Testing Laboratory 3787

RADIO TEST REPORT

FCC ID	:	Z3WAIR4985
Equipment	:	Wi-Fi 6E Smart Mesh System
Brand Name	:	Airties
Model Name	:	Air 4985
Applicant	:	Airties Wireless Networks Sehit Mehmet Mikdat Uluunlu Sokagi No:23 Esentepe, Sisli İstanbul, 34394 Turkey
Manufacturer	:	Airties Wireless Networks Sehit Mehmet Mikdat Uluunlu Sokagi No:23 Esentepe, Sisli İstanbul, 34394 Turkey
Standard	:	47 CFR FCC Part 15.247

The product was received on Jan. 06, 2023, and testing was started from Jan. 06, 2023 and completed on Jan. 19, 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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History of this test report

Report No.	Version	Description	Issued Date
FR281911-03AA	01	Initial issue of report	Jun. 12, 2023

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)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
2400-2483.5	b, g, n (HT20), VHT20, ax (HEW20)	2412-2462	1-11 [11]
2400-2483.5	n (HT40), VHT40, ax (HEW40)	2422-2452	3-9 [7]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	802.11b	20	2TX
2.4-2.4835GHz	802.11g	20	2TX
2.4-2.4835GHz	802.11n HT20	20	2TX
2.4-2.4835GHz	802.11n HT20-BF	20	2TX
2.4-2.4835GHz	VHT20	20	2TX
2.4-2.4835GHz	VHT20-BF	20	2TX
2.4-2.4835GHz	802.11ax HEW20	20	2TX
2.4-2.4835GHz	802.11ax HEW20-BF	20	2TX
2.4-2.4835GHz	802.11n HT40	40	2TX
2.4-2.4835GHz	802.11n HT40-BF	40	2TX
2.4-2.4835GHz	VHT40	40	2TX
2.4-2.4835GHz	VHT40-BF	40	2TX
2.4-2.4835GHz	802.11ax HEW40	40	2TX
2.4-2.4835GHz	802.11ax HEW40-BF	40	2TX

Note:
- 11b mode uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
- 11g, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.
- HEW20, HEW40 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Port			Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz					
1	1	-	1	AirTies	ANT A00	PCB	N/A	Note 1
2	2	-	2	AirTies	ANT A11	PCB	N/A	
3	-	1	-	AirTies	ANT A0X	PCB	N/A	
4	-	2	-	AirTies	ANT A1X	PCB	N/A	
5	-	3	-	AirTies	ANT A2X	PCB	N/A	
6	-	4	-	AirTies	ANT A3X	PCB	N/A	

Note 1:

<Antenna Gain>

Ant.	Port			Antenna Gain (dBi)								
	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz	WLAN 2.4GHz	WLAN 5GHz				WLAN 6GHz			
					UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 5	UNII 6	UNII 7	UNII 8
1	1	-	1	4.21	-	-	-	-	1.32	1.46	1.76	2.61
2	2	-	2	4.42	-	-	-	-	1.62	1.98	2.47	2.12
3	-	1	-	-	3.49	3.27	2.85	2.09	-	-	-	-
4	-	2	-	-	3.58	2.61	4.52	2.72	-	-	-	-
5	-	3	-	-	2.41	2.6	3.51	5.47	-	-	-	-
6	-	4	-	-	4.45	4.89	4.53	4.93	-	-	-	-

< Directional Gain>

Item	Directional Gain (dBi)								
	WLAN 2.4GHz	WLAN 5GHz				WLAN 6GHz			
		UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 5	UNII 6	UNII 7	UNII 8
2T1S	4.52	-	-	-	-	3.75	3.57	4.12	4.26
4T1S	-	4.57	4.92	5.39	5.58	-	-	-	-

Note 2: The above information (except gain) was declared by manufacturer.
The directional gain is measured which follows the procedure of KDB 662911 D03.

Note 3: The EUT has six antennas.:

For 2.4GHz function:
For 802.11 b/g/n/VHT/ax (2TX/2RX):
Port 1 and Port 2 can be used as transmitting/receiving antenna.
Port 1 and Port 2 could transmit/receive simultaneously.
For 5GHz function:
For 802.11a/n/ac/ax (4TX/4RX):
Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.
Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.
For 6GHz function:
For 802.11ax (2TX/2RX):
Port 1 and Port 2 can be used as transmitting/receiving antenna.
Port 1 and Port 2 could transmit/receive simultaneously.

1.1.3 EUT Operational Condition

EUT Power Type	From Power Adapter			
Beamforming Function	☒	With beamforming	☐	Without beamforming
	The product has beamforming function for n/VHT/ax in 2.4GHz, n/ac/ax in 5GHz and ax in 6GHz.			
Function	☒	Point-to-multipoint	☐	Point-to-point
Support RU	☒	Full RU	☐	Partial RU
Test Software Version	Access Manual Tool 3.2.1.3			
Serial Number	AW2862239000027			
SW version	4.144.8.0_wltest			
HW version	PCB-4985-D01-M01-R03			

Note: The above information was declared by manufacturer.

1.1.4 Table for EUT supports functions

Function	Support Band
AP Router	WLAN 2.4GHz, WLAN 5GHz UNII 1~3 and WLAN 6GHz UNII 5~8
Mesh	WLAN 5GHz UNII 1~3 and WLAN 6GHz UNII 5~8

Note 1: After evaluating, AP Router was selected to test and record in the report.

Note 2: The above information was declared by manufacturer.

1.1.5 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11b	0.949	0.23	12.419m	100
802.11ax HEW40-BF	0.967	0.15	4.36m	300

Note:
- DC is Duty Cycle.
- DCF is Duty Cycle Factor.

1.1.6 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FR281911AA

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

Modifications	Performance Checking
1. Adding one adapter model name: NBS24M120200VU 2. PCB layout and P/N changed from PCB-4985-D01-M01-R02 to PCB-4985-D01-M01-R03PCB layout and P/N changed from PCB-4985-D01-M01-R02 to PCB-4985-D01-M01-R03. 3. Layout change for adding capacitors new brand: Richtek, model NO. RT6278BHGQUF, and change power inductor, old brand: TAI-TECH, model No : TMPF0402LR-1R2MN-ABD, new brand: MAGLAYERS, model NO: MNR-8040-2R0N-CP. 4. Layout changed for 3.3V DC switcher. 5. Layout change for new DC switcher design , power inductor changed, old brand: Chilisin, model NO. BMMA000606301R2MX1, new brand : MAGLAYERS, model No. MNR-8040-1R4M-BL. 6. Layout change for new 5V DC switcher design 7. The RJ45 connector changed, The old Part Number: SK01-G110060NL ,brand: CSAK, and the new part number is SK01-G110067NL, brand: CSAK. 8. MLCCs have been added to CPU Core regulator output and Radio IC Core regulator output according to Broadcom suggestion.(C1091, C1092,C1094). Brand : Taiyo Yuden , model No: JMK107BC6106MA-T. 9. Reserved MLCCs have been added according to 1.8V power rail measurements, brand :Yageo , model NO. : CC0402KRX5R6BB104. 10. JTAG_SEL function of the Radio IC has been cancelled, and the component at position R178 has been removed. 11. MLCC capacitor packages have been removed for 6G ＆5G FEM supply circuitry, the placement is C412, C384, C356, C328. 12. 6 GHZ Co-existence filters have been removed (by passed) from 5G RX Chains (FL1, FL4, FL7, FL10).	1. AC Conducted Emissions. 2. Emissions in Restricted Frequency Bands Below 1GHz.

13. Co-existence filters have been removed(by passed) from 2.4G RX Chains (U17, U19).	1. AC Conducted Emissions. 2. Emissions in Restricted Frequency Bands Below 1GHz. 3. Missions in Restricted Frequency Bands Above 1GHz, After evaluating, the worst case is found at 802.11b CH6 (2437MHz), 802.11ax HEW40-BF CH3 (2422MHz) and retest these channels only and for above 1GHz will be based on original output power to retest.

