



EMI TEST REPORT

Equipment : Dual HDMI™ Video Capture
Brand Name : j5create
Model Name : JVA06
Applicant : KAIJET TECHNOLOGY INTERNATIONAL CORPORATION
8F., No.109, Zhongcheng Rd., Tucheng Dist.,
New Taipei City 236, Taiwan, R.O.C.
Manufacturer : Magic Control Technology Corporation
10F., No.123, Zhongcheng Rd., Tucheng Dist.,
New Taipei City 236, Taiwan R.O.C.
Standard : ICES-003 Issue 7, Class B

The product was received on Sep. 22, 2021, and testing was started from Oct. 04, 2021 and completed on Oct. 07, 2021. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4a-2017 standards and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Hsinhua Laboratory, the test report shall not be reproduced except in full.

Approved by: William Li

SPORTON INTERNATIONAL INC. Hsinhua Laboratory
No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



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Appendix A. Test Photos

Photographs of EUT v01



History of this test report

Report No.	Version	Description	Issued Date
CI191532-01	01	Initial issue of report	Dec. 07, 2021



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
4	3.2.1	Conducted Emissions of Powerline	PASS	Under limit 10.07 dB at 0.15 MHz
5.1	3.2.2	Radiated Emissions below 1GHz	PASS	Under limit 3.78 dB at 742.400 MHz
5.2	3.2.2	Radiated Emissions above 1GHz	PASS	Under limit 4.69 dB at 1.44 GHz

Note 1: From Sporton Project No.:CI191532.

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and explanations:
None

Reviewed by: Mark Ma

Report Producer: Anne Kuo



1. General Description of Equipment under Test

1.1. Basic Description of Equipment under Test

Equipment : Dual HDMI™ Video Capture
Model No. : JVA06
Power Supply Type : From Power Adapter
AC Power Cord : Wall-Mount, 2 pin
DC Power Cable : D-Shielded, 2.0 m
The maximum operating frequency : 500 MHz

1.2. Feature of Equipment under Test

Accessory Information				
Type C to C Cable	Brand Name	N/A	Model Name	N/A
	Signal Line	0.6 meter, D-shielded cable, without ferrite core		
Type C to A Cable	Brand Name	N/A	Model Name	N/A
	Signal Line	0.6 meter, D-shielded cable, without ferrite core		
HDMI Cable	Brand Name	N/A	Model Name	N/A
	Signal Line	1 meter, D-shielded cable, without ferrite core		

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2. Test Configuration of Equipment under Test

2.1. Details of EUT Test Modes

From the above models, Model: JVA06 was selected as representative model for the test and its data was recorded in this report. The equipment under test were performed the following test modes:

Test Items	Description of test modes
Conducted Emission	<p>Mode 1. HDMI1+2 IN 1920*1080 60Hz ,HDMI OUT A:1280*720 60Hz,HDMI AUDIO,HEADSET,MIC, TYPE C TO C CABLE</p> <p>Mode 2. HDMI1+2 IN 1920*1080 60Hz ,HDMI OUT B:1920*1080 60Hz,HDMI AUDIO,HEADSET,MIC, TYPE C TO A CABLE</p> <p>Mode 3. HDMI1+2 IN 1920*1080 60Hz ,HDMI OUT A+B:1280*720 60Hz,HDMI AUDIO,HEADSET,MIC, TYPE C TO C CABLE</p> <p>Mode 4. HDMI1+2 IN 1920*1080 60Hz ,HDMI OUT B+A:1280*720 60Hz,HDMI AUDIO,HEADSET,MIC, TYPE C TO C CABLE</p> <p>Mode 5. HDMI1+2 IN :1680*1050 60Hz,HDMI OUT A+B:720*576 60Hz,HDMI AUDIO,HEADSET,MIC, HDMI A+B OUT, TYPE C TO C CABLE</p> <p>cause "mode 3" generated the worst test result; it was reported as final data.</p>
Radiated Emissions <below 1GHz>	<p>Mode 1. HDMI1+2 IN 1920*1080 60Hz ,HDMI OUT A:1280*720 60Hz,HDMI AUDIO,HEADSET,MIC, TYPE C TO C CABLE</p> <p>Mode 2. HDMI1+2 IN 1920*1080 60Hz ,HDMI OUT B:1920*1080 60Hz,HDMI AUDIO,HEADSET,MIC, TYPE C TO A CABLE</p> <p>Mode 3. HDMI1+2 IN 1920*1080 60Hz ,HDMI OUT A+B:1280*720 60Hz,HDMI AUDIO,HEADSET,MIC, TYPE C TO C CABLE</p> <p>Mode 4. HDMI1+2 IN 1920*1080 60Hz ,HDMI OUT B+A:1280*720 60Hz,HDMI AUDIO,HEADSET,MIC, TYPE C TO C CABLE</p> <p>Mode 5. HDMI1+2 IN :1680*1050 60Hz,HDMI OUT A+B:720*576 60Hz,HDMI AUDIO,HEADSET,MIC, HDMI A+B OUT, TYPE C TO C CABLE</p> <p>cause "mode 3" generated the worst test result; it was reported as final data.</p>
Radiated Emissions <above 1GHz>	<p>Mode 1. HDMI1+2 IN 1920*1080 60Hz ,HDMI OUT A:1280*720 60Hz,HDMI AUDIO,HEADSET,MIC, TYPE C TO C CABLE</p> <p>Mode 2. HDMI1+2 IN 1920*1080 60Hz ,HDMI OUT B:1920*1080 60Hz,HDMI AUDIO,HEADSET,MIC, TYPE C TO A CABLE</p> <p>Mode 3. HDMI1+2 IN 1920*1080 60Hz ,HDMI OUT A+B:1280*720 60Hz,HDMI AUDIO,HEADSET,MIC, TYPE C TO C CABLE</p> <p>Mode 4. HDMI1+2 IN 1920*1080 60Hz ,HDMI OUT B+A:1280*720 60Hz,HDMI AUDIO,HEADSET,MIC, TYPE C TO C CABLE</p> <p>Mode 5. HDMI1+2 IN :1680*1050 60Hz,HDMI OUT A+B:720*576 60Hz,HDMI AUDIO,HEADSET,MIC, HDMI A+B OUT, TYPE C TO C CABLE</p> <p>cause "mode 3" generated the worst test result; it was reported as final data.</p>

**2.2. Description of Test System****Conducted emission radiated emission below 1GHz**

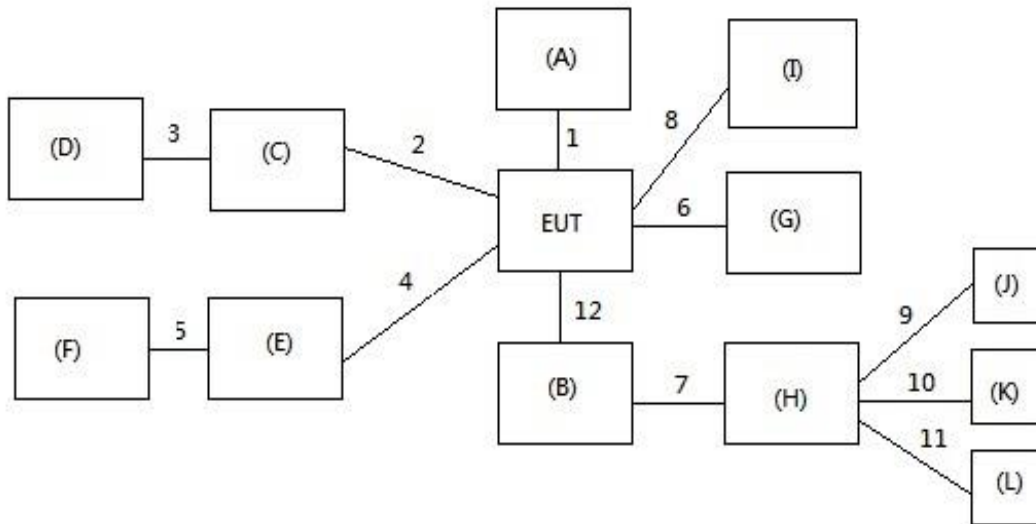
No.	Peripheral	Manufacturer	Model Number	FCC ID	Remarks
For Local					
A	Adapter	Apple	A1947	DoC	-
B	Laptop 1	ASUS	UX392F	DoC	-
C	Laptop 2	Lenovo	TP00103J	DoC	-
D	Laptop 2 Adapter	Lenovo	ADLX65YLC3D	DoC	-
E	Laptop 3	Lenovo	TP00088C	DoC	-
F	Laptop 3 Adapter	Lenovo	ADLX65YLC3A	DoC	-
G	LCD Monitor	DELL	UltraSharp U2410f	DoC	-
H	USB HUB	j5 create	JUH340	DoC	-
I	Headset	i-Acon	HOH-323-BK	N/A	-
J	Printer	Fuji Xerox	Phaser 3121	DoC	-
K	HDD	PQI	H566	DoC	-
L	Mouse	ASUS	MOBTUO	DoC	-

Radiated emission above 1GHz

No.	Peripheral	Manufacturer	Model Number	FCC ID	Remarks
For Local					
A	Adapter	Apple	A1947	DoC	-
B	Laptop 1	ASUS	UX392F	DoC	-
C	Laptop 2	ASUS	FA506I	DoC	-
D	Laptop 2 Adapter	ASUS	A18-150P1A	N/A	-
E	Laptop 3	Lenovo	TP00088C	DoC	-
F	Laptop 3 Adapter	Lenovo	ADLX65YLC3A	DoC	-
G	LCD Monitor	DELL	UltraSharp U2410f	DoC	-
H	USB HUB	j5 create	JCH377	DoC	-
I	Headset	HAWK	03-MSB301	N/A	-
J	Printer	EPSON	C61	N/A	-
K	HDD	PQI	H566	DoC	-
L	Mouse	Microsoft	1113	DoC	-

