FCC Radio Test Report

FCC ID	:	**2A2G4-SYN3**
Equipment	:	**u_puretone**
Brand Name	:	**unfilter**
Model Name	:	**SYN3**
Applicant	:	**OBO Pro.2 Inc. No. 18 Yan-Wu Road, Taoyuan City 330, Taiwan(R.O.C.)**
Manufacturer	:	**OBO Pro.2 Inc. No. 18 Yan-Wu Road, Taoyuan City 330, Taiwan(R.O.C.)**
Standard	:	**47 CFR FCC Part 15.247**

The product was received on Jun. 08, 2021, and testing was started from Jun. 25, 2021 and completed on Jun. 28, 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.

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
FR160334AL	01	Initial issue of report	Jul. 29, 2021
FR160334AL	02	Accessories were updated. This report is the latest version replacing for the report issued on Jul. 29, 2021.	Aug. 02, 2021

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: Howard Lee

Report Producer: Amber Chiu

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	Bluetooth Mode	Ch. Frequency (MHz)	Channel Number
2400-2483.5	LE	2402-2480	0-39 [40]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	BT-LE(1Mbps)	1.0	1TX

Note:
- Bluetooth LE uses a GFSK (1Mbps) modulation.
- BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	FEIMIN TECHNOLOGY CO.,LTD.	SYN3 Antenna 1812	FPC	N/A	0

For BT function:

For IEEE 802.15.1 Bluetooth mode (1TX/1RX)

Ant. 1 can be used as transmitting/receiving antenna.

1.1.3 EUT Information

Operational Condition				
EUT Power Type	From DC Power supply / From Host system / 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
BT-LE(1Mbps)	0.637	1.96	398.125u	3k

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:

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

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

- KDB 558074 D01 v05r02
- KDB 414788 D01 v01r01

1.3 Testing Location Information

Test Lab.：Sporton International Inc. Hsinhua Laboratory				
☒ Hsinhua (**TAF:** 3785)	**ADD:** No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)			
	TEL: 886-3-327-3456		**FAX:** 886-3-327-0973	
Test site Designation No. TW3785 with FCC.				
Test Condition	**Test Site No.**	**Test Engineer**	**Test Environment**	**Test Date**
AC Conduction	CO04-HY	Billy Wang	25.5~26.9°C / 58~60%	28/Jun/2021
RF Conducted	TH07-HY	Alan Chien	20.1~26.9°C / 50~60%	25/Jun/2021
Radiated	03CH03-HY	Billy Wang	24.9~26.9°C / 50~60%	25/Jun/2021~26/Jun/2021
☐ Wen 33rd.St. (**TAF:** 3785)	**ADD:** No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)			
	TEL: 886-3-318-0787		**FAX:** 886-3-318-0287	
Test site Designation No. TW0008 with FCC.				

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Test Items	**Uncertainty**	**Remark**
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	AWRDlab R_1_0_5_199

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	Default
2440MHz	Default
2480MHz	Default

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/CRX
1	DC power supply

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/CRX		
1	DC power supply		
Operating Mode > 1GHz	CTX/CRX		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
Worst Planes of EUT		V	

2.3 Accessories

Accessories				
Charging Case	**Brand Name**	unfilter	**Model Name**	Uf-001
	Manufacturer	OBO Pro.2 Inc.	**SN**	uf29AE000005
Charging Case Battery	**Brand Name**	Xin Yu GanFeng Eletronices Co.,Ltd.	**Model Name**	702334
	Manufacturer	Xin Yu GanFeng Eletronices Co.,Ltd.	**SN**	uf29AE000005
	Power Rating	3.7 Vdc, 500 mAh	**Type**	Li-ion, Yes
USB Type C Cable	**Brand Name**	unfilter	**Model Name**	u-puretone
	Power Cord	0.12 meter, non-shielded cable		
Battery	**Brand Name**	XINYU GANFENG ELECTRONICS	**Model Name**	1254
	Manufacturer	XINYU GANFENG ELECTRONICS	**SN**	Uf11AB999999
	Power Rating	3.7 Vdc, 60 mAh	**Type**	Li-ion, Yes

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

2.4 Support Equipment

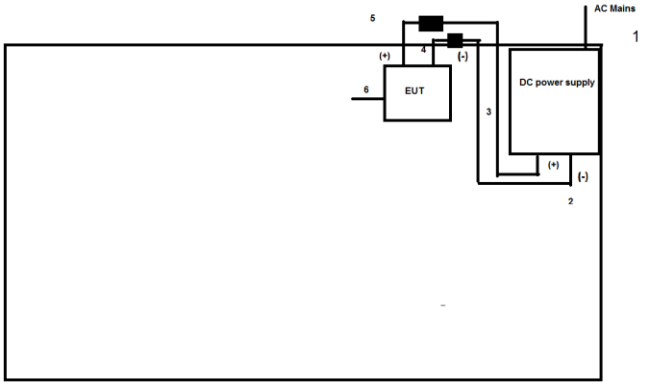
Support Equipment – AC Conduction					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	DC Power Supply	GW	GPS-3030DD	-	-
2	DC Power cable(+)	MiSUMi	WTN1227-RED	-	-
3	DC Power cable(-)	MiSUMi	WTN1227-BLACK	-	-
4	Fixture Cable	WAVESHARE	FTDI FT232RL USB UART	-	-

Support Equipment – Conducted					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	Notebook	DELL	E5410	-	-
2	Adapter for NB	DELL	HA65NM130	-	-
3	DC Power Supply	GW	GPS-3030DD	-	-

Support Equipment – Radiated					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	DC Power Supply	GW	GPS-3030DD	-	-
2	DC Power cable(+)	MiSUMi	WTN1227-RED	-	-
3	DC Power cable(-)	MiSUMi	WTN1227-BLACK	-	-
4	Fixture Cable	WAVESHARE	FTDI FT232RL USB UART	-	-

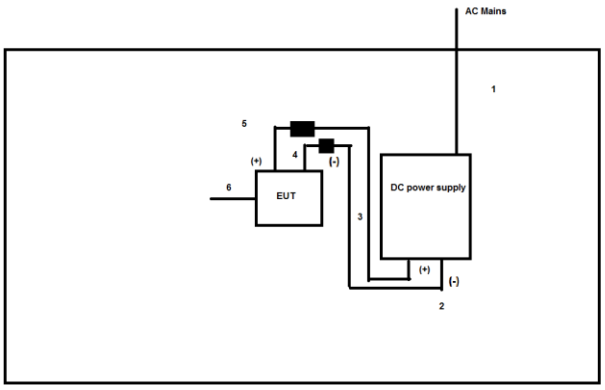
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power cable	No	1.8	-
2	DC Power cable(-)	No	1.0	-
3	DC Power cable(+)	No	1.0	-
4	DC Power cable(-)	No	0.1	-
5	DC Power cable(+)	No	0.1	-
6	Fixture Cable	No	0.07	-

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)	Remark
1	AC Power cable	No	1.8	-
2	DC Power cable(-)	No	1.0	-
3	DC Power cable(+)	No	1.0	-
4	DC Power cable(-)	No	0.1	-
5	DC Power cable(+)	No	0.1	-
6	Fixture Cable	No	0.07	-

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 foray power-line conducted emissions.

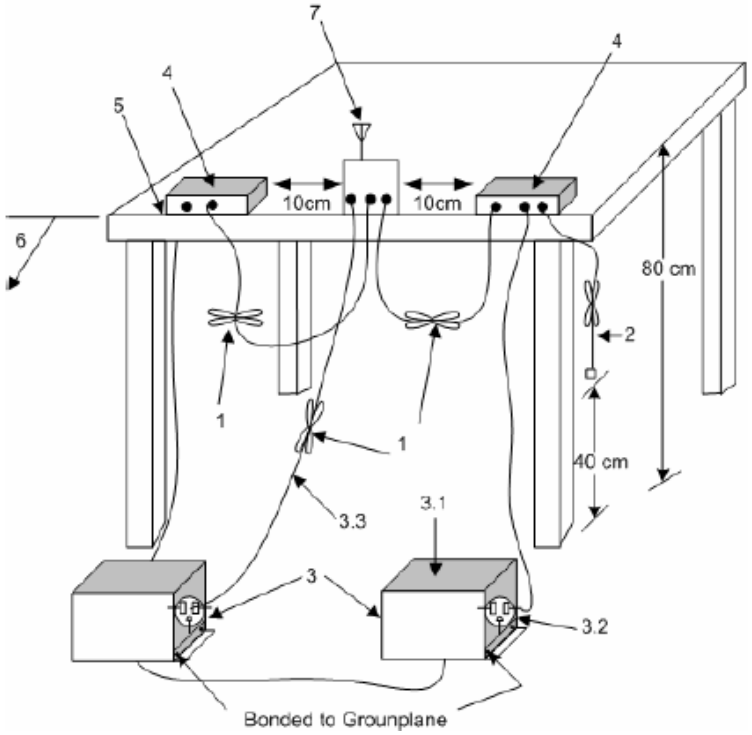
3.1.4 Measurement Results Calculation

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.

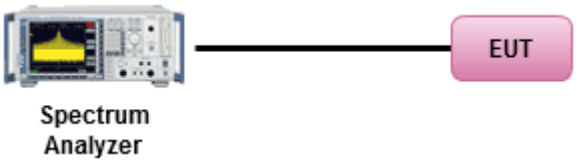
3.2.2 Measuring Instruments

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

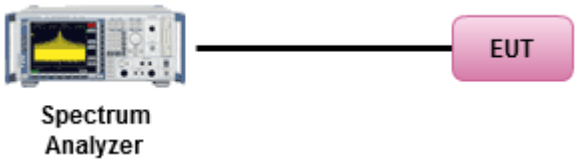
3.4.2 Measuring Instruments

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

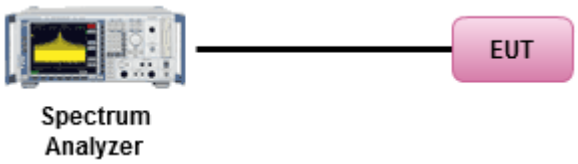
Refer a test equipment and calibration data table in this test report.

