.0	-66.3
13158.6	<85.0			
15038.4	<85.0			
16918.2	<85.0			
18798.0	<85.0			

7.4 FCC PART 22.917 (F) MOBILE EMISSIONS IN BASE FREQUENCY RANGE

*Mobile emissions in base frequency rang*e. 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 to exceed 80 dBm at the transmit antenna connector.







8 RADIATED SPURIOUS AND HARMONIC EMISSIONS - §2.1053

8.1 RADIATED SPURIOUS AND HARMONIC EMISSIONS - §2.1053

Radiated and harmonic emissions were measured at our 3-meter outdoor site. The EUT was placed on the turntable with the transmitter transmitting into a non-radiating load. A receiving antenna located 3 meters from the turntable received any signal radiated from the transmitter and its operating accessories. The receiving antenna was varied from 1 to 4 meters and the polarization was varied to determine the worst-case emission level, the EUT was tested in 3 orthogonal planes.

8.2 RADIATED SPURIOUS TEST EQUIPMENT

TABLE 8-1: RADIATED SPURIOUS TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901053	Schaffner Chase	CBL6112B	Bi-Log Antenna (20 MHz – 2 GHz)	2648	5/22/02
901184	Agilent Technologies	E4416A	EPM-P Power Meter, single channel	GB41050573	7/5/02
901186	Agilent Technologies	E9323A (50MHz-6GHz)	Peak & Avg. Power Sensor	US40410380	6/25/02
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz – 22 GHz)	3138A07771	5/16/02
900917	Hewlett Packard	8648C	Signal Generator (100kHz – 3200 MHz)	3537A01741	4/10/02
900928	Hewlett Packard	83752A	Syntesized Sweeper (0.01 GHz – 20 GHz)	3610A00866	5/11/02

8.3 FIELD STRENGTH OF SPURIOUS RADIATION TEST DATA - §2.1053

TABLE 8-2: FIELD STRENGTH DATA §2.1053 (824.2 MHZ GSM)

Operating Frequency (MHz): 824.2
Channel: 128
Measured Cond. Pwr. (dBm): 29.93
Measured ERP (dBm): 28.14
Modulation: GSM
Distance: 3
Limit: 41.14 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBd)	POL (H/V)	ERP (dBc)	Margin (dB)
1648.4	43.9	-38.1	0.8	4.72	H	62.3	-21.2
2472.6	24.5	-39.3	1.6	5.17	H	63.9	-22.8
3296.8	<20						
4121	16.9	-49.2	1.0	6.29	H	72.2	-31.1
4945.2	<20						
5769.4	<20						
6593.6	<20						
7417.8	<20						
8242	<20						

TABLE 8-3: FIELD STRENGTH DATA §2.1053 (836.4 MHZ GSM)

Operating Frequency (MHz): 836.4
Channel: 189
Measured Cond. Pwr. (dBm): 29.94
Measured ERP (dBm): 28.28
Modulation: GSM
Distance: 3
Limit: 41.28 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBd)	POL (H/V)	ERP (dBc)	Margin (dB)
1672.8	45.3	-37.9	0.9	4.72	H	62.4	-21.1
2509.2	22.8	-36.6	1.6	5.16	H	61.3	-20.0
3345.6	<20.0						
4182.0	16.9	-47.3	1.0	6.29	H	70.3	-29.0
5018.4	<20.0						
5854.8	<20.0						
6691.2	<20.0						
7527.6	<20.0						
8364.0	<20.0						

TABLE 8-4: FIELD STRENGTH DATA §2.1053 (836.4 MHZ, GSM)

Operating Frequency (MHz): 848.8
Channel: 251
Measured Cond. Pwr. (dBm): 29.94
Measured ERP (dBm): 28.28
Modulation: GSM
Distance: 3
Limit: 41.28 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBd)	POL (H/V)	ERP (dBc)	Margin (dB)
1697.6	43.1	-41.4	0.9	4.72	H	66.2	-24.6
2546.4	22.1	-37.3	1.8	5.18	H	62.6	-20.9
3395.2	<20						
4244	16.4	-41.9	1.0	6.44	H	65.1	-23.5
5092.8	<20						
5941.6	<20						
6790.4	<20						
7639.2	<20						
8488	<20						

TABLE 8-5: FIELD STRENGTH DATA §2.1053 (1850.2 MHZ GSM)

Operating Frequency (MHz): 1850.2
Channel: 512
Measured Cond. Pwr. (dBm): 30.5
Measured ERP (dBm): 28.13
Modulation: GSM
Distance: 3
Limit: 41.13

