

FCC TEST REPORT

Report No.: ARFR-ESH-P2004211473B-3

Product: Smart Zigbee Gateway

Test Model: THP10-Z

Received: Apr.21, 2020

ISSUED: May.23, 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, Xinzhuang Road, Shanghai, P.R.China (201612)

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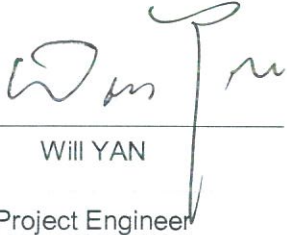
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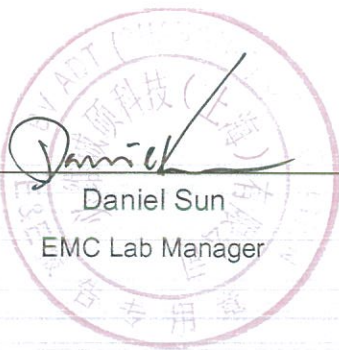
1. TEST PROGRAM

PRODUCT: Smart Zigbee Gateway
TEST MODEL: THP10-Z
APPLICANT: Hangzhou Tuya Information Technology Co., Ltd
TESTED: Apr.25 to May.12, 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 :  , **DATE:** May.23, 2020
Will YAN
Project Engineer

APPROVED BY :  , **DATE:** May.23, 2020
Daniel Sun
EMC Lab Manager



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:	Smart Zigbee Gateway
Test Model:	THP10-Z
EUT Power Rating:	5VDC/1A with adaptor 100-240Vac~, 50/60Hz

Note: 1. Please refer to user manual.

3.3 Description of support units

NO.	PRODUCT	BRAND	MODEL NO.
1	AC adapter	--	KA25-0501000US
2	Mobile Phone	Vivo	--

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 0.50MHz.
 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.

4.4 Measurement Equipment

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	E1R1001	Mar.03, 2021
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

120Vac/60Hz

Phase : LINE

Location: Conduction 1

Date: 5/5/2020

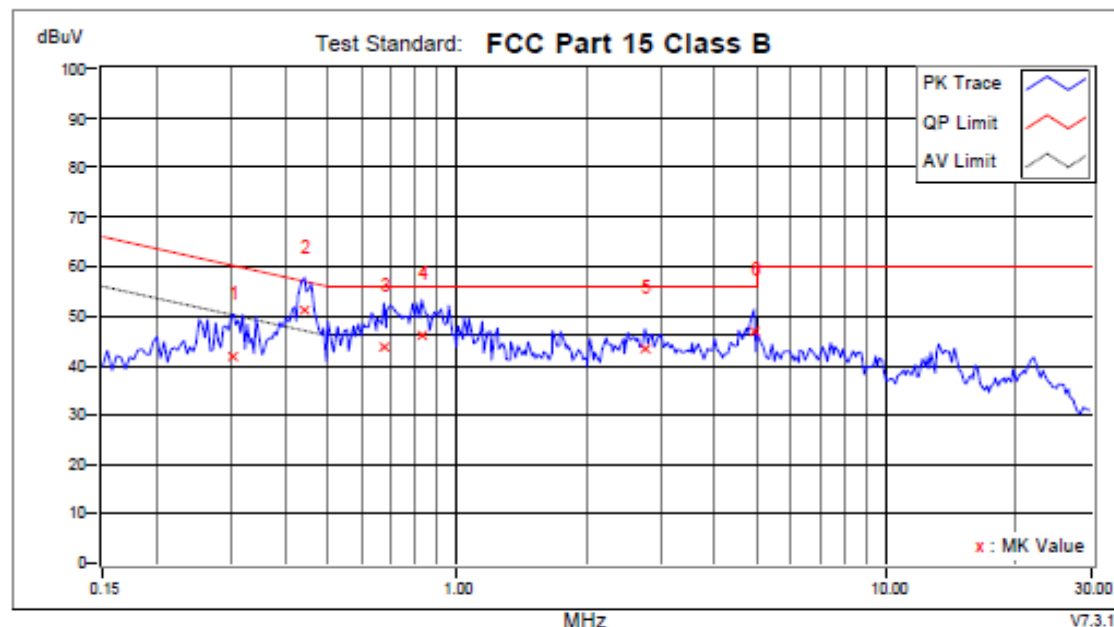
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Phase L1

