FCC Compliance Report
Part 24 Certification
For
Flarion Technologies, Inc.
mT-1000 Wireless Broadband Modem

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mT-1000 Wireless Broadband Modem

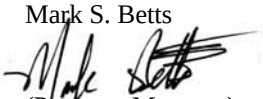
Date	**:**	3/12/04
MJO #	**:**	40420-04
File	**:**	40420-04-fcc24.FTI
Revision #	**:**	1
Product	**:**	Wireless Broadband Modem
Manufacturer	**:**	Flarion Technologies, Inc.
P.O. #	**:**	NR0289

Product	:	Wireless Broadband Modem
Model	:	mT-1000
Serial Number	:	33943503470023
Manufacturer	:	Flarion Technologies, Inc.
Address	:	135 Route 202/206 South Bedminster, NJ 07921 USA
Phone	:	908 947 7052
Fax	:	908 997 2050
Date Received	:	9/8/03
Contact	:	Bill Clark
Test Laboratory	:	National Technical Systems 36 Gilbert Street South Tinton Falls, NJ 07724 USA Phone: 732 936 0800 Fax: 732 936 0700 E-mail: nts-nj@ntscorp.com

Prepared By : Mark S. Betts Date: 3/12/04

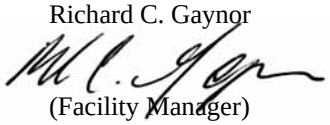
(Senior EMC Test Engineer)

Reviewed By : Mark S. Betts Date: 3/12/04



(Program Manager)

Approved By : Richard C. Gaynor Date: 3/12/04



(Facility Manager)

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1. General Description:

The Wireless Broadband Modem is a wireless desktop modem that provides always-on access to the Wireless Broadband network. The modem is designed for plug-and-play compatibility with desktop PCs, notebook PCs, and other consumer electronic devices (gaming consoles, web tablets, etc) that have standard Ethernet or USB connections. Users can utilize the Wireless Broadband Modem in stationary or mobile environments.

2. Classification and Environment:

FCC Part 24, Personal Communications Services and TIA/EIA 603 Land Mobile FM or PM Communications Equipment Measurement and Performance standards are applied to the mT-1000 Wireless Broadband Modem.

3. Test Summary:

Tests
Transmitter Power Conducted Output
Transmitter Occupied Bandwidth
Frequency vs. Temperature
Frequency vs. Voltage
Conducted Spurious Emissions
Radiated Spurious Emissions
Band Edge Measurements

4. Test Report Summary:

The Wireless Broadband Modem was tested to the specified standards.

4.1. Test Sample Description:

The test sample is in a small plastic enclosure and powered by +5 VDC.

4.1.1. Block Diagram:

Not available.

4.1.2. EUT Equipment List:

The table below displays what the EUT consists of during the tests.

Manufacturer	Make	Model	Serial Number
Flarion	Wireless Broadband Modem	mT-1000	33943503470023

4.1.3. EUT Cabling:

Not available.

4.2. Test Configuration:

4.2.1. EUT Electrical Mode of Operation:

The EUT was operated at +5 VDC Nominal.
The EUT was run in Normal Operation mode.

4.2.2. Software/Firmware:

Windows GUI

4.3. Test Procedure:

The EUT's testing was performed in accordance with approved test procedures specified in the applicable standards. All test procedures can be found with their appropriate tests.

4.4. Test Results and Data:

4.4.1. Transmitter Conducted Power Output:

Transmitter Conducted Power Output testing was conducted as defined in TIA\EIA-603, Paragraph 2.2.1
A spectrum analyzer was used to perform this test. The test was done on the RF output of the unit. The output of the unit was connected to the input of the spectrum analyzer through a 20 dB attenuator. All measurements include attenuator and cable losses.