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBi)	POL (H/V)	EIRP (dBc)	Margin (dB)
3700.4	48.8	-30.8	1.3	8.1	H	52.2	-11.0
5550.6	36.2	-28.4	2.8	8.7	H	50.6	-9.5
7400.8	<20						
9251.0	<20						
11101.2	<20						
12951.4	<20						
14801.6	<20						
16651.8	<20						
18502.0	<20						

TABLE 8-6: FIELD STRENGTH DATA §2.1053 (1879.8 MHZ GSM)

Operating Frequency (MHz): 1879.8
Channel: 660
Measured Cond. Pwr. (dBm): 30.6
Measured ERP (dBm): 27.55
Modulation: GSM
Distance: 3
Limit: 40.55

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBi)	POL (H/V)	EIRP (dBc)	Margin (dB)
3759.6	43.6	-37.2	1.2	8.0	H	57.9	-17.4
5639.4	24.7	-39.9	2.8	8.7	H	61.6	-21.0
7519.2	<20						
9399.0	<20						
11278.8	<20						
13158.6	<20						
15038.4	<20						
16918.2	<20						
18798.0	<20						

TABLE 8-7: FIELD STRENGTH DATA §2.1053 (1909.8 MHZ GSM)

Operating Frequency (MHz): 1909.8
Channel: 810
Measured Cond. Pwr. (dBm): 30.9
Measured ERP (dBm): 29.09
Modulation: GSM
Distance: 3
Limit: 42.09

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBi)	POL (H/V)	EIRP (dBc)	Margin (dB)
3819.6	34.3	-44.8	1.2	8.0	H	67.1	-25.0
5729.4	24.9	-39.7	2.8	8.7	H	62.9	-20.8
7639.2	<20						
9549.0	<20						
11458.8	<20						
13368.6	<20						
15278.4	<20						
17188.2	<20						
19098.0	<20						

The spectrum analyzer was set to the following settings:

1. Resolution Bandwidth ≤100 kHz
2. Video Bandwidth 10 Hz
3. Sweep Speed 5 Second
4. Detector Mode = Positive Peak

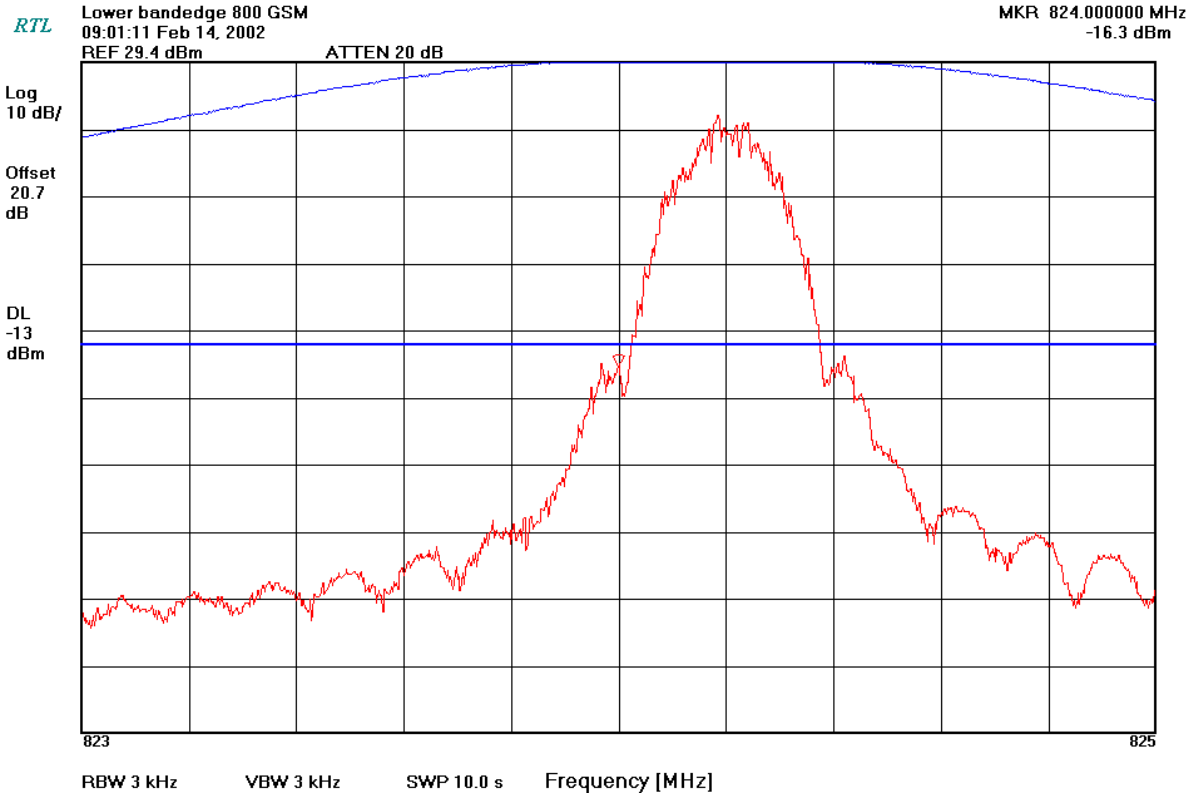
Notes:

ERP Measurements by Substitution Method:

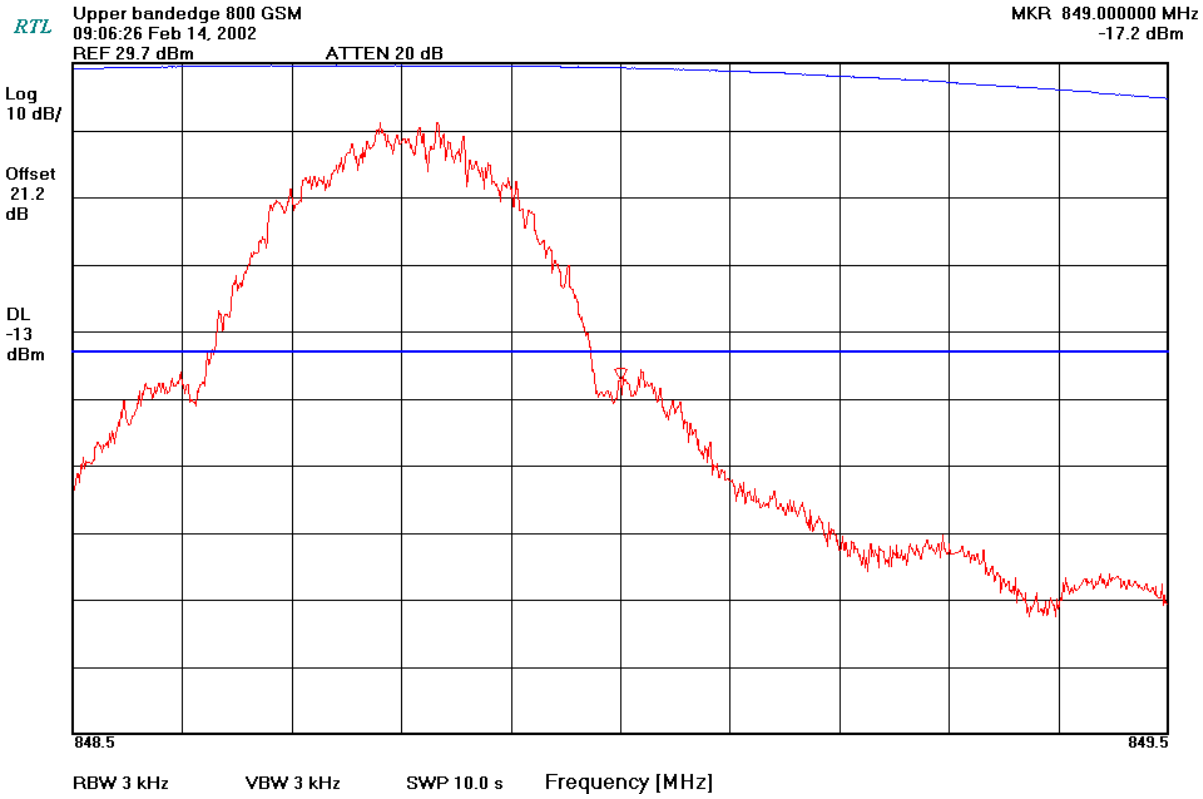
The EUT was placed on a turntable 3-meters from the receive antenna. The field of maximum intensity was found by rotating the EUT approximately 360 degrees through 3 orthogonal planes, and changing the height of the receive antenna from 1 to 4 meters. The field strength was recorded from a calibrated spectrum analyzer for each channel being tested. A horn aantenna was substituted in place of the EUT. The horn was fed through a cable from a signal generator and the power at the signal generator was monitored. The level of the signal generator was adjusted to the same field strength level as the EUT. The conducted power of the signal generator was recorded. The horn gain was then determined and the EIRP level was determined by subtracting the cable loss and adding the horn gain in dBi.

