FCC PART 15, SUBPART B AND C
TEST METHOD: ANSI C63.4-1992

for

2.4 GHz HALF DUPLEX TRANSCEIVER

Model: M24SXCRN1

Prepared for

VTECH WIRELESS, INC.
1 CORPORATE PARK DRIVE, SUITE 100
IRVINE, CALIFORNIA 92606-5113

Prepared by:_____

KYLE FUJIMOTO

Approved by:_____

SCOTT McCUTCHAN

COMPATIBLE ELECTRONICS INC.
114 OLINDA DRIVE
BREA, CALIFORNIA 92823
(714) 579-0500

DATE: OCTOBER 11, 1999

	REPORT BODY	APPENDICES				TOTAL
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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 in any form unless done so in full with the written permission of Compatible Electronics.

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

Device Tested:	2.4 GHz Half Duplex Transceiver Model: M24SXCRN1 S/N: N/A
Product Description:	See Expository Statement
Modifications:	The EUT was not modified during the testing.
Manufacturer:	VTech Wireless, Inc. 1 Corporate Park Drive, Suite 100 Irvine, California 92606-5113
Test Date:	October 7, 1999
IC File # for Canada	IC2154-D
Test Specifications:	EMI requirements FCC Title 47, Part 15 Subpart B and Subpart C, Sections 15.205, 15.207, and 15.249
Test Procedure:	ANSI C63.4: 1992
Test Deviations:	The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 450 kHz - 30 MHz	Complies with the **Class B** limits of FCC Title 47, Part 15 Subpart B; and Subpart C, section 15.207
2	Radiated RF Emissions, 10 kHz - 25000 MHz	Complies with the limits of FCC Title 47, Part 15, Subpart B and Subpart C, sections 15.205 and 15.249

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the 2.4 GHz Half Duplex Transceiver Model: M24SXCRN1. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 1992. 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 specification limits defined by FCC Title 47, Part 15, Subpart B and Subpart C, sections 15.205, 15.207, and 15.249.

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

VTech Wireless, Inc.

Terry Flach	Engineering
Thomas Craft	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 October 7, 1999

2.5 Disposition of the Test Sample

The test sample was returned to VTech Wireless, Inc. on October 8, 1999.

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, Subpart C.	FCC Rules – Radio frequency devices (including digital devices) – Intentional Radiators
ANSI C63.4 1992	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, 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

The 2.4 GHz Half Duplex Transceiver Model: M24SXCRN1 (EUT) was connected to the laptop computer and antenna via its RS-232 and RF output ports, respectively. The laptop computer was also connected to a printer and power supply via its parallel and power ports, respectively. The EUT was continuously receiving and transmitting.

During the preliminary investigation, the EUT was tested in three orthogonal axis, with the Y Axis producing the highest emission levels.

The final fundamental and harmonics data was taken in the worst case orthogonal axis.

Antenna	Worst Case Axis
1.625 inch vertical whip	Y

For the spurious and conducted emissions, the data was also taken in the worst case orthogonal axis.

Please see Appendix D for the data sheets. Please see the special antenna information exhibit for more details on each of the antennas.

4.1.1 Cable Construction and Termination

Cable 1 This is a 1 foot unshielded cable connecting the EUT to the laptop computer. It has a terminal block connected to the data pins (3 through 10) at the EUT end and a D-9 pin connector at the laptop computer end.

Cable 2 This is a 1 foot unshielded cable connecting the EUT to the laptop computer. It has a terminal block connected to the power pins (1 and 2) at the EUT end and a 6 pin mini DIN at the laptop computer end.

Cable 3 This is a 6 foot unshielded cable connecting the EUT to the AC Adapter. It has a 1/8 inch power connector at the EUT end and a two pin power connector at the AC Adapter end.

Cable 4 This is a 5 foot braid and foil shielded cable connecting the printer to the laptop computer. It has a Centronics metallic type connector at the printer end and a D-25 pin metallic connector at the laptop computer end. The cable was bundled to a length of bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connectors.

Cable 5 This is a 1 foot braid shielded cable connecting the EUT to the antenna. It has a metallic MMCX miniature coax connector at each end. The shield of the cable was grounded to the chassis via the connectors.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
2.4 GHz HALF DUPLEX TRANSCEIVER (EUT)	VTECH WIRELESS, INC.	M24SXCRN1	N/A	**NRLM24SXCRN1**
LAPTOP COMPUTER	TOSHIBA	PA124OU VCD	X7345171-1	**DoC**
AC ADAPTER	TOSHIBA	PA245UV	N/A	**N/A**
PRINTER	CITIZEN	LSP-10	1130060-73	**DLK66TLSP-10**
1.625 INCH VERTICAL WHIP (EUT)	VTECH WIRELESS, INC.	N/A	N/A	**N/A**

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Spectrum Analyzer	Hewlett Packard	8566B	3638A08768	Dec. 11, 1998	Dec. 11, 1999
Preamplifier	Com Power	PA-102	01414	Jan. 16, 1999	Jan. 16, 2000
Quasi-Peak Adapter	Hewlett Packard	85650A	2811A01362	April 9, 1999	April 9, 2000
Biconical Antenna	Com Power	AB-100	01543	Oct. 15, 1998	Oct. 15, 1999
Log Periodic Antenna	Com Power	AL-100	01011	Oct. 15, 1998	Oct. 15, 1999
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Hewlett Packard	HP98561A	2522A05178	N/A	N/A
Printer	Hewlett Packard	2225A	2925S33268	N/A	N/A
Plotter	Hewlett Packard	7440A	8726K38417	N/A	N/A
Microwave Preamplifier	Hewlett Packard	8449B	3008A008766	Jan. 30, 1999	Jan. 30, 2000
Horn Antenna	Antenna Research	DRG-118/A	1053	Dec. 8, 1995	N/A
Loop Antenna	Com-Power	AL-130	25309	April 13, 1999	April 13, 2000
Amplifier	Hewlett Packard	11975A	2403A00202	Dec. 14, 1998	Dec. 14, 1999
Harmonic Mixer	Hewlett Packard	11970K	3003A05460	Feb. 25, 1999	Feb. 25, 2000
Horn Antenna	Antenna Research	MWH-182/B	1004	January 21, 1997	N/A

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.2 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. TEST PROCEDURES

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

7.1 Conducted Emissions Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak detector 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 spectrum analyzer offset was adjusted accordingly to read the actual data measured. The LISN output was read by the spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for the conducted emissions 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: 1992. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The initial test data was taken in manual mode while scanning the frequency ranges of 0.45 MHz to 1.6 MHz, 1.6 MHz to 5 MHz and 5 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the spectrum analyzer span adjusted to 1 MHz.

The final data was collected under program control by the HP 9000/300 in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave.

7.2 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, and the Hewlett Packard Microwave Preamplifier Model: 8449B was used for frequencies above 1 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.

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 25 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: 1992. 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. 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.

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 to obtain final test data.

For the 22 GHz – 25 GHz span, the Hewlett Packard 11970K Harmonic Mixer and the Hewlett Packard 11975A Amplifier were used to allow the spectrum analyzer to scan up to 25 GHz.

7.3 RF Band Edges

Spectral plots of both the low and high channels were taken of the EUT to show that the emissions at the band edges (2400 MHz and 2483.50 MHz) were attenuated by at least 50 dB below the level of the fundamental or to the general radiated emissions limits in FCC Title 47, Subpart C, section 15.209, whichever is the lesser attenuation. The spectral plots are located in Appendix D. The plots were taken with the antenna 3 meters away from the EUT.

8. CONCLUSIONS

The 2.4 GHz Half Duplex Transceiver Model: M24SXCRN1 meets all of the specification limits defined in FCC Title 47, Part 15, Subpart B and Subpart C, sections 15.205, 15.207, and 15.249.

APPENDIX A

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC 15.249 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.

Modifications:

No modifications were made to the EUT.

APPENDIX B

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST	2.4 GHz Half Duplex Transceiver Model: M24SXCRN1 S/N: N/A

There were no additional models covered under this report.

