Testing Laboratory 3787

RADIO TEST REPORT

FCC ID	:	2BAKF-QN-I-270
Equipment	:	Dual Band Wifi 6 Indoor access point (802.11 ax 2X2)
Brand Name	:	Qunatum Networks
Model Name	:	QN-I-270
Applicant	:	Zen Exim Pvt. Ltd. 2nd Floor, Shakti 404, Opp. New Gurudwara, Bodakdev, Ahmedabad Gujarat 380054, India
Manufacturer	:	Zen Exim Pvt. Ltd. 2nd Floor, Shakti 404, Opp. New Gurudwara, Bodakdev, Ahmedabad Gujarat 380054, India
STANDARD	:	47 CFR FCC PART 15.247

The product was received on Nov. 10, 2020, and testing was started from Mar. 10, 2021 and completed on Mar. 18, 2021. We, Sporton International Inc. Hsinchu 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. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

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Photographs of EUT v01

History of this test report

Report No.	Version	Description	Issued Date
FR0O2913-08AD	01	Initial issue of report	May 16, 2023

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	-
Reference to Sporton Project No.: 0O2913-02				

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

Disclaimer:

1. The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.
2. The test configuration, test mode and test software were written in this test report are declared by the manufacturer.

Reviewed by: Sam Chen

Report Producer: Viola Huang

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(2Mbps)	2.0	1TX

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

1.1.2 Antenna Information

Ant.	Port	Brand	P/N	Antenna Type	Connector	Gain (dBi)		
						2.4GHz	5GHz	Bluetooth
1	1	Angeei	SD2430S01-185G13U1S	PIFA	I-PEX	4.8	5.8	-
2	2	Angeei	SD2430R01-100G13U1S	PIFA	I-PEX	4.8	6.0	-
3	1	Angeei	P242003-T4-55G13U1S	PCB	I-PEX	-	-	4.6

Note 1: The above information was declared by manufacturer.

For 2.4GHz Function:

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

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For 5GHz Function:

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

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For Bluetooth Function (1TX/1RX):

Only Port 1 can be used as transmitting/receiving.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-LE(2Mbps)	0.338	4.71	211.25u	10k

Note:
- DC is Duty Cycle.
- DCF is Duty Cycle Factor.

1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter or PoE			
Function	☒	Point-to-multipoint	☐	Point-to-point
Test Software Version	Btool V1.42.18			
Support Mode	☐	LE 1M PHY: 1 Mb/s		
	☐	LE Coded PHY (S=2): 500 Kb/s		
	☐	LE Coded PHY (S=8): 125 Kb/s		
	☒	LE 2M PHY: 2 Mb/s		

Note: The above information was declared by manufacturer.

1.2 Applicable 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.

- FCC KDB 558074 D01 v05r02
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location Information	
Test Lab.：Sporton International Inc. Hsinchu Laboratory	
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085
	Test site Designation No. TW0006 with FCC.
	Test site registered number IC 4086D with Industry Canada.

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted	TH01-CB	Serway Li	23.5-24.1 / 56-59	Mar. 11, 2021
Radiated <For Below 1GHz>	03CH05-CB	Cola Fan	20.4~21.4 / 55~57	Mar. 17, 2021
Radiated <For Above 1GHz>	03CH06-CB	Cola Fan	20.2-21.3 / 56-58	Mar. 10, 2021
AC Conduction	CO01-CB	Wei Li	24~25 / 57~59	Mar. 18, 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)	2.0 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.8 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	5.0 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.9 dB	Confidence levels of 95%
Conducted Emission	2.8 dB	Confidence levels of 95%
Output Power Measurement	1.4 dB	Confidence levels of 95%
Power Density Measurement	2.8 dB	Confidence levels of 95%
Bandwidth Measurement	0.4%	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
BT-LE(2Mbps)	-
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
Operating Mode	Normal Link
1	AP Router: EUT + Adapter
2	AP Router: EUT + PoE
For operating mode 1 is the worst case and it was record in this test report.	

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	Normal Link
1	AP Router: EUT in Y axis + Adapter
2	AP Router: EUT in Z axis + Adapter
Mode 1 has been evaluated to be the worst case between Mode 1~2, thus measurement for Mode 3 will follow this same test mode.	
3	AP Router: EUT in Y axis + PoE
For operating mode 1 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	CTX
	The EUT was performed at Y axis and Z axis position. The worst case was found at Z axis, thus the measurement will follow this same test configuration.
1	EUT in Z axis

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
Operating Mode	
1	WLAN 2.4GHz + WLAN 5GHz + Bluetooth
Refer to Sporton Test Report No.: FA0O2913-08 for Co-location RF Exposure Evaluation.	

Note1: The console port can not be used by end-user. It is generally used for updating FW by professional installer.

Note2: The PoE below is for measurement only, would not be marketed.

The PoE information as below:

Support Unit	Brand	Model Number
PoE	Cambium Networks	P060V04

2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

Accessories			
Equipment Name	**Brand Name**	**Model Name**	**Rating**
Adapter	APD	WB-24J12R	Input: 100-240V~50-60Hz 0.7A Max. Output: 12.0V, 2.0A 24.0W
Others			
Plug*1			
Console cable*1: Non-Shieleded, 1.5m			
Wall-mounted*1			

2.5 Support Equipment

For AC Conduction:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	LAN NB	DELL	E6430	N/A
B	2.5G Uplink (POE) PC	DELL	T3400	N/A
C	2.4G NB	DELL	E6430	N/A
D	5G NB	DELL	E6430	N/A
E	Smart phone	Samsung	Galaxy J2	A3LSMJ200F
F	Flash disk3.0	Transcend	JetFlash-700	N/A

For Radiated (below 1GHz):

