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

| Test Lab: | Applicant Information |
|---|---|
| Rhein Tech Laboratories, Inc.<br>360 Herndon Parkway<br>Suite 1400<br>Herndon, VA 20170<br>Phone: 703-689-0368<br>Fax: 703-689-2056<br>Web Site: www.rheintech.com | UTStarcom, Inc.<br>33 Wood Avenue South<br>3rd Floor<br>Iselin, NJ 08830<br>732-767-5263 (Scott Black)<br>USA |

| | | | |
|---|---|---|---|
| **FCC ID:** | O6YUTS-600FSU | **GRANTEE FRN NUMBER:** | 0005823877 |
| **PLAT FORM:** | N/A | **RTL WORK ORDER NUMBER:** | 2002018 |
| **MODEL(S):** | UTS-600FSU | **RTL QUOTE NUMBER:** | QRTL02-241 |
| **DATE OF TEST REPORT:** | March 15, 2002 | | |

| | |
|---|---|
| **American National Standard Institute:** | ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1 |
| **FCC Classification:** | PCB - Licensed Base Station for Part 24 |
| **FCC Rule Part(s):** | PART 24: PERSONAL COMMUNICATIONS SERVICES<br>Subpart E - Broadband PCS |
| **Industry Canada Standard:** | 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) | EIRP (W) | Freq. Tolerance | Emission Designator |
|---|---|---|---|
| 1896.65-1909.95 | 0.380 | 2.5 ppm | 289KDXW |

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# 1 GENERAL INFORMATION

## 1.1 SCOPE

FCC Rules Part 24 (E) PERSONAL COMMUNICATIONS SERVICES – BROADBAND PCS

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

## 1.2 TEST FACILITY

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

## 1.3 RELATED SUBMITAL(S)/GRANT(S)

This is a new application submittal. The Digital Interface and Receiver were investigated and found compliant. A DoC report can be provided upon request. The IF, LO and up to the 2$^{nd}$ LO were investigated.

# 2 EQUIPMENT INFORMATION

## 2.1 APPLICANT AND EQUIPMENT INFORMATION

| Test Lab: | Applicant Information |
|---|---|
| Rhein Tech Laboratories, Inc.<br>360 Herndon Parkway<br>Suite 1400<br>Herndon, VA 20170<br>Phone: 703-689-0368<br>Fax: 703-689-2056<br>Web Site: www.rheintech.com | UTStarcom, Inc.<br>33 Wood Avenue South<br>3rd Floor<br>Iselin, NJ 08830<br>732-767-5263 (Scott Black)<br>USA |

| | | | |
|---|---|---|---|
| **FCC ID:** | O6YUTS-600FSU | **GRANTEE FRN NUMBER:** | 0005823877 |
| **PLAT FORM:** | N/A | **RTL WORK ORDER NUMBER:** | 2002018 |
| **MODEL(S):** | UTS-600FSU | **RTL QUOTE NUMBER:** | QRTL02-241 |
| **DATE OF TEST REPORT:** | March 15, 2002 | | |

| | |
|---|---|
| **American National Standard Institute:** | ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1 |
| **FCC Classification:** | PCB - Licensed Base Station for Part 24 |
| **FCC Rule Part(s):** | PART 24: PERSONAL COMMUNICATIONS SERVICES<br>Subpart E - Broadband PCS |
| **Industry Canada Standard:** | 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) | EIRP (W) | Freq. Tolerance | Emission Designator |
|---|---|---|---|
| 1896.65-1909.95 | 0.380 | 2.5 ppm | 289KDXW |

## 2.2 JUSTIFICATION

To complete the test configuration required by the FCC, the transmitter was software controlled by the manufacturer to operate in a continuous mode. The final data was taken as a substitution measurement. The device is provided with an external antenna connector. EIRP measurement is provided to support the RF exposure requirements for the antenna listed in this application filing.

## 2.3 EXERCISING THE EUT

The UTS-600FSU is a desk phone transmitter designed to link to a PHS phone network which transmits at a frequency within the range (1893.65 MHz – 1909.95 MHz). Three channels were investigated, 1893.65 MHz, 1902.35 MHz, and 1909.95 MHz, in three orthogonal planes, with the receiving antenna in both horizontal and vertical polarities, from 1 meter to 4 meters in height.

## 2.4 TEST SYSTEM DETAILS

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

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 |
|---|---|---|---|---|---|---|
| PHONE | UTSTARCOM | UTS-600FSU | 053806 | O6YUTS-600FSU | UNSHIELDED | 014123 |
| PHONE | UTSTARCOM | UTS-600FSU | 053806 | O6YUTS-600FSU | UNSHIELDED | 014123 |
| PATCH ANTENNA | UTSTARCOM | QXX0318900 (10DBI GAIN) | B03888 | SAMPLE | N/A | 014120 |
| WHIP ANTENNA | UTSTARCOM | 2 DBI GAIN | N/A | N/A | N/A | N/A |
| POWER SUPPLY | UTSTARCOM | H-7EPBN008 | MB102-040030 | N/A | UNSHIELDED POWER | 014121 |
| POWER SUPPLY | UTSTARCOM | H-7EPBN008 | MB102-040030 | N/A | UNSHIELDED POWER | 014122 |

## 2.5 CONFIGURATION OF TESTED SYSTEM

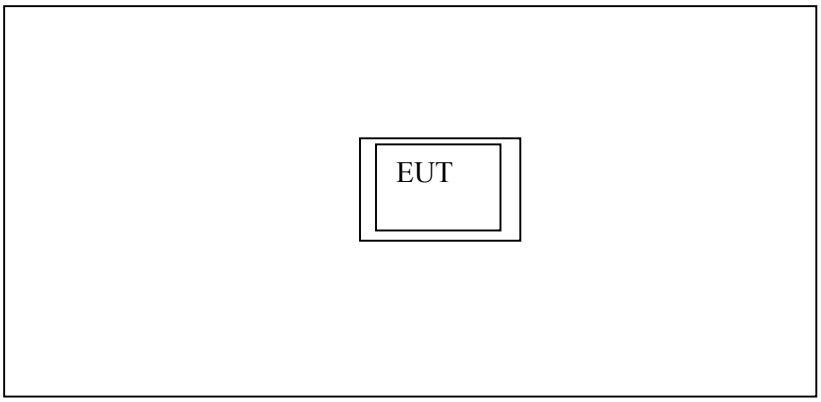


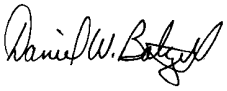

**FIGURE 1: CONFIGURATION OF TESTED SYSTEM**

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

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

| | Minimum | Typical | Maximum |
|---|---|---|---|
| Voltage (DC) | 2.9 | 4 | 4.6 |
| Current (Amps) | 0.22 | 0.3 | .35 |

