NCC Radio Test Report

Equipment	:	**Hue Motion Sensor**
Brand Name	:	**PHILIPS**
Model Name	:	**9290030675**
Applicant	:	台灣昕諾飛股份有限公司 台北市南港區 **115** 園區街 **3-1** 號 **15** 樓之 **1**
Manufacturer	:	**Signify (China) Investment Co., Ltd.** **Building 9, Lane 888, Tianlin Road, Minhang District, Shanghai 200233 China**
Standard	:	**LP0002 Section 4.10 (2020-07-01)**

The product was received on Apr. 19, 2021, and testing was started from May 03, 2021 and completed on May 10, 2021. 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.

Allen Lin

Approved by: Allen Lin

SPORTON INTERNATIONAL INC. Hsinhua Laboratory

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

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PHOTOGRAPHS OF EUT V01

History of this test report

Report No.	Version	Description	Issued Date
TR140204AZ	01	Initial issue of report	Jul. 01, 2021

Summary of Test Result

Report Clause	Ref. Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	4.10.1.4	Antenna Requirement	PASS	-
-	3.3	AC Power-line Conducted Emissions	Not Required	Only employ battery power.
3.1	4.10.1.6	DTS Bandwidth	PASS	-
3.2	4.10.1.2	Maximum Conducted Output Power	PASS	-
3.3	4.10.1.6	Power Spectral Density	PASS	-
3.4	4.10.1.5	Emissions in Non-restricted Frequency Bands	PASS	-
3.5	4.10.1.5	Emissions in Restricted Frequency Bands	PASS	-
3.6	3.9	Receiver Radiated Unwanted Emissions	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: Sam Tsai
Report Producer: Debby Hung

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.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	WALSIN	RFECA3216060A1T	chip antenna	N/A	2.2

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.

1.2 Testing Applied Standards

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

- LP0002 (2020-07-01)
- ANSI C63.10-2013
- ANSI C63.4-2014

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 Condition	**Test Site No.**	**Test Engineer**	**Test Environment**	**Test Date**
RF Conducted	TH01-HY	Vivi Jiang	20.1~26.9°C / 50~60%	03/May/2021~07/May/2021
☒ 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 Condition	**Test Site No.**	**Test Engineer**	**Test Environment**	**Test Date**
Radiated	03CH09-HY	Daniel Hsu	23.5~24.2°C / 54~57%	03/May/2021~10/May/2021

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	Dos6.1

Mode	Power Setting
Zigbee	-
2405MHz	52
2440MHz	52
2475MHz	52
2480MHz	52

2.2 The Worst Case Measurement Configuration

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 Receiver Radiated Spurious Emissions		
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/CRX		
1	Battery mode		
Operating Mode > 1GHz	CTX/CRX		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
Worst Planes of EUT		V	

2.3 Accessories

Accessories				
Battery * 2	**Brand Name**	PHILIPS	**Model Name**	LR03
	Power Rating	1.5Vdc, AAA	**Type**	Alkaline

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

2.4 Support Equipment

Support Equipment – Conducted					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	Notebook	DELL	E5410	-	-
2	Adapter for NB	DELL	HA65NM130	-	-
3	Fixture cable	杜邦線	彩色 cable 2.54mm female	-	Note 1 / Note 2

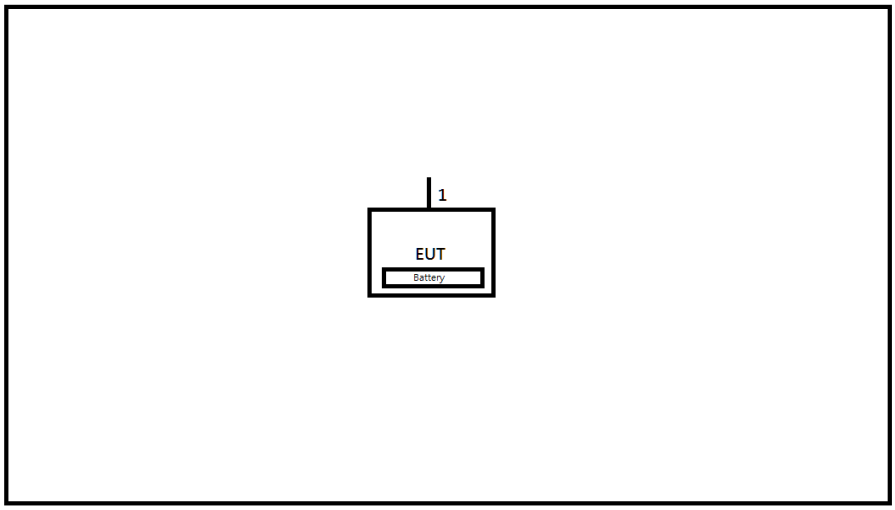
Note 1: The applicant has signed the recognizance that the equipment will not be sold with the accessory.
Note 2: Support equipment was provided by customer.

Support Equipment – Radiated					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	Fixture cable	杜邦線	彩色 cable 2.54mm female	-	Note 1 / Note 2

Note 1: The applicant has signed the recognizance that the equipment will not be sold with the accessory.
Note 2: Support equipment was provided by customer.

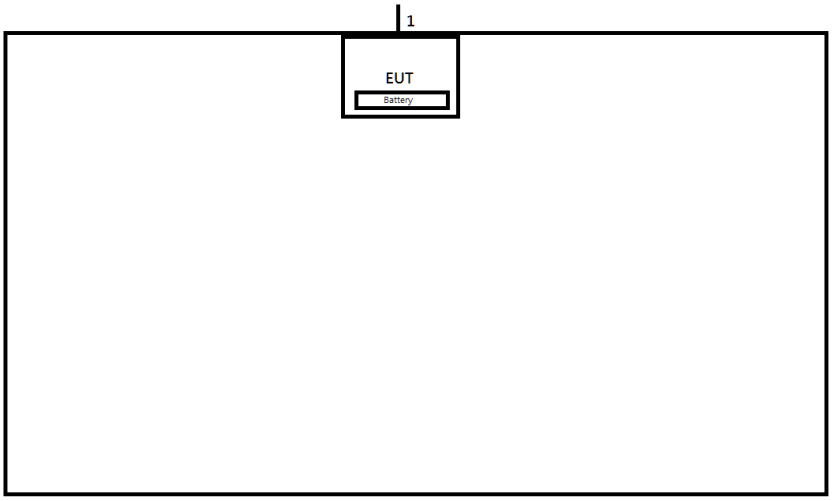
2.5 Test Setup Diagram

Test Setup Diagram - Radiated Test - TX



Item	Connection	Shielded	Length(m)	Remark
1	fixture cable	No	0.15	-

Test Setup Diagram - Radiated Test - RX



Item	Connection	Shielded	Length(m)	Remark
1	fixture cable	No	0.15	-

3 Transmitter Test Result

3.1 DTS Bandwidth

3.1.1 6dB Bandwidth Limit

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

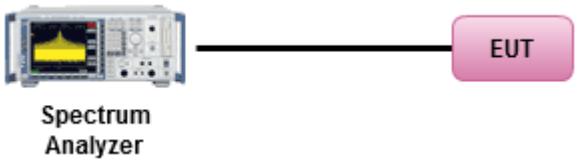
3.1.2 Measuring Instruments

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

3.1.3 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.

3.1.4 Test Setup

Emission Bandwidth


3.1.5 Test Result of Emission Bandwidth

Refer as Appendix A

3.2 Maximum Conducted Output Power

3.2.1 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.		

3.2.2 Measuring Instruments

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

3.2.3 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]) $EIRP_{total} = P_{total} + DG$

3.2.4 Test Setup

Maximum Conducted Output Power (Power Meter)

3.2.5 Test Result of Maximum Conducted Output Power

Refer as Appendix B

3.3 Power Spectral Density

3.3.1 Power Spectral Density Limit

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

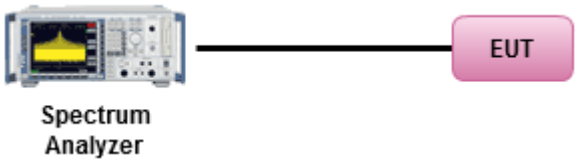
3.3.2 Measuring Instruments

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

3.3.3 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.

3.3.4 Test Setup

Power Spectral Density


3.3.5 Test Result of Power Spectral Density

Refer as Appendix C

3.4 Emissions in Non-restricted Frequency Bands

3.4.1 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.	

3.4.2 Measuring Instruments

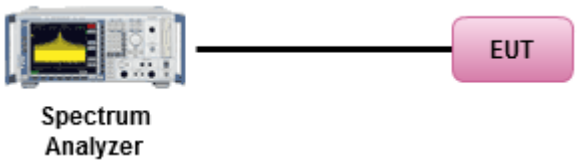
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

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

3.4.4 Test Setup

Emissions in Non-restricted Frequency Bands



3.4.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix D

3.5 Emissions in Restricted Frequency Bands

3.5.1 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.

3.5.2 Measuring Instruments

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

3.5.3 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 LP0002 6.5.2: 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.

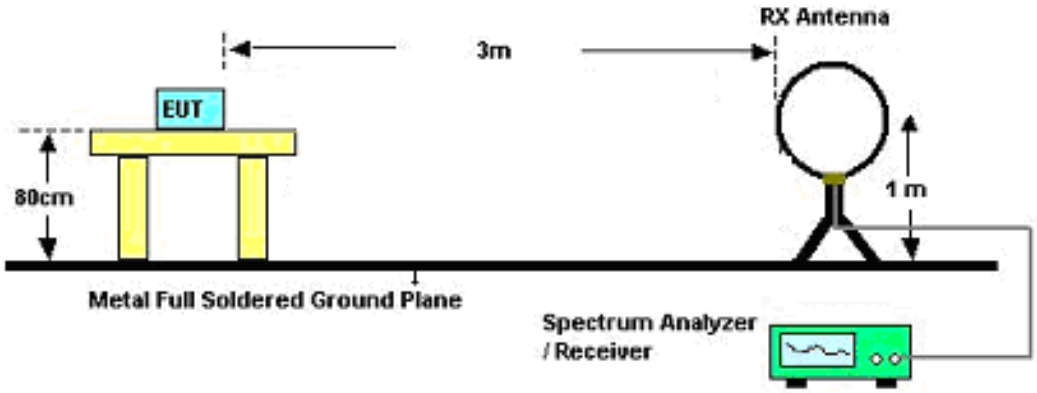
3.5.4 Measurement Results Calculation

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

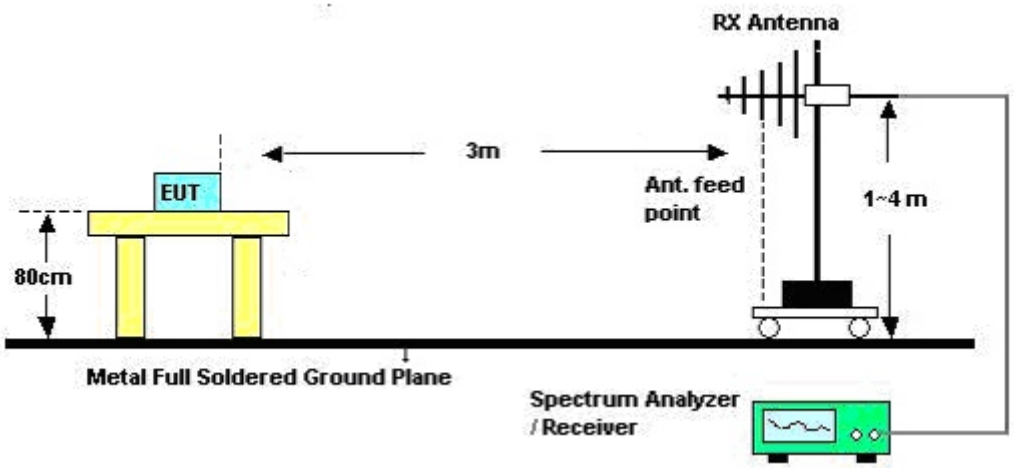
3.5.5 Test Setup

Emissions in Restricted Frequency Bands

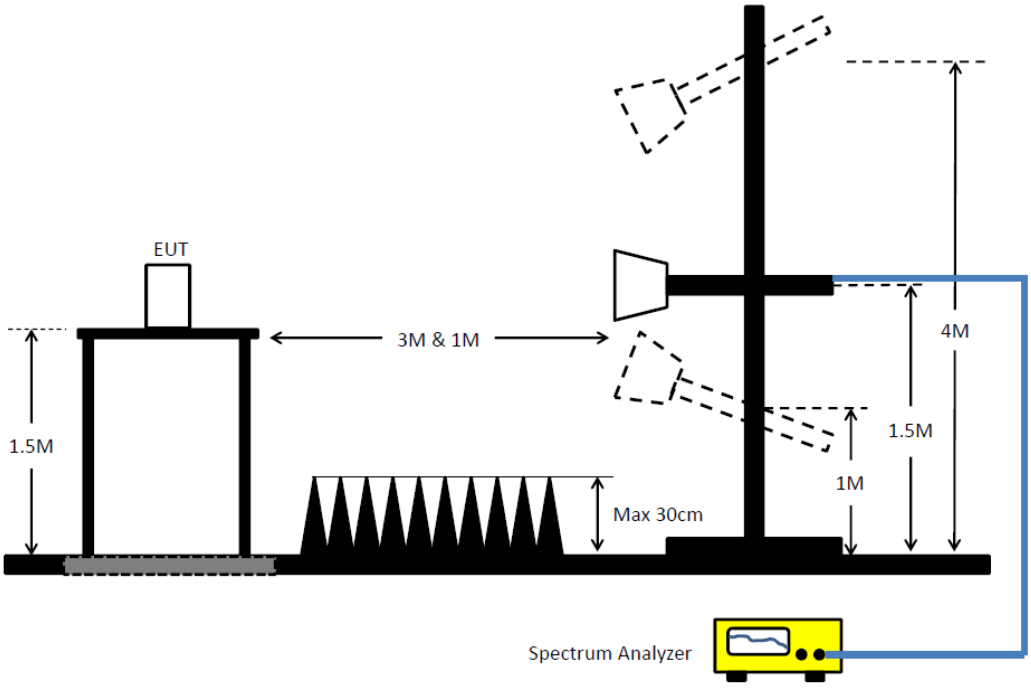
9kHz ~30MHz



30MHz~1GHz



Above 1GHz



3.5.6 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.