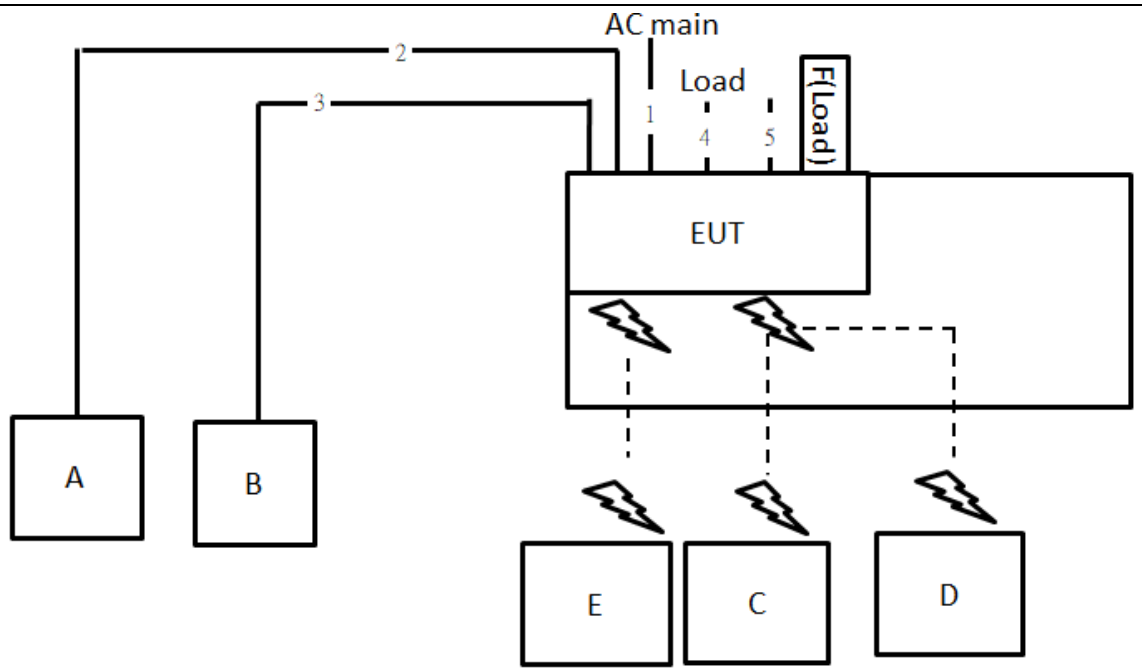
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	2.4G NB	DELL	E4300	N/A
B	5G NB	DELL	E4300	N/A
C	Smart phone	SamSung	Galaxy J2	A3LSMJ200F
D	Flash disk3.0	Silicon Power	B06	N/A
E	Uplink (POE) NB	DELL	E4300	N/A
F	LAN NB	DELL	E4300	N/A

For Radiated (above 1GHz) and RF Conducted:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	NB	DELL	E4300	N/A

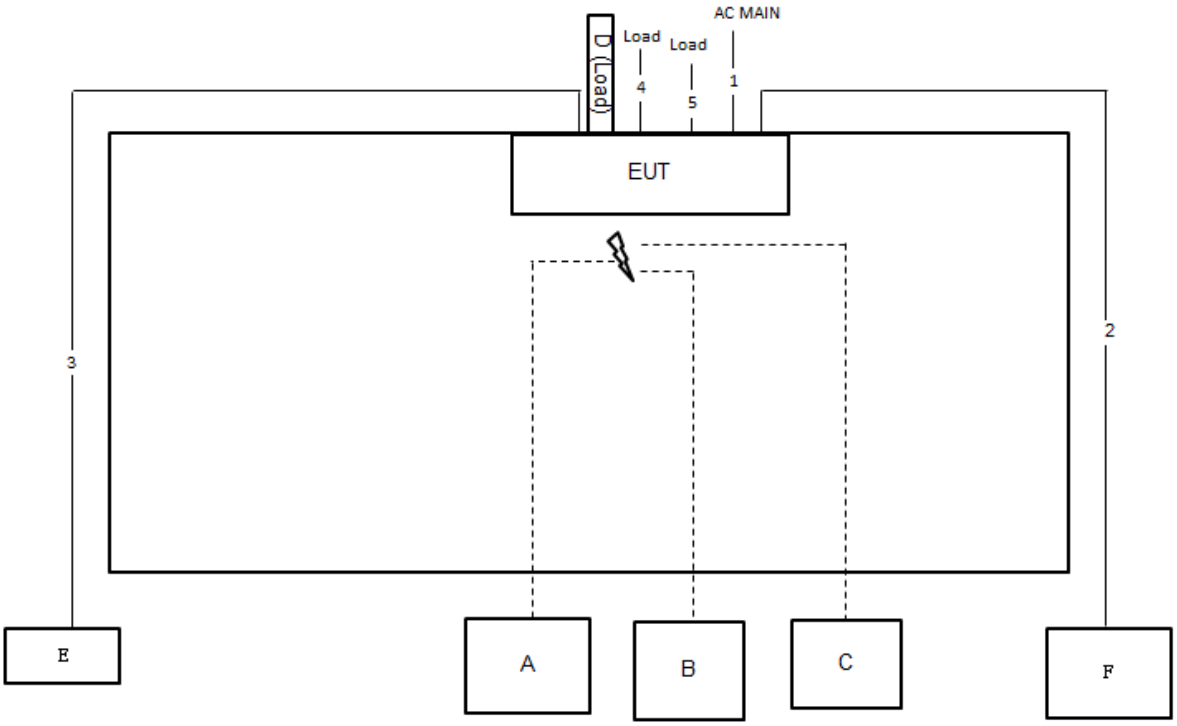
2.6 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



