



PHILIPS

Philips Electronics Industries (Taiwan) Ltd - EMC Lab. 5, Tze Chiang 1 Road, Chungli Industrial Park, Chungli, Taoyuan, Taiwan Tel.: +886-3-454-9862 Fax.: +886-3-454-9887 E-mail: ronnie.yang@philips.com	FCC Test Report	Report No.: TYR87-2001 Date : 22 February, 2002 Page : 1 of 25
Customer : Philips Electronics Industries Name : Mr. S.T. Huang – EE LCD Address : 5, Tze Chiang 1 Road, Zip/City : Chungli Industrial Park, Country : Chungli, Taiwan, R.O.C.		
Equipment Under Test (including peripherals) : FCC ID. : A3KM104 Model Name : 170S2 Serial Number : TY0105735 Description : 17" XGA TFT LCD monitor, Max. resolution 1280x1024/75Hz		
EMC Standards : FCC Part 15 of October 01,1999 Class B ANSI C63.4-1992 Result : PASSED the limits/test-levels in the standards. Note : The results in this report apply only to the sample(s) and mode(s) tested. It is the manufacturer's responsibility to assume the continued EMC compliance of production models.		
Date of receipt of EUT : 04 Jan. 2002 Date of performance of test : 08 Jan., 2002 to 09 Jan., 2002		
 C.C. Wu - EMC Test Engineer  Ronnie Yang - EMC Manager NVLAP Signatory		

Philips Electronics Industries (Taiwan) Ltd

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1. Summary of test results

Test	Standard	Result	Note
Emission, ANSI C63.4-1992			
Conducted emission	FCC Part 15	Passed	
Radiated emission	FCC Part 15	Passed	

Remark:

The test sample fully complies with the requirements set forth in : FCC Part 15 Class B.

2. General Information of EUT

The EUT, 17" LCD color monitor :

Model No. : 170S2
 FCC ID : A3KM104
 Brand : Philips

The color monitor automatically scans horizontal frequencies between 30KHz and 82KHz , and vertical frequencies between 56Hz and 76Hz. This color monitor displays sharp and brilliant images of text and graphics with a maximum resolution up to 1280x1024 pixels.

The monitor has 16 factory-preset modes as indicated in the following table:

Model	Resolution	Frequency	Pixel rate	Sync	Comment
1	640X350	31.5K/70HZ	25.175	(+/-)	IBM VGA 10h
2	720X400	31.5K/70HZ	28.322	(-/+)	IBM VGA 3h
3	640X480	37.5K/75HZ	31.501	(-/-)	
4	640X480	35.0K/67HZ	30.24	(-/-)	
5	640X480	31.5K/60HZ	25.175	(-/-)	
6	800X600	35.2K/56HZ	36	(+/+)	
7	800X600	46.9K/75HZ	49.498	(+/+)	
8	800X600	37.9K/60HZ	40	(+/+)	
9	832X624	49.7K/75HZ	57.28	(+/+)	MAC
10	1024X768	60.0K/75HZ	78.75	(+/+)	
11	1024X768	48.4K/60HZ	65	(-/-)	
12	1152X870	68.7K/75HZ	100	(-/-)	MAC
13	1152X900	71.8K/76HZ	108	(+/+)	SUN Mode II
14	1280X1024	64.0K/60HZ	108	(+/+)	
15	1280X1024	80.0K/75HZ	135	(+/+)	
16	688X556	31.3K/50HZ	27	(-/+)	TV-PAL

3. Test Equipment

Test equipment used for line Conducted and Radiated emissions as following.
All equipment were calibrated according to ANSI C63.4-1992 and ISO-9000 requirement unless otherwise specified.

Traceability to R.O.C. and international standards is assured by using calibrated all equipment.

- For Conducted Emissions Test:

Test Equipment	Model No.	Serial No.	Last Calibrate	Next Calibrate
Spectrum	HP8568B	2415A00346	05/16/2001	05/16/2002
EMI Receiver	R & S ESCS30	830245/026	06/09/2001	06/08/2002
LISN	EMCO 3825/2	9311-2153	12/04/2001	06/04/2002
LISN	EMCO 3825/2	9311-2154	12/04/2001	06/04/2002
RF Cable	8-meter	N/A	05/28-2001	05/28/2002

- For Radiated Emissions Test:

