

EMI TESTING REPORT

EUT : SCANNER

MODEL : MRS-1200V6US

FCC ID : EF9MRS-1200V6U

PREPARED FOR :

MICROTEK INTERNATIONAL INC.

NO. 6, INDUSTRY EAST ROAD 3,

SCIENCE-BASED INDUSTRIAL PARK,

HSINCHU, TAIWAN 30077, R.O.C.

PREPARED BY :

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Spectrum Research & Testing Lab.

FCC ID : EF9MRS-1200V6US

REPORT# : T9A19-1

1. TEST REPORT CERTIFICATION

APPLICANT : MICROTEK INTERNATIONAL INC.

ADDRESS : NO. 6, INDUSTRY EAST ROAD 3,

SCIENCE-BASED INDUSTRIAL PARK,

HSINCHU, TAIWAN 30077, R.O.C.

EUT DESCRIPTION : SCANNER

(A) POWER SUPPLY : FROM ADAPTOR

(B) MODEL : MRS-1200V6US

(C) FCC ID : EF9MRS-1200V6US

FINAL TEST DATE : 01/20/1999

MEASUREMENT PROCEDURE USED :

* PART 15 SUBPART B OF FCC RULES AND REGULATIONS (47 CFR PART 15)

* ANSI C63.4 - 1992

* TEST PROCEDURE AND DATA ARE TRACEABLE TO NIST / USA.

We hereby show that :

The measurement shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable.

TESTING ENGINEER : Tommy Bai DATE 1/20/1999
Tommy Bai

SUPERVISOR : Jesse Ho DATE 1/20/1999
Jesse Ho

APPROVED BY : Johnson Ho DATE 1/20/99
Johnson Ho

2. TEST STATEMENT**2.1 TEST STATEMENT**

To whom it may concern,

This letter is to explain the test condition of this project.
The EUT be tested as the following status.

Resolution : 600 dpi

The data was shown in this report reflects the worst-case data for the condition as listed above.

Please disregard any other oricessir(s) speed shown in this user manual.

2.2 DEPARTURE FROM DOCUMENT POLICIES, PROCEDURE OR SPECIFICATIONS , THE STATEMNT**A. DID HAVE**

Any departure from document policies & procedures or from specifications.

Yes _____, No ✓ _____.

If yes , the description as below.

B. The certificate and report shall not be reproduced except in full, without the written approval of SRT laboratory.

C. The report must not be used by the client to claim product endorsement by NVLAP or any agency the government.

3. EUT MODIFICATIONS

The following accessories were added to the EUT during testing :

No modification by SRT LAB.

4. MODIFICATION LETTER

This section contains the following documents :

