


<b>Prüfbericht-Nr.:</b> <i>Test Report No.:</i>	<b>50235819 001</b>	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	<b>190101447</b>	Seite 1 von 30 <i>Page 1 of 30</i>	
<b>Kunden-Referenz-Nr.:</b> <i>Client Reference No.:</i>	<b>N/A</b>	<b>Auftragsdatum:</b> <i>Order date:</i>	<b>26.03.2019</b>		
<b>Auftraggeber:</b> <i>Client:</i>	<b>Sync (Beijing) Technology co., LTD.</b> Room A508, No.79 shuangqing road, Haidian district, Beijing,100085, P.R. China				
<b>Prüfgegenstand:</b> <i>Test item:</i>	<b>WR Switch</b>				
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	<b>WRS-18B</b>				
<b>30Auftrags-Inhalt:</b> <i>Order content:</i>	<b>CE EMC</b>				
<b>Prüfgrundlage:</b> <i>Test specification:</i>	<b>EN 55032:2015, EN 55035:2017, EN 61000-3-2:2014, EN 61000-3-3:2013</b>				
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	<b>26.03.2019</b>				
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	<b>Engineering sample</b>				
<b>Prüfzeitraum:</b> <i>Testing period:</i>	<b>26.03.2019 to 27.03.2019</b>				
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	<b>Refer to section 1.1</b>				
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	<b>Refer to section 1.1</b>				
<b>Prüfergebnis*:</b> <i>Test result*:</i>	<b>Pass</b>				
<b>geprüft von / tested by:</b>	<b>geprüft von / tested by:</b>				
04.06.2019 Gao, Shuying /PE	<i>Gao Shuying</i>	04.06.2019 Wang, Gang /TC	<i>Wang Gang</i>		
<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>	<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>
<b>Sonstiges / Other:</b> Manufacturer or/and his importer shall ensure product bears label requirements in article 7 and article 9 of the 2014/30/EU relate to name, batch number, post address prior place the product into EU market.					
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>			<b>Prüfmuster vollständig und unbeschädigt</b> <i>Test item complete and undamaged</i>		
* Legende: 1 = sehr gut      2 = gut      3 = befriedigend      4 = ausreichend      5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n)      F(ail) = entspricht nicht o.g. Prüfgrundlage(n)      N/A = nicht anwendbar      N/T = nicht getestet Legend: 1 = very good      2 = good      3 = satisfactory      4 = sufficient      5 = poor P(ass) = passed a.m. test specification(s)      F(ail) = failed a.m. test specification(s)      N/A = not applicable      N/T = not tested					
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>					

V04

## TEST SUMMARY

### 4.1.1 HARMONICS ON AC MAINS

*Result:*

*N/A*

### 4.1.2 VOLTAGE CHANGES, VOLTAGE FLUCTUATIONS AND FLICKER ON AC MAINS

*Result:*

*N/A*

### 4.1.3 CONTINUOUS DISTURBANCE VOLTAGE AT MAINS TERMINAL

*Result:*

*Pass*

### 4.2.1 RADIATED EMISSION

*Result:*

*Pass*

### 5.1.1 ELECTROSTATIC DISCHARGE

*Result:*

*Pass*

### 5.1.2 RF ELECTROMAGNETIC FIELD IMMUNITY TEST

*Result:*

*Pass*

### 5.1.3 POWER FREQUENCY MAGNETIC FIELD

*Result:*

*N/A*

### 5.2.1 FAST TRANSIENTS ON AC POWER PORT, SIGNAL PORT AND INTERCONNECTING PORT

*Result:*

*Pass*

### 5.2.2 INJECTED CURRENT INTO AC POWER PORT, SIGNAL PORT AND INTERCONNECTING PORT

*Result:*

*Pass*

### 5.2.3 SURGES TO AC POWER PORT, SIGNAL PORT AND INTERCONNECTING PORT

*Result:*

*Pass*

### 5.2.4 VOLTAGE DIPS AND INTERRUPTIONS TO AC POWER PORT

*Result:*

*Pass*

# Contents

<b>1</b>	<b>TEST SITES .....</b>	<b>4</b>
1.1	TEST FACILITIES .....	4
1.2	LIST OF TEST AND MEASUREMENT INSTRUMENTS .....	4
<b>2</b>	<b>GENERAL PRODUCT INFORMATION.....</b>	<b>6</b>
2.1	PRODUCT FUNCTION AND INTENDED USE .....	6
2.2	RATINGS AND SYSTEM DETAILS .....	6
2.3	INDEPENDENT OPERATION MODES .....	6
2.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS .....	6
2.5	SUBMITTED DOCUMENTS .....	6
<b>3</b>	<b>TEST SET-UP AND OPERATION MODES .....</b>	<b>7</b>
3.1	PRINCIPLE OF CONFIGURATION SELECTION .....	7
3.2	PHYSICAL CONFIGURATION FOR TESTING.....	7
3.3	TEST OPERATION AND TEST SOFTWARE .....	7
3.4	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT.....	7
3.5	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE .....	7
<b>4</b>	<b>TEST RESULTS EMISSION .....</b>	<b>8</b>
4.1	EMISSION IN THE FREQUENCY RANGE UP TO 30 MHz.....	8
4.1.1	<i>Harmonics on AC mains .....</i>	<i>8</i>
4.1.2	<i>Voltage changes, voltage fluctuations and flicker on AC mains .....</i>	<i>9</i>
4.1.3	<i>Continuous Disturbance Voltage at Mains Terminal.....</i>	<i>10</i>
4.2	EMISSION IN THE FREQUENCY RANGE ABOVE 30 MHz.....	13
4.2.1	<i>Radiated emission .....</i>	<i>13</i>
<b>5</b>	<b>TEST RESULTS IMMUNITY ACCORDING TO EN 55035:2017 .....</b>	<b>17</b>
5.1	ENCLOSURE .....	18
5.1.1	<i>Electrostatic Discharge.....</i>	<i>18</i>
5.1.2	<i>RF electromagnetic field immunity test.....</i>	<i>19</i>
5.1.3	<i>Power frequency magnetic field.....</i>	<i>20</i>
5.2	INPUT AND OUTPUT AC POWER PORT, SIGNAL PORT AND INTERCONNECTING PORT .....	21
5.2.1	<i>Fast Transients on AC Power Port, Signal Port and Interconnecting Port .....</i>	<i>21</i>
5.2.2	<i>Injected Current into AC Power Port, Signal Port and Interconnecting Port .....</i>	<i>22</i>
5.2.3	<i>Surges to AC Power Port, Signal Port and Interconnecting Port.....</i>	<i>23</i>
5.2.4	<i>Voltage dips and interruptions to AC Power Port .....</i>	<i>24</i>
<b>6</b>	<b>PHOTOGRAPHS OF THE TEST SET-UP .....</b>	<b>25</b>
<b>7</b>	<b>LIST OF TABLES .....</b>	<b>30</b>
<b>8</b>	<b>LIST OF FIGURES .....</b>	<b>30</b>
<b>9</b>	<b>LIST OF PHOTOGRAPHS .....</b>	<b>30</b>

# 1 Test Sites

## 1.1 Test Facilities

**Laboratory 1: CHEARI (Beijing) Certification & Testing Co., Ltd.**

**Address: No.3, Boxing Balu, Beijing Economic and Technological Development Area, Beijing, China**

The used test equipment is in accordance with CISPR 16-1 for measurement of radio interference.

