

FCC Radio Test Report

FCC ID : TVE-51018E01231

Equipment : Secured Wireless Access Point

Brand Name : FORTINET

Model Name : FortiAP 234Gxxxxxx, FAP-234Gxxxxxx,
FORTIAP-234Gxxxxxx (Where "x" can be used as
"A-Z", or "0-9", or "-", or blank for software changes
or marketing purposes only)

Applicant : Fortinet, Inc.
899 Kifer Road, Sunnyvale, CA 94086, USA

Manufacturer : Fortinet, Inc.
899 Kifer Road, Sunnyvale, CA 94086, USA

Standard : 47 CFR FCC Part 15.247

The product was received on Aug. 07, 2023, and testing was started from Aug. 17, 2023 and completed on Sep. 19, 2023. We, SPORTON INTERNATIONAL INC. Hsinhua 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. Hsinhua Laboratory, the test report shall not be reproduced except in full.


Approved by: Jackson Tsai

SPORTON INTERNATIONAL INC. Hsinhua Laboratory

No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



Table of Contents

HISTORY OF THIS TEST REPORT	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Information.....	5
1.2 Testing Applied Standards	9
1.3 Testing Location Information	9
1.4 Measurement Uncertainty	9
2 TEST CONFIGURATION OF EUT.....	10
2.1 Test Channel Mode	10
2.2 The Worst Case Measurement Configuration	11
2.3 Accessories	13
2.4 Support Equipment.....	13
2.5 Test Setup Diagram	14
3 TRANSMITTER TEST RESULT	16
3.1 AC Power-line Conducted Emissions	16
3.2 DTS Bandwidth.....	18
3.3 Maximum Conducted Output Power	19
3.4 Power Spectral Density	21
3.5 Emissions in Non-restricted Frequency Bands	22
3.6 Emissions in Restricted Frequency Bands.....	23
4 TEST EQUIPMENT AND CALIBRATION DATA	27
APPENDIX A. TEST RESULTS OF AC POWER-LINE CONDUCTED EMISSIONS	
APPENDIX B. TEST RESULTS OF DTS BANDWIDTH	
APPENDIX C. TEST RESULTS OF MAXIMUM CONDUCTED OUTPUT POWER	
APPENDIX D. TEST RESULTS OF POWER SPECTRAL DENSITY	
APPENDIX E. TEST RESULTS OF EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS	
APPENDIX F. TEST RESULTS OF EMISSIONS IN RESTRICTED FREQUENCY BANDS	
APPENDIX G. TEST RESULTS OF RADIATED EMISSION CO-LOCATION	
APPENDIX H. TEST PHOTOS	
PHOTOGRAPHS OF EUT V01	



History of this test report

[illegible]

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	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and explanations:

None

Reviewed by: Barry Hsiao

Report Producer: Amber 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	5	1

Note:.

- ♦ Zigbee uses a O-QPSK (250kbps) modulation for DSSS.
- ♦ BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Support
1	1	AWAN	7102A0613000	Cross Dipole	I-Pex	2.4G
2	2	AWAN	7102A0613000	Cross Dipole	I-Pex	2.4G
3	1	AWAN	7102A0651000	Cross Dipole	I-Pex	5G
4	2	AWAN	7102A0651000	Cross Dipole	I-Pex	5G
5	1	AWAN	7102A0651000	Cross Dipole	I-Pex	5G+6G
6	2	AWAN	7102A0651000	Cross Dipole	I-Pex	5G+6G
7	3	AWAN	7102A0650000	Cross Dipole	I-Pex	2.4G
8	4	AWAN	7102A0650000	Cross Dipole	I-Pex	2.4G
9	1	AWAN	7102A0614000	Dipole	I-Pex	BT&Zigbee
10	1	Quectel	7102A0652000	Patch	I-Pex	GPS

Gain (dBi)							Remark
Ant.	Port	2.4G	5G	6G	BT& Zigbee	GPS	
1	1	6.8	-	-	-	-	Radio 1
2	2	6.8	-	-	-	-	Radio 1
3	1	-	8.4	-	-	-	Radio 2
4	2	-	8.2	-	-	-	Radio 2
5	1	-	8.4	8.3	-	-	Radio 3
6	2	-	8.4	8.3	-	-	Radio 3
7	3	6.6	-	-	-	-	Radio 3
8	4	6.7	-	-	-	-	Radio 3
9	1	-	-	-	6.2	-	-
10	1	-	-	-	-	2	-

Note 1: The EUT has ten antennas.

For 2.4GHz function:

< Radio 1 >

For IEEE 802.11b/g/n/VHT/ax mode (2TX/2RX)

Ant.1 (port 1), Ant.2 (port 2) could transmit/receive simultaneously.

< Radio 3 >

For IEEE 802.11b/g/n/VHT/ax mode (2TX/2RX)

Ant.7 (port 3), Ant.8 (port 4) could transmit/receive simultaneously.

For 5GHz function:

< Radio 2 >

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

Ant.3 (port 1), Ant.4 (port 2) could transmit/receive simultaneously.

< Radio 3 >

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

Ant.5 (port 1), Ant.6 (port 2) could transmit/receive simultaneously.

For Bluetooth function:

For Bluetooth mode (1TX/1RX)

Only Ant.9 can be used as transmitting/receiving.

For GPS function:

For GPS mode (1RX)

Only Ant.10 can be used as receiving.

1.1.3 EUT Information

Operational Condition			
EUT Power Type	From PoE		
EUT Function	☒ Point-to-multipoint	☐ Point-to-point	
Type of EUT			
☒	Stand-alone		
☐	Combined (EUT where the radio part is fully integrated within another device)		
	Combined Equipment - Brand Name / Model No.:	...	
☐	Plug-in radio (EUT intended for a variety of host systems)		
	Host System - Brand Name / Model No.:	...	
☐	Other:		

1.1.4 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
Zigbee_Nss 1	1	0	n/a (DC≥0.98)	n/a (DC≥0.98)

Note. If DC < 0.98, the DCF was added while measuring Output power and PSD.

1.1.5 Table for Multiple Listing

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

Brand Name	Model Name	Description
FORTINET	FortiAP 234Gxxxxxx, FAP-234Gxxxxxx, FORTIAP-234Gxxxxxx (Where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only)	All the models are identical, the difference model served as marketing strategy.

1.2 Testing Applied Standards

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

- ♦ 47 CFR FCC Part 15
- ♦ ANSI C63.10-2013

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

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

1.3 Testing Location Information

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
☒ Hsinhua (TAF: 3785)	ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)			
	TEL: 886-3-327-3456		FAX: 886-3-327-0973	
Test site Designation No. TW3785 with FCC.				
Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
AC Conduction	CO04-HY	Ivan Chung	22.1~23.6°C / 53~58%	18/Sep/2023~19/Sep/2023
RF Conducted	TH07-HY	Xie Xun	24.2~25.1°C / 53~56%	17/Aug/2023
Radiated	03CH03-HY	Lego Lin	22.1~23.8°C / 55~59%	17/Aug/2023
☐ Wen 33rd.St. (TAF: 3785)	ADD: No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)			
	TEL: 886-3-318-0787		FAX: 886-3-318-0287	
Test site Designation No. TW0008 with FCC.				

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
AC Power-line Conducted Emissions	4.53 dB	Confidence levels of 95%
Bandwidth	3 MHz	Confidence levels of 95%
Maximum Conducted Output Power	2 dB	Confidence levels of 95%
Power Spectral Density	2 dB	Confidence levels of 95%
Emissions in Non-restricted Frequency Bands	0.14 dB	Confidence levels of 95%
Emissions in Restricted Frequency Bands	4.8 dB	Confidence levels of 95%
Temperature	0.41 °C	Confidence levels of 95%
Humidity	3.4 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Test Software	DOS
---------------	-----

Mode	Power Setting
Zigbee	-
2405MHz	100
2440MHz	100
2475MHz	100
2480MHz	82

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	CTX
1	PoE Mode

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
1	PoE Mode
Operating Mode > 1GHz	CTX
Orthogonal Planes of EUT	Y Plane
	
Worst Planes of EUT	V



The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis
Operating Mode	CTX
1	Radio 1:2.4G+ Radio 2:5G+ Radio 3:2.4G+ BT
2	Radio 1:2.4G+ Radio 2:5G+ Radio 3:5G+ BT
3	Radio 1:2.4G+ Radio 2:5G+ Radio 3:2.4G+ Zigbee
4	Radio 1:2.4G+ Radio 2:5G+ Radio 3:5G+ Zigbee
5	Radio 1:2.4G+ (Radio 2:5G Low Band+ Radio 3:5G High Band)+ BT
6	Radio 1:2.4G+ (Radio 2:5G Low Band+ Radio 3:5G High Band)+ Zigbee
Refer to Sporton Test Report No.: FA380143 for Co-location RF Exposure Evaluation and Appendix G for Radiated Emission Co-location.	

2.3 Accessories

Accessories				
AC Cord	Brand Name	I-SHENG	Model Name	AC CORD 600mm
	Signal Line	0.5 meter, shielded cable, w/o ferrite core		
PoE Adapter	Brand Name	Senao Inc.	Model Name	EPA5006GPR-SN(4P)
	Power Rating	I/P: 100-240 Vdc, 0.8A, 50-60 Hz O/P: 54 Vdc, 0.6 A		
BRACKET POLE MOUNT	Brand Name	CUN SHENG	Model Name	BRACKET POLE MOUNT LFP
BRACKET WALL MOUNT	Brand Name	XIERTEK	Model Name	BRACKET WALL MOUNT
Pole Mount Bracket	Brand Name	CUN SHENG	Model Name	6301A2873010
Ground Wire	Brand Name	BO YAO	Model Name	WIRE GEN AWG10 180cm
	Signal Line	1.8 meter, shielded cable, w/o ferrite core		

Reminder: Regarding to more detail and other information, please refer to user manual.

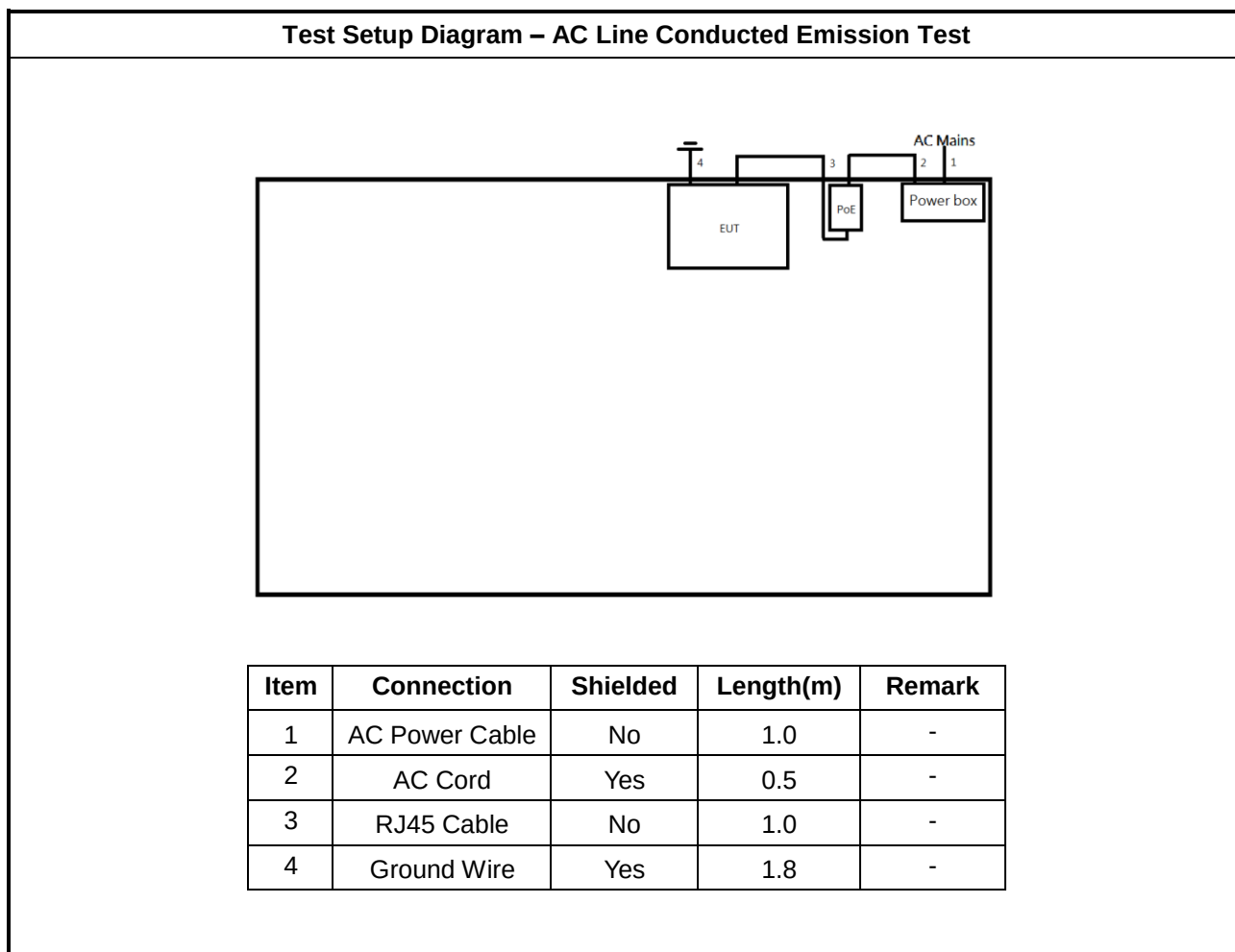
2.4 Support Equipment

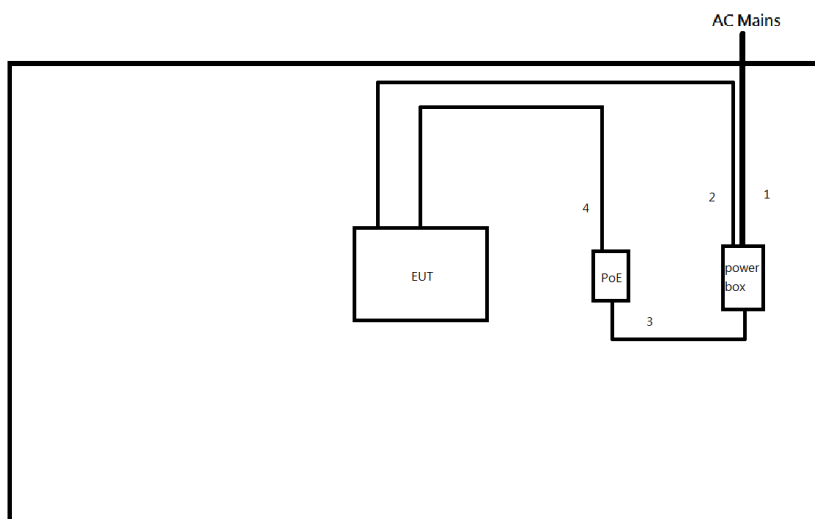
Support Equipment – AC Conduction					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	RJ45 cable	Power Sync	CAT-6E-01	-	-

Support Equipment – Conducted					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	Notebook	DELL	E5410	-	-
2	Adapter for NB	DELL	HA65NM130	-	-

Support Equipment – Radiated					
No.	Equipment	Brand Name	Model Name	FCC ID	Remark
1	RJ45 cable	Power Sync	CAT-6E-01	-	-

2.5 Test Setup Diagram



Test Setup Diagram - Radiated Test


Item	Connection	Shielded	Length(m)	Remark
1	AC Power Cable	No	1.8	-
2	Ground Wire	Yes	1.8	-
3	AC Cord	Yes	0.5	-
4	RJ45 Cable	No	1.0	-

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

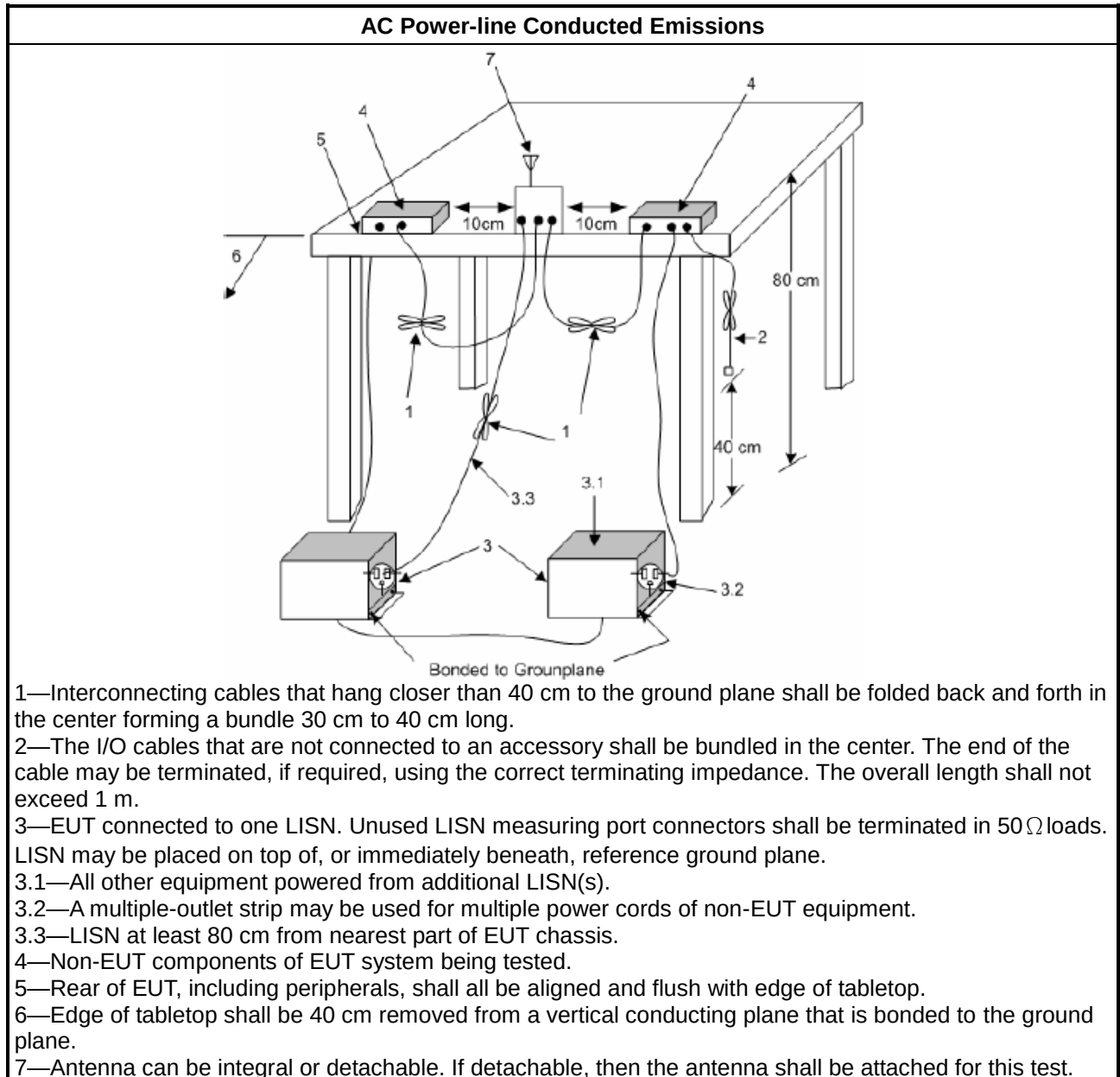
Test Method
☒ Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

3.1.4 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Raw(Read Level) + LISN(LISN Factor) + CL(Cable Loss) + AT(Attenuator).