- A. Letter of modifications

5. CONDUCTED POWER LINE TEST

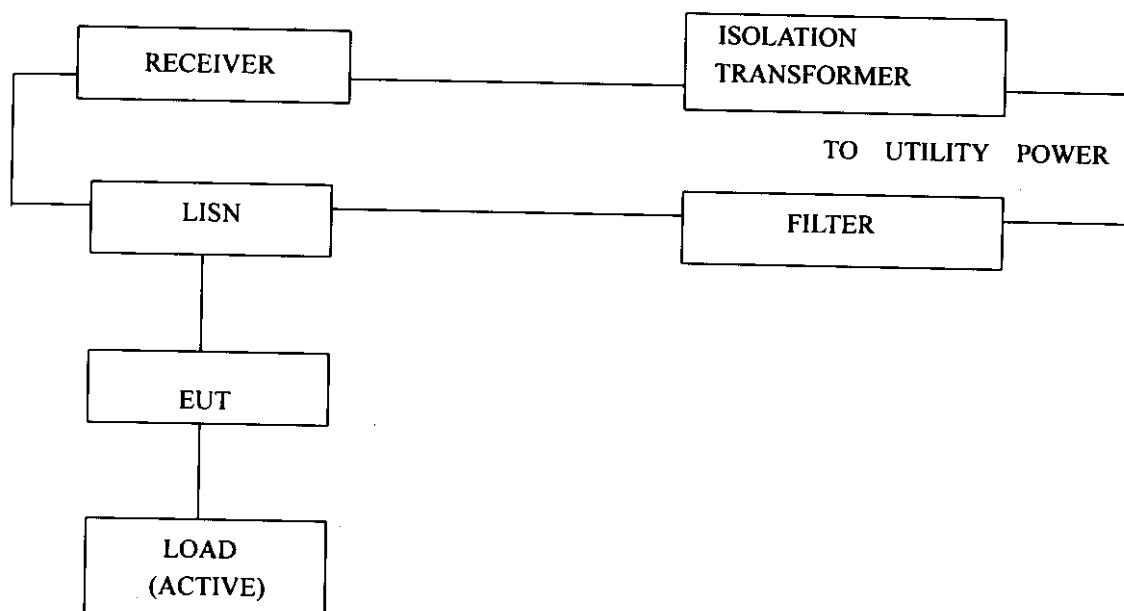
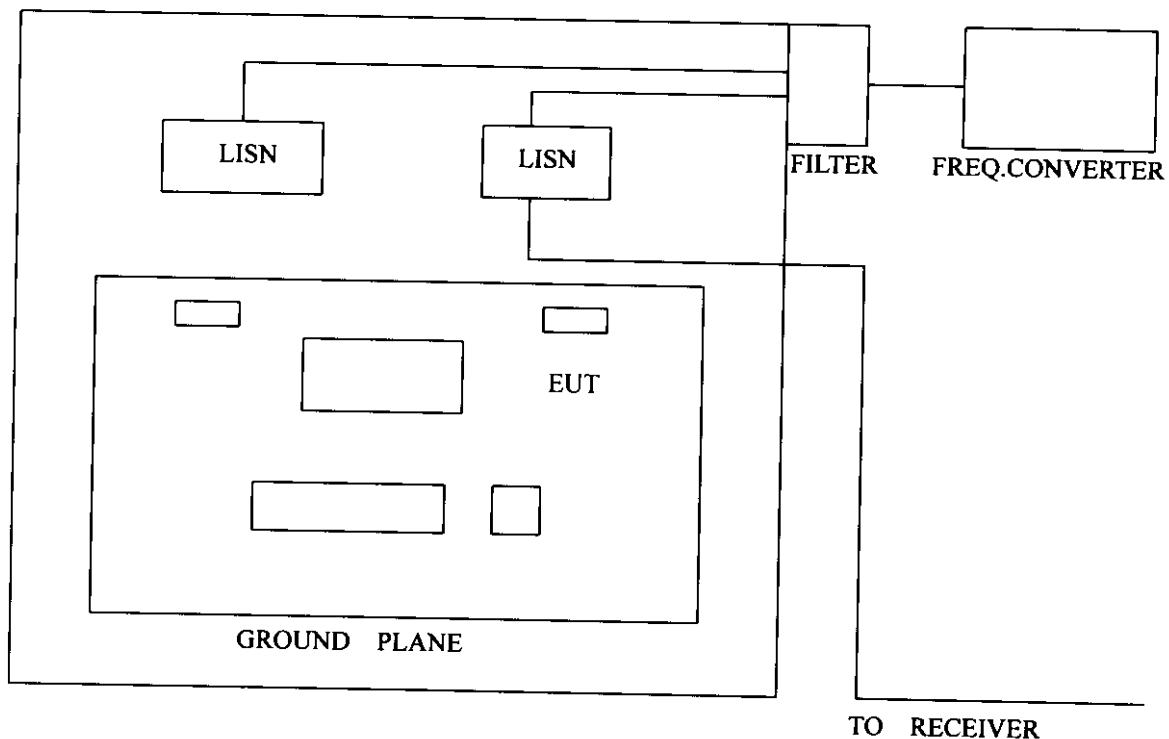
5.1 TEST EQUIPMENT

The following test equipment were used during the conducted power line test :