## 1.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

**Lab 1: (Radiated emission, RF electromagnetic field immunity test, Surges to AC Power Port, Voltage dips and interruptions to AC Power Port, Mains Terminal Continuous Disturbance Voltage, Electrostatic Discharge, Injected Current into AC Power Port and antenna Port, Surges to antenna Port, Fast Transients on AC Power Lines and antenna Port, Voltage dips and interruptions to AC Power Port)**

No.	Equipment	Manufacturer	Model	Serial no. / Inventory no.	Cal. due date
1	Test system for conducted immunity	TESEQ	NSG4070	03047393	2019-12-18
2	Coupling Network	EM TEST	CDN-M3	0311037-02	2020-03-29
3	Attenuator	EM TEST	ATT6	0311037-01	2020-03-29
4	EMI Receiver	R&S	ESCI7 (9kHz-7GHz)	0304826-03	2020-11-13
5	Bi-log Antenna	R&S	HL562 (30MHz-3GHz)	0304826-06	2020-11-18
6	Horn antenna	R&S	HF907 (1GHz-18GHz)	0304826-07	2020-10-15
7	EMI Receiver	R&S	ESCS30	0311031	2020-02-25
8	LISN	R&S	ESH2-Z5	0311031-03	2020-02-21
9	Semi anechoic chamber	R&S	SAC3 plus (9mx6mx6m)	0304728	2022-02-23
10	Signal generator	R&S	SMB100A	0304827-02	2020-10-22
11	Power meter	R&S	NRP2	0304827-03	2020-10-18
12	Bi-con antenna	R&S	HL046E(80MHz-3GHz)	0304807-06	/
13	Horn antenna	R&S	SWB-STLP9149 ((0,6) 0,7 – 9 (10,5) GHz)	0304827-07	/

**Prüfbericht - Nr.: 50235819 001**

Test Report No.:

Seite 5 von 30

Page 5 of 30

No.	Equipment	Manufacturer	Model	Serial no. / Inventory no.	Cal. due date
14	Power amplifier	Bonn	BLWA 0810- 160/100D	0304828	/
15	Power amplifier	Bonn	BLMA 1060- 100/50D	0304828-01	/
16	Surge signal generator	TESEQ	NSG 3060	0304771	2020-03-27
17	Coupling Decoupling Network	TESEQ	CDN 3063	0304771	2020-03-27
18	ESD Simulator	TESEQ	NSG 437	0304788	2020-06-26
19	EFT signal generator	TESEQ	NSG 3040	0304770	2020-02-21
20	Coupling Decoupling Network	TESEQ	CDN 3063	0304770	2020-02-21
21	Dips tester	TESEQ	NSG3040, VAR 3005- S16	0304654	2020-09-17

## 2 General Product Information

### 2.1 Product Function and Intended Use

The EUT (equipment under test) is a WR Switch. For further information, refer to the user's manual.

### 2.2 Ratings and System Details

Type	:	WRS-18B
Class	:	A
System input voltage and current	:	AC100-240V,50/60Hz, 1A
Rated power	:	35W
Protection class	:	I

### 2.3 Independent Operation Modes

The basic operation modes are:

On: Working mode according to client's requirement.

Off.

### 2.4 Noise Generating and Noise Suppressing Parts

Refer to the circuit diagram for further information.

### 2.5 Submitted Documents

Nameplate, User's manual, and Circuit diagram, PCB layout, BOM.

## 3 Test Set-up and Operation Modes

### 3.1 Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

**Immunity:** The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

### 3.2 Physical Configuration for Testing

Refer to the related paragraph of this report.

The test was performed at the status of AC230V; 50Hz for voltage and frequency, which was the nominal voltage for EU.

### 3.3 Test Operation and Test Software

None.

### 3.4 Special Accessories and Auxiliary Equipment

The following auxiliary equipments were used:

No.	Name	Model	Manufactory
1	PC	/	xiaomi
2	WR Switch	WRS-18B	Sync

### 3.5 Countermeasures to achieve EMC Compliance

None.

**Prüfbericht - Nr.: 50235819 001**  
Test Report No.:Seite 8 von 30  
Page 8 of 30

## 4 Test Results EMISSION

### 4.1 Emission in the Frequency Range up to 30 MHz

#### 4.1.1 Harmonics on AC mains

<b>Result:</b>	N/A
----------------	-----

Date of testing : /  
Test procedure : EN 61000-3-2:2014

The rated power of EUT does not exceed 75W.  
According to EN 61000-3-2:2014, clause 7, “ for equipment with a rated power of 75W or less, other than lighting equipment, limits are not specified in this edition of the standard.”  
Therefore no test is needed.



**Prüfbericht - Nr.: 50235819 001**  
Test Report No.:Seite 9 von 30  
Page 9 of 30

#### 4.1.2 Voltage changes, voltage fluctuations and flicker on AC mains

<b>Result:</b>	N/A
----------------	-----

Date of testing : /  
Test procedure : EN 61000-3-3:2013

Due to the low power characteristic of the sample, it cannot produce voltage fluctuations and flicker exceeding the limits, thus the sample is deemed to meet the requirements of IEC 61000-3-3:2013 without actual test.

### 4.1.3 Continuous Disturbance Voltage at Mains Terminal

**Result:****Pass**

Date of testing	: 26.03.2019
Test procedure	: EN 55032:2015 and CISPR 16-1
Product category	: Class A
Frequency range	: 0.15 – 30MHz
Limits	: Quasi-peak: 0.15-0.5MHz, 79dB $\mu$ V; 0.5-30MHz, 73dB $\mu$ V Average: 0.15-0.5MHz, 66dB $\mu$ V; 0.5-30MHz, 60dB $\mu$ V
Kind of test site	: Shielding room

**Test Setup**

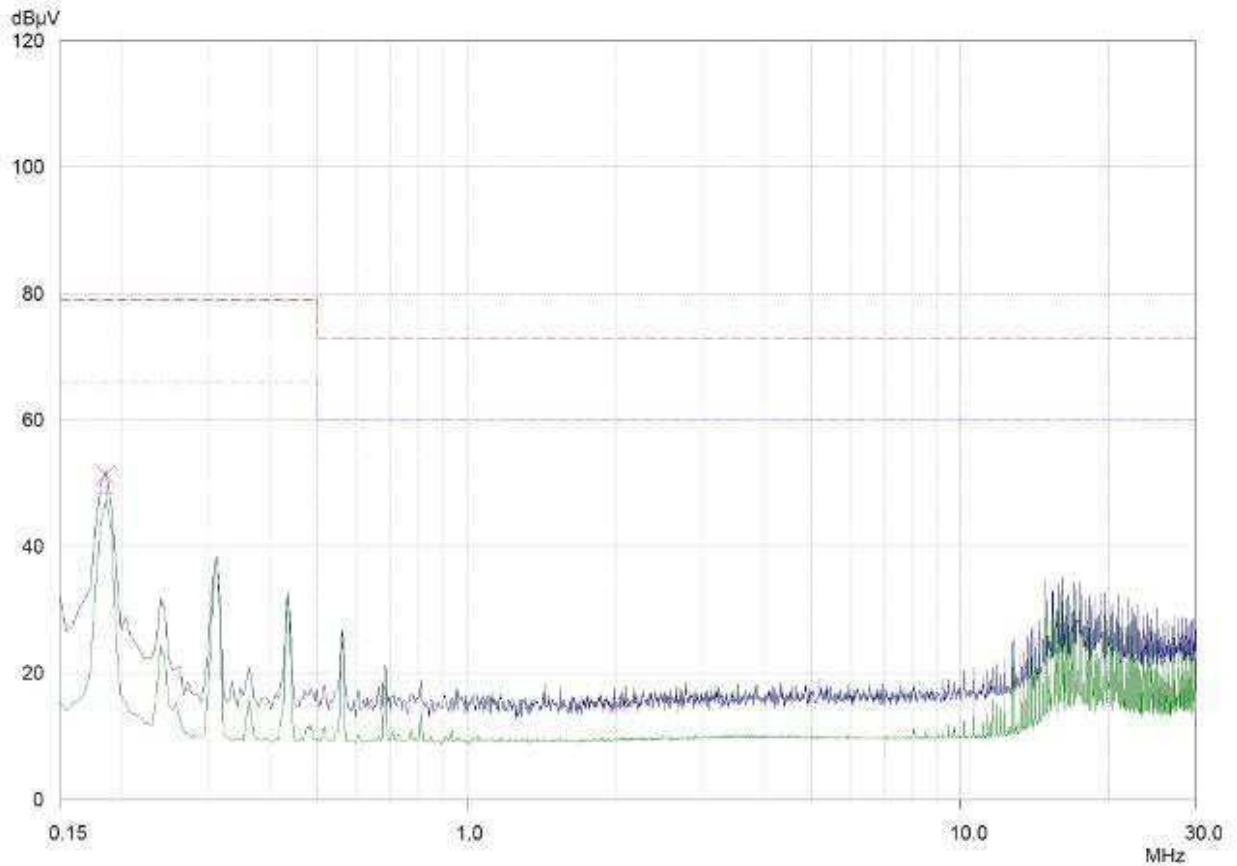
Input voltage	: AC 230V; 50Hz
Operation mode	: On
Artificial hand	: N/A
Earthing	: Applied

The measurement equipment like test receivers, quasi-peak detector and Artificial Mains Network (AMN) are in compliance with CISPR 16-1. The tested object was operated under its input voltage and its input frequency.

