



TEST REPORT

Report No.: ARFR-ESH-P200320321B-2-A1

FCC ID: 2ANDLTY-R8804

Test Model: SC002-WO2

Received: Nov.16, 2020

ISSUED: Dec.15, 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)

This test report consists of 24 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by A2LA, CNAS, or any government agency. The test results in the report only apply to the tested item. The test results in this report are traceable to the national or international standards.



1. TEST PROGRAM.....	3
2. Summary of Test Procedure and Test Results	4
3. Test Configuration of Equipment under Test	5
3.1. Manufacturer information.....	5
3.2. Feature of Equipment under Test.....	5
3.3. Description of support units	5
3.4. Measurement Uncertainty	6
4. Test of Conducted Emission	7
4.1. Test Limit	7
4.2. Test Procedures	8
4.3. Typical Test Setup	8
4.4. Measurement Equipment	9
4.5. Test Result and Data	10
4.6. Test Photographs	14
5. Test of Radiated Emission	15
5.1. Test Limit	15
5.2. Test Procedures	16
5.3. Typical Test Setup	16
5.4. Measurement Equipment	17
5.5. Test Result and Data (30MHz ~ 1GHz)	18
5.6. Test Result and Data (1GHz ~ 18GHz)	20
5.7. Test Photographs (30MHz ~ 1000MHz)	22
5.8. Test Photographs (1000MHz ~ 18000MHz)	23
6. Photographs of EUT	24



1. TEST PROGRAM

PRODUCT: Smart Camera
TEST MODEL: SC002-WO2
SERIES MODEL: --
APPLICANT: Hangzhou Tuya Information Technology Co., Ltd
TESTED: Nov.18 to 23, 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:** Dec.15, 2020
Scott XU
Project Engineer

APPROVED BY : Daniel SUN, **DATE:** Dec.15, 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: Supplement “A1” to test report No.: ARFR-ESH-P200320321B dated on 2020-04-08.

This report is updated report based on history report ARFR-ESH-P200320321B for adding alternative adaptor KA06E-0501000US. After evaluation, we choose model SC002-WO2 with adaptor KA06E-0501000US to perform full EMC test.



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-WO2
Series Model:	--
Model Discrepancy:	All models only have different appearance.
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	KEYU	KA25-0501000US
2	AC adapter	KEYU	KA06E-0501000US



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

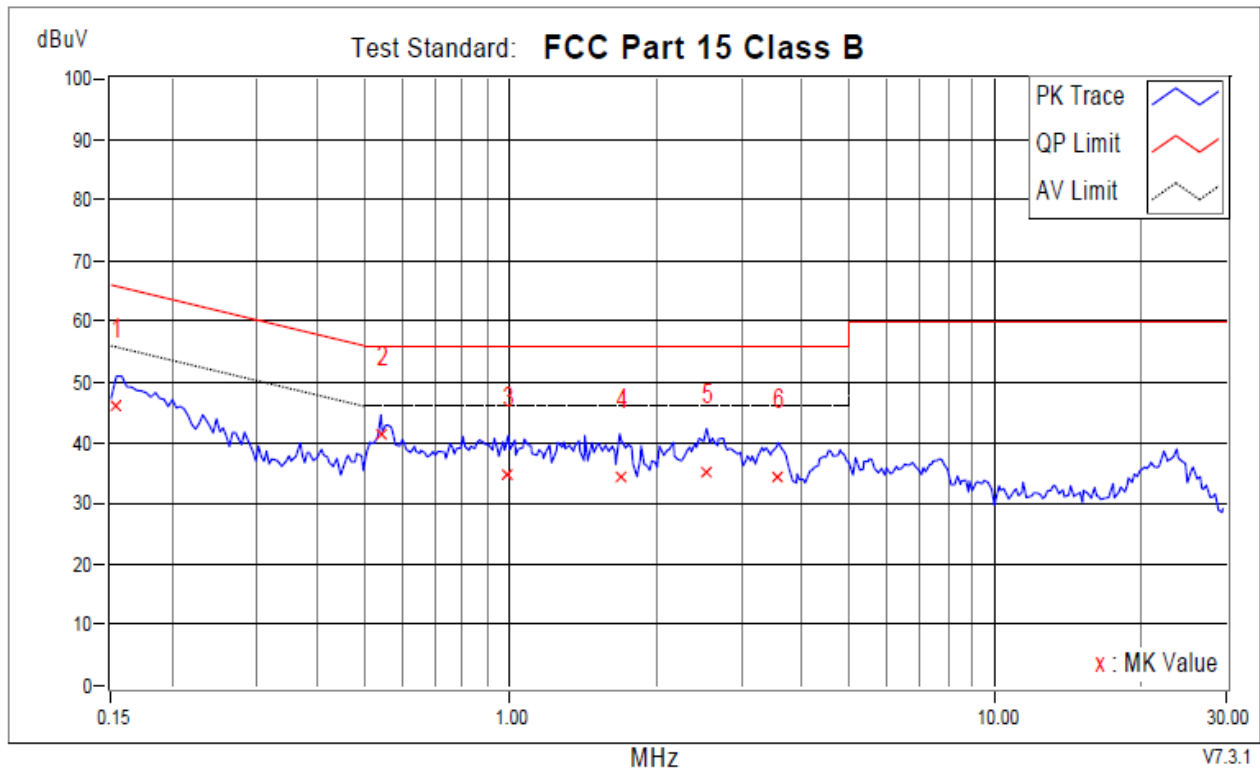
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	E1R1001	Mar.11, 2021
LISN ROHDE & SCHWARZ	ENV216	E1L1011	Mar.11, 2021
Software ADT	ADT_Cond_V7.3.0	N/A	N/A

