

TEST REPORT

of

FCC Part 15 Subpart B & C

Product : **Thermal Printer**

Model(s): **DuraLabel Pro 200; DuraLabel Pro 300;
TT024-50HR Pro ; TT024-60HR Pro**

Applicant: **TSC Auto ID Technology Co.,Ltd.**

Address: **No.35, Sec.2, Ligong 1st Rd., Wujie Town,
I-Lan Hsien 268, Taiwan**

Test Performed by:

International Standards Laboratory

<Lung-Tan LAB>

*Site Registration No.

BSMI: SL2-IN-E-0013; TAF: 0997; NVLAP: 200234-0; IC: IC4164-1 ;
VCCI: R-1435, C-1440, T-299, R-2598, C-2845; NEMKO: ELA 113B

*Address:

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Lung-Tan Hsiang, Tao Yuan County 325, Taiwan
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Report No.: **ISL-07LR032FC**

Issue Date : **2007/12/11**

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1. General

1.1 Certification of Accuracy of Test Data

Standards: CFR 47 Part 15 Subpart B Class B
CFR 47 Part 15 Subpart C (Section 15.225)

Test Procedure: ANSI C63.4:2003

Equipment Tested: Thermal Printer

Model: DuraLabel Pro 200; DuraLabel Pro 300;
TT024-50HR Pro ; TT024-60HR Pro

Applied by: TSC Auto ID Technology Co.,Ltd.

Sample received Date: 2007/11/02

Final test Date : 2007/11/06-2007/11/09

Test Result PASS

Test Site: Chamber 12, Conduction 03

Temperature Refer to each site test data

Humidity: Refer to each site test data

Test Engineer:

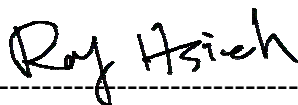


Leo JL Lin/Engineer

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Approve & Signature



Roy Hsieh / Manager

Test results given in this report apply only to the specific sample(s) tested under stated test conditions.

This report shall not be reproduced other than in full without the explicit written consent of ISL.

This report totally contains 36 pages, including 1 cover page, 1 contents page, and 34 pages for the test description.

This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

This test data shown below is traceable to NIST or national or international standard.

International Standards Laboratory certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

1.2 Test Results Summary

The RFID functions of EUT has been tested according to the FCC regulations listed below:

Tested Standards: 47 CFR Part 15 Subpart C			
Standard Section	Test Type	Result	Remarks
15.207	AC Power Line Emissions	Pass	
15.225(a)(b)(c)	Peak Output Power	Pass	
15.225(d)	Radiated Emissions	Pass	
15.225(d)	Band Edge Measurement	Pass	
15.225(e)	Frequency Stability	Pass	

2. Description of Equipment Under Test (EUT)

Description:	Thermal Printer
Model No.:	DuraLabel Pro 200; DuraLabel Pro 300; TT024-50HR Pro ; TT024-60HR Pro
Frequency Range:	13.56 MHz
Support channel:	1 Channel
Modulation Skill:	FSK
Antennas Type:	Loop
Antenna Connected:	Soldered on PCB.
Working Voltage:	120V/60Hz

The channel and the operation frequency is listed below:

Channel	Frequency(MHz)
01	13.56

Adapter Type:	Auto Switching AC Adapter 100-240V,2.5A 50-60Hz EDAC (Model: EA10953)
DC-In:	one
USB2.0 Connector:	four 4-pin
Parallel Port:	one 25-pin
Serial Port:	two 9-pin
Power Cord:	Non-shielded, Detachable

1. This device is a printer and includes a 13.56MHz RFID.
2. This device is one channel and perform the test, then record on this report.
3. The antenna of EUT is solder on PCB and conform to FCC 15.203.
4. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.227.

This device is Thermal Printer included 13.56MHz RFID modular, The RFID is detect tag and determine use correct model of roller in printer, the tag is combined with roller of printer. This device only one channel and operation in 13.56MHz with FSK modulation. Another information please refer to users manual.

3. Description of Support Equipment

Support Unit 1:

Description:	IBM Notebook Personal Computer
Model:	2371
Serial Number:	N/A
Power Supply Type:	Switching AC Adapte 56W Lite-On (Model: 02K6809) 3 pins
CPU Type:	Intel Pentium-M 1.2 GHz
Hard Disk Device:	Hitachi 20GB (Model: HTC424020F7AT00)
DDR: 256MB	Infineon (Model: HYB25D256160BT-6)
BT/MODEM card:	Actiontec (Model: BMDC200)
Wireless card: WW)	Phillips (Model: WLAN 802.11ABG 930700811107)
DC-In:	one
VGA Port:	one
USB2.0 Connector:	two
LAN Connector:	one
Modem Port:	one
PCIMCIA Connector:	one
SD Connector	one
Docking Connector:	one
Battery:	Sanyo 4 cell (Model: 92P0999)
Power Cord:	Shielded 3 PIN, 2 PIN
LCD:	Samsung 12.1" XGA TFT (Model: LTN121XA-L01)
Maximum display Resolution:	1024X768 Non-interlaced

Support Unit 2:

Description:	Mouse
Brand:	DELL
Model Number::	MO56UC
Serial Number::	N/A
FCC ID:	(Complied with FCC DOC)

3.1.1 Software for Controlling Support Unit

Test programs exercising various part of EUT were used. The programs were executed as follows:

- A. Read and write to the disk drives.
- B. Send H pattern continuously from PC to EUT
- C. Repeat the above steps.

	Filename	Issued Date
Send H pattern	245_H_LPT1.bat	2007/11/07

3.1.2 I/O Cable Condition of EUT and Support Units

Description	Path	Cable Length	Cable Type	Connector Type
AC Power Cord	110V (~240V) to AC Power Cord Inlet (3-pin)	1.8M	Nonshielded, Detachable	Plastic Head
USB data cable	USB Mouse to PC USB port	1.8M	Shielded, Undetachable	Metal Head
USB data cable	EUT to PC USB port	1.8M	Shielded, Undetachable	Metal Head
RS232 Data Cable	EUT to PC Serial Port:	1.5M	Shielded, Detachable	Metal Head
Printer Data Cable	EUT to PC Parallel Port	1.8M	Shielded, Detachable	Metal Head

4. TEST RESULTS

4.1 Powerline Conducted Emissions [Section 15.207]

4.1.1 EUT Configuration

The EUT was set up on the non-conductive table that is 1.0 by 1.5 meter, 80cm above ground. The wall of the shielded room was located 40cm to the rear of the EUT.

Power to the EUT was provided through the LISN. The impedance vs. frequency characteristic of the LISN is complied with the limit used.

Both lines (neutral and hot) were connected to the LISN in series at testing. A coaxial-type connector which provides one 50 ohms terminating impedance was provided for connecting the test instrument. The excess length of the power cord was folded back and forth at the center of the lead so as to form a bundle not exceeding 40cm in length.

Any changes made to the configuration, or modifications made to the EUT, during testing are noted in the following test record.

If the EUT is a Personal Computer or a peripheral of personal computer, and the personal computer has an auxiliary AC outlet which can be used for providing power to an external monitor, then all measurements will be made with the monitor power from first the computer-mounted AC outlet and then a floor-mounted AC outlet.

4.1.2 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. The main power line conducted EMI tests were run on the hot and neutral conductors of the power cord and the results were recorded. The effect of varying the position of the interface cables has been investigated to find the configuration that produces maximum emission.

At the frequencies where the peak values of the emissions were higher than 6dB below the applicable limits, the emissions were also measured with the quasi-peak detectors. At the frequencies where the quasi-peak values of the emissions were higher than 6dB below the applicable average limits, the emissions were also measured with the average detectors.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

Powerline Conducted Emissions Test Mode:

1. Transmitter with antenna
2. Transmitter with 50ohm dummy load.

4.1.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range	150 KHz--30MHz
Detector Function	Quasi-Peak/Average
Bandwidth (RBW)	9KHz

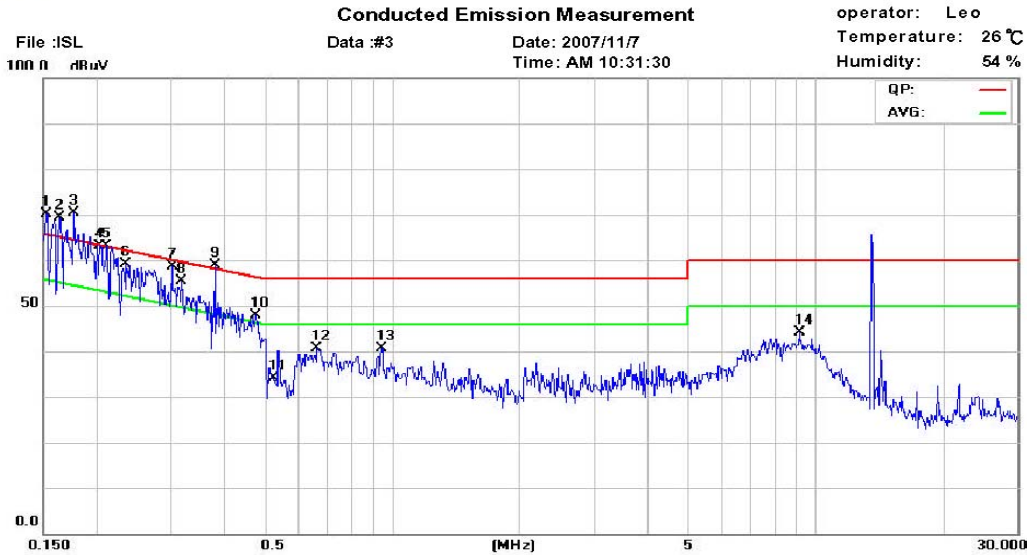
4.1.4 Test Data:

Mode 1: Transmitter with antenna

Power Line Conducted Emissions (Hot)



Address: No.120, Lane 180, San Ho Tsuen, Hsin Ho Road, Lung-Tan Hsiang,
Tao Yuan Conty, Taiwan R.O.C.
Tel: 03-4071718



Site: Conduction 03 Phase: **L1**
Limit: CISPR22 Class B Conduction(QP) Power: AC 120V/60Hz
Company: Witness:
EUT Model: TTP-343HR
Execute Program:
Note:

Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
* 0.1512	1.79	0.02	60.67	65.9	-5.26	40.46	55.9	-15.4	
0.1633	1.64	0.03	56.40	65.2	-8.89	31.36	55.2	-23.9	
0.1762	1.49	0.03	57.43	64.6	-7.23	36.93	54.6	-17.7	
0.2031	1.18	0.05	50.33	63.4	-13.1	31.95	53.4	-21.5	
0.2114	1.14	0.05	48.76	63.1	-14.3	22.71	53.1	-30.4	
0.2371	1.01	0.07	46.78	62.2	-15.4	21.26	52.2	-30.9	
0.3041	0.69	0.1	39.46	60.1	-20.6	19.16	50.1	-30.9	
0.3162	0.67	0.1	39.91	59.8	-19.9	18.57	49.8	-31.2	
0.3837	0.53	0.09	36.47	58.2	-21.7	17.37	48.2	-30.8	
0.4720	0.43	0.07	31.18	56.4	-25.3	16.54	46.4	-29.9	
0.5292	0.39	0.07	34.82	56.0	-21.1	27.61	46.0	-18.3	
0.6610	0.37	0.07	33.12	56.0	-22.8	25.98	46.0	-20.0	
0.9320	0.33	0.07	36.33	56.0	-19.6	21.65	46.0	-24.3	
9.1577	0.21	0.2	31.47	60.0	-28.5	22.63	50.0	-27.3	