PERSONNEL INFORMATION:

Signature:  Test Date: February 12, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

## 4 RF POWER OUTPUT - §2.1046

**TABLE 4-1: POWER OUTPUT AT THE ANTENNA PORT DATA - §2.1046**

| Channel | Frequency (MHz) | Burst Peak Power Meter Level (dBm) | Burst Average Power Meter Level (dBm) | Duty Factor (dB) | Modulation Average Power Level (dBm) | Modulation Average Power Level (mW) |
|---|---|---|---|---|---|---|
| 251 | 1893.65 | 18.54 | 17.38 | 8.9 | 8.48 | 7.0 |
| 25 | 1902.35 | 18.46 | 17.29 | 8.9 | 8.39 | 6.9 |
| 50 | 1909.85 | 18.30 | 17.14 | 8.9 | 8.24 | 6.7 |

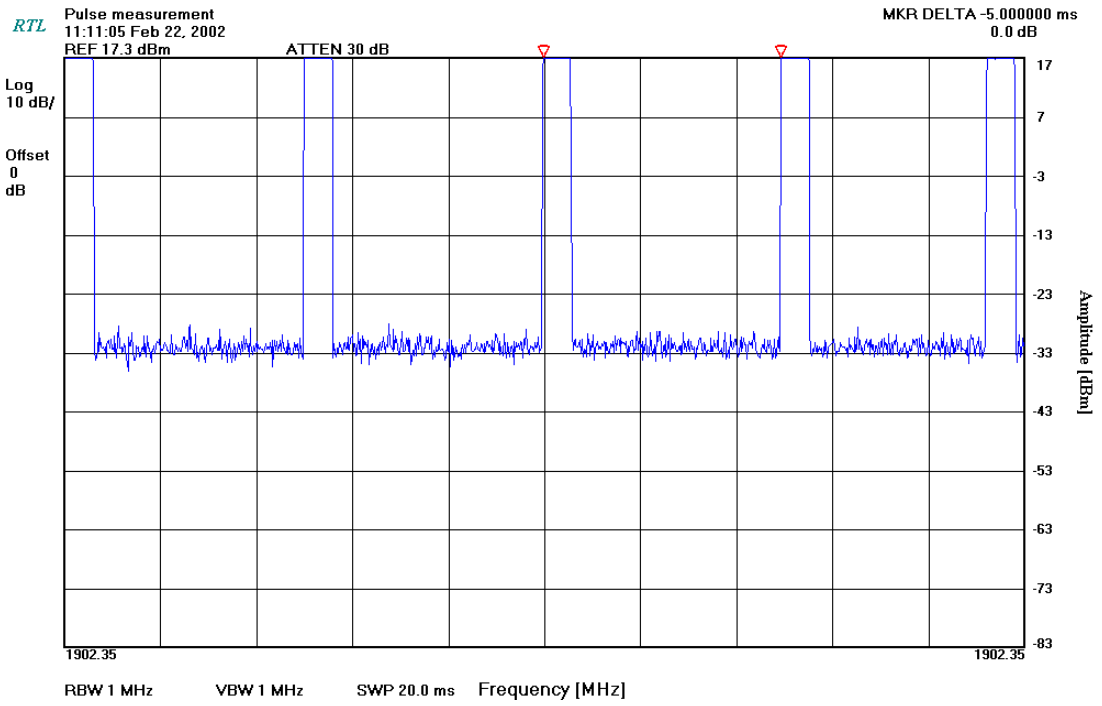
PERSONNEL INFORMATION:

Signature:  Test Date: February 12, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

## 4.1 DUTY CYCLE MEASUREMENT

### PLOT 4-1: PULSE MEASUREMENT FOR DUTY CYCLE



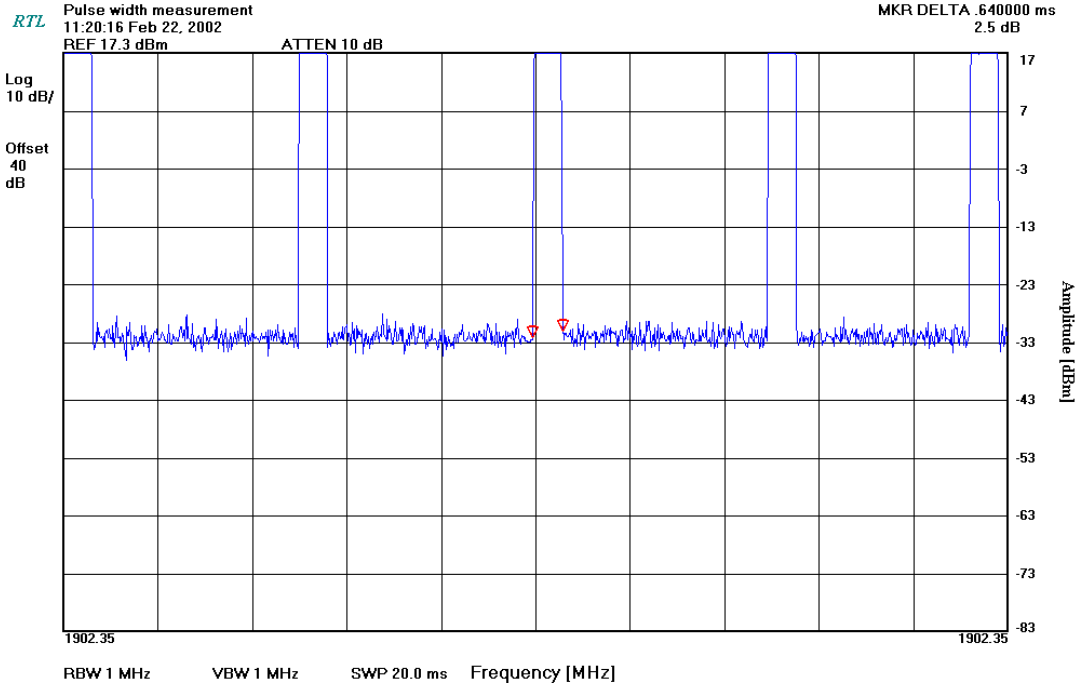

Duty cycle calculation from above plots:

0.64ms / 5 ms = 0.128 or 12.8 % duty cycle
crest factor = 1/.128 = 7.8
10 LOG 0.128 = -8.9 dB correction.

