Engineering and Testing for EMC and Safety Compliance

CERTIFICATION APPLICATION REPORT
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-505 A2	**GRANTEE FRN NUMBER:**	0005-0294-00
PLAT FORM:	N/A	**RTL WORK ORDER NUMBER:**	2002107
MODEL(S):	DM-25	**RTL QUOTE NUMBER:**	QRTL02-449
DATE OF TEST REPORT:	June 6, 2002		

American National Standard Institute:	ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1
FCC Classification:	TBC – Licensed Broadcast Station Transmitter
FCC Rule Part(s):	Part 22: Public Mobile Services Subpart H – Cellular Radiotelephone Services Part 24: Personal Communications Services Subpart E – Broadband PCS
Industry Canada Standard:	RSS-128: 800 MHz Dual-Mode TDMA Cellular Telephones RSS-133: 2 GHz Personal Communications Services
Digital Interface Information	Digital Interface was found to be compliant
Receiver Information	Receiver was found to be compliant

Frequency Range (MHz)	Power (W)	Freq. Tolerance	Emission Designator
824.04-848.97 1850.04-1909.92	3.162 W AMPS Burst Mode 0.411 W Burst Average TDMA	2.5 ppm	30K0DXW; 40K0F1D; 40K0F8W

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-128, RSS-133, ANSI C63.4, ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1.

Signature: _____ Date: June 6, 2002

Typed/Printed Name: Desmond Fraser Position: President

Signature: _____ Date: June 6, 2002

Typed/Printed Name: Daniel W. Baltzell Position: EMC Test Engineer

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-128: This Radio Standards Specification (RSS) and the TIA/EIA-627 Compatibility Standard referred to in section 3.10 set out the minimum requirements for the certification (type-approval) of transmitters and receivers for the dual-mode (analog and digital TDMA) cellular telephone system in the 824-849 MHz and 869-894 MHz paired bands.

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-129 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 Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 1992).

1.3 RELATED SUBMITTAL(S)/GRANT(S)

This is a certification application.

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)

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Digital Interface Information	Digital Interface was found to be compliant
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Frequency Range (MHz)	Power (W)	Freq. Tolerance	Emission Designator
824.04-848.97 1850.04-1909.92	3.162 W AMPS Burst Mode 0.411 W Burst Average TDMA	2.5 ppm	30K0DXW; 40K0F1D; 40K0F8W

2.2 JUSTIFICATION

To complete the test configuration required by the FCC, the receiver was tested using client provided software to place the device in a receive mode for Part 15 data. The DM-25 crystal oscillators and harmonics of each were investigated. All modes were investigated and tested including standby mode and receiving mode. 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. The data presented represents worst case data measured.

2.3 EXERCISING THE EUT

The DM-25 was tested using client-based software to set all the parameters required for testing, such as modulation types, frequencies, and receive mode.

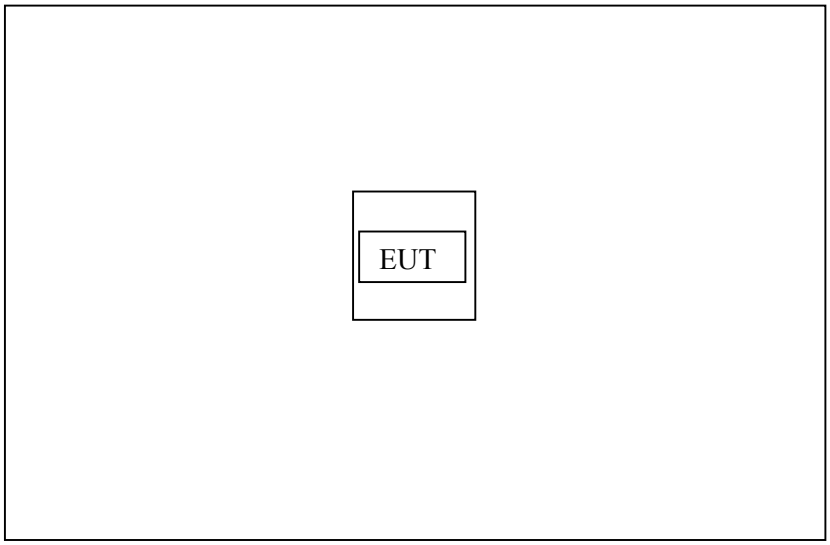
2.4 TEST SYSTEM DETAILS

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 BAR CODE
Wireless Communication Module	SONY ERICSSON MOBILE COMMUNICATIONS	DM-25	TE60012MJF	PXITR-505 A2	UNSHIELDED	14411
Wireless Communication Module	SONY ERICSSON MOBILE COMMUNICATIONS	DM-25	TE60012MJG	PXITR-505 A2	UNSHIELDED	14412
Wireless Communication Module	SONY ERICSSON MOBILE COMMUNICATIONS	DM-25	TE60012MK2	PXITR-505 A2	UNSHIELDED	14413
Power Supply	HEWLETT PACKARD	E3610A	KR83020678	N/A	UNSHIELDED	14415
Power Supply	HEWLETT PACKARD	E3610A	KR83020714	N/A	UNSHIELDED	14414
Laptop	TOSHIBA	500CDT/1.3	10668837	DoC	N/A	14417
Interface Box	SONY ERICSSON MOBILE COMMUNICATIONS	DM20/DM45	MODULE 03	N/A	UNSHIELDED	14416

2.5 CONFIGURATION OF TESTED SYSTEM



3 FCC PART 2.1033(C)(8); DC VOLTAGES AND CURRENTS

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.

VCC_12V	13.8 volt ± 20%, 1.5 A max
VCC_5V	5 volt ± 13.3% regulated, 1A max

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.

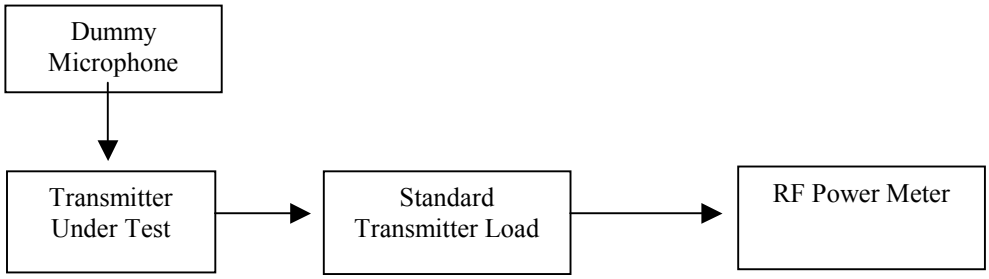


FIGURE 4-1: ILLUSTRATION OF HOW THE EQUIPMENT IS CONNECTED

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.

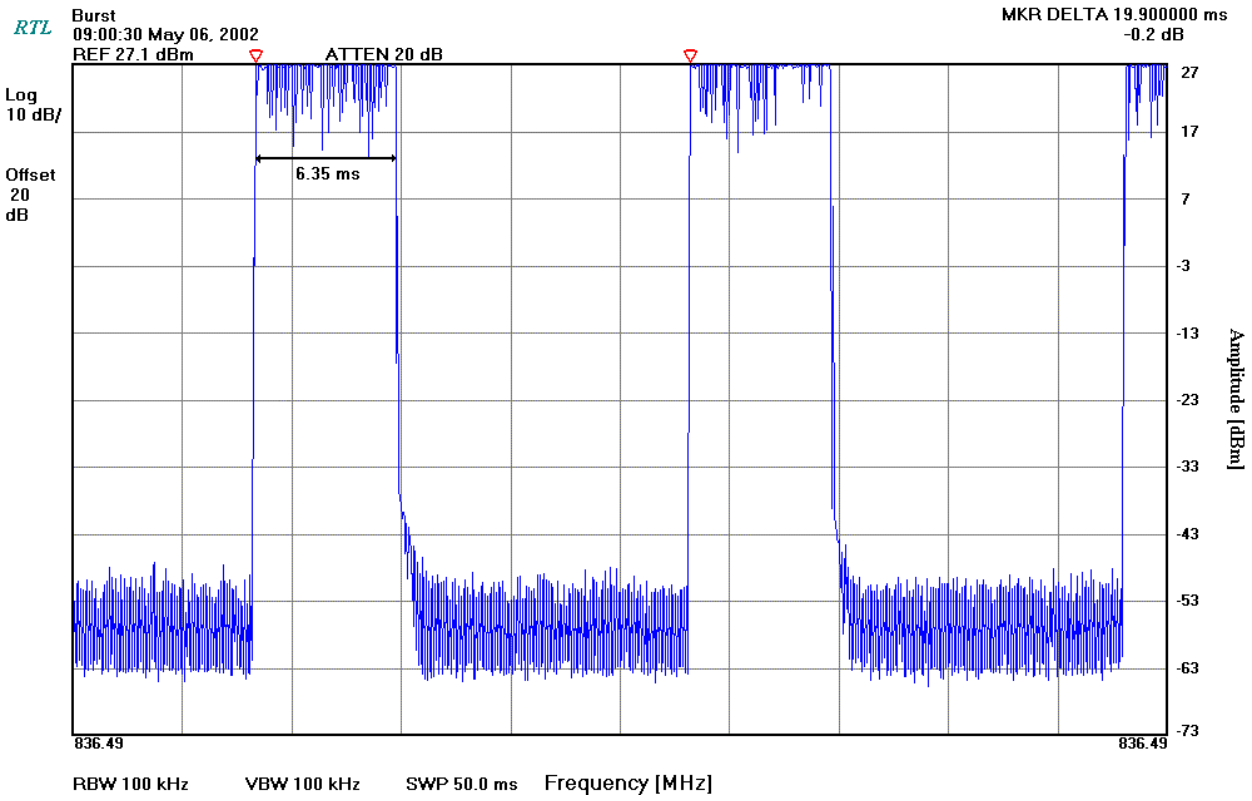
In addition, transmitters that are single sideband, independent sideband and controlled carrier radiotelephone the transmitter shall be modulated during the test as follows. In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power,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

4.2 RF POWER OUTPUT TEST EQUIPMENT

TABLE 4-1: RF POWER OUTPUT TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
901184	Agilent Technologies	E4416A	EPM-P Power Meter, single channel	GB41050573
901186	Agilent Technologies	E9323A (50MHz-6GHz)	Peak & Avg. Power Sensor	US40410380
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz – 22 GHz)	3138A07771
	Rhein Tech Laboratories, Inc.	N/A	RTL Advanced Measurement Software Version 3.4.4 12/18/01	N/A

4.3 DUTY CYCLE/CREST FACTOR MEASUREMENT



Duty cycle calculation from above plot:

6.35 ms / 19.9 ms = 0.319 or 31.9 % duty cycle
crest factor = 1/.319 = 3.13
10 LOG 0.319 = -5 dB duty factor.

Signature: _____ Test Date: May 7, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

4.4 POWER OUTPUT TEST DATA- §2.1046

TABLE 4-2: ANTENNA CONDUCTED POWER OUTPUT DATA - §2.1046

(800MHZ AMPS)

Channel Number	Frequency (MHz)	AMPS Burst Peak Power Meter Level (dBm)	AMPS Burst Average Power Meter Level (dBm)	Modulation Average Power Level (mW)
991	824.04	26.29	26.27	423.6
383	836.49	26.27	26.10	407.4
799	848.97	26.19	26.05	402.7

(800MHZ AMPS BURST)

Channel Number	Frequency (MHz)	AMPS Burst Peak Power Meter Level (dBm)	AMPS Burst Average Power Meter Level (dBm)	Modulation Average Power Level (mW)
991	824.04	35.13	35.00	3162.3
383	836.49	35.11	34.94	3118.9
799	848.97	35.62	35.00	3162.3

(800MHZ TDMA)

Channel Number	Frequency (MHz)	TDMA Burst Peak Power Meter Level (dBm)	TDMA Burst Average Power Meter Level (dBm)	Duty Factor (dB)	Modulation Average Power Level (dBm)	Modulation Average Power Level (mW)
991	824.04	27.19	26.14	-5.0	21.1	130.0
383	836.49	27.10	26.00	-5.0	21.0	125.9
799	848.97	26.89	25.98	-5.0	21.0	125.3

(1900 MHz TDMA)

Channel Number	Frequency (MHz)	TDMA Burst Peak Power Meter Level (dBm)	TDMA Burst Average Power Meter Level (dBm)	Duty Factor (dB)	Modulation Average Power Level (dBm)	Modulation Average Power Level (mW)
2	1850.04	26.75	25.68	-5.0	20.7	116.9
1000	1879.98	26.72	25.67	-5.0	20.7	116.7
1998	1909.929	26.91	25.74	-5.0	20.7	118.6

Signature:  Test Date: May 6, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

5 MODULATION CHARACTERISTICS - §2.1047

5.1 MODULATION CHARACTERISTICS - §2.1047 TEST PROCEDURE

(a) *Voice modulated communication equipment.* A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.
(b) *Equipment which employs modulation limiting.* A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability
throughout the range of modulating frequencies and input modulating signal levels employed.

5.2 MODULATION REQUIREMENTS - §22.915 TEST PROCEDURE

Cellular systems must be capable of providing service using the types of modulation described in the cellular system compatibility specification.

5.3 MODULATION CHARACTERISTICS TEST EQUIPMENT

TABLE 5-1: MODULATION CHARACTERISTICS TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
901055	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2545A04102
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585
901054	Hewlett Packard	HP 3586B	Selective Level Meter	1928A01892
	Rhein Tech Laboratories, Inc.	N/A	RTL Advanced Measurement Software Version 3.4.4 12/18/01	N/A

5.4 MODULATION CHARACTERISTICS TEST DATA

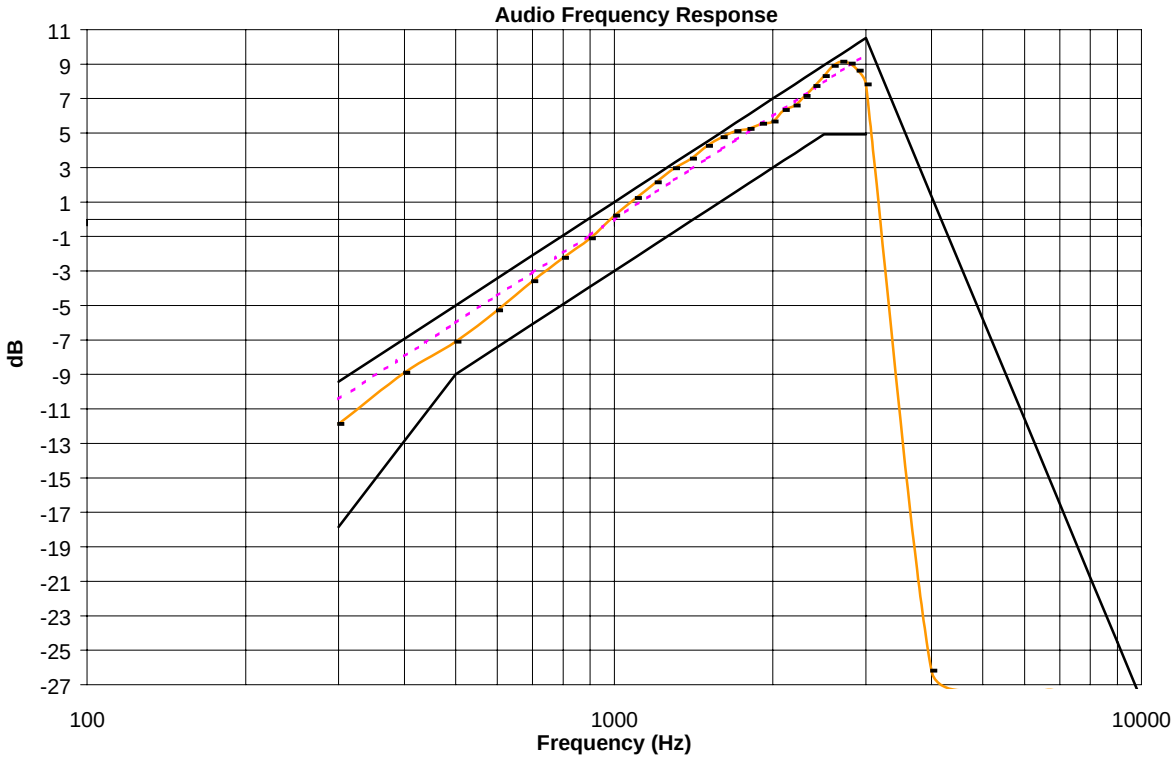
5.4.1 MEASURED DEVIATION LEVELS §22.915(B)

Type	Measured	Rated	Lower Limit	Upper Limit
Voice	11.51	12	10.8	13.2
Wideband	8.8	8	7.2	8.8
SAT	2.137	2	1.8	2.2
ST	7.72	8	7.2	8.8

Signature:  Test Date: June 6, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

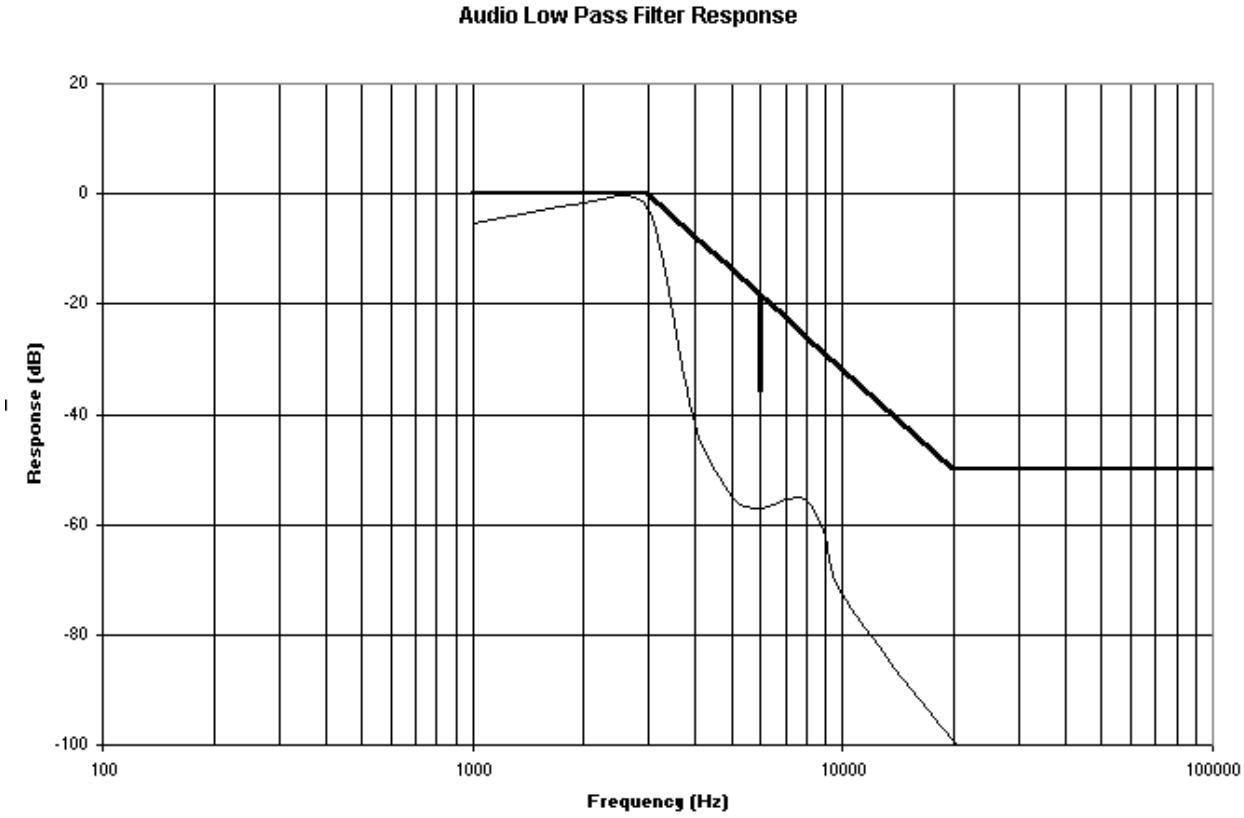
5.4.2 AUDIO FREQUENCY RESPONSE



Signature: _____ Test Date: May 7, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

