



TEST REPORT

Report No.: ARFR-19AU0427VTSHPB-4-A1

Test Model: TYGWBS-01; TYGWBS-01N

Received: Jul.09, 2020

ISSUED: Jul.29, 2020

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: Jul.09 to Jul.29, 2020
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 : Scott XU , **DATE:** Jul.29, 2020
Scott XU
Project Engineer

APPROVED BY : Daniel Sun , **DATE:** Jul.29, 2020
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

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.

Special Comment: This report is updated report based on history report ARFR-19AU0427VTSHPB-4 for adding new adaptor KA06E-0501000US. So we choose the new adaptor for full tests.

3.3 Description of support units

NO.	PRODUCT	BRAND	MODEL NO.
1	Adaptor	--	KA06E-0501000US
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

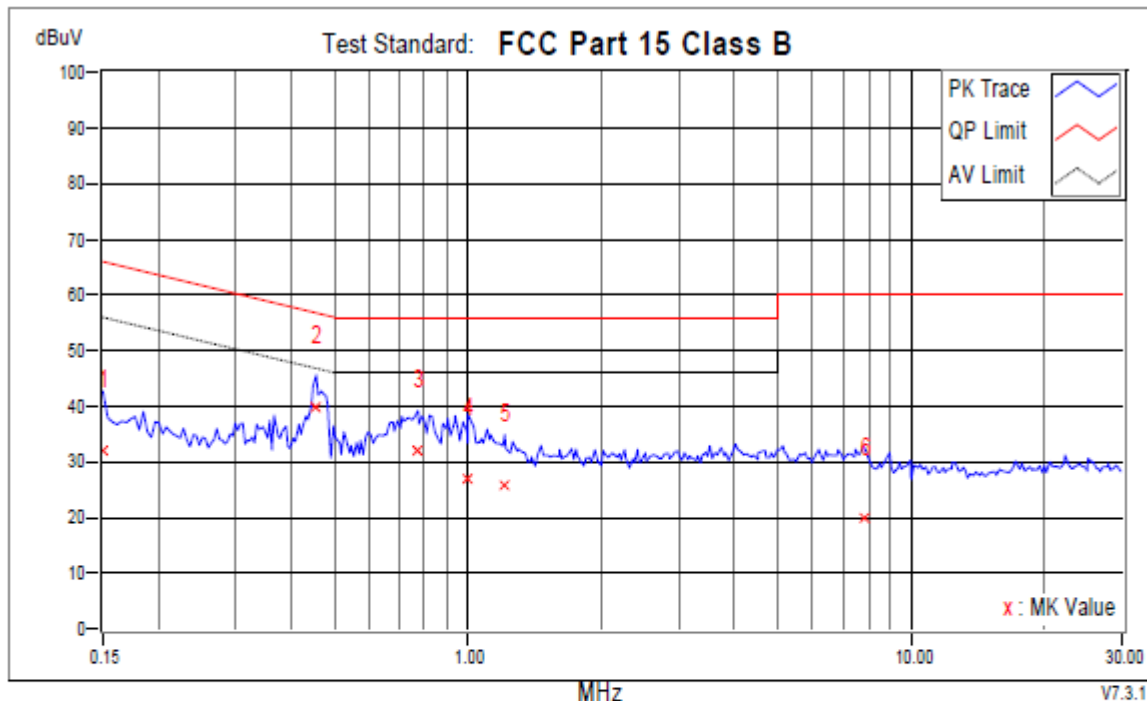
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	E1R1001	Mar.11, 2021
LISN ROHDE & SCHWARZ	ENV216	E1L1011	Mar.11, 2021
Software ADT	ADT_Cond_V7.3.0	N/A	N/A