APPENDIX C

DIAGRAMS, CHARTS AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

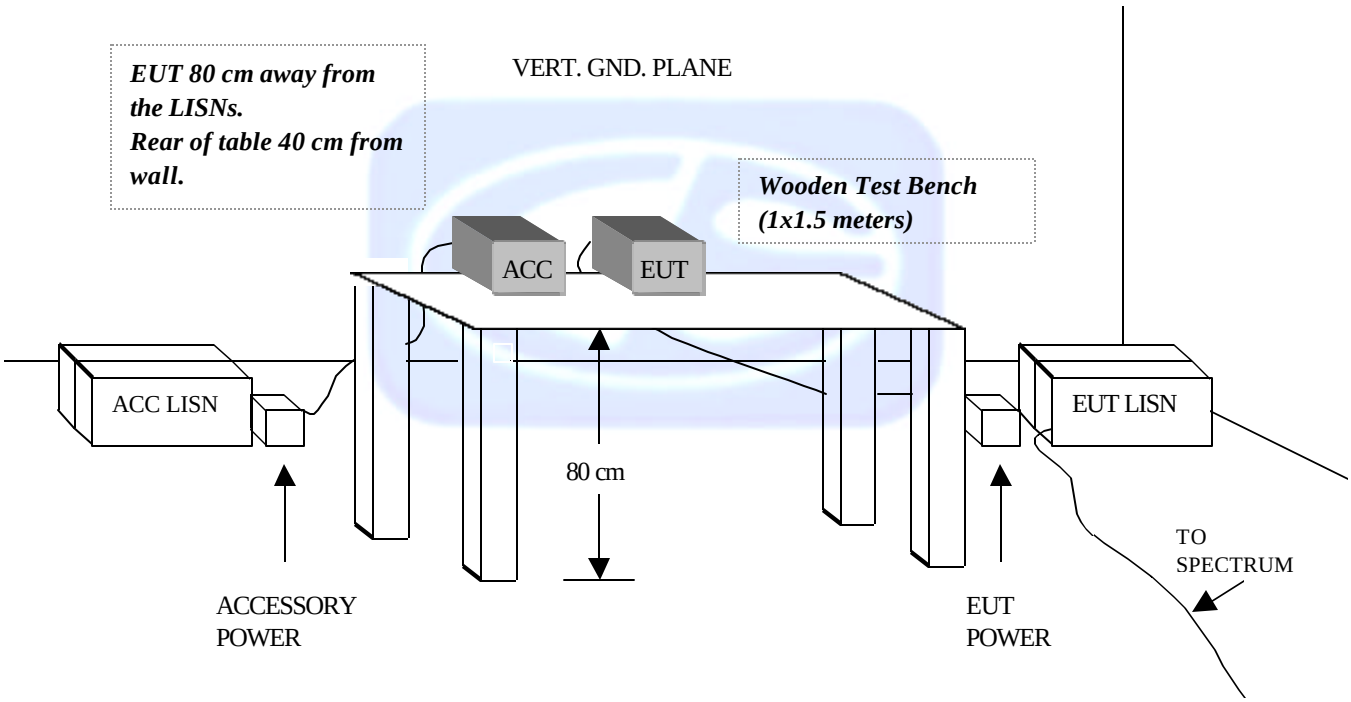
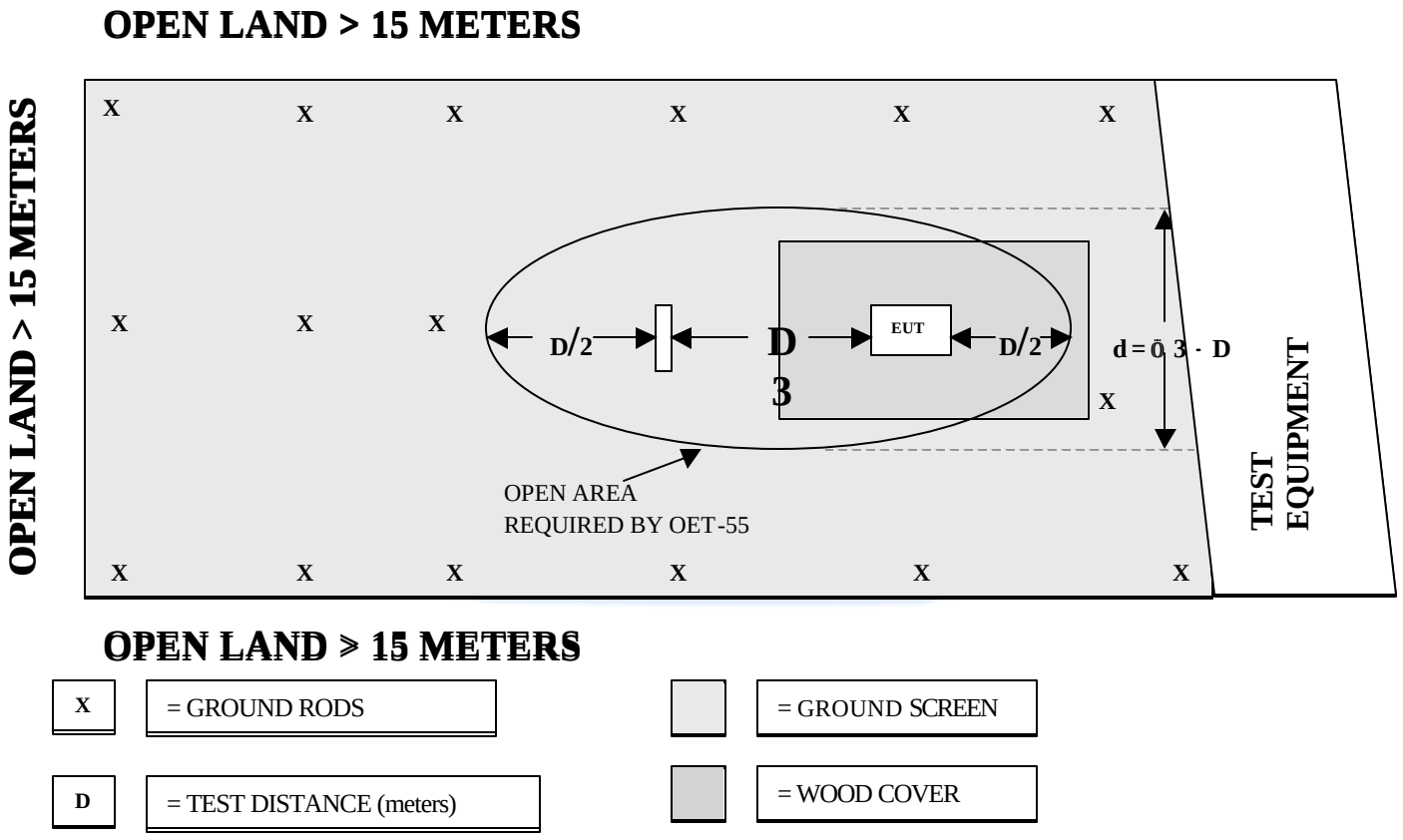


FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED SITE



FRONT VIEW

VTECH WIRELESS, INC.
2.4 GHz HALF DUPLEX TRANSCEIVER
Model: M24SXCRN1
FCC SUBPART B AND C - RADIATED EMISSIONS – 10-7-99

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

VTECH WIRELESS, INC.
2.4 GHz HALF DUPLEX TRANSCEIVER
Model: M24SXCRN1
FCC SUBPART B AND C - RADIATED EMISSIONS – 10-7-99

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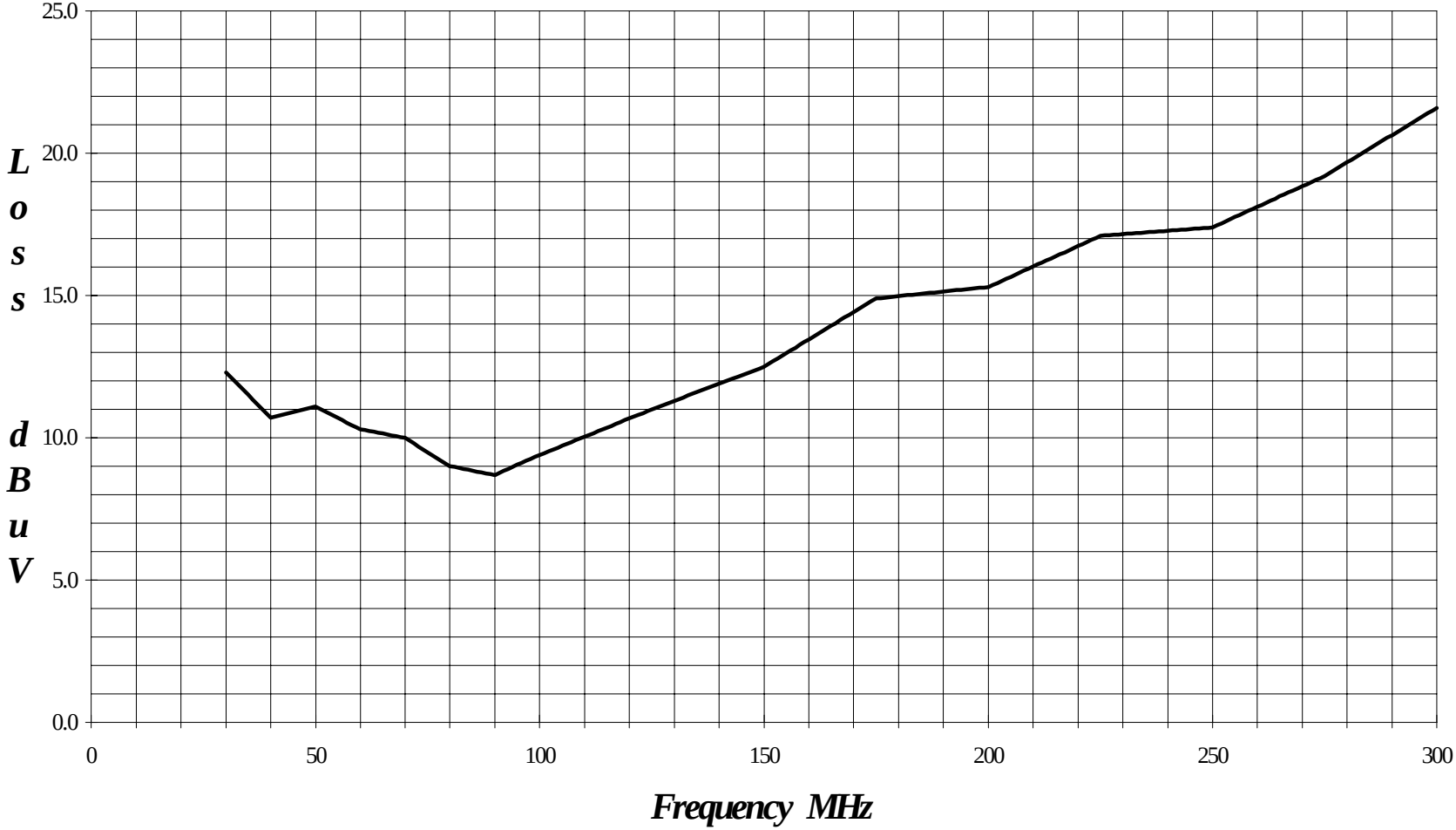
FCC SUBPART B AND C - CONDUCTED EMISSIONS – 10-7-99