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 662911 D03 v01
- 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	Ederson Huang	21.5~22.9 / 64~68	Jan. 06, 2023~Jan. 18, 2023
Radiated Above 1GHz	03CH03-CB	Wendy Hsu	23.8~24.9 / 55~58	Jan. 10, 2023~Jan. 11, 2023
AC Conduction	CO01-CB	Tum Chen	23~24 / 58~59	Jan. 09, 2023~Jan. 19, 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%
Radiated Emission (1GHz ~ 18GHz)	5.2 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.7 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	Normal Link
1	AP Router Mode: EUT + Adapter 1
2	AP Router Mode: EUT + Adapter 2
For operating mode 2 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	Normal Link
1	AP Router Mode: EUT in X axis + Adapter 1
2	AP Router Mode: EUT in Y axis + Adapter 1
3	AP Router Mode: EUT in Z axis + Adapter 1
Mode 2 has been evaluated to be the worst case among Mode 1~3, thus measurement for Mode 4 will follow this same test mode.	
4	AP Router Mode: EUT in Y axis + Adapter 2
Mode 4 generated the worst test result, so it was recorded in this report.	
Operating Mode > 1GHz	CTX
	The EUT was performed at X axis, Y axis and Z axis position. The worst case was found at Z axis, thus the measurement will follow this same test
1	EUT in Z axis

2.2 EUT Operation during Test

For CTX Mode:

non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

beamforming mode:

During the test, the following programs under WIN 7 were executed.
The program was executed as follows:
1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under DOS.
3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by WLAN module and transmit duty cycle no less than 98%.

For Normal Link Mode:

During the test, the EUT operation to normal function.

2.3 Accessories

Accessories			
Equipment Name	**Brand Name**	**Model Name**	**Rating**
Adapter 1	MOSO	MS-V2000R120-024H0-US	Input: 100-240V~50/60Hz, 0.7A max. Output: 12.0V, 2.0A
Adapter 2	NetBit	NBS24M120200VU	Input: 100-120V~50/60Hz, 0.6A Output: 12.0V, 2.0A
Others			
RJ-45 cable*1: Non-shielded, 1.5m			

2.4 Support Equipment

For AC Conduction:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	2.5G WAN NB	DELL	E6430	N/A
B	LAN NB	DELL	E6430	N/A
C	2.4G NB	DELL	E6430	N/A
D	5G NB	DELL	E6430	N/A
E	6G NB	DELL	E6430	N/A
F	6G Client	INTEL	AX210	N/A

For Radiated (below 1GHz):

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook(LAN)	DELL	E4300	N/A
B	2.5G PC(WAN)	DELL	T3400	N/A
C	Notebook(WIFI 2.4G)	DELL	E4300	N/A
D	Notebook(WIFI 5G)	DELL	E4300	N/A
E	Notebook(WIFI 6E)	DELL	E4300	N/A
F	WLAN module	Intel	AX210NGW	PD9AX210NG

For Radiated (above 1GHz):
For non beamforming mode

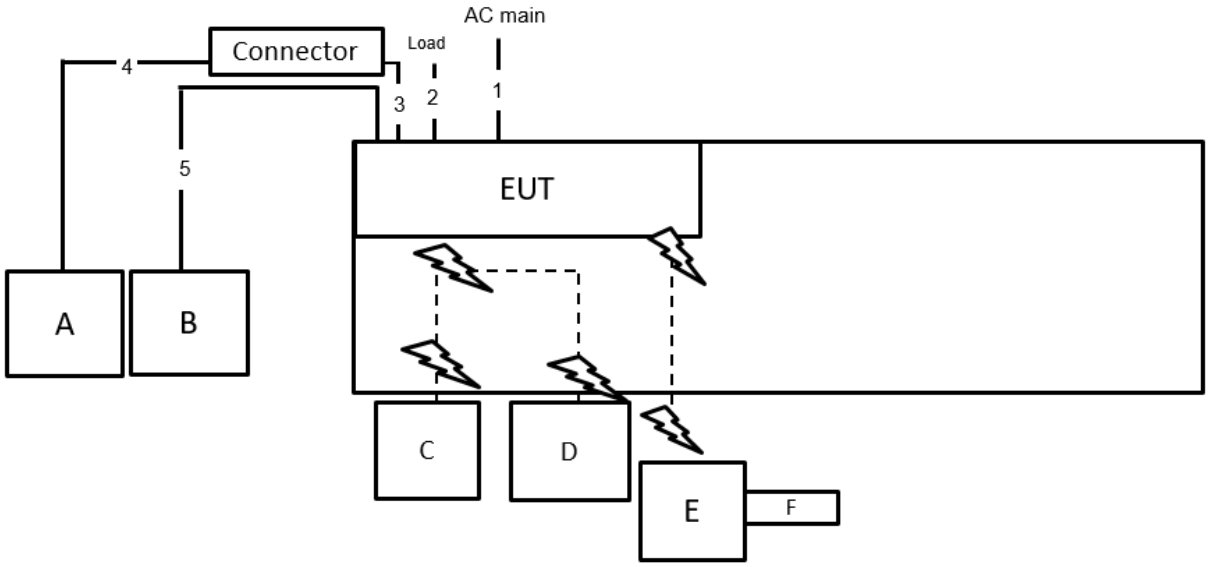
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook	DELL	E4300	N/A

For Beamforming mode

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook	DELL	E4300	N/A
B	WLAN module	Intel	AX210	N/A
C	Notebook	DELL	E4300	N/A

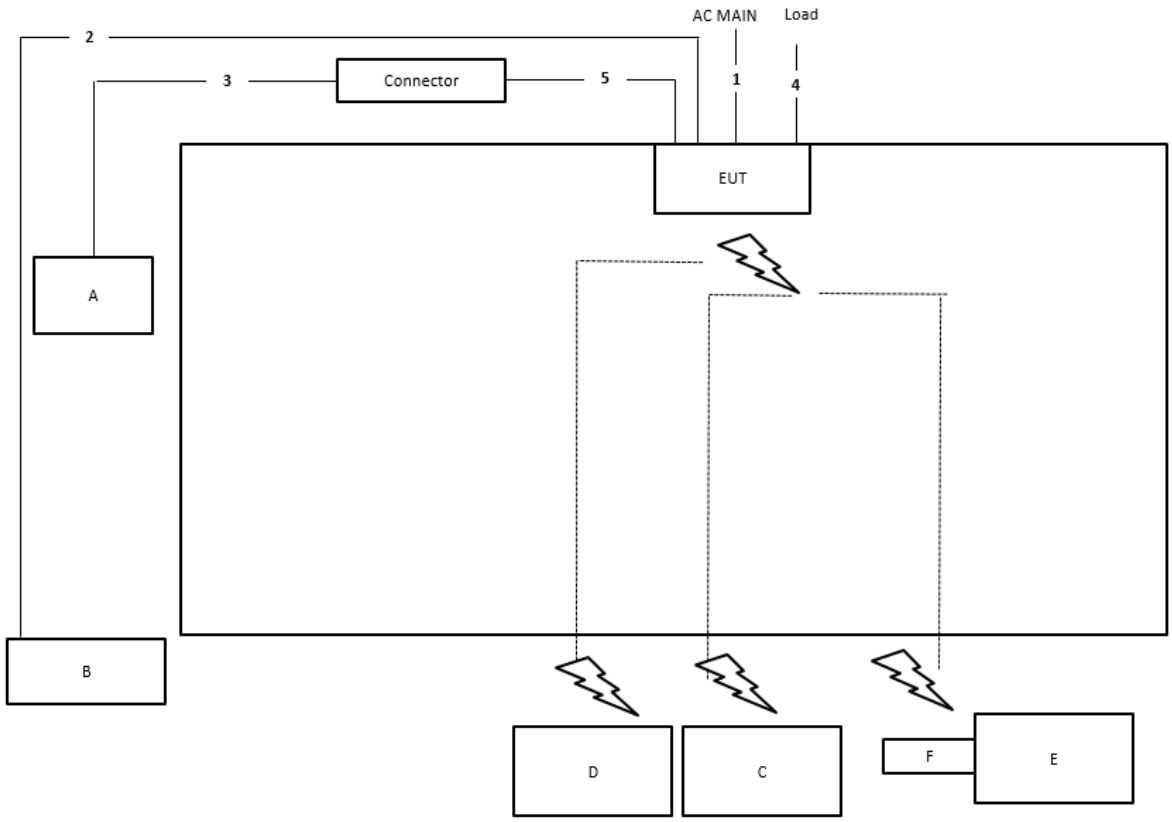
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