*:Maximum data x:Over limit

Power Line Conducted Emissions (Neutral)



Address: No. 120, Lane 180, San Ho Tsuen, Hsin Ho Road, Lung-Tan Hsiang,
Tao Yuan Conty, Taiwan R.O.C.
Tel: 03-4071718

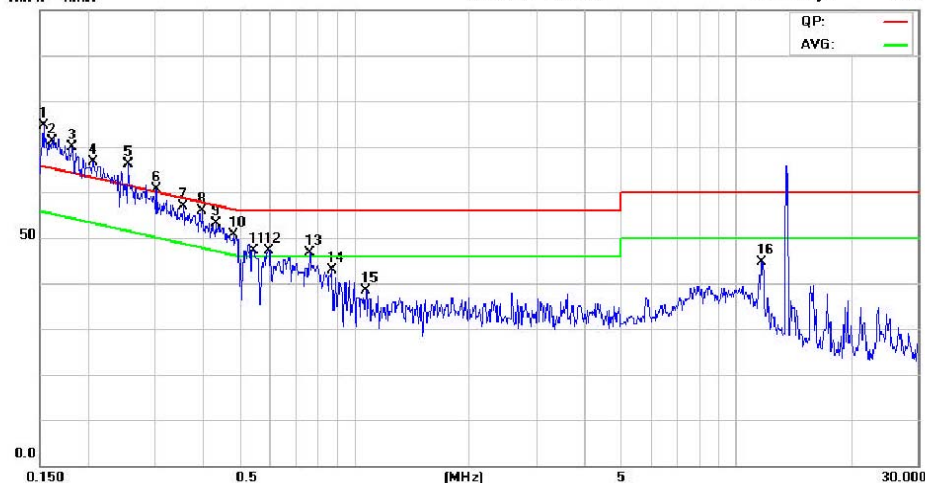
Conducted Emission Measurement

File : ISL
1000 n dBuV

Data #1

Date: 2007/11/7
Time: AM 10:18:04

operator: Leo
Temperature: 26 °C
Humidity: 54 %



Site: Conduction 03

Phase: N

Limit: CISPR22 Class B Conduction(QP)

Power: AC 120V/60Hz

Company:

Witness:

EUT Model: TTP-343HR

Execute Program:

Note:

Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
* 0.1528	1.47	0.02	62.70	65.8	-3.15	38.64	55.8	-17.2	
0.1607	1.39	0.03	61.11	65.4	-4.32	35.03	55.4	-20.4	
0.1825	1.18	0.04	55.96	64.3	-8.41	31.74	54.3	-22.6	
0.2060	0.97	0.05	53.97	63.3	-9.40	31.95	53.3	-21.4	
0.2545	0.78	0.08	50.98	61.6	-10.6	26.09	51.6	-25.5	
0.3030	0.59	0.1	45.56	60.1	-14.6	27.05	50.1	-23.1	
0.3527	0.49	0.09	42.80	58.9	-16.1	24.23	48.9	-24.6	
0.3980	0.4	0.09	42.28	57.9	-15.6	30.99	47.9	-16.9	
0.4277	0.39	0.08	40.30	57.3	-17.0	21.27	47.3	-26.0	
0.4774	0.38	0.07	37.49	56.3	-18.8	18.24	46.3	-28.1	
0.5416	0.38	0.07	36.84	56.0	-19.1	17.38	46.0	-28.6	
0.6025	0.37	0.07	35.79	56.0	-20.2	19.40	46.0	-26.6	
0.7671	0.35	0.07	29.85	56.0	-26.1	13.71	46.0	-32.2	
0.8707	0.34	0.07	30.60	56.0	-25.4	15.56	46.0	-30.4	
1.0585	0.28	0.07	28.99	56.0	-27.0	20.52	46.0	-25.4	

*:Maximum data x:Over limit

Site: Conduction 03	Phase: <i>N</i>
Limit: CISPR22 Class B Conduction(QP)	Power: AC 120V/60Hz
Company:	Witness:
EUT Model: TTP-343HR	
Execute Program:	
Note:	

Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
11.6773	0.25	0.24	36.06	60.0	-23.9	26.93	50.0	-23.0	

*.Maximum data x:Over limit

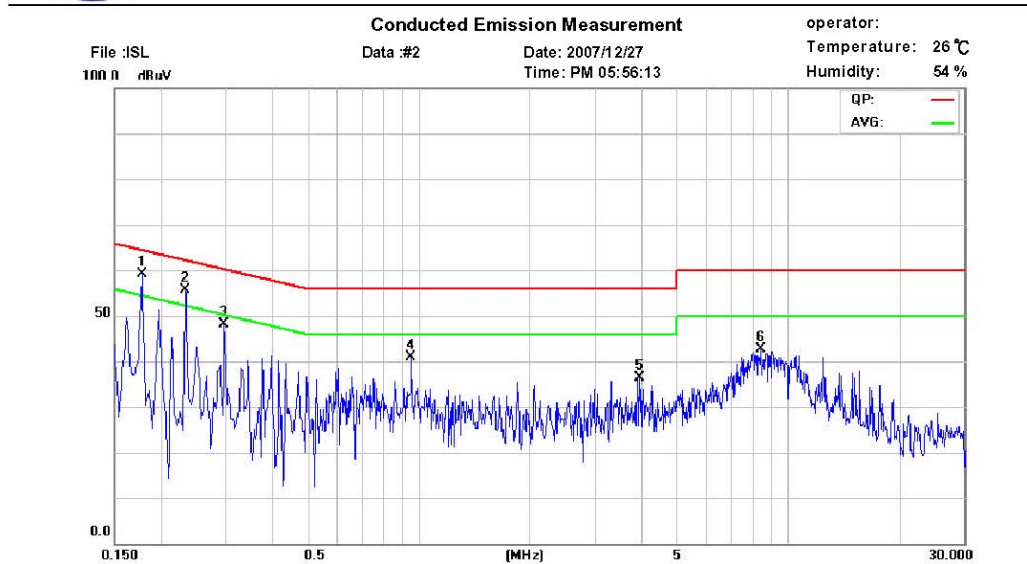
* NOTE: Margin = Amplitude + Insertion Loss- Limit
 A margin of -8dB means that the emission is 8dB below the limit

Mode 2: Transmitter with a dummy load

Power Line Conducted Emissions (Hot)



Address: No.120, Lane 180, San Ho Tsuen, Hsin Ho Road, Lung-Tan Hsiang,
Tao Yuan Conty, Taiwan R.O.C.
Tel: 03-4071718



Site: Conduction 03 Phase: L1
 Limit: CISPR22 Class B Conduction(QP) Power: AC 120V/60Hz
 Company: Witness:
 EUT Model: TTP-343HR
 Execute Program:
 Note:

Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
* 0.1780	1.46	0.03	54.81	64.5	-9.77	28.65	54.5	-25.9	
0.2340	1.03	0.06	48.32	62.3	-13.9	23.30	52.3	-29.0	
0.2980	0.71	0.1	43.20	60.3	-17.1	20.37	50.3	-29.9	
0.9540	0.33	0.07	30.87	56.0	-25.1	18.77	46.0	-27.2	
3.9820	0.21	0.14	29.16	56.0	-26.8	20.56	46.0	-25.4	
8.4180	0.21	0.19	39.79	60.0	-20.2	34.61	50.0	-15.3	

*:Maximum data x:Over limit

Power Line Conducted Emissions (Neutral)



Address: No.120, Lane 180, San Ho Tsuen, Hsin Ho Road, Lung-Tan Hsiang,
Tao Yuan Conty, Taiwan R.O.C.
Tel: 03-4071718

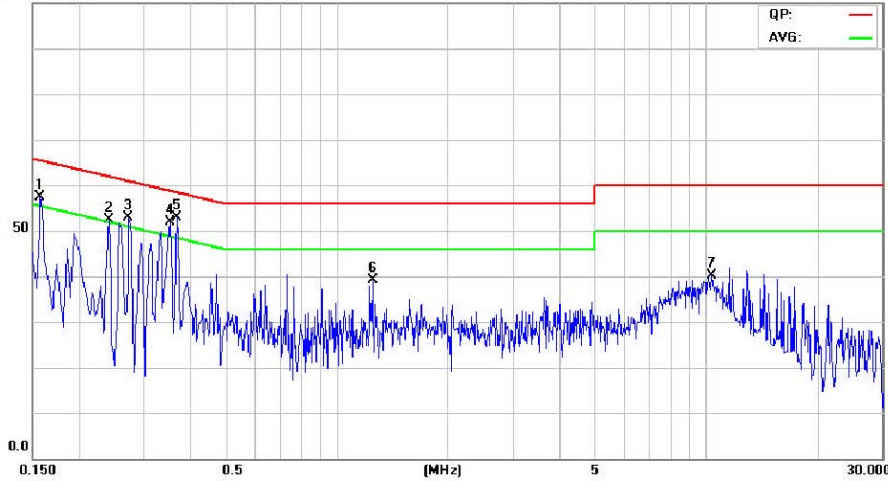
Conducted Emission Measurement

File : ISL
1000 Hz dBuV

Data : #3

Date: 2007/12/27
Time: PM 06:03:12

operator:
Temperature: 26 °C
Humidity: 54 %



Site: Conduction 03

Phase: N

Limit: CISPR22 Class B Conduction(QP)

Power: AC 120V/60Hz

Company:

Witness:

EUT Model: TTP-343HR

Execute Program:

Note:

Frequency MHz	LISN Loss dB	Cable Loss dB	QP Correct. dBuV	QP Limit dBuV	QP Margin dB	AVG Correct. dBuV	AVG Limit dBuV	AVG Margin dB	Note
* 0.1580	1.42	0.02	57.85	65.5	-7.72	32.46	55.5	-23.1	
0.2420	0.83	0.07	48.89	62.0	-13.1	25.60	52.0	-26.4	
0.2740	0.7	0.09	46.89	61.0	-14.1	25.31	51.0	-25.6	
0.3540	0.49	0.09	42.11	58.8	-16.7	23.73	48.8	-25.1	
0.3700	0.46	0.09	40.87	58.5	-17.6	23.18	48.5	-25.3	
1.2500	0.26	0.08	28.42	56.0	-27.5	17.20	46.0	-28.8	
10.3460	0.23	0.22	27.87	60.0	-32.1	20.52	50.0	-29.4	

*:Maximum data x:Over limit

* NOTE: Margin = Amplitude + Insertion Loss- Limit
A margin of -8dB means that the emission is 8dB below the limit

4.2 Radiated Emission Measurement [Section [15.225(a)(b)(c)(d)]]

4.2.1 EUT Configuration

The equipment under test was set up on the 10 meter chamber with measurement distance of 3 and 10 meters. The EUT was placed on a non-conductive table 80cm above ground. Any changes made to the configuration, or modifications made to the EUT, during testing are noted in the following test record.

