

Nemko Test Report No.: 4L0194RUS3REV1

Applicant: Enfora, Inc.  
661 E. 18<sup>th</sup> Street  
Plano, TX 75074

Equipment Under Test: GSM0110

In Accordance With: FCC Part 22, Subpart H  
800 MHz Cellular Subscriber Units

Tested By: Nemko Dallas Inc.  
802 N. Kealy  
Lewisville, TX  
75057-3136

Authorized By:



Dustin Oaks, Engineer

Date: 4/08/2005

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**Section 1. Summary of Test Results**

Manufacturer: Enfora, Inc.

Model No.: GSM0110

Serial No.: None

General: All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 22, Subpart H.

- |                                     |                            |                                     |                     |
|-------------------------------------|----------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | New Submission             | <input type="checkbox"/>            | Production Unit     |
| <input type="checkbox"/>            | Class II Permissive Change | <input checked="" type="checkbox"/> | Pre-Production Unit |

This test report relates only to the item(s) tested.

The following deviations from, additions to, or exclusions from the test specifications have been made. None  
See " Summary of Test Data".

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**Summary Of Test Data**

| NAME OF TEST                            | PARA. NO. | RESULT    |
|---|-----------|-----------|
| RF Power Output                         | 2.1046    | *Complies |
| Audio Frequency Response                | 2.1047    | NA        |
| Audio Low Pass Filter Response          | 2.1047    | NA        |
| Modulation Limiting                     | 2.1047    | NA        |
| Occupied Bandwidth (GSM)                | 2.1049    | Complies  |
| Spurious Emissions at Antenna Terminals | 2.1051    | Complies  |
| Field Strength of Spurious Emissions    | 2.1053    | *Complies |
| Frequency Stability                     | 2.1055    | Complies  |

Footnotes:

The device is GSM/GPRS only.

Radiated Measurements redone due to a redesign of antenna. Conducted measurements were originally taken in April 2004

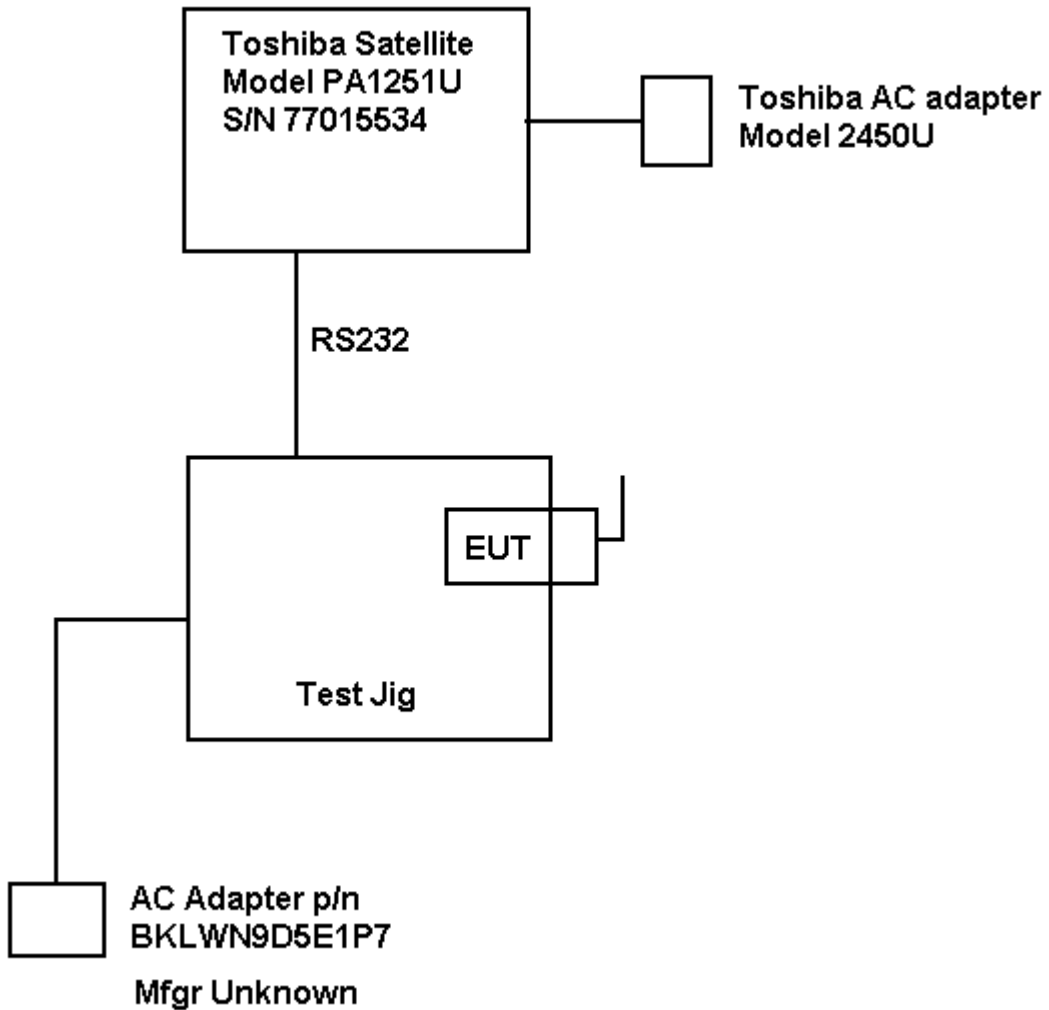
**Section 2.        General Equipment Specification**

|                                     |                     |
|-------------------------------------|---------------------|
| Frequency Range:                    | 824.2 to 848.8 MHz  |
| Tunable Bands:                      | 824.2 to 848.8 MHz  |
| Necessary Bandwidth:                | 300 kHz             |
| Emission Designator:                | 300KG7W             |
| Output Impedance:                   | 50 ohms             |
| Operator Selection of Frequency:    | Software Controlled |
| Power Output Adjustment Capability: | Software Controlled |

**Operational Description**

This device is a wireless PCMCIA GSM/GPRS wireless modem that operates in the PCS band and in the 800 MHz Cellular band.

**System Diagram**



**Section 3. RF Power Output**

|                               |                   |
|-------------------------------|-------------------|
| NAME OF TEST: RF Power Output | PARA. NO.: 2.1046 |
| TESTED BY: David Light        | DATE: 3/11/05     |

Test Results:                   Complies.

Measurement Data:

Antenna Conducted:

| <b>Modulation Type</b> | <b>Power Level</b> | <b>Output Power (dBm)</b> | <b>Output Power (W)</b> |
|------------------------|--------------------|---------------------------|-------------------------|
| GSM                    | PL5                | 31                        | 1.26                    |

Unit has no provisions for conducted measurements, values based on manufacturers settings. PL5 is the setting to produce the maximum output power.