4.5. Test Result and Data

4.5.1 Conducted Emission Test Data

AC 120V, 60Hz

Phase : LINE

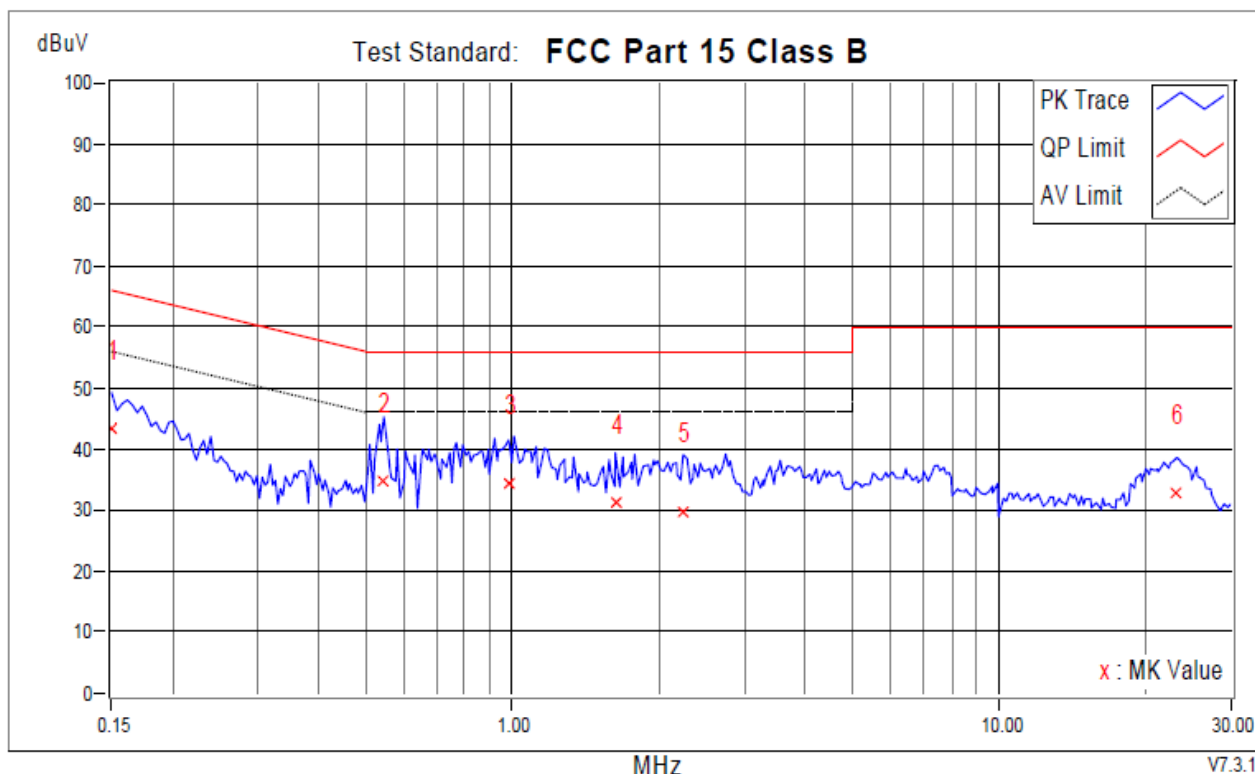


	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.15391	9.87	36.09	18.49	45.96	28.36	65.79	55.79	-19.82	-27.42	
+2	0.54100	9.72	31.82	26.93	41.54	36.65	56.00	46.00	-14.46	-9.35	
3	0.99065	9.61	25.14	14.88	34.75	24.49	56.00	46.00	-21.25	-21.51	
4	1.68425	9.74	24.63	13.19	34.37	22.93	56.00	46.00	-21.63	-23.07	
5	2.54445	9.84	25.39	16.64	35.23	26.48	56.00	46.00	-20.77	-19.52	
6	3.57669	9.94	24.46	13.44	34.40	23.38	56.00	46.00	-21.60	-22.62	

