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-5100P

2003-10-08

This Report Concerns:	**Equipment Type:**
☒ Original Report	CDMA 1X Network Card

Test Engineer:	Ling Zhang /
Report No.:	R0308292
Test Date:	2003-09-26
Reviewed By:	Benjamin Jing /
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-5100P, FCC ID:Q2FMM-5100P or the "EUT " as referred to in this report is a CDMA 1X Network Card which measures approximately 95mm x 54mm x 5mm. The EUT operates at the frequency range of 824.64 ~ 848.37MHz. with the maximum output power of 24.83dBm (304.09mW).

The EUT was tested with 3 host Laptop PC separately. They are Dell, IBM and Sony. And the laptop PC systems were fed by the their own AC power adapters respectively.

* *The test data gathered are 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 63.4-2001, 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 C63.4-2001.

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
DELL	Notebook PC	PP01S	0001498T-12800-068-0887	DOC
IBM	Notebook PC	2647	78-MPGZ8	DOC
SONY	Notebook PC	PCG-885L	283520304516747	DOC
HP	Printer	2225C	N/A	DOC

1.7 External I/O Cabling

Cable Description	Length (M)	Port/From	To
Shielded Printer Cable	2.0	Parallel Port/Notebook PC	Printer

1.8 Power Supply List

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	AC Adapter	ADP-50SB	CN-09834T-17972-083-03DF	DOC
IBM	AC Adapter	02K6665	1Z0ZX0794D1	DOC
SONY	AC Adapter	PCGA-AC16V	0111A0217169P	DOC

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.

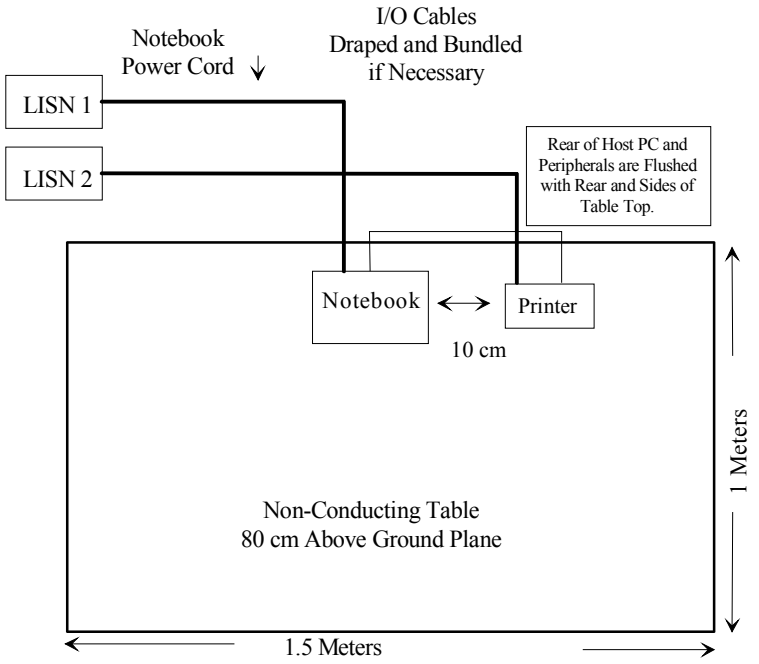
2.2 Block Diagram

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

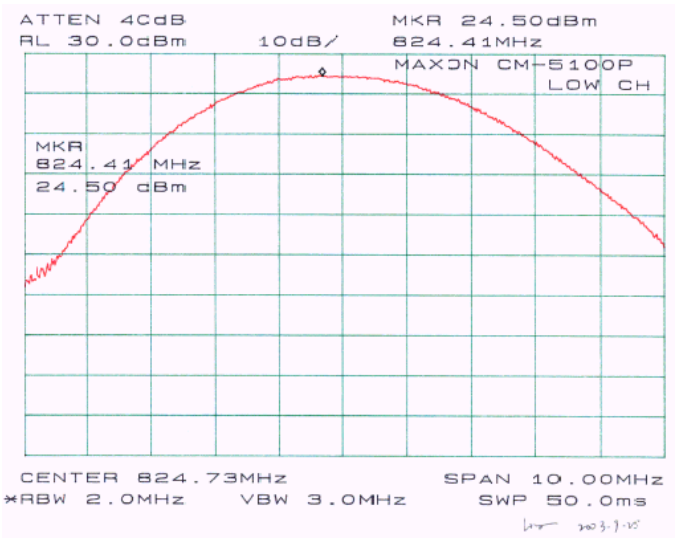
The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

4.3 Test Equipment

Hewlett Packard HP8564E Spectrum Analyzer, Calibration Due Date: 2004-08-01.
Hewlett Packard HP 7470A Plotter, Calibration not required.
A.H. Systems SAS200 Horn Antenna, Calibration Due Date: 2004-05-31
Com-Power AB-100 Dipole Antenna, Calibration Due Date: 2004-09-05

4.4 Test Results

Channel	Output Power in dBm	Output Power in W	Limit in W
824.41	24.50	0.282	7
836.22	24.83	0.304	7
848.02	24.67	0.293	7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10dB/
MKR 24.50dBm
824.41MHz
MAXON CM-5100P
LOW CH
MKR
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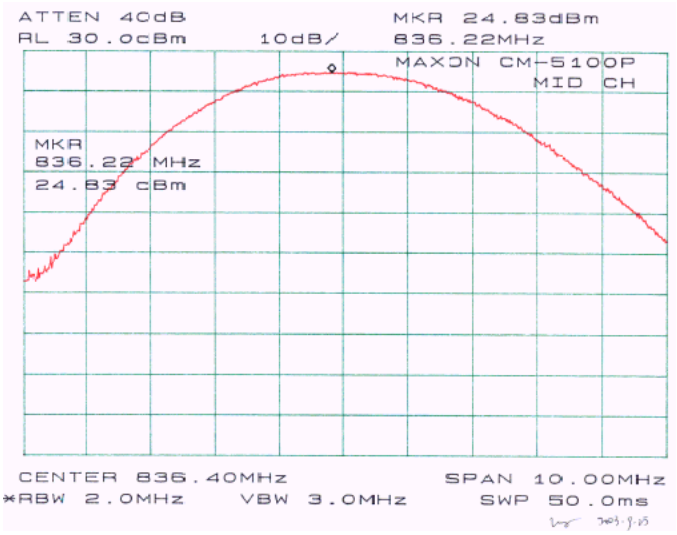
*RBW 2.0MHz
VBW 3.0MHz
SWP 50.0ms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10dB/
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836.22MHz
MAXON CM-5100P
MID CH
MKR
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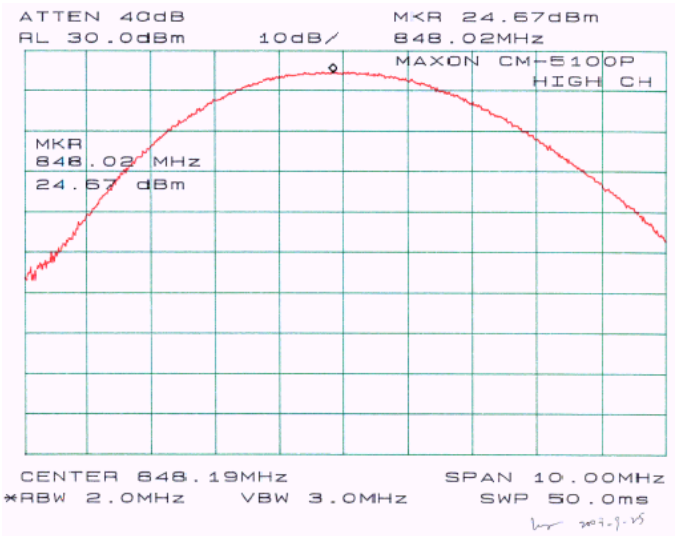
VBW 3.0MHz
SWP 50.0ms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RL 30.0dBm
10dB/
MKR 24.67dBm
848.02MHz
MAXON CM-5100P
HIGH CH
MKR
848.02 MHz
24.67 dBm
CENTER 848.19MHz
SPAN 10.00MHz
*RBW 2.0MHz
VBW 3.0MHz
SWP 50.0ms

5 – EFFECTIVE RADIATED POWER

5.1 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.

5.2 Test Procedure

1. On a test site, the EUT shall be placed at 1.5m height on a turn table, and in the position closest to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3m from EUT to correspond to the frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the quasi-peak detector is used for the measurement.
4. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.
5. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
6. The transmitter shall then the rotated through 360? in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
7. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
8. The maximum signal level detected by the measuring receiver shall be noted.
9. The transmitter shall be replaced by a tuned dipole (substitution antenna).
10. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. In necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
14. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

17. The measure of the effective radiated power is the large of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

5.3 Test equipment

Signal Generator
Manufacturer: Hewlett Packard
Model: OPT001
S/N: 3217A04699
Calibration Due Date: 2004-02-05

Dipole Antenna
Manufacturer: Com Power Corporation
Model: AD-100
S/N: 02222
Calibration Due Date: 2004-07-23

5.4 Test Results

The measured output power showed as follows:

EUT with DELL Laptop:

Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Leval dBm
Frequency MHz	Level dBm	Polar H/V			
824.73	17	v	6.1	0.1	**23.0**
824.73	16.8	h	6.1	0.1	22.8
836.4	17.1	v	6.1	0.1	**23.1**
836.4	16.8	h	6.1	0.1	22.8
848.19	16.9	v	6.1	0.1	**22.9**
848.19	16.6	h	6.1	0.1	22.6

EUT with IBM Laptop:

Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Leval dBm
Frequency MHz	Level dBm	Polar H/V			
824.73	16.6	v	6.1	0.1	**22.6**
824.73	16.4	h	6.1	0.1	22.4
836.4	16.7	v	6.1	0.1	**22.7**
836.4	16.5	h	6.1	0.1	22.5
848.19	16.1	v	6.1	0.1	**22.1**
848.19	16	h	6.1	0.1	22.0