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 below30 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

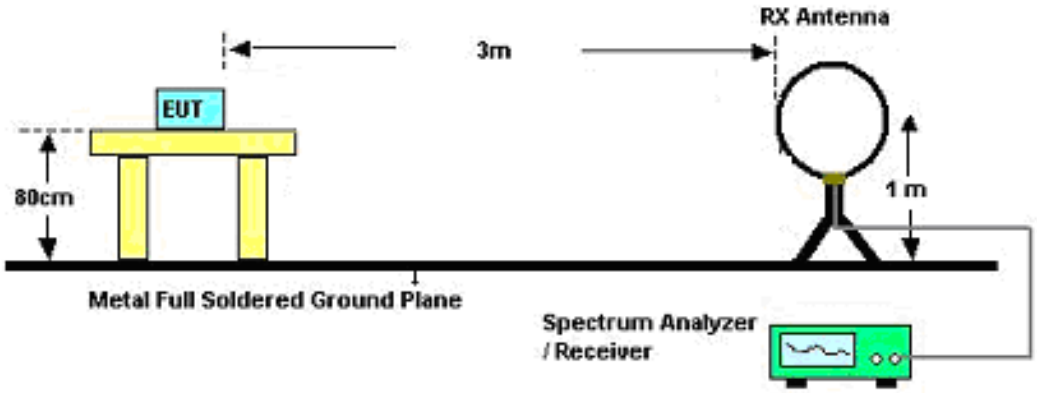
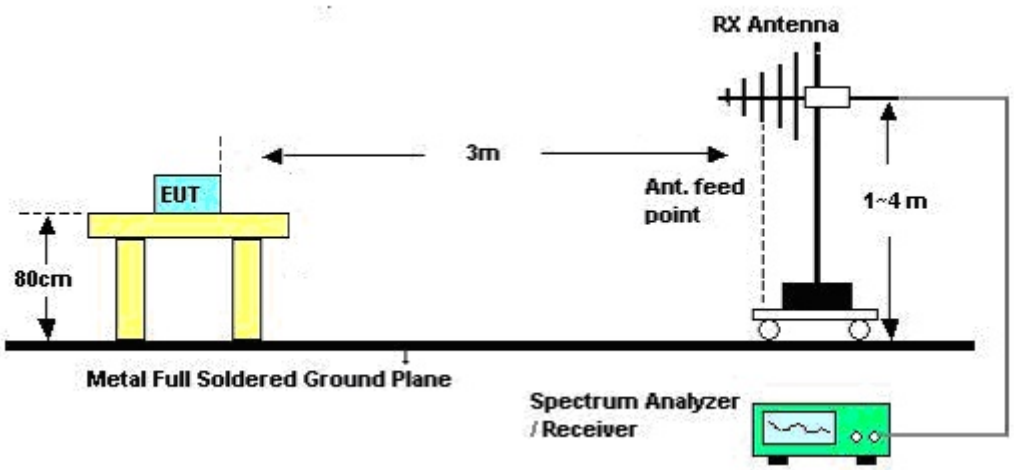
Test Method	
▪ The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].	
▪ Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.	
▪ For the transmitter unwanted 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.
▪ 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

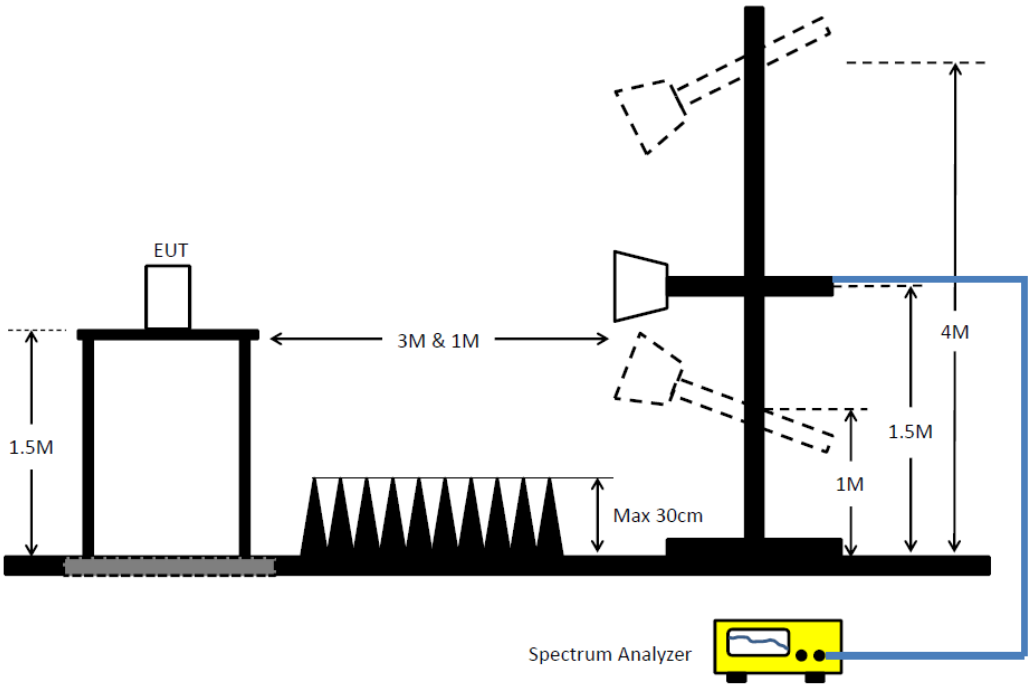
The measured Level is calculated using:

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	ESR	102052	9kHz ~ 3.6GHz	19/Apr/2021	18/Apr/2022
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	11/Nov/2020	10/Nov/2021
RF Cable 5m	TITAN	TITAN	CO04-cable-01	0.1MHz~200MHz	03/Mar/2021	02/Mar/2022
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9kHz ~ 30MHz	21/Sep/2020	20/Sep/2021

Instrument for Conducted Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSV 40	101515	10Hz~40GHz	26/Mar/2021	25/Mar/2022
SMB100A Signal Generator	R&S	SMB100A03	181147	100kHz~40GHz	20/Oct/2020	19/Oct/2021
Pulse Sensor	Anritsu	MA2411B	1339407	300MHz~40GHz	27/Nov/2020	26/Nov/2021
Power Meter	Anritsu	ML2495A	1517010	300MHz~40GHz	27/Nov/2020	26/Nov/2021

Instrument for Radiated Test

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	06/Aug/2020	05/Aug/2021
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz~18GHz 3m	04/Aug/2020	03/Aug/2021
Signal Analyzer	R&S	FSV40	101500	10Hz~40GHz	19/Aug/2020	18/Aug/2021
Amplifier	HP	8447D	2944A08033	10kHz~1.3GHz	13/Apr/2021	12/Apr/2022
Microwave System Preamplifier	KEYSIGHT	83017A	MY53270196	1GHz~26.5GHz	06/Oct/2020	05/Oct/2021
Bilog Antenna & 5dB Attenuator	SCHAFFNER / MTJ	CBL 6112B / MTJ6102-05	2723 / 2	30MHz~1GHz	06/Sep/2020	05/Sep/2021
Double Ridged Guide Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1531	1GHz~18GHz	24/Mar/2021	23/Mar/2022
RF Cable-R03m	Jye Bao	RG142	MY37335/4+ CB021-1+CB 021-2	30MHz~1GHz	17/Mar/2021	16/Mar/2022
RF CABLE 5+6m	HUBER+SUHNER	SUOFLEX 104	SN MY38596/4+S N 804300/4	1GHz~40GHz	04/Aug/2020	03/Aug/2021
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA 9170221	15GHz~40GHz	11/Mar/2021	10/Mar/2022
Microwave Premplifier	EMC INSTRUMENTS	EM18G40G	060604	18GHz ~ 40GHz	09/Mar/2021	08/Mar/2022
Preamplifier	MITEQ	TTA1840-35-HG	1864481	18GHz~40GHz	18/Mar/2021	17/Mar/2022
Loop Antenna	TESEQ	HLA 6120	31244	9kHz~30MHz	16/Mar/2021	15/Mar/2022
EMI Test Receiver	R&S	ESR3	102052	9kHz~3.6GHz	19/Apr/2021	18/Apr/2022
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz~30MHz	16/Jun/2021	15/Jun/2022

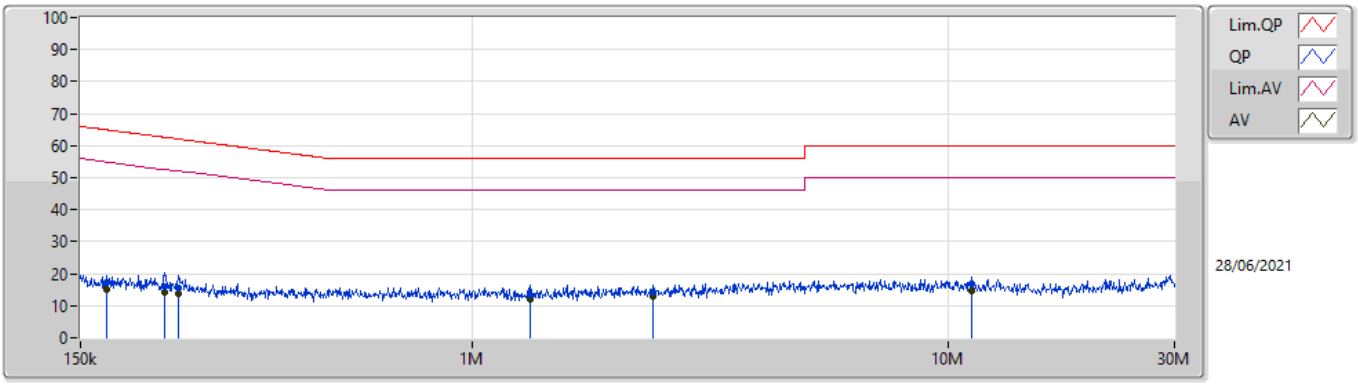
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	4.008M	14.05	46.00	-31.95	Neutral