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



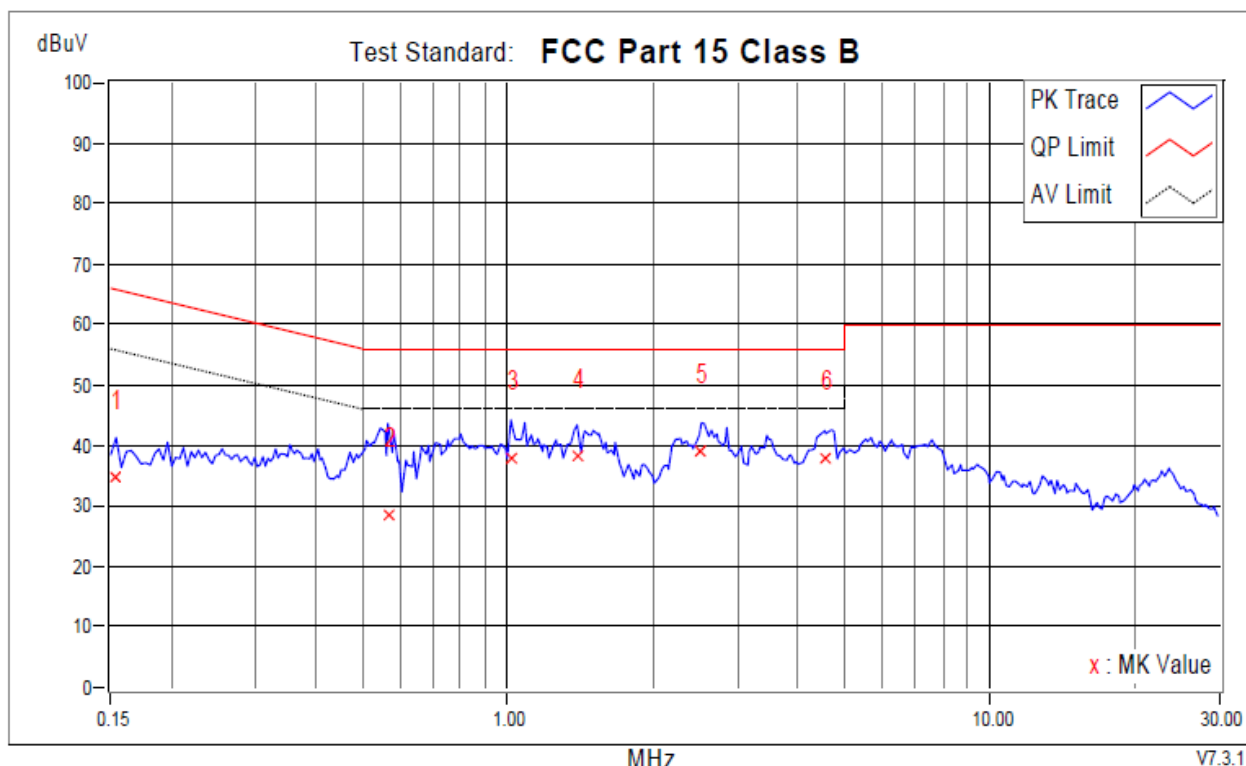
	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.15000	9.88	33.36	10.78	43.24	20.66	66.00	56.00	-22.76	-35.34	
+2	0.54491	9.86	24.73	16.30	34.59	26.16	56.00	46.00	-21.41	-19.84	
3	0.98283	9.91	24.46	14.93	34.37	24.84	56.00	46.00	-21.63	-21.16	
4	1.62951	9.94	21.23	1.84	31.17	11.78	56.00	46.00	-24.83	-34.22	
5	2.24729	9.98	19.87	8.33	29.85	18.31	56.00	46.00	-26.15	-27.69	
6	23.25099	10.32	22.40	11.85	32.72	22.17	60.00	50.00	-27.28	-27.83	

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.