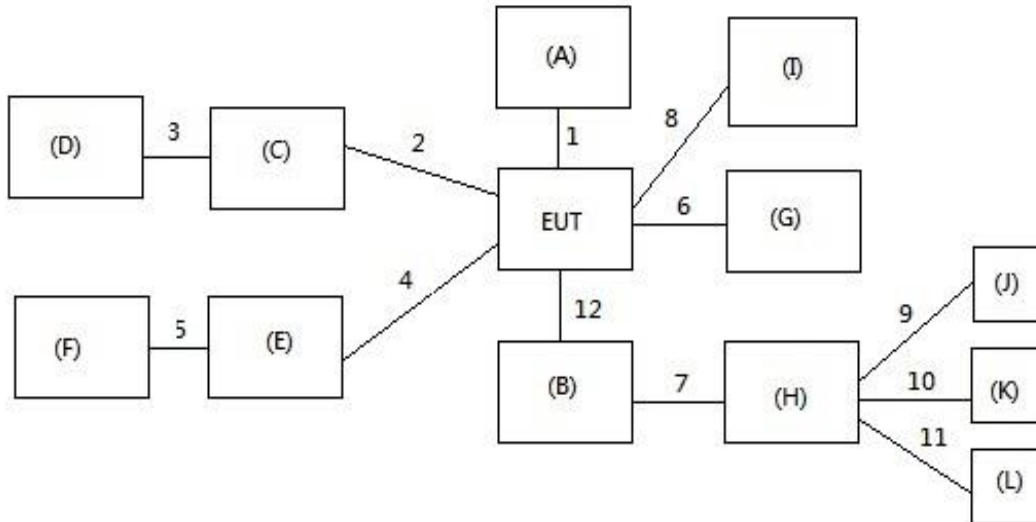
2.3. Connection Diagram of Test System

Test Setup Diagram - Conducted emission and radiated emission below 1GHz



No.	Types of Cables	Shielding on Cable	Length (m)	Remarks
1	DC	D-Shielded	2.0	-
2	HDMI	D-Shielded	1.8	-
3	DC	B-Shielded	1.8	-
4	HDMI	D-Shielded	1.8	-
5	DC	B-Shielded	1.8	-
6	HDMI	D-Shielded	1.0	EUT
7	USB	D-Shielded	0.6	-
8	Audio	Non-Shielded	2.0	-
9	USB	D-Shielded	1.8	-
10	USB	D-Shielded	1.0	-
11	USB	AL-F-Shielded	1.5	-
12	Type C	D-Shielded	0.6	EUT

Test Setup Diagram - Radiated emission above 1GHz



No.	Types of Cables	Shielding on Cable	Length (m)	Remarks
1	DC	D-Shielded	2.0	-
2	HDMI	D-Shielded	1.8	-
3	DC	B-Shielded	1.8	-
4	HDMI	D-Shielded	1.8	-
5	DC	B-Shielded	1.8	-
6	HDMI	D-Shielded	1.0	EUT
7	USB	D-Shielded	1.0	-
8	Audio	Non-Shielded	1.7	-
9	USB	D-Shielded	1.8	-
10	USB	D-Shielded	1.0	-
11	USB	AL-F-Shielded	1.8	-
12	Type C	D-Shielded	0.6	EUT



2.4. Details of EUT Test Setup

During the test, the following program under WIN 10 was executed

- The Laptop executed "BurnInTest" to display the "H" pattern on the screen by EUT.
- The Laptop executed "BurnInTest" to keeps read and write data from Portable External HDD.
- The Laptop executed "Word" sends "H" messages to the printer, and then the printer prints them on the paper.
- The Laptop executed "Media player" to continuous audio playback from screen speakers/headset via EUT.
- The Laptop executed "OBS Studio" and receives audio from the microphone via the EUT.



3. General Information of Test

3.1. Test Facilities

Test Lab : Sporton International Inc. Hsinhua Laboratory						
<input checked="" type="checkbox"/>	Hsinhua (TAF: 3785)	ADD : No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)				
		TEL : 886-3-327-3456	FAX : 886-3-327-0973			
<input checked="" type="checkbox"/>		ADD : No.3, Ln. 238, Kangle St., Neihu Dist., Taipei City 114040, Taiwan (R.O.C.)				
		TEL : 886-2-2631-5551	FAX : 886-2-2631-9740			
Test Items	Test Site No.	Test Engineer	Test Environment		Test Date	Remark
			temp °C	humidity %		
Powerline Conducted Emissions	CO01-NH	Willy Lee	25.8~25.9	47~48	06/Oct/2021	-
Radiated Emissions (below 1GHz)	OS03-NH	Louis Lin	27.6~27.7	56.5~56.7	05/Oct/2021	-
Radiated Emissions (above 1GHz)	03CH04-HY	Yen-Liang Ou	25.5~26.5	56~57	07/Oct/2021	-

3.2. Test Standards

Test items	Test Standards and Test Procedures
Radiated and Conducted Emissions	Canada Standard ICES-003 Issue 7 , Class B ANSI C63.4a-2017

3.3. Test Voltage/Frequencies

Power Supply Type	Voltage/Frequencies
Power Adapter	120V / 60Hz



3.4. Test Distance and Frequency Range Investigated

Test Items	Frequency Range	Remark
Powerline Conducted Emissions	150 kHz to 30 MHz	-
Radiated Emissions (below 1GHz)	30 MHz to 1,000 MHz	Measurement distance is 10 m.
Radiated Emissions (above 1GHz)	1,000 MHz to 18,000 MHz	Measurement distance is 3 m.
	Above 18,000 MHz	Measurement distance is 1 m.

3.5. Operating Condition

- Full system.

3.6. ICES Labelling requirements

The requirements specified in ICES-Gen shall apply. An example ISED compliance label, to be placed on each unit of an equipment model (or in the user manual, if allowed), is given below:

CAN ICES-003(*) / NMB-003(*)

* Insert either “A” or “B”, but not both, to identify the applicable Class of the device used for compliance verification.

The above label is only an example. The specific format is left to the manufacturer to decide, as long as the label includes the required information, in accordance with ICES-Gen.

4. Conducted Emissions Measurement (AC mains power terminals)

The EUT is which satisfies the Class B disturbance limits.

4.1. Limit

Limits for conducted disturbance at the mains ports of class A			
Frequency range MHz	Coupling device	Detector type / bandwidth	Class A limits dB(μ V)
0,15 – 0,5	AMN	Quasi-peak / 9 kHz	79
0,50 – 5			73
5 – 30			73
0,15 – 0,5	AMN	Average / 9 kHz	66
0,50 – 5			60
5 – 30			60

Note : The more stringent limit applies at transition frequencies.

Limits for conducted disturbance at the mains ports of class B			
Frequency range MHz	Coupling device	Detector type / bandwidth	Class B limits dB(μ V)
0,15 – 0,5	AMN	Quasi-peak / 9 kHz	66 to 56
0,50 – 5			56
5 – 30			60
0,15 – 0,5	AMN	Average / 9 kHz	56 to 46
0,50 – 5			46
5 – 30			50

Note : The more stringent limit applies at transition frequencies.



4.2. Test Procedures

Tabletop equipment:

- a). The EUT was warmed up for 15 minutes before testing started.
- b). The EUT was placed on a desk 0.8 meter height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meter from any other grounded conducting surface.
- c). Connect EUT to the power mains through a line impedance stabilization network (LISN).
- d). All the support units are connect to the other LISN.
- e). The LISN provides 50 ohm, coupling impedance for the measuring instrument.
- f). The CISPR states that a 50 ohm, 50 microhenry LISN should be used.
- g). Both sides of AC line were checked for maximum conducted interference.
- h). The frequency range from 150 kHz to 30 MHz was searched.
- i). Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- j). All emissions not reported here are more than 10 dB below the prescribed limit.

Floor-standing equipment:

- a). The EUT was warmed up for 15 minutes before testing started.
- b). The EUT was placed on the horizontal ground reference plane, 12 mm above ground.
- c). Connect EUT to the power mains through a line impedance stabilization network (LISN).
- d). All the support units are connect to the other LISN.
- e). The LISN provides 50 ohm, coupling impedance for the measuring instrument.
- f). The CISPR states that a 50 ohm, 50 microhenry LISN should be used.
- g). Both sides of AC line were checked for maximum conducted interference.
- h). The frequency range from 150 kHz to 30 MHz was searched.
- i). Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- j). All emissions not reported here are more than 10 dB below the prescribed limit.