Mode Config

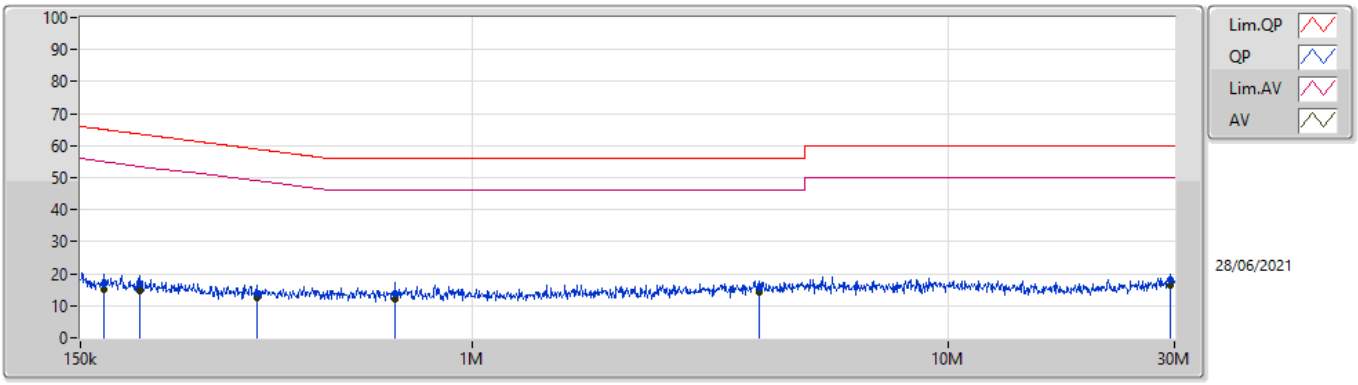
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition	Comments
Mode 1	Pass	QP	170.439k	17.13	64.93	-47.80	Line	-
Mode 1	Pass	AV	170.439k	15.12	54.93	-39.81	Line	-
Mode 1	Pass	QP	225.388k	15.88	62.62	-46.74	Line	-
Mode 1	Pass	AV	225.388k	14.03	52.62	-38.59	Line	-
Mode 1	Pass	QP	241.214k	15.52	62.06	-46.54	Line	-
Mode 1	Pass	AV	241.214k	13.78	52.06	-38.28	Line	-
Mode 1	Pass	QP	1.326M	13.49	56.00	-42.51	Line	-
Mode 1	Pass	AV	1.326M	12.10	46.00	-33.90	Line	-
Mode 1	Pass	QP	2.404M	14.23	56.00	-41.77	Line	-
Mode 1	Pass	AV	2.404M	12.92	46.00	-33.08	Line	-
Mode 1	Pass	QP	11.226M	16.72	60.00	-43.28	Line	-
Mode 1	Pass	AV	11.226M	14.78	50.00	-35.22	Line	-
Mode 1	Pass	QP	167.739k	16.85	65.06	-48.21	Neutral	-
Mode 1	Pass	AV	167.739k	15.15	55.06	-39.91	Neutral	-
Mode 1	Pass	QP	199.949k	16.73	63.61	-46.88	Neutral	-
Mode 1	Pass	AV	199.949k	14.85	53.61	-38.76	Neutral	-
Mode 1	Pass	QP	353.867k	13.61	58.87	-45.26	Neutral	-
Mode 1	Pass	AV	353.867k	12.35	48.87	-36.52	Neutral	-
Mode 1	Pass	QP	689.239k	13.62	56.00	-42.38	Neutral	-
Mode 1	Pass	AV	689.239k	11.96	46.00	-34.04	Neutral	-
Mode 1	Pass	QP	4.008M	15.38	56.00	-40.62	Neutral	-
Mode 1	Pass	AV	4.008M	14.05	46.00	-31.95	Neutral	-
Mode 1	Pass	QP	29.381M	18.23	60.00	-41.77	Neutral	-
Mode 1	Pass	AV	29.381M	16.36	50.00	-33.64	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	170.439k	17.13	64.93	-47.80	19.63	Line	-	-2.50	9.69	0.04	9.90
AV	170.439k	15.12	54.93	-39.81	19.63	Line	-	-4.51	9.69	0.04	9.90
QP	225.388k	15.88	62.62	-46.74	19.62	Line	-	-3.74	9.68	0.04	9.90
AV	225.388k	14.03	52.62	-38.59	19.62	Line	-	-5.59	9.68	0.04	9.90
QP	241.214k	15.52	62.06	-46.54	19.63	Line	-	-4.11	9.68	0.05	9.90
AV	241.214k	13.78	52.06	-38.28	19.63	Line	-	-5.85	9.68	0.05	9.90
QP	1.326M	13.49	56.00	-42.51	19.56	Line	-	-6.07	9.67	0.09	9.80
AV	1.326M	12.10	46.00	-33.90	19.56	Line	-	-7.46	9.67	0.09	9.80
QP	2.404M	14.23	56.00	-41.77	19.62	Line	-	-5.39	9.68	0.11	9.83
AV	2.404M	12.92	46.00	-33.08	19.62	Line	-	-6.70	9.68	0.11	9.83
QP	11.226M	16.72	60.00	-43.28	19.82	Line	-	-3.10	9.71	0.21	9.90
AV	11.226M	14.78	50.00	-35.22	19.82	Line	-	-5.04	9.71	0.21	9.90

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	167.739k	16.85	65.06	-48.21	19.63	Neutral	-	-2.78	9.69	0.04	9.90
AV	167.739k	15.15	55.06	-39.91	19.63	Neutral	-	-4.48	9.69	0.04	9.90
QP	199.949k	16.73	63.61	-46.88	19.62	Neutral	-	-2.89	9.68	0.04	9.90
AV	199.949k	14.85	53.61	-38.76	19.62	Neutral	-	-4.77	9.68	0.04	9.90
QP	353.867k	13.61	58.87	-45.26	19.63	Neutral	-	-6.02	9.67	0.06	9.90
AV	353.867k	12.35	48.87	-36.52	19.63	Neutral	-	-7.28	9.67	0.06	9.90
QP	689.239k	13.62	56.00	-42.38	19.58	Neutral	-	-5.96	9.67	0.07	9.84
AV	689.239k	11.96	46.00	-34.04	19.58	Neutral	-	-7.62	9.67	0.07	9.84
QP	4.008M	15.38	56.00	-40.62	19.73	Neutral	-	-4.35	9.69	0.14	9.90
AV	4.008M	14.05	46.00	-31.95	19.73	Neutral	-	-5.68	9.69	0.14	9.90
QP	29.381M	18.23	60.00	-41.77	19.94	Neutral	-	-1.71	9.70	0.34	9.90
AV	29.381M	16.36	50.00	-33.64	19.94	Neutral	-	-3.58	9.70	0.34	9.90

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	672.5k	1.047M	1M05F1D	670k	1.041M

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

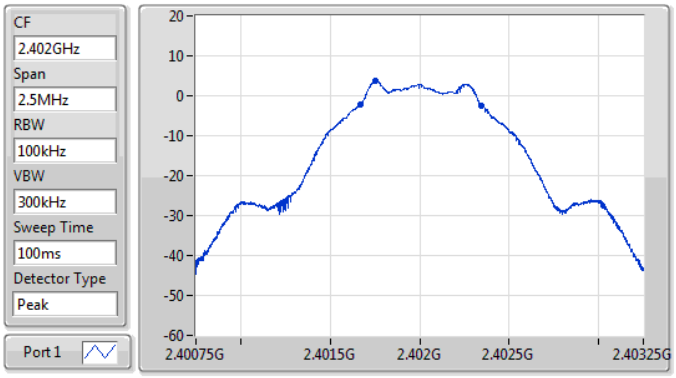
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	671.25k	1.046M
2440MHz	Pass	500k	670k	1.041M
2480MHz	Pass	500k	672.5k	1.047M

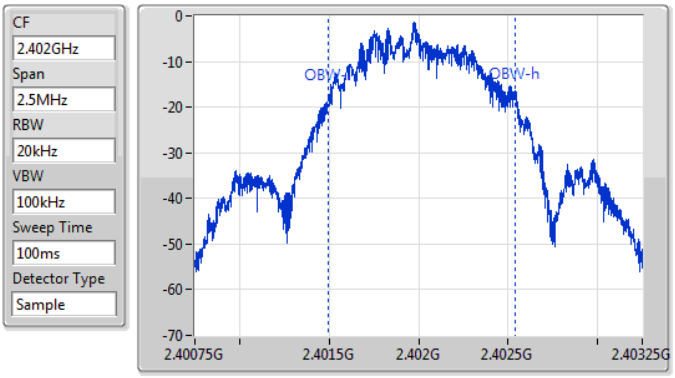
Port X-N dB = Port X 6dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth

BT-LE(1Mbps) EBW-DTS

2402MHz

25/06/2021



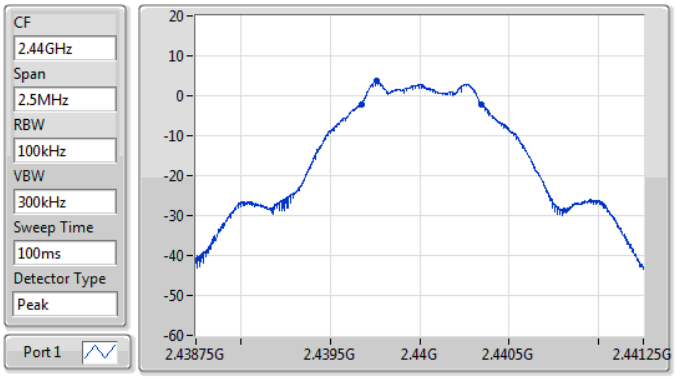


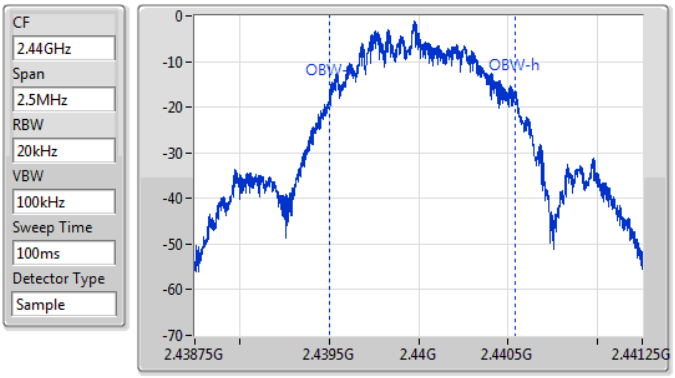
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
671.25k	2.401671G	2.402343G	1.046M	2.401494G	2.40254G	500k	1

BT-LE(1Mbps) EBW-DTS

2440MHz

25/06/2021



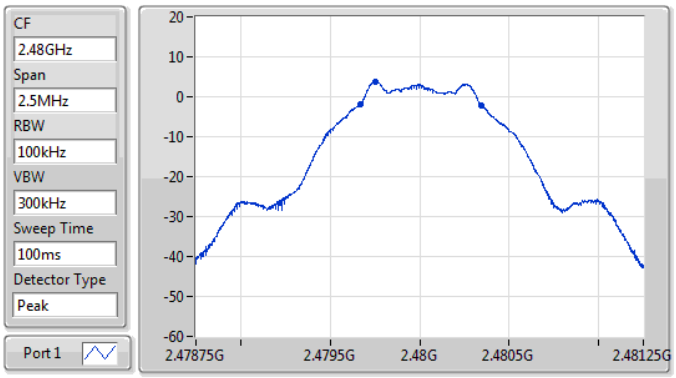


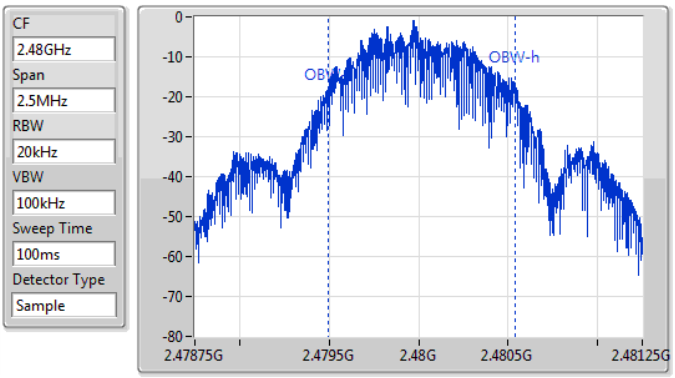
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
670k	2.439674G	2.440344G	1.041M	2.4395G	2.440541G	500k	1

BT-LE(1Mbps) **EBW-DTS**

2480MHz

25/06/2021





6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
672.5k	2.47967G	2.480343G	1.047M	2.479494G	2.480541G	500k	1

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	4.00	0.00251

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	0.00	3.51	30.00
2440MHz	Pass	0.00	3.52	30.00
2480MHz	Pass	0.00	4.00	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-11.40

RBW = 3kHz;

