

ETSI EN 301 489-1 V2.2.1 (2019-03)  
ETSI EN 301 489-17 V3.2.0 (2017-03)

## TEST REPORT

For

**Wallys Communications (SuZhou) Co.,LTD**

Room 2723,Le Jia building,Jia Rui Xiang No.8, Suzhou Industrial Park, Suzhou, P.R Suzhou, 215000  
China

**Tested Model: DR900VX**  
**Series Model: DR900VX-4.9,DR600VX,**  
**DR600VX-4.9,DR900VX-MX,DR600VX-MX**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Dual Band 11AC wireless Module
<b>Test Engineer:</b>	Chao Gao <span style="float: right;"><i>chao gao</i></span>
<b>Report Number:</b>	RKSA191022001-02
<b>Report Date:</b>	2019-10-30
<b>Reviewed By:</b>	Oscar Ye <span style="float: right;"><i>Oscar.Ye</i></span> EMC Manager
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan,Jiangsu province, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 <a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a>

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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Applicant	Wallys Communications (SuZhou) Co.,LTD
Test Model	DR900VX
Series Model	DR900VX-4.9,DR600VX,DR600VX-4.9,DR900VX-MX,DR600VX-MX
Product	Dual Band 11AC wireless Module
Highest Operation Frequency	5G WiFi
Rate Voltage	DC 3.3V

*Note: The difference between tested model and series model was explained in the attached declaration letter.*

*\*All measurement and test data in this report was gathered from production sample serial number: 20191022001 (Assigned by the BACL. The EUT supplied by the applicant was received on 2019-10-22)*

### Objective

This test report is prepared on behalf of *Wallys Communications (SuZhou) Co.,LTD* in accordance with:

ETSI EN 301 489-1 V2.2.1 (2019-03), ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.

ETSI EN 301489-17 V3.2.0 (2017-03), ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems.

The objective is to determine compliance with ETSI EN 301489-1 V2.2.1 (2019-03) and ETSI EN 301489-17 V3.2.0 (2017-03).

### Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.2.1 (2019-03).

### Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user)

*Test mode: POE & Wi-Fi Link*

### EUT Exercise Software

No exercise software was used to test.

### Equipment Modifications

No modifications were made to the EUT.

### Support Equipment List and Details

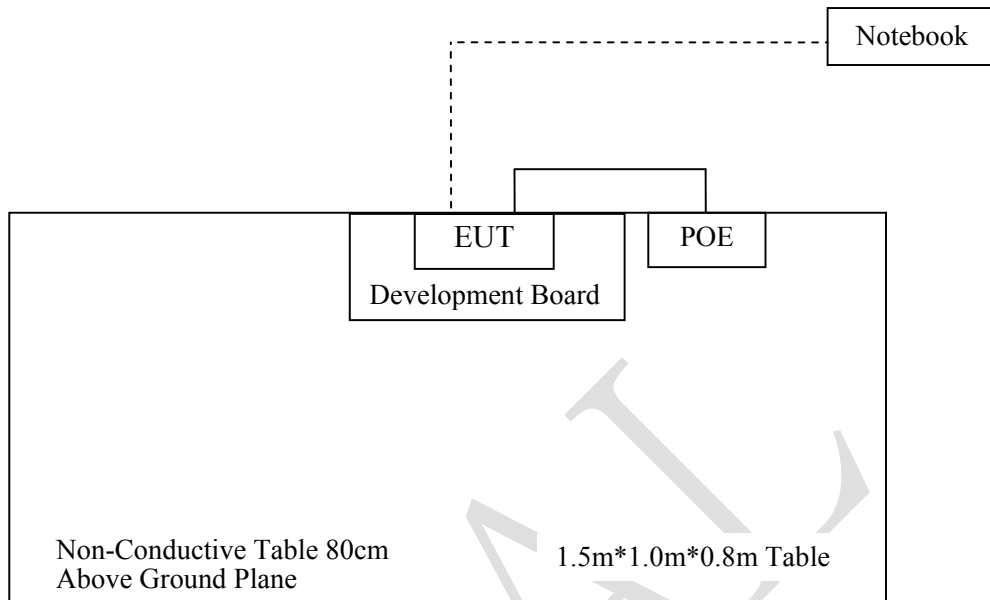
Manufacturer	Description	Model	Serial Number
/	Power Over Ethernet	GRT-POE15-240100	862266039775394
HP	Notebook	444s	2CE3130VWY
/	Development Board	DR344-NAS	MP3A

### External I/O Cable

Cable Description	Length (m)	From/Port	To
LAN Cable	1.0	EUT	POE

### Configuration of Radiation Test Setup

Test mode: POE & Wi-Fi Link



**SUMMARY OF TEST RESULTS**

	Description of Test	Result
Reference to clauses EN 301 489-1 §7.1	Reference to clauses EN 301 489-1 §8.2 Enclosure of ancillary equipment measured on a stand alone basis	Compliant
	Reference to clauses EN 301 489-1 §8.3 DC power input/output ports	Not Applicable <sup>1</sup>
	Reference to clauses EN 301 489-1 §8.4 AC mains power input/output ports	Compliant
	Reference to clauses EN 301 489-1 §8.5 Harmonic current emissions (AC mains input port)	Not Applicable <sup>2</sup>
	Reference to clauses EN 301 489-1 §8.6 Voltage fluctuations and flicker (AC mains input port)	Compliant
	Reference to clauses EN 301 489-1 §8.7 Wired network ports	Not Applicable <sup>3</sup>
Reference to clauses EN 301 489-1 §7.2	Reference to clauses EN 301 489-1 §9.3 Electrostatic discharge (EN 61000-4-2)	Compliant
	Reference to clauses EN 301 489-1 §9.2 Radio frequency electromagnetic field (80 MHz to 6000 MHz) (EN 61000-4-3)	Compliant
	Reference to clauses EN 301 489-1 §9.4 Fast transients, common mode (EN 61000-4-4)	Compliant
	Reference to clauses EN 301 489-1 §9.8 Surges (EN 61000-4-5)	Compliant
	Reference to clauses EN 301 489-1 §9.5 Radio frequency, common mode (EN 61000-4-6)	Compliant
	Reference to clauses EN 301 489-1 §9.7 Voltage dips and interruptions (EN 61000-4-11)	Compliant
	Reference to clauses EN 301 489-1 §9.6 Transients and surges in the vehicular environment(ISO 7637-2)	Not Applicable*

Note:

Not Applicable<sup>1</sup>: AC/DC power supply, then the measurement shall be performed on the AC power input port.

Not Applicable<sup>2</sup>: According to EN 61000-3-2:2014 section 7: Equipment with a rated power of 75 W or less, other than lighting equipment, are not included in this standard.

Not Applicable<sup>3</sup>: There are no wired network ports.

Not Applicable\*: This equipment will not in vehicular environment.

Immunity test performance criteria:

“A “ means : CT/CR Reference to clauses EN 301 489-1 §6.1/EN 301 489-17 §6.3 §6.5

“B” means : TT/TR Reference to clauses EN 301 489-1 §6.2/EN 301 489-17 §6.4 §6.6

## §8.4 - CONDUCTED EMISSIONS

### Measurement Uncertainty

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

If  $U_{lab}$  is less than or equal to  $U_{cispr}$  of Table 1, 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  $U_{cispr}$  of Table 1, then:

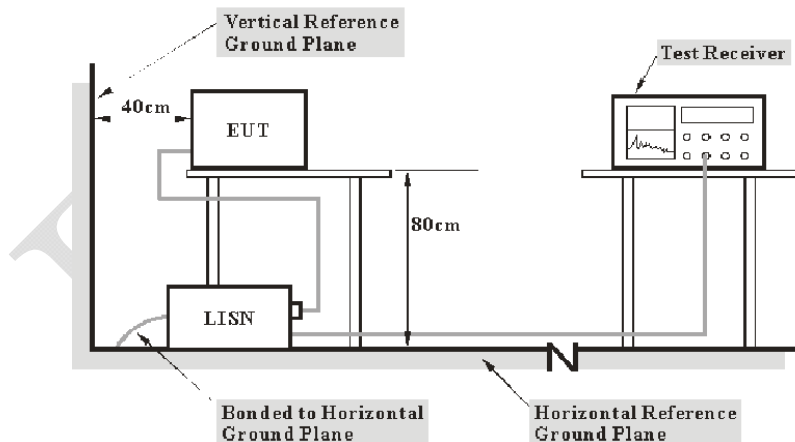
- compliance is deemed to occur if no measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit;
- Non-compliance is deemed to occur if any measured disturbance level, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

Table 1 – Values of  $U_{cispr}$

Item	Measurement Uncertainty	$U_{cispr}$
AMN	150kHz~30MHz	3.19 dB
		3.4 dB

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

### EUT Setup



- Note: 1. Support units were connected to second LISN.  
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per EN 301489-1 measurement procedures. The specification used was with the EN 301 489-1 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



## EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-102454-Qd	2019-06-25	2020-06-24
Rohde & Schwarz	LISN	ENV216	3560655016	2018-11-30	2019-11-29
Audix	Test Software	e3	V9	--	--
MICRO-COAX	Coaxial Cable	Cable-15	015	2019-09-08	2020-09-07

