

TEST REPORT

Applicant Name : Axtel sp. z o.o. sp. k.
Address : 16 Woloska st. Warsaw Mazowieckie 02-675 Poland
Report Number : RA221118-55023E-EM
FCC ID: 2A9UU-AXVDM

Test Standard (s)
FCC PART 15B

Sample Description

Product Type: Axtel USB Headset
Model No.: Voice UC45 duo NC
Trade Mark: Axtel
Date Received: 2022-11-18
Date of Test: 2022-11-21 to 2022-11-25
Report Date: 2022-11-27

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

Zeki Ma

Zeki Ma
EMC Engineer

Approved By:

Candy Li

Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RA221118-55023E-EM	Original Report	2022-11-27

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Axtel USB Headset
Tested Model	Voice UC45 duo NC
Highest Operation Frequency	48MHz (It is provided by the applicant.)
Voltage Range	DC 5V
Sample number	RA221118-55023E-EM-S1 (Assigned by ATC)
Sample/EUT Status	Good condition

Objective

This report is in accordance with Part 2-Subpart J, and Part 15-Subparts A and B of the Federal Communication Commission's rules.

The objective of the manufacturer is to determine the compliance of EUT with FCC Part 15, Class B device.

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.

All radiated and conducted emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	9kHz - 30MHz	2.66dB
	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
Temperature		1°C
Humidity		6%
Supply voltages		0.4%

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

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189.

Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01.

Listed by Innovation, Science and Economic Development Canada (ISED), the Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

Test Mode 1: Playing for Phone

Test Mode 2: Playing for Notebook

EUT Exercise Software

No exercise software.

Special Accessories

No special accessory was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Redmi	Phone	K20Pro	Unknown
Lenovo	Notebook	T430	Unknown
Unknown	Notebook Adapter	92P1156	Unknown

