



# RADIO TEST REPORT

**FCC ID** : TLZ-XM9098  
**Equipment** : IEEE 802.112X2 WiFi 6 SU and MU-MIMO DBC  
Wireless LAN + Bluetooth 5.1 Combo Module  
**Brand Name** : AzureWave  
**Model Name** : AW-XM458, AW-XM369, AW-XM458MA-XXX,  
AW-XM369MA-XXX  
**Applicant** : AzureWave Technologies, Inc.  
8F., No.94, Baozhong Rd. , Xindian Dist., New  
Taipei City , Taiwan 231  
**Manufacturer** : AzureWave Technologies (Shanghai) Inc.  
No. 1355, Jiaxin Road, Malu Twon, Jiading District  
Shanghai, P.R. China  
**Standard** : 47 CFR FCC Part 15.247

The product was received on Feb. 13, 2023, and testing was started from Feb. 25, 2023 and completed on Apr. 13, 2023. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.



Approved by: Sam Chen

**Sporton International Inc. Hsinchu Laboratory**  
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



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### Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-

**Conformity Assessment Condition:**

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

**Reviewed by: Sam Chen**

**Report Producer: Viola Huang**



# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

Frequency Range (MHz)	Bluetooth Version	Ch. Frequency (MHz)	Channel Number
2400-2483.5	BR / EDR	2402-2480	0-78 [79]

Band	Mode	BWch (MHz)	Nant
2400-2483.5	BT-BR	1	1
2400-2483.5	BT-EDR	1	1

Note:

- ♦ Bluetooth BR uses a GFSK (1Mbps).
- ♦ Bluetooth EDR uses a combination of  $\pi/4$ -DQPSK (2Mbps) and 8DPSK (3Mbps).
- ♦ Bluetooth BR/EDR uses as a system using FHSS modulation.
- ♦ BWch is the nominal channel bandwidth.



**1.1.2 Antenna Information**

Ant.	Port			Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	2.4GHz	5GHz	Bluetooth					
1	1	1	-	MAG. LAYERS	MSA-4008-25GC1-A2	PIFA	I-PEX	Note 1
2	2	2	-	MAG. LAYERS	MSA-4008-25GC1-A2	PIFA	I-PEX	
3	-	-	1	MAG. LAYERS	MSA-4008-25GC1-A2	PIFA	I-PEX	
4	1/2	1/2	1	Inpaq	WA-P-LB-02-587	PCB	I-PEX	
5	1/2	1/2	1	Inpaq	WA-P-LB-03-129	PCB	I-PEX	
6	-	-	-	Inpaq	WA-P-LB-03-130	PCB	I-PEX	
7	-	-	-	Inpaq	WA-F-LB-03-110	PCB	I-PEX	
8	-	-	-	Inpaq	WA-F-LB-02-187	PCB	I-PEX	
9	-	-	-	Inpaq	WA-F-LA-01-015	PCB	I-PEX	
10	-	-	-	TE Connectivity	2195501-2	PCB	I-PEX	
11	-	-	-	TE Connectivity	2195505-2	PCB	I-PEX	
12	-	-	-	LUXSHARE-ICT	SA37A47021	Dipole	I-PEX	Note 2
13	-	-	-	LUXSHARE-ICT	SA37A47021	Dipole	I-PEX	
14	-	-	-	LUXSHARE-ICT	SA37A47025	PIFA	I-PEX	Note 1

Note1:

Ant.	Port			Antenna Gain (dBi)		
	2.4GHz	5GHz	Bluetooth	WLAN 2.4GHz	WLAN 5GHz	Bluetooth
1	1	1	-	2.98	5.16	-
2	2	2	-	2.98	5.16	-
3	-	-	1	-	-	2.98
4	1/2	1/2	1	4.43	7.52	4.43
5	1/2	1/2	1	6.51	3.2	6.51
6	-	-	-	4.91	5.84	4.91
7	-	-	-	-0.27	2.74	-0.27
8	-	-	-	0.07	2.39	0.07
9	-	-	-	5.66	-	5.66
10	-	-	-	0.47	1.88	0.47
11	-	-	-	0.77	0.96	0.77
14	-	-	-	-	-	-1.1

Note2:

Ant.	Port		Cable Length	Antenna Gain (dBi)		Cable Loss (dB)		True Gain (dBi)	
	2.4GHz	5GHz		WLAN 2.4GHz	WLAN 5GHz	WLAN 2.4GHz	WLAN 5GHz	WLAN 2.4GHz	WLAN 5GHz
12	-	-	450mm	2.8	2.6	1.1	1.9	1.7	0.7
13	-	-	470mm	2.8	2.6	1.2	2	1.6	0.6



Note3: The above information was declared by manufacturer.

Note4: There are 14 antennas listed on the antenna table. The EUT has three types of antenna.

Note5: Directional gain information.

