

Attachment 5

FCC ID I5Q200-100-01

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Equipment Under Test (EUT) : 9 pin Life Scan Cable
Model No. : 200-100-01
Serial No. : 13
Manufacturer : M/s. HCL Peripherals, Chennai

Test Instrumentation:

Description	Make	Model number	Serial number	Cal. Due date
EMI Receiver	R&S	ESAI-D	825316/004	01/02/03
	R&S	ESAI-RF	863791/009	01/02/03
EMI Receiver	R&S	ESI 126	100070	11/10/02
Biconical Antenna	AH-system	SAS-200/540	423	16/01/03
Log Periodic Antenna	Electrometrics	LPA 25	1463	06/01/03
EMI Receiver	R&S	ESCS 30	100063	05/03/03
Line Impedance Stabilization Network (LISN)	R&S	ESH2-Z5	100034	07/02/03

Applicable Standard:

FCC, class B part 15,1998. The test procedures are followed as given in the standard ANSI C63.4 1992

The EMI test receiver (make R&S)(model: ESAI) was used for measuring radiated emission from EUT. The receiver is a sophisticated instrument to specifically carry out EMC measurements. Transducer table settings are available to enter the cable loss & antenna factor in the receiver to get the field strength (dB μ V/m) values from the display. So manual calculation is not necessary.

For example:

$$E \text{ (dB}\mu\text{V/m)} = V \text{ (dB}\mu\text{V)} + AF \text{ ----- Eq.1}$$

Where

E (dB μ V/m) = Field strength

V (dB μ V) = receiver two terminal voltage

AF = Antenna factor

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1. CONDUCTED EMISSION TEST

1.1 EUT Configuration:

The 9 pin Life Scan Cable (EUT) was connected to the PC & other subsystems, and other end with 3 pin Pono Plug (to be connected to a meter) was shorted to communicate with the PC. See in Annexure-1

1.2 Test Frequency and limits:

Frequency (Mhz)	Quasi Peak Limits (dB μ V)
0.45-30.0	48

1.3 Test Procedure:

The RF conducted emissions from the EUT sent back to the power lines were measured using LISN and EMI receiver. The measurement was done in Peak detection mode. Since the emission level was within the limit in peak mode, measurement was not done in Quasipeak detection mode.

1.4 Test Observations:

It was observed that the Conducted Emission from the EUT (9 Pin Life Scan Cable) was within the FCC limits in the test frequency range of 450KHz-30MHz.

1.5 Enclosed Documents:

Plot 1 shows conducted emissions from the EUT on Neutral.

Plot 2 shows conductd emissions from the EUT on Line

Annexure shows the photograph of EUT & Conducted Emission test Setup

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2. RADIATED EMISSION TEST

2.1 EUT Configuration:

The 9 Pin Life Scan Cable (EUT) was connected to the PC & other subsystems, and other end with 3 Pin Pono Plug (to be connected to a meter) was shorted to communicate with the PC.

2.2 Test Frequency Range and Limits at 10 meter Distance:

Frequency (MHz)	Emission Limits (dB μ V)
30-88	29.55
88-216	33.05
216-960	35.55
960-1000	43.55

2.3 Test Procedure:

(I) The Radiated Emission (RE) from the EUT was first measured in anchoic chamber at 3-meter distance for both horizontal and vertical polarization and antenna height was varied to maximize the emission. The manipulation cables were done to idenfity maximum emissions in the frequency range of 30 Mhz – 1000Mhz to identify any emission from the EUT.

The above measurement was done in two steps.

Step 1: PC with subsystems in powered condition.

Step2: PC with subsystems plus EUT (9 pin Life scan Cable) in powered condition.

The frequencies of appreciable emission were identified and recorded

(II) The above RE measurement procedure was repreated at OATS (Open Area Test Site) at 10 m distance as required by FCC standard for those tests frequencies with appreciable emission. Measurement was carried out for both horizontal and vertical polarization and antenna height was varied to maximize the emission. The manipulation cables were done to idenfity maximum emissions. The photograph shows the maximum emission condition.

2.4 Test Observations:

The Radiated Emission (RE) was within the FCC limit. This was observed in Anchoic chamber with peak detection mode as well as in OATS for the test frequency range of 30-1000Mhz. As the emission from the EUT was below the FCC limit, the measurements plots take in the ancchoic chamber are enclosed for ready reference.

2.7 Enclosed Documents:

Plot 3 & 4 shows radiated emission due to ambient (PC & subsystems ON) for the frequency range 30MHz-230Mhz.

