



# TEST REPORT

Reference No..... : WTF20X08055952W-3  
 Manufacturer\*..... : Mid Ocean Brands B.V.  
 Address ..... : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong  
 Product ..... : Bluetooth headphone  
 Test Model..... : MO9168  
 Standards ..... : EN 55032:2015/AC:2016-07; EN 55035:2017  
 EN 61000-3-2:2014 ; EN 61000-3-3:2013  
 ETSI EN 301 489-1 V2.2.3 (2019-11)  
 Draft ETSI EN 301 489-17 V3.2.2 (2019-12)  
 Date of Receipt sample .... : Aug.15, 2020  
 Date of Test..... : Aug.15, 2020 to Aug.27, 2020  
 Date of Issue ..... : Aug.27, 2020  
 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 compiler and 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

Tested by:

Reviewed By:

Approved & Authorized By:

Mike Shi / Project Engineer

Lion Cai / RF Manager

Silin Chen / Manager





## **TABLE OF CONTENTS**

<b>1. GENERAL INFORMATION</b> .....	<b>5</b>
1.2 TEST STANDARDS.....	6
1.3 TEST METHODOLOGY.....	6
1.4 TEST FACILITY.....	6
1.5 EUT SETUP AND OPERATION MODE.....	7
1.6 PERFORMANCE CRITERIA FOR EMS.....	8
1.7 MEASUREMENT UNCERTAINTY.....	10
1.8 TEST EQUIPMENT LIST AND DETAILS.....	11
<b>2. SUMMARY OF TEST RESULTS</b> .....	<b>13</b>
<b>3. CONDUCTED EMISSIONS</b> .....	<b>14</b>
3.1 TEST PROCEDURE.....	14
3.2 BASIC TEST SETUP BLOCK DIAGRAM.....	14
3.3 ENVIRONMENTAL CONDITIONS.....	14
3.4 CONDUCTED EMISSIONS TEST DATA.....	14
<b>4. RADIATED EMISSIONS</b> .....	<b>17</b>
4.1 TEST PROCEDURE.....	17
4.2 CORRECTED AMPLITUDE & MARGIN CALCULATION.....	17
4.3 ENVIRONMENTAL CONDITIONS.....	18
4.4 SUMMARY OF TEST RESULTS/PLOTS.....	18
<b>5. HARMONIC CURRENT EMISSIONS</b> .....	<b>24</b>
5.1 TEST PROCEDURE.....	24
5.2 TEST SETUP BLOCK DIAGRAM.....	24
5.3 TEST STANDARDS.....	24
5.4 ENVIRONMENTAL CONDITIONS.....	24
5.5 HARMONIC CURRENT EMISSIONS TEST DATA.....	24
<b>6. VOLTAGE FLUCTUATION AND FLICKER</b> .....	<b>25</b>
6.1 TEST PROCEDURE.....	25
6.2 TEST SETUP BLOCK DIAGRAM.....	25
6.3 TEST STANDARDS.....	25
6.4 ENVIRONMENTAL CONDITIONS.....	25
6.5 VOLTAGE FLUCTUATION AND FLICKER TEST DATA.....	25
<b>7. ELECTROSTATIC DISCHARGE (ESD)</b> .....	<b>27</b>
7.1 TEST PROCEDURE.....	27
7.2 TEST SETUP BLOCK DIAGRAM.....	27
7.3 TEST PERFORMANCE.....	27
7.4 ENVIRONMENTAL CONDITIONS.....	27
7.5 ELECTROSTATIC DISCHARGE IMMUNITY TEST DATA.....	27
<b>8. RADIO FREQUENCY ELECTROMAGNETIC FIELD (R/S)</b> .....	<b>29</b>
8.1 TEST PROCEDURE.....	29
8.2 TEST SETUP BLOCK DIAGRAM.....	29
8.3 TEST PERFORMANCE.....	29
8.4 ENVIRONMENTAL CONDITIONS.....	29
8.5 CONTINUOUS RADIATED DISTURBANCES TEST DATA.....	29
<b>9. FAST TRANSIENTS, COMMON MODE (EFT)</b> .....	<b>31</b>
9.1 TEST PROCEDURE.....	31
9.2 TEST SETUP BLOCK DIAGRAM.....	31
9.3 TEST PERFORMANCE.....	31
9.4 ENVIRONMENTAL CONDITIONS.....	31
9.5 ELECTRICAL FAST TRANSIENTS TEST DATA.....	31
<b>10. SURGES</b> .....	<b>33</b>



10.1 TEST PROCEDURE.....	33
10.2 TEST SETUP BLOCK DIAGRAM.....	33
10.3 TEST PERFORMANCE .....	33
10.4 ENVIRONMENTAL CONDITIONS.....	33
10.5 SURGE TEST DATA.....	33
<b>11. RADIO FREQUENCY, COMMON MODE (C/S) .....</b>	<b>35</b>
11.1 TEST PROCEDURE.....	35
11.2 TEST SETUP BLOCK DIAGRAM.....	35
11.3 TEST PERFORMANCE .....	35
11.4 ENVIRONMENTAL CONDITIONS.....	35
11.5 CONTINUOUS CONDUCTED DISTURBANCES TEST DATA .....	35
<b>12. VOLTAGE DIPS AND INTERRUPTIONS.....</b>	<b>37</b>
12.1 TEST PROCEDURE.....	37
12.2 TEST SETUP BLOCK DIAGRAM.....	37
12.3 TEST PERFORMANCE .....	37
12.4 ENVIRONMENTAL CONDITIONS.....	37
12.5 VOLTAGE DIPS AND INTERRUPTIONS TEST DATA .....	37
<b>EXHIBIT 1 - PRODUCT LABELING .....</b>	<b>38</b>
<b>EXHIBIT 2 - EUT PHOTOGRAPHS.....</b>	<b>39</b>
<b>EXHIBIT 3 - TEST SETUP PHOTOGRAPHS.....</b>	<b>40</b>



# WALTEK



## Report version

Version No.	Date of issue	Description
Rev.00	Aug.27, 2020	Original
/	/	/



# WALTEK



## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Manufacturer: Mid Ocean Brands B.V.  
 Address of manufacturer: 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong

General Description of EUT	
Product Name:	Bluetooth headphone
Trade Name:	/
Model No.:	MO9168
Adding Model(s):	/
Rated Voltage:	Charging Port:DC5V Battery:DC3.7V
Battery Capacity:	300mAh
Power Adapter:	/
Software Version:	V1.0
Hardware Version:	V1.0
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
<b>Bluetooth</b>	
Bluetooth Version:	Bluetooth V5.0(Only BR/EDR )
Frequency Range:	2402-2480MHz
Max.RF Output Power:	5.86dBm (EIRP)
Type of Modulation:	GFSK, Pi/4 DQPSK
Data Rate:	1Mbps, 2Mbps
Quantity of Channels	79
Channel Separation:	1MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	1.2dBi



## 1.2 Test Standards

The tests were performed according to following standards:

**EN 55032:2015/AC:2016-07**: Electromagnetic compatibility of multimedia equipment - Emission requirements.

**EN 55035:2017**: Electromagnetic compatibility of multimedia equipment - Immunity requirements.

**EN 61000-3-2:2014**: 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**: 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  $\leq 16$  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.

**Draft ETSI EN 301 489-17 V3.2.2 (2019-12)**: 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.

*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

### **FCC – Registration No.: 125990**

Waltek Testing Group (Shenzhen) Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). 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.



## 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 and AUX Input	Connect to the Adapter; AC230V 50Hz for adapter,
TM2	TF Card Input	TF Card Input and playing “1kHz” audio
TM3	Bluetooth Connect	Bluetooth connecting and playing “1kHz” audio
TM4	Bluetooth	TR, CR, TT, CT for EMS testing

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	0.5	Unshielded	Without Ferrite
AUX Cable	1.3	Unshielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Adapter	/	YNQX12L050200UU	/

# WALTEK



## 1.6 Performance Criteria for EMS

### ➤ 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 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.





➤ **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.



