

FCC PART 15B

TEST REPORT

For

MPOW TECHNOLOGY CO.,LIMITED

FLAT/RM 605 6/F FA YUEN COMMERCIAL BUILDING 75-77 FA YUEN STREET
MONGKOK KL HONG KONG

Test Model:BH480A

Report Type: Original Report	Product Type: MPOW MX1 TRUE WIRELESS EARBUDS
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Report Number:	RDG201012032-00B
Report Date:	2020-11-06
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	MPOW MX1 TRUE WIRELESS EARBUDS
EUT Model:	BH480A
Highest Operation Frequency:	2480 MHz
Rated Input Voltage:	DC 3.7V from battery or charged by charger box
Serial Number:	RDG201012032-RF-S1
EUT Received Date:	2020.10.13
EUT Received Status:	Good

Objective

This report is prepared on behalf of **MPOW TECHNOLOGY CO.,LIMITED** in accordance with FCC Part 15B Part 2, Part J, and Part 15, Subpart A and B of the Federal Communications Commission's rules..

The objective is to determine the compliance of EUT with: FCC Part 15B.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

Measurement Uncertainty

Parameter	Measurement Uncertainty
Unwanted Emissions, radiated	30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~13GHz: 5.23 dB
Temperature	±1℃
Humidity	±5%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol “△”. Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk “★”.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in Charging mode.

Test mode 1(M1): USB Charging

Test mode 2(M2): Wireless Charging

EUT Exercise Software

No software was tested in test.

Local Support Equipment List and Details

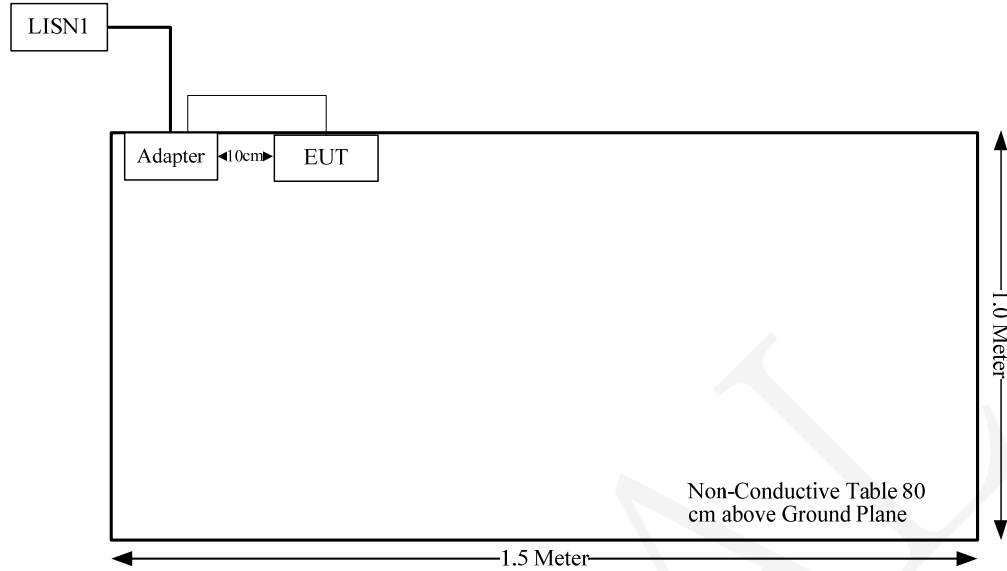
Manufacturer	Description	Model	Serial Number
Switching Adapter	Adapter	PS06C050K1000UU	PS06C050K1000UU
eMoMo Tech Co.,Ltd	wireless charging	E504	E504

Support Cable List and Details

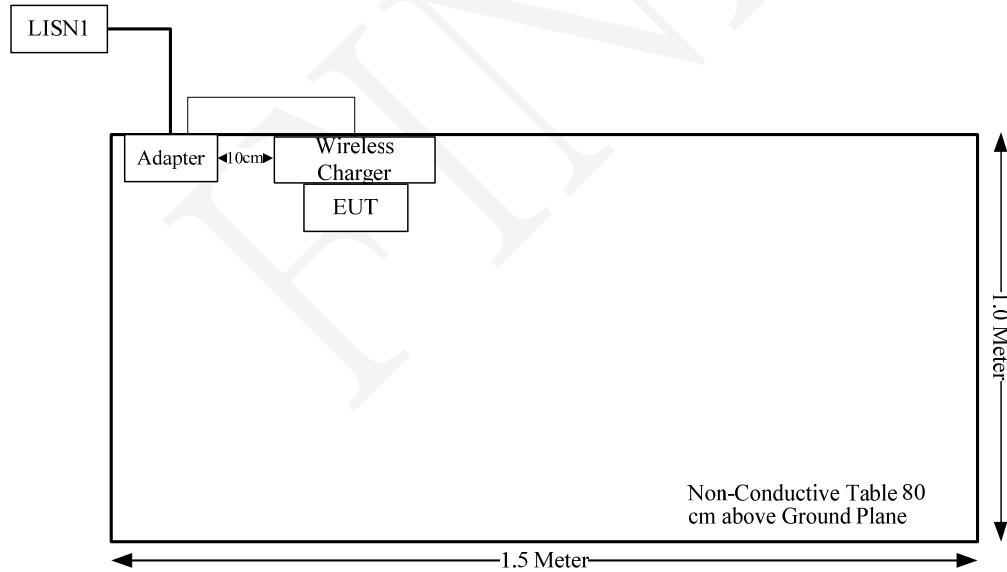
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB-C Cable	yes	no	0.3	Adapter	EUT/Wireless Charger

Block Diagram of Test Setup

Test mode 1:



Test mode 2:



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emissions					
R&S	LISN	ENV 216	101614	2020-09-12	2021-09-12
R&S	EMI Test Receiver	ESCI	101121	2020-07-07	2021-07-07
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2020-09-05	2021-09-05
R&S	Test Software	EMC32	Version 9.10.00	N/A	N/A
Radiated emissions Below 1GHz					
Sunol Sciences	Antenna	JB3	A060611-2	2020-08-25	2023-08-25
R&S	EMI Test Receiver	ESCI	100224	2020-09-12	2021-09-12
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2020-09-05	2021-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2020-09-24	2021-09-24
Sonoma	Amplifier	310N	185914	2020-10-13	2021-10-13
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Radiated emissions Above 1GHz					
TDK RF	Horn Antenna	HRN-0118	130 084	2018-10-12	2021-10-12
R&S	Spectrum Analyzer	FSP 38	100478	2020-07-07	2021-07-07
HUBER+SUHNER	Coaxial Cable	SUCOFLEX 126EA	MY369/26/26EA	2020-09-25	2021-09-25
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2020-09-05	2021-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

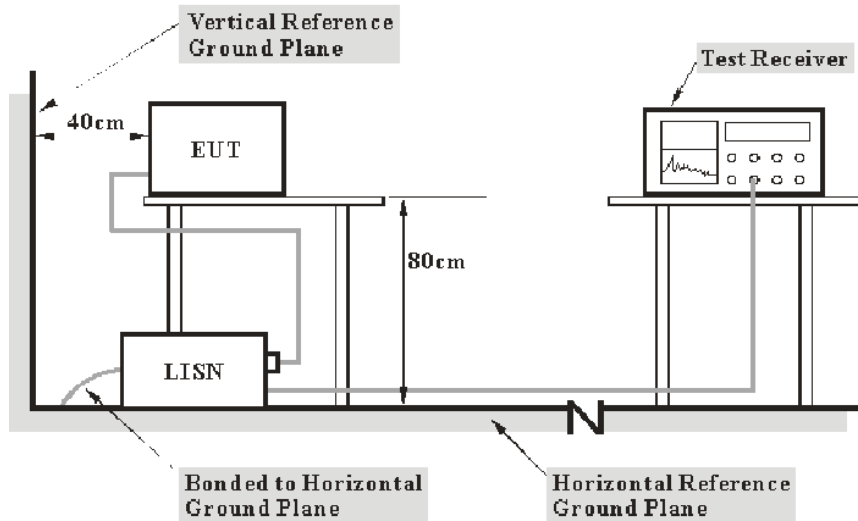
Test Item:	Conducted emissions	Radiated emissions (Below 1GHz)	Radiated emissions (Above 1GHz)
Temperature:	22.2°C	27.4 °C	24.5°C
Relative Humidity:	52%	41%	32%
ATM Pressure:	101.1kPa	100.8kPa	100.8kPa
Tester:	Barry Yang	Michael Zhang	Jalon Liu
Test Date:	2020-10-26	2020-10-24	2020-10-24

SUMMARY OF TEST RESULTS**FCC Part 15B**

Clause	Description of Test	Test Result
§15.107	Conducted emissions	Compliance
§15.109	Radiated emissions	Compliance

FCC PART 15B §15.107 – CONDUCTED EMISSIONS

EUT Setup



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

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15 B Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to the main LISN with a 120 V/60 Hz AC power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter or EUT was connected to the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result (QuasiPeak or Average) = Meter Reading + Corr.

