Test Report No.:
FCC2020-0024-1

TEST REPORT

Applicant	:	Schneider Electric (China) Co., Ltd., Shenzhen Branch
Product Name	:	Z-WAVE+ SWITCH SINGLE POLE
Mode No.	:	SQR14102WHZ,SQR14102LAZ,SQR14102BKZ

Vkan Certification & Testing Co., Ltd.

威凯检测技术有限公司

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E-mail: emc@cvc.org.cn

Applicant	**Name :** Schneider Electric (China) Co., Ltd., Shenzhen Branch **Address :** Room 201, Building A, No. 1 Qianwanyi Road, Shengang Cooperation Zone, Qianhai, Shenzhen, China
Manufacturer	**Name :** Schneider Electric (China) Co., Ltd., Shenzhen Branch **Address :** Room 201, Building A, No. 1 Qianwanyi Road, Shengang Cooperation Zone, Qianhai, Shenzhen, China
Equipment under Test	**Product Name :** Z-WAVE+ SWITCH SINGLE POLE **Model No. :** SQR14102WHZ,SQR14102LAZ,SQR14102BKZ **Trade mark :**Schneider Electric,Square D **Serial no. :** — **Sampling :** —

Date of Receipt.	**2020.12.01**	Date of Testing	**2020.12.01~2021.01.27**

Test Specification	**Test Result**
FCC CFR47 Part 15B (2020) Radio Frequency Devices ANSI C63.4 (2014)	PASS

Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied. **Issue Date: 2021.01.27**

Tested by:	Reviewed by:	Approved by:
Xu Zhenfei	Liu Yonghai	Zeng Bo
Name Signature	Name Signature	Name Signature

Other Aspects: NONE.

Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of **CVC**.

Note: The report was originally issued on January 5, 2021, and was modified for the first time on January 28, 2021. The modification contents are as follows: the test block diagram of radiated emission is modified from "3m / 10m" to "3M"; the number of punctuation points in the result diagram of all test items is modified from "3" to "6"; the antenna description is added to the test photos; the level value of the main frequency of radiated emission is marked; the modification is involved The page is the whole certification report with (XG1) symbol after the corresponding original report number.

TABLE OF CONTENTS

1. General Product Information

The model of this application: SQR14102WHZ, SQR14102LAZ, SQR14102BKZ. SQR14102LAZ and SQR14102BKZ have the same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction with SQR14102WHZ. The difference lies only model number and color. All the tests carried out on model SQR14102WHZ.

1.1 General information

Product Name	Z-WAVE + SWITCH SINGLE POLE
Model No.	SQR14102WHZ,SQR14102LAZ,SQR14102BKZ
Power Supply	120 Vac,60Hz
FCC ID	2AUCU-14102Z
Note： 1. The information of the EUT is declared by the manufacturer.	

2. Test Sites

2.1 Test Facilities

The tests and measurements refer to this report were performed by EMC testing Lab. of Vkan Certification & Testing Co., Ltd.

Add.: No.3, Tiantaiyi Road, Kaitai Avenue, Science City, Guangzhou, 510663, P. R. China

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The EMC testing laboratory has been recognized by CNAS, and authorized by Nemko of Norway since 1997, and accredited by DAkkS of Germany since 2007, and assessed and found eligible to participated in the TDAP of VDE testing and certification Institute since 2004, and registered by FCC since 2001.

2.2 Description of Non-standard Method and Deviations

The testing and measurement methods used in this report are applied by all standard methods. Not any non-standard method or deviation from the used standards was used.

2.3 List of Test and Measurement Instruments

Refer to **Appendix**.

3. Test Configuration

3.1 Test Mode

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

4. Summary of measurement results

Summary of measurements of results	Clause in FCC rules	Class / Severity	Verdict
Conducted Emissions	FCC CFR47 Part 15B ANSI C63.4	Class B	PASS
Radiated Emissions	FCC CFR47 Part 15B ANSI C63.4	Class B	PASS

5. Measurement procedure

5.1 Conducted Emission

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement:

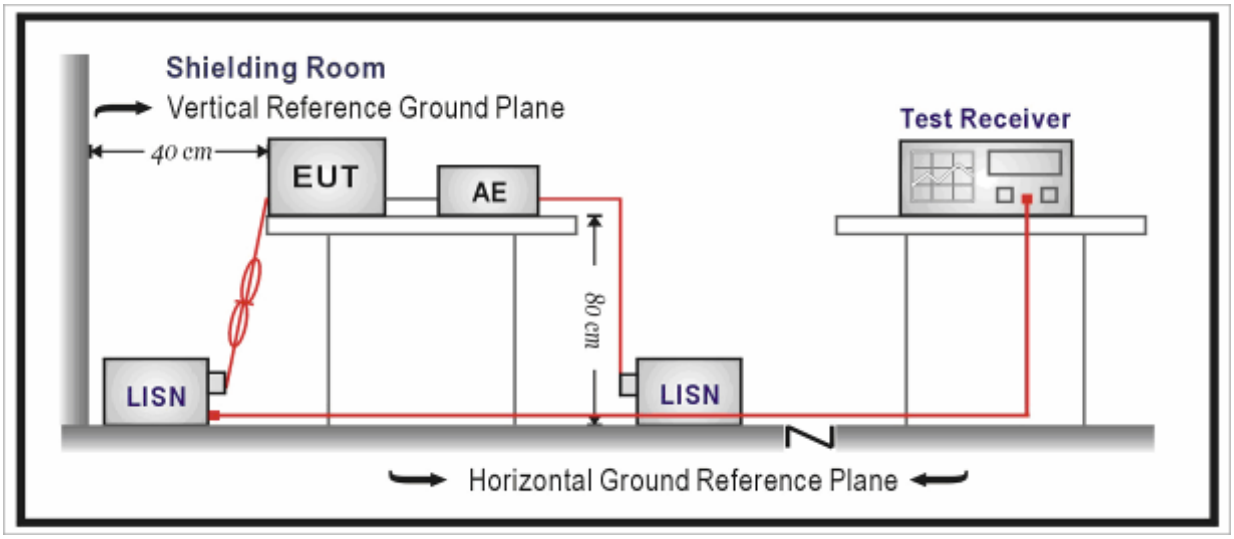
The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz.The measurement result should include both L line and N line.

The test is in transmitting mode.

Limits:

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.		

Test Setup:



Note: AC Power source is used to change the voltage 120V/60Hz.

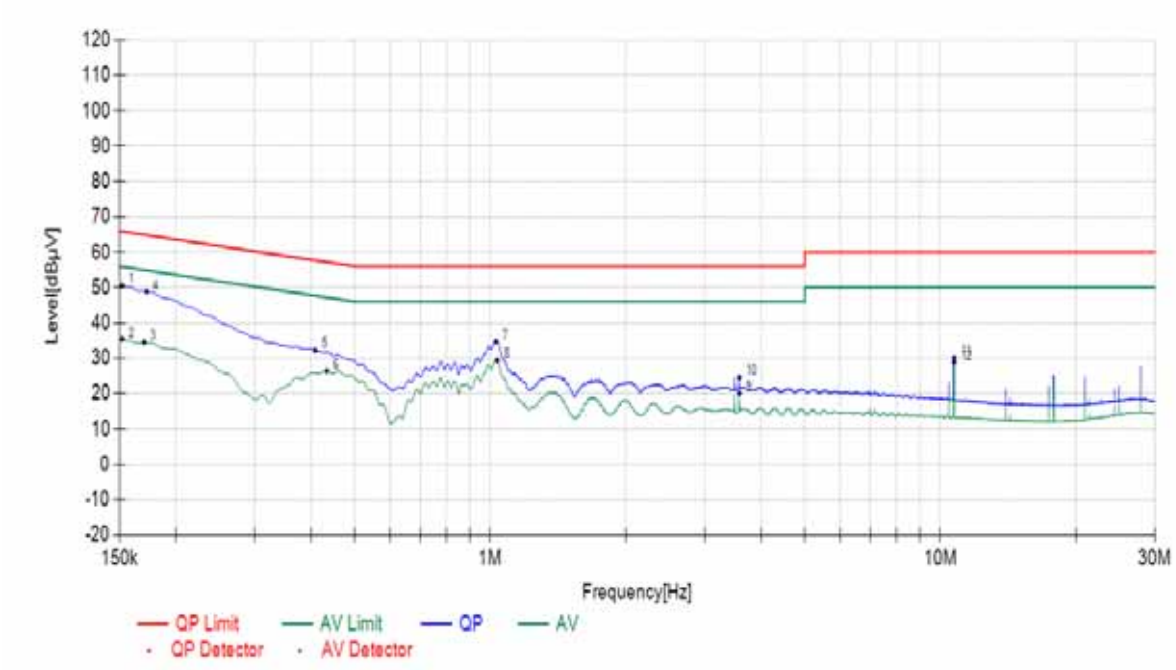
Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96. U= 3.12 dB.

