

FCC TEST REPORT

Report No.: ARFR-19AU0430VTSHPB-3

Test Model: SC002-WM2

Received: Sept.05, 2019

ISSUED: Sept.27, 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, Xinzhuan 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: Smart Camera
TEST MODEL: SC002-WM2
SERIES MODEL: --
APPLICANT: Hangzhou Tuya Information Technology Co., Ltd
TESTED: Sept.05 to Spet.24, 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:** Sept.27, 2019
Will YAN

Project Engineer

APPROVED BY : Daniel Sun, **DATE:** Sept.27, 2019
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

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:	SC002-WM2
Series Model:	--
Model Discrepancy:	--
EUT Power Rating:	5VDC/1A with adaptor 100-240Vac~, 50/60Hz

Note: Please refer to user manual.

3.3 Description of support units

NO.	PRODUCT	BRAND	MODEL NO.
1	AC adapter	--	KA1517-0502000USU
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.04, 2020
LISN ROHDE & SCHWARZ	ENV216	E1L1011	Jul.17, 2020
Software ADT	ADT_Cond_V7.3.0	N/A	N/A



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4.5 Test Result and Data

a. Conducted Emission Test Data

Phase : LINE

Location: Conduction 1

Date: 9/17/2019

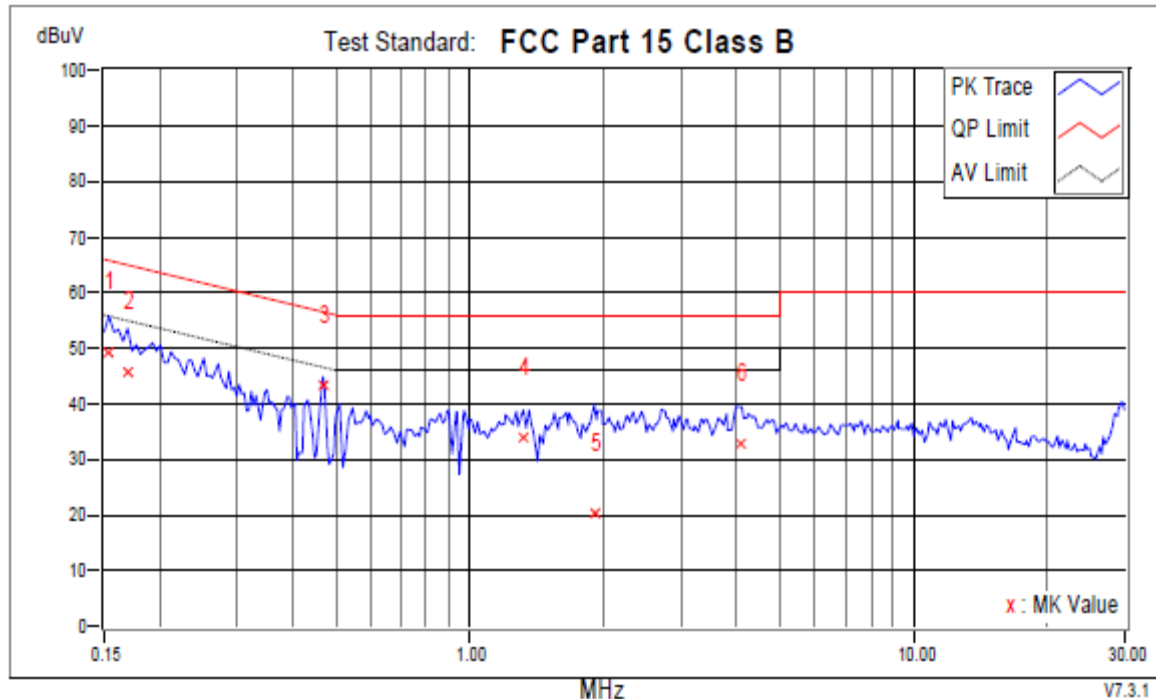
Time: 1:50:43 PM

Phase L1

Temperatuer (C): 22

Humidity (%): 48

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	0.15391	10.28	39.07	22.55	49.35	32.83	65.79	55.79	-16.44	-22.96	
2	0.16955	10.27	35.48	18.83	45.75	29.10	64.98	54.98	-19.23	-25.88	
+3	0.46671	10.11	33.19	30.94	43.30	41.05	56.57	46.57	-13.27	-5.52	
4	1.32062	10.02	23.83	11.09	33.85	21.11	56.00	46.00	-22.15	-24.89	
5	1.90712	10.02	10.41	-0.56	20.43	9.46	56.00	46.00	-35.57	-36.54	
6	4.10063	10.10	22.66	14.97	32.76	25.07	56.00	46.00	-23.24	-20.93	