4.5 Test Result and Data

Conducted Emission Test Data

120Vac/60Hz

Phase : LINE

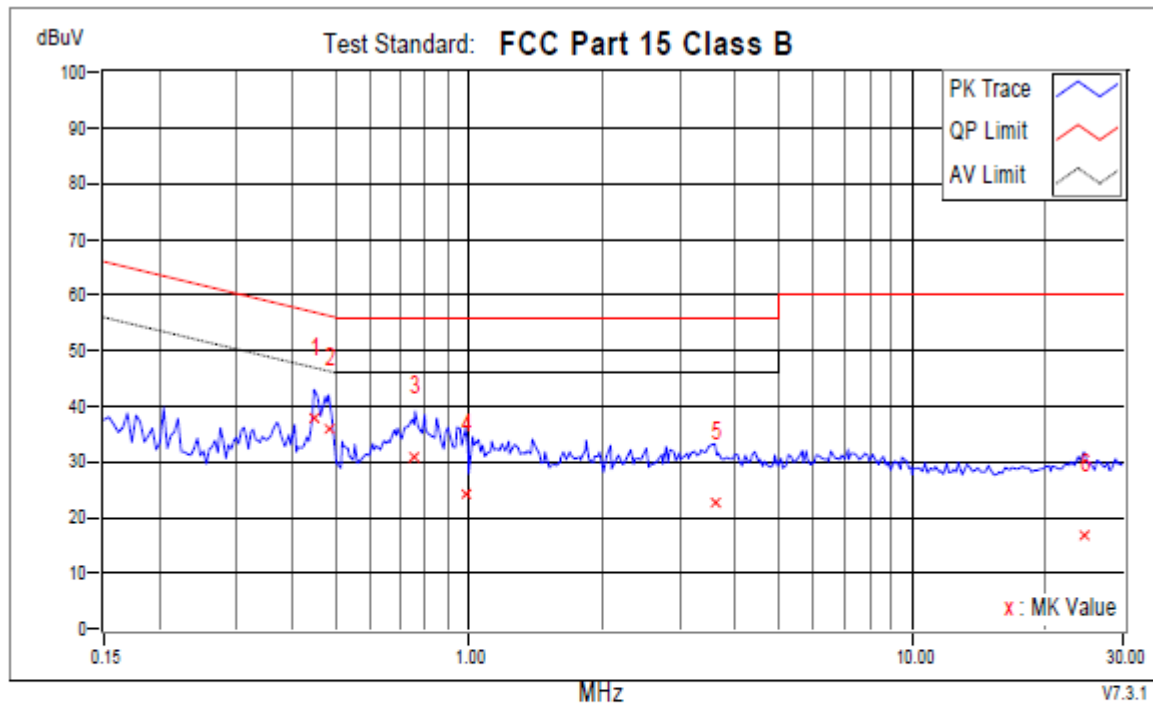


No.	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.15000	9.84	22.20	4.91	32.04	14.75	66.00	56.00	-33.96	-41.25	
+2	0.45498	9.72	29.98	15.79	39.70	25.51	56.78	46.78	-17.08	-21.27	
3	0.77169	9.59	22.56	6.88	32.15	16.47	56.00	46.00	-23.85	-29.53	
4	1.00000	9.59	17.49	2.33	27.08	11.92	56.00	46.00	-28.92	-34.08	
5	1.21114	9.63	16.19	2.58	25.82	12.21	56.00	46.00	-30.18	-33.79	
6	7.81513	10.24	9.57	-0.94	19.81	9.30	60.00	50.00	-40.19	-40.70	

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



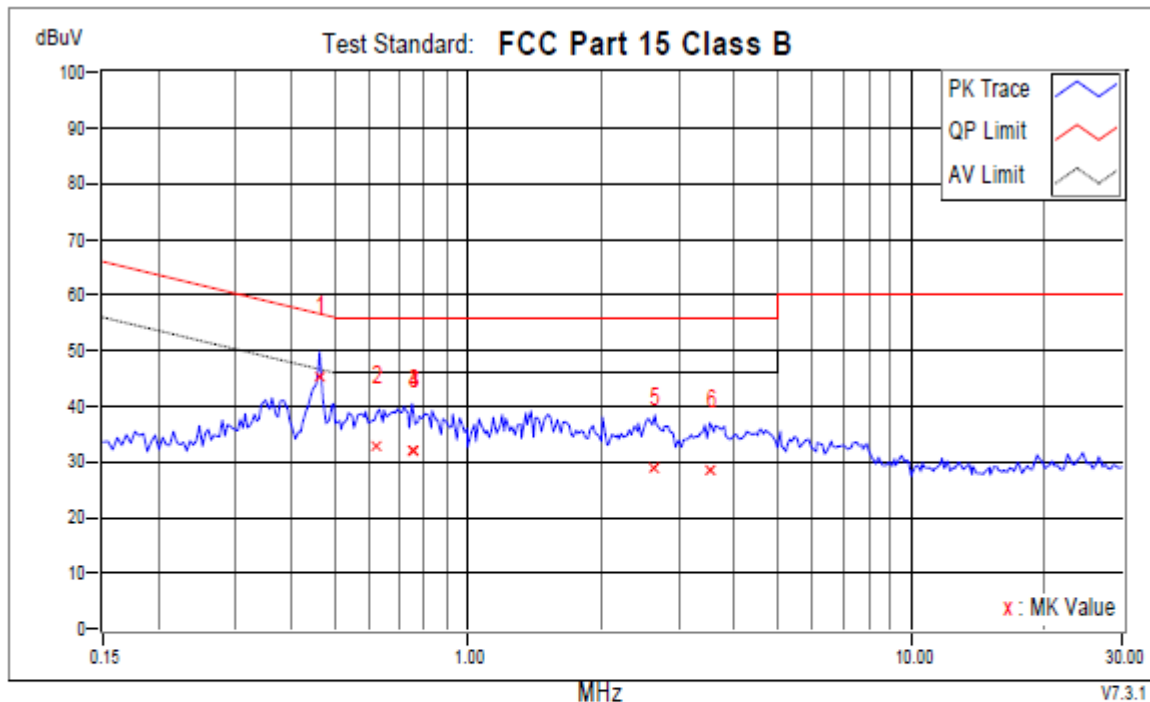
No.	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
+1	0.44716	9.85	27.85	16.88	37.70	26.73	56.93	46.93	-19.22	-20.19	
2	0.48235	9.84	26.15	11.54	35.99	21.38	56.30	46.30	-20.30	-24.91	
3	0.75605	9.85	21.17	9.44	31.02	19.29	56.00	46.00	-24.98	-26.71	
4	0.98283	9.89	14.41	3.41	24.30	13.30	56.00	46.00	-31.70	-32.70	
5	3.58842	9.94	12.79	1.29	22.73	11.23	56.00	46.00	-33.27	-34.77	
6	24.41617	10.26	6.55	-5.77	16.81	4.49	60.00	50.00	-43.19	-45.51	

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.

