Testing Laboratory 3785

FCC Radio Test Report

FCC ID	:	**N7NXR90**
Equipment	:	**WiFi / Bluetooth**
Brand Name	:	**Sierra Wireless**
Model Name	:	**XR90**
Applicant	:	**Sierra Wireless Inc.** **13811 Wireless Way, Richmond, BC Canada V6V 3A4**
Manufacturer	:	**Sierra Wireless Inc.** **13811 Wireless Way, Richmond, BC Canada V6V 3A4**
Standard	:	**47 CFR FCC Part 15.247**

The product was received on Nov. 09, 2020, and testing was started from Jan. 07, 2021 and completed on Jul. 22, 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.)

Table of Contents

HISTORY OF THIS TEST REPORT 3

SUMMARY OF TEST RESULT 4

1 GENERAL DESCRIPTION 5

1.1 Information 5
1.2 Testing Applied Standards 7
1.3 Testing Location Information 7
1.4 Measurement Uncertainty 7

2 TEST CONFIGURATION OF EUT 8

2.1 Test Channel Mode 8
2.2 The Worst Case Measurement Configuration 9
2.3 Accessories 9
2.4 Support Equipment 10
2.5 Test Setup Diagram 11

3 TRANSMITTER TEST RESULT 13

3.1 AC Power-line Conducted Emissions 13
3.2 DTS Bandwidth 15
3.3 Maximum Conducted Output Power 16
3.4 Power Spectral Density 18
3.5 Emissions in Non-restricted Frequency Bands 19
3.6 Emissions in Restricted Frequency Bands 20

4 TEST EQUIPMENT AND CALIBRATION DATA 24

APPENDIX A. TEST RESULTS OF AC POWER-LINE CONDUCTED EMISSIONS

APPENDIX B. TEST RESULTS OF DTS BANDWIDTH

APPENDIX C. TEST RESULTS OF MAXIMUM CONDUCTED OUTPUT POWER

APPENDIX D. TEST RESULTS OF POWER SPECTRAL DENSITY

APPENDIX E. TEST RESULTS OF EMISSIONS IN NON-RESTRICTED FREQUENCY BANDS

APPENDIX F. TEST RESULTS OF EMISSIONS IN RESTRICTED FREQUENCY BANDS

APPENDIX G. TEST PHOTOS

PHOTOGRAPHS OF EUT V01

History of this test report

Report No.	Version	Description	Issued Date
FR0N0913-03AL	01	Initial issue of report	Jul. 29, 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	-
3.1	15.247(a)	DTS Bandwidth	PASS	-
3.3	15.247(b)	Maximum Conducted Output Power	PASS	-
3.4	15.247(e)	Power Spectral Density	PASS	-
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
3.6	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and explanations:
None

Reviewed by: Ben Tseng

Report Producer: Jenny Yang

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
5	PANORAMA	LGMQM4-6-60-24-58	Panel	FAKRA
6	PANORAMA	LGMQM4-6-60-24-58	Panel	FAKRA
7	PANORAMA	LGMQM4-6-60-24-58	Panel	FAKRA
8	PANORAMA	LGMQM4-6-60-24-58	Panel	FAKRA
9	PANORAMA	PWB-24-58	Paddle	FAKRA

Ant.	Port	Gain (dBi)		
		2.4G	5G	BT
5	1	-0.25	0.5	-
6	2	-0.25	0.5	-
7	3	-0.25	0.5	-
8	4	-0.25	0.5	-
9	1	-	-	3

Note 1: The EUT has five antennas.

For 2.4GHz function:

For IEEE 802.11 b/g/n/VHT/ax mode (4TX/4RX)

Ant. 5 (port 1), Ant. 6 (port 2), Ant. 7 (port 3) and Ant. 8 (port 4) could transmit/receive simultaneously.

For BT function:

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

Only Ant. 9 (port 1) can be used as transmitting/receiving antenna.

For 5GHz function:

For IEEE 802.11 a/n/ac/ax mode (4TX/4RX)

Ant. 5 (port 1), Ant. 6 (port 2), Ant. 7 (port 3) and Ant. 8 (port 4) could transmit/receive simultaneously.

1.1.3 EUT Information

Operational Condition				
EUT Power Type	From AC Adapter			
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)	0.626	2.03	391.25u	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	Tony Chang	25.1~26.7°C / 50~56%	21/Jul/2021~22/Jul/2021
RF Conducted	TH01-HY	Vivi Jiang	22.1~26.9°C / 52~60%	26/Jan/2021~22/Mar/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.				
Test Condition	**Test Site No.**	**Test Engineer**	**Test Environment**	**Test Date**
Radiated (below 1GHz)	03CH09-HY	Lego Lin	22.5~24.4°C / 42~54%	19/Jul/2021~21/Jul/2021
Radiated (above 1GHz)	03CH09-HY	Lego Lin	21.5~22.3°C / 55~60%	07/Jan/2021~16/Mar/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	DOS v6.1

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
1	Adapter mode

he 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

Note: From Sporton Project No.: FR0N0913-02AL.

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emissions in Restricted Frequency Bands
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
Operating Mode < 1GHz	CTX
1	DC Power Supply mode
Operating Mode > 1GHz	CTX
Orthogonal Planes of EUT	**Z Plane**

Note: From Sporton Project No.: FR0N0913-02AL. (above 1GHz)

2.3 Accessories

Accessories				
RJ45 Cable	Category	5	In/Out door	-
	Signal Line	2.0 meter, non-shielded cable		

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	Adapter	Tenpao	S090IP2400375	-	Note 1
2	Notebook	HP	HSTNN-Q85C	-	-
3	AC Adapter (for NB)	HP	PPP012L-E	-	-
4	RS232-to-Lan cable	-	-	-	-
5	USB-to-RS232 cable	-	-	-	-
6	AC Adapter (for NB) (Remote)	HP	PPP012H-S	-	-
7	AC Power cable (Remote)	Power Sync	TPCMRN0018	-	-
8	Notebook (Remote)	HP	5220m	-	-

Note 1: Provided by Customer

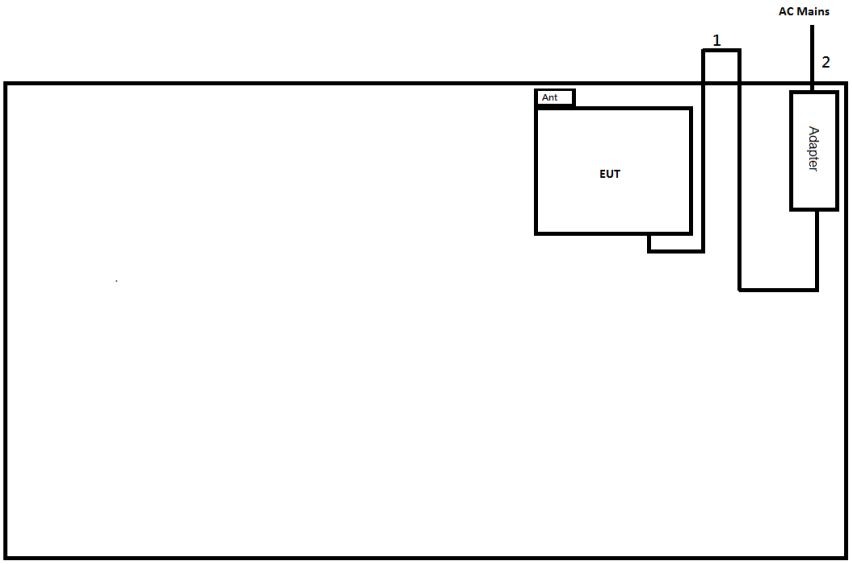
Support Equipment – Conducted					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	Notebook	DELL	E5410	-	-
2	Adapter for NB	DELL	HA65NM130	-	-
3	Notebook	Acer	Trave Mate P2410	-	-
4	Adapter for NB	HIPRO	HP-A0652R3B	-	-

Support Equipment – Radiated					
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**	**Remark**
1	Adapter	Tenpao	S090IP2400375	-	Note 1
2	Notebook	HP	HSTNN-Q85C	-	-
3	AC Adapter (for NB)	HP	PPP012L-E	-	-
4	USB-to-RS232 cable	-	-	-	-
5	RS232-to-Lan cable	-	-	-	-
6	AC Adapter (for NB) (Remote)	HP	PPP012H-S	-	-
7	AC Power cable (Remote)	Power Sync	TPCMRN0018	-	-
8	Notebook (Remote)	HP	5220m	-	-

Note 1: Provided by Customer

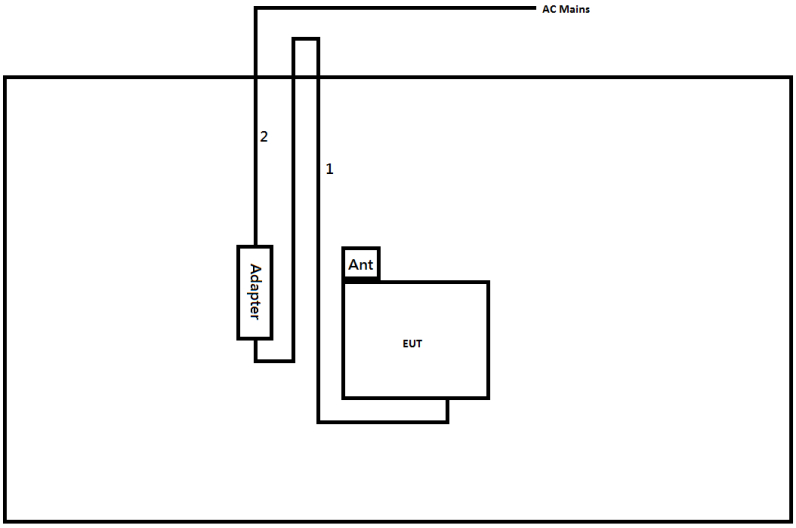
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)	Remark
1	DC Power cable	No	3.0	-
2	AC Power cable	No	1.8	-

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length(m)	Remark
1	DC Power cable	No	3.0	-
2	AC Power cable	No	1.8	-

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

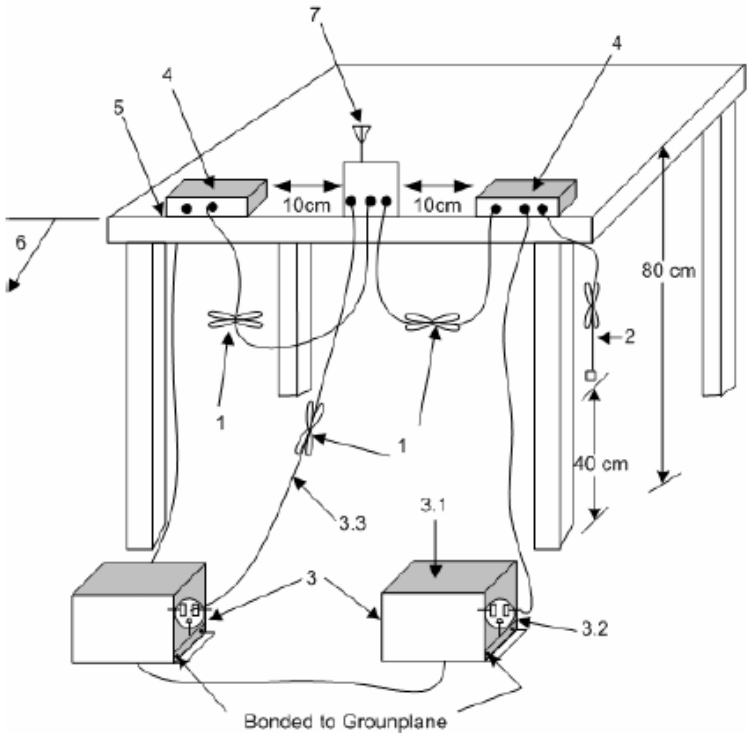
Test Method
▪ Refer as ANSI C63.10-2013, clause 6.2 foray power-line conducted emissions.

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

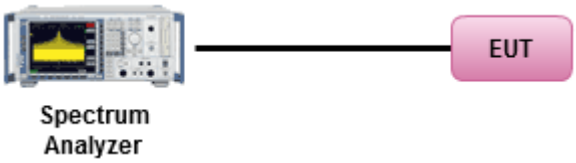
Refer a test equipment and calibration data table in this test report.

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 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} ≤ 6 dBi, then P_{Out} ≤ 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 + 8dB dBm
e.i.r.p. Power Limit:		
▪ 2400-2483.5 MHz Band		
	▪ Point-to-multipoint systems (P2M): P_{eirp} ≤ 36 dBm (4 W)	
	▪ Point-to-point systems (P2P): P_{eirp} ≤ MAX(36, [P_{Out} + G_{TX}]) dBm	
	▪ Smart antenna system (SAS)	
		- Single beam: P_{eirp} ≤ MAX(36, P_{Out} + G_{TX}) dBm
		- Overlap beam: P_{eirp} ≤ MAX(36, P_{Out} + G_{TX}) dBm
		- Aggregate power on all beams: P_{eirp} ≤ 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

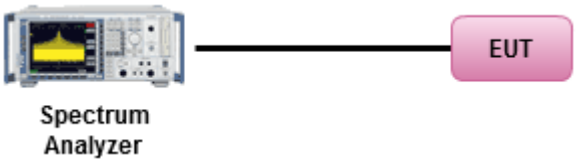
3.4.2 Measuring Instruments

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.	