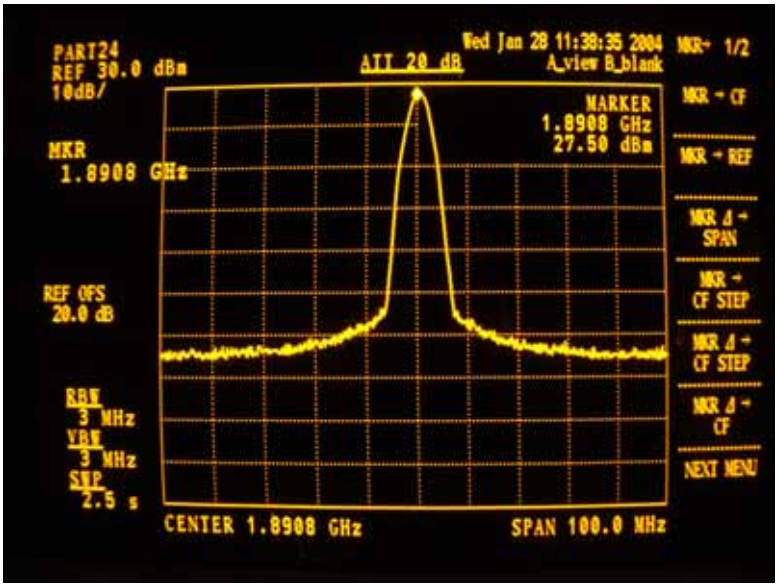
Transmitter Conducted Power Output Report

MJO #:	40420-04	**Applied Standard:**	TIA/EIA 603
Manufacturer Name:	Flarion Technologies, Inc.	**Date of Test:**	1/26/04
Product Name:	Wireless Broadband Modem	**Tester:**	Mark Betts
Model Number:	mT-1000	**Test Facility:**	Safety Area
Serial Number:	33943503470023	**Temperature:**	22°C
Performance Criteria:	N/A	**Relative Humidity:**	48%
EUT Mode:	Normal Operation	**EUT Power:**	+5 VDC

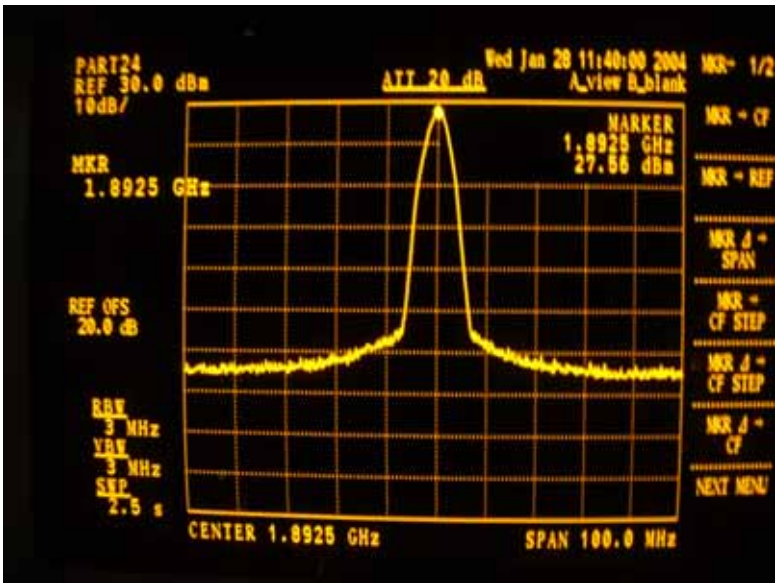
Transmitter Conducted Power Output Test Results
Note: All levels include attenuator and cable losses.

Frequency (MHz)	Conducted Power Output (dBm)
1890.75	27.50
1892.50	27.56
1894.25	27.25

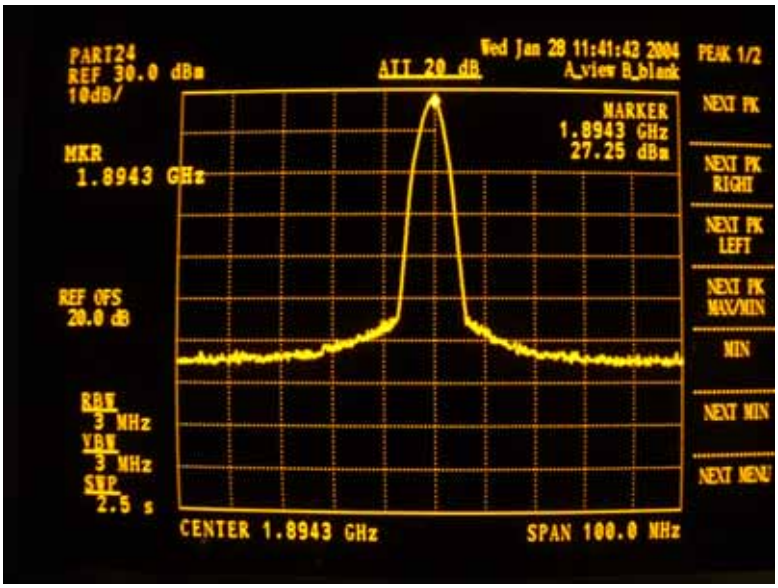
1890.75 MHz



1892.50 MHz



1894.25 MHz



Transmitter Conducted Power Output Equipment List:

Property Number	Manufacturer	Make	Model	S/N	Cal. Date	Cal. Due
WA527	Advantest	Spectrum Analyzer	RS3271A	45050124	12/22/03	12/22/04

4.4.2. Transmitter Occupied Bandwidth:

Transmitter Occupied Bandwidth testing was conducted as defined in TIA\EIA-603, Paragraph 2.2.11

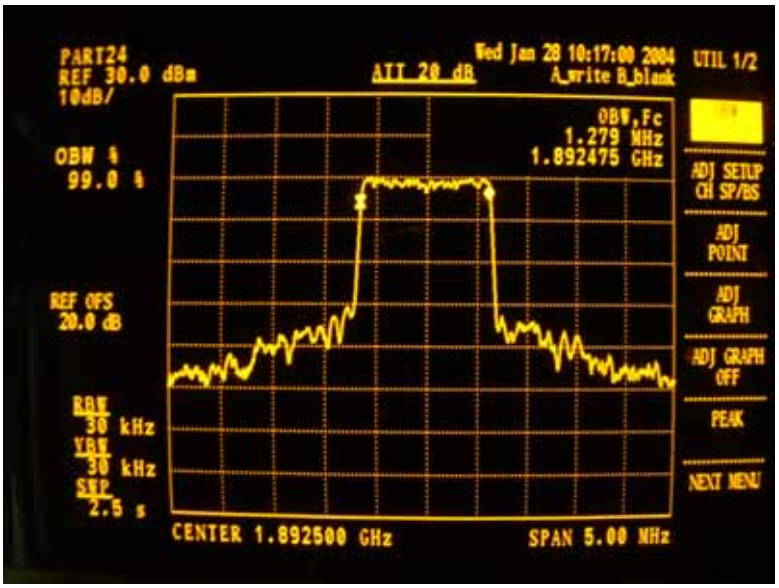
A spectrum analyzer was used to perform this test. The test was done on the RF output of the unit. The output of the unit was connected to the input of the spectrum analyzer through a 20 dB attenuator. All measurements include attenuator and cable losses.

Transmitter Occupied Bandwidth Laboratory Report

MJO #:	40420-04	**Applied Standard:**	TIA/EIA 603
Manufacturer Name:	Flarion Technologies, Inc.	**Date of Test:**	1/26/04
Product Name:	Wireless Broadband Modem	**Tester:**	Mark Betts
Model Number:	mT-1000	**Test Facility:**	Safety Area
Serial Number:	33943503470023	**Temperature:**	22°C
Performance Criteria:	N/A	**Relative Humidity:**	48%
EUT Mode:	Normal Operation	**EUT Power:**	+5 VDC

Transmitter Occupied Bandwidth Test Results:
Note: All levels include attenuator and cable losses.

1892.50 MHz



Transmitter Occupied Bandwidth Equipment List:

Property Number	Manufacturer	Make	Model	S/N	Cal. Date	Cal. Due
WA527	Advantest	Spectrum Analyzer	RS3271A	45050124	12/22/03	12/22/04

4.4.3. Frequency vs. Temperature

Frequency vs. Temperature testing was conducted as defined in TIA\EIA-603, Paragraph 2.2.2

A spectrum analyzer was used to perform this test. The test was done on the RF output of the unit. The output of the unit was connected to the input of the spectrum analyzer through a 20 dB attenuator. The unit was then placed in a temperature chamber where the temperature was raised to 50º C and lowered to -30º C in increments of 10º C. Measurements were taken when the unit was stabilized at the set temperature. All measurements include attenuator and cable losses.

Frequency vs. Temperature Laboratory Report

MJO #:	40420-04	**Applied Standard:**	TIA/EIA 603
Manufacturer Name:	Flarion Technologies, Inc.	**Date of Test:**	1/27/04
Product Name:	Wireless Broadband Modem	**Tester:**	Mark Betts
Model Number:	mT-1000	**Test Facility:**	Temperature Chamber
Serial Number:	33943503470023	**Temperature:**	Variable
Performance Criteria:	N/A	**Relative Humidity:**	N/A
EUT Mode:	Normal Operation	**EUT Power:**	+5 VDC

Frequency vs. Temperature Test Results-:
Note: All levels include attenuator and cable losses.

