

VERIFICATION OF COMPLIANCE

● Equipment : WiFi6 11ax 2T2R module 1800Mbps
Model No. : AW7915-NPD
Applicant : AsiaRF Co., Ltd.
1F, 7, Houde Street, Yonghe Dist. New Taipei City
Taiwan 23455



I HEREBY

DECLARE THAT :

The equipment was **Passed** the test performed according to the following Standard
EN 55032:2015+A11:2020 Class B, EN 61000-3-2:2014,
EN 61000-3-3:2013, EN 55035:2017

(IEC 61000-4-2 Edition 2.0 2008-12, IEC 61000-4-3 Edition 3.2 2010-04,
IEC 61000-4-4 Edition 3.0 2012-04, IEC 61000-4-5 Edition 3.1 2017-08,
IEC 61000-4-6 Edition 4.0 2013-10, IEC 61000-4-8 Edition 2.0 2009-09,
IEC 61000-4-11 Edition 3.0 2020-01)

The test was carried out on **Apr. 21, 2022** at **SPORTON INTERNATIONAL INC.**
Hsinhua Laboratory.

William Li



EMC TEST REPORT

Equipment : WiFi6 11ax 2T2R module 1800Mbps
Brand Name : AsiaRF Co., Ltd.
Model Name : AW7915-NPD
Applicant : AsiaRF Co., Ltd.
1F, 7, Houde Street, Yonghe Dist. New Taipei City
Taiwan 23455
Manufacturer : AsiaRF Co., Ltd.
1F, 7, Houde Street, Yonghe Dist. New Taipei City
Taiwan 23455
Standard : EN 55032:2015+A11:2020 Class B
EN 61000-3-2:2014
EN 61000-3-3:2013
EN 55035:2017

The product was received on Mar. 28, 2022, and testing was started from Apr. 07, 2022 and completed on Apr. 21, 2022. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in above 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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History of this test report

Report No.	Version	Description	Issued Date
EC211912	01	Initial issue of report	Jun. 27, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test reference standard	Test Items	Result (PASS/FAIL)	Remark
Emission Tests and Conformance Test Specifications					
4.1	A.3	EN 55032:2015+A11:2020 Class B	Conducted Emission	PASS	Under limit 15.74 dB at 0.15 MHz
-	A.3		Conducted Emissions of asymmetric mode	Not Applicable	Note 1
4.2	A.2		Radiated Emissions below 1GHz	PASS	Under limit 4.56 dB at 249.600 MHz
4.3	A.2		Radiated Emissions above 1GHz	PASS	Under limit 23.29 dB at 4.875 GHz
-	6.2	EN 61000-3-2:2014	Harmonic Current Emissions	Not Applicable	Note 2
-	6.1	EN 61000-3-3:2013	Voltage Fluctuations and Flicker	Not Applicable	Note 2
<p>Note 1: There are no wired network ports on the EUT.</p> <p>Note 2: After fixed installation or following the instructions for use, the power is provided by the host system.</p>					



EMC TEST REPORT

Report No. : EC211912

Report Clause	Ref Std. Clause	Test reference standard	Test Items		Result (PASS/FAIL)	Remark
Immunity Tests and Conformance Test Specifications - EN 55035:2017						
5.2	4.2.1	IEC 61000-4-2 Edition 2.0 2008-12	ESD		PASS	-
5.3	4.2.2.2	IEC 61000-4-3 Edition 3.2 2010-04	RS		PASS	-
-	4.2.4	IEC 61000-4-4 Edition 3.0 2012-04	EFT/B	Power Port	Not Applicable	Note 1
				Analogue/digital data ports	Not Applicable	Note 2
-	4.2.5	IEC 61000-4-5 Edition 3.1 2017-08	Surges	Power Port	Not Applicable	Note 1
				Analogue/digital data ports	Not Applicable	Note 2
-	4.2.2.3	IEC 61000-4-6 Edition 4.0 2013-10	CS	Power Port	Not Applicable	Note 1
				Analogue/digital data ports	Not Applicable	Note 2
5.4	4.2.3	IEC 61000-4-8 Edition 2.0 2009-09	Power Frequency Magnetic Fields		PASS	-
-	4.2.6	IEC 61000-4-11 Edition 3.0 2020-01	Voltage dips		Not Applicable	Note 1
			Voltage interruptions		Not Applicable	Note 1
According to the applicant's requirements, the version of the normative reference used in this test report is specified by the applicant.						
Note 1: After fixed installation or following the instructions for use, the power is provided by the host system.						
Note 2: There are no Analogue/digital data ports on the EUT.						

Declaration of Conformity:	
<ol style="list-style-type: none"> The Radiated Emission and Conducted Transient Disturbances test result (Pass/Fail) which exclude measurement uncertainty. Note that measurement values may risk exceeding the limit of regulation standard. If measurement uncertainty is included in test results. The Radiated Emission and Conducted Transient Disturbances measurement uncertainty please refer to the "Measurement Uncertainty" section of the report. 	
Comments and explanations:	
<ol style="list-style-type: none"> The test configuration and test mode were recorded in this test report are declared by the manufacturer. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification. 	

Reviewed by: Mark Ma

Report Producer: Debby Hung

1. General Description of Equipment under Test

1.1. Basic Description of Equipment under Test

Equipment : WiFi6 11ax 2T2R module 1800Mbps
Model No. : AW7915-NPD
Power Supply Type : From Host System
The maximum operating frequency : 5.85 GHz

1.2. Feature of Equipment under Test

Group	Ant.	Brand	Model Name	Antenna Type	Connector	Support	Cable Loss (dBi)
1	1-2	Asiarf	ANT010-DAU	PCB	I-PEX / MMCX	2.4G+5G	0.3
2	3-4	Asiarf	ANT003	PCB	I-PEX / MMCX	2.4G+5G	0.3
3	5-6	Asiarf	A245005N	PCB	I-PEX / MMCX	2.4G+5G	0.3
4	7-8	Asiarf	A2405N	PCB	I-PEX / MMCX	2.4G	0.3
5	9-10	Asiarf	A5005N	PCB	I-PEX / MMCX	5G	0.3
6	11-12	Asiarf	A245004	Dipole	I-PEX / MMCX	2.4G+5G	0.3
7	13-14	Asiarf	A245002	Dipole	I-PEX / MMCX	2.4G+5G	0.3

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

1.3. Table for Multiple Listing

SKU	Ant. Connector	Description
1	I-PEX	There are two SKUs for EUT. The only difference between SKU 1 and SKU 2 is Ant. Connector, but the gain is same.
2	MMCX	

Note 1: The information is provided by manufacturer.

Note 2: After evaluation, only SKU1 is required to be tested.

2. Test Configuration of Equipment under Test

2.1. Details of EUT Test Modes

Model No.: AW7915-NPD was selected as the main test model and its data was recorded in this report. The equipment under test was performed the following test modes:

Test Items	Description of test modes
Conducted Emission	Mode 1. PCB antenna(ANT010-DAU),WiFi2.4G&5G/ I-Pex connector Mode 2. Dipole antenna(A245004),WiFi2.4G&5G/ I-Pex connector Mode 3. Dipole antenna(A245002),WiFi2.4G&5G/ I-Pex connector Mode 4. PCB antenna(A245005N),WiFi2.4G&5G/ I-Pex connector Mode 5. PCB antenna(ANT003),WiFi2.4G&5G/ I-Pex connector Mode 6. PCB antenna(A2405N),WiFi2.4G/ I-Pex connector Mode 7. PCB antenna(A5005N),WiFi5G/ I-Pex connector cause "mode 1" generated the worst test result; it was reported as final data.
Radiated Emissions <below 1GHz>	Mode 1. PCB antenna(ANT010-DAU),WiFi2.4G&5G/ I-Pex connector Mode 2. Dipole antenna(A245004),WiFi2.4G&5G/ I-Pex connector Mode 3. Dipole antenna(A245002),WiFi2.4G&5G/ I-Pex connector Mode 4. PCB antenna(A245005N),WiFi2.4G&5G/ I-Pex connector Mode 5. PCB antenna(ANT003),WiFi2.4G&5G/ I-Pex connector Mode 6. PCB antenna(A2405N),WiFi2.4G/ I-Pex connector Mode 7. PCB antenna(A5005N),WiFi5G/ I-Pex connector cause "mode 1" generated the worst test result; it was reported as final data.
Radiated Emissions <above 1GHz>	Mode 1. PCB antenna(ANT010-DAU),WiFi2.4G&5G/ I-Pex connector The measurement of radiated emissions above 1GHz follows the test configuration for the worst test results below 1GHz.

Test Items	Description of test modes
EMS	Mode 1. PCB antenna(ANT010-DAU),WiFi2.4G&5G/ I-Pex connector

2.2. Description of Test System

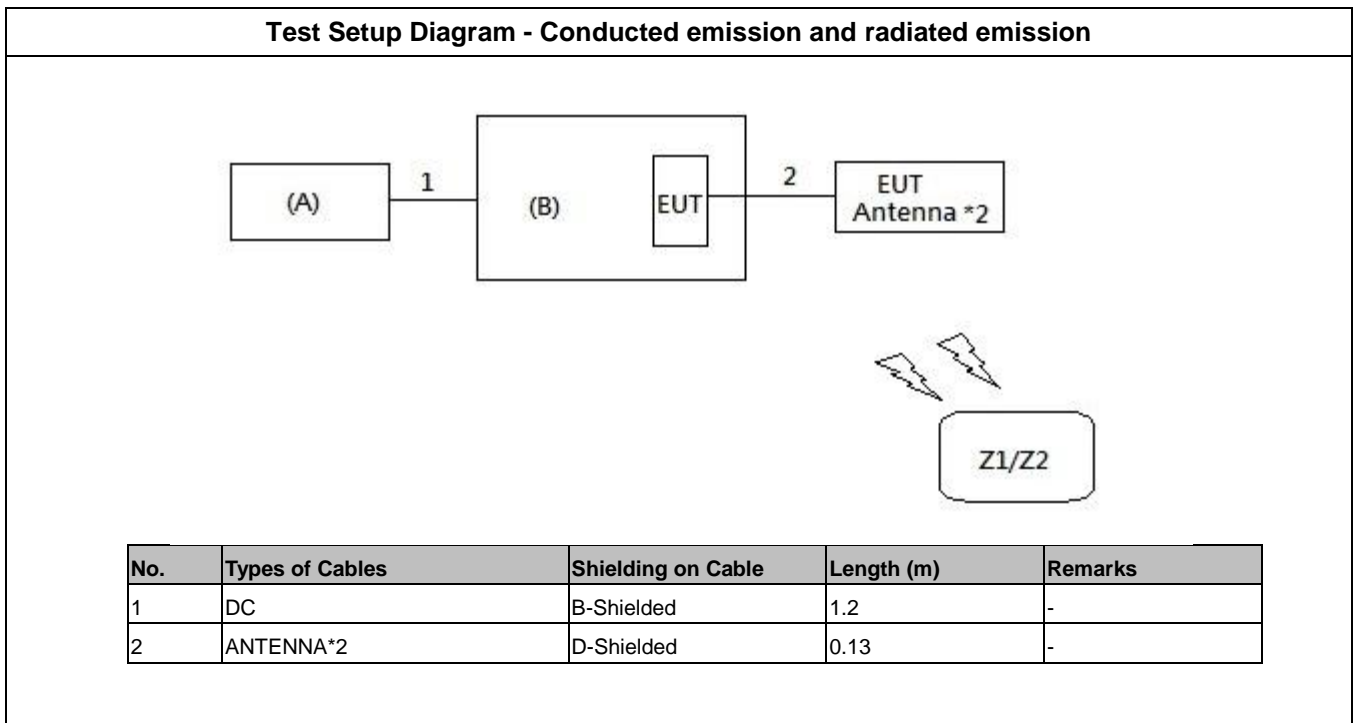
Conducted emission and radiated emission

No.	Peripheral	Manufacturer	Model Number	FCC ID	Remarks
For Local					
A	Adapter	YINGHUIYUAN	YHY-12004000	DoC	-
B	PCB fixture	N/A	N/A	-	-
For Remote					
Z1	Laptop	DELL	Latitude E5520	DoC	-
Z2	Laptop	DELL	Latitude E5520	DoC	-

EMS

No.	Peripheral	Manufacturer	Model Number	Signal Cable	Cable Type	Length (m)	Remarks
For Local							
A	ADAPTER	YINGHUIYUAN	YHY-12004000	DC Cable	Non-Shielded	1.2	-
B	PCB fixture	N/A	N/A	-	-	-	-
For Remote							
Z	Laptop1	DELL	E5520	-	-	-	-
Z	Laptop2	DELL	E5520	-	-	-	-

2.3. Connection Diagram of Test System





2.4. Details of EUT Test Setup

EMI & EMS

During the test, the following program under WIN 7 was executed:

- The remote Laptop executed "ping" to link with the EUT to maintain the connection by WIFI.