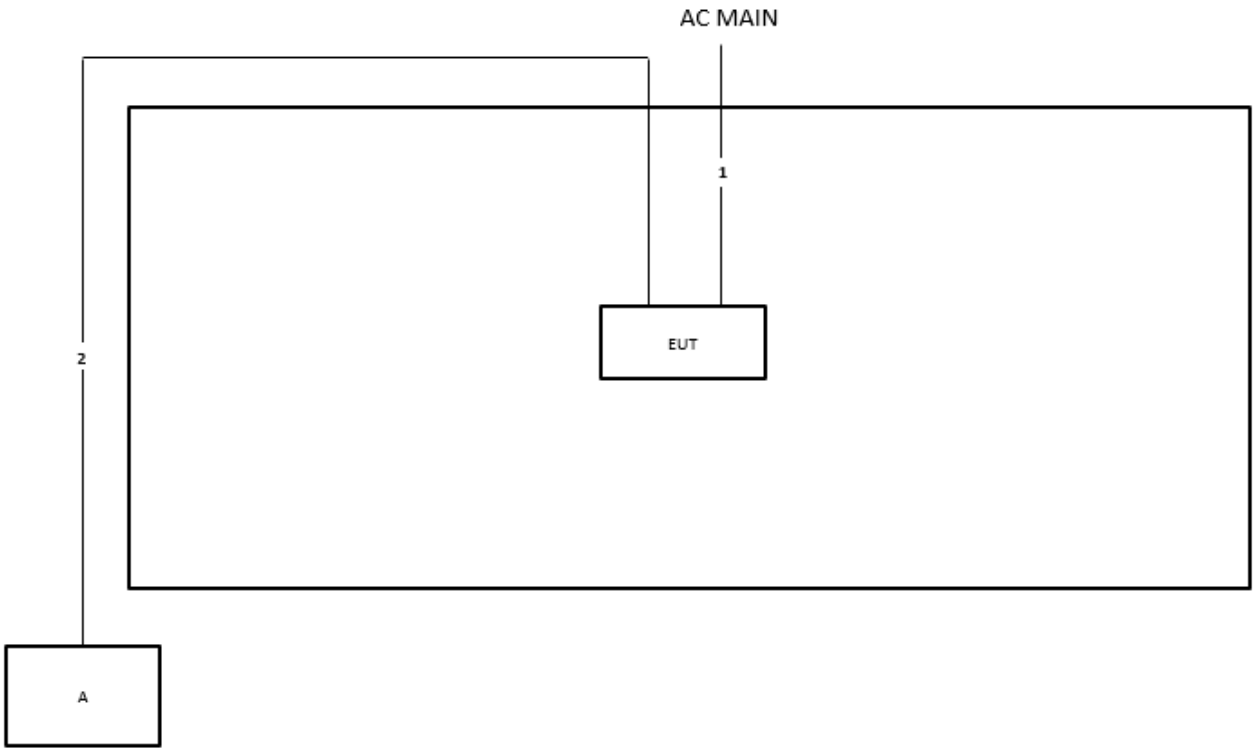
Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	1.5m
4	RJ-45 cable	No	10m
5	RJ-45 cable	No	10m

Test Setup Diagram - Radiated Test < 1GHz



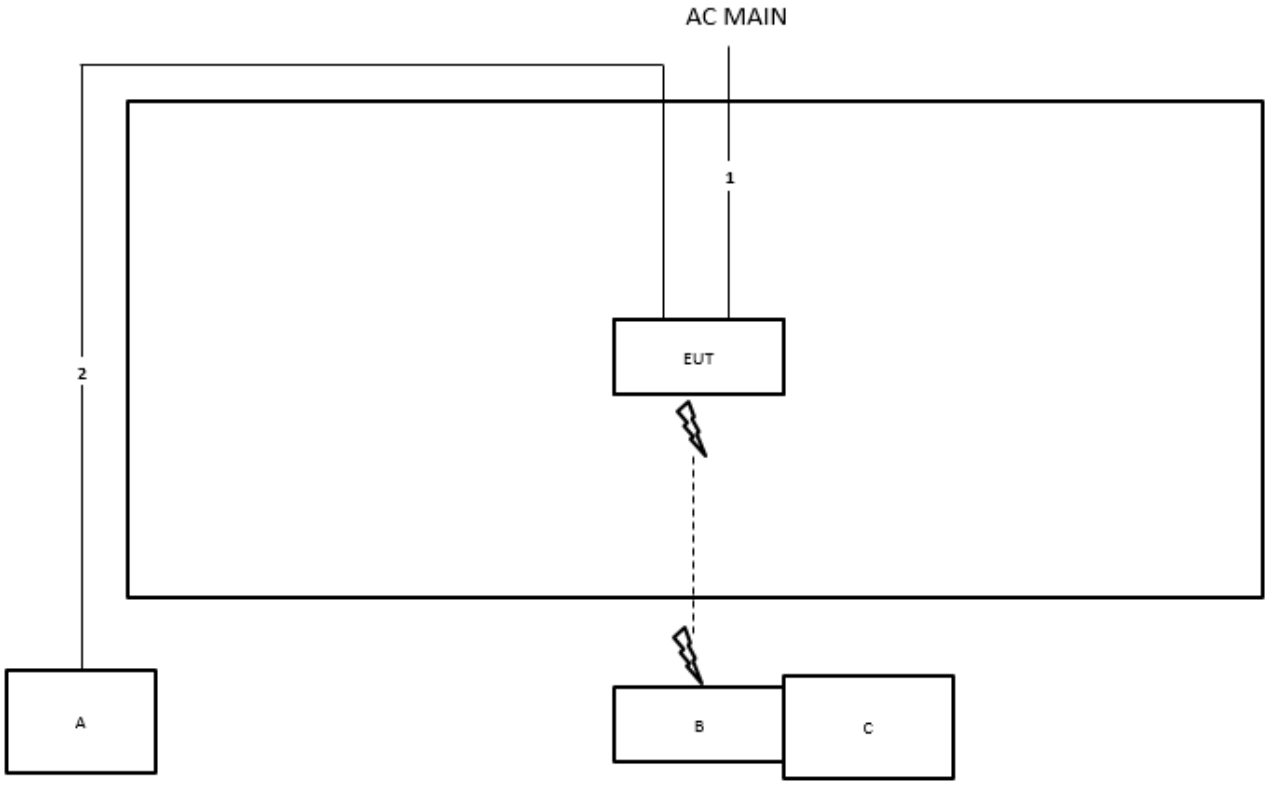
Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	1.0m
5	RJ-45 cable	No	1.5m

Test Setup Diagram - Radiated Test > 1GHz / For non beamforming mode



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m

Test Setup Diagram - Radiated Test > 1GHz / For beamforming mode



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m

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

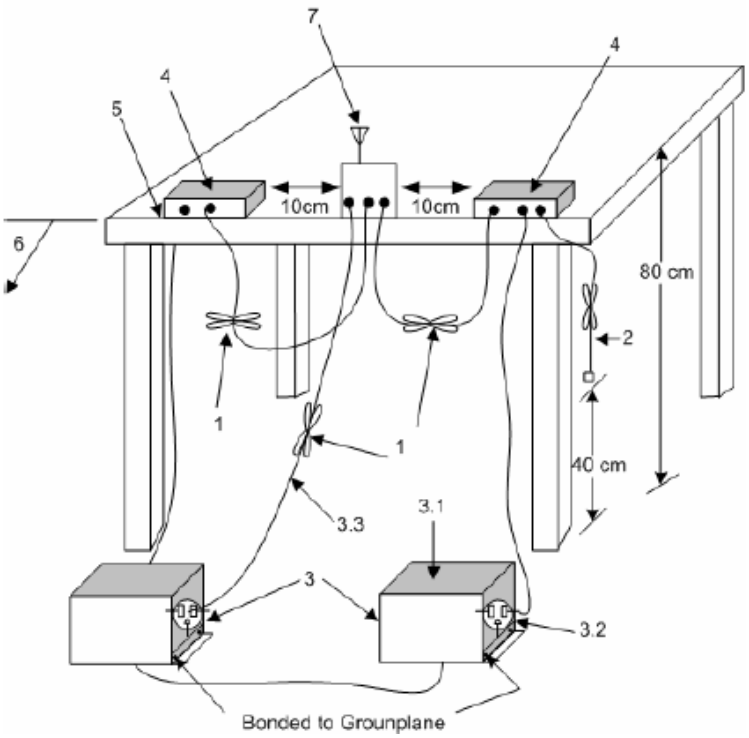
Refer a test equipment and calibration data table in this test report.