4.3. Measurement Results Calculation

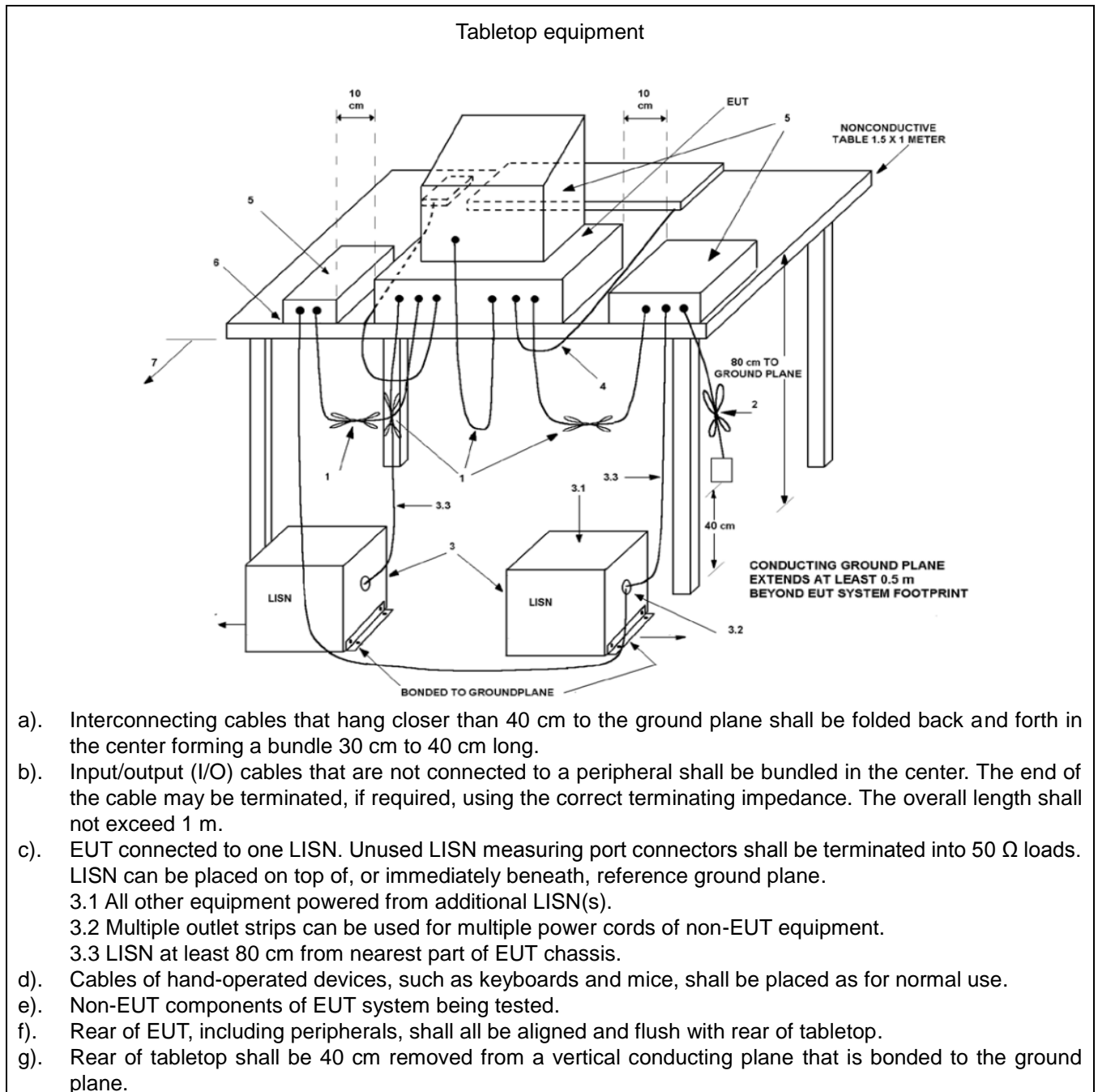
The measured Level is calculated using:

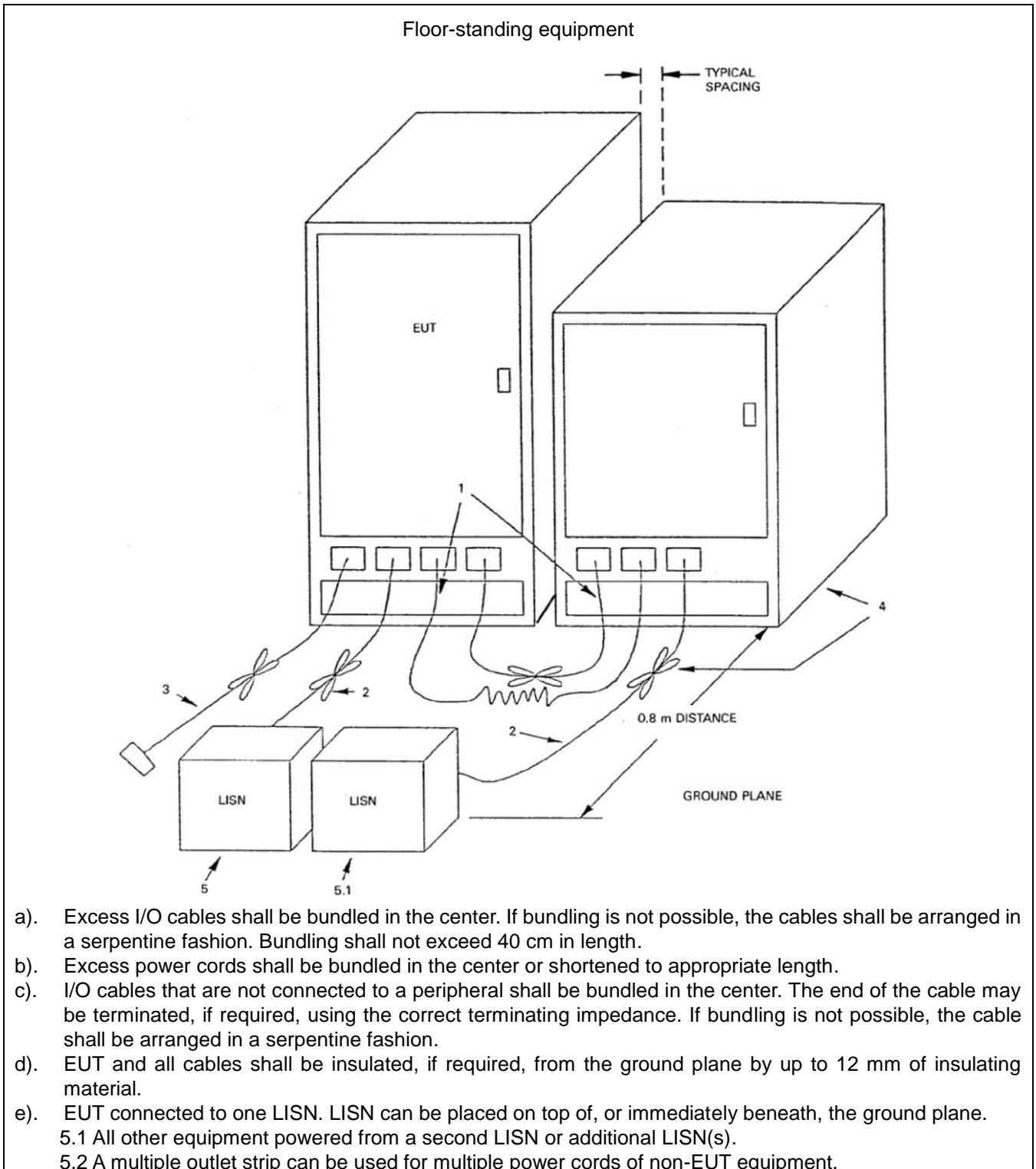
$$\text{Corrected Reading (dB}\mu\text{V)} = \text{LISN Factor} + \text{Cable Loss} + \text{Read Level}$$

For example at 0.3 MHz if the LISN Factor is 10.48 dB, the cable loss is 0.10 dB, the measured voltage is 36.39 dB μ V, the signal strength would be calculated:

$$\text{Corrected Reading (dB}\mu\text{V)} = 10.48 \text{ dB} + 0.10 \text{ dB} + 36.39 \text{ dB}\mu\text{V} = 46.97 \text{ dB}\mu\text{V}$$

4.4. Typical Test Setup Layout



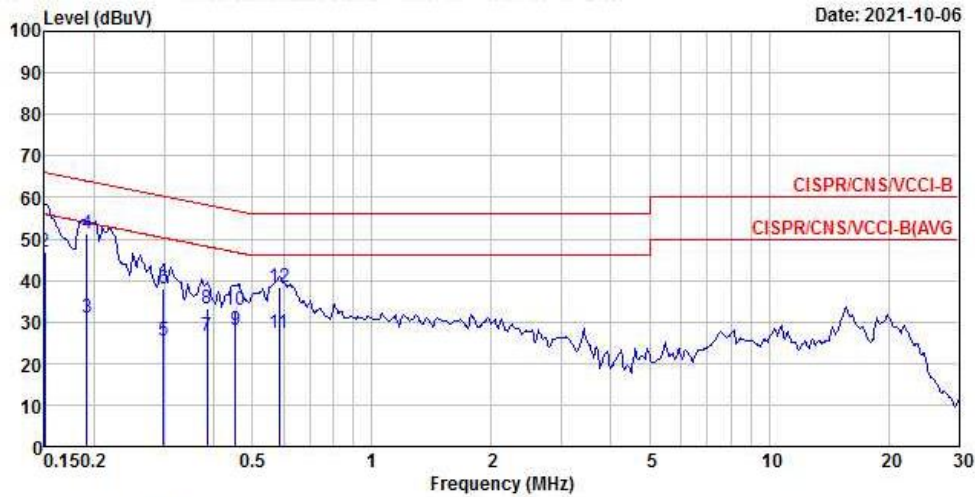




4.5. Test Result

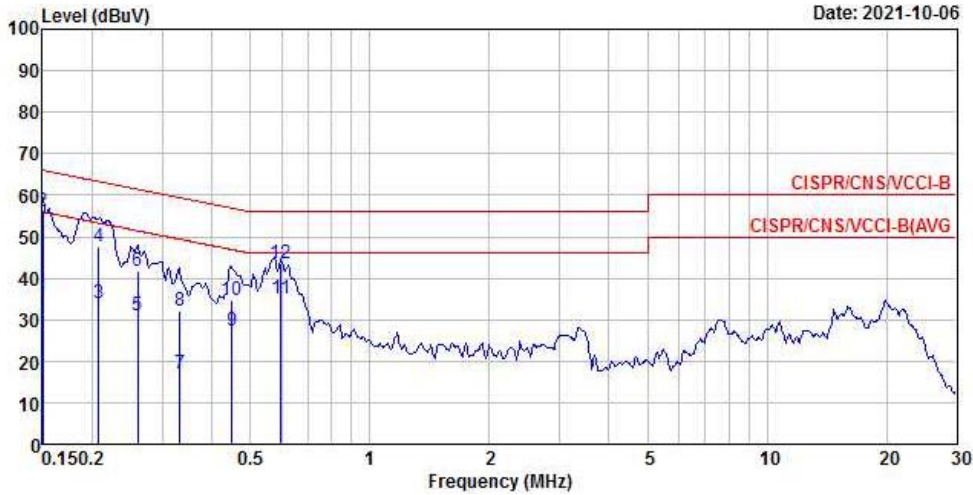
Test Mode	Mode 3		
Test Frequency	0.15 MHz ~ 30 MHz	Test Voltage	AC 120V / 60Hz
<p>■ The test was passed at the minimum margin that marked by the frame in the following data</p>			