PERSONNEL INFORMATION:

| | | | |
|---|---|---|---|
| Signature: | | Test Date: | February 22, 2002 |
| Typed/Printed Name: | Daniel Baltzell | Position: | Test Engineer |

**PLOT 4-2: PULSE WIDTH MEASUREMENT FOR DUTY CYCLE**




Duty cycle calculation from above plots:

0.64ms / 5 ms = 0.128 or 12.8 % duty cycle
crest factor = 1/.128 = 7.8
10 LOG 0.128 = -8.9 dB correction.

PERSONNEL INFORMATION:

| | | | |
|---|---|---|---|
| Signature: | | Test Date: | February 22, 2002 |
| Typed/Printed Name: | Daniel Baltzell | Position: | Test Engineer |

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

Substitution method.

## 4.3 EFFECTIVE ISOTROPIC RADIATED POWER LIMITS - §24.232 TEST PROCEDURE

(a) Base stations are limited to 1640 watts peak equivalent isotropically radiated power (e.i.r.p.) with an antenna height up to 300 meters HAAT.

## 4.4 RF POWER TEST EQUIPMENT

### TABLE 4-2: RF POWER TEST EQUIPMENT

| RTL Asset # | Manufacturer | Model | Part Type | Serial Number | Calibration Due |
|---|---|---|---|---|---|
| 901053 | Schaffner Chase | CBL6112B | Bi-Log Antenna (20 MHz – 2 GHz) | 2648 | 5/22/02 |
| 900932 | Hewlett Packard | 8449B OPT H02 | Preamplifier 1-26.5 GHz | 3008A00505 | N/A |
| 900931 | Hewlett Packard | 8566B | Spectrum Analyzer (100 Hz – 22 GHz) | 3138A07771 | 5/16/02 |
| 900917 | Hewlett Packard | 8648C | Signal Generator (100kHz – 3200 MHz) | 3537A01741 | 4/10/02 |
| 900928 | Hewlett Packard | 83752A | Synthesized Sweeper (0.01 GHz – 20 GHz) | 3610A00866 | 5/11/02 |
| 900814 | Electro-Metrics | EM-6961 (RGA-60) | Double Ridged Guide Antenna 1-18 GHz | 2310 | 2/26/02 |
| 901184 | Agilent Technologies | E4416A | EPM-P Power Meter, single channel | GB41050573 | 7/5/02 |
| 901186 | Agilent Technologies | E9323A (50MHz-6GHz) | Peak & Avg. Power Sensor | US40410380 | 6/25/02 |

## 4.5 EFFECTIVE RADIATED POWER TEST DATA- §2.1046

### TABLE 4-3: RADIATED POWER DATA - §2.1046 (WHIP ANTENNA (2DBI)

| Channel | Test Detector | Frequency (MHz) | Spectrum Analyzer (dBuV) | Signal Generator Level (dBm) | Cable Loss (dB) | Antenna Gain (dBi) | Burst Level EIRP (dBm) | Duty Factor (dB) | Modulation EIRP (dBm) | Modulation EIRP (mW) |
|---|---|---|---|---|---|---|---|---|---|---|
| 251 | Pk | 1893.65 | 81.0 | 16.3 | 1.6 | 4.8 | 19.5 | 8.9 | 10.6 | 11.5 |
| 251 | Av | 1893.65 | 79.8 | 15.1 | 1.6 | 4.8 | 18.3 | 8.9 | 9.4 | 8.7 |
| 25 | Pk | 1902.35 | 80.1 | 18.5 | 1.7 | 4.8 | 21.6 | 8.9 | 12.7 | 18.6 |
| 25 | Av | 1902.35 | 78.9 | 17.3 | 1.7 | 4.8 | 20.4 | 8.9 | 11.5 | 14.1 |
| 50 | Pk | 1909.85 | 79.7 | 16.2 | 1.7 | 4.8 | 19.3 | 8.9 | 10.4 | 11.0 |
| 50 | Av | 1909.85 | 78.5 | 15.0 | 1.7 | 4.8 | 18.1 | 8.9 | 9.2 | 8.3 |

Notes: Pk = Peak Detector; Av = Average Detector.

EIRP 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 and changing the height of the receive antenna from 1 to 4 meters. The field strength was recorded from a calibrated spectrum analyzer using a 1 MHz resolution bandwidth for each channel being tested, and adjusted to an average level using a power meter attached at the end of the receive antenna. A double ridge horn antenna was substituted in place of the EUT. The horn antenna was fed by a signal generator and adjusted until the previous level was attained. This level was recorded and was further corrected by subtracting the cable loss from the signal generator to the transmit antenna and adding the horn gain.

i.e., Sg – CL + Gn = EIRP (dBm)

Sg = Signal Generator Level (dBm)
CL= Cable Loss (dB)
Gn= Transmitting horn antenna gain (dBi)

PERSONNEL INFORMATION:

Signature: _____ Test Date: February 1, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

