

ETSI EN 301 489-1&-17 Test Report

Project No. : 2208C076
Equipment : AX5700 Tri-Band Gigabit Wi-Fi 6E Router
Brand Name : Tenda
Test Model : RX27 Pro
Series Model : TX27 Pro
Applicant : SHENZHEN TENDA TECHNOLOGY CO.,LTD.
Address : 6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052
Manufacturer : SHENZHEN TENDA TECHNOLOGY CO.,LTD.
Address : 6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052
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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.

Better Yan

Prepared by : Better Yan

Kang Zhang

Approved by : Kang Zhang



BTL Inc.

No. 3 Jinshagang 1st Rd. Shixia, Dalang Town Dongguan City, Guangdong 523792 People's Republic of China.

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

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BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** 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-1-2208C076	R00	Original Report.	Oct. 04, 2022	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
		Current Probe
		CP+CVP
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 Rd. Shixia, Dalang Town Dongguan City, Guangdong 523792 People's Republic of 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	4.00
		200MHz ~ 1,000MHz	V	4.50
		200MHz ~ 1,000MHz	H	4.26

B. Radiated emissions above 1 GHz measurement:

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-CB02 (3m)	CISPR	1GHz ~ 6GHz	4.04

C. Conducted emissions AC mains power port measurement:

Test Site	Method	Measurement Frequency Range	U,(dB)
DG-C01	CISPR	150kHz ~ 30MHz	2.86

D. Asymmetric mode conducted emissions measurement:

Test Site	Method	Test Item	U,(dB)
DG-C01	CISPR	AAN Cat.5 LCL = 65 ... 50 dB	4.04

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

Test Site	Method	Item	U (%)
DG-C01	EN IEC 61000-3-2	Current	0.593
	EN 61000-3-3	Voltage	0.595

F. Immunity Measurement:

Test Site	Method	Item	U
DG-SR02	EN 61000-4-2	Rise time tr	6.30%
		Peak current Ip	6.70%
		Current at 30 ns	6.40%
		Current at 60 ns	6.90%
DG-CB05	EN IEC 61000-4-3 (80MHz~6GHz)	Electromagnetic field immunity test	2.00dB
		PER or FER measurement, test set-up for RS (WLAN 2.4G&5G, BT)	2.08dB
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%
		Peak voltage (VP)-with clamp	3.7%
		Rise time (tr) -with clamp	4.4%
		Pulse width(tw) -with clamp	4.4%
DG-SR05 DG-SR01	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)	4.8%
		Open-Circuit Output Voltage (10/700us)	3.8%
		Open circuit front time (10/700us)	5.8%
		Open circuit time of half value (10/700us)	4.6%
DG-CB06	EN 61000-4-6 (150kHz-80MHz)	CDN	1.32dB
		EM clamp	3.14dB
		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
Radiated emissions up to 1 GHz	26°C	50%	Allan Yao
Radiated emissions above 1 GHz	26°C	50%	Allan Yao
Conducted emissions AC mains power port	22°C	50%	Eli Chen
Asymmetric mode conducted emissions	22°C	50%	Eli Chen
Harmonic current	26°C	52%	Jolly Su
Voltage fluctuations (Flicker)	26°C	52%	Jolly Su

Test Item	Temperature	Humidity	Pressure	Tested By
ESD	21°C	50%	1017hPa	Cole Chen
RS	23°C	46%	/	Robert Luo
EFT	23°C	56%	/	Gerry Zhao
Surge	23-24°C	49-56%	/	Gerry Zhao Karl Wu
CS	24°C	55%	/	Gerry Zhao
Dips	24°C	49%	/	Karl Wu

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	AX5700 Tri-Band Gigabit Wi-Fi 6E Router
Brand Name	Tenda
Test Model	RX27 Pro
Series Model	TX27 Pro
Model Difference(s)	Only differ in model name.
Power Source	DC voltage supplied from AC adapter. Model: BN026-A24012E (EU) Model: BN026-A24012B (UK)
Power Rating	I/P: 100-240V~ 50/60Hz 0.7A O/P: 12.0V  2.0A
Connecting I/O Port(s)	1* POWER port 2* LAN port 1* WAN port 1* IPTV port
Classification of EUT	Class B
Intended Operating Frequency(Fo)	2412-2472MHz, 5150-5250MHz, 5250-5350MHz, 5945-6425MHz
Highest Internal Frequency(Fx)	6425MHz

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	FULL SYSTEM(2.4G WIFI+5G WIFI+6E WIFI)

Radiated emissions up to 1 GHz Test	
Final Test Mode	Description
Mode 1	FULL SYSTEM(2.4G WIFI+5G WIFI+6E WIFI)

Radiated emissions Above 1 GHz Test	
Final Test Mode	Description
Mode 1	FULL SYSTEM(2.4G WIFI+5G WIFI+6E WIFI)

Conducted emissions AC mains power port Test	
Final Test Mode	Description
Mode 1	FULL SYSTEM(2.4G WIFI+5G WIFI+6E WIFI)

Asymmetric mode conducted emissions Test	
Final Test Mode	Description
Mode 1	FULL SYSTEM(2.4G WIFI+5G WIFI+6E WIFI) (WAN 1Gbps/LAN1 1Gbps/IPTV 1Gbps)

Harmonic current & Voltage fluctuations (Flicker) Test	
Final Test Mode	Description
Mode 1	FULL SYSTEM(2.4G WIFI+5G WIFI+6E WIFI)

Immunity Test	
Final Test Mode	Description
Mode 1	FULL SYSTEM(2.4G WIFI+5G WIFI+6E WIFI)

Note:

- Two adapters only differ in plug, so tested with EU adapter.
- The product supports 2.4G&5G WIFI&6E WIFI function.
The frequency exemptions are 2400-2483.5MHz, 5150-5250MHz, 5250-5350MHz, 5945-6425MHz.
- Radiated emission above 1GHz tested with 2.4G&5G&6E filter.

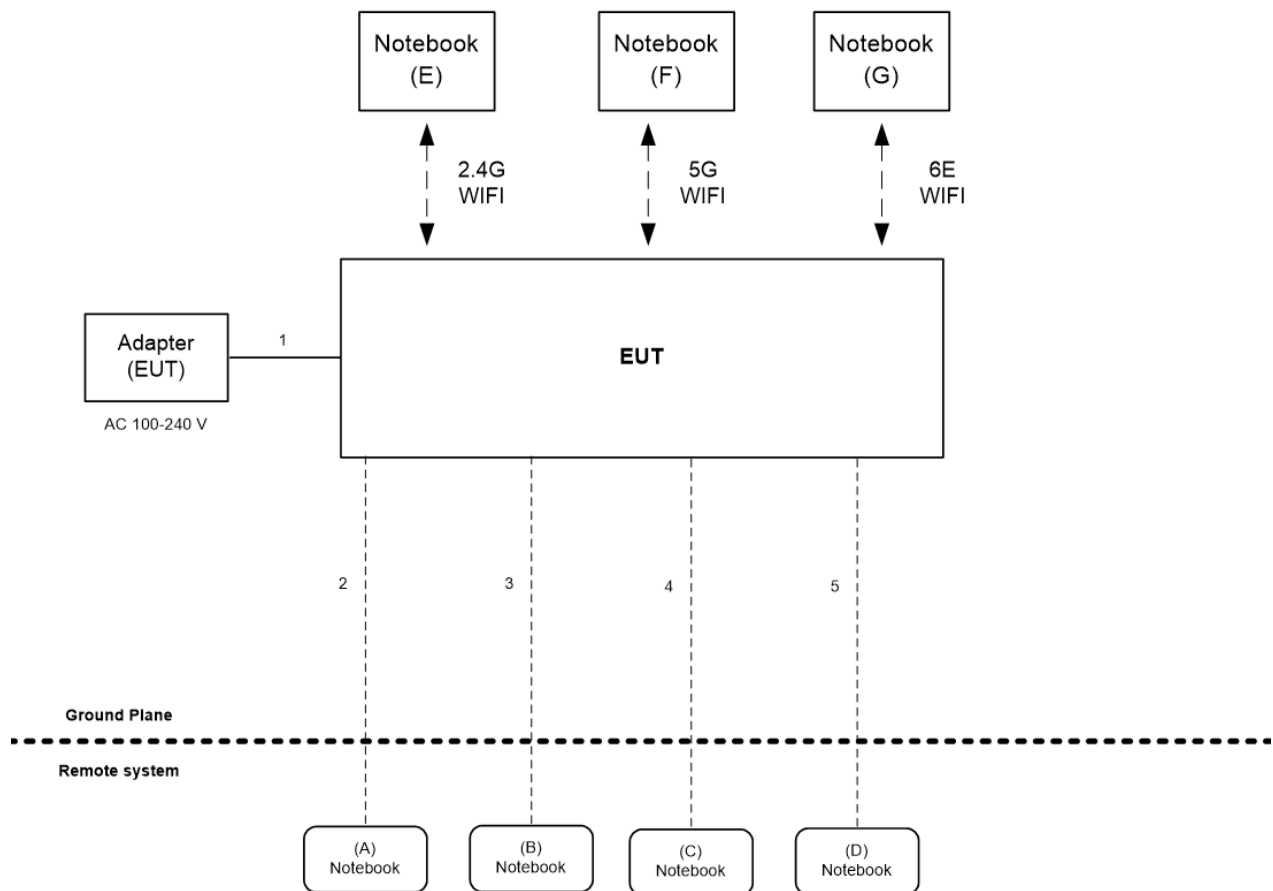
2.3 EUT OPERATING CONDITIONS

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 DC Cable.
2. EUT connected to Notebook (A&B&C&D) via RJ45 Cable.
3. EUT connected to Notebook (E) via 2.4G WIFI.
4. EUT connected to Notebook (F) via 5G WIFI.
5. EUT connected to Notebook (G) via 6E WIFI.

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	Notebook	Lenovo	V310-14ISK	LR07GZHC
B	Notebook	Lenovo	V310-14ISK	LR07GZML
C	Notebook	Lenovo	V310-14ISK	LR07GZNB
D	Notebook	Lenovo	V310-14IKB	LR07SH58
E	Notebook	Lenovo	V310-14IKB	LR07SH32
F	Notebook	Lenovo	Air 13IWL	MP1GSLN8
G	Notebook	Razer	N/A	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	DC Cable	NO	NO	1.5m
2-5	RJ45 Cable	NO	NO	10m

3. EMC EMISSION TEST

3.1 RADIATED EMISSIONS UP TO 1 GHZ

3.1.1 LIMITS

Class B equipment up to 1 GHz

Frequency Range MHz	Measurement			Class B limits dB(μV/m)
	Facility	Distance m	Detector type/ bandwidth	
30 - 230	SAC	3	Quasi peak / 120 kHz	40
230 - 1000				47

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

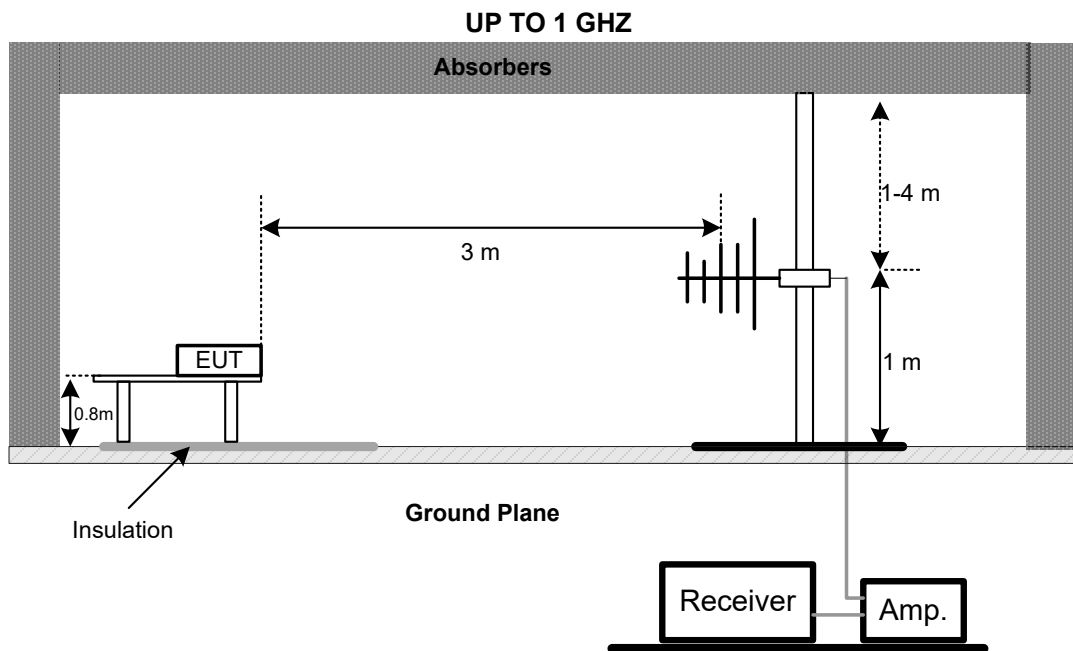
3.1.2 TEST PROCEDURE

- 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

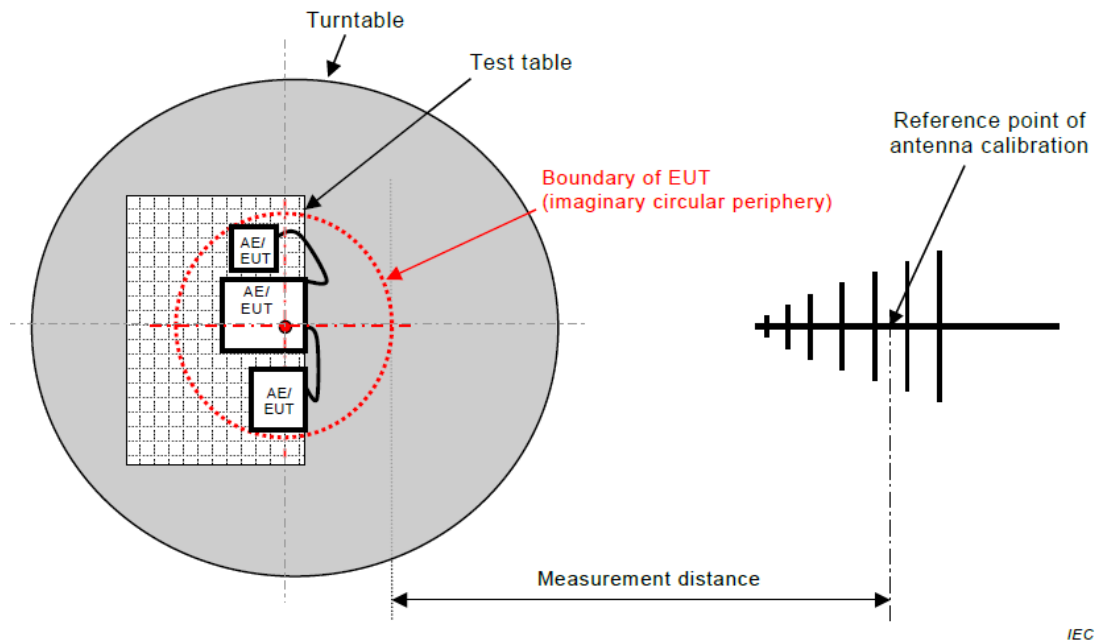


Figure C.1 – Measurement distance

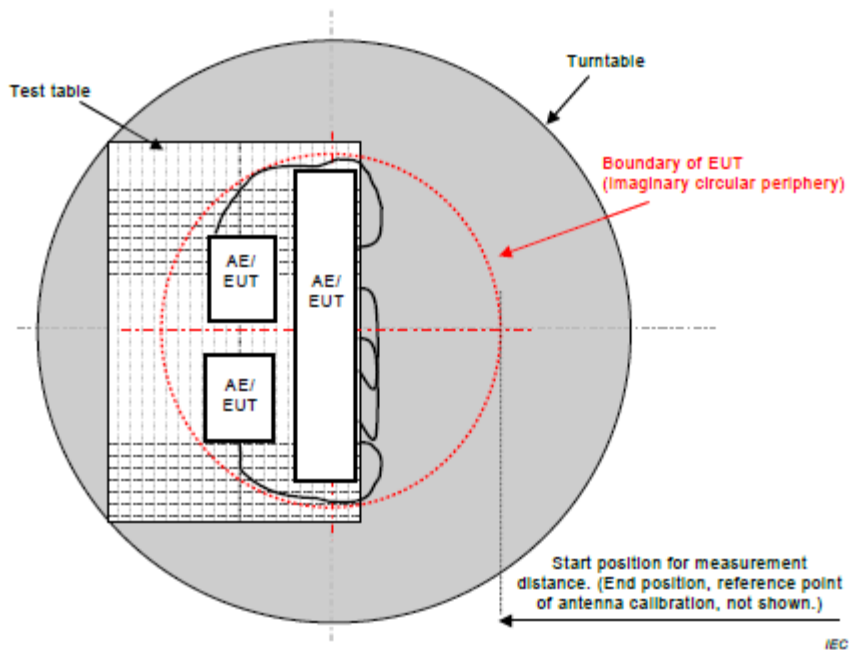


Figure C.2 – Boundary of EUT, Local AE and associated cabling

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 B equipment above 1 GHz

Frequency Range MHz	Measurement			Class B limits dB(μV/m)
	Facility	Distance m	Detector type/bandwidth	
1000 - 3000	FSOATS	3	Average / 1 MHz	50
3000 - 6000				54
1000 - 3000			Peak / 1 MHz	70
3000 - 6000				74

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

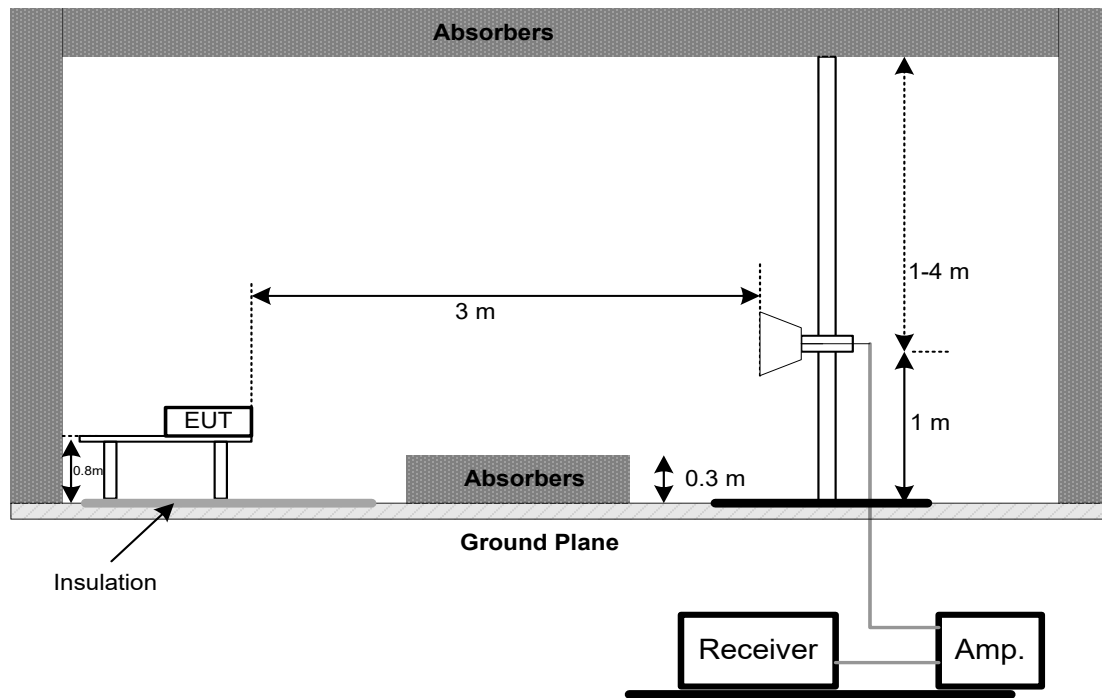
- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz).
- b. The height of the 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

