



RADIO TEST REPORT

FCC ID : TLZ-CM467
Equipment : IEEE 802.11 a/b/g/n/ac and Bluetooth 5.0 Module
Brand Name : AzureWave
Model Name : AW-CM467-SUR, AW-CM467-USB,
AW-CM467-SUR-I, AW-CM467-USB-I
Applicant : AzureWave Technologies, Inc.
8F., No.94, Baozhong Rd. , Xindian Dist., New
Taipei City , Taiwan 231
Manufacturer : AzureWave Technologies, Inc.
8F., No.94, Baozhong Rd. , Xindian Dist., New
Taipei City , Taiwan 231
Standard : 47 CFR FCC Part 15.247

The product was received on Jul. 26, 2024, and testing was started from Aug. 14, 2024 and completed on Sep. 03, 2024. 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

Sportun International Inc. Hsinchu Laboratory

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



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History of this test report



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: Muse Chan



1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	Bluetooth Mode	Ch. Frequency (MHz)	Channel Number
2400-2483.5	LE	2402-2480	0-39 [40]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	BT-LE(1Mbps)	1.0	1TX

Note:

- Bluetooth LE uses a GFSK modulation.
- BWch is the nominal channel bandwidth.



1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)		Remark
						WLAN 2.4GHz / Bluetooth	WLAN 5GHz	
1	1	Nienyi	NYS4939	PCB	I-PEX	3.58	3.89	External
2	1	Genesis	650-10045-01	PCB	I-PEX	2.50	3.85	External
3	1	Lynwave	5-PP005737	PCB	I-PEX	4.20	3.60	Internal
4	1	Maglayers	MSA-4008-25GC1-A1	PIFA	I-PEX	2.98	5.16	External
5	1	Maglayers	MSA-4008-25GC1-A2	PIFA	I-PEX	2.98	5.16	External
6	1	Wavelink	WL-2458E108	Dipole	Reversed-SMA	Note 1		External
7	1	CHANGHONG	DA-2458-02-SMR	Dipole	Reversed-SMA			External

Note 1:

Ant.	Gain (dBi)		Cable loss(dB)		Net Gain (dBi)	
	2.4GHz / Bluetooth	5GHz	2.4GHz / Bluetooth	5GHz	2.4GHz / Bluetooth	5GHz
6	2.23	3.83	0.39	0.63	1.84	3.20
7	3.35	3.13	0.39	0.63	2.96	2.50

Note 2: The above information was declared by manufacturer.

Note 3: The EUT has seven antennas.

Only evaluated the dipole antenna (Ant. 6~7) in this test report:

For conducted measurement: Only the highest gain antenna "Ant. 6" for WLAN 5GHz was selected to test and recorded in the report.

For AC power-line conducted emissions and radiated emission measurement: Only the highest gain antenna "Ant. 7" for WLAN 2.4GHz/Bluetooth and "Ant. 6" for WLAN 5GHz were selected to test and recorded in the report.

For 2.4GHz WLAN function**IEEE 802.11b/g/n mode (1TX/1RX):**

Only Port 1 can be used as transmitting/receiving.

For 5GHz WLAN function**IEEE 802.11a/n/ac mode (1TX/1RX):**

Only Port 1 can be used as transmitting/receiving.

For Bluetooth function (1TX/1RX):

Only Port 1 can be used as transmitting/receiving.



1.1.3 EUT Operational Condition

EUT Power Type	From Host System			
Function	<input checked="" type="checkbox"/>	Point-to-multipoint	<input type="checkbox"/>	Point-to-point
Test Software Version	Tera Term 4.75			
Support Mode	<input checked="" type="checkbox"/>	LE 1M PHY: 1 Mb/s		
	<input type="checkbox"/>	LE Coded PHY (S=2): 500 Kb/s		
	<input type="checkbox"/>	LE Coded PHY (S=8): 125 Kb/s		
	<input type="checkbox"/>	LE 2M PHY: 2 Mb/s		

Note: The above information was declared by manufacturer.

1.1.4 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

EUT	Model Name	Interface	Equip Antenna	Description
1	AW-CM467-SUR	SDIO-UART	External or Internal Antenna	All the models are identical, the difference model for difference brand served as marketing strategy.
	AW-CM467-SUR-I			
2	AW-CM467-USB	USB-USB	External Antenna	All the models are identical, the difference model for difference brand served as marketing strategy.
	AW-CM467-USB-I			

Note 1: From the above models, model: AW-CM467-SUR (EUT 1) and AW-CM467-USB (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: FR181814AD

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

Modifications	Performance Checking
Add a new type dipole antenna. (Please refer to section 1.1.2 for detailed antenna information.)	1. AC power-line conducted emissions 2. Emissions in Restricted Frequency Bands 3. Radiated Emission Co-location



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
- ◆ ANSI C63.10-2013

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 (TAF: 3787)	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.) 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)	03CH05-CB	Gordon Hung	21.6-22.7 / 56-59	Aug. 14, 2024~ Aug. 30, 2024
Radiated (Above 1GHz)	03CH02-CB		21.8-22.9 / 55-58	
	03CH04-CB		22.3-23.1 / 55-58	Aug. 16, 2024~ Aug. 27, 2024
	03CH06-CB		21.9-22.4 / 55-58	
Radiated (Emission Co-location)	03CH01-CB	Ryan Huang	22-23 / 55-58	Aug. 29, 2024~ Sep. 03, 2024
AC Conduction	CO02-CB		23-24 / 52-53	Aug. 29, 2024

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)	3.8 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	4.1 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.2 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.2 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.0 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	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	CTX
1	EUT 2 + Bluetooth + Ant. 7
2	EUT 2 + WLAN 2.4GHz + Ant. 7
3	EUT 2 + WLAN 5GHz + Ant. 6
4	EUT 1 + Bluetooth + Ant. 7
5	EUT 1 + WLAN 2.4GHz + Ant. 7
6	EUT 1 + WLAN 5GHz + Ant. 6

For operating mode 4 is the worst case and it was record in this test report.

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emissions in Restricted Frequency Bands
Test Condition	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.
Operating Mode < 1GHz	CTX After evaluating, and the worst case axis was found as below for Emissions in Restricted Frequency Bands above 1GHz test. So the measurement will follow this same test configuration.
1	EUT 2 in Z axis + Bluetooth + Ant. 7
2	EUT 2 in Y axis + WLAN 2.4GHz + Ant. 7
3	EUT 2 in Z axis + WLAN 5GHz + Ant. 6
4	EUT 1 in X axis + Bluetooth + Ant. 7
5	EUT 1 in X axis + WLAN 2.4GHz + Ant. 7
6	EUT 1 in Y axis + WLAN 5GHz + Ant. 6

For operating mode 4 is the worst case and it was record in this test report.

Operating Mode > 1GHz	CTX
	1. There are EUT 1 and EUT 2, EUT 1 has been evaluated to be the worst case after evaluating. So the measurement will follow this same test configuration. 2. After evaluating, and the worst case was found at X axis, so it was selected to perform test and its test result was written in the report.
1	EUT 1 in X axis + Bluetooth + Ant. 7



The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Radiated Emission Co-location
Test Condition	Radiated measurement
Operating Mode	<p>Normal Link</p> <p>1. There are EUT 1 and EUT 2, EUT 1 has been evaluated to be the worst case after evaluating. So the measurement will follow this same test configuration.</p> <p>2. After evaluating, and the worst case axis was found as below for Emissions in Restricted Frequency Bands above 1GHz test. So the measurement will follow this same test configuration.</p>
1	EUT 1 in X axis - WLAN 2.4GHz + Bluetooth + Ant. 7
2	EUT 1 in X axis - WLAN 5GHz + Bluetooth + Ant. 7
3	EUT 1 in Y axis - WLAN 5GHz + Bluetooth + Ant. 6
For operating mode 1 is the worst case and it was record in this test report.	
Refer to Appendix C for Radiated Emission Co-location.	