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

## Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

## Corrected Amplitude & Margin Calculation

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

$$\text{Factor (dB)} = \text{LISN VDF (dB)} + \text{Cable Loss (dB)} + \text{Transient Limiter Attenuation (dB)}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit of 7dB means the emission is 7 dB below the limit. The equation for Over Limit calculation is as follows:

$$\text{Over Limit (dB)} = \text{Read level (dB}\mu\text{V)} + \text{Factor (dB)} - \text{Limit (dB}\mu\text{V)}$$

**Test Data**

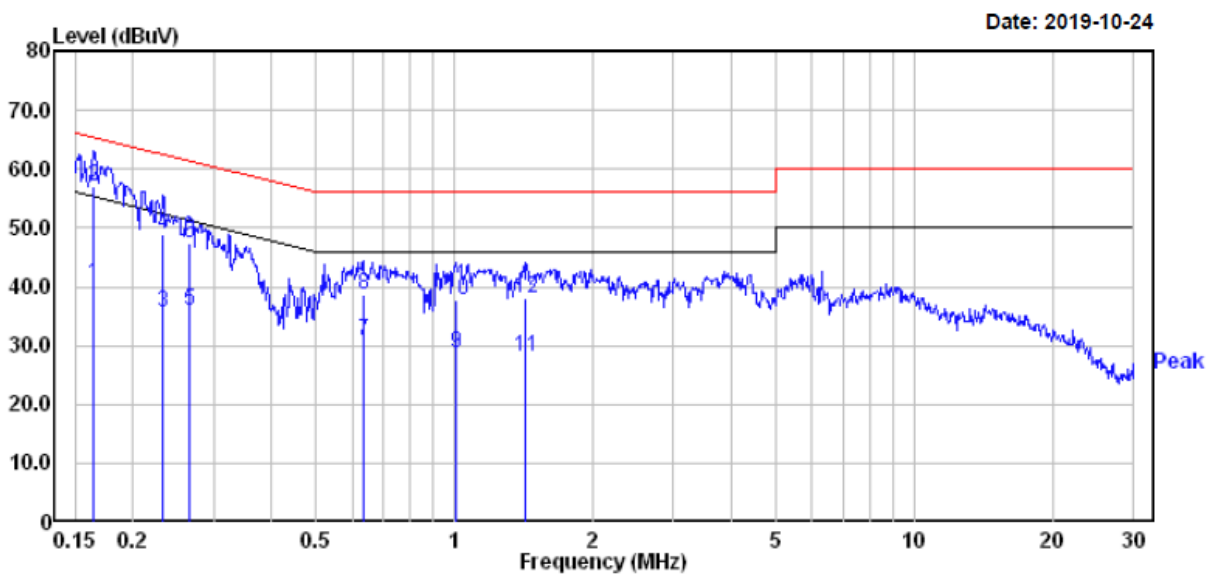
**Environmental Conditions**

<b>Temperature:</b>	20.8 °C
<b>Relative Humidity:</b>	41 %
<b>ATM Pressure:</b>	101.2 kPa

The testing was performed by Chao Gao on 2019-10-24.

Test mode: POE & Wi-Fi Link

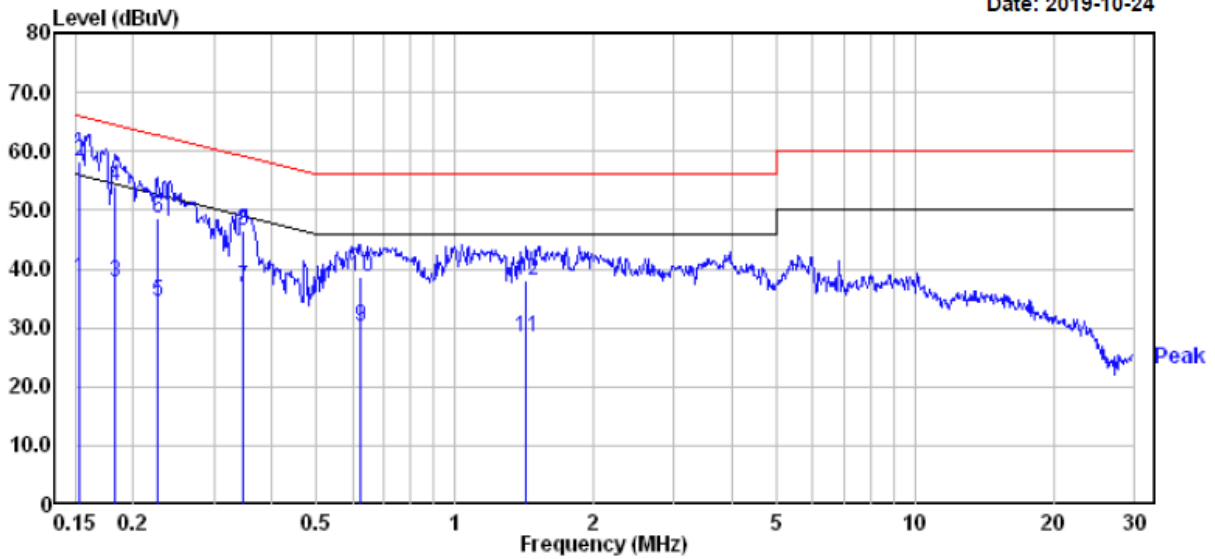
**AC Main Port - Line:**



	Read		Limit	Over			
	Freq	Level	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.164	20.50	19.83	40.33	55.25	-14.92	Average
2	0.164	37.10	19.83	56.93	65.25	-8.32	QP
3	0.233	15.80	19.82	35.62	52.35	-16.73	Average
4	0.233	29.00	19.82	48.82	62.35	-13.53	QP
5	0.264	16.20	19.82	36.02	51.29	-15.27	Average
6	0.264	27.50	19.82	47.32	61.29	-13.97	QP
7	0.634	10.90	19.75	30.65	46.00	-15.35	Average
8	0.634	19.00	19.75	38.75	56.00	-17.25	QP
9	1.010	8.90	19.82	28.72	46.00	-17.28	Average
10	1.010	18.00	19.82	37.82	56.00	-18.18	QP
11	1.433	8.31	19.83	28.14	46.00	-17.86	Average
12	1.433	18.11	19.83	37.94	56.00	-18.06	QP

**AC Main Port - Neutral:**

Date: 2019-10-24



	Read			Limit	Over	
Freq	Level	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.152	18.40	19.82	38.22	55.87	-17.65 Average
2	0.152	38.40	19.82	58.22	65.87	-7.65 QP
3	0.182	17.90	19.83	37.73	54.37	-16.64 Average
4	0.182	34.20	19.83	54.03	64.37	-10.34 QP
5	0.226	14.60	19.82	34.42	52.61	-18.19 Average
6	0.226	28.90	19.82	48.72	62.61	-13.89 QP
7	0.346	17.10	19.81	36.91	49.05	-12.14 Average
8	0.346	26.70	19.81	46.51	59.05	-12.54 QP
9	0.624	10.40	19.75	30.15	46.00	-15.85 Average
10	0.624	18.90	19.75	38.65	56.00	-17.35 QP
11	1.426	8.51	19.83	28.34	46.00	-17.66 Average
12	1.426	18.21	19.83	38.04	56.00	-17.96 QP

## §8.2 - RADIATED EMISSIONS

### Measurement Uncertainty

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

If  $U_{lab}$  is less than or equal to  $U_{cispr}$  of Table 1, 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  $U_{cispr}$  of Table 1, 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.

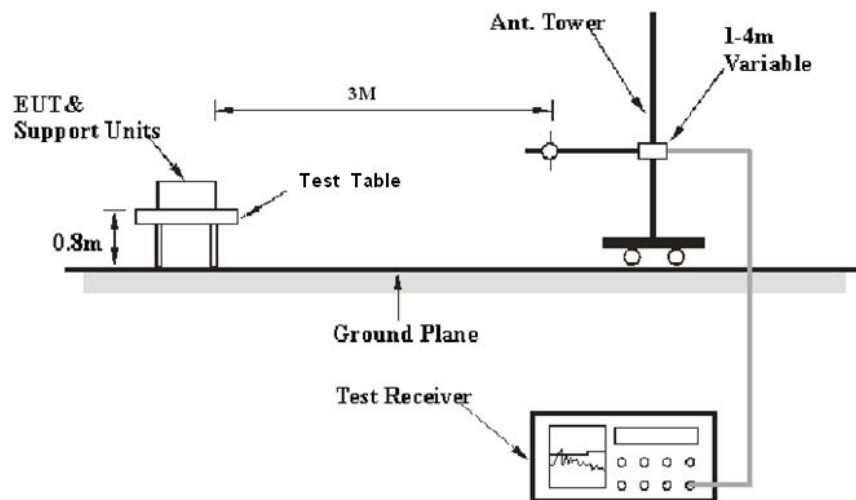
Table 1 – Values of  $U_{cispr}$

Item		Measurement Uncertainty	$U_{cispr}$
Radiated Emission	30MHz~1GHz	5.91dB	6.3 dB
	1GHz~6GHz	4.68dB	5.2 dB