3.5.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix E

3.6 Receiver Radiated Spurious Emissions

3.6.1 Receiver in Radiated Spurious Emissions Limit

Restricted Spurious 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.

3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

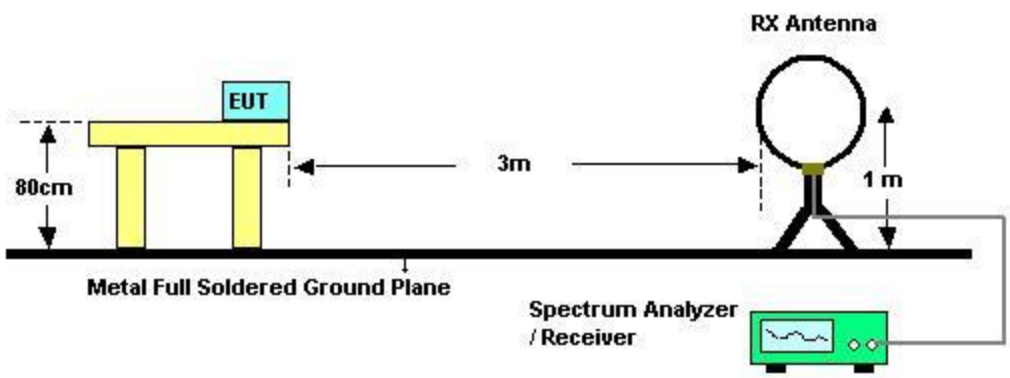
Test Method	
☒	The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is higher, to at least 3 times the highest tuneable or local oscillator frequency, whichever is higher, without exceeding 40 GHz.
☒	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).
☒	For radiated measurement, refer as ANSI C63.4, clause 8.3.
☒	Refer as ANSI C63.4, clause 8.3.1.1 and 8.3.2.1 for radiated emissions from below 30 MHz.
☒	Refer as ANSI C63.4, clause 8.3.1.1 and 8.3.2.1 for radiated emissions from 30 MHz-1 GHz. For the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the QP-Limit so that the QP level does not need to be reported in addition.
☒	Refer as ANSI C63.4, clause 8.3.1.2 and 8.3.2.2 for radiated emissions from above 1 GHz. For the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.
☒	All amplitude of spurious emissions that are attenuated by more than 30 dB below the permissible value has no need to be reported.

3.6.4 Measurement Results Calculation

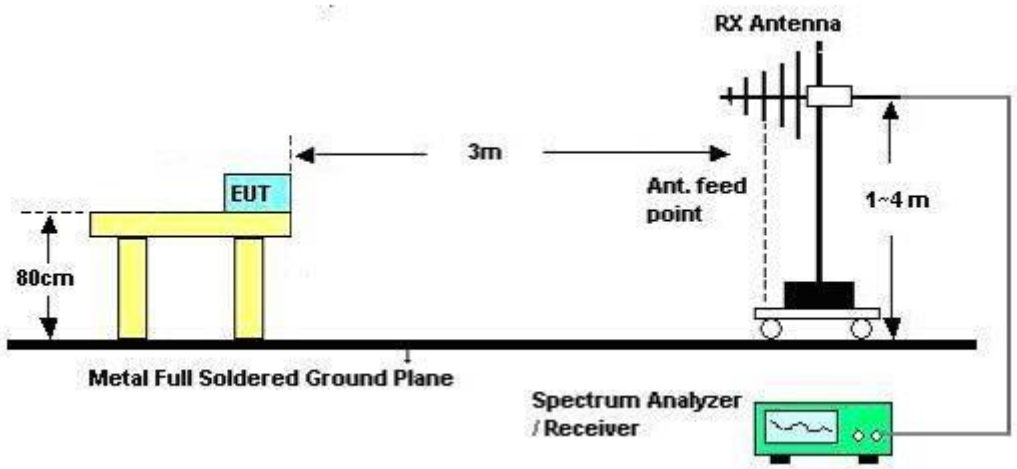
The measured Level is calculated using:
Corrected Reading: Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor)

3.6.5 Test Setup

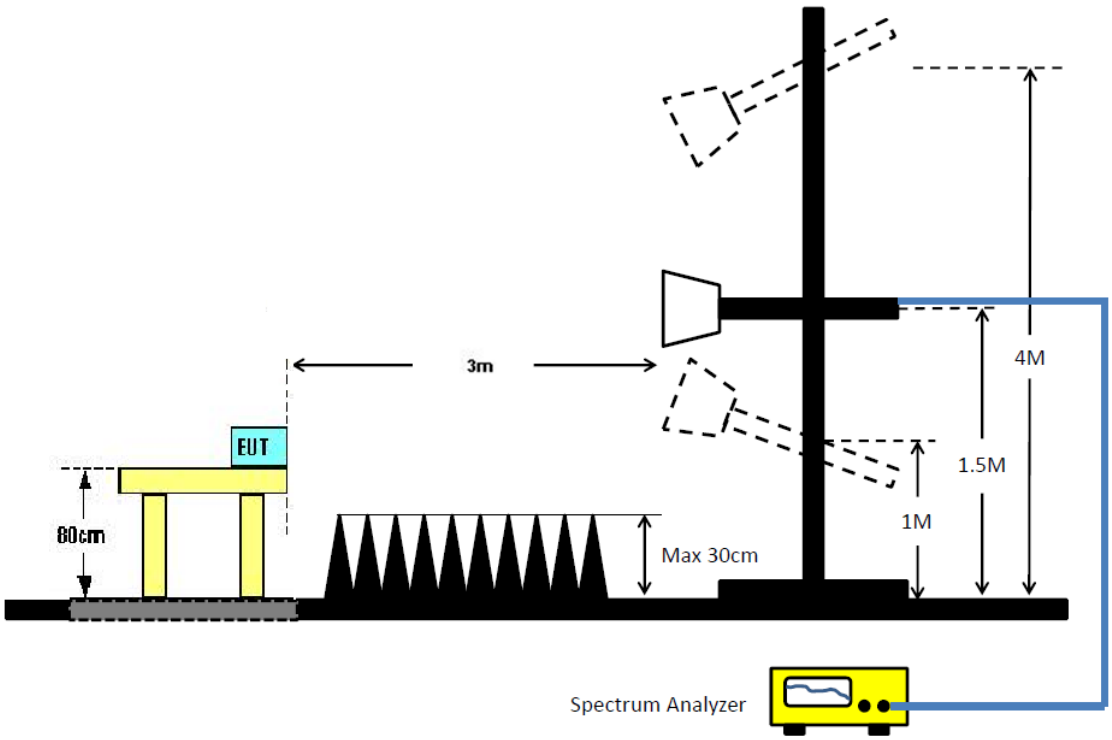
Receiver Spurious and Out of Band Emissions (9 kHz - 30 MHz)



Receiver Radiated Unwanted Emissions (below 1GHz)



Receiver Radiated Unwanted Emissions (above 1GHz)



3.6.6 Receiver Radiated Unwanted Emissions (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 Receiver Radiated Unwanted Emissions

Refer as Appendix F

4 Test Equipment and Calibration Data

Instrument for Conducted Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSV 40	101013	10Hz~40GHz	30/Mar/2021	29/Mar/2022
SMB100A Signal Generator	R&S	SMB100A03	181147	100kHz~40GHz	20/Oct/2020	19/Oct/2021
Pulse Sensor	Anritsu	MA2411B	0917017	300MHz~40GHz	23/Feb/2021	22/Feb/2022
Power Meter	Anritsu	ML2495A	0949003	300MHz~40GHz	23/Feb/2021	22/Feb/2022

Instrument for Radiated Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	30MHz~1GHz 3m	26/Mar/2021	25/Mar/2022
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	1GHz~18GHz 3m	18/Mar/2021	17/Mar/2022
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200885	10Hz~44GHz	11/Aug/2020	10/Aug/2021
Amplifier	EMC	EMC9135	980232	9kHz~1GHz	12/Apr/2021	11/Apr/2022
Microwave Preamplifier	Agilent	8449B	3008A02096	1GHz~26.5GHz	24/Jul/2020	23/Jul/2021
Bilog Antenna & 5dB Attenuator	TESEQ & MTJ	CBL6111D&MTJ 6102-05	35418 & 3	30MHz~1GHz	06/Sep/2020	05/Sep/2021
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA9120 D 1534	1GHz~18GHz	28/May/2020	27/May/2021
RF Cable-low	Jye Bao	RG142	CB031+324530/4	9kHz~30MHz	03/Sep/2020	02/Sep/2021
RF Cable-low	Jye Bao	RG142	CB031+324530/4	30MHz~1GHz	09/Feb/2021	08/Feb/2022
RF CABLE 5m+3m+1m	HUBER+SUHNER	SUCOFLEX104	SN MY25918/4+ SN MY39478/4 + SN 324530/4	1GHz~40GHz	15/Aug/2020	14/Aug/2021
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	18GHz~40GHz	11/Mar/2021	10/Mar/2022
Microwave Premplifier	EMC INSTRUMENTS	EM18G40G	060604	18GHz ~ 40GHz	09/Mar/2021	08/Mar/2022
Loop Antenna	TESEQ	HLA 6120	31244	9kHz~30MHz	16/Mar/2021	15/Mar/2022
EMI Test Receiver	R&S	ESR3	102051	9kHz~3.6GHz	29/May/2020	28/May/2021

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
Zigbee	1.631M	2.255M	2M26G1D	1.625M	2.249M

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	1.625M	2.249M
2440MHz	Pass	500k	1.631M	2.255M
2475MHz	Pass	500k	1.625M	2.255M
2480MHz	Pass	500k	1.631M	2.255M

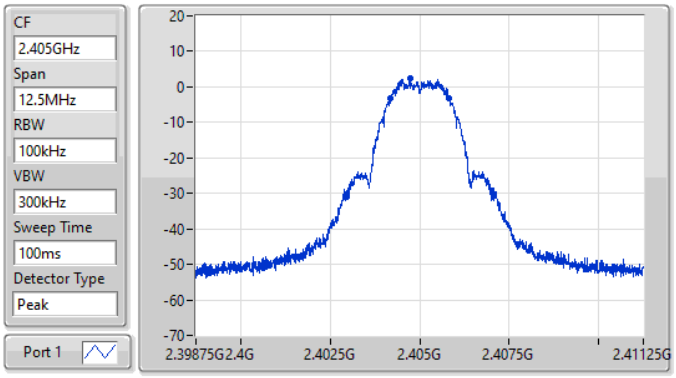
Port X-N dB = Port X 6dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth

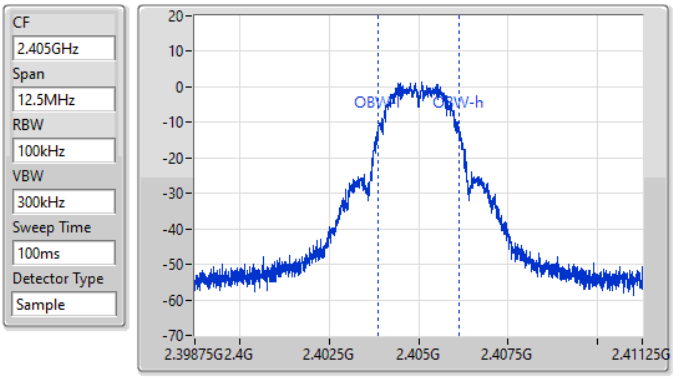
Zigbee

EBW

2405MHz

07/05/2021





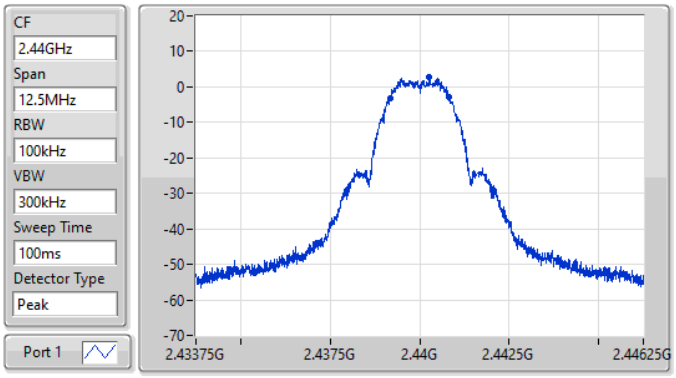
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.625M	2.404194G	2.405819G	2.249M	2.403882G	2.406131G	500k	1

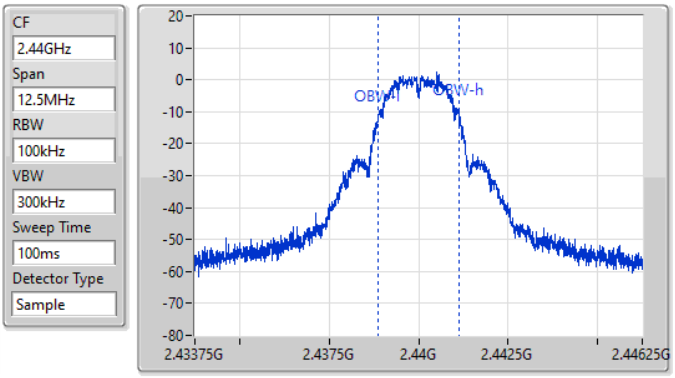
Zigbee

EBW

2440MHz

03/05/2021





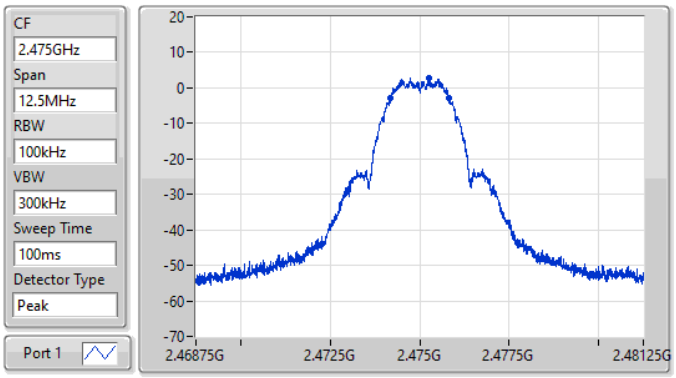
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.631M	2.439188G	2.440819G	2.255M	2.438876G	2.441131G	500k	1

