



FCC DOC TEST REPORT

According to

**47 CFR, Part 2, Part 15, CISPR PUB. 22,
ICES 003 Issue 6**

Applicant : Zhejiang Dahua Vision Technology Co., Ltd.

Address : No.1199, Bin'an Road, Binjiang District, Hangzhou, P.R.
China

Equipment : Outdoor Station

Model No. : DH-VTO1220B, OEM-VTO1220B, DH-VTO1220BW,
OEM-VTO1220BW, DHI-VTO1220B, VTO1220B,
DHI-VTO1220BW, VTO1220BW

I HEREBY CERTIFY THAT :

The sample was received on Aug. 03, 2016 and the testing was carried out on Aug. 16, 2016 at CerpPASS Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of CerpPASS Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Ray Chou
EMC/RF B.U. Assistant Manager



FCC TEST REPORT

Issued by:

Cerpass Technology Co.,Ltd

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The test record, data evaluation & Equipment. Under Test configurations represented herein are true and accurate accounts of the measurements of the samples EMC characteristics under the conditions specified in this report.

Laboratory Accreditation:

☒ Cerpass Technology Corporation Test Laboratory

NVLAP LAB Code:	200954-0
TAF LAB Code:	1439



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History of this test report

■ ORIGINAL.

□ Additional attachment as following record:

Report No	Version	Date	Description
SEFD1606291	Rev 01	Sep 27, 2016	Initial Issue



1. Summary of Test Procedure and Test Result

1.1. Applicable Standards

The measurements shown in this test report were made in accordance with the procedures given in ANSI C63.4 – 2014 and the energy emitted by this equipment was passed Part 2, Part 15, CISPR PUB. 22.

The energy emitted by this equipment was passed both Radiated and Conducted Emissions Class B limits.

Test Item	Normative References	Test Result	Remarks
Conducted Emission	ANSI C63.4-2014 FCC Part 15 Subpart B ICES 003 Issue 6	PASS	Meets Class B Limit Minimum passing margin(AV) is -8.87 dB at 16.2300MHz
Radiated Emission	ANSI C63.4-2014 FCC Part 15 Subpart B ICES 003 Issue 6	PASS	Meets Class B Limit Minimum passing margin(QP) is -3.64 dB at 150.2800MHz



2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

Product Name:	Outdoor Station		
Model Name:	DH-VTO1220B, OEM-VTO1220B, DH-VTO1220BW, OEM-VTO1220BW, DHI-VTO1220B, VTO1220B, DHI-VTO1220BW, VTO1220BW		
Model Discrepancy:	1) DH-VTO1220B was selected as the test models and its data have been recorded in this report. 2) These models are similar except for hardware, structure, software and label.		
Adapter	Model No.:	ADS-12B-1212012Gz	
	INPUT:	100-240V~ 50/60Hz Max. 0.3A	
	OUTPUT:	12V, 1.0A	

2.2. Test Manner

- During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- Turn on the power of all equipment.
- The complete test system included Notebook PC-01, Notebook PC-02 and EUT for EMI test.
- The test mode as follow:
Mode 1 Normal Operation
The "Test Mode 1" was reported as final data.

2.3. Description of Test System

No.	Device	Manufacturer	Model No.	Description
1	Notebook PC-01	SONY	PCG-71811P	Non-Shielded, 1.5m (R33021)
2	Notebook PC-02	SONY	PCG-71811P	Non-Shielded, 1.5m (R33021)

Use Cable:

No.	Cable	Quantity	Description
A	LAN Cable	1	Non-Shielded, >3.0m
B	LAN Cable	1	Non-Shielded, >3.0m



2.4. General Information of Test

Test Site :	Cerpass Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582
FCC Registration Number :	TW1079, TW1061,390316, 228391, 641184
IC Registration Number :	4934B-1, 4934E-1, 4934E-2
VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-3428, R-4218 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz
Frequency Range Investigated :	Conducted Emission Test: from 150 kHz to 30 MHz Radiated Emission Test: from 30 MHz to 18,000 MHz
Test Distance :	The test distance of radiated emission below 1GHz from antenna to EUT is 10 M. The test distance of radiated emission above 1GHz from antenna to EUT is 3 M.

2.5. Measurement Uncertainty

Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	LINE / NEUTRAL	3.25 dB
Radiated Emission	30 MHz ~ 1,000 MHz	Vertical / Horizontal	3.93 dB
	1,000 MHz ~ 18,000 MHz	Vertical / Horizontal	5.18 dB

Test results and Measurement uncertainty without any relationship in the test report.



3. Test of Conducted Emission

3.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2014 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

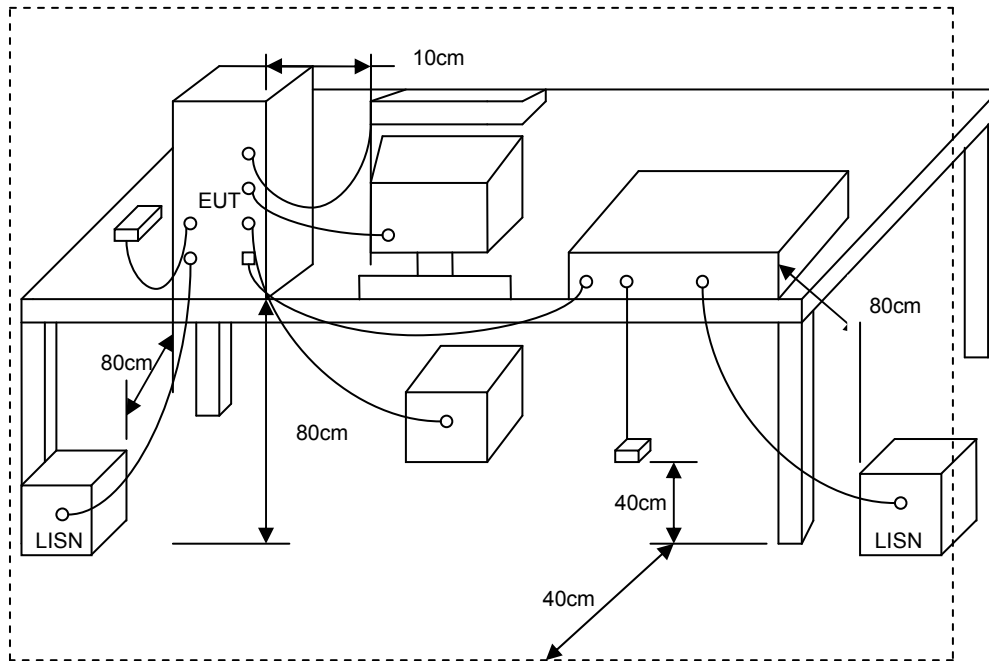
Conducted Emission Limits:

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

3.2. Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

3.3. Typical test Setup



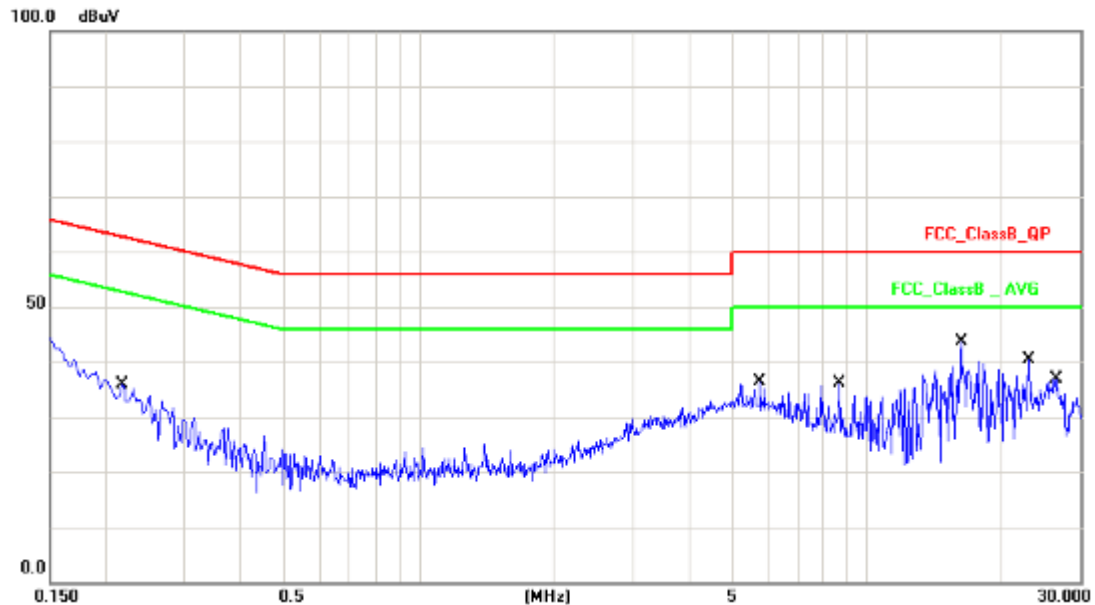
3.4. Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Test Receiver	R&S	ESCI	100565	2016.07.07	2017.07.06
AMN	R&S	ESH2-Z5	100182	2016.08.31	2017.08.30
Two-Line V-Network	R&S	ENV216	100325	/	/
ISN	FCC	FCC-TLISN-T2-02	20379	2016.03.26	2017.03.25
ISN	FCC	FCC-TLISN-T4-02	20380	2016.06.24	2017.06.24
ISN	FCC	FCC-TLISN-T8-02	20381	2016.03.26	2017.03.25
ISN	TESEQ	ISN ST08	30175	2016.03.26	2017.03.25
Current Probe	R&S	EZ-17	100303	2016.03.26	2017.03.25
Passive Voltage Probe	R&S	ESH2-Z3	100026	2016.03.26	2017.03.25
Pulse Limiter	R&S	ESH3-Z2	100529	2016.03.26	2017.03.25
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-004	2016.03.29	2017.03.28
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A



3.5. Test Result and Data

Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 120V/60Hz	Phase :	LINE
Equipment :	Outdoor Station	Model No :	DH-VTO1220B
Temperature :	26°C	Humidity :	54%
Pressure(mbar) :	1002	Date :	2016/08/03