Test Results:

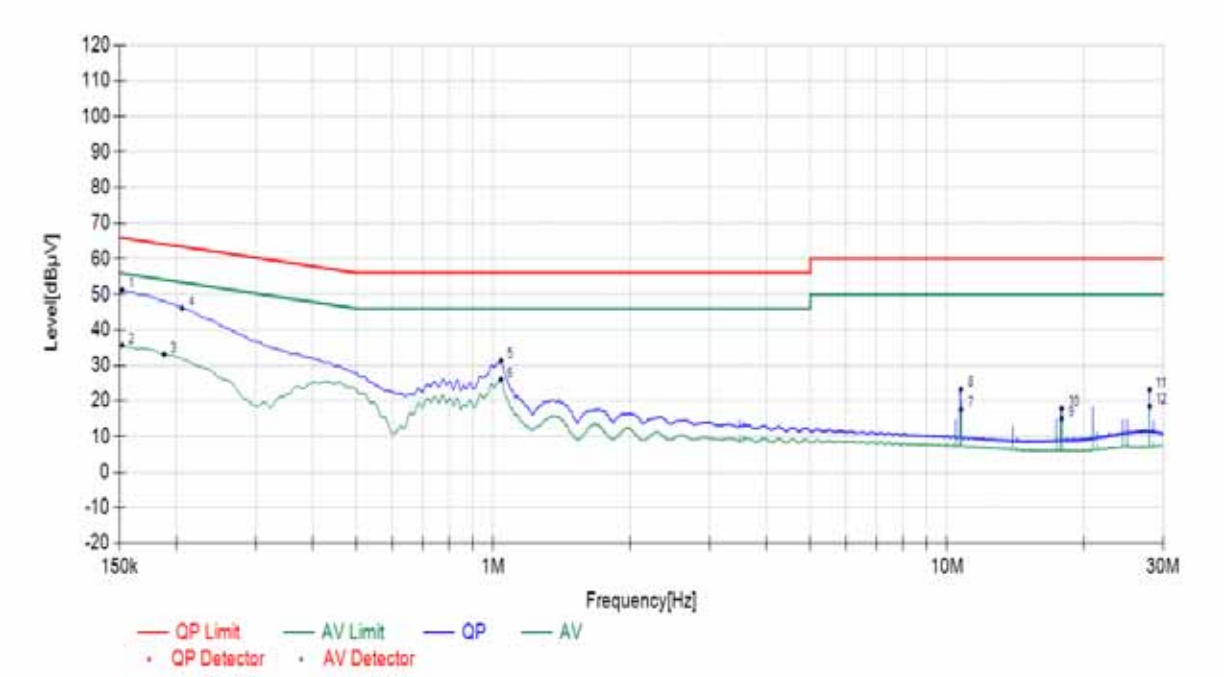
Power Line	L
Test Mode	Normal Working

Suspected List								
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV]	Level [dBμV]	Limit [dBμV]	Margin [dB]	Detector	Pass/Fail
1	0.1523	10.16	40.39	50.55	65.88	15.33	QP	PASS
10	3.5790	10.22	14.35	24.57	56.00	31.43	QP	PASS
11	10.7385	10.36	19.77	30.13	60.00	29.87	QP	PASS
4	0.1725	10.15	38.71	48.86	64.84	15.98	QP	PASS
5	0.4088	10.15	22.09	32.24	57.67	25.43	QP	PASS
7	1.0298	10.17	24.57	34.74	56.00	21.26	QP	PASS
12	10.7385	10.36	18.53	28.89	50.00	21.11	AV	PASS
2	0.1523	10.16	25.24	35.40	55.88	20.48	AV	PASS
3	0.1703	10.15	24.39	34.54	54.95	20.41	AV	PASS
8	1.0365	10.17	19.28	29.45	46.00	16.55	AV	PASS
9	3.5790	10.22	9.84	20.06	46.00	25.94	AV	PASS
6	0.4335	10.15	16.27	26.42	47.19	20.77	AV	PASS



Power Line	N
Test Mode	Normal Working

Suspected List								
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV]	Level [dBµV]	Limit [dBµV]	Margin [dB]	Detector	Pass/Fail
1	0.1523	10.15	41.08	51.23	65.88	14.65	QP	PASS
10	17.8980	10.53	7.38	17.91	60.00	42.09	QP	PASS
11	27.9645	10.67	12.48	23.15	60.00	36.85	QP	PASS
5	1.0410	10.17	21.21	31.38	56.00	24.62	QP	PASS
8	10.7385	10.37	12.92	23.29	60.00	36.71	QP	PASS
4	0.2063	10.14	35.95	46.09	63.35	17.26	QP	PASS
12	27.9645	10.67	7.83	18.50	50.00	31.50	AV	PASS
2	0.1523	10.15	25.53	35.68	55.88	20.20	AV	PASS
3	0.1883	10.14	23.00	33.14	54.11	20.97	AV	PASS
9	17.8980	10.53	4.57	15.10	50.00	34.90	AV	PASS
7	10.7385	10.37	7.23	17.60	50.00	32.40	AV	PASS
6	1.0410	10.17	15.85	26.02	46.00	19.98	AV	PASS



5.2 Radiated Emission

Ambient condition:

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement:

The test set-up was made in accordance to the general provisions of ANSI C63.4-2014.The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration.

Sweep the whole frequency band through the range from 9 kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

During the test, below 30MHz, the center of the loop shall be 1 meters; above 30MHz, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

Set the spectrum analyzer in the following:

Below 1GHz (detector: Peak and Quasi-Peak)

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz(detector: Peak):

(a)PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO

(b)AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded. Then this mode was measured in the following mode: EUT with cradle and EUT without cradle. The worst emission was found in EUT with cradle mode and the worst case was recorded.

The test is in transmitting mode.