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:

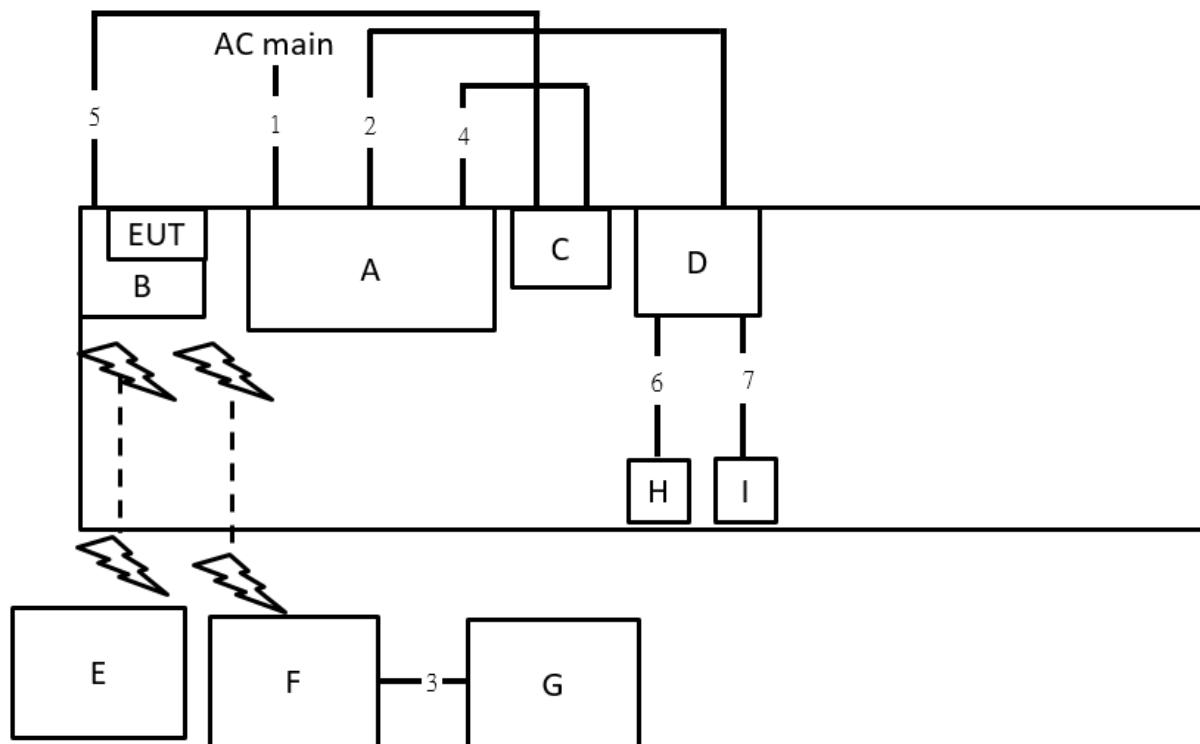
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Fixture 1	AzureWave	2460 I4	N/A
B	Fixture 2	AzureWave	2467 I5	N/A
C	USB HUB	Fujiei	TY1050	N/A
D	NB	DELL	E6430	N/A
E	BT Speaker	BSOPI	S8	N/A
F	AP Router	TP-LINK	Archer C54	N/A
G	AP Router NB	DELL	E6430	N/A
H	Earphone	e-Power	GT-02	N/A
I	Mouse	acer	MOJFUO	N/A

For Radiated Tests:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Notebook	DELL	E4300	N/A
B	Fixture	AzureWare	2467 I5	N/A
C	Fixture	AzureWare	2440 I4	N/A
D	USB HUB	Fujiei	TY1050	N/A

2.5 Test Setup Diagram

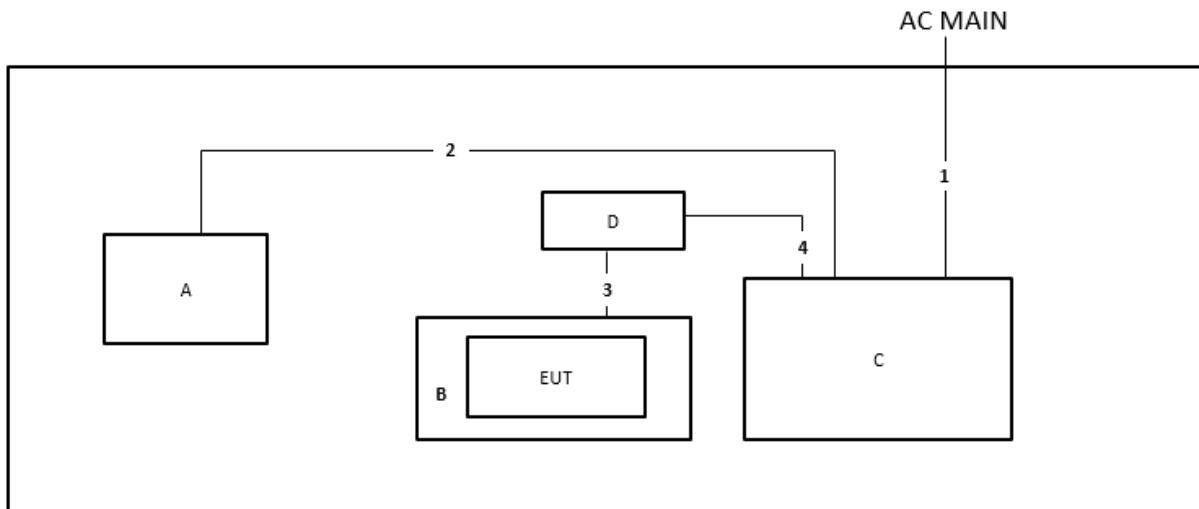
Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length
1	Type C USB cable	Yes	1.8m
2	Micro USB cable	Yes	1.5m
3	RJ-45 cable	No	1.5m
4	Type C USB cable	Yes	0.3m
5	Micro USB cable	Yes	1.5m
6	Audio cable	No	1.5m
7	USB cable	Yes	1.5m



Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length
1	Power cable	Yes	1.2m
2	USB to Type C cable	Yes	1m
3	USB to Micro cable	Yes	1m
4	USB HUB	Yes	0.1m



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.

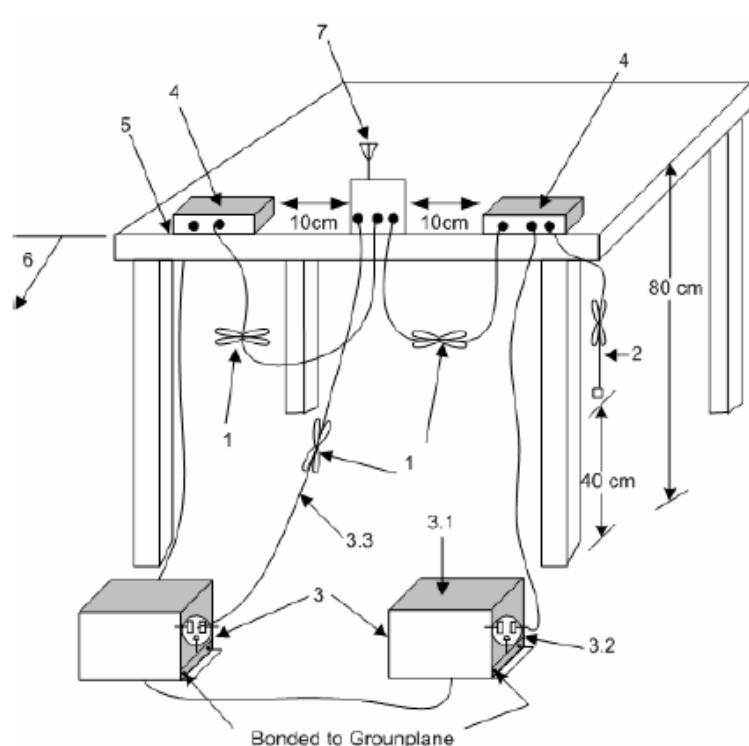
3.1.2 Measuring Instruments

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—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.
- 2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- 3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50Ω loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
 - 3.1—All other equipment powered from additional LISN(s).
 - 3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
 - 3.3—LISN at least 80 cm from nearest part of EUT chassis.
- 4—Non-EUT components of EUT system being tested.
- 5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
- 6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
- 7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