Test Equipment	Model No.	Serial No.	Last Calibrate	Next Calibrate
Spectrum	HP8568B	2415A00346	08/15/2001	08/15/2002
RF Preselector	HP85685A	2901A00946	08/15/2001	08/15/2002
QP Adapter	HP85650A	2043A00366	08/15/2001	08/15/2002
EMI Receiver	HP85460A	3441A00199	09/11/2001	09/11/2002
RFI Filter Section	HP85460A	3330A00177	09/11/2001	09/11/2002
EMI Receiver	R & S ESVS30	841977/006	05/28/2001	05/28/2002
Biconical Antenna	EMCO 3110B	3222	04/27/2001	04/27/2002
Biconical Antenna	EMCO 3110B	3224	04/27/2001	04/27/2002
Log-Periodic Antenna	EMCO 3146A	1424	04/27/2001	04/27/2002
Log-Periodic Antenna	EMCO 3146A	1425	04/27/2001	04/27/2002
Turn Table	EMCO 1060	1068	05/26/2001	05/26/2002
Antenna Tower	EMCO 1050	1113	05/26/2001	05/26/2002
RF Cable	M17/75-RG214-NE	N/A	05/26/2001	05/26/2002

4. Test Configuration of EUT and Peripherals

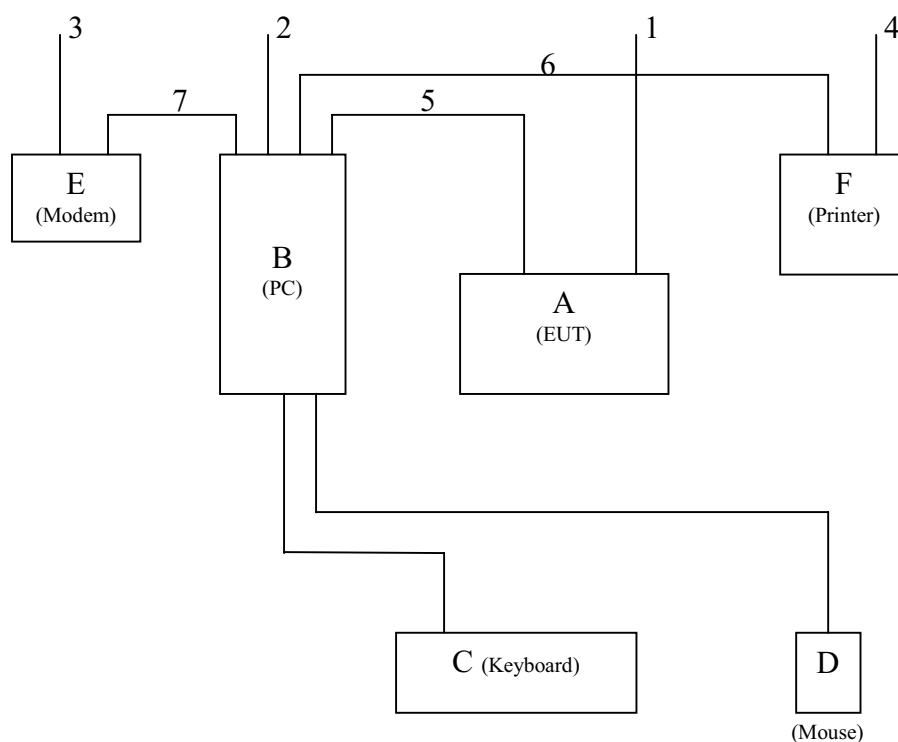
The system was configured for testing in a typical fashion (as a customer would normally use it) according to ANSI C63.4-1992, please see the photographs for detail. For system measurement, the EUT “170S2” were connected to:

	Description	Brand/ Model No.	Serial No.	FCC ID	Remark
A	15” LCD monitor	Philips 170S2	TY0105735	A3KM104	EUT
B	PC	Dell MMS	F1807	FCC logo	
C	Keyboard	KB-7959	10422	FCC Logo	
D	Mouse	Logitech M-S34	457249	DZL211029	
E	Modem	USRobotics 268	2680559278575	CJE-0318	
F	Printer	HP 2225C	3145S02419	DSI6XU2225	

Connected Cables

No.	Description	Manufacturer	Length	Shielded	Remark
1	Power Cord	Long Shine	1.8 meters	No	for EUT
2	Power Cord	Acer	1.8 meters	No	for PC
3	Power Cord	Aceex	2.0 meters	No	for Modem
4	Power Cord	HP	1.8 meters	No	for Printer
5	Video Cable	Long Shine	1.5 meters	Yes	
6	Printer Cable	HP	1.8 meters	Yes	
7	Modem Cable	Aceex	1.5 meters	Yes	

System Block Diagram of Test Configuration



5. Test Procedure

Test was performed by:

PHILIPS ELECTRONICS INDUSTRIES (TAIWAN) LTD.
CONSUMER ELECTRONICS DIVISION
- EMC LAB

5, Tze Chiang 1 Road, Chungli Industrial Park
P.O. Box 123, Chungli, Taoyuan, Taiwan
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The test was performed in accordance with ANSI C63.4-1992, "AMERICAN NATIONAL STANDARD FOR MEASUREMENT OF RADIO-NOISE EMISSION FROM LOW-VOLTAGE ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE OF 9KHz TO 40GHz"

Both conducted and radiated testing were performed according to the procedure in ANSI C63.4-1992. Conducted testing was performed in screen room and radiated testing was performed in open site at an antenna to EUT distance of 3-meter on horizontal and vertical polarization.

