



# EMC

## TEST REPORT

REPORT NO. : F87122311  
MODEL NO. : TD-521  
DATE OF TEST : Dec. 23, 1998

PREPARED FOR : ADI CORPORATION

ADDRESS : 14TH FL. NO. 1, SEC. 4, NAN-KING E. RD.,  
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PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

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**1. CERTIFICATION**

Issue Date: Dec. 28, 1998

Product : LCD MONITOR  
Trade Name : ADI  
Model No. : TD-521  
Applicant : ADI CORPORATION  
Standard : FCC Part 15, Subpart B, Class B  
ANSI C63.4-1992  
CISPR 22:1993+A1:1995+A2:1996

We hereby certify that one sample of the designation has been tested in our facility on Dec. 23, 1998. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in this report is in compliance with the Class B limits of conducted and radiated emission of applicable standards.

TESTED BY: Joy Chen, DATE: 12/28/98  
( Joy Chen )

CHECKED BY : Yemmy, DATE: 12/28/98  
( Yemmy Soong )

APPROVED BY: Mike Su, DATE: 12/28/98  
( Mike Su )

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## **2. GENERAL INFORMATION**

### **2.1 GENERAL DESCRIPTION OF EUT**

Product	:	LCD MONITOR
Model No.	:	TD-521
Power Supply Type	:	Switching
Power Cord	:	Nonshielded (1.8 m)
Data Cable	:	Shielded (1.5 m)

Note: The EUT is a 15” SAMSUNG TFT LCD Monitor with resolution up to 1024x768.

There are two ferrite cores on the video cable outside the monitor.

For more detailed features description, please refer to Manufacturer's Specification or User's Manual.



## 2.2 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories are used to form representative test configuration during the tests.

No	Product	Brand	Model No.	FCC ID	I/O Cable
1	PERSONAL COMPUTER	HP	D4572A	FCC DoC Approved	Nonshielded Power (1.8 m)
2	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Nonshielded Signal ( 1.4 m)
3	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (1.2 m) Nonshielded Power (1.8 m)
4	MOUSE	LOGITECH	M-S34	DZL210472	Shielded Signal ( 1.8 m)
5	MODEM	ACEEX	1414	IFAXDM1414	Shielded Signal (1.5 m) Nonshielded Power (1.8 m)
6	CCD CAMERA 2X	COMPAQ	YC72-CPQ	EDUYC72-CPQ	Shielded Signal (2 m)
7	VGA CARD	GORDIA	DSV3365	LUT-DSV3365	N/A
8	SOUND CARD	YA HSIN	AUDIO 1869	FCC DoC Approved	N/A

- Note: 1. Support unit 6 was connected to the USB port of EUT.  
 2. Three USB cables (2.0 m) were connected to the three USB ports of EUT to form three USB open loop cables.  
 3. Two audio cables (1.5 m) were connected between PC and EUT.  
 4. A USB cable (2.0 m) was connected between PC and EUT.

## 2.3 TEST METHODOLOGY AND CONFIGURATION

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4: 1992. Radiated testing was performed at an antenna to EUT distance of 10 m on an open area test site.

Please refer to the photos of test configuration in Item 5.



### 3. TEST INSTRUMENTS

#### 3.1 TEST INSTRUMENTS (EMISSION)

##### RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	8594A	3144A00308	Sept. 3, 1999
HP Preamplifier	8447D	2944A08119	Jan. 20, 1999
ROHDE & SCHWARZ TEST RECEIVER	ESVP	893496/030	July 15, 1999
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 25, 1999
CHASE Bilog Antenna	CBL6112A	2329	Sept. 19, 1999
EMCO Turn Table	1060	1195	N/A
EMCO Tower	1051	1163	N/A
Open Field Test Site	Site 2	ADT-R02	Sept. 18, 1999

Note: 1. The measurement uncertainty is less than +/- 3dB, which is calculated as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months.

And the calibrations are traceable to NML/ROC and NIST/USA.

##### CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Test Receiver	ESH3	893495/006	July 15, 1999
ROHDE & SCHWARZ Spectrum Monitor	EZM	893787/013	July 16, 1999
ROHDE & SCHWARZ Artificial Mains Network	ESH3-Z5	839135/006	July 14, 1999
EMCO-L.I.S.N.	3825/2	9204-1964	July 14, 1999
Shielded Room	Site 2	ADT-C02	N/A

Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months.

And the calibrations are traceable to NML/ROC and NIST/USA.



## 3.2 LIMITS OF CONDUCTED AND RADIATED EMISSION

### LIMIT OF RADIATED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

### LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
Above 1000	300	49.5	500	54.0

Note: (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### LIMIT OF CONDUCTED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Note: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz

(3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



## 4. TEST RESULTS (EMISSION)

### 4.1 RADIO DISTURBANCE

Frequency Range	:	0.15 - 30 MHz (Conducted Emission) 30 - 1000 MHz (Radiated Emission)
Input Voltage	:	120 Vac, 60 Hz
Temperature	:	21 Degree C
Humidity	:	79 %
Atmospheric Pressure	:	1010 mbar

TEST RESULT	Remarks
<b>PASS</b>	Minimum passing margin of conducted emission: - 16.1 dB at 0.182 MHz Minimum passing margin of radiated emission: -2.1 dB at 229.78 MHz

Note: The EUT was pretested under the following resolution & horizontal synchronization speed mode:

- \* 1024x768 mode (60 kHz),
- \* 800x600 mode (48 kHz),
- \* 640x480 mode (31 kHz)

The worst emission levels were found under 1024x768 (60 kHz) and therefore the test data of only this mode is recorded

### 4.2 EUT OPERATION CONDITION

1. Turn on the power of all equipment.
2. PC runs a test program to enable all functions.
3. PC reads and writes messages from FDD and HDD.
4. PC sends "H" messages to LCD monitor (EUT) and then LCD monitor displays "H" patterns on screen.
5. CCD cameras capture images and send image messages to EUT, and EUT displays them on its screen.
6. PC sends "H" messages to modem.
7. PC sends "H" messages to printer, and then printer prints them on paper.
8. PC sends audio messages to internal speaker of EUT.
9. Repeat steps 3-9.





### 4.3 TEST DATA OF CONDUCTED EMISSION

EUT: **LCD MONITOR**

MODEL: **TD-521**

MODE: **1024x768 ( 60 kHz )**

6 dB Bandwidth: **10 kHz**

Freq.	L Level		N Level		Limit		Margin [dB (mV)]			
[MHz]	[dB (mV)]		[dB (mV)]		[dB (mV)]		L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.182	47.0	-	48.3	-	64.4	45.4	-17.4	-	-16.1	-
0.246	38.3	-	42.3	-	61.9	51.9	-23.6	-	-19.6	-
0.675	24.5	-	31.8	-	56.0	46.0	-31.5	-	-24.2	-
4.796	29.4	-	35.1	-	56.0	46.0	-26.6	-	-20.9	-
6.887	35.6	-	37.6	-	60.0	50.0	-24.4	-	-22.4	-
19.126	27.7	-	29.3	-	60.0	50.0	-32.3	-	-30.7	-

