



# TEST REPORT

**Reference No.** ..... : WTF21F09092922W002  
**Applicant** ..... : Mid Ocean Brands B.V.  
**Address** ..... : 7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong  
**Manufacturer** ..... : 109328  
**Product Name** ..... : Health bracelet(smart watch)  
**Model No.** ..... : MO9771  
**Standards** ..... : ETSI EN 301 489-1 V2.2.3 (2019-11)  
ETSI EN 301 489-17 V3.2.4 (2020-09)  
**Date of Receipt sample** ..... : 2021-09-03  
**Date of Test** ..... : 2021-09-09 to 2021-09-14  
**Date of Issue** ..... : 2021-10-08  
**Test Report Form No.** ..... : WEW-301489A-01A  
**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.

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## 1 Test Summary

Emission				
Test	Test Requirement	Test Method	Class / Severity	Result
Conducted Emissions	ETSI EN 301 489-17 V3.2.4	ETSI EN 301 489-1 V2.2.3 EN 55032	Table A.10 of EN 55032	Pass
Radiation Emission	ETSI EN 301 489-17 V3.2.4	ETSI EN 301 489-1 V2.2.3 EN 55032	Table A.4 and Table A.5 of EN 55032	Pass
Harmonic Current Emissions	ETSI EN 301 489-17 V3.2.4	ETSI EN 301 489-1 V2.2.3 EN 61000-3-2	Clause 7 of EN 61000-3-2	Pass**
Voltage Fluctuations and Flicker	ETSI EN 301 489-17 V3.2.4	ETSI EN 301 489-1 V2.2.3 EN 61000-3-3	Clause 5 of EN 61000-3-3	Pass
Immunity				
Test	Test Requirement	Test Method	Class / Severity	Result
Electrostatic Discharge (ESD)	ETSI EN 301 489-17 V3.2.4	ETSI EN 301 489-1 V2.2.3 EN 61000-4-2	$\pm 2/\pm 4$ kV Contact $\pm 2/\pm 4/\pm 8$ kV Air	Pass
Radio frequency electromagnetic field (80 MHz to 6 000MHz)	ETSI EN 301 489-17 V3.2.4	ETSI EN 301 489-1 V2.2.3 EN 61000-4-3	3V/m, 80%, 1kHz, Amp. Mod.	Pass
Fast Transients Common Mode (EFT)	ETSI EN 301 489-17 V3.2.4	ETSI EN 301 489-1 V2.2.3 EN 61000-4-4	AC $\pm 0.5/1.0$ kV	Pass
Surge	ETSI EN 301 489-17 V3.2.4	ETSI EN 301 489-1 V2.2.3 EN 61000-4-5	$\pm 1$ kV D.M.† $\pm 2$ kV C.M.‡	Pass
RF common mode 0,15 MHz to 80 MHz (CS)	ETSI EN 301 489-17 V3.2.4	ETSI EN 301 489-1 V2.2.3 EN 61000-4-6	3Vrms(emf), 80%, 1kHz Amp. Mod.	Pass
Voltage Dips and Interruptions	ETSI EN 301 489-17 V3.2.4	ETSI EN 301 489-1 V2.2.3 EN 61000-4-11	0 % UT* for 0.5per 0 % UT* for 1per 70 % UT* for 25per 0 % UT* for 250per	Pass

### Remark:

Pass Test item meets the requirement

Fail Test item does not meet the requirement

N/A Test case does not apply to the test object

A.M Amplitude Modulation

† Differential Mode

‡ Common Mode

\*  $U_T$  is the nominal supply voltage

\*\* According to EN61000-3-2 which states:“ For the following categories of equipment limits are not specified in this edition of the standard. Equipment with a rated power of 75W or less, other than lighting equipment” Therefore there is no need for harmonics test to be performed on this product and deemed to fulfil emission requirements without testing.





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### 3 General Information

#### 3.1 General Description of E.U.T.

Product Name ..... : Health bracelet(smart watch)

Model No. .... : MO9771

Remark ..... : ---

#### 3.2 Details of E.U.T.

Technical Data ..... : Input: DC 5V, 65mA  
Rechargeable battery: 3.7V

#### 3.3 Description of Support Units

The EUT has been tested as an independent unit. MO9771 is the test sample. The all tests were performed in the condition of AC 230V/50Hz input. All tests were performed with the AC adapter specified by the laboratory.

#### 3.4 Standards Applicable for Testing

The tests were performed according to following standards:

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 301 489-17 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 for ElectroMagnetic Compatibility





### 3.5 Test Facility

The test facility has a test site registered with the following organizations:

- **ISED – Registration No.: 21895**

Waltek Testing Group (Foshan) Co., Ltd. has been registered and fully described in a report filed with the Innovation, Science and Economic Development Canada (ISED). The acceptance letter from the ISED is maintained in our files. Registration ISED number: 21895, March 12, 2019

- **FCC – Registration No.: 820106**

Waltek Testing Group (Foshan) 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. Registration 820106, August 16, 2018

- **NVLAP – Lab Code: 600191-0**

Waltek Testing Group (Foshan) Co., Ltd. EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 600191-0.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

### 3.6 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

Yes  No

If Yes, list the related test items and lab information:

Test items: ---

Lab information: ---

### 3.7 Abnormalities from Standard Conditions

None.



## 4 Equipment Used during Test

### 4.1 Equipment List

Mains Terminal Disturbance Voltage 1#(Conducted Emission)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1.	EMI Test Receiver	R&S	ESR3	102423	2021-01-11	2022-01-10
2.	LISN	R&S	ENV216	101343	2021-01-13	2022-01-12
3.	Cable	HUBER+SUHNER	CBL2-NN-6M	223NN624	2021-01-12	2022-01-11
4.	Switch	CD	RSU-A4 18G	RSUA4008	2021-01-11	2022-01-10
Mains Terminal Disturbance Voltage 2#(Conducted Emission)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1.	EMI Test Receiver	R&S	ESCI	101178	2021-01-11	2022-01-10
2.	LISN	R&S	ENV216	101215	2021-01-13	2022-01-12
3.	Cable	HUBER+SUHNER	CBL2-NN-6M	6102701	2021-01-12	2022-01-11
4.	Switch	ESE	RSU/M2	---	2021-01-11	2022-01-10
Radiated Emission						
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1.	EMI Test Receiver	R&S	ESR7	101566	2021-01-11	2022-01-10
2.	Active Loop Antenna	SCHWARZBECK	FMZB1519B	00004	2021-01-08	2022-01-07
3.	Trilog Broadband Antenna	SCHWARZBECK	VULB 9162	9162-117	2021-01-08	2022-01-07
4.	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	01561	2021-01-08	2022-01-07
5.	Preamplifier	Lunar E M	LNA1G18-40	20160501002	2021-01-12	2022-01-11
Harmonics and Flicker Measuring System						
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1.	Harmonics and Flicker Measuring System	TESEQ	CCN1000-1	1133A01498	2021-01-13	2022-01-12
ESD						
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1.	ESD Simulator	TESEQ	NSG437	521	2021-01-19	2022-01-18
EFT & Voltage Dips and Interruptions						
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1.	EMS test system	TESEQ	NSG3040	1858	2021-01-11	2022-01-10
2.	Clamp	TESEQ	CDN8014	31405	2021-01-11	2022-01-10
Surge						
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1.	Surge Simulator	TESEQ	NSG3060	1395	2021-01-11	2022-01-10





Injected Currents						
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1.	Conducted Immunity test system	TESEQ	NSG4070	31469	2021-01-11	2022-01-10
2.	CDN	TESEQ	CDN M016	31586	2021-01-13	2022-01-12
3.	Clamp	TESEQ	KEMZ801	32362	2021-01-13	2022-01-12
Radio-frequency electromagnetic fields						
Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1.	RF Power Amplifier	OPHIR	5225R	1051/1712	2021-01-11	2022-01-10
2.	RF Power Amplifier	OPHIR	5293RE	1051/171	2021-01-11	2022-01-10
3.	Stacked double logarithmic periodic antenna	SCHWARZBECK	STLP9128E-SPECIAL	142	2021-01-08	2022-01-07
4.	Stacked double logarithmic periodic antenna	SCHWARZBECK	STLP 9149	476	2021-01-08	2022-01-07
5.	RF signal generator	Agilent	N5181A	MY48080720	2021-01-12	2022-01-11
6.	Power meter	RS	NRP6A	101133	2021-01-11	2022-01-10
7.	Power meter	RS	NRP6A	101134	2021-01-11	2022-01-10
8.	Electric field probe	Narda	EP 601	611WX70311	2021-01-13	2022-01-12

#### 4.2 Software List

Description	Manufacturer	Model	Version
EMI Test Software (Conducted Emission1#)	FARATRONIC	EZ-EMC	EMEC-3A1
EMI Test Software (Conducted Emission2#)	FARATRONIC	EZ-EMC	CON-03A1
EMI Test Software (Radiated Emission)	FARATRONIC	EZ-EMC	RA-03A1-1
Harmonics and Flicker Test Software	TESEQ	Win2100	V4.28
Radiated Immunity Test Software	TONSCEND	JS35-RS	V2.0.1.7



### 4.3 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conducted Emission	150kHz~30MHz	±2.7dB	(1)
Radiated Emission	30MHz~1GHz	±4.1dB	(1)
Radiated Emission	1GHz~6GHz	±5.0dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

### 4.4 Special Accessories and Auxiliary Equipment

Item	Equipment	Technical Data	Manufacturer	Model No.	Serial No.
1.	AC Adapter	Input: AC 100-240V~, 50/60Hz, 0.5A Output: DC 5V, 2A or DC 9V, 2A	HUAWEI	HW-090200CHO	/
2.	Mobile Phone	--	Apple	IPHONE 12	DNPDM0RU0DYQ

### 4.5 Decision Rule

Compliance or non-compliance with a disturbance limit shall be determined in the following manner.