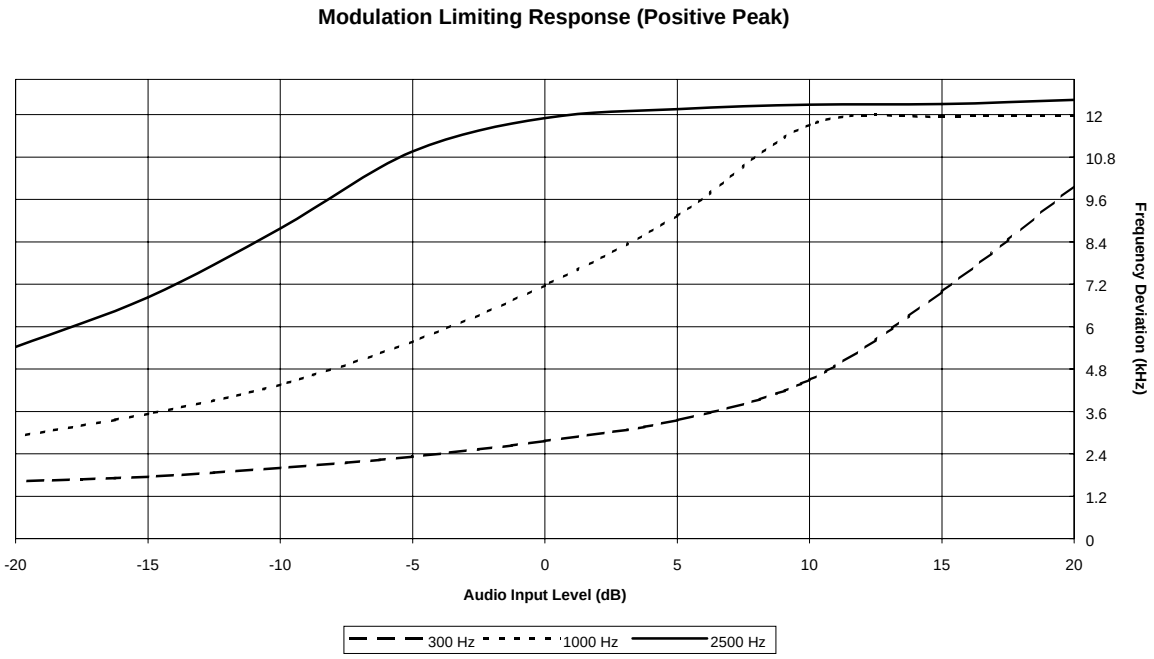
5.4.3 AUDIO LOW PASS FILTER RESPONSE



Signature: _____ Test Date: May 8, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

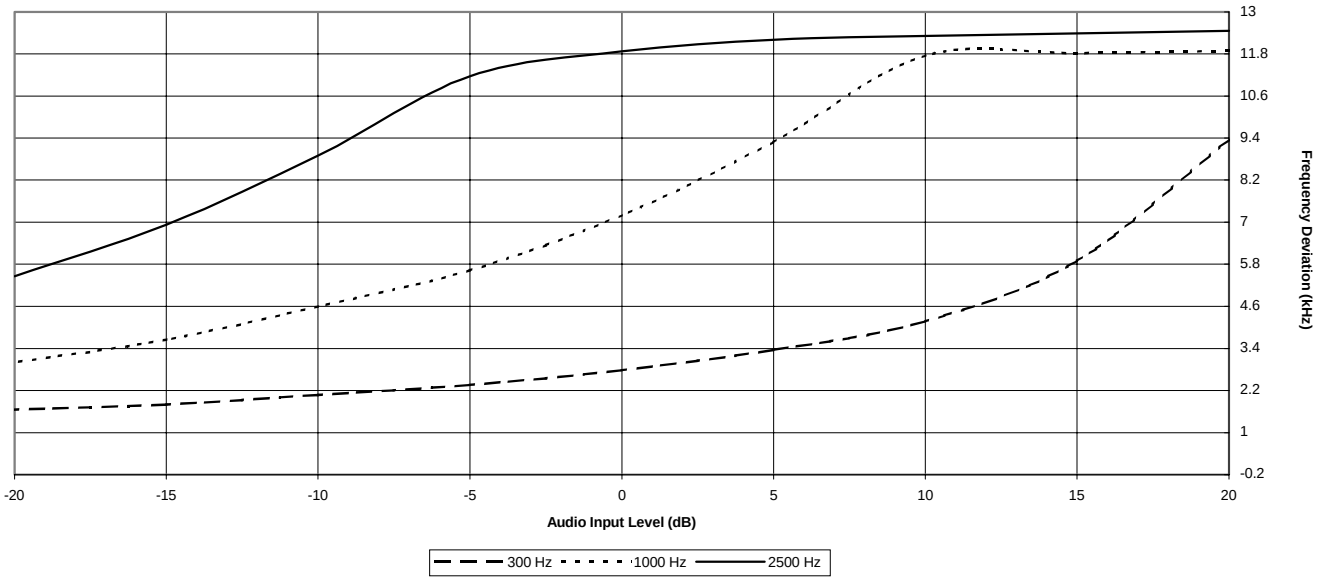
5.4.4 MODULATION LIMITING RESPONSE



Signature: _____ Test Date: May 8, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

Modulation Limiting Response (Negative Peak)



Signature: _____ Test Date: May 8, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

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 20 kHz, up to and including 45 kHz, the sideband was at least 26dB below the carrier.
B. On any frequency removed from the assigned carrier frequency by more than 45 kHz, up to and including 90 kHz, the sideband was at least 45 dB below the carrier.
C. On any frequency removed from the assigned carrier frequency by more than 90 kHz, 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 TEST EQUIPMENT

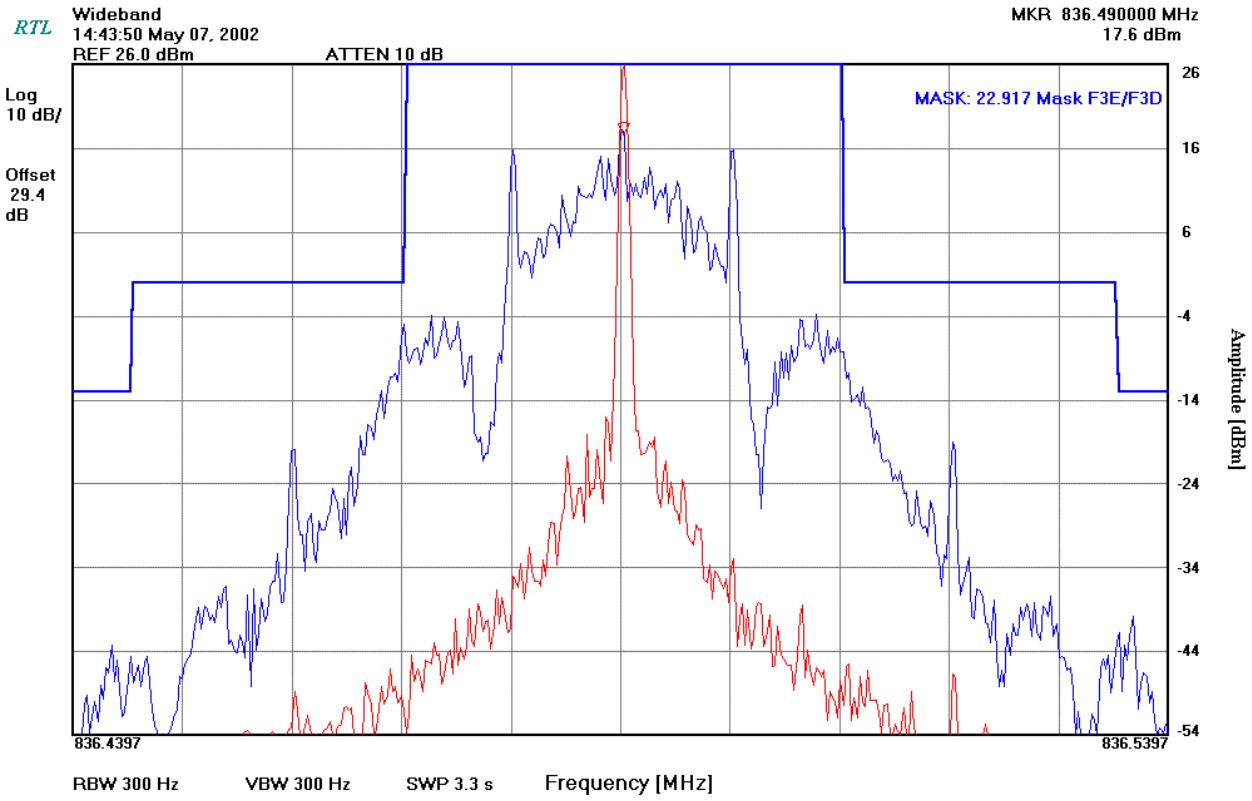
TABLE 6-1: OCCUPIED BANDWIDTH TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
900913	HEWLETT PACKARD	85462A	EMI Receiver RF Section, 9 KHz - 6.5 GHz	3325A00159
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585
	Rhein Tech Laboratories, Inc.	N/A	RTL Advanced Measurement Software Version 3.4.4 and 3.4.5 12/18/01-5/8/02	N/A

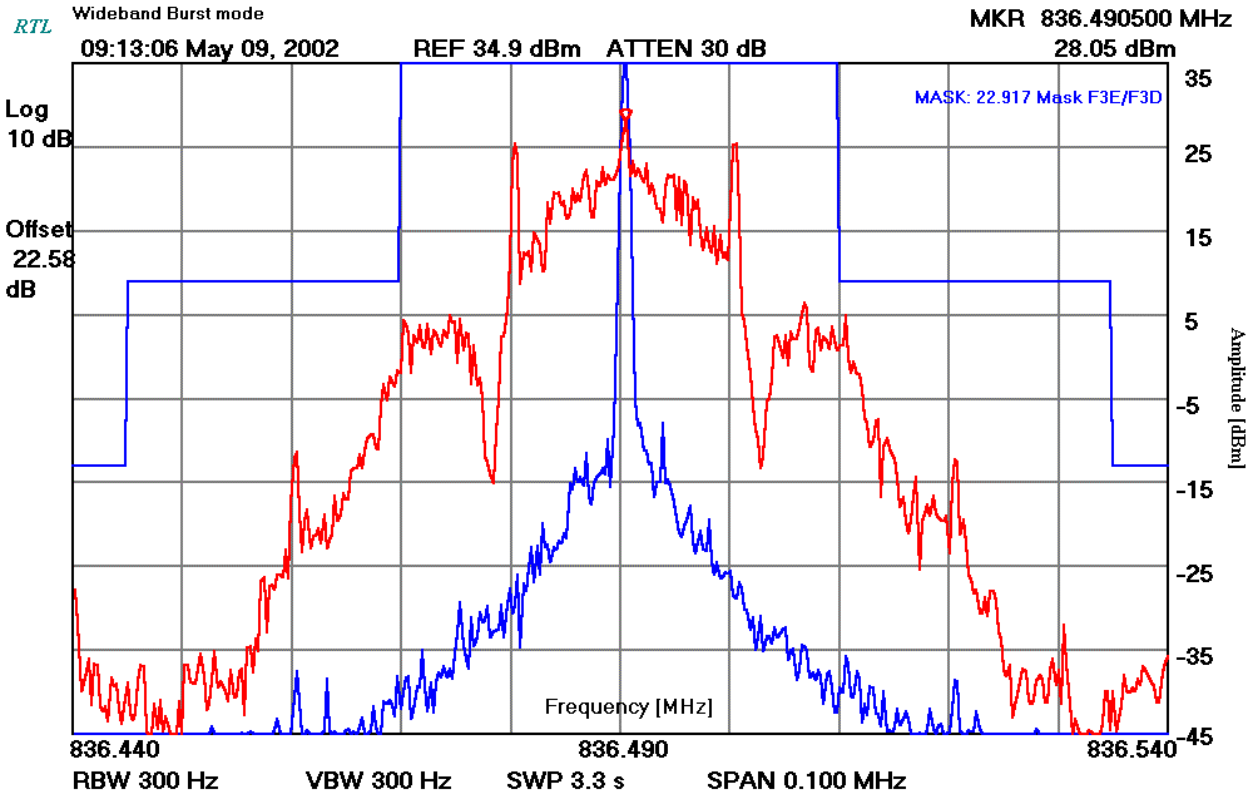
6.3 OCCUPIED BANDWIDTH TEST DATA

6.3.1 WIDEBAND

40 kHz Channel Bandwidth; Wideband; 836.49 MHz; 8.8 kHz deviation

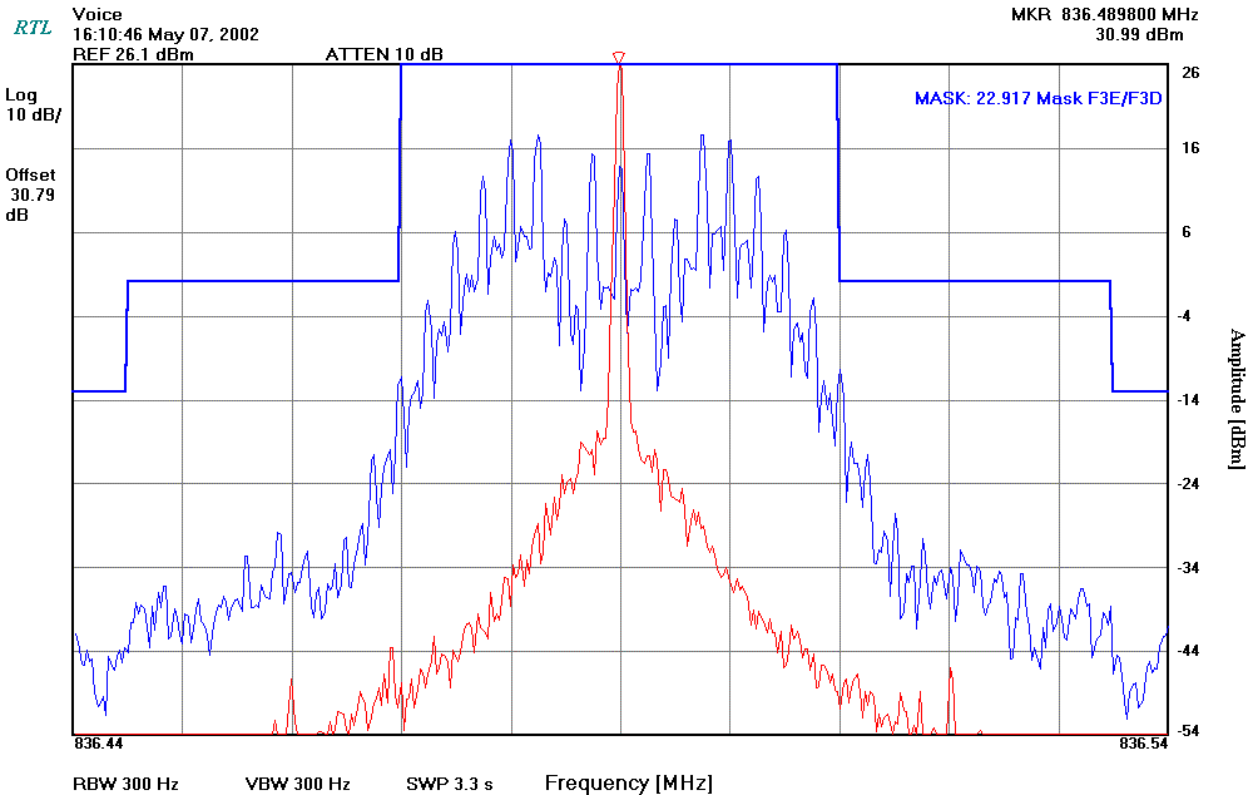


40 kHz Channel Bandwidth; Wideband; 836.49 MHz; 8.8 kHz deviation; Burst mode

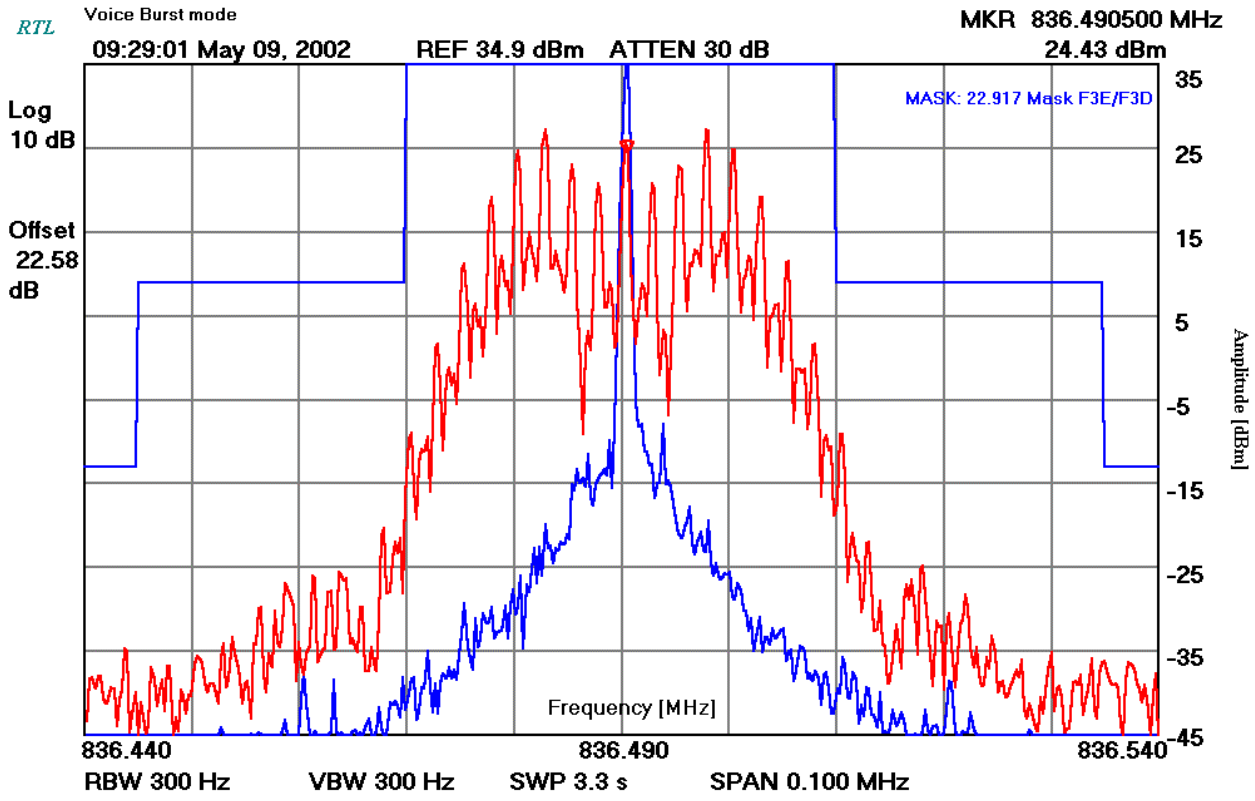


6.3.2 VOICE

40 kHz Channel Bandwidth; Voice; 836.49 MHz; 2500 kHz; 11.51 kHz deviation

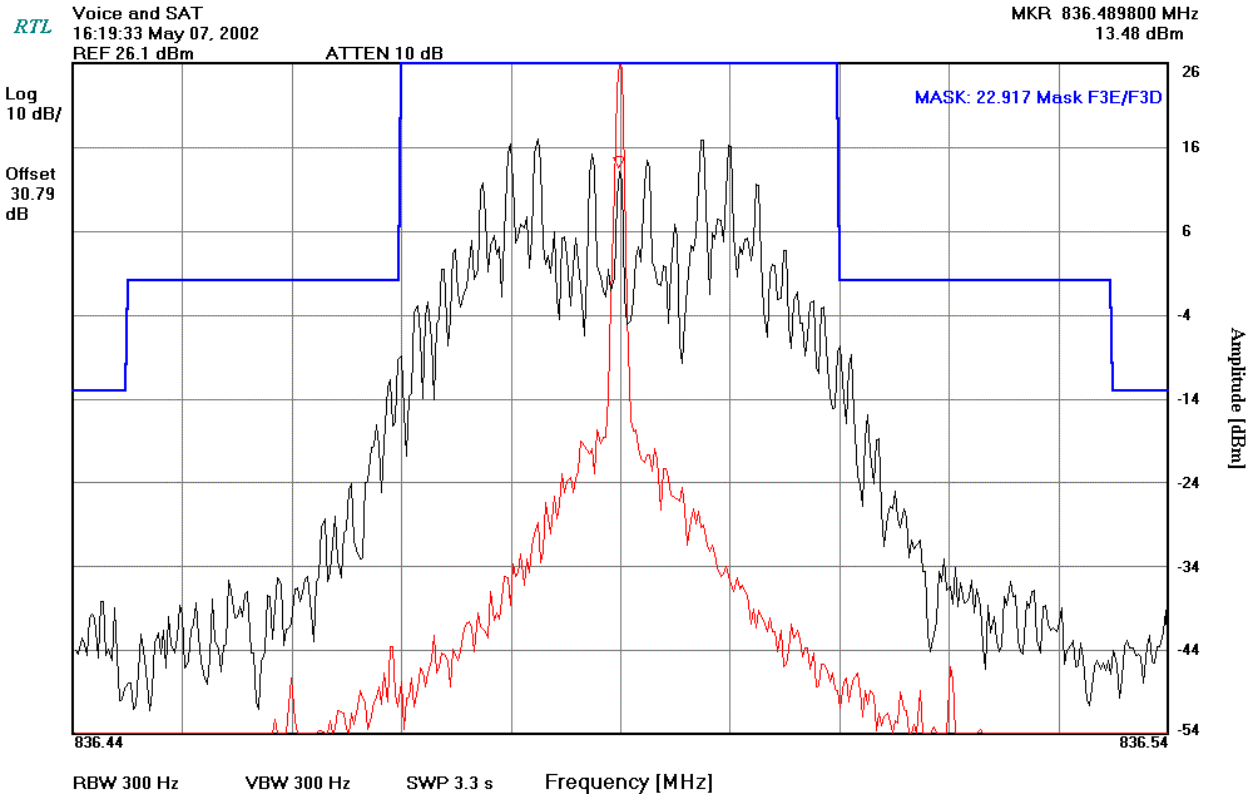


40 kHz Channel Bandwidth; Voice; 836.49 MHz; 2500 kHz; 11.51 kHz deviation; Burst mode