EUT with Sony Laptop:

Substituted			Antenna Gain Correction	Cable Loss dB	Absolute Leval dBm
Frequency MHz	Level dBm	Polar H/V			
824.73	16.6	v	6.1	0.1	**22.6**
824.73	16.4	h	6.1	0.1	22.4
836.4	17.2	v	6.1	0.1	**23.2**
836.4	16.8	h	6.1	0.1	22.8
848.19	16.8	v	6.1	0.1	**22.8**
848.19	16.3	h	6.1	0.1	22.3

6 - OCCUPIED BANDWIDTH

6.1 Applicable Standard

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

6.2 Test Procedure

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

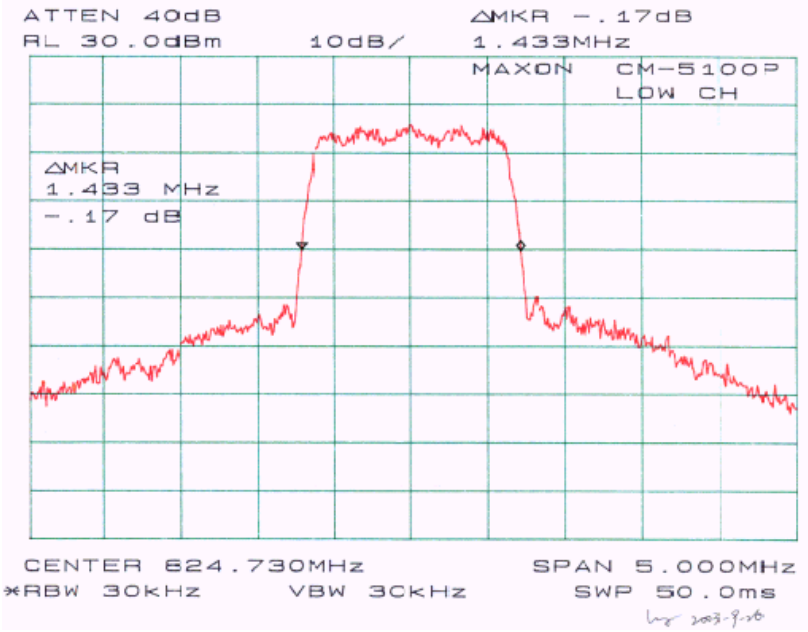
The resolution bandwidth of the spectrum analyzer was set at 30 KHz and the 26 dB bandwidth was recorded.

6.3 Test Equipment

Hewlett Packard HP8564E Spectrum Analyzer, Calibration Due Date: 2004-08-01.
Hewlett Packard HP 7470A Plotter, Calibration not required.

6.4 Test Results

Please refer to the following plots.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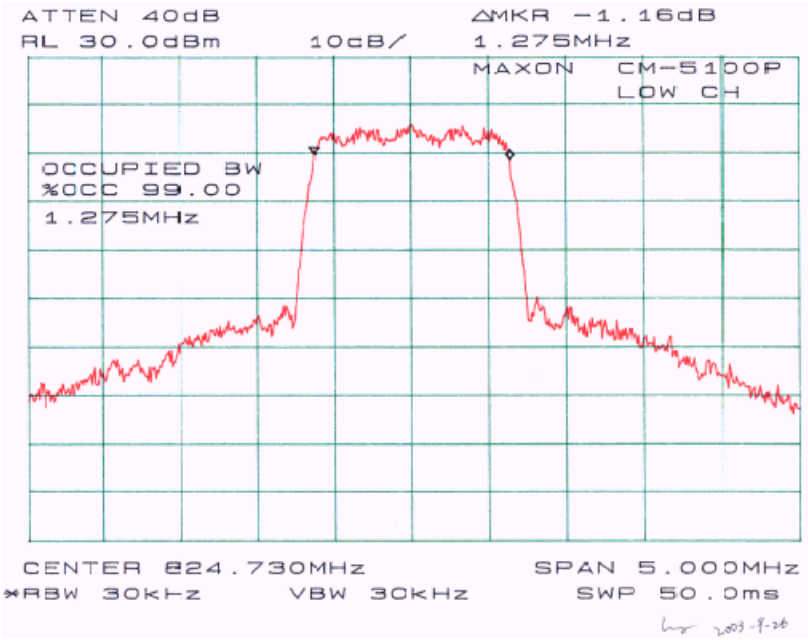
RL 30.0dBm
10dB/
ΔMKR -.17dB
1.433MHz
MAXON CM-5100P
LOW CH
ΔMKR
1.433 MHz
-.17 dB
CENTER 824.730MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms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ΔMKR -1.16dB
1.275MHz
MAXON CM-5100P
LOW CH
OCCUPIED BW
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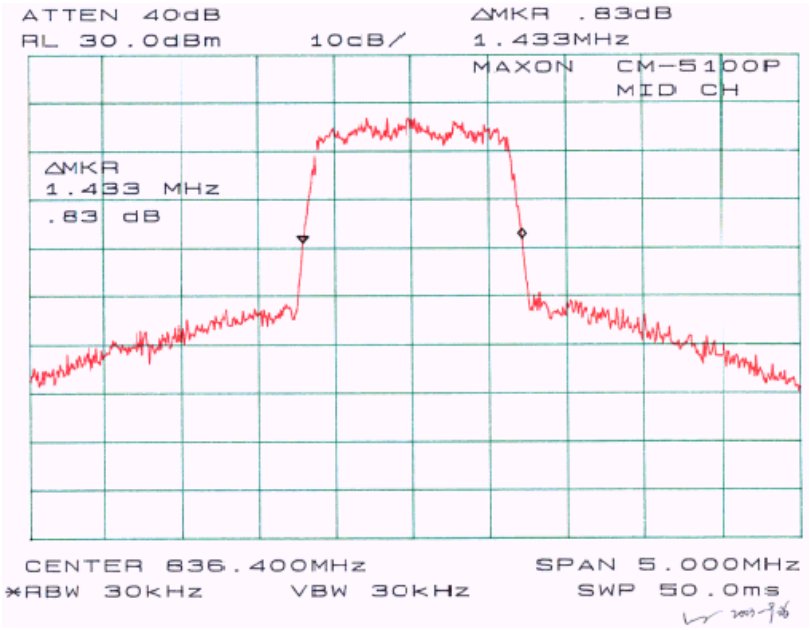
1.275MHz
CENTER 824.730MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms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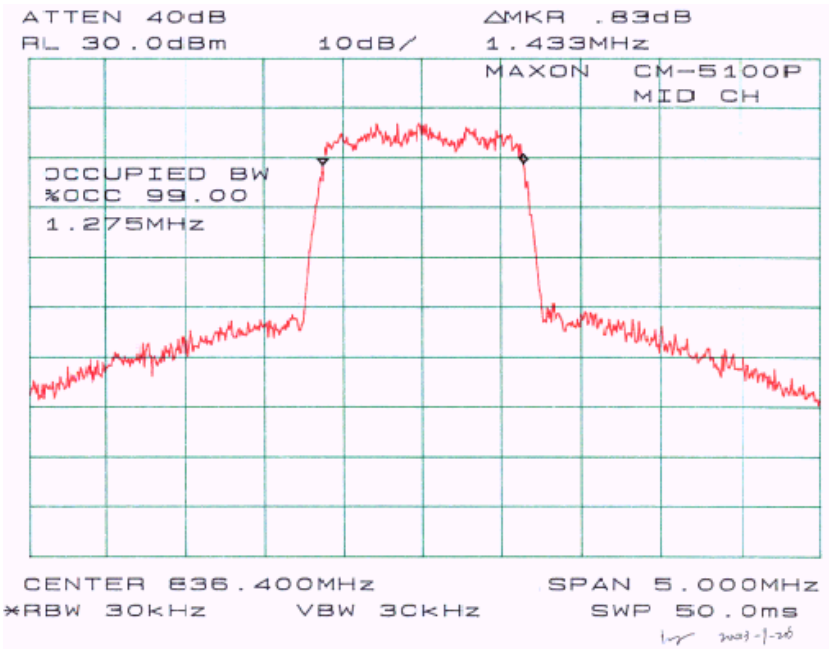
10dB/
ΔMKR .83dB
1.433MHz
MAXON CM-5100P
MID CH
ΔMKR
1.433 MHz
.83 dB
CENTER 836.400MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms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RL 30.0dBm
10dB/
ΔMKR .83dB
1.433MHz
MAXON CM-5100P
MID CH
OCCUPIED BW
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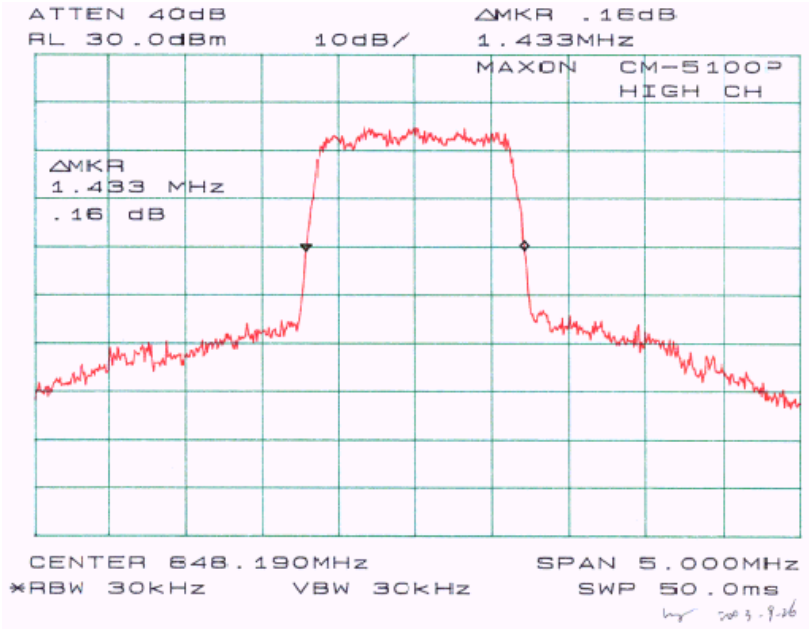
1.275MHz
CENTER 836.400MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 3CkHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR .16dB
1.433MHz
MAXON CM-5100P
HIGH CH
ΔMKR
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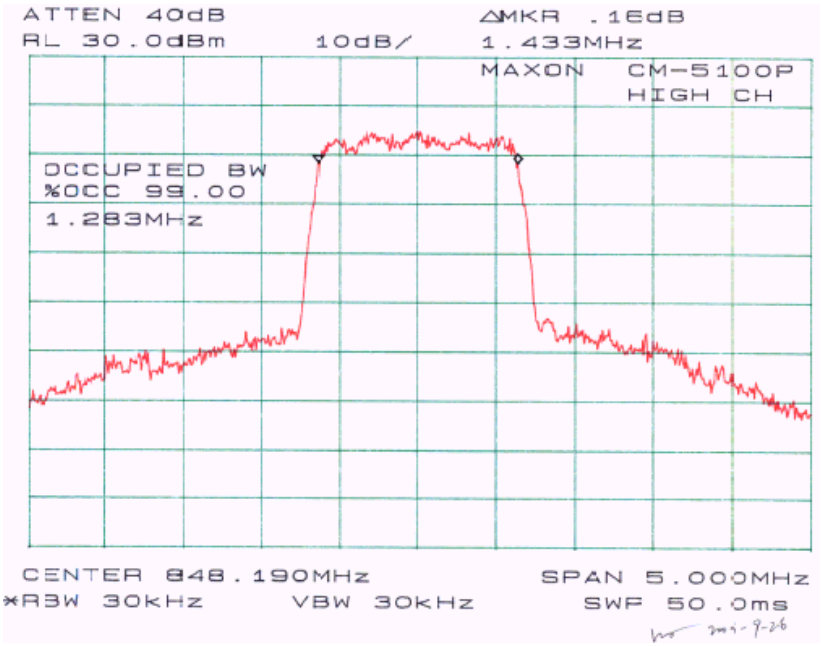
.16 dB
CENTER 648.190MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms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OCCUPIED BW
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1.283MHz
CENTER 848.190MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