**If  $U_{LAB}$  is less than or equal to  $U_{cispr}$ , then**

- Compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

**If  $U_{LAB}$  is greater than  $U_{cispr}$ , then**

- Compliance is deemed to occur if no measured disturbance level, increased by  $(U_{LAB} - U_{cispr})$ , exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{LAB} - U_{cispr})$ , exceeds the disturbance limit.





## 5 EMC Requirements for Emissions

### 5.1 Conducted Emission

Test Requirement .....	: ETSI EN 301 489-17
Test Method .....	: ETSI EN 301 489-1, EN 55032 Class B
Frequency Range .....	: 150kHz to 30MHz
Class/Severity .....	: Class B/ Table A.10 of EN 55032
Ports .....	: AC Mains
Detector .....	: Peak for pre-scan (9kHz Resolution Bandwidth)

#### 5.1.1 E.U.T. Operation

##### Operating Environment:

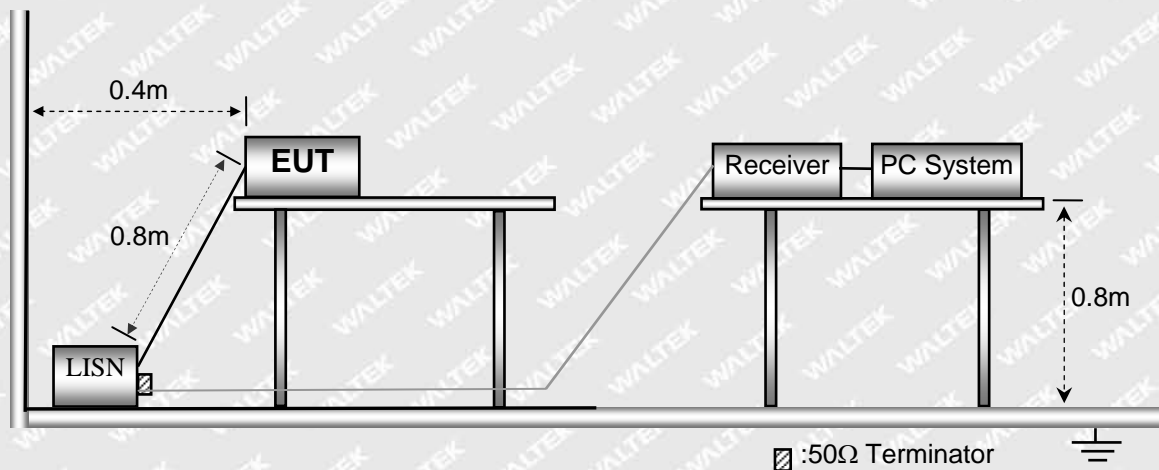
Temperature .....	: 26°C
Humidity .....	: 60%RH
Atmospheric Pressure .....	: 101.2kPa

##### EUT Operation:

Input Voltage .....	: AC 230V/50Hz
Operating Mode .....	: Communication mode

#### 5.1.2 Test Setup

The conducted emission tests were performed using the setup accordance with the EN 55032.





### 5.1.3 Corrected Amplitude & Margin Calculation

The Corrected factor is calculated by adding LISN VDF(Voltage Division Facotr), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Measurement} = \text{Reading Level} + \text{Correct Factor}$$

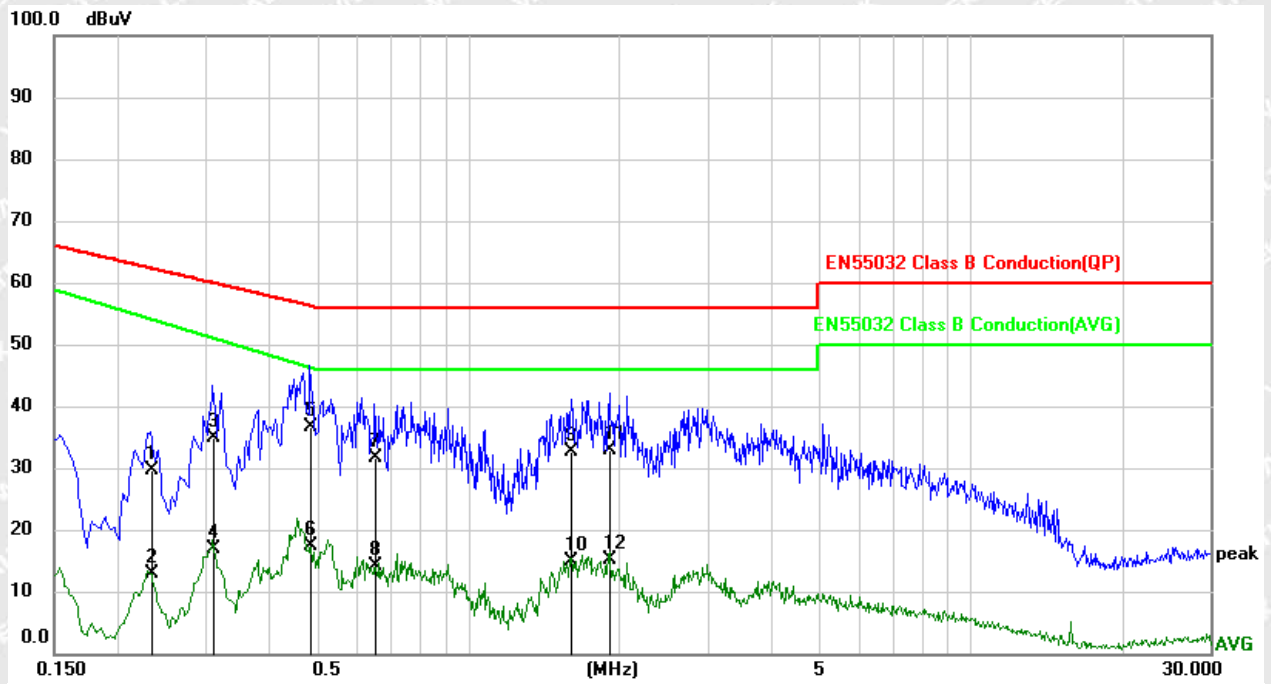
$$\text{Correct Facotor} = \text{LISN VDF} + \text{Cable Loss}$$

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Measurement}$$

### 5.1.4 Test Result

Live Line :