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

AC Power-line Conducted Emissions



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 50 Ω 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.

3.1.5 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

3.1.6 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.

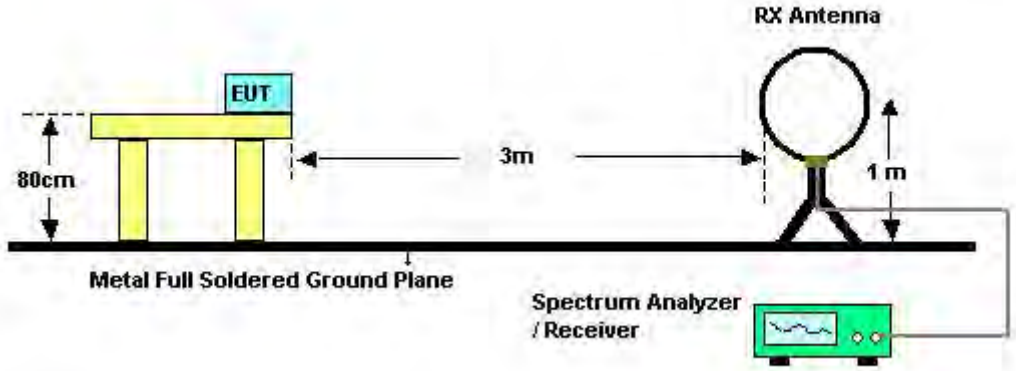
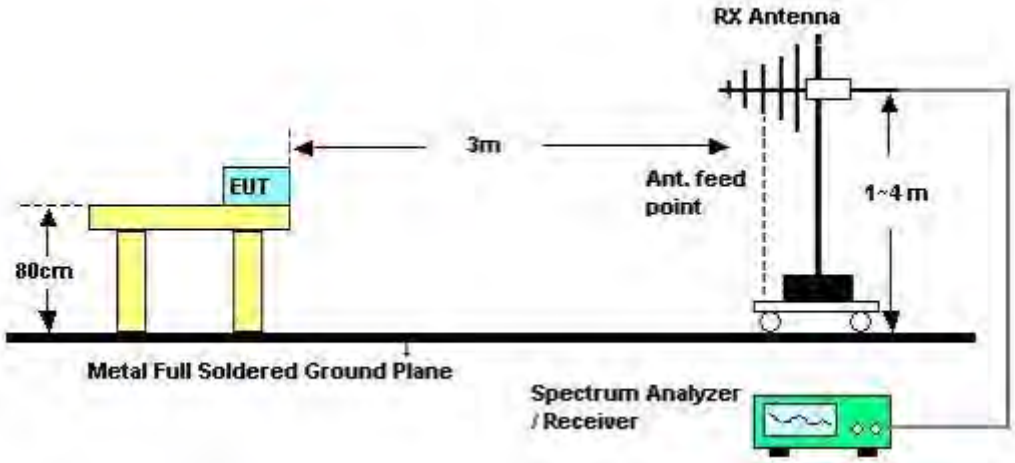
3.2.2 Measuring Instruments

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

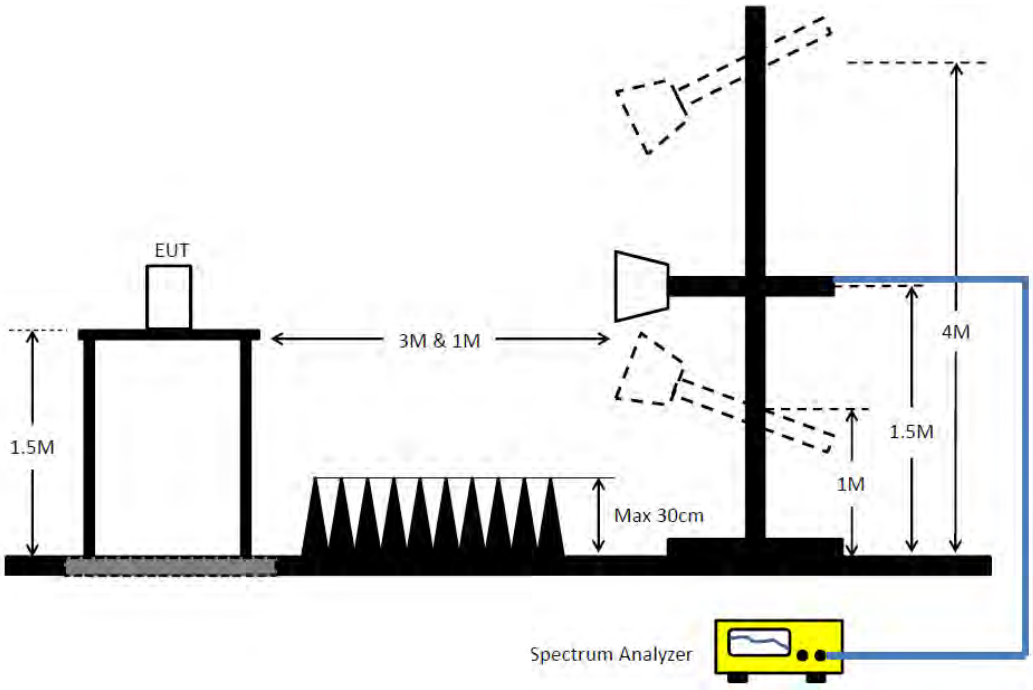
3.2.3 Test Procedures

Test Method			
▪ The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].			
▪ 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.			
▪ For the transmitter unwanted emissions shall be measured using following options below:			
	▪ Refer as FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands.		
		☐	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for duty cycle ≥98%).
		☐	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor).
		☒	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced VBW≥1/T).
		☐	Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
		☐	Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
		☒	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.4 measurement procedure peak limit.
▪ For the transmitter band-edge emissions shall be measured using following options below:			
	▪ 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.		
	▪ Refer as FCC KDB 558074, clause 8.7 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.		
	▪ 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).		
	▪ 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		
	▪ 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

Radiated - Emissions in Restricted Frequency Bands
9kHz ~30MHz

30MHz~1GHz


Above 1GHz



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. 22, 2022	Feb. 21, 2023	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Feb. 09, 2022	Feb. 08, 2023	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Apr. 12, 2022	Apr. 11, 2023	Conduction (CO01-CB)
Pulse Limiter	Rohde& Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 10, 2022	Feb. 09, 2023	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 (05CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Mar. 14, 2022	Mar. 13, 2023	Radiation (05CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 26, 2022	Apr. 25, 2023	Radiation (05CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 25, 2022	Mar. 24, 2023	Radiation (05CH05-CB)
CABLE	Woken	N/A	Low Cable-06	25MHz ~ 1GHz	Dec. 13, 2022	Dec. 12, 2023	Radiation (05CH05-CB)
RF Cable-high	Woken	RG402	High Cable-28	1GHz~18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (05CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+28	1GHz~18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (05CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (05CH05-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH03-CB	1GHz ~18GHz 3m	May 05, 2022	May 04, 2023	Radiation (03CH03-CB)
Horn Antenna	ETS・Lindgren	3115	6821	750MHz~18GHz	Jan. 21, 2022	Jan. 20, 2023	Radiation (03CH03-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 22, 2022	Aug. 21, 2023	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Jul. 01, 2022	Jun. 30, 2023	Radiation (03CH03-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 16, 2022	Nov. 15, 2023	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 10, 2022	Jun. 09, 2023	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+29	1GHz ~ 18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH03-CB)

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-29	1GHz ~ 18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH03-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#6	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH03-CB)