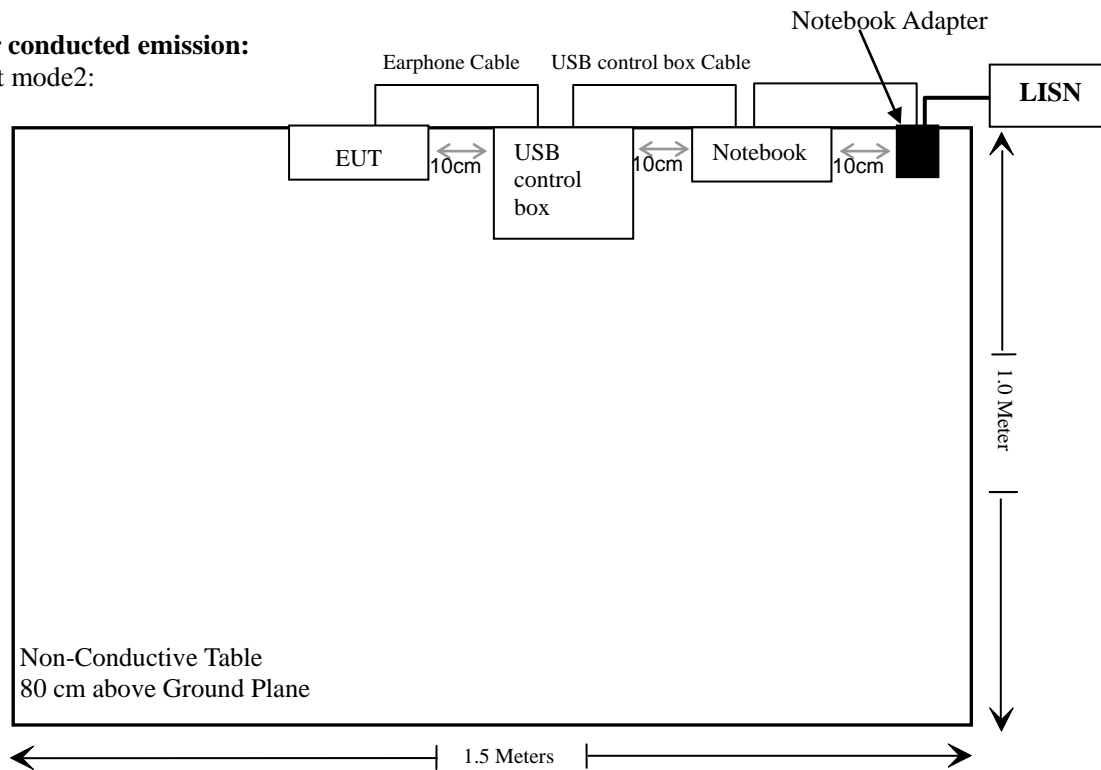
External I/O Cable

Cable Description	Length (m)	From Port	To Port
Un-shielding Un-Detachable Earphone Cable	1.2	EUT	USB control box/ Phone
Un-shielding Detachable USB Cable	1.3	USB control box	Notebook
Un-shielding Detachable AC Cable	2.0	Notebook Adapter	LISN
Un-shielding Detachable DC Cable	2.0	Notebook Adapter	Notebook
Unshielded Detachable Network cable	5.0	Notebook	Network

Block Diagram of Radiated Test Setup

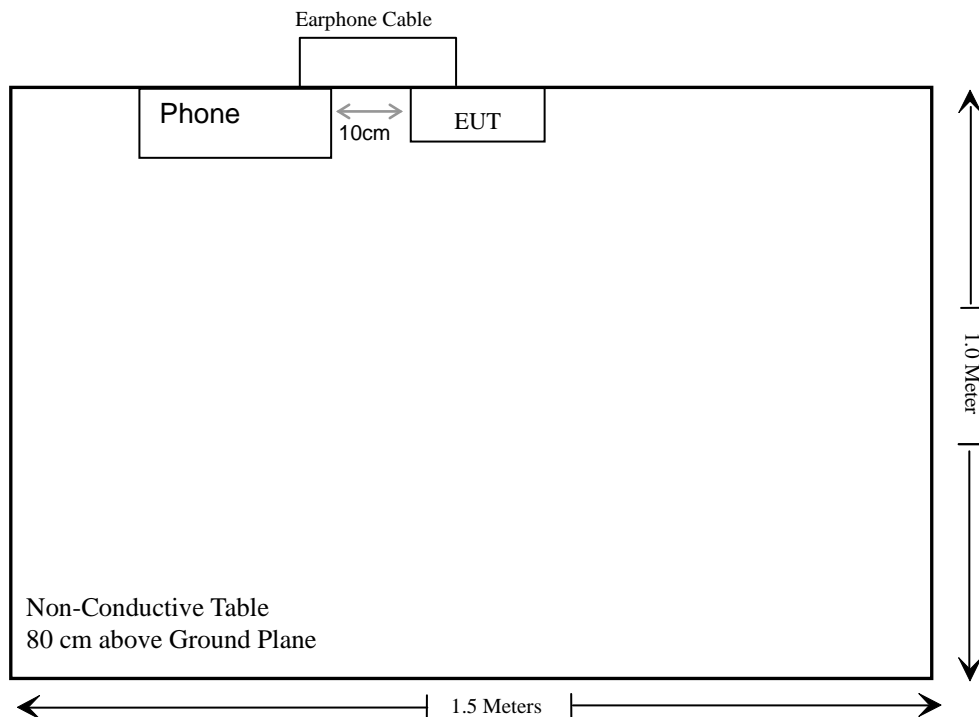
For conducted emission:

Test mode2:

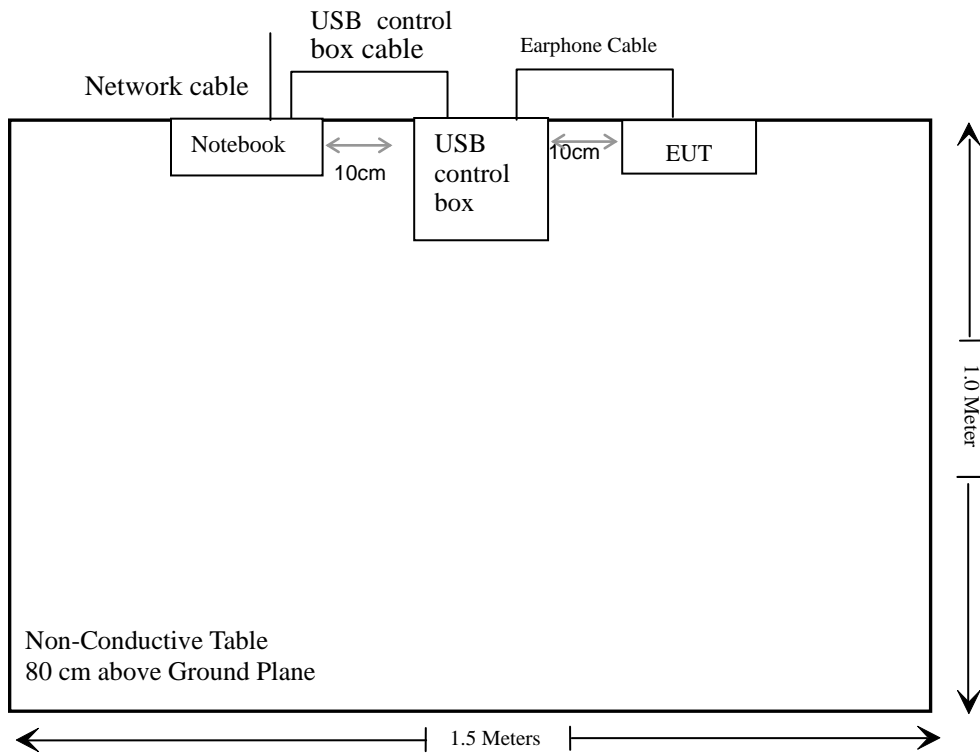


For Radiated emission:

Test mode1:



Test mode 2:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliant
§15.109	Radiated Emissions	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emission					
Rohde & Schwarz	EMI Test Receiver	ESCI	100784	2021/12/13	2022/12/12
Rohde & Schwarz	L.I.S.N.	ENV216	101314	2021/12/13	2022/12/12
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2021/12/13	2022/12/12
Unknown	RF Coaxial Cable	No.17	N0350	2021/12/14	2022/12/13
Conducted Emission Test Software: e3 19821b (V9)					
Radiated Emissions Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2021/12/13	2022/12/12
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Unknown	RF Coaxial Cable	No.12	N040	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.13	N300	2021/12/14	2022/12/13
Unknown	RF Coaxial Cable	No.14	N800	2021/12/14	2022/12/13
Radiated Emission Test Software: e3 19821b(V9)					

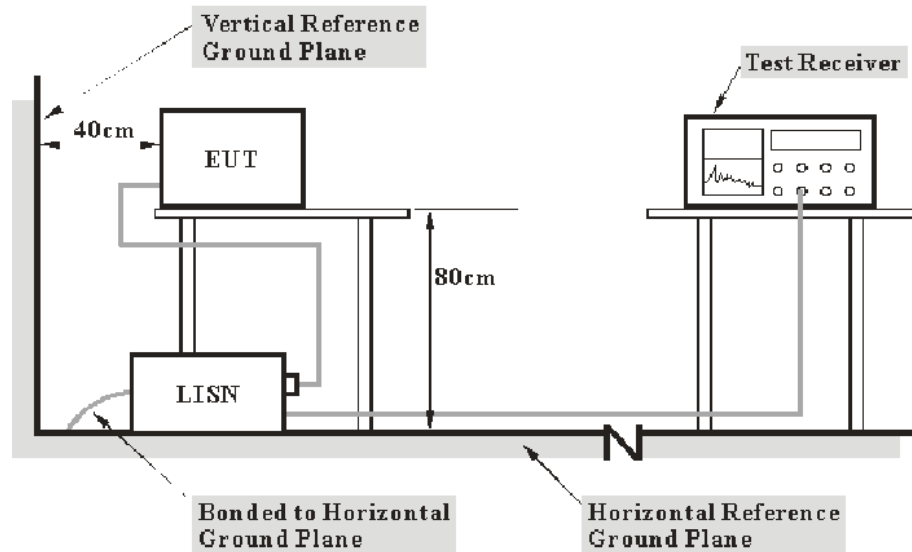
* **Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.107 – CONDUCTED EMISSIONS

Applicable Standard

According to FCC§15.107

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 measurement procedure of EUT setup is according with ANSI C63.4-2014. The related limit was specified in FCC Part 15.107 Class B.