Temperature (ºC)	Frequency (MHz)	Frequency Change (Hz)
-30	1892.495677	0
-20	1892.495677	0
-10	1892.495697	+20
0	1892.495687	+10
10	1892.495687	+10
20	1892.495677	0
Ambient	**1892.495677**	**N/A**
30	1892.495677	0
40	1892.495687	+10
50	1892.495687	+10

Frequency vs. Temperature Equipment List:

Property Number	Manufacturer	Make	Model	S/N	Cal. Date	Cal. Due
WA527	Advantest	Spectrum Analyzer	RS3271A	45050124	12/22/03	12/22/04
FM347	Protek	Frequency Counter	B2000	U2000122	8/26/03	8/26/04
CH424	Thermotron	Thermal Shock Chamber	ATS-195V-5-5-LN2	12215	UWCE	UWCE
RE488	Fluke	Data Logger	Hydra	6818502	9/3/03	9/3/04

4.4.4. Frequency vs. Voltage

Frequency vs. Voltage testing was conducted as defined in TIA\EIA-603, Paragraph 2.2.2 A spectrum analyzer was used to perform this test. The test was done on the RF output of the unit. The output of the unit was connected to the input of the spectrum analyzer through a 20 dB attenuator. The unit was then adjusted from 85% to 115% of input voltage. All measurements include attenuator and cable losses.

Frequency vs. Voltage Laboratory Report

MJO #:	40420-04	**Applied Standard:**	TIA/EIA 603
Manufacturer Name:	Flarion Technologies, Inc.	**Date of Test:**	1/27/04
Product Name:	Wireless Broadband Modem	**Tester:**	Mark Betts
Model Number:	mT-1000	**Test Facility:**	Safety Area
Serial Number:	33943503470023	**Temperature:**	22°C
Performance Criteria:	N/A	**Relative Humidity:**	48%
EUT Mode:	Normal Operation	**EUT Power:**	Variable

Frequency vs. Voltage Test Results-:
Note: All levels include attenuator and cable losses.

Test State	Voltage (VDC)	Power (W)	Power (dB)	Frequency (MHz)	Frequency Change (Hz)
115% STV	+5.75	.5705	27.56	1892.495677	0
100% STV	+5.0	.5705	27.56	1892.495677	0
85% STV	+4.25	.5705	27.56	1892.495677	0

Frequency vs. Voltage Equipment List:

Property Number	Manufacturer	Make	Model	S/N	Cal. Date	Cal. Due
WA527	Advantest	Spectrum Analyzer	RS3271A	45050124	12/22/03	12/22/04
FM347	Protek	Frequency Counter	B2000	U2000122	8/26/03	8/26/04
ML419	Keithley	Digital Multimeter	2000	626108	8/7/03	8/7/04

4.4.5. Transmitter Conducted Spurs:

Transmitter Conducted Spurs testing was conducted as defined in TIA\EIA-603, Paragraph 2.2.13.

A spectrum analyzer was used to perform this test. The test was done on the RF output of the unit. The output of the unit was connected to the input of the spectrum analyzer through a 20 dB attenuator. The RBW/VBW used was 1MHz/3MHz above 1000 MHz. 10kHz and 120kHz/3MHz below 1000 MHz. A peak detector was used. All measurements include attenuator and cable losses. Tests were done to the 10^{th} harmonic.

Transmitter Conducted Spurs Report

MJO #:	40420-04	**Applied Standard:**	TIA/EIA 603
Manufacturer Name:	Flarion Technologies, Inc.	**Date of Test:**	1/28/04
Product Name:	Wireless Broadband Modem	**Tester:**	Mark Betts
Model Number:	mT-1000	**Test Facility:**	Safety Area
Serial Number:	33943503470023	**Temperature:**	22°C
Performance Criteria:	N/A	**Relative Humidity:**	48%
EUT Mode:	Normal Operation	**EUT Power:**	+5 VDC

Transmitter Conducted Spurs Test Results
Note: All levels include attenuator and cable losses.