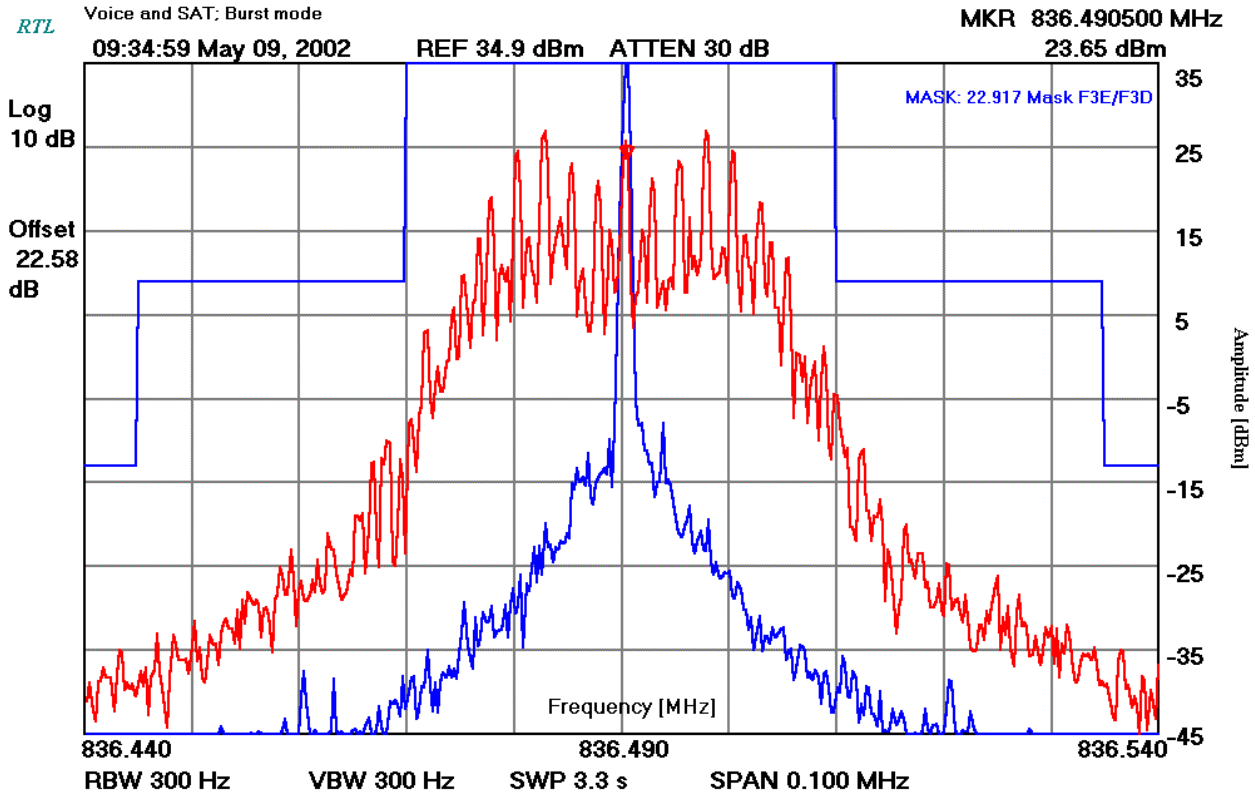


6.3.3 VOICE AND SUPERVISORY AUDIO TONE

40 kHz Channel Bandwidth: Voice and SAT; 836.49 MHz; 14.3 kHz deviation

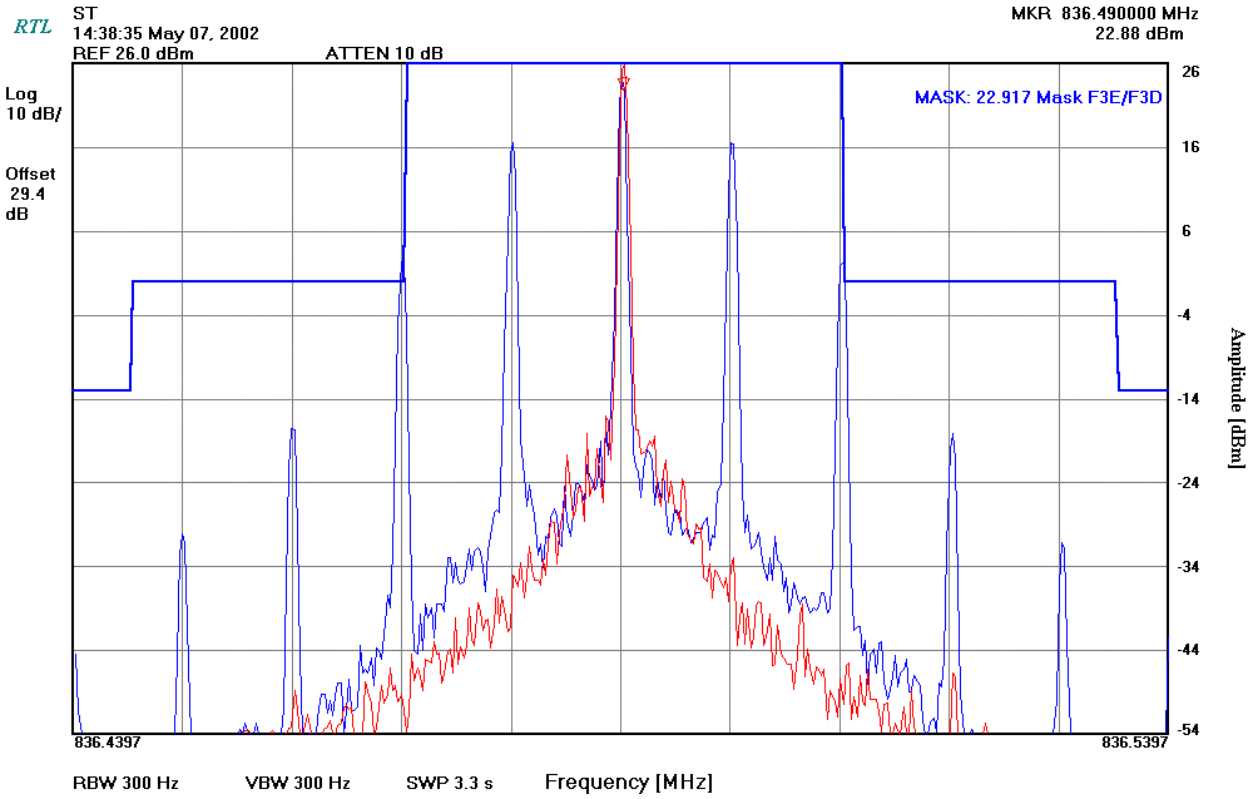


40 kHz Channel Bandwidth: Voice and SAT; 836.49 MHz; 14.3 kHz deviation; Burst mode

