FCC PART 22 TYPE APPROVAL
EMI MEASUREMENT AND TEST REPORT

For

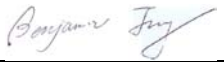
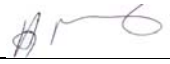
MAXON ELECTRONICS AUSTRALIA PTY. LTD.

A1, Nevesby North
New South Wales, Australia 2212

FCC ID: Q2FMM-5100

2003-04-15

This Report Concerns:	**Equipment Type:**
☒ Original Report	Wireless Modem

Test Engineer:	Benjamin Jing / 
Report No.:	R0302211
Test Date:	2003-03-18
Reviewed By:	Hans Mellberg / 
Prepared By:	Bay Area Compliance Laboratory Corporation (BACL) 230 Commercial Street Sunnyvale, CA 94085 Tel: (408) 732-9162 Fax: (408) 732 9164

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Maxon Electronics Australia Pty. Ltd's product, model No.:MM-5100, FCC ID:Q2FMM-5100 or the "EUT " as referred to in this report is a wireless modem which performs data communication functions between Host and IS-95 CDMA Cellular station. The MM-5100 wireless modem incorporates wireless-modem functionality together with the RS-232, USB driver, DC/DC down converter, and Voice interface.

The MM-5100 wireless modem connects directly to a HOST device utilizing a RS-232C or USB V1.1 interface. The MM-5100 wireless modem functionality is specifically controlled from the Host via AT command sets.

Supply voltage range is from 6V to 36VDC which provides compatibility for a variety of power platforms. The MM-5100 wireless modem power saving mode is controlled by the Host via AT command.

* *The test data gathered is from typical production samples provided by the manufacturer.*

1.2 Objective

This type approval report is prepared on behalf of *Maxon Electronics Australia Pty. Ltd.* in accordance with Part 2, Subpart J, Part 15, Subparts A and B, and Part 22 Subpart H, of the Federal Communication Commissions rules.

It is also prepared in accordance with Part 2, Subpart J, Part 15, Subparts A and B, and Part 22 Subpart H, of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with FCC rules for output power, modulation characteristic, occupied bandwidth, spurious emission at antenna terminal, field strength of spurious radiation, frequency stability, and conducted and radiated margin.

1.3 Related Submittal(s)/Grant(s)

No Related Submittals

1.4 Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 15 Subpart B – Unintentional Radiators
Part 22 Subpart H - Public Mobile Services

Applicable Standards: TIA EIA 137-A, TIA EIA 98-C, ANSI 63.4-1992, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.5 Test Facility

The Open Area Test site used by BACL Corp. to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-1992.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACLa is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, IEC/CISPR 22: 1997, Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods.

1.6 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
SONY	Notebook PC	PCG-GR370	None	None
Bellsouth	AC/DC Adapter	U090030D	None	None
HP	Printer	2225C	None	None

1.7 External I/O Cabling

Cable Description	Length (M)	Port/From	To
Shielded Cable	1.5	USB Port/Host	USB Port/EUT
Shielded Cable	0.5	Voice Port/EUT	Ear & MIC
Shielded Serial Cable	1.5	DC Power Port/EUT	DC Adapter

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was configured for testing in a typical fashion (as normally used in a typical application).

The final qualification test was performed with the EUT operating at normal mode.

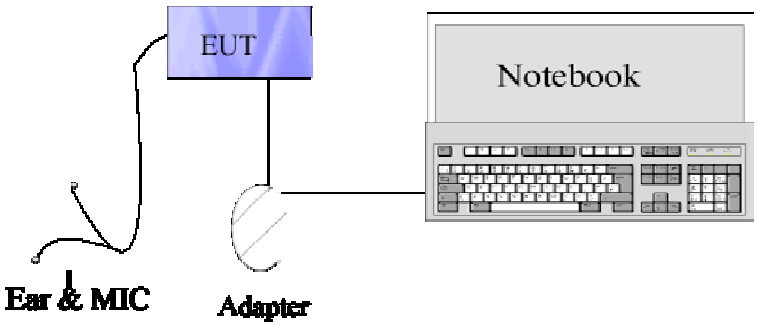
2.2 Block Diagram

Please refer to Exhibit D.

2.3 Equipment Modifications

No modifications were necessary for the EUT to comply with the applicable limits and requirements.

2.4 Test Setup Block Diagram



3 - SUMMARY OF TEST RESULTS

FCC RULE	DESCRIPTION OF TEST	RESULT
§ 2.1046, § 22.913 (a)	RF power output	Compliant
2.1047	Modulation Characteristics	Compliant
§ 2.1049 § 22.905	Occupied Bandwidth, Channels	Compliant
§ 22.917	Out of Band	Compliant
§ 2.1051, § 22.917	Spurious emissions at antenna terminals	Compliant
§ 2.1053	Field strength of spurious radiation	Compliant
§ 2.1055 (a) § 2.1055 (d) § 22.355	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant
§ 15.107	AC Line Conducted emission	Compliant
§ 15.109	Radiated Emission Limit (Digital Portion)	Compliant

4 – CONDUCTED OUTPUT POWER

4.1 Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

4.2 Test Procedure

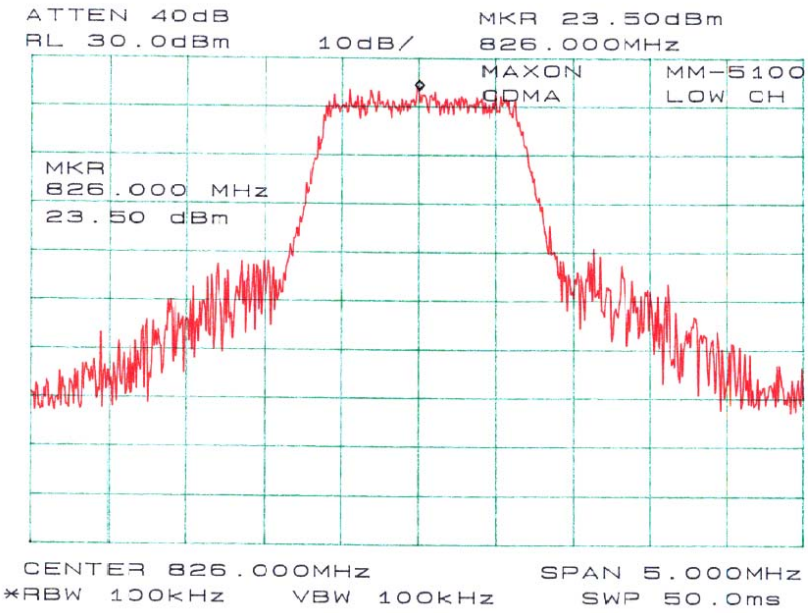
The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