Limits:

Limit in restricted band(Part 15.109)

Frequency (MHz)	Measurement Distance (m)	Field strength(uV/m)	Level (dBuV/m)
30 - 88	3	100	40
88 - 216	3	150	43.5
216 - 960	3	200	46
Above 960-1000	3	500	54
Note 1: The lower limit shall apply at the transition frequency. Note 2: Distance refers to the distance in meters between the measuring instrument Antenna and the closed point of any part of the device or system. Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)			

Limit in radiated emission measurement (Part 15.109)

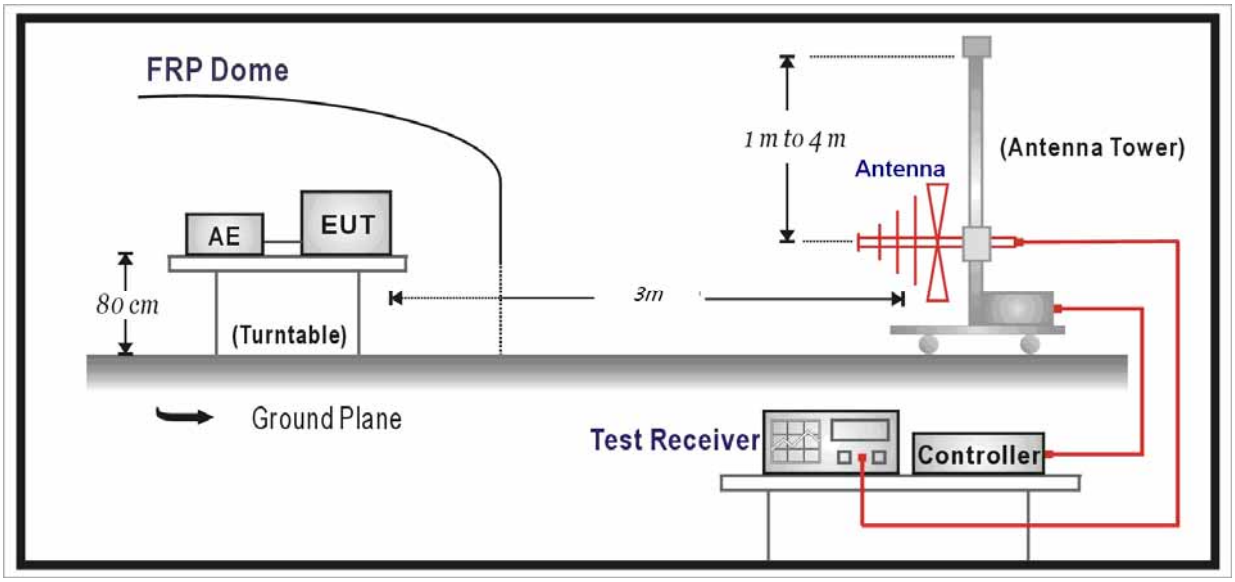
Frequency(MHz)	Field strength(dBuV/m) @3m	
Above 1000	74(peak)	54(average)

According to FCC Part 15.33(b),for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

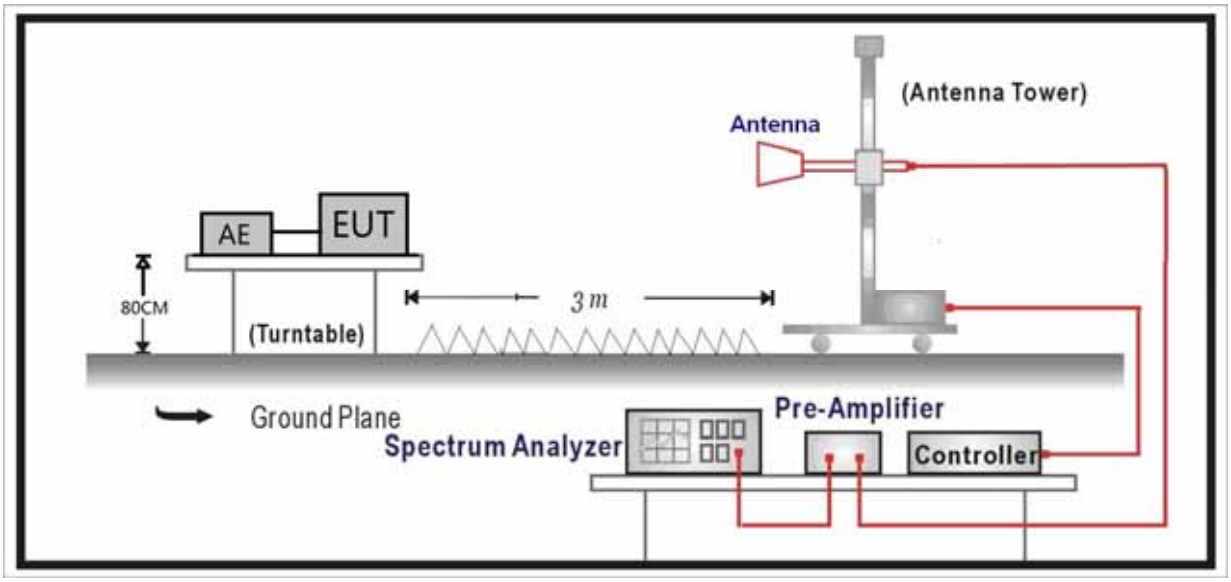
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Above 1.705	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

Test Setup:

Below 1GHz Test Setup:



Above 1GHz Test Setup:



Measurement Uncertainty：

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96.

Frequency	Uncertainty
above 1G	4.10 dB
below 1G	4.84 dB

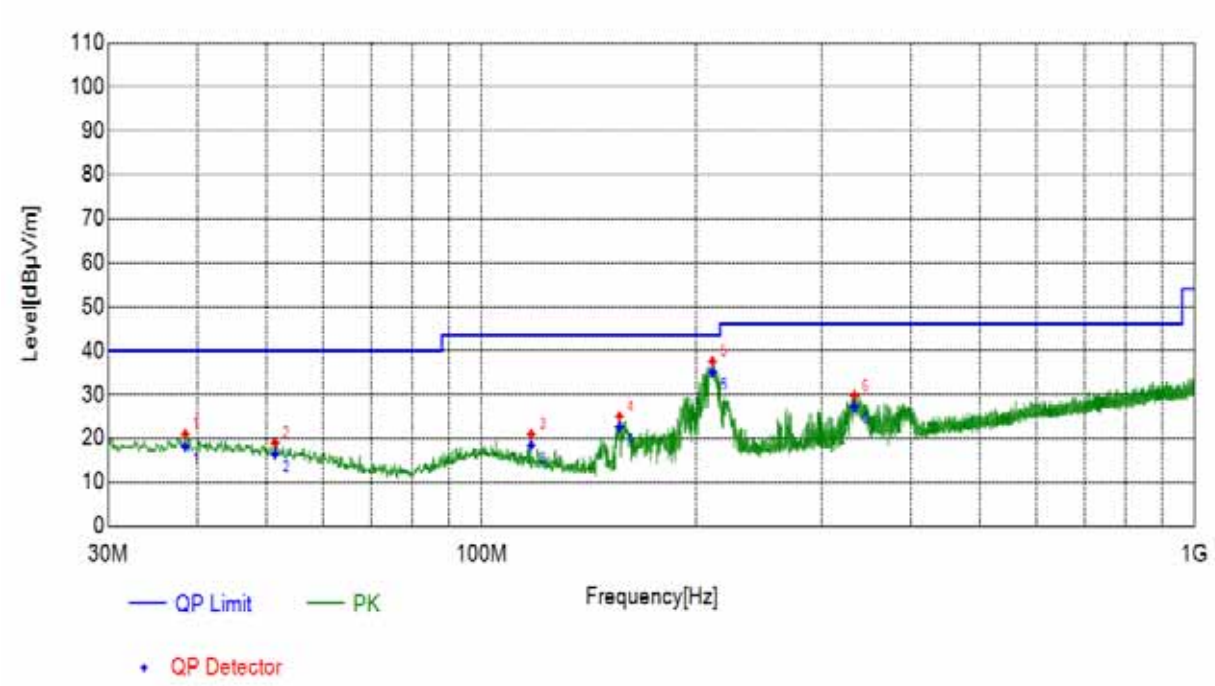
Test Results:

SPURIOUS EMISSIONS 30MHz~1GHz：

Radiated Emission	30MHz-1GHz
Polarity	Horizontal
Test Mode	Normal Working

Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
38.4398	Horizontal	21.16	-0.13	21.03	40.00	18.97	PK	100	335	PASS
51.3421	Horizontal	20.27	-1.28	18.99	40.00	21.01	PK	100	18	PASS
117.4057	Horizontal	17.63	3.39	21.02	43.52	22.50	PK	100	27	PASS
156.1126	Horizontal	15.91	9.18	25.09	43.52	18.43	PK	100	353	PASS
210.7291	Horizontal	18.78	18.88	37.66	43.52	5.86	PK	100	9	PASS
333.2523	Horizontal	22.26	7.56	29.82	46.02	16.20	PK	100	193	PASS