240Vac/50Hz

Phase : LINE

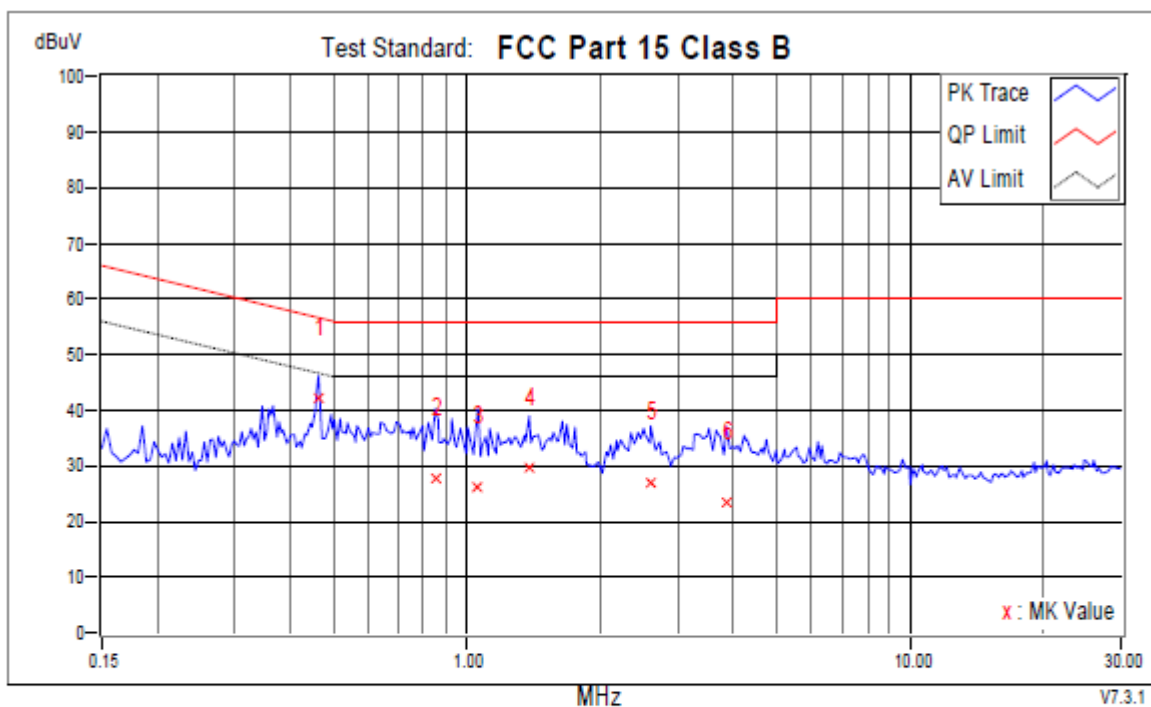


No.	Frequency MHz	Corr. Factor dB	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
			QP	AV	QP	AV	QP	AV	QP	AV	
+1	0.46280	9.72	35.73	19.00	45.45	28.72	56.64	46.64	-11.19	-17.92	
2	0.62311	9.65	23.22	10.26	32.87	19.91	56.00	46.00	-23.13	-26.09	
3	0.74823	9.60	22.32	7.64	31.92	17.24	56.00	46.00	-24.08	-28.76	
4	0.74823	9.60	22.56	7.73	32.16	17.33	56.00	46.00	-23.84	-28.67	
5	2.64220	9.83	19.18	3.82	29.01	13.65	56.00	46.00	-26.99	-32.35	
6	3.51413	9.91	18.45	4.52	28.36	14.43	56.00	46.00	-27.64	-31.57	

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

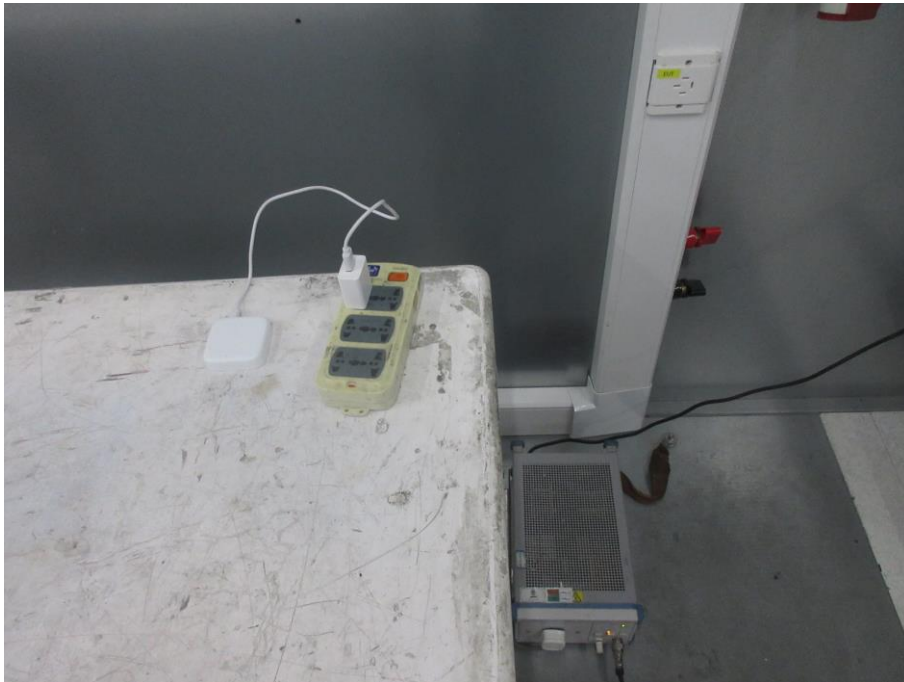


	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
+1	0.46280	9.85	32.18	19.88	42.03	29.73	56.64	46.64	-14.61	-16.91	
2	0.84989	9.89	17.99	7.14	27.88	17.03	56.00	46.00	-28.12	-28.97	
3	1.05865	9.89	16.44	7.48	26.33	17.37	56.00	46.00	-29.67	-28.63	
4	1.38318	9.91	19.65	8.86	29.56	18.77	56.00	46.00	-26.44	-27.23	
5	2.59919	9.99	16.80	5.29	26.79	15.28	56.00	46.00	-29.21	-30.72	
6	3.85821	9.89	13.55	1.98	23.44	11.87	56.00	46.00	-32.56	-34.13	

