

FCC TEST REPORT

Report No.: ACHJ-19JU1631LTSHPB-3

Product: SMART WIFI BULB

Test Model: MS-A19-9.5W-RGBCW

Serial Model: Refer to model list

Received: Jun.17, 2019

ISSUED: Dec.12, 2019

Applicant: Haining Mingshuai Technology Lighting Co.,Ltd

Address: Building 1, No.327 Chuangye Road, Chang'an Town, Haining City,
Jiaxing, China

Issued By: BUREAU VERITAS ADT (Shanghai) Corporation

Lab Location: No. 829, Xinzhuan Road, Shanghai, P.R.China (201612)

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1. TEST PROGRAM

PRODUCT: SMART WIFI BULB
TEST MODEL: MS-A19-9.5W-RGBCW
SERIES MODEL: Refer to model list
APPLICANT: Haining Mingshuai Technology Lighting Co.,Ltd
TESTED: Jun.20 to Jul.02, 2019
STANDARDS: 47 CFR FCC Part15, Subpart B, Class B
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 : _____, **Date:** Dec.12, 2019

Will YAN

Project Engineer



Approved by : _____, **Date:** Dec.12, 2019

Daniel SUN
RF Supervisor

2. Summary of Test Procedure and Test Results

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

Special Comment: All tests were performed on 120Vac 60Hz.



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3. Test Configuration of Equipment under Test

3.1 Manufacturer information

Manufacturer : Haining Mingshuai Technology Lighting Co.,Ltd

Address : Building 1, No.327 Chuangye Road, Chang'an Town, Haining City, Jiaxing,
China

3.2 Feature of Equipment under Test

Product Name:	SMART WIFI BULB
Test Model:	MS-A19-9.5W-RGBCW
Series Model:	Refer to model list
Model Discrepancy:	--
EUT Power Rating:	120Vac 60Hz

Note: Compare the model list and the differences , we choose the model MS-A19-9.5W-RGBCW as final test.

3.3 Model List

Main Model No	Serial Model No	Difference1	Difference2
MS-A19-9.5W-RGBCW	MS-A19-7W-RGBCW MS-A19-5W-RGBCW	9.5W is all same as 7W and 5W except for different LED quantity in same LED PWB and	RGBCW is all same as RGBW except RGBCW has more LEDs(cold colour temperature) in same LED PWB and has more components in same driver PWB
MS-A19-9.5W-RGBW	MS-A19-7W-RGBW MS-A19-5W-RGBW	different component ratings in same driver PWB (The driver difference, please refer to BOM)	CW is all same as W except CW has more LEDs(cold colour temperature) in same LED PWB and has more components in same driver PWB
MS-A19-9.5W-CW	MS-A19-7W-CW MS-A19-5W-CW		

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)

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 0.50 MHz.
 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.