ABOVE 1 GHZ



3.2.5 MEASUREMENT DISTANCE

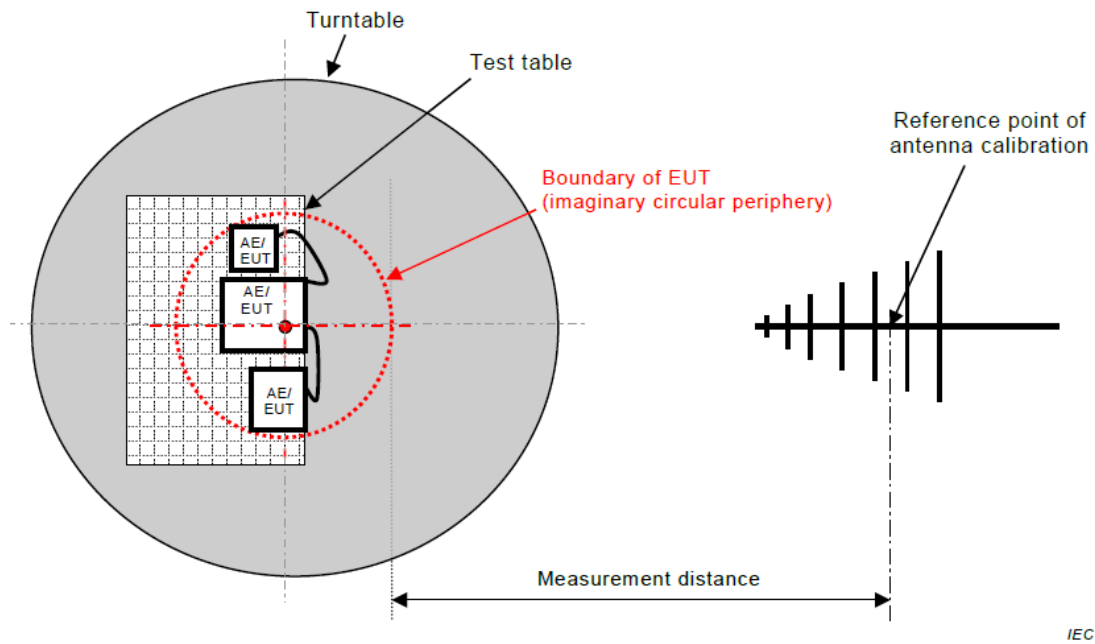


Figure C.1 – Measurement distance

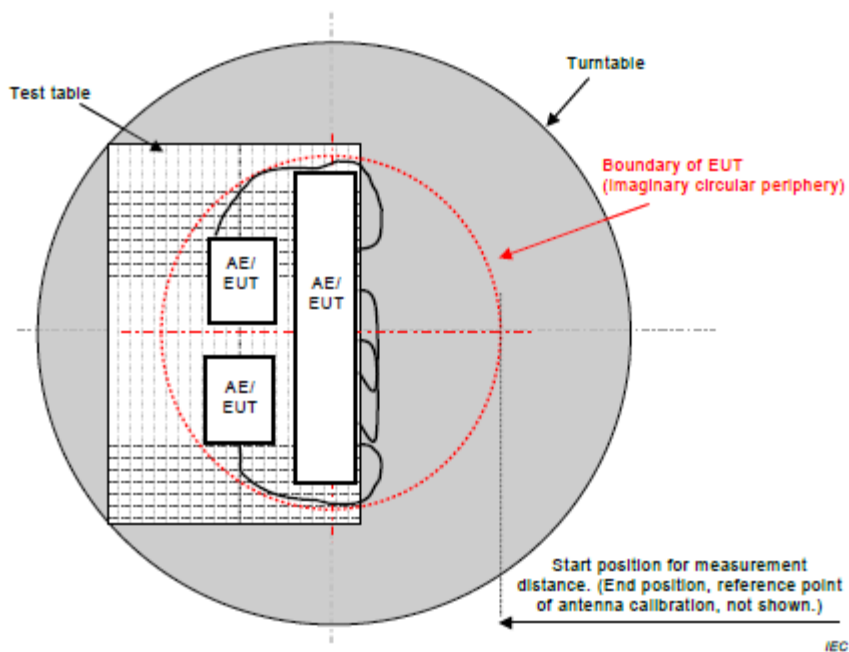


Figure C.2 – Boundary of EUT, Local AE and associated cabling

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 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:

(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

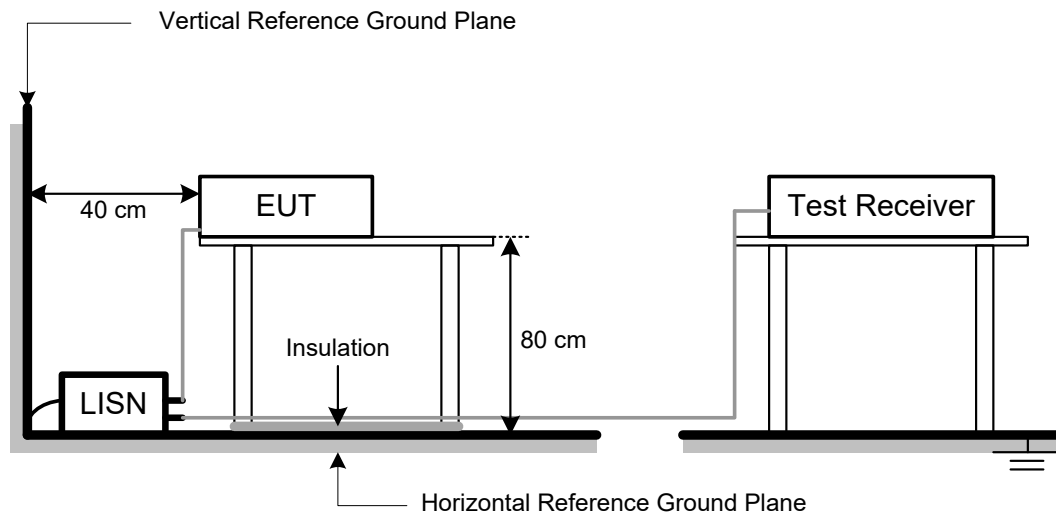
3.3.2 TEST PROCEDURE

- 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 ASYMMETRIC MODE CONDUCTED EMISSIONS TEST

3.4.1 LIMITS

Requirements for asymmetric mode conducted emissions from Class B equipment

Frequency Range MHz	Coupling device	Detector type / Bandwidth	Class B voltage limits dB(μV)	Class B current limits dB(μA)
0.15 - 0.5	AAN	Quasi Peak / 9 kHz	84 - 74	n/a
0.5 - 30			74	
0.15 - 0.5	AAN	Average / 9 kHz	74 - 64	
0.5 - 30			64	

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

3.4.2 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.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

NOTE:

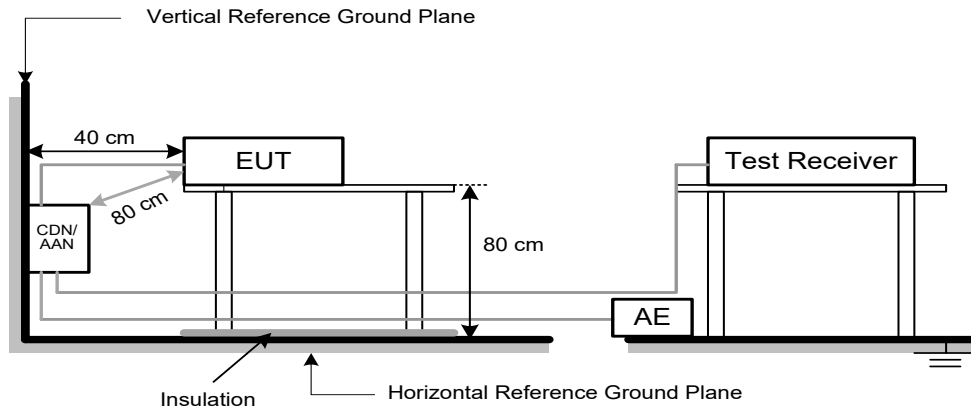
- The communication function of EUT was executed and AAN was connected between EUT and associated equipment and the AAN was connected directly to reference ground plane.
Measure the voltage at the measurement port of the AAN
Correct the measured voltage by adding the AAN voltage division factor
Compare the corrected voltage with the limit.

3.4.3 DEVIATION FROM TEST STANDARD

No deviation

3.4.4 TEST SETUP

a) Cable Type: Balanced Unscreened, Screened or Coaxial



3.4.5 TEST RESULTS

Please refer to the Appendix D.

3.5 HARMONIC CURRENT EMISSIONS TEST

3.5.1 LIMITS

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

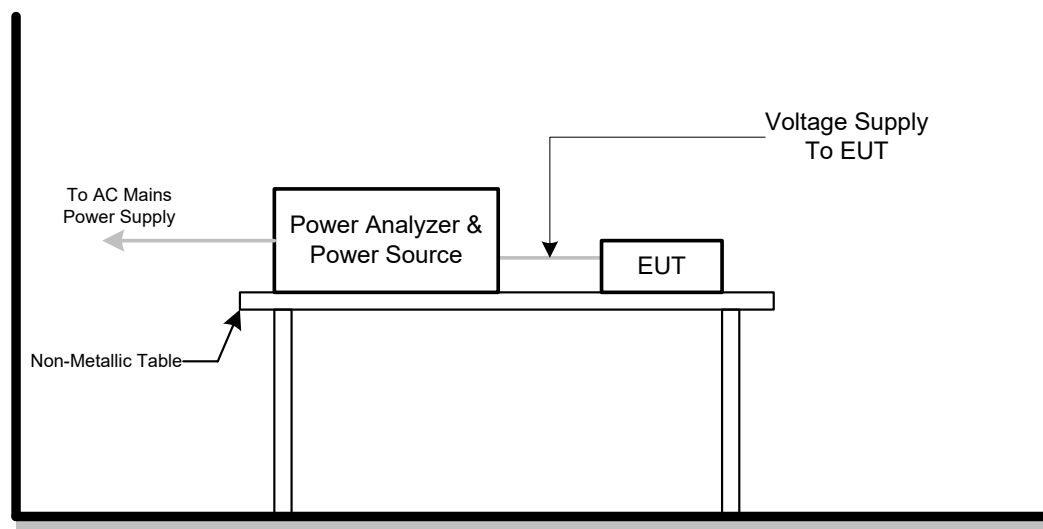
3.5.2 TEST PROCEDURE

- 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.

3.5.3 DEVIATION FROM TEST STANDARD

No deviation

3.5.4 TEST SETUP



3.5.5 TEST RESULTS

Please refer to the Appendix E.

3.6 VOLTAGE FLUCTUATIONS AND FLICKER

3.6.1 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-Chang
dmax	≤ 4 %	Maximum Relative V-change
d (t)	≤ 500 ms	Relative V-change characteristic

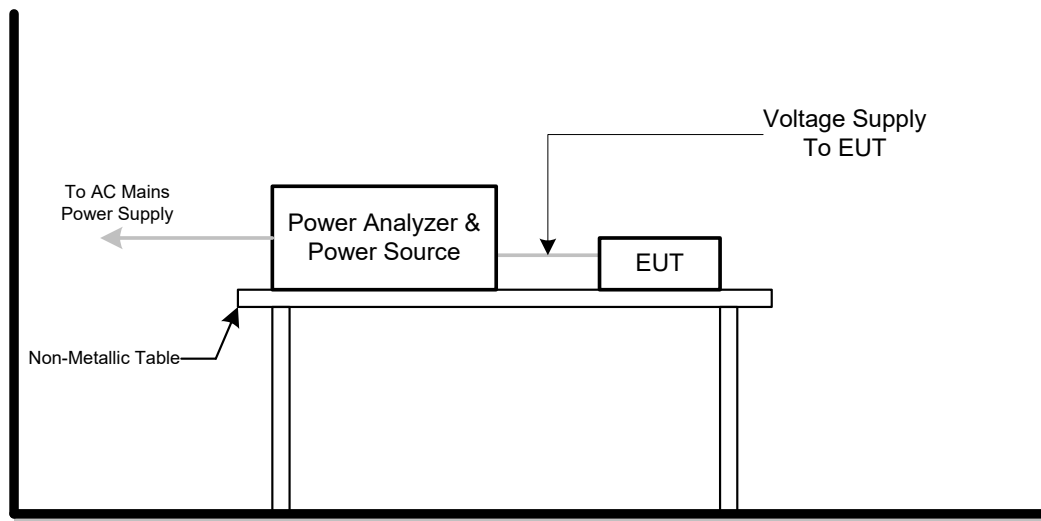
3.6.2 TEST PROCEDURE

- 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.

3.6.3 DEVIATION FROM TEST STANDARD

No deviation

3.6.4 TEST SETUP



3.6.5 TEST RESULTS

Please refer to the Appendix F.

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	Direct Mode	B
	± 4 kV contact discharge		
	± 4 kV HCP discharge	Indirect Mode	B
	± 4 kV VCP discharge		
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

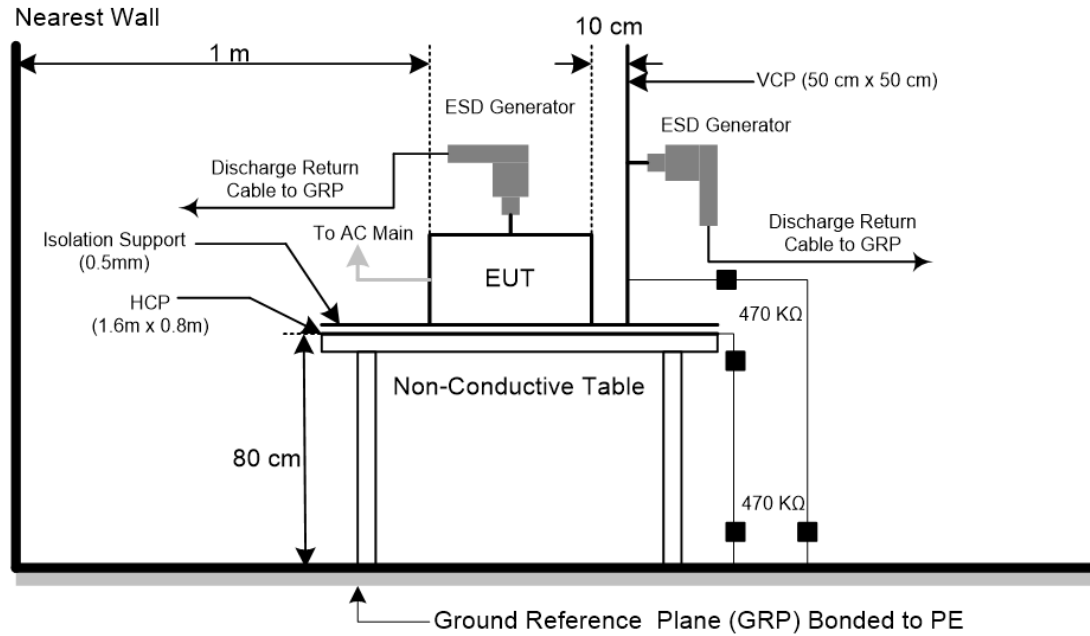
The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

- 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 G.

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 fundamental
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% frequency increment of the momentary used 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

The exclusion band of equipment operating in the 5 GHz Wi-Fi band shall be:

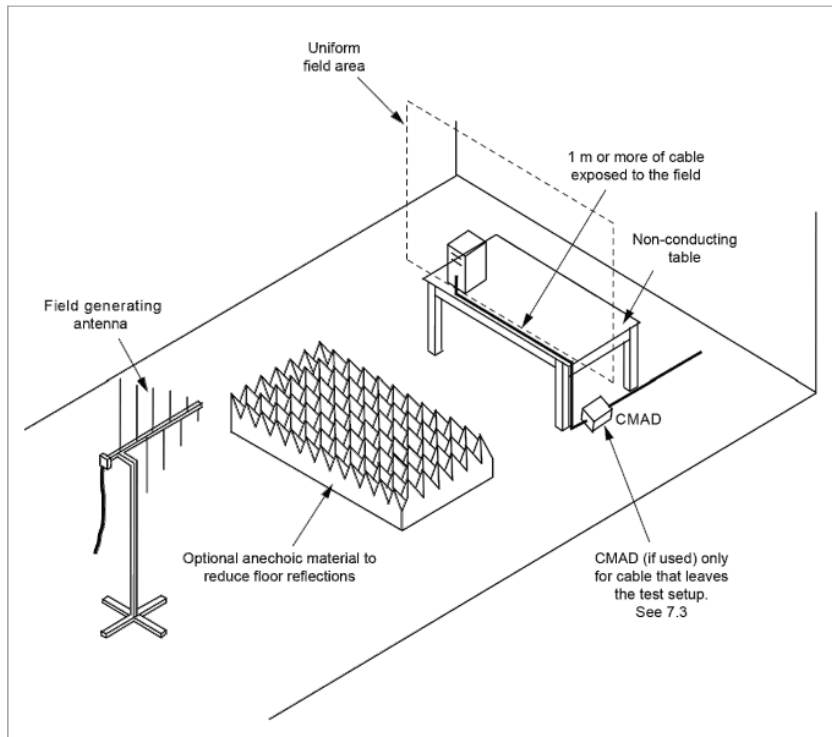
 - Lower limit of exclusion band = lowest allocated band edge frequency -320 MHz
 - Upper limit of exclusion band = highest allocated band edge frequency +320 MHz
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- d. The test was performed 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

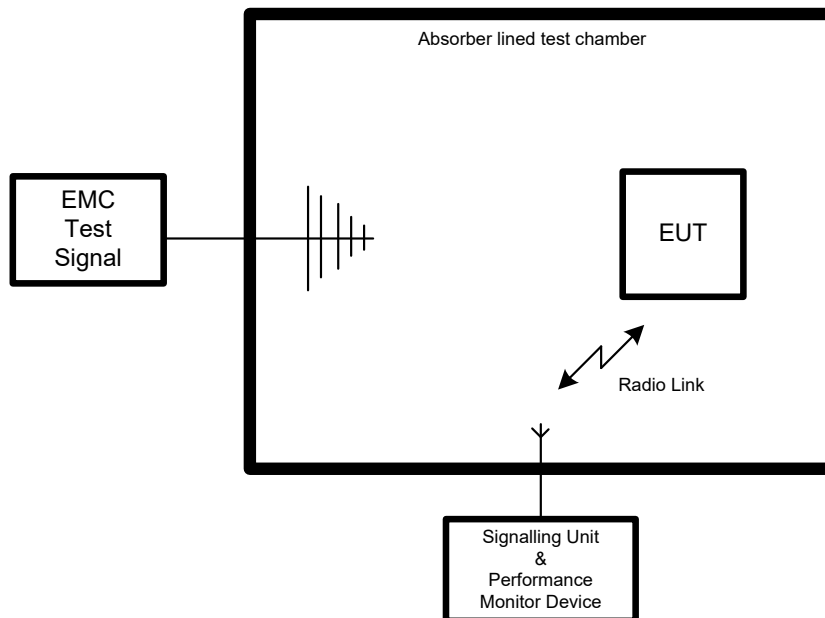
No deviation

4.4.4 TEST SETUP

General



PER or FER



4.4.5 TEST RESULTS

Please refer to the Appendix H.

