TEST REPORT

Report No.:	LGD-ESH-P20062572B-3
Product:	FIXTURE INTEGRATED SENSOR - PIR AND DAYLIGHT SENSING
Test Model:	LMFS-601
Received:	Jun.30, 2020
ISSUED:	Jul.30, 2020

Applicant:	The Watt Stopper Inc.
Address:	2700 Zanker Rd., Suite 168, San Jose, CA. 95134
Manufacturer:	Shanghai Legrand Electrical Co., Ltd
Address:	1/F, Building 1, No. 1358 Xiangyang Road, Minhang District, Shanghai, China

Issued By:	BUREAU VERITAS ADT (Shanghai) Corporation
Lab Location:	No. 829, Xinzhuan Road, Shanghai, P.R.China (201612)

ACCREDITED
Test Lab
Cert 2343.01

Contents

1. TEST PROGRAM

PRODUCT: FIXTURE INTEGRATED SENSOR - PIR AND DAYLIGHT SENSING
TEST MODEL: LMFS-601
APPLICANT: The Watt Stopper Inc. d/b/a Qmotion
TESTED: Jul.20 to 23, 2020
STANDARDS: 47 CFR FCC Part15, Subpart B, Class B
ICES-003 Issue 6
ANSI C63.4:2014

We, BUREAU VERITAS ADT (Shanghai) Corporation, declare that the equipment above has been tested and found compliance with the requirement limits of applicable standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate under the standards herein specified.

PREPARED BY : Scott XU , **DATE:** Jul.28, 2020

Scott XU

Project Engineer

APPROVED BY : Daniel , **DATE:** Jul.28, 2020

Daniel Sun

EMC Lab Manager

2. Summary of Test Procedure and Test Results

EMISSION (47 CFR FCC Part15/ICES-003, Subpart B)		
Test Item	Normative References	Test Result
Conducted Emission	47 CFR FCC Part15, Subpart B 15.107 ICES-003 Issue 6	Meets the Class B requirements
Radiated Emission	47 CFR FCC Part15, Subpart B 15.109 ICES-003 Issue 6	Meets the Class B requirements

3. Test Configuration of Equipment under Test

3.1 Manufacturer information

Manufacturer : Shanghai Legrand Electrical Co., Ltd

Address : 1/F, Building 1, No. 1358 Xiangyang Road, Minhang District, Shanghai, China

3.2 Feature of Equipment under Test

Product	FIXTURE INTEGRATED SENSOR - PIR AND DAYLIGHT SENSING
Test Model:	LMFS-601
Brand	legrand
EUT Power Rating:	12-20Vdc powered by DALI
Information of power supply	Powered by LMFI, AC 120V, 60Hz for LMFI

Note: 1.Please refer to user manual.

3.3 Description of support units

NO.	PRODUCT	BRAND	MODEL NO.
1	DLM Fixture Interface	LMFI-111	LMFI-111

3.4 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

This listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement		Value
Conducted emissions		2.55 dB
Radiated emissions	30 MHz ~ 1GHz	3.22 dB
	Above 1GHz	2.89 dB

4 Test of Conducted Emission

4.1 Test Limit

TEST STANDARD:

CFR 47 FCC Part 15, Subpart B (Section: 15.107)/ICES-003

FREQUENCY (MHz)	Class A (dBµV)		Class B (dBµV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTES: 1.The lower limit shall apply at the transition frequencies.

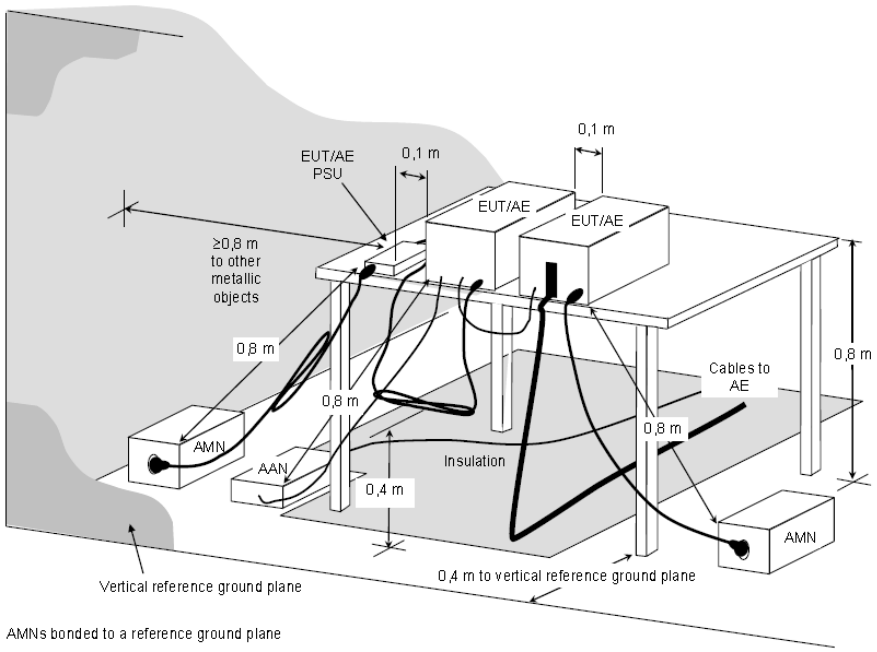
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2 Test Procedures

1. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
2. Connect EUT to the power mains through a Artificial Mains Network (AMN).
3. All the support units are connecting to the other AMN.
4. The AMN provides 50 ohm coupling impedance for the measuring instrument.
5. The CISPR states that a 50 ohm, 50 micro-Henry AMN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched
8. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

4.3 Typical Test Setup



NOTE The 0,8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be ≥0,8 m.