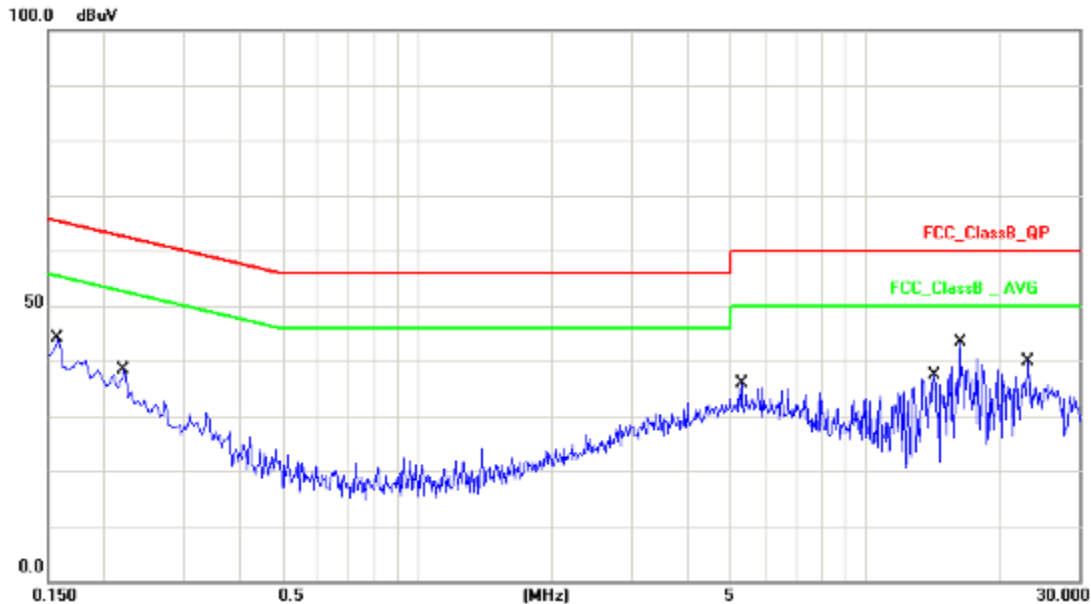


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2180	10.12	19.31	29.43	62.89	-33.46	QP
2	0.2180	10.12	3.00	13.12	52.89	-39.77	AVG
3	5.7860	10.25	21.77	32.02	60.00	-27.98	QP
4	5.7860	10.25	17.22	27.47	50.00	-22.53	AVG
5	8.7180	10.26	21.12	31.38	60.00	-28.62	QP
6	8.7180	10.26	17.33	27.59	50.00	-22.41	AVG
7	16.2300	10.48	32.47	42.95	60.00	-17.05	QP
8	16.2300	10.48	30.65	41.13	50.00	-8.87	AVG
9	23.1299	10.40	27.82	38.22	60.00	-21.78	QP
10	23.1299	10.40	25.09	35.49	50.00	-14.51	AVG
11	26.6100	10.43	24.12	34.55	60.00	-25.45	QP
12	26.6100	10.43	20.24	30.67	50.00	-19.33	AVG

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 120V/60Hz	Phase :	NEUTRAL
Equipment :	Outdoor Station	Model No :	DH-VTO1220B
Temperature :	26°C	Humidity :	54%
Pressure(mbar) :	1002	Date :	2016/08/03



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1580	10.13	27.83	37.96	65.56	-27.60	QP
2	0.1580	10.13	8.07	18.20	55.56	-37.36	AVG
3	0.2220	10.13	18.07	28.20	62.74	-34.54	QP
4	0.2220	10.13	0.98	11.11	52.74	-41.63	AVG
5	5.2980	10.26	22.12	32.38	60.00	-27.62	QP
6	5.2980	10.26	17.76	28.02	50.00	-21.98	AVG
7	14.2140	10.49	26.17	36.66	60.00	-23.34	QP
8	14.2140	10.49	24.35	34.84	50.00	-15.16	AVG
9	16.2300	10.50	32.20	42.70	60.00	-17.30	QP
10	16.2300	10.50	30.45	40.95	50.00	-9.05	AVG
11	23.1299	10.38	28.12	38.50	60.00	-21.50	QP
12	23.1299	10.38	25.37	35.75	50.00	-14.25	AVG

Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Dian

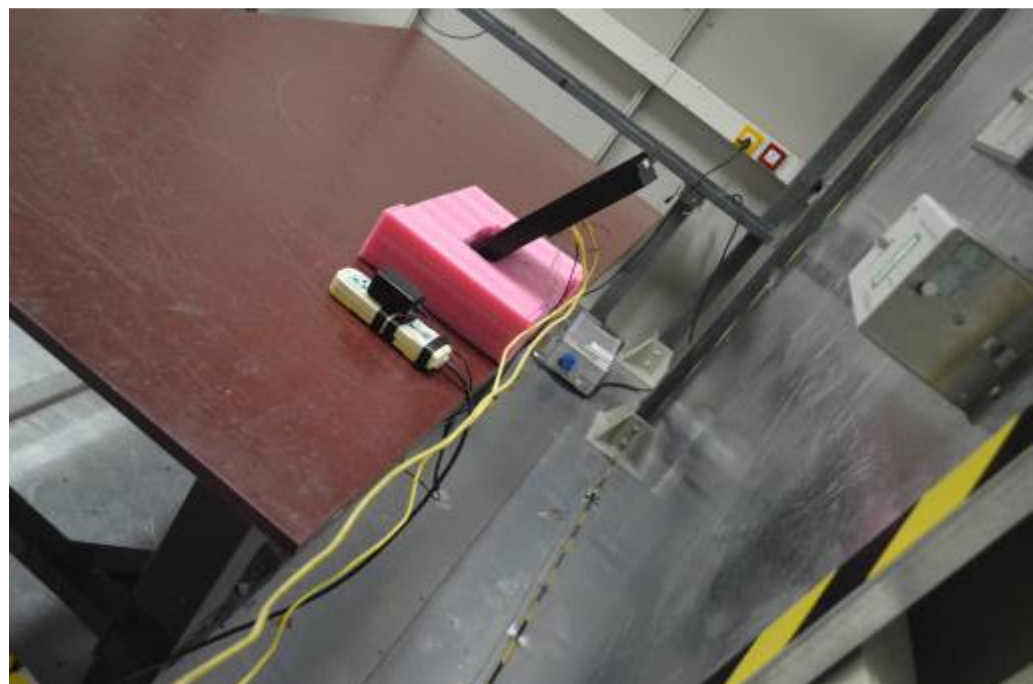


3.6. Test Photographs

Front View



Rear View





4. Test of Radiated Emission

4.1. Test Limit

Below 1GHz (for digital device)

For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the below table.

FREQUENCY (MHz)	dBuV/m (At 10m)	
	Class A	Class B
30 ~ 230	40	30
230 ~ 1000	47	37

Limit tables for non-digital device:

Class A Radiated Emission limit at 10m (for others)

Frequency (MHz)	Field Strength Limit (uV/m)Q.P.	Field Strength Limit (dBuV/m)Q.P.
30 - 88	90	39
88 - 216	150	43.5
216 - 960	210	46.4
Above 960	300	49.5

Class B Radiated Emission limit at 3m (for others)

Frequency (MHz)	Field Strength Limit (uV/m)Q.P.	Field Strength Limit (dBuV/m)Q.P.
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

Above 1GHz(for all device)

Frequency (MHz)	Class A (dBuV/m) (At 10m)		Class B (dBuV/m) (At 3m)	
	Average	Peak	Average	Peak
Above 1000	49.5	69.5	54	74

NOTE: (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

(3) The measurement above 1GHz is at close-in distances 3m, and determine the limit L2 corresponding to the close-in distance d2 by applying the following relation: $L2 = L1 (d1/d2)^2$, where L1 is the specified limit in microvolts per metre (uV/m) at the distance d1 (10m), L2 is the new limit for distance d2 (3m).