7 - MODULATION CHARACTERISTIC

7.1 Applicable Standard

Requirement: FCC § 2.1047.

7.2 Test Procedure

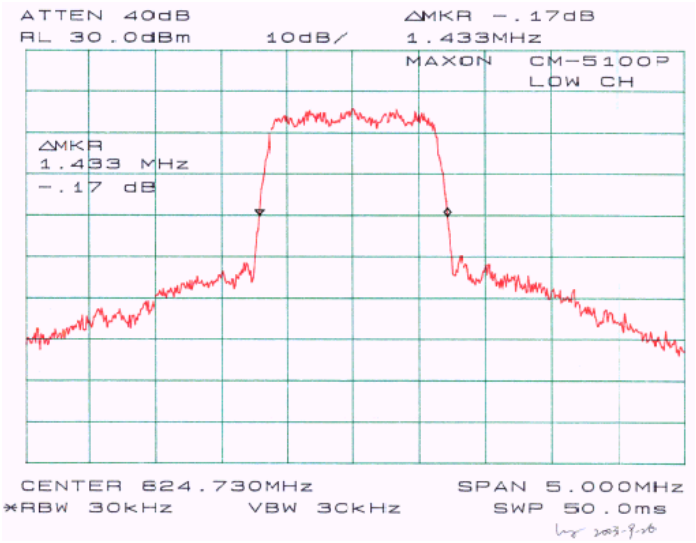
CDMA digital mode is used by EUT.

7.3 Test Equipment

Hewlett Packard HP8564E Spectrum Analyzer, Calibration Due Date:2004-08-01
Hewlett Packard HP 7470A Plotter, Calibration not required.

7.4 Test Results

Please refer to the hereinafter plots.


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR -.17dB
1.433MHz
MAXON CM-5100P
LOW CH
ΔMKR
1.433 MHz
-.17 dB
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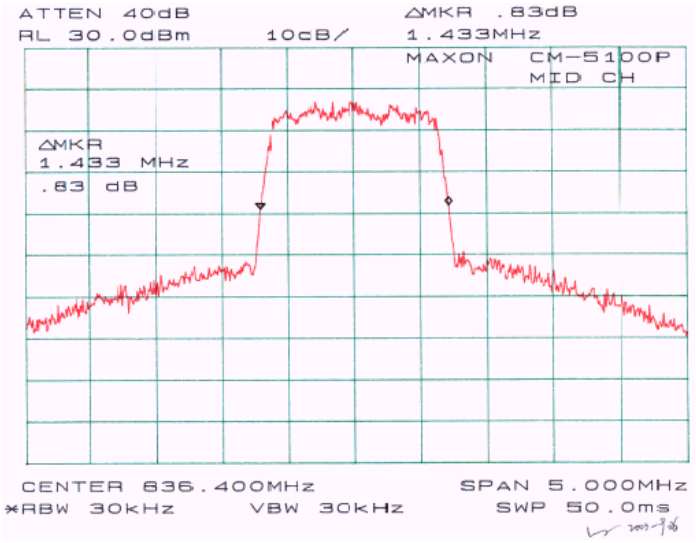
SPAN 5.000MHz
*RBW 30kHz
VBW 3CkHz
SWP 50.0ms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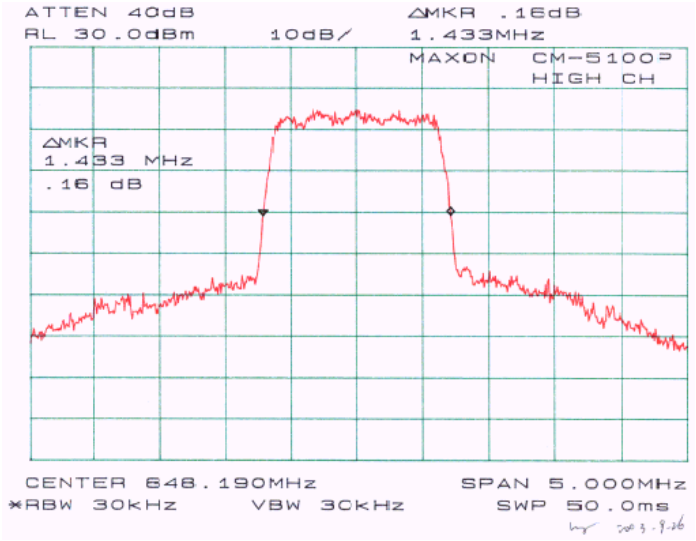
RL 30.0dBm
10cB/
ΔMKR .83dB
1.433MHz
MAXON CM-5100P
MID CH
ΔMKR
1.433 MHz
.83 dB
CENTER 836.400MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR .16dB
1.433MHz
MAXON CM-5100P
HIGH CH
ΔMKR
1.433 MHz
.16 dB
CENTER 648.190MHz
SPAN 5.000MHz
*RBW 30kHz
VBW 3CkHz
SWP 50.0ms

8 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

8.1 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.

8.2 Test Procedure

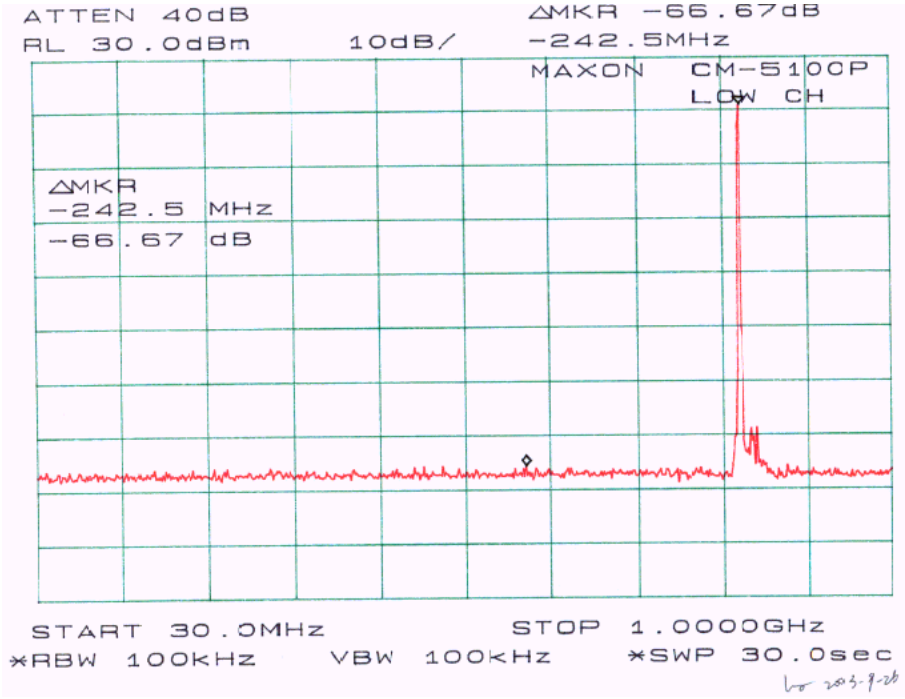
The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.

8.3 Test Equipment

Hewlett Packard HP 8564E Spectrum Analyzer, Calibration Due Date: 2004-08-01
HP 7470A Plotter, Calibration not required.