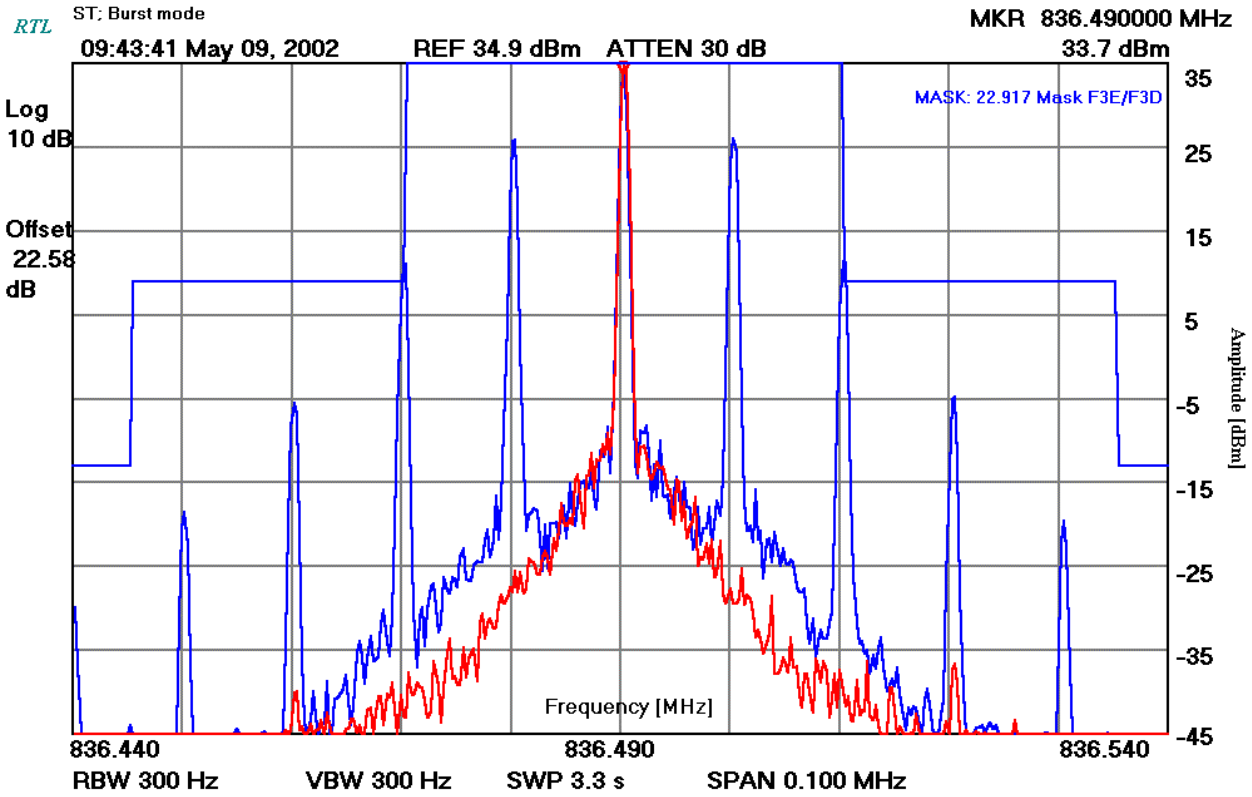


6.3.4 SIGNALING TONE

40 kHz Channel Bandwidth: ST; 836.49 MHz; 7.72 kHz deviation

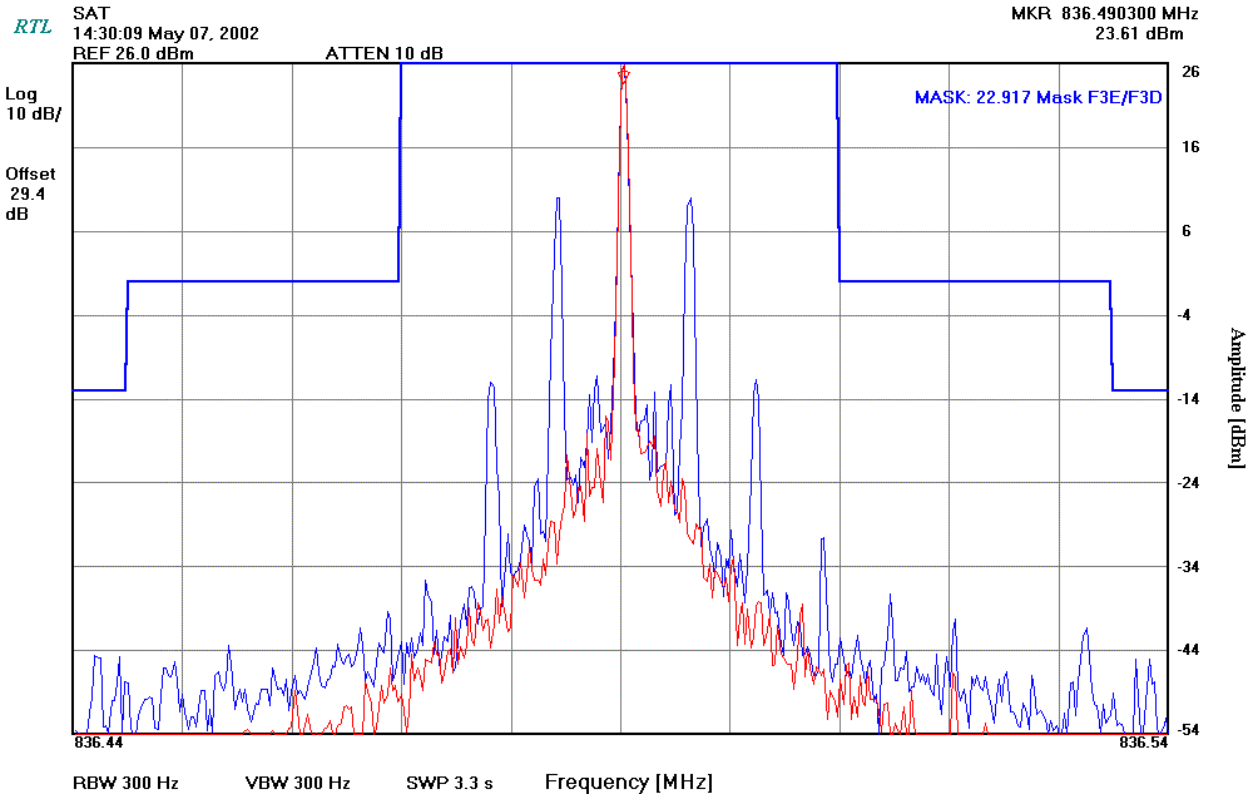


40 kHz Channel Bandwidth: ST; 836.49 MHz; 7.72 kHz deviation: Burst mode

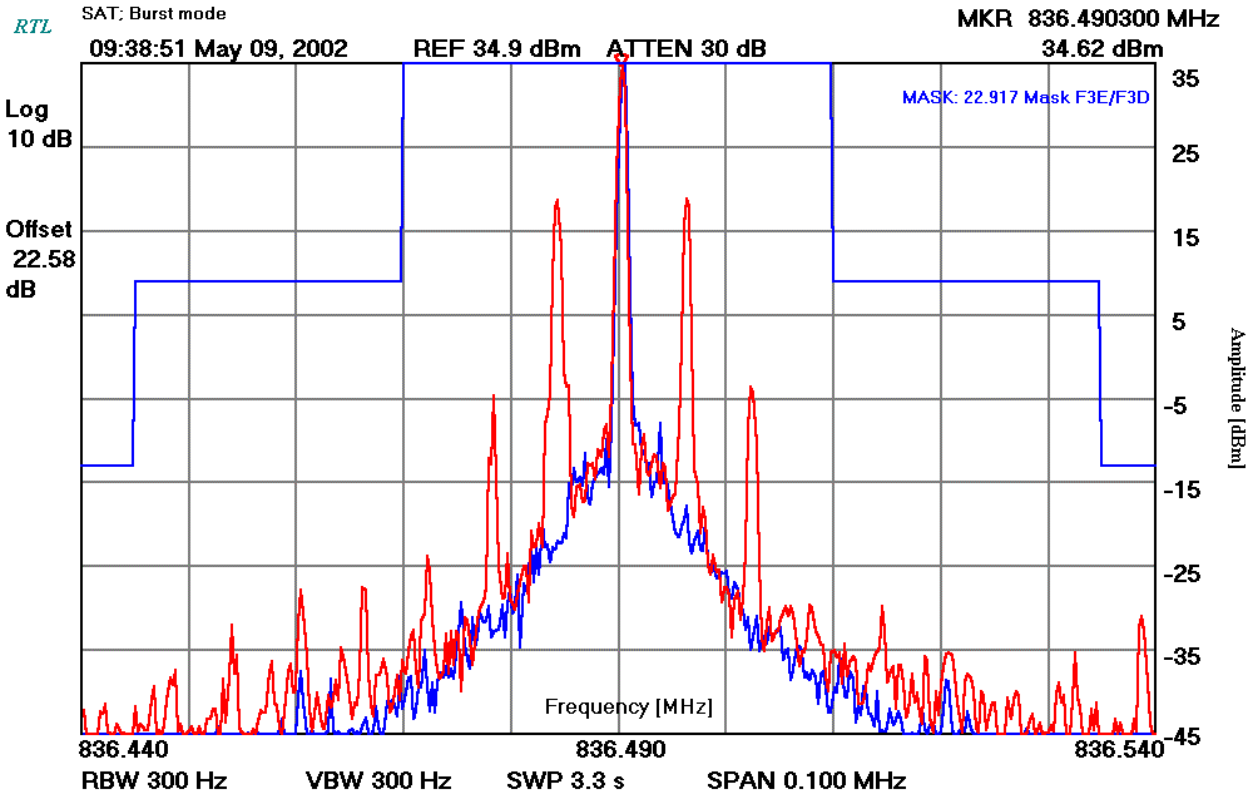


6.3.5 SUPERVISORY AUDIO TONE

40 kHz Channel Bandwidth: SAT; 836.49 MHz; 2.137 kHz deviation

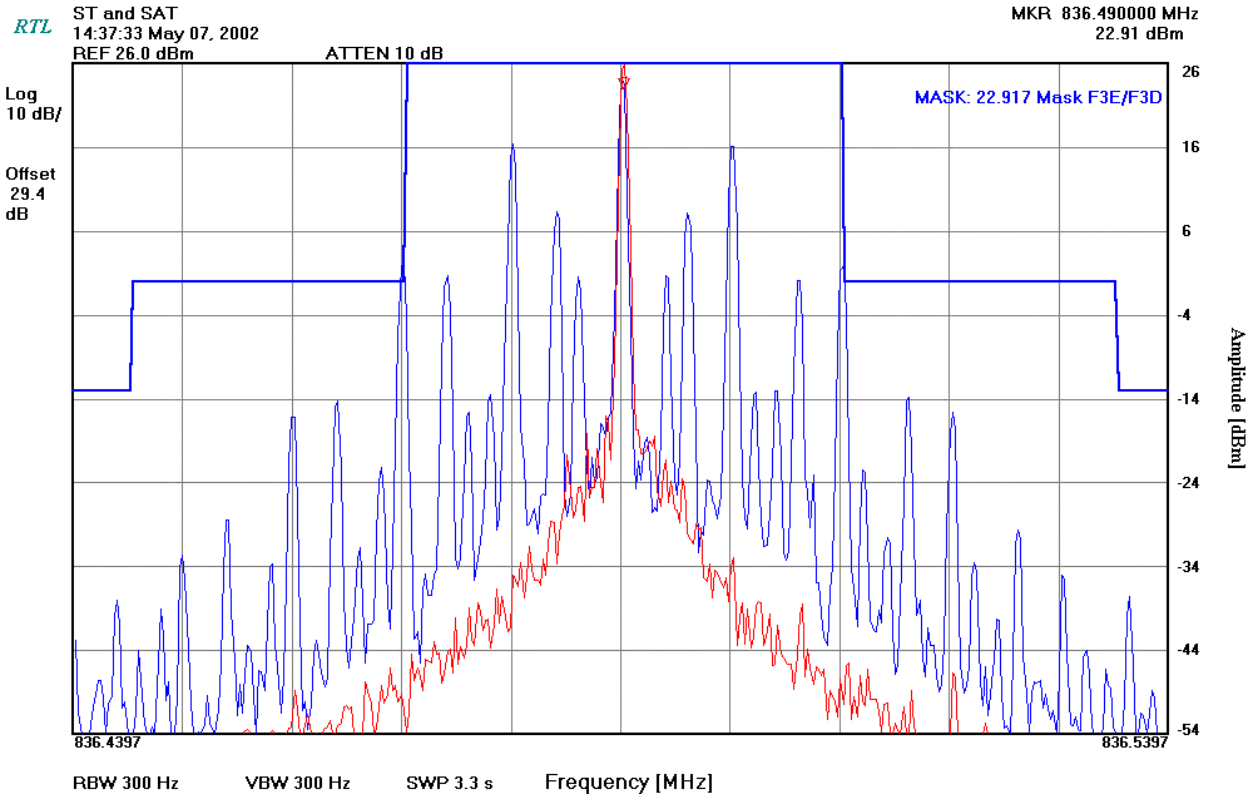


40 kHz Channel Bandwidth: SAT; 836.49 MHz; 2.137 kHz deviation; Burst mode

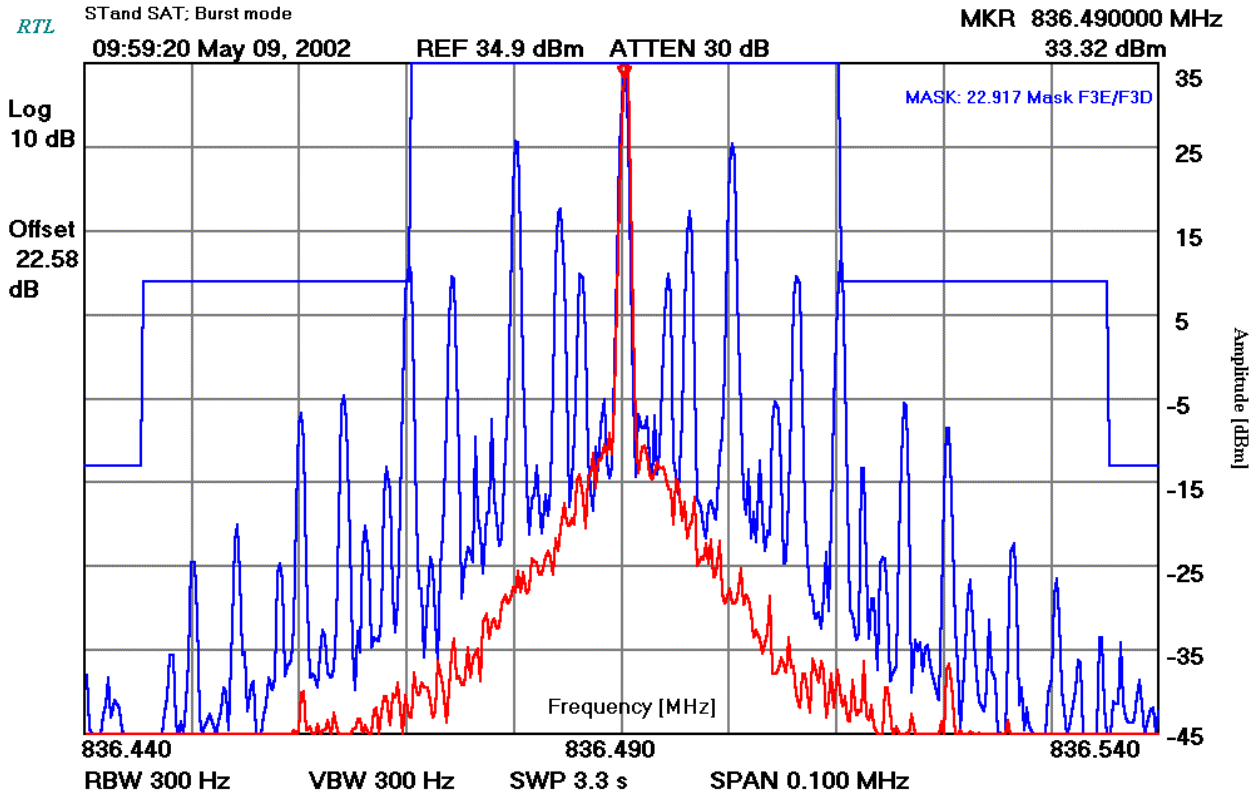


6.3.6 SUPERVISORY AUDIO TONE AND SIGNALING TONE

40 kHz Channel Bandwidth: SAT and ST; 836.49 MHz; 9.75 kHz deviation

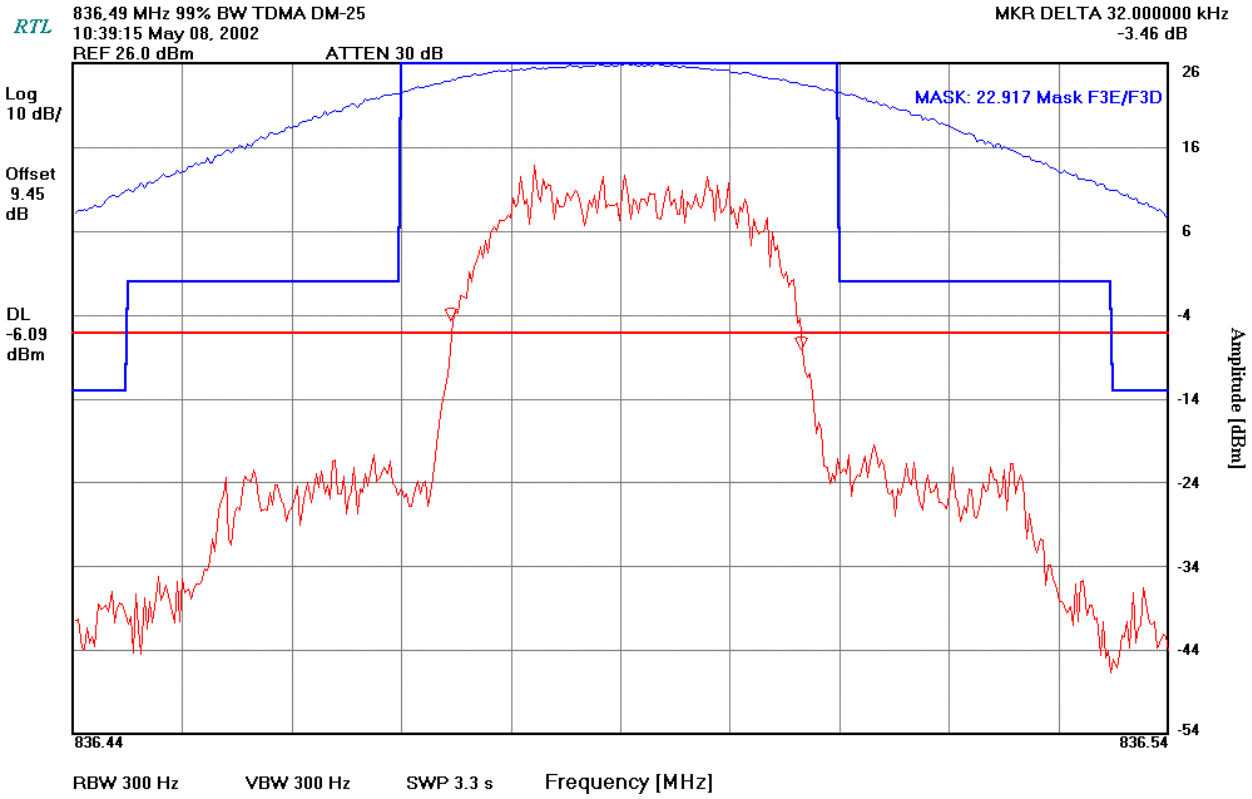


40 kHz Channel Bandwidth: SAT and ST; 836.49 MHz; 9.75 kHz deviation; Burst mode

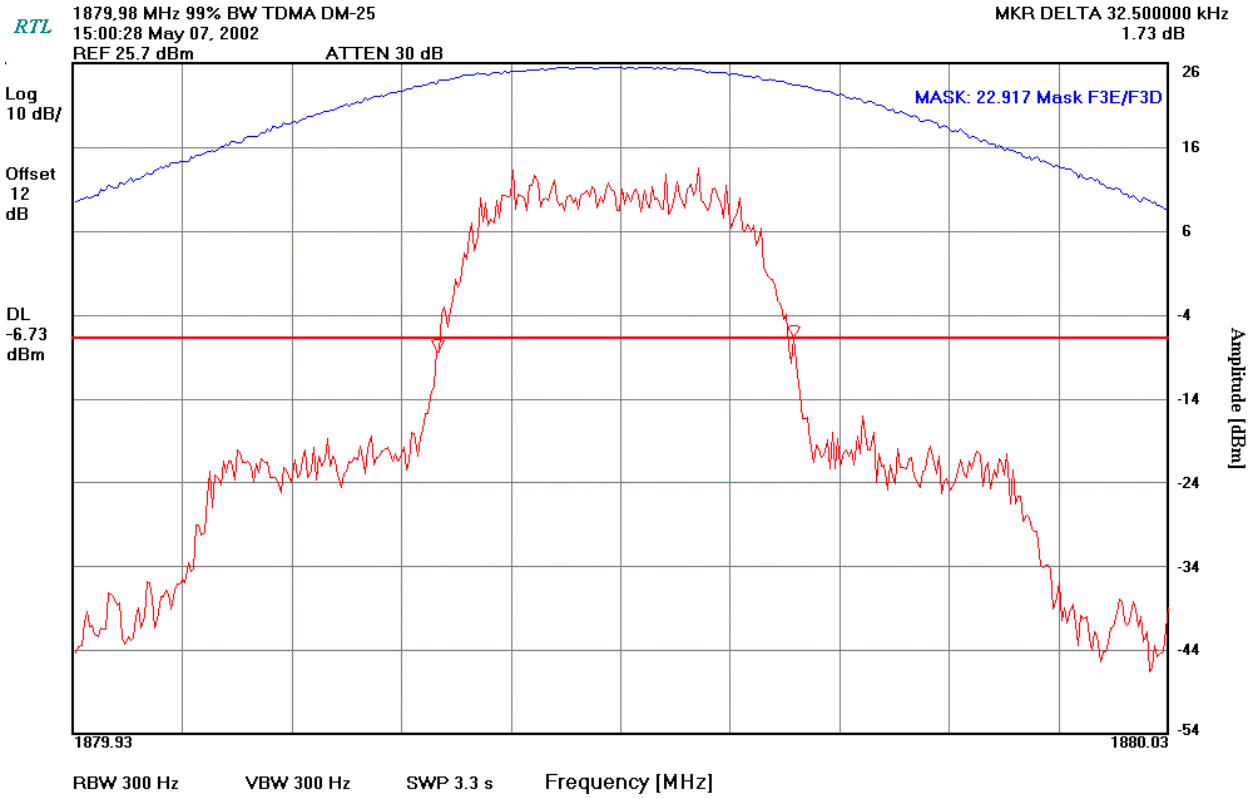


6.3.7 TDMA OCCUPIED BANDWIDTH

TDMA Occupied Bandwidth (32 kHz): 836.49 MHz



TDMA Occupied Bandwidth (32.5 kHz): 1879.98 MHz



Signature: _____ Test Date: June 6, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

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
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719
901057	Hewlett Packard	3336B	Synthesizer/Level Generator	2514A02585
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 KHz – 6.5 GHz)	3325A00159
901137	PAR Electronics	N/A	Notch Filter	N/A
901132	PAR Electronics	806-902 (25W)	UHF Notch Filter	N/A
900931	Hewlett Packard	8566B	SPECTRUM ANALYZER (100 Hz - 22 GHz)	3138A07771

7.3 SPURIOUS EMISSIONS TEST DATA

800 MHz AMPS BURST
824.040 MHz
Channel 991
Conducted power = 35.00 dBm
Limit = 48.00 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
1648.08	-66.3	1.8	99.5	-51.5
2472.12	-47.2	6.8	75.4	-27.4
3296.16	-61.0	3.2	92.8	-44.8
4120.20	-30.7	2.9	62.8	-14.8
4944.24	-69.7	3.6	101.1	-53.1
5768.28	-83.1	12.0	106.1	-58.1
6592.32	-82.9	5.2	112.7	-64.7
7416.36	-60.0	5.2	89.8	-41.8
8240.40	-65.7	9.0	91.7	-43.7

800 MHz AMPS BURST
836.490 MHz
Channel 383
Conducted power = 39.94 dBm
Limit = 47.94 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
1672.98	-60.9	1.9	93.9	-46.0
2509.47	-43.9	5.8	73.0	-25.1
3345.96	-53.5	2.3	86.1	-38.2
4182.45	-55.9	2.8	88.0	-40.1
5018.94	-64.5	5.3	85.5	-37.6
5855.43	-63.3	14.9	83.3	-35.4
6691.92	-83.4	10.7	107.6	-59.7
7528.41	-65.8	9.6	91.1	-43.2
8364.90	-83.3	9.6	108.6	-60.7

800 MHz AMPS BURST
848.9700 MHz
Channel 799
Conducted power = 35.00 dBm
Limit = 48.00 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
1697.94	-67.3	8.0	94.3	-46.3
2546.91	-52.7	12.1	75.6	-27.6
3395.88	-41.6	8.4	68.2	-20.2
4244.85	-64.0	9.7	89.3	-41.3
5093.82	-68.5	8.8	94.7	-46.7
5942.79	-81.8	10.5	106.3	-58.3
6791.76	-81.7	27.0	89.7	-41.7
7640.73	-80.3	12.6	102.7	-54.7
8489.70	-83.2	14.8	103.4	-55.4

800 MHz AMPS
824.040 MHz
Channel 991
Conducted power = 26.27 dBm
Limit = 39.27 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
1648.08	-65.0	1.8	89.5	-50.2
2472.12	-52.0	6.8	71.5	-32.2
3296.16	-67.5	3.2	90.6	-51.3
4120.20	-72.6	2.9	96.0	-56.7
4944.24	-81.0	3.6	103.7	-64.4
5768.28	-89.2	12.0	103.5	-64.2
6592.32	-86.8	5.2	107.9	-68.6
7416.36	-73.9	5.2	95.0	-55.7
8240.40	-80.1	9.0	97.4	-58.1

800 MHz AMPS
836.490 MHz
Channel 383
Conducted power = 26.1 dBm
Limit = 39.1 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
1672.98	-65.0	1.9	89.2	-50.1
2509.47	-43.0	5.8	63.3	-24.2
3345.96	-64.1	2.3	87.9	-48.8
4182.45	-59.3	2.8	82.6	-43.5
5018.94	-74.5	5.3	95.3	-56.2
5855.43	-81.8	11.9	96.0	-56.9
6691.92	-76.7	7.7	95.1	-56.0
7528.41	-65.4	6.6	84.9	-45.8
8364.90	-60.7	6.6	80.2	-41.1

800 MHz AMPS
848.9700 MHz
Channel 799
Conducted power = 26.05 dBm
Limit = 39.05 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
1697.94	-71.0	5.0	92.1	-53.0
2546.91	-59.4	9.1	76.4	-37.3
3395.88	-60.7	5.4	81.4	-42.3
4244.85	-78.9	6.7	98.3	-59.2
5093.82	-76.1	5.8	96.4	-57.3
5942.79	-80.4	7.5	99.0	-59.9
6791.76	-82.5	24.0	84.6	-45.5
7640.73	-69.4	9.6	85.9	-46.8
8489.70	-77.8	11.8	92.1	-53.0

800 MHz TDMA
824.040 MHz
Channel 991
Conducted power = 26.14 dBm
Limit = 39.14 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
1648.08	-59.0	1.8	83.3	-44.2
2472.12	-47.7	6.8	67.0	-27.9
3296.16	-64.2	3.2	87.1	-48.0
4120.20	-64.2	2.9	87.4	-48.3
4944.24	-68.1	3.6	90.6	-51.5
5768.28	-76.3	12.0	90.4	-51.3
6592.32	-70.5	5.2	91.4	-52.3
7416.36	-60.6	5.2	81.5	-42.4
8240.40	-63.8	9.0	80.9	-41.8

800 MHz TDMA
836.490 MHz
Channel 383
Conducted power = 26.0 dBm
Limit = 39.0 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
1672.98	-65.4	1.9	89.5	-50.5
2509.47	-40.0	5.8	60.2	-21.2
3345.96	-60.4	2.3	99.9	-60.9
4182.45	-55.8	2.8	79.0	-40.0
5018.94	-63.8	5.3	84.5	-45.5
5855.43	-70.5	11.9	84.6	-45.6
6691.92	-69.2	7.7	87.5	-48.5
7528.41	-57.8	6.6	77.2	-38.2
8364.90	-58.0	6.6	77.4	-38.4

800 MHz TDMA
848.970 MHz
Channel 799
Conducted power = 25.98 dBm
Limit = 39.98 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
1697.94	-66.8	5.0	87.8	-48.8
2546.91	-55.7	9.1	72.6	-33.6
3395.88	-57.2	5.4	77.8	-38.8
4244.85	-70.2	6.7	89.5	-50.5
5093.82	-70.5	5.8	90.7	-51.7
5942.79	-70.4	7.5	88.9	-49.9
6791.76	-70.4	24.0	72.4	-33.4
7640.73	-60.0	9.6	76.4	-37.4
8489.70	-65.2	11.8	79.4	-40.4

1900 MHz TDMA
1850.04 MHz
Channel 2
Conducted power = 25.68 dBm
Limit = 38.68dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
3700.08	-35.1	4.9	56.3	-17.7
5550.12	-33.3	6.9	52.5	-13.9
7400.16	-61.7	5.3	82.5	-43.9
9250.20	-67.1	7.0	86.2	-47.6
11100.24	-72.1	7.6	90.6	-52.0
12950.28	-67.4	10.6	82.9	-44.3
14800.32	-68.9	13.1	81.9	-43.3
16650.36	-68.6	13.3	81.4	-52.8
18500.40	-68.3	4.9	56.3	-50.7

1900 MHz TDMA
1879.98 MHz
Channel 1000
Conducted power = 25.67 dBm
Limit = 38.67 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
3759.96	-39.0	4.5	60.6	-22.0
5639.94	-36.4	6.6	55.9	-17.3
7519.92	-40.4	6.1	60.4	-21.8
9399.90	-56.9	7.1	75.9	-37.3
11279.88	-69.4	7.3	88.2	-49.6
13159.86	-72.0	10.3	87.8	-49.2
15039.84	-68.4	13.4	81.1	-42.5
16919.82	-70.6	14.7	82.0	-43.4
18799.80	-65.1	12.7	78.5	-39.9

1900 MHz TDMA
1909.929 MHz
Channel 1998
Conducted power = 25.74 dBm
Limit = 38.74 dBc

Frequency (MHz)	Level Measured (dBm)	Notch Insertion Loss (dB)	Corrected Level (dBc)	Margin (dB)
3819.86	-38.6	4.5	60.2	-21.5
5729.79	-52.1	7.2	71.0	-32.3
7639.72	-50.9	6.1	70.9	-32.2
9549.65	-71.4	6.9	90.6	-51.9
11459.57	-75.2	7.9	93.4	-54.7
13369.50	-71.1	9.4	87.8	-49.1
15279.43	-71.1	11.6	85.6	-46.9
17189.36	-72.5	12.4	86.2	-47.5
19099.29	-64.1	11.6	78.6	-39.9

Signature:  Test Date: May 7, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

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.

