

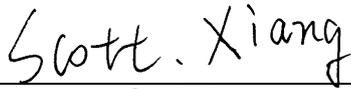


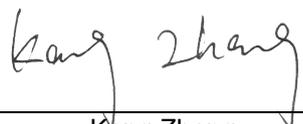
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检测
TESTING
CNAS L3163

CE EMC Test Report

Project No. : 2404C130
Equipment : MINI PRINTER
Brand Name : 
Test Model : B10
Series Model : B11, B12, B13, B15, B16, B17, B18, B19
Applicant : Zhuhai Bentsai Electronics Co., Ltd.
Address : 2/F, Block B, Factory Building 1, 115 Huawei Road, Xiangzhou District,Zhuhai
Manufacturer : Zhuhai Bentsai Electronics Co., Ltd.
Address : 2/F, Block B, Factory Building 1, 115 Huawei Road, Xiangzhou District,Zhuhai
Factory : Zhuhai Bentsai Electronics Co., Ltd.
Address : 2/F, Block B, Factory Building 1, 115 Huawei Road, Xiangzhou District,Zhuhai
Date of Receipt : Apr. 16, 2024
Date of Test : Apr. 17, 2024 ~ May 10, 2024
Issued Date : May 15, 2024
Report Version : R00
Test Sample : Engineering Sample No.: DG20240416127
Standard(s) : ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-17 V3.2.4 (2020-09)

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.(Dongguan).

Prepared by : 
Scott Xiang

Approved by : 
Kang Zhang

No.3, Jinshagang 1st Road, Dalang, Dongguan, Guangdong, China.

Tel: +86-769-8318-3000 Web: www.newbtl.com Service mail: btl_qa@newbtl.com

Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** assumes no responsibility for the data provided by the customer, any statements, inferences or generalizations drawn by the customer or others from the reports issued by **BTL**.

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BTL's laboratory quality assurance procedures are in compliance with the ISO/IEC 17025: 2017 requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-ETSE-1-2404C130	R00	Original Report.	May 15, 2024	Valid

1. SUMMARY OF TEST RESULTS

Emission EN 301 489-1 / EN 301 489-17			
Ref Standard(s)	Test Item	Result	
EN 55032:2015+A11:2020	Radiated emissions up to 1 GHz	PASS	
	Radiated emissions above 1 GHz	PASS	
	Conducted emissions AC mains power port	PASS	
	Conducted emissions DC power port	N/A	
	Asymmetric mode conducted emissions	AAN	N/A
		Current Probe	N/A
CP+CVP		N/A	
EN IEC 61000-3-2:2019+A1:2021	Harmonic current	PASS	
EN 61000-3-3:2013+A2:2021	Voltage fluctuations (Flicker)	PASS	

Immunity EN 301 489-1 / EN 301 489-17		
Ref Standard(s)	Test Item	Result
EN 61000-4-2:2009	ESD	PASS
EN IEC 61000-4-3:2020	RS	PASS
EN 61000-4-4:2012	EFT	PASS
EN 61000-4-5:2014+A1:2017	Surge	PASS
EN 61000-4-6:2014+AC:2015	CS	PASS
EN IEC 61000-4-11:2020	Dips	PASS

NOTE:

(1) "N/A" denotes test is not applicable to this device.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report is at the location of No.3, Jinshagang 1st Road, Dalang, Dongguan, Guangdong, China.

1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{CISPR} requirement.

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95%**.

A. Radiated emissions up to 1 GHz measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U ,(dB)
DG-CB02 (3m)	CISPR	30MHz ~ 200MHz	V	4.34
		30MHz ~ 200MHz	H	3.38
		200MHz ~ 1,000MHz	V	4.80
		200MHz ~ 1,000MHz	H	4.16

B. Radiated emissions above 1 GHz measurement:

Test Site	Method	Measurement Frequency Range	U ,(dB)
DG-CB02 (3m)	CISPR	1GHz ~ 6GHz	4.38

C. Conducted emissions AC mains power port measurement:

Test Site	Method	Measurement Frequency Range	U ,(dB)
DG-C01	CISPR	150kHz ~ 30MHz	2.98

D. Harmonic current / Voltage fluctuations (Flicker) measurement:

Test Site	Method	Item	U (%)
DG-C01	EN IEC 61000-3-2 EN 61000-3-3	Voltage	0.757
		Current	0.592

E. Immunity Measurement:

Test Site	Method	Item	U
DG-SR02	EN 61000-4-2	Rise time tr	7.00%
		Peak current Ip	6.50%
		Current at 30 ns	6.60%
		Current at 60 ns	6.80%
DG-CB05	EN IEC 61000-4-3 (80MHz~6GHz)	Electromagnetic field immunity test	2.2dB
		PER or FER measurement, test set-up for RS(WLAN 2.4G&5G, BT)	2.28dB
DG-SR05	EN 61000-4-4	Peak voltage (VP)	3.8%
		Rise time (tr)	4.4%
		Pulse width(tw)	4.2%
		Pulse Freq.(kHz)	0.7%
		Burst Duration(ms)	1.5%
		Burst Period(ms)	1.4%
DG-SR05	EN 61000-4-5	Open-Circuit Output Voltage (1.2/50us)	4.0%
		Open circuit front time (1.2/50us)	6.2%
		Open circuit time of half value (1.2/50us)	4.7%
DG-CB06	EN 61000-4-6 (150kHz-80MHz)	CDN	1.28dB
		PER or FER measurement, test set-up for CS(WLAN 2.4G&5G, BT)	1.44dB
DG-SR01	EN IEC 61000-4-11	DIP Amplitude	3.6%
		DIP Time Event	4.0%

Note: Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Tested By	Test Date
Radiated emissions up to 1 GHz	22°C	56%	Trey Chen	May 07, 2024
Radiated emissions above 1 GHz	22°C	56%	Trey Chen	May 07, 2024
Conducted emissions AC mains power port	25°C	60%	Riki Ran	Apr. 30, 2024
Harmonic current	25°C	60%	Riki Ran	Apr. 30, 2024
Voltage fluctuations (Flicker)	25°C	60%	Riki Ran	Apr. 30, 2024

Test Item	Temperature	Humidity	Pressure	Tested By	Test Date
ESD	24°C	54%	1010hPa	Jack Zhang	Apr. 22, 2024
RS	20°C	58%	/	Hunter Xu	Apr. 23, 2024
EFT	26°C	66%	/	Ellery Liang	Apr. 28, 2024
Surge	26°C	66%	/	Ellery Liang	Apr. 28, 2024
CS	25°C	69%	/	Penn Li	Apr. 23, 2024
Dips	24°C	64%	/	Jensen Jiang	Apr. 19, 2024

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	MINI PRINTER
Brand Name	 BENTSAI INKJET CODING SOLUTIONS
Test Model	B10
Series Model	B11, B12, B13, B15, B16, B17, B18, B19
Model Difference(s)	Only differ in model name and sale marketing.
HVIN	FOX_MB_V5
FVIN	2.0.0.8
Identification No. of EUT(S/N)	B152310117
Dimensions and mass	92mm*40.5mm*110.7mm
Component unit of EUT	<input type="checkbox"/> Single unit <input checked="" type="checkbox"/> Multiple unit
Sample Status	<input type="checkbox"/> Engineering sample <input checked="" type="checkbox"/> Final shipment prototype
Power Source	1# Supplied from Type-C port. 2# Supplied battery. Model: XY503040
Power Rating	1# DC 5V 2# DC 7.4V, 500mAh
Connecting I/O Port(s)	1* Type-C port
Classification of EUT	Class A
Intended Operating Frequency(Fo)	2412-2472MHz
Highest Internal Frequency(Fx)	2472MHz

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Charging+Printer(WIFI)

Radiated emissions up to 1 GHz Test	
Final Test Mode	Description
Mode 1	Charging+Printer(WIFI)

Radiated emissions Above 1 GHz Test	
Final Test Mode	Description
Mode 1	Charging+Printer(WIFI)

Conducted emissions AC mains power port Test	
Final Test Mode	Description
Mode 1	Charging+Printer(WIFI)

Harmonic current & Voltage fluctuations (Flicker) Test	
Final Test Mode	Description
Mode 1	Charging+Printer(WIFI)

Immunity Test	
Final Test Mode	Description
Mode 1	Charging+Printer(WIFI)

Note:

1. The product supports 2.4G WIFI function.
The frequency exemption is 2400-2483.5MHz.
2. Radiated emission above 1GHz tested with 2.4G filter.

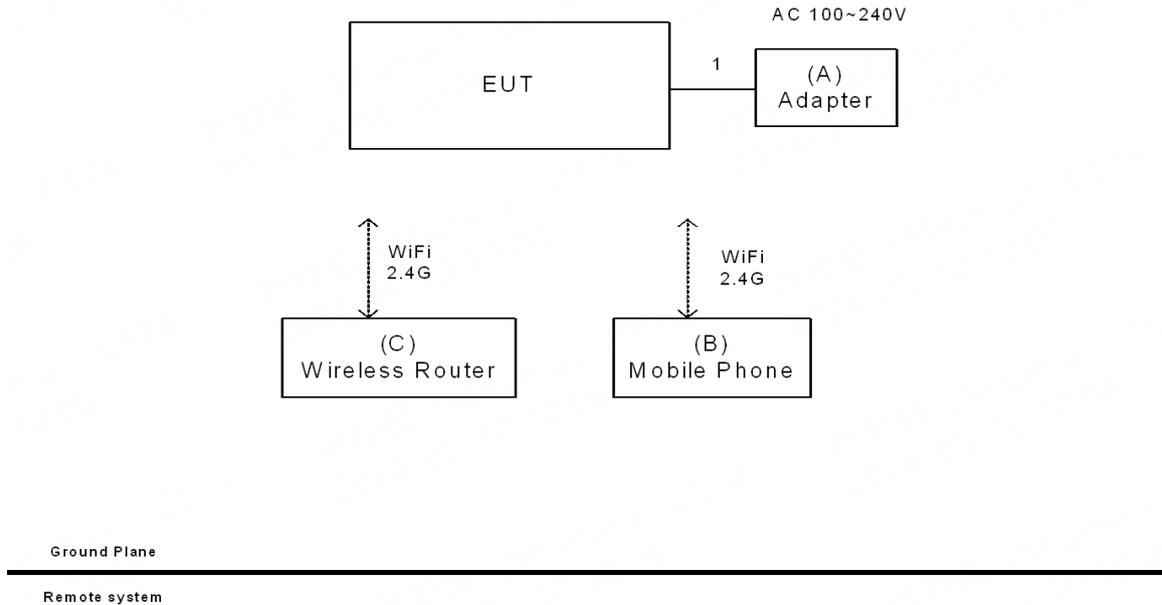
2.3 EUT OPERATING CONDITIONS

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use.

The standard test signals and output signal as following:

1. EUT connected to Adapter via TYPE-C Cable.
2. EUT connected to Wireless Router via WiFi 2.4G.
3. EUT connected to Mobile Phone via WiFi 2.4G.

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 DESCRIPTION OF SUPPORT UNITS

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

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
A	Adapter	chicony	WI2-010N3A	N/A
B	Mobile Phone	SAMSUNG	SM-3650/DS	A3LSMG9650
C	Wireless Router	ASUS	RT-AC66U	E8ICGG000136

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	TYPE-C Cable	YES	NO	0.5m/1m

3. EMC EMISSION TEST

3.1 RADIATED EMISSIONS UP TO 1 GHZ

3.1.1 LIMITS

Class A equipment up to 1 GHz

Frequency Range MHz	Measurement			Class A limits dB(μ V/m)
	Facility	Distance m	Detector type/ bandwidth	
30 - 230	SAC	3	Quasi peak / 120 kHz	50
230 - 1000				57

Notes:

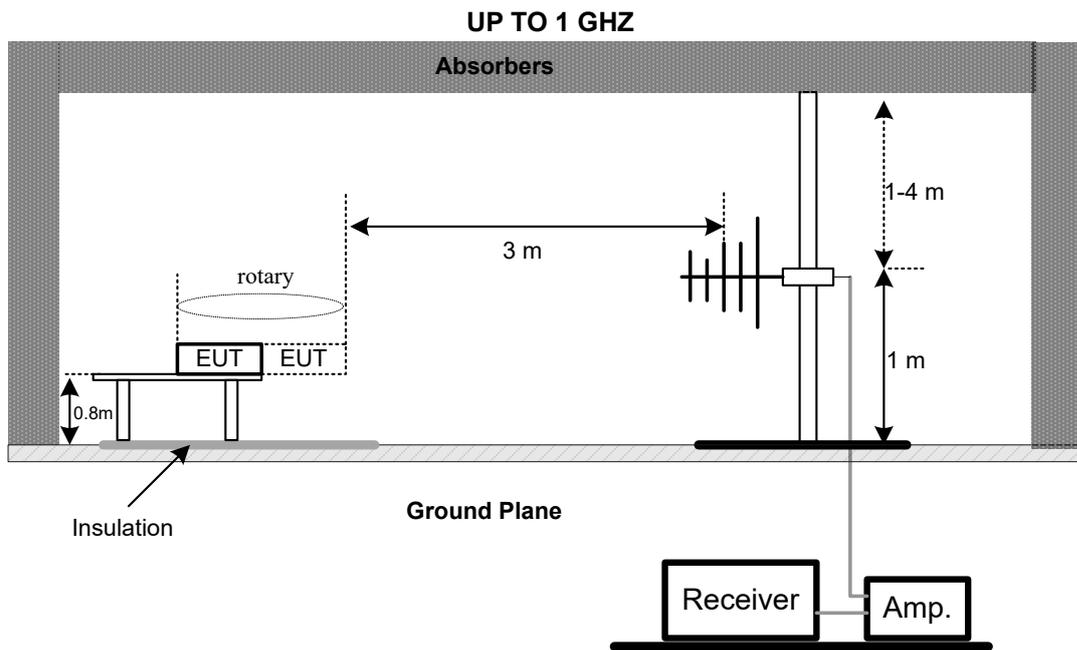
- (1) The limit for radiated test was performed according to as following: EN 55032
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
 Margin Level = Measurement Value - Limit Value

