



Engineering and Testing for EMC and Safety Compliance

CERTIFICATION APPLICATION REPORT FCC PART 22H

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MODEL: FSU C800

MODEL #: C800

CDMA Fixed Wireless Desk Phone

FCC ID: O6Y-FSUC800

January 20, 2005

STANDARDS REFERENCED FOR THIS REPORT	
PART 2: 2003	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
PART 15: 2003	RADIO FREQUENCY DEVICES - §15.109: RADIATED EMISSIONS LIMITS
PART 22: 2002	Public Mobile Services: Subpart H – Cellular Radiotelephone Services
ANSI C63.4-2003	AMERICAN NATIONAL STANDARD FOR METHODS OF MEASUREMENT OF RADIO NOISE EMISSIONS FROM LOW -VOLTAGE ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE OF 9 KHz – 40 GHz
ANSI/TIA/EIA-603- 2002	LAND PORTABLE FM OR PM COMMUNICATIONS EQUIPMENT - MEASUREMENT AND PERFORMANCE STANDARDS

Frequency Range (MHz)	Maximum Measured Output Power (W) Conducted	Measured Frequency Tolerance (ppm)	Emission Designator
824.7-848.31 CDMA Cellular Mode	0.244	1.43	1M25F9W

REPORT PREPARED BY TEST ENGINEER: DANIEL BALTZELL

Document Number: 2004232 / QRTL04-420

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1 GENERAL INFORMATION

The following Type Certification Report is prepared on behalf of **UTStarcom** in accordance with the Federal Communications Commission Rules and Regulations. The Equipment Under Test (EUT) was **Model Name: FSU C800, Model Number: C800; FCC ID: O6Y-FSUC800**. The test results reported in this document relate only to the item that was tested.

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

All measurements contained in this application were conducted in accordance with the FCC Rules and Regulations CFR 47, ANSI/TIA/EIA 603-2002 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.

1.1 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 dated March 3, 1994, submitted to and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 2003).

1.2 RELATED SUBMITTAL(S)/GRANT(S)

This is an original application. A DoC report for digital and receiver emissions is available.

1.3 JUSTIFICATION

The transmitter was tested at a high, mid, and low channel in the following frequency range (824 – 849 MHz). The following frequencies were tested: 824.7, 836.52, 848.31 MHz. Each transmitter frequency was measured independently in 3 orthogonal planes at 360° rotation.

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

1.4 EXERCISING THE EUT

The FSU C800 was tested using client-based software to set all the parameters required for testing, such as power level, frequency, and receive modes.

2 TESTED SYSTEM DETAILS

The EUT sample was received on December 7, 2004. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for the tests in this report, as applicable.

TABLE 2-1: EQUIPMENT UNDER TEST (EUT)

Part	Manufacturer	Model #	Serial Number/PN	FCC ID	Cable Type/Size	RTL Bar Code
Desk Phone	UTStarcom	C800	OX54013B0B	O6Y-FSUC800	N/A	16370
Desk Phone	UTStarcom	C800	OX54013B1B	O6Y-FSUC800	N/A	16373
Desk Phone	UTStarcom	C800	OX54013B07	O6Y-FSUC800	N/A	16376
Handset	UTStarcom	FSU	N/A	N/A	1.9m unshielded	16369
Handset	UTStarcom	FSU	N/A	N/A	1.9m unshielded	16375
Handset	UTStarcom	FSU	N/A	N/A	1.9m unshielded	16372
Power Supply	UTStarcom	P-010B	P-010B-B619	N/A	1.8m unshielded	16424
Power Supply	UTStarcom	S668002A	CY160445	N/A	1.8m unshielded	16425

TABLE 2-2: TEST SUPPORT EQUIPMENT

Part	Manufacturer	Model	Serial Number/PN	FCC ID	Cable Type/Size	RTL Bar Code
Serial Cable	N/A	N/A	N/A	N/A	1.7m shielded	16384
Laptop Computer	Toshiba	Satellite 1905-S301	920403315C	N/A	N/A	N/A
USB Mobile Port Replicator	Targus	PA070	430-0019-001B	N/A	1m shielded I/O	N/A

