

FCC CLASS B COMPLIANCE REPORT

(CLASS II PERMISSIVE CHANGE)

for

Electromagnetic Emissions

of

Internal Modem Card

Trade Name : Taicom
Model Number : MR56PVSP/2
FCC ID : FELMR56PVS
Serial Number : Prototype
Report Number : 980036-F
Date : Mar 31 , 1998

Prepared for :

TAICOM DATA SYSTEMS CO., LTD.
No.45 Wu-Kung 5 Rd. Wu-Ku Ind. Park,
Taipei Hsien, Taiwan, R.O.C.

Prepared by :

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TABLE OF CONTENTS

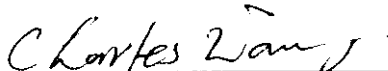
DESCRIPTION	PAGE
VERIFICATION OF COMPLIANCE	3
GENERAL INFORMATION	4
SYSTEM DESCRIPTION	5
PRODUCT INFORMATION	6
SUPPORT EQUIPMENT	7
MEASUREMENT PRODEDURE & LIMIT (LINE CONDUCTED EMISSION TEST)	8
MEASUREMENT PRODEDURE & LIMIT (RADIATED EMISSION TEST)	10
SUMMARY DATA	13
APPENDIX 1 LETTER OF AGENT AUTHORIZATION	15
APPENDIX 2 LETTER OF MODIFICATION	16
APPENDIX 3 FCC ID LABEL & LOCATION	17
APPENDIX 4 BLOCK DIAGRAM/SCHEMATICS OF EUT	19
APPENDIX 5 TEST FACILITY	20
APPENDIX 6 TEST EQUIPMENT	22
APPENDIX 7 BLOCK DIAGRAM OF TEST SETUP	25
APPENDIX A PHOTOGRAPHS (TEST SETUP OF LINE CONDUCTED EMISSION TEST)	A1 ~ A2
APPENDIX B PHOTOGRAPHS (TEST SETUP OF RADIATED EMISSION TEST)	B-1 ~ 2
APPENDIX C PHOTOGRAPHS (EUT)	C1~ C4

VERIFICATION OF COMPLIANCE

Equipment Under Test: Internal Modem Card
Trade Name: Taicom
Model Number: MR56PVSP/2
Serial Number: N/A
FCC ID: FELMR56PVS
Applicant: Taicom Data Systems Co., Ltd.
No.45 Wu-Kung 5 Rd. Wu-Ku Ind. Park,
Taipei Hsien, Taiwan, R.O.C
Type of Test: FCC Class B
Measurement Procedure: ANSI C63.4: 1992
File Number: 980036-F
Date of test: Mar 31,1998
Tested by: James Yang
Deviation: None
Condition of Test Sample: Good

The above equipment was tested by C&C Laboratory Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, Subpart B and the measurement procedure according to ANSI C63.4, 1992. This said equipment in the configuration described in the above report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.



Charles Wang / Director

GENERAL INFORMATION

Applicant: Taicom Data Systems Co., Ltd.

Contact Person: Mike Yu

Phone Number: (02)2299-8159

Fax Number: (02)2299-3514

Manufacturer: Taicom Data Systems Co., Ltd.
No. 45 Wu-Kung 5 RD., Wu-Ku Ind. Park,
Taipei Hsien, Taiwan, R.O.C.

File Number: 980036-F

Date of Test: Mar 31, 1998

Equipment Under Test: Internal Modem Card

Model Number: MR56PVSP/2

Serial Number: Prototype

FCC ID: FELMR56PVS

Type of Test: FCC Class B

Measurement Procedure: ANSI C63.4:19924

Frequency Range: 450kHz to 30MHz for Line Conducted Test
30MHz to 1000MHz for Radiated Emission Test

SYSTEM DESCRIPTION

EUT Test Program:

- 1.A communication software was loaded and executed to communicate between EUT and modem on remote side.
- 2.Test program was loaded from HDD of Host PC and executed in DOS mode.
- 3.The Data was sent to modem on remote side via LINE port.
- 4.program have self-repeating throughout the test.