3.1.2 TEST PROCEDURE

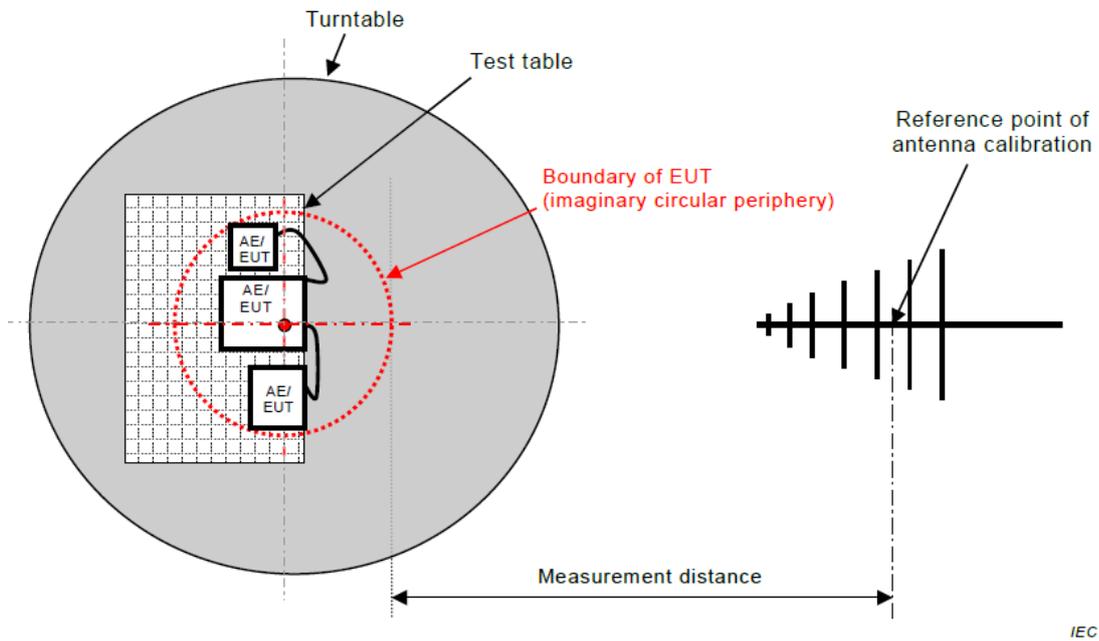
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz).
- b. The height of the equipment or of the substitution antenna shall be 0.8 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- c. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- d. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
(below 1GHz)
- e. For the actual test configuration, please refer to the related Item - Block Diagram of system tested.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

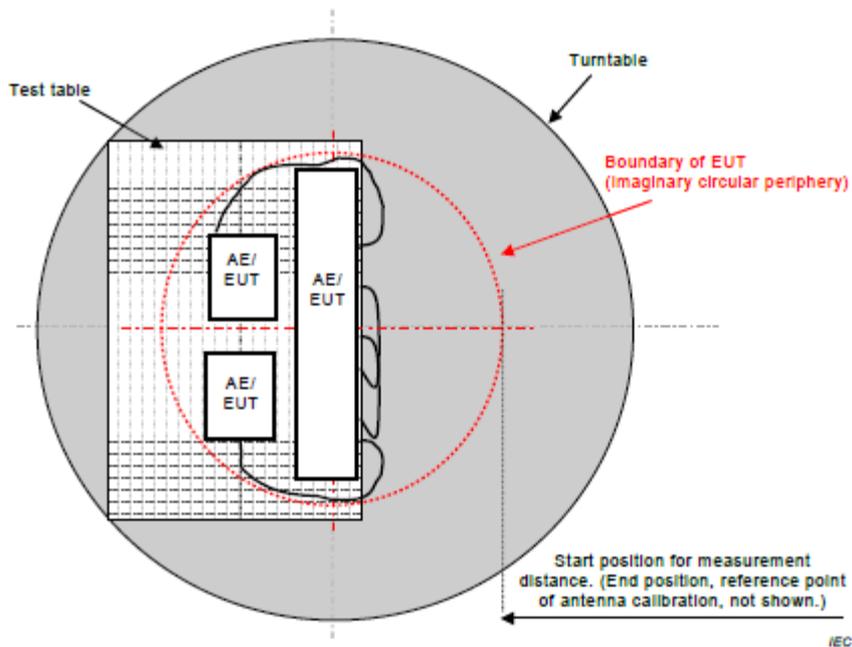
3.1.4 TEST SETUP

3.1.5 MEASUREMENT DISTANCE



IEC

Figure C.1 – Measurement distance



IEC

Figure C.2 – Boundary of EUT, Local AE and associated cabling

3.1.6 TEST RESULTS (UP TO 1 GHZ)

Please refer to the Appendix A.

3.2 RADIATED EMISSIONS ABOVE 1 GHZ

3.2.1 LIMITS

Class A equipment above 1 GHz

Frequency Range MHz	Measurement			Class A limits dB(μV/m)
	Facility	Distance m	Detector type/bandwidth	
1000 - 3000	FSOATS	3	Average / 1 MHz	56
3000 - 6000				60
1000 - 3000			Peak / 1 MHz	76
3000 - 6000				80

Notes:

- (1) The limit for radiated test was performed according to as following: EN 55032
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
 Margin Level = Measurement Value - Limit Value

Required highest frequency for radiated measurement

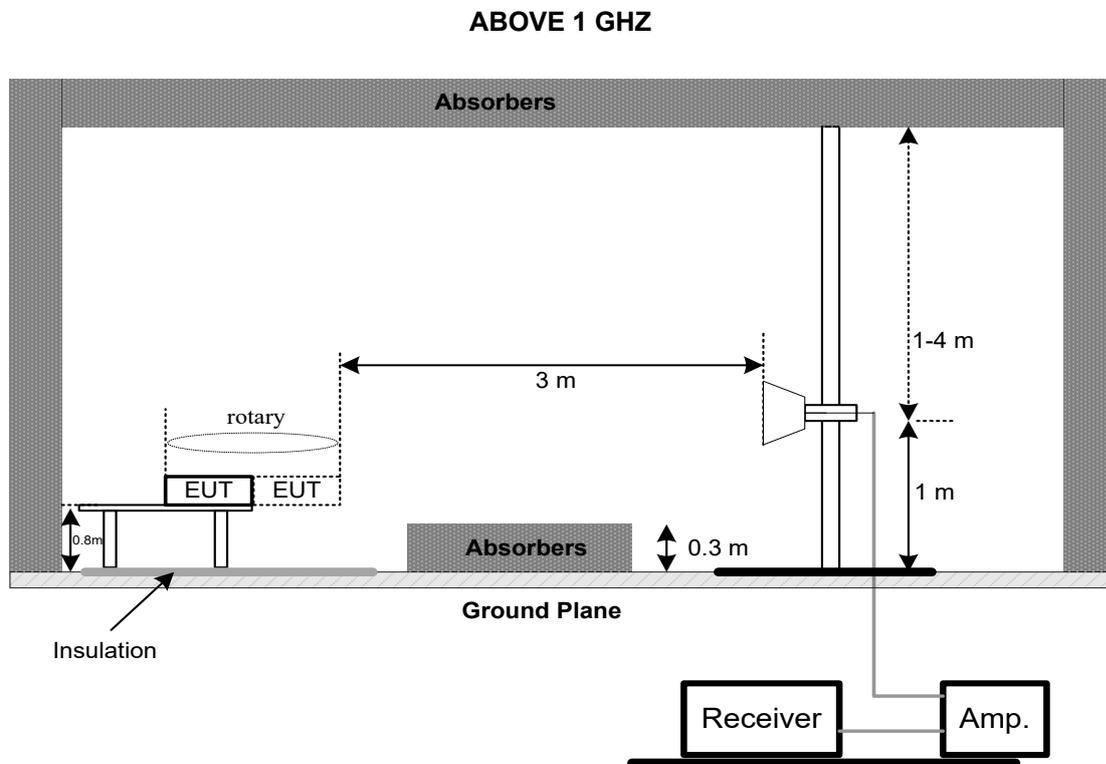
Highest internal frequency (F _x)	Highest measured frequency
F _x ≤ 108 MHz	1 GHz
108 < F _x ≤ 500 MHz	2 GHz
500 < F _x ≤ 1000 MHz	5 GHz
F _x > 1 GHz	5 x F _x up to a maximum of 6 GHz

3.2.2 TEST PROCEDURE

- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz).
- b. The height of the equipment or of the substitution antenna shall be 0.8 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- c. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- d. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- e. For the actual test configuration, please refer to the related Item - Block Diagram of system tested.
- f. For transmitters:
 The frequencies on which the transmitter part of the EUT is intended to operate shall be excluded from radiated emission measurements when performed in transmit mode of operation.
- g. For receivers:
 There shall be no frequency exclusion band applied to emission measurements of the receiver part of transceivers or the stand alone receiver under test, and/or associated ancillary equipment.

3.2.3 DEVIATION FROM TEST STANDARD

No deviation

3.2.4 TEST SETUP

3.2.5 MEASUREMENT DISTANCE

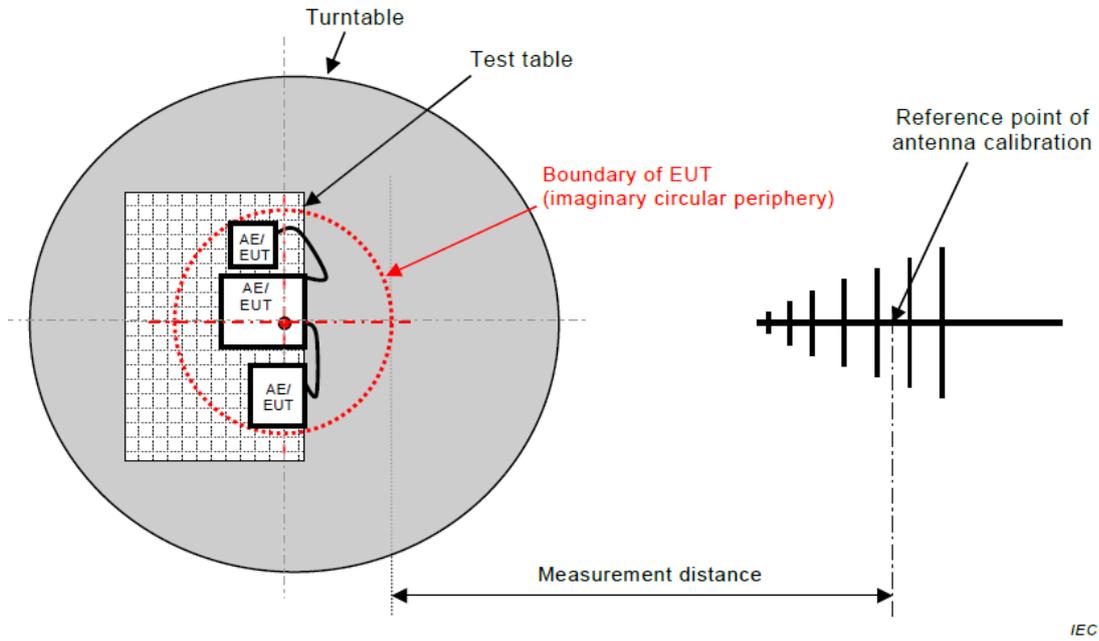


Figure C.1 – Measurement distance

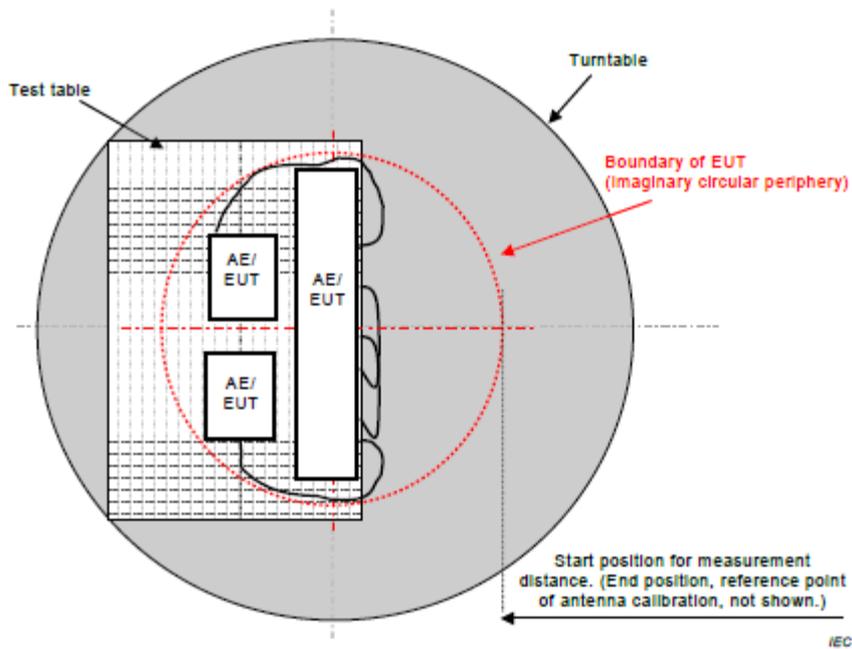


Figure C.2 – Boundary of EUT, Local AE and associated cabling

3.2.6 TEST RESULTS (ABOVE 1 GHZ)

Please refer to the Appendix B.