8.4 Test Results

Please refer to the hereinafter plots.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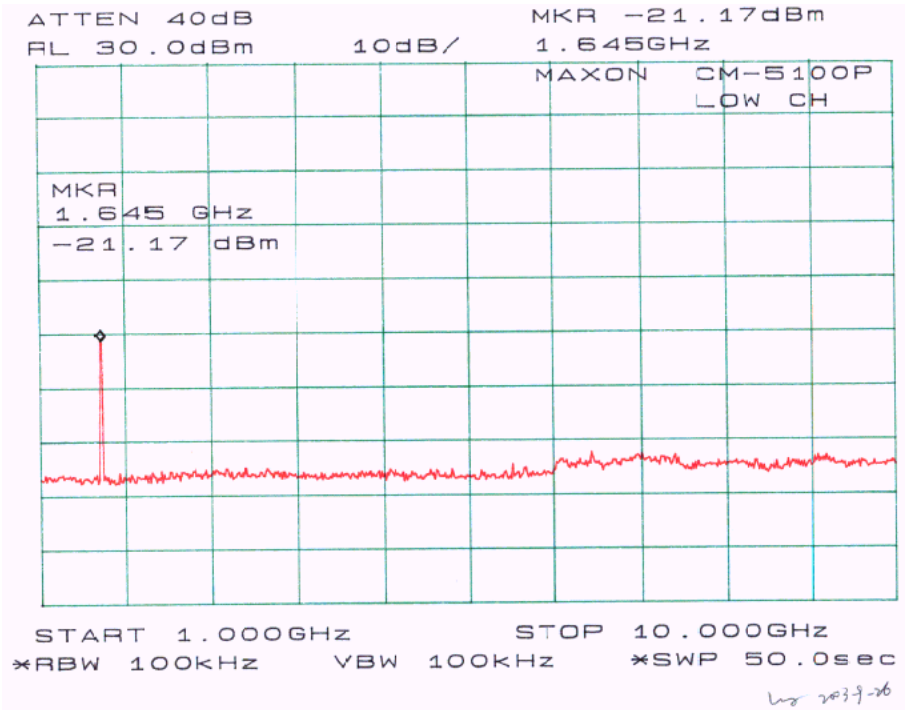
10dB/
ΔMKR -66.67dB
-242.5MHz
MAXON CM-5100P
LOW CH
ΔMKR
-242.5 MHz
-66.67 dB
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 30.0sec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10dB/
MKR -21.17dBm
1.645GHz
MAXON CM-5100P
LOW CH
MKR
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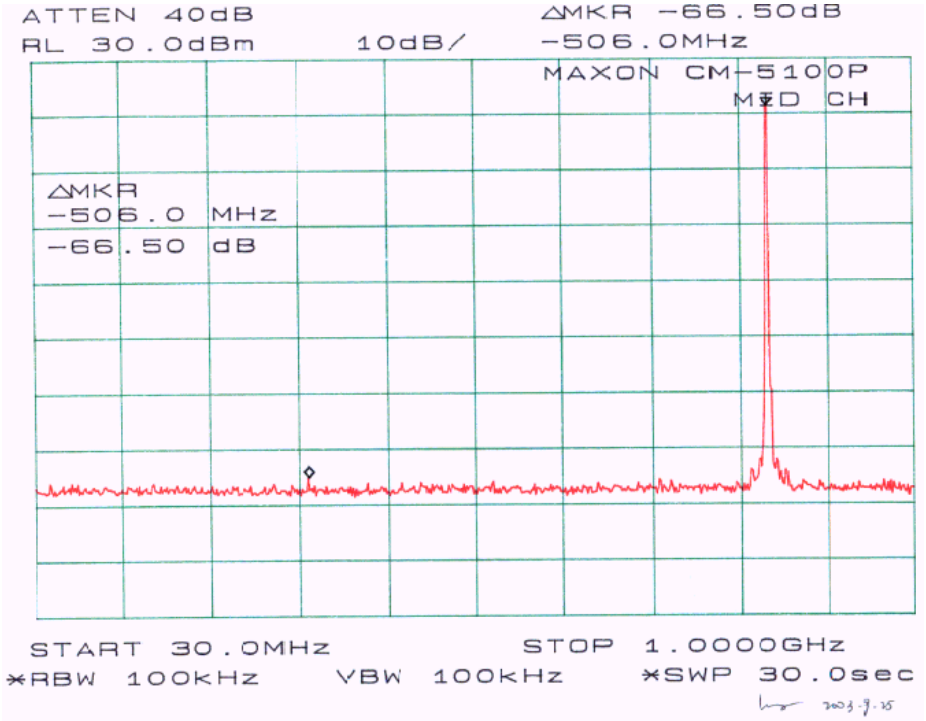
-21.17 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec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10dB/
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MID CH
ΔMKR
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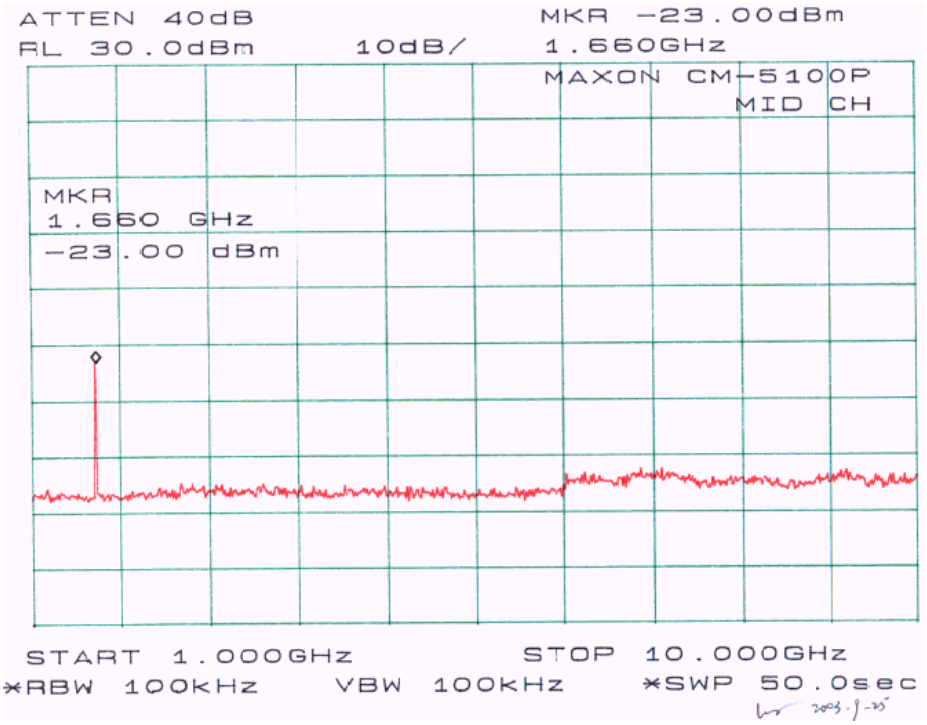
-66.50 dB
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 30.0sec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10dB/
MKR -23.00dBm
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MAXON CM-5100P
MID CH
MKR
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-23.00 dBm
START 1.000GHz
STOP 10.000GHz
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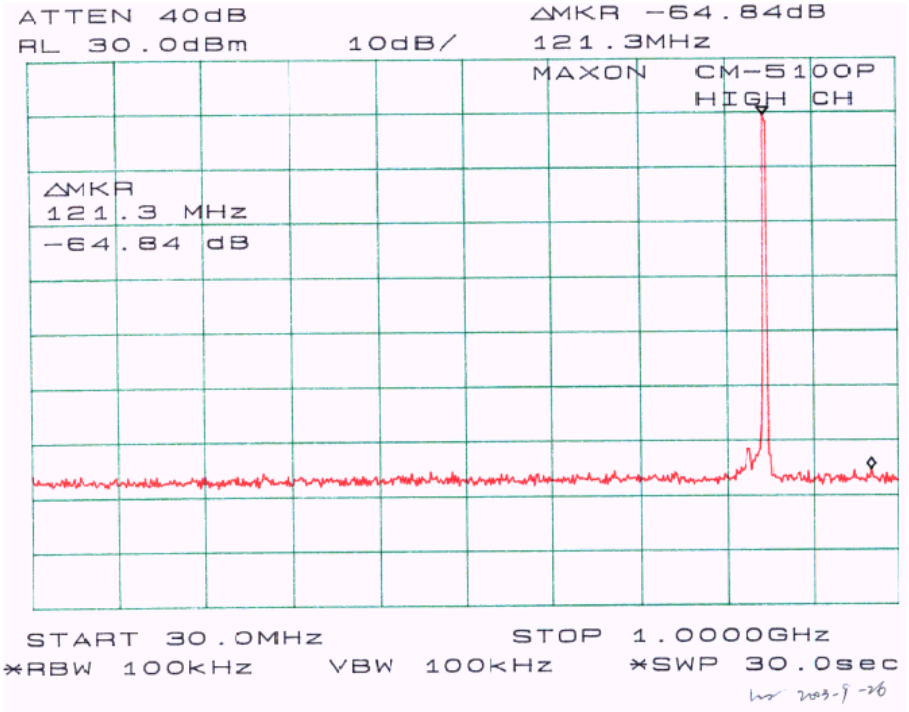
VBW 100kHz
*SWP 50.0sec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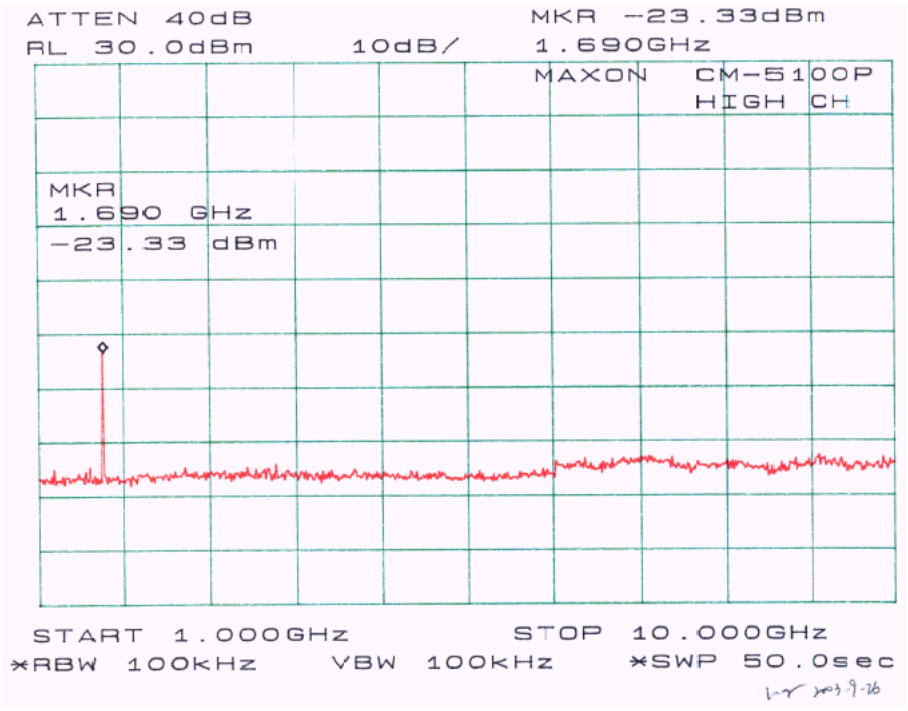
10dB/
ΔMKR -64.84dB
121.3MHz
MAXON CM-5100P
HIGH CH
ΔMKR
121.3 MHz
-64.84 dB
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 30.0sec