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

Location: Conduction 1

Date: 9/17/2019

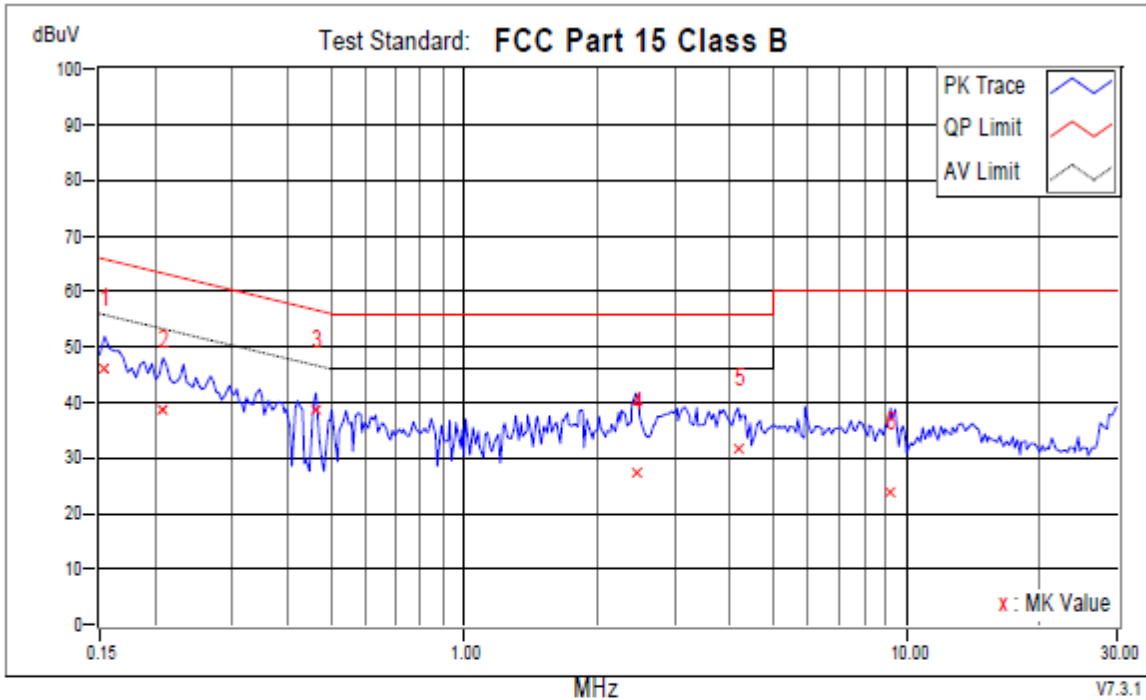
Time: 1:59:14 PM

Phase N

Temperatuer (C): 22

Humidity (%): 48

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	0.15391	10.39	35.62	16.29	46.01	26.68	65.79	55.79	-19.78	-29.11	
2	0.20865	10.34	28.36	9.19	38.70	19.53	63.26	53.26	-24.55	-33.72	
+3	0.46280	10.22	28.60	20.67	38.82	30.89	56.64	46.64	-17.82	-15.75	
4	2.44670	10.15	17.23	5.59	27.38	15.74	56.00	46.00	-28.62	-30.26	
5	4.16319	10.21	21.27	8.54	31.48	18.75	56.00	46.00	-24.52	-27.25	
6	9.21100	10.17	13.58	4.35	23.75	14.52	60.00	50.00	-36.25	-35.48	

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.