Plot 5 shows radiated emission due to ambient (PC & Subsystems ON) for the frequency range 230Mhz – 1000Mhz

Plot 6&7 shows radiated emissions from the entire setup as shown in Aneexure-1 for the frequency range 30-230Mhz

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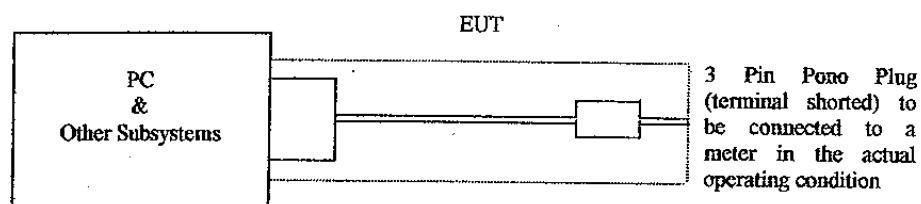
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Plot 8 &9 shows radiated emissions from the entire setup as shown in Annexure –1 for the frequency range 230-1000Mhz

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Annexure – I

EUT Configuration



Power Supply used for testing:

Voltage: 120V AC

Frequency: 60Hz

Description of support equipment:

Item	Make	Model	Serial no.	FCC ID
Personal Computer	HP	VECTRA VL24/50Se	IN3MC9735609	HCJVECTRA486-XX
Monitor	Samsung	Samtron, 40Bn	HMEJB01171X	FCC complied
Mouse	Logitech	M-M34	LZA81902629	DZLZ10365
Keyboard	BTC	5207	3872B490	E5XKB5121WTH0110

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CONDUCTED EMISSION
NEUTRAL

Plot - 1

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EUT: LIFE SCAN 9 PIN INTERFACE CABLE
Manuf: HCL PERIPHERALS, INDIA
Op Cond: CONNECTED TO PC, PHONOCONECTOR END SHORTED
Test Spec: FCC 15, CLASS B.
Comment: MODEL NO : 200-100-01, SERIAL NO :13
Date: 25. Jun 02 12:58

Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
450k	30M	5k	9k	PK	20ms	AUTO	LN OFF

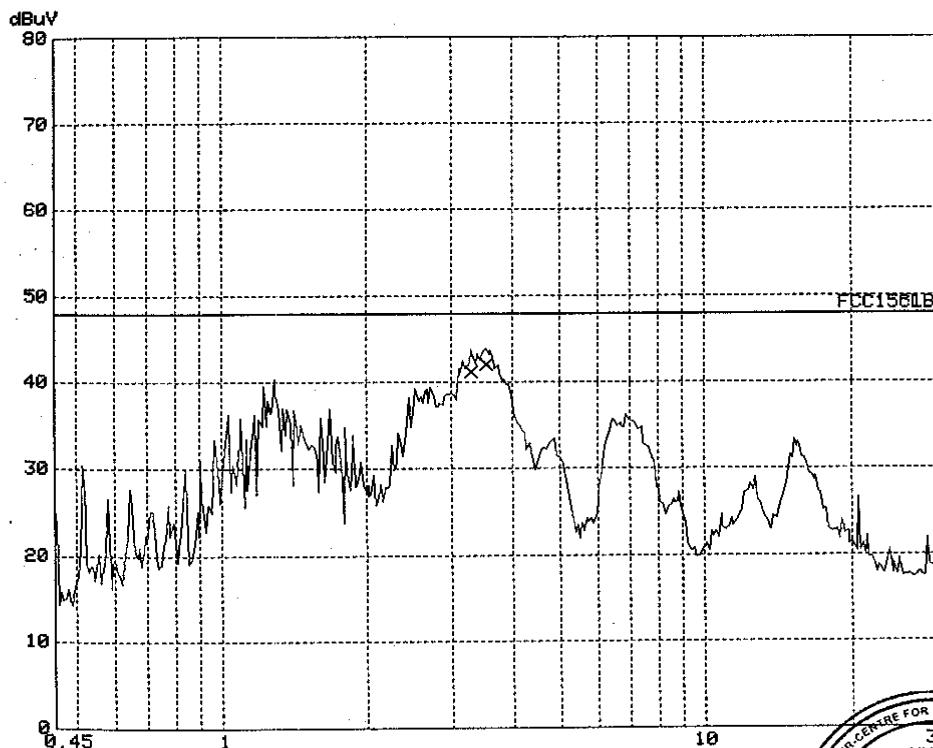
Transducer No. Start Stop Name
1 1 9k 200M PFACT

Final Measurement: x QP

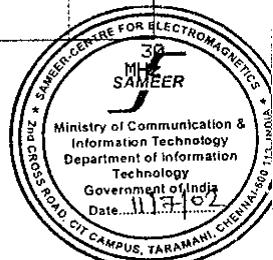
Meas Time: 1 s

Subranges: 25

Acc Margin: 6dB



Freq QP
1.142MHz 38.4dB
3.21MHz 42.5dB
3.45MHz 44.0dB
6.93MHz 33.1dB
1.14MHz 32.2dB
4.92MHz 31.0dB



