FCC PART 15, SUBPART B and C
TEST REPORT

for

EMULATION ENGINE

MODEL: EE a/b/g

Prepared for

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DATE: AUGUST 5, 2002

	REPORT BODY	APPENDICES					TOTAL
		A	*B*	*C*	*D*	*E*	
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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP, NIST, or any other agency of the U.S. Government.

Device Tested:	Emulation Engine Model: EE a/b/g S/N: N/A
Product Description:	See Expository Statement.
Modifications:	The EUT was not modified during the testing.
Manufacturer:	Communication Machinery Corporation 402 E. Gutierrez Street Santa Barbara, California 93101
Test Dates:	July 24, 28, and 29, 2003
Test Specifications:	EMI requirements CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247
Test Procedure:	ANSI C63.4: 2001
Test Deviations:	The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz – 30 MHz	Complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, section 15.207
2	Spurious Radiated RF Emissions, 30 MHz – 1000 MHz	Complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, section 15.209
3	Spurious Radiated RF Emissions, 10 kHz – 30 MHz and 1000 MHz – 40000 MHz	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(c)
4	Fundamental and Emissions produced by the intentional radiator in non-restricted bands, 10 kHz – 40 GHz	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(c)
5	Emissions produced by the intentional radiator in restricted bands, 10 kHz – 40 GHz	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.205, 15.209(a), and section 15.247 (c)
6	6 dB Bandwidth	This test was not performed because the RF Module inside the EUT was approved as a module under the FCC-ID: **MCLJ07H06903**.
8	Peak Power Output	This test was not performed because the RF Module inside the EUT was approved as a module under the FCC-ID: **MCLJ07H06903**.
9	RF Conducted Antenna Test	This test was not performed because the RF Module inside the EUT was approved as a module under the FCC-ID: **MCLJ07H06903**.
10	Peak Power Spectral Density Conducted from the Intentional Radiator to the Antenna	This test was not performed because the RF Module inside the EUT was approved as a module under the FCC-ID: **MCLJ07H06903**.

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Emulation Engine Model: EE a/b/g. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 2001. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the Class B specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247.

Note: For the unintentional radiator portion of the test, the EUT was within the **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B.

Note: The 2.4 and 5.8 GHz bands are applicable this report; another band of operation (5.15 GHz – 5.35 GHz) is documented in the Compatible Electronics, Inc. report number **B30729D2**.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Communication Machinery Corporation

Omar F. Tarzi	Senior Test Engineer
Larry Green	President

Compatible Electronics, Inc.

Kyle Fujimoto	Test Engineer
Scott McCutchan	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on July 23, 2003.

2.5 Disposition of the Test Sample

The sample was returned to Communication Machinery Corporation on July 29, 2003.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules - Radio frequency devices (including digital devices) – Intentional Radiators
ANSI C63.4 2001	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz
FCC Title 47, Part 15 Subpart B	FCC Rules - Radio frequency devices (including digital devices) – Unintentional Radiators

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

Setup and operation of the equipment under test.

Specifics of the EUT and Peripherals Tested

For the intentional radiator portion of the test - The Emulation Engine Model: EE a/b/g (EUT) was connected to the laptop, AC Adapter, and data generator via its serial, power, and Ethernet ports, respectively. The laptop was also connected to a printer and AC Adapter via its parallel and power ports, respectively. The data generator was also connected to the computer via its Ethernet port. The computer was also connected to a keyboard, mouse, monitor, and access point via its keyboard, mouse, monitor, and Ethernet ports, respectively. The EUT was continuously monitoring the access point, which causes the EUT to continuously transmit and receive to and from the access point.

For the digital portion of the test - The Emulation Engine Model: EE a/b/g (EUT) was connected to the laptop, AC Adapter, and data generator via its serial, power, and Ethernet ports, respectively. The laptop was also connected to a printer and AC Adapter via its parallel and power ports, respectively. The data generator was also connected to the computer and access point via its Ethernet ports. The computer was also connected to a keyboard, mouse, and monitor via its keyboard, mouse, and monitor ports, respectively. The EUT was continuously transmitting and receiving data packets to and from the access point.

Note: The data generator, computer, and access points were located inside the building, approximately 50 feet away from the test site.

The final radiated as well as the conducted data was taken in the mode above. Please see Appendix E for the data sheets.

4.1.1 Cable Construction and Termination

Cable 1 **(For Tx Mode Only)** This is a 3 meter unshielded cable connecting the 802.11 a/b access point to the computer. It has an RJ-45 connector at each end.

Cable 2 **(For Tx Mode Only)** This is a 3 meter unshielded cable connecting the 802.11 g access point to the computer. It has an RJ-45 connector at each end.

Cable 3 This is a 2 meter braid and foil shielded cable connecting the computer to the monitor. It has a D-15 pin metallic connector at the computer end and is hard wired into the monitor. The cable was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connector.

Cable 4 This is a 4 foot foil shielded cable connecting the computer to the keyboard. It has a 6 pin mini DIN metallic connector at the computer end and is hard wired into the keyboard. The shield of the cable was grounded to the chassis via the connector.

Cable 5 This is a 6 foot foil shielded cable connecting the computer to the mouse. It has a 6 pin mini DIN metallic connector at the computer end and is hard wired into the mouse. The shield of the cable was grounded to the chassis via the connector.

Cable 6 This is a 6 foot unshielded cable connecting the 802.11 a/b access point to the AC Adapter. It has a 1/8 inch power connector the 802.11 a/b access point end and is hard wired into the AC Adapter.

Cable 7 This is a 6 foot unshielded cable connecting the 802.11 g access point to the AC Adapter. It has a 1/8 inch power connector the 802.11 g access point end and is hard wired into the AC Adapter.

Cable 8 This is a 2 meter unshielded cable connecting the laptop to the AC Adapter. It has a 1/8 inch power connector the laptop end and is hard wired into the AC Adapter. The cable was bundled to a length of 1 meter.

Cable 9 This is a 2 meter unshielded cable connecting the EUT to the AC Adapter. It has a 1/8 inch power connector the EUT end and is hard wired into the AC Adapter. The cable was bundled to a length of 1 meter.

Cable 10 This is a 2 meter braid and foil shielded cable connecting the EUT to the computer. It has a D-9 pin metallic connector at each end. The cable was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connectors.

Cable 11 This is a 50 foot unshielded cable connecting the EUT to the data generator. It has an RJ-45 connector at each end.

Cable 12 **(For Digital Mode Only)** This is a 3 meter unshielded cable connecting the 802.11 a/b access point to the data generator. It has an RJ-45 connector at each end.

Cable 13 This is a 3 meter unshielded cable connecting the computer to the data generator. It has an RJ-45 connector at each end.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
EMULATION ENGINE (EUT)	COMMUNICATION MACHINERY CORPORATION	EE a/b/g	N/A	**RCX-EE11ABG**
802.11g ACCESS POINT	D-LINK	DWL-2000AP	BN2Q134001624	**KA25212G**
802.11a/b ACCESS POINT	LINKSYS	WAP51AB	MCG102B03982	**PKW-WAP51AB**
AC ADAPTER (for g ACCESS POINT)	BOTHHAND ENTERPRISE, INC.	M1-10S05	N/A	**DoC**
AC ADAPTER (for a/b ACCESS POINT)	LINKSYS	AD512.5C	N/A	**DoC**
COMPUTER	DELL	MCM	CLFHF	**DoC**
KEYBOARD	HEWLETT PACKARD	FDA-104EB	FDKB8025323	**F4ZFDA-104EB**
MOUSE	HEWLETT PACKARD	M-S34	LZC83503353	**DZL211029**
MONITOR	HEWLETT PACKARD	D5258A	N/A	**C57FNFCMC1516X**
AC ADAPTER FOR EUT	FSP GROUP, INC.	FSP013-1AD201	H0 0102657	**N/A**
AC ADAPTER FOR LAPTOP	COMPAQ	ADP-60BB	298297-001	**N/A**
LAPTOP	COMPAQ	1456VQLIN	1V98CLS9A1J1	**DoC**
DATA GENERATOR	SPIRENT COMMUNICATIONS	SMARTBITS 200	N/A	**N/A**

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Radiated Emissions Manual Test – Radiated	Compatible Electronics	N/A	N/A	N/A	N/A
Conducted Emissions Test Program	Compatible Electronics	N/A	N/A	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	2727A04757	Nov. 12, 2002	Nov. 12, 2003
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	2648A15455	Nov. 12, 2002	Nov. 12, 2003
Spectrum Analyzer – Quasi-Peak Adapter	Hewlett Packard	85650A	3303A01688	Nov. 12, 2002	Nov. 12, 2003
Preamplifier	Com Power	PA-102	1017	Jan. 2, 2003	Jan. 2, 2004
Biconical Antenna	Com Power	AB-100	1548	Sept. 19, 2002	Sept. 19, 2003
Log Periodic Antenna	Com Power	AL-100	16089	Oct. 4, 2002	Oct. 4, 2003
Computer	Hewlett Packard	D5251A 888	US74458128	N/A	N/A
Monitor	Hewlett Packard	D5258A	DK74889705	N/A	N/A
Harmonic Mixer	Hewlett Packard	11970A	3003A05460	Mar. 14, 2002	Mar. 14, 2004
Loop Antenna	Com-Power	AL-130	17070	June 19, 2002	June 19, 2004
Horn Antenna	Antenna Research	DRG-118/A	1053	Jan. 13, 2002	Jan. 13, 2004
Microwave Preamplifier	Com-Power	PA-122	25196	Jan. 10, 2003	Jan. 10, 2004
Amplifier	Hewlett Packard	11975A	2403A00202	Mar. 14, 2002	Mar. 14, 2004
Harmonic Mixer	Hewlett Packard	11970K	3003A05460	Mar. 14, 2002	Mar. 14, 2004
Horn Antenna	Com-Power	MWH-2640/B	1011	Nov. 3, 2001	Nov. 3, 2003
Microwave Preamplifier	Com-Power	PA-840	711013	Mar. 6, 2002	Mar. 6, 2004
Horn Antenna	Com-Power	AH826	0071957	Nov. 3, 2001	Nov. 3, 2003

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.