Figure D.2 – Example measurement arrangement for table-top EUT (Conducted emission measurement – alternative 1)

4.4 Measurement Equipment

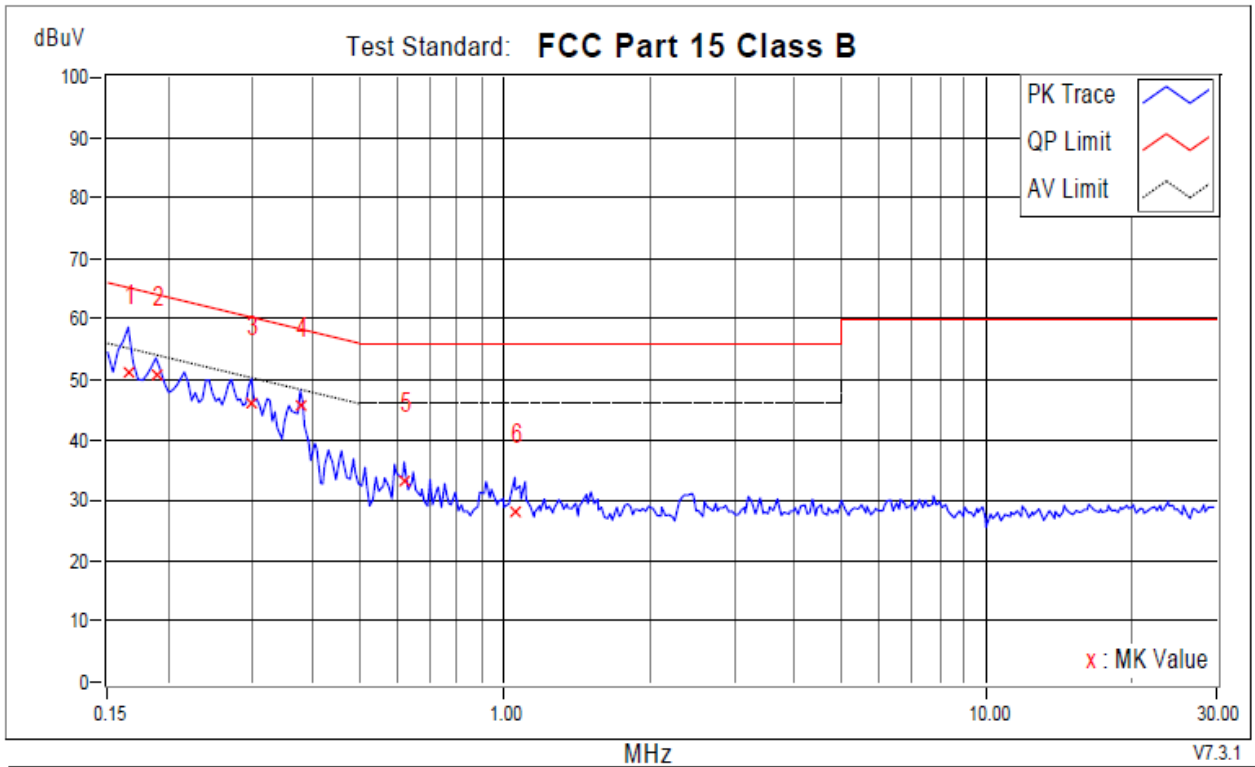
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	E1R1001	May.11, 2021
LISN ROHDE & SCHWARZ	ENV216	E1L1011	May.11, 2021
Software ADT	ADT_Cond_V7.3.0	N/A	N/A

4.5 Test Result and Data

a. Conducted Emission Test Data

120Vac/60Hz(Via LMFI)