Result

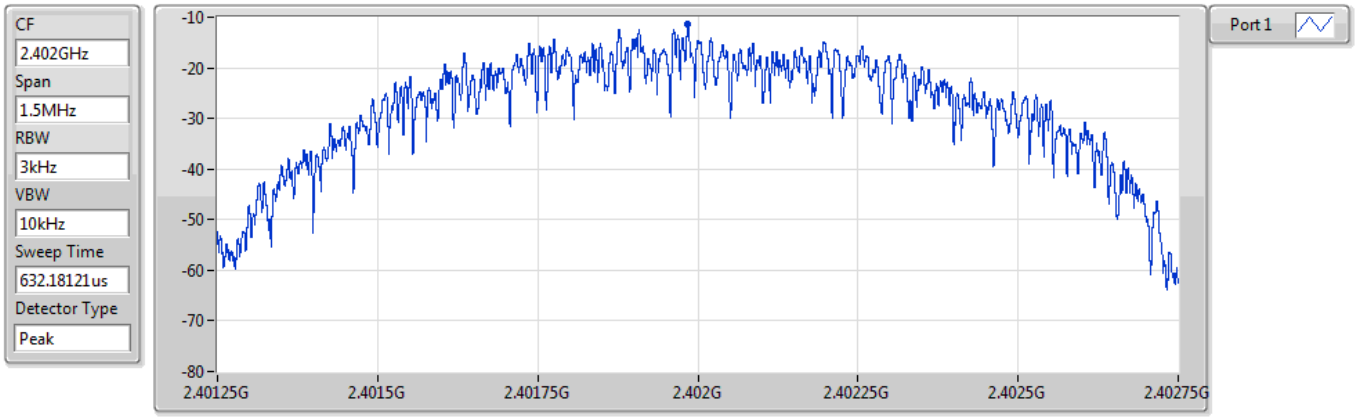
Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	0.00	-11.40	8.00
2440MHz	Pass	0.00	-11.47	8.00
2480MHz	Pass	0.00	-11.48	8.00

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;

BT-LE(1Mbps) PSD

2402MHz

25/06/2021

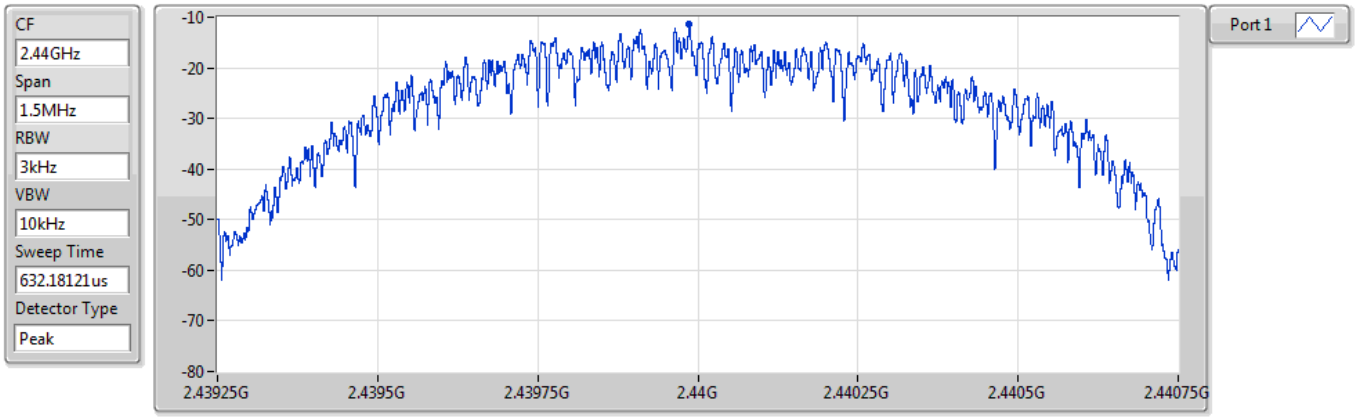


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.40	-11.40	-11.40

BT-LE(1Mbps) PSD

2440MHz

25/06/2021

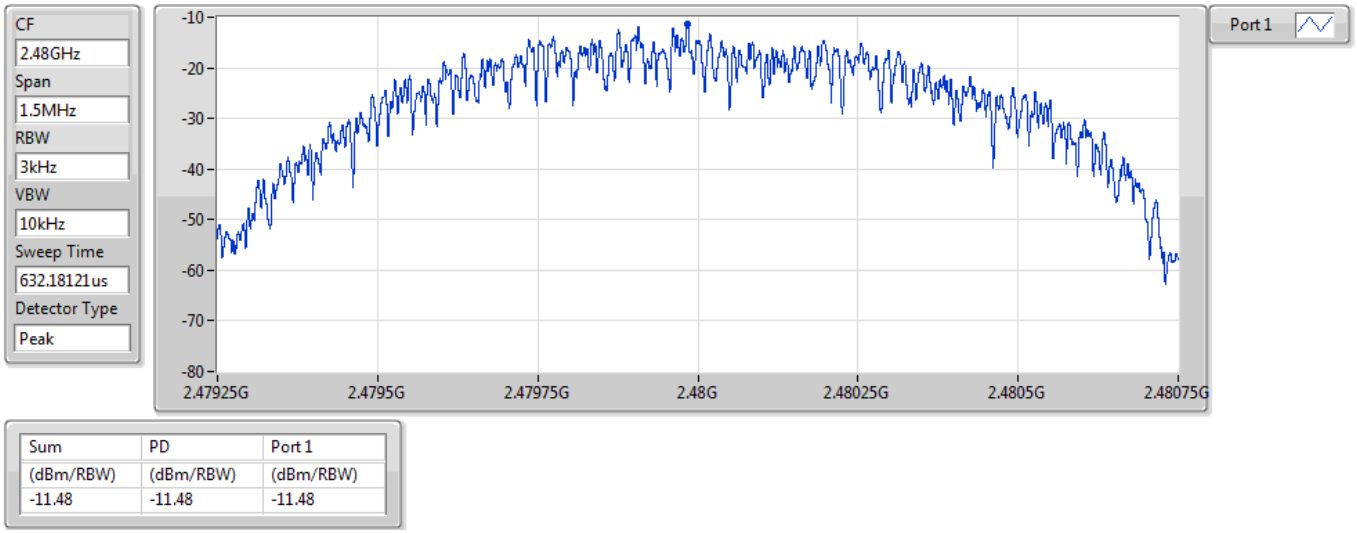


Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.47	-11.47	-11.47

BT-LE(1Mbps) **PSD**

2480MHz

25/06/2021



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.48	-11.48	-11.48

Summary

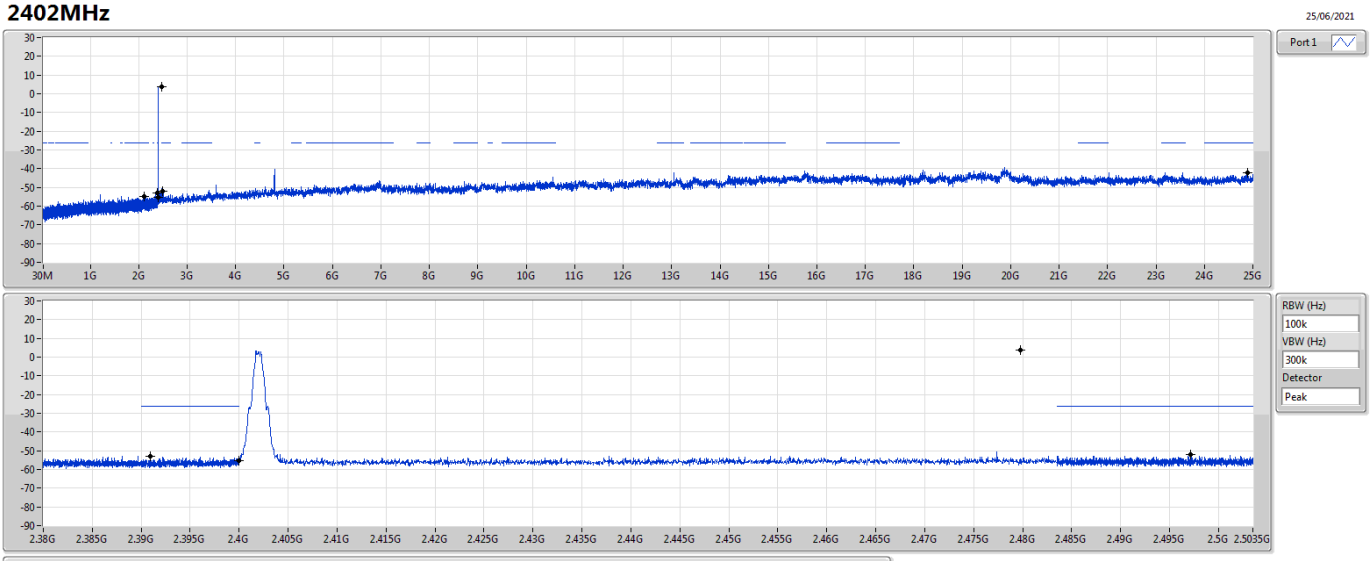
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.47978G	3.86	-26.14	2.10329G	-54.77	2.39095G	-52.75	2.4G	-55.33	2.49713G	-51.88	24.89314G	-42.15	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
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.47978G	3.86	-26.14	2.10329G	-54.77	2.39095G	-52.75	2.4G	-55.33	2.49713G	-51.88	24.89314G	-42.15	1
2440MHz	Pass	2.47978G	3.86	-26.14	2.13531G	-53.11	2.39367G	-52.52	2.4835G	-55.69	2.49244G	-52.72	24.94095G	-42.58	1
2480MHz	Pass	2.47978G	3.86	-26.14	2.16997G	-53.28	2.39118G	-53.05	2.4835G	-55.28	2.48879G	-52.72	24.87346G	-42.02	1

