

FCC TEST REPORT

Report No.: ARFR-ESH-P1912002B-1-A1

Product: Smart Camera

Test Model: SC002-WA2,SC002-WB2

Received: Jul.08, 2020

ISSUED: Aug.05, 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: Smart Camera

MODEL: SC002-WA2, SC002-WB2

APPLICANT: Hangzhou Tuya Information Technology Co., Ltd

TESTED: Jul.10 to Jul.16, 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:** Aug.05, 2020
Scott XU
Project Engineer

APPROVED BY : Daniel Sun, **DATE:** Aug.05, 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

Special Comment: The report is based on historical report ARFE-ESH-P19121002B-1, just adding alternative adaptor KA06E-0501000US. After evaluation, we choose model SC002-WA2 matched with adaptor KA06E-0501000US to apply full EMC tests. Other test result can refer to historical report ARFE-ESH-P19121002B-1.



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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 Camera
Test Model:	SC002-WA2, SC002-WB2
EUT Power Rating:	100-240VAC, 50/60Hz for adaptor, DC 5V for Smart camera

Note: Please refer to user manual. All EMC tests were performed on 120Vac, 60Hz.

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 (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.03, 2021
LISN ROHDE & SCHWARZ	ENV216	E1L1011	Jul.16, 2021
Software ADT	ADT_Cond_V7.3.0	N/A	N/A

