



TEST REPORT

Report No.: ARFR-19MY2317VTSHPB

Test Model: SC004-WA2

Received: May.22, 2019

ISSUED: Jun.06, 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, Xinzhuang Road, Shanghai, P.R.China (201612)

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Contents

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	12
5. Test of Radiated Emission	13
5.1. Test Limit	13
5.2. Test Procedures	14
5.3. Typical Test Setup	14
5.4. Measurement Equipment	15
5.5. Test Result and Data (30MHz ~ 1GHz).....	16
5.6. Test Result and Data (1GHz ~ 18GHz)	18
5.7. Test Photographs (30MHz ~ 1000MHz)	20
5.8. Test Photographs (1000MHz ~ 18000MHz)	21
6. Photographs of EUT	22



1. TEST PROGRAM

PRODUCT: Camera

TEST MODEL: SC004-WA2

SERIES MODEL: SC004-WA2/ SC004-WB2

APPLICANT: Hangzhou Tuya Information Technology Co., Ltd

TESTED: May.22, 2019 to Jun.06, 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:** Jun.06, 2019
Will YAN
Project Engineer

APPROVED BY : Daniel Sun, **DATE:** Jun.06, 2019
Daniel Sun
RF Supervisor





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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.



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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:	SC004-WA2
Series Model:	SC004-WA2/SC004-WB2
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	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	3.22 dB
	Above 1GHz



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

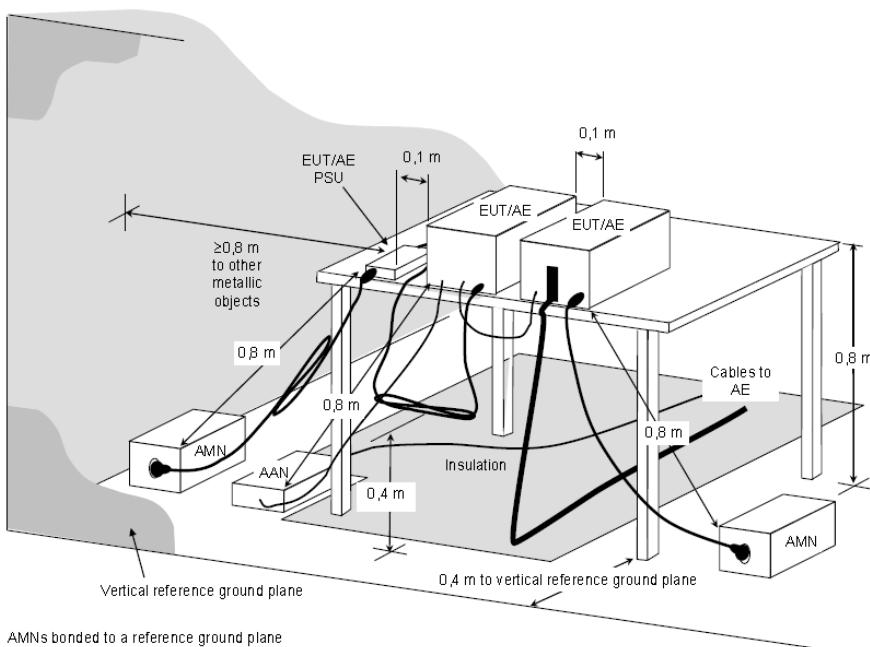
NOTES:

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.

4.2. Test Procedures

- a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a Artificial Mains Network (AMN).
- c. All the support units are connecting to the other AMN.
- d. The AMN provides 50 ohm coupling impedance for the measuring instrument.
- e. The CISPR states that a 50 ohm, 50 micro-Henry AMN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

4.3. Typical Test Setup



NOTE The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be ≥ 0.8 m.