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 %	pressure kPa		
Powerline Conducted Emissions		CO01-NH	Willy Lee	23.6~23.7	71~72	-	11/Apr/2022	-
Radiated Emissions (below 1GHz)		OS03-NH	Louis Lin	24.1~24.2	63.1~63.2	-	11/Apr/2022	-
Radiated Emissions (above 1GHz)		03CH04-HY	Alan Chen	23.8~23.9	62~63	-	21/Apr/2022	-
ESD		ES01-HY	Jaily	22.1~22.9	48~49	100	16/Apr/2022	-
RS		RS01-HY	Jaily	23.6~23.9	47~48	100	16/Apr/2022	-
Power Frequency Magnetic Fields		EX02-HY	Jaily	24.1~24.6	46~47	100	16/Apr/2022	-

3.2. Test Standards

Test items	Test Standards and Test Procedures
Radiated and Conducted Emissions	European Standard EN 55032 Class B
Harmonics	European Standard EN 61000-3-2
Voltage Fluctuations	European Standard EN 61000-3-3
EMS	European Standard EN 55035 (ESD: IEC 61000-4-2, RS: IEC 61000-4-3, EFT: IEC 61000-4-4, SURGES: IEC 61000-4-5, CS: IEC 61000-4-6, PFMF: IEC 61000-4-8, DIPs: IEC 61000-4-11)

3.3. Test Voltage/Frequencies

Power Supply Type	Voltage/Frequencies
Host System	230V / 50Hz

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 6,000 MHz	Measurement distance is 3 m.
Radio frequency electromagnetic field immunity	80 to 1,000 MHz	Measurement distance is 3 m.
	1,800 MHz / 2,600 MHz / 3,500 MHz / 5,000 MHz	Measurement distance is 3 m.

3.5. Operating Condition

- Customers request this specification for test plan.

4. Emissions Measurement

The EUT is which satisfies the Class B disturbance limits.

4.1. Conducted Emissions at Powerline

4.1.1. Limit

conducted emissions from the AC mains power ports of Class A equipment			
Frequency range MHz	Coupling device	Detector type / bandwidth	Class A limits dB(μV)
0,15 – 0,5	AMN	Quasi-peak / 9 kHz	79
0,50 – 30			73
0,15 – 0,5	AMN	Average / 9 kHz	66
0,50 – 30			60

conducted emissions from the AC mains power ports of Class B equipment			
Frequency range MHz	Coupling device	Detector type / bandwidth	Class B limits dB(μV)
0,15 – 0,5	AMN	Quasi-peak / 9 kHz	66 - 56
0,5 – 5			56
5 – 30			60
0,15 – 0,5	AMN	Average / 9 kHz	56 - 46
0,5 – 5			46
5 – 30			50

Note: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

4.1.2. 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, 0.15 meter 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.

4.1.3. Measurement Results Calculation

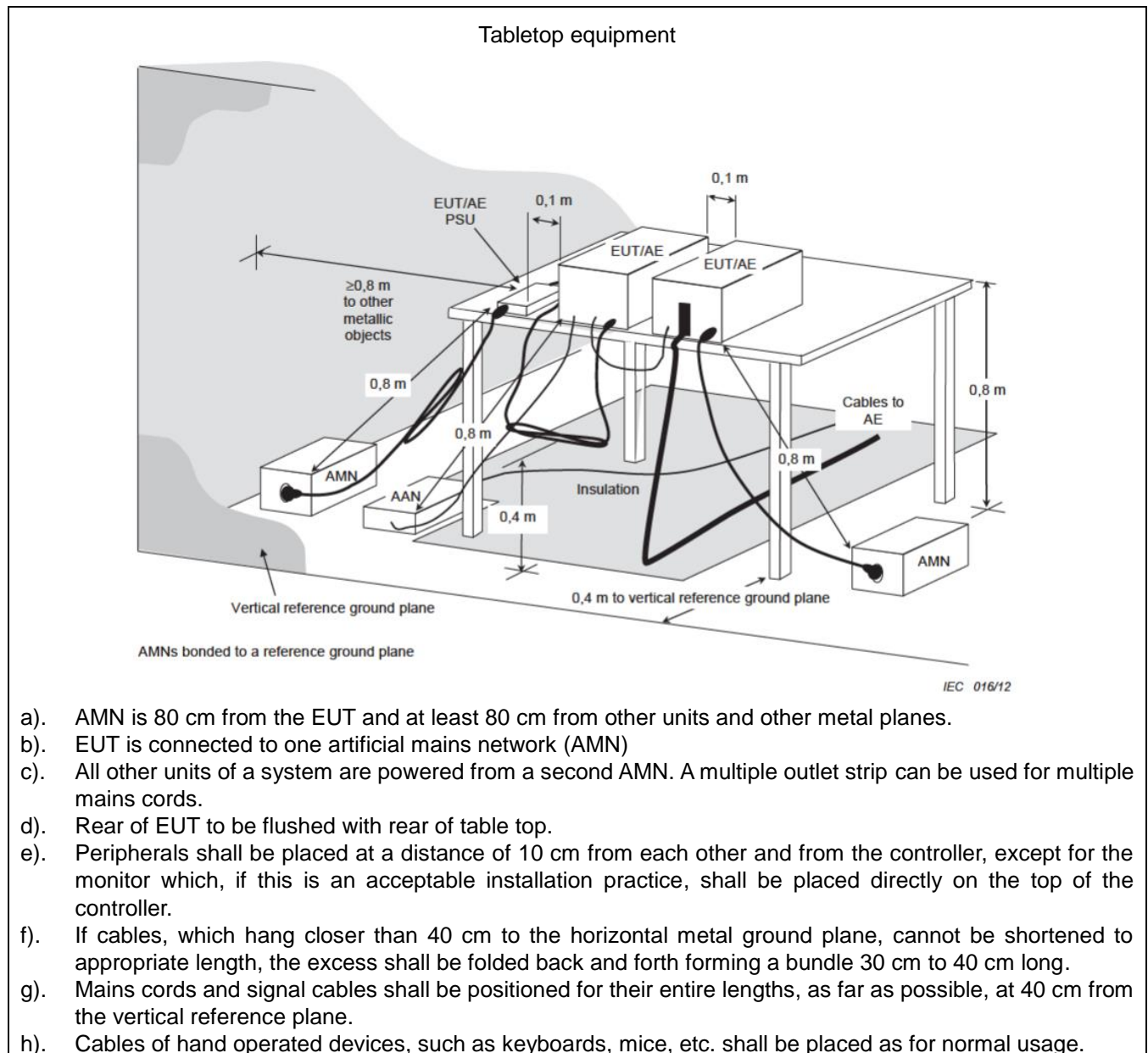
The measured Level is calculated using:

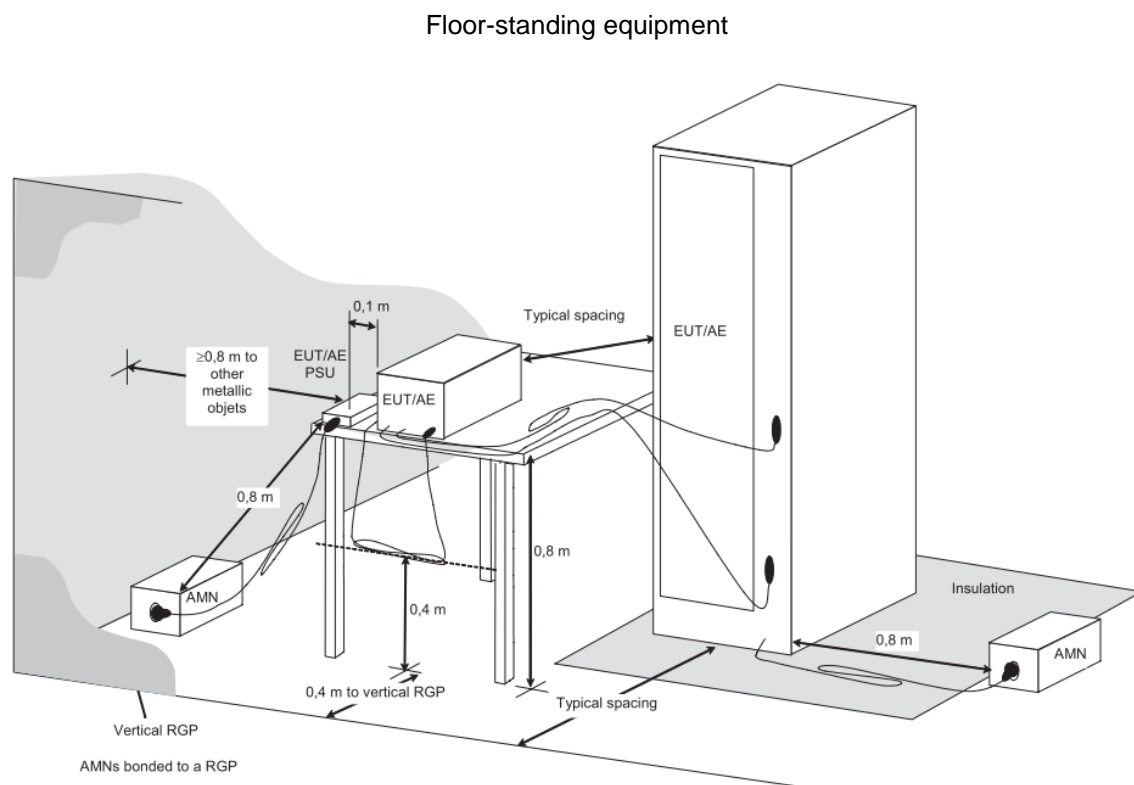
Corrected Reading (dB μ V) = LISN Factor + Cable Loss + Read Level

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:

Corrected Reading (dB μ V) = 10.48 dB + 0.10 dB + 36.39 dB μ V = 46.97 dB μ V

4.1.4. Typical Test Setup Layout





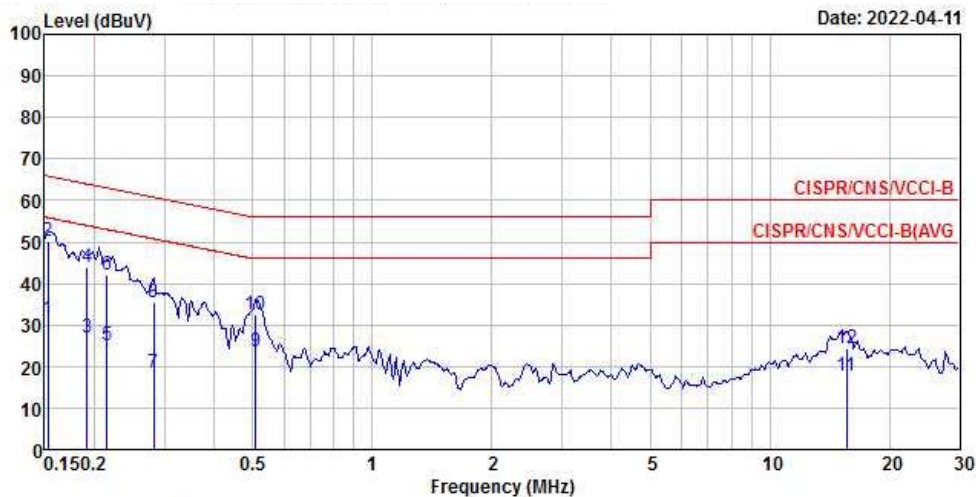
IEC 021/12

- a). AMN is 80 cm from the EUT and at least 80 cm from other units and other metal planes.
- b). EUT is connected to one artificial mains network (AMN)
- c). All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.
- d). Rear of EUT to be flushed with rear of table top.
- e). Peripherals shall be placed at a distance of 10 cm from each other and from the controller, except for the monitor which, if this is an acceptable installation practice, shall be placed directly on the top of the controller.
- f). If cables, which hang closer than 40 cm to the horizontal metal ground plane, cannot be shortened to appropriate length, the excess shall be folded back and forth forming a bundle 30 cm to 40 cm long.
- g). Mains cords and signal cables shall be positioned for their entire lengths, as far as possible, at 40 cm from the vertical reference plane.
- h). Cables of hand operated devices, such as keyboards, mice, etc. shall be placed as for normal usage.
- i). The EUT shall be insulated (by insulation of maximum thickness of 150 mm) from the horizontal reference ground plane.

