



中国认可
国际互认
检测
TESTING
CNAS L4062



TEST REPORT

Reference No..... : WTF22X12246930R1W004
Manufacturer : Mid Ocean Brands B.V.
Address : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Factory : 118102
Product Name : Wireless multi speaker
Model No..... : MO6887
Standards : EN 55032:2015+A1:2020; EN 55035:2017+A11:2020
EN IEC 61000-3-2:2019+A1:2021; EN 61000-3-3:2013+A2:2021
ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-3 V2.1.1 (2019-03)
Draft ETSI EN 301 489-17 V3.2.5 (2022-08)
Date of Receipt sample : 2023-11-06
Date of Test..... : 2023-11-06 to 2023-11-17
Date of Issue : 2023-11-17
Test Report Form No. : WTX_ETSIEN301489_1_2019W
Test Result..... : Pass

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road,
Block 70 Bao'an District, Shenzhen, Guangdong, China

Tel.: +86-755-33663308 Fax.: +86-755-33663309 Email: sem@waltek.com.cn

Tested by:

Dashan Chen

Dashan Chen

Approved by:

Silin Chen

Silin Chen



TABLE OF CONTENTS

1. GENERAL INFORMATION	5
1.2 TEST STANDARDS	7
1.3 TEST METHODOLOGY	7
1.4 TEST FACILITY	8
1.5 EUT SETUP AND OPERATION MODE	9
1.6 PERFORMANCE CRITERIA FOR EMS	10
1.7 MEASUREMENT UNCERTAINTY	13
1.8 TEST EQUIPMENT LIST AND DETAILS	14
2. SUMMARY OF TEST RESULTS	17
3. CONDUCTED EMISSIONS	18
3.1 TEST PROCEDURE	18
3.2 BASIC TEST SETUP BLOCK DIAGRAM	18
3.3 ENVIRONMENTAL CONDITIONS	18
3.4 CONDUCTED EMISSIONS TEST DATA	18
4. RADIATED EMISSIONS	25
4.1 TEST PROCEDURE	25
4.2 CORRECTED AMPLITUDE & MARGIN CALCULATION	25
4.3 ENVIRONMENTAL CONDITIONS	26
4.4 SUMMARY OF TEST RESULTS/PLOTS	26
5. HARMONIC CURRENT EMISSIONS	32
5.1 TEST PROCEDURE	错误!未定义书签。
5.2 TEST SETUP BLOCK DIAGRAM	32
5.3 TEST STANDARDS	32
5.4 ENVIRONMENTAL CONDITIONS	32
5.5 HARMONIC CURRENT EMISSIONS TEST DATA	32
6. VOLTAGE FLUCTUATION AND FLICKER	38
6.1 TEST PROCEDURE	错误!未定义书签。
6.2 TEST SETUP BLOCK DIAGRAM	38
6.3 TEST STANDARDS	38
6.4 ENVIRONMENTAL CONDITIONS	38
6.5 VOLTAGE FLUCTUATION AND FLICKER TEST DATA	38
7. ELECTROSTATIC DISCHARGE (ESD)	40
7.1 TEST PROCEDURE	错误!未定义书签。
7.2 TEST SETUP BLOCK DIAGRAM	40
7.3 TEST PERFORMANCE	40
7.4 ENVIRONMENTAL CONDITIONS	40
7.5 ELECTROSTATIC DISCHARGE IMMUNITY TEST DATA	40
8. RADIO FREQUENCY ELECTROMAGNETIC FIELD (R/S)	42
8.1 TEST PROCEDURE	错误!未定义书签。
8.2 TEST SETUP BLOCK DIAGRAM	42
8.3 TEST PERFORMANCE	42
8.4 ENVIRONMENTAL CONDITIONS	42
8.5 CONTINUOUS RADIATED DISTURBANCES TEST DATA	42
9. FAST TRANSIENTS, COMMON MODE (EFT)	44
9.1 TEST PROCEDURE	错误!未定义书签。
9.2 TEST SETUP BLOCK DIAGRAM	44
9.3 TEST PERFORMANCE	44
9.4 ENVIRONMENTAL CONDITIONS	44
9.5 ELECTRICAL FAST TRANSIENTS TEST DATA	44
10. SURGES	46
10.1 TEST PROCEDURE	错误!未定义书签。
10.2 TEST SETUP BLOCK DIAGRAM	46



Reference No.: WTF22X12246930R1W004

10.3 TEST PERFORMANCE	46
10.4 ENVIRONMENTAL CONDITIONS.....	46
10.5 SURGE TEST DATA.....	46
11. RADIO FREQUENCY, COMMON MODE (C/S)	48
11.1 TEST PROCEDURE	错误!未定义书签。
11.2 TEST SETUP BLOCK DIAGRAM.....	48
11.3 TEST PERFORMANCE	48
11.4 ENVIRONMENTAL CONDITIONS.....	48
11.5 CONTINUOUS CONDUCTED DISTURBANCES TEST DATA	48
12. VOLTAGE DIPS AND INTERRUPTIONS.....	50
12.1 TEST PROCEDURE	错误!未定义书签。
12.2 TEST SETUP BLOCK DIAGRAM.....	50
12.3 TEST PERFORMANCE	50
12.4 ENVIRONMENTAL CONDITIONS.....	50
12.5 VOLTAGE DIPS AND INTERRUPTIONS TEST DATA	50
EXHIBIT 1 - EUT PHOTOGRAPHS.....	51
EXHIBIT 2 - TEST SETUP PHOTOGRAPHS.....	52

WALTEK



Report version

Version No.	Date of issue	Description
Rev.00	2023-11-17	Original
/	/	/

WALTEK



1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	Wireless multi speaker
Trade Name:	/
Model No.:	MO6887
Adding Model(s):	/
Rated Voltage:	Battery DC 3.7V
Battery Capacity:	4000mAh
Adapter Model:	/
Software Version:	V1.0
Hardware Version:	V1.2
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

WALTEK



Technical Characteristics of EUT	
Bluetooth	
Bluetooth Version:	Bluetooth V5.1(EDR Mode)
Frequency Range:	2402-2480MHz
Max.RF Output Power:	0.93dBm (EIRP)
Type of Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Data Rate:	1Mbps, 2Mbps, 3Mbps
Quantity of Channels	79
Channel Separation:	1MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	-0.58dBi
EN 303417	
Frequency Range:	100-205kHz
Radiated H-Field:	39.21dBuA/m(@3m)
Type of Antenna:	Coil Antenna
Note: The Antenna Gain is provided by the customer and can affect the validity of results.	

WALTEK



1.2 Test Standards

The tests were performed according to following standards:

EN 55032:2015+A1:2020: Electromagnetic compatibility of multimedia equipment - Emission requirements

EN 55035:2017+A11:2020: Electromagnetic compatibility of multimedia equipment - Immunity requirements.

EN IEC 61000-3-2:2019+A1:2021: Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase).

EN 61000-3-3:2013+A2:2021: 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.

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 for Electromagnetic Compatibility.

ETSI EN 301 489-3 V2.1.1 (2019-03): Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU.

Draft ETSI EN 301 489-17 V3.2.5 (2022-08): ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with the standard ETSI EN 301489-1, Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.



1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

WALTEK



1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission/immunity level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Charging; AUX IN; Wireless Output 5W	(Connect to the Adapter; AC230V 50Hz for adapter)
TM2	Charging; Connect BT; Wireless Output 10W	(Connect to the Adapter; AC230V 50Hz for adapter)
TM3	Charging; USB; Wireless Output 10W	(Connect to the Adapter; AC230V 50Hz for adapter)
TM4	Wireless Charging	TR, CR, TT, CT for EMS testing (Wireless Output 5W)
TM5	Wireless Charging	TR, CR, TT, CT for EMS testing (Wireless Output 10W)
TM6	Wireless Charging	TT, CT for EMS testing
TM7	Bluetooth	TR, CR, TT, CT for EMS testing
Note: Activate simultaneous transmission in all possible configurations during the testing, and the report only shows the worse case data.		

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	1.03	Unshielded	Without Ferrite

Auxiliary Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
AUX IN Cable	1.00	Unshielded	Without Ferrite

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
wireless charging tester	YBZ	YBZ wireless charging tester	/
Adapter	Xiaomi	MDY-08-ES	/



1.6 Performance Criteria for EMS

➤ EN 301 489-3, The performance criteria are:

In the table below:

- performance criterion A applies for immunity tests with phenomena of a continuous nature;
- performance criterion B applies for immunity tests with phenomena of a transient nature.

NOTE: Whether a phenomenon is considered transient, continuous or otherwise is indicated in the test procedures for the phenomenon in ETSI EN 301 489-1 [1], clause 9.

Table 2: Performance Requirements

Criterion	During test	After test
A	Operate as intended No loss of function No unintentional responses	Operate as intended No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May show loss of function No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions

Where "operate as intended" or "no loss of function" is specified, the EUT shall demonstrate correct functioning as described in ETSI EN 301 489-3 [1], clause 5.

Where the EUT has more than one mode of operation (see clause 4.4.1), an unplanned transition from one mode to another is considered as an unintentional response. The EUT shall be tested in sufficient modes to confirm there are no such unintentional responses.



➤ **EN 301 489-17, The performance criteria are:**

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

Table 1: Performance criteria

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
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.



➤ **EN 55035, The performance criteria are:**

A. The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacturer as a permissible loss of performance.

B. The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.

C. Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.

➤ **Monitoring EUT in Immunity Test:**

Monitoring for Continuous Phenomena Applied to EUT

Wi-Fi

The communication link should be maintained and there should be no loss of data packets during the test.

In addition to confirming the above performance during a communication, the test is also been performed in idle mode, with an interference receiver to monitor if the transmitter unintentionally operates.

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.



1.7 Measurement Uncertainty

Measurement uncertainty	
Parameter	Uncertainty
Uncertainty for Radiated Emission in 3m chamber	@30-200MHz $\pm 4.52\text{dB}$ @0.2-1GHz $\pm 5.56\text{dB}$ @1-6GHz $\pm 3.84\text{dB}$ @6-18GHz $\pm 3.92\text{dB}$
Uncertainty for Conducted Emission	@9-150kHz $\pm 3.74\text{dB}$ @0.15-30MHz $\pm 3.34\text{dB}$
Uncertainty for Harmonic test	3.26%
Uncertainty for Flicker test	4.76%
Uncertainty for RS test	21%, k=2
Uncertainty for CS test	29%, k=2
Uncertainty for ESD test	The immunity measurement system uncertainty is within standard requirement and is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.
Uncertainty for EFT test	
Uncertainty for Surges test	
Uncertainty for Voltage Dips, Voltage Variations and Short Interruptions Test	
Uncertainty for PFMF test	



1.8 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
☐ Chamber A: Below 1GHz					
Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2023-02-25	2024-02-24
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-02-25	2024-02-24
Amplifier	HP	8447F	2805A03475	2023-02-25	2024-02-24
Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
Trilog Broadband Antenna	Schwarz beck	VULB9163	9163-333	2023-03-20	2026-03-19
☐ Chamber A: Above 1GHz					
Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2023-02-25	2024-02-24
Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2023-02-25	2024-02-24
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-02-25	2024-02-24
Amplifier	C&D	PAP-1G18	14918	2023-02-25	2024-02-24
Horn Antenna	ETS	3117	00086197	2021-03-19	2024-03-18
DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18
Pre-amplifier	Schwarz beck	BBV 9721	9721-031	2023-02-25	2024-02-24
☐ Chamber B: Below 1GHz					
Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2024-04-08
Amplifier	Agilent	8447D	2944A10457	2023-02-25	2024-02-24
EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2023-02-25	2024-02-24
☒ Chamber C: Below 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2024-05-27
Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
Amplifier	HP	8447F	2944A03869	2023-02-25	2024-02-24
☒ Chamber C: Above 1GHz					
EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
Horn Antenna	POAM	RTF-118A	1820	2023-03-10	2026-03-09
Amplifier	Tonscend	TAP01018050	AP22E806235	2023-02-25	2024-02-24
DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18
Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2023-02-25	2024-02-24
☐ Conducted Room 1#					
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2023-02-25	2024-02-24
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2023-02-25	2024-02-24
AC LISN	Schwarz beck	NSLK8126	8126-279	2023-02-25	2024-02-24
8-WIRE LISN	Schwarz beck	8158	CAT3-8158-0059	2023-02-25	2024-02-24