**Figure D.2 – Example measurement arrangement for table-top EUT
(Conducted emission measurement – alternative 1)**



4.4. Measurement Equipment

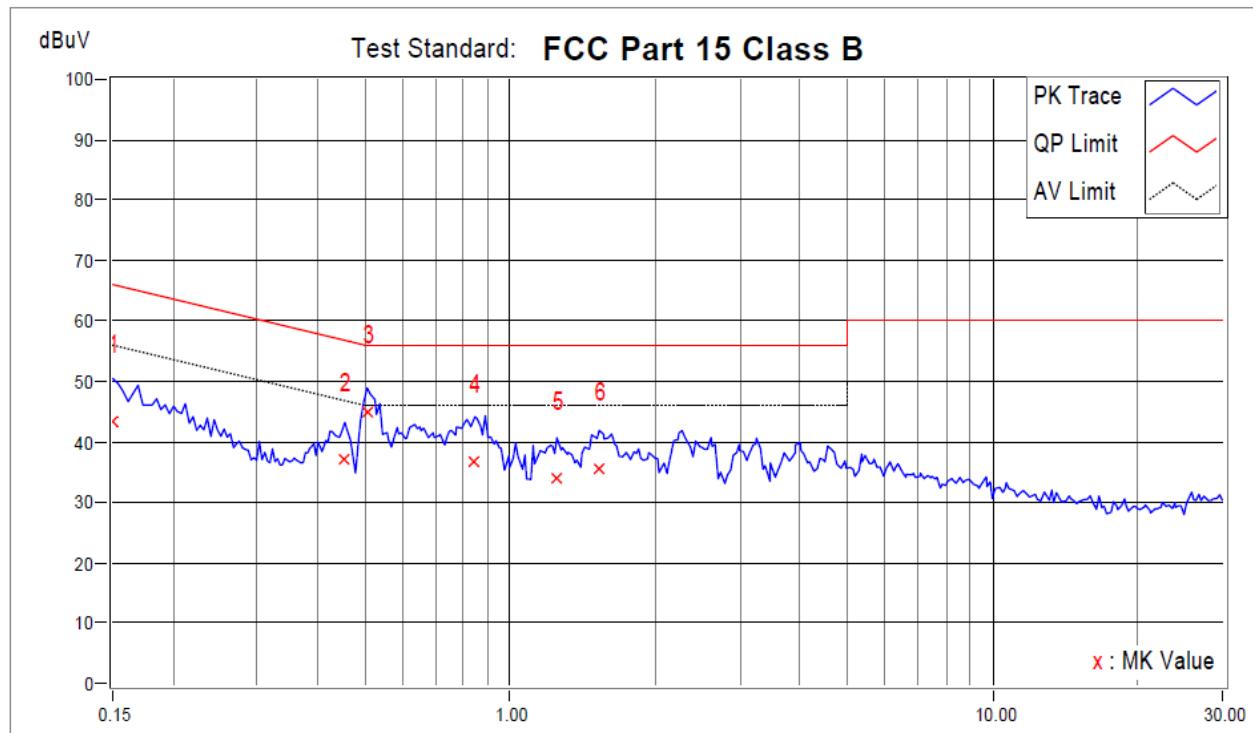
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	E1R1001	Mar.04, 2020
LISN ROHDE & SCHWARZ	ENV216	E1L1011	Jul.18, 2019
Software ADT	ADT_Cond_V7.3.0	N/A	N/A

4.5. Test Result and Data

4.5.1 Conducted Emission Test Data

Phase : LINE

Location: Conduction 1 Date: 6/1/2019 Time: 10:32:36 AM Phase L1
 Temperatuer (C): 22 Humidity (%): 48 Approved by:



V7.3.1

	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
			MHz	dB	QP	AV	QP	AV	QP	AV	
No.											
1	0.15000	9.86	33.66	17.03	43.52	26.89	66.00	56.00	-22.48	-29.11	
2	0.45498	9.74	27.26	17.41	37.00	27.15	56.78	46.78	-19.79	-19.64	
+3	0.50581	9.74	35.20	26.65	44.94	36.39	56.00	46.00	-11.06	-9.61	
4	0.84598	9.61	27.02	18.54	36.63	28.15	56.00	46.00	-19.37	-17.85	
5	1.25024	9.66	24.20	14.87	33.86	24.53	56.00	46.00	-22.14	-21.47	
6	1.53176	9.71	25.84	16.77	35.55	26.48	56.00	46.00	-20.45	-19.52	