Temperatuer (C): 19

Humidity (%): 53

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	0.30249	9.70	31.99	19.74	41.69	29.44	60.17	50.17	-18.48	-20.73	
+2	0.44325	9.72	41.30	30.56	51.02	40.28	57.00	47.00	-5.98	-6.72	
3	0.67785	9.61	34.25	23.92	43.86	33.53	56.00	46.00	-12.14	-12.47	
4	0.83034	9.59	36.44	24.45	46.03	34.04	56.00	46.00	-9.97	-11.96	
5	2.74386	9.84	33.51	24.76	43.35	34.60	56.00	46.00	-12.65	-11.40	
6	4.92564	10.04	36.93	28.48	46.97	38.52	56.00	46.00	-9.03	-7.48	

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.

Phase : NEUTRAL

Location: Conduction 1

Date: 5/5/2020

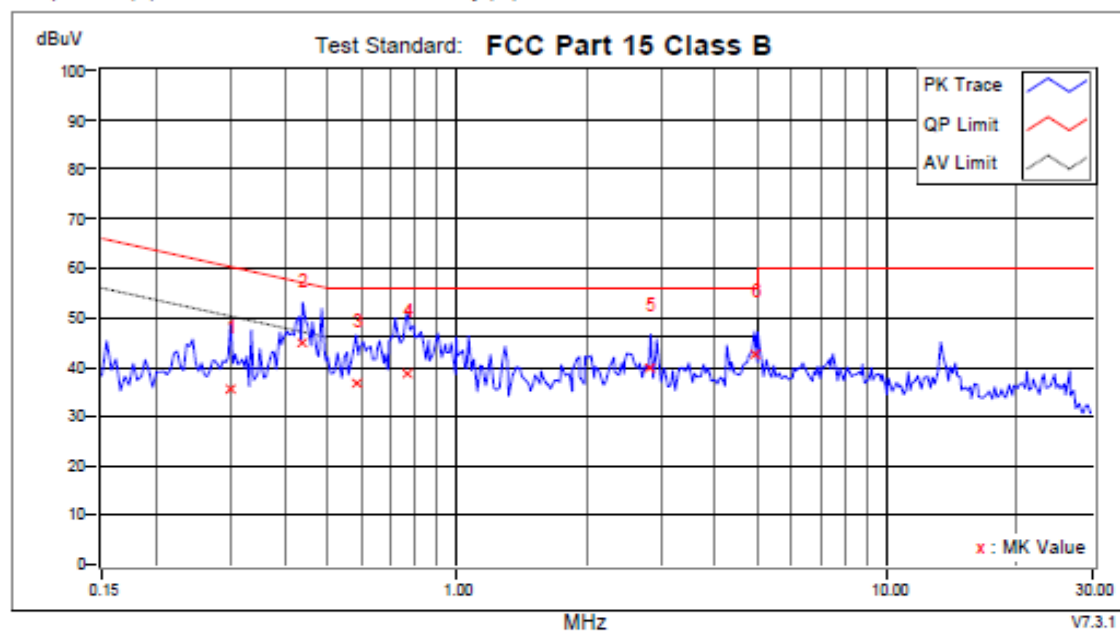
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Phase N

Temperatuer (C): 19

Humidity (%): 53

Approved by:



No.	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.29858	9.87	25.65	12.61	35.52	22.48	60.28	50.28	-24.76	-27.80	
2	0.43934	9.86	35.02	22.20	44.88	32.06	57.07	47.07	-12.20	-15.02	
3	0.58401	9.83	26.90	15.56	36.73	25.39	56.00	46.00	-19.27	-20.61	
4	0.76778	9.86	29.00	17.44	38.86	27.30	56.00	46.00	-17.14	-18.70	
5	2.82597	10.02	29.90	24.27	39.92	34.29	56.00	46.00	-16.08	-11.71	
+6	4.92564	9.72	32.89	25.93	42.61	35.65	56.00	46.00	-13.39	-10.35	

