FCC Radio Test Report

FCC ID	:	**2AGBW9290022230AX**
Equipment	:	**Smart button**
Brand Name	:	**PHILIPS**
Model Name	:	**9290022230A**
Applicant	:	**Signify (China) Investment Co., Ltd. Building 9, Lane 888, Tianlin Road, Minhang District, Shanghai 200233 China**
Manufacturer	:	**Signify (China) Investment Co., Ltd. Building 9, Lane 888, Tianlin Road, Minhang District, Shanghai 200233 China**
Standard	:	**47 CFR FCC Part 15.247**

The product was received on Mar. 17, 2022, and testing was started from Mar. 25, 2022 and completed on Mar. 30, 2022. 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.

Jackson Tsai

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 6
1.3 Testing Location Information 6
1.4 Measurement Uncertainty 6

2 TEST CONFIGURATION OF EUT 7

2.1 Test Channel Mode 7
2.2 The Worst Case Measurement Configuration 8
2.3 Accessories 9
2.4 Support Equipment 9
2.5 Test Setup Diagram 10

3 TRANSMITTER TEST RESULT 12

3.1 AC Power-line Conducted Emissions 12
3.2 DTS Bandwidth 14
3.3 Maximum Conducted Output Power 15
3.4 Power Spectral Density 17
3.5 Emissions in Non-restricted Frequency Bands 18
3.6 Emissions in Restricted Frequency Bands 19

4 TEST EQUIPMENT AND CALIBRATION DATA 23

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 PHOTOS

PHOTOGRAPHS OF EUT V01

History of this test report

Report No.	Version	Description	Issued Date
FR222436AZ	01	Initial issue of report	Jun. 07, 2022

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: Ben Tseng
Report Producer: Ann Hou

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	1TX

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

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	INPAQ	WAG-M-LA-00-048	Metal	I-PEX	-1.93

Note 1: The EUT has one antenna.

For Zigbee function:

For Zigbee mode (1TX/1RX)

Ant. 1 (port 1) could transmit/receive.

1.1.3 EUT Information

Operational Condition				
EUT Power Type	From Battery			
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	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

There are two sources of flash for EUT.

Flash	Brand Name	Model Name
Main source	GD	GD25WQ40EEIGR
2nd source	MXIC	MX25R4035FZUIL0

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	**ADD:** No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)			
(TAF: 3785**)**	**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	Billy	22.6~22.7°C / 55~57%	30/Mar/2022
RF Conducted	TH06-HY	Johnny	22.6~26.2°C / 53~66%	28/Mar/2022
Radiated	03CH02-HY	Jack	21.5~22.3°C / 56~62%	25/Mar/2022~26/Mar/2022
☐ Wen 33rd.St.	**ADD:** No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)			
(TAF: 3785**)**	**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**
Conducted Emission (150kHz ~ 30MHz)	0.9 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.0 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 Version	Tera Term Version 4.76

Mode	Power Setting
Zigbee	-
2405MHz	60
2440MHz	40
2480MHz	30

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	Test Fixture 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	Test Fixture mode		
Operating Mode > 1GHz	CTX		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
Worst Planes of EUT	V		

2.3 Accessories

Accessories				
Wall Pate (Round)	**Brand Name**	-	**Model Name**	-
Wall Pate (Square)	**Brand Name**	-	**Model Name**	-
Wall Pate (Rectangle)	**Brand Name**	-	**Model Name**	-

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

2.4 Support Equipment

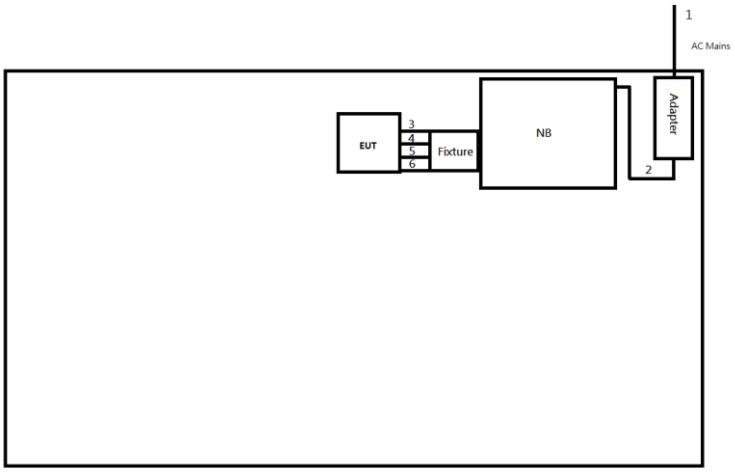
Support Equipment – AC Conduction					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	Notebook	HP	5220M	-	-
2	Fixture	Waveshare	FT232	-	Provided by Customer
3	Adapter for NB	HP	PPP012L-E	-	-

Support Equipment – Conducted					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	Notebook	DELL	E5410	-	-
2	Adapter for NB	DELL	HA65NM130	-	-
3	Fixture	Waveshare	FT232	-	Provided by Customer

Support Equipment – Radiated					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	Notebook	HP	5220M	-	-
2	Fixture	Waveshare	FT232	-	Provided by Customer
3	Adapter for NB	HP	PPP012L-E	-	-

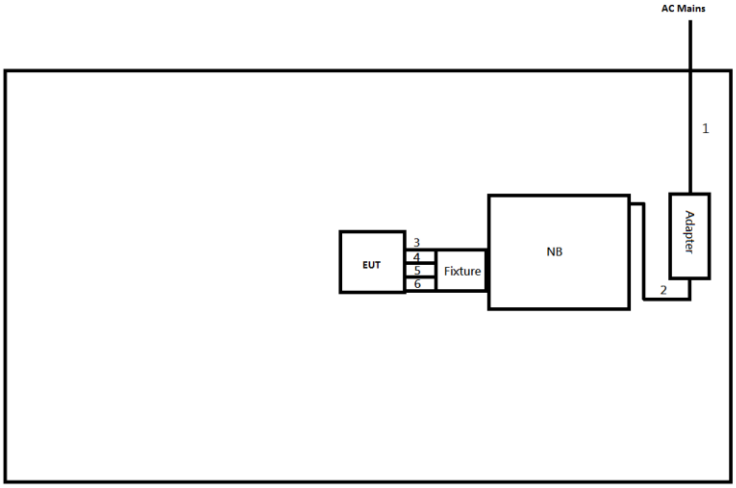
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)
1	AC Power cable	No	1.8
2	DC Power cable	No	1.8
3	Fixture cable	No	0.3
4	Fixture cable	No	0.3
5	Fixture cable	No	0.3
6	Fixture cable	No	0.3

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)
1	AC Power cable	No	1.8
2	DC Power cable	No	1.8
3	Fixture cable	No	0.3
4	Fixture cable	No	0.3
5	Fixture cable	No	0.3
6	Fixture cable	No	0.3

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

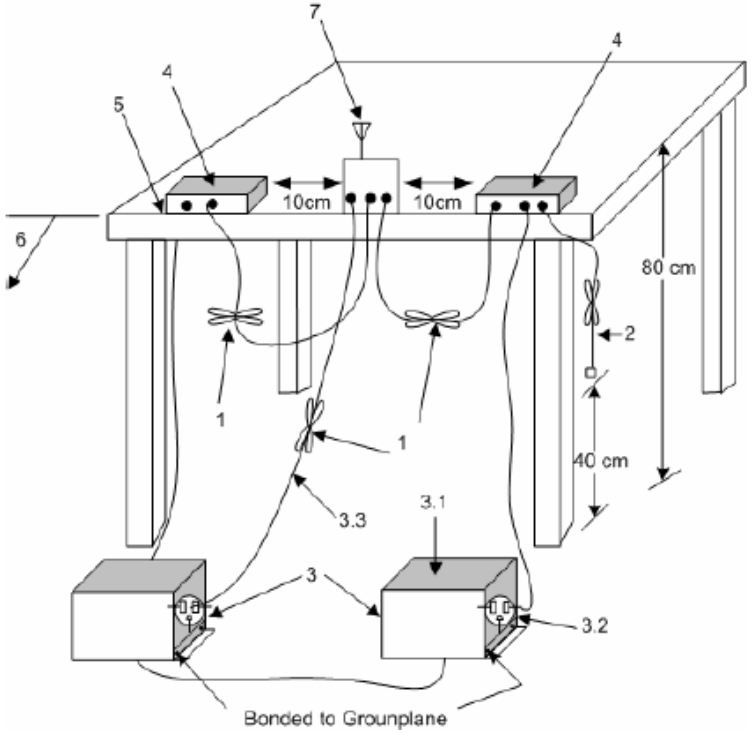
Test Method
☒ Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

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

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 50Ω loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
3.1—All other equipment powered from additional LISN(s).
3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
3.3—LISN at least 80 cm from nearest part of EUT chassis.
4—Non-EUT components of EUT system being tested.
5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

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.

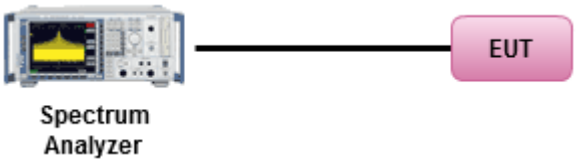
3.2.2 Measuring Instruments

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 KDB 558074, clause 8.2 (11.8 of ANSI C63.10) DTS bandwidth measurement.
	☐ Refer as RSS-Gen, clause 6.7 for for occupied bandwidth testing.
	☐ Refer as ANSI C63.10, clause 6.9.3 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
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): $P_{eirp} \leq MAX(36, [P_{Out} + G_{TX}])$ dBm	
	▪ Smart antenna system (SAS)	
		- Single beam: $P_{eirp} \leq MAX(36, P_{Out} + G_{TX})$ dBm
		- Overlap beam: $P_{eirp} \leq MAX(36, P_{Out} + G_{TX})$ dBm
		- Aggregate power on all beams: $P_{eirp} \leq MAX(36, [P_{Out} + G_{TX} + 8])$ 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: $P_{total} = P_1 + P_2 + \ldots + P_n$ (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

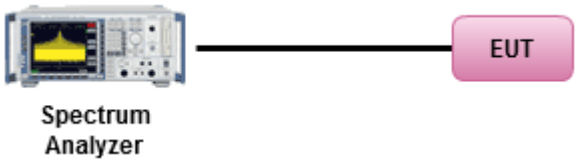
3.4.2 Measuring Instruments

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 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

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 (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

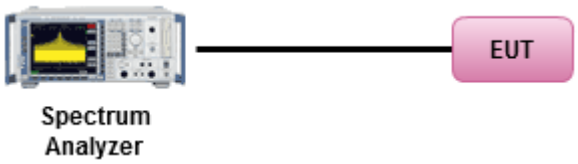
Refer a test equipment and calibration data table in this test report.

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

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 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 ≥ 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.