# WALTEK



## 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	

# WALTEK



## 1.8 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Spectrum Analyzer	Rohde & Schwarz	FSP	836079/035	2020-04-28	2021-04-27
EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2020-04-28	2021-04-27
Amplifier	Agilent	8447F	3113A06717	2020-04-28	2021-04-27
Amplifier	C&D	PAP-1G18	2002	2020-04-28	2021-04-27
Broadband Antenna	Schwarz beck	VULB9163	9163-333	2019-05-05	2021-05-04
Horn Antenna	ETS	3117	00086197	2019-05-05	2021-05-04
Loop Antenna	Schwarz beck	FMZB 1516	9773	2019-05-05	2021-05-04
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2020-04-28	2021-04-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2020-04-28	2021-04-27
AC LISN	Schwarz beck	NSLK8126	8126-224	2020-04-28	2021-04-27
DC LISN	Schwarz beck	NNBM8126D	279	2020-04-28	2021-04-27
8-WIRE LISN	Schwarz beck	8158	CAT3-8158-0059	2020-04-28	2021-04-27
8-WIRE LISN	Schwarz beck	8158	CAT5-8158-0117	2020-04-28	2021-04-27
Digital Power Analyzer	California Instrument	PACS-1	72831	2020-04-28	2021-04-27
Power Source	California Instrument	5001iX	25965	2020-04-28	2021-04-27
ESD Generator	LIOGCEL	ESD-203B	0170901	2020-04-28	2021-04-27
Signal Generator	Rohde & Schwarz	SMT03	100059	2020-04-28	2021-04-27
Voltage Probe	Rohde & Schwarz	URV5-Z2	100013	2020-04-28	2021-04-27
Power Amplifier	AR	150W1000	300999	2020-04-28	2021-04-27
Power Amplifier	AR	25S1G4AM1	305993	2020-04-28	2021-04-27
Transient 2000	EMC PARTNER	TRA2000	863	2020-04-28	2021-04-27
CS Immunity Tester	SCHAFFNER	NSG2070	1123	2020-04-28	2021-04-27
CDN	Luthi	CDNL-801	2655	2020-04-28	2021-04-27
Attenuator	EMCI	MA-5100/6BF2	1009	2020-04-28	2021-04-27
EMC PRO	KEYTEK	EMCPro	0509124	2020-04-28	2021-04-27
Coil	KEYTEK	F-1000-4-8	0533	2020-04-28	2021-04-27
Anechoic chamber	Albatross Projects	MCDC	----	2020-04-28	2021-04-27
CS Generator	MARCONI	2024	112260/042	2020-04-28	2021-04-27
Attenuator	FRANKONIA	75-A-FFN-06	1001698	2020-04-28	2021-04-27
CDN	FRANKONIA	CDN M2+M3	A3027019	2020-04-28	2021-04-27
Signal Generator	HP	8688B	3438A00604	2020-04-28	2021-04-27
Power Meter	KEITHLEY	3500	1162591	2020-04-28	2021-04-27
Power Meter	KEITHLEY	3500	1121428	2020-04-28	2021-04-27
RF Power Amplifier	MicoTop	MPA-80-1000-250	MPA1906239	2020-04-28	2021-04-27
RF Power Amplifier	MicoTop	MPA-80-1000-100	MPA1906238	2020-04-28	2021-04-27
Antenna	SCHWARZBECK	STLP 9129	9129 114	N/A	N/A



Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission)*	Farad	EZ-EMC	RA-03A1

\*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	N/A
	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.

# WALTEK

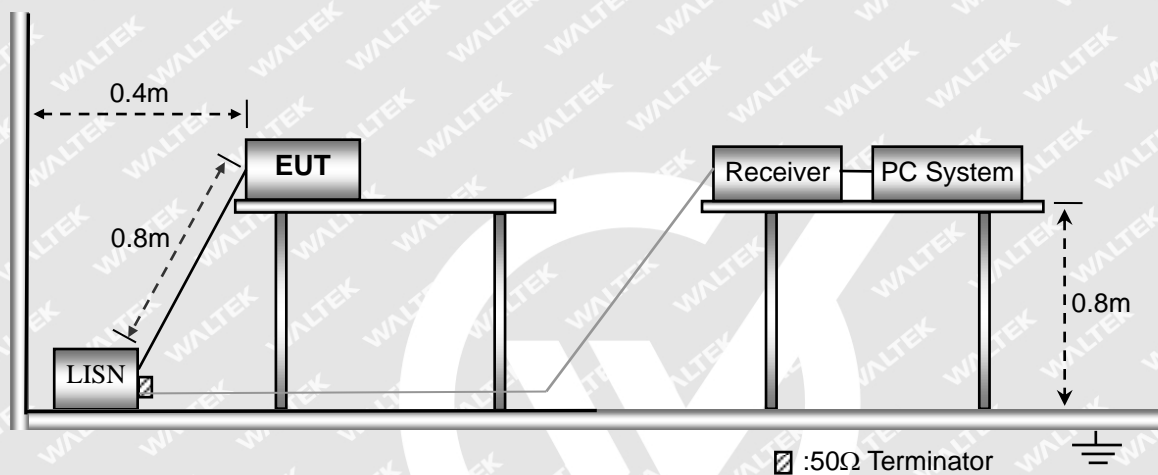


### 3. Conducted Emissions

#### 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

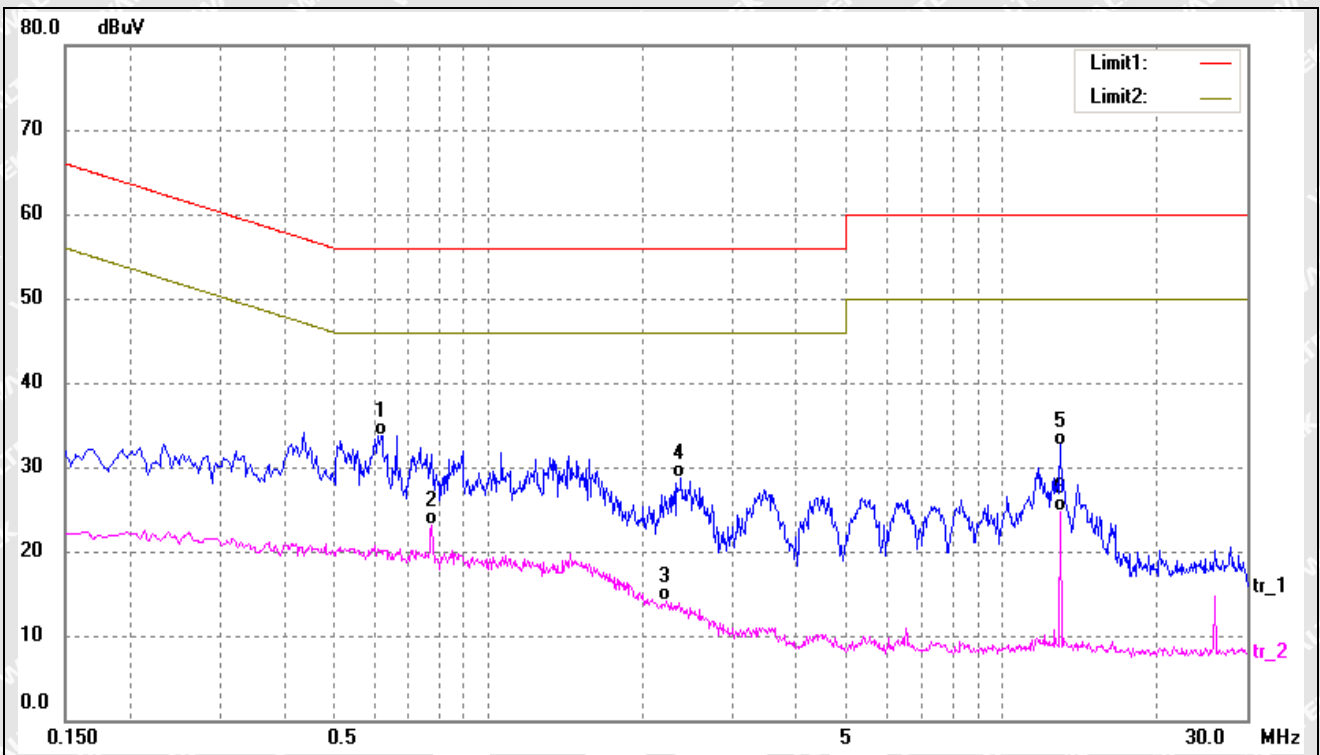
Temperature:	26 °C
Relative Humidity:	60 %
ATM Pressure:	1015 mbar

#### 3.4 Conducted Emissions Test Data

Note: Only show the worst case in the test report



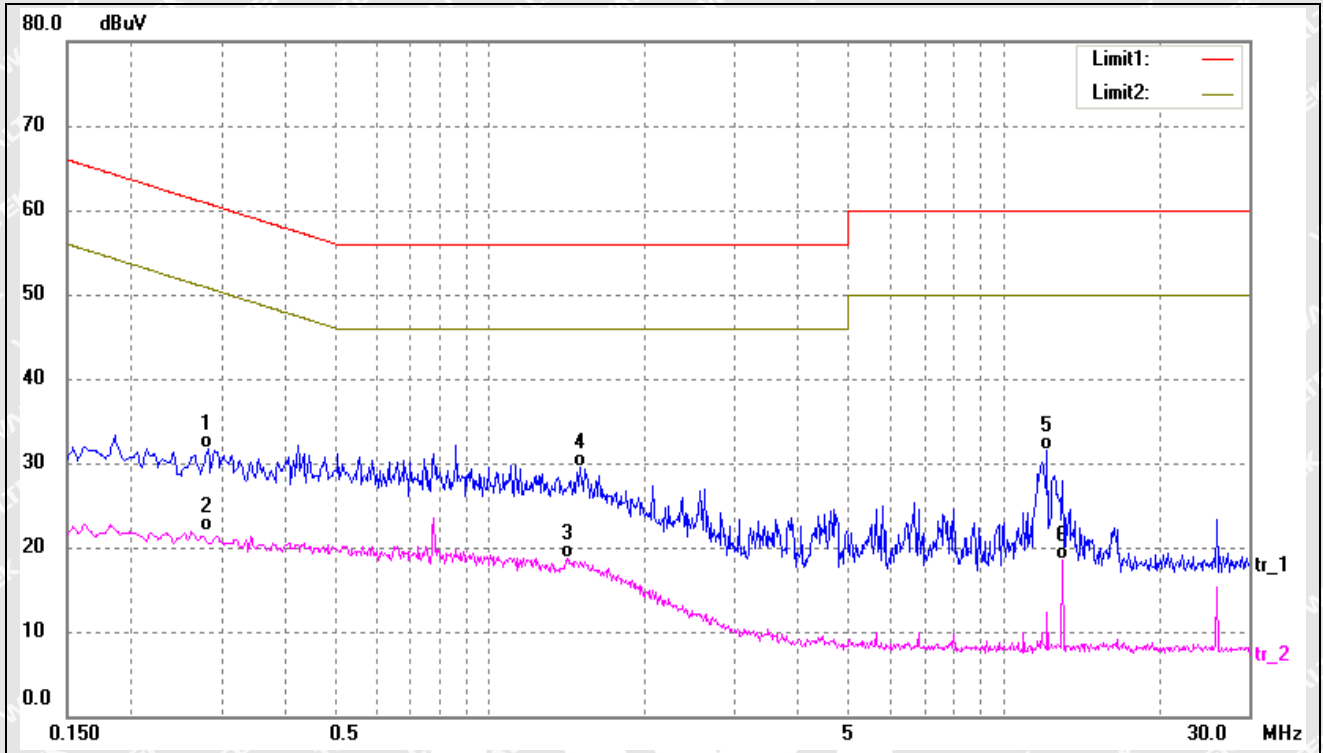
Test mode:	TM1	Polarity:	Neutral
------------	-----	-----------	---------