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

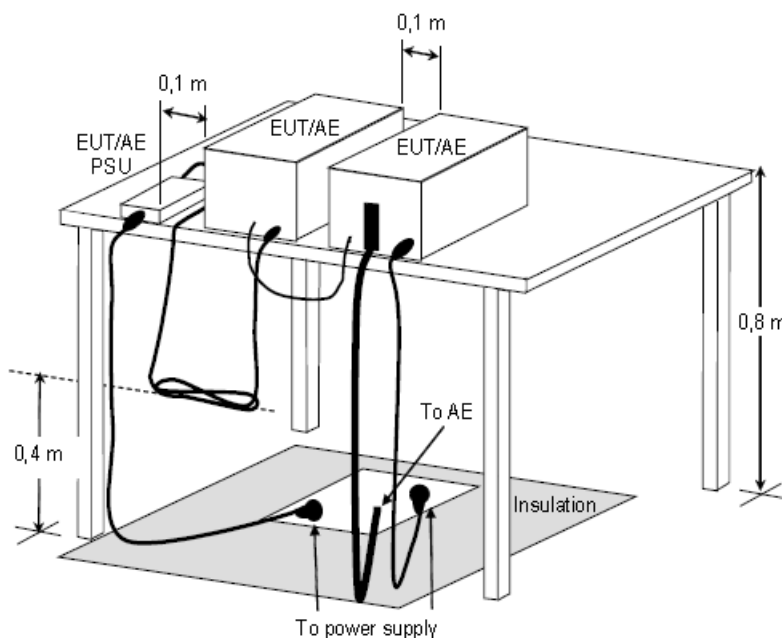


Figure D.8 – Example measurement arrangement for table-top EUT (Radiated emission measurement)

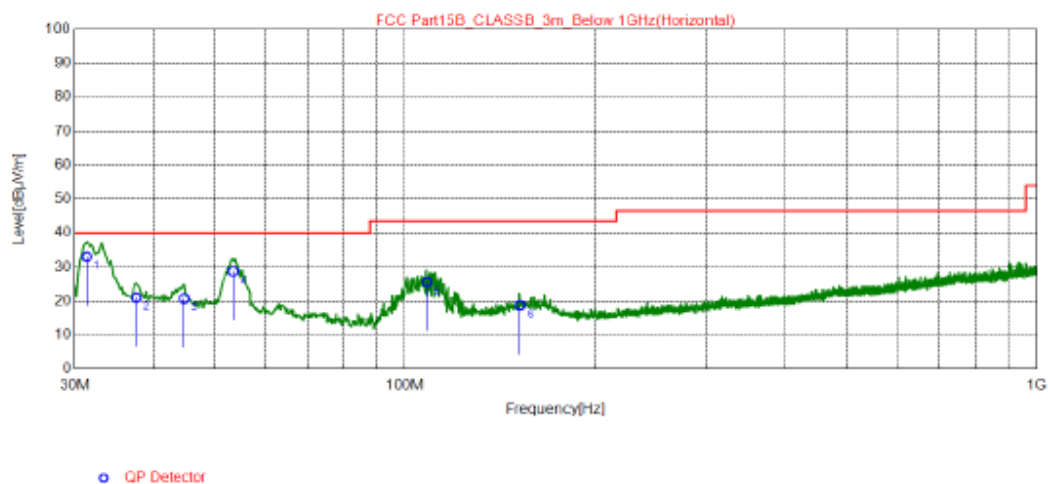


5.4 Measurement Equipment

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMI Test Spectrum ROHDE & SCHWARZ	ESR7	E1R1005	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.25, 2021
Preamplifier Agilent	8447D	E1A2001	Apr.19, 2021
Preamplifier Agilent	EMC051845SE	E1A2009	Jul.05, 2021

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

Position: Horizontal

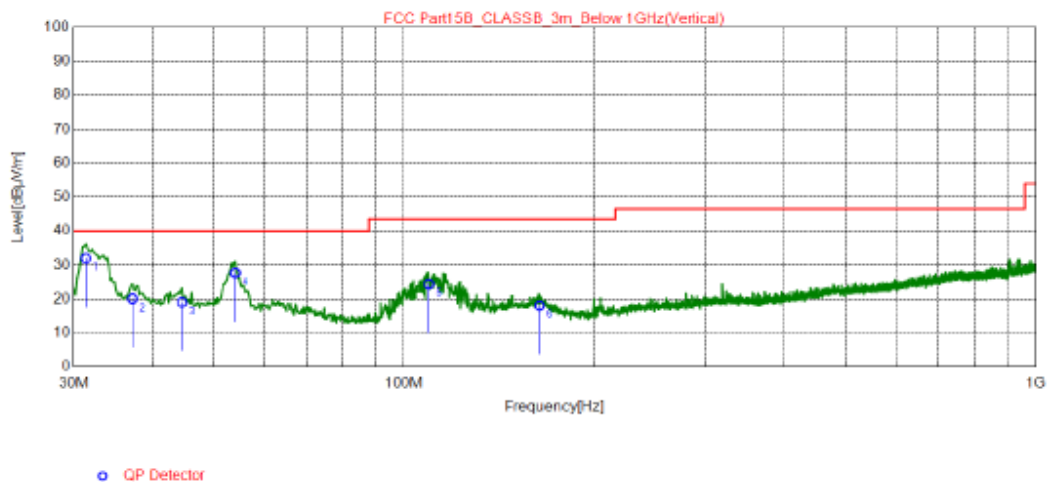


NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.35	43.58	-10.54	33.04	40.00	6.96	200	232	Horizontal
2	37.56	30.75	-9.76	20.99	40.00	19.01	200	193	Horizontal
3	44.74	30.29	-9.57	20.72	40.00	19.28	200	94	Horizontal
4	53.47	38.73	-10.00	28.73	40.00	11.27	200	159	Horizontal
5	108.3	37.86	-12.31	25.55	43.50	17.95	200	277	Horizontal
6	152.2	27.91	-9.22	18.69	43.50	24.81	200	90	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



