Testing Laboratory 3787

RADIO TEST REPORT

FCC ID	:	Z8H89FT0085
Equipment	:	X7-35X Indoor Wi-Fi 7 2x2 Access Point
Brand Name	:	Cambium Networks
Model Name	:	X7-35X
Applicant	:	Cambium Networks Inc. 3800 Golf Road Suite 360 Rolling Meadows IL United States 60008
Manufacturer	:	Cambium Networks Inc. 3800 Golf Road Suite 360 Rolling Meadows IL United States 60008
Standard	:	47 CFR FCC Part 15.247

The product was received on Nov. 24, 2023, and testing was started from Dec. 08, 2023 and completed on Feb. 27, 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 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
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Photographs of EUT v01

History of this test report

Report No.	Version	Description	Issued Date
FR3N2319AD	01	Initial issue of report	Mar. 12, 2024

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(a)	DTS Bandwidth	PASS	-
3.3	15.247(b)	Maximum Conducted Output Power	PASS	-
3.4	15.247(e)	Power Spectral Density	PASS	-
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
3.6	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: Cathy Chiu

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std.	Ch. Frequency (MHz)	Channel Number
2400-2483.5	802.15.4	2405-2480	11-26 [16]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	Zigbee	3	1TX

Note:
- Zigbee uses a O-QPSK (250kbps) 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	6GHz	Bluetooth/ Zigbee					
1	2	-	-	INPAQ	3010001479GD	PIFA Antenna	I-PEX	Note 1
2	1	-	-	INPAQ	3010001479GD	PIFA Antenna	I-PEX	
3	-	2	-	INPAQ	3010001479GD	PIFA Antenna	I-PEX	
4	-	1	-	INPAQ	3010001479GD	PIFA Antenna	I-PEX	
5	-	-	1	INPAQ	3010001479GD	Dipole Antenna	I-PEX	

Note 1:

Ant.	Port			WLAN 2.4GHz (dBi)	WLAN 5GHz (dBi)				WLAN 6GHz (dBi)				Bluetooth/ Zigbee (dBi)
	2.4GHz /5GHz	6GHz	Bluetooth/ Zigbee		UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 5	UNII 6	UNII 7	UNII 8	
1	2	-	-	2.35	3.32	3.7	4.67	4.73	-	-	-	-	-
2	1	-	-	2.23	3.5	3.57	5.19	4.82	-	-	-	-	-
3	-	2	-	-	-	-	-	-	5.29	5.95	5.95	5.30	-
4	-	1	-	-	-	-	-	-	5.69	5.80	5.80	5.45	-
5	-	-	1	-	-	-	-	-	-	-	-	-	5.6

Directional Gain (dBi)									
WLAN 2.4GHz		WLAN 5GHz UNII 1		WLAN 5GHz UNII 2A		WLAN 5GHz UNII 2C		WLAN 5GHz UNII 3	
2T1S	2T2S	2T1S	2T2S	2T1S	2T2S	2T1S	2T2S	2T1S	2T2S
5.01	2.35	4.34	3.5	5.36	3.7	6.89	5.19	6.2	4.82

Note 2: The above information (excepting WLAN 2.4GHz/5GHz gain) was declared by manufacturer.
Note 3: The WLAN 5GHz UNII2A~2C and WLAN 6GHz function of EUT was not enabled at this time.

<For 2.4GHz function>
For IEEE 802.11b/g/n/VHT/ax/be (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 IEEE 802.11a/n/ac/ax/be (2TX/2RX):
Port 1 and Port 2 can be used as transmitting/receiving antenna.
Port 1 and Port 2 could transmit/receive simultaneously.
<For Bluetooth/Zigbee function> (1TX/1RX):
Only Port 1 can be used as transmitting/receiving antenna.
Port 1 could transmit/receive simultaneously.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
Zigbee	0.455	3.42	910.313u	3k

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

1.1.4 EUT Operational Condition

EUT Power Type	From PoE			
Beamforming Function	☒	With beamforming	☐	Without beamforming
	The product has beamforming function for 802.11n/VHT/ax/be in 2.4GHz and 802.11n/ac/ax/be in 5GHz.			
Function	☒	Point-to-multipoint	☒	Point-to-point
Test Software Version	QSPR V5.14.00227.1			

Note: The above information was declared by manufacturer.

1.1.5 Table for EUT supports function

Function	Supports type
AP	Master
Mesh	Master
Slave	Slave without Radar detection

Note1: For above table list, only AP mode was tested and recorded in this test.
Note2: The above information was declared by manufacturer.

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
RF Conducted	TH01-CB	KJ Chang	21.3~21.9 / 65~68	Dec. 27, 2023~ Dec. 30, 2023
Radiated (Below 1GHz)	03CH05-CB	Gordon Hung	21-22 / 56-59	Dec. 08, 2023~ Feb. 06, 2024
Radiated (Above 1GHz)	03CH01-CB	Gordon Hung	22.4-23.5 / 55-58	Dec. 08, 2023~ Feb. 06, 2024
	03CH03-CB	Gordon Hung	21.5-22.5 / 55-58	Dec. 08, 2023~ Feb. 06, 2024
AC Conduction	CO01-CB	Peter Wu	22~23 / 58~59	Feb. 27, 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)	3.4 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.1 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.1 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.2 dB	Confidence levels of 95%
Conducted Emission	3.1 dB	Confidence levels of 95%
Output Power Measurement	0.8 dB	Confidence levels of 95%
Power Density Measurement	3.1 dB	Confidence levels of 95%
Bandwidth Measurement	2.2%	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode
Zigbee
2405MHz
2440MHz
2475MHz
2480MHz

2.2 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	WLAN/Bluetooth (Normal Link), Zigbee (TX, RX)
1	EUT + Zigbee (TX) + PoE
2	EUT + Zigbee (RX) + PoE
3	EUT + Bluetooth + PoE
For operating mode 1 is the worst case and it was record in this test report.	

The Worst Case Mode for Following Conformance Tests	
Tests Item	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains

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
The EUT was performed testing at X axis, Y axis and Z axis position for Radiated emission above 1GHz test, and the worst case was found below. Thus, the measurement will follow this same test configuration.	
1	EUT in Z axis + WLAN 2.4GHz + PoE
2	EUT in X axis + WLAN 5GHz + PoE
3	EUT in Y axis + Bluetooth + PoE
4	EUT in X axis + Zigbee + PoE
For operating mode 3 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	CTX
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 in X axis

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
Operating Mode	CTX
1	Bluetooth + WLAN 2.4GHz + WLAN 5GHz
2	Zigbee + WLAN 2.4GHz + WLAN 5GHz
Refer to Sporton Test Report No.: FA3N2319 for Co-location RF Exposure Evaluation.	

Note: The PoE below is for measurement only, would not be marketed.

The PoE information as below:

Support Unit	Brand Name	Model Number
PoE	Cambium Networks	P060U04

2.3 EUT Operation during Test

For CTX/CRX Mode:

The EUT was programmed to be in continuously transmitting/receiving mode.

For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

Accessories
Bracket type 1*1
Bracket type 2*1

2.5 Support Equipment

For AC Conduction:

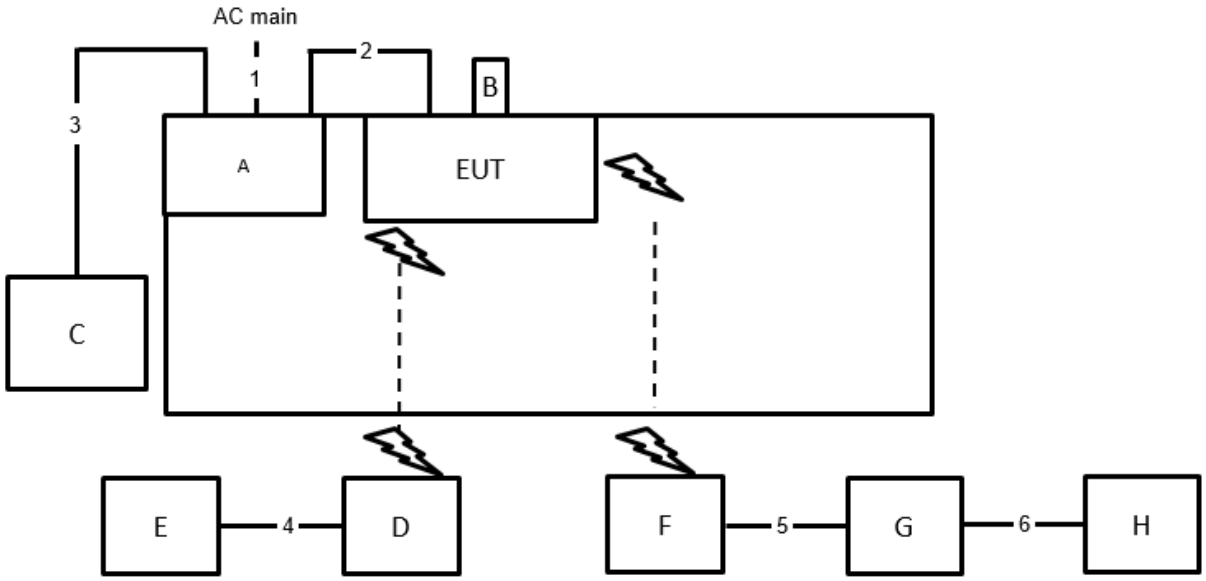
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	PoE	Cambium Networks	P060U04	N/A
B	Flash disk3.0	Transcend	JetFlash-700	N/A
C	LAN 2.5G NB	DELL	E6430	N/A
D	2.4G+5G Device	Cambium Networks	X7-35X	N/A
E	2.4G+5G Device NB	DELL	E6430	N/A
F	Zigbee Device	Cambium Networks	X7-35X	N/A
G	Zigbee PoE	H3C	N/A	N/A
H	Zigbee Device NB	DELL	E6430	N/A

For Radiated and RF Conducted:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook	DELL	E4300	N/A
B	PoE	Cambium Networks	P060U04	N/A