First, pre-scan all modes in screen room then select **2 higher modes** (worst case) were tested and reported.

The line conductive interference was tested with 110VAC and 220VAC receptively. Unshielded power cord was used during test.

D-sub I/F cable with two ferrite cores was used.

Tested and reported modes as following:

File No.	Resolution	Frequencies	I/F Cable	Figure	
				Conducted	Radiated
EMI02-001	1280x1024	80.0KHz/75Hz	D-sub	Figure 1, 2	Figure 5
EMI02-001A	1024x768	60.0KHz/75Hz	D-sub	Figure 3, 4	Figure 6

Set up the EUT and all peripherals as chapter 6 of ANSI C63.4-1992 for AC power line conducted emissions testing and radiated emissions testing.

Turn on the power of EUT and all peripherals, select an appropriate displaying mode using the "setup" software. Then run an EMI test program "HTEST.EMI" as a basic software to execute the EUT operating under test. A pattern of scrolling H's should be displayed on the monitor.

Step 1 : Run the "HTEST.EMI" on personal computer then sends "H" character to monitor continuously until full screen.

Step 2 : Personal computer sends a complete line of continuously repeating “H” to HP 2225C printer.

Step 3 : Personal computer sends a file of “H” pattern to floppy disk then read a file of “H” pattern from floppy disk.

Step 4 : Personal computer sends a file of “H” pattern to hard disk then read a file of “H” pattern from hard disk.

Step 5 : Personal computer sends a file of “H” pattern to USRobotics 268 modem.

Step 6 : Return to step 1

All data in this report are “PEAK” value within 15dB margin unless otherwise noted.

6. Measurement Uncertainty

The system uncertainty listed below are based on the instrument absolute specifications, and do not include uncertainties of the equipment under test.

Uncertainty for Radiated Emissions Test at 3 meters Test Site.

Source of Measurement Uncertainty	Uncertainty/dB
Antenna factor calibration	+/-2.0
Cable loss calibration	+/-0.5
Receiver specification	+/-1.0
Antenna position ver.	+/-2.0
Measurement distance ver.	+/-0.5
Site imperfections	+/-2.0
Mismatch	+/-1.1
System repeatability	+/-0.5

Uncertainty for Conducted Emissions Test at 3 meters Test Site.

Source of Measurement Uncertainty	Uncertainty/dB
LISN specification	+/-2.0
Cable loss calibration	+/-0.5
Receiver specification	+/-1.0
Pulse limiter Spec.	+/-0.3
Measurement distance ver.	+/-0.5
Site imperfections	+/-2.0
System repeatability	+/-0.5

Conducted Emissions FCC Part 15										
Operating conditions EUT: EUT powered on with scrolling “H” pattern.										
Limits: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Frequency range (MHz)</th> <th style="width: 33%;">Class A (dBUv) QP</th> <th style="width: 33%;">Class B (dBUv) QP</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0.45 – 1.705</td> <td style="text-align: center;">60.0</td> <td style="text-align: center;">48.0</td> </tr> <tr> <td style="text-align: center;">1.705 – 30.0</td> <td style="text-align: center;">69.5</td> <td style="text-align: center;">48.0</td> </tr> </tbody> </table>		Frequency range (MHz)	Class A (dBUv) QP	Class B (dBUv) QP	0.45 – 1.705	60.0	48.0	1.705 – 30.0	69.5	48.0
Frequency range (MHz)	Class A (dBUv) QP	Class B (dBUv) QP								
0.45 – 1.705	60.0	48.0								
1.705 – 30.0	69.5	48.0								
Test Result : Passed FCC Class B Limits Option: The following option may be employed if the conducted emissions exceed the limits, as appropriate, when measured using instrumentation employing a quasi-peak detector function: If the level of the emission measured using the quasi-peak instrumentation is 6dB, or, more higher than the level of the same emission measured with instrumentation having an average detector and a 9KHz minimum bandwidth, that emission is considered broadband and the level obtained with the quasi-peak detector may be reduced by 13dB for comparison to the limits. Remark:										
Date of Test Test Engineer	: 08 Jan, 2002 to 09 Jan, 2002 : C.C.Wu									
For detail measurement results see next pages.										