2.1 TEST SYSTEM CONFIGURATION

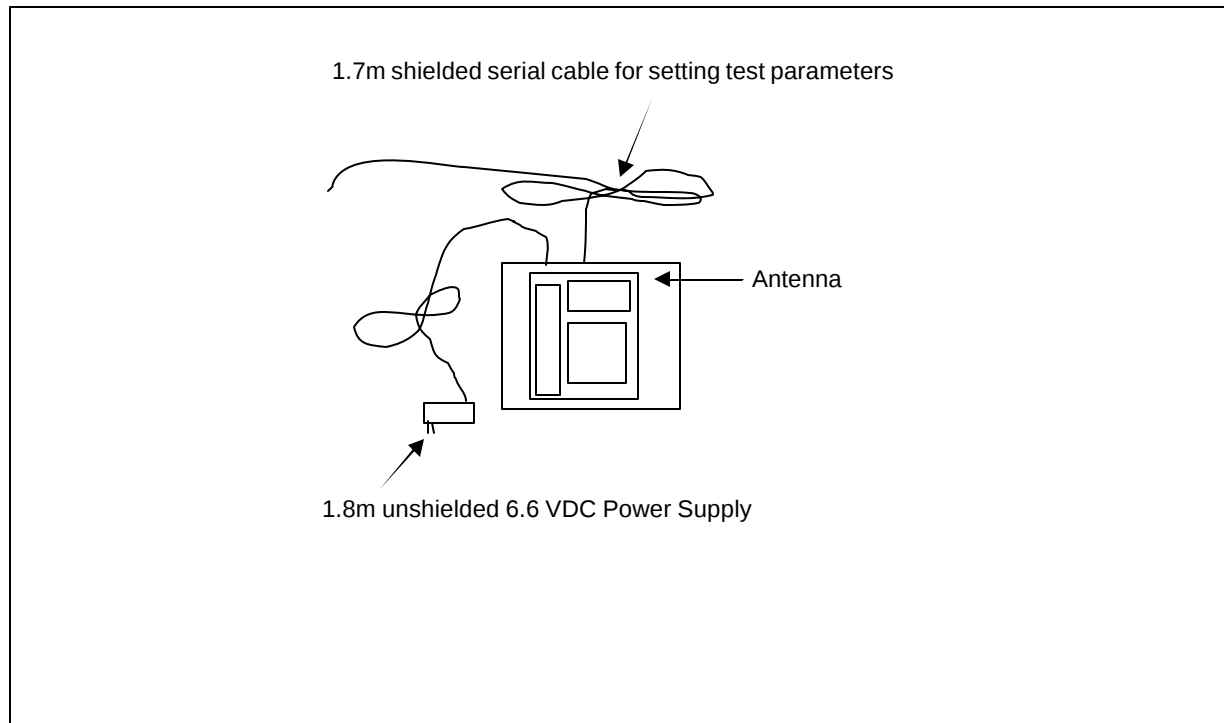


FIGURE 2-1: CONFIGURATION OF TESTED SYSTEM

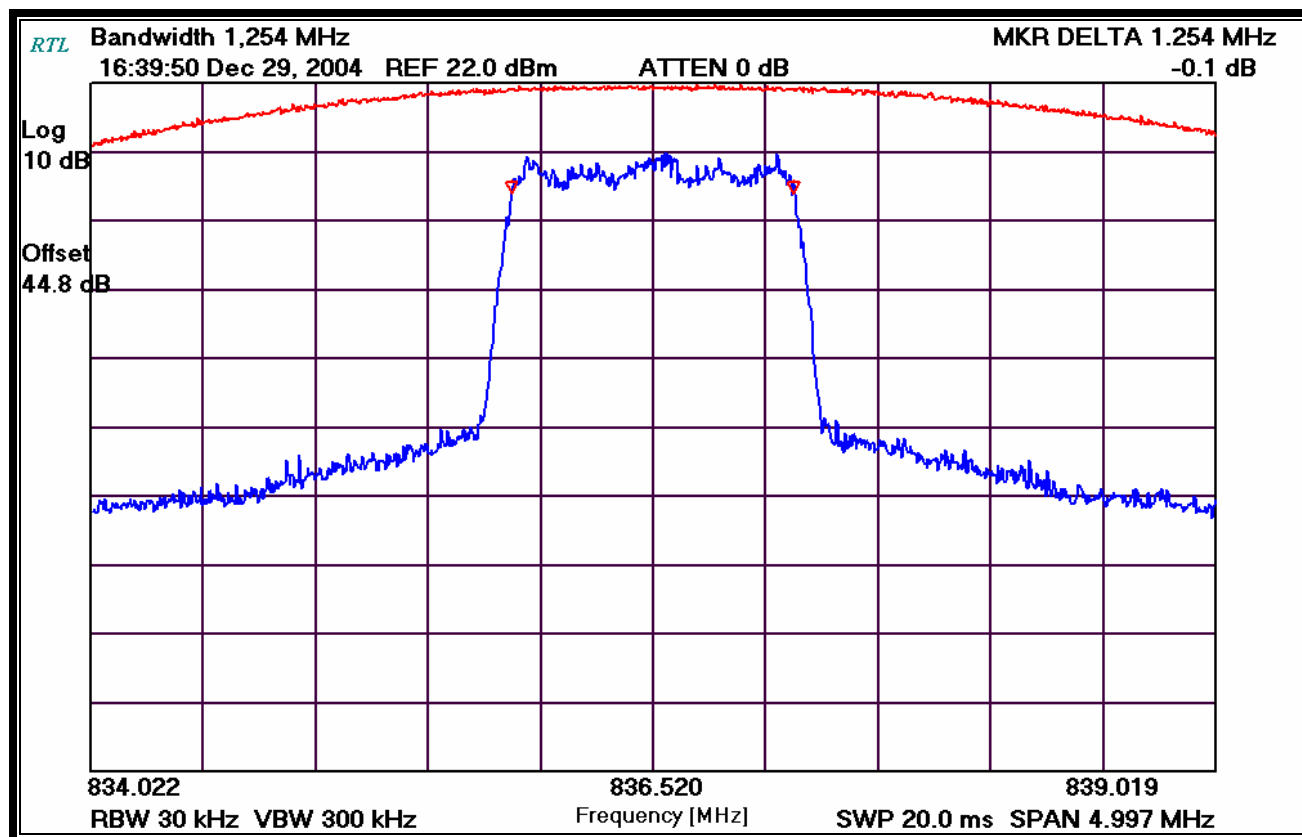
3 NECESSARY BANDWIDTH AND EMISSION BANDWIDTH - § 2.202 AND § 22.917(B)