4.2.2 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. We found the maximum readings by varying the height of antenna and then rotating the turntable. Both polarization of antenna, horizontal and vertical, are measured.

30M to 1GHz: The highest emissions between 30 MHz to 1000 MHz were also analyzed in details by operating the spectrum analyzer and/or EMI receiver in quasi-peak mode to determine the precise amplitude of the emissions. While doing so, the interconnecting cables and major parts of the system were moved around, the antenna height was varied between one and four meters, its polarization was varied between vertical and horizontal, and the turntable was slowly rotated, to maximize the emission.

For the test of 2nd to 10th harmonics frequencies, the equipment setup was also refer to EMI Receiver/Spectrum Analyzer Configuration. The frequencies were tested using Peak mode first, if the test data is higher than the emissions limit, an additional measurement using Average mode will be performed and the average reading will be compared to the limit and record in test report.

4.2.3 EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

RADIATED OF FUNDAMENTAL EMISSION

Frequency Range Tested:	13.56MHz
Detector Function:	Peak Mode
Resolution Bandwidth (RBW):	10KHz
Video Bandwidth (VBW)	100KHz
Measurement distance	3m and 10m

BAND EDGE

Frequency Range Tested:	13.11 MHz ~14.01MHz
Detector Function:	Peak Mode
Resolution Bandwidth (RBW):	10KHz
Video Bandwidth (VBW)	100KHz
Measurement distance	3m and 10m

RADIATED OF SPURIOUS EMISSION

Frequency Range Tested:	9KHz~30MHz
Detector Function:	Peak Mode
Resolution Bandwidth (RBW):	10KHz
Video Bandwidth (VBW)	100KHz
Measurement distance	3m and 10m
Frequency Range Tested:	30MHz~1000MHz
Detector Function:	Quasi-Peak Mode
Resolution Bandwidth (RBW):	120KHz
Video Bandwidth (VBW)	360KHz
Measurement distance	10m

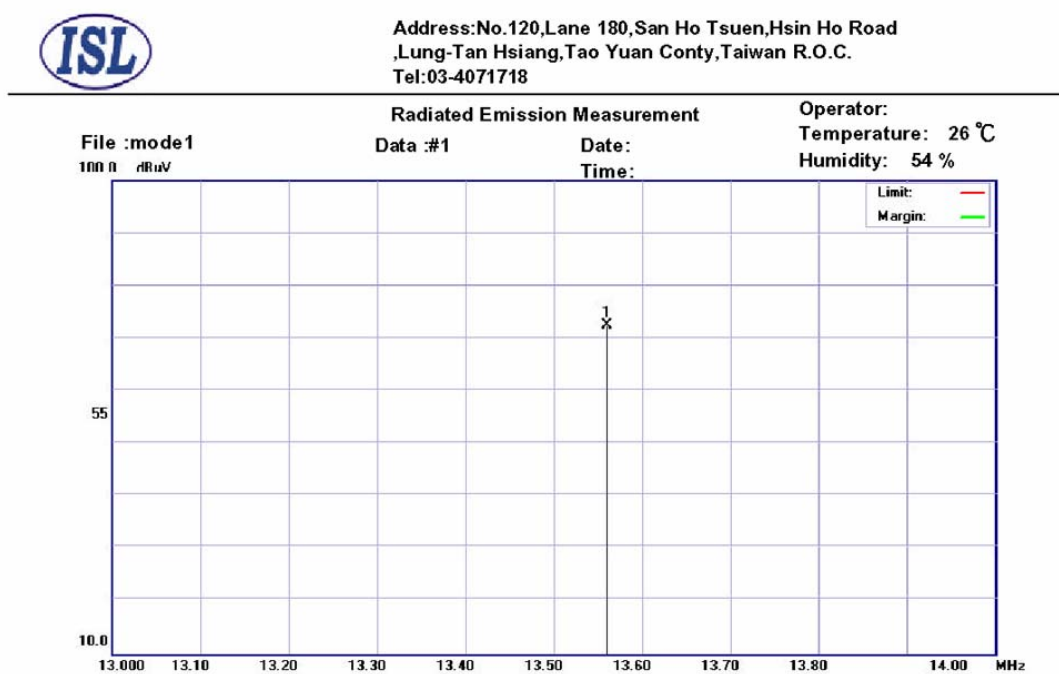
4.2.4 Radiated Emission Limit

FCC 15.225 Fundamental Emission Limits

Frequency MHz	Distance Meter	Field Strength of Fundamental	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
13.110 – 13.410	30	106	40.5
13.410 – 13.553	30	334	50.4
13.553 – 13.567	30	15848	84
13.567 – 13.710	30	334	50.4
13.710 – 14.010	30	106	40.5

Note: RF Voltage ($\text{dB}\mu\text{V/m}$) = 20 log RF Voltage ($\mu\text{V/m}$)

4.2.5 Test Data (Radiated of Fundamental Emission)



Radiated of Fundamental Emission

Temp. (° C): 23

Test Engr: Leo JL Lin

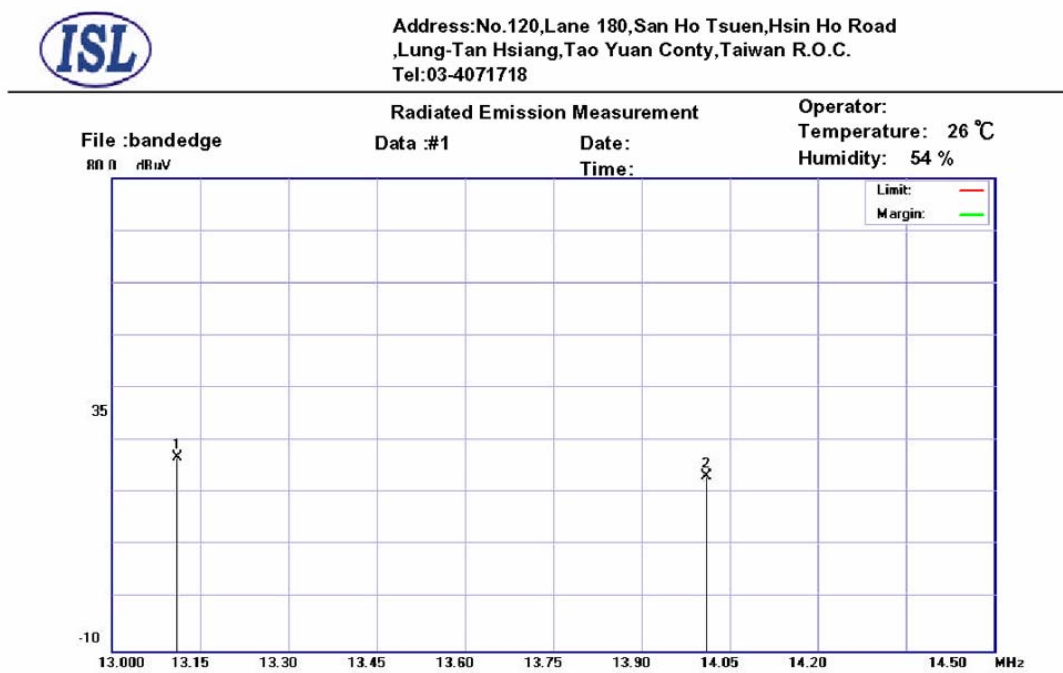
Humidity (%): 49

Frequency [MHz]	Reading Level [dBuV]	Correction Factor [dB/m]	Emission Level [dBuV/m]
13.56	63.2	9.32	72.52

Converted to 30m

Frequency [MHz]	Emission Level [dBuV/m]@3m	Emission Level [dBuV/m] @30m	Limit[dBuV/m]	Margin[dB]
13.56	72.52	32.52	84	-51.48

4.2.6 Test Data(Band Edge measurement)



Band Edge measurement

Temp. (° C): 24

Test Engr: Leo JL Lin

Humidity (%): 49

Frequency [MHz]	Reading Level [dBuV]	Correction Factor [dB/m]	Emission Level [dBuV/m]
13.11	17.43*	9.32	26.75
14.01	16.66*	6.47	23.13

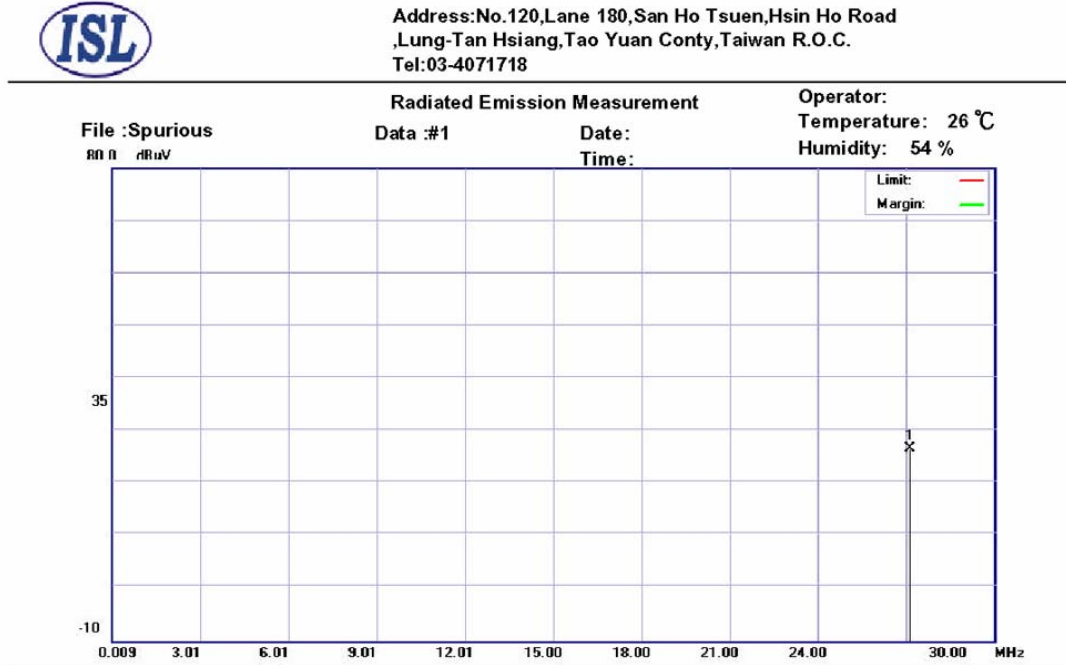
Note: “*” The value is detect on the Spectrum noise level.