So the new Class A limit above 1GHz at 3m is as following table:



Frequency (MHZ)	Class A (dBuV/m) (At 3m)	
	Average	Peak
Above 1000	60	80

According to FCC Part 15.33 (b), for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.75	30
1.75-108	1000
108-500	2000
500-1000	5000
Above 1000	5 th harmonic of the highest frequency or 40GHz, whichever is lower

4.2. Test Procedures

Procedure of Preliminary Test

- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground plane which has a 15 cm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per ANSI C63.4.
- All I/O cables were positioned to simulate typical usage as per ANSI C63.4.
- The EUT received AC 120VAC/60Hz power source from the outlet socket under the turntable. All support equipment power received from another socket under the turntable.
- The antenna was placed at 3 or 10 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- The Analyzer / Receiver quickly scanned from 30MHz to 40GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.



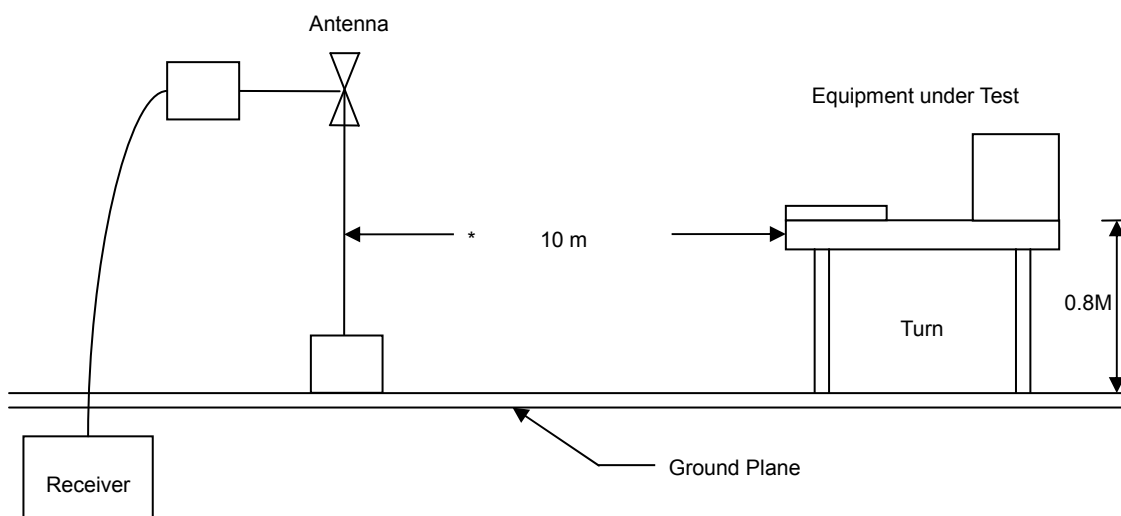
- Set the spectrum analyzer/ Receiver in the following setting as:
Below 1GHz:
RBW=120KHz / VBW=300KHz / Sweep=AUTO
Above 1GHz:
Peak: RBW=1MHz, VBW=3MHz / Sweep=AUTO
Average: RBW=1MHz / VBW=10Hz / Sweep=AUTO
- The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

- EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 40GHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 or 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- Recording at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. Below 1GHz the Q.P. reading and above 1GHz the Peak and Average reading are presented.
- The test data of the worst-case condition(s) was recorded.

