Reg. No. DAT-P-061/95-10a

ACCREDITED
EMC/SAFETY

CERTIFICATION TEST REPORT

FOR THE

RADIO RF MODEM, QTM-8524

FCC PART 15 SUBPART C SECTIONS 15.247/15.207/15.209

COMPLIANCE

DATE OF ISSUE: NOVEMBER 8, 2000

PREPARED FOR:

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Akron, Ohio 44311

P.O. No: 14258
W.O. No: 74623

Report No: FC00-108

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Date of test: October 18-20, 2000

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CKC Laboratories, Inc. has Letters of Acceptance through an MRA for the following agencies:
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ADMINISTRATIVE INFORMATION

DATE OF TEST: October 18-20, 2000

PURPOSE OF TEST: To demonstrate the compliance of the Radio RF Modem, QTM-8524, with the requirements for FCC Part 15.247, 15.207 and 15.209 devices.

MANUFACTURER: Quatech Inc.
662 Wolf Ledges Parkway
Akron, Ohio 44311

REPRESENTATIVE: Diane Glaze, Quality Manager

TEST LOCATION: CKC Laboratories, Inc.
22105 Wilson River Hwy
Tillamook, OR 97141

TEST PERSONNEL: Mike Wilkinson

TEST METHOD: ANSI C63.4 1992 & FCC 97-114 Appendix C

FREQUENCY RANGE TESTED: 450 kHz – 25 GHz

EQUIPMENT UNDER TEST:

Radio RF Modem
Manuf: Quatech Inc.
Model: QTM-8524
Serial: IT240EXT99KI0139
FCC ID: F4AQTM85242000 (pending)

Monopole Antenna
Manuf: Quatech Inc.
Model: QTM-24ANT-C
Serial: NONE
FCC ID: N/A

Patch Array Antenna
Manuf: Quatech Inc.
Model: QTM-24ANT-SW
Serial: NONE
FCC ID: N/A

SUMMARY OF RESULTS

The Quatech Inc. Radio RF Modem, QTM-8524, was tested in accordance with ANSI C63.4 1992 and FCC 97-114 Appendix C for compliance with FCC Part 15.247, 15.207 and 15.209.

As received, the above equipment was found to be fully compliant with the limits of FCC Part 15.247, 15.207 and 15.209. The results in this report apply only to the items tested, as identified herein.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

2.4GHz, DSSS data modem with RS-232 and RS-422/485 I/O interfaces. No cabling provided for RS-422/485 interfacing.

Spread Spectrum Method:	Direct Sequence
Tx/Rx Frequency Range:	2426 to 2458 MHz
Number Of Channels:	8 Channels Jumper Select
Channel Separation:	2.048 MHz
Max RF Output Power:	28.5 dBm ± 2 dB (.707 watts)
Type of Antenna:	1) Patch 2) Monopole
Modulation Type:	Gaussian Minimum Shift Keying (GMSK)

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ±4dB measurement uncertainty.

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Laptop Computer
Manuf: Toshiba
Model: 220CDS
Serial: 67041753
FCC ID: DOC

Power Supply
Manuf: Danube
Model: KWMO2O-1824F
Serial: N/A
FCC ID: N/A

Printer
Manuf: HP
Model: 895CXI
Serial: MY97G1924Z
FCC ID: DOC

Remote Laptop Computer
Manuf: IBM
Model: ThinkPad
Serial: W9G-V7795
FCC ID: JRUANB-5

Support Radio RF Modem
Manuf: Quatech Inc.
Model: QTM-8524
Serial: IT240EXT99K-0132
FCC ID: DOC

Power Supply
Manuf: Danube
Model: KWMO2O-1824F
Serial: N/A
FCC ID: N/A

Patch Array Antenna
Manuf: Quatech Inc.
Model: QTM-24ANT-SW
Serial: NONE
FCC ID: N/A

REPORT OF MEASUREMENTS

The following tables report the highest worst case levels recorded during the tests performed on the Radio RF Modem, QTM-8524. All readings taken are peak readings unless otherwise noted by a "Q" or "A". The data sheets from which these tables were compiled are contained in Appendix B.

Table 1: Peak Output Power Emission Levels

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV	SPEC LIMIT dBµV	MARGIN dB	NOTES
2426.350	125.6	9.6				135.2	137.0	-1.8	N-1
2439.850	126.0	9.3				135.3	137.0	-1.7	N-2
2457.800	126.3	9.2				135.5	137.0	-1.5	N-3

Test Method: ANSI C63.4 1992
Spec Limit: FCC Part 15 Subpart C Section 15.247(b1)
Test Distance: No Distance

NOTES: N = None
1 = Center Frequency (low)
2 = Center Frequency (mid)
3 = Center Frequency (highest)

COMMENTS: EUT antenna port is connected directly to the spectrum analyzer input. EUT is connected to the laptop via a 3 conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full- Duplex Synchronous. The measured 6 dB bandwidth for each frequency setting is as follows: Frequency setting 2426.112 MHz = 9.05 dB. A correction factor has been added to the reading to reflect: 9.05 MHz EUT BW / 3 MHz S/A BW = 3.02 then 20 Log 3.02 = 9.6 dB correction factor, Frequency setting 2458.368 MHz = 8.65 dB. A correction factor has been added to the reading to reflect: 8.65 MHz EUT BW / 3 MHz S/A BW = 2.88 then 20 Log 2.88 = 9.2 dB correction factor & Frequency setting 2439.936 MHz = 8.8 dB. A correction factor has been added to the reading to reflect: 8.8 MHz EUT BW / 3 MHz S/A BW = 2.93 then 20 Log 2.93 = 9.3 dB correction factor The temperature was 69°F and the humidity was 50% 135.5 dB/uV corrected reading at 2457 MHz = 0.7079 Watt 135.3 dB/uV corrected reading at 2439 MHz = 0.676 Watt 135.2 dB/uV corrected reading at 2426 MHz = 0.660 Watt.

Table 2: Spurious Emissions – RF Antenna Conducted

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV	SPEC LIMIT dBµV	MARGIN dB	NOTES
2425.950	123.0	0.0				123.0	137.0	-14.0	N-1
2440.100	123.4	0.0				123.4	137.0	-13.6	N-2
2458.200	123.2	0.0				123.2	137.0	-13.8	N-3
4879.310	59.3	0.2				59.5	103.4	-43.9	N-2
4916.090	62.7	0.1				62.8	103.2	-40.4	N-3
7277.420	59.4	0.7				60.1	103.0	-42.9	N-1

Test Method: ANSI C63.4 1992
Spec Limit: FCC Part 15 Subpart C Section 15.247(c)
Test Distance: No Distance

NOTES: N = None
1 = Low Fundamental
2 = Middle Fundamental
3 = High Fundamental

COMMENTS: EUT antenna port is connected directly to the spectrum analyzer input. EUT is connected to the laptop via a 3 conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full- Duplex Synchronous.

Table 3: Spurious Emissions – Radiated (Patch)

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN dB	NOTES
33.209	46.3	17.6	-27.6	1.2		37.5	40.0	-2.5	VQ-3
771.845	42.3	21.3	-28.0	6.6		42.2	46.0	-3.8	HQ-1
776.459	41.6	21.4	-28.0	6.7		41.7	46.0	-4.3	VQ-2
782.596	40.7	21.5	-28.0	6.7		40.9	46.0	-5.1	VQ-3
808.723	43.4	21.7	-28.0	6.8		43.9	46.0	-2.1	HQ-1
819.470	42.7	21.8	-28.0	6.8		43.3	46.0	-2.7	VQ-3

Test Method: ANSI C63.4 1992
Spec Limit: FCC Part 15 Subpart C Section 15.247(c) & 15.209
Test Distance: 3 Meters

NOTES: H = Horizontal Polarization
V = Vertical Polarization
Q = Quasi Peak Reading
1 = Low Frequency
2 = Middle Frequency
3 = High Frequency

COMMENTS: Patch array antenna is connected to the antenna port of the EUT modem. Printer is connected to the LPT-1 port of the Toshiba laptop and is printing continuously, batch jobs of H's from EMI4Z program. EUT is connected to the laptop via a 3-conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full-Duplex Synchronous. The receiver function of the EUT is exercised as follows: The remote computer running hyper terminal is connected to a support RF modem and patch array antenna which is transmitting data to the EUT. The frequency select jumpers on the support modem are set to the same as the EUT. The temperature was 73°F and the humidity was 45%. Frequency range investigated was 10 MHz to 25 GHz. Lowest clock is 16.384 MHz, Highest frequency generated is 2.458 GHz. Steward p/n 28A2025-0A0 clip on ferrite added to the EUT end of the serial cable.

Table 4: Spurious Emissions – Radiated (Monopole)

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN dB	NOTES
33.175	43.6	17.6	-27.6	1.2		34.8	40.0	-5.2	VQ-2
132.714	52.1	11.9	-27.3	2.6		39.3	43.5	-4.2	VQ-2
221.191	51.8	11.2	-26.8	3.4		39.6	46.0	-6.4	VQ-2
771.845	44.5	21.3	-28.0	6.6		44.4	46.0	-1.6	HQ-1
776.455	43.5	21.4	-28.0	6.7		43.6	46.0	-2.4	HQ-2
808.663	39.2	21.7	-28.0	6.8		39.7	46.0	-6.3	H-1

Test Method: ANSI C63.4 1992
Spec Limit: FCC Part 15 Subpart C Section 15.247(c) & 15.209
Test Distance: 3 Meters

NOTES:
H = Horizontal Polarization
V = Vertical Polarization
Q = Quasi Peak Reading
1 = Low Frequency
2 = Middle Frequency
3 = High Frequency

COMMENTS: Monopole antenna is connected to the antenna port of the EUT modem. Printer is connected to the LPT-1 port of the Toshiba laptop and is printing continuously, batch jobs of H's from EMI4Z program. EUT is connected to the laptop via a 3-conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full-Duplex Synchronous. The receiver function of the EUT is exercised as follows: The remote computer running hyper terminal is connected to a support RF modem and patch array antenna which is transmitting data to the EUT. The frequency select jumpers on the support modem are set to the same as the EUT. The temperature was 73°F and the humidity was 45%. Frequency range investigated was 10 MHz to 25 GHz. Lowest clock is 16.384 MHz, Highest frequency generated is 2.458 GHz. Steward p/n 28A2025-0A0 clip on ferrite added to the EUT end of the serial cable.

Table 5: Peak Power Spectral Density

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV	SPEC LIMIT dBµV	MARGIN dB	NOTES
2426.018	114.1	0.0				114.1	115.0	-0.9	N-1
2440.003	113.5	0.0				113.5	115.0	-1.5	N-2
2458.356	113.9	0.0				113.9	115.0	-1.1	N-3

Test Method: ANSI C63.4 1992
Spec Limit: FCC Part 15 Subpart C Section 15.247(d)
Test Distance: No Distance

NOTES: N = None
1 = Low
2 = Middle
3 = High

COMMENTS: EUT antenna port is connected directly to the spectrum analyzer input. EUT is connected to the laptop via a 3 conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full- Duplex Synchronous. The S/A settings were RBW= 3 kHz, VBW= 10 kHz, Span = 300 kHz and Sweep = 100 Sec. Per FCC 97-114 Appendix C.

Table 6: Six Highest Conducted Emission Levels

FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Lisn dB	dB	Cable dB	dB	CORRECTED READING dBµV	SPEC LIMIT dBµV	MARGIN dB	NOTES
0.558763	42.8	0.1		0.0		42.9	48.0	-5.1	B
6.461387	41.2	0.3		0.6		42.1	48.0	-5.9	B
6.570696	41.6	0.3		0.7		42.6	48.0	-5.4	B
6.693669	41.8	0.3		0.7		42.8	48.0	-5.2	B
6.802979	41.7	0.4		0.7		42.8	48.0	-5.2	B
29.551050	39.9	0.7		1.5		42.1	48.0	-5.9	B

Test Method: ANSI C63.4 1992
Spec Limit: FCC Part 15 Subpart C Section 15.207

NOTES: Q = Quasi Peak Reading
A = Average Reading
B = Black Lead
W = White Lead

COMMENTS: Patch array antenna is connected to the antenna port of the EUT modem. Printer is connected to the LPT-1 port of the Toshiba laptop and is printing continuously, batch jobs of H's from EMI4Z program. EUT is connected to the laptop via a 3-conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full-Duplex Synchronous. The receiver function of the EUT is exercised as follows: The remote computer running hyper terminal is connected to a support RF modem and patch array antenna which is transmitting data to the EUT. The frequency select jumpers on the support modem are set to the same as the EUT. The temperature was 73°F and the humidity was 45%. Frequency range investigated was 10 MHz to 25 GHz. Lowest clock is 16.384 MHz, Highest frequency generated is 2.458 GHz. Steward p/n 28A2025-0A0 clip on ferrite added to the EUT end of the serial cable. AC input to the EUT was 120 V, 60 Hz.