Test Data – RF Power Output (ERP)



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ERP

Page 1 of 2

Job No.: 4L0194 Date: 3/11/05 Complete X  
Preliminary \_\_\_\_\_

Specification: PT 22 Temperature(°C): 24

Tested By: David Light Relative Humidity(%) 35

E.U.T.: ORION

Configuration: TX FULL POWER

Sample No: 1

Location: AC 3 RBW: 1 MHz Measurement  
Detector Type: Peak VBW: 1 MHz Distance: 3 m

**Test Equipment Used**

Antenna: 1304 Directional Coupler: \_\_\_\_\_  
Pre-Amp: 1016 Cable #1: 1484  
Filter: 1481 Cable #2: 1485  
Receiver: 1464 Cable #3: \_\_\_\_\_  
Attenuator #1: \_\_\_\_\_ Cable #4: \_\_\_\_\_  
Attenuator #2: \_\_\_\_\_ Mixer: \_\_\_\_\_

Additional equipment used: \_\_\_\_\_

Measurement Uncertainty: +1.7 dB

| Frequency<br>(MHz) | Meter<br>Reading<br>(dBm) | Correction<br>Factor<br>(dB) |  | Pre-Amp<br>Gain<br>(dB) | Substitution<br>Antenna Gain<br>(dBd) |  | ERP<br>(dBm) | ERP<br>(mW) | Polarity | Comments |
|--------------------|---------------------------|------------------------------|--|-------------------------|---------------------------------------|--|--------------|-------------|----------|----------|
| 836.6              | -12.7                     | 32.3                         |  | 0                       | 0.5                                   |  | 20.1         | 103.28      | V        |          |
| 836.6              | -6.8                      | 32.3                         |  | 0                       | 0.5                                   |  | 26.0         | 399.02      | H        |          |
| 824.2              | -11.5                     | 32.3                         |  | 0                       | 0.5                                   |  | 21.3         | 136.14      | V        |          |
| 824.2              | -6.7                      | 32.3                         |  | 0                       | 0.5                                   |  | 26.1         | 408.32      | H        |          |
| 848.8              | -11.8                     | 32.3                         |  | 0                       | 0.5                                   |  | 21.0         | 127.06      | V        |          |
| 848.8              | -5.2                      | 32.3                         |  | 0                       | 0.5                                   |  | 27.6         | 576.77      | H        |          |
|                    |                           |                              |  | 0                       |                                       |  |              |             |          |          |

Notes: \_\_\_\_\_



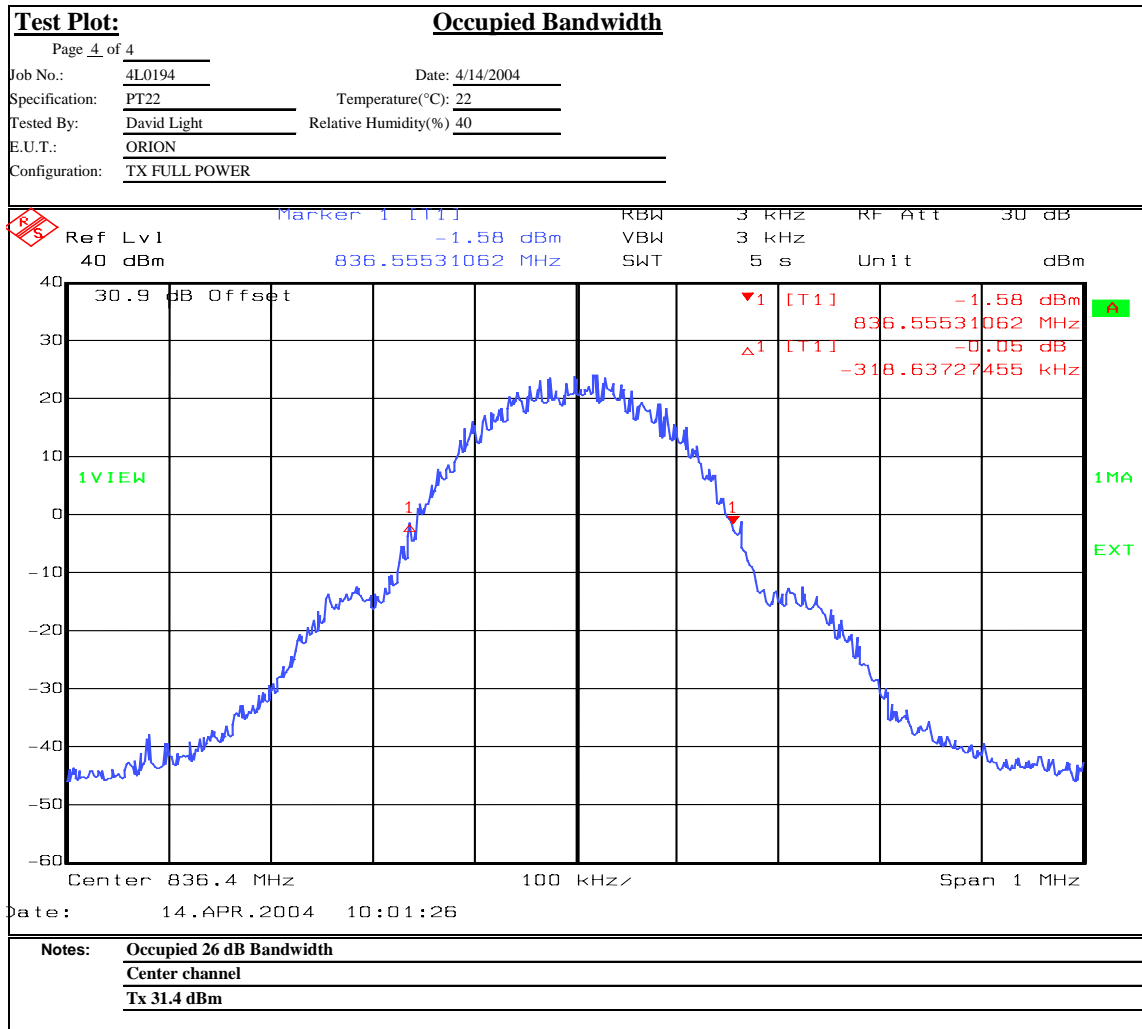
EQUIPMENT: GSM0110

**Section 4. Occupied Bandwidth**

|  |                   |
|--|-------------------|
| NAME OF TEST: Field Strength of Spurious | PARA. NO.: 2.1047 |
| TESTED BY: David Light                   | DATE: 4/14/04     |

Test Results: Complies.

Measurement Data: See attached table.