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.6220	23.53	10.20	33.73	56.00	-22.27	QP
2	0.7780	12.96	10.18	23.14	46.00	-22.86	AVG
3	2.2140	3.78	10.29	14.07	46.00	-31.93	AVG
4	2.3780	18.37	10.29	28.66	56.00	-27.34	QP
5	13.0020	22.14	10.46	32.60	60.00	-27.40	QP
6	13.0020	14.20	10.46	24.66	50.00	-25.34	AVG



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



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2819	21.47	10.25	31.72	60.76	-29.04	QP
2	0.2819	11.72	10.25	21.97	50.76	-28.79	AVG
3	1.4180	8.43	10.22	18.65	46.00	-27.35	AVG
4*	1.4980	19.31	10.23	29.54	56.00	-26.46	QP
5	12.1420	21.04	10.41	31.45	60.00	-28.55	QP
6	13.0020	8.02	10.46	18.48	50.00	-31.52	AVG

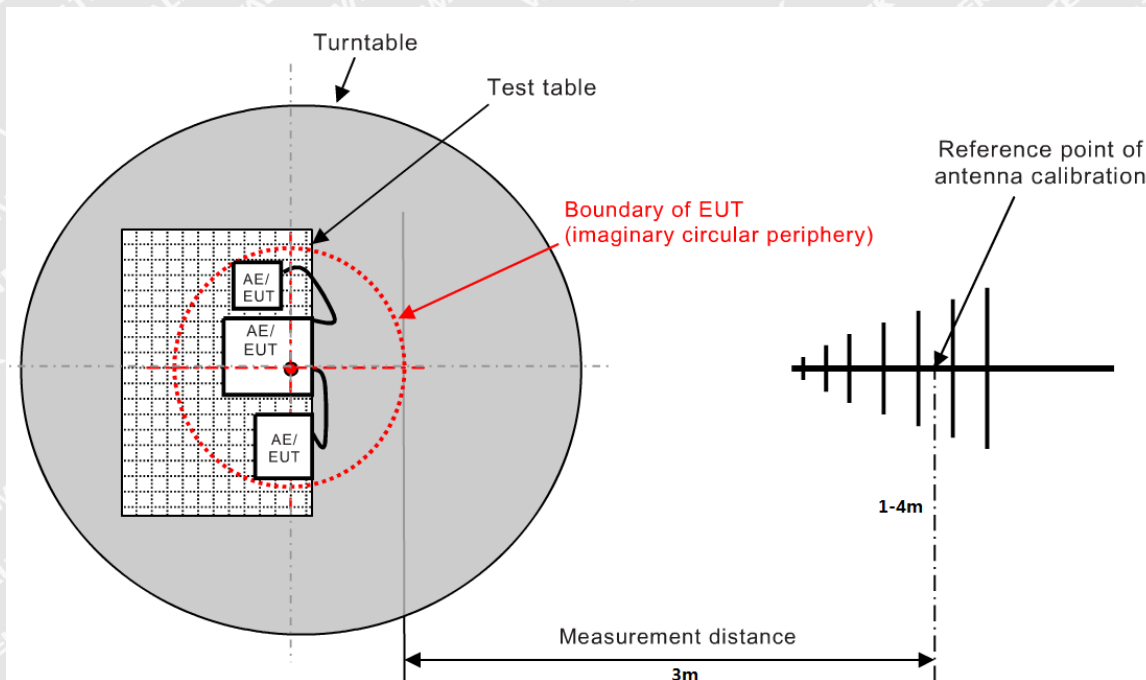




## 4. Radiated Emissions

### 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  $-6\text{dB}\mu\text{V}$  means the emission is  $6\text{dB}\mu\text{V}$  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

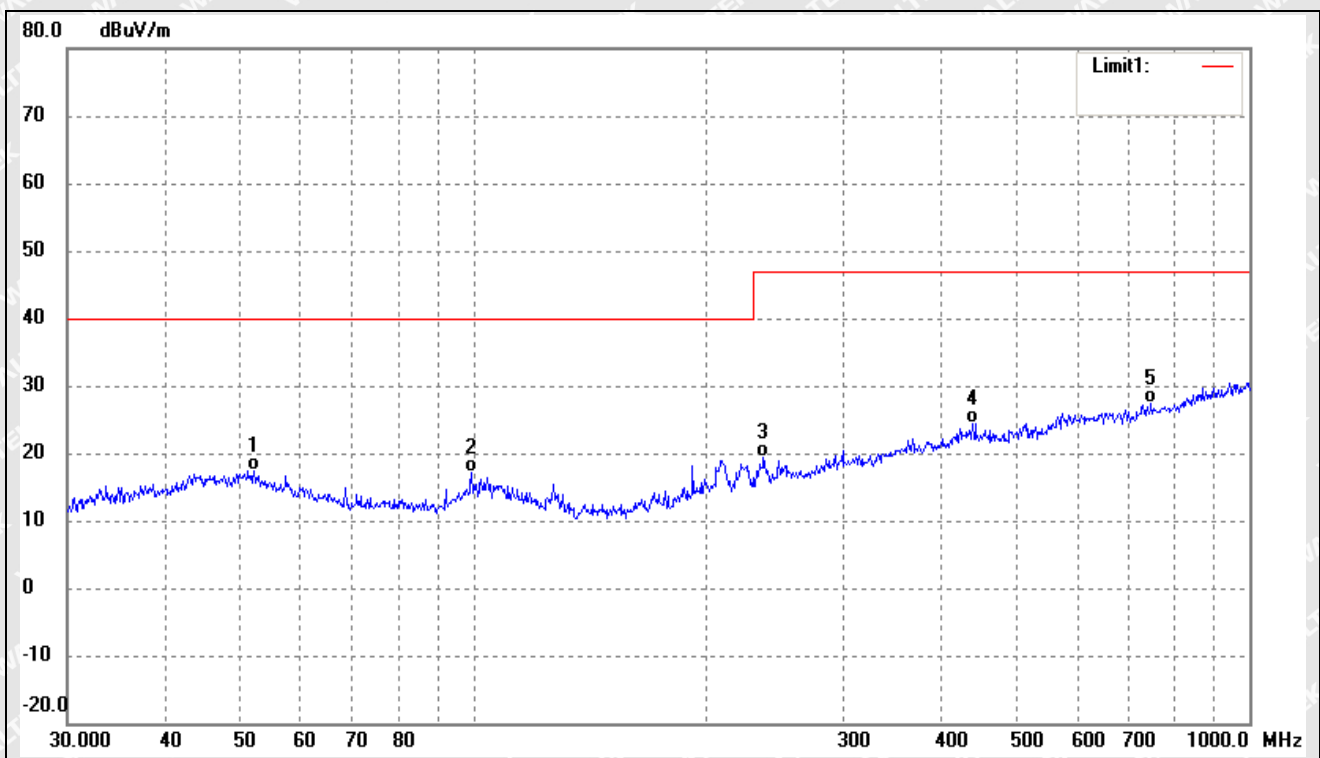
Temperature:	25° C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