Converted to 30m

Frequency [MHz]	Emission Level [dBuV/m]@3m	Emission Level [dBuV/m] @30m	Limit[dBuV/m]	Margin[dB]
13.11	26.75	-13.25	29.5	-42.75
14.01	23.13	-17.87	29.5	-46.37

4.2.7 Test Data (RADIATED OF SPURIOUS EMISSION)(9KHz – 1GHz):

9KHz - 30MHz Open Field Radiated Emissions



Test Engr:

Leo JL Lin

Temp. (° C):

24

Humidity (%):

49

3m			
Frequency [MHz]	Reading Level [dBuV]	Correction Factor [dB/m]	Emission Level [dBuV/m]
27.12	16.48*	10.09	26.57

Note: "*" The value is detect on the Spectrum noise level.

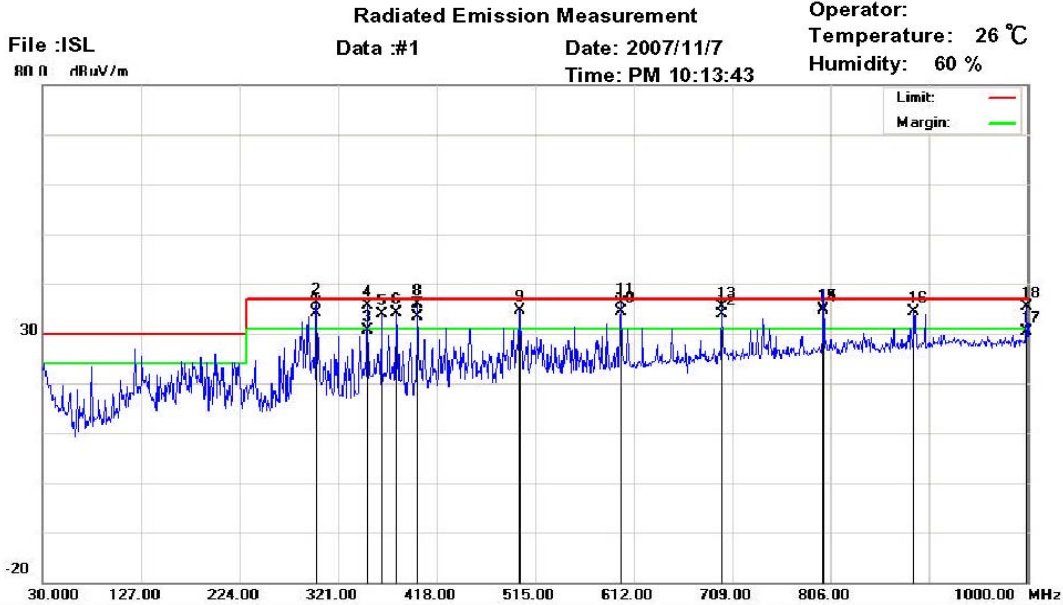
Converted to 30m

Frequency [MHz]	Emission Level [dBuV/m]@3m	Emission Level [dBuV/m] @30m	Limit[dBuV/m]	Margin[dB]
27.12	26.57	-13.43	29.5	-42.93

30M – 1GHz Open Field Radiated Emissions (Horizontal)



Address: No.120, Lane 180, San Ho Tsuen, Hsin Ho Road
Lung-Tan Hsiang, Tao Yuan Conty, Taiwan R.O.C.
Tel: 03-4071718



Site : Chamber 02 Polarization: *Horizontal*
 Condition : CISPR22 ClassB 10m Radiation Power : AC 120V/60Hz
 Company : Witness : 10M
 EUT Model: TTP-343HR
 Execute Program :
 Note :

Mk.	Frequency (MHz)	RX_R (dBuV/m)	Ant_F (dB)	Cab_L (dB)	PreAmp (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
!	299.4685	20.75	10.83	2.54	0	34.12	37.00	-2.88	370	143	QP
*	299.6600	22.86	10.84	2.54	0	36.24	37.00	-0.76			peak
	349.4380	15.62	12.25	2.75	0	30.62	37.00	-6.38	370	338	QP
!	350.1000	20.63	12.27	2.75	0	35.65	37.00	-1.35			peak
!	363.6800	18.58	12.63	2.79	0	34.00	37.00	-3.00			peak
!	378.2300	18.21	12.99	2.83	0	34.03	37.00	-2.97			peak
!	399.3430	17.08	13.41	2.89	0	33.38	37.00	-3.62	323	200	QP
!	399.5700	19.48	13.41	2.89	0	35.78	37.00	-1.22			peak
!	499.4800	15.92	15.45	3.25	0	34.62	37.00	-2.38			peak
!	599.0460	14.01	16.95	3.41	0	34.37	37.00	-2.63	121	325	QP
!	599.3900	15.69	16.96	3.41	0	36.06	37.00	-0.94			peak
!	698.8700	11.89	18.4	3.7	0	33.99	37.00	-3.01	100	256	QP
!	699.3000	13.19	18.4	3.7	0	35.29	37.00	-1.71			peak
!	798.6730	11.23	19.45	3.89	0	34.57	37.00	-2.43	100	135	QP
!	799.2100	11.58	19.46	3.9	0	34.94	37.00	-2.06			peak
!	888.4500	9.87	20.51	4.12	0	34.50	37.00	-2.50			peak

*:Maximum data x:Over limit !:over margin

Site : Chamber 02

Condition : CISPR22 ClassB 10m Radiation

Polarization: *Horizontal*

Company :

Power : AC 120V/60Hz

EUT Model: TTP-343HR

Witness: 10M

Execute Program :

Note :

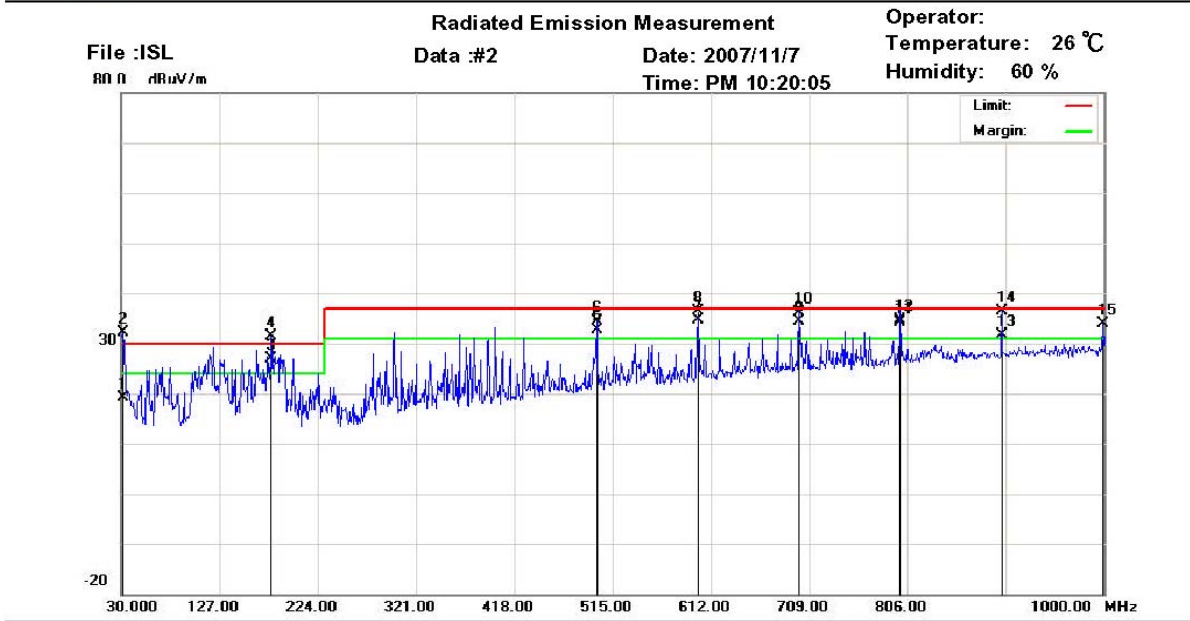
Mk.	Frequency (MHz)	RX_R (dBuV/m)	Ant_F (dB)	Cab_L (dB)	PreAmp (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
	998.3140	4.66	21.36	4.34	0	30.36	37.00	-6.64	156	83	QP
!	999.0300	9.55	21.37	4.34	0	35.26	37.00	-1.74			peak

*:Maximum data x:Over limit !:over margin

30MHz~ 1 GHz (Vertical)



Address: No.120, Lane 180, San Ho Tsuen, Hsin Ho Road
, Lung-Tan Hsiang, Tao Yuan Conty, Taiwan R.O.C.
Tel: 03-4071718



Site : Chamber 02 Polarization: **Vertical**
Condition : CISPR22 ClassB 10m Radiation Power : AC 120V/60Hz
Company : Witness:
EUT Model: TTP-343HR
Execute Program :
Note :

Mk.	Frequency (MHz)	RX_R (dBuV/m)	Ant_F (dB)	Cab_L (dB)	PreAmp (dB)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
	31.8960	0.31	18.05	0.89	0	19.25	30.00	-10.75	100	133	QP
*	31.9400	13.11	18.03	0.89	0	32.03	30.00	2.03			peak
!	178.2620	16.83	8.1	1.95	0	26.88	30.00	-3.12	100	133	QP
X	178.4100	21.44	8.1	1.95	0	31.49	30.00	1.49			peak
!	499.2170	13.95	15.45	3.25	0	32.65	37.00	-4.35	100	214	QP
!	499.4800	15.74	15.45	3.25	0	34.44	37.00	-2.56			peak
!	598.9860	14.29	16.95	3.41	0	34.65	37.00	-2.35	213	336	QP
!	599.3900	15.91	16.96	3.41	0	36.28	37.00	-0.72			peak
!	698.8130	12.41	18.39	3.7	0	34.50	37.00	-2.50	264	142	QP
!	699.3000	14.06	18.4	3.7	0	36.16	37.00	-0.84			peak
!	798.6370	10.85	19.45	3.89	0	34.19	37.00	-2.81	315	182	QP
!	799.2100	11.32	19.46	3.9	0	34.68	37.00	-2.32			peak
!	898.5250	6.82	20.67	4.15	0	31.64	37.00	-5.36	146	226	QP
!	899.1200	11.61	20.68	4.15	0	36.44	37.00	-0.56			peak
!	999.0300	8.17	21.37	4.34	0	33.88	37.00	-3.12			peak

*:Maximum data x:Over limit !:over margin

4.3 Frequency Stability Measurement

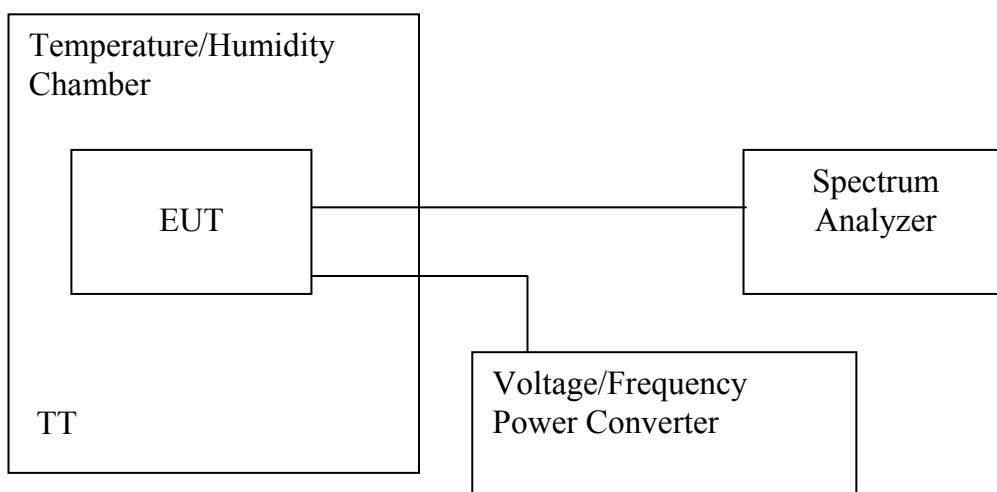
7.1.1. Limits of Frequency Stability Measurement

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20°C to $+50^{\circ}\text{C}$ at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20°C . For battery operated equipment, the equipment tests shall be performed using a new battery. The emission limit is based on measurement instrumentation employing an average detector.