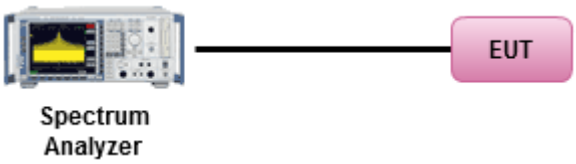
3.5.2 Measuring Instruments

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.

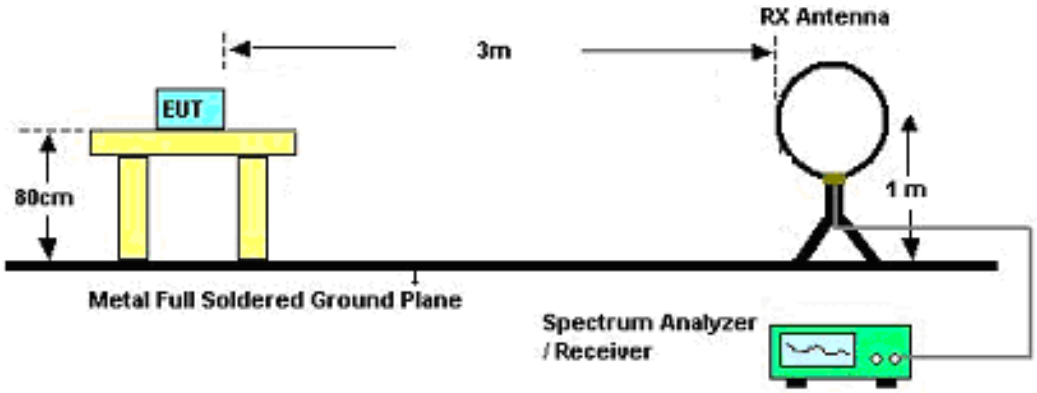
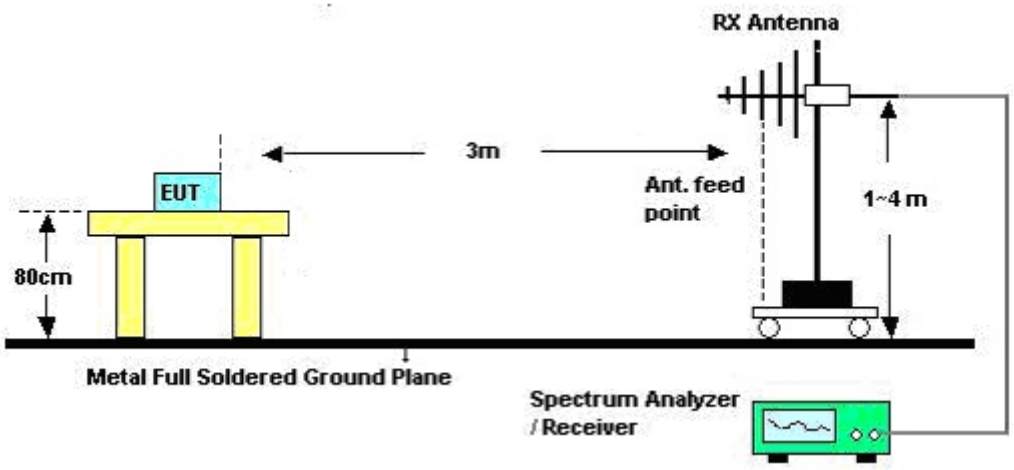
3.6.3 Test Procedures

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.

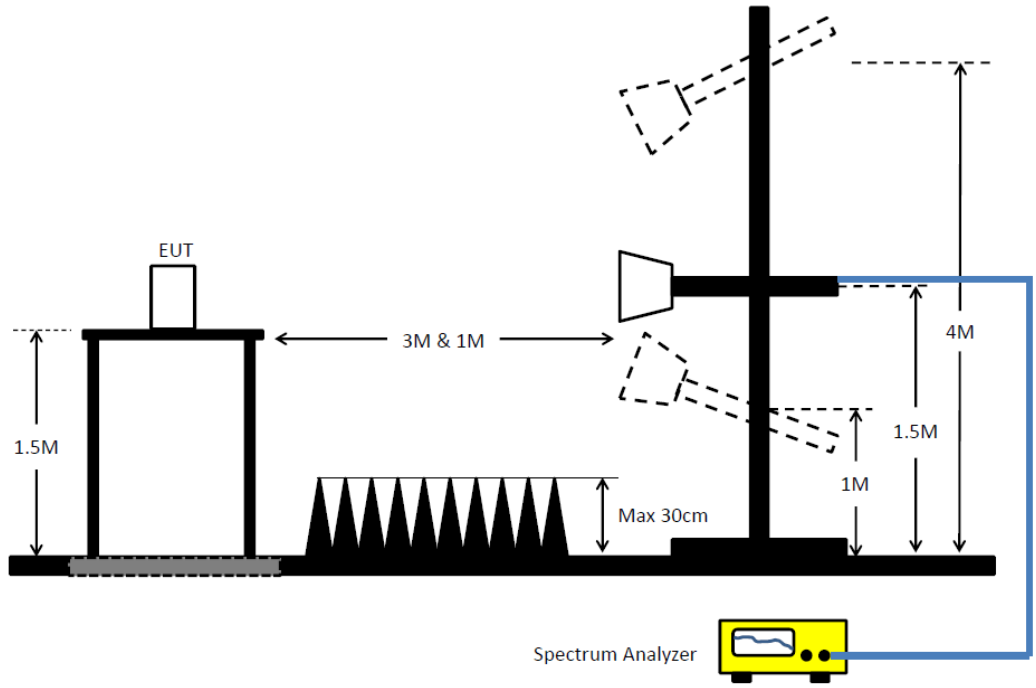
3.6.4 Measurement Results Calculation

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	101029	10Hz~40GHz	19/Oct/2020	18/Oct/2021
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
Pulse Sensor	Anritsu	MA2411B	1027452	300MHz~40GHz	18/Mar/2020	17/Mar/2021
Power Meter	Anritsu	ML2495A	1124009	300MHz~40GHz	18/Mar/2020	17/Mar/2021

Instrument for Radiated Test (below 1GHz)

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
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
Bilog Antenna & 5dB Attenuator	TESEQ & MTJ	CBL6111D&MT J6102-05	35418 & 3	30MHz~1GHz	06/Sep/2020	05/Sep/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
Loop Antenna	TESEQ	HLA 6120	31244	9kHz~30MHz	16/Mar/2021	15/Mar/2022
EMI Test Receiver	R&S	ESR3	102051	9kHz~3.6GHz	21/May/2021	20/May/2022

Instrument for Radiated Test (above 1GHz)

Instrument	Manufacturer /Brand	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	TDK	SAC-3M	03CH09-HY	1GHz~18GHz 3m	19/Mar/2020	18/Mar/2021
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200885	10Hz~44GHz	11/Aug/2020	10/Aug/2021
Microwave Preamplifier	Agilent	8449B	3008A02096	1GHz~26.5GHz	24/Jul/2020	23/Jul/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	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	13/Mar/2020	12/Mar/2021
Preamplifier	MITEQ	TTA1840-35-H G	1864481	18GHz~40GHz	10/Mar/2020	09/Mar/2021
EMI Test Receiver	R&S	ESR3	102051	9kHz~3.6GHz	29/May/2020	28/May/2021

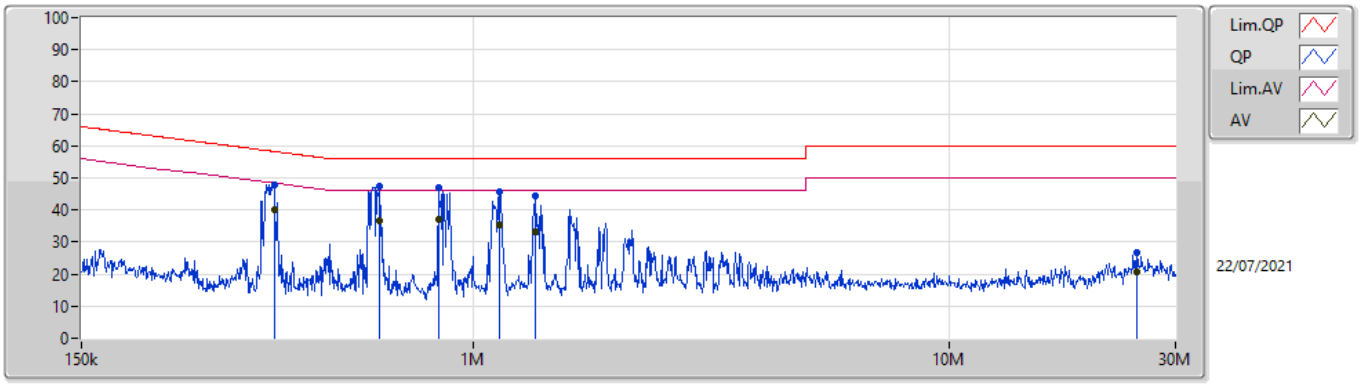
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	613.892k	39.47	46.00	-6.53	Neutral