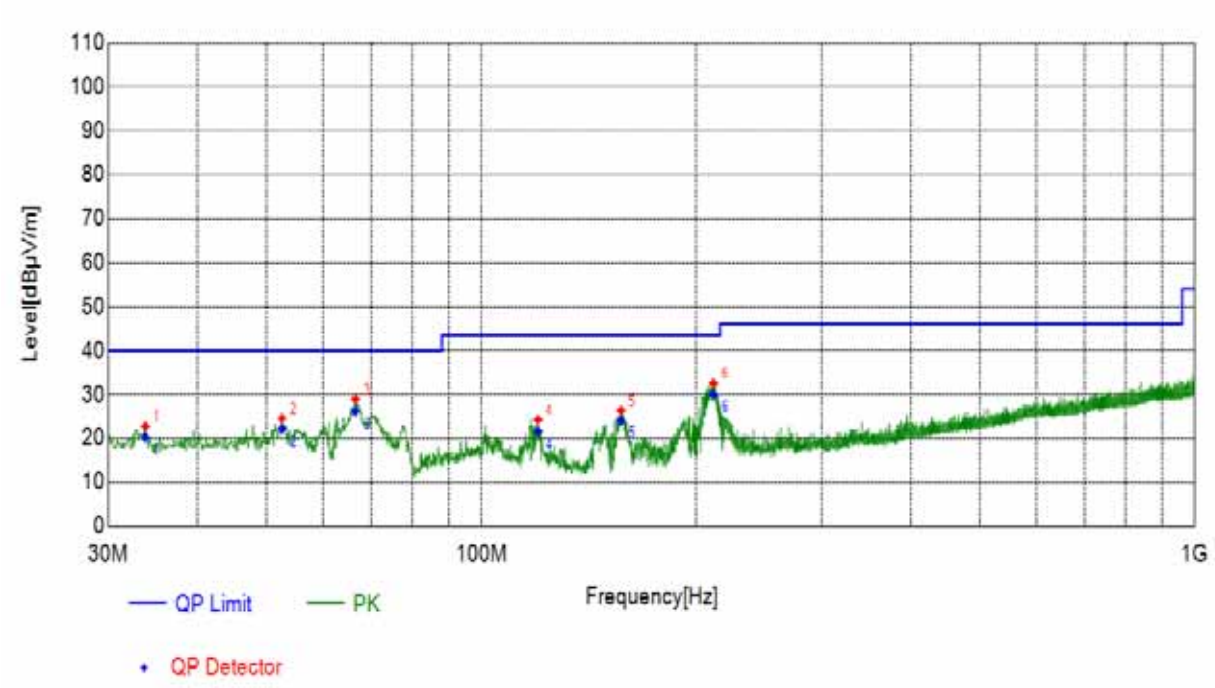
Final Data List								
Frequency [MHz]	Polarity	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
38.4398	Horizontal	21.16	18.14	40.00	21.86	108	335	PASS
51.3421	Horizontal	20.27	16.46	40.00	23.54	100	18	PASS
117.4057	Horizontal	17.63	18.49	43.52	25.03	101	27	PASS
156.1126	Horizontal	15.91	22.60	43.52	20.92	114	353	PASS
210.7291	Horizontal	18.78	35.00	43.52	8.52	193	9	PASS
333.2523	Horizontal	22.26	27.16	46.02	18.86	111	193	PASS


110
100
90
80
70
60
50
40
30
20
10
0
Level[dBµV/m]
30M
100M
1G
Frequency[Hz]
QP Limit
PK
QP Detector

Radiated Emission	30MHz-1GHz
Polarity	Vertical
Test Mode	Normal Working

Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
33.7834	Vertical	20.73	2.01	22.74	40.00	17.26	PK	100	253	PASS
52.5063	Vertical	20.02	4.56	24.58	40.00	15.42	PK	100	342	PASS
66.5727	Vertical	16.94	12.00	28.94	40.00	11.06	PK	100	229	PASS
120.0250	Vertical	17.25	7.01	24.26	43.52	19.26	PK	100	210	PASS
156.8887	Vertical	15.92	10.44	26.36	43.52	17.16	PK	100	300	PASS
211.4081	Vertical	18.78	13.76	32.54	43.52	10.98	PK	100	356	PASS

Final Data List								
Frequency [MHz]	Polarity	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Pass/Fail
33.7834	Vertical	20.73	20.28	40.00	19.72	105	253	PASS
52.5063	Vertical	20.02	22.12	40.00	17.88	106	342	PASS
66.5727	Vertical	16.94	26.20	40.00	13.80	117	229	PASS
120.0250	Vertical	17.25	21.63	43.52	21.89	100	210	PASS
156.8887	Vertical	15.92	23.98	43.52	19.54	109	300	PASS
211.4081	Vertical	18.78	29.99	43.52	13.53	101	356	PASS



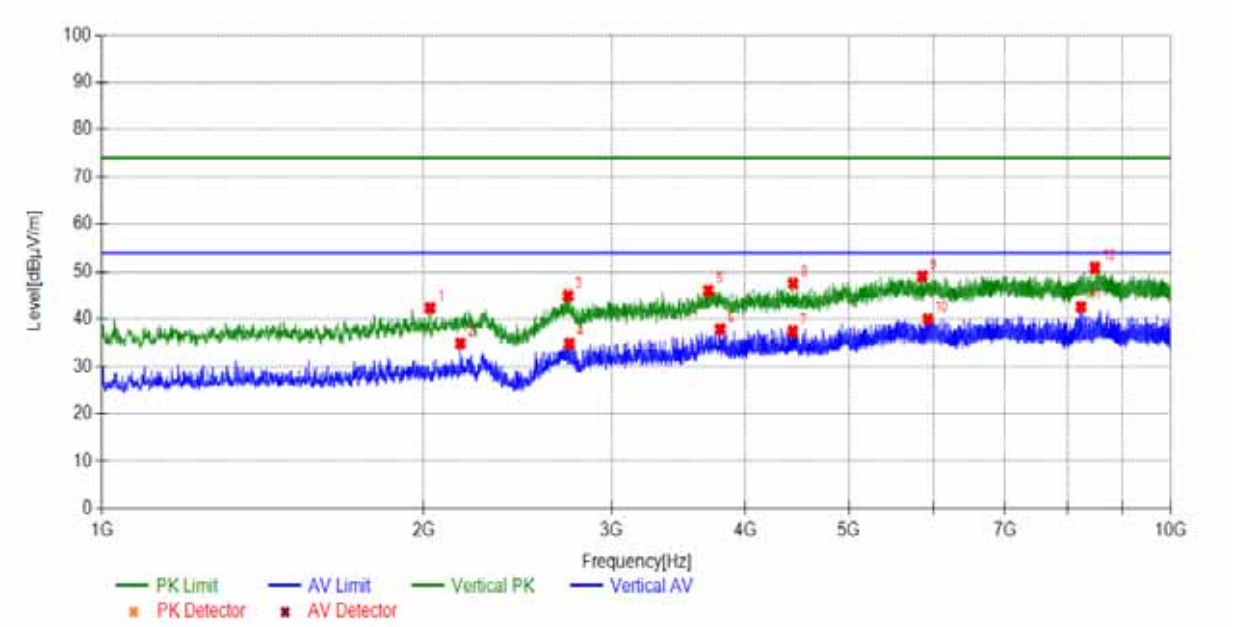
Note: 1. Quasi-Peak = Reading value + Correction factor