SPECTRUM ANALYZER	9 KHz TO 1 GHz	HP	8590L/3624A01317	AUGUST , 1998 ETC	1Y
EMI TEST RECEIVER	9 KHz TO 30 MHz	ROHDE & SCHWARZ	ESHS30/826003/008	AUGUST , 1998 ETC	1Y
LISN	50 uH, 50 ohm	SOLAR ELECTRONICS	9252-50-R24-BNC/951315	AUGUST , 1998 ETC	1Y
LISN	50uH, 50 ohm	SOLAR ELECTRONICS	9252-50-R24-BNC/951315	AUGUST , 1998 ETC	1Y
SIGNAL GENERATOR	9 KHz TO 1080 MHz	ROHDE & SCHWARZ	SMY01/841104/019	APRIL , 1998 ITRI	1Y
POWER CONVERTER	0 TO 300 VAC VAC 47-500 Hz	AFC	AFC-1KW/850510	APRIL , 1998 SRT	1Y

5.2 TEST PROCEDURE

The EUT was tested according to ANSI C63.4 - 1992. The frequency spectrum from 0.45 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 uHenry as specified by SECTION 5.1 of ANSI C63.4 - 1992. Cables and peripherals were moved to find the maximum emission levels for each frequency.

5.3 TEST SETUP**SEMI-ANECHOIC CHAMBER**

5.4 CONFIGURATION OF THE EUT

The EUT was configured according to ANSI C63.4 - 1992. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

SCANNER	MICROTEK INTERNATIONAL INC.	MRS-1200V6US	EF9MRS-1200V6US
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B. INTERNAL DEVICES

C. PERIPHERALS

DEVICE	MANUFACTURER	MODEL # SERIAL #	FCCID / DoC	CABLE
MONITOR	PHILIPS	14B1320W	A3KM064	POWER-UNS DATA-S
PRINTER	HP	2225C	BS46XU2225C	POWER-UNS DATA-S
MODEM	SMARTTEAM	103/212A	EF56A5103/212A	POWER-UNS DATA-S
KEYBOARD	COMPAQ	KPQ-E99AC-10	EW4KPQ4813	DATA-UNS
MOUSE	HP	M-S34	EZL211029	DATA-UNS
ADAPTOR	L.S.E.	LSE9801B15	N/A	POWER-UNS
ADAPTOR	KENTEX	KA18-150	N/A	POWER-UNS
SCSI CARD	ADAPTEC	AVA-1505AE/A1	N/A	N/A
MAIN BOARD	MICRO-STAR	MS-6117	DoC	N/A
POWER SUPPLY	SEASINIC	SS-250GPX	N/A	N/A
HDD	MAXTOR	90288D2	N/A	N/A
FDD	TEAC	FD-235HF	N/A	N/A
VGA CARD	MICRO-STAR	MS-4413	DoC	N/A

ANSWER :

(1). cable - uns : unshielded

s : shielded

(2). cables - All 1m or greater in length – bundled according to
ANSI C63.4 – 1992.

5 . 5 EUT OPERATING CONDITION

OPERATING CONDITION IS ACCORDING TO ANSI C63.4 - 1992.

1. EUT POWER ON.
2. "H" PATTERN SENT TO THE FOLLOWING PERIPHERALS :
 - PRINTER
 - MONITOR
 - MODEM
3. RESOLUTION : 600 dpi

5 . 6 CONDUCTED POWER LINE EMISSION LIMIT

CONDUCTED POWER LINE EMISSION LIMIT		
0 . 45 - 1.705	1000 uV	250 uV
1.705 - 30	3000 uV	250 uV

NOTE : In the above table, the tighter limit applies at the band edges.

5.7 CONDUCTED POWER LINE TEST RESULT

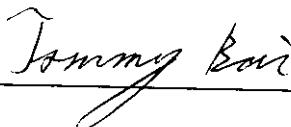
The frequency spectrum from 0.45 MHz to 30 MHz was investigated.
 All readings are QUASI-PEAK VALUES with a resolution bandwidth of 9 KHz.