7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Antenna Gain

The antenna has a gain of 4.0 dBi in the 2.4 GHz range and a gain of 4.5 dBi in the 5.75 GHz range.

8. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

8.1 RF Emissions

8.1.1 Conducted Emissions Test

The spectrum analyzer was used as a measuring meter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak was used only where indicated in the data sheets. A 10 dB attenuation pad was used for the protection of the spectrum analyzer input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4: 2001. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the Compatible Electronics conducted emissions software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The final qualification data is located in Appendix E.

Test Results:

The EUT complies with the **Class B** limits of **CFR** Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, Section 15.207 for conducted emissions.

8.1.2 Radiated Emissions (Spurious and Harmonics) Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com Power Preamplifier Model: PA-102 was used for frequencies from 30 MHz to 1 GHz, the Com-Power Microwave Preamplifier Model: PA-122 was used for frequencies from 1 GHz to 18 GHz, and the Com Power Microwave Preamplifier Model: PA-840 was used for frequencies from 18 GHz to 40 GHz. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps.

The quasi-peak adapter was used only for those readings which are marked accordingly on the data sheets.

The frequencies above 1 GHz were averaged manually by narrowing the video filter down to 10 Hz and putting the sweep time on AUTO on the spectrum analyzer to keep the amplitude reading calibrated.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
10 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna
1 GHz to 40 GHz	1 MHz	Horn Antenna

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 2001. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT by the Radiated Emission Manual Test software. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results.

Radiated Emissions (Spurious and Harmonics) Test (con't)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance.

. For the 18 GHz – 26.5 GHz span, the Hewlett Packard 11970K Harmonic Mixer and the Hewlett Packard 11975A Amplifier were used to allow the spectrum analyzer to scan from 18 GHz to 26.5 GHz.

For the 26.5 GHz – 40 GHz span, the Hewlett Packard 11970A Harmonic Mixer and the Hewlett Packard 11975A Amplifier were used to allow the spectrum analyzer to scan from 26.5 GHz to 40 GHz.

8.2 6 dB Bandwidth

The 6 dB bandwidth was measured using the spectrum analyzer. The bandwidth was measured using a direct connection from the RF out on the EUT. The resolution and video bandwidths were 100 kHz.

Test Results:

This test was not performed because the RF Module inside the EUT was approved as a module under the FCC-ID: **MCLJ07H06903**.

8.3 Peak Output Power

The Peak Output Power was taken using the spectrum analyzer. The bandwidth was measured using a direct connection from the RF out on the EUT. The resolution bandwidth was 3 MHz, and the video bandwidth was 3 MHz.

Test Results:

This test was not performed because the RF Module inside the EUT was approved as a module under the FCC-ID: **MCLJ07H06903**.

8.4 RF Antenna Conducted Test

The RF antenna conducted test was taken using the spectrum analyzer. The RF antenna conducted test was measured using a direct connection from the RF out on the EUT into the input of the analyzer. The resolution bandwidth was 100 kHz, and the video bandwidth 300 kHz. The spans were wide enough to include all the harmonics and emissions that were produced by the intentional radiator.

Test Results:

This test was not performed because the RF Module inside the EUT was approved as a module under the FCC-ID: **MCLJ07H06903**.

8.5 RF Band Edges

The RF band edges were taken at the start of the restricted bands (2390 MHz and 2483.5 MHz). The readings taken were also averaged manually by narrowing the video filter down to 10 Hz and putting the sweep time on AUTO on the spectrum analyzer to keep the amplitude reading calibrated. Data sheets are included in Appendix E, which compares the reading from the spectrum analyzer to the spec limit.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (c). The RF power at the band edges at 2400 MHz and 2483.5 MHz meet the limits of section 15.209. Please see the data sheets located in Appendix E.

9. CONCLUSIONS

The Emulation Engine meets all of the specification limits defined in FCC Title 47, Part 15, Subpart C, sections 15.205, 15.207, 15.209, and 15.247.

Note: For the unintentional radiator portion of the test, the EUT was within the **Class B** specification limits defined in CFR Title 47, Part 15, Subpart B.

Note: The 2.4 and 5.8 GHz bands are applicable this report; another band of operation (5.15 GHz – 5.35 GHz) is documented in the Compatible Electronics, Inc. report number **B30729D2**.

APPENDIX A

LABORATORY RECOGNITIONS

LABORATORY RECOGNITIONS

Compatible Electronics has the following agency accreditations:

National Voluntary Laboratory Accreditation Program - Lab Code: 200528-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Conformity Assessment Body for the EMC Directive Under the US/EU MRA Appointed by NIST

Compatible Electronics is recognized or on file with the following agencies:

Federal Communications Commission

Industry Canada

Radio-Frequency Technologies (Competent Body)

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC Subpart B and Subpart C specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT during the testing.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST	Emulation Engine Model: EE A/B/G S/N: N/A

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

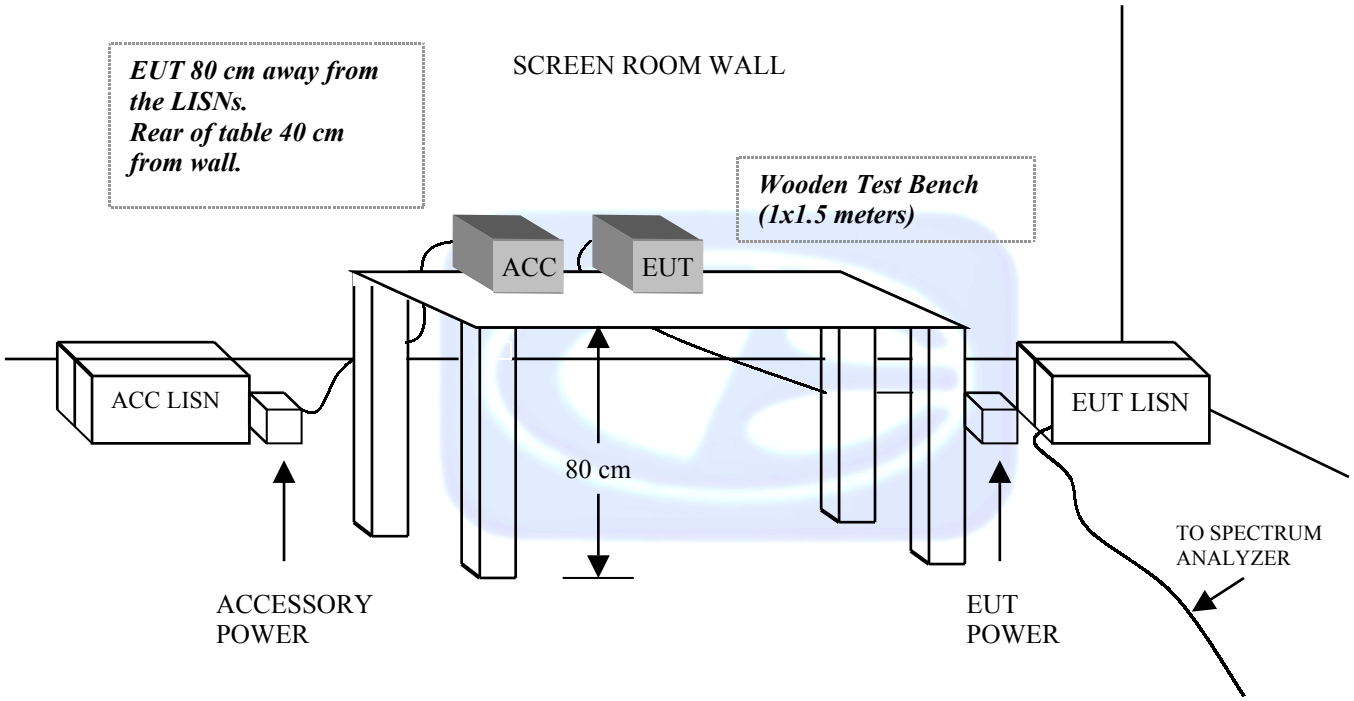
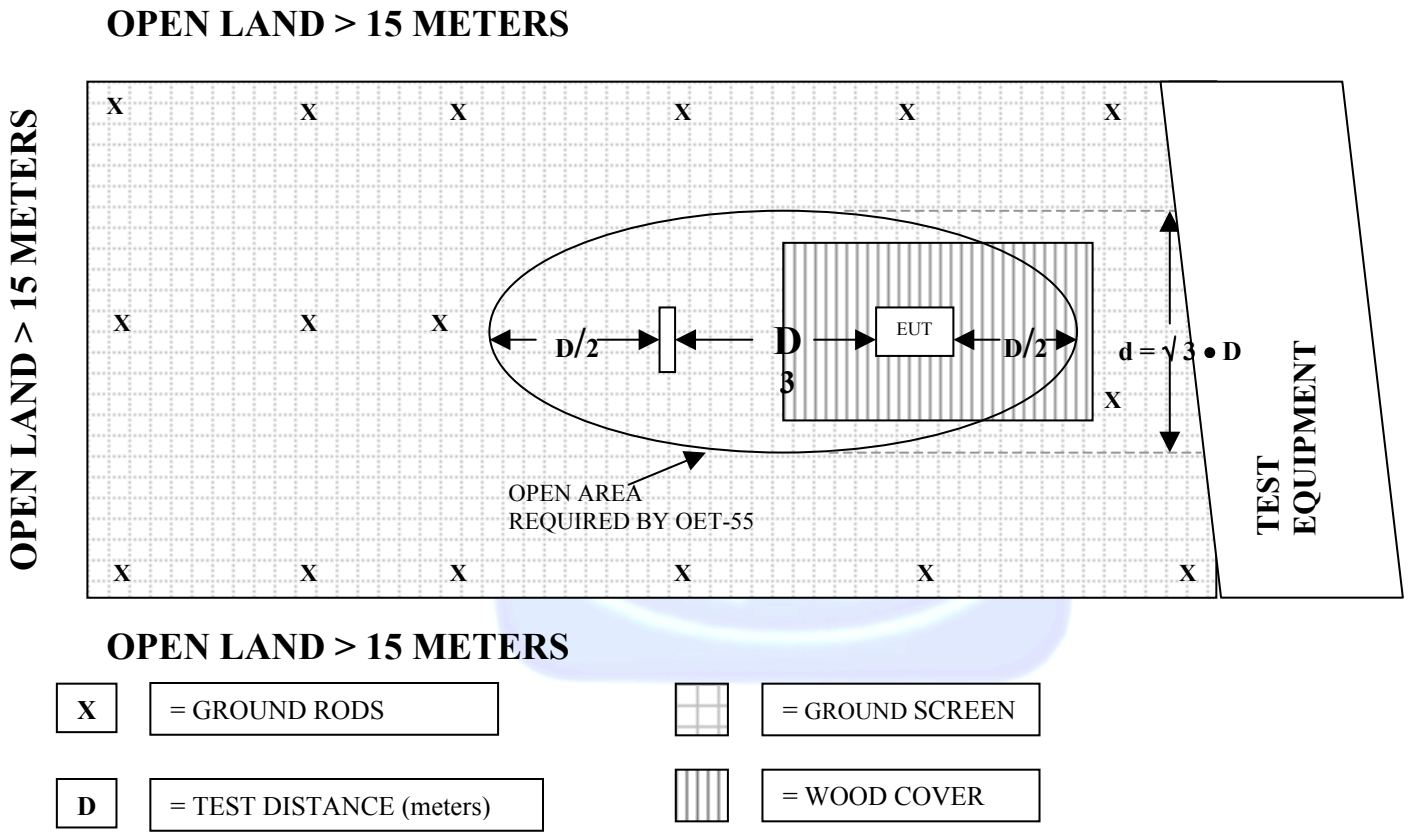


FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED SITE



COM-POWER AB-100

BICONICAL ANTENNA

S/N: 01548

CALIBRATION DATE: SEPTEMBER 19, 2002

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	14.30	120	10.70
35	14.00	125	11.40
40	13.70	140	12.70
45	12.00	150	12.50
50	11.40	160	12.90
60	9.70	175	14.10
70	8.30	180	14.70
80	7.60	200	15.10
90	7.80	250	16.90
100	8.60	300	19.10

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16089

CALIBRATION DATE: OCTOBER 4, 2002

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	13.10	700	17.70
350	14.40	750	19.60
400	14.30	800	20.50
450	15.70	850	21.20
500	16.60	900	21.20
550	16.60	950	22.50
600	17.30	1000	24.60
650	18.80		

COM-POWER PA-102

PREAMPLIFIER

S/N: 1017

CALIBRATION DATE: JANUARY 2, 2003

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	38.4	300	38.3
40	38.4	350	38.3
50	38.3	400	38.3
60	38.4	450	37.9
70	38.4	500	38.1
80	38.4	550	38.2
90	38.4	600	38.1
100	38.3	650	37.9
125	38.4	700	37.9
150	38.4	750	37.7
175	38.2	800	37.4
200	38.4	850	37.6
225	38.2	900	37.4
250	38.3	950	36.7
275	38.5	1000	37.0

COM-POWER PA-122

MICROWAVE PREAMPLIFIER

S/N: 25196

CALIBRATION DATE: JANUARY 10, 2003

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	32.3	6.0	27.9
1.1	32.6	6.5	28.9
1.2	32.4	7.0	29.2
1.3	32.1	7.5	29.3
1.4	31.8	8.0	29.4
1.5	31.7	8.5	28.5
1.6	31.6	9.0	28.7
1.7	31.6	9.5	27.9
1.8	31.0	10.0	27.0
1.9	32.0	11.0	26.9
2.0	31.0	12.0	28.7
2.5	30.5	13.0	28.6
3.0	30.5	14.0	28.7
3.5	30.0	15.0	27.1
4.0	30.0	16.0	26.1
4.5	29.9	17.0	26.0
5.0	29.7	18.0	23.9
5.5	30.2		

ANTENNA RESEARCH DRG-118/A

HORN ANTENNA

S/N: 1053

CALIBRATION DATE: JANUARY 13, 2002

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	25.5	9.5	39.1
1.5	26.6	10.0	39.7
2.0	29.4	10.5	40.9
2.5	30.4	11.0	40.7
3.0	31.2	11.5	42.4
3.5	32.3	12.0	42.6
4.0	32.9	12.5	42.4
4.5	33.0	13.0	41.5
5.0	34.8	13.5	41.0
5.5	35.2	14.0	40.5
6.0	36.4	14.5	43.6
6.5	36.6	15.0	43.7
7.0	38.8	15.5	43.3
7.5	38.8	16.0	42.8
8.0	38.0	16.5	43.0
8.5	38.1	17.0	42.7
9.0	39.9	17.5	44.0
		18.0	41.8

COM-POWER AL-130

LOOP ANTENNA

S/N: 17070

CALIBRATION DATE: JUNE 19, 2002

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-40.4	11.1
0.01	-40.3	11.2
0.02	-41.2	10.3
0.05	-41.6	9.9
0.07	-41.4	10.1
0.1	-41.7	9.8
0.2	-44.0	7.5
0.3	-41.6	9.9
0.5	-41.3	10.2
0.7	-41.4	10.1
1	-40.9	10.6
2	-40.6	10.9
3	-40.5	11.0
4	-40.8	10.7
5	-40.2	11.3
10	-40.7	10.8
15	-41.4	10.1
20	-41.6	9.9
25	-41.7	9.8
30	-42.9	8.6

COM-POWER AH826

HORN ANTENNA

S/N: 0071957

CALIBRATION DATE: NOVEMBER 03, 2001

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	32.3	22.5	32.5
18.5	32.2	23.0	32.1
19.0	32.3	23.5	32.3
19.5	31.9	24.0	32.3
20.0	32.0	24.5	32.9
20.5	32.3	25.0	33.1
21.0	32.0	25.5	32.9
21.5	32.3	26.0	33.4
22.0	32.5	26.5	33.0

COM-POWER MWH-2640/B

HORN ANTENNA

S/N: 1011

CALIBRATION DATE: NOVEMBER 03, 2001

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
26.5	35.7	33.5	36.7
27.0	35.4	34.0	36.4
27.5	35.7	34.5	36.8
28.0	35.9	35.0	36.4
28.5	35.8	35.5	36.6
29.0	35.7	36.0	36.7
29.5	35.9	36.5	37.1
30.0	36.1	37.0	37.0
30.5	36.5	37.5	37.2
31.0	36.6	38.0	37.2
31.5	36.3	38.5	37.7
32.0	36.5	39.0	38.0
32.5	36.6	39.5	37.9
33.0	36.8	40.0	38.2