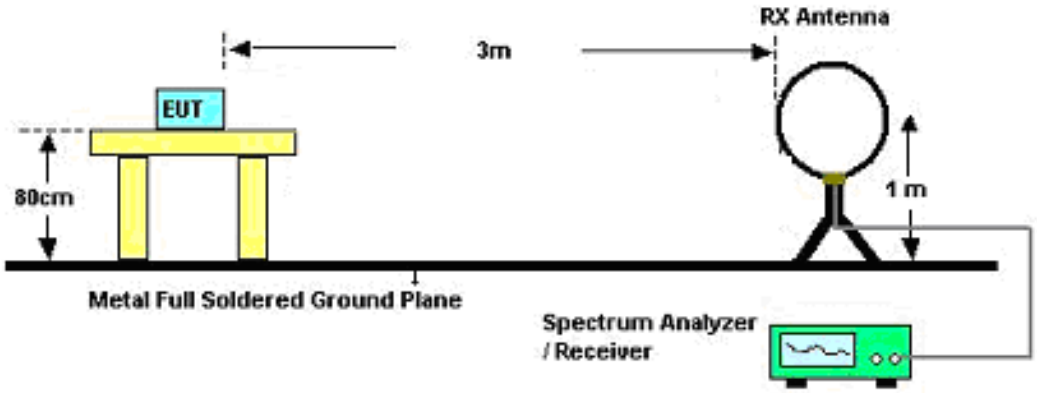
3.6.4 Measurement Results Calculation

The measured Level is calculated using:
Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor)

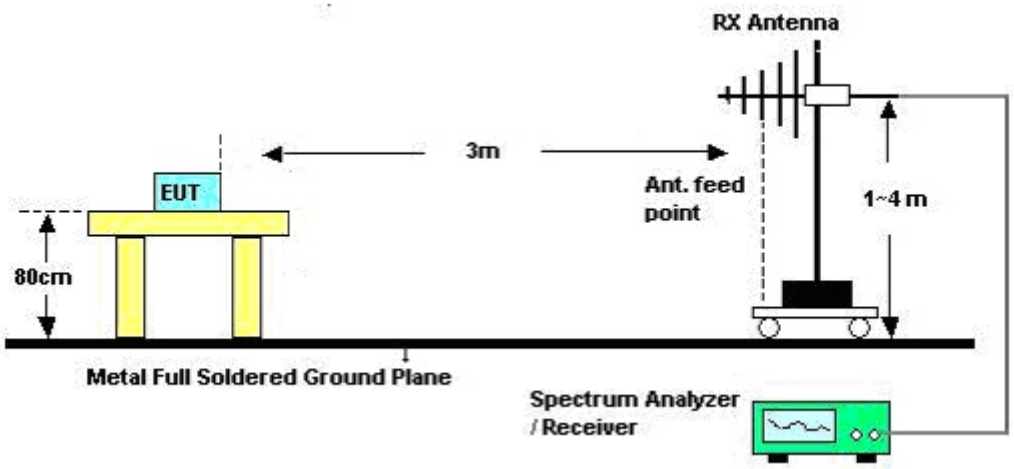
3.6.5 Test Setup

Emissions in Restricted Frequency Bands

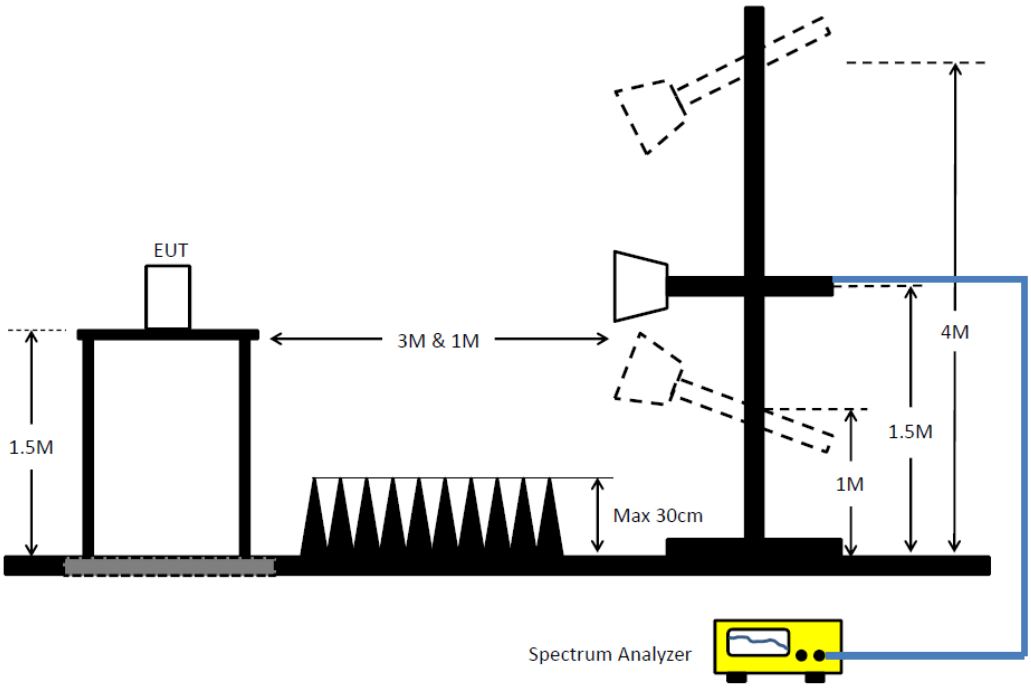
9kHz ~30MHz



30MHz~1GHz



Above 1GHz



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	ESR3	102051	9kHz ~ 3.6GHz	21/May/2021	20/May/2022
Two-Line V-Network	R&S	ENV 216	100003	9kHz ~ 30MHz	18/Feb/2022	17/Feb/2023
Two-Line V-Network	R&S	ENV 216	ENV 216	9kHz ~ 30MHz	13/May/2021	12/May/2022
RF Cable 5m	TITAN	TITAN	CO04-cable-01	9 kHz ~ 200MHz	01/Mar/2022	28/Feb/2023
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9kHz ~ 30MHz	26/Oct/2021	25/Oct/2022
Software	Sporton	SENSE-EMI	V5.10.7	-	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	101029	10Hz~40GHz	20/Oct/2021	19/Oct/2022
SMB100A Signal Generator	R&S	SMB100A	181147	100kHz~40GHz	21/Oct/2021	20/Oct/2022
Pulse Sensor	Anritsu	MA2411B	0917017	300MHz~40GHz	21/Feb/2022	20/Feb/2023
Power Meter	Anritsu	ML2495A	0949003	300MHz~40GHz	21/Feb/2022	20/Feb/2023
SENSE-15247_DTS	Sporton	V5.10.7.14	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	03CH02-HY	30MHz~1GHz 3m	02/Aug/2021	01/Aug/2022
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	1GHz~18GHz 3m	01/Aug/2021	31/Jul/2022
Signal Analyzer	R&S	FSP40	100792	9kHz~40GHz	30/Jun/2021	29/Jun/2022
Amplifier	Agilent	8447D	2944A11149	100kHz~1.3GHz	29/Jun/2021	28/Jun/2022
Microwave Preamplifier	Agilent	8449B	3008A02373	1GHz~26.5GHz	03/Nov/2021	02/Nov/2022
Bilog Antenna & 5dB Attenuator	SCHAFFNER / MTJ	CBL 6112B / MTJ6102-05	2723 / 2	30MHz~1GHz	04/Sep/2021	03/Sep/2022
Double Ridged Guide Horn Antenna	SCHWARZBEC	BBHA 9120 D	BBHA 9120 D 01543	1GHz~18GHz	04/Jun/2021	03/Jun/2022
RF Cable	MVE	400LL	MVE-1-0802	9kHz~30MHz	05/May/2021	04/May/2022
RF Cable	MVE	400LL	MVE-1-0802	30MHz~1GHz	05/May/2021	04/May/2022
RF Cable-R03m	HUBER+SUHNER	SUCOFLEX104	805193/4+805192/4	1GHz~40GHz	06/Apr/2021	05/Apr/2022
EMI Test Receiver	R&S	ESR3	102052	9kHz~3.6GHz	19/Apr/2021	18/Apr/2022
SENSE-15247_DTS	Sporton	V5.10.7.13	N/A	N/A	N/A	N/A

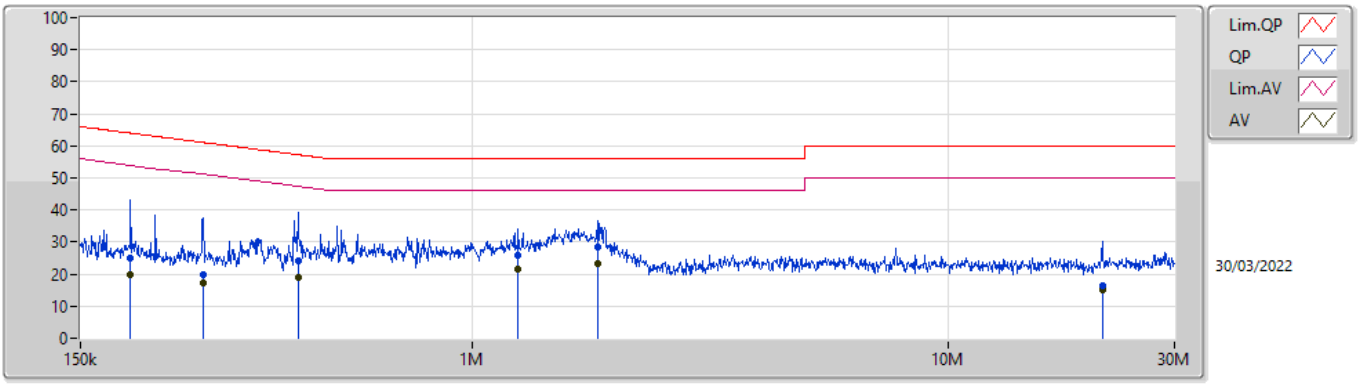
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	1.833M	23.28	46.00	-22.72	Line

