


# TEST REPORT

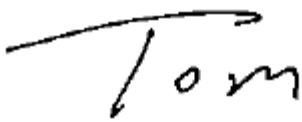

Applicant	AfterShokz LLC
Address	6057 Corporate Dr., East Syracuse, NY 13057

Manufacturer or Supplier	AfterShokz LLC	
Address	6057 Corporate Dr., East Syracuse, NY 13057	
Product	XTRAINERZ WATERPROOF BONE CONDUCTION MP3 HEADPHONES	
Brand Name	AfterShokz	
Model	AS700	
Additional Model & Model Difference	N/A	
Date of tests	May 21, 2019 ~ Jun. 11, 2019	

The submitted sample of the above equipment has been tested for according to the client's specification.

**J55032 (H29):2017, Class B**

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

<p>Tested by Tom Chen Project Engineer / EMC Department</p>	<p>Approved by Madison Luo Supervisor / EMC Department</p>
	
<p>Date: Jun. 13, 2019</p>	

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**BUREAU  
VERITAS**

Test Report No.: JC190521N022

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
JC190521N022	Original release	Jun. 13, 2019



# 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications.

EMISSION			
Standard	Test Type	Result	Remarks
J55032(H29):2017, Class B	Conducted emission from the AC mains power port	PASS	Minimum passing margin is -13.10dB at 0.51834MHz
	Radiated test (30MHz ~ 1GHz)	PASS	Minimum passing margin is -1.20dB at 240.000MHz

## 1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	FREQUENCY	UNCERTAINTY
Conducted emission from the AC mains power port using AMN	0.15MHz ~ 30MHz	+/- 2.70 dB
Radiated emission	30MHz ~ 1GHz	+/- 4.04 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



## 2 GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	XTRAINERZ WATERPROOF BONE CONDUCTION MP3 HEADPHONES
<b>MODEL NO.</b>	AS700
<b>ADDITIONAL MODEL</b>	N/A
<b>POWER SUPPLY</b>	DC 3.7V from Li-ion Battery or DC 5V from Host Unit
<b>CABLE SUPPLIED</b>	USB Line: Unshielded, Non-detachable 0.25m
<b>THE HIGHEST OPERATING FREQUENCY</b>	24MHz

#### NOTES:

1. For the test results, the EUT had been tested with all conditions. But only the worst case was showed in test report.
2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
3. Please refer to the EUT photo document (Reference No.: 190521N022) for detailed product photo.



## 2.2 DESCRIPTION OF TEST MODES

The EUT was pre-tested all audio and video input sources as table below, the final worst mode were marked in boldface and recorded in this report.

### FOR COUDUCTED TEST:

Test Mode	Test Voltage
Data transmission	DC 5V from notebook Input AC 100V 60Hz
<b>Charging</b>	<b>DC 5V from Adapter Input AC 100V 60Hz</b>

### FOR RADIATED TEST:

Test Mode	Test Voltage
Music Playing	DC 3.7V from Li-ion Battery
<b>Data transmission</b>	<b>DC 5V from notebook Input AC 100V 60Hz</b>
Charging	DC 5V from Adapter Input AC 100V 60Hz

## 2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as a dependent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook PC	DELL	E6420	9H12FS1	N/A
2	Printer	HP	HP LaserJet 1300	CNSJF75989	N/A
3	Mouse	DELL	MOC5UO	J0Z008H3	N/A
4	Adapter	InFocus	C5010-C08N	N/A	N/A
5	Adapter	N/A	C-P57	N/A	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1,	AC Line: Unshielded, Detachable 1.0m; DC Line: Unshielded, Detachable 2.0m.
2,	AC Line: Unshielded, Detachable 1.5m, USB Line: Unshielded, Detachable 1.5m.
3,	USB Line: Unshielded, Non-detachable 1.8m.
4-5,	N/A



### 3 EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	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.

##### 3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Mar. 12,19	Mar. 11,20
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 12,19	Mar. 11,20
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Mar. 13,19	Mar. 12,20
Voltage probe	SCHWARZBEC K	TK 9421	TK 9421-176	Jan. 17,19	Jan. 16,20
Test software	ADT	ADT_Cond_V 7.3.7	N/A	N/A	N/A

- NOTES:** 1. The test was performed at Shielded Room 553.  
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