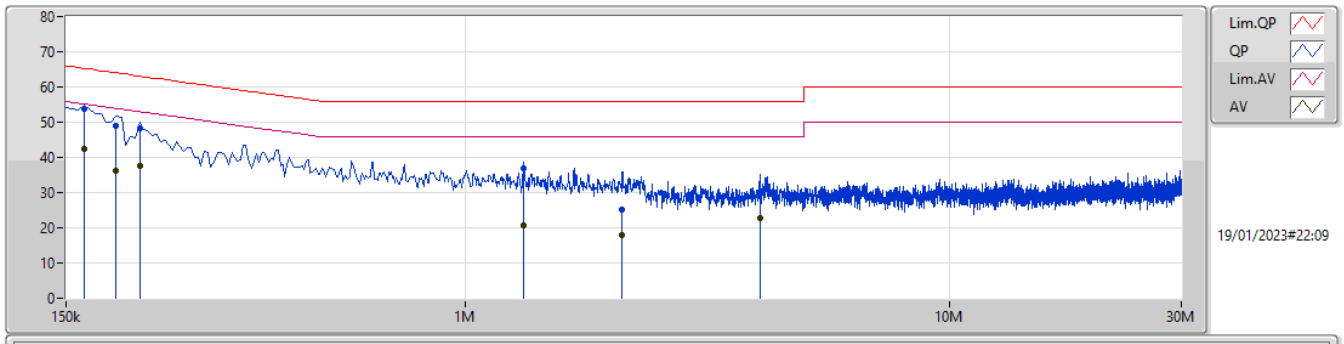
Note: Calibration Interval of instruments listed above is one year.

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

Summary

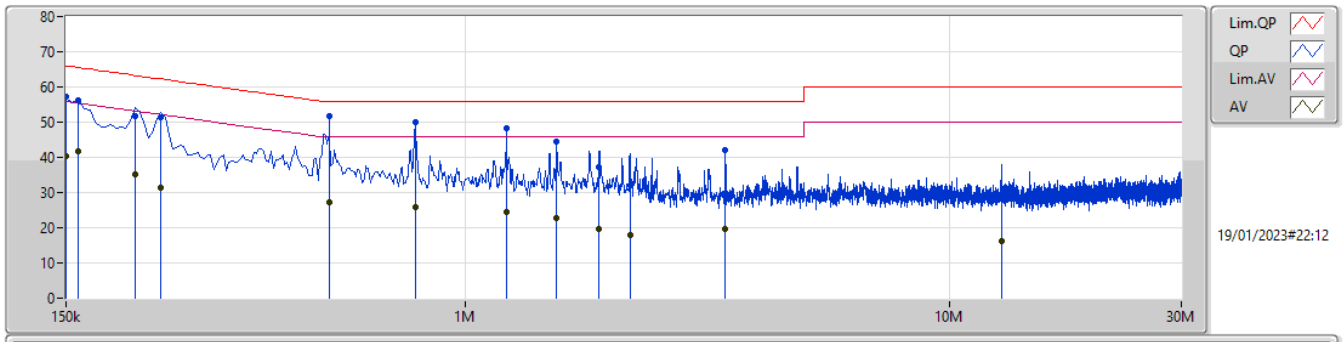
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 2	Pass	QP	523.5k	51.66	56.00	-4.34	Neutral

Mode 2



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	163.5k	53.84	65.27	-11.43	9.99	Line	"Worst"	43.85	0.06	0.04	9.89
AV	163.5k	42.55	55.27	-12.72	9.99	Line	-	32.56	0.06	0.04	9.89
QP	190.5k	48.97	64.01	-15.04	9.99	Line	-	38.98	0.06	0.04	9.89
AV	190.5k	36.16	54.01	-17.85	9.99	Line	-	26.17	0.06	0.04	9.89
QP	213k	48.20	63.09	-14.89	9.99	Line	-	38.21	0.06	0.04	9.89
AV	213k	37.69	53.09	-15.40	9.99	Line	-	27.70	0.06	0.04	9.89
QP	1.32M	36.78	56.00	-19.22	10.03	Line	-	26.75	0.08	0.06	9.89
AV	1.32M	20.83	46.00	-25.17	10.03	Line	-	10.80	0.08	0.06	9.89
QP	2.108M	25.12	56.00	-30.88	10.07	Line	-	15.05	0.09	0.09	9.89
AV	2.108M	17.92	46.00	-28.08	10.07	Line	-	7.85	0.09	0.09	9.89
QP	4.052M	29.66	56.00	-26.34	10.11	Line	-	19.55	0.12	0.10	9.89
AV	4.052M	22.90	46.00	-23.10	10.11	Line	-	12.79	0.12	0.10	9.89

Mode 2

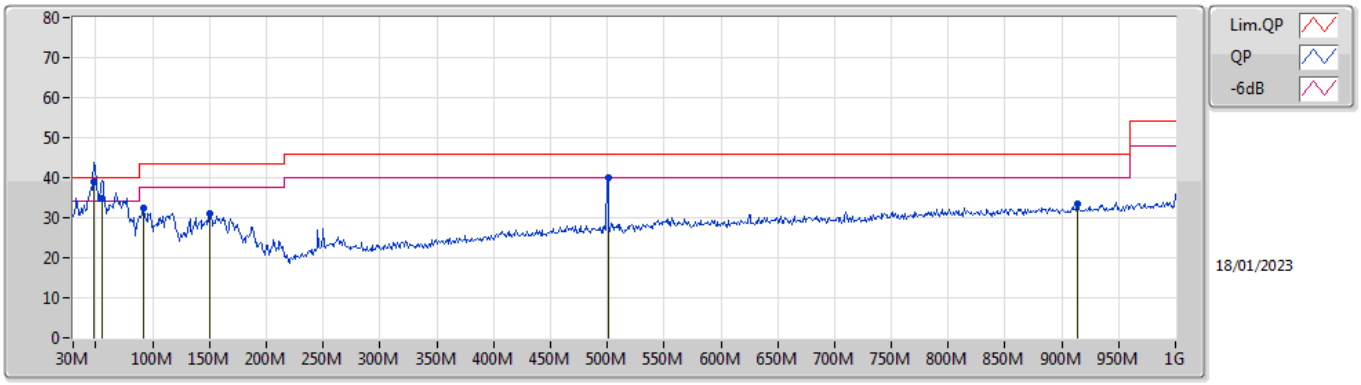


Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	150k	57.27	66.00	-8.73	10.00	Neutral	-	47.27	0.07	0.04	9.89
AV	150k	40.26	56.00	-15.74	10.00	Neutral	-	30.26	0.07	0.04	9.89
QP	159k	56.31	65.52	-9.21	10.00	Neutral	-	46.31	0.07	0.04	9.89
AV	159k	41.78	55.52	-13.74	10.00	Neutral	-	31.78	0.07	0.04	9.89
QP	208.5k	51.63	63.27	-11.64	10.00	Neutral	-	41.63	0.07	0.04	9.89
AV	208.5k	35.04	53.27	-18.23	10.00	Neutral	-	25.04	0.07	0.04	9.89
QP	235.5k	51.35	62.25	-10.90	10.00	Neutral	-	41.35	0.07	0.04	9.89
AV	235.5k	31.25	52.25	-21.00	10.00	Neutral	-	21.25	0.07	0.04	9.89
QP	523.5k	51.66	56.00	-4.34	10.01	Neutral	"Worst"	41.65	0.07	0.05	9.89
AV	523.5k	27.24	46.00	-18.76	10.01	Neutral	-	17.23	0.07	0.05	9.89
QP	789k	50.10	56.00	-5.90	10.02	Neutral	-	40.08	0.08	0.05	9.89
AV	789k	25.75	46.00	-20.25	10.02	Neutral	-	15.73	0.08	0.05	9.89
QP	1.217M	48.14	56.00	-7.86	10.03	Neutral	-	38.11	0.09	0.05	9.89
AV	1.217M	24.51	46.00	-21.49	10.03	Neutral	-	14.48	0.09	0.05	9.89
QP	1.541M	44.57	56.00	-11.43	10.05	Neutral	-	34.52	0.09	0.07	9.89
AV	1.541M	22.90	46.00	-23.10	10.05	Neutral	-	12.85	0.09	0.07	9.89
QP	1.887M	37.08	56.00	-18.92	10.08	Neutral	-	27.00	0.10	0.09	9.89
AV	1.887M	19.51	46.00	-26.49	10.08	Neutral	-	9.43	0.10	0.09	9.89
QP	2.184M	31.91	56.00	-24.09	10.08	Neutral	-	21.83	0.10	0.09	9.89
AV	2.184M	17.98	46.00	-28.02	10.08	Neutral	-	7.90	0.10	0.09	9.89
QP	3.435M	42.14	56.00	-13.86	10.11	Neutral	-	32.03	0.12	0.10	9.89
AV	3.435M	19.63	46.00	-26.37	10.11	Neutral	-	9.52	0.12	0.10	9.89
QP	12.764M	29.63	60.00	-30.37	10.36	Neutral	-	19.27	0.26	0.17	9.93
AV	12.764M	16.12	50.00	-33.88	10.36	Neutral	-	5.76	0.26	0.17	9.93