Conducted Emission QP Band Width: 9KHz

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CONDUCTED EMISSION
LINE

Plot - 2

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EUT: LIFE SCAN 9 PIN INTERFACE CABLE
Manuf: HCL PERIPHERALS, INDIA
Op Cond: CONNECTED TO PC, PHONOCONNECTOR END SHORTED
Test Spec: FCC 15, CLASS B.
Comment: MODEL NO : 200-100-01, SERIAL NO :13
Date: 25. Jun 02 13:08

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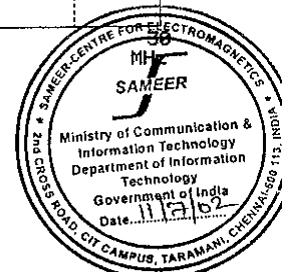
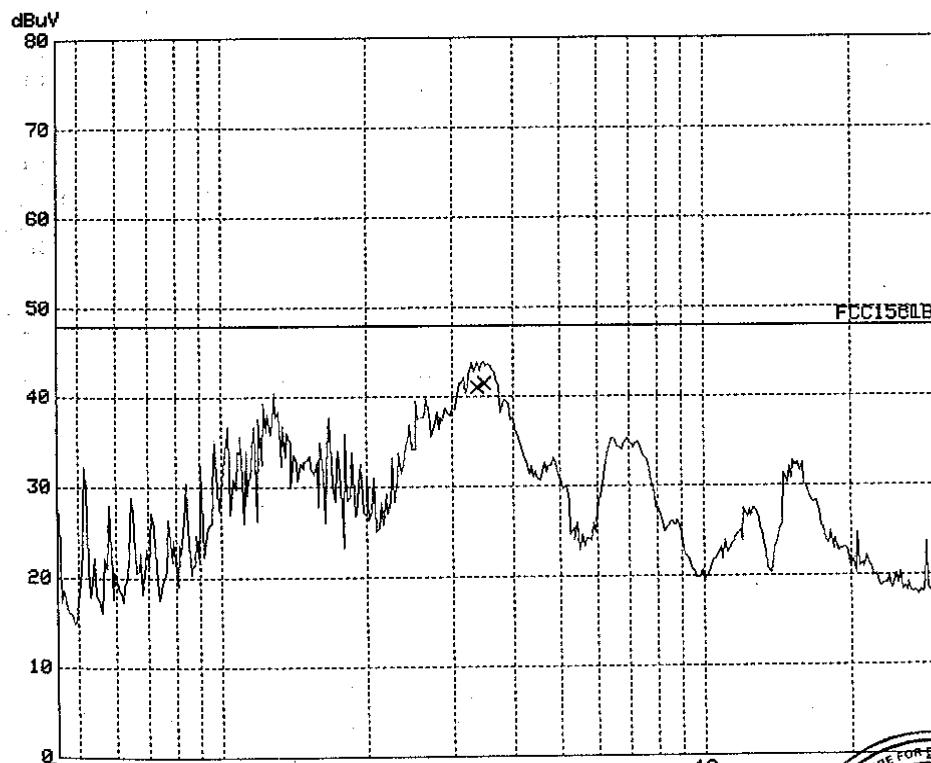
Scan Settings (1 Range)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
450k	30M	5k	9k	PK	20ms	AUTO	LN OFF

Transducer No.	Start	Stop	Name
1	1	9k	PFAC

Final Measurement: x QP

Meas Time: 1 s
Subranges: 25
Acc Margin: 6dB



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Plot - 3

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Marker 1 (T1) Att 10 dB Preamp INPUT 2 41.39 dB μ V/m 42.90000000 MHz Det ResBW 120 kHz Meas T 50 ms Unit dB μ V/m

100 MHz

SGL 1MA

80

70

60

50

40

30

20

10

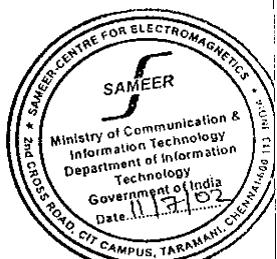
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30 MHz 50 70 90 110 130 150 170 190 210 230 MHz

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Title: RADIATED EMISSION MEASUREMENT
Comment B: AMBIENT MEASUREMENT WITH PC ON CONDITION, WITHOUT CABLE
CONNECTED, HOR POL, HT = 3M
Date: 9.JUL.2002 09:19:08