TABLE A

LIST OF TEST EQUIPMENT

Tillamook A
Tillamook site A VCCI Registration Numbers R-577 & C-312
Industry Canada File No. IC 3082-A

Occupied Bandwidth - FCC 15.247(a)(2)

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8593EM EMC Analyzer	3624A00159	09/21/2000	09/21/2001	2111

Peak Output Power - FCC 15.247(b)(1)

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8593EM EMC Analyzer	3624A00159	09/21/2000	09/21/2001	2111

Spurious Emissions –Conducted - 15.247(c)

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8593EM EMC Analyzer	3624A00159	09/21/2000	09/21/2001	2111
HP 84300-80038 3.5 GHz High Pass Filter	3643A00027	03/02/2000	03/02/2001	2117

Spurious Emissions – Radiated – 15.247(c) & 15.209

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8593EM EMC Analyzer	3624A00159	09/21/2000	09/21/2001	2111
HP 8447D Amplifier	2727A05392	02/14/2000	02/14/2001	10
Chase CBL6111C Bilog Antenna	2455	06/17/2000	06/17/2001	1992
HP 84125-80008 18-26 GHz Horn Antenna	3643A00027	02/02/2000	02/02/2001	2112
HP 84300-80038 3.5 GHz High Pass Filter	3643A00027	03/02/2000	03/02/2001	2117
HP 83051A Amplifier	3331A00238	02/21/2000	02/21/2001	0
EMCO 6502 Mag Loop Antenna	2156	01/26/2000	01/26/2001	52
EMCO 3115 1-18 GHz Horn Antenna	9006-4854	02/17/2000	02/17/2001	1412

Peak Power Spectral Density – 15.247(d)

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8593EM EMC Analyzer	3624A00159	09/21/2000	09/21/2001	2111

Conducted Emissions – AC Power – 15.207

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8574A EMI Receiver	3010A01076	07/25/2000	07/25/2001	0
Fischer LISN	none	12/28/1999	12/28/2000	11
Fischer LISN	none	12/28/1999	12/28/2000	12
Fischer LISN	none	12/28/1999	12/28/2000	13
Fischer LISN	none	12/28/1999	12/28/2000	14

EUT SETUP

The equipment under test (EUT) and the peripheral(s) listed were set up in a manner that represented their normal use. Any special conditions required for the EUT to operate normally are identified in the comments that accompany Tables 1-5 for radiated emissions and Table 6 for conducted emissions. Additionally, a complete description of all the ports and I/O cables is included on the information sheets contained in Appendix A.

Radiated Emissions

During radiated emissions testing, the EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters. This configuration is typical for radiated emissions testing of table top devices.

I/O cables were connected to the EUT and peripherals in the manner required for normal operation of the system. Excess cabling was bundled in the center in a serpentine fashion using 30-40 centimeter lengths.

Conducted Emissions

During conducted emissions testing, the EUT was located on a wooden table measuring approximately 80 cm high, 1 meter deep, and 1.5 meters in length. One wall of the room where the EUT is located has a minimum 2 meter by 2 meter conductive plane. The EUT was mounted on the wooden table 40 cm away from the conductive plane, and 80 cm from any other conductive surface.

The vertical metal plane used for conducted emissions was grounded to the earth. Power to the EUT was provided through a LISN. The LISN was grounded to the ground plane. All other objects were kept a minimum of 80 cm away from the EUT during the conducted test. Conducted emissions tests required the use of the LISNs listed in Table A.

EUT TESTING

Radiated Emissions

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode with the I/O cables and line cords facing the antenna. The frequency range of 10 MHz - 30 MHz was scanned using the mag loop antenna. The frequency range of 30 MHz - 1000 MHz was then scanned with the biconilog antenna located about 1.5 meter above the ground plane in the vertical polarity. During this scan, the turntable was rotated and all peaks, which were at or near the limit, were recorded. Lastly, a scan of the FM band from 88 - 110 MHz was made, using a reduced resolution bandwidth and a reduced frequency span. The biconilog antenna was changed to the horizontal polarity and the above steps were repeated. The horn antenna was used to scan for frequencies above 1000 MHz. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

For the final radiated scan, the equipment was again positioned with its I/O and power cables facing the antenna. A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable as needed. Comparison with the previously recorded measurements was then made.

Using the peak readings from both scans as a guide, the test engineer then maximized the readings with respect to the table rotation, and configuration of the cables. Maximizing of the cables locations was achieved by monitoring the spectrum analyzer on a closed circuit television monitor while the EUT components and cables were being moved and rearranged on the EUT table for maximum emissions. Photographs showing the final worst case configuration of the EUT are contained in Appendix A.

Conducted Emissions

For conducted emissions testing, a 30 to 50 second sweep time was used for automated measurements in the frequency bands of 450 kHz to 1.705 MHz, 1.705 MHz to 3 MHz, and 3 MHz to 30 MHz. All readings within 20 dB of the limit were recorded. At frequencies where the recorded emissions were close to the limit, further investigation was performed manually at a slower sweep rate.

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Table A were used to collect both the radiated and conducted emissions data for the Radio RF Modem, QTM-8524. Frequencies below 30 MHz were scanned using the mag loop antenna. For radiated measurements between 30 to 1000 MHz, the biconilog antenna was used. Frequencies above 1000 MHz were scanned using a horn antenna. All antennas were located at a distance of 3 meters from the edge of the EUT. Conducted emissions tests required the use of the FCC type LISNs.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. For conducted emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. A 10 dB external attenuator was also used during conducted tests, with internal offset correction in the analyzer. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dBµV, and a vertical scale of 10 dB per division.

TABLE B: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE

TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	450 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	150kHz	3 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	25 GHz	1 MHz

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in Tables 1 through 5 indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data for the Radio RF Modem, QTM-8524.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

Average

Average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

TEST METHODS

The radiated and conducted emissions data of the Radio RF Modem, QTM-8524, was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the "Sample Calculations". The corrected data was then compared to the FCC Part 15.247, 15.207 and 15.209 emissions limits to determine compliance.

Preliminary and final measurements were taken in order to better ensure that all emissions from the EUT were found and maximized.

TRANSMITTER CHARACTERISTICS

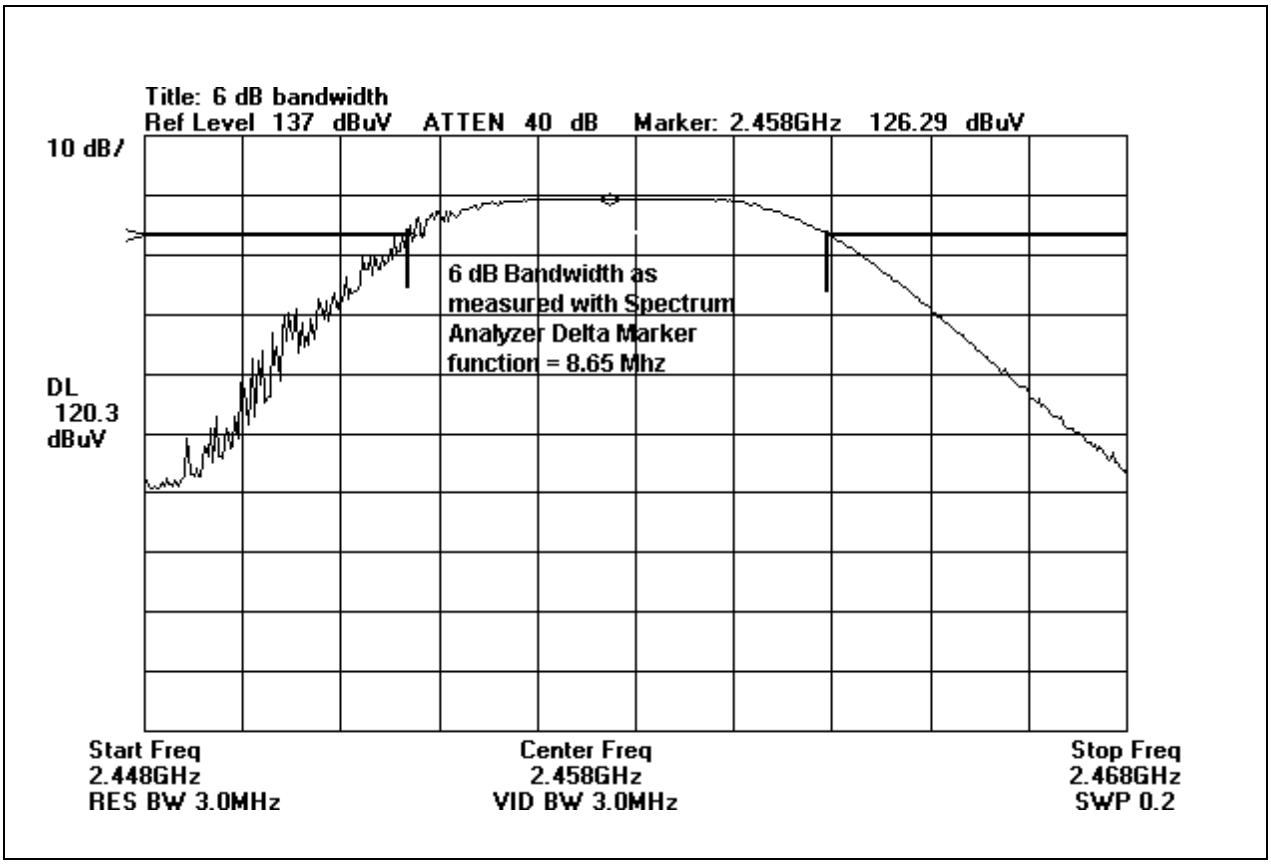
15.247(a)(2) Occupied Bandwidth Measurements (Direct Sequence)

The fundamental frequency was kept within the permitted band 2400-2483.5 MHz. The minimum 6dB bandwidth shall be at least 500 kHz. Refer to the following occupied bandwidth plots.

List of Test Equipment Used for Occupied Bandwidth Test:

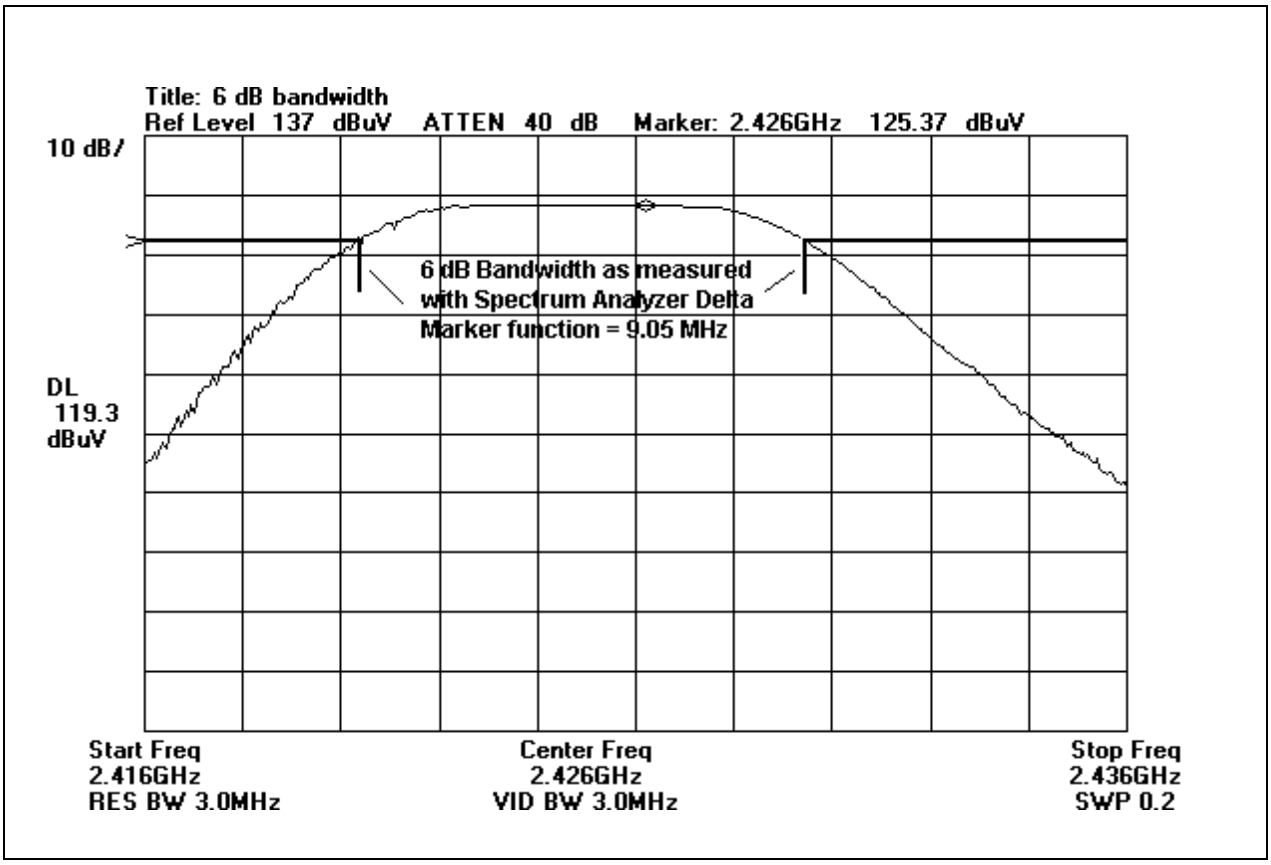
Function	Manufacturer	Model	Cal Date	Cal Due Date
EMC Analyzer	HP	8593EM	09/21/2000	09/21/2001