For ant. 1~ant. 2

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{ANT}} \left( \sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$
BF	$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{ANT}} \left( \sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$	$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{ANT}} \left( \sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula :

$$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{ANT}} \left( \sum_{k=1}^{N_{ANT}} g_{j,k} \right)^2}{N_{ANT}} \right]$$

$$NSS1(g1,1) = 10^{G1/20} ; NSS1(g1,2) = 10^{G2/20}$$

$$g_{j,k} = (NSS1(g1,1) + NSS1(g1,2))^2$$

$$DG = 10 \log \left[ \frac{(NSS1(g1,1) + NSS1(g1,2))^2}{N_{ANT}} \right] \Rightarrow 10 \log \left[ \frac{(10^{G1/20} + 10^{G2/20})^2}{N_{ANT}} \right]$$

Where ;

$$2.4G \ G1 = 2.98 ; G2 = 2.98 ; DG=5.99$$

$$5G \ G1 = 5.16 ; G2 = 5.16 ; DG=8.17$$



For ant. 4~ant. 5

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{ANT}} \left( \sum_{k=1}^{N_{ANT}} S_{j,k} \right)^2}{N_{ANT}} \right]$
BF	$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{ANT}} \left( \sum_{k=1}^{N_{ANT}} S_{j,k} \right)^2}{N_{ANT}} \right]$	$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{ANT}} \left( \sum_{k=1}^{N_{ANT}} S_{j,k} \right)^2}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula :

$$DirectionalGain = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{ANT}} \left( \sum_{k=1}^{N_{ANT}} S_{j,k} \right)^2}{N_{ANT}} \right]$$

$$NSS1(g1,1) = 10^{G1/20} ; NSS1(g1,2) = 10^{G2/20}$$

$$g_{j,k} = (NSS1(g1,1) + NSS1(g1,2))^2$$

$$DG = 10 \log[(NSS1(g1,1) + NSS1(g1,2))^2 / N_{ANT}] \Rightarrow 10 \log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$$

Where ;

For ant. 5

$$2.4G \ G1 = 6.51 ; G2 = 6.51 ; DG=9.52$$

For ant. 4

$$5G \ G1 = 7.52 ; G2 = 7.52 ; DG=10.53$$

**<WLAN 2.4GHz Function>**

**For IEEE 802.11b/g/n/ax (2TX/2RX):**

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

**<WLAN 5GHz Function>**

**For IEEE 802.11a/n/ac/ax (2TX/2RX):**

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

**<Bluetooth Function> (1TX/1RX)**

Only Port 1 can be used as transmitting/receiving.





1.1.3 EUT Operational Condition

<b>EUT Power Type</b>	From host system
<b>Test Software Version</b>	DutApiMimoApApp (Version : 2.0.0.80 )

1.1.4 Table for Multiple Listing

EUT	Model No.	GPIO	Antenna	Description
1	AW-XM458, AW-XM369	Without GPIO	PIFA, PCB, Dipole	All the model names are identical, the difference model names served as marketing strategy.
2	AW-XM458MA-XXX, AW-XM369MA-XXX	With GPIO		1. All the model names are identical, the difference model names served as marketing strategy. 2. The difference between this two EUTs are RF connector trace and RF connector type.
3				

Note 1: From the above models, model: AW-XM458MA-XXX (EUT 2) was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.

1.1.5 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FR132339-01AC.

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding antenna type for WLAN 2.4GHz/5GHz: Dipole antenna (Set 12~13).	1. AC Power-line Conducted Emissions 2. Emissions in Restricted Frequency Bands below 1GHz. (Based on original output power to test.)
2. Adding 1 set of PIFA antenna (Set 14) for bluetooth. The antenna type is the same as the original and the gain is lower than the original report.	Do not have to retest assessed.
3. Adding 2 same PCB type antenna (Ant. 10~11) with lower gain than the original report for all EUT.	
4. Adding PCB type antenna for EUT 2.	
5. Adding PIFA type antenna for EUT 3.	



### 1.2 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15.247

The following reference test guidance is not within the scope of accreditation of TAF.

- ♦ FCC KDB 558074 D01 v05r02
- ♦ FCC KDB 414788 D01 v01r01

### 1.3 Testing Location Information

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085
	Test site Designation No. TW3787 with FCC.
	Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
Radiated below 1GHz	03CH04-CB	Chris Li	22~23 / 55~58	Feb. 25, 2023~Apr. 07, 2023
AC Conduction	CO01-CB	Bob Chang	23~24 / 52~53	Apr. 13, 2023

### 1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.6 dB	Confidence levels of 95%



## 2 Test Configuration of EUT

### 2.1 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	AC power-line conducted emissions
<b>Condition</b>	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
<b>Operating Mode</b>	CTX
1	EUT 2 + WLAN 2.4GHz (Ant. 12)
2	EUT 2 + WLAN 5GHz (Ant. 12)
For operating mode 2 is the worst case and it was record in this test report.	

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	Emissions in Restricted Frequency Bands
<b>Test Condition</b>	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
<b>Operating Mode &lt; 1GHz</b>	CTX
1	EUT 2 in X axis + WLAN 2.4GHz (Ant. 12)
2	EUT 2 in Y axis + WLAN 2.4GHz (Ant. 12)
3	EUT 2 in Z axis + WLAN 2.4GHz (Ant. 12)
4	EUT 2 in X axis + WLAN 5GHz (Ant. 12)
5	EUT 2 in Y axis + WLAN 5GHz (Ant. 12)
6	EUT 2 in Z axis + WLAN 5GHz (Ant. 12)
For operating mode 5 is the worst case and it was record in this test report.	