Note:

Corr. = Cable loss + Factor of coupling device

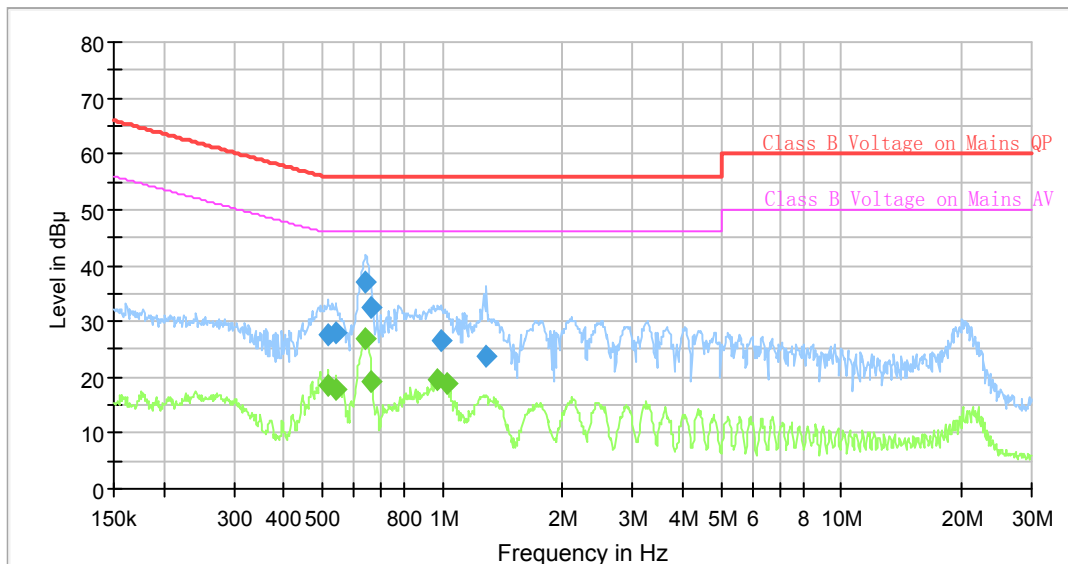
The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Result

Test Data

Please refer to following table and plots:

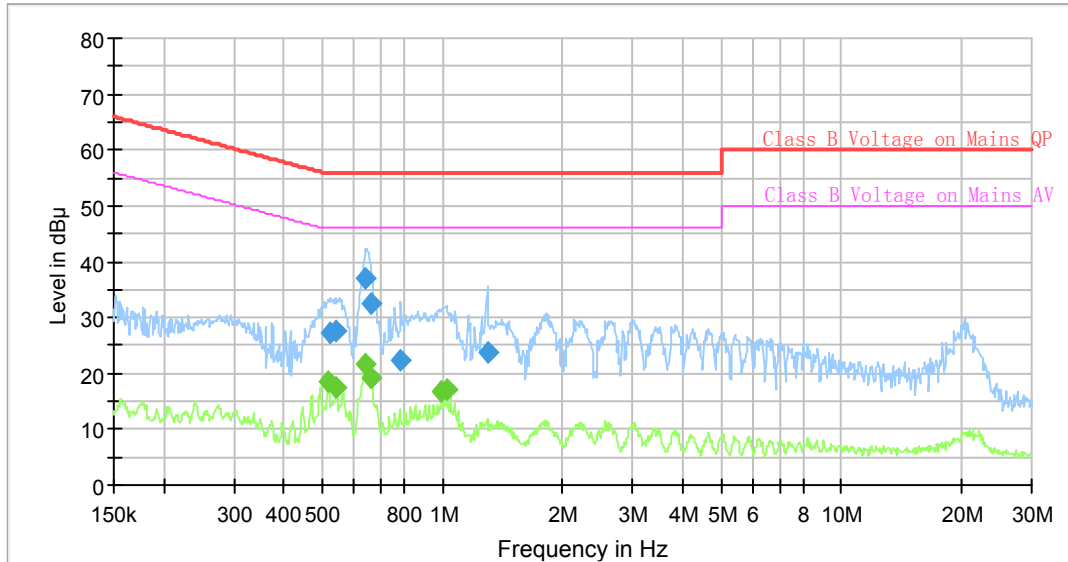
Port: L
 Test Mode: M1
 Power Source: AC 120V/60Hz



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.516743	---	18.68	46.00	27.32	9.000	L1	ON	9.6
0.516743	27.53	---	56.00	28.47	9.000	L1	ON	9.6
0.540467	---	17.91	46.00	28.09	9.000	L1	ON	9.6
0.540467	27.88	---	56.00	28.12	9.000	L1	ON	9.6
0.643549	37.14	---	56.00	18.86	9.000	L1	ON	9.6
0.643549	---	26.86	46.00	19.14	9.000	L1	ON	9.6
0.663098	32.34	---	56.00	23.66	9.000	L1	ON	9.6
0.663098	---	19.27	46.00	26.73	9.000	L1	ON	9.6
0.973564	---	19.47	46.00	26.53	9.000	L1	ON	9.7
0.998148	26.43	---	56.00	29.57	9.000	L1	ON	9.7
1.023352	---	18.83	46.00	27.17	9.000	L1	ON	9.7
1.287253	23.76	---	56.00	32.24	9.000	L1	ON	9.7

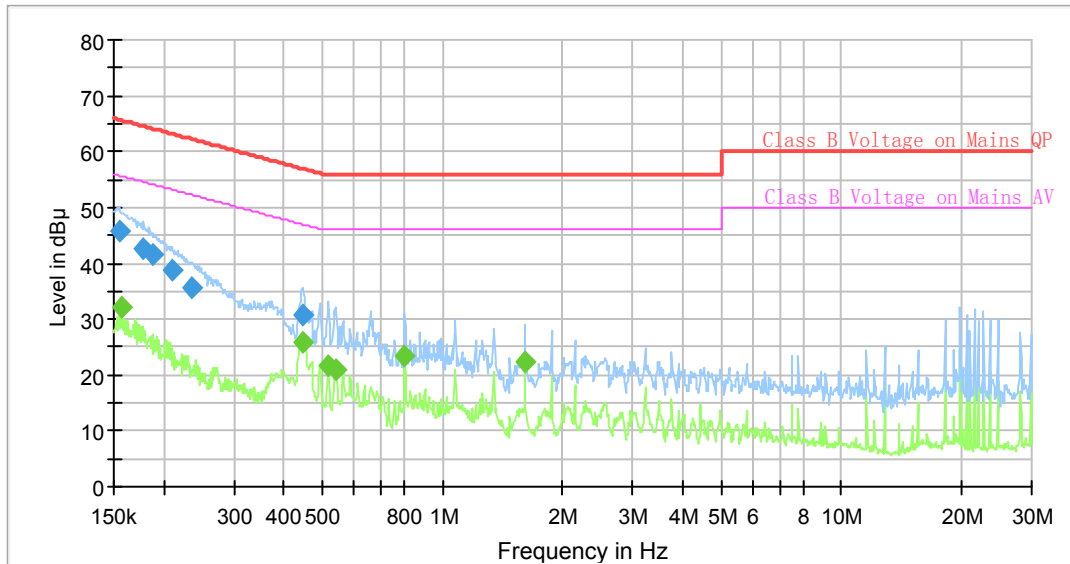
Port: N
Test Mode: M1
Power Source: AC 120V/60Hz



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.516743	---	18.36	46.00	27.64	9.000	N	ON	9.6
0.524533	27.29	---	56.00	28.71	9.000	N	ON	9.6
0.537778	27.59	---	56.00	28.41	9.000	N	ON	9.6
0.540467	---	17.33	46.00	28.67	9.000	N	ON	9.6
0.643549	---	21.78	46.00	24.22	9.000	N	ON	9.6
0.643549	37.07	---	56.00	18.93	9.000	N	ON	9.6
0.663098	32.40	---	56.00	23.60	9.000	N	ON	9.6
0.663098	---	19.20	46.00	26.80	9.000	N	ON	9.6
0.785640	22.20	---	56.00	33.80	9.000	N	ON	9.6
0.998148	---	16.67	46.00	29.33	9.000	N	ON	9.6
1.023352	---	17.03	46.00	28.97	9.000	N	ON	9.6
1.293689	23.66	---	56.00	32.34	9.000	N	ON	9.6

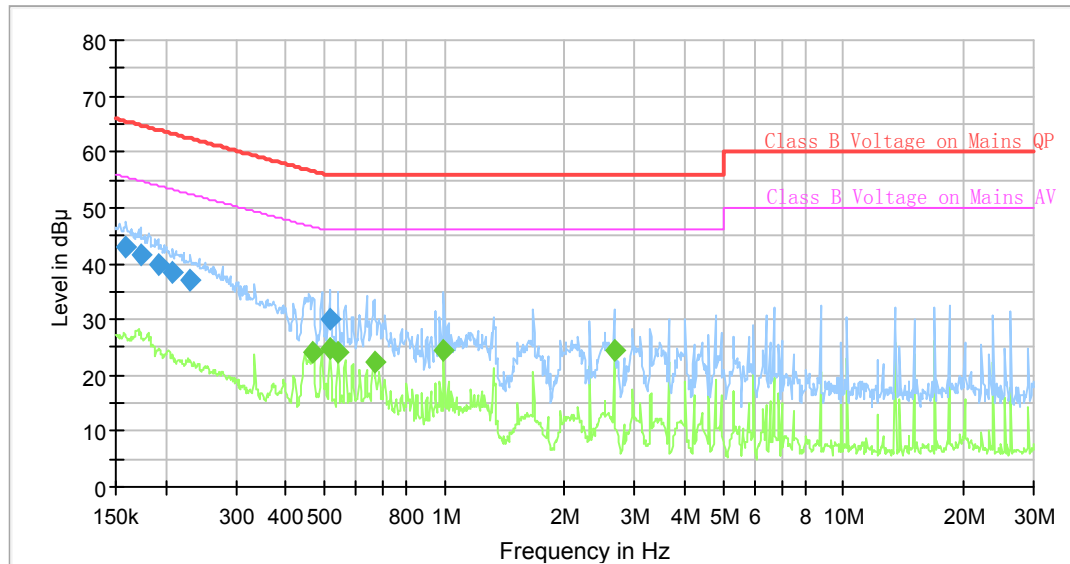
Port: L
 Test Mode: M2
 Power Source: AC 120V/60Hz



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.154557	45.65	---	65.75	20.10	9.000	L1	9.6
0.156106	---	32.29	55.67	23.38	9.000	L1	9.6
0.177720	42.62	---	64.59	21.97	9.000	L1	9.6
0.186809	41.43	---	64.18	22.75	9.000	L1	9.6
0.209516	38.75	---	63.22	24.47	9.000	L1	9.6
0.236158	35.65	---	62.23	26.58	9.000	L1	9.6
0.444931	30.76	---	56.97	26.21	9.000	L1	9.6
0.447156	---	25.71	46.93	21.22	9.000	L1	9.6
0.516743	---	21.61	46.00	24.39	9.000	L1	9.6
0.540467	---	20.86	46.00	25.14	9.000	L1	9.6
0.805479	---	23.29	46.00	22.71	9.000	L1	9.7
1.611153	---	22.24	46.00	23.76	9.000	L1	9.7