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

Location: Conduction 1

Date: 5/5/2020

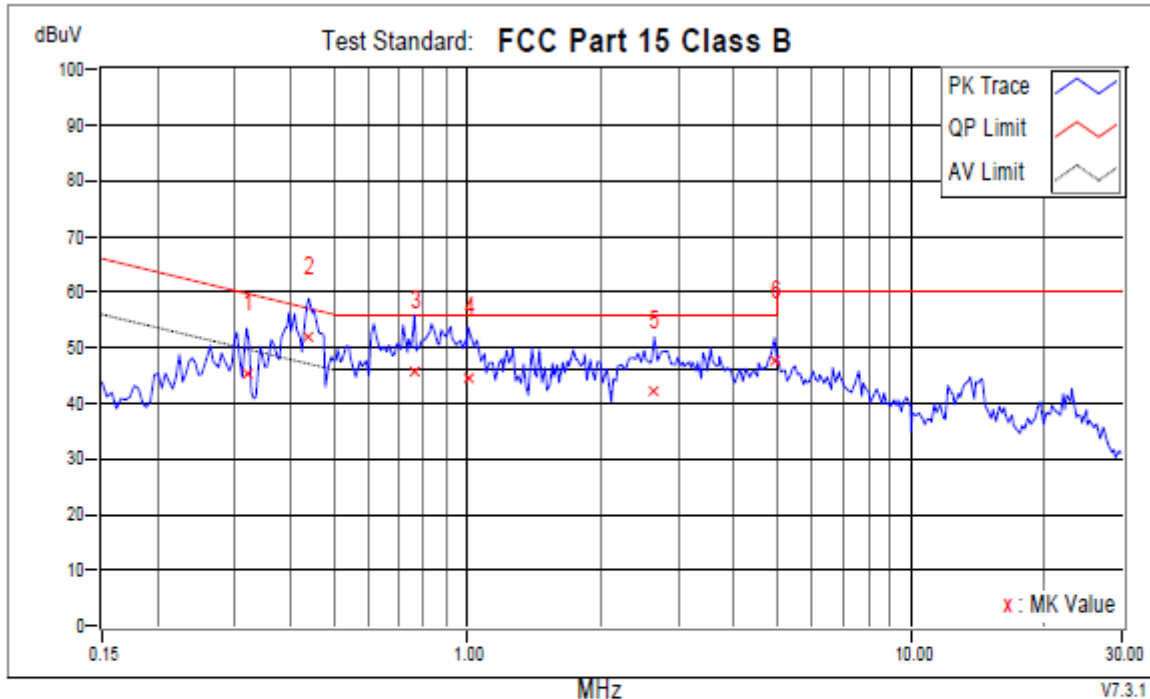
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Phase L1

Temperature (C): 19

Humidity (%): 53

Approved by:



No.	Frequency MHz	Corr. Factor dB	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
			QP	AV	QP	AV	QP	AV	QP	AV	
1	0.31813	9.70	35.58	22.92	45.28	32.62	59.76	49.76	-14.47	-17.13	
+2	0.43934	9.72	42.31	28.50	52.03	38.22	57.07	47.07	-5.04	-8.85	
3	0.75996	9.59	35.98	23.92	45.57	33.51	56.00	46.00	-10.43	-12.49	
4	1.00391	9.59	34.85	24.42	44.44	34.01	56.00	46.00	-11.56	-11.99	
5	2.63829	9.83	32.20	22.18	42.03	32.01	56.00	46.00	-13.97	-13.99	
6	4.92564	10.04	37.60	29.15	47.64	39.19	56.00	46.00	-8.36	-6.81	