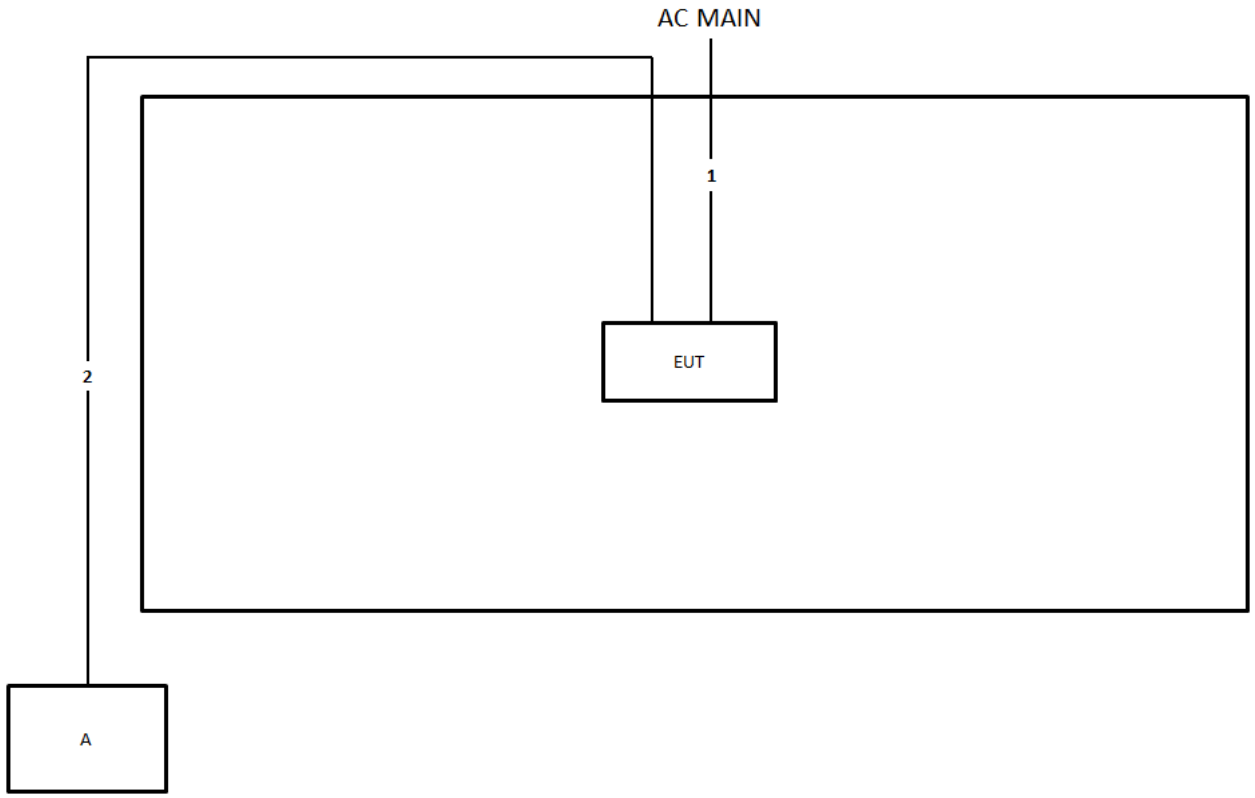
Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	1.5m
5	Console cable	No	1.5m

Test Setup Diagram - Radiated Test < 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	1.5m
5	Console cable	No	1.5m

Test Setup Diagram - Radiated Test > 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m

3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Measuring Instruments

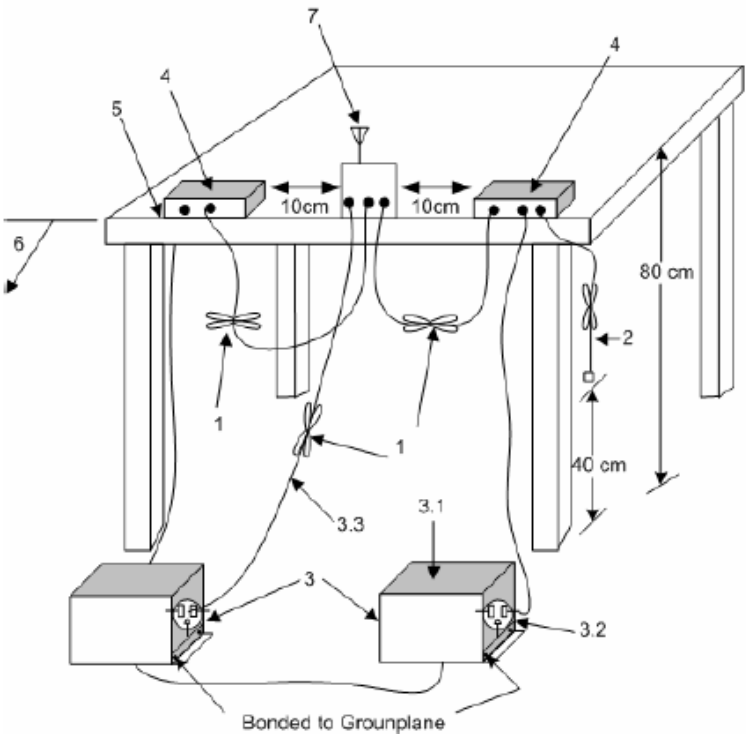
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

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

3.1.4 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 50 Ω 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.

1.1.1. Measurement Results Calculation

The measured Level is calculated using:

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

b. Margin = -Limit + Level

3.1.5 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

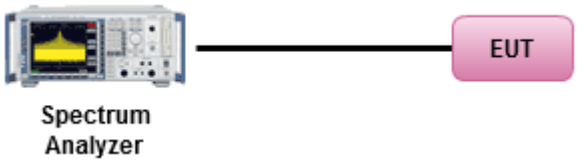
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method	
▪ For the emission bandwidth shall be measured using one of the options below:	
	☒ Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.1 Option 1 for 6 dB bandwidth measurement.
	☐ Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.2 Option 2 for 6 dB bandwidth measurement.
	☐ Refer as ANSI C63.10, clause 6.9.1 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
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 FCC KDB 558074, clause 8.3.1.1 & C63.10 clause 11.9.1.1 (RBW ≥ EBW method).
	☐ Refer as FCC KDB 558074, clause 8.3.1.3 & C63.10 clause 11.9.1.3 (peak power meter).
▪ Maximum Conducted Output Power	
	[duty cycle ≥ 98% or external video / power trigger]
	☐ Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1.
	☐ Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.3 Method AVGSA-1A. (alternative)
	duty cycle < 98% and average over on/off periods with duty factor
	☐ Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.4 Method AVGSA-2.
	☐ Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.5 Method AVGSA-2A (alternative)
	☐ Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.6 Method AVGSA-3
	☐ Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.7 Method AVGSA-3A (alternative)
	Measurement using a power meter (PM)
	☐ Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.1 Method AVGPM (using an RF average power meter).
	☒ Refer as FCC KDB 558074, clause 8.3.2.3 & C63.10 clause 11.9.2.3.2 Method AVGPM-G (using an gate RF average power meter).
▪ For conducted measurement.	
	▪ If the EUT supports multiple transmit chains using options given below: Refer as FCC 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