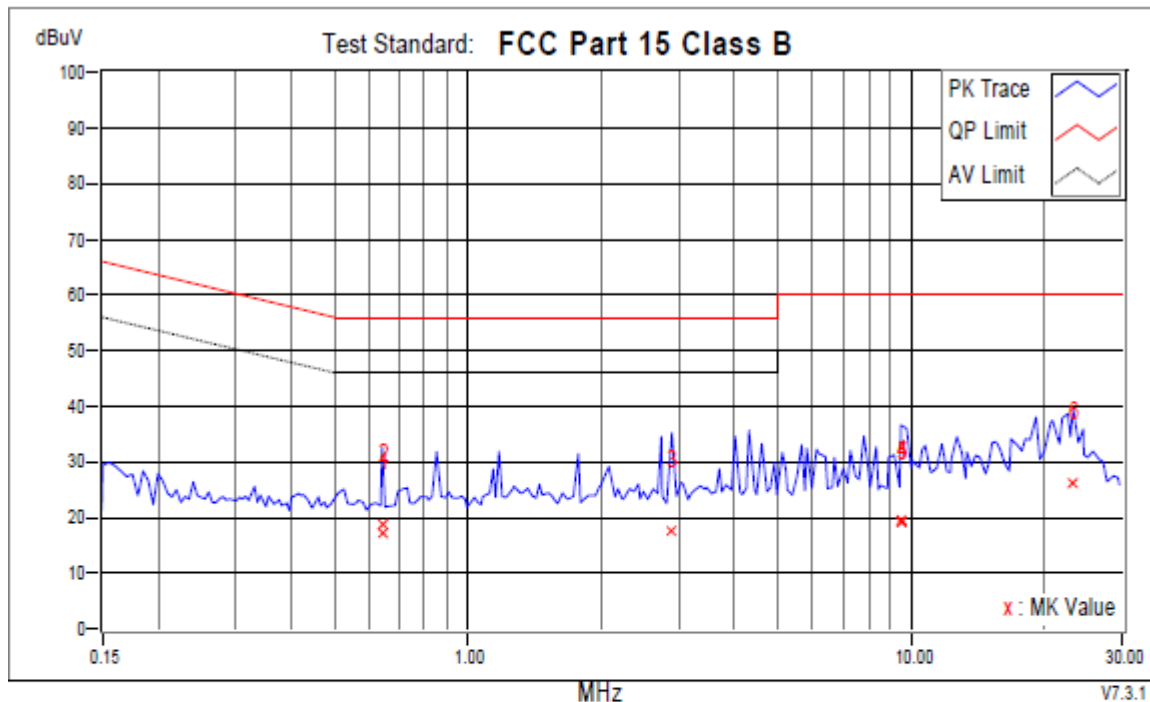
4.4 Measurement Equipment

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	E1R1001	Mar.04, 2020
LISN ROHDE & SCHWARZ	ENV216	E1L1011	Jul.18, 2019
Software ADT	ADT_Cond_V7.3.0	N/A	N/A

4.5 Test Result and Data

a. Conducted Emission Test Data

Phase : LINE



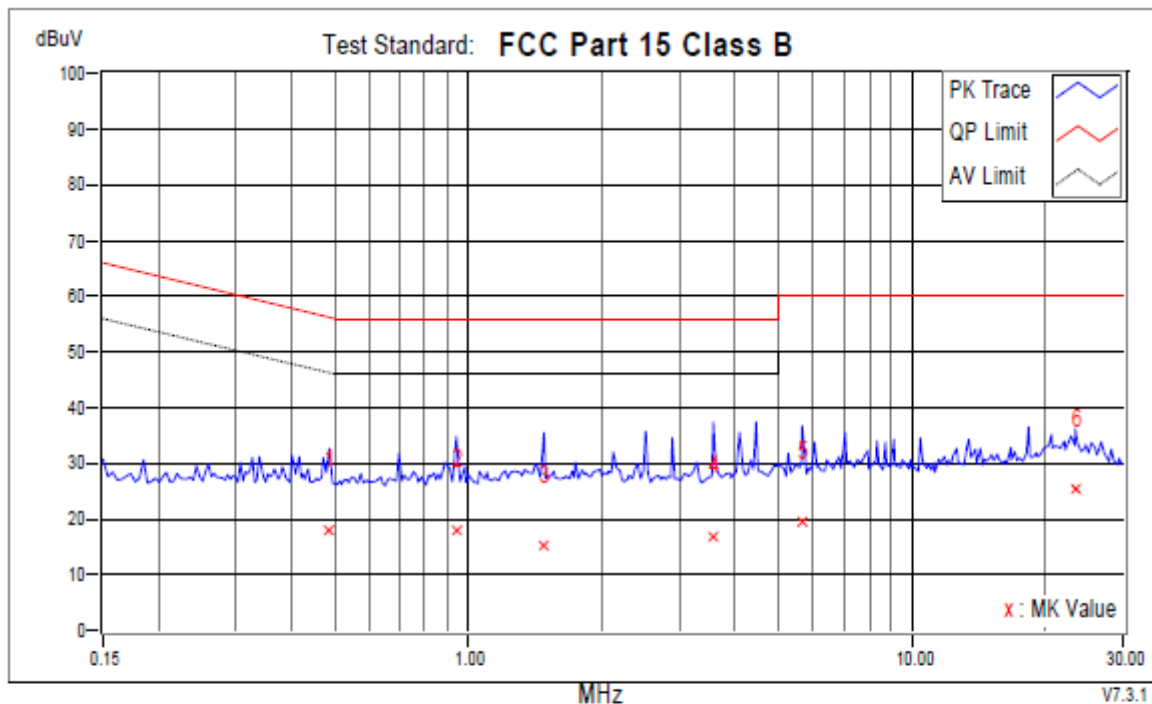
No.	Frequency MHz	Corr. Factor dB	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
			QP	AV	QP	AV	QP	AV	QP	AV	
1	0.64000	9.66	7.71	-5.08	17.37	4.58	56.00	46.00	-38.63	-41.42	
2	0.64000	9.66	8.91	-5.50	18.57	4.16	56.00	46.00	-37.43	-41.84	
3	2.88500	9.81	7.59	-2.69	17.40	7.12	56.00	46.00	-38.60	-38.88	
4	9.47500	10.16	9.51	-0.25	19.67	9.91	60.00	50.00	-40.33	-40.09	
5	9.47500	10.16	8.79	-0.30	18.95	9.86	60.00	50.00	-41.05	-40.14	
+6	23.18500	10.05	16.13	5.35	26.18	15.40	60.00	50.00	-33.82	-34.60	