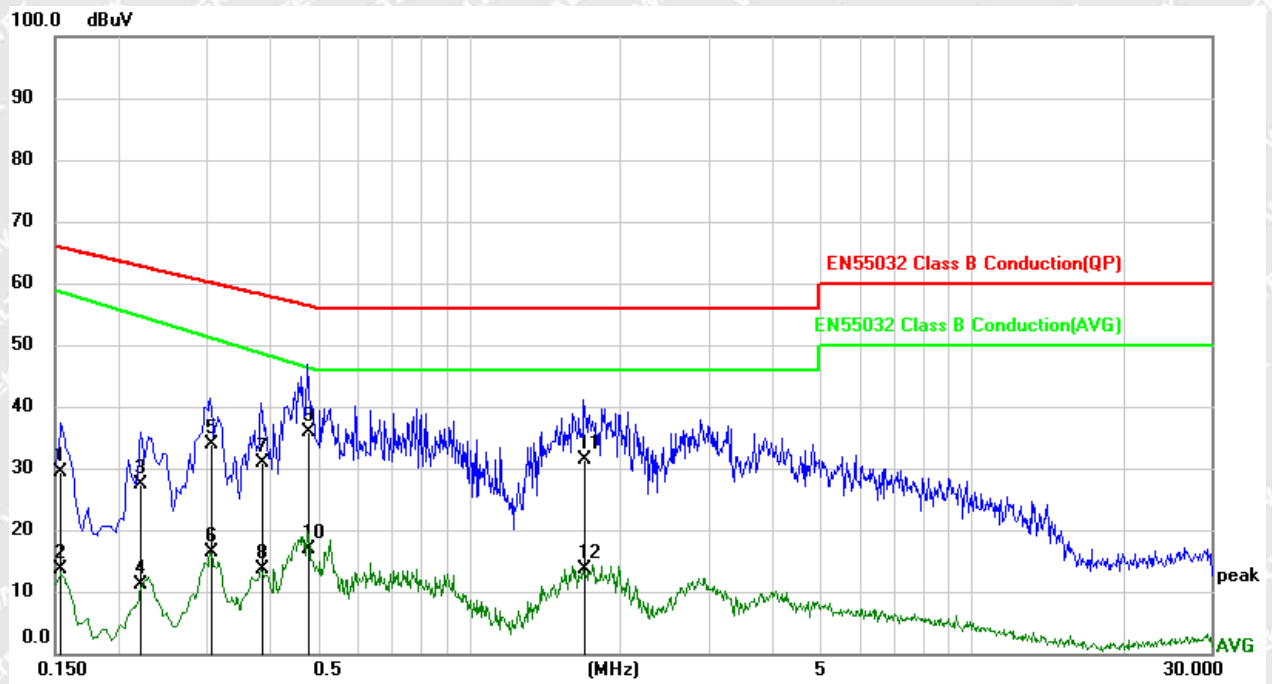


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.2340	19.89	9.64	29.53	62.31	-32.78	QP	
2		0.2340	3.33	9.64	12.97	55.88	-42.91	AVG	
3		0.3100	25.28	9.64	34.92	59.97	-25.05	QP	
4		0.3100	7.12	9.64	16.76	53.06	-36.30	AVG	
5	*	0.4860	27.01	9.66	36.67	56.24	-19.57	QP	
6		0.4860	7.67	9.66	17.33	46.52	-29.19	AVG	
7		0.6540	21.86	9.66	31.52	56.00	-24.48	QP	
8		0.6540	4.50	9.66	14.16	46.00	-31.84	AVG	
9		1.6019	23.04	9.69	32.73	56.00	-23.27	QP	
10		1.6019	5.29	9.69	14.98	46.00	-31.02	AVG	
11		1.9140	23.29	9.70	32.99	56.00	-23.01	QP	
12		1.9140	5.48	9.70	15.18	46.00	-30.82	AVG	





**Neutral Line :**



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1539	19.85	9.61	29.46	65.79	-36.33	QP	
2		0.1539	3.98	9.61	13.59	58.86	-45.27	AVG	
3		0.2220	17.71	9.63	27.34	62.74	-35.40	QP	
4		0.2220	1.62	9.63	11.25	56.33	-45.08	AVG	
5		0.3060	24.31	9.64	33.95	60.08	-26.13	QP	
6		0.3060	6.64	9.64	16.28	53.21	-36.93	AVG	
7		0.3860	21.33	9.65	30.98	58.15	-27.17	QP	
8		0.3860	3.94	9.65	13.59	50.23	-36.64	AVG	
9	*	0.4780	26.28	9.66	35.94	56.37	-20.43	QP	
10		0.4780	7.30	9.66	16.96	46.82	-29.86	AVG	
11		1.6940	21.59	9.70	31.29	56.00	-24.71	QP	
12		1.6940	3.88	9.70	13.58	46.00	-32.42	AVG	



## 5.2 Radiated Emission

**Test Requirement** ..... : ETSI EN 301 489-17

**Test Method** ..... : ETSI EN 301 489-1, EN 55032, Class B

**Frequency Range** ..... : 30MHz to 1GHz, 1GHz to 6GHz

**Class/Severity** ..... : Class B/ Table A.4 and A.5 of EN 55032

**Detector** ..... : Peak for pre-scan (120kHz Resolution Bandwidth Below 1GHz;  
1MHz Resolution Bandwidth Above 1GHz)

### 5.2.1 EUT Operation:

#### Operating Environment:

**Temperature** ..... : 24.3°C

**Humidity** ..... : 49.6%RH

**Atmospheric Pressure** ..... : 101.2kPa

#### EUT Operation:

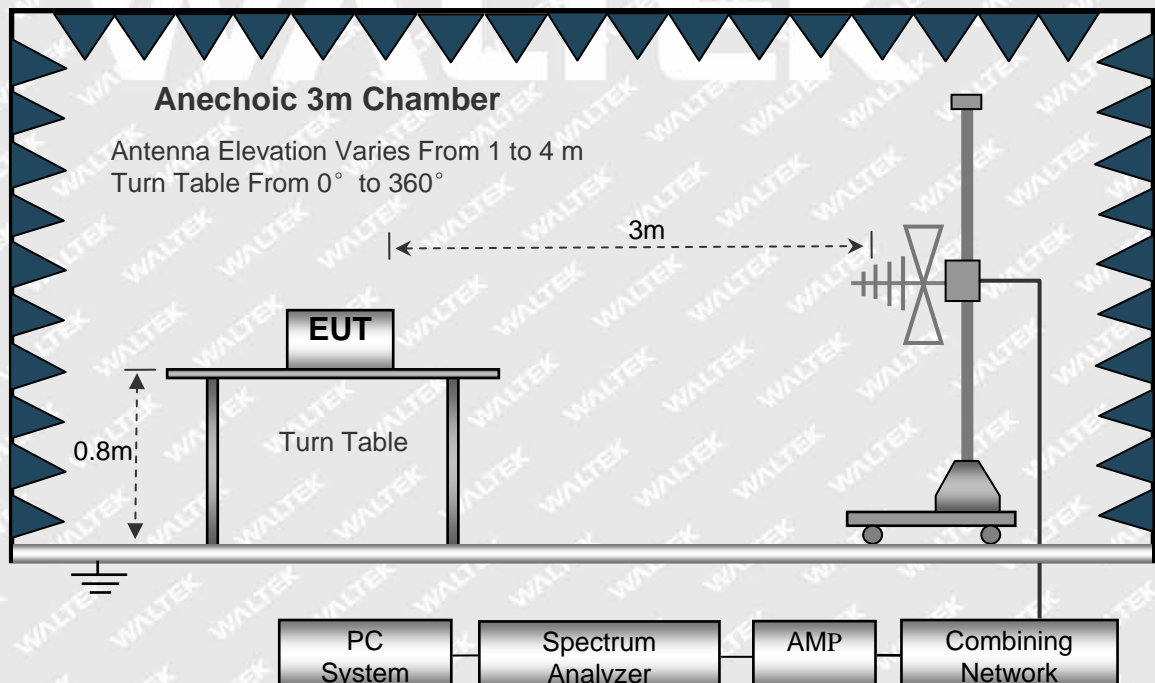
**Input Voltage** ..... : AC 230V/50Hz

**Operating Mode** ..... : Communication mode

### 5.2.2 Test Setup

The radiated emission tests were performed using the setup accordance with the EN 55032.

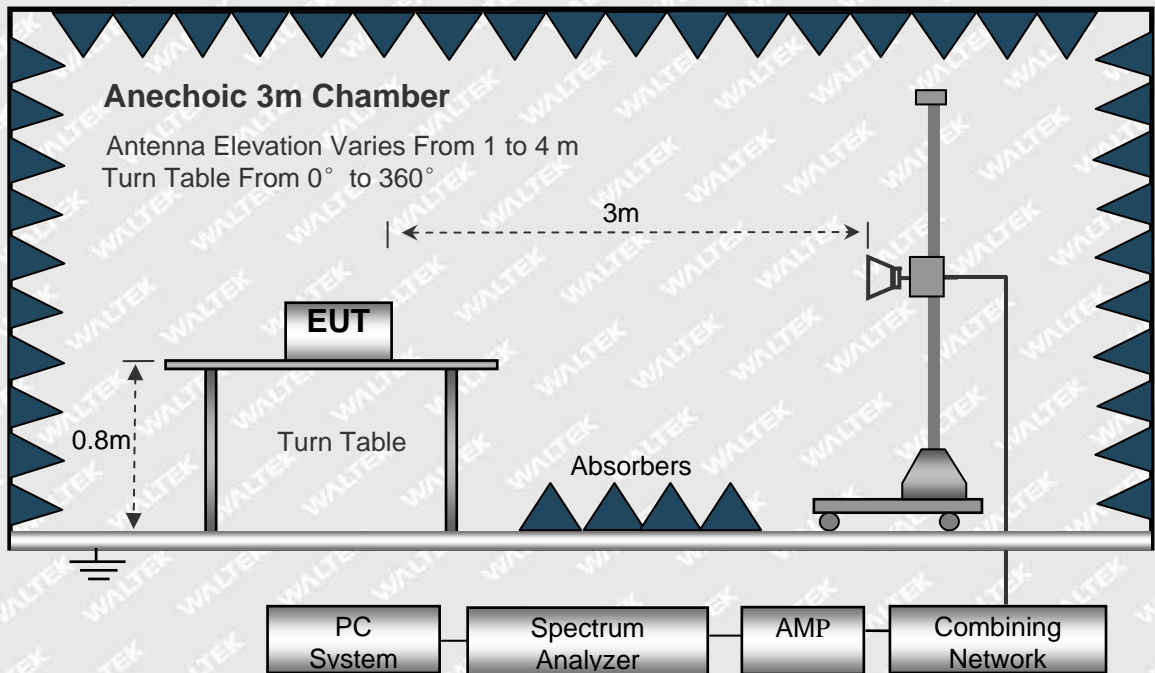
Frequency Range: Below 1 GHz







Frequency Range: Above 1 GHz



### 5.2.3 Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Corr. Factor}$$

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

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit.