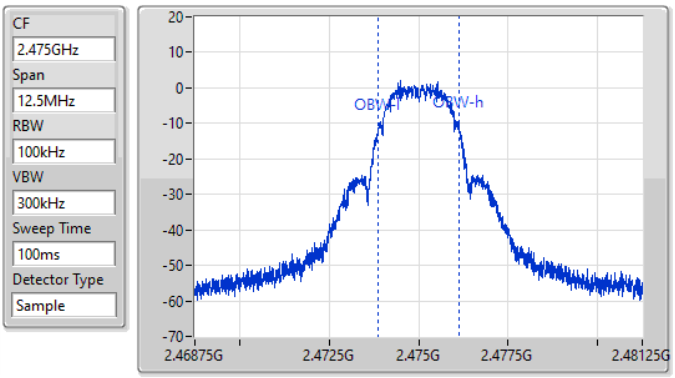
Zigbee

EBW

2475MHz

03/05/2021





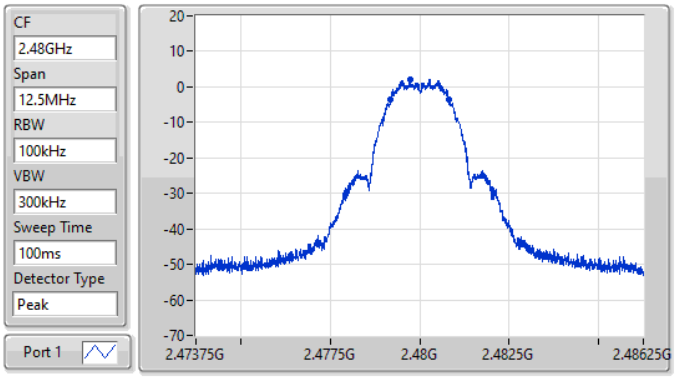
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.625M	2.474194G	2.475819G	2.255M	2.473876G	2.476131G	500k	1

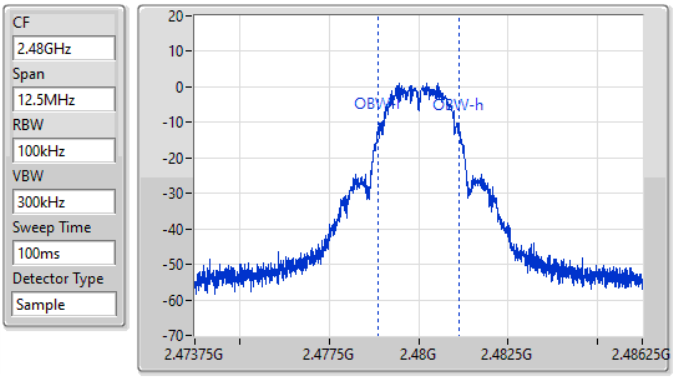
Zigbee

EBW

2480MHz

07/05/2021





6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.631M	2.479194G	2.480825G	2.255M	2.478876G	2.481131G	500k	1

Summary

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
Zigbee	6.31	0.00428

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)
Zigbee	-	-	-	-	-
2405MHz	Pass	2.20	6.31	6.31	30.00
2440MHz	Pass	2.20	6.24	6.24	30.00
2475MHz	Pass	2.20	6.23	6.23	30.00
2480MHz	Pass	2.20	6.17	6.17	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
Zigbee	-9.19

RBW = 3kHz;

Result

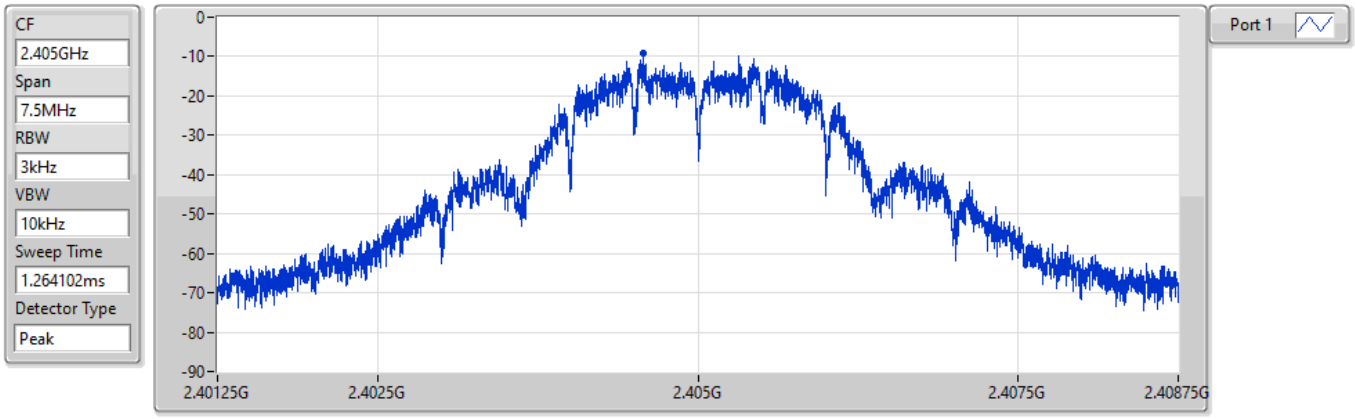
Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
Zigbee	-	-	-	-	-
2405MHz	Pass	2.20	-9.19	-9.19	8.00
2440MHz	Pass	2.20	-9.64	-9.64	8.00
2475MHz	Pass	2.20	-9.43	-9.43	8.00
2480MHz	Pass	2.20	-10.10	-10.10	8.00

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

03/05/2021

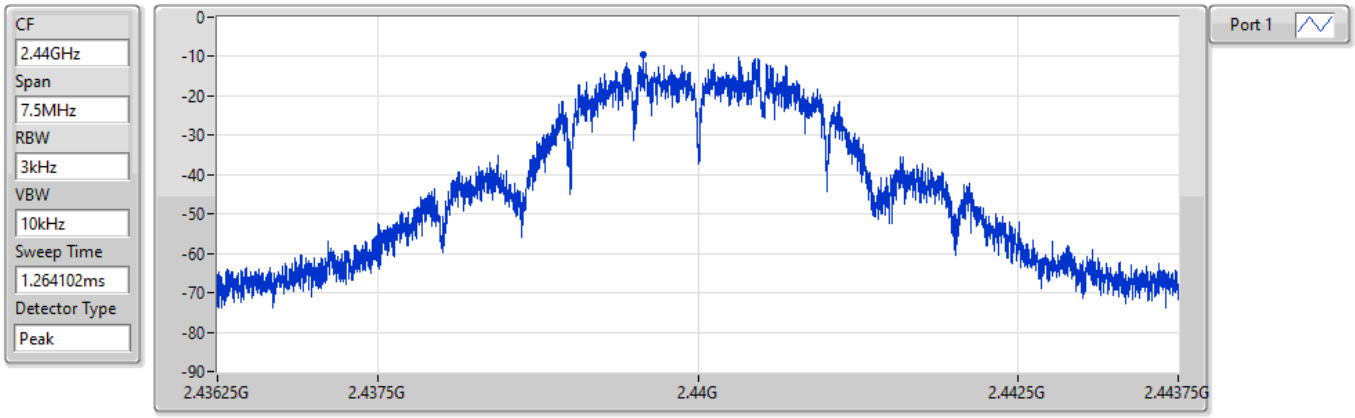


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.19	-9.19	-9.19

Zigbee PSD

2440MHz

03/05/2021

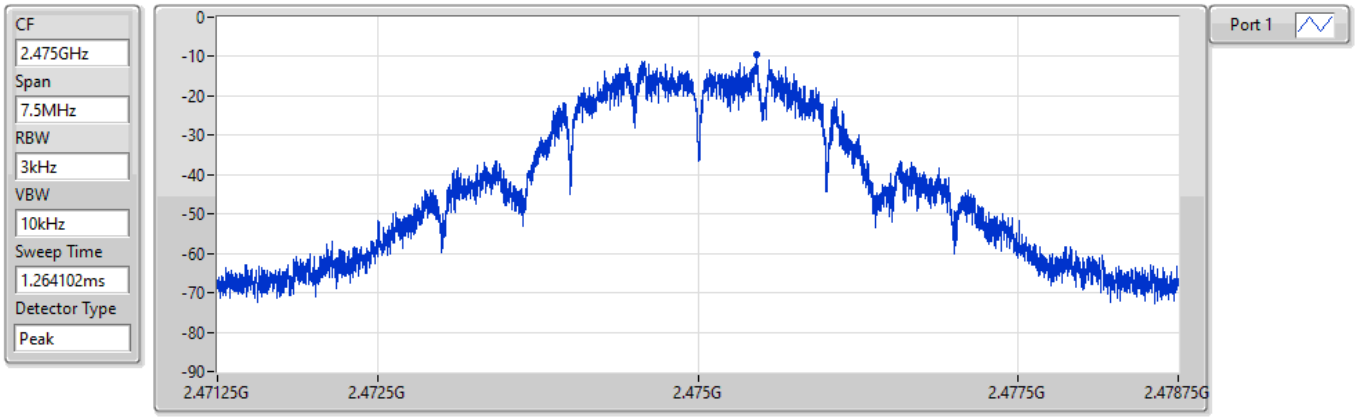


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.64	-9.64	-9.64

Zigbee PSD

2475MHz

03/05/2021

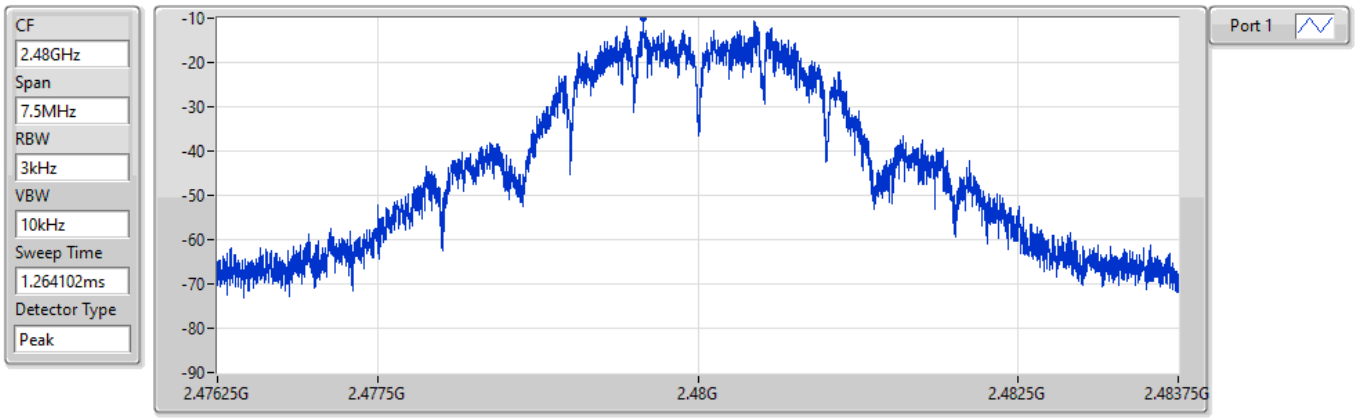


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-9.43	-9.43	-9.43

Zigbee PSD

2480MHz

07/05/2021



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-10.10	-10.10	-10.10

Summary

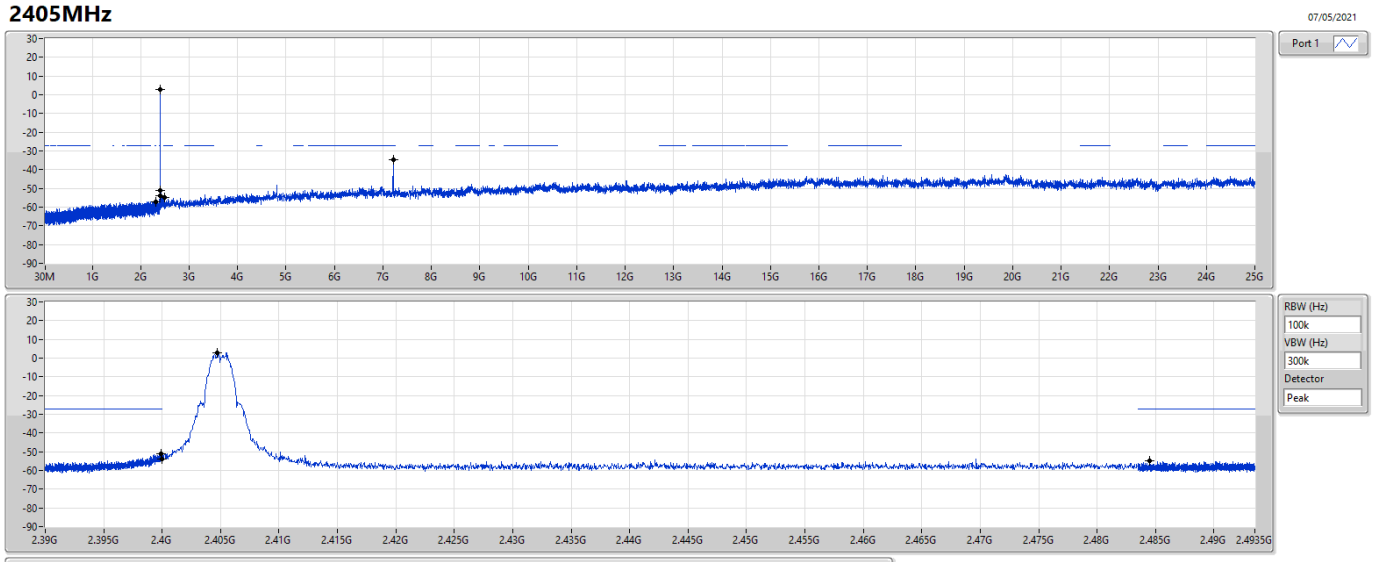
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	2.40472G	2.73	-27.27	2.0835G	-57.20	2.39857G	-55.47	2.4835G	-48.17	2.48353G	-46.91	24.67366G	-42.84	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	2.40472G	2.73	-27.27	2.30622G	-56.98	2.39992G	-51.01	2.4G	-53.93	2.48451G	-54.89	7.21705G	-34.48	1
2440MHz	Pass	2.40472G	2.73	-27.27	834.47M	-56.11	2.39435G	-55.50	2.4835G	-56.90	2.48584G	-54.47	17.13116G	-43.78	1
2475MHz	Pass	2.40472G	2.73	-27.27	2.11359G	-57.18	2.3997G	-55.05	2.4835G	-55.83	2.48455G	-54.66	24.18414G	-43.29	1
2480MHz	Pass	2.40472G	2.73	-27.27	2.0835G	-57.20	2.39857G	-55.47	2.4835G	-48.17	2.48353G	-46.91	24.67366G	-42.84	1