Result

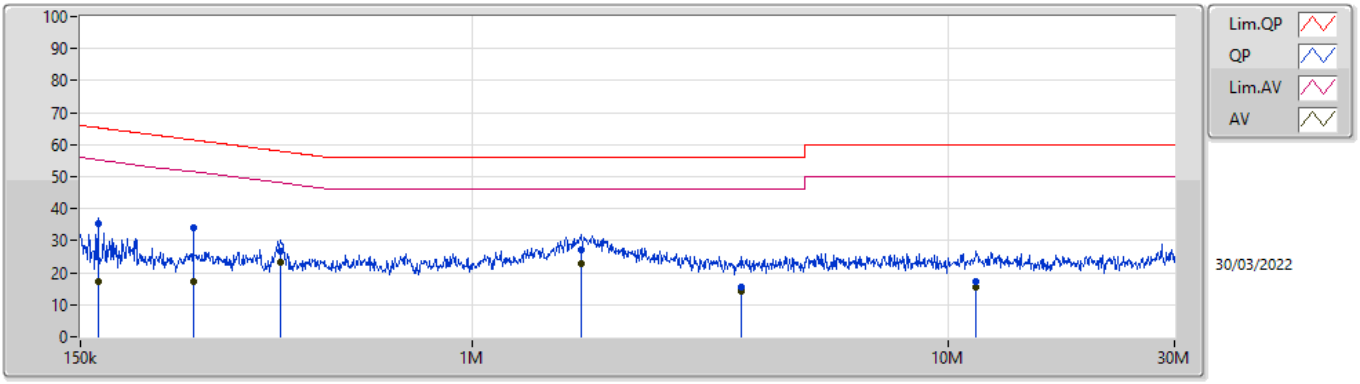
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition	Comments
Mode 1	Pass	QP	191.358k	24.87	63.97	-39.10	Line	-
Mode 1	Pass	AV	191.358k	19.85	53.97	-34.12	Line	-
Mode 1	Pass	QP	271.903k	19.85	61.07	-41.22	Line	-
Mode 1	Pass	AV	271.903k	17.16	51.07	-33.91	Line	-
Mode 1	Pass	QP	430.32k	23.95	57.24	-33.29	Line	-
Mode 1	Pass	AV	430.32k	18.83	47.24	-28.41	Line	-
Mode 1	Pass	QP	1.249M	25.66	56.00	-30.34	Line	-
Mode 1	Pass	AV	1.249M	21.56	46.00	-24.44	Line	-
Mode 1	Pass	QP	1.833M	28.46	56.00	-27.54	Line	-
Mode 1	Pass	AV	1.833M	23.28	46.00	-22.72	Line	-
Mode 1	Pass	QP	21.178M	16.43	60.00	-43.57	Line	-
Mode 1	Pass	AV	21.178M	14.97	50.00	-35.03	Line	-
Mode 1	Pass	QP	163.117k	35.38	65.31	-29.93	Neutral	-
Mode 1	Pass	AV	163.117k	17.45	55.31	-37.86	Neutral	-
Mode 1	Pass	QP	259.185k	33.97	61.45	-27.48	Neutral	-
Mode 1	Pass	AV	259.185k	17.20	51.45	-34.25	Neutral	-
Mode 1	Pass	QP	395.716k	26.81	57.95	-31.14	Neutral	-
Mode 1	Pass	AV	395.716k	23.08	47.95	-24.87	Neutral	-
Mode 1	Pass	QP	1.699M	27.14	56.00	-28.86	Neutral	-
Mode 1	Pass	AV	1.699M	23.00	46.00	-23.00	Neutral	-
Mode 1	Pass	QP	3.671M	15.68	56.00	-40.32	Neutral	-
Mode 1	Pass	AV	3.671M	14.33	46.00	-31.67	Neutral	-
Mode 1	Pass	QP	11.498M	17.17	60.00	-42.83	Neutral	-
Mode 1	Pass	AV	11.498M	15.61	50.00	-34.39	Neutral	-

Conducted Emissions at Powerline_Mode 1



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	191.358k	24.87	63.97	-39.10	19.63	Line	-	5.24	9.69	0.03	9.91
AV	191.358k	19.85	53.97	-34.12	19.63	Line	-	0.22	9.69	0.03	9.91
QP	271.903k	19.85	61.07	-41.22	19.63	Line	-	0.22	9.69	0.03	9.91
AV	271.903k	17.16	51.07	-33.91	19.63	Line	-	-2.47	9.69	0.03	9.91
QP	430.32k	23.95	57.24	-33.29	19.63	Line	-	4.32	9.68	0.04	9.91
AV	430.32k	18.83	47.24	-28.41	19.63	Line	-	-0.80	9.68	0.04	9.91
QP	1.249M	25.66	56.00	-30.34	19.67	Line	-	5.99	9.69	0.06	9.92
AV	1.249M	21.56	46.00	-24.44	19.67	Line	-	1.89	9.69	0.06	9.92
QP	1.833M	28.46	56.00	-27.54	19.70	Line	-	8.76	9.70	0.08	9.92
AV	1.833M	23.28	46.00	-22.72	19.70	Line	-	3.58	9.70	0.08	9.92
QP	21.178M	16.43	60.00	-43.57	20.00	Line	-	-3.57	9.79	0.28	9.93
AV	21.178M	14.97	50.00	-35.03	20.00	Line	-	-5.03	9.79	0.28	9.93

Conducted Emissions at Powerline_Mode 1



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	163.117k	35.38	65.31	-29.93	19.67	Neutral	-	15.71	9.73	0.03	9.91
AV	163.117k	17.45	55.31	-37.86	19.67	Neutral	-	-2.22	9.73	0.03	9.91
QP	259.185k	33.97	61.45	-27.48	19.66	Neutral	-	14.31	9.72	0.03	9.91
AV	259.185k	17.20	51.45	-34.25	19.66	Neutral	-	-2.46	9.72	0.03	9.91
QP	395.716k	26.81	57.95	-31.14	19.67	Neutral	-	7.14	9.72	0.04	9.91
AV	395.716k	23.08	47.95	-24.87	19.67	Neutral	-	3.41	9.72	0.04	9.91
QP	1.699M	27.14	56.00	-28.86	19.73	Neutral	-	7.41	9.74	0.07	9.92
AV	1.699M	23.00	46.00	-23.00	19.73	Neutral	-	3.27	9.74	0.07	9.92
QP	3.671M	15.68	56.00	-40.32	19.80	Neutral	-	-4.12	9.76	0.12	9.92
AV	3.671M	14.33	46.00	-31.67	19.80	Neutral	-	-5.47	9.76	0.12	9.92
QP	11.498M	17.17	60.00	-42.83	20.04	Neutral	-	-2.87	9.91	0.20	9.93
AV	11.498M	15.61	50.00	-34.39	20.04	Neutral	-	-4.43	9.91	0.20	9.93

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
Zigbee	1.638M	2.261M	2M26G1D	1.631M	2.261M

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	1.638M	2.261M
2440MHz	Pass	500k	1.631M	2.261M
2480MHz	Pass	500k	1.631M	2.261M

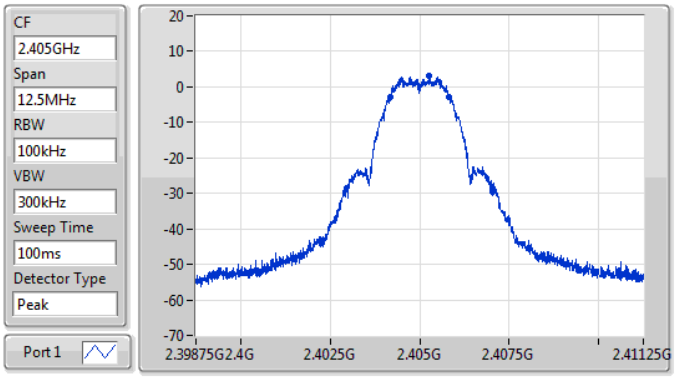
Port X-N dB = Port X 6dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth

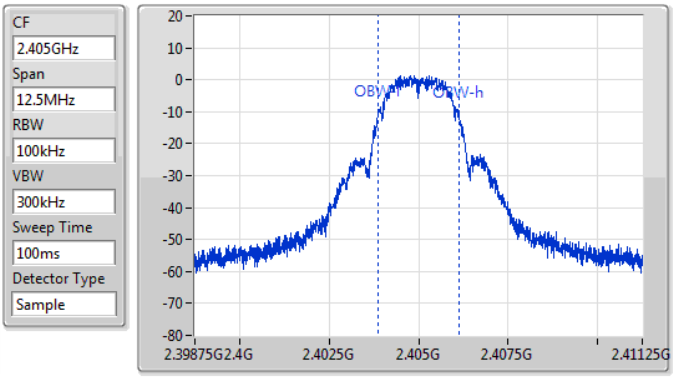
Zigbee

EBW

2405MHz

28/03/2022





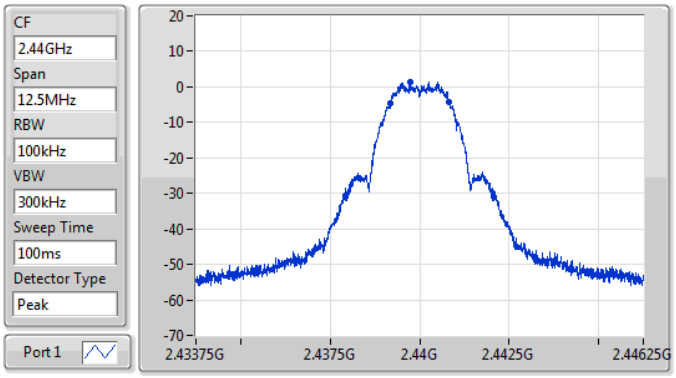
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.638M	2.404188G	2.405825G	2.261M	2.403869G	2.406131G	500k	1

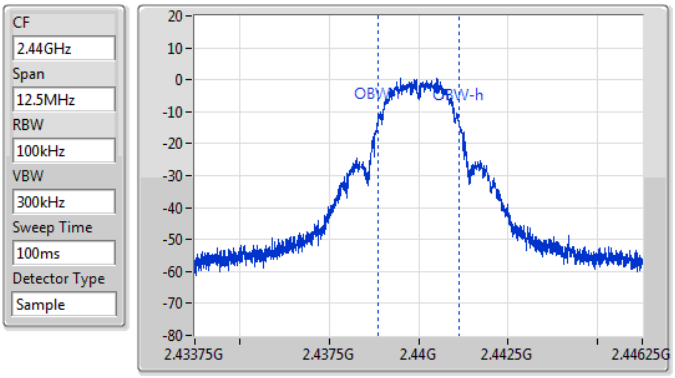
Zigbee

EBW

2440MHz

28/03/2022



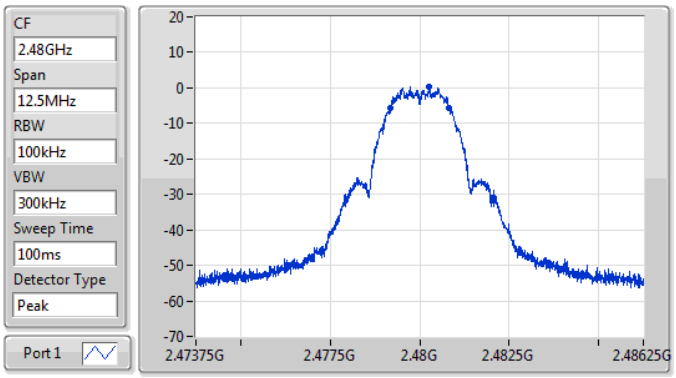


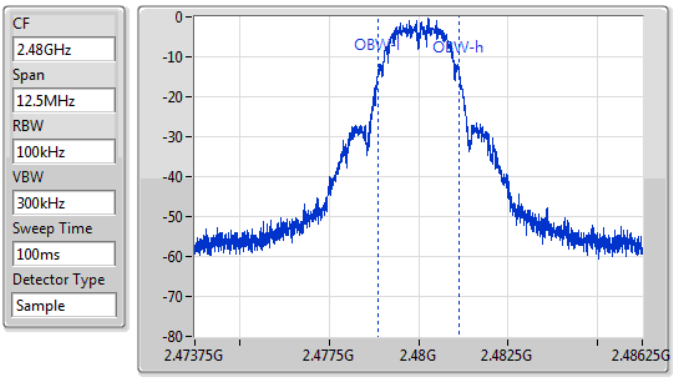
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.631M	2.439188G	2.440819G	2.261M	2.438869G	2.441131G	500k	1