Port: N
Test Mode: M2
Power Source: AC 120V/60Hz

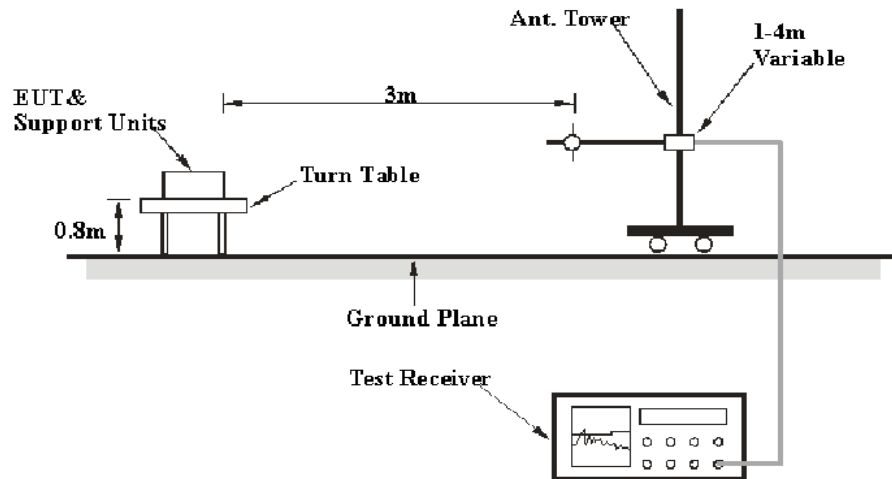


Final Result

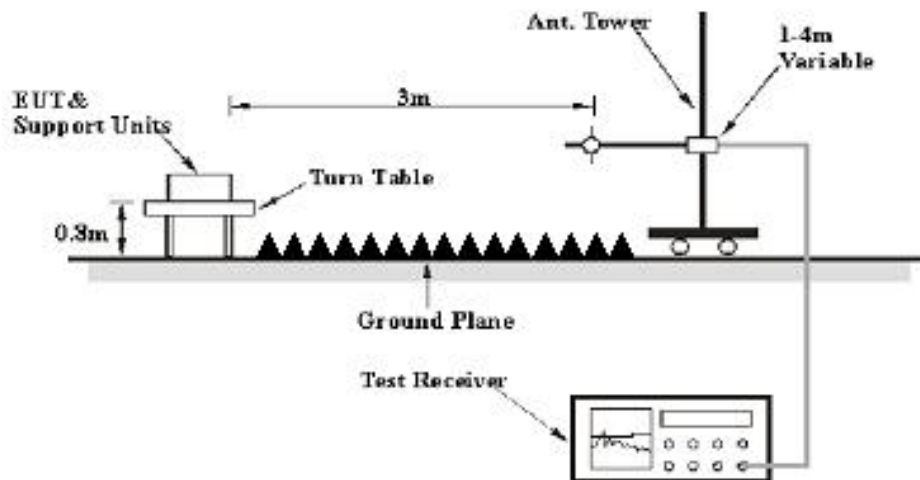
Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.159252	42.85	---	65.50	22.65	9.000	N	9.6
0.173343	41.55	---	64.80	23.25	9.000	N	9.6
0.191526	39.95	---	63.97	24.02	9.000	N	9.6
0.208474	38.49	---	63.27	24.78	9.000	N	9.6
0.230342	37.15	---	62.44	25.29	9.000	N	9.6
0.467685	---	24.24	46.55	22.31	9.000	N	9.6
0.516743	---	24.73	46.00	21.27	9.000	N	9.6
0.516743	30.05	---	56.00	25.95	9.000	N	9.6
0.540467	---	24.22	46.00	21.78	9.000	N	9.6
0.666413	---	22.23	46.00	23.77	9.000	N	9.6
0.998148	---	24.44	46.00	21.56	9.000	N	9.6
2.666299	---	24.36	46.00	21.64	9.000	N	9.6

FCC PART 15B §15.109 – RADIATED EMISSIONS**EUT Setup**

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed at the 3 meters distance, above 1GHz were performed at the 3 meters, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 Class B limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 13 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	Reduced video bandwidth	/	AVG

Test Procedure

During the radiated emissions, the adapter was connected to the first AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in the Quasi-peak detection mode for below 1 GHz, peak and average detection mode above 1 GHz.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Meter Reading + Corrected

Note:

Corrected = Antenna Factor + Cable Loss - Amplifier Gain

or

Corrected = Antenna Factor + Cable Loss + Insertion loss of attenuator - Amplifier Gain

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

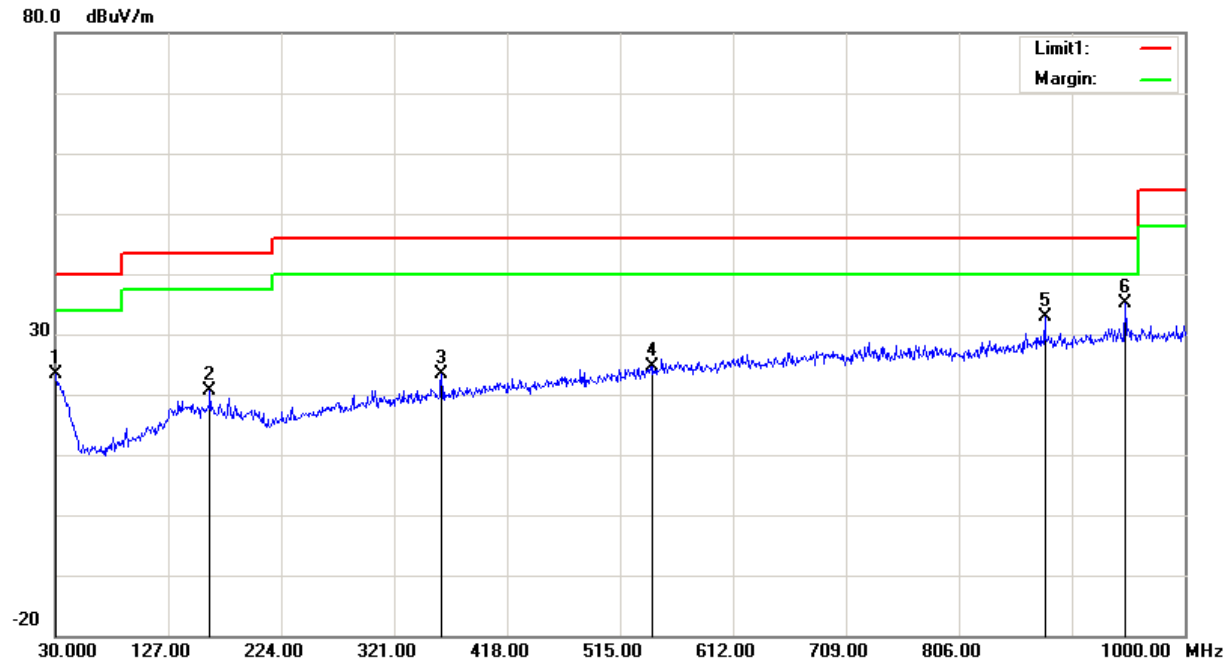
$$\text{Margin} = \text{Limit} - \text{Result}$$

Test Data

Please refer to following table and plots:

Condition: FCC Part 15B Class B
Model: BH480A
Test Mode: M1

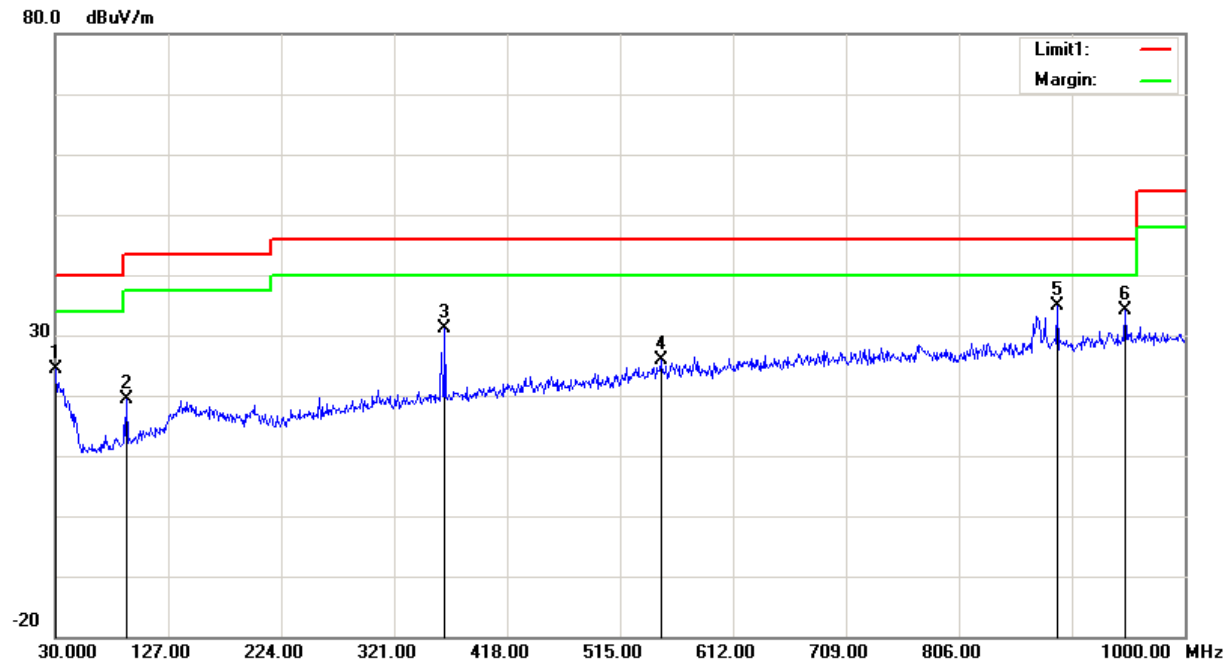
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	27.37	peak	-4.10	23.27	40.00	16.73
2	162.8900	29.91	peak	-9.39	20.52	43.50	22.98
3	361.7400	29.36	peak	-6.00	23.36	46.00	22.64
4	543.1300	26.57	peak	-2.02	24.55	46.00	21.45
5	879.7200	29.89	peak	2.88	32.77	46.00	13.23
6	948.5900	30.44	peak	4.63	35.07	46.00	10.93