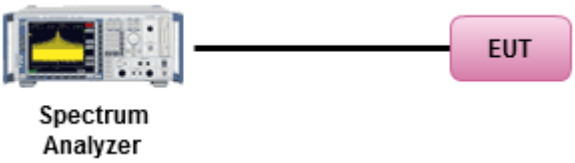
3.4.2 Measuring Instruments

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 FCC KDB 558074, clause 8.4 & C63.10 clause 11.10 Method Max. PSD.	
	[duty cycle ≥ 98% or external video / power trigger]	
▪ For conducted measurement.		
	▪ If The EUT supports multiple transmit chains using options given below:	
		☐ Option 1: Measure and sum the spectra across the outputs. Refer as FCC 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.
		☐ Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,
		☐ Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.

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 (dBc)**
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 PSD 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 PSD level.

3.5.2 Measuring Instruments

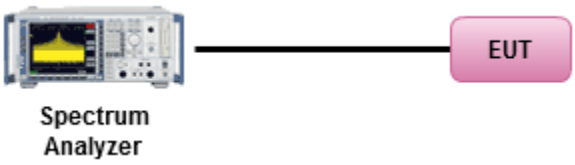
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method
▪ Refer as FCC KDB 558074, clause 8.5 for unwanted emissions into non-restricted 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.

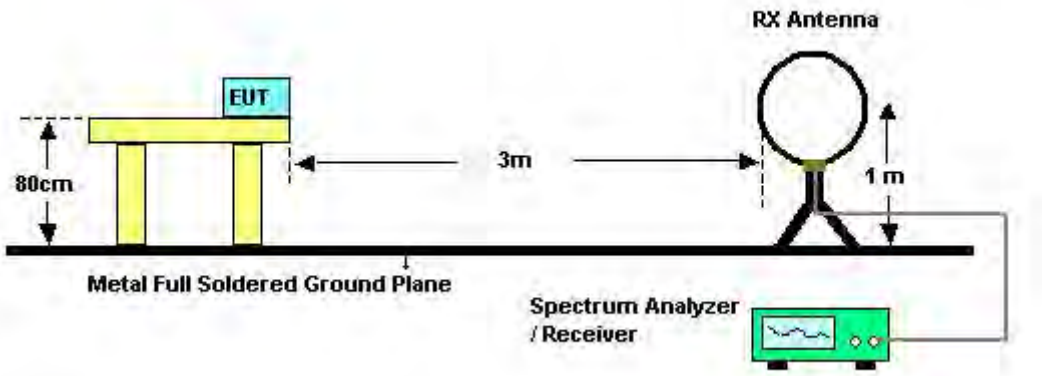
3.6.3 Test Procedures

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 FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands.		
		☐	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for duty cycle ≥98%).
		☐	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor).
		☒	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced VBW≥1/T).
		☐	Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
		☐	Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
		☒	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.4 measurement procedure peak limit.
▪ For the transmitter band-edge emissions shall be measured using following options below:			
	▪ Refer as FCC KDB 558074 clause 8.7 & c63.10 clause 11.13.1, 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 FCC KDB 558074, clause 8.7 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.		
	▪ Refer as FCC KDB 558074, clause 8.7 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).		
	▪ For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB		
	▪ For FCC KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.		