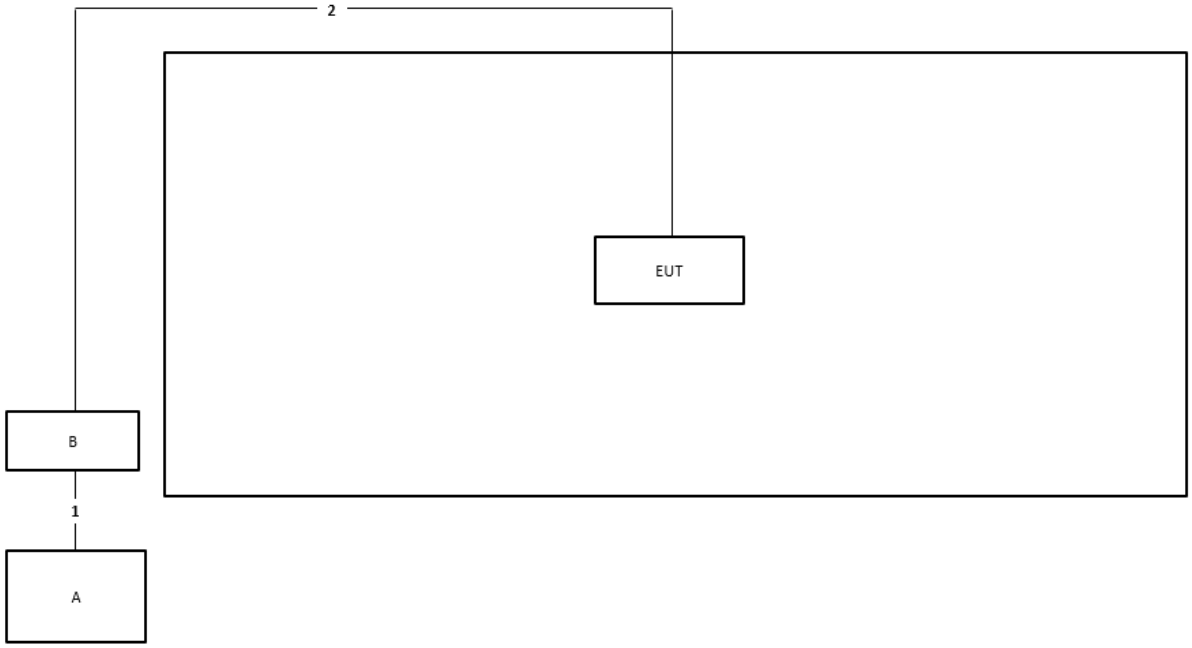
2.6 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length
1	Power cable	No	2.9m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	10m
5	RJ-45 cable	No	10m
6	RJ-45 cable	No	10m

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length
1	RJ-45 cable	No	1m
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

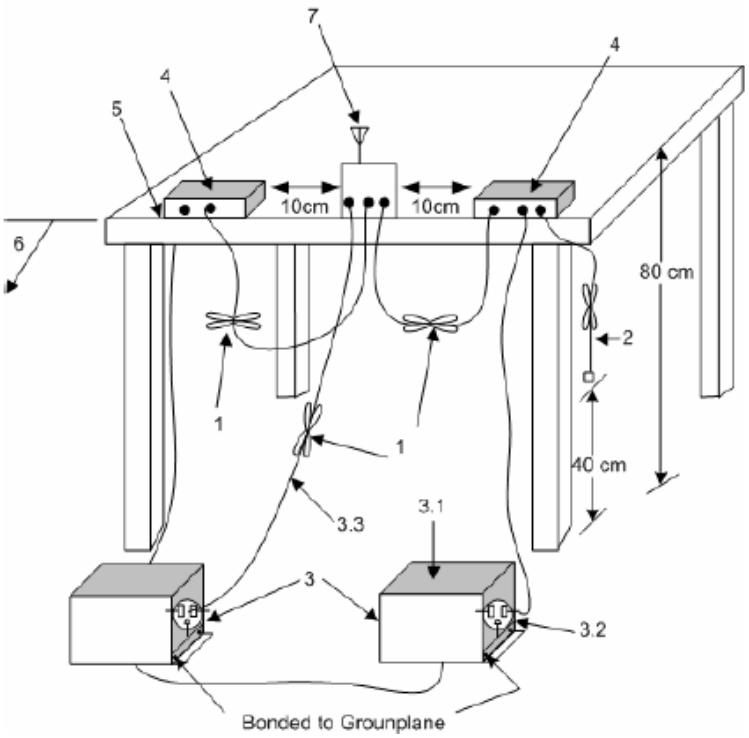
Refer a test equipment and calibration data table in this test report.

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 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
Systems using digital modulation techniques:
▪ 6 dB bandwidth ≥ 500 kHz.

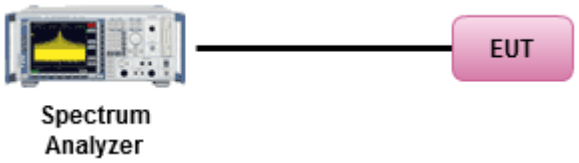
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method	
▪ For the emission bandwidth shall be measured using one of the options below:	
	☒ Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.1 Option 1 for 6 dB bandwidth measurement.
	☐ Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.2 Option 2 for 6 dB bandwidth measurement.
	☐ Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.

3.2.4 Test Setup

Emission Bandwidth


3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit		
	▪ If $G_{TX} \leq 6$ dBi, then $P_{Out} \leq 30$ dBm (1 W)	
	▪ Point-to-multipoint systems (P2M): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)$ dBm	
	▪ Point-to-point systems (P2P): If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)/3$ dBm	
	▪ Smart antenna system (SAS):	
		- Single beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)/3$ dBm
		- Overlap beam: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)/3$ dBm
		- Aggregate power on all beams: If $G_{TX} > 6$ dBi, then $P_{Out} = 30 – (G_{TX} – 6)/3 + 8$dB dBm
P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, **G_{TX}** = the maximum transmitting antenna directional gain in dBi.		

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method	
▪ Maximum Peak Conducted Output Power	
	☐ Refer as FCC KDB 558074, clause 8.3.1.1 & C63.10 clause 11.9.1.1 (RBW ≥ EBW method).
	☐ Refer as FCC KDB 558074, clause 8.3.1.3 & C63.10 clause 11.9.1.3 (peak power meter).
▪ Maximum Conducted Output Power	
	[duty cycle ≥ 98% or external video / power trigger]
	☐ Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1.
	☐ Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.3 Method AVGSA-1A. (alternative)
	duty cycle < 98% and average over on/off periods with duty factor
	☐ Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.4 Method AVGSA-2.
	☐ Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.5 Method AVGSA-2A (alternative)
	☐ Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.6 Method AVGSA-3
	☐ Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.7 Method AVGSA-3A (alternative)
	Measurement using a power meter (PM)
	☐ Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.1 Method AVGPM (using an RF average power meter).
	☒ Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.2 Method AVGPM-G (using an gate RF average power meter).
▪ For conducted measurement.	
	▪ If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
	▪ If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \ldots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.3.4 Test Setup

Maximum Conducted Output Power (Power Meter)


3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
▪ Power Spectral Density (PSD) ≤ 8 dBm/3kHz

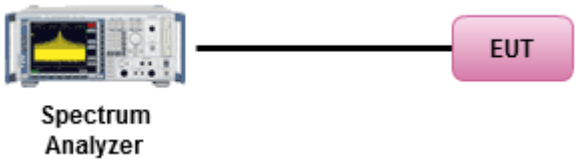
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

Test Method		
▪ Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).		
	☒ Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10 Method Max. PSD.	
▪ For conducted measurement.		
	▪ If The EUT supports multiple transmit chains using options given below:	
		☐ Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.
		☐ Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,
		☐ Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.

3.4.4 Test Setup

Power Spectral Density


3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	**Limit (dBc)**
Peak output power procedure	20
Average output power procedure	30
Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level. Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.	

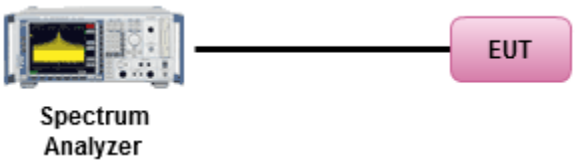
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method
▪ Refer as FCC KDB 558074, clause 8.5 for unwanted emissions into non-restricted bands.

3.5.4 Test Setup

Emissions in Non-restricted Frequency Bands


3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

3.6 Emissions in Restricted Frequency Bands

3.6.1 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.

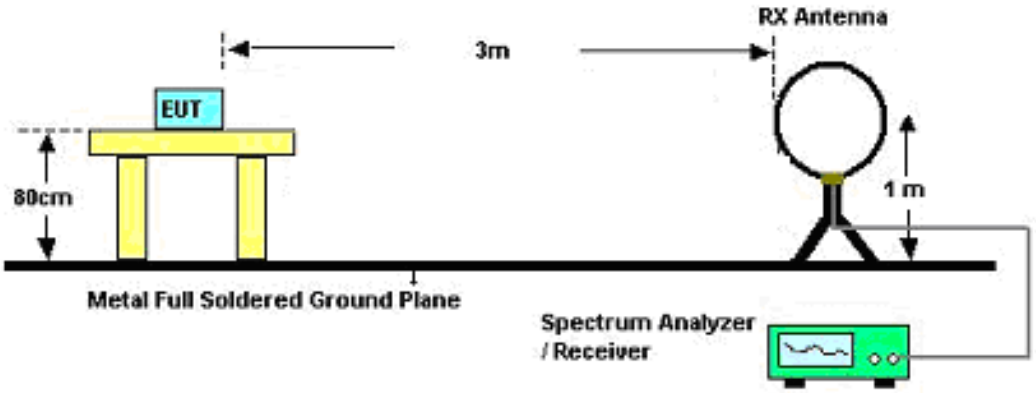
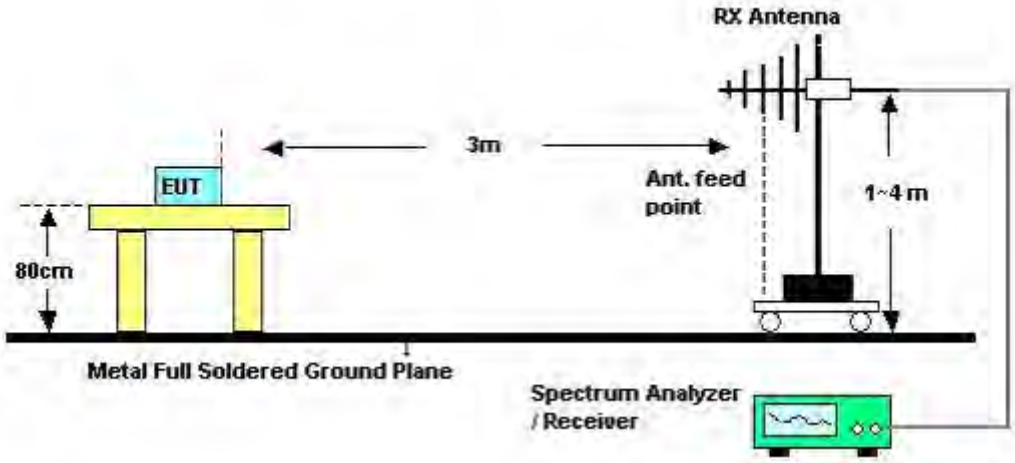
3.6.2 Measuring Instruments

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

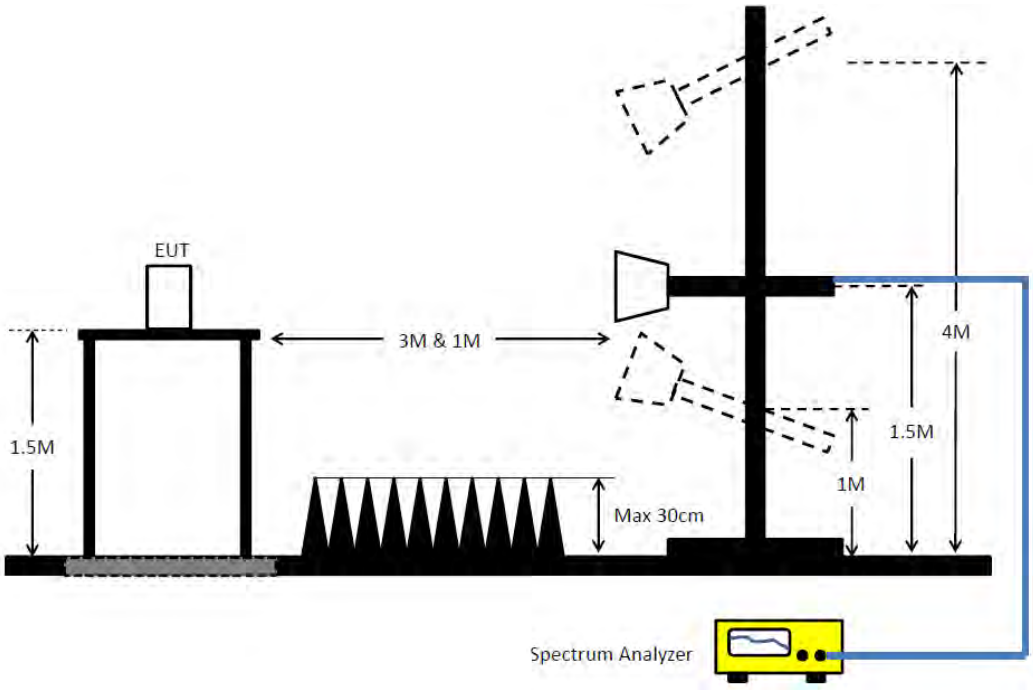
3.6.3 Test Procedures

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.		