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

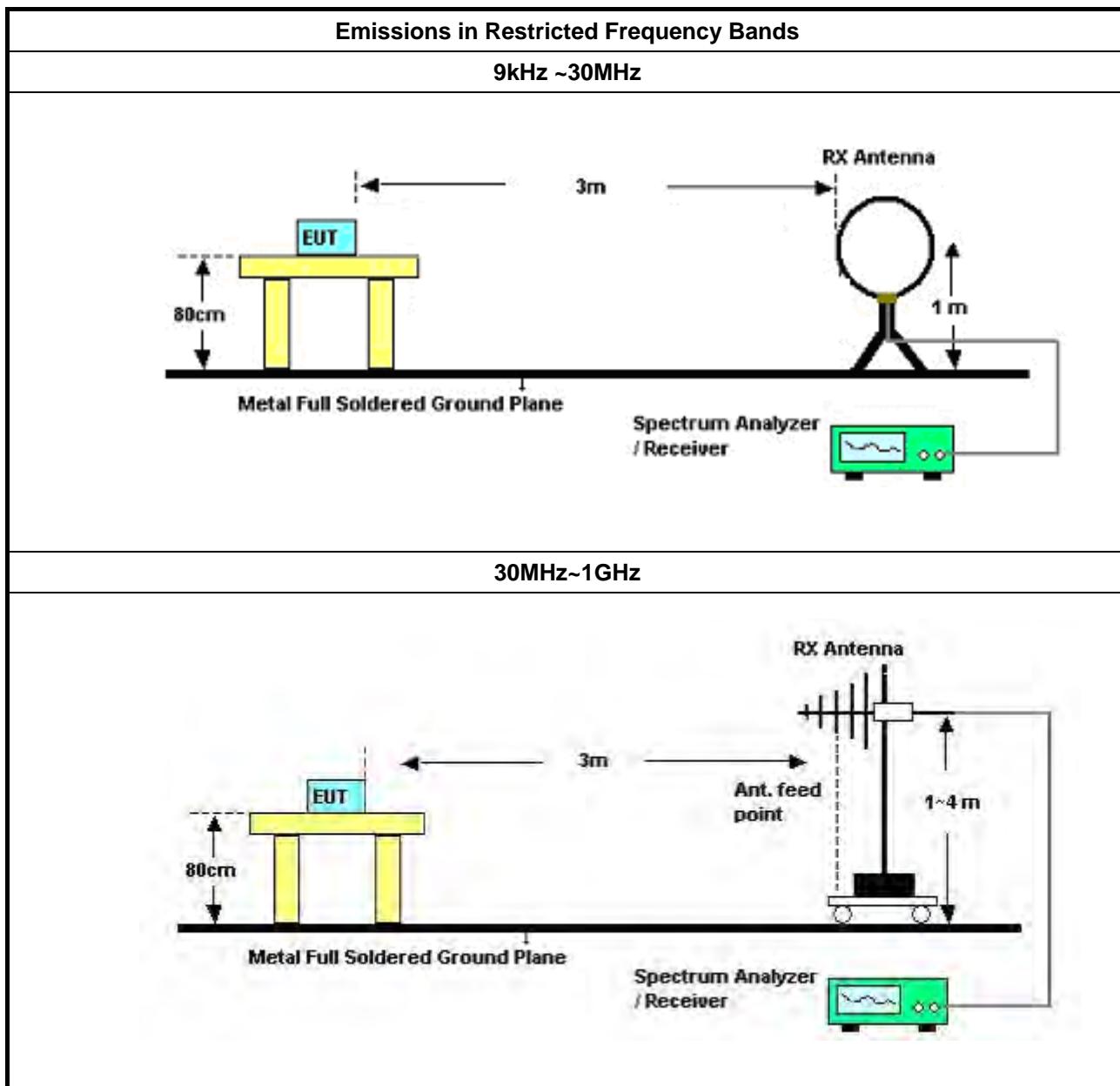
Refer a test equipment and calibration data table in this test report.

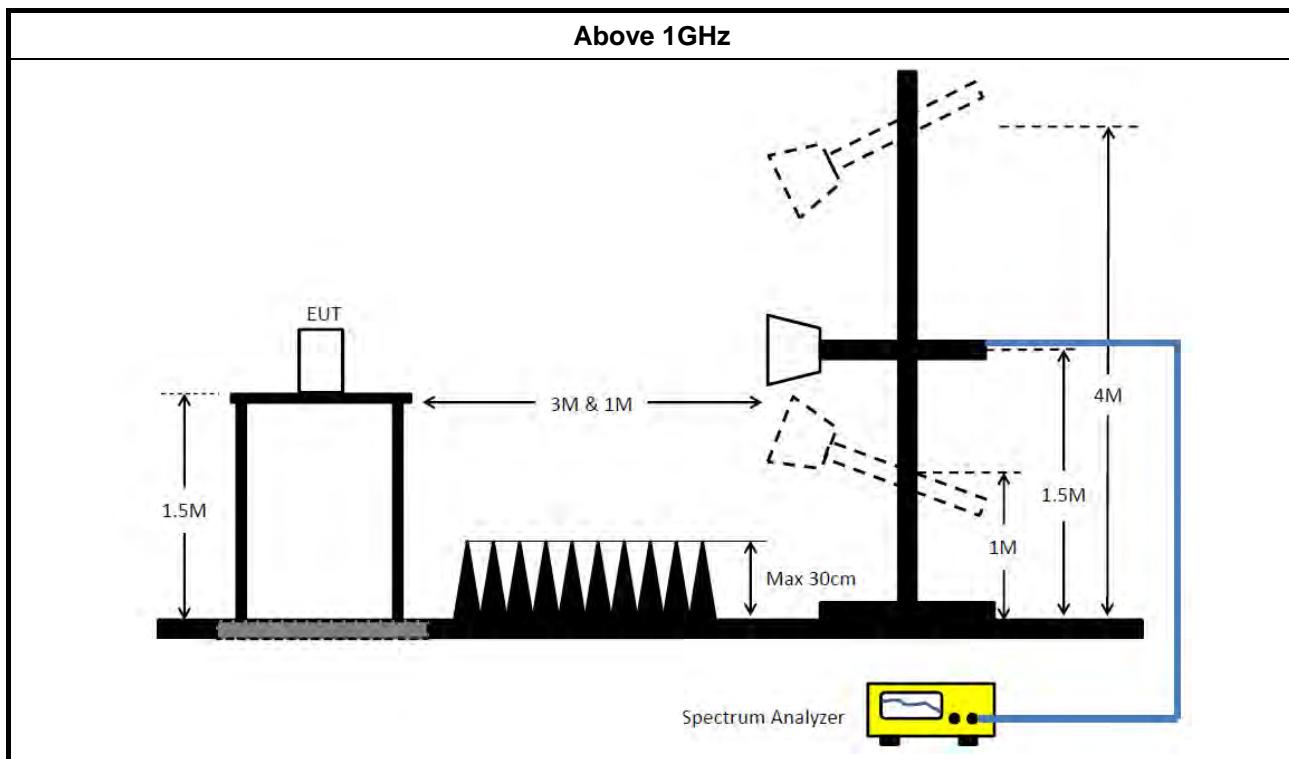


3.2.3 Test Procedures

Test Method	
<ul style="list-style-type: none">▪ The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].	
<ul style="list-style-type: none">▪ 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.	
<ul style="list-style-type: none">▪ For the transmitter unwanted emissions shall be measured using following options below:	
<ul style="list-style-type: none">▪ Refer as FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands.	<ul style="list-style-type: none"><input type="checkbox"/> Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for duty cycle \geq98%).
	<ul style="list-style-type: none"><input type="checkbox"/> Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor).
	<ul style="list-style-type: none"><input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced $VBW \geq 1/T$).
	<ul style="list-style-type: none"><input type="checkbox"/> Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). $VBW \geq 1/T$, where T is pulse time.
	<ul style="list-style-type: none"><input type="checkbox"/> Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
	<ul style="list-style-type: none"><input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.4 measurement procedure peak limit.
	<ul style="list-style-type: none">▪ For the transmitter band-edge emissions shall be measured using following options below:
<ul style="list-style-type: none">▪ Refer as FCC KDB 558074 clause 8.7 & c63.10 clause 11.13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.	<ul style="list-style-type: none">▪ Refer as FCC KDB 558074, clause 8.7 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.
	<ul style="list-style-type: none">▪ Refer as FCC KDB 558074, clause 8.7 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
	<ul style="list-style-type: none">▪ For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add $10 \log(N)$ dB
<ul style="list-style-type: none">▪ For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.	