8.4 FCC PART 22.901(D); PART 24.229 AND PART 24.238 - BAND-EDGE COMPLIANCE

800 MHz GSM Lower Bandedge



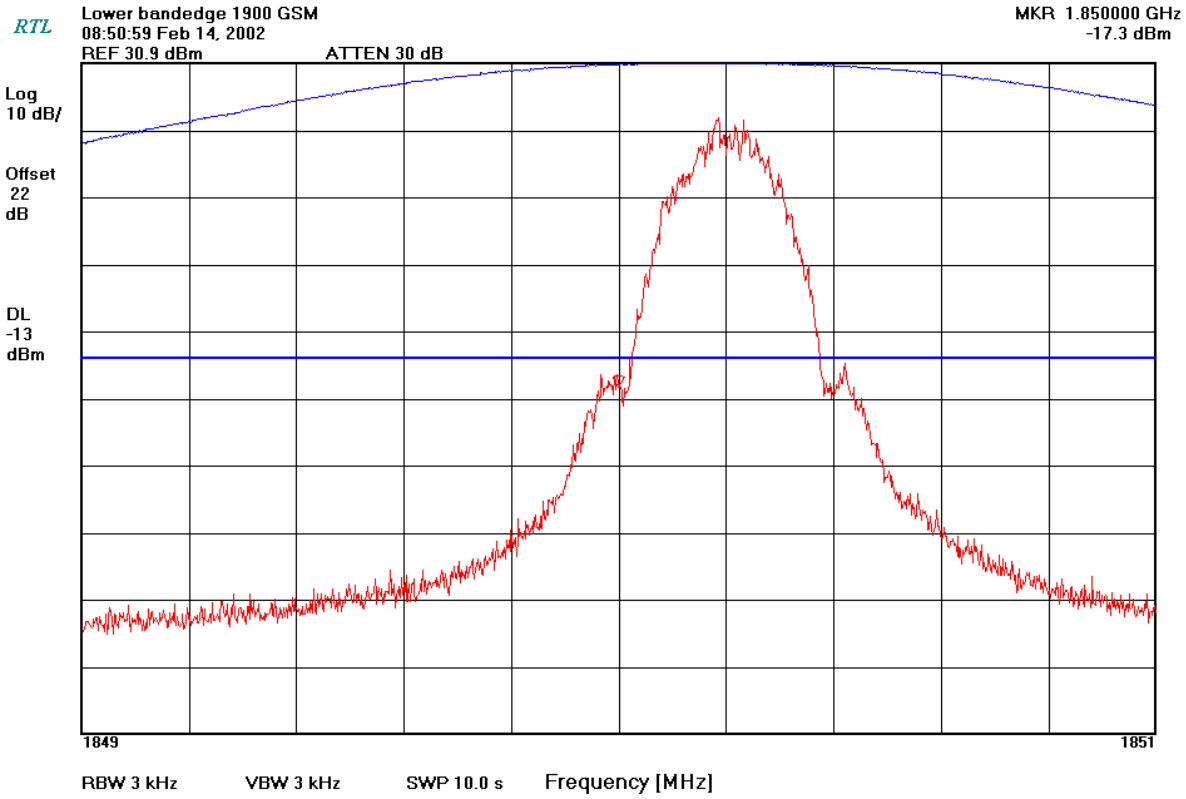
800 MHz GSM Upper bandedge



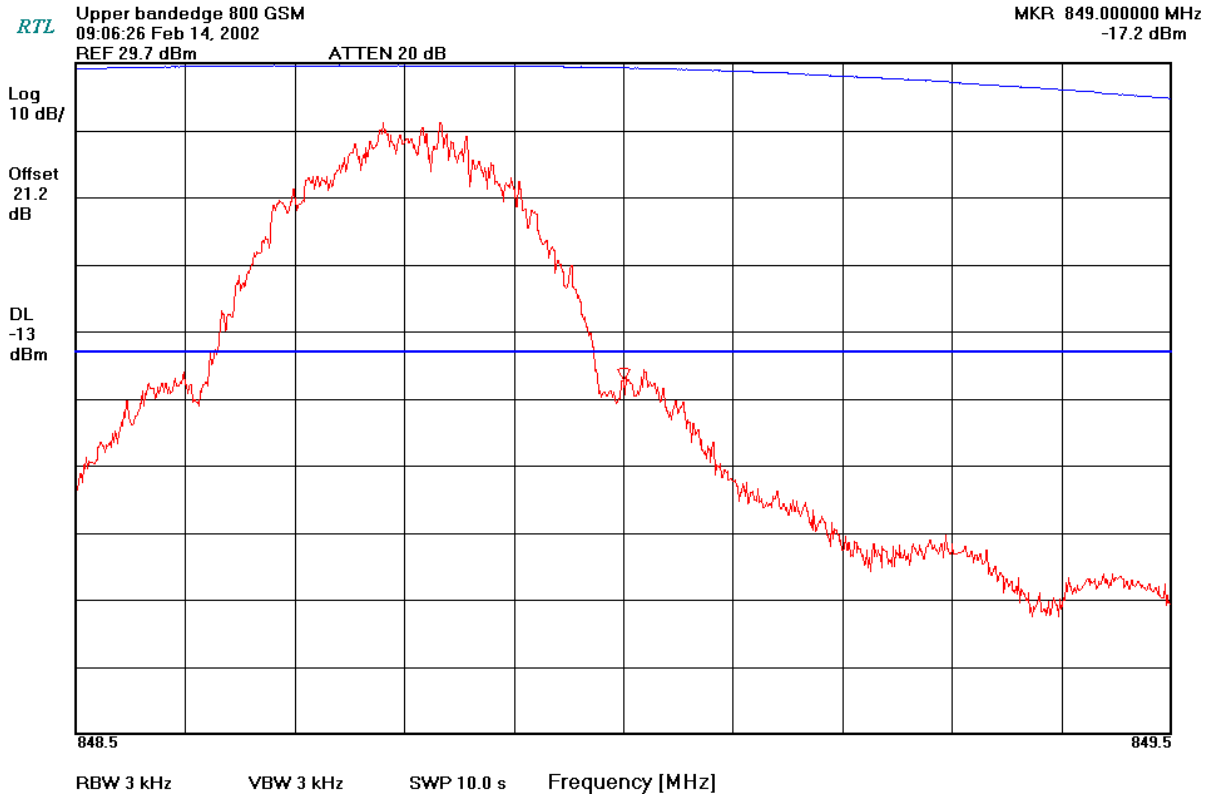
360 Herndon Parkway
Suite 1400
Herndon, VA 20170
http://www.rheintech.com

RTL Work Order: 2001342
RTL Quote Number: QRTL01-378
PO Number: 0070020947
Date of Tests: December 7, 2001

1900 MHz GSM Lower Bandedge



1900 MHz GSM Upper Bandedge



9 FREQUENCY STABILITY / TEMPERATURE VARIATION - §2.1055

The frequency stability and RF power, measured at the antenna connector using a communications test set as the specified load, are plotted against supply voltage variations and temperature variations at the highest power levels for each modulation type. All measurements are made at the center of the frequency band.

9.1 MEASUREMENT METHOD:

The frequency stability of the transmitter was measured by:

1. Temperature: The temperature was varied from -30°C to +60°C at intervals no more than 10°C throughout the temperature range using an environmental chamber. A period of time sufficient to stabilize all of the components in the equipment shall be allowed prior to each frequency measurement.
2. Primary Supply Voltage: The primary supply voltage was varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied. The EUT was tested down to the battery endpoint.

9.2 FREQUENCY STABILITY TEST EQUIPMENT