2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

SPURIOUS EMISSIONS 1GHz~10GHz：

Radiated Emission	1GHz~10GHz
Polarity	Horizontal
Test Mode	Normal Working

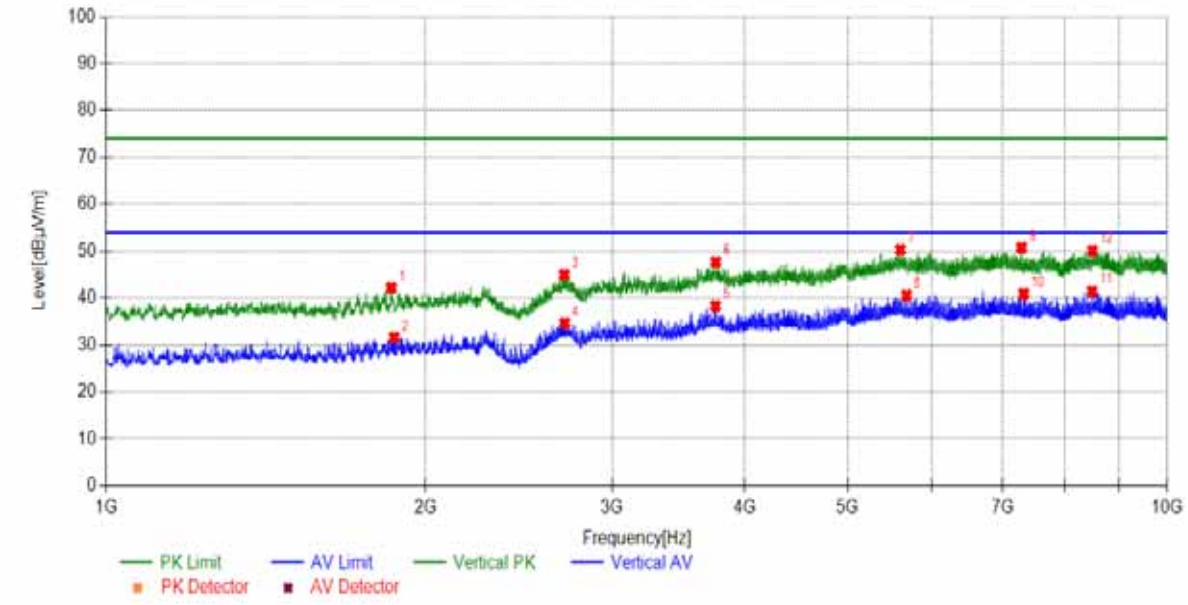
Suspected List										
Frequency [MHz]	Polarity	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
8493.2	Horizont	2.38	48.44	50.82	74.00	23.18	PK	100	90	PASS
3693.0	Horizont	-4.39	50.42	46.03	74.00	27.97	PK	100	70	PASS
2027.9	Horizont	-10.26	52.62	42.36	74.00	31.64	PK	100	60	PASS
4432.9	Horizont	-3.90	51.40	47.50	74.00	26.50	PK	100	40	PASS
5856.8	Horizont	-1.34	50.37	49.03	74.00	24.97	PK	100	20	PASS
2729.9	Horizont	-7.77	52.69	44.92	74.00	29.08	PK	100	120	PASS
2738.0	Horizont	-7.74	42.59	34.85	54.00	19.15	AV	100	10	PASS
2164.7	Horizont	-9.84	44.78	34.94	54.00	19.06	AV	100	10	PASS
5926.1	Horizont	-1.20	41.15	39.95	54.00	14.05	AV	100	10	PASS
4430.2	Horizont	-3.90	41.31	37.41	54.00	16.59	AV	100	10	PASS
8242.1	Horizont	2.00	40.62	42.62	54.00	11.38	AV	100	10	PASS
3789.3	Horizont	-4.22	42.11	37.89	54.00	16.11	AV	100	10	PASS



Radiated Emission	1GHz~10GHz
Polarity	Vertical
Test Mode	Normal Working

Suspected List

Frequency [MHz]	Polarity	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Height [cm]	Angle deg	Pass/Fail
8504.0	Vertical	2.40	47.71	50.11	74.00	23.89	PK	100	140	PASS
1856.8	Vertical	-10.84	52.94	42.10	74.00	31.90	PK	100	200	PASS
3754.2	Vertical	-4.28	51.93	47.65	74.00	26.35	PK	100	230	PASS
5604.8	Vertical	-1.86	52.16	50.30	74.00	23.70	PK	100	270	PASS
7289.8	Vertical	1.26	49.47	50.73	74.00	23.27	PK	100	70	PASS
2702.9	Vertical	-7.88	52.83	44.95	74.00	29.05	PK	100	180	PASS
2705.6	Vertical	-7.87	42.50	34.63	54.00	19.37	AV	100	10	PASS
1868.5	Vertical	-10.80	42.31	31.51	54.00	22.49	AV	100	10	PASS
7324.9	Vertical	1.30	39.56	40.86	54.00	13.14	AV	100	10	PASS
5679.5	Vertical	-1.71	42.23	40.52	54.00	13.48	AV	100	10	PASS
8495.9	Vertical	2.38	39.03	41.41	54.00	12.59	AV	100	10	PASS
3752.4	Vertical	-4.29	42.62	38.33	54.00	15.67	AV	100	10	PASS

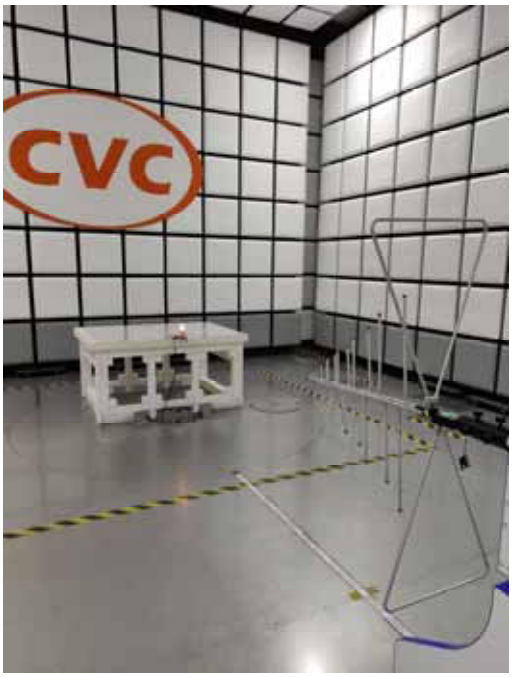


Note: 1. Quasi-Peak = Reading value + Correction factor

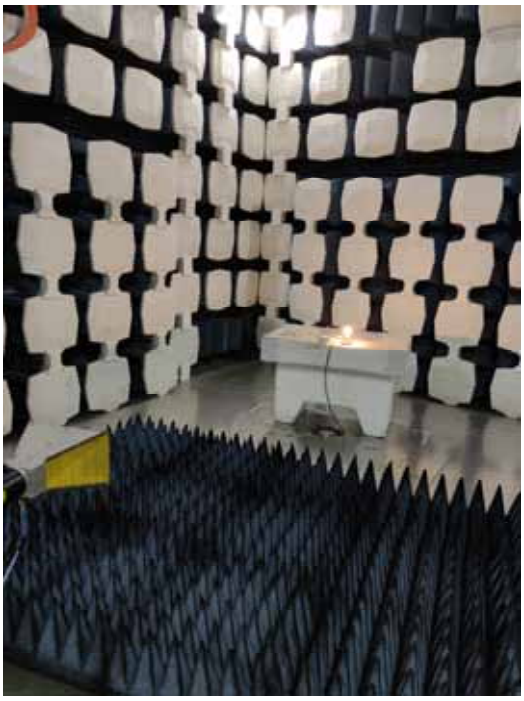
2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

6. Test Setup Photograph

(1) Radiated spurious emission Test Setup(Below 1GHz)