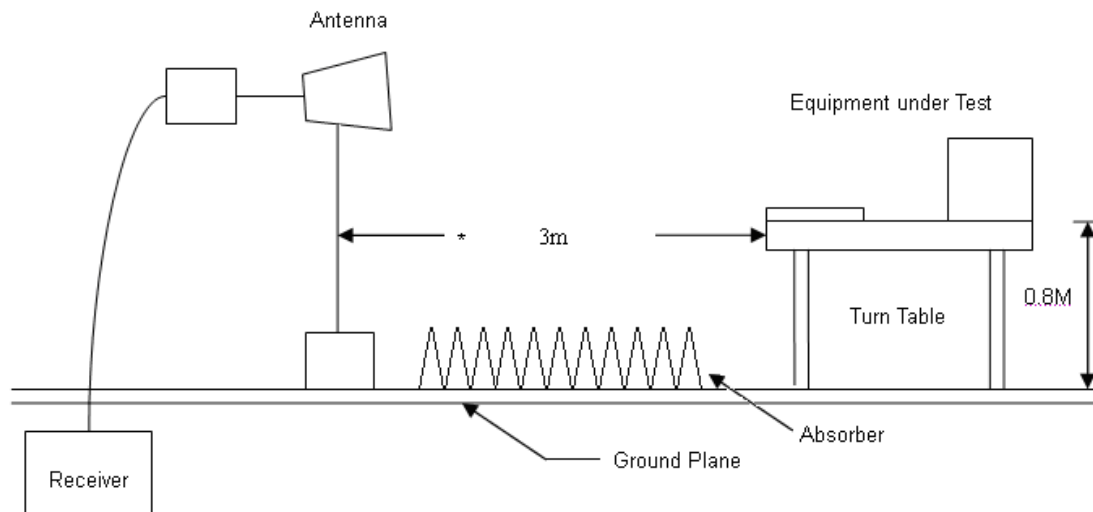
4.3. Typical test Setup

Below 1GHz Test Setup





Above 1GHz Test Setup

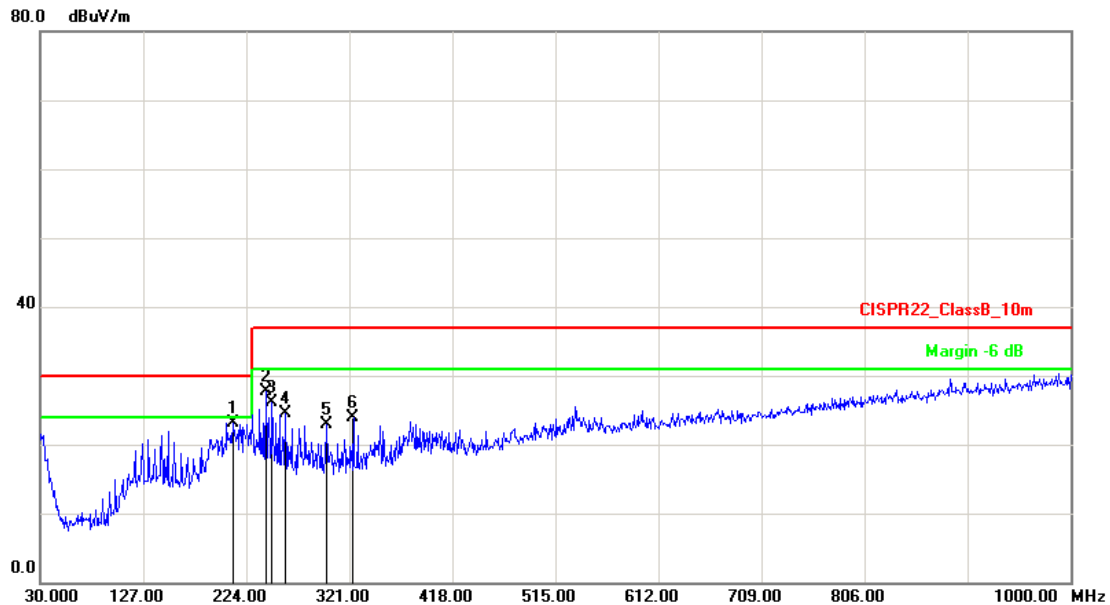
**4.4. Measurement Equipment**

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
Preamplifier	Agilent	87405B	My39500554	2016.03.26	2017.03.25
Preamplifier	Agilent	8449B	3008A02342	2016.03.26	2017.03.25
Bilog Antenna	Sunol Science	JB1	A072414-3	2016.07.16	2017.07.15
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-618	2016.04.16	2017.04.15
Spectrum Analyzer	R&S	FSP40	100324	2016.03.26	2017.03.25
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-001	2016.03.29	2017.03.28
EZ-EMC	Fala	Ver CT3A1	N/A	N/A	N/A



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

Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Equipment :	Outdoor Station	Model No :	DH-VTO1220B
Temp :	25℃	Humidity :	52%
Pressure(mbar) :	1002	Date :	2016/08/16

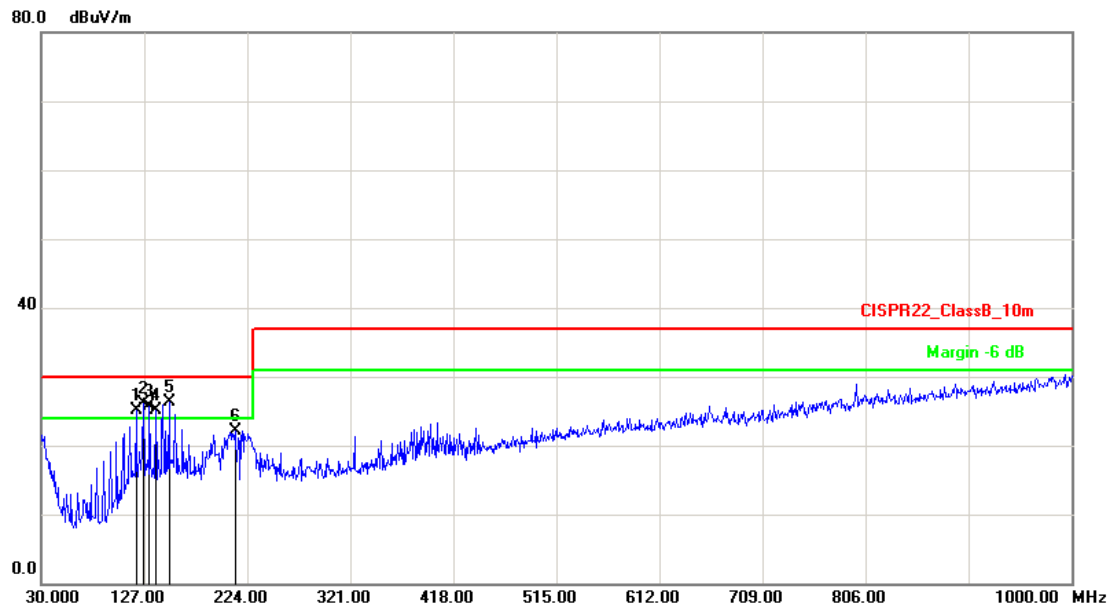


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	211.3899	-11.06	34.14	23.08	30.00	-6.92	QP	400	324
2	242.4300	-10.75	38.46	27.71	37.00	-9.29	QP	400	178
3	248.2500	-10.52	36.65	26.13	37.00	-10.87	QP	400	167
4	260.8599	-9.99	34.41	24.42	37.00	-12.58	QP	400	162
5	299.6600	-8.76	31.75	22.99	37.00	-14.01	QP	400	227
6	324.8798	-7.97	31.88	23.91	37.00	-13.09	QP	400	227

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Equipment :	Outdoor Station	Model No :	DH-VTO1220B
Temp :	25°C	Humidity :	52%
Pressure(mbar) :	1002	Date :	2016/08/16