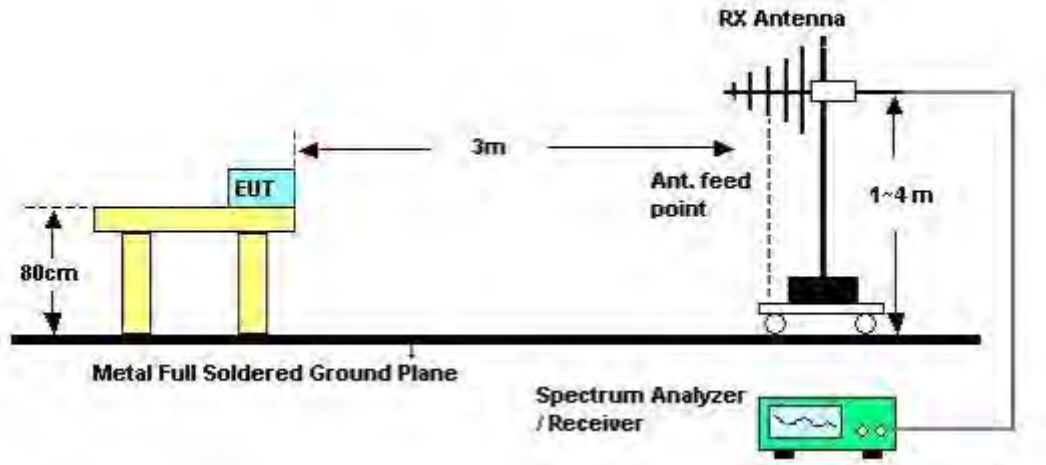
3.6.4 Test Setup

Emissions in Restricted Frequency Bands

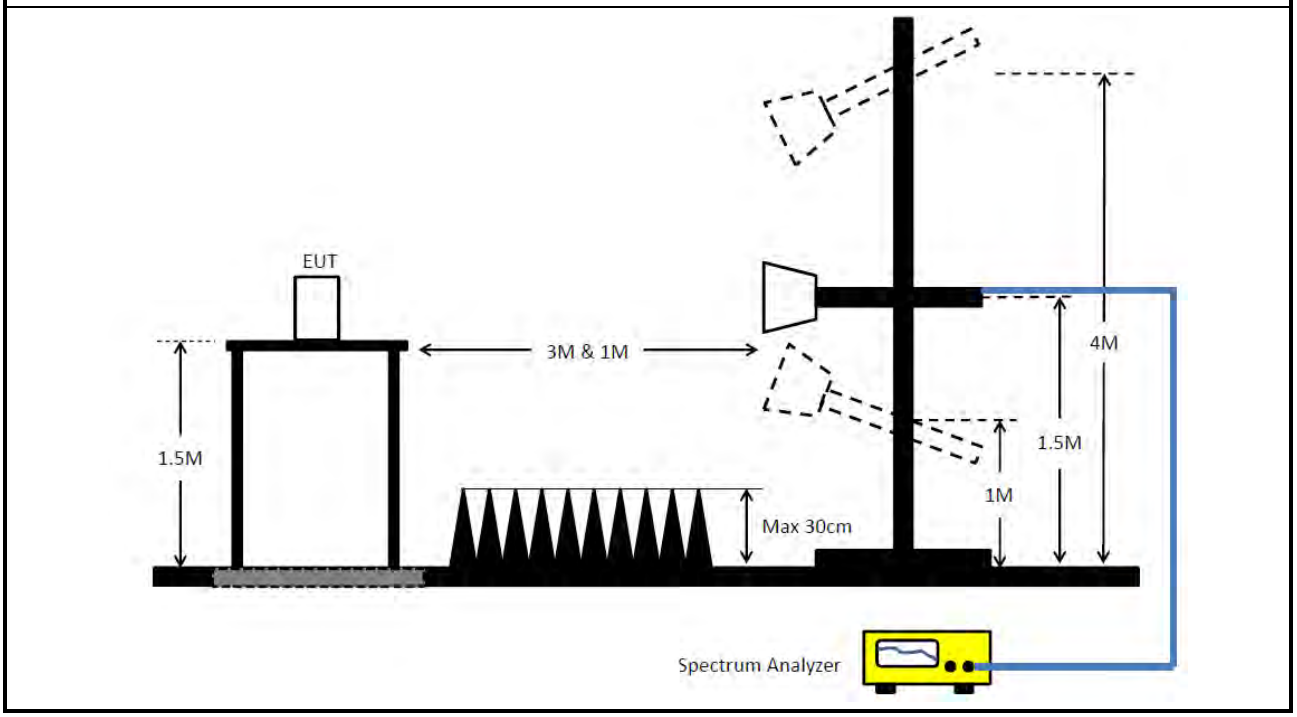
9kHz ~30MHz



30MHz~1GHz



Above 1GHz



3.6.5 Measurement Results Calculation

The measured Level is calculated using:
Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level.

3.6.6 Emissions in Restricted Frequency Bands (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.
The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10th harmonic or 40 GHz, whichever is appropriate.

3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Mar. 03, 2021	Mar. 02, 2022	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz~100MHz	Jan. 06, 2021	Jan. 05, 2022	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Nov. 20, 2020	Nov. 19, 2021	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Jan. 30, 2021	Jan. 29, 2022	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 20, 2020	May 19, 2021	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 13, 2020	Apr. 12, 2021	Radiation (03CH05-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 10, 2020	Aug. 09, 2021	Radiation (03CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 27, 2020	Mar. 26, 2021	Radiation (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 28, 2020	Apr. 27, 2021	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Nov. 10, 2020	Nov. 09, 2021	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 13, 2020	May 12, 2021	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH06-CB	1GHz ~18GHz 3m	Oct. 02, 2020	Oct. 01, 2021	Radiation (03CH06-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1292	1GHz~18GHz	Jul. 22, 2020	Jul. 21, 2021	Radiation (03CH06-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2020	Jul. 20, 2021	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	May 07, 2020	May 06, 2021	Radiation (03CH06-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 08, 2020	Jul. 07, 2021	Radiation (03CH06-CB
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Dec. 15, 2020	Dec. 14, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-05+24	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	May 05, 2020	May 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-30	1 GHz –26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH01-CB)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Feb. 23, 2021	Feb. 22, 2022	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Feb. 23, 2021	Feb. 22, 2022	Conducted (TH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH01-CB)

Note: Calibration Interval of instruments listed above is one year.

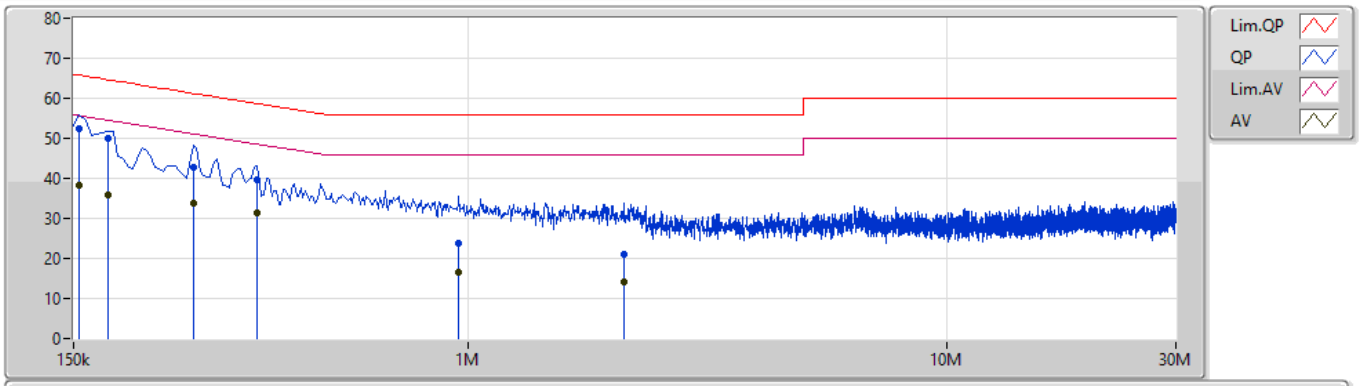
N.C.R. means Non-Calibration required.