4.5 FAST TRANSIENTS, COMMON MODE (EFT)

4.5.1 TEST SPECIFICATION

Test Method:	EN 61000-4-4
Required Performance	B
Test Voltage	AC power port: ± 1 kV Signal port, Wired network port, Control port: ± 0.5 kV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave shape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	1 min.

4.5.2 TEST PROCEDURE

For TABLE-TOP equipment:

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane and should be located 0.1 m+/- 0.01m above the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

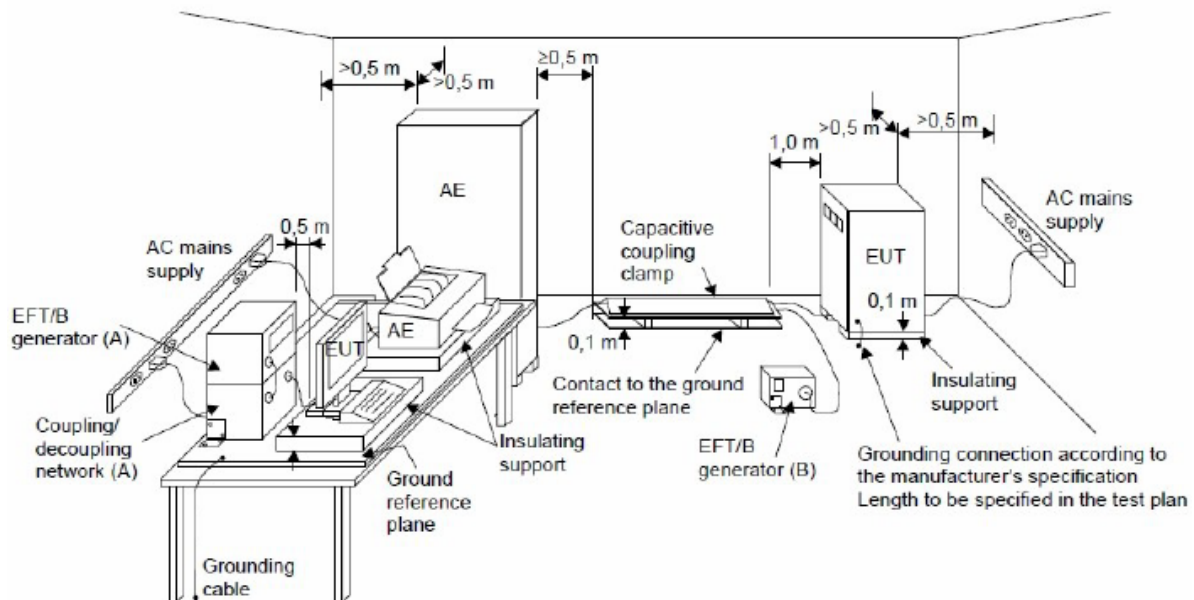
The other condition as following manner:

- Both positive and negative polarity discharges were applied.
- The duration time of each test sequential was 1 minute

4.5.3 DEVIATION FROM TEST STANDARD

No deviation

4.5.4 TEST SETUP



4.5.5 TEST RESULTS

Please refer to the Appendix I.

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 10/700(5/320) Tr/Th μ s combination wave
Test Voltage	AC Power Line: ± 0.5 kV, ± 1 kV Wired network ports: ± 0.5 kV, ± 1 kV
Generator Source Impedance	2 Ω of the low-voltage power supply network. 42 Ω (40 Ω +2 Ω) between all other signal lines and ground when use 1.2/50(8/20) waveform 40 Ω (15 Ω +25 Ω) between outdoor unscreened symmetrical interconnection line and ground when use 10/700(5/320) waveform
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 2meters 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).

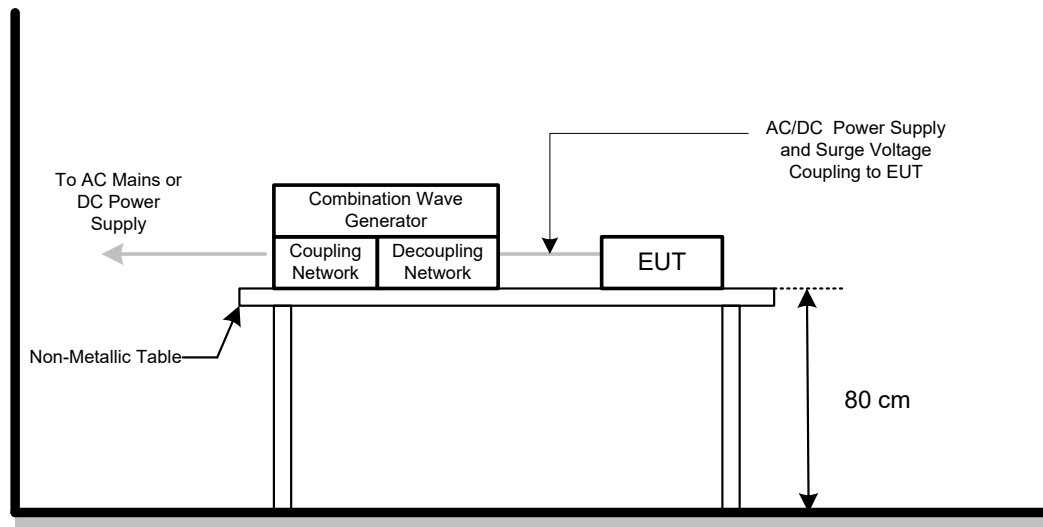
c. For test applied to unshielded symmetrically operated interconnection /telecommunication lines of EUT:

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 J.

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% of fundamental
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.

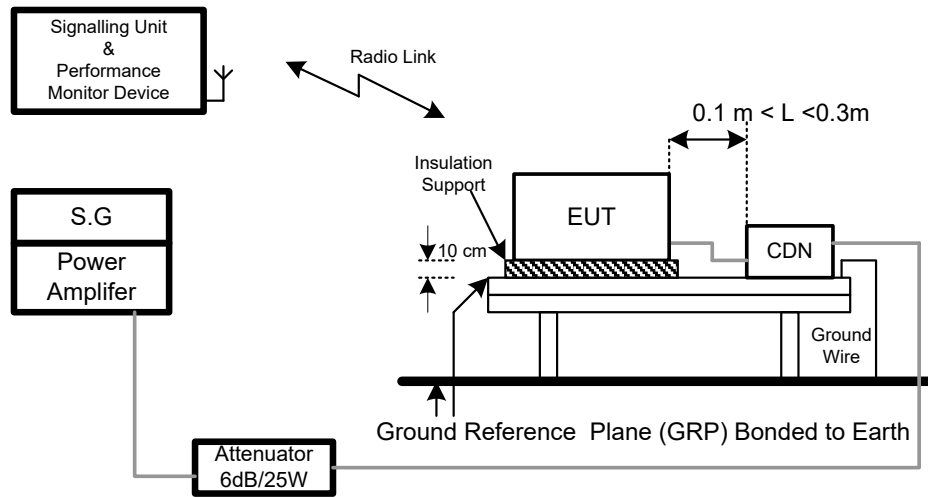
The other condition as following manner:

- 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 K.

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

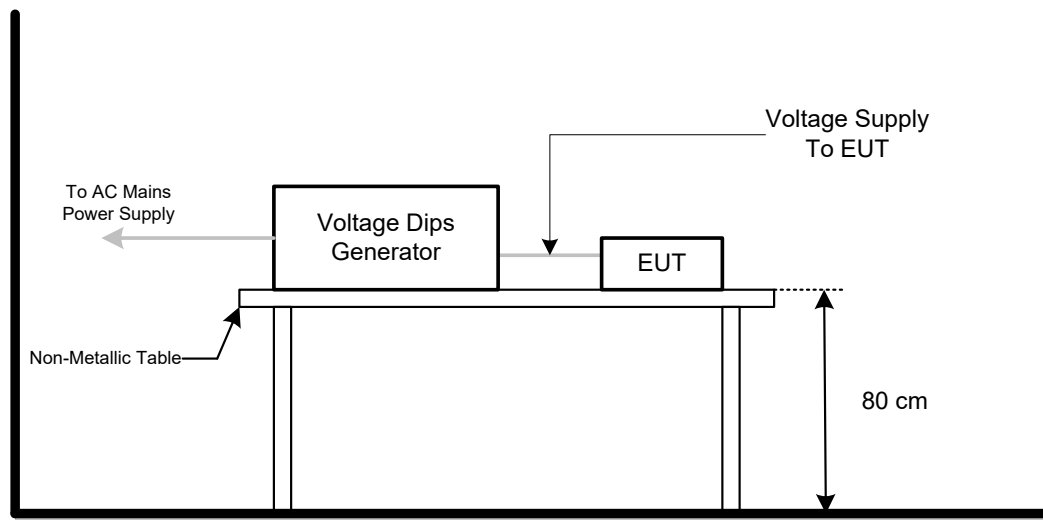
4.8.2 TEST PROCEDURE

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 L.

5. MEASUREMENT INSTRUMENTS LIST

Radiated emission up to 1GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Amplifier	HP	8447D	1937A02847	Jan. 22, 2023
2	Cable	emci	LMR-400(30MHz-1 GHz)(10m+2.5m)	N/A	May 19, 2023
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	Jan. 22, 2023
6	Trilog-Broadband Antenna	Schwarzbeck	VULB9168	586	Jan. 11, 2023
7	Attenuator	SHX	TS2-6dB-6G-A	16101106	Jan. 11, 2023

Radiated emission above 1GHz					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Double Ridged Guide Antenna	ETS	3115	75789	May 22, 2023
2	Amplifier	Agilent	8449B	3008A02334	Apr. 06, 2023
3	Cable	mitron	RWLP50-4.0A-KJ-S MSM-12M	N/A	Sep. 23, 2022
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	Jan. 22, 2023
7*	Band Reject Filter	Wairwright Instruments GmbH	WRCG 2400/2483-2375/25 05-50/10SS	16	Feb. 28, 2024
8*	Band Reject Filter	Micro-Tronics	BRC50703-01	7	Feb. 27, 2024
9	Band Reject Filter	COM-MW	ZBSF6-C5925-6425 -1105	12205846	Jul. 03, 2023

Conducted emission at AC mains power port					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	50Ω Terminator	SHX	TF2-3G-A	8122901	Jan. 23, 2023
2	TWO-LINE V-NETWORK	R&S	ENV216	100526	Jul. 03, 2023
3	EMI Test Receiver	R&S	ESR3	101862	Jan. 22, 2023
4*	Artificial-Mains Network	SCHWARZBECK	NSLK 8127	8127685	Feb. 28, 2024
5	Cable	N/A	RG400	N/A(12m)	Mar. 08, 2023
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Asymmetric mode conducted emissions

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	50Ω Terminator	SHX	TF2-3G-A	8122901	Jan. 23, 2023
2	TWO-LINE V-NETWORK	R&S	ENV216	100526	Jul. 03, 2023
3	EMI Test Receiver	R&S	ESR3	101862	Jan. 22, 2023
4*	Artificial-Mains Network	SCHWARZBECK	NSLK 8127	8127685	Feb. 28, 2024
5	Cable	N/A	RG400	N/A(12m)	Mar. 08, 2023
6	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A
7	ISN	Teseq GmbH	ISN T8	30833	Jul. 03, 2023

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	Jul. 03, 2023
2	3KVA AC Power source	California Instruments	3001ix	56309	Jul. 03, 2023
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	Dec. 01, 2022

Radio frequency electromagnetic Field

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	ETS	3142C	47662	Jan. 11, 2023
2	Amplifier	AR	50S1G4A	326720	Jan. 23, 2023
3	MXG Analog Signal Generator	Agilent	N5181A	MY49060710	Jul. 03, 2023
4	Power amplifier	MILMEGA	AS1860-50	1064834	Jan. 23, 2023
5	Microwave Log.-Per. Antenna	Schwarzbeck	STLP 9149	9149-277	Apr. 18, 2023
6	Power amplifier	MILMEGA	80RF1000-250	1064833	Jan. 23, 2023
7	Measurement Software	Farad	(EZ-RS)V2.0.1.3	N/A	N/A
8	wideband radio communication tester	R&S	CMW500	152372	Mar. 13, 2023

Fast transients, common mode					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Fast Transient Burst Simulator	Prima	EFT61004TA	PR190741004	Jul. 03, 2023
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	System mainframe	Schaffner	NSG 2050	200729-619LU	Jul. 03, 2023
2	Impulse Network	Schaffner	PNW 2050	200719-610LU	Jul. 03, 2023
3	Impulse Network	Schaffner	PNW 2051	200708-533LU	Jul. 03, 2023
4	Pulse coupling network	Schaffner	CDN 131	34426	Jul. 03, 2023
5	CDN	EMC PARTNER	CDN-UTP8	40	Jan. 23, 2023
6	Measurement Software	Schaffner	Win 2000 Version V7.10	N/A	N/A
7	Lightning Surge Generator	Prima	SUG61005TB	PR190854067	Jul. 03, 2023
8	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	Power CDN	FCC	FCC-801-M2/M3-16 A	100270	Jan. 23, 2023
2	TEST SYSTEM FOR CONDUCTED AND RADIATED IMMUNITY	TESEQ	NSG 4070B	37513	Jul. 03, 2023
3	Coupling Decoupling Network	Teseq GmbH	CDN T8-10	40373	Jul. 03, 2023
4	Measurement Software	Farad	EZ-CS (V2.0.1.4)	N/A	N/A
5	wideband radio communication tester	R&S	CMW500	152372	Mar. 13, 2023
6*	Attenuator	Teseq	100-SA-FFN-06	163357	Jan. 22, 2025

Voltage dips and interruptions					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Cycle Sag Simulator	Prima	DRP61011TA	PR19076452	Dec. 01, 2022
2	Measurement Software	Prima	DRP_Series V1.0.0.3.20190123	N/A	N/A

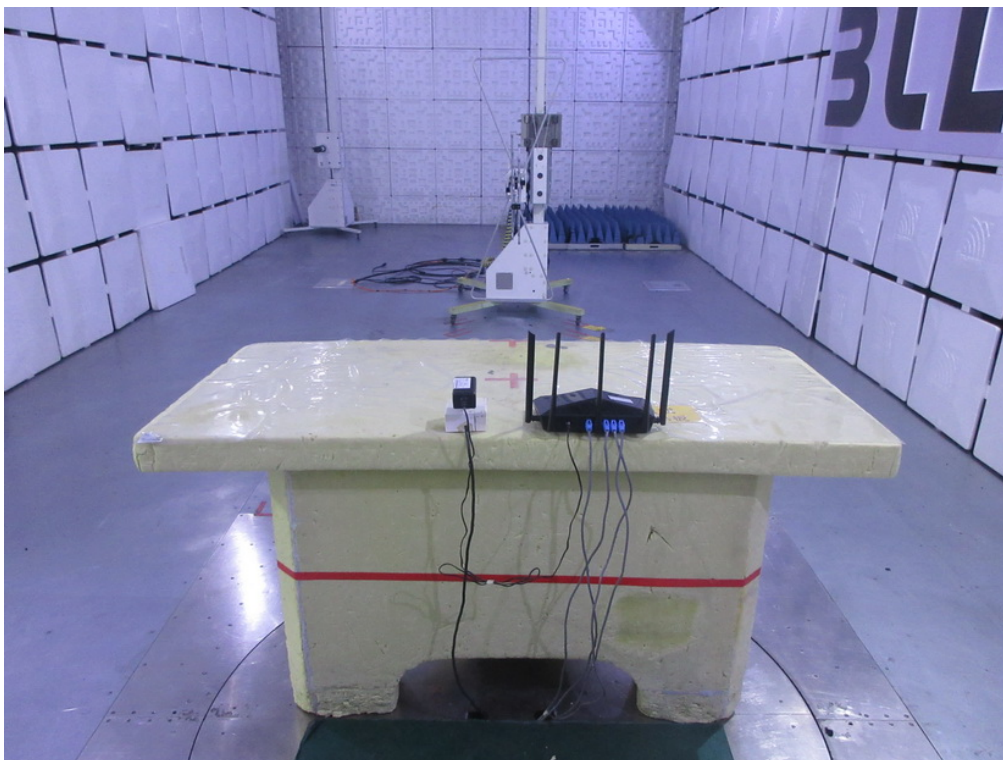
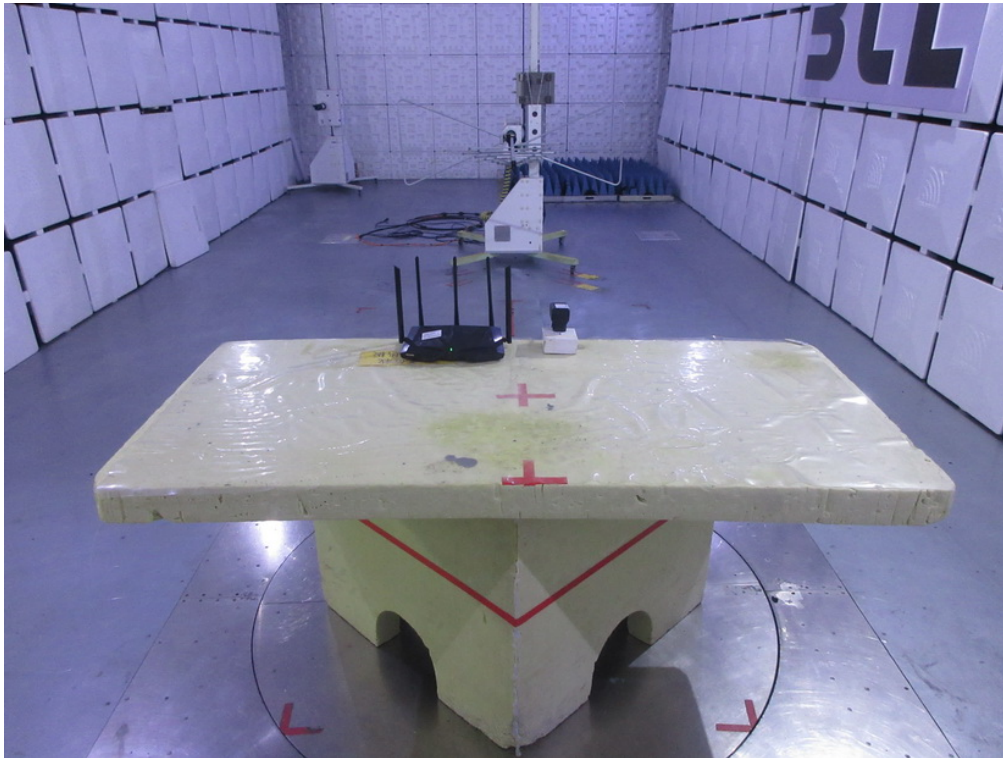
Remark: "N/A" denotes no model name, serial no. or calibration specified.