Zigbee **CSENdB**

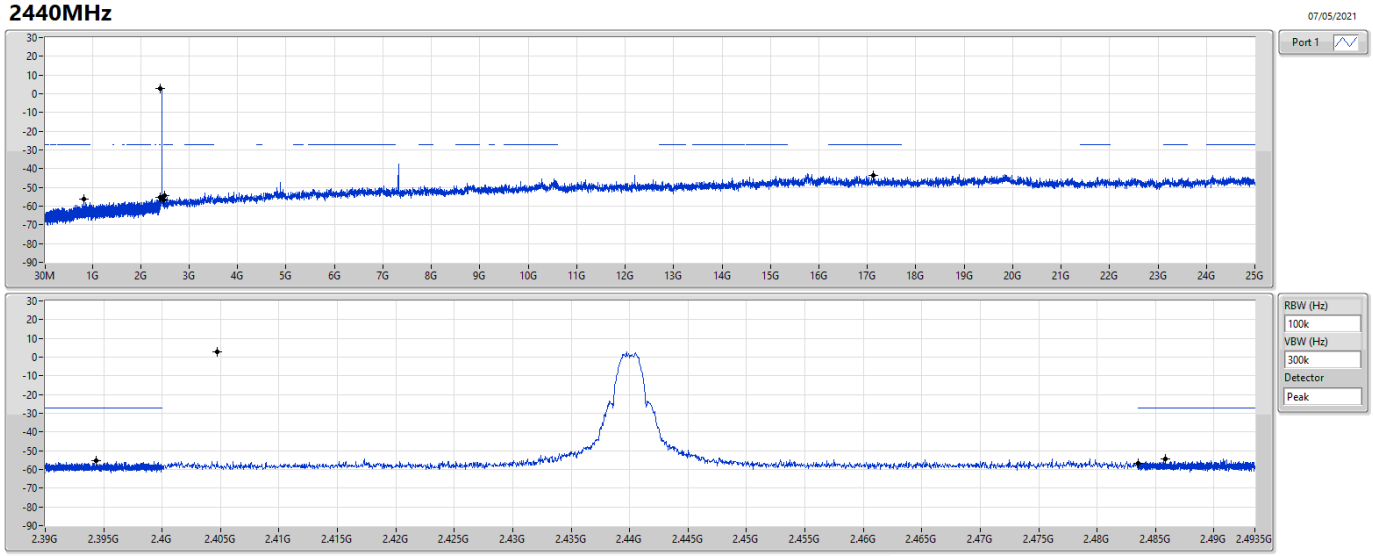
2405MHz



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
2.40472G	2.73	-27.27	2.30622G	-56.98	2.39992G	-51.01	2.4G	-53.93	2.48451G	-54.89	7.21705G	-34.48	1

Zigbee **CSENdB**

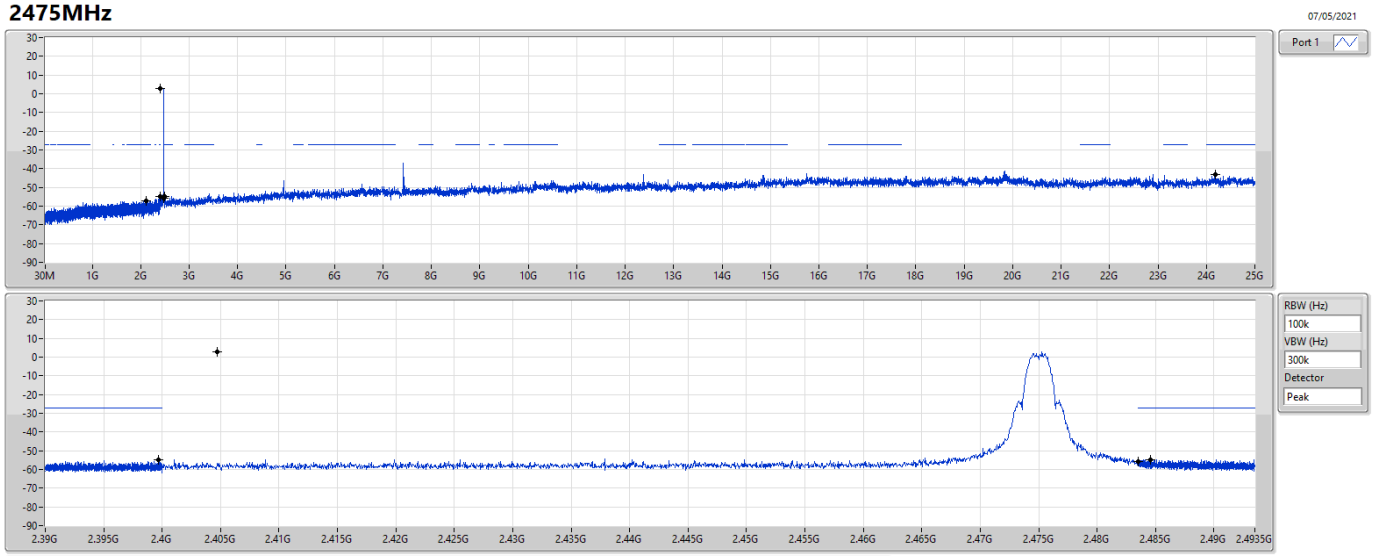
2440MHz



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
2.40472G	2.73	-27.27	834.47M	-56.11	2.39435G	-55.50	2.4835G	-56.90	2.48584G	-54.47	17.13116G	-43.78	1

Zigbee **CSENdB**

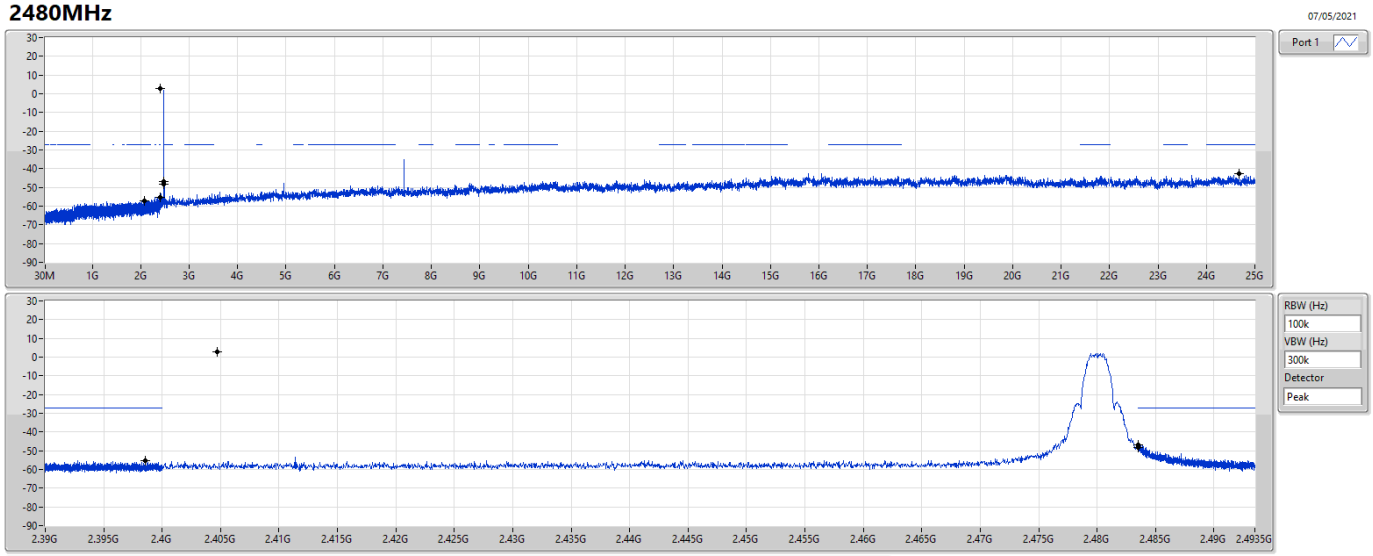
2475MHz



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
2.40472G	2.73	-27.27	2.11359G	-57.18	2.3997G	-55.05	2.4835G	-55.83	2.48455G	-54.66	24.18414G	-43.29	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
2.40472G	2.73	-27.27	2.0835G	-57.20	2.39857G	-55.47	2.4835G	-48.17	2.48353G	-46.91	24.67366G	-42.84	1

Summary

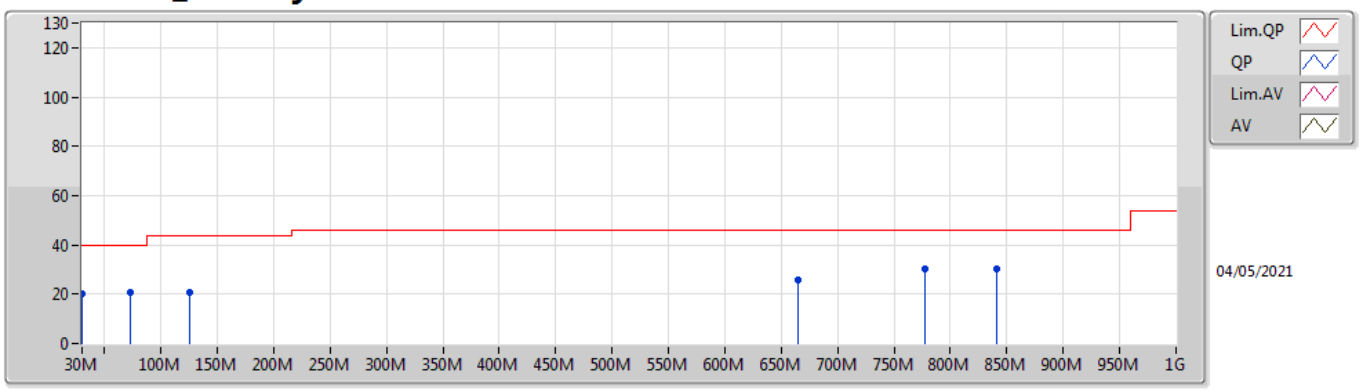
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	PK	840.92M	30.77	46.00	-15.23	3	Horizontal	0	1.00	-

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	30M	20.24	40.00	-19.76	3	Vertical	360	1.00	-
2440MHz	Pass	PK	72.68M	20.90	40.00	-19.10	3	Vertical	360	1.00	-
2440MHz	Pass	PK	125.06M	21.00	43.50	-22.50	3	Vertical	360	1.00	-
2440MHz	Pass	PK	664.38M	25.58	46.00	-20.42	3	Vertical	360	1.00	-
2440MHz	Pass	PK	776.9M	29.99	46.00	-16.01	3	Vertical	360	1.00	-
2440MHz	Pass	PK	840.92M	30.19	46.00	-15.81	3	Vertical	360	1.00	-
2440MHz	Pass	PK	30M	21.11	40.00	-18.89	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	115.36M	14.31	43.50	-29.19	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	427.7M	20.75	46.00	-25.25	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	579.02M	23.84	46.00	-22.16	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	776.9M	30.52	46.00	-15.48	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	840.92M	30.77	46.00	-15.23	3	Horizontal	0	1.00	-

Zigbee

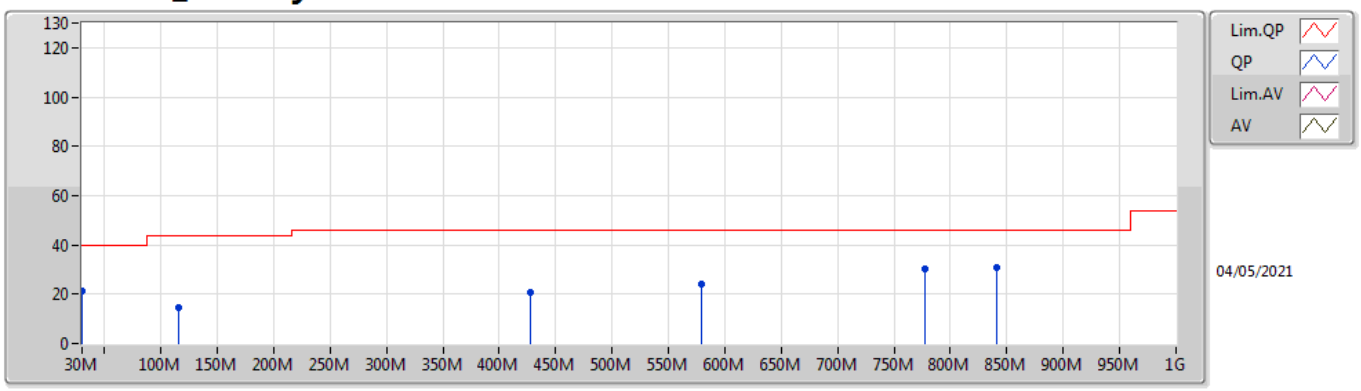
2440MHz_Battery



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	30M	20.24	40.00	-19.76	-13.08	3	Vertical	360	1.00	-	33.32	23.51	0.56	37.15
PK	72.68M	20.90	40.00	-19.10	-24.58	3	Vertical	360	1.00	-	45.48	11.52	0.85	36.95
PK	125.06M	21.00	43.50	-22.50	-18.63	3	Vertical	360	1.00	-	39.63	16.88	1.10	36.61
PK	664.38M	25.58	46.00	-20.42	-9.13	3	Vertical	360	1.00	-	34.71	25.49	2.64	37.26
PK	776.9M	29.99	46.00	-16.01	-7.41	3	Vertical	360	1.00	-	37.40	27.36	2.77	37.54
PK	840.92M	30.19	46.00	-15.81	-6.49	3	Vertical	360	1.00	-	36.68	28.20	2.91	37.60