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	QP	150k	57.34	66.00	-8.66	Neutral

Mode 1

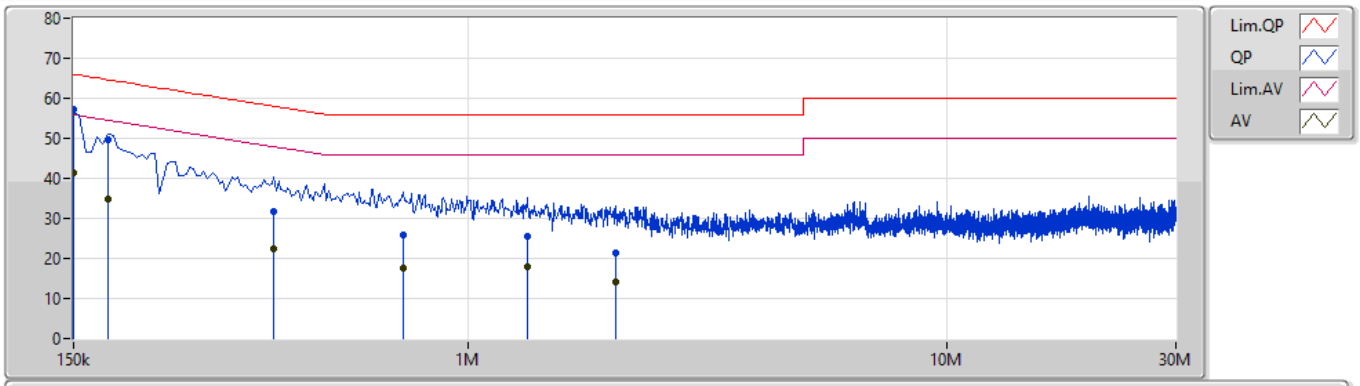
18/03/2021



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	154.5k	52.27	65.75	-13.48	9.88	Line	"Worst"	42.39	0.04	0.03	9.81
AV	154.5k	38.21	55.75	-17.54	9.88	Line	-	28.33	0.04	0.03	9.81
QP	177k	49.97	64.62	-14.65	9.88	Line	-	40.09	0.04	0.03	9.81
AV	177k	35.95	54.62	-18.67	9.88	Line	-	26.07	0.04	0.03	9.81
QP	267k	42.88	61.20	-18.32	9.88	Line	-	33.00	0.04	0.03	9.81
AV	267k	33.82	51.20	-17.38	9.88	Line	-	23.94	0.04	0.03	9.81
QP	361.5k	39.71	58.70	-18.99	9.89	Line	-	29.82	0.04	0.03	9.82
AV	361.5k	31.46	48.70	-17.24	9.89	Line	-	21.57	0.04	0.03	9.82
QP	955.5k	23.70	56.00	-32.30	9.93	Line	-	13.77	0.06	0.04	9.83
AV	955.5k	16.70	46.00	-29.30	9.93	Line	-	6.77	0.06	0.04	9.83
QP	2.117M	20.97	56.00	-35.03	9.98	Line	-	10.99	0.09	0.07	9.82
AV	2.117M	14.24	46.00	-31.76	9.98	Line	-	4.26	0.09	0.07	9.82

Mode 1

18/03/2021



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	150k	57.34	66.00	-8.66	9.87	Neutral	"Worst"	47.47	0.03	0.03	9.81
AV	150k	41.37	56.00	-14.63	9.87	Neutral	-	31.50	0.03	0.03	9.81
QP	177k	49.80	64.62	-14.82	9.87	Neutral	-	39.93	0.03	0.03	9.81
AV	177k	34.92	54.62	-19.70	9.87	Neutral	-	25.05	0.03	0.03	9.81
QP	393k	31.80	58.01	-26.21	9.88	Neutral	-	21.92	0.03	0.03	9.82
AV	393k	22.45	48.01	-25.56	9.88	Neutral	-	12.57	0.03	0.03	9.82
QP	730.5k	25.81	56.00	-30.19	9.91	Neutral	-	15.90	0.04	0.04	9.83
AV	730.5k	17.68	46.00	-28.32	9.91	Neutral	-	7.77	0.04	0.04	9.83
QP	1.329M	25.62	56.00	-30.38	9.94	Neutral	-	15.68	0.06	0.05	9.83
AV	1.329M	17.95	46.00	-28.05	9.94	Neutral	-	8.01	0.06	0.05	9.83
QP	2.027M	21.21	56.00	-34.79	9.96	Neutral	-	11.25	0.07	0.07	9.82
AV	2.027M	14.14	46.00	-31.86	9.96	Neutral	-	4.18	0.07	0.07	9.82

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(2Mbps)	1.168M	2.049M	2M05F1D	1.163M	2.036M

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

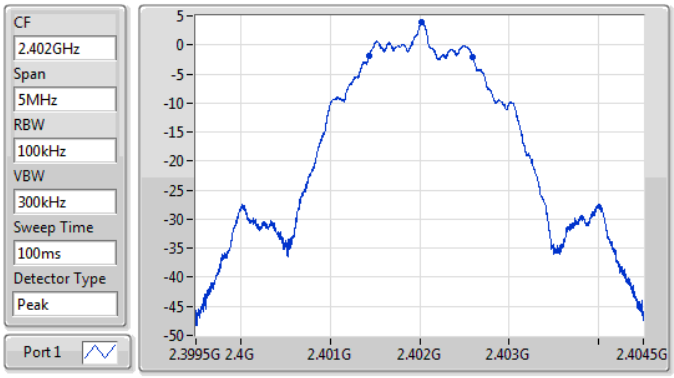
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	500k	1.165M	2.039M
2440MHz	Pass	500k	1.163M	2.036M
2480MHz	Pass	500k	1.168M	2.049M

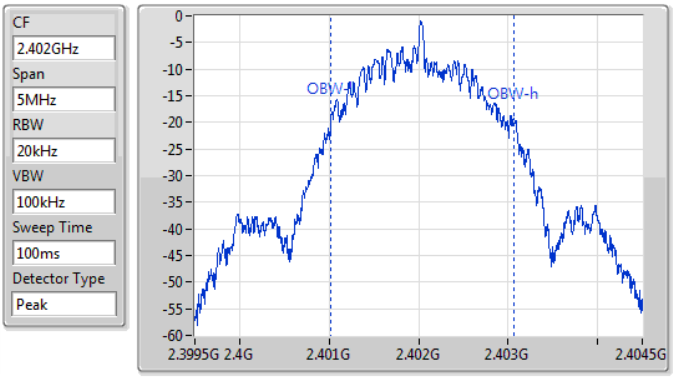
Port X-N dB = Port **X** 6dB down bandwidth; **Port X-OBW** = Port **X** 99% occupied bandwidth;