Zigbee **EBW**

2480MHz

28/03/2022





6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.631M	2.479188G	2.480819G	2.261M	2.478869G	2.481131G	500k	1

Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
Zigbee	6.96	0.00497

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)
Zigbee	-	-	-	-	-
2405MHz	Pass	-1.93	6.96	6.96	30.00
2440MHz	Pass	-1.93	5.41	5.41	30.00
2480MHz	Pass	-1.93	4.19	4.19	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
Zigbee	-8.52

RBW = 3kHz;

Result

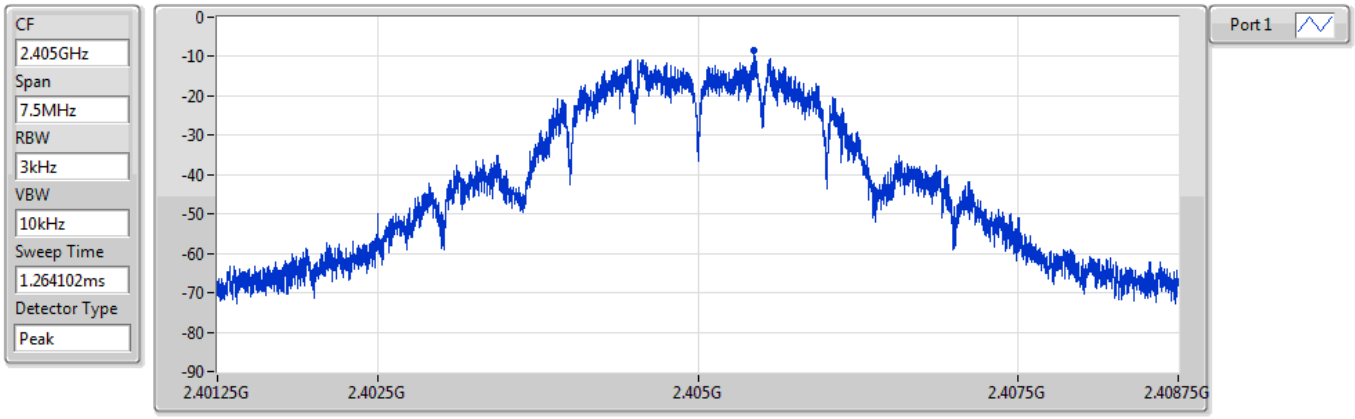
Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
Zigbee	-	-	-	-	-
2405MHz	Pass	-1.93	-8.52	-8.52	8.00
2440MHz	Pass	-1.93	-11.61	-11.61	8.00
2480MHz	Pass	-1.93	-12.12	-12.12	8.00

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;

Zigbee PSD

2405MHz

28/03/2022

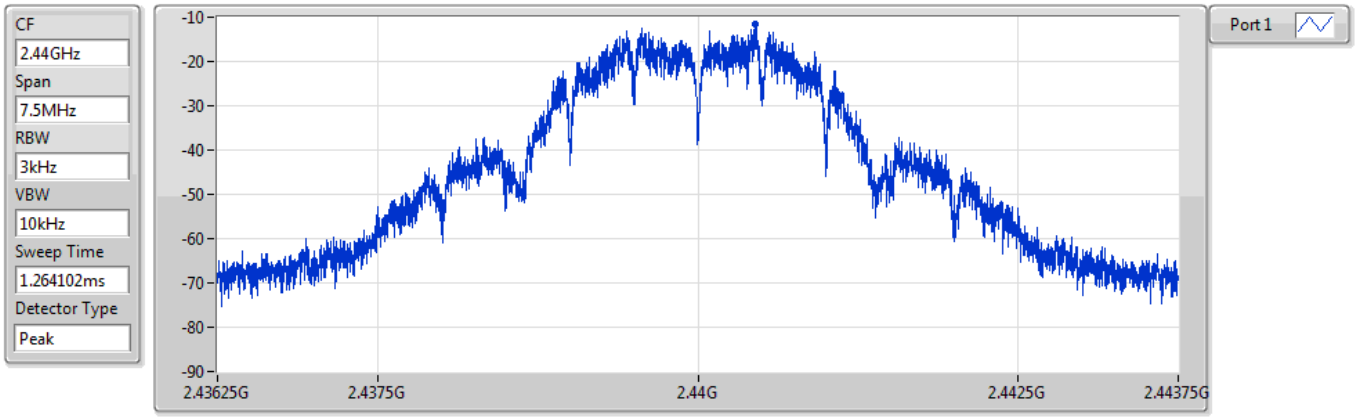


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.52	-8.52	-8.52

Zigbee PSD

2440MHz

28/03/2022

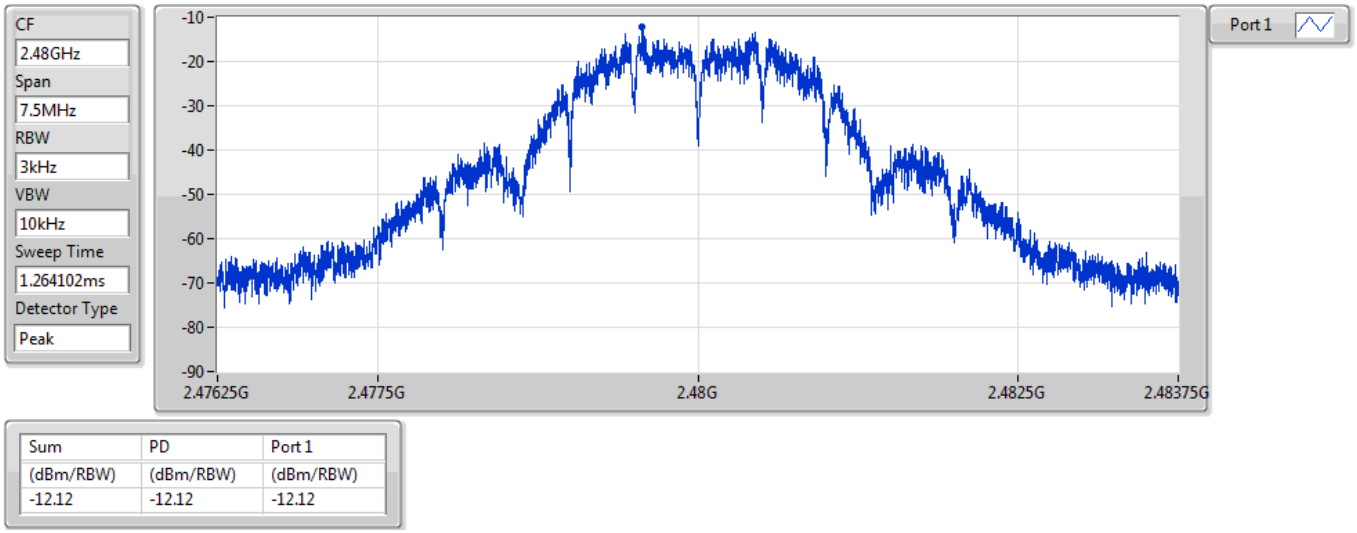


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.61	-11.61	-11.61

Zigbee **PSD**

2480MHz

28/03/2022



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-12.12	-12.12	-12.12

Summary

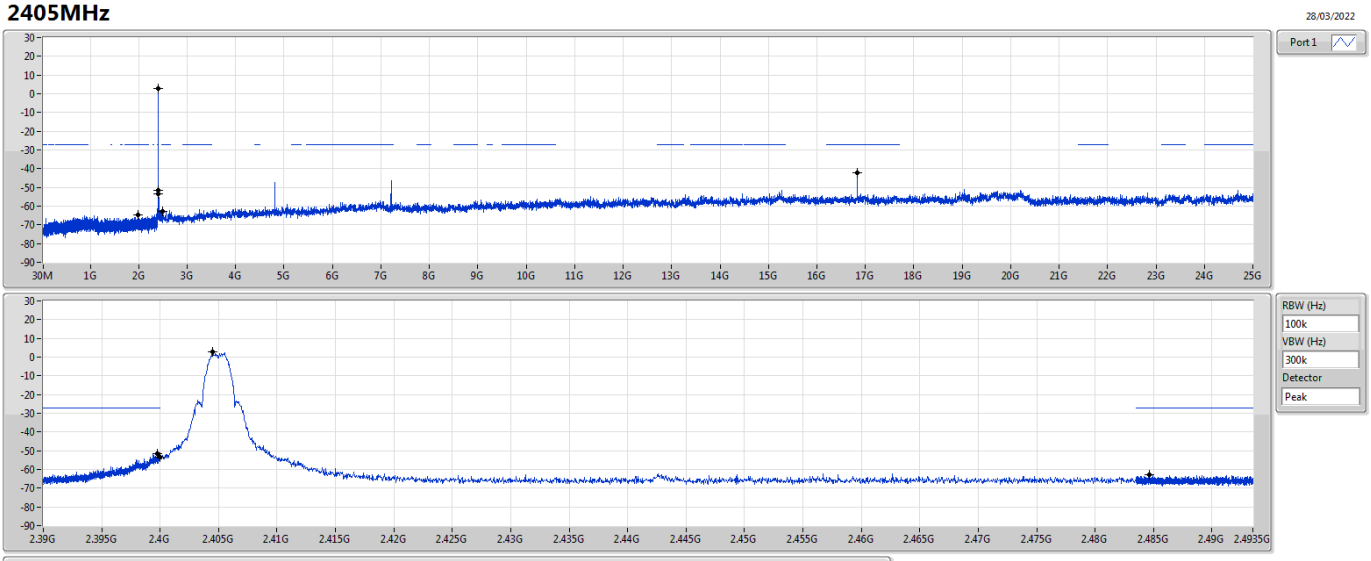
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	2.40447G	2.68	-27.32	2.13099G	-65.10	2.39108G	-63.64	2.4835G	-50.25	2.48356G	-47.41	17.36467G	-50.09	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	2.40447G	2.68	-27.32	1.98172G	-64.49	2.39979G	-51.71	2.4G	-53.57	2.48468G	-62.98	16.83858G	-42.19	1
2440MHz	Pass	2.40447G	2.68	-27.32	2.12952G	-63.68	2.39906G	-63.10	2.4835G	-65.85	2.48363G	-62.12	17.08334G	-49.70	1
2480MHz	Pass	2.40447G	2.68	-27.32	2.13099G	-65.10	2.39108G	-63.64	2.4835G	-50.25	2.48356G	-47.41	17.36467G	-50.09	1