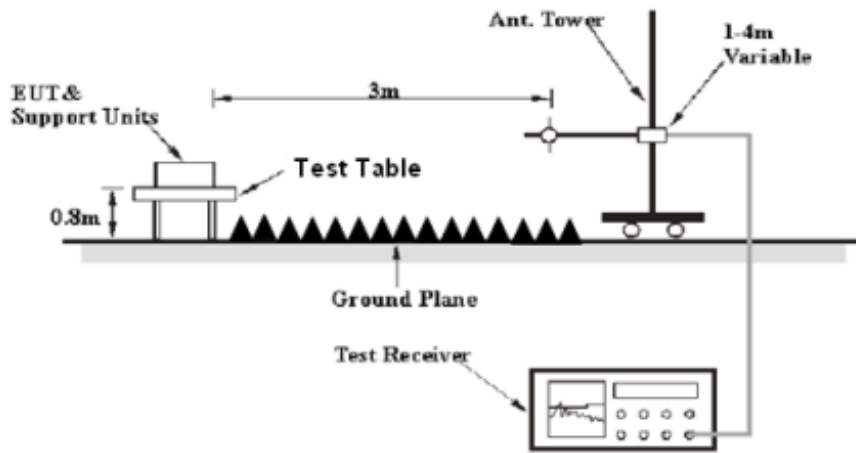
Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

### Test System Setup

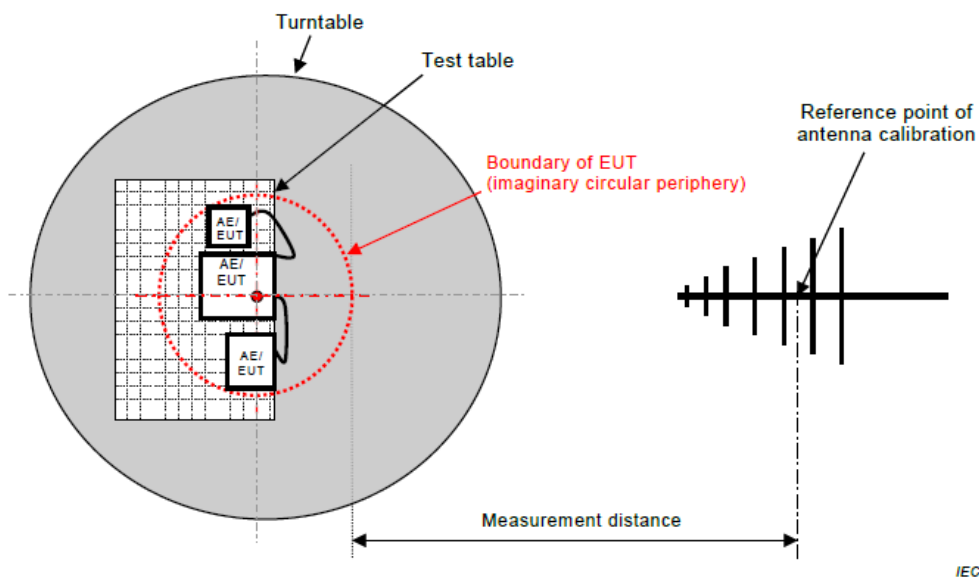
Below 1GHz:



Above 1GHz:



Radiated Top View:



**Figure C.1 – Measurement distance**

The radiated emission tests were performed in the 3 meters, using the setup accordance with the ETSI EN 301 489-1 V2.2.1 (2019-03). The specification used was the ETSI EN 301 489-1 V2.2.1 (2019-03).

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

## EMI Test Receiver Setup

The system was investigated from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver Setup was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector Type
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	Peak
	1MHz	3 MHz	1 MHz	AVG

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrument	Amplifier	310N	185700	2019-08-14	2020-08-13
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2018-11-12	2019-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2019-01-09	2022-01-08
Champrotek	Chamber	Chamber A	T-KSEMC049	-	-
Champrotek	Chamber	Chamber B	T-KSEMC080	-	-
R&S	Auto test Software	EMC32	100361	-	-
ETS	Horn Antenna	3115	6229	2019-01-11	2022-01-10
Rohde & Schwarz	EMI Receiver	ESU40	100207	2019-08-27	2020-08-26
A.H.Systems, inc	Amplifier	2641-1	466	2019-09-11	2020-09-10
MICRO-COAX	Coaxial Cable	Cable-8	008	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-4	004	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-5	005	2019-08-15	2020-08-14

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

## Test Procedure

During the radiated emissions, the POE was connected to the first AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detection mode from 30MHz to 1GHz, Peak and average detection mode above 1 GHz.

## Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Amp.} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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 limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amp}$$

## Test Data

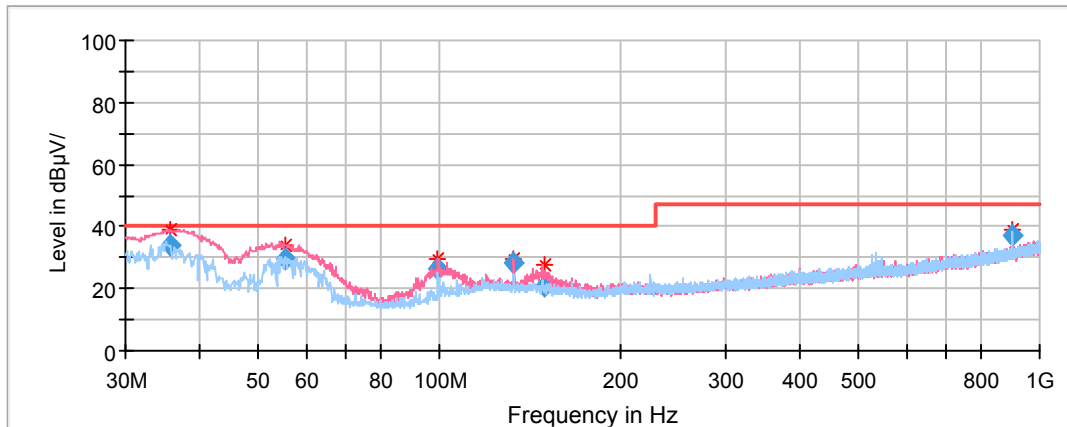
### Environmental Conditions

<b>Temperature:</b>	24.1 °C
<b>Relative Humidity:</b>	55 %
<b>ATM Pressure:</b>	101.2 kPa

*The testing was performed by Chao Gao on 2019-10-24.*

*Test mode: POE & Wi-Fi Link*

**1) Below 1GHz:**



Frequency (MHz)	Quasi Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
35.538950	34.09	40.00	5.91	101.0	V	88.0	-7.7
55.191100	29.52	40.00	10.48	101.0	V	19.0	-17.7
99.593600	26.57	40.00	13.43	101.0	V	304.0	-15.0
132.805600	28.00	40.00	12.00	101.0	V	217.0	-11.7
149.305050	20.45	40.00	19.55	101.0	V	196.0	-12.3
899.988600	37.27	47.00	9.73	101.0	H	0.0	0.0

**Above 1 GHz:**

Frequency (MHz)	Max Peak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1350.00	---	32.68	50.00	17.32	200.0	V	241.0	-10.7
1350.00	36.80	---	70.00	33.20	200.0	V	241.0	-10.7
1800.00	---	47.14	50.00	2.86	200.0	V	36.0	-8.9
1800.00	48.83	---	70.00	21.17	200.0	V	36.0	-8.9
1999.00	---	35.89	50.00	14.11	100.0	H	356.0	-8.2
1999.00	44.65	---	70.00	25.35	100.0	H	356.0	-8.2
2250.00	---	38.48	50.00	11.52	100.0	V	109.0	-7.6
2250.00	41.53	---	70.00	28.47	100.0	V	109.0	-7.6
3830.00	40.72	---	74.00	33.28	200.0	V	198.0	-2.4
3830.00	---	35.07	54.00	18.93	200.0	V	198.0	-2.4
5734.00	---	44.82	54.00	9.18	200.0	V	155.0	1.8
5734.00	51.42	---	74.00	22.58	200.0	V	155.0	1.8



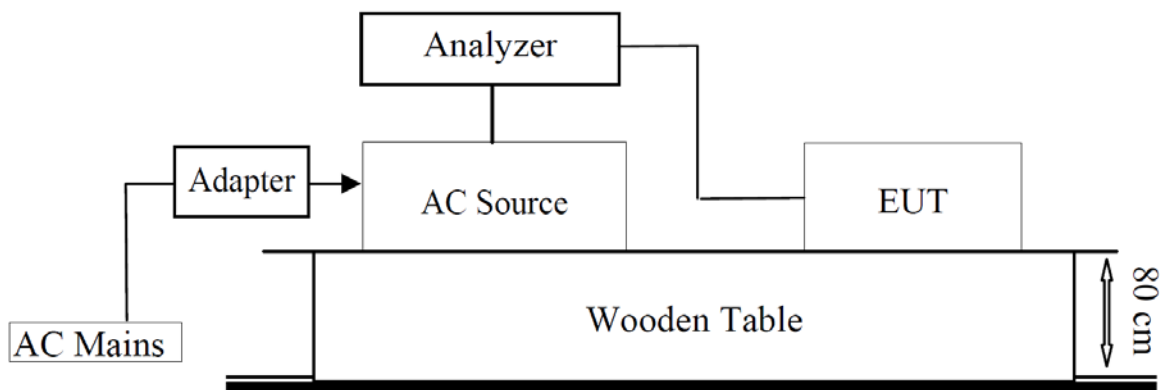
## §8.6-VOLTAGE FLUCTUATION AND FLICKER

### Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM TEST	Harmonic & Flicker Analyzer	DPA 500N	P1402129120	2018-11-30	2019-11-29
EM TEST	AC Power Source	ACS 500N	P1251107475	2018-11-30	2019-11-29

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

### Test System Setup



### Test Standard

EN 61000-3-3:2013

### Flicker Test Limits:

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test, measured or calculated according to clause 4 under test conditions described in clause 6 and annex A. Tests made to prove compliance with the limits are considered to be type tests.