BT-LE(2Mbps) EBW

2402MHz

11/03/2021



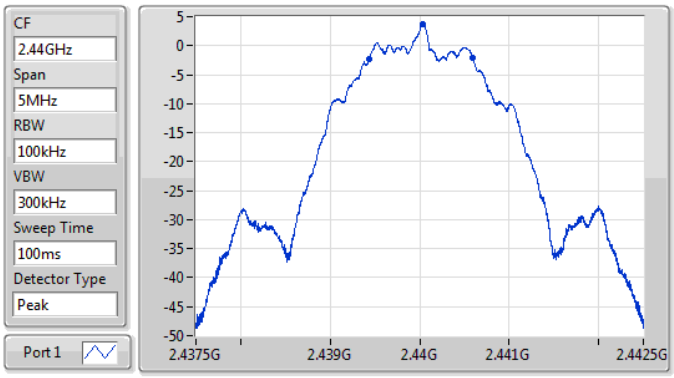


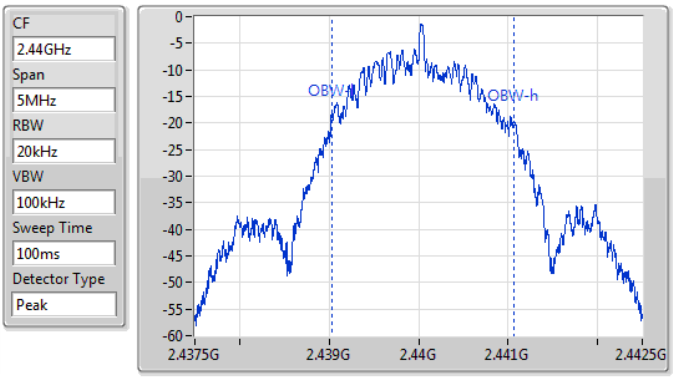
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.165M	2.40143G	2.402595G	2.039M	2.401023G	2.403062G	500k	1

BT-LE(2Mbps) EBW

2440MHz

11/03/2021



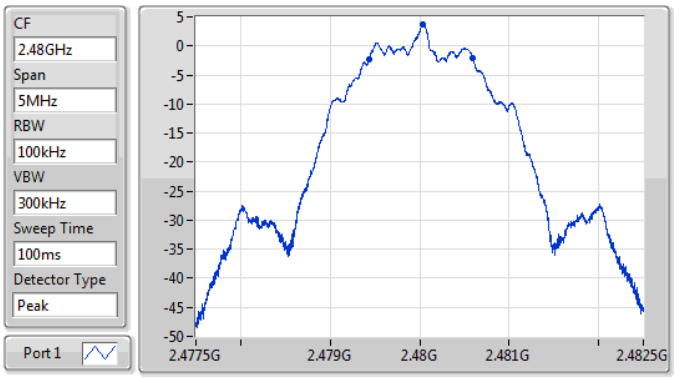


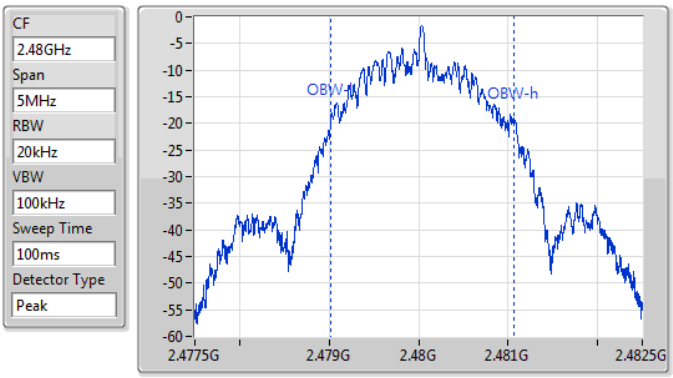
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.163M	2.439435G	2.440598G	2.036M	2.439025G	2.441062G	500k	1

BT-LE(2Mbps) **EBW**

2480MHz

11/03/2021





6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
1.168M	2.47943G	2.480598G	2.049M	2.47902G	2.481069G	500k	1

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(2Mbps)	3.75	0.00237

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	4.60	3.75	30.00
2440MHz	Pass	4.60	3.61	30.00
2480MHz	Pass	4.60	3.53	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(2Mbps)	-14.19

RBW=3 kHz.

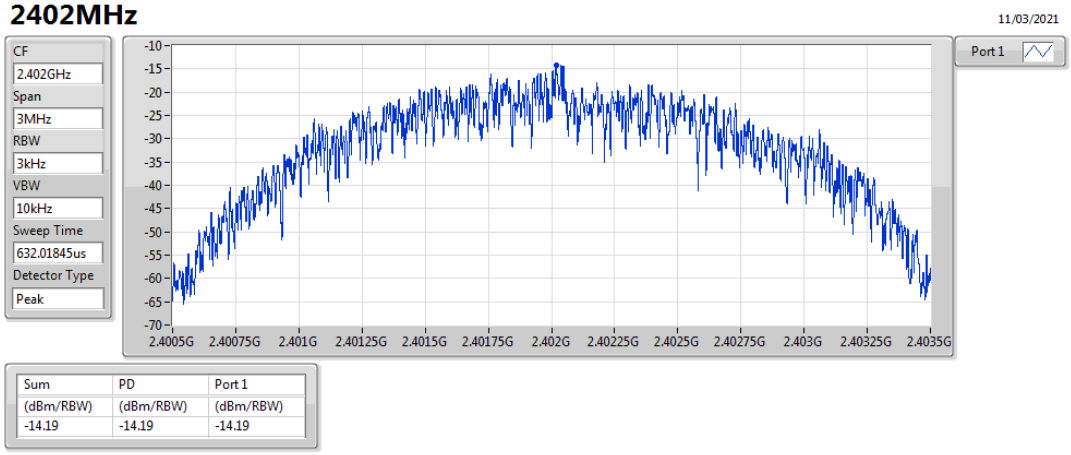
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	4.60	-14.19	8.00
2440MHz	Pass	4.60	-14.35	8.00
2480MHz	Pass	4.60	-14.33	8.00

