



TEST REPORT

Report No.: ARFR-19AU0427VTSHPB-4

Test Model: TYGWBS-01;TYGWBS-01N

Received: Aug.06, 2019

ISSUED: Aug.15, 2019

Applicant: Hangzhou Tuya Information Technology Co., Ltd

Address: Room701, Building3, More Center,No.87 GuDun Road, Hangzhou, Zhejiang, 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: BLEMESH(SIG) Gateway
TEST MODEL: TYGWBS-01;TYGWBS-01N
SERIES MODEL: --
APPLICANT: Hangzhou Tuya Information Technology Co., Ltd
TESTED: Aug.06 to Aug.15, 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 : Will YAN, **DATE:** Aug.20, 2019
Will YAN

Project Engineer

APPROVED BY : Daniel Sun, **DATE:** Aug.20, 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.



3. Test Configuration of Equipment under Test

3.1 Manufacturer information

Manufacturer : Hangzhou Tuya Information Technology Co., Ltd

Address : Room701, Building3, More Center, No.87 GuDun Road, Hangzhou, Zhejiang,
China

3.2 Feature of Equipment under Test

Product Name:	BLEMESH(SIG) Gateway
Test Model:	TYGWBS-01;TYGWBS-01N
Series Model:	--
Model Discrepancy:	The two models exactly are the same except the model name and the package.
EUT Power Rating:	5VDC/1A with adaptor 100-240V~, 50/60Hz

Note: Please refer to user manual.

3.3 Description of support units

NO.	PRODUCT	BRAND	MODEL NO.
1	AC adapter	--	KA1517-0502000USU
2	Mobile Phone	Vivo	--
3	Cable	--	--



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 (dB μ V)		Class B (dB μ V)	
	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.17, 2020
Software ADT	ADT_Cond_V7.3.0	N/A	N/A