4.1.5. Test Result

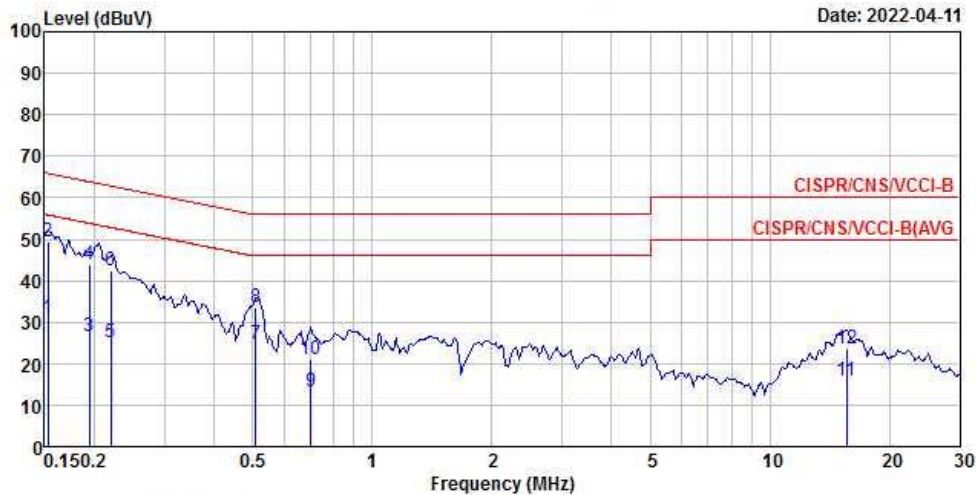
Test Mode	Mode 1		
Test Frequency	0.15 MHz ~ 30 MHz	Test Voltage	AC 230V / 50Hz
■ The test was passed at the minimum margin that marked by the frame in the following data			

Line



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.15	31.26	-24.56	55.82	20.89	10.28	0.09	Average
2 @	0.15	50.08	-15.74	65.82	39.71	10.28	0.09	QP
3	0.19	26.84	-27.11	53.95	16.48	10.27	0.09	Average
4	0.19	44.04	-19.91	63.95	33.68	10.27	0.09	QP
5	0.22	25.05	-27.95	53.00	14.69	10.27	0.09	Average
6	0.22	42.24	-20.76	63.00	31.88	10.27	0.09	QP
7	0.28	18.33	-32.43	50.76	7.97	10.27	0.09	Average
8	0.28	35.57	-25.19	60.76	25.21	10.27	0.09	QP
9	0.51	23.77	-22.23	46.00	13.39	10.27	0.11	Average
10	0.51	32.39	-23.61	56.00	22.01	10.27	0.11	QP
11	15.63	17.89	-32.11	50.00	7.00	10.57	0.32	Average
12	15.63	24.39	-35.61	60.00	13.50	10.57	0.32	QP

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	31.02	-24.80	55.82	20.69	10.24	0.09	Average
2 @	0.15	49.38	-16.44	65.82	39.05	10.24	0.09	QP
3	0.19	26.63	-27.22	53.85	16.31	10.23	0.09	Average
4	0.19	44.07	-19.78	63.85	33.75	10.23	0.09	QP
5	0.22	25.05	-27.78	52.83	14.73	10.23	0.09	Average
6	0.22	42.27	-20.56	62.83	31.95	10.23	0.09	QP
7	0.51	24.57	-21.43	46.00	14.23	10.23	0.11	Average
8	0.51	33.62	-22.38	56.00	23.28	10.23	0.11	QP
9	0.70	13.36	-32.64	46.00	3.00	10.24	0.12	Average
10	0.70	21.04	-34.96	56.00	10.68	10.24	0.12	QP
11	15.63	15.73	-34.27	50.00	4.85	10.56	0.32	Average
12	15.63	23.79	-36.21	60.00	12.91	10.56	0.32	QP

4.2. Radiated Emission below 1GHz

4.2.1.Limit

radiated emissions at frequencies up to 1 GHz for Class A equipment			
Frequency range MHz	Measurement		Class A limits dB(µV/m)
	Distance (m)	Detector type / bandwidth	OATS/SAC
30 – 230	10	Quasi Peak / 120 kHz	40
230 – 1000			47
30 – 230	3		50
230 – 1000			57

radiated emissions at frequencies up to 1 GHz for Class B equipment			
Frequency range MHz	Measurement		Class B limits dB(μV/m)
	Distance (m)	Detector type / bandwidth	OATS/SAC
30 – 230	10	Quasi Peak / 120 kHz	30
230 – 1000			37
30 – 230	3		40
230 – 1000			47

4.2.2. Test Procedures

Tabletop equipment

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 10 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- 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.
- Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- 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.
- The central point of the EUT shall be positioned at the center of the turntable. The measurement distance is the shortest horizontal distance between an imaginary circular periphery just encompassing this arrangement and the calibration point of the antenna.
- 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:

- The EUT was placed on the horizontal ground reference plane, 0.15 meter above ground.
- The EUT was set 10 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- 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). The central point of the EUT shall be positioned at the centre of the turntable. The measurement distance is the shortest horizontal distance between an imaginary circular periphery just encompassing this arrangement and the calibration point of the antenna.
 - i). If the EUT is having a Wireless modular, can choose to install the filter at the input connector of test-receiver system.

4.2.3.Measurement Results Calculation

The measured Level is calculated using:

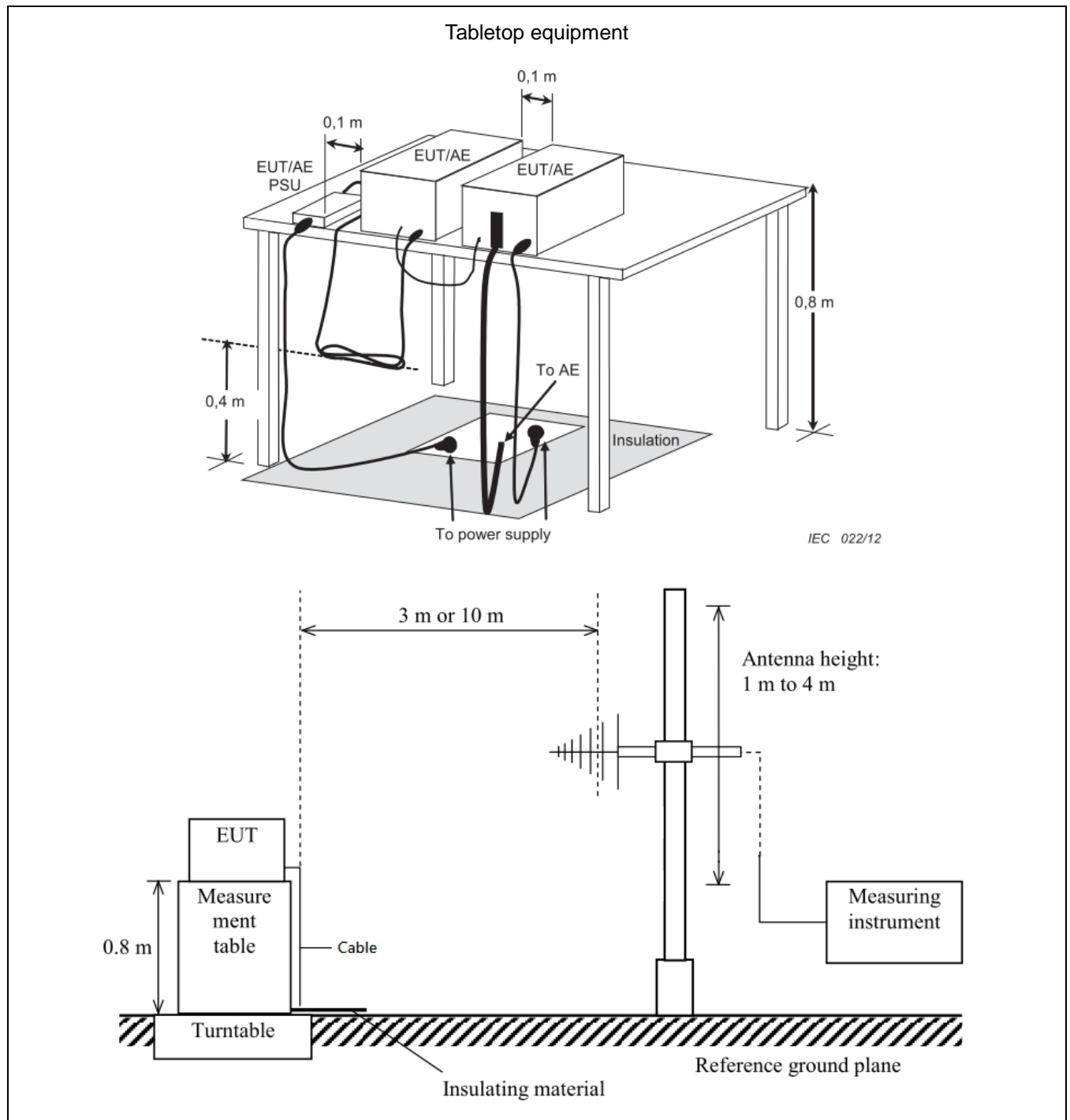
Corrected Reading (dB μ V/m) = Antenna Factor + Cable Loss + Read Level – Preamp Factor

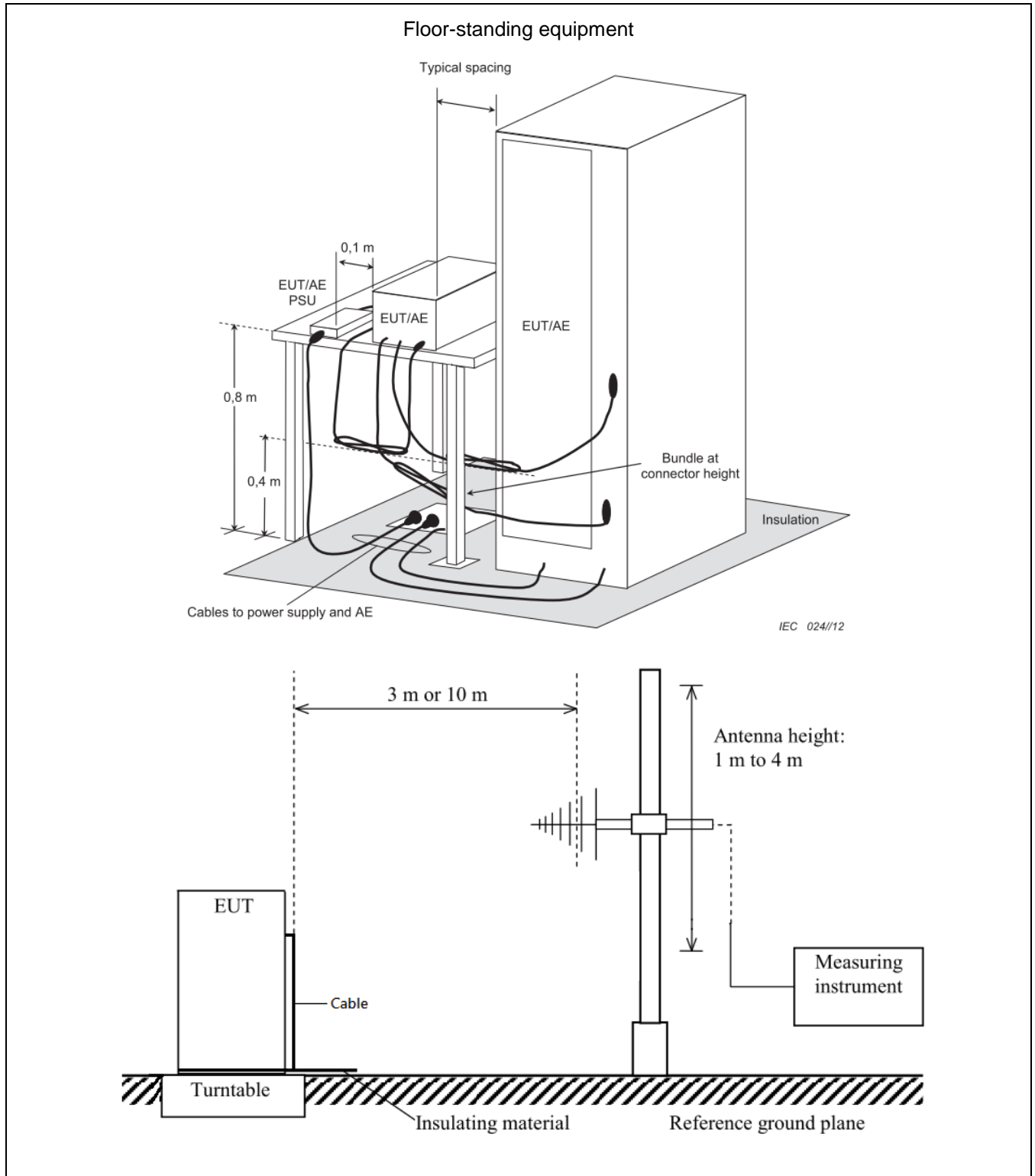
For example at 125 MHz if the Antenna Factor is 17.24 dB/m, the cable loss is 1.20 dB, the measured voltage is 35.80 dB μ V and the Preamp Factor is 27.18 dB, the signal strength would be calculated:

Corrected Reading (dB μ V/m) = 17.24 dB/m + 1.20 dB + 35.80 dB μ V - 27.18 dB = 27.06 dB μ V/m

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

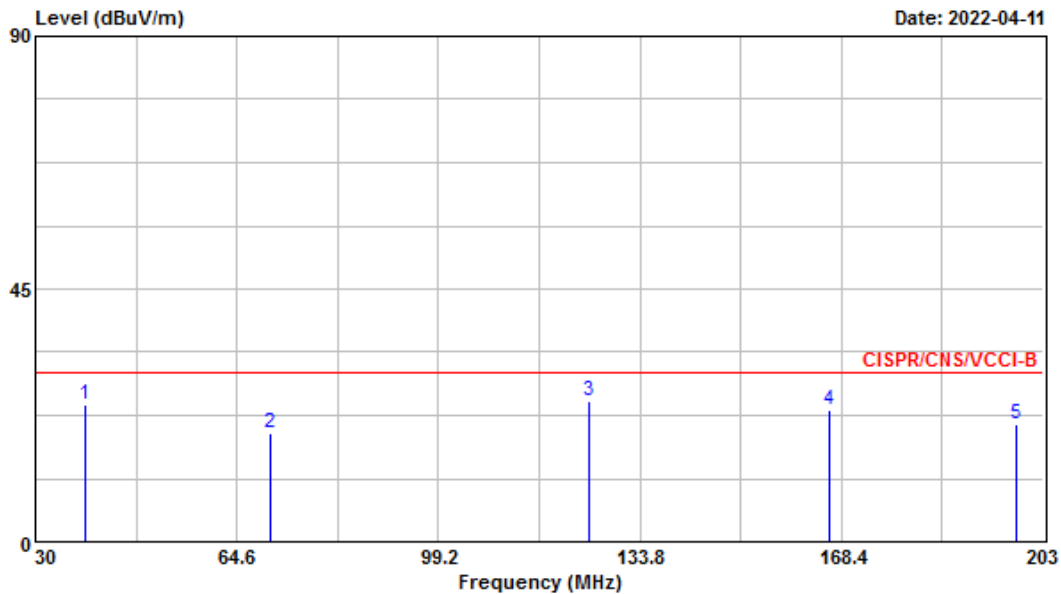
4.2.4. Typical Test Setup Layout



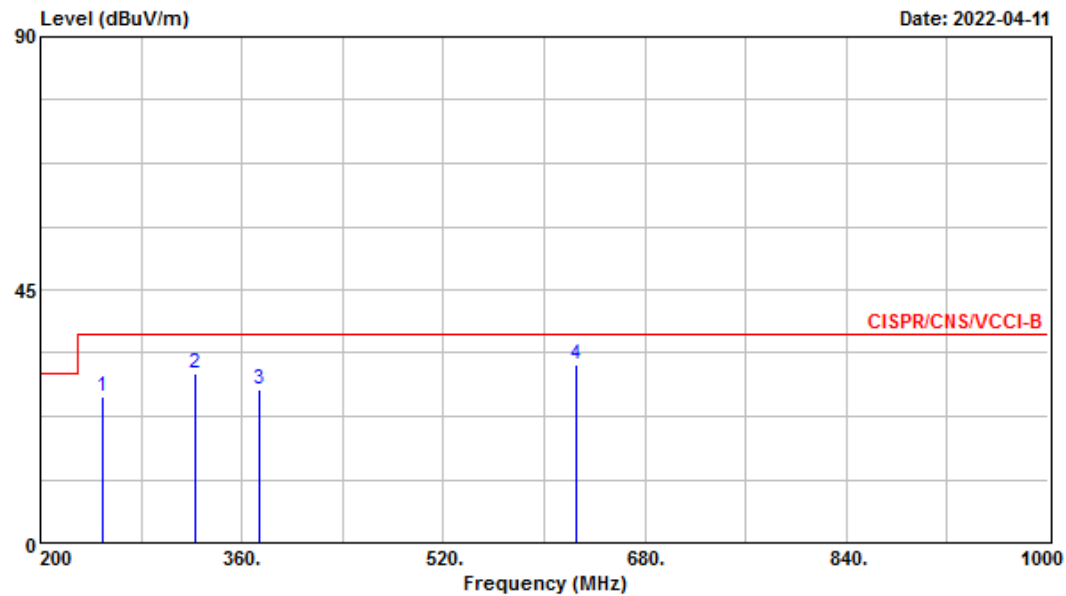


4.2.5. Test Result

Test mode	Mode 1		
Test frequency	30 MHz ~ 1000 MHz	Test Voltage	AC 230V / 50Hz
■ The test was passed at the minimum margin that marked by the frame in the following data			

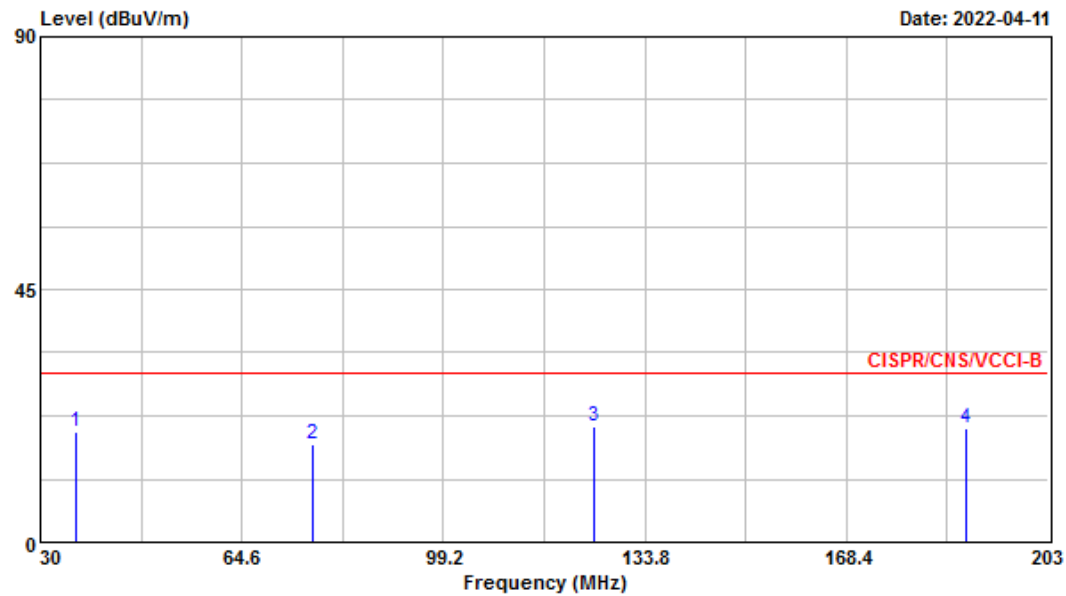
Vertical


	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	38.480	24.37	-5.63	30.00	33.65	18.11	1.08	28.47	Peak	---	---
2	70.310	19.42	-10.58	30.00	34.77	11.56	1.52	28.43	Peak	---	---
3	125.150	25.11	-4.89	30.00	33.64	17.71	2.05	28.29	Peak	---	---
4	166.320	23.51	-6.49	30.00	34.27	14.97	2.43	28.16	Peak	---	---
5	198.330	21.05	-8.95	30.00	31.87	14.48	2.69	27.99	Peak	---	---

Vertical


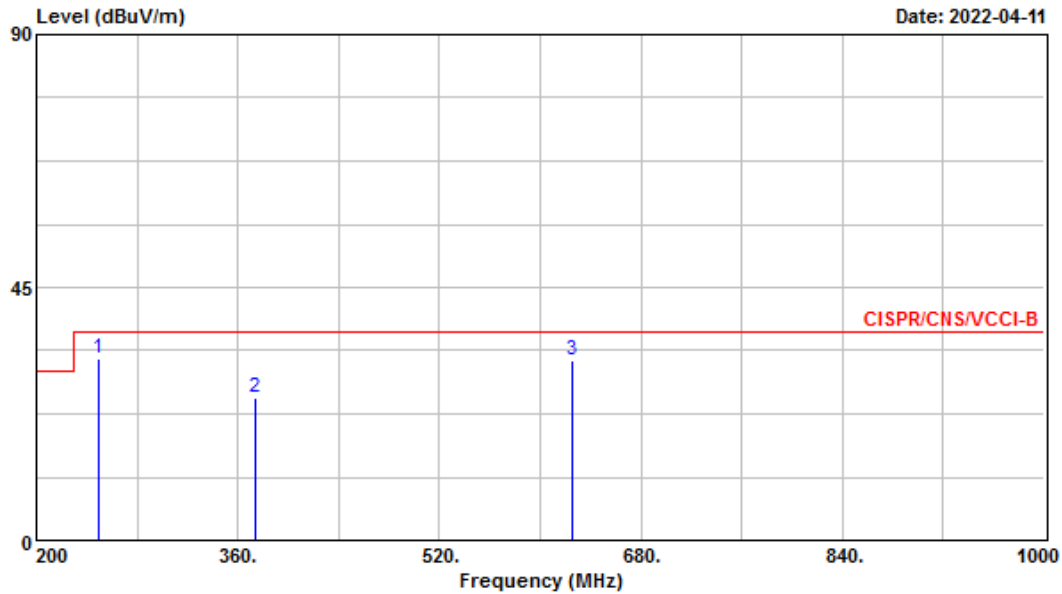
	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	249.600	25.87	-11.13	37.00	33.16	17.31	3.19	27.79	Peak	---	---
2	323.200	30.25	-6.75	37.00	35.77	18.82	3.62	27.96	Peak	---	---
3	374.400	27.41	-9.59	37.00	31.73	19.99	4.00	28.31	Peak	---	---
4	624.800	31.55	-5.45	37.00	31.38	23.89	5.45	29.17	Peak	---	---

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	36.060	19.57	-10.43	30.00	27.19	19.83	1.02	28.47	Peak	---	---
2	76.710	17.49	-12.51	30.00	32.54	11.74	1.63	28.42	Peak	---	---
3	125.150	20.52	-9.48	30.00	29.05	17.71	2.05	28.29	Peak	---	---
4	188.990	20.13	-9.87	30.00	31.15	14.44	2.59	28.05	Peak	---	---