8-WIRE LISN	Schwarz beck	8158	CAT5-8158-0117	2023-02-25	2024-02-24
☒ Conducted Room 2#					
EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2023-02-25	2024-02-24
LISN	Rohde & Schwarz	ENV 216	100097	2023-02-25	2024-02-24
EMF					
VDH Test Head	AFJ	VDH 30	SC022Z	2023-02-25	2024-02-24
3 Loop Antenna					
Loop Antenna	ZHINAN	ZN30401	19037	2023-02-25	2025-02-24
Clamp					
Clamp	Luthi	MDS21	3809	2023-02-27	2024-02-26
PFMF					
PMF Generator	LIONCEL	PMF-801C-C	0171101	2023-02-25	2024-02-24
PMF Antenna	LIONCEL	PMF-801C-A	0180302	2023-02-25	2024-02-24
Instantaneous PMF Generator Module	LIONCEL	PMF-801C-T	0171001	2023-02-25	2024-02-24
H/F					
Digital Power Analyzer	California Instrument	CTS	72831	2023-02-25	2024-02-24
Power Source	California Instrument	5001IX-CTS-400	60077	2023-02-25	2024-02-24
ESD					
ESD Generator	LIONCEL	ESD-203B	0170901	2023-03-14	2024-03-13
EFT/SURGE/DIPS					
Transient 2000	EMC PARTNER	TRA2000	836	2023-02-25	2024-02-24
Couple Clamp	EMC PARTNER	CN-EFT1000	513	2023-02-25	2024-02-24
CS					
CONDUCTED IMMUNITY TEST SYSTEM	FRANKONIA	CIT-10/75	126B1247/2013	2023-02-25	2024-02-24
Attenuator	EMTEST	MA-5100/6BF2	1009	2023-02-25	2024-02-24
CDN	Luthi	L-801M2/M3	2665	2023-02-25	2024-02-24
CDN	LIONCEL	CDN-T8	0210401	2023-02-25	2024-02-24
EM Clamp	TESEQ	KEMZ801A	45028	2023-02-25	2024-02-24
RS					
Signal Generator	HP	8665B	3438A00604	2023-02-25	2024-02-24
Power Sensor	Agilent	E9301A	MY52450001	2023-02-25	2024-02-24
Power Sensor	Agilent	E9304A	MY55081055	2023-02-25	2024-02-24
RF Power Amplifier	MicoTop	MPA-80-1000-250	MPA1906239	2023-02-25	2024-02-24
RF Power Amplifier	MicoTop	MPA-80-6000-100	MPA1906238	2023-02-25	2024-02-24



Antenna	SCHWARZBECK	STLP 9129	9129 114	N/A	N/A
Power Meter	Agilent	E4419B	GB42420578	2023-02-25	2024-02-24
Communication Tester					
Universal Radio Communication Tester	Rohde & Schwarz	CMW500	148650	2023-02-25	2024-02-24

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission Room 1#)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission Room 2#)*	SKET	EMC-I	V2.0

*Remark: indicates software version used in the compliance certification testing.

WALTEK



2. SUMMARY OF TEST RESULTS

Standards	Reference	Description of Test Item	Result
ETSI EN 301 489-1	8.2	Radiated Emissions	Pass
	8.3	Conducted Emissions for DC Power Port	N/A
	8.4	Conducted Emissions for AC Power Port	Pass
	8.5	Harmonic Current Emissions	Pass
	8.6	Voltage Fluctuations and Flicker	Pass
	8.7	Telecommunication Ports	N/A
	9.2	Radio Frequency Electromagnetic Field	Pass
	9.3	Electrostatic Discharge	Pass
	9.4	Fast Transients, Common Mode	Pass
	9.5	Radio Frequency, Common Mode	Pass
	9.6	Transient and Surges in the Vehicular Environment	N/A
	9.7	Voltage Dips and Interruptions	Pass
	9.8	Surges	Pass
Pass: The EUT complies with the essential requirements in the standard. Fail: The EUT does not comply with the essential requirements in the standard. N/A: Not applicable.			

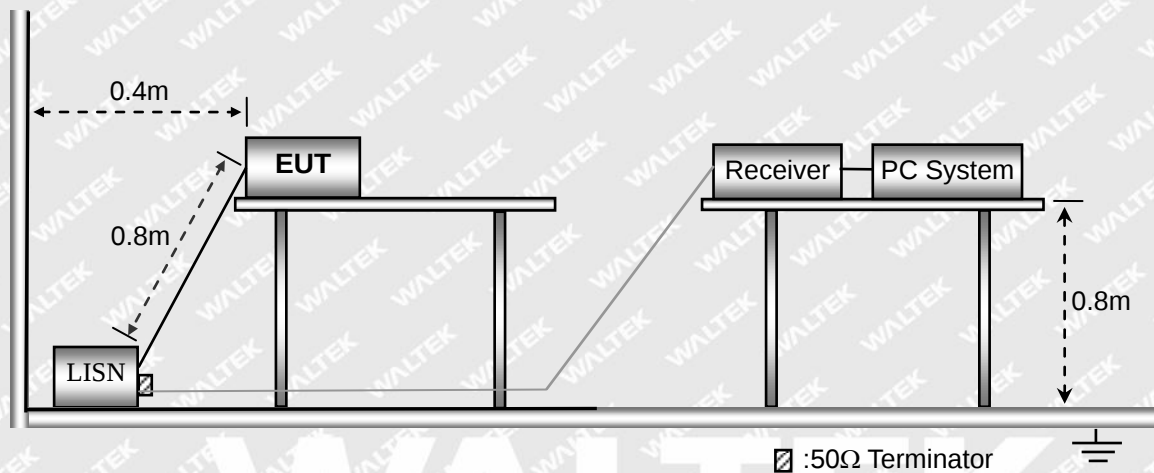


3. Conducted Emissions

3.1 Test Procedure

Test is conducting under the description of EN55032 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.

3.2 Basic Test Setup Block Diagram



3.3 Environmental Conditions

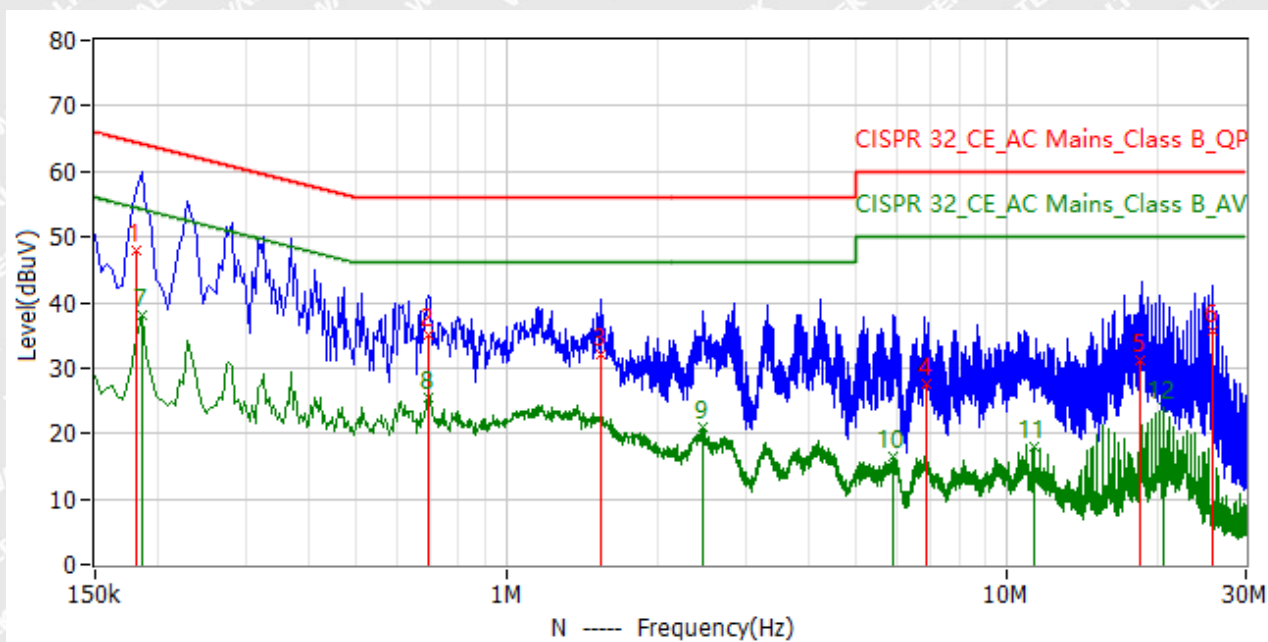
Temperature:	25 ° C
Relative Humidity:	45 %
ATM Pressure:	1015 mbar

3.4 Conducted Emissions Test Data

Note: Only show the worst case in the test report



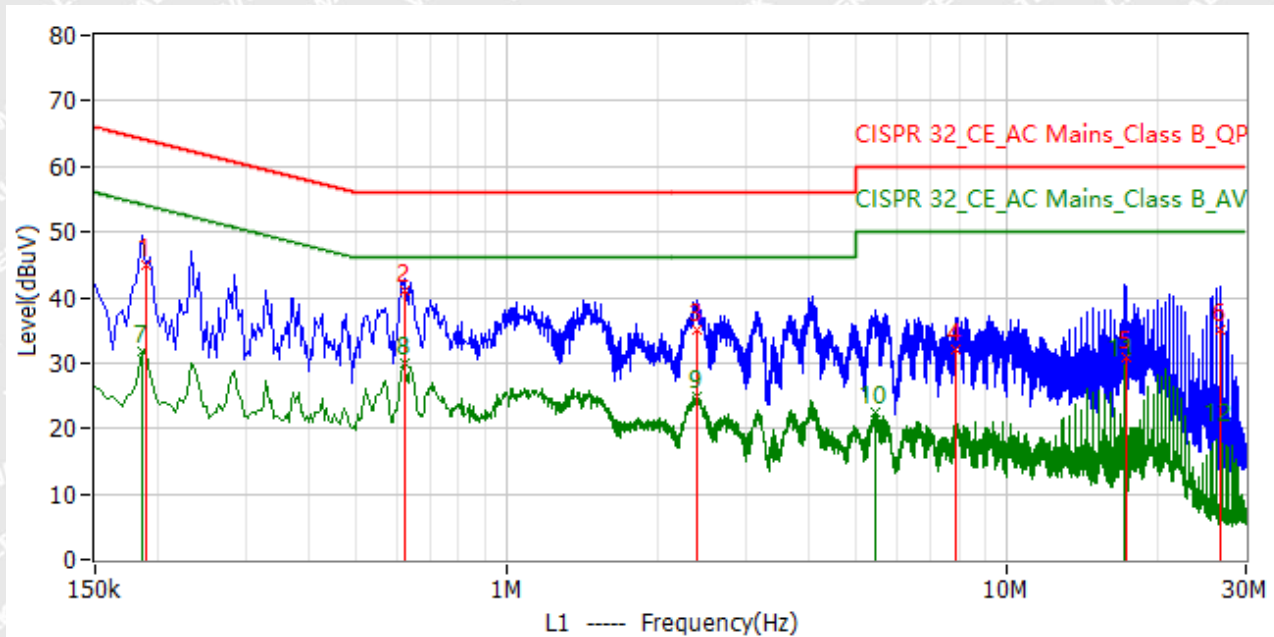
Test mode:	TM1	Polarity:	Neutral
------------	-----	-----------	---------



No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector
1	182.000kHz	27.2	20.7	47.9	64.4	-16.5	QP
2	698.000kHz	14.3	20.7	35.0	56.0	-21.0	QP
3	1.538MHz	11.2	20.8	32.0	56.0	-24.0	QP
4	6.910MHz	7.0	20.7	27.7	60.0	-32.3	QP
5	18.494MHz	11.1	20.2	31.3	60.0	-28.7	QP
6	25.766MHz	15.4	20.2	35.6	60.0	-24.4	QP
7*	186.000kHz	17.3	20.7	38.0	54.2	-16.2	AV
8*	694.000kHz	4.8	20.7	25.5	46.0	-20.5	AV
9*	2.458MHz	0.0	20.9	20.9	46.0	-25.1	AV
10*	5.906MHz	-4.3	20.8	16.5	50.0	-33.5	AV
11*	11.270MHz	-2.8	20.8	18.0	50.0	-32.0	AV
12*	20.614MHz	3.9	20.0	23.9	50.0	-26.1	AV