Furthermore an internal calibration with the test receiver was conducted prior to each measurement.

The tested object was set-up on 0.8m wooden support. The EUT was set 0.8m away from the AMN. The cord longer than necessary to be connected to the AMN was folded forth and back parallel so as to form a bundle with a length between 0.3m and 0.4m.

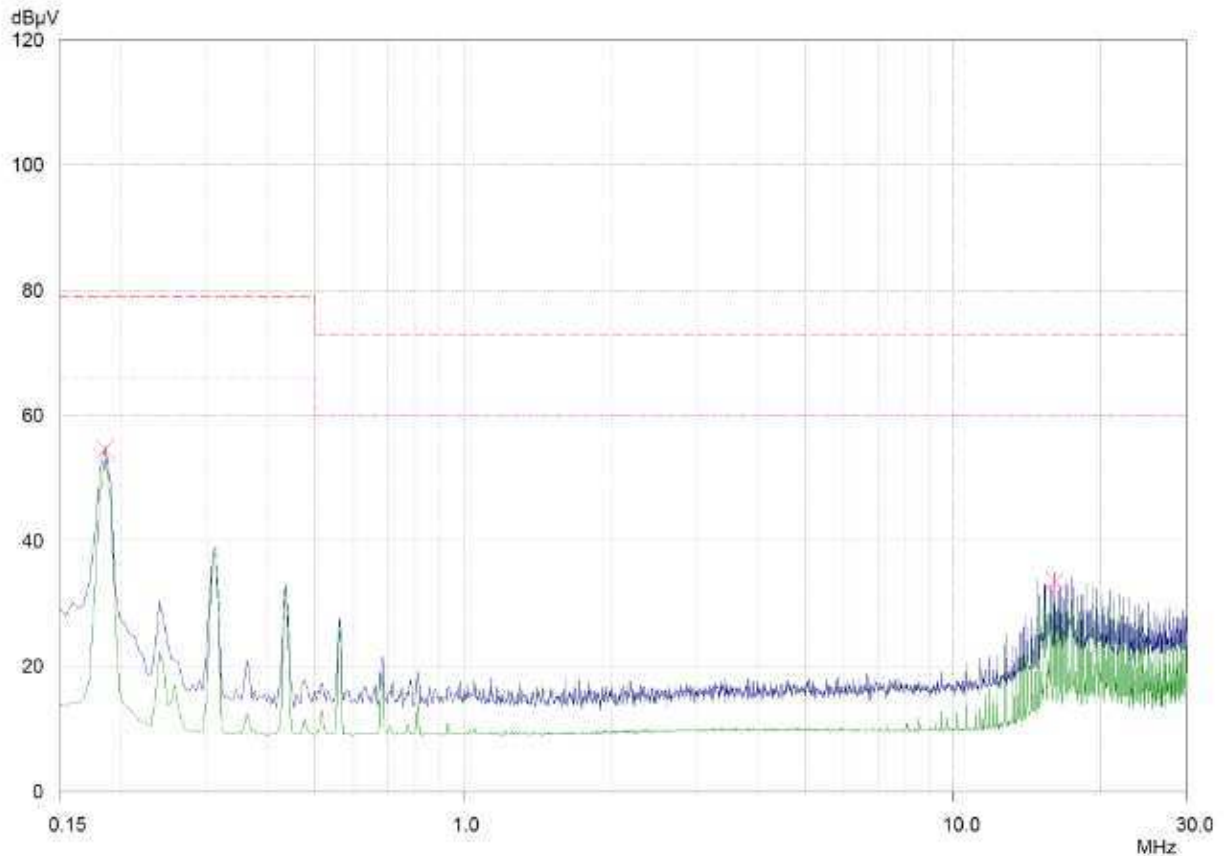
The following figures and tables were those measured by an automatic measuring system. Both Quasi-Peak and Average Value were measured. Quasi-Peak and Average Value were measured and listed respectively where they had a maximum in previous scanning survey.

**Figure 1: Spectral Diagrams, Conducted Emission, 150 kHz - 30MHz, L**

**Final Measurement Results**

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -	PE -
0.186	51.29	79.00	27.71	L1	gnd

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -	PE -
0.186	48.34	66.00	17.66	L1	gnd

**Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz - 30MHz, N**

**Final Measurement Results**

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -	PE -
0.186	54.65	79.00	24.35	N	gnd
16.09799	33.49	73.00	39.51	N	gnd

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -	PE -
0.186	52.83	66.00	13.17	N	gnd
16.09799	32.57	60.00	27.43	N	gnd

## 4.2 Emission in the Frequency Range above 30 MHz

### 4.2.1 Radiated emission

<b>Result:</b>	<b>Pass</b>
----------------	-------------

Date of testing : 27.03.2019  
 Test procedure : EN 55032:2015 and CISPR 16-1  
 Product category : Class A  
 Frequency range : 30 – 6000MHz  
 Limits : 30-230MHz, 50dB $\mu$ V/m with 3m test distance;  
           230-1000MHz, 57dB $\mu$ V/m with 3m test distance.  
           1000-3000MHz, 76dB $\mu$ V/m for peak and 56dB $\mu$ V/m for  
           average with 3m test distance  
           3000-6000MHz, 80dB $\mu$ V/m for peak and 60dB $\mu$ V/m for  
           average with 3m test distance  
 Kind of test site : Semi-anechoic chamber  
 Operation mode : On

The measurement setup was made according to EN 55032:2015.

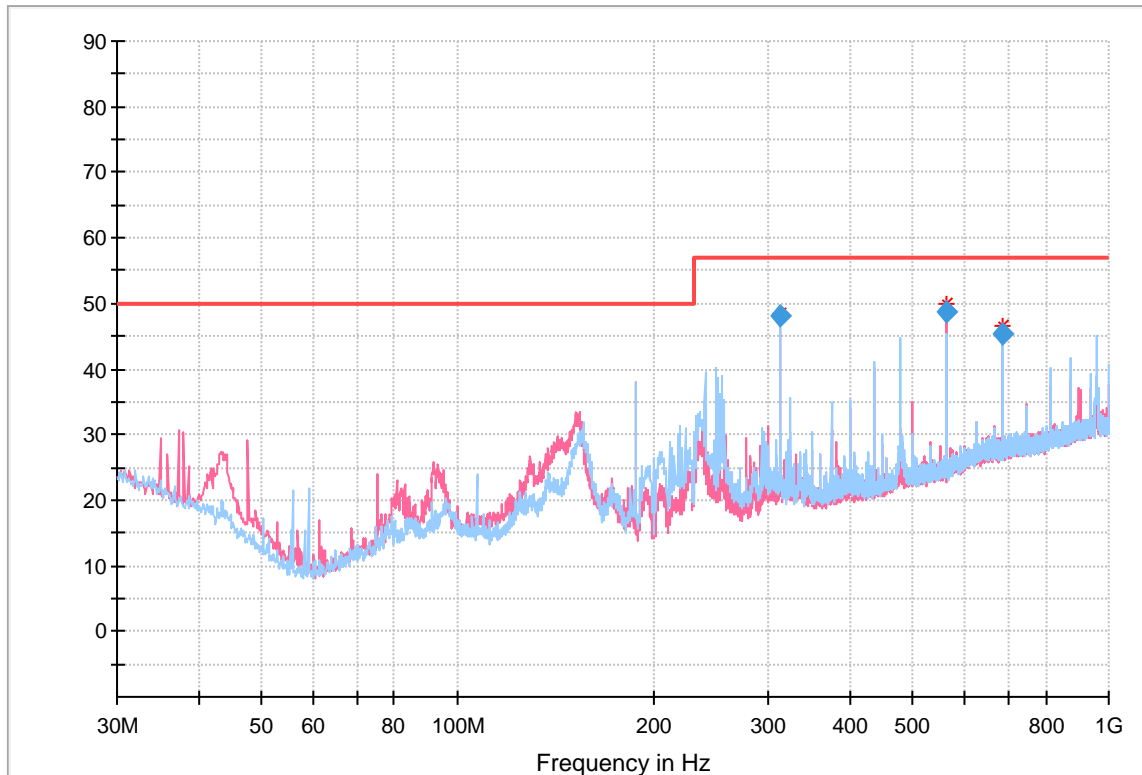
The test equipment listed in 1.1, table 1 of this report are as specified in CISPR 16-1.

