

APPENDIX 6

TEST FACILITY

TEST FACILITY

- Location:** No. 15, 14 Line, Chin Twu Chi, Lu Chu Hsiang, Taoyuan, Taiwan, R.O.C.
- Description:** There is one 3/10m open area test site and one line conducted lab for final test, and one 3/10m open area test site for engineering lab. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 1992 and CISPR 22/EN 55022 requirements.
- Site Filing:** A site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.
Registration also was made with Voluntary Control Council for Interference (VCCI). Registration number: R-393 for Open Area Test Site #1; C-402 for Line Conducted Lab.
Site is also approved by Ministry of Commerce of New Zealand.
- Site Accreditation:** Accredited by NEMKO (Authorization #: ELA 124)for EMC & A2LA (Certificate #: 824.01)for Emission
Also accredited by BCIQ for the product category of Information Technology Equipment.
- Measurement Uncertainty:** Radiated Emission Test +/-4dB
Line Conducted Emission Test +/-2dB
(This includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.)

Ground Plane: Two conductive reference ground plane were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

Site #1 Line Conducted Test Site: Vertical ground plane (2.2m x 2.2m)
Horizontal ground plane (2.5m x 2.5m)

APPENDIX 7

TEST EQUIPMENT

MEASURING INSTRUMENT SETTING

TEST TYPE	DETECTOR	FREQUENCY RANGE	RESOLUTION BANDWIDTH	VIDEO BANDWIDTH
Conducted	Peak/Avg	10kHz-150kHz	300Hz	100kHz
Conducted	Peak/QP/Avg	150kHz-30MHz	9kHz	100kHz
Radiated	Peak	30MHz-1GHz	100kHz	100kHz
Radiated	QP	30MHz-1GHz	120kHz	120kHz
Radiated	Peak/Avg	Above 1GHz	1MHz	1MHz

Note: All readings on data pages are taken with the detector in peak mode unless otherwise stated.

UNITS OF MEASUREMENT

Measurements of radiated interference are reported in terms of dB(uV/m), at a specified distance. The dicated readings on the spectrum analyzer are converted to dB(uV/m) by use of appropriate conversion factors. Measurements of conducted interference are reported in terms of dB(uV).

TEST EQUIPMENT LIST

Instrumentation: The following list contains equipment used at C & C Laboratory Co., Ltd. for testing. The equipment conforms to the American National Standard Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10kHz to 2GHz.

EQUIPMENT TYPE	* MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
Spectrum Analyzer / Display (100Hz-1.5GHz)	HP	8568B	3001A05004 3014A18846	8/27/1997	8/26/1998
Quasi-Peak Adapter	HP	85650A	2811A01399	8/27/1997	8/26/1998
RF Preselector (20Hz- 2GHz)	HP	85685A	2947A01064	8/27/1997	8/26/1998
LISN (10KHz-100MHz)	EMCO	3825/2	9106-1810	3/05/1997	3/04/1998
LISN (10KHz-100MHz)	EMCO	3825/2	9106-1809	3/05/1997	3/04/1998
Dipole Antenna (30MHz-1GHz)	COMPLIANCE DESIGN	N/A	126	12/04/1997	12/03/1998
Horn Antenna (1GHz-18GHz)	EMCO	3115	9602-4659	N/A	N/A
Bilog Antenna (30MHz-2GHz)	CHASE	CBL6112A	2156	11/7/1997	11/6/1998