Line



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	27.54	-28.46	56.00	17.15	10.29	0.10	Average
2	0.15	46.88	-19.12	66.00	36.49	10.29	0.10	QP
3	0.19	31.17	-22.79	53.96	20.79	10.28	0.10	Average
4 @	0.19	51.45	-12.51	63.96	41.07	10.28	0.10	QP
5	0.30	25.46	-24.81	50.27	15.08	10.27	0.11	Average
6	0.30	38.07	-22.20	60.27	27.69	10.27	0.11	QP
7	0.39	26.66	-21.51	48.17	16.28	10.27	0.11	Average
8	0.39	33.11	-25.06	58.17	22.73	10.27	0.11	QP
9	0.45	27.88	-18.92	46.80	17.50	10.27	0.11	Average
10	0.45	32.95	-23.85	56.80	22.57	10.27	0.11	QP
11	0.59	27.27	-18.73	46.00	16.88	10.27	0.12	Average
12	0.59	38.31	-17.69	56.00	27.92	10.27	0.12	QP

Neutral



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.15	35.68	-20.32	56.00	25.28	10.30	0.10	Average
2 @	0.15	55.93	-10.07	66.00	45.53	10.30	0.10	QP
3	0.21	33.99	-19.29	53.28	23.60	10.29	0.10	Average
4	0.21	47.77	-15.51	63.28	37.38	10.29	0.10	QP
5	0.26	31.05	-20.37	51.42	20.66	10.29	0.10	Average
6	0.26	41.52	-19.90	61.42	31.13	10.29	0.10	QP
7	0.33	17.03	-32.37	49.40	6.64	10.28	0.11	Average
8	0.33	32.21	-27.19	59.40	21.82	10.28	0.11	QP
9	0.45	27.45	-19.42	46.87	17.06	10.28	0.11	Average
10	0.45	34.56	-22.31	56.87	24.17	10.28	0.11	QP
11	0.60	34.94	-11.06	46.00	24.54	10.28	0.12	Average
12	0.60	43.70	-12.30	56.00	33.30	10.28	0.12	QP



5. Radiated Emissions Measurement

The EUT is which satisfies the Class B disturbance limits.

5.1. Radiated Emission below 1GHz

5.1.1.Limit

radiated emissions at frequencies up to 1 GHz for Class A equipment				
Frequency range MHz	Measurement		Class A limits	
	Distance (m)	Detector type / bandwidth	3m(dBµV/m)	10m(dBµV/m)
30 – 88	3 or 10	Quasi Peak / 120 kHz	50.0	40.0
88 – 216			54.0	43.5
216 – 230			56.9	46.4
230 – 960			57.0	47.0
960 – 1000			60.0	49.5
Note: The more stringent limit applies at transition frequencies.				
radiated emissions at frequencies up to 1 GHz for Class B equipment				
Frequency range MHz	Measurement		Class B limits	
	Distance (m)	Detector type / bandwidth	3m(dBµV/m)	10m(dBµV/m)
30 – 88	3 or 10	Quasi Peak / 120 kHz	40.0	30.0
88 – 216			43.5	33.1
216 – 230			46.0	35.6
230 – 960			47.0	37.0
960 – 1000			54.0	43.5
Note: The more stringent limit applies at transition frequencies.				



5.1.2. Test Procedures

Tabletop equipment:

- a). The EUT was placed on a rotatable table top 0.8 meter above ground.
- b). The EUT was set 10 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- c). The table was rotated 360 degrees to determine the position of the highest radiation.
- d). The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e). For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f). Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g). If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h). If the EUT is having a Wireless modular, can choose to install the filter at the input connector of test-receiver system.

Floor-standing equipment:

- a). The EUT was placed on the horizontal ground reference plane, 12 mm above ground.
- b). The EUT was set 10 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- c). The table was rotated 360 degrees to determine the position of the highest radiation.
- d). The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e). For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f). If the EUT is having a Wireless modular, can choose to install the filter at the input connector of test-receiver system.

5.1.3. Measurement Results Calculation

The measured Level is calculated using:

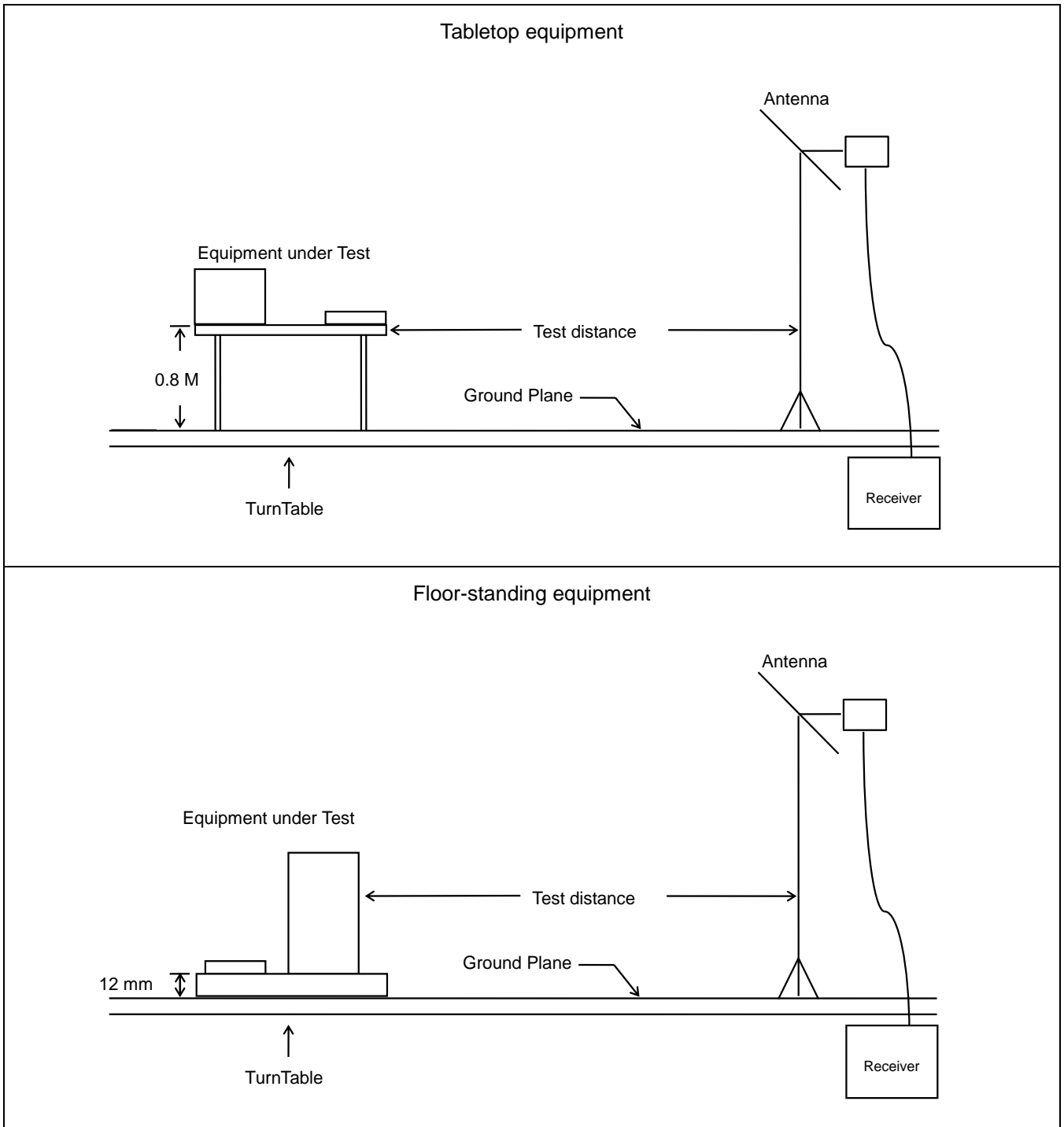
$$\text{Corrected Reading (dB}\mu\text{V/m)} = \text{Antenna Factor} + \text{Cable Loss} + \text{Read Level} - \text{Preamp Factor}$$

For example at 125 MHz if the Antenna Factor is 17.24 dB/m, the cable loss is 1.20 dB, the measured voltage is 35.80 dB μ V and the Preamp Factor is 27.18 dB, the signal strength would be calculated:

$$\text{Corrected Reading (dB}\mu\text{V/m)} = 17.24 \text{ dB/m} + 1.20 \text{ dB} + 35.80 \text{ dB}\mu\text{V} - 27.18 \text{ dB} = 27.06 \text{ dB}\mu\text{V/m}$$

Note: If a hybrid antenna is used, the antenna factor shall be the sum of the Antenna Factor + Attenuator Factor.