FCC Part 15.247(a)(2) Occupied Bandwidth Plot – Direct Sequence



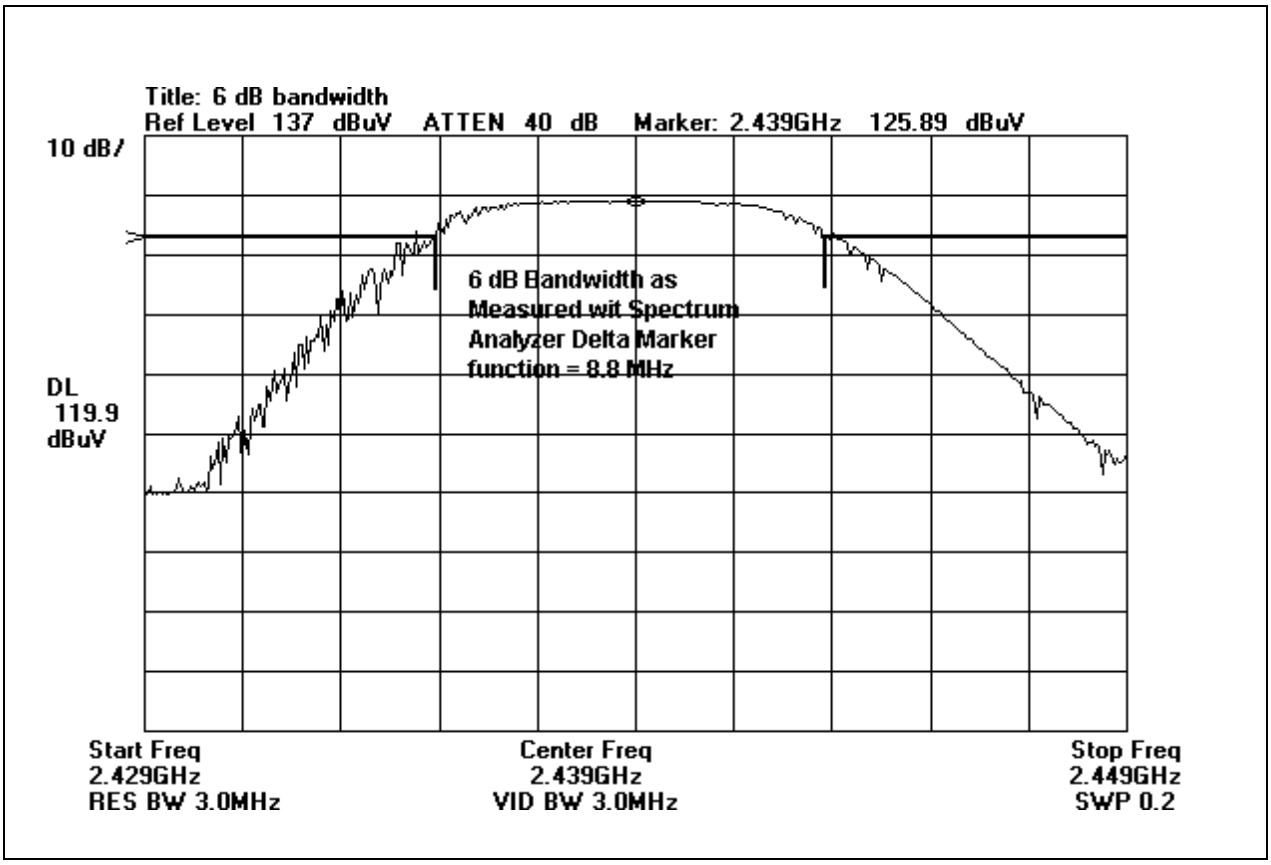
Highest Frequency - 2.458GHz

FCC Part 15.247(a)(2) Occupied Bandwidth Plot – Direct Sequence



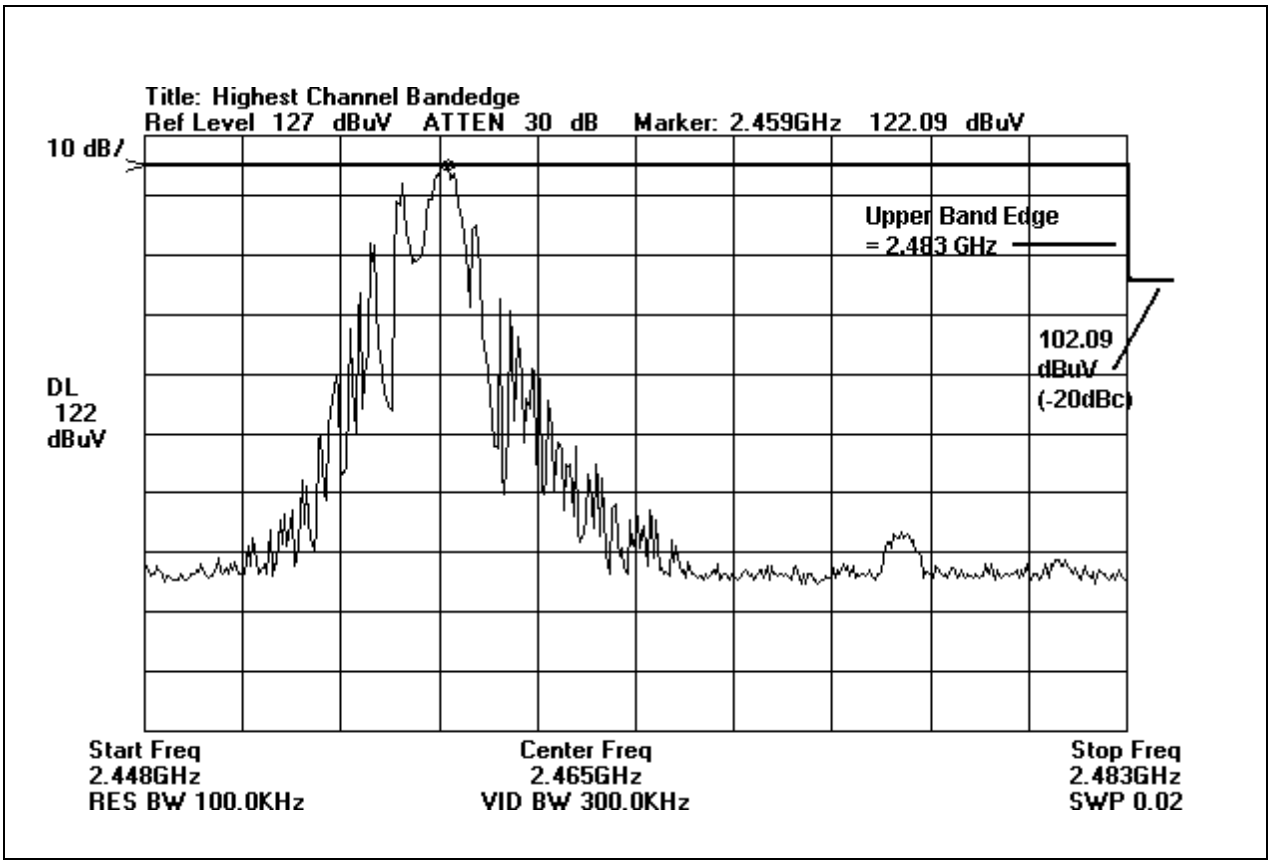
Lowest Frequency - 2.426GHz

FCC Part 15.247(a)(2) Occupied Bandwidth Plot – Direct Sequence



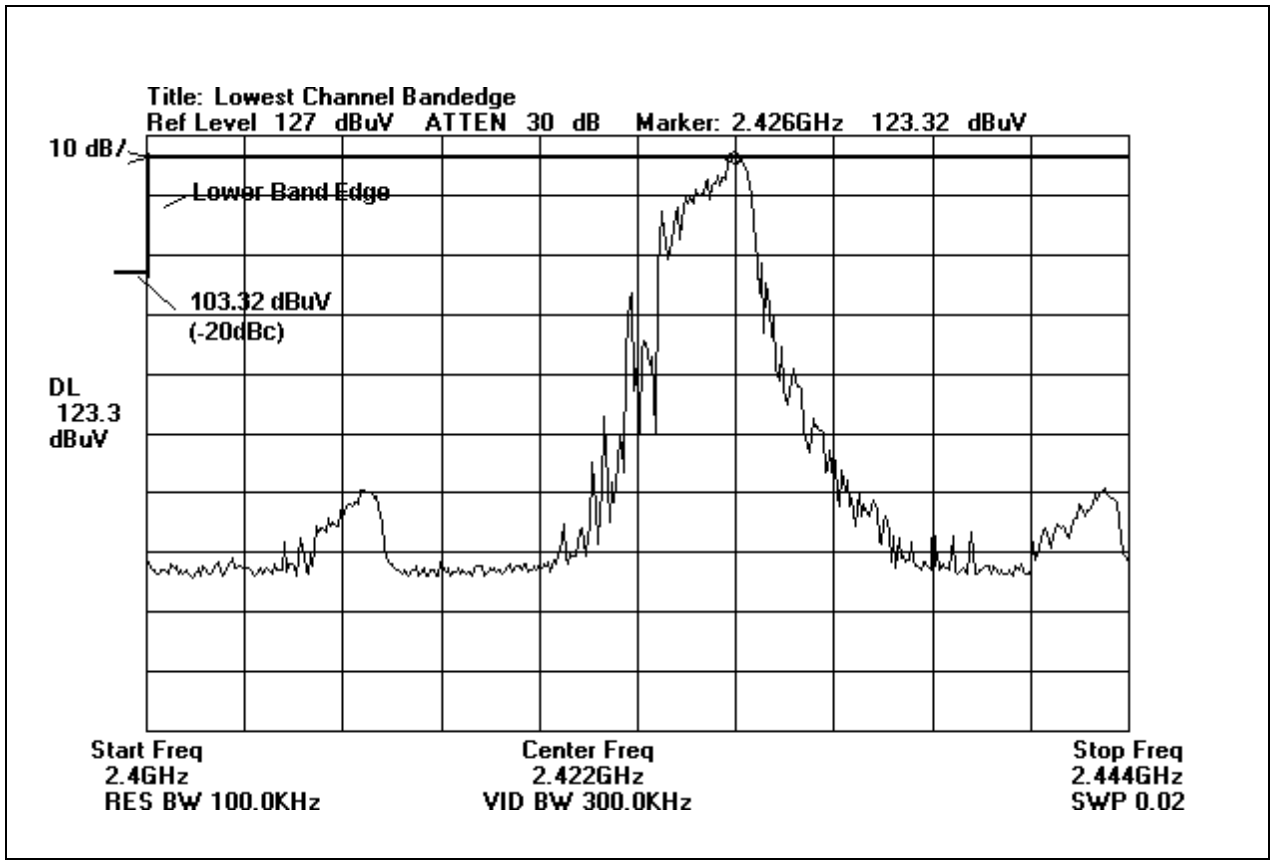
Mid Frequency - 2.439GHz

FCC Part 15.247(a)(2) Highest Channel Band Edge Plot



Highest Channel Band Edge Plot

FCC Part 15.247(a)(2) Lowest Channel Band Edge Plot



Lowest Channel Band Edge Plot

15.247(b) Power Output

Frequency of Transmitter: 2400-2483.5 MHz

The RF conducted test was measured using a direct connection between the antenna port of the transmitter and the spectrum analyzer, through suitable attenuation. The resolution bandwidth was adjusted to greater than the 6 dB bandwidth of the emissions.

Frequency	Measurement in dB	Measurement in mW
2457.800	126.3	707.9
2439.850	126.0	676
2426.350	125.6	660

• 15.247(b)(1) The maximum peak output power of frequency hopping systems operating in the 2400-2483.5 band, and for all direct sequences, shall not exceed 1 watt.

NOTE: As the EUT bandwidth is larger than the S/A bandwidth of 3 MHz, the following correction factors were used for the Peak Power measurements: Low frequency setting = 9.05 EUT BW/3 S/A BW = 3.02 20Log 3.02 = 9.6 dB correction factor to be added to raw S/A reading. The high freq = 9.2 dB correction and the Mid freq. = 9.3 dB correction.

List of Test Equipment Used for Power Output Test

Function	Manufacturer	Model	Cal Date	Cal Due Date
EMC Analyzer	HP	8593EM	09/21/2000	09/21/2001

15.247(d) Peak Power Spectral Density

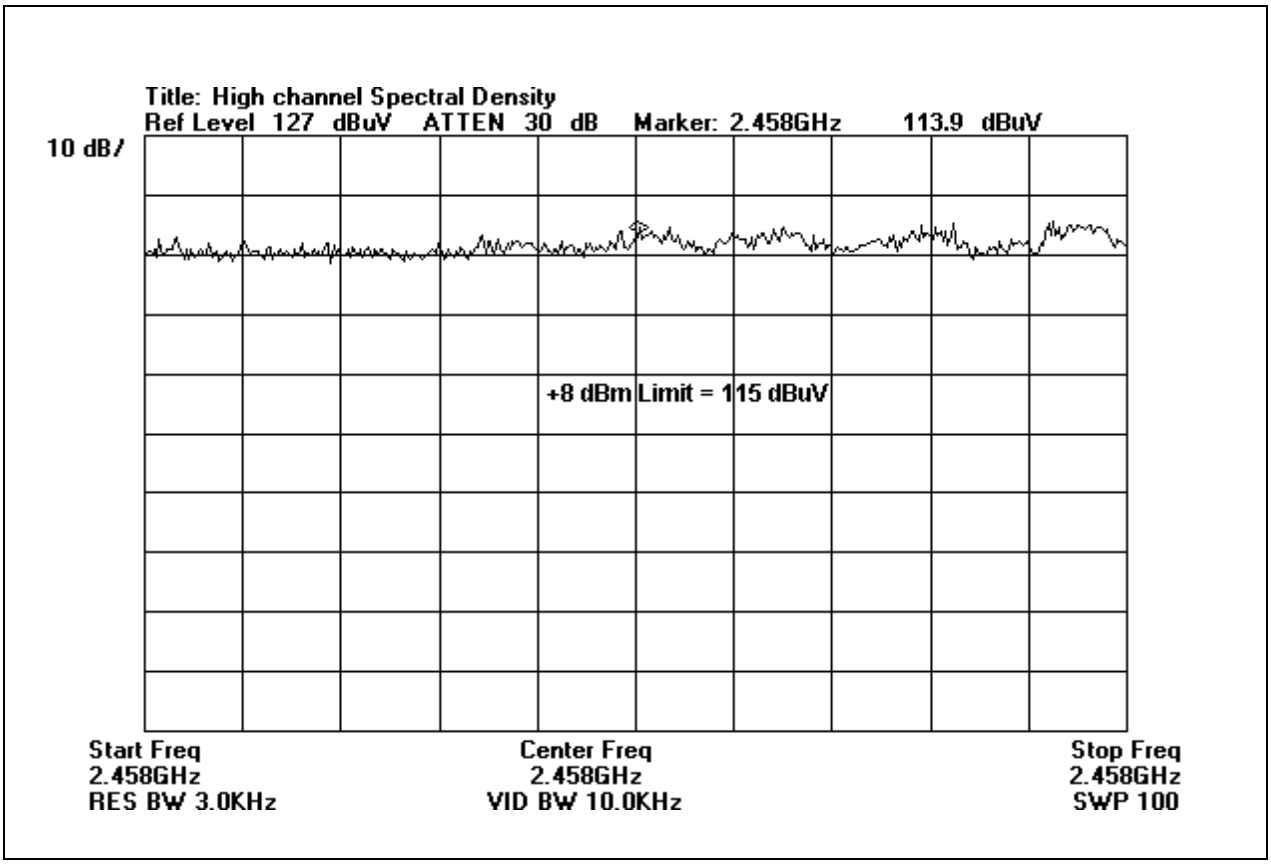
The peak power spectral density conducted from the EUT to the antenna was not greater than 8 dm in any 3 kHz band during any time interval of continuous transmission. Refer to the following spectral density plots.