4.5 Test Result and Data

a. Conducted Emission Test Data

Phase : LINE

Location: Conduction 1

Date: 8/2/2019

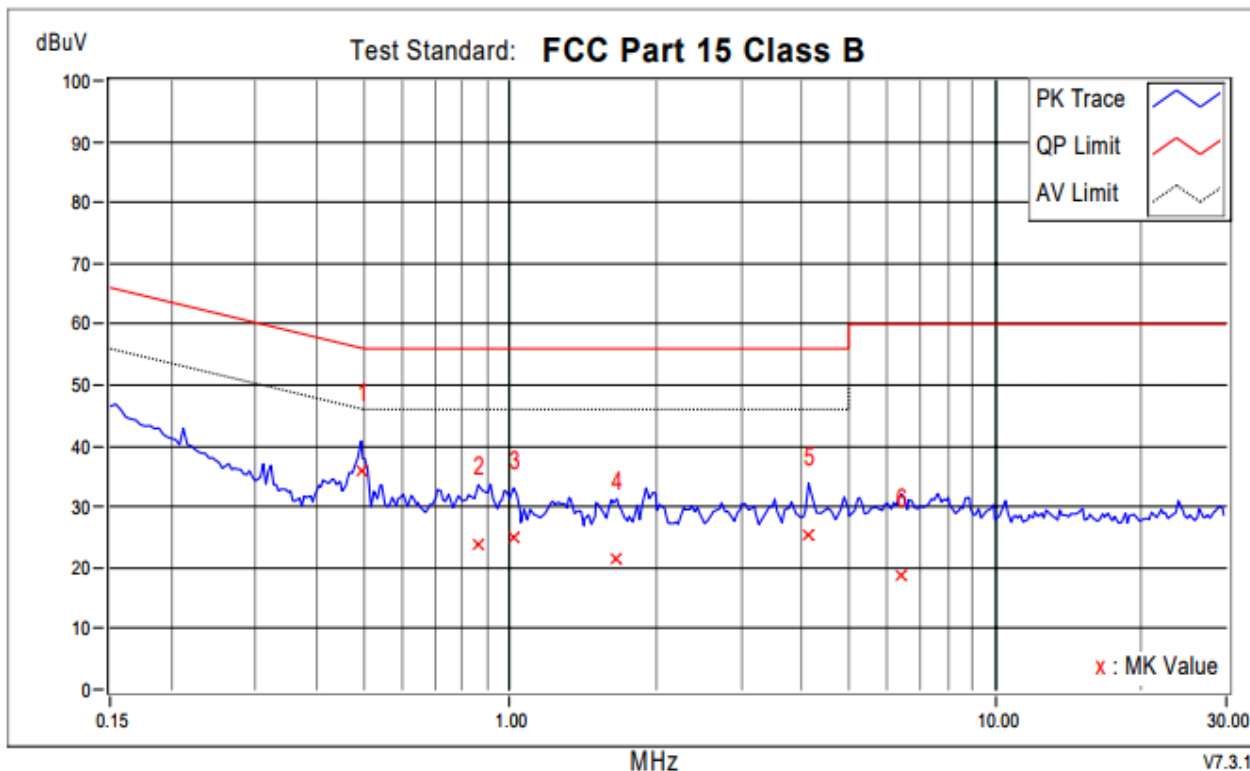
Time: 9:43:13 AM

Phase L1

Temperatuer (C): 22

Humidity (%): 48

Approved by:



	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
+1	0.49408	9.71	26.29	21.25	36.00	30.96	56.10	46.10	-20.10	-15.14	
2	0.86162	9.58	14.19	10.42	23.77	20.00	56.00	46.00	-32.23	-26.00	
3	1.01955	9.59	15.46	8.58	25.05	18.17	56.00	46.00	-30.95	-27.83	
4	1.66470	9.70	11.89	8.08	21.59	17.78	56.00	46.00	-34.41	-28.22	
5	4.13191	9.81	15.53	8.17	25.34	17.98	56.00	46.00	-30.66	-28.02	
6	6.42317	9.87	8.70	4.13	18.57	14.00	60.00	50.00	-41.43	-36.00	