Mode Config

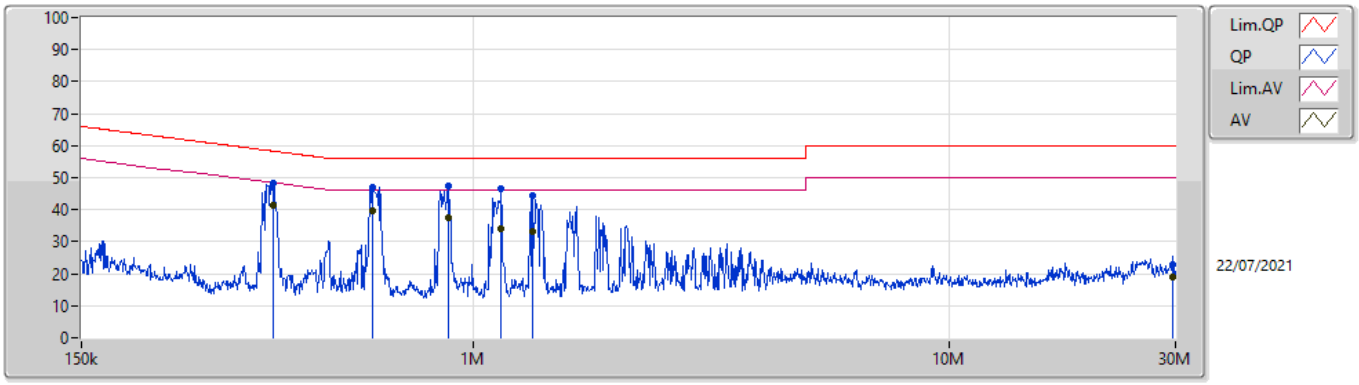
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition	Comments
Mode 1	Pass	QP	381.751k	47.96	58.24	-10.28	Line	-
Mode 1	Pass	AV	381.751k	39.88	48.24	-8.36	Line	-
Mode 1	Pass	QP	636.349k	47.56	56.00	-8.44	Line	-
Mode 1	Pass	AV	636.349k	36.61	46.00	-9.39	Line	-
Mode 1	Pass	QP	844.868k	47.05	56.00	-8.95	Line	-
Mode 1	Pass	AV	844.868k	37.27	46.00	-8.73	Line	-
Mode 1	Pass	QP	1.135M	45.83	56.00	-10.17	Line	-
Mode 1	Pass	AV	1.135M	35.22	46.00	-10.78	Line	-
Mode 1	Pass	QP	1.353M	44.57	56.00	-11.43	Line	-
Mode 1	Pass	AV	1.353M	33.40	46.00	-12.60	Line	-
Mode 1	Pass	QP	24.945M	26.61	60.00	-33.39	Line	-
Mode 1	Pass	AV	24.945M	20.59	50.00	-29.41	Line	-
Mode 1	Pass	QP	380.23k	48.11	58.28	-10.17	Neutral	-
Mode 1	Pass	AV	380.23k	41.46	48.28	-6.82	Neutral	-
Mode 1	Pass	QP	613.892k	47.00	56.00	-9.00	Neutral	-
Mode 1	Pass	AV	613.892k	39.47	46.00	-6.53	Neutral	-
Mode 1	Pass	QP	886.326k	47.39	56.00	-8.61	Neutral	-
Mode 1	Pass	AV	886.326k	37.70	46.00	-8.30	Neutral	-
Mode 1	Pass	QP	1.144M	46.40	56.00	-9.60	Neutral	-
Mode 1	Pass	AV	1.144M	33.97	46.00	-12.03	Neutral	-
Mode 1	Pass	QP	1.337M	44.54	56.00	-11.46	Neutral	-
Mode 1	Pass	AV	1.337M	33.11	46.00	-12.89	Neutral	-
Mode 1	Pass	QP	29.616M	23.04	60.00	-36.96	Neutral	-
Mode 1	Pass	AV	29.616M	18.97	50.00	-31.03	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	381.751k	47.96	58.24	-10.28	19.63	Line	-	28.33	9.67	0.06	9.90
AV	381.751k	39.88	48.24	-8.36	19.63	Line	-	20.25	9.67	0.06	9.90
QP	636.349k	47.56	56.00	-8.44	19.59	Line	-	27.97	9.67	0.07	9.85
AV	636.349k	36.61	46.00	-9.39	19.59	Line	-	17.02	9.67	0.07	9.85
QP	844.868k	47.05	56.00	-8.95	19.57	Line	-	27.48	9.67	0.08	9.82
AV	844.868k	37.27	46.00	-8.73	19.57	Line	-	17.70	9.67	0.08	9.82
QP	1.135M	45.83	56.00	-10.17	19.55	Line	-	26.28	9.67	0.08	9.80
AV	1.135M	35.22	46.00	-10.78	19.55	Line	-	15.67	9.67	0.08	9.80
QP	1.353M	44.57	56.00	-11.43	19.56	Line	-	25.01	9.67	0.09	9.80
AV	1.353M	33.40	46.00	-12.60	19.56	Line	-	13.84	9.67	0.09	9.80
QP	24.945M	26.61	60.00	-33.39	19.81	Line	-	6.80	9.59	0.32	9.90
AV	24.945M	20.59	50.00	-29.41	19.81	Line	-	0.78	9.59	0.32	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	380.23k	48.11	58.28	-10.17	19.63	Neutral	-	28.48	9.67	0.06	9.90
AV	380.23k	41.46	48.28	-6.82	19.63	Neutral	-	21.83	9.67	0.06	9.90
QP	613.892k	47.00	56.00	-9.00	19.59	Neutral	-	27.41	9.67	0.07	9.85
AV	613.892k	39.47	46.00	-6.53	19.59	Neutral	-	19.88	9.67	0.07	9.85
QP	886.326k	47.39	56.00	-8.61	19.56	Neutral	-	27.83	9.67	0.08	9.81
AV	886.326k	37.70	46.00	-8.30	19.56	Neutral	-	18.14	9.67	0.08	9.81
QP	1.144M	46.40	56.00	-9.60	19.55	Neutral	-	26.85	9.67	0.08	9.80
AV	1.144M	33.97	46.00	-12.03	19.55	Neutral	-	14.42	9.67	0.08	9.80
QP	1.337M	44.54	56.00	-11.46	19.56	Neutral	-	24.98	9.67	0.09	9.80
AV	1.337M	33.11	46.00	-12.89	19.56	Neutral	-	13.55	9.67	0.09	9.80
QP	29.616M	23.04	60.00	-36.96	19.94	Neutral	-	3.10	9.70	0.34	9.90
AV	29.616M	18.97	50.00	-31.03	19.94	Neutral	-	-0.97	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)	723.75k	1.058M	1M06F1D	717.5k	1.053M

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

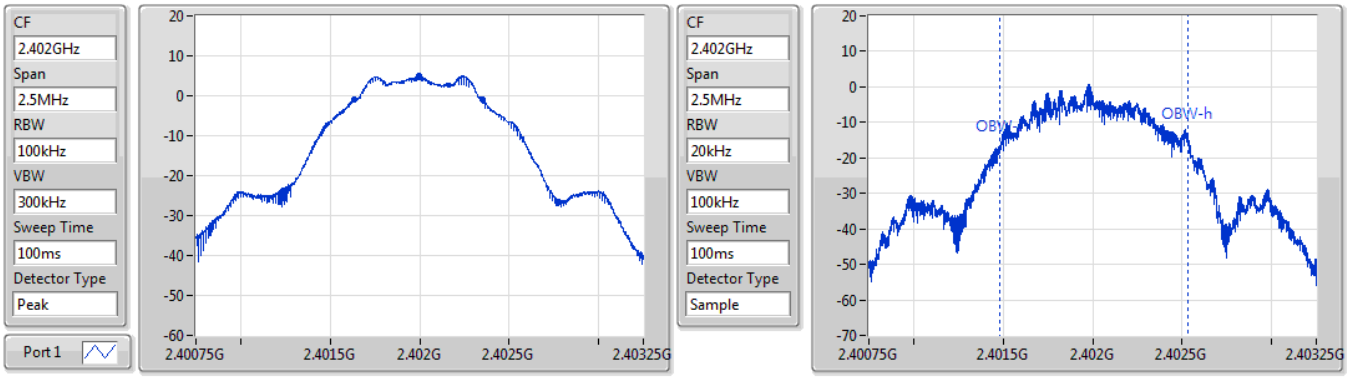
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	717.5k	1.053M
2440MHz	Pass	500k	723.75k	1.058M
2480MHz	Pass	500k	721.25k	1.057M

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

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

2402MHz

26/01/2021

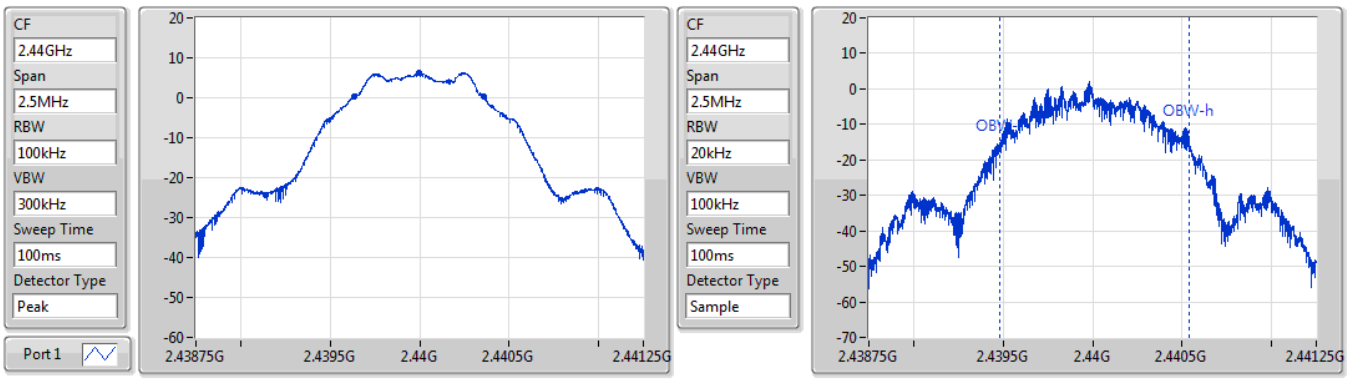


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
717.5k	2.401635G	2.402353G	1.053M	2.401482G	2.402535G	500k	1

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

2440MHz

26/01/2021

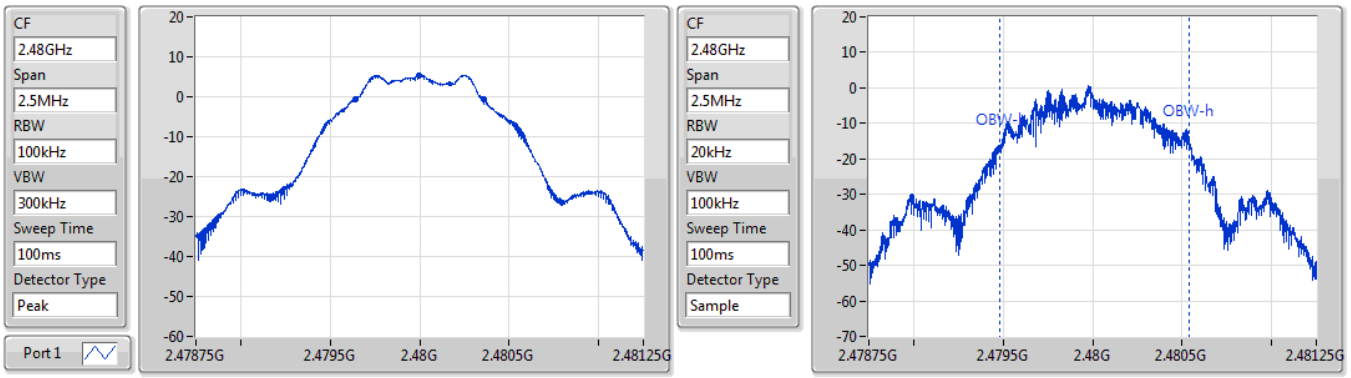


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
723.75k	2.439633G	2.440356G	1.058M	2.439479G	2.440537G	500k	1

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

2480MHz

26/01/2021



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
721.25k	2.479639G	2.48036G	1.057M	2.479482G	2.480538G	500k	1

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	7.09	0.00512

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.00	5.83	30.00
2440MHz	Pass	3.00	7.09	30.00
2480MHz	Pass	3.00	6.36	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-7.88

RBW = 3kHz;

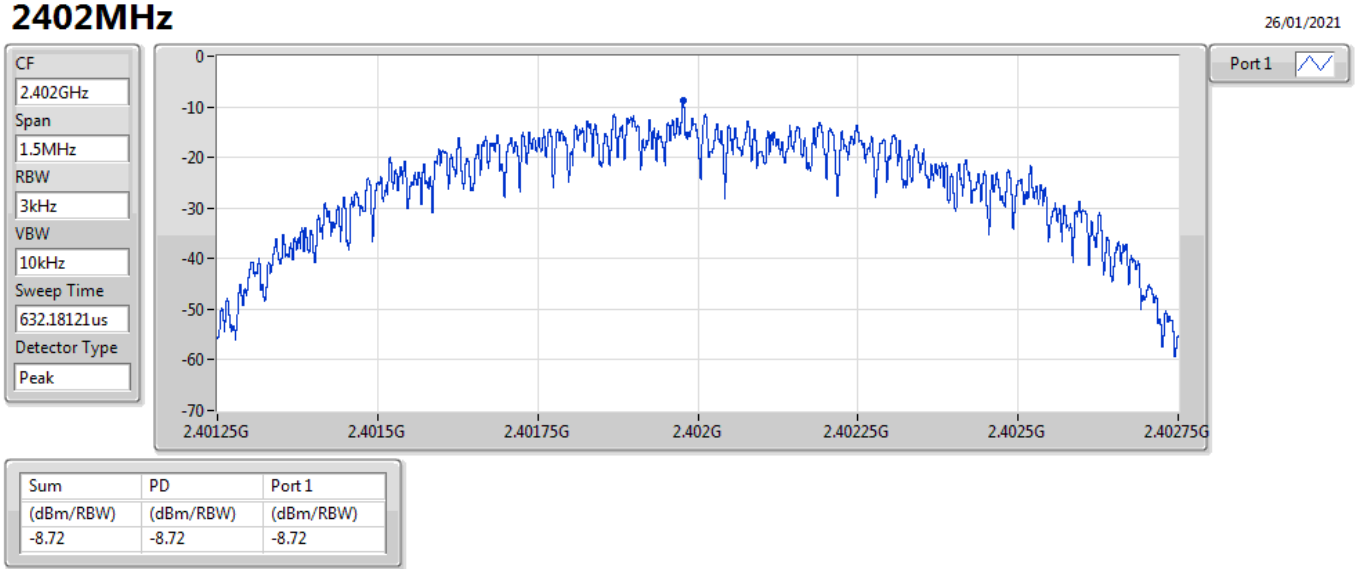
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	3.00	-8.72	8.00
2440MHz	Pass	3.00	-7.88	8.00
2480MHz	Pass	3.00	-8.61	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