The equation for margin calculation is as follows:

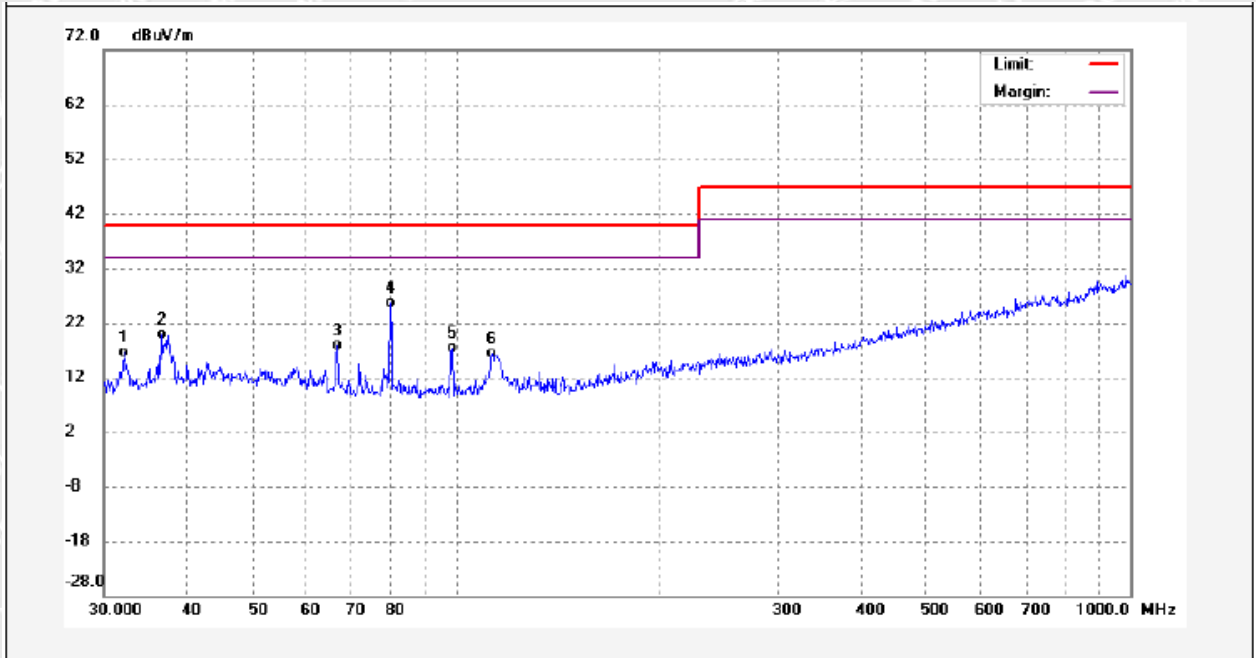
$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$



## 5.2.4 Test Result

Frequency Range: 30MHz ~ 1000MHz

Antenna Polarization: Vertical

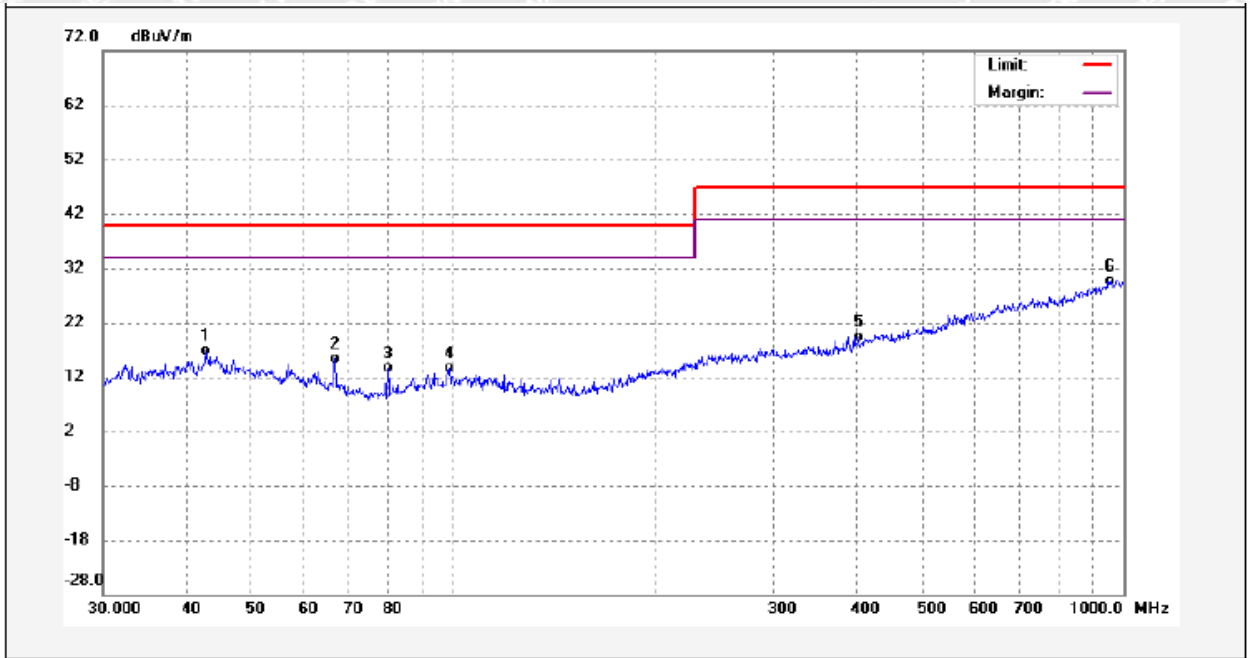


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	32.1231	5.08	11.53	16.61	40.00	-23.39	QP	
2	36.5092	7.67	12.33	20.00	40.00	-20.00	QP	
3	66.6390	6.44	11.38	17.82	40.00	-22.18	QP	
4	79.9964	15.32	10.32	25.64	40.00	-14.36	QP	
5	98.4866	6.20	11.14	17.34	40.00	-22.66	QP	
6	112.9988	4.39	12.02	16.41	40.00	-23.59	QP	





Antenna Polarization: Horizontal

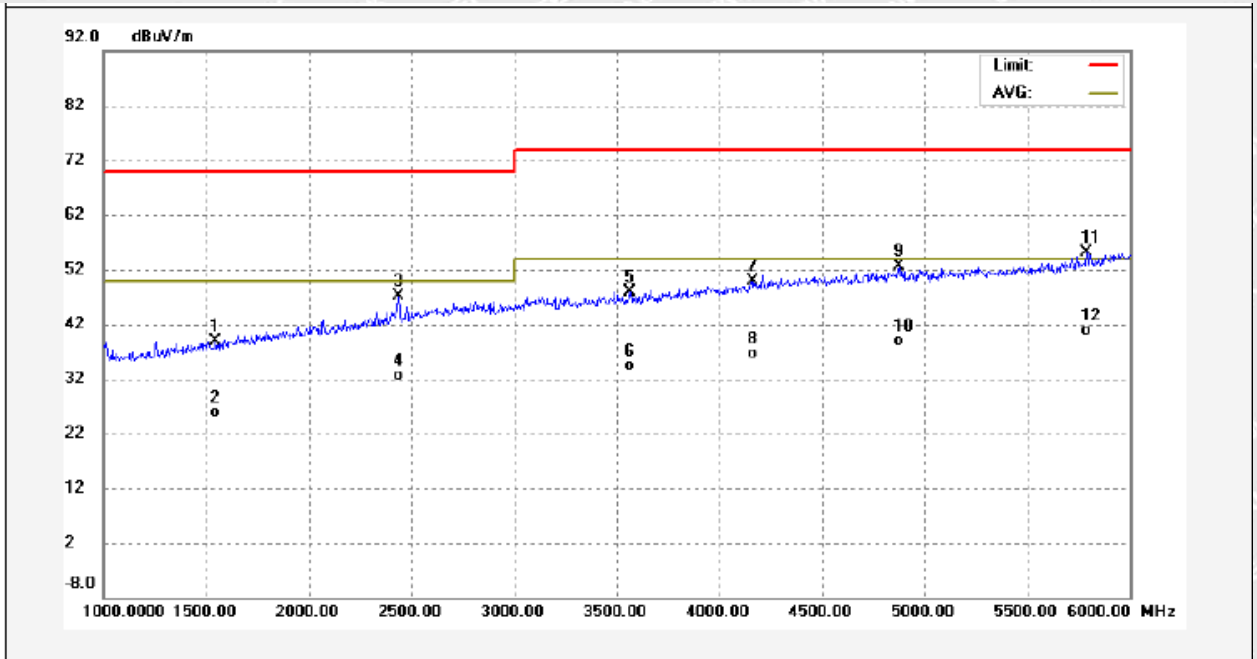


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	42.6747	1.55	15.28	16.83	40.00	-23.17	QP	
2	66.6390	4.16	11.18	15.34	40.00	-24.66	QP	
3	80.0245	3.68	10.02	13.70	40.00	-26.30	QP	
4	98.4866	1.56	12.12	13.68	40.00	-26.32	QP	
5	401.9794	1.50	17.99	19.49	47.00	-27.51	QP	
6	955.4381	2.36	27.33	29.69	47.00	-17.31	QP	