3.1.5 Test Setup



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 $\geq$ 500 kHz.

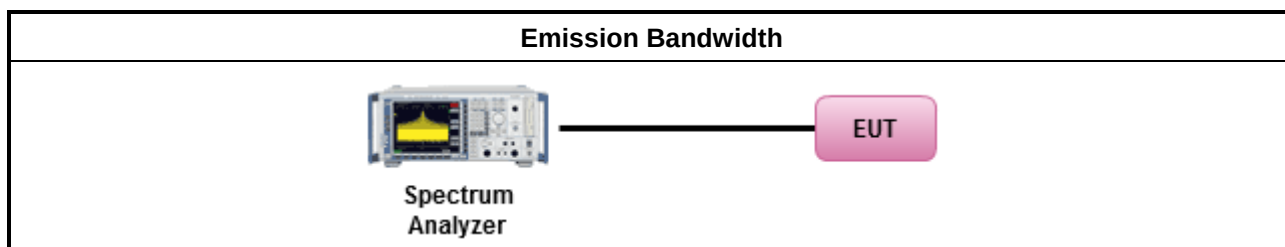
3.2.2 Measuring Instruments

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 KDB 558074, clause 8.2 (11.8 of ANSI C63.10) DTS bandwidth measurement.
☐	Refer as RSS-Gen, clause 6.7 for occupied bandwidth testing.
☐	Refer as ANSI C63.10, clause 6.9.3 for occupied bandwidth testing.

3.2.4 Test Setup



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
e.i.r.p. Power Limit:	
	2400-2483.5 MHz Band
	Point-to-multipoint systems (P2M): $P_{eirp} \leq 36$ dBm (4 W)
	Point-to-point systems (P2P): $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX}])$ dBm
	Smart antenna system (SAS)
	- Single beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	- Overlap beam: $P_{eirp} \leq \text{MAX}(36, P_{Out} + G_{TX})$ dBm
	- Aggregate power on all beams: $P_{eirp} \leq \text{MAX}(36, [P_{Out} + G_{TX} + 8])$ 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.	

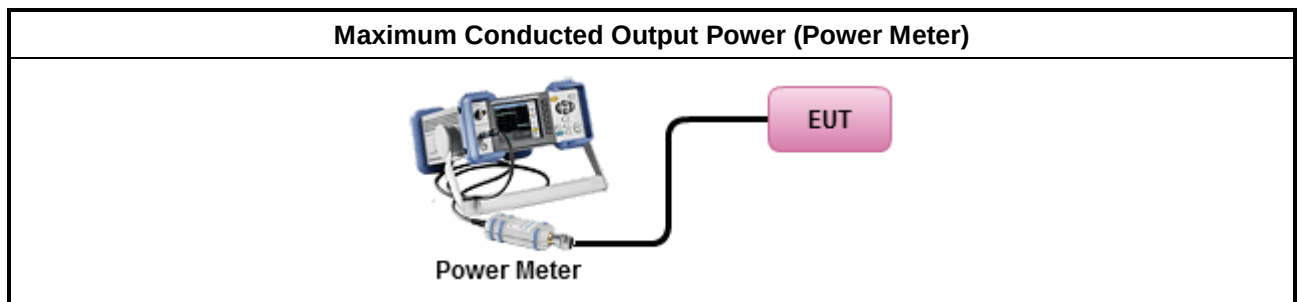
3.3.2 Measuring Instruments

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 KDB 558074, clause 8.3.1.1 (11.9.1.1 of ANSI C63.10) RBW ≥ EBW method.
☐	Refer as KDB 558074, clause 8.3.1.2 (11.9.1.2 of ANSI C63.10) integrated band power method.
☐	Refer as KDB 558074, clause 8.3.1.3 (11.9.1.3 of ANSI C63.10) peak power meter.
Maximum Average Conducted Output Power	
☐	Refer as KDB 558074, clause 8.3.2.2 (11.9.2.2 of ANSI C63.10) using a spectrum analyzer.
☒	Refer as KDB 558074, clause 8.3.2.3 (11.9.2.3 of ANSI C63.10) using a power meter.
For conducted measurement.	
If the EUT supports multiple transmit chains using options given below: Refer as 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: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$	

3.3.4 Test Setup



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

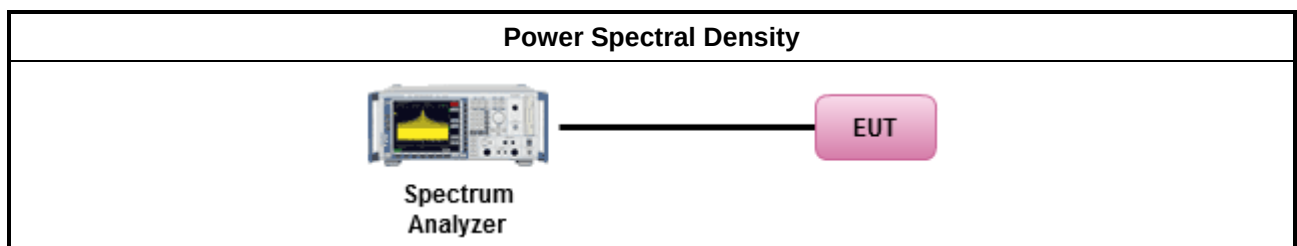
3.4.2 Measuring Instruments

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 KDB 558074, clause 8.4 (11.10 of ANSI C63.10) Max. PSD.
▪	For conducted measurement.
▪	If The EUT supports multiple transmit chains using options given below:
▪	Measure and sum the spectra across the outputs. Refer as 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.

3.4.4 Test Setup



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 (dB)
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 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 level.	

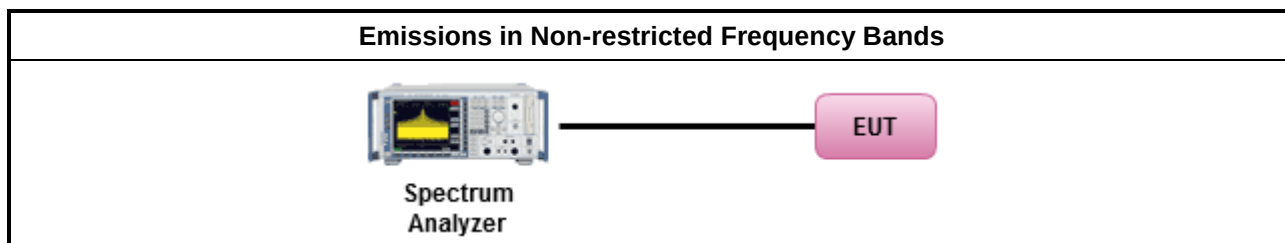
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

Test Method
Refer as KDB 558074, clause 8.5 (11.11 of ANSI C63.10) for non-restricted frequency bands.

3.5.4 Test Setup



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

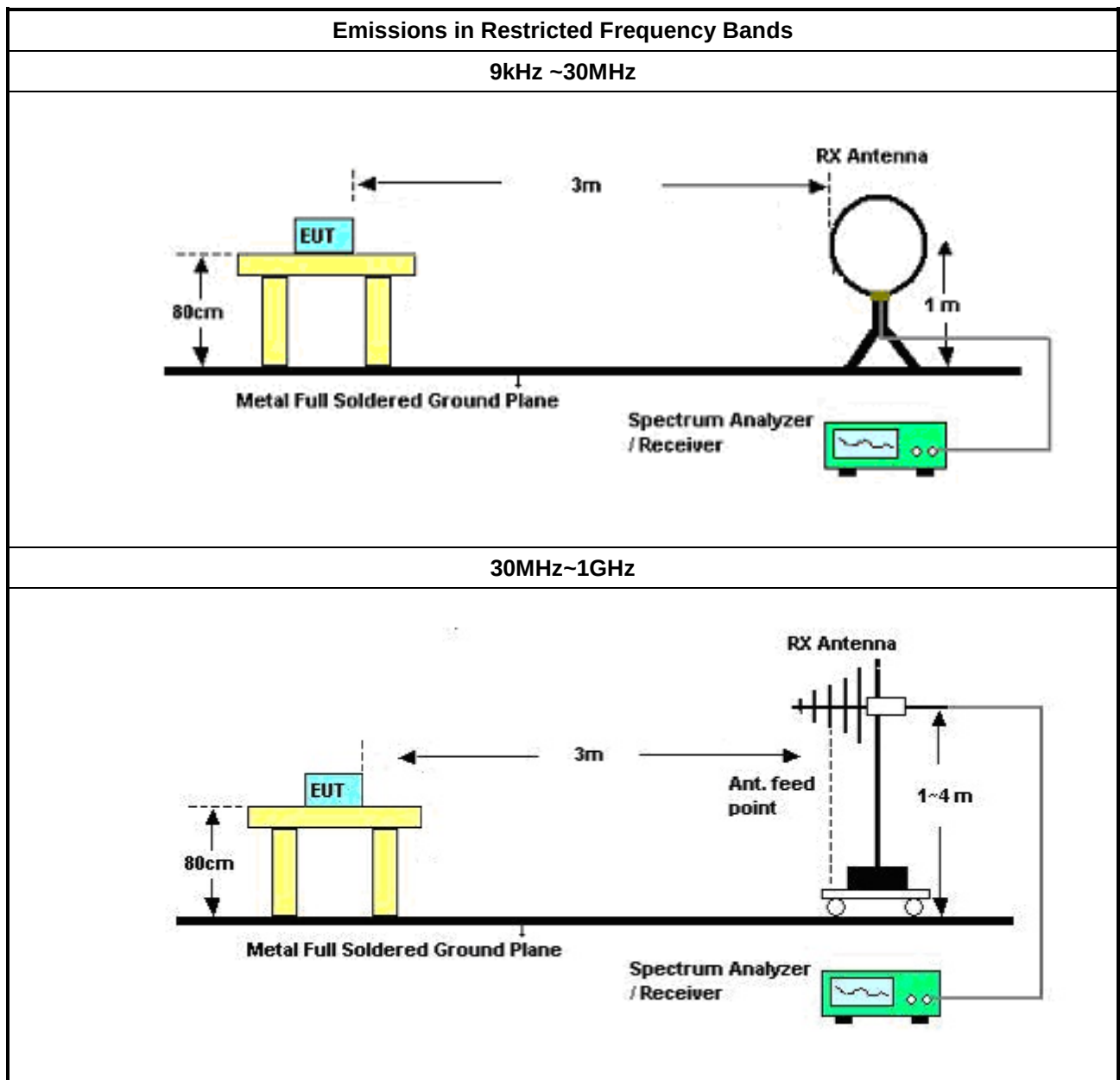
Test Method	
The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].	
Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.	
For the transmitter unwanted emissions shall be measured using following options below:	
	Refer as KDB 558074, clause 8.6 (11.12 of ANSI C63.10) for restricted frequency bands.
For the transmitter band-edge emissions shall be measured using following options below:	
	Refer as KDB 558074 clause 8.7.1, 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 KDB 558074, clause 8.7.2 (6.10.6 of ANSI C63.10) for marker-delta method for band-edge measurements.
	Refer as KDB 558074, clause 8.7.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
Use the following spectrum analyzer settings:	
	Set RBW=100 kHz for $f < 1$ GHz; VBW=3 * RBW; Sweep = auto; Detector function = peak; Trace = max hold.
	Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement. For average measurement, refer as 1.1.4.
KDB 414788 Open-Field Test Sites and Chamber Correlation Justification.	
	Based on FCC 15.31(f)(2): measurements may be performed at a distance closer than that specified in regulations; however, an attempt should be made to avoid making measurements in the near field.
	Open-field site and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

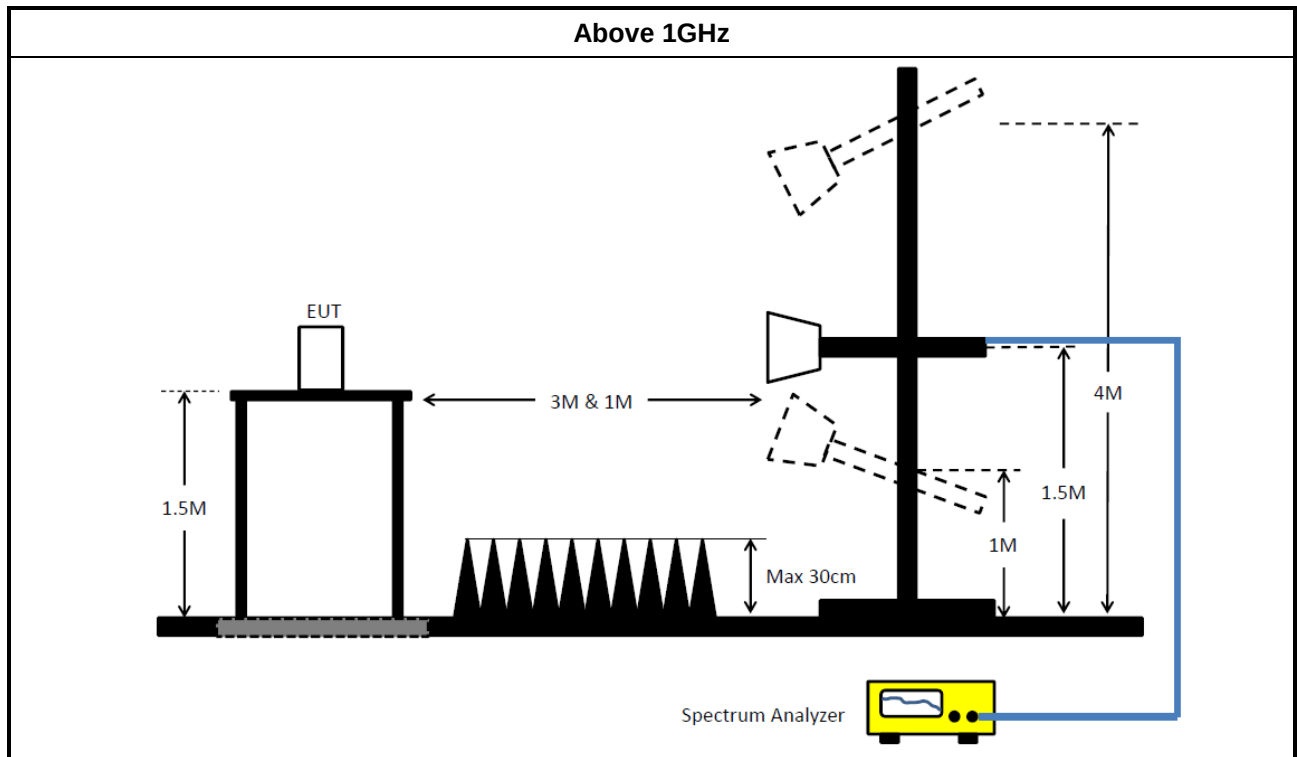
3.6.4 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamplifier Factor)

3.6.5 Test Setup





3.6.6 Test Result of Emissions in Restricted Frequency Bands (Below 30MHz)

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

3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR	102051	9kHz ~ 3.6GHz	16/May/2023	15/May/2024
Two-Line V-Network	R&S	ENV 216	100003	9kHz ~ 30MHz	07/Sep/2023	06/Sep/2024
RF Cable 5m	TITAN	TITAN	CO04-cable-01	9 kHz~200MHz	28/Feb/2023	27/Feb/2024
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9kHz ~ 30MHz	25/Oct/2022	24/Oct/2023
Software	Sporton	SENSE-EMI	V5.11.3	-	NCR	NCR

NCR: No Calibration Required

Instrument for Conducted Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSV 40	101515	9kHz~40GHz	14/Fed/2023	13/Fed/2024
SMB100A Signal Generator	R&S	SMB100A	181147	100kHz~40GHz	21/Oct/2022	20/Oct/2023
Pulse Sensor	Anritsu	MA2411B	1339407	300MHz~40GHz	14/Dec/2022	13/Dec/2023
Power Meter	Anritsu	ML2495A	1517010	300MHz~40GHz	14/Dec/2022	13/Dec/2023
SENSE-15247_DTS	Sporton	V5.11.7	N/A	N/A	N/A	N/A

Instrument for Radiated Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	30/Jul/2023	29/Jul/2024
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz~18GHz 3m	28/Jul/2023	27/Jul/2024
Signal Analyzer	R&S	FSV40	101500	10Hz~40GHz	26/Oct/2022	25/Oct/2023
Amplifier	Aglient	8447D	2944A08033	10kHz~1.3GHz	07/Apr/2023	06/Apr/2024
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	02267	1GHz~18GHz	27/Sep/2022	26/Sep/2023
Bilog Antenna & 6dB Attenuator	SCHAFFNER / EMC	CBL6112B / N-6-05	22237 / AT-N-0603	30MHz~1GHz	16/Oct/2022	15/Oct/2023
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz~30MHz	13/Jun/2023	12/Jun/2024
RF Cable-R03m	Jye Bao	RG142	03CH03-cable-02	30MHz~1GHz	13/Jun/2023	12/Jun/2024
RF CABLE 5+6m	HUBER+SUHNER	SUOFLEX 104	03CH03-cable-01	1GHz~40GHz	29/Jun/2023	28/Jun/2024
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	15GHz~40GHz	25/Mar/2023	24/Mar/2024
Microwave Premplifier	Agilent	8449B	3008A02326	1GHz~26.5GHz	14/Jul/2023	13/Jul/2024
Microwave Premplifier	EMC INSTRUMENTS	EM18G40G	060604	18GHz ~ 40GHz	16/Mar/2023	15/Mar/2024
Loop Antenna	TESEQ	HLA 6120	31244	9kHz~30MHz	23/Mar/2023	22/Mar/2024
EMI Test Receiver	R&S	ESR3	ESR3102052	9kHz~3.6GHz	26/Mar/2023	25/Mar/2024
SENSE-DTS-15247	Sporton	V5.11.10	NA	NA	NA	NA