BT-LE(1Mbps) **CSENdB-DTS**

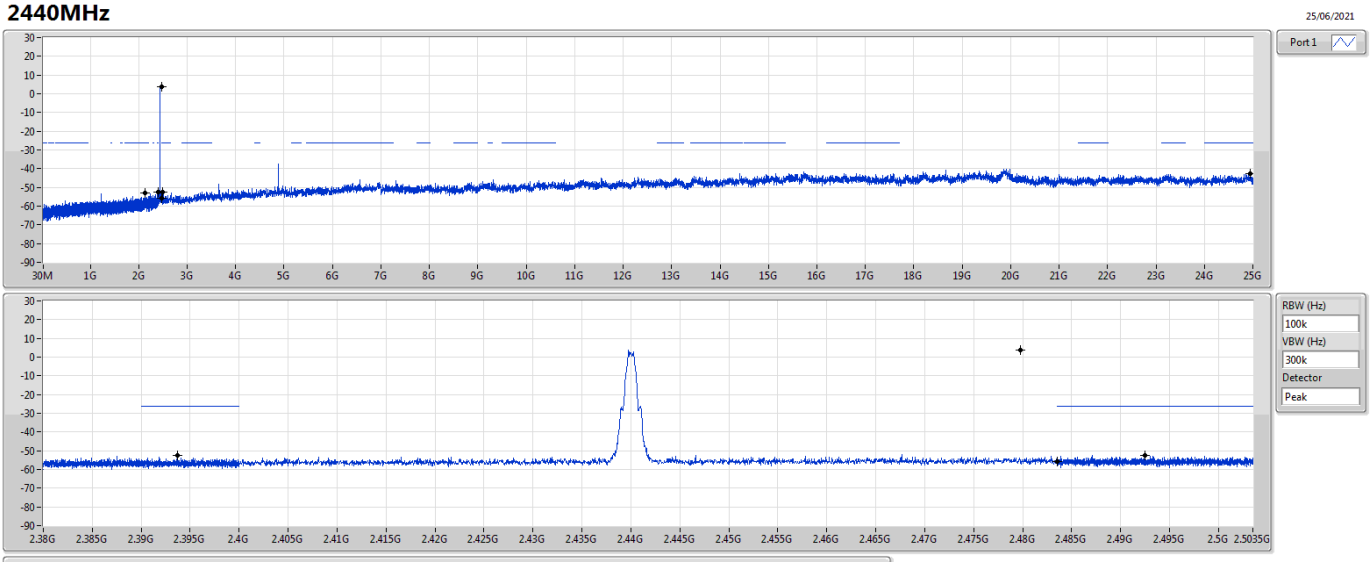
2402MHz



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
2.47978G	3.86	-26.14	2.10329G	-54.77	2.39095G	-52.75	2.4G	-55.33	2.49713G	-51.88	24.89314G	-42.15	1

BT-LE(1Mbps) **CSENdB-DTS**

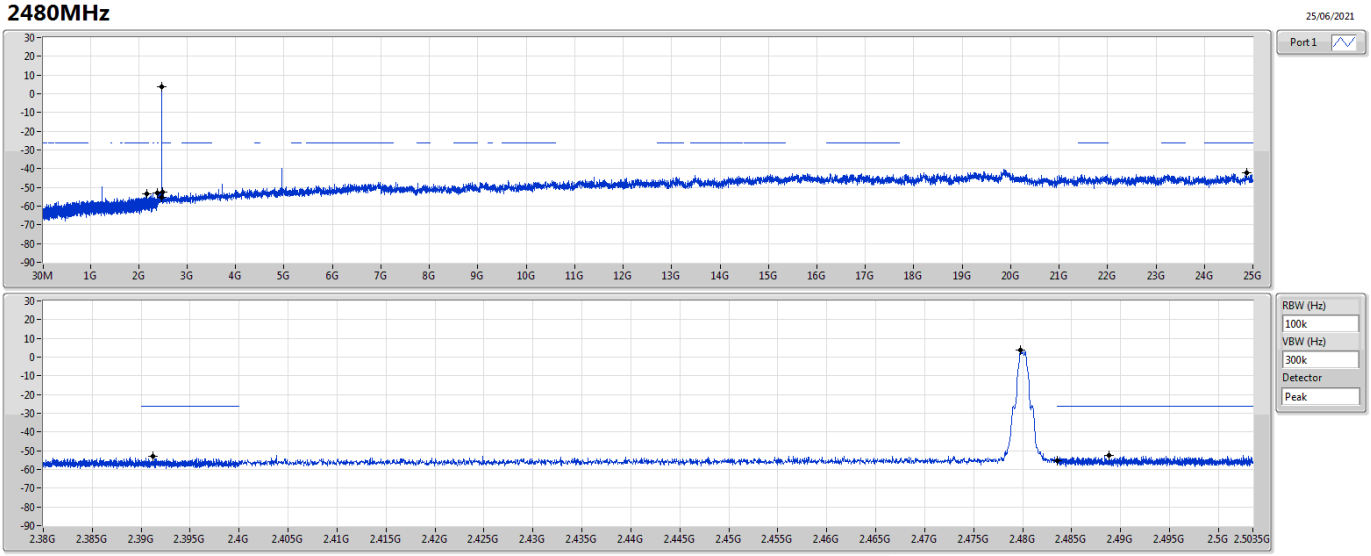
2440MHz



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
2.47978G	3.86	-26.14	2.13531G	-53.11	2.39367G	-52.52	2.4835G	-55.69	2.49244G	-52.72	24.94095G	-42.58	1

BT-LE(1Mbps) **CSENdB-DTS**

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
2.47978G	3.86	-26.14	2.16997G	-53.28	2.39118G	-53.05	2.4835G	-55.28	2.48879G	-52.72	24.87346G	-42.02	1

Summary

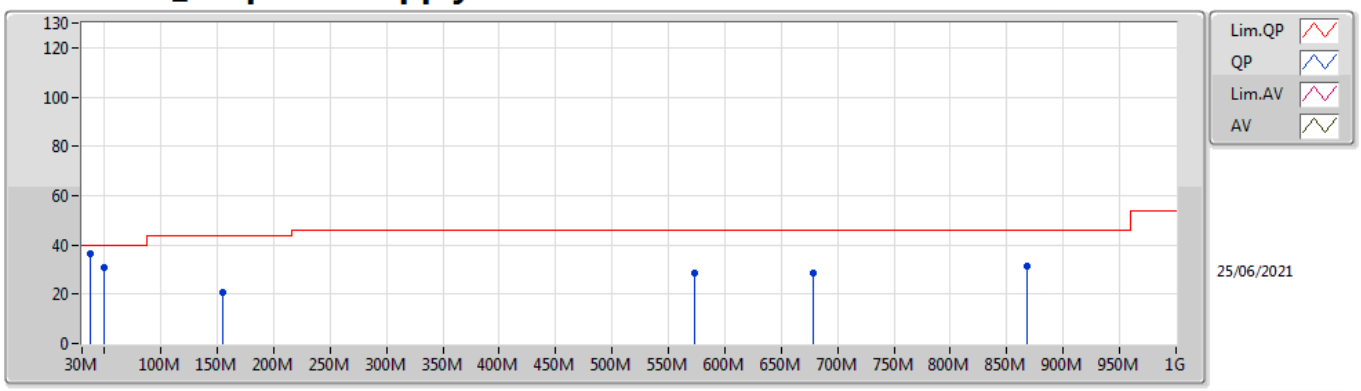
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	PK	37.76M	36.18	40.00	-3.82	3	Vertical	0	1.00	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	PK	37.76M	36.18	40.00	-3.82	3	Vertical	0	1.00	-
2440MHz	Pass	PK	49.4M	30.75	40.00	-9.25	3	Vertical	0	1.00	-
2440MHz	Pass	PK	154.16M	20.85	43.50	-22.65	3	Vertical	0	1.00	-
2440MHz	Pass	PK	573.2M	28.83	46.00	-17.17	3	Vertical	0	1.00	-
2440MHz	Pass	PK	677.96M	28.73	46.00	-17.27	3	Vertical	0	1.00	-
2440MHz	Pass	PK	868.08M	31.20	46.00	-14.80	3	Vertical	0	1.00	-
2440MHz	Pass	PK	30M	34.02	40.00	-5.98	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	37.76M	29.01	40.00	-10.99	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	161.92M	29.89	43.50	-13.61	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	363.68M	27.40	46.00	-18.60	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	416.06M	28.88	46.00	-17.12	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	730.34M	32.45	46.00	-13.55	3	Horizontal	360	1.00	-

BT-LE(1Mbps)

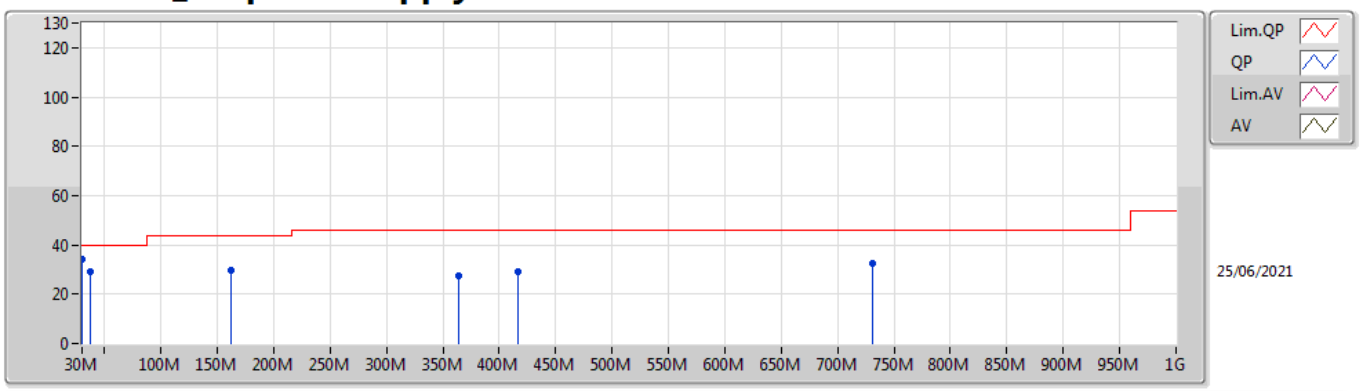
2440MHz_DC power supply



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	37.76M	36.18	40.00	-3.82	-7.51	3	Vertical	0	1.00	-	43.69	19.08	1.02	27.61
PK	49.4M	30.75	40.00	-9.25	-13.10	3	Vertical	0	1.00	-	43.85	13.40	1.13	27.63
PK	154.16M	20.85	43.50	-22.65	-9.75	3	Vertical	0	1.00	-	30.60	15.38	2.09	27.22
PK	573.2M	28.83	46.00	-17.17	0.11	3	Vertical	0	1.00	-	28.72	23.98	4.22	28.09
PK	677.96M	28.73	46.00	-17.27	0.63	3	Vertical	0	1.00	-	28.10	24.17	4.55	28.09
PK	868.08M	31.20	46.00	-14.80	3.05	3	Vertical	0	1.00	-	28.15	25.51	5.21	27.67

BT-LE(1Mbps)

2440MHz_DC power supply



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	34.02	40.00	-5.98	-3.42	3	Horizontal	360	1.00	-	37.44	23.32	0.90	27.64
PK	37.76M	29.01	40.00	-10.99	-7.51	3	Horizontal	360	1.00	-	36.52	19.08	1.02	27.61
PK	161.92M	29.89	43.50	-13.61	-9.87	3	Horizontal	360	1.00	-	39.76	15.18	2.14	27.19
PK	363.68M	27.40	46.00	-18.60	-3.84	3	Horizontal	360	1.00	-	31.24	19.90	3.31	27.05
PK	416.06M	28.88	46.00	-17.12	-2.05	3	Horizontal	360	1.00	-	30.93	21.84	3.52	27.41
PK	730.34M	32.45	46.00	-13.55	1.38	3	Horizontal	360	1.00	-	31.07	24.66	4.73	28.01