Phase : LINE

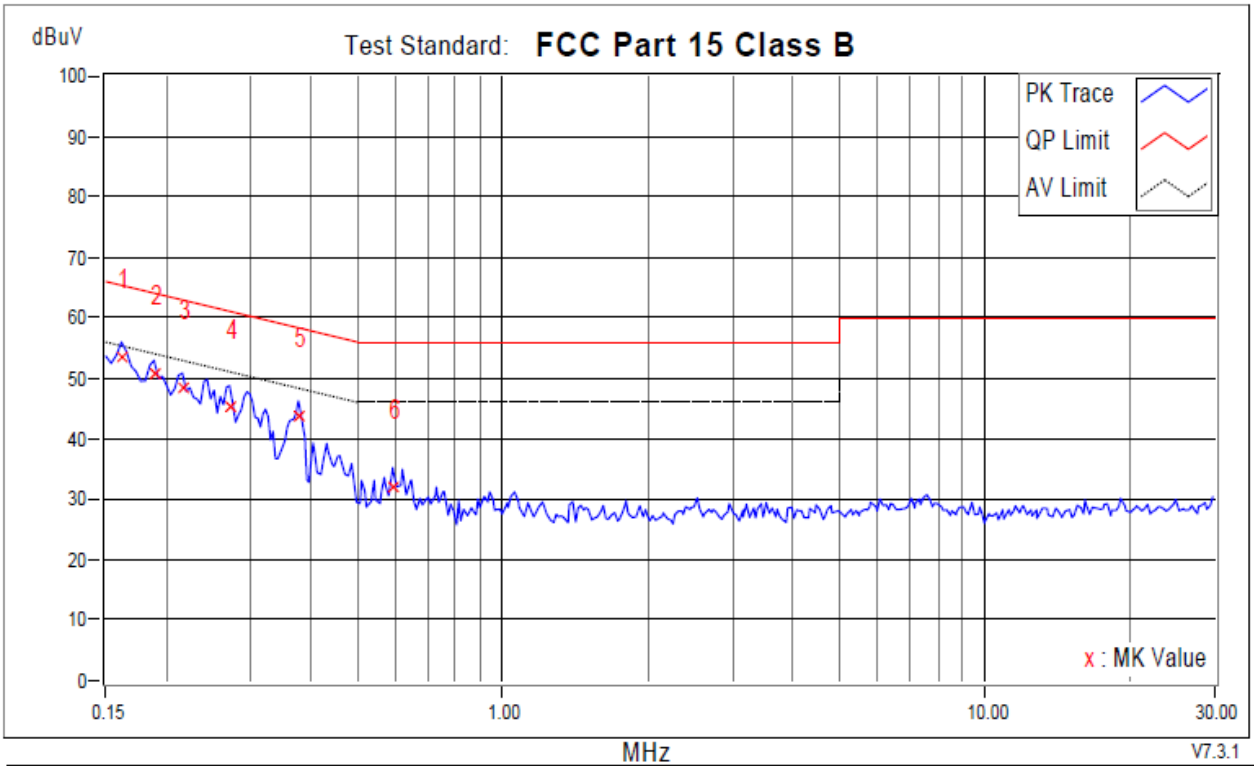


	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.16564	9.83	41.29	25.73	51.12	35.56	65.18	55.18	-14.05	-19.61	
2	0.18910	9.81	41.08	25.85	50.89	35.66	64.08	54.08	-13.19	-18.42	
3	0.29858	9.87	36.38	25.95	46.25	35.82	60.28	50.28	-14.03	-14.46	
+4	0.37678	9.87	35.70	29.26	45.57	39.13	58.35	48.35	-12.78	-9.22	
5	0.61920	9.82	23.21	14.62	33.03	24.44	56.00	46.00	-22.97	-21.56	
6	1.05083	9.89	18.20	13.37	28.09	23.26	56.00	46.00	-27.91	-22.74	

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

Phase : NEUTRAL



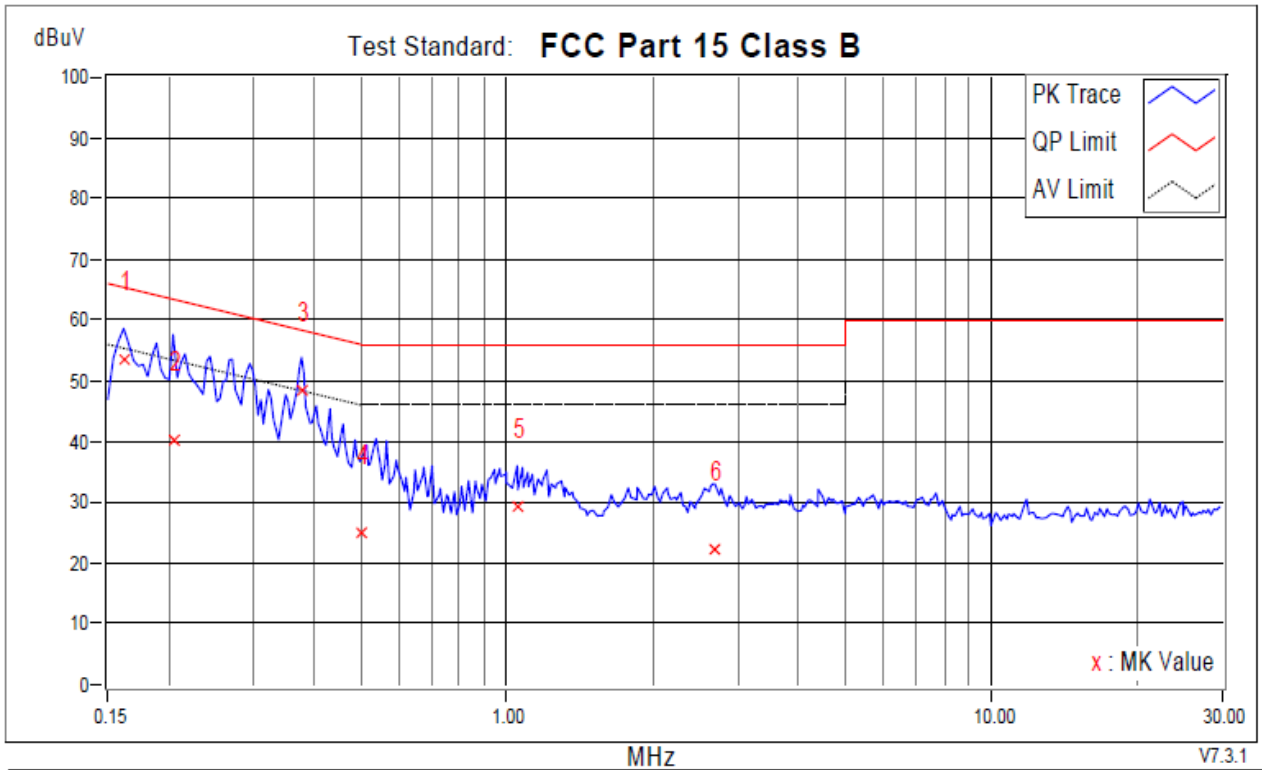
	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
+1	0.16173	9.84	43.64	26.20	53.48	36.04	65.37	55.37	-11.90	-19.34	
2	0.18910	9.81	40.94	23.81	50.75	33.62	64.08	54.08	-13.33	-20.46	
3	0.21647	9.81	38.70	20.05	48.51	29.86	62.95	52.95	-14.44	-23.09	
4	0.27121	9.85	35.35	17.92	45.20	27.77	61.08	51.08	-15.88	-23.31	
5	0.37678	9.87	33.83	25.65	43.70	35.52	58.35	48.35	-14.65	-12.83	
6	0.59183	9.83	22.10	8.83	31.93	18.66	56.00	46.00	-24.07	-27.34	