3.3 CONDUCTED EMISSION MEASUREMENT AT AC MAINS POWER PORTS

3.3.1 LIMITS

Requirements for conducted emissions from 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
0.5 - 30			73
0.15 - 0.5	AMN	Average / 9 kHz	66
0.5 - 30			60

NOTE:

(1) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)

Margin Level = Measurement Value – Limit Value

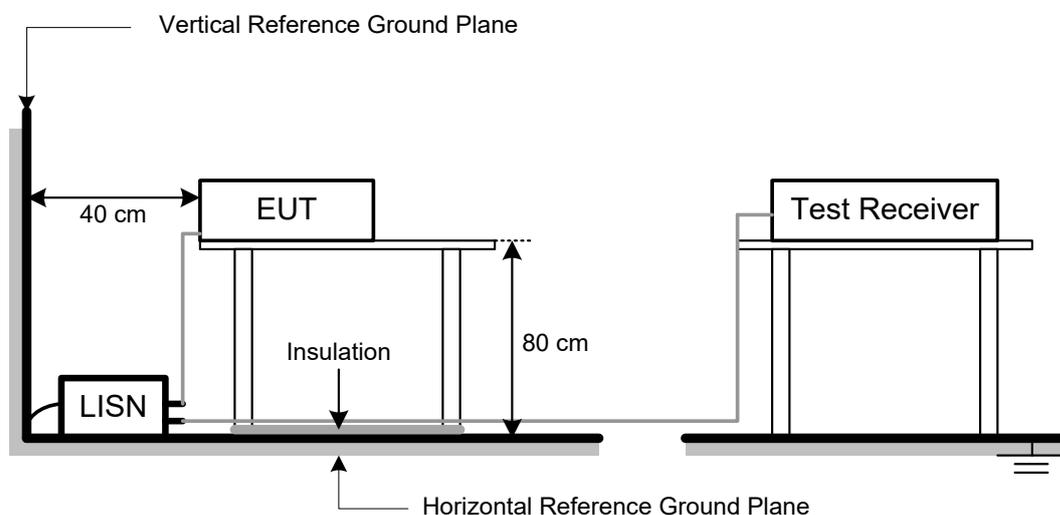
3.3.2 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP



3.3.5 TEST RESULTS

Please refer to the Appendix C.

3.4 HARMONIC CURRENT EMISSIONS TEST

3.4.1 LIMITS

The power consumption is less than 75W, there is no limit applied.

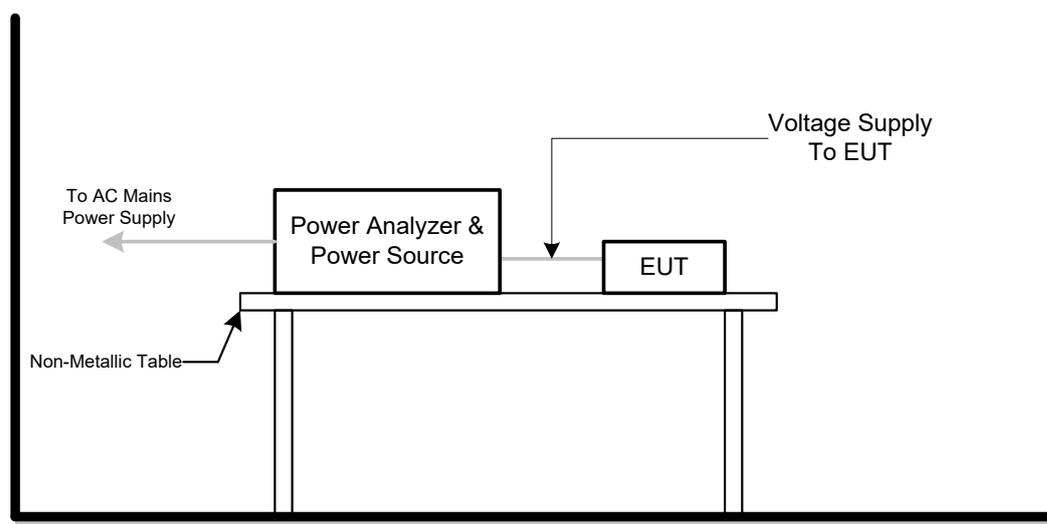
3.4.2 TEST PROCEDURE

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions.
- The classification of EUT is according to of EN IEC 61000-3-2. The EUT is classified as Class A.
- The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

3.4.3 DEVIATION FROM TEST STANDARD

No deviation

3.4.4 TEST SETUP



3.4.5 TEST RESULTS

Please refer to the Appendix D.

3.5 VOLTAGE FLUCTUATIONS AND FLICKER

3.5.1 LIMITS

Tests	Limits	Descriptions
	EN 61000-3-3	
Pst	≤ 1.0 , $T_p = 10$ min.	Short Term Flicker Indicator
Plt	≤ 0.65 , $T_p = 2$ hr.	Long Term Flicker Indicator
dc	≤ 3.3 %	Relative Steady-State V-Change
$dm \square x$	≤ 4 %	Maximum Relative V-change
d (t)	≤ 500 ms	Relative V-change characteristic

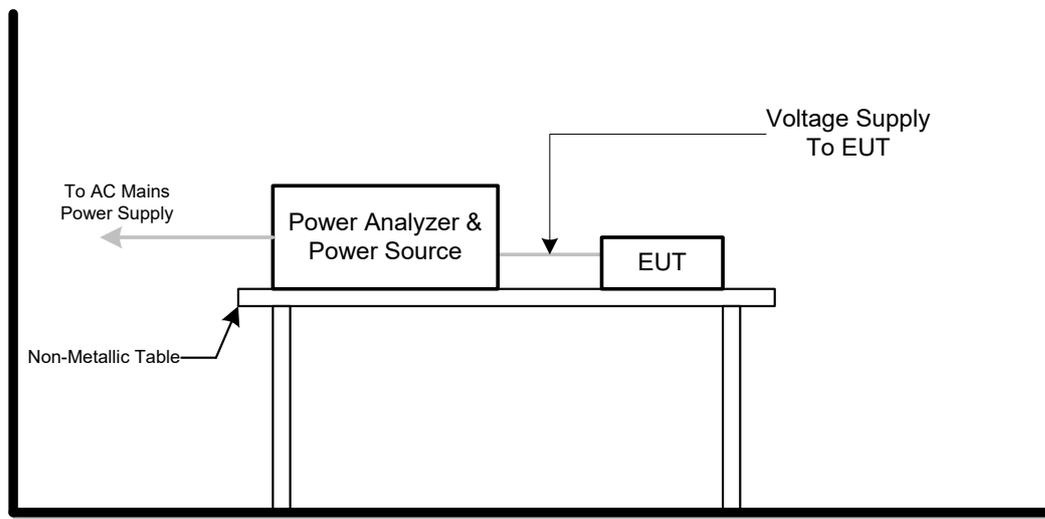
3.5.2 TEST PROCEDURE

- Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in EN 61000-3-3 depend on which standard adopted for compliance measurement.
- All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

3.5.3 DEVIATION FROM TEST STANDARD

No deviation

3.5.4 TEST SETUP



3.5.5 TEST RESULTS

Please refer to the Appendix E.

4. EMC IMMUNITY TEST

4.1 STANDARD COMPLIANCE/SEVERITY LEVEL/CRITERIA

Equipment operating in locations other than telecommunication centres			
Test Standard No.	Test Specification Level	Test Mode Test Port	Performance Criteria
Electrostatic discharge EN 61000-4-2 (ESD)	± 8 kV air discharge ± 4 kV contact discharge	Direct Mode	B
	± 4 kV HCP discharge ± 4 kV VCP discharge	Indirect Mode	B
Radio frequency electromagnetic Field EN IEC 61000-4-3 (RS)	80 MHz to 6000 MHz 3 V/m (unmodulated, r.m.s), 1000 Hz or 400 Hz, 80%, AM modulated (NOTE 1)	Enclosure	A
Fast transients, common mode EN 61000-4-4 (EFT)	± 1 kV(peak) 5/50 ns Tr/Th 5 kHz Repetition Frequency	AC mains power port	B
	±0.5 kV(peak) 5/50ns Tr/Th 5 kHz Repetition Frequency	DC power port (NOTE 2)	B
	± 0.5 kV(peak) 5/50 ns Tr/Th 5 kHz Repetition Frequency	Signal port, Wired network port, Control port (NOTE 2)	B
Surges, line to line and line to Ground EN 61000-4-5 (Surge)	±1 kV(5P/5N) 1.2/50(8/20) Tr/Th us (line to line)	AC mains power port	B
	± 2 kV(5P/5N) 1.2/50(8/20) Tr/Th us (line to earth or ground)		B
	±1 kV (5P/5N) 10/700 (5/320)Tr/Th us (symmetrically operated line to ground)	wired network ports (NOTE 3)	B
	±0.5 kV (5P/5N) 1.2/50(8/20) Tr/Th us (non-symmetrically line to line)		
	±1 kV (5P/5N) 1.2/50(8/20) Tr/Th us (non-symmetrically line to ground, or shield to ground)		
±0.5 kV (5P/5N) 1.2/50(8/20) Tr/Th us (line to ground, or shield to ground)	wired network ports (NOTE 4)	B	

Radio frequency, common mode EN 61000-4-6 (CS)	0.15 MHz to 80 MHz 3 V (unmodulated, r.m.s), 1000 Hz or 400 Hz, 80%, AM Modulated 150Ω source impedance (NOTE 1)	AC Power Port	A
	0.15 MHz to 80 MHz 3 V (unmodulated, r.m.s), 1000 Hz or 400 Hz, 80%, AM Modulated 150Ω source impedance (NOTE 1)	DC Power Port (NOTE 2)	A
	0.15 MHz to 80 MHz 3V (unmodulated, r.m.s), 1000 Hz or 400 Hz, 80%, AM Modulated 150Ω source impedance (NOTE 1)	signal ports, wired network ports, control ports (NOTE 2)	A
Voltage dips and interruptions EN IEC 61000-4-11 (Dips)	Voltage dips: 0 % residual voltage for 0,5 cycle 0 % residual voltage for 1 cycle 70 % residual voltage for 25 cycles (at 50 Hz) Voltage interruptions: 0 % residual voltage for 250 cycles (at 50 Hz)	AC Power Port	B B C C

NOTE:

- (1) If the wanted signal is modulated at 1 000 Hz, then an audio signal of 400 Hz shall be used.
- (2) If the cables may be longer than 3 m.
- (3) Only for directly connected to outdoor cables.
- (4) Only for connected to indoor cables (longer than 30 m).

4.2 GENERAL PERFORMANCE CRITERIA

According to **ETSI EN 301 489-17** standard, the general performance criteria as following:

Criteria	During Test	After Test
A	Shall operate as intended. (see note). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May show loss of function.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.

NOTE: Operate as intended during the test allows a level of degradation in accordance with minimum performance level.

Minimum performance level

For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %.

For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.

4.3 ELECTROSTATIC DISCHARGE (ESD)

4.3.1 TEST SPECIFICATION

Test Method	EN 61000-4-2
Discharge Impedance	330 ohm / 150 pF
Required Performance	B
Discharge Voltage	Air Discharge: ± 2 kV, ± 4 kV, ± 8 kV Contact Discharge: ± 4 kV
Polarity	Positive & Negative
Number of Discharge	20 times at each test point
Discharge Mode	Single Discharge
Discharge Period	1 second

4.3.2 TEST PROCEDURE

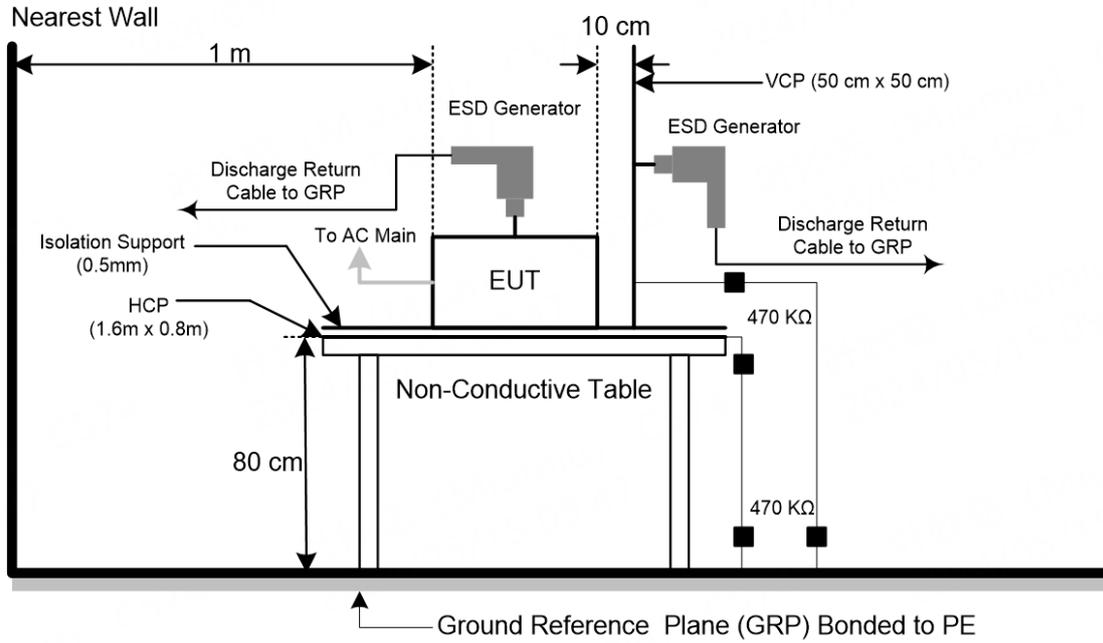
The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

- a. The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied.
 NOTE 1 The minimum number of discharges applied is depending on the EUT; for products with synchronized circuits the number of discharges should be larger.
 For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
 NOTE 2 The points to which the discharges should be applied may be selected by means of an exploration carried out at a repetition rate of 20 discharges per second, or more.
 Vertical Coupling Plane (VCP):
 The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Discharge Electrode touching the coupling plane.
 The four faces of the EUT will be performed with electrostatic discharge.
 Horizontal Coupling Plane (HCP):
 The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.
 The four faces of the EUT will be performed with electrostatic discharge.
- b. Air discharges at insulation surfaces of the EUT.
 It was at least ten single discharges with positive and negative at the same selected point.
- c. For TABLE-TOP equipment:
 The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test was installed in a representative system as described in EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

4.3.3 DEVIATION FROM TEST STANDARD

No deviation

4.3.4 TEST SETUP



4.3.5 TEST RESULTS

Please refer to the Appendix F.