HORIZONTAL POLARISATION



Radiated Emission Qp Band width: 120KHz

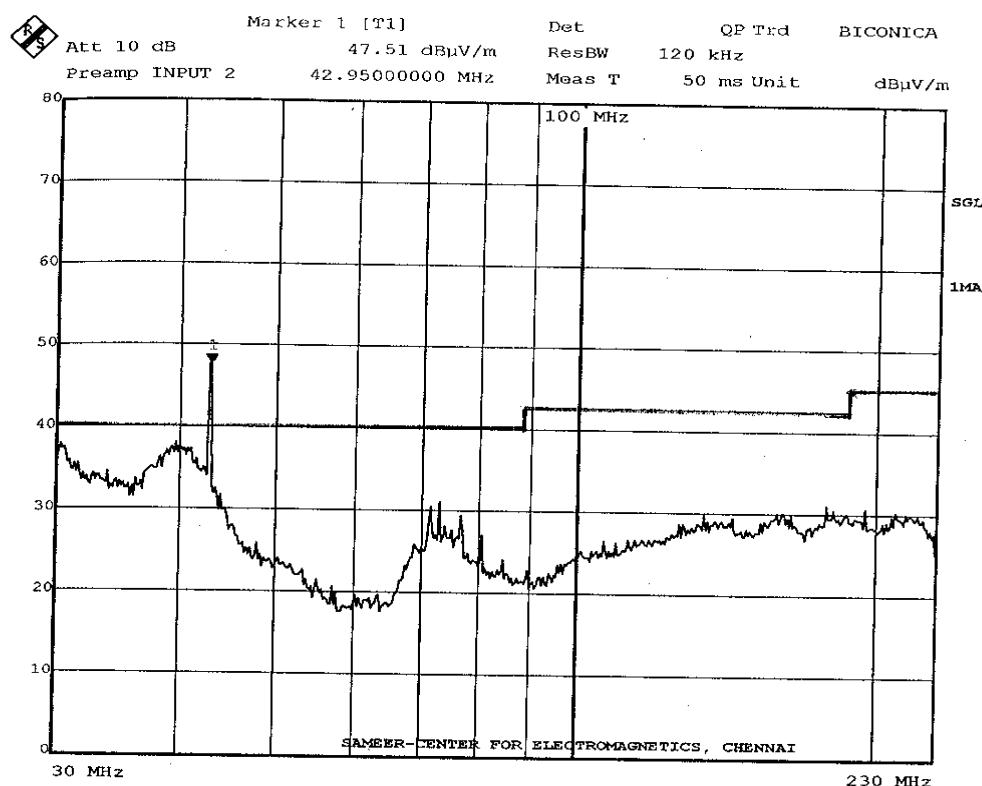
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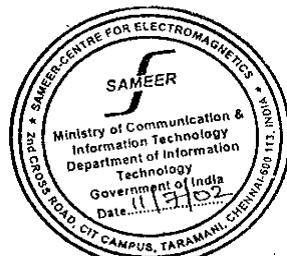
Plot - 4

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Title: RADIATED EMISSION MEASUREMENT
Comment B: AMBIENT MEASUREMENT WITH PC ON CONDITION, WITHOUT CABLE
CONNECTED, VER POL, HT = 3M
Date: 9.JUL.2002 09:22:17

VERTICAL POLARISATION



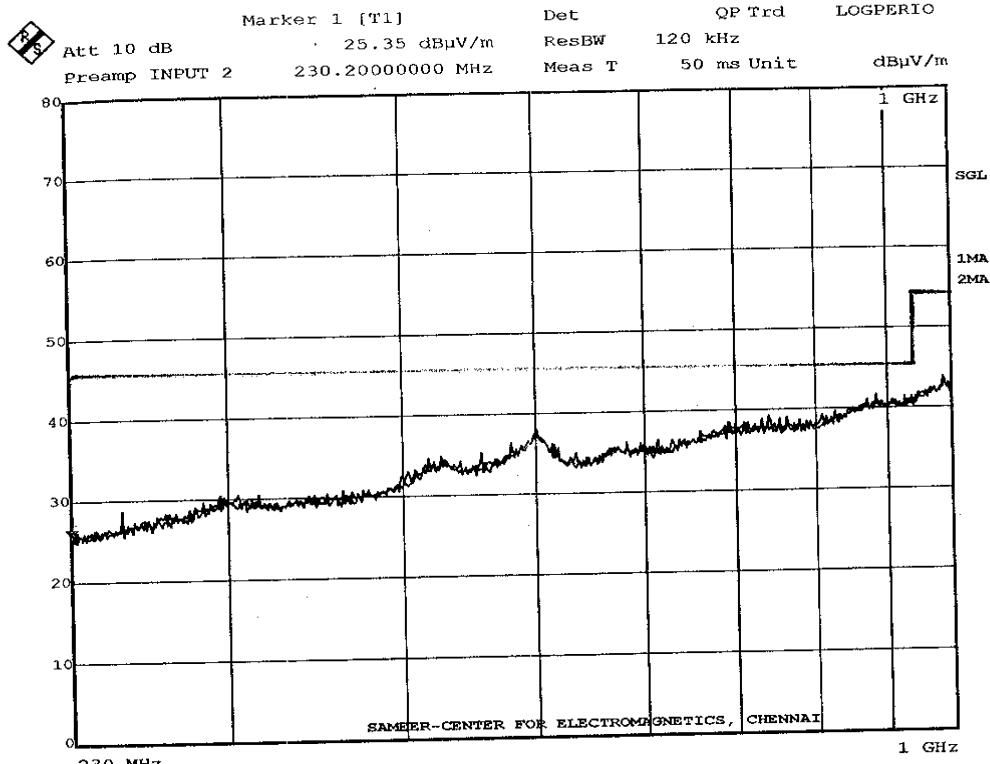
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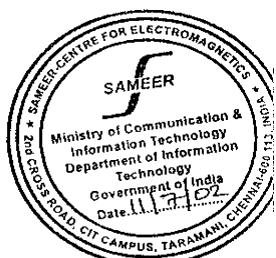
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Plot - 5