PRODUCT INFORMATION

Housing Type : N/A

EUT Power Rating : DC, from slot of the PC

AC Power during Test : 110VAC/60Hz (to Host PC)

Power Supply Manufacturer : N/A

Power Supply Model Number : N/A

AC Power Cord Type : N/A

DC Power Cable Type : N/A

OSC/CLOCK Frequencies : 28.22 MHz

I/O PORT TYPES	Q'TY	TESTED WITH
1) MIC.	1	1
2) SPEAKER-OUT	1	1
3) PHONE PORT	1	1
4) LINE PORT	1	1

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	6511-T	K6568070065 P	JVP6511-T	Acer	Shielded, 1.2m	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
Modem	103/212A	A038338	EF56A5103/212 A	TEAM	Shielded, 1.8m	Nonshielded 1.9m
Modem	103/212A	A038518	EF56A5103/212 A	TEAM	Shielded, 1.8m	Nonshielded 1.9m
Modem Remote Side	2400SE	N/A	DK467GSM24	Computer peripheral	Nonshielded, 15m	Nonshielded 1.9m
Mouse	M-S34	N/A	DZL210472	Compaq	Shielded, 1.5m,	N/A
Speaker	KS140	N/A	N/A	Koka	Nonshielded, 1.4m	N/A
Telephone	HT-930A	35653226	N/A	SAMPO	Nonshielded, 1.8m	N/A
Host PC	VL SERIES 55/166	SG74903048	FCC DOC	HP	N/A	Nonshielded, 1.76m

Notes: All the above equipment/cables were placed in worse case poritions to maximize emission.

Grounding: Grounding was 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 110VAC/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

- 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 Q.P. limit in peak mode, then the emission signal was re-checked using a Quasi-Peak 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	Q.P. Limit dBuV	Q.P. Margin dB	Note
X.XX	43.95	---	56	-12.05	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 Average limits with at least 2dB margin, so no further re-check.

LINE CONDUCTED EMISSION LIMIT

Frequency	Maximum RF Line Voltage
	Q.P.
450kHz-30MHz	48dBuV

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 110VAC/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 quick 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
- 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	30	-8.8	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 or Q.P.)
Note	= Antenna polarization

RADIATED EMISSION LIMIT

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit Q.P. (dBu V/m)
30-88	3	40
88-216	3	43.5
216-960	3	46
960-1000	3	53.6

SUMMARY DATA (LINE CONDUCTED TEST)