4.4 RADIO FREQUENCY ELECTROMAGNETIC FIELD (RS)

4.4.1 TEST SPECIFICATION

Test Method	EN IEC 61000-4-3
Required Performance	A
Frequency Range	80 MHz - 6000 MHz
Field Strength	3 V/m (unmodulated, r.m.s)
Modulation	1000 Hz Sine Wave, 80%, AM Modulation
Frequency Step	1% of the preceding frequency.
Polarity of Antenna	Horizontal and Vertical
Test Distance	3 m
Antenna Height	1.55 m
Dwell Time	3 seconds

4.4.2 TEST PROCEDURE

The EUT and support equipment are in a fully-anechoic chamber.

The testing distance from antenna to the EUT was 3 meters.

For TABLE-TOP equipment:

The EUT installed in a representative system as described in EN IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

The other condition as following manner:

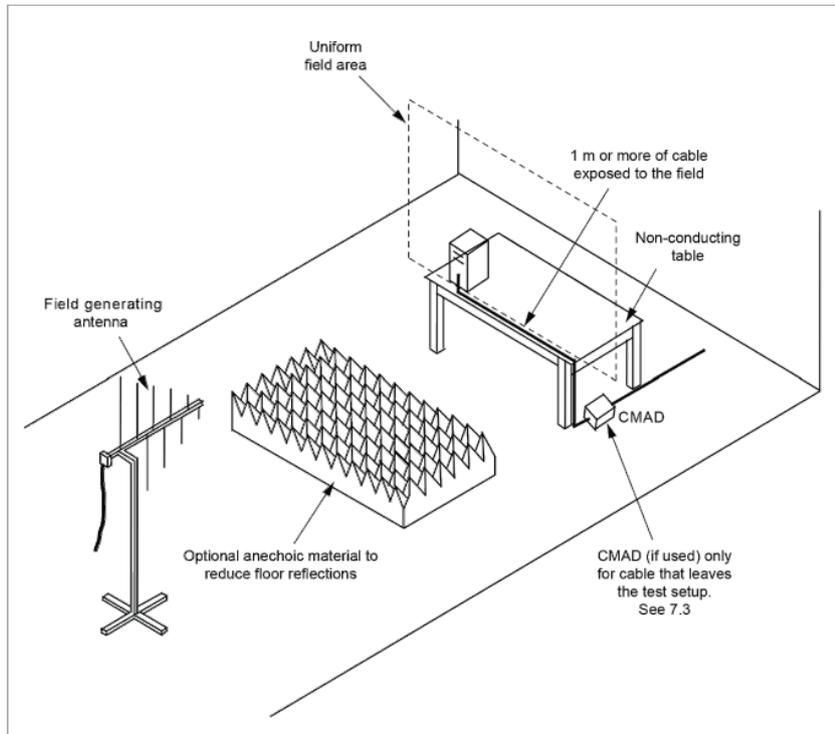
- a. The test level shall be 3 V/m (measured unmodulated).
The test signal shall be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1000 Hz.
The test shall be performed over the frequency range 80 MHz to 6000 MHz.
For receivers and transmitters the stepped frequency increments shall be 1% of the preceding frequency.
- b. The exclusion band of equipment operating in the 2,4 GHz band shall be:
 - Lower limit of exclusion band = lowest allocated band edge frequency -120 MHz
 - Upper limit of exclusion band = highest allocated band edge frequency +120 MHz
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- d. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.
- e. PER or FER performance monitoring:
The EUT was establish link with signaling unit, reduce power to point of link failure then increase by no more than 30 dB, Observe PER or FER test results with the Performance Monitor Device during the application of the required EMC Test Signal.

4.4.3 DEVIATION FROM TEST STANDARD

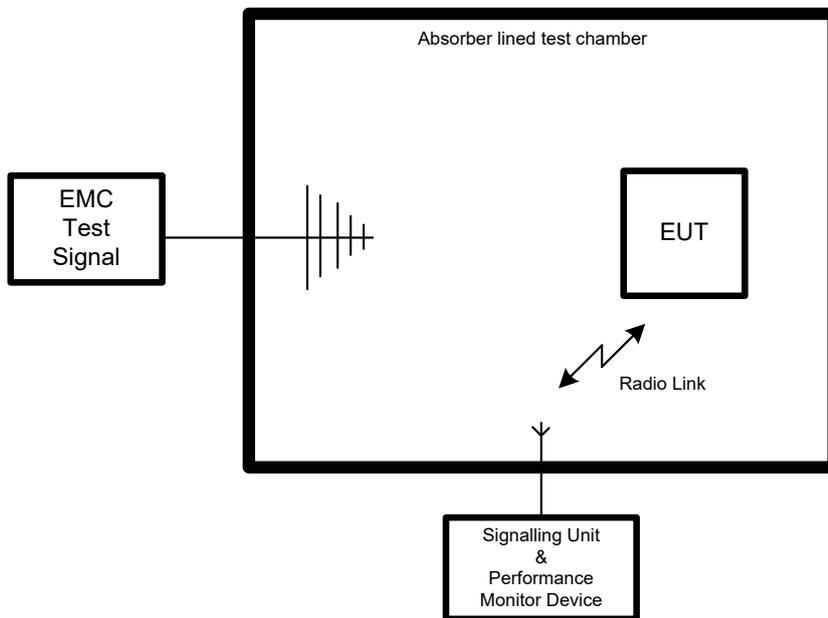
No deviation

4.4.4 TEST SETUP

General



PER



4.4.5 TEST RESULTS

Please refer to the Appendix G.

4.6 SURGE IMMUNITY TEST (SURGE)

4.6.1 TEST SPECIFICATION

Test Method	EN 61000-4-5
Required Performance	B
Wave-Shape	1.2/50(8/20) Tr/Th μ s combination wave
Test Voltage	AC Power Line: ± 0.5 kV
Generator Source Impedance	2 Ω of the low-voltage power supply network.
Polarity	5 positive and 5 negative at selected points
Number of Tests & Polarity	AC Power Port: 0°/90°/180°/270°
Pulse Repetition Rate	1 time / min.

4.6.2 TEST PROCEDURE

a. For EUT power supply:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:

The surge is applied to the lines via the capacitive coupling. The coupling /decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

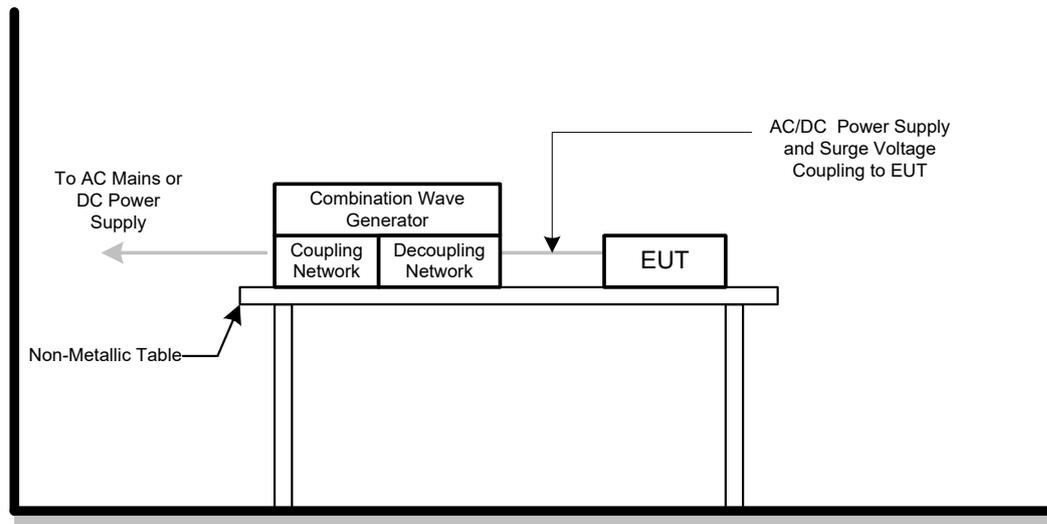
c. For test applied to unshielded symmetrically operated interconnection /telecommunication lines of EUT:

The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

4.6.3 DEVIATION FROM TEST STANDARD

No deviation

4.6.4 TEST SETUP



4.6.5 TEST RESULTS

Please refer to the Appendix I.

4.7 RADIO FREQUENCY, COMMON MODE (CS)

4.7.1 TEST SPECIFICATION

Test Method	EN 61000-4-6
Required Performance	A
Frequency Range	0.15 MHz - 80 MHz
Field Strength	3 V (unmodulated, r.m.s)
Modulation	1000 Hz Sine Wave, 80%, AM Modulation
Frequency Step	1 % frequency increment of the momentary frequency
Dwell Time	3 seconds

4.7.2 TEST PROCEDURE

The equipment to be tested is placed on an insulating support of 0.1m height above a reference ground plane. All cables exiting the EUT shall be supported at a height of at least 30 mm above the reference ground plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

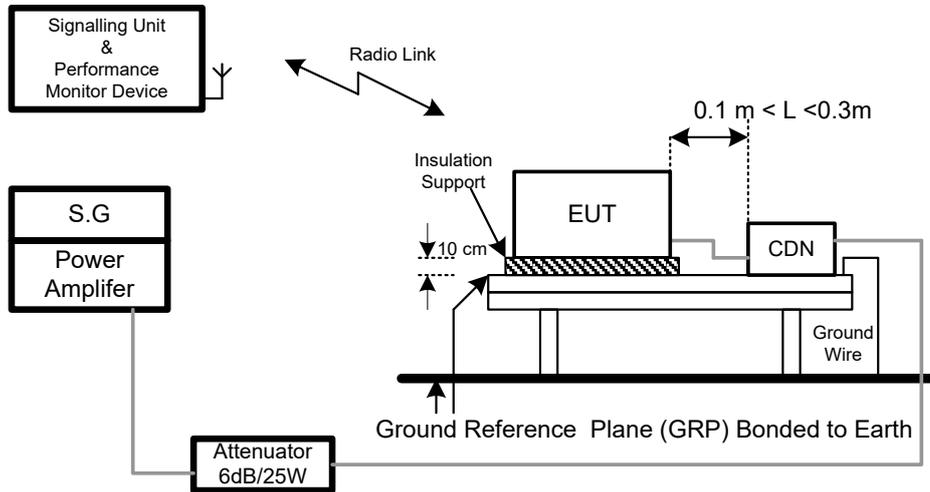
The other condition as following manner:

- a. The test level shall be severity level 2 as given in EN 61000-4-6 corresponding to 3 V (unmodulated, r.m.s). The test signal shall then be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1000 Hz.
- b. The test shall be performed over the frequency range 150 kHz to 80 MHz with the exception of an exclusion band for transmitters, and for receivers and duplex transceivers.
- c. For receivers and transmitters the stepped frequency increments shall be 1 % frequency increment of the momentary frequency in the frequency range 150 kHz to 80 MHz.
- d. The injection method to be used shall be selected according to the basic standard EN 61000-4-6.
- e. The dwell time of the test phenomena at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond.
- f. PER or FER performance monitoring:
The EUT was establish link with signaling unit, reduce power to point of link failure then increase by no more than 30 dB, Observe PER or FER test results with the Performance Monitor Device during the application of the required interference signal.

4.7.3 DEVIATION FROM TEST STANDARD

No deviation.

4.7.4 TEST SETUP



4.7.5 TEST RESULTS

Please refer to the Appendix J.

4.8 VOLTAGE DIPS AND INTERRUPTIONS (DIPS)

4.8.1 TEST SPECIFICATION

Test Method	EN IEC 61000-4-11
Required Performance	Voltage dips: B (0 % residual voltage for 0,5 cycle) B (0 % residual voltage for 1 cycle) C (70 % residual voltage for 25 cycles (at 50 Hz)) Voltage interruptions: C (0 % residual voltage for 250 cycles (at 50 Hz))
Interval between Event	ten seconds
Phase Angle	0°/180°
Test Cycle	3 times

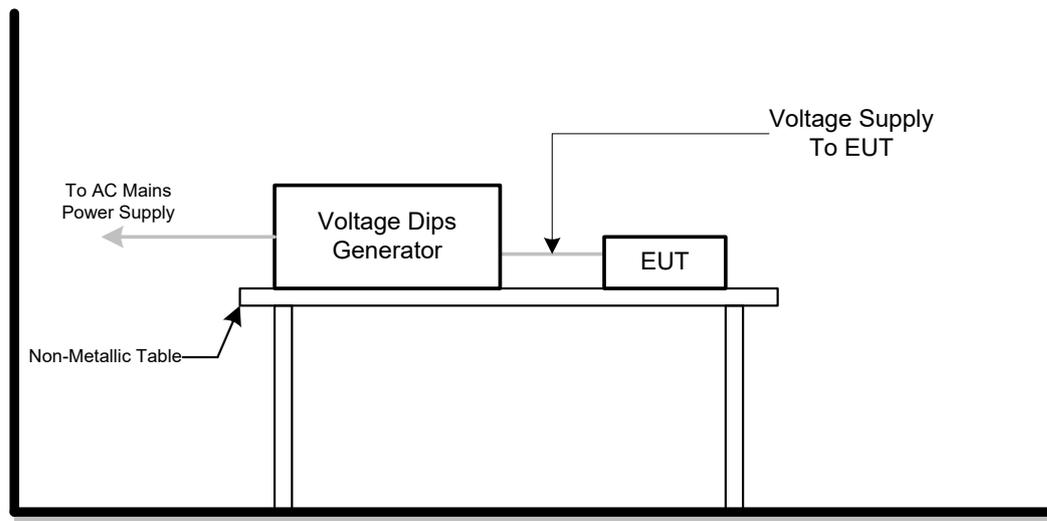
4.8.2 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

4.8.3 DEVIATION FROM TEST STANDARD

No deviation

4.8.4 TEST SETUP



4.8.5 TEST RESULTS

Please refer to the Appendix K.