The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

APPENDIX 8

BLOCK DIAGRAM OF TEST SETUP

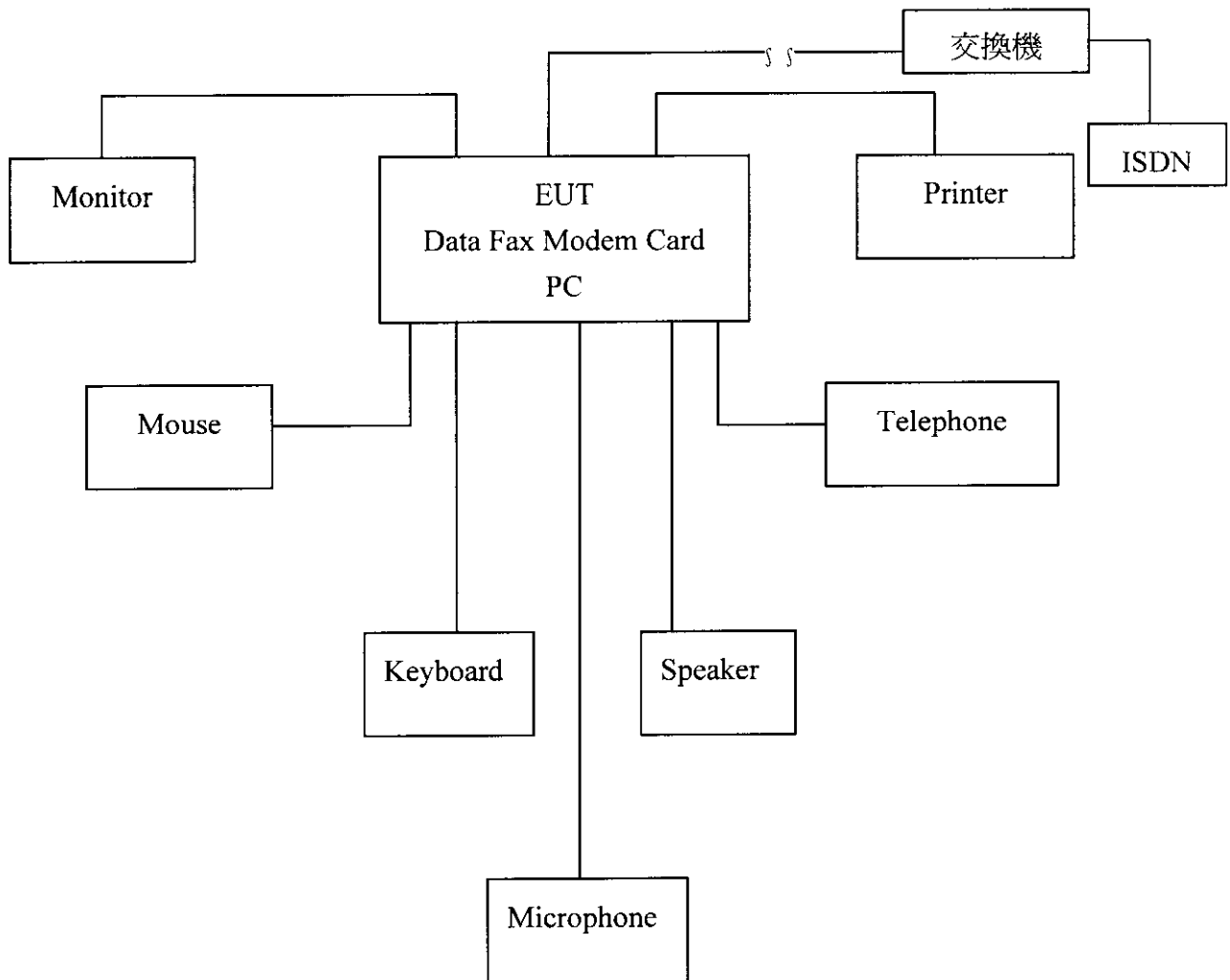
SYSTEM DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS

EUT: DATA FAX MODEM CARD

Trade Name: TAICOM

Model Number: MR56PVS-HI

Power Cord: Nonshielded, 1.76m



APPENDIX 9

PHOTOGRAPHS

(TEST SETUP OF LINE CONDUCTED EMISSION TEST)