**Section 5. Spurious Emissions at Antenna Terminals**

|   |                   |
|---|-------------------|
| NAME OF TEST: Spurious Emissions at Antenna Terminals | PARA. NO.: 2.1053 |
| TESTED BY: David Light                                | DATE: 4/14/04     |

Test Results:                      Complies.

Measurement Data:    See attached table.

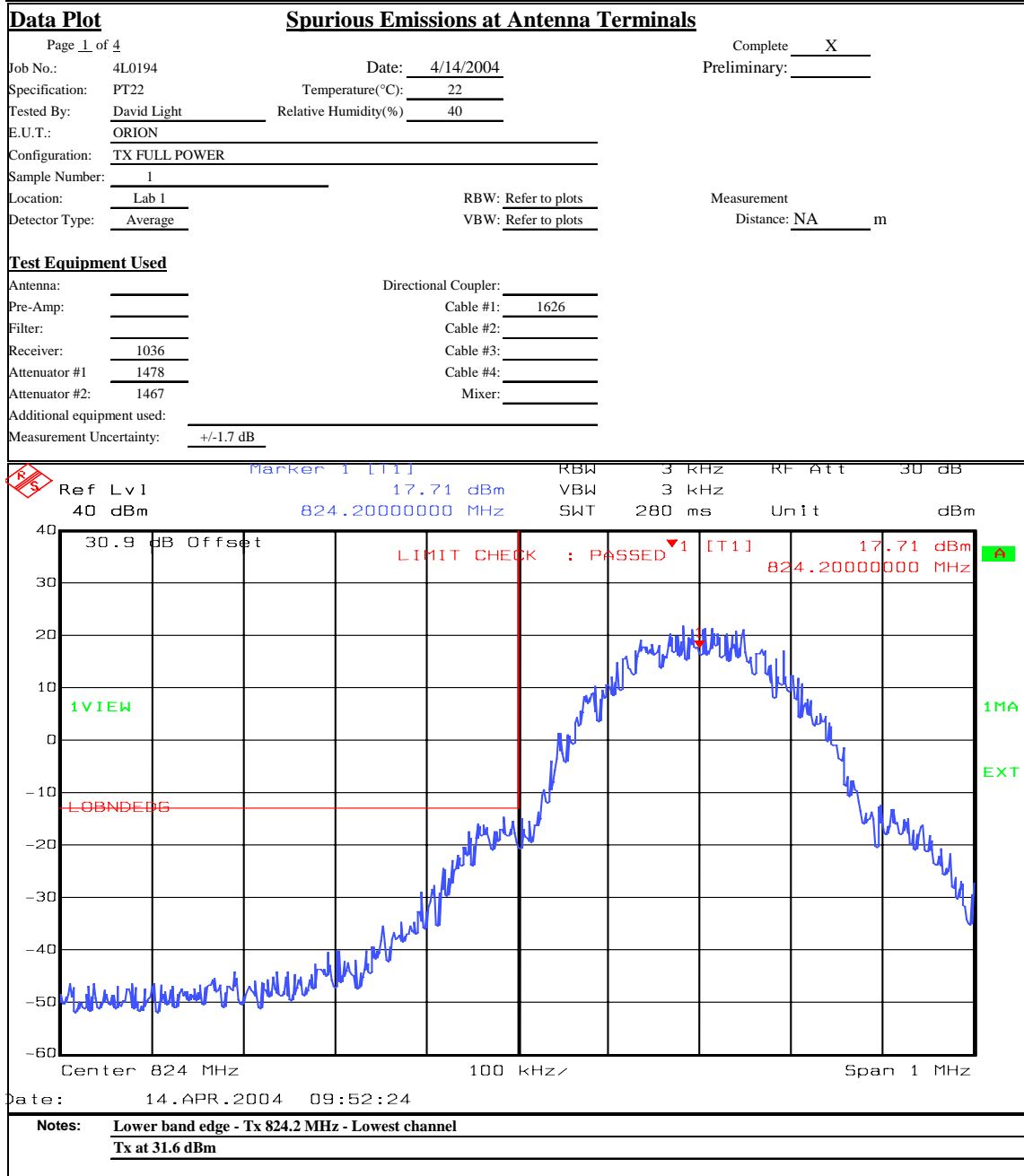
EQUIPMENT: GSM0110

Test Data – Spurious Emissions at Antenna Terminals



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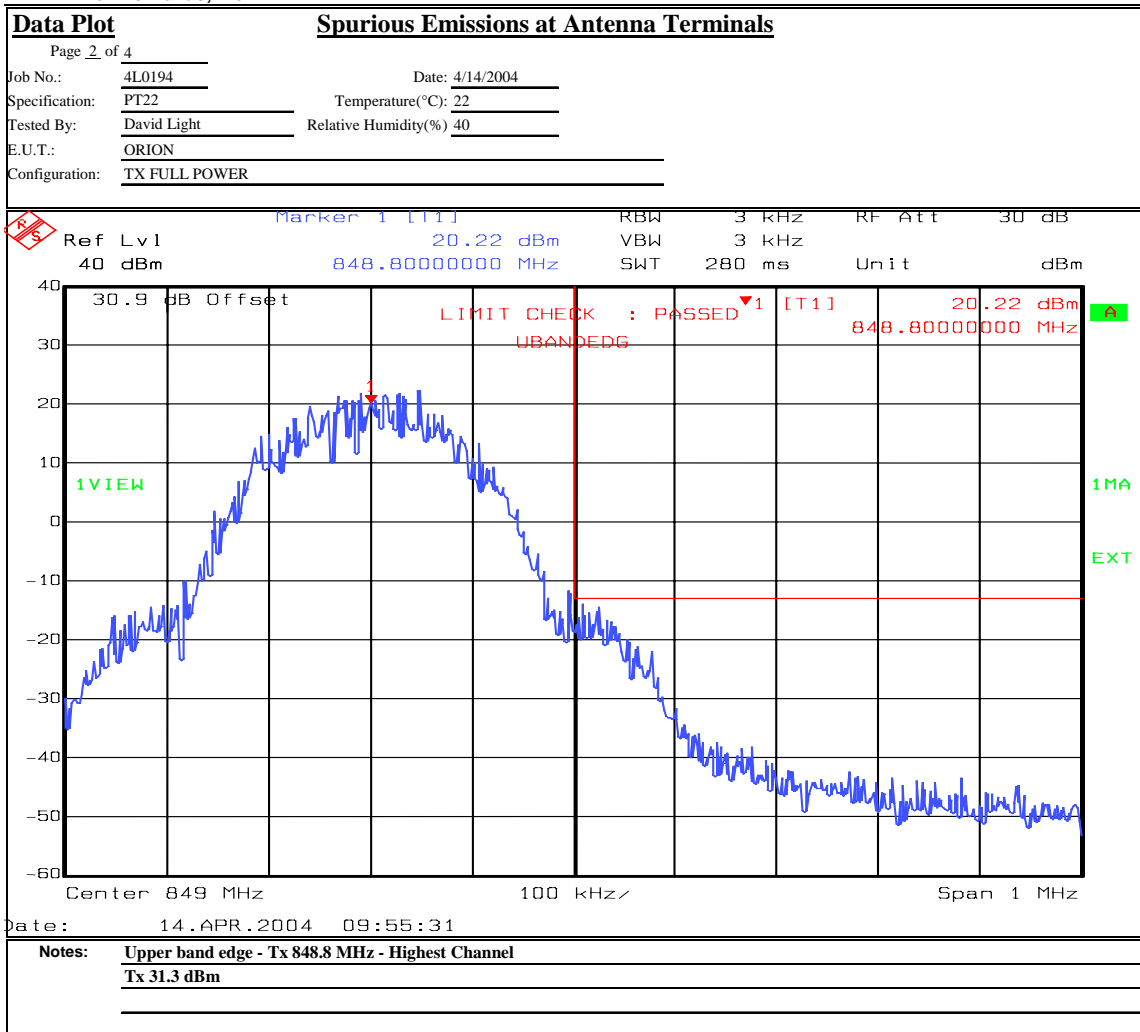