Zigbee **CSENdB**

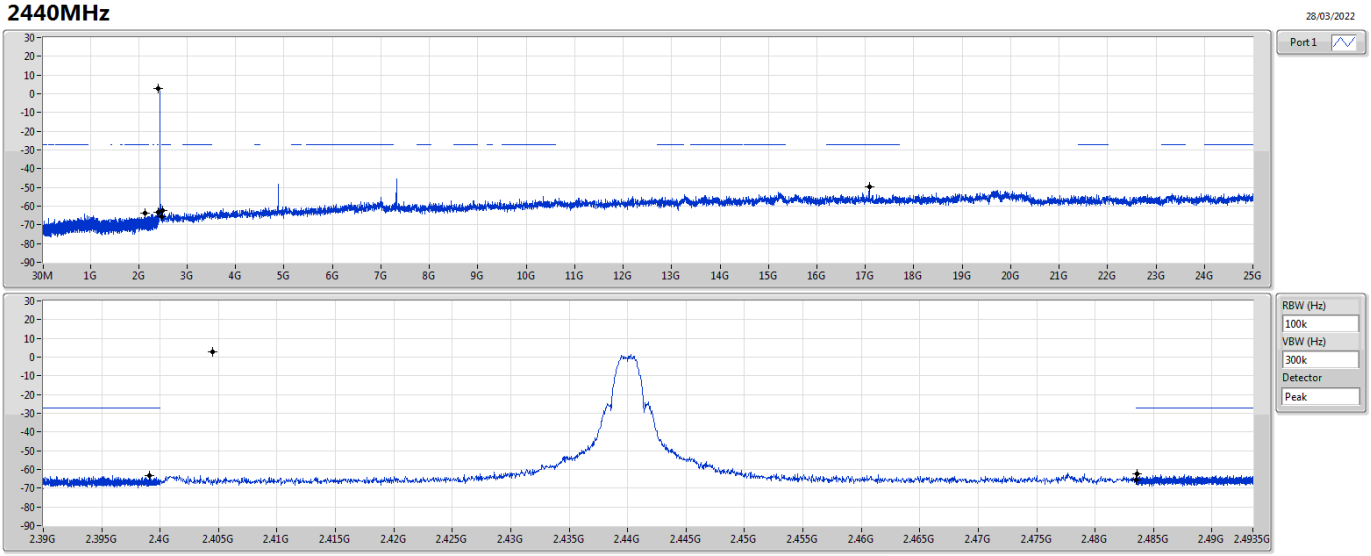
2405MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40447G	2.68	-27.32	1.98172G	-64.49	2.39979G	-51.71	2.4G	-53.57	2.48468G	-62.98	16.83858G	-42.19	1

Zigbee **CSENdB**

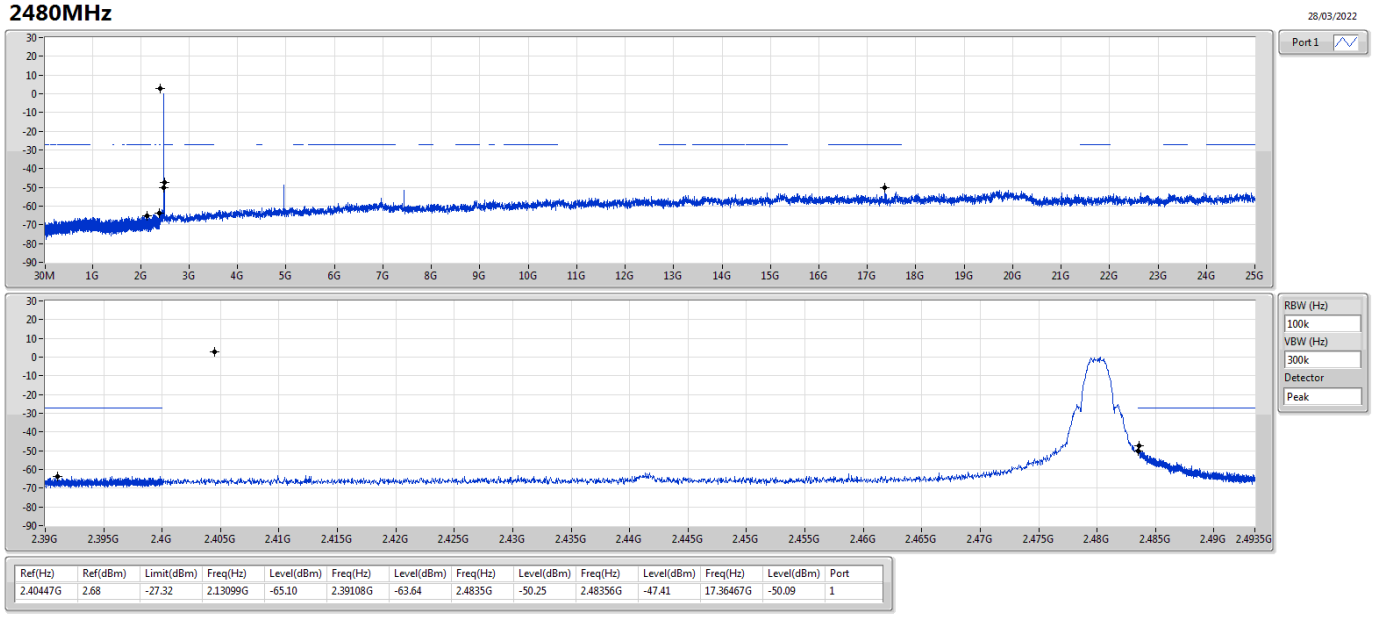
2440MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.40447G	2.68	-27.32	2.12952G	-63.68	2.39906G	-63.10	2.4835G	-65.85	2.48363G	-62.12	17.08334G	-49.70	1

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)	Freq(Hz)	Level(dBm)	Port
2.40447G	2.68	-27.32	2.13099G	-65.10	2.39108G	-63.64	2.4835G	-50.25	2.48356G	-47.41	17.36467G	-50.09	1

Summary

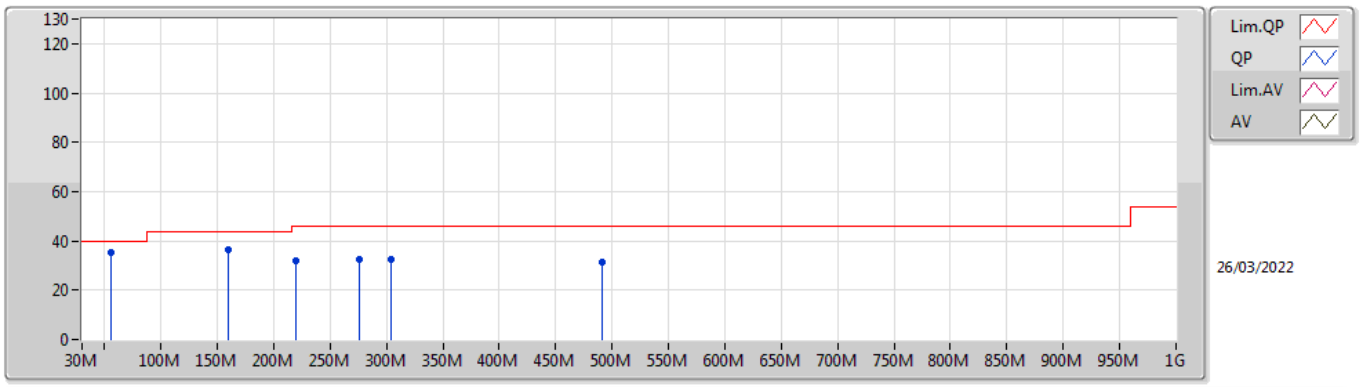
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	PK	49.4M	35.74	40.00	-4.26	3	Horizontal	360	1.00	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
Zigbee	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	PK	55.22M	35.32	40.00	-4.68	3	Vertical	0	1.00	-
2440MHz	Pass	PK	159.98M	36.49	43.50	-7.01	3	Vertical	0	1.00	-
2440MHz	Pass	PK	220.12M	31.90	46.00	-14.10	3	Vertical	0	1.00	-
2440MHz	Pass	PK	276.38M	32.37	46.00	-13.63	3	Vertical	0	1.00	-
2440MHz	Pass	PK	303.54M	32.25	46.00	-13.75	3	Vertical	0	1.00	-
2440MHz	Pass	PK	491.72M	31.43	46.00	-14.57	3	Vertical	0	1.00	-
2440MHz	Pass	PK	49.4M	35.74	40.00	-4.26	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	165.8M	38.02	43.50	-5.48	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	191.02M	37.17	43.50	-6.33	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	288.02M	35.37	46.00	-10.63	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	311.3M	32.99	46.00	-13.01	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	480.08M	37.34	46.00	-8.66	3	Horizontal	360	1.00	-

Zigbee

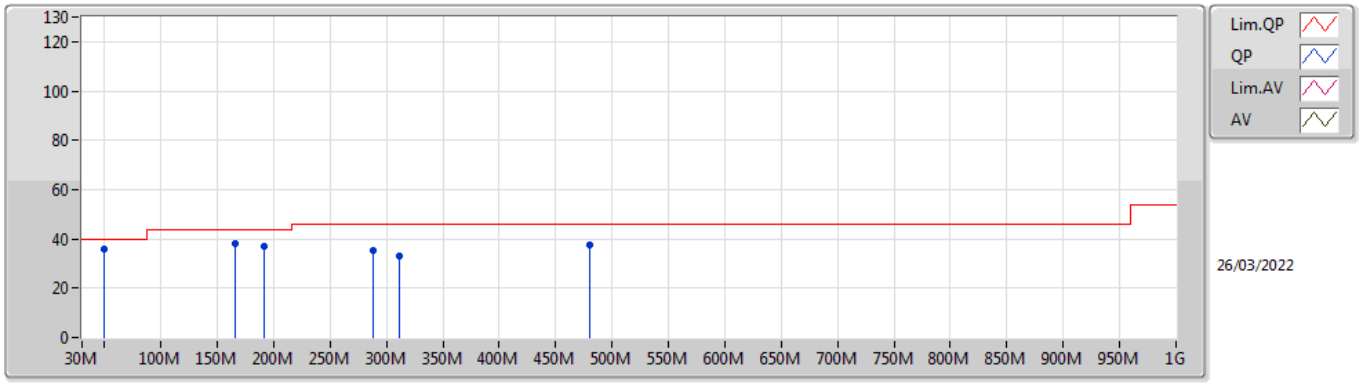
2440MHz_Test Fixture



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	55.22M	35.32	40.00	-4.68	-14.62	3	Vertical	0	1.00	-	49.94	12.01	1.10	27.73
PK	159.98M	36.49	43.50	-7.01	-10.53	3	Vertical	0	1.00	-	47.02	15.22	1.77	27.52
PK	220.12M	31.90	46.00	-14.10	-10.77	3	Vertical	0	1.00	-	42.67	14.39	2.04	27.20
PK	276.38M	32.37	46.00	-13.63	-6.79	3	Vertical	0	1.00	-	39.16	17.99	2.26	27.04
PK	303.54M	32.25	46.00	-13.75	-6.24	3	Vertical	0	1.00	-	38.49	18.47	2.37	27.08
PK	491.72M	31.43	46.00	-14.57	-2.54	3	Vertical	0	1.00	-	33.97	22.71	3.05	28.30

Zigbee

2440MHz_Test Fixture



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	49.4M	35.74	40.00	-4.26	-13.19	3	Horizontal	360	1.00	-	48.93	13.45	1.06	27.70
PK	165.8M	38.02	43.50	-5.48	-10.62	3	Horizontal	360	1.00	-	48.64	15.08	1.80	27.50
PK	191.02M	37.17	43.50	-6.33	-11.20	3	Horizontal	360	1.00	-	48.37	14.26	1.92	27.38
PK	288.02M	35.37	46.00	-10.63	-6.64	3	Horizontal	360	1.00	-	42.01	18.10	2.31	27.05
PK	311.3M	32.99	46.00	-13.01	-6.03	3	Horizontal	360	1.00	-	39.02	18.69	2.40	27.12
PK	480.08M	37.34	46.00	-8.66	-2.61	3	Horizontal	360	1.00	-	39.95	22.62	3.01	28.24