The EUT was placed on a turntable. The turntable can turn in 360°. A log periodic antenna is fixed 3m from boundary of EUT.

During the test, the turntable was rotated fully with a measurement antenna oriented for both horizontal and vertical polarisation. The antenna was adjusted between 1m and 4m in height above the ground plane to find the max disturbance.

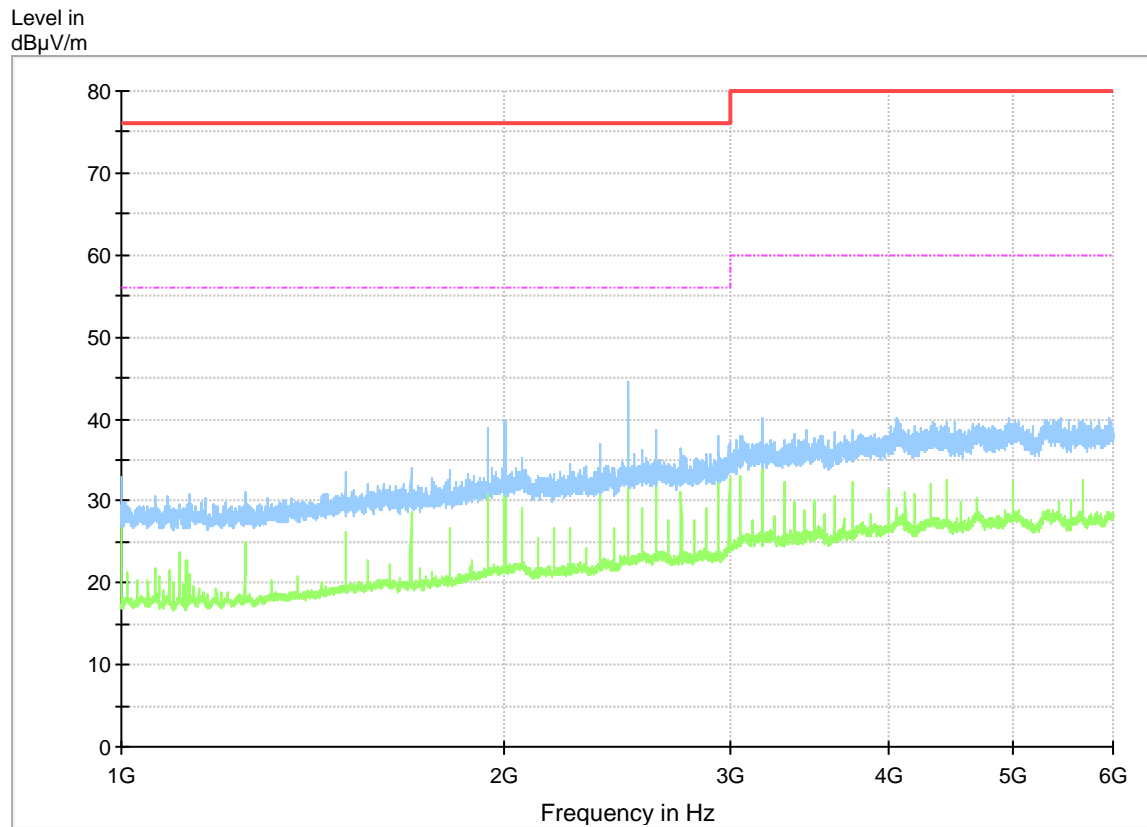
The following diagram and table show the measurement value:

**Figure 3: Spectral diagrams and measurement results 30-1000MHz, Horizontal and Vertical**

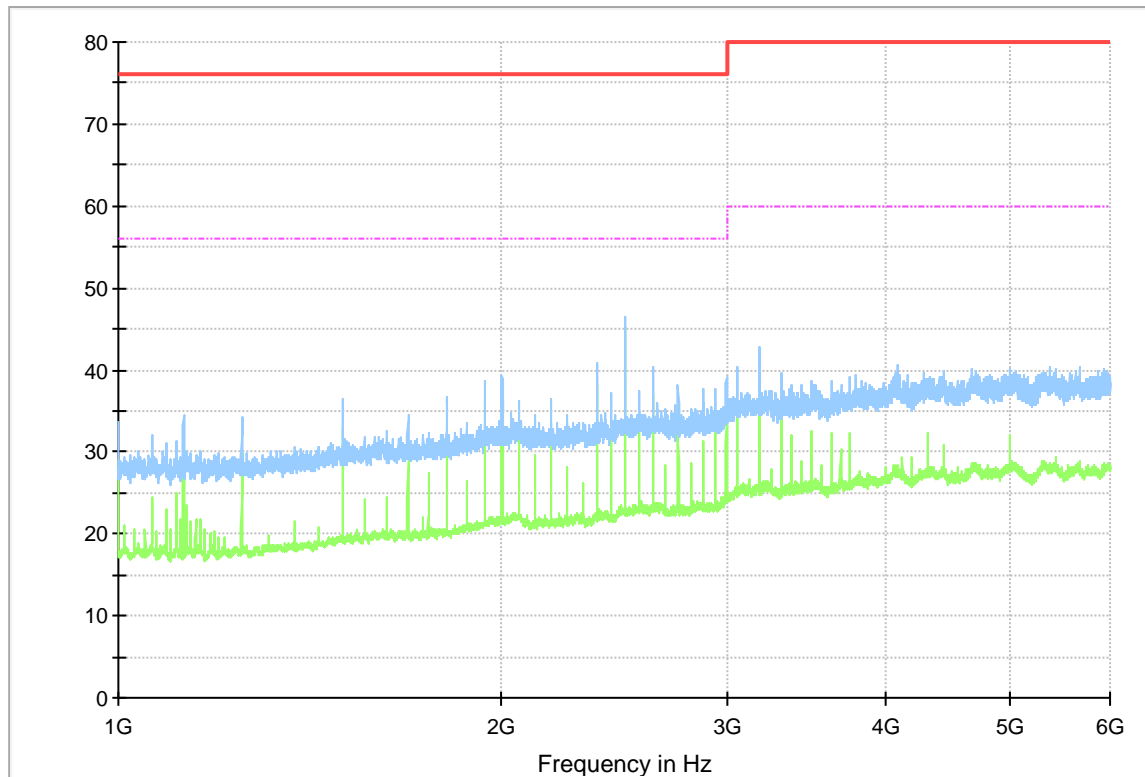
 Level in dB $\mu$ V/m


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dB $\mu$ V/m)	Average (dB $\mu$ V/m)	MaxPeak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol
312.472500	47.95	---	---	57.00	9.05	1000.0	120.000	99.9	H
562.490000	48.67	---	---	57.00	8.33	1000.0	120.000	99.9	V
687.498750	45.39	---	---	57.00	11.61	1000.0	120.000	99.9	V

**Figure 4: Spectral diagrams and measurement results 1000-6000MHz, Horizontal**

There is no suspect points were found in the diagram therefore the final test is not needed.

**Figure 5: Spectral diagrams and measurement results 1000-6000MHz, Vertical**


There is no suspect points were found in the diagram therefore the final test is not needed.



## 5 Test Results I M M U N I T Y According to EN 55035:2017

During the immunity tests, the EUT was operated under conditions specified by clause 3.1 of this report.