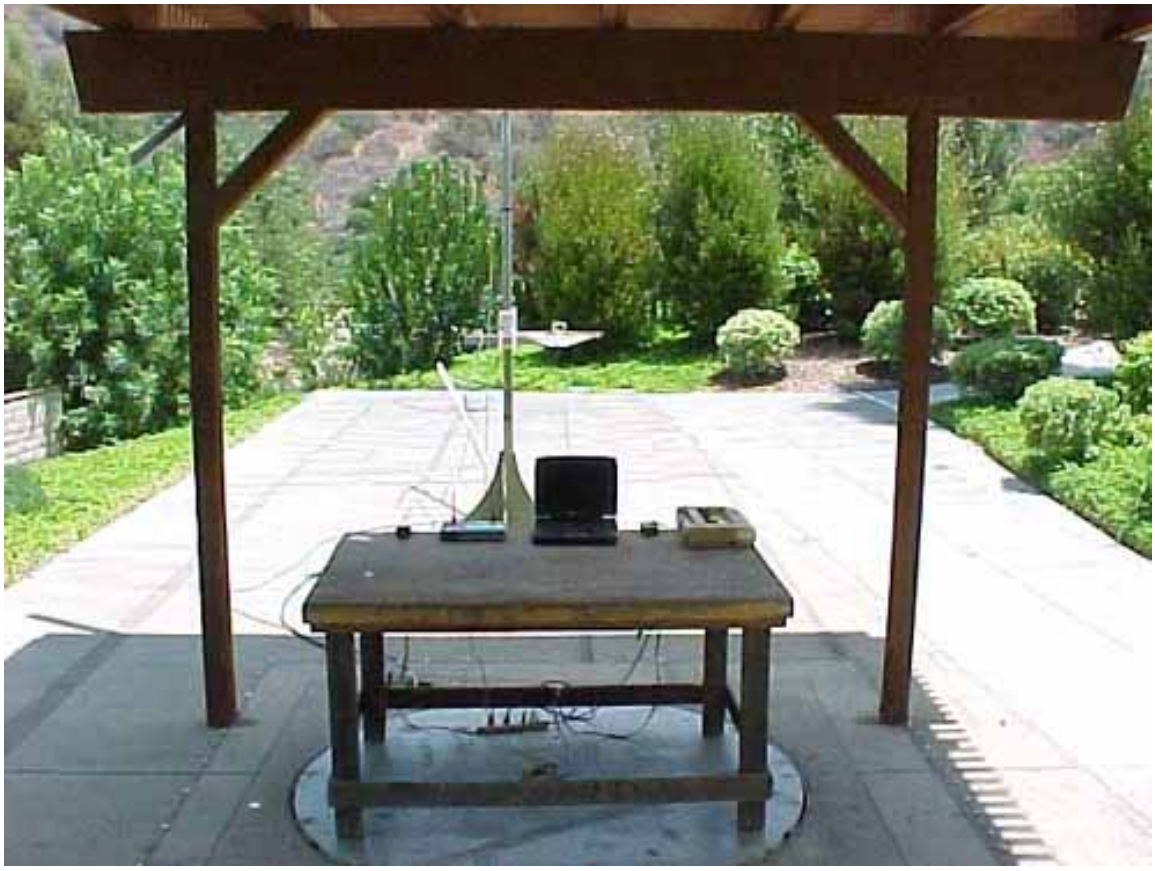
COM-POWER PA-840

MICROWAVE PREAMPLIFIER

S/N: 711013

CALIBRATION DATE: MARCH 06, 2002

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	26.4	30.0	27.6
19.0	25.4	31.0	27.3
20.0	24.5	32.0	26.9
21.0	23.9	33.0	26.7
22.0	24.0	34.0	27.0
23.0	24.4	35.0	25.9
24.0	25.2	36.0	25.5
25.0	26.1	37.0	26.2
26.0	26.6	38.0	25.6
27.0	27.2	39.0	23.4
28.0	27.4	40.0	24.3
29.0	27.5		



FRONT VIEW

COMMUNICATION MACHINERY CORPORATION
EMULATION ENGINE
MODEL: EE A/B/G
FCC SUBPART B - RADIATED EMISSIONS – 07-29-03

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

COMMUNICATION MACHINERY CORPORATION
EMULATION ENGINE
MODEL: EE A/B/G
FCC SUBPART B - RADIATED EMISSIONS – 07-29-03

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

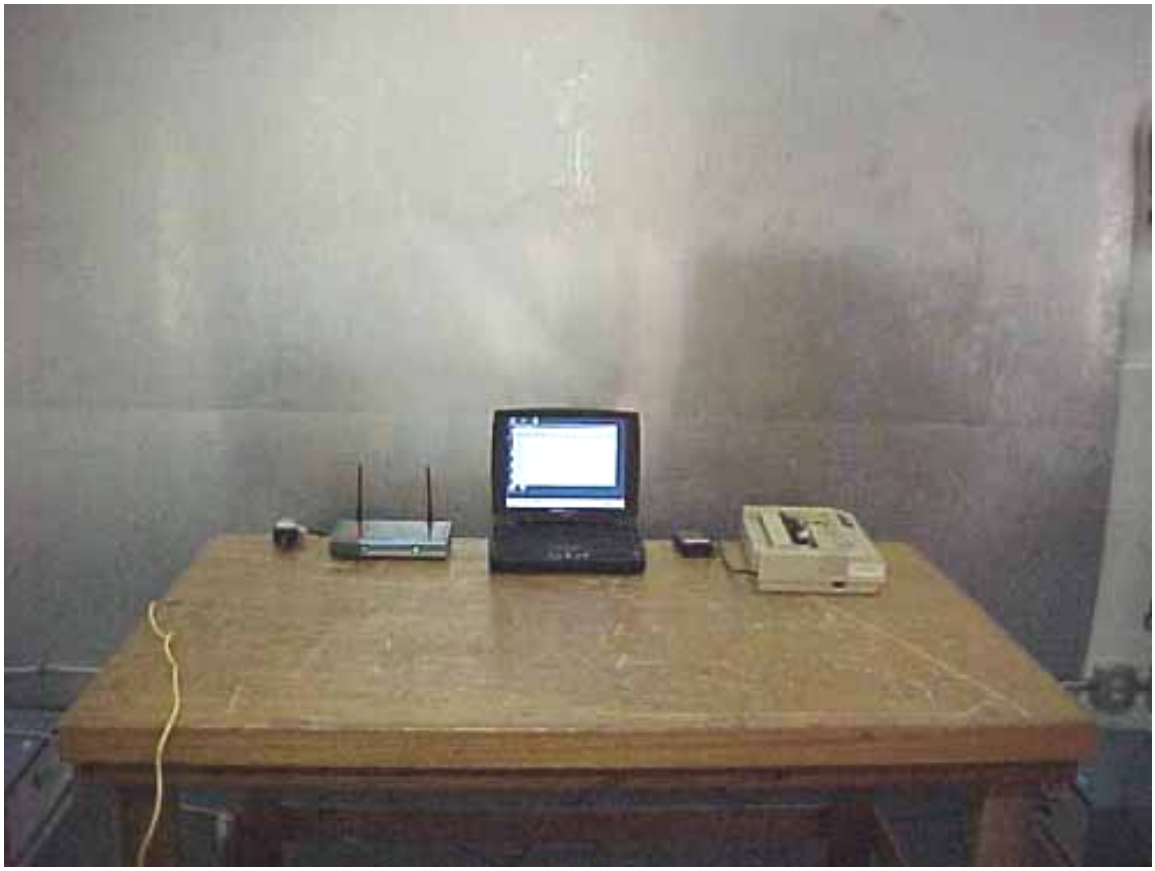
COMMUNICATION MACHINERY CORPORATION
EMULATION ENGINE
MODEL: EE A/B/G
FCC SUBPART C - RADIATED EMISSIONS – 07-24-03

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

COMMUNICATION MACHINERY CORPORATION
EMULATION ENGINE
MODEL: EE A/B/G
FCC SUBPART C - RADIATED EMISSIONS – 07-24-03

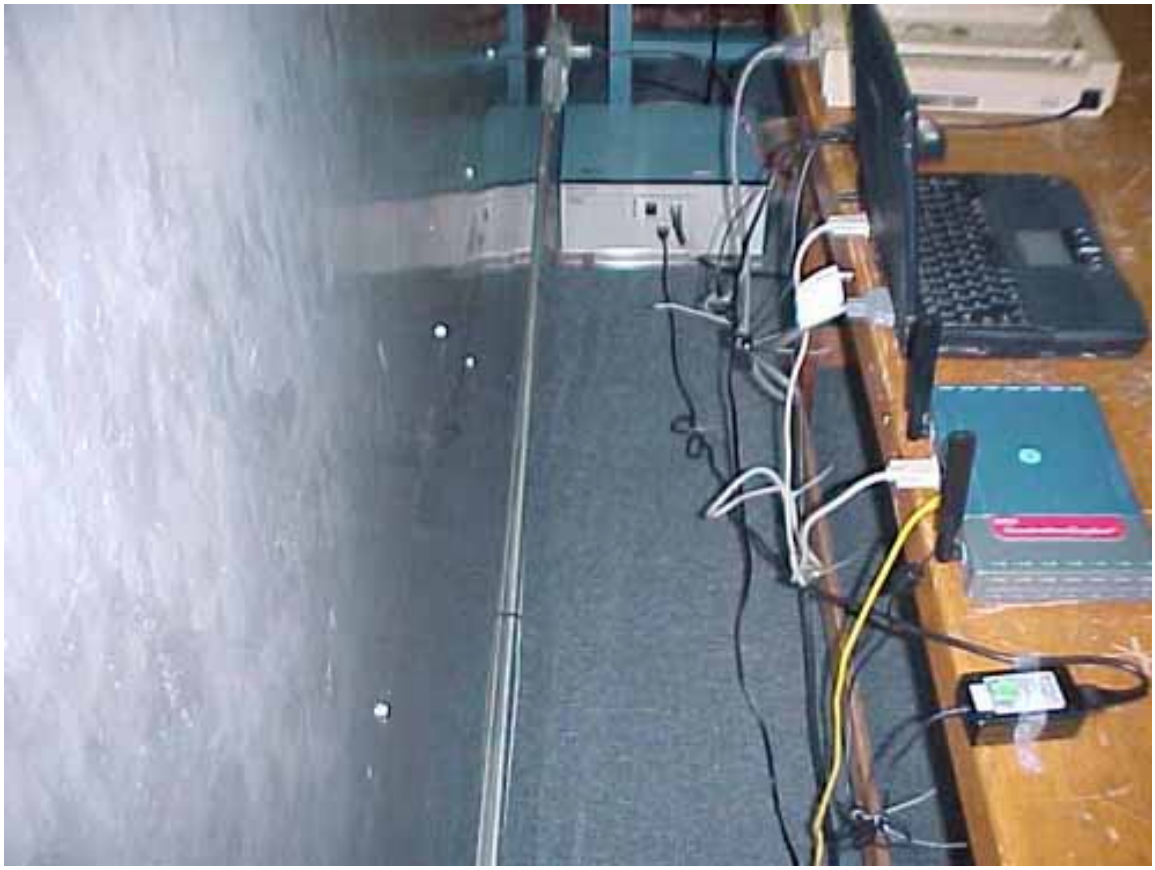
PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