7.1.2. Test Procedure

1. The EUT was placed in the Temperature/Humidity Chamber and powered by a Voltage/Frequency Power converter.
2. Connect the RF output of EUT to Spectrum.
3. Set the temperature of chamber to 20°C .
4. While maintaining a constant temperature inside the Temperature/Humidity Chamber, turn the EUT on and record the operating frequency at startup and two, five, and ten minutes after the EUT is energized.
5. Turn the EUT off and set the chamber to the highest temperature specified.
6. Reduce 10°C and repeat step 4, 5, 6 until the temperature of chamber set to the lowest temperature.
7. Set the temperature of chamber to 20°C and the Voltage/Frequency Power Converter to 85% and 115% of supply voltage, then repeat step 4.

7.1.3. Test Setup



4.3.1 Test Data

Frequency Stability

Temp.	Power Supply	Observe Time	Read Frequency	Tolerance	Pass or Fail
(°C)	(V AC)		(MHz)	(%)	Limit: +/- 0.01%
20	120	Start	13.561040	N/A	
		2mins	13.561040	N/A	
		5mins	13.561040	N/A	
		10mins	13.561040	N/A	
50	120	Start	13.561030	-0.000074	PASS
		2mins	13.561030	-0.000074	PASS
		5mins	13.561030	-0.000074	PASS
		10mins	13.561030	-0.000074	PASS
40	120	Start	13.561040	0.000000	PASS
		2mins	13.561030	-0.000074	PASS
		5mins	13.561030	-0.000074	PASS
		10mins	13.561030	-0.000074	PASS
30	120	Start	13.561040	0.000000	PASS
		2mins	13.561040	0.000000	PASS
		5mins	13.561040	0.000000	PASS
		10mins	13.561040	0.000000	PASS
10	120	Start	13.561040	0.000000	PASS
		2mins	13.561040	0.000000	PASS
		5mins	13.561040	0.000000	PASS
		10mins	13.561040	0.000000	PASS
0	120	Start	13.561040	0.000000	PASS
		2mins	13.561040	0.000000	PASS
		5mins	13.561040	0.000000	PASS
		10mins	13.561040	0.000000	PASS
-10	120	Start	13.561030	-0.000074	PASS
		2mins	13.561030	-0.000074	PASS
		5mins	13.561030	-0.000074	PASS
		10mins	13.561030	-0.000074	PASS

Temp.	Power Supply	Observe Time	Read Frequency	Tolerance	Pass or Fail
(°C)	(V AC)		(MHz)	(%)	Limit: +/- 0.01%
-20	120	Start	13.561020	-0.000147	PASS
		2mins	13.561020	-0.000147	PASS
		5mins	13.561020	-0.000147	PASS
		10mins	13.561020	-0.000147	PASS
20	138	Start	13.561040	0.000000	PASS
		2mins	13.561040	0.000000	PASS
		5mins	13.561030	-0.000074	PASS
		10mins	13.561040	0.000000	PASS
20	102	Start	13.561030	-0.000074	PASS
		2mins	13.561040	0.000000	PASS
		5mins	13.561030	-0.000074	PASS
		10mins	13.561030	-0.000074	PASS

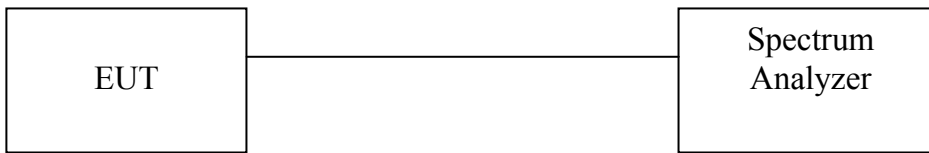
4.4 Occupied bandwidth measurements [ANSI C63.4 section 13.1.7]

4.4.1 Test Procedure

The Transmitter output of EUT was connected to the spectrum analyzer. The 26 dB bandwidth of the fundamental frequency was measured. The setting of spectrum analyzer is as follows

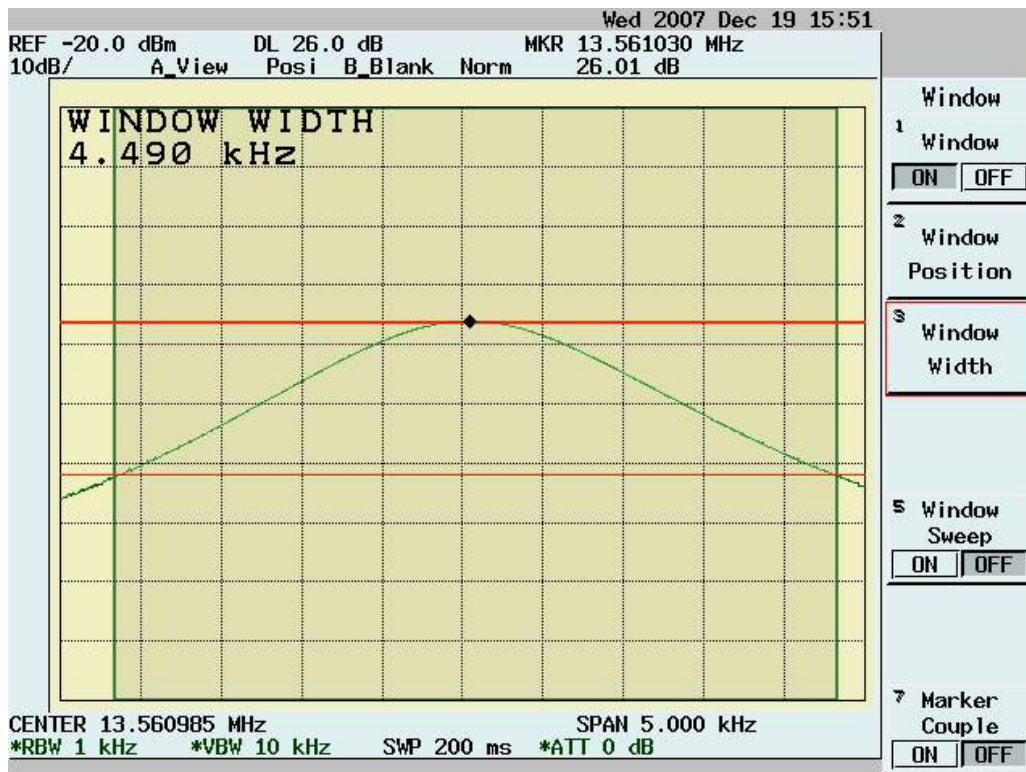
Equipment mode	Spectrum analyzer
Detector function	Peak mode
RBW	1KHz
VBW	10KHz

4.4.2 Test Setup



4.4.3 Test Data:

Frequency (MHz)	26dB Bandwidth (KHz)
13.56	4.49



5. Appendix

5.1 Appendix A: Measurement Procedure for Power line Conducted Emissions

The measurements are performed in a 3.5m x 3.4m x 2.5m shielded room, which referred as Conduction 01 test site, or a 3m x 3m x 2.3m test site, which referred as Conduction 02 test site. The EUT was placed on non-conduction 1.0m x 1.5m table, which is 0.8 meters above an earth-grounded.

Power to the EUT was provided through the LISN which has the Impedance (50ohm/50uH) vs. Frequency Characteristic in accordance with the required standard. Power to the LISNs were filtered to eliminate ambient signal interference and these filters were bonded to the ground plane. Peripheral equipment required to provide a functional system (support equipment) for EUT testing was powered from the second LISN through a ganged, metal power outlet box which is bonded to the ground plane at the LISN.

If the EUT is supplied with a flexible power cord, the power cord length in excess of the distance separating the EUT from the LISN shall be folded back and forth at the center of the lead so as to form a bundle not exceeding 40cm in length. If the EUT is provided with a permanently coiled power cord, bundling of the cord is not required. If the EUT is supplied without a power cord, the EUT shall be connected to the LISN by a power cord of the type specified by the manufacturer which shall not be longer than 1 meter. The excess power cord shall be bundled as described above. If a non-flexible power cord is provided with the EUT, it shall be cut to the length necessary to attach the EUT to the LISN and shall not be bundled.

The interconnecting cables were arranged and moved to get the maximum emission. Both the line of power cord, hot and neutral, were measured.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

5.2 Appendix B: Test Procedure for Radiated Emissions

Preliminary Measurements in the Anechoic Chamber

The radiated emissions are initially measured in the anechoic chamber at a measurement distance of 3 meters. Desktop EUT are placed on a wooden stand 0.8 meter in height. The measurement antenna is 3 meters from the EUT. The test setup in anechoic chamber is the same as open site. The turntable rotated 360°. The antenna height is varied from 1-2.5m. The primary objective of the radiated measurements in the anechoic chamber is to identify the frequency spectrum in the absence of the electromagnetic environment existing on the open test site. The frequencies can then be pre-selected on the open test site to obtain the corresponding amplitude. The initial scan is made with the spectrum analyzer in automatic sweep mode. The spectrum peaks are then measured manually to determine the exact frequencies.

Measurements on the Open Site or 10m EMC Chamber

The radiated emissions test will then be repeated on the open site or 10m EMC chamber to measure the amplitudes accurately and without the multiple reflections existing in the shielded room. The EUT and support equipment are set up on the turntable of one of the 3 or 10 meter open field sites. Desktop EUT are set up on a wooden stand 0.8 meter above the ground.

For the initial measurements, the receiving antenna is varied from 1-4 meter height and is changed in the vertical plane from vertical to horizontal polarization at each frequency. Both reading are recorded with the quasi-peak detector with 120KHz bandwidth. For frequency between 30 MHz and 1000MHz, the reading is recorded with peak detector or quasi-peak detector. For frequency above 1 GHz, the reading is recorded with peak detector or average detector with 1 MHz bandwidth.