"**" calibration period of equipment list is three year.

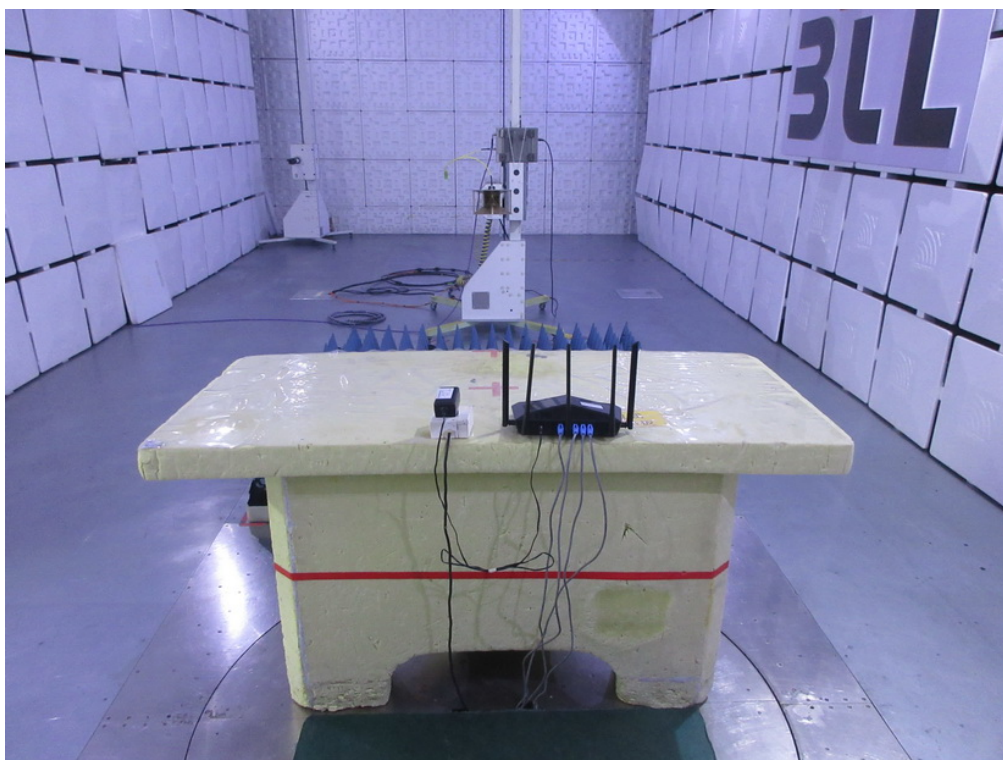
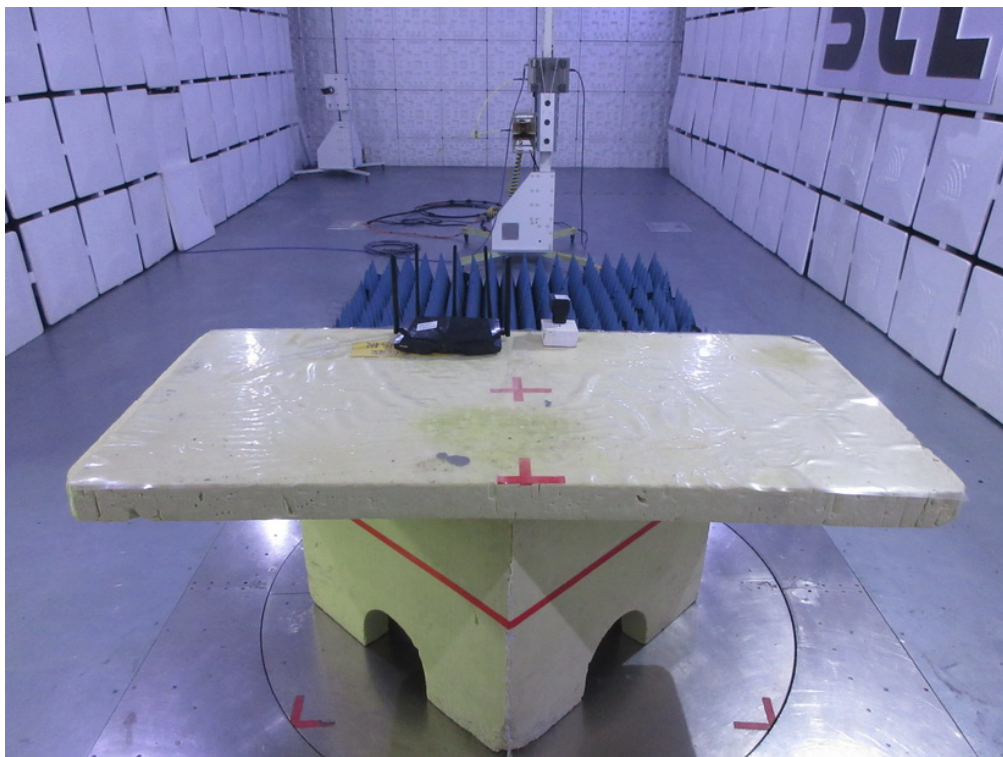
Except "*" item, all calibration period of equipment list is one year.

6. EUT TEST PHOTO

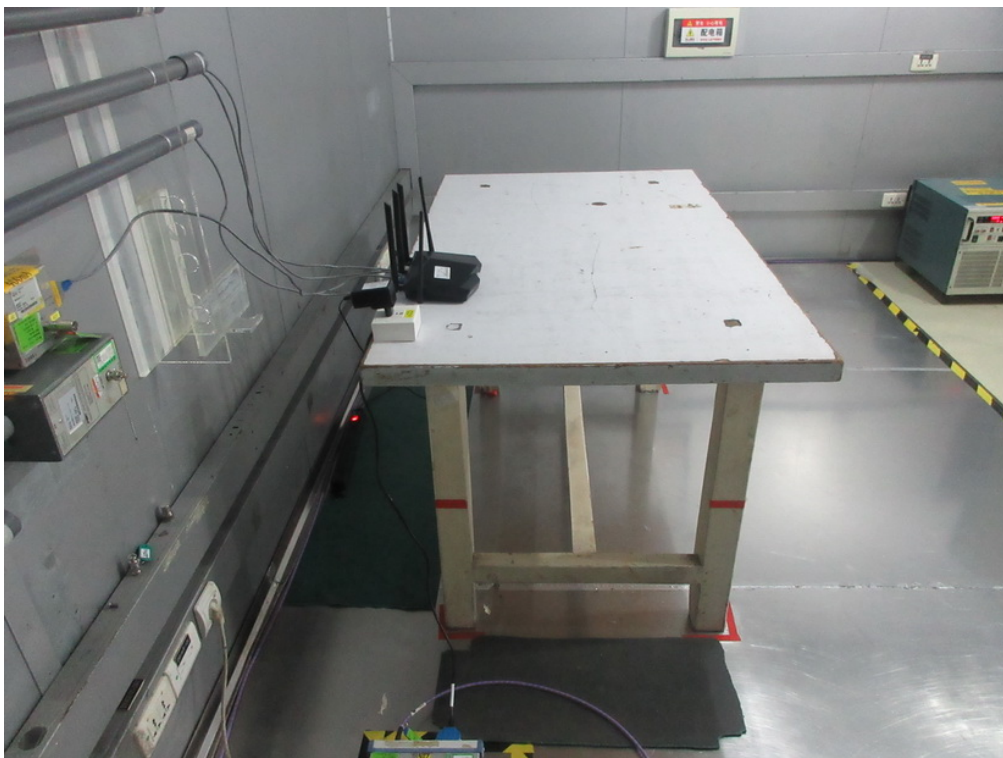
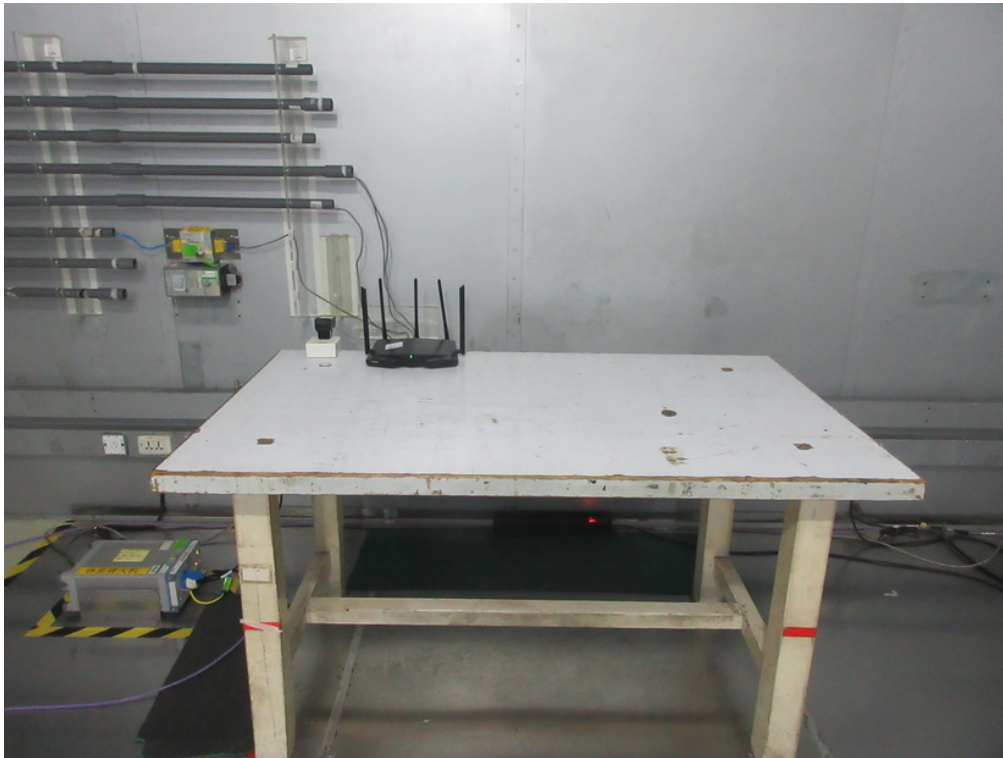
Radiated emissions up to 1 GHz



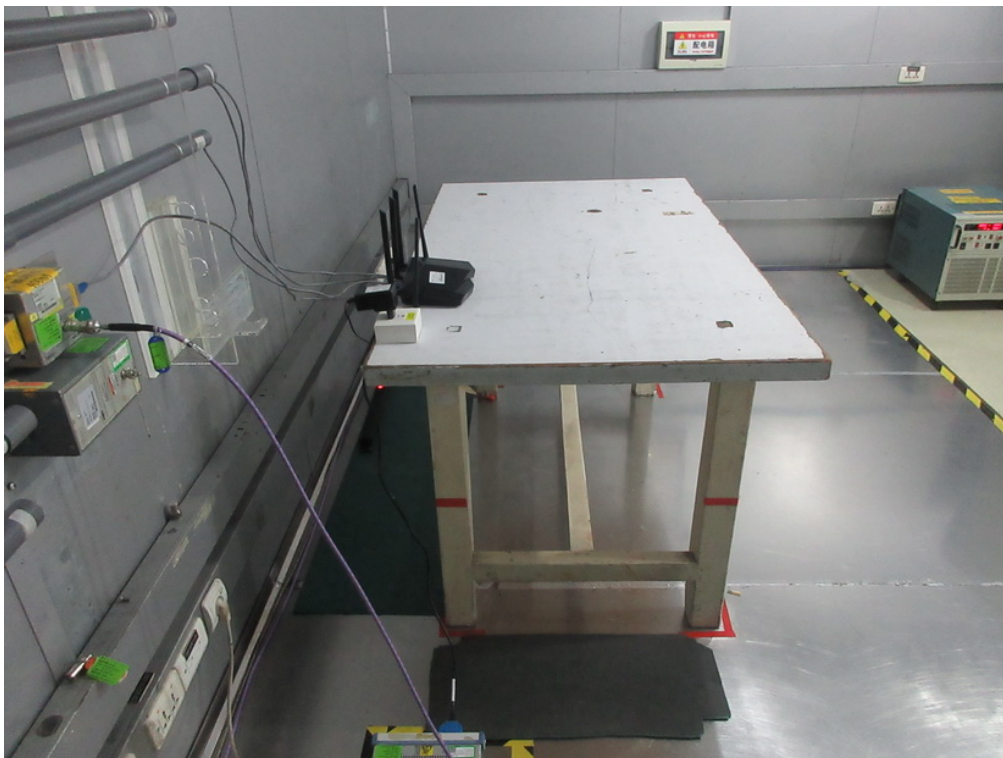
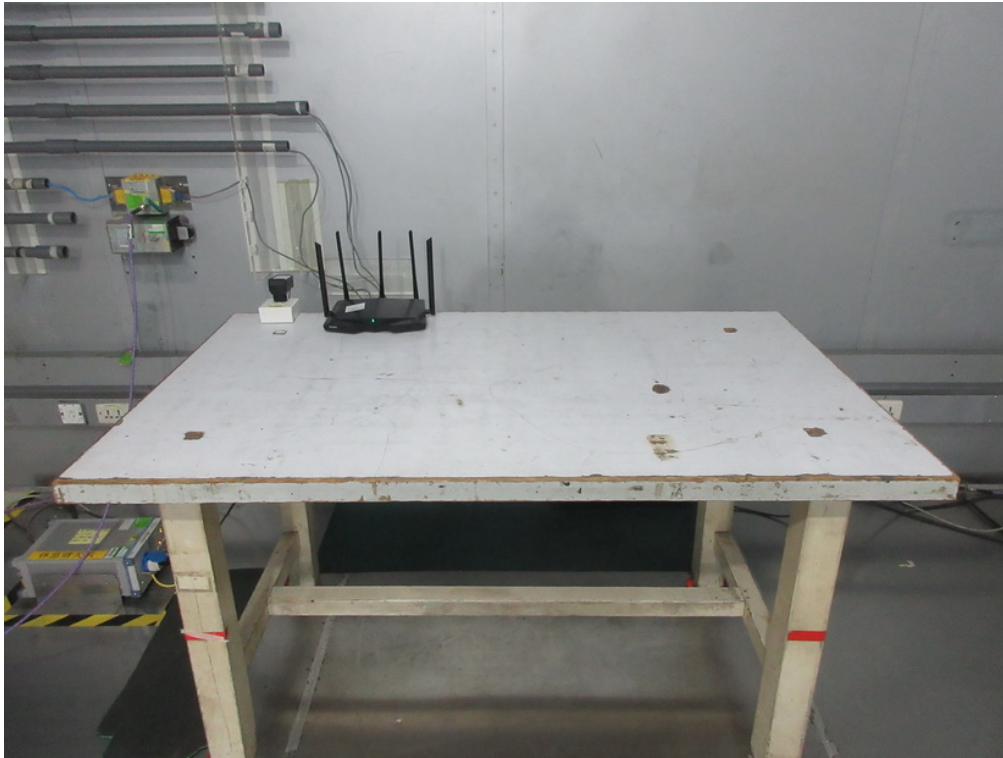
Radiated emissions above 1 GHz



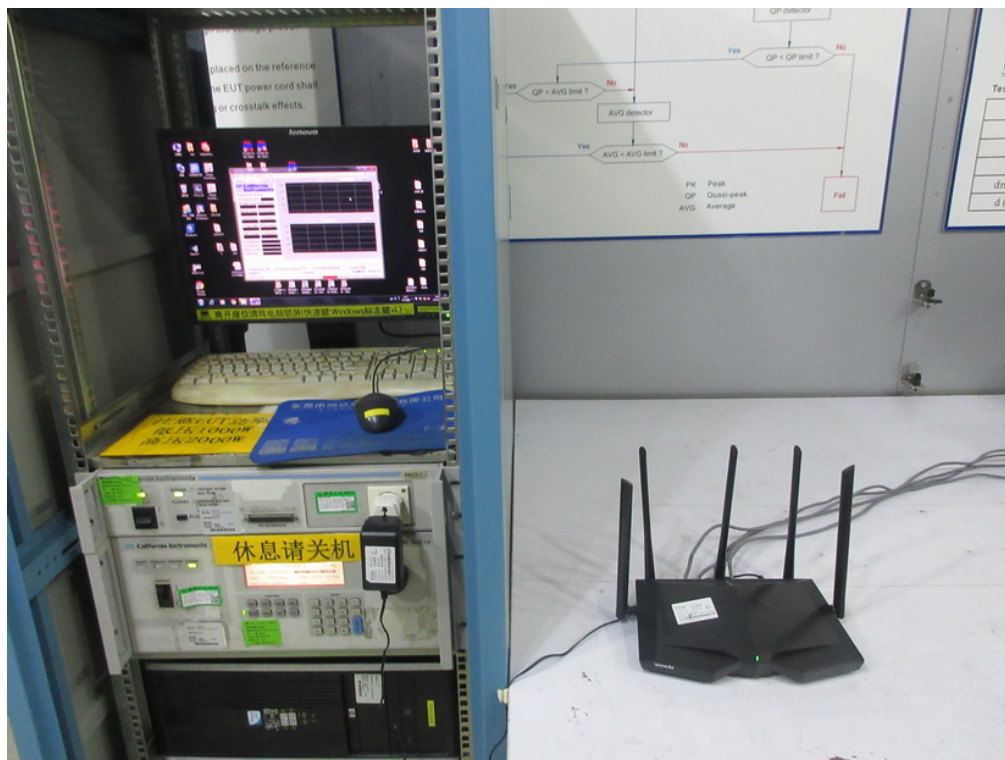
Conducted emissions AC mains power port



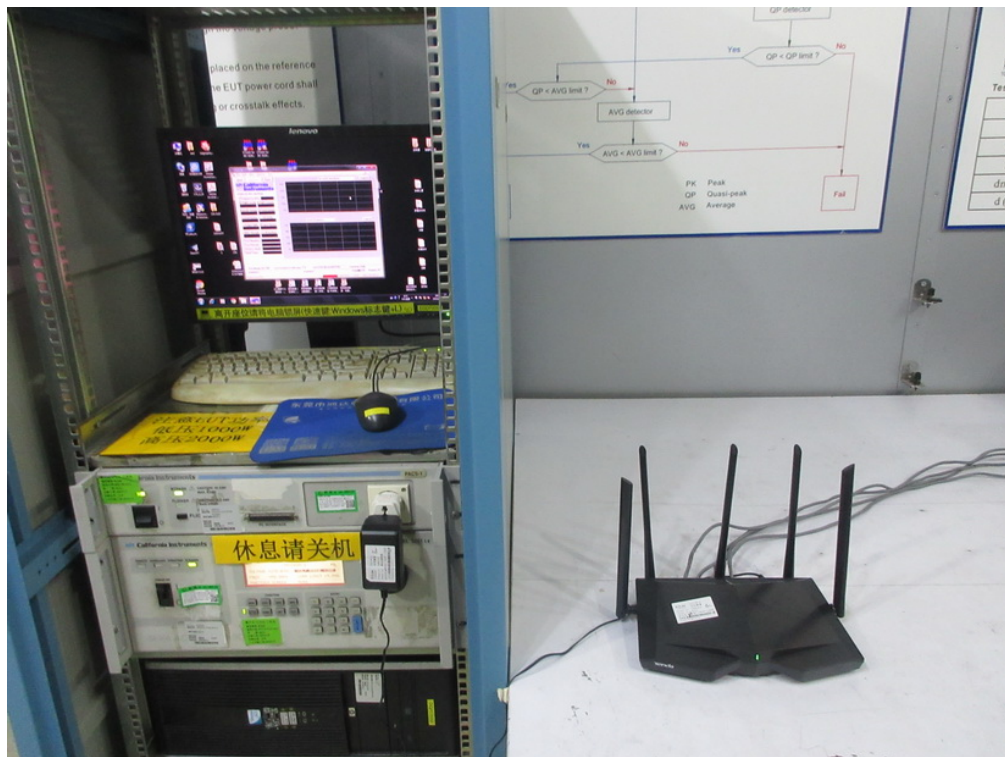
Asymmetric mode conducted emissions(RJ45)