Figure 1

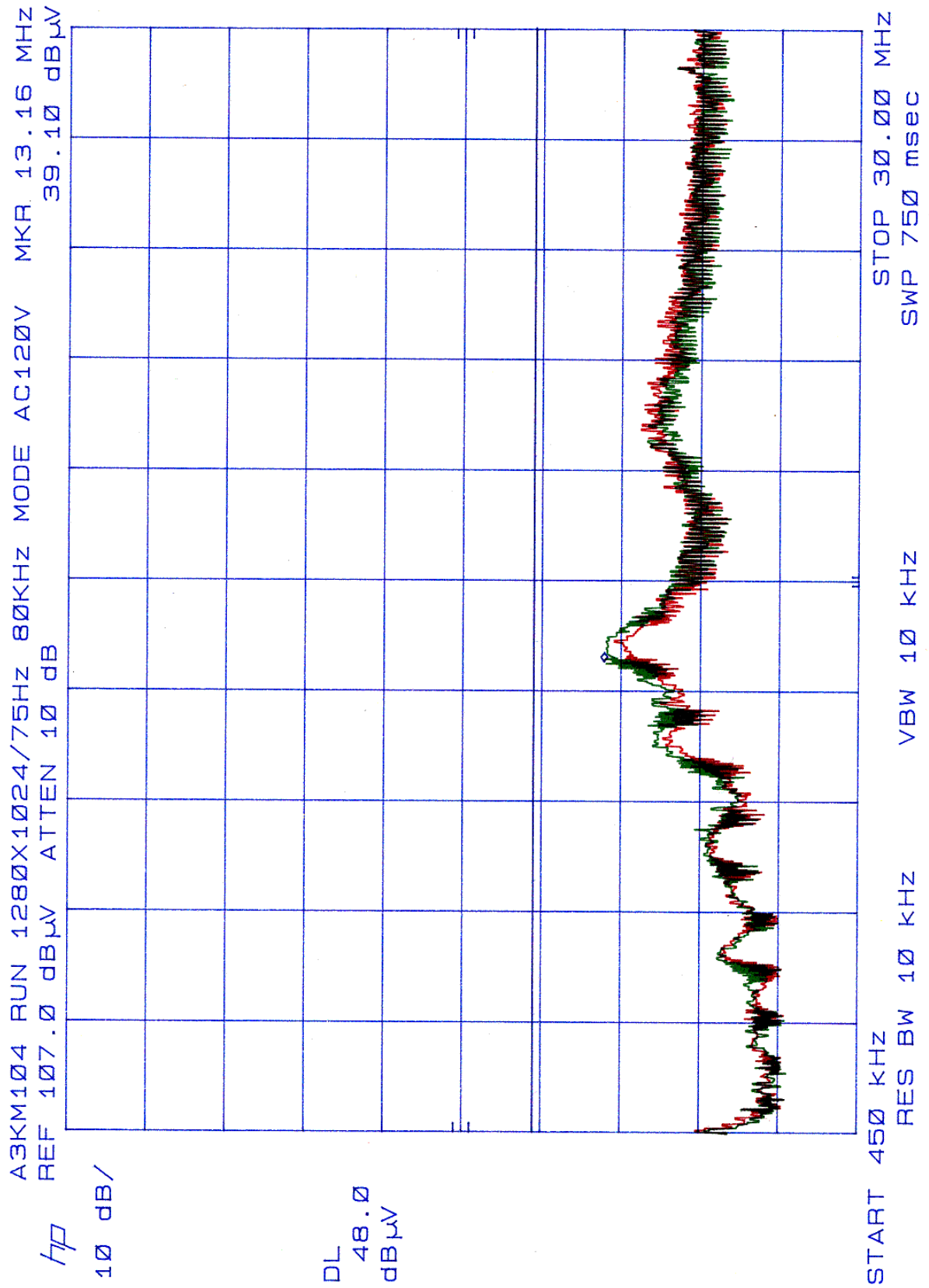


Figure 2