Summary

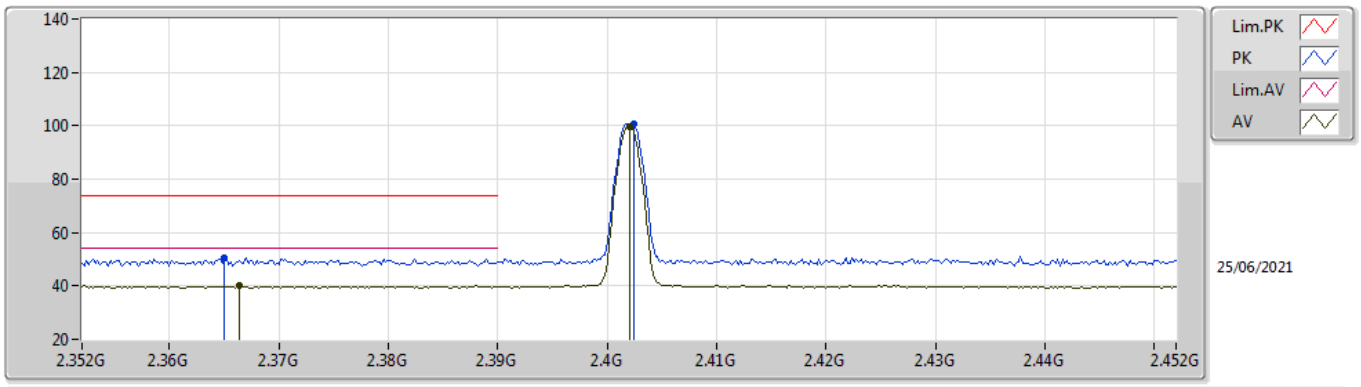
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	4.95972G	50.26	54.00	-3.74	3	Vertical	251	1.49	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.3664G	40.07	54.00	-13.93	3	Vertical	194	1.74	-
2402MHz	Pass	AV	2.402G	99.64	Inf	-Inf	3	Vertical	194	1.74	-
2402MHz	Pass	PK	2.365G	50.58	74.00	-23.42	3	Vertical	194	1.74	-
2402MHz	Pass	PK	2.4024G	100.53	Inf	-Inf	3	Vertical	194	1.74	-
2402MHz	Pass	AV	2.3834G	40.16	54.00	-13.84	3	Horizontal	28	1.24	-
2402MHz	Pass	AV	2.402G	100.93	Inf	-Inf	3	Horizontal	28	1.24	-
2402MHz	Pass	PK	2.3658G	50.34	74.00	-23.66	3	Horizontal	28	1.24	-
2402MHz	Pass	PK	2.4022G	101.80	Inf	-Inf	3	Horizontal	28	1.24	-
2402MHz	Pass	AV	4.80388G	49.32	54.00	-4.68	3	Vertical	162	2.64	-
2402MHz	Pass	PK	4.80352G	54.56	74.00	-19.44	3	Vertical	162	2.64	-
2402MHz	Pass	AV	4.80412G	46.34	54.00	-7.66	3	Horizontal	350	1.69	-
2402MHz	Pass	PK	4.8034G	52.43	74.00	-21.57	3	Horizontal	350	1.69	-
2440MHz	Pass	AV	2.3724G	39.79	54.00	-14.21	3	Vertical	204	1.63	-
2440MHz	Pass	AV	2.44G	98.54	Inf	-Inf	3	Vertical	204	1.63	-
2440MHz	Pass	AV	2.4936G	39.85	54.00	-14.15	3	Vertical	204	1.63	-
2440MHz	Pass	PK	2.3652G	51.34	74.00	-22.66	3	Vertical	204	1.63	-
2440MHz	Pass	PK	2.4404G	99.43	Inf	-Inf	3	Vertical	204	1.63	-
2440MHz	Pass	PK	2.4888G	51.11	74.00	-22.89	3	Vertical	204	1.63	-
2440MHz	Pass	AV	2.368G	40.01	54.00	-13.99	3	Horizontal	28	1.38	-
2440MHz	Pass	AV	2.44G	99.30	Inf	-Inf	3	Horizontal	28	1.38	-
2440MHz	Pass	AV	2.4992G	39.95	54.00	-14.05	3	Horizontal	28	1.38	-
2440MHz	Pass	PK	2.3676G	50.01	74.00	-23.99	3	Horizontal	28	1.38	-
2440MHz	Pass	PK	2.44G	100.22	Inf	-Inf	3	Horizontal	28	1.38	-
2440MHz	Pass	PK	2.4892G	50.64	74.00	-23.36	3	Horizontal	28	1.38	-
2440MHz	Pass	AV	4.87994G	49.03	54.00	-4.97	3	Vertical	252	1.45	-
2440MHz	Pass	AV	7.31934G	45.22	54.00	-8.78	3	Vertical	319	2.21	-
2440MHz	Pass	PK	4.88059G	54.88	74.00	-19.12	3	Vertical	252	1.45	-
2440MHz	Pass	PK	7.3205G	54.69	74.00	-19.31	3	Vertical	319	2.21	-
2440MHz	Pass	AV	4.87989G	46.63	54.00	-7.37	3	Horizontal	324	1.32	-
2440MHz	Pass	AV	7.31941G	45.10	54.00	-8.90	3	Horizontal	192	2.33	-
2440MHz	Pass	PK	4.87971G	53.71	74.00	-20.29	3	Horizontal	324	1.32	-
2440MHz	Pass	PK	7.32075G	53.99	74.00	-20.01	3	Horizontal	192	2.33	-
2480MHz	Pass	AV	2.48G	99.59	Inf	-Inf	3	Vertical	202	1.73	-
2480MHz	Pass	AV	2.4835G	40.27	54.00	-13.73	3	Vertical	202	1.73	-
2480MHz	Pass	PK	2.4798G	100.43	Inf	-Inf	3	Vertical	202	1.73	-
2480MHz	Pass	PK	2.4964G	50.92	74.00	-23.08	3	Vertical	202	1.73	-
2480MHz	Pass	AV	2.48G	99.07	Inf	-Inf	3	Horizontal	11	1.29	-
2480MHz	Pass	AV	2.492G	40.08	54.00	-13.92	3	Horizontal	11	1.29	-
2480MHz	Pass	PK	2.4802G	99.95	Inf	-Inf	3	Horizontal	11	1.29	-
2480MHz	Pass	PK	2.4906G	51.42	74.00	-22.58	3	Horizontal	11	1.29	-
2480MHz	Pass	AV	4.95972G	50.26	54.00	-3.74	3	Vertical	251	1.49	-
2480MHz	Pass	AV	7.43933G	44.69	54.00	-9.31	3	Vertical	333	1.33	-
2480MHz	Pass	PK	4.95968G	55.71	74.00	-18.29	3	Vertical	251	1.49	-
2480MHz	Pass	PK	7.44074G	54.23	74.00	-19.77	3	Vertical	333	1.33	-
2480MHz	Pass	AV	4.96002G	47.35	54.00	-6.65	3	Horizontal	325	1.51	-
2480MHz	Pass	AV	7.43929G	44.42	54.00	-9.58	3	Horizontal	192	1.11	-
2480MHz	Pass	PK	4.96055G	54.01	74.00	-19.99	3	Horizontal	325	1.51	-
2480MHz	Pass	PK	7.43937G	53.62	74.00	-20.38	3	Horizontal	192	1.11	-

BT-LE(1Mbps)

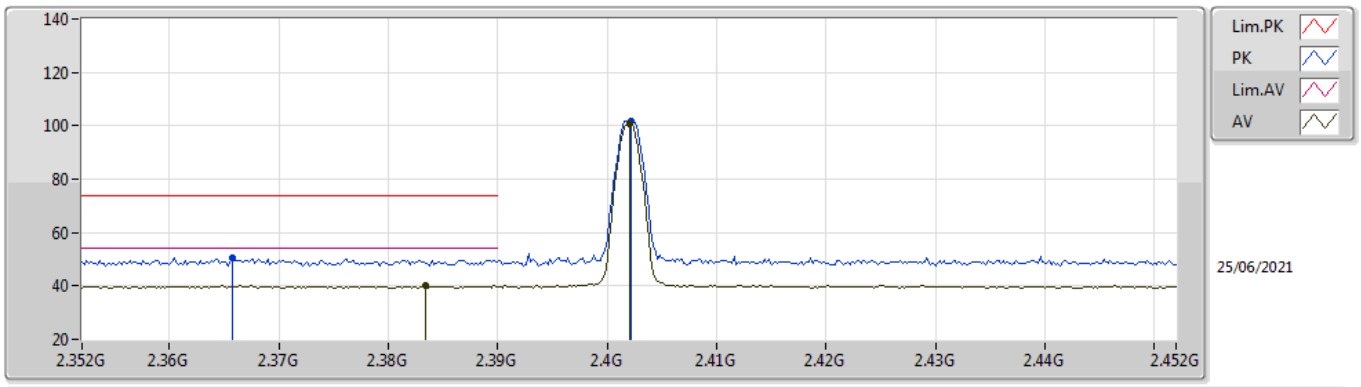
2402MHz_TX



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	2.3664G	40.07	54.00	-13.93	1.97	3	Vertical	194	1.74	-	38.10	27.73	4.27	30.03
AV	2.402G	99.64	Inf	-Inf	1.89	3	Vertical	194	1.74	-	97.75	27.60	4.30	30.01
PK	2.365G	50.58	74.00	-23.42	1.97	3	Vertical	194	1.74	-	48.61	27.74	4.26	30.03
PK	2.4024G	100.53	Inf	-Inf	1.89	3	Vertical	194	1.74	-	98.64	27.60	4.30	30.01

BT-LE(1Mbps)

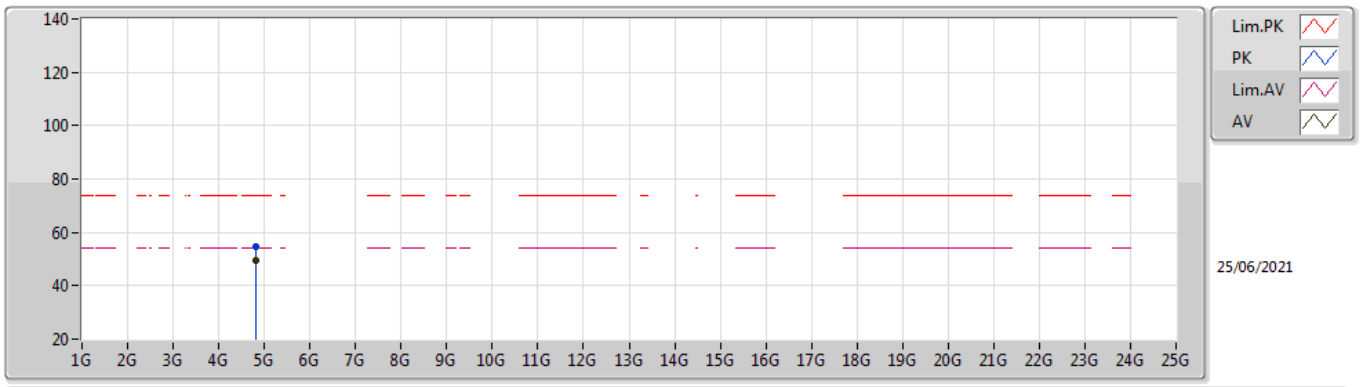
2402MHz_TX



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	2.3834G	40.16	54.00	-13.84	1.93	3	Horizontal	28	1.24	-	38.23	27.67	4.28	30.02
AV	2.402G	100.93	Inf	-Inf	1.89	3	Horizontal	28	1.24	-	99.04	27.60	4.30	30.01
PK	2.3658G	50.34	74.00	-23.66	1.98	3	Horizontal	28	1.24	-	48.36	27.74	4.27	30.03
PK	2.4022G	101.80	Inf	-Inf	1.89	3	Horizontal	28	1.24	-	99.91	27.60	4.30	30.01