3.6.4 Test Setup

Emissions in Restricted Frequency Bands
9kHz ~30MHz

30MHz~1GHz


Above 1GHz



3.6.5 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.

3.6.6 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.

3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	MY52260140	9kHz ~ 8.4GHz	May 18, 2023	May 17, 2024	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Dec. 29, 2023	Dec. 28, 2024	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Apr. 27, 2023	Apr. 26, 2024	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 08, 2024	Feb. 07, 2025	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	Oct. 17, 2023	Oct. 16, 2024	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-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. 02, 2023	Aug. 01, 2024	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 24, 2023	Mar. 23, 2024	Radiation (03CH05-CB)
Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	May 03, 2023	May 02, 2024	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Apr. 18, 2023	Apr. 17, 2024	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 13, 2023	Jun. 12, 2024	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Dec. 06, 2023	Dec. 05, 2024	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH01-CB	1GHz ~18GHz 3m	May 05, 2023	May 04, 2024	Radiation (03CH01-CB)
Horn Antenna	ETS-LINDGREN	3115	00075790	750MHz ~ 18GHz	Oct. 30, 2023	Oct. 29, 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 18, 2023	May 17, 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)

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
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	Dec. 06, 2023	Dec. 05, 2024	Radiation (03CH01-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH01-CB)
High Cable	Woken	WCA0929M	40G#6	1GHz ~ 40 GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH01-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH03-CB	1GHz ~18GHz 3m	May 04, 2023	May 03, 2024	Radiation (03CH03-CB)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1370	1GHz~18GHz	Jun. 30, 2023	Jun. 29, 2024	Radiation (03CH03-CB)
Horn Antenna	ETS·Lindgren	3115	6821	750MHz~18GHz	Jan. 24, 2024	Jan. 23, 2025	Radiation (03CH03-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Sep. 04, 2023	Sep. 03, 2024	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Jun. 30, 2023	Jun. 29, 2024	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 12, 2023	Jun. 11, 2024	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+29	1GHz ~ 18GHz	Nov. 07, 2023	Nov. 06, 2024	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-29	1GHz ~ 18GHz	Nov. 07, 2023	Nov. 06, 2024	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Dec. 06, 2023	Dec. 05, 2024	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#6	1GHz ~ 40 GHz	Oct. 02, 2023	Oct. 01, 2024	Radiation (03CH03-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH03-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 29, 2023	May 28, 2024	Conducted (TH01-CB)
Switch	SPTCB	SP-SWI	SWI-01	1~26.5 GHz	Oct. 03, 2023	Oct. 02, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)

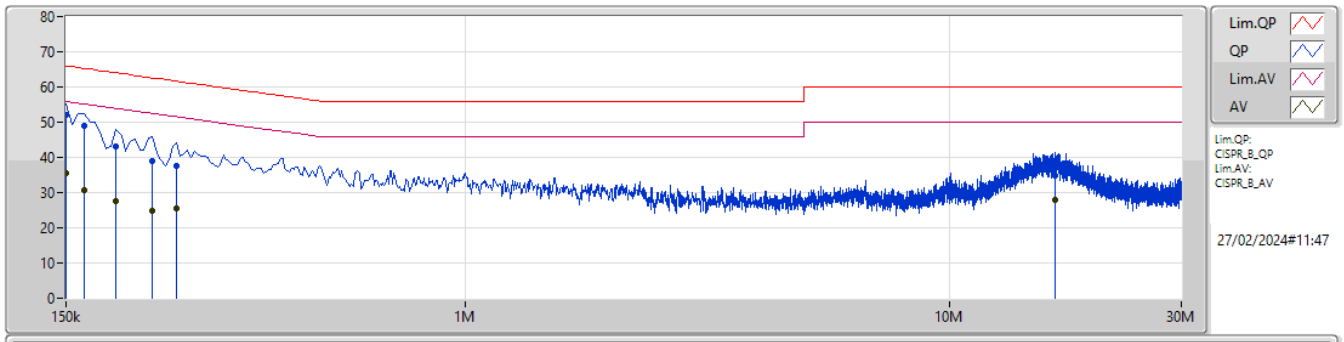
Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-09	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-30	1 GHz – 18 GHz	Oct. 02, 2023	Oct. 01, 2024	Conducted (TH01-CB)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Feb. 22, 2023	Feb. 21, 2024	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Feb. 22, 2023	Feb. 21, 2024	Conducted (TH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.
NCR means Non-Calibration required.

Summary

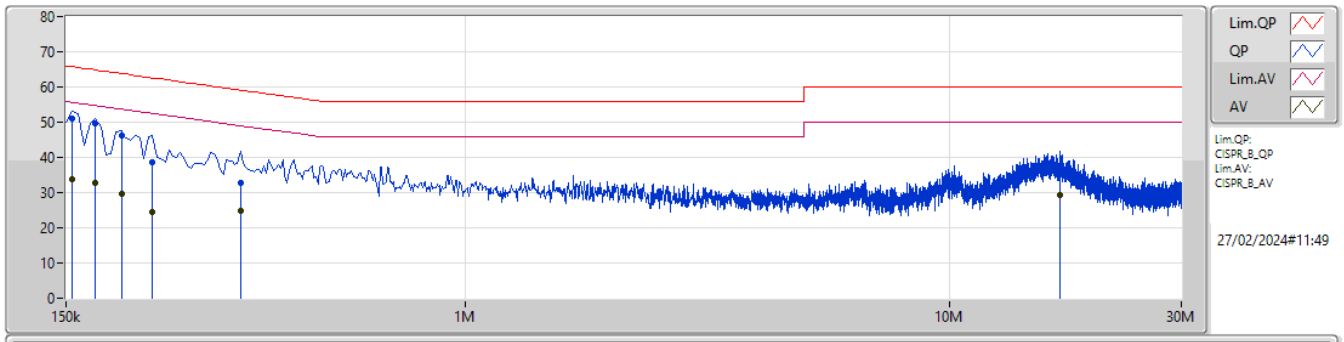
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	QP	150k	52.13	66.00	-13.87	Line

Mode 1



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	150k	52.13	66.00	-13.87	9.98	Line	"Worst"	42.15	0.09	0.02	9.87
AV	150k	35.65	56.00	-20.35	9.98	Line	-	25.67	0.09	0.02	9.87
QP	163.5k	48.81	65.27	-16.46	9.97	Line	-	38.84	0.09	0.02	9.86
AV	163.5k	30.58	55.27	-24.69	9.97	Line	-	20.61	0.09	0.02	9.86
QP	190.5k	43.00	64.01	-21.01	9.95	Line	-	33.05	0.08	0.02	9.85
AV	190.5k	27.60	54.01	-26.41	9.95	Line	-	17.65	0.08	0.02	9.85
QP	226.5k	38.95	62.58	-23.63	9.96	Line	-	28.99	0.08	0.02	9.86
AV	226.5k	24.96	52.58	-27.62	9.96	Line	-	15.00	0.08	0.02	9.86
QP	253.5k	37.52	61.64	-24.12	9.96	Line	-	27.56	0.08	0.02	9.86
AV	253.5k	25.55	51.64	-26.09	9.96	Line	-	15.59	0.08	0.02	9.86
QP	16.517M	34.79	60.00	-25.21	10.46	Line	-	24.33	0.29	0.20	9.97
AV	16.517M	27.93	50.00	-22.07	10.46	Line	-	17.47	0.29	0.20	9.97

Mode 1



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	154.5k	51.11	65.75	-14.64	9.95	Neutral	"Worst"	41.16	0.07	0.02	9.86
AV	154.5k	33.94	55.75	-21.81	9.95	Neutral	-	23.99	0.07	0.02	9.86
QP	172.5k	49.64	64.83	-15.19	9.95	Neutral	-	39.69	0.07	0.02	9.86
AV	172.5k	32.77	54.83	-22.06	9.95	Neutral	-	22.82	0.07	0.02	9.86
QP	195k	46.04	63.82	-17.78	9.94	Neutral	-	36.10	0.07	0.02	9.85
AV	195k	29.62	53.82	-24.20	9.94	Neutral	-	19.68	0.07	0.02	9.85
QP	226.5k	38.60	62.58	-23.98	9.95	Neutral	-	28.65	0.07	0.02	9.86
AV	226.5k	24.57	52.58	-28.01	9.95	Neutral	-	14.62	0.07	0.02	9.86
QP	343.5k	32.60	59.12	-26.52	9.97	Neutral	-	22.63	0.07	0.02	9.88
AV	343.5k	24.74	49.12	-24.38	9.97	Neutral	-	14.77	0.07	0.02	9.88
QP	16.814M	36.27	60.00	-23.73	10.45	Neutral	-	25.82	0.27	0.20	9.98
AV	16.814M	29.32	50.00	-20.68	10.45	Neutral	-	18.87	0.27	0.20	9.98

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
Zigbee	1.639M	2.211M	2M21G1D	1.058M	2.152M

Max-N dB = Maximum 6dB down bandwidth; Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth; Min-OBW = Minimum 99% occupied bandwidth