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

Location: Conduction 1

Date: 8/2/2019

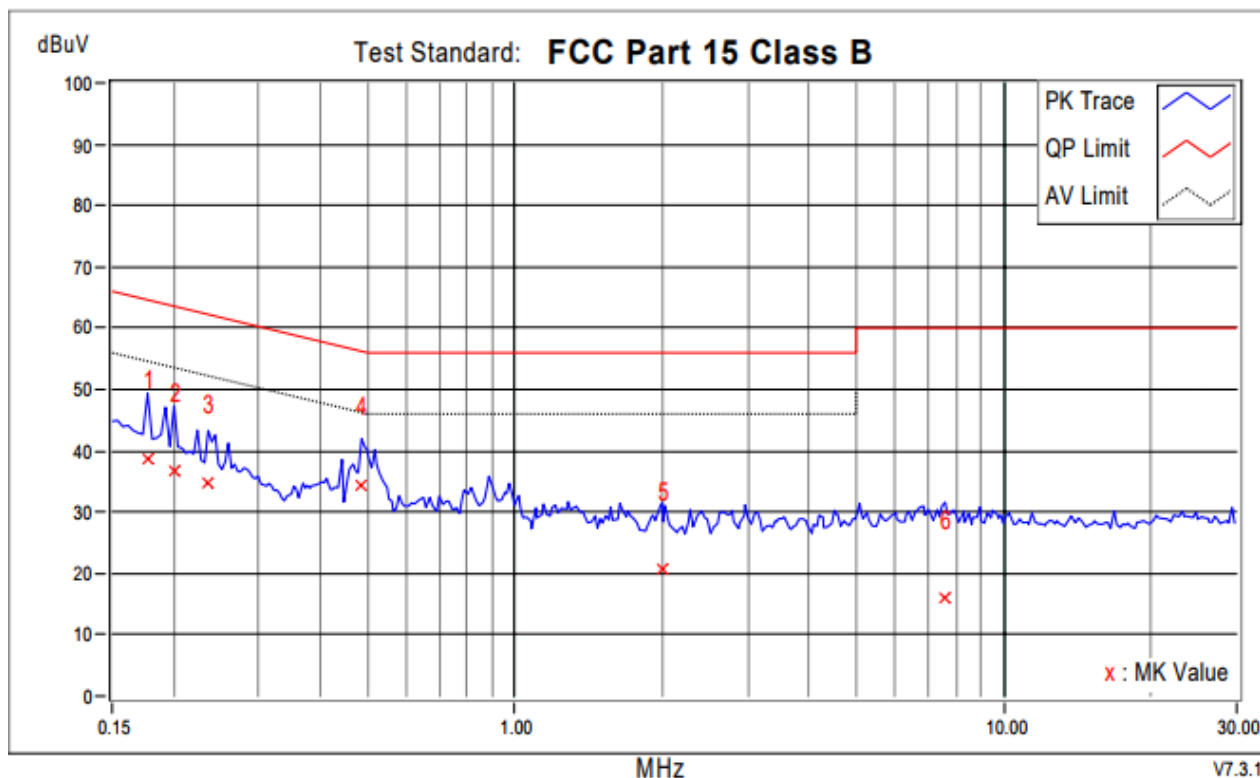
Time: 9:48:43 AM

Phase N

Temperatuer (C): 22

Humidity (%): 48

Approved by:



	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.17737	9.81	28.91	11.76	38.72	21.57	64.61	54.61	-25.89	-33.04	
2	0.20083	9.79	27.11	11.60	36.90	21.39	63.58	53.58	-26.68	-32.19	
3	0.23602	9.82	24.78	10.81	34.60	20.63	62.24	52.24	-27.64	-31.61	
+4	0.48626	9.83	24.44	19.55	34.27	29.38	56.23	46.23	-21.96	-16.85	
5	2.00487	9.91	10.79	5.33	20.70	15.24	56.00	46.00	-35.30	-30.76	
6	7.59617	9.90	6.27	-0.73	16.17	9.17	60.00	50.00	-43.83	-40.83	

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

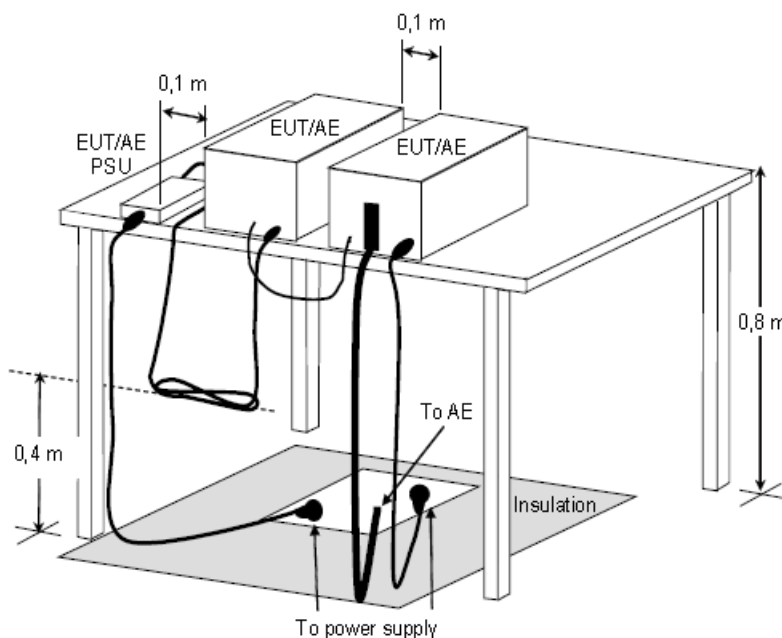


Figure D.8 – Example measurement arrangement for table-top EUT (Radiated emission measurement)