5. MEASUREMENT INSTRUMENTS LIST

Radiated emission up to 1GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Amplifier	EMC INSTRUMENT	EMC001330	980989	Nov. 17, 2024
2	Cable	RW	LMR-400(30MHz-1 GHz)(10m+2.5m+0.8M)	N/A	May 06, 2025
3	Controller	MF	MF-7802BS	N/A	N/A
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
5	EMI Test Receiver	Keysight	N9038A	MY56400060	Dec. 22, 2024
6	Trilog-Broadband Antenna	Schwarzbeck	VULB9168	946	Mar. 21, 2025
7	Attenuator	EMCI	EMCI-N-6-06	AT-N0671	Mar. 21, 2025

Radiated emission above 1GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double Ridged Guide Antenna	ETS-Lindgren	3115	75846	Mar. 20, 2025
2	Amplifier	EMC INSTRUMENT	EMC118A45SE	9801002	Nov. 17, 2024
3	Cable	RW	LMR-400(1GHz-18 GHz)(12.5m+1M)	N/A	Mar. 25, 2025
4	Controller	MF	MF-7802BS	N/A	N/A
5	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
6	EMI Test Receiver	Keysight	N9038A	MY56400060	Dec. 22, 2024

Conducted emission at AC mains power port					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	TWO-LINE V-NETWORK	R&S	ENV216	100526	Jun. 16, 2024
2	EMI Test Receiver	R&S	ESR3	101862	Dec. 22, 2024
3	Cable	N/A	SFT205-NMNM-12 M-001	12M	Nov. 27, 2024
4	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Harmonic current emissions & Voltage fluctuations and flicker					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Harmonics and Flicker Analyzer	California Instruments	PACS-1	72344	Jun. 16, 2024
2	3KVA AC Power source	California Instruments	3001ix	56309	Jun. 16, 2024
3	Measurement Software	California	CTS4.0 Version 4.29	N/A	N/A

Electrostatic discharge					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	ESD Generator	TESEQ AG	NSG 437	450	Nov. 12, 2024

Radio frequency electromagnetic Field					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	ETS	3142B	26419	N/A
2	Amplifier	AR	50S1G4A	326720	Dec. 22, 2024
3	MXG Analog Signal Generator	Agilent	N5181A	MY49060710	Jun. 17, 2024
4	Power amplifier	MILMEGA	AS1860-50	1064834	Dec. 22, 2024
5	Microwave Log.-Per. Antenna	Schwarzbeck	STLP 9149	9149-277	N/A
6	Power amplifier	MILMEGA	80RF1000-250	1064833	Dec. 22, 2024
7	Measurement Software	Farad	(EZ-RS)V2.0.1.3	N/A	N/A

Fast transients, common mode					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Fast Transient Burst Simulator	Prima	EFT61004TA	PR190741004	Jun. 16, 2024
2	Measurement Software	Prima	EFT_Series V1.0.0 .0.20180710	N/A	N/A

Surge					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Lightning Surge Generator	Prima	SUG61005TB	PR190854067	Jun. 16, 2024
2	Measurement Software	Prima	SUG_Series V1. 0.0.7.20190827	N/A	N/A

Radio frequency, common mode					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	TEST SYSTEM FOR CONDUCTED AND RADIATED IMMUNITY	TESEQ	NSG 4070B	37513	Jun. 16, 2024
2	Attenuator	Teseq	100-SA-FFN-06	163357	Jun. 16, 2024
3	Measurement Software	Farad	EZ-CS (V2.0.1.4)	N/A	N/A
4	Power CDN	FCC	FCC-801-M2/M3-16A	100270	Dec. 22, 2024
5	Coupling Decoupling Network	Teseq GmbH	CDN M016	35834	Jun. 16, 2024
6	wideband radio communication tester	R&S	CMW500	152372	Dec. 22, 2024

Voltage dips and interruptions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Cycle Sag Simulator	Prima	DRP61011TA	PR19076452	Jun. 16, 2024

Remark: "N/A" denotes no model name, serial no. or calibration specified.

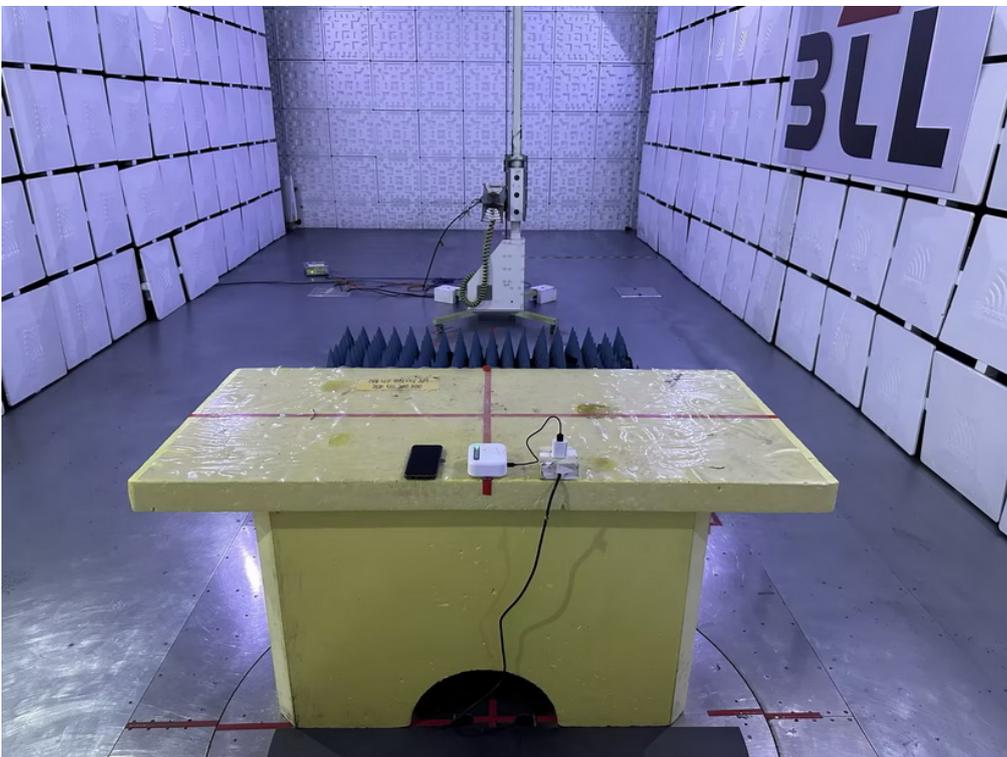
All calibration period of equipment list is one year.

6. EUT TEST PHOTO

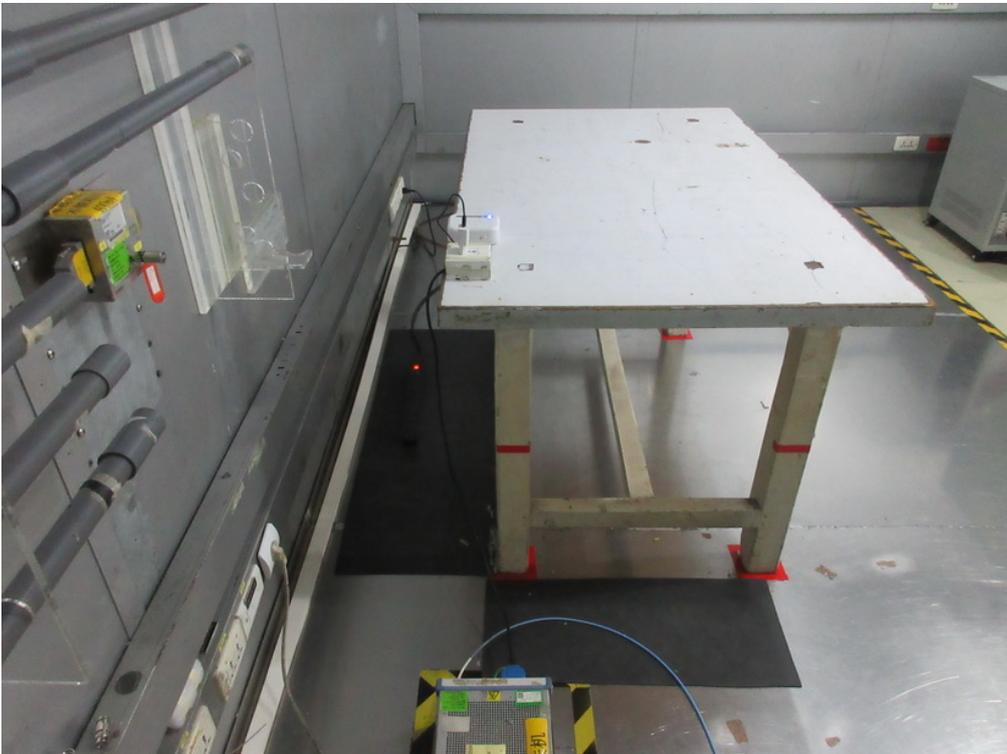
Radiated emissions up to 1 GHz



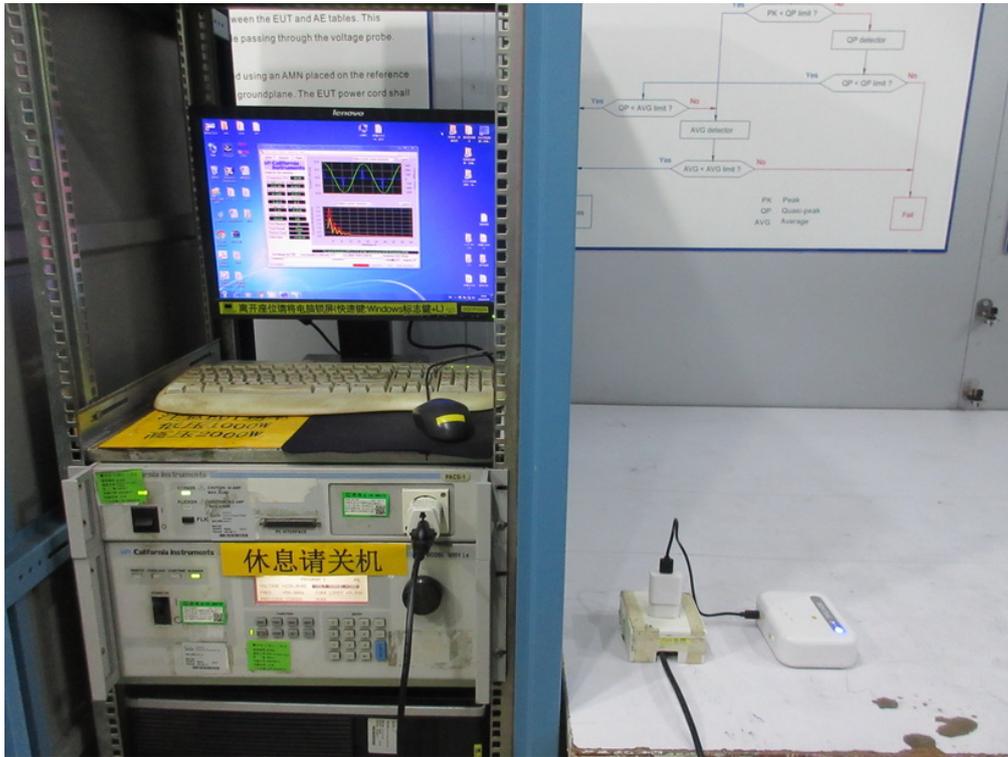
Radiated emissions above 1 GHz



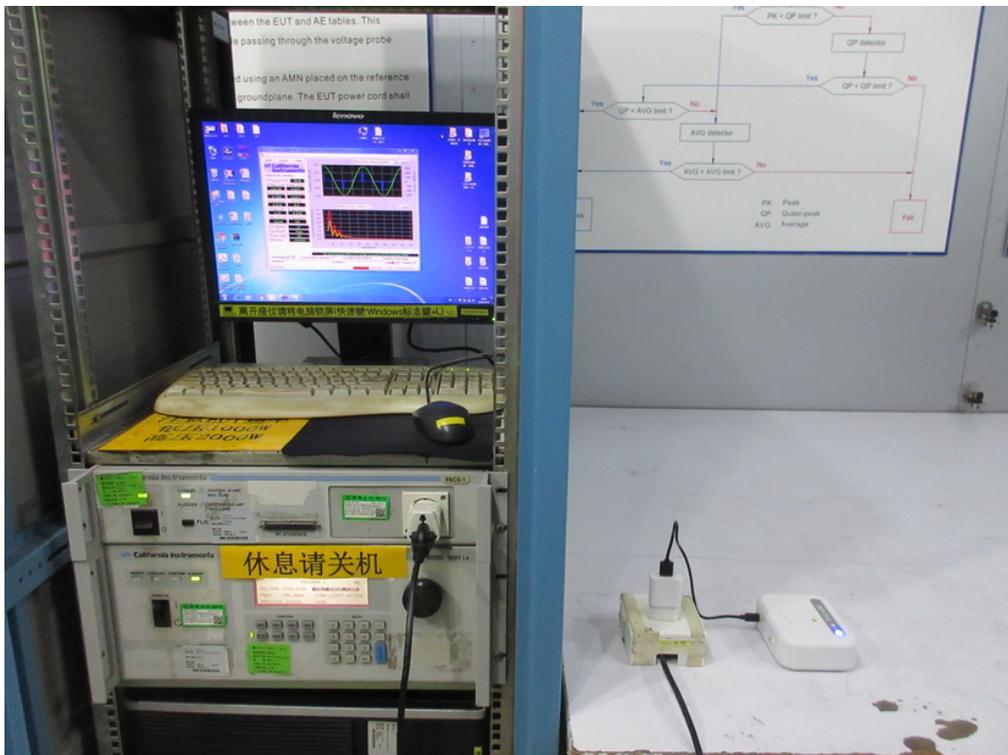
Conducted emissions AC mains power port



Harmonic current



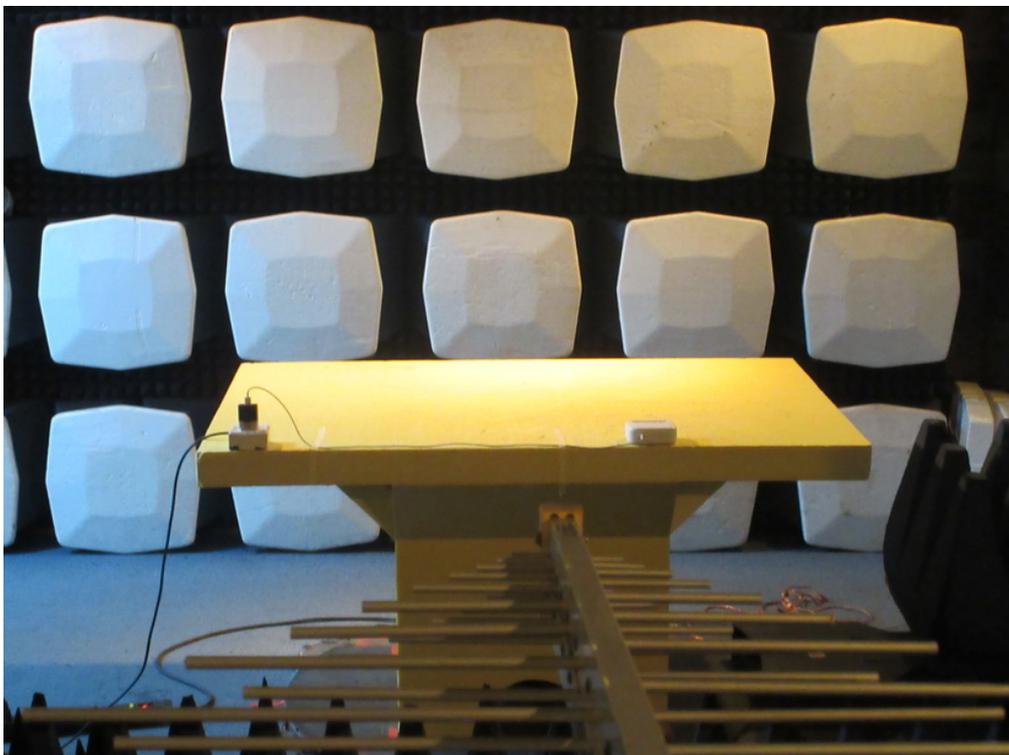
Voltage fluctuations (Flicker)



