



TEST REPORT

Product Name: Baby Monitor

Trade Mark: N/A

Model No.: ABM900

Add. Model No.: ABM101, ABM100, ABM100S, ABM109, ABM200, ABM200S, ABM201, ABM201S, ABM206, ABM209, ABM210, ABM210S, ABM201S, ABM300, ABM600, ABM601, ABM605, ABM610, ABM609, ABM400, ABM500, ABM540, ABM540P, ABM501, ABM520, ABM510, ABM570, ABM560, ABM700, ABM720, ABM730, ABM806, ABM800, ABM808, ABM809, ABM810, ABM906, ABM910

Report Number: CT-10021EC803

Test Standards: ETSI EN 301 489-1 V2.2.3(2019-11)
ETSI EN 301 489-17 V3.2.4(2020-09)

Directive: 2014/53/EU

Test Result: PASS

Date of Issue: November 30, 2023

Prepared for:

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Version

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Dongguan Anhong Electronic Technology Co.,Ltd
Address of Applicant:	Room 1008, Building 8, No. 95 Jiaoping Road, Tangxia Town, Dongguan City, Guangdong Province, China
Manufacturer/ Factory:	Dongguan Anhong Electronic Technology Co.,Ltd
Address of Manufacturer/ Factory:	Room 1008, Building 8, No. 95 Jiaoping Road, Tangxia Town, Dongguan City, Guangdong Province, China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Baby Monitor	
Model No.:	ABM900	
Add. Model No.:	ABM101, ABM100, ABM100S, ABM109, ABM200, ABM200S, ABM201, ABM201S, ABM206, ABM209, ABM210, ABM210S, ABM201S, ABM300, ABM600, ABM601, ABM605, ABM610, ABM609, ABM400, ABM500, ABM540, ABM540P, ABM501, ABM520, ABM510, ABM570, ABM560, ABM700, ABM720, ABM730, ABM806, ABM800, ABM808, ABM809, ABM810, ABM906, ABM910	
Trade Mark:	N/A	
DUT Stage:	Production Unit	
EUT Supports Function:	2.4 GHz ISM Band:	Bluetooth 5.3
Software Version:	V1.0	
Hardware Version:	V1.0	
Sample Received Date:	October 25, 2023	
Sample Tested Date:	October 25, 2023 to November 20, 2023	
Note:	All models the difference is only to distinguish different sales areas of different customers, the product appearance is different, so the model name is different, the color and material of the product are the same.	

1.2.2 Description of Accessories

Adapter	
Model No.:	G006A0501000C
Input:	100-240V~ 50/60Hz 0.3A
Output:	5.0V = 1.0A 5.0W
DC Cable:	2.00 Meter, Unshielded without ferrite
Manufacturer:	Shenzhen Sorghum red Electronics Technology Co.,Ltd

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2402MHz to 2480MHz
Support Standards:	Bluetooth LE
Geo-location Capability:	Not Support
Type of Modulation:	FSK/GFSK
Number of Channels:	40
Channel Separation:	5 MHz
Antenna Type:	PCB Antenna
Antenna Gain:	5.18 dBi
Maximum EIRP:	9.05 dBm
Normal Test Voltage:	DC5V 1A
Extreme Test Temperature:	-20 °C to +65 °C

1.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

ETSI EN 301 489-1 V2.2.3(2019-11);

ETSI EN 301 489-17 V3.2.4(2020-09);

All test items have been performed and recorded as per the above standards

1.5 TEST FACILITY

Guangdong Cooperate International Testing Co., Ltd.
6/F., Factory Building 3, Xida Street, Lincun, Tangxia, Dongguan, Guangdong, China
At the time of testing, the following bodies accredited the Laboratory:

CMA (202119015505)

The Laboratory has been accredited by CNCA to RBT 214-2017 Competence assessment for inspection body and laboratory mandatory approval- General requirements for inspection body and laboratory. And the Registration No.: CMA 202119015505.

CNAS (L13426)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L13426.

Testing items: The conduction and radiation testing items in the report were completed in Guangdong Cooperate International Testing Co., Ltd.

1.6 DEVIATION FROM STANDARDS

None.

1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.9 MEASUREMENT UNCERTAINTY

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 %.

Test	Parameters	Expanded Uncertainty (U_{Lab})	Expanded Uncertainty (U_{Cispr})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	± 3.42 dB ± 3.42 dB	± 4.0 dB ± 3.6 dB
Electromagnetic Radiated Emission(3-loop)	Level Accuracy: 9kHz to 30 MHz	± 3.60 dB	N/A
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	± 4.60 dB	N/A
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	± 4.40 dB	± 5.2 dB
Radiated Emission	Level Accuracy: Above 1000MHz	± 4.20 dB	N/A
Mains Harmonic	Voltage	$\pm 3.11\%$	N/A
Voltage Fluctuations & Flicker	Voltage	$\pm 3.25\%$	N/A

2. TEST SUMMARY

ETSI EN 301 489-1 V2.2.3 EMC emission Test Cases					
Test Item		Test Requirement (ETSI EN 301 489-17)	Test Method (ETSI EN 301489-1 V2.2.3)	Limit (ETSI EN 301489-1 V2.2.3)	Result
Radiated Emission		Clause 7.1	Clause 8.2	Clause 8.2.3	PASS
Conducted Emission					
	AC mains input/output port	Clause 7.1	Clause 8.4	Clause 8.4.3	PASS
	DC power input/output port	Clause 7.1	Clause 8.3	Clause 8.3.3	N/A (SEE NOTE 1, 2)
	wired network port	Clause 7.1	Clause 8.7	Clause 8.7.3	N/A (SEE NOTE 1, 3)
Harmonic Current Emissions *		Clause 7.1	Clause 8.5	Clause 8.5	N/A
Voltage Fluctuations and Flicker *		Clause 7.1	Clause 8.6	Clause 8.6	N/A
ETSI EN 301 489-1 V2.2.3 Immunity Test Cases					
Test Item		Test Requirement (ETSI EN 301 489-17)	Test Method (ETSI EN 301489-1 V2.2.3)	Performance criteria (ETSI EN 301489-1 V2.2.3)	Result
RF electromagnetic field (80 MHz to 6 000 MHz) *		Clause 7.2	Clause 9.2	Clause 9.2.3	Complied
Electrostatic Discharge *		Clause 7.2	Clause 9.3	Clause 9.3.3	Complied
Fast transients common mode *					
	AC power ports *	Clause 7.2	Clause 9.4	Clause 9.4.3	Complied
	signal ports				N/A (SEE NOTE 1, 4)
	wired network ports				N/A (SEE NOTE 1, 3)
	control ports				N/A (SEE NOTE 1, 5)
	DC power ports				N/A (SEE NOTE 1, 2)
RF common mode 0,15 MHz to 80 MHz *					
	AC power ports *	Clause 7.2	Clause 9.5	Clause 9.5.3	Complied
	signal ports				N/A (SEE NOTE 1, 4)
	wired network ports				N/A (SEE NOTE 1, 3)
	control ports				N/A (SEE NOTE 1, 5)
	DC power ports				N/A (SEE NOTE 1, 2)
Transients and surges (DC power input ports)		Clause 7.2	Clause 9.6	Clause 9.6.3	N/A (SEE NOTE 1, 6)
Voltage dips and interruptions *		Clause 7.2	Clause 9.7	Clause 9.8.3	Complied
Surges *					
	AC power ports *	Clause 7.2	Clause 9.8	Clause 9.9.3	Complied
	wired network ports				N/A (SEE NOTE 1, 3)
Note: N/A: In this whole report not applicable. 1.The EUT is powered by AC port. 2.The EUT does not support the wired network ports. 3.The EUT does not support the signal ports. 4.The EUT does not support the control ports. 5.This EUT does not apply to car environment.					

3. EQUIPMENT LIST

Radiation Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul.03,2023	Jul. 02, 2024
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Jul.03,2023	Jul. 02, 2024
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Jul.26,2023	Jul.25,2024
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Jul.18,2023	Jul.17,2024
Horn Antenna	ETS-LINDGREN	3117	00143207	Jul.27,2023	Jul.26,2024
Horn Antenna	ETS-LINDGREN	3117	00143209	Jul.14,2023	Jul.13,2024
Pre-amplifier	HP	11909A	185903	Jul.13,2022	Jul.12,2024
Pre-amplifier	HP	8449B	3008A00849	Jul.23,2023	Jul.22,2024
Cable	HUBER+SUHNER	100	SUCOFLEX	Jul.11,2023	Jul.10,2024
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Jul.27,2023	Jul.26,2024
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

Conducted Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul.12,2023	Jul.11,2024
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul.11,2023	Jul.10,2024
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul.03,2023	Jul. 02, 2024
LISN	Rohde & Schwarz	ENV216	101131	Jul.15,2023	Jul.14,2024
ISN	SCHWARZBECK	NTFM 8131	8131-193	Jul.12,2023	Jul.11,2024
ISN	SCHWARZBECK	CAT3 8158	cat3 8158-0094	Jul.11,2023	Jul.10,2024
ISN	SCHWARZBECK	NTFM8158	NTFM8158 0145	Jul.27,2023	Jul.26,2024
ISN	SCHWARZBECK	CAT 8158	cat5 8158-179	Jul.14,2023	Jul.13,2024
Harmonic Current and Voltage Fluctuation and Flicker Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
Harmonic Flicker Test System	CI	5001ix-CTS-400	100321	Jul.26, 2023	Jul.25, 2024
5K VA	CI	500liX	59468	Jul.03,2023	Jul. 02, 2024

Conducted Immunity Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.DueDate
RF Generator	FRANKONIA	CIT-10/75	126B1126	Jul.12,2023	Jul.11,2024
Attenuator	FRANKONIA	59-6-33	A413	Jul.23,2023	Jul.22,2024
M-CDN	LUTHI	L-801 M2/M3	2599	Jul.15,2023	Jul.14,2024
AF2-CDN	LUTHI	L-801:AF2	2538	Jul.12,2023	Jul.11,2024
EM Injection Clamp	LUTHI	EM101	35958	Jul.03,2023	Jul. 02, 2024

Radiated Immunity Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
Signal Generator	Rohde Schwarz &	SMT03	200754	Jul.28,2023	Jul.29,2024
Power Meter	Rohde Schwarz &	NRVD	110562	Jul.27,2023	Jul.26,2024
Voltage Probe	Rohde Schwarz &	URV5-Z2	12056	Jul.23,2023	Jul.22,2024
Voltage Probe	Rohde Schwarz &	URV5-Z2	12074	Jul.12,2023	Jul.13,2024
RF Amplifier	AR	50S1G4A	326720	Jul.12,2023	Jul.11,2024
Bilog Antenna	ETS	3142C	00047662	Jul.12,2023	Jul.11,2024
Horn Antenna	ARA	DRG-118A	16554	Jul.27,2023	Jul.26,2024

Discharge Immunity Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
ESD Generator	HAFELY	PESD 1610	H808671	Jul.27,2023	Jul.26, 2024
ESD Tester	TESEQ	NSG437	304	Jul.03,2023	Jul. 02, 2024

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage	Relative Humidity (%)
NT/NV	+15 to +35	5Vdc	20 to 75 (Except Electrostatic Discharge is 30 to 60)
Remark: 1.NV: Normal Voltage; NT: Normal Temperature			

4.1.1 Record of Normal Environment

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (Kpa)	Tested by
Radiated Emission	25.7	47	100	Bert Luo
Conducted Emission	25.8	48	101	Kit Tang
Harmonic Current Emissions	N/A	N/A	N/A	N/A
Voltage Fluctuations and Flicker	N/A	N/A	N/A	N/A
RF electromagnetic field	25.8	48	101	CSIC
Electrostatic Discharge	25.9	50	102	Bert Luo
Fast transients common mode	25.9	50	102	Bert Luo
RF common mode 0,15 MHz to 80 MHz	26.0	51	101	CSIC
Voltage dips and interruptions	25.9	50	102	Bert Luo
Surges	26.0	51	101	Bert Luo

4.2 TEST MODES

Mode No.	Description of the modes
Mode 1	Normal working Mode

5. PERFORMANCE CRITERIA

5.1 FOR ETSI EN 301 489-1 V2.2.3(2019-11)

Performance criteria for continuous phenomena applied to transmitters and receivers

If no further details are given in the relevant part of ETSI EN 301 489 series [i.13] dealing with the particular type of radio equipment, the following general performance criteria for continuous phenomena shall apply.