Conducted Emissions at Powerline

Appendix A

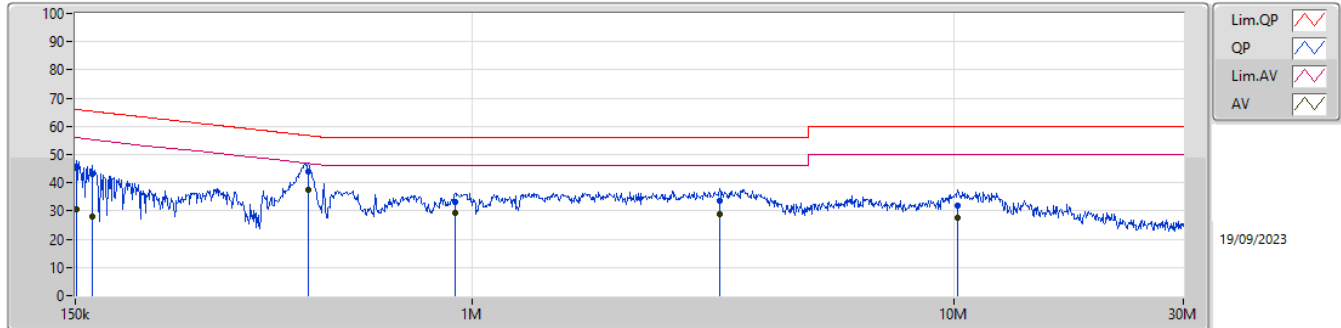
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	451.436k	38.52	46.84	-8.32	Neutral

Result

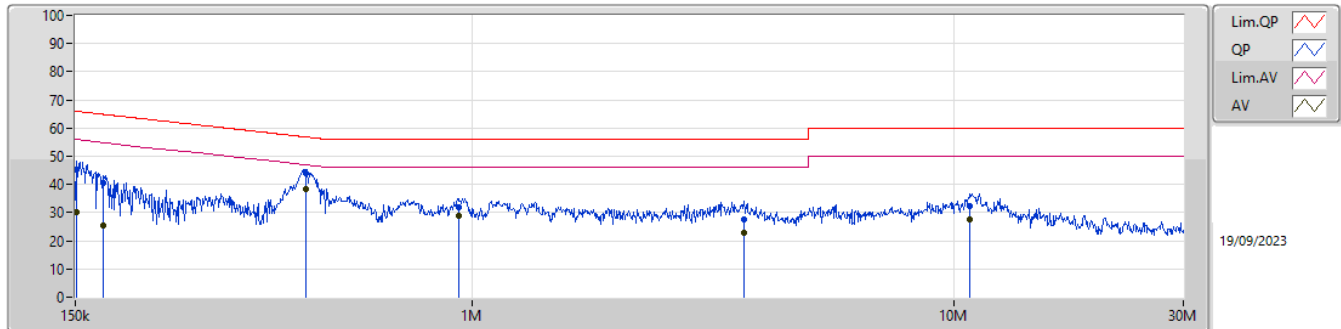
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	QP	150.6k	45.18	65.96	-20.78	Line
Mode 1	Pass	AV	150.6k	30.77	55.96	-25.19	Line
Mode 1	Pass	QP	162.467k	42.92	65.33	-22.41	Line
Mode 1	Pass	AV	162.467k	27.90	55.33	-27.43	Line
Mode 1	Pass	QP	456.875k	43.93	56.75	-12.82	Line
Mode 1	Pass	AV	456.875k	37.52	46.75	-9.23	Line
Mode 1	Pass	QP	922.424k	33.11	56.00	-22.89	Line
Mode 1	Pass	AV	922.424k	29.24	46.00	-16.76	Line
Mode 1	Pass	QP	3.27M	33.49	56.00	-22.51	Line
Mode 1	Pass	AV	3.27M	28.79	46.00	-17.21	Line
Mode 1	Pass	QP	10.201M	32.01	60.00	-27.99	Line
Mode 1	Pass	AV	10.201M	27.59	50.00	-22.41	Line
Mode 1	Pass	QP	151.202k	45.17	65.92	-20.75	Neutral
Mode 1	Pass	AV	151.202k	30.29	55.92	-25.63	Neutral
Mode 1	Pass	QP	171.806k	40.49	64.87	-24.38	Neutral
Mode 1	Pass	AV	171.806k	25.49	54.87	-29.38	Neutral
Mode 1	Pass	QP	451.436k	44.16	56.84	-12.68	Neutral
Mode 1	Pass	AV	451.436k	38.52	46.84	-8.32	Neutral
Mode 1	Pass	QP	941.021k	31.72	56.00	-24.28	Neutral
Mode 1	Pass	AV	941.021k	28.70	46.00	-17.30	Neutral
Mode 1	Pass	QP	3.671M	27.67	56.00	-28.33	Neutral
Mode 1	Pass	AV	3.671M	22.81	46.00	-23.19	Neutral
Mode 1	Pass	QP	10.83M	32.20	60.00	-27.80	Neutral
Mode 1	Pass	AV	10.83M	27.56	50.00	-22.44	Neutral

Mode 1



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)						
QP	150.6k	45.18	65.96	-20.78	19.53	Line	-	25.65	9.57	0.03	9.93						
AV	150.6k	30.77	55.96	-25.19	19.53	Line	-	11.24	9.57	0.03	9.93						
QP	162.467k	42.92	65.33	-22.41	19.53	Line	-	23.39	9.57	0.03	9.93						
AV	162.467k	27.90	55.33	-27.43	19.53	Line	-	8.37	9.57	0.03	9.93						
QP	456.875k	43.93	56.75	-12.82	19.57	Line	-	24.36	9.57	0.04	9.96						
AV	456.875k	37.52	46.75	-9.23	19.57	Line	-	17.95	9.57	0.04	9.96						
QP	922.424k	33.11	56.00	-22.89	19.56	Line	-	13.55	9.57	0.05	9.94						
AV	922.424k	29.24	46.00	-16.76	19.56	Line	-	9.68	9.57	0.05	9.94						
QP	3.27M	33.49	56.00	-22.51	19.64	Line	-	13.85	9.59	0.12	9.93						
AV	3.27M	28.79	46.00	-17.21	19.64	Line	-	9.15	9.59	0.12	9.93						
QP	10.201M	32.01	60.00	-27.99	19.85	Line	-	12.16	9.71	0.18	9.96						
AV	10.201M	27.59	50.00	-22.41	19.85	Line	-	7.74	9.71	0.18	9.96						

Mode 1



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)						
QP	151.202k	45.17	65.92	-20.75	19.58	Neutral	-	25.59	9.62	0.03	9.93						
AV	151.202k	30.29	55.92	-25.63	19.58	Neutral	-	10.71	9.62	0.03	9.93						
QP	171.806k	40.49	64.87	-24.38	19.58	Neutral	-	20.91	9.62	0.03	9.93						
AV	171.806k	25.49	54.87	-29.38	19.58	Neutral	-	5.91	9.62	0.03	9.93						
QP	451.436k	44.16	56.84	-12.68	19.62	Neutral	-	24.54	9.62	0.04	9.96						
AV	451.436k	38.52	46.84	-8.32	19.62	Neutral	-	18.90	9.62	0.04	9.96						
QP	941.021k	31.72	56.00	-24.28	19.61	Neutral	-	12.11	9.62	0.05	9.94						
AV	941.021k	28.70	46.00	-17.30	19.61	Neutral	-	9.09	9.62	0.05	9.94						
QP	3.671M	27.67	56.00	-28.33	19.71	Neutral	-	7.96	9.66	0.12	9.93						
AV	3.671M	22.81	46.00	-23.19	19.71	Neutral	-	3.10	9.66	0.12	9.93						
QP	10.83M	32.20	60.00	-27.80	19.97	Neutral	-	12.23	9.82	0.19	9.96						
AV	10.83M	27.56	50.00	-22.44	19.97	Neutral	-	7.59	9.82	0.19	9.96						

**Summary**

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
Zigbee	1.844M	2.255M	2M26G1D	1.725M	2.236M

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	1.838M	2.236M
2440MHz	Pass	500k	1.725M	2.249M
2475MHz	Pass	500k	1.838M	2.255M
2480MHz	Pass	500k	1.844M	2.255M

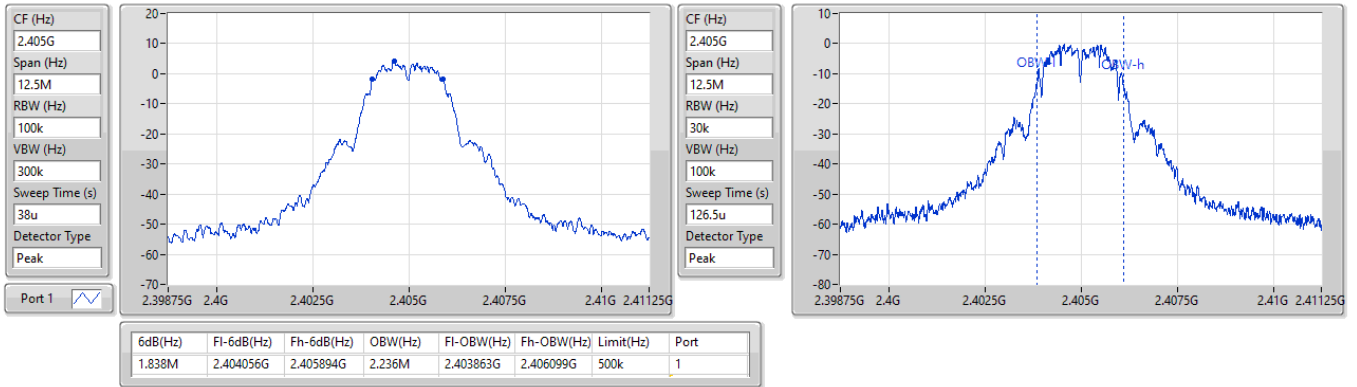
Port X-N dB = Port X 6dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth

2.4-2.4835GHz_Zigbee

EBW

2405MHz

17/08/2023

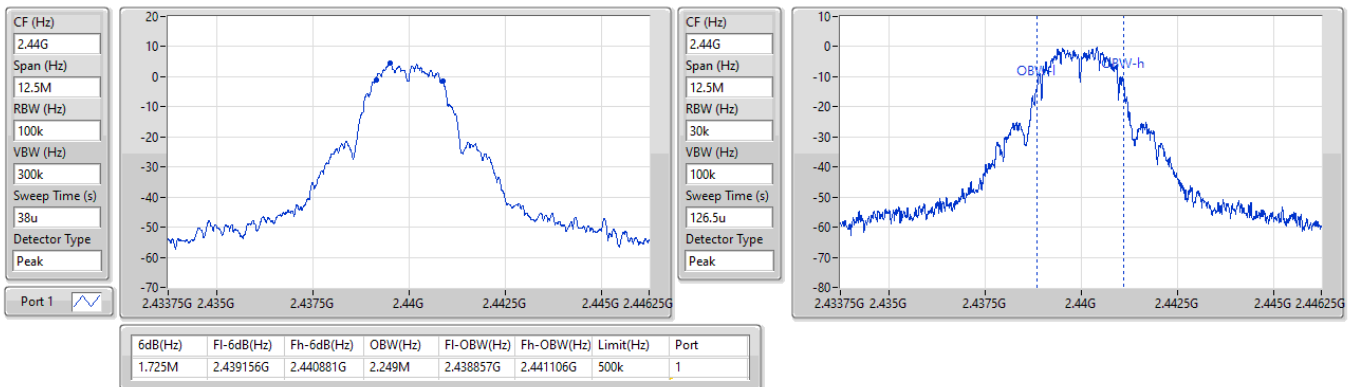


2.4-2.4835GHz_Zigbee

EBW

2440MHz

17/08/2023

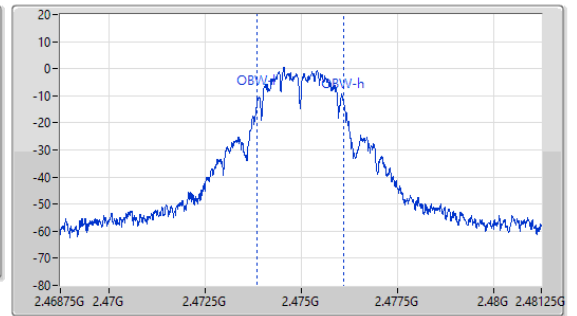
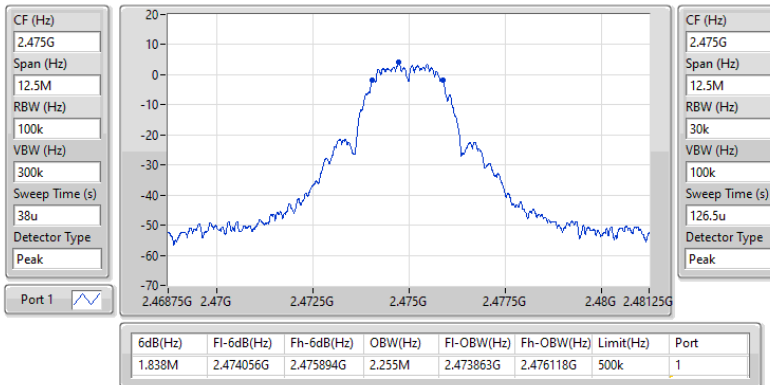


2.4-2.4835GHz Zigbee

EBW

2475MHz

17/08/2023

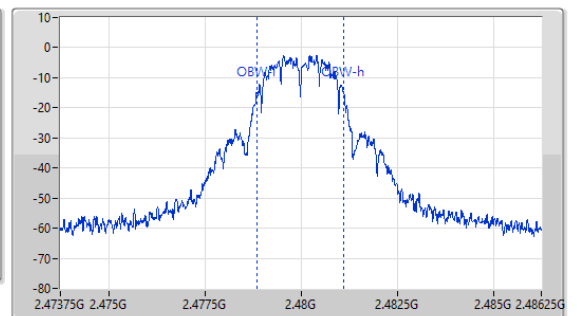
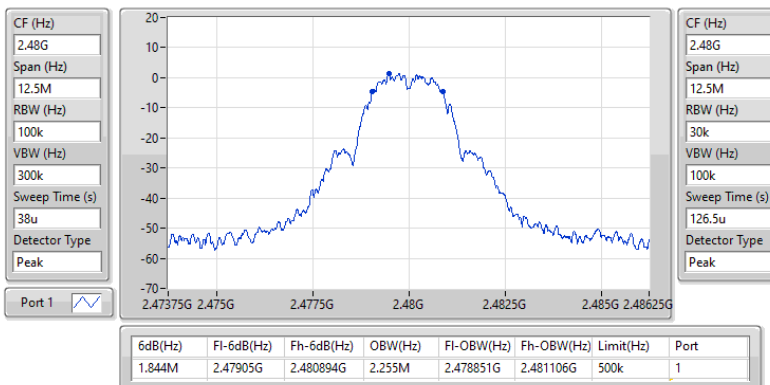


2.4-2.4835GHz Zigbee

EBW

2480MHz

17/08/2023





Average Power

Appendix C

Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
Zigbee	9.95	0.00989



Average Power

Appendix C

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)
Zigbee	-	-	-	-	-
2405MHz	Pass	6.20	9.95	9.95	29.80
2440MHz	Pass	6.20	9.93	9.93	29.80
2475MHz	Pass	6.20	9.92	9.92	29.80
2480MHz	Pass	6.20	7.58	7.58	29.80

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



Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
Zigbee	-6.16

RBW = 3kHz;

Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
Zigbee	-	-	-	-	-
2405MHz	Pass	6.20	-6.93	-6.93	7.80
2440MHz	Pass	6.20	-6.16	-6.16	7.80
2475MHz	Pass	6.20	-7.30	-7.30	7.80
2480MHz	Pass	6.20	-9.58	-9.58	7.80

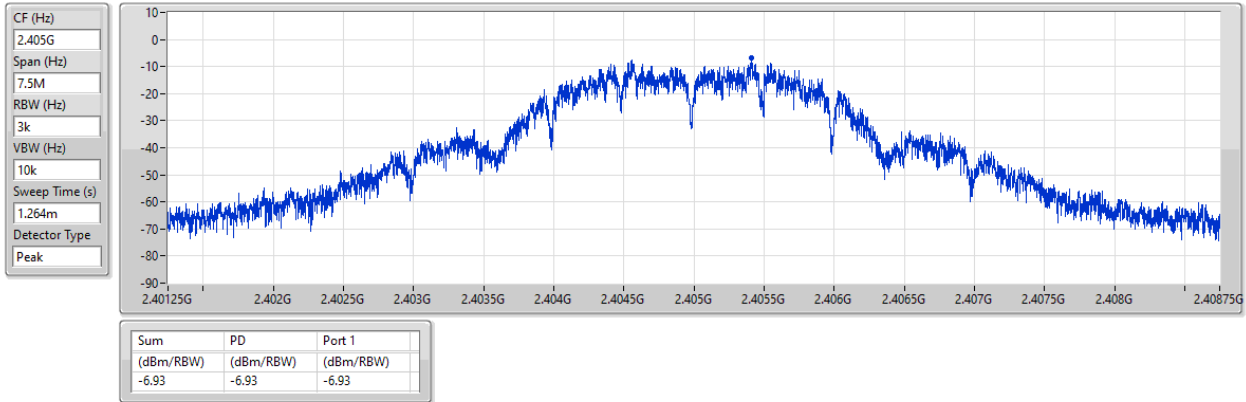
DG = Directional Gain; RBW = 3kHz;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;