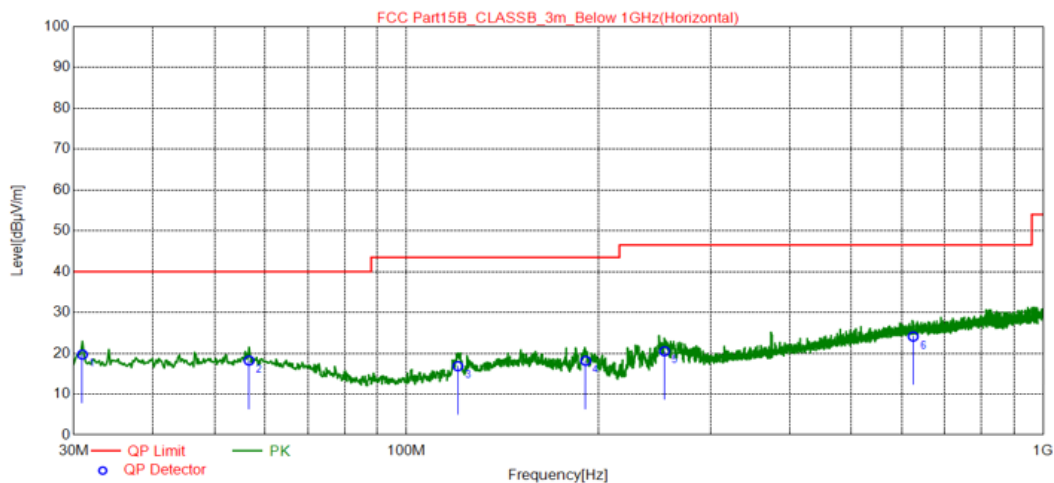
5.4 Measurement Equipment

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMI Test Spectrum ROHDE & SCHWARZ	ESR7	E1R1005	Dec.03, 2019
Spectrum Analyzer Keysight	N9030B	E1S1003	Jul.22, 2020
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.18, 2020

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

Position: Horizontal

Test Graph



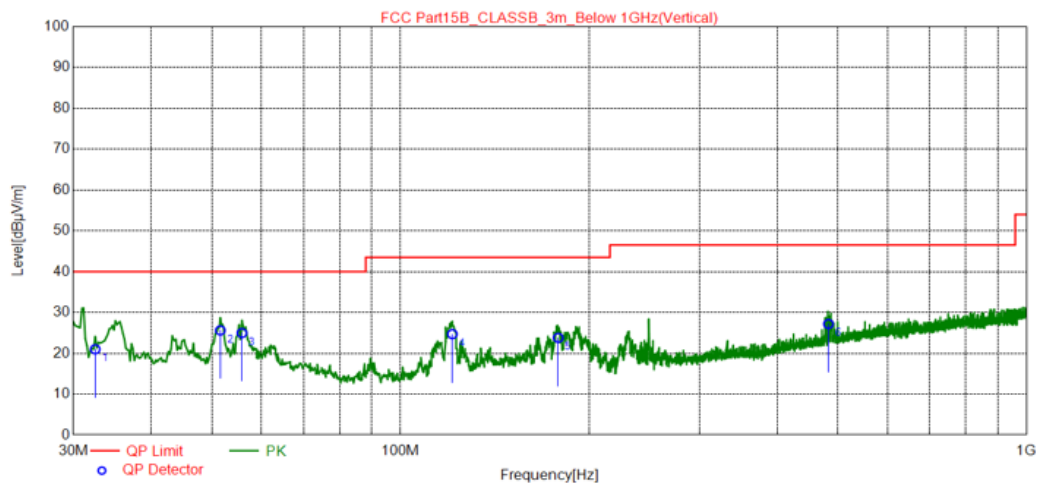
NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.97	31.69	-12.01	19.68	40.00	20.32	100	330	Horizontal
2	56.57	28.62	-10.40	18.22	40.00	21.78	200	54	Horizontal
3	120.4	30.01	-13.17	16.84	43.50	26.66	100	210	Horizontal
4	191.2	30.79	-12.63	18.16	43.50	25.34	200	254	Horizontal
5	254.2	31.42	-10.91	20.51	46.50	25.99	200	66	Horizontal
6	624.9	26.82	-2.70	24.12	46.50	22.38	200	151	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 [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	32.52	32.84	-11.85	20.99	40.00	19.01	100	114	Vertical
2	51.53	35.94	-10.33	25.61	40.00	14.39	100	215	Vertical
3	55.80	35.35	-10.39	24.96	40.00	15.04	100	299	Vertical
4	120.9	37.81	-13.10	24.71	43.50	18.79	100	215	Vertical
5	178.6	35.39	-11.60	23.79	43.50	19.71	100	54	Vertical
6	482.6	32.54	-5.36	27.18	46.50	19.32	100	287	Vertical