Zigbee

2440MHz_Battery



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	30M	21.11	40.00	-18.89	-13.08	3	Horizontal	0	1.00	-	34.19	23.51	0.56	37.15
PK	115.36M	14.31	43.50	-29.19	-19.01	3	Horizontal	0	1.00	-	33.32	16.61	1.05	36.67
PK	427.7M	20.75	46.00	-25.25	-12.45	3	Horizontal	0	1.00	-	33.20	22.13	2.02	36.60
PK	579.02M	23.84	46.00	-22.16	-9.73	3	Horizontal	0	1.00	-	33.57	24.94	2.43	37.10
PK	776.9M	30.52	46.00	-15.48	-7.41	3	Horizontal	0	1.00	-	37.93	27.36	2.77	37.54
PK	840.92M	30.77	46.00	-15.23	-6.49	3	Horizontal	0	1.00	-	37.26	28.20	2.91	37.60

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	7.42363G	53.87	54.00	-0.13	3	Horizontal	45	2.46	-

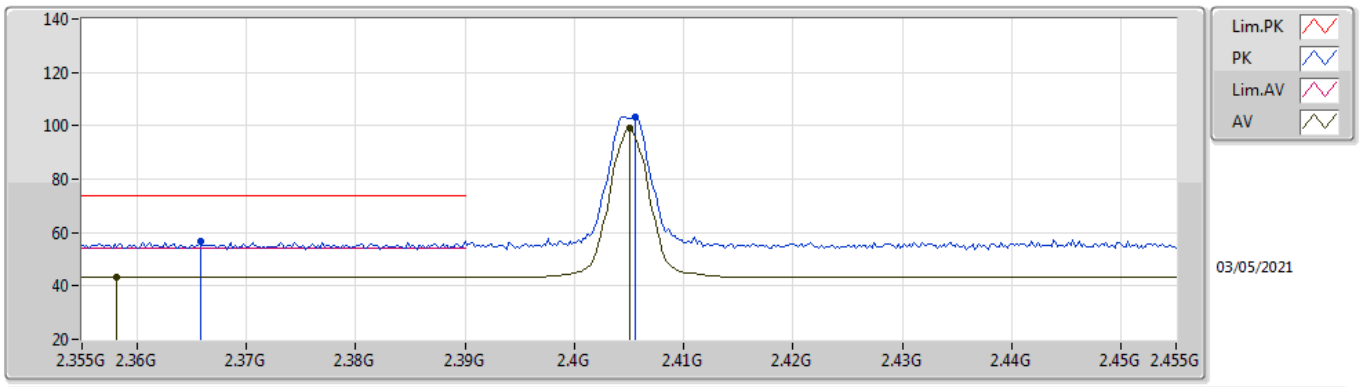
Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
Zigbee	-	-	-	-	-	-	-	-	-	-	-
2405MHz	Pass	AV	2.3582G	43.20	54.00	-10.80	3	Vertical	92	1.40	-
2405MHz	Pass	AV	2.405G	99.09	Inf	-Inf	3	Vertical	92	1.40	-
2405MHz	Pass	PK	2.3658G	56.81	74.00	-17.19	3	Vertical	92	1.40	-
2405MHz	Pass	PK	2.4056G	103.51	Inf	-Inf	3	Vertical	92	1.40	-
2405MHz	Pass	AV	2.3552G	43.19	54.00	-10.81	3	Horizontal	204	1.50	-
2405MHz	Pass	AV	2.405G	98.27	Inf	-Inf	3	Horizontal	204	1.50	-
2405MHz	Pass	PK	2.3642G	57.03	74.00	-16.97	3	Horizontal	204	1.50	-
2405MHz	Pass	PK	2.4056G	102.66	Inf	-Inf	3	Horizontal	204	1.50	-
2405MHz	Pass	AV	4.80897G	37.58	54.00	-16.42	3	Vertical	40	1.17	-
2405MHz	Pass	PK	4.80904G	48.85	74.00	-25.15	3	Vertical	40	1.17	-
2405MHz	Pass	AV	4.80905G	41.48	54.00	-12.52	3	Horizontal	348	1.22	-
2405MHz	Pass	PK	4.80886G	52.32	74.00	-21.68	3	Horizontal	348	1.22	-
2440MHz	Pass	AV	2.35G	43.22	54.00	-10.78	3	Vertical	68	1.56	-
2440MHz	Pass	AV	2.44G	99.37	Inf	-Inf	3	Vertical	68	1.56	-
2440MHz	Pass	AV	2.4996G	43.66	54.00	-10.34	3	Vertical	68	1.56	-
2440MHz	Pass	PK	2.3424G	57.49	74.00	-16.51	3	Vertical	68	1.56	-
2440MHz	Pass	PK	2.4404G	103.72	Inf	-Inf	3	Vertical	68	1.56	-
2440MHz	Pass	PK	2.4996G	56.71	74.00	-17.29	3	Vertical	68	1.56	-
2440MHz	Pass	AV	2.3468G	43.22	54.00	-10.78	3	Horizontal	212	1.29	-
2440MHz	Pass	AV	2.44G	98.71	Inf	-Inf	3	Horizontal	212	1.29	-
2440MHz	Pass	AV	2.4956G	43.62	54.00	-10.38	3	Horizontal	212	1.29	-
2440MHz	Pass	PK	2.35G	56.57	74.00	-17.43	3	Horizontal	212	1.29	-
2440MHz	Pass	PK	2.4404G	103.09	Inf	-Inf	3	Horizontal	212	1.29	-
2440MHz	Pass	PK	2.488G	57.80	74.00	-16.20	3	Horizontal	212	1.29	-
2440MHz	Pass	AV	4.879G	34.47	54.00	-19.53	3	Vertical	39	1.00	-
2440MHz	Pass	AV	7.32144G	52.13	54.00	-1.87	3	Vertical	4	1.00	-
2440MHz	Pass	PK	4.88088G	46.43	74.00	-27.57	3	Vertical	39	1.00	-
2440MHz	Pass	PK	7.32167G	62.79	74.00	-11.21	3	Vertical	4	1.00	-
2440MHz	Pass	AV	4.87902G	36.70	54.00	-17.30	3	Horizontal	31	1.06	-
2440MHz	Pass	AV	7.3214G	52.54	54.00	-1.46	3	Horizontal	43	2.38	-
2440MHz	Pass	PK	4.87883G	47.87	74.00	-26.13	3	Horizontal	31	1.06	-
2440MHz	Pass	PK	7.32159G	63.35	74.00	-10.65	3	Horizontal	43	2.38	-
2475MHz	Pass	AV	2.475G	99.93	Inf	-Inf	3	Vertical	66	1.08	-
2475MHz	Pass	AV	2.4836G	44.06	54.00	-9.94	3	Vertical	66	1.08	-
2475MHz	Pass	PK	2.4744G	104.33	Inf	-Inf	3	Vertical	66	1.08	-
2475MHz	Pass	PK	2.4846G	57.51	74.00	-16.49	3	Vertical	66	1.08	-
2475MHz	Pass	AV	2.475G	98.71	Inf	-Inf	3	Horizontal	211	1.50	-
2475MHz	Pass	AV	2.4835G	44.04	54.00	-9.96	3	Horizontal	211	1.50	-
2475MHz	Pass	PK	2.4756G	103.08	Inf	-Inf	3	Horizontal	211	1.50	-
2475MHz	Pass	PK	2.4992G	58.10	74.00	-15.90	3	Horizontal	211	1.50	-
2475MHz	Pass	AV	4.94899G	32.97	54.00	-21.03	3	Vertical	127	2.63	-
2475MHz	Pass	AV	7.42641G	53.66	54.00	-0.34	3	Vertical	352	2.66	-
2475MHz	Pass	PK	4.95112G	45.44	74.00	-28.56	3	Vertical	127	2.63	-
2475MHz	Pass	PK	7.42349G	64.39	74.00	-9.61	3	Vertical	352	2.66	-
2475MHz	Pass	AV	4.94899G	33.75	54.00	-20.25	3	Horizontal	30	1.03	-
2475MHz	Pass	AV	7.42363G	53.87	54.00	-0.13	3	Horizontal	45	2.46	-
2475MHz	Pass	PK	4.94893G	45.71	74.00	-28.29	3	Horizontal	30	1.03	-
2475MHz	Pass	PK	7.42668G	64.35	74.00	-9.65	3	Horizontal	45	2.46	-
2480MHz	Pass	AV	2.48G	100.59	Inf	-Inf	3	Vertical	77	1.00	-
2480MHz	Pass	AV	2.4835G	50.69	54.00	-3.31	3	Vertical	77	1.00	-
2480MHz	Pass	PK	2.4806G	104.92	Inf	-Inf	3	Vertical	77	1.00	-
2480MHz	Pass	PK	2.4835G	60.97	74.00	-13.03	3	Vertical	77	1.00	-
2480MHz	Pass	AV	2.48G	99.00	Inf	-Inf	3	Horizontal	193	3.00	-
2480MHz	Pass	AV	2.4835G	49.78	54.00	-4.22	3	Horizontal	193	3.00	-
2480MHz	Pass	PK	2.4806G	103.39	Inf	-Inf	3	Horizontal	193	3.00	-
2480MHz	Pass	PK	2.4835G	62.28	74.00	-11.72	3	Horizontal	193	3.00	-
2480MHz	Pass	AV	4.95899G	34.48	54.00	-19.52	3	Vertical	228	1.10	-
2480MHz	Pass	AV	7.43865G	52.01	54.00	-1.99	3	Vertical	20	2.52	-
2480MHz	Pass	PK	4.95897G	46.54	74.00	-27.46	3	Vertical	228	1.10	-
2480MHz	Pass	PK	7.44166G	62.50	74.00	-11.50	3	Vertical	20	2.52	-

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2480MHz	Pass	AV	4.95904G	35.27	54.00	-18.73	3	Horizontal	32	1.00	-
2480MHz	Pass	AV	7.44144G	52.66	54.00	-1.34	3	Horizontal	40	1.00	-
2480MHz	Pass	PK	4.95918G	47.34	74.00	-26.66	3	Horizontal	32	1.00	-
2480MHz	Pass	PK	7.44158G	63.15	74.00	-10.85	3	Horizontal	40	1.00	-

Zigbee

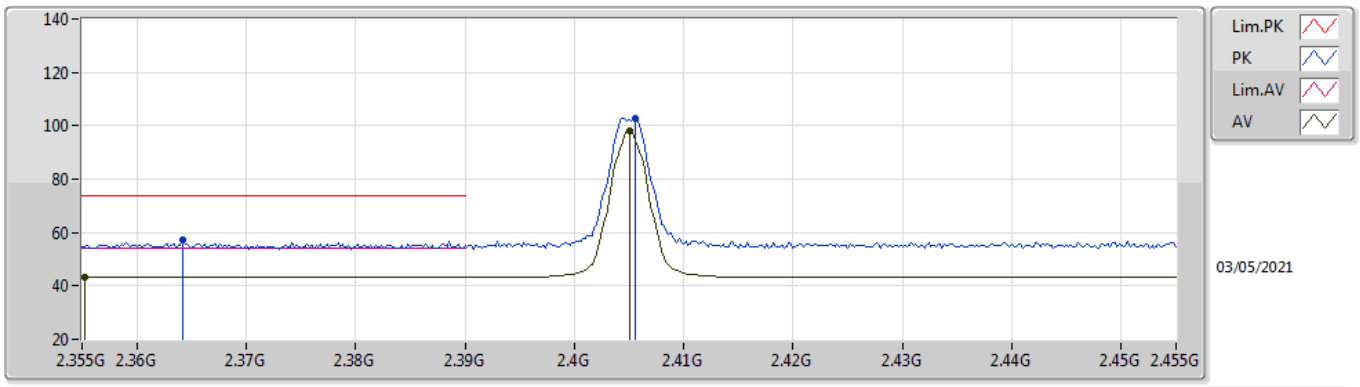
2405MHz_TX



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	2.3582G	43.20	54.00	-10.80	31.61	3	Vertical	92	1.40	-	11.59	27.77	3.84	-
AV	2.405G	99.09	Inf	-Inf	31.51	3	Vertical	92	1.40	-	67.58	27.60	3.91	-
PK	2.3658G	56.81	74.00	-17.19	31.59	3	Vertical	92	1.40	-	25.22	27.74	3.85	-
PK	2.4056G	103.51	Inf	-Inf	31.51	3	Vertical	92	1.40	-	72.00	27.60	3.91	-

Zigbee

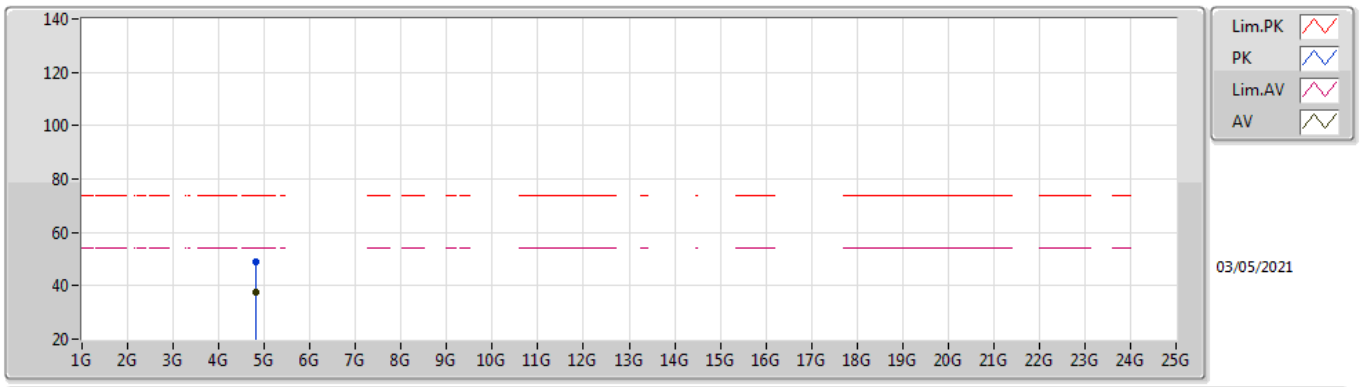
2405MHz_TX



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	2.3552G	43.19	54.00	-10.81	31.61	3	Horizontal	204	1.50	-	11.58	27.78	3.83	-
AV	2.405G	98.27	Inf	-Inf	31.51	3	Horizontal	204	1.50	-	66.76	27.60	3.91	-
PK	2.3642G	57.03	74.00	-16.97	31.59	3	Horizontal	204	1.50	-	25.44	27.74	3.85	-
PK	2.4056G	102.66	Inf	-Inf	31.51	3	Horizontal	204	1.50	-	71.15	27.60	3.91	-