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

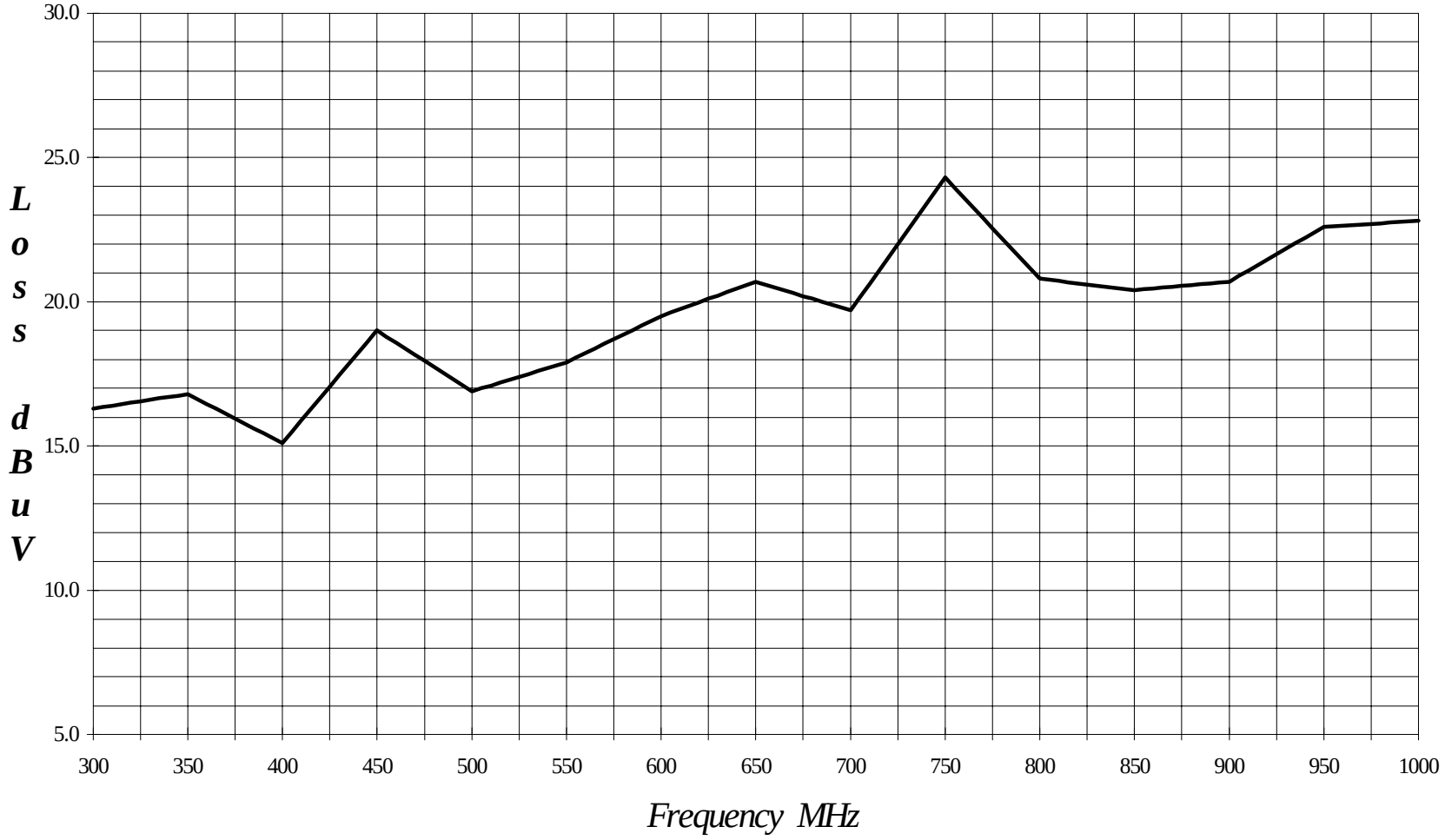
***Cal*: 10/15/98**

LAB "D" BICONICAL ANTENNA AB-100 S/N 01548

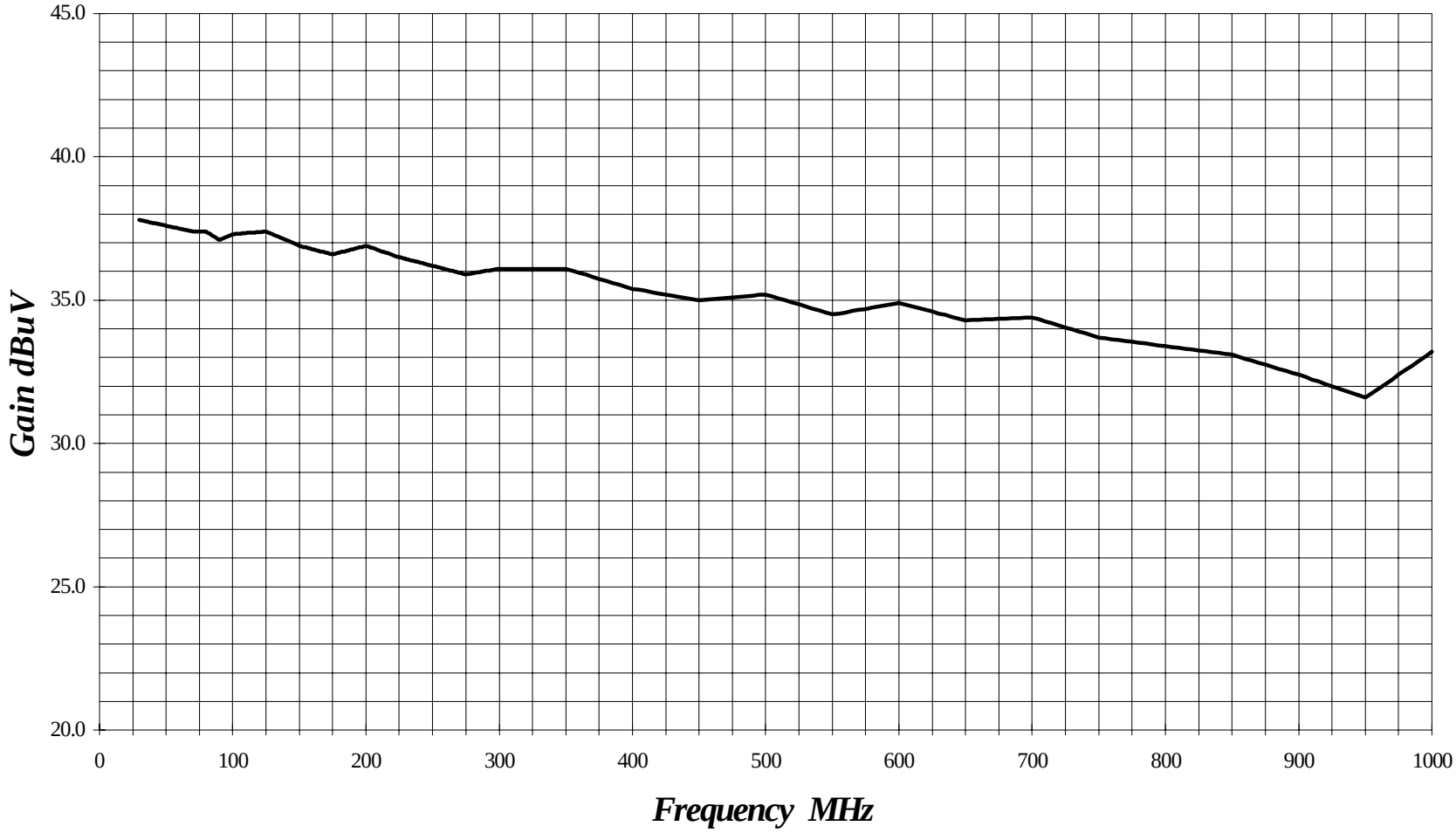


***Cal*: 10/15/98**

LAB "D" LOG PERIODIC ANTENNA AL-100 S/N 01117



PREAMPLIFIER EFFECTIVE GAIN AT 3 METERS PA-102 S/N: 1017



HEWLETT PACKARD 8449B

MICROWAVE PREAMPLIFIER

S/N: 3008A008766

CALIBRATION DATE: JANUARY 30, 1999

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	36.9	10.5	34.1
1.1	36.3	11.0	33.7
1.2	36.4	11.5	34.0
1.3	36.2	12.0	33.9
1.4	36.3	12.5	34.4
1.5	35.7	13.0	32.9
1.6	35.9	13.5	31.6
1.7	35.7	14.0	31.8
1.8	35.6	14.5	31.9
1.9	35.5	15.0	32.2
2.0	35.4	15.5	32.8
2.5	35.6	16.0	32.4
3.0	35.2	16.5	32.1
3.5	35.2	17.0	32.3
4.0	34.3	17.5	30.3
4.5	34.1	18.0	31.5
5.0	34.3	18.5	31.2
5.5	33.0	19.0	32.2
6.0	34.1	19.5	32.0
6.5	34.5	20.0	32.0
7.0	34.3	20.5	33.2
7.5	33.9	21.0	30.9
8.0	34.5	22.0	32.1
8.5	34.5	23.0	32.8
9.0	34.4	24.0	32.9
9.5	34.3	25.0	32.3
10.0	33.7	26.0	32.6

ANTENNA RESEARCH ASSOCIATES, INC.
11317 Frederick Avenue, Beltsville, MD 20705

E-FIELD ANTENNA FACTOR CALIBRATION

E(dB V/m) = Vo(dB V) + AFE(dB/m)

Model number : DRG-118/A

Frequency GHz	AFE dB/m	Gain dBi
1	22.3	8.0
2	26.7	9.5
3	29.7	10.1
4	29.5	12.8
5	32.3	12.0
6	32.4	13.4
7	36.1	11.0
8	37.4	10.9
9	36.8	12.5
10	39.5	10.7
11	39.6	11.5
12	39.8	12.0
13	39.7	12.8
14	41.8	11.3
15	41.9	11.9
16	38.1	16.3
17	41.0	13.9
18	46.5	8.9

Serial number : 1053
Job number : 96-092
Remarks : 3 meter calibration
Standards : LPD-118/A, TE-1000

Temperature : 72° F
Humidity : 56 %
Traceability : A01887
Date : December 08, 1995

Calibrated By

ANTENNA RESEARCH
11317 Frederick Avenue, Beltsville, MD 20705, USA
TEL: (301)937-8888 FAX: (301)937-2796

E-FIELD ANTENNA FACTOR CALIBRATION

E (dB V/m) = V_o (dB V) + AFE (dB 1/m)

Model Number : MWH-1826/B

Frequency (GHz)	AFE (dB 1/m)	Gain (dBi)
18.000	23.1	32.2
18.850	23.2	32.5
19.700	23.6	32.5
20.550	23.5	33.0
21.400	23.7	33.1
22.250	24.0	33.2
23.100	24.0	33.5
23.950	24.1	33.7
24.800	24.1	34.0
25.650	24.3	34.1
26.500	24.4	34.3

Serial Number : 1004

Com-Power Corporation

(949) 587-9800

Antenna Calibration

Antenna Type:	Loop Antenna
Model:	AL-130
Serial Number:	25309
Calibration Date:	4/13/99

Frequency MHz	Magnetic (dB/m)	Electric dB/m
0.01	-40.6	10.9
0.02	-41.5	10.0
0.03	-39.9	11.6
0.04	-40.2	11.3
0.05	-41.5	10.0
0.06	-41.1	10.4
0.07	-41.3	10.2
0.08	-41.6	9.9
0.09	-41.7	9.8
0.1	-41.7	9.8
0.2	-44.0	7.5
0.3	-41.6	9.9
0.4	-41.6	9.9
0.5	-41.7	9.8
0.6	-41.5	10.0
0.7	-41.4	10.1
0.8	-41.5	10.0
0.9	-41.6	9.9
1	-41.2	10.3
2	-40.5	11.0
3	-40.8	10.7
4	-41.0	10.5
5	-40.5	11.0
6	-40.5	11.0
7	-40.7	10.8
8	-40.8	10.7
9	-40.1	11.4
10	-40.4	11.1
12	-41.0	10.5
14	-42.1	9.4
15	-42.3	9.2
16	-42.7	8.8
18	-41.0	10.5
20	-41.1	10.4
25	-43.4	8.1
30	-45.3	6.2

Trans. Antenna Height	2 meter
Receiving Antenna Height	2 meter

APPENDIX D

DATA SHEETS

CONDUCTED EMISSIONS DATA SHEETS

COMPATIBLE ELECTRONICS

10/07/1999 15:44:58

VTECH WIRELESS, INC.
2.4 GHz HALF DUPLEX TRANS.
MODEL: M24SXCRN1
FCC C - BLACK LEAD
TEST ENGINEER : Kyle Fujimoto
KYLE FUJIMOTO