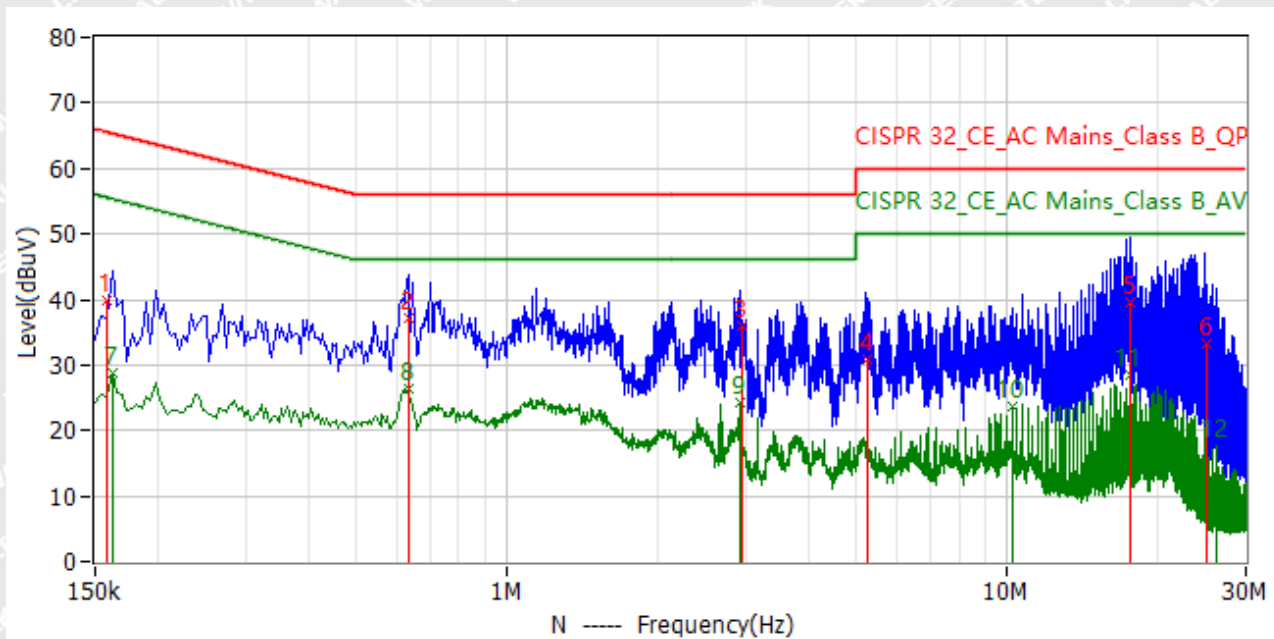
Test mode:	TM1	Polarity:	Line
------------	-----	-----------	------



No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector
1	190.000kHz	24.1	20.7	44.8	64.0	-19.3	QP
2	622.000kHz	20.2	20.7	40.9	56.0	-15.1	QP
3	2.386MHz	14.3	20.9	35.2	56.0	-20.8	QP
4	7.882MHz	11.4	20.7	32.1	60.0	-27.9	QP
5	17.222MHz	10.4	20.4	30.8	60.0	-29.2	QP
6	26.590MHz	14.8	20.3	35.1	60.0	-24.9	QP
7*	186.000kHz	11.2	20.7	31.9	54.2	-22.4	AV
8*	622.000kHz	9.3	20.7	30.0	46.0	-16.0	AV
9*	2.394MHz	3.9	20.9	24.8	46.0	-21.2	AV
10*	5.466MHz	1.6	20.8	22.4	50.0	-27.6	AV
11*	17.218MHz	9.3	20.4	29.7	50.0	-20.3	AV
12*	26.590MHz	-0.5	20.3	19.8	50.0	-30.2	AV



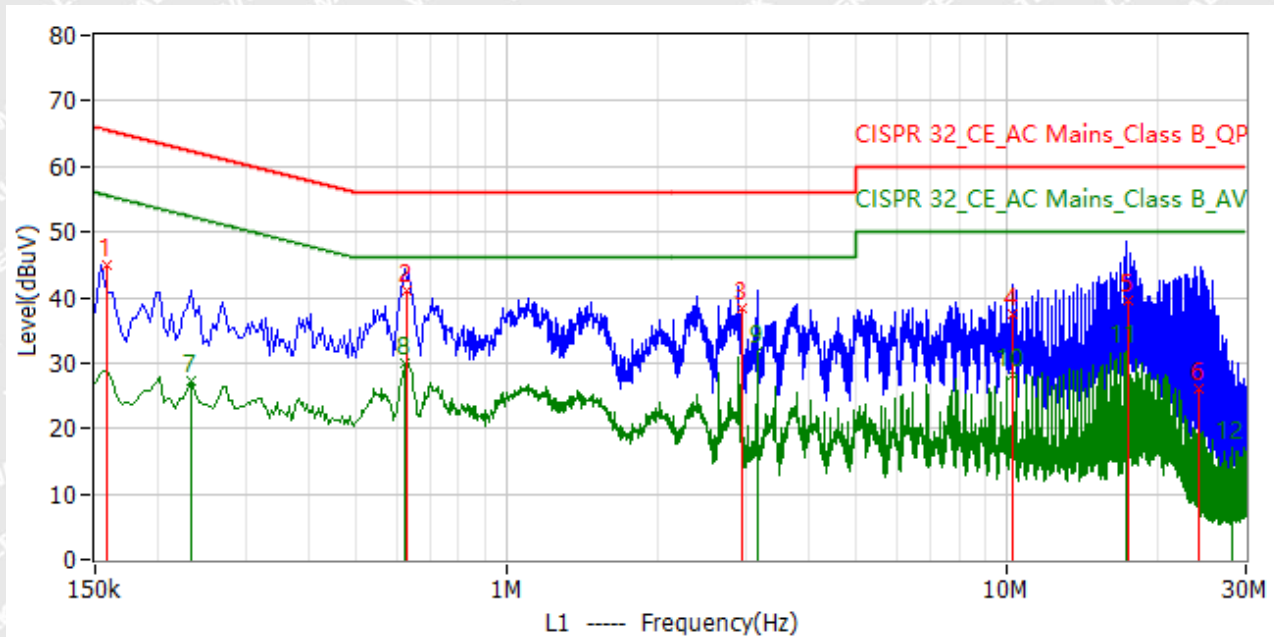
Test mode:	TM2	Polarity:	Neutral
------------	-----	-----------	---------



No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector
1	158.000kHz	19.0	20.9	39.9	65.6	-25.7	QP
2	634.000kHz	16.6	20.7	37.3	56.0	-18.7	QP
3	2.938MHz	15.0	20.9	35.9	56.0	-20.1	QP
4	5.254MHz	9.9	20.9	30.8	60.0	-29.2	QP
5	17.606MHz	19.1	20.4	39.5	60.0	-20.5	QP
6	25.046MHz	13.2	20.1	33.3	60.0	-26.7	QP
7*	162.000kHz	8.0	20.9	28.9	55.4	-26.5	AV
8*	634.000kHz	5.7	20.7	26.4	46.0	-19.6	AV
9*	2.914MHz	3.4	20.9	24.3	46.0	-21.7	AV
10*	10.214MHz	2.8	20.8	23.6	50.0	-26.4	AV
11*	17.618MHz	8.0	20.4	28.4	50.0	-21.6	AV
12*	26.094MHz	-2.4	20.2	17.8	50.0	-32.2	AV



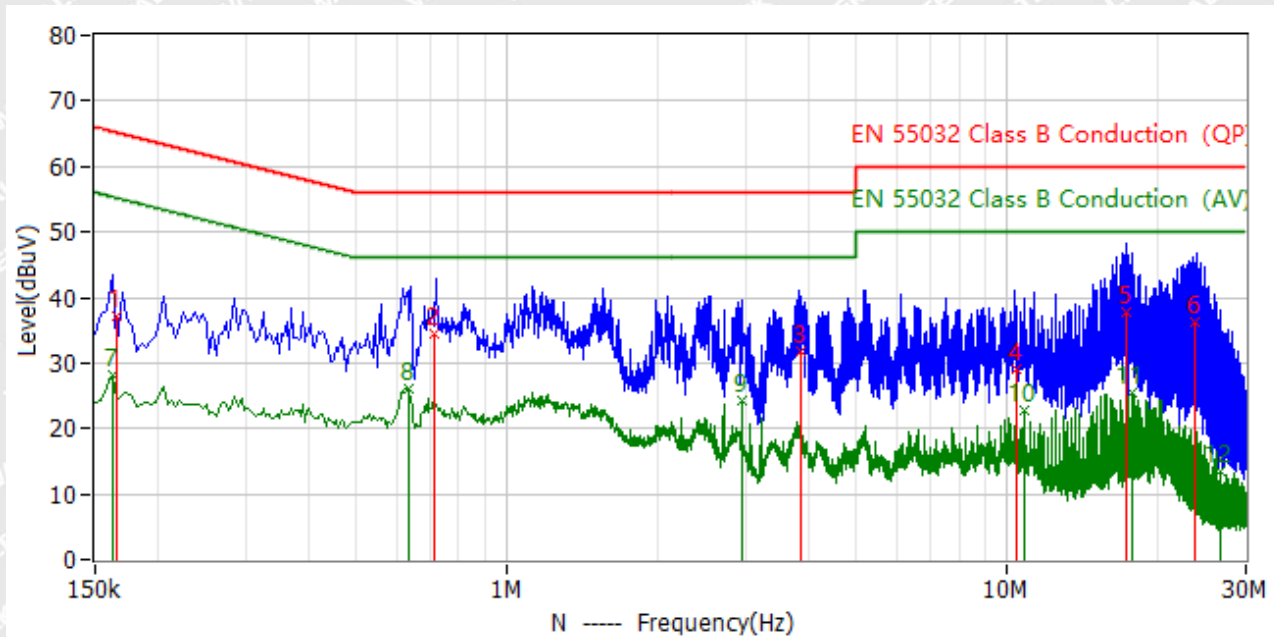
Test mode:	TM2	Polarity:	Line
------------	-----	-----------	------



No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector
1	158.000kHz	24.1	20.9	45.0	65.6	-20.5	QP
2	630.000kHz	20.2	20.7	40.9	56.0	-15.1	QP
3	2.938MHz	17.6	20.9	38.5	56.0	-17.5	QP
4	10.258MHz	16.7	20.8	37.5	60.0	-22.5	QP
5	17.378MHz	19.1	20.4	39.5	60.0	-20.5	QP
6	24.202MHz	6.0	20.1	26.1	60.0	-33.9	QP
7*	234.000kHz	6.8	20.5	27.3	52.3	-25.0	AV
8*	626.000kHz	9.4	20.7	30.1	46.0	-15.9	AV
9*	3.162MHz	10.8	20.9	31.7	46.0	-14.3	AV
10*	10.250MHz	7.5	20.8	28.3	50.0	-21.7	AV
11*	17.366MHz	11.3	20.4	31.7	50.0	-18.3	AV
12*	28.102MHz	-3.4	20.5	17.1	50.0	-32.9	AV



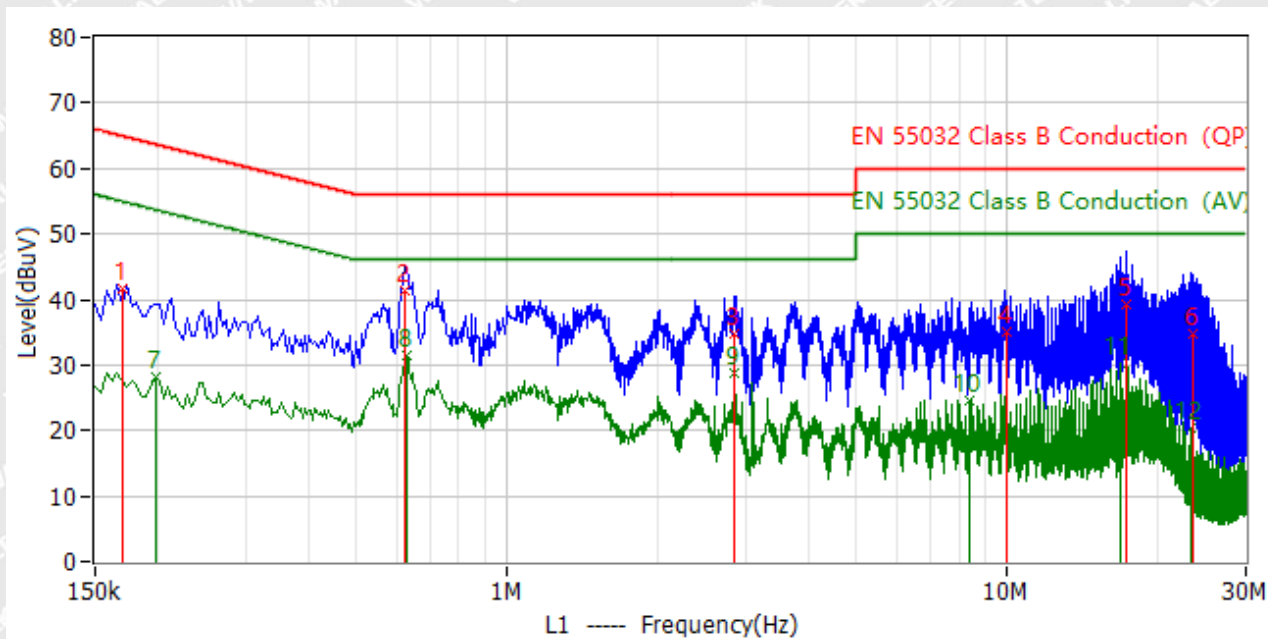
Test mode:	TM3	Polarity:	Neutral
------------	-----	-----------	---------



