



Engineering and Testing for EMC and Safety Compliance

TYPE CERTIFICATION REPORT (BROADBAND PCS)

UTStarcom, Inc.
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Iselin, NJ 08830
732-767-5263 (Scott Black)

MODEL: UTS-800FSU

FCC ID: O6YUTS-800

August 15, 2001

STANDARDS REFERENCED FOR THIS REPORT	
PART 2: 1999	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
PART 15: 1999	§15.109: RADIATED EMISSIONS LIMITS
PART 24 (E): 1998	PERSONAL COMMUNICATIONS SERVICES – BROADBAND PCS
ANSI C63.4-1992	STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS
ANSI/TIA/EIA603- 1992	LAND MOBILE FM OR PM COMMUNICATIONS EQUIPMENT MEASUREMENT AND PERFORMANCE STANDARDS
ANSI/TIA/EIA 603-1-1998	ADDENDUM TO ANSI/TIA/EIA 603-1992
RSS-133 (Rev. 1): November 1999	2 GHz PERSONAL COMMUNICATIONS SERVICES
RSS-102 (Issue 1): September 1999	EVALUATION PROCEDURE FOR MOBILE AND PORTABLE RADIO TRANSMITTERS WITH RESPECT TO HEALTH CANADA'S SAFETY CODE 6 FOR EXPOSURE OF HUMANS TO RADIO FREQUENCY FIELDS

Frequency Range	Output Power (W)	Freq. Tolerance	Emission Designator
1895.15-1909.95 MHz	0.168 EIRP	3 ppm	252KDXW

REPORT PREPARED BY:

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Document Number: 2001220

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1 GENERAL INFORMATION

The following Report of a Type Certification for a broadband PCS is prepared on behalf of **UTStarcom, Inc.** in accordance with the Federal Communications Commissions and Industry Canada Rules and Regulations. The Equipment Under Test (EUT) was the **UTS-800FSU; FCC ID: 06YUTS-800FSU**. The test results reported in this document relate only to the item that was tested.

All measurements contained in this application were conducted in accordance with FCC Rules and Regulations CFR 47 and ANSI C63.4 Methods of Measurement of Radio Noise Emissions, 1992. 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.

1.1 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located on the parking lot of Rhein Tech Laboratories, Inc. 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).

1.2 RELATED SUBMITTAL(S)/GRANT(S)

This is an original application report.



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2 CONFORMANCE STATEMENT

STANDARDS REFERENCED FOR THIS REPORT	
PART 2: 1999	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
PART 15: 1999	§15.109: RADIATED EMISSIONS LIMITS
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Frequency Range	Output Power (W)	Freq. Tolerance	Emission Designator
1890-1910 MHz	0.168 EIRP	3 ppm	296KDXW

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 15.109, FCC Part 24(E), ANSI/TIA/EIA 603, ANSI/TIA/EIA 603-1, Canada RSS-133, and Canada RSS-102 Certification methodology.

Signature: 

Date: August 15, 2001

Typed/Printed Name: Bruno Clavier

Position: Vice President of Operations
(NVLAP Signatory)

Signature: 

Date: August 15, 2001

Typed/Printed Name: Daniel W. Baltzell

Position: Test Engineer

 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.



3 TESTED SYSTEM DETAILS

Listed below is the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable.

3.1 EQUIPMENT TEST CONFIGURATION INFORMATION

TABLE 3-1: EQUIPMENT UNDER TEST (EUT)

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
FIXED SUBSCRIBER UNIT	UTSTARCOM, INC.	UTS-800	0005492	O6YUTS-800FSU	SHIELDED ANTENNA CABLE, UNSHIELDED POWER AND DATA CABLE	13596

TABLE 3-2: EXTERNAL COMPONENTS USED IN TEST CONFIGURATION

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
ADAPTER BOX	UTSTARCOM, INC.	PSJ_JR.	0910	SAMPLE	UNSHIELDED CABLE	13595
DATA TRANSFER CABLE	UTSTARCOM, INC.	DS-102	N/A	N/A	UNSHIELDED CABLE	
DC POWER SUPPLY	UTSTARCOM, INC.	SA1010UVE	N/A	N/A	UNSHIELDED CABLE	1359
ANTENNA	ANTEN CORPORATION	1.9G-PA019	9708	SAMPLE	SHIELDED CABLE	13592
BATTERY BOX	UTSTARCOM, INC.	VE-V012	N/A	N/A	UNSHIELDED CABLE	13594