Frequency (MHz)	Level (dBm)	Limit (dBm)	Delta (dBm)
1890.75 Fundamental	N/A	N/A	N/A
3781.50	-36.43	*-13.0*	-23.43
5672.25	-35.66	*-13.0*	-22.66
7563.00	-40.38	*-13.0*	-27.38
1892.50 Fundamental	N/A	*N/A*	*N/A*
3785	-25.13	*-13.0*	-12.13
5677.50	-33.74	*-13.0*	-20.74
7570.00	-36.35	*-13.0*	-23.35
1894.25 Fundamental	N/A	N/A	N/A
3788.50	-35.46	*-13.0*	-22.46
5682.75	-37.15	*-13.0*	-24.15
7577.00	-40.55	*-13.0*	-27.55

Transmitter Conducted Spurs Equipment List:

Property Number	Manufacturer	Make	Model	S/N	Cal. Date	Cal. Due
WA527	Advantest	Spectrum Analyzer	RS3271A	45050124	12/22/03	12/22/04

4.4.6. Transmitter Radiated Spurs:

Transmitter Radiated Spurs testing was conducted as defined in TIA\EIA-603, Paragraph 2.2.12.
The EUT was placed on a wooden table 3m away from the receive antenna. The antenna height and turntable azimuth were adjusted for the highest reading. An antenna was substituted in place of the EUT. A signal generator was connected to the antenna and the level of the signal generator was adjusted to obtain the same reading read from the EUT. The RBW/VBW used was 1MHz/3MHz above 1000 MHz. 10kHz and 120kHz/3MHz below 1000 MHz. A peak detector was used. All measurements include antenna factors and cable losses. Tests were done to the 10^{th} harmonic.

Transmitter Radiated Spurs Report

MJO #:	40420-04	**Applied Standard:**	TIA/EIA 603
Manufacturer Name:	Flarion Technologies, Inc.	**Date of Test:**	1/28/04
Product Name:	Wireless Broadband Modem	**Tester:**	Mark Betts
Model Number:	mT-1000	**Test Facility:**	Semi-Anechoic Chamber
Serial Number:	33943503470023	**Temperature:**	20°C
Performance Criteria:	N/A	**Relative Humidity:**	48%
EUT Mode:	Normal Operation	**EUT Power:**	+5 VDC

Transmitter Radiated Spurs Test Results
Note: All levels include antenna factors and cable losses.

Frequency (MHz)	Level (dBm)	Substitute Antenna Gain (dBi)	Correct Generator Level (dBm)	Polarization (H/V)
1890.75 Fundamental	27.56			
3781.50	-45.35	8.50	-36.85	V
5672.25	-53.64	8.80	-44.84	V
7563.00	-54.87	9.40	-45.47	V
9453.75	-65.49	10.80	-54.69	V
11344.50	-70.12	10.10	-60.02	V
1892.50 Fundamental	27.56			
3785	-46.89	8.50	-38.39	V
5677.50	-55.56	8.80	-46.76	V
7570.00	-57.64	9.40	-48.24	V
9462.50	-66.38	10.80	-55.58	V
11355.00	-71.64	10.10	-61.54	V
1894.25 Fundamental	27.25			
3788.50	-45.79	8.50	-37.29	V
5682.75	-54.37	8.80	-45.57	V
7577.00	-58.67	9.40	-49.27	V
9471.25	-65.49	10.80	-54.69	V
11365.50	-70.58	10.10	-60.48	V

Transmitter Radiated Spurs Equipment List:

Property Number	Manufacturer	Make	Model	S/N	Cal. Date	Cal. Due
AN371	Emco	Active Rod Antenna	3301B	9607-3708	07/15/02	07/15/05
AN368	Emco	Biconilog Antenna	3143	9607-1282	07/01/02	07/01/05
AN354	Electrometrics	Double Ridged Guide Antenna	6150	6150	05/17/01	05/17/04
WA527	Advantest	Spectrum Analyzer	RS3271A	45050124	12/22/03	12/22/04

4.4.7. Transmitter Band/Block Edge:

Transmitter Band/Block Edge testing was conducted as defined in TIA\EIA-603, Paragraph 2.2.11