At the highest amplitudes observed, the EUT is rotated in the horizontal plane while changing the antenna polarization in the vertical plane to maximize the reading. The interconnecting cables were arranged and moved to get the maximum emission. Once the maximum reading is obtained, the antenna elevation and polarization will be varied between specified limits to maximize the readings.

5.3 Appendix C: Test Equipment

5.3.1 Test Equipment List

Location	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction	Coaxial Cable 1F-C2	Harbourindustries	RG400	1F-C2	02/13/2007	02/13/2008
Conduction	Digital Hygro-Thermometer Conduct	MicroLife	HT-2126G	ISL-Conduction02	12/26/2006	12/26/2007
Conduction	EMI Receiver 07	Schwarzbeck Mess-Elektronik	FCKL 1528	1528-201	08/31/2007	08/30/2008
Conduction	LISN 01	R&S	ESH2-Z5	890485/013	01/03/2007	01/03/2008
Conduction	LISN 06	R&S	ESH3-Z5	828874/009	12/07/2006	12/06/2007
Radiation	BILOG Antenna 08	Schaffner	CBL6112B	2756	06/13/2007	06/12/2008
Radiation	Coaxial Cable Chmb 02-10M	Belden	RG-8/U	Chmb 02-10M	02/13/2007	02/12/2008
Radiation	Digital Hygro-Thermometer Chmb 02	MicroLife	HT-2126G	Chmb 02	12/26/2006	12/26/2008
Radiation	EMI Receiver 02	HP	85460A	3448A00183	12/29/2006	12/28/2007
Radiation	Spectrum Analyzer 13	Advantest	R3132	121200411	03/16/2007	03/15/2008
Radiation	Loop Antenna 03	Com-Power	AL-130	17101	05/10/2006	05/10/2008
Temp/Humidity Chamber	Temp/Humidity Chamber	KSON instrument	THS-B4H+100	2287	09/30/2007	09/30/2008

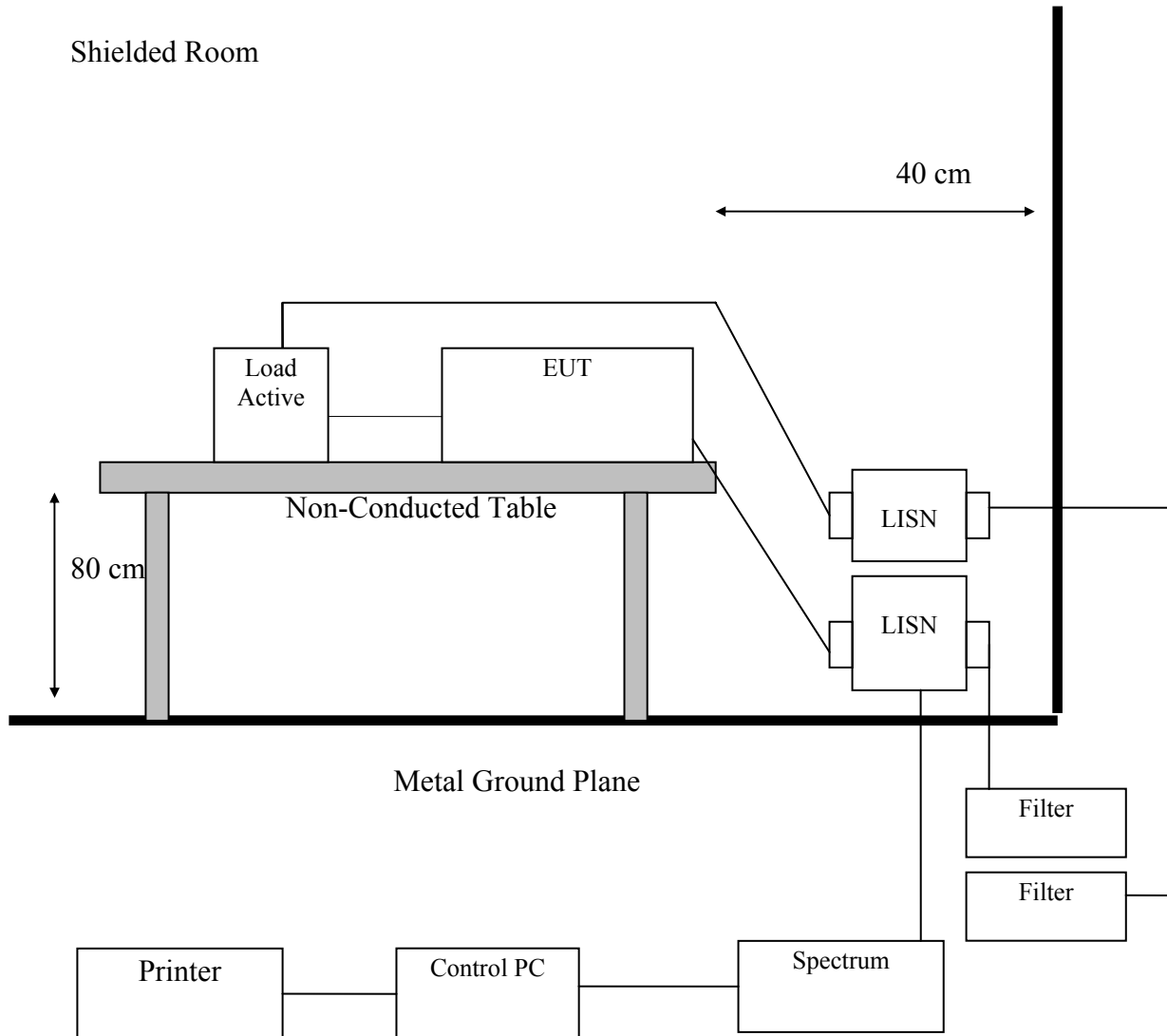
Note: Calibration is traceable to NIST or national or international standards.

5.3.2 Software for Controlling Spectrum/Receiver and Calculating Test Data

Radiation/Conduction	Filename	Version	Issued Date
Hsichih Conduction	EZ EMC	1.1.4.2	2/10/2007
Hsichih Radiation	EZ EMC	1.1.4.2	1/24/2007
Lung_Tan Conduction	EZ EMC	1.1.4.2	2/10/2007
Lung_Tan Radiation	EZ EMC	1.1.4.2	1/24/2007

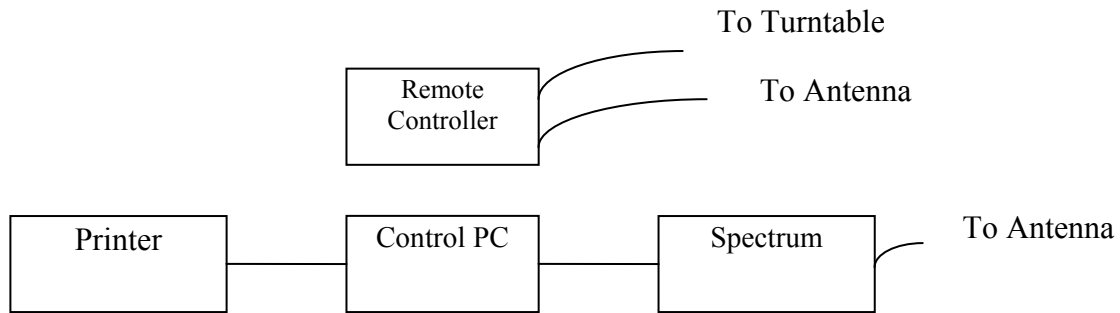
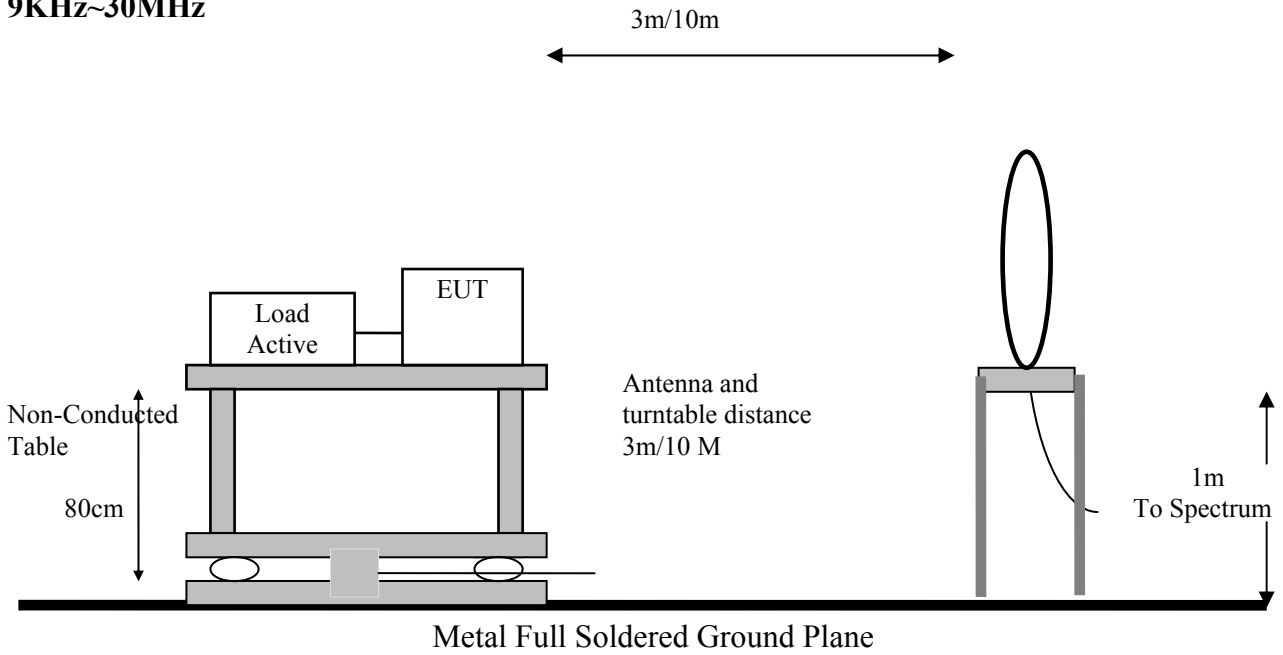
5.4 Appendix D: Layout of EUT and Support Equipment