Zigbee

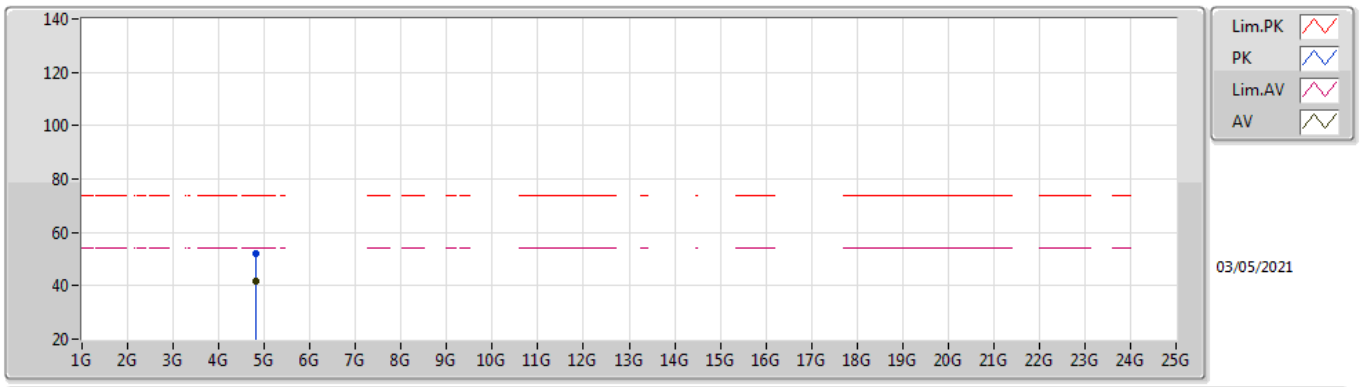
2405MHz_TX



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	4.80897G	37.58	54.00	-16.42	1.51	3	Vertical	40	1.17	-	36.07	31.14	5.30	34.93
PK	4.80904G	48.85	74.00	-25.15	1.51	3	Vertical	40	1.17	-	47.34	31.14	5.30	34.93

Zigbee

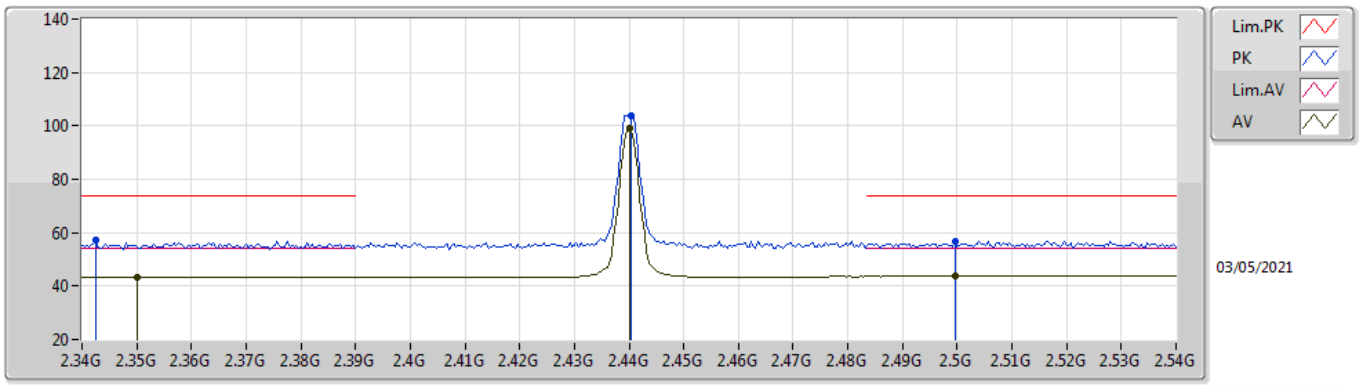
2405MHz_TX



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	4.80905G	41.48	54.00	-12.52	1.51	3	Horizontal	348	1.22	-	39.97	31.14	5.30	34.93
PK	4.80886G	52.32	74.00	-21.68	1.51	3	Horizontal	348	1.22	-	50.81	31.14	5.30	34.93

Zigbee

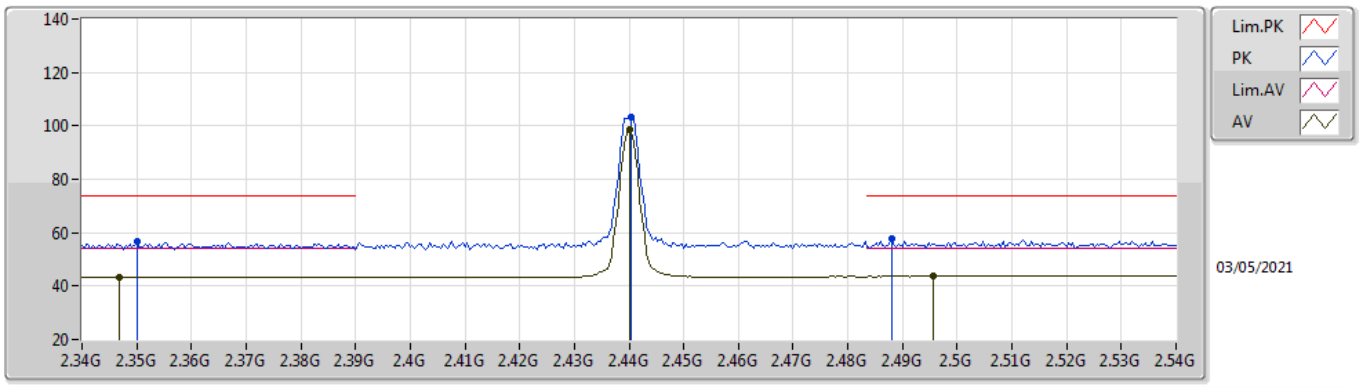
2440MHz_TX



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	2.35G	43.22	54.00	-10.78	31.63	3	Vertical	68	1.56	-	11.59	27.80	3.83	-
AV	2.44G	99.37	Inf	-Inf	31.56	3	Vertical	68	1.56	-	67.81	27.60	3.96	-
AV	2.4996G	43.66	54.00	-10.34	31.65	3	Vertical	68	1.56	-	12.01	27.60	4.05	-
PK	2.3424G	57.49	74.00	-16.51	31.63	3	Vertical	68	1.56	-	25.86	27.82	3.81	-
PK	2.4404G	103.72	Inf	-Inf	31.56	3	Vertical	68	1.56	-	72.16	27.60	3.96	-
PK	2.4996G	56.71	74.00	-17.29	31.65	3	Vertical	68	1.56	-	25.06	27.60	4.05	-

Zigbee

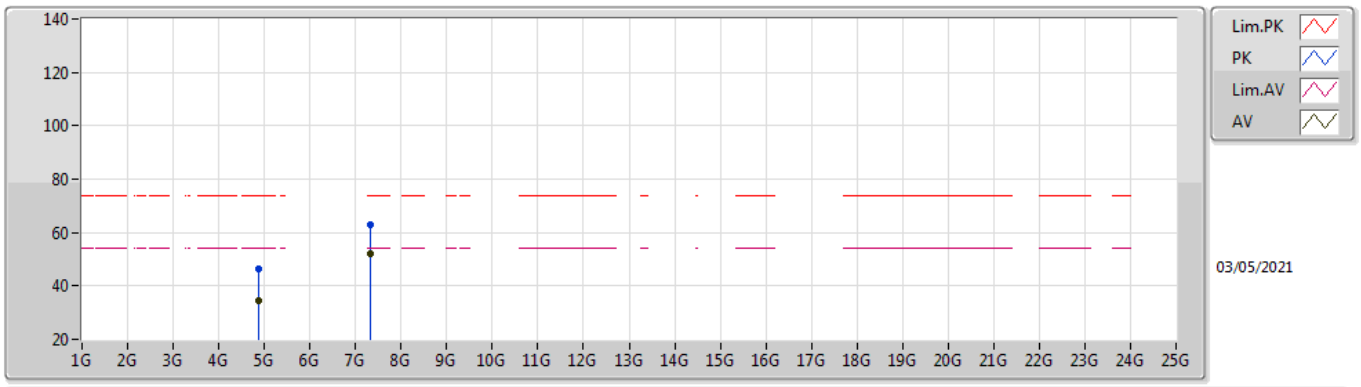
2440MHz_TX



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	2.3468G	43.22	54.00	-10.78	31.63	3	Horizontal	212	1.29	-	11.59	27.81	3.82	-
AV	2.44G	98.71	Inf	-Inf	31.56	3	Horizontal	212	1.29	-	67.15	27.60	3.96	-
AV	2.4956G	43.62	54.00	-10.38	31.64	3	Horizontal	212	1.29	-	11.98	27.60	4.04	-
PK	2.35G	56.57	74.00	-17.43	31.63	3	Horizontal	212	1.29	-	24.94	27.80	3.83	-
PK	2.4404G	103.09	Inf	-Inf	31.56	3	Horizontal	212	1.29	-	71.53	27.60	3.96	-
PK	2.488G	57.80	74.00	-16.20	31.63	3	Horizontal	212	1.29	-	26.17	27.60	4.03	-

Zigbee

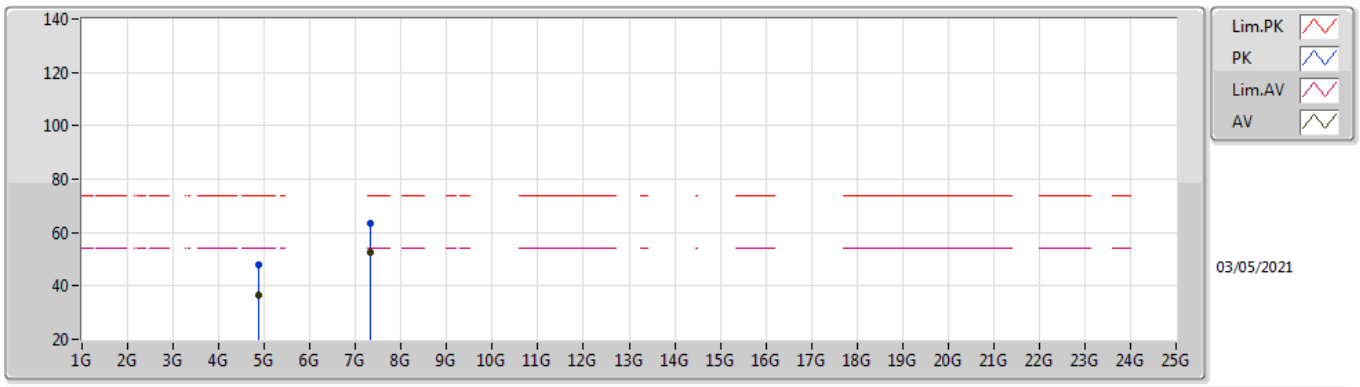
2440MHz_TX



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	4.879G	34.47	54.00	-19.53	1.65	3	Vertical	39	1.00	-	32.82	31.24	5.34	34.93
AV	7.32144G	52.13	54.00	-1.87	8.18	3	Vertical	4	1.00	-	43.95	36.56	6.80	35.18
PK	4.88088G	46.43	74.00	-27.57	1.65	3	Vertical	39	1.00	-	44.78	31.24	5.34	34.93
PK	7.32167G	62.79	74.00	-11.21	8.18	3	Vertical	4	1.00	-	54.61	36.56	6.80	35.18

Zigbee

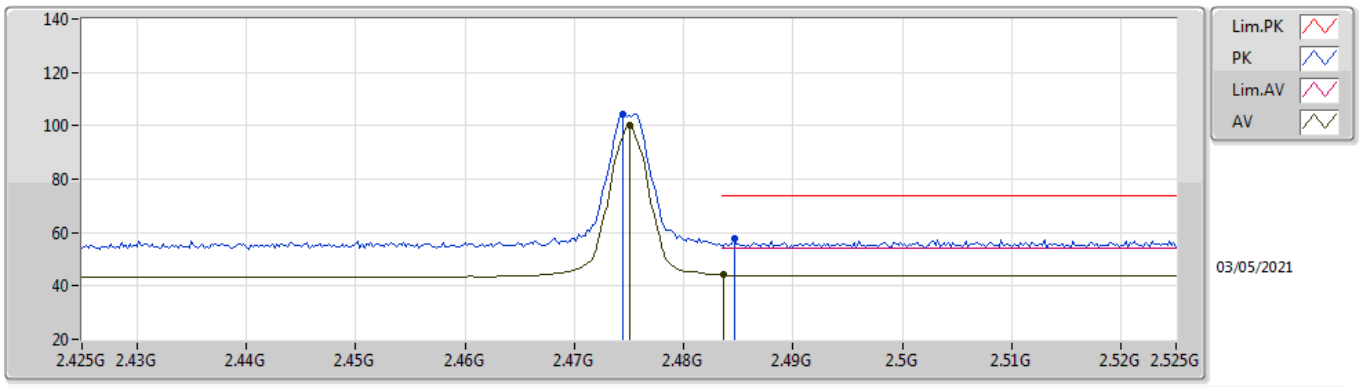
2440MHz_TX



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	4.87902G	36.70	54.00	-17.30	1.65	3	Horizontal	31	1.06	-	35.05	31.24	5.34	34.93
AV	7.3214G	52.54	54.00	-1.46	8.18	3	Horizontal	43	2.38	-	44.36	36.56	6.80	35.18
PK	4.87883G	47.87	74.00	-26.13	1.65	3	Horizontal	31	1.06	-	46.22	31.24	5.34	34.93
PK	7.32159G	63.35	74.00	-10.65	8.18	3	Horizontal	43	2.38	-	55.17	36.56	6.80	35.18