Model Number : MR56PVSP/2

Location: Site#1

Tested by : James Yang

Test Mode : 56k bps

Test Results : Passed

Temperature: 22°C

Humidity: 80%RH

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

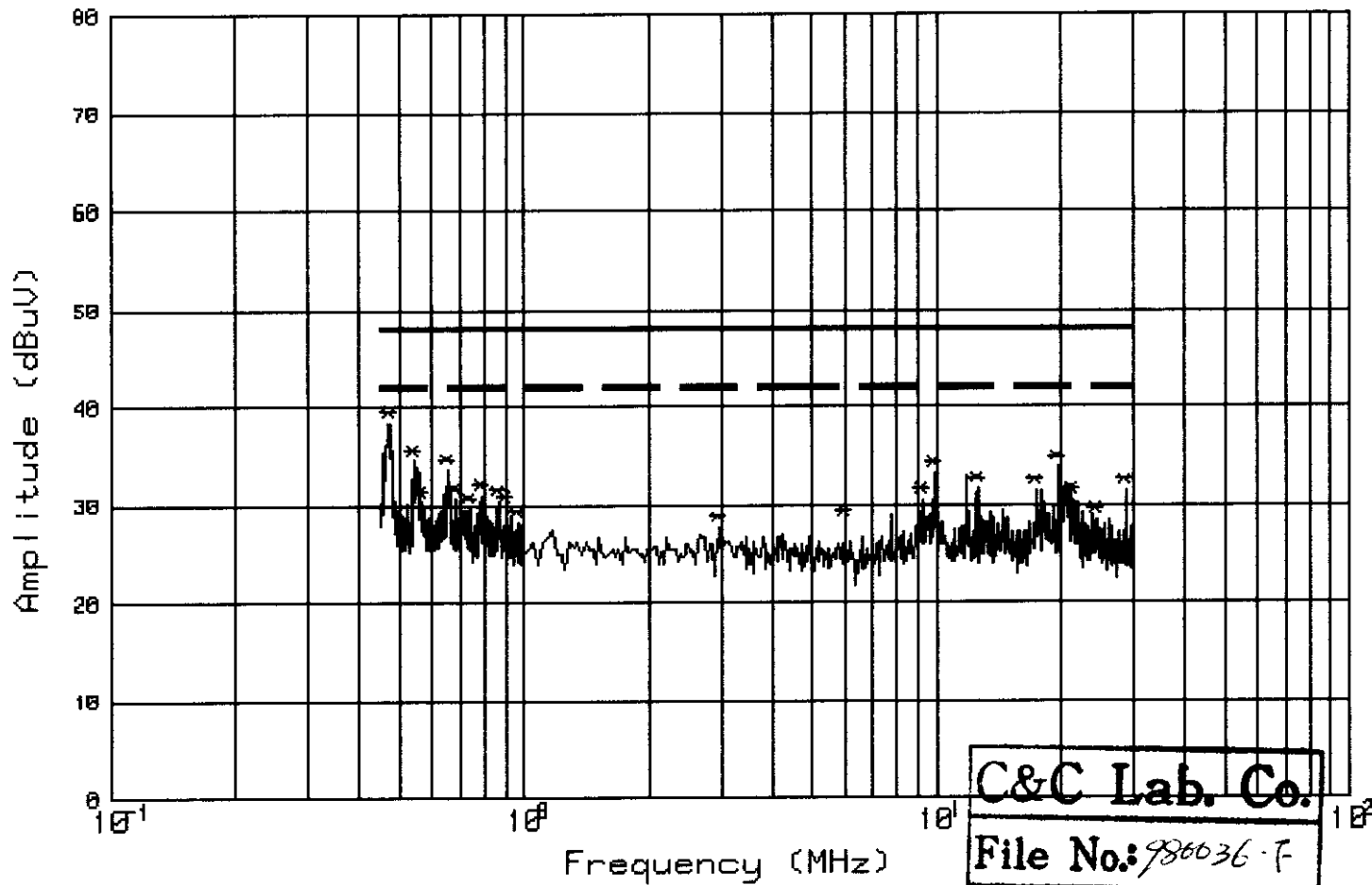
FREQ MHz	PEAK RAW dBuV	Q.P. RAW dBuV	AVG RAW dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.473	38.3	---	---	48.0	---	-9.7	---	L1
0.625	33.6	---	---	48.0	---	-14.4	---	L1
0.789	31	---	---	48.0	---	-17.0	---	L1
9.294	30.5	---	---	48.0	---	-17.5	---	L1
19.792	33.8	---	---	48.0	---	-14.2	---	L1
28.782	31.4	---	---	48.0	---	-16.6	---	L1
0.466	34.7	---	---	48.0	---	-13.3	---	L2
0.833	28.3	---	---	48.0	---	-19.7	---	L2
0.946	27.9	---	---	48.0	---	-20.1	---	L2
9.584	31.7	---	---	48.0	---	-16.3	---	L2
20.546	34.5	---	---	48.0	---	-13.5	---	L2
28.782	32.6	---	---	48.0	---	-15.4	---	L2

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

****NOTE: “---” denotes the emission level was complied with the Average limits at least 2dB margin,
so no re-check anymore.**

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

FCC - Class B QP/-6 dB Limit



C&C Lab. Co.