During and after the test, the equipment shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the equipment is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Performance criteria for transient phenomena applied to transmitters and receivers

If no further details are given in the relevant part of ETSI EN 301 489 series [i.13] dealing with the particular type of radio equipment, the following general performance criteria for transient phenomena shall apply.

For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies:

For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A SW reboot is not allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. A SW reboot is not allowed.

Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

For all other ports the following applies:

After the test, the equipment shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the equipment is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Performance criteria for equipment which does not provide a continuous communication link

For radio equipment which does not provide a continuous communication link, the performance criteria described in clauses 6.1 and 6.2 are not appropriate, in these cases the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 have also to be taken into account.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses 6.1 and 6.2.

Performance criteria for ancillary equipment tested on a stand-alone basis

If ancillary equipment is intended to be tested on a stand-alone basis, the performance criteria described in clauses 6.1 and 6.2 are not appropriate, in these cases the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 have also to be taken into account.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses 6.1 and 6.2.

5.2 FOR ETSI EN 301 489-17 V3.2.4(2020-09)

➤ PERFORMANCE TABLE

Criteria	During test	After test
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3).

NOTE 1: Operate as intended during the test allows a level of degradation not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 2: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

NOTE 3: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA APPLIED TO TRANSMITTERS (CT)

The performance criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA APPLIED TO TRANSMITTERS (TT)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE CRITERIA FOR CONTINUOUS PHENOMENA APPLIED TO RECEIVERS (CR)

The performance criteria A shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE CRITERIA FOR TRANSIENT PHENOMENA APPLIED TO RECEIVERS (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

6. EMC REQUIREMENTS SPECIFICATION

6.1 REFERENCE DOCUMENTS FOR TESTING

ETSI EN 301 489-1 V2.2.3(2019-11)

ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2015/30/EU

ETSI EN 301 489-17 V3.2.4(2020-09)

ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

EN 61000-3-2:2014

Electromagnetic compatibility (EMC) Part 3-2: Limits — Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

EN 61000-3-3:2013

Electromagnetic compatibility (EMC) Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection

EN 61000-4-2:2009

Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test

EN 61000-4-3:2006+A1:2008+A2:2010

Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test

EN 61000-4-4:2012

Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test

EN 61000-4-5:2014

Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test

EN 61000-4-6:2014

Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields

EN 61000-4-8:2010

Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test

EN 61000-4-11:2020

Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests

6.2 EMC EMISSION

6.2.1 Radiated Emission

Test Requirement: ETSI EN 301 489-17 V3.2.4(2020-09) Clause 7.1

Receiver Setup:

Frequency: (f) (MHz)	Detector type	Measurement receiver bandwidth	
		RBW	VBW
$30 \leq f \leq 1\,000$	Quasi Peak	120 kHz	300 kHz
$f \geq 1000$	Peak	1 MHz	3 MHz
	Average	1 MHz	3 MHz

Measured frequency range

Required highest frequency for radiated measurement	
Highest internal frequency (Fx)	Highest measured frequency
$F_x \leq 108\text{ MHz}$	1 GHz
$108\text{ MHz} < F_x \leq 500\text{ MHz}$	2 GHz
$500\text{ MHz} < F_x \leq 1\text{ GHz}$	5 GHz
$F_x > 1\text{ GHz}$	$5 \times F_x$ up to a maximum of 6 GHz
NOTE 1 For FM and TV broadcast receivers, F_x is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.	
NOTE 2 F_x is defined in 3.1.18.	
NOTE 3 For outdoor units of home satellite receiving systems highest measured frequency shall be 18 GHz.	

Limit:

Requirements for radiated emissions at frequencies up to 1 GHz for class B equipment

Frequency range (MHz)	Measurement receiver bandwidth			Class B limits dB(μV/m)
	Facility (see Table A.1)	Distance m	Detector type / bandwidth	
30 to 230	OATS/SAC	10	Quasi Peak / 120 kHz	30
230 to 1 000				37
30 to 230	OATS/SAC	3	Quasi Peak / 120 kHz	40
230 to 1 000				47
30 to 230	FAR	10	Quasi Peak / 120 kHz	32 to 25
230 to 1 000				32
30 to 230	FAR	3	Quasi Peak / 120 kHz	42 to 35
230 to 1 000				42

Table A.5 – Requirements for radiated emissions at frequencies above 1 GHz for class B equipment

Frequency range (MHz)	Measurement receiver bandwidth			Class B limits dB(μV/m)
	Facility (see Table A.1)	Distance m	Detector type / bandwidth	
1 000 to 3 000	FSOATS	3	Average / 1 MHz	50
3 000 to 6 000				54
1 000 to 3 000			Peak / 1 MHz	70
3 000 to 6 000				74

Test Setup:

Test setup for radiated emissions of tabletop equipment

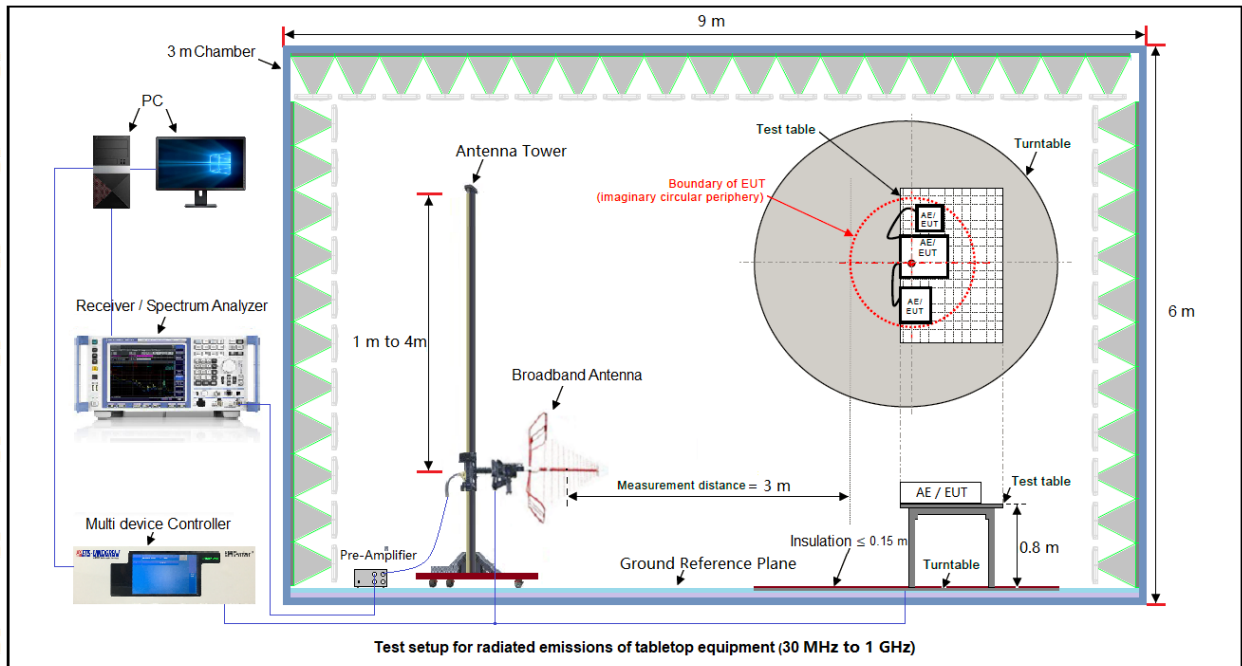


Figure 1. 30 MHz to 1 GHz

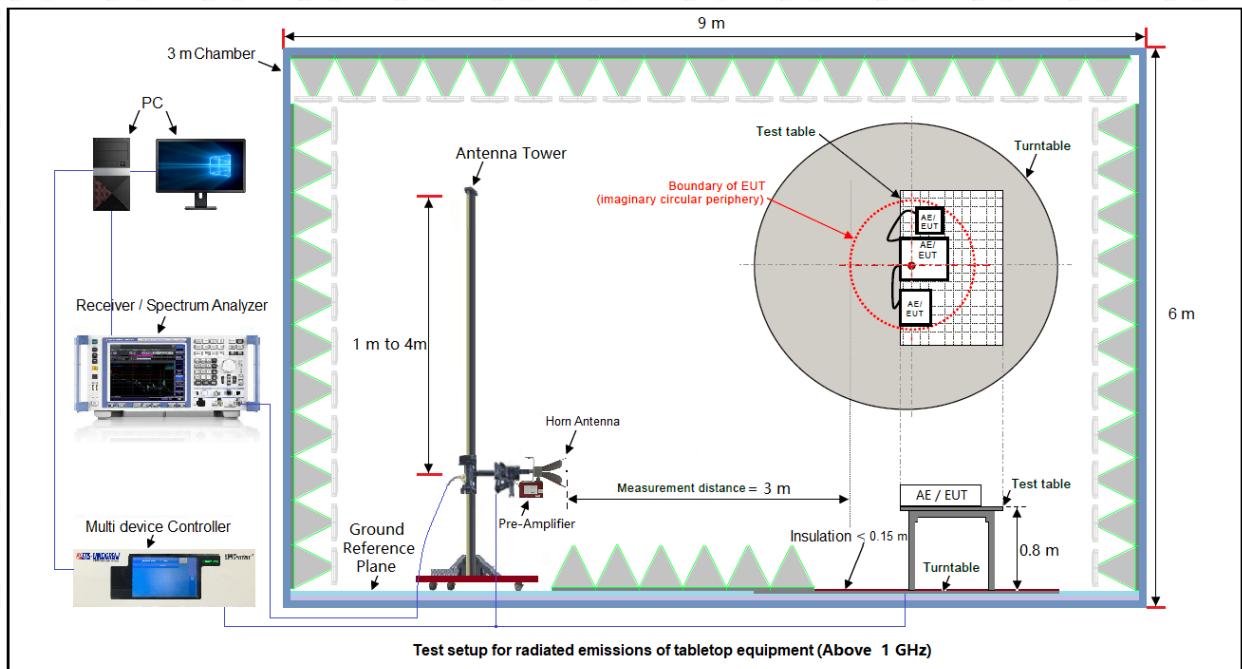


Figure 2. Above 1 GHz

Test Procedures:

1. From 30 MHz to 1GHz test procedure as below:

- 1) The radiated emissions were tested in a semi-anechoic chamber.
- 2) The Product was placed on the non-conductive turntable 0.8 m or 0.1 m above the ground at a chamber.
- 3) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- 4) For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where

Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

2. Above 1GHz test procedure as below:

- 1) The radiated emissions were tested in a fully Anechoic Chamber.
- 2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- 3) For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Equipment Used: Refer to section 3 for details.