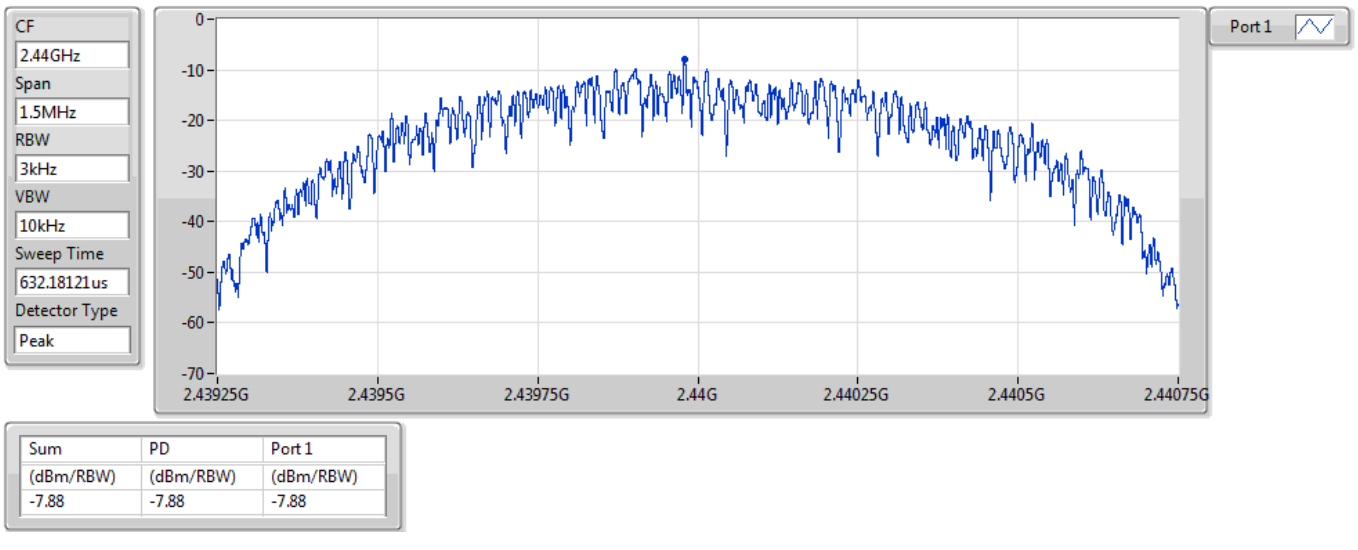
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.72	-8.72	-8.72

BT-LE(1Mbps) PSD

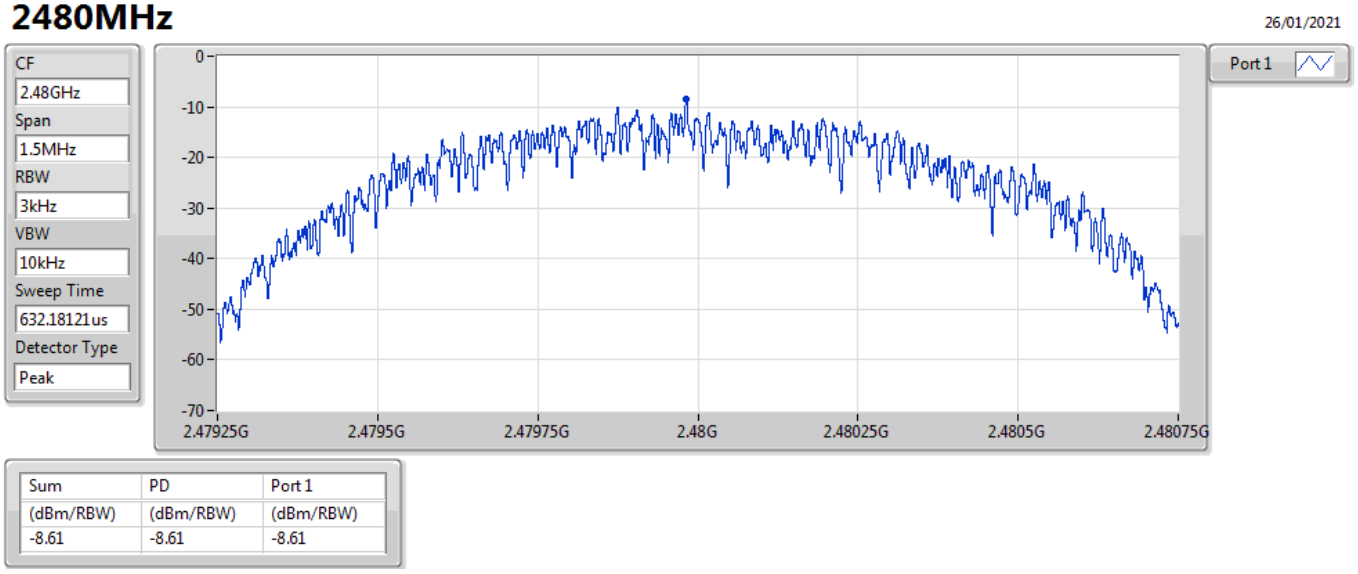
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-7.88	-7.88	-7.88

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

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-8.61	-8.61	-8.61

Summary

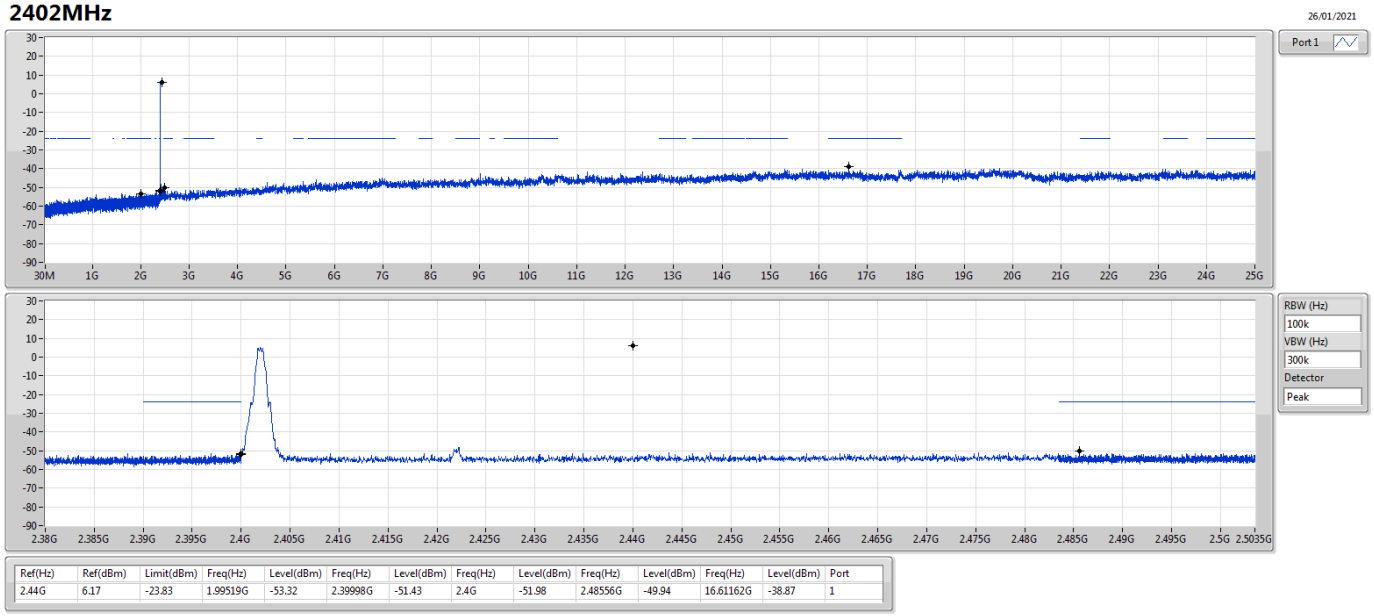
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.44G	6.17	-23.83	1.99519G	-53.32	2.39998G	-51.43	2.4G	-51.98	2.48556G	-49.94	16.61162G	-38.87	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	2.44G	6.17	-23.83	1.99519G	-53.32	2.39998G	-51.43	2.4G	-51.98	2.48556G	-49.94	16.61162G	-38.87	1
2440MHz	Pass	2.44G	6.17	-23.83	2.12062G	-53.43	2.39052G	-52.06	2.4835G	-54.08	2.49121G	-50.74	14.88501G	-40.27	1
2480MHz	Pass	2.44G	6.17	-23.83	2.3001G	-52.87	2.39877G	-52.23	2.4835G	-53.76	2.48467G	-50.78	23.47867G	-40.22	1

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

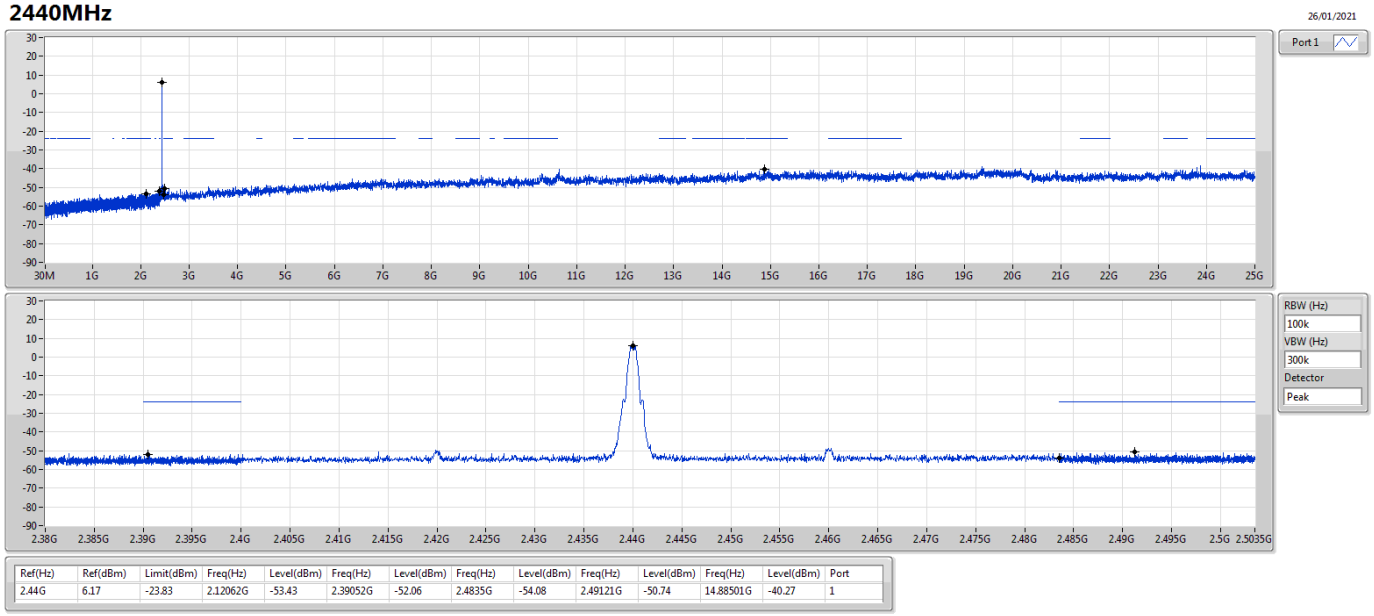
2402MHz



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
2.44G	6.17	-23.83	1.99519G	-53.32	2.39998G	-51.43	2.4G	-51.98	2.48556G	-49.94	16.61162G	-38.87	1

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

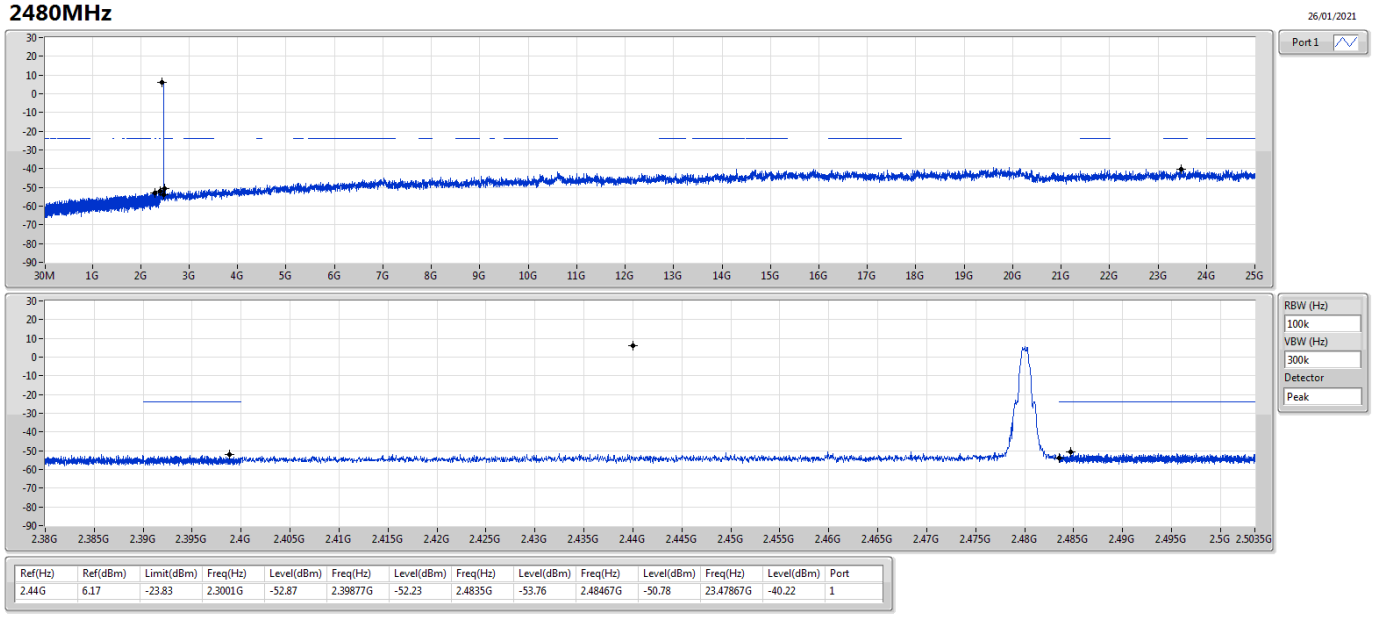
2440MHz



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
2.44G	6.17	-23.83	2.12062G	-53.43	2.39052G	-52.06	2.4835G	-54.08	2.49121G	-50.74	14.88501G	-40.27	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
2.44G	6.17	-23.83	2.3001G	-52.87	2.39877G	-52.23	2.4835G	-53.76	2.48467G	-50.78	23.47867G	-40.22	1