### 4.4 Summary of Test Results/Plots

Note: Only show the worst case in the test report

➤ 30MHz to 1GHz

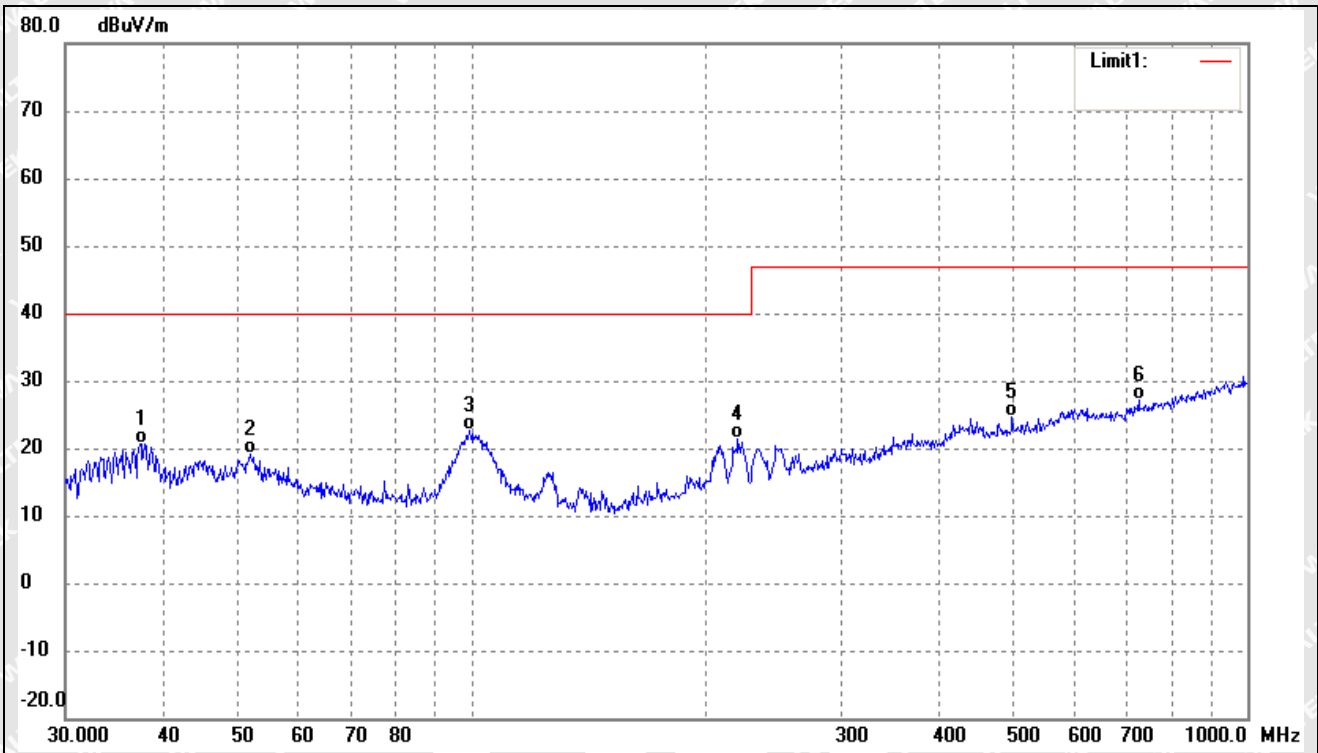
Test mode:	TM1	Polarity:	Horizontal
------------	-----	-----------	------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	52.2079	28.17	-10.67	17.50	40.00	-22.50	-	-	QP
2	99.5281	29.50	-12.48	17.02	40.00	-22.98	-	-	QP
3	236.6447	29.51	-10.09	19.42	47.00	-27.58	-	-	QP
4	440.1963	28.75	-4.41	24.34	47.00	-22.66	-	-	QP
5	747.4825	28.18	-0.91	27.27	47.00	-19.73	-	-	QP



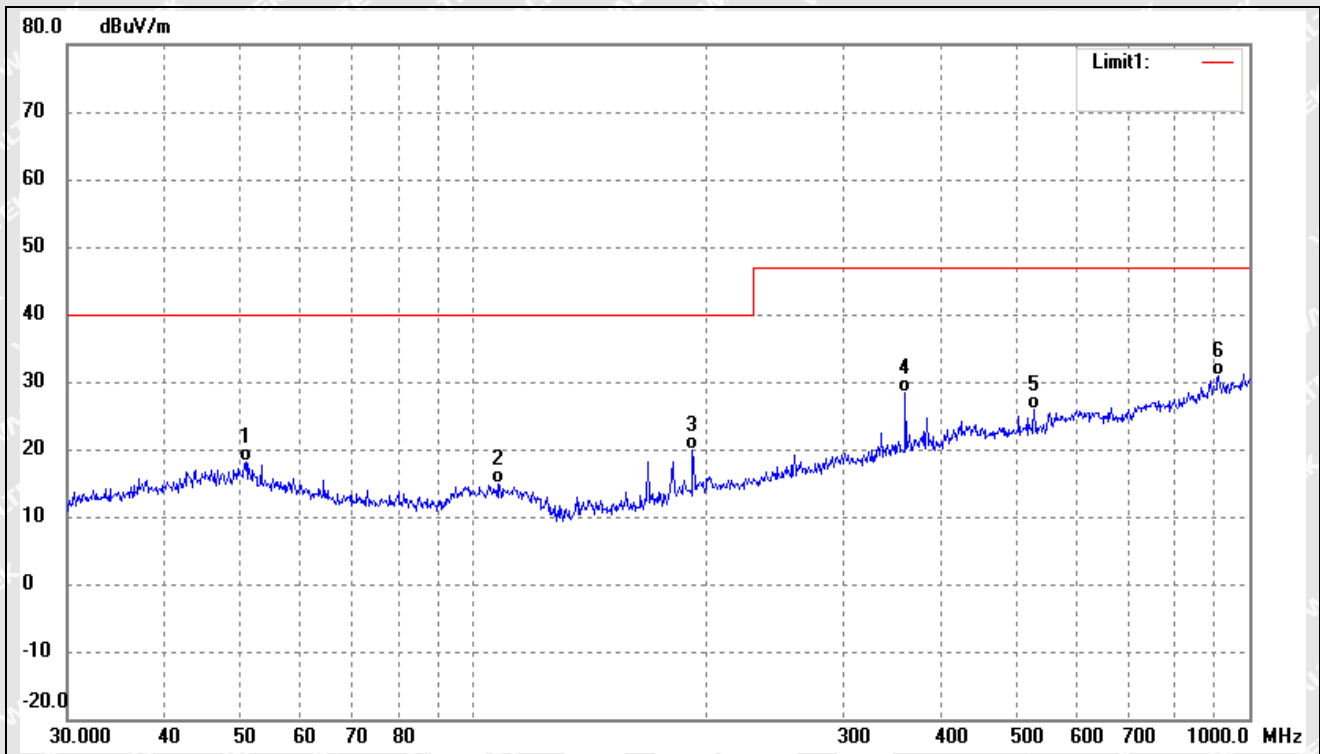
Test mode:	TM1	Polarity:	Vertical
------------	-----	-----------	----------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	37.5479	32.87	-12.18	20.69	40.00	-19.31	-	-	QP
2	51.8430	29.77	-10.59	19.18	40.00	-20.82	-	-	QP
3	99.5281	35.09	-12.48	22.61	40.00	-17.39	-	-	QP
4	220.6171	32.12	-10.86	21.26	40.00	-18.74	-	-	QP
5	497.6765	29.02	-4.50	24.52	47.00	-22.48	-	-	QP
6	724.2611	28.29	-1.23	27.06	47.00	-19.94	-	-	QP



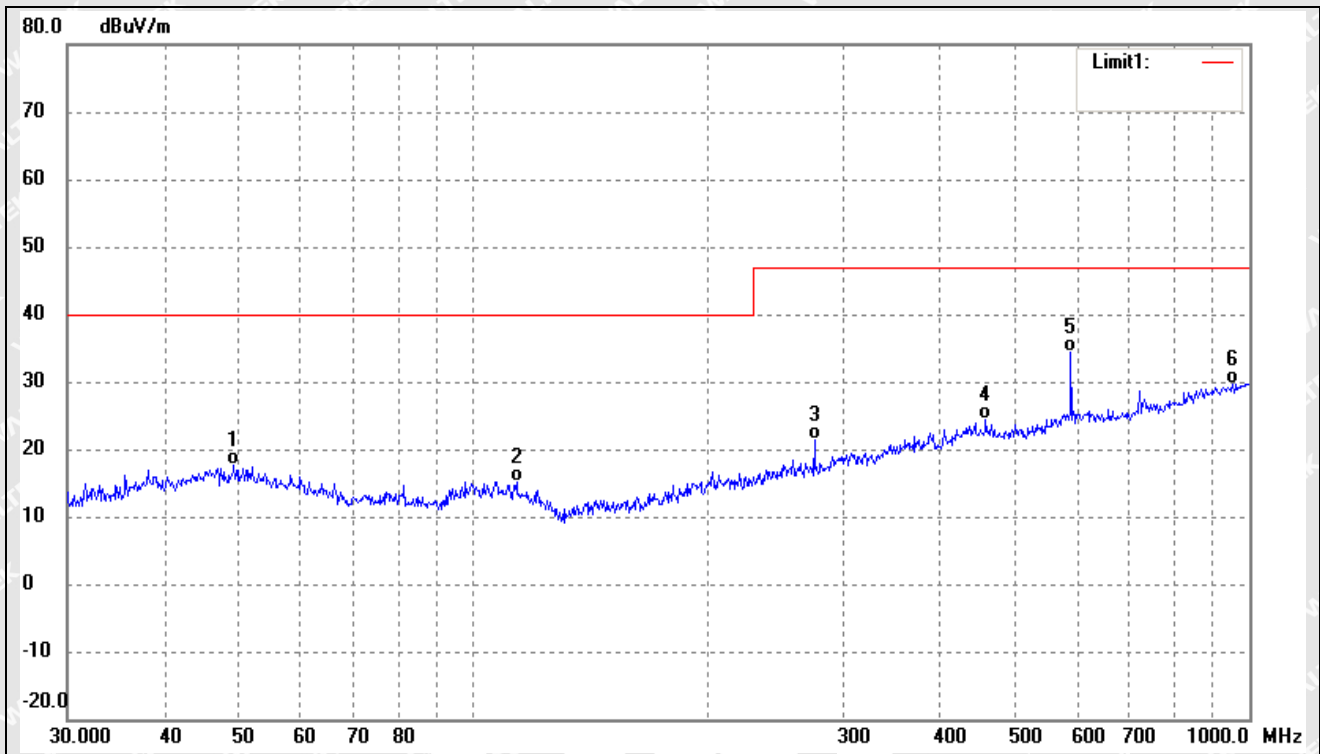
Test mode:	TM2	Polarity:	Horizontal
------------	-----	-----------	------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	50.9420	28.55	-10.39	18.16	40.00	-21.84	-	-	QP
2	107.5101	27.08	-12.21	14.87	40.00	-25.13	-	-	QP
3	191.7450	31.73	-11.93	19.80	40.00	-20.20	-	-	QP
4	360.4476	34.29	-5.95	28.34	47.00	-18.66	-	-	QP
5	528.2458	30.15	-4.35	25.80	47.00	-21.20	-	-	QP
6	912.8620	29.13	1.81	30.94	47.00	-16.06	-	-	QP