##### 3.1.3 TEST PROCEDURE

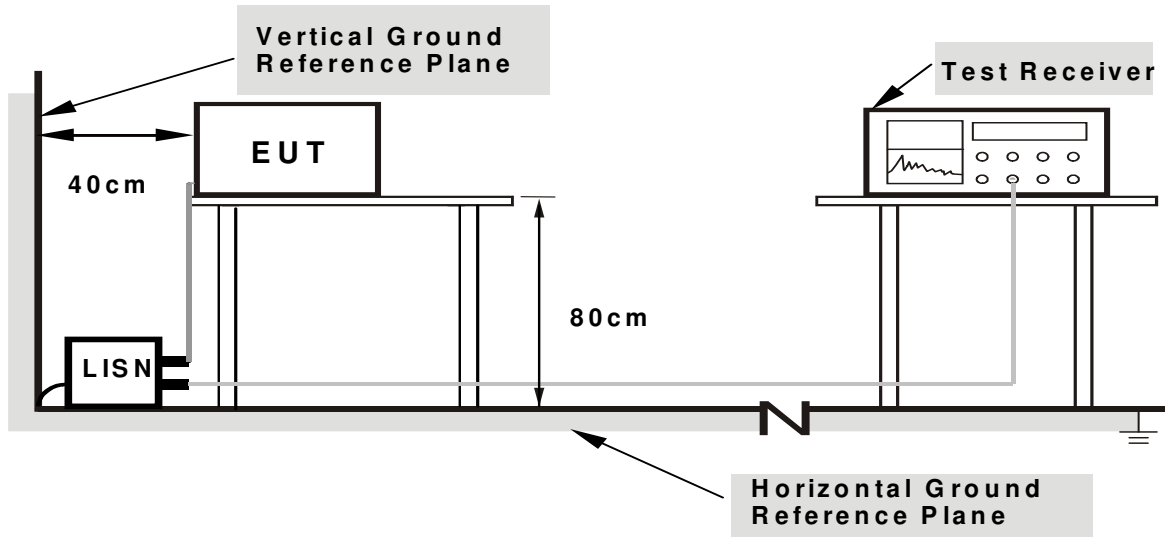
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (AMN). Other support units were connected to the power mains through another AMN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20dB) were not recorded.



### 3.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 3.1.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
  2. Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

### 3.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power of all equipment.
- b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