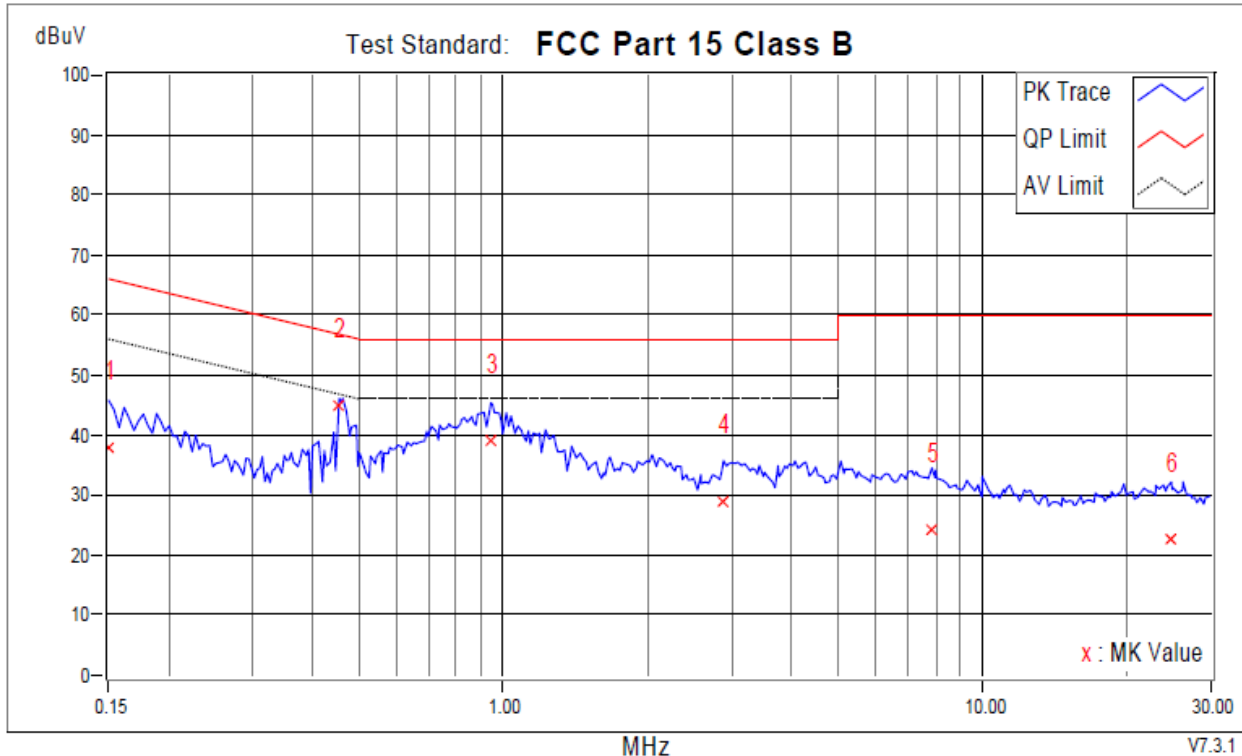


4.5 Test Result and Data

Conducted Emission Test Data

AC 120V, 60Hz

Phase : LINE



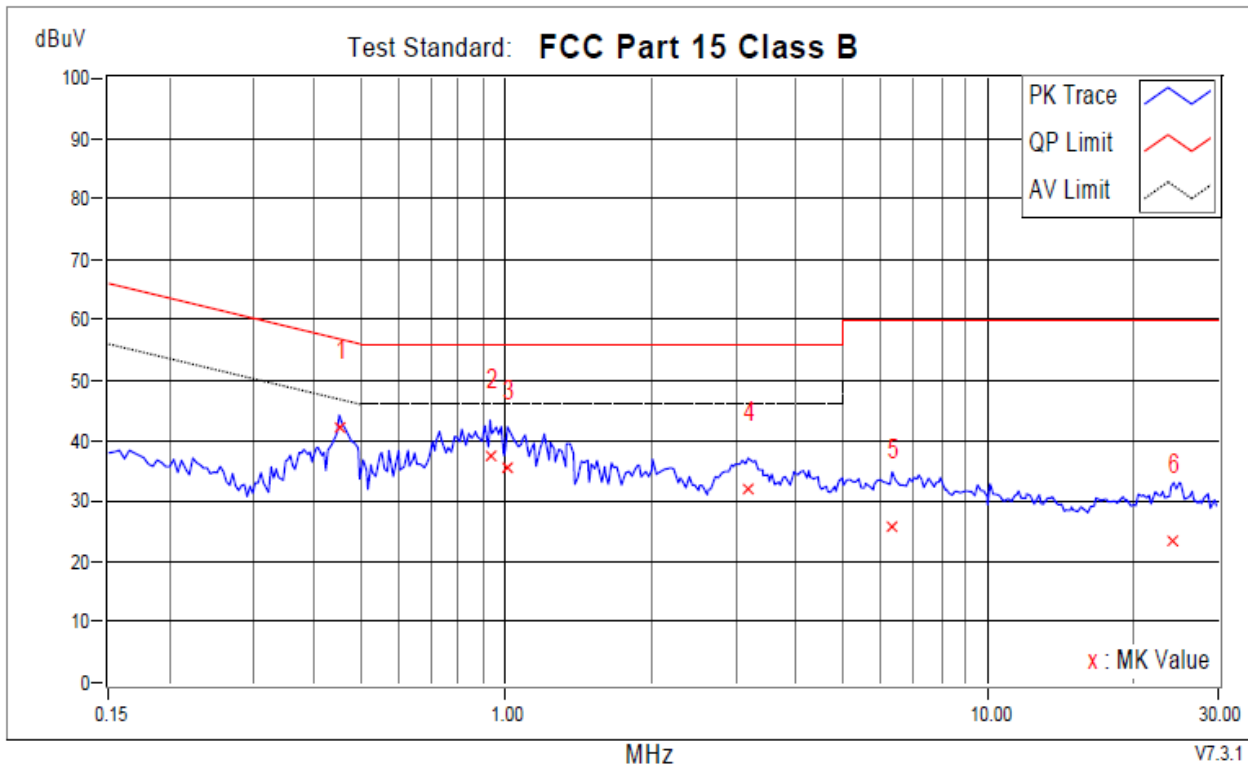
No.	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.15000	9.83	28.18	11.35	38.01	21.18	66.00	56.00	-27.99	-34.82	
+2	0.45498	9.71	35.32	23.64	45.03	33.35	56.78	46.78	-11.76	-13.44	
3	0.94373	9.59	29.28	10.26	38.87	19.85	56.00	46.00	-17.13	-26.15	
4	2.88462	9.78	19.17	7.30	28.95	17.08	56.00	46.00	-27.05	-28.92	
5	7.86205	9.94	14.47	3.50	24.41	13.44	60.00	50.00	-35.59	-36.56	
6	24.86973	10.01	12.63	3.53	22.64	13.54	60.00	50.00	-37.36	-36.46	

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	0.45107	9.84	32.46	26.59	42.30	36.43	56.86	46.86	-14.56	-10.43	
2	0.92809	9.89	27.72	21.67	37.61	31.56	56.00	46.00	-18.39	-14.44	
3	1.00782	9.89	25.56	15.68	35.45	25.57	56.00	46.00	-20.55	-20.43	
4	3.18569	9.91	21.96	10.95	31.87	20.86	56.00	46.00	-24.13	-25.14	
5	6.34106	9.76	16.00	5.94	25.76	15.70	60.00	50.00	-34.24	-34.30	
6	24.33797	10.22	13.21	3.82	23.43	14.04	60.00	50.00	-36.57	-35.96	

REMARKS:

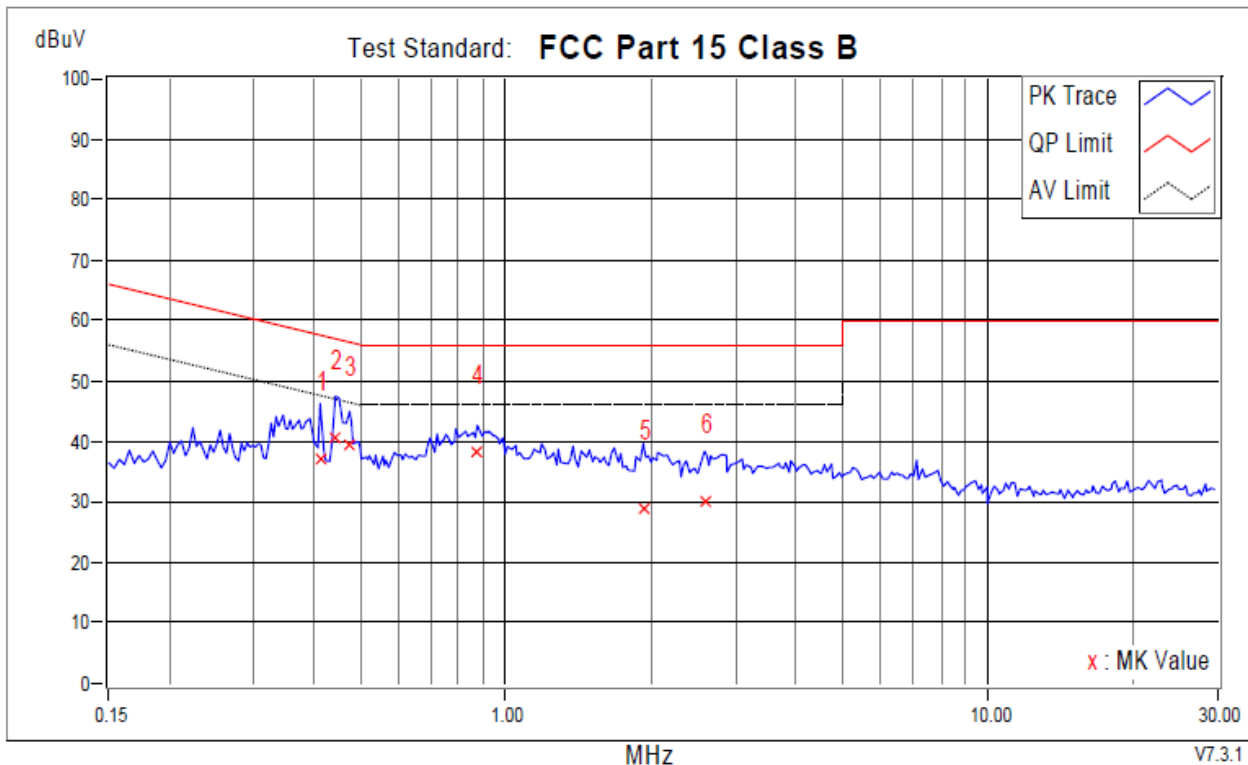
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



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AC 240V, 50Hz

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	0.41197	9.72	27.48	16.29	37.20	26.01	57.61	47.61	-20.41	-21.60	
2	0.44325	9.72	30.72	19.01	40.44	28.73	57.00	47.00	-16.56	-18.27	
+3	0.47453	9.72	29.91	23.04	39.63	32.76	56.43	46.43	-16.80	-13.67	
4	0.87335	9.59	28.80	18.05	38.39	27.64	56.00	46.00	-17.61	-18.36	
5	1.93058	9.77	19.26	14.27	29.03	24.04	56.00	46.00	-26.97	-21.96	
6	2.58746	9.82	20.34	11.58	30.16	21.40	56.00	46.00	-25.84	-24.60	

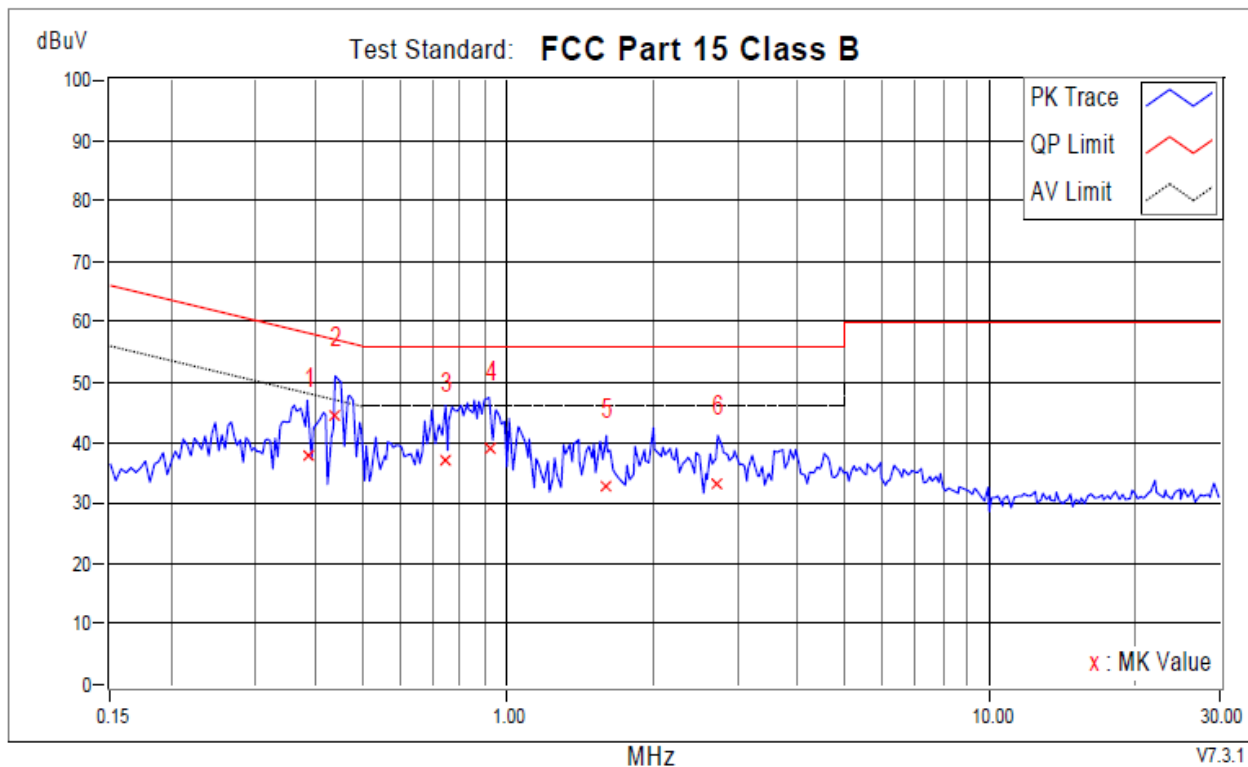
REMARKS:

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.



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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	0.38460	9.87	28.02	18.00	37.89	27.87	58.18	48.18	-20.29	-20.31	
+2	0.43934	9.86	34.52	12.36	44.38	22.22	57.07	47.07	-12.70	-24.86	
3	0.74432	9.85	27.19	17.51	37.04	27.36	56.00	46.00	-18.96	-18.64	
4	0.91636	9.89	29.06	17.53	38.95	27.42	56.00	46.00	-17.05	-18.58	
5	1.60605	9.92	22.71	13.84	32.63	23.76	56.00	46.00	-23.37	-22.24	
6	2.73213	10.01	23.25	11.33	33.26	21.34	56.00	46.00	-22.74	-24.66	

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

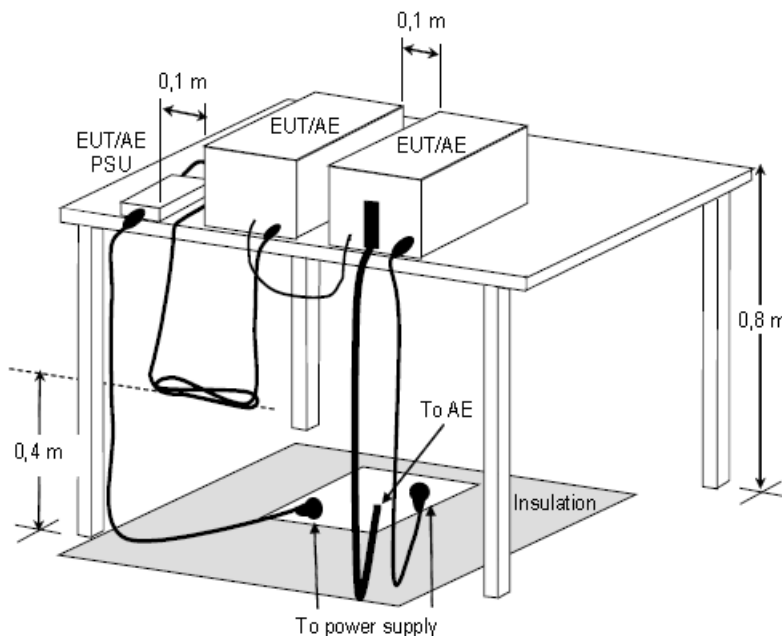
FREQUENCY (MHz)	Class A ($\text{dB}\mu\text{V/m}$) (at 3m)		Class B ($\text{dB}\mu\text{V/m}$) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

- 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)**

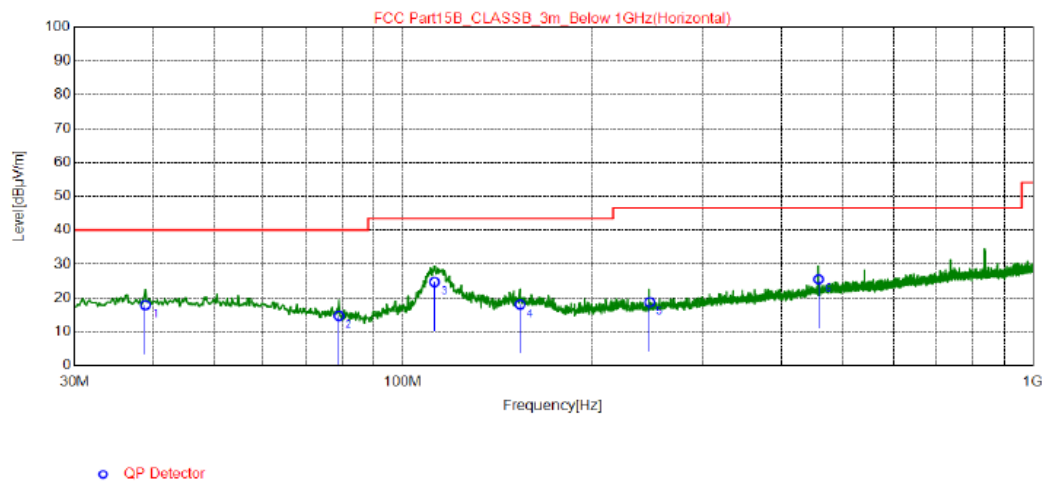
5.4 Measurement Equipment

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMI Test Spectrum ROHDE & SCHWARZ	ESR7	E1R1005	Dec.01, 2020
Spectrum Analyzer Keysight	N9030B	E1S1003	Jul.21, 2021
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.17, 2021