3.2 EQUIPMENT TEST CONFIGURATION

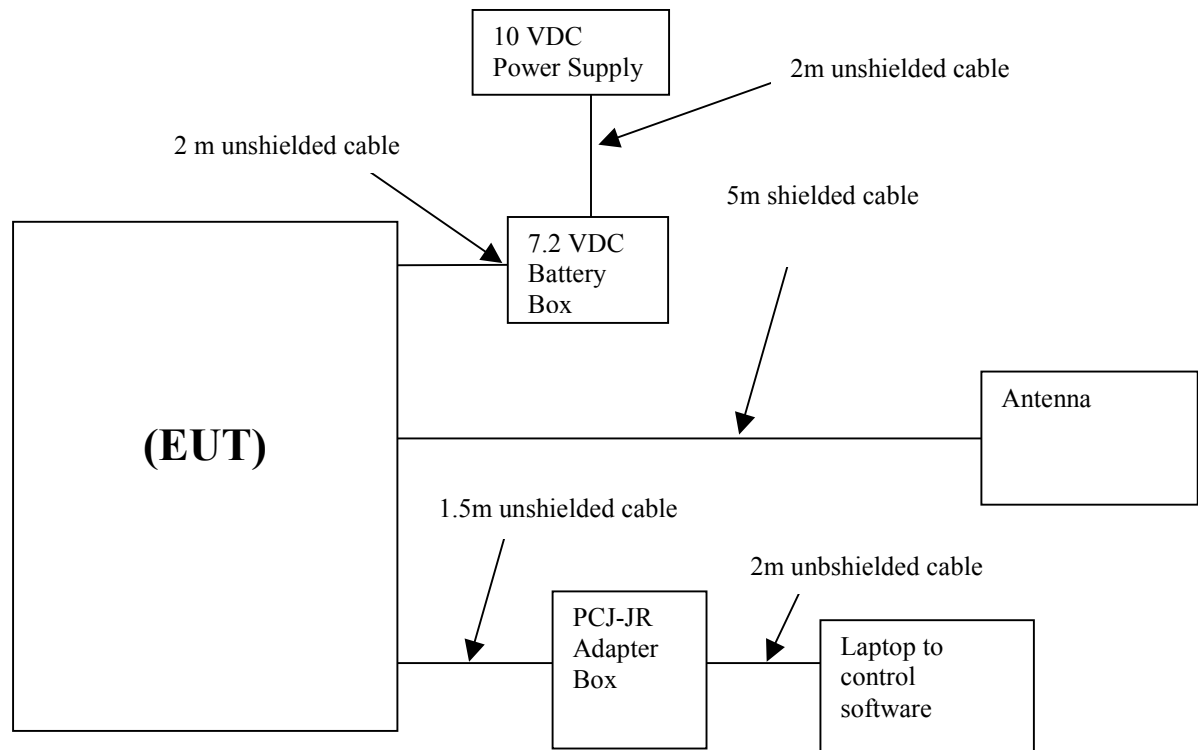


FIGURE 3-1: CONFIGURATION OF TESTED SYSTEM



4 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FI(\text{dBuV/m}) = SAR(\text{dBuV}) + SCF(\text{dB/m})$$

FI = Field Intensity

SAR = Spectrum Analyzer Reading

SCF = Site Correction Factor

The Site Correction Factor (SCF) used in the above equation is determined empirically, and is expressed in the following equation:

$$SCF(\text{dB/m}) = -PG(\text{dB}) + AF(\text{dB/m}) + CL(\text{dB})$$

SCF = Site Correction Factor

PG = Pre-amplifier Gain

AF = Antenna Factor

CL = Cable Loss

The field intensity in microvolts per meter can then be determined according to the following equation:

$$FI(\text{uV/m}) = 10^{FI(\text{dBuV/m})/20}$$

For example, assume a signal at a frequency of 125 MHz has a received level measured as 49.3 dBuV. The total Site Correction Factor (antenna factor plus cable loss minus preamplifier gain) for 125 MHz is -11.5 dB/m. The actual radiated field strength is calculated as follows:

$$49.3 \text{ dBuV} - 11.5 \text{ dB/m} = 37.8 \text{ dBuV/m}$$

$$10^{37.8/20} = 10^{1.89} = 77.6 \text{ uV/m}$$



5 CONDUCTED AND RADIATED EMISSIONS MEASUREMENT INFORMATION

5.1 CONDUCTED MEASUREMENT

The EUT is operated with a battery. Power lines conducted emissions were measured when the radio and the transfer cable connected to an external modem sending data to the unit and while operation using a battery charger AC/DC powered from the mains.

The power line conducted emission measurements were performed in a Series 81 type shielded enclosure manufactured by Rayproof. The EUT was assembled on a wooden table 80 centimeters high. Power was fed to the EUT through a 50 ohm / 50 microhenry Line Impedance Stabilization Network (EUT LISN). The EUT LISN was fed power through an A.C. filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. A second LISN, the peripheral LISN, provides isolation for the EUT test peripherals. This peripheral LISN was also fed A.C. power. A metal power outlet box, which is bonded to the ground plane and electrically connected to the peripheral LISN, powers the EUT host peripherals.

The spectrum analyzer was connected to the A.C. line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input through a Solar 400 kHz high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 400 kHz. Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. No video filter less than 10 times the resolution bandwidth was used. Average measurements are performed in linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, and by increasing the sweep time in order to obtain a calibrated measurement. The emission spectrum was scanned from 450 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in this report.