TABLE 9-1: FREQUENCY STABILITY TEST EQUIPMENT

Manufacturer	Model	Part Type
Inritsu	MT8802A	Radio Communications Test Set
Hewlett Packard	E3631A	Power Supply
Hewlett Packard	E3610A	Power Supply
Hewlett Packard	E4418B	Power Meter
ESPEC	SH-240	Temperature Chamber

9.3 TIME PERIOD AND PROCEDURE:

1. The carrier frequency of the transmitter was measured at room temperature (25°C to provide a reference).
2. The equipment was subjected to a “soak” at -30°C without any power applied.
3. After the “soak” at -30°C, the measurement of the carrier frequency of the transmitter was made within a three-minute interval after applying power to the transmitter.
4. Frequency measurements were made at 10°C intervals up to +60°C, then back to room temperature. A minimum period of one hour was provided to allow stabilization of the equipment at each temperature level.

9.4 FREQUENCY TOLERANCE §22.355:

The maximum frequency stability shall 2.5 ppm for this device

TABLE 9-2: FREQUENCY TOLERANCE §22.355

Frequency Range (MHz)	Base, Fixed (ppm)	Mobile •3 Watts (ppm)	Mobile <=3 Watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	N/A	N/A
929 to 960	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

9.5 FREQUENCY STABILITY § 24.235

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

9.6 FREQUENCY STABILITY TEST DATA - §2.1055

Operating Frequency: 836.4 and 1879.8 MHz
Channel: 189 and 660
Reference Voltage: 3.6 VDC
Deviation Limit: 0.00025 % or 2.5 ppm