Zigbee

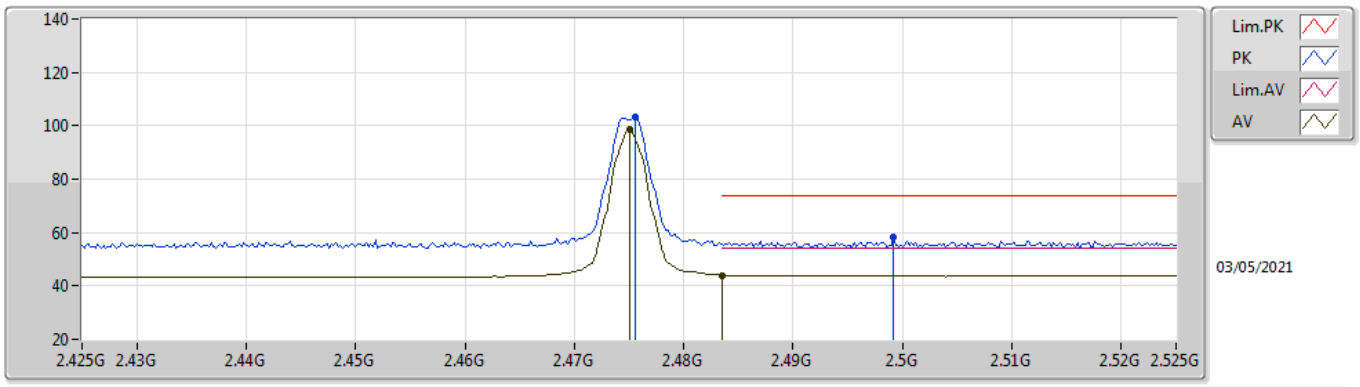
2475MHz_TX



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	2.475G	99.93	Inf	-Inf	31.61	3	Vertical	66	1.08	-	68.32	27.60	4.01	-
AV	2.4836G	44.06	54.00	-9.94	31.63	3	Vertical	66	1.08	-	12.43	27.60	4.03	-
PK	2.4744G	104.33	Inf	-Inf	31.61	3	Vertical	66	1.08	-	72.72	27.60	4.01	-
PK	2.4846G	57.51	74.00	-16.49	31.63	3	Vertical	66	1.08	-	25.88	27.60	4.03	-

Zigbee

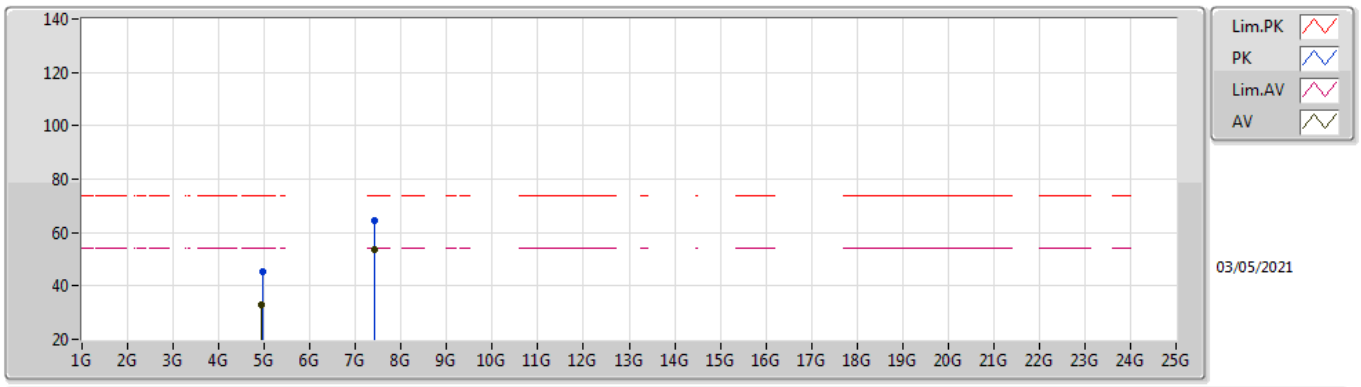
2475MHz_TX



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	2.475G	98.71	Inf	-Inf	31.61	3	Horizontal	211	1.50	-	67.10	27.60	4.01	-
AV	2.4835G	44.04	54.00	-9.96	31.63	3	Horizontal	211	1.50	-	12.41	27.60	4.03	-
PK	2.4756G	103.08	Inf	-Inf	31.61	3	Horizontal	211	1.50	-	71.47	27.60	4.01	-
PK	2.4992G	58.10	74.00	-15.90	31.65	3	Horizontal	211	1.50	-	26.45	27.60	4.05	-

Zigbee

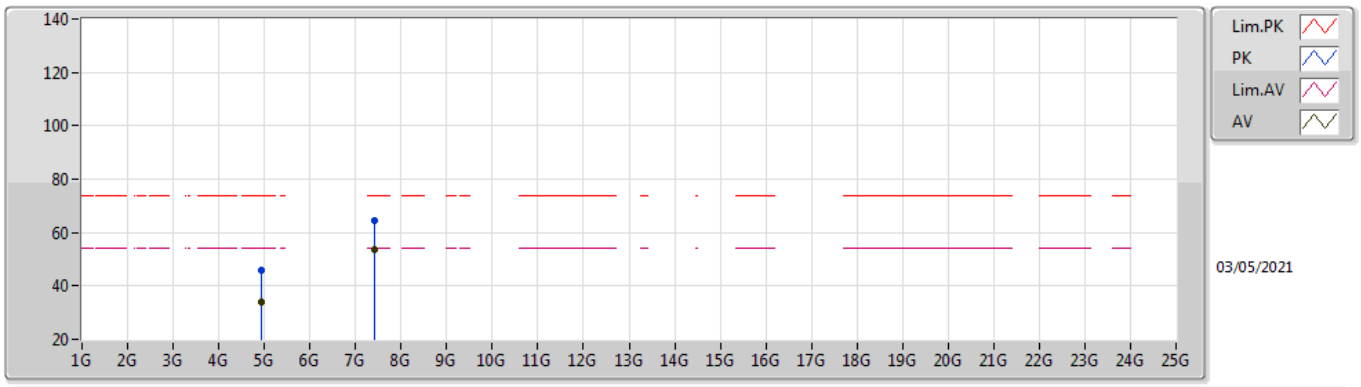
2475MHz_TX



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	4.94899G	32.97	54.00	-21.03	1.83	3	Vertical	127	2.63	-	31.14	31.40	5.37	34.94
AV	7.42641G	53.66	54.00	-0.34	8.15	3	Vertical	352	2.66	-	45.51	36.51	6.81	35.17
PK	4.95112G	45.44	74.00	-28.56	1.84	3	Vertical	127	2.63	-	43.60	31.40	5.38	34.94
PK	7.42349G	64.39	74.00	-9.61	8.13	3	Vertical	352	2.66	-	56.26	36.49	6.81	35.17

Zigbee

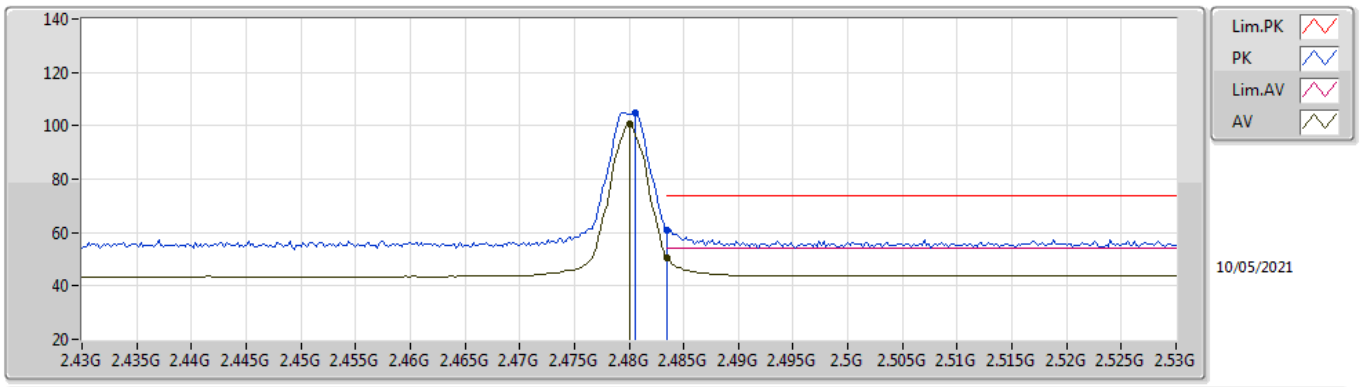
2475MHz_TX



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	4.94899G	33.75	54.00	-20.25	1.83	3	Horizontal	30	1.03	-	31.92	31.40	5.37	34.94
AV	7.42363G	53.87	54.00	-0.13	8.13	3	Horizontal	45	2.46	-	45.74	36.49	6.81	35.17
PK	4.94893G	45.71	74.00	-28.29	1.83	3	Horizontal	30	1.03	-	43.88	31.40	5.37	34.94
PK	7.42668G	64.35	74.00	-9.65	8.15	3	Horizontal	45	2.46	-	56.20	36.51	6.81	35.17

Zigbee

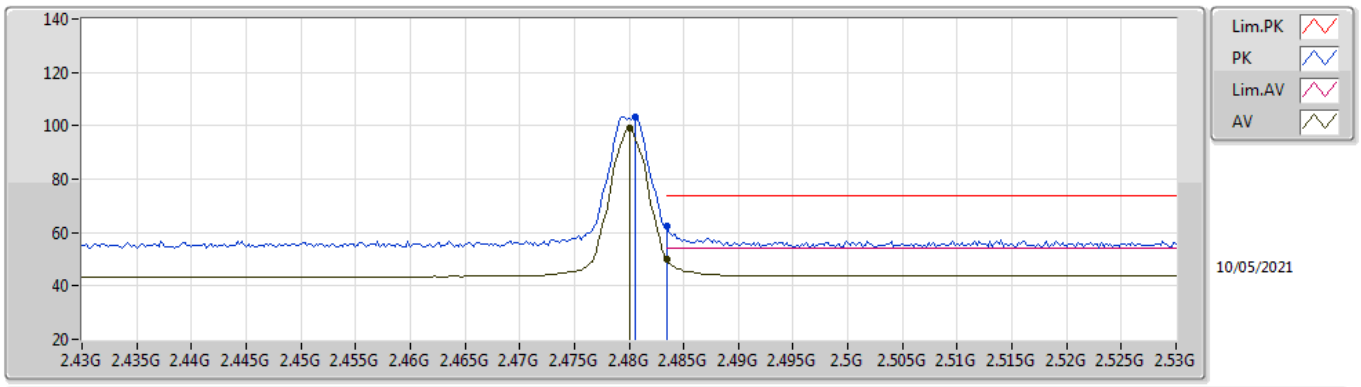
2480MHz_TX



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	100.59	Inf	-Inf	31.62	3	Vertical	77	1.00	-	68.97	27.60	4.02	-
AV	2.4835G	50.69	54.00	-3.31	31.63	3	Vertical	77	1.00	-	19.06	27.60	4.03	-
PK	2.4806G	104.92	Inf	-Inf	31.62	3	Vertical	77	1.00	-	73.30	27.60	4.02	-
PK	2.4835G	60.97	74.00	-13.03	31.63	3	Vertical	77	1.00	-	29.34	27.60	4.03	-

Zigbee

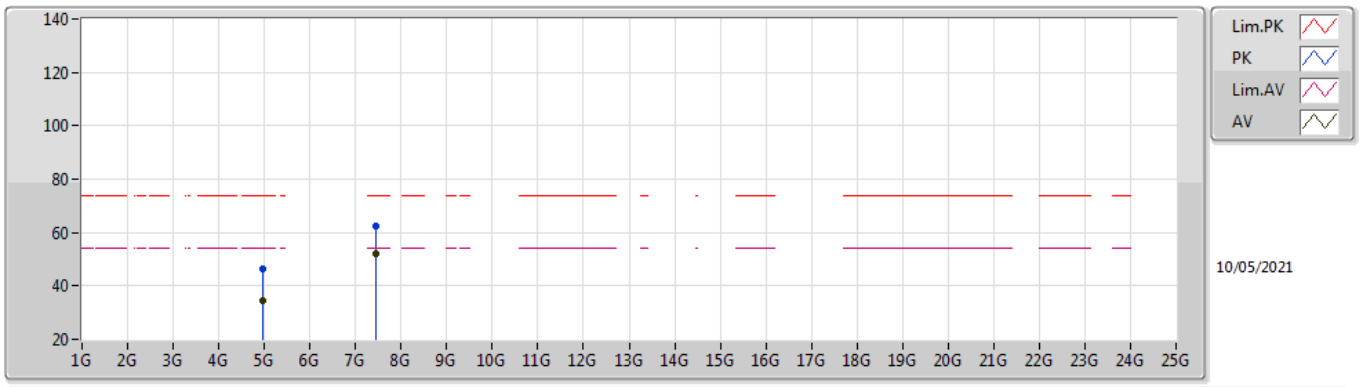
2480MHz_TX



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	99.00	Inf	-Inf	31.62	3	Horizontal	193	3.00	-	67.38	27.60	4.02	-
AV	2.4835G	49.78	54.00	-4.22	31.63	3	Horizontal	193	3.00	-	18.15	27.60	4.03	-
PK	2.4806G	103.39	Inf	-Inf	31.62	3	Horizontal	193	3.00	-	71.77	27.60	4.02	-
PK	2.4835G	62.28	74.00	-11.72	31.63	3	Horizontal	193	3.00	-	30.65	27.60	4.03	-

Zigbee

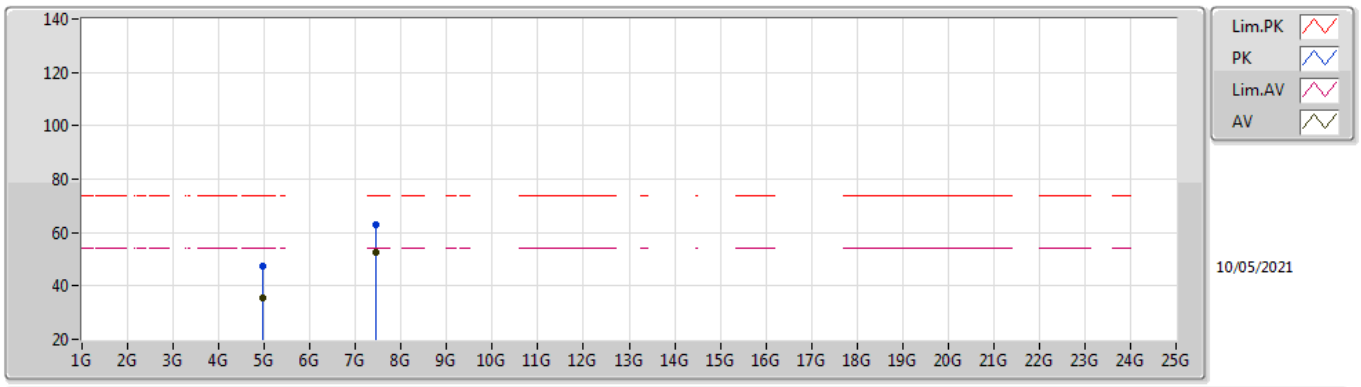
2480MHz_TX



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	4.95899G	34.48	54.00	-19.52	1.86	3	Vertical	228	1.10	-	32.62	31.42	5.38	34.94
AV	7.43865G	52.01	54.00	-1.99	8.20	3	Vertical	20	2.52	-	43.81	36.55	6.82	35.17
PK	4.95897G	46.54	74.00	-27.46	1.86	3	Vertical	228	1.10	-	44.68	31.42	5.38	34.94
PK	7.44166G	62.50	74.00	-11.50	8.22	3	Vertical	20	2.52	-	54.28	36.57	6.82	35.17