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

277Vac/50Hz(Via LMFI)

Phase: LINE

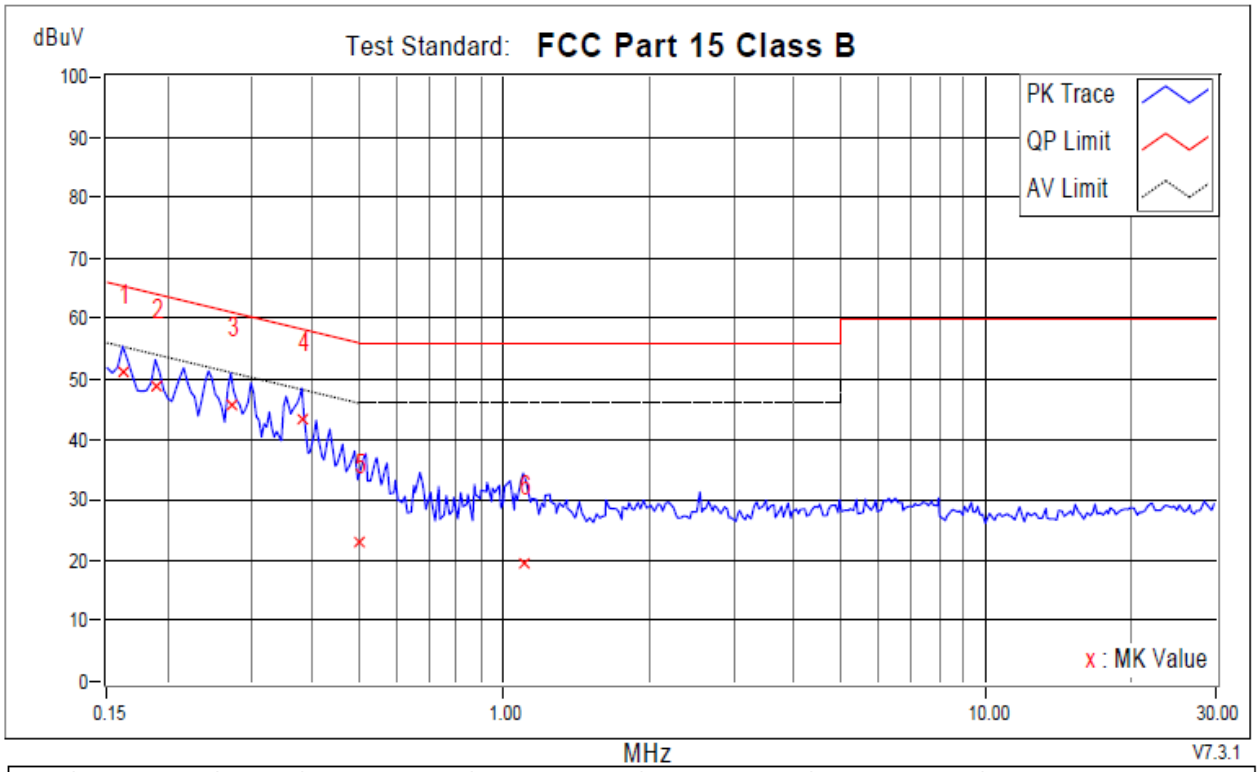


	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.16173	9.84	43.78	24.07	53.62	33.91	65.37	55.37	-11.75	-21.46	
2	0.20474	9.85	30.39	9.97	40.24	19.82	63.42	53.42	-23.17	-33.59	
+3	0.37678	9.72	38.59	30.24	48.31	39.96	58.35	48.35	-10.04	-8.39	
4	0.50000	9.72	15.35	1.45	25.07	11.17	56.00	46.00	-30.93	-34.83	
5	1.05083	9.60	19.62	12.29	29.22	21.89	56.00	46.00	-26.78	-24.11	
6	2.69303	9.83	12.60	5.07	22.43	14.90	56.00	46.00	-33.57	-31.10	