SUPPORT EQUIPMENT

Equipment	Model #	Serial #	FCC ID	Manufacturer	Data Cable	Power Cord
Monitor	D2813	TW 64736409	A3KM043	HP	Shielded, 1.5m	Nonshielded, 1.72m
Keyboard	RT101	22240445	AQ6-MTN4XZ15	Digital	Shielded, 1.8m	N/A
Printer	2225C	N/A	BS46XU2225C	HP	Shielded, 1.2m	Nonshielded, 1.74m
Microphone	AT-K40	N/A	N/A	Audio Technica	Nonshielded, 3.6m	N/A
Dial Tone System (Remote)	UP-206	100825	N/A	Pro-com	N/A	N/A
Mouse	M-S34	N/A	DZL210472	Compaq	Shielded, 1.5m	N/A
Speaker	KS140	N/A	N/A	Koka	Nonshielded, 1.4m	Nonshielded, 1.35m
Telephone	HT-930A	35653226	N/A	SAMPO	N/A	N/A
Host PC	D3782A	SG54800206	FCC DoC	HP	Nonshielded, 1.74m, 3pin	Nonshielded, 1.76m
ISDN-TAP (Remote)	MT128B-D	FD0811F	N/A	OMRON	Nonshielded 2.5m	Nonshielded 1.8m

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

MEASUREMENT PROCEDURE (PRELIMINARY LINE CONDUCTED EMISSION TEST)

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4: 1992 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, would be placed as per ANSI C63.4: 1992.
- 3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4: 1992.
- 4) The EUT received AC power through a Line Impedance Stabilization Network (LISN) which supplied power source of 115VAC/60Hz and was grounded to the ground plane.
- 5) All support equipment received power from a second LISN supplying power of 115VAC/60Hz.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum analyzer connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to analyzer and Line 2 connected to a 50 ohm load; the second scan has Line 1 connected to a 50 ohm load and Line 2 connected to the analyzer.
- 7) Analyzer is scanned from 450kHz to 30MHz for emissions in each of the test modes. Analyzer settings are stated on the Measuring Instrument Settings page.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The Preliminary scan mode(s) as the following:

Mode 1: 56k bps (highest transmission speed)

- 10) After the preliminary scan, we found the following test mode(s) producing the highest emission level.

Mode: 1

Then, the EUT configuration and cables configuration of the above highest emission level were recorded
for reference of final testing.

MEASUREMENT PROCEDURE (FINAL LINE CONDUCTED EMISSION TEST)

- 1) EUT and support equipment was set up on the test bench as per step 10 of the preliminary test.
- 2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V limit in peak mode, then the emission signal was re-checked using a Quasi-Peak /A.V detector.
- 3) The test data of the worst case condition(s) was reported on the Summary Data page.

Data Sample:

Freq. MHz	Peak Raw dBuV	Q.P. Raw dBuV	Average Raw dBuV	Q.P. Limit dBuV	Average Limit dBuV	Q.P. Margin dB	Average Margin dB	Note
X.XX	43.95	---	N/A	48	N/A	-4.05	N/A	L1

Freq.	= Emission frequency in MHz
Raw dBuV	= Uncorrected Analyzer /Receiver reading
Limit dBuV	= Limit stated in standard
Margin dB	= Reading in reference to limit
Note	= Current carrying line of reading
"---	= The emission level was complied with the Q.P limits with at least 2dB margin, so no further re-check.

LINE CONDUCTED EMISSION LIMIT

Frequency	Maximum RF Line Voltage	
	Q.P.	AVERAGE
450kHz-30MHz	48dBuV	N/A

MEASUREMENT PROCEDURE (PRELIMINARY RADIATED EMISSION TEST)

- 1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4: 1992 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, would be placed as per ANSI C63.4: 1992.
- 3) All I/O cables were positioned to simulate typical actual usage as per t ANSI C63.4: 1992n.
- 4) The EUT received 115VAC/60Hz power source from the outlet socket under the turntable. All support equipment received 115VAC/60Hz power from another socket under the turntable.
- 5) The antenna was placed at some given distance away from the EUT as stated in ANSI C63.4: 1992. The antenna connected to the analyzer via a cable and at times a pre-amplifier would be used.
- 6) The analyzer was qucik-scanning from 30MHz to 1000MHz. Analyzer settings are stated on the Measuring Instrument Settings page. The EUT test program was started. Emissions were scanned and measured rotating the EUT 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 7) The EUT was scanned in the following preliminary modes:
Mode 1: 56 bps (highest transmission speed)
- 8) After the preliminary scan, we found the following test mode producing the highest emission level.