The following limits apply:

- the value of Pst shall not be greater than 1,0;
- the value of Plt shall not be greater than 0,65;
- T<sub>max</sub>, the accumulated time value of d(t) with a deviation exceeding 3,3 % during a single voltage change at the EUT terminals, shall not exceed 500 ms;
- the relative steady-state voltage change, dc, shall not exceed 3,3 %;
- the maximum relative voltage change d<sub>max</sub>, shall not exceed
  - a) 4 % without additional conditions;
  - b) 6 % for equipment which is:
    - switched manually, or
    - switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

Note: The cycling frequency will be further limited by the Pst and Plt limit. For example: a dmax of 6 % producing a rectangular voltage change characteristic twice per hour will give a Plt of about 0.65. c) 7 % for equipment which is- attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or - switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

In the case of equipment having several separately controlled circuits in accordance with 6.6, limits b) and c) shall apply only if there is delayed or manual restart after a power supply interruption; for all equipment with automatic switching which is energized immediately on restoration of supply after a power supply interruption, limits a) shall apply; for all equipment with manual switching, limits b) or c) shall apply depending on the rate of switching. Pst and Plt requirements shall not be applied to voltage changes caused by manual switching. The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions.

## Test Data

### Environmental Conditions

<b>Temperature:</b>	19 °C
<b>Relative Humidity:</b>	47 %
<b>ATM Pressure:</b>	101.0 kPa

<b>Date of test:</b>	10:39 26.Okt 2019
<b>Tester:</b>	Chao Gao
<b>Standard used:</b>	EN/IEC 61000-3-3 Flicker
<b>Short time (Pst):</b>	10 min
<b>Observation time:</b>	120 min (12 Flicker measurement)
<b>Flicker meter:</b>	230V / 50Hz
<b>Flicker Impedance:</b>	Zref (IEC 60725)
<b>Customer:</b>	Wallys Communications (SuZhou) Co.,LTD
<b>E. U. T.:</b>	Dual Band 11AC wireless Module
<b>Model:</b>	DR900VX
<b>EUT operation mode</b>	<i>POE &amp; Wi-Fi Link</i>

**Maximum Flicker results**

	<b>EUT values</b>	<b>Limit</b>	<b>Result</b>
<b>Pst</b>	0.036	1.00	Pass
<b>Plt</b>	0.036	0.65	Pass
<b>dc [%]</b>	0.000	3.30	Pass
<b>dmax [%]</b>	0.194	4.00	Pass
<b>Tmax[s]</b>	0.000	0.50	Pass

FINAL

### §9.3 - ELECTROSTATIC DISCHARGE

#### Measurement Uncertainty

$U_{lab}$  (measurement uncertainty of lab) and  $U_{EN}$  (measurement uncertainty of EN 61000-4-2) please refer to the following:

Parameter	$U_{EN}$	$U_{lab}$
Rise time $t_r$	$\leq 15\%$	15%
Peak current $I_p$	$\leq 7\%$	6.30%
Current at 30 ns	$\leq 7\%$	6.30%
Current at 60 ns	$\leq 7\%$	6.30%

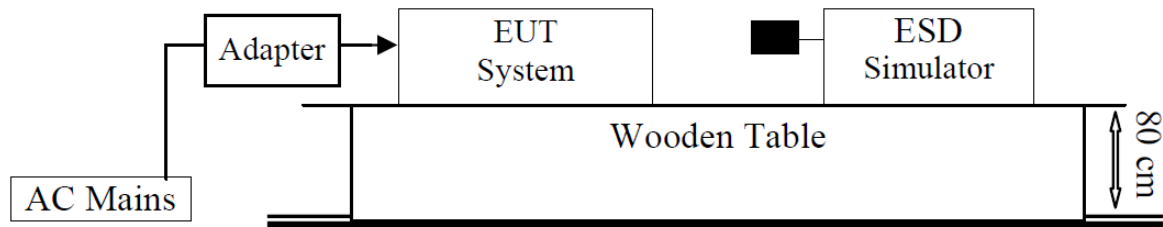
Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

#### Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM Test	ESD Simulator	Dito	V0824103870	2018-12-01	2019-11-30

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

#### Test System Setup



Remark: ■ is the tip of the electrode

EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on an insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For EUTop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 kOhms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

**Test Standard**

ETSI EN 301 489-1 V2.2.1 (2019-03) / EN 61000-4-2:2009  
 Test Level 3 for Air Discharge at  $\pm 8$  kV  
 Test Level 2 for Contact Discharge at  $\pm 4$  kV

**Test Level**

Level	Test Voltage Contact Discharge ( $\pm$ kV)	Test Voltage Air Discharge ( $\pm$ kV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

**Performance criterion: B****Test Procedure****Air Discharge:**

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

**Contact Discharge:**

All the procedure shall be same as Section 8.3.1 of EN 61000-4-2, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

**Indirect discharge for horizontal coupling plane**

At least 50 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

**Indirect discharge for vertical coupling plane**

At least 50 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m \* 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24.3 °C
<b>Relative Humidity:</b>	49 %
<b>ATM Pressure:</b>	100.7 kPa

The testing was performed by Chao Gao on 2019-10-26.

Test Mode: POE & Wi-Fi Link

**Table 1: Electrostatic Discharge Immunity (Air Discharge)**

EN 61000-4-2 Test Points Location	Test Levels								
	-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV	X
/	/	/	/	/	/	/	/	/	/

**Table 2: Electrostatic Discharge Immunity (Contact Discharge)**

EN 61000-4-2 Test Points Location	Test Levels								
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	X
/	/	/	/	/	/	/	/	/	/

**Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)**

EN 61000-4-2 Test Points Location	Test Levels								
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	X
Front Side	A	A	A	A	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/

**Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)**

EN 61000-4-2 Test Points Location	Test Levels								
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV	X
Front Side	A	A	A	A	/	/	/	/	/
Back Side	A	A	A	A	/	/	/	/	/
Left Side	A	A	A	A	/	/	/	/	/
Right Side	A	A	A	A	/	/	/	/	/

## §9.2 -RF ELECTROMAGNETIC FIELD (80 MHz - 6000MHz)

### Measurement Uncertainty

$U_{lab}$  (measurement uncertainty of lab) and  $U_{EN}$  (measurement uncertainty of EN 61000-4-3) please refer to the following:

Parameter	$U_{EN}$	$U_{lab}$
Calibration process	1.88 dB	1.88 dB
Level setting	2.19 dB	2.19 dB

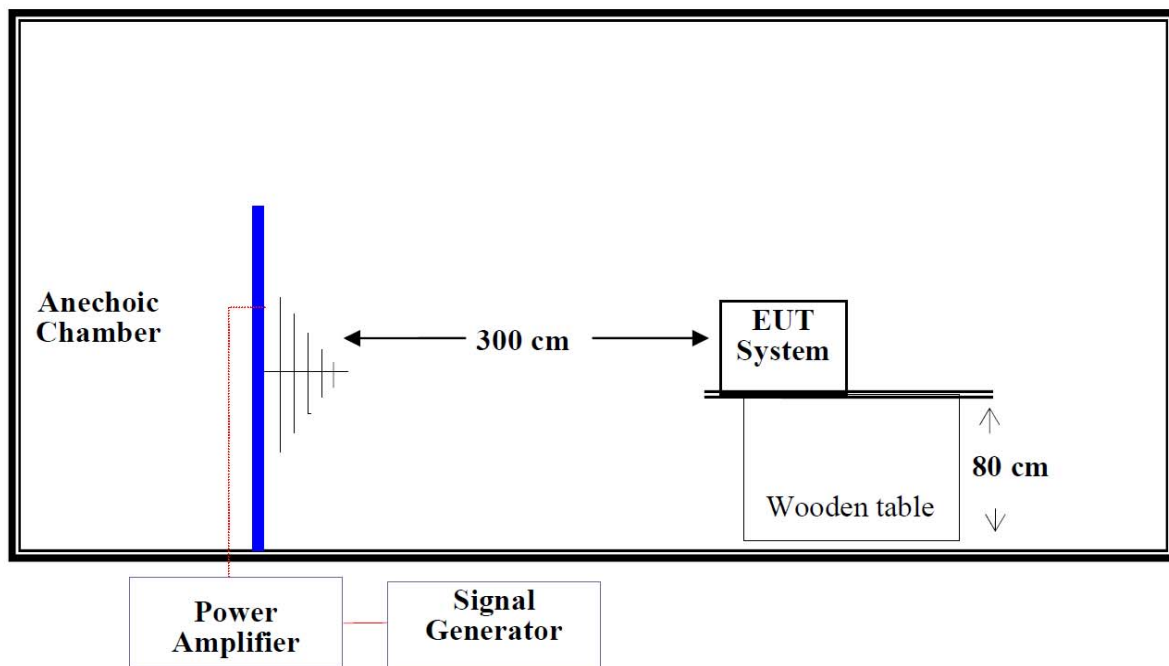
Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

### Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Signal Generator	E4428C	MY49070179	2019-07-21	2020-07-20
A&R	Power Amplifier	60S1G6	0349442	NCR	NCR
Amplifier Research	Power Amplifier	200W1000M3A	18062	NCR	NCR
Ar	Log Periodic Antenna	ATL80M1G	350122	NCR	NCR
Ar	Log Periodic Antenna	ATT700M12G	350307	NCR	NCR

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### Test System Setup



**Test Standard**

ETSI EN 301 489-1 V2.2.1 (2019-03) / EN 61000-4-3:2006+A1:2008+A2:2010  
 Test Level 2 at 3V/m  
 Test Levels and Performance Criterion

**Test Level**

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

**Performance Criterion: A**

**Test Procedure**

The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarizations of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.