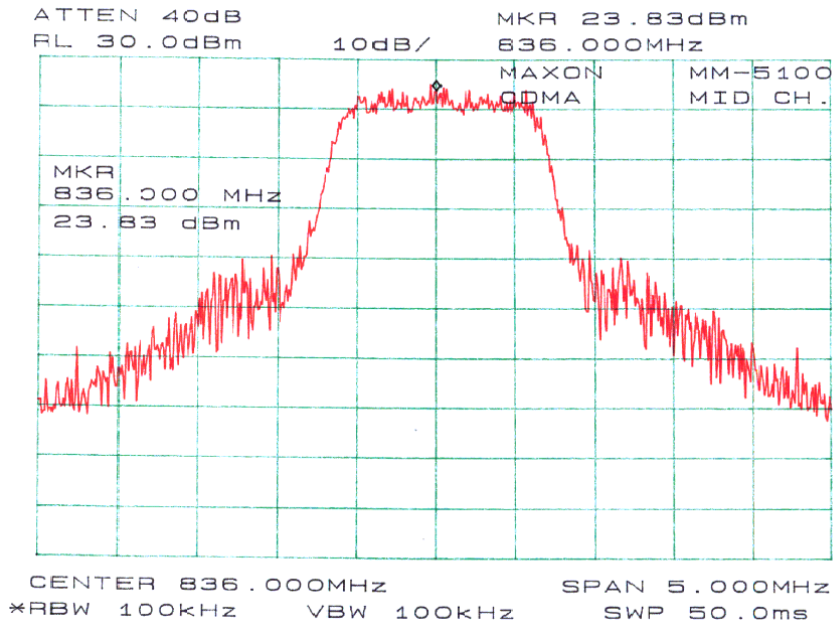
4.3 Test Equipment

Hewlett Packard HP8564E Spectrum Analyzer, Calibration Due Date: 2003-08-01.
Hewlett Packard HP 7470A Plotter, Calibration not required.
A.H. Systems SAS200 Horn Antenna, Calibration Due Date: 2003-05-31
Com-Power AB-100 Dipole Antenna, Calibration Due Date: 2003-09-05

4.4 Test Results

Channel	Output Power in dBm	Output Power in W	Limit in W
826	23.50	0.224	7
836	23.83	0.242	7
846	23.33	0.215	7


ATTEN 40dB
RL 30.0dBm
10dB/
MKR 23.50dBm
826.000MHz
MAXON
CDMA
MM-5100
LOW CH
MKR
826.000 MHz
23.50 dBm
CENTER 826.000MHz
SPAN 5.000MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
MKR 23.83dBm
836.000MHz
MAXON
CDMA
MM-5100
MID CH.
MKR
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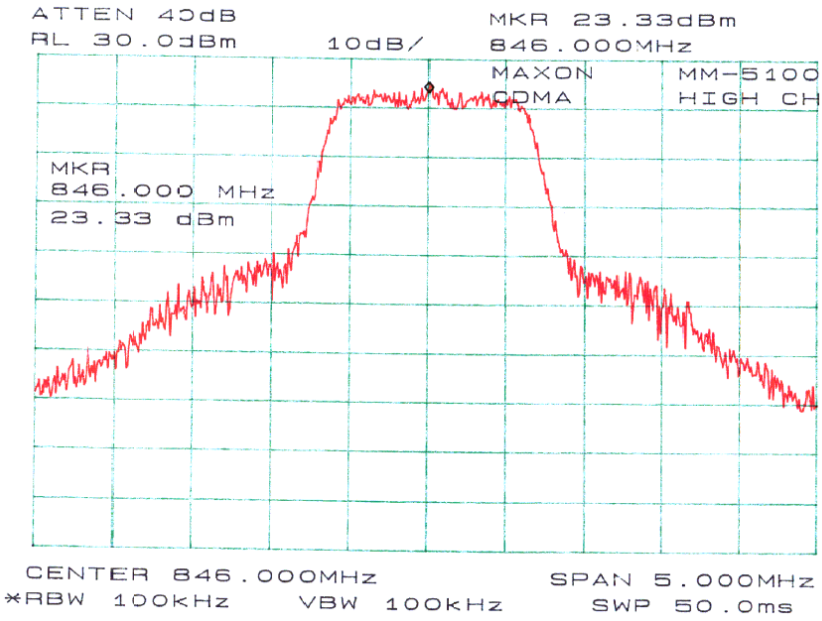
23.83 dBm
CENTER 836.000MHz
SPAN 5.000MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
MKR 23.33dBm
846.000MHz
MAXON
CDMA
MM-5100
HIGH CH
MKR
846.000 MHz
23.33 dBm
CENTER 846.000MHz
SPAN 5.000MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

5 - OCCUPIED BANDWIDTH

5.1 Applicable Standard

Requirements: CFR 47, Section 2.1049, Section 22.901, and Section 22.905.

5.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

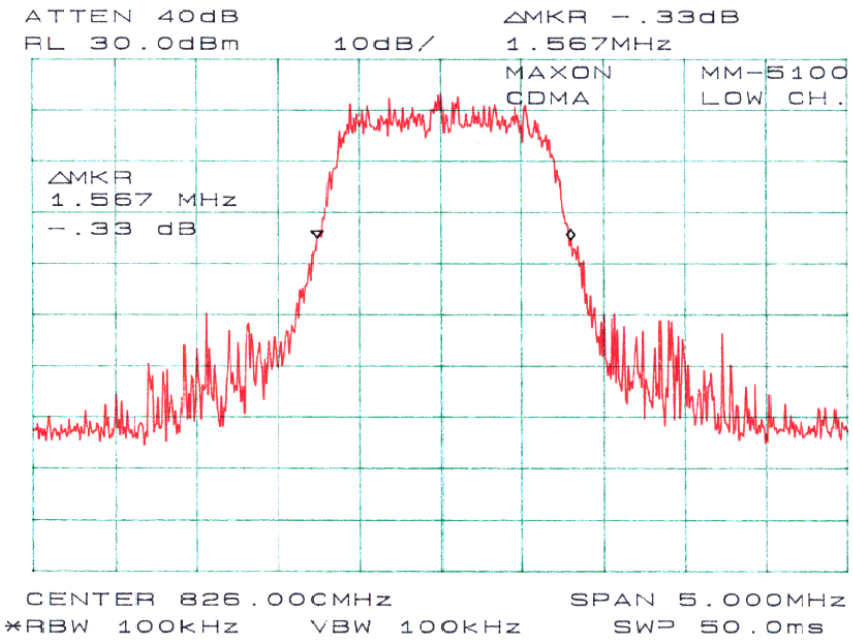
The resolution bandwidth of the spectrum analyzer was set at 100 KHz and the 26 dB bandwidth was recorded.