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
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Apr. 15, 2024	Apr. 14, 2025	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Dec. 29, 2023	Dec. 28, 2024	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	May 15, 2024	May 14, 2025	Conduction (CO02-CB)
COND Cable	Woken	Cable	2	0.15MHz ~ 30MHz	Oct. 17, 2023	Oct. 16, 2024	Conduction (CO02-CB)
Pulse Limiter	Schwarzbeck	VTSD 9561F-N	00378	9kHz ~ 30MHz	Oct. 17, 2023	Oct. 16, 2024	Conduction (CO02-CB)
Test Software	SPORTON	SENSE-EMI	V5.11	150kHz-30MHz	N.C.R.	N.C.R.	Conduction (CO02-CB)
Loop Antenna	Teseq	HLA 6121	65417	9kHz - 30 MHz	Oct. 13, 2023	Oct. 12, 2024	Radiation (03CH05-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 01, 2024	Jul. 31, 2025	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 23, 2024	Mar. 22, 2025	Radiation (03CH05-CB)
Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	May 02, 2024	May 01, 2025	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Apr. 17, 2024	Apr. 16, 2025	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESR7	102172	9kHz ~ 7GHz	Oct. 20, 2023	Oct. 19, 2024	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Jul. 27, 2024	Jul. 26, 2025	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE-EMI	V5.11.8	30MHz-40GHz	N.C.R.	N.C.R.	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	RIKEN	SAC-3M	03CH02-CB	1GHz ~18GHz	Mar. 24, 2024	Mar. 23, 2025	Radiation (03CH02-CB)
Horn Antenna	EMCO	3115	9610-4976	1GHz ~ 18GHz	Apr. 12, 2024	Apr. 11, 2025	Radiation (03CH02-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH02-CB)
Pre-Amplifier	Agilent	83017A	MY39501305	1GHz ~ 26.5GHz	Jun. 29, 2024	Jun. 28, 2025	Radiation (03CH02-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 24, 2023	Nov. 23, 2024	Radiation (03CH02-CB)
Signal Analyzer	R&S	FSV3044	101536	10kHz ~ 44GHz	Aug. 14, 2024	Aug. 13, 2025	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18	1GHz ~ 18GHz	Jun. 20, 2024	Jun. 19, 2025	Radiation (03CH02-CB)



Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-18+19	1GHz ~ 18GHz	Jun. 20, 2024	Jun. 19, 2025	Radiation (03CH02-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Jan. 11, 2024	Jan. 10, 2025	Radiation (03CH02-CB)
Test Software	SPORTON	SENSE-1524_7_FS	V5.11.18	2.4GHz-2.4835GHz	N.C.R.	N.C.R.	Radiation (03CH02-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH04-CB	1GHz ~18GHz 3m	Feb. 22, 2024	Feb. 21, 2025	Radiation (03CH04-CB)
Horn Antenna	ETS • Lindgren	3115	00143147	750MHz~18GHz	Oct. 04, 2023	Oct. 03, 2024	Radiation (03CH04-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH04-CB)
Pre-Amplifier	SGH	SGH5265	20211115-1	1~ 26.5GHz	Jan. 17, 2024	Jan. 16, 2025	Radiation (03CH04-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 24, 2023	Nov. 23, 2024	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Mar. 19, 2024	Mar. 18, 2025	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21	1GHz - 18GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21+67	1GHz - 18GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH04-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Jan. 11, 2024	Jan. 10, 2025	Radiation (03CH04-CB)
Test Software	SPORTON	SENSE-1524_7_FS	V5.11.18	2.4GHz-2.4835GHz	N.C.R.	N.C.R.	Radiation (03CH04-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH06-CB	1GHz ~18GHz 3m	Oct. 09, 2023	Oct. 08, 2024	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA9120D-1292	1GHz~18GHz	Jul. 29, 2024	Jul. 28, 2025	Radiation (03CH06-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	Jul. 31, 2024	Jul. 30, 2025	Radiation (03CH06-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 24, 2023	Nov. 23, 2024	Radiation (03CH06-CB)
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	Apr. 26, 2024	Apr. 25, 2025	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05+68	1GHz~18GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH06-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Jan. 11, 2024	Jan. 10, 2025	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE-1524_7_FS	V5.11.18	2.4GHz-2.4835GHz	N.C.R.	N.C.R.	Radiation (03CH06-CB)



Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH01-CB	1GHz ~18GHz 3m	May 04, 2024	May 03, 2025	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120D-01816	1GHz~18GHz	Dec. 20, 2023	Dec. 19, 2024	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02121	1GHz ~ 26.5GHz	May 17, 2024	May 16, 2025	Radiation (03CH01-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 24, 2023	Nov. 23, 2024	Radiation (03CH01-CB)
Signal Analyzer	R&S	FSV3044	101437	10kHz ~ 44GHz	Nov. 28, 2023	Nov. 27, 2024	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16	1 GHz ~ 18 GHz	Nov. 06, 2023	Nov. 05, 2024	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16+17	1 GHz ~ 18 GHz	Nov. 06, 2023	Nov. 05, 2024	Radiation (03CH01-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Jan. 11, 2024	Jan. 10, 2025	Radiation (03CH01-CB)
Test Software	SPORTON	SENSE-EMI	V5.11.8	30MHz-40GHz	N.C.R.	N.C.R.	Radiation (03CH01-CB)

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

NCR means Non-Calibration required.