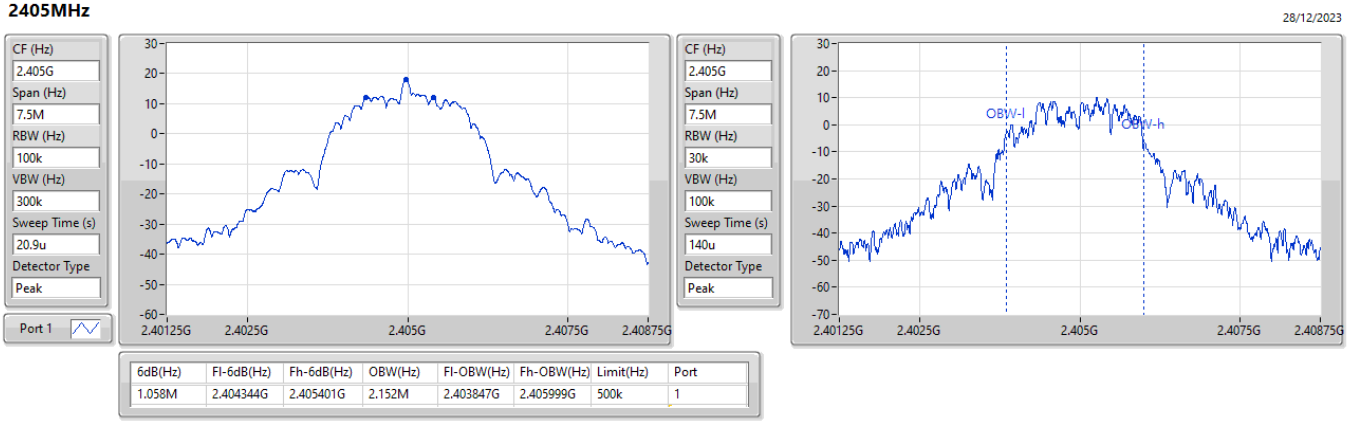
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
Zigbee	-	-	-	-
2405MHz	Pass	500k	1.058M	2.152M
2440MHz	Pass	500k	1.639M	2.208M
2480MHz	Pass	500k	1.451M	2.211M

Port X-N dB = Port X 6dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth

2.4-2.4835GHz_Zigbee **EBW**

2405MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.058M	2.404344G	2.405401G	2.152M	2.403847G	2.405999G	500k	1

2.4-2.4835GHz_Zigbee **EBW**

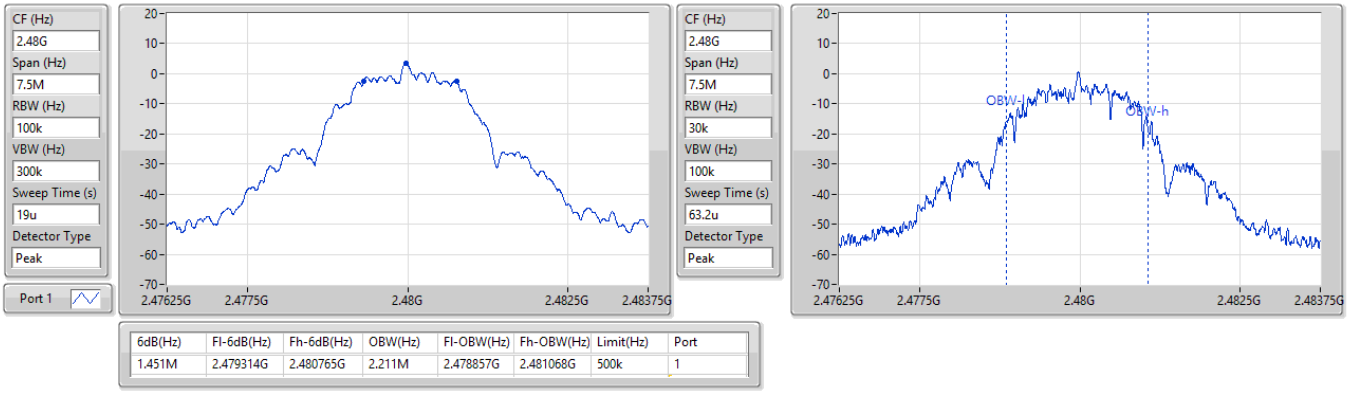
2440MHz

6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.639M	2.439171G	2.44081G	2.208M	2.438845G	2.441054G	500k	1

2.4-2.4835GHz_Zigbee **EBW**

2480MHz

19/01/2024



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.451M	2.479314G	2.480765G	2.211M	2.478857G	2.481068G	500k	1

Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
Zigbee	19.12	0.08166

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)
Zigbee	-	-	-	-	-
2405MHz	Pass	5.60	19.05	19.05	30.00
2440MHz	Pass	5.60	19.12	19.12	30.00
2475MHz	Pass	5.60	18.67	18.67	30.00
2480MHz	Pass	5.60	5.71	5.71	30.00

DG = Directional Gain; Port X = Port X output power

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
Zigbee	4.83

RBW = 3kHz;

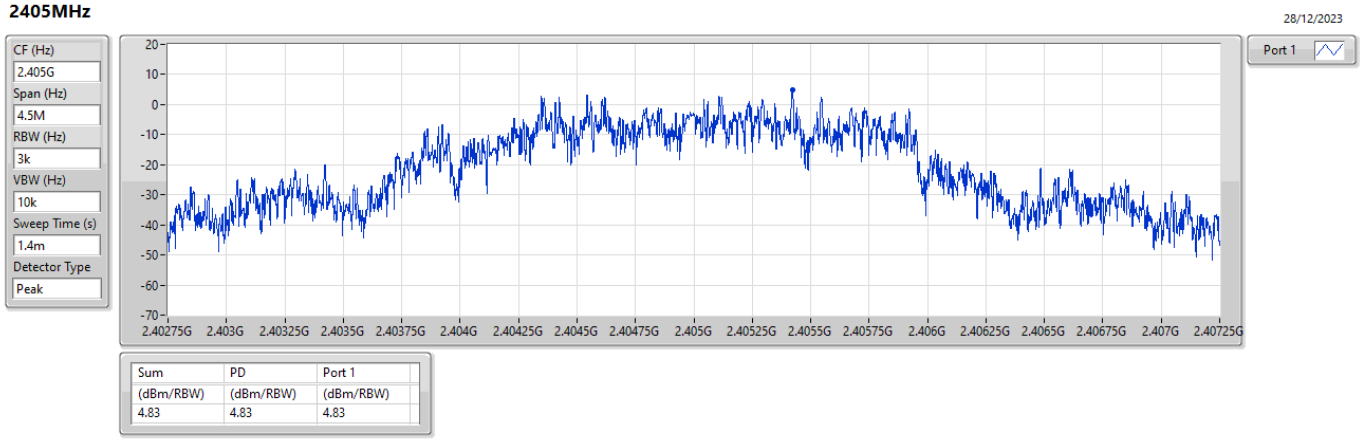
Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
Zigbee	-	-	-	-	-
2405MHz	Pass	5.60	4.83	4.83	8.00
2440MHz	Pass	5.60	4.12	4.12	8.00
2480MHz	Pass	5.60	-9.00	-9.00	8.00

DG = Directional Gain; RBW = 3kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;

2.4-2.4835GHz_Zigbee **PSD**

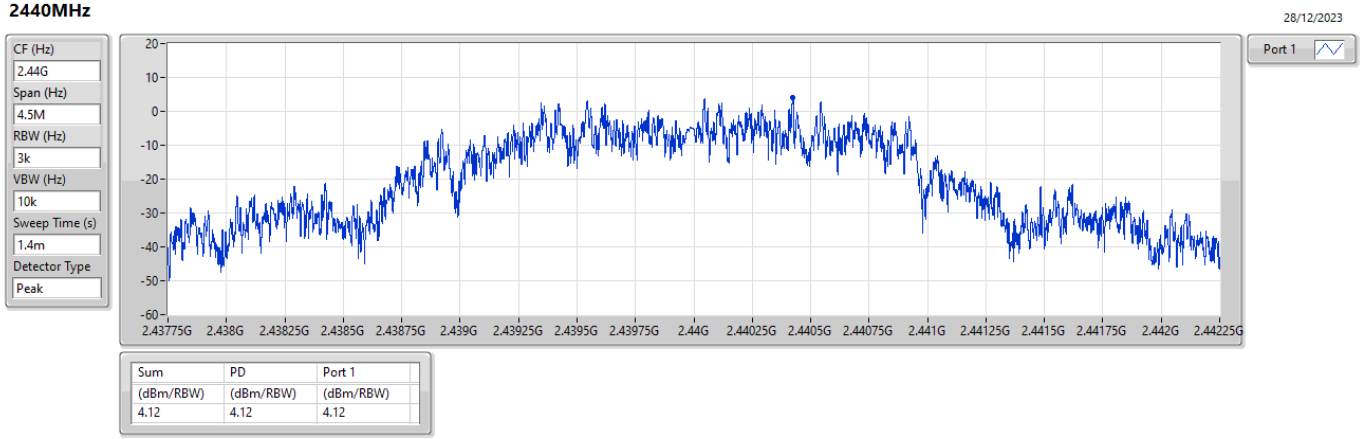
2405MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
4.83	4.83	4.83

2.4-2.4835GHz_Zigbee **PSD**

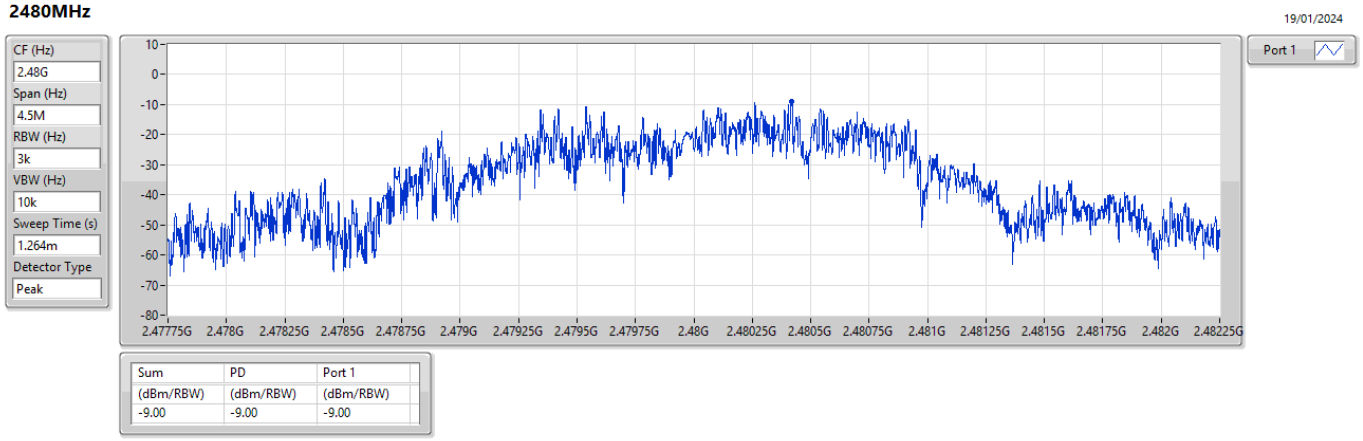
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
4.12	4.12	4.12