Type of Emission: F9W

Emission Designator: 1M25F9W

Measurement of Necessary Bandwidth

PLOT 3-1: 99% OCCUPIED BANDWIDTH – CDMA CELL BAND



PLOT 3-2: 26 DB EMISSION BANDWIDTH – CDMA CELL BAND

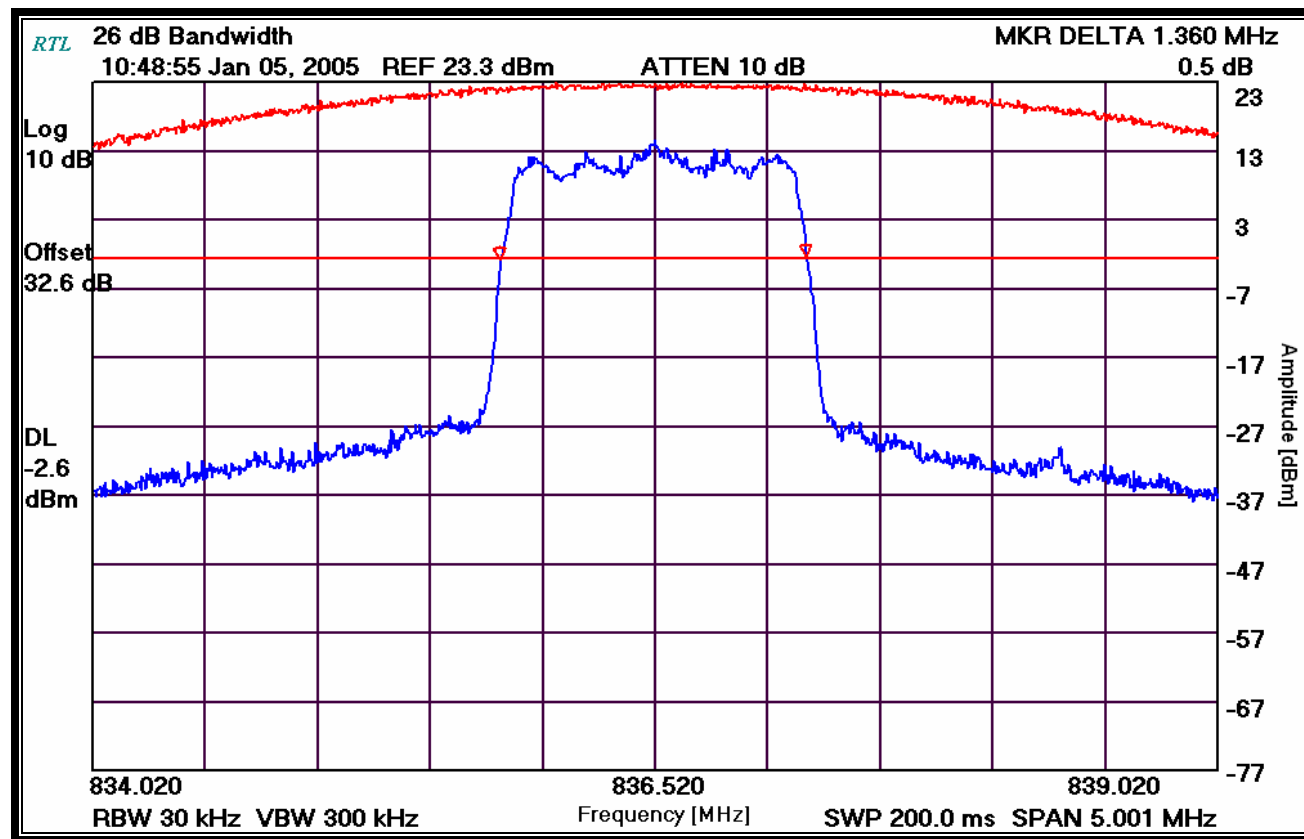
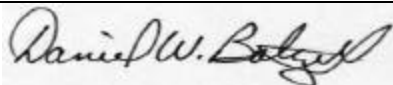


TABLE 3-1: TEST EQUIPMENT USED FOR TESTING BANDWIDTHS

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	6/23/05

TEST PERSONNEL:

DANIEL BALTZELL		DECEMBER 29, 2004 AND JANUARY 5, 2005
TEST ENGINEER	SIGNATURE	DATES OF TEST

4 DC VOLTAGES AND CURRENTS - PART §2.1033(C)(8); VOLTAGES AND CURRENTS THROUGH THE FINAL AMPLIFYING STAGE

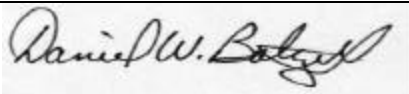
The dc voltages applied to, and dc currents into, the several elements of the final radio frequency amplifying device for normal operation over the power range.