In order to judge the EUT performance, a CCD camera is used to monitor EUT and notebook .

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Field Strength	3 V/m (Test Level 2)
2. Radiated Signal	1 kHz, 80% AM, sine wave
3. Scanning Frequency	80 MHz– 6000 MHz
4. Scanning Frequency Step	1%
5. Dwell Time	3 Sec.

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	19 °C
<b>Relative Humidity:</b>	47 %
<b>ATM Pressure:</b>	101.0 kPa

The testing was performed by Chao Gao on 2019-10-29.



*Test Mode: POE & Wi-Fi Link*

Frequency Range (MHz)	Front Side (3 V/m)		Rear Side (3 V/m)		Left Side (3 V/m)		Right Side (3 V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-6000	A	A	A	A	A	A	A	A

Note:

1. "Wi-Fi Link" is monitor notebook to connect EUT and monitor the connection state.
2. "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

FINAL

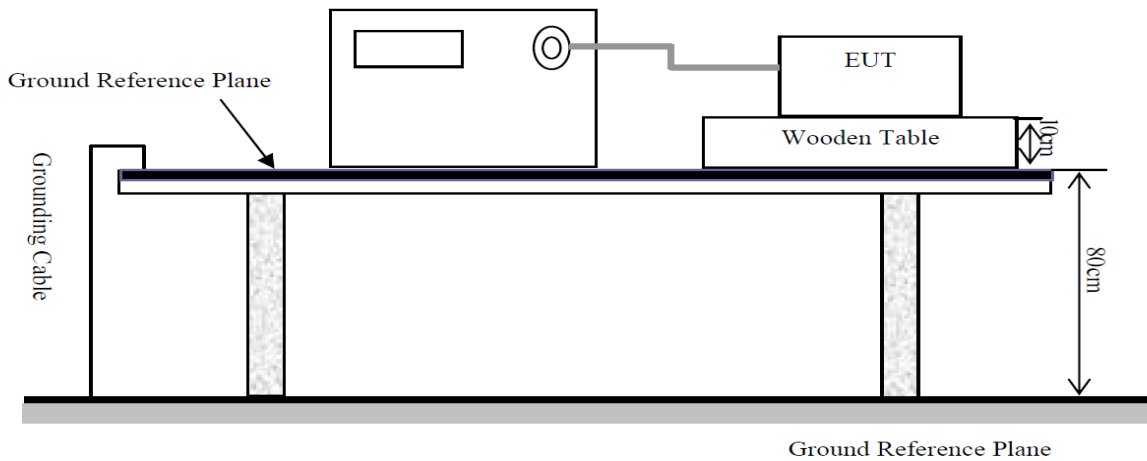
## §9.4 - ELECTRICAL FAST TRANSIENT IMMUNITY

### Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM TEST	Auto Transformer	MV2616	V0939105172	NCR	NCR
EM TEST	Ultra Compact Generator	UCS 500 N5	P1406130994	2019-07-21	2020-07-20

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

### Test System Setup



### Test Standard

ETSI EN 301 489-1 V2.2.1 (2019-03)/ EN 61000-4-4: 2012  
AC Mains: Test level 2 at 1 kV

### Test Level

Open Circuit Output Test Voltage $\pm 10\%$				
Level	Power ports, earth port(PE)		Signal and control ports	
	Voltage(kV)	Repetition frequency(kHz)	Voltage(kV)	Repetition frequency(kHz)
1	0.5	5 or 100	0.25	5 or 100
2	1		0.5	
3	2		1	
4	4		2	
X	Special	Special	Special	Special

### Performance Criterion: B

**Test Procedure**

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meter by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0 meter ground rod. The ground rod is connected to the test facility’s electrical earth.

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24.5 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	100.6 kPa

The testing was performed by Chao Gao on 2019-10-27.

Test Mode: POE & Wi-Fi Link

EN 61000-4-4 Test Points		Test Levels (kV) Repetition frequency(5kHz)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC Mains Power Input Ports	L-N	A	A	A	A	/	/	/	/
	L-PE	/	/	/	/	/	/	/	/
	N-PE	/	/	/	/	/	/	/	/
Signal Port	/	/	/	/	/	/	/	/	/

**Note:**

“A” stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

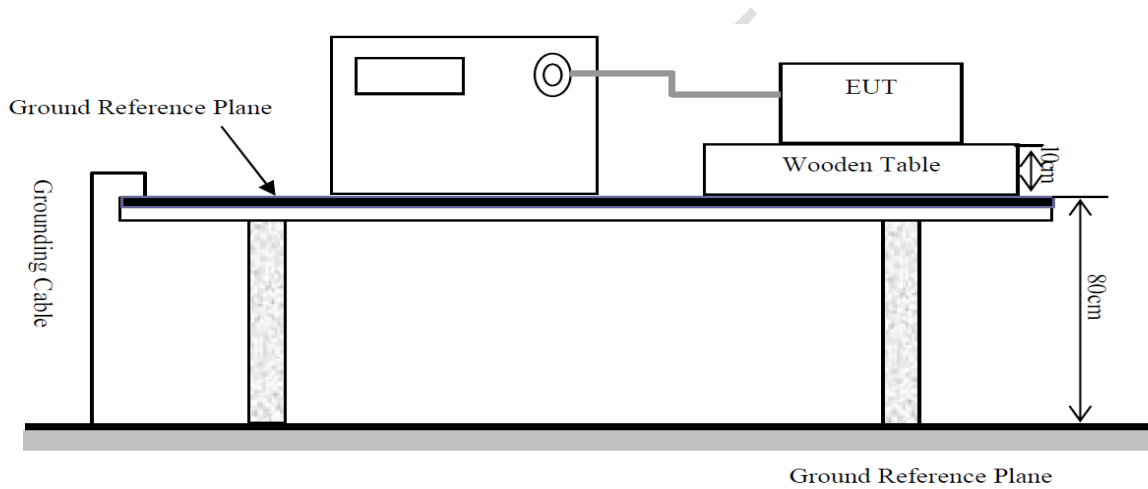
### §9.8 - SURGES, LINE TO LINE AND LINE TO GROUND

#### Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM TEST	Auto Transformer	MV2616	V0939105172	N/A	N/A
EM TEST	Ultra Compact Generator	UCS500-N	P1406130994	2019-07-21	2020-07-20

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

#### Test System Setup



#### Test Standard

ETSI EN 301 489-1 V2.2.1 (2019-03) / EN 61000-4-5: 2014  
 AC Mains: L-N: Test level 3 at 1 kV

#### Test Level

Level	Open Circuit Output Test Voltage ±10%		Performance Criterion	
	Line - Line	Line - Ground	AC Mains	Signal Port
1	---	0.5 kV	---	---
2	0.5 kV	1 kV	---	---
3	1 kV	2 kV	B	---
4	2 kV	4 kV	---	---
X	Special	Special	---	---

**Test Procedure**

1. For line to line coupling mode, provide a 1.2/50µs voltage surge (at open-circuit condition) and an 8/20 µs current surge into a short circuit.
2. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
3. Different phase angles are done individually.
4. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

**Test Data and Setup Photo**

**Environmental Conditions**

<b>Temperature:</b>	20.5 °C
<b>Relative Humidity:</b>	53 %
<b>ATM Pressure:</b>	100.6 kPa

The testing was performed by Chao Gaoon 2019-10-27

Test Mode: POE & Wi-Fi Link

EN61000-4-5 Test Points		Test Levels (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC Mains power input ports	L-N	A	A	A	A	/	/	/	/
	L-PE	/	/	/	/	/	/	/	/
	N-PE	/	/	/	/	/	/	/	/
Signal port	/	/	/	/	/	/	/	/	/

**Note:**

“A” stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

## §9.5 - RF COMMON MODE

### Measurement Uncertainty

$U_{lab}$  (measurement uncertainty of lab) and  $U_{EN}$  (measurement uncertainty of EN 61000-4-6) please refer to the following:

Parameter	$U_{EN}$	$U_{lab}$
CDN calibration process	1.27 dB	1.27 dB
CDN test process	1.36 dB	1.36 dB

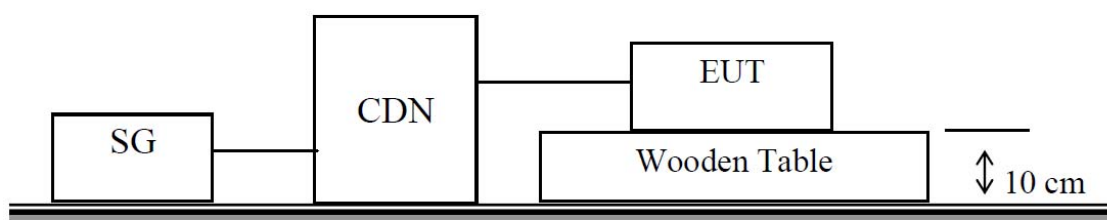
Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

### Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Signal Generator	8648C	3537A01810	2019-07-21	2020-07-20
R&S	Power Amplifier	500A100M2	18117	NCR	NCR
Dressler	Attenuator	ATT 6/75	510020010004	NCR	NCR
COM-POWER	CDN	CDN M225E	511098	2019-07-21	2020-07-20

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

### Test Setup



### Test Standard

ETSI EN 301 489-1 V2.2.1 (2019-03)/EN 61000-4-6: 2014  
 Test level 2 at 3 V (r.m.s.), 0.15 MHz ~ 80 MHz

**Test Level**

Level	Voltage Level (r.m.s.) (U <sub>0</sub> )
1	1
2	3
3	10
X	Special

**Performance Criterion: A****Test Procedure**

- 1) Let the EUT work in test mode and test it.
- 2) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50mm (where possible).
- 3) The disturbance signal described below is injected to EUT through CDN.
- 4) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 5) The frequency range is swept from 150 kHz to 80 MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave.
- 6) The rate of sweep shall not exceed  $1.5 \times 10^{-3}$  decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- 7) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

**Test Data****Environmental Conditions**

<b>Temperature:</b>	20.5 °C
<b>Relative Humidity:</b>	53 %
<b>ATM Pressure:</b>	100.6 kPa

\* The testing was performed by Chao Gao on 2019-10-28.