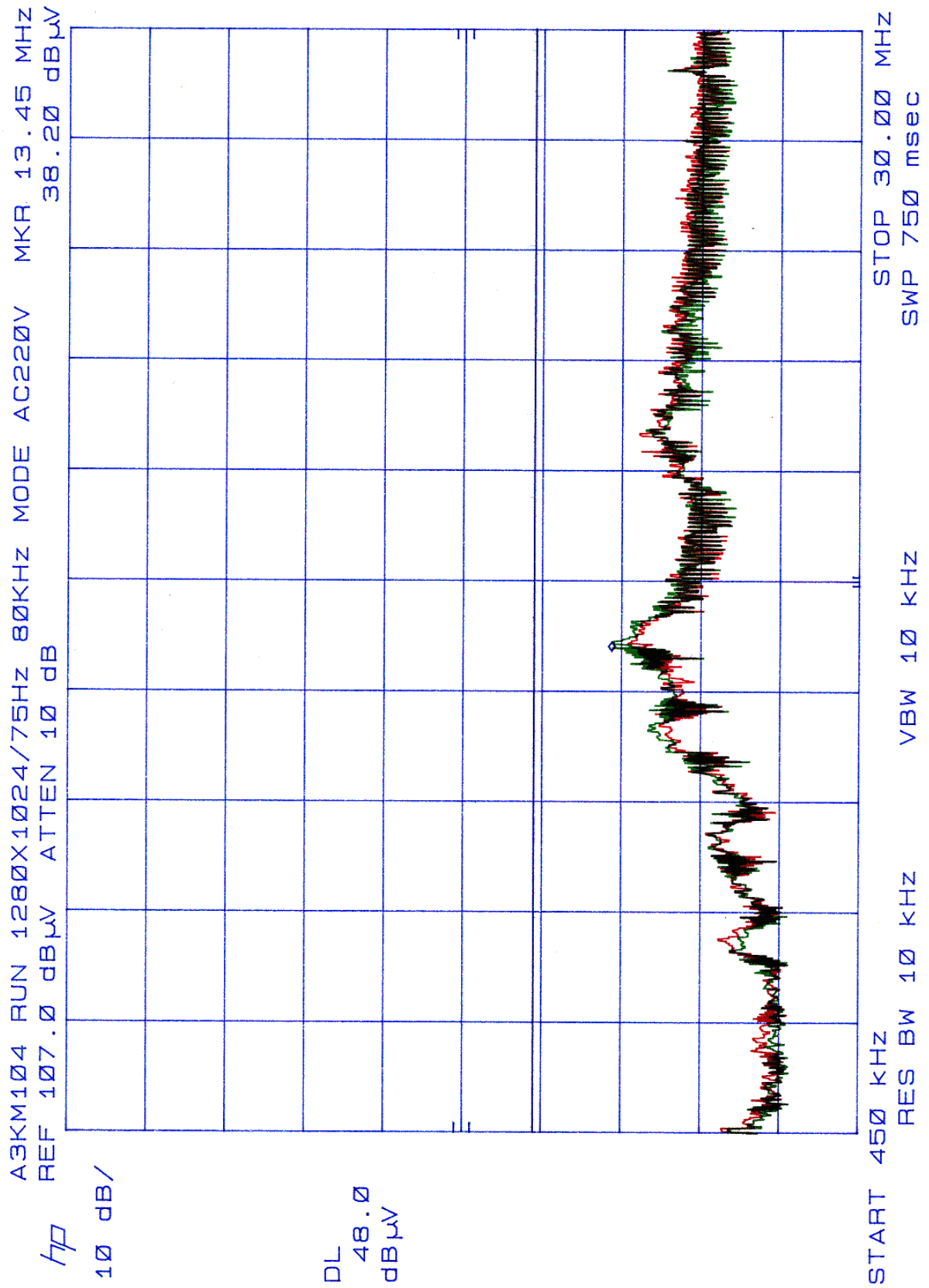


Figure 3