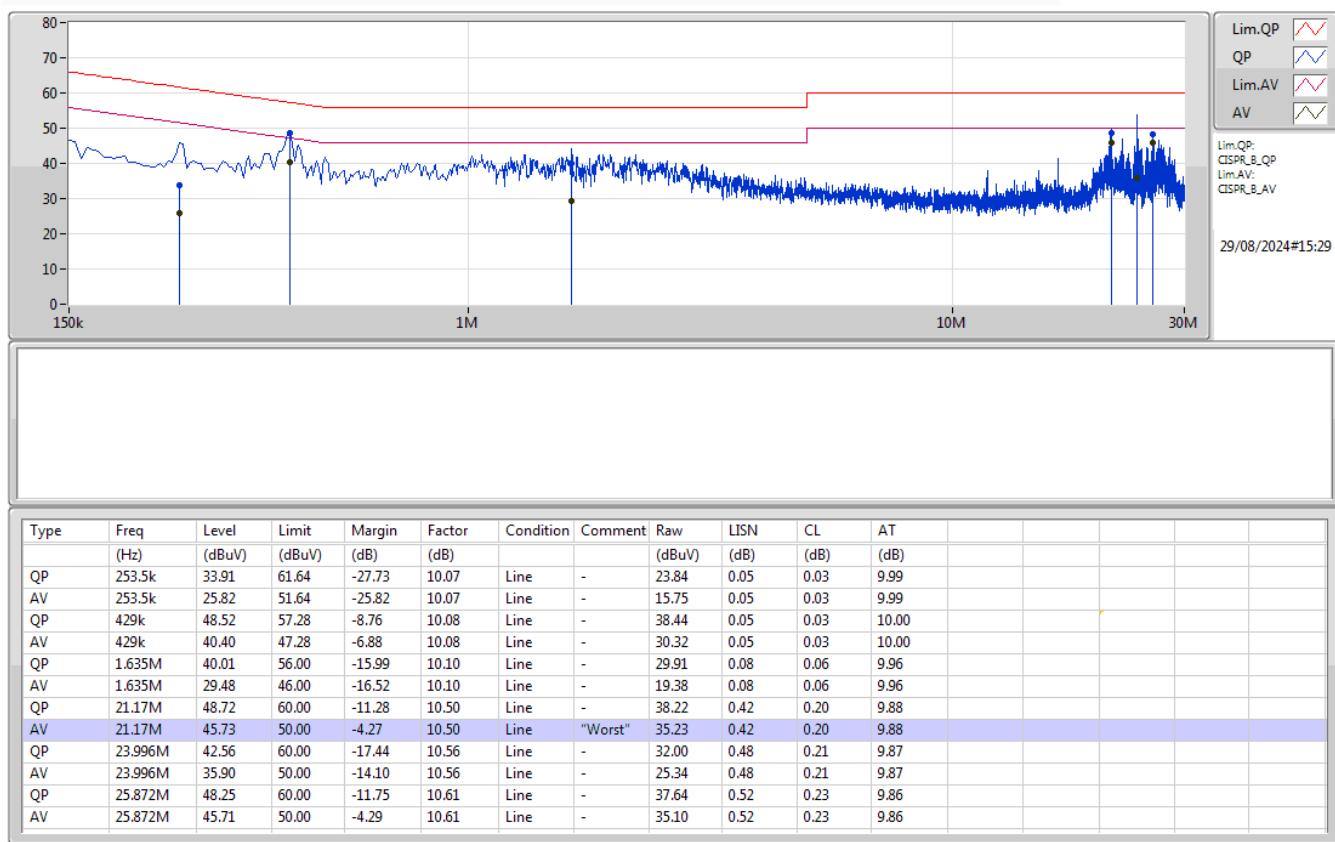


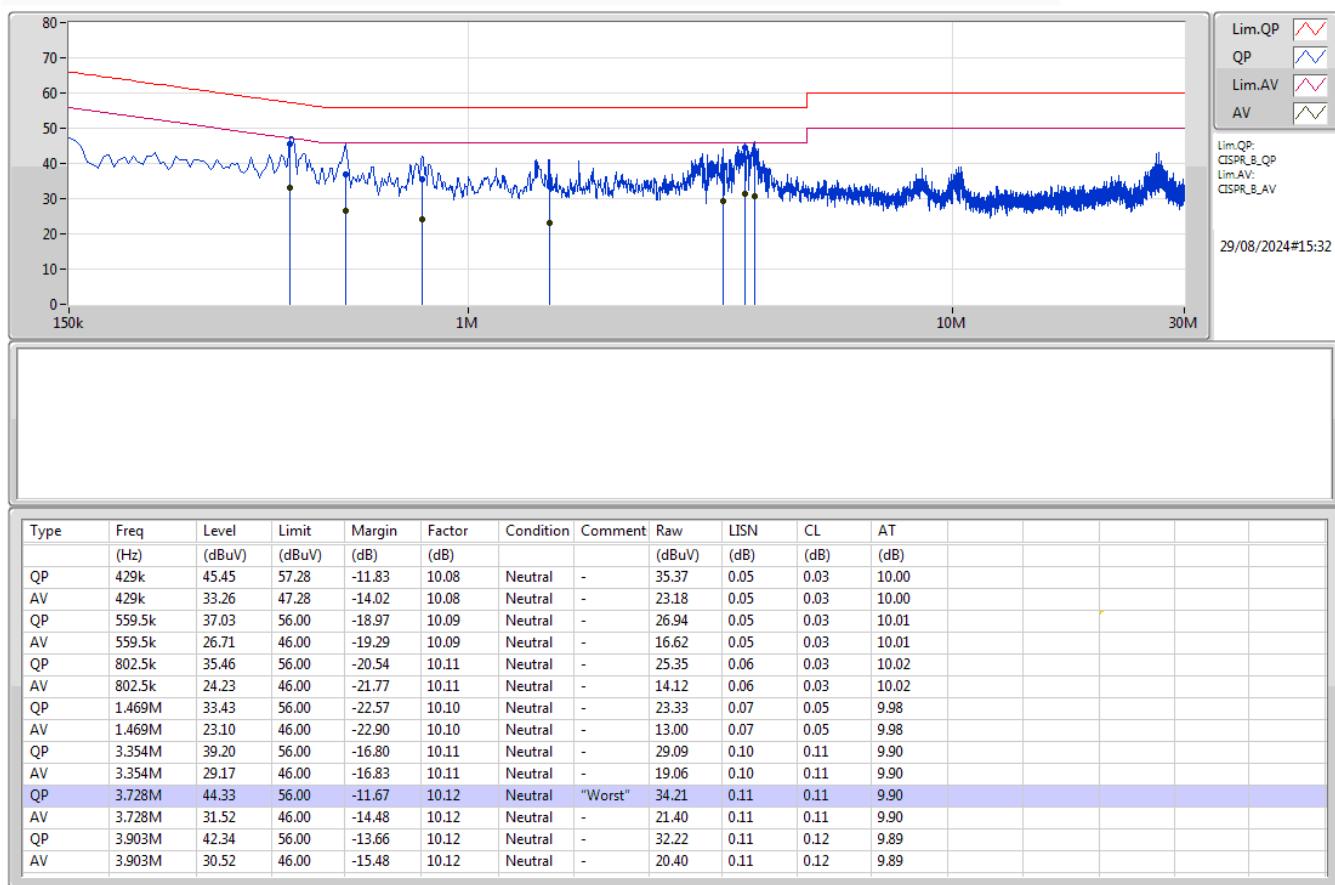
Conducted Emissions at Powerline

Appendix A

Summary

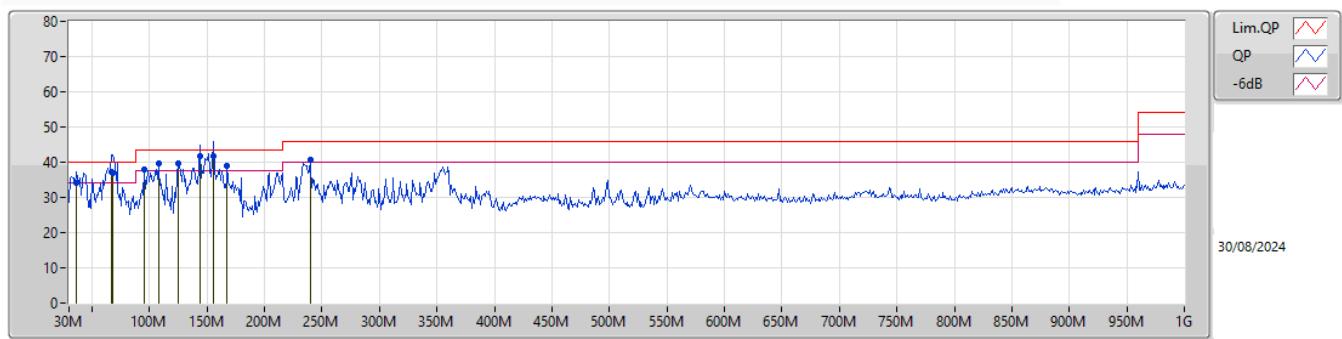
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 4	Pass	AV	21.17M	45.73	50.00	-4.27	Line