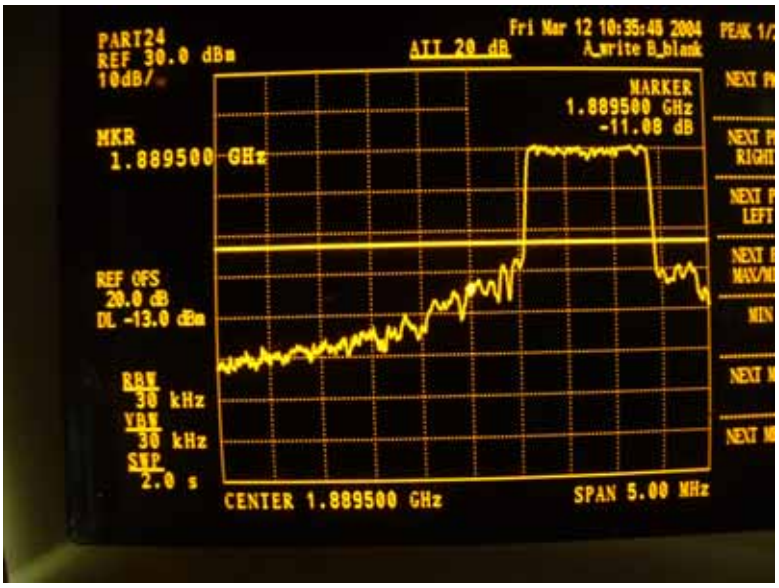
A spectrum analyzer was used to perform this test. The test was done on the RF output of the unit. The output of the unit was connected to the input of the spectrum analyzer through a 20 dB attenuator. All measurements include attenuator and cable losses.

Transmitter Band/Block Edge Laboratory Report

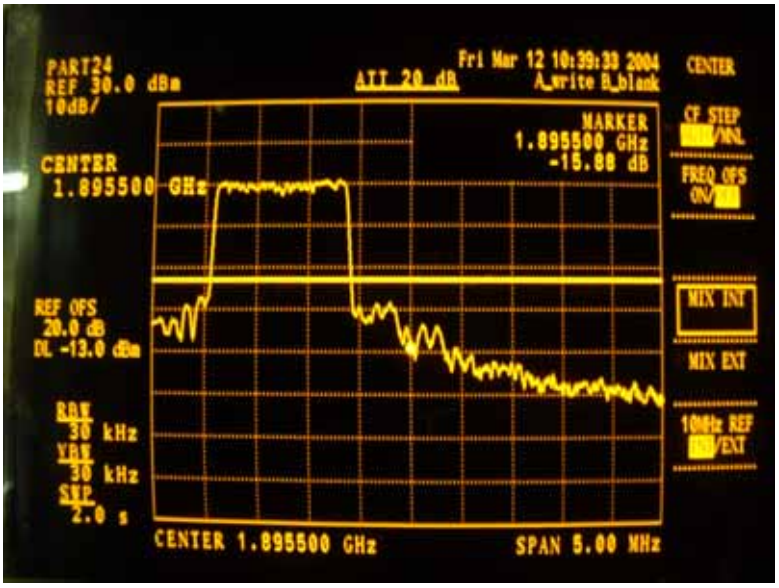
MJO #:	40420-04	**Applied Standard:**	TIA/EIA 603
Manufacturer Name:	Flarion Technologies, Inc.	**Date of Test:**	3/12/04
Product Name:	Wireless Broadband Modem	**Tester:**	Mark Betts
Model Number:	mT-1000	**Test Facility:**	Safety Area
Serial Number:	33943503470023	**Temperature:**	22°C
Performance Criteria:	N/A	**Relative Humidity:**	48%
EUT Mode:	Normal Operation	**EUT Power:**	+5 VDC

Transmitter Band/Block Edge Test Results:
Note: All levels include attenuator and cable losses.

1889.50 MHz-Lower Band Edge



1895.50 MHz-Upper Band Edge



Transmitter Band/Block Edge Equipment List:

Property Number	Manufacturer	Make	Model	S/N	Cal. Date	Cal. Due
WA527	Advantest	Spectrum Analyzer	RS3271A	45050124	12/22/03	12/22/04

5. Test Equipment:

All test equipment used in the compiling of test data can be found in the test laboratory reports.

6. References:

40420-04-fcc24.FTI	Test Report for EUT
FCC Part 24	FCC part 24- Personal Communications Services
TIA/EIA 603	Land Mobile FM Or PM Communications Equipment Measurement and Performance Standards

Attachment 1, Photographs

EUT Test Setups

EUT Test Setups

EUT Test Setups, Continued