ATTEN 40dB
RL 30.0dBm
10dB/
MKR -23.33dBm
1.690GHz
MAXON CM-5100P
HIGH CH
MKR
1.690 GHz
-23.33 dBm
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

9 – BAND EDGE

9.1 Applicable Standard

Requirement: § 22.917.

9.2 Test Procedure

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

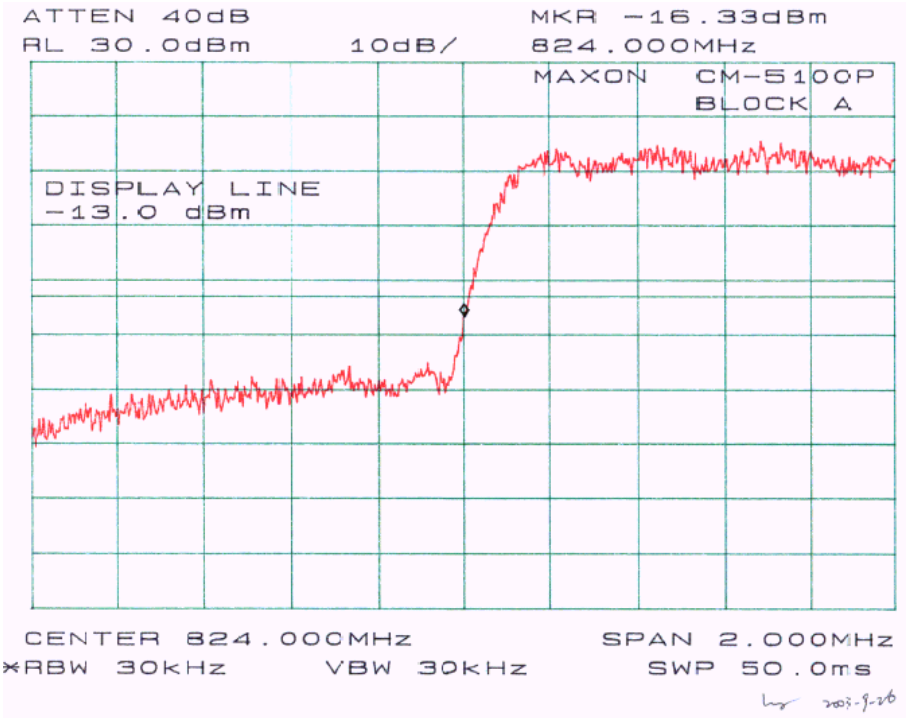
The center of the spectrum analyzer was set to block edge frequency, RBW set to 30KHz.

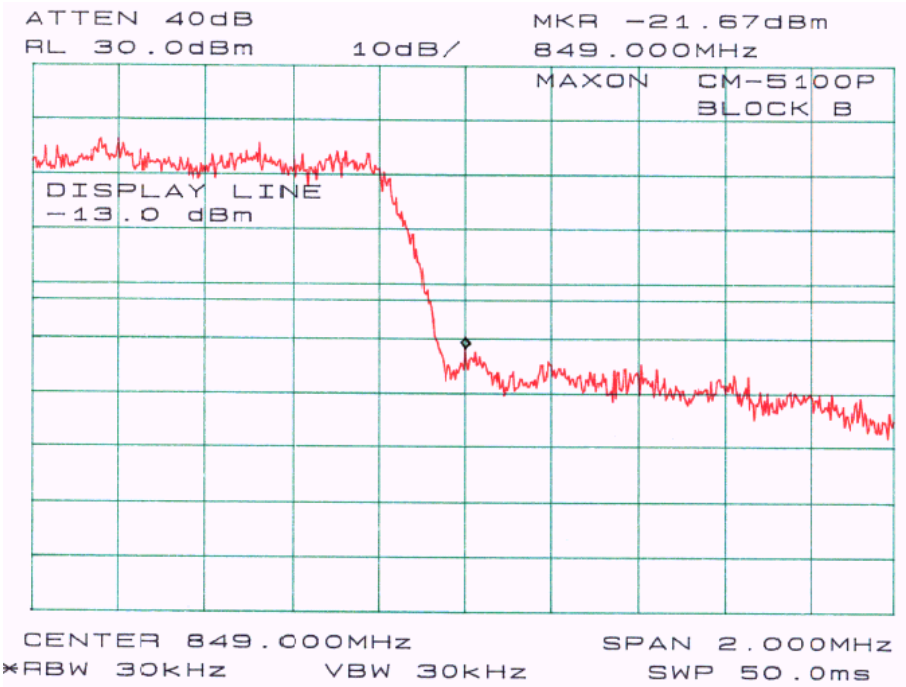
9.3 Test Equipment

Hewlett Packard HP8564E Spectrum Analyzer, Calibration Due Date: 2004-08-01.
Hewlett Packard HP 7470A Plotter, Calibration not required.

9.4 Test Results

Please refer to the following plots.


ATTEN 40dB
RL 30.0dBm
10dB/
MKR -16.33dBm
824.000MHz
MAXON CM-5100P
BLOCK A
DISPLAY LINE
-13.0 dBm
CENTER 824.000MHz
SPAN 2.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
MKR -21.67dBm
849.000MHz
MAXON CM-5100P
BLOCK B
DISPLAY LINE
-13.0 dBm
CENTER 849.000MHz
SPAN 2.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms

10 – RADIATED SPURIOUS EMISSION

10.1 Applicable Standard

Requirements: CFR 47, § 2.1053.

10.2 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 = $43 + 10 \text{ Log}_{10}$ (power out in Watts)

10.3 Test Equipment

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

10.4 Test Result

EUT installed in DELL notebook PC:

Low Frequency: -11.2dB at 1649.46MHz
Middle Frequency: -10.4dB at 1672.8MHz
High Frequency: -11.4dB at 1696.38MHz

EUT installed in IBM notebook PC:

Low Frequency: -11.5dB at 1649.46MHz
Middle Frequency: -12.2dB at 1672.8MHz
High Frequency: -13.1dB at 1696.38MHz

EUT installed in SONY notebook PC:

Low Frequency: -11.2dB at 1649.46MHz
Middle Frequency: -10.0dB at 1672.8MHz
High Frequency: -10.2dB at 1696.38MHz

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.

Notebook: DELL Latitude LS

Run # 1- 1 :Primary scan 1GHz -10GHz , Low CH

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Leval dBm	dBm	dB
824.73	120.5	60	2.1	v	824.73	17	6.1	0.1	23		
824.73	120.33	0	1.7	h	824.73	16.8	6.1	0.1	22.8		
1649.46	47.5	100	2.3	v	1649.46	-30.5	6.8	0.5	-24.2	-13	-11.2
1649.46	47.17	45	1.7	h	1649.46	-30.9	6.8	0.5	-24.6	-13	-11.6
2474.19	38.5	90	2.1	v	2474.19	-41.3	7.6	0.7	-34.4	-13	-21.4
2474.19	38.33	60	2.2	h	2474.19	-41.9	7.6	0.7	-35	-13	-22.0

Run # 1- 2 :Primary scan 1GHz -10GHz , Mid CH

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Leval dBm	dBm	dB
836.4	121.33	45	2	v	836.4	17.1	6.1	0.1	23.13		
836.4	121	0	1.7	h	836.4	16.8	6.1	0.1	22.8		
1672.8	47.67	60	2	v	1672.8	-29.7	6.8	0.5	-23.4	-13	-10.4
1672.8	46.17	30	1.5	h	1672.8	-31	6.8	0.5	-24.7	-13	-11.7
2509.2	39.5	270	1.8	v	2509.2	-40.1	7.6	0.7	-33.2	-13	-20.2
2509.2	39.17	150	1.6	h	2509.2	-40.5	7.6	0.7	-33.6	-13	-20.6

Run # 1- 3: Primary scan 1GHz -10GHz , High CH

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Leval dBm	dBm	dB
848.19	121	100	2.1	v	848.19	16.9	6.1	0.1	22.9		
848.19	120.67	90	2.3	h	848.19	16.6	6.1	0.1	22.6		
1696.38	46.83	30	1.8	h	1696.38	-30.7	6.8	0.5	-24.4	-13	-11.4
1696.38	47.83	330	2	v	1696.38	-31.7	6.8	0.5	-25.4	-13	-12.4
2544.57	38.6	300	2	v	2544.57	-41.1	7.6	0.7	-34.2	-13	-21.2
2544.57	38.5	30	1.8	h	2544.57	-41.3	7.6	0.7	-34.4	-13	-21.4