Mode 4


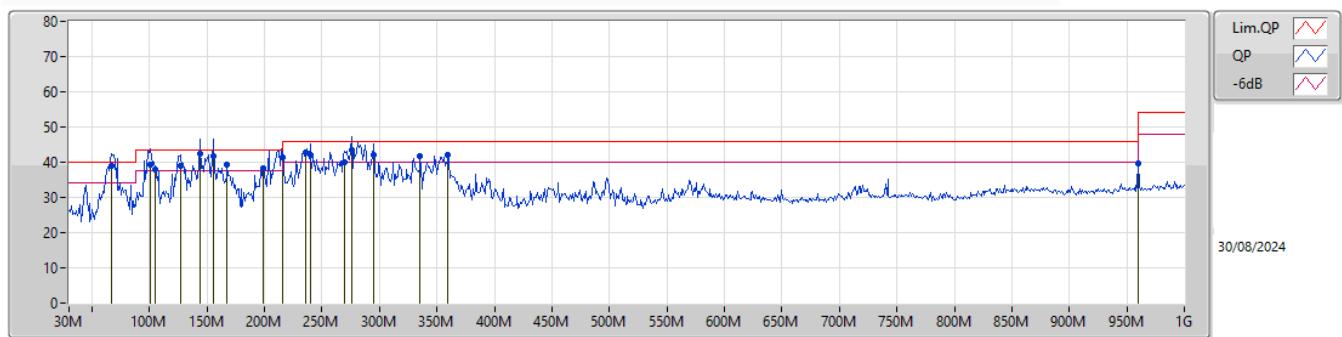
Mode 4


**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 4	Pass	QP	66.86M	39.10	40.00	-0.90	Horizontal

**Mode 4**

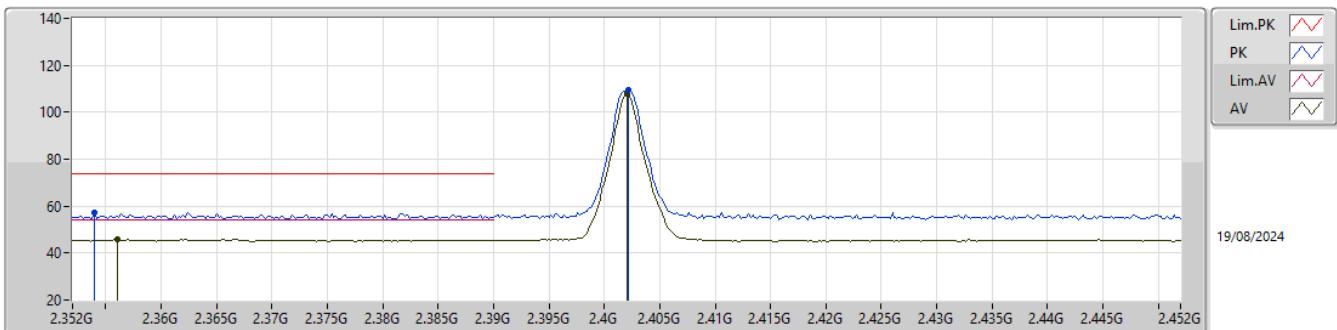
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)	
QP	36.79M	34.29	40.00	-5.71	-9.66	3	Vertical	93	1.00	-	43.95	20.83	1.02	31.51	
QP	66.86M	37.10	40.00	-2.90	-17.84	3	Vertical	75	3.00	-	54.94	12.49	1.36	31.69	
QP	67.83M	36.99	40.00	-3.01	-17.81	3	Vertical	75	3.00	-	54.80	12.51	1.37	31.69	
PK	95.96M	37.82	43.50	-5.68	-14.08	3	Vertical	222	2.00	-	51.90	16.05	1.62	31.75	
PK	107.6M	39.70	43.50	-3.80	-12.55	3	Vertical	154	1.25	-	52.25	17.48	1.71	31.74	
PK	125.06M	39.78	43.50	-3.72	-11.70	3	Vertical	198	1.00	-	51.48	18.19	1.86	31.75	
QP	143.49M	41.58	43.50	-1.92	-12.80	3	Vertical	198	1.00	-	54.38	16.95	2.00	31.75	
QP	156.1M	41.62	43.50	-1.88	-13.51	3	Vertical	248	1.00	"Worst"	55.13	16.16	2.09	31.76	
PK	167.74M	39.10	43.50	-4.40	-13.82	3	Vertical	206	1.00	-	52.92	15.78	2.17	31.77	
PK	240M	40.65	46.00	-5.35	-11.99	3	Vertical	222	1.00	-	52.64	17.17	2.65	31.81	

**Mode 4**

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)		
QP	66.86M	39.10	40.00	-0.90	-17.84	3	Horizontal	343	3.00	"Worst"	56.94	12.49	1.36	31.69		
QP	100.81M	39.34	43.50	-4.16	-13.16	3	Horizontal	319	3.00	-	52.50	16.92	1.66	31.74		
PK	104.69M	38.05	43.50	-5.45	-12.79	3	Horizontal	162	3.00	-	50.84	17.26	1.69	31.74		
QP	127M	39.03	43.50	-4.47	-11.76	3	Horizontal	238	2.00	-	50.79	18.12	1.87	31.75		
QP	143.49M	42.35	43.50	-1.15	-12.80	3	Horizontal	89	2.00	-	55.15	16.95	2.00	31.75		
QP	156.1M	41.77	43.50	-1.73	-13.51	3	Horizontal	254	2.00	-	55.28	16.16	2.09	31.76		
PK	167.74M	39.22	43.50	-4.28	-13.82	3	Horizontal	237	2.00	-	53.04	15.78	2.17	31.77		
PK	198.78M	38.13	43.50	-5.37	-14.17	3	Horizontal	245	2.00	-	52.30	15.22	2.38	31.77		
QP	215.27M	41.31	43.50	-2.19	-14.42	3	Horizontal	130	1.50	-	55.73	14.88	2.49	31.79		
PK	235.64M	42.81	46.00	-3.19	-12.50	3	Horizontal	228	1.00	-	55.31	16.68	2.63	31.81		
QP	240M	42.14	46.00	-3.86	-11.99	3	Horizontal	220	1.00	-	54.13	17.17	2.65	31.81		
QP	269.59M	40.04	46.00	-5.96	-10.22	3	Horizontal	179	1.00	-	50.26	18.78	2.83	31.83		
QP	275.41M	43.57	46.00	-2.43	-10.23	3	Horizontal	170	1.00	-	53.80	18.73	2.87	31.83		
QP	294.81M	42.17	46.00	-3.83	-9.81	3	Horizontal	162	1.00	-	51.98	19.05	2.98	31.84		
PK	335.55M	41.68	46.00	-4.32	-8.89	3	Horizontal	237	1.00	-	50.57	19.80	3.21	31.90		
PK	359.8M	42.16	46.00	-3.84	-7.92	3	Horizontal	49	1.00	-	50.08	20.68	3.34	31.94		
PK	960.23M	39.73	54.00	-14.27	0.21	3	Horizontal	37	1.00	-	39.52	26.73	5.79	32.31		

**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	2.4838G	50.17	54.00	-3.83	3	Vertical	346	1.04	-

2.4-2.4835GHz_BT-LE(1Mbps)
2402MHz_TX


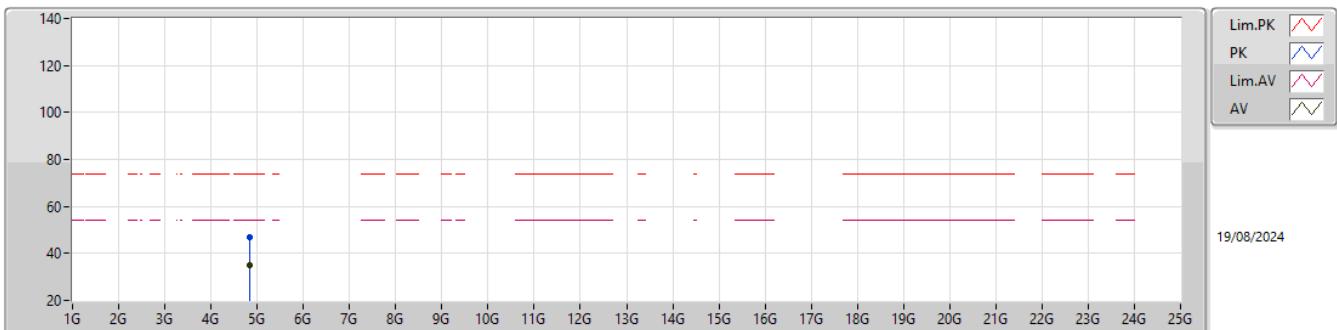
EUT X_1TX
Setting Default
02-D-V-1

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition (*)	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)			
PK	2.354G	57.12	74.00	-16.88	24.74	3	Vertical	18	1.30	-	28.34	4.04	-			
AV	2.356G	45.79	54.00	-8.21	13.39	3	Vertical	18	1.30	-	28.36	4.04	-			
PK	2.4022G	109.24	Inf	-Inf	76.69	3	Vertical	18	1.30	-	28.48	4.07	-			
AV	2.402G	107.73	Inf	-Inf	75.18	3	Vertical	18	1.30	-	28.48	4.07	-			



2.4-2.4835GHz_BT-LE(1Mbps)

2402MHz_TX



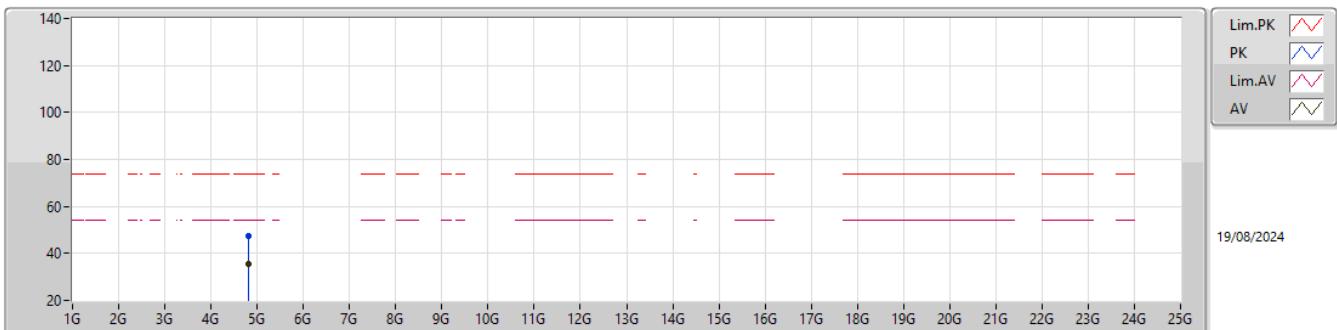
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Setting Default
02-D-V-1