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: 5/5/2020

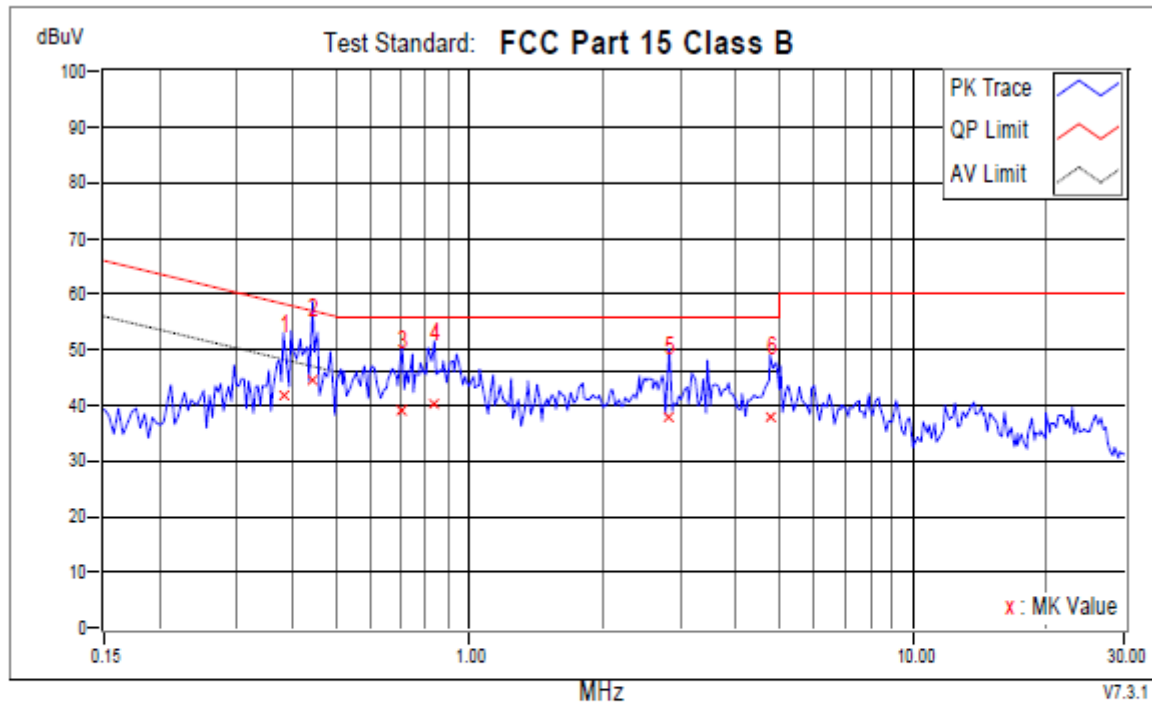
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Phase N

Temperatuer (C): 19

Humidity (%): 53

Approved by:

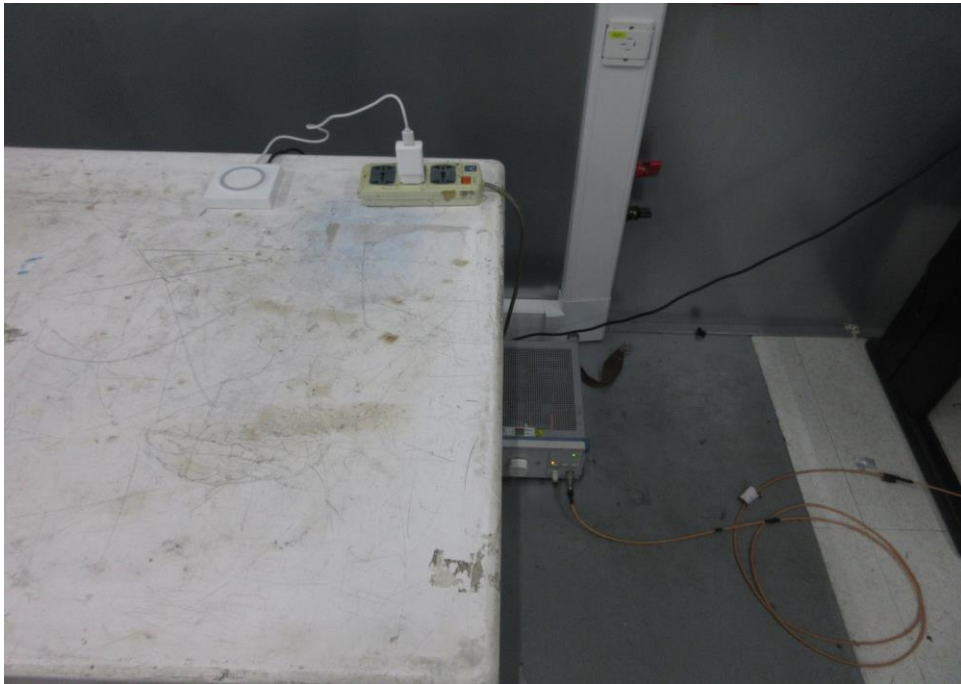


No.	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.38069	9.87	32.03	19.76	41.90	29.63	58.26	48.26	-16.37	-18.64	
+2	0.44325	9.85	34.84	21.92	44.69	31.77	57.00	47.00	-12.31	-15.23	
3	0.70522	9.81	29.06	16.84	38.87	26.65	56.00	46.00	-17.13	-19.35	
4	0.83425	9.89	30.29	17.38	40.18	27.27	56.00	46.00	-15.82	-18.73	
5	2.82206	10.01	28.05	20.39	38.06	30.40	56.00	46.00	-17.94	-15.60	
6	4.76533	9.75	28.29	20.27	38.04	30.02	56.00	46.00	-17.96	-15.98	

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.