BT-LE(1Mbps)

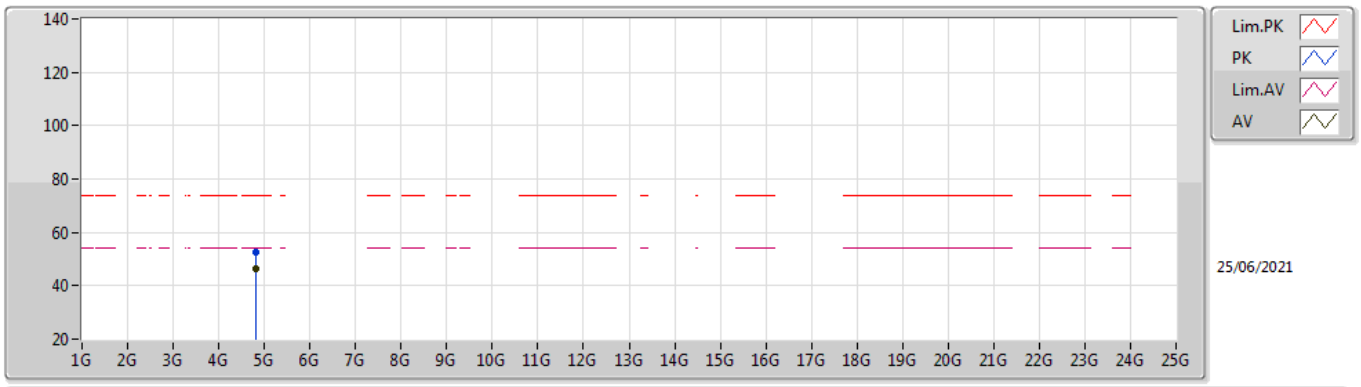
2402MHz_TX



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	4.80388G	49.32	54.00	-4.68	8.38	3	Vertical	162	2.64	-	40.94	31.11	6.50	29.23
PK	4.80352G	54.56	74.00	-19.44	8.38	3	Vertical	162	2.64	-	46.18	31.11	6.50	29.23

BT-LE(1Mbps)

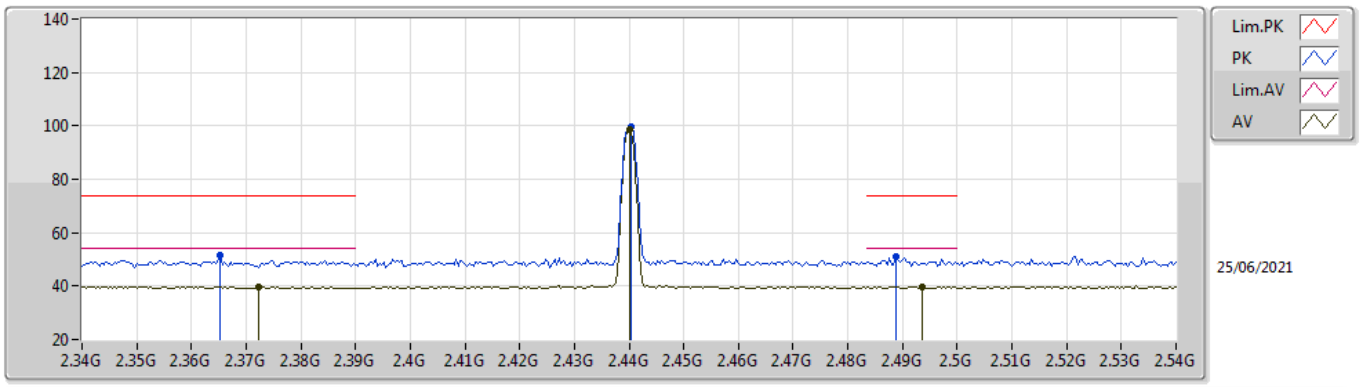
2402MHz_TX



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	4.80412G	46.34	54.00	-7.66	8.38	3	Horizontal	350	1.69	-	37.96	31.11	6.50	29.23
PK	4.8034G	52.43	74.00	-21.57	8.38	3	Horizontal	350	1.69	-	44.05	31.11	6.50	29.23

BT-LE(1Mbps)

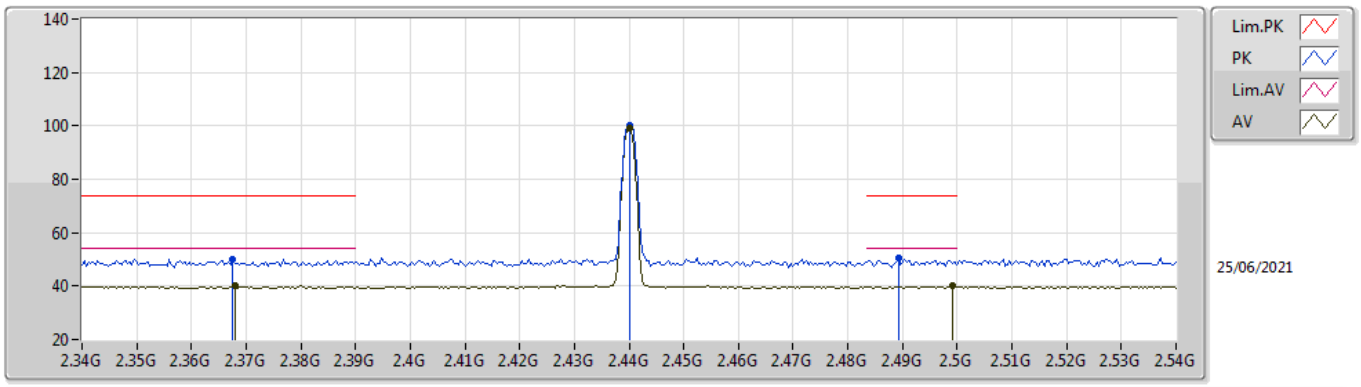
2440MHz_TX



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	2.3724G	39.79	54.00	-14.21	1.95	3	Vertical	204	1.63	-	37.84	27.71	4.27	30.03
AV	2.44G	98.54	Inf	-Inf	1.95	3	Vertical	204	1.63	-	96.59	27.60	4.34	29.99
AV	2.4936G	39.85	54.00	-14.15	2.12	3	Vertical	204	1.63	-	37.73	27.69	4.39	29.96
PK	2.3652G	51.34	74.00	-22.66	1.98	3	Vertical	204	1.63	-	49.36	27.74	4.27	30.03
PK	2.4404G	99.43	Inf	-Inf	1.95	3	Vertical	204	1.63	-	97.48	27.60	4.34	29.99
PK	2.4888G	51.11	74.00	-22.89	2.10	3	Vertical	204	1.63	-	49.01	27.68	4.39	29.97

BT-LE(1Mbps)

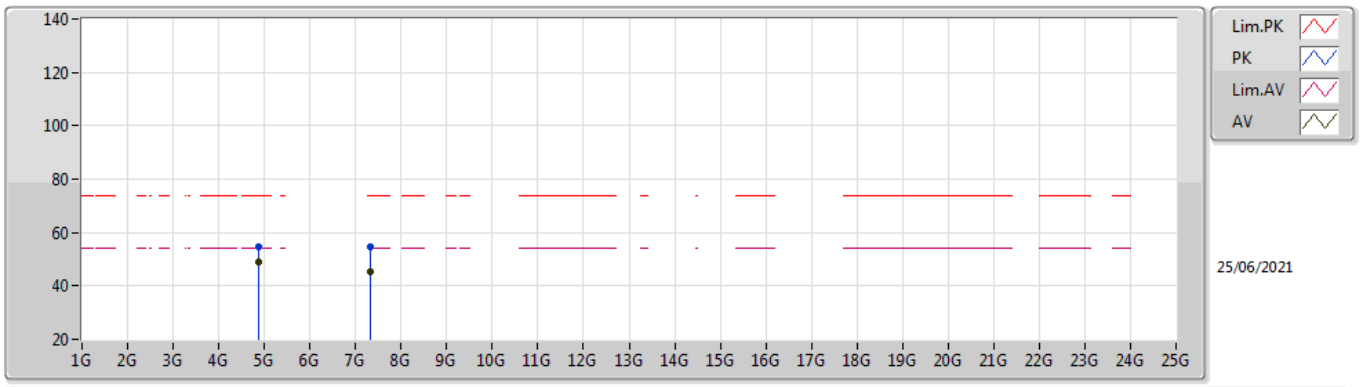
2440MHz_TX



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	2.368G	40.01	54.00	-13.99	1.97	3	Horizontal	28	1.38	-	38.04	27.73	4.27	30.03
AV	2.44G	99.30	Inf	-Inf	1.95	3	Horizontal	28	1.38	-	97.35	27.60	4.34	29.99
AV	2.4992G	39.95	54.00	-14.05	2.14	3	Horizontal	28	1.38	-	37.81	27.70	4.40	29.96
PK	2.3676G	50.01	74.00	-23.99	1.97	3	Horizontal	28	1.38	-	48.04	27.73	4.27	30.03
PK	2.44G	100.22	Inf	-Inf	1.95	3	Horizontal	28	1.38	-	98.27	27.60	4.34	29.99
PK	2.4892G	50.64	74.00	-23.36	2.10	3	Horizontal	28	1.38	-	48.54	27.68	4.39	29.97

BT-LE(1Mbps)