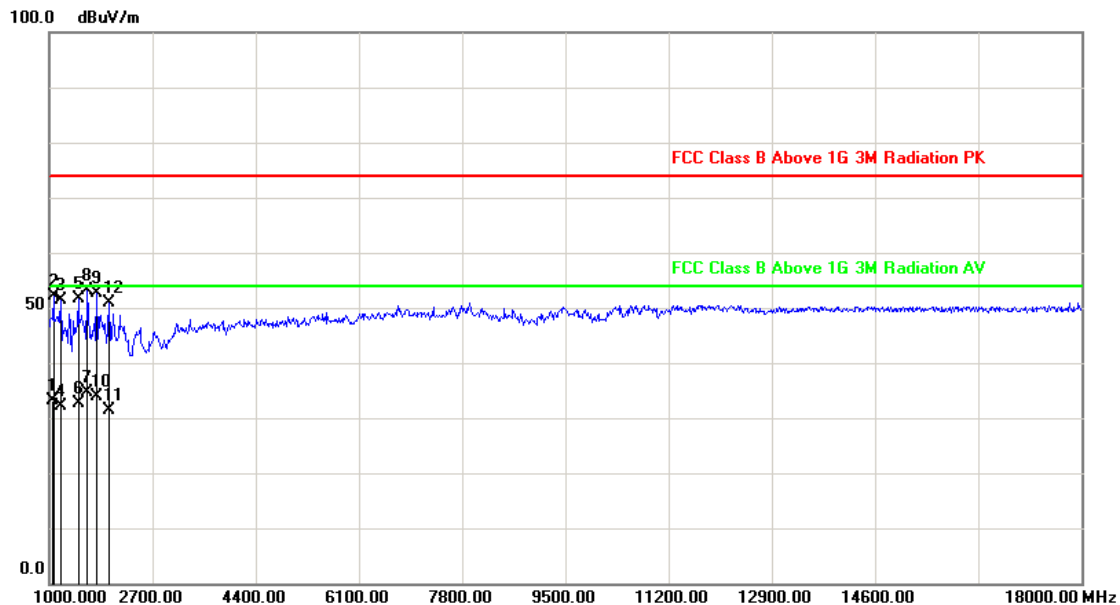


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	119.2400	-9.71	34.90	25.19	30.00	-4.81	QP	100	172
2	126.0300	-9.81	35.92	26.11	30.00	-3.89	QP	100	352
3	131.8500	-10.07	35.76	25.69	30.00	-4.31	QP	100	1
4	137.6700	-10.32	35.51	25.19	30.00	-4.81	QP	100	31
5	150.2800	-10.65	37.01	26.36	30.00	-3.64	QP	100	358
6	212.3600	-11.16	33.17	22.01	30.00	-7.99	QP	100	342

Note: Measurement Level = Reading Level + Correct Factor

**4.6. Test Result and Data (1GHz ~ 18GHz)**

Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Horizontal
Equipment :	Outdoor Station	Model No :	DH-VTO1220B
Temp :	25℃	Humidity :	52%
Pressure(mbar) :	1002	Date :	2016/08/16

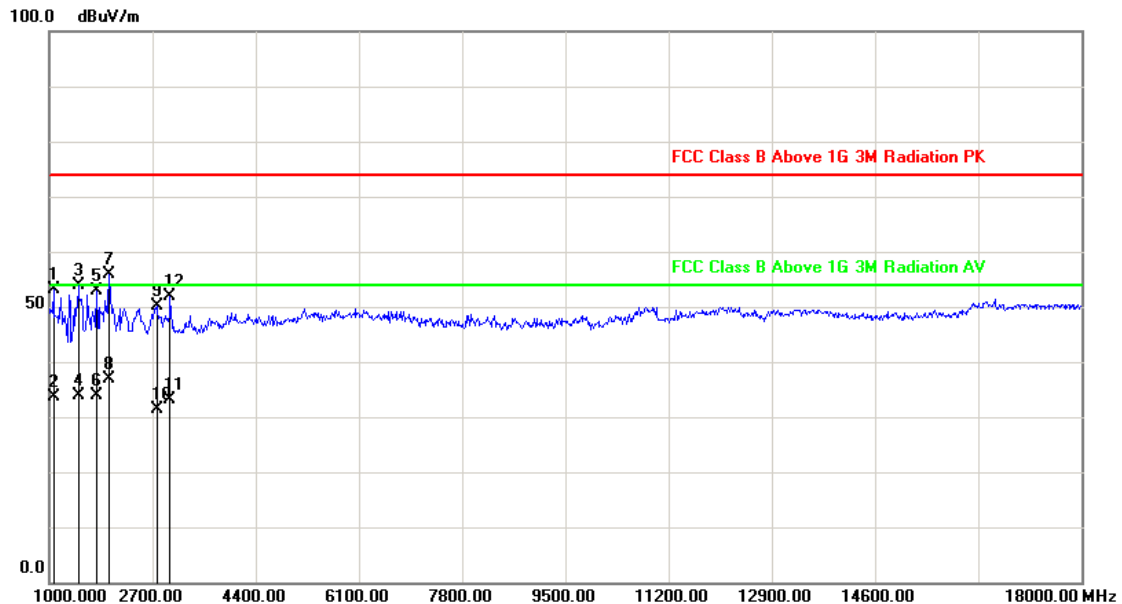


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1067.000	-6.59	39.64	33.05	54.00	-20.95	AVG	200	45
2	1068.000	-6.59	58.81	52.22	74.00	-21.78	peak	200	45
3	1187.000	-6.09	57.39	51.30	74.00	-22.70	peak	100	320
4	1188.000	-6.09	38.20	32.11	54.00	-21.89	AVG	100	320
5	1476.000	-4.89	56.57	51.68	74.00	-22.32	peak	200	19
6	1478.000	-4.88	37.41	32.53	54.00	-21.47	AVG	200	19
7	1627.000	-4.26	38.91	34.65	54.00	-19.35	AVG	200	211
8	1629.000	-4.25	57.39	53.14	74.00	-20.86	peak	200	211
9	1782.000	-3.61	56.28	52.67	74.00	-21.33	peak	200	6
10	1783.000	-3.60	37.56	33.96	54.00	-20.04	AVG	200	6
11	1985.000	-2.76	34.23	31.47	54.00	-22.53	AVG	200	315
12	1986.000	-2.76	53.70	50.94	74.00	-23.06	peak	200	315