2.4-2.4835GHz_Zigbee

PSD

2405MHz

17/08/2023

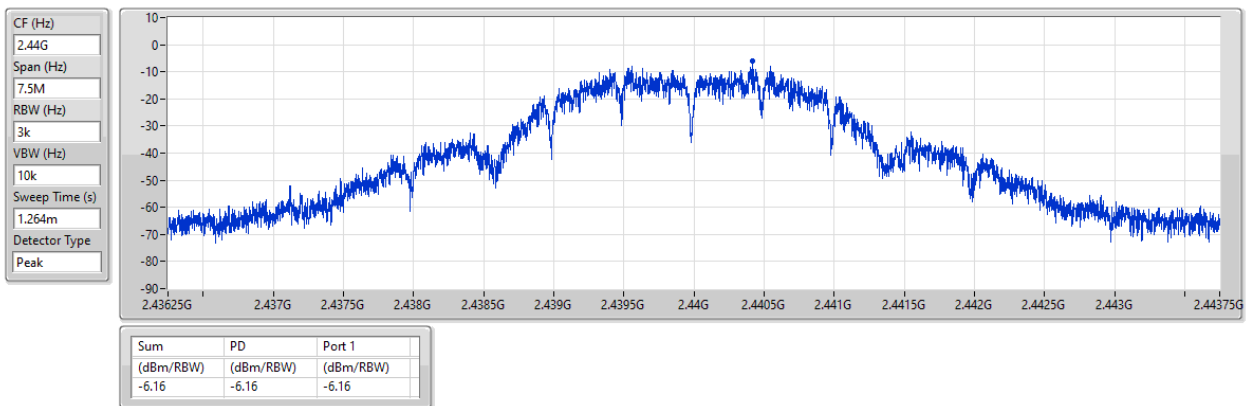


2.4-2.4835GHz_Zigbee

PSD

2440MHz

17/08/2023

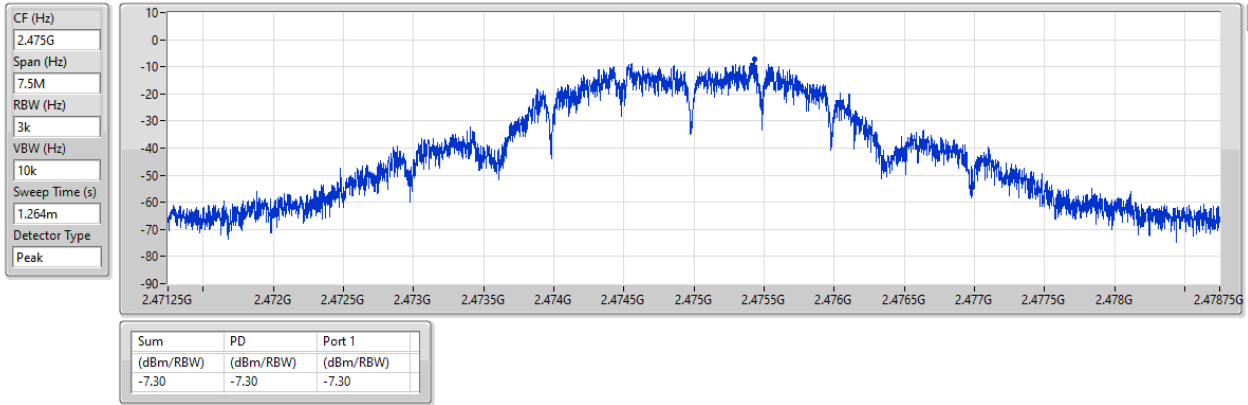


2.4-2.4835GHz_Zigbee

PSD

2475MHz

17/08/2023

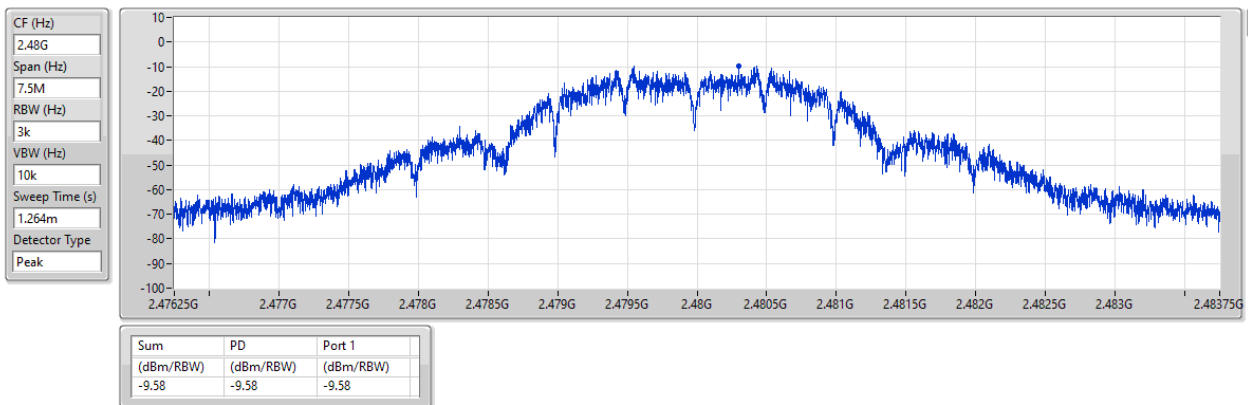


2.4-2.4835GHz_Zigbee

PSD

2480MHz

17/08/2023





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)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	2.40534G	5.98	-24.02	2.13347G	-53.97	2.3998G	-48.81	2.4G	-48.06	2.50775G	-53.03	24.49675G	-40.92	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)	Freq (Hz)	Level (dBm)	Port
Zigbee	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2405MHz	Pass	2.40534G	5.98	-24.02	2.13347G	-53.97	2.3998G	-48.81	2.4G	-48.06	2.50775G	-53.03	24.49675G	-40.92	1
2440MHz	Pass	2.40534G	5.98	-24.02	1.71254G	-54.61	2.3918G	-53.91	2.4G	-56.01	2.50315G	-53.04	24.7554G	-41.65	1
2475MHz	Pass	2.40534G	5.98	-24.02	2.30348G	-54.30	2.39995G	-53.62	2.4G	-55.36	2.50225G	-52.28	16.4223G	-40.75	1
2480MHz	Pass	2.40534G	5.98	-24.02	1.93883G	-54.56	2.39635G	-54.21	2.4G	-54.16	2.5008G	-53.05	24.50519G	-41.01	1

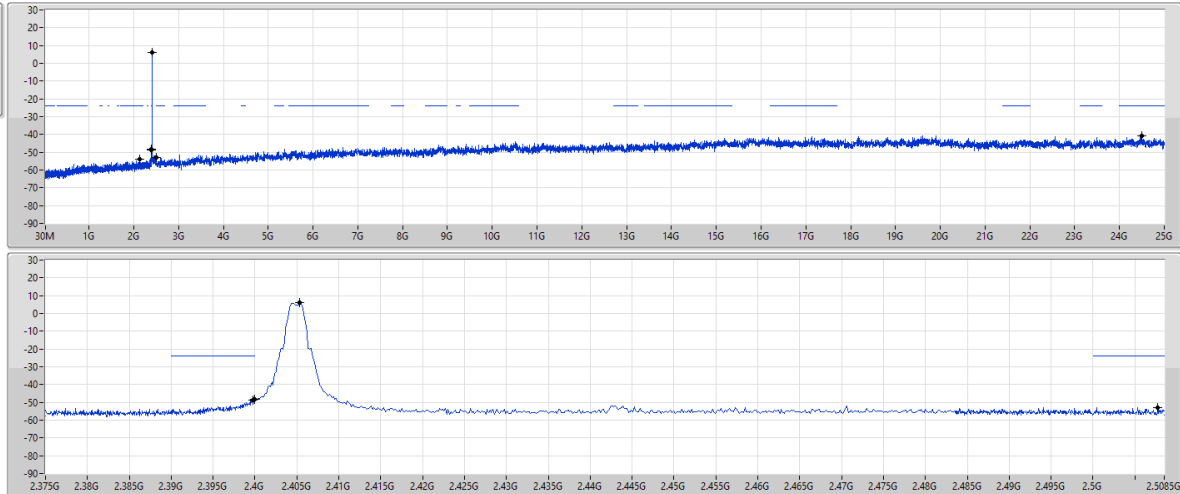
2.4-2.4835GHz Zigbee

CSEndB

2405MHz

17/08/2023

RBW (Hz)
100k
VBW (Hz)
300k
Detector
Peak



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40534G	5.98	-24.02	2.13347G	-53.97	2.3998G	-48.81	2.4G	-48.06	2.50775G	-53.03	2.449675G	-40.92	1

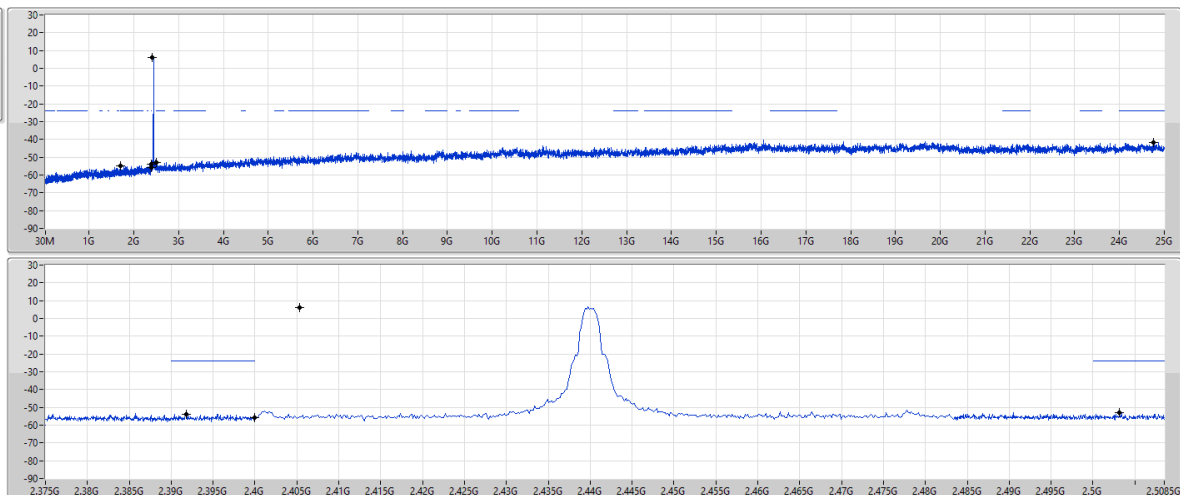
2.4-2.4835GHz Zigbee

CSEndB

2440MHz

17/08/2023

RBW (Hz)
100k
VBW (Hz)
300k
Detector
Peak



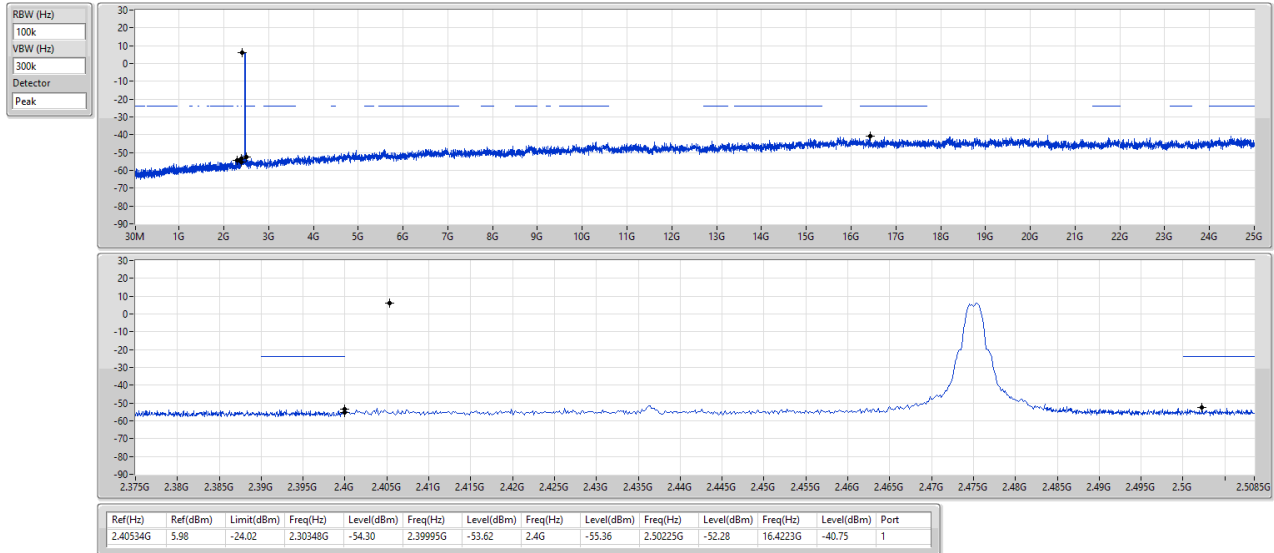
Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40534G	5.98	-24.02	1.71254G	-54.61	2.3918G	-53.91	2.4G	-56.01	2.50315G	-53.04	2.47534G	-41.65	1

2.4-2.4835GHz_Zigbee

CSEndB

2475MHz

17/08/2023

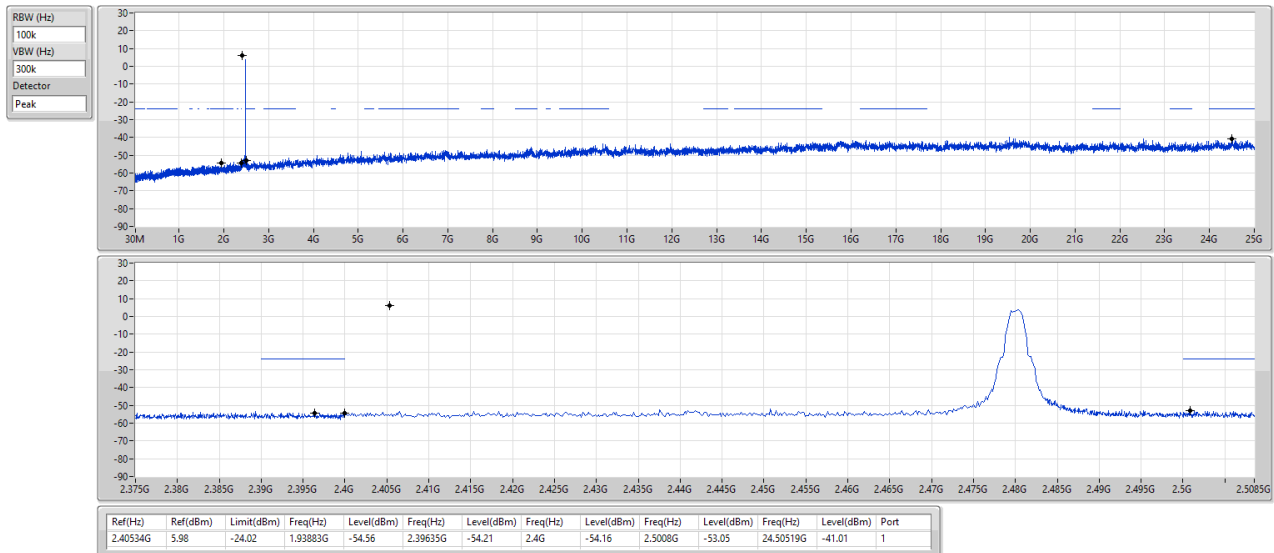


2.4-2.4835GHz_Zigbee

CSEndB

2480MHz

17/08/2023





Summary

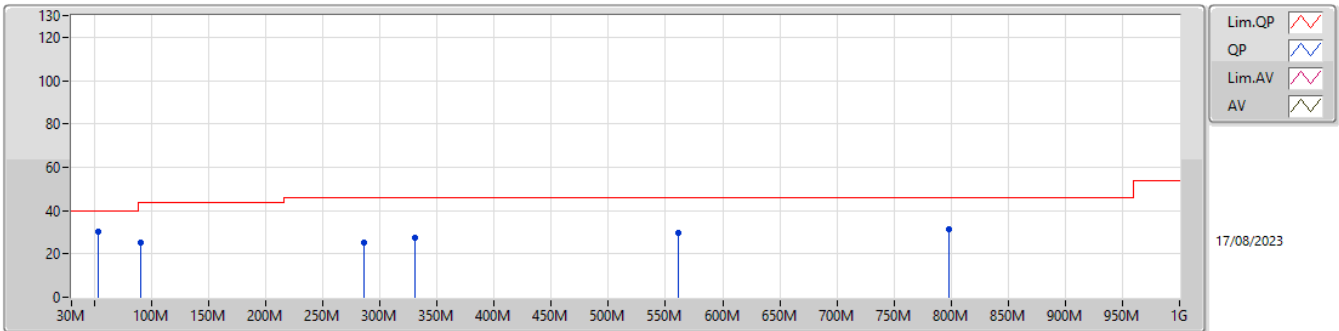
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	PK	53.28M	30.08	40.00	-9.92	3	Vertical	0	1.00

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
Zigbee	-	-	-	-	-	-	-	-	-	-
2475MHz	Pass	PK	53.28M	30.08	40.00	-9.92	3	Vertical	0	1.00
2475MHz	Pass	PK	90.14M	25.41	43.50	-18.09	3	Vertical	0	1.00
2475MHz	Pass	PK	286.08M	25.16	46.00	-20.84	3	Vertical	0	1.00
2475MHz	Pass	PK	330.7M	27.24	46.00	-18.76	3	Vertical	0	1.00
2475MHz	Pass	PK	561.56M	29.46	46.00	-16.54	3	Vertical	0	1.00
2475MHz	Pass	PK	798.24M	31.31	46.00	-14.69	3	Vertical	0	1.00
2475MHz	Pass	PK	128.94M	21.31	43.50	-22.19	3	Horizontal	360	1.00
2475MHz	Pass	PK	204.6M	22.54	43.50	-20.96	3	Horizontal	360	1.00
2475MHz	Pass	PK	303.54M	30.39	46.00	-15.61	3	Horizontal	360	1.00
2475MHz	Pass	PK	328.76M	32.86	46.00	-13.14	3	Horizontal	360	1.00
2475MHz	Pass	PK	584.84M	29.35	46.00	-16.65	3	Horizontal	360	1.00
2475MHz	Pass	PK	784.66M	31.95	46.00	-14.05	3	Horizontal	360	1.00