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	249.600	32.44	-4.56	37.00	39.73	17.31	3.19	27.79	Peak	400	178
2	374.400	25.41	-11.59	37.00	29.73	19.99	4.00	28.31	Peak	---	---
3	624.800	31.88	-5.12	37.00	31.71	23.89	5.45	29.17	Peak	---	---

4.3. Radiated Emission above 1GHz

4.3.1.Limit

radiated emissions at frequencies above 1 GHz for Class A equipment			
Frequency range MHz	Measurement		Class A limits dB(μV/m)
	Distance (m)	Detector type / bandwidth	SAC
1000 – 3000	3	Average / 1 MHz	56
3000 – 6000			60
1000 – 3000		Peak / 1 MHz	76
3000 – 6000			80

radiated emissions at frequencies above 1 GHz for Class B equipment			
Frequency range MHz	Measurement		Class B limits dB(μV/m)
	Distance (m)	Detector type / bandwidth	SAC
1000 – 3000	3	Average / 1 MHz	50
3000 – 6000			54
1000 – 3000		Peak / 1 MHz	70
3000 – 6000			74

Required highest frequency for radiated measurement	
Highest internal frequency (F_x)	Highest measured frequency
$F_x \leq 108 \text{ MHz}$ $108 \text{ MHz} < F_x \leq 500 \text{ MHz}$ $500 \text{ MHz} < F_x \leq 1 \text{ GHz}$ $F_x > 1 \text{ GHz}$	1 GHz 2 GHz 5 GHz 5 x F_x up to a maximum of 6 GHz

4.3.2. Test Procedures**Tabletop equipment:**

- a). Same test set up as below 1GHz radiated testing.
- b). The EUT was set 3 meter 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). 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.
- g). 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, then turning around the turn-table to get the maximum noise reading of the Horizontal and Vertical polarity separately. Note the maximum raise up height is same as the top of EUT.
- h). 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.
- i). The central point of the EUT shall be positioned at the center of the turntable. The measurement distance is the shortest horizontal distance between an imaginary circular periphery just encompassing this arrangement and the calibration point of the antenna.
- j). 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). Same test set up as below 1GHz radiated testing.
- b). The EUT was set 3 meter 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). 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.
- g). 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, then turning around the turn-table to get the maximum noise reading of the Horizontal and Vertical polarity separately. Note the maximum raise up height is same as the top of EUT.
- h). 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.
- i). The central point of the EUT shall be positioned at the centre of the turntable. The measurement distance is the shortest horizontal distance between an imaginary circular periphery just encompassing this arrangement and the calibration point of the antenna.
- j). If the EUT is having a Wireless modular, can choose to install the filter at the input connector of test-receiver system.

4.3.3.Measurement Results Calculation

The measured Level is calculated using:

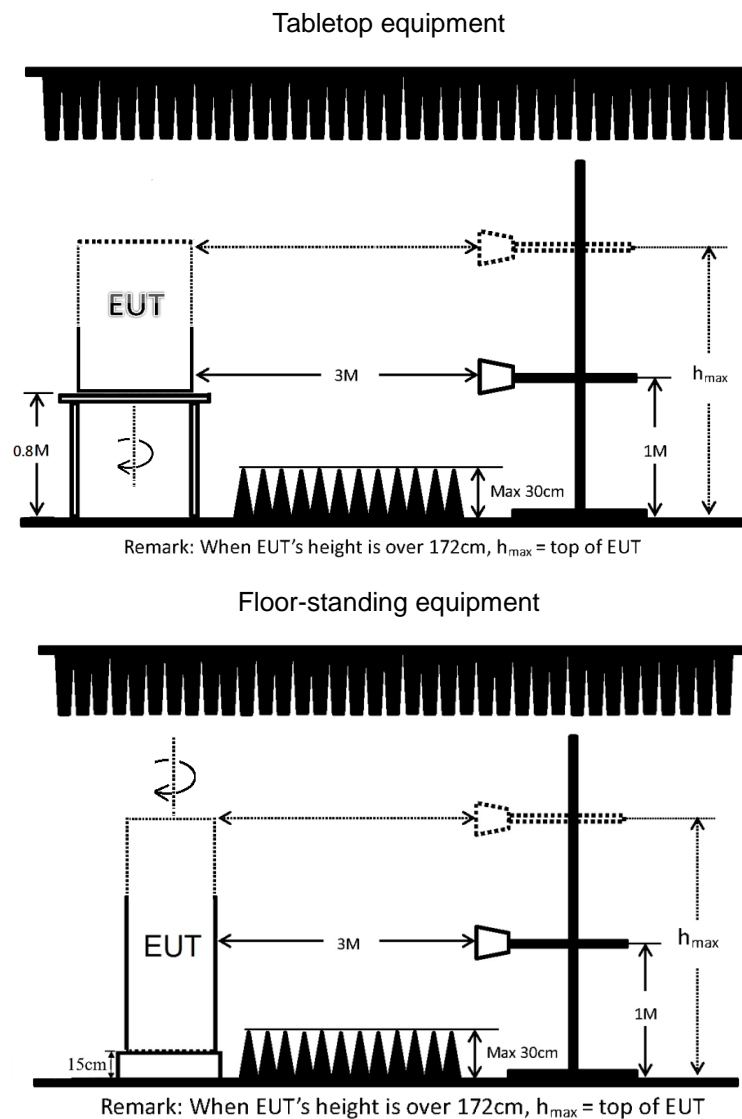
$$\text{Corrected Reading (dB}\mu\text{V/m)} = \text{Raw(Read Level)} + \text{AF(Antenna Factor)} + \text{CL(Cable Loss)} - \text{PA(Preamplifier Factor)}$$

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 dBμV and the Preamplifier Factor is 33.34 dB, the signal strength would be calculated:

$$\text{Corrected Reading (dB}\mu\text{V/m)} = 51.30 \text{ dB}\mu\text{V} + 26.19 \text{ dB/m} + 4.08 \text{ dB} - 33.34 \text{ dB} = 48.23 \text{ dB}\mu\text{V/m}$$

Note: If a Band reject filter is used, this factor will be added to the sum of the factors.

4.3.4. Typical Test Setup Layout

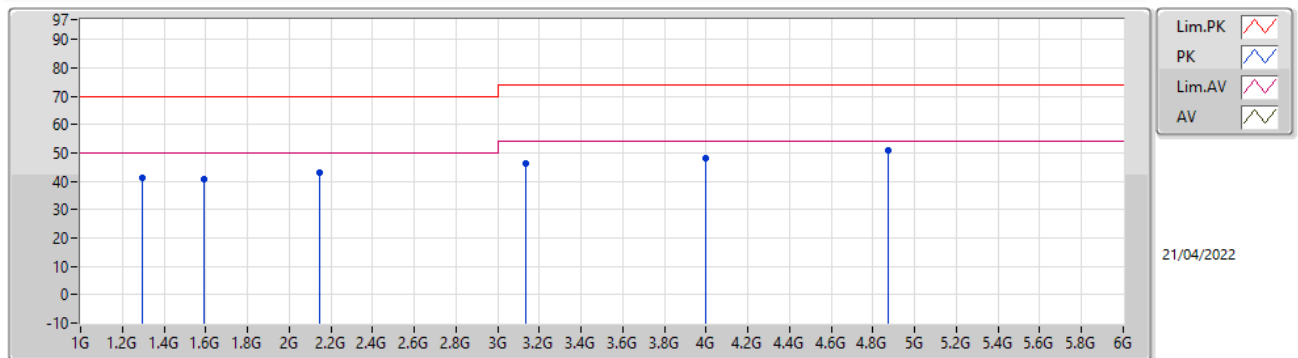


4.3.5. Test Result

Test mode	Mode 1		
Test frequency	1 GHz ~ 6 GHz	Test Voltage	AC 230V / 50Hz
■ The test was passed at the minimum margin that marked by the frame in the following data			

Vertical

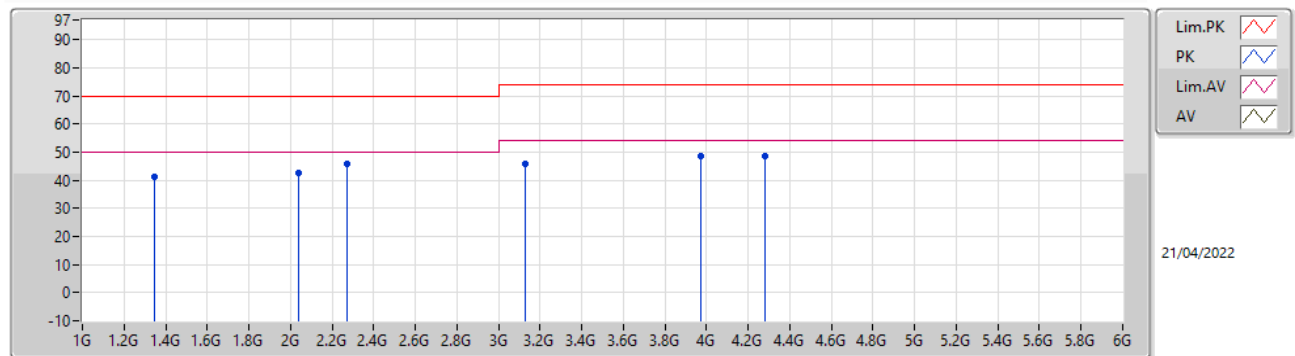
Mode 1



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	1.295G	41.10	70.00	-28.90	-5.19	3	Vertical	-	-	-	46.29	26.06	3.36	34.78
PK	1.595G	40.68	70.00	-29.32	-5.16	3	Vertical	-	-	-	45.84	25.31	3.72	34.40
PK	2.145G	43.01	70.00	-26.99	-1.89	3	Vertical	-	-	-	44.90	27.60	4.38	34.15
PK	3.135G	46.20	74.00	-27.80	1.23	3	Vertical	-	-	-	44.97	29.74	5.38	34.23
PK	4G	48.34	74.00	-25.66	3.91	3	Vertical	-	-	-	44.43	30.90	6.27	33.84
PK	4.875G	50.71	74.00	-23.29	6.06	3	Vertical	175	1	"Worst"	44.65	32.65	6.86	33.86

Horizontal

Mode 1



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	1.345G	41.04	70.00	-28.96	-4.75	3	Horizontal	-	-	-	45.79	26.37	3.41	34.70
PK	2.04G	42.56	70.00	-27.44	-2.60	3	Horizontal	-	-	-	45.16	26.98	4.29	34.13
PK	2.27G	45.66	70.00	-24.34	-2.27	3	Horizontal	100	1	"Worst"	47.93	27.12	4.47	34.16
PK	3.13G	45.98	74.00	-28.02	1.21	3	Horizontal	-	-	-	44.77	29.72	5.38	34.23
PK	3.97G	48.51	74.00	-25.49	3.88	3	Horizontal	-	-	-	44.63	30.96	6.25	33.85
PK	4.28G	48.47	74.00	-25.53	4.49	3	Horizontal	-	-	-	43.98	31.42	6.38	33.86

5. Immunity Measurement

5.1. General performance criteria

Applicable Standard: EN 55035	
Criteria A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criteria B	During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test. After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criteria C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

5.2. Electrostatic Discharge (ESD)

5.2.1. Test Specification

Reference Standard	IEC 61000-4-2
Discharge Impedance	330 Ω / 150 pF
Polarity	Positive and negative
Single Discharge Mode	1 discharge per 1s