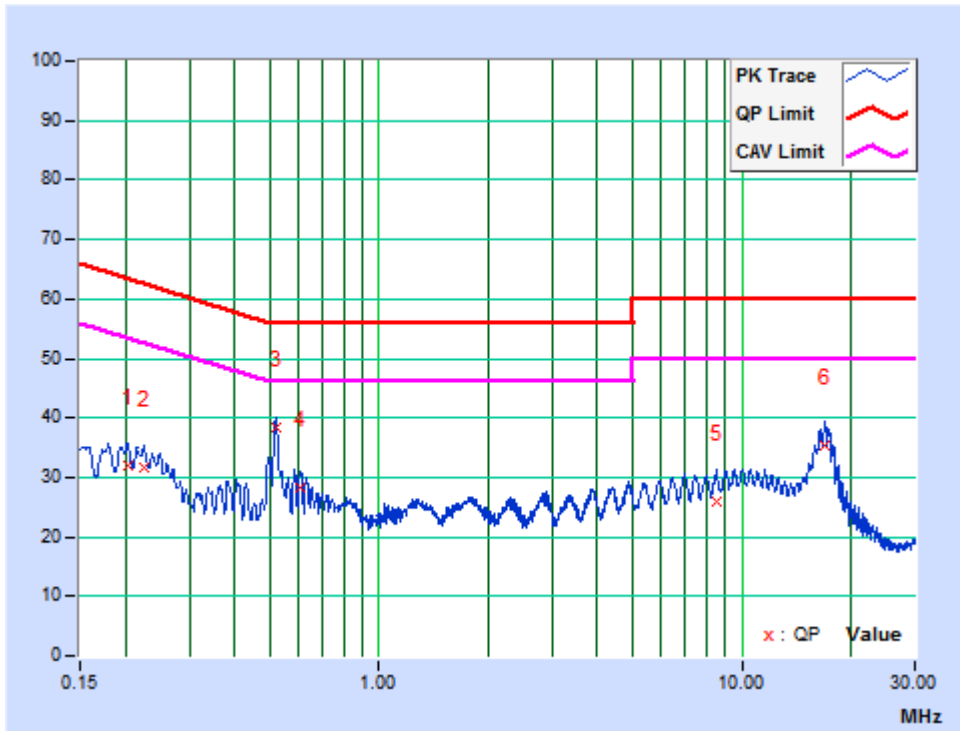




### 3.1.7 TEST RESULTS

<b>TEST MODE</b>		Charging								
<b>TEST VOLTAGE</b>		DC 5V from Adapter Input AC 100V 60Hz			<b>6dB BANDWIDTH</b>		9 kHz			
<b>ENVIRONMENTAL CONDITIONS</b>		25deg.C, 53% RH			<b>TESTED BY:</b> Dragon					
<b>PHASE OF POWER: LINE (L)</b>										
No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.20400	10.16	21.75	7.83	31.91	17.99	63.45	53.45	-31.54
2	0.22445	10.16	21.53	9.30	31.69	19.46	62.65	52.65	-30.96	-33.19
3	0.51971	10.19	28.30	21.10	38.49	31.29	56.00	46.00	-17.51	-14.71
4	0.60893	10.21	18.12	9.29	28.33	19.50	56.00	46.00	-27.67	-26.50
5	8.54475	10.21	15.60	4.97	25.81	15.18	60.00	50.00	-34.19	-34.82
6	16.94850	10.25	24.99	12.17	35.24	22.42	60.00	50.00	-24.76	-27.58

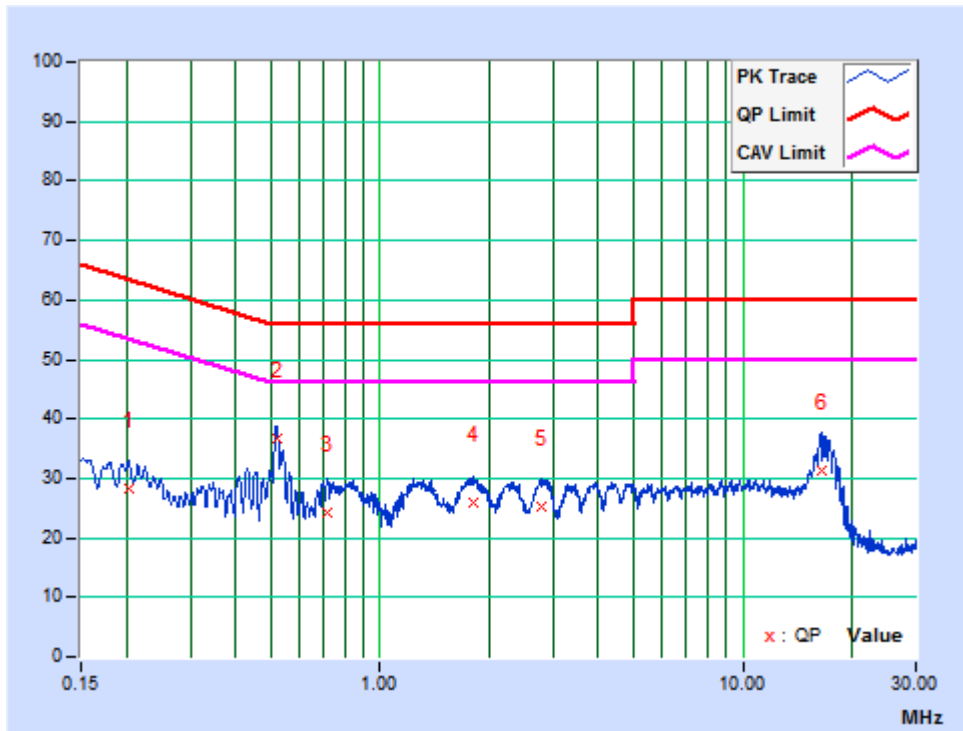
**REMARK:** The emission levels of other frequencies were very low against the limit.