Summary

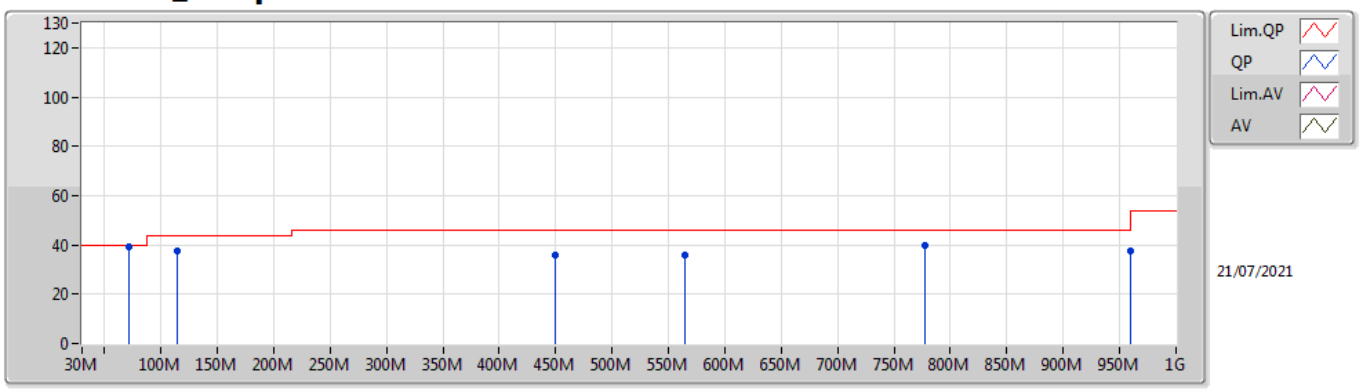
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	QP	71.29M	39.29	40.00	-0.71	3	Vertical	164	1.00	-

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	114.7M	37.32	43.50	-6.18	3	Vertical	0	1.00	-
2440MHz	Pass	PK	450.1M	35.69	46.00	-10.31	3	Vertical	0	1.00	-
2440MHz	Pass	PK	565.15M	35.78	46.00	-10.22	3	Vertical	0	1.00	-
2440MHz	Pass	PK	777.7M	39.83	46.00	-6.17	3	Vertical	0	1.00	-
2440MHz	Pass	PK	960M	37.64	46.00	-8.36	3	Vertical	0	1.00	-
2440MHz	Pass	QP	71.29M	39.29	40.00	-0.71	3	Vertical	164	1.00	-
2440MHz	Pass	PK	136.7M	39.21	43.50	-4.29	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	260.86M	36.73	46.00	-9.27	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	425.76M	38.44	46.00	-7.56	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	563.5M	39.10	46.00	-6.90	3	Horizontal	360	1.00	-
2440MHz	Pass	PK	960M	34.42	46.00	-11.58	3	Horizontal	360	1.00	-
2440MHz	Pass	QP	79.44M	37.53	40.00	-2.47	3	Horizontal	2	1.00	-

BT-LE(1Mbps)

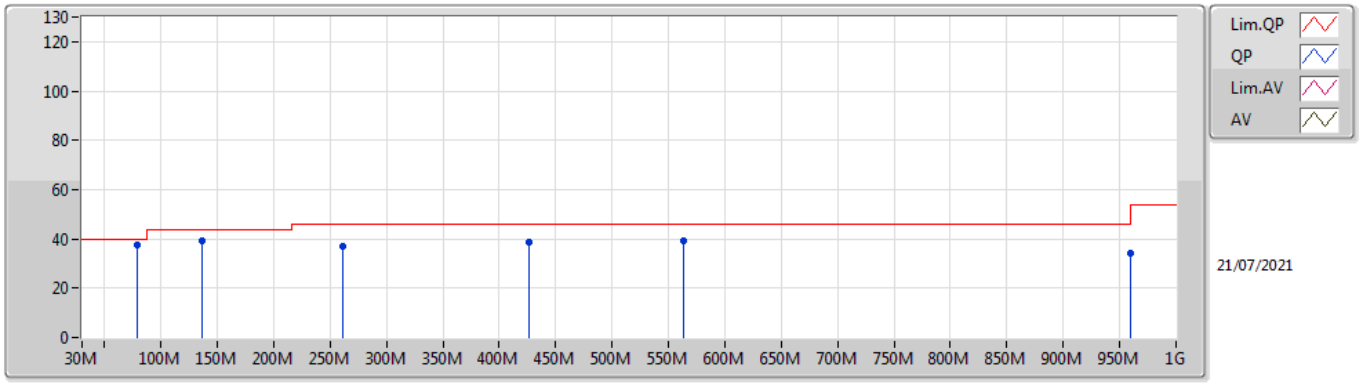
2440MHz_Adapter



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	114.7M	37.32	43.50	-6.18	-19.09	3	Vertical	0	1.00	-	56.41	16.52	1.05	36.66
PK	450.1M	35.69	46.00	-10.31	-12.10	3	Vertical	0	1.00	-	47.79	22.42	2.10	36.62
PK	565.15M	35.78	46.00	-10.22	-9.34	3	Vertical	0	1.00	-	45.12	25.34	2.41	37.09
PK	777.7M	39.83	46.00	-6.17	-7.42	3	Vertical	0	1.00	-	47.25	27.35	2.77	37.54
PK	960M	37.64	46.00	-8.36	-4.11	3	Vertical	0	1.00	-	41.75	30.25	3.11	37.47
QP	71.29M	39.29	40.00	-0.71	-24.68	3	Vertical	164	1.00	-	63.97	11.44	0.85	36.97

BT-LE(1Mbps)

2440MHz_Adapter



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	136.7M	39.21	43.50	-4.29	-18.51	3	Horizontal	360	1.00	-	57.72	16.78	1.16	36.45
PK	260.86M	36.73	46.00	-9.27	-15.70	3	Horizontal	360	1.00	-	52.43	19.16	1.54	36.40
PK	425.76M	38.44	46.00	-7.56	-12.47	3	Horizontal	360	1.00	-	50.91	22.12	2.01	36.60
PK	563.5M	39.10	46.00	-6.90	-9.32	3	Horizontal	360	1.00	-	48.42	25.37	2.40	37.09
PK	960M	34.42	46.00	-11.58	-4.11	3	Horizontal	360	1.00	-	38.53	30.25	3.11	37.47
QP	79.44M	37.53	40.00	-2.47	-23.63	3	Horizontal	2	1.00	-	61.16	12.35	0.89	36.87

Summary

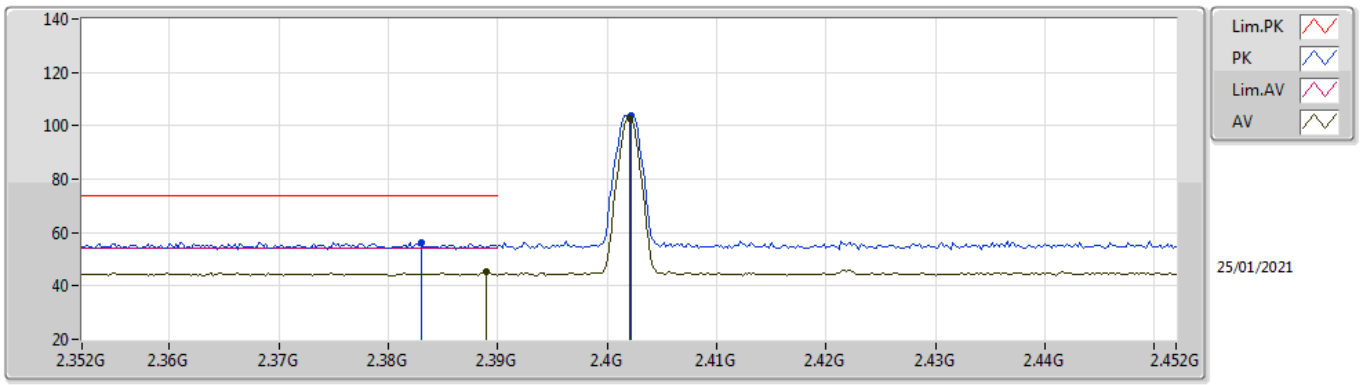
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	2.4835G	45.36	54.00	-8.64	3	Vertical	212	1.09	-

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	2.389G	45.14	54.00	-8.86	3	Vertical	165	1.50	-
2402MHz	Pass	AV	2.402G	102.86	Inf	-Inf	3	Vertical	165	1.50	-
2402MHz	Pass	PK	2.383G	56.43	74.00	-17.57	3	Vertical	165	1.50	-
2402MHz	Pass	PK	2.4022G	103.87	Inf	-Inf	3	Vertical	165	1.50	-
2402MHz	Pass	AV	2.37G	44.90	54.00	-9.10	3	Horizontal	15	2.80	-
2402MHz	Pass	AV	2.402G	88.40	Inf	-Inf	3	Horizontal	15	2.80	-
2402MHz	Pass	PK	2.3692G	57.02	74.00	-16.98	3	Horizontal	15	2.80	-
2402MHz	Pass	PK	2.4022G	89.48	Inf	-Inf	3	Horizontal	15	2.80	-
2402MHz	Pass	AV	4.8015G	32.23	54.00	-21.77	3	Vertical	171	1.50	-
2402MHz	Pass	PK	4.80165G	44.49	74.00	-29.51	3	Vertical	171	1.50	-
2402MHz	Pass	AV	4.80153G	32.33	54.00	-21.67	3	Horizontal	209	2.37	-
2402MHz	Pass	PK	4.80348G	44.75	74.00	-29.25	3	Horizontal	209	2.37	-
2440MHz	Pass	AV	2.3688G	44.81	54.00	-9.19	3	Vertical	224	1.38	-
2440MHz	Pass	AV	2.44G	104.12	Inf	-Inf	3	Vertical	224	1.38	-
2440MHz	Pass	AV	2.49G	44.87	54.00	-9.13	3	Vertical	224	1.38	-
2440MHz	Pass	PK	2.378G	56.43	74.00	-17.57	3	Vertical	224	1.38	-
2440MHz	Pass	PK	2.4404G	105.12	Inf	-Inf	3	Vertical	224	1.38	-
2440MHz	Pass	PK	2.4964G	56.92	74.00	-17.08	3	Vertical	224	1.38	-
2440MHz	Pass	AV	2.3612G	44.83	54.00	-9.17	3	Horizontal	106	1.24	-
2440MHz	Pass	AV	2.44G	96.74	Inf	-Inf	3	Horizontal	106	1.24	-
2440MHz	Pass	AV	2.4948G	45.13	54.00	-8.87	3	Horizontal	106	1.24	-
2440MHz	Pass	PK	2.348G	56.45	74.00	-17.55	3	Horizontal	106	1.24	-
2440MHz	Pass	PK	2.4396G	97.79	Inf	-Inf	3	Horizontal	106	1.24	-
2440MHz	Pass	PK	2.488G	56.71	74.00	-17.29	3	Horizontal	106	1.24	-
2440MHz	Pass	AV	4.87962G	31.71	54.00	-22.29	3	Vertical	160	1.39	-
2440MHz	Pass	PK	4.87792G	43.34	74.00	-30.66	3	Vertical	160	1.39	-
2440MHz	Pass	AV	4.87866G	30.97	54.00	-23.03	3	Horizontal	196	2.56	-
2440MHz	Pass	PK	4.87765G	44.13	74.00	-29.87	3	Horizontal	196	2.56	-
2480MHz	Pass	AV	2.48G	105.02	Inf	-Inf	3	Vertical	212	1.09	-
2480MHz	Pass	AV	2.4835G	45.36	54.00	-8.64	3	Vertical	212	1.09	-
2480MHz	Pass	PK	2.4798G	106.06	Inf	-Inf	3	Vertical	212	1.09	-
2480MHz	Pass	PK	2.4912G	57.09	74.00	-16.91	3	Vertical	212	1.09	-
2480MHz	Pass	AV	2.48G	94.74	Inf	-Inf	3	Horizontal	105	1.25	-
2480MHz	Pass	AV	2.487G	45.24	54.00	-8.76	3	Horizontal	105	1.25	-
2480MHz	Pass	PK	2.4798G	95.80	Inf	-Inf	3	Horizontal	105	1.25	-
2480MHz	Pass	PK	2.498G	57.06	74.00	-16.94	3	Horizontal	105	1.25	-
2480MHz	Pass	AV	4.95912G	31.20	54.00	-22.80	3	Vertical	321	2.04	-
2480MHz	Pass	PK	4.95912G	44.10	74.00	-29.90	3	Vertical	321	2.04	-
2480MHz	Pass	AV	4.96057G	31.48	54.00	-22.52	3	Horizontal	71	1.50	-
2480MHz	Pass	PK	4.96G	43.60	74.00	-30.40	3	Horizontal	71	1.50	-