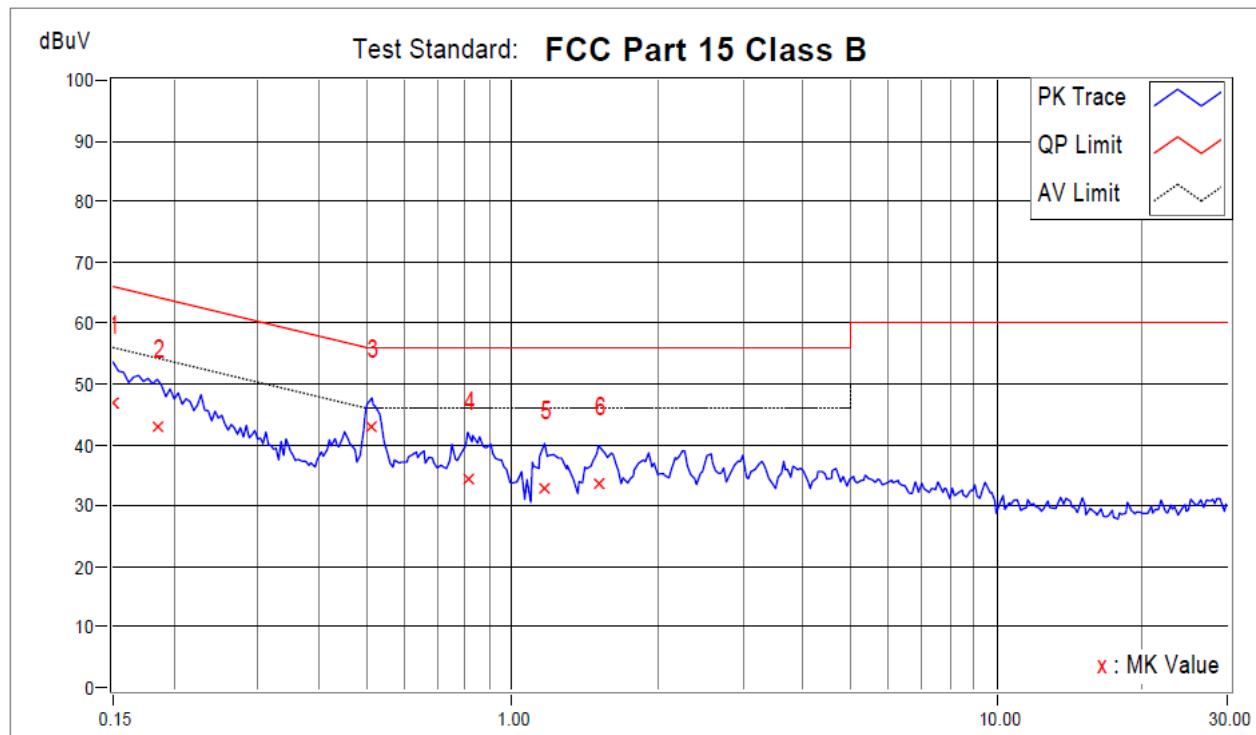
REMARKS:

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: 6/1/2019 Time: 10:29:01 AM Phase N

Temperatuer (C): 22 Humidity (%): 48 Approved by:



V7.3.1

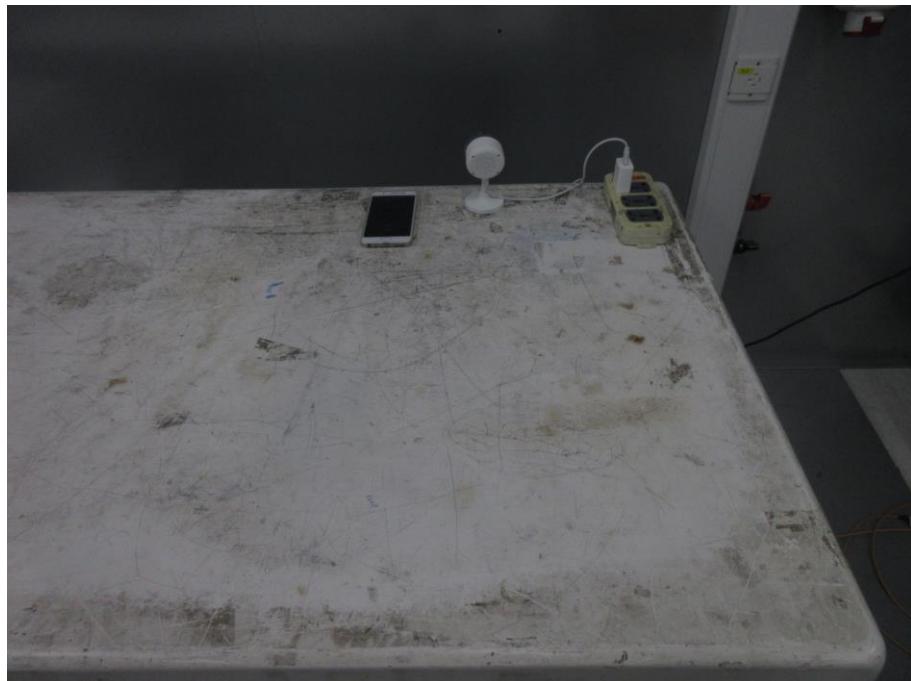
	Frequency	Corr. Factor	Reading dBuV		Emission dBuV		Limit dBuV		Margins dB		Notes
	No.	MHz	dB	QP	AV	QP	AV	QP	AV	QP	AV
1	0.15000	9.87	37.06	20.23	46.93	30.10	66.00	56.00	56.00	-19.07	-25.90
2	0.18519	9.83	33.16	18.87	42.99	28.70	64.25	54.25	54.25	-21.25	-25.54
+3	0.51363	9.86	33.28	25.44	43.14	35.30	56.00	46.00	46.00	-12.86	-10.70
4	0.81079	9.91	24.42	15.49	34.33	25.40	56.00	46.00	46.00	-21.67	-20.60
5	1.16813	9.92	22.80	13.55	32.72	23.47	56.00	46.00	46.00	-23.28	-22.53
6	1.50830	9.93	23.58	14.34	33.51	24.27	56.00	46.00	46.00	-22.49	-21.73

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)	
	µV/m	dBµV/m	µV/m	dBµV/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

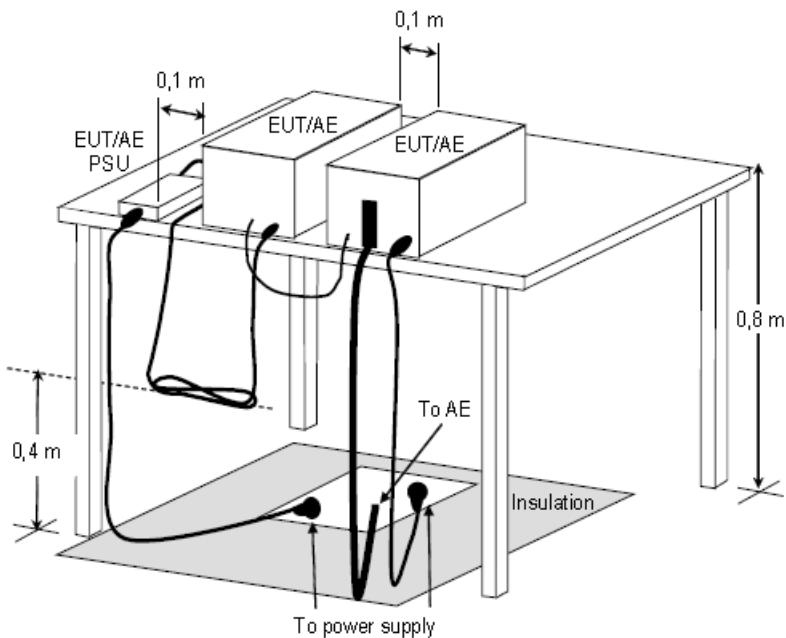
FREQUENCY (MHz)	Class A (dBµV/m) (at 3m)		Class B (dBµV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

Note: (1) The lower limit shall apply at the transition frequencies.
(2) Emission level (dB μ V/m) = 20 log Emission level (uV/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

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3/10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. 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.
- e. 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.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. 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)**