5.2 RADIATED MEASUREMENT

Before final measurements of radiated emissions were made on the open-field three-meter range, the EUT was scanned indoors at a three-meter distance in order to determine its emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to insure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made on the three-meter, open-field test site. The EUT was placed on a nonconductive turntable approximately 0.8 meters above the ground plane.

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.

Note: Rhein Tech Laboratories, Inc. has implemented procedures to minimize errors that occur from test instruments, calibration, procedures, and test setups. Test instrument and calibration errors are documented from the manufacturer or calibration lab. Other errors have been defined and calculated within the Rhein Tech quality manual, section 6.1. Rhein Tech implements the following procedures to minimize errors that may occur: yearly as well as daily calibration methods, technician training, and emphasis to employees on avoiding error.



6 PART 2 §2.1046 (A) RF POWER OUTPUT: RADIATED – EIRP PART 24.232 (RSS-133 §6.2)

6.1 TEST PROCEDURE

Method: EIRP

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 approximately 0.8 meters above the ground plane.

The physical arrangement of the EUT and associated cabling was varied 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 EIRP measurement.

The level in units of dBm from the substitution signal generator was corrected for cable loss and receiving antenna factor, the corrected signal generator level was then used to calculate the final level in mW.



6.2 TEST DATA

TABLE 6-1: PART 2.1046 (A) RF POWER OUTPUT: RADIATED – EIRP PART 24.232

Settings:

- Output power delivered to antenna:

Frequency (MHz)	Power Meter Level (dBm)	(mW)
Channel 1		
1895.15	12.09	16.18
Channel 25		
1902.35	12.17	16.48
Channel 50		
1909.95	12.37	17.26

- Antenna: 10 dBi gain
- radiated power measurements performed at a 3 meter distance

Frequency (MHz)	Signal Generator Level (dBm)	Correction Factor (dB)	Corrected Signal Generator Level (dBm)	EIRP (mW)
Channel 1				
1895.15	17.1	4.86	21.96	157.0
Channel 25				
1902.35	17.3	4.96	22.26	168.3
Channel 50				
1909.95	17.3	4.66	21.96	157.0

*Measurement accuracy is +/- 1.5 dB

TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER


SIGNATURE

AUGUST 15, 2001
DATE OF TEST



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TABLE 6-2: TEST EQUIPMENT USED FOR TESTING (RADIATED – ERP RF POWER OUTPUT)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771
900154	Compliance Design Inc,	Roberts Dipole	Adjustable Elements Dipole Antenna (30-1000MHz)	-



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7 FCC PART 2 §2.1049 (C) (1): OCCUPIED BANDWIDTH – PART 24.238

OCCUPIED BANDWIDTH (99% POWER BANDWIDTH) - COMPLIANCE WITH THE EMISSION MASKS

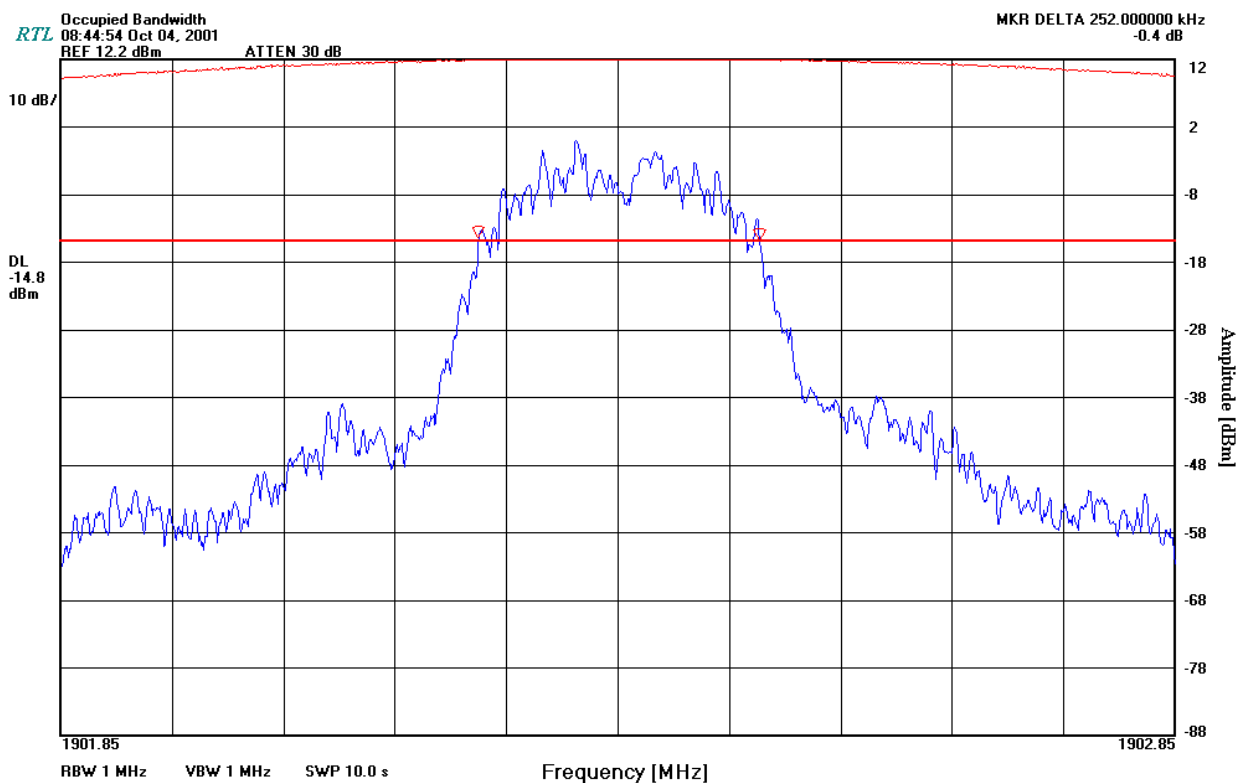
7.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, section 2.2.11