Electrostatic discharge immunity



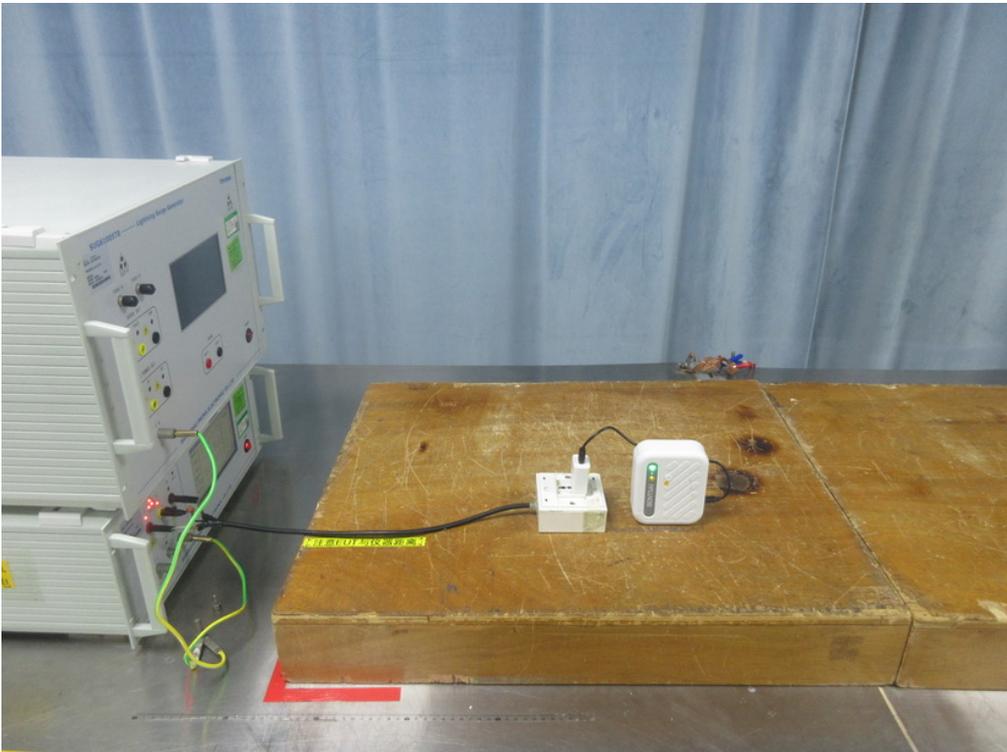
Radiated, radio-frequency, electromagnetic field immunity – Up to 1GHz



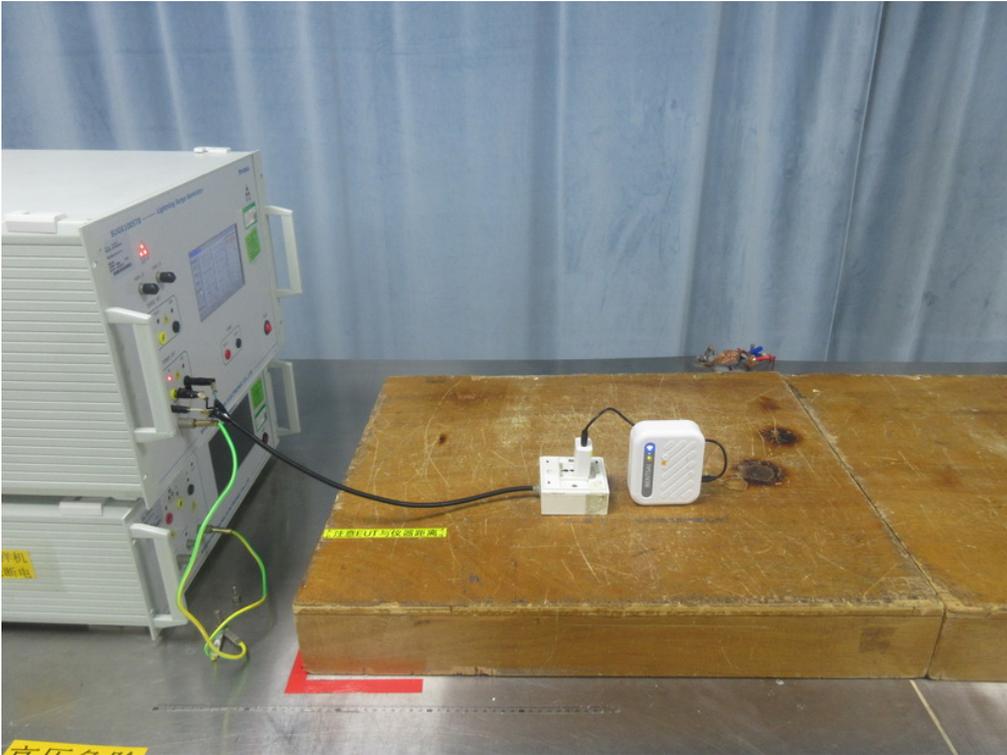
Radiated, radio-frequency, electromagnetic field immunity – Above 1GHz



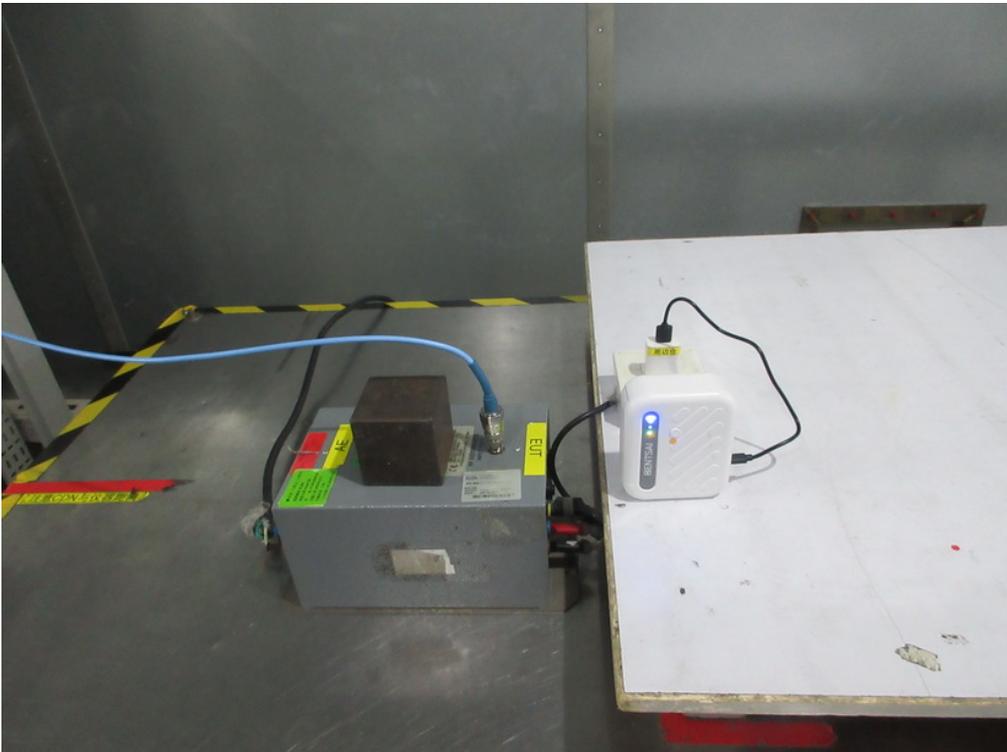
Electrical fast transient/burst immunity - AC



Surge immunity - AC



Immunity to conducted disturbances, induced by radio-frequency fields - AC

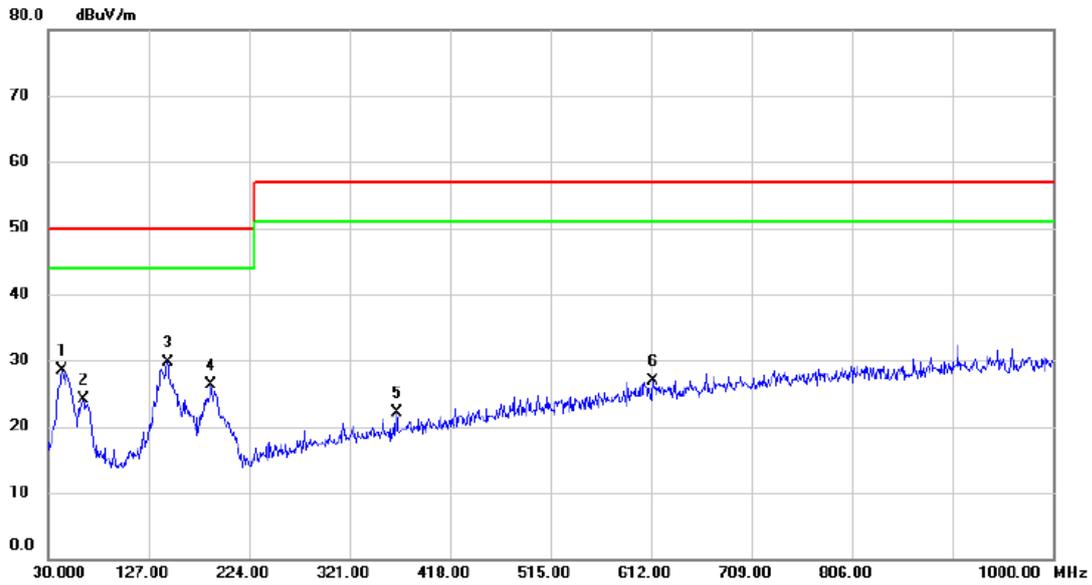


Voltage dips, short interruptions and voltage variations immunity



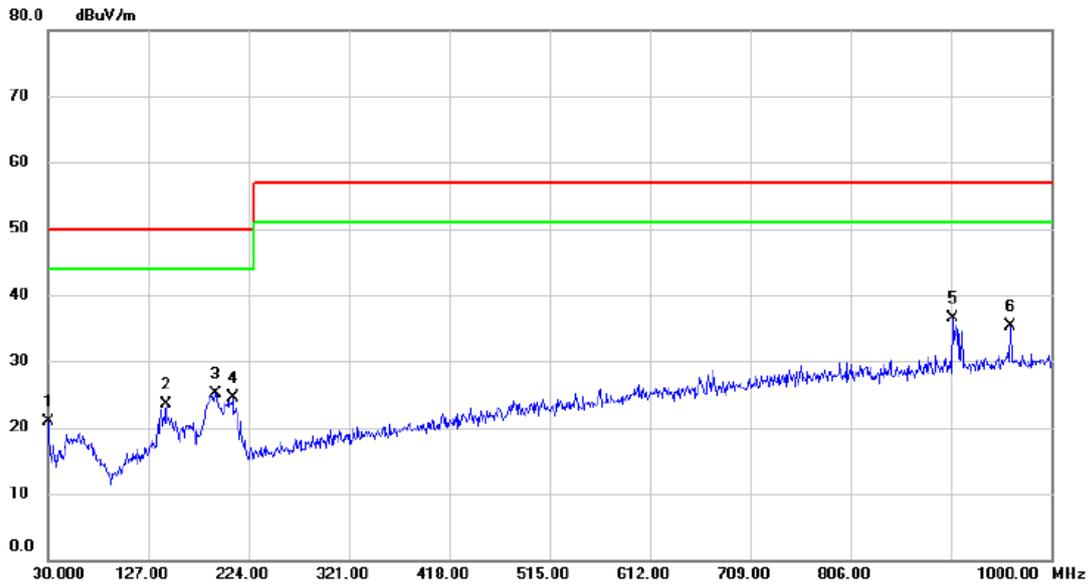
APPENDIX A - RADIATED EMISSION UP TO 1GHZ

Test Voltage	AC 230V/50Hz	Polarization	Vertical
Test Mode	Mode 1		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		43.5800	42.20	-13.63	28.57	50.00	-21.43	QP	
2		63.9500	35.33	-11.29	24.04	50.00	-25.96	QP	
3	*	145.4300	42.01	-12.30	29.71	50.00	-20.29	QP	
4		187.1400	39.71	-13.35	26.36	50.00	-23.64	QP	
5		366.5900	31.47	-9.33	22.14	57.00	-34.86	QP	
6		613.9400	30.46	-3.63	26.83	57.00	-30.17	QP	