Frequency Range: 1000MHz ~ 6000MHz

Antenna Polarization: Vertical

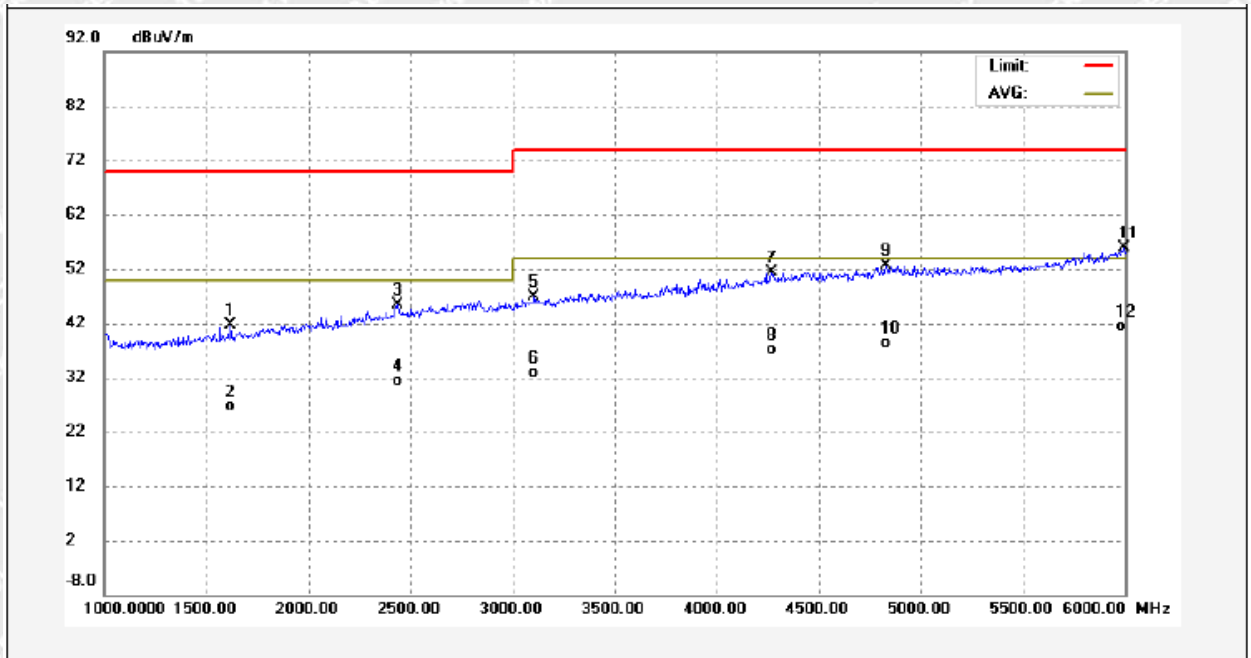


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1546.500	9.88	29.08	38.96	70.00	-31.04	peak	
2	1546.500	-3.14	29.08	25.94	50.00	-24.06	AVG	
3	2436.000	14.43	32.67	47.10	70.00	-22.90	peak	
4	2436.000	0.08	32.67	32.75	50.00	-17.25	AVG	
5	3562.500	12.41	35.51	47.92	74.00	-26.08	peak	
6	3562.500	-1.17	35.51	34.34	54.00	-19.66	AVG	
7	4168.500	12.52	37.32	49.84	74.00	-24.16	peak	
8	4168.500	-0.63	37.32	36.69	54.00	-17.31	AVG	
9	4879.500	13.46	39.06	52.52	74.00	-21.48	peak	
10	4879.500	-0.12	39.06	38.94	54.00	-15.06	AVG	
11	5790.000	14.11	41.06	55.17	74.00	-18.83	peak	
12	5790.000	-0.15	41.06	40.91	54.00	-13.09	AVG	





Antenna Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1616.000	12.03	29.72	41.75	70.00	-28.25	peak	
2	1616.000	-3.05	29.72	26.67	50.00	-23.33	AVG	
3	2439.000	13.08	32.42	45.50	70.00	-24.50	peak	
4	2439.000	-0.96	32.42	31.46	50.00	-18.54	AVG	
5	3105.500	12.45	34.41	46.86	74.00	-27.14	peak	
6	3105.500	-1.41	34.41	33.00	54.00	-21.00	AVG	
7	4274.000	14.03	37.46	51.49	74.00	-22.51	peak	
8	4274.000	-0.43	37.46	37.03	54.00	-16.97	AVG	
9	4834.000	13.83	38.81	52.64	74.00	-21.36	peak	
10	4834.000	-0.36	38.81	38.45	54.00	-15.55	AVG	
11	5998.500	14.69	41.16	55.85	74.00	-18.15	peak	
12	5998.500	0.31	41.16	41.47	54.00	-12.53	AVG	



### 5.3 Voltage Fluctuation and Flicker

Test Requirement ..... : ETSI EN 301 489-17

Test Method ..... : ETSI EN 301 489-1, EN 61000-3-3

Test Result ..... : Pass

#### 5.3.1 E.U.T. Operation

Operating Environment:

Temperature..... : 23.5°C

Humidity ..... : 47.1%RH

Atmospheric Pressure ..... : 100.8kPa

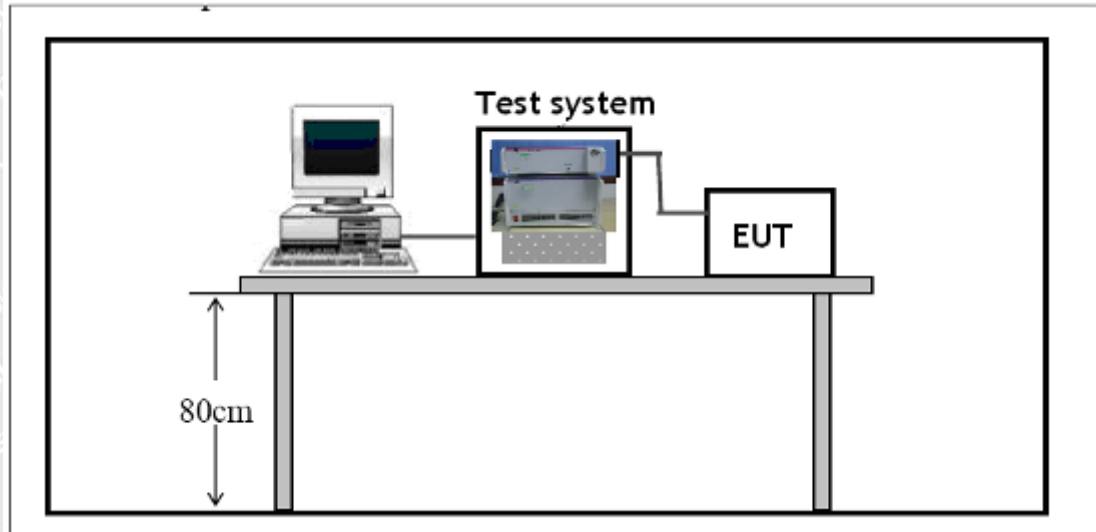
EUT Operation:

Input Voltage..... : AC 230V/50Hz

Operating Mode ..... : Communication mode

#### 5.3.2 Block Diagram of Setup

The Voltage Fluctuation and Flicker test was performed in accordance with the EN 61000-3-3.