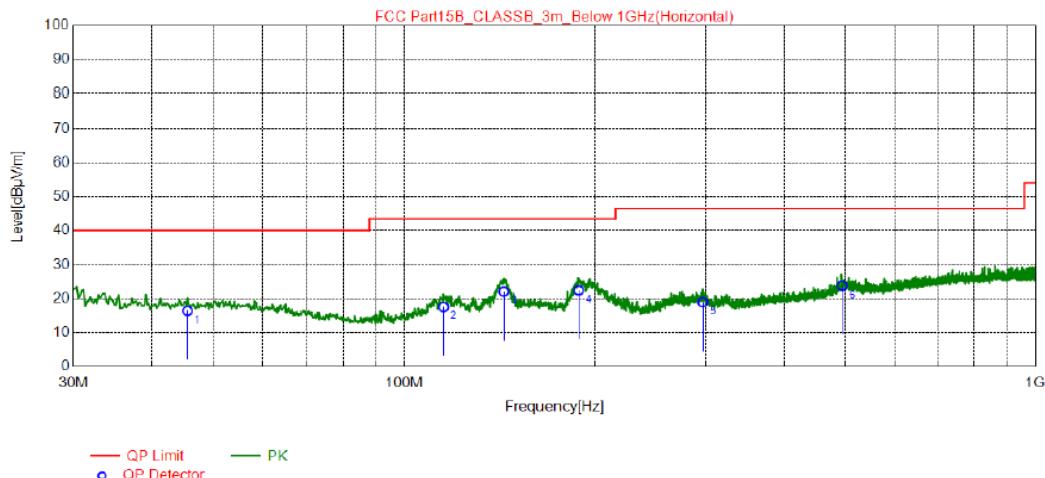
5.4. Measurement Equipment

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMI Test Spectrum ROHDE & SCHWARZ	ESR7	E1R1005	Dec.03, 2019
Spectrum Analyzer Keysight	N9030B	E1S1003	Jul.23, 2019
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.19, 2019

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

Position: Horizontal

Test Graph



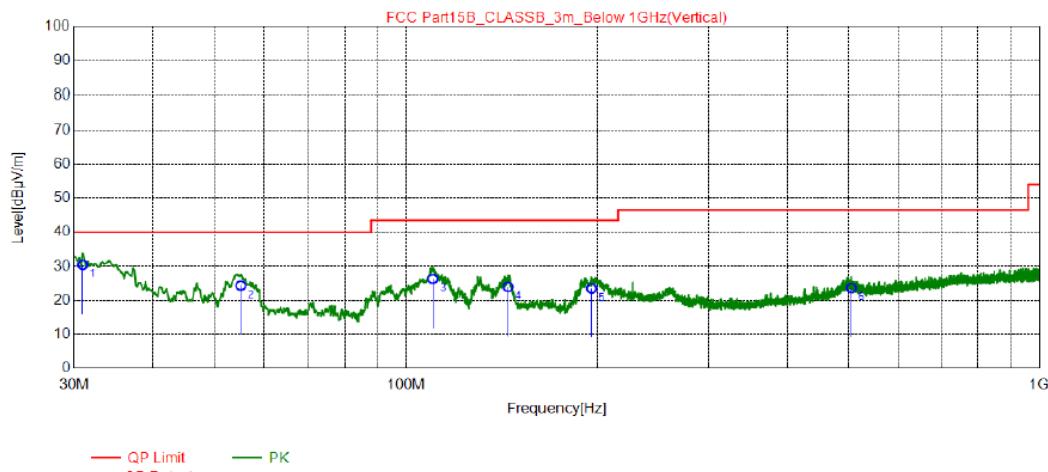
NO.	Freq. [MHz]	QP Reading [dB μ V/m]	Factor [dB]	QP Value [dB μ V/m]	QP Limit [dB μ V/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	45.52	26.01	-9.59	16.42	40.00	23.58	100	107	Horizontal
2	115.3	29.41	-11.89	17.52	43.50	25.98	200	265	Horizontal
3	143.6	31.88	-9.85	22.03	43.50	21.47	200	170	Horizontal
4	188.8	34.26	-11.88	22.38	43.50	21.12	200	136	Horizontal
5	296.9	28.23	-9.28	18.95	46.50	27.55	100	302	Horizontal
6	493.8	29.53	-5.78	23.75	46.50	22.75	100	223	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 [dB μ V/m]	Factor [dB]	QP Value [dB μ V/m]	QP Limit [dB μ V/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.97	41	-10.59	30.41	40.00	9.59	100	100	Vertical
2	55.02	34.41	-10.13	24.28	40.00	15.72	100	290	Vertical
3	110.1	38.35	-12.08	26.27	43.50	17.23	100	73	Vertical
4	144.8	33.66	-9.75	23.91	43.50	19.59	100	168	Vertical
5	196.2	35.63	-12.20	23.43	43.50	20.07	100	231	Vertical
6	504.9	29.32	-5.74	23.58	46.50	22.92	100	190	Vertical