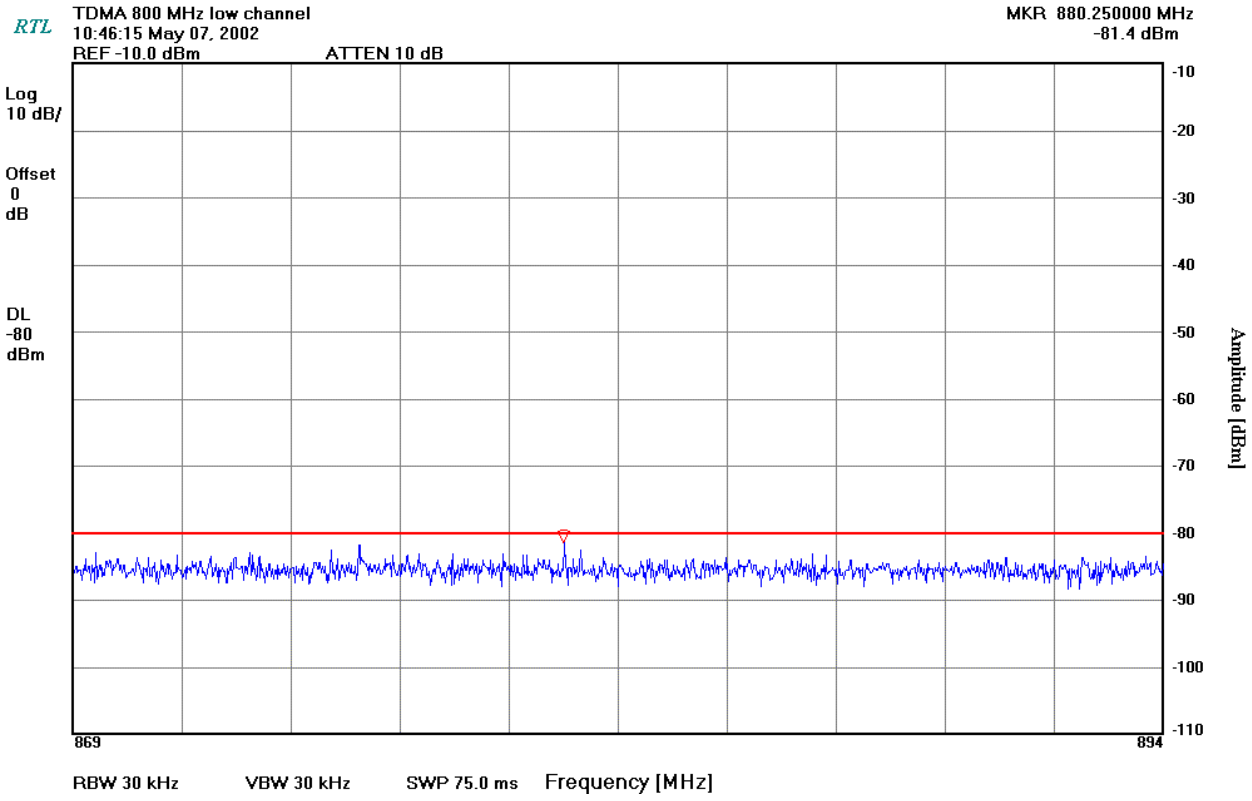
7.5 MOBILE EMISSIONS IN BASE FREQUENCY RANGE TEST EQUIPMENT

TABLE 7-2: MOBILE EMISSIONS IN BASE FREQUENCY RANGE TEST EQUIPMENT

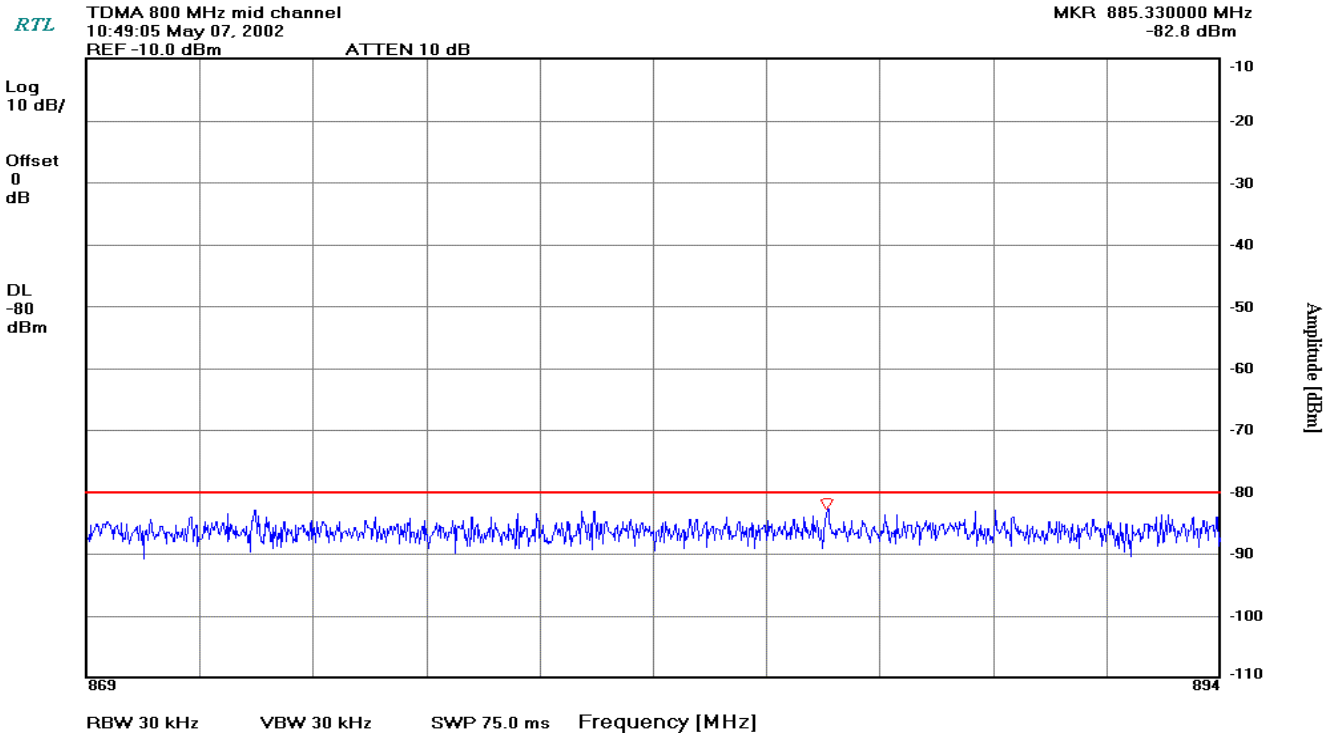
RTL Asset #	Manufacturer	Model	Part Type	Serial Number
901132	PAR Electronics	806-902 (25W)	UHF Notch Filter	N/A
900931	Hewlett Packard	8566B	SPECTRUM ANALYZER (100 Hz - 22 GHz)	3138A07771
	Rhein Tech Laboratories, Inc.	N/A	RTL Advanced Measurement Software Version 3.4.4 12/18/01	N/A

7.6 MOBILE EMISSIONS IN BASE FREQUENCY RANGE TEST DATA

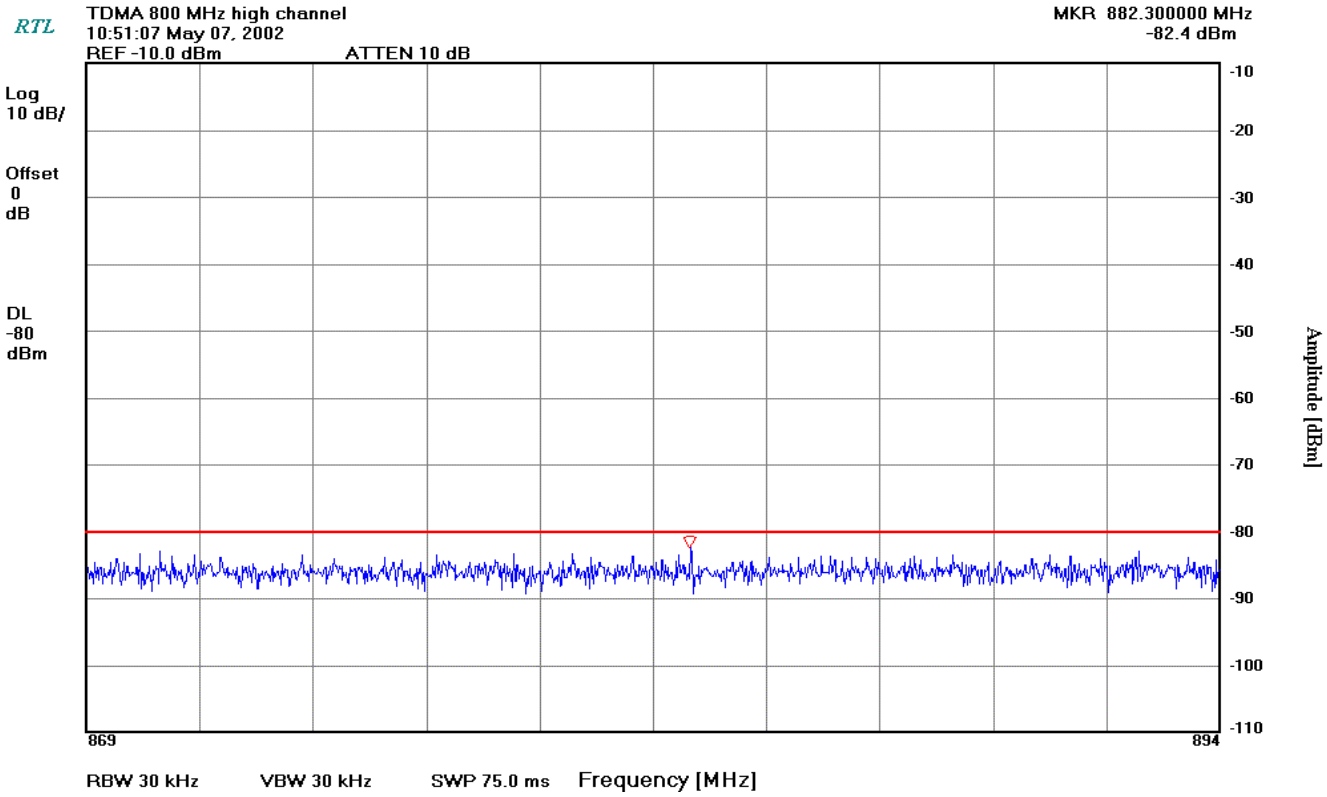
TDMA Channel 991 (824.04 MHz)



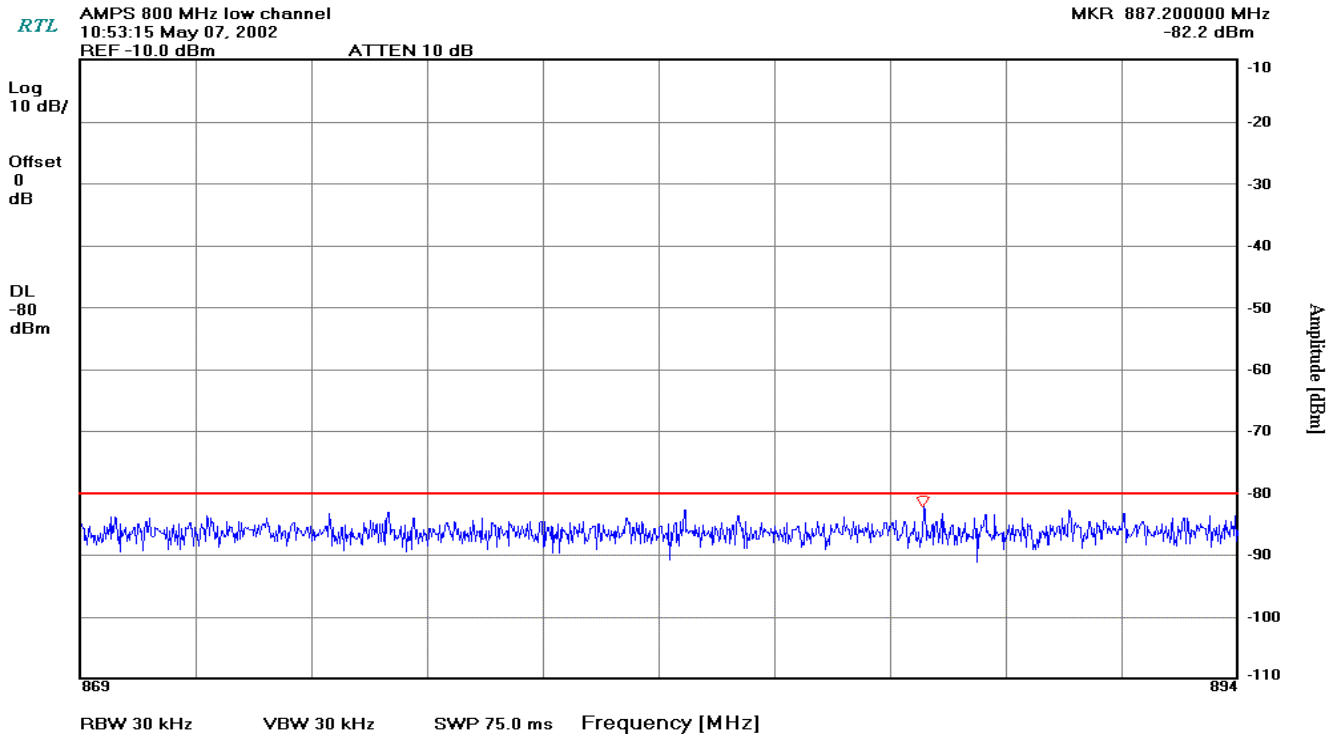
TDMA Channel 383 (836.49 MHz)



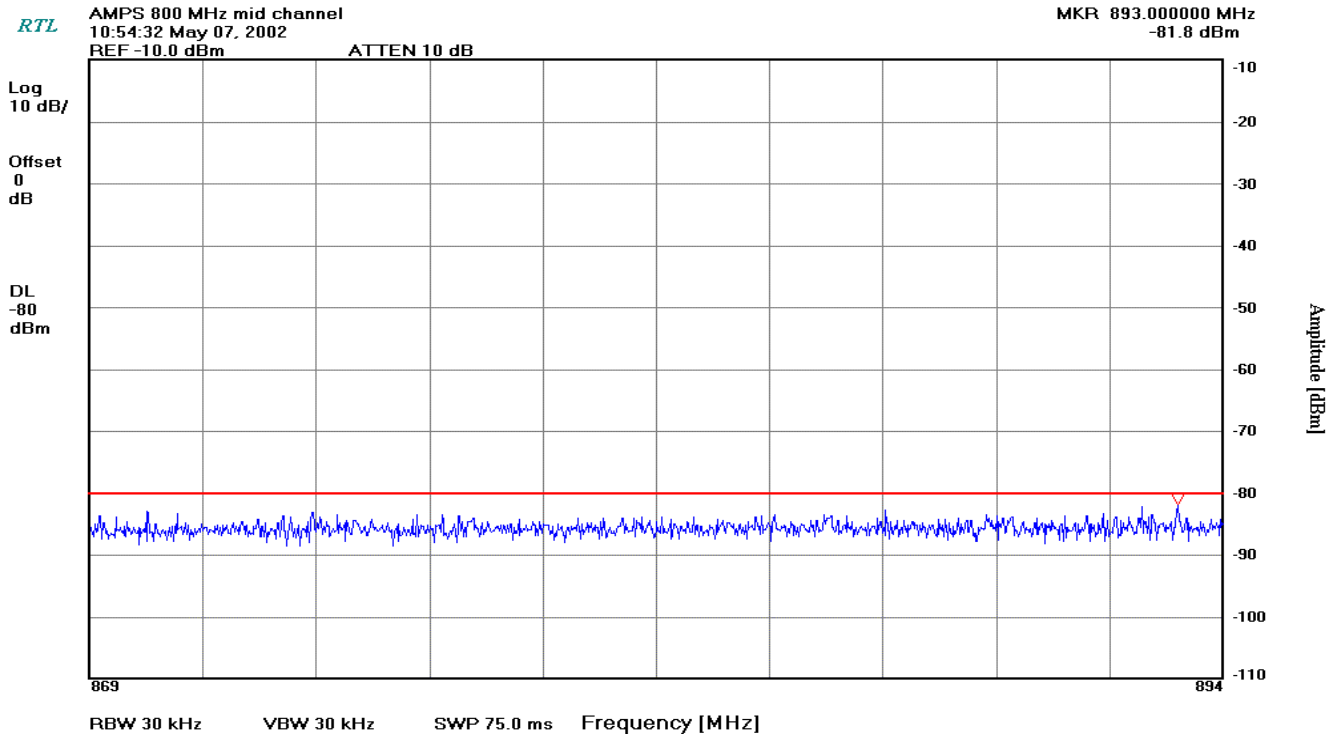
TDMA Channel 799 (848.97 MHz)



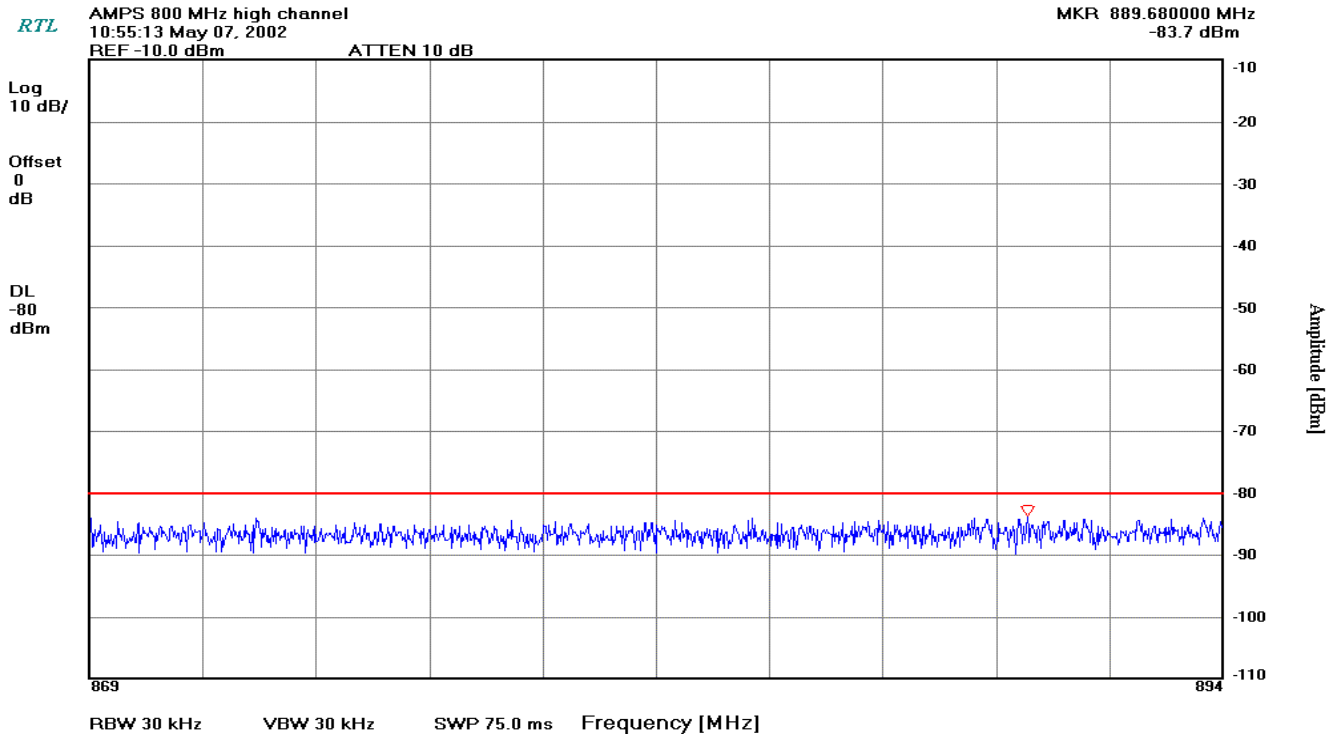
AMPS Channel 991 (824.04 MHz)