5.1.4. Typical Test Setup Layout

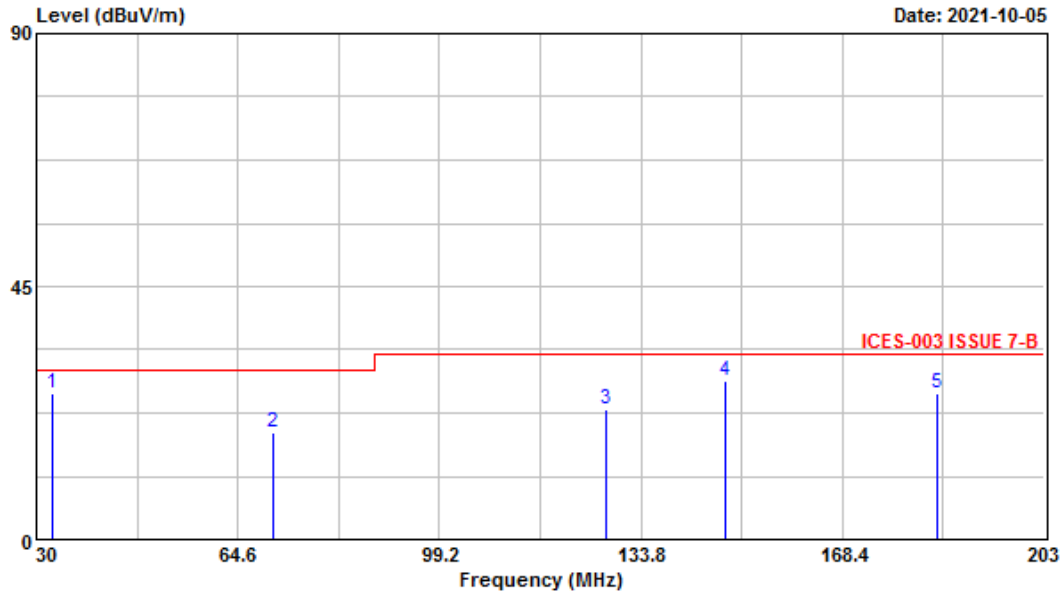




5.1.5. Test Result

Test mode	Mode 3		
Test frequency	30 MHz ~ 1000 MHz	Test Voltage	AC 120V / 60Hz
<p>■ The test was passed at the minimum margin that marked by the frame in the following data</p>			

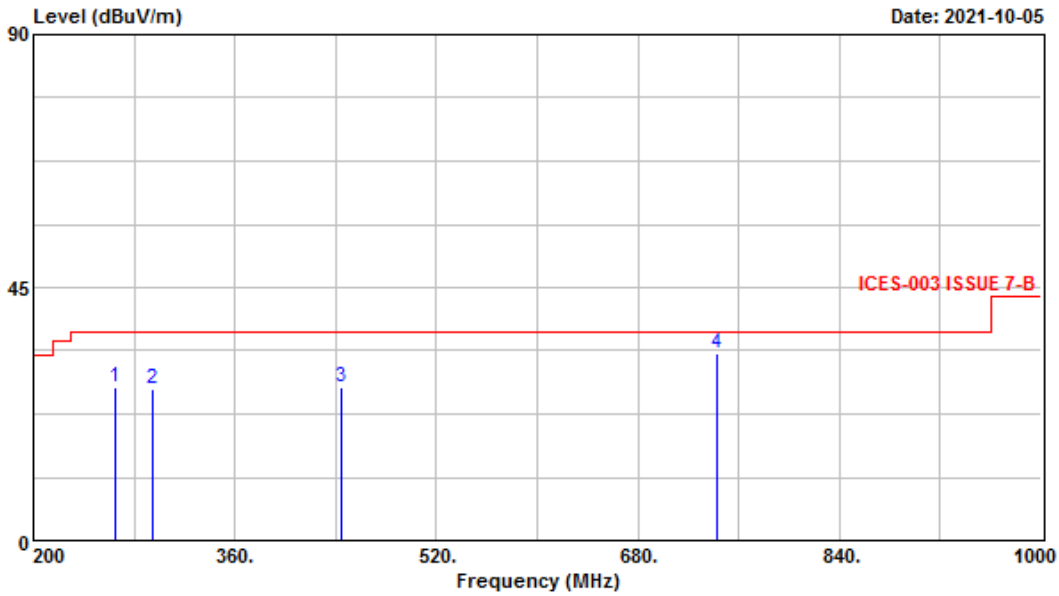
Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	32.770	25.93	-4.07	30.00	31.86	21.58	0.96	28.47	Peak	---	---
2	70.660	19.16	-10.84	30.00	34.51	11.56	1.52	28.43	Peak	---	---
3	127.920	23.20	-9.90	33.10	31.80	17.60	2.08	28.28	Peak	---	---
4	148.160	28.19	-4.91	33.10	38.19	15.92	2.29	28.21	QP	---	---
5	184.660	26.14	-6.96	33.10	37.19	14.49	2.54	28.08	Peak	---	---



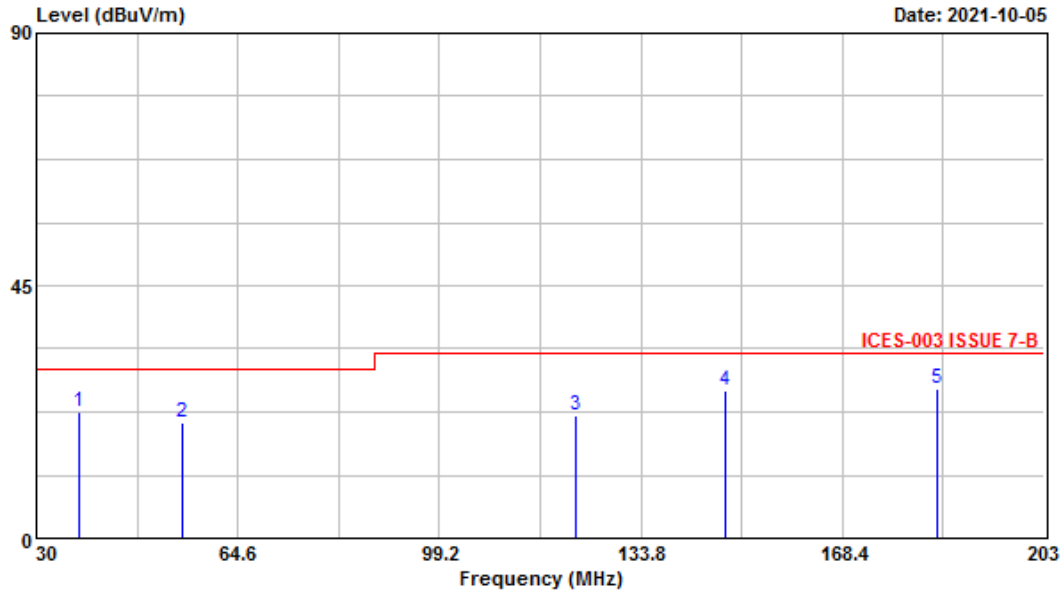
Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	264.800	27.26	-9.74	37.00	33.26	18.57	3.23	27.80	Peak	---	---
2	295.200	26.85	-10.15	37.00	33.08	18.32	3.29	27.84	Peak	---	---
3	444.800	27.24	-9.76	37.00	30.05	21.86	4.18	28.85	Peak	---	---
4	742.400	33.22	-3.78	37.00	31.72	24.63	5.94	29.07	Peak	202	181



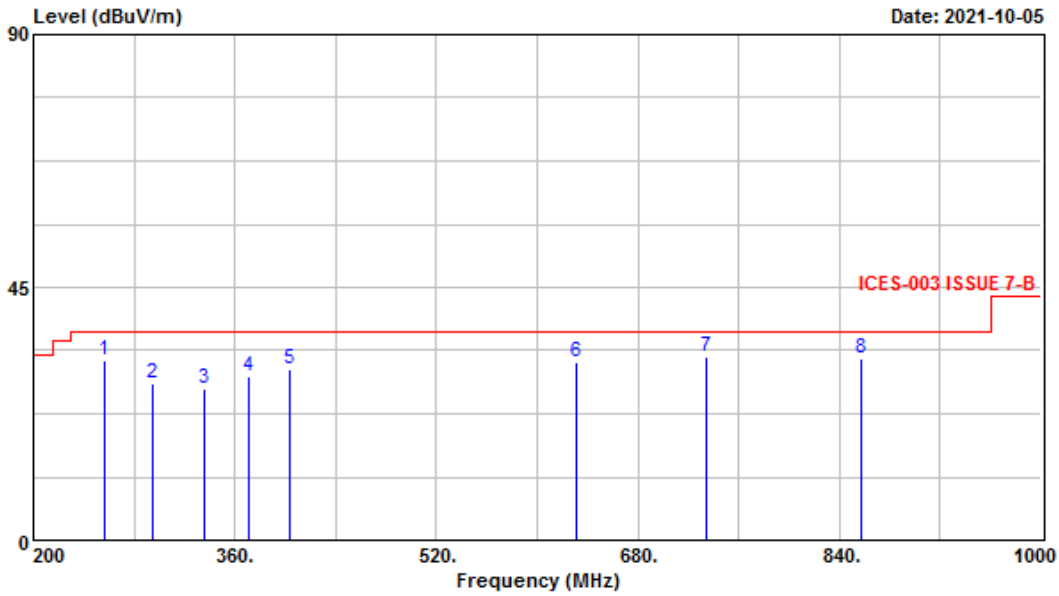
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	37.270	22.62	-7.38	30.00	30.67	19.38	1.04	28.47	Peak	---	---
2	55.090	20.73	-9.27	30.00	35.62	12.17	1.40	28.46	Peak	---	---
3	122.560	21.87	-11.23	33.10	30.28	17.87	2.02	28.30	Peak	---	---
4	148.160	26.19	-6.91	33.10	36.19	15.92	2.29	28.21	QP	---	---
5	184.660	26.75	-6.35	33.10	37.80	14.49	2.54	28.08	QP	---	---



Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	256.000	32.13	-4.87	37.00	38.57	18.15	3.21	27.80	Peak	---	---
2	295.200	27.91	-9.09	37.00	34.14	18.32	3.29	27.84	Peak	---	---
3	336.000	26.80	-10.20	37.00	31.97	19.06	3.80	28.03	Peak	---	---
4	371.200	29.13	-7.87	37.00	33.48	19.94	4.00	28.29	Peak	---	---
5	404.000	30.30	-6.70	37.00	33.71	21.13	4.02	28.56	Peak	---	---
6	630.400	31.82	-5.18	37.00	31.55	23.96	5.48	29.17	Peak	---	---
7	733.600	32.55	-4.45	37.00	31.25	24.52	5.87	29.09	Peak	---	---
8	857.600	32.22	-4.78	37.00	28.79	25.54	6.73	28.84	Peak	---	---