Frequency	Measurement in dB	Measurement in mW
2426.018	3	7.1
2458.356	3	6.9
2440.003	3	6.5

List of Test Equipment Used for Peak Power Spectral Density Test

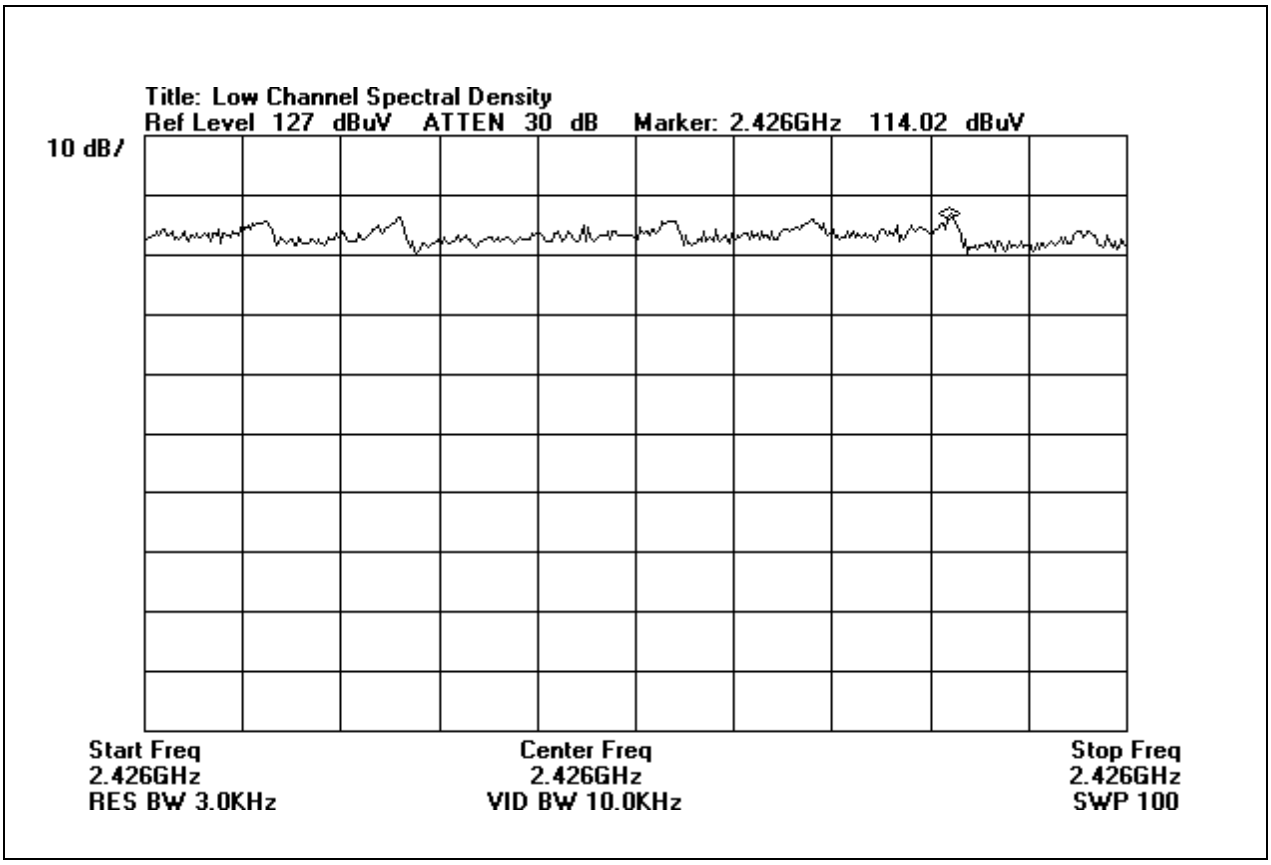
Function	**Manufacturer**	**Model**	**Cal Date**	**Cal Due Date**
EMC Analyzer	HP	8593EM	09/21/2000	09/21/2001

FCC Part 15.247(d) Peak Power Spectral Density Plot



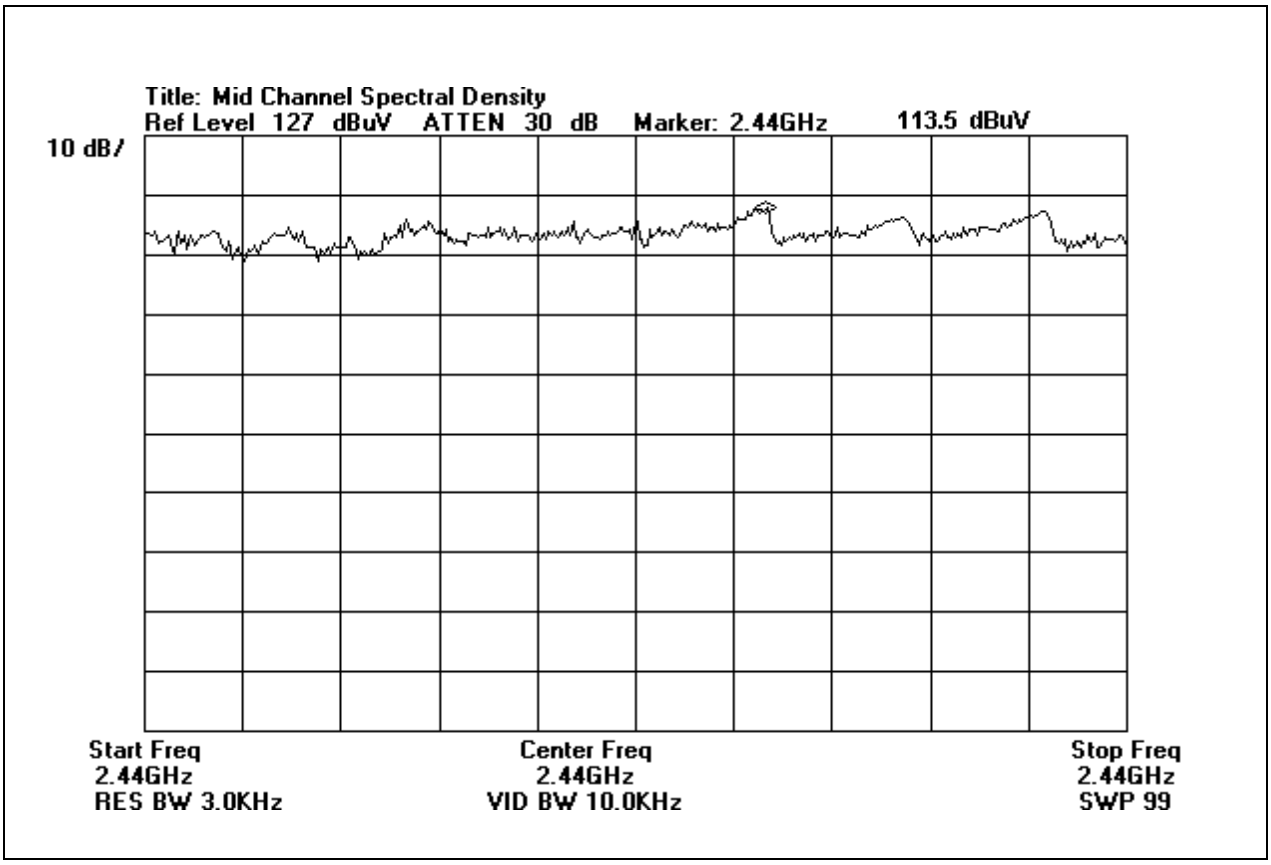
Highest Frequency - 2.458GHz

FCC Part 15.247(d) Peak Power Spectral Density Plot



Lowest Frequency - 2.426GHz

FCC Part 15.247(d) Peak Power Spectral Density Plot



Mid Frequency - 2.44GHz

SAMPLE CALCULATIONS

The basic spectrum analyzer reading was converted using correction factors as shown in the six highest emissions readings in Tables 1 through 6. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula:

Meter reading (dBµV)
+ Antenna Factor (dB)
+ Cable Loss (dB)
- Distance Correction (dB)
- Pre-amplifier Gain (dB)

= Corrected Reading(dBµV/m)

This reading was then compared to the applicable specification limit to determine compliance.

A typical data sheet will display the following in column format:

#	Freq MHz	Rdng dBuV	Cable	Amp	Mag	Horn	AmpA	3.5G	Dist	Corr dBuV/m	Spec	Margin	Polar
			9.6d	9.2d	9.3d	Bilog	HP 83						

#	Reading number, order of frequencies listed by margin.
Freq MHz	Frequency in MHz of the obtained reading.
Rdng dBuV	Reading obtained on the spectrum analyzer in dBµV.
9.6d/9.2d/9.3d	Bandwidth Correction factor in dB
3.5G	HP 3.5GHz High Pass Filter factor in dB
Amp/AmpA	Preamplifier factor or gain in dB.
Mag	Magnetic loop antenna factor in dB
Horn	Horn antenna factor in dB.
Bilog	Biconilog antenna factor in dB.
HP 83	Microwave Amplifier factor in dB
Cable	Cable loss in dB of the coaxial cable on the OATS.
Dist	Distance factor in dB. It is used when testing at a different test distance than otherwise stated in the spec.
Corr dBµV/m	Corrected reading which is now in dBµV/m (field strength).
Spec	Specification limit (dB) stated in the appropriate standard.
Margin	Closeness to the specified limit in dB; + is over and - is under the limit.
Polar	Polarity of the antenna with respect to earth.

APPENDIX A

INFORMATION ABOUT THE EQUIPMENT UNDER TEST

INFORMATION ABOUT THE EQUIPMENT UNDER TEST	
Test Software/Firmware:	N/A
CRT was displaying:	N/A
Power Supply Manufacturer:	Danube
Power Supply Part Number:	KWM020-1824F
AC Line Filter Manufacturer:	N/A
AC Line Filter Part Number:	N/A
Line voltage used during testing:	120VAC, 60Hz

I/O PORTS	
Type	#
RS-232	1
RS-422/485	1

CRYSTAL OSCILLATORS	
Type	Freq In MHz
XTAL	44.2368
XTAL	6.384

PRINTED CIRCUIT BOARDS				
Function	Model & Rev	Clocks, MHz	Layers	Location
Baseband interface	SST-2400 Rev. A2	44.2368, 6.384	2	N/A
RF module	IRF4085DS Rev. A2	None	4	N/A

REQUIRED EUT CHANGES TO COMPLY:
During Radiated Spurious Emissions and Power Line Conducted Emissions Testing: Steward p/n 28A2025-0A0 clip on ferrite added to the EUT end of the serial cable.

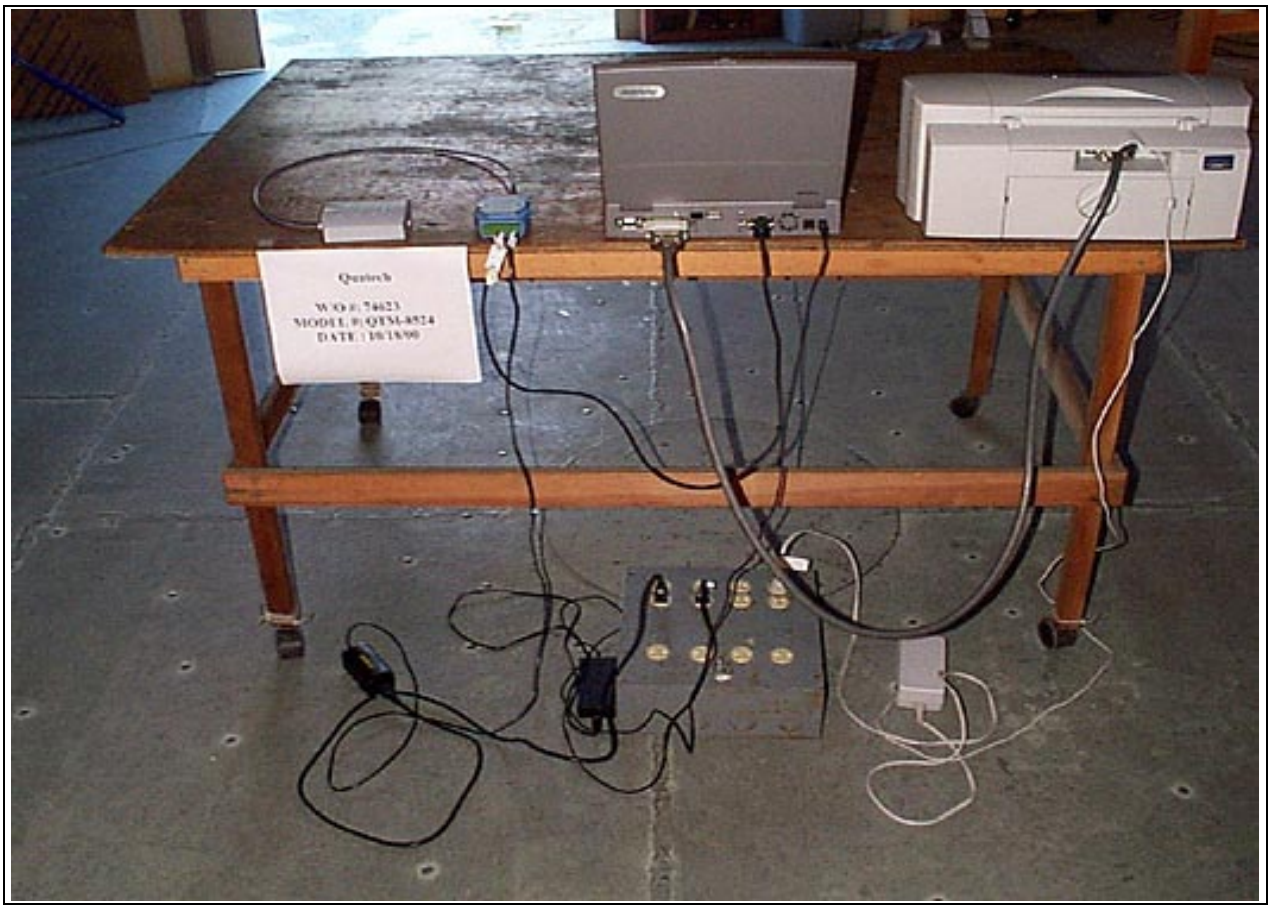
CABLE INFORMATION

Cable #:	N/A	Cable(s) of this type:	1
Cable Type:	RS-232	Shield Type:	N/A
Construction:	Three conductor	Length In Meters:	1.09m
Connected To End (1):	RS-232 I/O	Connected To End (2):	RS-232 connector
Connector At End (1):	Terminal Spades	Connector At End (2):	D-type; 9 pin female
Shield Grounded At (1):	EUT GND	Shield Grounded At (2):	Chassis
Part Number:	N/A	Number of Conductors:	3
Notes and/or description:	Connects EUT Rx, Tx and GND to the host controller RS-232 connector. Ferrite located 1" from EUT termination.		