Device with digital modulation: operation to its maximum extent

7.2 TEST DATA

PLOT 7-1: CHANNEL 25: OCCUPIED BANDWIDTH = 296 KHZ



TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER

SIGNATURE

AUGUST 15, 2001
DATE OF TEST

TABLE 7-1: TEST EQUIPMENT USED FOR TESTING (OCCUPIED BANDWIDTH)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719



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8 FCC PART 2 §2.1051 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

TABLE 8-1: (CHANNEL 1; 1895.15 MHZ; POWER OUTPUT= 12.09 DBM)

Frequency (MHz)	Emission level* (dBm)	Correction Factor (dB)	Corrected Level (dBc)	Limit (dBc)	Margin (dB)
3790.300	-47.8	4.3	55.6	25.1	30.5
5685.450	NF**				
7580.600	NF**				
9475.750	NF**				
11370.900	NF**				
13266.050	NF**				
15161.200	NF**				
17056.350	NF**				
18951.500	NF**				

**NF: Noise Floor

TABLE 8-2: (CHANNEL 25; 1902.35 MHZ; POWER OUTPUT= 12.17 DBM)

Frequency (MHz)	Emission level* (dBm)	Correction Factor (dB)	Corrected Level (dBc)	Limit (dBc)	Margin (dB)
3790.300	-50.7	4.5	58.4	25.2	33.2
5685.450	NF**				
7580.600	NF**				
9475.750	NF**				
11370.900	NF**				
13266.050	NF**				
15161.200	NF**				
17056.350	NF**				
18951.500	NF**				

**NF: Noise Floor

TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER


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TABLE 8-3: (CHANNEL 50; 1909.95 MHZ; POWER OUTPUT= 12.37 DBM)

Frequency (MHz)	Emission level* (dBm)	Correction Factor (dB)	Corrected Level (dBc)	Limit (dBc)	Margin (dB)
3819.90	-47.2	4.2	55.4	25.4	30.0
5729.85	NF**				
7639.80	NF**				
9549.75	NF**				
11459.70	NF**				
13369.65	NF**				
15279.60	NF**				
17189.55	NF**				
19099.50	NF**				

**NF: Noise Floor

TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER


SIGNATURE

AUGUST 15, 2001
DATE OF TEST

TABLE 8-4: TEST EQUIPMENT USED FOR TESTING (FIELD STRENGTH)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719



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9 FCC PART 2 §2.1053 (A): FIELD STRENGTH OF SPURIOUS RADIATION – PART 24.238

9.1 TEST PROCEDURE

ANSI C63.4-1992

The transmitter is set in continuous transmitting mode and modulated with pseudo random data using the internal software.

Refer to section "Radiated Measurement" in this report for further information.

9.2 TEST DATA

The worst-case emissions test data are shown. The magnitude of emissions, attenuated more than 20 dB below the FCC limit, does not need to be recorded.

TABLE 9-1: FIELD STRENGTH (CHANNEL 1; 1895.15 MHZ; EIRP= 157 MW)

Frequency (MHz)	Emission level* (dBuV)	Signal Generator Level (dBm)	Correction Factor (dB/m)	Corrected Level (dBc)	Limit (dBc)	Margin (dB)
3790.300*	51.5	-33.9	6.9	49.0	35.0	14.0
3790.300	34.3	-51.1	6.9	66.2	35.0	31.2
5685.450	NF**					
7580.600	NF**					
9475.750	NF**					
11370.900	NF**					
13266.050	NF**					
15161.200	NF**					
17056.350	NF**					
18951.500	NF**					

* Peak detector per Part 24.238

**NF: Noise Floor

TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER


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TABLE 9-2: FIELD STRENGTH (CHANNEL 25; 1902.35 MHZ; EIRP= 168.3 MW)