5.2. Radiated Emission above 1GHz

5.2.1.Limit

radiated emissions at frequencies above 1 GHz for Class A equipment			
Frequency range GHz	Measurement		Class A limits
	Distance (m)	Detector type / bandwidth	dB(µV/m)
1 – 18	3	Average / 1 MHz	60
1 – 18		Peak / 1 MHz	80
18 – 40	1	Average / 1 MHz	69.54
18 – 40		Peak / 1 MHz	89.54
radiated emissions at frequencies above 1 GHz for Class B equipment			
Frequency range GHz	Measurement		Class B limits
	Distance (m)	Detector type / bandwidth	dB(µV/m)
1 – 18	3	Average / 1 MHz	54
1 – 18		Peak / 1 MHz	74
18 – 40	1	Average / 1 MHz	63.54
18 – 40		Peak / 1 MHz	83.54
1. The measurement bandwidth shall be 1 MHz or greater. 2. These limit levels apply for a measurement distance of 3 m. If using a different measurement distance, the measured levels shall be extrapolated to the 3 m limit distance using a factor of 20 dB per decade of distance. The measurement distance shall place the measurement antenna in the far field of the ITE or digital apparatus under test. 3. The test site shall have been validated at the distance used for radiated emission measurements on the ITE or digital apparatus under test.			
Remark: It should be noted that the field strength is inversely proportional to distance, so the field strength at 3m is 1/3 the strength at 1m, i.e. $L3m/Lx = X/3$. Ex. $L3m\text{ dB}-Lx\text{ dB} = 20\log(3/x)$; $L1m\text{ dB} = 60 + 20\log(3/1) = 69.54\text{ dB}(\mu\text{V/m})$ Ex. $L3m\text{ dB}-Lx\text{ dB} = 20\log(3/x)$; $L1m\text{ dB} = 54 + 20\log(3/1) = 63.54\text{ dB}(\mu\text{V/m})$			

Required highest measurement frequency for radiated emissions	
Highest internal frequency (F_x)	Highest measured frequency
$F_x \leq 108\text{ MHz}$	1 GHz
$108\text{ MHz} < F_x \leq 500\text{ MHz}$	2 GHz
$500\text{ MHz} < F_x \leq 1\text{ GHz}$	5 GHz
$F_x > 1\text{ GHz}$	$5 \times F_x$ up to a maximum of 40 GHz
Note: F_x is the highest fundamental frequency generated and/or used in the ITE or digital apparatus under test.	



5.2.2. Test Procedures

Tabletop equipment:

- a). Same test set up as below 1GHz radiated testing.
- b). The EUT was set 3m (1 – 18GHz) / 1m (18 – 40GHz) from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- c). There should be absorber placed between the EUT and Antenna and its located size should let the test site meet CISPR16-1-4 requirement.
- d). The table was rotated 360 degrees to determine the position of the highest radiation.
- e). The measured using a test-receiver system with both a peak and CISPR average detector.
- f). If the EUT is having a Wireless or Bluetooth modular, can choose to install the filter at the input connector of test-receiver system.
- g). Set the DRG Horn Antenna at 1M height, then run the turn table to get the maximum noise reading from Horizontal and Vertical polarity separately the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- h). When EUT locating on the turn-table, and its height is over 172cm (Antenna’s 3dB beam width of 6GHz is 27°), the DRG Horn Antenna must be raised up and descended down, while keeping the antenna in the cone of radiation from that area and pointed at the area both in azimuth and elevation, then turning around the turn-table to get the maximum noise reading of the Horizontal and Vertical polarity separately.
- i). If emission level of the EUT in peak mode was 23dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

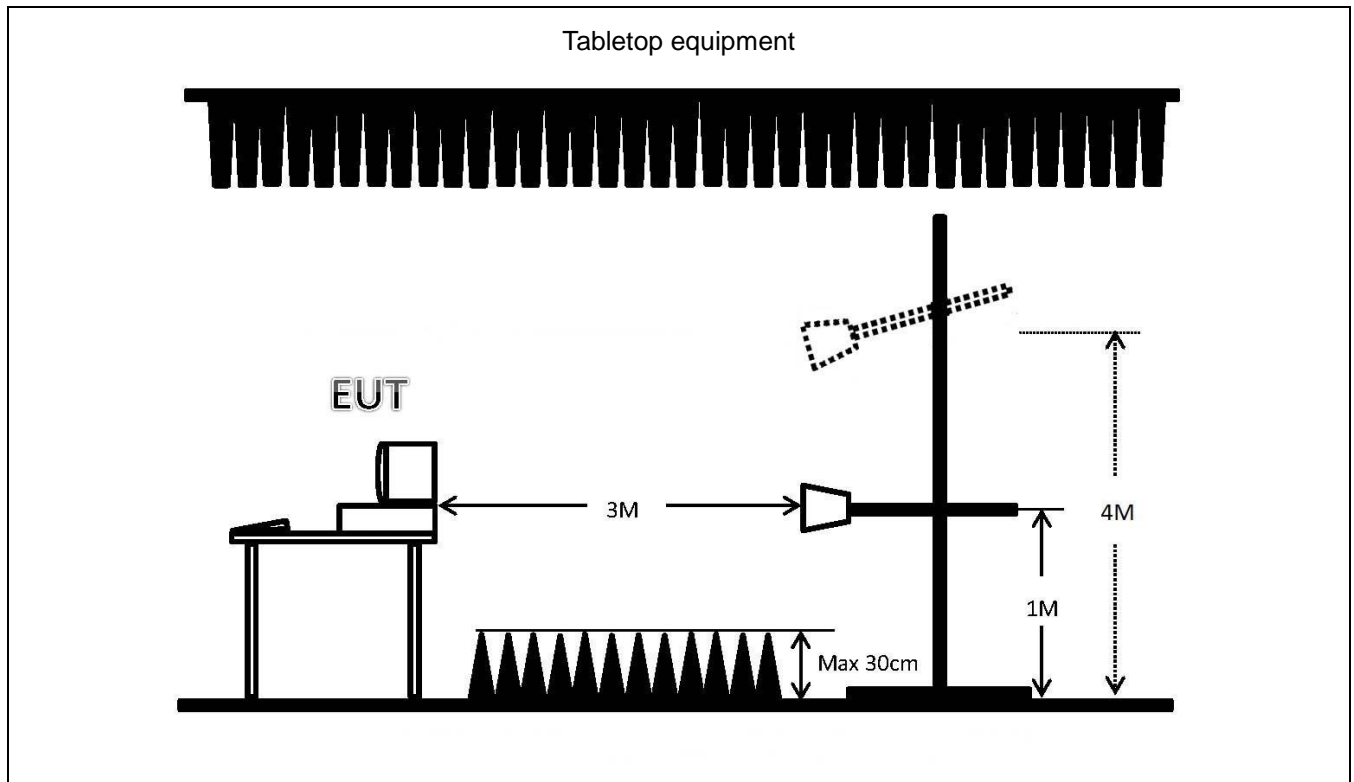
Floor-standing equipment:

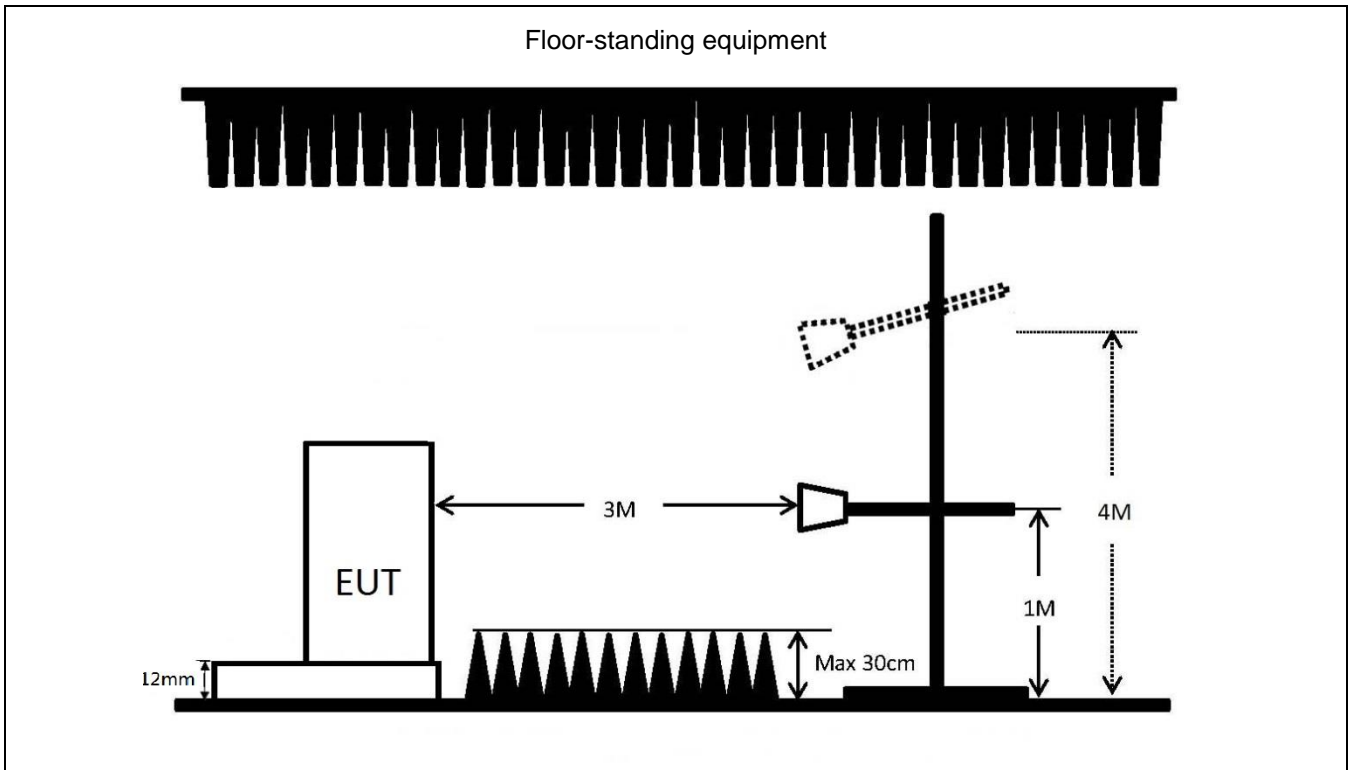
- a). Same test set up as below 1GHz radiated testing.
- b). The EUT was set 3m (1 – 18GHz) / 1m (18 – 40GHz) from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- c). There should be absorber placed between the EUT and Antenna and its located size should let the test site meet CISPR16-1-4 requirement.
- d). The table was rotated 360 degrees to determine the position of the highest radiation.
- e). The measured using a test-receiver system with both a peak and CISPR average detector.
- f). If the EUT is having a Wireless or Bluetooth modular, can choose to install the filter at the input connector of test-receiver system.
- g). Set the DRG Horn Antenna at 1M height, then run the turn table to get the maximum noise reading from Horizontal and Vertical polarity separately the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- h). When EUT locating on the turn-table, and its height is over 172cm (Antenna’s 3dB beam width of 6GHz is 27°), the DRG Horn Antenna must be raised up and descended down, while keeping the antenna in the cone of radiation from that area and pointed at the area both in azimuth and elevation, then turning around the turn-table to get the maximum noise reading of the Horizontal and Vertical polarity separately.
- i). If emission level of the EUT in peak mode was 23dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