AC 240V, 50Hz

Phase : LINE

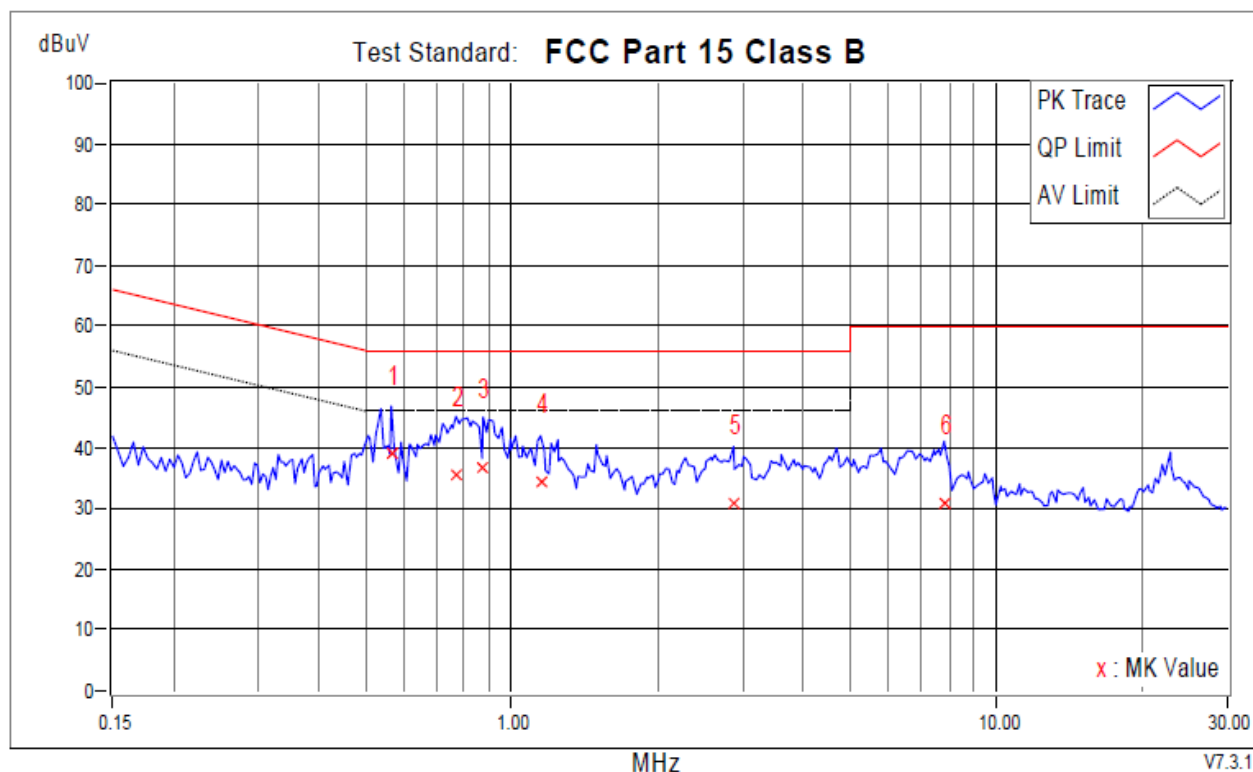


No.	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
1	0.15391	9.87	24.79	14.08	34.66	23.95	65.79	55.79	-31.12	-31.83	
+2	0.56446	9.71	18.95	26.27	28.66	35.98	56.00	46.00	-27.34	-10.02	
3	1.01564	9.61	28.10	17.56	37.71	27.17	56.00	46.00	-18.29	-18.83	
4	1.39491	9.68	28.65	15.00	38.33	24.68	56.00	46.00	-17.67	-21.32	
5	2.52490	9.84	29.21	20.76	39.05	30.60	56.00	46.00	-16.95	-15.40	
6	4.55419	10.03	27.72	17.80	37.75	27.83	56.00	46.00	-18.25	-18.17	