Summary

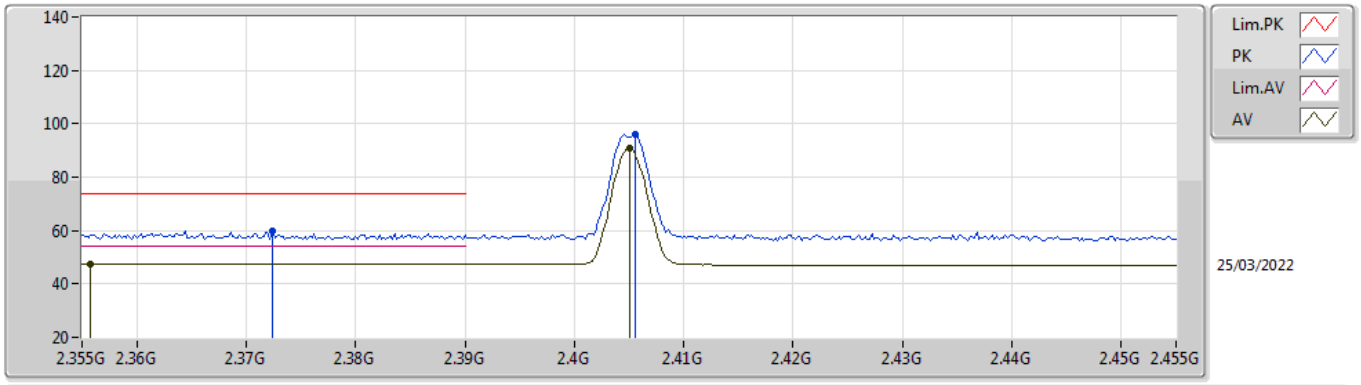
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	AV	7.31862G	50.97	54.00	-3.03	3	Horizontal	0	1.19	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
Zigbee	-	-	-	-	-	-	-	-	-	-	-
2405MHz	Pass	AV	2.3558G	47.54	54.00	-6.46	3	Vertical	81	1.29	-
2405MHz	Pass	AV	2.405G	91.04	Inf	-Inf	3	Vertical	81	1.29	-
2405MHz	Pass	PK	2.3724G	59.94	74.00	-14.06	3	Vertical	81	1.29	-
2405MHz	Pass	PK	2.4056G	95.82	Inf	-Inf	3	Vertical	81	1.29	-
2405MHz	Pass	AV	2.3558G	47.55	54.00	-6.45	3	Horizontal	143	1.28	-
2405MHz	Pass	AV	2.405G	87.68	Inf	-Inf	3	Horizontal	143	1.28	-
2405MHz	Pass	PK	2.3582G	59.16	74.00	-14.84	3	Horizontal	143	1.28	-
2405MHz	Pass	PK	2.4046G	92.65	Inf	-Inf	3	Horizontal	143	1.28	-
2405MHz	Pass	AV	4.81096G	33.94	54.00	-20.06	3	Vertical	8	1.12	-
2405MHz	Pass	PK	4.81108G	46.16	74.00	-27.84	3	Vertical	8	1.12	-
2405MHz	Pass	AV	4.81098G	35.31	54.00	-18.69	3	Horizontal	349	2.80	-
2405MHz	Pass	PK	4.81122G	46.82	74.00	-27.18	3	Horizontal	349	2.80	-
2440MHz	Pass	AV	2.3416G	47.61	54.00	-6.39	3	Vertical	168	1.34	-
2440MHz	Pass	AV	2.44G	91.76	Inf	-Inf	3	Vertical	168	1.34	-
2440MHz	Pass	AV	2.4932G	47.02	54.00	-6.98	3	Vertical	168	1.34	-
2440MHz	Pass	PK	2.3468G	58.81	74.00	-15.19	3	Vertical	168	1.34	-
2440MHz	Pass	PK	2.4408G	96.42	Inf	-Inf	3	Vertical	168	1.34	-
2440MHz	Pass	PK	2.4835G	57.69	74.00	-16.31	3	Vertical	168	1.34	-
2440MHz	Pass	AV	2.3404G	47.63	54.00	-6.37	3	Horizontal	193	2.61	-
2440MHz	Pass	AV	2.44G	89.92	Inf	-Inf	3	Horizontal	193	2.61	-
2440MHz	Pass	AV	2.4944G	46.97	54.00	-7.03	3	Horizontal	193	2.61	-
2440MHz	Pass	PK	2.3708G	58.43	74.00	-15.57	3	Horizontal	193	2.61	-
2440MHz	Pass	PK	2.4396G	94.67	Inf	-Inf	3	Horizontal	193	2.61	-
2440MHz	Pass	PK	2.49G	58.75	74.00	-15.25	3	Horizontal	193	2.61	-
2440MHz	Pass	AV	4.881G	34.14	54.00	-19.86	3	Vertical	169	1.25	-
2440MHz	Pass	AV	7.31866G	50.54	54.00	-3.46	3	Vertical	119	1.16	-
2440MHz	Pass	PK	4.881G	45.93	74.00	-28.07	3	Vertical	169	1.25	-
2440MHz	Pass	PK	7.31832G	60.93	74.00	-13.07	3	Vertical	119	1.16	-
2440MHz	Pass	AV	4.88092G	33.37	54.00	-20.63	3	Horizontal	33	1.16	-
2440MHz	Pass	AV	7.31862G	50.97	54.00	-3.03	3	Horizontal	0	1.19	-
2440MHz	Pass	PK	4.87876G	45.55	74.00	-28.45	3	Horizontal	33	1.16	-
2440MHz	Pass	PK	7.31846G	61.52	74.00	-12.48	3	Horizontal	0	1.19	-
2480MHz	Pass	AV	2.48G	93.38	Inf	-Inf	3	Vertical	167	1.29	-
2480MHz	Pass	AV	2.4835G	50.92	54.00	-3.08	3	Vertical	167	1.29	-
2480MHz	Pass	PK	2.4806G	98.19	Inf	-Inf	3	Vertical	167	1.29	-
2480MHz	Pass	PK	2.4835G	60.42	74.00	-13.58	3	Vertical	167	1.29	-
2480MHz	Pass	AV	2.48G	87.64	Inf	-Inf	3	Horizontal	122	1.26	-
2480MHz	Pass	AV	2.4835G	48.23	54.00	-5.77	3	Horizontal	122	1.26	-
2480MHz	Pass	PK	2.4796G	92.40	Inf	-Inf	3	Horizontal	122	1.26	-
2480MHz	Pass	PK	2.4835G	57.40	74.00	-16.60	3	Horizontal	122	1.26	-
2480MHz	Pass	AV	4.96095G	34.22	54.00	-19.78	3	Vertical	77	1.39	-
2480MHz	Pass	AV	7.43858G	49.05	54.00	-4.95	3	Vertical	118	1.31	-
2480MHz	Pass	PK	4.96107G	47.19	74.00	-26.81	3	Vertical	77	1.39	-
2480MHz	Pass	PK	7.44156G	59.95	74.00	-14.05	3	Vertical	118	1.31	-
2480MHz	Pass	AV	4.96098G	34.92	54.00	-19.08	3	Horizontal	335	1.00	-
2480MHz	Pass	AV	7.43856G	49.63	54.00	-4.37	3	Horizontal	56	2.62	-
2480MHz	Pass	PK	4.96098G	46.63	74.00	-27.37	3	Horizontal	335	1.00	-
2480MHz	Pass	PK	7.43846G	60.41	74.00	-13.59	3	Horizontal	56	2.62	-

Zigbee

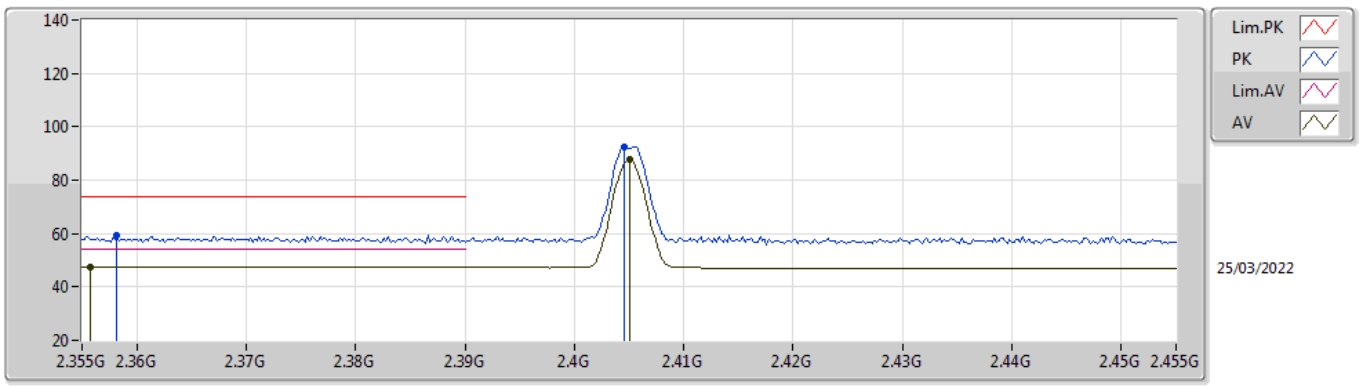
2405MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3558G	47.54	54.00	-6.46	35.03	3	Vertical	81	1.29	-	12.51	27.79	7.24	-
AV	2.405G	91.04	Inf	-Inf	34.93	3	Vertical	81	1.29	-	56.11	27.67	7.26	-
PK	2.3724G	59.94	74.00	-14.06	35.01	3	Vertical	81	1.29	-	24.93	27.76	7.25	-
PK	2.4056G	95.82	Inf	-Inf	34.93	3	Vertical	81	1.29	-	60.89	27.67	7.26	-