REMARKS:

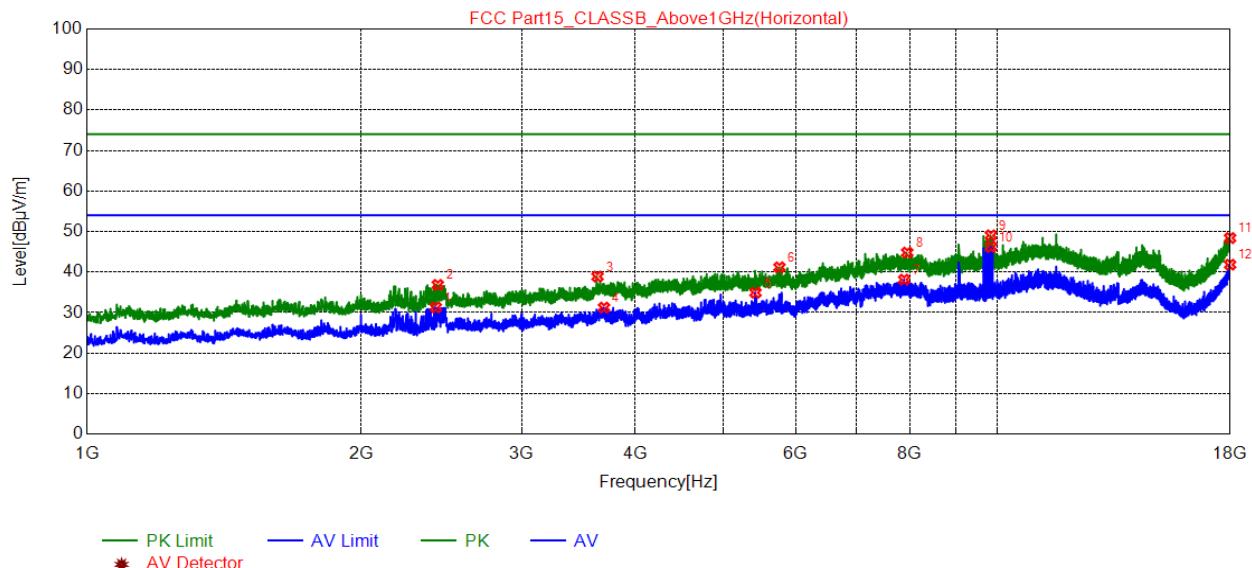
1. Q.P. is abbreviation of quasi-peak individually.
2. The emission levels of other frequencies were very low against the limit.
3. QP Margin value = QP Limit value – QP value
4. Factor = Antenna Factor + Amplifier Factor + Cable loss
5. QP value = Factor + Reading Value.