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
<b>Operating Mode</b>	
1	WLAN 2.4GHz + WLAN 5GHz + Bluetooth
Refer to Sporton Test Report No.: FA132339-07 for Co-location RF Exposure Evaluation.	



## 2.2 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link Mode:

During the test, the EUT operation to normal function.

## 2.3 Accessories

N/A

## 2.4 Support Equipment

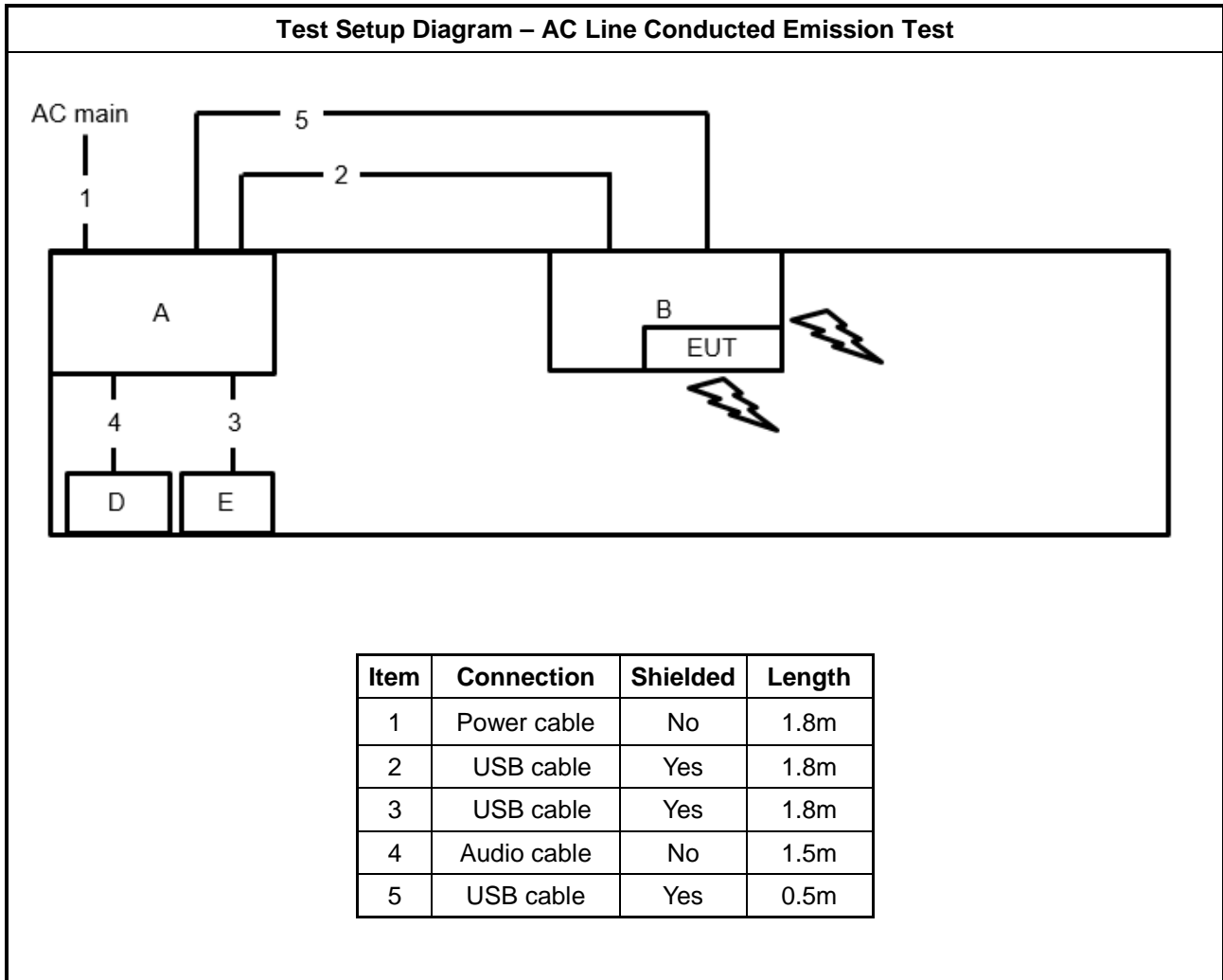
For AC Conduction:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	NB	DELL	E6430	N/A
B	Fixture 3	Azurewave	2460 I2	N/A
C	Earphone	SHYARO CHI	MIC-04	N/A
D	Mouse	HP	FM100	N/A