Notebook: IBM

Run # 2- 1 :Primary scan 1GHz -10GHz , Low CH

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Leval dBm	dBm	dB
824.73	120	250	2.2	v	824.73	16.6	6.1	0.1	22.6		
824.73	119.67	200	1.8	h	824.73	16.4	6.1	0.1	22.4		
1649.46	45.83	180	2	h	1649.46	-30.8	6.8	0.5	-24.5	-13	-11.5
1649.46	46.17	90	2.2	v	1649.46	-31.2	6.8	0.5	-24.9	-13	-11.9
2474.19	38.1	100	2.1	v	2474.19	-41.7	7.6	0.7	-34.8	-13	-21.8
2474.19	37.67	200	2.2	h	2474.19	-43	7.6	0.7	-36.1	-13	-23.1

Run # 2 - 2 :Primary scan 1GHz -10GHz , Mid CH

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Leval dBm	dBm	dB
836.4	120.67	220	1.8	v	836.4	16.7	6.1	0.1	22.7		
836.4	120.5	200	1.7	h	836.4	16.5	6.1	0.1	22.5		
1672.8	45	220	1.8	h	1672.8	-31.5	6.8	0.5	-25.2	-13	-12.2
1672.8	45.33	100	2.2	v	1672.8	-31.7	6.8	0.5	-25.4	-13	-12.4
2509.2	38.17	90	2	v	2509.2	-41.2	7.6	0.7	-34.3	-13	-21.3
2509.2	37.65	0	1.8	h	2509.2	-42.6	7.6	0.7	-35.7	-13	-22.7

Run # 2 - 3: Primary scan 1GHz -10GHz , High CH

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Leval dBm	dBm	dB
848.19	119.83	200	2	v	848.19	16.1	6.1	0.1	22.1		
848.19	119.67	180	1.8	h	848.19	16	6.1	0.1	22		
1696.38	45.33	200	1.8	h	1696.38	-32.4	6.8	0.5	-26.1	-13	-13.1
1696.38	45.67	220	2.2	v	1696.38	-32.7	6.8	0.5	-26.4	-13	-13.4
2544.57	37.5	180	1.8	v	2544.57	-42.3	7.6	0.7	-35.43	-13	-22.4
2544.57	37.17	60	2.2	h	2544.57	-42.5	7.6	0.7	-35.6	-13	-22.6

Notebook: Sony

Run # 3 - 1 :Primary scan 1GHz -10GHz , Low CH

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Leval dBm	dBm	dB
824.73	120	30	1.8	v	824.73	16.6	6.1	0.1	22.6		
824.73	119.83	270	2	h	824.73	16.4	6.1	0.1	22.4		
1649.46	47.68	250	2	v	1649.46	-30.5	6.8	0.5	-24.2	-13	-11.2
1649.46	47.15	270	2.2	h	1649.46	-31	6.8	0.5	-24.7	-13	-11.7
2474.19	38.33	60	2	v	2474.19	-41.5	7.6	0.7	-34.6	-13	-21.6
2474.19	37.83	220	1.8	h	2474.19	-42.1	7.6	0.7	-35.2	-13	-22.2

Run # 3 - 2 :Primary scan 1GHz -10GHz , Mid CH

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Leval dBm	dBm	dB
836.4	121.17	200	2.2	v	836.4	17.2	6.1	0.1	23.2		
836.4	120.67	250	2.5	h	836.4	16.8	6.1	0.1	22.8		
1672.8	48.33	180	2.5	v	1672.8	-29.3	6.8	0.5	-23	-13	-10.0
1672.8	47.5	180	1.6	h	1672.8	-30.1	6.8	0.5	-23.8	-13	-10.8
2509.2	38.5	180	1.8	v	2509.2	-41.3	7.6	0.7	-34.4	-13	-21.4
2509.2	38.1	250	2.2	h	2509.2	-42.9	7.6	0.7	-36	-13	-23.0

Run # 3 - 3: Primary scan 1GHz -10GHz , High CH

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Gain Correction	Loss dB	Leval dBm	dBm	dB
848.19	120.5	200	2.5	v	848.19	16.8	6.1	0.1	22.8		
848.19	120	220	2	h	848.19	16.3	6.1	0.1	22.3		
1696.38	48.17	180	2.5	v	1696.38	-29.5	6.8	0.5	-23.2	-13	-10.2
1696.38	46.33	180	2.2	h	1696.38	-31.2	6.8	0.5	-24.9	-13	-11.9
2544.57	38.33	180	2.2	v	2544.57	-41.2	7.6	0.7	-34.3	-13	-21.3
2544.57	38.15	200	1.6	h	2544.57	-41.3	7.6	0.7	-34.4	-13	-21.4

Note : no pre-amplifier for the harmonic test.

11 - FREQUENCY STABILITY

11.1 Applicable Standard

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

11.2 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.

11.3 Test Equipment

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

11.4 Test Results

Frequency Stability Versus Temperature

Reference Frequency: 836.400 MHz, Limit: 2.5ppm		
Environment Temperature	Frequency Measure with Time Elapsed	
(°C)	MCF (MHz)	PPM Error
50	836.401	1.20
40	836.401	1.20
30	836.400	0.00
20	836.400	0.00
10	836.400	0.00
0	836.400	0.00
-10	836.401	1.20
-20	836.402	2.39

Frequency Stability Versus Input Voltage

	Reference Frequency: 836.400 MHz, Limit: 2.5ppm	
Power Supplied	Frequency Measure with Time Elapsed	
(Vdc)	MHz	PPM
102	836.001	0.00
138	836.000	1.20

12 - CONDUCTED EMISSIONS

12.1 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.

12.2 EUT Setup

The measurement was performed at the shield room, using the same setup per ANSI C63.4-2001 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.

12.3 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

12.4 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**".

12.5 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.

12.6 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:

DELL: -10.7 dBµV at 7.200 MHz in the Neutral mode

IBM: -4.3 dBµV at 0.575 MHz in the Neutral mode

SONY: -4.7 dBµV at 0.180 MHz in the Neutral mode

12.7 Conducted Emissions Test Data

DELL:

LINE CONDUCTED EMISSIONS				FCC CLASS B	
Frequency MHz	Amplitude dBµV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBµV	Margin dB
7.200	39.3	AVG	Neutral	50	-10.7
0.825	31.8	AVG	Neutral	46	-14.2
8.300	35.1	AVG	Line	50	-14.9
9.400	33.0	AVG	Line	50	-17.0
8.300	40.3	QP	Line	60	-19.7
7.200	39.4	QP	Neutral	60	-20.6
0.825	33.5	QP	Neutral	56	-22.5
9.400	37.4	QP	Line	60	-22.6
0.205	29.4	AVG	Line	54	-24.6
0.205	37.2	QP	Line	64	-26.8
0.205	36.2	QP	Neutral	64	-27.8
0.205	25.2	AVG	Neutral	54	-28.8

IBM:

LINE CONDUCTED EMISSIONS				FCC CLASS B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
0.575	41.7	AVG	Neutral	46	-4.3
0.575	41.2	AVG	Line	46	-4.8
0.640	37.4	AVG	Line	46	-8.6
0.150	55.3	QP	Neutral	66	-10.7
0.575	45.1	QP	Neutral	56	-10.9
0.575	44.7	QP	Line	56	-11.3
0.150	53.9	QP	Line	66	-12.1
0.525	42.1	QP	Neutral	56	-13.9
0.525	32.1	AVG	Neutral	46	-13.9
0.640	41.2	QP	Line	56	-14.8
0.150	25.0	AVG	Neutral	56	-31.0
0.150	23.3	AVG	Line	56	-32.7

SONY:

LINE CONDUCTED EMISSIONS				FCC CLASS B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
0.180	48.3	AVG	Neutral	53	-4.7
0.180	47.1	AVG	Line	53	-5.9
0.180	51.8	QP	Neutral	63	-11.2
0.180	51.0	QP	Line	63	-12.0
1.710	30.9	AVG	Line	46	-15.1
2.070	29.8	AVG	Line	46	-16.2
0.900	29.2	AVG	Neutral	46	-16.8
3.500	33.7	QP	Neutral	56	-22.3
0.900	33.4	QP	Neutral	56	-22.6
2.070	33.2	QP	Line	56	-22.8
1.710	33.0	QP	Line	56	-23.0
3.500	21.9	AVG	Neutral	46	-24.1