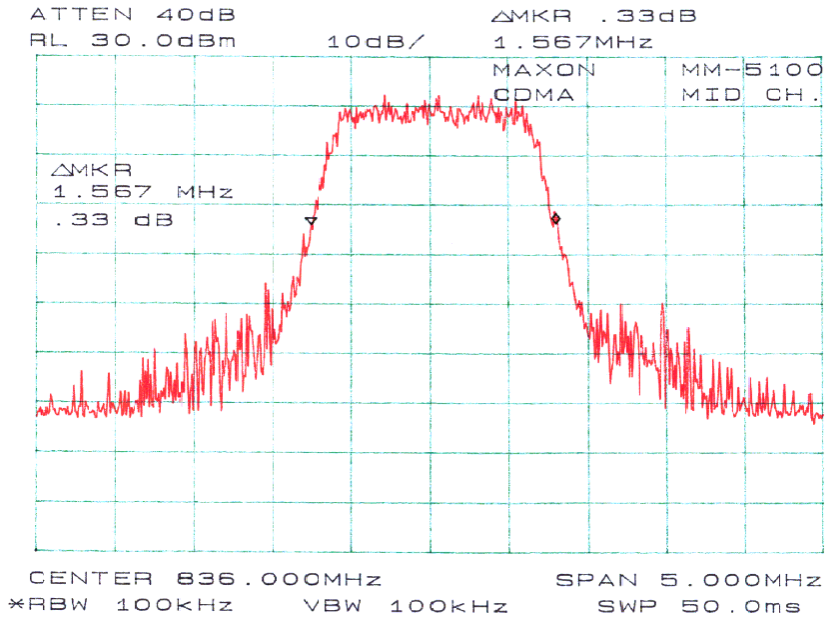
5.3 Test Equipment

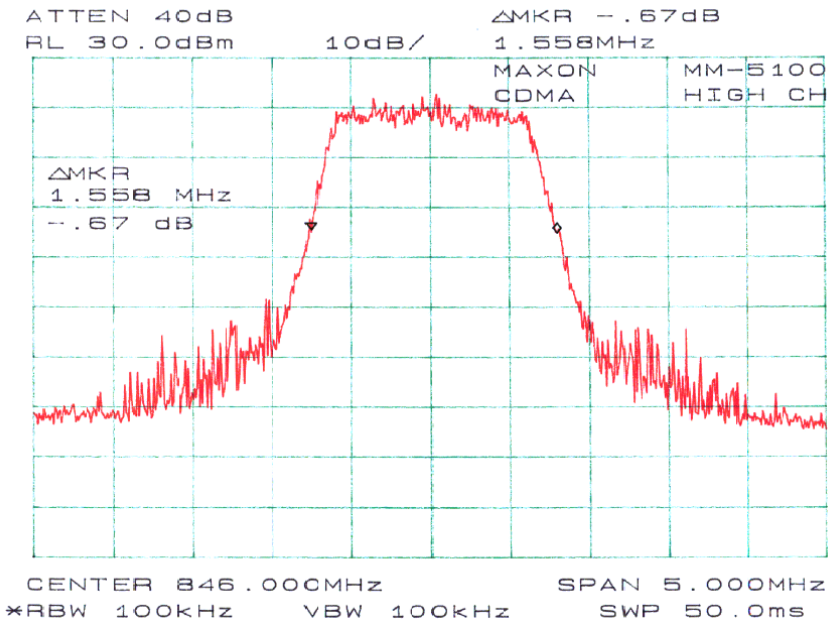
Hewlett Packard HP8564E Spectrum Analyzer, Calibration Due Date: 2003-08-01.
Hewlett Packard HP 7470A Plotter, Calibration not required.

5.4 Test Results

Please refer to the following plots.


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR -.33dB
1.567MHz
MAXON
CDMA
MM-5100
LOW CH.
ΔMKR
1.567 MHz
-.33 dB
CENTER 826.000MHz
SPAN 5.000MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR .33dB
1.567MHz
MAXON
CDMA
MM-5100
MID CH.
ΔMKR
1.567 MHz
.33 dB
CENTER 836.000MHz
SPAN 5.000MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR -.67dB
1.558MHz
MAXON
CDMA
MM-5100
HIGH CH
ΔMKR
1.558 MHz
-.67 dB
CENTER 846.000MHz
SPAN 5.000MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

6 - MODULATION CHARACTERISTIC

6.1 Applicable Standard

Requirement: FCC § 2.1047.

6.2 Test Procedure

CDMA digital mode is used by EUT.

6.3 Test Equipment

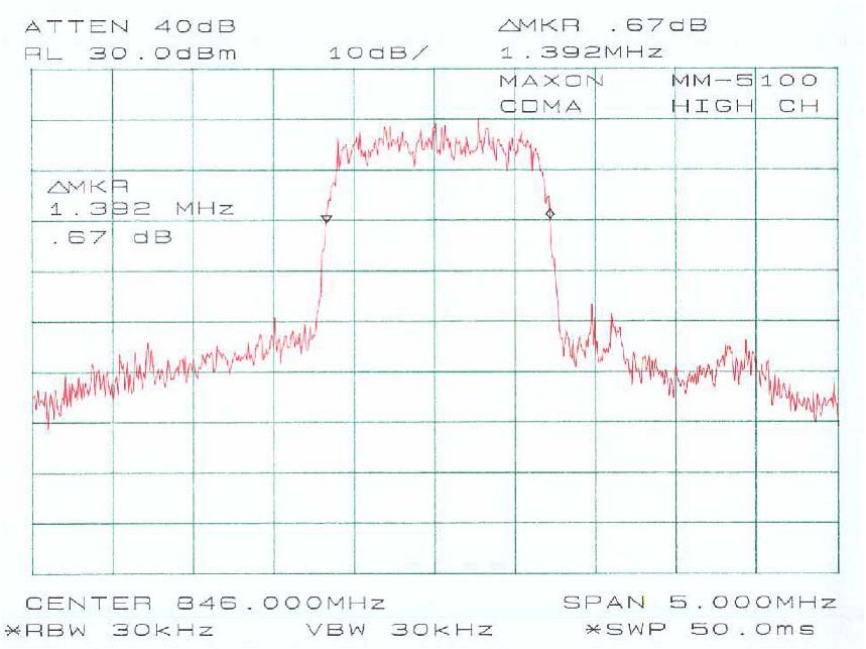
Hewlett Packard HP8564E Spectrum Analyzer, Calibration Due Date:2003-08-01
Hewlett Packard HP 7470A Plotter, Calibration not required.

6.4 Test Results

Please refer to the hereinafter plots.