<b>TEST MODE</b>		Charging								
<b>TEST VOLTAGE</b>		DC 5V from Adapter Input AC 100V 60Hz			<b>6dB BANDWIDTH</b>		9 kHz			
<b>ENVIRONMENTAL CONDITIONS</b>		25deg.C, 53% RH			<b>TESTED BY:</b> Dragon					
<b>PHASE OF POWER: NEUTRAL (N)</b>										
No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20400	9.95	18.46	8.56	28.41	18.51	63.45	53.45	-35.04	-34.94
<b>2</b>	<b>0.51834</b>	<b>9.99</b>	<b>26.85</b>	<b>22.91</b>	<b>36.84</b>	<b>32.90</b>	<b>56.00</b>	<b>46.00</b>	<b>-19.16</b>	<b>-13.10</b>
3	0.71250	10.02	14.30	6.71	24.32	16.73	56.00	46.00	-31.68	-29.27
4	1.80825	9.99	15.80	10.30	25.79	20.29	56.00	46.00	-30.21	-25.71
5	2.77912	9.99	15.33	10.37	25.32	20.36	56.00	46.00	-30.68	-25.64
6	16.40850	10.13	21.16	11.10	31.29	21.23	60.00	50.00	-28.71	-28.77

**REMARK:** The emission levels of other frequencies were very low against the limit.





### 3.2 RADIATED EMISSION MEASUREMENT

#### 3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

##### FOR FREQUENCY BELOW 1000 MHz

FREQUENCY (MHz)	Class B (at 3m)	Class B (at 10m)
	Quasi-Peak (dBuV/m)	Quasi-Peak (dBuV/m)
30 – 230	40	30
230 – 1000	47	37

#### FREQUENCY RANGE OF RADIATED MEASUREMENT

(For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	Up to 5 times of the highest frequency or 6 GHz, whichever is less

##### FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (GHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
1 to 3	76	56	70	50
3 to 6	80	60	74	54

- NOTES:** (1) The lower limit shall apply at the transition frequencies.  
(2) Emission level (dBuV/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.



### 3.2.2 TEST INSTRUMENTS

#### FREQUENCY RANGE BELOW 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU26	100005	Aug. 24,18	Aug. 23,19
EMI Test Receiver	Rohde&Schwarz	ESR7	101564	Mar. 12,19	Mar. 11,20
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-555	Nov. 10, 18	Nov. 09, 19
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	9168-554	Dec. 10, 18	Dec. 09, 19
Preamplifier	EMCI	EMC1135	980378	Mar. 19,19	Mar. 18,20
Preamplifier	EMCI	EMC1135	980423	Mar. 19,19	Mar. 18,20
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m*8.8m	NSEMC006	Feb. 10,19	Feb. 09,20
Test Software	ADT	ADT_Radiated_V8.7.07	N/A	N/A	N/A

- NOTES:** 1. The test was performed in 10m Chamber.  
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

#### FREQUENCY RANGE ABOVE 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	ETS-Lindgren	3117	00085519	Dec. 10, 18	Dec. 09, 19
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170242	Aug. 05,18	Aug. 04,19
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101003	Mar. 12,19	Mar. 11,20
Broadband Preamplifier (1~18GHz)	SCHWARZBECK	BBV9718	266	Aug. 18,18	Aug. 18,19
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 09,18	Nov. 08,19
Test Software	ADT	ADT_Radiated_V8.7.07	N/A	N/A	N/A

- NOTES:** 1. The test was performed in 10m Chamber.  
2. The calibration interval of the above test instruments are 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.



### 3.2.3 TEST PROCEDURE

#### <Frequency Range below 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

#### NOTES:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
5. Margin value = Emission level – Limit value.



### <Frequency Range above 1GHz>

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna can be varied from one meter-to four meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test receiver/spectrum was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

#### NOTES:

1. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
2. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
3. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
4. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) (if the raw value not contains the amplifier);
5. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain(dB) (if the raw value contains the amplifier).
6. Margin value = Emission level – Limit value.