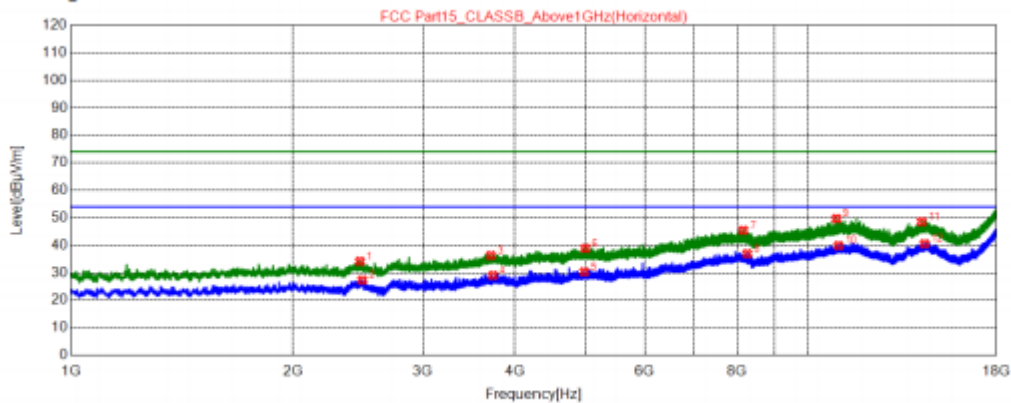
REMARKS:

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



● AV Detector

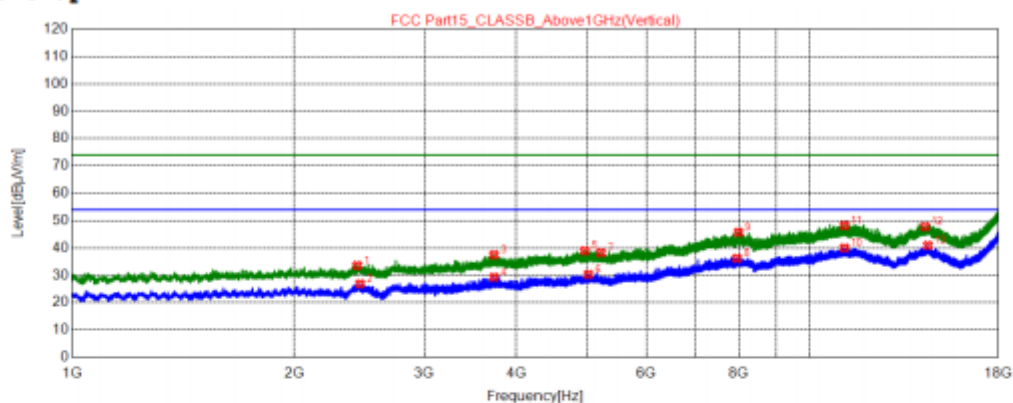
NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2466.	35.07	-0.94	34.13	74.00	39.87	155	185	Horizontal
2	2484.	28.21	-0.91	27.30	54.00	26.70	155	70	Horizontal
3	3710.	33.35	2.91	36.26	74.00	37.74	155	146	Horizontal
4	3735.	26.03	2.98	29.01	54.00	24.99	155	70	Horizontal
5	4968.	23.78	6.55	30.33	54.00	23.67	155	185	Horizontal
6	4984.	32.27	6.58	38.85	74.00	35.15	155	146	Horizontal
7	8159.	30.94	14.46	45.40	74.00	28.60	155	185	Horizontal
8	8260.	22.62	14.30	36.92	54.00	17.08	155	340	Horizontal
9	10915	30.51	19.14	49.65	74.00	24.35	155	31	Horizontal
10	10986	20.51	19.35	39.86	54.00	14.14	155	108	Horizontal
11	14241	26.25	22.29	48.54	74.00	25.46	155	146	Horizontal
12	14374	18.02	22.52	40.54	54.00	13.46	155	301	Horizontal