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR -.67dB
1.392MHz
MAXON MM-5100
CDMA LOW CH
ΔMKR
1.392 MHz
-.67 dB
CENTER 825.000MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR 0dB
1.392MHz
MAXON MM-5100
CDMA MID CH
ΔMKR
1.392 MHz
0 dB
CENTER 836.000MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
*SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR .67dB
1.392MHz
MAXON MM-5100
CDMA HIGH CH
ΔMKR
1.392 MHz
.67 dB
CENTER 846.000MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
*SWP 50.0ms

7 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

7.1 Applicable Standard

Requirements: CFR 47, § 2.1051, § 22.917.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057.

7.2 Test Procedure

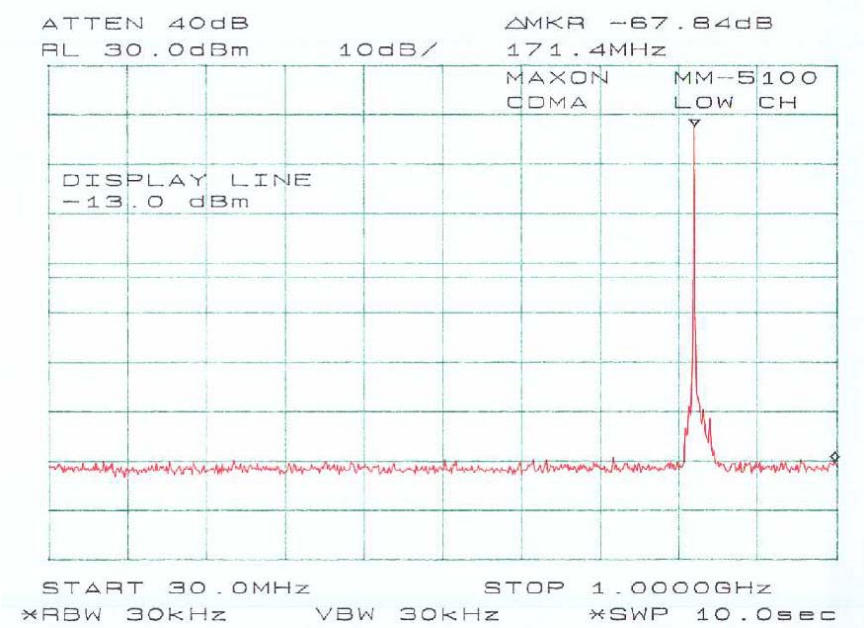
The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.

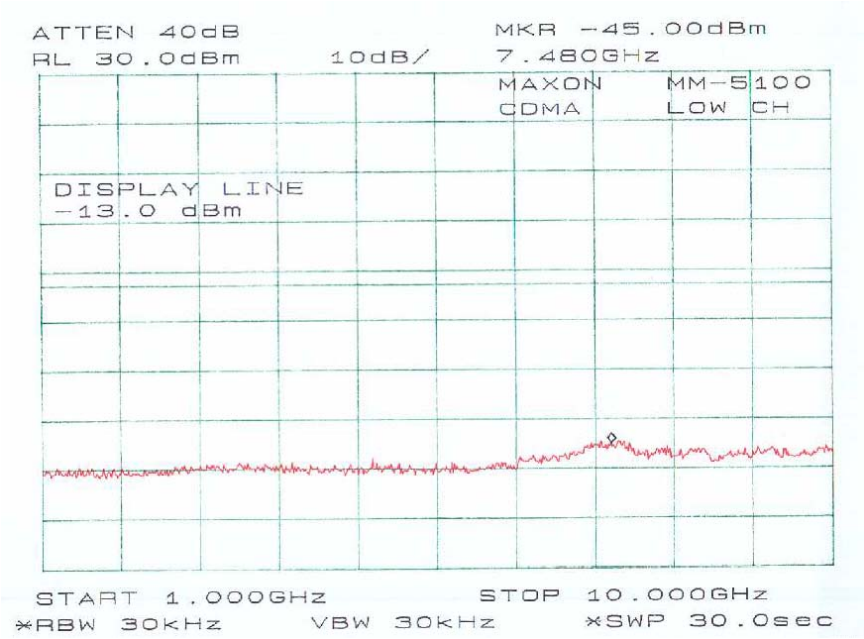
7.3 Test Equipment

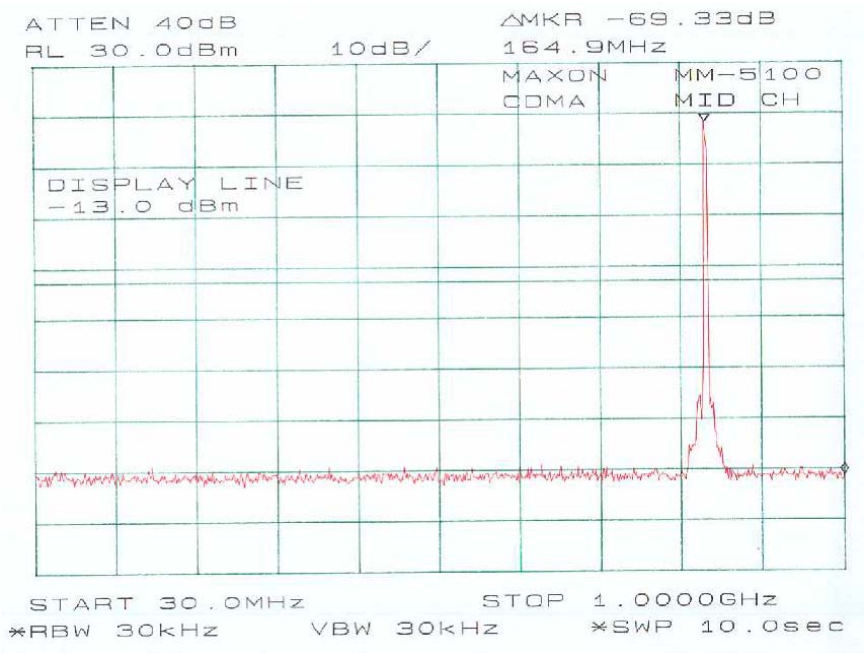
Hewlett Packard HP 8564E Spectrum Analyzer, Calibration Due Date: 2003-08-01
HP 7470A Plotter, Calibration not required.