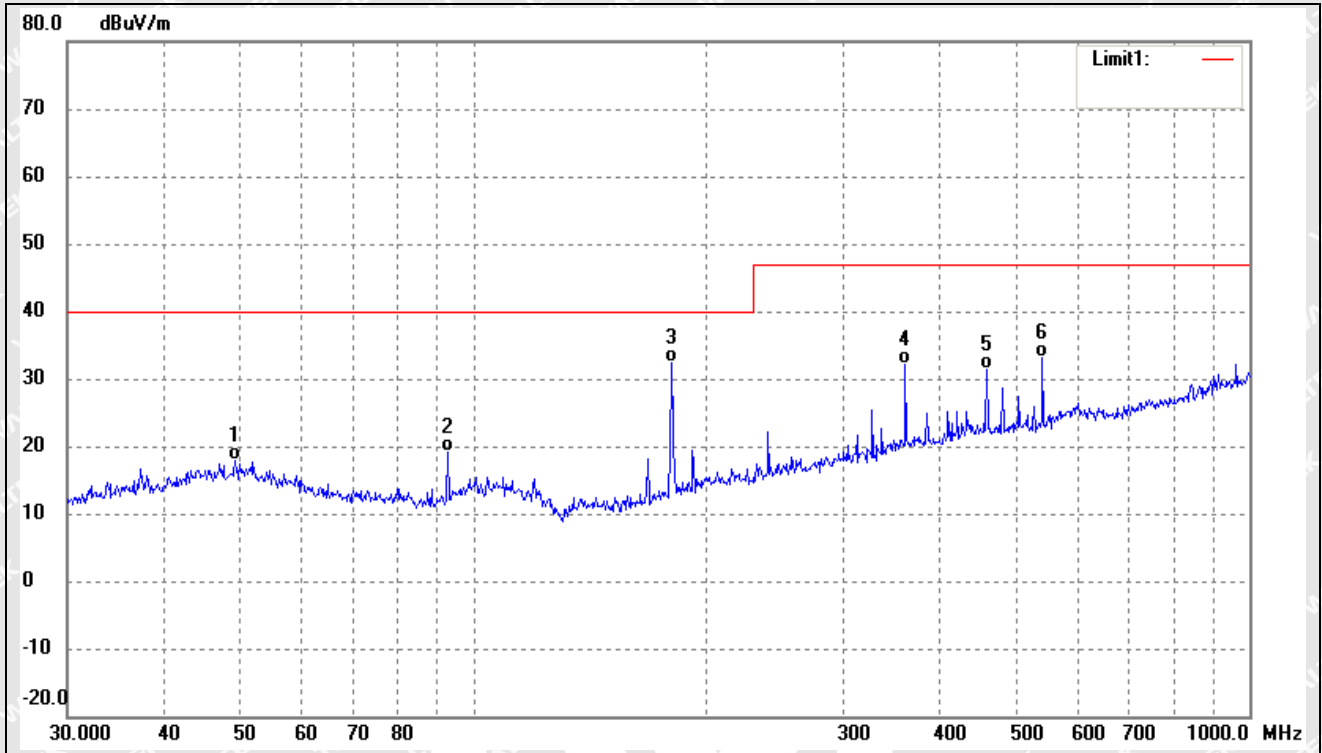
Test mode:	TM2	Polarity:	Vertical
------------	-----	-----------	----------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	49.1865	27.99	-10.25	17.74	40.00	-22.26	-	-	QP
2	113.7143	27.76	-12.56	15.20	40.00	-24.80	-	-	QP
3	275.1570	30.10	-8.69	21.41	47.00	-25.59	-	-	QP
4	457.5073	29.14	-4.77	24.37	47.00	-22.63	-	-	QP
5	588.9051	36.79	-2.40	34.39	47.00	-12.61	-	-	QP
6	952.0937	27.13	2.45	29.58	47.00	-17.42	-	-	QP



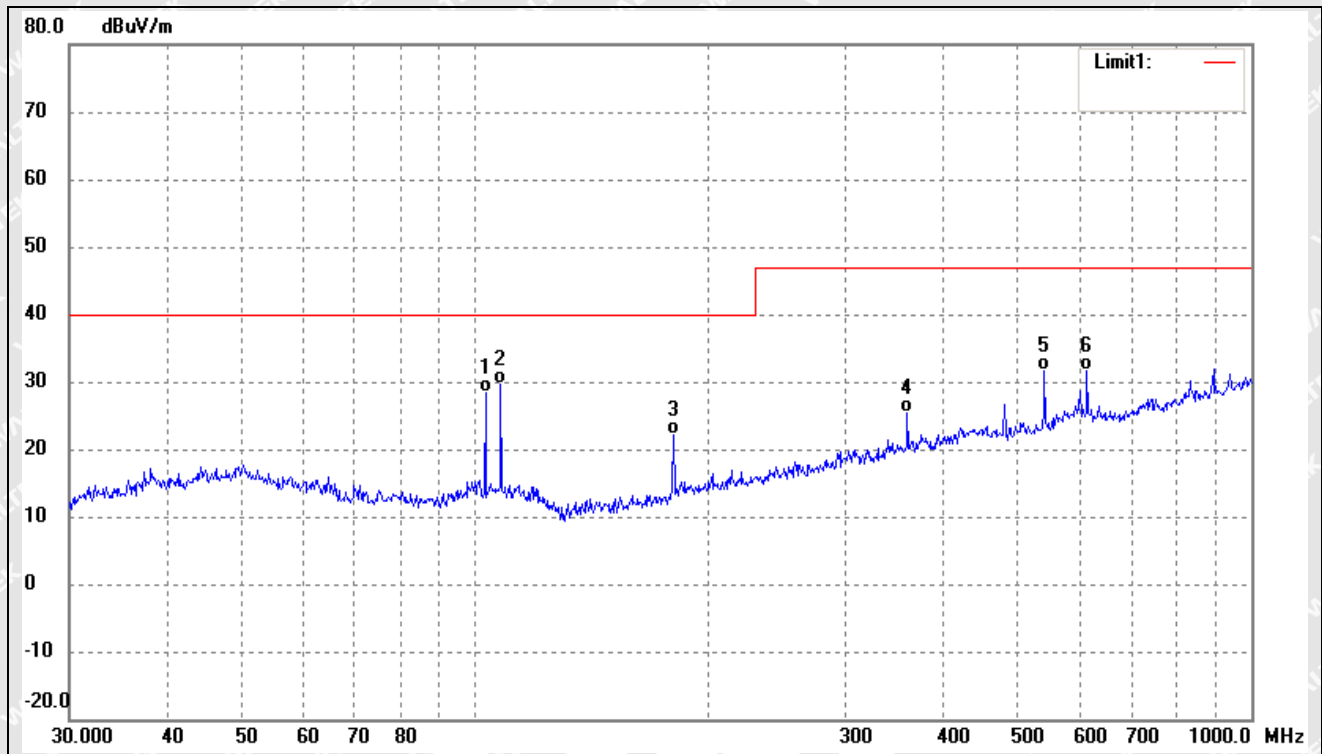
Test mode:	TM3	Polarity:	Horizontal
------------	-----	-----------	------------



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( )	Height (cm)	Remark
1	49.3594	28.08	-10.24	17.84	40.00	-22.16	-	-	QP
2	92.7871	33.13	-13.91	19.22	40.00	-20.78	-	-	QP
3	180.0165	45.76	-13.32	32.44	40.00	-7.56	-	-	QP
4	360.4476	38.12	-5.95	32.17	47.00	-14.83	-	-	QP
5	459.1144	36.10	-4.81	31.29	47.00	-15.71	-	-	QP
6	541.3725	37.24	-4.02	33.22	47.00	-13.78	-	-	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	103.0799	40.65	-12.31	28.34	40.00	-11.66	-	-	QP
2	107.8876	41.82	-12.20	29.62	40.00	-10.38	-	-	QP
3	180.0165	35.37	-13.32	22.05	40.00	-17.95	-	-	QP
4	360.4476	31.43	-5.95	25.48	47.00	-21.52	-	-	QP
5	541.3724	35.56	-4.02	31.54	47.00	-15.46	-	-	QP
6	614.2142	34.06	-2.34	31.72	47.00	-15.28	-	-	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.