Test Data – Spurious Emissions at Antenna Terminals



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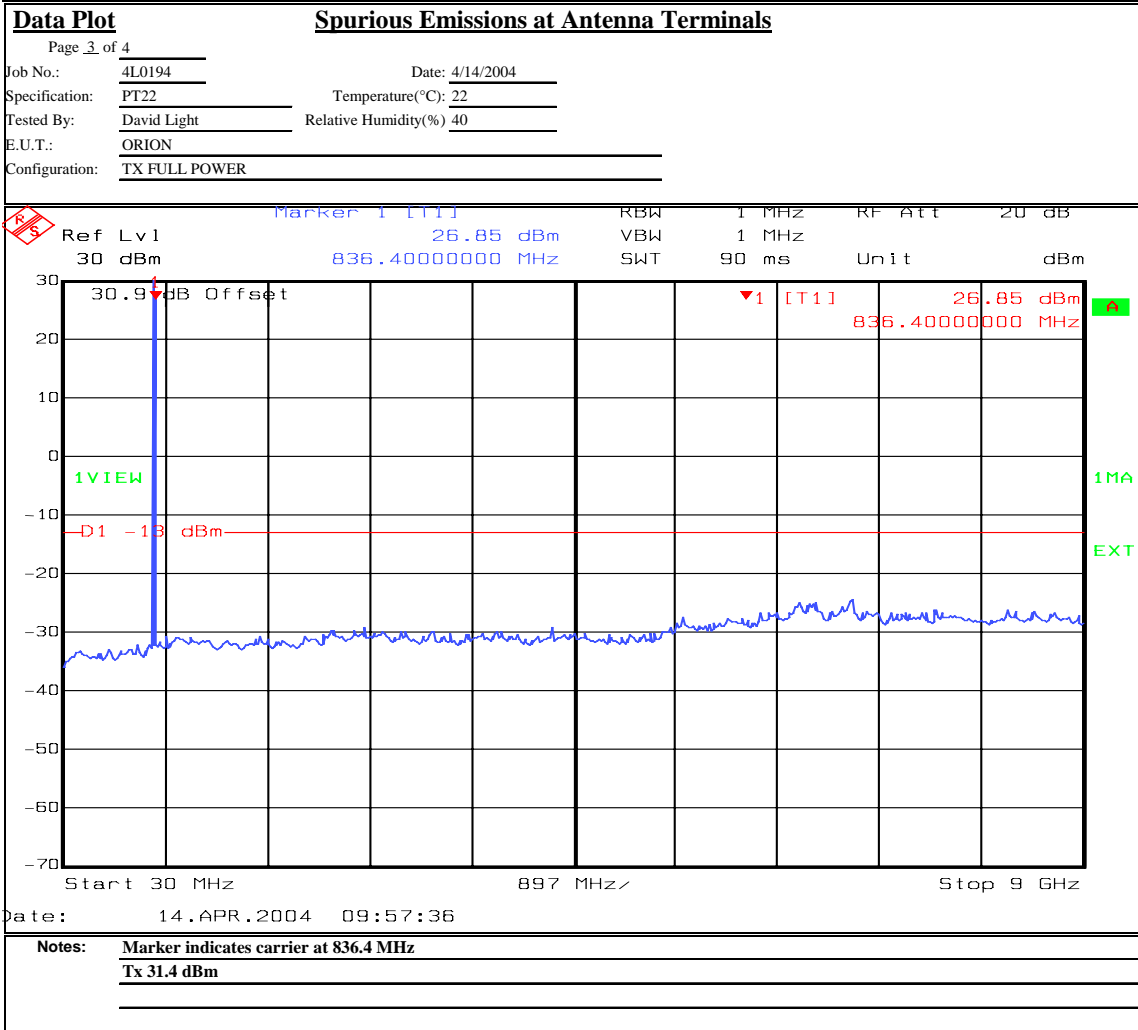


Test Data – Spurious Emissions at Antenna Terminals



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**Section 6. Field Strength of Spurious**

|  |                   |
|--|-------------------|
| NAME OF TEST: Field Strength of Spurious | PARA. NO.: 2.1053 |
| TESTED BY: David Light                   | DATE: 3/11/05     |

Test Results:                      Complies.

Measurement Data:    See attached table.

Test Data - Radiated Emissions



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ERP

Page 1 of 2

Job No.: 4L0194 Date: 3/11/05 Complete X  
Preliminary \_\_\_\_\_

Specification: PT 22 Temperature(°C): 24  
Tested By: David Light Relative Humidity(%) 35

E.U.T.: ORION  
Configuration: TX FULL POWER

Sample No: 1  
Location: AC 3 RBW: 1 MHz  
Detector Type: Peak VBW: 1 MHz Measurement Distance: 3 m

**Test Equipment Used**

Antenna: 1304 Directional Coupler: \_\_\_\_\_  
Pre-Amp: 1016 Cable #1: 1484  
Filter: 1481 Cable #2: 1485  
Receiver: 1464 Cable #3: \_\_\_\_\_  
Attenuator #1: \_\_\_\_\_ Cable #4: \_\_\_\_\_  
Attenuator #2: \_\_\_\_\_ Mixer: \_\_\_\_\_