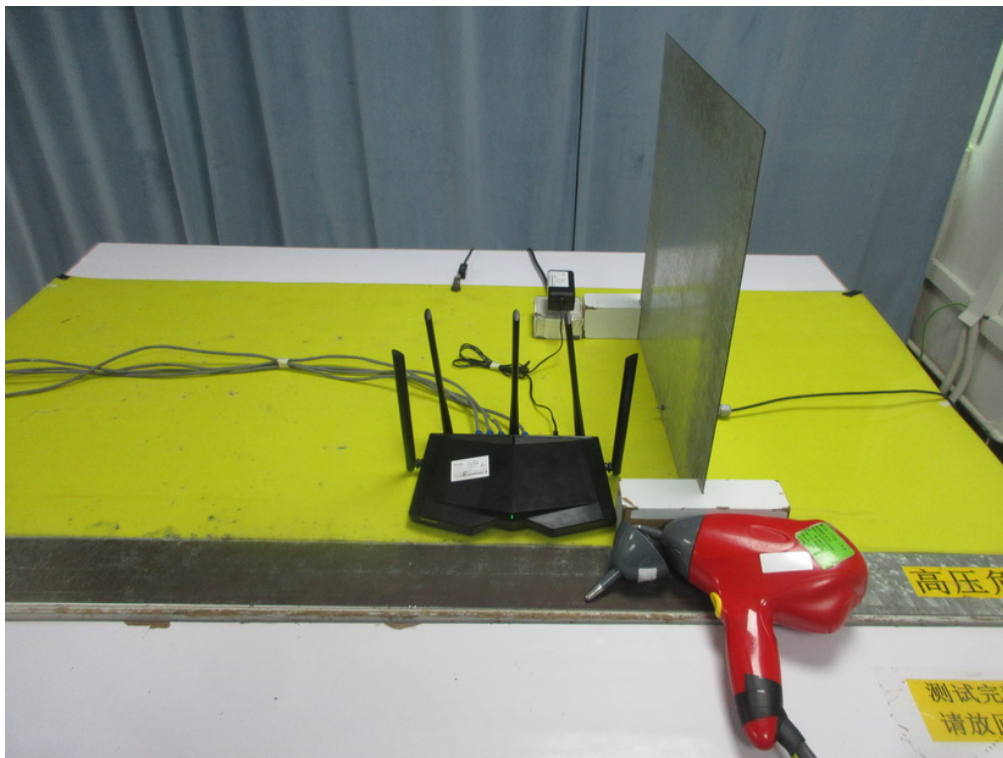
Harmonic current



Voltage fluctuations (Flicker)



Electrostatic discharge immunity



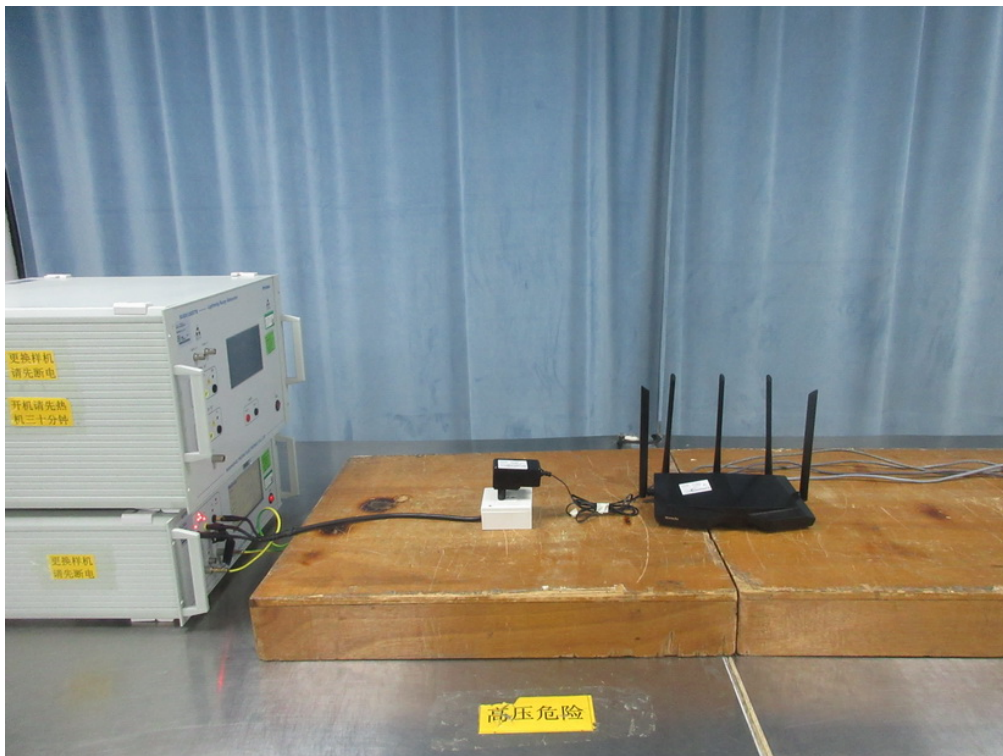
Radiated, radio-frequency, electromagnetic field immunity – Up to 1GHz



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



Electrical fast transient/burst immunity - AC



Electrical fast transient/burst immunity(RJ45)



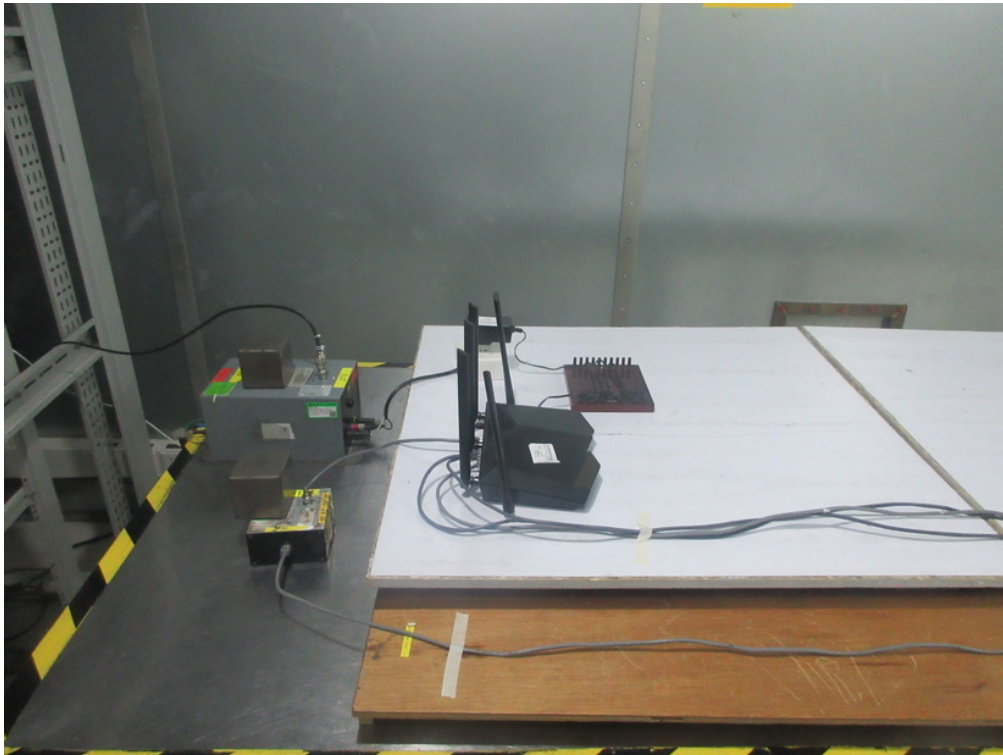
Surge immunity - AC



Surge immunity (RJ45)



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



Immunity to conducted disturbances, induced by radio-frequency fields(RJ45)

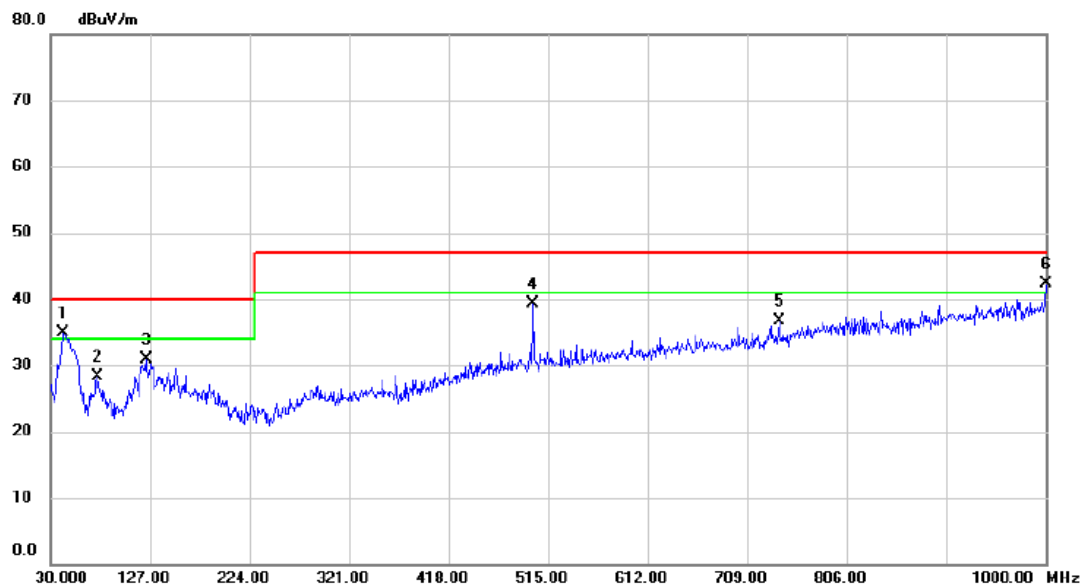


Voltage dips, short interruptions and voltage variations immunity



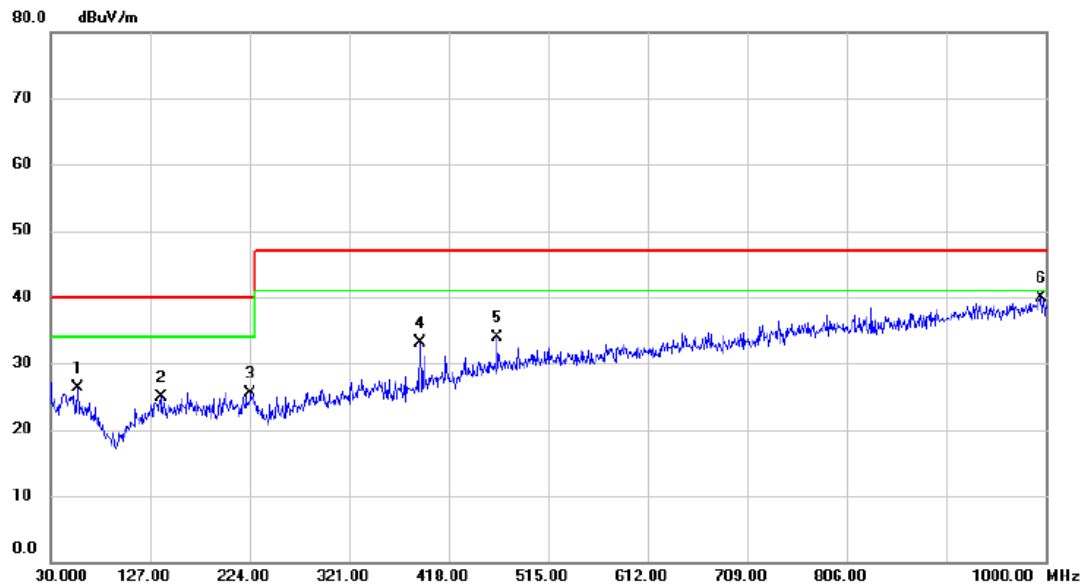
APPENDIX A - RADIATED EMISSION UP TO 1GHZ

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



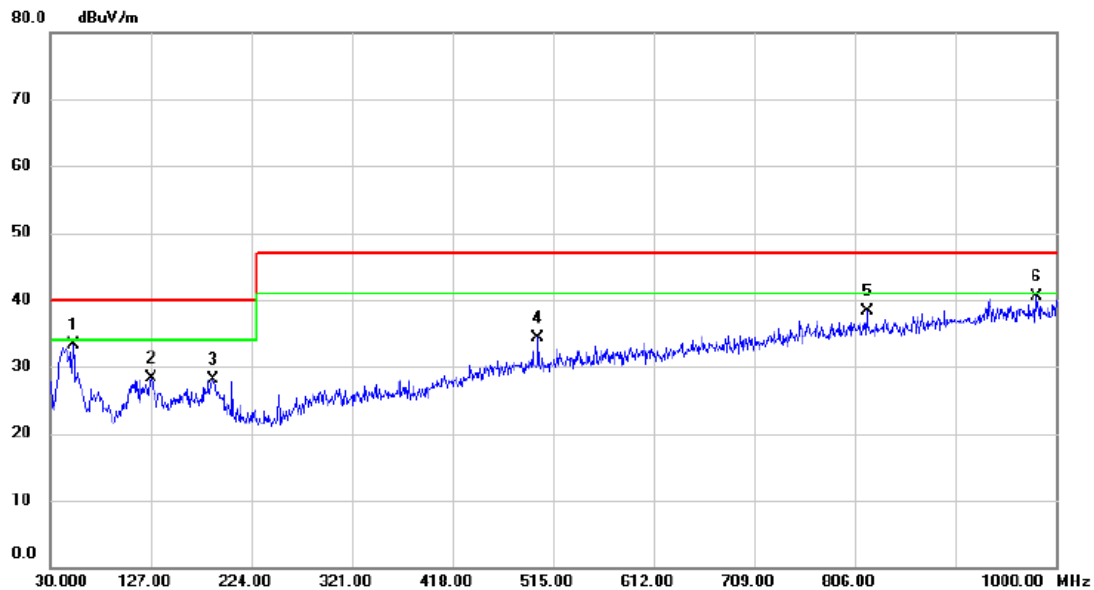
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1	!	42.6100	40.67	-5.74	34.93	40.00	-5.07	QP	
2		75.5900	35.60	-7.26	28.34	40.00	-11.66	QP	
3		123.1200	38.12	-7.19	30.93	40.00	-9.07	QP	
4		500.4500	36.64	2.74	39.38	47.00	-7.62	QP	
5		740.0400	29.30	7.34	36.64	47.00	-10.36	QP	
6	*	1000.000	30.68	11.67	42.35	47.00	-4.65	QP	

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



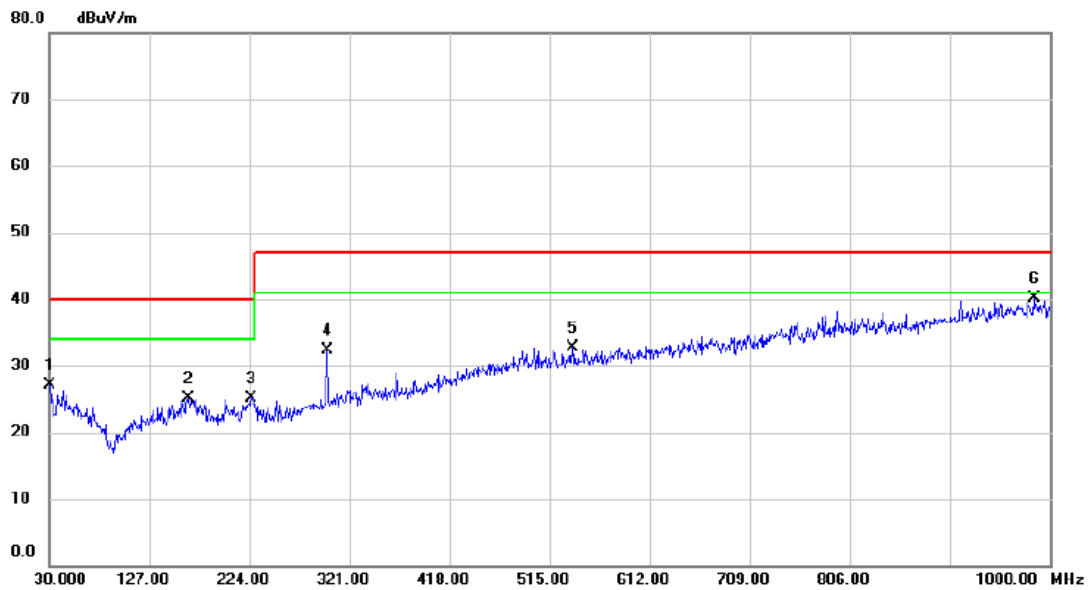
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		56.1900	31.70	-5.41	26.29	40.00	-13.71	QP	
2		137.6700	31.20	-6.35	24.85	40.00	-15.15	QP	
3		224.9700	33.37	-7.82	25.55	40.00	-14.45	QP	
4		389.8700	33.85	-0.78	33.07	47.00	-13.93	QP	
5		465.5300	32.24	1.75	33.99	47.00	-13.01	QP	
6	*	995.1500	28.20	11.61	39.81	47.00	-7.19	QP	