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

Phase: NEUTRAL



	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
+1	0.16173	9.84	41.23	19.25	51.07	29.09	65.37	55.37	-14.31	-26.29	
2	0.18910	9.81	39.21	17.26	49.02	27.07	64.08	54.08	-15.06	-27.01	
3	0.27121	9.85	36.02	20.13	45.87	29.98	61.08	51.08	-15.21	-21.10	
4	0.38069	9.87	33.47	23.93	43.34	33.80	58.26	48.26	-14.93	-14.47	
5	0.50000	9.84	13.22	-1.42	23.06	8.42	56.00	46.00	-32.94	-37.58	
6	1.09775	9.89	9.45	-0.51	19.34	9.38	56.00	46.00	-36.66	-36.62	

REMARKS:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

4.6 Test Photographs

5 Test of Radiated Emission

5.1 Test Limit

TEST STANDARD:

CFR 47 FCC Part 15, Subpart B (Section: 15.109)/ICES-003

FOR FREQUENCY BELOW 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	μV/m	dBμV/m	μV/m	dBμV/m
30 – 88	90	39.1	100	40.0
88 – 216	150	43.5	150	43.5
216 – 960	210	46.4	200	46.0
960 – 1000	300	49.5	500	54.0

LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (dBμV/m) (at 3m)		Class B (dBμV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

Note: 1.The lower limit shall apply at the transition frequencies.

2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

5.2 Test Procedures

1. The EUT was placed on a rotatable table top 0.8 meter above ground.
2. The EUT was set 3/10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
5. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

5.3 Typical Test Setup

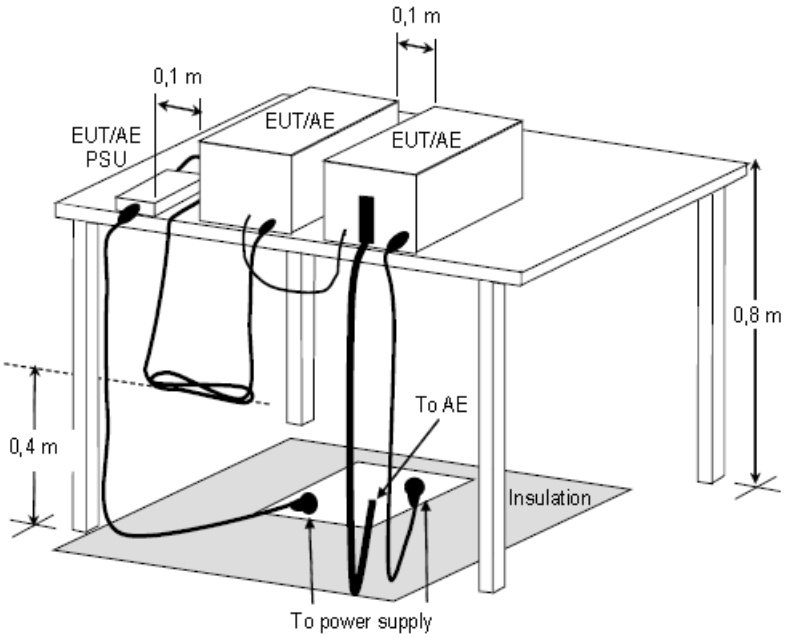


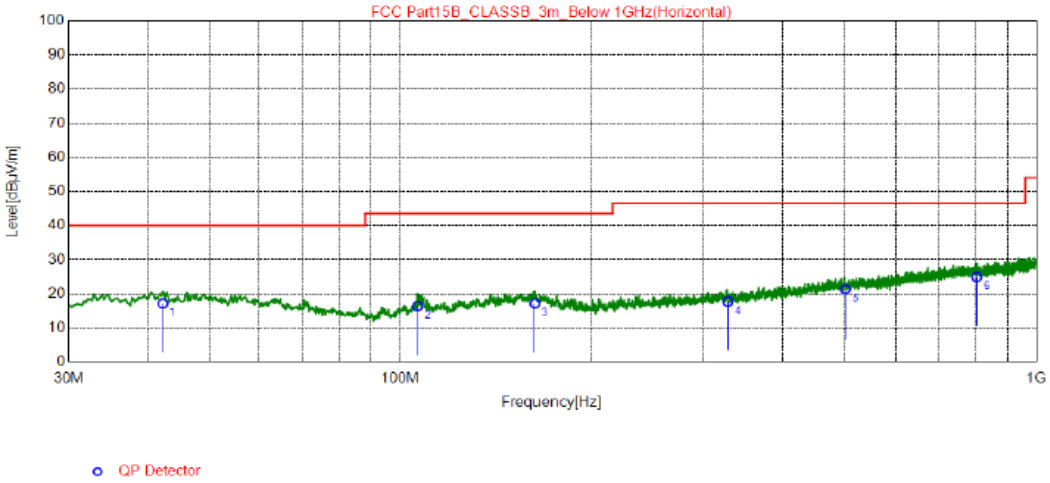
Figure D.8 – Example measurement arrangement for table-top EUT (Radiated emission measurement)

5.4 Measurement Equipment

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMI Test Spectrum ROHDE & SCHWARZ	ESR7	E1R1005	May.11, 2021
Spectrum Analyzer Keysight	N9030B	E1S1003	Aug.04, 2020
Broad-Band Antenna Schwarzbeck	VULB9168	E1A1012	Jul.28, 2020
Double Riaged Vroadband Horn Antenna Schwarzbeck	BBHA9120D	E1A1017	Jan.26, 2021
Preamplifier Agilent	8447D	E1A2001	Apr.19, 2021
Preamplifier Agilent	EMC051845SE	E1A2009	Jul.17, 2021