Note: Measurement Level = Reading Level + Correct Factor



Test Mode :	Mode 1: Normal Operation		
AC Power :	AC 120V/60Hz	Ant. Polarization:	Vertical
Equipment :	Outdoor Station	Model No :	DH-VTO1220B
Temp :	25°C	Humidity :	52%
Pressure(mbar) :	1002	Date :	2016/08/16



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	1068.000	-6.59	59.75	53.16	74.00	-20.84	peak	100	154
2	1069.000	-6.58	40.26	33.68	54.00	-20.32	AVG	100	154
3	1476.000	-4.89	58.86	53.97	74.00	-20.03	peak	100	286
4	1477.000	-4.88	38.77	33.89	54.00	-20.11	AVG	100	286
5	1782.000	-3.61	56.48	52.87	74.00	-21.13	peak	100	39
6	1783.000	-3.60	37.41	33.81	54.00	-20.19	AVG	100	39
7	1986.000	-2.76	58.52	55.76	74.00	-18.24	peak	200	64
8	1987.000	-2.75	39.56	36.81	54.00	-17.19	AVG	200	64
9	2768.000	-0.13	50.21	50.08	74.00	-23.92	peak	100	0
10	2769.000	-0.12	31.52	31.40	54.00	-22.60	AVG	100	0
11	2988.000	0.61	32.60	33.21	54.00	-20.79	AVG	200	120
12	2989.000	0.61	51.17	51.78	74.00	-22.22	peak	200	120

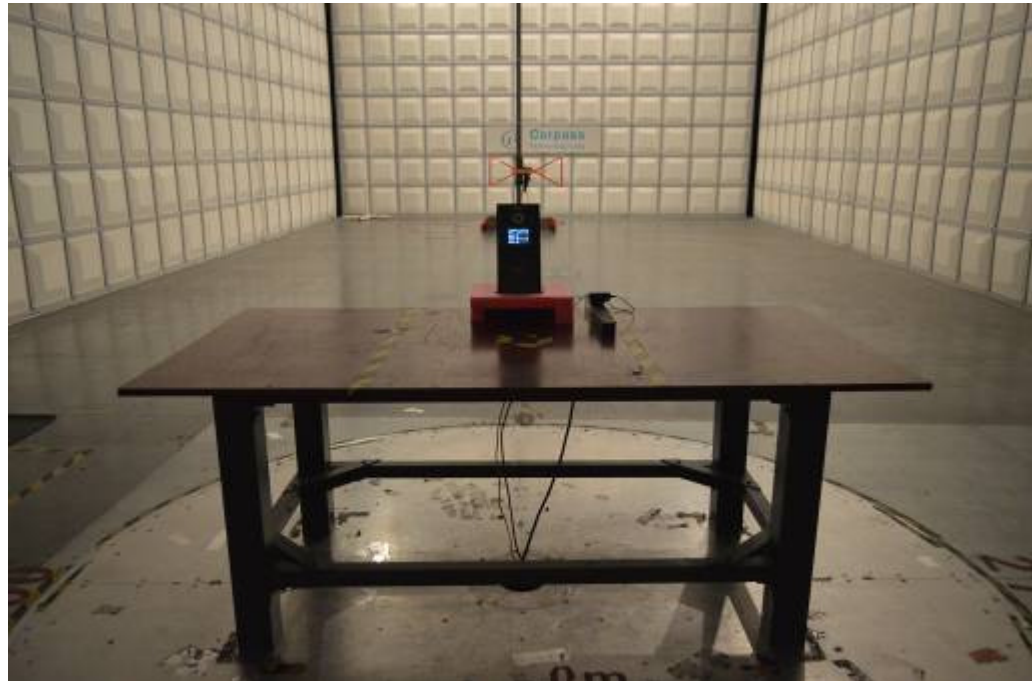
Note: Measurement Level = Reading Level + Correct Factor