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

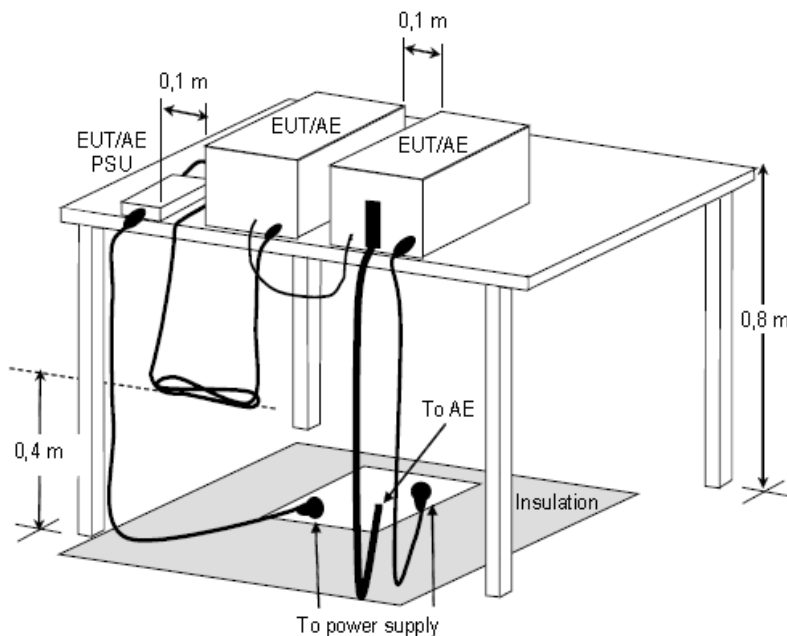
FREQUENCY (MHz)	Class A ($\text{dB}\mu\text{V/m}$) (at 3m)		Class B ($\text{dB}\mu\text{V/m}$) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

- 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

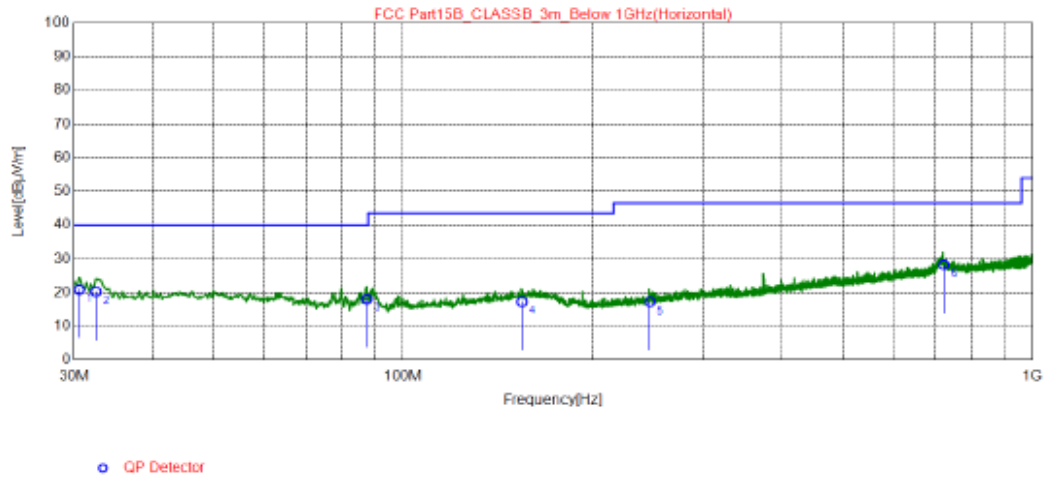
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMI Test Spectrum ROHDE & SCHWARZ	ESR7	E1R1005	Dec.03, 2019
Spectrum Analyzer Keysight	N9030B	E1S1003	Jul.22, 2020
Broad-Band Antenna Schwarzbeck	VULB9168	E1A1012	Aug.25, 2020
Double Riaged Vroadband Horn Antenna Schwarzbeck	BBHA9120D	E1A1017	Jan.26, 2020
Preamplifier Agilent	8447D	E1A2001	Oct.14, 2019
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	30.58	31.51	-10.64	20.87	40.00	19.13	200	133	Horizontal
2	32.52	30.61	-10.39	20.22	40.00	19.78	100	178	Horizontal
3	87.61	32.37	-14.33	18.04	40.00	21.96	200	171	Horizontal
4	154.5	26.37	-9.13	17.24	43.50	26.26	100	39	Horizontal
5	246.8	27.77	-10.54	17.23	46.50	29.27	200	275	Horizontal
6	723.1	30.22	-2.00	28.22	46.50	18.28	100	185	Horizontal