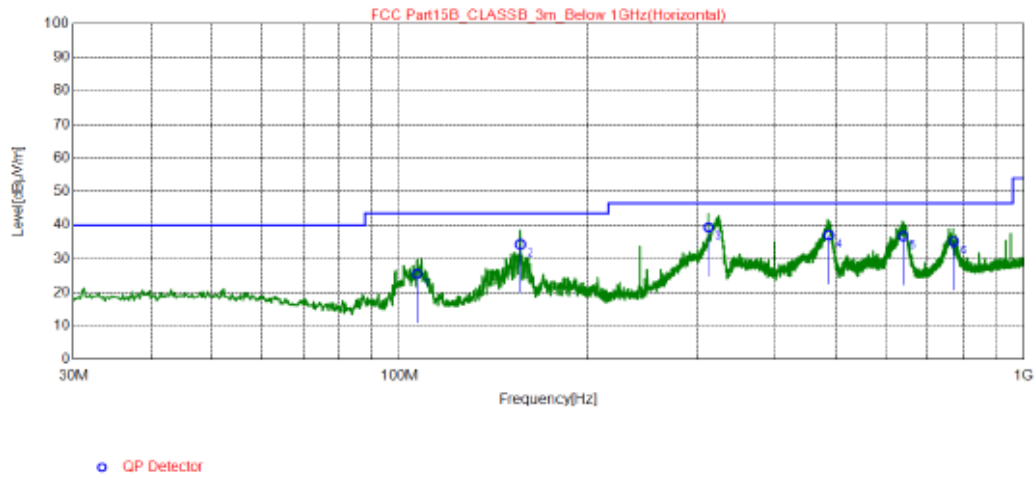
5.4 Measurement Equipment

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMI Test Spectrum ROHDE & SCHWARZ	ESR7	E1R1005	Dec.02, 2020
Spectrum Analyzer Keysight	N9030B	E1S1003	Jul.22, 2020
Broad-Band Antenna Schwarzbeck	VULB9168	E1A1012	Aug.25, 2020
Double Riaged Vroadband Horn Antenna Schwarzbeck	BBHA9120D	E1A1017	Jan.25, 2021
Preamplifier Agilent	8447D	E1A2001	Oct.13, 2020
Preamplifier Agilent	EMC051845SE	E1A2009	Jul.18, 2020