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

The spacing between the peripherals was 10 cm.

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

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

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

Factor & Over Limit Calculation

The factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

$$\text{Factor} = \text{LISN VDF} + \text{Cable Loss}$$

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

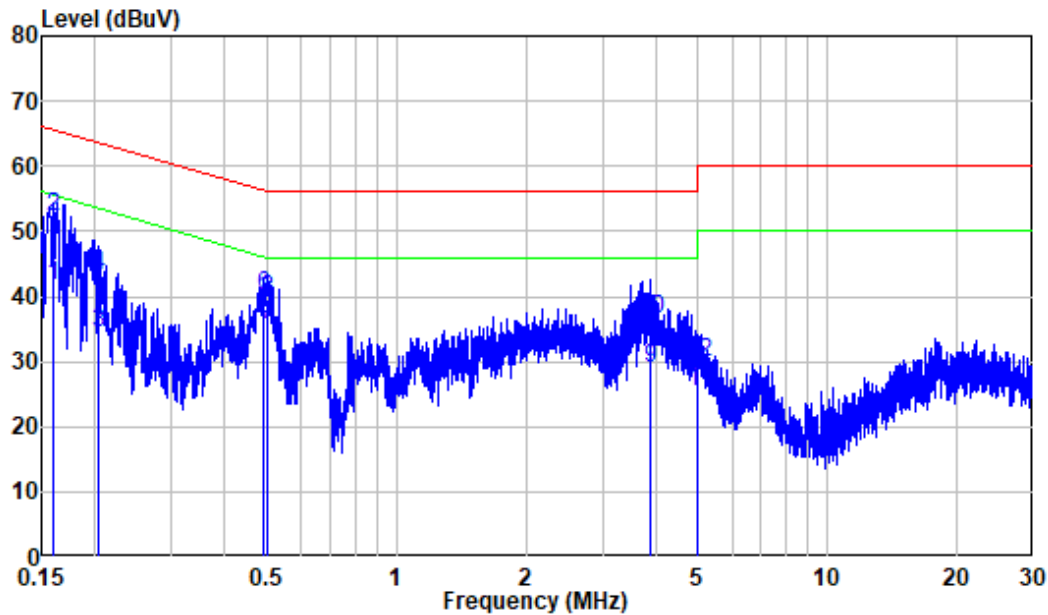
$$\begin{aligned}\text{Over Limit} &= \text{Level} - \text{Limit} \\ \text{Level} &= \text{Read Level} + \text{Factor}\end{aligned}$$

Test Data

Environmental Conditions

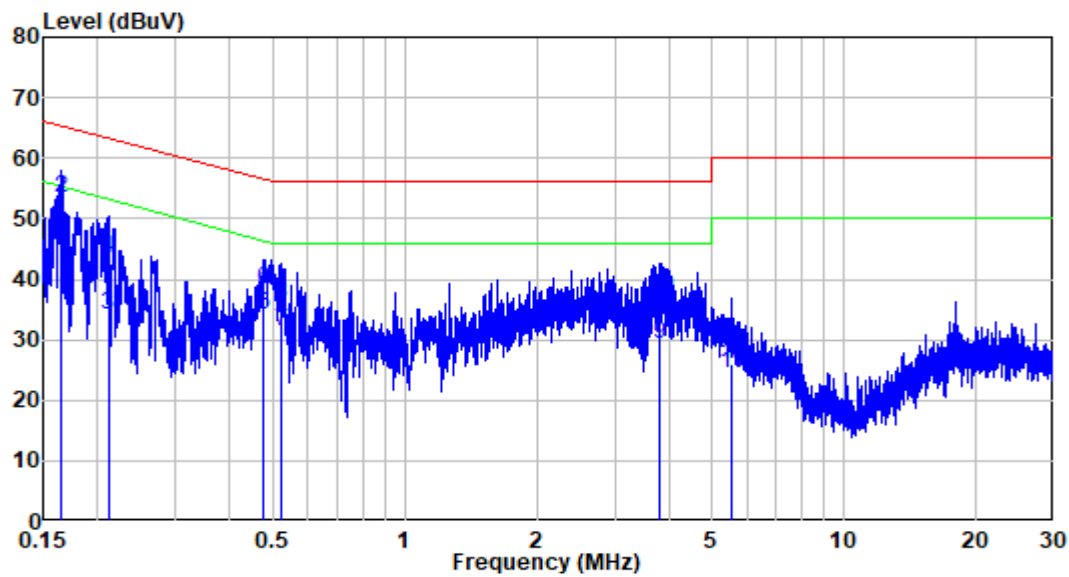
Temperature:	23 °C
Relative Humidity:	60 %
ATM Pressure:	101.0 kPa