2.4-2.4835GHz_Zigbee

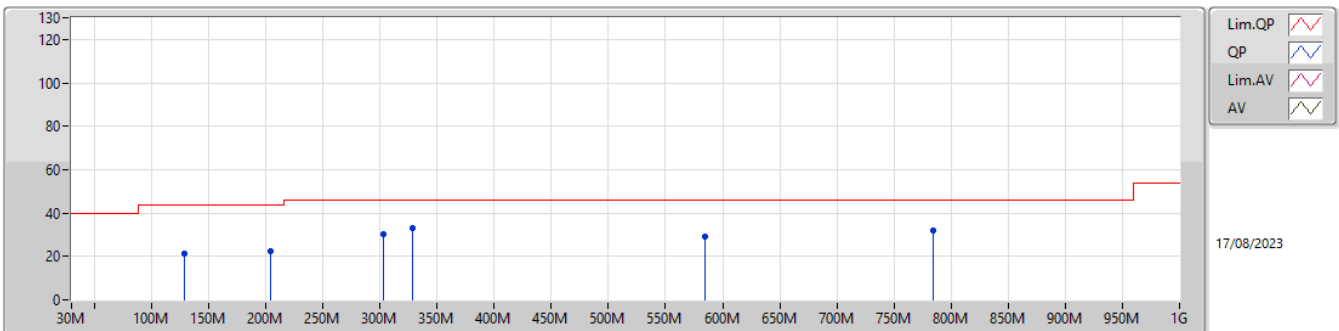
2475MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	53.28M	30.08	40.00	-9.92	-13.74	3	Vertical	0	1.00	43.82	12.14	1.19	27.07
PK	90.14M	25.41	43.50	-18.09	-11.93	3	Vertical	0	1.00	37.34	14.34	1.56	27.83
PK	286.08M	25.16	46.00	-20.84	-6.42	3	Vertical	0	1.00	31.58	18.01	2.83	27.26
PK	330.7M	27.24	46.00	-18.76	-5.55	3	Vertical	0	1.00	32.79	18.85	3.07	27.47
PK	561.56M	29.46	46.00	-16.54	-0.42	3	Vertical	0	1.00	29.88	24.15	4.08	28.65
PK	798.24M	31.31	46.00	-14.69	2.13	3	Vertical	0	1.00	29.18	25.45	5.01	28.33

2.4-2.4835GHz_Zigbee

2475MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	128.94M	21.31	43.50	-22.19	-8.65	3	Horizontal	360	1.00	29.96	17.26	1.88	27.79
PK	204.6M	22.54	43.50	-20.96	-10.66	3	Horizontal	360	1.00	33.20	14.42	2.38	27.46
PK	303.54M	30.39	46.00	-15.61	-5.94	3	Horizontal	360	1.00	36.33	18.43	2.93	27.30
PK	328.76M	32.86	46.00	-13.14	-5.58	3	Horizontal	360	1.00	38.44	18.82	3.06	27.46
PK	584.84M	29.35	46.00	-16.65	-0.32	3	Horizontal	360	1.00	29.67	23.98	4.25	28.55
PK	784.66M	31.95	46.00	-14.05	2.23	3	Horizontal	360	1.00	29.72	25.61	4.95	28.33



Summary

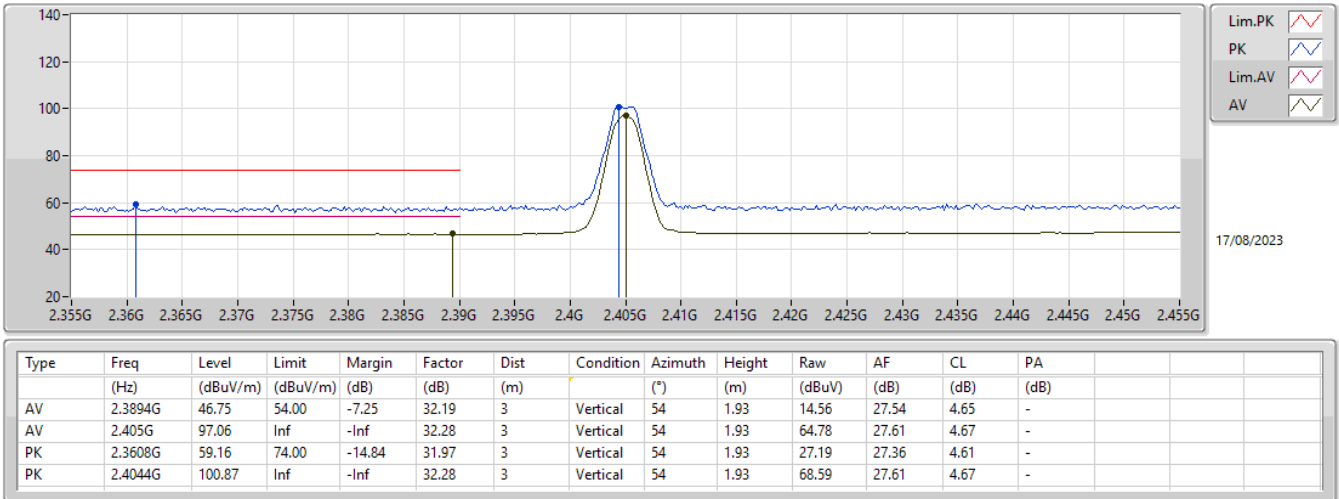
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	AV	2.4835G	53.85	54.00	-0.15	3	Horizontal	9	1.10

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
Zigbee	-	-	-	-	-	-	-	-	-	-
2405MHz	Pass	AV	2.3894G	46.75	54.00	-7.25	3	Vertical	54	1.93
2405MHz	Pass	AV	2.405G	97.06	Inf	-Inf	3	Vertical	54	1.93
2405MHz	Pass	PK	2.3608G	59.16	74.00	-14.84	3	Vertical	54	1.93
2405MHz	Pass	PK	2.4044G	100.87	Inf	-Inf	3	Vertical	54	1.93
2405MHz	Pass	AV	2.3664G	48.02	54.00	-5.98	3	Horizontal	0	1.01
2405MHz	Pass	AV	2.405G	105.71	Inf	-Inf	3	Horizontal	0	1.01
2405MHz	Pass	PK	2.372G	59.36	74.00	-14.64	3	Horizontal	0	1.01
2405MHz	Pass	PK	2.4044G	109.49	Inf	-Inf	3	Horizontal	0	1.01
2405MHz	Pass	AV	4.8113G	33.11	54.00	-20.89	3	Vertical	261	2.74
2405MHz	Pass	PK	4.80855G	45.53	74.00	-28.47	3	Vertical	261	2.74
2405MHz	Pass	AV	4.81087G	33.55	54.00	-20.45	3	Horizontal	351	1.48
2405MHz	Pass	PK	4.81176G	46.02	74.00	-27.98	3	Horizontal	351	1.48
2440MHz	Pass	AV	2.3888G	46.74	54.00	-7.26	3	Vertical	49	2.04
2440MHz	Pass	AV	2.44G	97.88	Inf	-Inf	3	Vertical	49	2.04
2440MHz	Pass	AV	2.4928G	47.74	54.00	-6.26	3	Vertical	49	2.04
2440MHz	Pass	PK	2.3856G	58.56	74.00	-15.44	3	Vertical	49	2.04
2440MHz	Pass	PK	2.4404G	101.72	Inf	-Inf	3	Vertical	49	2.04
2440MHz	Pass	PK	2.4952G	59.20	74.00	-14.80	3	Vertical	49	2.04
2440MHz	Pass	AV	2.3876G	46.73	54.00	-7.27	3	Horizontal	0	1.08
2440MHz	Pass	AV	2.44G	105.78	Inf	-Inf	3	Horizontal	0	1.08
2440MHz	Pass	AV	2.4968G	47.74	54.00	-6.26	3	Horizontal	0	1.08
2440MHz	Pass	PK	2.3508G	58.95	74.00	-15.05	3	Horizontal	0	1.08
2440MHz	Pass	PK	2.4404G	109.53	Inf	-Inf	3	Horizontal	0	1.08
2440MHz	Pass	PK	2.4876G	59.18	74.00	-14.82	3	Horizontal	0	1.08
2440MHz	Pass	AV	4.88139G	33.52	54.00	-20.48	3	Vertical	111	2.01
2440MHz	Pass	PK	4.87775G	47.00	74.00	-27.00	3	Vertical	111	2.01
2440MHz	Pass	AV	4.88226G	33.60	54.00	-20.40	3	Horizontal	239	2.34
2440MHz	Pass	PK	4.87797G	46.01	74.00	-27.99	3	Horizontal	239	2.34
2475MHz	Pass	AV	2.475G	98.62	Inf	-Inf	3	Vertical	50	1.88
2475MHz	Pass	AV	2.4835G	47.96	54.00	-6.04	3	Vertical	50	1.88
2475MHz	Pass	PK	2.4754G	102.39	Inf	-Inf	3	Vertical	50	1.88
2475MHz	Pass	PK	2.489G	59.59	74.00	-14.41	3	Vertical	50	1.88
2475MHz	Pass	AV	2.475G	105.97	Inf	-Inf	3	Horizontal	7	1.06
2475MHz	Pass	AV	2.4835G	48.45	54.00	-5.55	3	Horizontal	7	1.06
2475MHz	Pass	PK	2.4744G	109.71	Inf	-Inf	3	Horizontal	7	1.06
2475MHz	Pass	PK	2.4902G	60.66	74.00	-13.34	3	Horizontal	7	1.06
2475MHz	Pass	AV	4.9475G	33.77	54.00	-20.23	3	Vertical	153	2.44
2475MHz	Pass	PK	4.94816G	45.79	74.00	-28.21	3	Vertical	153	2.44
2475MHz	Pass	AV	4.94831G	33.84	54.00	-20.16	3	Horizontal	14	1.50
2475MHz	Pass	PK	4.95039G	47.08	74.00	-26.92	3	Horizontal	14	1.50
2480MHz	Pass	AV	2.48G	92.69	Inf	-Inf	3	Vertical	6	1.88
2480MHz	Pass	AV	2.4835G	48.45	54.00	-5.55	3	Vertical	6	1.88
2480MHz	Pass	PK	2.4794G	96.48	Inf	-Inf	3	Vertical	6	1.88
2480MHz	Pass	PK	2.492G	60.00	74.00	-14.00	3	Vertical	6	1.88
2480MHz	Pass	AV	2.48G	103.19	Inf	-Inf	3	Horizontal	9	1.10
2480MHz	Pass	AV	2.4835G	53.85	54.00	-0.15	3	Horizontal	9	1.10
2480MHz	Pass	PK	2.4794G	106.97	Inf	-Inf	3	Horizontal	9	1.10
2480MHz	Pass	PK	2.4835G	64.06	74.00	-9.94	3	Horizontal	9	1.10
2480MHz	Pass	AV	4.95993G	33.34	54.00	-20.66	3	Vertical	214	1.50
2480MHz	Pass	PK	4.96069G	46.49	74.00	-27.51	3	Vertical	214	1.50
2480MHz	Pass	AV	4.96194G	33.42	54.00	-20.58	3	Horizontal	343	1.05
2480MHz	Pass	PK	4.96235G	45.82	74.00	-28.18	3	Horizontal	343	1.05