BT-LE(1Mbps)

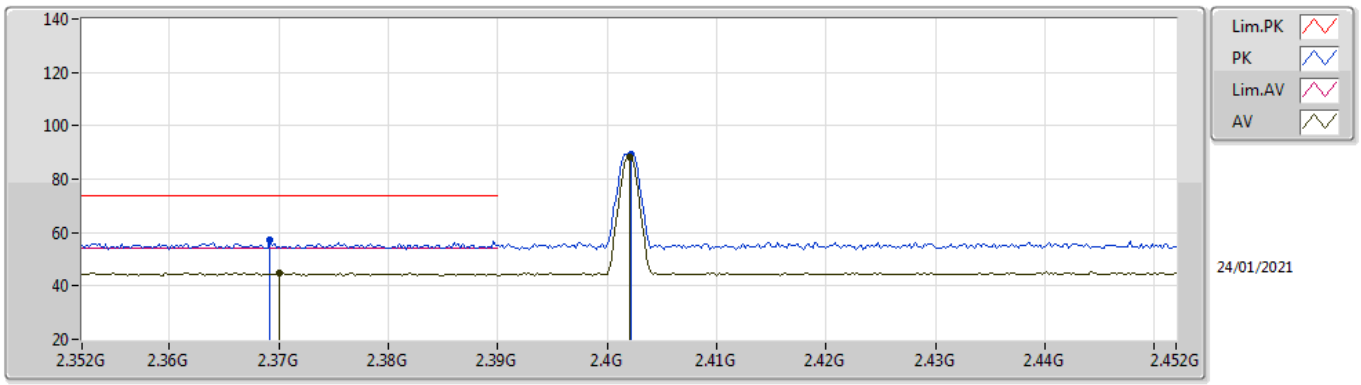
2402MHz_TX



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	2.389G	45.14	54.00	-8.86	31.52	3	Vertical	165	1.50	-	13.62	27.64	3.88	-
AV	2.402G	102.86	Inf	-Inf	31.50	3	Vertical	165	1.50	-	71.36	27.60	3.90	-
PK	2.383G	56.43	74.00	-17.57	31.54	3	Vertical	165	1.50	-	24.89	27.67	3.87	-
PK	2.4022G	103.87	Inf	-Inf	31.50	3	Vertical	165	1.50	-	72.37	27.60	3.90	-

BT-LE(1Mbps)

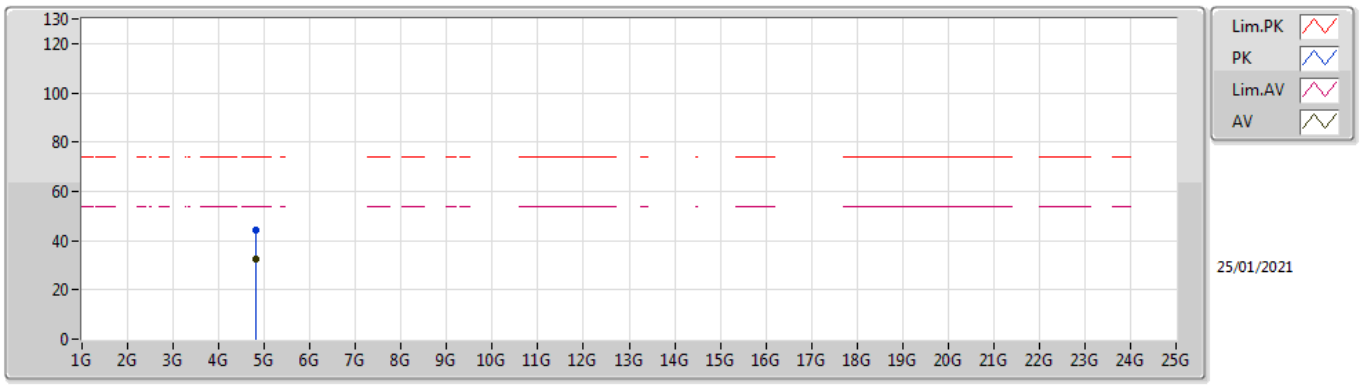
2402MHz_TX



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	2.37G	44.90	54.00	-9.10	31.57	3	Horizontal	15	2.80	-	13.33	27.72	3.85	-
AV	2.402G	88.40	Inf	-Inf	31.50	3	Horizontal	15	2.80	-	56.90	27.60	3.90	-
PK	2.3692G	57.02	74.00	-16.98	31.57	3	Horizontal	15	2.80	-	25.45	27.72	3.85	-
PK	2.4022G	89.48	Inf	-Inf	31.50	3	Horizontal	15	2.80	-	57.98	27.60	3.90	-

BT-LE(1Mbps)

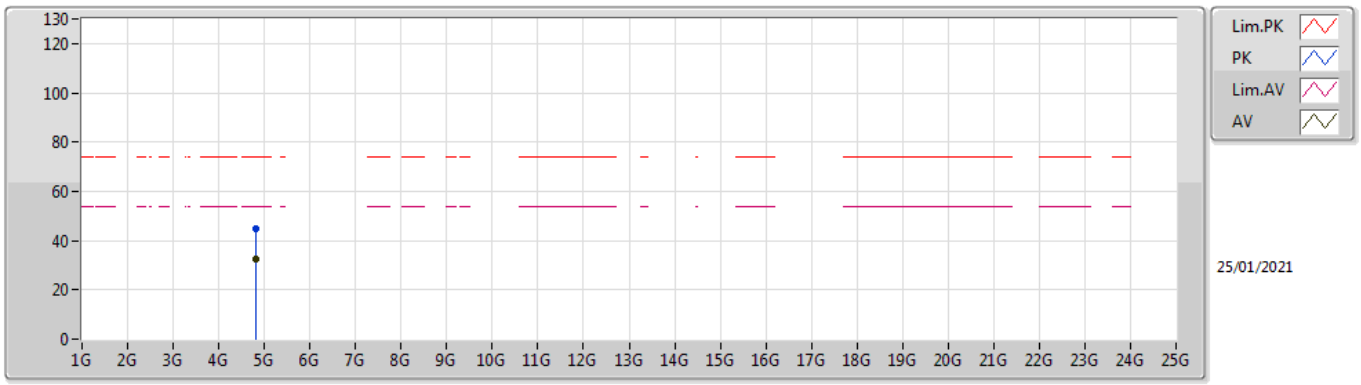
2402MHz_TX



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	4.8015G	32.23	54.00	-21.77	1.48	3	Vertical	171	1.50	-	30.75	31.11	5.30	34.93
PK	4.80165G	44.49	74.00	-29.51	1.48	3	Vertical	171	1.50	-	43.01	31.11	5.30	34.93

BT-LE(1Mbps)

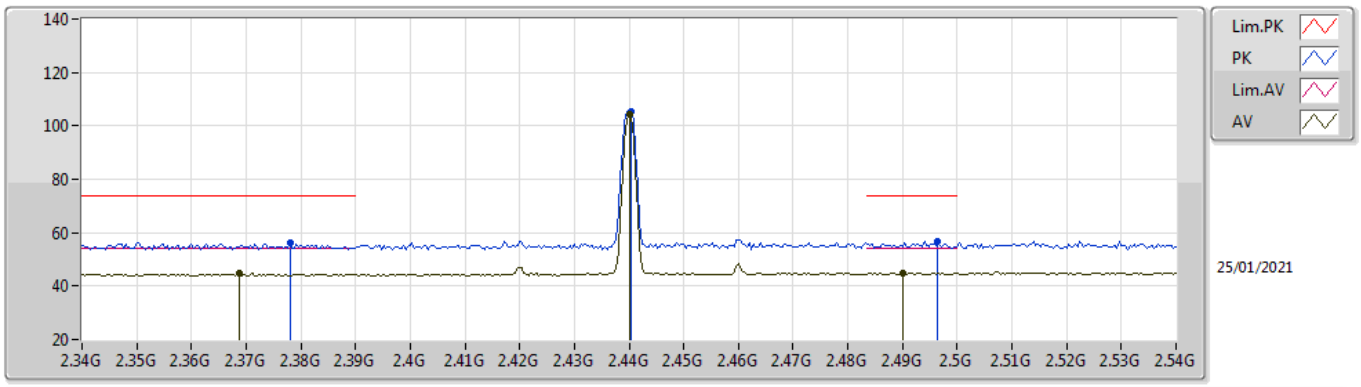
2402MHz_TX



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	4.80153G	32.33	54.00	-21.67	1.48	3	Horizontal	209	2.37	-	30.85	31.11	5.30	34.93
PK	4.80348G	44.75	74.00	-29.25	1.48	3	Horizontal	209	2.37	-	43.27	31.11	5.30	34.93

BT-LE(1Mbps)

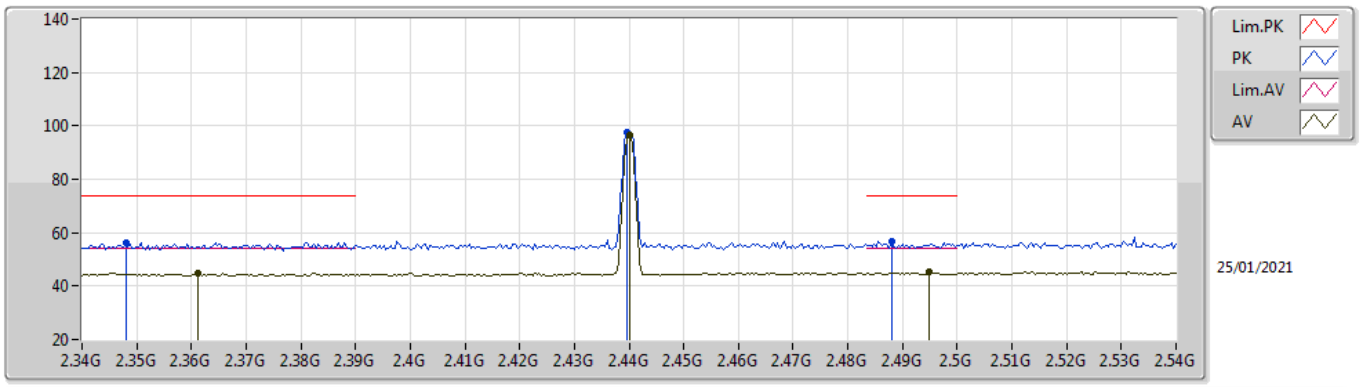
2440MHz_TX



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	2.3688G	44.81	54.00	-9.19	31.57	3	Vertical	224	1.38	-	13.24	27.72	3.85	-
AV	2.44G	104.12	Inf	-Inf	31.56	3	Vertical	224	1.38	-	72.56	27.60	3.96	-
AV	2.49G	44.87	54.00	-9.13	31.64	3	Vertical	224	1.38	-	13.23	27.60	4.04	-
PK	2.378G	56.43	74.00	-17.57	31.56	3	Vertical	224	1.38	-	24.87	27.69	3.87	-
PK	2.4404G	105.12	Inf	-Inf	31.56	3	Vertical	224	1.38	-	73.56	27.60	3.96	-
PK	2.4964G	56.92	74.00	-17.08	31.64	3	Vertical	224	1.38	-	25.28	27.60	4.04	-

BT-LE(1Mbps)