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

Position: Horizontal

Test Graph



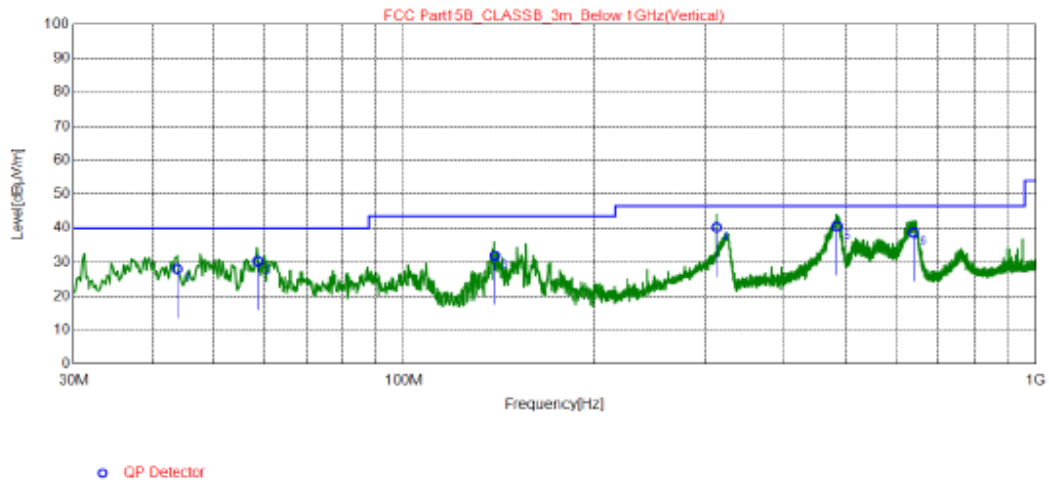
NO.	Freq. [MHz]	QP Reading [dBuV/m]	Factor [dB]	QP Value [dBuV/m]	QP Limit [dBuV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	106.6	37.98	-12.55	25.43	43.50	18.07	200	190	Horizontal
2	156.1	43.35	-9.08	34.27	43.50	9.23	200	221	Horizontal
3	312.4	48.16	-8.85	39.31	46.50	7.19	100	312	Horizontal
4	486.8	42.7	-5.71	36.99	46.50	9.51	200	152	Horizontal
5	640.7	39.92	-3.25	36.67	46.50	9.83	100	170	Horizontal
6	772.0	36.53	-1.43	35.10	46.50	11.40	100	139	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	43.77	37.52	-9.55	27.97	40.00	12.03	100	197	Vertical
2	58.71	40.72	-10.44	30.28	40.00	9.72	100	21	Vertical
3	139.2	42.15	-10.22	31.93	43.50	11.57	100	163	Vertical
4	312.4	49	-8.85	40.15	46.50	6.35	200	289	Vertical
5	484.9	46.17	-5.69	40.48	46.50	6.02	100	228	Vertical
6	640.1	41.97	-3.25	38.72	46.50	7.78	100	10	Vertical

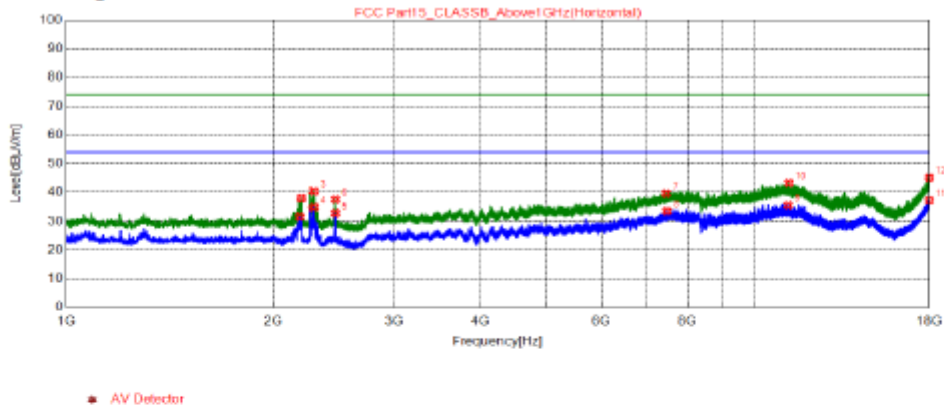
REMARKS:

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	2187.4500	47.99	31.60	54.00	22.40	155	302	Horizontal	AV
2	2198.5000	54.35	37.99	74.00	36.01	155	302	Horizontal	PK
3	2294.5500	56.53	40.36	74.00	33.64	155	334	Horizontal	PK
4	2295.4000	51.04	34.88	54.00	19.12	155	302	Horizontal	AV
5	2463.7000	48.70	32.87	54.00	21.13	155	302	Horizontal	AV
6	2463.7000	53.37	37.54	74.00	36.46	155	334	Horizontal	PK
7	7454.9000	43.54	39.57	74.00	34.43	155	334	Horizontal	PK
8	7475.3000	37.41	33.50	54.00	20.50	155	145	Horizontal	AV
9	11209.3500	33.87	35.53	54.00	18.47	155	208	Horizontal	AV
10	11240.8000	41.54	43.21	74.00	30.79	155	334	Horizontal	PK
11	17977.0500	25.44	37.19	54.00	16.81	155	113	Horizontal	AV
12	17978.7500	33.28	45.05	74.00	28.95	155	17	Horizontal	PK

REMARKS:

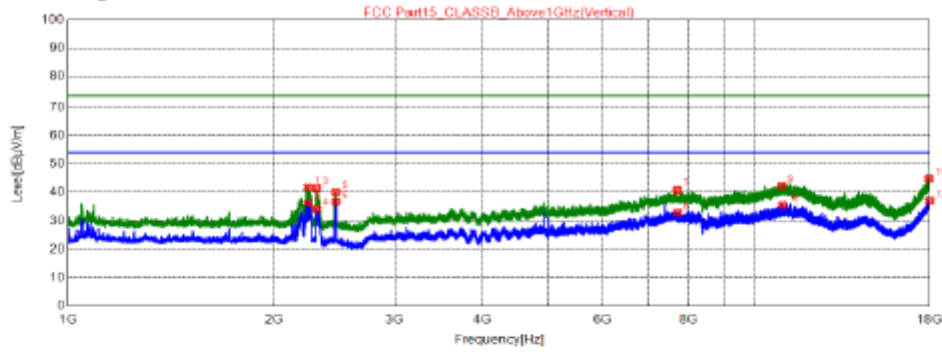
1. The emission levels of other frequencies were very low against the limit.
2. Margin = Limit – Level



BUREAU
VERITAS

Position: Vertical

Test Graph



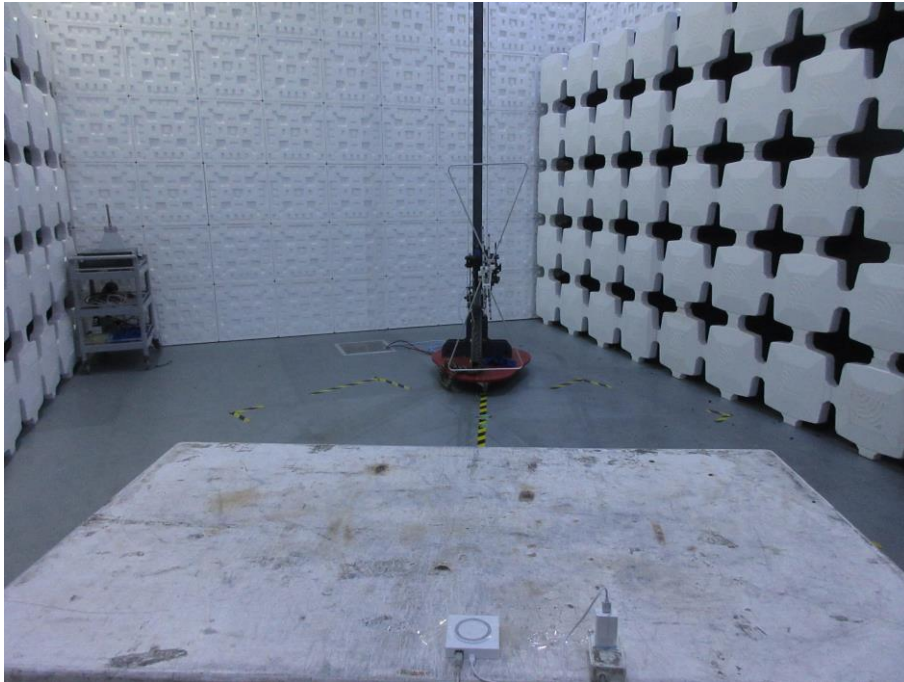
★ AV Detector

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2241.8500	57.99	41.72	74.00	32.28	155	311	Vertical	PK
2	2242.7000	52.52	36.25	54.00	17.75	155	343	Vertical	AV
3	2308.1500	57.61	41.47	74.00	32.53	155	185	Vertical	PK
4	2309.0000	50.19	34.05	54.00	19.95	155	185	Vertical	AV
5	2462.8500	55.92	40.09	74.00	33.91	155	154	Vertical	PK
6	2463.7000	52.47	36.64	54.00	17.36	155	90	Vertical	AV
7	7698.8500	44.25	40.79	74.00	33.21	155	185	Vertical	PK
8	7709.0500	36.30	32.86	54.00	21.14	155	90	Vertical	AV
9	10945.8500	41.03	42.28	74.00	31.72	155	59	Vertical	PK
10	10974.7500	34.25	35.57	54.00	18.43	155	154	Vertical	AV
11	17944.7500	33.44	44.91	74.00	29.09	155	280	Vertical	PK
12	17991.5000	25.11	36.99	54.00	17.01	155	248	Vertical	AV