**TABLE 4-4: RADIATED POWER DATA - §2.1046 (PATCH ANTENNA (10DBI) WITH 5 METER CABLE)**

| Channel | Test Detector | Frequency (MHz) | Spectrum Analyzer (dBuV) | Signal Generator Level (dBm) | Cable Loss (dB) | Antenna Gain (dBi) | Burst Level EIRP (dBm) | Duty Factor (dB) | Modulation EIRP (dBm) | Modulation EIRP (mW) |
|---|---|---|---|---|---|---|---|---|---|---|
| 251 | Pk | 1893.65 | 82.3 | 20.6 | 1.6 | 4.8 | 23.8 | 8.9 | 14.9 | 30.9 |
| 251 | Av | 1893.65 | 81.1 | 19.4 | 1.6 | 4.8 | 22.6 | 8.9 | 13.7 | 23.4 |
| 25 | Pk | 1902.35 | 82.2 | 20.7 | 1.7 | 4.8 | 25.8 | 8.9 | 16.9 | 49.0 |
| 25 | Av | 1902.35 | 81.0 | 19.5 | 1.7 | 4.8 | 22.6 | 8.9 | 13.7 | 23.4 |
| 50 | Pk | 1909.85 | 81.5 | 20.8 | 1.7 | 4.8 | 23.9 | 8.9 | 15.0 | 31.6 |
| 50 | Av | 1909.85 | 80.3 | 19.6 | 1.7 | 4.8 | 22.7 | 8.9 | 13.8 | 24.0 |

Notes: Pk = Peak Detector; Av = Average Detector.

EIRP 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 and changing the height of the receive antenna from 1 to 4 meters. The field strength was recorded from a calibrated spectrum analyzer using a 1 MHz resolution bandwidth for each channel being tested, and adjusted to an average level using a power meter attached at the end of the receive antenna. A double ridge horn antenna was substituted in place of the EUT. The horn antenna was fed by a signal generator and adjusted until the previous level was attained. This level was recorded and was further corrected by subtracting the cable loss from the signal generator to the transmit antenna and adding the horn gain.

i.e., Sg – CL + Gn = EIRP (dBm)

Sg = Signal Generator Level (dBm)
CL= Cable Loss (dB)
Gn= Transmitting horn antenna gain (dBi)

PERSONNEL INFORMATION:

Signature: _____ Test Date: February 1, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

# 5 OCCUPIED BANDWIDTH - §2.1049; NECESSARY BANDWIDTH §2.202 (OCCUPIED BANDWIDTH) – PART 24.238 (B) (EMISSION BANDWIDTH)

Type of Emission: DXW

Necessary bandwidth designator derived from measurement of emission bandwidth (-26 dB) (289 kHz): 289KDXW

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

## 5.1 TEST PROCEDURE

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

Device with digital modulation: operation to its maximum extent

Note: Reference level is average conducted power measurement not corrected for duty cycle.

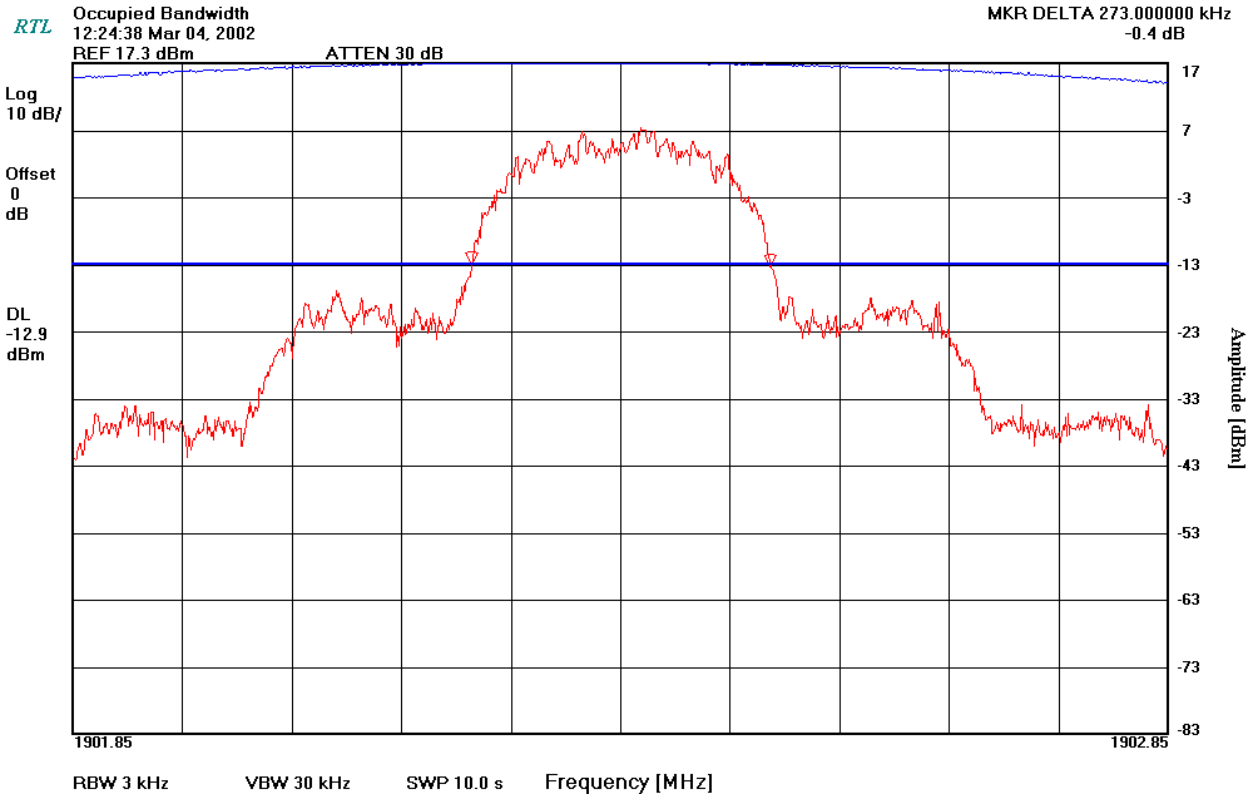
## 5.2 OCCUPIED BANDWIDTH TEST EQUIPMENT