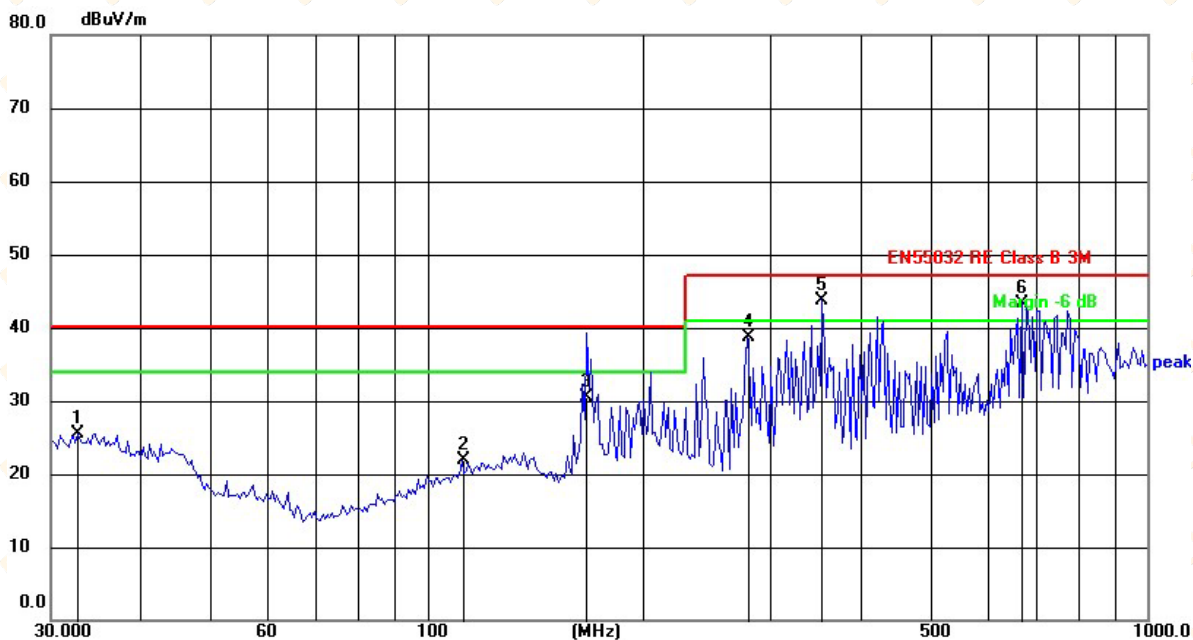
Test Result: Pass

The worst measurement data as follows:

Below 1GHz

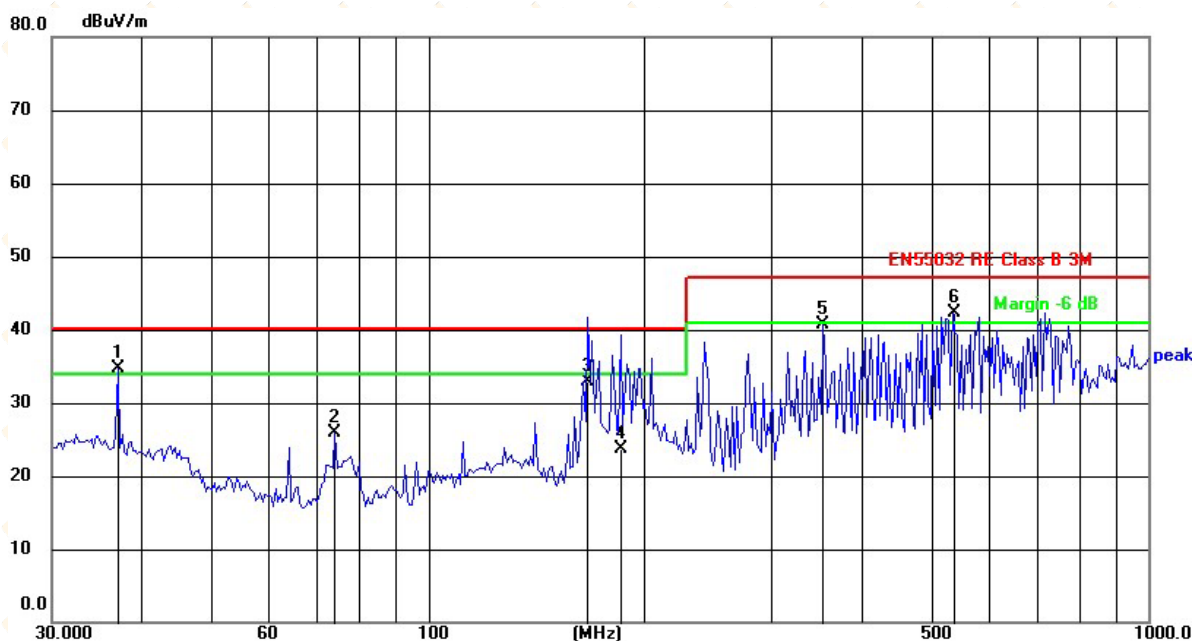
Mode 1 (Normal working Mode)

Horizontal



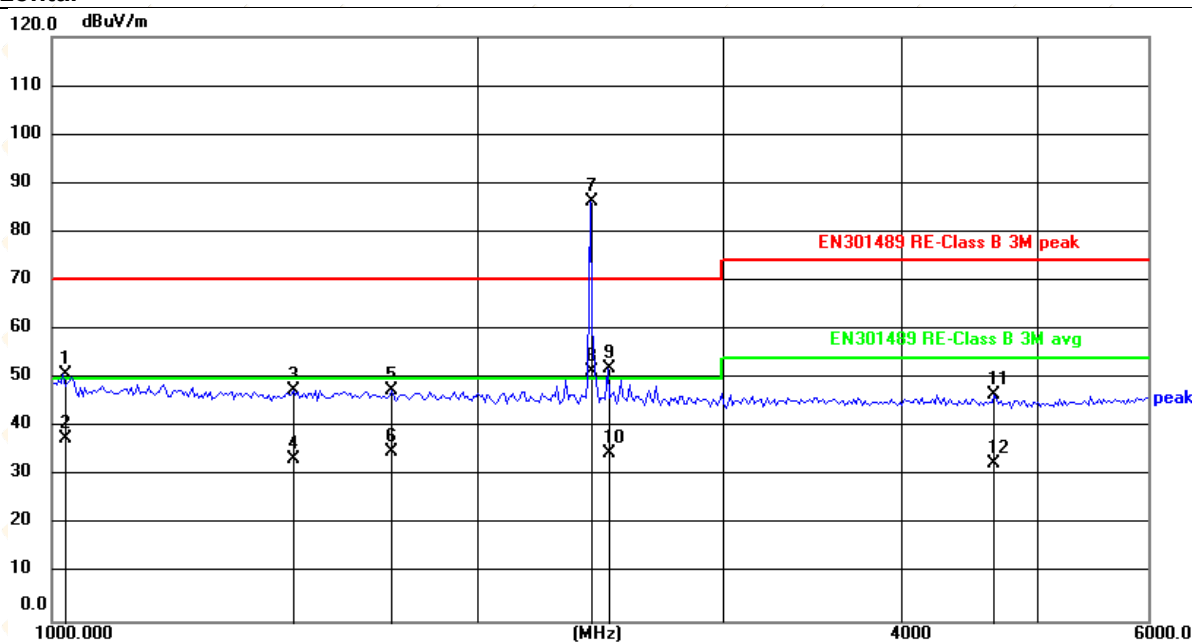
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	32.6395	27.82	-2.36	25.46	40.00	-14.54	QP
2	111.6399	29.49	-7.54	21.95	40.00	-18.05	QP
3	166.6385	37.31	-6.80	30.51	40.00	-9.49	QP
4	278.3308	43.94	-5.30	38.64	47.00	-8.36	QP
5	353.4471	47.80	-4.07	43.73	47.00	-3.27	QP
6	669.9523	41.78	1.47	43.25	47.00	-3.75	QP

Mode 1 (Normal working Mode)
Vertical



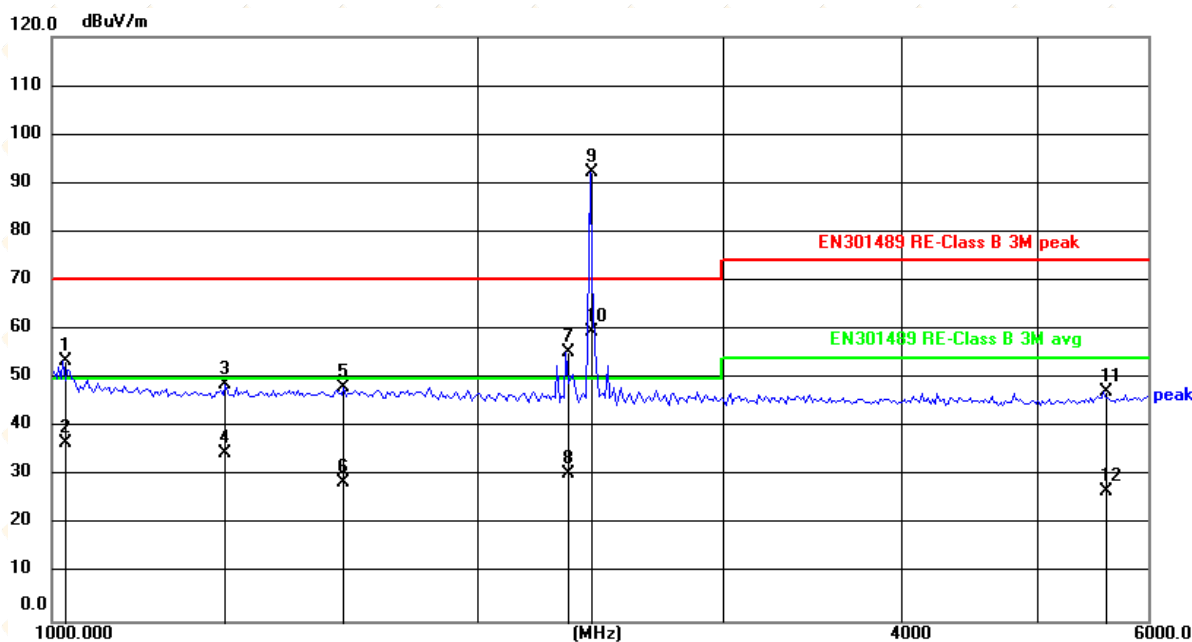
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	37.0405	37.57	-2.96	34.61	40.00	-5.39	QP
2	74.2696	39.47	-13.50	25.97	40.00	-14.03	QP
3	166.6385	39.62	-6.80	32.82	40.00	-7.18	QP
4	185.1626	28.75	-5.11	23.64	40.00	-16.36	QP
5	353.4471	44.61	-3.93	40.68	47.00	-6.32	QP
6	535.0377	42.59	-0.19	42.40	47.00	-4.60	QP

Above 1GHz
Mode 1 (Normal working Mode)
Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1018.116	49.31	1.68	50.99	70.00	-19.01	peak
2	1018.116	35.87	1.68	37.55	50.00	-12.45	AVG
3	1484.350	23.17	24.38	47.55	70.00	-22.45	peak
4	1484.350	9.13	24.38	33.51	50.00	-16.49	AVG
5	1744.658	22.75	24.93	47.68	70.00	-22.32	peak
6	1744.658	10.08	24.93	35.01	50.00	-14.99	AVG
7	2410.229	60.02	26.36	86.38	70.00	16.38	peak
8	2410.229	25.16	26.36	51.52	50.00	1.52	AVG
9	2480.468	25.57	26.47	52.04	70.00	-17.96	peak
10	2480.468	8.05	26.47	34.52	50.00	-15.48	AVG
11	4666.505	16.85	29.77	46.62	74.00	-27.38	peak
12	4666.505	2.89	29.77	32.66	54.00	-21.34	AVG

Mode 1 (Normal working Mode)
Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1018.116	51.98	1.68	53.66	70.00	-16.34	peak
2	1018.116	35.14	1.68	36.82	50.00	-13.18	AVG
3	1327.988	24.62	24.23	48.85	70.00	-21.15	peak
4	1327.988	10.32	24.23	34.55	50.00	-15.45	AVG
5	1612.141	23.49	24.54	48.03	70.00	-21.97	peak
6	1612.141	4.07	24.54	28.61	50.00	-21.39	AVG
7	2316.886	29.04	26.21	55.25	70.00	-14.75	peak
8	2316.886	4.35	26.21	30.56	50.00	-19.44	AVG
9	2410.229	66.02	26.36	92.38	70.00	22.38	peak
10	2410.229	33.28	26.36	59.64	50.00	9.64	AVG
11	5584.224	15.78	31.45	47.23	74.00	-26.77	peak
12	5584.224	-4.46	31.45	26.99	54.00	-27.01	AVG

Remark:

1. Emission Level= Read Level+ Correct Factor
2. All possible modes of operation were investigated, and testing at two nominal voltages of 230V/50Hz and 110V/60Hz, only the worst case emissions reported.