Performance according to EN 55035:2017:

Performance criterion A: The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion B: During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

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

Performance criterion C: Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

## 5.1 Enclosure

### 5.1.1 Electrostatic Discharge

<b>Result:</b>	<b>Pass</b>
----------------	-------------

The immunity against electrostatic discharge was tested in accordance with EN 55035:2017. Test setup and ESD-Generator are according to IEC 61000-4-2:2008 which is specified by EN 55035:2017.

The EUT is placed on 0.8m wood table above the ground plane. And the minimum distance between the EUT and all other conductive structures except the ground plane beneath the EUT is more than 0.5m.

The reference ground plane is an aluminum sheet of 0.25mm minimum thickness. The reference ground plane is connected to the protective earth. The size of the ground plane is 2m x 2m.

A horizontal coupling plane (HCP) 1.6m x 0.8m, placed on the table and isolates the EUT 0.5mm thick. Vertical coupling plane (VCP) of dimensions 0.5m x 0.5m is placed parallel to and positioned at a distance of 0.1m from the EUT.

Date of testing : 26.03.2019  
 Test procedure : IEC 61000-4-2:2008  
 Test level :  $\pm 4.0\text{kV}$  contact discharge;  
 $\pm 2.0\text{kV}$ ,  $\pm 4.0\text{kV}$ ,  $\pm 8.0\text{kV}$  air discharge  
 Polarity : Positive / Negative  
 Performance criteria : B  
 Number of discharges : 10 at each point  
 Ambient condition : Temperature: 24°C, Relative humidity: 35%

**Table 2: Electrostatic discharge immunity test results**

Position	Kind of Discharge	Result	Remarks
Non-metallic enclosure, Gap, Port, Signal line	Air discharge $\pm 2.0\text{kV}$ , $\pm 4.0\text{kV}$ , $\pm 8.0\text{kV}$	Pass	No disturbance of function
Metallic enclosure	Contact discharge $\pm 4\text{kV}$	Pass	No disturbance of function
Coupling plane (HCP and VCP)	Contact discharge $\pm 4\text{kV}$	Pass	No disturbance of function

### 5.1.2 RF electromagnetic field immunity test

**Result:**
**Pass**

The test for frequency range 80MHz-6GHz was performed inside a 3m modified semi-anechoic chamber with a test disturbance of 3m. The field uniformity of the test sites is regularly calibrated to ensure the 0-6dB field uniformity criterion as specified by IEC 61000-4-3:2006+A1+A2 are met.

Date of testing : 26.03.2019  
 Basic standard : IEC 61000-4-3:2006+A1+A2  
 Test level : Table 1 of EN 55035:2017  
                   3 V/m (80 MHz to 1 GHz)  
                   3 V/m (1.8GHz, 2.6GHz, 3.5GHz, 5GHz)  
 Frequency range : 80MHz-6GHz  
 Modulation : 80% 1kHz AM  
 Frequency scan speed : Frequency step: 1%; Dwell time: 3s  
 Performance criteria : A  
 Ambient condition : Temperature: 23°C, Relative humidity: 35%

**Table 3: RF electromagnetic field immunity test**

Polarization	Result	Remarks
Horizontal	Pass	During the test, the EUT can operate as intended.
Vertical	Pass	During the test, the EUT can operate as intended.

**Prüfbericht - Nr.: 50235819 001**  
Test Report No.:**Seite 20 von 30**  
Page 20 of 30

### 5.1.3 Power frequency magnetic field

**Result:****N/A**

Due to the EUT does not contain components susceptible to magnetic fields, such as Hall elements or magnetic field sensors. Therefore, the EUT is deemed to meet the requirement without actual testing.

## 5.2 Input and Output AC Power Port, Signal Port and Interconnecting Port

### 5.2.1 Fast Transients on AC Power Port, Signal Port and Interconnecting Port

<b>Result:</b>	<b>Pass</b>
----------------	-------------

During the test, the EUT was placed on a 0.1m high insulating support above the reference ground plane. The minimum distance between the EUT and all other conductive structures except the reference ground plane beneath the EUT is more than 0.5m.

The length between the coupling device and the EUT is less than 1m. The excessive part of the power cord longer than 1m was folded forth and back parallel so as to form a bundle with a length between 0.3m and 0.4m.

Date of testing	: 26.03.2019
Test procedure	: IEC 61000-4-4:2004
Test level	: Clause 4.2.4 of EN 55035:2017 ±1kV, 5kHz, for mains port
Polarity	: Positive / Negative
Coupling duration	: 1min/polarity
Performance criteria	: B
Ambient condition	: Temperature: 24°C, Relative humidity: 45%

**Table 4: EFT/B immunity test results for power Port and antenna Port**

Coupling mode	Result	Remarks
L-N-PE	Pass	During the test, the EUT can operate as intended.
Signal port and interconnecting port	N/A	The signal line and interconnecting line does not exceed 3m, therefore no test was needed.

## 5.2.2 Injected Current into AC Power Port, Signal Port and Interconnecting Port

<b>Result:</b>	<b>Pass</b>
----------------	-------------

During the test, the sample was placed on a 0.1m wooden support above the reference ground plane. The minimum distance between the sample and all other conductive structures except the reference ground plane beneath the EUT is more than 0.5m.

A CDN was used to couple the disturbing signal onto the power input port of the sample. The distance between the EUT and the CDN is within 0.1-0.3m. The cable between the EUT and CDN is placed about 50mm above the reference ground plane.

Date of testing	: 27.03.2019
Basic standard	: IEC 61000-4-6:2008
Test level	: Table 4 of EN 55035:2017 3V 0.15M Hz to 10MHz 3V to 1V 10MHz to 30MHz 1V 30MHz to 80MHz
Frequency range	: 0.15 – 80 MHz
Modulation	: 80% AM, 1kHz
Frequency scan speed	: Frequency step: 1%; Dwell time: 1s
Performance criteria	: A
Ambient conditions	: Temperature: 23°C, Relative humidity: 45%

**Table 5: Injected current, AC power port and antenna port**

Port	Result	Remarks
AC Input port	Pass	During the test, the EUT can operate as intended.
Signal port and interconnecting port	N/A	The signal line and interconnecting line does not exceed 3m, therefore no test was needed.

### 5.2.3 Surges to AC Power Port, Signal Port and Interconnecting Port

<b>Result:</b>	<b>Pass</b>
----------------	-------------

The immunity against surges to AC power port was tested in accordance to IEC 61000-4-5:2005. Test setup and the Combination Wave Generator (CWG) were according to IEC 61000-4-5:2005 which is specified by EN 55035:2017.

Date of testing	: 27.03.2019
Test procedure	: IEC 61000-4-5:2005
Test level	: Table 4 of EN 55035:2017 ±2kV (Line/N to PE) ±1kV (Line to N)
$T_r/T_n$	: 1.2/50µs (open-circuit voltage) 8/20µs (short-circuit current)
Polarity	: Positive / Negative
Pulse number	: 5 pulses for each polarity
Coupling phase	: 0°, 90°, 180° and 270°
Repetition rate	: 1 pulse/min
Performance criteria	: B
Ambient conditions	: Temperature: 23°C, Relative humidity: 35%

**Table 6: Surge immunity test results**

Coupling mode	Result	Remarks
L-PE	Pass	During the test, the EUT can operate as intended
N-PE	Pass	During the test, the EUT can operate as intended
L-N	Pass	During the test, the EUT can operate as intended
Signal port and interconnecting port	N/A	EUT doesn't connect directly to outdoor cables, therefore no test is needed.

### 5.2.4 Voltage dips and interruptions to AC Power Port

<b>Result:</b>	<b>Pass</b>
----------------	-------------

The immunity against voltage dips and interruptions to AC power port was tested in accordance to IEC 61000-4-11:2004. Test setup and the test generator were according to IEC 61000-4-11:2004 which is specified by EN 55035:2017.