No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector
1	166.000kHz	16.4	20.8	37.2	65.2	-27.9	QP
2	718.000kHz	13.8	20.8	34.6	56.0	-21.4	QP
3	3.858MHz	10.9	20.9	31.8	56.0	-24.2	QP
4	10.426MHz	8.2	20.8	29.0	60.0	-31.0	QP
5	17.266MHz	17.5	20.4	37.9	60.0	-22.1	QP
6	23.686MHz	16.1	20.1	36.2	60.0	-23.8	QP
7*	162.000kHz	7.2	20.9	28.1	55.4	-27.3	AV
8*	638.000kHz	5.4	20.7	26.1	46.0	-19.9	AV
9*	2.954MHz	3.3	20.9	24.2	46.0	-21.8	AV
10*	10.770MHz	2.0	20.8	22.8	50.0	-27.2	AV
11*	17.726MHz	5.2	20.3	25.5	50.0	-24.5	AV
12*	26.734MHz	-6.9	20.3	13.4	50.0	-36.6	AV



Test mode:	TM3	Polarity:	Line
------------	-----	-----------	------



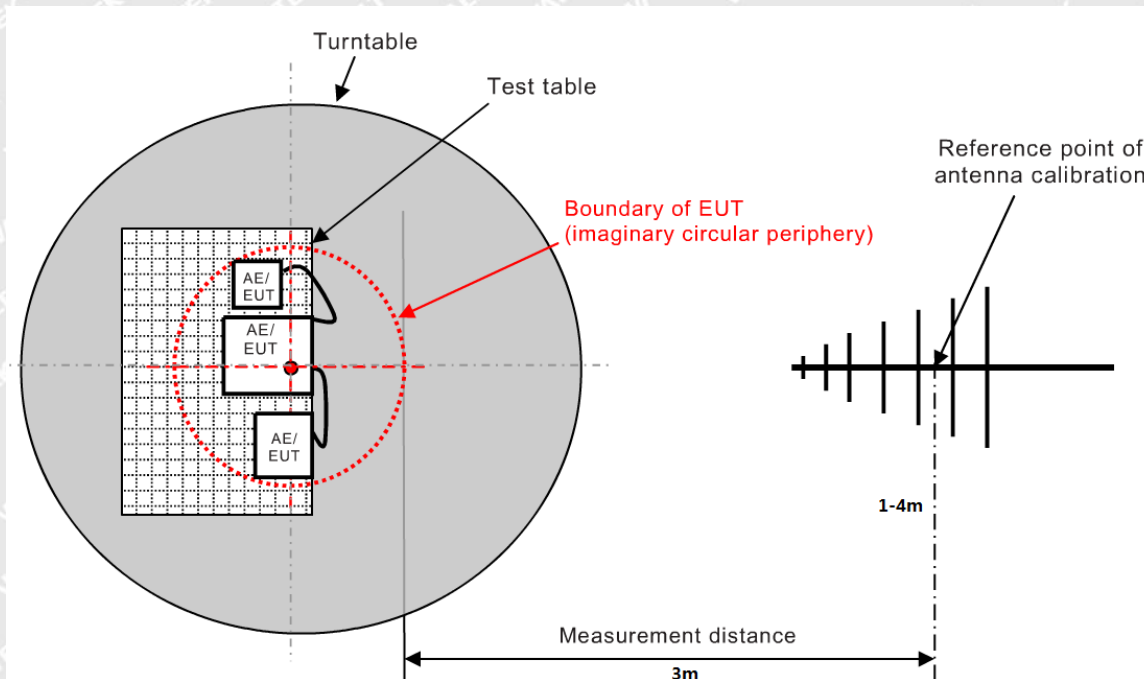
No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector
1	170.000kHz	20.8	20.8	41.6	65.0	-23.4	QP
2	626.000kHz	20.5	20.7	41.2	56.0	-14.8	QP
3	2.842MHz	13.8	20.9	34.7	56.0	-21.3	QP
4	9.930MHz	14.4	20.8	35.2	60.0	-24.8	QP
5	17.246MHz	19.0	20.4	39.4	60.0	-20.6	QP
6	23.566MHz	14.7	20.1	34.8	60.0	-25.2	QP
7*	198.000kHz	7.5	20.6	28.1	53.7	-25.6	AV
8*	630.000kHz	10.7	20.7	31.4	46.0	-14.6	AV
9*	2.838MHz	8.0	20.9	28.9	46.0	-17.1	AV
10*	8.406MHz	3.7	20.8	24.5	50.0	-25.5	AV
11*	16.802MHz	9.8	20.5	30.3	50.0	-19.7	AV
12*	23.350MHz	0.4	20.1	20.5	50.0	-29.5	AV



4. Radiated Emissions

4.1 Test Procedure

Test is conducting under the description of EN55032 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.



4.2 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{EN 301489 Class B Limit}$$



4.3 Environmental Conditions

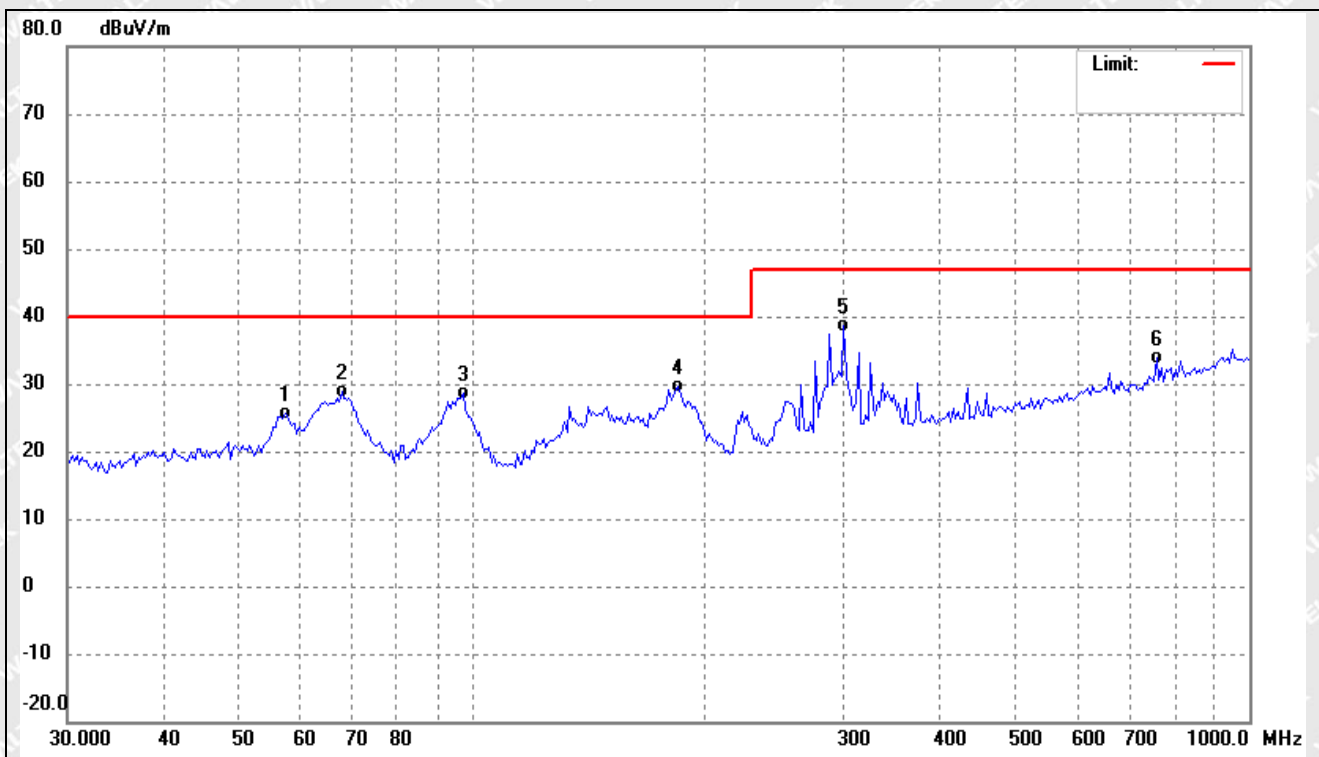
Temperature:	23° C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

4.4 Summary of Test Results/Plots

Note: Only show the worst case in the test report

➤ 30MHz to 1GHz

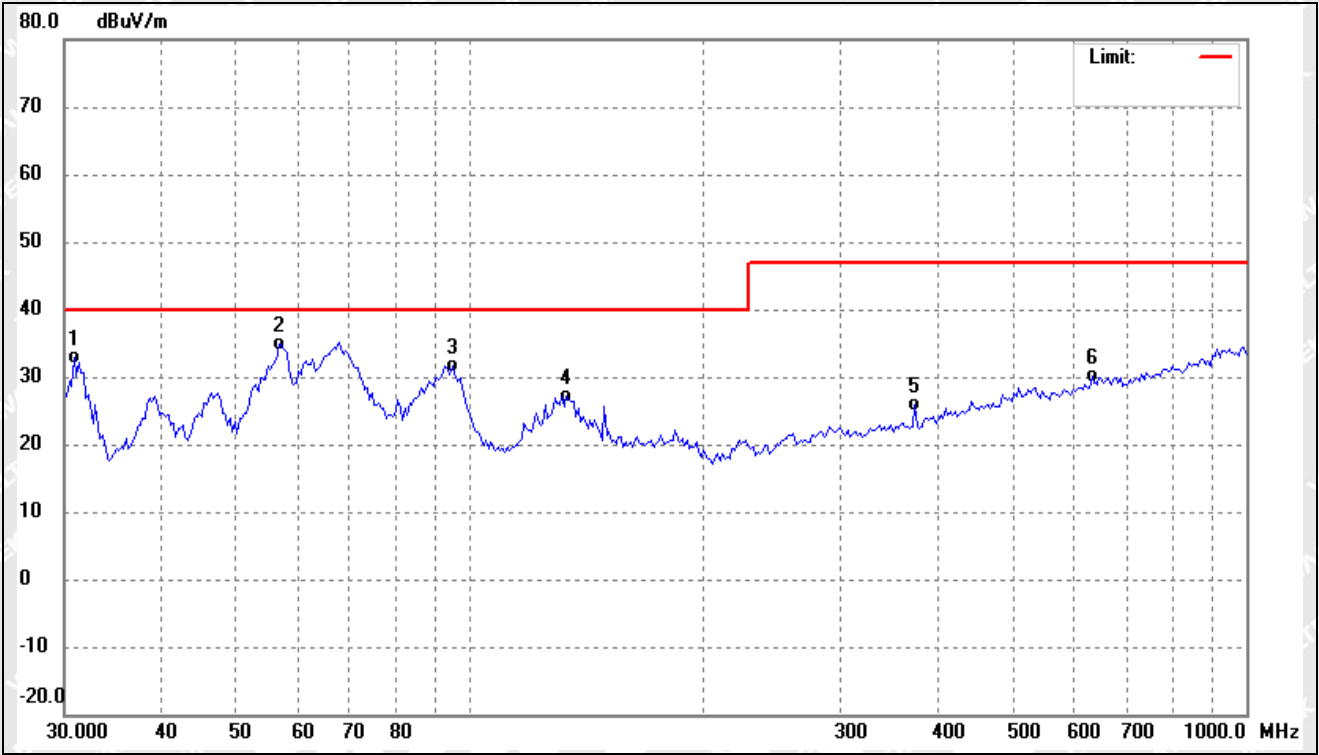
Test mode:	TM1	Polarity:	Horizontal
------------	-----	-----------	------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	57.2654	34.45	-8.77	25.68	40.00	-14.32	-	-	QP
2	67.7856	39.20	-10.36	28.84	40.00	-11.16	-	-	QP
3	97.0023	41.31	-12.67	28.64	40.00	-11.36	-	-	QP
4	183.8660	40.47	-10.74	29.73	40.00	-10.27	-	-	QP
5	300.6988	46.81	-8.24	38.57	47.00	-8.43	-	-	QP
6	760.2867	33.86	-0.07	33.79	47.00	-13.21	-	-	QP