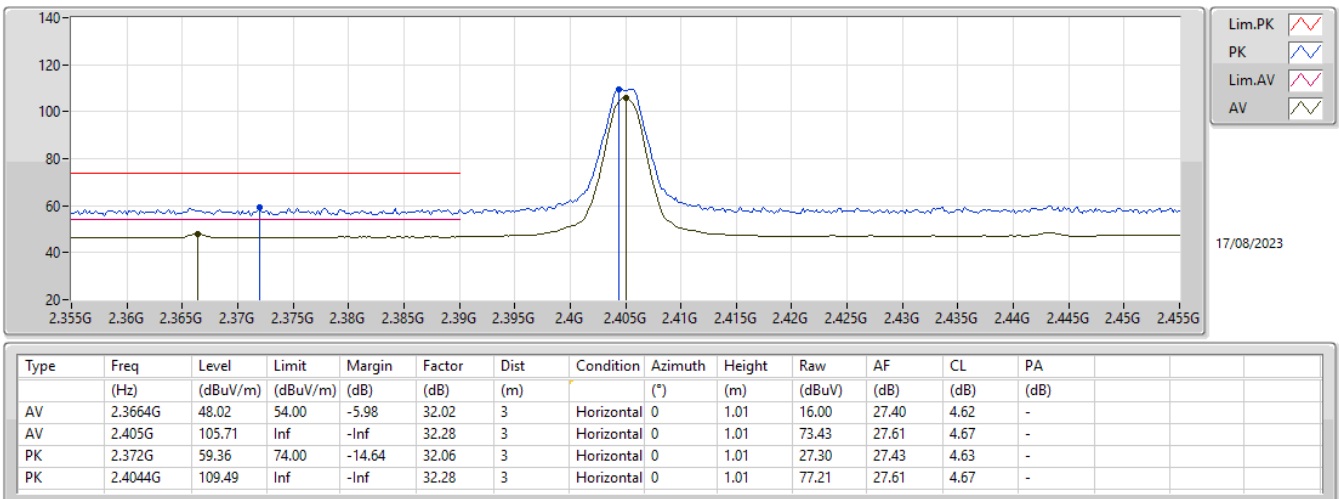
2.4-2.4835GHz_Zigbee

2405MHz_TX



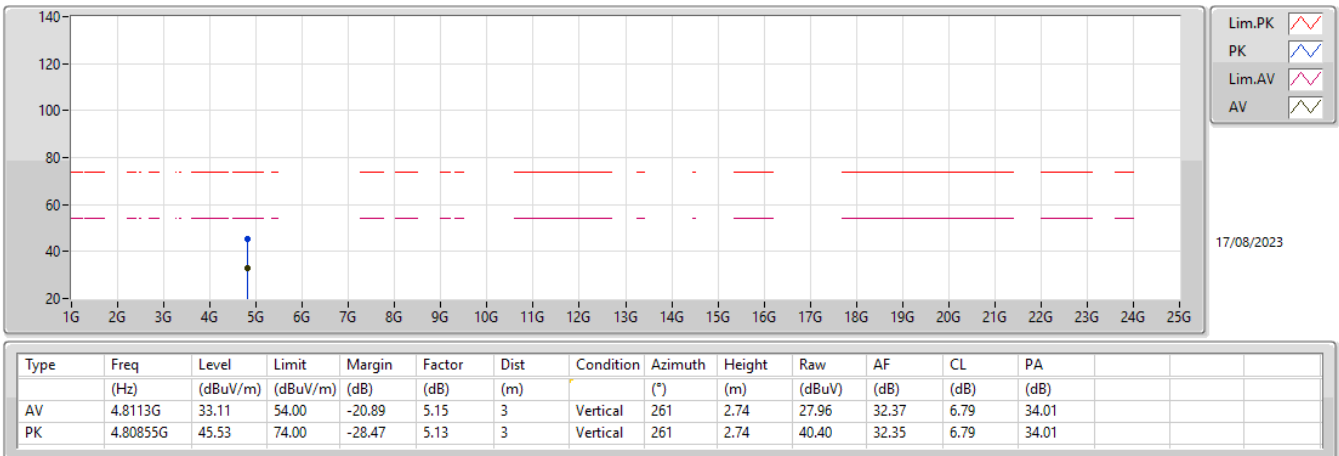
2.4-2.4835GHz_Zigbee

2405MHz_TX



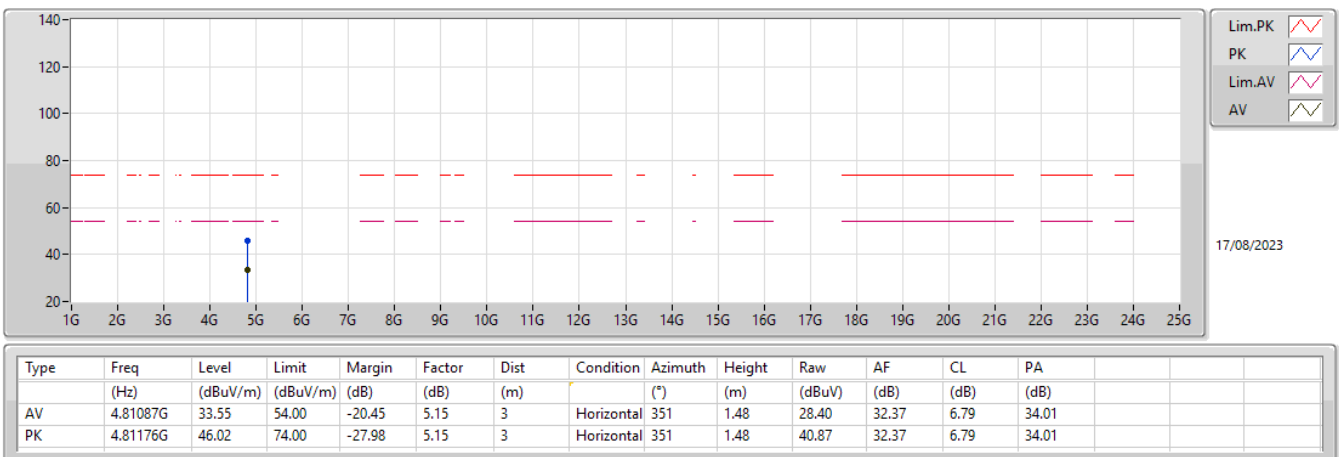
2.4-2.4835GHz_Zigbee

2405MHz_TX



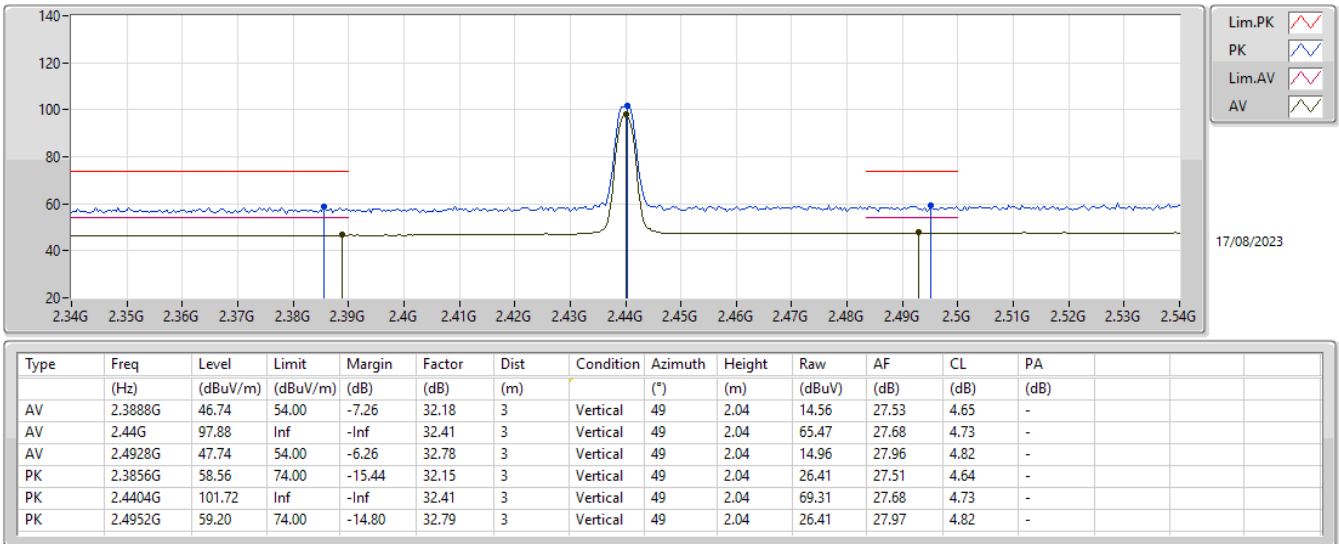
2.4-2.4835GHz_Zigbee

2405MHz_TX



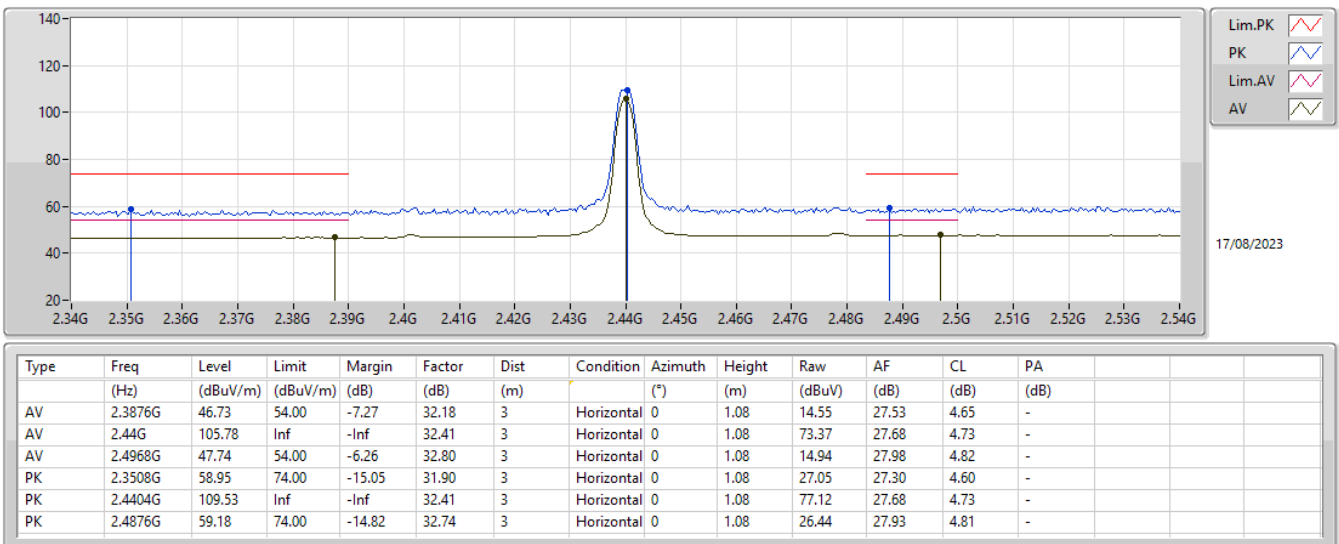
2.4-2.4835GHz_Zigbee

2440MHz_TX



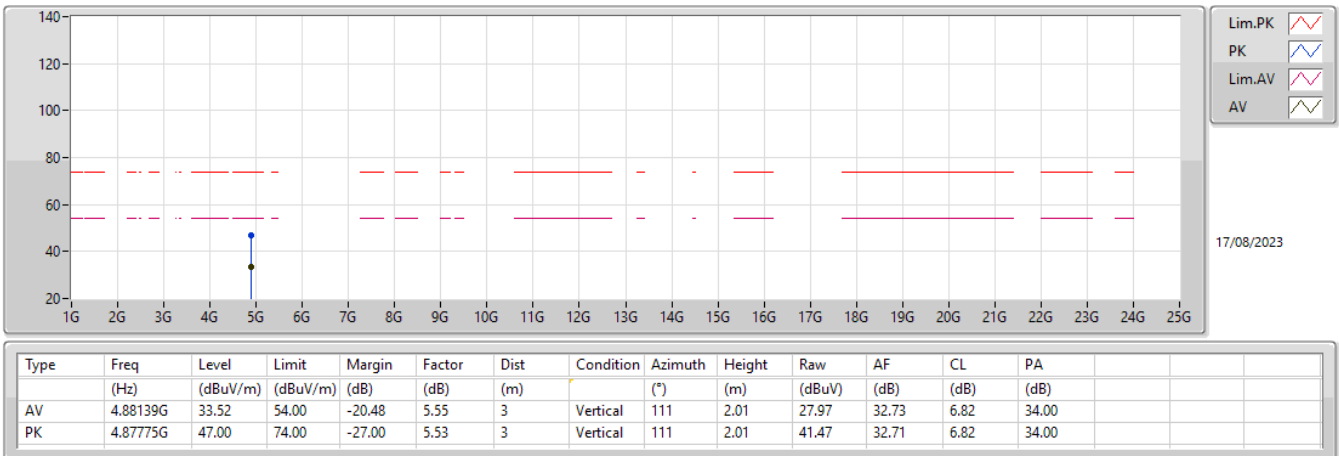
2.4-2.4835GHz_Zigbee

2440MHz_TX



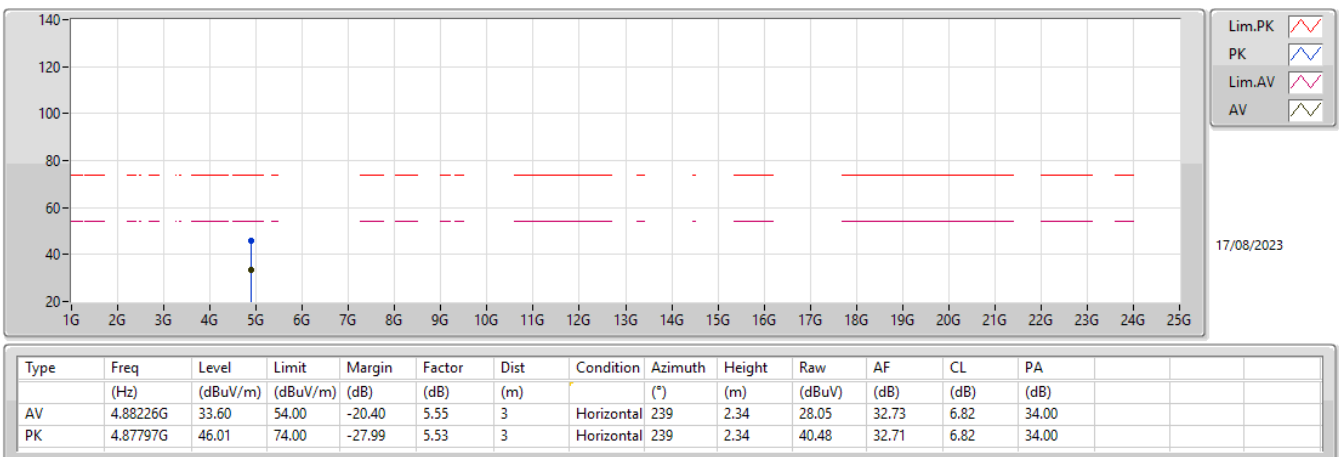
2.4-2.4835GHz_Zigbee

2440MHz_TX



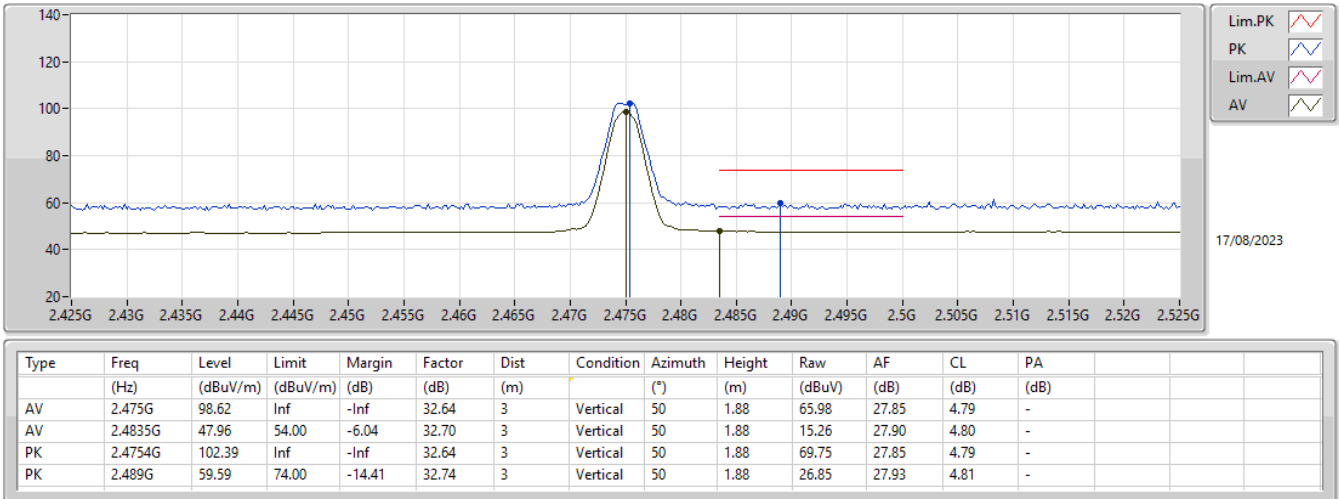
2.4-2.4835GHz_Zigbee

2440MHz_TX



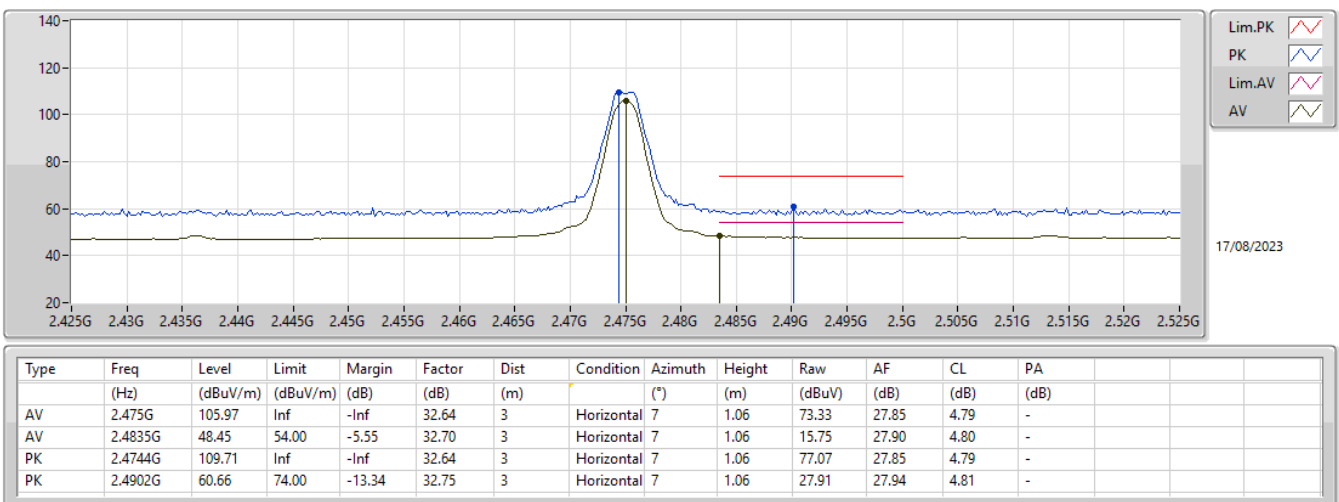
2.4-2.4835GHz_Zigbee

2475MHz_TX



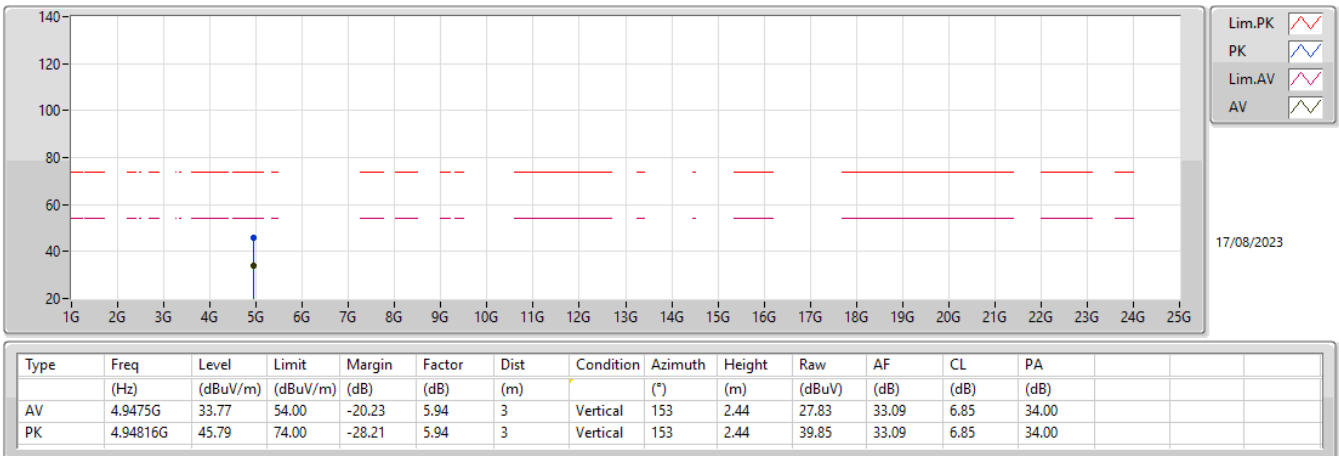
2.4-2.4835GHz_Zigbee

2475MHz_TX



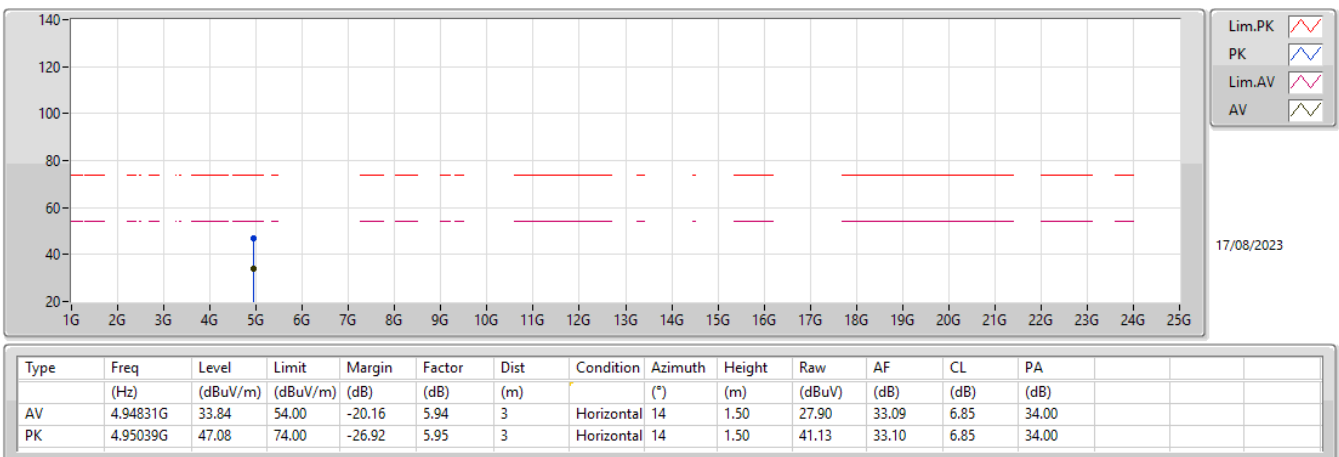
2.4-2.4835GHz_Zigbee

2475MHz_TX



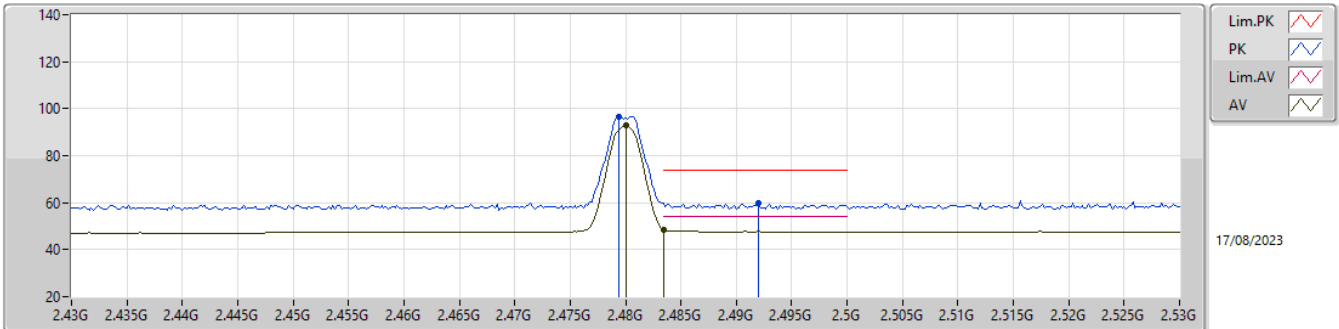
2.4-2.4835GHz_Zigbee

2475MHz_TX



2.4-2.4835GHz_Zigbee

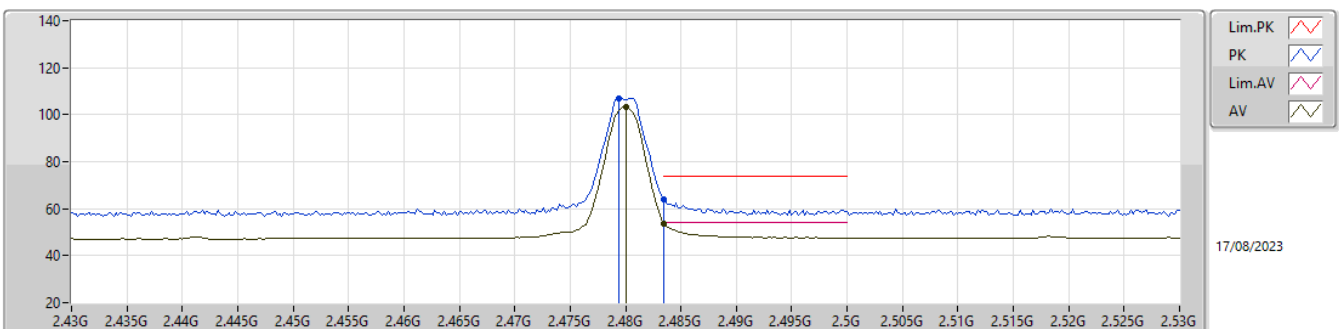
2480MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.48G	92.69	Inf	-Inf	32.68	3	Vertical	6	1.88	60.01	27.88	4.80	-
AV	2.4835G	48.45	54.00	-5.55	32.70	3	Vertical	6	1.88	15.75	27.90	4.80	-
PK	2.4794G	96.48	Inf	-Inf	32.67	3	Vertical	6	1.88	63.81	27.88	4.79	-
PK	2.492G	60.00	74.00	-14.00	32.77	3	Vertical	6	1.88	27.23	27.95	4.82	-