Summary

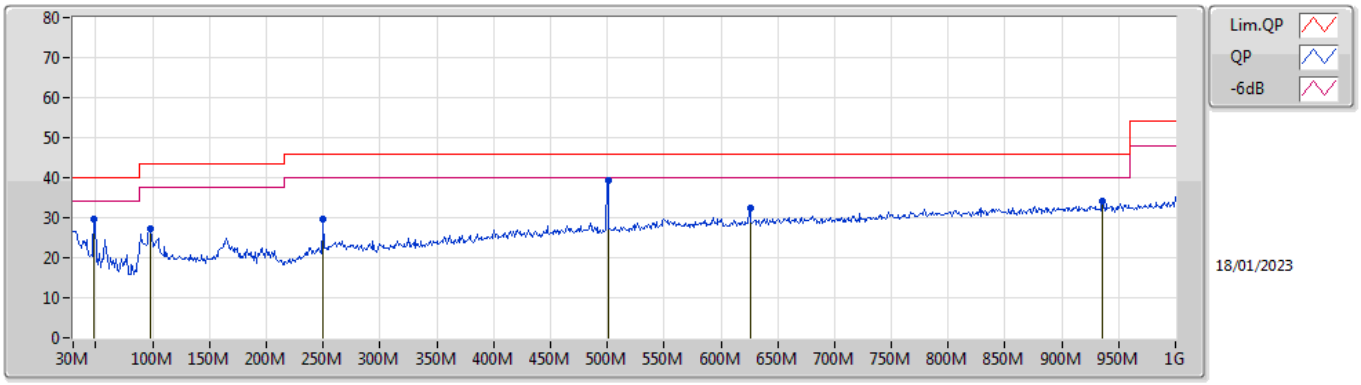
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 4	Pass	QP	48.43M	39.08	40.00	-0.92	Vertical

Mode 4



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
QP	48.43M	39.08	40.00	-0.92	-16.02	3	Vertical	346	1.50	"Worst"	55.10	14.59	1.24	31.85
QP	55.22M	34.71	40.00	-5.29	-17.89	3	Vertical	112	1.25	-	52.60	12.69	1.31	31.89
PK	92.08M	32.34	43.50	-11.16	-15.18	3	Vertical	336	1.25	-	47.52	15.14	1.64	31.96
PK	150.28M	30.87	43.50	-12.63	-13.74	3	Vertical	170	1.00	-	44.61	16.18	2.08	32.00
PK	500.45M	40.14	46.00	-5.86	-5.21	3	Vertical	1	1.25	-	45.35	23.20	3.99	32.40
PK	913.67M	33.55	46.00	-12.45	-0.61	3	Vertical	29	2.00	-	34.16	26.20	5.68	32.49

Mode 4



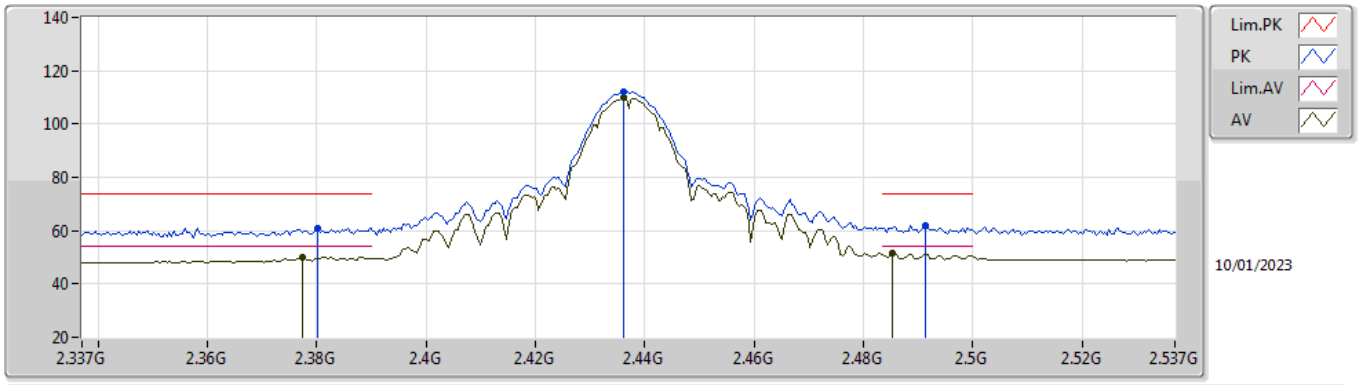
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	48.43M	29.53	40.00	-10.47	-16.02	3	Horizontal	216	1.00	-	45.55	14.59	1.24	31.85
PK	97.9M	27.29	43.50	-16.21	-13.99	3	Horizontal	30	1.50	-	41.28	16.28	1.69	31.96
PK	250.19M	29.50	46.00	-16.50	-11.06	3	Horizontal	222	1.00	-	40.56	18.22	2.72	32.00
PK	500.45M	39.34	46.00	-6.66	-5.21	3	Horizontal	59	2.00	"Worst"	44.55	23.20	3.99	32.40
PK	625.58M	32.45	46.00	-13.55	-3.47	3	Horizontal	251	1.00	-	35.92	24.53	4.52	32.52
PK	935.98M	34.01	46.00	-11.99	-0.47	3	Horizontal	308	1.50	-	34.48	26.33	5.68	32.48

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	-	-	-	-	-	-	-	-	-	-	-
802.11b_Nss1,(1Mbps)_2TX	Pass	AV	2.4854G	51.44	54.00	-2.56	3	Vertical	339	1.09	-

2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_2TX

2437MHz_TX

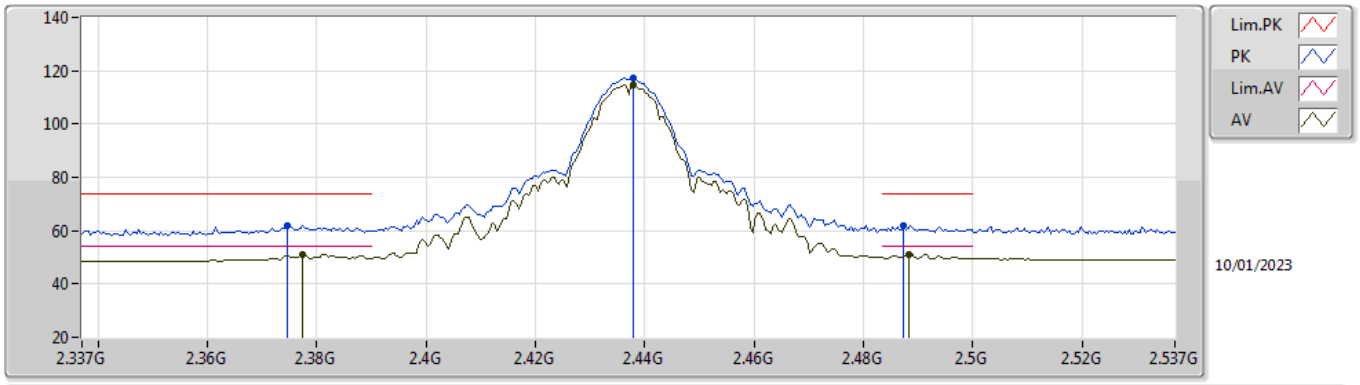


EUT Z_2TX
Setting 95
03-I-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.3802G	61.05	74.00	-12.95	28.85	3	Vertical	339	1.09	-	28.22	3.98	-
AV	2.3774G	50.02	54.00	-3.98	17.83	3	Vertical	339	1.09	-	28.21	3.98	-
PK	2.4362G	112.28	Inf	-Inf	79.94	3	Vertical	339	1.09	-	28.30	4.04	-
AV	2.4362G	109.98	Inf	-Inf	77.64	3	Vertical	339	1.09	-	28.30	4.04	-
PK	2.4914G	62.02	74.00	-11.98	29.46	3	Vertical	339	1.09	-	28.47	4.09	-
AV	2.4854G	51.44	54.00	-2.56	18.91	3	Vertical	339	1.09	-	28.44	4.09	-