Date of testing	:	26.03.2019
Basic standard	:	IEC 61000-4-11:2004
Test level	:	Clause 4.2.6 of EN 55035:2017 >95% reduction, 10ms; 30% reduction, 500ms; >95% reduction, 5s
Performance criteria	:	B+C
Ambient conditions	:	Temperature: 25°C, Relative humidity: 40%

**Table 7: Test condition and Test Result for Voltage interruptions**

Environmental Phenomena	Test level (in % $U_T$ )	Duration (in period of the rated frequency)	Remarks
Dips	0	0.5 (10ms)	The EUT can operate as intended after the test.
Dips	70	25 (500ms)	The EUT can operate as intended after the test.
Interruptions	0	250 (5s)	The EUT can operate as intended after the test.

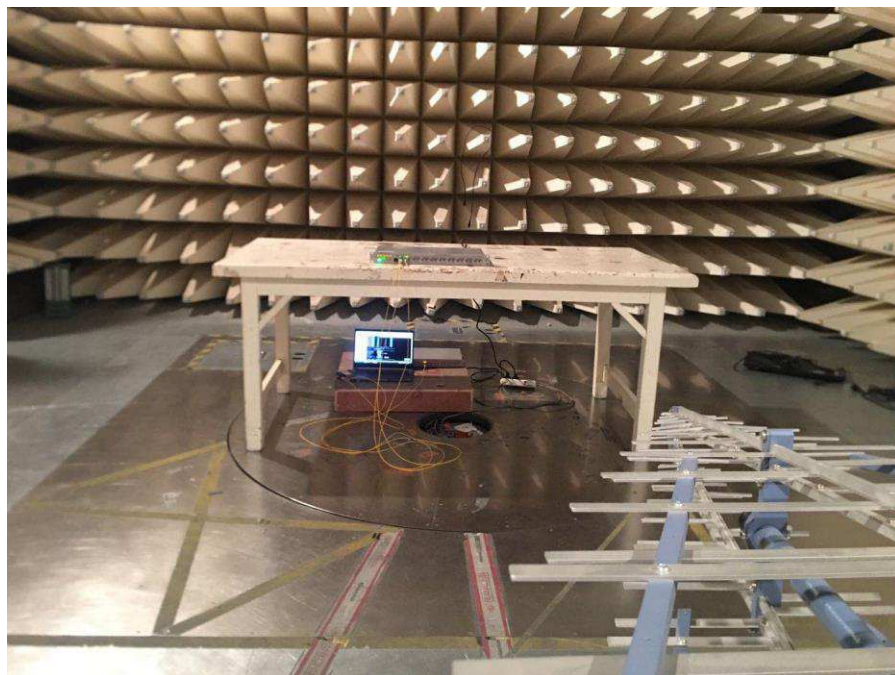


## 6 Photographs of the Test Set-Up

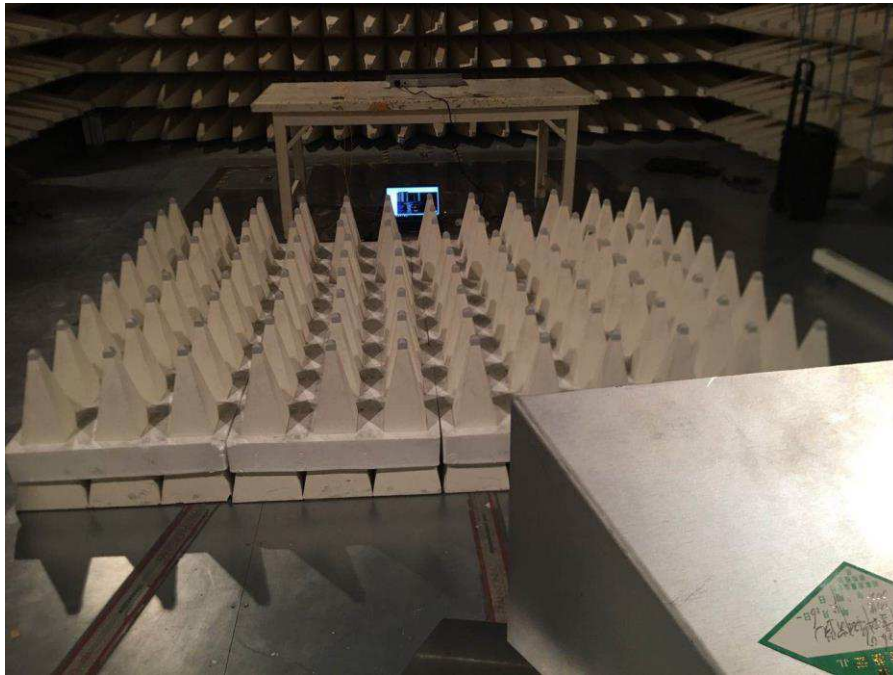
**Photograph 1: Set-up for measurement of disturbance voltage on AC mains**