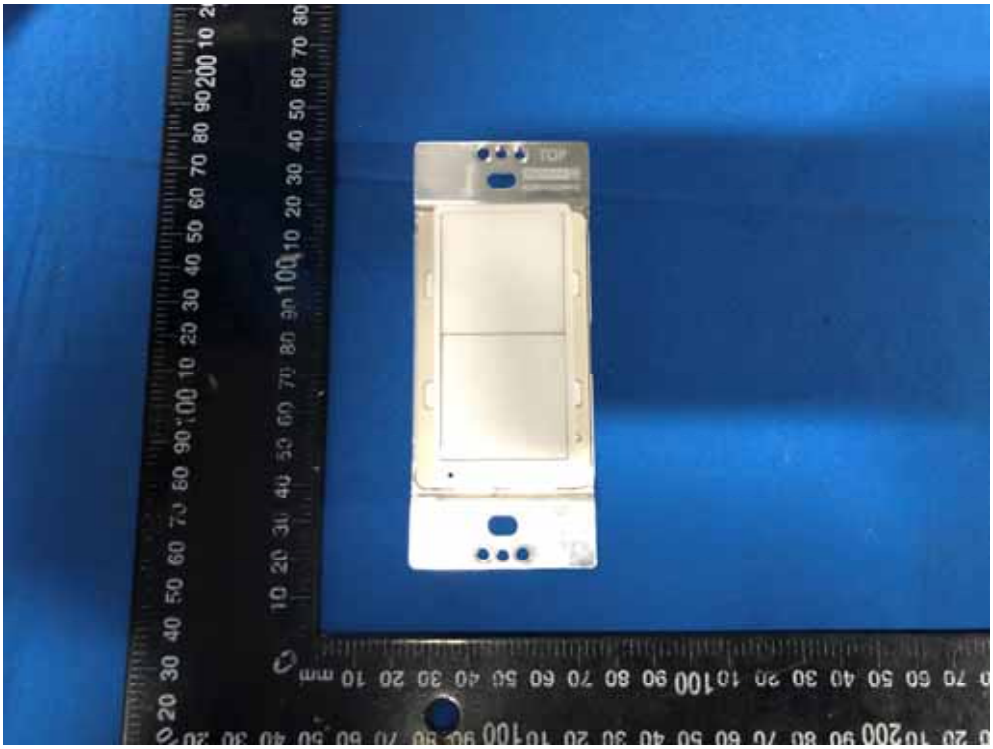
(2) Radiated spurious emission Test Setup(Above 1GHz)