COMMUNICATION MACHINERY CORPORATION
EMULATION ENGINE
MODEL: EE A/B/G
FCC SUBPART B AND C - CONDUCTED EMISSIONS – 07-29-03

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

COMMUNICATION MACHINERY CORPORATION
EMULATION ENGINE
MODEL: EE A/B/G
FCC SUBPART B AND C - CONDUCTED EMISSIONS – 07-29-03

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

RADIATED EMISSIONS

DATA SHEETS for 802.11b MODE

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	COMMUNICATION MACHINERY CORPORATION	DATE	7/24/03
EUT	EMULATION ENGINE	DUTY CYCLE	N/A %
MODEL	EE a/b/g	PEAK TO AVG	N/A dB
S/N	N/A	TEST DIST.	3 Meters
TEST ENGINEER	Kyle Fujimoto	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2412.0000	100.2	A	H	2.0	90	Y	LOW	30.2	2.5	30.6	0.0	0.0	**102.4**			
2412.0000	111.0	A	V	1.0	90	Y	LOW	30.2	2.5	30.6	0.0	0.0	**113.2**			
2437.0000	103.2	A	H	1.0	90	Y	MID	30.3	2.5	30.6	0.0	0.0	**105.4**			
2437.0000	109.9	A	V	1.5	180	Y	MID	30.3	2.5	30.6	0.0	0.0	**112.1**			
2462.0000	97.9	A	H	2.0	90	Y	HIGH	30.3	2.6	30.5	0.0	0.0	**100.3**			
2462.0000	112.1	A	V	1.0	90	Y	HIGH	30.3	2.6	30.5	0.0	0.0	**114.5**			

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	COMMUNICATION MACHINERY CORPORATION	DATE	7/24/03
EUT	EMULATION ENGINE	DUTY CYCLE	N/A %
MODEL	EE a/b/g	PEAK TO AVG	N/A dB
S/N	N/A	TEST DIST.	3 Meters
TEST ENGINEER	Kyle Fujimoto	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
4824.0000	35.3	26.5 A	H	1.0	90	Y	LOW	35.1	3.8	29.8	0.0	0.0	**35.6**	**-18.4**	**54.0**	
4824.0000	36.9	28.8 A	V	1.0	90	Y	LOW	35.1	3.8	31.1	0.0	0.0	**36.6**	**-17.4**	**54.0**	
4874.0000	34.9	A	H	1.0	90	Y	MID	35.3	3.8	29.8	0.0	0.0	**44.2**	**-9.8**	**54.0**	
4874.0000	42.0	28.3 A	V	1.0	90	Y	MID	35.3	3.8	29.8	0.0	0.0	**37.6**	**-16.4**	**54.0**	
4924.0000	33.5	A	H	1.0	90	Y	HIGH	35.4	3.8	29.7	0.0	0.0	**43.0**	**-11.0**	**54.0**	
4924.0000	40.2	27.9 A	V	1.0	90	Y	HIGH	35.4	3.8	29.7	0.0	0.0	**37.4**	**-16.6**	**54.0**	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	COMMUNICATION MACHINERY CORPORATION	DATE	7/24/03
EUT	EMULATION ENGINE	DUTY CYCLE	N/A %
MODEL	EE a/b/g	PEAK TO AVG	N/A dB
S/N	N/A	TEST DIST.	3 Meters
TEST ENGINEER	Kyle Fujimoto	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
7236.0000	39.0	26.5 A	H	1.0	90	Y	LOW	40.5	4.8	29.3	0.0	0.0	42.6	-11.4	54.0	No Harmonics Nor
																Emissions Found
																After the 3rd Harmonic
7236.0000	38.8	28.7 A	V	1.0	90	Y	LOW	40.5	4.8	29.3	0.0	0.0	44.8	-9.2	54.0	
7311.0000	48.4	30.7 A	H	1.0	90	Y	MID	40.7	4.9	29.3	0.0	0.0	47.0	-7.0	54.0	
7311.0000	46.7	30.7 A	V	1.0	90	Y	MID	40.7	4.9	29.3	0.0	0.0	47.0	-7.0	54.0	
7386.0000	47.1	31.0 A	H	1.0	90	Y	HIGH	40.8	4.9	29.3	0.0	0.0	47.4	-6.6	54.0	
7386.0000	48.3	31.4 A	V	1.5	0	Y	HIGH	40.8	4.9	29.3	0.0	0.0	47.8	-6.2	54.0	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	COMMUNICATION MACHINERY CORPORATION	DATE	7/24/03
EUT	EMULATION ENGINE	DUTY CYCLE	N/A %
MODEL	EE a/b/g	PEAK TO AVG	N/A dB
S/N	N/A	TEST DIST.	3 Meters
TEST ENGINEER	Kyle Fujimoto	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2390.0000	53.8	44.3 A	H	2.0	0	Y	HIGH	30.2	2.5	30.6	0.0	0.0	46.4	-7.6	54.0	Band Edge - Low Ch.
																in Mode "b"
2390.0000	59.4	47.9 A	V	2.0	0	Y	HIGH	30.2	2.5	30.6	0.0	0.0	50.0	-4.0	54.0	Band Edge - Low Ch.
																in Mode "b"
2483.5000	46.8	39.7 A	H	2.0	0	Y	HIGH	30.4	2.6	30.5	0.0	0.0	42.2	-11.8	54.0	Band Edge - High Ch.
																in Mode "b"
2483.5000	61.7	47.5 A	V	2.0	0	Y	HIGH	30.4	2.6	30.5	0.0	0.0	50.0	-4.0	54.0	Band Edge - High Ch.
																in Mode "b"

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS

DATA SHEETS for 802.11g MODE

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	COMMUNICATION MACHINERY CORPORATION	DATE	7/24/03
EUT	EMULATION ENGINE	DUTY CYCLE	N/A %
MODEL	EE a/b/g	PEAK TO AVG	N/A dB
S/N	N/A	TEST DIST.	3 Meters
TEST ENGINEER	Kyle Fujimoto	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2412.0000	100.0	A	H	2.0	90	Y	LOW	30.2	2.5	30.6	0.0	0.0	**102.2**			
2412.0000	111.2	A	V	1.0	90	Y	LOW	30.2	2.5	30.6	0.0	0.0	**113.4**			
2437.0000	99.2	A	H	1.0	90	Y	MID	30.3	2.5	30.6	0.0	0.0	**101.4**			
2437.0000	109.7	A	V	1.5	180	Y	MID	30.3	2.5	30.6	0.0	0.0	**111.9**			
2462.0000	99.6	A	H	2.0	90	Y	HIGH	30.3	2.6	30.5	0.0	0.0	**102.0**			
2462.0000	109.4	A	V	1.0	90	Y	HIGH	30.3	2.6	30.5	0.0	0.0	**111.8**			

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	COMMUNICATION MACHINERY CORPORATION	DATE	7/24/03
EUT	EMULATION ENGINE	DUTY CYCLE	N/A %
MODEL	EE a/b/g	PEAK TO AVG	N/A dB
S/N	N/A	TEST DIST.	3 Meters
TEST ENGINEER	Kyle Fujimoto	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
4824.0000	34.2	24.5 A	H	1.0	90	Y	LOW	35.1	3.8	29.8	0.0	0.0	**33.6**	**-20.4**	**54.0**	**No Harmonics Nor**
																Emissions Found
																After the 2rd Harmonic
4824.0000	36.2	28.1 A	V	1.0	90	Y	LOW	35.1	3.8	31.1	0.0	0.0	**35.9**	**-18.1**	**54.0**	
4874.0000	36.7	27.2 A	H	1.0	90	Y	MID	35.3	3.8	29.8	0.0	0.0	**36.6**	**-17.4**	**54.0**	
4874.0000	33.5	25.6 A	V	1.0	90	Y	MID	35.3	3.8	29.8	0.0	0.0	**34.9**	**-19.1**	**54.0**	
4924.0000	35.8	25.6 A	H	1.0	90	Y	HIGH	35.4	3.8	29.7	0.0	0.0	**35.1**	**-18.9**	**54.0**	
4924.0000	35.7	27.6 A	V	1.0	90	Y	HIGH	35.4	3.8	29.7	0.0	0.0	**37.1**	**-16.9**	**54.0**	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	COMMUNICATION MACHINERY CORPORATION	DATE	7/24/03
EUT	EMULATION ENGINE	DUTY CYCLE	N/A %
MODEL	EE a/b/g	PEAK TO AVG	N/A dB
S/N	N/A	TEST DIST.	3 Meters
TEST ENGINEER	Kyle Fujimoto	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2390.0000	58.7	38.4 A	H	2.0	0	Y	HIGH	30.2	2.5	30.6	0.0	0.0	40.5	-13.5	54.0	Band Edge - Low Ch.
																in Mode "g"
2390.0000	60.2	42.8 A	V	2.0	0	Y	HIGH	30.2	2.5	30.6	0.0	0.0	44.9	-9.1	54.0	Band Edge - Low Ch.
																in Mode "g"
2483.5000	53.5	36.2 A	H	2.0	0	Y	HIGH	30.4	2.6	30.5	0.0	0.0	38.7	-15.3	54.0	Band Edge - High Ch.
																in Mode "g"
2483.5000	70.2	46.9 A	V	2.0	0	Y	HIGH	30.4	2.6	30.5	0.0	0.0	49.4	-4.6	54.0	Band Edge - High Ch.
																in Mode "g"