Condition: FCC Part 15B Class B
Model: BH480A
Test Mode: M1

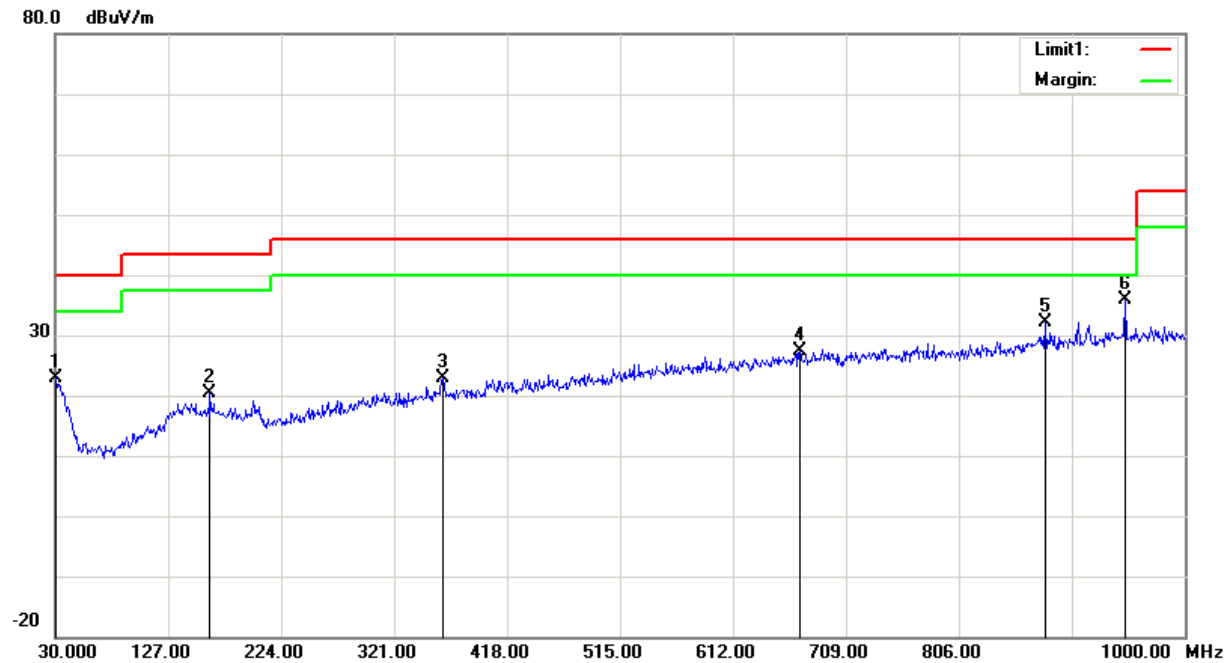
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	28.53	peak	-4.10	24.43	40.00	15.57
2	91.1100	34.39	peak	-14.94	19.45	43.50	24.05
3	364.6500	37.14	peak	-6.13	31.01	46.00	14.99
4	549.9200	27.60	peak	-1.82	25.78	46.00	20.22
5	890.3900	31.65	peak	3.19	34.84	46.00	11.16
6	948.5900	29.59	peak	4.63	34.22	46.00	11.78

Condition: FCC Part 15B Class B
Model: BH480A
Test Mode: M2

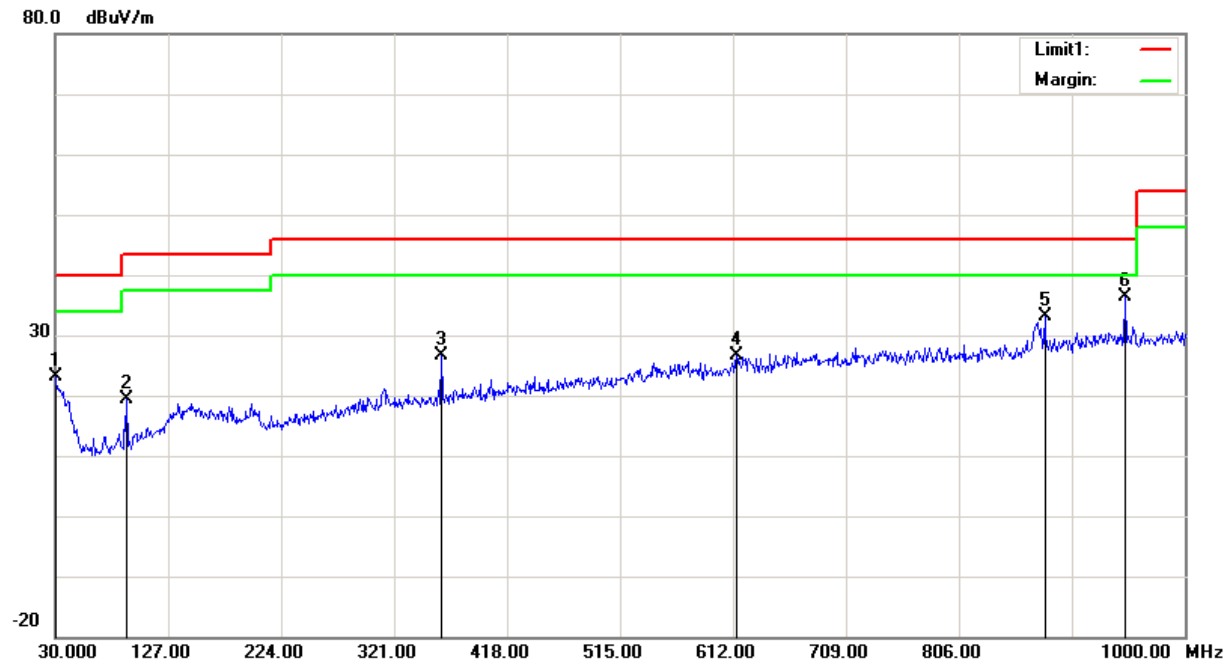
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.9700	27.60	peak	-4.66	22.94	40.00	17.06
2	162.8900	29.78	peak	-9.39	20.39	43.50	23.11
3	362.7100	28.89	peak	-6.04	22.85	46.00	23.15
4	669.2300	27.45	peak	0.04	27.49	46.00	18.51
5	879.7200	29.25	peak	2.88	32.13	46.00	13.87
6	948.5900	31.18	peak	4.63	35.81	46.00	10.19

Condition: FCC Part 15B Class B
Model: BH480A
Test Mode: M2

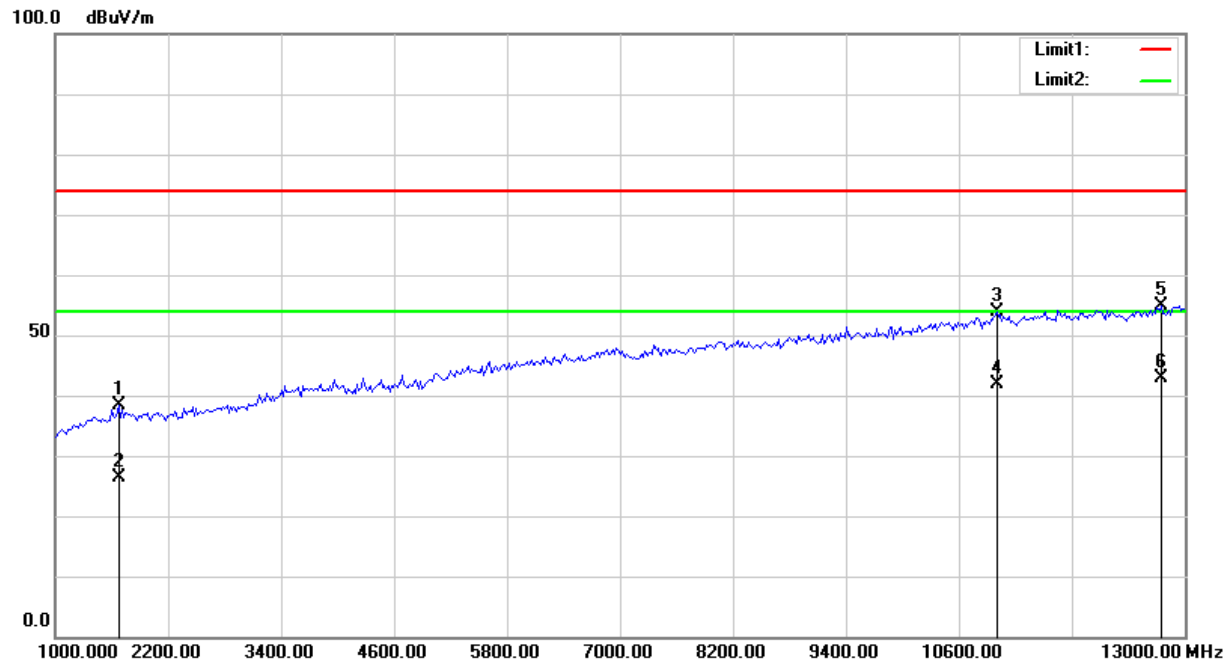
Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	27.17	peak	-4.10	23.07	40.00	16.93
2	91.1100	34.32	peak	-14.94	19.38	43.50	24.12
3	361.7400	32.61	peak	-6.00	26.61	46.00	19.39
4	614.9100	27.53	peak	-0.92	26.61	46.00	19.39
5	879.7200	30.24	peak	2.88	33.12	46.00	12.88
6	948.5900	31.70	peak	4.63	36.33	46.00	9.67