Voltage (DC)	Amperage (mA)
6.6	500

TABLE 4-1: TEST EQUIPMENT USED FOR TESTING VOLTAGE AND CURRENTS

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
901247	Wavetek	DM25XT	Multimeter	40804098	3/3/05

TEST PERSONNEL:

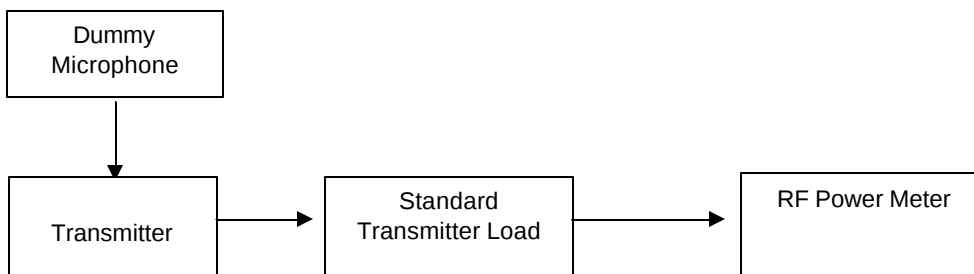
DANIEL BALTZELL		DECEMBER 30, 2004
TEST ENGINEER	SIGNATURE	DATES OF TEST

5 FCC RULES AND REGULATIONS PART 2 §2.1046(A): RF POWER OUTPUT: CONDUCTED

5.1 TEST PROCEDURE

ANSI/TIA/EIA-603-2002, section 2.2.1

The EUT was connected to a coaxial attenuator having a 50Ω load impedance.



5.2 EFFECTIVE RADIATED POWER LIMITS - §22.913

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

5.3 POWER OUTPUT TEST DATA

TABLE 5-1: CONDUCTED ANTENNA PORT RF POWER OUTPUT

Channel Number	Frequency Tuned (MHz)	EUT Conducted Power (dBm)	RF Power Measured (Watts)*
1013	824.70	23.87	0.244
384	836.52	23.32	0.215
777	848.31	22.65	0.184

* Measurement accuracy: +/- .04 dB (logarithmic mode)

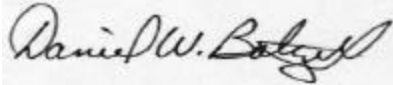
TABLE 5-2: RADIATED RF POWER OUTPUT

CDMA Cellular	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	ERP (W)	Limit (W)
824.70	89.0	23.7	0.3	-1.3	22.1	0.162	7.0
836.52	90.0	23.0	0.2	-1.2	21.6	0.145	7.0
848.31	89.6	23.8	0.5	-1.2	22.1	0.162	7.0

TABLE 5-3: TEST EQUIPMENT USED FOR TESTING RF POWER OUTPUT - CONDUCTED

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901184/901186	Agilent	E4416A/E9323A	Power Meter / Sensor	GB41050573/ US420.52510380	8/2/05
901053	Schaffner-Chase	CBL6112	Antenna (25 MHz – 2 GHz)	2648	9/20/05
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	6/23/05
900928	Hewlett Packard	HP 83752A	Synthesized Sweeper (.01 – 20 GHz)	3610A00866	9/5/05
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901231	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	1/30/05
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	1/30/05
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	1/30/05
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required

TEST PERSONNEL:

DANIEL BALTZELL		DECEMBER 30, 2004
TEST ENGINEER	SIGNATURE	DATE OF TEST

6 FCC RULES AND REGULATIONS PART 2 §2.1049(C)(1): OCCUPIED BANDWIDTH

6.1 TEST PROCEDURE

ANSI/TIA/EIA-603-2002, section 2.2.11 and TIA/EIA-102, CAAA-2002 section 2.2.5

6.2 TEST DATA

PLOT 6-1: 99% OCCUPIED BANDWIDTH – CDMA CELL BAND

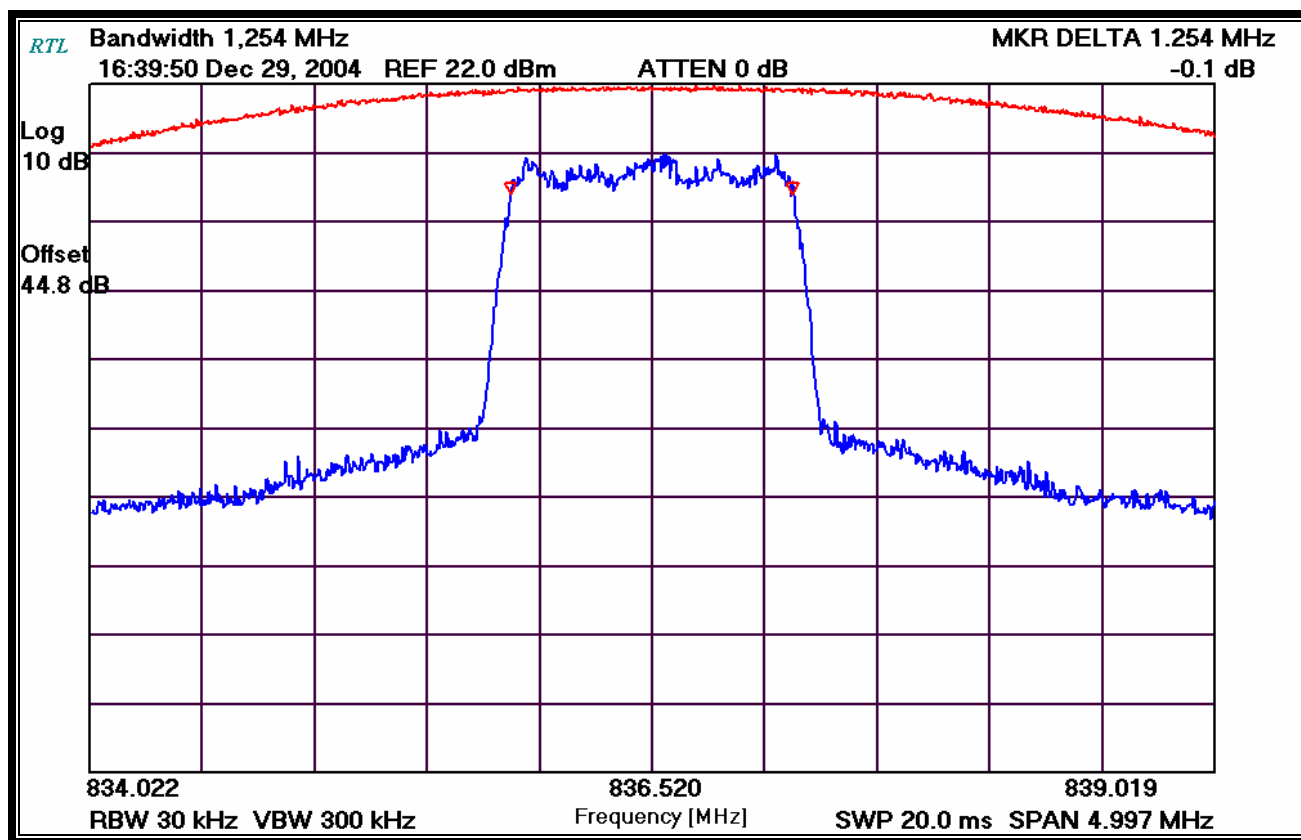
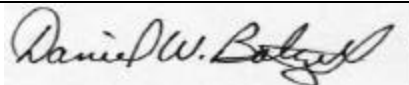


TABLE 6-1: TEST EQUIPMENT USED FOR TESTING OCCUPIED BANDWIDTH

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	6/23/05

TEST PERSONNEL:

DANIEL BALTZELL		DECEMBER 29, 2004
TEST ENGINEER	SIGNATURE	DATE OF TEST

7 FCC RULES AND REGULATIONS PART 2 §2.1051: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

7.1 TEST PROCEDURE

ANSI/TIA/EIA-603-2002, Section 2.2.13

The transmitter is terminated with a 50 Ω load and interfaced with a spectrum analyzer.

Part 22: 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.

7.2 EMISSION LIMITATIONS FOR CELLULAR - §22.917(A)

Out of band emissions: The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

7.3 TEST DATA

Frequency range of measurement per Part 2.1057: 9 kHz to $10 \times F_c$

The worse case (unwanted emissions) channels are shown in following tables. The magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded.

TABLE 7-1: CONDUCTED SPURIOUS EMISSIONS CHANNEL 1013– 824.7 MHZ – CDMA CELL BAND

40 kHz channel spacing; Conducted power = 0.244 W; Limit 36.87 dBc

Frequency (MHz)	Level (dBc)	Margin(dB)
1649.400	70.27	-33.4
2474.100	75.97	-39.1
3298.800	95.07	-58.2
4123.500	100.17	-63.3
4948.200	96.27	-59.4
5772.900	94.27	-57.4

TABLE 7-2: CONDUCTED SPURIOUS EMISSIONS CHANNEL 384– 836.52 MHZ – CDMA CELL BAND

40 kHz channel spacing; Conducted power = 0.215W; Limit 36.32 dBc

Frequency (MHz)	Level (dBc)	Margin(dB)
1673.040	80.72	-44.4
2509.560	70.42	-34.1
3346.080	99.32	-63.0
4182.600	98.62	-62.3
5019.120	93.92	-57.6
5855.640	86.82	-50.5

TABLE 7-3: CONDUCTED SPURIOUS EMISSIONS CHANNEL 777 – 848.31 MHZ –CDMA CELL BAND

40 kHz channel spacing; Conducted power = 0.184 W

Frequency (MHz)	Level (dBc)	Margin(dB)
1696.620	79.05	-42.4
2544.930	82.15	-45.5
3393.240	99.45	-62.8
4241.550	98.55	-61.9
5089.860	94.15	-57.5
5938.170	88.15	-51.5