2.4-2.4835GHz_Zigbee

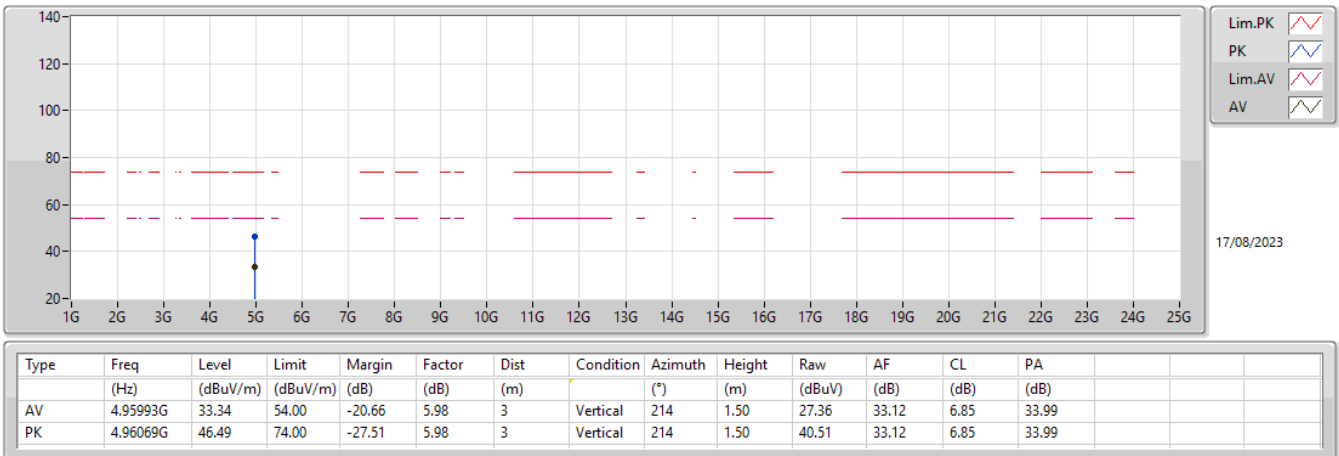
2480MHz_TX



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	2.48G	103.19	Inf	-Inf	32.68	3	Horizontal	9	1.10	70.51	27.88	4.80	-
AV	2.4835G	53.85	54.00	-0.15	32.70	3	Horizontal	9	1.10	21.15	27.90	4.80	-
PK	2.4794G	106.97	Inf	-Inf	32.67	3	Horizontal	9	1.10	74.30	27.88	4.79	-
PK	2.4835G	64.06	74.00	-9.94	32.70	3	Horizontal	9	1.10	31.36	27.90	4.80	-

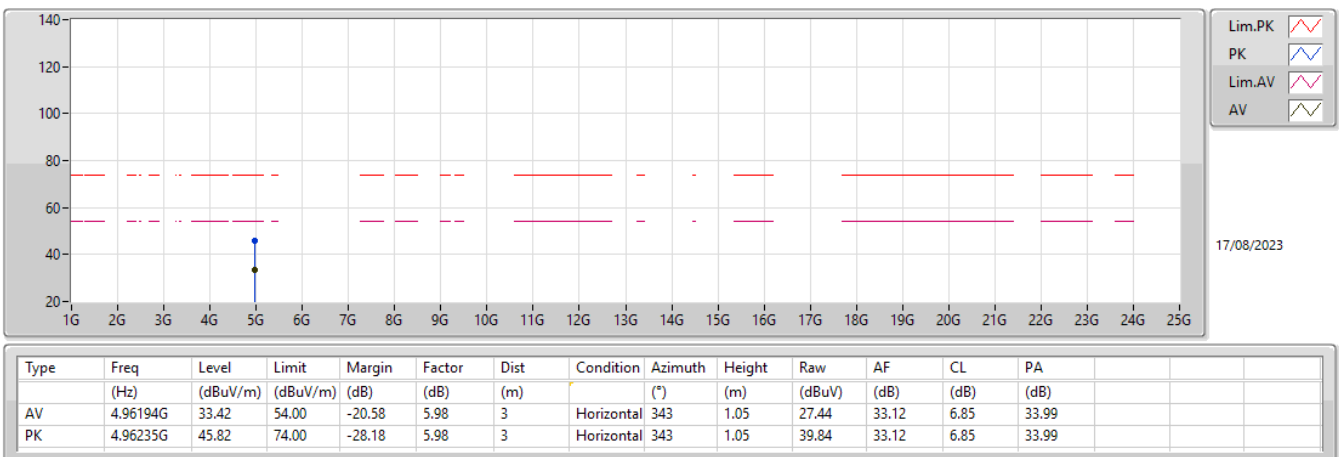
2.4-2.4835GHz_Zigbee

2480MHz_TX



2.4-2.4835GHz_Zigbee

2480MHz_TX



Summary

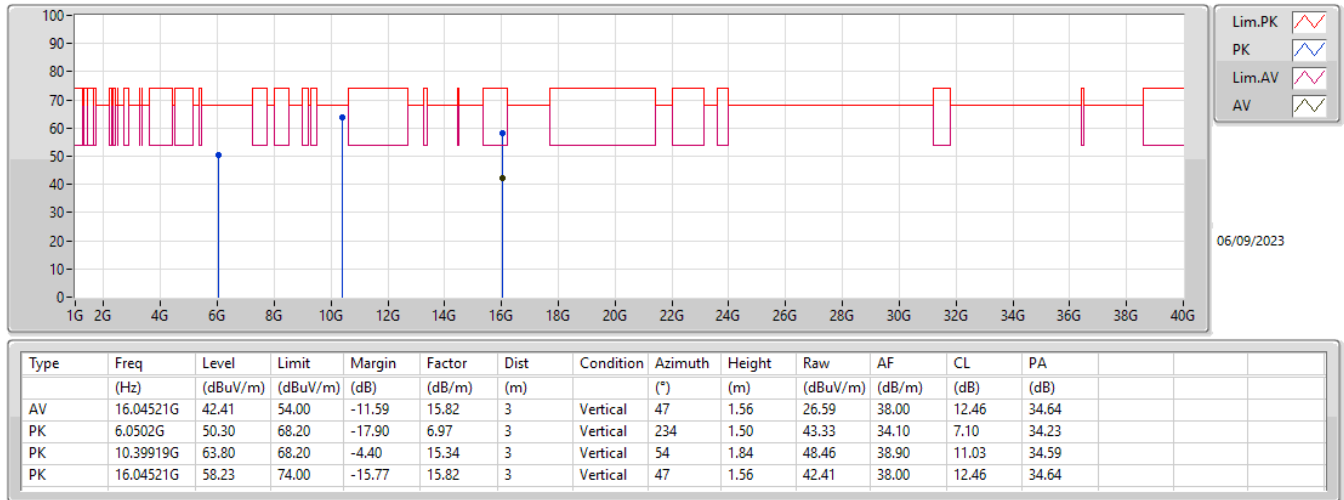
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	PK	10.39919G	63.80	68.20	-4.40	Vertical
Mode 2	Pass	PK	13.60193G	61.07	68.20	-7.13	Horizontal
Mode 3	Pass	PK	10.39659G	65.10	68.20	-3.10	Horizontal
Mode 4	Pass	AV	12.02275G	43.15	54.00	-10.85	Horizontal
Mode 5	Pass	PK	13.321G	60.53	74.00	-13.47	Horizontal
Mode 6	Pass	AV	8.43579G	41.18	54.00	-12.82	Horizontal

Result

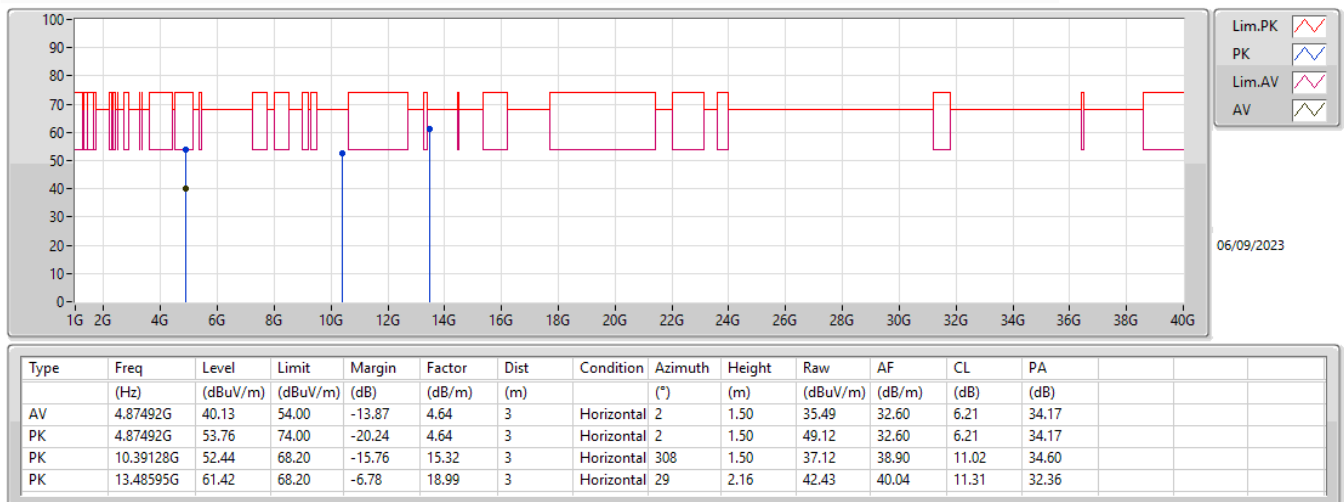
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
Mode 1	Pass	AV	6.0502G	33.59	68.20	-34.61	3	Vertical	234	1.50
Mode 1	Pass	AV	10.39919G	42.25	68.20	-25.95	3	Vertical	54	1.84
Mode 1	Pass	AV	16.04521G	42.41	54.00	-11.59	3	Vertical	47	1.56
Mode 1	Pass	PK	6.0502G	50.30	68.20	-17.90	3	Vertical	234	1.50
Mode 1	Pass	PK	10.39919G	63.80	68.20	-4.40	3	Vertical	54	1.84
Mode 1	Pass	PK	16.04521G	58.23	74.00	-15.77	3	Vertical	47	1.56
Mode 1	Pass	AV	4.87492G	40.13	54.00	-13.87	3	Horizontal	2	1.50
Mode 1	Pass	AV	10.39128G	42.97	68.20	-25.23	3	Horizontal	308	1.50
Mode 1	Pass	AV	13.48595G	45.95	68.20	-22.25	3	Horizontal	29	2.16
Mode 1	Pass	PK	4.87492G	53.76	74.00	-20.24	3	Horizontal	2	1.50
Mode 1	Pass	PK	10.39128G	52.44	68.20	-15.76	3	Horizontal	308	1.50
Mode 1	Pass	PK	13.48595G	61.42	68.20	-6.78	3	Horizontal	29	2.16
Mode 2	Pass	AV	4.32006G	30.47	54.00	-23.53	3	Vertical	54	1.44
Mode 2	Pass	AV	10.39718G	49.92	68.20	-18.28	3	Vertical	51	1.14
Mode 2	Pass	AV	15.77993G	42.59	54.00	-11.41	3	Vertical	14	2.18
Mode 2	Pass	PK	4.32006G	46.12	74.00	-27.88	3	Vertical	54	1.44
Mode 2	Pass	PK	10.39718G	59.92	68.20	-8.28	3	Vertical	51	1.14
Mode 2	Pass	PK	15.77993G	57.66	74.00	-16.34	3	Vertical	14	2.18
Mode 2	Pass	AV	4.3592G	30.40	54.00	-23.60	3	Horizontal	341	1.67
Mode 2	Pass	AV	13.60193G	58.60	68.20	-9.60	3	Horizontal	64	1.68
Mode 2	Pass	AV	16.81324G	43.39	68.20	-24.81	3	Horizontal	21	1.51
Mode 2	Pass	PK	4.3592G	46.60	74.00	-27.40	3	Horizontal	341	1.67
Mode 2	Pass	PK	13.60193G	61.07	68.20	-7.13	3	Horizontal	64	1.68
Mode 2	Pass	PK	16.81324G	59.92	68.20	-8.28	3	Horizontal	21	1.51
Mode 3	Pass	AV	3.41346G	28.67	68.20	-39.53	3	Vertical	276	1.83
Mode 3	Pass	AV	7.45493G	36.97	54.00	-17.03	3	Vertical	254	1.68
Mode 3	Pass	AV	14.92756G	44.36	68.20	-23.84	3	Vertical	358	1.62
Mode 3	Pass	PK	3.41346G	44.23	68.20	-23.97	3	Vertical	276	1.83
Mode 3	Pass	PK	7.45493G	53.18	74.00	-20.82	3	Vertical	254	1.68
Mode 3	Pass	PK	14.92756G	59.50	68.20	-8.70	3	Vertical	358	1.62
Mode 3	Pass	AV	2.97678G	28.44	68.20	-39.76	3	Horizontal	248	1.54
Mode 3	Pass	AV	5.96245G	34.00	68.20	-34.20	3	Horizontal	198	1.37
Mode 3	Pass	AV	10.39659G	41.56	68.20	-26.64	3	Horizontal	311	2.14
Mode 3	Pass	PK	2.97678G	43.67	68.20	-24.53	3	Horizontal	248	1.54
Mode 3	Pass	PK	5.96245G	49.60	68.20	-18.60	3	Horizontal	198	1.37
Mode 3	Pass	PK	10.39659G	65.10	68.20	-3.10	3	Horizontal	311	2.14
Mode 4	Pass	AV	5.66069G	32.90	68.20	-35.30	3	Vertical	116	1.17
Mode 4	Pass	AV	8.07867G	37.59	54.00	-16.41	3	Vertical	320	2.13
Mode 4	Pass	AV	15.8784G	42.37	54.00	-11.63	3	Vertical	68	2.41
Mode 4	Pass	PK	5.66069G	49.30	68.20	-18.90	3	Vertical	116	1.17
Mode 4	Pass	PK	8.07867G	53.38	74.00	-20.62	3	Vertical	320	2.13
Mode 4	Pass	PK	15.8784G	58.27	74.00	-15.73	3	Vertical	68	2.41
Mode 4	Pass	AV	4.87393G	31.12	54.00	-22.88	3	Horizontal	16	1.84
Mode 4	Pass	AV	6.4189G	34.63	68.20	-33.57	3	Horizontal	351	2.18
Mode 4	Pass	AV	12.02275G	43.15	54.00	-10.85	3	Horizontal	26	2.32
Mode 4	Pass	PK	4.87393G	58.82	74.00	-15.18	3	Horizontal	16	1.84
Mode 4	Pass	PK	6.4189G	50.46	68.20	-17.74	3	Horizontal	351	2.18
Mode 4	Pass	PK	12.02275G	57.83	74.00	-16.17	3	Horizontal	26	2.32
Mode 5	Pass	AV	3.1703G	30.43	68.20	-37.77	3	Vertical	106	1.82
Mode 5	Pass	AV	5.76388G	36.69	68.20	-31.51	3	Vertical	63	2.14

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)
Mode 5	Pass	PK	3.1703G	46.42	68.20	-21.78	3	Vertical	106	1.82
Mode 5	Pass	PK	5.76388G	52.70	68.20	-15.50	3	Vertical	63	2.14
Mode 5	Pass	PK	11.45G	59.02	74.00	-14.98	3	Vertical	0	1.00
Mode 5	Pass	AV	3.38179G	31.00	68.20	-37.20	3	Horizontal	347	1.50
Mode 5	Pass	AV	6.08679G	36.38	68.20	-31.82	3	Horizontal	4	2.00
Mode 5	Pass	PK	3.38179G	47.22	68.20	-20.98	3	Horizontal	347	1.50
Mode 5	Pass	PK	6.08679G	52.06	68.20	-16.14	3	Horizontal	4	2.00
Mode 5	Pass	PK	13.321G	60.53	74.00	-13.47	3	Horizontal	360	1.00
Mode 6	Pass	AV	3.4337G	30.59	68.20	-37.61	3	Vertical	194	1.63
Mode 6	Pass	AV	6.19199G	36.89	68.20	-31.31	3	Vertical	59	2.79
Mode 6	Pass	AV	8.07156G	41.02	54.00	-12.98	3	Vertical	56	2.31
Mode 6	Pass	PK	3.4337G	46.23	68.20	-21.97	3	Vertical	194	1.63
Mode 6	Pass	PK	6.19199G	52.17	68.20	-16.03	3	Vertical	59	2.79
Mode 6	Pass	PK	8.07156G	56.44	74.00	-17.56	3	Vertical	56	2.31
Mode 6	Pass	AV	3.92062G	32.45	54.00	-21.55	3	Horizontal	118	1.52
Mode 6	Pass	AV	5.92792G	37.00	68.20	-31.20	3	Horizontal	53	1.67
Mode 6	Pass	AV	8.43579G	41.18	54.00	-12.82	3	Horizontal	316	1.46
Mode 6	Pass	PK	3.92062G	47.71	74.00	-26.29	3	Horizontal	118	1.52
Mode 6	Pass	PK	5.92792G	52.68	68.20	-15.52	3	Horizontal	53	1.67
Mode 6	Pass	PK	8.43579G	56.89	74.00	-17.11	3	Horizontal	316	1.46