5.4.1 General Conducted Test Configuration

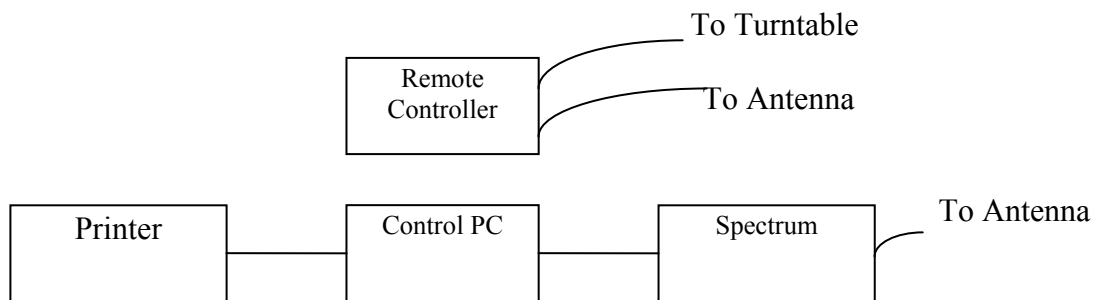
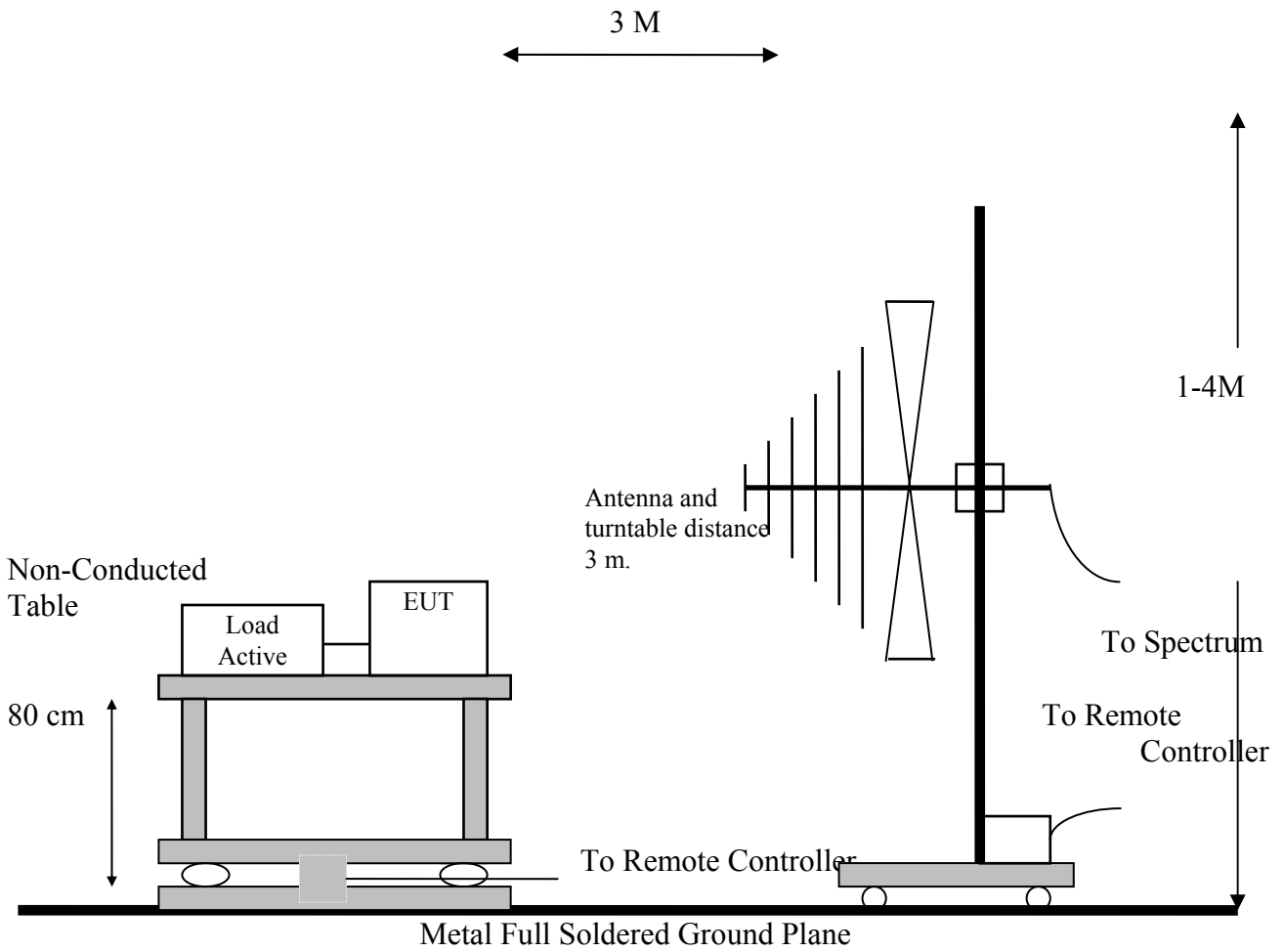


5.4.2 General Radiation Test Configuration

9KHz~30MHz



30MHz~1GHz



5.5 Appendix E: Accuracy of Measurement

The measurement uncertainty refers to CISPR 16-4-2:2003. The coverage factor $k = 2$ yields approximately a 95 % level of confidence.

<Conduction 03>: ± 0.88 dB

<Chamber 12 (3M)>

30MHz~1GHz: ± 3.306 dB

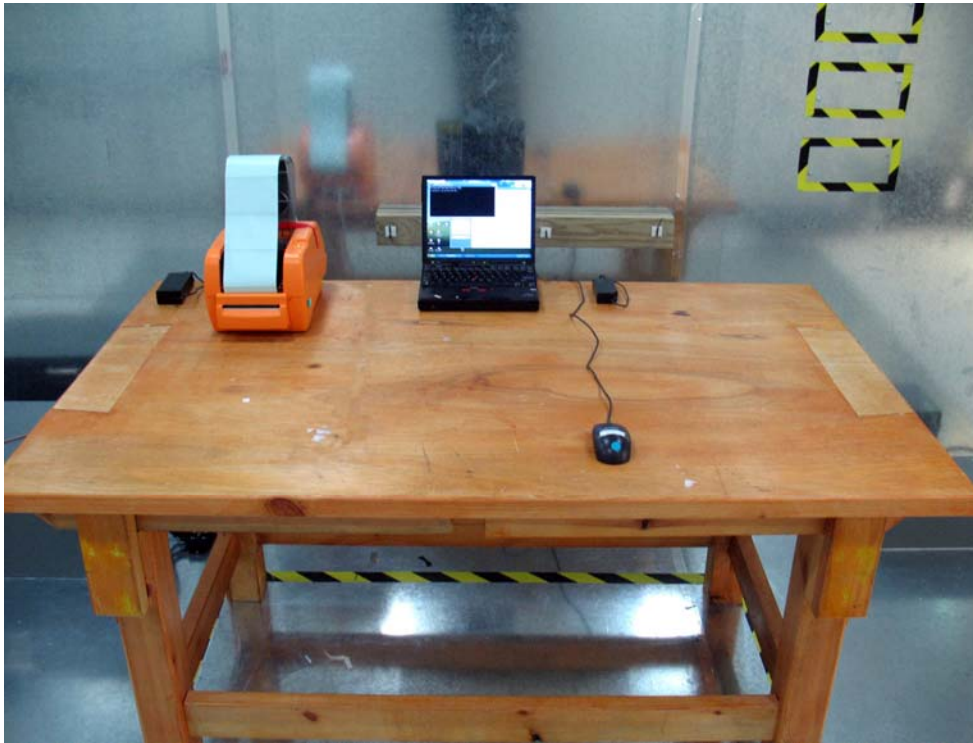
1GHz~18GHz: ± 2.62 dB

18GHz~26GHz: ± 3.609 dB

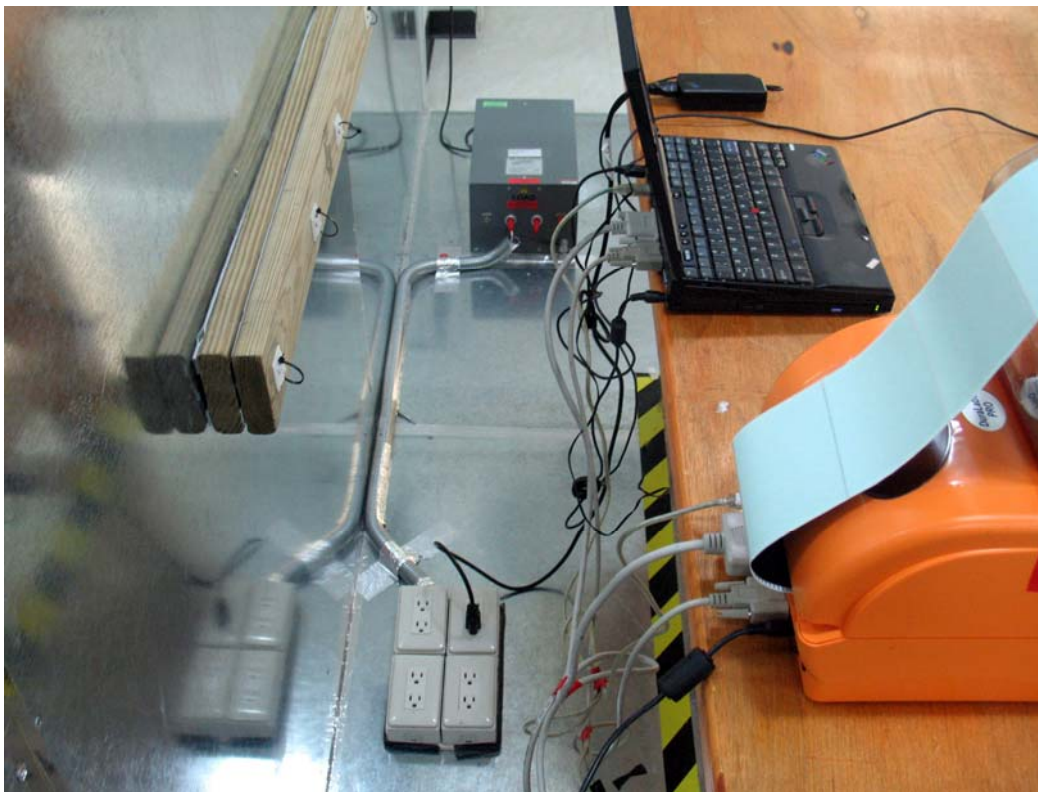
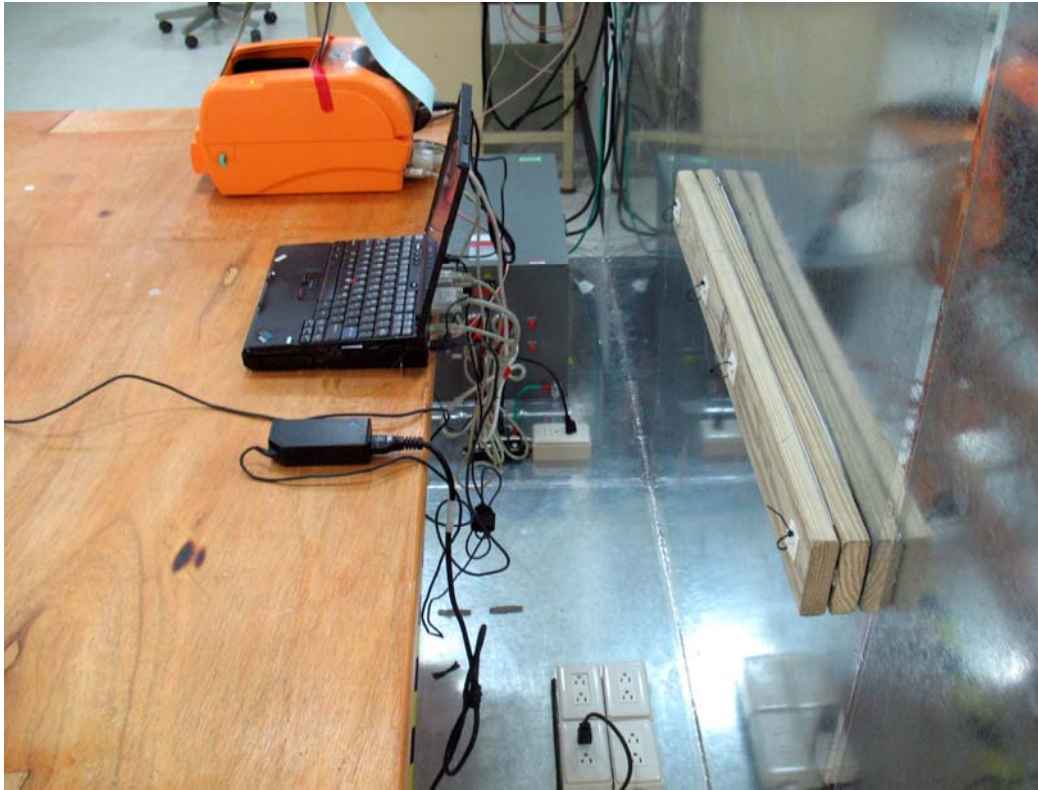
26GHz~40GHz: ± 2.702 dB