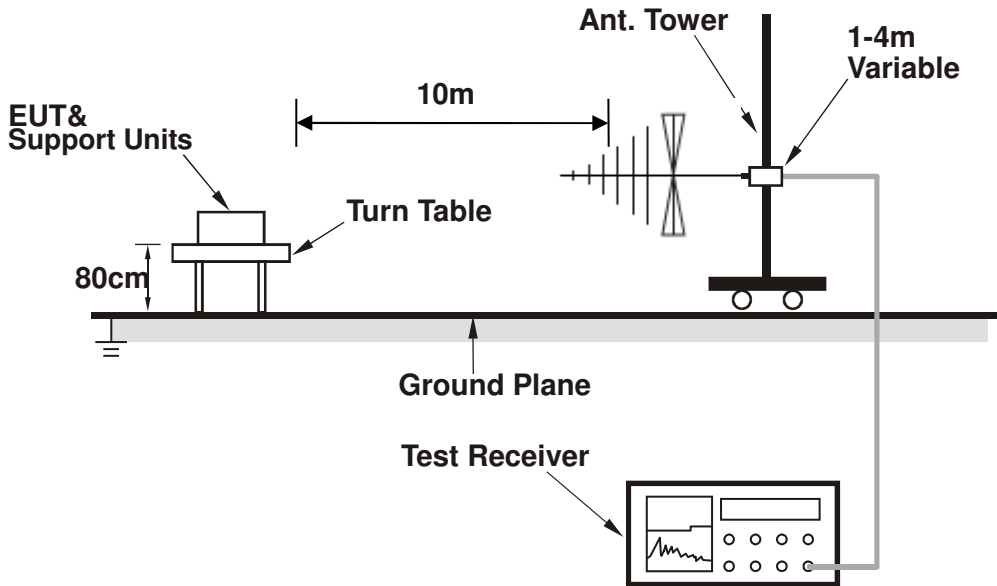
### 3.2.4 DEVIATION FROM TEST STANDARD

No deviation

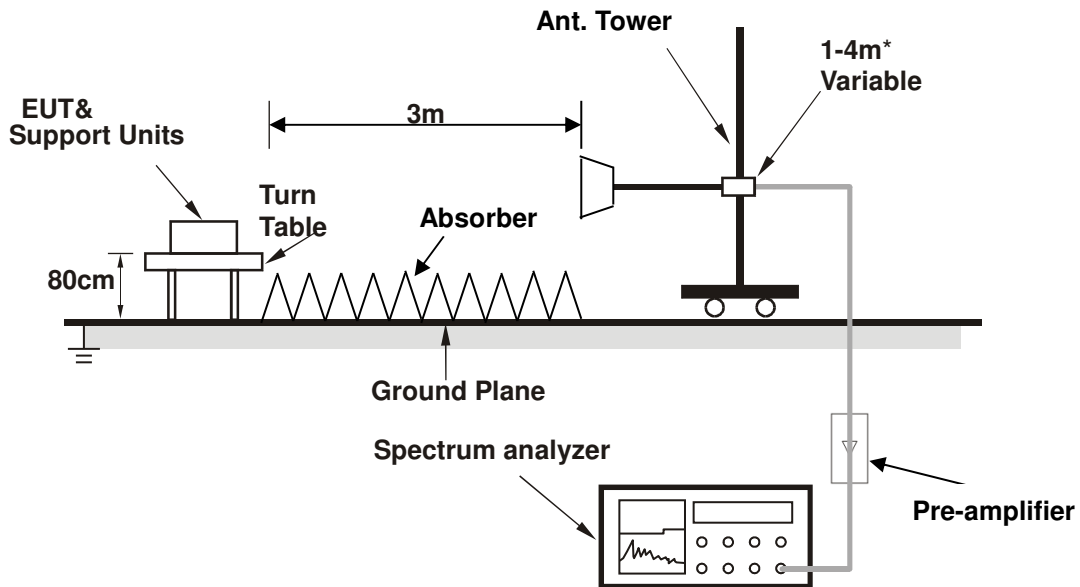


### 3.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



\*: depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

### 3.2.6 EUT OPERATING CONDITIONS

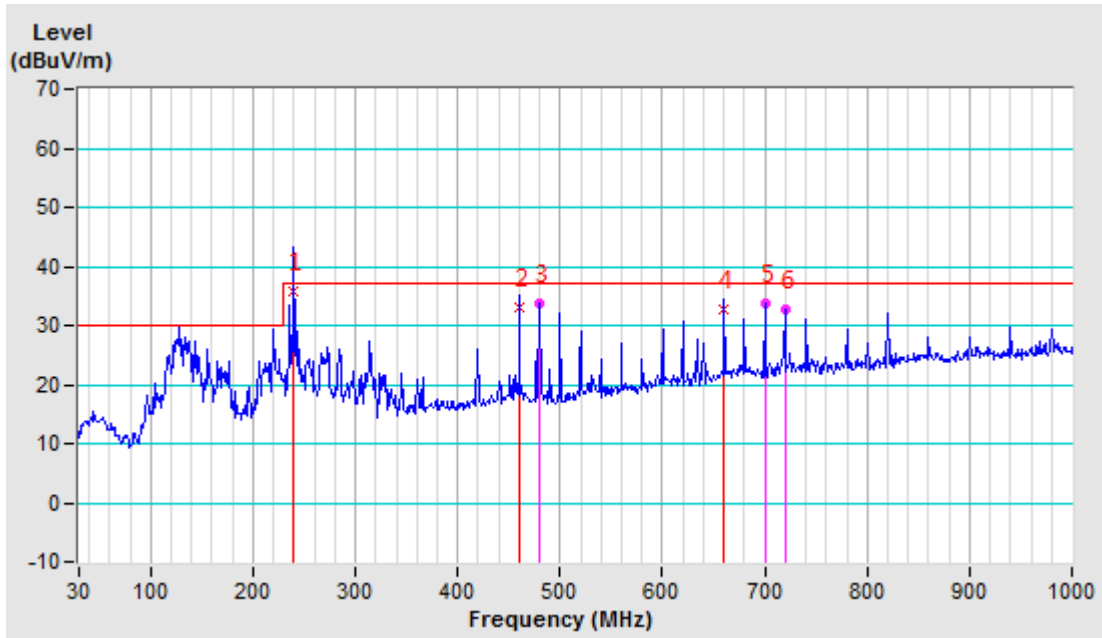
Same as section 3.1.6



### 3.2.7 TEST RESULTS

<b>TEST MODE</b>		Data transmission						
<b>FREQUENCY RANGE</b>		30-1000 MHz			<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>		Quasi-Peak, 120kHz	
<b>ENVIRONMENTAL CONDITIONS</b>		20deg. C, 61% RH			<b>TESTED BY:</b> Joby			
<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 10 M</b>								
No	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	.Tower cm	Table deg
1	240.000	-17.53	53.33	35.80	37.00	-1.20	400	9
2	460.000	-11.75	44.95	33.20	37.00	-3.80	200	154
3	479.959	-11.57	45.42	33.85	37.00	-3.15	200	250
4	660.130	-6.88	39.68	32.80	37.00	-4.20	200	277
5	700.028	-6.77	40.49	33.72	37.00	-3.28	400	91
6	720.155	-5.90	38.64	32.74	37.00	-4.26	400	150

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 30MHz to 1000MHz.
  4. Only emissions significantly above equipment noise floor are reported.