Condition: FCC Part 15B Class B Peak
Model: BH480A
Test Mode: M1

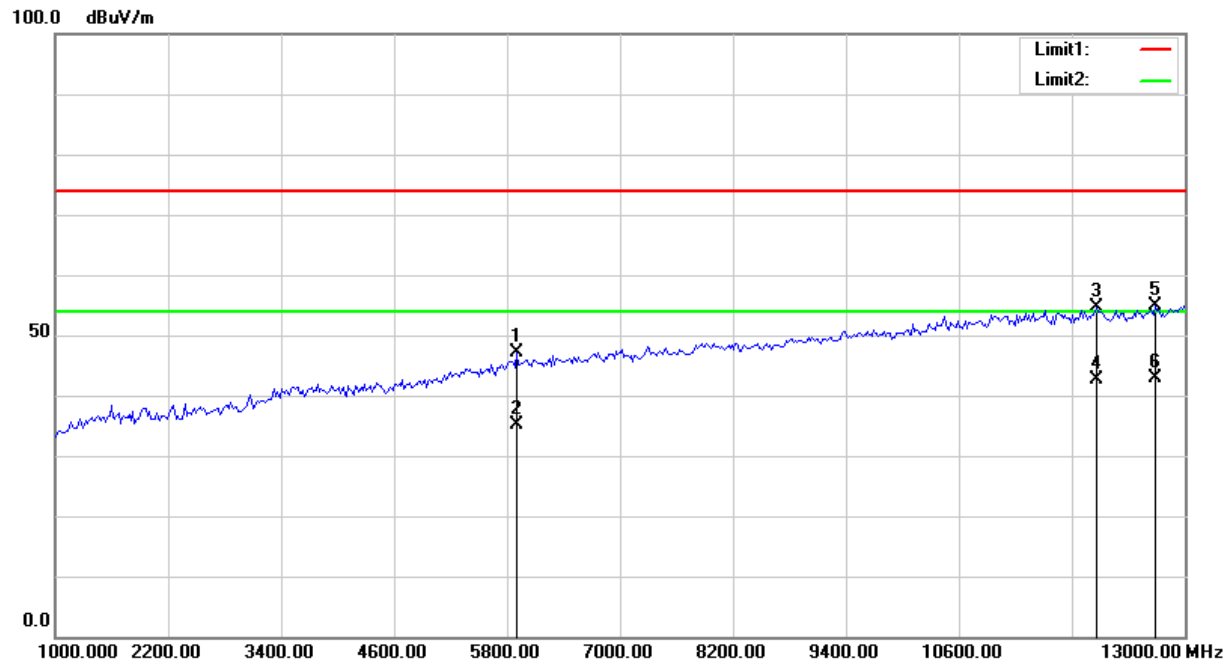
Polarization: Horizontal
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1673.077	39.51	peak	-1.13	38.38	74.00	35.62
2	1673.077	27.43	AVG	-1.13	26.30	54.00	27.70
3	11000.000	37.13	peak	16.80	53.93	74.00	20.07
4	11000.000	25.06	AVG	16.80	41.86	54.00	12.14
5	12750.000	36.31	peak	18.52	54.83	74.00	19.17
6	12750.000	24.25	AVG	18.52	42.77	54.00	11.23

Condition: FCC Part 15B Class B
Model: BH480A
Test Mode: M1

Polarization: Vertical
Power: AC 120V/60Hz
Distance: 3m



No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	5903.846	37.75	peak	9.41	47.16	74.00	26.84
2	5903.846	25.66	AVG	9.41	35.07	54.00	18.93
3	12057.692	37.03	peak	17.68	54.71	74.00	19.29
4	12057.692	25.01	AVG	17.68	42.69	54.00	11.31
5	12692.308	36.21	peak	18.67	54.88	74.00	19.12
6	12692.308	24.15	AVG	18.67	42.82	54.00	11.18