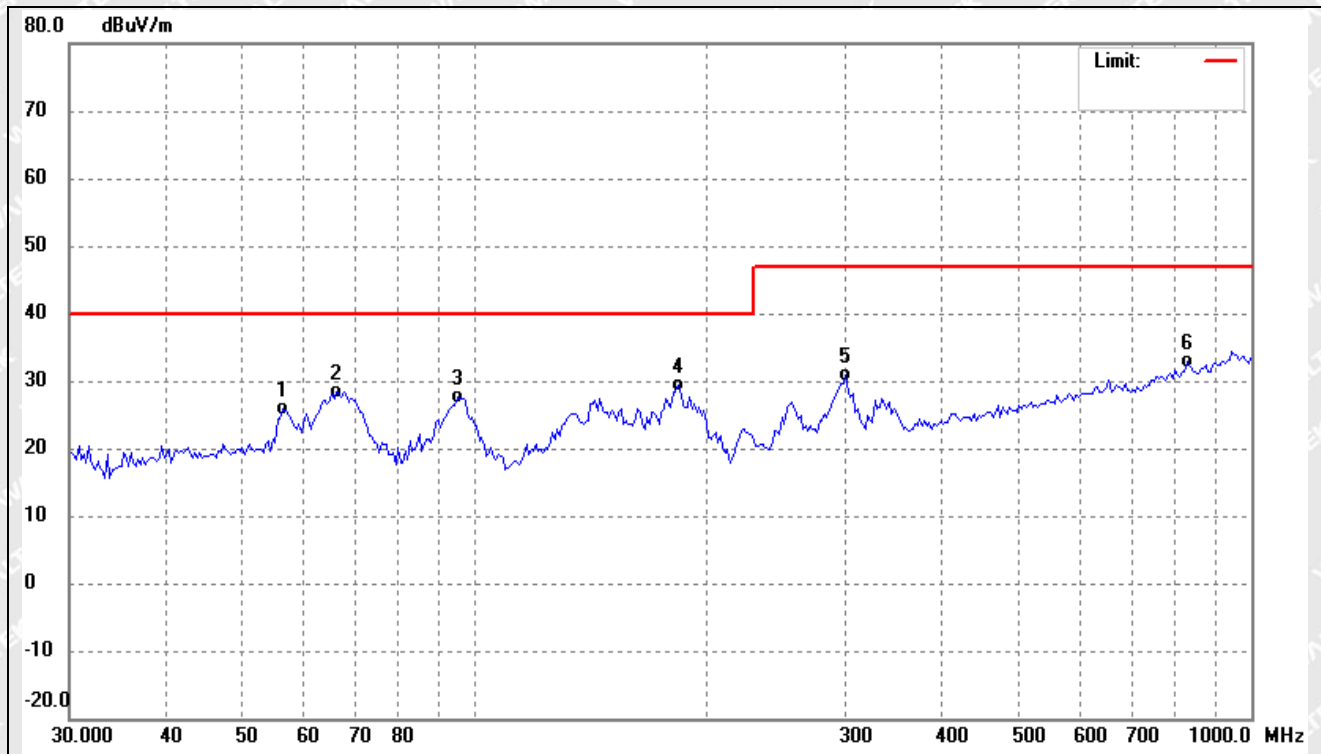
Test mode:	TM1	Polarity:	Vertical
------------	-----	-----------	----------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	30.8552	42.90	-10.08	32.82	40.00	-7.18	-	-	QP
2	56.8644	43.54	-8.75	34.79	40.00	-5.21	-	-	QP
3	94.9788	44.48	-12.81	31.67	40.00	-8.33	-	-	QP
4	133.0809	36.95	-9.72	27.23	40.00	-12.77	-	-	QP
5	373.8862	32.36	-6.50	25.86	47.00	-21.14	-	-	QP
6	633.3285	31.56	-1.37	30.19	47.00	-16.81	-	-	QP



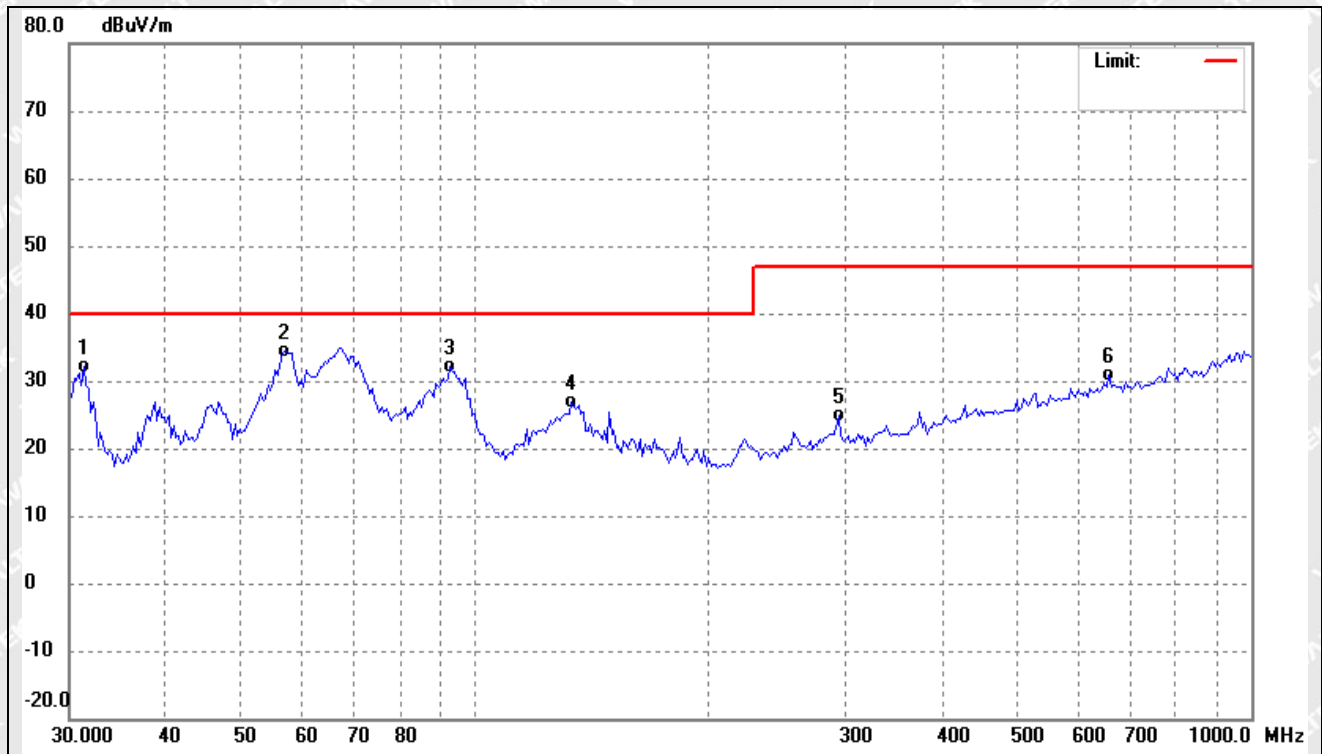
Test mode:	TM2	Polarity:	Horizontal
------------	-----	-----------	------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	56.4662	34.54	-8.72	25.82	40.00	-14.18	-	-	QP
2	66.3715	38.56	-10.11	28.45	40.00	-11.55	-	-	QP
3	94.9788	40.48	-12.81	27.67	40.00	-12.33	-	-	QP
4	182.5785	39.99	-10.60	29.39	40.00	-10.61	-	-	QP
5	300.6988	39.20	-8.24	30.96	47.00	-16.04	-	-	QP
6	827.1795	32.40	0.54	32.94	47.00	-14.06	-	-	QP



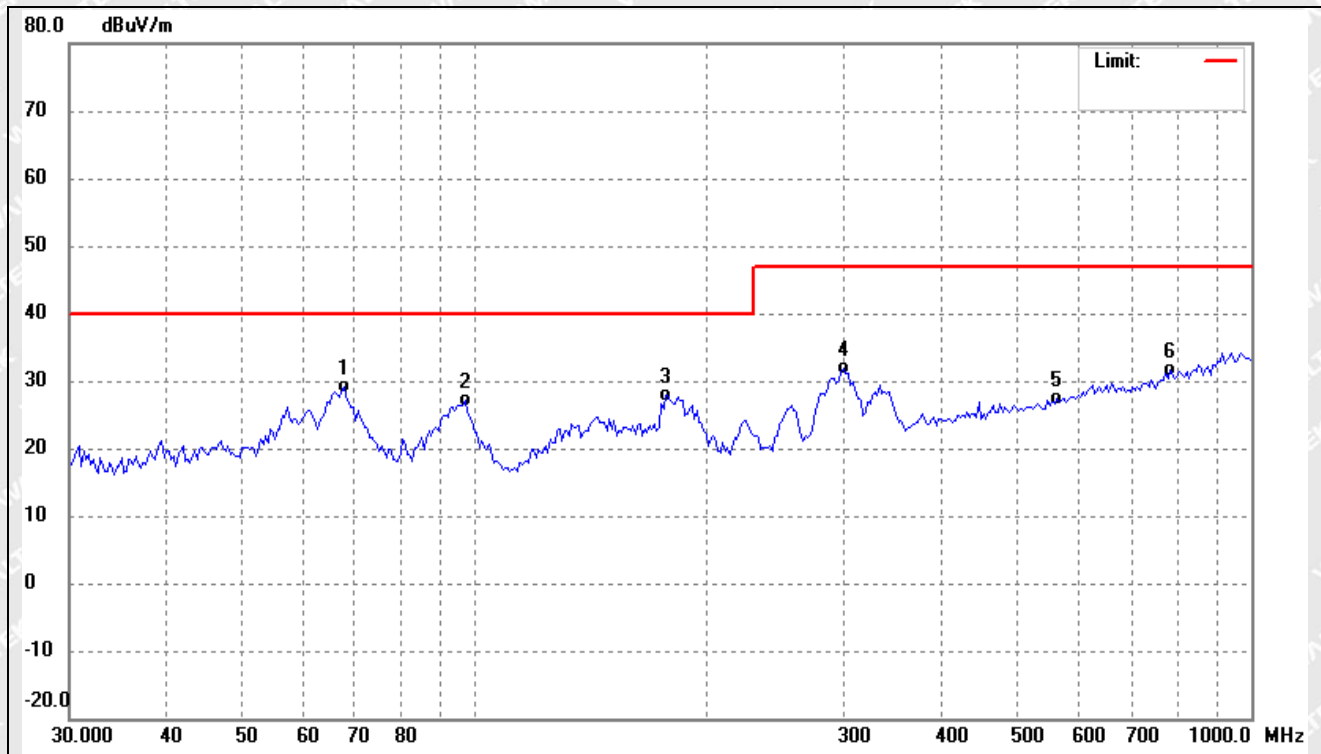
Test mode:	TM2	Polarity:	Vertical
------------	-----	-----------	----------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	31.2919	42.05	-10.02	32.03	40.00	-7.97	-	-	QP
2	56.8644	43.25	-8.75	34.50	40.00	-5.50	-	-	QP
3	92.9974	45.15	-12.92	32.23	40.00	-7.77	-	-	QP
4	133.0809	36.68	-9.72	26.96	40.00	-13.04	-	-	QP
5	294.4259	33.39	-8.45	24.94	47.00	-22.06	-	-	QP
6	655.9765	32.18	-1.30	30.88	47.00	-16.12	-	-	QP



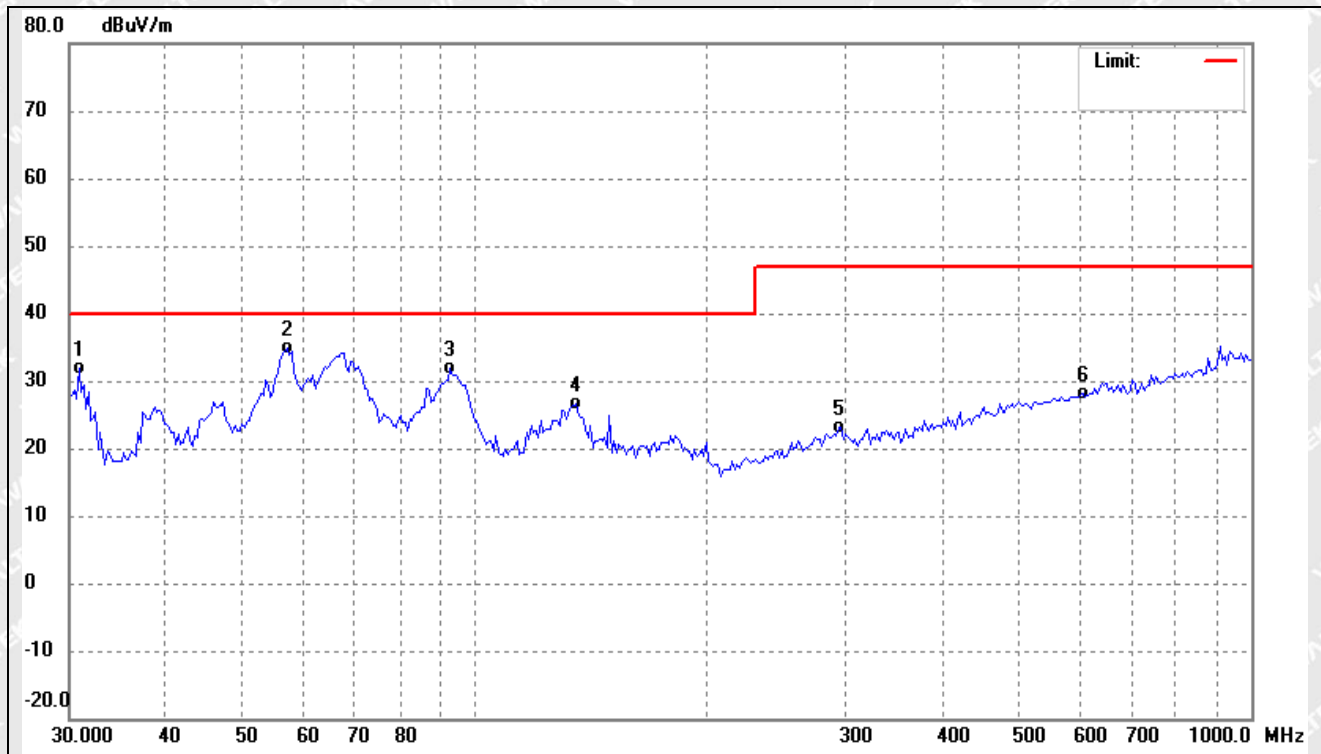
Test mode:	TM3	Polarity:	Horizontal
------------	-----	-----------	------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	67.7856	39.50	-10.36	29.14	40.00	-10.86	-	-	QP
2	97.0023	39.81	-12.67	27.14	40.00	-12.86	-	-	QP
3	176.2748	37.71	-9.78	27.93	40.00	-12.07	-	-	QP
4	298.5932	40.11	-8.31	31.80	47.00	-15.20	-	-	QP
5	562.0143	29.95	-2.55	27.40	47.00	-19.60	-	-	QP
6	787.4749	31.55	0.19	31.74	47.00	-15.26	-	-	QP