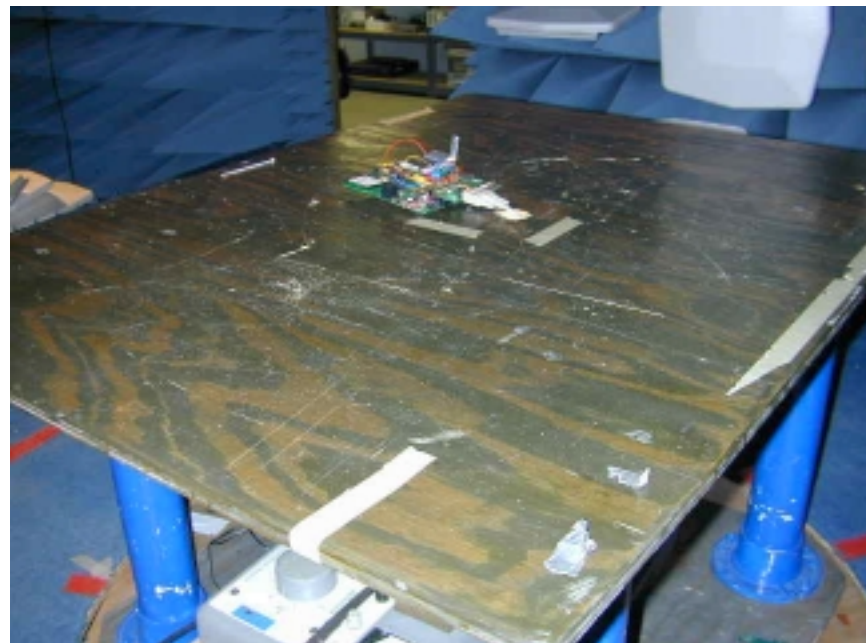
Additional equipment used: \_\_\_\_\_  
Measurement Uncertainty: +/-1.7 dB

| Frequency (MHz) | Meter Reading (dBm) | Correction Factor (dB) |  | Pre-Amp Gain (dB) | Substitution Antenna Gain (dBd) | Limit (dBm) | ERP (dBm) | ERP (mW) | Polarity | Comments    |
|-----------------|---------------------|------------------------|--|-------------------|---------------------------------|-------------|-----------|----------|----------|-------------|
| 1673.2          | -66.0               | 29.9                   |  | 0                 | 6.4                             | -13         | -29.8     | 0.0010   | V        |             |
| 2509.8          | -44.0               | 35.6                   |  | 33                | 8.0                             | -13         | -33.5     | 0.0004   | V        |             |
| 3346.4          | -60.0               | 37.1                   |  | 32.6              | 8.1                             | -13         | -47.4     | 0.0000   | V        |             |
| 4183            | -56.0               | 42.8                   |  | 33                | 7.9                             | -13         | -38.3     | 0.0001   | V        |             |
| 5019.6          | -60.0               | 40.6                   |  | 32.7              | 9.1                             | -13         | -43.0     | 0.0000   | V        |             |
| 5856.2          | -62.0               | 38.5                   |  | 31.9              | 9.1                             | -13         | -46.3     | 0.0000   | V        |             |
| 6692.8          | -66.0               | 38.3                   |  | 31.5              | 10.1                            | -13         | -49.1     | 0.0000   | V        |             |
| 7529.4          | -73.0               | 40.4                   |  | 32.5              | 9.4                             | -13         | -55.6     | 0.0000   | V        | Noise floor |
| 8366            | -67.0               | 41.6                   |  | 32.9              | 9.7                             | -13         | -48.6     | 0.0000   | V        |             |
| 1673.2          | -64.0               | 32.7                   |  | 0                 | 6.4                             | -13         | -25.0     | 0.0032   | H        |             |
| 2509.8          | -47.0               | 34.6                   |  | 33                | 8.0                             | -13         | -37.4     | 0.0002   | H        |             |
| 3346.4          | -65.0               | 35.8                   |  | 32.6              | 8.1                             | -13         | -53.7     | 0.0000   | H        |             |
| 4183            | -65.0               | 35.2                   |  | 33                | 7.9                             | -13         | -54.9     | 0.0000   | H        |             |
| 5019.6          | -67.0               | 36.3                   |  | 32.7              | 9.1                             | -13         | -54.4     | 0.0000   | H        |             |
| 5856.2          | -65.0               | 36.0                   |  | 31.9              | 9.1                             | -13         | -51.8     | 0.0000   | H        |             |
| 6692.8          | -68.0               | 37.8                   |  | 31.5              | 10.1                            | -13         | -51.5     | 0.0000   | H        |             |
| 7529.4          | -73.0               | 39.8                   |  | 32.5              | 9.4                             | -13         | -56.3     | 0.0000   | H        | Noise floor |
| 8366            | -70.0               | 42.2                   |  | 32.9              | 9.7                             | -13         | -51.0     | 0.0000   | H        | Noise floor |

Notes: \_\_\_\_\_

Searched spectrum from 30 MHz to 9 GHz

**Photographs of Test Setup**





**Section 7. Frequency Stability**

|                                   |                   |
|-----------------------------------|-------------------|
| NAME OF TEST: Frequency Stability | PARA. NO.: 2.1055 |
| TESTED BY: David Light            | DATE: 4/15/04     |