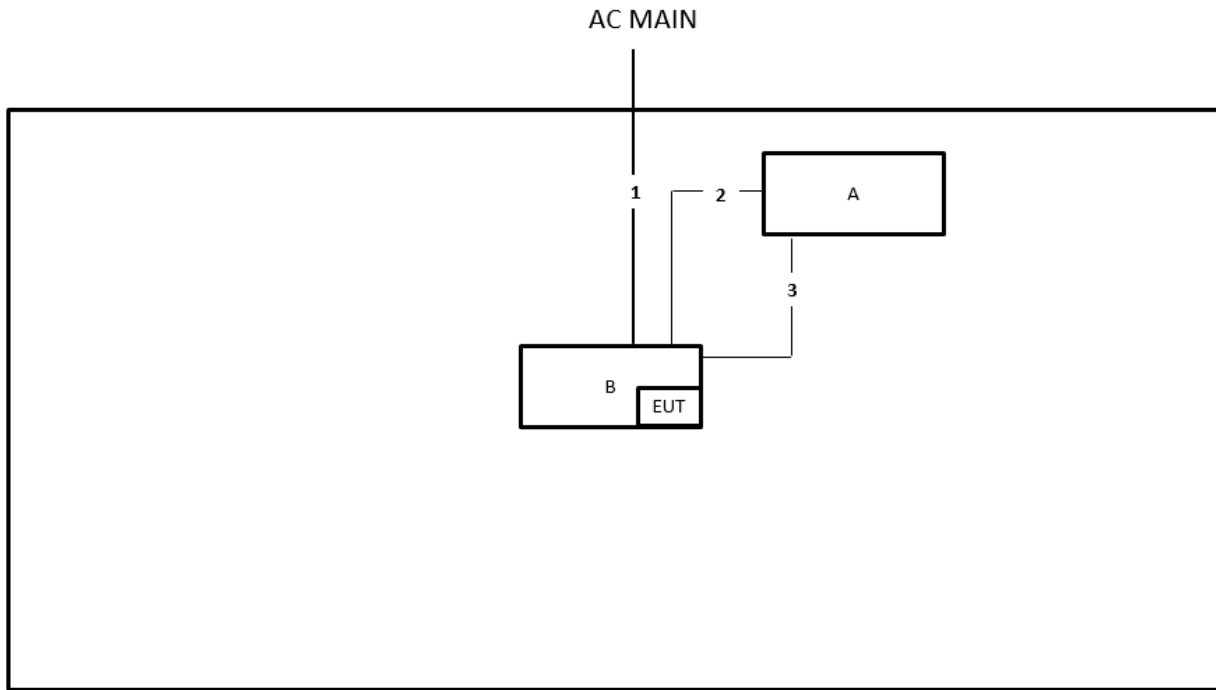
For Radiated (below 1GHz):

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Notebook	DELL	E4300	N/A
B	Fixture 1	Azurewave	2458 I2	N/A

## 2.5 Test Setup Diagram



**Test Setup Diagram - Radiated Test < 1GHz**



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	USB to Type C cable	No	0.3m
3	RJ-45 cable	No	0.3m



### 3 Transmitter Test Result

#### 3.1 AC Power-line Conducted Emissions

##### 3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: \* Decreases with the logarithm of the frequency.

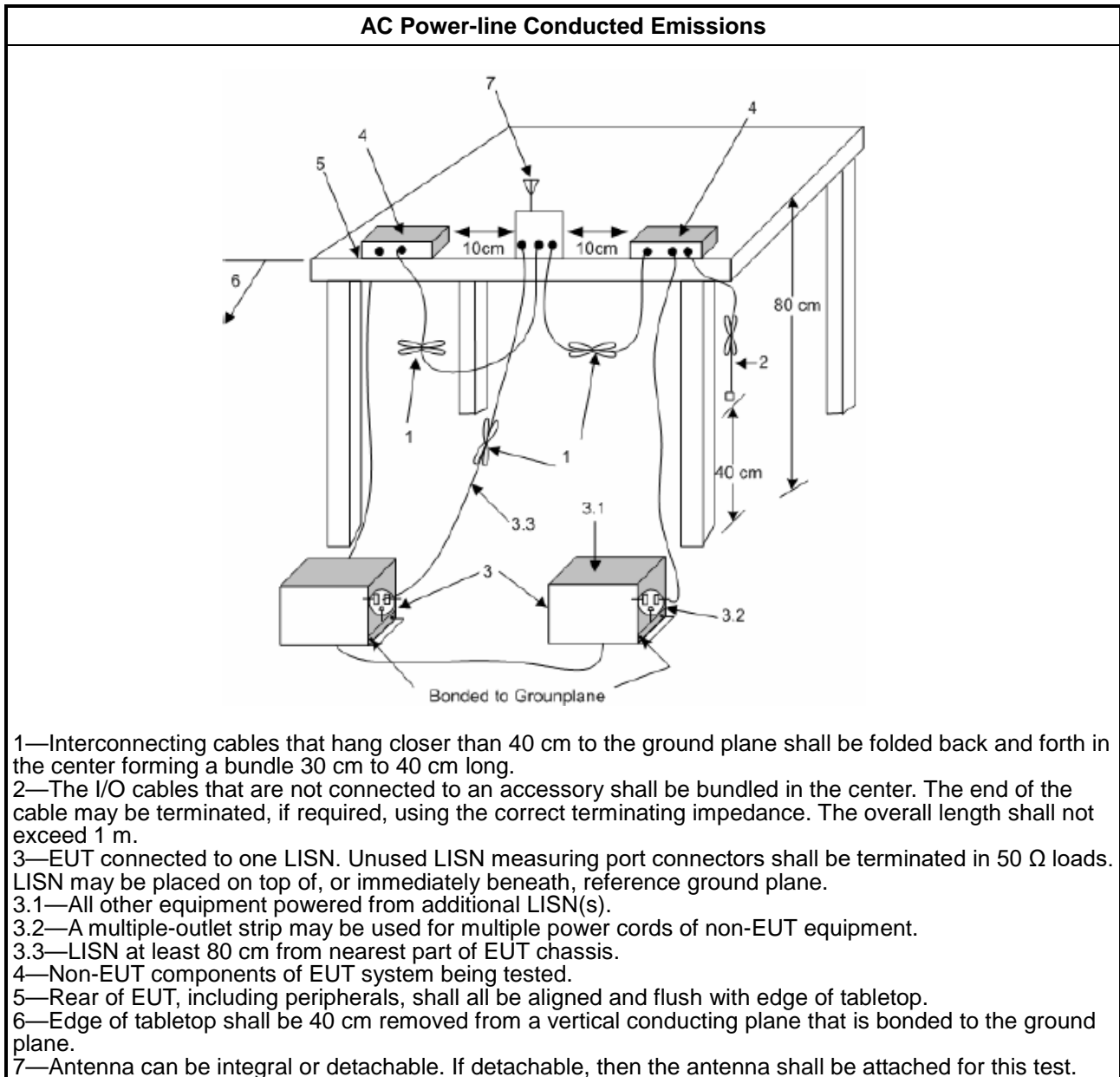
##### 3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