5.2.3. Measurement Results Calculation

The measured Level is calculated using:
 Corrected Reading (dB μ V/m) = Raw(Read Level)+AF(Antenna Factor)+CL(Cable Loss)-PA(Preamp Factor)
 For example at 1980 MHz if the Antenna Factor is 26.19 dB/m, the cable loss is 4.08 dB, the measured voltage is 51.30 dB μ V and the Preamp Factor is 33.34 dB, the signal strength would be calculated:
 Corrected Reading (dB μ V/m) = 51.30 dB μ V + 26.19 dB/m + 4.08 dB - 33.34 dB = 48.23 dB μ V/m
 Note: If a Band reject filter is used, this factor will be added to the sum of the factors.

5.2.4. Typical Test Setup Layout





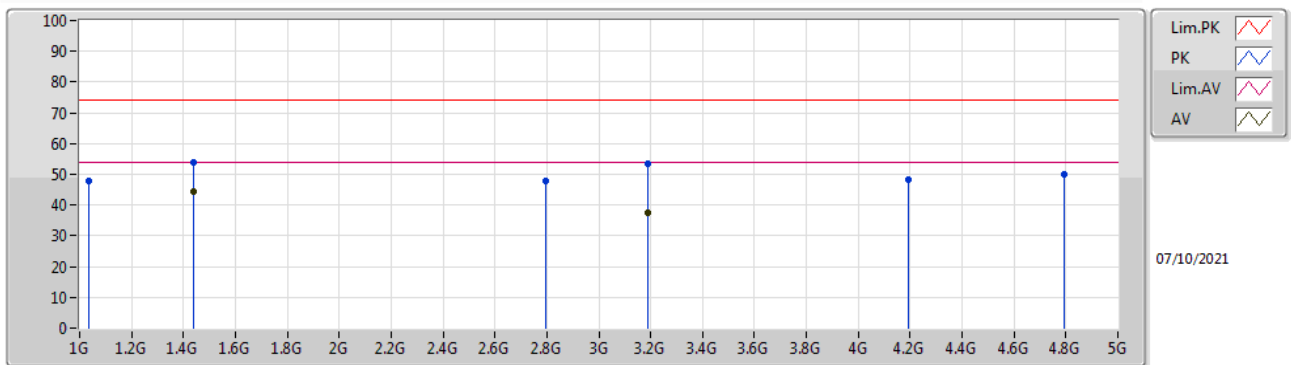


5.2.5. Test Result

Test mode	Mode 3		
Test frequency	Above 1GHz	Test Voltage	AC 120V / 60Hz
<p>■ The test was passed at the minimum margin that marked by the frame in the following data</p>			

Vertical

Mode 3

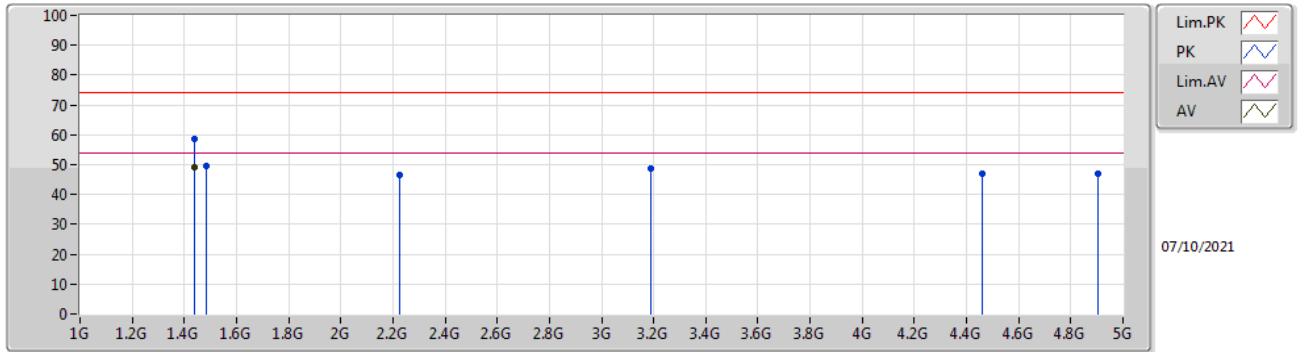


Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB/m)	CL (dB)	PA (dB)
PK	1.035G	47.77	74.00	-26.23	-8.71	3	Vertical	-	-	-	56.48	24.54	2.88	36.13
PK	1.44G	53.85	74.00	-20.15	-5.73	3	Vertical	290	1	-	59.58	26.30	3.40	35.43
AV	1.44G	44.50	54.00	-9.50	-5.73	3	Vertical	290	1	"Worst"	50.23	26.30	3.40	35.43
PK	2.795G	47.78	74.00	-26.22	-2.50	3	Vertical	-	-	-	50.28	28.37	4.27	35.14
PK	3.19G	53.59	74.00	-20.41	-1.93	3	Vertical	38	1	-	55.52	29.08	4.08	35.09
AV	3.19G	37.50	54.00	-16.50	-1.93	3	Vertical	38	1	-	39.43	29.08	4.08	35.09
PK	4.195G	48.13	74.00	-25.87	0.94	3	Vertical	-	-	-	47.19	29.99	5.86	34.91
PK	4.795G	49.79	74.00	-24.21	2.82	3	Vertical	-	-	-	46.97	31.21	6.25	34.64



Horizontal

Mode 3



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB/m)	CL (dB)	PA (dB)
PK	1.44G	58.75	74.00	-15.25	-5.73	3	Horizontal	320	1	-	64.48	26.30	3.40	35.43
AV	1.44G	49.31	54.00	-4.69	-5.73	3	Horizontal	320	1	"Worst"	55.04	26.30	3.40	35.43
PK	1.485G	49.61	74.00	-24.39	-5.93	3	Horizontal	-	-	-	55.54	25.95	3.48	35.36
PK	2.225G	46.66	74.00	-27.34	-2.40	3	Horizontal	-	-	-	49.06	28.60	4.10	35.10
PK	3.19G	48.91	74.00	-25.09	-1.93	3	Horizontal	-	-	-	50.84	29.08	4.08	35.09
PK	4.46G	47.08	74.00	-26.92	2.43	3	Horizontal	-	-	-	44.65	30.62	6.61	34.80
PK	4.905G	47.13	74.00	-26.87	3.05	3	Horizontal	-	-	-	44.08	31.23	6.41	34.59



6. Uncertainty of Test Site

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$)).

6.1. Emission Test Measurement Uncertainty

Test Items	Test Site No.	U_{LAB}
Conducted Emissions	CO01-NH	2.66 dB
Radiated Emissions below 1GHz	OS03-NH	5.07 dB
Radiated Emissions above 1GHz	03CH04-HY	3.53 dB



7. List of Measuring Equipment Used

Conducted Emission - Test Date: 06/Oct/2021

Instrument	Manufacturer/ Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	R&S	ESR	102318	9kHz - 3.6 GHz	26/Jul/2021	25/Jul/2022	Conduction (CO01-NH)
LISN	SCHAFFNER	NNB41	06/10024	9kHz - 30MHz	28/Dec/2020	27/Dec/2021	Conduction (CO01-NH)
LISN (Support Unit)	MessTec	NNB-2/16Z	99079	9kHz - 30MHz	03/Feb/2021	02/Feb/2022	Conduction (CO01-NH)
Power Filter	CORCOM	MR12030	N/A	30A*2	NCR	NCR	Conduction (CO01-NH)
RF Cable-CON	Suhner Switzerland	RG223/U	CB004	9kHz - 30MHz	25/Dec/2020	24/Dec/2021	Conduction (CO01-NH)
software	Audix	E3	6.12160806	-	NCR	NCR	Conduction (CO01-NH)

NCR: No Calibration Required

Radiated Emission below 1GHz - Test Date: 05/Oct/2021

Instrument	Manufacturer/ Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Open Area Test Site	SPORTON	OATS-10	OS03-NH	30 MHz - 1 GHz 10m, 3m	20/Oct/2020	19/Oct/2021	Radiation (OS03-NH)
Amplifier	HP	8447D	2944A08292	0.1 MHz - 1.3 GHz	02/Jul/2021	01/Jul/2022	Radiation (OS03-NH)
Spectrum Analyzer	R&S	FSP7	838858/038	9 kHz - 7GHz	21/Jun/2021	20/Jun/2022	Radiation (OS03-NH)
Receiver	R&S	ESCS30	100357	9 kHz - 2.75 GHz	07/May/2021	06/May/2022	Radiation (OS03-NH)
Bilog Antenna With 5dB Attenuator	CHASE	CBL6112D	25234	30 MHz - 2 GHz	24/Apr/2021	23/Apr/2022	Radiation (OS03-NH)
Turn Table	EMCO	2080	9805-2065	0 - 360 degree	NCR	NCR	Radiation (OS03-NH)
Antenna Mast	EMCO	2075	9804-2151	1 m - 4 m	NCR	NCR	Radiation (OS03-NH)
RF Cable-R10m	HSCN	RG213U	2X11N	30 MHz - 1 GHz	13/Jul/2021	12/Jul/2022	Radiation (OS03-NH)
Software	Audix	E3	Ver.4	-	NCR	NCR	Radiation (OS03-NH)