Test Voltage	AC 110V/60Hz	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		52.3100	38.74	-5.45	33.29	40.00	-6.71	QP	
2		127.9700	35.22	-7.00	28.22	40.00	-11.78	QP	
3		187.1400	34.86	-6.71	28.15	40.00	-11.85	QP	
4		500.4500	31.51	2.74	34.25	47.00	-12.75	QP	
5		817.6400	29.66	8.64	38.30	47.00	-8.70	QP	
6	*	980.6000	29.16	11.42	40.58	47.00	-6.42	QP	

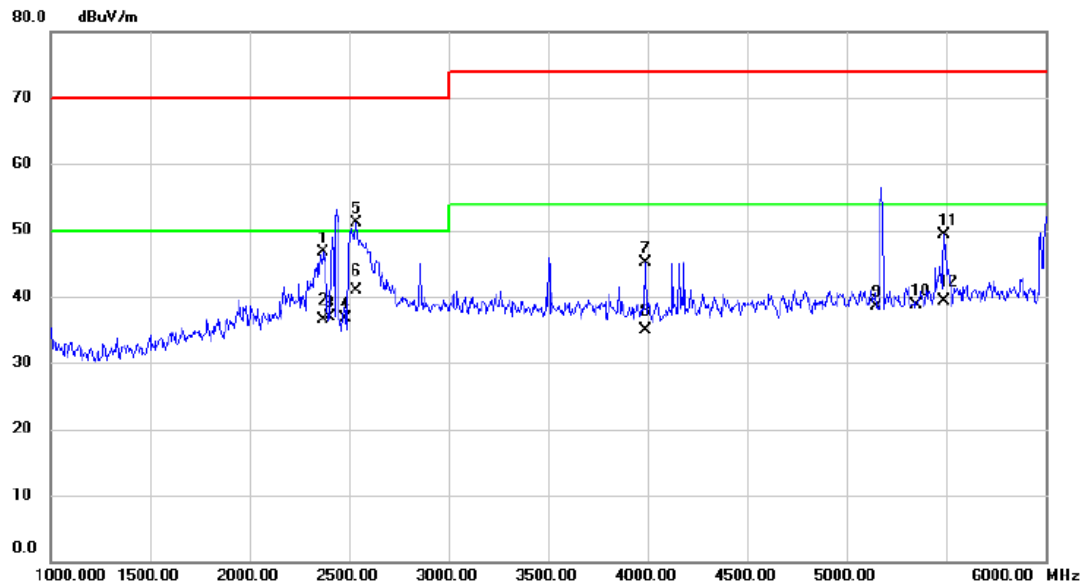
Test Voltage	AC 110V/60Hz	Polarization	Horizontal
Test Mode	Mode 1		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		30.9700	34.12	-7.10	27.02	40.00	-12.98	QP	
2		164.8300	30.37	-5.25	25.12	40.00	-14.88	QP	
3		225.9400	32.91	-7.75	25.16	40.00	-14.84	QP	
4		299.6600	36.03	-3.65	32.38	47.00	-14.62	QP	
5		537.3100	29.62	3.17	32.79	47.00	-14.21	QP	
6	*	984.4800	28.59	11.47	40.06	47.00	-6.94	QP	

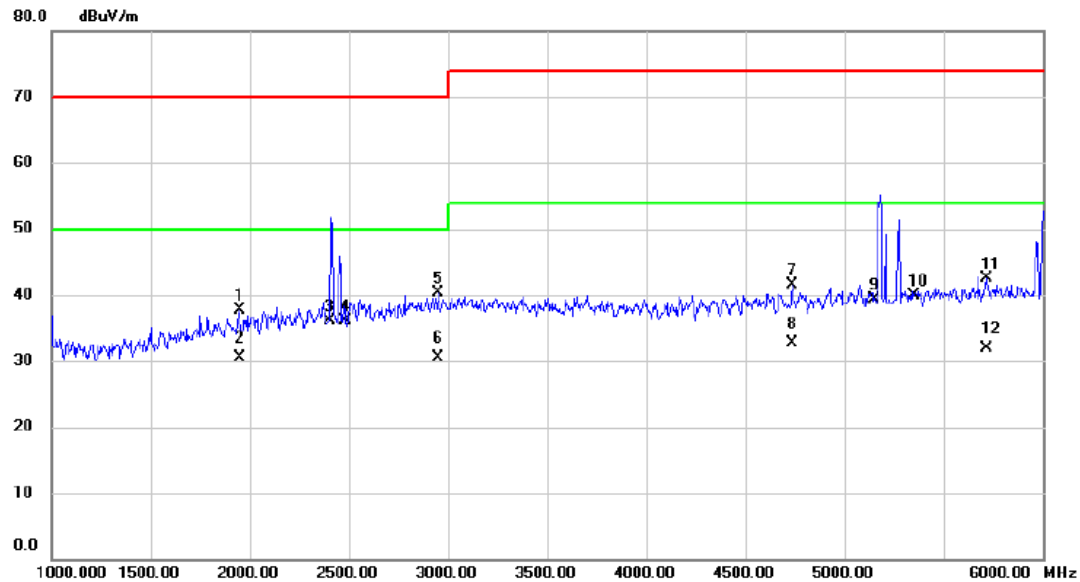
APPENDIX B - RADIATED EMISSION ABOVE 1GHZ

Test Voltage	AC 230V/50Hz	Polarization	Vertical
Test Mode	Mode 1		
Note	2.4G WIFI(2400-2483.5MHz) and 5G WIFI(5150-5350MHz) are intentional transmissions, which are not applicable to the radiation emission requirements in this standard.		



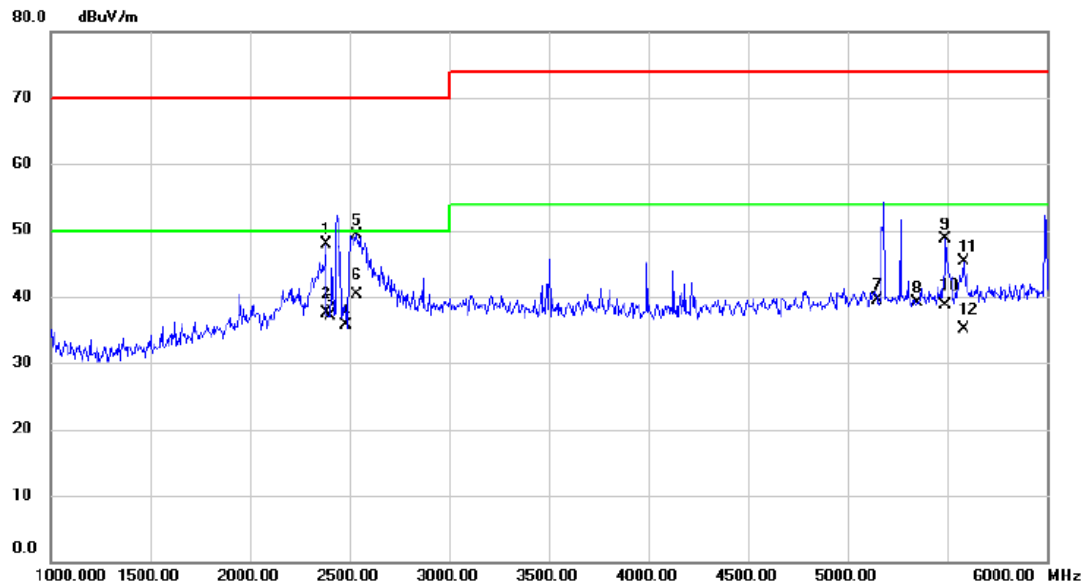
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2367.500	45.70	0.92	46.62	70.00	-23.38	peak	
2		2367.500	35.55	0.92	36.47	50.00	-13.53	AVG	
3		2400.000	35.90	1.01	36.91	70.00	-33.09	peak	
4		2483.500	35.55	1.23	36.78	70.00	-33.22	peak	
5		2535.000	49.71	1.43	51.14	70.00	-18.86	peak	
6	*	2535.000	39.46	1.43	40.89	50.00	-9.11	AVG	
7		3990.000	40.46	4.64	45.10	74.00	-28.90	peak	
8		3990.000	30.25	4.64	34.89	54.00	-19.11	AVG	
9		5150.000	30.00	8.44	38.44	74.00	-35.56	peak	
10		5350.000	29.87	8.85	38.72	74.00	-35.28	peak	
11		5492.500	40.12	9.12	49.24	74.00	-24.76	peak	
12		5492.500	30.25	9.12	39.37	54.00	-14.63	AVG	

Test Voltage	AC 230V/50Hz	Polarization	Horizontal
Test Mode	Mode 1		
Note	2.4G WIFI(2400-2483.5MHz) and 5G WIFI(5150-5350MHz) are intentional transmissions, which are not applicable to the radiation emission requirements in this standard.		



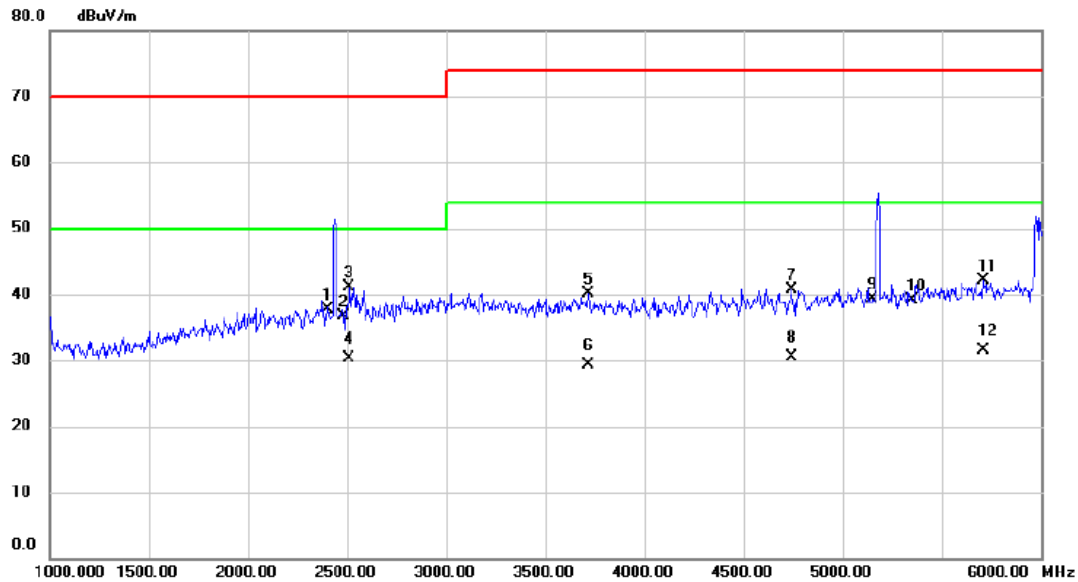
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		1947.500	38.30	-0.51	37.79	70.00	-32.21	peak	
2	*	1947.500	31.07	-0.51	30.56	50.00	-19.44	AVG	
3		2400.000	35.09	1.01	36.10	70.00	-33.90	peak	
4		2483.500	34.94	1.23	36.17	70.00	-33.83	peak	
5		2952.500	37.10	3.25	40.35	70.00	-29.65	peak	
6		2952.500	27.30	3.25	30.55	50.00	-19.45	AVG	
7		4737.500	34.43	7.04	41.47	74.00	-32.53	peak	
8		4737.500	25.64	7.04	32.68	54.00	-21.32	AVG	
9		5150.000	30.96	8.44	39.40	74.00	-34.60	peak	
10		5350.000	31.10	8.85	39.95	74.00	-34.05	peak	
11		5715.000	32.99	9.56	42.55	74.00	-31.45	peak	
12		5715.000	22.32	9.56	31.88	54.00	-22.12	AVG	

Test Voltage	AC 110V/60Hz	Polarization	Vertical
Test Mode	Mode 1		
Note	2.4G WIFI(2400-2483.5MHz) and 5G WIFI(5150-5350MHz) are intentional transmissions, which are 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		2382.500	46.95	0.96	47.91	70.00	-22.09	peak	
2		2382.500	36.60	0.96	37.56	50.00	-12.44	AVG	
3		2400.000	36.03	1.01	37.04	70.00	-32.96	peak	
4		2483.500	34.52	1.23	35.75	70.00	-34.25	peak	
5		2535.000	47.94	1.43	49.37	70.00	-20.63	peak	
6	*	2535.000	38.90	1.43	40.33	50.00	-9.67	AVG	
7		5150.000	31.13	8.44	39.57	74.00	-34.43	peak	
8		5350.000	30.29	8.85	39.14	74.00	-34.86	peak	
9		5492.500	39.51	9.12	48.63	74.00	-25.37	peak	
10		5492.500	29.64	9.12	38.76	54.00	-15.24	AVG	
11		5582.500	36.08	9.29	45.37	74.00	-28.63	peak	
12		5582.500	25.88	9.29	35.17	54.00	-18.83	AVG	

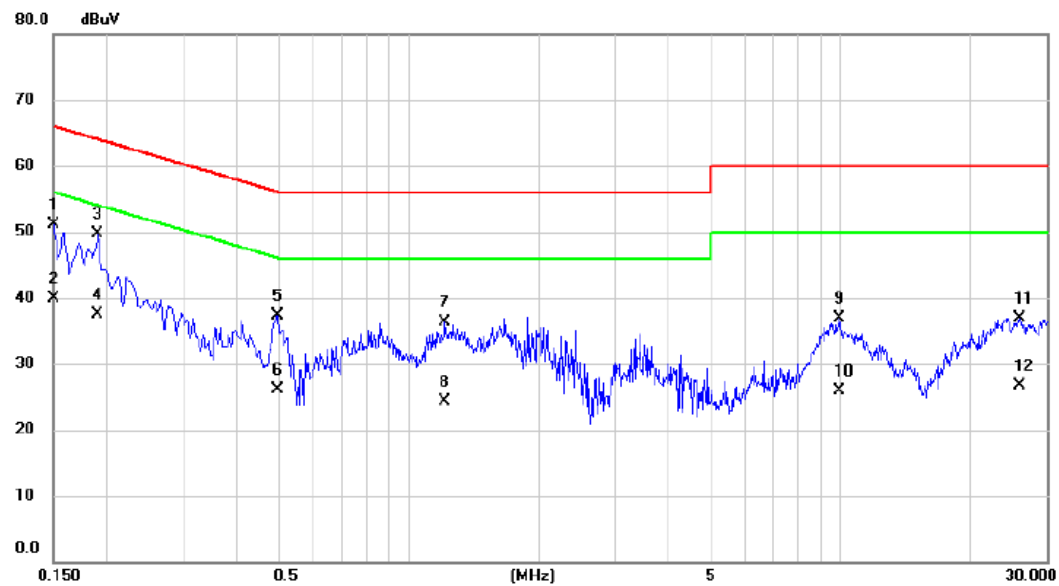
Test Voltage	AC 110V/60Hz	Polarization	Horizontal
Test Mode	Mode 1		
Note	2.4G WIFI(2400-2483.5MHz) and 5G WIFI(5150-5350MHz) are intentional transmissions, which are not applicable to the radiation emission requirements in this standard.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Comment
1		2400.000	36.71	1.01	37.72	70.00	-32.28	peak	
2		2483.500	35.39	1.23	36.62	70.00	-33.38	peak	
3		2510.000	39.73	1.32	41.05	70.00	-28.95	peak	
4	*	2510.000	29.03	1.32	30.35	50.00	-19.65	AVG	
5		3715.000	35.96	4.16	40.12	74.00	-33.88	peak	
6		3715.000	25.15	4.16	29.31	54.00	-24.69	AVG	
7		4740.000	33.72	7.05	40.77	74.00	-33.23	peak	
8		4740.000	23.52	7.05	30.57	54.00	-23.43	AVG	
9		5150.000	30.82	8.44	39.26	74.00	-34.74	peak	
10		5350.000	30.33	8.85	39.18	74.00	-34.82	peak	
11		5707.500	32.48	9.55	42.03	74.00	-31.97	peak	
12		5707.500	21.93	9.55	31.48	54.00	-22.52	AVG	