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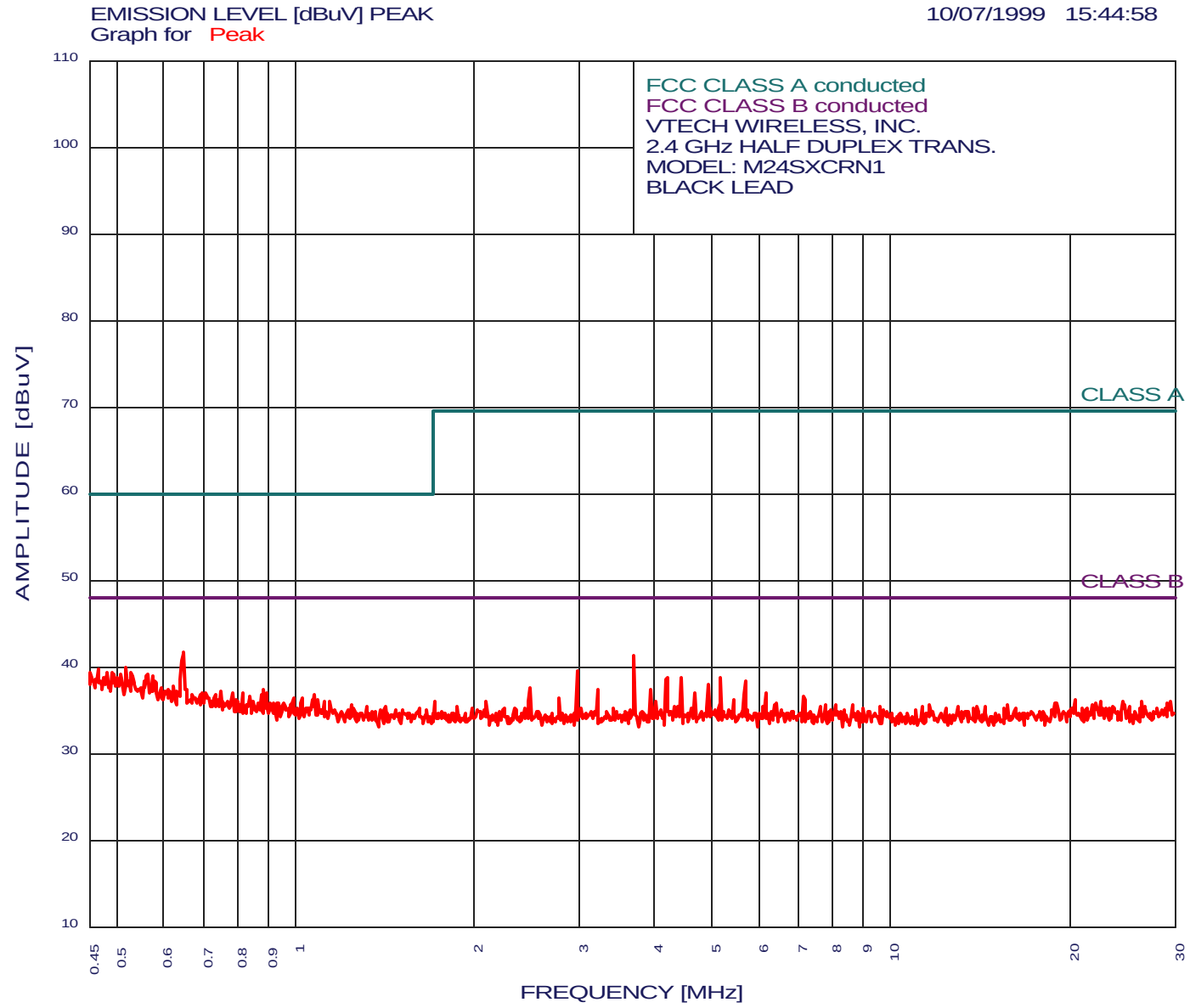
20 highest peaks above -50.00 dB of CLASS B limit line
Peak criteria : 0.10 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.649	41.67	48.00	-6.33
2	3.706	41.18	48.00	-6.82
3	0.519	39.87	48.00	-8.13
4	0.466	39.77	48.00	-8.23
5	2.968	39.48	48.00	-8.52
6	0.530	39.37	48.00	-8.63
7	0.484	39.37	48.00	-8.63
8	0.452	39.37	48.00	-8.63
9	0.492	39.27	48.00	-8.73
10	0.496	39.17	48.00	-8.83
11	0.565	39.07	48.00	-8.93
12	0.509	39.07	48.00	-8.93
13	0.574	38.97	48.00	-9.03
14	4.442	38.78	48.00	-9.22
15	0.500	38.77	48.00	-9.23
16	0.476	38.77	48.00	-9.23
17	5.186	38.69	48.00	-9.31
18	4.206	38.68	48.00	-9.32
19	0.462	38.57	48.00	-9.43
20	0.579	38.37	48.00	-9.63