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS

DATA SHEETS for 802.11a – HIGH BAND

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	COMMUNICATION MACHINERY CORPORATION	DATE	7/24/03
EUT	EMULATION ENGINE	DUTY CYCLE	N/A %
MODEL	EE a/b/g	PEAK TO AVG	N/A dB
S/N	N/A	TEST DIST.	3 Meters
TEST ENGINEER	Kyle Fujimoto	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
5745.0000	102.3	A	H	2.0	90	Y	LOW	36.0	4.4	30.6	0.0	0.0	**112.1**			
5745.0000	105.4	A	V	1.0	90	Y	LOW	36.0	4.4	30.6	0.0	0.0	**115.2**			
5785.0000	98.2	A	H	1.0	90	Y	MID	36.1	4.2	30.6	0.0	0.0	**107.9**			
5785.0000	103.7	A	V	1.5	180	Y	MID	36.1	4.2	30.6	0.0	0.0	**113.4**			
5825.0000	94.5	A	H	2.0	90	Y	HIGH	36.1	4.0	30.5	0.0	0.0	**104.2**			
5825.0000	102.0	A	V	1.0	90	Y	HIGH	36.1	4.0	30.5	0.0	0.0	**111.7**			

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	COMMUNICATION MACHINERY CORPORATION	DATE	7/24/03
EUT	EMULATION ENGINE	DUTY CYCLE	N/A %
MODEL	EE a/b/g	PEAK TO AVG	N/A dB
S/N	N/A	TEST DIST.	3 Meters
TEST ENGINEER	Kyle Fujimoto	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
11490.0000	35.7	26.5 A	H	1.0	90	Y	LOW	42.0	6.8	27.8	0.0	0.0	47.5	-6.5	54.0	No Harmonics Nor
																Emissions Found
																After the 2nd Harmonic
11490.0000	39.9	28.6 A	V	1.0	90	Y	LOW	42.0	6.8	27.8	0.0	0.0	49.6	-4.4	54.0	
11570.0000	38.5	27.6 A	H	1.0	90	Y	MID	42.3	6.9	27.9	0.0	0.0	48.9	-5.1	54.0	
11570.0000	35.2	26.5 A	V	1.0	90	Y	MID	42.3	6.9	27.9	0.0	0.0	47.8	-6.2	54.0	
11650.0000	37.1	27.5 A	H	1.0	90	Y	HIGH	42.6	7.0	28.1	0.0	0.0	49.0	-5.0	54.0	
11650.0000	36.2	26.5 A	V	1.0	90	Y	HIGH	42.6	7.0	28.1	0.0	0.0	48.0	-6.0	54.0	

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.247)

COMPANY	COMMUNICATION MACHINERY CORPORATION	DATE	7/24/03
EUT	EMULATION ENGINE	DUTY CYCLE	N/A %
MODEL	EE a/b/g	PEAK TO AVG	N/A dB
S/N	N/A	TEST DIST.	3 Meters
TEST ENGINEER	Kyle Fujimoto	LAB	D

Frequency MHz	Peak Reading (dBuV)	Average (A) or Quasi-Peak (QP)	Antenna Polar. (V or H)	Antenna Height (meters)	EUT Azimuth (degrees)	EUT Axis (X,Y,Z)	EUT Tx Channel	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Distance Factor (dB)	Mixer Factor (dB)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
																No Band Edge because the
																Restricted Band is nowhere
																near the Operating Band
																Edges for this operating
																range.

* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN
** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS

DATA SHEETS for the DIGITAL PORTION

Test Location : Compatible Electronics **Page** : 1/1
Customer : Communication Machinery Corp. **Date** : 7/29/2003
Manufacturer : Communication Machinery Corp. **Time** : 9:53:25
Eut name : Emulation Engine **Lab** : A
Model : EE a/b/g **Test Distance** : 3.0 Meters
Serial # : N/A
Specification : FCC Class B
Distance correction factor (20 * log(test/spec) : 0.00
Test Mode : Radiated Spurous Emissions 10 kHz to 300 MHz
Vertical (V) and Horizontal (H) Polarization
Temperature 75 Degrees F., Relative Humidity 55%
Tested By: Kyle Fujimoto

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	Limit = L dBuV/m	Delta R-L dB
1V	44.155	62.70	1.00	12.27	38.36	37.62	40.00	-2.38
2V	45.194	61.70	1.00	11.98	38.35	36.33	40.00	-3.67
3H	46.617	50.80	1.00	11.80	38.33	25.27	40.00	-14.73
4V	64.853	58.90	1.50	8.99	38.40	30.99	40.00	-9.01
5H	69.130	46.80	1.58	8.41	38.40	18.40	40.00	-21.60
6V	72.611	54.70	1.63	8.11	38.40	26.04	40.00	-13.96
7V	73.960	60.10	1.64	8.01	38.40	31.35	40.00	-8.65
8V	100.091	66.10	1.90	8.61	38.30	38.31	43.50	-5.19
9H	108.833	55.90	1.94	9.57	38.34	29.07	43.50	-14.43
10V	114.850	60.20	1.96	10.19	38.36	33.99	43.50	-9.51
11V	120.062	60.70	1.98	10.71	38.38	35.01	43.50	-8.49
12V	120.341	53.60	1.98	10.75	38.38	27.95	43.50	-15.55
13V	127.356	58.90	2.02	11.61	38.40	34.13	43.50	-9.37
14H	137.259	47.50	2.10	12.47	38.40	23.68	43.50	-19.82
15V	150.337	44.20	2.21	12.51	38.40	20.52	43.50	-22.98
16H	160.044	51.80	2.37	12.90	38.32	28.76	43.50	-14.74
17V	170.450	61.70	2.53	13.75	38.23	39.74	43.50	-3.76
18H	172.113	57.90	2.56	13.88	38.22	36.11	43.50	-7.39
19H	186.179	55.90	2.55	14.83	38.29	34.99	43.50	-8.51
20V	190.400	56.60	2.54	14.91	38.33	35.72	43.50	-7.78
21H	194.094	62.97	2.52	14.99	38.36	42.12	43.50	-1.38
22H	194.094	64.00	2.52	14.99	38.36	43.15	43.50	-0.35
23V	194.119	60.00	2.52	14.99	38.36	39.15	43.50	-4.35
24V	194.180	61.40	2.52	14.99	38.36	40.55	43.50	-2.95
25H	200.047	59.30	2.50	15.10	38.40	38.50	43.50	-5.00
26V	200.077	59.00	2.50	15.10	38.40	38.20	43.50	-5.30
27V	221.700	59.50	2.67	15.93	38.23	39.88	46.00	-6.12
28V	225.057	56.40	2.70	16.05	38.20	36.95	46.00	-9.05
29H	225.081	55.40	2.70	16.05	38.20	35.95	46.00	-10.05
30V	250.077	60.00	3.00	16.90	38.30	41.60	46.00	-4.40
31H	250.095	59.40	3.00	16.90	38.30	41.00	46.00	-5.00
32V	275.053	53.00	3.10	18.05	38.50	35.65	46.00	-10.35
33H	275.085	59.00	3.10	18.05	38.50	41.66	46.00	-4.34
34H	286.473	48.30	3.19	18.54	38.41	31.63	46.00	-14.37

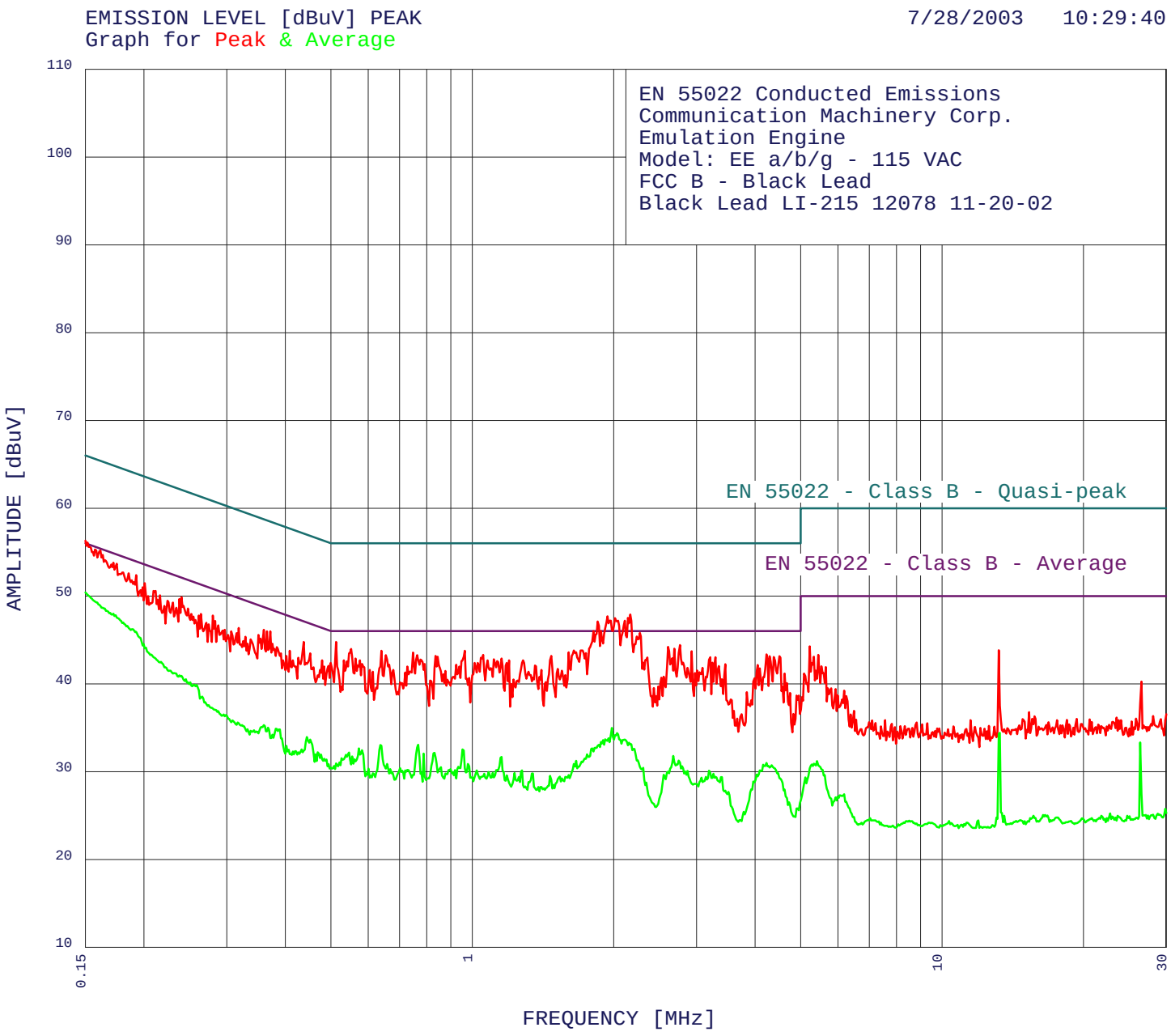
Test Location : Compatible Electronics **Page** : 1/1
Customer : Communication Machinery Corp. **Date** : 7/29/2003
Manufacturer : Communication Machinery Corp. **Time** : 10:44:53
Eut name : Emulation Engine **Lab** : A
Model : EE a/b/g **Test Distance** : 3.0 Meters
Serial # : N/A
Specification : FCC Class B
Distance correction factor (20 * log(test/spec) : 0.00
Test Mode : Radiated Spurous Emissions 300 MHz to 1000 MHz
Vertical (V) and Horizontal (H) Polarization
Temperature 75 Degrees F., Relative Humidity 55%
Tested By: Kyle Fujimoto