6.2.2 Conducted Emission (AC mains power ports)

Test Requirement: ETSI EN 301 489-17 V3.2.4(2020-09) Clause 7.1

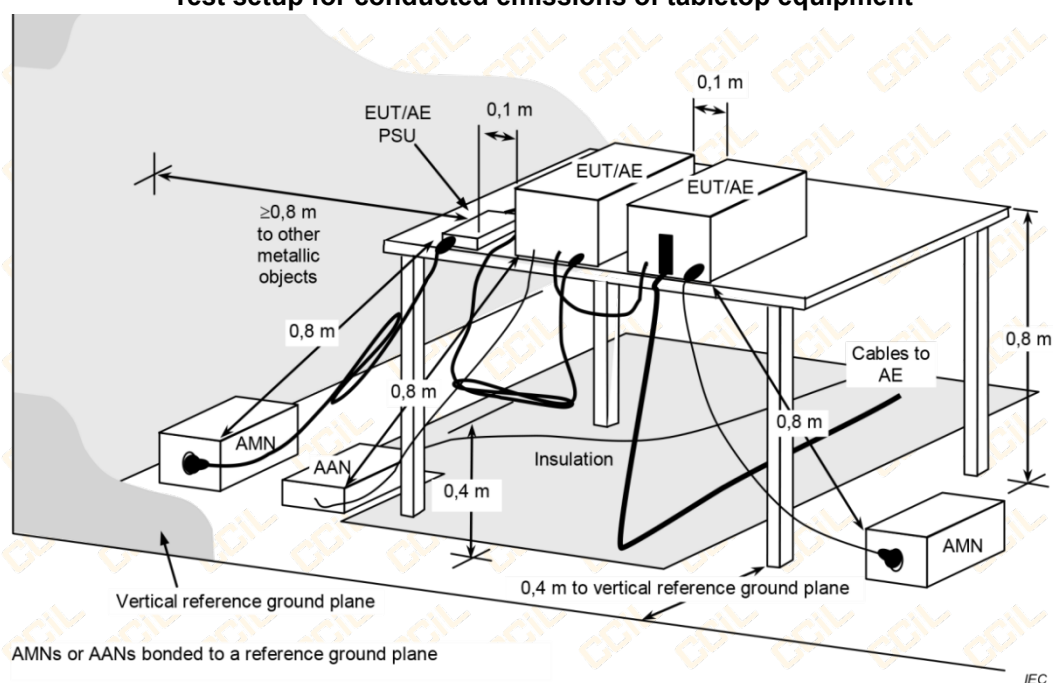
Limit:

Table A.10 – Requirements for conducted emissions from the AC mains power ports of Class B equipment

Frequency range (MHz)	Coupling device (see Table A.8)	Detector type / bandwidth	Class A limits dB(μV)
0.15 to 0.5	AMN	Quasi Peak / 9 kHz	66 to 56
0.5 to 5			56
5 to 30			60
0.15 to 0.5	AMN	Average / 9 kHz	56 to 46
0.5 to 5			46
5 to 30			50

Test Setup:

Test setup for conducted emissions of tabletop equipment



Test Procedures:

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The table top EUT was placed upon a non-metallic table 0.8 m or 0.1 m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m or 0.1 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

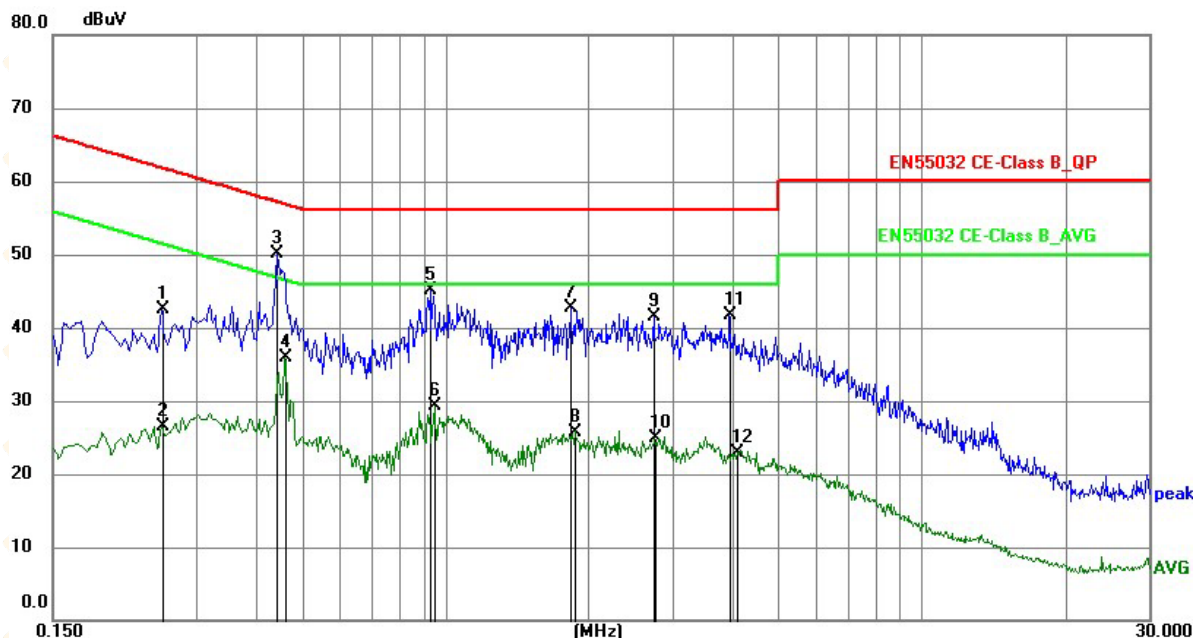
Equipment Used: Refer to section 3 for details.

Test Result: Pass

The worst measurement data as follows:

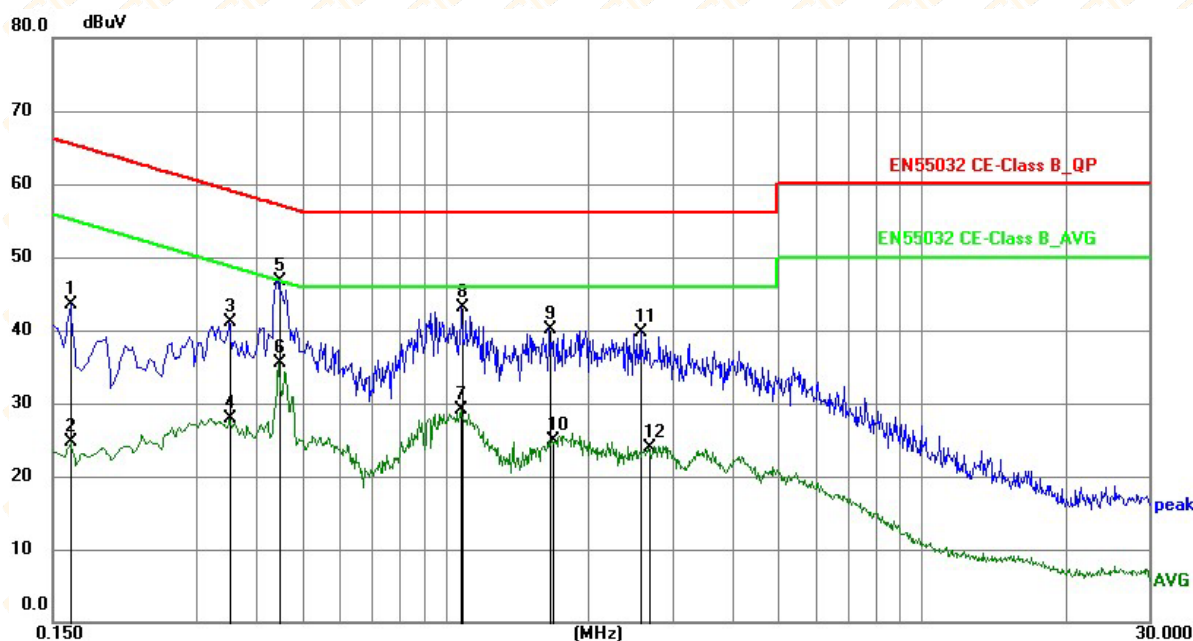
Quasi Peak and Average:

Mode 1 (Normal working Mode)
Live Line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2535	32.80	9.74	42.54	61.64	-19.10	QP	P
2	0.2535	16.86	9.74	26.60	51.64	-25.04	AVG	P
3	0.4425	40.29	9.72	50.01	57.01	-7.00	QP	P
4	0.4605	26.16	9.72	35.88	46.68	-10.80	AVG	P
5	0.9285	35.52	9.65	45.17	56.00	-10.83	QP	P
6	0.9510	19.60	9.65	29.25	46.00	-16.75	AVG	P
7	1.8375	33.09	9.71	42.80	56.00	-13.20	QP	P
8	1.8690	16.09	9.71	25.80	46.00	-20.20	AVG	P
9	2.7465	31.71	9.71	41.42	56.00	-14.58	QP	P
10	2.7600	15.23	9.72	24.95	46.00	-21.05	AVG	P
11	3.9525	32.06	9.72	41.78	56.00	-14.22	QP	P
12	4.1055	13.17	9.72	22.89	46.00	-23.11	AVG	P

Mode 1 (Normal working Mode)
Neutral Line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1635	33.70	9.81	43.51	65.28	-21.77	QP	P
2	0.1635	14.82	9.81	24.63	55.28	-30.65	AVG	P
3	0.3525	31.34	9.73	41.07	58.90	-17.83	QP	P
4	0.3525	18.12	9.73	27.85	48.90	-21.05	AVG	P
5	0.4470	37.07	9.72	46.79	56.93	-10.14	QP	P
6	0.4470	25.73	9.72	35.45	46.93	-11.48	AVG	P
7	1.0770	19.40	9.65	29.05	46.00	-16.95	AVG	P
8	1.0859	33.44	9.65	43.09	56.00	-12.91	QP	P
9	1.6620	30.45	9.70	40.15	56.00	-15.85	QP	P
10	1.6800	15.24	9.70	24.94	46.00	-21.06	AVG	P
11	2.5800	29.93	9.72	39.65	56.00	-16.35	QP	P
12	2.6700	14.26	9.72	23.98	46.00	-22.02	AVG	P

Remark:

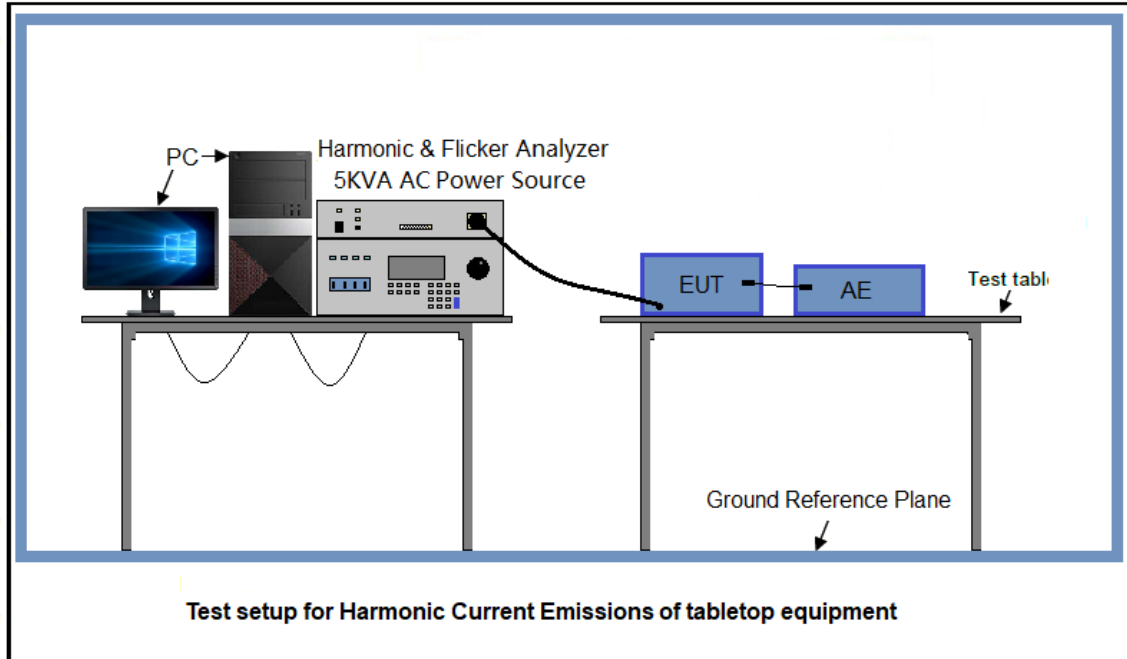
1. Emission Level= Read Level+ Correct Factor
2. All possible modes of operation were investigated, and testing at two nominal voltages of 230V/50Hz and 110V/60Hz, only the worst case emissions reported.