TEMPERATURE : 24 °CHUMIDITY : 56 %RH

FREQUENCY (MHz)	LINE1 (dBuV)	LINE2 (dBuV)	LIMIT (dBuV)
0.60	38.9	37.8	48.0
0.99	37.2	35.8	48.0
1.03	38.2	*	48.0
1.96	*	36.3	48.0
2.25	35.5	35.9	48.0
3.69	29.9	29.7	48.0
16.9	35.7	33.9	48.0

REMARKS : (1). * = measurement does not apply for this frequency
 (2). uncertainty in conducted emission measured is <+/-2dB
 (3). any departure from specification : N/A
 (4).Resolution : 600 dpi
 (5).Test with L.S.E. adaptor

SIGNED BY TESTING ENGINEER :



5.7 CONDUCTED POWER LINE TEST RESULT

The frequency spectrum from 0.45 MHz to .30 MHz was investigated. All readings are QUASI-PEAK VALUES with a resolution bandwidth of 9 KHz.

TEMPERATURE : 24 °C

HUMIDITY : 56 %RH

REMARKS : (1). * = measurement does not apply for this frequency
(2). uncertainty in conducted emission measured is <+/-2dB
(3). any departure from specification : N/A
(4).Resolution : 600 dpi
(5).Test with KENTEX adaptor

SIGNED BY TESTING ENGINEER :

6.1 TEST EQUIPMENT