**Test Results:** Complies.

**Measurement Data:** Refer to attached data

**Test Conditions :** Standard Test Frequency: 836.459956 MHz  
Standard Test Voltage: 3.6 Vdc

EQUIPMENT: GSM0110

Test Data – Frequency Stability



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| <u>Frequency Stability</u> |                               |              |  |               |             |         |  |
|----------------------------|-------------------------------|--------------|--|---------------|-------------|---------|--|
| Page <u>1</u> of <u>1</u>  |                               |              |  |               |             |         |  |
| Job No.:                   | 4L0194                        |              | Date: 4/15/2004                                  |               |             |         |  |
| Specification:             | PT 22                         |              | Temperature(°C): <u>22</u>                       |               |             |         |  |
| Tested By:                 | <u>David Light</u>            |              | Relative Humidity(%) <u>40</u>                   |               |             |         |  |
| E.U.T.:                    | <u>ORION</u>                  |              |  |               |             |         |  |
| Configuration:             | <u>TX AT MID BAND</u>         |              |  |               |             |         |  |
| Sample Number:             | <u>1</u>                      |              |  |               |             |         |  |
| <u>Test Equipment Used</u> |                               |              |  |               |             |         |  |
| Antenna:                   | <u>#N/A</u>                   |              | Directional Coupler: <u>                    </u> |               |             |         |  |
| Pre-Amp:                   | <u>#N/A</u>                   |              | Cable #1: <u>1629</u>                            |               |             |         |  |
| Filter:                    | <u>1026</u>                   |              | Cable #2: <u>                    </u>            |               |             |         |  |
| Receiver:                  | <u>#N/A</u>                   |              |  |               |             |         |  |
| Attenuator #1              | <u>1478</u>                   |              |  |               |             |         |  |
| Attenuator #2:             | <u>#N/A</u>                   |              |  |               |             |         |  |
| Measurement Uncertainty:   | <u>1x10<sup>-17</sup> ppm</u> |              | Standard Test Frequency <u>836.459956</u> MHz    |               |             |         |  |
| Temp (°C)                  | Measured Frequency (MHz)      | Test Voltage | Frequency Error (Hz)                             | Limit (+/-Hz) | Error (ppm) | Comment |  |
| 20                         | 836.459956                    | 3.6          | 0  | 2091.1        | 0.0         |         |  |
| 20                         | 836.459950                    | 3.06         | -6   | 2091.1        | 0.0         |         |  |
| 20                         | 836.459940                    | 4.14         | -16  | 2091.1        | 0.0         |         |  |
| 50                         | 836.459844                    | 3.6          | -112   | 2091.1        | -0.1        |         |  |
| 40                         | 836.460190                    | 3.6          | 234  | 2091.1        | 0.3         |         |  |
| 30                         | 836.460787                    | 3.6          | 831  | 2091.1        | 1.0         |         |  |
| 10                         | 836.458922                    | 3.6          | -1034  | 2091.1        | -1.2        |         |  |
| 0                          | 836.459950                    | 3.6          | -6   | 2091.1        | 0.0         |         |  |
| -10                        | 836.459893                    | 3.6          | -63  | 2091.1        | -0.1        |         |  |
| -20                        | 836.460755                    | 3.6          | 799  | 2091.1        | 1.0         |         |  |
| -30                        | 836.458270                    | 3.6          | -1686  | 2091.1        | -2.0        |         |  |
| Notes:                     |                               |              |  |               |             |         |  |
|                            |                               |              |  |               |             |         |  |

**Section 8. Test Equipment List**

April 2004

| Nemko ID | Description                                     | Manufacturer Model Number                   | Serial Number | Calibration Date | Calibration Due |
|----------|---|---|---------------|------------------|-----------------|
| 1467     | 10 db Attenuator DC 18 Ghz                      | MCL Inc.<br>BW-S10W2 10db-2WDC              | NONE          | CBU              | N/A             |
| 1478     | 20db Attenuator DC 18 Ghz                       | MCL Inc.<br>BW-S20W6                        | NONE          | CBU              | N/A             |
| 1626     | CABLE, 5 ft                                     | MEGAPHASE<br>10311 1GVT4                    | N/A           | CBU              | N/A             |
| 1036     | SPECTRUM ANALYZER                               | ROHDE & SCHWARZ<br>FSEK30                   | 830844/006    | 03/29/04         | 03/29/06        |
| 1484     | Spectrum analyzer                               | Hewlett Packard<br>8563E                    | 3551A04428    | 02/11/03         | 02/11/05        |
| 1484     | Cable 2.0-18.0 Ghz                              | Storm<br>PR90-010-072                       | N/A           | 07/24/03         | 07/23/04        |
| 1485     | Cable 2.0-18.0 Ghz                              | Storm<br>PR90-010-216                       | N/A           | 07/24/03         | 07/23/04        |
| 1036     | SPECTRUM ANALYZER                               | ROHDE & SCHWARZ<br>FSEK30                   | 830844/006    | 02/11/03         | 02/11/05        |
| 1016     | Pre-Amp   | HEWLETT PACKARD<br>8449A                    | 2749A00159    | 10/27/03         | 10/26/04        |
| 283      | Environmental Chamber with controller # 1189006 | ENVIRONMENTAL CHAMBERS<br>SH27 & 2030-22844 | 129010083     | 04/22/03         | 04/21/04        |
| 1026     | FREQUENCY COUNTER                               | HEWLETT PACKARD<br>6360B                    | 8232A01493    | 01/23/04         | 01/22/05        |

March 2005

| Nemko ID | Description           | Manufacturer Model Number   | Serial Number | Calibration Date | Calibration Due |
|----------|-----------------------|-----------------------------|---------------|------------------|-----------------|
| 1484     | Cable 2.0-18.0 Ghz    | Storm<br>PR90-010-072       | N/A           | 08/26/04         | 08/26/05        |
| 1485     | Cable 2.0-18.0 Ghz    | Storm<br>PR90-010-216       | N/A           | 08/02/04         | 08/02/05        |
| 1464     | Spectrum analyzer     | Hewlett Packard<br>8563E    | 3551A04428    | 01/14/05         | 01/15/07        |
| 1016     | Pre-Amp               | HEWLETT PACKARD<br>8449A    | 2749A00159    | 11/12/04         | 11/12/05        |
| 1304     | HORN ANTENNA          | ELECTRO METRICS<br>RGA-60   | 6151          | 09/22/03         | 09/22/05        |
| 791      | PREAMP, 25dB          | ICC<br>LNA25                | 398           | 11/12/04         | 11/12/05        |
| 1983     | CABLE                 | KTL<br>Site A OATS          | N/A           | 03/11/04         | 03/11/05        |
| 759      | ANTENNA, LOG PERIODIC | A.H. SYSTEMS<br>SAS-200/510 | 556           | 07/23/04         | 07/23/05        |
| 760      | Antenna biconical     | Electro Metrics<br>MFC-25   | 477           | 06/22/04         | 06/22/05        |

**ANNEX A - TEST DETAILS**

|                               |                   |
|-------------------------------|-------------------|
| NAME OF TEST: RF Power Output | PARA. NO.: 1.1046 |
|-------------------------------|-------------------|

Minimum Standard:

§22.913 Effective radiated power limits. - The effective radiated power (ERP) of transmitters in the Cellular Radiotelephone Service must not exceed the limits in this section.

(a) Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

Method Of Measurement:

Detachable Antenna:

The power at antenna terminals is measured using power meter.

Integral Antenna:

Test Method: TIA/EIA-603-1992, Section 2.2.12

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The spurious emissions were measured at a distance of 3 meters. The EUT was then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna was fed with a signal at the spurious frequency. The level of the signal was adjusted to repeat the previously measured level. The resulting erp is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

|  |                   |
|--|-------------------|
| NAME OF TEST: Audio Frequency Response | PARA. NO.: 2.1047 |
|--|-------------------|

**Minimum Standard:** No specific limit expressed in the FCC Rules.

From 300 to 3000 Hz the audio frequency response should not vary more than +1 to -3 dB from a true 6dB octave pre-emphasis characteristic as referred to 1000 Hz level (with the exception of a permissible 6dB per octave roll-off from 2500 to 3000 Hz).