Cable #:	N/A	Cable(s) of this type:	1
Cable Type:	Power Supply	Shield Type:	None
Construction:	20 AWG	Length In Meters:	1.83m
Connected To End (1):	Power supply	Connected To End (2):	EUT DC inputs
Connector At End (1):	N/A	Connector At End (2):	Terminal Spade
Shield Grounded At (1):	N/A	Shield Grounded At (2):	N/A
Part Number:	N/A	Number of Conductors:	2
Notes and/or description:	Cable supplies +24VDC (DC+ and DC GND) to the EUT DC inputs from the power supply. DC GND terminates at Chassis GND in power supply. AC power cord not supplied.		

Cable #:	N/A	Cable(s) of this type:	1
Cable Type:	Antenna	Shield Type:	Double Braid
Construction:	Cushcraft Ultralink	Length In Meters:	≈1.0m
Connected To End (1):	Antenna	Connected To End (2):	RF output
Connector At End (1):	N/A	Connector At End (2):	RP SMA-M
Shield Grounded At (1):	Antenna	Shield Grounded At (2):	PCB GND
Part Number:	N/A	Number of Conductors:	2 (center and shield)
Notes and/or description:	Coaxial cable connects antenna (monopole or patch) to EUT RF output; antenna side permanently connected.		

PHOTOGRAPH SHOWING RADIATED EMISSIONS

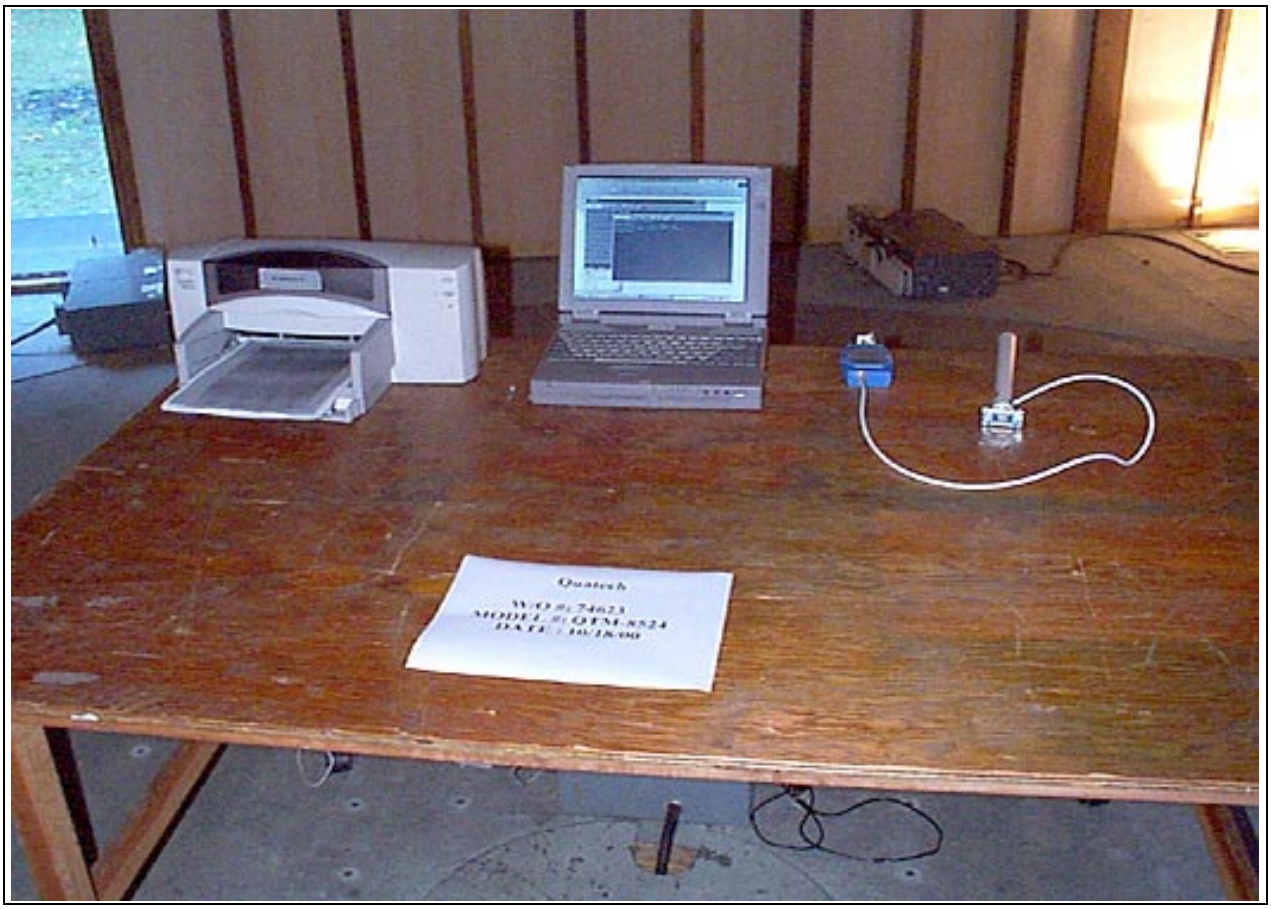


Radiated Emissions - Back View (Patch)

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Back View (Monopole)

PHOTOGRAPH SHOWING RADIATED EMISSIONS

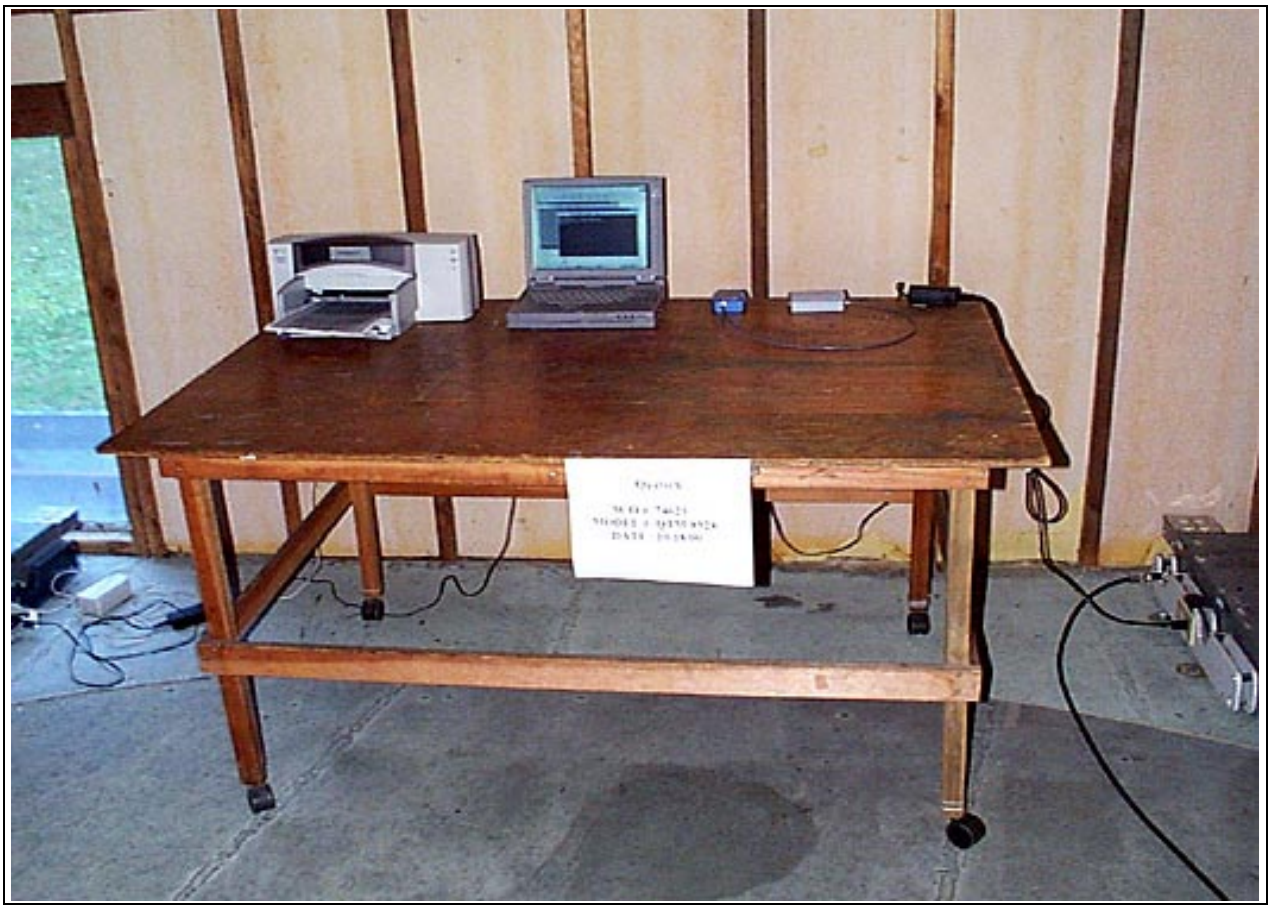


Radiated Emissions - Front View (Monopole)

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Front View (Patch)

PHOTOGRAPH SHOWING CONDUCTED EMISSIONS

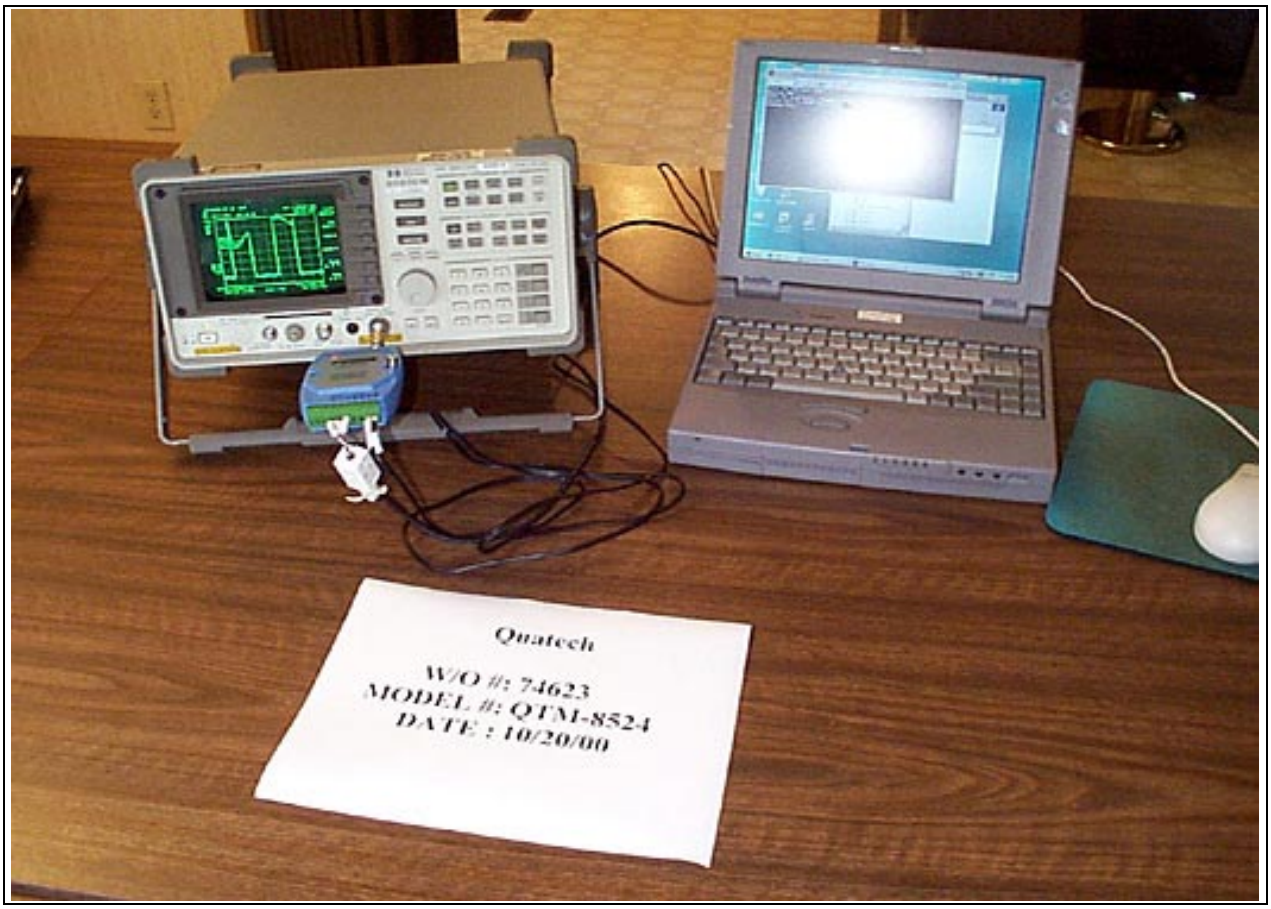


Conducted Emissions - Front View

PHOTOGRAPH SHOWING CONDUCTED EMISSIONS

Conducted Emissions - Side View

PHOTOGRAPH SHOWING POWER OUTPUT



Conducted Emissions - RF Port

APPENDIX B

RADIATED AND CONDUCTED DATA SHEETS

Test Location: CKC Laboratories, Inc. • 22105 Wilson River Hwy • Tillamook, OR 97141 • 800 500-4EMC