COMPATIBLE ELECTRONICS

COMPATIBLE ELECTRONICS

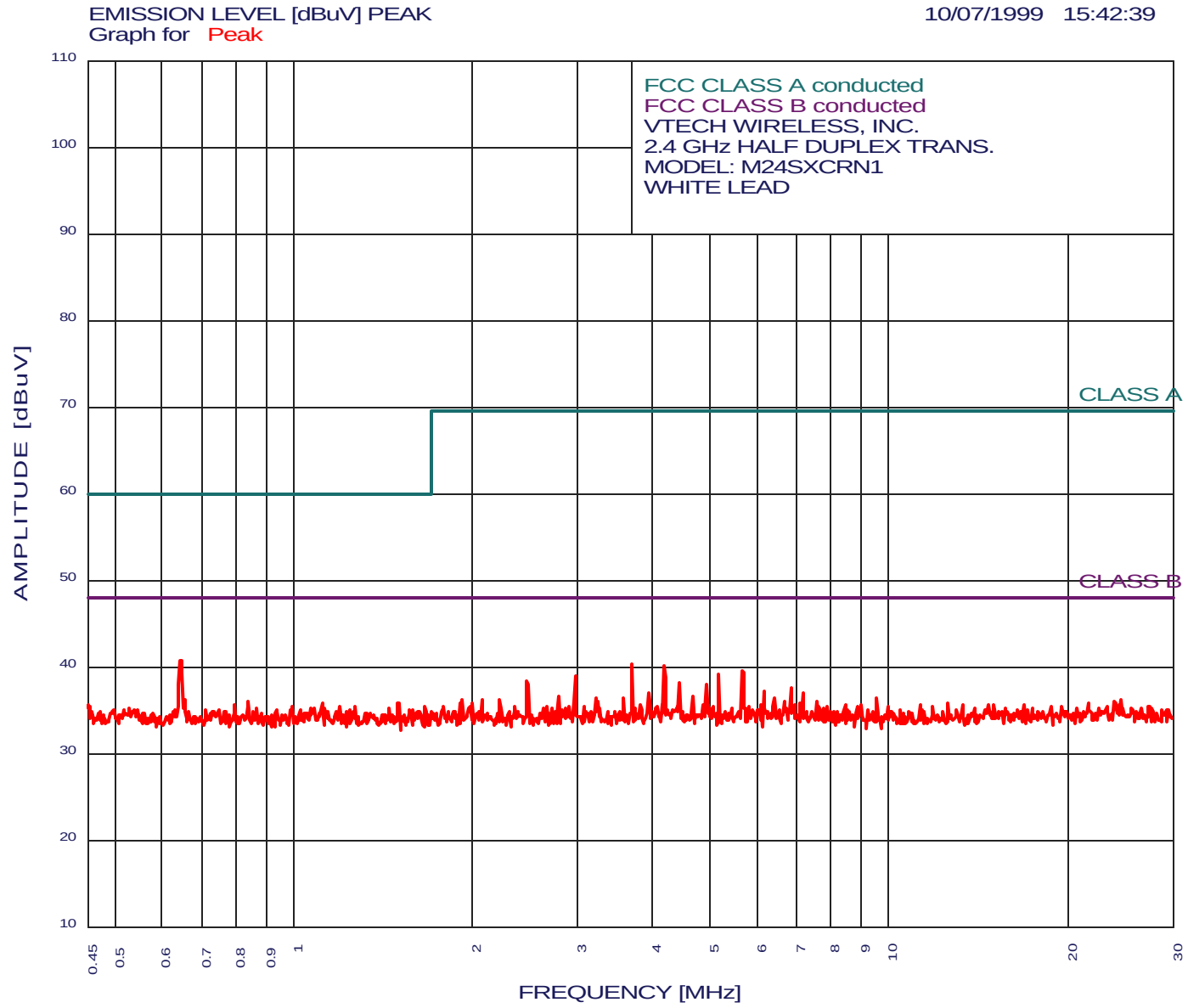
10/07/1999 15:42:39

VTECH WIRELESS, INC.
2.4 GHz HALF DUPLEX TRANS.
MODEL: M24SXCRN1
FCC C - WHITE LEAD
TEST ENGINEER : KYLE FUJIMOTO

---

20 highest peaks above -50.00 dB of CLASS B limit line
Peak criteria : 0.10 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.643	40.78	48.00	-7.22
2	3.706	40.28	48.00	-7.72
3	4.189	40.18	48.00	-7.82
4	5.665	39.48	48.00	-8.52
5	5.186	39.18	48.00	-8.82
6	2.968	38.98	48.00	-9.02
7	2.467	38.38	48.00	-9.62
8	4.442	38.18	48.00	-9.82
9	4.934	37.98	48.00	-10.02
10	6.847	37.58	48.00	-10.42
11	6.162	37.18	48.00	-10.82
12	3.948	36.98	48.00	-11.02
13	7.165	36.88	48.00	-11.12
14	4.689	36.58	48.00	-11.42
15	2.787	36.48	48.00	-11.52
16	9.540	36.38	48.00	-11.62
17	6.428	36.38	48.00	-11.62
18	3.215	36.38	48.00	-11.62
19	3.585	36.28	48.00	-11.72
20	24.544	36.25	48.00	-11.75



COMPATIBLE ELECTRONICS

RADIATED EMISSIONS DATA SHEETS

Test location: Compatible Electronics
Customer : VTECH WIRELESS, INC. Date : 10/ 7/1999
Manufacturer : VTECH WIRELESS, INC. Time : 14.31
EUT name : 2.4 GHz HALF DUPLEX TRANSCEIVER Model: M24SXCRN1
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor(20*log(test/spec)) : 0.00
Test Mode : SPURIOUS EMISSIONS - 10 kHz to 30 MHz
TEMPERATURE 96 DEGREES F.
RELATIVE HUMIDITY 25%
TESTED BY: Kyle Fujimoto
KYLE FUJIMOTO

NO SPURIOUS EMISSIONS FOUND FROM 10 kHz TO 30 MHz
IN EITHER POLARIZATION FOR THE EUT

Test location: Compatible Electronics
Customer : VTECH WIRELESS, INC. Date : 10/ 7/1999
Manufacturer : VTECH WIRELESS, INC. Time : 14.31
EUT name : 2.4 GHz HALF DUPLEX TRANSCEIVER Model: M24SXCRN1
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor(20*log(test/spec)) : 0.00
Test Mode : SPURIOUS EMISSIONS - VERTICAL - 30 MHz TO 300 MHz
TEMPERATURE 96 DEGREES F.
RELATIVE HUMIDITY 25%
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	65.20	44.40	1.10	10.14	38.60	17.05	40.00	-22.95
2V	66.38	44.60	1.13	10.11	38.60	17.24	40.00	-22.76
3V	71.03	49.20	1.20	9.90	38.60	21.70	40.00	-18.30
4V	90.17	54.10	1.20	8.71	38.40	25.61	43.50	-17.89
5V	110.30	55.20	1.44	10.06	38.68	28.02	43.50	-15.48
6V	124.97	56.20	1.50	11.00	38.80	29.90	43.50	-13.60
7V	140.37	59.80	1.62	11.92	38.62	34.73	43.50	-8.77
8V	152.11	60.00	1.70	12.70	38.49	35.91	43.50	-7.59
9V	180.45	59.90	1.77	14.99	38.49	38.17	43.50	-5.33
10V	195.47	58.60	1.95	15.23	38.73	37.05	43.50	-6.45
11V	199.02	55.40	1.99	15.28	38.78	33.89	43.50	-9.61
12V	215.53	56.30	2.06	16.42	38.49	36.29	43.50	-7.21

Test location: Compatible Electronics
Customer : VTECH WIRELESS, INC. Date : 10/ 7/1999
Manufacturer : VTECH WIRELESS, INC. Time : 14.31
EUT name : 2.4 GHz HALF DUPLEX TRANSCEIVER Model: M24SXCRN1
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor(20*log(test/spec)) : 0.00
Test Mode : SPURIOUS EMISSIONS - HORIZONTAL - 30 MHz TO 300 MHz
TEMPERATURE 96 DEGREES F.
RELATIVE HUMIDITY 25%
TESTED BY: Kyle Fujimoto
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
1H	70.86	47.30	1.20	9.91	38.60	19.81	40.00	-20.19
2H	85.98	49.20	1.20	8.82	38.48	20.74	40.00	-19.26
3H	90.28	62.70	1.21	8.72	38.41	34.22	43.50	-9.28
4H	95.28	55.80	1.31	9.07	38.51	27.67	43.50	-15.83
5H	101.88	55.70	1.41	9.52	38.62	28.01	43.50	-15.49
6H	105.29	64.30	1.42	9.74	38.64	36.82	43.50	-6.68
7H	114.61	45.30	1.46	10.34	38.72	18.38	43.50	-25.12
8H	132.69	63.00	1.56	11.46	38.71	37.32	43.50	-6.18
9H	199.00	53.60	1.99	15.28	38.78	32.09	43.50	-11.41
10H	240.63	50.50	2.29	17.29	38.36	31.71	46.00	-14.29

Test location: Compatible Electronics
Customer : VTECH WIRELESS, INC. Date : 10/ 7/1999
Manufacturer : VTECH WIRELESS, INC. Time : 14.31
EUT name : 2.4 GHz HALF DUPLEX TRANSCEIVER Model: M24SXCRN1
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor(20*log(test/spec)) : 0.00
Test Mode : SPURIOUS EMISSIONS - HORIZONTAL - 300 MHz TO 1000 MHz
TEMPERATURE 96 DEGREES F.
RELATIVE HUMIDITY 25%
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
1H	331.62	52.00	2.69	16.62	38.56	32.74	46.00	-13.26
2H	360.12	48.00	2.86	16.46	38.52	28.80	46.00	-17.20
3H	364.76	59.00	2.89	16.30	38.48	39.70	46.00	-6.30
4H	397.90	64.50	3.09	15.17	38.22	44.54	46.00	-1.46
5H	397.90	63.53	3.09	15.17	38.22	43.57Qp	46.00	-2.43
6H	400.95	46.90	3.10	15.17	38.19	26.98	46.00	-19.02
7H	408.11	50.00	3.12	15.73	38.14	30.71	46.00	-15.29
8H	431.07	59.10	3.16	17.52	37.95	41.83	46.00	-4.17
9H	464.26	56.20	3.29	18.40	37.94	39.94	46.00	-6.06
10H	497.44	54.30	3.48	17.01	38.27	36.52	46.00	-9.48
11H	511.07	54.10	3.57	17.12	38.21	36.58	46.00	-9.42
12H	530.54	55.00	3.68	17.51	38.06	38.14	46.00	-7.86
13H	563.71	49.00	3.80	18.34	38.04	33.10	46.00	-12.90
14H	596.90	57.60	3.80	19.40	38.37	42.43	46.00	-3.57
15H	644.38	46.40	3.89	20.57	38.05	32.81	46.00	-13.19
16H	994.75	42.20	4.96	22.78	37.93	32.01	54.00	-21.99