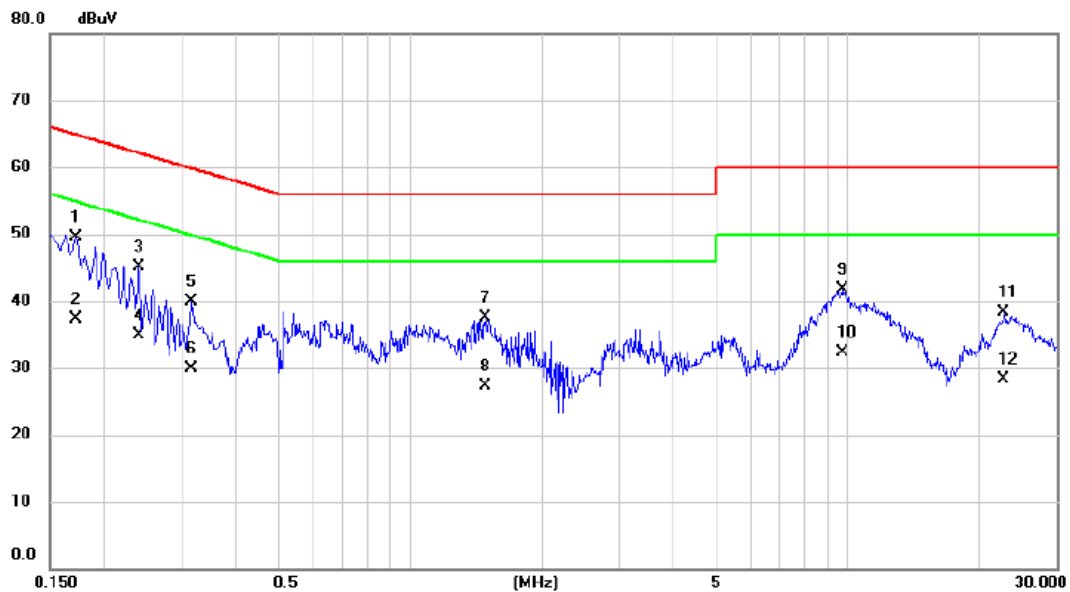
APPENDIX C - CONDUCTED EMISSION AT AC MAINS POWER PORT

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



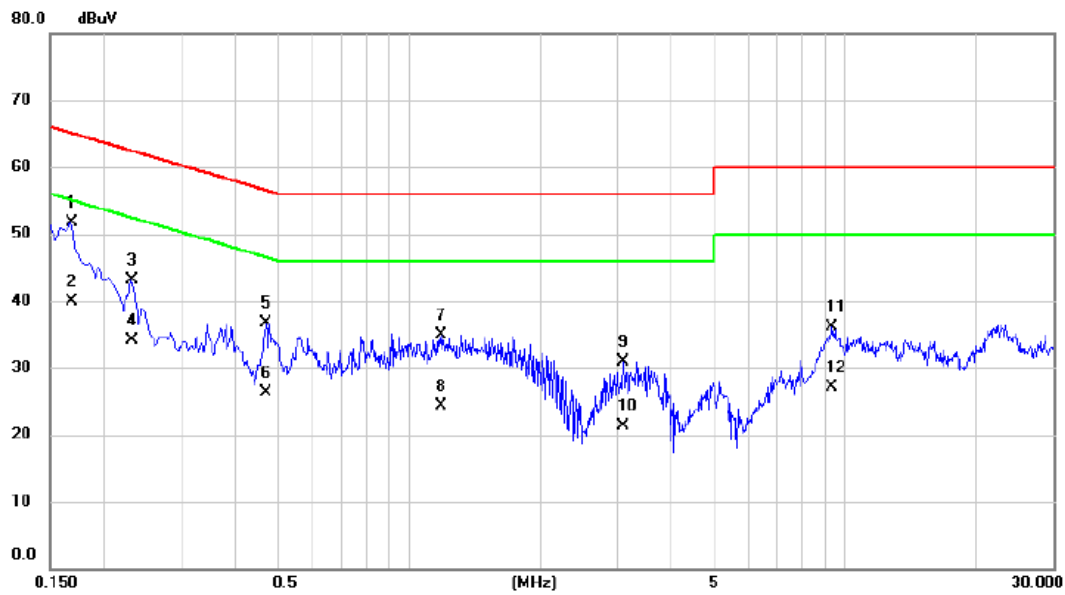
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1500	41.41	9.66	51.07	66.00	-14.93	QP	
2		0.1500	30.20	9.66	39.86	56.00	-16.14	AVG	
3	*	0.1905	39.94	9.68	49.62	64.01	-14.39	QP	
4		0.1905	27.80	9.68	37.48	54.01	-16.53	AVG	
5		0.4965	27.63	9.73	37.36	56.06	-18.70	QP	
6		0.4965	16.30	9.73	26.03	46.06	-20.03	AVG	
7		1.2120	26.54	9.80	36.34	56.00	-19.66	QP	
8		1.2120	14.50	9.80	24.30	46.00	-21.70	AVG	
9		9.9420	26.64	10.28	36.92	60.00	-23.08	QP	
10		9.9420	15.70	10.28	25.98	50.00	-24.02	AVG	
11		25.9260	26.24	10.71	36.95	60.00	-23.05	QP	
12		25.9260	15.90	10.71	26.61	50.00	-23.39	AVG	

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



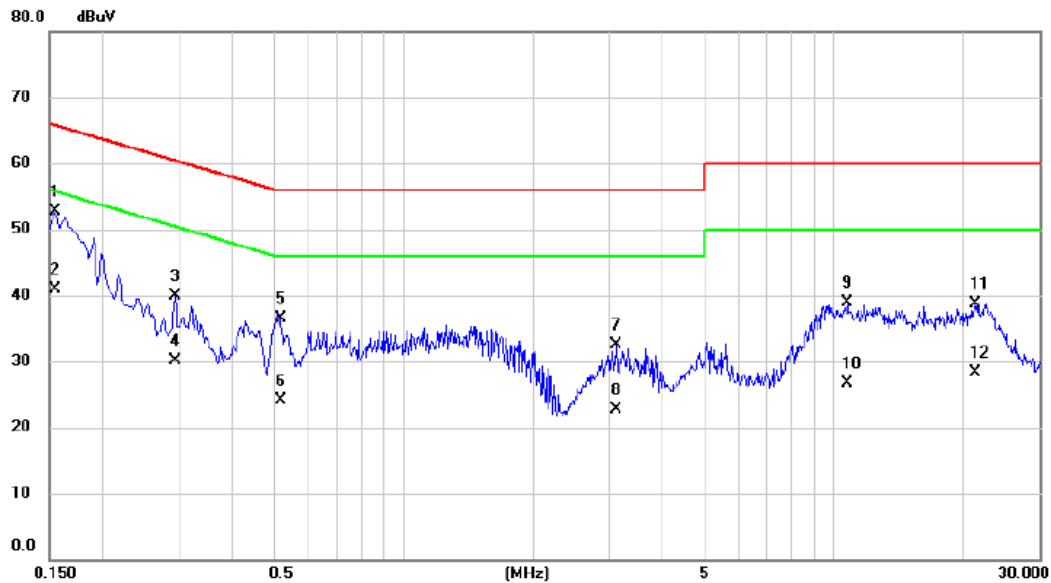
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1725	39.86	9.62	49.48	64.84	-15.36	QP	
2		0.1725	27.60	9.62	37.22	54.84	-17.62	AVG	
3		0.2400	35.53	9.65	45.18	62.10	-16.92	QP	
4		0.2400	25.30	9.65	34.95	52.10	-17.15	AVG	
5		0.3165	30.28	9.66	39.94	59.80	-19.86	QP	
6		0.3165	20.30	9.66	29.96	49.80	-19.84	AVG	
7		1.4865	27.65	9.89	37.54	56.00	-18.46	QP	
8		1.4865	17.40	9.89	27.29	46.00	-18.71	AVG	
9		9.6990	31.31	10.34	41.65	60.00	-18.35	QP	
10		9.6990	21.90	10.34	32.24	50.00	-17.76	AVG	
11		22.6635	27.35	10.94	38.29	60.00	-21.71	QP	
12		22.6635	17.40	10.94	28.34	50.00	-21.66	AVG	

Test Voltage	AC 110V/60Hz	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	*	0.1680	42.03	9.67	51.70	65.06	-13.36	QP	
2		0.1680	30.20	9.67	39.87	55.06	-15.19	AVG	
3		0.2310	33.46	9.68	43.14	62.41	-19.27	QP	
4		0.2310	24.50	9.68	34.18	52.41	-18.23	AVG	
5		0.4695	26.97	9.73	36.70	56.52	-19.82	QP	
6		0.4695	16.50	9.73	26.23	46.52	-20.29	AVG	
7		1.1850	25.18	9.80	34.98	56.00	-21.02	QP	
8		1.1850	14.50	9.80	24.30	46.00	-21.70	AVG	
9		3.0975	21.05	9.94	30.99	56.00	-25.01	QP	
10		3.0975	11.30	9.94	21.24	46.00	-24.76	AVG	
11		9.3120	25.75	10.26	36.01	60.00	-23.99	QP	
12		9.3120	16.90	10.26	27.16	50.00	-22.84	AVG	

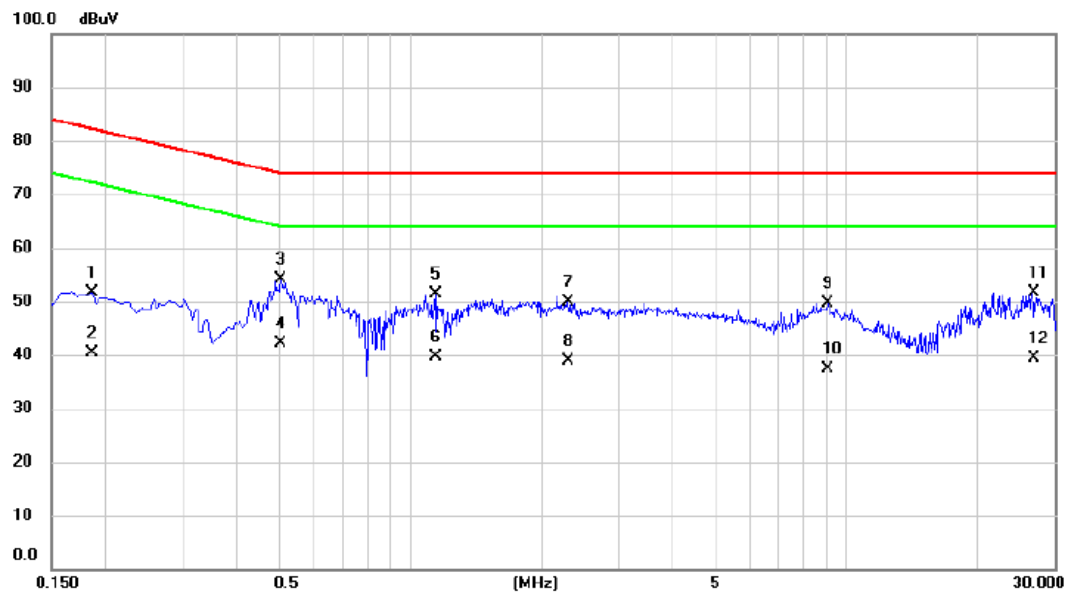
Test Voltage	AC 110V/60Hz	Phase	Neutral
Test Mode	Mode 1		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1545	43.08	9.63	52.71	65.75	-13.04	QP	
2		0.1545	31.20	9.63	40.83	55.75	-14.92	AVG	
3		0.2940	30.23	9.66	39.89	60.41	-20.52	QP	
4		0.2940	20.50	9.66	30.16	50.41	-20.25	AVG	
5		0.5190	26.76	9.69	36.45	56.00	-19.55	QP	
6		0.5190	14.50	9.69	24.19	46.00	-21.81	AVG	
7		3.1110	22.61	9.94	32.55	56.00	-23.45	QP	
8		3.1110	12.80	9.94	22.74	46.00	-23.26	AVG	
9		10.7565	28.54	10.40	38.94	60.00	-21.06	QP	
10		10.7565	16.30	10.40	26.70	50.00	-23.30	AVG	
11		21.3000	27.86	10.87	38.73	60.00	-21.27	QP	
12		21.3000	17.40	10.87	28.27	50.00	-21.73	AVG	

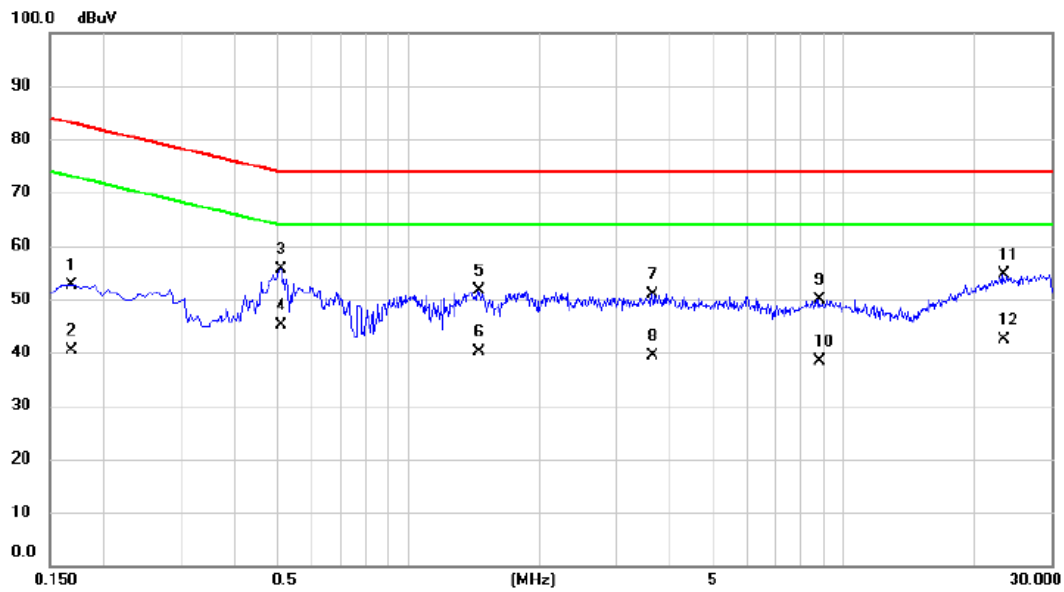
APPENDIX D - ASYMMETRIC MODE CONDUCTED EMISSIONS TEST

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1 (WAN 1Gbps)



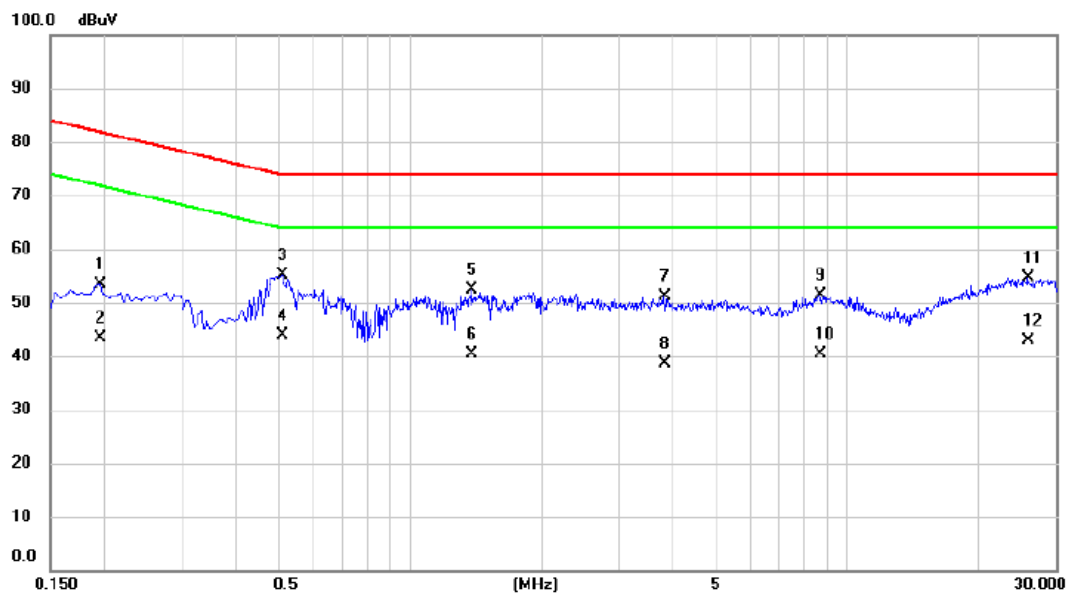
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1860	41.67	10.06	51.73	82.21	-30.48	QP	
2		0.1860	30.34	10.06	40.40	72.21	-31.81	AVG	
3	*	0.5055	44.41	9.76	54.17	74.00	-19.83	QP	
4		0.5055	32.35	9.76	42.11	64.00	-21.89	AVG	
5		1.1445	41.54	9.72	51.26	74.00	-22.74	QP	
6		1.1445	29.79	9.72	39.51	64.00	-24.49	AVG	
7		2.2965	40.04	9.74	49.78	74.00	-24.22	QP	
8		2.2965	29.20	9.74	38.94	64.00	-25.06	AVG	
9		9.0870	39.58	10.00	49.58	74.00	-24.42	QP	
10		9.0870	27.36	10.00	37.36	64.00	-26.64	AVG	
11		26.8260	41.11	10.58	51.69	74.00	-22.31	QP	
12		26.8260	28.91	10.58	39.49	64.00	-24.51	AVG	

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1 (LAN1 1Gbps)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1680	42.64	10.08	52.72	83.06	-30.34	QP	
2		0.1680	30.25	10.08	40.33	73.06	-32.73	AVG	
3	*	0.5100	45.90	9.76	55.66	74.00	-18.34	QP	
4		0.5100	35.45	9.76	45.21	64.00	-18.79	AVG	
5		1.4505	42.00	9.72	51.72	74.00	-22.28	QP	
6		1.4505	30.47	9.72	40.19	64.00	-23.81	AVG	
7		3.6375	41.15	9.80	50.95	74.00	-23.05	QP	
8		3.6375	29.62	9.80	39.42	64.00	-24.58	AVG	
9		8.7990	39.97	9.99	49.96	74.00	-24.04	QP	
10		8.7990	28.45	9.99	38.44	64.00	-25.56	AVG	
11		23.3790	44.10	10.44	54.54	74.00	-19.46	QP	
12		23.3790	31.95	10.44	42.39	64.00	-21.61	AVG	

Test Voltage	AC 230V/50Hz
Test Mode	Mode 1 (IPTV 1Gbps)

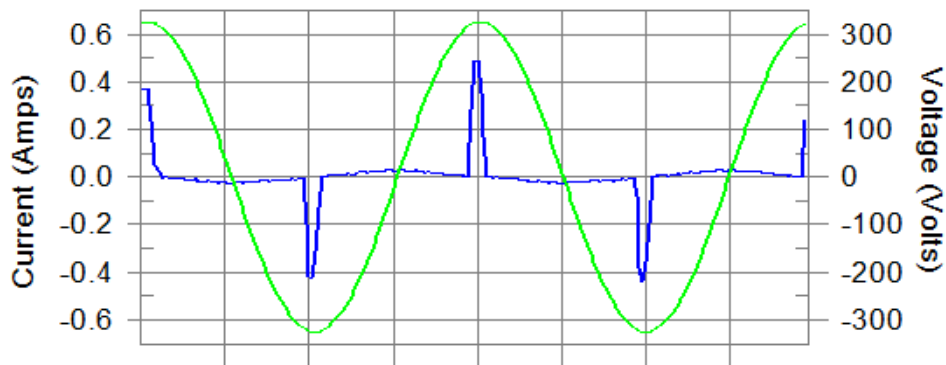


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1950	43.46	10.04	53.50	81.82	-28.32	QP	
2		0.1950	33.44	10.04	43.48	71.82	-28.34	AVG	
3	*	0.5100	45.39	9.76	55.15	74.00	-18.85	QP	
4		0.5100	34.05	9.76	43.81	64.00	-20.19	AVG	
5		1.3875	42.60	9.72	52.32	74.00	-21.68	QP	
6		1.3875	30.57	9.72	40.29	64.00	-23.71	AVG	
7		3.8175	41.25	9.81	51.06	74.00	-22.94	QP	
8		3.8175	28.71	9.81	38.52	64.00	-25.48	AVG	
9		8.6595	41.37	9.98	51.35	74.00	-22.65	QP	
10		8.6595	30.46	9.98	40.44	64.00	-23.56	AVG	
11		25.8855	44.11	10.54	54.65	74.00	-19.35	QP	
12		25.8855	32.26	10.54	42.80	64.00	-21.20	AVG	