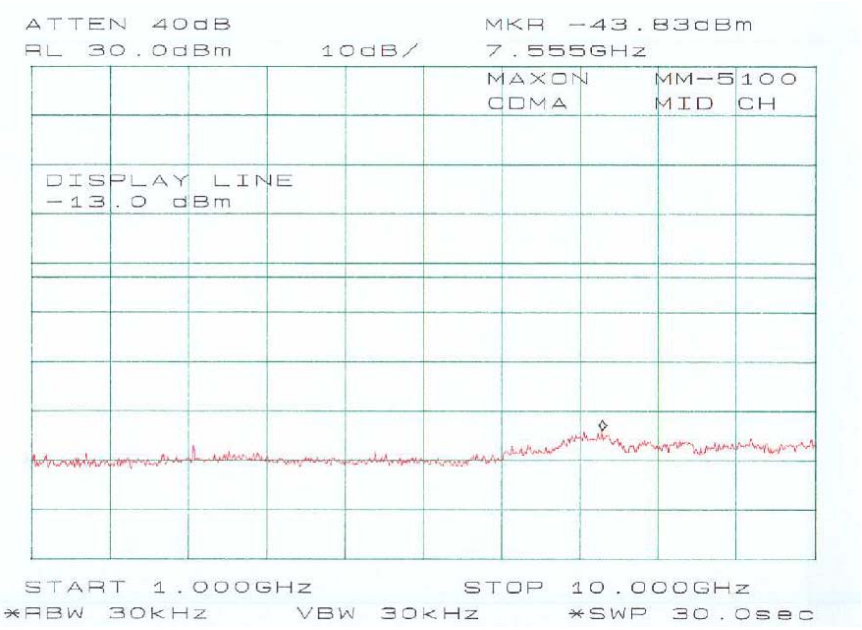
7.4 Test Results

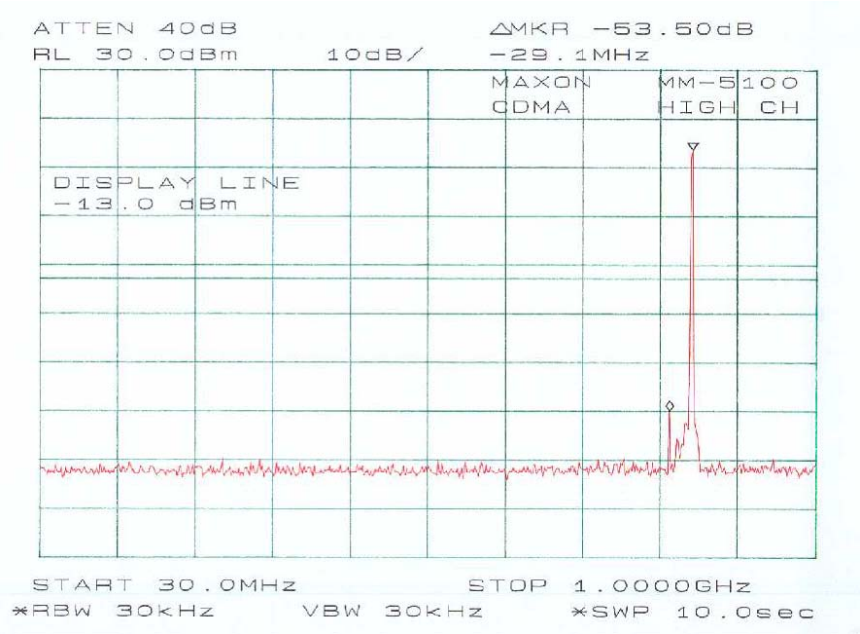
Please refer to the hereinafter plots.

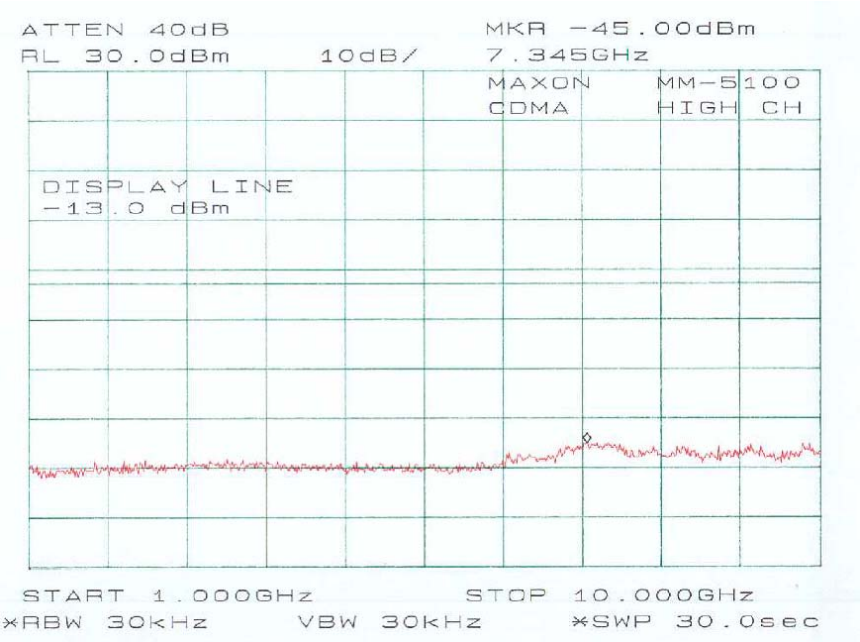

ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR -67.84dB
171.4MHz
MAXON
CDMA
MM-5100
LOW CH
DISPLAY LINE
-13.0 dBm
START 30.0MHz
STOP 1.0000GHz
*RBW 30kHz
VBW 30kHz
*SWP 10.0sec


ATTEN 40dB
RL 30.0dBm
10dB/
MKR -45.00dBm
7.480GHz
MAXON
CDMA
MM-5100
LOW CH
DISPLAY LINE
-13.0 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 30kHz
VBW 30kHz
*SWP 30.0sec


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR -69.33dB
164.9MHz
MAXON MM-5100
CDMA MID CH
DISPLAY LINE
-13.0 dBm
START 30.0MHz
STOP 1.0000GHz
*RBW 30kHz
VBW 30kHz
*SWP 10.0sec


ATTEN 40dB
RL 30.0dBm
10dB/
MKR -43.83dBm
7.555GHz
MAXON MM-5100
CDMA MID CH
DISPLAY LINE
-13.0 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 30kHz
VBW 30kHz
*SWP 30.0sec


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR -53.50dB
-29.1MHz
MAXON
CDMA
MM-5100
HIGH CH
DISPLAY LINE
-13.0 dBm
START 30.0MHz
STOP 1.0000GHz
*RBW 30kHz
VBW 30kHz
*SWP 10.0sec


ATTEN 40dB
RL 30.0dBm
10dB/
MKR -45.00dBm
7.345GHz
MAXON
CDMA
MM-5100
HIGH CH
DISPLAY LINE
-13.0 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 30kHz
VBW 30kHz
*SWP 30.0sec

8 – BAND EDGE

8.1 Applicable Standard

Requirement: § 22.917.