### 5.3.3 Voltage Fluctuation and Flicker Test Data

#### Flicker Test Summary per IEC61000-3-3:2013/AMD1:2017 (Run time)

EUT: Health bracelet MO9771

Tested by: ziv

Test category: dt,dmax,dc and Pst (European limits)

Test Margin: 100

Test date: 2021/9/10

Start time: 15:19:49

End time: 15:30:16

Test duration (min): 10

Data file name: F-000627.cts\_data

Comment: Communication mode

Customer:

Test Result: Pass

Status: Test Completed

Pst, and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt): 230.10

Highest dt (%):

Test limit (%):

T-max (mS):

0

Test limit (mS):

500.0

Pass

Highest dc (%):

0.00

Test limit (%):

3.30

Pass

Highest dmax (%):

0.00

Test limit (%):

4.00

Pass

Highest Pst (10 min. period):

0.064

Test limit:

1.000

Pass





## 6 EMC Requirement for Immunity

### 6.1 Performance Criteria

#### 6.1.1 General performance criteria

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;

#### 6.1.2 Performance table

Criteria	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

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## 6.2 Electrostatic Discharge(ESD)

Test Requirement .....	: ETSI EN 301 489-17
Test Method .....	: ETSI EN 301 489-1, EN 61000-4-2
Discharge Impedance .....	: 330 $\Omega$ / 150 pF
Discharge Voltage .....	: Air Discharge: +/-2,4,8 KV Contact Discharge: +/-2,4 kV HCP & VCP: +/-2,4 kV
Polarity .....	: Positive & Negative
Discharge Repeat Times .....	: At Least 20 times at each test point
Discharge Mode .....	: Single Discharge
Discharge Period .....	: 1 second minimum

### 6.2.1 E.U.T. Operation

#### Operating Environment:

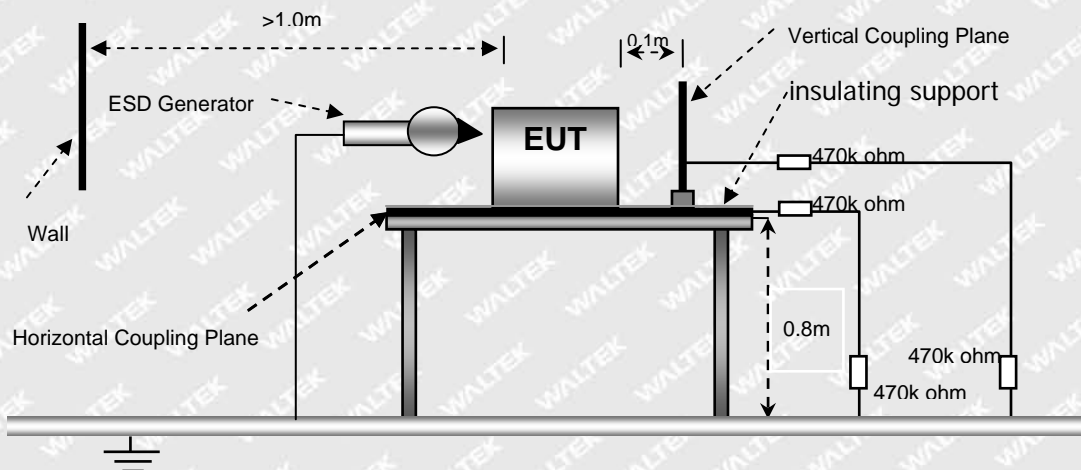
Temperature .....	: 24.7°C
Humidity .....	: 47.9%RH
Atmospheric Pressure .....	: 101.1kPa

#### EUT Operation:

Input Voltage .....	: AC 230V/50Hz
Operating Mode .....	: Communication mode

### 6.2.2 Block Diagram of Setup

The ESD test was performed in accordance with the EN 61000-4-2.





### 6.2.3 Test Result

Direct Discharge			Performance Criteria	
Discharge Level (kV)	Performance Criterion	Test Point	Contact Discharge	Air Discharge
$\pm 2 / \pm 4 / \pm 8$	B	1	N/A	Pass*
$\pm 2 / \pm 4$	B	2	Pass*	N/A

Remark:

Test points 1. All Exposed Surface & Seams; 2. All metallic part

\* During the test no deviation was detected to the selected operation mode(s)

Indirect Discharge			Performance Criteria	
Discharge Level (kV)	Performance Criterion	Test Point	Horizontal Coupling	Vertical Coupling
$\pm 2 / \pm 4$	B	1	Pass*	Pass*

Remark:

Test points 1. All sides

\* During the test no deviation was detected to the selected operation mode(s)

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### 6.3 RF Electromagnetic Field (80MHz to 6 000MHz) (RS)

Test Requirement .....	: ETSI EN 301 489-17
Test Method .....	: ETSI EN 301 489-1, EN 61000-4-3
Face of EUT .....	: Front, Back, Left, Right
Frequency Range .....	: 80MHz to 6 000MHz
Test Level .....	: 3V/m
Modulation .....	: 80%, 1kHz Amplitude Modulation.
Antenna polarisation.....	: Horizontal& Vertical

#### 6.3.1 E.U.T. Operation

##### Operating Environment:

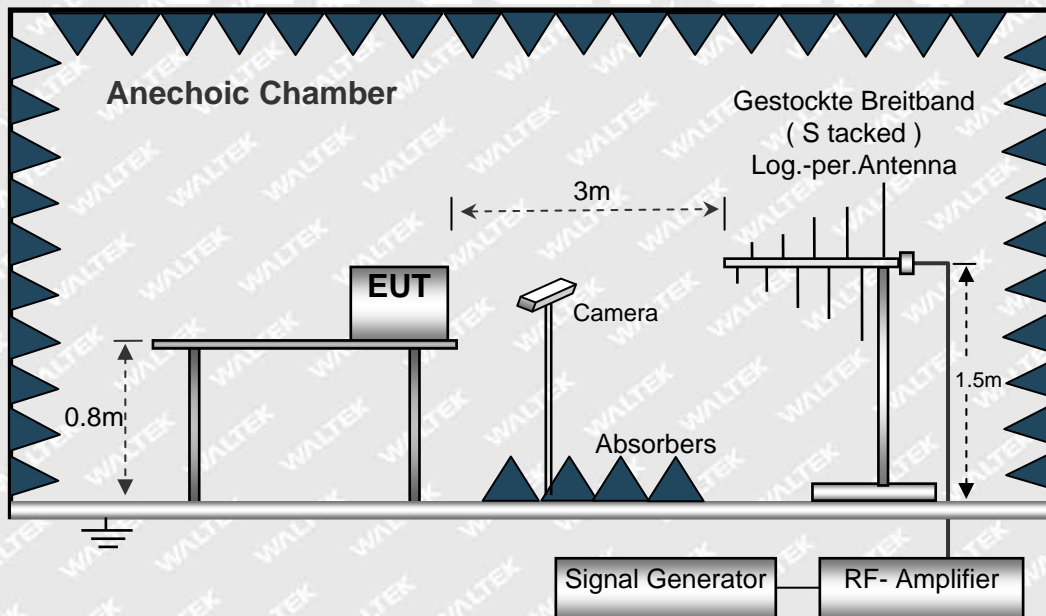
Temperature.....	: 21.7°C
Humidity .....	: 42.3%RH
Atmospheric Pressure.....	: 100.2kPa

##### EUT Operation:

Input Voltage.....	: AC 230V/50Hz
Operating Mode .....	: Communication mode

#### 6.3.2 Block Diagram of Setup

The Radiated Immunity test was performed in accordance with the EN 61000-4-3.





### 6.3.3 Test Result

Frequency	Face of EUT	Antenna polarisation	Test Level	Step Size	Dwell Time	Performance Criterion	Result
80MHz to 1000MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	1s	A	Pass*
80MHz to 1000MHz	Front, Back, Left, Right	Vertical	3V/m	1%	1s	A	Pass*
1000MHz to 6000MHz	Front, Back, Left, Right	Horizontal	3V/m	1%	1s	A	Pass*
1000MHz to 6000MHz	Front, Back, Left, Right	Vertical	3V/m	1%	1s	A	Pass*

Remark:

- \* During the test no deviation was detected to the selected operation mode(s)

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## 6.4 Fast Transients Common Mode (EFT)

Test Requirement .....	: ETSI EN 301 489-17
Test Method .....	: ETSI EN 301 489-1, EN 61000-4-4
Polarity .....	: Positive & Negative
Repetition Frequency .....	: 5kHz
Burst Duration .....	: 300ms
Test Duration .....	: 2 minutes per level & polarity

### 6.4.1 E.U.T. Operation

#### Operating Environment:

Temperature .....	: 24.7°C
Humidity .....	: 54.8%RH
Atmospheric Pressure .....	: 101.5kPa

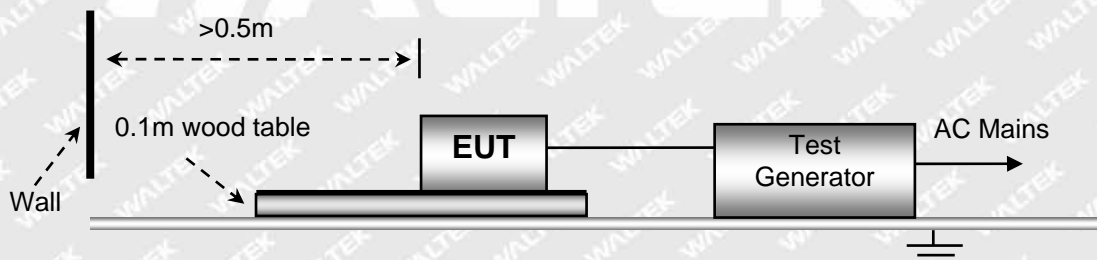
#### EUT Operation:

Input Voltage .....	: AC 230V/50Hz
Operating Mode .....	: Communication mode

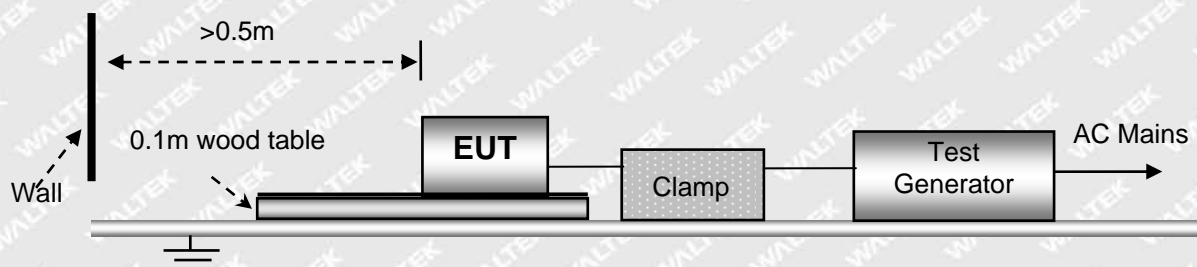
### 6.4.2 Block Diagram of Test Setup

The Electrical Fast Transients Immunity test was performed in accordance with the EN 61000-4-4.

For AC Mains or DC Ports:



For Signal, Wired network or Control Ports:







### 6.4.3 Test Result

Test Port	Test Level(kV)	Performance Criterion	Result
AC mains power port	$\pm 1.0$	B	Pass*
DC power port	$\pm 0.5$	B	N/A
Signal port	$\pm 0.5$	B	N/A
Control port	$\pm 0.5$	B	N/A
Wired network port	$\pm 0.5$	B	N/A

Remark:

\* During the test no deviation was detected to the selected operation mode(s)

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## 6.5 Surges

<b>Test Requirement</b> .....	: ETSI EN 301 489-17
<b>Test Method</b> .....	: ETSI EN 301 489-1, EN 61000-4-5
<b>Interval</b> .....	: 60s between each surge
<b>No. of surges</b> .....	: 5 positive, 5 negative at 0°, 90°, 180°, 270°.

### 6.5.1 E.U.T. Operation

#### Operating Environment:

<b>Temperature</b> .....	: 24.7°C
<b>Humidity</b> .....	: 54.6%RH
<b>Atmospheric Pressure</b> .....	: 101.3kPa

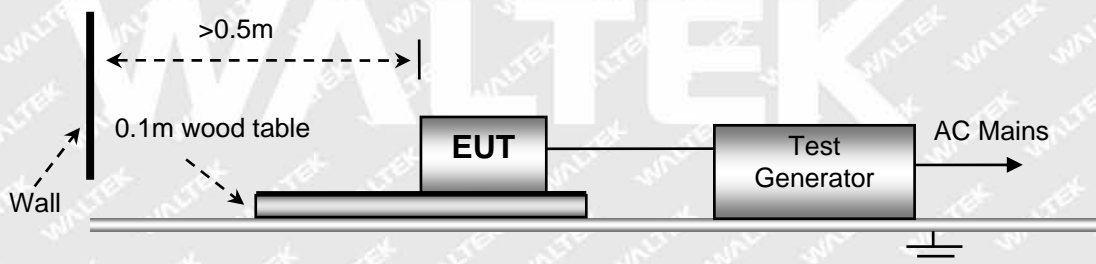
#### EUT Operation:

<b>Input Voltage</b> .....	: AC 230V/50Hz
<b>Operating Mode</b> .....	: Communication mode

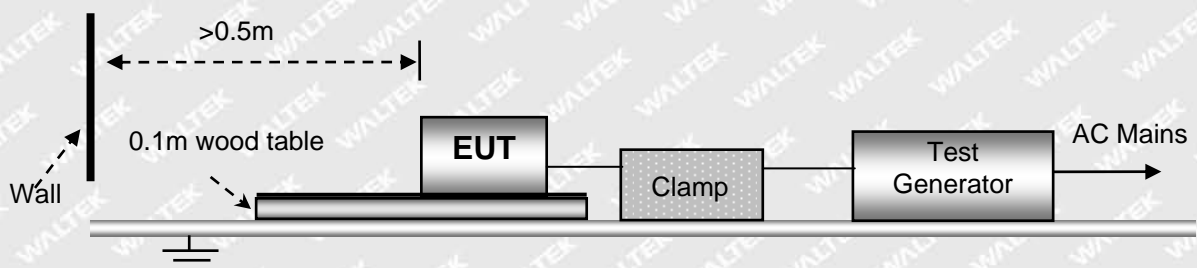
### 6.5.2 Block Diagram of Test Setup

The Surges Immunity test was performed in accordance with the EN 61000-4-5.

For AC Mains or DC Ports:



For Wired network port:





### 6.5.3 Test Result

Coupling point	Test Port	Applied Voltage (kV)	Performance criterion	Result
AC power port	Between Phase And Phase	$\pm 1$	B	N/A
	Between Live And Neutral	$\pm 1$	B	Pass*
	Between Live And Earth	$\pm 2$	B	N/A
	Between Neutral And Earth	$\pm 2$	B	N/A

Remark:

\* During the test no deviation was detected to the selected operation mode(s)

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## 6.6 RF Common Mode 0,15 MHz to 80MHz (CS)

<b>Test Requirement</b> .....	: ETSI EN 301 489-17
<b>Test Method</b> .....	: ETSI EN 301 489-1, EN 61000-4-6
<b>Frequency Range</b> .....	: 150kHz to 80MHz
<b>Test level</b> .....	: 3V rms (unmodulated emf into 150 $\Omega$ )
<b>Modulation</b> .....	: 80%, 1kHz Amplitude Modulation.

### 6.6.1 E.U.T. Operation

#### Operating Environment:

<b>Temperature</b> .....	: 24.8°C
<b>Humidity</b> .....	: 54.7%RH
<b>Atmospheric Pressure</b> .....	: 101.4kPa

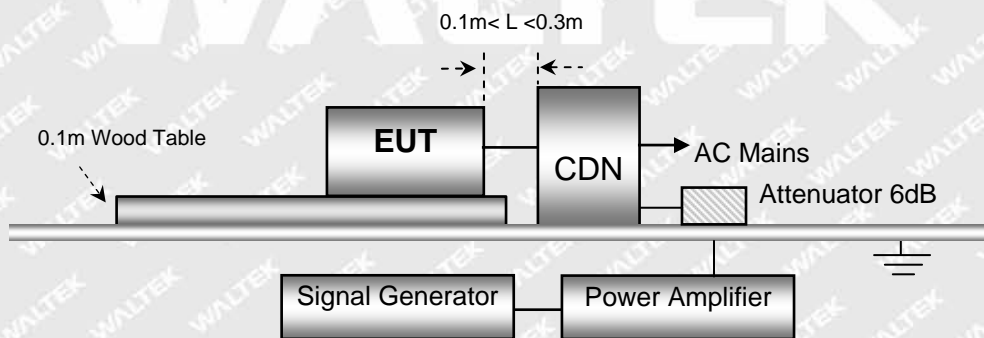
#### EUT Operation:

<b>Input Voltage</b> .....	: AC 230V/50Hz
<b>Operating Mode</b> .....	: Communication mode

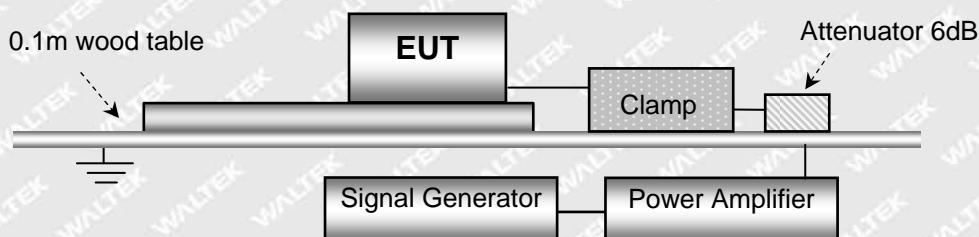
### 6.6.2 Block Diagram of Test Setup

The Injected Currents Immunity test was performed in accordance with the EN 61000-4-6.