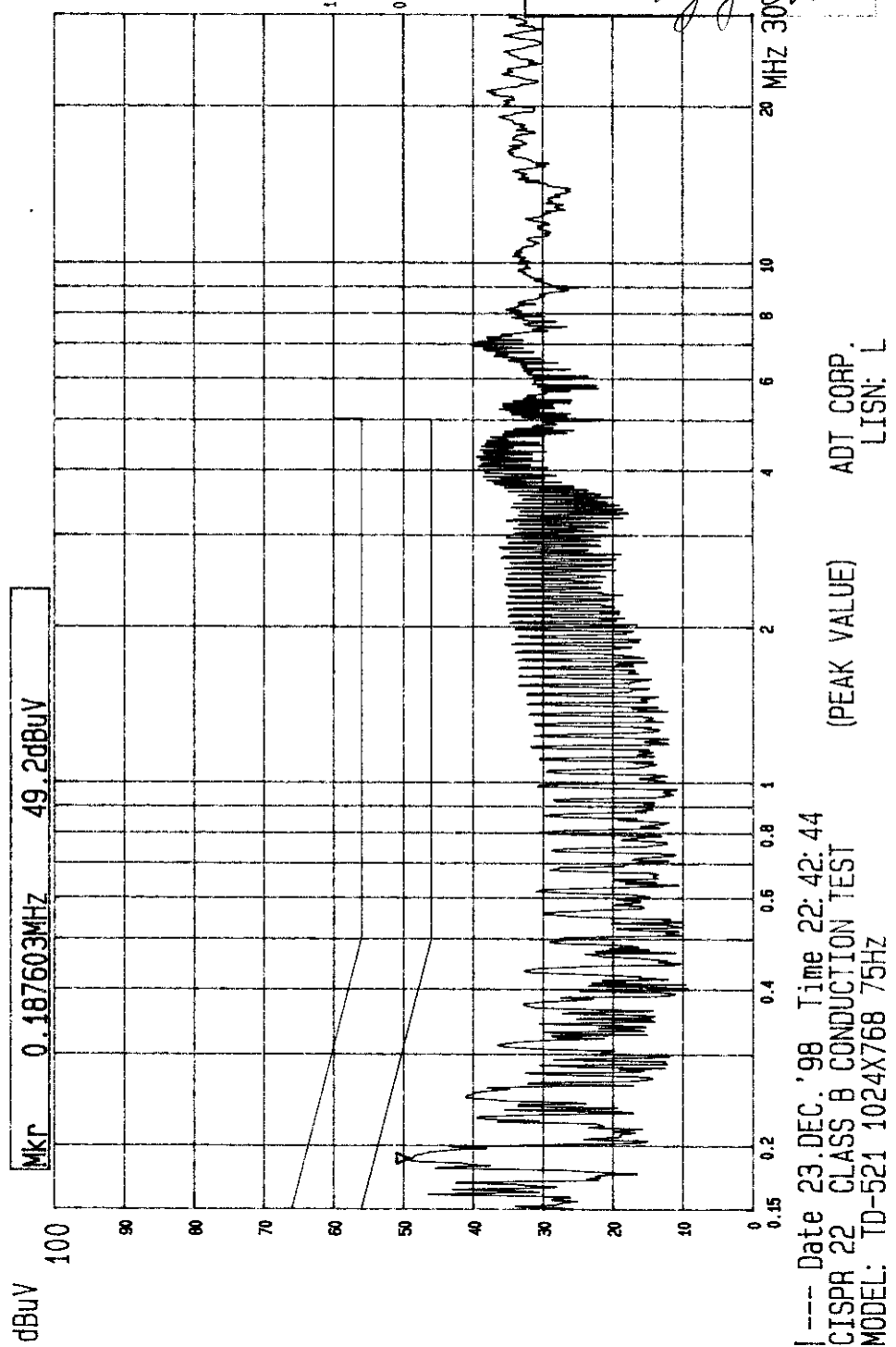
- Remarks:
1. "\*": Undetectable
  2. Q.P. and AV are abbreviations of quasi-peak and average individually.
  3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  4. The emission levels of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value