Method Of Measurement:

Operate the transmitter with the compressor disabled, and monitor the output with a frequency deviation meter or standard test receiver without standard 750-microsecond de-emphasis, with expander disabled, and without C-message weighted filter (see 6.6.2). Apply a sine wave audio input to the transmitter external audio input port, vary the modulating frequency from 300 to 3000 Hz and observe the input levels necessary to maintain a constant  $\pm 2.9$  kHz system deviation.

|  |                   |
|--|-------------------|
| NAME OF TEST: Audio Low Pass Filter Response | PARA. NO.: 2.1047 |
|--|-------------------|

**Minimum Standard:** No specific limit expressed in the FCC Rules.

For mobile stations, signals should be attenuated as a function of frequency as follows:

- i. In the frequency ranges 3.0 to 5.9 Hz and 6.1 to 15 kHz,  $40 \log (f/3)$  dB.
- ii. In the frequency range 5.9 to 6.1 kHz, 35 dB
- iii. In the frequency range above 15 kHz, 28 dB.

Method Of Measurement:

Adjust the audio input frequency to 1000 Hz and adjust the input level to 20 dB greater than that required to produce  $\pm 8$  kHz deviation. Note the output level on the frequency deviation meter or standard test receiver. Using the output level as reference (0dB), vary the modulating frequency from 3000 Hz to 30,000 Hz and observe the change in output while maintaining a constant audio input level.

NAME OF TEST: Modulation Limiting

PARA. NO.: 2.1047

**Minimum Standard:** No specific requirement expressed in the FCC Rules.

The levels of the modulating signals should be set to the values specified below and should be maintained within  $\pm 10\%$  of these values.

Voice:  $\pm 12$  kHz

SAT:  $\pm 2$  kHz

Wideband Data:  $\pm 8$  kHz

ST:  $\pm 8$  kHz

Method Of Measurement:

Voice: A 1 kHz audio tone is injected at levels between -45 and +20 dBVrms. The peak deviation is noted. This is repeated with a 300 Hz tone and a 3 kHz tone. A plot showing the family of curves is presented.

SAT: A SAT tone is generated by the mobile station and the peak deviation is measured.

Wideband Data: Wideband data is generated by the mobile station and the peak deviation is measured.

ST: ST data is generated by the mobile station and the peak deviation is measured.



|  |                   |
|--|-------------------|
| NAME OF TEST: Occupied Bandwidth (Voice & SAT) | PARA. NO.: 2.1049 |
|--|-------------------|

Minimum Standard:

22.917 Emission limitations for cellular equipment. - The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(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.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

|  |                   |
|--|-------------------|
| NAME OF TEST: Occupied Bandwidth (WBD & SAT) | PARA. NO.: 2.1049 |
|--|-------------------|

Minimum Standard:

22.917 Emission limitations for cellular equipment. - The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(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.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

|   |
|---|
| NAME OF TEST: Spurious Emission at Antenna Terminals    PARA. NO.: 2.1051 |
|---|

Minimum Standard:

22.917 Emission limitations for cellular equipment. - The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(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.

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

|  |                   |
|--|-------------------|
| NAME OF TEST: Field Strength of Spurious Radiation | PARA. NO.: 2.1053 |
|--|-------------------|

Minimum Standard:

22.917 Emission limitations for cellular equipment. - The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(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.

**Test Method:** TIA/EIA-603-1992, Section 2.2.12

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The spurious emissions were measured at a distance of 3 meters. The EUT was then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna was fed with a signal at the spurious frequency. The level of the signal was adjusted to repeat the previously measured level. The resulting erp is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

The spectrum is searched to 10 GHz.

|                                   |                   |
|-----------------------------------|-------------------|
| NAME OF TEST: Frequency Stability | PARA. NO.: 2.1055 |
|-----------------------------------|-------------------|

**Minimum Standard:** Para. No. 22.355. The transmitter carrier frequency shall remain within the tolerances given in Table C-1.

| Freq. Range (MHz) | Mobile > 3 W | Mobile ≤ 3 W |
|-------------------|--------------|--------------|
| 821 to 896        | 2.5          | 2.5          |

Table C-1

Method Of Measurement:

Frequency Stability With Voltage Variation:

The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

Frequency Stability With Temperature Variation:

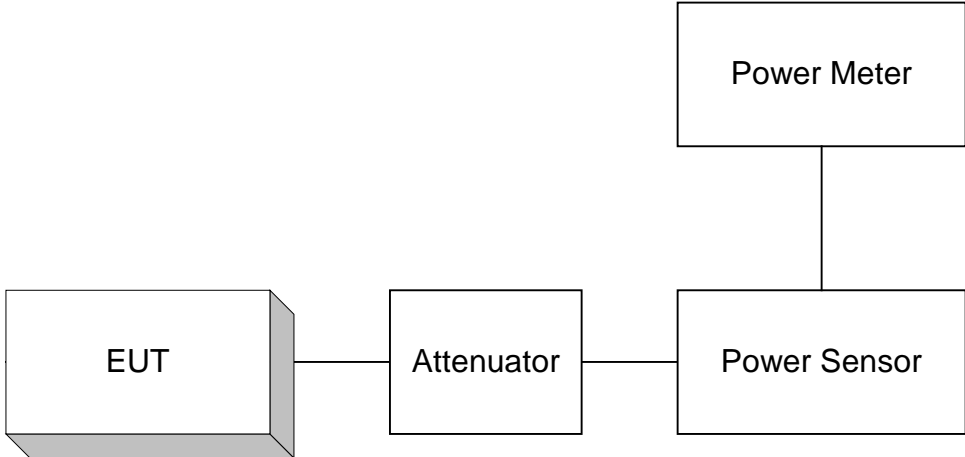
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

Devices that operate within a network and use dynamic power and frequency adjustment, the device is placed in call mode using a test set during this testing.

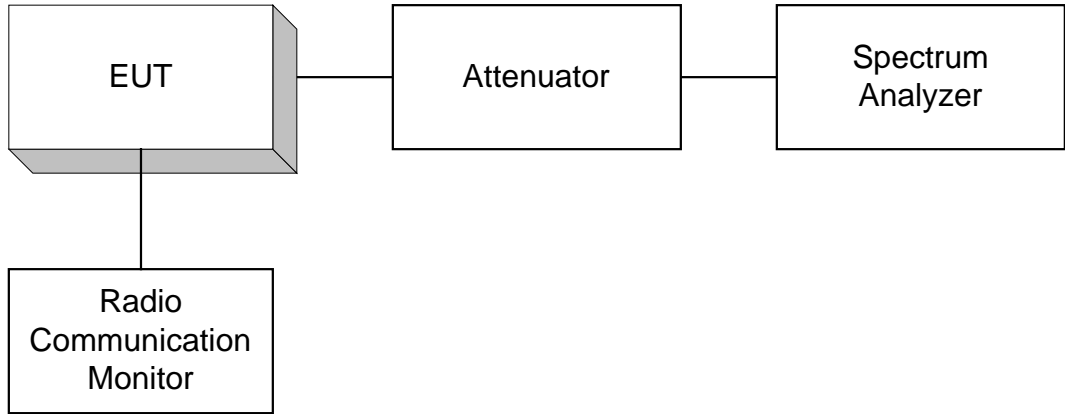
For devices that use complex digital modulation and cannot produce an unmodulated rf signal, the device is placed into call mode with a test set and the frequency error and rho parameters are recorded at each temperature and voltage variation.