Frequency (MHz)	Emission level* (dBuV)	Signal Generator Level (dBm)	Correction Factor (dB/m)	Corrected Level (dBc)	Limit (dBc)	Margin (dB)
3804.700*	51.7	-33.5	7.0	48.8	35.3	13.5
3804.700	33.8	-51.4	7.0	66.7	35.3	31.4
5707.050	NF**					
7609.400	NF**					
9511.750	NF**					
11414.100	NF**					
13316.450	NF**					
15218.800	NF**					
17121.150	NF**					
18951.500	NF**					

* Peak detector per Part 24.238

**NF: Noise Floor

TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER


SIGNATURE

AUGUST 15, 2001
DATE OF TEST



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TABLE 9-3: FIELD STRENGTH (CHANNEL 50; 1909.95 MHZ; EIRP= 157 MW)

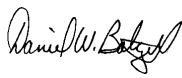
Frequency (MHz)	Emission level* (dBuV)	Signal Generator Level (dBm)	Correction Factor (dB/m)	Corrected Level (dBc)	Limit (dBc)	Margin (dB)
3819.90*	52.2	-33.7	7.0	48.7	35.0	13.7
3819.90	34.2	-51.7	7.0	66.7	35.0	31.7
5729.85	NF**					
7639.80	NF**					
9549.75	NF**					
11459.70	NF**					
13369.65	NF**					
15279.60	NF**					
17189.55	NF**					
19099.50	NF**					

* Peak detector per Part 24.238

**NF: Noise Floor

TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER


SIGNATURE

AUGUST 15, 2001
DATE OF TEST

TABLE 9-4: TEST EQUIPMENT USED FOR TESTING (FIELD STRENGTH)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
900791	Schaffner@Chase	CBL6112	Anetenna (25MHz – 2GHz)	2099
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1-26.5 GHz)	3008A00505
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719
900917	Hewlett Packard	8648C	Synthesized. Signal Generator (9 KHz to 3200 MHz)	3537A01741
900928	Hewlett Packard	83752A	Synthesized Sweeper, 0.01 to 20 GHz	3610A00866



10 FCC PART 2 §2.1055: FREQUENCY STABILITY – PART 24.235 (RSS-133 §7)

10.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, section 2.2.2

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

The EUT was evaluated over the temperature range -30°C to +50°C.

The temperature was initially set to -30°C and a 2-hour period was observed for stabilization of the EUT.

The frequency stability was measured within one minute after application of primary power to the transmitter. The temperature was raised at intervals of 10 degrees centigrade through the range. A ½ an hour period was observed to stabilize the EUT at each measurement step and the frequency stability was measured within one minute after application of primary power to the transmitter.

Additionally, the power supply voltage of the EUT was varied from 85% to 115% of the nominal battery voltage.

The worst-case test data are shown.

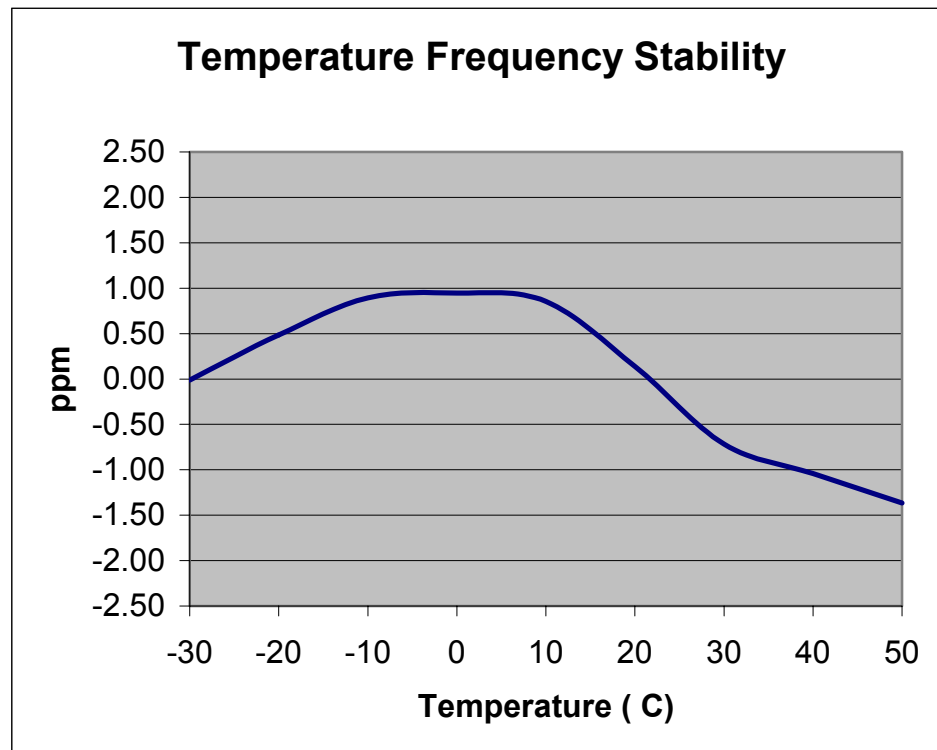


10.2 TEST DATA

TABLE 10-1: FREQUENCY STABILITY/FREQUENCY VARIATION

Temperature (C)	Frequency Measured (MHz)	ppm
-30	1902.349975	-0.01
-20	1902.350925	0.49
-10	1902.351700	0.89
0	1902.351800	0.95
10	1902.351625	0.85
20	1902.350267	0.14
30	1902.348634	-0.72
40	1902.348018	-1.04
50	1902.347401	-1.37