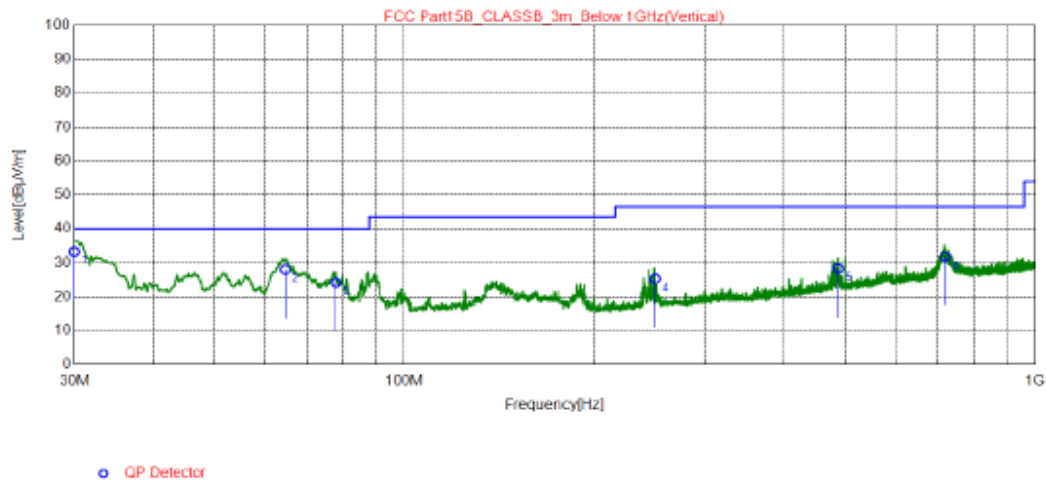
REMARKS:

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	30.00	43.97	-10.71	33.26	40.00	6.74	100	210	Vertical
2	64.72	39.32	-11.29	28.03	40.00	11.97	100	343	Vertical
3	77.91	37.57	-13.41	24.16	40.00	15.84	100	82	Vertical
4	249.9	35.7	-10.43	25.27	46.50	21.23	100	156	Vertical
5	487.2	33.99	-5.72	28.27	46.50	18.23	100	292	Vertical
6	720.4	33.95	-2.07	31.88	46.50	14.62	100	184	Vertical

REMARKS:

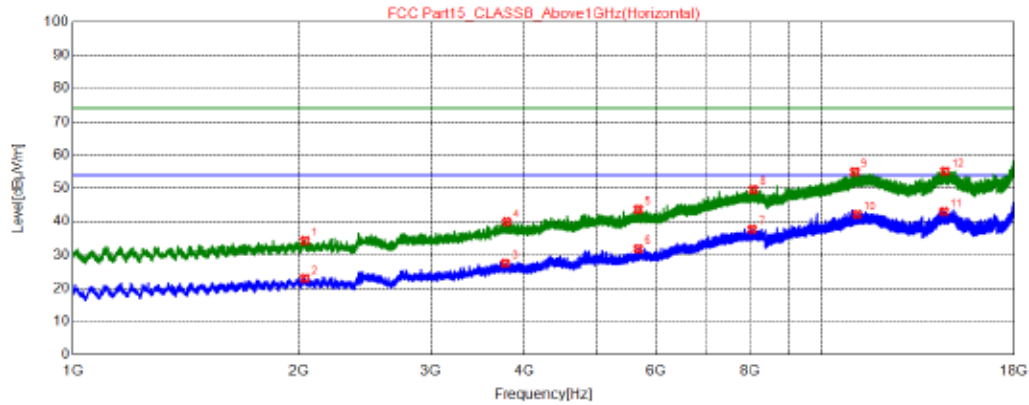
1. Q.P. is abbreviation of quasi-peak individually.
2. The emission levels of other frequencies were very low against the limit.
3. QP Margin value = QP Limit value – QP value
4. Factor = Antenna Factor + Amplifier Factor + Cable loss
5. QP value = Factor + Reading Value.