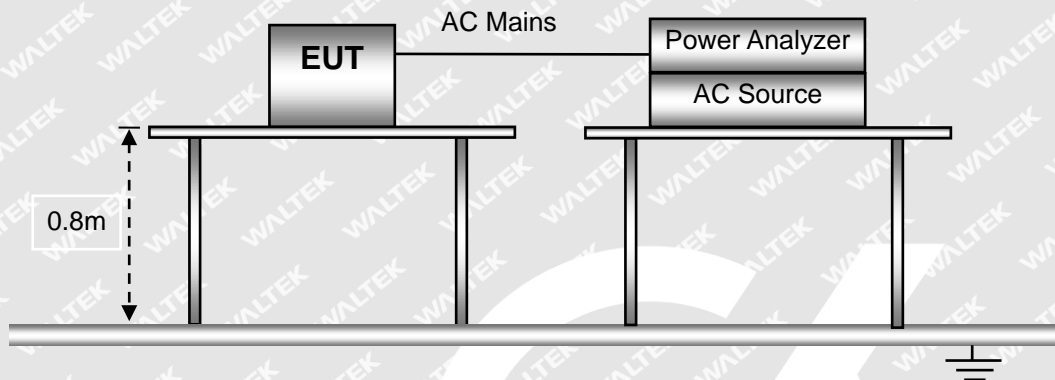


## 5. Harmonic Current Emissions

### 5.1 Test Procedure

Test is conducting under the description of EN 61000-3-2.

### 5.2 Test Setup Block Diagram



### 5.3 Test Standards

EN61000-3-2, Clause 7.1 Limits for Class A equipment.

### 5.4 Environmental Conditions

Temperature:	26 °C
Relative Humidity:	55%
ATM Pressure:	1015 mbar

### 5.5 Harmonic Current Emissions Test Data

According to Clause 7 of EN61000-3-2, the EUT rated power is less than 75W, belong to 'equipment with a rated power of 75W or less', therefore 'limits are not specified in this edition of the standards'. It is deem to full fit the requirements of the standards.

Result: N/A



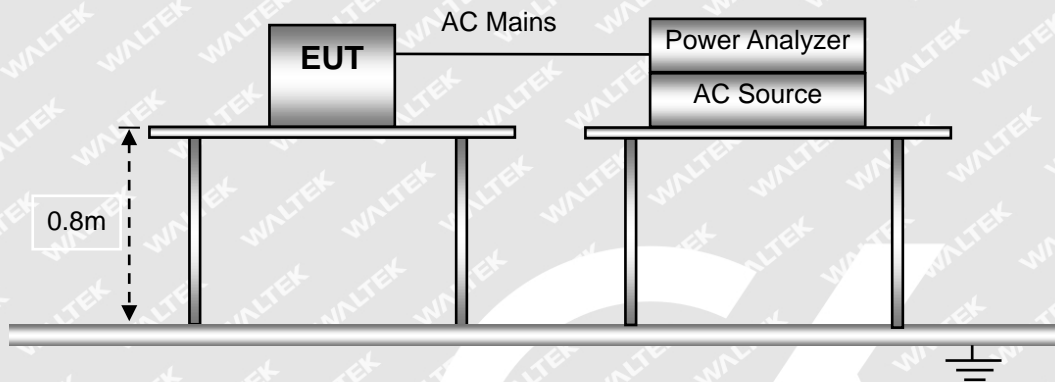


## 6. Voltage Fluctuation and Flicker

### 6.1 Test Procedure

Test is conducting under the description of EN 61000-3-3.

### 6.2 Test Setup Block Diagram



### 6.3 Test Standards

EN61000-3-3, Limit: Clause 5.

### 6.4 Environmental Conditions

Temperature:	26 °C
Relative Humidity:	55%
ATM Pressure:	1015 mbar

### 6.5 Voltage Fluctuation and Flicker Test Data

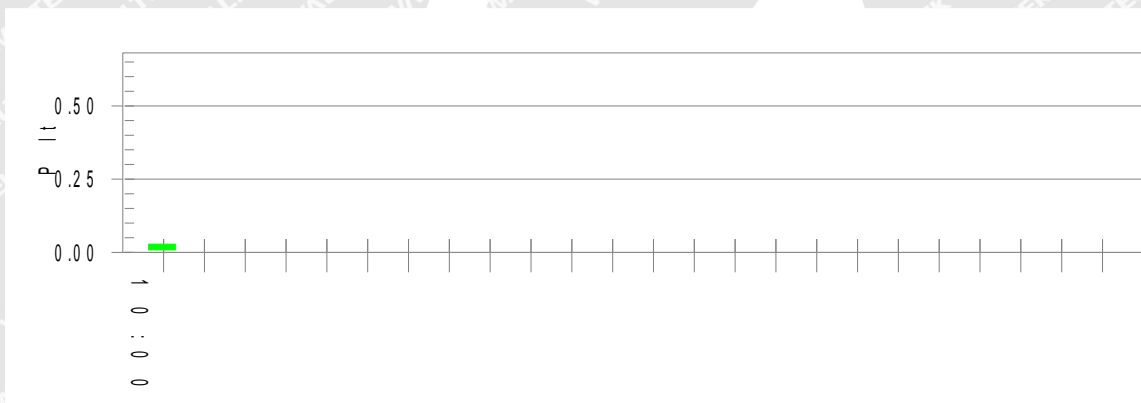


Test mode:

TM1(worst case)

Test Result: Pass

Status: Test Completed

Pst<sub>i</sub> and limit lineEuropean LimitsPlt and limit line

## Parameter values recorded during the test:

Vrms at the end of test (Volt):	229.99			
T-max (mS):	0	Test limit (mS):	500.0	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000	Pass
Highest Plt (2 hr. period):	0.028	Test limit:	0.650	Pass

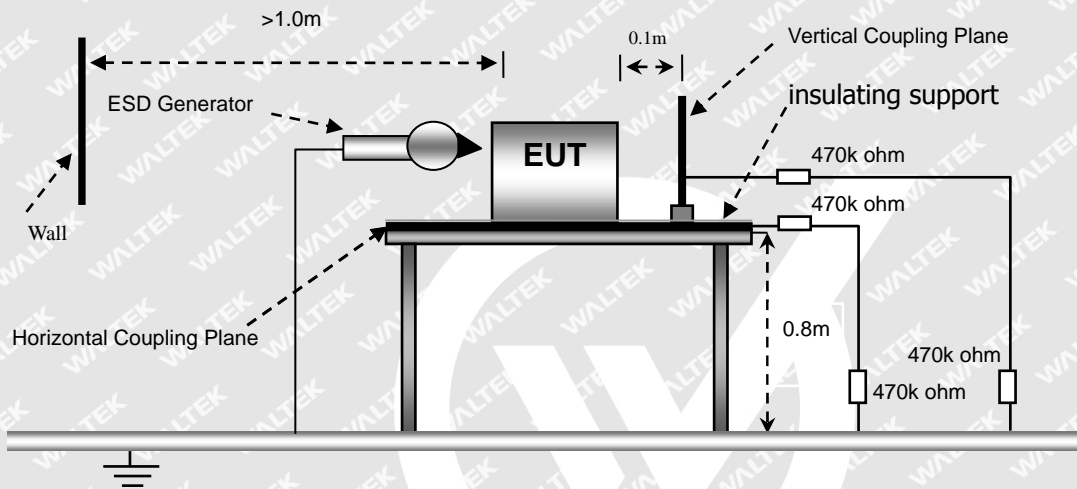


## 7. Electrostatic Discharge (ESD)

### 7.1 Test Procedure

Test is conducting under the description of EN 61000-4-2.

### 7.2 Test Setup Block Diagram



### 7.3 Test Performance

Performance Criterion:	Mode	Verdict
	TM1-TM4	

Note: TM4 for TT, TR

### 7.4 Environmental Conditions

Temperature:	26 °C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

### 7.5 Electrostatic Discharge Immunity Test Data



Test mode	TM1-TM4							
EN 61000-4-2 Test Points	Test Levels (kV)							
	-2	+2	-4	+4	-6	+6	-8	+8
<b>Air Discharge</b>								
Charging Port	A	A	A	A	A	A	A	A
MIC	A	A	A	A	A	A	A	A
AUX Port	A	A	A	A	A	A	B	B
Button	A	A	A	A	A	A	A	A
TF Card Port	A	A	A	A	A	A	B	B
Enclosure	A	A	A	A	A	A	A	A
<b>Direct Contact Discharge</b>								
/	/	/	/	/	/	/	/	/
<b>Indirect Contact Discharge</b>								
HCP (6 Sides)	A	A	A	A	/	/	/	/
VCP (4 Sides)	A	A	A	A	/	/	/	/

Test Result: Pass

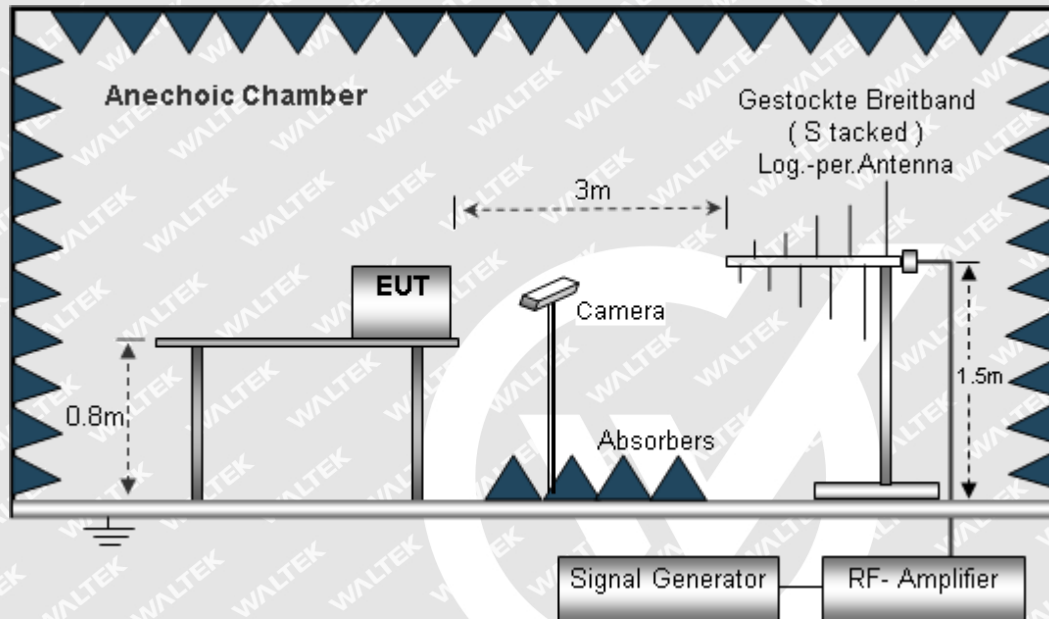


## 8. Radio Frequency Electromagnetic Field (R/S)

### 8.1 Test Procedure

Test is conducting under the description of EN 61000-4-3.