TABLE 9-3: TEMPERATURE FREQUENCY STABILITY DATA - §2.1055 (800 MHZ GSM BAND)

Temperature	Frequency Measured (MHz)	ppm
-30	836.399987	-0.02
-25	836.399983	-0.02
-20	836.399983	-0.02
-15	836.399986	-0.02
-10	836.399996	-0.01
0	836.400029	0.03
10	836.399980	-0.02
20	836.400030	0.04
30	836.399985	-0.02
40	836.400018	0.02
50	836.399980	-0.02
60	836.399971	-0.03

PLOT 9-1: TEMPERATURE FREQUENCY STABILITY DATA - §2.1055 (800 MHZ GSM BAND)

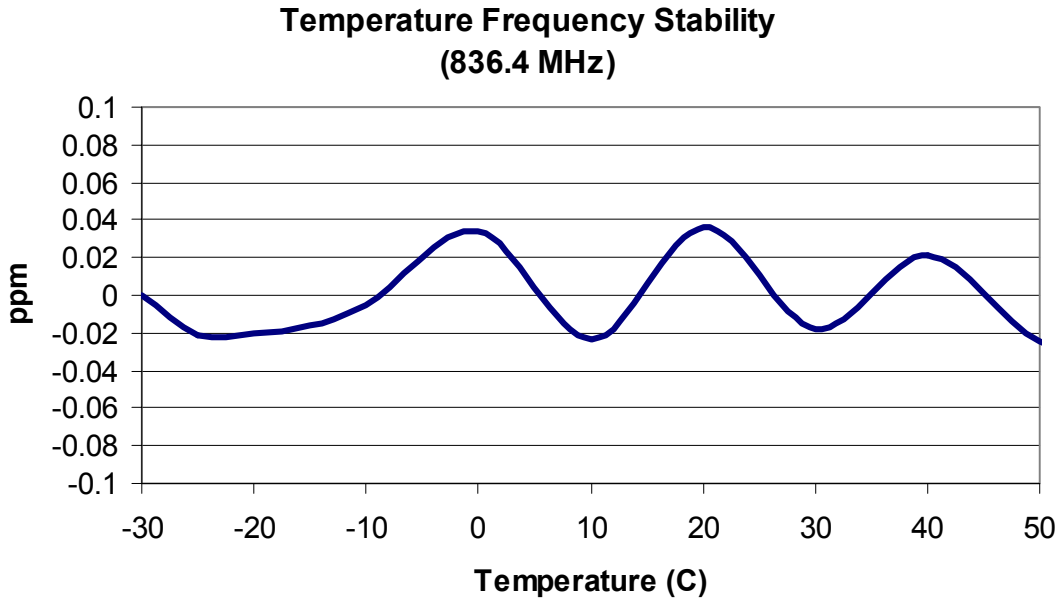


TABLE 9-4: TEMPERATURE FREQUENCY STABILITY DATA - §2.1055 (1900 MHZ GSM BAND)

Temperature	Frequency Measured (MHz)	ppm
-30	1879.799996	-0.002
-25	1879.800005	0.003
-20	1879.799996	-0.002
-15	1879.799994	-0.003
-10	1879.799993	-0.004
0	1879.799928	-0.038
10	1879.799877	-0.066
20	1879.799949	-0.027
30	1879.799916	-0.045
40	1879.799923	-0.041
50	1879.799862	-0.073
60	1879.799901	-0.053

PLOT 9-2: TEMPERATURE FREQUENCY STABILITY DATA - §2.1055 (1900 MHZ GSM BAND)