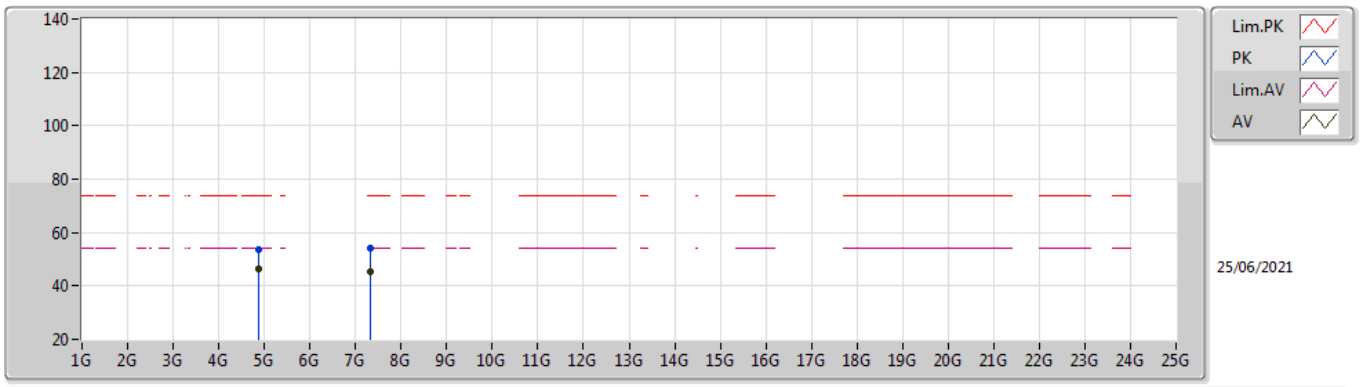
2440MHz_TX



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	4.87994G	49.03	54.00	-4.97	8.57	3	Vertical	252	1.45	-	40.46	31.20	6.58	29.21
AV	7.31934G	45.22	54.00	-8.78	13.69	3	Vertical	319	2.21	-	31.53	36.26	7.60	30.17
PK	4.88059G	54.88	74.00	-19.12	8.57	3	Vertical	252	1.45	-	46.31	31.20	6.58	29.21
PK	7.3205G	54.69	74.00	-19.31	13.69	3	Vertical	319	2.21	-	41.00	36.26	7.60	30.17

BT-LE(1Mbps)

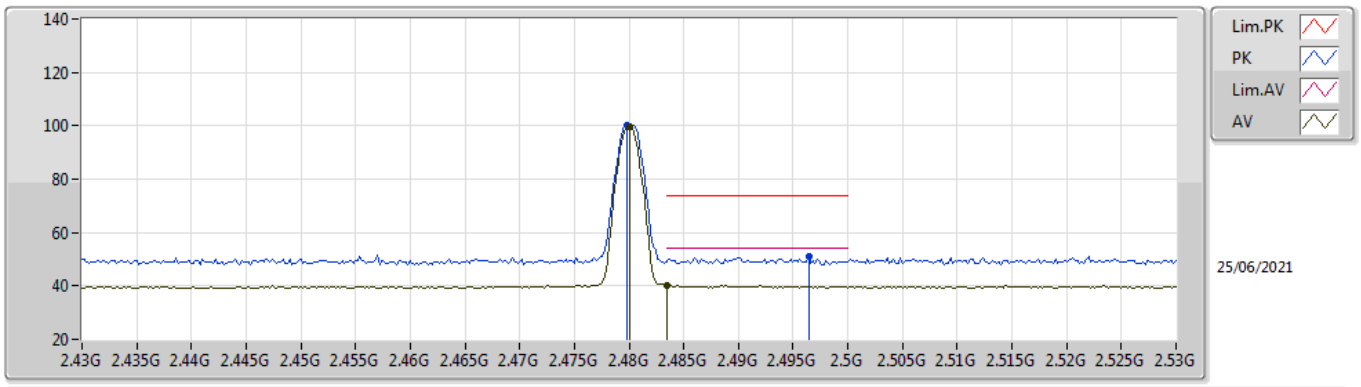
2440MHz_TX



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	4.87989G	46.63	54.00	-7.37	8.57	3	Horizontal	324	1.32	-	38.06	31.20	6.58	29.21
AV	7.31941G	45.10	54.00	-8.90	13.69	3	Horizontal	192	2.33	-	31.41	36.26	7.60	30.17
PK	4.87971G	53.71	74.00	-20.29	8.57	3	Horizontal	324	1.32	-	45.14	31.20	6.58	29.21
PK	7.32075G	53.99	74.00	-20.01	13.69	3	Horizontal	192	2.33	-	40.30	36.26	7.60	30.17

BT-LE(1Mbps)

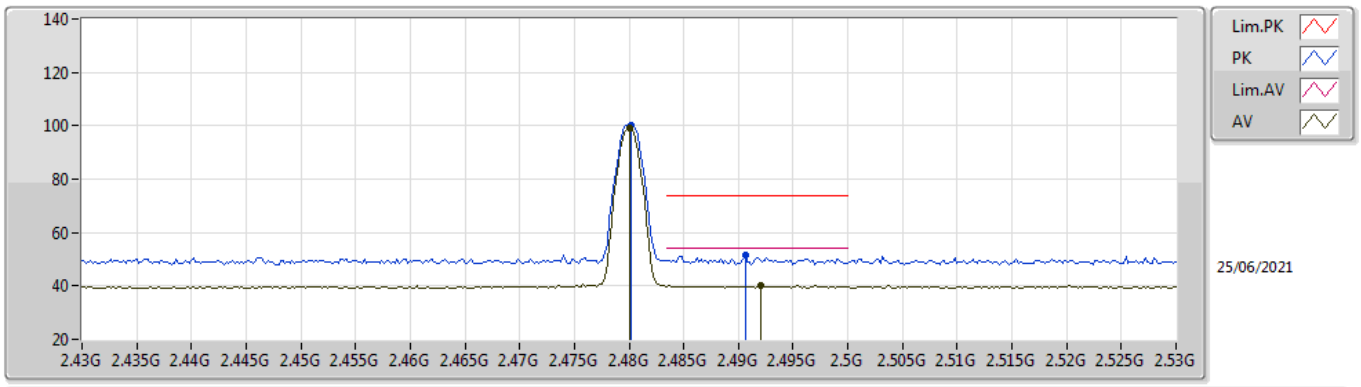
2480MHz_TX



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	99.59	Inf	-Inf	2.07	3	Vertical	202	1.73	-	97.52	27.66	4.38	29.97
AV	2.4835G	40.27	54.00	-13.73	2.08	3	Vertical	202	1.73	-	38.19	27.67	4.38	29.97
PK	2.4798G	100.43	Inf	-Inf	2.07	3	Vertical	202	1.73	-	98.36	27.66	4.38	29.97
PK	2.4964G	50.92	74.00	-23.08	2.13	3	Vertical	202	1.73	-	48.79	27.69	4.40	29.96

BT-LE(1Mbps)

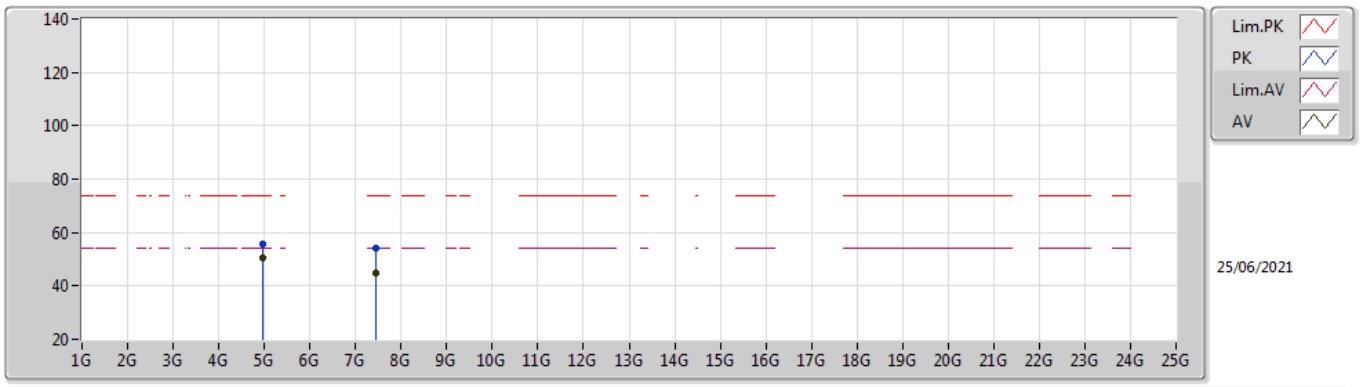
2480MHz_TX



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	99.07	Inf	-Inf	2.07	3	Horizontal	11	1.29	-	97.00	27.66	4.38	29.97
AV	2.492G	40.08	54.00	-13.92	2.11	3	Horizontal	11	1.29	-	37.97	27.68	4.39	29.96
PK	2.4802G	99.95	Inf	-Inf	2.07	3	Horizontal	11	1.29	-	97.88	27.66	4.38	29.97
PK	2.4906G	51.42	74.00	-22.58	2.11	3	Horizontal	11	1.29	-	49.31	27.68	4.39	29.96

BT-LE(1Mbps)

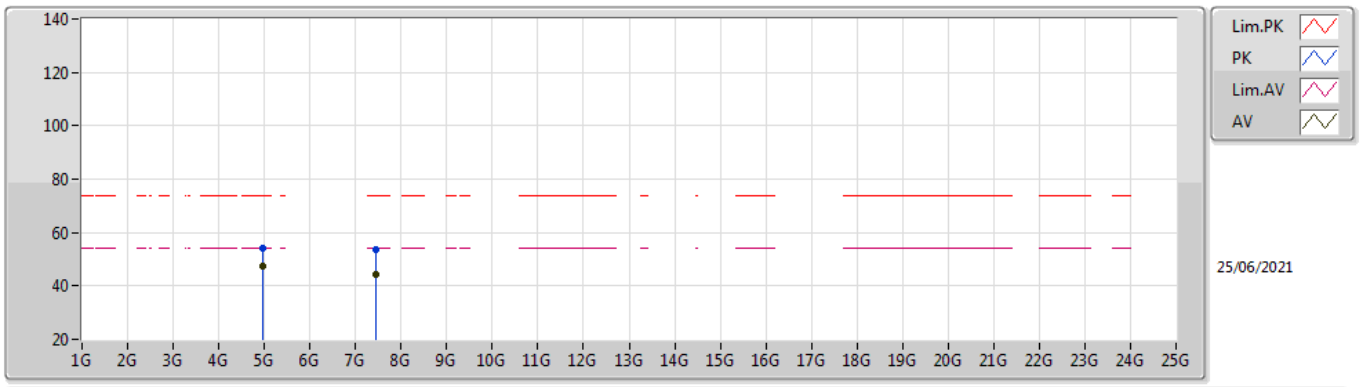
2480MHz_TX



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	4.95972G	50.26	54.00	-3.74	8.82	3	Vertical	251	1.49	-	41.44	31.34	6.66	29.18
AV	7.43933G	44.69	54.00	-9.31	13.64	3	Vertical	333	1.33	-	31.05	36.26	7.64	30.26
PK	4.95968G	55.71	74.00	-18.29	8.82	3	Vertical	251	1.49	-	46.89	31.34	6.66	29.18
PK	7.44074G	54.23	74.00	-19.77	13.64	3	Vertical	333	1.33	-	40.59	36.26	7.64	30.26

BT-LE(1Mbps)

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	4.96002G	47.35	54.00	-6.65	8.82	3	Horizontal	325	1.51	-	38.53	31.34	6.66	29.18
AV	7.43929G	44.42	54.00	-9.58	13.64	3	Horizontal	192	1.11	-	30.78	36.26	7.64	30.26
PK	4.96055G	54.01	74.00	-19.99	8.82	3	Horizontal	325	1.51	-	45.19	31.34	6.66	29.18
PK	7.43937G	53.62	74.00	-20.38	13.64	3	Horizontal	192	1.11	-	39.98	36.26	7.64	30.26