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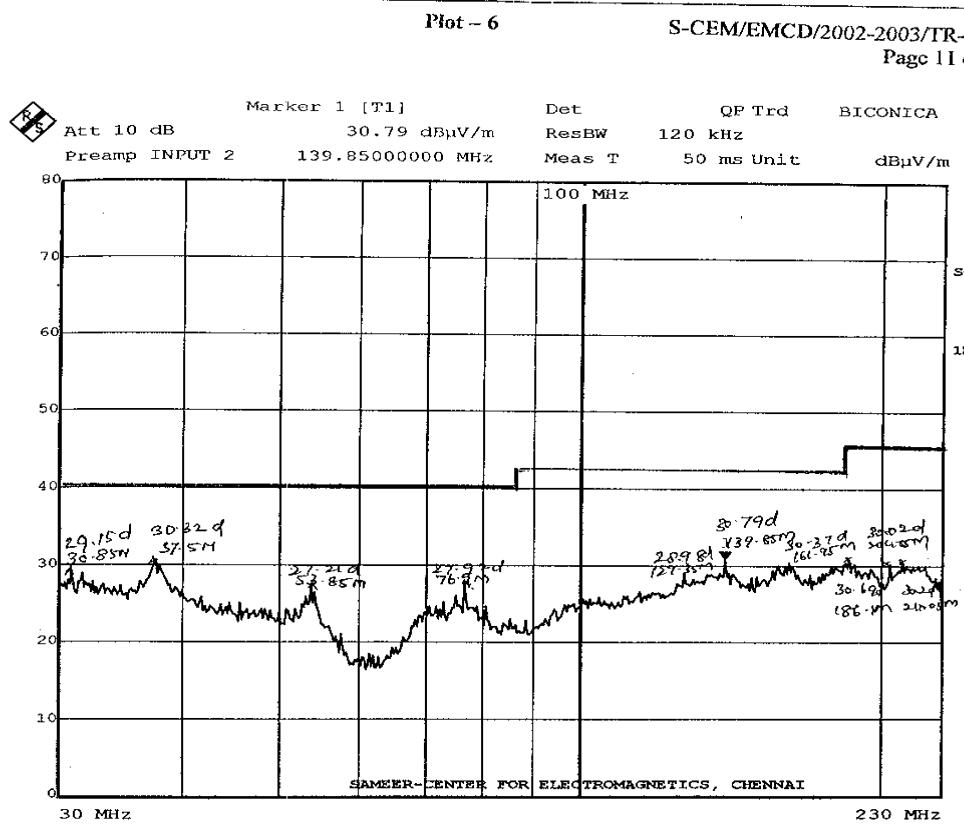
Title: RADIATED EMISSION MEASUREMENT
Comment B: AMBIENT MEASUREMENT WITH PC ON POL:MAGENTA:HOR BLUE:VER, HT:
1M
Date: 9.JUL.2002 11:34:39



Attachment 5

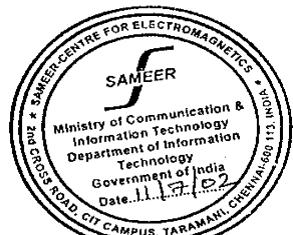
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Title: RADIATED EMISSION MEASUREMENT
Comment B: RE FROM 9PIN LINE SCAN CABLE; MODEL 200-100-01; SERIAL:13, H
OR POL, HT = 3M,
Date: 9.JUL.2002 09:38:02

HORIZONTAL POLARISATION.