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

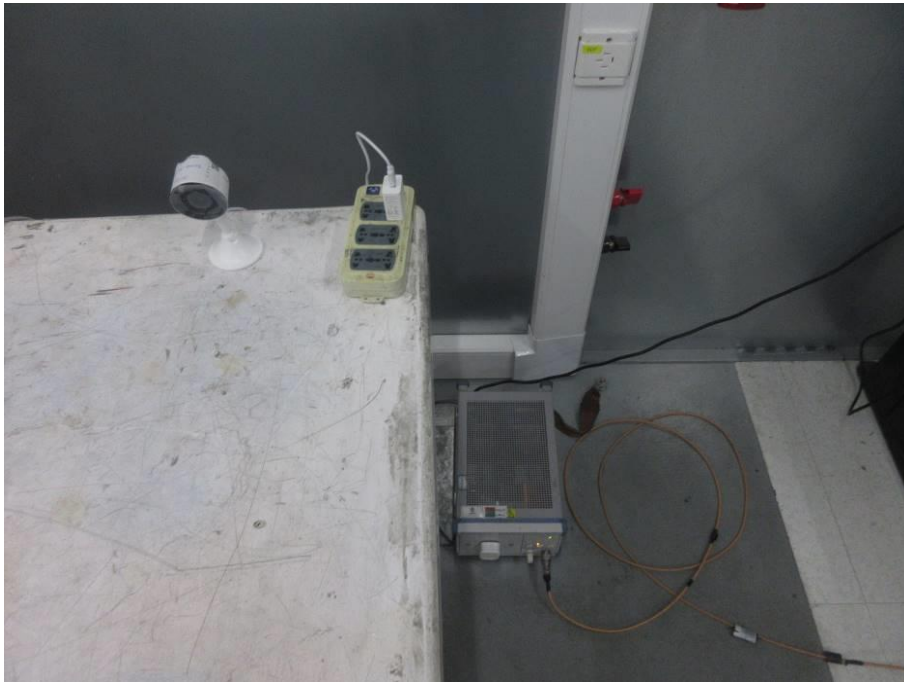


	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV	
+1	0.56446	9.86	29.21	19.37	39.07	29.23	56.00	46.00	-16.93	-16.77	
2	0.76778	9.88	25.80	15.03	35.68	24.91	56.00	46.00	-20.32	-21.09	
3	0.87335	9.91	26.76	14.74	36.67	24.65	56.00	46.00	-19.33	-21.35	
4	1.14858	9.92	24.33	10.21	34.25	20.13	56.00	46.00	-21.75	-25.87	
5	2.87680	10.04	20.63	9.10	30.67	19.14	56.00	46.00	-25.33	-26.86	
6	7.82295	10.22	20.80	7.95	31.02	18.17	60.00	50.00	-28.98	-31.83	

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

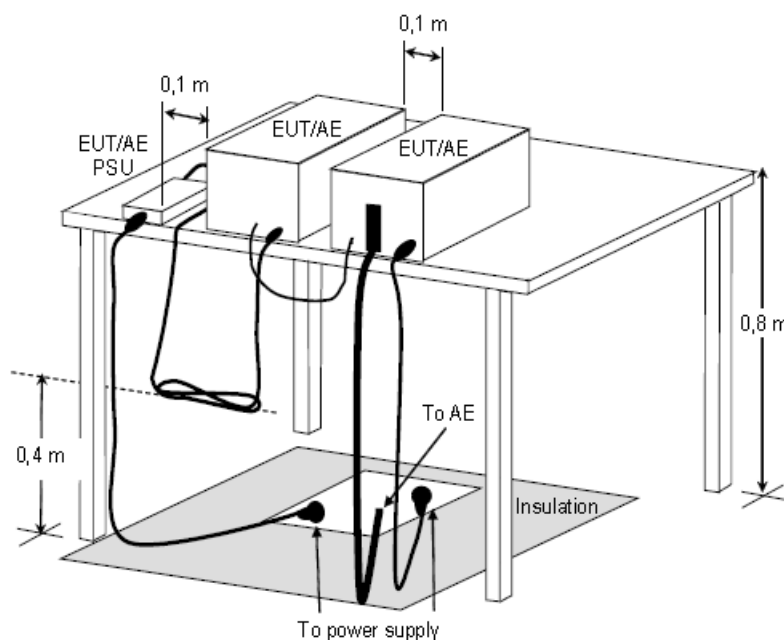
FREQUENCY (MHz)	Class A ($\text{dB}\mu\text{V/m}$) (at 3m)		Class B ($\text{dB}\mu\text{V/m}$) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