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

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

PLOT 7-1: MOBILE EMISSIONS IN BASE FREQUENCY

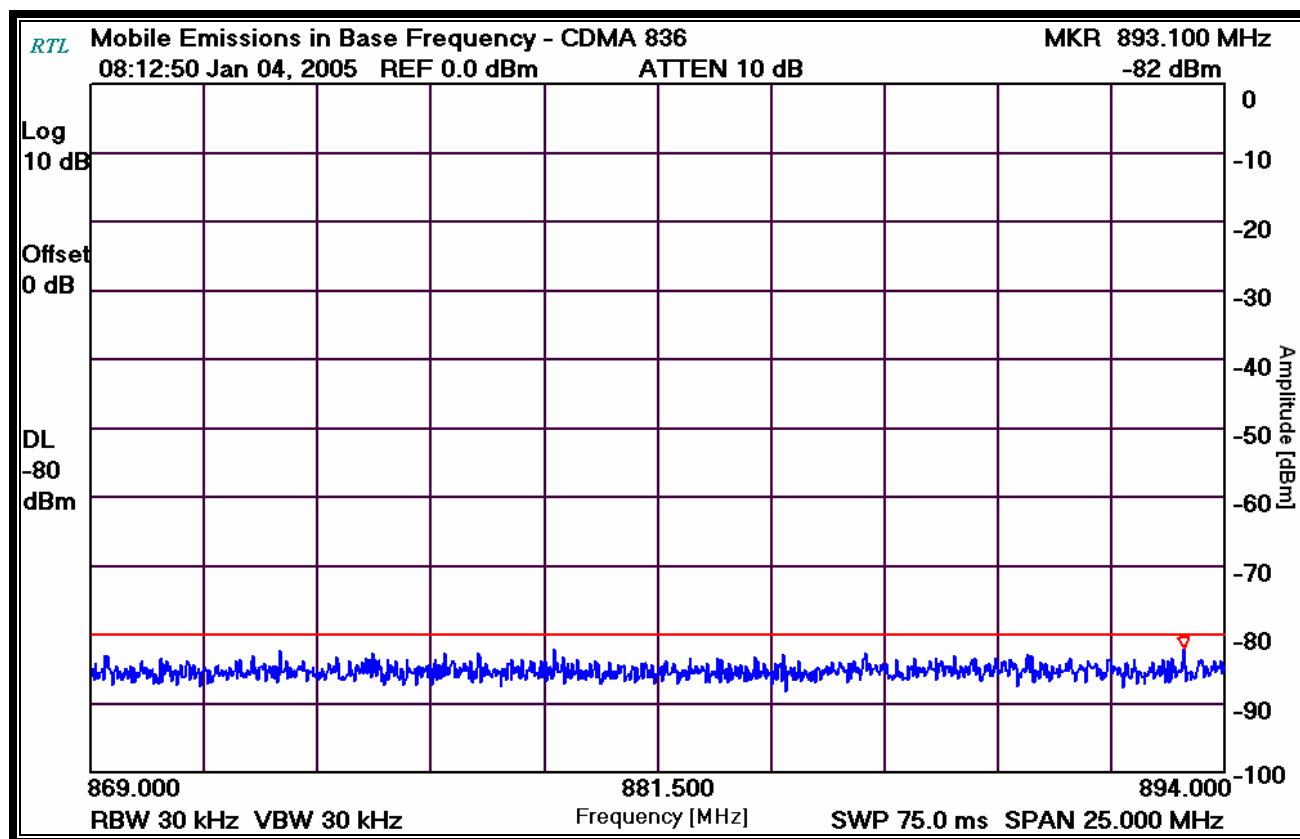
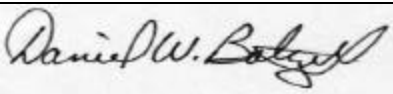


TABLE 7-4: TEST EQUIPMENT USED FOR TESTING SPURIOUS EMISSIONS AT ANTENNA TERMINAL

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	6/23/05
901128	Par Electronics	806-902 (25W)	UHF Notch Filter	N/A	5/13/05
900889	Hewlett Packard	85685A	RF Preselector for HP 8566B (20 Hz - 2 GHz)	3146A01309	3/10/05

TEST PERSONNEL:

DANIEL BALTZELL		JANUARY 4, 2005
TEST ENGINEER	SIGNATURE	DATE OF TEST

8 FCC RULES AND REGULATIONS PART 2 §2.1053 (A): FIELD STRENGTH OF SPURIOUS RADIATION

8.1 TEST PROCEDURE

ANSI/TIA/EIA-603-2002, section 2.2.12

The spurious emissions levels were measured from a 3 meter distance, 360 degrees, while the receive antenna was raised and lowered from 1 to 4 meters in both vertical and horizontal polarities. The EUT was replaced by a transmitting antenna connected to a signal generator. This signal generator level was lowered or raised until the receive level matched that of the original measured level of the EUT. The signal generator level was then corrected by subtracting the cable loss from the substitution antenna to the signal generator and the gain of the antenna was further corrected to a half wave dipole for ERP measurement.

8.2 TEST DATA

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

8.3 FIELD STRENGTH OF SPURIOUS RADIATION TEST DATA - §2.1053, CELLULAR CDMA

TABLE 8-1: RADIATED SPURIOUS EMISSIONS; 824.70 MHZ, CH 1013

Limit = $43 + 10 \log P = 36.87 \text{ dBc}$
Conducted Power = 23.87 dBm = 0.244 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
1649.400	49.8	-51.4	.6	4.7	71.2	-34.3

*This insertion loss corresponds to the cable connecting the RF Signal Generator to the transmit antenna.

TABLE 8-2: RADIATED SPURIOUS EMISSIONS; 836.52 MHZ, CH 384

Limit = $43 + 10 \log P = 36.32 \text{ dBc}$
Conducted Power = 22.53 dBm = 0.215 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
1673.040	52.0	-49.5	0.8	4.7	69.5	-32.6

*This insertion loss corresponds to the cable connecting the RF Signal Generator to the transmit antenna.