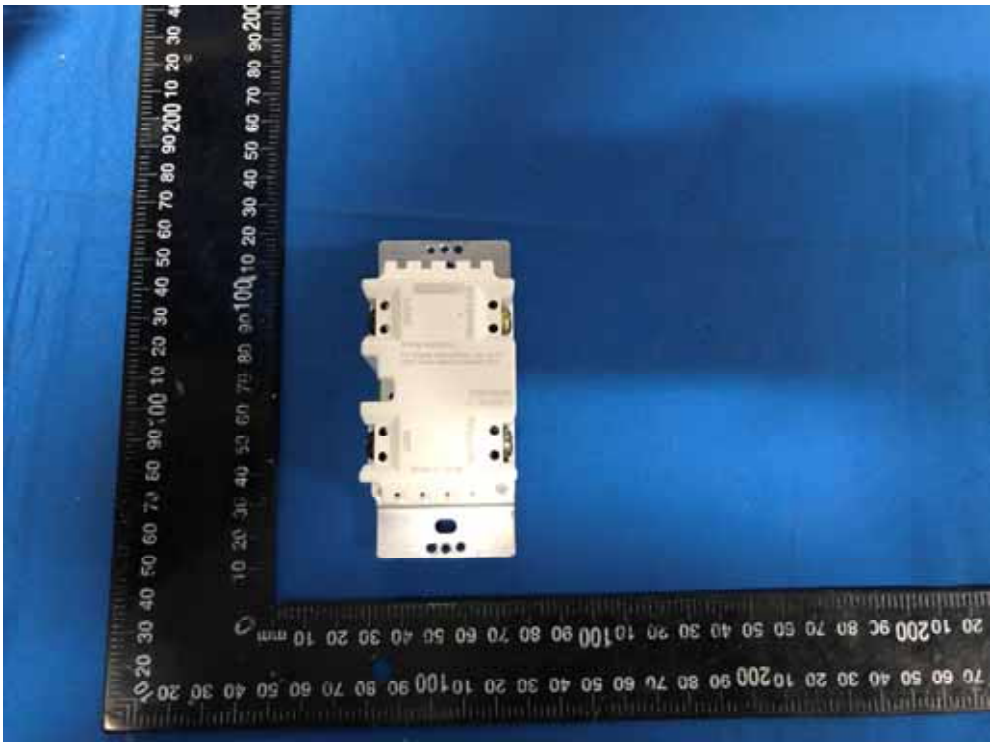
(3) Conducted Emission Test Setup

7. EUT Photograph

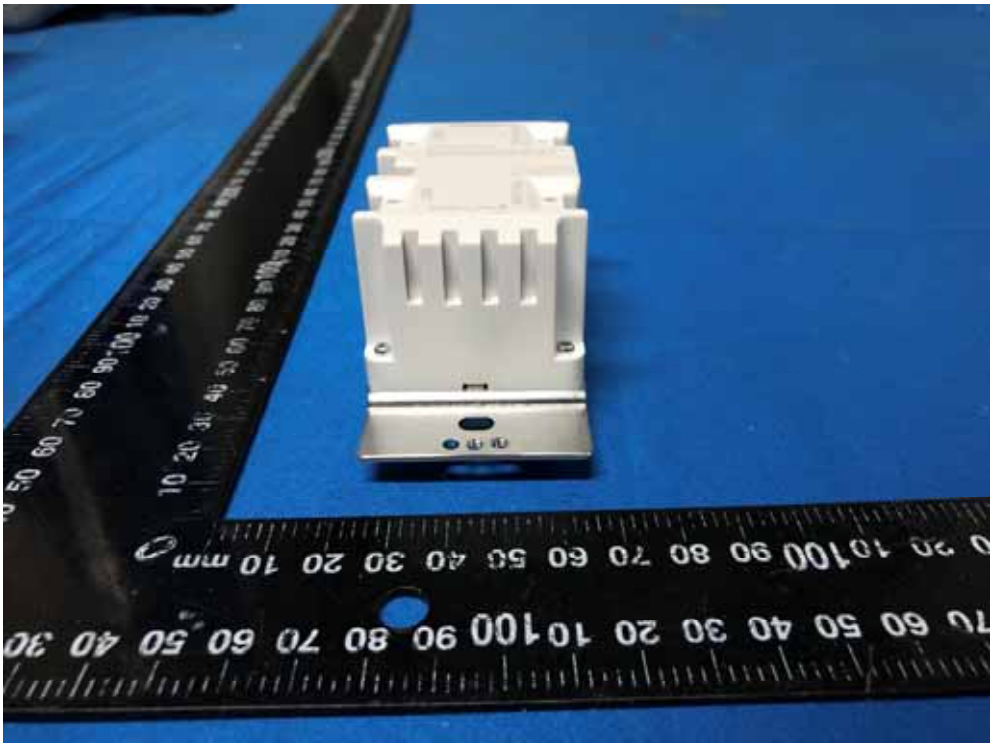
(1) EUT Photo



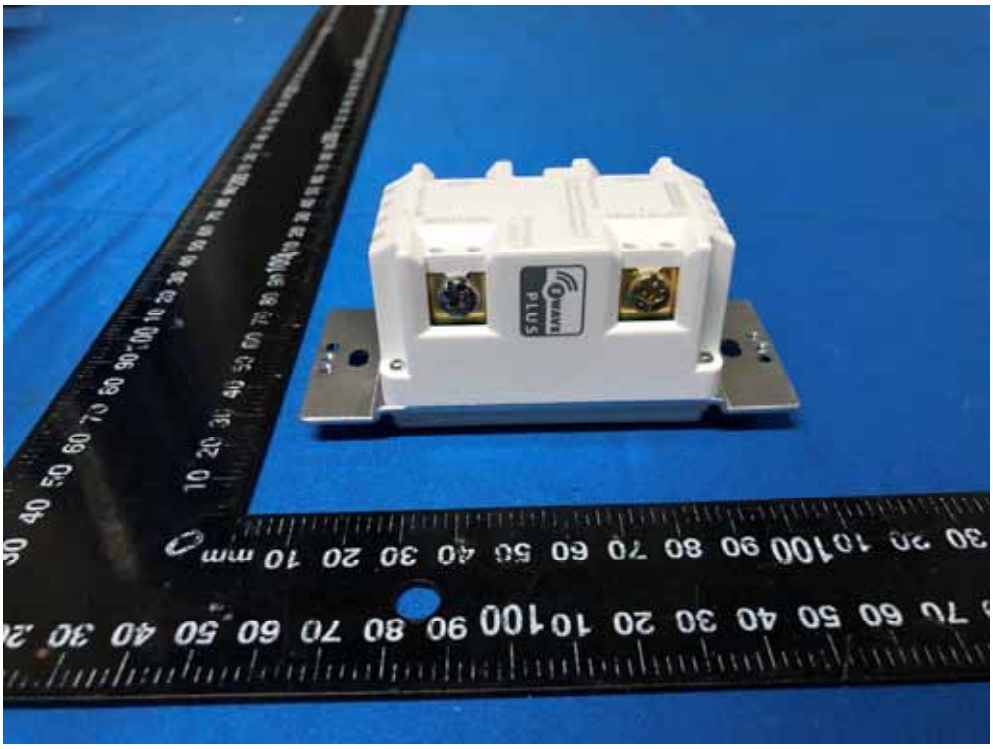
(2) EUT Photo



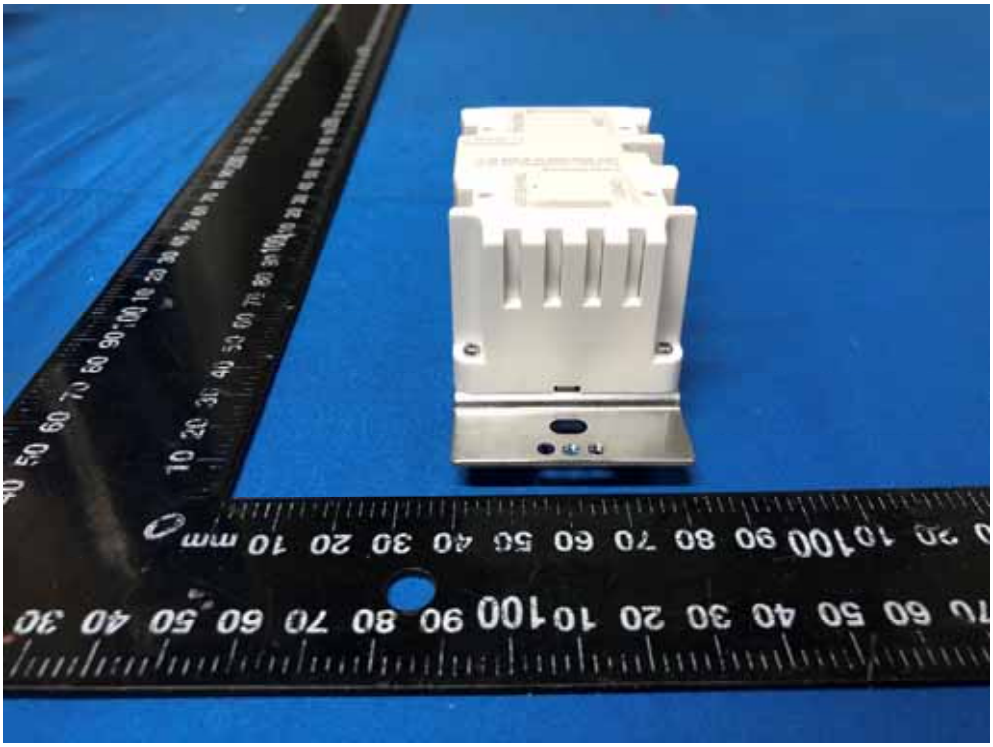
(3) EUT Photo



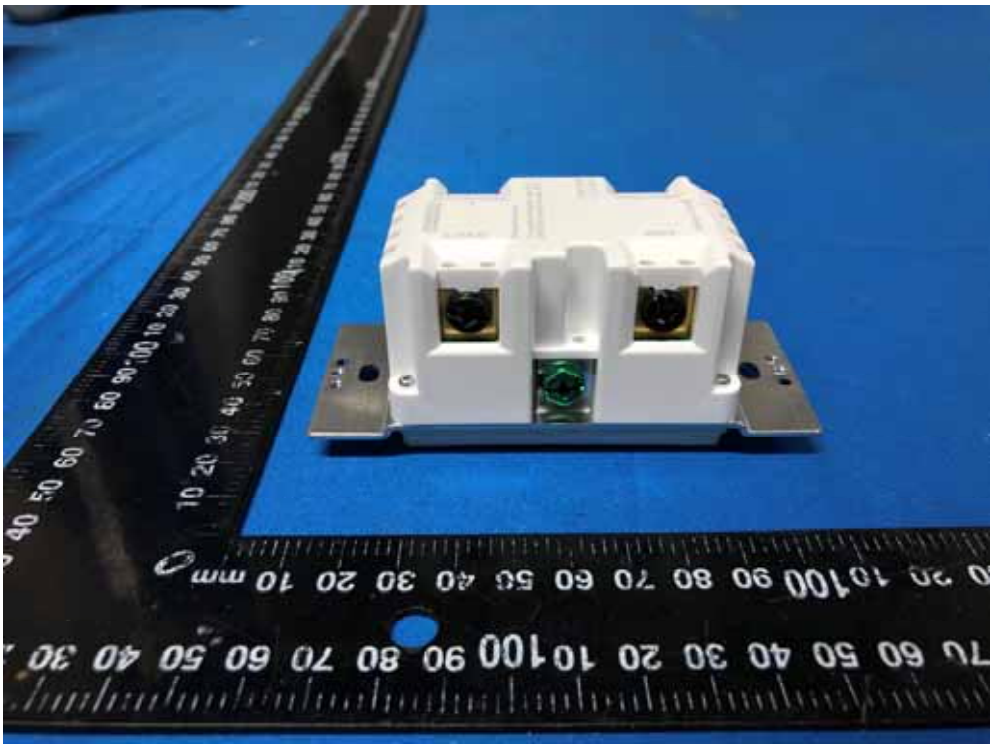
(4) EUT Photo



(5) EUT Photo

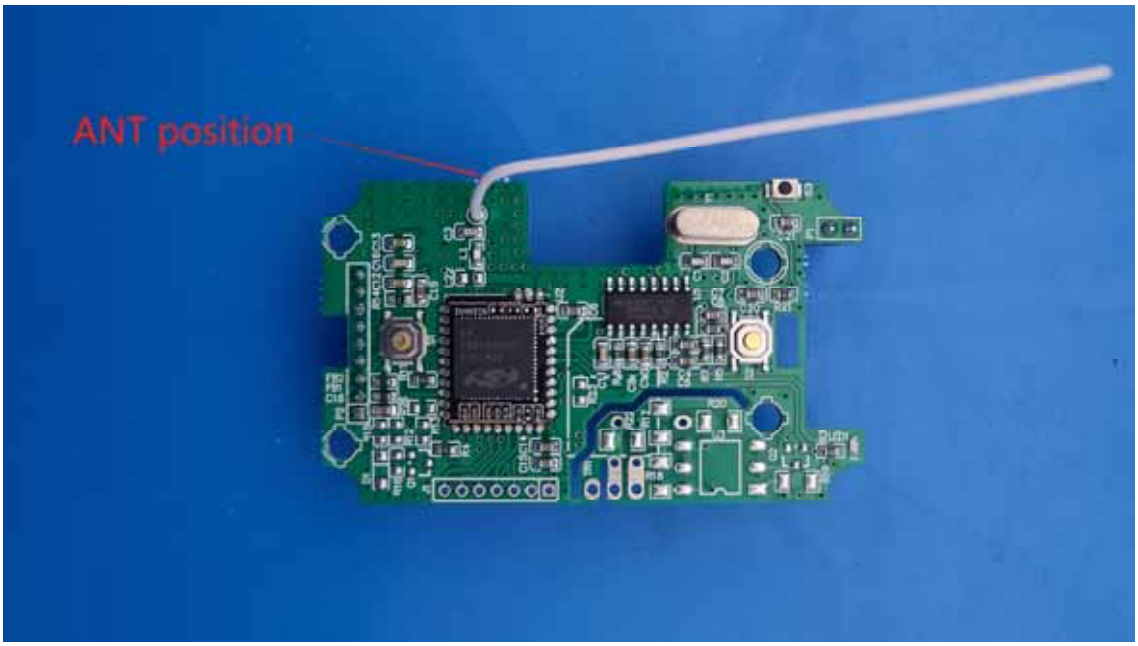


(6) EUT Photo

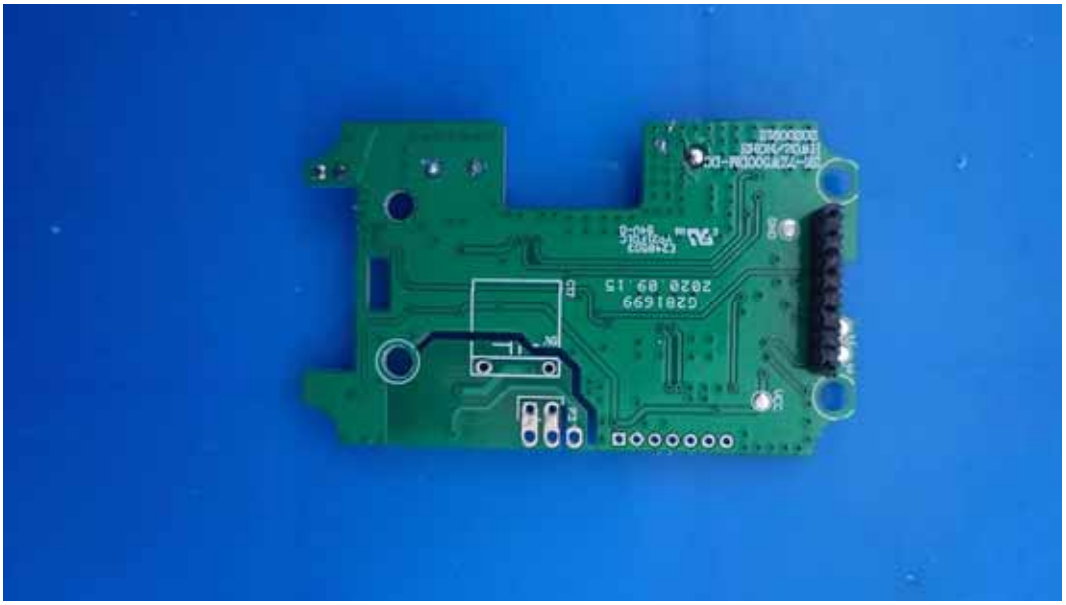


(7) EUT Photo

(8) EUT Photo

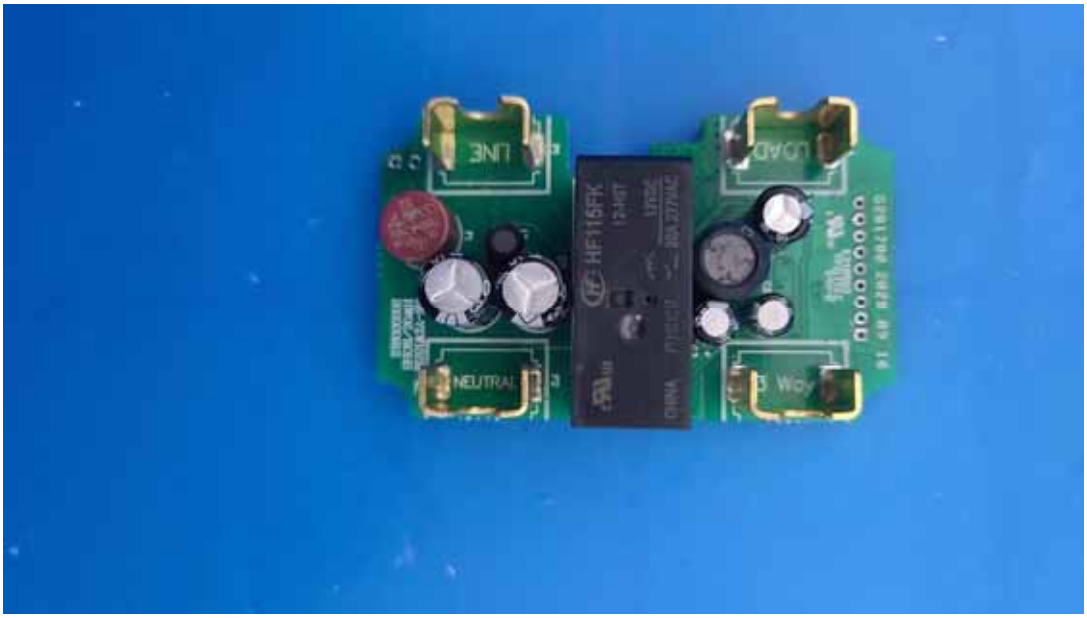


(9) EUT Photo



(10) EUT Photo

(11) EUT Photo



8. Appendix

Equipment list	Type/Mode	Equipment No.	Manufacturer	Cal. Due
EMI Test Receiver	ESI26	EM-0087	R&S	2021-03-15
EMI Test Receiver	ESR3	VGDY-0705	R&S	2021-03-15
LISN	NSLK 8127	VGDY-0150	SCHWARZBECK	2021-09-04
LISN	NSLK 8128	VGDY-0149	SCHWARZBECK	2021-09-04