Zigbee

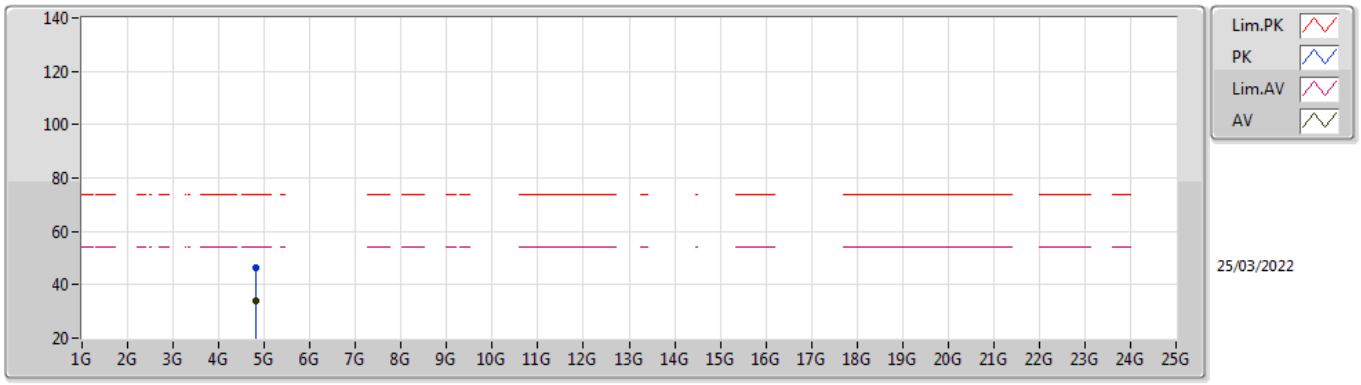
2405MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3558G	47.55	54.00	-6.45	35.03	3	Horizontal	143	1.28	-	12.52	27.79	7.24	-
AV	2.405G	87.68	Inf	-Inf	34.93	3	Horizontal	143	1.28	-	52.75	27.67	7.26	-
PK	2.3582G	59.16	74.00	-14.84	35.02	3	Horizontal	143	1.28	-	24.14	27.78	7.24	-
PK	2.4046G	92.65	Inf	-Inf	34.93	3	Horizontal	143	1.28	-	57.72	27.67	7.26	-

Zigbee

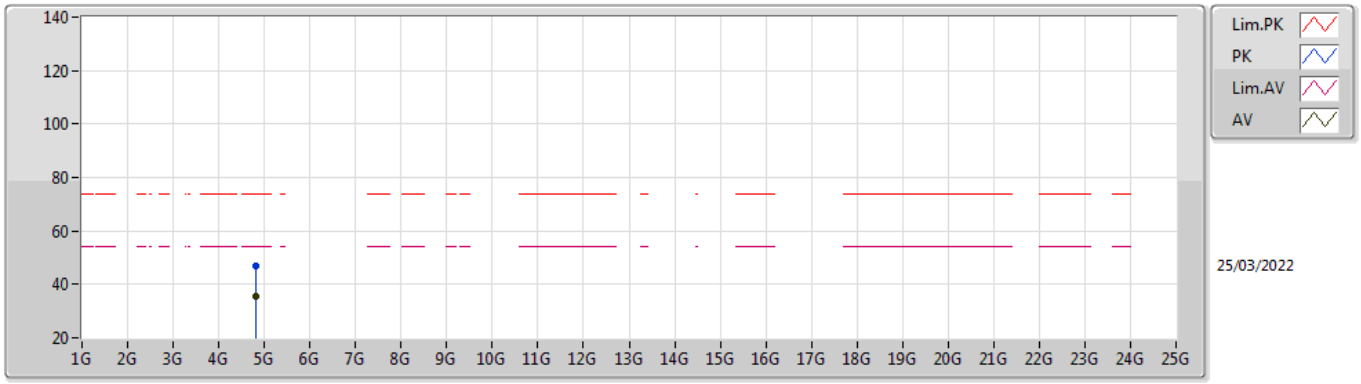
2405MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.81096G	33.94	54.00	-20.06	5.84	3	Vertical	8	1.12	-	28.10	31.12	8.91	34.19
PK	4.81108G	46.16	74.00	-27.84	5.84	3	Vertical	8	1.12	-	40.32	31.12	8.91	34.19

Zigbee

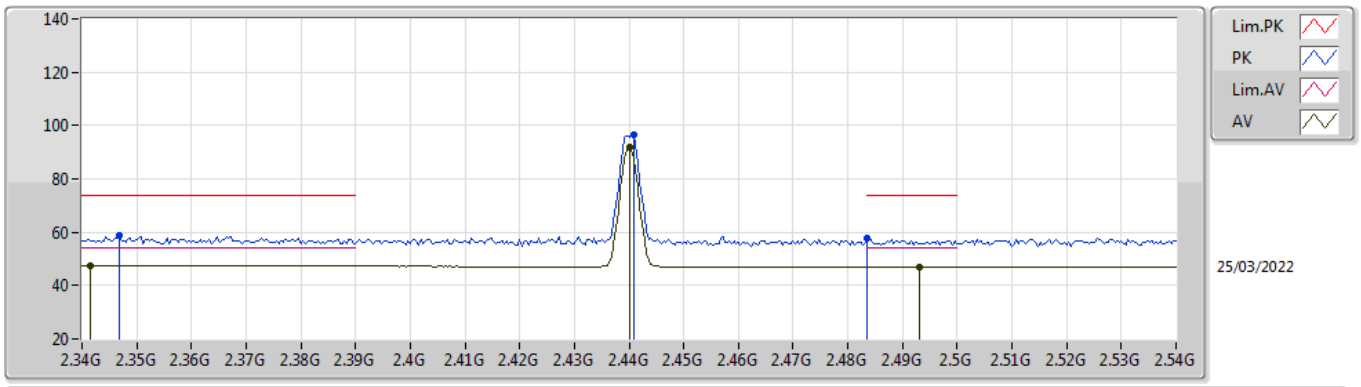
2405MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.81098G	35.31	54.00	-18.69	5.84	3	Horizontal	349	2.80	-	29.47	31.12	8.91	34.19
PK	4.81122G	46.82	74.00	-27.18	5.84	3	Horizontal	349	2.80	-	40.98	31.12	8.91	34.19

Zigbee

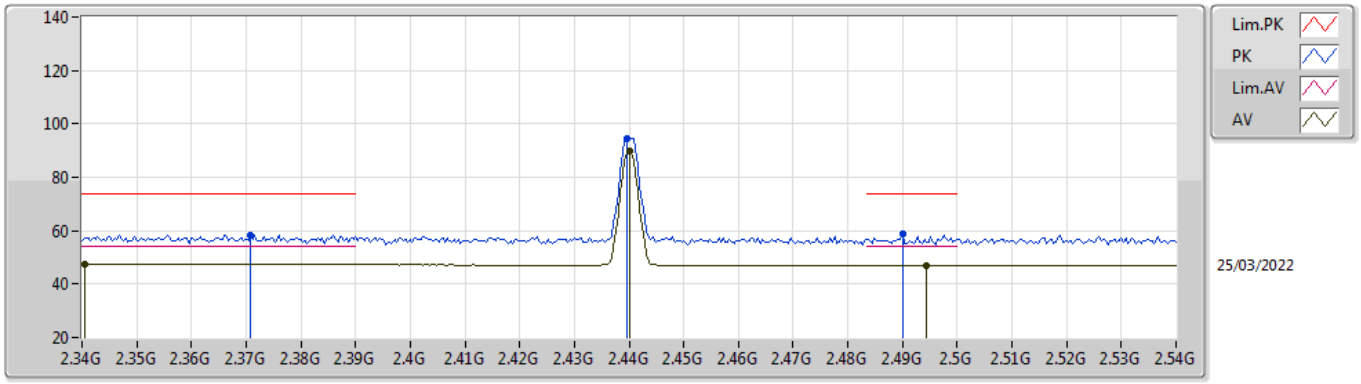
2440MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3416G	47.61	54.00	-6.39	35.05	3	Vertical	168	1.34	-	12.56	27.82	7.23	-
AV	2.44G	91.76	Inf	-Inf	34.75	3	Vertical	168	1.34	-	57.01	27.46	7.29	-
AV	2.4932G	47.02	54.00	-6.98	34.73	3	Vertical	168	1.34	-	12.29	27.40	7.33	-
PK	2.3468G	58.81	74.00	-15.19	35.05	3	Vertical	168	1.34	-	23.76	27.81	7.24	-
PK	2.4408G	96.42	Inf	-Inf	34.75	3	Vertical	168	1.34	-	61.67	27.46	7.29	-
PK	2.4835G	57.69	74.00	-16.31	34.73	3	Vertical	168	1.34	-	22.96	27.40	7.33	-

Zigbee

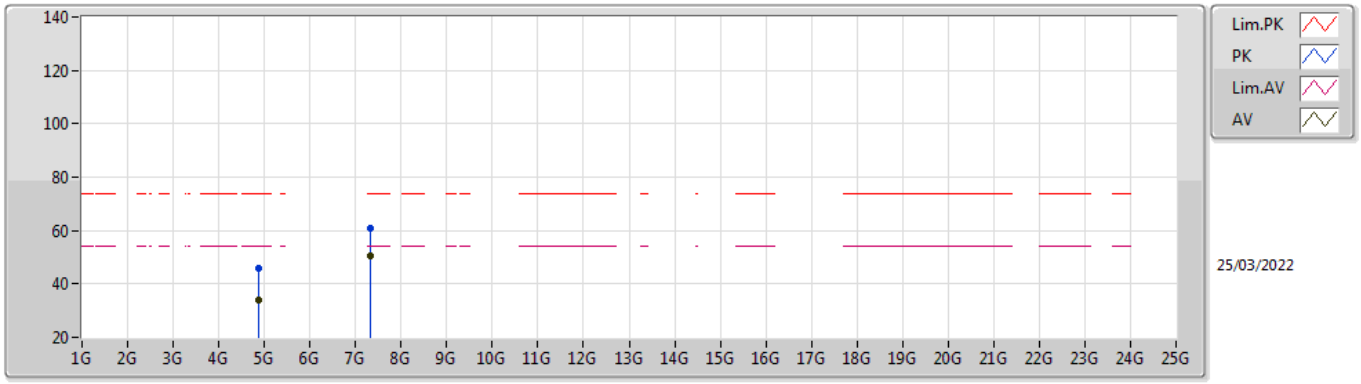
2440MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3404G	47.63	54.00	-6.37	35.05	3	Horizontal	193	2.61	-	12.58	27.82	7.23	-
AV	2.44G	89.92	Inf	-Inf	34.75	3	Horizontal	193	2.61	-	55.17	27.46	7.29	-
AV	2.4944G	46.97	54.00	-7.03	34.74	3	Horizontal	193	2.61	-	12.23	27.40	7.34	-
PK	2.3708G	58.43	74.00	-15.57	35.01	3	Horizontal	193	2.61	-	23.42	27.76	7.25	-
PK	2.4396G	94.67	Inf	-Inf	34.75	3	Horizontal	193	2.61	-	59.92	27.46	7.29	-
PK	2.49G	58.75	74.00	-15.25	34.73	3	Horizontal	193	2.61	-	24.02	27.40	7.33	-