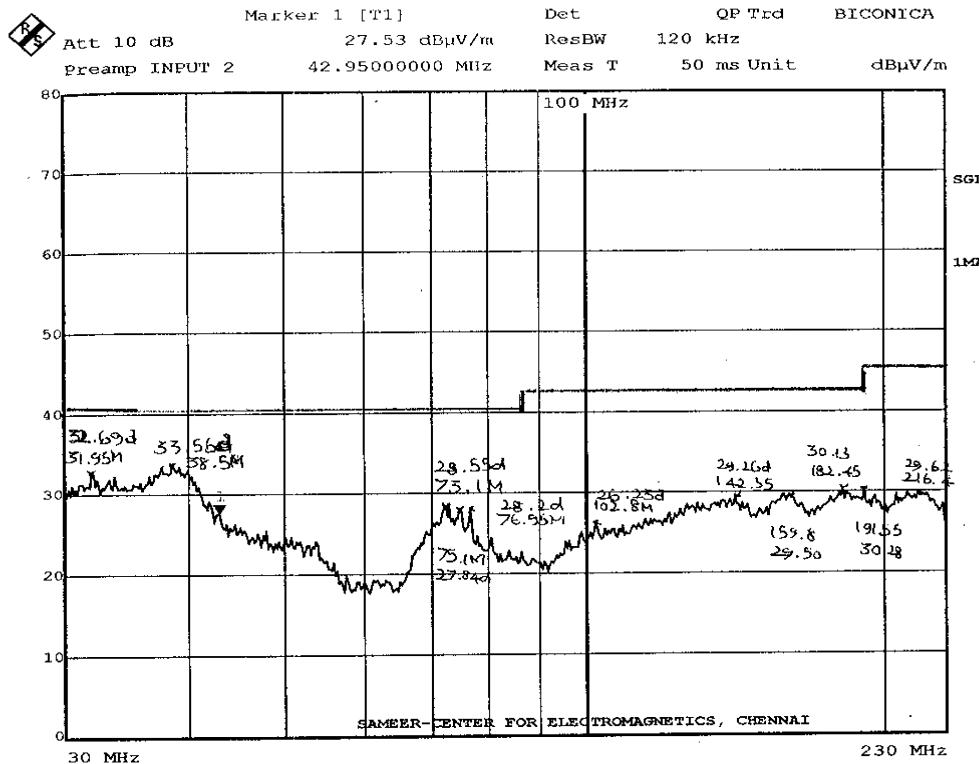
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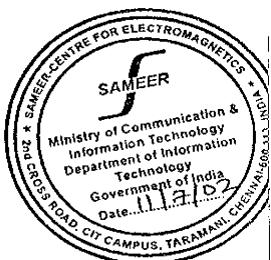
Plot - 7

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Title: RADIATED EMISSION MEASUREMENT
Comment B: RE FROM 9PIN LIFE SCAN CABLE; MODEL 200-100-01; SERIAL:13, V
ER POL, HT = 3M,
Date: 9.JUL.2002 09:26:42