Test mode:	TM3	Polarity:	Vertical
------------	-----	-----------	----------



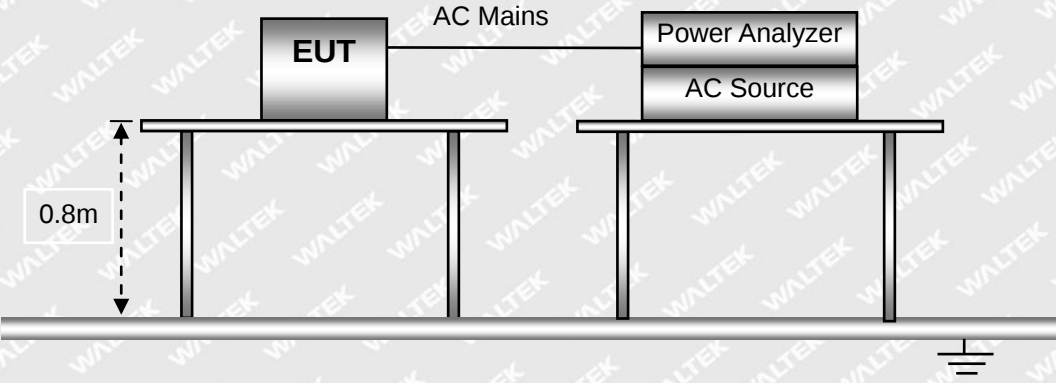
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	30.8552	42.04	-10.08	31.96	40.00	-8.04	-	-	QP
2	57.2654	43.68	-8.77	34.91	40.00	-5.09	-	-	QP
3	92.9974	44.77	-12.92	31.85	40.00	-8.15	-	-	QP
4	134.9645	36.30	-9.64	26.66	40.00	-13.34	-	-	QP
5	294.4259	31.59	-8.45	23.14	47.00	-23.86	-	-	QP
6	607.1805	29.82	-1.64	28.18	47.00	-18.82	-	-	QP

Remark: '-' Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.



5. Harmonic Current Emissions

5.1 Test Setup Block Diagram



5.2 Test Standards

EN IEC 61000-3-2, Clause 7.2 Limits for Class A equipment.

5.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	53%
ATM Pressure:	1015 mbar

5.4 Harmonic Current Emissions Test Data



Harmonics – Class-A

Test category: Class-A (European limits)

Test Margin: 100

Test date: 2023/11/13

Start time: 16:16:29

End time: 16:19:11

Test duration (min): 2.5

Data file name: H-000162.cts_data

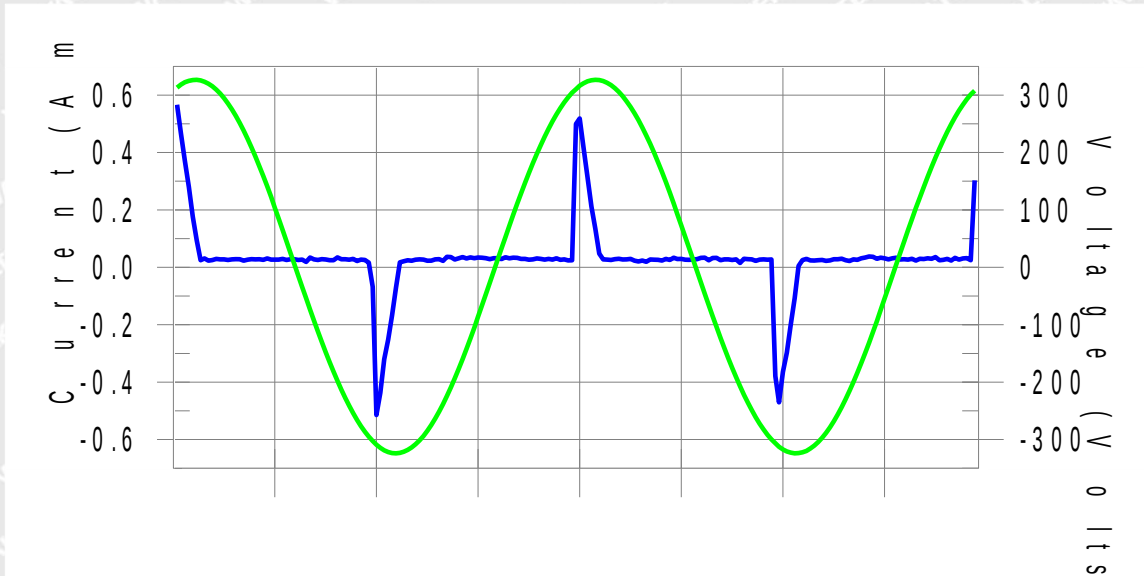
Comment: TM1

Test Result: Pass

Source qualification: Normal

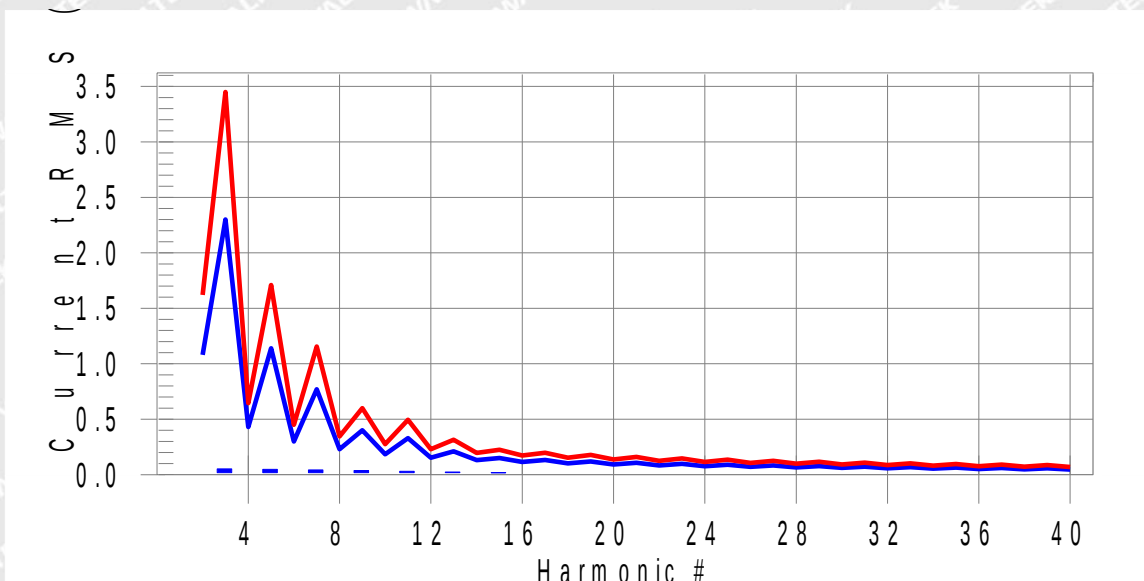
Current & voltage waveforms

-



Harmonics and Class A limit line

European Limits

**Test result: Pass** **Worst harmonics H15-8.2% of 150% limit, H15-12.2% of 100% limit**



Current Test Result Summary (Run time)

Test category: Class-A (European limits)

Test Margin: 100

Test date: 2023/11/13

Start time: 16:16:29

End time: 16:19:11

Test duration (min): 2.5

Data file name: H-000162.cts_data

Comment: TM1

Test Result: Pass

Source qualification: Normal

THC(A): 0.106

I-THD(%): 192.6

POHC(A): 0.027

POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts): 230.10

Frequency(Hz): 50.00

I_Peak (Amps): 0.605

I_RMS (Amps): 0.124

I_Fund (Amps): 0.055

Crest Factor: 4.911

Power (Watts): 12.4

Power Factor: 0.440

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	N/A	0.001	1.620	N/A	Pass
3	0.052	2.300	2.3	0.053	3.450	1.5	Pass
4	0.001	0.430	N/A	0.001	0.645	N/A	Pass
5	0.049	1.140	4.3	0.049	1.710	2.8	Pass
6	0.000	0.300	N/A	0.001	0.450	N/A	Pass
7	0.043	0.770	5.6	0.044	1.155	3.8	Pass
8	0.000	0.230	N/A	0.001	0.345	N/A	Pass
9	0.037	0.400	9.3	0.037	0.600	6.2	Pass
10	0.000	0.184	N/A	0.000	0.276	N/A	Pass
11	0.030	0.330	9.2	0.031	0.495	6.2	Pass
12	0.000	0.153	N/A	0.000	0.230	N/A	Pass
13	0.024	0.210	11.4	0.024	0.315	7.7	Pass
14	0.000	0.131	N/A	0.000	0.197	N/A	Pass
15	0.018	0.150	12.2	0.018	0.225	8.2	Pass
16	0.000	0.115	N/A	0.000	0.173	N/A	Pass
17	0.014	0.132	10.8	0.014	0.198	7.2	Pass
18	0.000	0.102	N/A	0.000	0.153	N/A	Pass
19	0.012	0.118	10.1	0.012	0.178	6.9	Pass
20	0.000	0.092	N/A	0.000	0.138	N/A	Pass
21	0.011	0.107	10.6	0.011	0.161	7.1	Pass
22	0.000	0.084	N/A	0.000	0.125	N/A	Pass
23	0.011	0.098	11.4	0.011	0.147	7.7	Pass
24	0.000	0.077	N/A	0.000	0.115	N/A	Pass
25	0.011	0.090	12.0	0.011	0.135	8.1	Pass
26	0.000	0.071	N/A	0.000	0.107	N/A	Pass



Reference No.: WTF22X12246930R1W004

27	0.010	0.083	12.1	0.010	0.125	8.1	Pass
28	0.000	0.066	N/A	0.000	0.099	N/A	Pass
29	0.009	0.078	11.5	0.009	0.116	7.8	Pass
30	0.000	0.061	N/A	0.000	0.092	N/A	Pass
31	0.008	0.073	10.5	0.008	0.109	7.1	Pass
32	0.000	0.058	N/A	0.000	0.086	N/A	Pass
33	0.007	0.068	9.6	0.007	0.102	6.6	Pass
34	0.000	0.054	N/A	0.000	0.081	N/A	Pass
35	0.006	0.064	9.0	0.006	0.096	6.1	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.005	0.061	9.0	0.006	0.091	6.1	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.005	0.058	9.3	0.005	0.087	6.3	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass

WALTEK



Voltage Source Verification Data (Run time)

Test category: Class-A (European limits)

Test Margin: 100

Test date: 2023/11/13

Start time: 16:16:29

End time: 16:19:11

Test duration (min): 2.5

Data file name: H-000162.cts_data

Comment: TM1

Test Result: Pass

Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 230.10

Frequency(Hz): 50.00

I_Peak (Amps): 0.605

I_RMS (Amps): 0.124

I_Fund (Amps): 0.055

Crest Factor: 4.911

Power (Watts): 12.4

Power Factor: 0.440

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.051	0.460	11.17	OK
3	0.519	2.071	25.05	OK
4	0.089	0.460	19.43	OK
5	0.062	0.920	6.71	OK
6	0.031	0.460	6.64	OK
7	0.035	0.690	5.04	OK
8	0.017	0.460	3.69	OK
9	0.026	0.460	5.63	OK
10	0.010	0.460	2.19	OK
11	0.030	0.230	12.94	OK
12	0.013	0.230	5.71	OK
13	0.020	0.230	8.85	OK
14	0.006	0.230	2.39	OK
15	0.027	0.230	11.84	OK
16	0.009	0.230	3.79	OK
17	0.020	0.230	8.71	OK
18	0.010	0.230	4.51	OK
19	0.013	0.230	5.65	OK
20	0.015	0.230	6.34	OK
21	0.015	0.230	6.32	OK
22	0.004	0.230	1.83	OK
23	0.014	0.230	6.22	OK
24	0.004	0.230	1.85	OK
25	0.017	0.230	7.19	OK
26	0.004	0.230	1.62	OK
27	0.012	0.230	5.32	OK