EXHIBIT A – EUT PHOTOGRAPHS



Left







Right







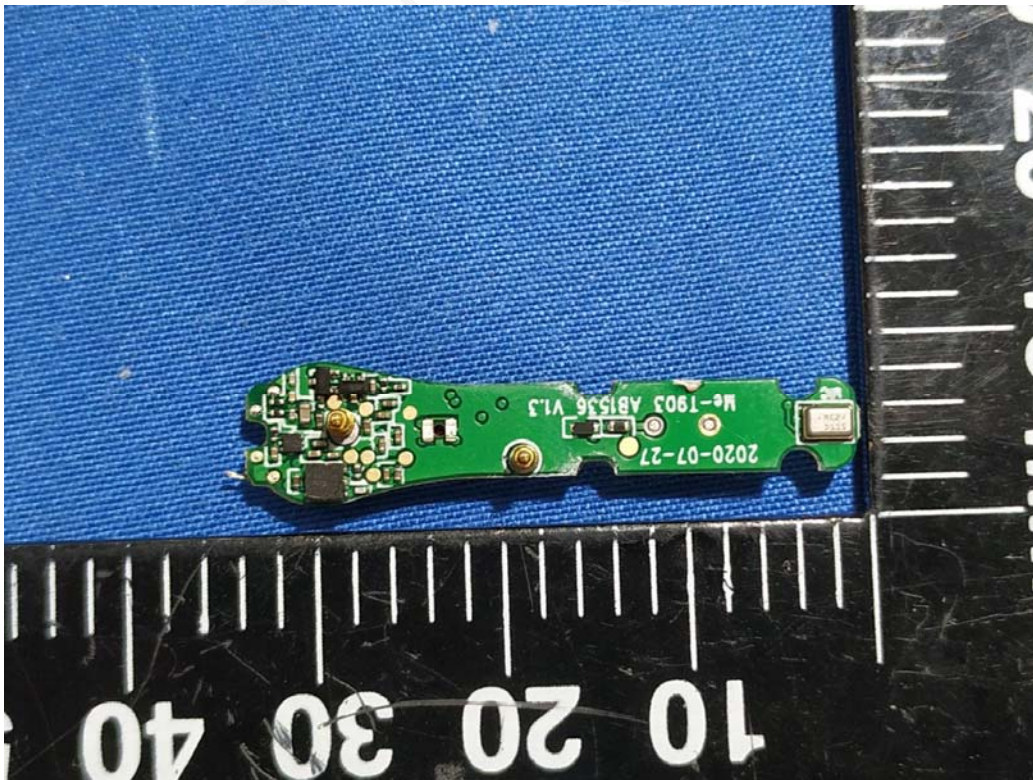


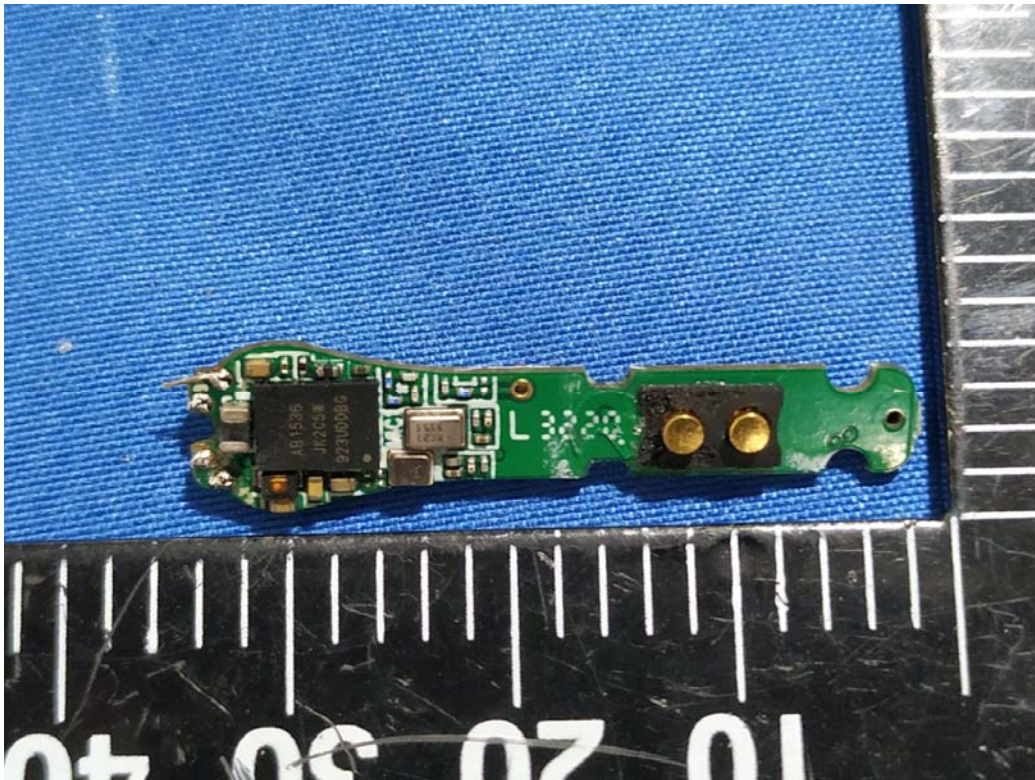


left



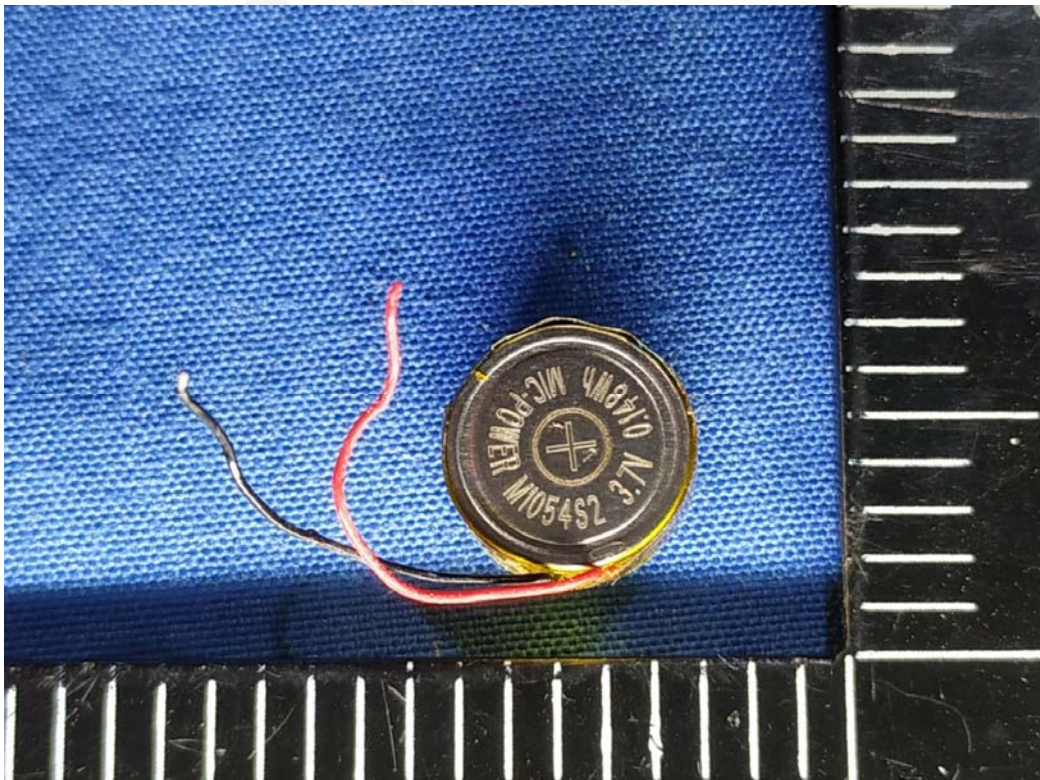
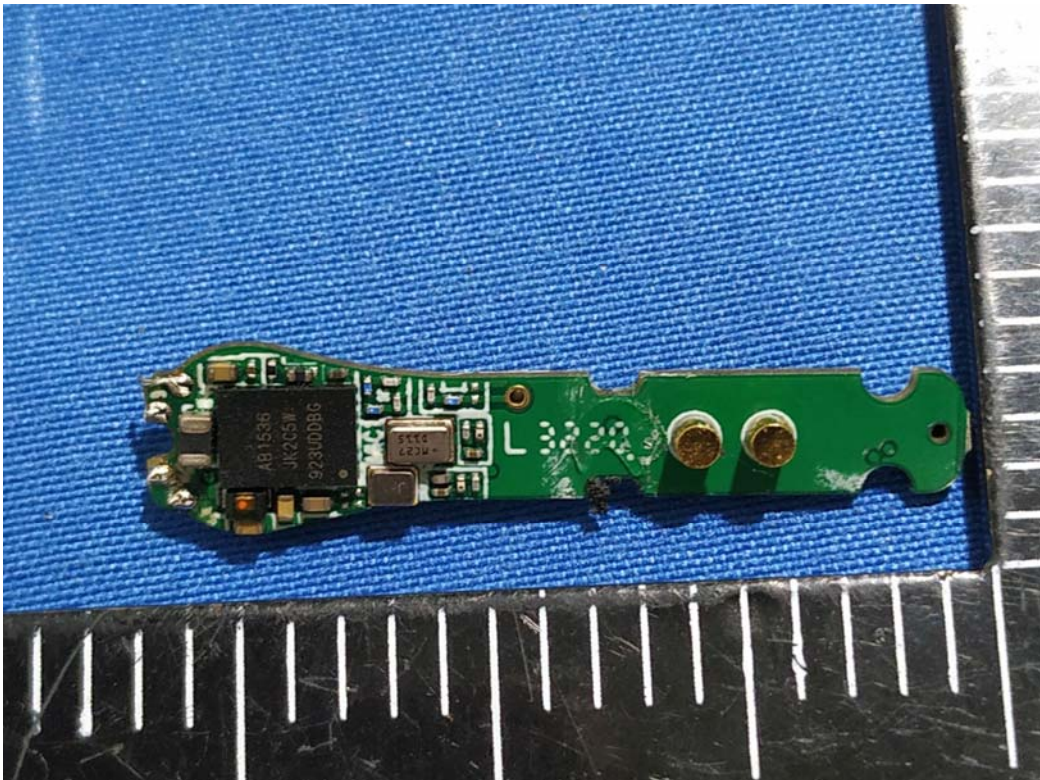
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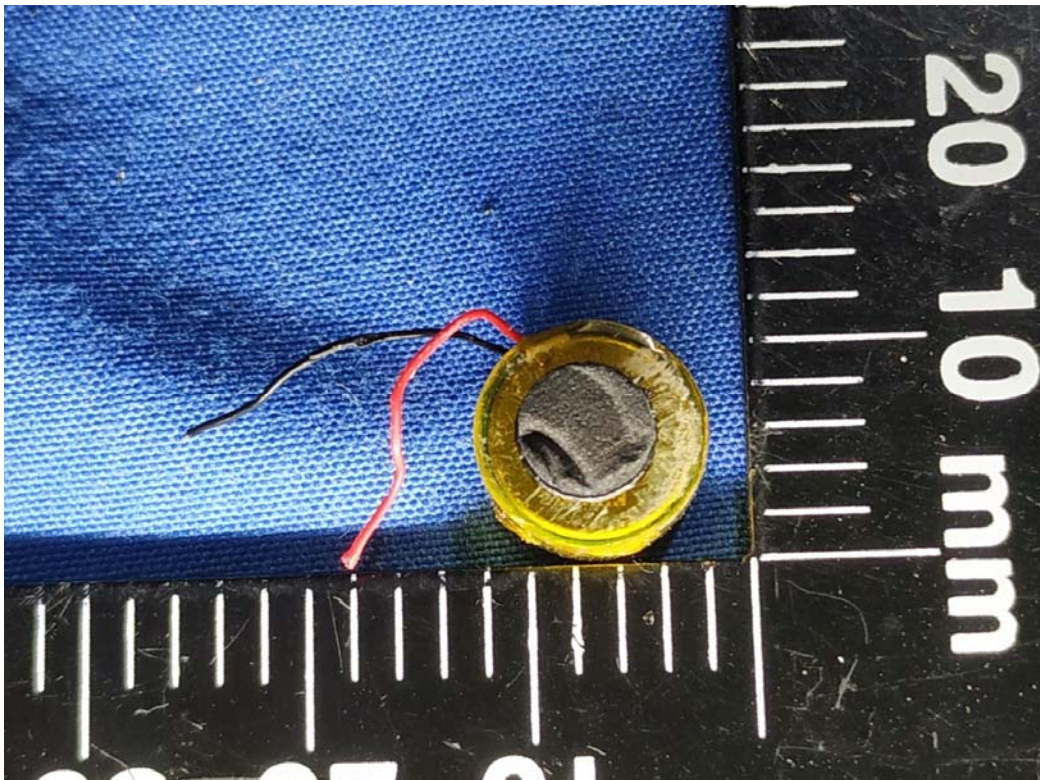