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Tested by Jay Chen





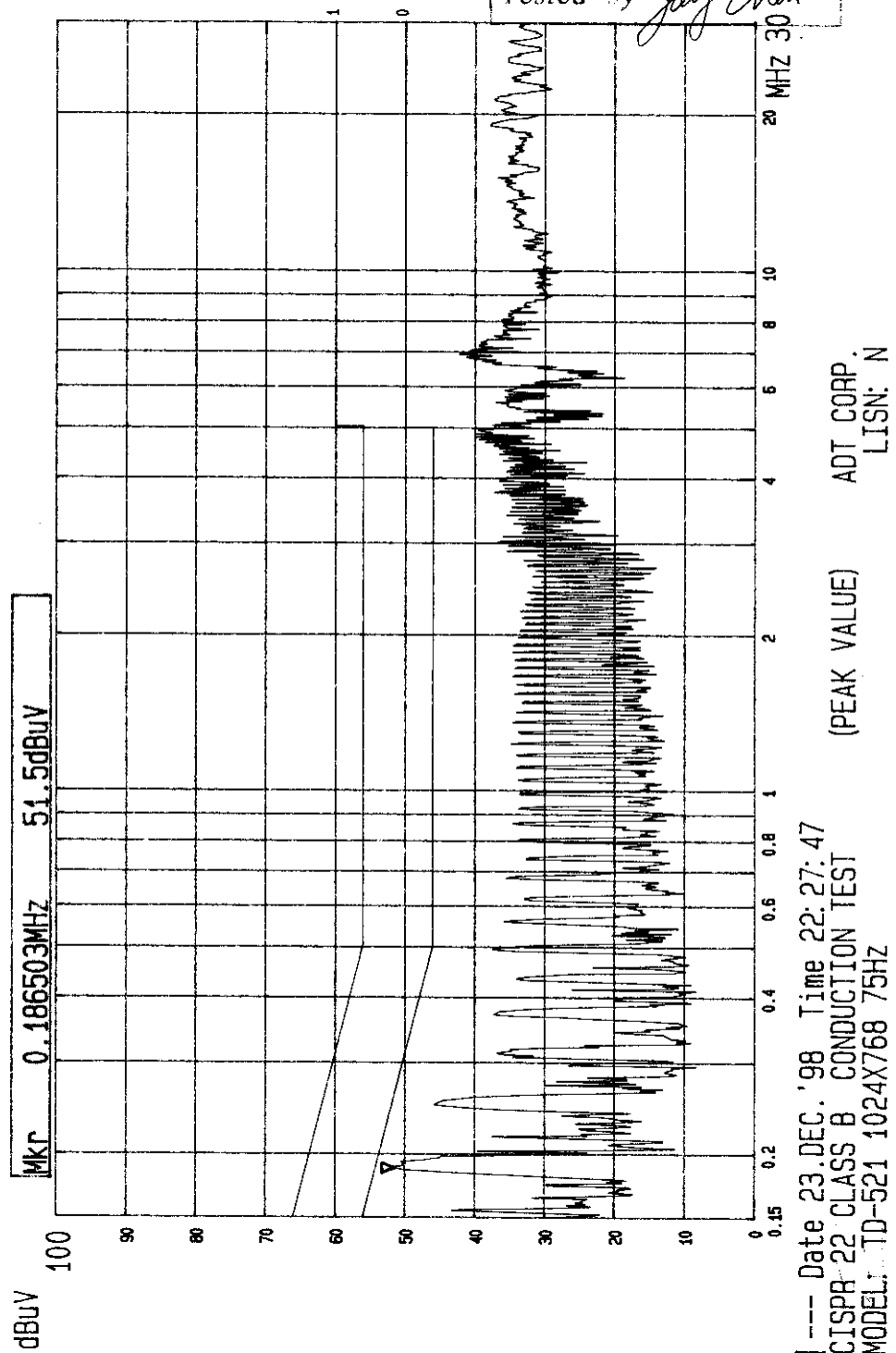
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Tested by

*Jeff Chen*





#### 4.4 TEST DATA OF RADIATED EMISSION

EUT: **LCD MONITOR**MODEL: **TD-521**MODE: **1024x768 ( 60 kHz )**ANT. POLARITY: HorizontalDETECTOR FUNCTION: Quasi-peak6 dB BANDWIDTH: 120 kHzFREQUENCY RANGE: 30-1000 MHzMEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
47.48	12.5	11.5	24.0	30.0	-6.0
86.86	9.5	8.8	18.3	30.0	-11.7
109.99	13.1	8.6	21.7	30.0	-8.3
118.16	14.1	12.0	26.1	30.0	-3.9
119.98	14.4	8.9	23.3	30.0	-6.7
125.96	14.1	7.9	22.0	30.0	-8.0
131.99	13.9	9.4	23.3	30.0	-6.7
143.99	13.2	9.6	22.8	30.0	-7.2
165.42	11.4	6.1	17.5	30.0	-12.5
189.08	11.7	4.4	16.1	30.0	-13.9
196.92	11.8	10.3	22.1	30.0	-7.9
203.97	12.2	9.8	22.0	30.0	-8.0
215.98	13.0	8.4	21.4	30.0	-8.6
229.76	14.0	9.3	23.3	30.0	-6.7
276.38	16.4	8.3	24.7	37.0	-12.3

- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB/m) + Meter Reading (dBuV).
  2. Correction Factor (dB/m) = Ant. Factor (dB/m) + Cable loss (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level - Limit value



## TEST DATA OF RADIATED EMISSION

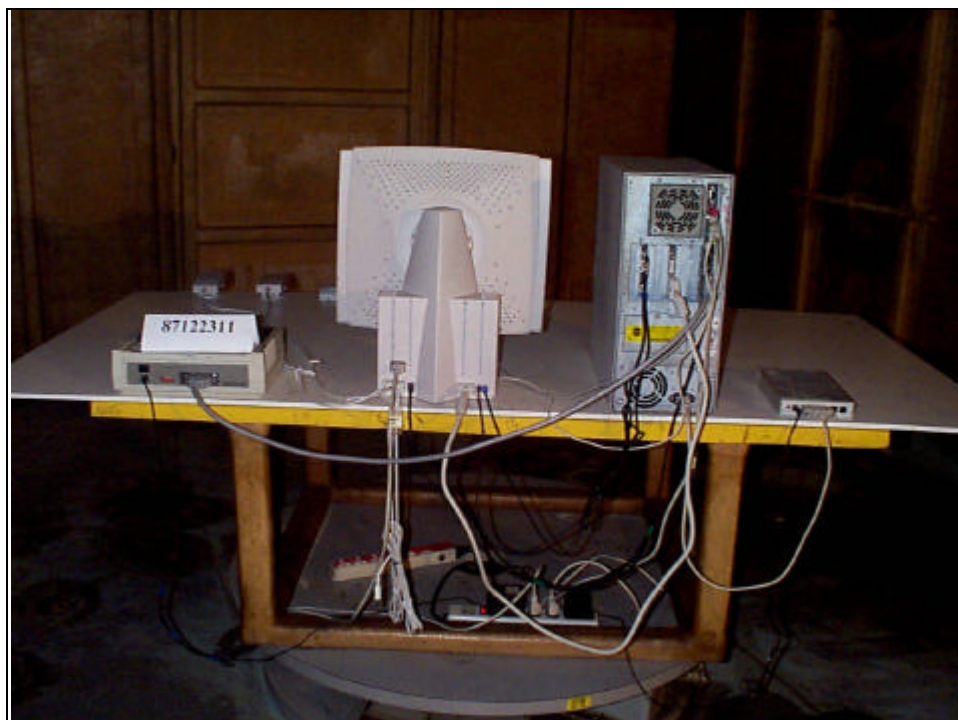
EUT: **LCD MONITOR**MODEL: **TD-521**MODE: **1024x768 ( 60 kHz )**ANT. POLARITY: VerticalDETECTOR FUNCTION: Quasi-peak6 dB BANDWIDTH: 120 kHzFREQUENCY RANGE: 30-1000 MHzMEASURED DISTANCE: 10 M

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
47.52	8.4	13.5	21.9	30.0	-8.1
51.45	6.8	15.9	22.7	30.0	-7.3
70.66	6.6	17.2	23.8	30.0	-6.2
86.87	8.9	16.7	25.6	30.0	-4.4
118.15	14.1	13.7	27.8	30.0	-2.2
120.00	14.4	12.2	26.6	30.0	-3.4
126.00	14.3	10.6	24.9	30.0	-5.1
137.96	14.1	8.4	22.5	30.0	-7.5
141.79	13.8	10.7	24.5	30.0	-5.5
143.99	13.6	12.9	26.5	30.0	-3.5
149.45	12.9	11.9	24.8	30.0	-5.2
157.55	11.9	11.5	23.4	30.0	-6.6
173.31	11.5	8.5	20.0	30.0	-10.0
196.90	12.4	12.9	25.3	30.0	-4.7
220.57	13.6	9.8	23.4	30.0	-6.6
229.78	14.0	13.9	27.9	30.0	-2.1

- REMARKS:
1. Emission level (dBuV/m) = Correction Factor (dB/m) + Meter Reading (dBuV).
  2. Correction Factor (dB/m) = Ant. Factor (dB/m) + Cable loss (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level - Limit value

## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN

### RADIATED EMISSION TEST





## CONDUCTED EMISSION TEST