THE FOLLOWING TEST EQUIPMENT WERE USED DURING THE RADIATED EMISSION TEST :

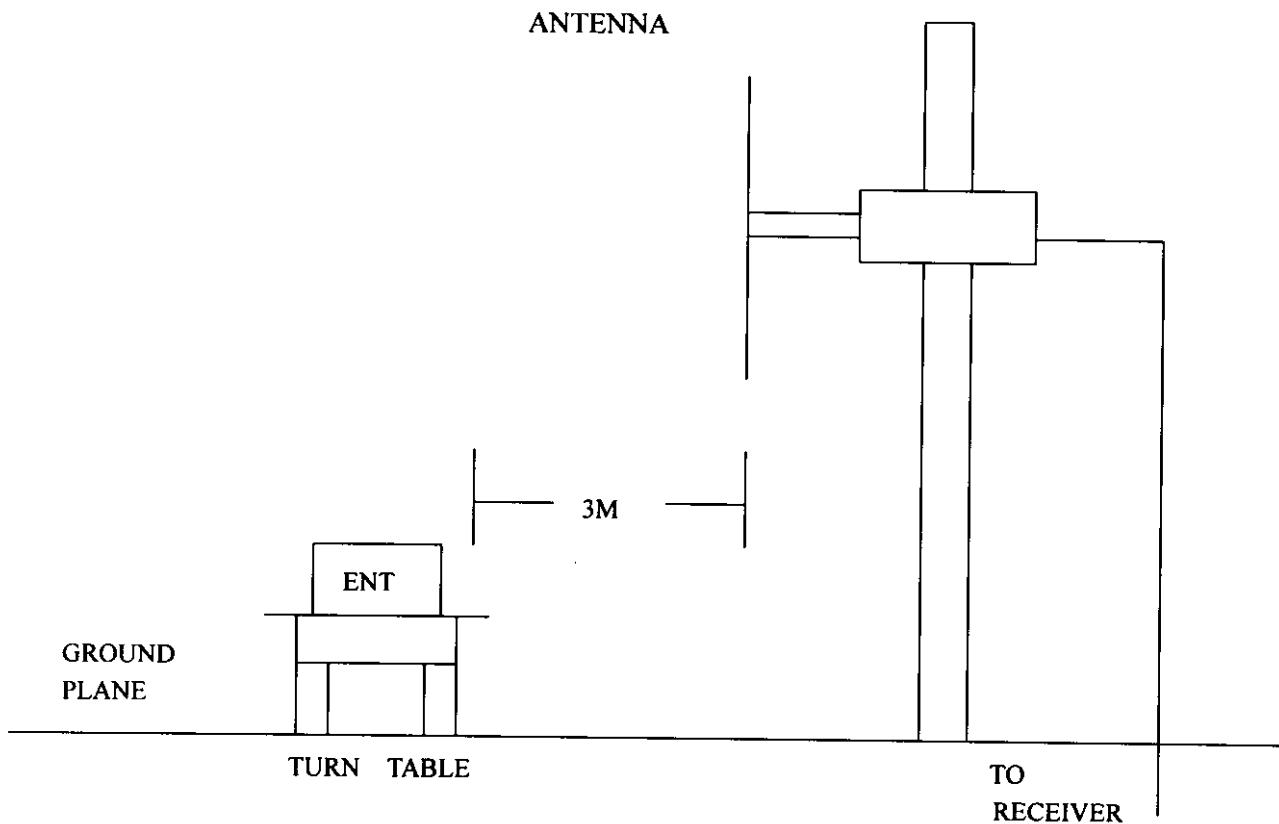
RECEIVER	20 MHz TO 1000 MHz	R & S	ESVS30/ 841977/03	APRIL, 1998 ITRI	1Y
SPECTRUM ANALYZER	100 Hz TO 1500 MHz	HP	8568B/ 3019A05294	OCT., 1998 ETC	1Y
SPECTRUM ANALYZER	9 KHz TO 22 GHz	HP	8593E/ 3322A00670	APRIL, 1998 ITRI	1Y
SPECTRUM ANALYZER	100 Hz TO 1000 MHz	IFR	A-7550/ 2684/1248	JULY, 1998 ETC	1Y
SIGNAL GENERATOR	9 KHz TO 1080 MHz	ROHDE & SCHWARZ	SMY01/ 841104/019	APRIL, 1998 ITRI	1Y
DIPOLE ANTENNA	28 MHz TO 1000 MHz	EMCO	3121C/ 9003-535	SEP., 1998 SRT	1Y
DIPOLE ANTENNA	28 MHz TO 1000 MHz	EMCO	3121C/ 9611-1239	NOV., 1998 SRT	1Y
BI-LOG ANTENNA	26 MHz TO 2000 MHz	EMCO	3142/ 9608-1073	NOV., 1998 SRT	1Y
BI-LOG ANTENNA	26 MHz TO 1100 MHz	EMCO	3143/ 9509-1152	SEP., 1998 SRT	1Y
PRE-AMPLIFIER	0.1 MHz TO 1300 MHz	HP	8447D/ 2944A08402	APRIL, 1998 ITRI	1Y
PRE-AMPLIFIER	0.1 MHz TO 1300 MHz	HP	8447D/ 2944A06412	AUGUST, 1998 ETC	1Y
HORN ANTENNA	1 GHz TO 18 GHz	EMCO	3115/ 9602-4681	JULY, 1997 SRT	1.5Y