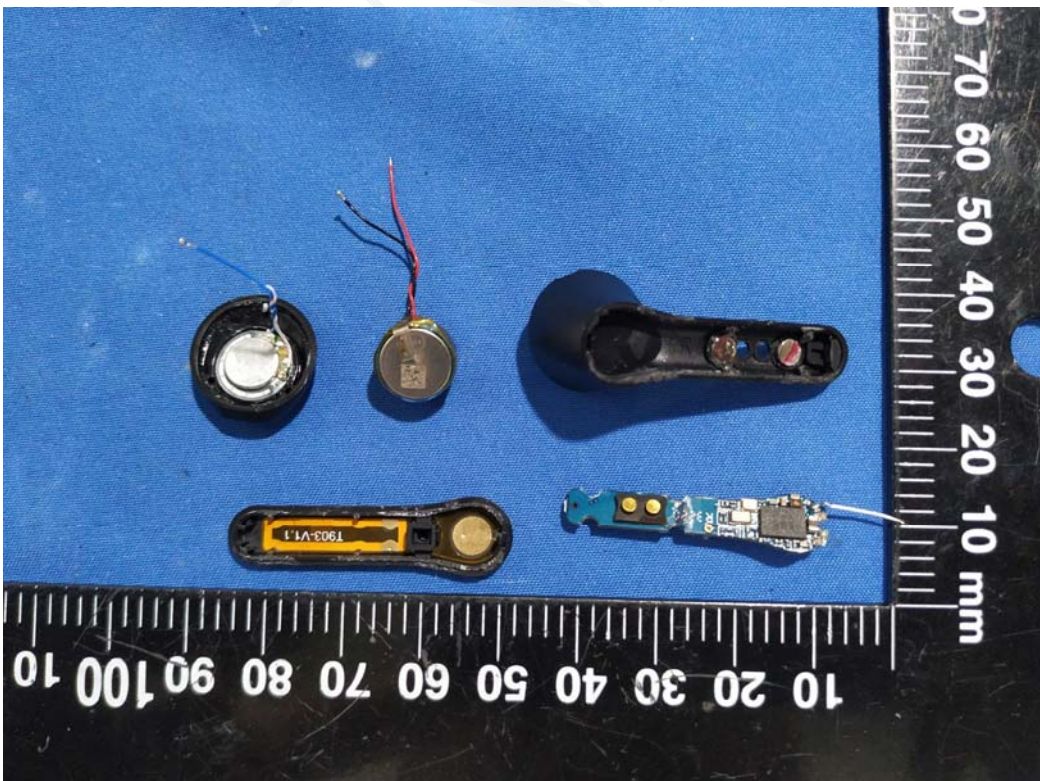
Chip1

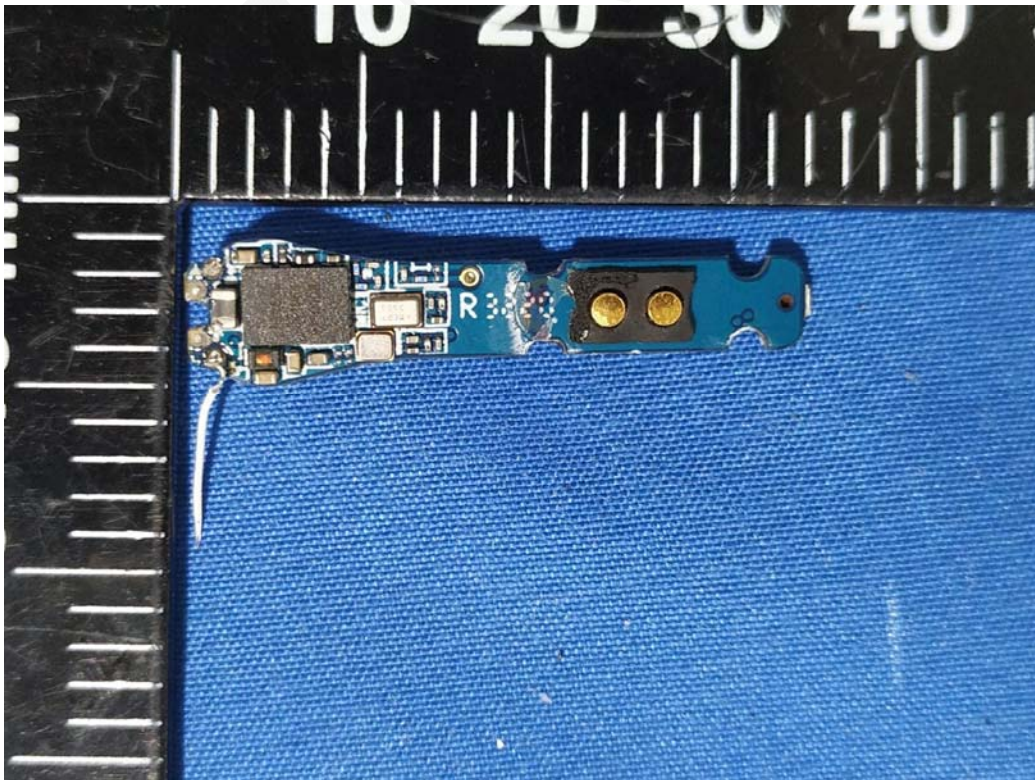
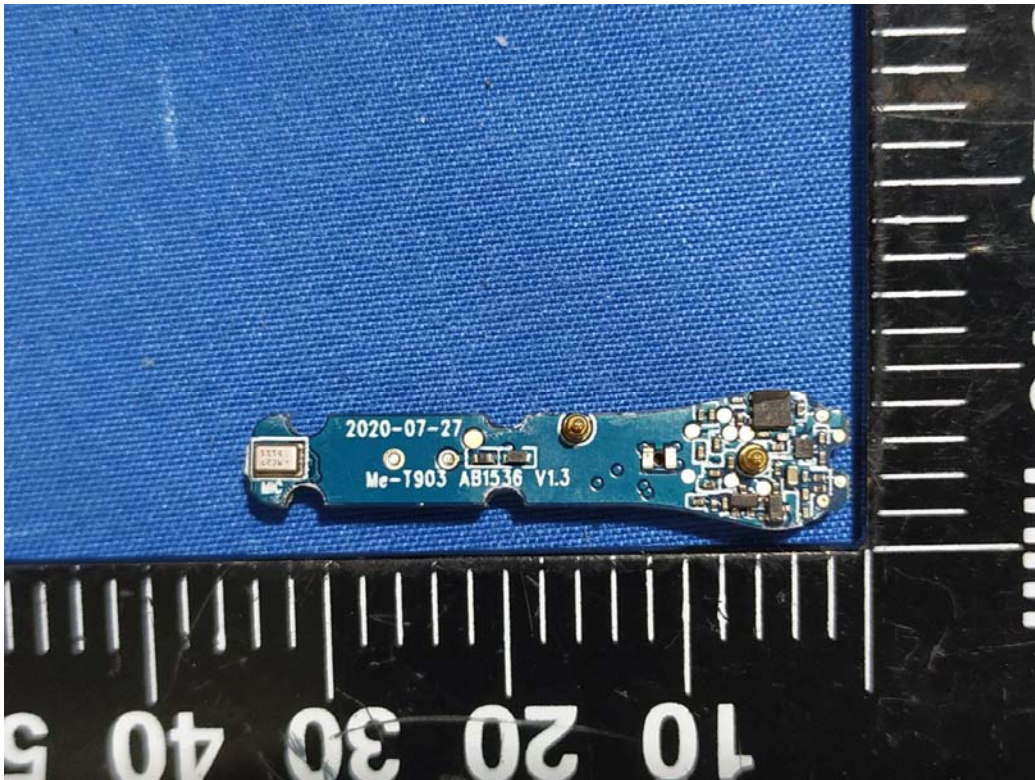




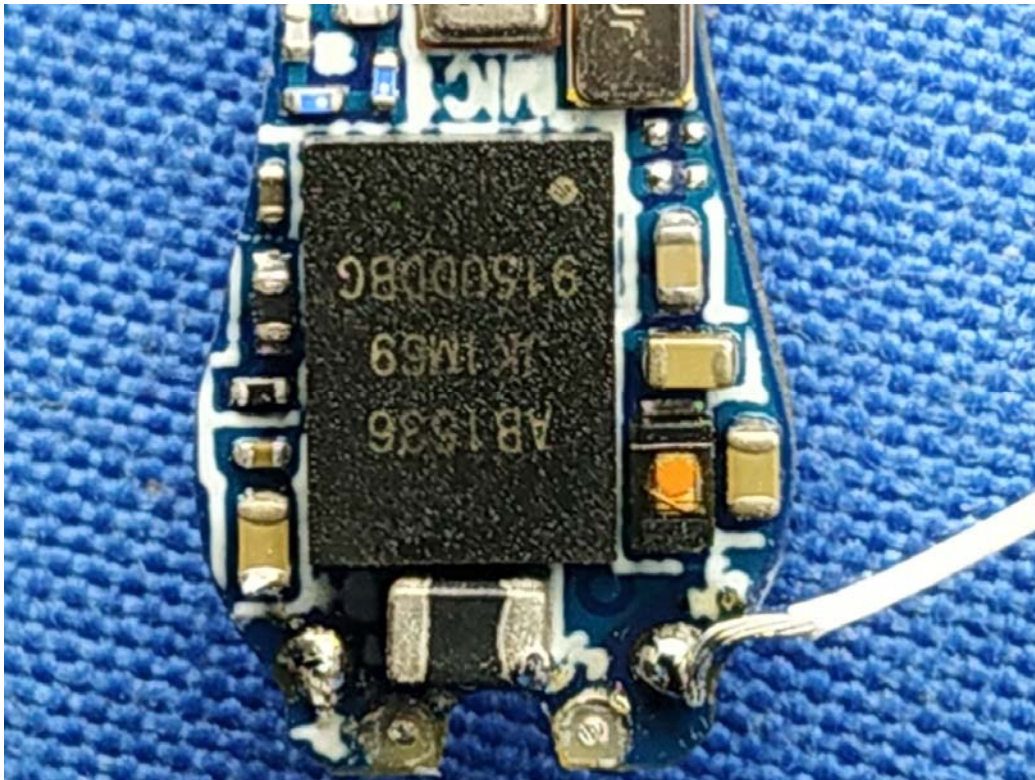


right





Chip2



ANT



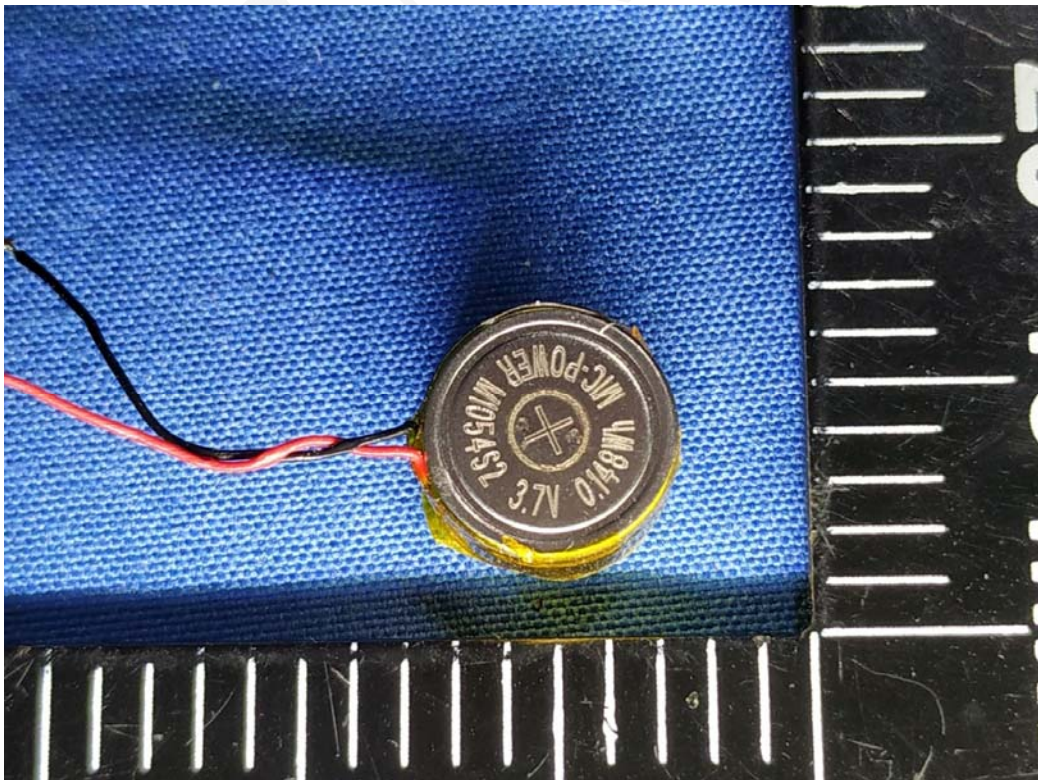
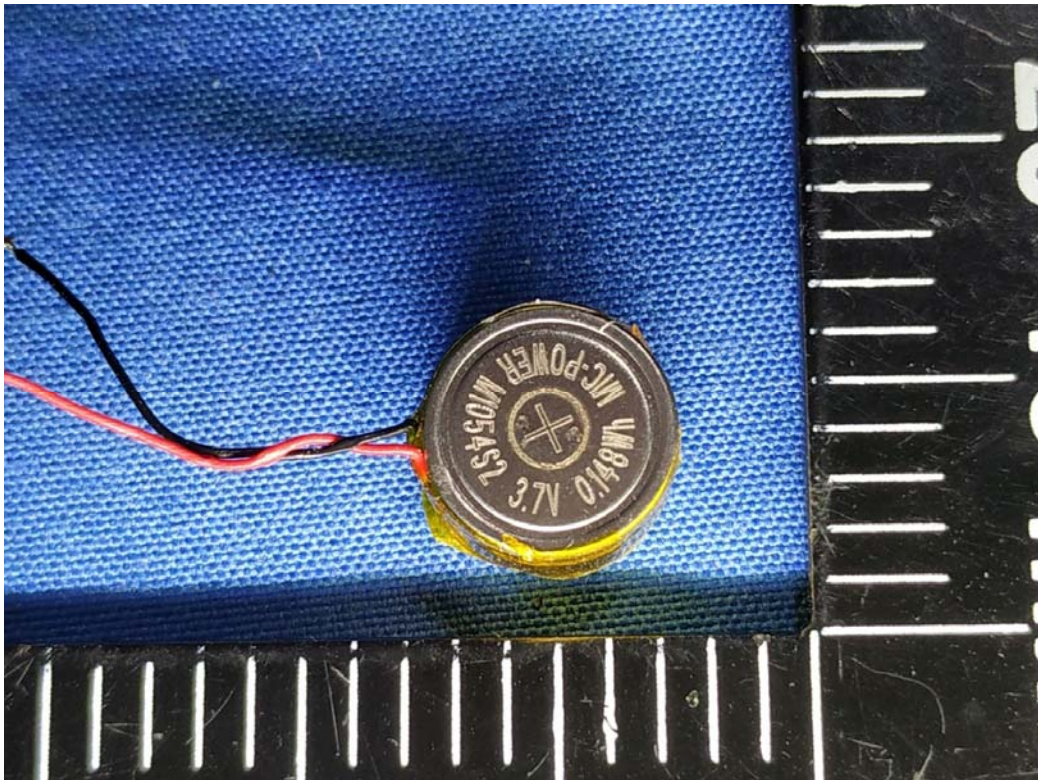