Reference No.: WTF22X12246930R1W004

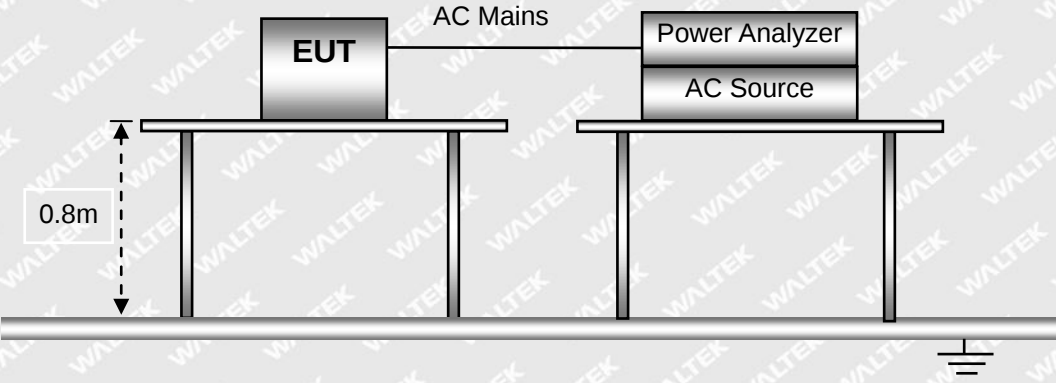
28	0.004	0.230	1.90	OK
29	0.019	0.230	8.33	OK
30	0.003	0.230	1.46	OK
31	0.015	0.230	6.32	OK
32	0.004	0.230	1.57	OK
33	0.013	0.230	5.73	OK
34	0.003	0.230	1.19	OK
35	0.011	0.230	4.94	OK
36	0.003	0.230	1.35	OK
37	0.010	0.230	4.47	OK
38	0.003	0.230	1.16	OK
39	0.010	0.230	4.43	OK
40	0.008	0.230	3.50	OK

WALTEK



6. Voltage Fluctuation and Flicker

6.1 Test Setup Block Diagram



6.2 Test Standards

EN 61000-3-3, Limit: Clause 5.

6.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	53%
ATM Pressure:	1015 mbar

6.4 Voltage Fluctuation and Flicker Test Data

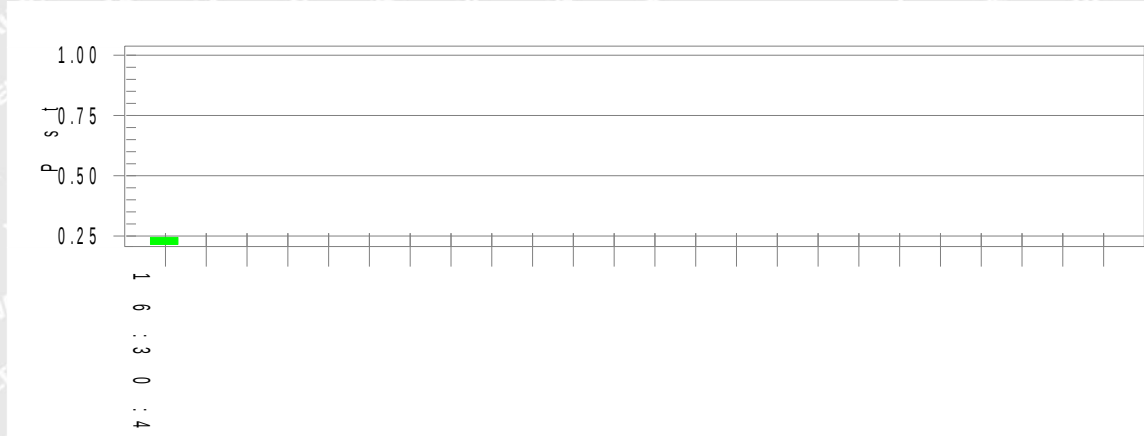


Test mode:

TM1(worst case)

Test Result: Pass

Status: Test Completed

Pst and limit lineEuropean LimitsPlt and limit line

Parameter values recorded during the test:

Vrms at the end of test (Volt): 230.00

Highest dt (%):

T-max (mS): 0

Highest dc (%): 0.00

Highest dmax (%): 0.00

Highest Pst (10 min. period): 0.244

Highest Plt (2 hr. period): 0.107

Test limit (%):

Test limit (mS): 500.0 Pass

Test limit (%): 3.30 Pass

Test limit (%): 4.00 Pass

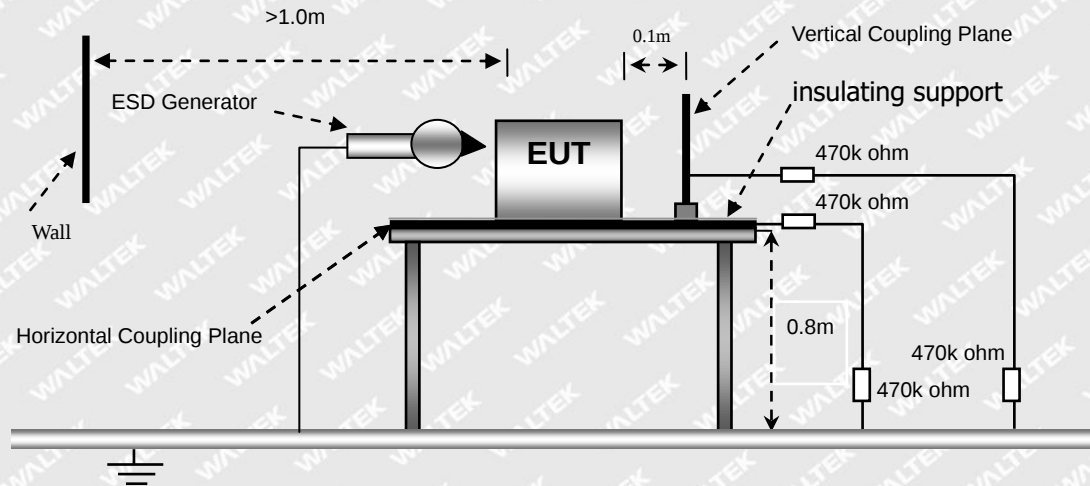
Test limit: 1.000 Pass

Test limit: 0.650 Pass



7. Electrostatic Discharge (ESD)

7.1 Test Setup Block Diagram



7.2 Test Performance

Required Performance Criterion:	B
Mode:	TM1-TM7
Note:TM4-TM7 for TT,TR	

7.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

7.4 Electrostatic Discharge Immunity Test Data



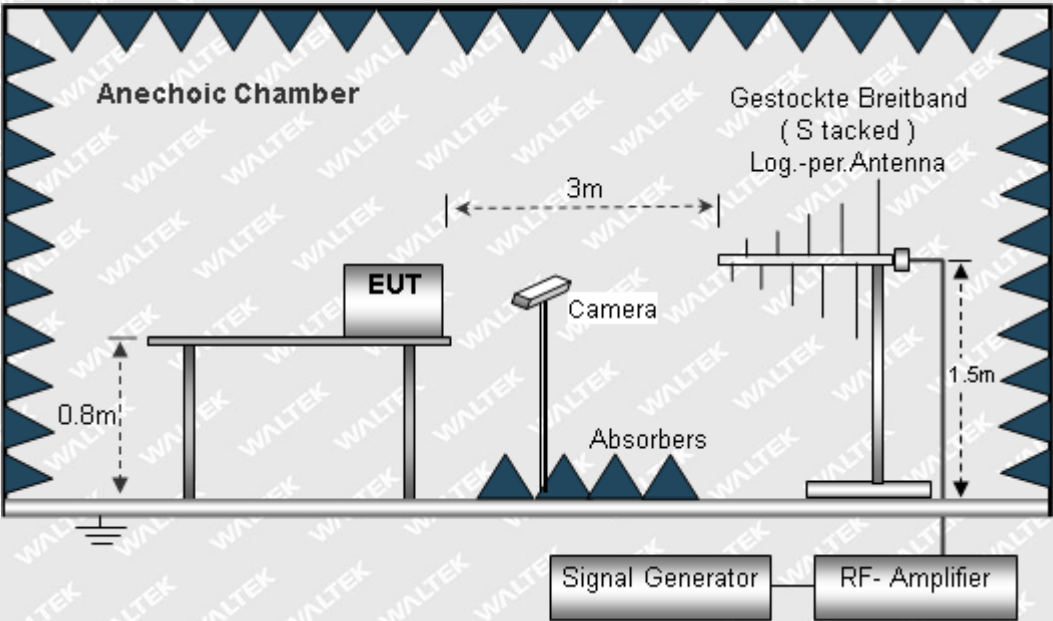
Test mode	TM1-TM7							
Test Points	Test Levels (kV)							
	-2	+2	-4	+4	-6	+6	-8	+8
Air Discharge								
Gap	A	A	A	A	A	A	A	A
Horn	A	A	A	A	A	A	A	A
AUX IN Port	A	A	A	A	A	A	A	A
USB Port	A	A	A	A	A	A	A	A
Direct Contact Discharge								
/	/	/	/	/	/	/	/	/
Indirect Contact Discharge								
HCP (6 Sides)	A	A	A	A	/	/	/	/
VCP (4 Sides)	A	A	A	A	/	/	/	/

WALTEK



8. Radio Frequency Electromagnetic Field (R/S)

8.1 Test Setup Block Diagram



8.2 Test Performance

Required Performance Criterion:	A
Mode:	TM1-TM7
Note:TM4-TM7 for CT,CR;	

8.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

8.4 Continuous Radiated Disturbances Test Data

Frequency step: 1% of fundamental
Dwell time: 1 second
Modulation: AM by 1kHz sine wave with 80% modulation depth



Test mode		TM1-TM7							
Frequency Range(MHz)	Field (V/m)	Front		Rear		Left Side		Right Side	
		VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	3	A	A	A	A	A	A	A	A
1000-3000	3	A	A	A	A	A	A	A	A
3000-6000	3	A	A	A	A	A	A	A	A

Test Result: Pass

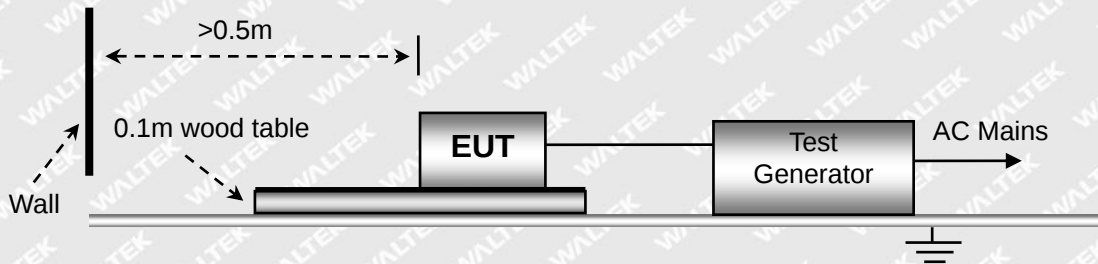
WALTEK



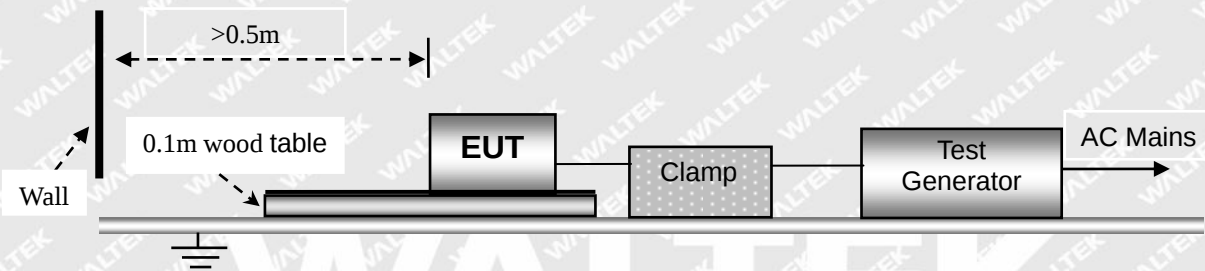
9. Fast Transients, Common Mode (EFT)

9.1 Test Setup Block Diagram

For AC Mains or DC Ports:



For Signal or Telecommunication Ports:



9.2 Test Performance

Required Performance Criterion:	B
Mode:	TM1-TM7
Note:TM4-TM7 for TT,TR	

9.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

9.4 Electrical Fast Transients Test Data



Test Mode		TM1-TM7							
Test Line		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC Main Power port	L	A	A	A	A	/	/	/	/
	N	A	A	A	A	/	/	/	/
	PE	/	/	/	/	/	/	/	/
	L-N	A	A	A	A	/	/	/	/
	L-PE	/	/	/	/	/	/	/	/
	N-PE	/	/	/	/	/	/	/	/
	L-N-PE	/	/	/	/	/	/	/	/
Signal ports	/	/	/	/	/	/	/	/	/