2.4-2.4835GHz_Zigbee **PSD**

2480MHz



Summary

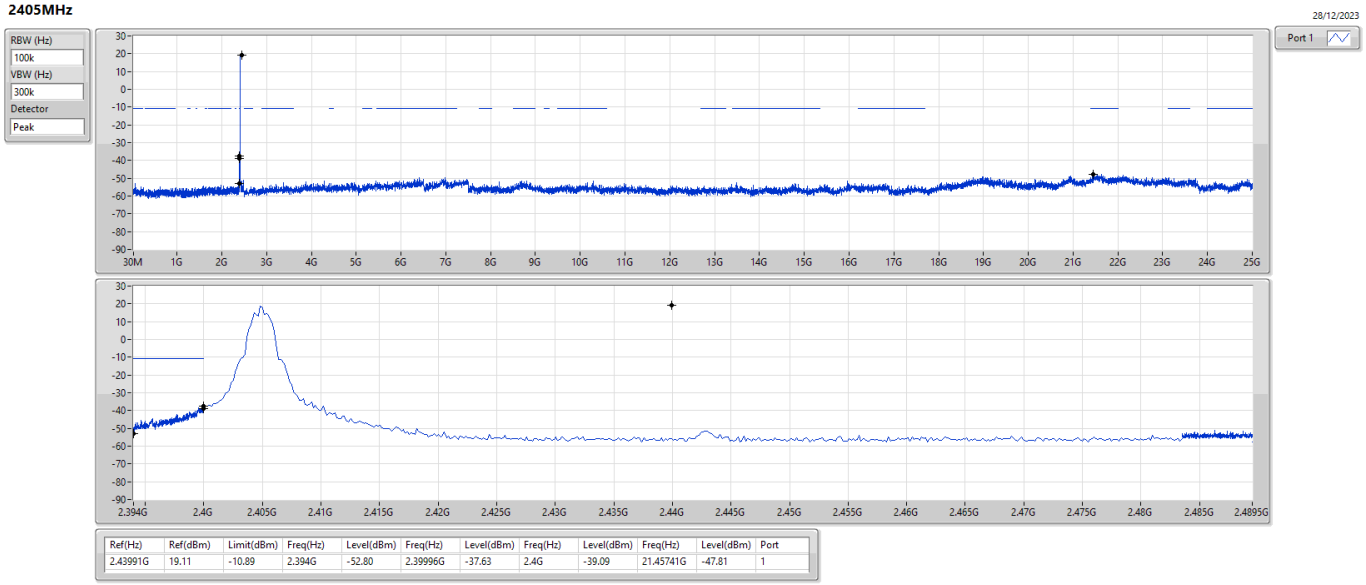
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	2.43991G	19.11	-10.89	2.394G	-52.80	2.39996G	-37.63	2.4G	-39.09	21.45741G	-47.81	1

Result

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
Zigbee	-	-	-	-	-	-	-	-	-	-	-	-	-
2405MHz	Pass	2.43991G	19.11	-10.89	2.394G	-52.80	2.39996G	-37.63	2.4G	-39.09	21.45741G	-47.81	1
2440MHz	Pass	2.43991G	19.11	-10.89	2.394G	-53.58	2.39849G	-51.86	2.4G	-56.72	21.47992G	-47.25	1
2480MHz	Pass	2.43991G	19.11	-10.89	1.6387G	-53.57	2.39556G	-52.15	2.4G	-56.50	21.62905G	-46.52	1

2.4-2.4835GHz_Zigbee CSENdB

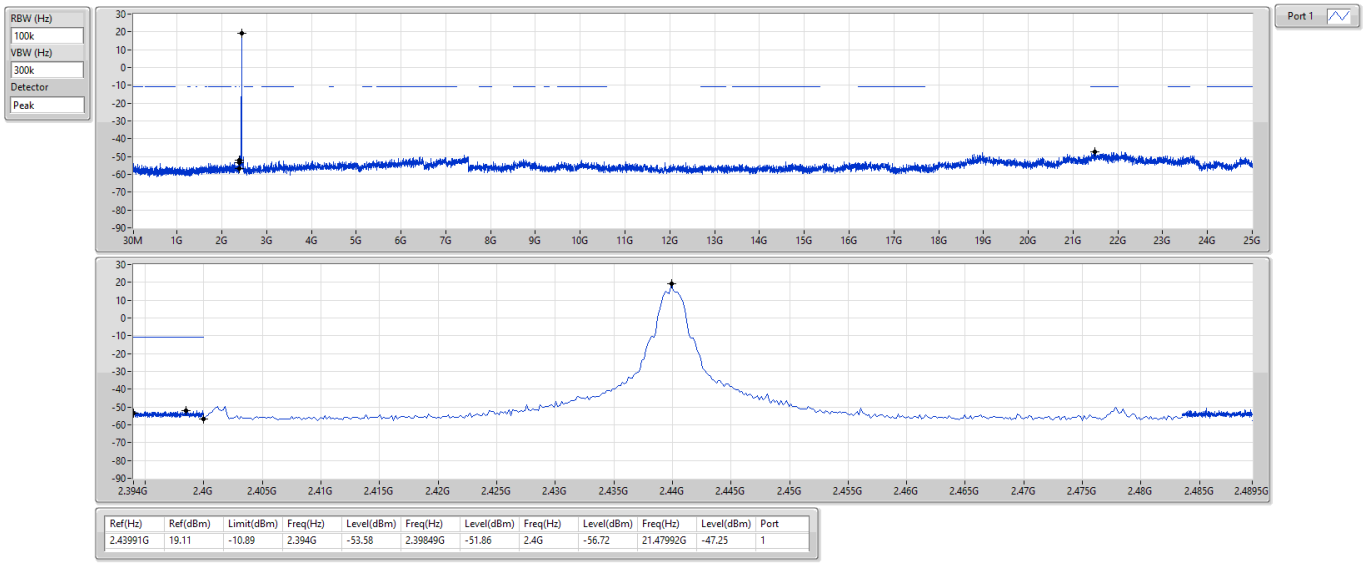
2405MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43991G	19.11	-10.89	2.394G	-52.80	2.39996G	-37.63	2.4G	-39.09	21.45741G	-47.81	1

2.4-2.4835GHz_Zigbee CSENdB

2440MHz

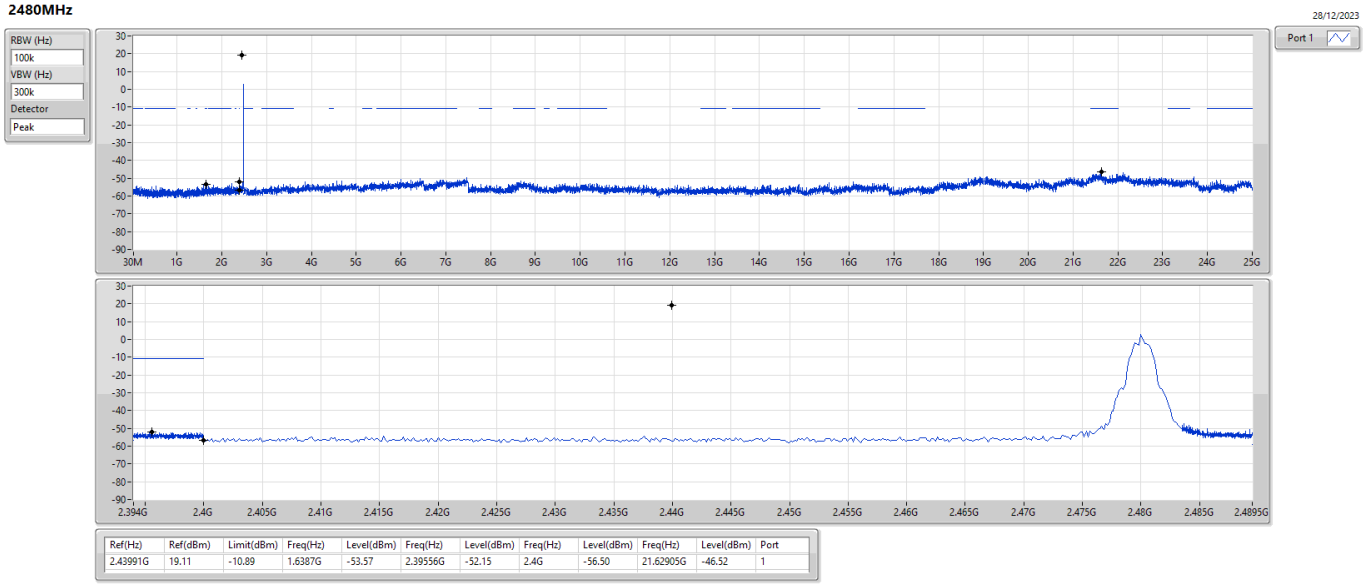


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43991G	19.11	-10.89	2.394G	-53.58	2.39849G	-51.86	2.4G	-56.72	21.47992G	-47.25	1

2.4-2.4835GHz_Zigbee

CSENdB

2480MHz

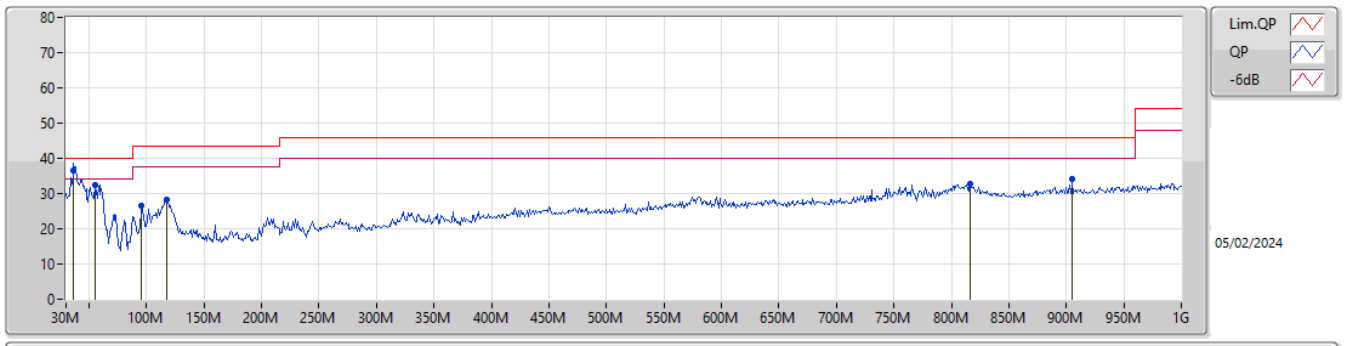


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.43991G	19.11	-10.89	1.6387G	-53.57	2.39556G	-52.15	2.4G	-56.50	21.62905G	-46.52	1

Summary

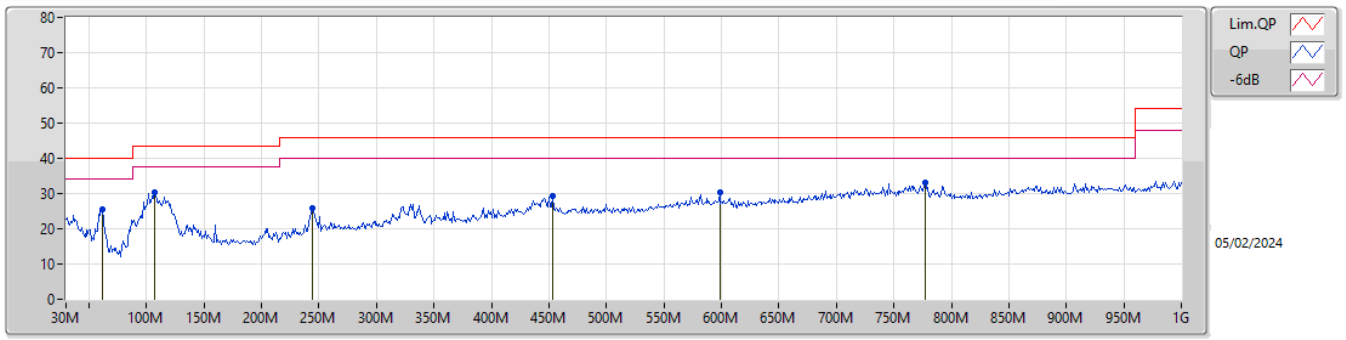
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 3	Pass	QP	36.79M	36.63	40.00	-3.37	Vertical