### 8.2 Test Setup Block Diagram



### 8.3 Test Performance

Performance Criterion:	Mode	Verdict
	TM1-TM4	

Note: TM4 for CT, CR

### 8.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1010 mbar

### 8.5 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-TM4							
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



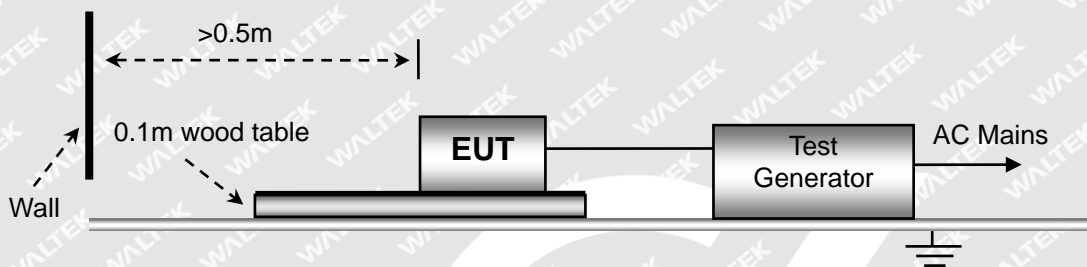
## 9. Fast Transients, Common Mode (EFT)

### 9.1 Test Procedure

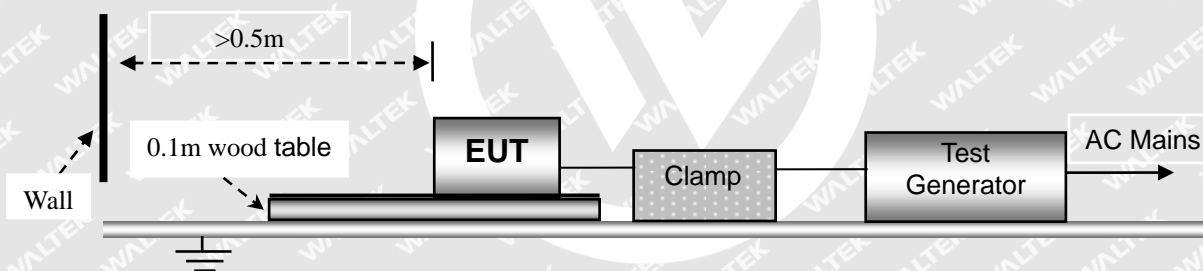
Test is conducting under the description of EN 61000-4-4.

### 9.2 Test Setup Block Diagram

For AC Mains or DC Ports:



For Signal or Telecommunication Ports:



### 9.3 Test Performance

Performance Criterion:	Mode	Verdict
	TM1-TM4	B

Note: TM4 for TT, TR

### 9.4 Environmental Conditions

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

### 9.5 Electrical Fast Transients Test Data



Test Mode		TM1, TM4							
EN 61000-4-4 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	/	/	/	/
	L-N	/	/	/	/	/	/	/	/
	L-PE	A	A	A	A	/	/	/	/
	N-PE	/	/	/	/	/	/	/	/
	L-N-PE	/	/	/	/	/	/	/	/
Signal ports	/	/	/	/	/	/	/	/	/

Test Result: Pass



# WALTEK





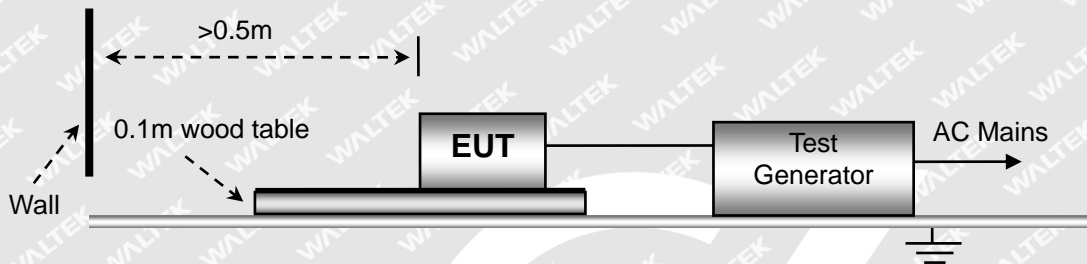
## 10. Surges

### 10.1 Test Procedure

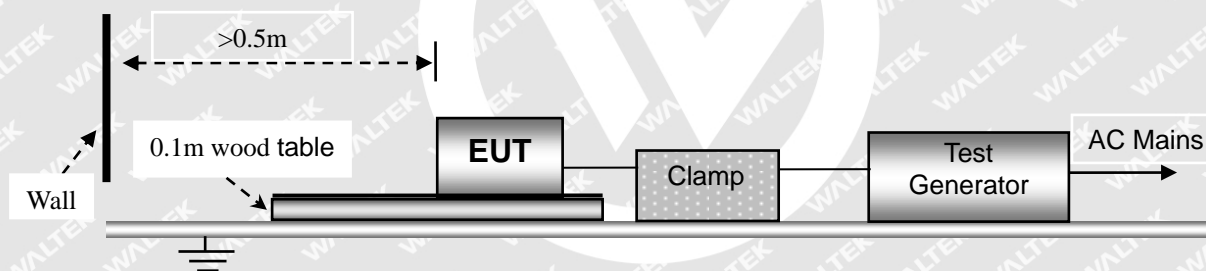
Test is conducting under the description of EN 61000-4-5.

### 10.2 Test Setup Block Diagram

For AC Mains or DC Ports:



For Signal or Telecommunication Ports:



### 10.3 Test Performance

Performance Criterion:	Mode	Verdict
	TM1-TM4	B

Note: TM4 for TT, TR

### 10.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

### 10.5 Surge Test Data



Test Mode	TM1, TM4			
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	/	/

Test Result: Pass



# WALTEK



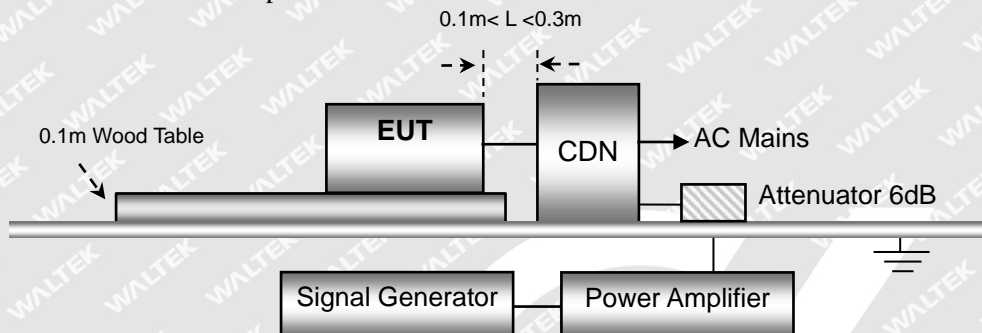
## 11. Radio Frequency, Common Mode (C/S)

### 11.1 Test Procedure

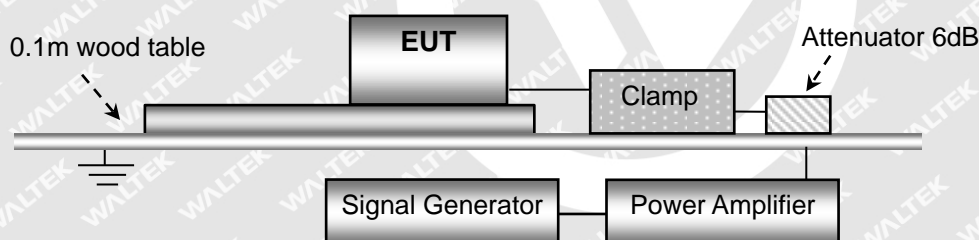
Test is conducting under the description of EN 61000-4-6.

### 11.2 Test Setup Block Diagram

For AC Mains or DC Input:



For Signal or Telecommunication Ports:



### 11.3 Test Performance

Performance Criterion:	Mode	Verdict
		TM1-TM4

Note: TM4 for CT, CR

### 11.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1011 mbar

### 11.5 Continuous Conducted Disturbances Test Data

Sweep frequency range: 150kHz~80MHz

Frequency step: 1% of fundamental

Dwell time: 1 second

Waltek Testing Group (Shenzhen) Co., Ltd.