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	Limit = L dBuV/m	Delta R-L dB
1V	300.081	55.00	3.30	13.10	38.30	33.10	46.00	-12.90
2H	302.381	44.50	3.32	13.17	38.30	22.68	46.00	-23.32
3V	320.046	60.70	3.43	13.65	38.30	39.47	46.00	-6.53
4H	325.058	58.70	3.46	13.78	38.30	37.63	46.00	-8.37
5V	325.090	59.30	3.46	13.78	38.30	38.23	46.00	-7.77
6H	350.078	61.30	3.60	14.40	38.30	41.00	46.00	-5.00
7V	350.092	61.20	3.60	14.40	38.30	40.90	46.00	-5.10
8H	375.071	58.20	3.70	14.35	38.30	37.95	46.00	-8.05
9V	375.075	55.60	3.70	14.35	38.30	35.35	46.00	-10.65
10H	400.053	51.20	3.80	14.30	38.30	31.00	46.00	-15.00
11V	400.060	52.20	3.80	14.30	38.30	32.00	46.00	-14.00
12H	425.056	52.70	3.90	15.02	38.09	33.53	46.00	-12.47
13V	425.060	48.50	3.90	15.02	38.09	29.33	46.00	-16.67
14V	450.060	47.10	4.00	15.70	37.90	28.90	46.00	-17.10
15H	450.063	54.20	4.00	15.70	37.90	36.00	46.00	-10.00
16H	475.075	55.30	4.21	16.16	38.00	37.67	46.00	-8.33
17V	485.379	56.90	4.29	16.35	38.04	39.49	46.00	-6.51
18H	485.420	56.80	4.29	16.35	38.04	39.39	46.00	-6.61
19V	498.596	53.90	4.39	16.58	38.09	36.77	46.00	-9.23
20H	500.059	52.20	4.40	16.60	38.10	35.10	46.00	-10.90
21H	525.075	47.00	4.40	16.60	38.15	29.85	46.00	-16.15
22H	550.075	49.00	4.40	16.60	38.20	31.80	46.00	-14.20
23H	566.747	53.50	4.47	16.84	38.17	36.64	46.00	-9.36
24H	569.980	58.70	4.48	16.89	38.16	41.91	46.00	-4.09
25V	574.600	50.20	4.50	16.95	38.15	33.50	46.00	-12.50
26H	575.007	54.50	4.50	16.96	38.15	37.81	46.00	-8.19
27H	585.704	50.30	4.54	17.11	38.13	33.82	46.00	-12.18
28H	625.097	54.20	4.75	18.07	38.00	39.02	46.00	-6.98
29H	650.111	53.60	4.90	18.80	37.90	39.40	46.00	-6.60
30H	668.765	50.20	4.98	18.38	37.90	35.65	46.00	-10.35
31V	668.820	53.10	4.98	18.38	37.90	38.55	46.00	-7.45
32H	674.760	46.50	5.00	18.25	37.90	31.85	46.00	-14.15
33V	716.700	34.40	5.10	18.35	37.83	20.02	46.00	-25.98
34H	813.079	41.80	5.37	20.69	37.45	30.41	46.00	-15.59
35V	950.440	44.50	5.86	22.52	36.70	36.18	46.00	-9.82

No Significant Frequencies found above 1 GHz for the Digital Portion in either Polarization for the EUT

CONDUCTED EMISSIONS

DATA SHEETS


EMISSION LEVEL [dBuV] PEAK
Graph for Peak & Average
7/28/2003 10:29:40
EN 55022 Conducted Emissions
Communication Machinery Corp.
Emulation Engine
Model: EE a/b/g - 115 VAC
FCC B - Black Lead
Black Lead LI-215 12078 11-20-02
EN 55022 - Class B - Quasi-peak
EN 55022 - Class B - Average
AMPLITUDE [dBuV]
110
100
90
80
70
60
50
40
30
20
10
0.15
1
10
30
FREQUENCY [MHz]

EN 55022 Conducted Emissions
Communication Machinery Corp.
Emulation Engine
Model: EE a/b/g - 115 VAC
FCC B - Black Lead
Black Lead LI-215 12078 11-20-02
TEST ENGINEER : Kyle Fujimoto

41 highest peaks above -50.00 dB of EN 55022 - Class B - Average limit line
Peak criteria : 1.00 dB, Curve : Peak

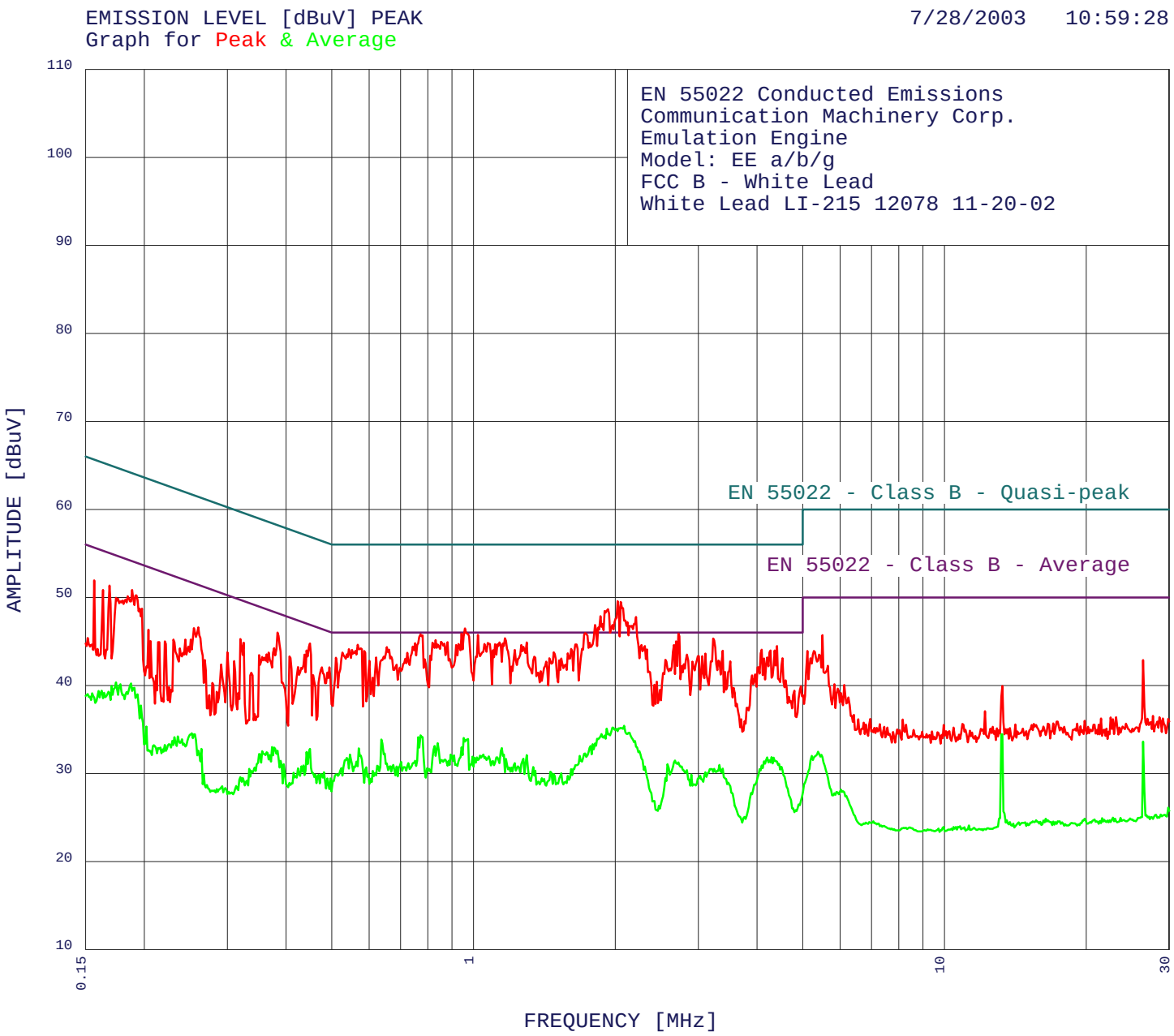
Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	2.168	47.89	46.00	1.89**
2	1.939	47.69	46.00	1.69**
3	2.013	47.49	46.00	1.49**
4	2.111	47.19	46.00	1.19**
5	1.849	47.09	46.00	1.09**
6	1.879	45.99	46.00	-0.01**
7	1.810	45.99	46.00	-0.01**
8	2.274	45.80	46.00	-0.20**
9	0.513	44.77	46.00	-1.23**
10	0.193	52.38	53.93	-1.55**
11	2.766	44.41	46.00	-1.59**
12	2.610	44.20	46.00	-1.80**
13	2.693	44.00	46.00	-2.00**
14	0.552	43.97	46.00	-2.03**
15	0.201	51.47	53.58	-2.10**
16	1.717	43.79	46.00	-2.21**
17	1.646	43.79	46.00	-2.21**
18	0.240	49.86	52.08	-2.22**
19	0.963	43.77	46.00	-2.23**
20	0.641	43.77	46.00	-2.23**
21	2.932	43.71	46.00	-2.29**
22	0.438	44.76	47.11	-2.34**
23	1.603	43.58	46.00	-2.42**
24	0.747	43.57	46.00	-2.43**
25	0.238	49.66	52.17	-2.51**
26	0.371	45.96	48.47	-2.51**
27	0.360	46.16	48.73	-2.57**
28	0.365	45.96	48.61	-2.64**
29	4.227	43.35	46.00	-2.65**
30	0.210	50.57	53.23	-2.65**
31	1.055	43.27	46.00	-2.73**
32	0.763	43.27	46.00	-2.73**
33	0.655	43.27	46.00	-2.73**
34	1.472	43.18	46.00	-2.82**
35	0.835	43.17	46.00	-2.83**
36	4.504	43.16	46.00	-2.84**
37	4.294	43.15	46.00	-2.85**
38	0.216	50.07	52.96	-2.89**
39	0.844	43.07	46.00	-2.93**
40	4.384	43.05	46.00	-2.95**
41	3.294	43.02	46.00	-2.98**