For AC Mains or DC Ports:



For Signal, Wired network or Control Ports:





### 6.6.3 Test Result

Line	Voltage Level	Modulation	Step Size	Dwell Time	Performance Criteria	Test Result
AC mains power port	3Vr.m.s	80%, 1kHz Amp. Mod.	1%	1s	A	Pass*
DC power port	3Vr.m.s	80%, 1kHz Amp. Mod.	1%	1s	A	N/A
Signal port	3Vr.m.s	80%, 1kHz Amp. Mod.	1%	1s	A	N/A
Wired network port	3Vr.m.s	80%, 1kHz Amp. Mod.	1%	1s	A	N/A
Control port	3Vr.m.s	80%, 1kHz Amp. Mod.	1%	1s	A	N/A

Remark:

\* During the test no deviation was detected to the selected operation mode(s)

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## 6.7 Voltage Dips and Interruptions

Test Requirement .....	: ETSI EN 301 489-17
Test Method .....	: ETSI EN 301 489-1, EN 61000-4-11
No. of Dips / Interruptions .....	: 3 per Level at 10ms intervals
Test Level(Voltage reduction) .....	: 0%&70 % of $U_T$ (Supply Voltage)

### 6.7.1 E.U.T. Operation

#### Operating Environment:

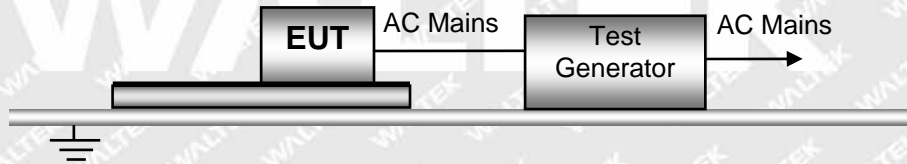
Temperature .....	: 24.7°C
Humidity .....	: 54.6%RH
Atmospheric Pressure .....	: 101.5kPa

#### EUT Operation:

Input Voltage .....	: AC 230V/50Hz
Operating Mode .....	: Communication mode

### 6.7.2 Block Diagram of Setup

The Voltage Dips and Interruptions Immunity test was performed in accordance with the EN 61000-4-11.



### 6.7.3 Test Result

Type	Test Level in % $U_T$	Phase	Duration	Performance criterion	Result
Voltage Dips	0	0° & 180°	0.5	B	Pass*
	0	0° & 180°	1	B	Pass*
	70	0° & 180°	25	B	Pass*
Voltage Interruption	0	0° & 180°	250	C	Pass*

Remark:

- \* During the test no deviation was detected to the selected operation mode(s)





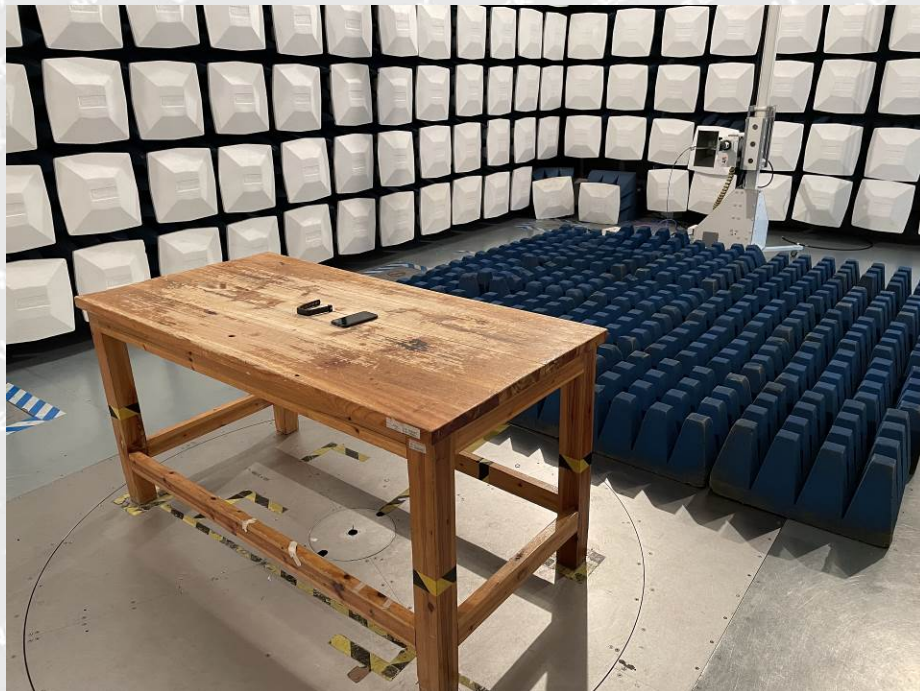
## 7 Photographs - Test Setup

### 7.1 Photograph - Radiated Emissions Test Setup

Below 1000MHz



Above 1000MHz





## 7.2 Photograph - Conducted Emissions Test Setup



## 7.3 Photograph - Voltage Fluctuations Test Setup



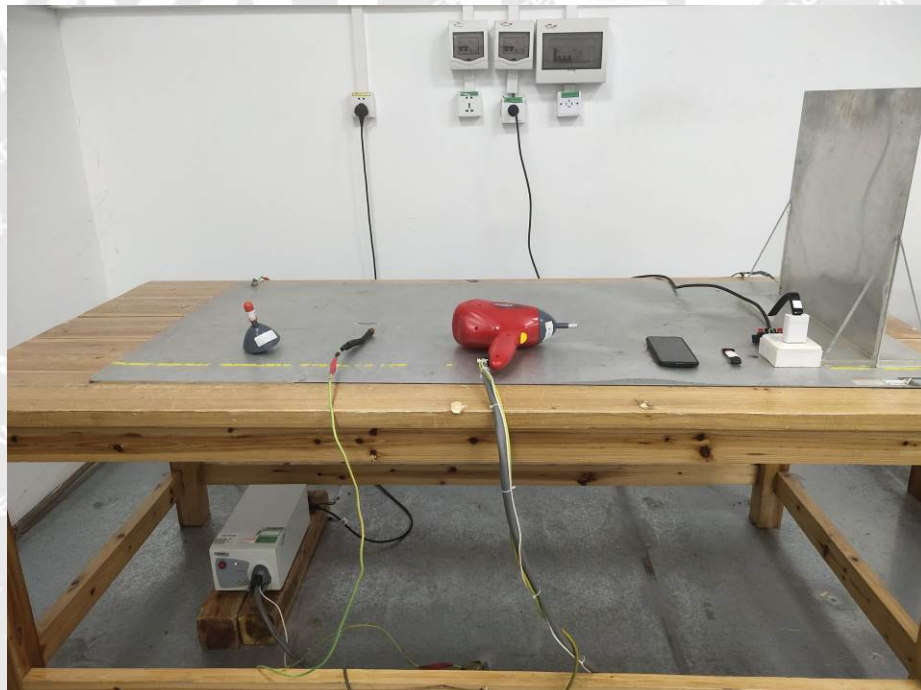




### 7.4 Photograph - RF Electromagnetic Field Test Setup



### 7.5 Photograph - ESD Test Setup







### 7.6 Photograph - EFT Immunity Test Setup

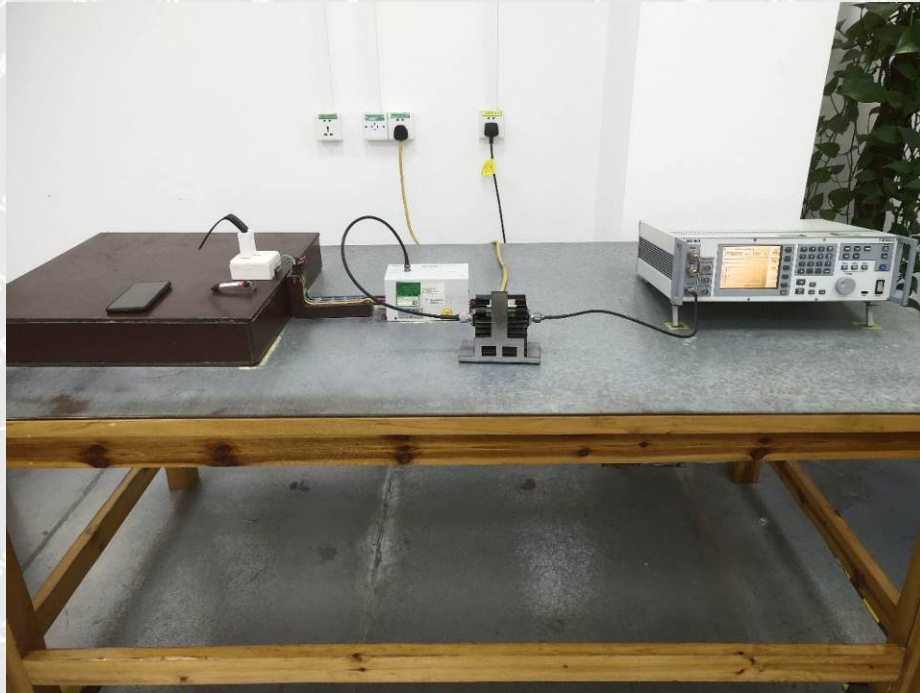


### 7.7 Photograph - Surge Immunity Test Setup





### 7.8 Photograph - Radio-frequency Common Mode Test Setup



### 7.9 Photograph - Voltage Dips and Interruptions Immunity Test Setup







## 8 Photographs - Constructional Details

Refer to Reference No.:WTF21F09092922W001 for details

=====End of Report=====

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