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



No.	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.48626	9.86	7.92	-10.24	17.78	-0.38	56.23	46.23	-38.45	-46.61	
2	0.93982	9.92	8.14	-6.34	18.06	3.58	56.00	46.00	-37.94	-42.42	
3	1.48093	9.93	5.31	-5.71	15.24	4.22	56.00	46.00	-40.76	-41.78	
4	3.56496	9.85	6.79	-5.90	16.64	3.95	56.00	46.00	-39.36	-42.05	
5	5.65681	9.65	9.90	-5.95	19.55	3.70	60.00	50.00	-40.45	-46.30	
+6	23.33701	10.25	15.14	7.27	25.39	17.52	60.00	50.00	-34.61	-32.48	

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)

FOR FREQUENCY BELOW 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
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

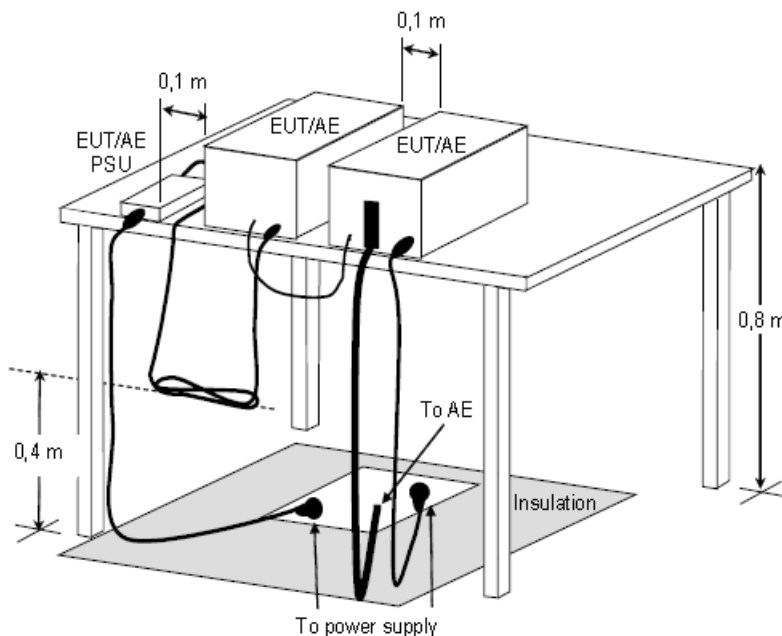
FREQUENCY (MHz)	Class A ($\text{dB}\mu\text{V/m}$) (at 3m)		Class B ($\text{dB}\mu\text{V/m}$) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