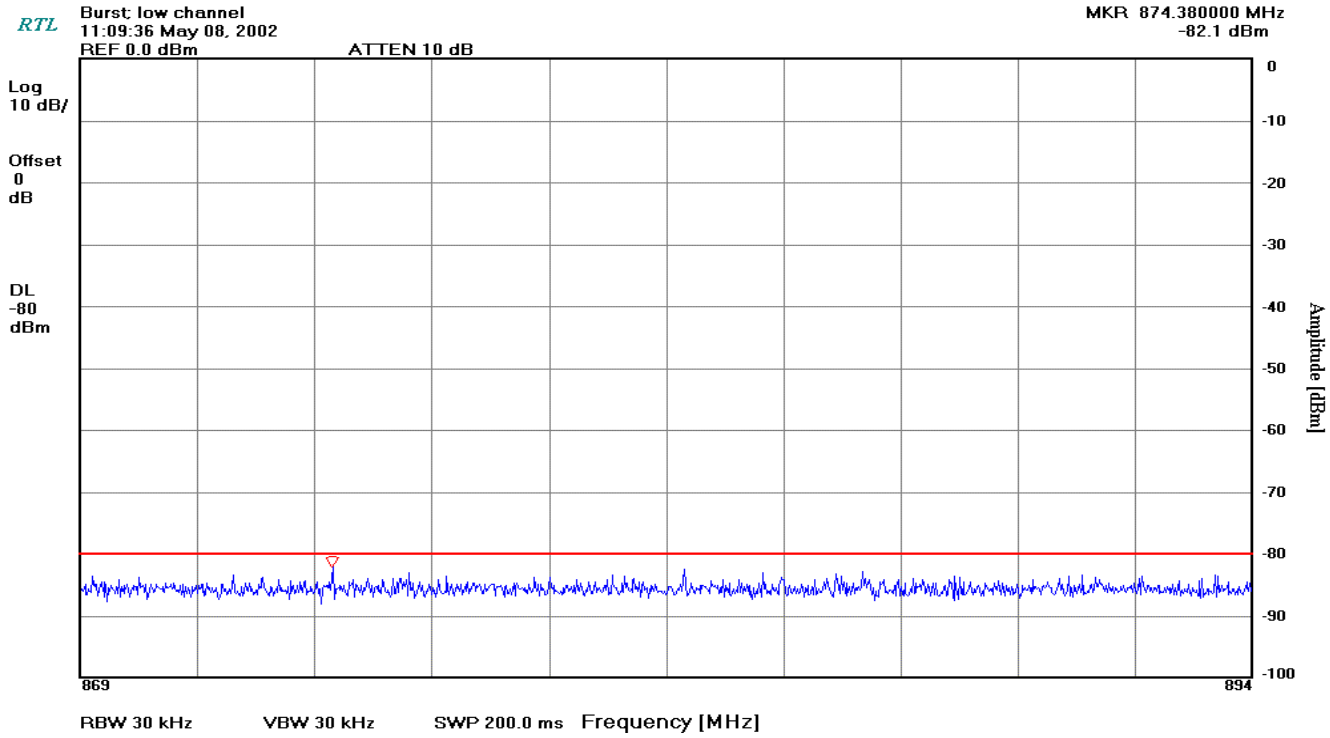
AMPS Channel 383 (836.49 MHz)



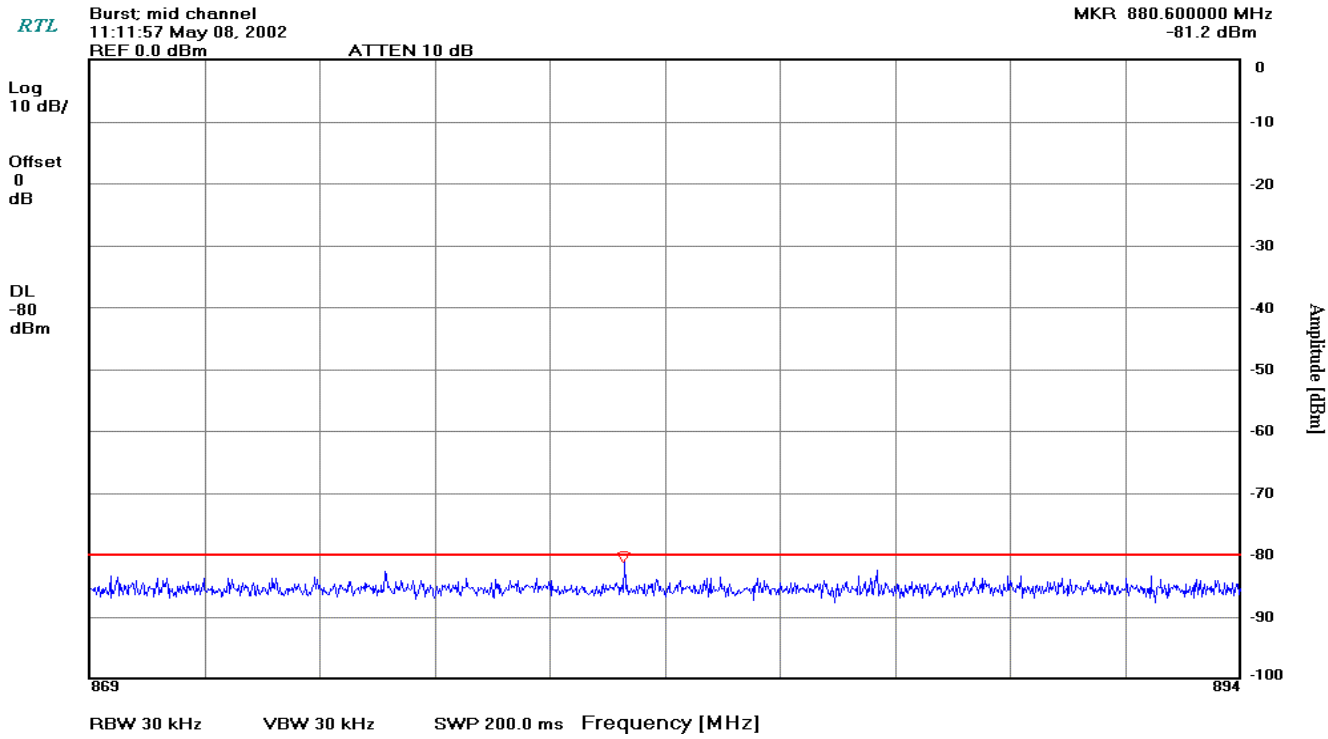
AMPS Channel 799 (848.97 MHz)



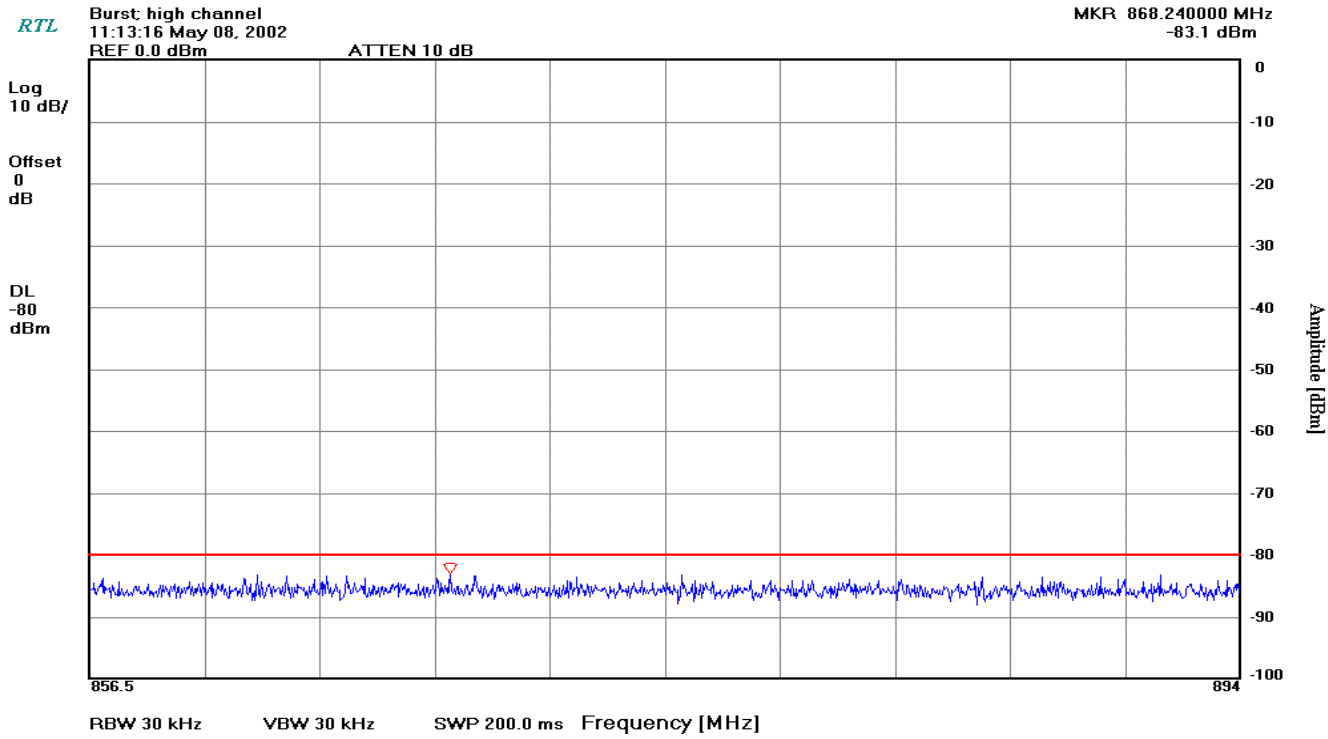
AMPS (Burst Mode) Channel 991 (824.04 MHz)



AMPS (Burst Mode) Channel 383 (836.49 MHz)



AMPS (Burst Mode) Channel 799 (848.97 MHz)



Signature: _____ Test Date: May 7, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

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 Number	Manufacturer	Model	Part Type	Serial Number
901053	Schaffner Chase	CBL6112B	Bi-Log Antenna (20 MHz – 2 GHz)	2648
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719
900928	Hewlett Packard	83752A	Synthesized Sweeper (0.01 GHz – 20 GHz)	3610A00866
900905	RTL	PR-1040	Amplifier 30 MHz - 2 GHz	900905
900814	Electro-Metrics	EM-6961 (RGA-60)	Double Ridges Guide Antenna 1-18 GHz	2310
900772	EMCO	3161-02	Horn antenna 2.0-4.0 GHz	9804-1044
900321	EMCO	3161-03	Horn antenna 4.0- 8.2 GHz	9508-1020
900323	EMCO	3160-07	HORN ANTENNA, 8.2-12.4 GHz	9605-1054
900356	EMCO	3160-08	HORN Antenna (12.4 - 18 GHz)	9607-1044
900325	EMCO	3160-09	HORN ANTENNA, 18.0-26.5 GHz	9605-1051
900932	Hewlett Packard	8449B OPT H02	Preamplifier 1-26.5 GHz	3008A00505

8.3 FIELD STRENGTH OF SPURIOUS RADIATION TEST DATA - §2.1053

TABLE 8-2: FIELD STRENGTH DATA §2.1053 (824.04 MHZ AMPS BURST)

Operating Frequency (MHz): 824.04
Channel: 991
Measured Conducted Power (dBm): 35.0
Modulation: AMPS
Distance (m): 3
Limit (dBc): 48.0

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBd)	POL (H/V)	ERP (dBc)	Margin (dB)
1648.080	91.2	-27.1	0.5	2.8	H	59.9	-11.9
2472.120	36.9	-55.8	0.6	5.1	H	86.3	-38.3
3296.160	44.3	-47.7	0.8	6.1	H	77.4	-29.4
4120.200							<-50
4944.240							<-50
5768.280							<-50
6592.320							<-50
7416.360							<-50
8240.400							<-50

TABLE 8-3: FIELD STRENGTH DATA §2.1053 (836.49 MHZ AMPS BURST MODE)

Operating Frequency (MHz): 836.49
Channel: 991
Measured Conducted Power (dBm): 34.94
Modulation: AMPS
Distance (m): 3
Limit (dBc): 47.94

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBd)	POL (H/V)	ERP (dBc)	Margin (dB)
1672.980	88.5	-30.0	2.8	2.8	H	65.0	-17.1
2509.470	37.0	-55.2	3.3	5.2	H	88.3	-40.3
3345.960	44.4	-46.9	4.0	6.0	H	79.9	-31.9
4182.450							<-50
5018.940							<-50
5855.430							<-50
6691.920							<-50
7528.410							<-50
8364.900							<-50

TABLE 8-4: FIELD STRENGTH DATA §2.1053 (848.97 MHZ, AMPS BURST MODE)

Operating Frequency (MHz): 848.97
Channel: 799
Measured Conducted Power (dBm): 35.0
Modulation: AMPS
Distance (m): 3
Limit (dBc): 48.0

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBd)	POL (H/V)	ERP (dBc)	Margin (dB)
1697.940	87.0	-31.5	2.8	2.8	H	66.6	-18.6
2546.910	34.3	-57.8	3.4	3.4	H	92.8	-44.8
3395.880	41.2	-50.0	4.3	4.2	H	85.1	-37.1
4244.850							<-50
5093.820							<-50
5942.790							<-50
6791.760							<-50
7640.730							<-50
8489.700							<-50

TABLE 8-5: FIELD STRENGTH DATA §2.1053 (824.04 MHZ AMPS)

Operating Frequency (MHz): 824.04
Channel: 991
Measured Conducted Power (dBm): 26.27
Modulation: AMPS
Distance (m): 3
Limit (dBc): 39.27

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBd)	POL (H/V)	ERP (dBc)	Margin (dB)
1648.080	73.7	-44.6	2.8	2.8	H	70.9	-31.7
2472.120							<-50
3296.160							<-50
4120.200							<-50
4944.240							<-50
5768.280							<-50
6592.320							<-50
7416.360							<-50
8240.400							<-50

TABLE 8-6: FIELD STRENGTH DATA §2.1053 (836.49 MHZ AMPS)

Operating Frequency (MHz): 836.49
Channel: 991
Measured Conducted Power (dBm): 26.1
Modulation: AMPS
Distance (m): 3
Limit (dBc): 39.1

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBd)	POL (H/V)	ERP (dBc)	Margin (dB)
1672.980	71.2	-47.3	2.8	2.8	H	73.5	-34.4
2509.470							<-50
3345.960							<-50
4182.450							<-50
5018.940							<-50
5855.430							<-50
6691.920							<-50
7528.410							<-50
8364.900							<-50

TABLE 8-7: FIELD STRENGTH DATA §2.1053 (848.97 MHZ, AMPS)

Operating Frequency (MHz): 848.97
Channel: 799
Measured Conducted Power (dBm): 26.05
Modulation: AMPS
Distance (m): 3
Limit (dBc): 39.05

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBd)	POL (H/V)	ERP (dBc)	Margin (dB)
1697.940	70.7	-47.8	2.8	2.8	H	73.9	-34.9
2546.910							<-50
3395.880							<-50
4244.850							<-50
5093.820							<-50
5942.790							<-50
6791.760							<-50
7640.730							<-50
8489.700							<-50

TABLE 8-8: FIELD STRENGTH DATA §2.1053 (824.04 MHZ TDMA)

Operating Frequency (MHz): 824.04
Channel: 991
Measured Conducted Power (dBm): 26.14
Modulation: TDMA
Distance (m): 3
Limit (dBc): 39.14

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBd)	POL (H/V)	ERP (dBc)	Margin (dB)
1648.08	76.0	-42.3	2.8	2.8	H	68.6	-29.4
2472.12							<-50
3296.16							<-50
4120.20							<-50
4944.24							<-50
5768.28							<-50
6592.32							<-50
7416.36							<-50
8240.40							<-50

TABLE 8-9: FIELD STRENGTH DATA §2.1053 (836.49 MHZ TDMA)

Operating Frequency (MHz): 836.49
Channel: 383
Measured Conducted Power (dBm): 26.00
Modulation: TDMA
Distance (m): 3
Limit (dBc): 39.00

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBd)	POL (H/V)	ERP (dBc)	Margin (dB)
1672.98	75.6	-42.9	2.8	2.8	H	69.0	-30.0
2509.47							<-50
3345.96							<-50
4182.45							<-50
5018.94							<-50
5855.43							<-50
6691.92							<-50
7528.41							<-50
8364.90							<-50

TABLE 8-10: FIELD STRENGTH DATA §2.1053 (848.97 MHZ, TDMA)

Operating Frequency (MHz): 848.97
Channel: 799
Measured Conducted Power (dBm): 25.98
Modulation: TDMA
Distance (m): 3
Limit (dBc): 38.98

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBd)	POL (H/V)	ERP (dBc)	Margin (dB)
1697.94	76.0	-42.5	2.8	2.8	H	68.5	-29.6
2546.91							<-50
3395.88							<-50
4244.85							<-50
5093.82							<-50
5942.79							<-50
6791.76							<-50
7640.73							<-50
8489.70							<-50

TABLE 8-11: FIELD STRENGTH DATA §2.1053 (1850.04 MHZ TDMA)

Operating Frequency (MHz): 1850.04
Channel: 2
Measured Conducted Power (dBm): 25.68
Modulation: TDMA
Distance (m): 3
Limit (dBc): 38.68

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBi)	POL (H/V)	EIRP (dBc)	Margin (dB)
3700.080	49.8	-39.5	4.5	6.2	H	63.4	-24.8
5550.120	50.3	-37.0	5.5	7.5	H	60.7	-22.0
7400.160							<-50
9250.200							<-50
11100.240							<-50
12950.280							<-50
14800.320							<-50
16650.360							<-50
18500.400							<-50

TABLE 8-12: FIELD STRENGTH DATA §2.1053 (1879.98 MHZ TDMA)

Operating Frequency (MHz): 1879.98
Channel: 660
Measured Conducted Power (dBm): 25.67
Modulation: TDMA
Distance (m): 3
Limit (dBc): 38.67

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBi)	POL (H/V)	EIRP (dBc)	Margin (dB)
3759.960	47.9	-41.4	4.7	6.2	H	65.6	-26.9
5639.940	30.9	-56.6	5.5	7.5	H	80.3	-41.6
7519.920							<-50
9399.900							<-50
11279.880							<-50
13159.860							<-50
15039.840							<-50
16919.820							<-50
18799.800							<-50

TABLE 8-13: FIELD STRENGTH DATA §2.1053 (1909.929 MHZ TDMA)

Operating Frequency (MHz): 1909.929
Channel: 1998
Measured Conducted Power (dBm): 25.74
Modulation: TDMA
Distance (m): 3
Limit (dBc): 38.74

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Horn Antenna Gain (dBi)	POL (H/V)	EIRP (dBc)	Margin (dB)
3819.840	50.3	-38.9	4.5	6.1	H	63.0	-24.5
5729.760	37.5	-50.7	5.7	7.5	H	74.6	-36.2
7639.680							<-50
9549.600							<-50
11459.520							<-50
13369.440							<-50
15279.360							<-50
17189.280							<-50
19099.200							<-50

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 antenna 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 ERP level was determined by subtracting the cable loss and adding the horn gain in dBd, or dBi for EIRP measurements.