6.2 TEST PROCEDURE

6 . 2 TEST PROCEDURE

- (1).The EUT was tested according to ANSI C63.4 - 1992. The radiated test was performed at SRT LAB'S OPEN SITE. this site is on file with the FCC laboratory division, reference 31040 / SRT.
- (2).The EUT, peripheralls were put on the turntable which table size is 1m x 1.5 m, table heigh 0.8 m. All set up is according to ANSI C63.4-1992.
- (3).The frequency spectrum from 30 MHz to 2 GHz was investigated. All readings from 30 MHz to 1 GHz are QUASI-PEAK values with a resolution bandeidth of 120 KHz. All readings are above 1 GHz, PEAK values with a resolution bandwidth of 1 MHz. Measurements were made at 3 METERS.
- (4). The antenna heigh were varied from 1 m to 4 m heigh to find the maximum emission for each frequency.
- (5). The antenna polarization : vertical polarization and horizontal polarization.

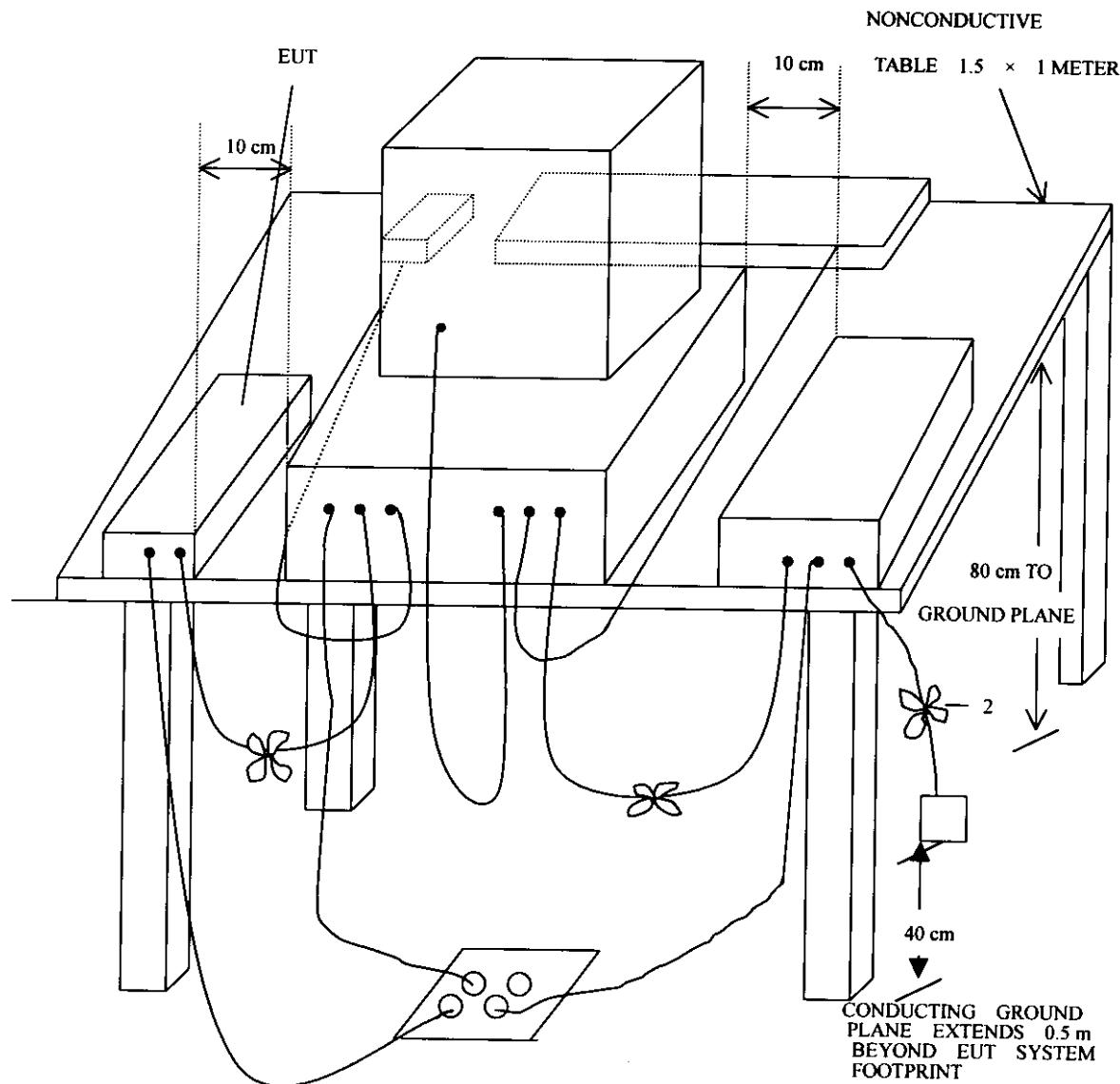
6 . 3 RADIATED TEST SET-UP



6 . 3 RADIATED TEST SET-UP

ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE IN THE RANGE OF 9 KHz TO 40 GHz C63.4-1992

ANSI



6 . 4 CONFIGURATION OF THE THE EUT

Same as section 4 . 4 of this report

6 . 5 EUT OPERATING CONDITION

Same as section 4 . 5 of this report.