- Note:** (1) The lower limit shall apply at the transition frequencies.
 (2) Emission level ($\text{dB}\mu\text{V/m}$) = $20 \log$ Emission level ($\mu\text{V/m}$).
 (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

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3/10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- 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.
- 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.
- Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- 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

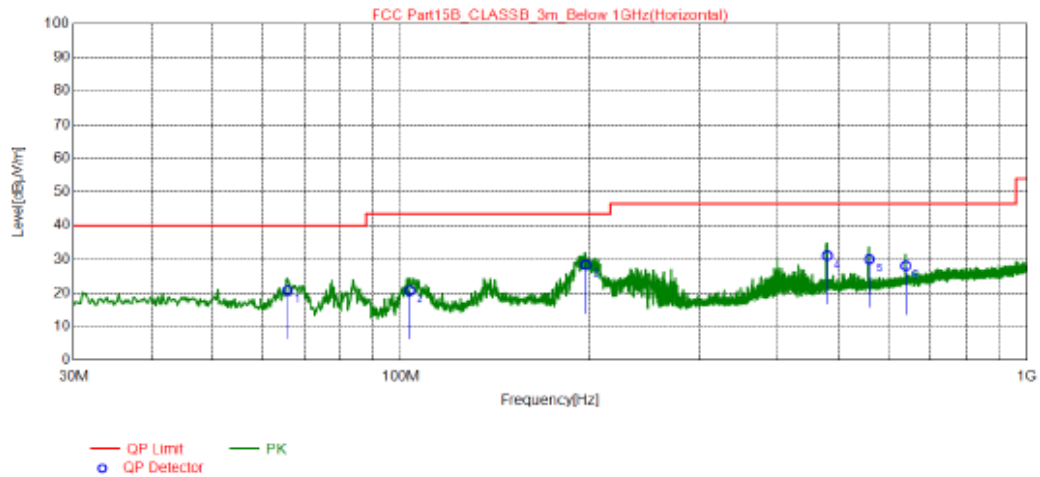
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMI Test Spectrum ROHDE & SCHWARZ	ESR7	E1R1005	Dec.04,19
Spectrum Analyzer Keysight	N9030B	E1S1003	Jul.23, 2019
Broad-Band Antenna Schwarzbeck	VULB9168	E1A1012	Aug.26, 2019
Double Riaged Vroadband Horn Antenna Schwarzbeck	BBHA9120D	E1A1017	Jan.26, 2020
Preamplifier Agilent	8447D	E1A2001	Oct.14, 2019
Preamplifier Agilent	EMC051845SE	E1A2009	Jul.19, 2019



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

Position: Horizontal

Test Graph



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	65.89	32.26	-11.47	20.79	40.00	19.21	200	64	Horizontal
2	103.3	33.74	-13.00	20.74	43.50	22.76	200	48	Horizontal
3	197.4	40.56	-12.25	28.31	43.50	15.19	200	186	Horizontal
4	480.0	36.71	-5.64	31.07	46.50	15.43	200	86	Horizontal
5	560.0	35.22	-5.18	30.04	46.50	16.46	200	92	Horizontal
6	640.1	31.29	-3.25	28.04	46.50	18.46	200	92	Horizontal