5.6 Appendix F: Photographs of EUT Configuration Test Set Up

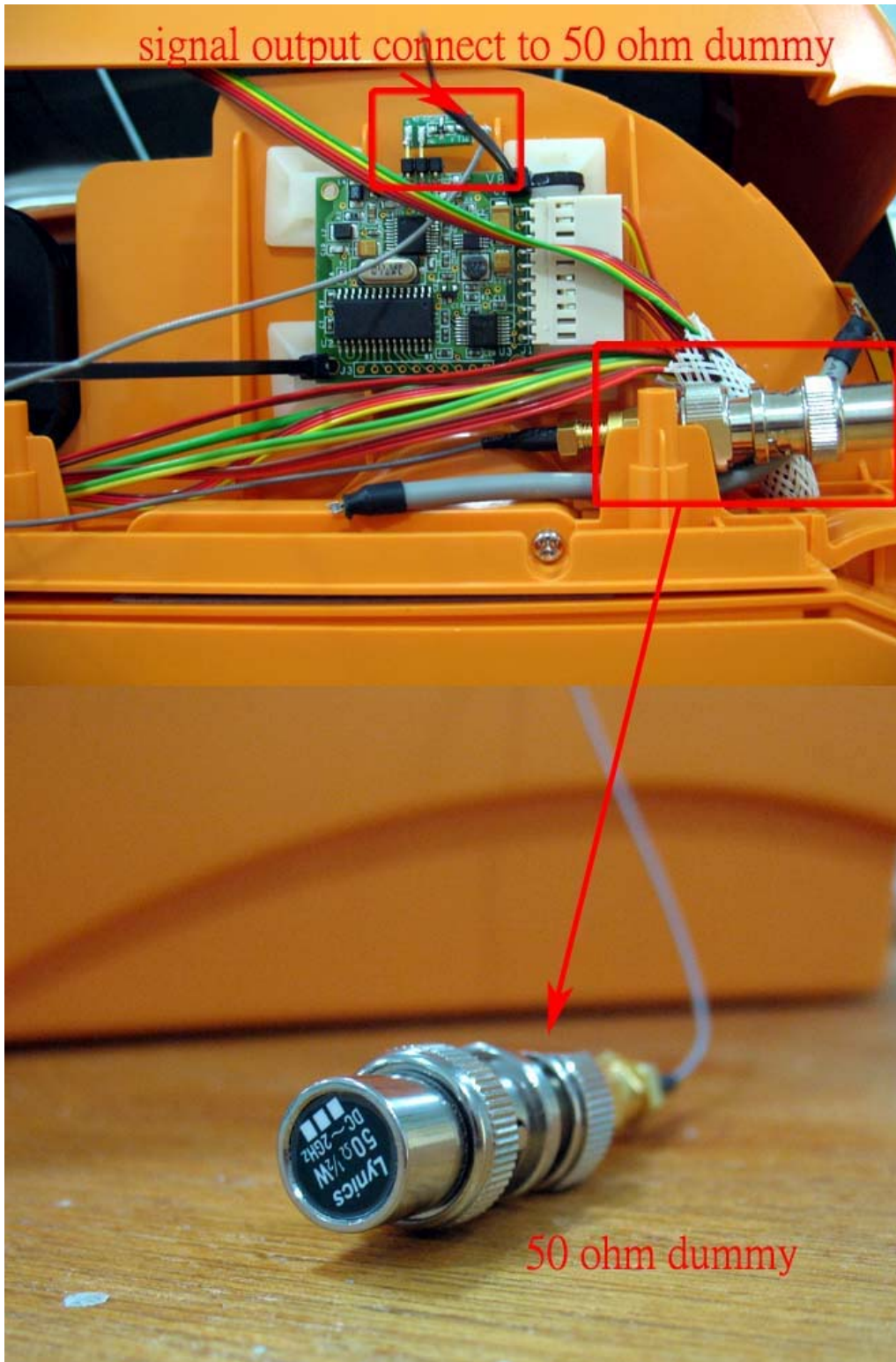
The Front View of Highest Conducted Set-up For EUT



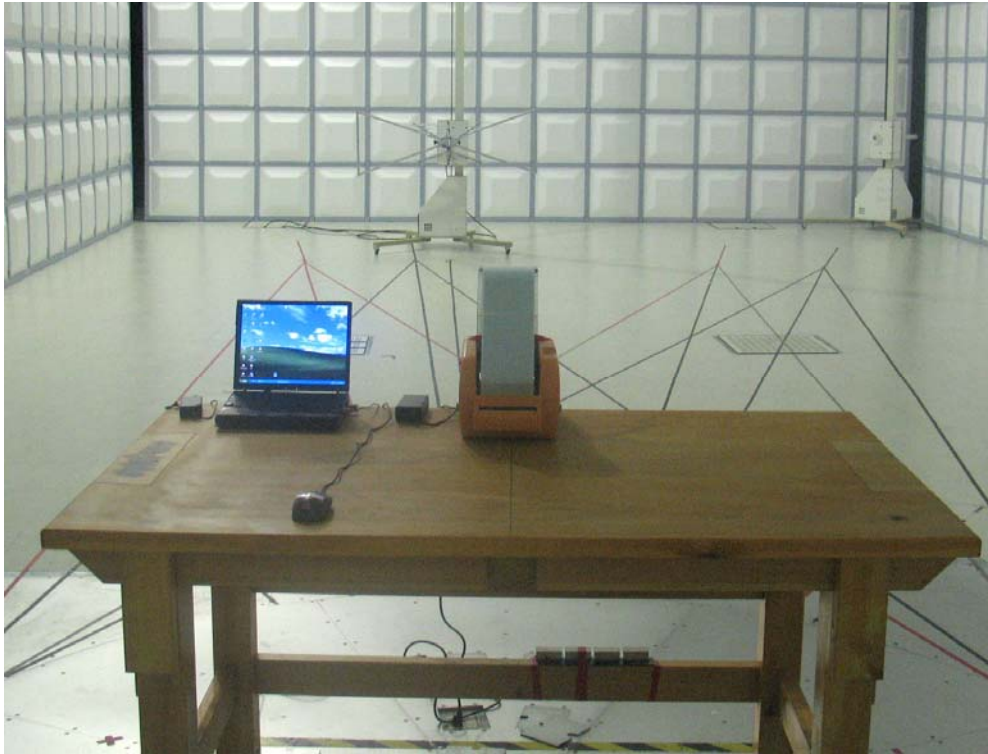
The Back View of Highest Conducted Set-up For EUT



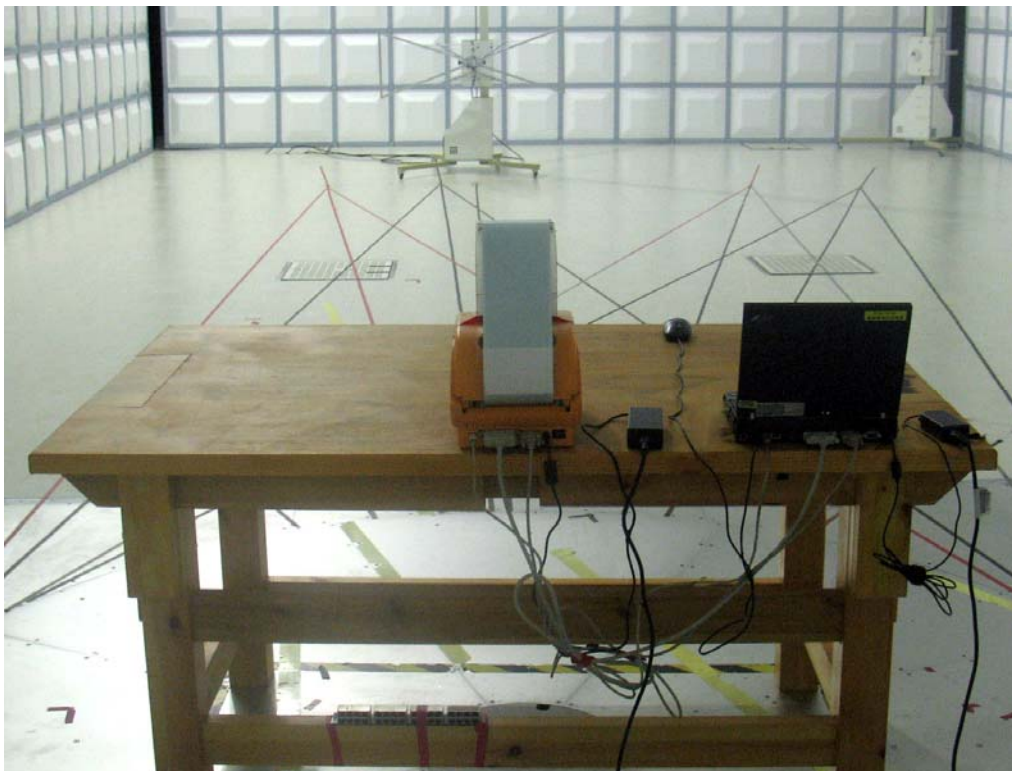
The Set-up For Transmitter With 50ohm Dummy Load



The Front View of Highest Radiated Set-up For EUT



The Back View of Highest Radiated Set-up For EUT



5.7 Appendix G: Antenna Spec.

Please refer to the attached file.