**TABLE 5-1: OCCUPIED BANDWIDTH TEST EQUIPMENT**

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

## 5.3 TEST DATA (CHANNEL 25: OCCUPIED BANDWIDTH = 273 KHZ)

### PLOT 5-1: OCCUPIED BANDWIDTH (-20 DB)



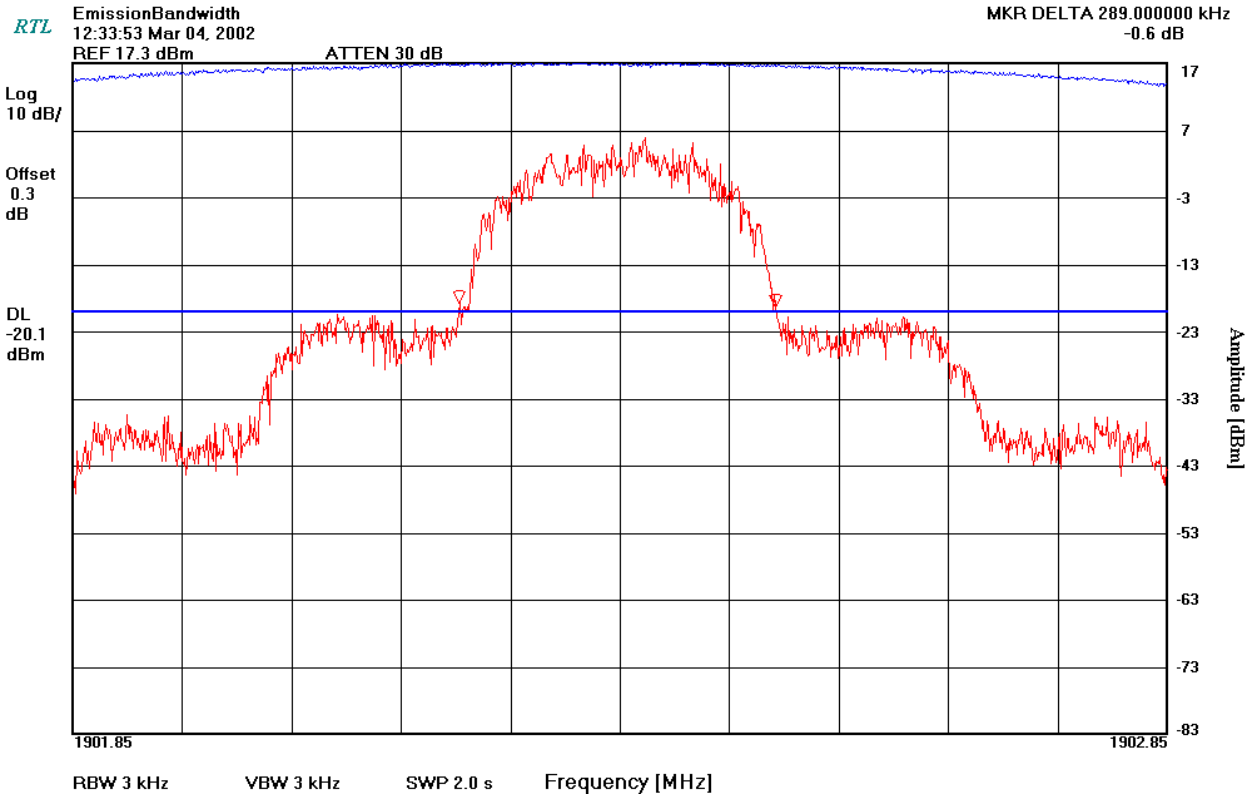

PERSONNEL INFORMATION:

Signature: _____ Test Date: March 4, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

**CHANNEL 25: EMISSION BANDWIDTH = 289 KHZ**

**PLOT 5-2: EMISSION BANDWIDTH (-26 DB)**




PERSONNEL INFORMATION:

| | | | |
|---|---|---|---|
| Signature: | | Test Date: | March 4, 2002 |
| Typed/Printed Name: | Daniel Baltzell | Position: | Test Engineer |

# 6 CONDUCTED SPURIOUS AND HARMONIC EMISSIONS - §2.1051

## 6.1 TEST PROCEDURE

ANSI/TIA/EIA-603-1992, Section 2.2.13

The transmitter antenna terminal is connected with the 50 Ω impedance input to the spectrum analyzer. The worst case average channel test data is provided.

## 6.2 RF POWER TEST EQUIPMENT

**TABLE 6-1: RF POWER TEST EQUIPMENT**

| RTL Asset # | Manufacturer | Model | Part Type | Serial Number | Calibration Due |
|---|---|---|---|---|---|
| 901137 | PAR Electronics | N/A | Notch Filter | N/A | N/A |
| 900931 | Hewlett Packard | 8566B | Spectrum Analyzer (100 Hz – 22 GHz) | 3138A07771 | 5/16/02 |

## 6.3 CONDUCTED SPURIOUS AND HARMONIC TEST DATA - §2.1051

Operating Frequency (MHz): 1902.35
Channel: 25
Measured Power at the Antenna Port (dBm): 17.29
Modulation: DXW
Limit (dBc): 30.29

**TABLE 6-2: CONDUCTED SPURIOUS AND HARMONIC DATA §2.1051**

| Frequency (MHz) | Measured Level (dBm) | Notch Filter Insertion Loss (dB) | Corrected Measured Level (dBc) | Margin (dB) |
|---|---|---|---|---|
| 3804.700 | -32.8 | 1.7 | 48.4 | -18.1 |
| 5707.050 | -66.5 | 3.3 | 80.5 | -50.2 |
| 7609.400 | -64.7 | 3.9 | 78.1 | -47.8 |
| 9511.750 | | | | <-50.0 |
| 11414.100 | | | | <-50.0 |
| 13316.450 | | | | <-50.0 |
| 15218.800 | | | | <-50.0 |
| 17121.150 | | | | <-50.0 |
| 19023.500 | | | | <-50.0 |

PERSONNEL INFORMATION:

Signature: _____ Test Date: March 4, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

# 7 RADIATED SPURIOUS AND HARMONIC EMISSIONS - §2.1053

## 7.1 RADIATED SPURIOUS AND HARMONIC EMISSIONS - §2.1053

Substitution method. The EUT was terminated with a 50 ohm termination and placed on a turntable 3-meters from the receive antenna. The field of maximum intensity was found by rotating the EUT approximately 360 degrees 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 double ridge horn antenna was substituted in place of the EUT. The horn antenna was fed by a signal generator and adjusted until the previous level was attained. The signal generator level was recorded. It was further corrected by subtracting the cable loss from the signal generator to the dipole and adding the horn gain The worst case average channel test data is provided.