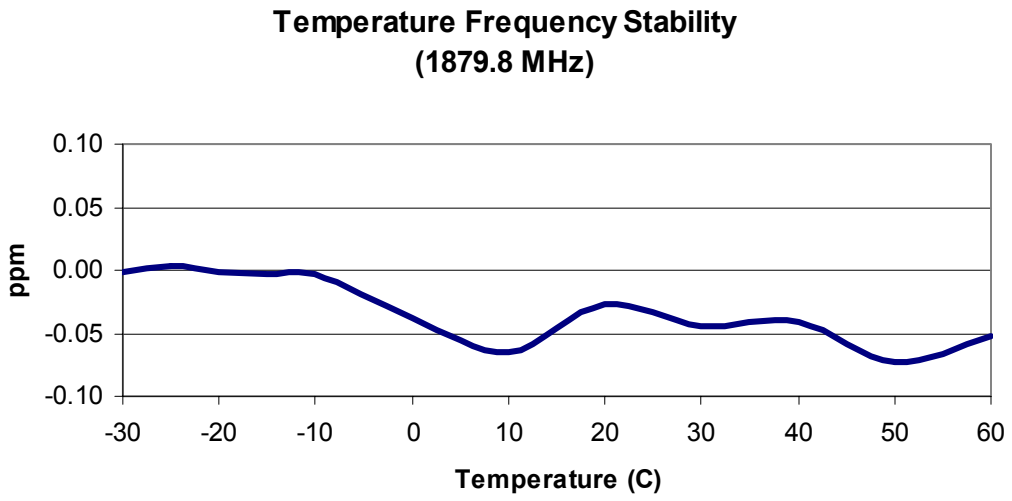


TABLE 9-5: VOLTAGE FREQUENCY STABILITY DATA - §2.1055 (800 MHZ GSM BAND)

Voltage (DC)	Frequency Measured (MHz)	ppm
3.0	836.399994	-0.008
3.1	836.399981	-0.022
3.2	836.399981	-0.023
3.3	836.399982	-0.022
3.4	836.399994	-0.008
3.5	836.399988	-0.014
3.6	836.399993	-0.009
3.7	836.399993	-0.008
3.8	836.399992	-0.010
3.9	836.399992	-0.009
4.0	836.399996	-0.004
4.1	836.399994	-0.007
4.2	836.400004	0.005

PLOT 9-3: VOLTAGE FREQUENCY STABILITY DATA - §2.1055 (800 MHZ GSM BAND)

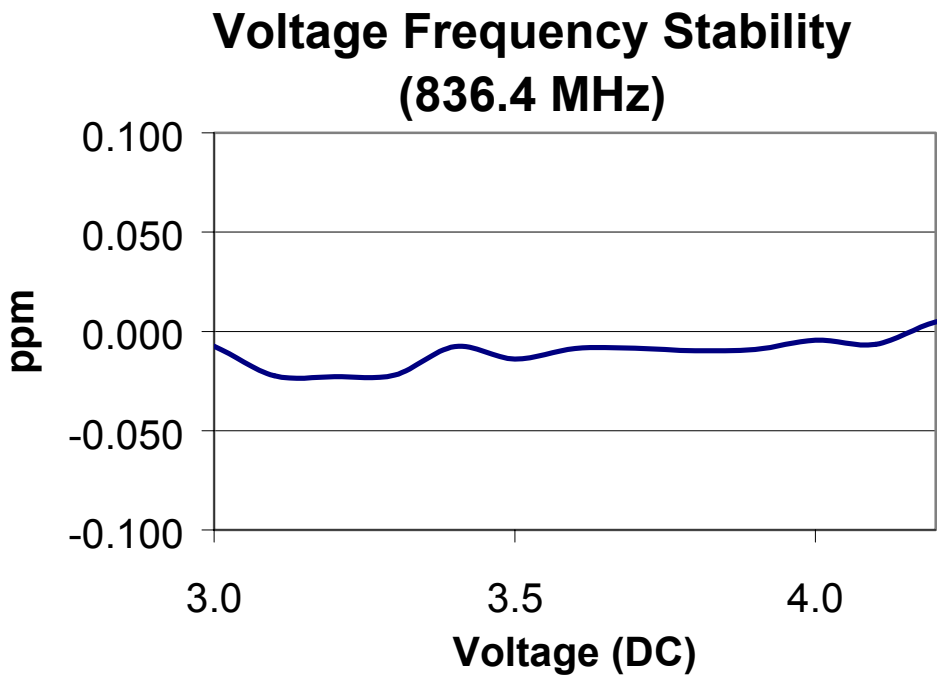
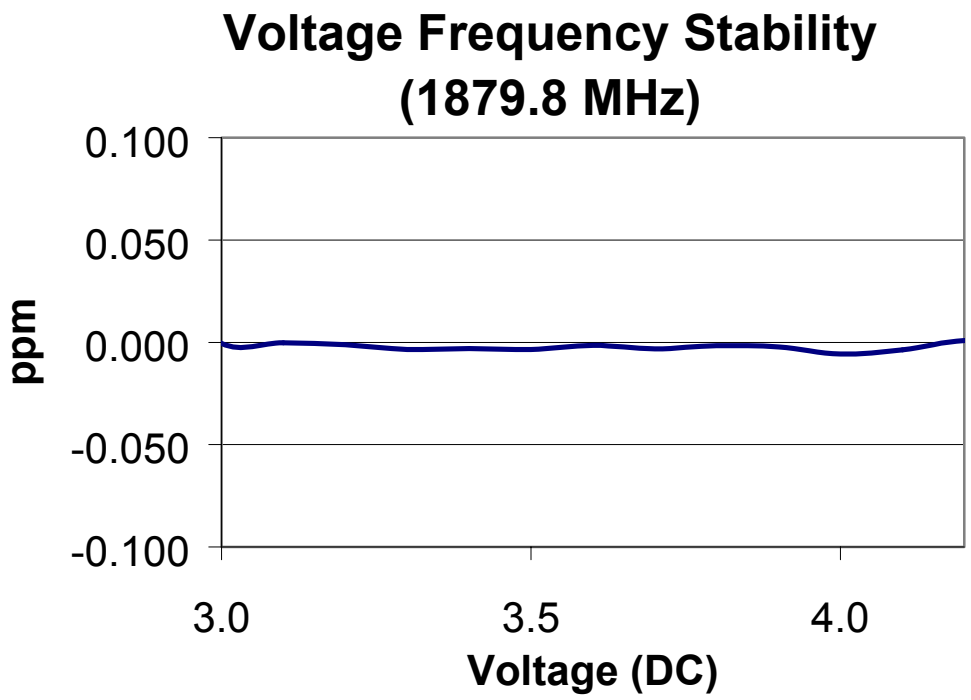