8.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

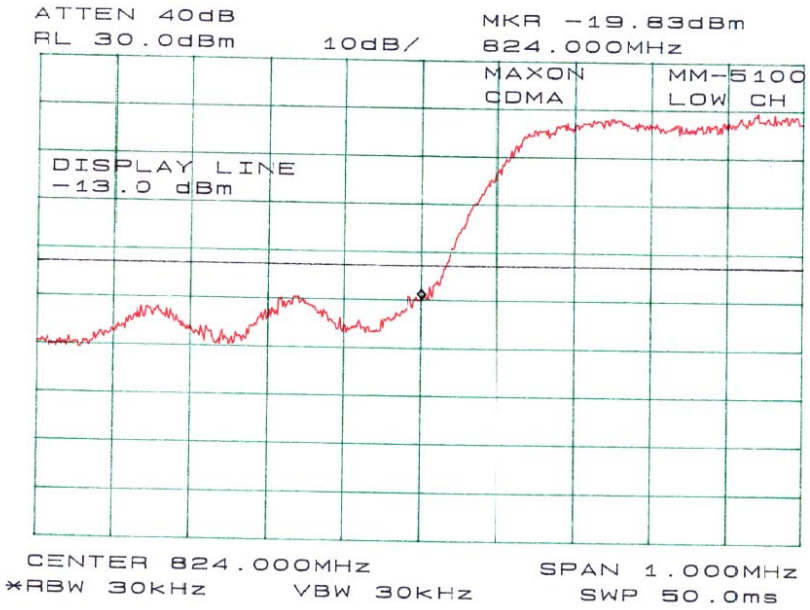
The center of the spectrum analyzer was set to block edge frequency, RBW set to 30KHz.

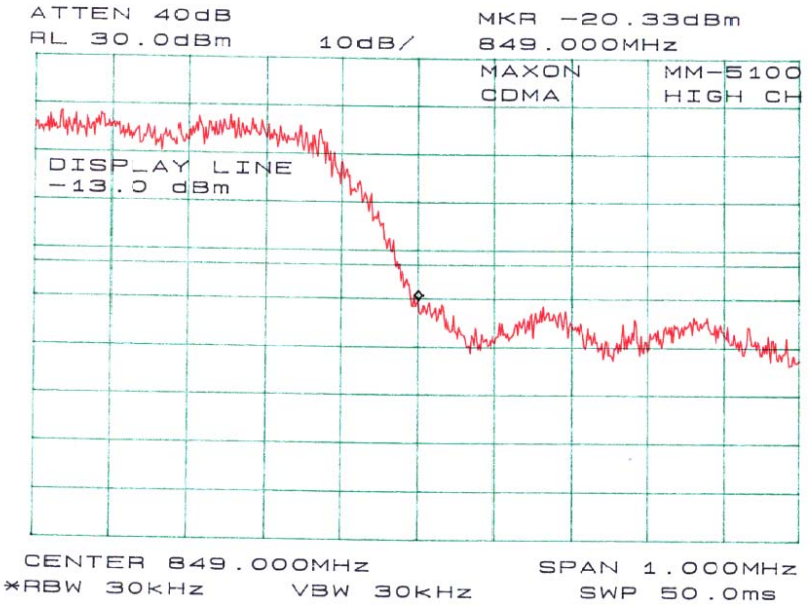
8.3 Test Equipment

Hewlett Packard HP8564E Spectrum Analyzer, Calibration Due Date: 2003-08-01.
Hewlett Packard HP 7470A Plotter, Calibration not required.

8.4 Test Results

Please refer to the following plots.


ATTEN 40dB
RL 30.0dBm
10dB/
MKR -19.83dBm
824.000MHz
MAXON
CDMA
MM-5100
LOW CH
DISPLAY LINE
-13.0 dBm
CENTER 824.000MHz
SPAN 1.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
MKR -20.33dBm
849.000MHz
MAXON
CDMA
MM-5100
HIGH CH
DISPLAY LINE
-13.0 dBm
CENTER 849.000MHz
SPAN 1.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

9 - FIELD STRENGTH OF SPURIOUS RADIATION

9.1 Applicable Standard

Requirements: CFR 47, § 2.1053.

9.2 Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

9.3 Test Equipment

EMCO Biconical Antennas, Calibration Due Date: 2003-09-11
EMCO Log Periodic Antenna, Calibration Due Date: 2003-08-11
A.H. Systems SAS200 Horn Antenna, Calibration Due Date:2003-05-31
Hewlett Packard HP 8564E Spectrum Analyzer, Calibration Due Date: 2003-08-01
Preamplifiers, Calibration Due Date:2004-03-14
Non-radiating Load

9.4 Test Result

Low Frequency: -22.5dB at 1652MHz
Middle Frequency: -22.4dB at 1672MHz
High Frequency: -22.6dB at 1692MHz

Compliance Statement

According to FCC Part 15, at 3-meter distance the emission from an intentional radiator shall not exceed the field strength level 40dBuV/m within 30-88MHz, 43.5dBuV/m within 88-216MHz, 46dBuV/m within 226-960MHz, 54dBuV/m above 960MHz. The level of any unwanted emissions shall not exceed the level of the fundamental frequency.

The levels of unwanted emission of this device were below the above limits. This device was compliant with the FCC Part 15.

Primary scan at 826MHz (Low CH.)

Indicated		Table	st Antenna		Substituted			Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V	Gain Correction	Loss dB	Leval dBm	dBm	dB
826	74.9	270	1.2	v	826	23.5	v	2.1	0.3	25.3		
826	73.1	90	1.5	h	826	21.8	h	2.1	0.3	23.6		
1652	43.5	0	1.2	v	1652	-41.8	v	6.8	0.5	-35.5	-13	-22.5
1652	41.2	90	1.5	h	1652	-42.9	h	6.8	0.5	-36.6	-13	-23.6
2478	37.8	180	1.2	v	2478	-45.7	v	7.6	0.7	-38.8	-13	-25.8
2478	35.5	150	1	h	2478	-47.3	h	7.6	0.7	-40.4	-13	-27.4

Primary scan at 836MHz (Mid CH.)

Indicated		Table	st Antenna		Substituted			Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V	Gain Correction	Loss dB	Leval dBm	dBm	dB
836	75.8	60	1.5	v	836	24.1	v	2.1	0.3	25.9		
836	74.2	90	1.5	h	836	22.5	h	2.1	0.3	24.3		
1672	43.7	30	1.2	v	1672	-41.7	v	6.8	0.5	-35.4	-13	-22.4
1672	41.5	110	1.5	h	1672	-42.6	h	6.8	0.5	-36.3	-13	-23.3
2508	38.2	120	1.5	v	2508	-45.3	v	7.6	0.7	-38.4	-13	-25.4
2508	36.1	230	1.2	h	2508	-47.1	h	7.6	0.7	-40.2	-13	-27.2

Primary scan at 846MHz (High CH.)