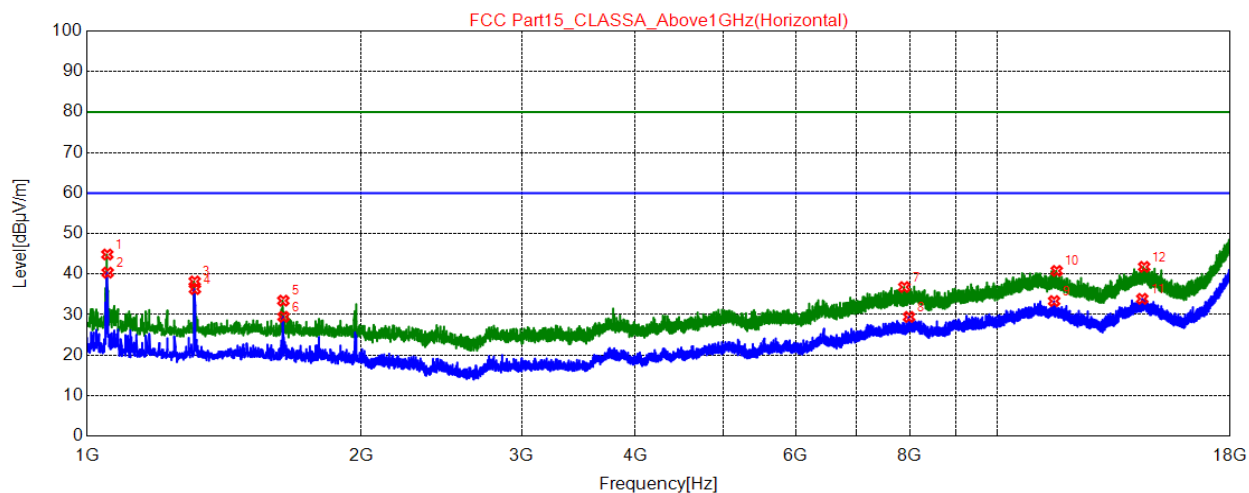
NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.35	42.48	-10.54	31.94	40.00	8.06	100	51	Vertical
2	37.17	29.89	-9.81	20.08	40.00	19.92	100	259	Vertical
3	44.55	28.59	-9.57	19.02	40.00	20.98	100	109	Vertical
4	54.05	37.7	-10.05	27.65	40.00	12.35	100	158	Vertical
5	109.5	36.54	-12.15	24.39	43.50	19.11	100	162	Vertical
6	163.8	27.19	-9.10	18.09	43.50	25.41	100	228	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