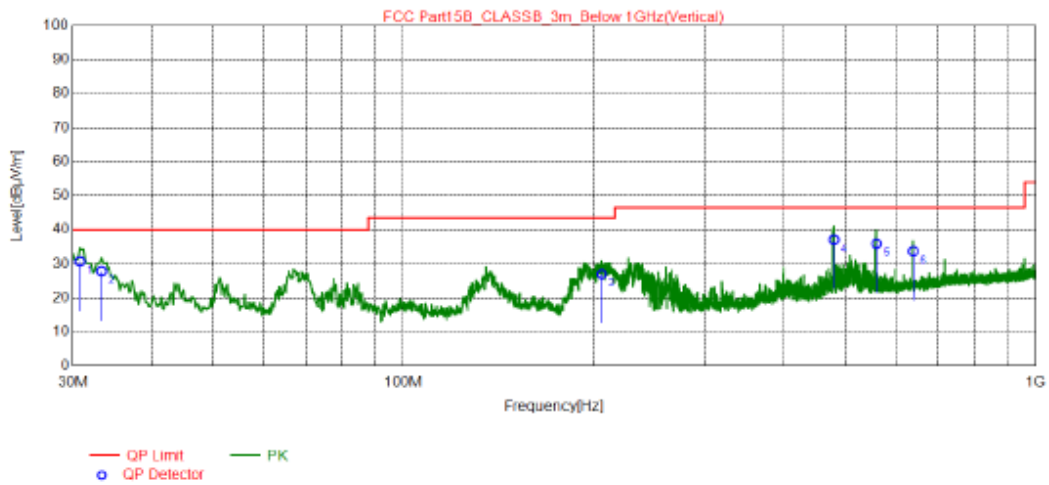
REMARKS:

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

Test Graph



NO.	Freq. [MHz]	QP Reading [dBuV/m]	Factor [dB]	QP Value [dBuV/m]	QP Limit [dBuV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.77	41.31	-10.61	30.70	40.00	9.30	100	17	Vertical
2	33.29	38.11	-10.30	27.81	40.00	12.19	100	55	Vertical
3	205.9	39.08	-12.09	26.99	43.50	16.51	100	209	Vertical
4	480.0	42.67	-5.64	37.03	46.50	9.47	100	90	Vertical
5	560.0	41.09	-5.18	35.91	46.50	10.59	100	96	Vertical
6	639.9	36.95	-3.26	33.69	46.50	12.81	100	158	Vertical

REMARKS:

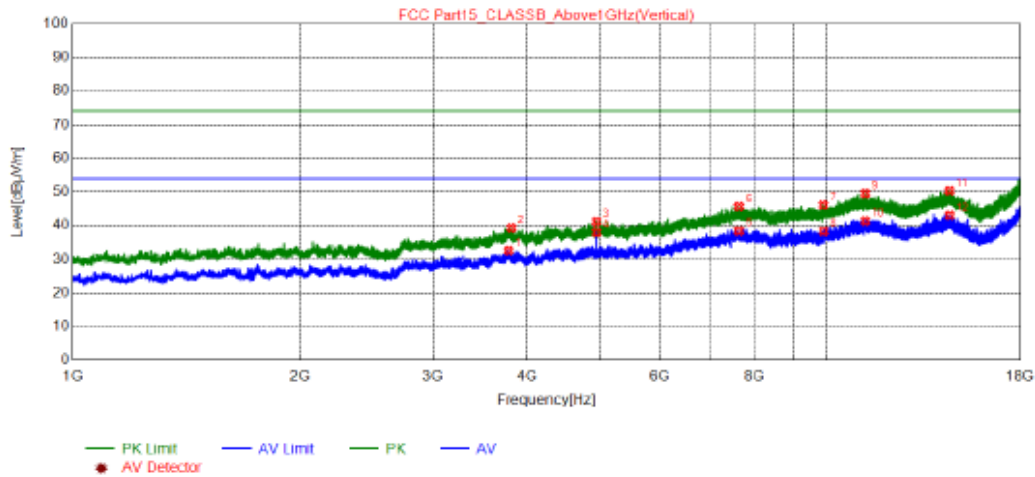
1. Q.P. is abbreviation of quasi-peak individually.
2. The emission levels of other frequencies were very low against the limit.
3. QP Margin value = QP Limit value – QP value
4. Factor = Antenna Factor + Amplifier Factor + Cable loss
5. QP value = Factor + Reading Value.