Test location: Compatible Electronics
Customer : VTECH WIRELESS, INC. Date : 10/ 7/1999
Manufacturer : VTECH WIRELESS, INC. Time : 14.31
EUT name : 2.4 GHz HALF DUPLEX TRANSCEIVER Model: M24SXCRN1
Specification: Fcc_B Test distance: 3.0 mtrs Lab: D
Distance correction factor(20*log(test/spec)) : 0.00
Test Mode : SPURIOUS EMISSIONS - VERTICAL - 300 MHz TO 1000 MHz
TEMPERATURE 96 DEGREES F.
RELATIVE HUMIDITY 25%
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	305.70	46.10	2.53	16.36	38.51	26.48	46.00	-19.52
2V	320.80	44.20	2.62	16.51	38.54	24.79	46.00	-21.21
3V	360.85	44.00	2.87	16.43	38.51	24.78	46.00	-21.22
4V	364.76	59.90	2.89	16.30	38.48	40.60	46.00	-5.40
5V	397.95	56.30	3.09	15.17	38.22	36.34	46.00	-9.66
6V	431.07	56.70	3.16	17.52	37.95	39.43	46.00	-6.57
7V	433.02	49.60	3.17	17.68	37.94	32.51	46.00	-13.49
8V	464.22	54.20	3.29	18.40	37.94	37.95	46.00	-8.05
9V	481.02	43.30	3.39	17.70	38.11	26.27	46.00	-19.73
10V	497.38	60.60	3.48	17.01	38.27	42.82	46.00	-3.18
11V	504.24	41.80	3.53	16.98	38.27	24.04	46.00	-21.96
12V	511.09	51.10	3.57	17.12	38.21	33.58	46.00	-12.42
13V	521.23	47.70	3.63	17.32	38.13	30.52	46.00	-15.48
14V	529.18	45.80	3.68	17.48	38.07	28.89	46.00	-17.11
15V	563.70	53.10	3.80	18.34	38.04	37.20	46.00	-8.80
16V	596.85	57.80	3.80	19.40	38.37	42.63	46.00	-3.37
17V	696.35	44.80	4.09	19.77	38.19	30.47	46.00	-15.53

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	VTECH WIRELESS, INC.	DATE	10/7/99
EUT	2.4 GHz HALF DUPLEX TRANSCEIVER	DUTY CYCLE	33.33 %
MODEL	M24SXCRN1	PEAK TO AVG	-9.54 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)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2400.0000	49.4	39.9 A	H	1.0	90	Y	LOW	28.2	4.5	0.0	**72.6**	**-21.4**	**94.0**	
2400.0000	53.4	43.9 A	V	1.0	90	Y	LOW	28.2	4.5	0.0	**76.6**	**-17.4**	**94.0**	
2441.0000	54.2	44.7 A	H	1.0	180	Y	MID	28.2	4.5	0.0	**77.4**	**-16.6**	**94.0**	
2441.0000	57.2	47.7 A	V	1.5	180	Y	MID	28.2	4.5	0.0	**80.4**	**-13.6**	**94.0**	
2481.0000	43.8	34.3 A	H	3.0	270	Y	HIGH	28.2	4.5	0.0	**67.0**	**-27.0**	**94.0**	
2481.0000	49.7	40.2 A	V	3.0	180	Y	HIGH	28.2	4.5	0.0	**72.9**	**-21.1**	**94.0**	

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

** DELTA = SPEC LIMIT - CORRECTED READING

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	VTECH WIRELESS, INC.	DATE	10/7/99
EUT	2.4 GHz HALF DUPLEX TRANSCEIVER	DUTY CYCLE	33.33 %
MODEL	M24SXCRN1	PEAK TO AVG	-9.54 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)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
4800.0000	50.9	41.4 A	H	1.0	180	Y	LOW	32.3	5.7	34.3	**45.1**	**-8.9**	**54.0**	
4800.0000	51.7	42.2 A	V	2.0	180	Y	LOW	32.3	5.7	34.3	**45.9**	**-8.1**	**54.0**	
4882.0000	44.6	35.1 A	H	1.0	180	Y	MID	32.3	5.7	34.3	**38.8**	**-15.2**	**54.0**	
4882.0000	45.9	36.4 A	V	2.0	270	Y	MID	32.3	5.7	34.3	**40.1**	**-13.9**	**54.0**	
4962.0000	49.4	39.9 A	H	1.5	180	Y	HIGH	32.3	5.7	34.3	**43.6**	**-10.4**	**54.0**	
4962.0000	50.6	41.1 A	H	2.0	0	Y	HIGH	32.3	5.7	34.3	**44.8**	**-9.2**	**54.0**	

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

** DELTA = SPEC LIMIT - CORRECTED READING

COMPATIBLE ELECTRONICS

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	VTECH WIRELESS, INC.	DATE	10/7/99
EUT	2.4 GHz HALF DUPLEX TRANSCEIVER	DUTY CYCLE	33.33 %
MODEL	M24SXCRN1	PEAK TO AVG	-9.54 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)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
7200.0000	48.9	39.4 A	H	1.5	90	Y	LOW	36.8	9.1	33.9	**51.4**	**-2.6**	**54.0**	
7200.0000	48.8	39.3 A	V	2.0	0	Y	LOW	36.8	9.1	33.9	**51.3**	**-2.7**	**54.0**	
7323.0000	46.1	36.6 A	H	1.0	180	Y	MID	36.8	9.1	33.9	**48.6**	**-5.4**	**54.0**	
7323.0000	45.9	36.4 A	V	1.5	270	Y	MID	36.8	9.1	33.9	**48.4**	**-5.6**	**54.0**	
7443.0000	46.5	37.0 A	H	1.0	180	Y	HIGH	36.8	6.4	33.9	**46.3**	**-7.7**	**54.0**	
7443.0000	48.0	38.5 A	H	1.5	0	Y	HIGH	36.8	6.4	33.9	**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 15.249)

COMPANY	VTECH WIRELESS, INC.	DATE	10/7/99
EUT	2.4 GHz HALF DUPLEX TRANSCEIVER	DUTY CYCLE	33.33 %
MODEL	M24SXCRN1	PEAK TO AVG	-9.54 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)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
9600.0000	42.0	32.5 A	H	2.0	180	Y	LOW	38.2	14.1	34.3	**50.5**	**-3.5**	**54.0**	
9600.0000	43.7	34.2 A	V	2.0	90	Y	LOW	38.2	14.1	34.3	**52.2**	**-1.8**	**54.0**	
9764.0000	38.0	28.5 A	H	3.5	180	Y	MID	38.2	14.1	34.3	**46.5**	**-7.5**	**54.0**	
9764.0000	42.0	32.5 A	V	2.0	0	Y	MID	38.2	14.1	34.3	**50.5**	**-3.5**	**54.0**	
9924.0000	40.7	31.2 A	H	2.0	90	Y	HIGH	39.5	12.6	33.7	**49.6**	**-4.4**	**54.0**	
9924.0000	41.7	32.2 A	H	2.0	180	Y	HIGH	39.5	12.6	33.7	**50.6**	**-3.4**	**54.0**	