Mode: 1.

Then, the EUT and cables configuration, antenna position, polarization and turntable position of the Above highest emission level were recorded for reference of final testing.

MEASUREMENT PROCEDURE (FINAL RAIDATED EMISSION TEST)

- 1) EUT and support equipment were set up on the turntable as per step 8 of the preliminary test.
- 2) The analyzer scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- 3) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the limit in peak mode, then the emission signal was re-checked using a Quasi-Peak detector, and only Q.P. reading will record in this report.
- 4) The test data of the worst case condition(s) was reported on the Summary Data page.

Data Sample:

Freq. MHz	Raw dBuV	Site CF dB	Corr'd dBuV/m	Limit dBuV/m	Margin dB	Table Pos. (deg)	Antenna Height (cm)	Detector	Note
XX.XX	14	7.2	21.2	40	-18.8	102	102	Peak	Vert

Freq.	= Emission frequency in MHz
Raw dBuV	= Uncorrected Analyzer/Receiver reading
Site CF	= Correction factors of antenna factor and cable loss
Corr'd dBuV/m	= Raw reading converted to dBuV and CF added
Limit dBuV/m	= Limit stated in standard
Margin dB	= Reading in reference to limit
Table Position	= EUT placement in reference to antenna
Antenna Height	= Antenna height above ground plane
Detector	= Detector function (Peak, Q.P. or Average)
Note	= Antenna polarization

RADIATED EMISSION LIMIT

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBu V/m)		
		Q.P.	AVERAGE	PEAK
30-88	3	40	N/A	N/A
88-216	3	43.5	N/A	N/A
216-960	3	46	N/A	N/A
960-1000	3	54.0	N/A	N/A
Above 1000	3	N/A	54	74

**Note: "/" means the limit line isn't applicable.

SUMMARY DATA (LINE CONDUCTED TEST)

Model Number: MR56PVS-HI

Location: Site#1

Tested by: Jack Wang

Test Mode: 56k bps

Test Results: Passed

Temperature: 19°C

Humidity: 75%RH

(The chart below shows the highest readings taken from the final data)