##### 3.1.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

### 3.1.4 Test Setup



#### 1.1.1. Measurement Results Calculation

The measured Level is calculated using:

- a. Corrected Reading: LISN Factor (LISN) + Attenuator (AT/AUX) + Cable Loss (CL) + Read Level (Raw) = Level
- b. Margin = -Limit + Level

### 3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A





### 3.2 Emissions in Restricted Frequency Bands

#### 3.2.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB / decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

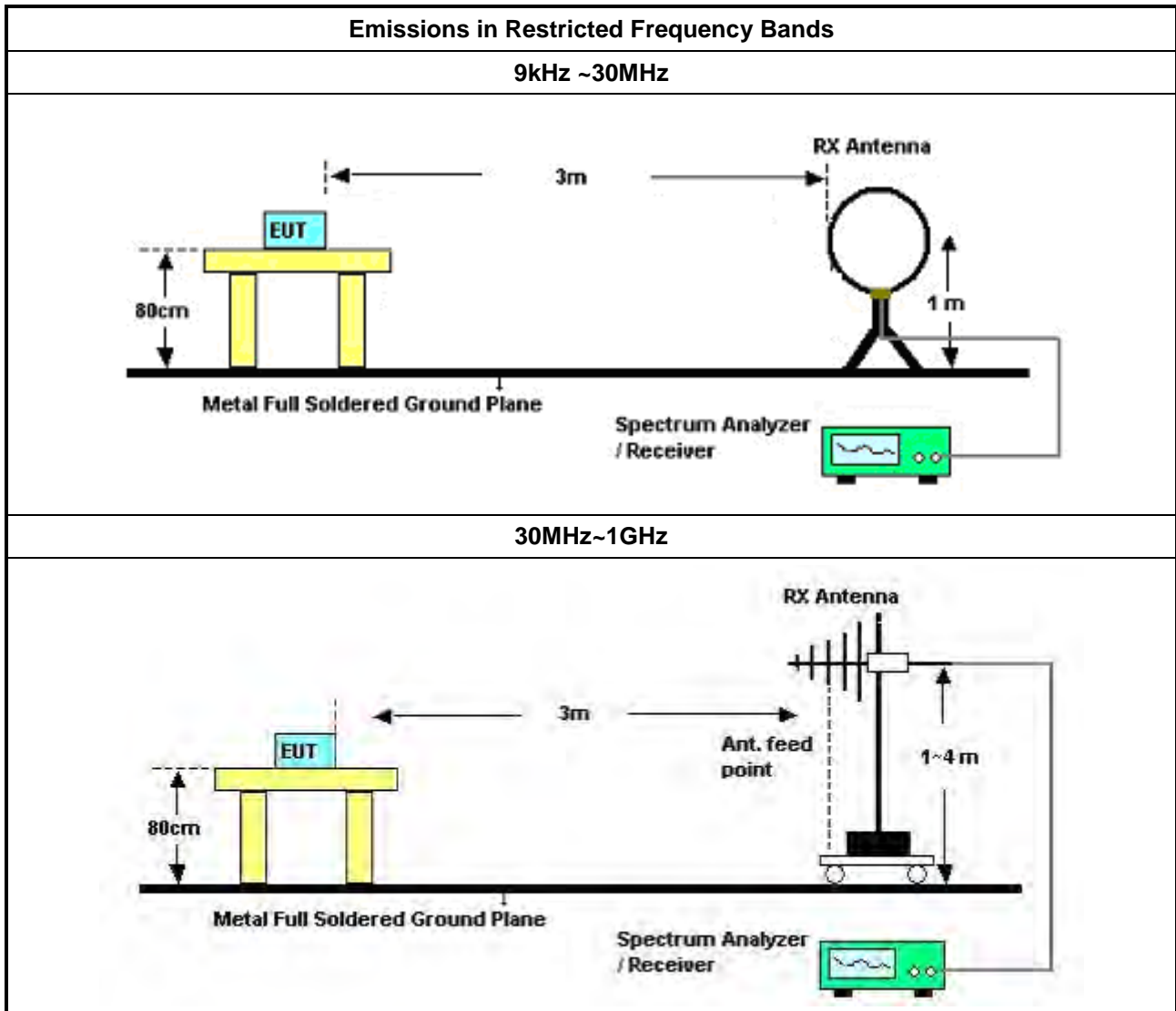
#### 3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.2.3 Test Procedures