6.2.3 Harmonic Current Emissions *

Test Requirement: ETSI EN 301 489-17 V3.2.4(2020-09) Clause 7.1
EN 61000-3-2: 2014 Clause 6.2.3

Test Method: The appropriate requirements of EN 61000-3-2/A1 for harmonic current emission apply for equipment covered by the scope of the present document with an input current up to and including 16A per phase. For equipment with an input current of greater than 16A per phase EN 61000-3-12 applies.

Test Setup:



Equipment Used: Refer to section 3 for details.

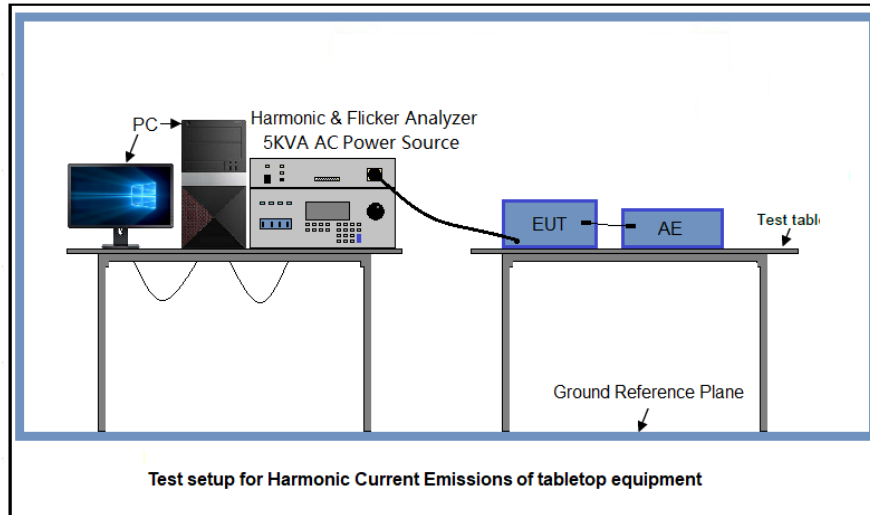
Test Result: NA

6.2.4 Voltage Fluctuations and Flicker *

Test Requirement: ETSI EN 301 489-17 V3.2.4(2020-09) Clause 7.1
EN 61000-3-3: 2013 Clause 4

Test Method: The appropriate requirements of EN 61000-3-3 for voltage fluctuations and flicker apply for equipment covered by the scope of the present document with an input current up to and including 16A per phase, if no conditional connection is needed. Where a conditional connection is required then the requirements of EN 61000-3-11 [12] shall apply.
For equipment with an input current of greater than 16A up to and including 75A per phase EN 61000-3-11 applies.

Test Setup:



Equipment Used: Refer to section 3 for details.

Test Result: NA

6.3 IMMUNITY (ENCLOSURE PORTS) *

6.3.1 RF electromagnetic field *

Test Requirement: ETSI EN 301 489-17 V3.2.4(2020-09) Clause 7.2

Test Method: The test method shall be in accordance with EN 61000-4-3

Criterion Required:

ETSI EN 301 489-17	CT & CR	performance criteria A
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Frequency range:

ETSI EN 301 489-17	80 MHz to 6 GHz
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Test Level: Level 2: 3 V/m(measured unmodulated)

Modulation: 1 kHz Sine wave, 80 % Amp. Modulation, audio signal of 400 Hz

Frequency Step: 1 % increment

Dwell time: 1 seconds

Polarity Antenna: Horizontal and vertical

Test Setup:

Test setup for Continuous RF electromagnetic field disturbances, swept test and spot test of tabletop equipment

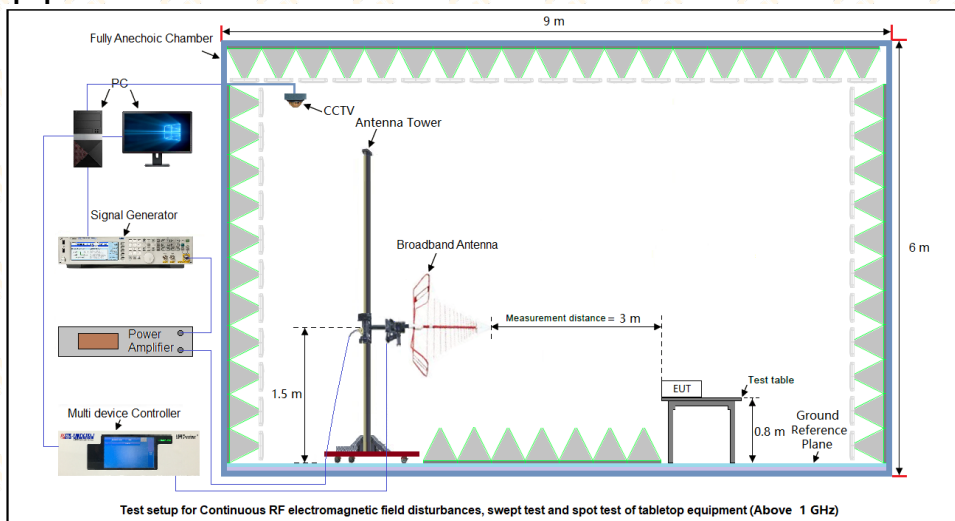


Figure 1. 30 MHz to 1 GHz

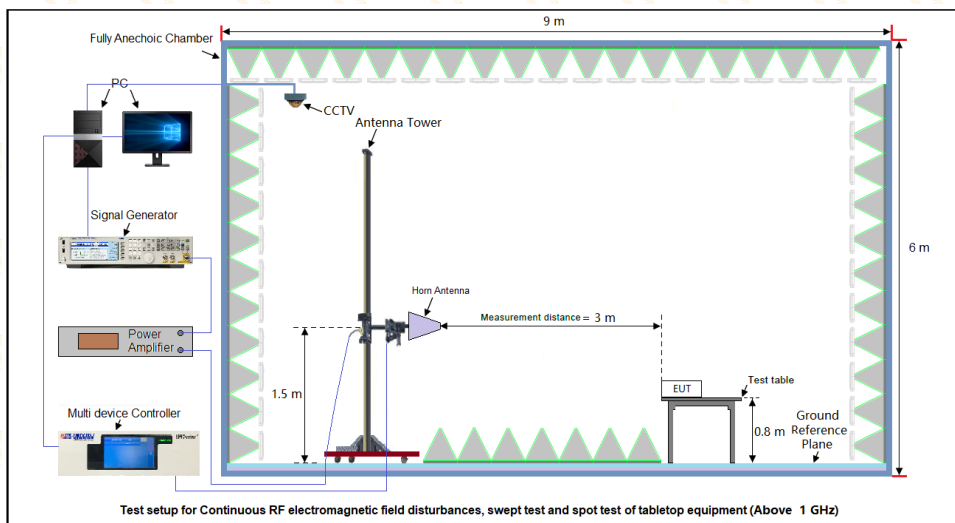
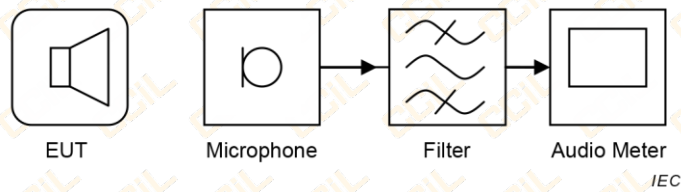


Figure 2. Above 1 GHz

Test setup for acoustic measurements



Test Procedures:

- 1) For table-top equipment, the EUT was placed in the chamber on a non-conductive table 0.8m high. For arrangement of floor-standing equipment, the EUT was mounted on a non-conductive support 0.1m above the supporting plane. For human body-mounted equipment, the EUT may be tested in the same manner as table top items.
- 2) If possible, a minimum of 1 m of cable is exposed to the electromagnetic field. Excess length of cables interconnecting units of the EUT shall be bundled low-inductively in the approximate center of the cable to form a bundle 30 cm to 40 cm in length.
- 3) The EUT was initially placed with one face coincident with the calibration plane. The EUT face being illuminated was contained within the UFA (Uniform Field Area).
- 4) The frequency ranges to be considered were swept with the signal modulated and pausing to adjust the RF signal level or to switch oscillators and antennas as necessary. Where the frequency range was swept incrementally, the step size was not exceed 10 % of the preceding frequency value.
- 5) The dwell time of the amplitude modulated carrier at each frequency was not be less than the time necessary for the EUT to be exercised and to respond, and was not less than 0.5 s.
- 6) The test normally was performed with the generating antenna facing each side of the EUT.
- 7) The polarization of the field generated by each antenna necessitates testing each selected side twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.
- 8) The EUT was performed in a configuration to actual installation conditions, a video camera and/or an audio monitor were used to monitor the performance of the EUT.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

EUT Face	Frequency	Level	Result (Pursuant to ETSI EN 301 489-17 Criterion CT & CR)
Front	80 MHz to 6 GHz	3 V/m	Complied
Back			Complied
Left			Complied
Right			Complied
Observation: No observable change.			
Conclusion: The EUT met the requirements of the standard.			

6.3.2 Electrostatic Discharge *

Test Requirement: ETSI EN 301 489-17 V3.2.4(2020-09) Clause 7.2
Test Method: The test method shall be in accordance with EN 61000-4-2

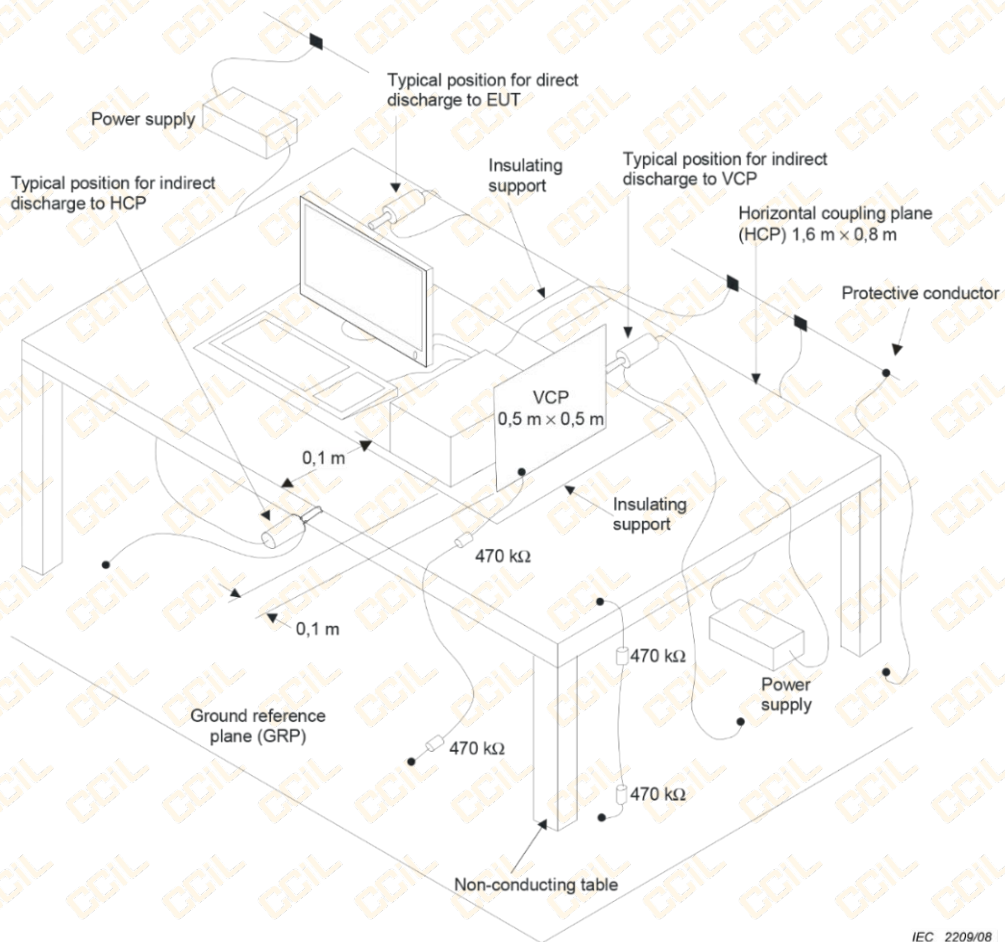
Criterion Required:

ETSI EN 301 489-17	TT & TR	performance criteria B
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Discharge Impedance: 330 Ω / 150 pF
Polarity: Positive & Negative
Number of Discharge: Minimum 10 times at each test point
Discharge Mode: Single Discharge
Discharge Period: 1 second minimum
Test Level:
 Contact discharge: Level 2, ± 4 kV
 Air discharge: Level 3, ± 8 kV

Test Setup:

Test set-up for table-top equipment



IEC 2209/08

Test Procedures:

- Electrostatic discharges shall be applied only to points and surfaces of the EUT which are expected to be touched during normal operation, including user access operations specified in the user manual, for example cleaning or adding consumables when the EUT is powered. The application of discharges to the contacts of open connectors is not required.
 When applying direct discharges to a portable or handheld battery- powered EUT with a display screen, it may not be possible to observe the screen for a given EUT orientation. If observation of the screen is

- necessary during this test, the EUT may be mounted vertically using non - metallic supports.
- 2) The EUT was put on a 0.8m high wooden table for table-top equipment or 0.1m high for floor standing equipment standing on the ground reference plane (GRP).
 - 3) A horizontal coupling plane(HCP) 1.6m by 0.8m in size was placed on the table, and the EUT with its cables were isolated from the HCP by an insulating support thick than 0.5mm. The VCP 0.5m by 0.5m in size & HCP were constructed from the same material type & think mess as that of the GRP, and connected to the GRP via a 470kΩ resistor at each end. The distance between EUT and any of the other metallic surface excepted the GRP, HCP and VCP was greater than 1m.
 - 4) During the contact discharges, the tip of the discharge electrode was touch the EUT before the discharge switch is operated. During the air discharges, the round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT.
 - 5) After each discharge, the ESD generator was removed from the EUT, the generator was then retriggered for a new single discharge. For ungrounded product, a discharge cable with two resistances was used after each discharge to remove remnant electrostatic voltage. 10 times of each polarity single discharge were applied to HCP and VCP.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

Discharge Type	Applied Voltage	Pulse No.	Result (Pursuant to ETSI EN 301 489-17 Criterion TT & TR)	
			☑ Complied	☐ N/A
Contact Discharge	± 2 kV, ± 4 kV	10 for every level	☑ Complied	☐ N/A
Air Discharge	± 2 kV, ± 4 kV, ± 8 kV	10 for every level	☑ Complied	☐ N/A
Indirect HCP Discharge	± 4 kV	10 for every level	☑ Complied	☐ N/A
Indirect VCP Discharge	± 4 kV	10 for every level	☑ Complied	☐ N/A
Remark: N/A: Not applicable Observation: ☑ No observable change. ☐ During the experiment, the following phenomena occurred: 				
Conclusion: The EUT met the requirements of the standard.				

6.4 IMMUNITY (AC MAINS POWER PORTS) *

6.4.1 Electrical fast transients/burst *

Test Requirement: ETSI EN 301 489-17 V3.2.4(2020-09) Clause 7.2

Test Method: The test method shall be in accordance with EN 61000-4-4

Criterion Required:

ETSI EN 301 489-17	TT & TR	performance criteria B
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Test Port : AC mains power port

Polarity: Positive & Negative

Test Level and Repetition Frequency:

- The test level for AC mains power input ports shall be 1 kV (Test Level: 2) open circuit voltage at a repetition rate of 5 kHz as given EN 61000-4-4.

Impulse Wave shape: 5/50 ns

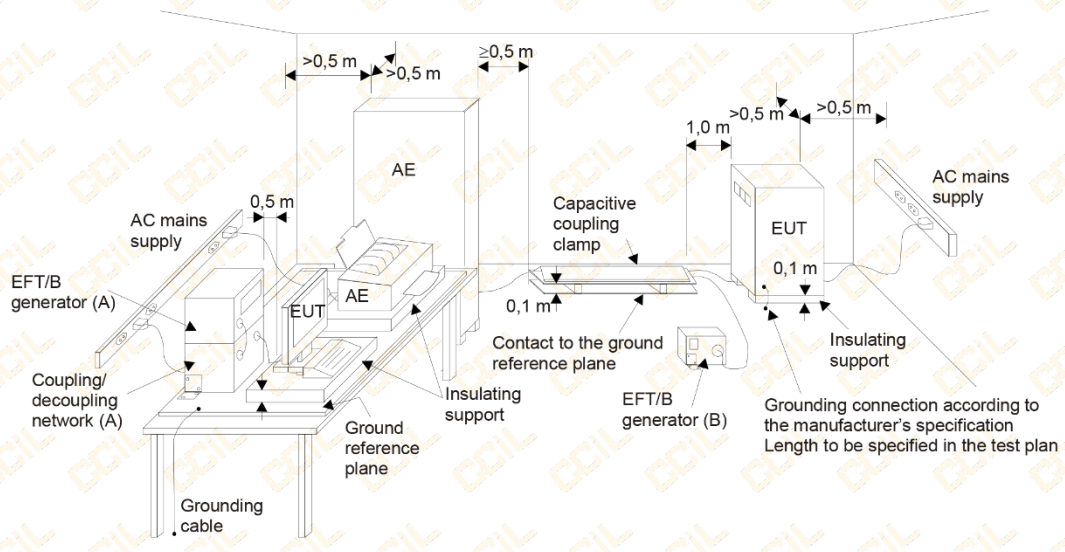
Burst Duration: 15ms

Burst Period: 300ms

Test Duration: 2 minute per level & polarity

Test Setup:

Test set-up for table-top equipment



IEC 645/12

(A) location for supply line coupling

(B) location for signal lines coupling

Test Procedures:

- 1) The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0.1m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
- 2) The GRP shall project beyond the EUT and the clamp by at least 0.1m on all sides. The distance between the EUT and any other of the metallic surface except the GRP was greater than 0.5m. All cables to the EUT was placed on the insulation support 0.1m above GRP. A cable not subject to EFT was routed as far as possible from cable under test to minimize the coupling between the cables.
- 3) The length of signal and power cable between the EUT and EFT generator was 0.5m. If the cable is a non-detachable supply cable more than 0.5m, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0.1m above the GRP.
- 4) The EUT was conducted the below specified test voltages for line and neutral or line, neutral and earth simultaneously (for Wired network, single, control and DC port line with capacitive coupling clamp), 120 seconds duration. If the equipment contains identical ports, only one was tested; multicomputer cables, such as a 50-pair Wired network cable, were tested as a single cable. Cables did not be split or divided into groups of conductors for this test; interface ports, which were intended by the manufacturer to be connected to data cables not longer than 3 m, did not be tested.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

Test Ports	Test Level	Result (Pursuant to ETSI EN 301 489-17 Criterion TT & TR)
AC mains power ports	$\pm 0.5 \text{ kV}, \pm 1.0 \text{ kV}$	Complied
Observation: ☒ No observable change. ☐ During the experiment, the following phenomena occurred: 		
Conclusion: The EUT met the requirements of the standard.		

6.4.2 Continuous induced RF disturbances *

Test Requirement: ETSI EN 301 489-17 V3.2.4(2020-09) Clause 7.2
Test Method: The test method shall be in accordance with EN 61000-4-6
Criterion Required:

ETSI EN 301 489-17	CT & CR	performance criteria A
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Test Level:

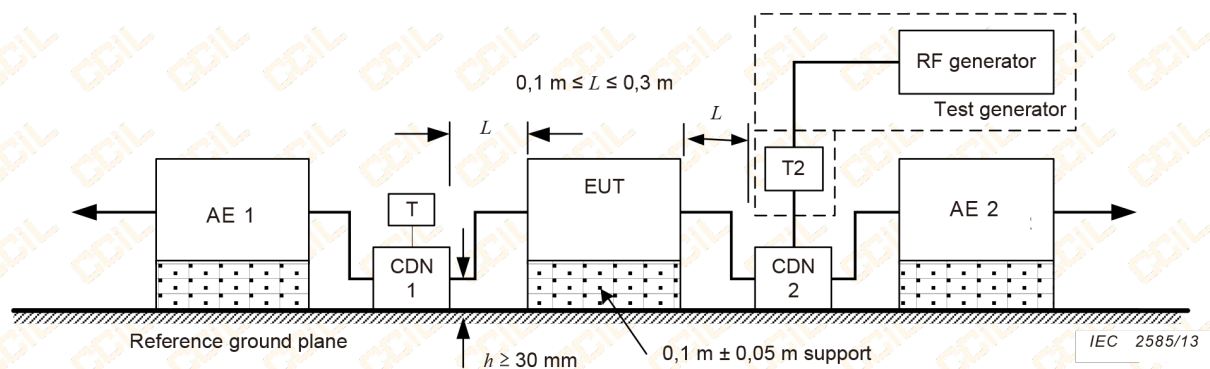
ETSI EN 301 489-1	0.15 MHz to 80 MHz: 3 V (r.m.s)
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Modulation: 80%, 1kHz Amplitude Modulation

Step Size: 1% increment

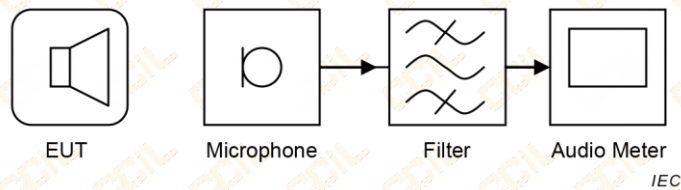
Dwell Time: 1s

Test Setup:



Schematic setup for immunity test used for CDN

Test setup for acoustic measurements



Test Procedures:

- 1) The Product and support units were located at a ground reference plane with the interposition of a 0.1 m thickness insulating support and the CDN was located on GRP directly.
- 2) The frequency range is swept from 150 kHz to 80MHz, with the signal 80% amplitude modulated with a 1 kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- 1) The dwell time at each frequency shall be not less than the time necessary for the Product to be able to respond.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

Test Ports	Frequency	Test Level	Result (Pursuant to ETSI EN 301 489-17 Criterion CT & CR)
AC mains power ports	0.15 MHz to 80 MHz	3 V	Complied
Observation: No observable change.			
Conclusion: The EUT met the requirements of the standard.			