2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_2TX

2437MHz_TX

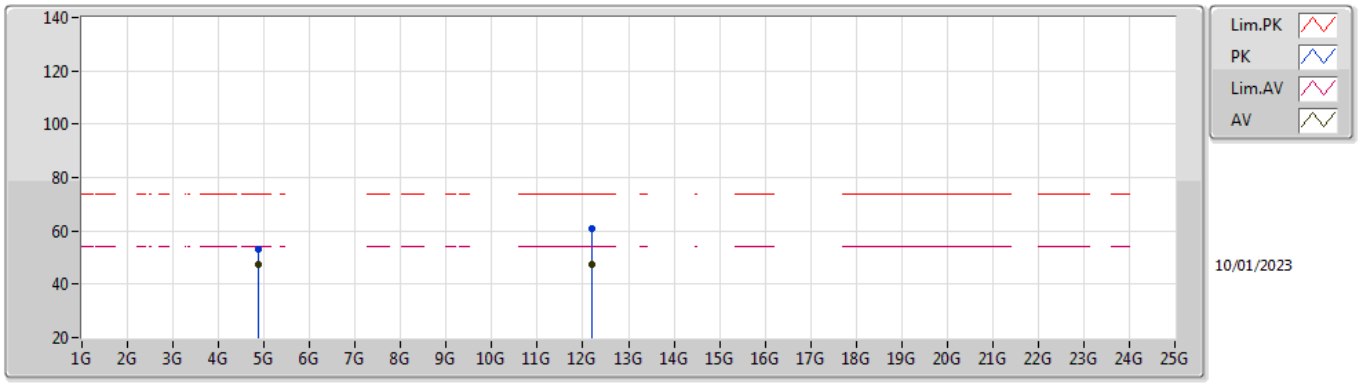


EUT Z_2TX
Setting 95
03-I-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.3746G	61.79	74.00	-12.21	29.62	3	Horizontal	300	1.09	-	28.20	3.97	-
AV	2.3774G	51.29	54.00	-2.71	19.10	3	Horizontal	300	1.09	-	28.21	3.98	-
PK	2.4378G	117.04	Inf	-Inf	84.70	3	Horizontal	300	1.09	-	28.30	4.04	-
AV	2.4378G	114.73	Inf	-Inf	82.39	3	Horizontal	300	1.09	-	28.30	4.04	-
PK	2.4874G	61.95	74.00	-12.05	29.41	3	Horizontal	300	1.09	-	28.45	4.09	-
AV	2.4882G	51.01	54.00	-2.99	18.47	3	Horizontal	300	1.09	-	28.45	4.09	-

2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_2TX

2437MHz_TX

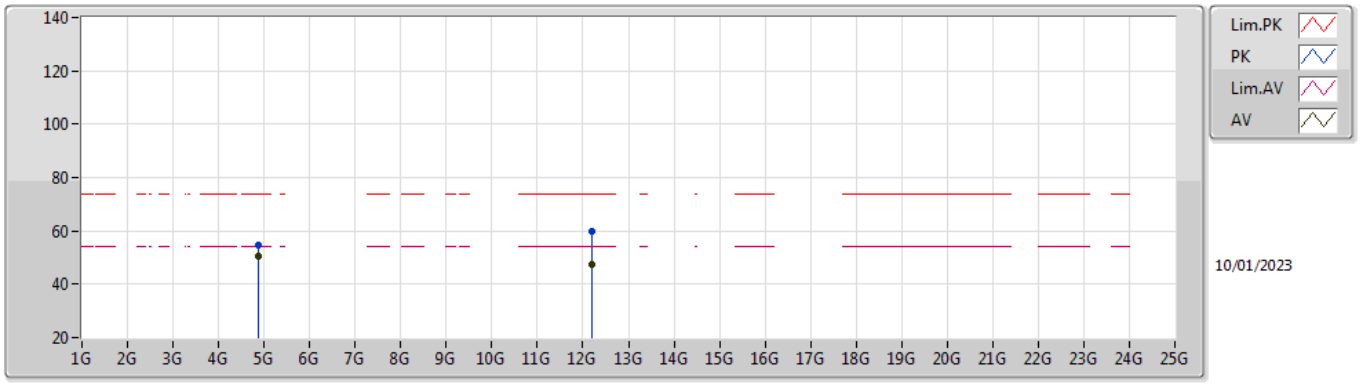


EUT Z_2TX
Setting 95
03-I-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.87416G	52.89	74.00	-21.11	47.65	3	Vertical	61	2.58	-	33.60	6.54	34.90
AV	4.874G	47.25	54.00	-6.75	42.01	3	Vertical	61	2.58	-	33.60	6.54	34.90
PK	12.18448G	60.70	74.00	-13.30	43.55	3	Vertical	312	1.80	-	38.83	13.25	34.93
AV	12.1924G	47.42	54.00	-6.58	30.27	3	Vertical	312	1.80	-	38.82	13.25	34.92

2.4-2.4835GHz_802.11b_Nss1,(1Mbps)_2TX

2437MHz_TX

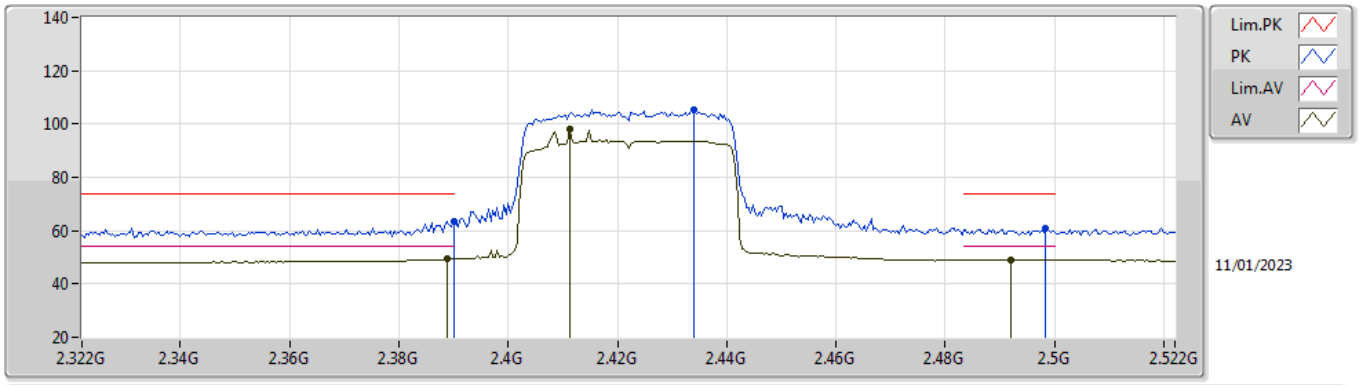


EUT Z_2TX
Setting 95
03-I-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.87388G	54.77	74.00	-19.23	49.53	3	Horizontal	87	1.00	-	33.60	6.54	34.90
AV	4.874G	50.57	54.00	-3.43	45.33	3	Horizontal	87	1.00	-	33.60	6.54	34.90
PK	12.18508G	59.72	74.00	-14.28	42.57	3	Horizontal	94	2.05	-	38.83	13.25	34.93
AV	12.18912G	47.43	54.00	-6.57	30.28	3	Horizontal	94	2.05	-	38.82	13.25	34.92