5.5 Test Result and Data (30MHz ~ 1GHz)

Position: Horizontal

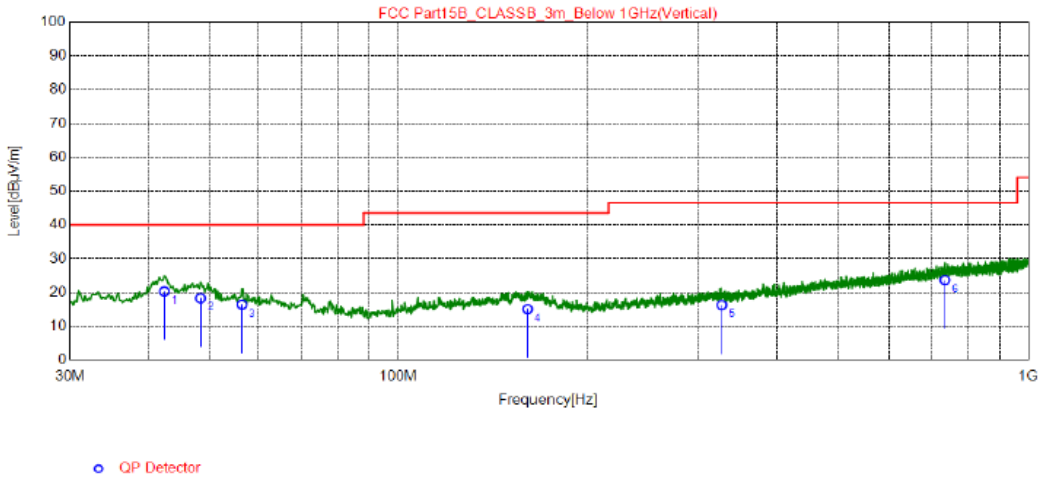


NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	42.22	26.66	-9.51	17.15	40.00	22.85	200	90	Horizontal
2	106.4	29.02	-12.58	16.44	43.50	27.06	200	255	Horizontal
3	162.8	26.21	-9.06	17.15	43.50	26.35	200	193	Horizontal
4	327.9	26.48	-8.77	17.71	46.50	28.79	200	232	Horizontal
5	502.0	27.11	-5.80	21.31	46.50	25.19	200	344	Horizontal
6	804.6	26.1	-1.21	24.89	46.50	21.61	200	302	Horizontal

REMARKS:

1. Q.P. is abbreviation of quasi-peak individually.
2. The emission levels of other frequencies were very low against the limit.
3. QP Margin value = QP Limit value – QP value.
4. Factor = Antenna Factor + Amplifier Factor + Cable loss.
5. QP value = Factor + Reading Value.

Position: Vertical



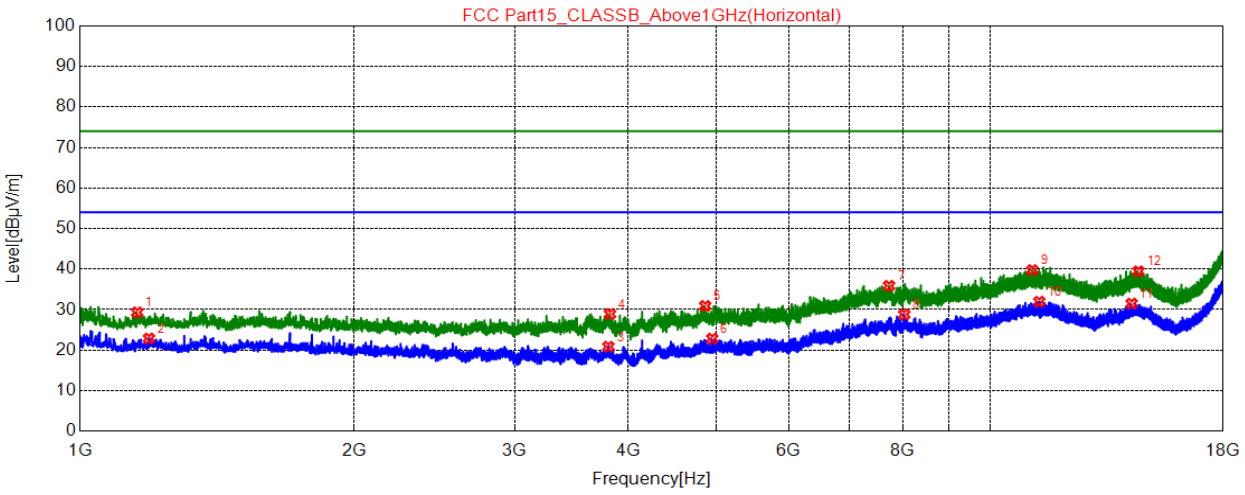
NO.	Freq. [MHz]	QP Reading [dBµV/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	42.41	29.8	-9.52	20.28	40.00	19.72	100	212	Vertical
2	48.43	27.94	-9.66	18.28	40.00	21.72	100	196	Vertical
3	56.38	26.69	-10.25	16.44	40.00	23.56	100	301	Vertical
4	160.5	24.04	-8.96	15.08	43.50	28.42	100	196	Vertical
5	326.8	25.03	-8.75	16.28	46.50	30.22	100	119	Vertical
6	736.3	25.35	-1.67	23.68	46.50	22.82	100	301	Vertical

REMARKS:

1. Q.P. is abbreviation of quasi-peak individually.
2. The emission levels of other frequencies were very low against the limit.
3. QP Margin value = QP Limit value – QP value
4. Factor = Antenna Factor + Amplifier Factor + Cable loss
5. QP value = Factor + Reading Value.