6.4.3 Voltage dips and Voltage interruptions *

Test Requirement: ETSI EN 301 489-17 V3.2.4(2020-09) Clause 7.2
Test Method: The test method shall be in accordance with EN 61000-4-11
Criterion Required:

ETSI EN 301 489-17	Voltage dips	TT & TR	performance criteria B
	interruptions		performance criteria C

Test Port : AC mains power port

Test Level:

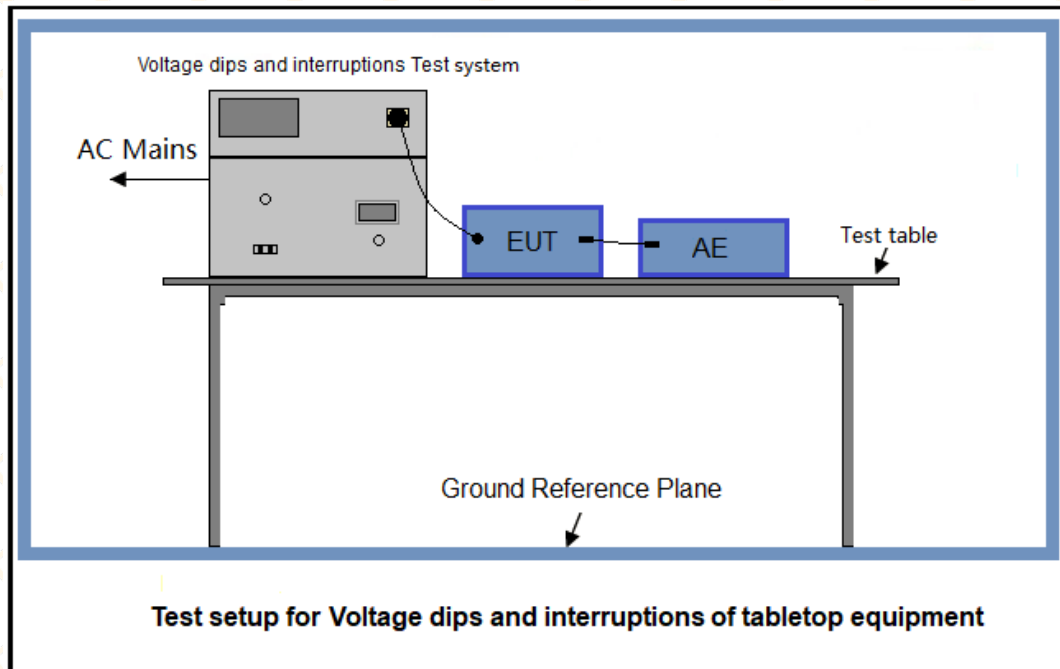
ETSI EN 301 489-1	Voltage dip: 0 % residual voltage for 0,5 cycle; Voltage dip: 0 % residual voltage for 1 cycle; Voltage dip: 70 % residual voltage for 25 cycles (at 50 Hz); Voltage interruption: 0 % residual voltage for 250 cycles (at 50 Hz).
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No. of Dips / Interruptions: 3 per Level

Interval between Event: Minimum 10 seconds

Phase Angle: 0°/45°/90°/135°/180°/225°/270°/315°

Test Setup:



Test Procedures:

- 1) The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0.1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
- 2) The test was performed with the EUT connected to the test generator with the shortest power supply cable as specified by the EUT manufacturer.
- 3) The EUT was tested for each selected combination of test level and duration with a sequence of three dips /interruptions with intervals of 10 s minimum. Each representative mode of operation was tested.
- 4) For EUT with more than one power cord, each power cord was tested individually.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

Test Condition		Result (Pursuant to ETSI EN 301 489-17 Criterion TT & TR)
Test Level in %UT	Duration(s)	
0	0.5	Complied
0	1.0	Complied
70	25	Complied
0	250	Complied (see phenomena)
Observation: ☐ No observable change. ☒ During the experiment, the following phenomena occurred: <u>EUT / The charger unit turned off at 0%UT test level with 250 cycles (at 50Hz) duration and it could resume to normal after the test.</u>		
Conclusion: The EUT met the requirements of the standard.		

6.4.4 Surges *

Test Requirement:

ETSI EN 301 489-17 V3.2.4(2020-09) Clause 7.2

Test Method:

The test method shall be in accordance with EN 61000-4-5

Criterion Required:

ETSI EN 301 489-17	TT & TR	performance criteria B
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Wave Shape:

ETSI EN 301 489-1	For AC mains power port: 1.2/50 μ s
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Test Level:

ETSI EN 301 489-1	For AC mains power port: mains power input ports shall be 2 kV line to ground, and 1 kV line to line
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Polarity:

Positive & Negative

Interval:

60s between each surge

No. of Surges:

ETSI EN 301 489-1	5 positive, 5 negative at 0°, 90°, 180°, 270°.
-------------------	--

Test Setup:

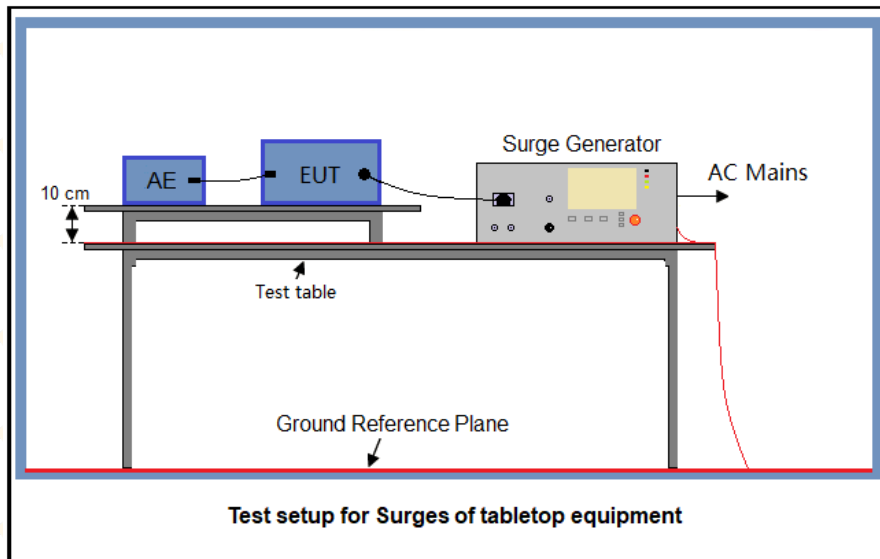


Figure 1. For AC port

Test Procedures:

Test Procedure:

- 1) The EUT was placed on a ground reference plane (GRP) insulated by an insulating support 0.1 m thick and the GRP was placed on a 0.8m high wooden table for table-top equipment. For floor standing equipment, the EUT was placed on a 0.1m high wooden support above the GRP.
- 2) The 1.2/50 μ s surge was to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks were 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 so that the specified wave may be applied on the lines under test.
- 3) The power cord between the EUT and the coupling/decoupling network was not exceed 2 m in length. The interconnection line between the EUT and the coupling/ decoupling network shall not exceed 2 m in length.
- 4) The EUT was conducted 0.5 kV and 1 kV test voltage for line to line and line to neutral and conducted 0.5 kV, 1 kV and 2 kV test voltage for line to earth and neutral to earth, five positive pulses and five negative pulses each at 90°, 270° for a.c. power ports and five positive pulses and five negative surge pulses for d.c. power ports, The test levels were applied on the EUT with a 2 Ω generator source impedance for power supply terminals and 12 Ω output impedance for interconnection lines. The tests were done at repetition rate one per minute.

Equipment Used:

Refer to section 3 for details.

Test Result:

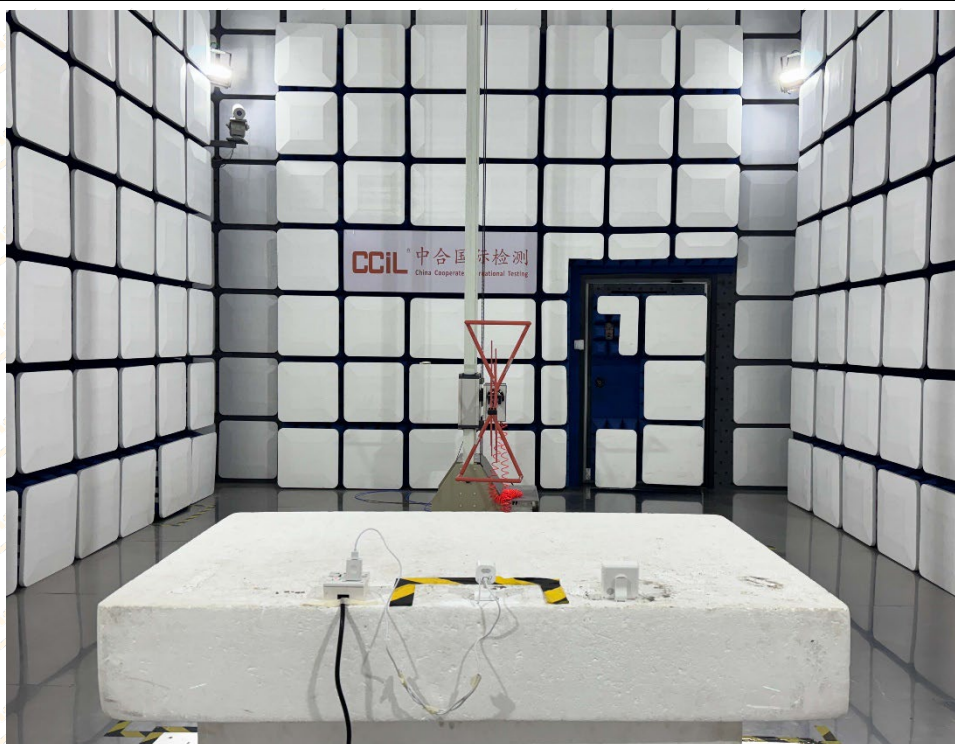
Pass

QF-7.8-E14 V1.0

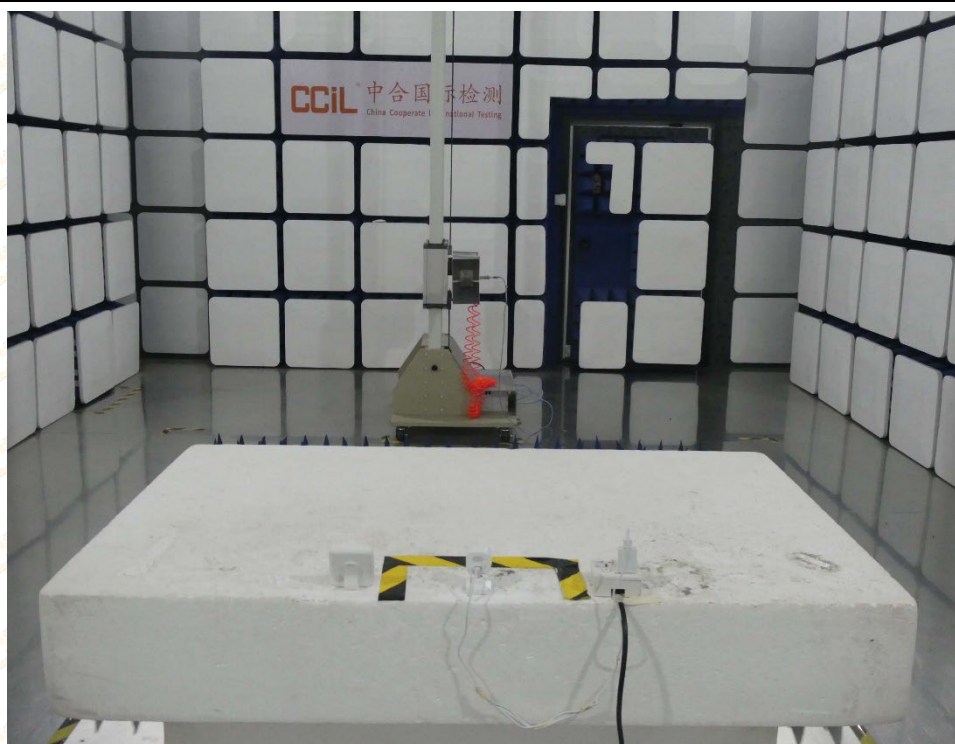
For AC mains power port			
Test Ports	Level	Result	
		(Pursuant to ETSI EN 301 489-17 Criterion TT & TR)	
Between Phase And Neutral	± 1.0 kV	☒ Complied	☐ N/A
Between Phase And Earth	± 2.0 kV	☐ Complied	☒ N/A
Between Phase And Earth	± 2.0 kV	☐ Complied	☒ N/A
Remark: N/A: Not applicable			
Observation: ☒ No observable change. ☐ During the experiment, the following phenomena occurred:			
Conclusion: The EUT met the requirements of the standard.			