2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_2TX

2422MHz_TX

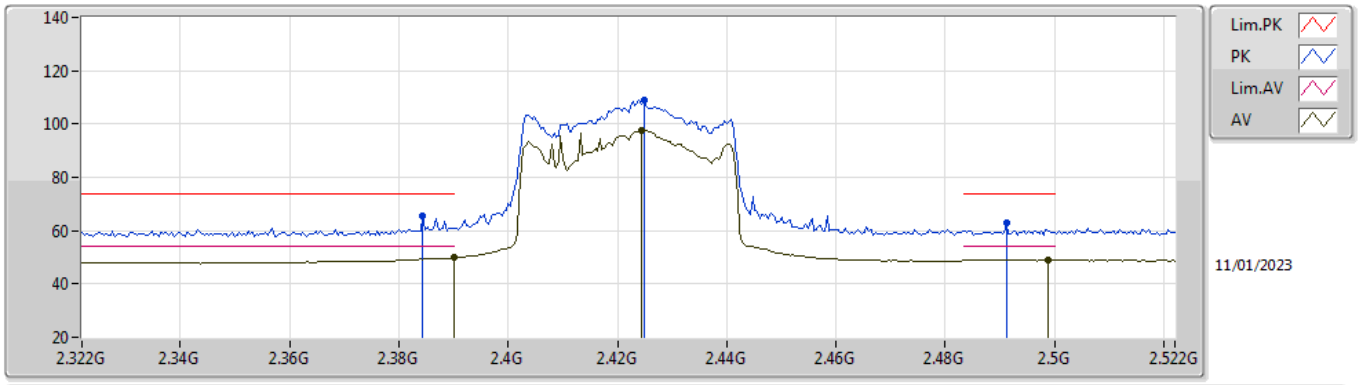


EUT Z_2TX
Setting 49
03-I-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.39G	63.28	74.00	-10.72	31.03	3	Vertical	332.8	1.08	-	28.26	3.99	-
AV	2.3888G	49.33	54.00	-4.67	17.08	3	Vertical	332.8	1.08	-	28.26	3.99	-
PK	2.434G	105.58	Inf	-Inf	73.25	3	Vertical	332.8	1.08	-	28.30	4.03	-
AV	2.4112G	98.24	Inf	-Inf	65.93	3	Vertical	332.8	1.08	-	28.30	4.01	-
PK	2.4984G	60.61	74.00	-13.39	28.02	3	Vertical	332.8	1.08	-	28.49	4.10	-
AV	2.492G	49.03	54.00	-4.97	16.47	3	Vertical	332.8	1.08	-	28.47	4.09	-

2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_2TX

2422MHz_TX

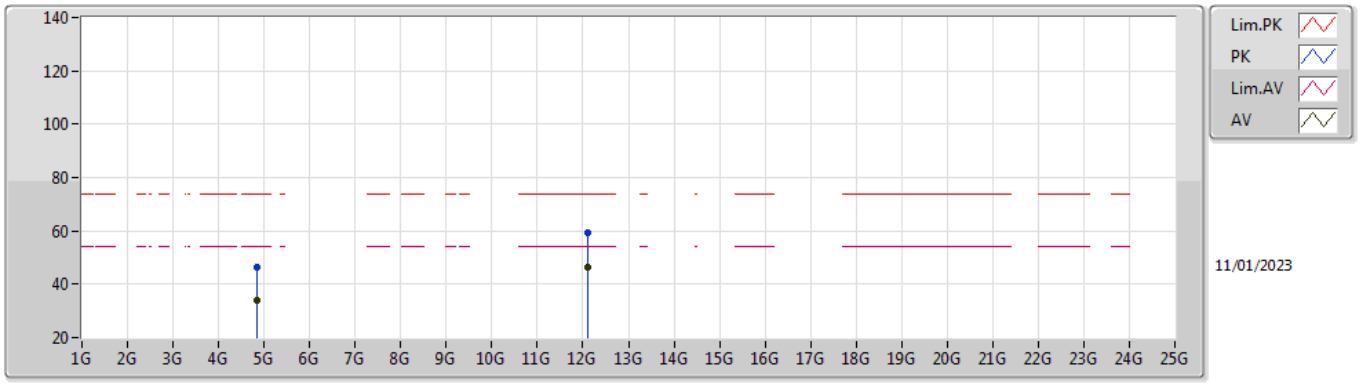


EUT Z_2TX
Setting 49
03-I-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.3844G	65.26	74.00	-8.74	33.04	3	Horizontal	317	1.12	-	28.24	3.98	-
AV	2.39G	49.82	54.00	-4.18	17.57	3	Horizontal	317	1.12	-	28.26	3.99	-
PK	2.4248G	109.18	Inf	-Inf	76.86	3	Horizontal	317	1.12	-	28.30	4.02	-
AV	2.4244G	97.77	Inf	-Inf	65.45	3	Horizontal	317	1.12	-	28.30	4.02	-
PK	2.4912G	62.73	74.00	-11.27	30.18	3	Horizontal	317	1.12	-	28.46	4.09	-
AV	2.4988G	48.77	54.00	-5.23	16.17	3	Horizontal	317	1.12	-	28.50	4.10	-

2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_2TX

2422MHz_TX

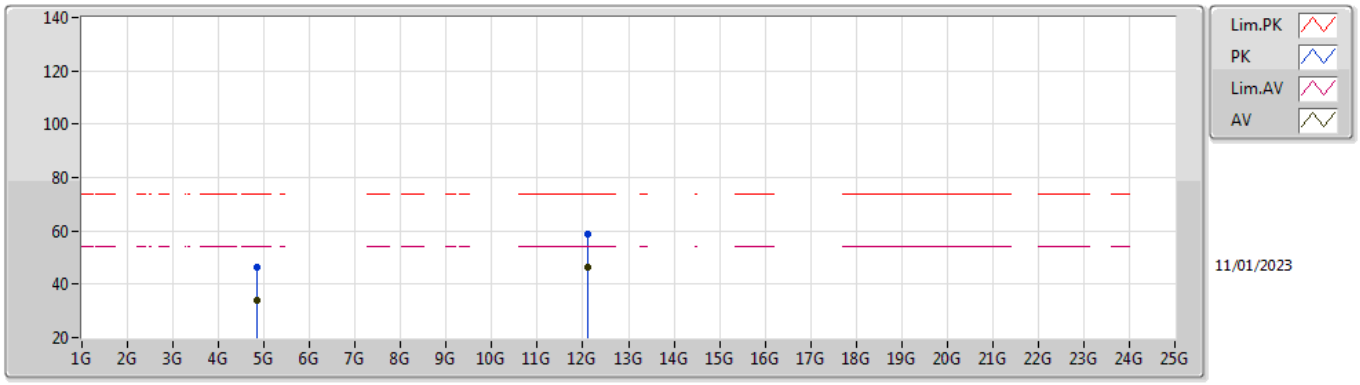


EUT Z_2TX
Setting 49
03-I-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.8348G	46.25	74.00	-27.75	49.54	3	Vertical	100	1.41	-	33.41	6.52	43.22
AV	4.83868G	33.89	54.00	-20.11	37.15	3	Vertical	100	1.41	-	33.43	6.52	43.21
PK	12.11636G	59.09	74.00	-14.91	49.67	3	Vertical	284	1.08	-	38.97	13.19	42.74
AV	12.11688G	46.41	54.00	-7.59	36.99	3	Vertical	284	1.08	-	38.97	13.19	42.74

2.4-2.4835GHz_802.11ax HEW40-BF_Nss1,(MCS0)_2TX

2422MHz_TX



EUT Z_2TX
Setting 49
03-I-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.85084G	46.13	74.00	-27.87	49.31	3	Horizontal	183	1.23	-	33.50	6.53	43.21
AV	4.84748G	34.11	54.00	-19.89	37.32	3	Horizontal	183	1.23	-	33.48	6.52	43.21
PK	12.1104G	58.88	74.00	-15.12	49.45	3	Horizontal	119	1.92	-	38.98	13.19	42.74
AV	12.11584G	46.52	54.00	-7.48	37.10	3	Horizontal	119	1.92	-	38.97	13.19	42.74