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	4.95904G	35.27	54.00	-18.73	1.86	3	Horizontal	32	1.00	-	33.41	31.42	5.38	34.94
AV	7.44144G	52.66	54.00	-1.34	8.22	3	Horizontal	40	1.00	-	44.44	36.57	6.82	35.17
PK	4.95918G	47.34	74.00	-26.66	1.86	3	Horizontal	32	1.00	-	45.48	31.42	5.38	34.94
PK	7.44158G	63.15	74.00	-10.85	8.22	3	Horizontal	40	1.00	-	54.93	36.57	6.82	35.17

Summary

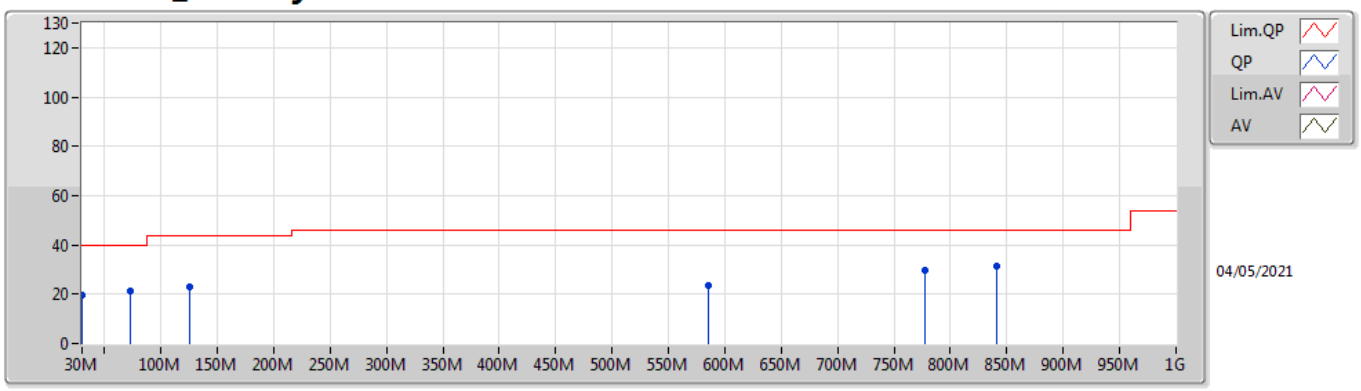
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	PK	840.92M	31.42	46.00	-14.58	3	Vertical	360	1.00	-

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	30M	19.89	40.00	-20.11	3	Vertical	360	1.00	-
2440MHz	Pass	PK	72.68M	21.41	40.00	-18.59	3	Vertical	360	1.00	-
2440MHz	Pass	PK	125.06M	23.18	43.50	-20.32	3	Vertical	360	1.00	-
2440MHz	Pass	PK	584.84M	23.81	46.00	-22.19	3	Vertical	360	1.00	-
2440MHz	Pass	PK	776.9M	29.52	46.00	-16.48	3	Vertical	360	1.00	-
2440MHz	Pass	PK	840.92M	31.42	46.00	-14.58	3	Vertical	360	1.00	-
2440MHz	Pass	PK	30M	20.37	40.00	-19.63	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	134.76M	14.47	43.50	-29.03	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	536.34M	23.68	46.00	-22.32	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	654.68M	25.10	46.00	-20.90	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	774.96M	30.12	46.00	-15.88	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	840.92M	30.90	46.00	-15.10	3	Horizontal	0	1.00	-

ZigbeeRX

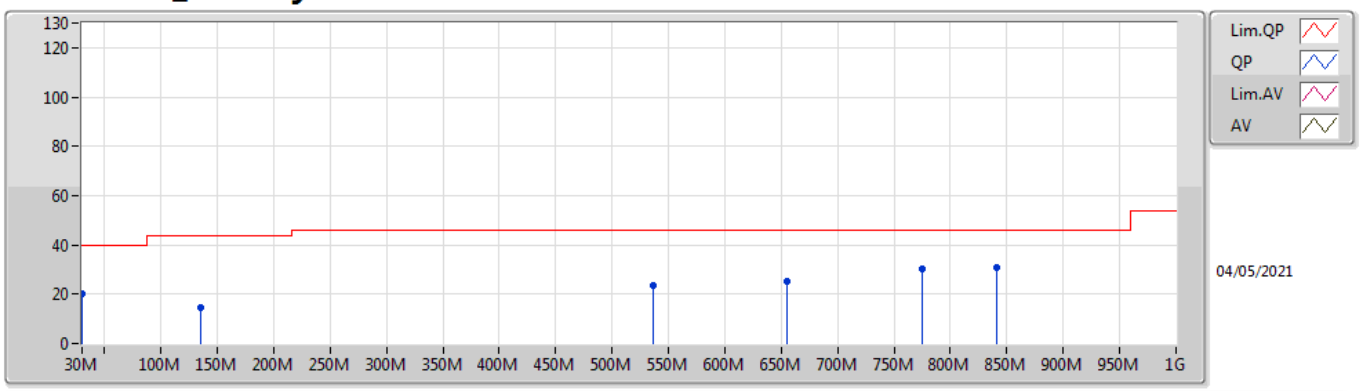
2440MHz_Battery



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	30M	19.89	40.00	-20.11	-13.08	3	Vertical	360	1.00	-	32.97	23.51	0.56	37.15
PK	72.68M	21.41	40.00	-18.59	-24.58	3	Vertical	360	1.00	-	45.99	11.52	0.85	36.95
PK	125.06M	23.18	43.50	-20.32	-18.63	3	Vertical	360	1.00	-	41.81	16.88	1.10	36.61
PK	584.84M	23.81	46.00	-22.19	-9.70	3	Vertical	360	1.00	-	33.51	24.97	2.44	37.11
PK	776.9M	29.52	46.00	-16.48	-7.41	3	Vertical	360	1.00	-	36.93	27.36	2.77	37.54
PK	840.92M	31.42	46.00	-14.58	-6.49	3	Vertical	360	1.00	-	37.91	28.20	2.91	37.60

ZigbeeRX

2440MHz_Battery



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	30M	20.37	40.00	-19.63	-13.08	3	Horizontal	0	1.00	-	33.45	23.51	0.56	37.15
PK	134.76M	14.47	43.50	-29.03	-18.53	3	Horizontal	0	1.00	-	33.00	16.80	1.15	36.48
PK	536.34M	23.68	46.00	-22.32	-11.44	3	Horizontal	0	1.00	-	35.12	23.28	2.34	37.06
PK	654.68M	25.10	46.00	-20.90	-9.08	3	Horizontal	0	1.00	-	34.18	25.54	2.63	37.25
PK	774.96M	30.12	46.00	-15.88	-7.42	3	Horizontal	0	1.00	-	37.54	27.36	2.77	37.55
PK	840.92M	30.90	46.00	-15.10	-6.49	3	Horizontal	0	1.00	-	37.39	28.20	2.91	37.60

Summary

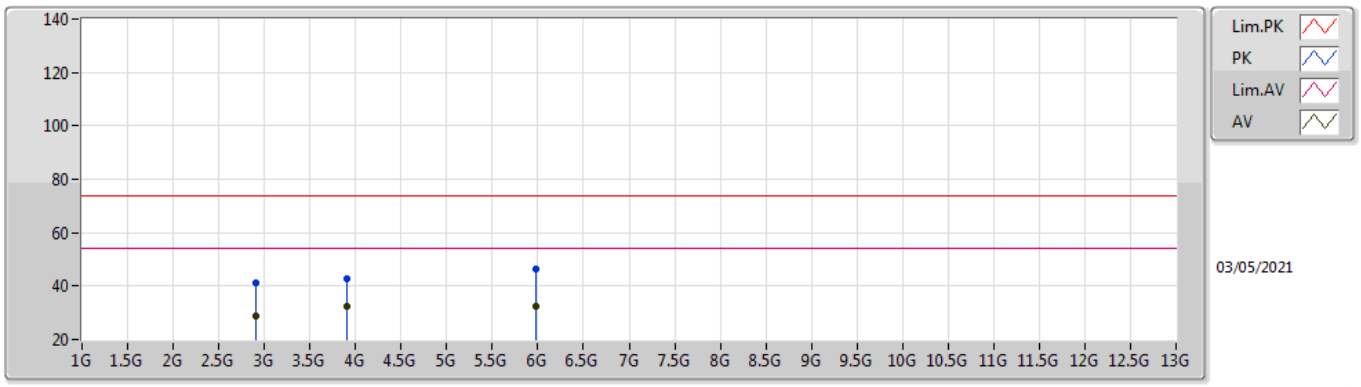
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	AV	3.9G	32.64	54.00	-21.36	3	Vertical	179	1.02	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
Zigbee	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	AV	2.9G	28.99	54.00	-25.01	3	Vertical	20	1.61	-
2440MHz	Pass	AV	3.9G	32.64	54.00	-21.36	3	Vertical	179	1.02	-
2440MHz	Pass	AV	5.98G	32.57	54.00	-21.43	3	Vertical	100	2.14	-
2440MHz	Pass	PK	2.9G	41.41	74.00	-32.59	3	Vertical	20	1.61	-
2440MHz	Pass	PK	3.9G	42.64	74.00	-31.36	3	Vertical	179	1.02	-
2440MHz	Pass	PK	5.98G	46.40	74.00	-27.60	3	Vertical	100	2.14	-
2440MHz	Pass	AV	2.77G	28.73	54.00	-25.27	3	Horizontal	195	1.98	-
2440MHz	Pass	AV	4.71G	31.66	54.00	-22.34	3	Horizontal	240	1.19	-
2440MHz	Pass	AV	5.14G	31.87	54.00	-22.13	3	Horizontal	62	1.92	-
2440MHz	Pass	PK	2.77G	41.45	74.00	-32.55	3	Horizontal	195	1.98	-
2440MHz	Pass	PK	4.71G	43.68	74.00	-30.32	3	Horizontal	240	1.19	-
2440MHz	Pass	PK	5.14G	44.74	74.00	-29.26	3	Horizontal	62	1.92	-

ZigbeeRX

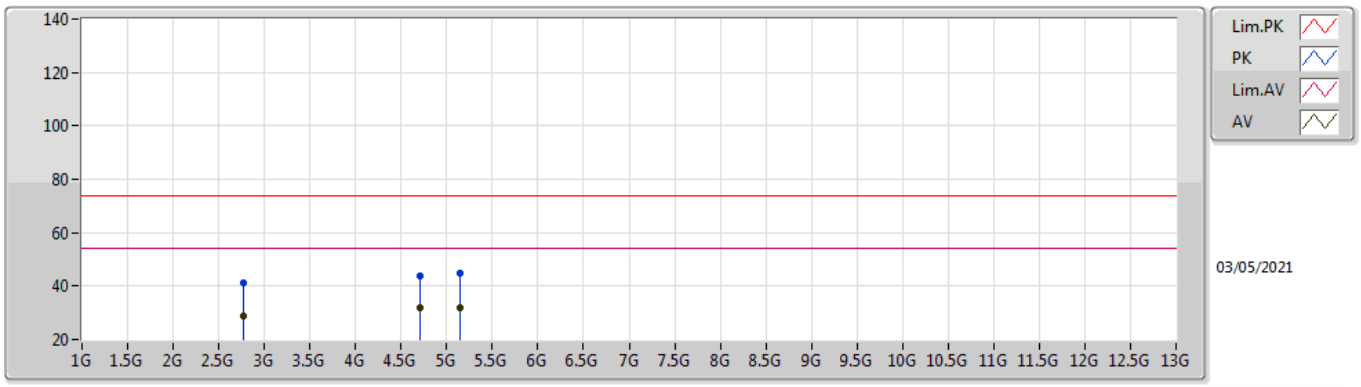
2440MHz_RX



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	2.9G	28.99	54.00	-25.01	-2.01	3	Vertical	20	1.61	-	31.00	28.40	4.60	35.01
AV	3.9G	32.64	54.00	-21.36	-0.31	3	Vertical	179	1.02	-	32.95	29.70	4.85	34.86
AV	5.98G	32.57	54.00	-21.43	3.43	3	Vertical	100	2.14	-	29.14	32.54	5.89	35.00
PK	2.9G	41.41	74.00	-32.59	-2.01	3	Vertical	20	1.61	-	43.42	28.40	4.60	35.01
PK	3.9G	42.64	74.00	-31.36	-0.31	3	Vertical	179	1.02	-	42.95	29.70	4.85	34.86
PK	5.98G	46.40	74.00	-27.60	3.43	3	Vertical	100	2.14	-	42.97	32.54	5.89	35.00

ZigbeeRX

2440MHz_RX



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	2.77G	28.73	54.00	-25.27	-2.59	3	Horizontal	195	1.98	-	31.32	27.95	4.44	34.98
AV	4.71G	31.66	54.00	-22.34	1.58	3	Horizontal	240	1.19	-	30.08	31.20	5.30	34.92
AV	5.14G	31.87	54.00	-22.13	2.55	3	Horizontal	62	1.92	-	29.32	32.00	5.47	34.92
PK	2.77G	41.45	74.00	-32.55	-2.54	3	Horizontal	195	1.98	-	43.99	27.98	4.46	34.98
PK	4.71G	43.68	74.00	-30.32	1.60	3	Horizontal	240	1.19	-	42.08	31.22	5.30	34.92
PK	5.14G	44.74	74.00	-29.26	2.55	3	Horizontal	62	1.92	-	42.19	32.00	5.47	34.92