Test Mode: POE & Wi-Fi Link

EN61000-4-6 Test Ports	Test Equipment	Frequency Range (MHz)	Voltage Level (e.m.f.) U <sub>0</sub>			
			1V	3V	10V	X
AC mains power input ports	M2	0.15-80	/	A	/	/
	M3	0.15-80	/	/	/	/
Signal port	CDN T8E	0.15-80	/	/	/	/

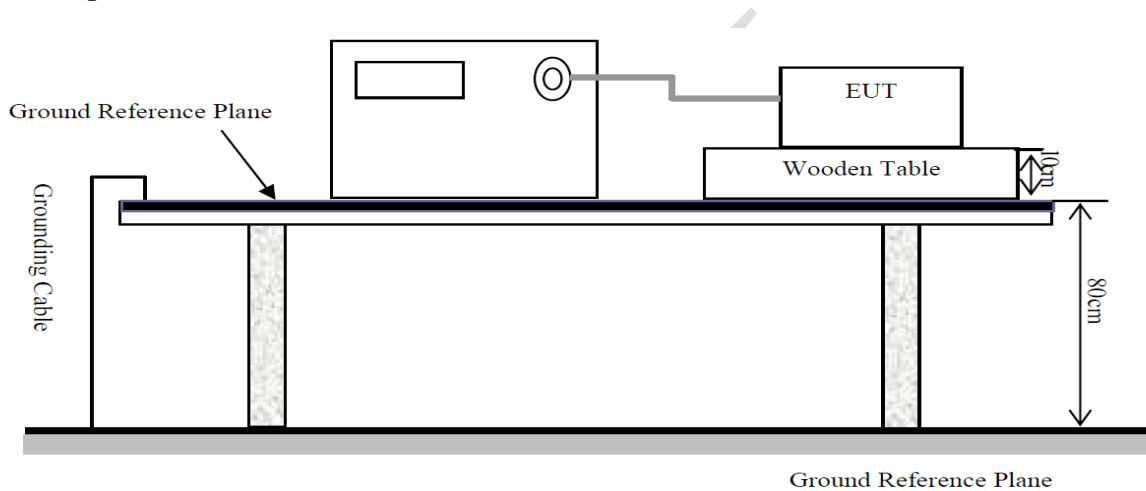
## §9.7 - VOLTAGE DIPS AND INTERRUPTIONS IMMUNITY TEST

### Test Equipment

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EM TEST	Auto Transformer	MV2616	V0939105172	N/A	N/A
EM TEST	Ultra Compact Generator	UCS500-N5	P1406130994	2018-07-21	2019-07-20

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

### Test Setup



### Test Standard

ETSI EN 301 489-1 V2.2.1 (2019-03) / EN 61000-4-11: 2004  
 Test levels and Performance Criterion

### Test Level

Test Level	Test Level	Td (ms)	Performance criterion
1	Voltage dip : 0% residual voltage	10	B
2	Voltage dip : 0% residual voltage	20	B
3	Voltage dip : 70% residual voltage	500	C
4	Voltage interruptions : 0% residual voltage	5000	C

### Test Procedure

1. The interruption is introduced at selected phase angles with specified duration.
2. Record any degradation of performance.



**Test Data****Environmental Conditions**

<b>Temperature:</b>	22.2 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	102.2 kPa

The testing was performed by Chao Gao on 2019-10-27.

Test Mode: POE & Wi-Fi Link

Test Level	Td (ms)	Phase Angle	Result
Voltage dip : 0% residual voltage	10	0°/90°/180°/270°	A
Voltage dip : 0% residual voltage	20	0°/90°/180°/270°	A
Voltage dip : 70% residual voltage	500	0°/90°/180°/270°	A
Voltage interruptions : 0% residual voltage	5000	0°/90°/180°/270°	C

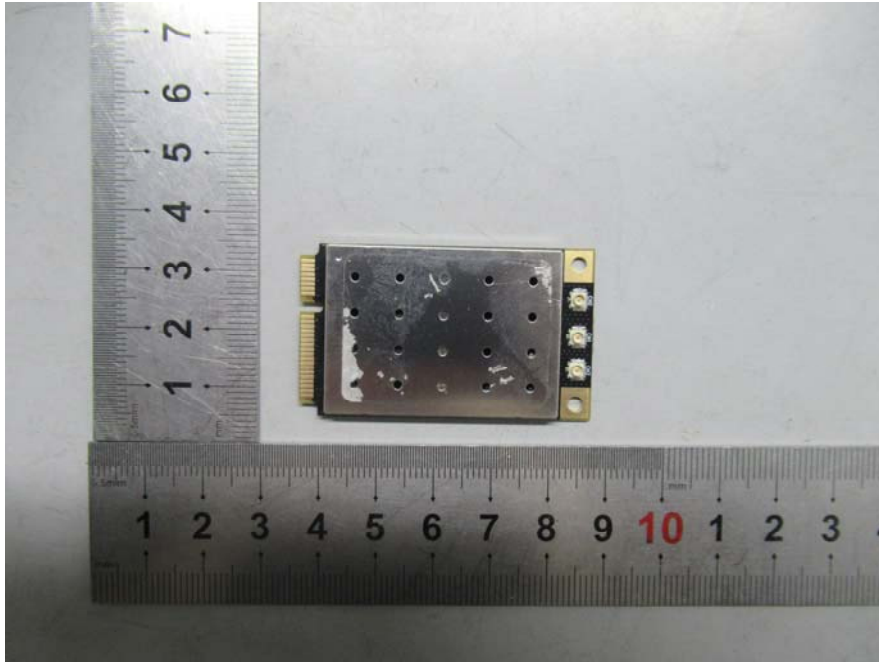
**Note:**

“A” stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

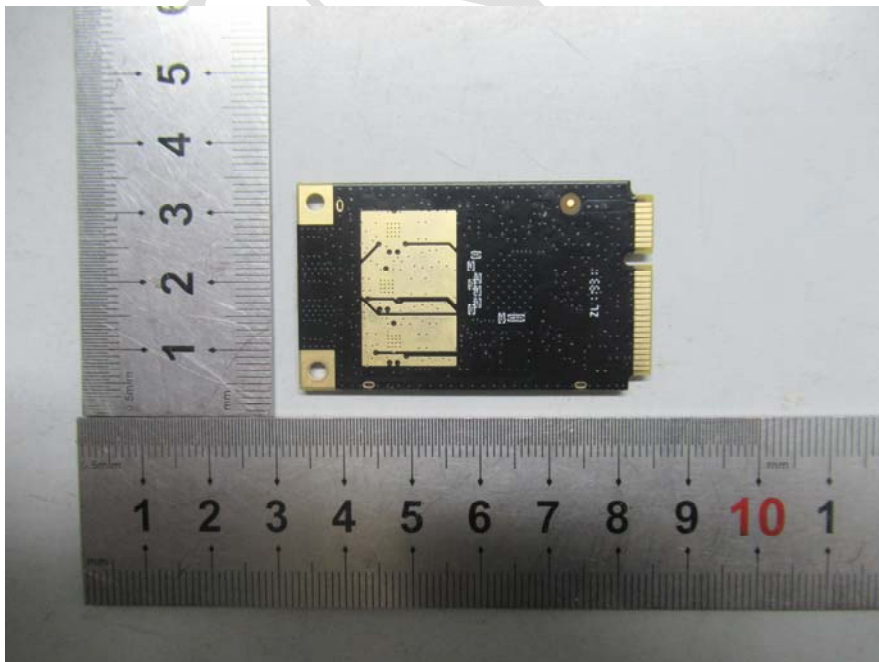
“C” the voltage is interrupted for a short time, but it works after restart, it can work normally without loss of function .