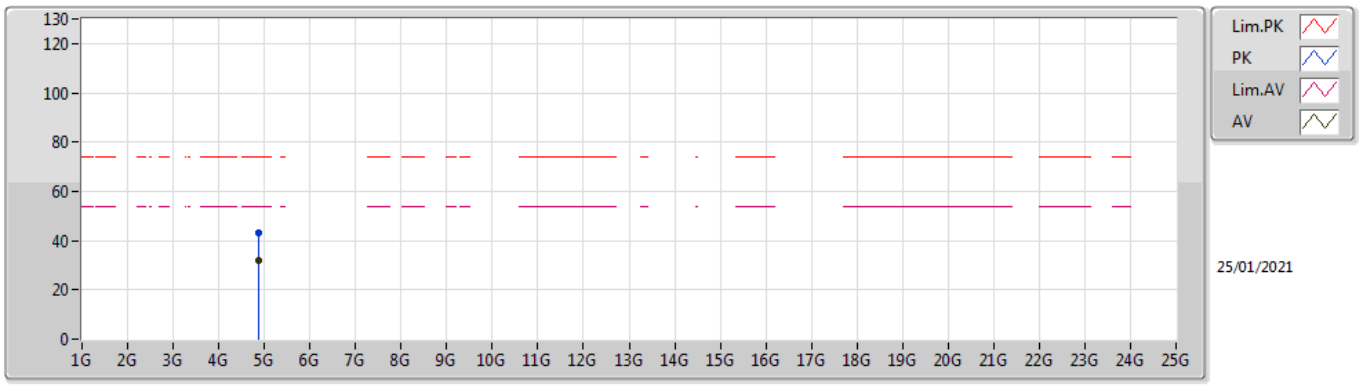
2440MHz_TX



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	2.3612G	44.83	54.00	-9.17	31.60	3	Horizontal	106	1.24	-	13.23	27.76	3.84	-
AV	2.44G	96.74	Inf	-Inf	31.56	3	Horizontal	106	1.24	-	65.18	27.60	3.96	-
AV	2.4948G	45.13	54.00	-8.87	31.64	3	Horizontal	106	1.24	-	13.49	27.60	4.04	-
PK	2.348G	56.45	74.00	-17.55	31.62	3	Horizontal	106	1.24	-	24.83	27.80	3.82	-
PK	2.4396G	97.79	Inf	-Inf	31.56	3	Horizontal	106	1.24	-	66.23	27.60	3.96	-
PK	2.488G	56.71	74.00	-17.29	31.63	3	Horizontal	106	1.24	-	25.08	27.60	4.03	-

BT-LE(1Mbps)

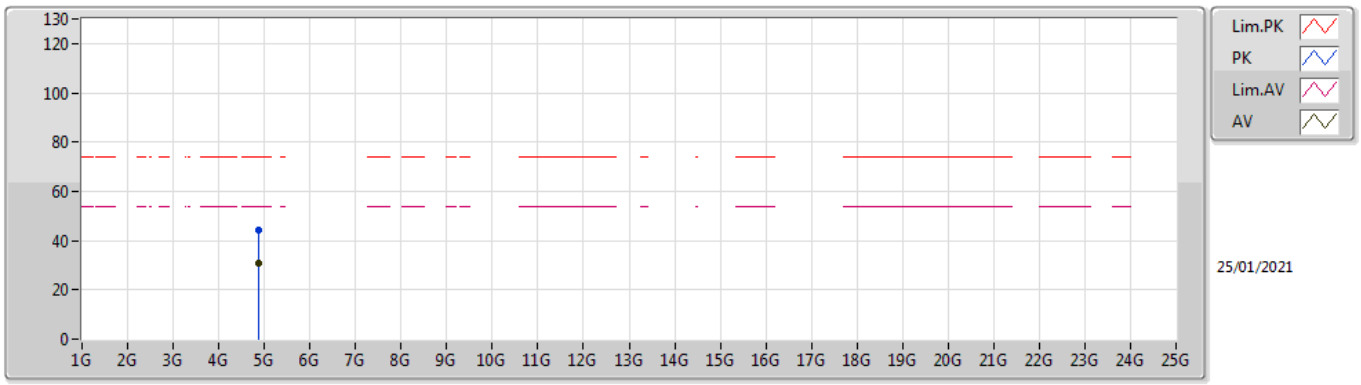
2440MHz_TX



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	4.87962G	31.71	54.00	-22.29	1.65	3	Vertical	160	1.39	-	30.06	31.24	5.34	34.93
PK	4.87792G	43.34	74.00	-30.66	1.65	3	Vertical	160	1.39	-	41.69	31.24	5.34	34.93

BT-LE(1Mbps)

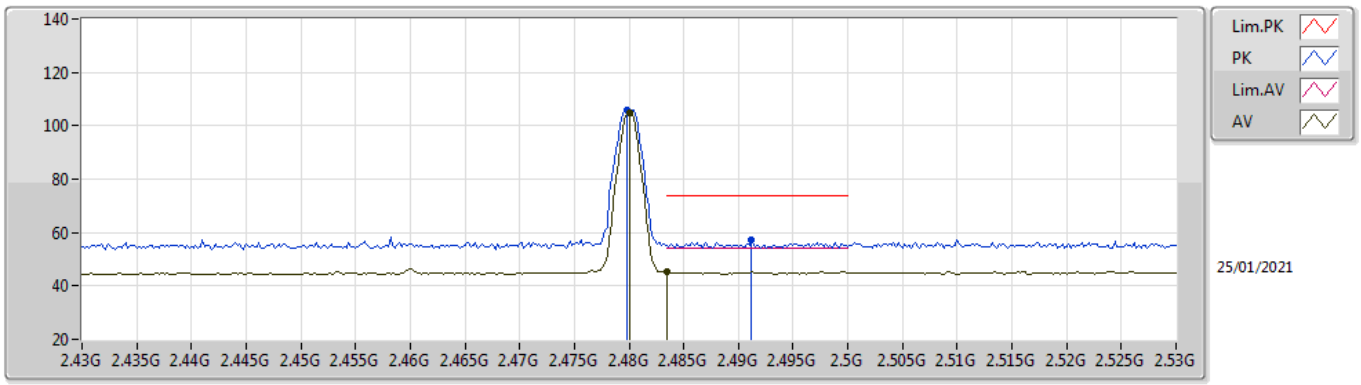
2440MHz_TX



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	4.87866G	30.97	54.00	-23.03	1.65	3	Horizontal	196	2.56	-	29.32	31.24	5.34	34.93
PK	4.87765G	44.13	74.00	-29.87	1.65	3	Horizontal	196	2.56	-	42.48	31.24	5.34	34.93

BT-LE(1Mbps)

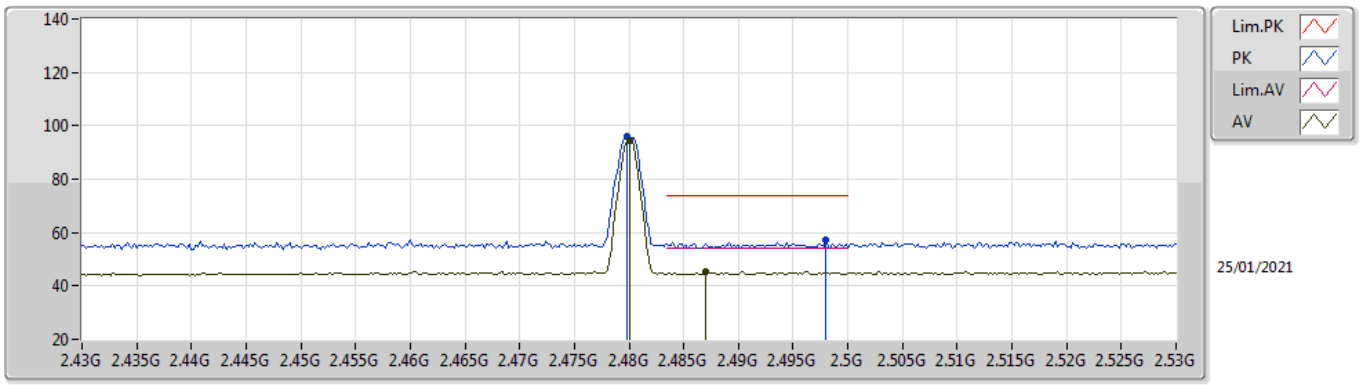
2480MHz_TX



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	105.02	Inf	-Inf	31.62	3	Vertical	212	1.09	-	73.40	27.60	4.02	-
AV	2.4835G	45.36	54.00	-8.64	31.63	3	Vertical	212	1.09	-	13.73	27.60	4.03	-
PK	2.4798G	106.06	Inf	-Inf	31.62	3	Vertical	212	1.09	-	74.44	27.60	4.02	-
PK	2.4912G	57.09	74.00	-16.91	31.64	3	Vertical	212	1.09	-	25.45	27.60	4.04	-

BT-LE(1Mbps)

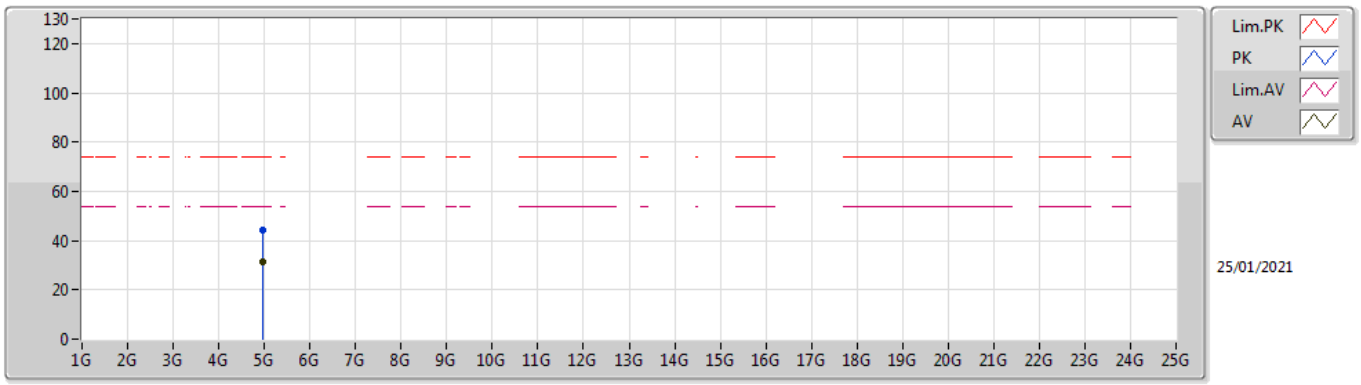
2480MHz_TX



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	94.74	Inf	-Inf	31.62	3	Horizontal	105	1.25	-	63.12	27.60	4.02	-
AV	2.487G	45.24	54.00	-8.76	31.63	3	Horizontal	105	1.25	-	13.61	27.60	4.03	-
PK	2.4798G	95.80	Inf	-Inf	31.62	3	Horizontal	105	1.25	-	64.18	27.60	4.02	-
PK	2.498G	57.06	74.00	-16.94	31.65	3	Horizontal	105	1.25	-	25.41	27.60	4.05	-

BT-LE(1Mbps)

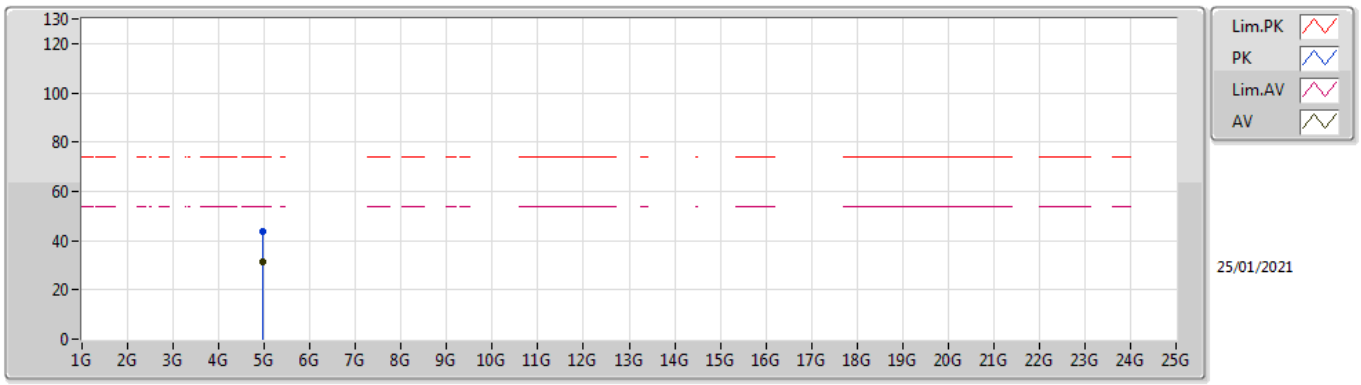
2480MHz_TX



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	4.95912G	31.20	54.00	-22.80	1.86	3	Vertical	321	2.04	-	29.34	31.42	5.38	34.94
PK	4.95912G	44.10	74.00	-29.90	1.86	3	Vertical	321	2.04	-	42.24	31.42	5.38	34.94

BT-LE(1Mbps)