12.8 Plot of Conducted Emissions Test Data

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

Bay Area Compliance Laboratory Corp 29. Sep 03 10:31

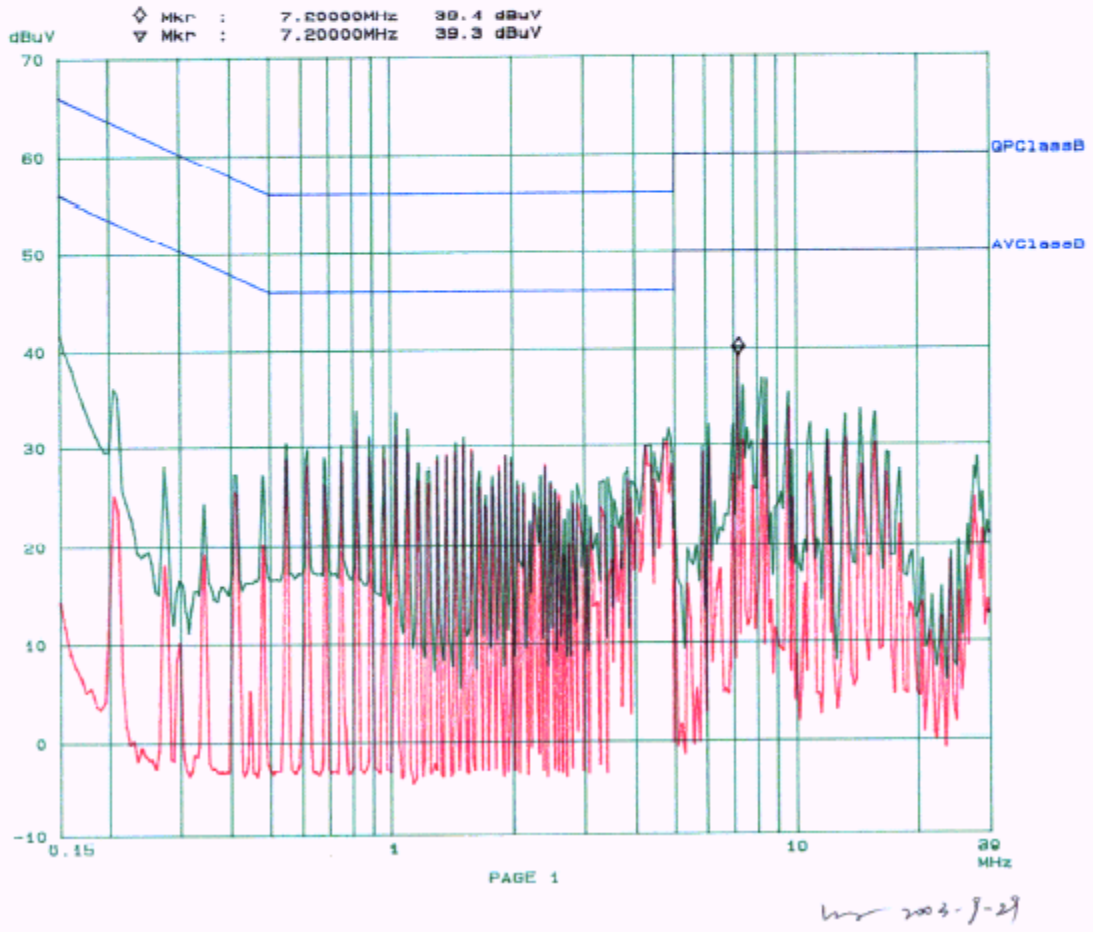
CLASS B

EUT: CM-5100P
Manuf: MAXON
Op Cond: Normal
Operator: LING
Comment: N (DELL)

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	10dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	10dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	10dBLN	OFF

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



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Bay Area Compliance Laboratory Corp 29. Sep 03 10:09

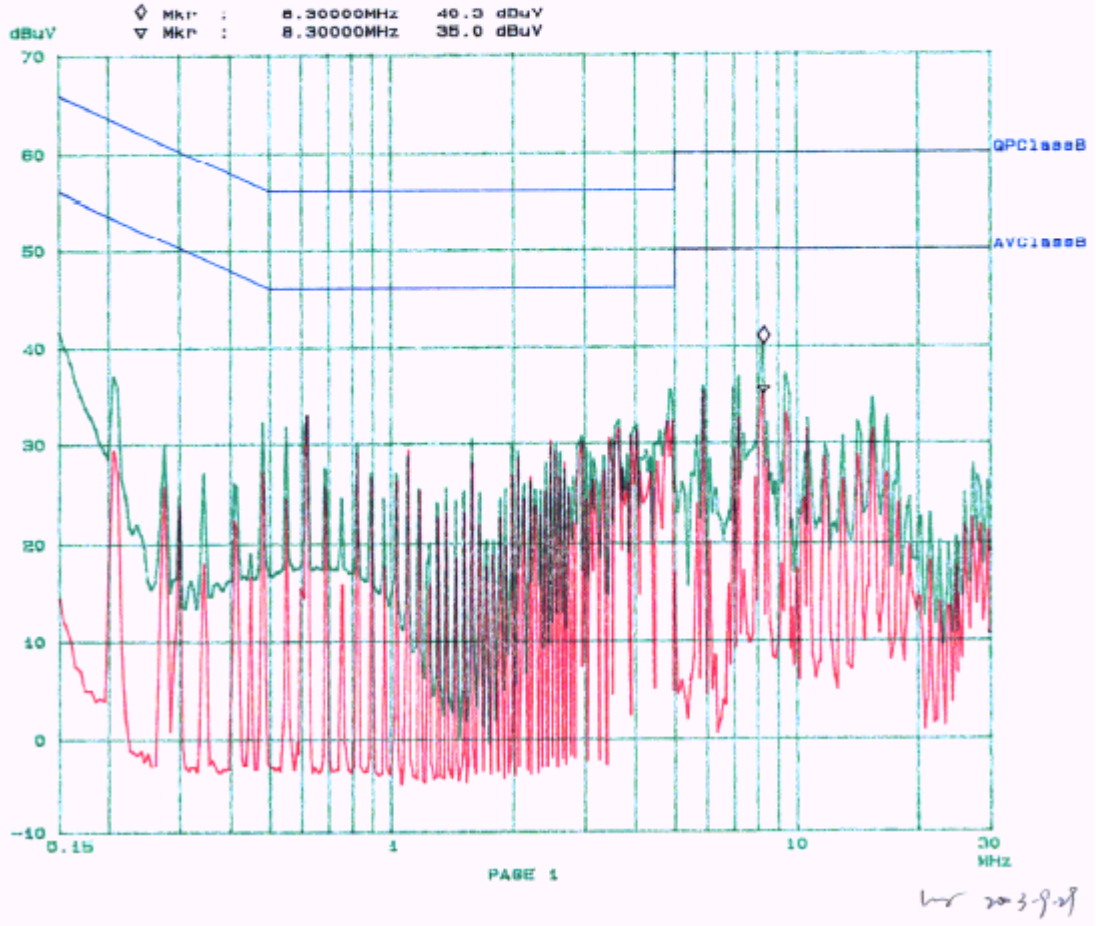
CLASS B

EUT: CM-5100P
Manuf: MAXON
Op Cond: Normal
Operator: LING
Comment: L (DELL)

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	10dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	10dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	10dBLN	OFF

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



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Bay Area Compliance Laboratory Corp 29. Sep 03 10:52

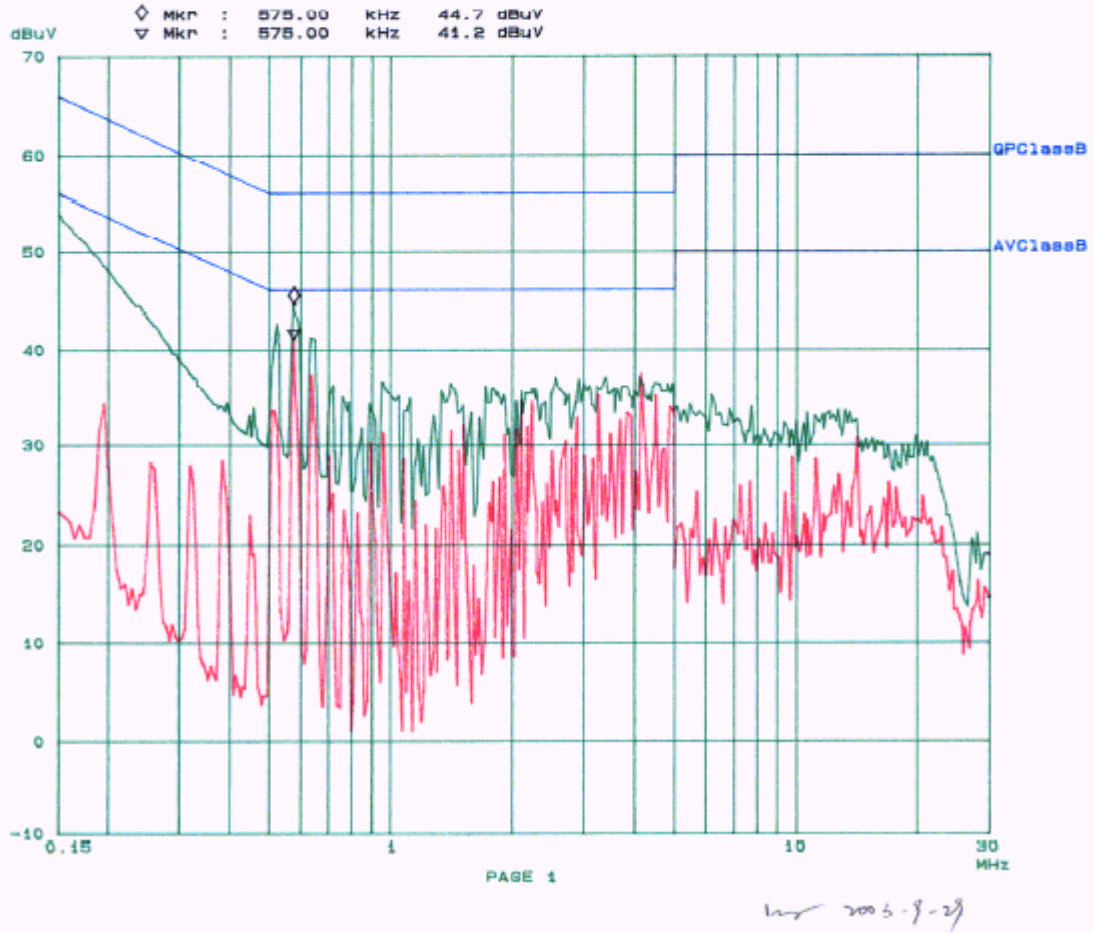
CLASS B

EUT: CM-5100P
Manuf: MAXON
Op Cond: Normal
Operator: LING
Comment: L(IBM)

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	10dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	10dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	10dBLN	OFF

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



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Bay Area Compliance Laboratory Corp 29. Sep 03 11:11