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

Position: Horizontal



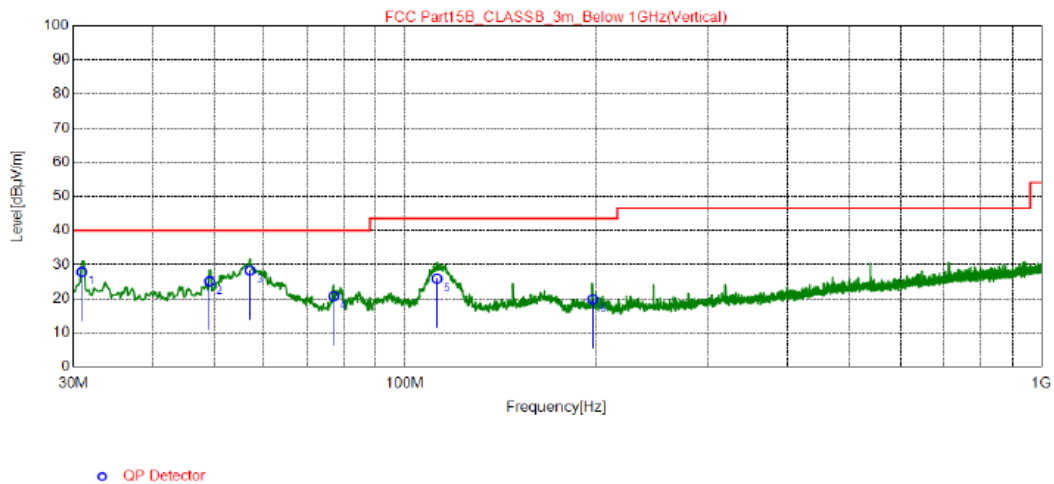
NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	38.92	27.44	-9.59	17.85	40.00	22.15	200	250	Horizontal
2	79.08	28.28	-13.61	14.67	40.00	25.33	200	108	Horizontal
3	112.2	36.68	-12.00	24.68	43.50	18.82	200	93	Horizontal
4	153.5	27.18	-9.17	18.01	43.50	25.49	200	258	Horizontal
5	246.8	29.24	-10.54	18.70	46.50	27.80	200	239	Horizontal
6	458.3	32.05	-6.57	25.48	46.50	21.02	200	285	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	30.97	38.39	-10.59	27.80	40.00	12.20	100	36	Vertical
2	49.20	34.76	-9.68	25.08	40.00	14.92	100	305	Vertical
3	56.96	38.53	-10.30	28.23	40.00	11.77	100	343	Vertical
4	77.14	33.94	-13.28	20.66	40.00	19.34	100	240	Vertical
5	112.2	37.86	-12.00	25.86	43.50	17.64	100	213	Vertical
6	197.4	32.05	-12.25	19.80	43.50	23.70	100	305	Vertical

REMARKS:

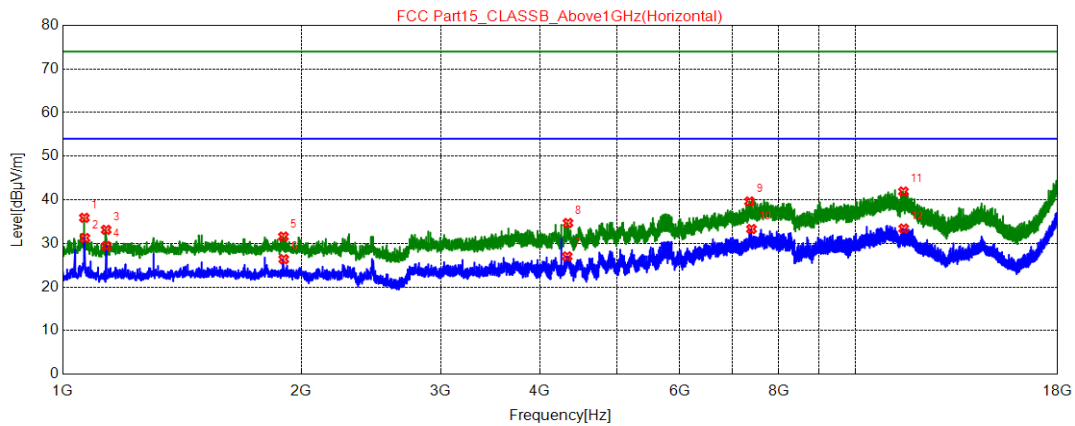
1. Q.P. is abbreviation of quasi-peak individually.
2. The emission levels of other frequencies were very low against the limit.
3. QP Margin value = QP Limit value – QP value
4. Factor = Antenna Factor + Amplifier Factor + Cable loss
5. QP value = Factor + Reading Value.