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

Position: Horizontal

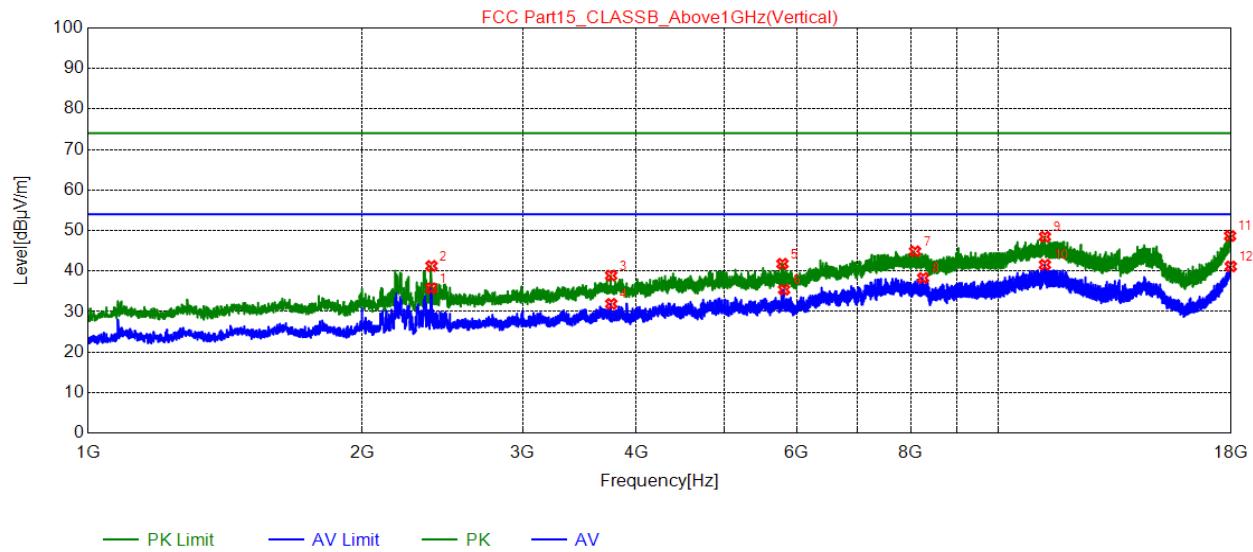


NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2415.2500	47.18	31.27	54.00	22.73	100	328	Horizont	AV
2	2427.1500	52.73	36.84	74.00	37.16	100	328	Horizont	PK
3	3635.0000	51.30	38.90	74.00	35.10	100	289	Horizont	PK
4	3695.3500	43.49	31.23	54.00	22.77	100	136	Horizont	AV
5	5420.0000	43.82	34.92	54.00	19.08	100	175	Horizont	AV
6	5758.3000	49.56	41.18	74.00	32.82	100	251	Horizont	PK
7	7891.8000	41.25	38.13	54.00	15.87	100	213	Horizont	AV
8	7953.8500	47.83	44.81	74.00	29.19	100	213	Horizont	PK
9	9828.1000	50.47	49.06	74.00	24.94	100	213	Horizont	PK
10	9828.9500	47.62	46.21	54.00	7.79	100	213	Horizont	AV
11	17991.5000	36.51	48.39	74.00	25.61	100	136	Horizont	PK
12	17992.3500	29.95	41.83	54.00	12.17	100	98	Horizont	AV

REMARKS:

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

Position: Vertical

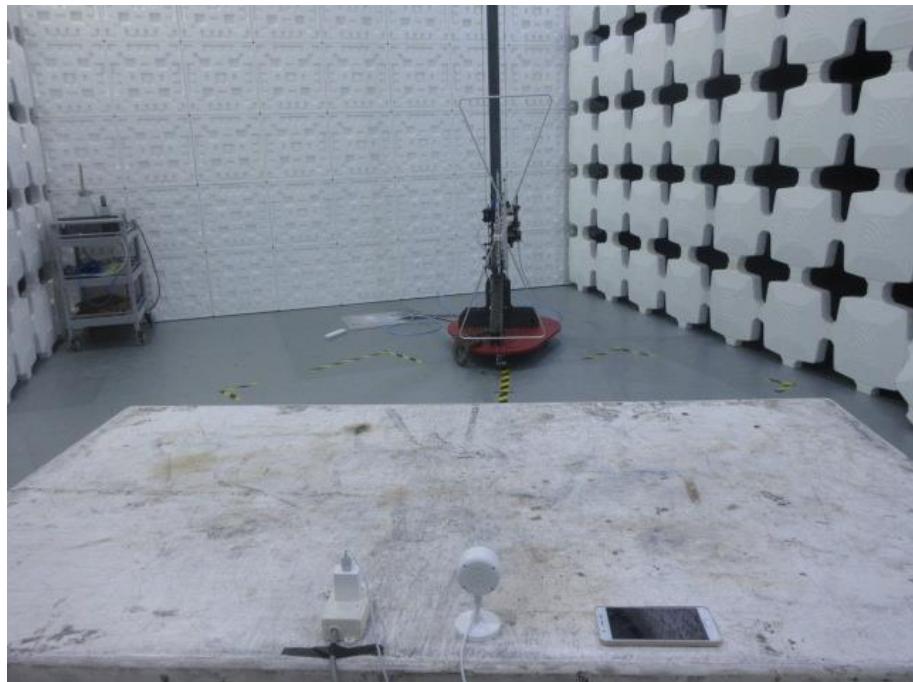


NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Detector
1	2382.1000	51.73	35.75	54.00	18.25	100	263	Vertical	AV
2	2382.9500	57.24	41.26	74.00	32.74	100	225	Vertical	PK
3	3753.1500	51.02	38.89	74.00	35.11	100	263	Vertical	PK
4	3754.0000	44.02	31.90	54.00	22.10	100	263	Vertical	AV
5	5787.2000	50.12	41.79	74.00	32.21	100	225	Vertical	PK
6	5811.8500	43.71	35.40	54.00	18.60	100	225	Vertical	AV
7	8091.5500	47.96	44.86	74.00	29.14	100	33	Vertical	PK
8	8259.8500	41.68	38.29	54.00	15.71	100	263	Vertical	AV
9	11236.5500	46.79	48.46	74.00	25.54	100	225	Vertical	PK
10	11237.4000	39.88	41.55	54.00	12.45	100	263	Vertical	AV
11	17948.1500	37.16	48.66	74.00	25.34	100	263	Vertical	PK
12	17979.6000	29.37	41.14	54.00	12.86	100	33	Vertical	AV

REMARKS:

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

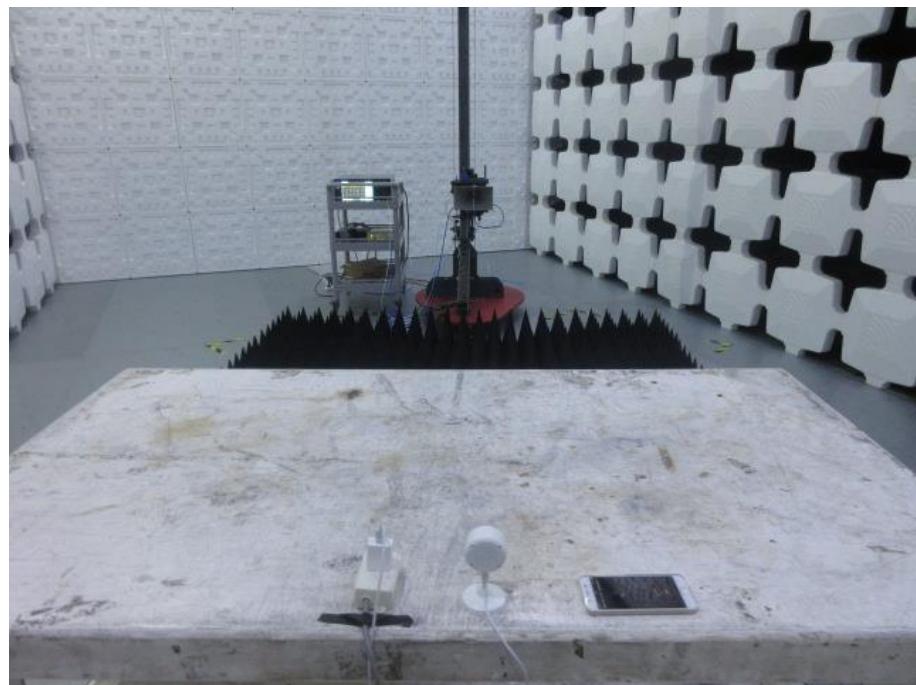
5.7. Test Photographs (30MHz ~ 1000MHz)





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5.8. Test Photographs (1000MHz ~ 18000MHz)





6. Photographs of EUT



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