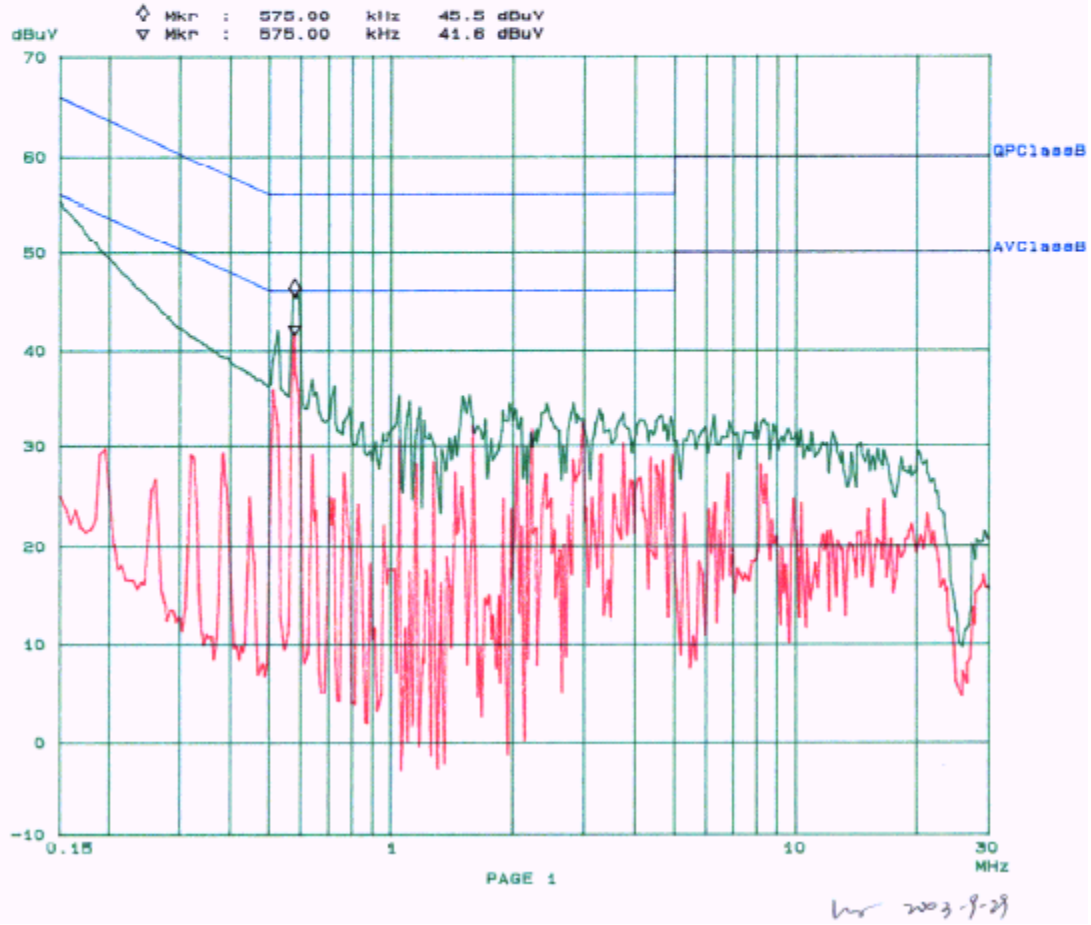
CLASS B

EUT: CM-5100P
Manuf: MAXON
Op Cond: Normal
Operator: LING
Comment: N(IBM)

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	10dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	10dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	10dBLN	OFF

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



Bay Area Compliance Laboratory Corp 29. Sep 03 16:37

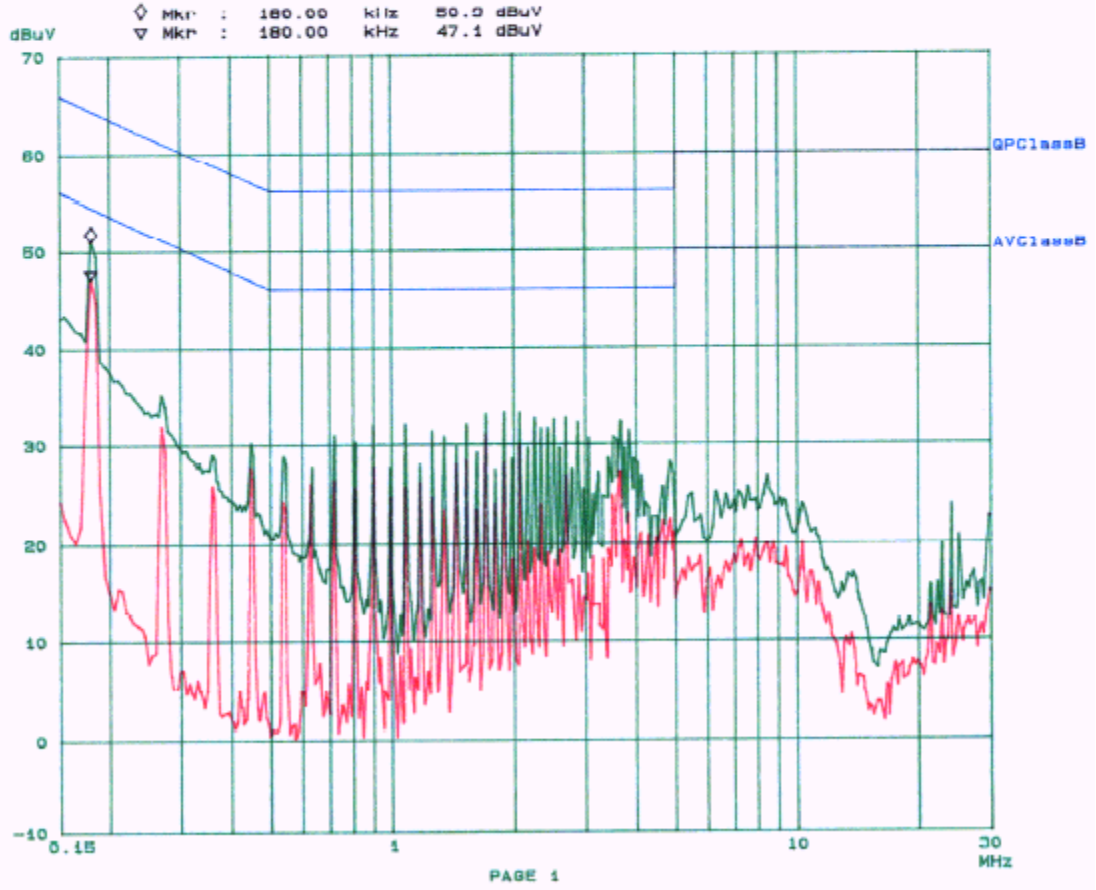
CLASS B

EUT: CM-5100P
Manuf: MAXON
Op Cond: Normal
Operator: LING
Comment: L (SONY)

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	10dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	10dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	10dBLN	OFF

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



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Lin 2003-9-29

Bay Area Compliance Laboratory Corp 29. Sep 03 16:56

CLASS B

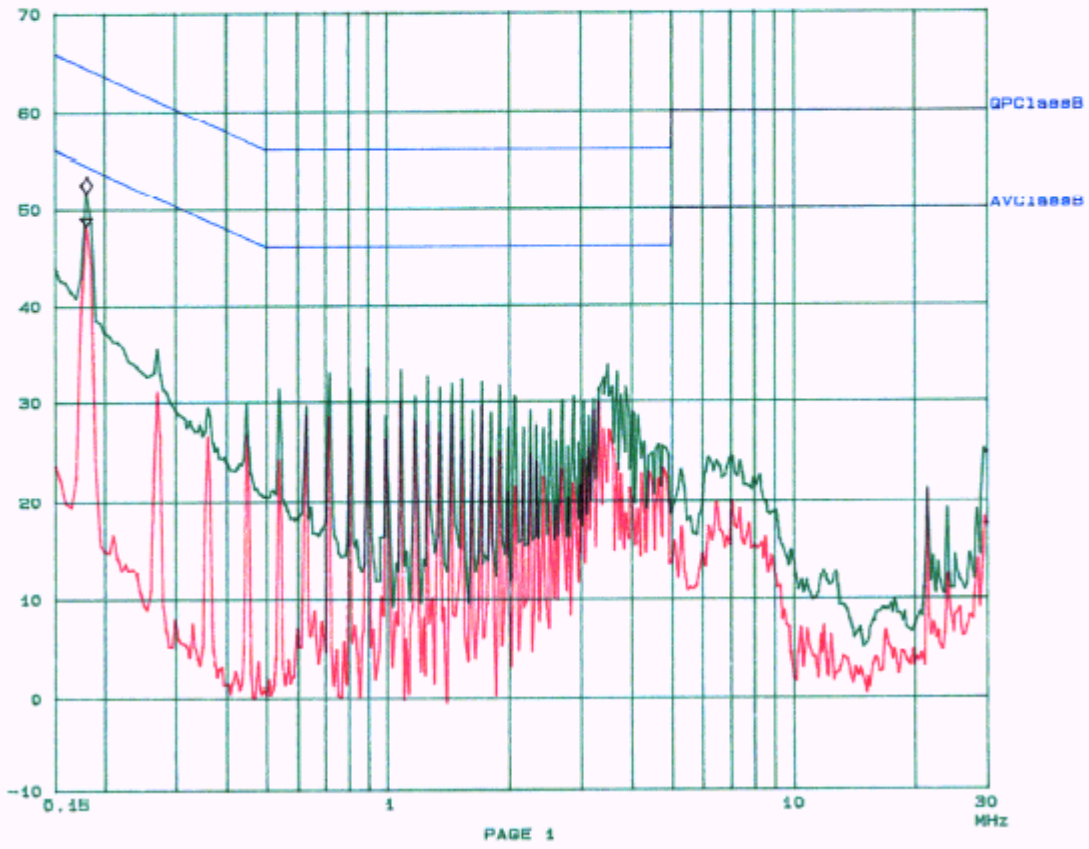
EUT: CM-5100P
Manuf: MAXON
Op Cond: Normal
Operator: LING
Comment: N (SONY)

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	10dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	10dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	10dBLN	OFF

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

◇ Mkr : 180.00 kHz 51.7 dBuV
▽ Mkr : 180.00 kHz 48.2 dBuV



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