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

Position: Horizontal

Test Graph



NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	3780.3500	44.66	32.60	54.00	21.40	100	110	Vertical	AV
2	3812.6500	51.24	39.25	74.00	34.75	100	186	Vertical	PK
3	4944.0000	50.44	41.20	74.00	32.80	100	263	Vertical	PK
4	4944.8500	47.23	37.99	54.00	16.01	100	263	Vertical	AV
5	7635.1000	42.00	38.42	54.00	15.58	100	263	Vertical	AV
6	7635.9500	49.21	45.63	74.00	28.37	100	186	Vertical	PK
7	9870.6000	47.41	46.07	74.00	27.93	100	186	Vertical	PK
8	9882.5000	39.65	38.33	54.00	15.67	100	110	Vertical	AV
9	11222.9500	47.88	49.54	74.00	24.46	100	263	Vertical	PK
10	11223.8000	39.72	41.38	54.00	12.62	100	263	Vertical	AV
11	14502.2500	46.55	50.37	74.00	23.63	100	33	Vertical	PK
12	14510.7500	39.18	42.98	54.00	11.02	100	263	Vertical	AV

REMARKS:

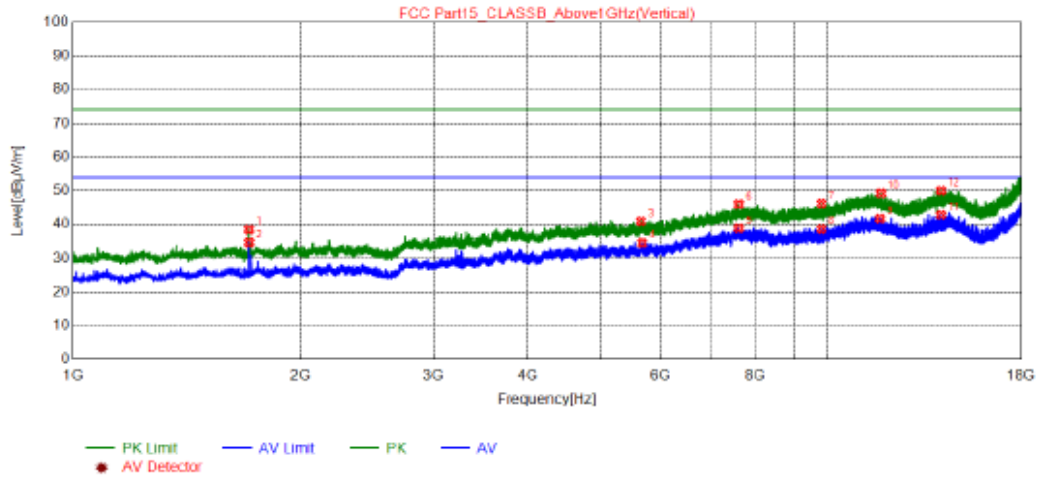
1. The emission levels of other frequencies were very low against the limit.
2. Margin = Limit –Level