**EXHIBIT A - EUT PHOTOGRAPHS**

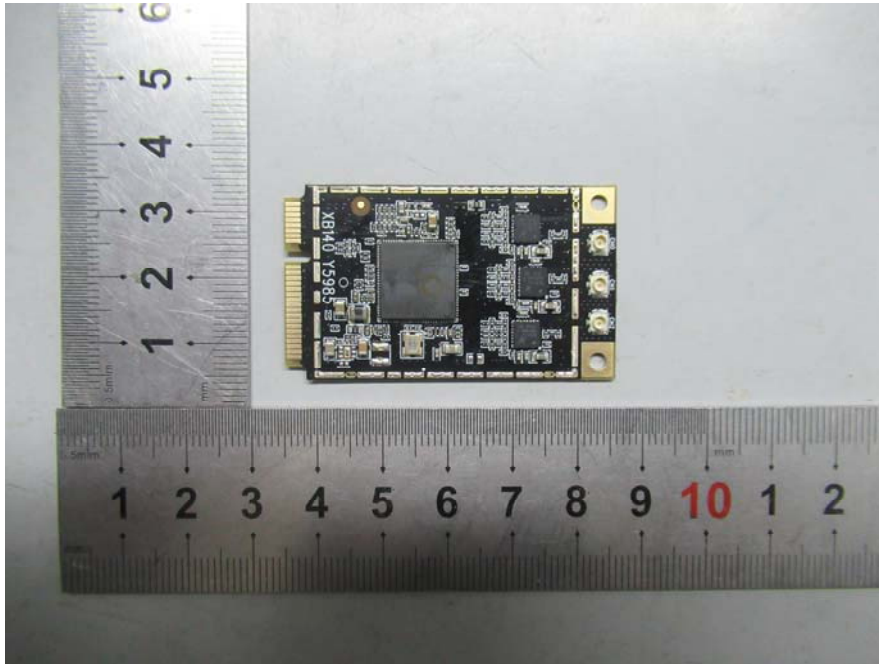
**EUT – Top View**



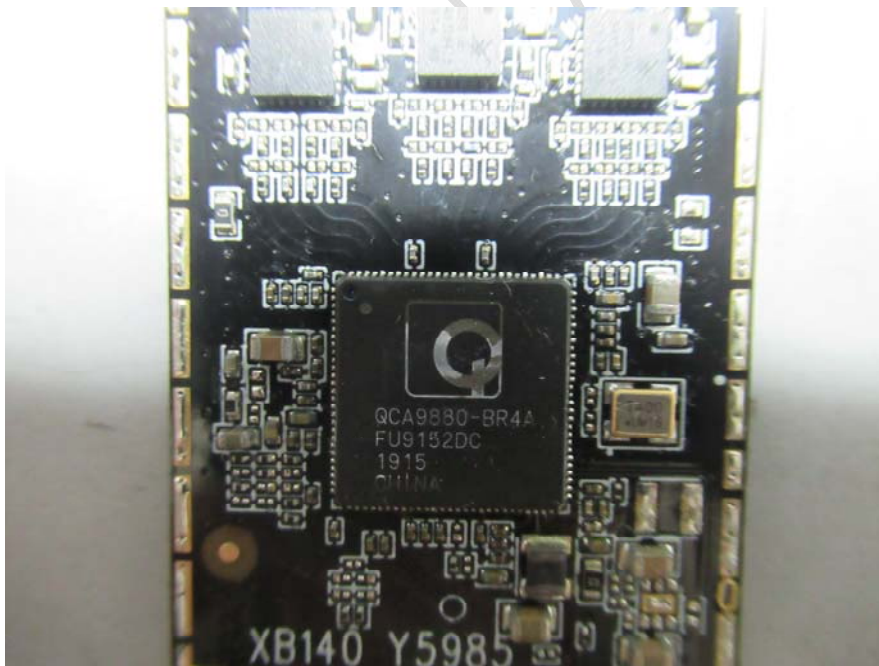
**EUT – Bottom View**



**EUT – Top Shielding off View**



**EUT – Chip View**



## EXHIBIT B – TEST SETUP PHOTOGRAPHS

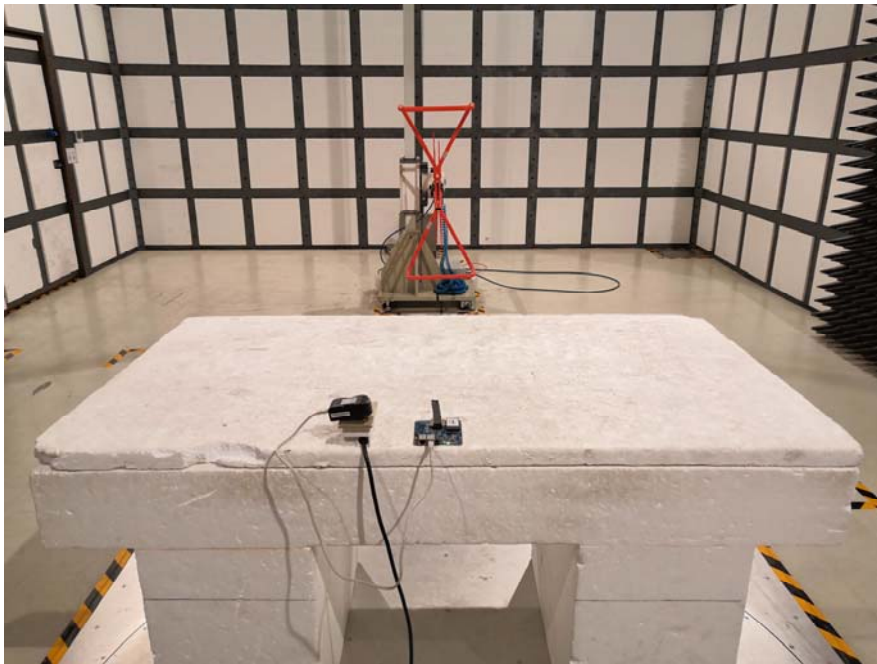
### Conducted Emissions - Front Side



### Conducted Emissions - Rear Side



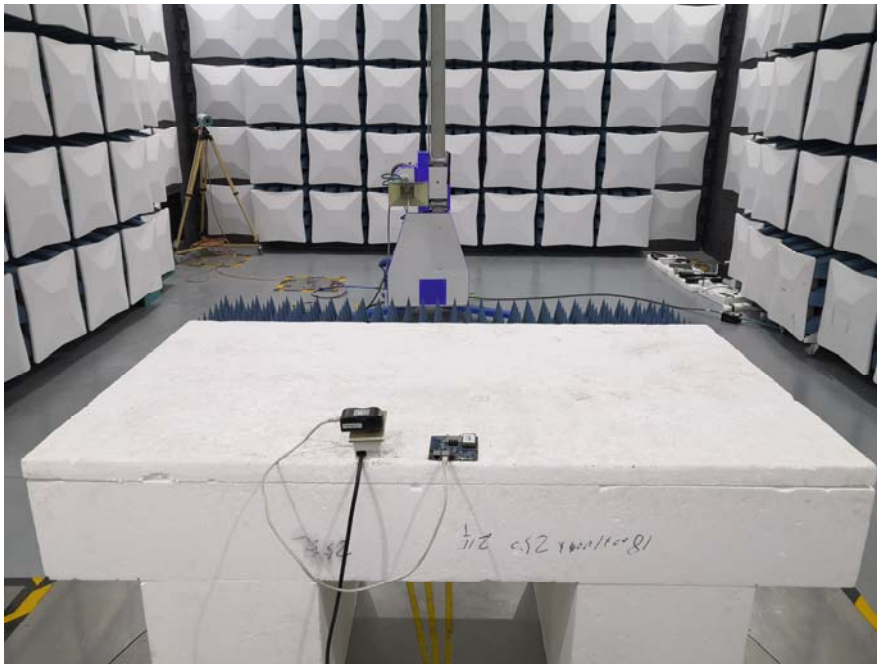
**Radiated Emissions - Front View (Below 1GHz)**



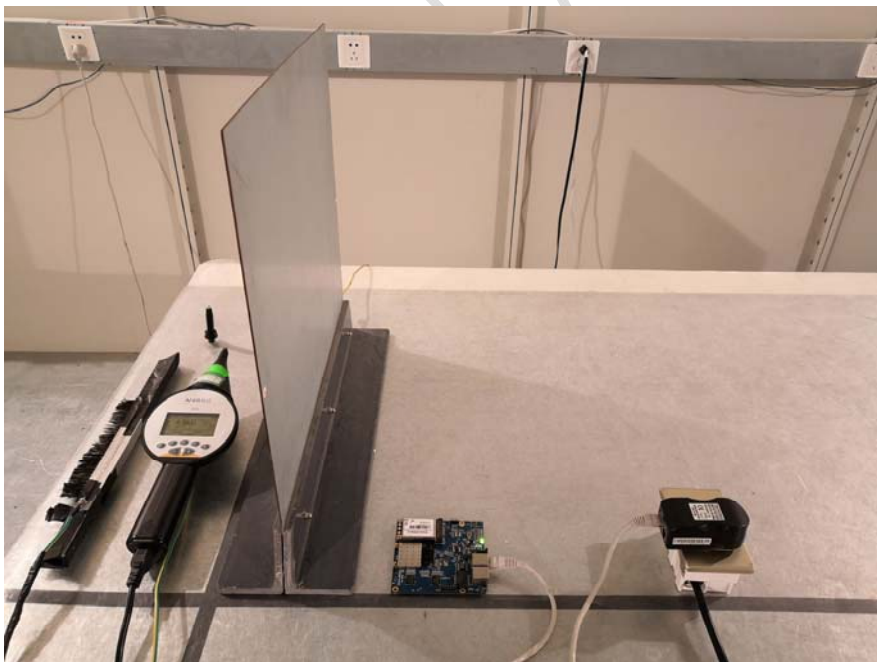
**Radiated Emissions - Rear View (Below 1GHz)**