Test engineer: Dian

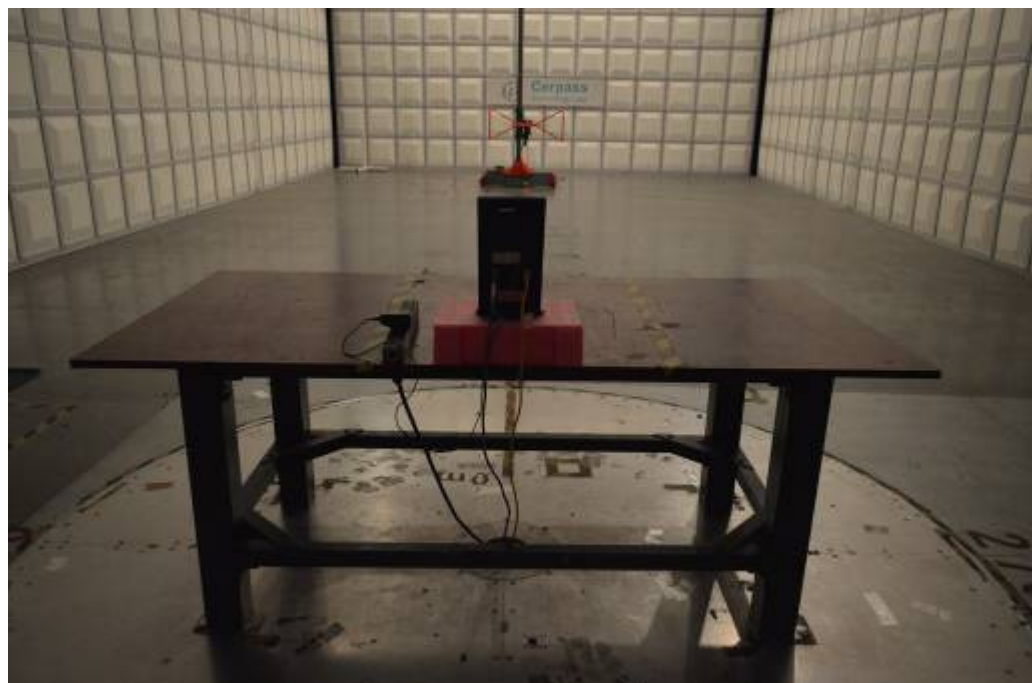


4.7. Test Photographs (30MHz ~ 1GHz)

Front View



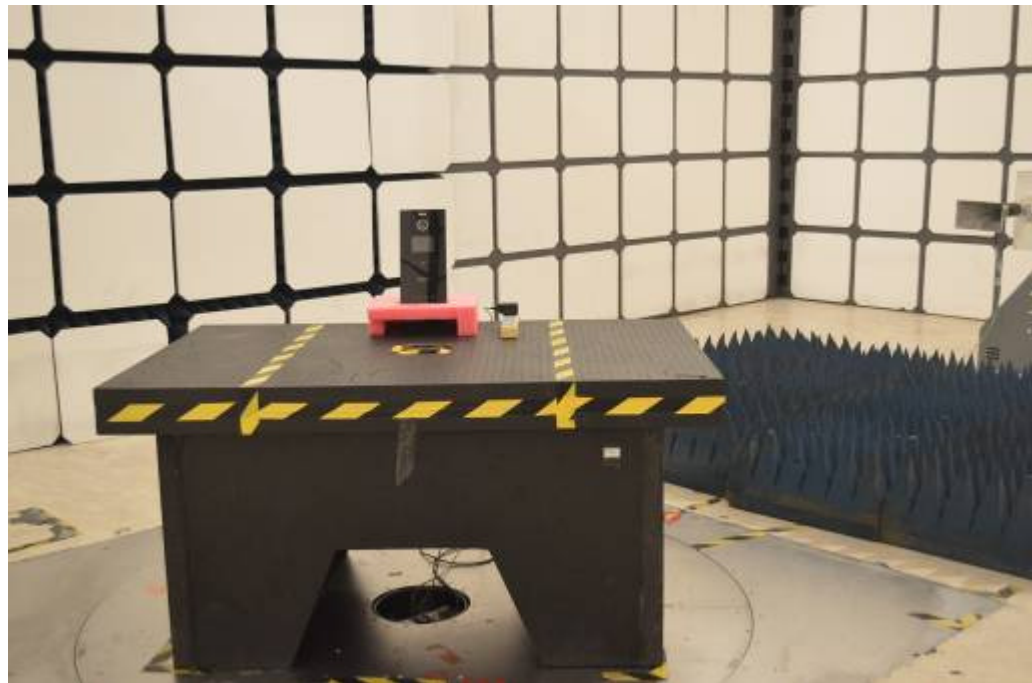
Rear View



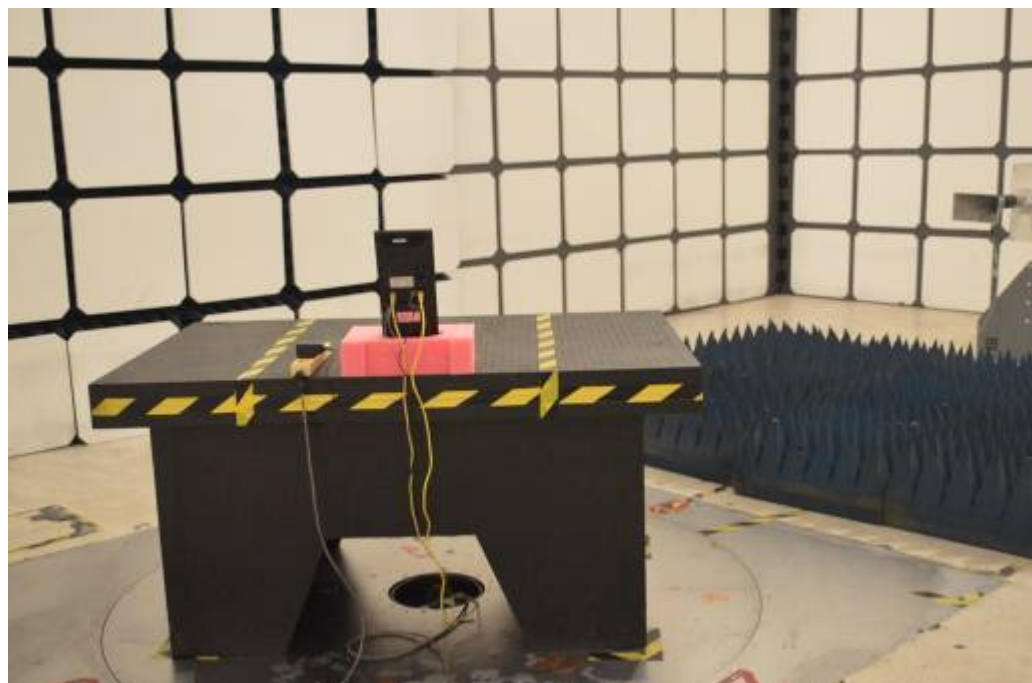


4.8. Test Photographs (1GHz ~ 18GHz)

Front View



Rear View





5. Photographs of EUT

1) EUT Photo



2) EUT Photo





3) EUT Photo



4) EUT Photo





5) EUT Photo



6) EUT Photo





7) EUT Photo



8) EUT Photo