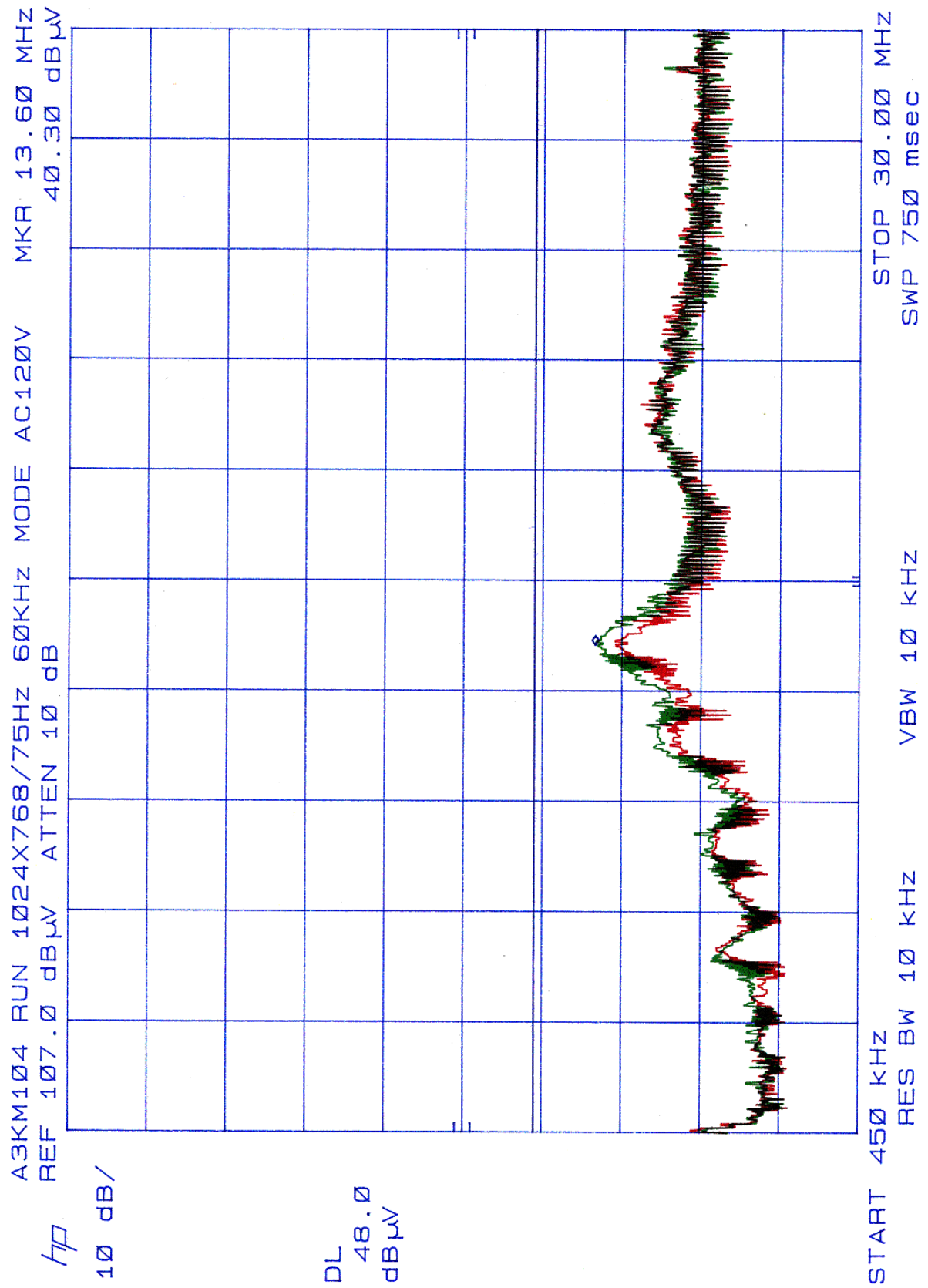
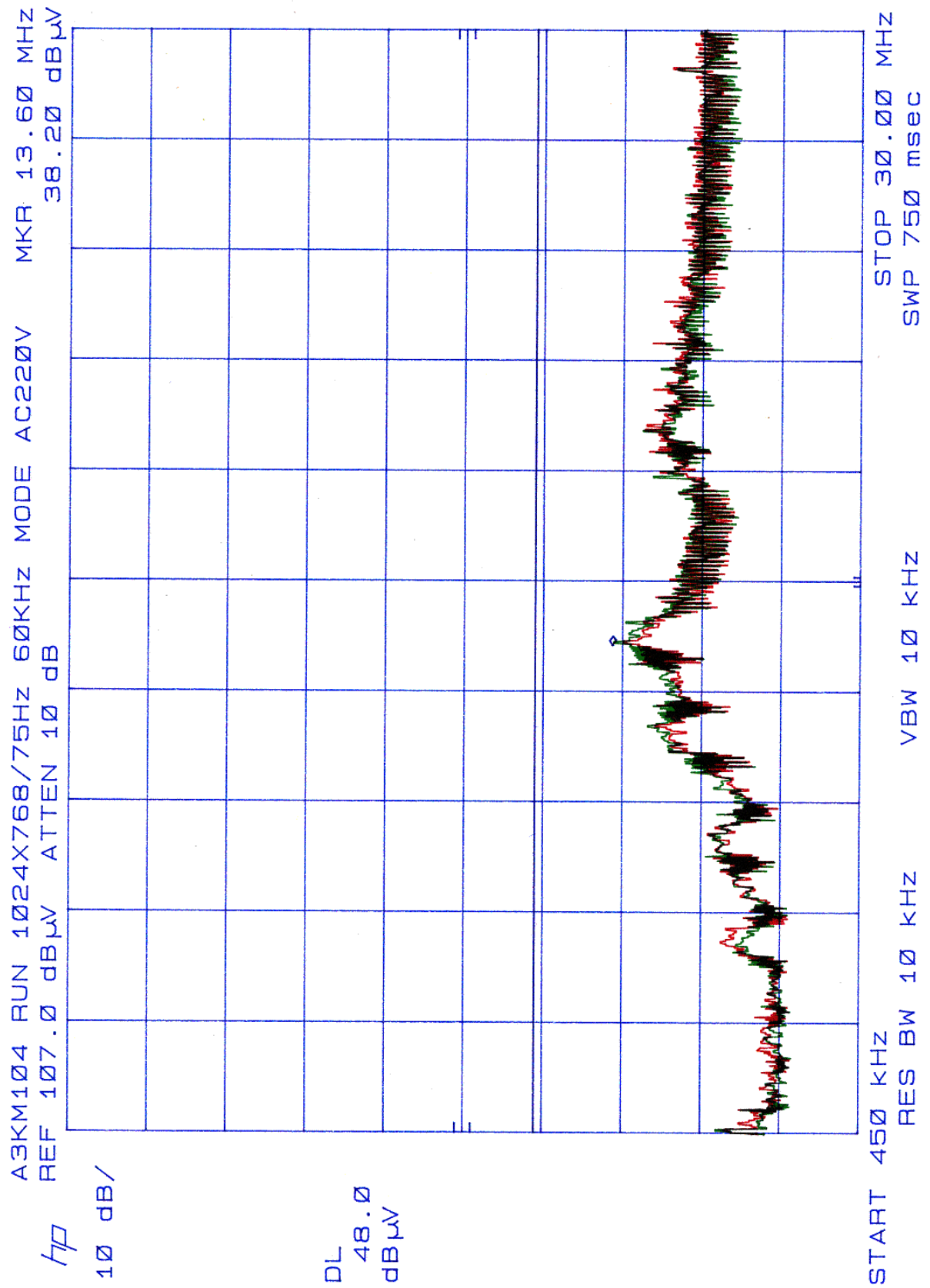