5.2.2. Test Levels

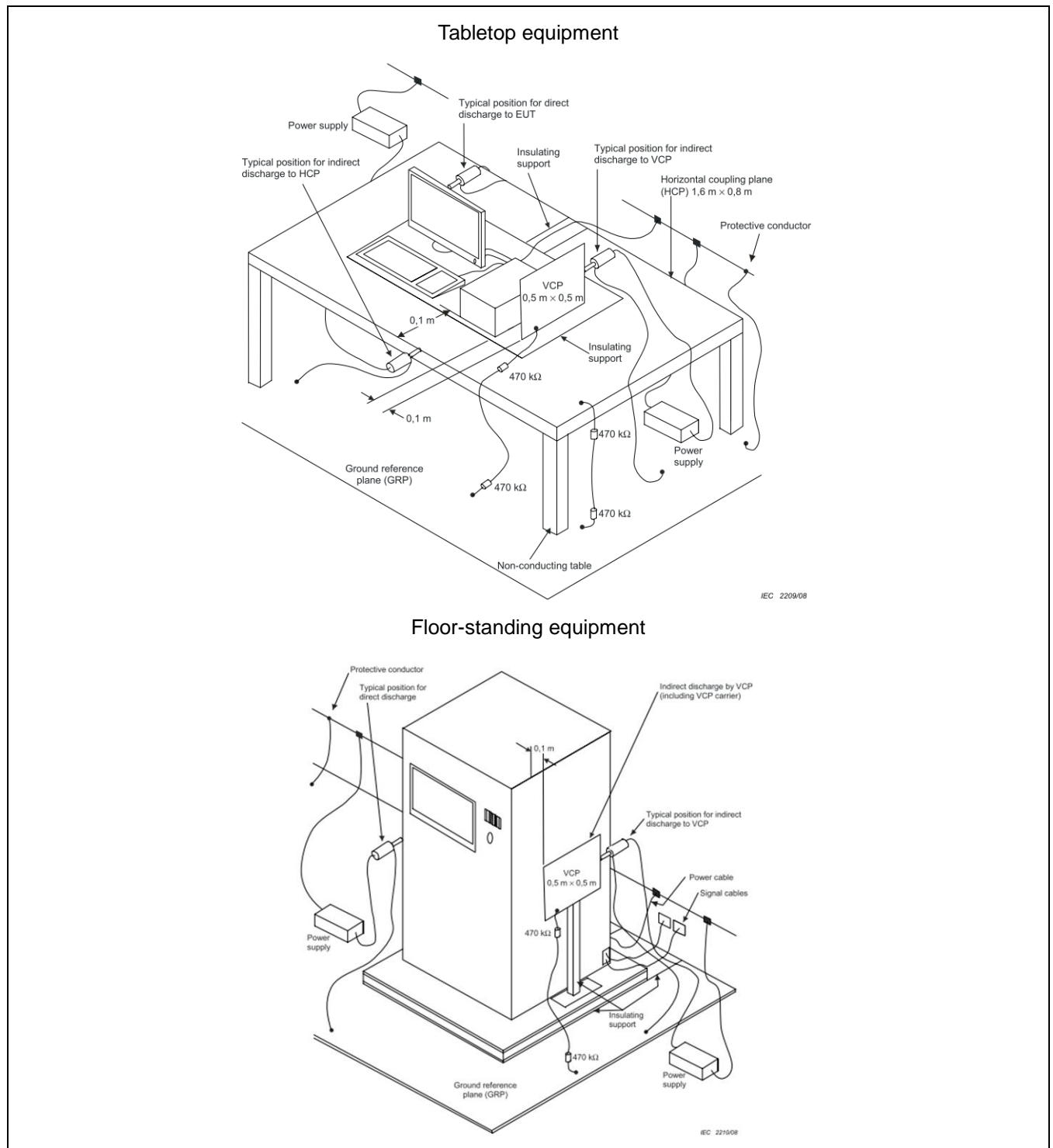
Contact discharge		Air Discharge	
Level	Test Voltage kV	Level	Test Voltage kV
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15
x	Specified	x	Specified

Remark : "x" can be any level, above, below or in between the others. The level shall be specified in the dedicated equipment specification. If higher voltages than those shown are specified, special test equipment may be needed.

5.2.3. Test Procedure

- In the case of air discharge testing the climatic conditions shall be within the following ranges:
 - ambient temperature: 15 °C to 35 °C;
 - relative humidity : 30 % to 60 %;
 - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).
- Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.
- The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.
- For the time interval between successive single discharges an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
- In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.
- In the case of painted surface covering a conducting substrate, the following procedure shall be adopted:
 - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
 - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
 - The contact discharge test shall not be applied to such surfaces.
- In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

5.2.4. Test Setup



The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform DIRECT and INDIRECT application of discharges to the EUT as applicable, in the follow manner:

- a). CONTACT DISCHARGE to the conductive surfaces and to coupling plane;
- b). AIR DISCHARGE at insulating surfaces.

The preferred test method is that of type tests performed in laboratories and the only accepted method of demonstrating conformance with this standard. The EUT was arranged as closely as possible to arrangement in final installed conditions.

5.2.5. Test Setup for Tests Performed in Laboratory

A ground reference plane was provided on the floor of the test site. It was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. In the Hsinhua LAB., we provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system.

The EUT was arranged and connected according to its functional requirements. A distance of 1 m minimum was provided between the EUT and the wall of the Lab., and any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not come closer than 0.2 m to other conductive parts in the test setup.

Tabletop equipment:

Where the EUT is installed on a metal table, the table was connected to the reference plane via a cable with a 470k ohm resistor located at each end, to prevent a build-up of charge. The test setup was consist a wooden table, 0.8 m high, standing on the ground reference plane. A HCP, 1.6 m x 0.8 m, was placed on the table. The EUT and cables was isolated from the HCP by an insulating support 0.5 mm thick. The VCP size, 0.5 m x 0.5 m.

Floor-standing equipment:

The EUT shall be isolated from the ground reference plane by an insulating support of 0,05 m to 0,15 m thick. The EUT cables shall be isolated from the ground reference plane by an insulating support of $(0,5 \pm 0,05)$ mm. This cable isolation shall extend beyond the edge of the EUT isolation.

The VCP size, 0.5 m x 0.5 m

**5.2.6. Test Result**

Test mode	Mode 1		
Applicable Standard	EN 55035:2017	Final Test Result	PASS
Contact discharge	±4 kV		
Air discharge	±8 kV		
Performance Criteria	B		

Test Result - Air Discharge/Round Tip

Those points and surfaces of equipment which are no longer accessible after fixed installation or after following the instructions for use.

Test Result - Contact Discharge/Pointed Tip**Direct discharge**

No direct discharge

Indirect discharge to HCP and VCP

Test Point	No. of Disch.	Test Result (Criteria)		Remark
		+4kV	-4kV	
HCP (At Front)	10	A	A	-
HCP (At Left)	10	A	A	-
HCP (At Right)	10	A	A	-
HCP (At Rear)	10	A	A	-
VCP (At Front)	10	A	A	-
VCP (At Left)	10	A	A	-
VCP (At Right)	10	A	A	-
VCP (At Rear)	10	A	A	-

5.3. Radio Frequency Electromagnetic Field (RS)

5.3.1. Test Specification

Reference Standard	IEC 61000-4-3
Dwell Time	2.9 seconds
Frequency Step size	1 % of the preceding frequency value
Antenna Polarity	Vertical and Horizontal

5.3.2. Test Levels

Level	Test field strength V/m
1	1
2	3
3	10
4	30
x	Specified

Remark : "x" is an open test level and the associated field strength may be any value. This level may be given in the product standard.

If the audio output function needs to be test, the function should be maintained and the following requirements should be met

Performance criterion A – Limits for devices supporting telephony					
Type of immunity test	Frequency range MHz	Acoustic or electrical interference ratio	Equivalent direct measurement		
			dB(SPL)	Digital dBm0	Analogue dBm
Radiated	80 to 1,000	0dB	75	-30	-30

The equivalent direct measurement values are presented to show the equivalency of the interference ratio in comparison to a direct measured value. These values may be used if the direct measurement method of the test is used.

The values within this table are aligned with CISPR 24, noting that the test levels are different between this document and CISPR 24.

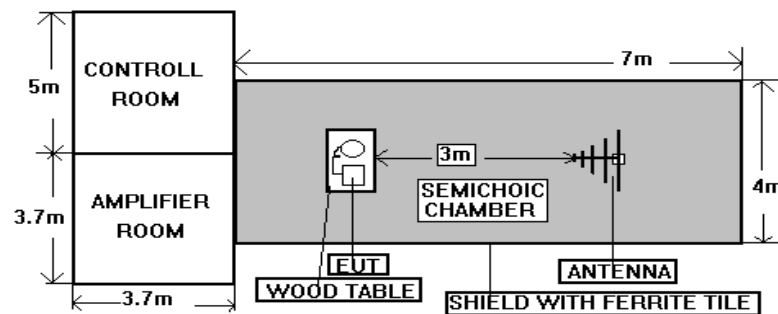
For terminals connected to digital wired network ports (such as Ethernet, ISDN), measurements of the demodulated 1 kHz may be performed on a remote AE, ideally of the same design.

MME not supporting telephony reference level					
A level within the expected dynamic range of the audio output, as intended by the manufacturer and is: at least 10 dB below the highest peak reproduced audio level occurring in normal use; and, below the highest level of reproduced audio that can be continuously output in normal use.					
The measured acoustic interference ratio and/or the measured electrical interference ratio during the test shall be –20 dB or better.					

5.3.3. Test Procedure

- The equipment to be tested is placed in the center of the enclosure on a wooden table. The equipment is then connected to power and signal leads according to pertinent installation instructions.
- The bilog antenna which is enabling the complete frequency range of 80 to 1000 MHz, The horn antenna which is enabling the complete frequency range 1000 to 5000 MHz is placed 3m away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the applicable antennae.
- The test is normally performed with the generating antenna facing each of four sides of the EUT. The polarization of the field generated by the broadband (bilog) antenna necessitates testing each position twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.
- The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency(ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
- At each of the above conditions, the frequency range is swept 80 to 5000 MHz, pausing to adjust the R.F. signal level or to switch oscillators and antenna. The rate of sweep is in the order of 1.5×10^{-3} decades/s. The sensitive frequencies or frequencies of dominant interest may be discretely analyzed.

5.3.4. Test Setup



NOTE : The SPORTON 7m x 4m x 4m semi-anechoic chamber is compliance with the sixteen point's uniform field requirement as stated in IEC 61000-4-3 Section 6.2.

The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with local regulations and to prevent biological hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or semi-anechoic chamber.

5.3.5. Test Result

Test mode	Mode 1		
Applicable Standard	EN 55035:2017	Final Test Result	PASS
Frequency Range(swept)	80 to 1000 MHz		
Frequency Range(spot)	1800,2600,3500,5000 MHz ($\pm 1\%$)		
Electromagnetic field	3 V/m (unmodulated, r.m.s)		
Amplitude modulated	80% AM (1 kHz)		
Performance Criteria	A		

Frequency Range MHz	Test field strength V/m	Antenna Polarization	Azimuth Degree	Test Result (Criteria)	Remark
80~1000	3	V&H	0, 90, 180, 270	A	-
1800	3	V&H	0, 90, 180, 270	A	-
2600	3	V&H	0, 90, 180, 270	A	-
3500	3	V&H	0, 90, 180, 270	A	-
5000	3	V&H	0, 90, 180, 270	A	-

5.4. Power Frequency Magnetic Field (PFMF)

5.4.1. Test Specification

Reference Standard	IEC 61000-4-8
Frequency Range	50 or 60 Hz
Inductance Coil	1 m x 1 m