Signature:		Test Date:	May 8, 2002
Typed/Printed Name:	Daniel Baltzell	Position:	Test Engineer

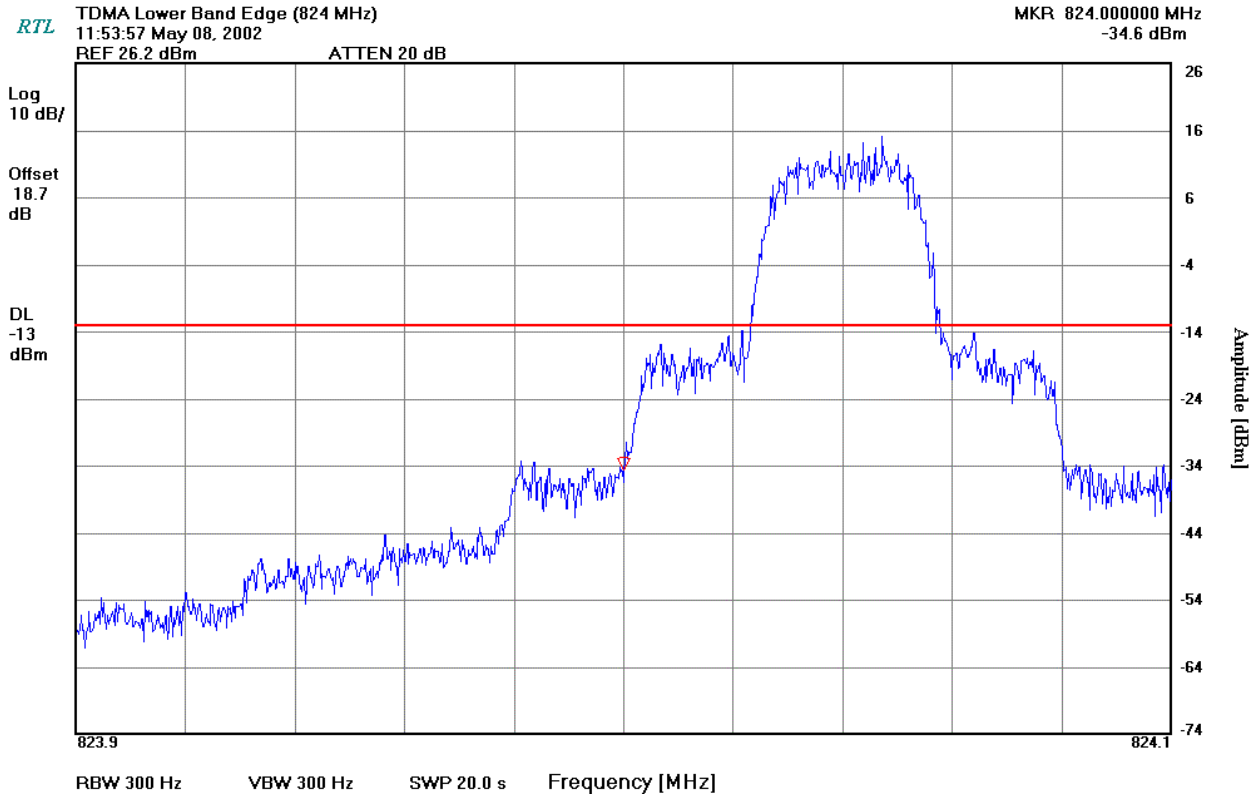
8.4 FCC PART 22.901(D); PART 24.229 AND PART 24.238 - BAND-EDGE COMPLIANCE

8.5 BAND-EDGE COMPLIANCE TEST EQUIPMENT

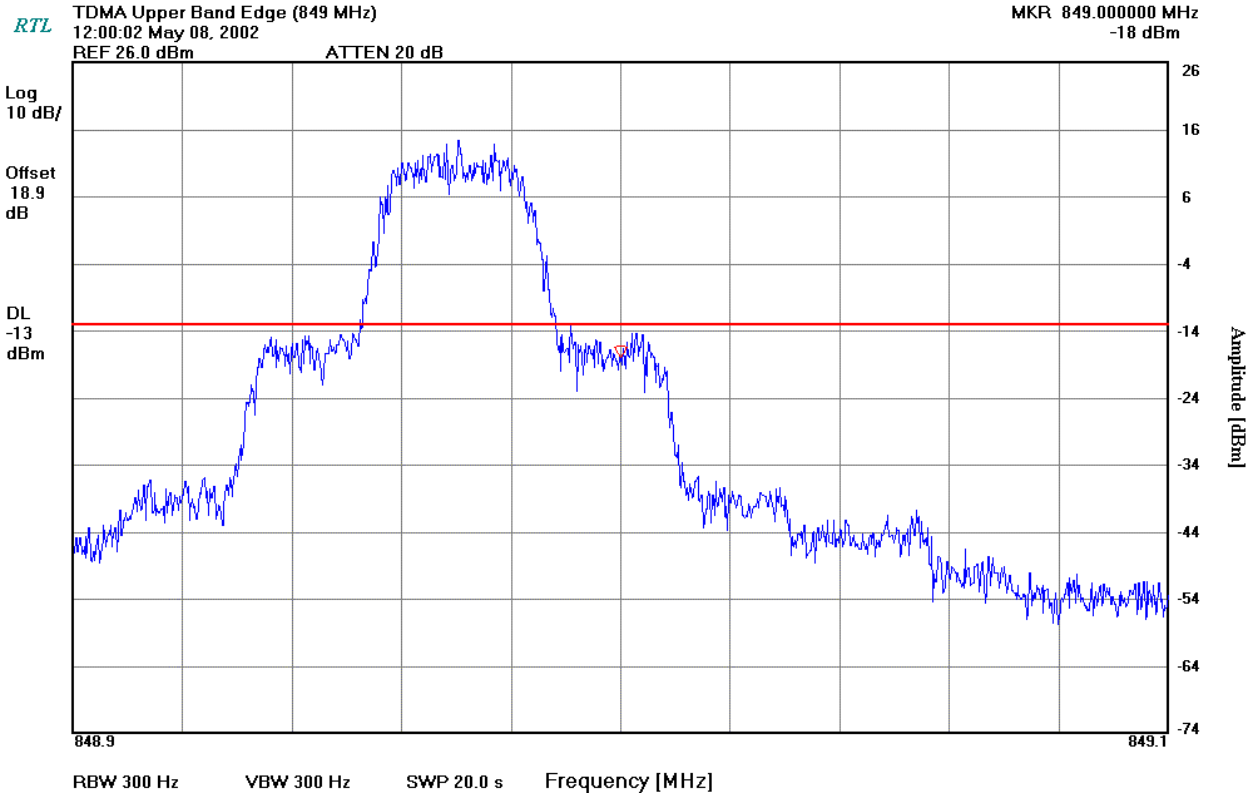
TABLE 8-14: BAND-EDGE COMPLIANCE TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
900931	Hewlett Packard	8566B	SPECTRUM ANALYZER (100 Hz - 22 GHz)	3138A07771
	Rhein Tech Laboratories, Inc.	N/A	RTL Advanced Measurement Software Version 3.4.4 12/18/01	N/A

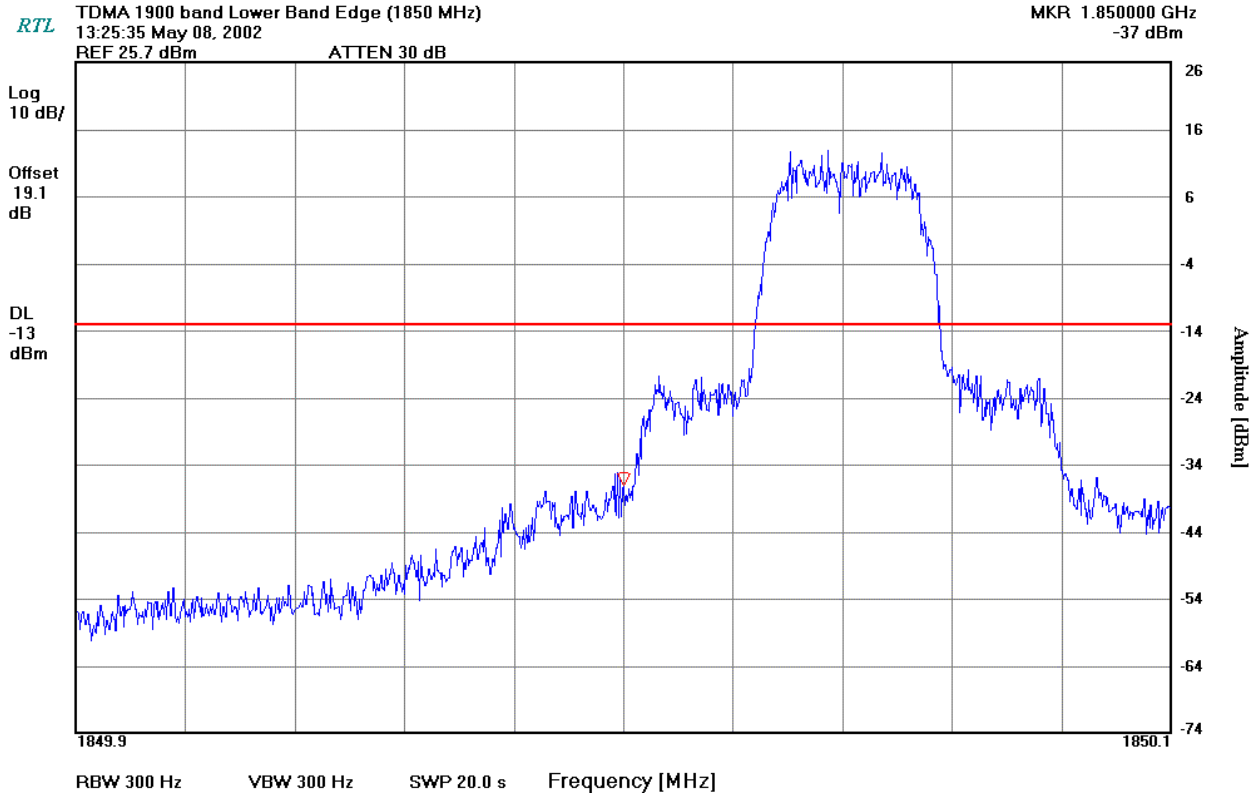
800 MHz TDMA Lower Bandedge (824 MHz)



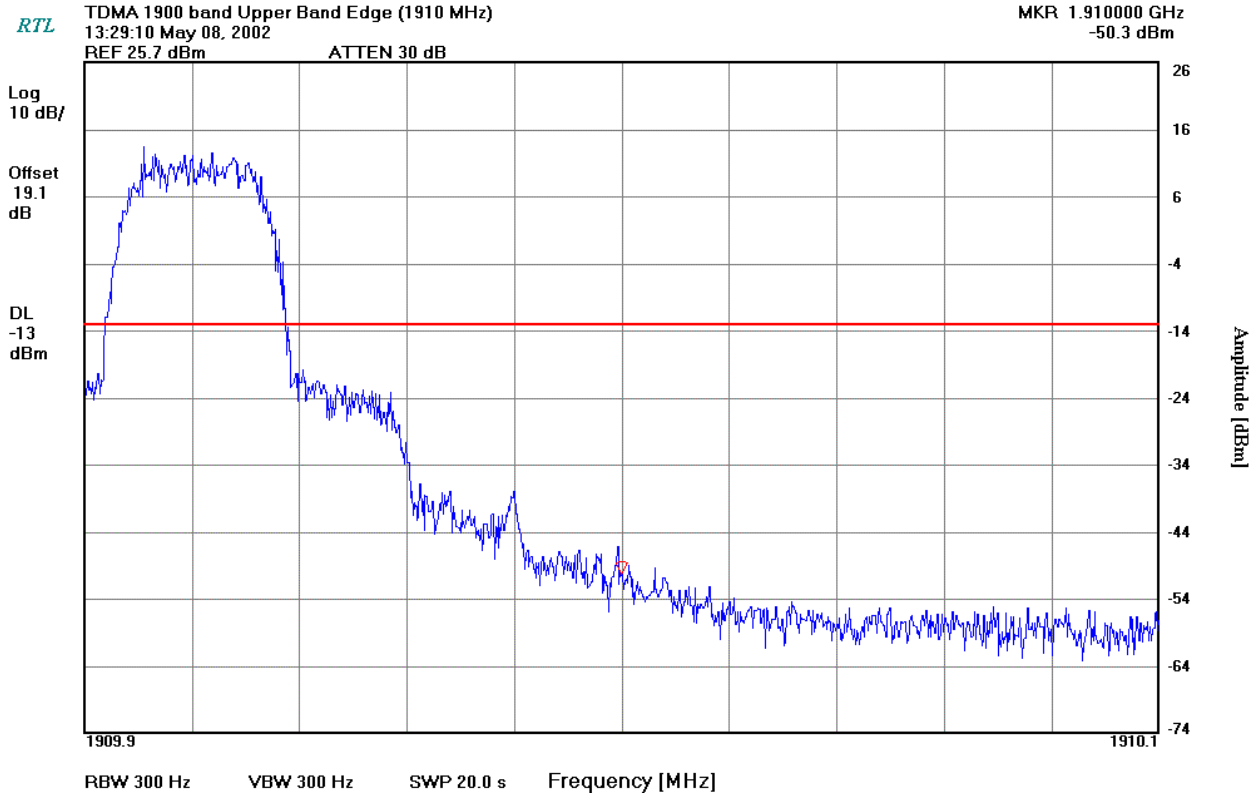
800 MHz TDMA Upper Bandedge (849 MHz)



1900 MHz TDMA Lower Bandedge (1850 MHz)



1900 MHz TDMA Upper Bandedge (1910 MHz)



Signature: _____ Test Date: May 8, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

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	MT8801B	Radio Communications Test Set
Hewlett Packard	E3631A	Power Supply
Hewlett Packard	E3610A	Power Supply
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: 836.49 and 1879.98 MHz
Channel: 383 and 1000
Reference Voltage: 5.0 and 13.8 VDC
Deviation Limit: 0.00025 % or 2.5 ppm

The RF Frequency is measured on the mid-band channel, at the antenna connector using a communications test set as the specified load, and are plotted against supply voltage and temperature variations for each modulation type.

Exhibit	Input Voltage	Temperature	Modulation (Freq)
1	5.0 ± 10%, 13.8 ± 20%	25°C	Analog (800)
2	5.0, 13.8	-40 to + 80 °C	Analog (800)
3	5.0 ± 10%, 13.8 ± 20%	25°C	Digital (800)
4	5.0, 13.8	-40 to + 80 °C	Digital (800)
5	5.0 ± 10%, 13.8 ± 20%	25°C	Digital (1900)
6	5.0, 13.8	-40 to + 80 °C	Digital (1900)

Exhibit 1: AMPS 800 Frequency Stability vs. Voltage
Carrier Frequency = 836.49 MHz

Channel	Voltage (5V nom./13.8V nom.)	Temperature (°C)	Freq. Error (Hz)
Mid-Band	4.5/11.0	25	-27
Mid-Band	4.6/11.6	25	-26
Mid-Band	4.7/12.1	25	-25
Mid-Band	4.8/12.7	25	-24
Mid-Band	4.9/13.2	25	-26
Mid-Band	5.0/13.8	25	-22
Mid-Band	5.1/14.3	25	-26
Mid-Band	5.2/14.9	25	-24
Mid-Band	5.3/15.5	25	-26
Mid-Band	5.4/16.0	25	-25
Mid-Band	5.5/16.6	25	-28

Exhibit 2: AMPS 800 Frequency Stability vs. Temperature
Carrier Frequency = 836.49 MHz

Channel	Temperature (°C)	Voltage (5V nom./13.8V nom.)	Freq. Error (Hz)
Mid-Band	-40	5.0/13.8	-28
Mid-Band	-30	5.0/13.8	-35
Mid-Band	-20	5.0/13.8	-24
Mid-Band	-10	5.0/13.8	-26
Mid-Band	0	5.0/13.8	-19
Mid-Band	10	5.0/13.8	-14
Mid-Band	20	5.0/13.8	-24
Mid-Band	30	5.0/13.8	-25
Mid-Band	40	5.0/13.8	-27
Mid-Band	50	5.0/13.8	-34
Mid-Band	60	5.0/13.8	-27
Mid-Band	70	5.0/13.8	-26
Mid-Band	80	5.0/13.8	-25
Mid-Band	85	5.0/13.8	-20

Exhibit 3: DAMPS 800 Frequency Stability vs. Voltage
Carrier Frequency = 836.49 MHz

Channel	Voltage (5V nom./13.8V nom.)	Temperature (°C)	Freq. Error (Hz)
Mid-Band	4.5/11.0	25	-10
Mid-Band	4.6/11.6	25	-13
Mid-Band	4.7/12.1	25	-11
Mid-Band	4.8/12.7	25	-14
Mid-Band	4.9/13.2	25	-15
Mid-Band	5.0/13.8	25	-13
Mid-Band	5.1/14.3	25	-12
Mid-Band	5.2/14.9	25	-13
Mid-Band	5.3/15.5	25	-14
Mid-Band	5.4/16.0	25	-11
Mid-Band	5.5/16.6	25	-10

Exhibit 4: DAMPS 800 Frequency Stability vs. Temperature
Carrier Frequency = 836.49 MHz

Channel	Temperature (°C)	Voltage (5V nom./13.8V nom.)	Freq. Error (Hz)
Mid-Band	-40	5.0/13.8	-15
Mid-Band	-30	5.0/13.8	-1
Mid-Band	-20	5.0/13.8	-9
Mid-Band	-10	5.0/13.8	-10
Mid-Band	0	5.0/13.8	-23
Mid-Band	10	5.0/13.8	-12
Mid-Band	20	5.0/13.8	-14
Mid-Band	30	5.0/13.8	-11
Mid-Band	40	5.0/13.8	-8
Mid-Band	50	5.0/13.8	-7
Mid-Band	60	5.0/13.8	-4
Mid-Band	70	5.0/13.8	-4
Mid-Band	80	5.0/13.8	-10
Mid-Band	85	5.0/13.8	-5

Exhibit 5: DAMPS 1900 Frequency Stability vs. Voltage
Carrier Frequency = 1879.980 MHz

Channel	Voltage (5V nom./13.8V nom.)	Temperature (°C)	Freq. Error (Hz)
Mid-Band	4.5/11.0	25	-48
Mid-Band	4.6/11.6	25	-34
Mid-Band	4.7/12.1	25	-47
Mid-Band	4.8/12.7	25	-32
Mid-Band	4.9/13.2	25	-41
Mid-Band	5.0/13.8	25	-42
Mid-Band	5.1/14.3	25	-45
Mid-Band	5.2/14.9	25	-44
Mid-Band	5.3/15.5	25	-35
Mid-Band	5.4/16.0	25	-35
Mid-Band	5.5/16.6	25	-46

Exhibit 6: DAMPS 1900 Frequency Stability vs. Temperature
Carrier Frequency = 1879.980 MHz

Channel	Temperature (°C)	Voltage (5V nom./13.8V nom.)	Freq. Error (Hz)
Mid-Band	-40	5.0/13.8	-55
Mid-Band	-30	5.0/13.8	-30
Mid-Band	-20	5.0/13.8	-41
Mid-Band	-10	5.0/13.8	-31
Mid-Band	0	5.0/13.8	-46
Mid-Band	10	5.0/13.8	-36
Mid-Band	20	5.0/13.8	-42
Mid-Band	30	5.0/13.8	-49
Mid-Band	40	5.0/13.8	-49
Mid-Band	50	5.0/13.8	-45
Mid-Band	60	5.0/13.8	-36
Mid-Band	70	5.0/13.8	-30
Mid-Band	80	5.0/13.8	-33
Mid-Band	85	5.0/13.8	-36

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

Temperature	Frequency Measured (MHz)	ppm
-40	836.489972	0.03
-30	836.489965	0.04
-20	836.489976	0.03
-10	836.489974	0.03
0	836.489981	0.02
10	836.489986	0.02
20	836.489976	0.03
30	836.489975	0.03
40	836.489973	0.03
50	836.489966	0.04
60	836.489973	0.03
70	836.489974	0.03
80	836.489975	0.03
85	836.489980	0.02

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

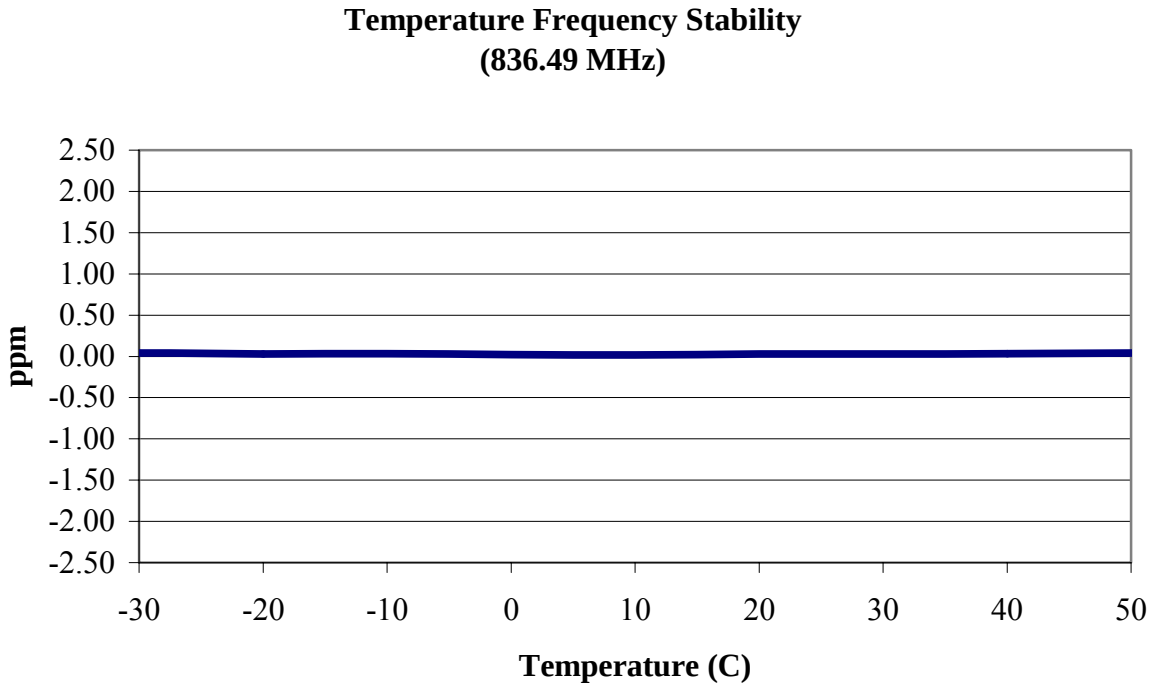


TABLE 9-4: TEMPERATURE FREQUENCY STABILITY DATA - §2.1055 (1900 MHZ TDMA BAND)