File No: 980036-F

Page: 13 - 1

Model: MR56PVSP/2

No. 1

Test Date: 31 Mar 1998 19:20:58

Remark: 110V/60Hz

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

LISN= L1

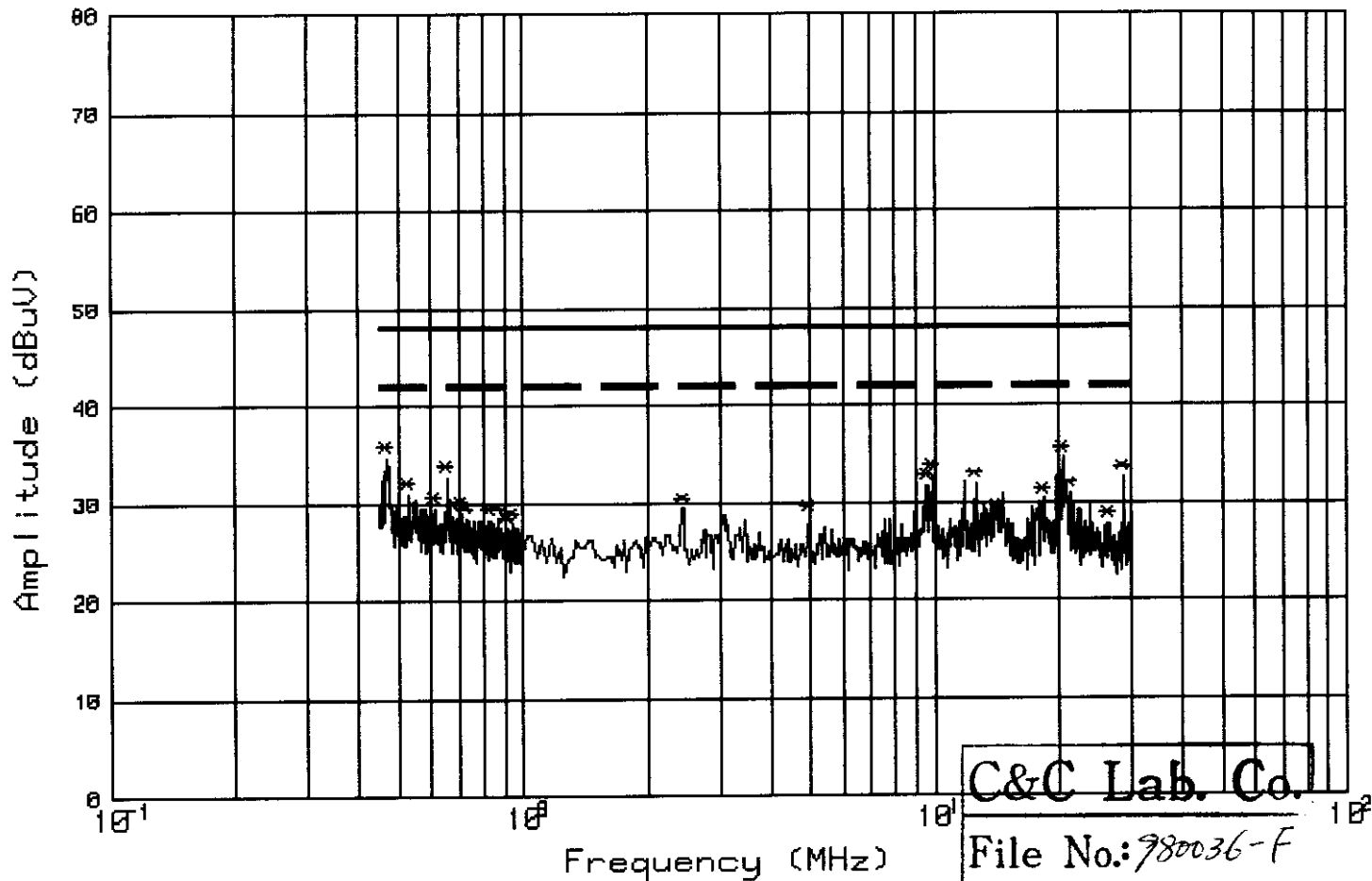
Tested by: James Yang

Detector= Peak

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Total (dBuV)	QP.Lmt (dBuV)	Margin (dB)	Warning Mark
1	.473	38.3	-	38.3	48.0	-9.7	!
2	.545	34.5	-	34.5	48.0	-13.5	!
3	.563	30.3	-	30.3	48.0	-17.7	!
4	.652	33.6	-	33.6	48.0	-14.4	!
5	.681	30.6	-	30.6	48.0	-17.4	!
6	.738	29.6	-	29.6	48.0	-18.4	!
7	.789	31.0	-	31.0	48.0	-17.0	!
8	.868	30.4	-	30.4	48.0	-17.6	!
9	.910	29.8	-	29.8	48.0	-18.2	!
10	.973	28.2	-	28.2	48.0	-19.8	!
11	2.972	27.7	-	27.7	48.0	-20.3	!
12	5.988	28.3	-	28.3	48.0	-19.7	!
13	9.294	30.5	-	30.5	48.0	-17.5	!
14	9.874	33.2	-	33.2	48.0	-14.8	!
15	12.600	31.6	-	31.6	48.0	-16.4	!

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

FCC - Class B QP/-6 dB Limit



C&C Lab. Co.