TABLE 8-3: RADIATED SPURIOUS EMISSIONS; 848.31 MHZ, CH 777

Limit = $43 + 10 \log P = 35.65 \text{ dBc}$
Conducted Power = 22.65 dBm = 0.184 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	Corrected Signal Generator Level (dBc)	Margin (dB)
1696.620	55.5	-46.5	0.7	4.7	66.4	-29.5

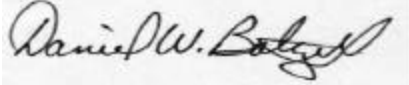
*This insertion loss corresponds to the cable connecting the RF Signal Generator to the transmit antenna.

8.4 RADIATED SPURIOUS TEST EQUIPMENT

TABLE 8-4: TEST EQUIPMENT USED FOR TESTING RADIATED SPURIOUS EMISSIONS

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901053	Schaffner-Chase	CBL6112	Antenna (25 MHz – 2 GHz)	2648	9/20/05
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	5/5/05
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	8/11/05
900928	Hewlett Packard	HP 83752A	Synthesized Sweeper (.01 – 20 GHz)	3610A00866	9/5/05
900811	Rhein Tech Labs	PR-1040	Amplifier	1003	2/13/05
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901231	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	12/30/05
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	12/30/05
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	12/30/05
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	5/20/07
900321	EMCO	3161-03	Horn Antennas (4 - 8,2GHz)	9508-1020	5/20/07
900323	EMCO	3160-7	Horn Antennas (8,2 - 12,4 GHz)	9605-1054	5/20/07
900356	EMCO	3160-08	Horn Antenna (12.4 - 18 GHz)	9607-1044	5/20/07
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051	5/20/07
900814	Electro-Metrics	EM-6961 (RGA-60)	Double Ridged Guide Antenna (1 - 18 GHz)	2310	2/17/06

TEST PERSONNEL:

DANIEL BALTZELL		DECEMBER 30, 2004
TEST ENGINEER	SIGNATURE	DATE OF TEST

9 FCC RULES AND REGULATION PART 2 §2.1055: FREQUENCY STABILITY

9.1 TEST PROCEDURE

ANSI/TIA/EIA-603-2002, 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 sufficient 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°C through the range. A ½ 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 $\pm 15\%$ voltage variation from the nominal 12V supplied to the test board. (5.61 – 7.59 VDC, 6.6VDC nominal, and a battery end-point of 5.4 VDC was measured).

The worst-case test data are shown in the tables below.

9.2 TEST DATA

9.2.1 FREQUENCY STABILITY/TEMPERATURE VARIATION

Limit is 2.5 ppm. Worst-case deviation was found to be 1.43 ppm at -20°C.

PLOT 9-1: TEMPERATURE FREQUENCY STABILITY

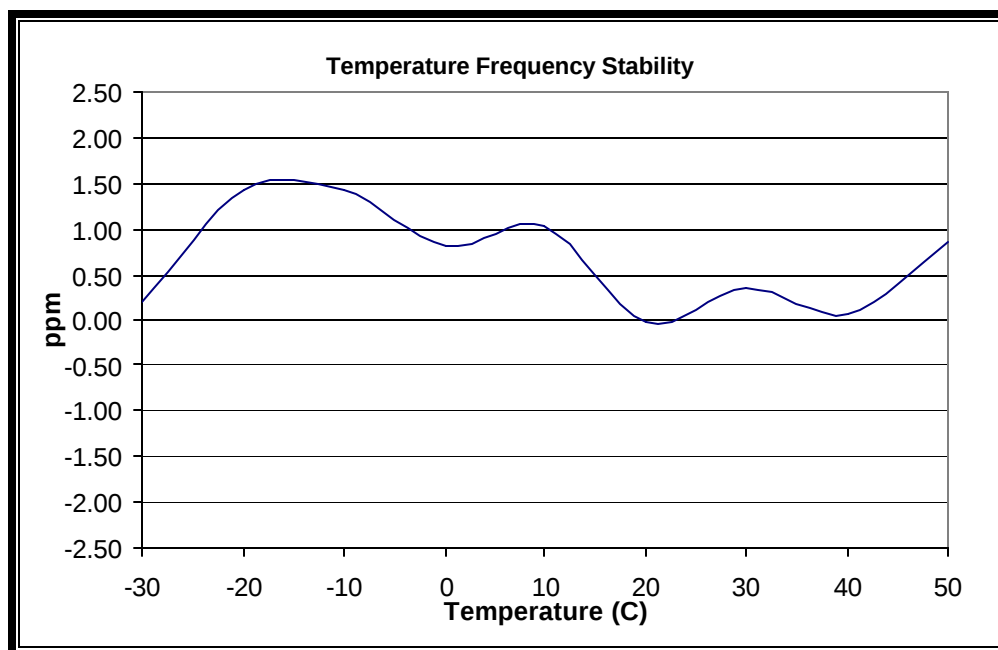


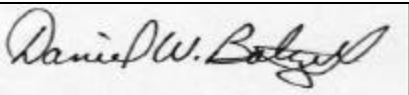
TABLE 9-1: TEMPERATURE FREQUENCY STABILITY CHANNEL 383, 836.49 MHZ

Temperature C	Measured Frequency (MHz)	ppm
-30	836.520175	0.21
-20	836.521200	1.43
-10	836.521188	1.42
0	836.520688	0.82
10	836.520875	1.05
20	836.520000	0.00
30	836.520300	0.36
40	836.520063	0.08
50	836.520713	0.85