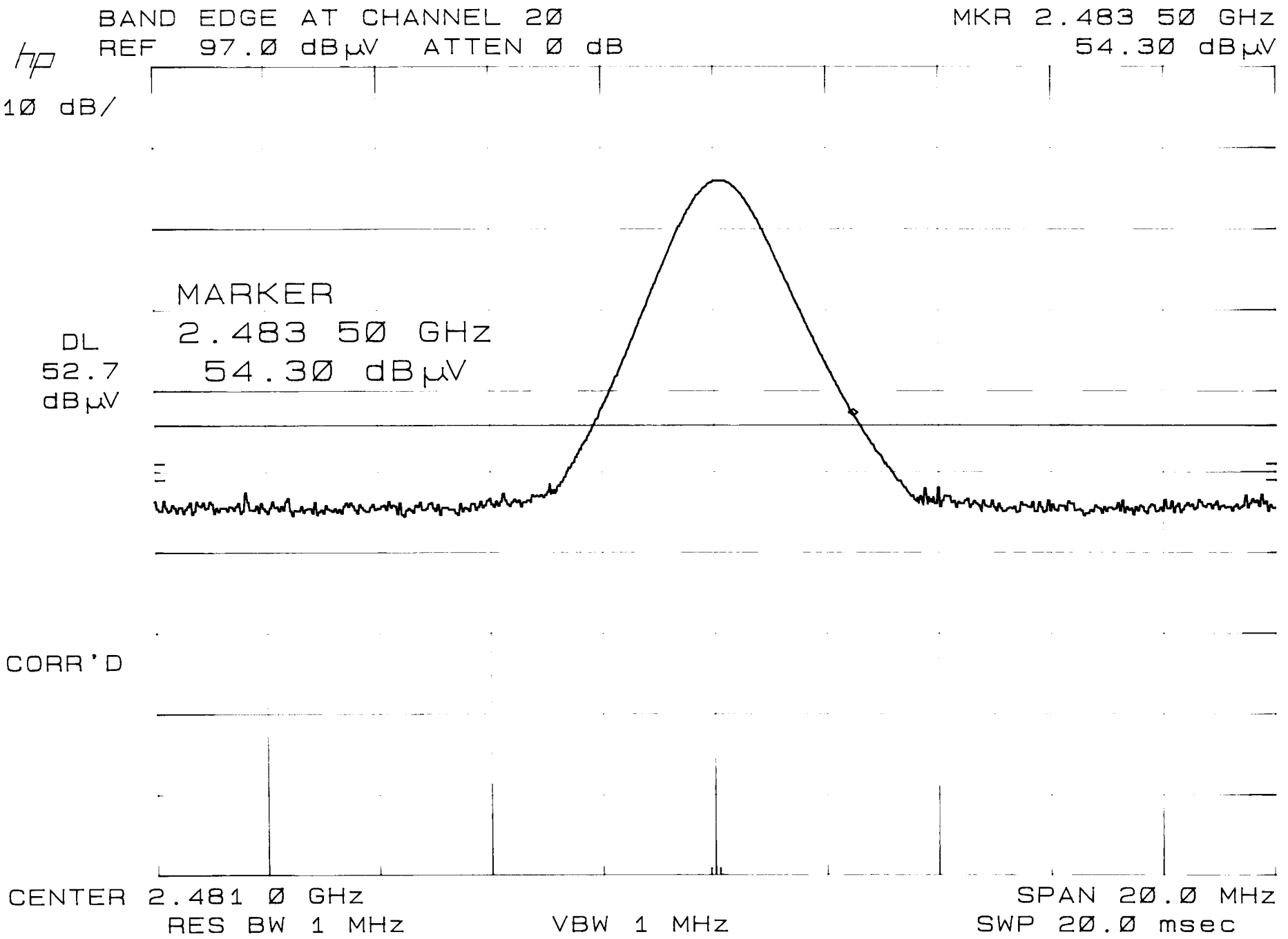
* CORRECTED READING = METER READING + ANTENNA FACTOR + CABLE LOSS - AMPLIFIER GAIN

** DELTA = SPEC LIMIT - CORRECTED READING

Note: No Harmonics nor Emissions found beyond 9924 MHz

COMPATIBLE ELECTRONICS

BAND EDGES DATA SHEETS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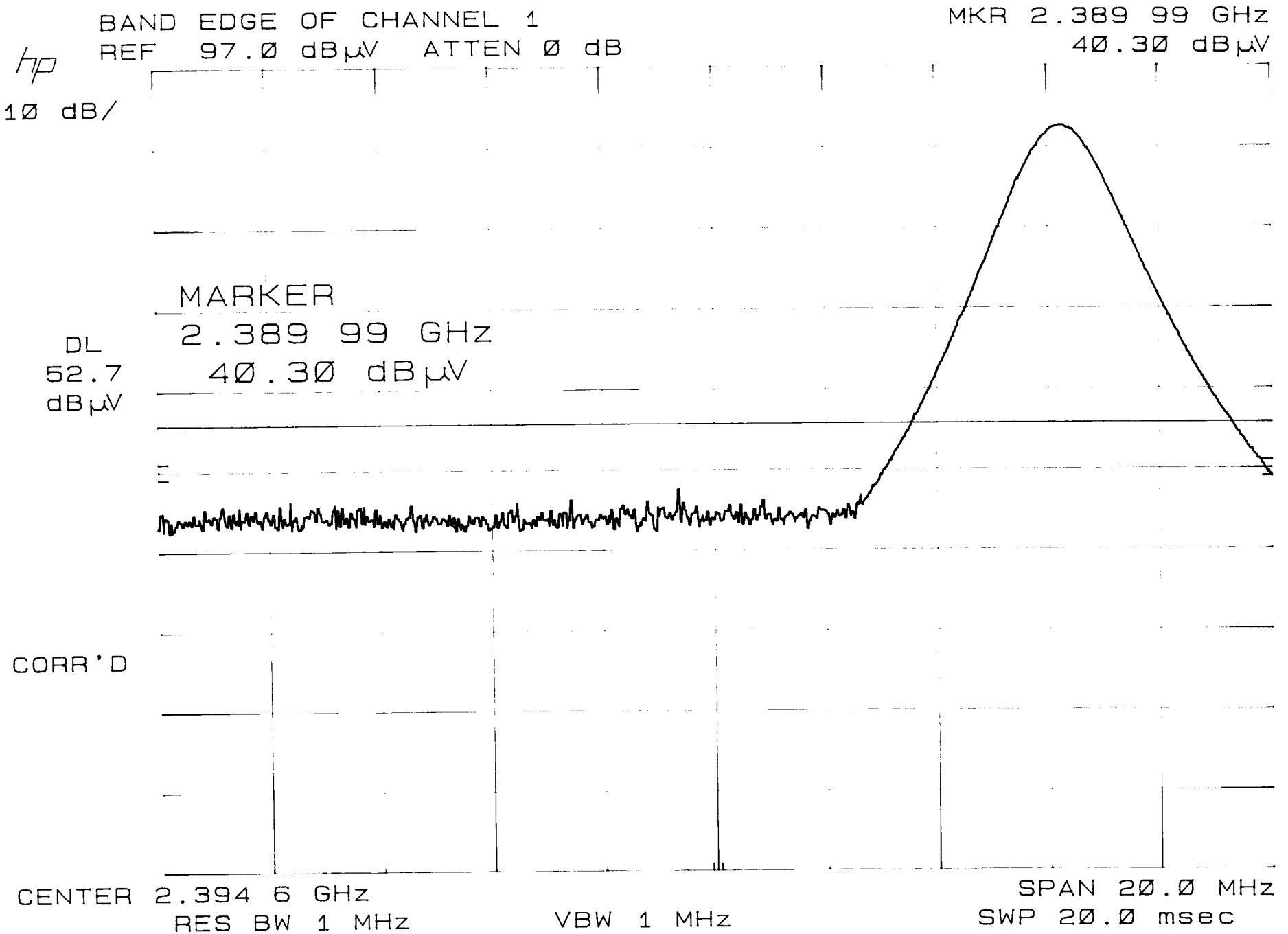
MKR 2.483 50 GHz
54.30 dBµV
10 dB/
MARKER
2.483 50 GHz
54.30 dBµV
DL
52.7
dBµV
CORR'D
CENTER 2.481 0 GHz
RES BW 1 MHz
VBW 1 MHz
SPAN 20.0 MHz
SWP 20.0 msec


BAND EDGE OF CHANNEL 1
REF 97.0 dBµV ATTEN 0 dB
MKR 2.389 99 GHz
40.30 dBµV
10 dB/
MARKER
2.389 99 GHz
40.30 dBµV
DL
52.7
dBµV
CORR'D
CENTER 2.394 6 GHz
RES BW 1 MHz
VBW 1 MHz
SPAN 20.0 MHz
SWP 20.0 msec

RADIATED EMISSIONS (FCC SECTION 15.205 AND 15.249)

COMPANY	VTECH WIRELESS, INC.	DATE	10/7/99
EUT	2.4 GHz HALF DUPLEX TRANSCEIVER	DUTY CYCLE	33.33 %
MODEL	M24SXCRN1	PEAK TO AVG	-9.54 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)	*Corrected Reading (dBuV/m)	Delta ** (dB)	Spec Limit (dBuV/m)	Comments
2390.0000	40.3	30.8 A	V	1.0	90	Y	LOW	28.2	4.5	35.6	27.9	-26.1	54.0	Band Edge of Low Channel
														Measured at 3 Meters
2483.5000	54.3	44.8 A	V	1.0	90	Y	LOW	28.2	4.5	35.6	41.9	-12.1	54.0	Band Edge of High Channel
														Measured at 3 Meters
														NOTE: THE WORST CASE
														POLARIZATION FOR THE
														BAND EDGES WAS THE
														VERTICAL POLARIZATION

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

** DELTA = SPEC LIMIT - CORRECTED READING

COMPATIBLE ELECTRONICS