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

Position: Horizontal



★ AV Detector

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	1065.4500	55.15	35.87	74.00	38.13	100	70	Horizontal	PK
2	1067.1500	50.50	31.23	54.00	22.77	100	109	Horizontal	AV
3	1135.1500	52.16	33.11	74.00	40.89	100	31	Horizontal	PK
4	1136.0000	48.43	29.39	54.00	24.61	100	70	Horizontal	AV
5	1899.3000	48.56	31.56	74.00	42.44	100	301	Horizontal	PK
6	1901.0000	43.37	26.37	54.00	27.63	100	301	Horizontal	AV
7	4331.1500	37.75	27.02	54.00	26.98	100	70	Horizontal	AV
8	4340.5000	45.37	34.67	74.00	39.33	100	301	Horizontal	PK
9	7354.6000	43.90	39.62	74.00	34.38	100	147	Horizontal	PK
10	7396.2500	37.44	33.29	54.00	20.71	100	70	Horizontal	AV
11	11499.200	40.20	41.89	74.00	32.11	100	185	Horizontal	PK
12	11508.550	31.73	33.40	54.00	20.60	100	109	Horizontal	AV

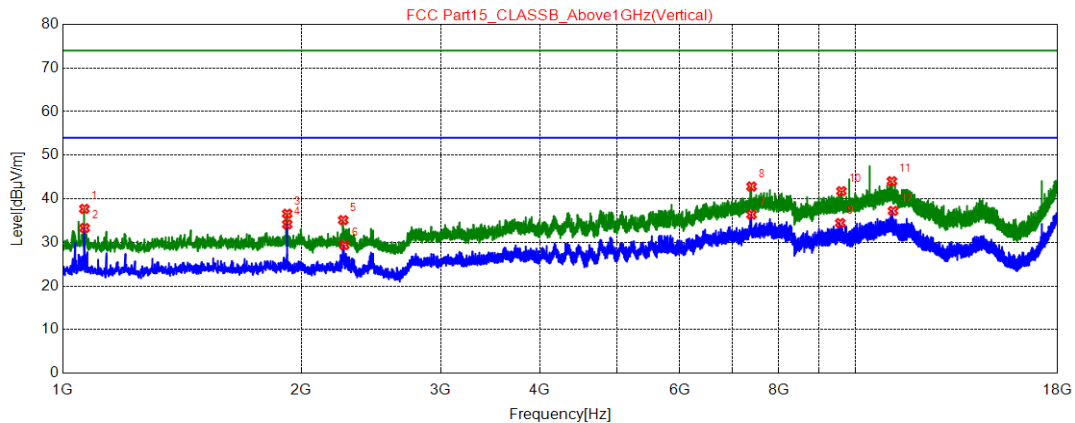
REMARKS:

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



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Position: Vertical



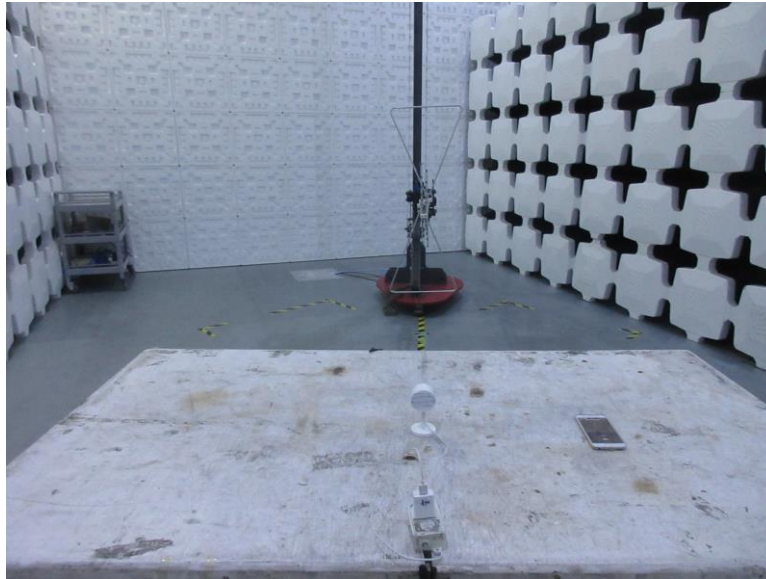
★ AV Detector

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	1065.4500	56.97	37.69	74.00	36.31	100	174	Vertical	PK
2	1066.3000	52.56	33.29	54.00	20.71	100	136	Vertical	AV
3	1920.5500	53.54	36.58	74.00	37.42	100	174	Vertical	PK
4	1920.5500	51.10	34.14	54.00	19.86	100	174	Vertical	AV
5	2259.7000	51.34	35.10	74.00	38.90	100	98	Vertical	PK
6	2266.5000	45.60	29.38	54.00	24.62	100	252	Vertical	AV
7	7397.1000	40.53	36.38	54.00	17.62	100	59	Vertical	AV
8	7397.9500	46.97	42.82	74.00	31.18	100	98	Vertical	PK
9	9572.2500	36.22	34.45	54.00	19.55	100	59	Vertical	AV
10	9604.5500	43.46	41.75	74.00	32.25	100	59	Vertical	PK
11	11120.950	42.48	44.04	74.00	29.96	100	252	Vertical	PK
12	11157.500	35.60	37.21	54.00	16.79	100	290	Vertical	AV