Impedance Stabilization Network	NTFM8131	EM-000498	SCHWARZBECK	2021-06-09
Voltage Probe	TK9420	VGDY-0128	SCHWARZBECK	2021-03-11
Power Divider	4901.17.B	DB-0016	HUBER+SUHNER	2021-11-08
Shielding Room(#1)	GP1A	WKNF-0001	LEINING	2024-08-08
Shielding Room(#2)	GP1A	WKNF-0006	LEINING	2024-08-08
EMI Test Receiver	N9038A-508	EM-000397	Agilent	2021-03-15
EMI Test Receiver	ESR7	VGDY-0956	R&S	2021-03-11
Broadband Antenna(3m)	VULB 9163	EM-000342	SCHWARZBECK	2021-07-11
Broadband Antenna(5m)	VULB 9163	EM-000382	SCHWARZBECK	2021-05-10
Loop Antenna	HLA 6121	EM-000546	TESEQ	2021-06-28
Waveguide Horn Antenna	BBHA9120B	EM-000383	SCHWARZBECK	2021-03-15
Waveguide Horn Antenna	HF906	WKNA-0024-8	R&S	2021-03-15
Semi-Anechoic Chamber(3m)	FACT-4	WKNA-0024	ETS	2024-12-12
Semi-Anechoic Chamber(5m)	SAC-5	EM-000557	COMTEST	2024-11-02
Spectrum analyzer	N9030A	EM-000395	Agilent	2021-06-08

The End