Indicated		Table	st Antenna		Substituted			Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V	Gain Correction	Loss dB	Leval dBm	dBm	dB
846	74.3	150	1.2	v	846	23.1	v	2.1	0.3	24.9		
846	72.5	0	1	h	846	21.6	h	2.1	0.3	23.4		
1692	43.1	150	1.2	v	1692	-41.9	v	6.8	0.5	-35.6	-13	-22.6
1692	40.7	180	1.2	h	1692	-43.2	h	6.8	0.5	-36.9	-13	-23.9
2538	37.2	90	2	v	2538	-46.3	v	7.6	0.7	-39.4	-13	-26.4
2538	35.3	270	1.2	h	2538	-47.8	h	7.6	0.7	-40.9	-13	-27.9

10 - FREQUENCY STABILITY

10.1 Applicable Standard

Requirements: FCC § 2.1055 (a) and § 2.1055 (d).

10.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a frequency counter via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.

10.3 Test Equipment

Temperature Chamber -50^0 to $+100^0$C
Hewlett Packard 5383A Frequency Counter
Goldstar DC Power Supply, GR303

10.4 Test Results

Frequency Stability Versus Input Voltage

Reference Frequency: 836.00 MHz, Limit: 2.5ppm			
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
		MCF (MHz)	PPM Error
50	9	836.001	1.1
40	9	836.002	2.3
30	9	836.001	1.1
20	9	836.000	0.0
10	9	836.000	0.0
0	9	835.999	-1.2
-10	9	835.999	-1.2
-20	9	835.998	-2.3
-30	9	835.998	-2.3

Frequency Stability Versus Input Voltage

Power Supplied (Vdc)	Reference Frequency: 836.00 MHz, Limit: 2.5ppm			
	Frequency Measure with Time Elapsed			
	5 Minutes		10 Minutes	
	MHz	PPM	MHz	PPM
115% of 120Vac	835.999	-1.2	836.001	1.1
100% of 120Vac	836.000	0.0	836.000	0.0
85% of 120Vac	836.001	1.1	836.000	0.0

11 - CONDUCTED EMISSIONS

11.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is $\pm$2.4 dB.

11.2 EUT Setup

The measurement was performed at the shield room, using the same setup per ANSI C63.4-1992 measurement procedure. The specification used was with FCC Class B limits.

The spacing between peripheral was 10cm.

The external I/O cables were draped and bundled when necessary.

The laptop utilized 120Vac/60Hz power source.

11.3 Spectrum Analyzer Setup

The spectrum analyzer was set with the following configurations during the conduction test:

Start Frequency	150 kHz
Stop Frequency	30 MHz
Sweep Speed	Auto
IF Bandwidth	10 kHz
Video Bandwidth	10 kHz
Quasi-Peak Adapter Bandwidth	9 kHz
Quasi-Peak Adapter Mode	Normal

11.4 Test Procedure

During the conducted emission test, the power cord of the host system was connected to the auxiliary outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of each modes tested to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (within -4 dBµV of specified limits). Quasi-peak readings are distinguished with a "**Qp**".

11.5 Equipment List

Com-Power LISN, LI-200, Calibration Due Date:10/30/2003
Rohde & Schwarz, EMI Test Receiver, Calibration Due Date: 12/03/2003
Epson 800 Color Printer, Calibration not required.

11.6 Summary of Test Results

According to the data in section 10.7, the EUT complied with the FCC Conducted margin for a Class B device and these test results is deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations, with the *worst* margin reading of:

-2.2 dBμV at 0.81 MHz in the Neutral mode

11.7 Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC CLASS B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
0.81	43.8	Ave	Neutral	46	-2.2
0.81	43.5	Ave	Line	46	-2.5
0.16	55.4	Qp	Line	63	-7.6
0.18	46.2	Ave	Line	54	-7.8
0.81	46.1	Qp	Neutral	56	-9.9
0.81	45.6	Qp	Line	56	-10.4
28.5	34.6	Ave	Line	50	-15.4
23.5	30.1	Ave	Neutral	50	-19.9
28.5	34.7	Qp	Line	60	-25.3
0.18	25.4	Ave	Neutral	54	-28.6
23.5	31.4	Qp	Neutral	60	-28.8
0.15	28.8	Qp	Neutral	66	-37.2

11.8 Plot of Conducted Emissions Test Data

Plot(s) of Conducted Emissions Test Data is presented hereinafter as reference.

Bay Area Compliance Corporation 22. Mar 03 12:43
CISPR CLASS B

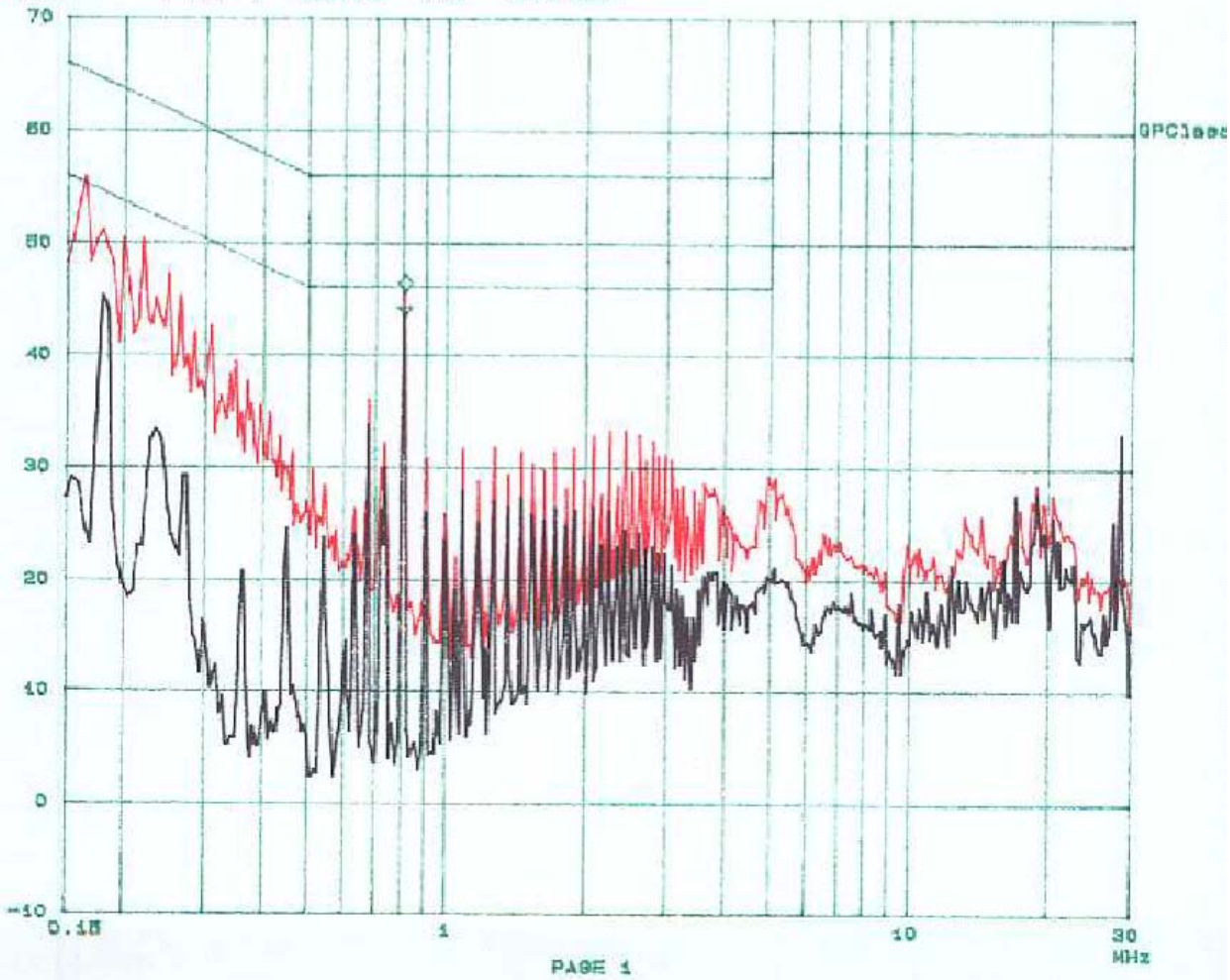
EUT: MM-5100
Manuf: Maxon
Op Cond: Normal
Operator: Benjamin
Test Spec: *
Comment: Line