Customer: **Quatech Inc.**
Specification: **FCC15.247 (b1)**
Work Order #: **74623** Date: 10/20/2000
Test Type: **Conducted Peak Power** Time: 13:43:53
Equipment: **Radio RF Modem** Sequence#: 1
Manufacturer: Quatech Inc. Tested By: Mike Wilkinson
Model: QTM-8524
S/N: IT240EXT99KI0139

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Radio RF Modem*	Quatech Inc.	QTM-8524	IT240EXT99KI0139

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Toshiba	220CDS	67041753
Power Supply	Danube	KWMO2O-1824F	N/A

Test Conditions / Notes:

EUT antenna port is connected directly to the spectrum analyzer input. EUT is connected to the laptop via a 3 conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full- Duplex Synchronous. The measured 6 dB bandwidth for each frequency setting is as follows: Frequency setting 2426.112 MHz = 9.05 dB. A correction factor has been added to the reading to reflect: 9.05 MHz EUT BW / 3 MHz S/A BW = 3.02 then 20 Log 3.02 = 9.6 dB correction factor, Frequency setting 2458.368 MHz = 8.65 dB. A correction factor has been added to the reading to reflect: 8.65 MHz EUT BW / 3 MHz S/A BW = 2.88 then 20 Log 2.88 = 9.2 dB correction factor & Frequency setting 2439.936 MHz = 8.8 dB. A correction factor has been added to the reading to reflect: 8.8 MHz EUT BW / 3 MHz S/A BW = 2.93 then 20 Log 2.93 = 9.3 dB correction factor The temperature was 69°F and the humidity was 50% 135.5 dB/uV corrected reading at 2457 MHz = 0.7079 Watt 135.3 dB/uV corrected reading at 2439 MHz = 0.676 Watt 135.2 dB/uV corrected reading at 2426 MHz = 0.660 Watt.

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	9.6 d dB	9.2 d dB	9.3 d dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2457.800M	126.3	+0.0	+9.2	+0.0		+0.0	135.5	137.0 2458.368 MHz center frequency (Highest)	-1.5	None
2	2439.850M	126.0	+0.0	+0.0	+9.3		+0.0	135.3	137.0 2439.936 MHz center frequency (Mid)	-1.7	None
3	2426.350M	125.6	+9.6	+0.0	+0.0		+0.0	135.2	137.0 2426.112 MHz center frequency (Lowest)	-1.8	None

Test Location: CKC Laboratories, Inc. • 22105 Wilson River Hwy • Tillamook, OR 97141 • 800 500-4EMC

Customer: **Quatech Inc.**
Specification: **FCC15.247(c)**
Work Order #: **74623** Date: 10/20/2000
Test Type: **Conducted Spurious** Time: 13:47:46
Equipment: **Radio RF Modem** Sequence#: 2
Manufacturer: Quatech Inc. Tested By: Mike Wilkinson
Model: QTM-8524
S/N: IT240EXT99KI0139

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Radio RF Modem*	Quatech Inc.	QTM-8524	IT240EXT99KI0139

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Toshiba	220CDS	67041753
Power Supply	Danube	KWMO2O-1824F	N/A

Test Conditions / Notes:

EUT antenna port is connected directly to the spectrum analyzer input. EUT is connected to the laptop via a 3 conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full- Duplex Synchronous.

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	3.5 G dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2440.100M	123.4	+0.0				+0.0	123.4	137.0 2.439 GHz fundamental (Mid)	-13.6	None
2	2458.200M	123.2	+0.0				+0.0	123.2	137.0 2.458 GHz fundamental (High)	-13.8	None
3	2425.950M	123.0	+0.0				+0.0	123.0	137.0 2.426 GHz fundamental (Low)	-14.0	None
4	4916.090M	62.7	+0.1				+0.0	62.8	103.2 2.458 GHz fundamental (High)	-40.4	None
5	7277.420M	59.4	+0.7				+0.0	60.1	103.0 2.426 GHz fundamental (Low)	-42.9	None
6	4879.310M	59.3	+0.2				+0.0	59.5	103.4 2.439 GHz fundamental (Mid)	-43.9	None

7	4853.610M	55.4	+0.2	+0.0	55.6	103.0 2.426 GHz fundamental (Low)	-47.4	None
8	12129.250 M	49.8	+0.4	+0.0	50.2	103.0 2.426 GHz fundamental (Low)	-52.8	None
9	9703.141M	48.8	+0.6	+0.0	49.4	103.0 2.426 GHz fundamental (Low)	-53.6	None
10	7374.460M	46.7	+0.5	+0.0	47.2	103.2 2.458 GHz fundamental (High)	-56.0	None
11	9833.530M	46.3	+0.6	+0.0	46.9	103.2 2.458 GHz fundamental (High)	-56.3	None
12	12290.520 M	45.2	+0.4	+0.0	45.6	103.2 2.458 GHz fundamental (High)	-57.6	None
13	7320.570M	44.5	+0.6	+0.0	45.1	103.4 2.439 GHz fundamental (Mid)	-58.3	None
14	9760.510M	44.3	+0.6	+0.0	44.9	103.4 2.439 GHz fundamental (Mid)	-58.5	None

Test Location: CKC Laboratories, Inc. • 22105 Wilson River Hwy • Tillamook, OR 97141 • 800 500-4EMC

Customer: **Quatech Inc.**
Specification: **FCC15.247(c) & 15.209**
Work Order #: **74623** Date: 10/18/2000
Test Type: **Radiated Spurious** Time: 16:05:28
Equipment: **Radio RF Modem** Sequence#: 5
Manufacturer: Quatech Inc. Tested By: Mike Wilkinson
Model: QTM-8524
S/N: IT240EXT99KI0139

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Patch Array Antenna	Quatech Inc.	QTM-24ANT-SW	NONE
Radio RF Modem*	Quatech Inc.	QTM-8524	IT240EXT99KI0139

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Toshiba	220CDS	67041753
Power Supply	Danube	KWMO2O-1824F	N/A
Printer	HP	895CXI	MY97G1924Z
Remote Laptop Computer	IBM	ThinkPad	W9G-V7795
Support Radio RF Modem	Quatech Inc.	QTM-8524	IT240EXT99K-0132
Power Supply	Danube	KWMO2O-1824F	N/A
Patch Array Antenna	Quatech Inc.	QTM-24ANT-SW	NONE

Test Conditions / Notes:

Patch array antenna is connected to the antenna port of the EUT modem. Printer is connected to the LPT-1 port of the Toshiba laptop and is printing continuously, batch jobs of H's from EMI4Z program. EUT is connected to the laptop via a 3-conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full-Duplex Synchronous. The receiver function of the EUT is exercised as follows: The remote computer running hyper terminal is connected to a support RF modem and patch array antenna which is transmitting data to the EUT. The frequency select jumpers on the support modem are set to the same as the EUT. The temperature was 73°F and the humidity was 45%. Frequency range investigated was 10 MHz to 25 GHz. Lowest clock is 16.384 MHz, Highest frequency generated is 2.458 GHz. Steward p/n 28A2025-0A0 clip on ferrite added to the EUT end of the serial cable.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	Cable 3.5 G	Cable Cable	Horn Bilog	Amp-A HP 83	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	808.723M	43.4	+0.0	+0.0	+0.0	-28.0	+0.0	43.9	46.0	-2.1	Horiz
	QP		+0.0	+6.8	+21.7	+0.0			2.426 GHz Center Frequency (Lowest)		

2	33.209M QP	46.3	+0.0 +0.0	+0.0 +1.2	+0.0 +17.6	-27.6 +0.0	+0.0	37.5	40.0 2.458 GHz Center Frequency (Highest)	-2.5	Vert
3	819.470M QP	42.7	+0.0 +0.0	+0.0 +6.8	+0.0 +21.8	-28.0 +0.0	+0.0	43.3	46.0 2.458 GHz Center Frequency (Highest)	-2.7	Vert
4	33.178M QP	45.8	+0.0 +0.0	+0.0 +1.2	+0.0 +17.6	-27.6 +0.0	+0.0	37.0	40.0 2.426 GHz Center Frequency (Lowest)	-3.0	Vert
5	819.465M QP	42.1	+0.0 +0.0	+0.0 +6.8	+0.0 +21.8	-28.0 +0.0	+0.0	42.7	46.0 2.458 GHz Center Frequency (Highest)	-3.3	Horiz
6	771.845M QP	42.3	+0.0 +0.0	+0.0 +6.6	+0.0 +21.3	-28.0 +0.0	+0.0	42.2	46.0 2.426 GHz Center Frequency (Lowest)	-3.8	Horiz
7	776.459M QP	41.6	+0.0 +0.0	+0.0 +6.7	+0.0 +21.4	-28.0 +0.0	+0.0	41.7	46.0 2.439 GHz Center Frequency (Mid)	-4.3	Vert
8	782.596M QP	40.7	+0.0 +0.0	+0.0 +6.7	+0.0 +21.5	-28.0 +0.0	+0.0	40.9	46.0 2.458 GHz Center Frequency (Highest)	-5.1	Vert
9	132.716M QP	50.9	+0.0 +0.0	+0.0 +2.6	+0.0 +11.9	-27.3 +0.0	+0.0	38.1	43.5 2.458 GHz Center Frequency (Highest)	-5.4	Horiz
10	33.218M QP	43.3	+0.0 +0.0	+0.0 +1.2	+0.0 +17.6	-27.6 +0.0	+0.0	34.5	40.0 2.439 GHz Center Frequency (Mid)	-5.5	Vert
11	44.238M QP	48.3	+0.0 +0.0	+0.0 +1.5	+0.0 +12.0	-27.6 +0.0	+0.0	34.2	40.0 2.439 GHz Center Frequency (Mid)	-5.8	Vert
^	44.245M	47.3	+0.0 +0.0	+0.0 +1.5	+0.0 +12.0	-27.6 +0.0	+0.0	33.2	40.0 2.458 GHz Center Frequency (Highest)	-6.8	Vert
13	132.713M QP	50.3	+0.0 +0.0	+0.0 +2.6	+0.0 +11.9	-27.3 +0.0	+0.0	37.5	43.5 2.426 GHz Center Frequency (Lowest)	-6.0	Horiz
14	309.656M	48.3	+0.0 +0.0	+0.0 +4.2	+0.0 +14.1	-26.7 +0.0	+0.0	39.9	46.0 2.439 GHz Center Frequency (Mid)	-6.1	Vert

15	221.192M QP	52.0	+0.0 +0.0	+0.0 +3.4	+0.0 +11.2	-26.8 +0.0	+0.0	39.8	46.0 2.426 GHz Center Frequency (Lowest)	-6.2	Vert
^	221.182M	50.2	+0.0 +0.0	+0.0 +3.4	+0.0 +11.2	-26.8 +0.0	+0.0	38.0	46.0 2.458 GHz Center Frequency (Highest)	-8.0	Vert
^	221.196M	48.0	+0.0 +0.0	+0.0 +3.4	+0.0 +11.2	-26.8 +0.0	+0.0	35.8	46.0 2.439 GHz Center Frequency (Mid)	-10.2	Vert
18	44.237M QP	47.9	+0.0 +0.0	+0.0 +1.5	+0.0 +12.0	-27.6 +0.0	+0.0	33.8	40.0 2.426 GHz Center Frequency (Lowest)	-6.2	Vert
19	776.436M	39.5	+0.0 +0.0	+0.0 +6.7	+0.0 +21.4	-28.0 +0.0	+0.0	39.6	46.0 2.439 GHz Center Frequency (Mid)	-6.4	Horiz
20	132.715M QP	49.7	+0.0 +0.0	+0.0 +2.6	+0.0 +11.9	-27.3 +0.0	+0.0	36.9	43.5 2.439 GHz Center Frequency (Mid)	-6.6	Vert
21	132.844M QP	49.6	+0.0 +0.0	+0.0 +2.6	+0.0 +11.9	-27.3 +0.0	+0.0	36.8	43.5 2.439 GHz Center Frequency (Mid)	-6.7	Horiz
22	309.664M	47.5	+0.0 +0.0	+0.0 +4.2	+0.0 +14.1	-26.7 +0.0	+0.0	39.1	46.0 2.458 GHz Center Frequency (Highest)	-6.9	Vert
23	813.326M	38.5	+0.0 +0.0	+0.0 +6.8	+0.0 +21.7	-28.0 +0.0	+0.0	39.0	46.0 2.439 GHz Center Frequency (Mid)	-7.0	Vert
24	132.711M QP	49.1	+0.0 +0.0	+0.0 +2.6	+0.0 +11.9	-27.3 +0.0	+0.0	36.3	43.5 2.426 GHz Center Frequency (Lowest)	-7.2	Vert
25	132.713M QP	49.1	+0.0 +0.0	+0.0 +2.6	+0.0 +11.9	-27.3 +0.0	+0.0	36.3	43.5 2.458 GHz Center Frequency (Highest)	-7.2	Vert
26	530.509M	42.1	+0.0 +0.0	+0.0 +5.4	+0.0 +18.5	-28.1 +0.0	+0.0	37.9	46.0 2.458 GHz Center Frequency (Highest)	-8.1	Vert
27	309.663M	45.8	+0.0 +0.0	+0.0 +4.2	+0.0 +14.1	-26.7 +0.0	+0.0	37.4	46.0 2.426 GHz Center Frequency (Lowest)	-8.6	Vert
28	176.966M	48.4	+0.0 +0.0	+0.0 +3.1	+0.0 +9.5	-27.0 +0.0	+0.0	34.0	43.5 2.439 GHz Center Frequency (Mid)	-9.5	Vert