**Photograph 2: Set-up for measurement of radiated emission**

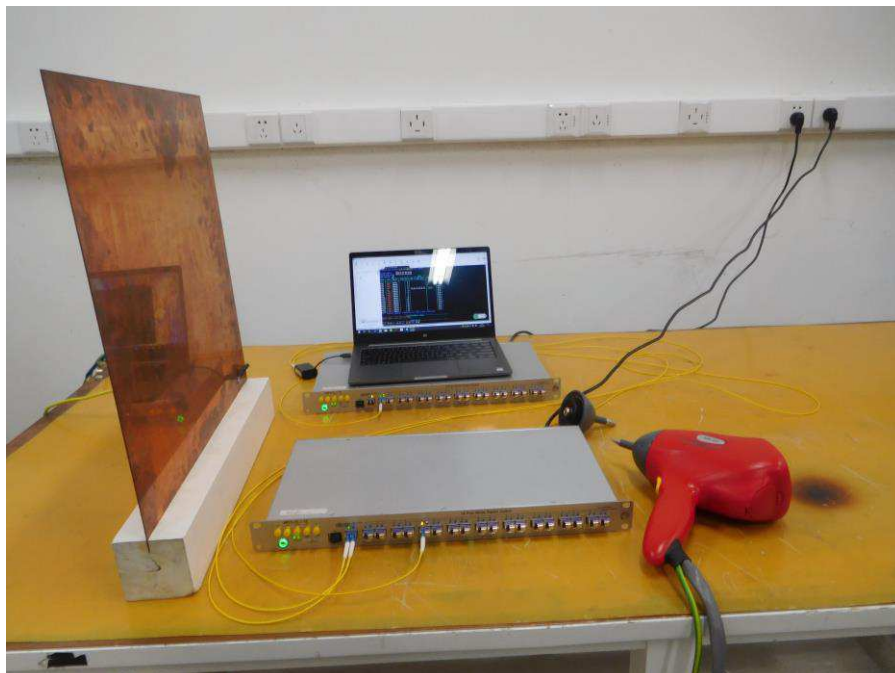


30-1000MHz

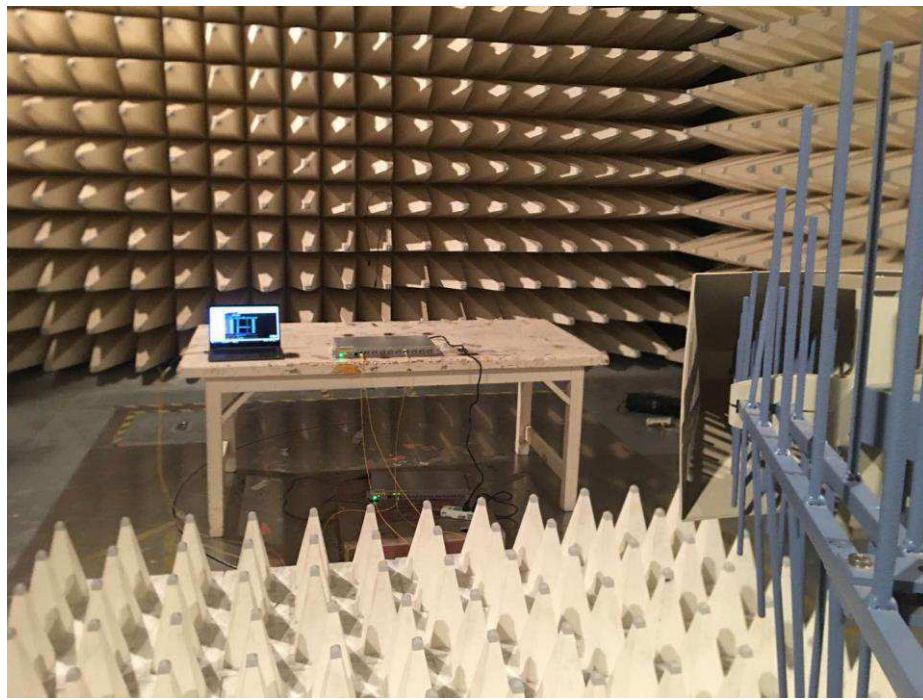


1-6GHz

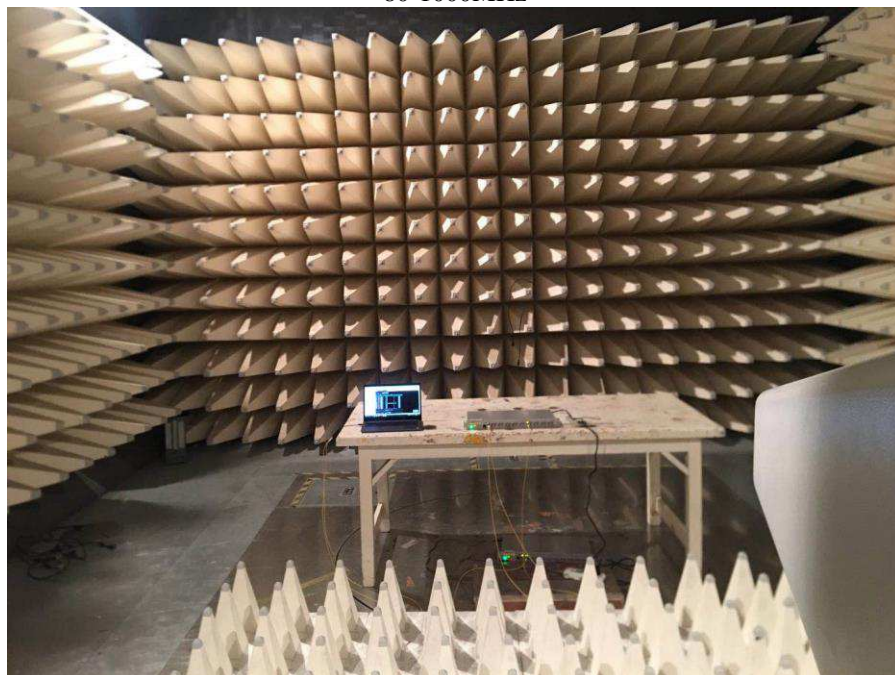
Photograph 3: Set-up for immunity test of electrostatic discharge