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	5k	9k	QP+CAV	20ms	10dBl.N	OFF

Final Measurement: x QP / + CAV
Meas Time: 1 s
Subranges: 25
Acc Margin: 6dB

◊ Mkr : 810.00 kHz 45.6 dBuV
▽ Mkr : 810.00 kHz 43.5 dBuV



Bay Area Compliance Corporation 21. Mar 03 10:21

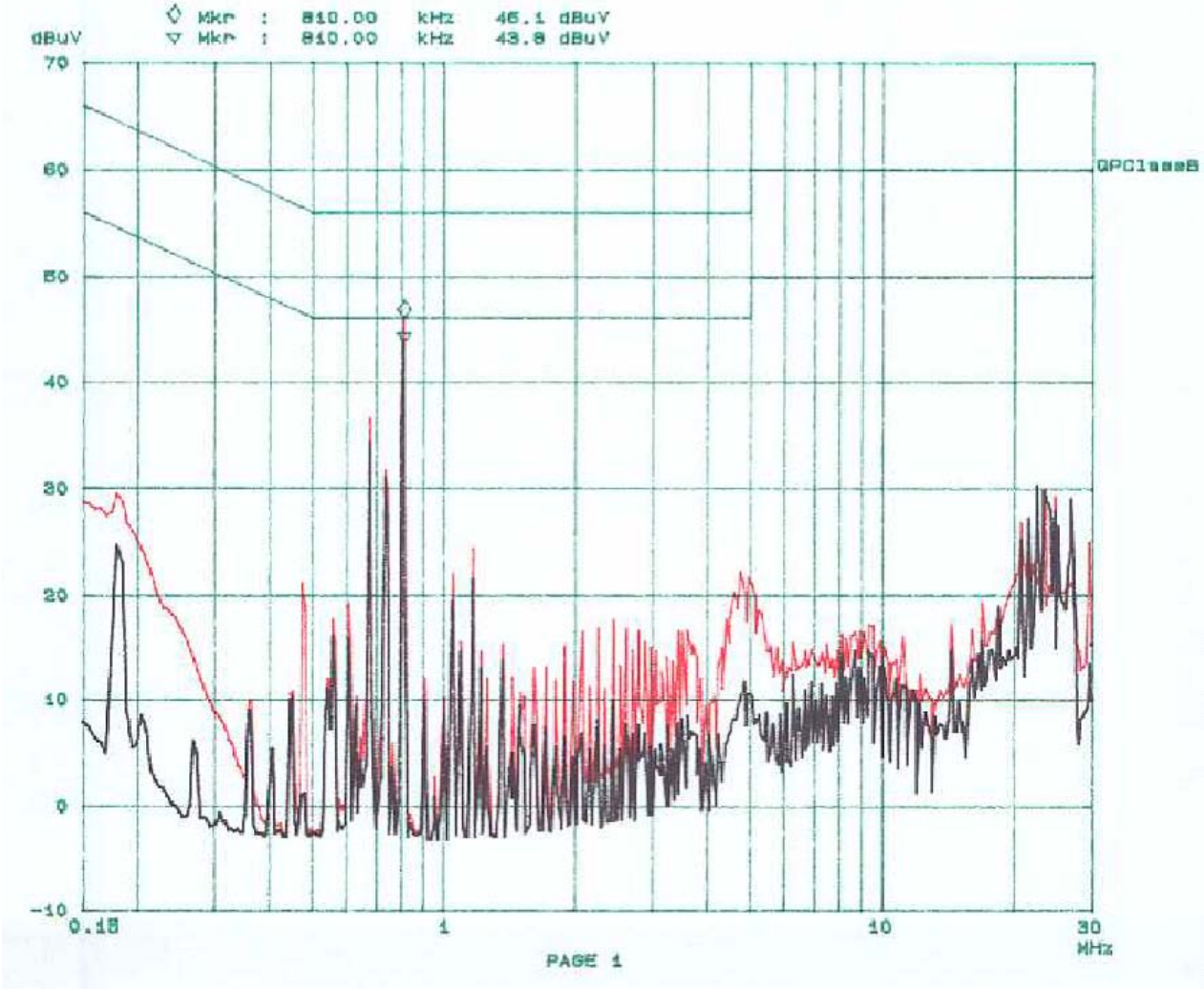
CISPR CLASS B

EUT: MM-5100
Manuf: Maxon
Op Cond: Normal
Operator: Benjamin
Comment: NEUTRAL

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	5k	9k	QP+AV	20ms	10dBLN	OFF

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 28
Acc Margin: 6dB



12 - RF EXPOSURE

According to §15.247(b)(4) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-15000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

MPE Prediction

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 23.83 (dBm)
Maximum peak output power at antenna input terminal: 241.55 (mW)
Prediction distance: 20 (cm)
Predication frequency: 849 (MHz)
13dBi Panel Antenna, Antenna Gain (typical): 3 (dBi)
antenna gain: 1.995 (numeric)
Power density at predication frequency at 20 cm: 0.0959 (mW/cm^2)

MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm^2)

Test Result

The EUT is defined as a mobile device since the predicted power density level at 20 cm is 0.0959 mW/cm^2. This is below the uncontrolled exposure limit of 1mW/cm^2 at 2400 MHz.