Test Method				
<ul style="list-style-type: none"> <li>The average emission levels shall be measured in [hopping duty factor].</li> </ul>				
<ul style="list-style-type: none"> <li>Refer as ANSI C63.10; clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.</li> </ul>				
<ul style="list-style-type: none"> <li>For the transmitter unwanted emissions shall be measured using following options below:               <table border="1" data-bbox="188 1776 1428 1912"> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>Refer as ANSI C63.10, clause 4.1.4.2.1 QP value.</li> </ul> </td> </tr> <tr> <td> <ul style="list-style-type: none"> <li>Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak.</li> </ul> </td> </tr> <tr> <td> <ul style="list-style-type: none"> <li>Refer as ANSI C63.10, clause 4.1.4.2.4 average value of hopping pulsed emissions.</li> </ul> </td> </tr> </tbody> </table> </li> </ul>		<ul style="list-style-type: none"> <li>Refer as ANSI C63.10, clause 4.1.4.2.1 QP value.</li> </ul>	<ul style="list-style-type: none"> <li>Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak.</li> </ul>	<ul style="list-style-type: none"> <li>Refer as ANSI C63.10, clause 4.1.4.2.4 average value of hopping pulsed emissions.</li> </ul>
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<ul style="list-style-type: none"> <li>Refer as ANSI C63.10, clause 4.1.4.2.4 average value of hopping pulsed emissions.</li> </ul>				

**3.2.4 Test Setup**





### **3.2.5 Measurement Results Calculation**

The measured Level is calculated using:

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level.

### **3.2.6 Emissions in Restricted Frequency Bands (Below 30MHz)**

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10th harmonic or 40 GHz, whichever is appropriate.

### **3.2.7 Test Result of Emissions in Restricted Frequency Bands**

Refer as Appendix B



## 4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 20, 2023	Feb. 19, 2024	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Feb. 16, 2023	Feb. 15, 2024	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Dec. 20, 2022	Dec. 19, 2023	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 09, 2023	Feb. 08, 2024	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	Oct. 18, 2022	Oct. 17, 2023	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	May 14, 2022	May 13, 2023	Radiation (03CH04-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH04-CB	30 MHz ~ 1 GHz	Aug. 02, 2022	Aug. 01, 2023	Radiation (03CH04-CB)
BILOG ANTENNA with 6 dB attenuator	Schaffner & EMCi	CBL6112B & N-6-06	22021&AT-N06 07	30MHz ~ 1GHz	Oct. 08, 2022	Oct. 07, 2023	Radiation (03CH04-CB)
Pre-Amplifier	EMCI	EMC330N	980391	20MHz ~ 3GHz	May 19, 2022	May 18, 2023	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Mar. 28, 2022	Mar. 27, 2023	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Mar. 21, 2023	Mar. 20, 2024	Radiation (03CH04-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 17, 2022	Jun. 16, 2023	Radiation (03CH04-CB)
RF Cable-low	Woken	RG402	Low Cable-03+67	30MHz ~ 1GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH04-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH04-CB)

Note: Calibration Interval of instruments listed above is one year.

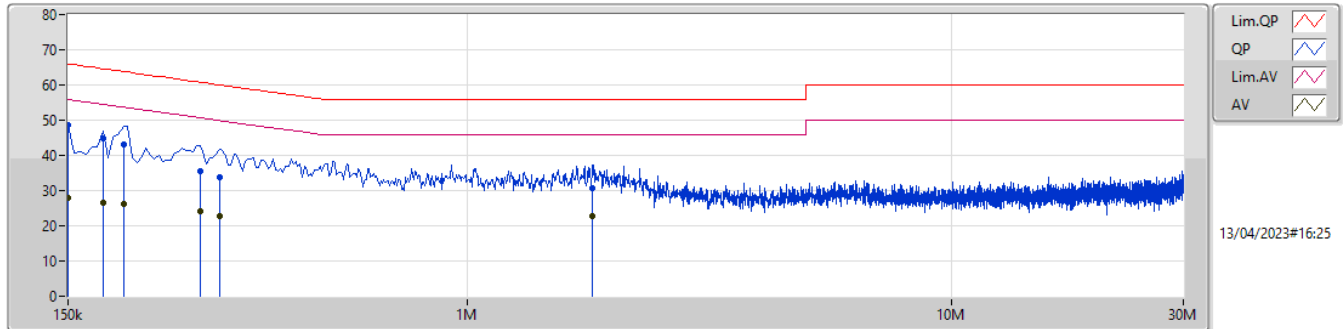
N.C.R. means Non-Calibration required.