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Position: Vertical

Test Graph

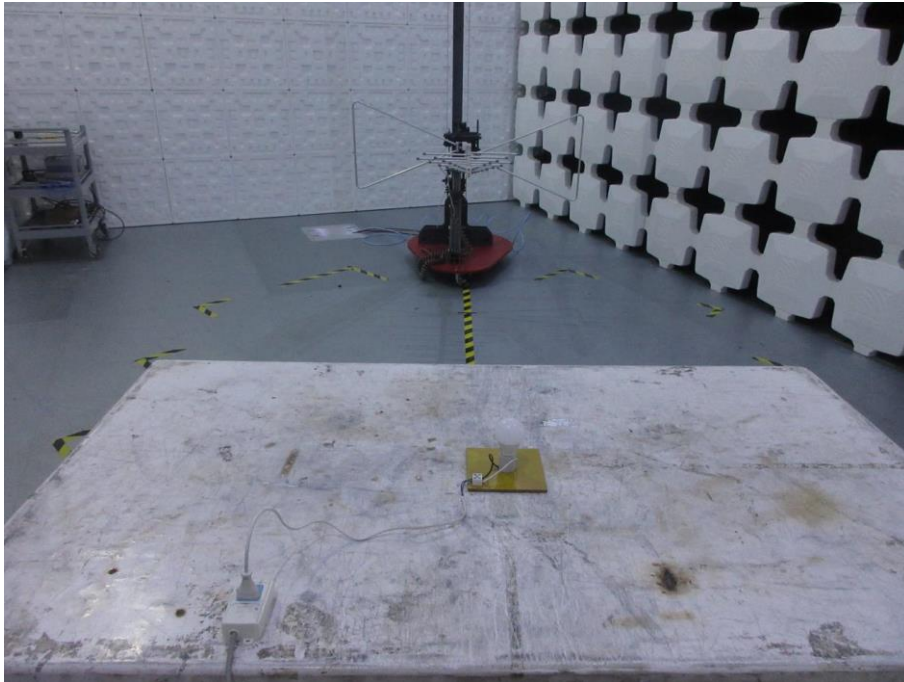


NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	1711.4500	55.92	38.51	74.00	35.49	100	263	Vertical	PK
2	1712.3000	52.06	34.65	54.00	19.35	100	301	Vertical	AV
3	5649.5000	49.49	40.93	74.00	33.07	100	186	Vertical	PK
4	5669.9000	43.04	34.51	54.00	19.49	100	72	Vertical	AV
5	7615.5500	42.51	38.89	54.00	15.11	100	224	Vertical	AV
6	7615.5500	49.57	45.95	74.00	28.05	100	224	Vertical	PK
7	9791.5500	47.61	46.14	74.00	27.86	100	34	Vertical	PK
8	9792.4000	40.14	38.67	54.00	15.33	100	34	Vertical	AV
9	11701.5000	40.49	41.74	54.00	12.26	100	301	Vertical	AV
10	11735.5000	48.05	49.23	74.00	24.77	100	301	Vertical	PK
11	14101.9000	39.71	42.78	54.00	11.22	100	301	Vertical	AV
12	14104.4500	47.00	50.07	74.00	23.93	100	263	Vertical	PK

REMARKS:

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

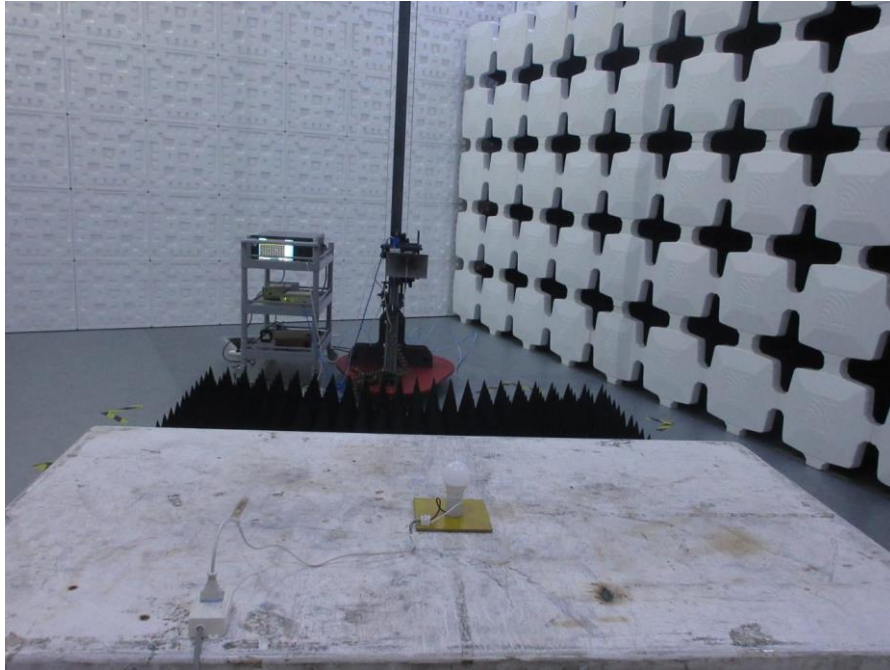
5.7 Test Photographs (30MHz ~ 1000MHz)





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5.8 Test Photographs (1000MHz ~ 18000MHz)



6 Photographs of EUT



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