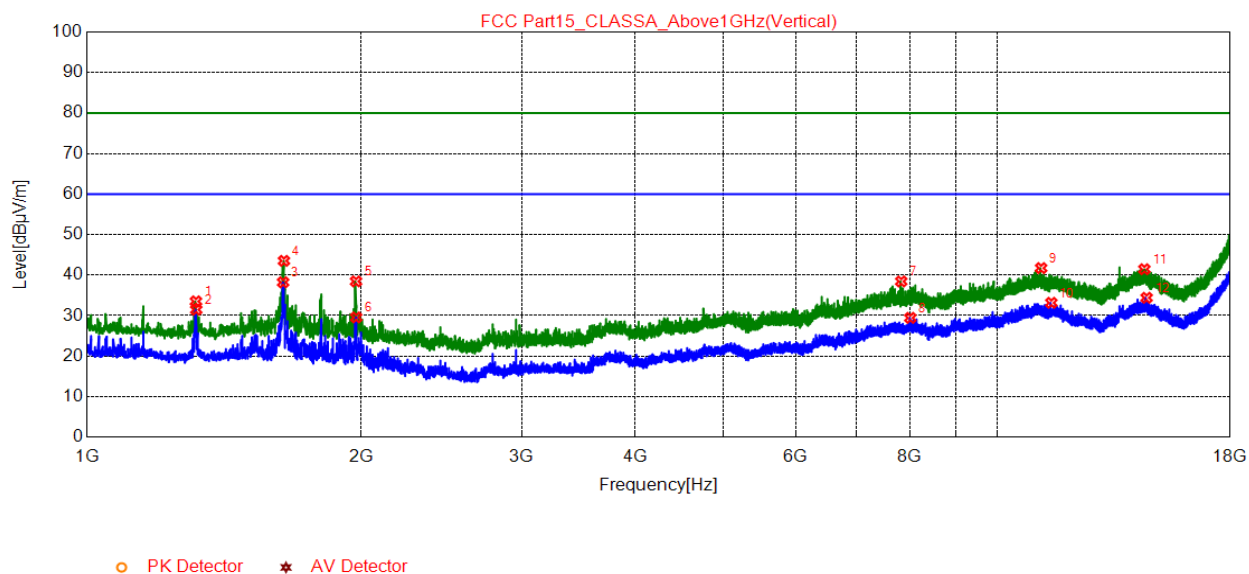


NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	1052.7000	64.15	44.83	80.00	35.17	100	301	Horizontal	PK
2	1053.5500	59.67	40.35	60.00	19.65	100	340	Horizontal	AV
3	1312.8000	56.67	38.18	80.00	41.82	100	301	Horizontal	PK
4	1313.6500	54.79	36.30	60.00	23.70	100	301	Horizontal	AV
5	1642.6000	50.99	33.43	80.00	46.57	100	301	Horizontal	PK
6	1643.4500	47.01	29.45	60.00	30.55	100	340	Horizontal	AV
7	7895.2000	39.91	36.80	80.00	43.20	100	146	Horizontal	PK
8	7990.4000	32.38	29.42	60.00	30.58	100	24	Horizontal	AV
9	11530.6500	31.71	33.33	60.00	26.67	100	262	Horizontal	AV
10	11608.0000	39.33	40.78	80.00	39.22	100	184	Horizontal	PK
11	14408.7500	30.22	33.89	60.00	26.11	100	223	Horizontal	AV
12	14478.4500	37.99	41.78	80.00	38.22	100	107	Horizontal	PK

REMARKS:

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

Position: Vertical

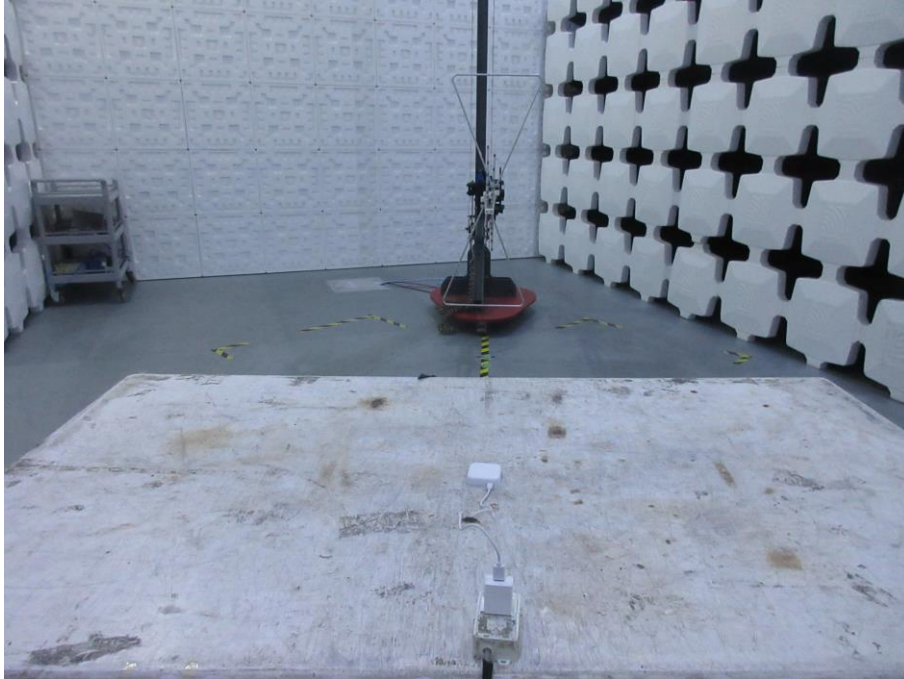


NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	1317.0500	51.99	33.51	80.00	46.49	100	253	Vertical	PK
2	1317.9000	49.92	31.44	60.00	28.56	100	214	Vertical	AV
3	1641.7500	55.79	38.22	60.00	21.78	100	253	Vertical	AV
4	1645.1500	61.07	43.51	80.00	36.49	100	253	Vertical	PK
5	1974.1000	55.28	38.44	80.00	41.56	100	292	Vertical	PK
6	1974.9500	46.39	29.55	60.00	30.45	100	253	Vertical	AV
7	7834.0000	41.64	38.43	80.00	41.57	100	214	Vertical	PK
8	8015.9000	32.41	29.43	60.00	30.57	100	253	Vertical	AV
9	11158.3500	40.11	41.72	80.00	38.28	100	175	Vertical	PK
10	11450.7500	31.47	33.15	60.00	26.85	100	214	Vertical	AV
11	14486.9500	37.64	41.44	80.00	38.56	100	175	Vertical	PK
12	14568.5500	30.73	34.39	60.00	25.61	100	175	Vertical	AV

REMARKS:

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

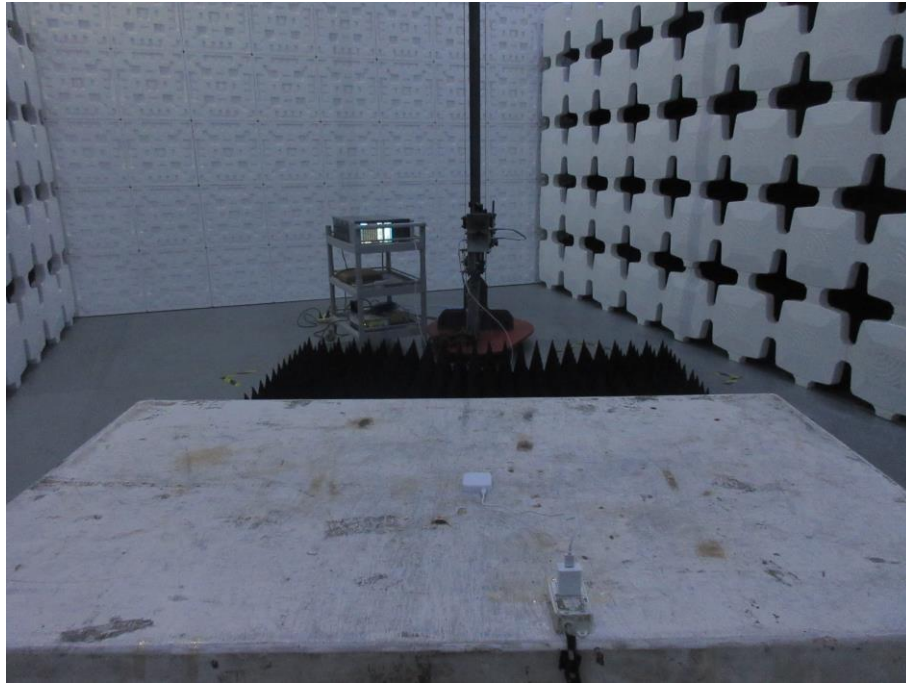
5.7 Test Photographs (30MHz ~ 1000MHz)