The testing was performed by Lipa Wu on 2022-11-25.

Test mode 2:**AC 120V/60Hz, Line:**

Site : Shielding Room
 Condition: Line
 Job No. : RA221118-55023E-EM
 Mode : Playing for Notebook
 Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.160	9.80	31.75	41.55	55.48	-13.93	Average
2	0.160	9.80	42.45	52.25	65.48	-13.23	QP
3	0.204	9.80	24.52	34.32	53.44	-19.12	Average
4	0.204	9.80	33.41	43.21	63.44	-20.23	QP
5	0.493	9.80	26.69	36.49	46.11	-9.62	Average
6	0.493	9.80	30.35	40.15	56.11	-15.96	QP
7	0.503	9.80	25.96	35.76	46.00	-10.24	Average
8	0.503	9.80	29.66	39.46	56.00	-16.54	QP
9	3.894	9.84	19.22	29.06	46.00	-16.94	Average
10	3.894	9.84	26.61	36.45	56.00	-19.55	QP
11	4.998	9.85	15.50	25.35	46.00	-20.65	Average
12	4.998	9.85	19.94	29.79	56.00	-26.21	QP

AC 120V/60Hz, Neutral:

Site : Shielding Room
 Condition: Neutral
 Job No. : RA221118-55023E-EM
 Mode : Playing for Notebook
 Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.164	9.80	33.67	43.47	55.24	-11.77	Average
2	0.164	9.80	43.59	53.39	65.24	-11.85	QP
3	0.211	9.80	24.36	34.16	53.17	-19.01	Average
4	0.211	9.80	33.60	43.40	63.17	-19.77	QP
5	0.478	9.80	24.33	34.13	46.37	-12.24	Average
6	0.478	9.80	28.64	38.44	56.37	-17.93	QP
7	0.524	9.81	21.50	31.31	46.00	-14.69	Average
8	0.524	9.81	25.98	35.79	56.00	-20.21	QP
9	3.792	9.84	19.56	29.40	46.00	-16.60	Average
10	3.792	9.84	27.36	37.20	56.00	-18.80	QP
11	5.520	9.92	14.57	24.49	50.00	-25.51	Average
12	5.520	9.92	16.17	26.09	60.00	-33.91	QP

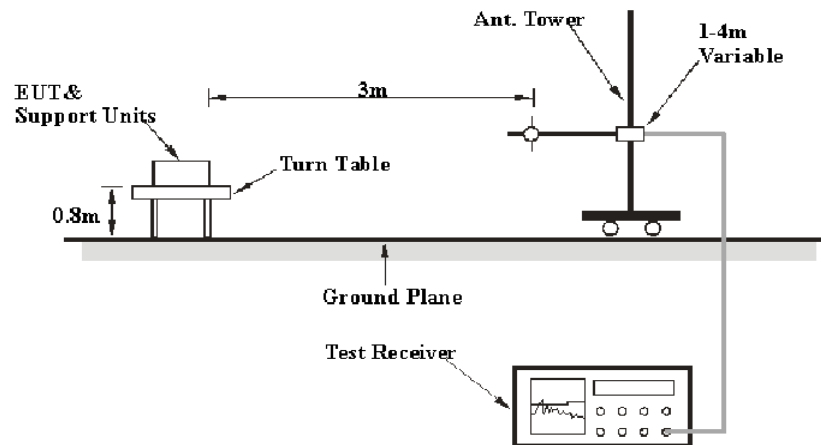
FCC §15.109 - RADIATED EMISSIONS

Applicable Standard

FCC §15.109

EUT Setup

Below 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 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 spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 1 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz.