** Please See the Average Readings on the Next Page and on the Plot

EN 55022 Conducted Emissions
Communication Machinery Corp.
Emulation Engine
Model: EE a/b/g - 115 VAC
FCC B - Black Lead
BlackLead LI-215 12078 11-20-02
TEST ENGINEER : Kyle Fujimoto

28 highest peaks above -50.00 dB of EN 55022 - Class B - Average limit line
Peak criteria : 1.00 dB, Curve : Average

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	1.981	34.96	46.00	-11.04
2	0.767	33.05	46.00	-12.95
3	0.637	33.03	46.00	-12.97
4	0.445	33.93	46.98	-13.04
5	0.573	32.65	46.00	-13.35
6	0.381	34.89	48.25	-13.36
7	0.360	35.28	48.73	-13.45
8	0.953	32.52	46.00	-13.48
9	0.547	32.17	46.00	-13.83
10	0.831	32.15	46.00	-13.85
11	0.788	32.06	46.00	-13.94
12	2.679	31.79	46.00	-14.21
13	1.154	31.68	46.00	-14.32
14	0.469	32.19	46.53	-14.34
15	4.227	31.00	46.00	-15.00
16	13.269	34.42	50.00	-15.58
17	0.701	30.40	46.00	-15.60
18	0.899	30.27	46.00	-15.73
19	1.276	30.14	46.00	-15.86
20	3.192	30.11	46.00	-15.89
21	1.230	29.83	46.00	-16.17
22	1.345	29.79	46.00	-16.21
23	1.464	29.50	46.00	-16.50
24	26.422	33.33	50.00	-16.67
25	5.420	31.18	50.00	-18.82
26	6.186	27.41	50.00	-22.59
27	29.851	25.74	50.00	-24.26
28	16.582	25.06	50.00	-24.94


EMISSION LEVEL [dBuV] PEAK
Graph for Peak & Average
7/28/2003 10:59:28
EN 55022 Conducted Emissions
Communication Machinery Corp.
Emulation Engine
Model: EE a/b/g
FCC B - White Lead
White Lead LI-215 12078 11-20-02
EN 55022 - Class B - Quasi-peak
EN 55022 - Class B - Average
AMPLITUDE [dBuV]
110
100
90
80
70
60
50
40
30
20
10
0.15
1
10
30
FREQUENCY [MHz]

EN 55022 Conducted Emissions
Communication Machinery Corp.
Emulation Engine
Model: EE a/b/g
FCC B - White Lead
WhiteLead LI-215 12078 11-20-02
TEST ENGINEER : Kyle Fujimoto

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41 highest peaks above -50.00 dB of EN 55022 - Class B - Average limit line
Peak criteria : 1.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	2.023	49.57	46.00	3.57**
2	2.055	49.47	46.00	3.47**
3	1.929	48.67	46.00	2.67**
4	1.859	47.86	46.00	1.86**
5	2.214	47.78	46.00	1.78**
6	1.810	46.86	46.00	0.86**
7	0.958	46.48	46.00	0.48**
8	1.726	45.96	46.00	-0.04**
9	2.722	45.90	46.00	-0.10**
10	0.944	45.89	46.00	-0.11**
11	0.771	45.79	46.00	-0.21**
12	1.021	45.74	46.00	-0.26**
13	1.166	45.35	46.00	-0.65**
14	3.226	45.32	46.00	-0.68**
15	0.831	45.15	46.00	-0.85**
16	2.693	45.00	46.00	-1.00**
17	0.881	44.92	46.00	-1.08**
18	1.297	44.88	46.00	-1.12**
19	1.136	44.87	46.00	-1.13**
20	1.072	44.81	46.00	-1.19**
21	0.751	44.80	46.00	-1.20**
22	1.112	44.69	46.00	-1.31**
23	1.654	44.66	46.00	-1.34**
24	0.567	44.61	46.00	-1.39**
25	0.919	44.60	46.00	-1.40**
26	2.665	44.60	46.00	-1.40**
27	2.274	44.58	46.00	-1.42**
28	4.408	44.47	46.00	-1.53**
29	0.655	44.36	46.00	-1.64**
30	1.611	44.15	46.00	-1.85**
31	0.544	44.12	46.00	-1.88**
32	2.334	44.08	46.00	-1.92**
33	4.092	44.05	46.00	-1.95**
34	1.223	44.02	46.00	-1.98**
35	4.361	43.96	46.00	-2.04**
36	4.272	43.96	46.00	-2.04**
37	3.383	43.92	46.00	-2.08**
38	0.586	43.90	46.00	-2.10**
39	0.449	44.78	46.89	-2.11**
40	0.383	46.02	48.21	-2.19**
41	1.480	43.77	46.00	-2.23**

** Please See the Average Readings on the Next Page and on the Plot

EN 55022 Conducted Emissions
Communication Machinery Corp.
Emulation Engine
Model: EE a/b/g
FCC B - White Lead
White Lead LI-215 12078 11-20-02
TEST ENGINEER : Kyle Fujimoto

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41 highest peaks above -50.00 dB of EN 55022 - Class B - Average limit line
Peak criteria : 1.00 dB, Curve : Average

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	2.089	35.40	46.00	-10.60
2	0.771	34.31	46.00	-11.69
3	0.763	34.11	46.00	-11.89
4	0.953	34.04	46.00	-11.96
5	0.637	33.86	46.00	-12.14
6	0.839	33.45	46.00	-12.55
7	0.826	33.10	46.00	-12.90
8	1.148	32.86	46.00	-13.14
9	0.570	32.85	46.00	-13.15
10	1.049	32.15	46.00	-13.85
11	0.547	32.13	46.00	-13.87
12	0.895	32.12	46.00	-13.88
13	1.297	32.09	46.00	-13.91
14	0.187	40.21	54.15	-13.94
15	0.995	31.89	46.00	-14.11
16	0.449	32.78	46.89	-14.11
17	4.294	31.85	46.00	-14.15
18	0.538	31.76	46.00	-14.24
19	1.276	31.67	46.00	-14.33
20	1.172	31.65	46.00	-14.35
21	0.174	40.35	54.77	-14.41
22	0.178	40.13	54.59	-14.46
23	2.679	31.47	46.00	-14.53
24	0.442	32.42	47.02	-14.60
25	0.701	31.32	46.00	-14.68
26	2.582	31.03	46.00	-14.97
27	0.170	39.93	54.94	-15.01
28	3.328	30.97	46.00	-15.03
29	1.338	30.71	46.00	-15.29
30	0.592	30.69	46.00	-15.31
31	0.373	32.98	48.43	-15.44
32	13.269	34.45	50.00	-15.55
33	1.456	30.18	46.00	-15.82
34	0.162	39.41	55.34	-15.93
35	1.536	30.01	46.00	-15.99
36	0.197	37.73	53.75	-16.03
37	1.480	29.92	46.00	-16.08
38	2.900	29.86	46.00	-16.14
39	0.481	30.12	46.32	-16.20
40	0.435	30.89	47.15	-16.26
41	0.356	32.53	48.82	-16.29