- 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)**

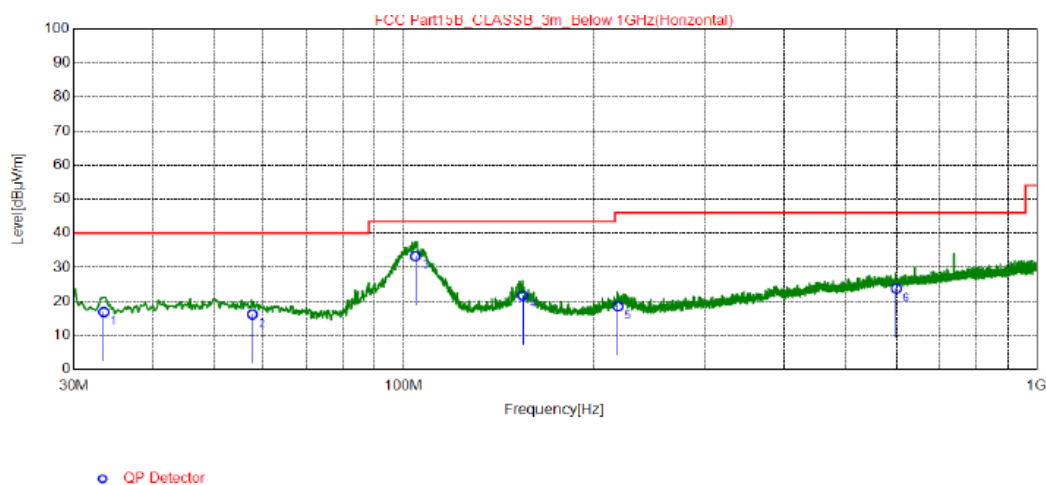


5.4. Measurement Equipment

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMI Test Spectrum ROHDE & SCHWARZ	ESR7	E1R1005	May.11, 2021
Spectrum Analyzer Keysight	N9030B	E1S1003	Aug.03, 2021
Broad-Band Antenna Schwarzbeck	VULB9168	E1A1001	Jul.27, 2021
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

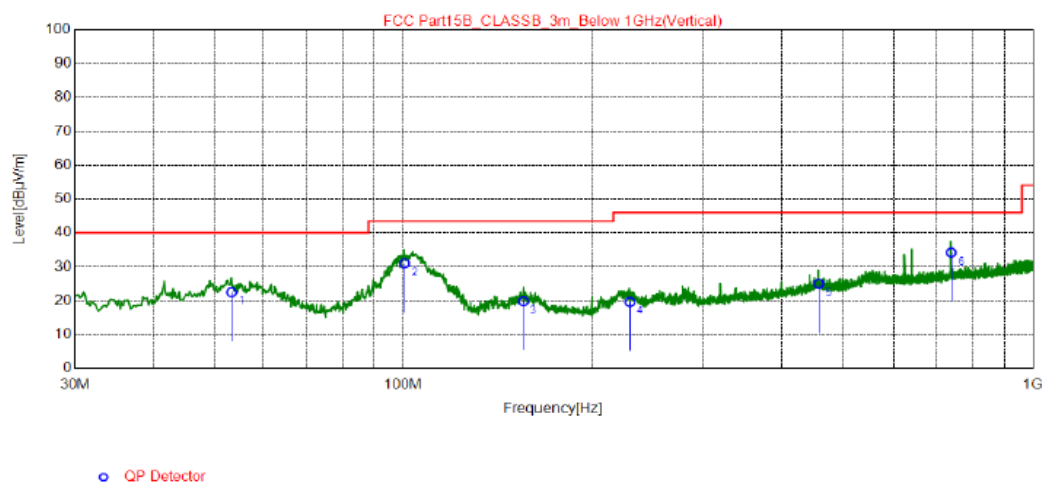


NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.49	28.05	-11.24	16.81	40.00	23.19	200	102	Horizontal
2	57.54	26.27	-10.13	16.14	40.00	23.86	200	340	Horizontal
3	104.3	47.65	-14.44	33.21	43.50	10.29	200	259	Horizontal
4	154.3	31.64	-9.92	21.72	43.50	21.78	200	102	Horizontal
5	218.3	30.27	-11.78	18.49	46.00	27.51	200	259	Horizontal
6	599.0	26.23	-2.46	23.77	46.00	22.23	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



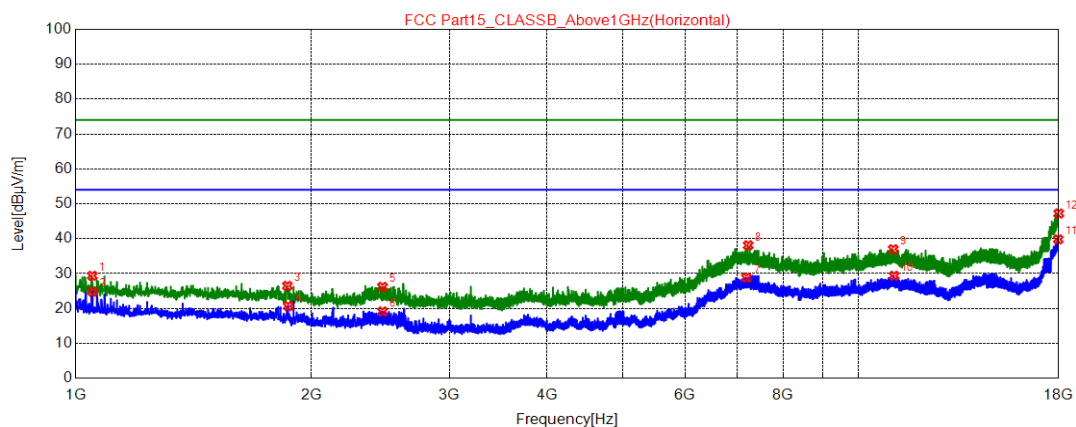
NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	53.28	32.41	-9.89	22.52	40.00	17.48	100	340	Vertical
2	100.4	45.92	-14.92	31.00	43.50	12.50	100	69	Vertical
3	155.3	29.71	-9.89	19.82	43.50	23.68	100	154	Vertical
4	229.4	31.02	-11.42	19.60	46.00	26.40	100	62	Vertical
5	458.3	30.01	-5.03	24.98	46.00	21.02	100	228	Vertical
6	740.6	35.01	-0.82	34.19	46.00	11.81	100	165	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