Test Procedure

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

Factor & Over Limit Calculation

The Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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

$$\begin{aligned}\text{Over Limit} &= \text{Level} - \text{Limit} \\ \text{Level} &= \text{Reading} + \text{Factor}\end{aligned}$$

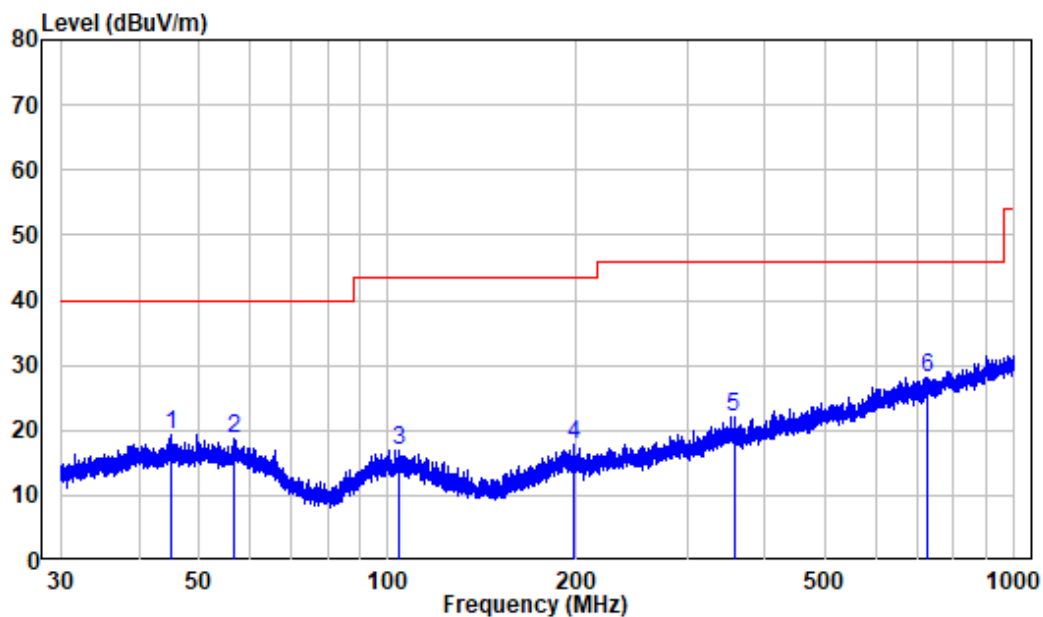
Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	60%
ATM Pressure:	101.0 kPa

The testing was performed by Jimi Zheng on 2022-11-21.