File No.: 980036-F

Page: 13 - 2

Model: MR56PVSP/2

No. 2

Test Date: 31 Mar 1998 19:22:15

Remark: 110V/60Hz

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

LISN= L2

Tested by: James Yang

Detector= Peak

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Total (dBuV)	QP.Lmt (dBuV)	Margin (dB)	Warning Mark
1	.466	34.7	-	34.7	48.0	-13.3	!
2	.525	31.0	-	31.0	48.0	-17.0	!
3	.611	29.5	-	29.5	48.0	-18.5	!
4	.657	32.7	-	32.7	48.0	-15.3	!
5	.709	29.0	-	29.0	48.0	-19.0	!
6	.728	28.4	-	28.4	48.0	-19.6	!
7	.833	28.3	-	28.3	48.0	-19.7	!
8	.867	28.4	-	28.4	48.0	-19.6	!
9	.916	27.4	-	27.4	48.0	-20.6	!
10	.946	27.9	-	27.9	48.0	-20.1	!
11	2.450	29.4	-	29.4	48.0	-18.6	!
12	4.944	28.5	-	28.5	48.0	-19.5	!
13	9.584	31.7	-	31.7	48.0	-16.3	!
14	9.874	32.7	-	32.7	48.0	-15.3	!
15	12.600	31.9	-	31.9	48.0	-16.1	!

SUMMARY DATA (RADIATED EMISSION TEST)

Model Number: MR56PRVSP/2

Location: Site#1

Tested by: James Yang

Test Mode: 56k bps

Test Results: Passed

Temperature: 22°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
65.10	8.8	9.5	18.3	40.0	-21.7	70.2	100.0	PEAK	Vert
194.50	21.6	13.1	34.7	43.5	-8.8	288.7	100.0	PEAK	Vert
229.30	7.9	14.4	22.3	46.0	-23.7	284.4	100.0	PEAK	Vert
266.00	9.4	16.0	25.4	46.0	-20.6	100.7	100.0	PEAK	Vert
299.50	7.5	16.4	23.9	46.0	-22.1	67.2	100.0	PEAK	Vert
67.50	8.9	9.2	18.1	40.0	-21.9	0.0	206.5	PEAK	Horz.
120.00	13	15.8	28.8	43.5	-14.7	182.7	199.2	PEAK	Horz.
136.70	8.8	15.6	24.4	43.5	-19.1	315.0	205.3	PEAK	Horz.
196.10	6.3	15.0	21.3	43.5	-22.2	133.8	196.1	PEAK	Horz.
225.50	10.6	14.3	24.9	46.0	-21.1	163.1	224.6	PEAK	Horz.
269.20	7.8	17.0	24.8	46.0	-21.2	355.1	218.3	PEAK	Horz.

APPENDIX 5

TEST FACILITY

TEST FACILITY

Location: No. 15, 14 Line, Chin Twu Chi, Lu Chu Hsiang, Taoyuan, Taiwan, R.O.C.

Description: There are two 3/10m open area test sites and two line conducted labs 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).

Site Accreditation: Accredited by NEMKO (Authorization #: ELA 124) for EMC & A2LA (Certificate #: 824.01) for Emission

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 planes 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 & #3 Line Conducted Test Site: Vertical ground plane (2.2m x 2.5m)
Horizontal ground plane (2.2m x 2.5m)

APPENDIX 6

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 indicated 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	3/25/1998	3/25/1999
Quasi-Peak Adapter	HP	85650A	2811A01399	3/25/1998	3/25/1999
RF Preselector (20Hz- 2GHz)	HP	85685A	2947A01064	3/25/1998	3/25/1999
LISN (10KHz-100MHz)	EMCO	3825/2	9106-1810	3/13/1998	3/12/1999
LISN (10KHz-100MHz)	EMCO	3825/2	9106-1809	3/13/1998	3/12/1999
Precision Dipole (30-300MHz)	ROHDE & SCHWARZ	HZ-12	846932/0004	06/06/1997	06/06/1998
Precision Dipole (300-1000MHz)	ROHDE & SCHWARZ	HZ-13	846556/0008	06/06/1997	06/06/1998
Horn Antenna (1GHz-18GHz)	EMCO	3115	9602-4659	N/A	N/A
Bilog Antenna (30MHz-2GHz)	CHASE	CBL6112A	2309	03/14/1998	03/136/1999

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 7

BLOCK DIAGRAM OF TEST SETUP

SYSTEM DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS

EUT: Internal Modem Card

Trade Name: TAICOM

Model Number: MR56PVSP/2

Power Cord: Unshielded, 1.76m (to Host PC)