Mode 3



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	36.79M	36.63	40.00	-3.37	-10.10	3	Vertical	24	1.00	"Worst"	46.73	20.49	1.12	31.71
PK	55.22M	32.44	40.00	-7.56	-17.70	3	Vertical	318	1.50	-	50.14	12.85	1.33	31.88
PK	95.96M	26.62	43.50	-16.88	-14.11	3	Vertical	84	1.50	-	40.73	16.15	1.73	31.99
PK	117.3M	28.21	43.50	-15.29	-11.84	3	Vertical	180	1.00	-	40.05	18.22	1.91	31.97
PK	816.67M	32.84	46.00	-13.16	-1.49	3	Vertical	360	1.25	-	34.33	25.65	5.49	32.63
PK	904.94M	34.15	46.00	-11.85	-0.22	3	Vertical	0	1.50	-	34.37	26.39	5.85	32.46

Mode 3



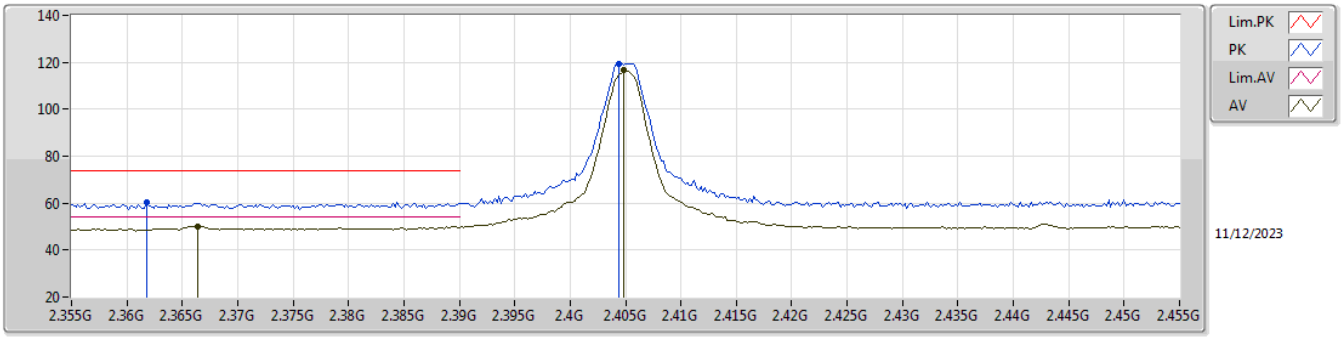
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	62.01M	25.50	40.00	-14.50	-18.35	3	Horizontal	93	3.00	-	43.85	12.17	1.41	31.93
PK	106.63M	30.26	43.50	-13.24	-12.44	3	Horizontal	249	3.00	-	42.70	17.70	1.81	31.95
PK	244.37M	25.75	46.00	-20.25	-11.54	3	Horizontal	130	1.25	-	37.29	17.71	2.79	32.04
PK	452.92M	29.32	46.00	-16.68	-5.83	3	Horizontal	63	2.00	-	35.15	22.55	3.95	32.33
PK	598.42M	30.47	46.00	-15.53	-3.56	3	Horizontal	140	1.50	-	34.03	24.37	4.60	32.53
PK	776.9M	33.19	46.00	-12.81	-1.74	3	Horizontal	100	1.25	"Worst"	34.93	25.55	5.34	32.63

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	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	AV	2.4835G	53.60	54.00	-0.40	3	Vertical	327	2.54	-

2.4-2.4835GHz_Zigbee

2405MHz_TX

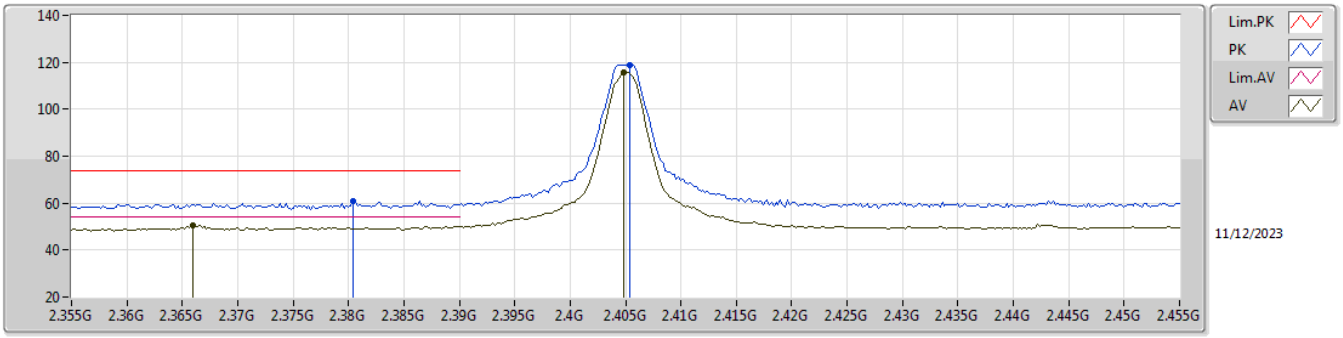


EUT X_1TX
Setting 200
01-K-Y-1

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	2.3618G	60.20	74.00	-13.80	28.25	3	Vertical	326	1.02	-	27.34	4.61	-
AV	2.3664G	50.17	54.00	-3.83	18.12	3	Vertical	326	1.02	-	27.43	4.62	-
PK	2.4044G	119.49	Inf	-Inf	87.23	3	Vertical	326	1.02	-	27.59	4.67	-
AV	2.4048G	116.69	Inf	-Inf	84.42	3	Vertical	326	1.02	-	27.60	4.67	-

2.4-2.4835GHz_Zigbee

2405MHz_TX

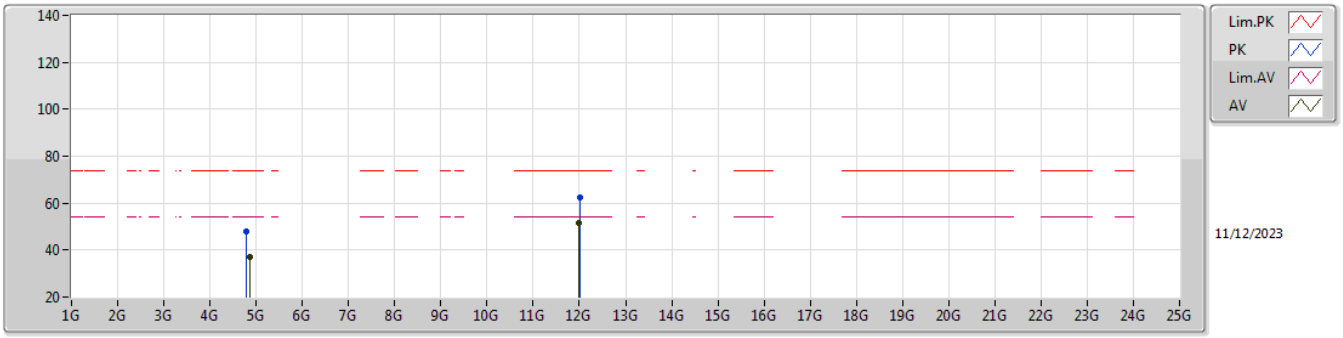


EUT X_1TX
Setting 200
01-K-Y-1

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	2.3804G	61.10	74.00	-12.90	28.86	3	Horizontal	359	2.88	-	27.60	4.64	-
AV	2.366G	50.58	54.00	-3.42	18.54	3	Horizontal	359	2.88	-	27.42	4.62	-
PK	2.4054G	118.89	Inf	-Inf	86.61	3	Horizontal	359	2.88	-	27.61	4.67	-
AV	2.4048G	115.91	Inf	-Inf	83.64	3	Horizontal	359	2.88	-	27.60	4.67	-

2.4-2.4835GHz_Zigbee

2405MHz_TX

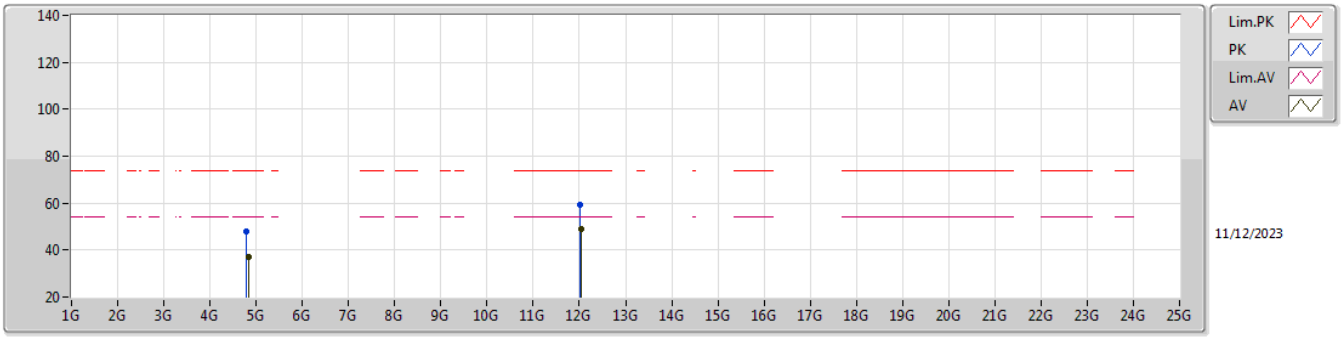


EUT X_1TX
Setting 200
01-K-Y-1

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	4.7968G	48.09	74.00	-25.91	41.74	3	Vertical	0	1.00	-	32.41	6.91	32.97
AV	4.854G	37.15	54.00	-16.85	30.53	3	Vertical	0	1.00	-	32.62	6.96	32.96
PK	12.0023G	62.32	74.00	-11.68	45.15	3	Vertical	5	2.25	-	38.50	11.12	32.45
AV	12.0003G	51.63	54.00	-2.37	34.46	3	Vertical	5	2.25	-	38.50	11.12	32.45