Figure 4



8. Radiated Emission Test

Radiated Emissions FCC Part 15		
Operating conditions EUT: EUT powered on with scrolling “H” pattern.		
Limits:		
Frequency range (MHz)	Class A at 10m (dBuv) QP	Class B at 3m (dBuv) QP
30.0 – 88.0	39.0	40.0 Quasi-Peak
88.0 – 216.0	43.5	43.5 Quasi-Peak
216.0 – 960.0	46.5	46.0 Quasi-Peak
960.0 – 1000.0	49.5	54.0 Quasi-Peak
Above 1000.0	49.5	54.0 Average
Test Result : Passed FCC Class B Limits Remark: 		
Date of Test	: 08 Jan., 2002 to 09 Jan., 2002	
Test Engineer	: C.C.Wu	
For detail measurement results see next pages.		

Radiated RF Level – Peak Value

Frequency (MHz)	Horizontal (dBuV/m)	Vertical (dBuV/m)	FCC/B Limit (dBuV/m)
63.92	28.92	31.52	40
127.84	33.94	32.74	43.5
159.77	31.7	AMBIENT	43.5
223.69	33.58	32.88	46
275.29	36	37.1	46
287.6	37.4	38.8	46
290.09	36.5	37.1	46
299.92	37	37.8	46
319.55	31.58	34.48	46
329.38	29.596	30.696	46
339.21	30.036	32.636	46
351.51	31.3	32.3	46
363.82	30.8	31.7	46
383.46	31.288	35.388	46
408.08	31.396	32.596	46
412.93	31.856	33.556	46
417.9	31.316	35.916	46
427.73	32.172	36.772	46
437.56	32.212	35.912	46
457.2	33.068	36.468	46
467.02	32.608	34.408	46
472	32.228	36.628	46
481.81	34.224	36.124	46
491.63	33.044	36.744	46
501.47	33.208	35.508	46
521.1	32.568	34.268	46
535.9	33.344	35.944	46
545.72	33.984	36.684	46
555.55	33.244	35.744	46
565.37	33.76	34.76	46
575.18	36.4	39.1	46
604.68	34.36	36.16	46
609.63	34.82	36.62	46
619.46	35.408	37.808	46
629.29	36.36	35.76	46
639.1	37.46	37.76	46
666.49	37.288	38.088	46
675.04	39.3	39.4	46
766.92	38.472	39.472	46

Spectrum Analyzer Setting:

RBW: 100KHz

VBW: 100KHz

Quasi-peak Values were taken with Rohde & Schwarz ESVS 30 EMI test receiver.

Radiated RF Level – QP Value

Frequency (MHz)	Horizontal (dBuv/m)	Vertical (dBuv/m)	FCC/B Limit (dBuv/m)
255.64	38.6	36.2	46
447.38	37.828	41.028	46
734.95	36.88	38.18	46
830.81	40.296	38.996	46
894.73	43.08	41.78	46