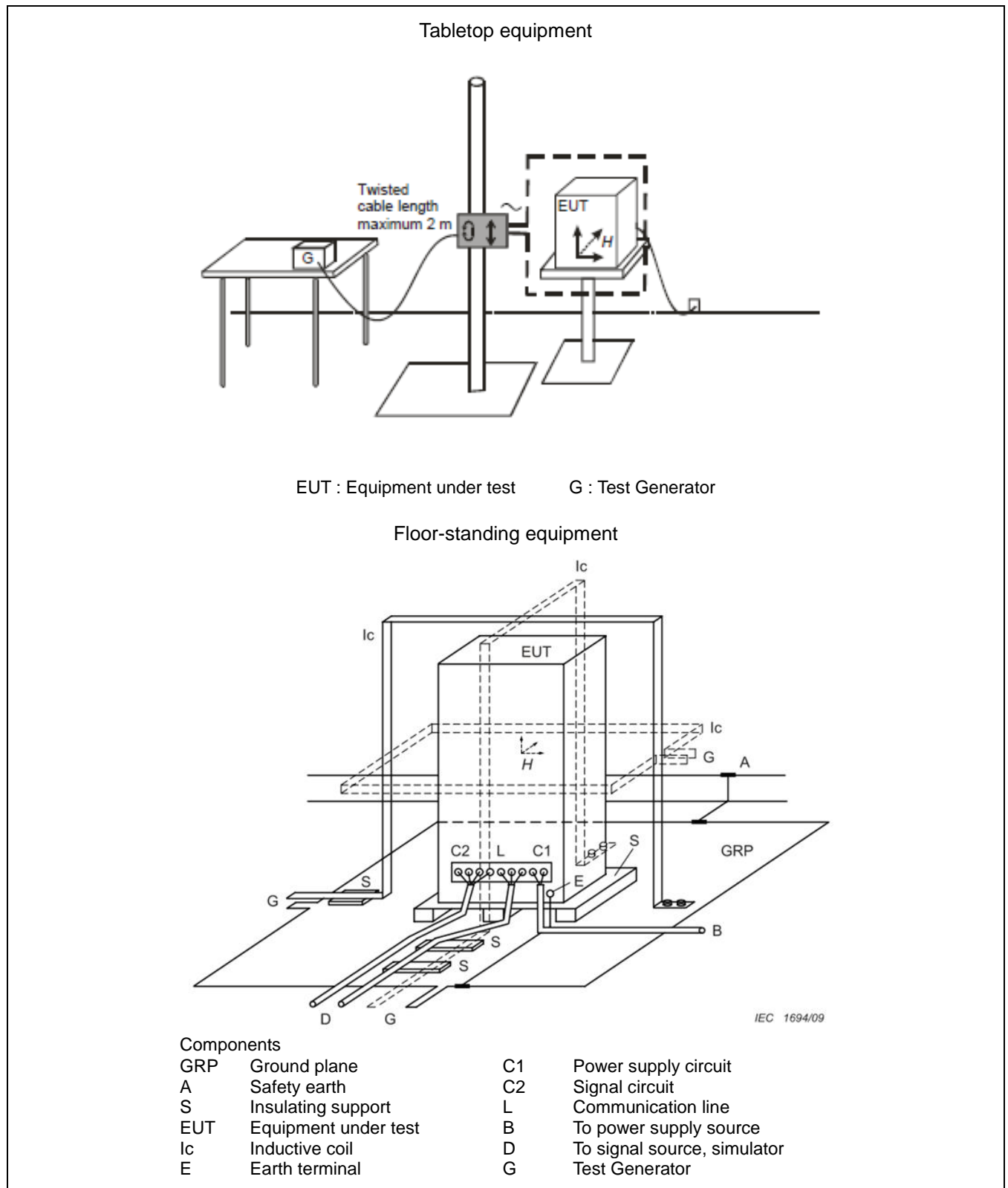
5.4.2. Test Levels

Level	Magnetic field strength A/m
1	1
2	3
3	10
4	30
5	100
x	Specified
Remark : " x " can be any level, above, below or in-between the other levels. This level can be given in the product specification.	

5.4.3. Test Procedure

- The equipment is configured and connected to satisfy its functional requirements.
- The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

5.4.4. Test Setup



**5.4.5. Test Result**

Test mode	Mode 1		
Applicable Standard	EN 55035:2017	Final Test Result	PASS
Power-frequency	50 Hz	Magnetic field	1 A/m (r.m.s.)
Performance Criteria	A		

Power Frequency Magnetic Field	Testing duration	Coil Orientation	Test Result (Criteria)	Remark
50Hz, 1A/m	1.0 Min	X-axis	A	-
50Hz, 1A/m	1.0 Min	Y-axis	A	-
50Hz, 1A/m	1.0 Min	Z-axis	A	-

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. Measurement Uncertainty

Test Items	Test Site No.	U_{LAB}
Conducted Emissions (AMN)	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: 11/Apr/2022

Instrument	Manufacturer/ Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	R&S	ESR	102318	9k Hz - 3.6 GHz	26/Jul/2021	25/Jul/2022	Conduction (CO01-NH)
LISN	SCHAFFNER	NNB41	06/10024	9kHz - 30MHz	17/Dec/2021	16/Dec/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	27/Dec/2021	26/Dec/2022	Conduction (CO01-NH)
software	Audix	E3	6.12160806	-	NCR	NCR	Conduction (CO01-NH)

NCR: No Calibration Required

Radiated Emission below 1GHz - Test Date: 11/Apr/2022

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	16/Oct/2021	15/Oct/2022	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: 21/Apr/2022**

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	05/Nov/2021	04/Nov/2022	Radiation (03CH04-HY)
Turn Table	Chaintek	3000	TT9664	0 ~ 360 degree	NCR	NCR	Radiation (03CH04-HY)
Antenna Mast	MF	MFA-515BSN	MFA-515BSN08 193	1 m ~ 4 m	NCR	NCR	Radiation (03CH04-HY)
3m Semi Anechoic Chamber (Site V.S.W.R)	RIKEN	SAC-3M	03CH04-HY	1 GHz ~ 18 GHz 3m	18/Feb/2022	17/Feb/2023	Radiation (03CH04-HY)
Microwave Preamplifier	Agilent	8449B	3008A02364	1GHz ~ 26.5GHz	08/Mar/2022	07/Mar/2023	Radiation (03CH04-HY)
Horn Antenna	SCHWARZBEC K	BBHA9120 D	BBHA 9120 D-1130	1 GHz ~ 18 GHz	27/Dec/2021	26/Dec/2022	Radiation (03CH04-HY)
RF Cable-HIGH	HUBER+SUHN ER	SUOFLEX 104	SN805197/4+M Y39497	1 GHz ~ 18 GHz	07/Mar/2022	06/Mar/2023	Radiation (03CH04-HY)
Band Reject Filter	Wi	WRCGV10	41	2382-2402-2480 -2500MHz	30/Apr/2021	29/Apr/2022	Radiation (03CH04-HY)
Band Reject Filter	MTJ	MBR-5150-5250 -45-S1	160413001	5150~5250MHz	30/Apr/2021	29/Apr/2022	Radiation (03CH04-HY)
Software	Sporton	SENSE-EMI	V5.10.7	-	NCR	NCR	Radiation (03CH04-HY)

NCR: No Calibration Required

**EMC TEST REPORT****Report No. : EC211912****EMS - Test Date: 16/Apr/2022**

Instrument	Manufacturer/ Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
ESD Simulator	TESEQ	NSG 437	192	Air: 0.5kV~30kV Contact: 0kV ~ 30kV	04/Oct/2021	03/Oct/2022	ESD
Magnetic field Immunity system	FCC (KEYTEK)	F-1000-4-8-G-12 5A,F-1000-4-8/9 /10-L-1AM	05004, 03004	30A//CONTINUO US 100A/2Hrs 230A/30SEC	26/Oct/2021	25/Oct/2022	Magnetic
Signal Generator	ROHDE&SCHW ARZ	SMB100A	108589	9kHz ~ 6GHz	01/Apr/2022	31/Mar/2023	RS
Power Amplifier	MILMEGA	80RF1000-300	1079234	80MHz ~ 1GHz, 300W	NCR	NCR	RS
Power Amplifier	MILMEGA	AS0860B-50/50	1079525	0.8 ~ 6GHz ,50W(0.8G Hz~2GHz and 1.8GHz~6.0GHz)	NCR	NCR	RS
Amplifier controller	MILMEGA	AC-001	N/A	N/A	NCR	NCR	RS
Antenna	AR	ATL80M1G	348541	80MHz ~ 1GHz, 30W	NCR	NCR	RS
Antenna	SCHWARZBEC K	STLP 9149	STLP9149 #490	700MHz ~ 10.5GHz	NCR	NCR	RS
EPM Series Power Meter	KEYSIGHT	N1914A	MY57070002	9 kHz to 110 GHz	01/Apr/2022	31/Mar/2023	RS
Avg Power Sensor	KEYSIGHT	E9304A	MY57020004	9kHz ~ 6GHz	01/Apr/2022	31/Mar/2023	RS
Avg Power Sensor	KEYSIGHT	E9304A	MY57030009	9kHz ~ 6GHz	01/Apr/2022	31/Mar/2023	RS
Fiber Optic modem	ETS-LINDGREN	HI-4413P	N/A	N/A	NCR	NCR	RS
Dual Directional Coupler	WERLATONE	C10117-10	112093	N/A	NCR	NCR	RS
Dual Directional Coupler	WERLATONE	C3908-10	112109	N/A	NCR	NCR	RS
RS immunity Test system	Sporton combination	Sporton RS	RS06HY	80MHz ~ 6GHz	01/Jul/2021	30/Jun/2022	RS
RF-Switch Network	TESEQ	RFB 2000	45818	N/A	NCR	NCR	RS
Probe	ETS-LINDGREN	HI-6105	00130664	0.1 MHz - 6GHz	02/Jul/2021	01/Jul/2022	RS
Software	Audix	i2	Version:5	-	NCR	NCR	RS