2.4-2.4835GHz_Zigbee

2405MHz_TX

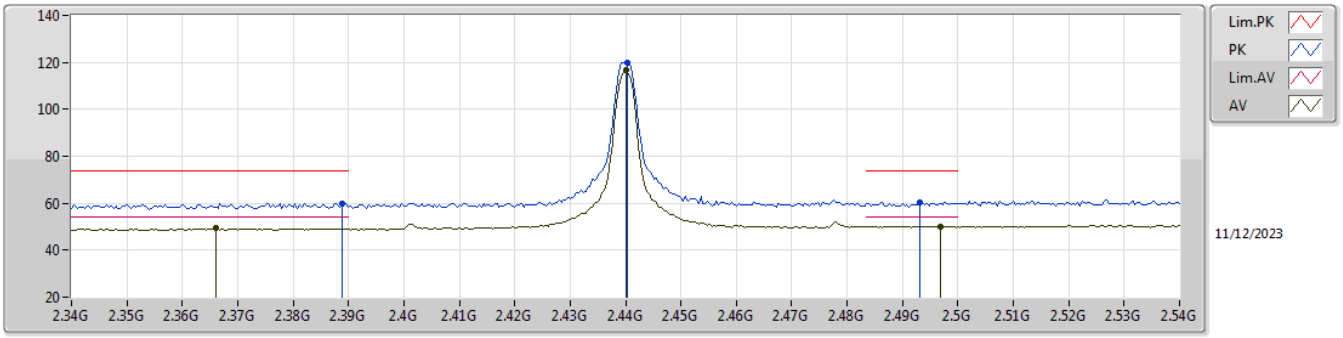


EUT X_1TX
Setting 200
01-K-Y-1

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	4.7972G	48.11	74.00	-25.89	41.76	3	Horizontal	60	1.80	-	32.41	6.91	32.97
AV	4.843G	37.18	54.00	-16.82	30.62	3	Horizontal	60	1.80	-	32.57	6.95	32.96
PK	12.0096G	59.15	74.00	-14.85	41.95	3	Horizontal	306	1.80	-	38.52	11.12	32.44
AV	12.0463G	48.74	54.00	-5.26	31.42	3	Horizontal	306	1.80	-	38.59	11.14	32.41

2.4-2.4835GHz_Zigbee

2440MHz_TX

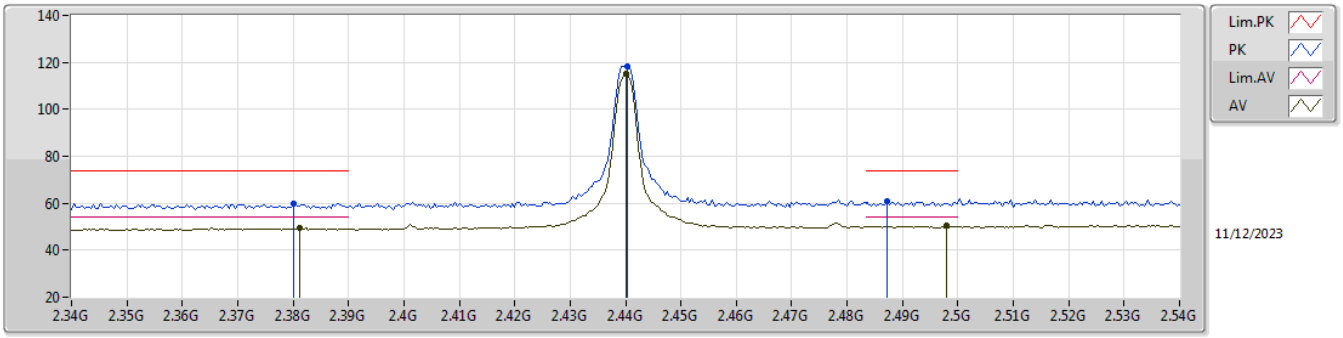


EUT X_1TX
Setting 200
01-K-Y-1

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	2.3888G	60.06	74.00	-13.94	27.90	3	Vertical	324	2.52	-	27.51	4.65	-
AV	2.366G	49.27	54.00	-4.73	17.23	3	Vertical	324	2.52	-	27.42	4.62	-
PK	2.4404G	119.94	Inf	-Inf	87.60	3	Vertical	324	2.52	-	27.70	4.64	-
AV	2.44G	116.49	Inf	-Inf	84.15	3	Vertical	324	2.52	-	27.70	4.64	-
PK	2.4932G	60.56	74.00	-13.44	28.04	3	Vertical	324	2.52	-	27.93	4.59	-
AV	2.4968G	50.19	54.00	-3.81	17.63	3	Vertical	324	2.52	-	27.97	4.59	-

2.4-2.4835GHz_Zigbee

2440MHz_TX

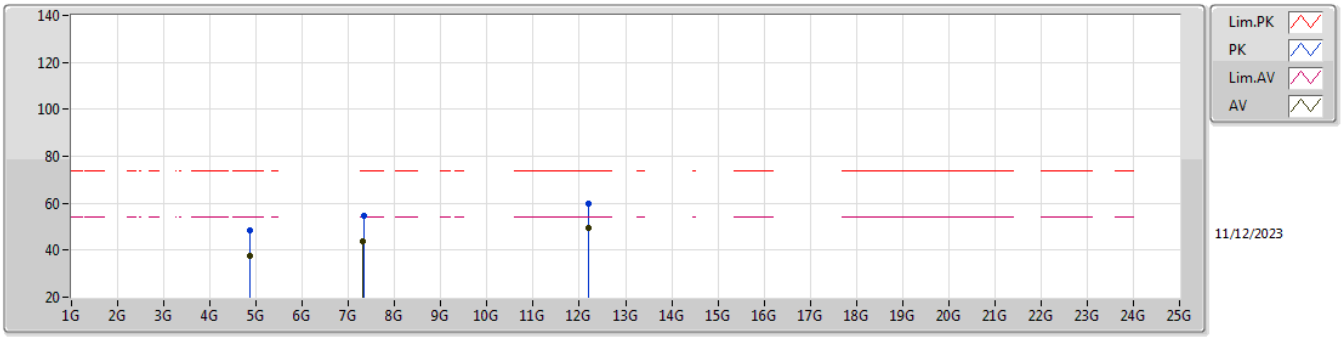


EUT X_1TX
Setting 200
01-K-Y-1

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	2.38G	60.06	74.00	-13.94	27.82	3	Horizontal	4	3.00	-	27.60	4.64	-
AV	2.3812G	49.44	54.00	-4.56	17.21	3	Horizontal	4	3.00	-	27.59	4.64	-
PK	2.4404G	118.49	Inf	-Inf	86.15	3	Horizontal	4	3.00	-	27.70	4.64	-
AV	2.44G	115.19	Inf	-Inf	82.85	3	Horizontal	4	3.00	-	27.70	4.64	-
PK	2.4872G	60.99	74.00	-13.01	28.52	3	Horizontal	4	3.00	-	27.87	4.60	-
AV	2.498G	50.44	54.00	-3.56	17.87	3	Horizontal	4	3.00	-	27.98	4.59	-

2.4-2.4835GHz_Zigbee

2440MHz_TX

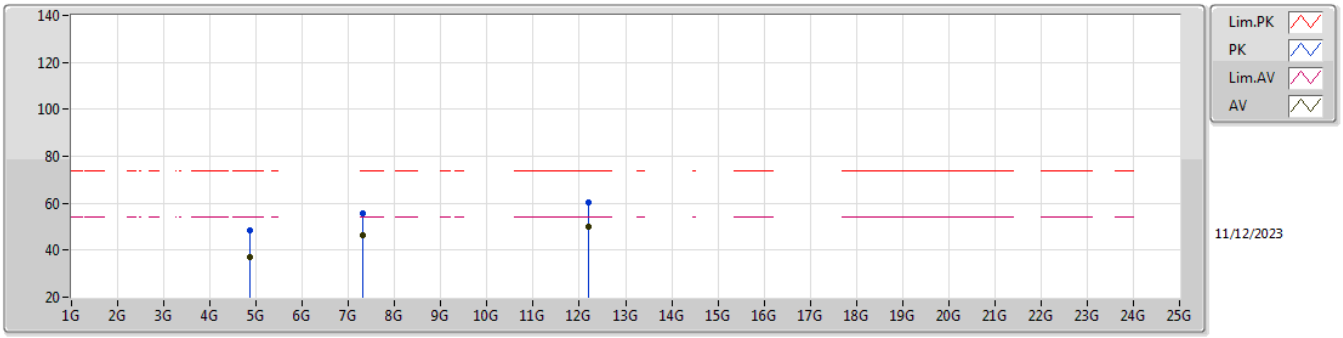


EUT X_1TX
Setting 200
01-K-Y-1

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	4.87118G	48.42	74.00	-25.58	41.72	3	Vertical	0	1.02	-	32.68	6.98	32.96
AV	4.86788G	37.48	54.00	-16.52	30.79	3	Vertical	0	1.02	-	32.67	6.98	32.96
PK	7.32954G	54.59	74.00	-19.41	41.63	3	Vertical	81	1.13	-	37.42	8.65	33.11
AV	7.3182G	43.88	54.00	-10.12	30.99	3	Vertical	81	1.13	-	37.37	8.63	33.11
PK	12.19676G	60.00	74.00	-14.00	42.58	3	Vertical	331	1.08	-	38.49	11.19	32.26
AV	12.1883G	49.50	54.00	-4.50	32.13	3	Vertical	331	1.08	-	38.45	11.19	32.27

2.4-2.4835GHz_Zigbee

2440MHz_TX

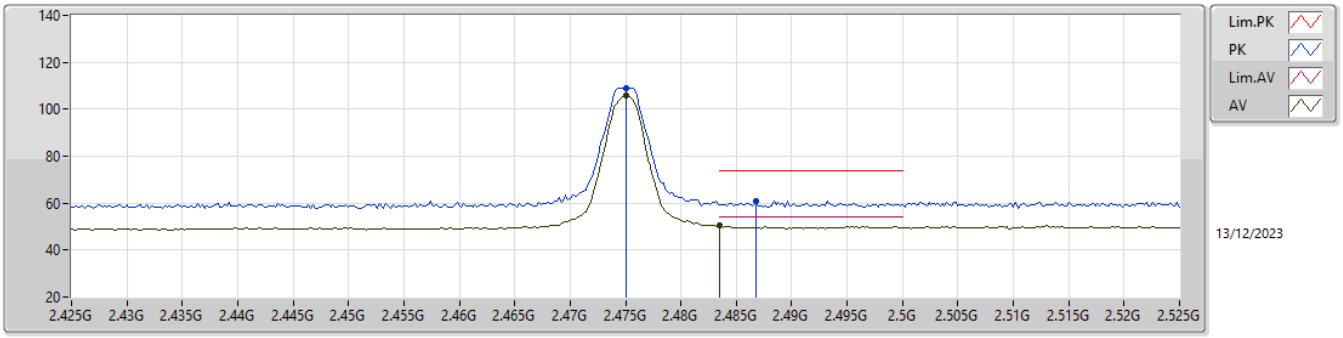


EUT X_1TX
Setting 200
01-K-Y-1

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	4.87382G	48.48	74.00	-25.52	41.76	3	Horizontal	232	1.15	-	32.70	6.98	32.96
AV	4.86608G	37.18	54.00	-16.82	30.50	3	Horizontal	232	1.15	-	32.66	6.98	32.96
PK	7.32156G	55.62	74.00	-18.38	42.70	3	Horizontal	335	1.80	-	37.39	8.64	33.11
AV	7.32162G	46.27	54.00	-7.73	33.35	3	Horizontal	335	1.80	-	37.39	8.64	33.11
PK	12.18866G	60.24	74.00	-13.76	42.87	3	Horizontal	299	1.80	-	38.45	11.19	32.27
AV	12.18584G	50.01	54.00	-3.99	32.65	3	Horizontal	299	1.80	-	38.44	11.19	32.27