PLOT 10-1: FREQUENCY STABILITY/FREQUENCY VARIATION (-1.4 PPM AT 50C WORST CASE)



TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER


SIGNATURE

AUGUST 15, 2001
DATE OF TEST

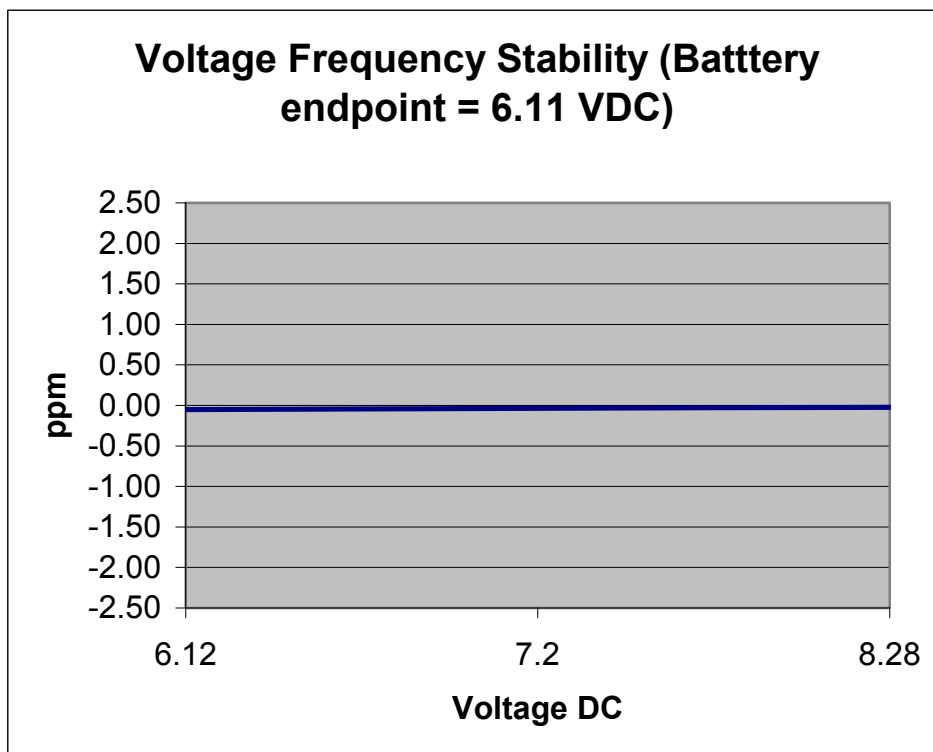


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TABLE 10-2: FREQUENCY STABILITY/VOLTAGE VARIATION

Voltage (VDC)	Frequency Measured (MHz)	ppm
3.06	1902.349904	-0.05
3.60	1902.349929	-0.04
4.14	1902.349954	-0.02

PLOT 10-2: FREQUENCY STABILITY/VOLTAGE VARIATION (-0.05 PPM WORST CASE)



TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER


SIGNATURE

AUGUST 15, 2001
DATE OF TEST

TABLE 10-3: TEST EQUIPMENT USED FOR TESTING (FREQUENCY STABILITY)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
900946	Tenney Engineering, Inc.	TH65	Temperature Chamber with Humidity	11380
901055	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2545A04102



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11 FCC PART 15 §15.107 (A) CONDUCTED EMISSIONS

11.1 CONDUCTED EMISSIONS: CHANNEL 25 1902.35 MHZ

TABLE 11-1: CONDUCTED EMISSIONS (CLASS B LIMITS) NEUTRAL SIDE (LINE 1)

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)
0.610	Pk	31.2	0.7	31.9	48.0	-16.1
1.615	Pk	45.6	1.0	46.6	48.0	-1.4
3.297	Pk	36.8	1.4	38.2	48.0	-9.8
10.368	Qp	43.6	1.9	45.5	48.0	-2.5
10.368	Av	41.8	1.9	43.7	48.0	-4.3
10.368	Pk	45.2	1.9	47.1	48.0	-0.9
18.816	Pk	29.0	3.4	32.4	48.0	-15.6
29.590	Pk	30.9	4.0	34.9	48.0	-13.1

TABLE 11-2: CONDUCTED EMISSIONS (CLASS B LIMITS) HOT SIDE (LINE 2)