TABLE 9-6: VOLTAGE FREQUENCY STABILITY DATA - §2.1055 (1900 MHZ GSM BAND)

Voltage (DC)	Frequency Measured (MHz)	ppm
3.0	1879.799999	-0.001
3.1	1879.800000	0.000
3.2	1879.799998	-0.001
3.3	1879.799993	-0.003
3.4	1879.799994	-0.003
3.5	1879.799993	-0.004
3.6	1879.799997	-0.002
3.7	1879.799994	-0.003
3.8	1879.799997	-0.002
3.9	1879.799996	-0.002
4.0	1879.799989	-0.006
4.1	1879.799993	-0.004
4.2	1879.800002	0.001

PLOT 9-4: VOLTAGE FREQUENCY STABILITY DATA - §2.1055 (1900 MHZ GSM BAND)



10 CONCLUSION

Test Lab:	Applicant Information
Rhein Tech Laboratories, Inc. 360 Herndon Parkway Suite 1400 Herndon, VA 20170 Phone: 703-689-0368 Fax: 703-689-2056 Web Site: www.rheintech.com	Sony Ericsson Mobile Communications (USA, Inc.) 7001 Development Drive P.O. Box 13969 Research Triangle Park, NC 27709 USA Phone: 919-472-1697 (Pierre Chery)

FCC ID:	PXITR-419-A2	**FRN NUMBER:**	0005-0294-00
EQUIPMENT TYPE:	GSM	**MODEL(S):**	T61g and T61z
RTL WORK ORDER NUMBER:	2001342	**RTL QUOTE NUMBER:**	QRTL01-378
DATE OF TEST REPORT:	February 14, 2002		

FCC Classification:	☐ PCB – Licensed Base Station for Part 24 ☒ PCE – Part 24 Licensed Portable Transmitter held to ear ☐ PCF – Part 24 Licensed Portable Transmitter held to face ☐ PCT – Part 24 Licensed Portable Transmitter held to body	
FCC Rule Part(s):	Part 22: Public Mobile Services ☐ Subpart E – Paging and Radiotelephone Services ☐ Subpart F – Rural Radiotelephone Services ☐ Subpart G – Air-Ground Radiotelephone Services ☒ Subpart H – Cellular Radiotelephone Services ☐ Subpart I – Offshore Radiotelephone Services	Part 24: Personal Communications Services ☐ Subpart D – Narrowband PCS ☒ Subpart E – Broadband PCS
Industry Canada Standard:	☐ RSS-118: Land and Subscriber Stations: Voice, Data and Tone Modulated, Angle Modulation Radiotelephone Transmitters and Receivers Operating in the Cellular Mobile Bands 824-849 MHz and 869-894 MHz ☐ RSS-128: 800 MHz Dual-Mode TDMA Cellular Telephones ☐ RSS-129: 800 MHz Dual Mode CDMA Cellular Telephones ☒ RSS-133: 2 GHz Personal Communications Services	

Frequency Range (MHz)	Output Power (W)	Freq. Tolerance (ppm, %, or Hz)	Emission Designator
824-849	0.733 W ERP	0.1 ppm	256KGXW
1850-1910	0.811 W EIRP	0.1 ppm	246KGXW

The data in this measurement report shows that the Sony Ericsson Mobile Communications (USA, Inc.), T61g FCC ID: PXITR-419-A2 complies with all the requirements of Parts 2 , 22.901, and 24 (E) of the FCC Rules and Industry Canada RSS-133.