## 7.2 RADIATED SPURIOUS TEST EQUIPMENT

### TABLE 7-1: RADIATED SPURIOUS TEST EQUIPMENT

| RTL Asset # | Manufacturer | Model | Part Type | Serial Number | Calibration Due |
|---|---|---|---|---|---|
| 901053 | Schaffner Chase | CBL6112B | Bi-Log Antenna (20 MHz – 2 GHz) | 2648 | 5/22/02 |
| 900932 | Hewlett Packard | 8449B OPT H02 | Preamplifier 1-26.5 GHz | 3008A00505 | N/A |
| 900931 | Hewlett Packard | 8566B | Spectrum Analyzer (100 Hz – 22 GHz) | 3138A07771 | 5/16/02 |
| 900917 | Hewlett Packard | 8648C | Signal Generator (100kHz – 3200 MHz) | 3537A01741 | 4/10/02 |
| 900928 | Hewlett Packard | 83752A | Synthesized Sweeper (0.01 GHz – 20 GHz) | 3610A00866 | 5/11/02 |
| 900814 | Electro-Metrics | EM-6961 (RGA-60) | Double Ridges Guide Antenna 1-18 GHz | 2310 | 2/26/02 |

## 7.3 FIELD STRENGTH OF SPURIOUS RADIATION TEST DATA - §2.1053

| | |
|---|---|
| Operating Frequency (MHz): | 1902.35 |
| Channel: | 25 |
| Measured Power at the Antenna Port (dBm): | 17.29 |
| Modulation: | DXW |
| Distance (m): | 3 |
| Limit (dBc): | 30.29 |

**TABLE 7-2: FIELD STRENGTH OF SPURIOUS RADIATION TEST DATA §2.1053**

| Frequency (MHz) | Signal Generator Level (dBm) | Cable Loss (dB) | Antenna Gain (dB) | Corrected Signal Generator Level (dBm) | Corrected Level (dBc) | Margin (dB) |
|---|---|---|---|---|---|---|
| 3804.700 | -45.6 | 1.3 | 5.9 | -41.0 | 58.3 | -28.0 |
| 5707.050 | | | | | | <-40.0 |
| 7609.400 | | | | | | <-40.0 |
| 9511.750 | | | | | | <-40.0 |
| 11414.100 | | | | | | <-40.0 |
| 13316.450 | | | | | | <-40.0 |
| 15218.800 | | | | | | <-40.0 |
| 17121.150 | | | | | | <-40.0 |
| 19023.500 | | | | | | <-40.0 |

PERSONNEL INFORMATION:

Signature:  Test Date: February 1, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

# 8 BAND-EDGE COMPLIANCE - PART 24.238

## 8.1 TEST PROCEDURE:

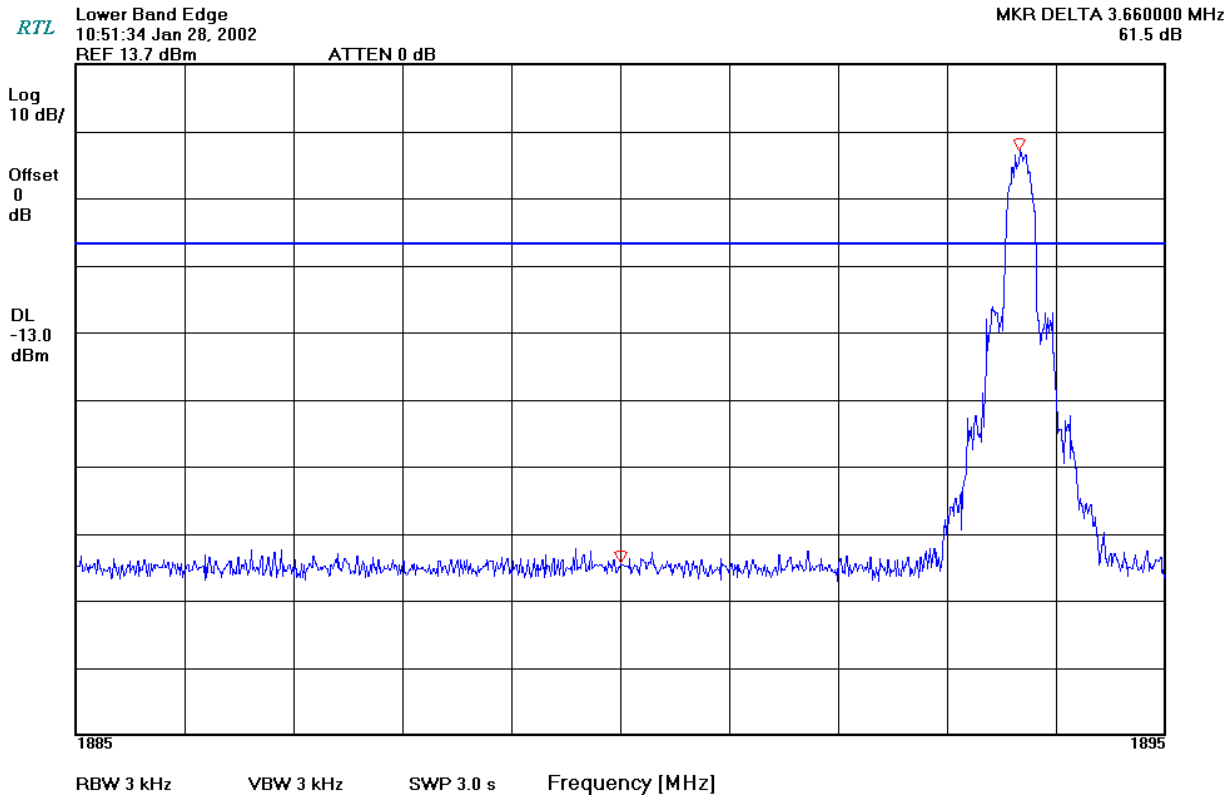
Delta Marker method : The resolution of the spectrum analyzer is adjusted to 1% of the emission bandwidth after the reference level is adjusted to the EIRP level using a resolution and video bandwidth of 1 MHz. The frequency is centered on the band edge of interest with a span capable of showing the peak, a delta to peak is performed with the display line set at –13 dBm (43+10LogP).