REMARKS:

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

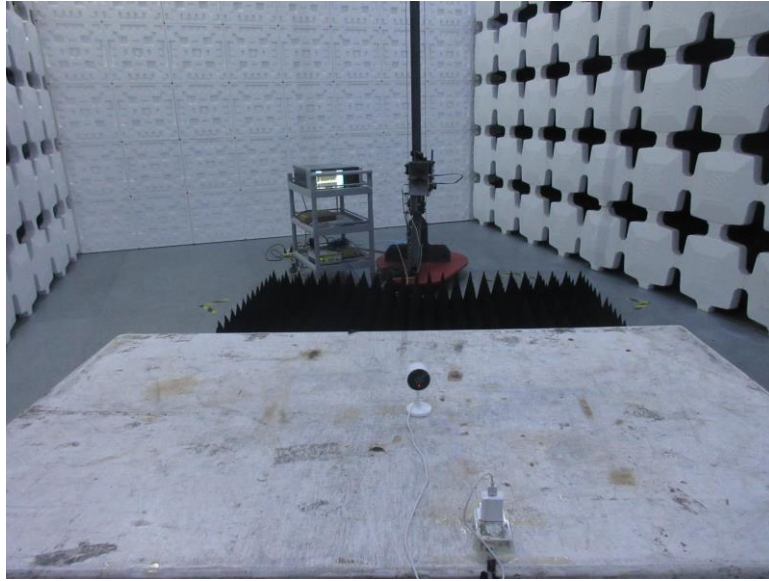
5.7 Test Photographs (30MHz ~ 1000MHz)



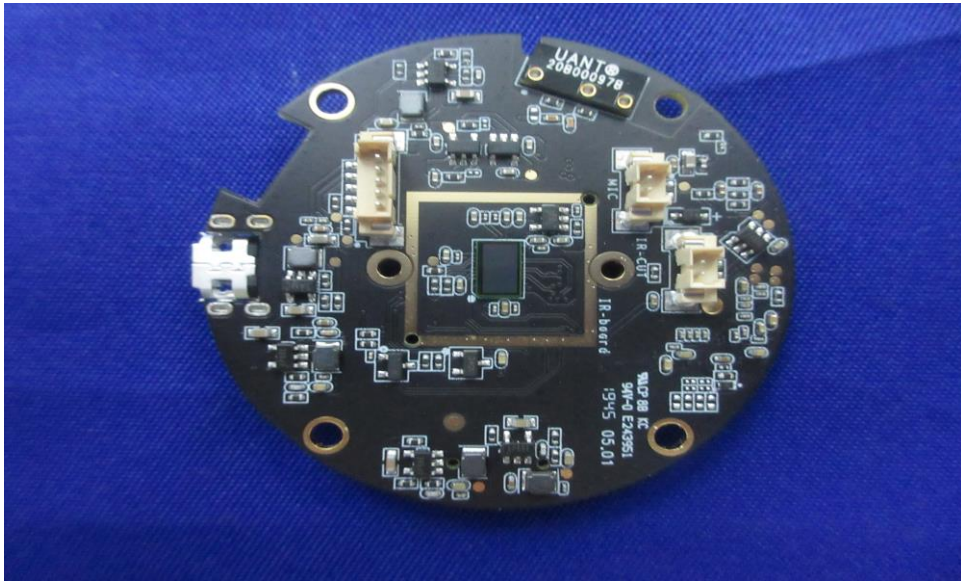
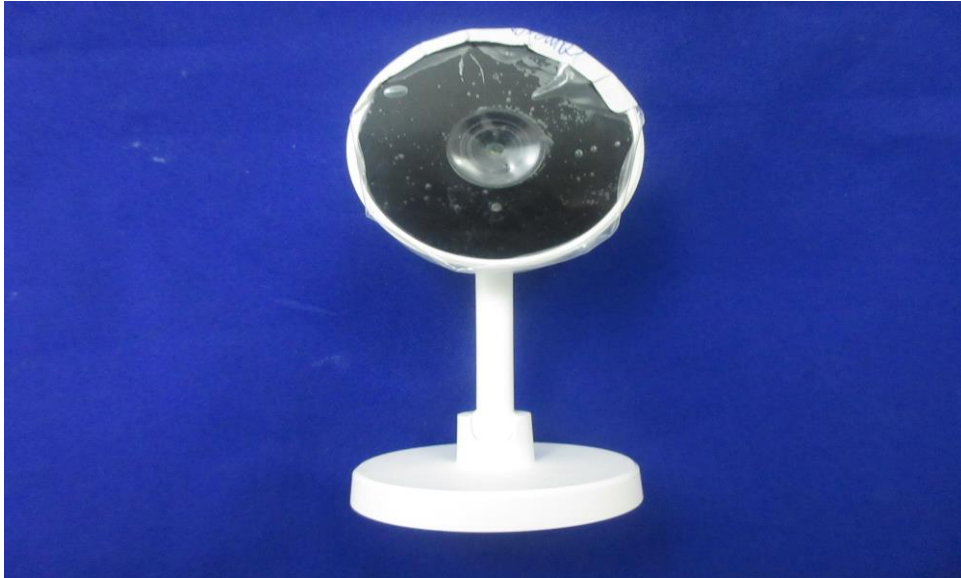