REMARKS:

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

Position: Vertical

Test Graph



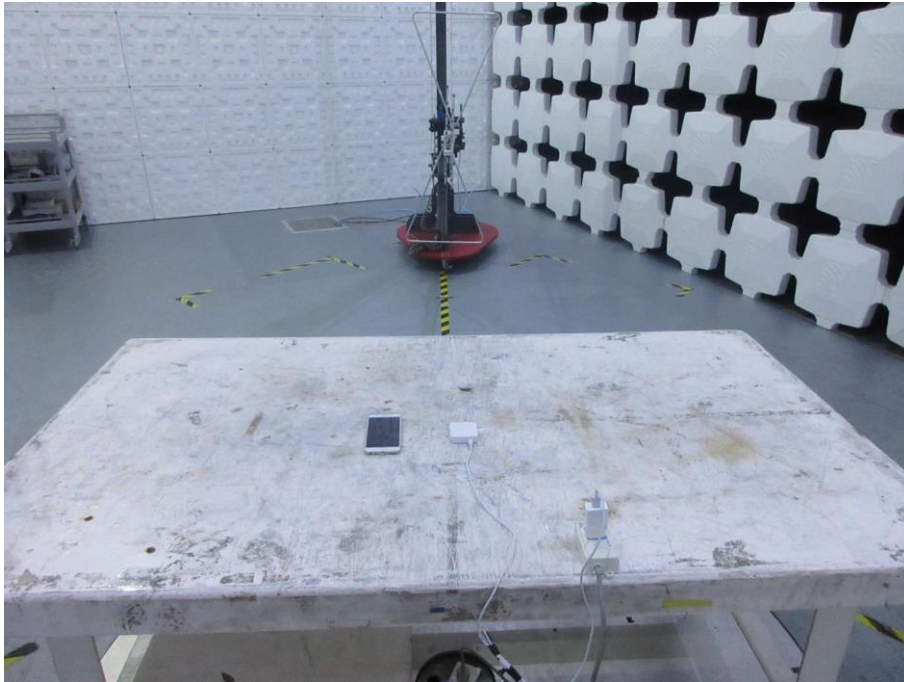
● AV Detector

NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2434.	34.56	-0.99	33.57	74.00	40.43	155	138	Vertical
2	2456.	27.81	-0.96	26.85	54.00	27.15	155	332	Vertical
3	3730.	34.49	2.97	37.46	74.00	36.54	155	254	Vertical
4	3730.	26.30	2.97	29.27	54.00	24.73	155	177	Vertical
5	4949.	32.43	6.52	38.95	74.00	35.05	155	216	Vertical
6	5007.	23.65	6.62	30.27	54.00	23.73	155	216	Vertical
7	5205.	31.23	6.98	38.21	74.00	35.79	155	254	Vertical
8	7958.	21.56	14.62	36.18	54.00	17.82	155	20	Vertical
9	7996.	30.99	14.69	45.68	74.00	28.32	155	254	Vertical
10	11131	20.28	19.69	39.97	54.00	14.03	155	293	Vertical
11	11133	28.47	19.70	48.17	74.00	25.83	155	100	Vertical
12	14316	25.32	22.42	47.74	74.00	26.26	155	20	Vertical
13	14438	18.30	22.61	40.91	54.00	13.09	155	62	Vertical

REMARKS:

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

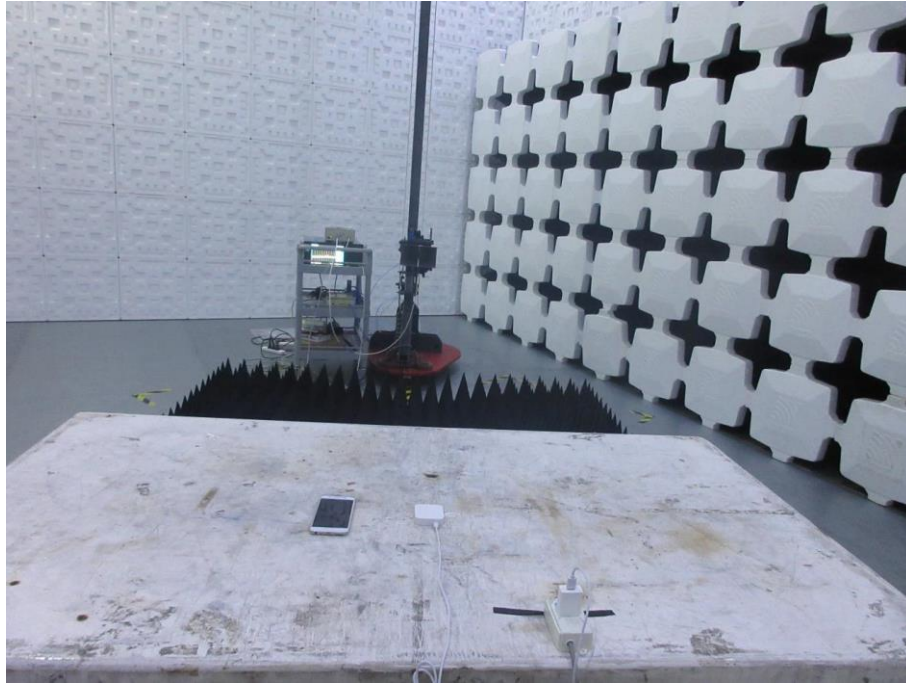
5.7 Test Photographs (30MHz ~ 1000MHz)





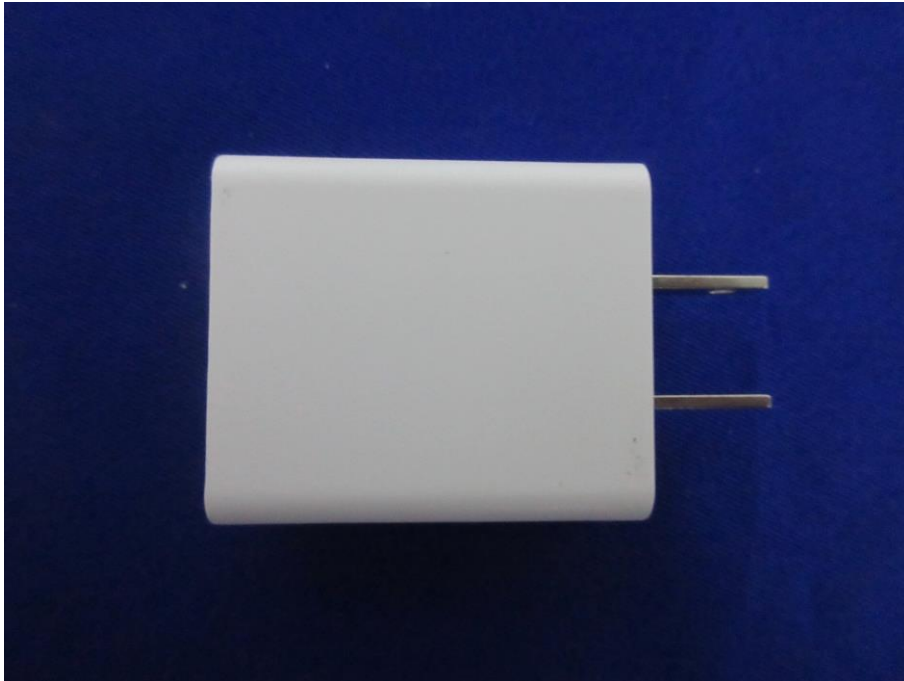
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5.8 Test Photographs (1000MHz ~ 18000MHz)



6 Photographs of EUT





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