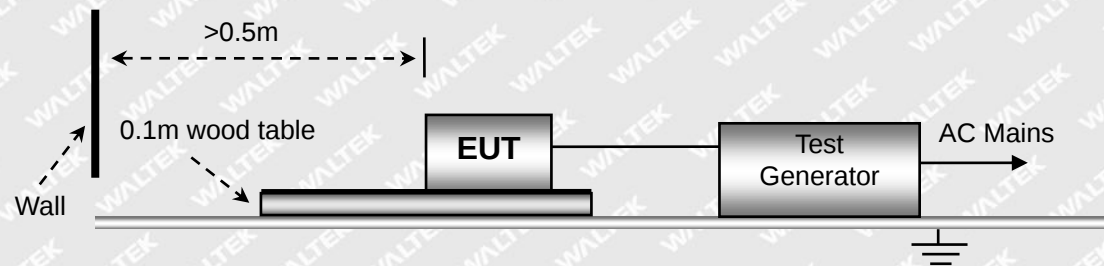
WALTEK



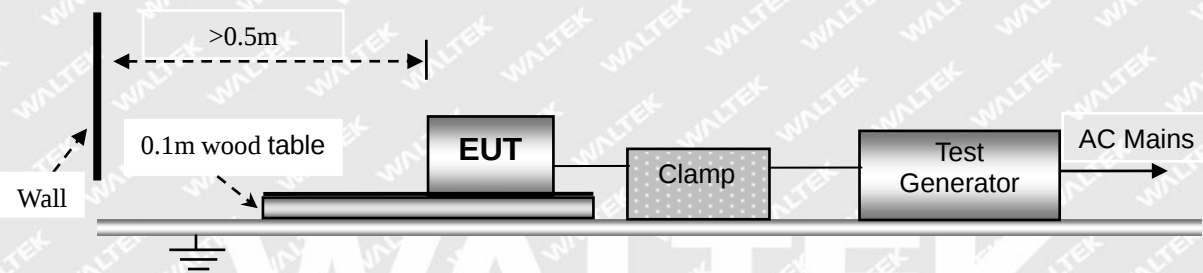
10. Surges

10.1 Test Setup Block Diagram

For AC Mains or DC Ports:



For Signal or Telecommunication Ports:



10.2 Test Performance

Required Performance Criterion:	B
Mode:	TM1-TM7
Note:TM4-TM7 for TT,TR	

10.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

10.4 Surge Test Data



Test Mode	TM1-TM7			
Voltage	Poll	Path	Pass	Fail
0.5kV	±	L-N	A	/
1kV	±	L-N	A	/
2kV	±	L-N, L-PE, N-PE	/	/
4kV	±	L-N, L-PE, N-PE	/	/

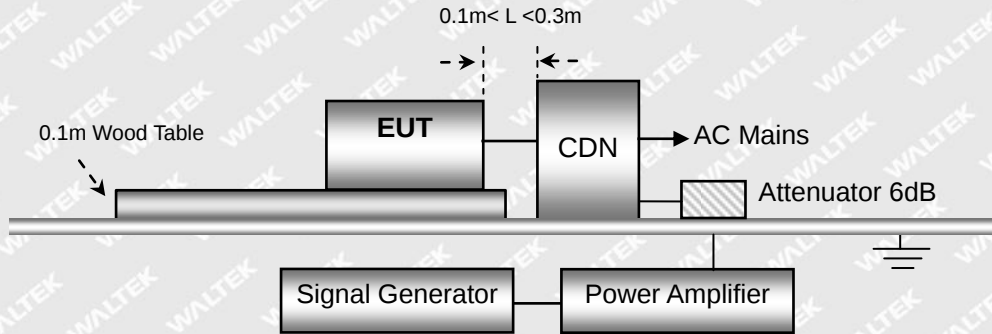
WALTEK



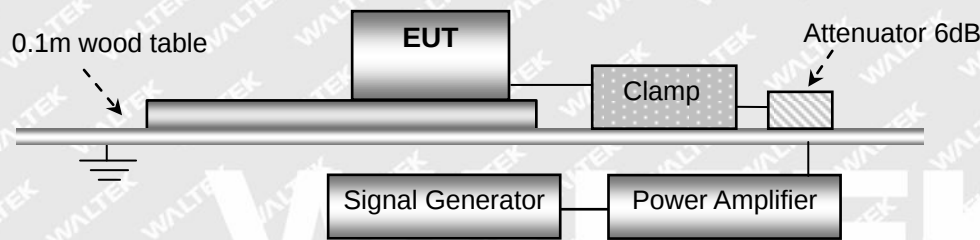
11. Radio Frequency, Common Mode (C/S)

11.1 Test Setup Block Diagram

For AC Mains or DC Input:



For Signal or Telecommunication Ports:



11.2 Test Performance

Required Performance Criterion:	A
Mode:	TM1-TM7
Note:TM4-TM7 for CT,CR	

11.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

11.4 Continuous Conducted Disturbances Test Data

Sweep frequency range: 150kHz~80MHz

Frequency step: 1% of fundamental

Dwell time: 1 second



Test Mode		TM1-TM7		
Level	Voltage (V) (rms, unmodulated)	Modulation:	Pass	Fail
1	1	AM 80%, 1kHz sinewave	/	/
2	3	AM 80%, 1kHz sinewave	A	/
3	10	AM 80%, 1kHz sinewave	/	/
X	Special	/	/	/

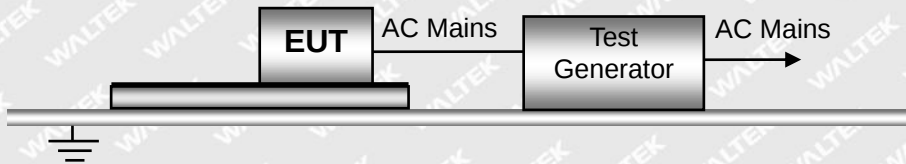
Test Result: Pass

WALTEK



12. Voltage Dips and Interruptions

12.1 Test Setup Block Diagram



12.2 Test Performance

Required Performance Criterion:	B for voltage dip/ C for voltage interruption
Mode:	TM1-TM7
Note: TM4-TM7 for TT, TR	

12.3 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

12.4 Voltage Dips And Interruptions Test Data

U: Voltage dips in % U_T (U_T is rated voltage for the EUT)

T: Test duration

Level	U	T	Phase Angle	N	Pass	Fail
1	100%	10ms	0/90/180/270	3	A	/
2	100%	20ms	0/90/180/270	3	B	/
3	30%	500ms	0/90/180/270	3	B	/
4	100%	5000ms	0/90/180/270	3	B	/



EXHIBIT 1 - EUT PHOTOGRAPHS

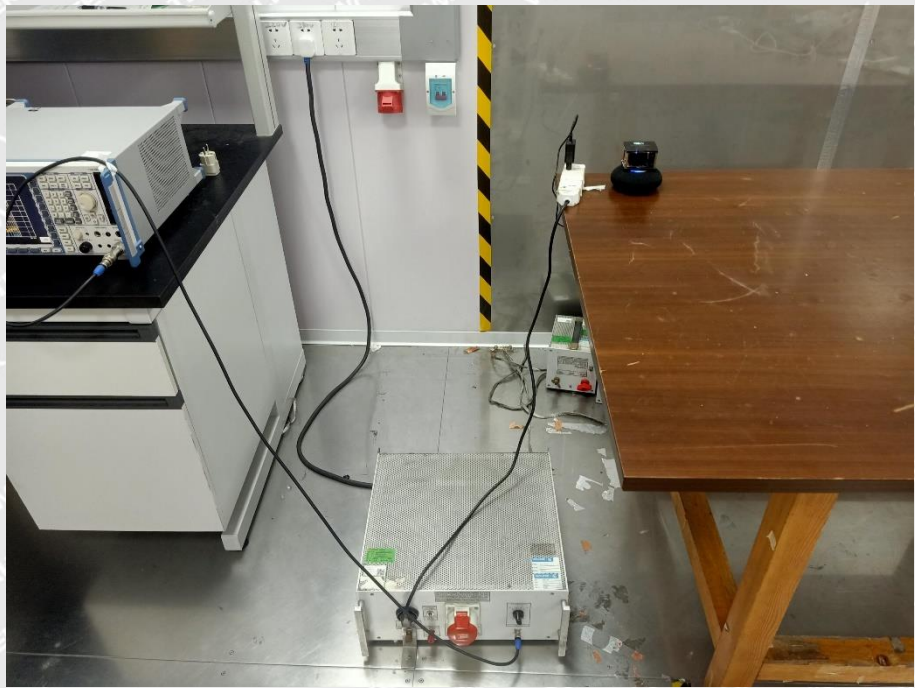
Please refer to “ANNEX”.

WALTEK



EXHIBIT 2 - TEST SETUP PHOTOGRAPHS

**Conducted Emission
Test Setup**



**Radiation Emission
Test View(30MHz to
1GHz)**

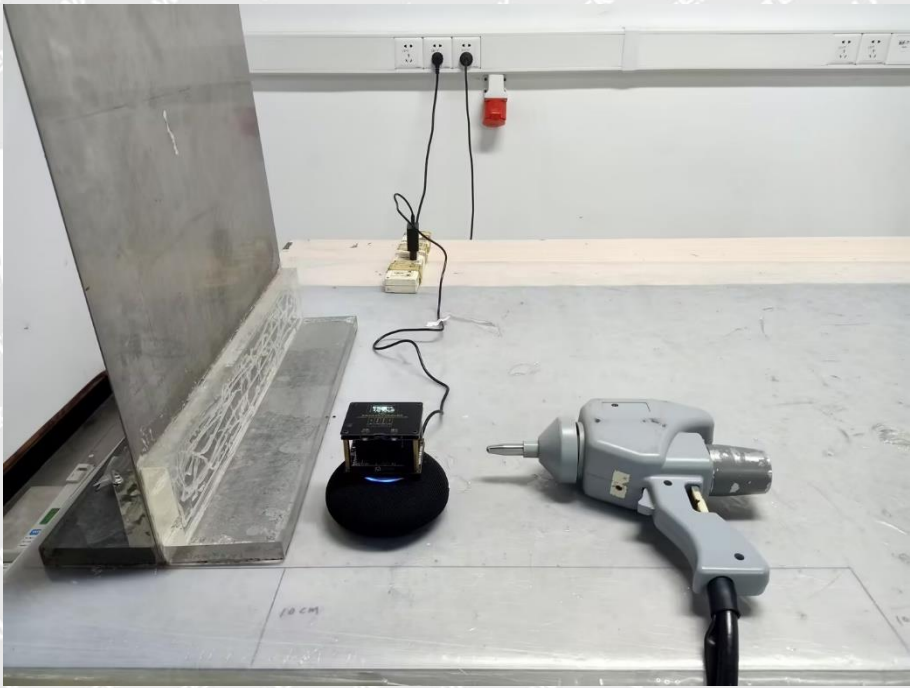




Harmonic/Flicker Test
View

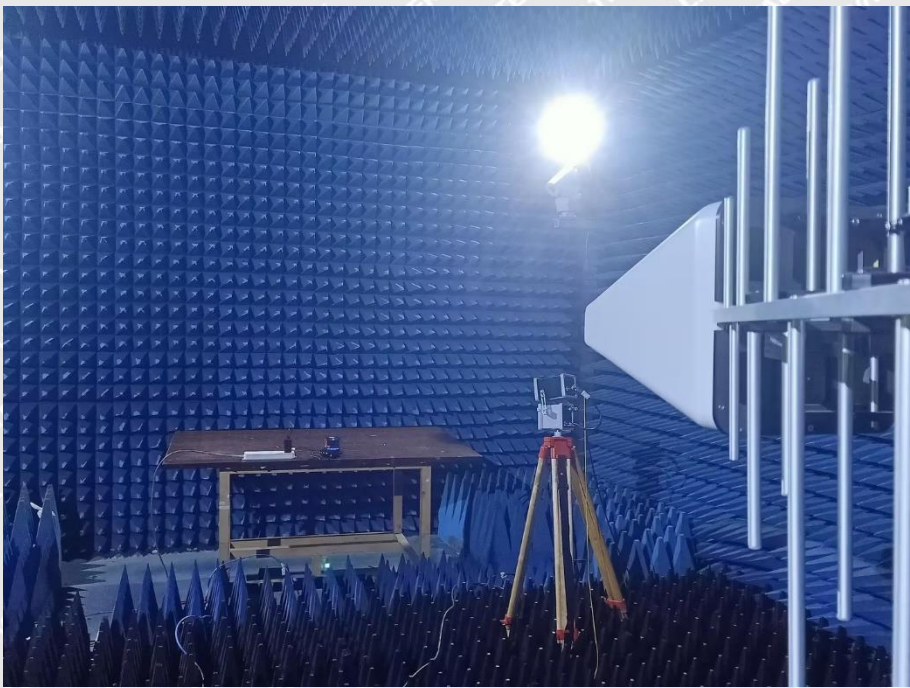


ESD Test View





R/S Test View



EFT/ Surges/ Dips and Interruptions Test View





CS Test View



***** END OF REPORT *****

WALTEK