Zigbee

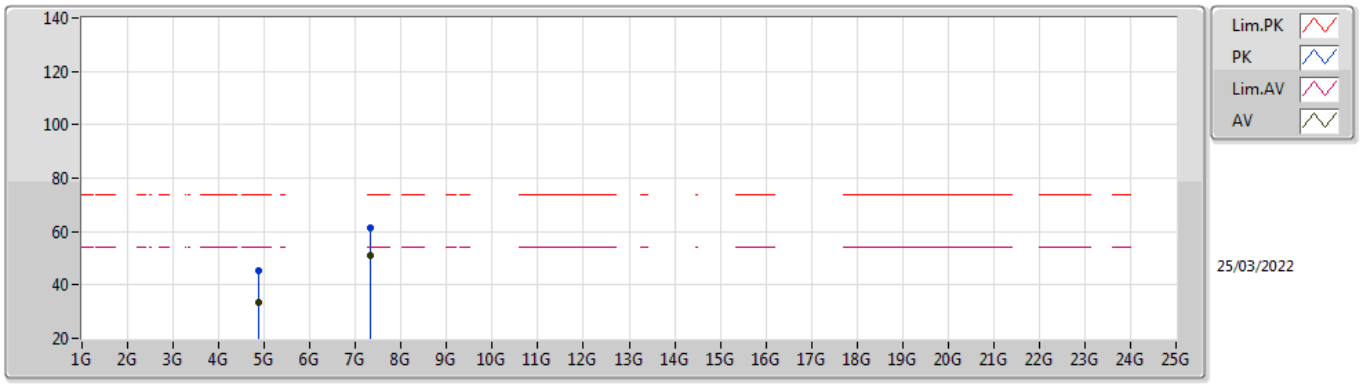
2440MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.881G	34.14	54.00	-19.86	6.00	3	Vertical	169	1.25	-	28.14	31.20	8.96	34.16
AV	7.31866G	50.54	54.00	-3.46	12.49	3	Vertical	119	1.16	-	38.05	36.36	10.63	34.50
PK	4.881G	45.93	74.00	-28.07	6.00	3	Vertical	169	1.25	-	39.93	31.20	8.96	34.16
PK	7.31832G	60.93	74.00	-13.07	12.49	3	Vertical	119	1.16	-	48.44	36.36	10.63	34.50

Zigbee

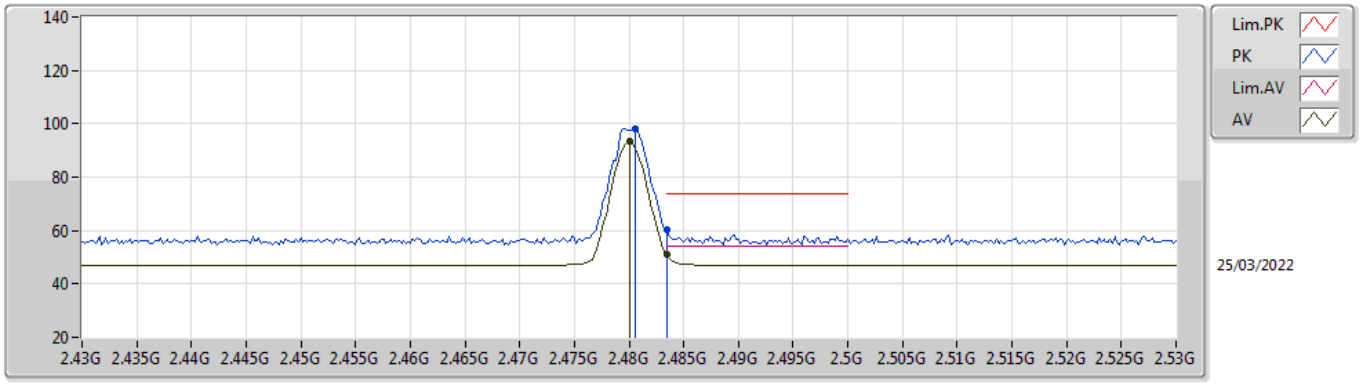
2440MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.88092G	33.37	54.00	-20.63	6.00	3	Horizontal	33	1.16	-	27.37	31.20	8.96	34.16
AV	7.31862G	50.97	54.00	-3.03	12.49	3	Horizontal	0	1.19	-	38.48	36.36	10.63	34.50
PK	4.87876G	45.55	74.00	-28.45	6.00	3	Horizontal	33	1.16	-	39.55	31.20	8.96	34.16
PK	7.31846G	61.52	74.00	-12.48	12.49	3	Horizontal	0	1.19	-	49.03	36.36	10.63	34.50

Zigbee

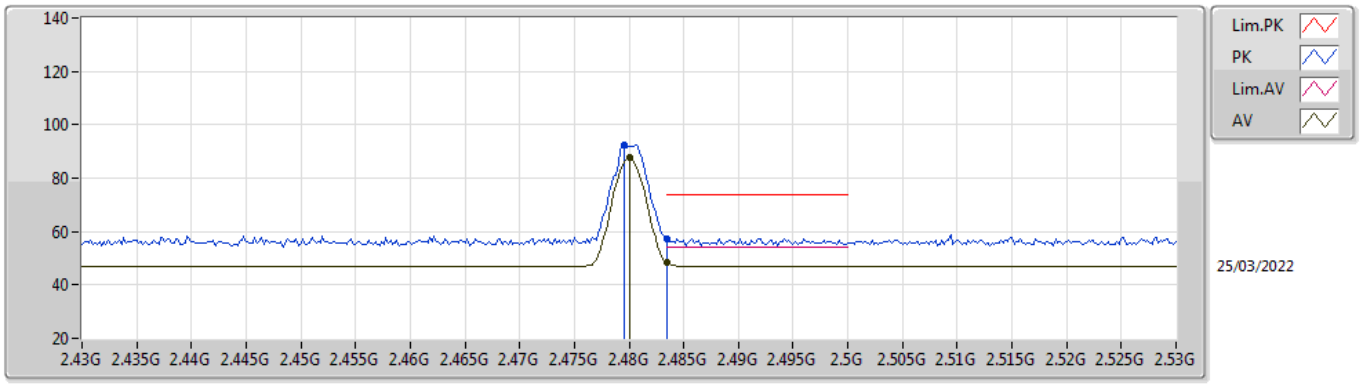
2480MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.48G	93.38	Inf	-Inf	34.72	3	Vertical	167	1.29	-	58.66	27.40	7.32	-
AV	2.4835G	50.92	54.00	-3.08	34.73	3	Vertical	167	1.29	-	16.19	27.40	7.33	-
PK	2.4806G	98.19	Inf	-Inf	34.72	3	Vertical	167	1.29	-	63.47	27.40	7.32	-
PK	2.4835G	60.42	74.00	-13.58	34.73	3	Vertical	167	1.29	-	25.69	27.40	7.33	-

Zigbee

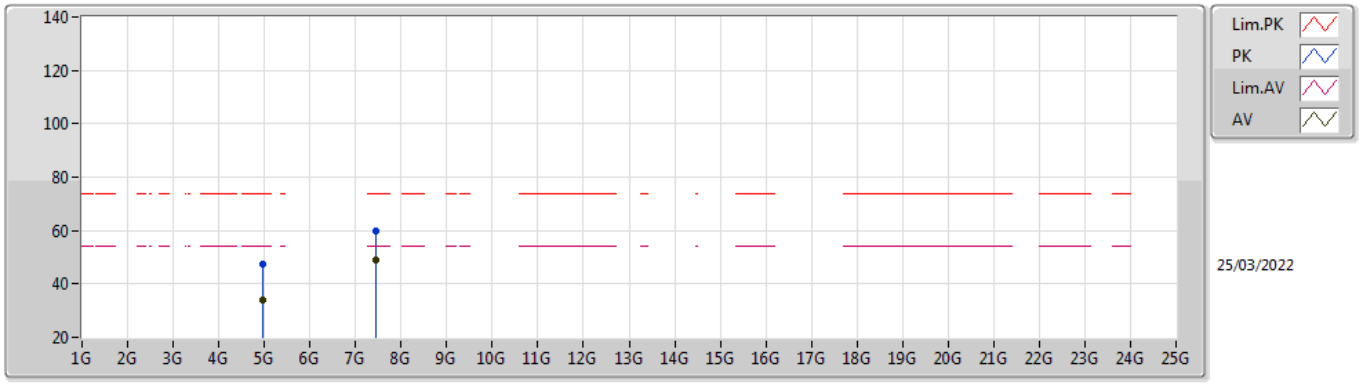
2480MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.48G	87.64	Inf	-Inf	34.72	3	Horizontal	122	1.26	-	52.92	27.40	7.32	-
AV	2.4835G	48.23	54.00	-5.77	34.73	3	Horizontal	122	1.26	-	13.50	27.40	7.33	-
PK	2.4796G	92.40	Inf	-Inf	34.72	3	Horizontal	122	1.26	-	57.68	27.40	7.32	-
PK	2.4835G	57.40	74.00	-16.60	34.73	3	Horizontal	122	1.26	-	22.67	27.40	7.33	-

Zigbee

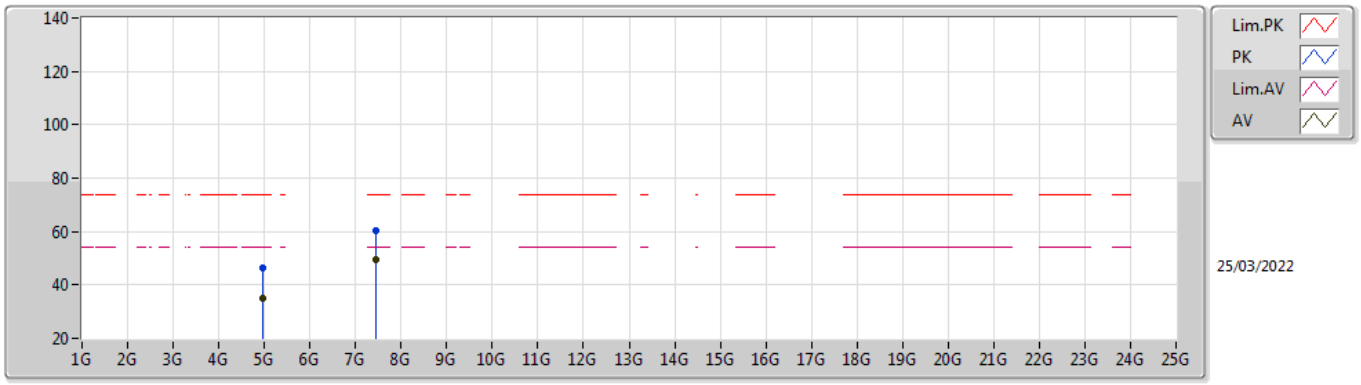
2480MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.96095G	34.22	54.00	-19.78	6.32	3	Vertical	77	1.39	-	27.90	31.42	9.02	34.12
AV	7.43858G	49.05	54.00	-4.95	12.51	3	Vertical	118	1.31	-	36.54	36.28	10.72	34.49
PK	4.96107G	47.19	74.00	-26.81	6.32	3	Vertical	77	1.39	-	40.87	31.42	9.02	34.12
PK	7.44156G	59.95	74.00	-14.05	12.51	3	Vertical	118	1.31	-	47.44	36.28	10.72	34.49

Zigbee

2480MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.96098G	34.92	54.00	-19.08	6.32	3	Horizontal	335	1.00	-	28.60	31.42	9.02	34.12
AV	7.43856G	49.63	54.00	-4.37	12.51	3	Horizontal	56	2.62	-	37.12	36.28	10.72	34.49
PK	4.96098G	46.63	74.00	-27.37	6.32	3	Horizontal	335	1.00	-	40.31	31.42	9.02	34.12
PK	7.43846G	60.41	74.00	-13.59	12.51	3	Horizontal	56	2.62	-	47.90	36.28	10.72	34.49