2480MHz_TX

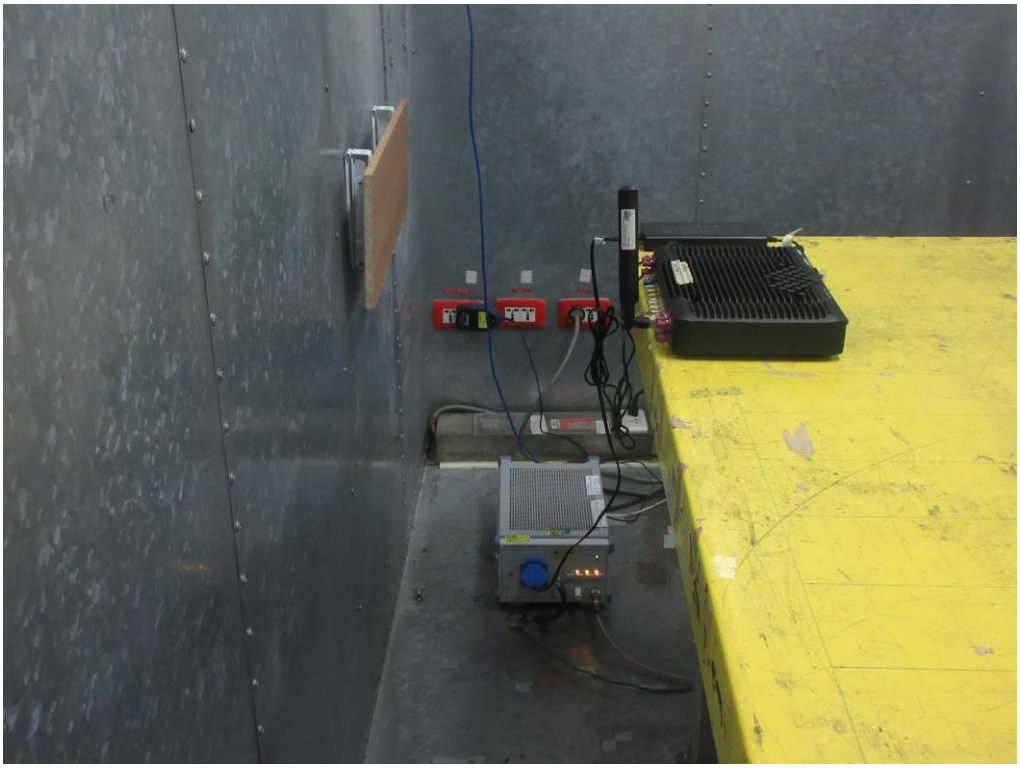


Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.96057G	31.48	54.00	-22.52	1.86	3	Horizontal	71	1.50	-	29.62	31.42	5.38	34.94
PK	4.96G	43.60	74.00	-30.40	1.86	3	Horizontal	71	1.50	-	41.74	31.42	5.38	34.94

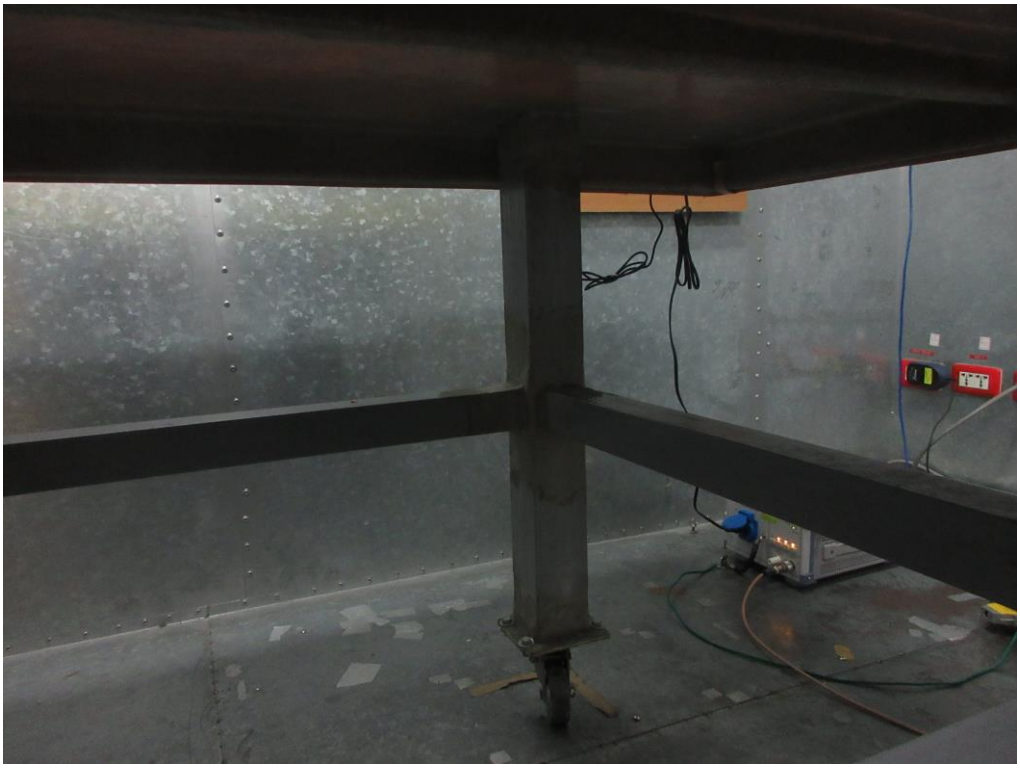
1. Photographs of Conducted Emissions Test Configuration

Front view

Side view



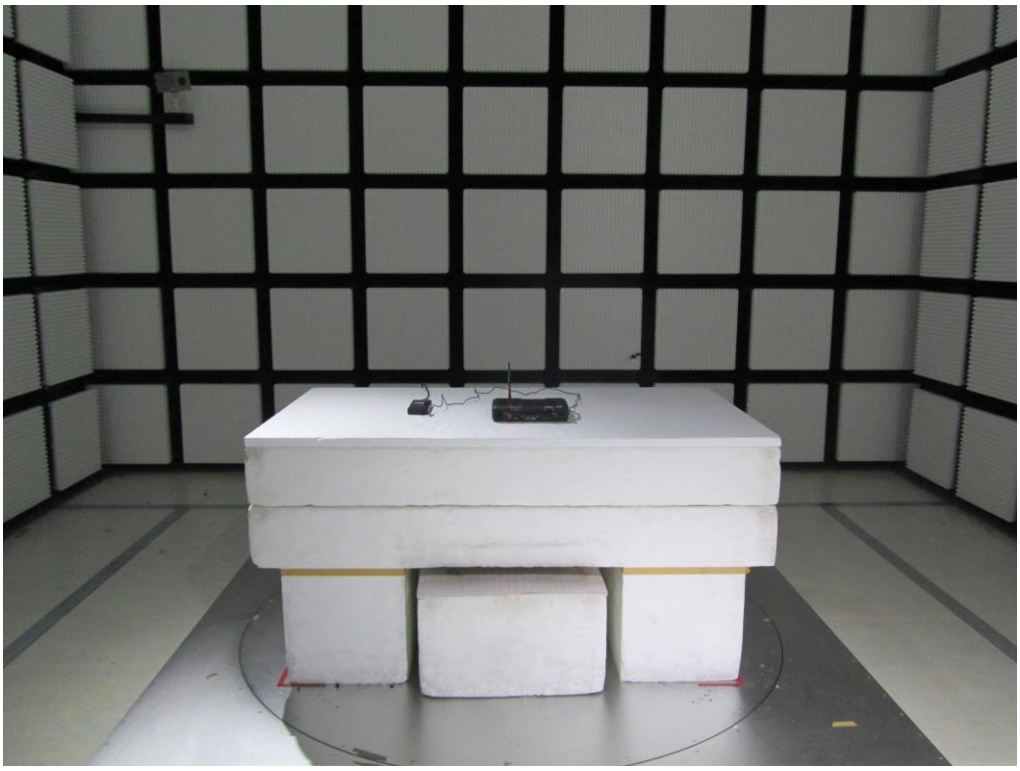
Under table view



2. Photographs of Radiated Emissions Test Configuration

For radiated emissions 30MHz~1GHz

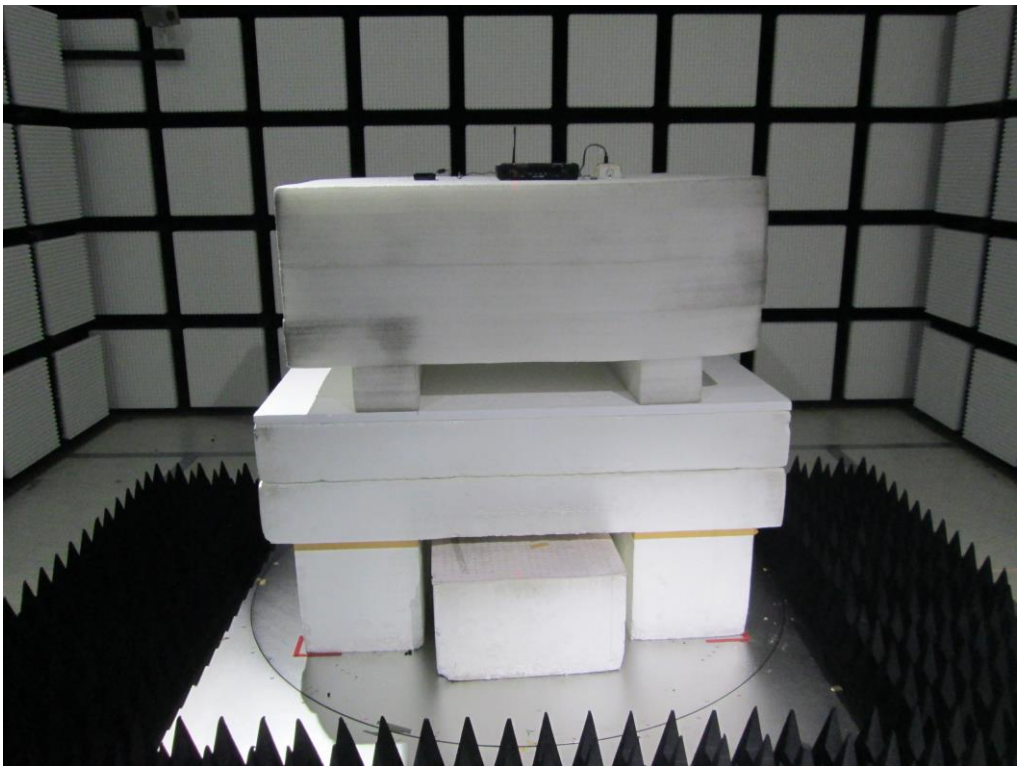
Front view



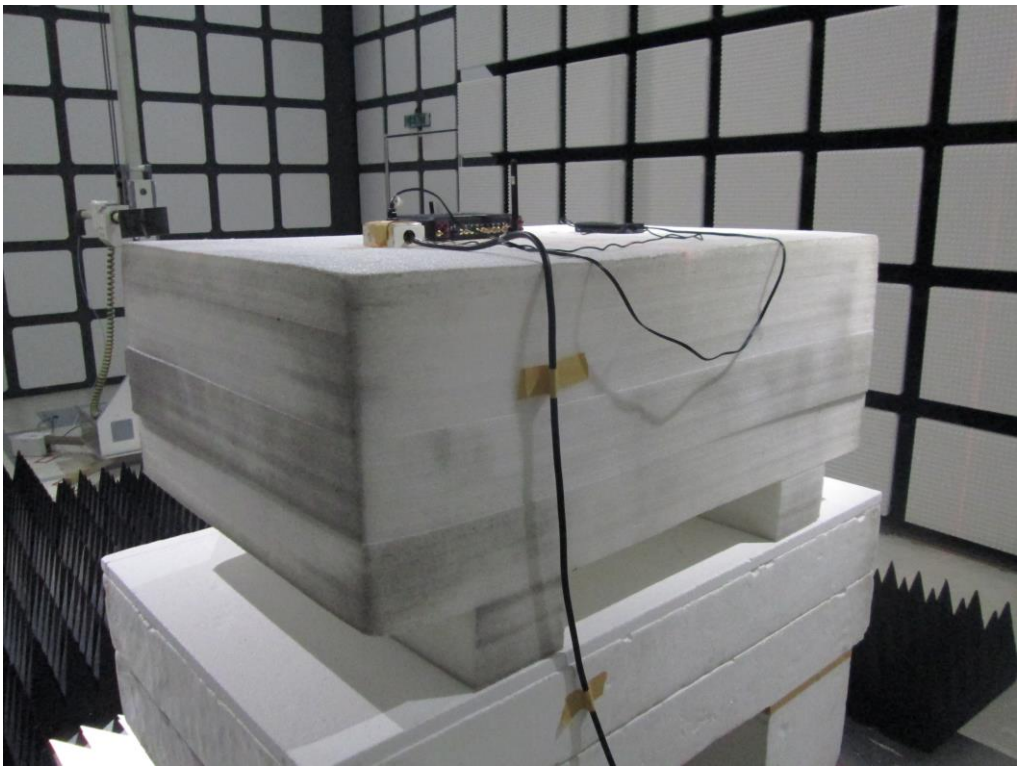
Rear view

For radiated emissions above 1GHz

Front view



Rear view



———THE END———