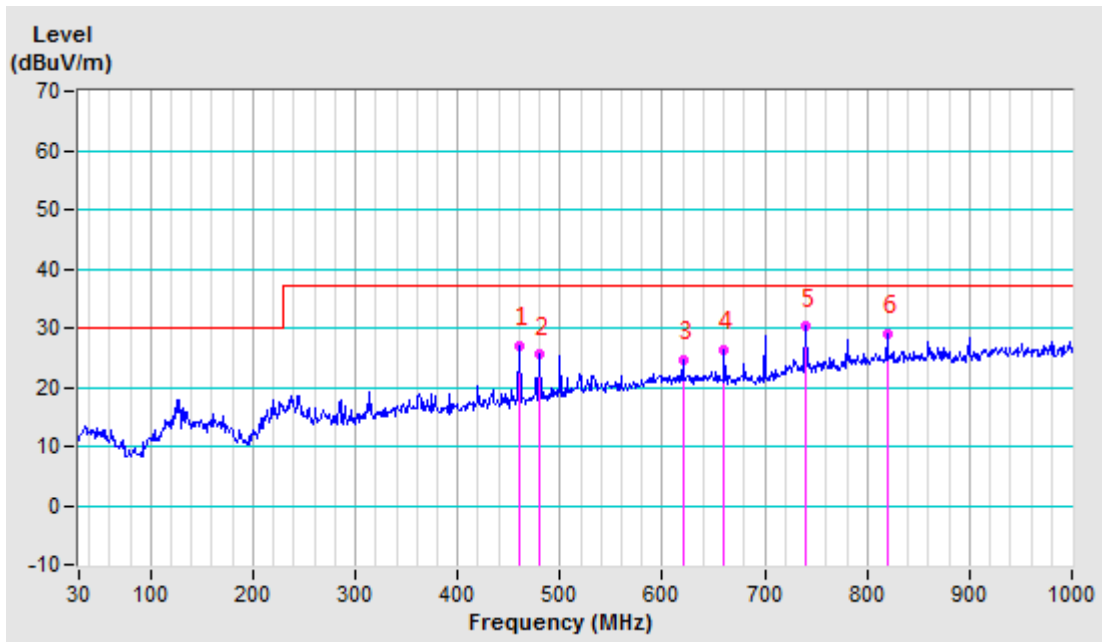






<b>TEST MODE</b>	Data transmission							
<b>FREQUENCY RANGE</b>	30-1000 MHz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Quasi-Peak, 120kHz					
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 61% RH	<b>TESTED BY:</b> Joby						
<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 10 M</b>								
No	Frequency MHz	Factor dB/m	Reading dBuV	Emission dBuV/m	Limit dBuV/m	Margin dB	.Tower cm	Table deg
1	460.023	-10.62	37.51	26.89	37.00	-10.11	300	358
2	480.006	-10.12	35.60	25.48	37.00	-11.52	300	196
3	620.032	-6.64	31.31	24.67	37.00	-12.33	300	350
4	659.950	-6.59	32.78	26.19	37.00	-10.81	300	113
5	740.027	-4.70	34.91	30.21	37.00	-6.79	300	358
6	820.202	-2.96	31.92	28.96	37.00	-8.04	300	251

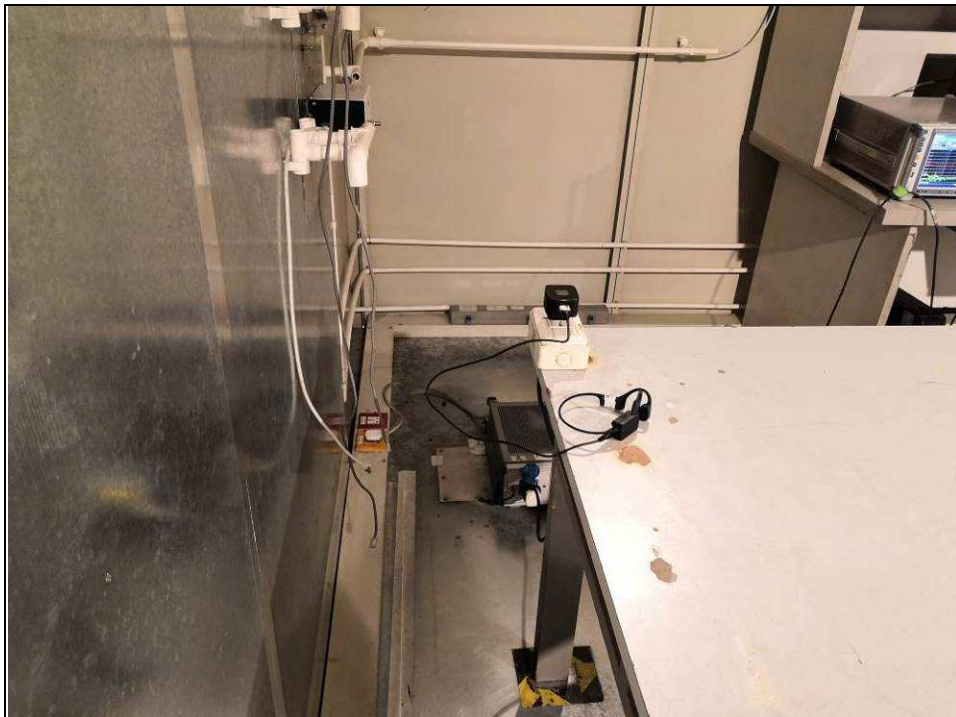
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 30MHz to 1000MHz.
  4. Only emissions significantly above equipment noise floor are reported.