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition (*)	Azimuth (m)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)			
PK	4.84G	47.15	74.00	-26.85	38.18	3	Vertical	360	2.37	-	33.18	6.79	31.00			
AV	4.8372G	34.94	54.00	-19.06	25.98	3	Vertical	360	2.37	-	33.17	6.79	31.00			



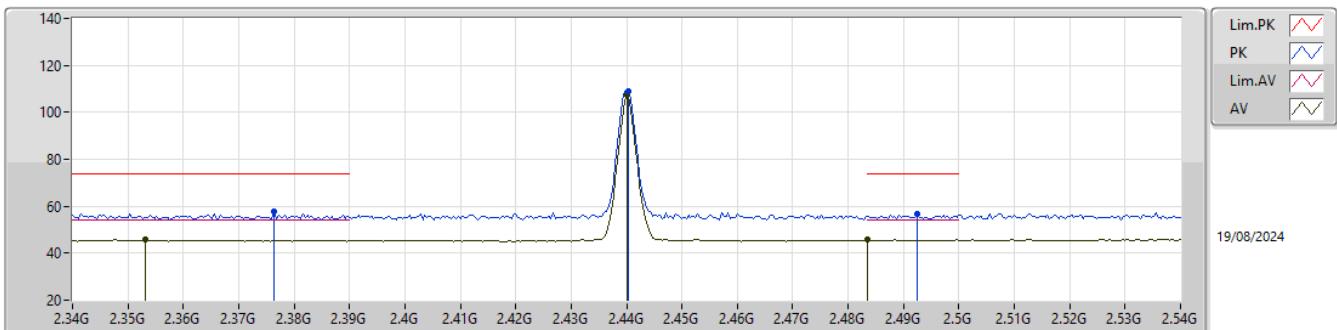
2.4-2.4835GHz_BT-LE(1Mbps)

2402MHz_TX



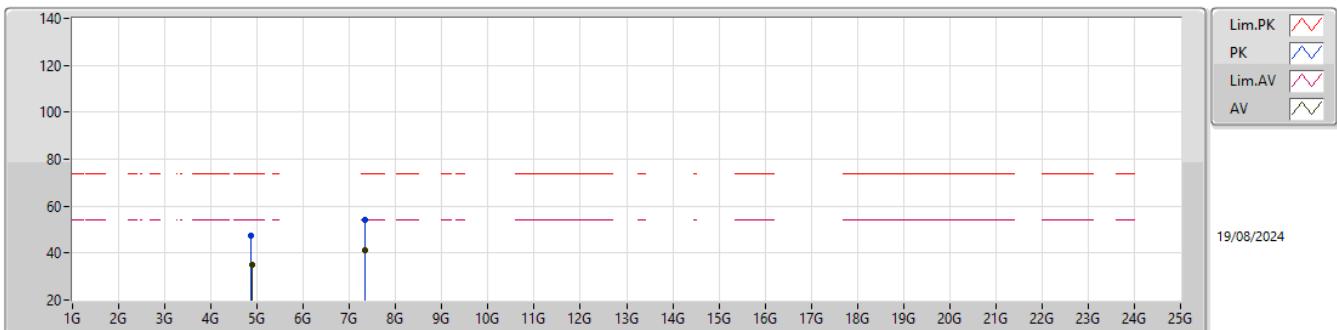
EUT X_1TX
Setting Default
02-D-V-1

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition (*)	Azimuth (m)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)			
PK	4.8G	47.20	74.00	-26.80	38.33	3	Horizontal	331	1.80	-	33.10	6.77	31.00			
AV	4.824G	35.39	54.00	-18.61	26.46	3	Horizontal	331	1.80	-	33.15	6.78	31.00			

2.4-2.4835GHz_BT-LE(1Mbps)
2440MHz_TX


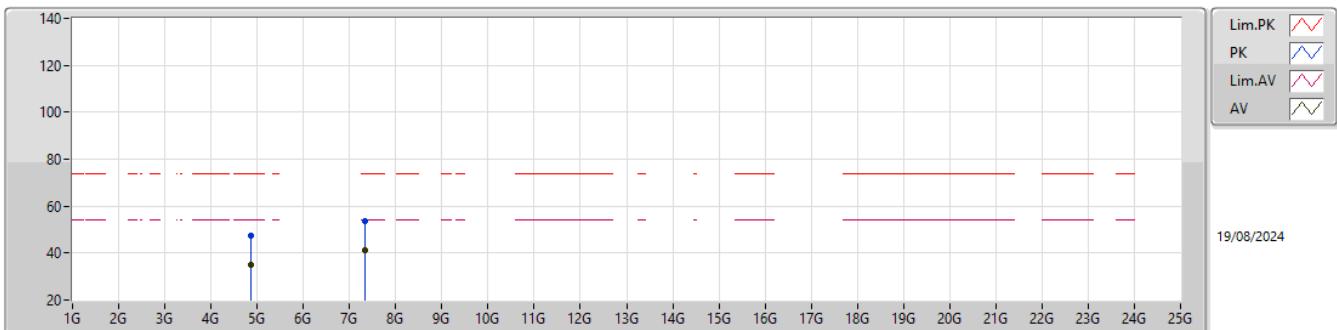
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Setting Default
02-D-V-1

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition (*)	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)			
PK	2.3764G	57.53	74.00	-16.47	25.08	3	Vertical	15	1.79	-	28.40	4.05	-			
AV	2.3532G	45.74	54.00	-8.26	13.37	3	Vertical	15	1.79	-	28.33	4.04	-			
PK	2.4404G	109.05	Inf	-Inf	76.45	3	Vertical	15	1.79	-	28.50	4.10	-			
AV	2.44G	107.58	Inf	-Inf	74.98	3	Vertical	15	1.79	-	28.50	4.10	-			
PK	2.4924G	56.77	74.00	-17.23	24.03	3	Vertical	15	1.79	-	28.60	4.14	-			
AV	2.4835G	45.73	54.00	-8.27	13.00	3	Vertical	15	1.79	-	28.60	4.13	-			

2.4-2.4835GHz_BT-LE(1Mbps)
2440MHz_TX


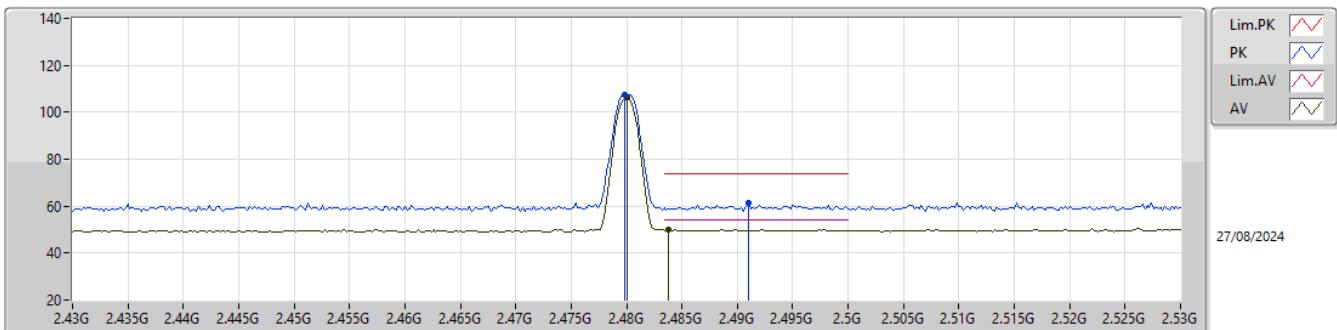
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Setting Default
02-D-V-1