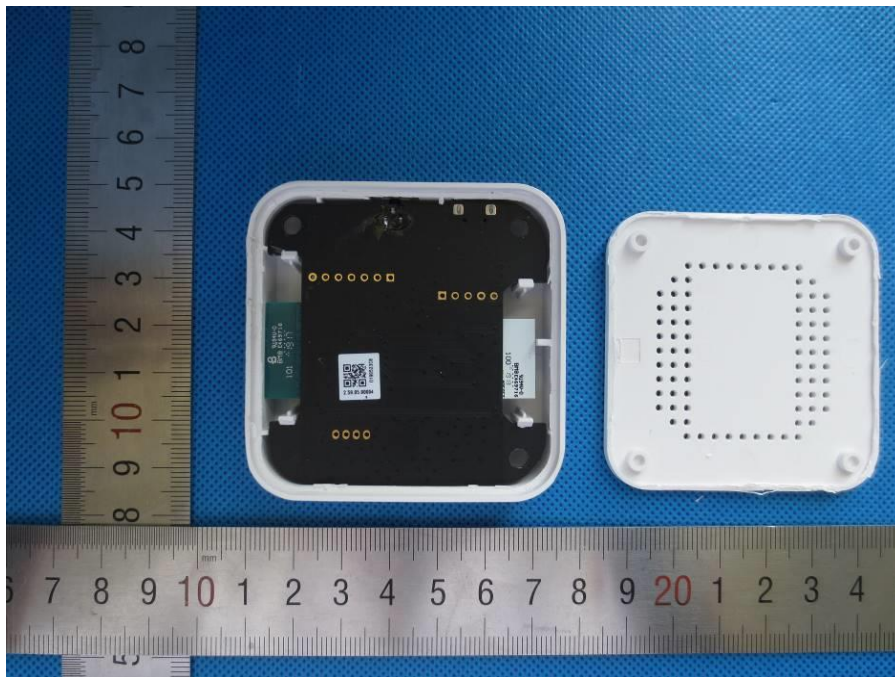


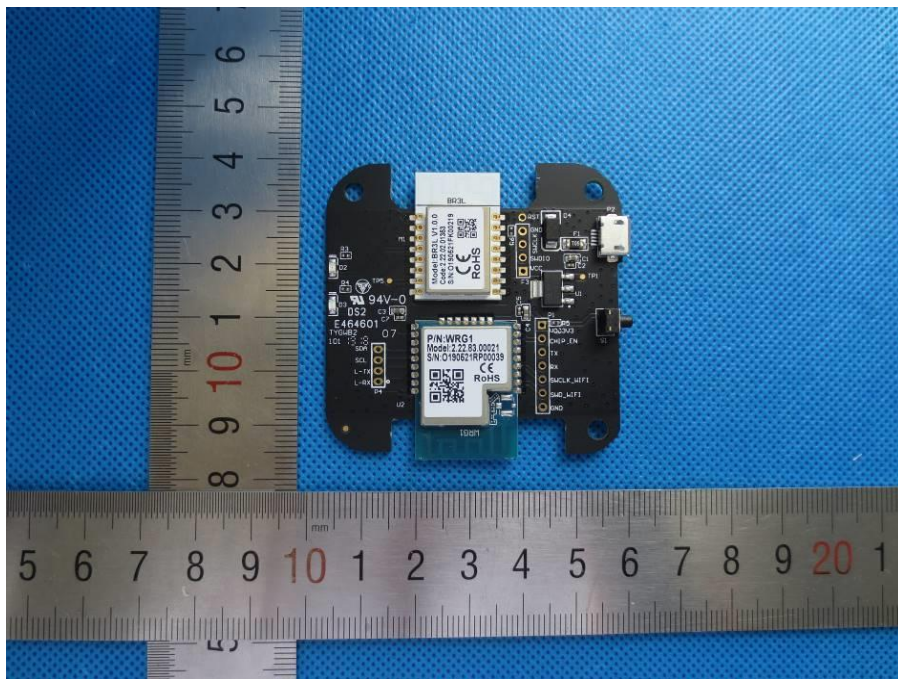
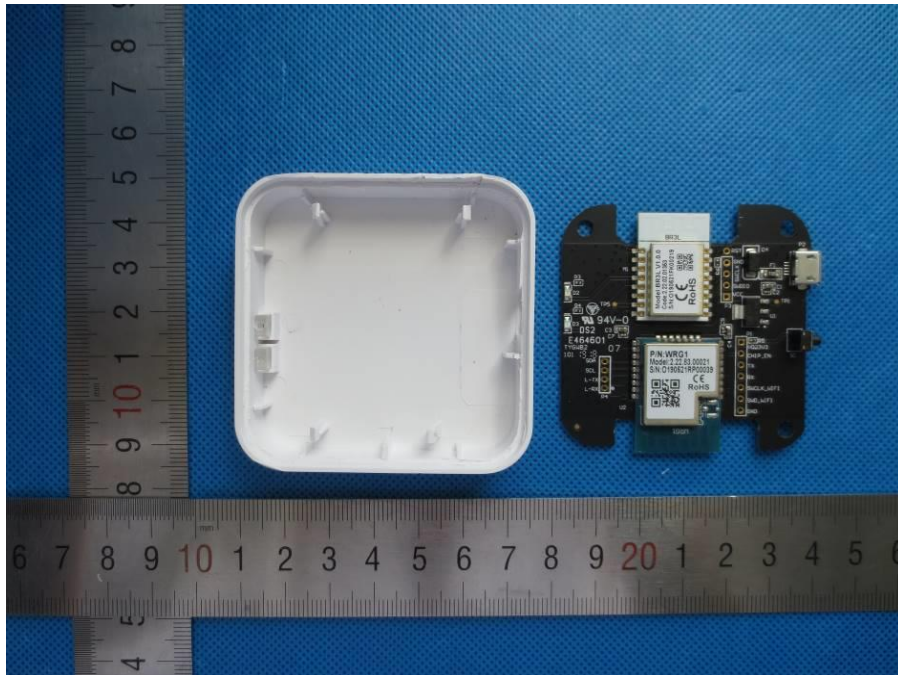
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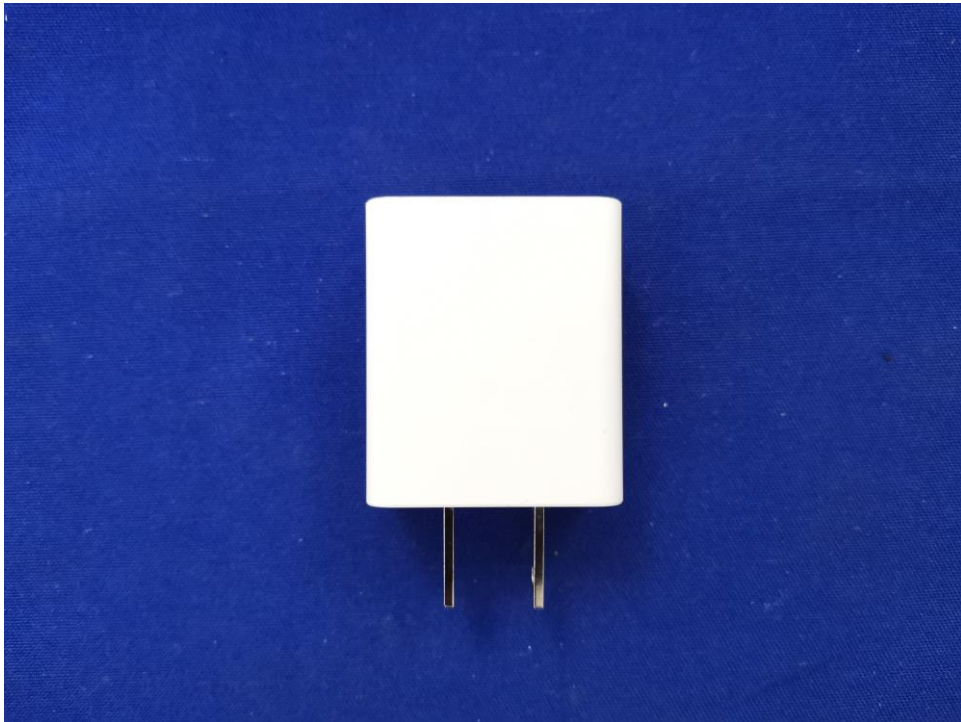