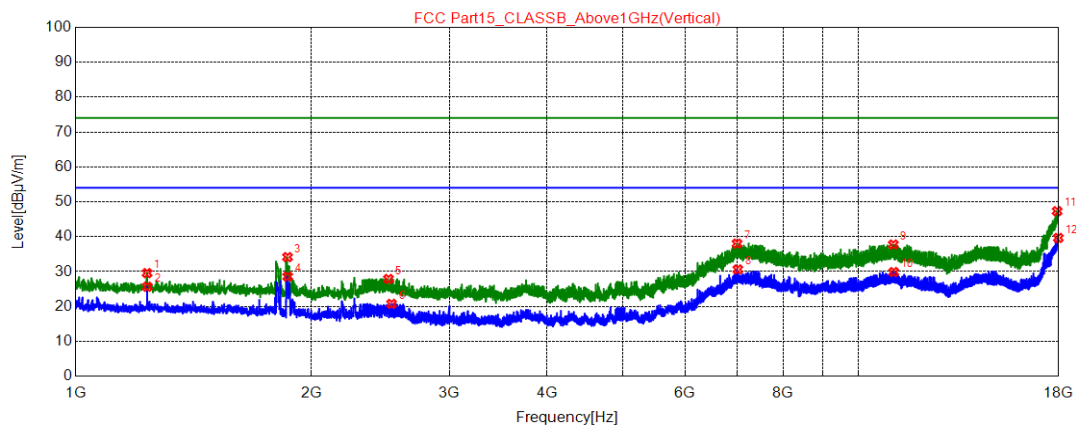
★ AV Detector

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	1050.1500	49.73	29.37	74.00	44.63	100	290	Horizontal	PK
2	1051.0000	45.17	24.82	54.00	29.18	100	175	Horizontal	AV
3	1863.6000	44.15	26.48	74.00	47.52	100	328	Horizontal	PK
4	1867.8500	38.34	20.68	54.00	33.32	100	59	Horizontal	AV
5	2464.5500	41.76	26.20	74.00	47.80	100	214	Horizontal	PK
6	2465.4000	34.70	19.14	54.00	34.86	100	175	Horizontal	AV
7	7185.4500	29.37	28.84	54.00	25.16	100	328	Horizontal	AV
8	7223.7000	38.73	38.11	74.00	35.89	100	175	Horizontal	PK
9	11066.5500	36.53	36.98	74.00	37.02	100	175	Horizontal	PK
10	11092.9000	28.92	29.38	54.00	24.62	100	59	Horizontal	AV
11	17971.1000	25.29	39.80	54.00	14.20	100	252	Horizontal	AV
12	18000.0000	32.40	47.21	74.00	26.79	100	214	Horizontal	PK

REMARKS:

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

Position: Vertical



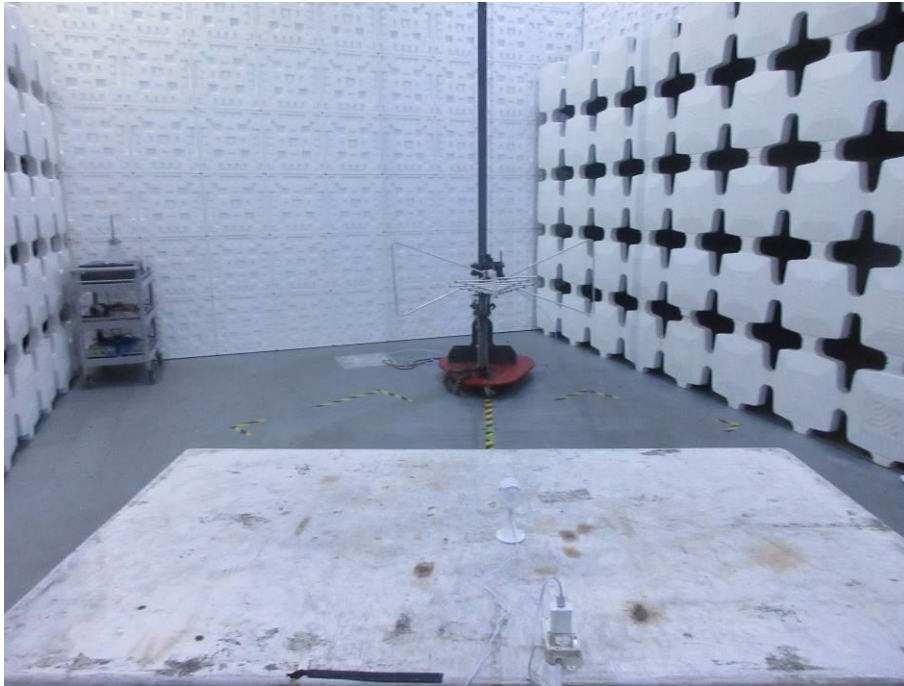
★ AV Detector

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	1233.7500	49.29	29.56	74.00	44.44	100	301	Vertical	PK
2	1234.6000	45.37	25.64	54.00	28.36	100	340	Vertical	AV
3	1864.4500	51.82	34.15	74.00	39.85	100	223	Vertical	PK
4	1865.3000	46.23	28.56	54.00	25.44	100	223	Vertical	AV
5	2508.7500	43.29	27.88	74.00	46.12	100	185	Vertical	PK
6	2531.7000	36.08	20.75	54.00	33.25	100	30	Vertical	AV
7	6990.8000	38.14	38.01	74.00	35.99	100	108	Vertical	PK
8	7006.9500	30.69	30.61	54.00	23.39	100	69	Vertical	AV
9	11068.2500	37.30	37.75	74.00	36.25	100	146	Vertical	PK
10	11080.1500	29.40	29.86	54.00	24.14	100	340	Vertical	AV
11	17915.8500	33.38	47.31	74.00	26.69	100	340	Vertical	PK
12	17977.9000	25.05	39.63	54.00	14.37	100	185	Vertical	AV

REMARKS:

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

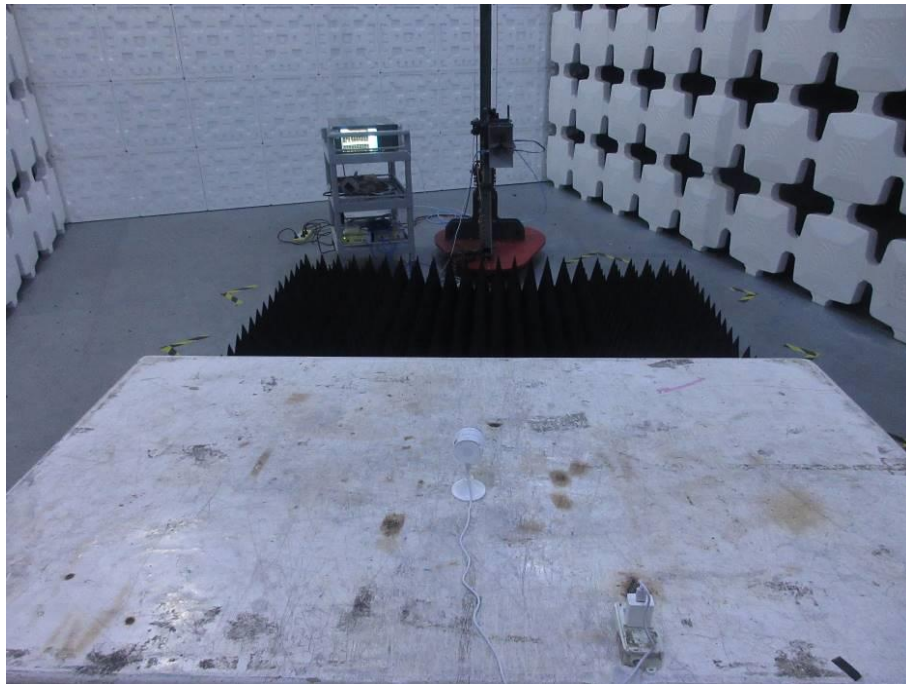
5.7. Test Photographs (30MHz ~ 1000MHz)





**BUREAU
VERITAS**

5.8. Test Photographs (1000MHz ~ 18000MHz)



6. Photographs of EUT



--- END ---