29	176.942M	47.4	+0.0 +0.0	+0.0 +3.1	+0.0 +9.5	-27.0 +0.0	+0.0	33.0	43.5 2.426 GHz Center Frequency (Lowest)	-10.5	Vert
30	176.944M	47.1	+0.0 +0.0	+0.0 +3.1	+0.0 +9.5	-27.0 +0.0	+0.0	32.7	43.5 2.458 GHz Center Frequency (Highest)	-10.8	Vert
31	7375.106M Ave	26.8	+12.3 +0.5	+4.7 +0.0	+36.0 +0.0	+0.0 -38.1	+0.0	42.2	54.0 2.458 GHz Center Frequency (Highest)	-11.8	Vert
32	4916.726M Ave	29.5	+9.8 +0.1	+3.5 +0.0	+33.1 +0.0	+0.0 -37.1	+0.0	38.9	54.0 2.458 GHz Center Frequency (Highest)	-15.1	Vert
33	4852.230M Ave	28.7	+9.8 +0.2	+3.6 +0.0	+33.0 +0.0	+0.0 -37.1	+0.0	38.2	54.0 2.426 GHz Center Frequency (Lowest)	-15.8	Vert
34	7317.006M Ave	21.4	+12.2 +0.6	+4.7 +0.0	+36.2 +0.0	+0.0 -38.1	+0.0	37.0	54.0 2.439 GHz Center Frequency (Mid)	-17.0	Vert
35	4852.230M Ave	26.5	+9.8 +0.2	+3.6 +0.0	+33.0 +0.0	+0.0 -37.1	+0.0	36.0	54.0 2.426 GHz Center Frequency (Lowest)	-18.0	Horiz
36	7278.340M Ave	20.0	+12.1 +0.7	+4.8 +0.0	+36.1 +0.0	+0.0 -38.1	+0.0	35.6	54.0 2.426 GHz Center Frequency (Lowest)	-18.4	Vert
37	4878.006M Ave	25.4	+9.8 +0.2	+3.7 +0.0	+33.0 +0.0	+0.0 -37.1	+0.0	35.0	54.0 2.439 GHz Center Frequency (Mid)	-19.0	Vert
38	4916.726M Ave	25.4	+9.8 +0.1	+3.5 +0.0	+33.1 +0.0	+0.0 -37.1	+0.0	34.8	54.0 2.458 GHz Center Frequency (Highest)	-19.2	Horiz
39	4878.010M Ave	24.5	+9.8 +0.2	+3.7 +0.0	+33.0 +0.0	+0.0 -37.1	+0.0	34.1	54.0 2.439 GHz Center Frequency (Mid)	-19.9	Horiz

Test Location: CKC Laboratories, Inc. • 22105 Wilson River Hwy • Tillamook, OR 97141 • 800 500-4EMC

Customer: **Quatech Inc.**
Specification: **FCC15.247(c) & 15.209**
Work Order #: **74623** Date: 10/18/2000
Test Type: **Radiated Spurious** Time: 15:57:23
Equipment: **Radio RF Modem** Sequence#: 6
Manufacturer: Quatech Inc. Tested By: Mike Wilkinson
Model: QTM-8524
S/N: IT240EXT99KI0139

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Radio RF Modem*	Quatech Inc.	QTM-8524	IT240EXT99KI0139
Monopole Antenna	Quatech Inc.	QTM-24ANT-C	NONE

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Toshiba	220CDS	67041753
Power Supply	Danube	KWMO2O-1824F	N/A
Printer	HP	895CXI	MY97G1924Z
Remote Laptop Computer	IBM	ThinkPad	W9G-V7795
Support Radio RF Modem	Quatech Inc.	QTM-8524	IT240EXT99K-0132
Power Supply	Danube	KWMO2O-1824F	N/A
Patch Array Antenna	Quatech Inc.	QTM-24ANT-SW	NONE

Test Conditions / Notes:

Monopole antenna is connected to the antenna port of the EUT modem. Printer is connected to the LPT-1 port of the Toshiba laptop and is printing continuously, batch jobs of H's from EMI4Z program. EUT is connected to the laptop via a 3-conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full-Duplex Synchronous. The receiver function of the EUT is exercised as follows: The remote computer running hyper terminal is connected to a support RF modem and patch array antenna which is transmitting data to the EUT. The frequency select jumpers on the support modem are set to the same as the EUT. The temperature was 73°F and the humidity was 45%. Frequency range investigated was 10 MHz to 25 GHz. Lowest clock is 16.384 MHz, Highest frequency generated is 2.458 GHz. Steward p/n 28A2025-0A0 clip on ferrite added to the EUT end of the serial cable.

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	Cable 3.5 G dB	Cable Cable dB	Horn Bilog dB	Amp-A HP 83 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	771.845M	44.5	+0.0	+0.0	+0.0	-28.0	+0.0	44.4	46.0	-1.6	Horiz
	QP		+0.0	+6.6	+21.3	+0.0			2.426 GHz Center Frequency (Lowest)		

2	776.455M QP	43.5	+0.0 +0.0	+0.0 +6.7	+0.0 +21.4	-28.0 +0.0	+0.0	43.6	46.0 2.439 GHz Center Frequency (Mid)	-2.4	Horiz
3	771.845M QP	42.4	+0.0 +0.0	+0.0 +6.6	+0.0 +21.3	-28.0 +0.0	+0.0	42.3	46.0 2.426 GHz Center Frequency (Lowest)	-3.7	Vert
4	132.714M QP	52.1	+0.0 +0.0	+0.0 +2.6	+0.0 +11.9	-27.3 +0.0	+0.0	39.3	43.5 2.439 GHz Center Frequency (Mid)	-4.2	Vert
5	132.715M QP	52.0	+0.0 +0.0	+0.0 +2.6	+0.0 +11.9	-27.3 +0.0	+0.0	39.2	43.5 2.439 GHz Center Frequency (Mid)	-4.3	Horiz
6	132.712M QP	52.0	+0.0 +0.0	+0.0 +2.6	+0.0 +11.9	-27.3 +0.0	+0.0	39.2	43.5 2.426 GHz Center Frequency (Lowest)	-4.3	Vert
7	776.452M QP	40.9	+0.0 +0.0	+0.0 +6.7	+0.0 +21.4	-28.0 +0.0	+0.0	41.0	46.0 2.439 GHz Center Frequency (Mid)	-5.0	Vert
8	33.175M QP	43.6	+0.0 +0.0	+0.0 +1.2	+0.0 +17.6	-27.6 +0.0	+0.0	34.8	40.0 2.439 GHz Center Frequency (Mid)	-5.2	Vert
9	808.663M	39.2	+0.0 +0.0	+0.0 +6.8	+0.0 +21.7	-28.0 +0.0	+0.0	39.7	46.0 2.426 GHz Center Frequency (Lowest)	-6.3	Horiz
10	221.191M QP	51.8	+0.0 +0.0	+0.0 +3.4	+0.0 +11.2	-26.8 +0.0	+0.0	39.6	46.0 2.439 GHz Center Frequency (Mid)	-6.4	Vert
^	221.200M	49.8	+0.0 +0.0	+0.0 +3.4	+0.0 +11.2	-26.8 +0.0	+0.0	37.6	46.0 2.426 GHz Center Frequency (Lowest)	-8.4	Vert
12	813.339M	39.0	+0.0 +0.0	+0.0 +6.8	+0.0 +21.7	-28.0 +0.0	+0.0	39.5	46.0 2.439 GHz Center Frequency (Mid)	-6.5	Vert
13	44.233M	47.3	+0.0 +0.0	+0.0 +1.5	+0.0 +12.0	-27.6 +0.0	+0.0	33.2	40.0 2.439 GHz Center Frequency (Mid)	-6.8	Vert
14	33.179M QP	41.9	+0.0 +0.0	+0.0 +1.2	+0.0 +17.6	-27.6 +0.0	+0.0	33.1	40.0 2.426 GHz Center Frequency (Lowest)	-6.9	Vert
15	44.233M	47.1	+0.0 +0.0	+0.0 +1.5	+0.0 +12.0	-27.6 +0.0	+0.0	33.0	40.0 2.426 GHz Center Frequency (Lowest)	-7.0	Vert
16	813.313M	38.3	+0.0 +0.0	+0.0 +6.8	+0.0 +21.7	-28.0 +0.0	+0.0	38.8	46.0 2.439 GHz Center Frequency (Mid)	-7.2	Horiz

17	309.650M	45.2	+0.0 +0.0	+0.0 +4.2	+0.0 +14.1	-26.7 +0.0	+0.0	36.8	46.0 2.426 GHz Center Frequency (Lowest)	-9.2	Vert
18	176.946M	48.6	+0.0 +0.0	+0.0 +3.1	+0.0 +9.5	-27.0 +0.0	+0.0	34.2	43.5 2.426 GHz Center Frequency (Lowest)	-9.3	Vert
19	7319.644M Ave	27.1	+12.2 +0.6	+4.7 +0.0	+36.2 +0.0	+0.0 -38.1	+0.0	42.7	54.0 2.439 GHz Center Frequency (Mid)	-11.3	Vert
20	7375.038M Ave	27.0	+12.3 +0.5	+4.7 +0.0	+36.0 +0.0	+0.0 -38.1	+0.0	42.4	54.0 2.458 GHz Center Frequency (Highest)	-11.6	Vert
21	309.659M	42.6	+0.0 +0.0	+0.0 +4.2	+0.0 +14.1	-26.7 +0.0	+0.0	34.2	46.0 2.426 GHz Center Frequency (Lowest)	-11.8	Vert
22	4916.678M Ave	28.8	+9.8 +0.1	+3.5 +0.0	+33.1 +0.0	+0.0 -37.1	+0.0	38.2	54.0 2.458 GHz Center Frequency (Highest)	-15.8	Vert
23	7278.318M Ave	21.4	+12.1 +0.7	+4.8 +0.0	+36.1 +0.0	+0.0 -38.1	+0.0	37.0	54.0 2.426 GHz Center Frequency (Lowest)	-17.0	Vert
24	4852.208M Ave	27.3	+9.8 +0.2	+3.6 +0.0	+33.0 +0.0	+0.0 -37.1	+0.0	36.8	54.0 2.426 GHz Center Frequency (Lowest)	-17.2	Vert
25	4879.724M Ave	25.1	+9.8 +0.2	+3.7 +0.0	+33.0 +0.0	+0.0 -37.1	+0.0	34.7	54.0 2.439 GHz Center Frequency (Mid)	-19.3	Vert

Test Location: CKC Laboratories, Inc. • 22105 Wilson River Hwy • Tillamook, OR 97141 • 800 500-4EMC

Customer: **Quatech Inc.**
Specification: **FCC15.247 (d)**
Work Order #: **74623** Date: 10/20/2000
Test Type: **Conducted Peak Power** Time: 13:45:40
Equipment: **Radio RF Modem** Sequence#: 3
Manufacturer: Quatech Inc. Tested By: Mike Wilkinson
Model: QTM-8524
S/N: IT240EXT99KI0139

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Radio RF Modem*	Quatech Inc.	QTM-8524	IT240EXT99KI0139

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Toshiba	220CDS	67041753
Power Supply	Danube	KWMO2O-1824F	N/A

Test Conditions / Notes:

EUT antenna port is connected directly to the spectrum analyzer input. EUT is connected to the laptop via a 3 conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full- Duplex Synchronous. The S/A settings were RBW= 3 kHz, VBW= 10 kHz, Span = 300 kHz and Sweep = 100 Sec. Per FCC 97-114 Appendix C.

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	2426.018M	114.1					+0.0	114.1	115.0	-0.9	None
									2.426 GHz center frequency (low)		
2	2458.356M	113.9					+0.0	113.9	115.0	-1.1	None
3	2440.003M	113.5					+0.0	113.5	115.0	-1.5	None
									2.439 GHz center frequency (Mid)		

Test Location: CKC Laboratories, Inc. • 22105 Wilson River Hwy • Tillamook, OR 97141 • 800 500-4EMC

Customer: **Quatech Inc.**
Specification: **FCC 15.207 COND**
Work Order #: **74623** Date: 10/19/2000
Test Type: **Conducted Emissions** Time: 08:45:37
Equipment: **Radio RF Modem** Sequence#: 6
Manufacturer: Quatech Inc. Tested By: Mike Wilkinson
Model: QTM-8524
S/N: IT240EXT99KI0139

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Patch Array Antenna	Quatech Inc.	QTM-24ANT-SW	NONE
Radio RF Modem*	Quatech Inc.	QTM-8524	IT240EXT99KI0139

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Toshiba	220CDS	67041753
Power Supply	Danube	KWMO2O-1824F	N/A
Printer	HP	895CXI	MY97G1924Z
Remote Laptop Computer	IBM	ThinkPad	W9G-V7795
Support Radio RF Modem	Quatech Inc.	QTM-8524	IT240EXT99K-0132
Power Supply	Danube	KWMO2O-1824F	N/A
Patch Array Antenna	Quatech Inc.	QTM-24ANT-SW	NONE

Test Conditions / Notes:

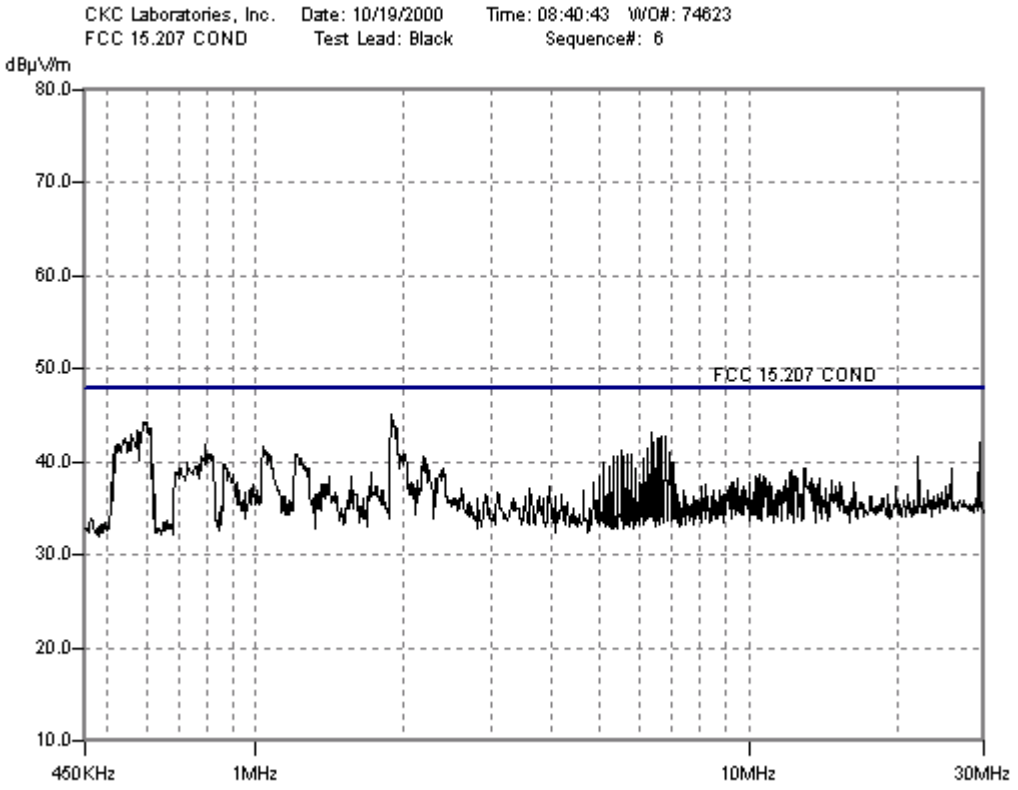
Patch array antenna is connected to the antenna port of the EUT modem. Printer is connected to the LPT-1 port of the Toshiba laptop and is printing continuously, batch jobs of H's from EMI4Z program. EUT is connected to the laptop via a 3-conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full-Duplex Synchronous. The receiver function of the EUT is exercised as follows: The remote computer running hyper terminal is connected to a support RF modem and patch array antenna which is transmitting data to the EUT. The frequency select jumpers on the support modem are set to the same as the EUT. The temperature was 73°F and the humidity was 45%. Frequency range investigated was 10 MHz to 25 GHz. Lowest clock is 16.384 MHz, Highest frequency generated is 2.458 GHz. Steward p/n 28A2025-0A0 clip on ferrite added to the EUT end of the serial cable. AC input to the EUT was 120 V, 60 Hz.

Measurement Data: Reading listed by margin. Test Lead: Black

#	Freq	Rdng	Cable		LISN		Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	558.763k	42.8	+0.0		+0.1		+0.0	42.9	48.0	-5.1	Black
2	6.803M	41.7	+0.7		+0.4		+0.0	42.8	48.0	-5.2	Black

3	6.694M	41.8	+0.7	+0.3	+0.0	42.8	48.0	-5.2	Black
4	6.571M	41.6	+0.7	+0.3	+0.0	42.6	48.0	-5.4	Black
5	615.654k	42.3	+0.1	+0.1	+0.0	42.5	48.0	-5.5	Black
6	542.030k	42.4	+0.0	+0.1	+0.0	42.5	48.0	-5.5	Black
7	29.551M	39.9	+1.5	+0.7	+0.0	42.1	48.0	-5.9	Black
8	6.461M	41.2	+0.6	+0.3	+0.0	42.1	48.0	-5.9	Black
9	553.743k	41.9	+0.0	+0.1	+0.0	42.0	48.0	-6.0	Black
10	789.675k	41.5	+0.2	+0.2	+0.0	41.9	48.0	-6.1	Black
11	523.624k	41.8	+0.0	+0.1	+0.0	41.9	48.0	-6.1	Black
12	1.039M	41.5	+0.2	+0.0	+0.0	41.7	48.0	-6.3	Black
13	517.768k	41.5	+0.0	+0.1	+0.0	41.6	48.0	-6.4	Black
14	6.229M	40.6	+0.6	+0.3	+0.0	41.5	48.0	-6.5	Black
15	5.546M	40.5	+0.6	+0.1	+0.0	41.2	48.0	-6.8	Black
16	6.912M	40.0	+0.7	+0.4	+0.0	41.1	48.0	-6.9	Black
17	1.998M	40.6	+0.3	+0.0	+0.0	40.9	48.0	-7.1	Black
18	1.208M	40.7	+0.2	+0.0	+0.0	40.9	48.0	-7.1	Black
19	814.774k	40.5	+0.2	+0.2	+0.0	40.9	48.0	-7.1	Black
20	513.584k	40.8	+0.0	+0.1	+0.0	40.9	48.0	-7.1	Black
21	5.669M	40.1	+0.6	+0.1	+0.0	40.8	48.0	-7.2	Black
22	1.067M	40.4	+0.3	+0.0	+0.0	40.7	48.0	-7.3	Black
23	6.352M	31.6	+0.6	+0.3	+0.0	32.5	48.0	-15.5	Black
Ave									
^	6.352M	42.2	+0.6	+0.3	+0.0	43.1	48.0	-4.9	Black

25 Ave	600.000k	26.0	+0.1	+0.1	+0.0	26.2	48.0	-21.8	Black
^	599.758k	44.1	+0.1	+0.1	+0.0	44.3	48.0	-3.7	Black
27 Ave	1.884M	22.7	+0.3	+0.0	+0.0	23.0	48.0	-25.0	Black
^	1.884M	44.7	+0.3	+0.0	+0.0	45.0	48.0	-3.0	Black


CKC Laboratories, Inc. Date: 10/19/2000 Time: 08:40:43 WO#: 74623
FCC 15.207 COND Test Lead: Black Sequence#: 6
dBµV/m
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
FCC 15.207 COND
450KHz
1MHz
10MHz
30MHz

Test Location: CKC Laboratories, Inc. • 22105 Wilson River Hwy • Tillamook, OR 97141 • 800 500-4EMC

Customer: **Quatech Inc.**
Specification: **FCC 15.207 COND**
Work Order #: **74623** Date: 10/19/2000
Test Type: **Conducted Emissions** Time: 08:53:15
Equipment: **Radio RF Modem** Sequence#: 7
Manufacturer: Quatech Inc. Tested By: Mike Wilkinson
Model: QTM-8524
S/N: IT240EXT99KI0139

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Patch Array Antenna	Quatech Inc.	QTM-24ANT-SW	NONE
Radio RF Modem*	Quatech Inc.	QTM-8524	IT240EXT99KI0139

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop Computer	Toshiba	220CDS	67041753
Power Supply	Danube	KWMO2O-1824F	N/A
Printer	HP	895CXI	MY97G1924Z
Remote Laptop Computer	IBM	ThinkPad	W9G-V7795
Support Radio RF Modem	Quatech Inc.	QTM-8524	IT240EXT99K-0132
Power Supply	Danube	KWMO2O-1824F	N/A
Patch Array Antenna	Quatech Inc.	QTM-24ANT-SW	NONE

Test Conditions / Notes:

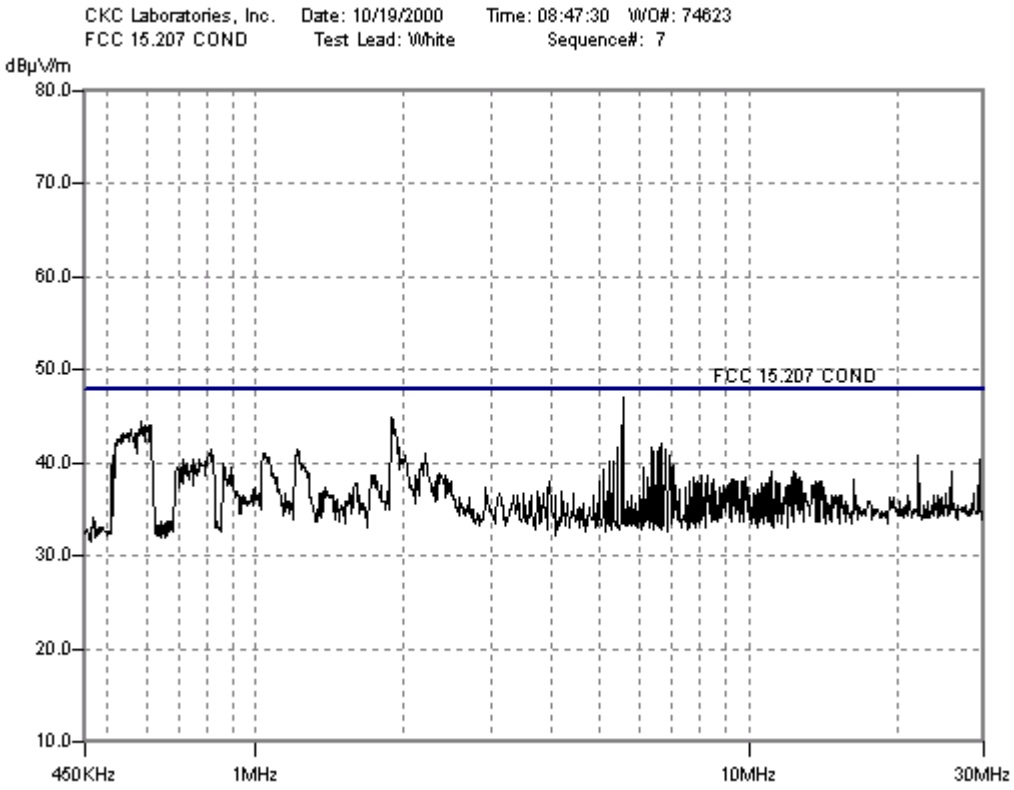
Patch array antenna is connected to the antenna port of the EUT modem. Printer is connected to the LPT-1 port of the Toshiba laptop and is printing continuously, batch jobs of H's from EMI4Z program. EUT is connected to the laptop via a 3-conductor 42" cable wire to the EUT: Rx, Tx & GND connections and 9 pin serial connector at the laptop. Power supply is connected to EUT Vs & GND connections. The laptop is sending data (Quatech FCC_test.exe) via the serial cable. The EUT internal jumpers are as follows: Channel 3, Frequency Select (as noted for each reading), Baudrate Select 9600, Master, RS-232, Full-Duplex Synchronous. The receiver function of the EUT is exercised as follows: The remote computer running hyper terminal is connected to a support RF modem and patch array antenna which is transmitting data to the EUT. The frequency select jumpers on the support modem are set to the same as the EUT. The temperature was 73°F and the humidity was 45%. Frequency range investigated was 10 MHz to 25 GHz. Lowest clock is 16.384 MHz, Highest frequency generated is 2.458 GHz. Steward p/n 28A2025-0A0 clip on ferrite added to the EUT end of the serial cable. AC input to the EUT was 120 V, 60 Hz.

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq	Rdng	Cable	LISN			Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV	dBµV	dB	Ant
1	6.694M	41.4	+0.7	+0.1			+0.0	42.2	48.0	-5.8	White
2	517.768k	42.2	+0.0	+0.0			+0.0	42.2	48.0	-5.8	White

3	5.437M	41.0	+0.6	+0.1		+0.0	41.7	48.0	-6.3	White
4	1.955M	41.4	+0.3	+0.0		+0.0	41.7	48.0	-6.3	White
5	6.584M	40.8	+0.7	+0.1		+0.0	41.6	48.0	-6.4	White
6	6.352M	40.9	+0.6	+0.1		+0.0	41.6	48.0	-6.4	White
7	6.803M	40.7	+0.7	+0.1		+0.0	41.5	48.0	-6.5	White
8	809.754k	41.3	+0.2	+0.0		+0.0	41.5	48.0	-6.5	White
9	1.220M	41.2	+0.2	+0.0		+0.0	41.4	48.0	-6.6	White
10	6.461M	40.5	+0.6	+0.1		+0.0	41.2	48.0	-6.8	White
11	2.218M	40.7	+0.4	+0.0		+0.0	41.1	48.0	-6.9	White
12	1.039M	40.8	+0.2	+0.0		+0.0	41.0	48.0	-7.0	White
13	2.010M	40.6	+0.3	+0.0		+0.0	40.9	48.0	-7.1	White
14	513.584k	40.9	+0.0	+0.0		+0.0	40.9	48.0	-7.1	White
15	22.134M	39.2	+1.3	+0.3		+0.0	40.8	48.0	-7.2	White
16	6.912M	39.9	+0.7	+0.1		+0.0	40.7	48.0	-7.3	White
17	818.120k	40.5	+0.2	+0.0		+0.0	40.7	48.0	-7.3	White
18	746.169k	40.2	+0.1	+0.1		+0.0	40.4	48.0	-7.6	White
19 Ave	5.560M	36.1	+0.6	+0.1		+0.0	36.8	48.0	-11.2	White
^	5.560M	46.4	+0.6	+0.1		+0.0	47.1	48.0	-0.9	White
21 Ave	607.000k	25.4	+0.1	+0.0		+0.0	25.5	48.0	-22.5	White
^	607.288k	44.0	+0.1	+0.0		+0.0	44.1	48.0	-3.9	White
23 Ave	1.884M	23.9	+0.3	+0.0		+0.0	24.2	48.0	-23.8	White
^	1.884M	44.5	+0.3	+0.0		+0.0	44.8	48.0	-3.2	White

25 Ave	586.000k	23.0	+0.1	+0.0		+0.0	23.1	48.0	-24.9	White
^	585.535k	44.3	+0.1	+0.0		+0.0	44.4	48.0	-3.6	White
27 Ave	1.912M	22.5	+0.3	+0.0		+0.0	22.8	48.0	-25.2	White
^	1.912M	43.4	+0.3	+0.0		+0.0	43.7	48.0	-4.3	White


CKC Laboratories, Inc. Date: 10/19/2000 Time: 08:47:30 WO#: 74623
FCC 15.207 COND Test Lead: White Sequence#: 7
dBµV/m
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
FCC 15.207 COND
450KHz
1MHz
10MHz
30MHz