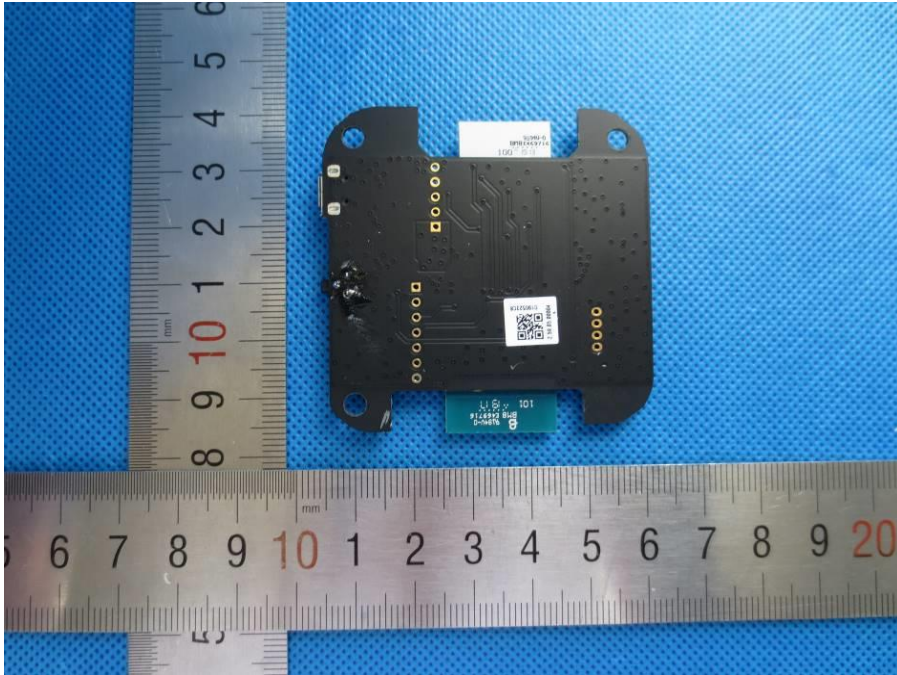
5.8 Test Photographs (1000MHz ~ 18000MHz)



6 Photographs of EUT









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Model: KA06E-0501000US

--- **END** ---