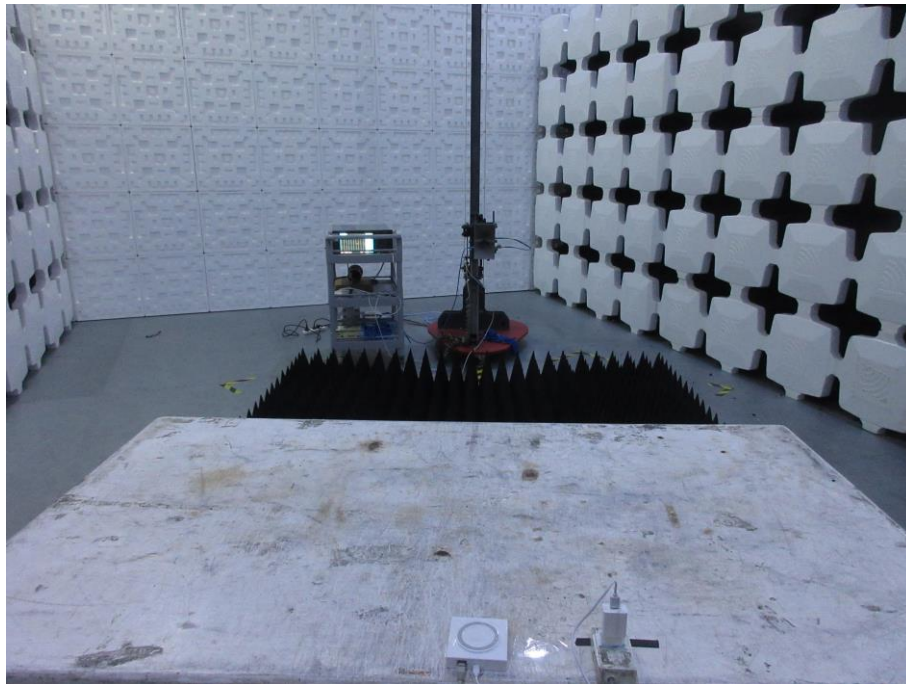
REMARKS:

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

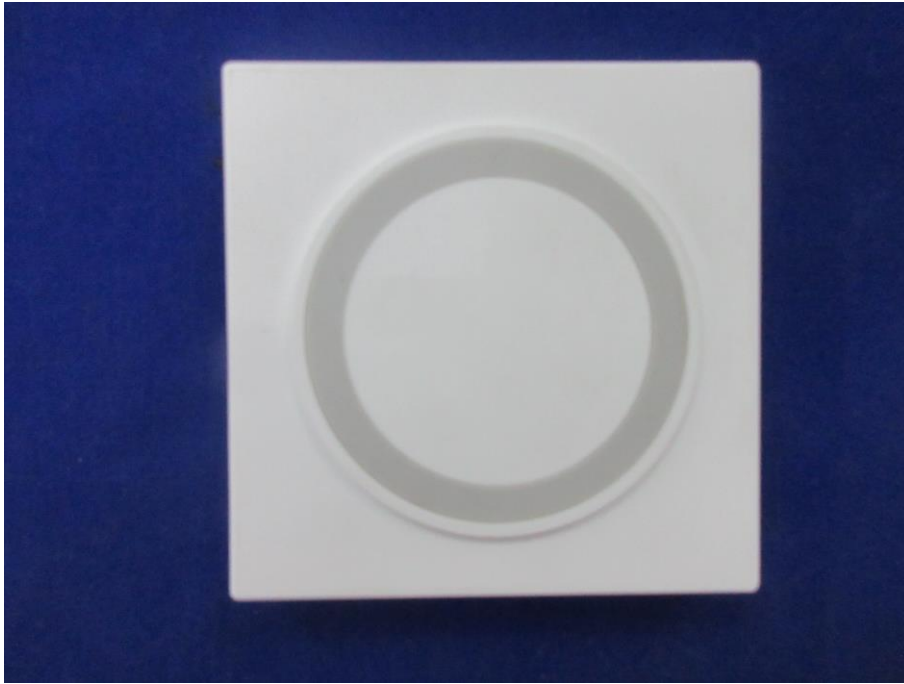
5.7 Test Photographs (30MHz ~ 1000MHz)



5.8 Test Photographs (1000MHz ~ 18000MHz)



6 Photographs of EUT



--- END ---