2.4-2.4835GHz_Zigbee

2475MHz_TX

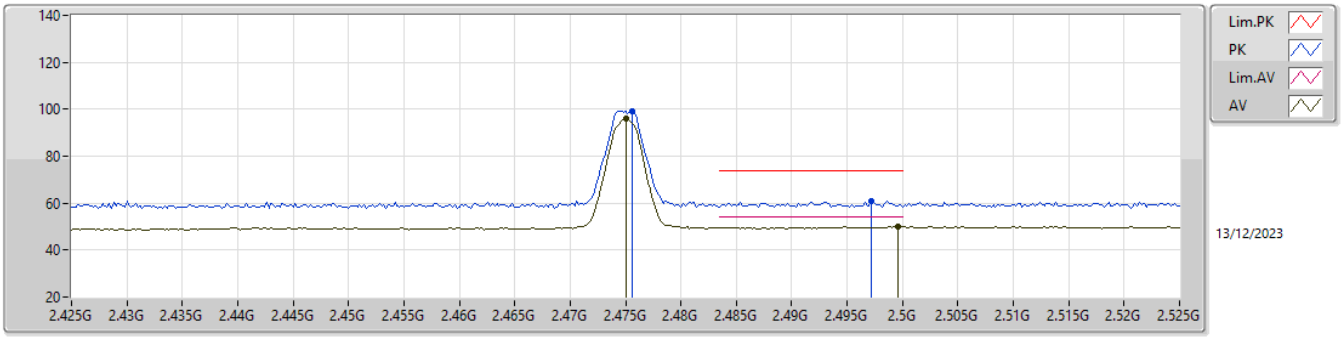


EUT X_1TX
Setting 200
01-K-J-8

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	2.475G	109.03	Inf	-Inf	76.67	3	Vertical	39	1.02	-	27.75	4.61	-
AV	2.475G	106.04	Inf	-Inf	73.68	3	Vertical	39	1.02	-	27.75	4.61	-
PK	2.4868G	60.91	74.00	-13.09	28.44	3	Vertical	39	1.02	-	27.87	4.60	-
AV	2.4835G	50.54	54.00	-3.46	18.10	3	Vertical	39	1.02	-	27.84	4.60	-

2.4-2.4835GHz_Zigbee

2475MHz_TX

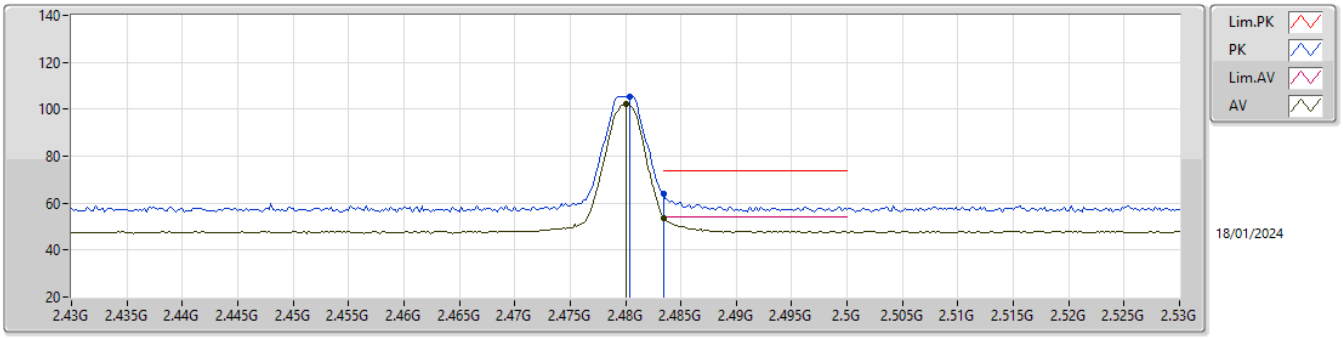


EUT X_1TX
Setting 200
01-K-J-8

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	2.4756G	99.01	Inf	-Inf	66.64	3	Horizontal	41	2.37	-	27.76	4.61	-
AV	2.475G	95.93	Inf	-Inf	63.57	3	Horizontal	41	2.37	-	27.75	4.61	-
PK	2.4972G	60.76	74.00	-13.24	28.20	3	Horizontal	41	2.37	-	27.97	4.59	-
AV	2.4996G	49.81	54.00	-4.19	17.22	3	Horizontal	41	2.37	-	28.00	4.59	-

2.4-2.4835GHz_Zigbee

2480MHz_TX

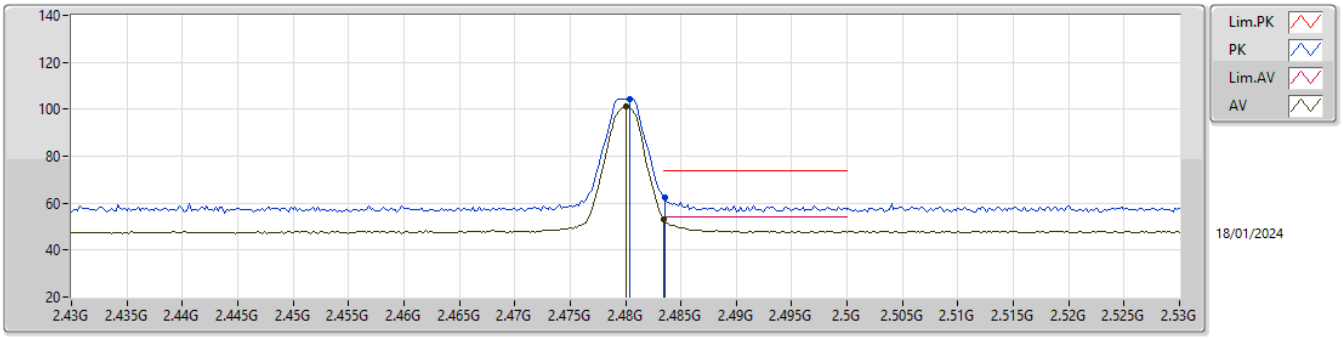


EUT X_1TX
Setting 70
03-R-M-2

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	2.4804G	105.39	Inf	-Inf	74.25	3	Vertical	327	2.54	-	27.50	3.64	-
AV	2.48G	102.34	Inf	-Inf	71.20	3	Vertical	327	2.54	-	27.50	3.64	-
PK	2.4835G	64.06	74.00	-9.94	32.92	3	Vertical	327	2.54	-	27.50	3.64	-
AV	2.4835G	53.60	54.00	-0.40	22.46	3	Vertical	327	2.54	-	27.50	3.64	-

2.4-2.4835GHz_Zigbee

2480MHz_TX

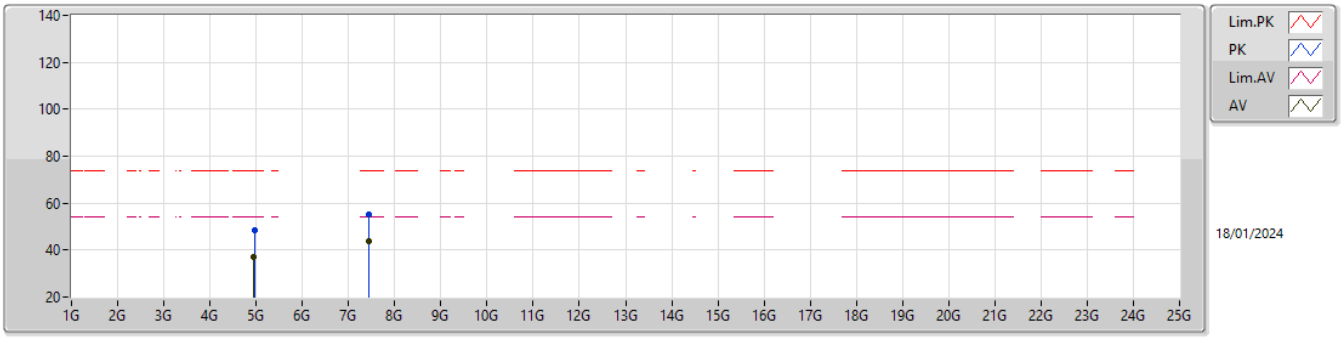


EUT X_1TX
Setting 70
03-R-M-2

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	2.4804G	104.48	Inf	-Inf	73.34	3	Horizontal	-0	2.74	-	27.50	3.64	-
AV	2.48G	101.44	Inf	-Inf	70.30	3	Horizontal	-0	2.74	-	27.50	3.64	-
PK	2.4836G	62.49	74.00	-11.51	31.35	3	Horizontal	-0	2.74	-	27.50	3.64	-
AV	2.4835G	53.18	54.00	-0.82	22.04	3	Horizontal	-0	2.74	-	27.50	3.64	-

2.4-2.4835GHz_Zigbee

2480MHz_TX

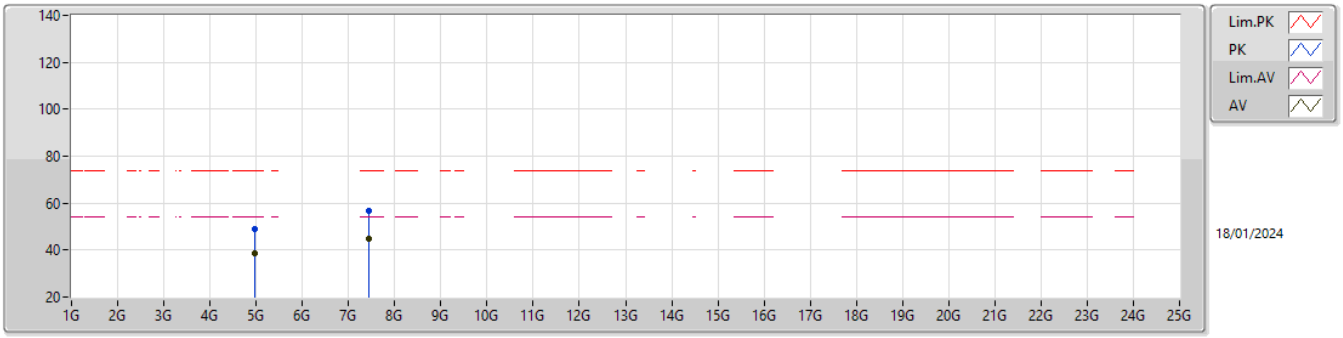


EUT X_1TX
Setting 70
03-R-M-2

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	4.9568G	48.56	74.00	-25.44	45.62	3	Vertical	312	2.79	-	31.53	6.21	34.80
AV	4.95586G	37.11	54.00	-16.89	34.19	3	Vertical	312	2.79	-	31.52	6.20	34.80
PK	7.43932G	55.38	74.00	-18.62	46.60	3	Vertical	357	1.54	-	36.40	7.69	35.31
AV	7.435G	43.56	54.00	-10.44	34.79	3	Vertical	357	1.54	-	36.40	7.68	35.31

2.4-2.4835GHz_Zigbee

2480MHz_TX



EUT X_1TX
Setting 70
03-R-M-2

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	4.9571G	49.12	74.00	-24.88	46.18	3	Horizontal	118	2.86	-	31.53	6.21	34.80
AV	4.95658G	38.52	54.00	-15.48	35.59	3	Horizontal	118	2.86	-	31.53	6.20	34.80
PK	7.4395G	56.81	74.00	-17.19	48.03	3	Horizontal	235	1.62	-	36.40	7.69	35.31
AV	7.43488G	44.62	54.00	-9.38	35.85	3	Horizontal	235	1.62	-	36.40	7.68	35.31