6 . 6 REDIATED EMISSION LIMIT

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below :

CLASS B

FRQUENCY (MHz)	DISTANCE (m)	FIELD STRENGTH (V/m)
30 - 88	3	100
88 - 216	3	150
216 - 960	3	200
ABOVE 960	3	500

CLASS B (OPEN CASE)

FRQUENCY (MHz)	DISTANCE (m)	FIELD STRENGTH (V/m)
30 - 88	3	199.5
88 - 216	3	298.5
216 - 960	3	398.1
ABOVE 960	3	

CLASS A

FRQUENCY (MHz)	DISTANCE (m)	FIELD STRENGTH (V/m)
30 - 88	3	316.3
88 - 216	3	473.2
216 - 960	3	613.0
ABOVE 960	3	1000.0

NOTE: 1. In the emission tables above, the tighter limit applies at the band edges.
 2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.

6.7 RADIATED EMISSION TEST RESULT

The frequency spectrum from 30 MHz to 2 GHz was investigated. All readings from 30 MHz to 1 GHz are QUASI-PEAK VALUES with a resolution bandwidth of 120 KHz. Measurements were made at 3 meters. The measurements above 1 GHz with a resolution bandwidth of 1 MHz are PEAK READING at a distance of 3 meters.

TEMPERATURE : 24 °CHUMIDITY : 56 %RH

FREQ. (MHz)	CABLE LOSS (dB)	ANT. FACTOR (dB)	READING (dBuV)		EMISSION (uV)		LMTS (uV)
			HORIZ	VERT	HORIZ	VERT	
225.06	1.3	14.6	19.4	21.1	58.21	70.79	200
375.01	1.8	16.7	23.0	*	118.9	*	200
432.05	1.7	18.0	21.5	21.1	116.14	108.4	200
456.06	1.7	18.0	23.2	*	139.6	*	200
480.06	1.7	18.0	*	22.6	*	130.3	200
561.22	2.1	23.2	16.6	15.3	124.5	107.2	200
962.09	3.1	25.0	15.1	12.8	144.5	110.9	200
750.02	2.8	21.2	*	19.5	*	149.6	200

REMARKS : (1). * = measurement does not apply for this frequency.

(2). uncertainty in radiated emission measured is <+/-4dB

(3). any departure from specification : N/A

(4). sample calculation

$20 \log (\text{emission}) \text{ uV/m} = \text{cable loss(dB)} + \text{factor(dB)} + \text{reading(dBuV/m)}$

(5). Resolution : 600 dpi

(6). Test with L.S.E. adaptor

SIGNED BY TESTING ENGINEER :



6.7 RADIATED EMISSION TEST RESULT

The frequency spectrum from 30 MHz to 2 GHz was investigated. All readings from 30 MHz to 1 GHz are QUASI-PEAK VALUES with a resolution bandwidth of 120 KHz. Measurements were made at 3 meters. The measurements above 1 GHz with a resolution bandwidth of 1 MHz are PEAK READING at a distance of 3 meters.

TEMPERATURE : 24 °CHUMIDITY : 56 %RH

FREQ. (MHz)	CABLE LOSS (dB)	ANT. FACTOR (dB)	READING (dBuV)		EMISSION (uV)		LMTS (uV)
			HORIZ	VERT	HORIZ	VERT	
37.56	0.5	11.1	*	24.1	*	60.95	100
200.00	1.2	11.8	18.6	18.0	38.02	35.48	150
286.68	1.6	12.9	24.8	25.9	95.56	104.7	200
382.86	1.8	17.0	24.1	21.7	139.6	105.9	200
456.06	1.7	18.5	21.2	20.0	117.5	102.3	200
669.00	2.2	22.0	17.4	16.0	120.2	102.3	200
801.88	2.8	23.7	15.9	*	131.8	*	200

REMARKS : (1). * = measurement does not apply for this frequency.

(2). uncertainty in radiated emission measured is <+/-4dB

(3). any departure from specification : N/A

(4). sample calculation

$$20 \log (\text{emission}) \text{ uV/m} = \text{cable loss(dB)} + \text{factor(dB)} + \text{reading(dBuV/m)}$$

(5). Resolution : 600 dpi

(6). Test with ? adaptor

SIGNED BY TESTING ENGINEER : Tommy Bai