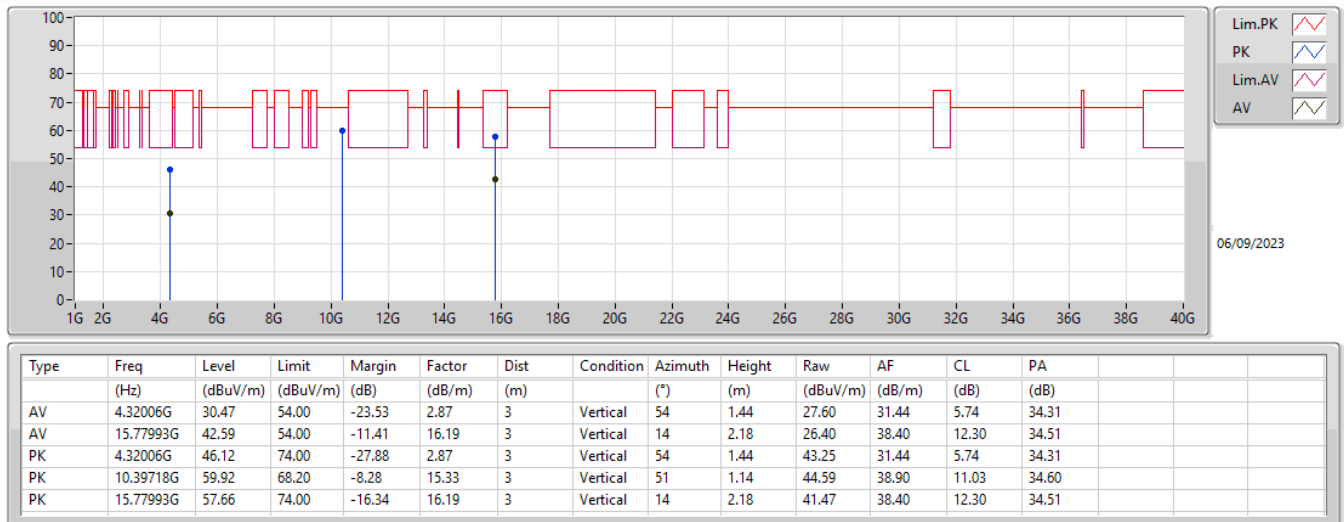
Mode 1



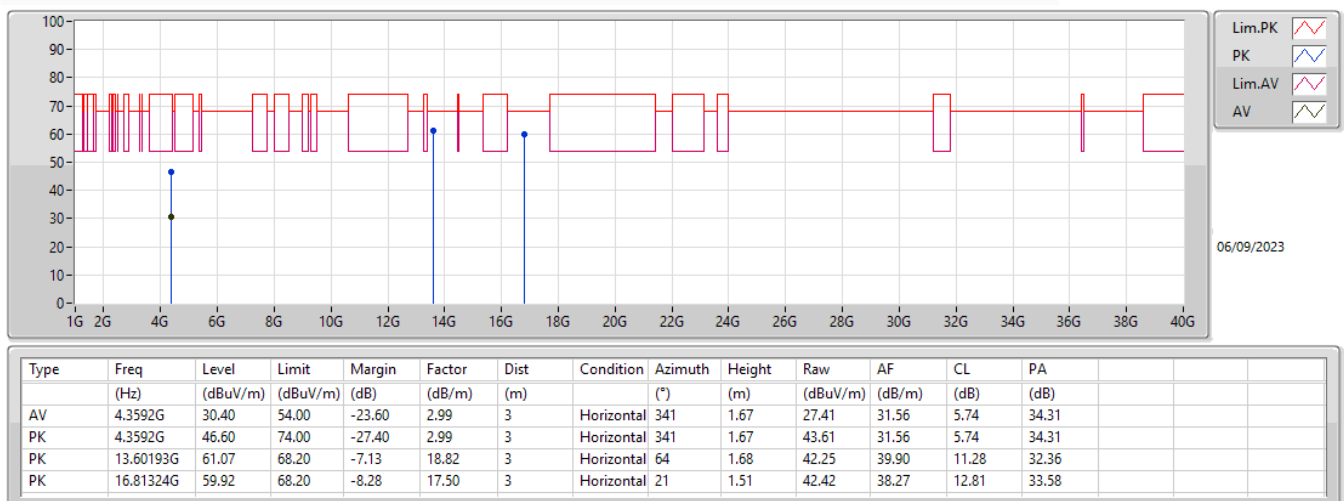
Mode 1



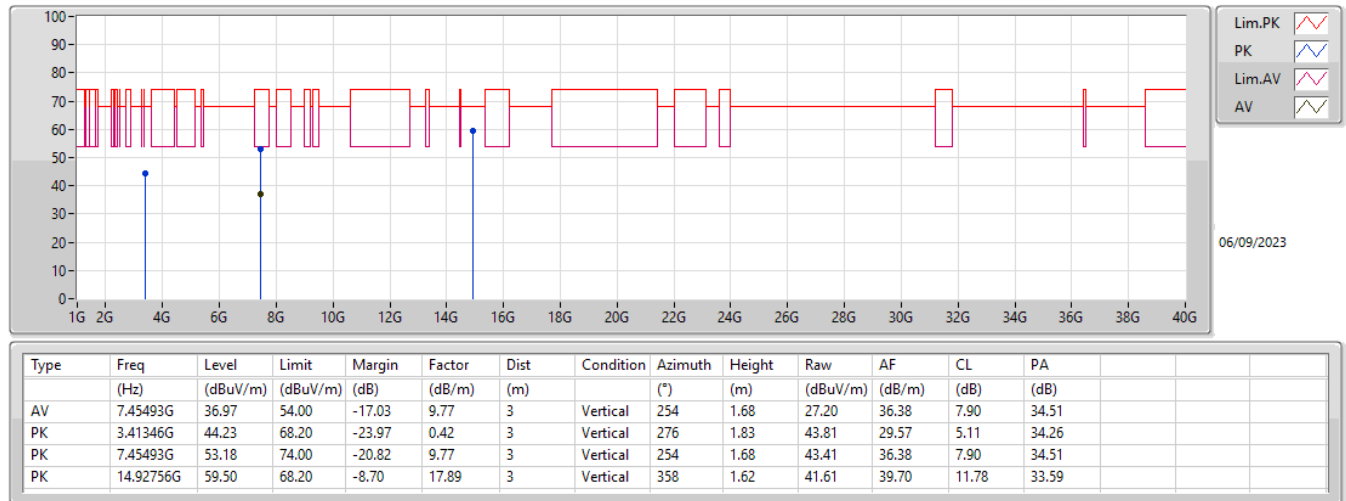
Mode 2



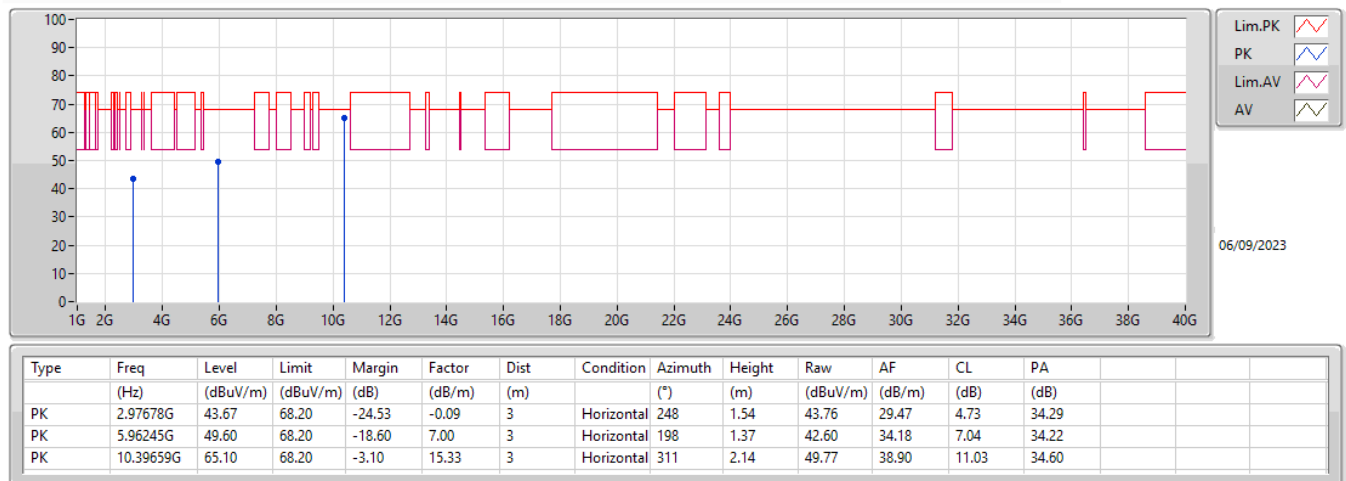
Mode 2



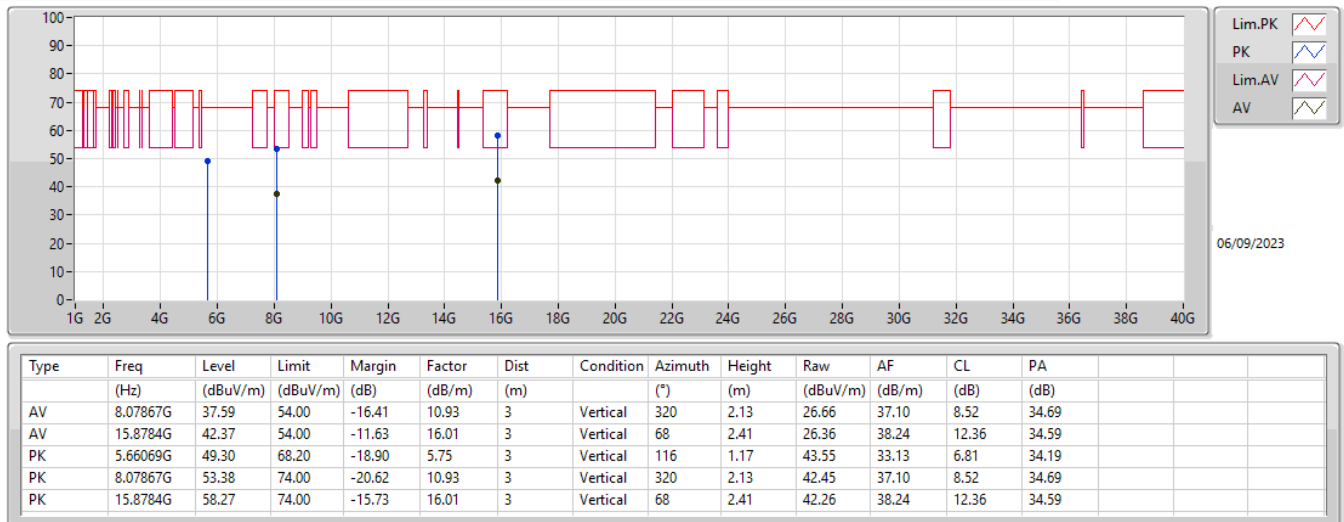
Mode 3



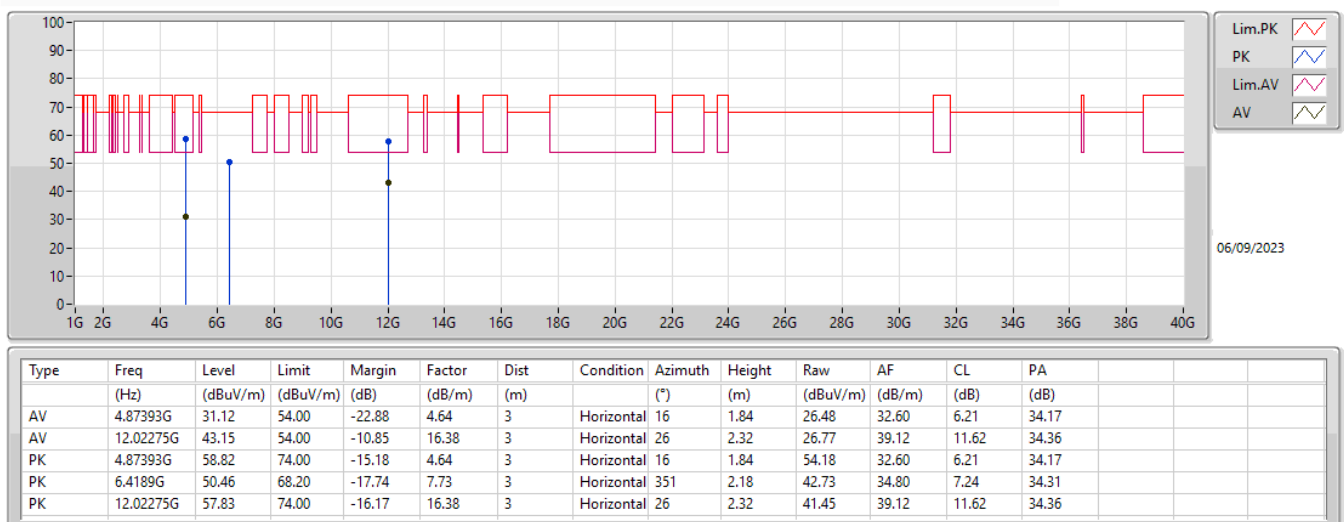
Mode 3



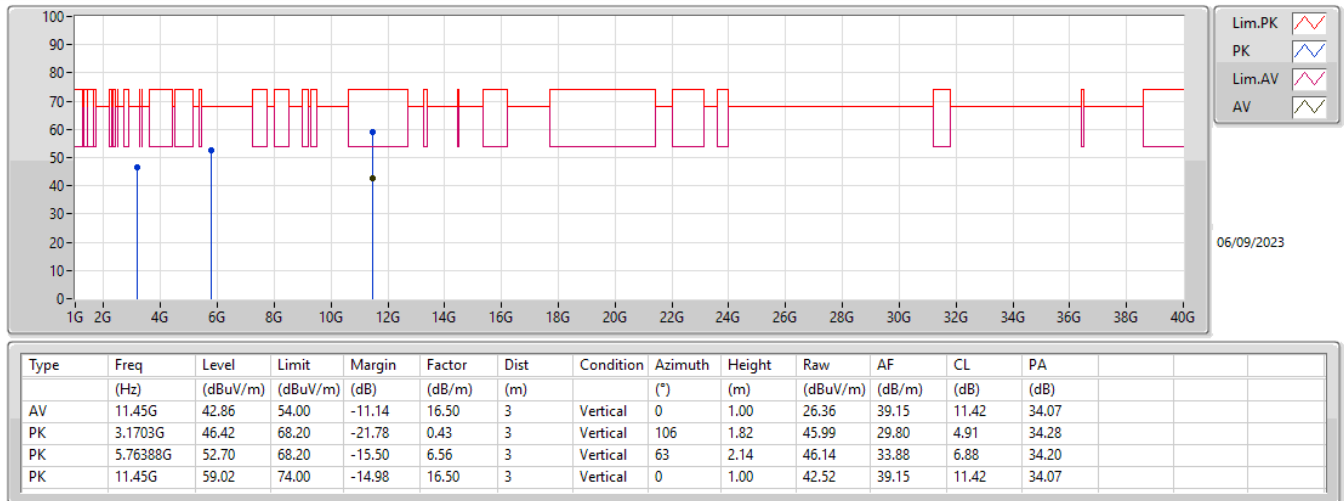
Mode 4



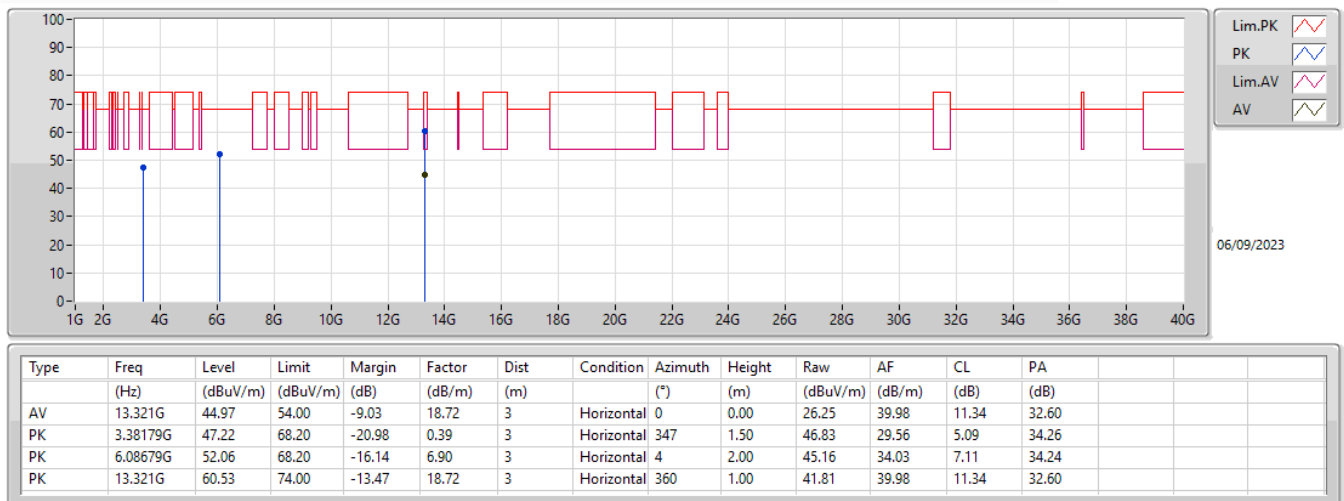
Mode 4



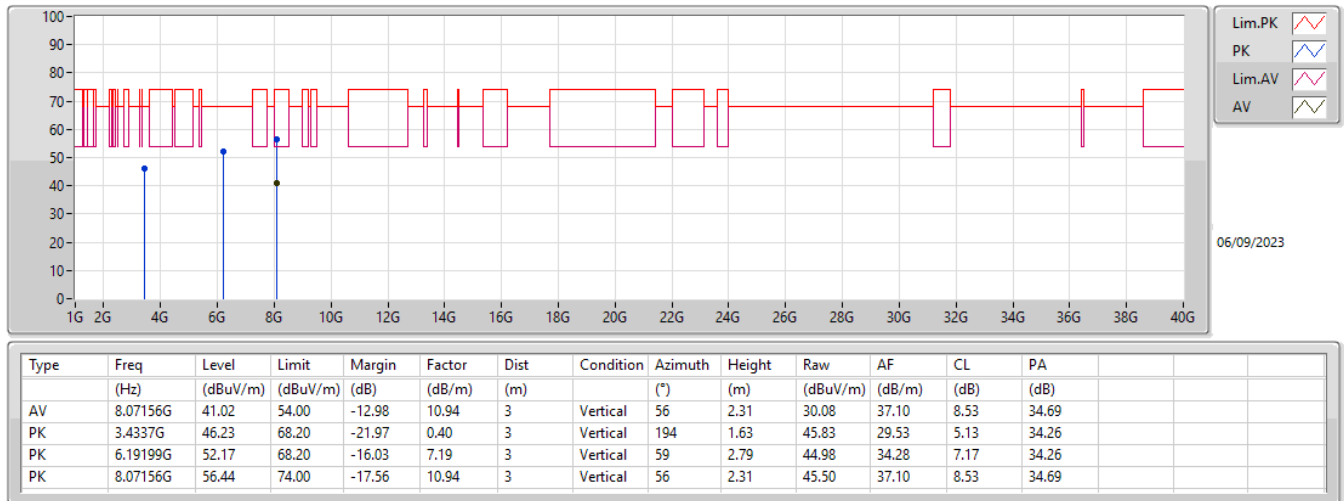
Mode 5



Mode 5



Mode 6



Mode 6