**Summary**

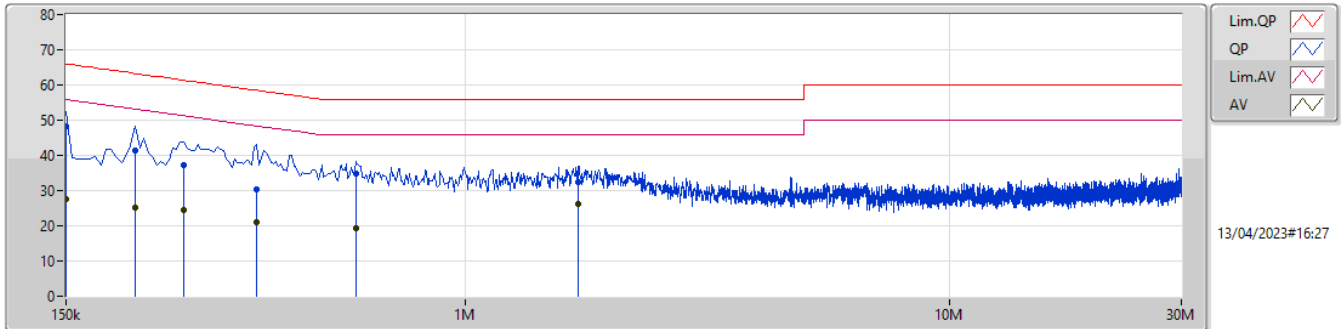
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 2	Pass	QP	150k	48.45	66.00	-17.55	Line

Mode 2



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)
QP	150k	48.45	66.00	-17.55	9.97	Line	"Worst"	38.48	0.06	0.04	9.87
AV	150k	27.77	56.00	-28.23	9.97	Line	-	17.80	0.06	0.04	9.87
QP	177k	44.82	64.62	-19.80	9.97	Line	-	34.85	0.06	0.04	9.87
AV	177k	26.50	54.62	-28.12	9.97	Line	-	16.53	0.06	0.04	9.87
QP	195k	42.99	63.82	-20.83	9.96	Line	-	33.03	0.06	0.04	9.86
AV	195k	26.32	53.82	-27.50	9.96	Line	-	16.36	0.06	0.04	9.86
QP	280.5k	35.52	60.80	-25.28	9.99	Line	-	25.53	0.06	0.05	9.88
AV	280.5k	24.24	50.80	-26.56	9.99	Line	-	14.25	0.06	0.05	9.88
QP	307.5k	33.73	60.03	-26.30	9.99	Line	-	23.74	0.06	0.05	9.88
AV	307.5k	22.77	50.03	-27.26	9.99	Line	-	12.78	0.06	0.05	9.88
QP	1.811M	30.56	56.00	-25.44	10.07	Line	-	20.49	0.09	0.08	9.90
AV	1.811M	22.79	46.00	-23.21	10.07	Line	-	12.72	0.09	0.08	9.90

## Mode 2



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)
QP	150k	48.35	66.00	-17.65	9.98	Neutral	"Worst"	38.37	0.07	0.04	9.87
AV	150k	27.75	56.00	-28.25	9.98	Neutral	-	17.77	0.07	0.04	9.87
QP	208.5k	41.43	63.27	-21.84	9.97	Neutral	-	31.46	0.07	0.04	9.86
AV	208.5k	25.30	53.27	-27.97	9.97	Neutral	-	15.33	0.07	0.04	9.86
QP	262.5k	37.36	61.35	-23.99	10.00	Neutral	-	27.36	0.07	0.05	9.88
AV	262.5k	24.38	51.35	-26.97	10.00	Neutral	-	14.38	0.07	0.05	9.88
QP	370.5k	30.49	58.49	-28.00	10.03	Neutral	-	20.46	0.07	0.06	9.90
AV	370.5k	21.11	48.49	-27.38	10.03	Neutral	-	11.08	0.07	0.06	9.90
QP	595.5k	34.79	56.00	-21.21	10.02	Neutral	-	24.77	0.07	0.05	9.90
AV	595.5k	19.35	46.00	-26.65	10.02	Neutral	-	9.33	0.07	0.05	9.90
QP	1.712M	32.56	56.00	-23.44	10.08	Neutral	-	22.48	0.10	0.08	9.90
AV	1.712M	26.27	46.00	-19.73	10.08	Neutral	-	16.19	0.10	0.08	9.90