EXHIBIT B – TEST SETUP PHOTOGRAPHS

Conducted Emission-M1 -front View



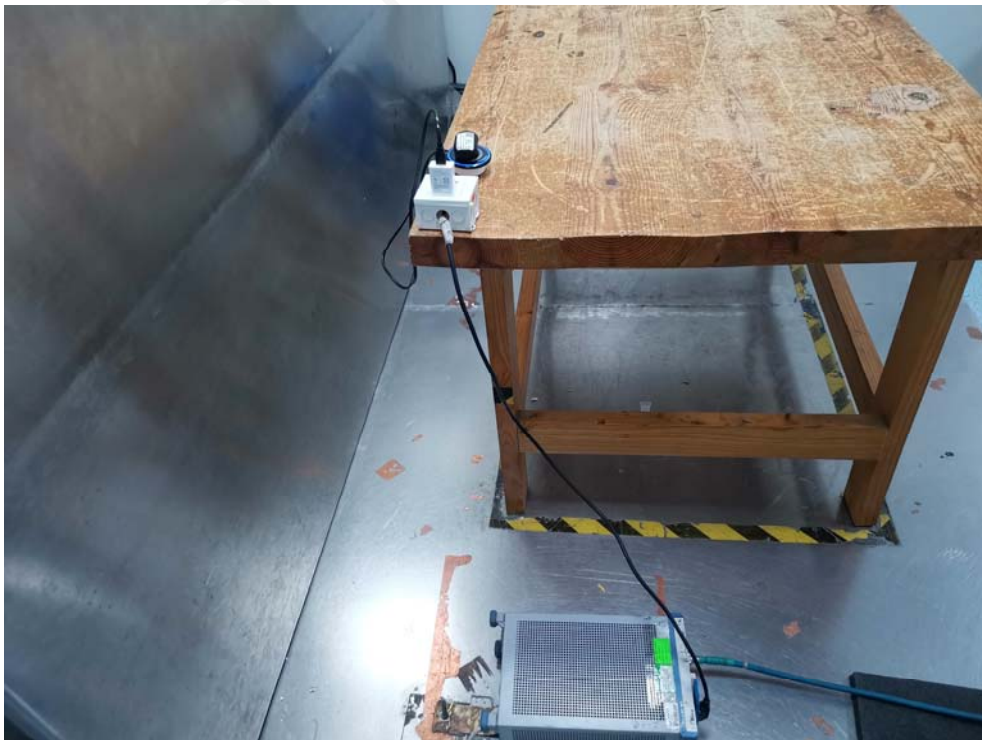
Conducted Emission-M1 -Side View



Conducted Emission-M2 -front View



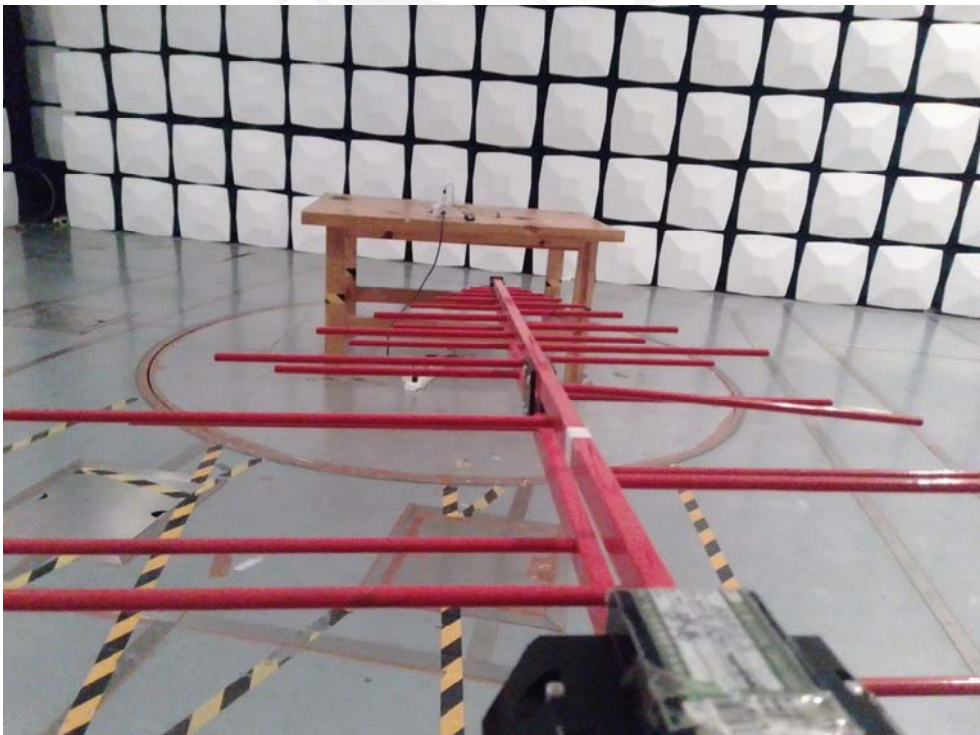
Conducted Emission-M2 -Side View



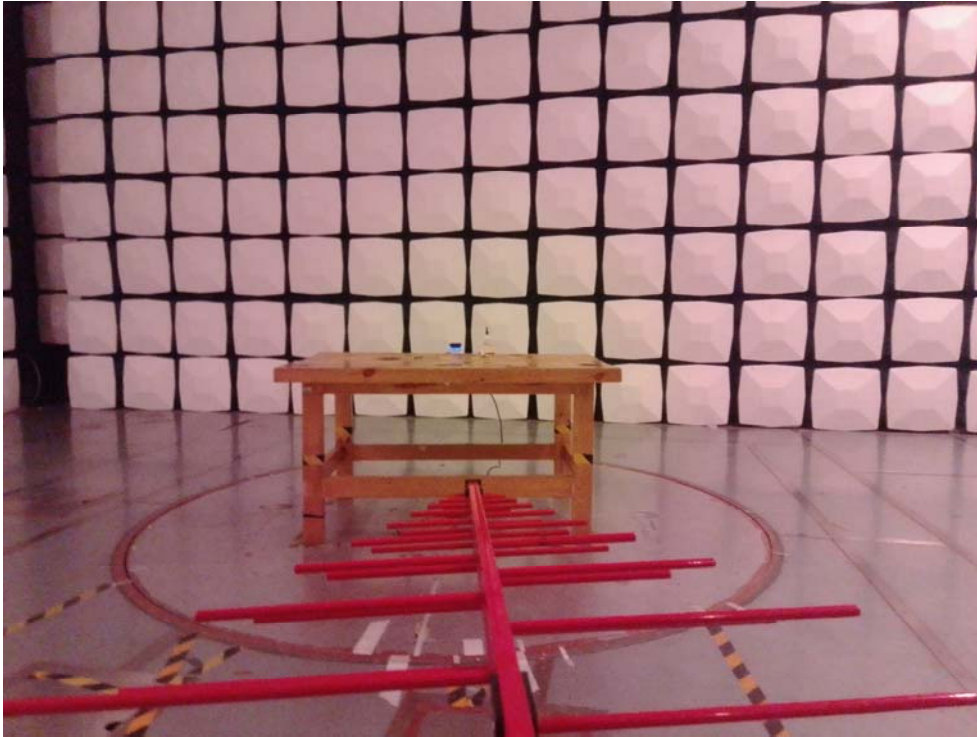
Radiated Emission Below 1G -M1-front View



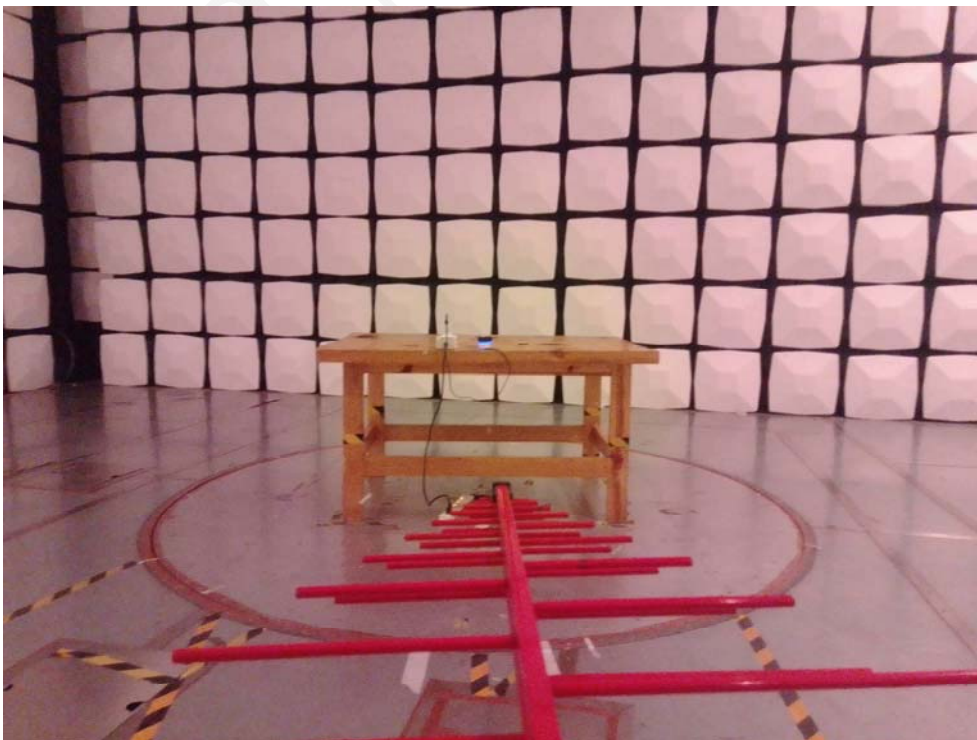
Radiated Emission Below 1G -M1-rear View



Radiated Emission Below 1G -M2-front View



Radiated Emission Below 1G-M1 -rear View



Radiated Emission Above 1G-front View



Radiated Emission Above 1G -rear View



*****END OF REPORT*****