**Radiated Emissions - Front View (Above 1GHz)**



**ESD Test Setup Photo**



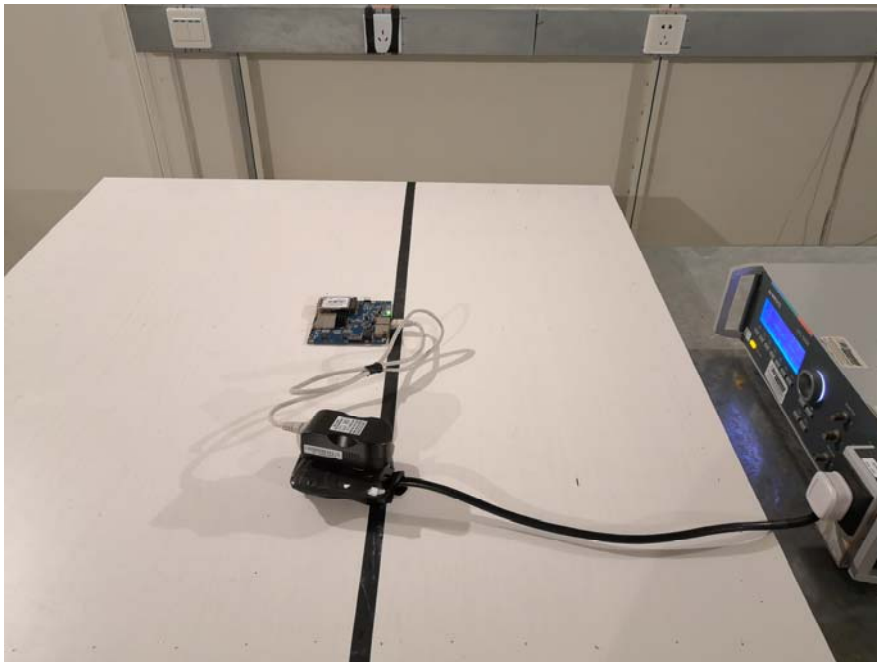
**RS Test Setup Photo (Below 1GHz)**



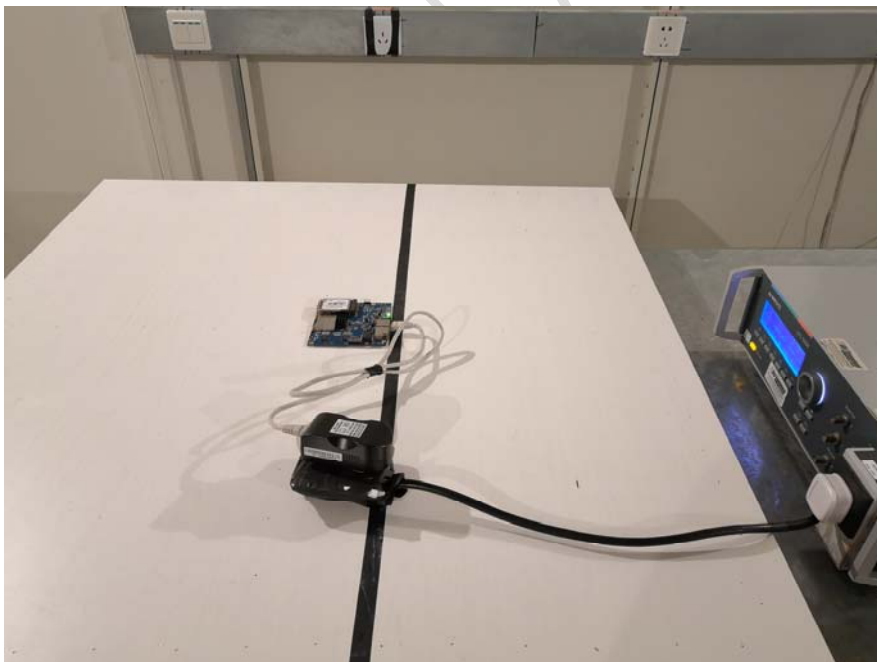
**RS Test Setup Photo (Above 1GHz)**



**EFT Test Setup Photo**



**SURGE Test Setup Photo**

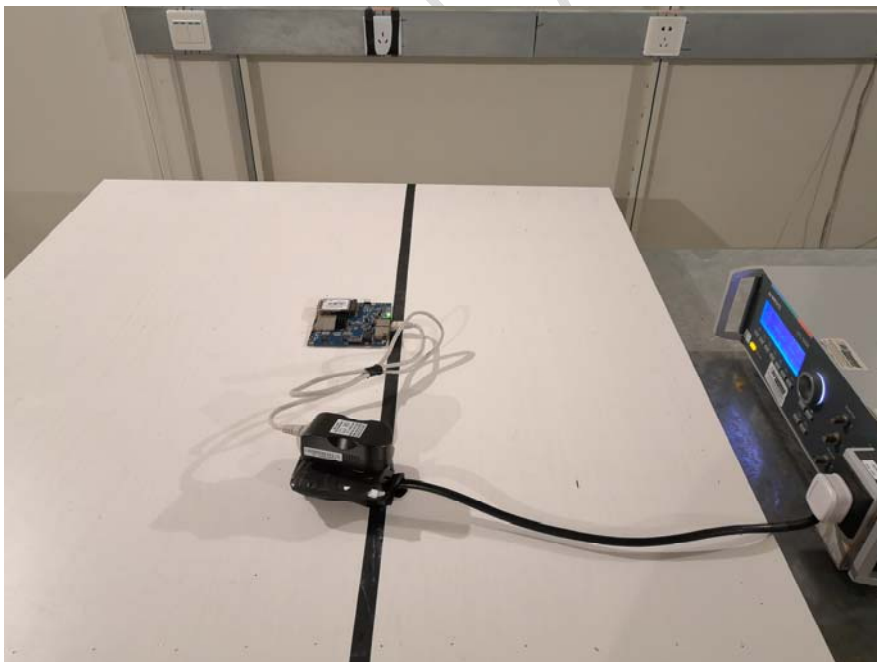




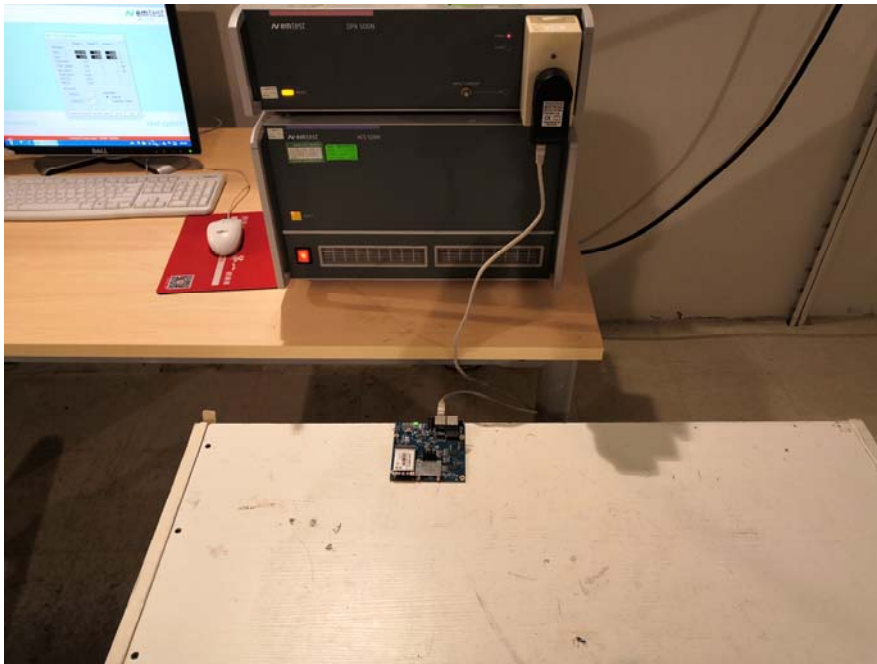
**CS Test Setup Photo**



**DIPS Test Setup Photo**



**Flicker Test Setup Photo**



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## **PRODUCT SIMILARITY DECLARATION LETTER**

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Wallys Communications (SuZhou) Co.,LTD

Add: Room 2723,Le Jia building,Jia Rui Xiang No.8, Suzhou Industrial Park, Suzhou,  
P.R Suzhou, 215000 China

Tel: 18913094531

Fax: 0512-62815802

Mail: richard\_zhu@wallystech.com

Date: 2019-10-20

### **DECLARATION OF SIMILARITY**

Dear Sir or Madam:

We, Wallys Communications (SuZhou) Co.,LTD, hereby declare that product:

Dual Band 11AC wireless Module , as following models: DR900VX, DR900VX-4.9,  
DR600VX,DR600VX-4.9,DR900VX-MX,DR600VX-MX.And only DR900VX  
was tested by BACL with the same electromagnetic emissions and  
electromagnetic compatibility characteristics.


The detail differences description as below:

All the products are the different model name, with the same appearance, structure,  
power and size, and schematic and PCB design.

Please contact me if there is need for any additional clarification or information.

Best Regards,

Signature:



Contact Person: Richard

Title: Engineer

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