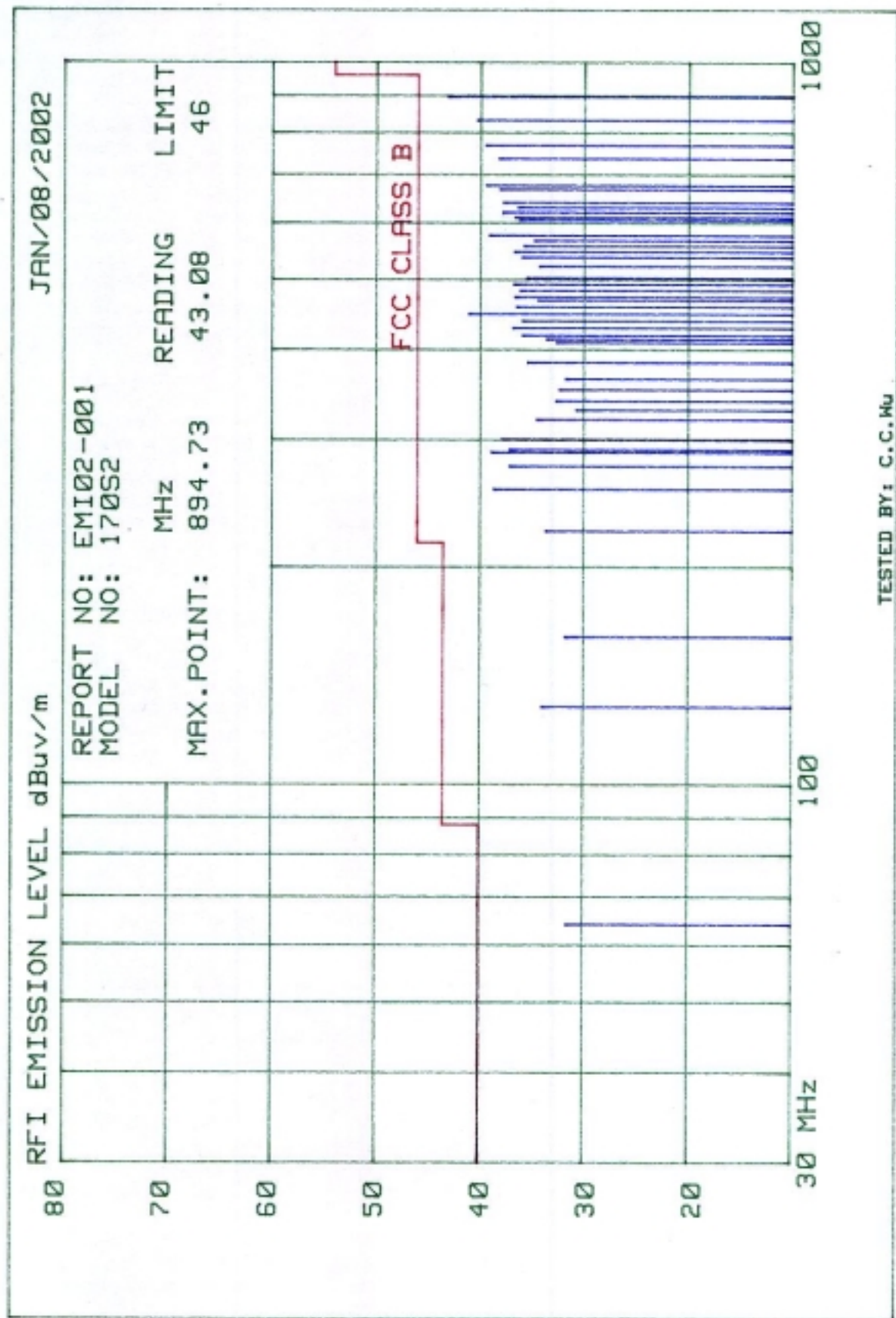
The spectrum was scanned from 30MHz to 1000MHz and the significant emissions were recorded.

Test distance between device under test and receiving antenna was 3-meter.

Sample of calculation:

Final value (dBuv/m) = Antenna Factor (dB) + Cable Loss (dB) + Reading value (dBuv/m)

Figure 5



Radiated RF Level – Peak Value

Frequency (MHz)	Horizontal (dBuv/m)	Vertical (dBuv/m)	FCC/B Limit (dBuv/m)
64.03	26.42	32.32	40
128.07	30.84	30.14	43.5
160.08	30.1	28.2	43.5
192.1	33.72	31.52	43.5
224.11	32.68	34.48	46
228.16	34.66	35.96	46
256.14	38	36.8	46
288.16	39.1	40.4	46
303.1	32.212	31.512	46
320.17	30.48	33.18	46
337.25	30.588	31.288	46
352.18	30.6	31.2	46
384.2	31.624	34.824	46
416.22	32.192	33.992	46
465.3	33.46	37.36	46
480.25	34.66	32.76	46
576.11	36.512	38.112	46
576.29	35.512	36.612	46
640.33	37.5'	37.9	46
720.15	39.22	39.62	46
960.5	41.976	42.476	54

Spectrum Analyzer Setting:

RBW: 100KHz

VBW: 100KHz

Quasi-peak Values were taken with Rohde & Schwarz ESVS 30 EMI test receiver.

Radiated RF Level – QP Value

Frequency (MHz)	Horizontal (dBuv/m)	Vertical (dBuv/m)	FCC/B Limit (dBuv/m)
448.24	39.252	40.252	46
832.42	40.412	40.312	46
896.46	42.184	41.684	46

The spectrum was scanned from 30MHz to 1000MHz and the significant emissions were recorded.
Test distance between device under test and receiving antenna was 3-meter.

Sample of calculation:

$$\text{Final value (dBuv/m)} = \text{Antenna Factor (dB)} + \text{Cable Loss (dB)} + \text{Reading value (dBuv/m)}$$

Figure 6