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Radiated emission Test Setup (30MHz~1GHz)



Radiated emission Test Setup (Above 1GHz)



Conducted Emission (AC port) Test Setup



ESD Test Setup

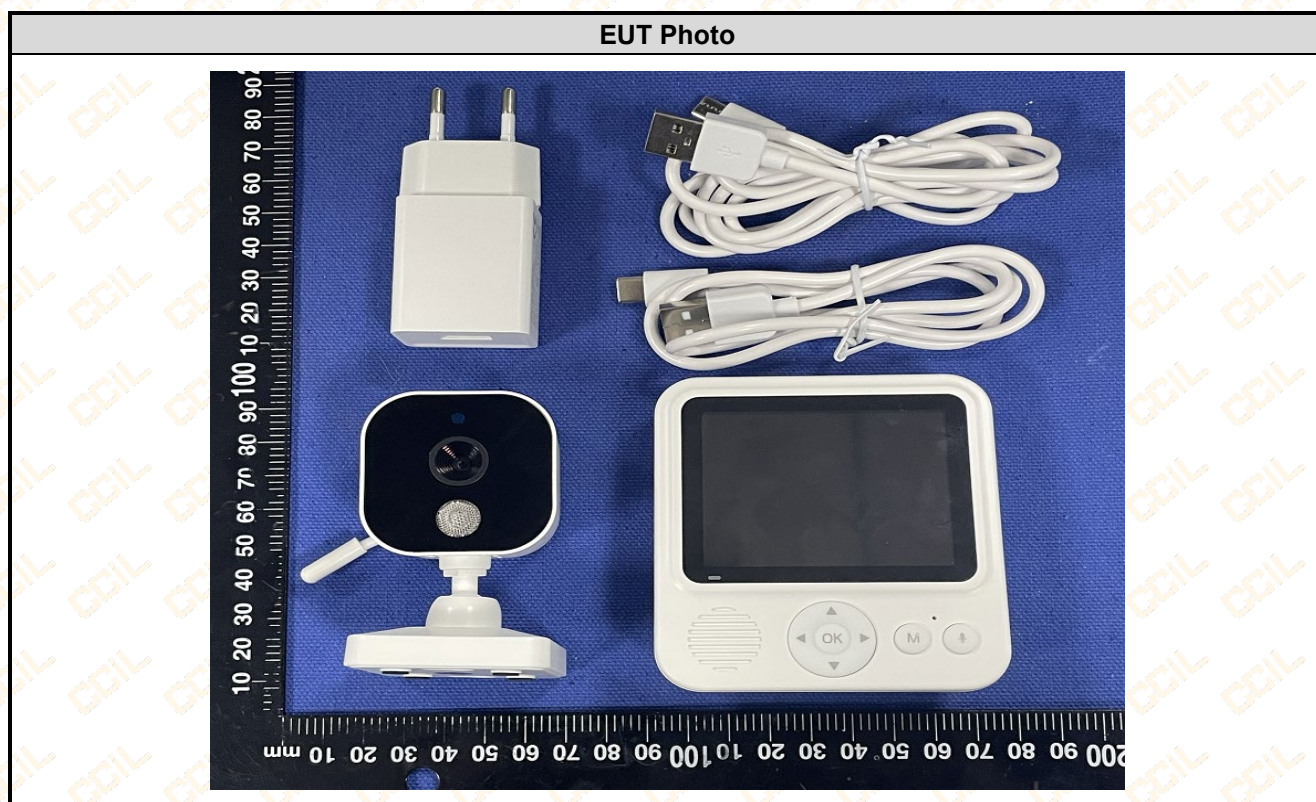


Surges/ EFT/ Dips Test Setup



APPENDIX 2 PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

EUT EXTERNAL PHOTOS



EUT Photo

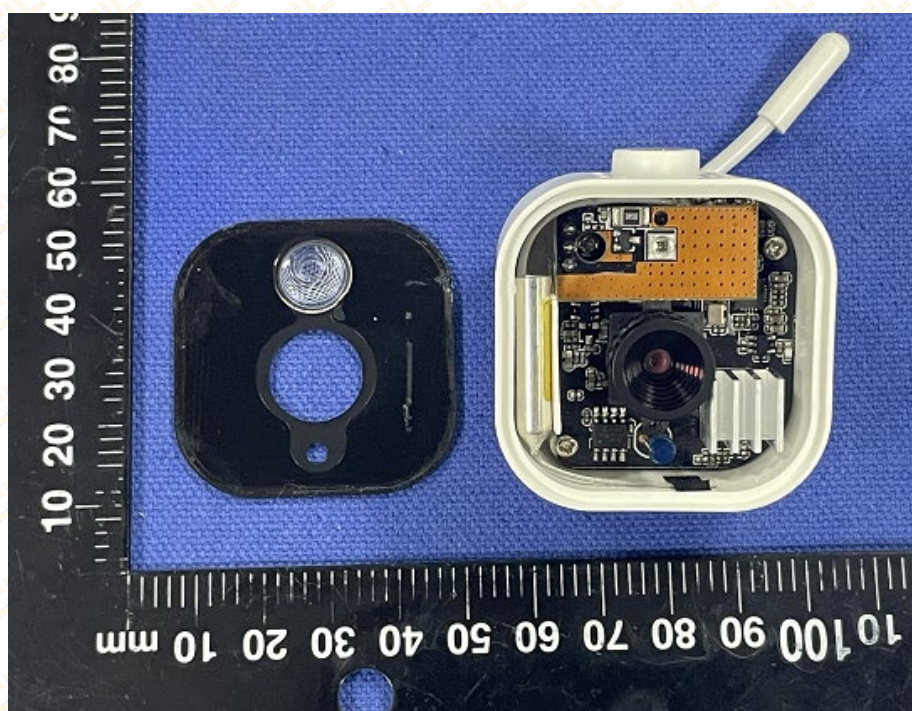


EUT Photo

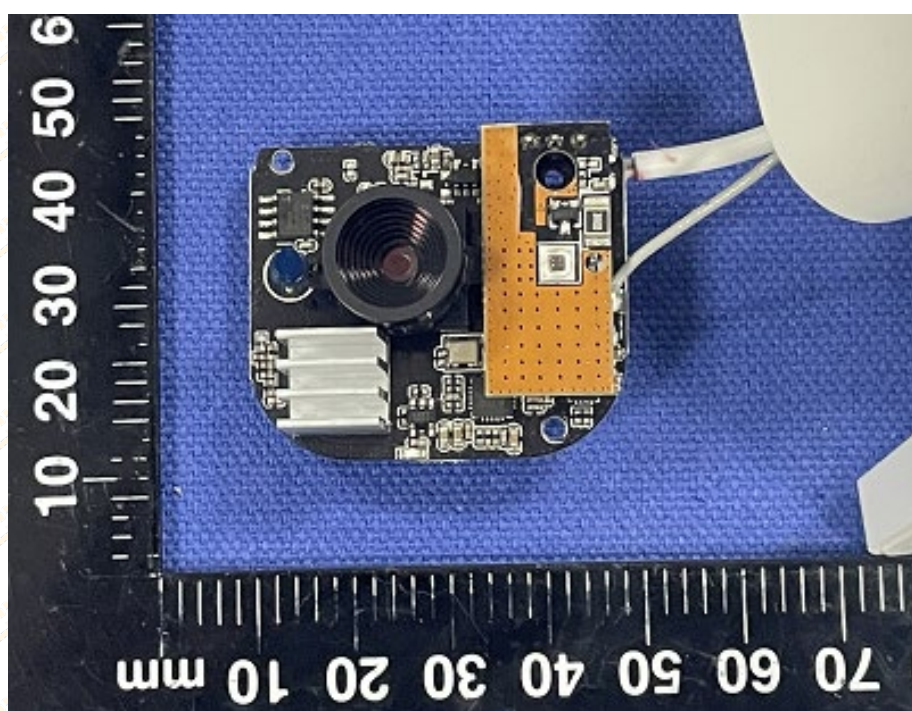


EUT INTERNAL PHOTOS

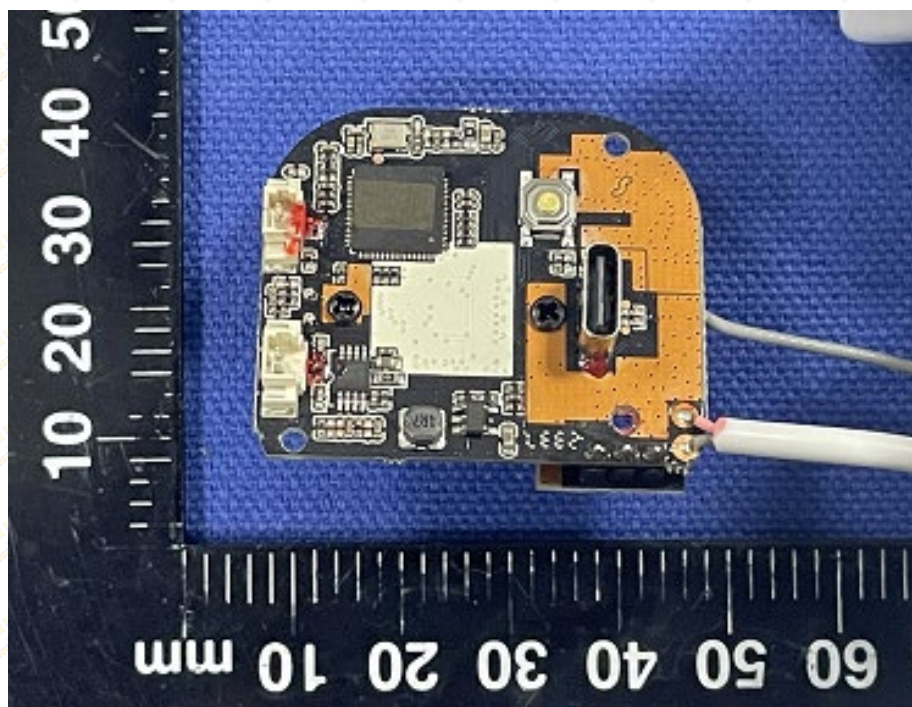
EUT Photo



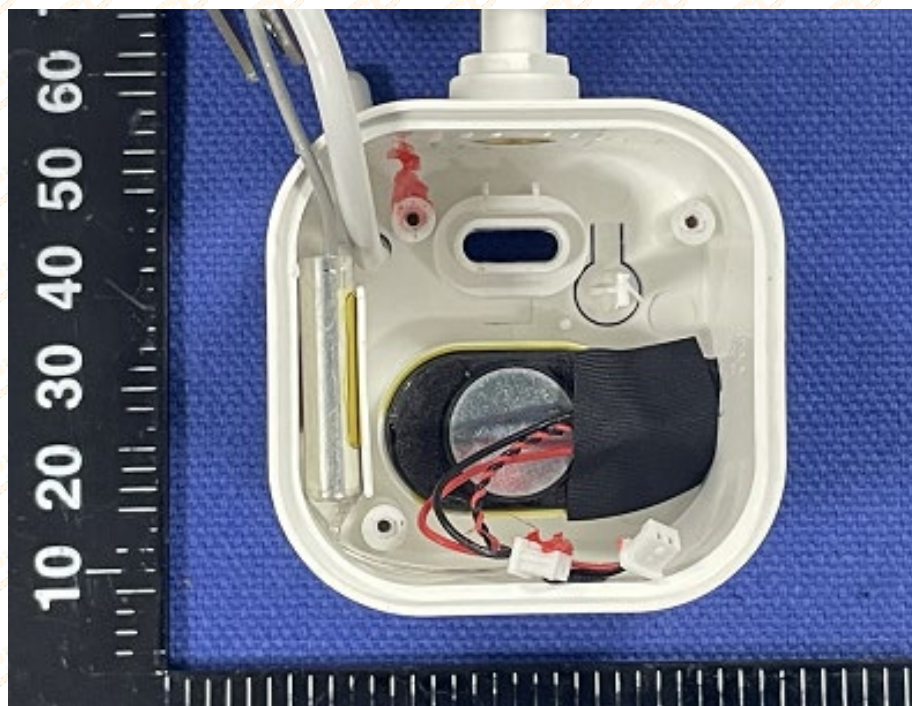
EUT Photo



EUT Photo



EUT Photo



*** End of Report ***

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