**Photograph 4: Set-up for immunity test of RF electromagnetic field**

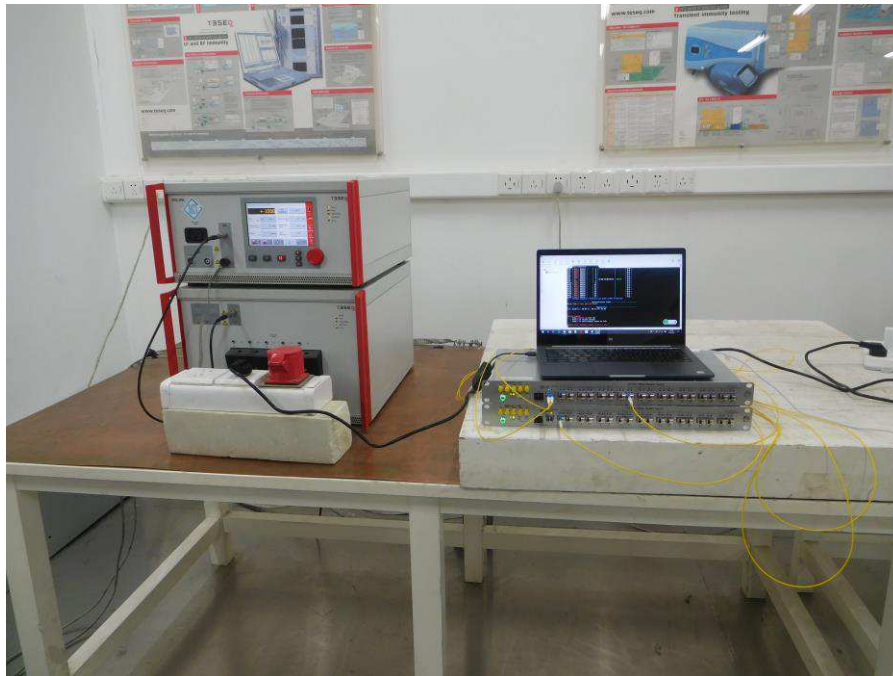


80-1000MHz



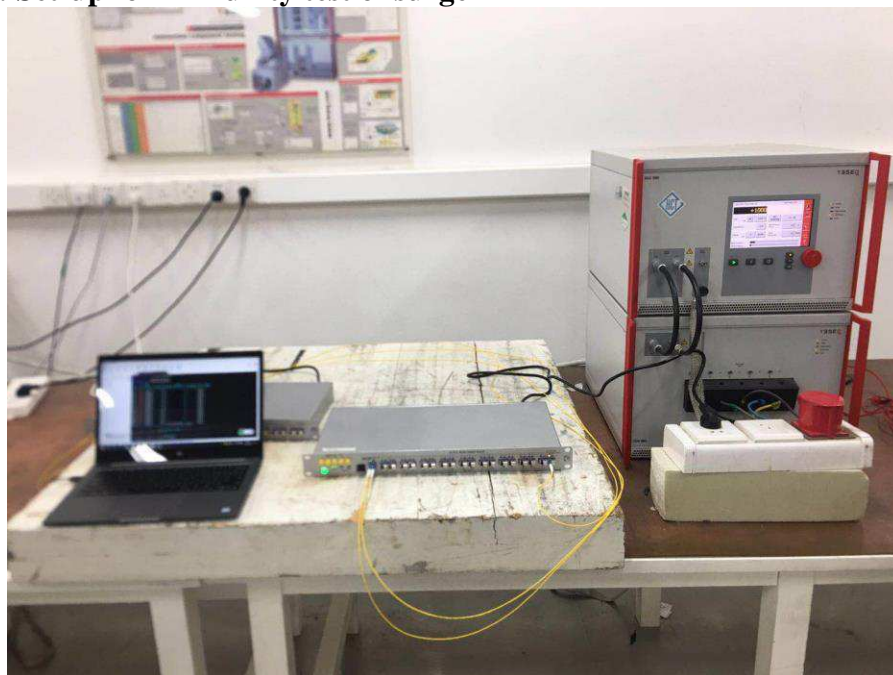
1-6GHz

**Photograph 5: Set-up for immunity test of fast transient/burst**



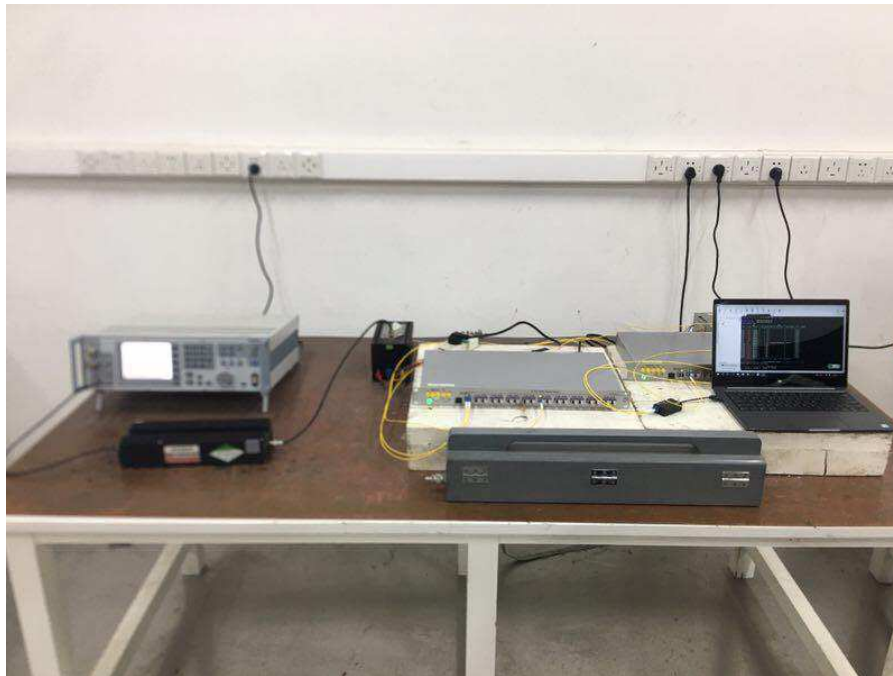
AC mains port

**Photograph 6: Set-up for immunity test of surge**



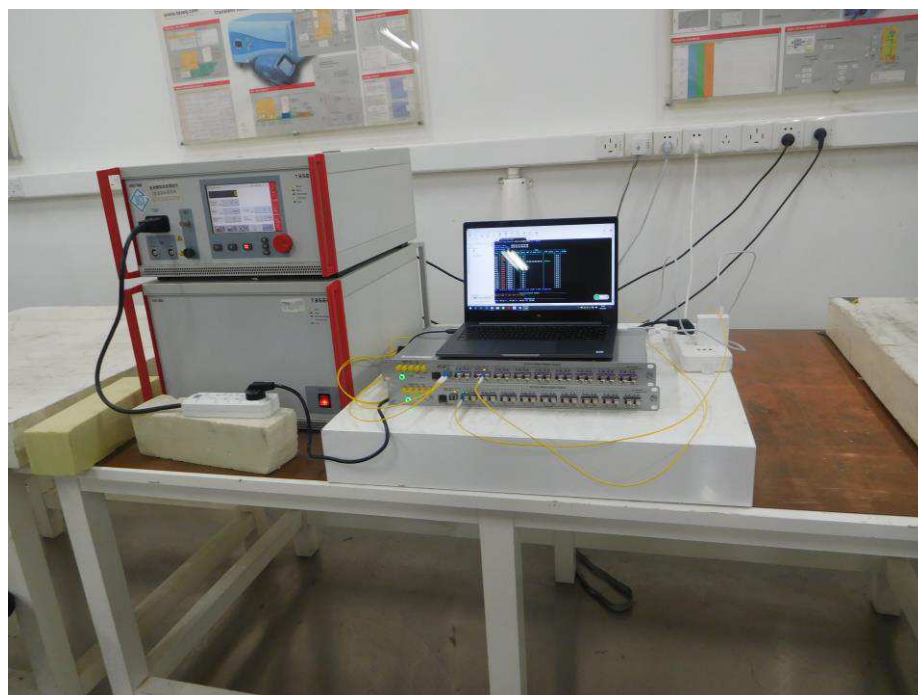
AC mains port

**Photograph 7: Set-up for immunity test of injected current**



AC mains port

**Photograph 8: Set-up for immunity test of voltage dips and short interruptions**



## 7 List of Tables


Table 1: List of Test and Measurement Equipment .....	4
Table 6: Electrostatic discharge immunity test results .....	18
Table 7: RF electromagnetic field immunity test .....	19
Table 8: EFT/B immunity test results for power Port and antenna Port .....	21
Table 9: Injected current, AC power port and antenna port .....	22
Table 10: Surge immunity test results .....	23
Table 11: Test condition and Test Result for Voltage interruptions .....	24

## 8 List of Figures

Figure 1: Spectral Diagrams, Conducted Emission, 150 kHz - 30MHz, L .....	11
Figure 2: Spectral Diagrams, Conducted Emission, 150 kHz - 30MHz, N .....	12
Figure 4: Spectral diagrams and measurement results 30-1000MHz, Horizontal and Vertical .....	14
Figure 4: Spectral diagrams and measurement results 1000-6000MHz, Horizontal .....	15
Figure 5: Spectral diagrams and measurement results 1000-6000MHz, Vertical .....	16

## 9 List of Photographs

Photograph 1: Set-up for measurement of disturbance voltage on AC mains .....	25
Photograph 2: Set-up for measurement of radiated emission .....	25
Photograph 3: Set-up for immunity test of electrostatic discharge .....	26
Photograph 4: Set-up for immunity test of RF electromagnetic field .....	27
Photograph 5: Set-up for immunity test of fast transient/burst .....	28
Photograph 6: Set-up for immunity test of surge .....	28
Photograph 7: Set-up for immunity test of injected current .....	29
Photograph 8: Set-up for immunity test of voltage dips and short interruptions .....	29

<b>Prüfbericht-Nr.:</b> <i>Test Report No.:</i>	<b>50235819 001</b>	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	<b>190101447</b>	Seite 1 von 30 Page 1 of 30	
<b>Kunden-Referenz-Nr.:</b> <i>Client Reference No.:</i>	<b>N/A</b>	<b>Auftragsdatum:</b> <i>Order date:</i>	<b>26.03.2019</b>		
<b>Auftraggeber:</b> <i>Client:</i>	<b>Sync (Beijing) Technology co., LTD.</b> Room A508, No.79 shuangqing road, Haidian district, Beijing,100085, P.R. China				
<b>Prüfgegenstand:</b> <i>Test item:</i>	<b>WR Switch</b>				
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	<b>WRS-18B</b>				
<b>30Auftrags-Inhalt:</b> <i>Order content:</i>	<b>CE EMC</b>				
<b>Prüfgrundlage:</b> <i>Test specification:</i>	<b>EN 55032:2015, EN 55035:2017, EN 61000-3-2:2014, EN 61000-3-3:2013</b>				
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	<b>26.03.2019</b>				
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	<b>Engineering sample</b>				
<b>Prüfzeitraum:</b> <i>Testing period:</i>	<b>26.03.2019 to 27.03.2019</b>				
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	<b>Refer to section 1.1</b>				
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	<b>Refer to section 1.1</b>				
<b>Prüfergebnis*:</b> <i>Test result*:</i>	<b>Pass</b>				
<b>geprüft von / tested by:</b>	<b>geprüft von / tested by:</b>				
04.06.2019 Gao, Shuying /PE	<i>Gao Shuying</i>	04.06.2019 Wang , Gang /TC	<i>Wang Gang</i>		
<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>	<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>
<b>Sonstiges / Other:</b> Manufacturer or/and his importer shall ensure product bears label requirements in article 7 and article 9 of the 2014/30/EU relate to name, batch number, post address prior place the product into EU market.					
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>			Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested					
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>					

## Appendix 1

Test Report No.:	<b>50235819 001</b>	Page 1 of 1
------------------	---------------------	-------------

### Measurement Uncertainties

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of  $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%.

**Table 1: Measurement Uncertainty levels**

Test	Parameters	Expanded uncertainty ( $U_{lab}$ )	Expanded uncertainty ( $U_{cispr}$ )
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	$\pm 3.1$ dB $\pm 3.1$ dB	$\pm 4.0$ dB $\pm 3.6$ dB
Power disturbance	Level accuracy (30MHz to 300MHz)	$\pm 4.24$ dB	$\pm 4.5$ dB
Electromagnetic Radiated Emission (3-loop)	Level accuracy (9kHz to 30MHz)	$\pm 2.5$ dB	N/A
Radiated Emission	Level accuracy (9kHz to 30MHz)	N/A	N/A
Radiated Emission	Level accuracy (30MHz to 200MHz) (200MHz to 1000MHz)	$\pm 4.66$ dB $\pm 4.66$ dB	$\pm 5.2$ dB $\pm 5.2$ dB
Radiated Emission	Level accuracy (1 to 6GHz) (6 to 18GHz)	$\pm 4.42$ dB	N/A
Insertion Loss	Level accuracy (150kHz to 1605kHz)	N/A	N/A
Mains Harmonic	Voltage	N/A	N/A
Voltage Fluctuations & Flicker	Voltage	N/A	N/A

As  $U_{lab}$  in all applicable tests listed above are less than  $U_{cispr}$  according to CISPR 16-4-2:2003,

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