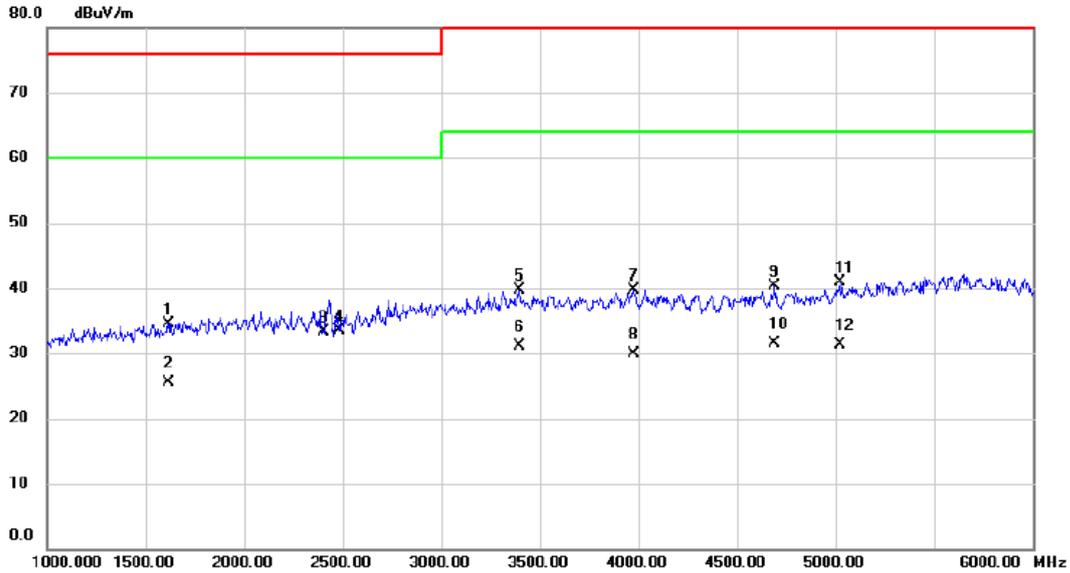
Test Voltage	AC 230V/50Hz	Polarization	Horizontal
Test Mode	Mode 1		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		30.0000	34.22	-13.27	20.95	50.00	-29.05	QP	
2		144.4600	35.80	-12.38	23.42	50.00	-26.58	QP	
3		191.9900	39.00	-13.84	25.16	50.00	-24.84	QP	
4		208.4800	39.05	-14.50	24.55	50.00	-25.45	QP	
5	*	904.9400	36.17	0.35	36.52	57.00	-20.48	QP	
6		960.2300	34.40	1.00	35.40	57.00	-21.60	QP	

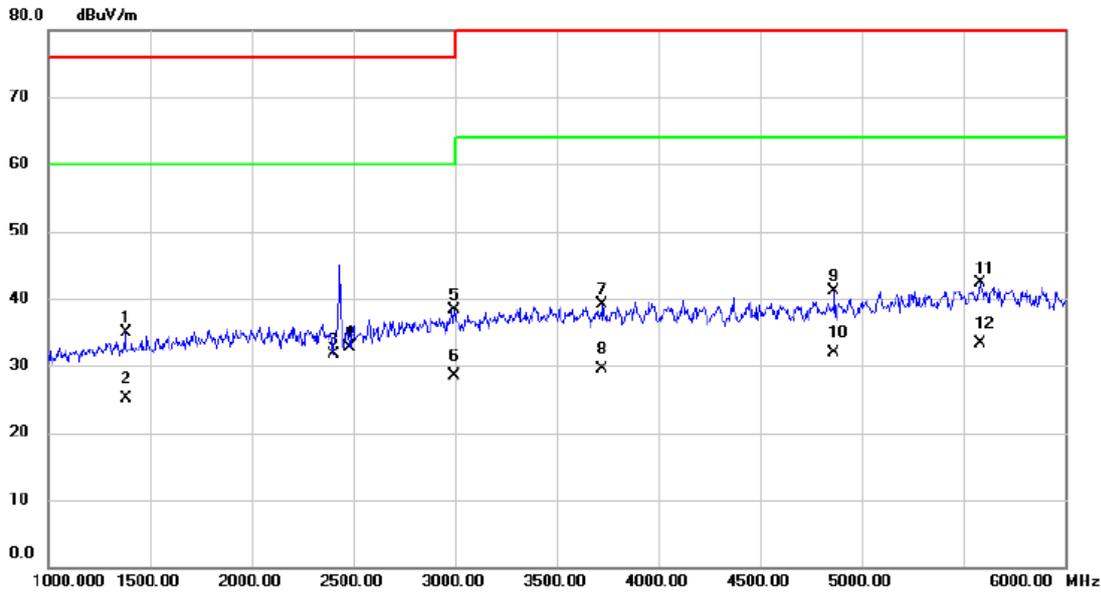
APPENDIX B - RADIATED EMISSION ABOVE 1GHZ

Test Voltage	AC 230V/50Hz	Polarization	Vertical
Test Mode	Mode 1		
Note	2.4G WIFI(2400-2483.5MHz) is intentional transmissions, which is not applicable to the radiation emission requirements in this standard.		



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	1617.500	39.41	-4.96	34.45	76.00	-41.55	peak	
2	1617.500	30.48	-4.96	25.52	60.00	-34.48	AVG	
3	2400.000	36.40	-3.02	33.38	76.00	-42.62	peak	
4	2483.500	36.52	-3.00	33.52	76.00	-42.48	peak	
5	3395.000	39.13	0.60	39.73	80.00	-40.27	peak	
6	3395.000	30.49	0.60	31.09	64.00	-32.91	AVG	
7	3975.000	37.89	1.89	39.78	80.00	-40.22	peak	
8	3975.000	28.04	1.89	29.93	64.00	-34.07	AVG	
9	4692.500	37.76	2.46	40.22	80.00	-39.78	peak	
10 *	4692.500	29.05	2.46	31.51	64.00	-32.49	AVG	
11	5020.000	37.72	3.26	40.98	80.00	-39.02	peak	
12	5020.000	28.04	3.26	31.30	64.00	-32.70	AVG	

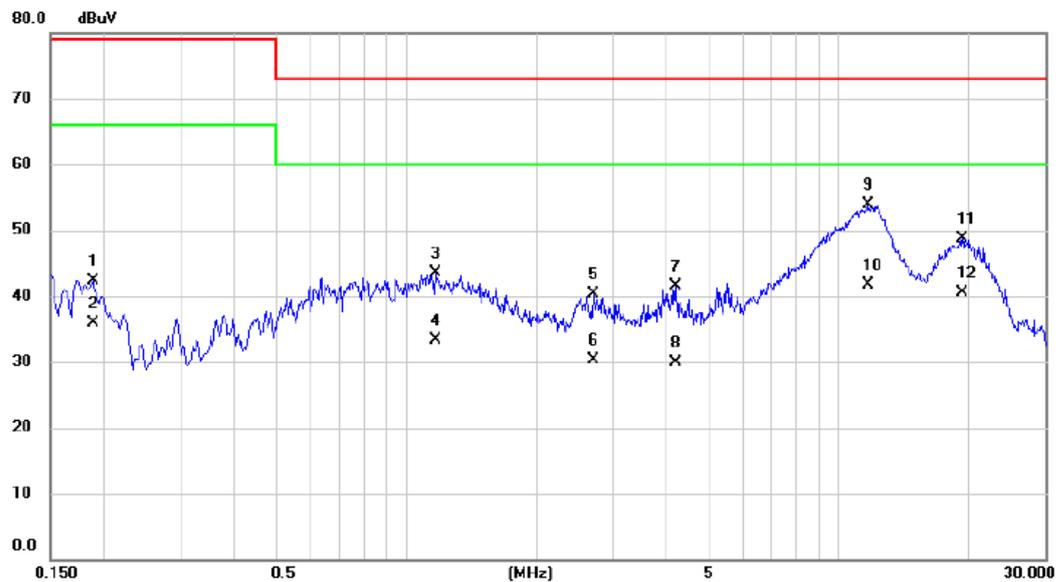
Test Voltage	AC 230V/50Hz	Polarization	Horizontal
Test Mode	Mode 1		
Note	2.4G WIFI(2400-2483.5MHz) is intentional transmissions, which is not applicable to the radiation emission requirements in this standard.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		1380.000	40.81	-6.00	34.81	76.00	-41.19	peak	
2		1380.000	31.05	-6.00	25.05	60.00	-34.95	AVG	
3		2400.000	34.73	-3.02	31.71	76.00	-44.29	peak	
4		2483.500	35.69	-3.00	32.69	76.00	-43.31	peak	
5		2995.000	38.88	-0.58	38.30	76.00	-37.70	peak	
6		2995.000	29.05	-0.58	28.47	60.00	-31.53	AVG	
7		3725.000	37.66	1.37	39.03	80.00	-40.97	peak	
8		3725.000	28.08	1.37	29.45	64.00	-34.55	AVG	
9		4865.000	38.20	2.87	41.07	80.00	-38.93	peak	
10		4865.000	29.05	2.87	31.92	64.00	-32.08	AVG	
11		5580.000	37.05	5.32	42.37	80.00	-37.63	peak	
12	*	5580.000	28.05	5.32	33.37	64.00	-30.63	AVG	

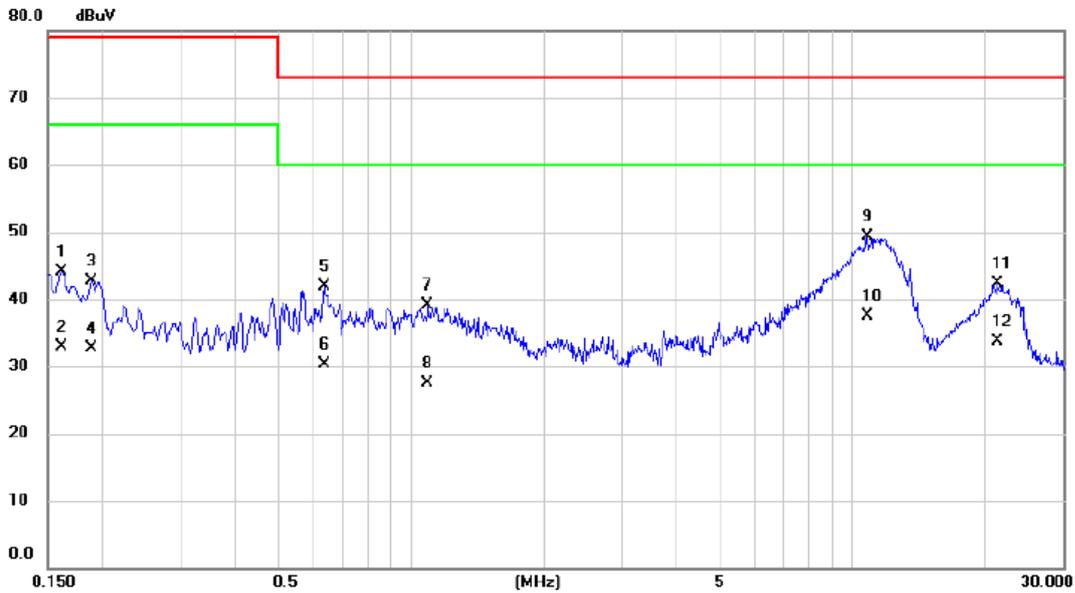
APPENDIX C - CONDUCTED EMISSION AT AC MAINS POWER PORT

Test Voltage	AC 230V/50Hz	Phase	Line
Test Mode	Mode 1		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1883	31.52	10.73	42.25	79.00	-36.75	QP	
2		0.1883	25.10	10.73	35.83	66.00	-30.17	AVG	
3		1.1647	32.73	10.72	43.45	73.00	-29.55	QP	
4		1.1647	22.50	10.72	33.22	60.00	-26.78	AVG	
5		2.7015	29.36	10.93	40.29	73.00	-32.71	QP	
6		2.7015	19.30	10.93	30.23	60.00	-29.77	AVG	
7		4.2000	30.24	11.23	41.47	73.00	-31.53	QP	
8		4.2000	18.70	11.23	29.93	60.00	-30.07	AVG	
9		11.6565	40.56	13.41	53.97	73.00	-19.03	QP	
10	*	11.6565	28.30	13.41	41.71	60.00	-18.29	AVG	
11		19.2413	32.76	15.86	48.62	73.00	-24.38	QP	
12		19.2413	24.70	15.86	40.56	60.00	-19.44	AVG	

Test Voltage	AC 230V/50Hz	Phase	Neutral
Test Mode	Mode 1		

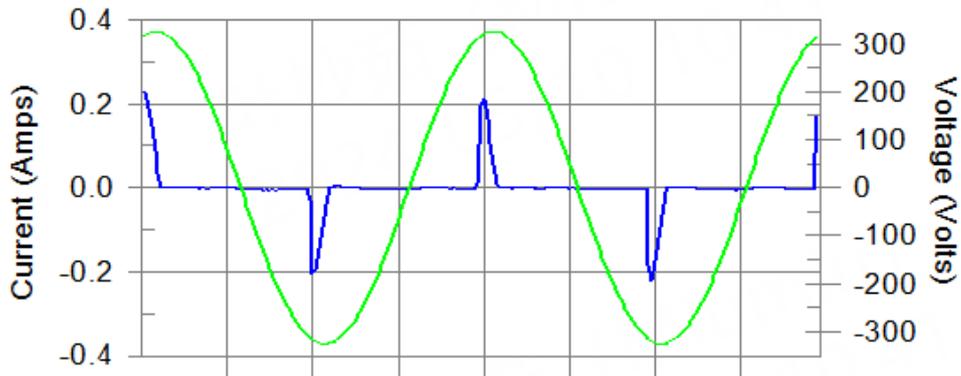


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1612	34.41	9.75	44.16	79.00	-34.84	QP	
2	0.1612	23.10	9.75	32.85	66.00	-33.15	AVG	
3	0.1882	32.96	9.77	42.73	79.00	-36.27	QP	
4	0.1882	22.90	9.77	32.67	66.00	-33.33	AVG	
5	0.6360	31.97	9.84	41.81	73.00	-31.19	QP	
6	0.6360	20.50	9.84	30.34	60.00	-29.66	AVG	
7	1.0904	29.23	9.92	39.15	73.00	-33.85	QP	
8	1.0904	17.60	9.92	27.52	60.00	-32.48	AVG	
9	10.8285	36.62	12.66	49.28	73.00	-23.72	QP	
10 *	10.8285	24.90	12.66	37.56	60.00	-22.44	AVG	
11	21.2572	26.71	15.51	42.22	73.00	-30.78	QP	
12	21.2572	18.20	15.51	33.71	60.00	-26.29	AVG	