NCR: No Calibration Required

**Radiated Emission above 1GHz - Test Date: 07/Oct/2021**

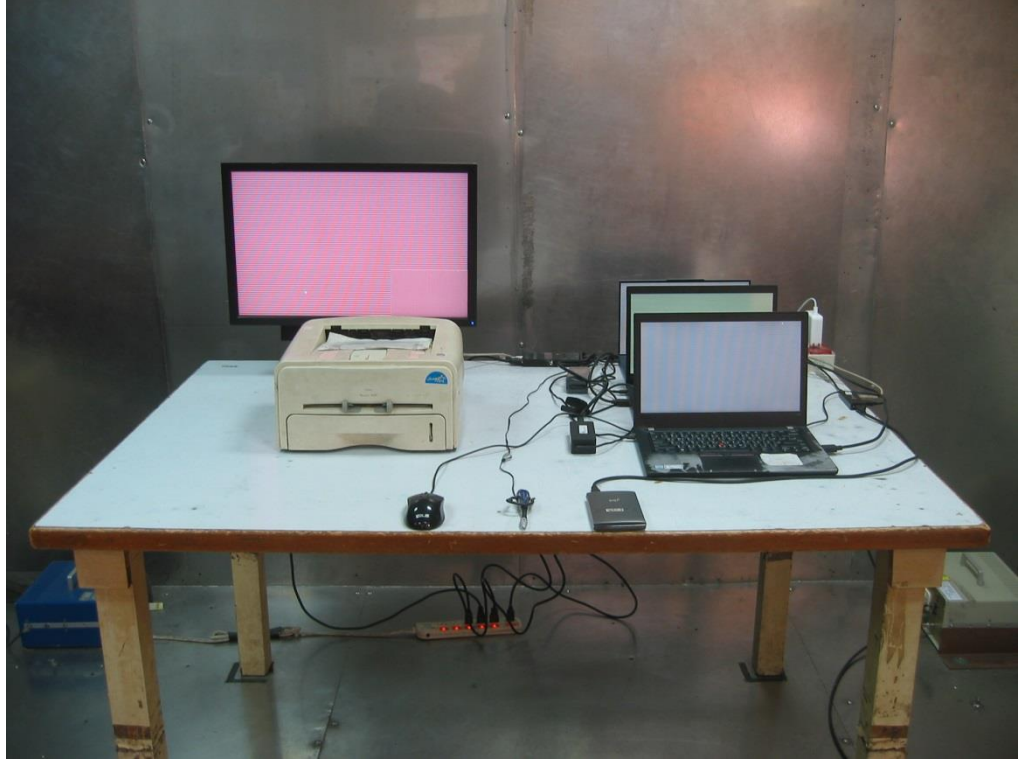
Instrument	Manufacturer/ Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Test Receiver	R&S	ESU-26	100422	20Hz ~ 26.5GHz	03/Nov/2020	02/Nov/2021	Radiation (03CH04-HY)
3m Semi Anechoic Chamber (Site V.S.W.R)	RIKEN	3m SAC	03CH04-HY	1 GHz ~ 18 GHz 3m	19/Feb/2021	18/Feb/2022	Radiation (03CH04-HY)
Microwave Preamplifier	Agilent	8449B	3008A02602	1GHz~26.5GHz	19/Mar/2021	18/Mar/2022	Radiation (03CH04-HY)
Horn Antenna	SCHWARZBECK	BBHA9120	BBHA9120D01834	1 GHz ~ 18 GHz	23/Feb/2021	22/Feb/2022	Radiation (03CH04-HY)
RF Cable	SUHNER	SUCOFLEX 104	CB001-03CH01	30MHz~18GHz	25/Feb/2021	24/Feb/2022	Radiation (03CH04-HY)
Turn Table	Chaintek	3000	MF7802056	0 ~ 360 degree	NCR	NCR	Radiation (03CH04-HY)
Antenna Mast	MF	MF-7802	MF780208163	1 ~ 4 m	NCR	NCR	Radiation (03CH04-HY)
Software	Sporton	SENSE-EMI	V5.10.7	-	NCR	NCR	Radiation (03CH04-HY)

NCR: No Calibration Required

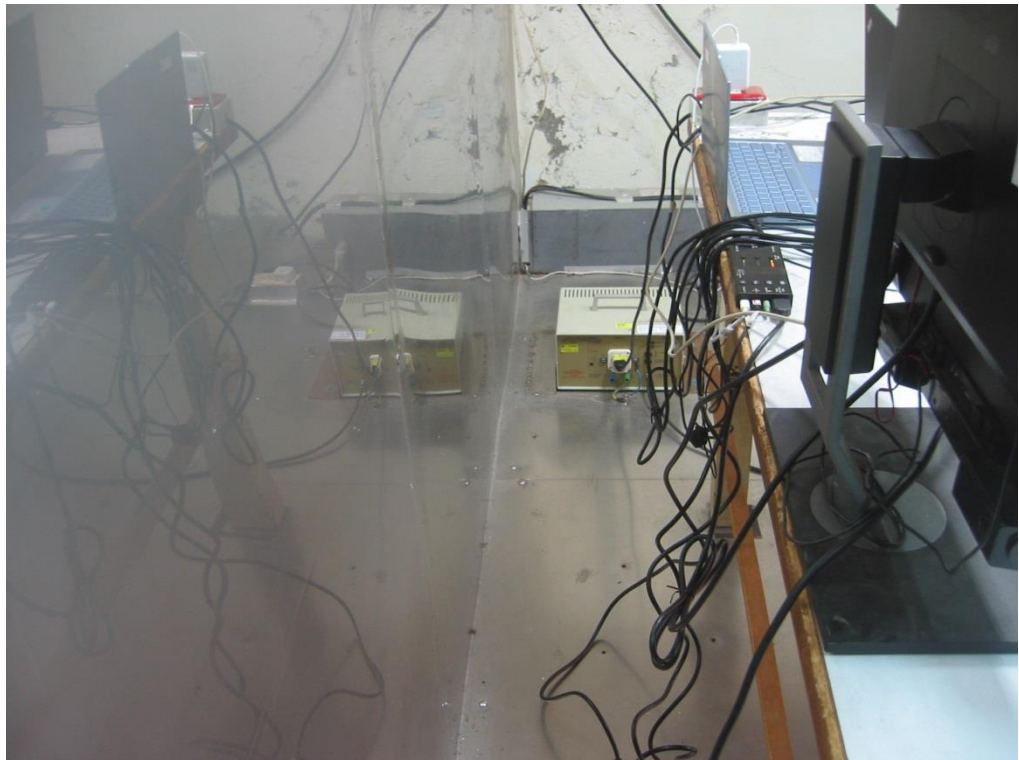
Appendix A. Test Photos

1. Photographs of Conducted Emissions Test Configuration

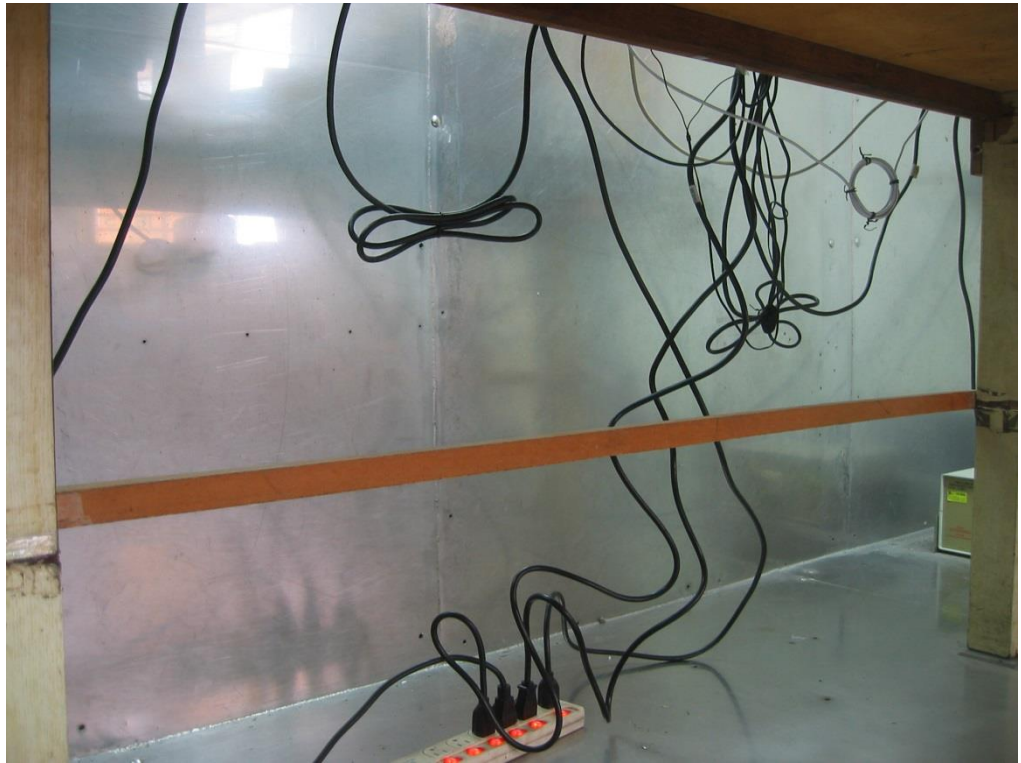
Front View



Side View



Under Table View



2. Photographs of Radiated Emissions Test Configuration

For radiated emissions below 1GHz

Front View



Rear View



For radiated emissions above 1GHz

Front View



Rear View



————THE END————