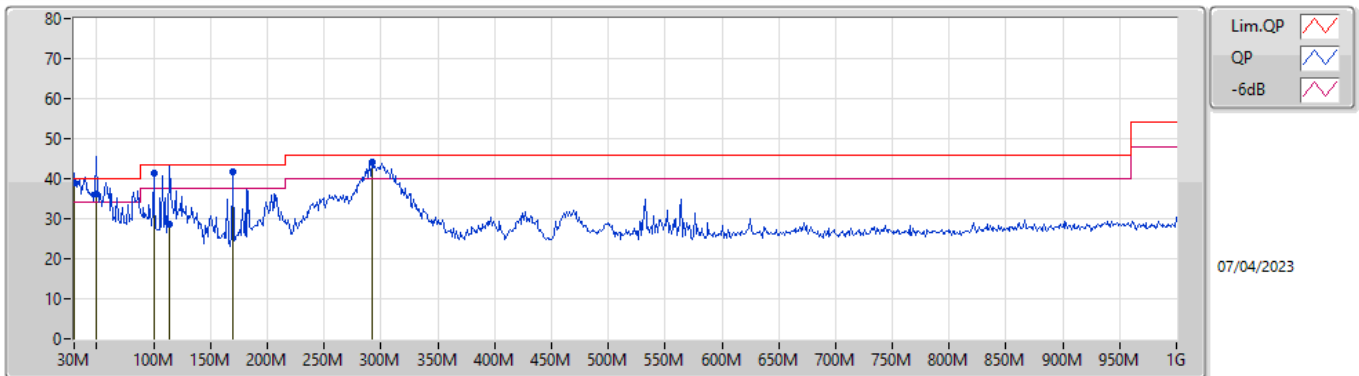


**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 5	Pass	QP	30M	38.95	40.00	-1.05	Vertical

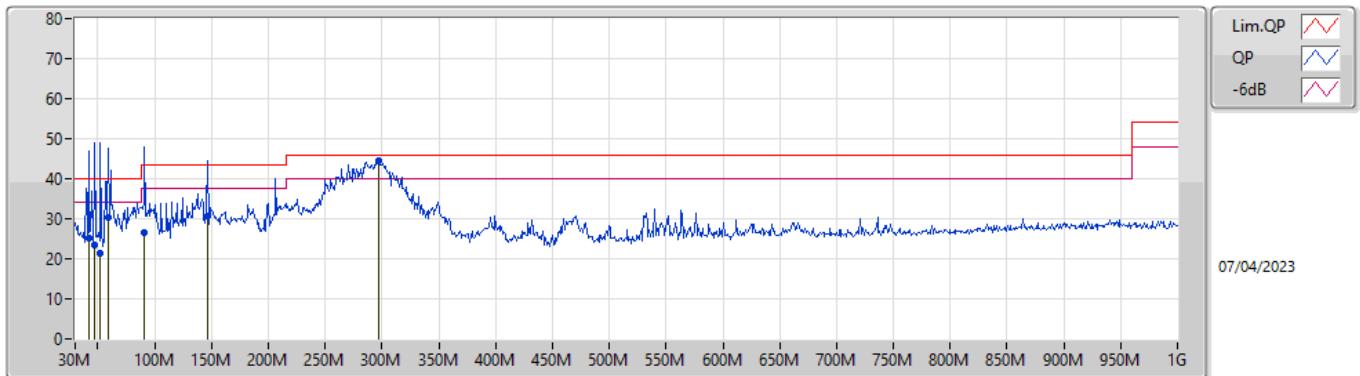


Mode 5



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV/m)	AF (dB/m)	CL (dB)	PA (dB)
QP	30M	38.95	40.00	-1.05	-6.30	3	Vertical	57	1.00	"Worst"	45.25	24.34	0.63	31.27
QP	49.4M	36.10	40.00	-3.90	-16.10	3	Vertical	77	1.50	-	52.20	14.70	0.78	31.58
PK	99.84M	41.45	43.50	-2.05	-13.92	3	Vertical	129	1.50	-	55.37	16.69	1.09	31.70
QP	113.42M	28.59	43.50	-14.91	-12.53	3	Vertical	267	1.00	-	41.12	18.02	1.16	31.71
PK	169.68M	41.74	43.50	-1.76	-14.43	3	Vertical	76	1.50	-	56.17	15.87	1.42	31.72
PK	291.9M	44.21	46.00	-1.79	-11.05	3	Vertical	168	1.50	-	55.26	18.93	1.87	31.85

Mode 5



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB/m)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV/m)	AF (dB/m)	CL (dB)	PA (dB)
QP	41.64M	25.30	40.00	-14.70	-12.82	3	Horizontal	342	3.00	-	38.12	17.96	0.72	31.50
QP	47.46M	23.49	40.00	-16.51	-15.43	3	Horizontal	342	3.00	-	38.92	15.37	0.76	31.56
QP	52.31M	21.33	40.00	-18.67	-17.03	3	Horizontal	84	3.00	-	38.36	13.76	0.80	31.59
QP	59.1M	30.28	40.00	-9.72	-17.82	3	Horizontal	342	3.00	-	48.10	12.95	0.86	31.63
QP	91.11M	26.41	43.50	-17.09	-15.82	3	Horizontal	349	1.50	-	42.23	14.82	1.05	31.69
QP	146.4M	30.81	43.50	-12.69	-13.70	3	Horizontal	82	1.25	-	44.51	16.72	1.32	31.74
PK	296.75M	44.32	46.00	-1.68	-10.94	3	Horizontal	62	1.25	"Worst"	55.26	19.03	1.89	31.86