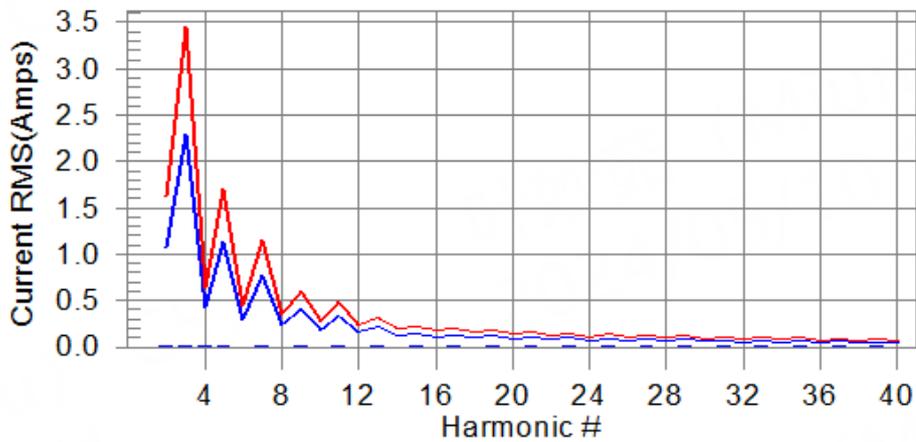
APPENDIX D - HARMONIC CURRENT EMISSION

Harmonics - Class A	
Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Test result: Pass Worst harmonics H15-3.1% of 150% limit, H17-4.2% of 100% limit

Current Test Result Summary (Run time)

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Highest parameter values during test:

V RMS (Volts):	229.96	Frequency(Hz):	50.00
I Peak (Amps):	0.236	I RMS (Amps):	0.036
I Fund (Amps):	0.011	Crest Factor:	8.432
Power (Watts):	2.5	Power Factor:	0.391

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	N/A	0.002	1.620	N/A	Pass
3	0.008	2.300	0.4	0.011	3.450	0.3	Pass
4	0.001	0.430	N/A	0.001	0.645	N/A	Pass
5	0.008	1.140	0.7	0.010	1.710	0.6	Pass
6	0.001	0.300	N/A	0.001	0.450	N/A	Pass
7	0.008	0.770	1.1	0.010	1.155	0.9	Pass
8	0.001	0.230	N/A	0.001	0.345	N/A	Pass
9	0.008	0.400	1.9	0.009	0.600	1.5	Pass
10	0.001	0.184	N/A	0.001	0.276	N/A	Pass
11	0.007	0.330	2.2	0.009	0.495	1.7	Pass
12	0.001	0.153	N/A	0.001	0.230	N/A	Pass
13	0.007	0.210	3.2	0.008	0.315	2.5	Pass
14	0.001	0.131	N/A	0.001	0.197	N/A	Pass
15	0.006	0.150	4.1	0.007	0.225	3.1	Pass
16	0.000	0.115	N/A	0.001	0.173	N/A	Pass
17	0.006	0.132	4.2	0.006	0.198	3.1	Pass
18	0.000	0.102	N/A	0.001	0.153	N/A	Pass
19	0.005	0.118	N/A	0.005	0.178	N/A	Pass
20	0.000	0.092	N/A	0.001	0.138	N/A	Pass
21	0.004	0.107	N/A	0.004	0.161	N/A	Pass
22	0.000	0.084	N/A	0.001	0.125	N/A	Pass
23	0.004	0.098	N/A	0.004	0.147	N/A	Pass
24	0.000	0.077	N/A	0.001	0.115	N/A	Pass
25	0.003	0.090	N/A	0.003	0.135	N/A	Pass
26	0.000	0.071	N/A	0.001	0.107	N/A	Pass
27	0.003	0.083	N/A	0.003	0.125	N/A	Pass
28	0.000	0.066	N/A	0.001	0.099	N/A	Pass
29	0.002	0.078	N/A	0.002	0.116	N/A	Pass
30	0.000	0.061	N/A	0.000	0.092	N/A	Pass
31	0.002	0.073	N/A	0.002	0.109	N/A	Pass
32	0.000	0.058	N/A	0.000	0.086	N/A	Pass
33	0.001	0.068	N/A	0.002	0.102	N/A	Pass
34	0.000	0.054	N/A	0.000	0.081	N/A	Pass
35	0.001	0.064	N/A	0.001	0.096	N/A	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.001	0.061	N/A	0.001	0.091	N/A	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.001	0.058	N/A	0.001	0.087	N/A	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass

Voltage Source Verification Data (Run time)	
Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Highest parameter values during test:

Voltage (Vrms):	229.96	Frequency(Hz):	50.00
I _{Peak} (Amps):	0.236	I _{RMS} (Amps):	0.036
I _{Fund} (Amps):	0.011	Crest Factor:	8.432
Power (Watts):	2.5	Power Factor:	0.391

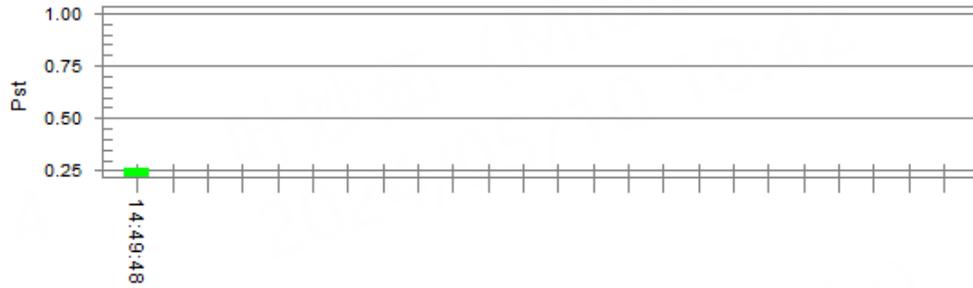
Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.132	0.460	28.65	OK
3	0.511	2.070	24.69	OK
4	0.067	0.460	14.53	OK
5	0.061	0.920	6.59	OK
6	0.039	0.460	8.42	OK
7	0.037	0.690	5.30	OK
8	0.020	0.460	4.40	OK
9	0.040	0.460	8.61	OK
10	0.026	0.460	5.68	OK
11	0.021	0.230	8.97	OK
12	0.019	0.230	8.37	OK
13	0.018	0.230	7.68	OK
14	0.016	0.230	6.93	OK
15	0.015	0.230	6.56	OK
16	0.017	0.230	7.48	OK
17	0.009	0.230	3.75	OK
18	0.013	0.230	5.87	OK
19	0.013	0.230	5.60	OK
20	0.018	0.230	7.66	OK
21	0.010	0.230	4.22	OK
22	0.011	0.230	4.63	OK
23	0.012	0.230	5.09	OK
24	0.006	0.230	2.53	OK
25	0.006	0.230	2.72	OK
26	0.008	0.230	3.54	OK
27	0.007	0.230	2.86	OK
28	0.008	0.230	3.69	OK
29	0.008	0.230	3.35	OK
30	0.006	0.230	2.72	OK
31	0.006	0.230	2.54	OK
32	0.006	0.230	2.46	OK
33	0.008	0.230	3.33	OK
34	0.004	0.230	1.56	OK
35	0.004	0.230	1.55	OK
36	0.003	0.230	1.43	OK
37	0.006	0.230	2.77	OK
38	0.003	0.230	1.52	OK
39	0.003	0.230	1.09	OK
40	0.006	0.230	2.60	OK

APPENDIX E - VOLTAGE FLUCTUATIONS AND FLICKER

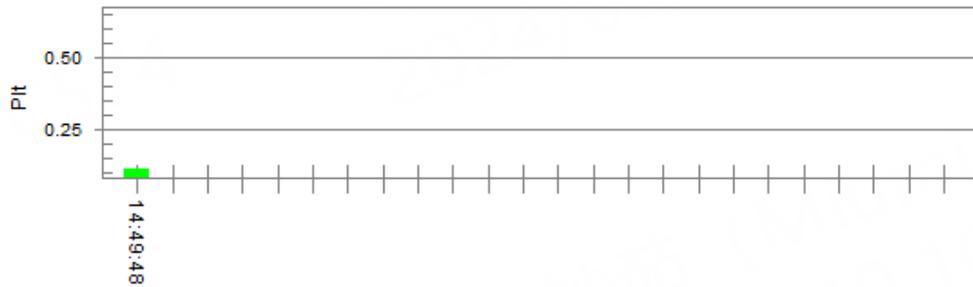
Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Pst and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.86		
Highest dt (%):		Test limit (%):	
T-max (mS):	0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	0.00	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.261	Test limit:	1.000 Pass
Highest Plt (2 hr. period):	0.114	Test limit:	0.650 Pass

APPENDIX F - ELECTROSTATIC DISCHARGE

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Mode	Air Discharge								Contact Discharge					
	2kV		4kV		8kV		- kV		4kV		- kV		- kV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	A	A	A	A	A	A	-	-	-	-	-	-	-	-
2	A	A	A	A	A	A	-	-	-	-	-	-	-	-
3	A	A	A	A	A	A	-	-	-	-	-	-	-	-
Criteria	B						-		B					
Result	A						-		N/A					

Mode	HCP Contact Discharge						VCP Contact Discharge							
	4kV		- kV		- kV		4kV		- kV		- kV			
Location	P	N	P	N	P	N	P	N	P	N	P	N		
Left side	A	A	-	-	-	-	A	A	-	-	-	-		
Right side	A	A	-	-	-	-	A	A	-	-	-	-		
Front side	A	A	-	-	-	-	A	A	-	-	-	-		
Rear side	A	A	-	-	-	-	A	A	-	-	-	-		
Criteria	B						-		B					
Result	A						-		A					

Note:

- 1) P/N denotes the Positive/Negative polarity of the output voltage.
- 2) N/A - denotes test is not applicable in this test report

PHOTO(S) SHOWN THE LOCATION(S) OF ESD EVALUATED



APPENDIX G - RF ELECTROMAGNETIC FIELD

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Modulation	Azimuth	Criteria	Results
80 - 1000	V/H	3 V/m	AM Modulated 1000 Hz, 80%	0	A	A
				90		
				180		
				270		
1000 - 3000	V/H	3 V/m	AM Modulated 1000 Hz, 80%	0	A	A
				90		
				180		
				270		
3000 - 6000	V/H	3 V/m	AM Modulated 1000 Hz, 80%	0	A	A
				90		
				180		
				270		

Freq. Range (MHz)	Operating Mode	Field Strength	Orientation (Side of EUT)	Polarity	Perform Criteria	PER		Judgment
						During test	Limit	
80 - 1000	Wi-Fi 2.4G	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	H / V	A	3.30%	10%	PASS
			Right	H / V	A	3.29%	10%	PASS
			Left	H / V	A	3.23%	10%	PASS
			Rear	H / V	A	3.70%	10%	PASS
1000 - 3000	Wi-Fi 2.4G	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	H / V	A	/	10%	/
			Right	H / V	A	/	10%	/
			Left	H / V	A	/	10%	/
			Rear	H / V	A	3.79%	10%	PASS
3000 - 6000	Wi-Fi 2.4G	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	H / V	A	/	10%	/
			Right	H / V	A	/	10%	/
			Left	H / V	A	/	10%	/
			Rear	H / V	A	3.71%	10%	PASS

APPENDIX H - FAST TRANSIENTS COMMON MODE

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

EUT Ports Tested		Polarity	Repetition Frequency	Test Level	Criterion	Result
				1kV		
AC Power Port	Line (L)	+	5 kHz	A	B	A
		-	5 kHz	A		
	Neutral (N)	+	5 kHz	A	B	A
		-	5 kHz	A		
	L+N	+	5 kHz	A	B	A
		-	5 kHz	A		

APPENDIX I - SURGE

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Wave Form EUT Ports Tested		1.2/50(8/20)Tr/Th μ s						Criterion	Result
		Polarity	Phase	Voltage					
				1kV	-- kV	-- kV	-- kV		
AC	L - N	+/-	0°	A	-	-	-	B	A
		+/-	90°	A	-	-	-		
		+/-	180°	A	-	-	-		
		+/-	270°	A	-	-	-		

APPENDIX J - RADIO FREQUENCY COMMON MODE

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1

Test Ports (Mode)	Freq. Range (MHz)	Field Strength	Modulation	Criteria	Results
Input/ Output AC. Power Port	0.15 --- 80	3 V	AM Modulated 1000 Hz, 80%	A	A

Test Ports (Mode)	Freq. Range (MHz)	Field Strength Modulation	Criteria	Operating Mode	PER		Judgement
					During Test	Limit	
Input/ Output AC. Power Port	0.15 --- 80	3 V AM Modulated 1000 Hz, 80%	A	Wi-Fi 2.4G	2.24%	10%	PASS

APPENDIX K - VOLTAGE DIPS AND INTERRUPTIONS

Test Voltage	AC 100V/50Hz, AC 230V/50Hz, AC 240V/50Hz
Test Mode	Mode 1

AC 100V/50Hz				
Item	Residual Voltage	Cycle	Perform Criteria	Results
Voltage dips	0%	0.5	B	A
Voltage dips	0%	1	B	A
Voltage dips	70%	25	C	A
Voltage interruptions	0%	250	C	B

AC 230V/50Hz				
Item	Residual Voltage	Cycle	Perform Criteria	Results
Voltage dips	0%	0.5	B	A
Voltage dips	0%	1	B	A
Voltage dips	70%	25	C	A
Voltage interruptions	0%	250	C	B

AC 240V/50Hz				
Item	Residual Voltage	Cycle	Perform Criteria	Results
Voltage dips	0%	0.5	B	A
Voltage dips	0%	1	B	A
Voltage dips	70%	25	C	A
Voltage interruptions	0%	250	C	B

End of Test Report