## 8.2 TEST DATA

Calculation of Lower Band Edge

The reference level 13.7 dBm is the average radiated EIRP level after duty cycle correction, which the delta measurement of 61.5 dB is subtracted (reference plots), which is equivalent to a level of - 47.8 dBm. This level has a margin of 34.8 dB below the limit of 43 + 10 Log P (-13 dBm).

**PLOT 8-1: LOWER BAND EDGE**



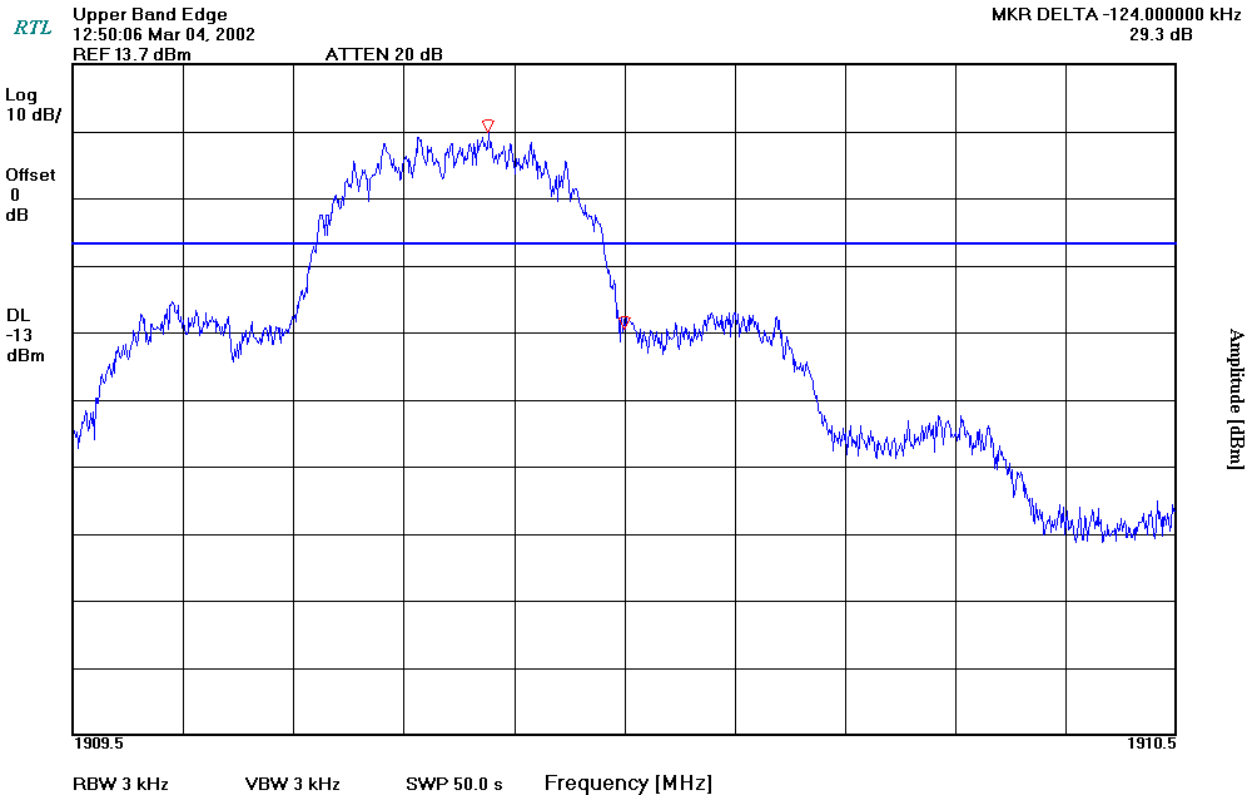

PERSONNEL INFORMATION:

| | | | |
|---|---|---|---|
| Signature: | | Test Date: | January 28, 2002 |
| Typed/Printed Name: | Daniel Baltzell | Position: | Test Engineer |

Calculation of Upper Band Edge

The reference level 13.7 dBm is the average radiated EIRP level after duty cycle correction, which the delta measurement of 29.3 dB is subtracted (reference plots), which is equivalent to a level of - 15.6 dBm. This level has a margin of 2.6 dB below the limit of 43 + 10 Log P (-13 dBm).

**PLOT 8-2: UPPER BAND EDGE**




PERSONNEL INFORMATION:

| | | | |
|---|---|---|---|
| Signature: | | Test Date: | March 4, 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 +50°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**

| RTL Asset # | Manufacturer | Model | Part Type | Serial Number | Calibration Due |
|---|---|---|---|---|---|
| 900883 | Tenney Engineering, Inc | TH65 | Temperature Chamber | 11380 | 11/19/02 |
| 901055 | Hewlett Packard | 8901A Opt. 002-003 | Modulation Analyzer | 2545A04102 | 7/31/02 |

## 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 +50°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 STABILITY § 24.235

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

## 9.5 FREQUENCY STABILITY TEST DATA - §2.1055

| | | | | |
|---|---|---|---|---|
| Operating Frequency: | 1902.35 | MHz | | |
| Channel: | 251 | | | |
| Reference Voltage: | 4 | VDC | | |
| Deviation Limit: | 0.00025 | % | or 2.5 | ppm |

**TABLE 9-2: TEMPERATURE FREQUENCY STABILITY DATA - §2.1055**

| Temperature | Frequency Measured (MHz) | ppm |
|---|---|---|
| -30 | 1902.347425 | -1.35 |
| -25 | 1902.348275 | -0.91 |
| -20 | 1902.349325 | -0.35 |
| -15 | 1902.349675 | -0.17 |
| -10 | 1902.349865 | -0.07 |
| 0 | 1902.350000 | 0.00 |
| 10 | 1902.348945 | -0.55 |
| 20 | 1902.348550 | -0.76 |
| 30 | 1902.348520 | -0.78 |
| 40 | 1902.347425 | -1.35 |
| 50 | 1902.348275 | -0.91 |

PERSONNEL INFORMATION:

Signature:  Test Date: February 8, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