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)
0.503	Pk	36.2	0.7	36.9	48.0	-11.1
3.305	Pk	36.8	1.4	38.2	48.0	-9.8
6.513	Pk	33.4	2.0	35.4	48.0	-12.6
10.367	Pk	45.2	2.3	47.5	48.0	-0.5
10.367	Qp	43.4	2.3	45.7	48.0	-2.3
10.367	Av	41.8	2.3	44.1	48.0	-3.9
18.816	Pk	27.4	3.3	30.7	48.0	-17.3
28.640	Pk	28.2	4.1	32.3	48.0	-15.7

TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER


SIGNATURE

AUGUST 15, 2001
DATE OF TEST

TABLE 11-3: TEST EQUIPMENT USED FOR TESTING (CONDUCTED EMISSIONS)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
900931	HP	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771
900070	Solar		LISN	



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12 FCC PART 15 §15.109 (A) RADIATED EMISSIONS (RSS-133 §9)

TABLE 12-1: RADIATED EMISSIONS (RECEIVER DATA) TEMPERATURE: 59°F, HUMIDITY: 62%

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)
57.590	Qp	V	0	1.0	46.5	-22.8	23.7	40.0	-16.3
115.190	Qp	V	120	1.0	44.9	-15.8	29.1	43.5	-14.4
134.390	Qp	V	270	1.0	39.6	-15.4	24.2	43.5	-19.3
153.590	Qp	V	190	1.0	45.5	-17.0	28.5	43.5	-15.0
172.790	Qp	V	225	1.0	39.6	-17.5	22.1	43.5	-21.4
191.990	Qp	V	20	1.0	43.3	-18.1	25.2	43.5	-18.3
1651.195	Av	V	300	1.4	26.5	17.4	43.9	54.0	-10.1
1658.395	Av	V	300	1.4	24.6	17.5	42.1	54.0	-11.9
1665.895	Av	V	300	1.4	29.8	17.3	47.1	54.0	-6.9
1724.440	Av	H	120	1.8	43.6	5.2	48.8	54.0	-5.2
3302.397	Av	H	270	1.2	20.5	18.8	39.3	54.0	-14.7
3316.797	Av	H	120	1.1	22.3	18.6	40.9	54.0	-13.1
3317.955	Av	H	175	1.0	21.3	18.5	39.8	54.0	-14.2
4997.696	Av	H	0	1	20.3	25.1	45.4	54.0	-8.6
4975.195	Av	H	0	1	19.0	25.3	44.3	54.0	-9.7
4953.596	Av	H	0	1	18.5	25.3	43.8	54.0	-10.2

TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER


SIGNATURE

AUGUST 15, 2001
DATE OF TEST

TABLE 12-2: TEST EQUIPMENT USED FOR TESTING (RADIATED EMISSIONS)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
900931	HP	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771
900999	HP	8596EM Analyzer	Spectrum Analyzer (9KHz - 12.5GHz)	3826A00144
901053	Schaffner@Chase	CBL6112B	Bilog antenna (20 MHz - 2 GHz)	2648
900321	EMCO	3161-03	Horn Antennas (4-8,2GHz)	9508-1020
900323	EMCO	3161-03	Horn Antennas (4-8,2GHz)	9508-1020
900772	Electro Metrics	RGA 60	Horn Antenna	2310
900889	HP	85685A	RF Preselector for HP 8566B or 8568B (20Hz-2GHz)	3146A01309
900800	EMCO	3301B	Active monopole antenna (30 Hz – 50 MHz)	9809-4071



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13 BAND-EDGE COMPLIANCE - PART 24.229 AND PART 24.238 (RSS-133 §6.3)