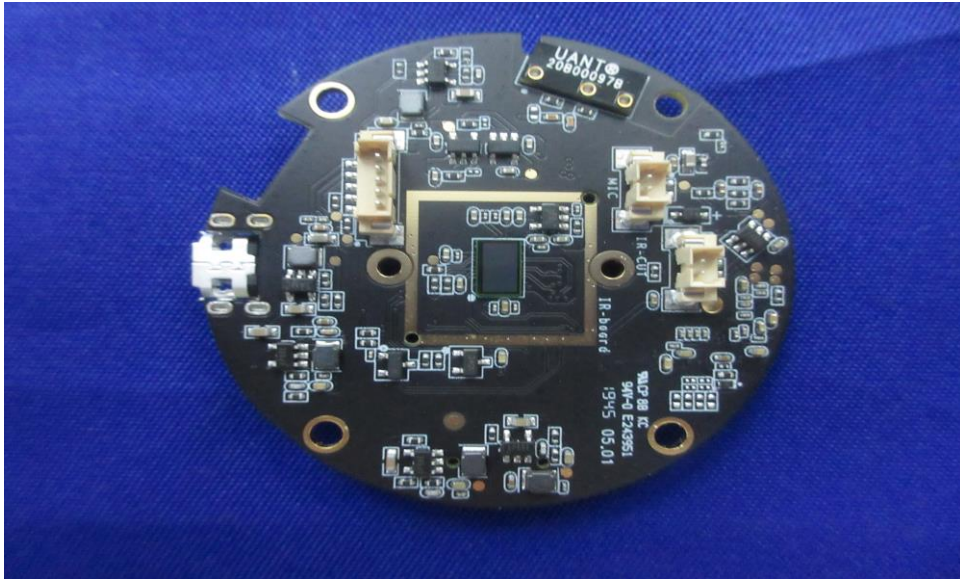
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5.8 Test Photographs (1000MHz ~ 18000MHz)



6 Photographs of EUT

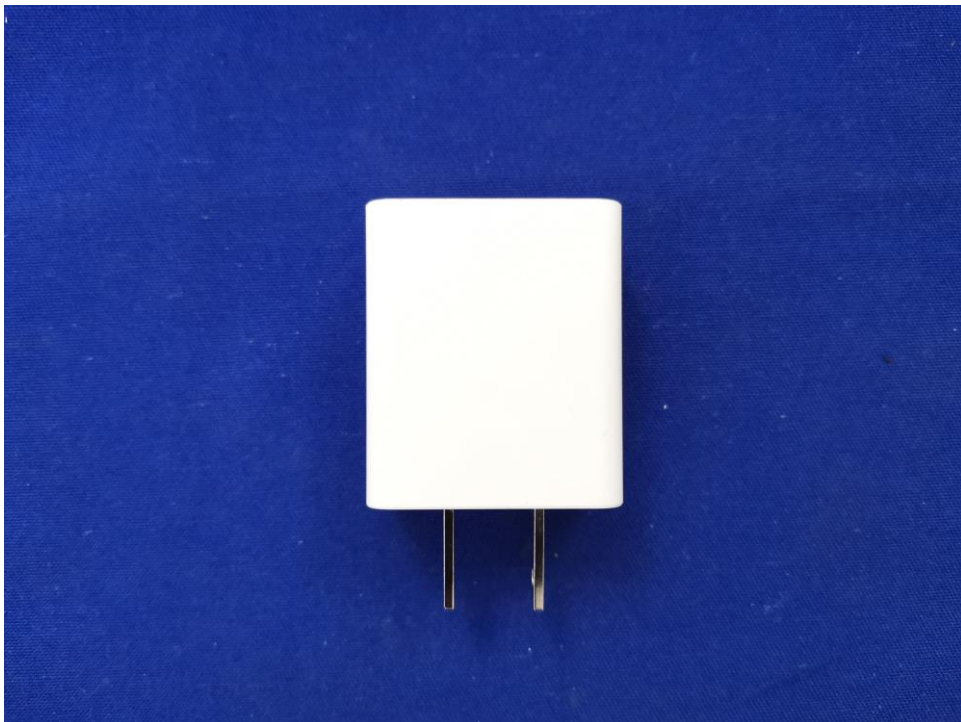




Model: XS-TY-6A -V1.0



Model: XYC-SC004-WA2-D6-V2.0





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