TABLE 9-2: TEST EQUIPMENT USED FOR TESTING FREQUENCY STABILITY/TEMPERATURE

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
900946	Tenney Engineering, Inc.	TH65	Temperature Chamber with Humidity	11380	02/03/05
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	8/11/05

TEST PERSONNEL:

DANIEL BALTZELL		DECEMBER 30, 2004
TEST ENGINEER	SIGNATURE	DATE OF TEST

9.2.2 FREQUENCY STABILITY/VOLTAGE VARIATION

Worst-case variation is 0.36 ppm.

PLOT 9-2: VOLTAGE FREQUENCY STABILITY

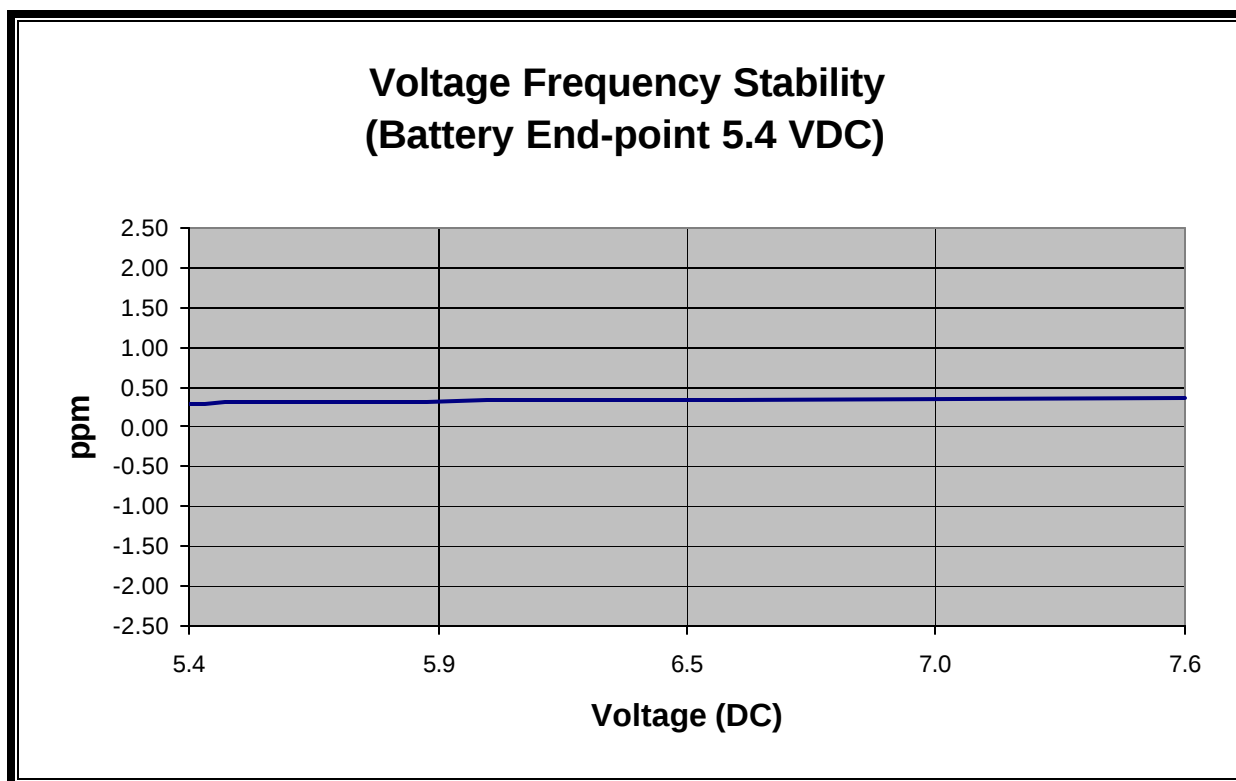


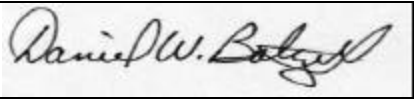
TABLE 9-3: FREQUENCY STABILITY/VOLTAGE VARIATION CHANNEL 383, 836.49 MHz

Voltage (VDC)	Measured Frequency (MHz)	ppm
5.4 (Battery End-point)	836.520256	0.31
5.610	836.520265	0.32
6.6	836.520300	0.36
7.590	836.520305	0.36

TABLE 9-4: TEST EQUIPMENT USED FOR TESTING FREQUENCY STABILITY/VOLTAGE

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Date
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	8/11/05
901247	Wavetek	DM25XT	Multimeter	40804098	3/3/05

TEST PERSONNEL:

DANIEL BALTZELL		DECEMBER 30, 2004
TEST ENGINEER	SIGNATURE	DATE OF TEST

10 CONCLUSION

The data in this measurement report shows that the UTStarcom, Model Name: FSU C800, Model #: C800, FCC ID: O6Y-FSUC800 complies with all the requirements of Parts 2 and 22.901 of the FCC Rules.