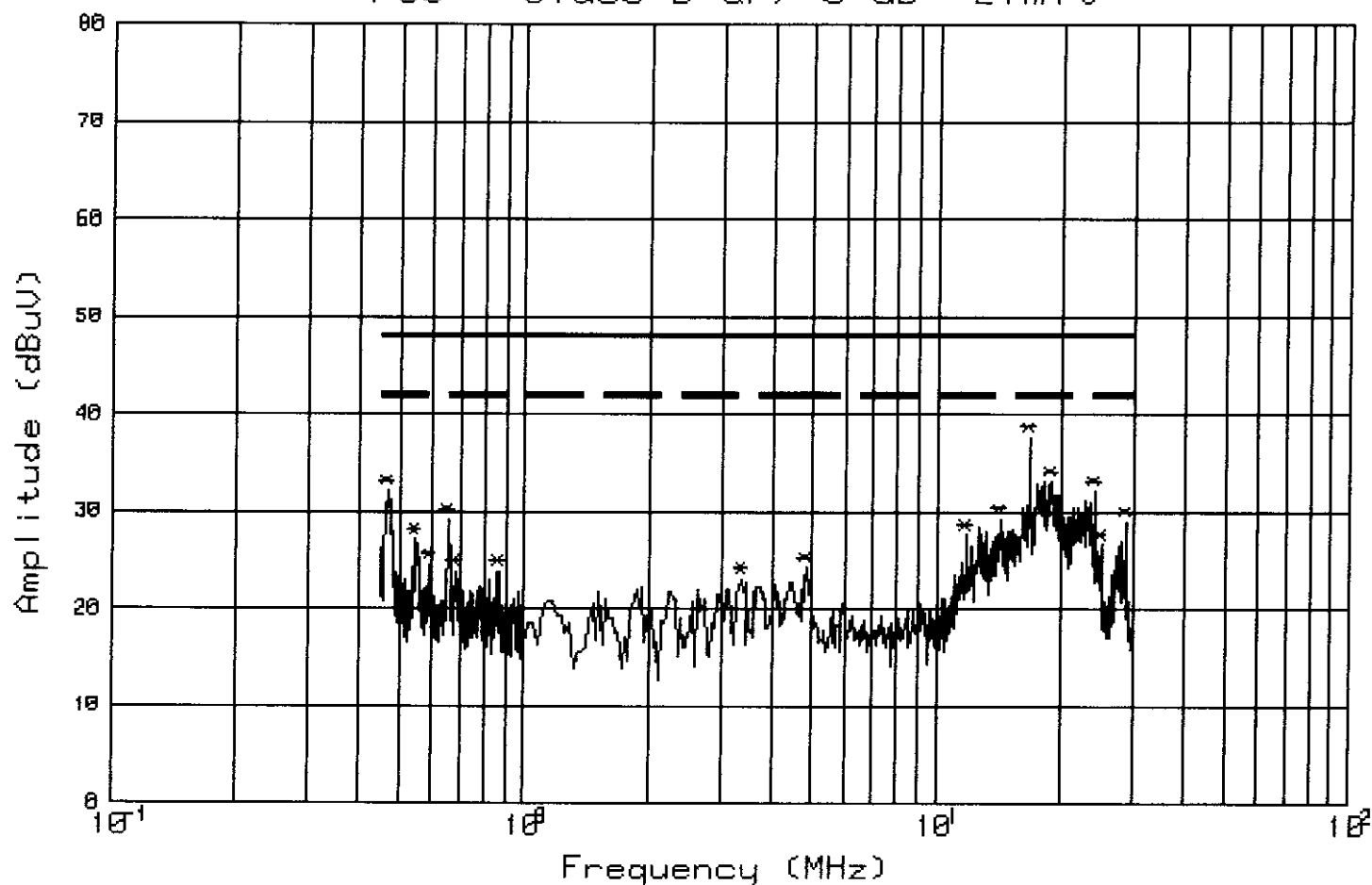
FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.467	32.1	---	N/A	48.0	N/A	-15.9	N/A	L1
16.776	37.6	---	N/A	48.0	N/A	-10.4	N/A	L1
19.038	33.1	---	N/A	48.0	N/A	-14.9	N/A	L1
0.467	36.8	---	N/A	48.0	N/A	-11.2	N/A	L2
0.548	34.4	---	N/A	48.0	N/A	-13.6	N/A	L2
18.400	34.4	---	N/A	48.0	N/A	-13.6	N/A	L2

L1 = Line One (Hot side) / L2 = Line Two (Neutral side)

****NOTE: "---" denotes the emission level was complied with the Q.P limits at least 2dB margin,
so no further re-check.**

C&C Lab.(Taiwan) Cond. Test Site 1

FCC - Class B QP/-6 dB Limit



Model:MR56PVS-HI

No. 2

Test Date:17 Feb 1998 21:03:02

Remark:

Auto-Marking;RBW=VBW=10 KHz;SWEEP TIME AUTO

LISN= L1

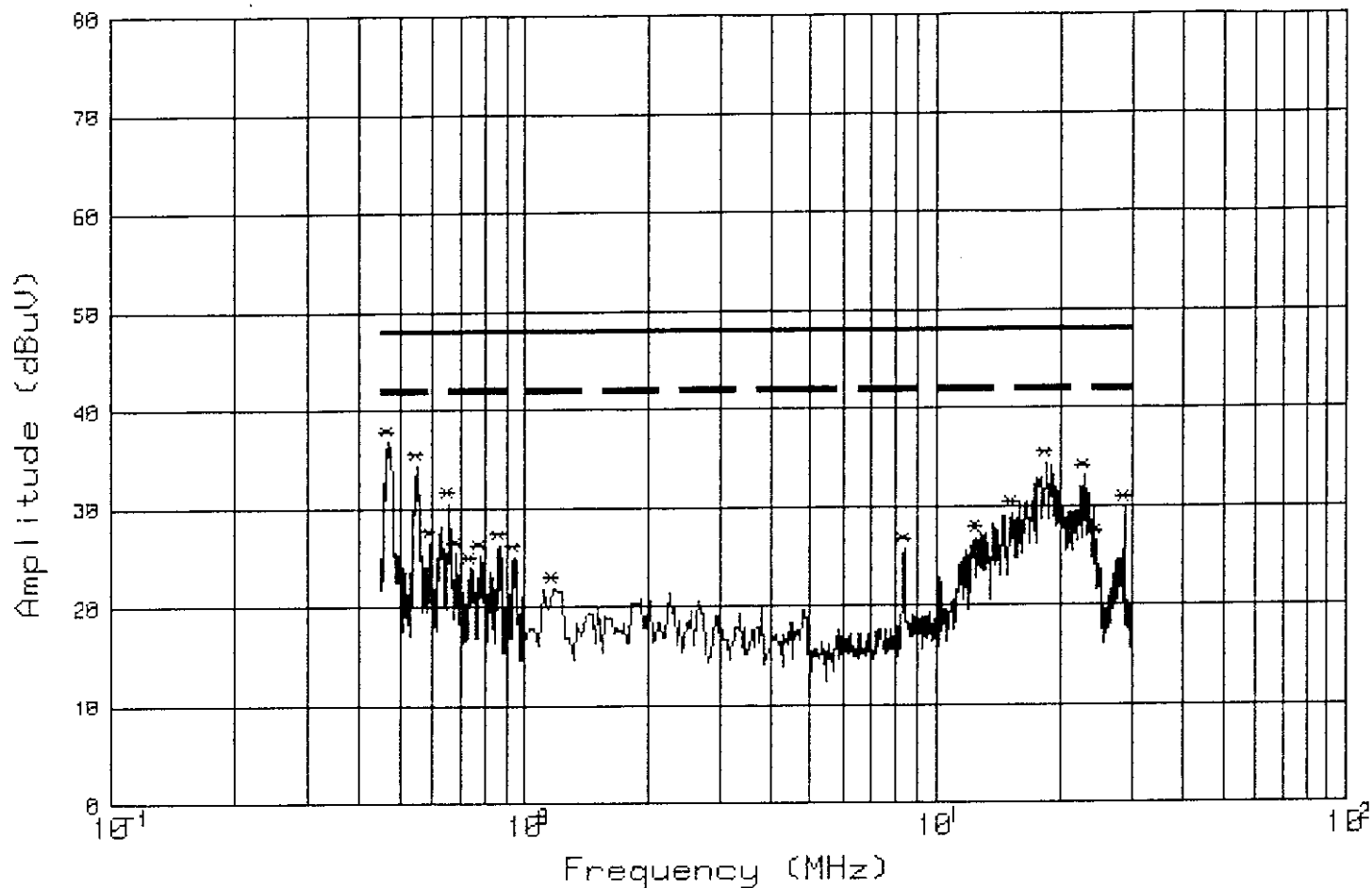
Tested by: Jack Wang *Jack Wang* Detector= Peak

Kurt Chen

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Total (dBuV)	QP.Lmt (dBuV)	Margin (dB)	Warning Mark
1	.467	32.1	-	32.1	48.0	-15.9	
2	.546	27.1	-	27.1	48.0	-20.9	
3	.592	24.5	-	24.5	48.0	-23.5	
4	.658	29.1	-	29.1	48.0	-18.9	
5	.684	23.8	-	23.8	48.0	-24.2	
6	.866	23.8	-	23.8	48.0	-24.2	
7	3.378	23.1	-	23.1	48.0	-24.9	
8	4.828	24.2	-	24.2	48.0	-23.8	
9	11.788	27.6	-	27.6	48.0	-20.4	
10	14.282	29.2	-	29.2	48.0	-18.8	
11	16.776	37.6	-	37.6	48.0	-10.4	
12	19.038	33.1	-	33.1	48.0	-14.9	
13	24.142	32.1	-	32.1	48.0	-15.9	
14	25.012	26.6	-	26.6	48.0	-21.4	
15	28.782	28.9	-	28.9	48.0	-19.1	