Temperature	Frequency Measured (MHz)	ppm
-40	836.489972	0.07
-30	836.489965	0.04
-20	836.489976	0.05
-10	836.489974	0.04
0	836.489981	0.05
10	836.489986	0.04
20	836.489976	0.05
30	836.489975	0.06
40	836.489973	0.06
50	836.489966	0.05
60	836.489973	0.04
70	836.489974	0.04
80	836.489975	0.04
85	836.489980	0.04

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

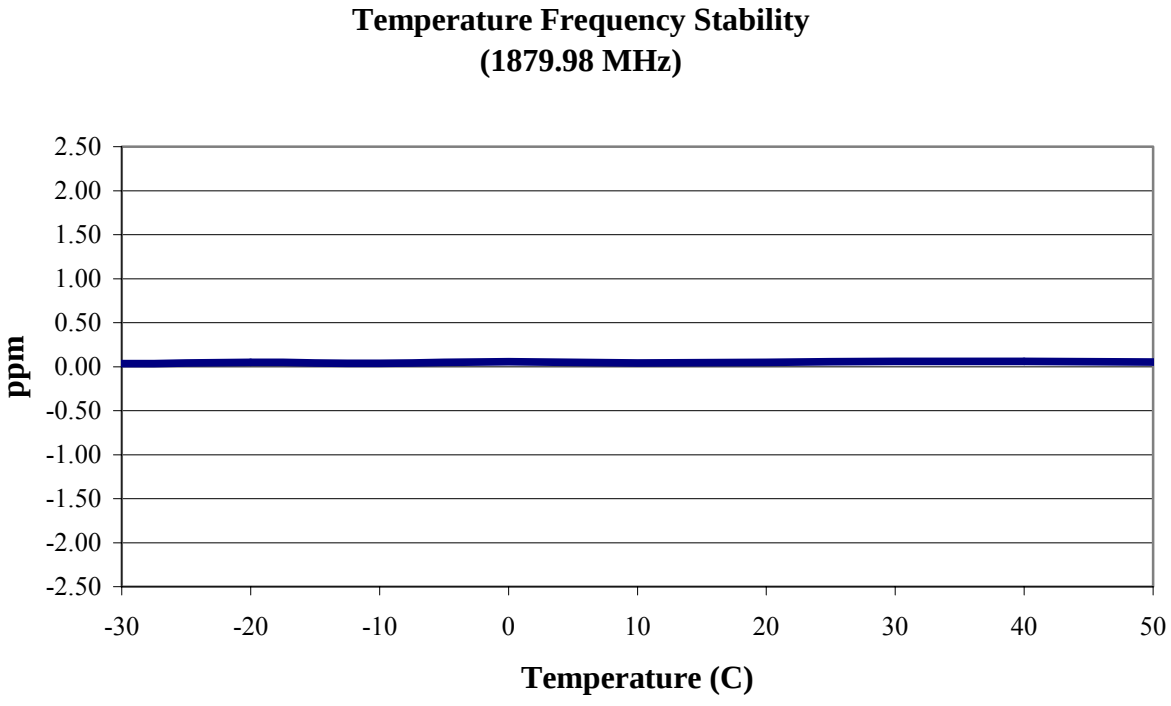


TABLE 9-5: VOLTAGE FREQUENCY STABILITY DATA - §2.1055 (800 MHZ TDMA BAND)

Voltage (DC)	Voltage (DC)	Frequency Measured (MHz)	ppm
4.5	11.0	836.489973	0.03
4.6	11.6	836.489974	0.03
4.7	12.1	836.489975	0.03
4.8	12.7	836.489976	0.03
4.9	13.2	836.489974	0.03
5.0	13.8	836.489978	0.03
5.1	14.3	836.489974	0.03
5.2	14.9	836.489976	0.03
5.3	15.5	836.489974	0.03
5.4	16.0	836.489975	0.03
5.5	16.6	836.489972	0.03

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

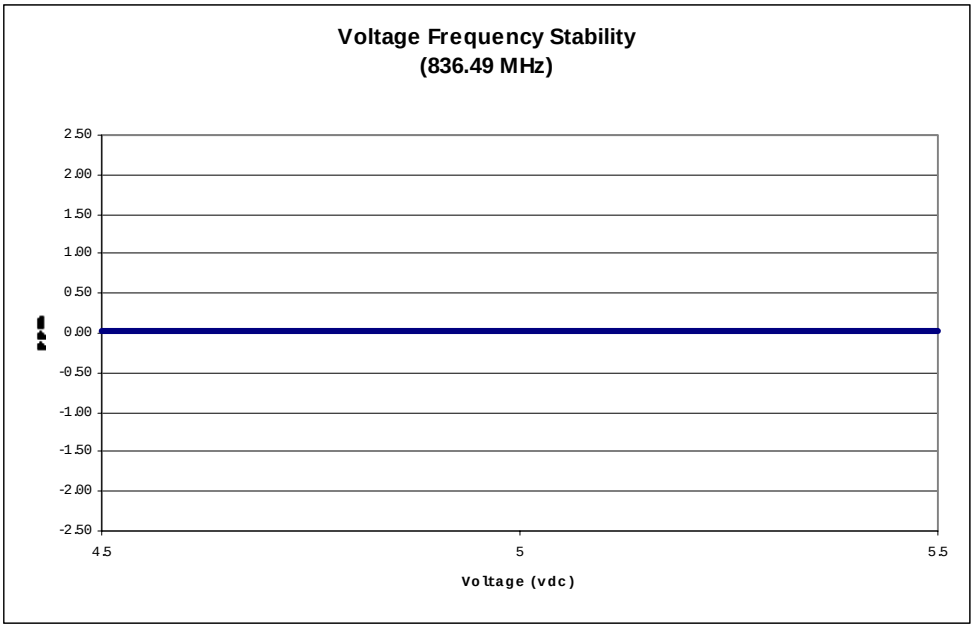
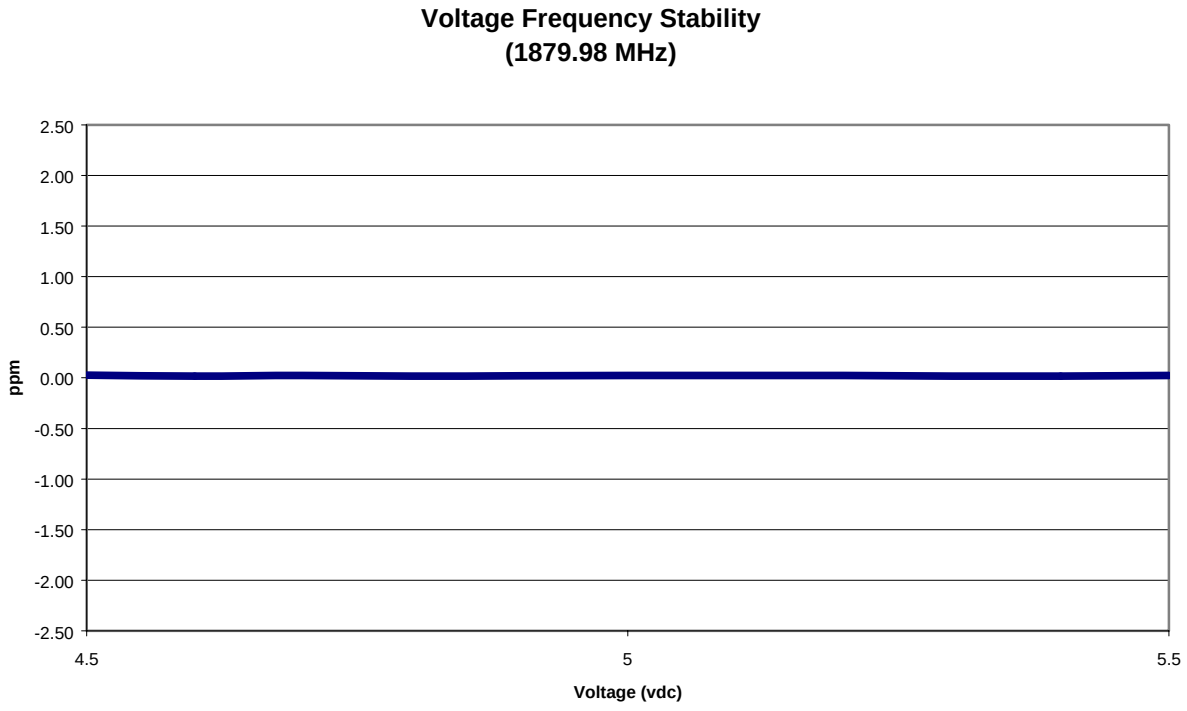


TABLE 9-6: VOLTAGE FREQUENCY STABILITY DATA - §2.1055 (1900 MHZ TDMA BAND)

Voltage (DC)	Voltage (DC)	Frequency Measured (MHz)	ppm
4.5	11.0	1879.979952	0.03
4.6	11.6	1879.979966	0.02
4.7	12.1	1879.979953	0.03
4.8	12.7	1879.979968	0.02
4.9	13.2	1879.979959	0.02
5.0	13.8	1879.979958	0.02
5.1	14.3	1879.979955	0.02
5.2	14.9	1879.979956	0.02
5.3	15.5	1879.979965	0.02
5.4	16.0	1879.979965	0.02
5.5	16.6	1879.979954	0.02

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

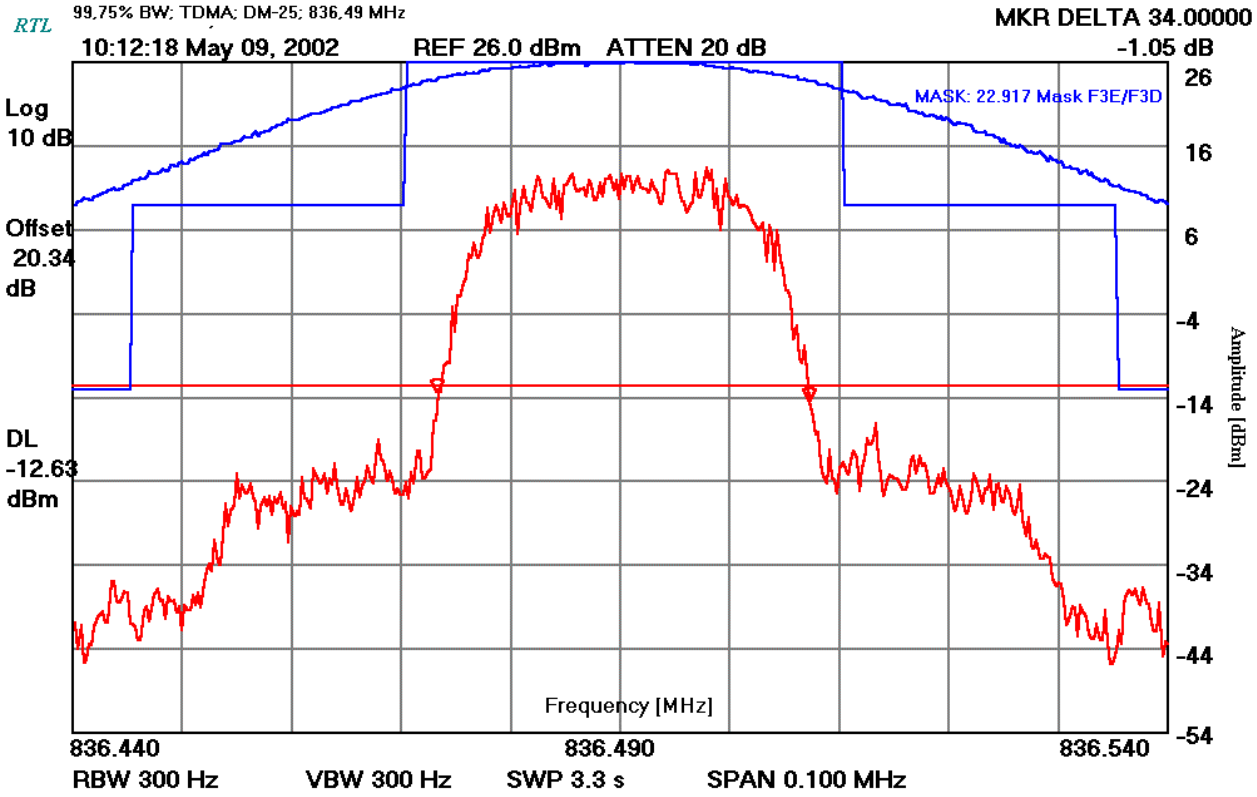


10 NECESSARY BANDWIDTH AND EMISSION BANDWIDTH - § 2.202

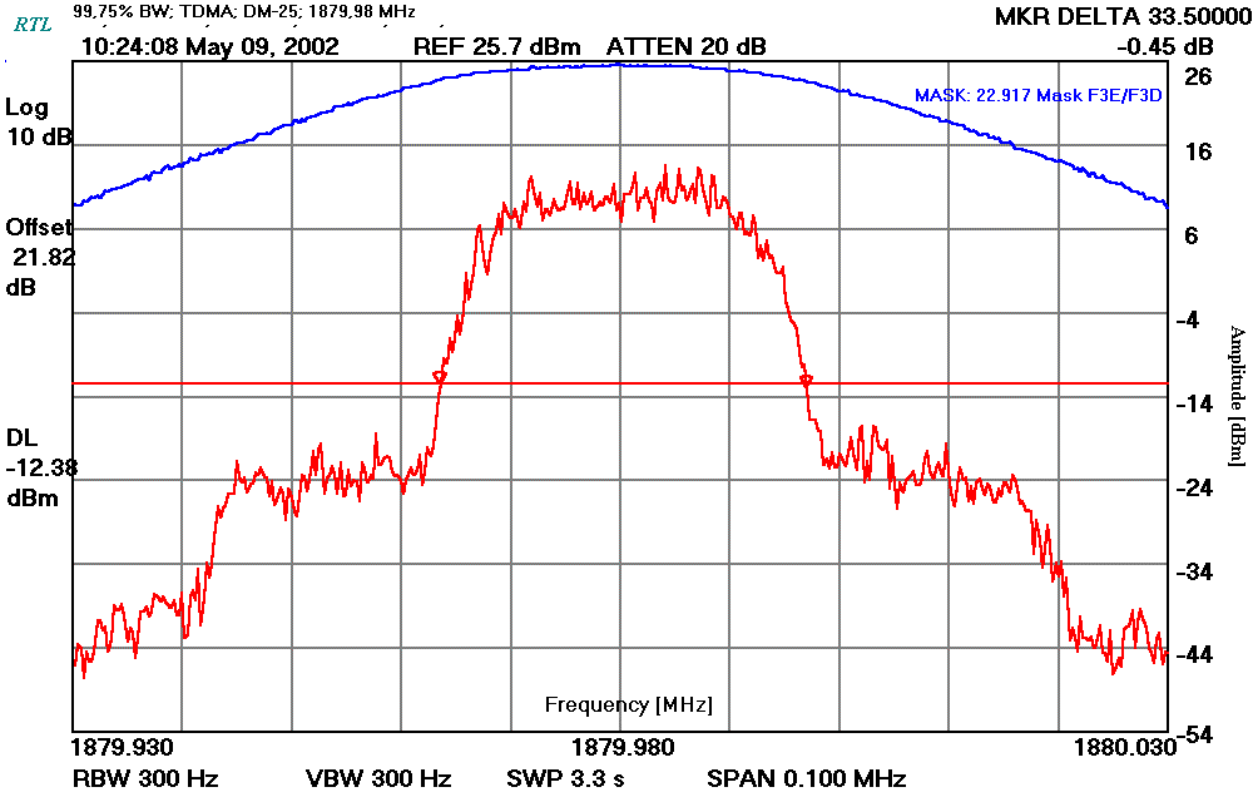
Type of Emission: F8W, F1D, DXW

Necessary Bandwidth and Emission Bandwidth:
40K0F1D
40K0F8W
30K0DXW

Emission Bandwidth (-26 dB) for DXW measured as follows:
99.75% Bandwidth, 836.49 MHz, 34.0 kHz



99.75% Bandwidth, 1879.98 MHz, 33.5 kHz



Calculation for 40K0F8W

1/ Voice + SAT
Modulation: Voice is 2.5 kHz and SAT is 6 kHz, thus the maximum modulation is M = 6 kHz
Deviation: Voice is 12 kHz and SAT is 2 kHz, thus the maximum deviation is D= 12+2= 14 kHz
Bn = 2xM+2xDK with K =1
Bn= 40 kHz

2/ Signaling Tone (ST) + SAT
Modulation: ST is 10 kHz and SAT is 6 kHz, thus the maximum modulation is M = 10 kHz
Deviation: ST is 8 kHz and SAT is 2 kHz, thus the maximum deviation is D= 8+2= 10 kHz
Bn = 2xM+2xDK with K =1
Bn= 40 kHz

Calculation for 40K0F1D (wide Band Data)

1/ Voice + SAT

Modulation: Wideband Data is 10 kHz and SAT is 6 kHz, thus the maximum modulation is M = 10 kHz
Deviation: Wideband Data is 8 kHz and SAT is 2 kHz, thus the maximum deviation is D= 8+2 = 10 kHz
Bn = 2xM+2xDK with K =1
Bn= 40 kHz

Signature:		Test Date:	May 9, 2002
Typed/Printed Name:	Daniel Baltzell	Position:	Test Engineer

11 CONCLUSION

The data in this measurement report shows that the Sony Ericsson Mobile Communications (USA, Inc.), DM-25, FCC ID: PXITR-505 A2 complies with all the requirements of Parts 2, 22.901, and 24 (E) of the FCC Rules and Industry Canada RSS-128 and RSS-133.

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-505 A2	**GRANTEE FRN NUMBER:**	0005-0294-00
PLAT FORM:	N/A	**RTL WORK ORDER NUMBER:**	2002107
MODEL(S):	DM-25	**RTL QUOTE NUMBER:**	QRTL02-449
DATE OF TEST REPORT:	June 6, 2002		

American National Standard Institute:	ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1
FCC Classification:	TBC – Licensed Broadcast Station Transmitter
FCC Rule Part(s):	Part 22: Public Mobile Services Subpart H – Cellular Radiotelephone Services Part 24: Personal Communications Services Subpart E – Broadband PCS
Industry Canada Standard:	RSS-128: 800 MHz Dual-Mode TDMA Cellular Telephones RSS-133: 2 GHz Personal Communications Services
Digital Interface Information	Digital Interface was found to be compliant
Receiver Information	Receiver was found to be compliant

Frequency Range (MHz)	Power (W)	Freq. Tolerance	Emission Designator
824.04-848.97 1850.04-1909.92	3.162 W AMPS Burst Mode 0.411 W Burst Average TDMA	2.5 ppm	30K0DXW; 40K0F1D; 40K0F8W

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, ANSI C63.4, ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1, and Industry Canada RSS-128 and RSS-133.

Signature: _____ Date: June 6, 2002

Typed/Printed Name: Desmond A. Fraser Position: President

Signature: _____ Date: June 6, 2002

Typed/Printed Name: Daniel W. Baltzell Position: EMC Test Engineer

APPENDIX A: TEST PHOTOGRAPHS

PHOTOGRAPH 1: FRONT VIEW OF RADIATED EMISSIONS

PHOTOGRAPH 2: REAR VIEW OF RADIATED EMISSIONS

APPENDIX B: ADDITIONAL INFORMATION FOR INDUSTRY CANADA RSS-128

Radiated Test Data - OATS 1
Test Date: May 8, 2002 - 14:30:55 AM
Work Order: 2002031
Customer Reference: QRTL02-449
Model: DM-25
Mode: digital/receiver spurious emissions
Name: Dan Baltzell
Limit/Distance: FCC /3M

Temperature: 68°F Humidity: 35%									
Emission Frequency (MHz)	**Test Detector**	**Antenna Polarity (H/V)**	**Turntable Azimuth (deg)**	**Antenna Height (m)**	**Analyzer Reading (dBuV)**	**Site Correction Factor (dB/m)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
979.560	Qp	H	353	1	22.8	-16.6	6.2	54.0	-47.8
992.025	Qp	H	353	1	34.3	-16.2	18.1	54.0	-35.9
1004.490	Av	H	353	1	34.7	-16.1	18.6	54.0	-35.4
1959.120	Av	H	353	1	26.3	-8.5	17.8	54.0	-36.2
1984.026	Av	H	353	1	30.3	-8.9	21.4	54.0	-32.6
2008.980	Av	H	353	1	36.2	-8.1	28.1	54.0	-25.9
979.560	Av	H	353	1	22.8	-16.6	6.2	54.0	-47.8