<http://www.semtest.com.cn>



Test Mode		TM1, TM4		
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

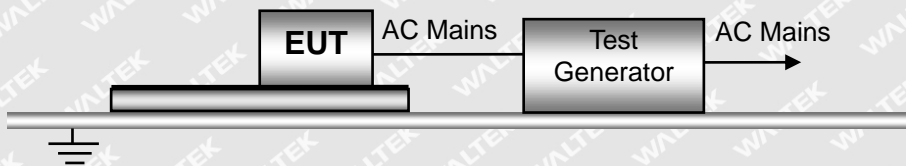


## 12. Voltage Dips and Interruptions

### 12.1 Test Procedure

Test is conducting under the description of EN 61000-4-11.

### 12.2 Test Setup Block Diagram



### 12.3 Test Performance

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

### 12.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50%
ATM Pressure:	1011 mbar

### 12.5 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	C	/

Test Result: Pass



## EXHIBIT 1 - PRODUCT LABELING

---

Please refer to “ANNEX\_EUT Label & Photos”.



# WALTEK



## EXHIBIT 2 - EUT PHOTOGRAPHS

---

Please refer to “ANNEX\_EUT Label & Photos”.



# WALTEK



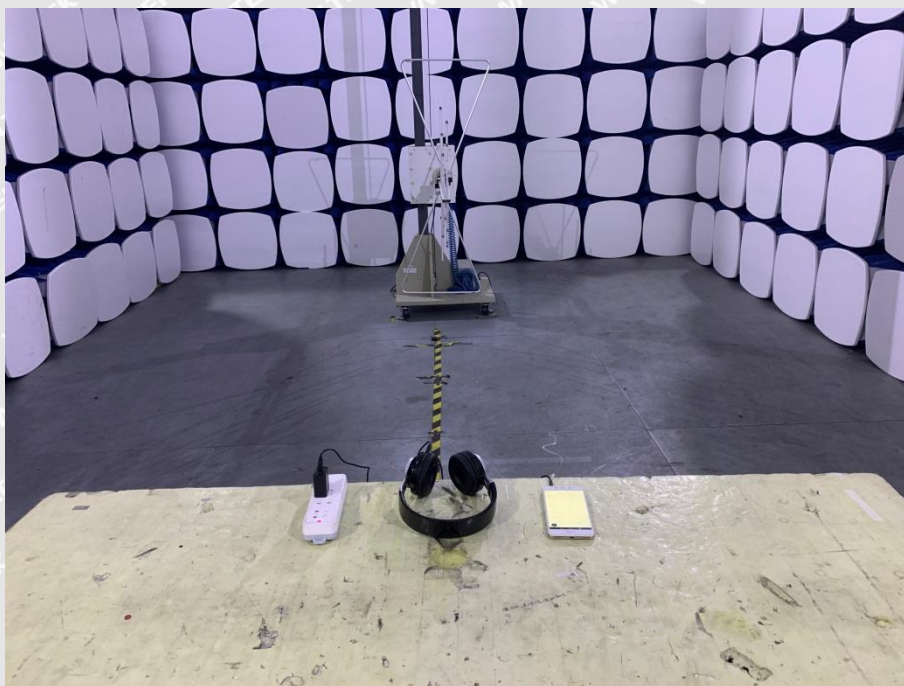
## EXHIBIT 3 - TEST SETUP PHOTOGRAPHS

---

### Conduction Emission Test View



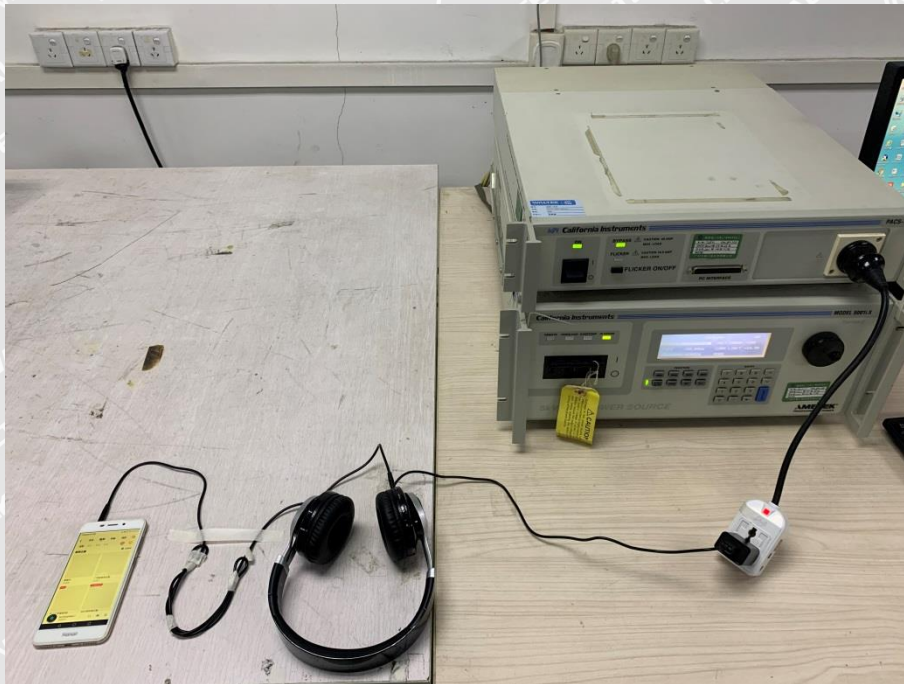
### Radiation Emission Test View (Below 1GHz)







**Flicker Test View**

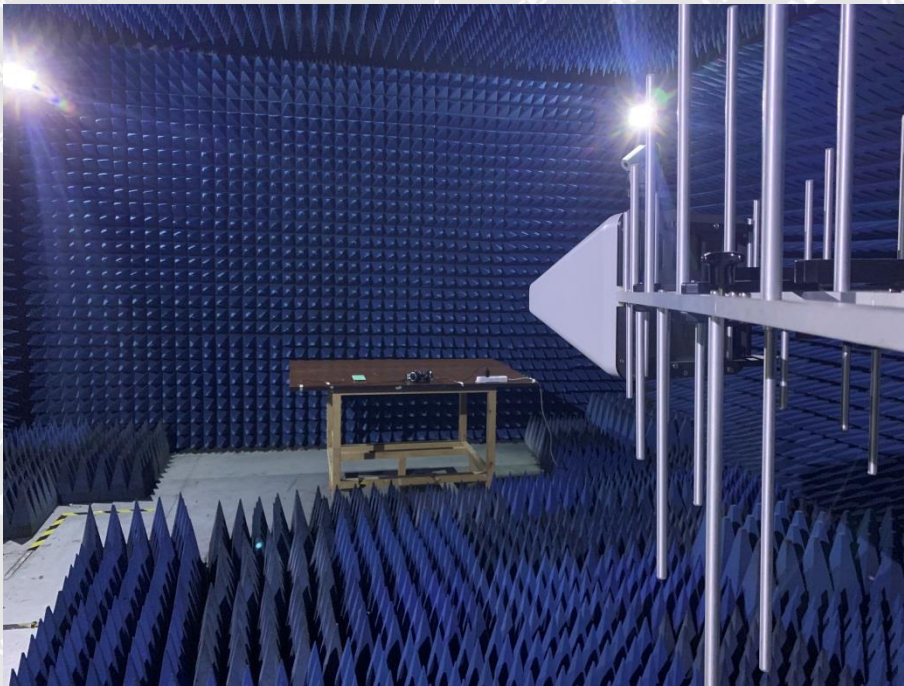


**EN 61000-4-2 Test View**





**EN 61000-4-3 Test View**

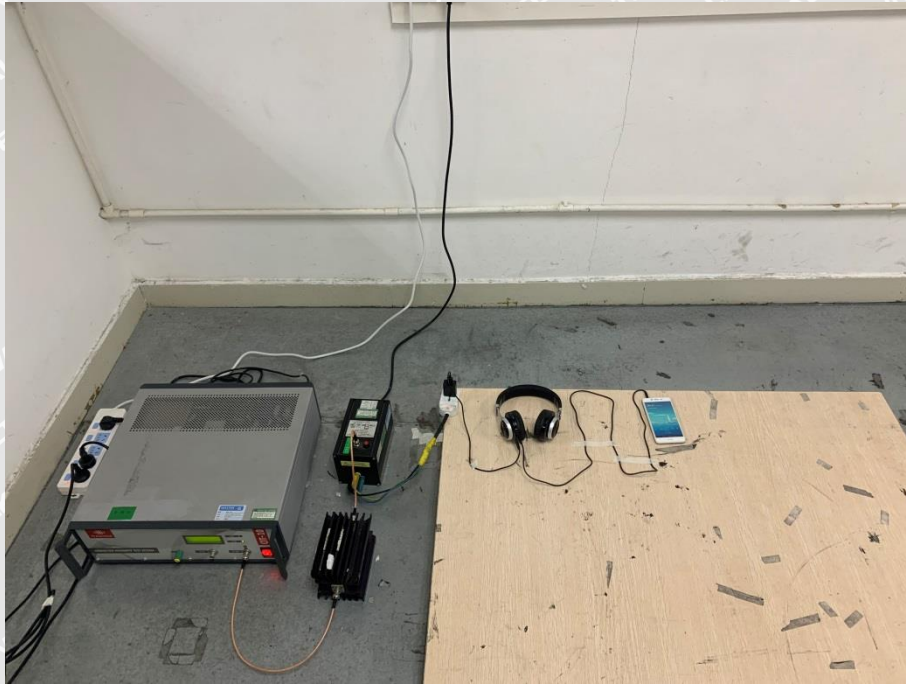


**EN 61000-4-4/5/11 Test View**





**EN 61000-4-6 Test View**



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

**WALTEK**