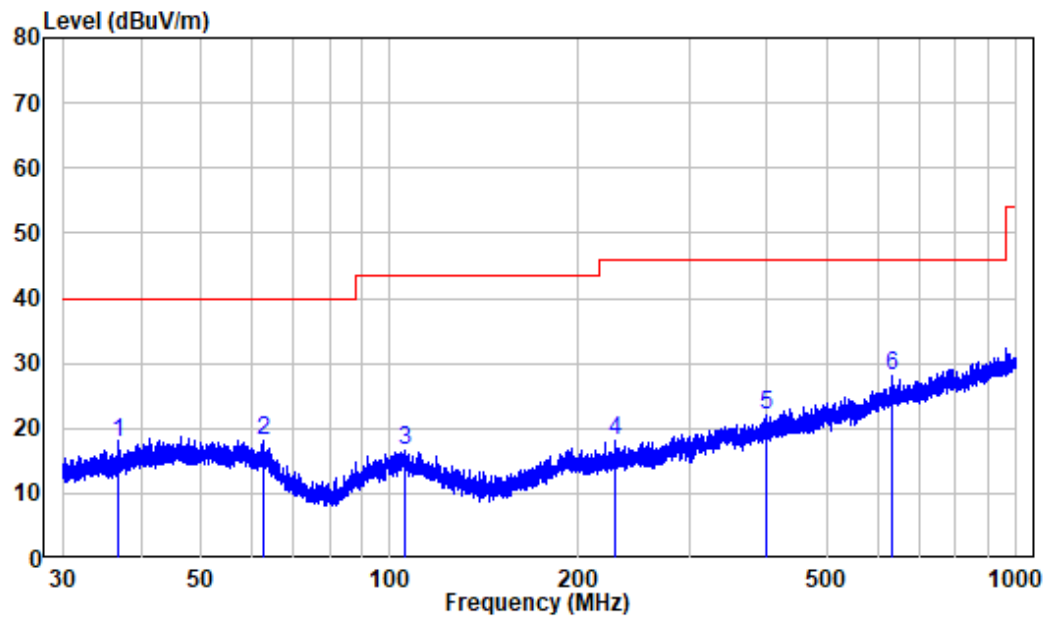
Note: Pre-scan in the X, Y and Z axes of orientation, the worst case of orientation was photo and recorded.

30MHz-1GHz:**Test mode 1****Horizontal:**

Site : chamber
Condition: 3m HORIZONTAL
Job No. : RA221118-55023E-EM
Test Mode: Playing for Phone

	Freq	Factor	Read Level	Level	Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	44.940	-9.94	29.13	19.19	40.00	-20.81	Peak
2	56.941	-10.06	28.66	18.60	40.00	-21.40	Peak
3	104.399	-11.78	28.82	17.04	43.50	-26.46	Peak
4	198.240	-11.52	29.37	17.85	43.50	-25.65	Peak
5	356.676	-7.56	29.55	21.99	46.00	-24.01	Peak
6	725.850	-1.22	29.44	28.22	46.00	-17.78	Peak

Vertical

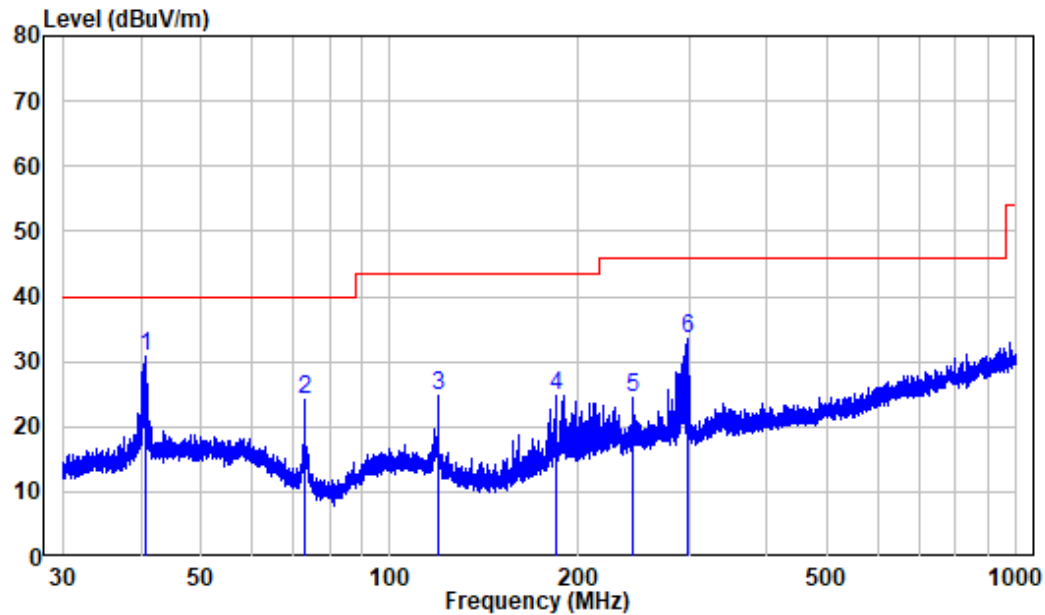


Site : chamber
Condition: 3m VERTICAL
Job No. : RA221118-55023E-EM
Test Mode: Playing for Phone