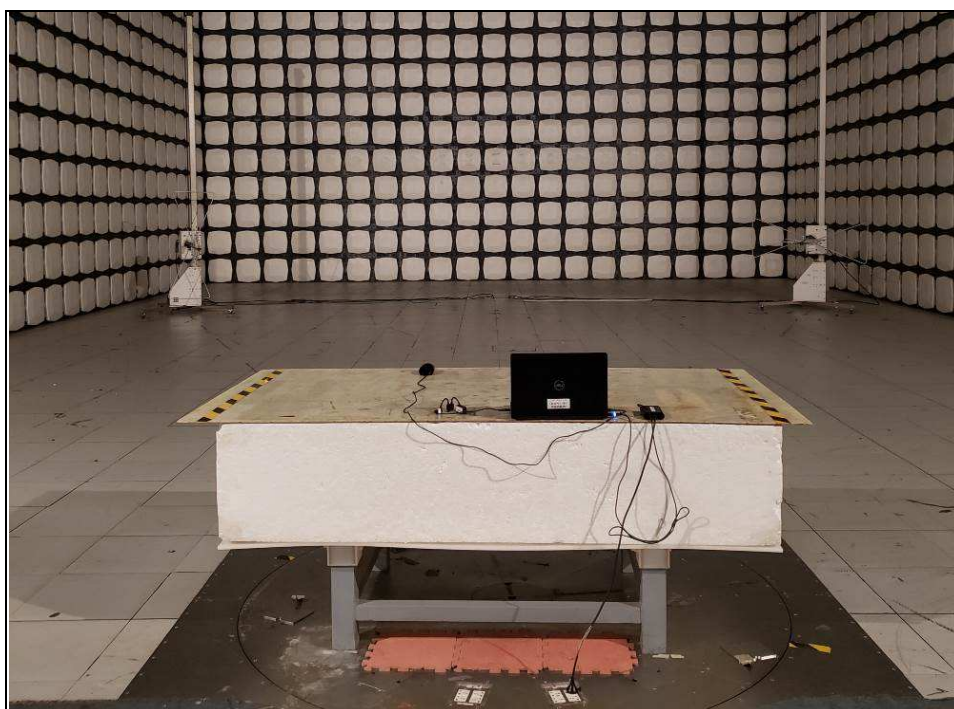
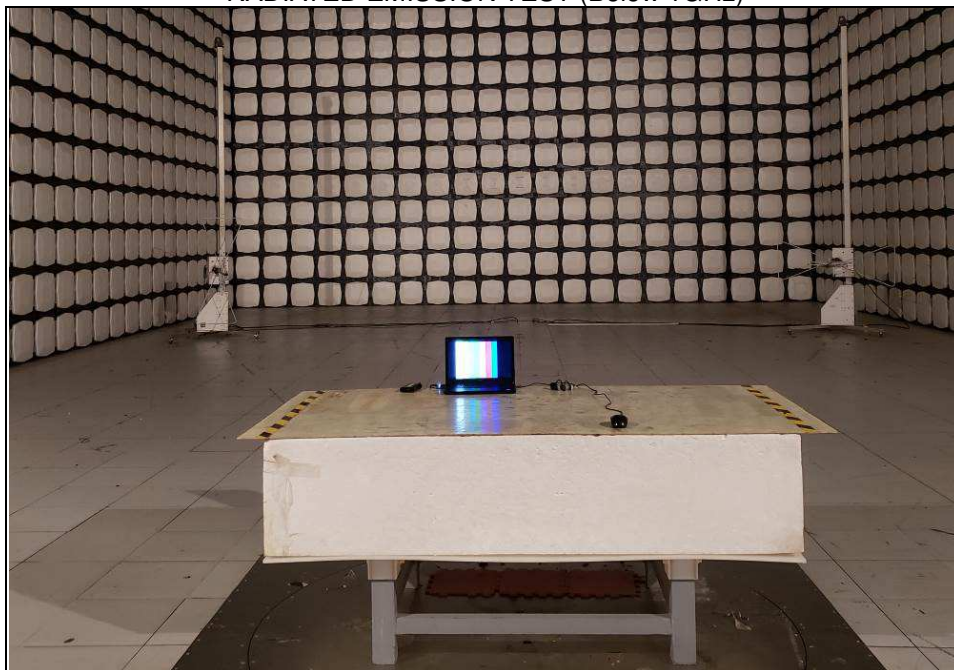


## 4 PHOTOGRAPHS OF THE EUT

### CONDUCTED EMISSION TEST



RADIATED EMISSION TEST (Below 1GHz)





Test Report No.: JC190521N022

## 5 APPENDIX A-MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

--- END ---