**PLOT 9-1: TEMPERATURE FREQUENCY STABILITY DATA - §2.1055**

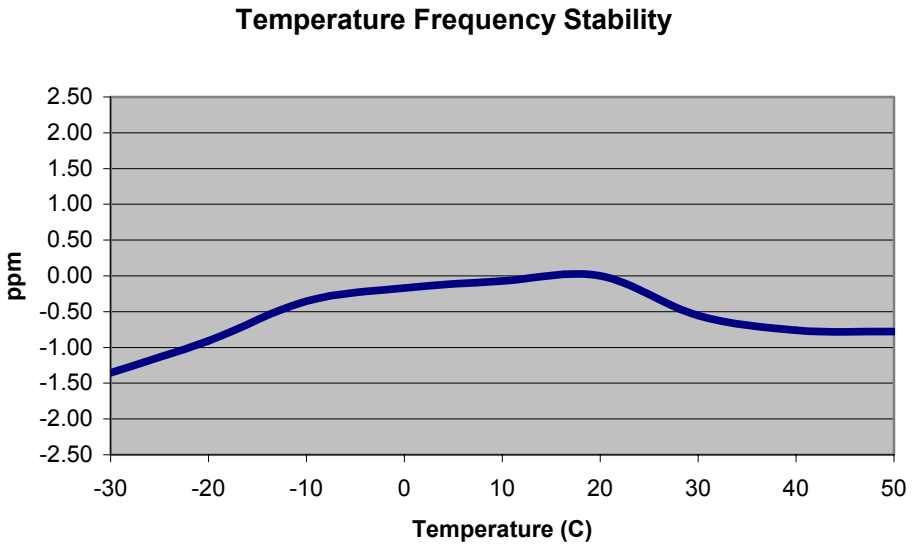



**TABLE 9-3: VOLTAGE FREQUENCY STABILITY DATA - §2.1055**

Battery endpoint = 2.9 VDC

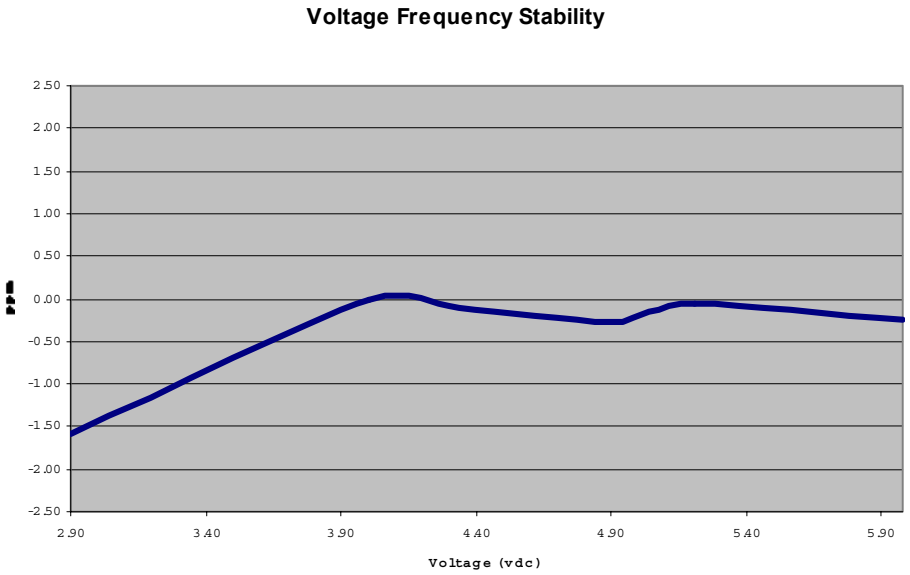
| Voltage | Frequency Measured (MHz) | ppm |
|---|---|---|
| 2.90 | 1902.3470060 | -1.57 |
| 4.00 | 1902.3500000 | 0.00 |
| 4.34 | 1902.3497900 | -0.11 |
| 4.90 | 1902.3494960 | -0.26 |
| 5.21 | 1902.3498820 | -0.06 |
| 5.98 | 1902.3495260 | -0.25 |

PERSONNEL INFORMATION:

Signature: _____ Test Date: February 8, 2002

Typed/Printed Name: Daniel Baltzell Position: Test Engineer

**PLOT 9-2: VOLTAGE FREQUENCY STABLITY**




PERSONNEL INFORMATION:

| | | | |
|---|---|---|---|
| Signature: | | Test Date: | February 8, 2002 |
| Typed/Printed Name: | Daniel Baltzell | Position: | Test Engineer |

## 10 CONCLUSION

| Test Lab: | Applicant Information |
|---|---|
| Rhein Tech Laboratories, Inc.<br>360 Herndon Parkway<br>Suite 1400<br>Herndon, VA 20170<br>Phone: 703-689-0368<br>Fax: 703-689-2056<br>Web Site: www.rheintech.com | UTStarcom, Inc.<br>33 Wood Avenue South<br>3rd Floor<br>Iselin, NJ 08830<br>732-767-5263 (Scott Black)<br>USA |

| | | | |
|---|---|---|---|
| **FCC ID:** | O6YUTS-600FSU | **GRANTEE FRN NUMBER:** | 0005823877 |
| **PLAT FORM:** | N/A | **RTL WORK ORDER NUMBER:** | 2002018 |
| **MODEL(S):** | UTS-600FSU | **RTL QUOTE NUMBER:** | QRTL02-241 |
| **DATE OF TEST REPORT:** | March 15, 2002 | | |

| | |
|---|---|
| **American National Standard Institute:** | ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1 |
| **FCC Classification:** | PCB - Licensed Base Station for Part 24 |
| **FCC Rule Part(s):** | PART 24: PERSONAL COMMUNICATIONS SERVICES<br>Subpart E - Broadband PCS |
| **Industry Canada Standard:** | 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) | EIRP (W) | Freq. Tolerance | Emission Designator |
|---|---|---|---|
| 1896.65-1909.95 | 0.380 | 2.5 ppm | 289KDXW |

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 24, ANSI C63.4, ANSI/TIA/EIA603 and ANSI/TIA/EIA 603-1.

Signature: _____ Date: March 15, 2002

Typed/Printed Name: Bruno Clavier Position: Vice President of Operations

Signature: _____ Date: March 15, 2002

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