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	36.847	-11.04	29.00	17.96	40.00	-22.04	Peak
2	62.761	-11.71	29.80	18.09	40.00	-21.91	Peak
3	105.827	-11.91	28.50	16.59	43.50	-26.91	Peak
4	228.290	-11.17	29.36	18.19	46.00	-27.81	Peak
5	399.380	-6.74	28.91	22.17	46.00	-23.83	Peak
6	632.520	-2.03	30.14	28.11	46.00	-17.89	Peak

Test mode 2

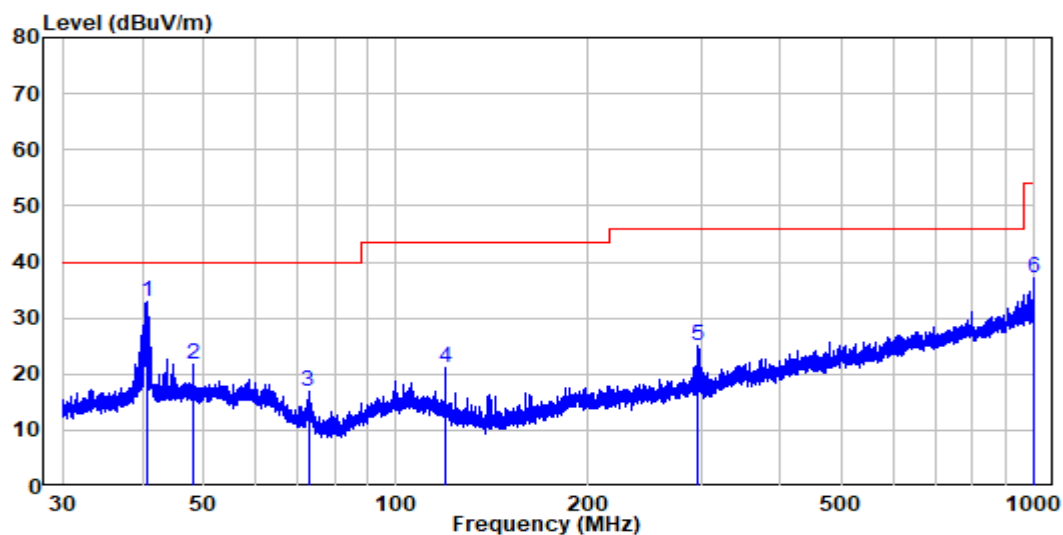
Horizontal:



Site : chamber
Condition: 3m HORIZONTAL
Job No. : RA221118-55023E-EM
Test Mode: Playing for Notebook

	Freq	Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	40.613	-10.25	41.13	30.88	40.00	-9.12	Peak
2	73.038	-15.85	39.95	24.10	40.00	-15.90	Peak
3	119.541	-13.45	38.22	24.77	43.50	-18.73	Peak
4	184.409	-12.25	37.06	24.81	43.50	-18.69	Peak
5	244.768	-10.59	34.92	24.33	46.00	-21.67	Peak
6	298.399	-9.25	42.78	33.53	46.00	-12.47	Peak

Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : RA221118-55023E-EM
Test Mode: Playing for Notebook

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	40.613	-10.25	43.08	32.83	40.00	-7.17	Peak
2	48.057	-10.00	31.81	21.81	40.00	-18.19	Peak
3	72.815	-15.80	32.75	16.95	40.00	-23.05	Peak
4	119.541	-13.45	34.67	21.22	43.50	-22.28	Peak
5	297.615	-9.25	34.28	25.03	46.00	-20.97	Peak
6	999.124	3.00	34.12	37.12	54.00	-16.88	Peak

Note:

The other spurious emission which is in the noise floor level was not recorded.

For below 1GHz, If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform QP/Average measurement.

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