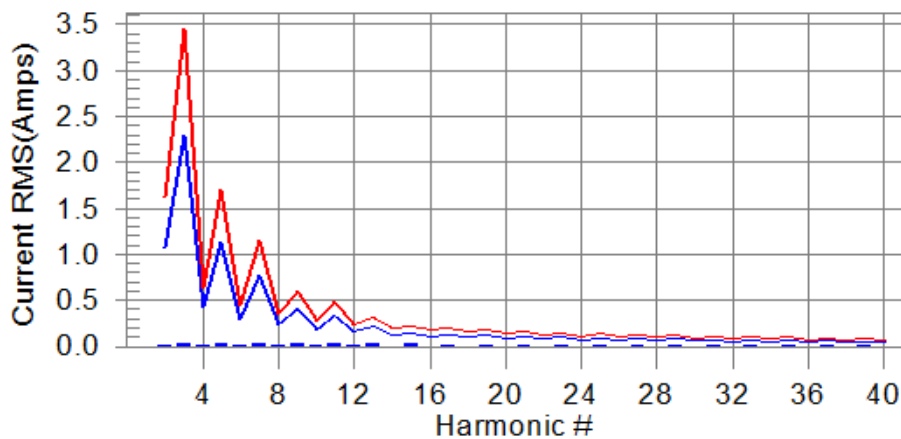
APPENDIX E - HARMONIC CURRENT EMISSION

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 H15-9.2% of 150% limit, H15-13.6% 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): 229.99	Frequency(Hz): 50.00
I Peak (Amps): 0.505	I RMS (Amps): 0.095
I Fund (Amps): 0.040	Crest Factor: 5.488
Power (Watts): 8.1	Power Factor: 0.399

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	1.080	N/A	0.002	1.620	N/A	Pass
3	0.034	2.300	1.5	0.036	3.450	1.0	Pass
4	0.002	0.430	N/A	0.002	0.645	N/A	Pass
5	0.032	1.140	2.8	0.033	1.710	2.0	Pass
6	0.001	0.300	N/A	0.002	0.450	N/A	Pass
7	0.031	0.770	4.0	0.031	1.155	2.7	Pass
8	0.001	0.230	N/A	0.002	0.345	N/A	Pass
9	0.029	0.400	7.2	0.029	0.600	4.9	Pass
10	0.001	0.184	N/A	0.002	0.276	N/A	Pass
11	0.026	0.330	7.9	0.027	0.495	5.4	Pass
12	0.001	0.153	N/A	0.002	0.230	N/A	Pass
13	0.023	0.210	11.1	0.024	0.315	7.5	Pass
14	0.001	0.131	N/A	0.001	0.197	N/A	Pass
15	0.020	0.150	13.6	0.021	0.225	9.2	Pass
16	0.001	0.115	N/A	0.001	0.173	N/A	Pass
17	0.017	0.132	13.1	0.018	0.198	8.9	Pass
18	0.001	0.102	N/A	0.001	0.153	N/A	Pass
19	0.014	0.118	12.1	0.014	0.178	8.1	Pass
20	0.001	0.092	N/A	0.001	0.138	N/A	Pass
21	0.011	0.107	10.6	0.011	0.161	7.2	Pass
22	0.001	0.084	N/A	0.001	0.125	N/A	Pass
23	0.009	0.098	8.8	0.009	0.147	6.0	Pass
24	0.001	0.077	N/A	0.001	0.115	N/A	Pass
25	0.006	0.090	6.9	0.006	0.135	4.7	Pass
26	0.001	0.071	N/A	0.001	0.107	N/A	Pass
27	0.004	0.083	N/A	0.004	0.125	N/A	Pass
28	0.001	0.066	N/A	0.001	0.099	N/A	Pass
29	0.003	0.078	N/A	0.003	0.116	N/A	Pass
30	0.001	0.061	N/A	0.001	0.092	N/A	Pass
31	0.002	0.073	N/A	0.002	0.109	N/A	Pass
32	0.001	0.058	N/A	0.001	0.086	N/A	Pass
33	0.002	0.068	N/A	0.002	0.102	N/A	Pass
34	0.000	0.054	N/A	0.001	0.081	N/A	Pass
35	0.003	0.064	N/A	0.003	0.096	N/A	Pass
36	0.000	0.051	N/A	0.001	0.077	N/A	Pass
37	0.003	0.061	N/A	0.003	0.091	N/A	Pass
38	0.000	0.048	N/A	0.001	0.073	N/A	Pass
39	0.003	0.058	N/A	0.003	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): 229.99	Frequency(Hz): 50.00
I Peak (Amps): 0.505	I RMS (Amps): 0.095
I Fund (Amps): 0.040	Crest Factor: 5.488
Power (Watts): 8.1	Power Factor: 0.399

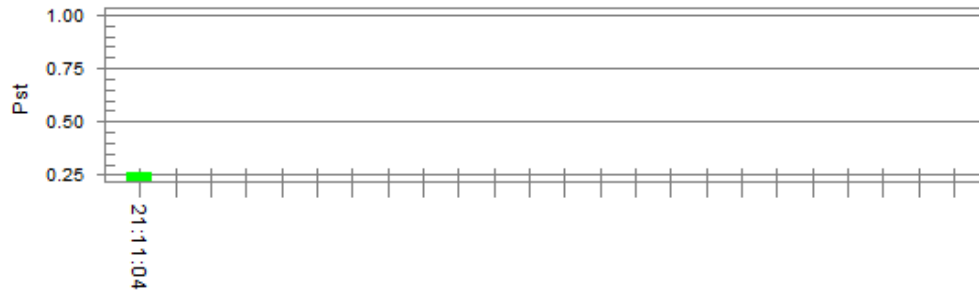
Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.119	0.460	25.96	OK
3	0.555	2.069	26.81	OK
4	0.065	0.460	14.19	OK
5	0.062	0.920	6.73	OK
6	0.035	0.460	7.54	OK
7	0.046	0.690	6.73	OK
8	0.019	0.460	4.13	OK
9	0.034	0.460	7.38	OK
10	0.020	0.460	4.38	OK
11	0.029	0.230	12.83	OK
12	0.016	0.230	7.06	OK
13	0.024	0.230	10.65	OK
14	0.015	0.230	6.52	OK
15	0.021	0.230	8.94	OK
16	0.017	0.230	7.29	OK
17	0.012	0.230	5.15	OK
18	0.013	0.230	5.73	OK
19	0.019	0.230	8.20	OK
20	0.017	0.230	7.18	OK
21	0.011	0.230	4.65	OK
22	0.012	0.230	5.06	OK
23	0.014	0.230	6.29	OK
24	0.005	0.230	2.08	OK
25	0.006	0.230	2.74	OK
26	0.008	0.230	3.45	OK
27	0.010	0.230	4.20	OK
28	0.007	0.230	3.11	OK
29	0.006	0.230	2.58	OK
30	0.005	0.230	2.32	OK
31	0.005	0.230	2.24	OK
32	0.005	0.230	2.23	OK
33	0.006	0.230	2.82	OK
34	0.003	0.230	1.13	OK
35	0.004	0.230	1.77	OK
36	0.003	0.230	1.44	OK
37	0.008	0.230	3.65	OK
38	0.003	0.230	1.27	OK
39	0.006	0.230	2.40	OK
40	0.006	0.230	2.49	OK

APPENDIX F - 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 (%):

T-max (mS): 0

Highest dc (%): 0.00

Highest dmax (%): 0.00

Highest Pst (10 min. period): 0.261

Highest Plt (2 hr. period): 0.114

Test limit (%):

Test limit (mS): 500.0 Pass

Test limit (%): 3.30 Pass

Test limit (%): 4.00 Pass

Test limit: 1.000 Pass

Test limit: 0.650 Pass

APPENDIX G - ELECTROSTATIC DISCHARGE

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

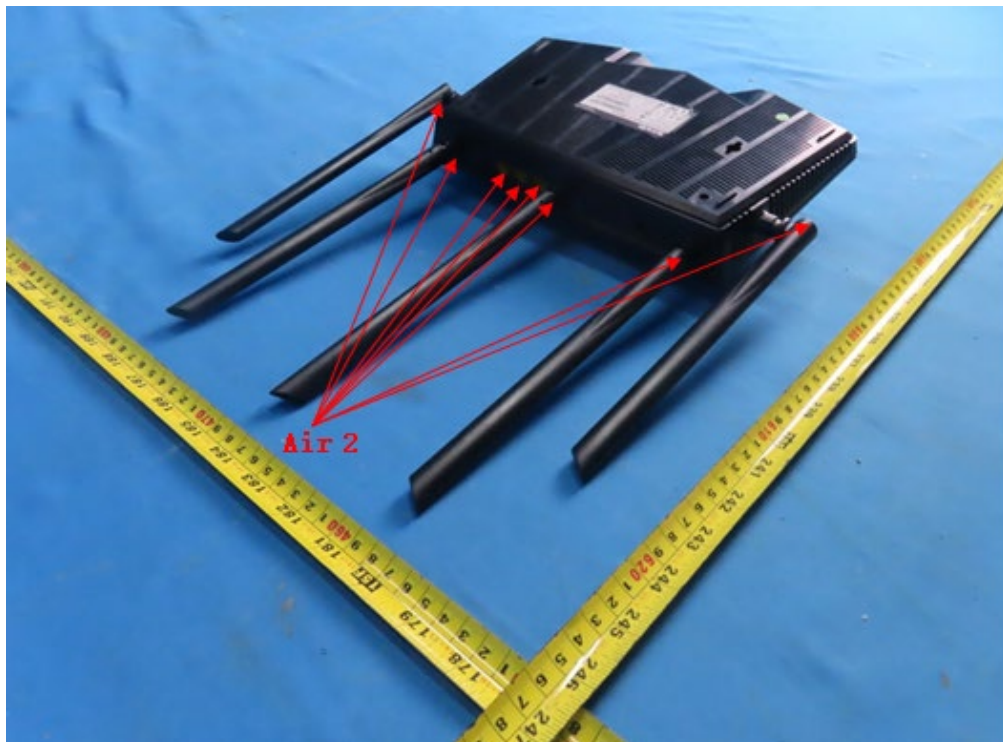
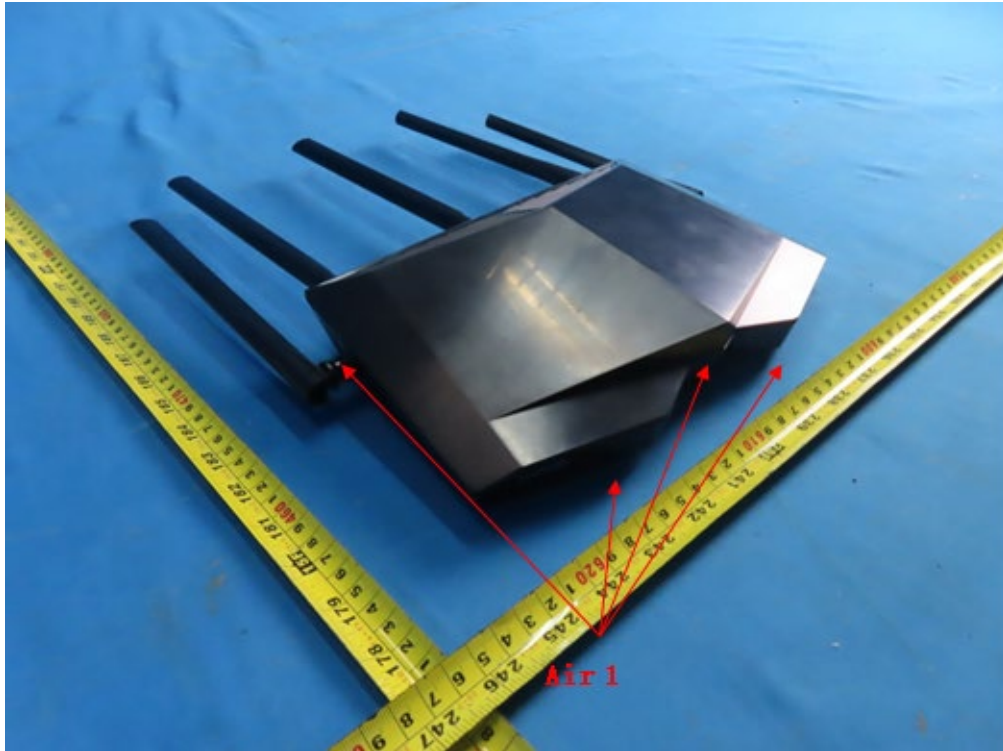
Mode	Air Discharge								Contact Discharge					
	2kV		4kV		8kV		- kV		4kV		- kV		- kV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	A	A	A	A	A	A	-	-	-	-	-	-	-	-
2	A	A	A	A	A	A	-	-	-	-	-	-	-	-
3	A	A	A	A	B	B	-	-	-	-	-	-	-	-
4	A	A	B	B	B	B	-	-	-	-	-	-	-	-
Criteria	B						-		B				-	
Result	B						-		N/A				-	

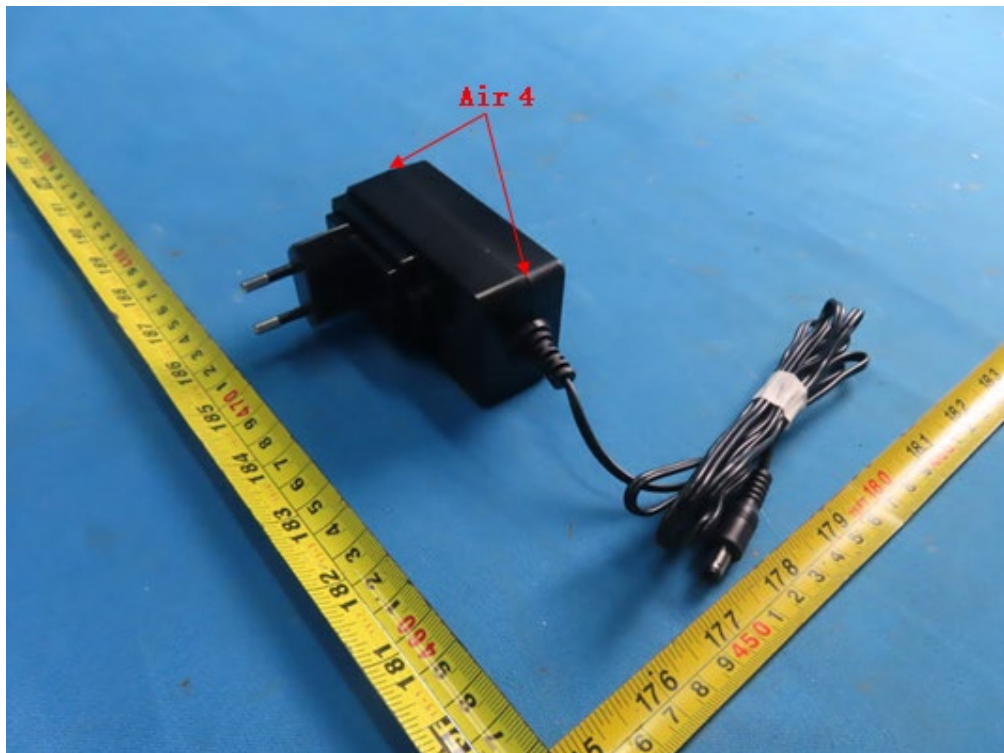
Mode	HCP Contact Discharge						VCP Contact Discharge					
	4kV		- kV		- kV		4kV		- kV		- kV	
Location	P	N	P	N	P	N	P	N	P	N	P	N
Left side	A	A	-	-	-	-	A	A	-	-	-	-
Right side	A	A	-	-	-	-	A	A	-	-	-	-
Front side	A	A	-	-	-	-	A	A	-	-	-	-
Rear side	B	B	-	-	-	-	B	B	-	-	-	-
Criteria	B				-		B				-	
Result	B		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

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 H - 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	0.81%	10%	PASS
			Right	H / V	A	0.72%	10%	PASS
			Left	H / V	A	0.78%	10%	PASS
			Rear	H / V	A	0.88%	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	1.08%	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	1.26%	10%	PASS

Freq. Range (MHz)	Operating Mode	Field Strength	Orientation (Side of EUT)	Polarity	Perform Criteria	PER		Judgment
						During test	Limit	
80 - 1000	Wi-Fi 5G	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	H / V	A	0.72%	10%	PASS
			Right	H / V	A	0.64%	10%	PASS
			Left	H / V	A	0.61%	10%	PASS
			Rear	H / V	A	0.80%	10%	PASS
1000 - 3000	Wi-Fi 5G	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	0.91%	10%	PASS
3000 - 6000	Wi-Fi 5G	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	1.01%	10%	PASS

APPENDIX I - FAST TRANSIENTS COMMON MODE

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

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

EUT Ports Tested		Polarity	Repetition Frequency	Test Level 0.5 kV	Criterion	Result
Signal port, Wired network port, Control port	LAN1	+	5 kHz	B	B	B
		-	5 kHz	B		
	WAN	+	5 kHz	B	B	B
		-	5 kHz	B		
	IPTV	+	5 kHz	B	B	B
		-	5 kHz	B		

APPENDIX J - SURGE

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

Wave Form EUT Ports Tested		1.2/50(8/20)Tr/Th μs						Criterion	Result
		Polarity	Phase	Voltage					
				0.5kV	1kV	-- kV	-- kV		
AC	L – N	+/-	0°	A	B	-	-	B	B
		+/-	90°	A	B	-	-		
		+/-	180°	A	B	-	-		
		+/-	270°	A	B	-	-		

Wave Form EUT Ports Tested		1.2/50(8/20)Tr/Th μs					Criterion	Result
		Polarity	Voltage					
			0.5kV	-- kV	-- kV	-- kV		
Wired network ports	LAN1	+/-	B	-	-	-	B	B
	WAN	+/-	B	-	-	-	B	B
	IPTV	+/-	B	-	-	-	B	B

Wave Form EUT Ports Tested		10/700(5/320)Tr/Th μs					Criterion	Result
		Polarity	Voltage					
			0.5kV	1kV	-- kV	-- kV		
Wired network ports	LAN1	+/-	B	B	-	-	B	B
	WAN	+/-	B	B	-	-	B	B
	IPTV	+/-	B	B	-	-	B	B

APPENDIX K - 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
Signal ports, wired network ports, control ports (LAN1)	0.15 --- 80			A	A
Signal ports, wired network ports, control ports (WAN)	0.15 --- 80			A	A
Signal ports, wired network ports, control ports (IPTV)	0.15 --- 80			A	A

Test Ports (Mode)	Freq. Range (MHz)	Field Strength Modulation	Criteria	Operating Mode	PER		Judgment
					During Test	Limit	
Input/ Output AC. Power Port	0.15 --- 80	3 V AM Modulated 1000 Hz, 80%	A	Wi-Fi 2.4G	0.57%	10%	PASS
				Wi-Fi 5G	0.61%	10%	PASS
A			Wi-Fi 2.4G	0.36%	10%	PASS	
			Wi-Fi 5G	0.44%	10%	PASS	
Signal ports, wired network ports, control ports (LAN1)			A	Wi-Fi 2.4G	0.61%	10%	PASS
				Wi-Fi 5G	0.36%	10%	PASS
Signal ports, wired network ports, control ports (WAN)			A	Wi-Fi 2.4G	0.41%	10%	PASS
				Wi-Fi 5G	0.56%	10%	PASS

APPENDIX L - 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	C

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	C

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	C

End of Test Report