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition (*)	Azimuth (m)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)			
PK	4.8728G	47.44	74.00	-26.56	38.38	3	Vertical	35	2.41	-	33.25	6.81	31.00			
AV	4.87982G	35.11	54.00	-18.89	26.04	3	Vertical	35	2.41	-	33.26	6.81	31.00			
PK	7.32888G	54.09	74.00	-19.91	39.63	3	Vertical	256	1.80	-	36.52	9.37	31.43			
AV	7.3236G	40.97	54.00	-13.03	26.54	3	Vertical	256	1.80	-	36.49	9.37	31.43			

2.4-2.4835GHz_BT-LE(1Mbps)
2440MHz_TX


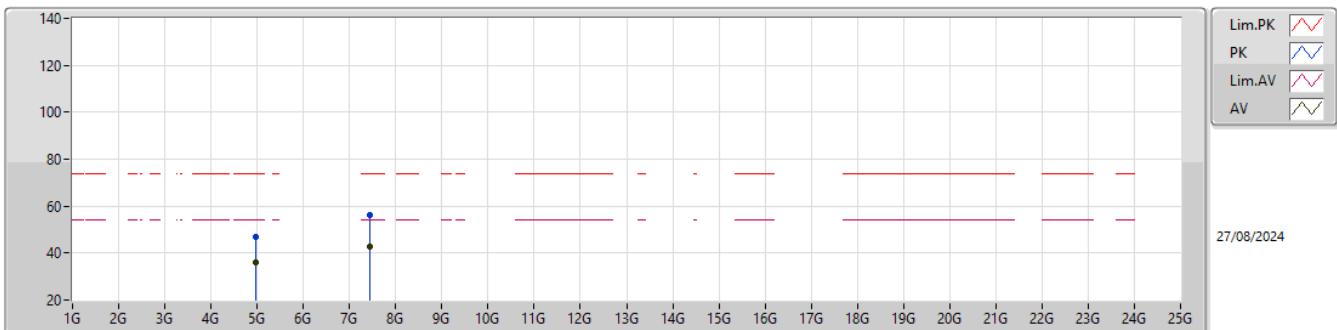
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Setting Default
02-D-V-1

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition (*)	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)			
PK	4.8554G	47.26	74.00	-26.74	38.25	3	Horizontal	135	1.80	-	33.21	6.80	31.00			
AV	4.8772G	35.13	54.00	-18.87	26.07	3	Horizontal	135	1.80	-	33.25	6.81	31.00			
PK	7.32966G	53.43	74.00	-20.57	38.97	3	Horizontal	297	2.59	-	36.52	9.37	31.43			
AV	7.33188G	41.14	54.00	-12.86	26.67	3	Horizontal	297	2.59	-	36.53	9.37	31.43			

2.4-2.4835GHz_BT-LE(1Mbps)
2480MHz_TX


EUT X_1TX
 Setting Default
 06-P-G-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition (*)	Azimuth (m)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)			
PK	2.4798G	107.25	Inf	-Inf	75.06	3	Vertical	346	1.04	-	27.40	4.79	-			
AV	2.48G	106.27	Inf	-Inf	74.08	3	Vertical	346	1.04	-	27.40	4.79	-			
PK	2.491G	61.24	74.00	-12.76	28.95	3	Vertical	346	1.04	-	27.49	4.80	-			
AV	2.4838G	50.17	54.00	-3.83	17.93	3	Vertical	346	1.04	-	27.44	4.80	-			

2.4-2.4835GHz_BT-LE(1Mbps)
2480MHz_TX


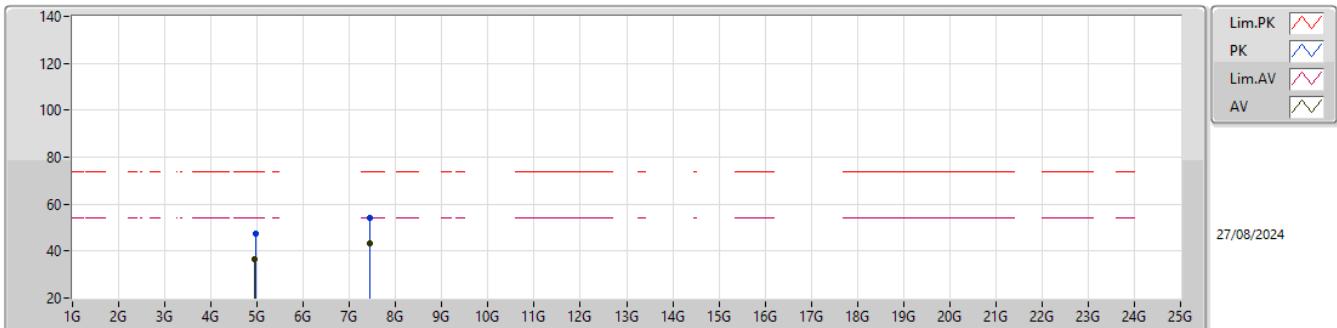
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Setting Default
06-P-G-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition (*)	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)			
PK	4.95782G	47.03	74.00	-26.97	40.67	3	Vertical	145	1.66	-	31.52	6.80	31.96			
AV	4.96394G	35.94	54.00	-18.06	29.56	3	Vertical	145	1.66	-	31.53	6.81	31.96			
PK	7.44132G	56.05	74.00	-17.95	44.53	3	Vertical	88	1.80	-	36.48	8.38	33.34			
AV	7.43658G	42.89	54.00	-11.11	31.39	3	Vertical	88	1.80	-	36.47	8.37	33.34			



2.4-2.4835GHz_BT-LE(1Mbps)

2480MHz_TX

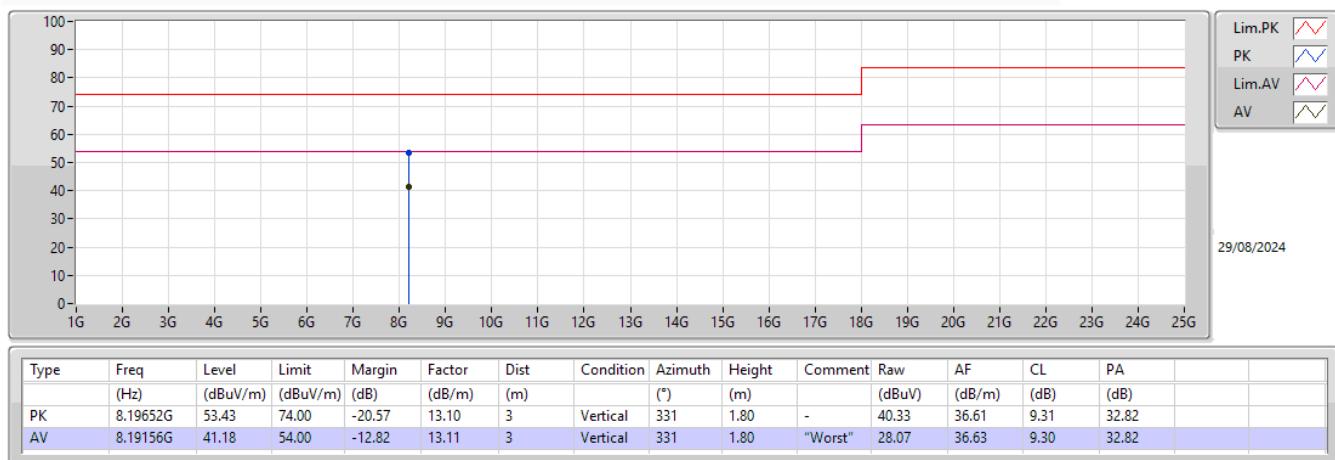


EUT X_1TX
Setting Default
06-P-G-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition (*)	Azimuth (m)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)				
PK	4.95744G	47.38	74.00	-26.62	41.03	3	Horizontal	189	1.80	-	31.51	6.80	31.96				
AV	4.95546G	36.48	54.00	-17.52	30.13	3	Horizontal	189	1.80	-	31.51	6.80	31.96				
PK	7.43772G	54.32	74.00	-19.68	42.81	3	Horizontal	246	1.80	-	36.48	8.37	33.34				
AV	7.43532G	43.43	54.00	-10.57	31.93	3	Horizontal	246	1.80	-	36.47	8.37	33.34				

**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	AV	8.19156G	41.18	54.00	-12.82	Vertical

**Mode 1**

Mode 1