NCR: No Calibration Required

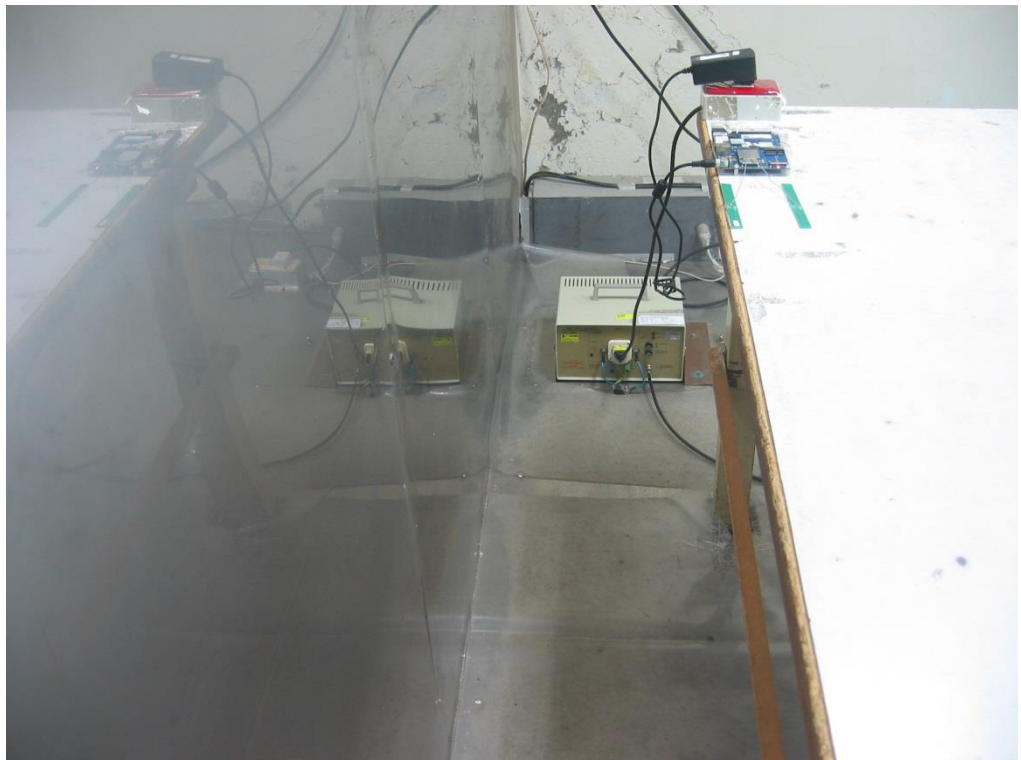
Appendix A. Test Photos

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

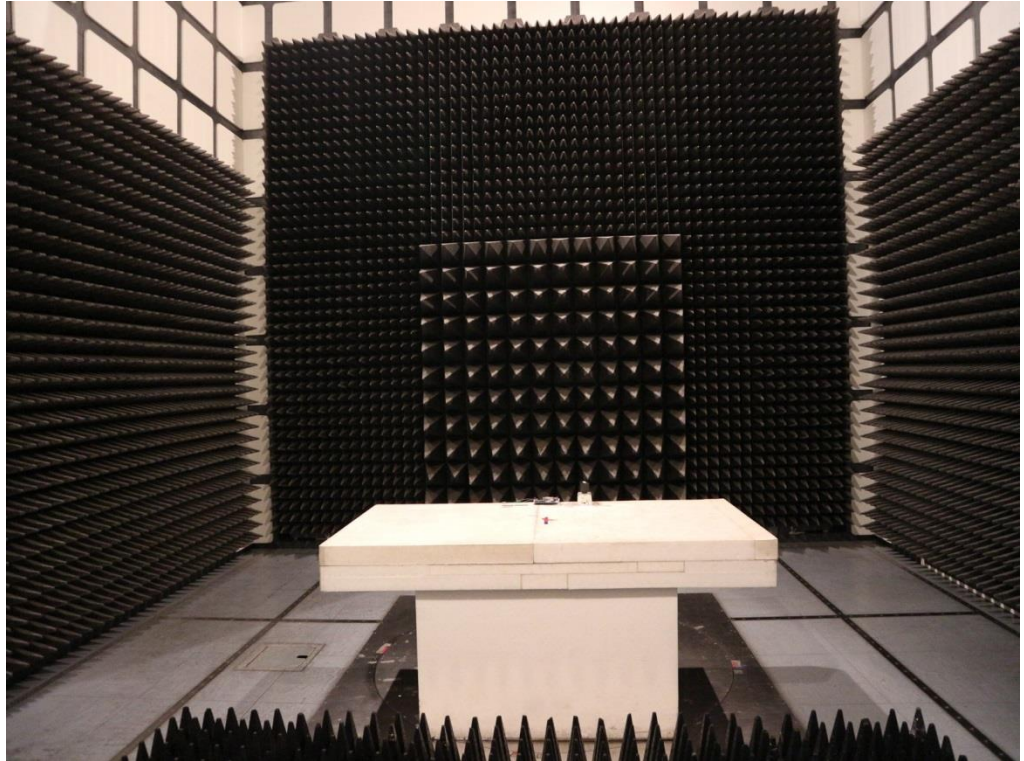


Rear View

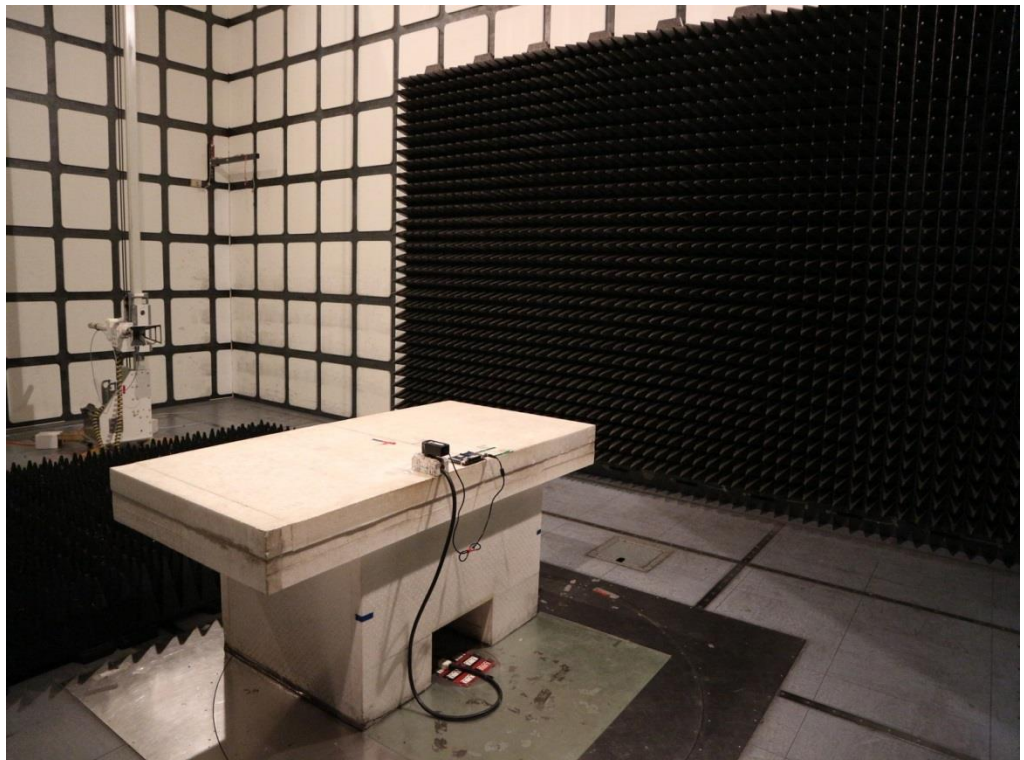


For radiated emissions above 1GHz

Front View

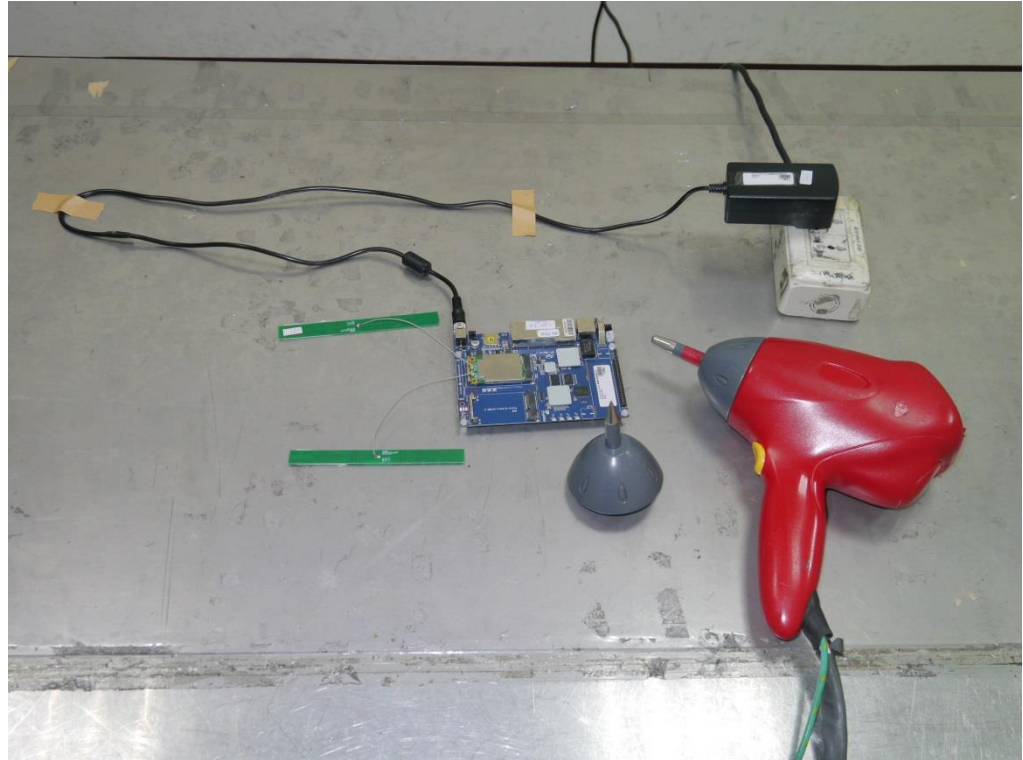


Rear View

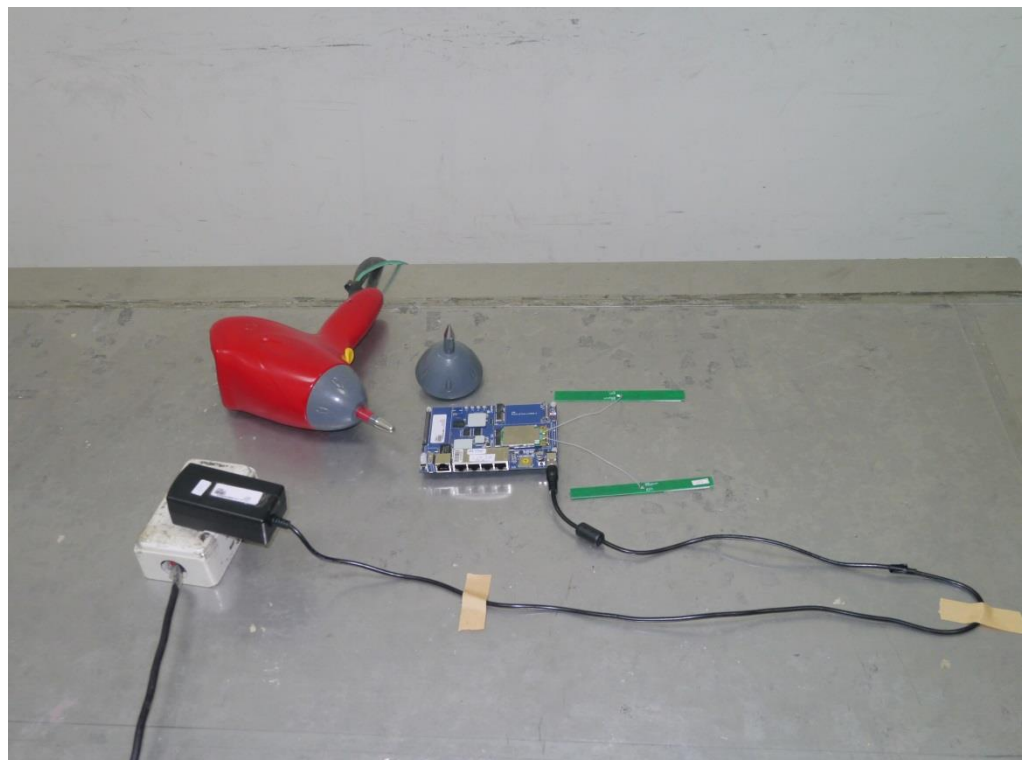


3. Photographs of ESD Immunity Test Configuration

Front View

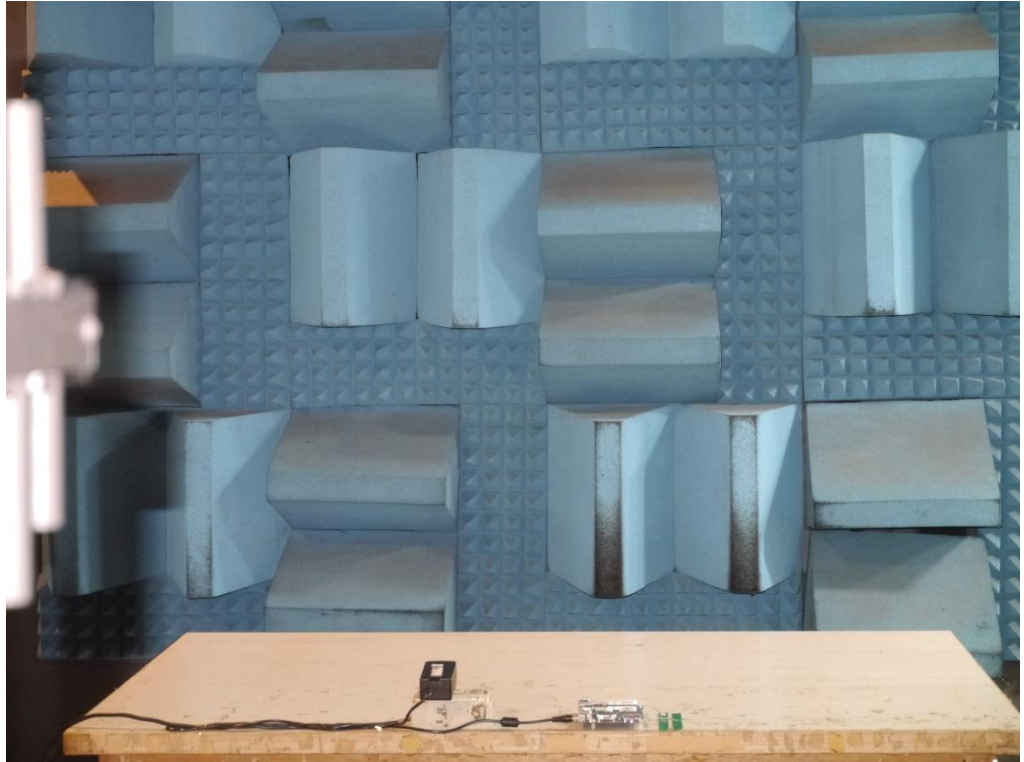


Rear View



4. Photographs of RS Immunity Test Configuration

Front View



Rear View



5. Power Frequency Magnetic Field immunity Measurement (PFMF)

Front View



————THE END————