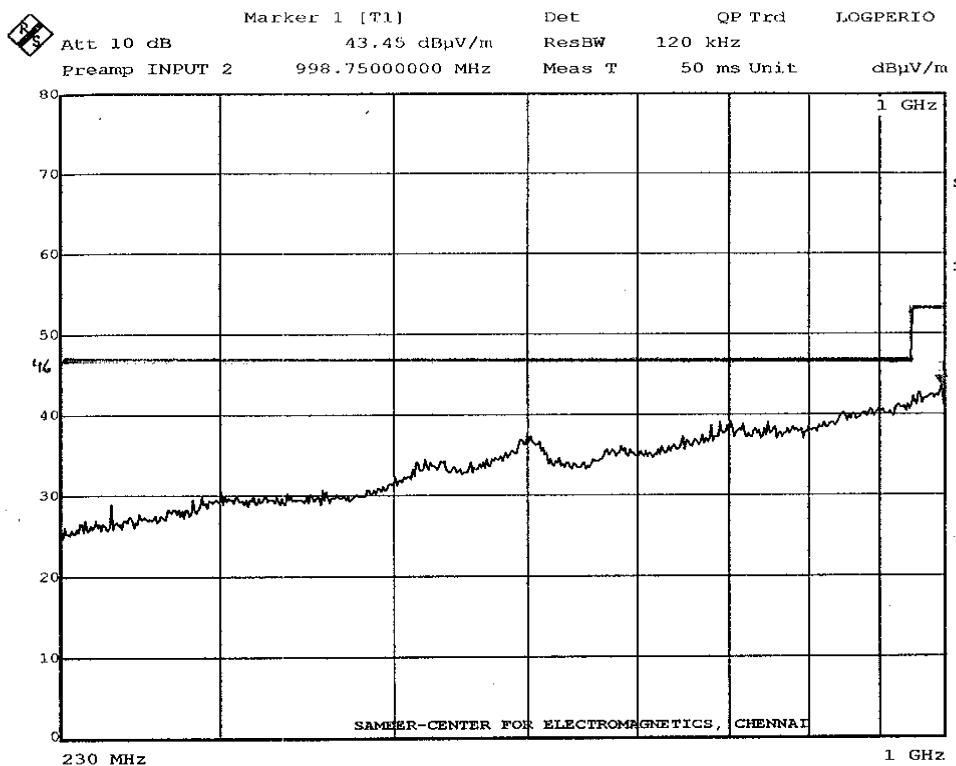
VERTICAL POLARISATION



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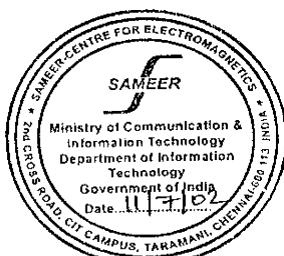
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Title: RADIATED EMISSION MEASUREMENT
Comment B: BUT:9 PIN LIFESCAN INTERFACE CABLE, MAKE:HCL, S/N:13, POL:VER
Date: 9.JUL.2002 12:08:31

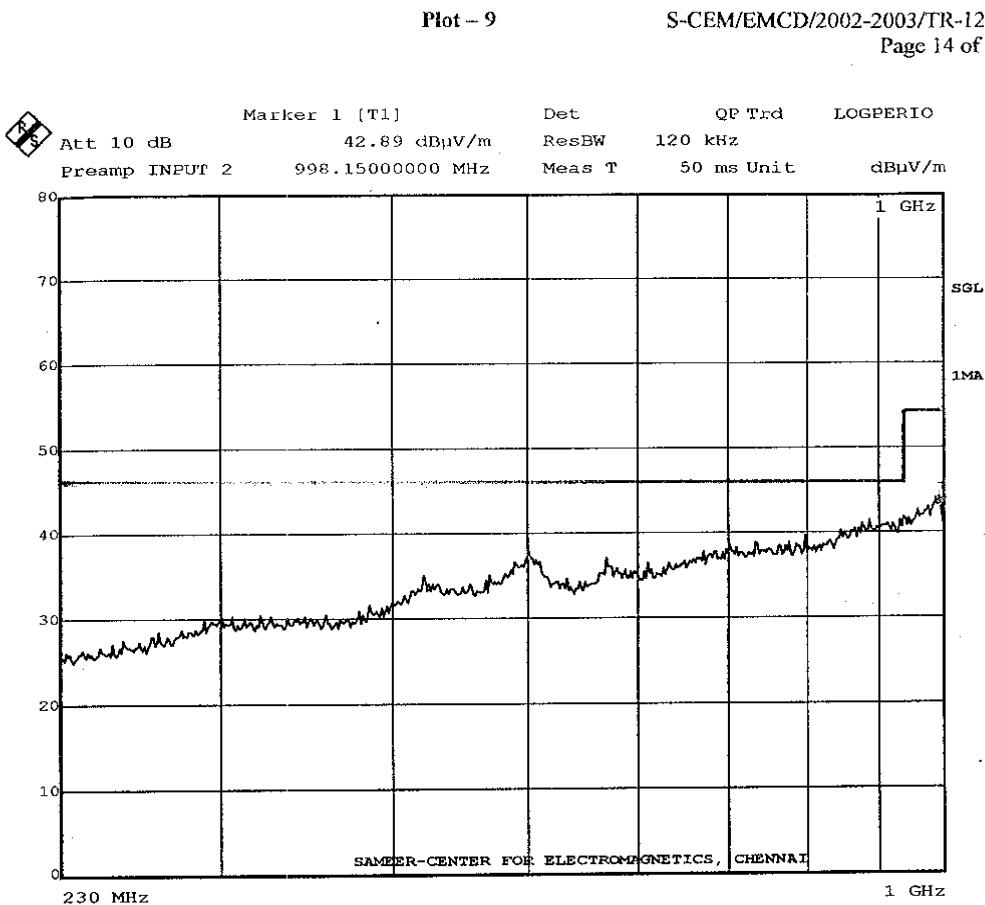
VERTICAL POLARISATION.



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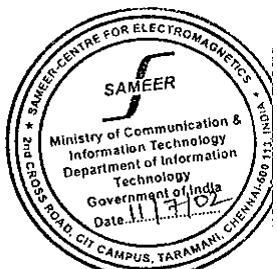
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Title: RADIATED EMISSION MEASUREMENT
Comment B: EUT:9 PIN LIFESCAN INTERFACE CABLE,MAKE:HCL,S/N:13,POL:HOR
Date: 9.JUL.2002 12:01:02

HORIZONTAL POLARISATION:



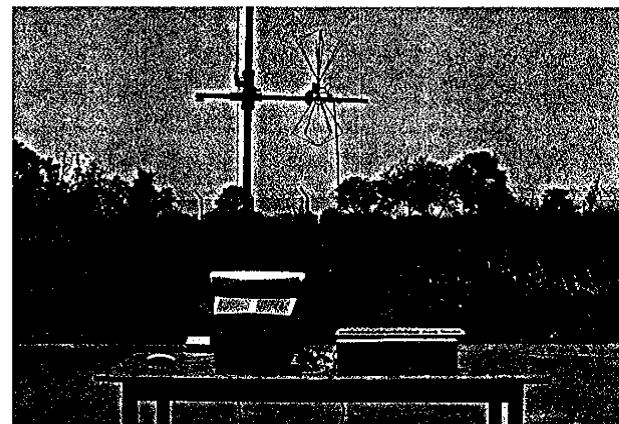
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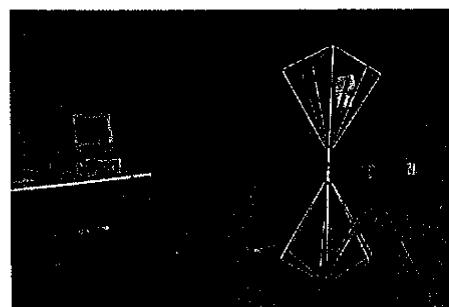
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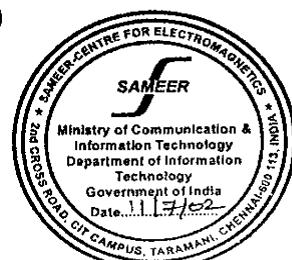
Annexure - III



Radiated Emission Test Setup (OATS)



Radiated Emission Test Setup (Chamber)



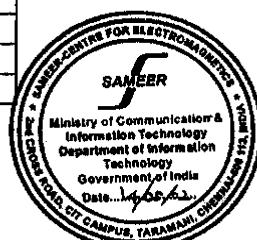
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Cable Loss

Frequency(MHz)	Cable Loss
30	0.4
40	0.52
50	0.58
60	0.61
70	0.67
80	0.75
90	0.75
100	0.84
200	1.25
300	1.66
400	2.03
500	2.10
600	2.14
700	2.19
800	2.54
900	2.74
1000	2.86



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Calibration Report		
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Calibration Report No: SCEM/EMCD/QAL/CR/2001/C11 11/3/2002		

Frequency In MHz	Antenna Factor		
	1m	3m	10m
200	12.00	15.62	17.05
225	12.23	15.35	16.83
250	13.05	13.54	14.93
275	14.45	16.59	18.82
300	16.12	18.34	19.84
325	15.28	17.57	19.05
350	16.16	16.56	18.74
375	15.86	17.94	20.12
400	17.48	16.26	17.65
425	19.64	18.40	20.53
450	19.00	19.04	20.44
475	20.60	20.84	23.04
500	22.28	20.15	21.88
525	19.69	18.88	21.28
550	19.51	20.08	21.71
575	20.95	22.25	23.81
600	19.98	21.64	23.30
625	20.30	20.82	22.69
650	21.42	21.26	22.80
675	22.08	22.42	24.57
700	22.02	23.22	25.34
725	22.37	23.03	24.80
750	22.21	22.98	24.84
775	22.10	21.72	24.02
800	21.53	22.08	25.30
825	22.30	23.44	25.59
850	22.97	24.94	27.26
875	23.75	25.05	28.92
900	23.68	22.22	24.33
925	23.29	25.37	27.15
950	24.38	25.19	26.78
975	25.25	25.73	27.10
1000	28.05	26.73	28.47



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Calibration Report

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Calibration Report No: SCEM/EMCD/CAL/CR/2004/C08

11/3/2002

Frequency in MHz	Antenna Factor		
	1m	3m	10m
20	12.51	18.07	20.50
30	13.26	17.01	19.59
40	12.93	14.15	16.06
50	10.32	11.19	13.67
60	11.39	3.34	8.01
70	11.32	9.45	11.27
80	9.68	9.13	11.67
90	10.01	8.55	10.59
100	12.22	11.14	14.23
110	12.57	11.99	14.58
120	15.19	13.16	15.62
130	14.13	14.67	16.83
140	15.36	15.56	17.46
150	18.09	14.04	15.97
160	14.33	16.01	18.44
170	15.77	13.65	17.03
180	15.04	15.85	18.32
190	15.18	15.95	17.91
200	18.22	14.30	16.93
210	17.41	16.72	19.74
220	17.01	17.01	19.16
230	17.00	13.99	17.40
240	16.37	15.30	18.04
250	19.68	15.55	17.85
260	18.68	16.90	19.81
270	18.82	16.62	19.95
280	20.55	18.30	21.12
290	20.18	19.09	21.42
300	21.27	20.31	22.10
310	24.76	20.03	21.84
320	26.19	22.26	24.39
330	24.73	23.55	25.04