C&C Lab.(Taiwan) Cond. Test Site 1

FCC - Class B QP/-6 dB Limit



Model:MR56PVS-HI

No. 1

Test Date:17 Feb 1998 21:01:51

Remark:

Auto-Marking;RBW=VBW=10 KHz;SWEEP TIME AUTO

LISN= L2

Tested by: Jack Wang *Jack Wang* Detector= Peak

Kurt Clum

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Total (dBuV)	QP.Lmt (dBuV)	Margin (dB)	Warning Mark
1	.467	36.8	-	36.8	48.0	-11.2	
2	.548	34.4	-	34.4	48.0	-13.6	
3	.592	26.5	-	26.5	48.0	-21.5	
4	.657	30.5	-	30.5	48.0	-17.5	
5	.681	25.4	-	25.4	48.0	-22.6	
6	.743	23.9	-	23.9	48.0	-24.1	
7	.783	25.2	-	25.2	48.0	-22.8	
8	.869	26.2	-	26.2	48.0	-21.8	
9	.945	25.0	-	25.0	48.0	-23.0	
10	.945	25.0	-	25.0	48.0	-23.0	
11	1.174	21.9	-	21.9	48.0	-26.1	
12	8.424	25.7	-	25.7	48.0	-22.3	
13	12.542	26.8	-	26.8	48.0	-21.2	
14	15.210	29.3	-	29.3	48.0	-18.7	
15	18.400	34.4	-	34.4	48.0	-13.6	
16	18.400	34.4	-	34.4	48.0	-13.6	

SUMMARY DATA (RADIATED EMISSION TEST)

Model Number: MR56PRVS-HI

Location: Site#1

Tested by: Jack Wang

Test Mode: 56k bps

Test Results: Passed

Temperature: 19°C

Humidity: 75%RH

(The chart below shows the highest readings taken from the final data)

FREQ MHz	RAW dBuV/m	SITE CF	CORR'D dBuV/m	Q.P. LIMIT (dBuV/m)	Q.P. MARGIN dB	Table Pos. (deg)	Antenna Height (cm)	Detector	NOTE
56.20	20	9.4	29.4	40.0	-10.6	225.9	100	PEAK	Vert
112.51	12	14.8	26.8	43.5	-16.7	37.6	192	PEAK	Vert
169.55	12	14.0	26.0	43.5	-17.5	343.0	192	PEAK	Vert
225.06	16.1	14.1	30.2	46.0	-15.8	174.0	143.6	PEAK	Vert
282.26	14	17.9	31.9	46.0	-14.1	46.8	143.6	PEAK	Vert
339.14	21	19.7	40.7	46.0	-5.3	119.1	128.5	PEAK	Vert
395.14	15	22.3	37.3	46.0	-8.7	192.5	155.3	PEAK	Vert
56.48	14	9.6	23.6	40.0	-16.4	257.0	117.7	PEAK	Horz.
112.76	12	14.8	26.8	43.5	-16.7	-0.2	192	PEAK	Horz.
169.53	17	13.3	30.3	43.5	-13.2	124.8	156.5	PEAK	Horz.
224.14	17	14.5	31.5	46.0	-14.5	307.7	209.3	PEAK	Horz.
282.24	15	17.4	32.4	46.0	-13.6	340.3	209.3	PEAK	Horz.
339.06	17	20.1	37.1	46.0	-8.9	57.0	141.2	PEAK	Horz.
395.15	16	22.1	38.1	46.0	-7.9	58.3	110.5	PEAK	Horz.