5.6 Test Result and Data (1GHz ~ 18GHz)

Position: Horizontal

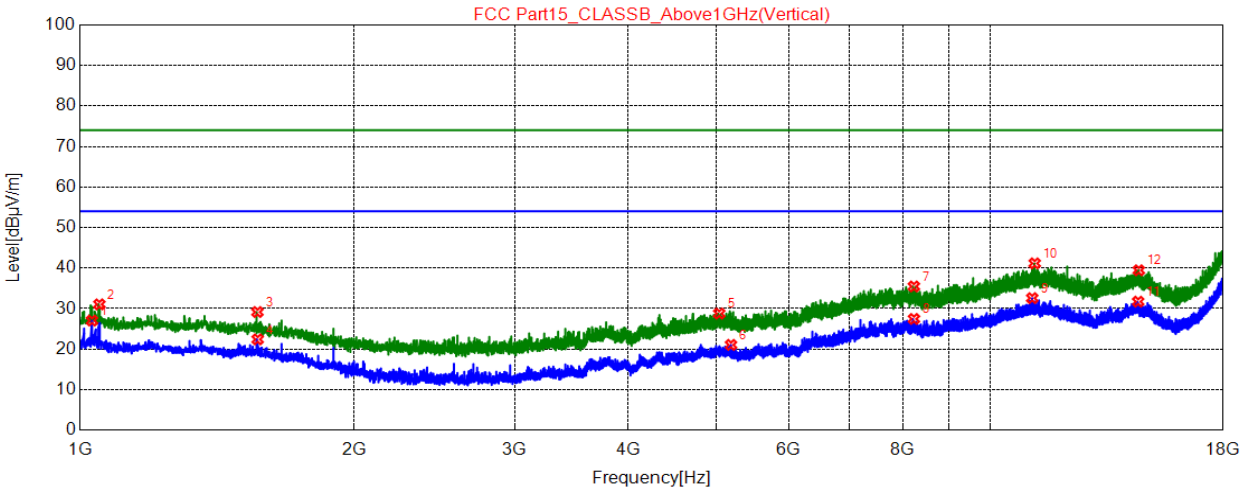


NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle[°]	Polarity	Detector
1	1155.5500	48.27	29.29	74.00	44.71	100	59	Horizonta	PK
2	1190.4000	41.72	22.86	54.00	31.14	100	290	Horizonta	AV
3	3803.3000	32.84	20.83	54.00	33.17	100	328	Horizonta	AV
4	3818.6000	40.88	28.90	74.00	45.10	100	290	Horizonta	PK
5	4858.1500	40.24	30.89	74.00	43.11	100	98	Horizonta	PK
6	4944.8500	32.06	22.82	54.00	31.18	100	213	Horizonta	AV
7	7732.0000	39.26	35.86	74.00	38.14	100	328	Horizonta	PK
8	8035.4500	31.80	28.79	54.00	25.21	100	213	Horizonta	AV
9	11109.050	38.19	39.74	74.00	34.26	100	328	Horizonta	PK
10	11304.550	30.27	31.94	54.00	22.06	100	328	Horizonta	AV
11	14278.700	28.08	31.48	54.00	22.52	100	59	Horizonta	AV
12	14526.050	35.69	39.45	74.00	34.55	100	290	Horizonta	PK

REMARKS:

1. The emission levels of other frequencies were very low against the limit.
2. Margin = Limit –Level

Position: Vertical

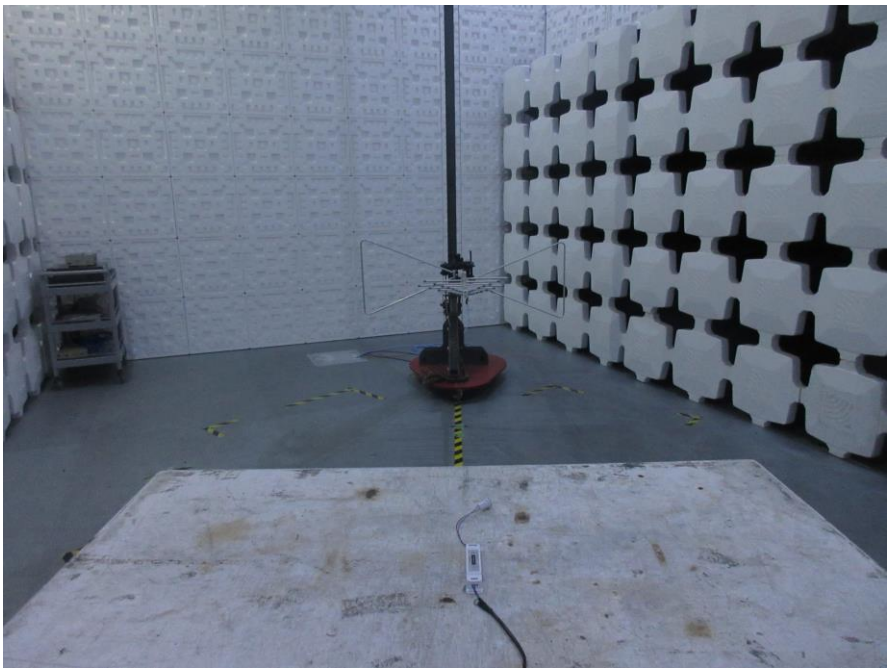


NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	1030.6000	46.42	27.03	54.00	26.97	100	148	Vertical	AV
2	1050.1500	50.37	31.04	74.00	42.96	100	109	Vertical	PK
3	1566.1000	46.89	29.15	74.00	44.85	100	33	Vertical	PK
4	1566.9500	40.14	22.40	54.00	31.60	100	71	Vertical	AV
5	5033.2500	37.92	28.77	74.00	45.23	100	224	Vertical	PK
6	5185.4000	30.03	21.04	54.00	32.96	100	186	Vertical	AV
7	8233.5000	38.81	35.46	74.00	38.54	100	224	Vertical	PK
8	8234.3500	30.79	27.44	54.00	26.56	100	262	Vertical	AV
9	11104.800	31.04	32.58	54.00	21.42	100	109	Vertical	AV
10	11174.500	39.53	41.16	74.00	32.84	100	109	Vertical	PK
11	14515.850	27.92	31.71	54.00	22.29	100	224	Vertical	AV
12	14537.950	35.71	39.45	74.00	34.55	100	109	Vertical	PK

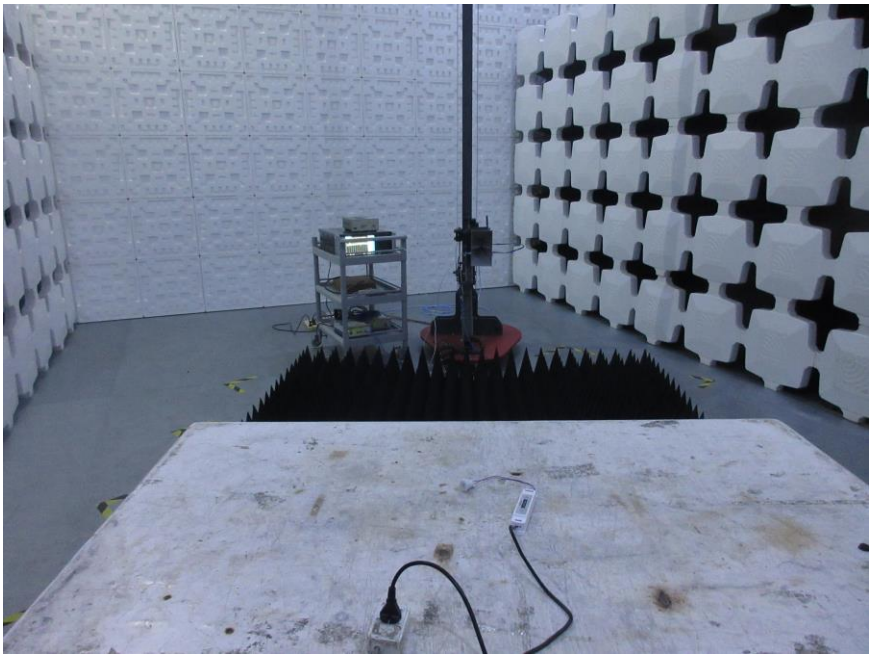
REMARKS:

1. The emission levels of other frequencies were very low against the limit.
2. Margin = Limit –Level

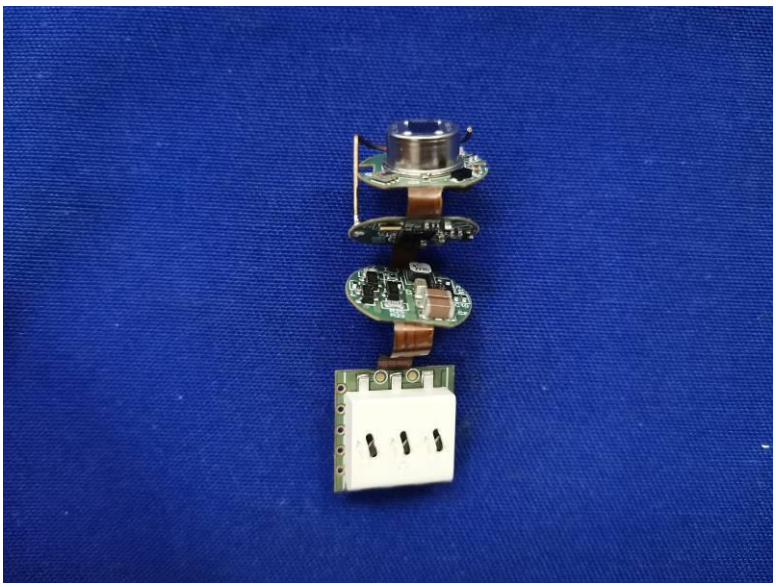
5.7 Test Photographs (30MHz ~ 1000MHz)



5.8 Test Photographs (1000MHz ~ 18000MHz)



6 Photographs of EUT



--- END ---