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

Position: Horizontal

Test Graph



• AV Detector

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2039.	36.06	-1.82	34.24	74.00	39.76	100	32	Horizontal
2	2039.	24.77	-1.82	22.95	54.00	31.05	100	343	Horizontal
3	3772.	24.40	3.09	27.49	54.00	26.51	100	311	Horizontal
4	3789.	36.77	3.13	39.90	74.00	34.10	100	249	Horizontal
5	5676.	35.79	7.89	43.68	74.00	30.32	100	95	Horizontal
6	5677.	24.01	7.89	31.90	54.00	22.10	100	95	Horizontal
7	8050.	23.01	14.62	37.63	54.00	16.37	100	95	Horizontal
8	8080.	35.09	14.58	49.67	74.00	24.33	100	249	Horizontal
9	11035	35.46	19.47	54.93	74.00	19.07	100	280	Horizontal
10	11117	22.51	19.66	42.17	54.00	11.83	100	95	Horizontal
11	14511	20.26	22.66	42.92	54.00	11.08	100	0	Horizontal
12	14566	32.61	22.50	55.11	74.00	18.89	100	95	Horizontal

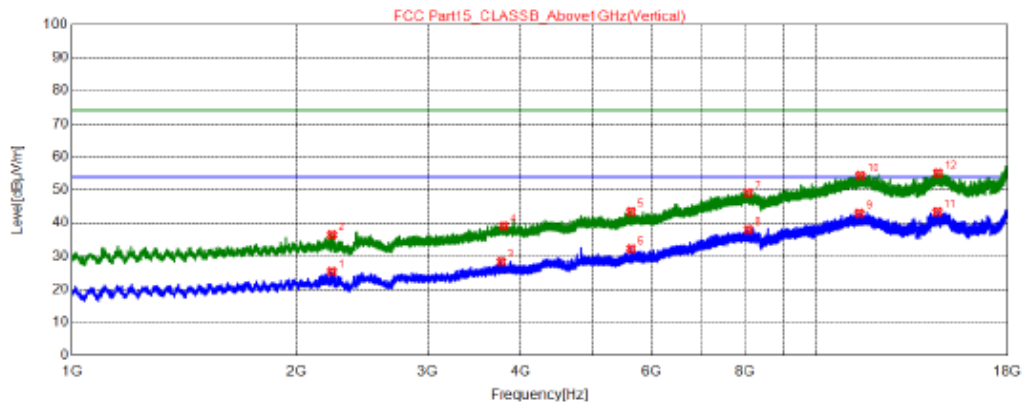
REMARKS:

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



Position: Vertical

Test Graph



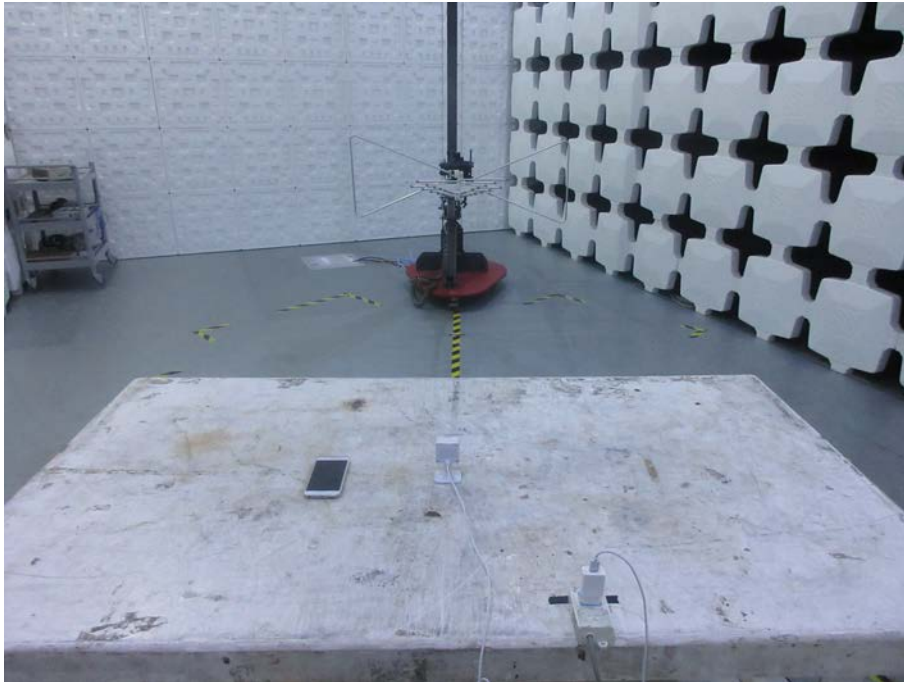
● AV Detector

NO.	Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2233.	26.68	-1.41	25.27	54.00	28.73	100	154	Vertical
2	2234.	37.83	-1.41	36.42	74.00	37.58	100	123	Vertical
3	3769.	25.22	3.08	28.30	54.00	25.70	100	123	Vertical
4	3798.	35.93	3.16	39.09	74.00	34.91	100	154	Vertical
5	5628.	35.62	7.76	43.38	74.00	30.62	100	123	Vertical
6	5629.	24.54	7.76	32.30	54.00	21.70	100	123	Vertical
7	8077.	34.46	14.58	49.04	74.00	24.96	100	29	Vertical
8	8085.	23.41	14.57	37.98	54.00	16.02	100	92	Vertical
9	11398	22.86	20.01	42.87	54.00	11.13	100	311	Vertical
10	11436	34.24	20.05	54.29	74.00	19.71	100	343	Vertical
11	14496	20.63	22.69	43.32	54.00	10.68	100	279	Vertical
12	14526	32.48	22.61	55.09	74.00	18.91	100	92	Vertical

REMARKS:

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

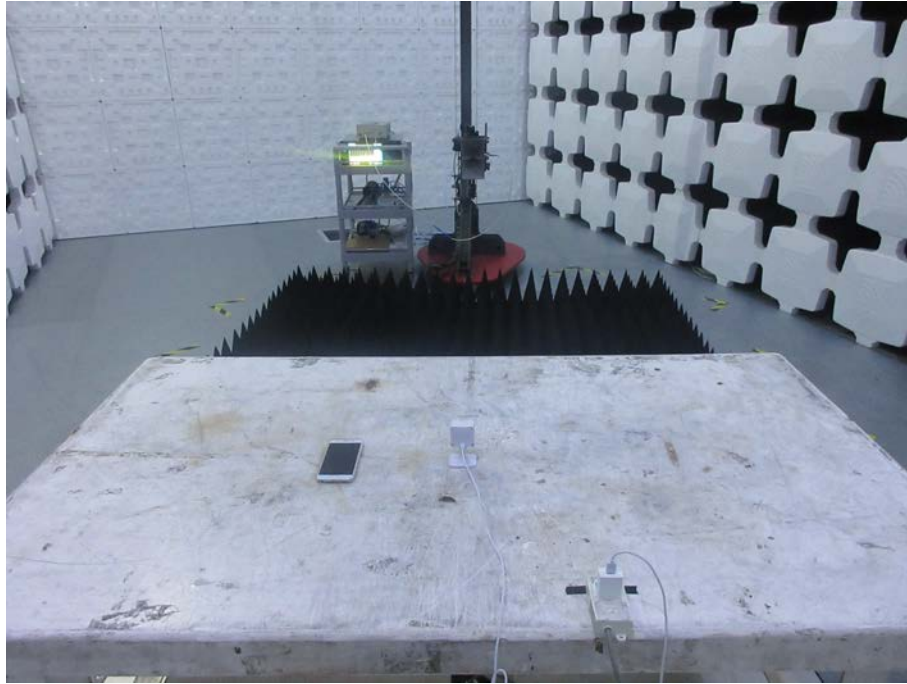
5.7 Test Photographs (30MHz ~ 1000MHz)





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5.8 Test Photographs (1000MHz ~ 18000MHz)



6 Photographs of EUT



--- END ---