**ANNEX B - TEST DIAGRAMS**

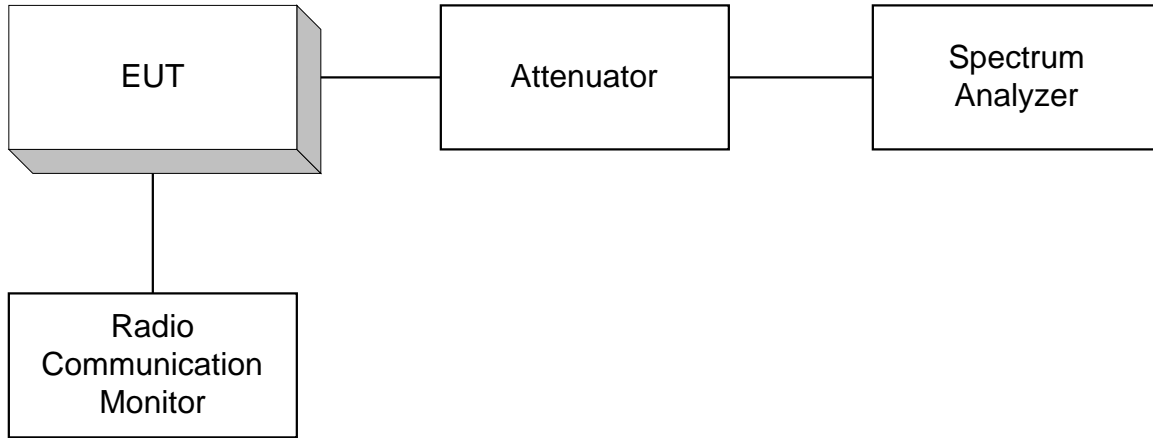
Para. No. 2.1046 - R.F. Power Output



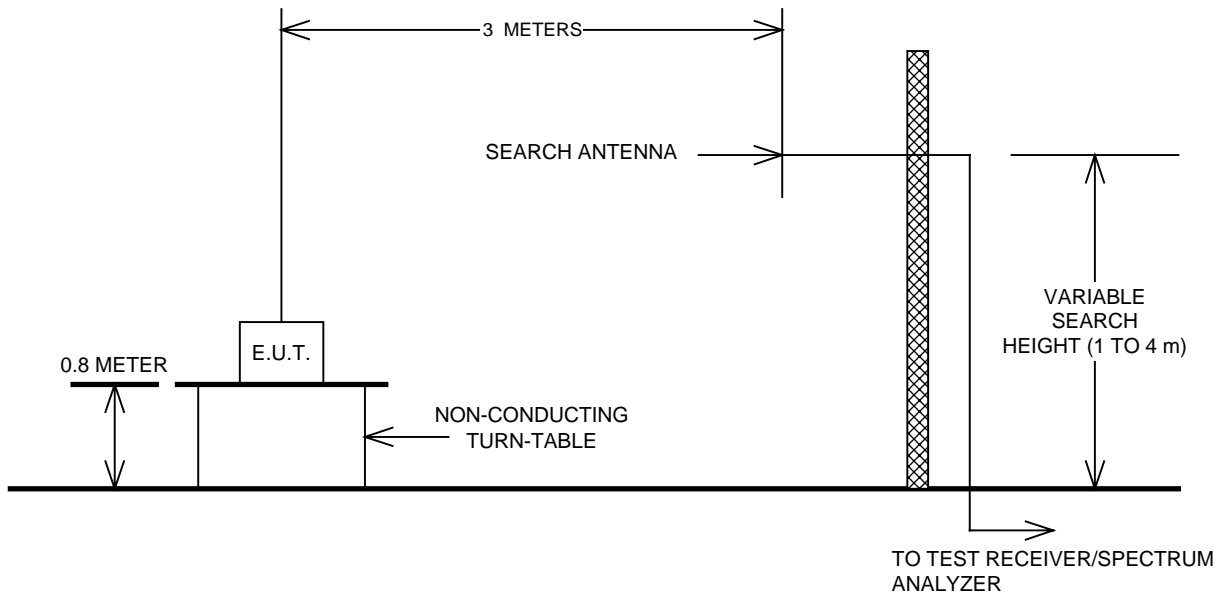
Para. No. 2.1049 - Occupied Bandwidth



**Para. No. 2.1051 Spurious Emissions at Antenna Terminals**

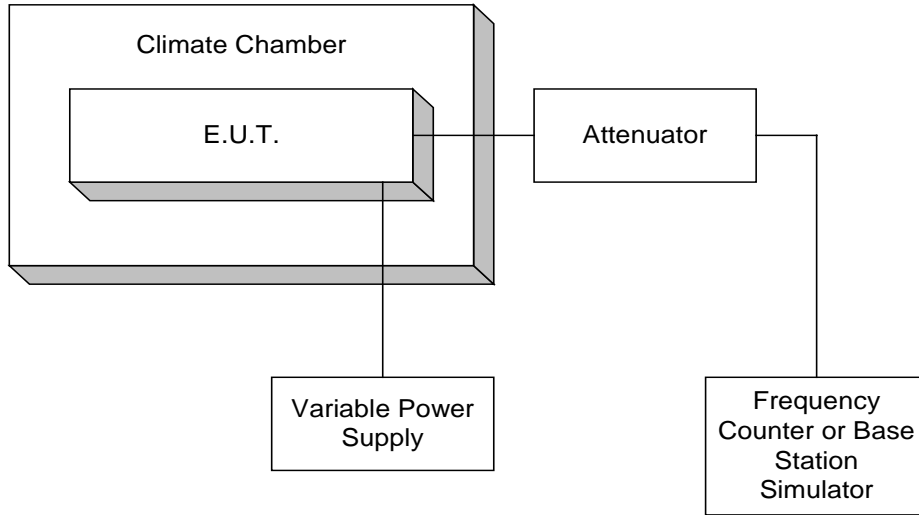


**Para. No. 2.1053 - Field Strength of Spurious Radiation**





**Para. No. 2.1055 - Frequency Stability**



**Para. No. 2.1045 – Audio Frequency Response, Audio Low Pass Filter Response And Modulation Limiting**