13.1 TEST PROCEDURE:

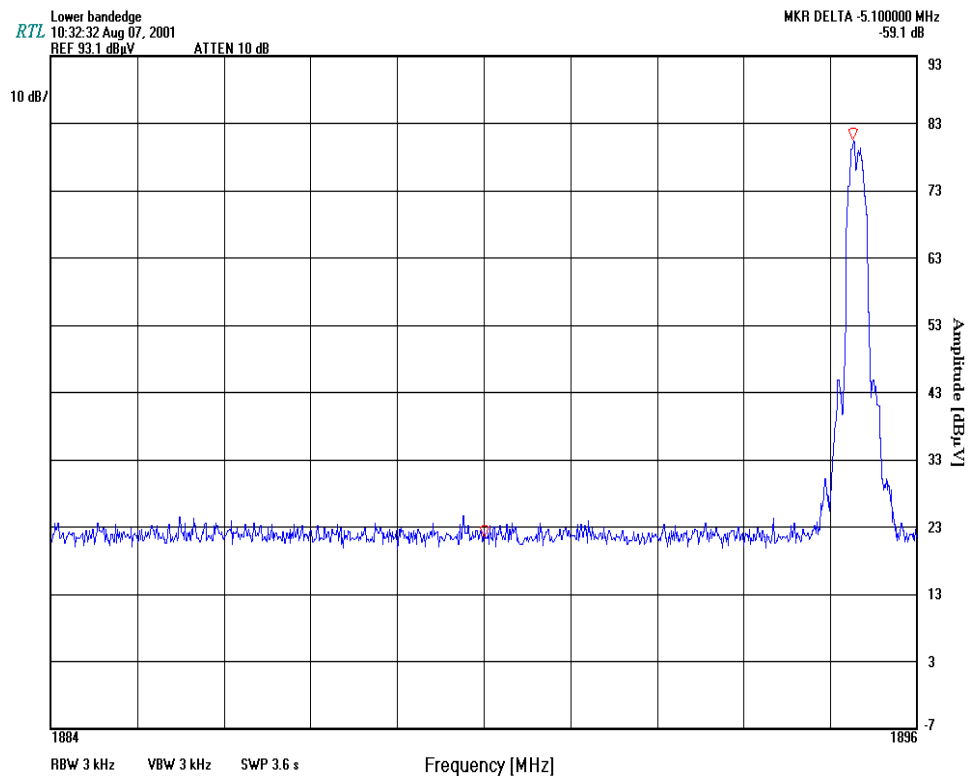
Delta Marker method

13.2 TEST DATA

The emission levels at the band edges are found to be below 82.2 dBuV/m EIRP.

PLOT 13-1: LOWER BAND EDGE

Calculation: $(105.0 \text{ dBuV/m (Average field strength)} - 59.1 \text{ (delta marker (dB))}) - 82.2 \text{ (dBuV/m)} = -36.3 \text{ dB}$



TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER

Daniel W. Baltzell
SIGNATURE

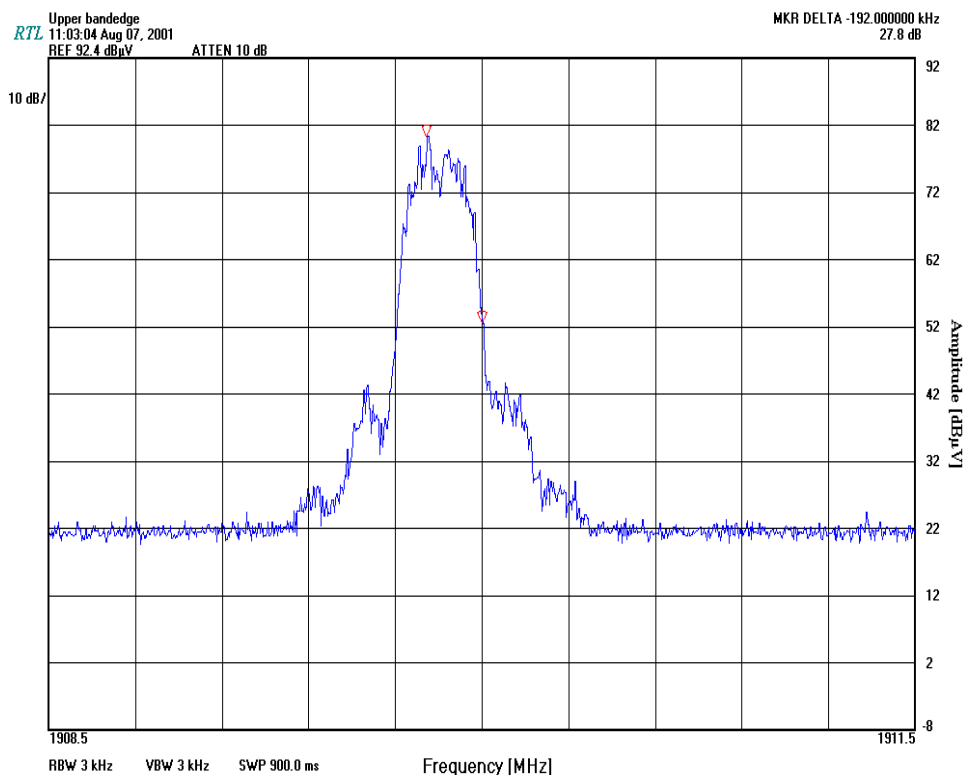
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PLOT 13-2: UPPER BAND EDGE

Calculation: $(103.3 \text{ dBuV/m (Average field strength)} - 27.8 \text{ (delta marker (dB))}) - 82.2 \text{ (dBuV/m)} = -6.7 \text{ dB}$



TEST PERSONNEL:

DANIEL BALTZELL
TEST TECHNICIAN/ENGINEER

Daniel W. Baltzell
SIGNATURE

AUGUST 15, 2001
DATE OF TEST

TABLE 13-1: TEST EQUIPMENT USED FOR TESTING (BANDEDGE)

RTL Asset #	Manufacturer	Model	Part Type	Serial Number
900931	HP	8566B	Spectrum Analyzer (100Hz – 22 GHz)	3138A07771
900791	Schaffner - Chase	CBL6112	BiLog Antenna (25MHz – 2GHz)	2099