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

BT-LE(2Mbps) **PSD**

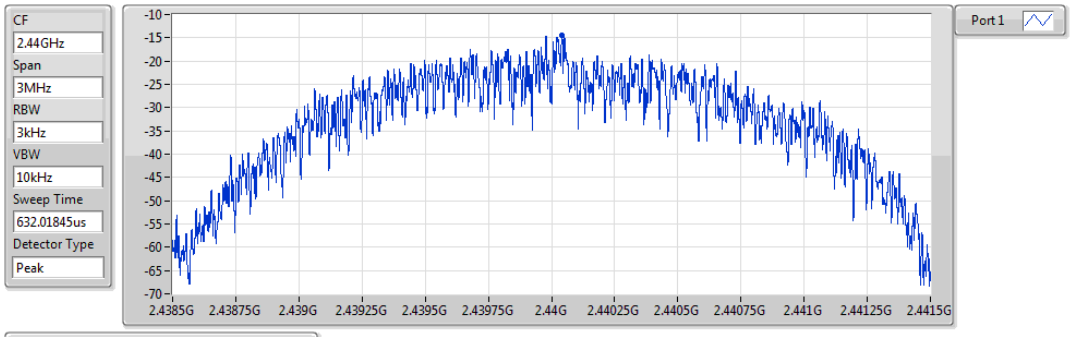
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-14.19	-14.19	-14.19

BT-LE(2Mbps) **PSD**

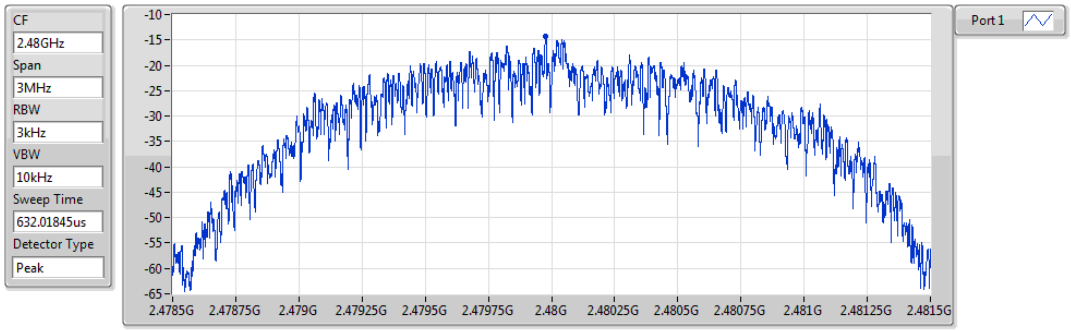
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-14.35	-14.35	-14.35

BT-LE(2Mbps) **PSD**

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-14.33	-14.33	-14.33

Summary

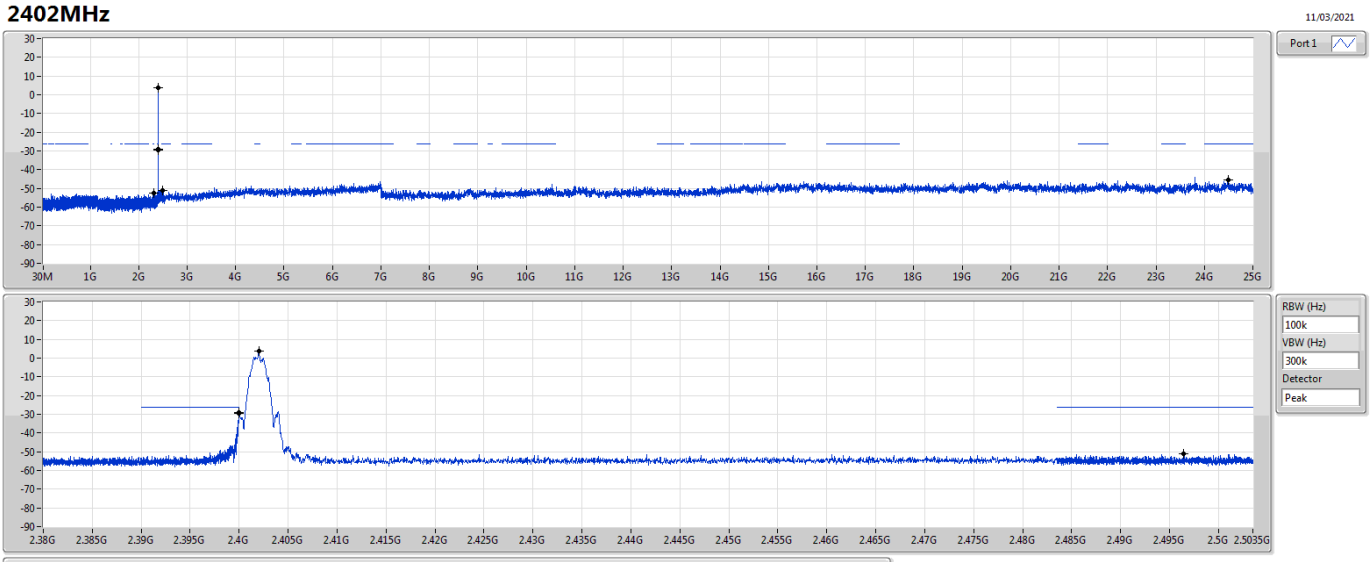
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(2Mbps)	Pass	2.402G	3.87	-26.13	2.30304G	-52.68	2.4G	-29.38	2.4G	-29.01	2.4964G	-51.32	24.49102G	-45.31	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(2Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.402G	3.87	-26.13	2.30304G	-52.68	2.4G	-29.38	2.4G	-29.01	2.4964G	-51.32	24.49102G	-45.31	1
2440MHz	Pass	2.402G	3.87	-26.13	685.94M	-52.71	2.39326G	-52.20	2.4G	-54.15	2.49853G	-50.69	15.18871G	-46.35	1
2480MHz	Pass	2.402G	3.87	-26.13	813.43M	-52.54	2.39271G	-52.42	2.4835G	-53.87	2.48389G	-49.62	21.8055G	-45.14	1

BT-LE(2Mbps) **CSE NdB**

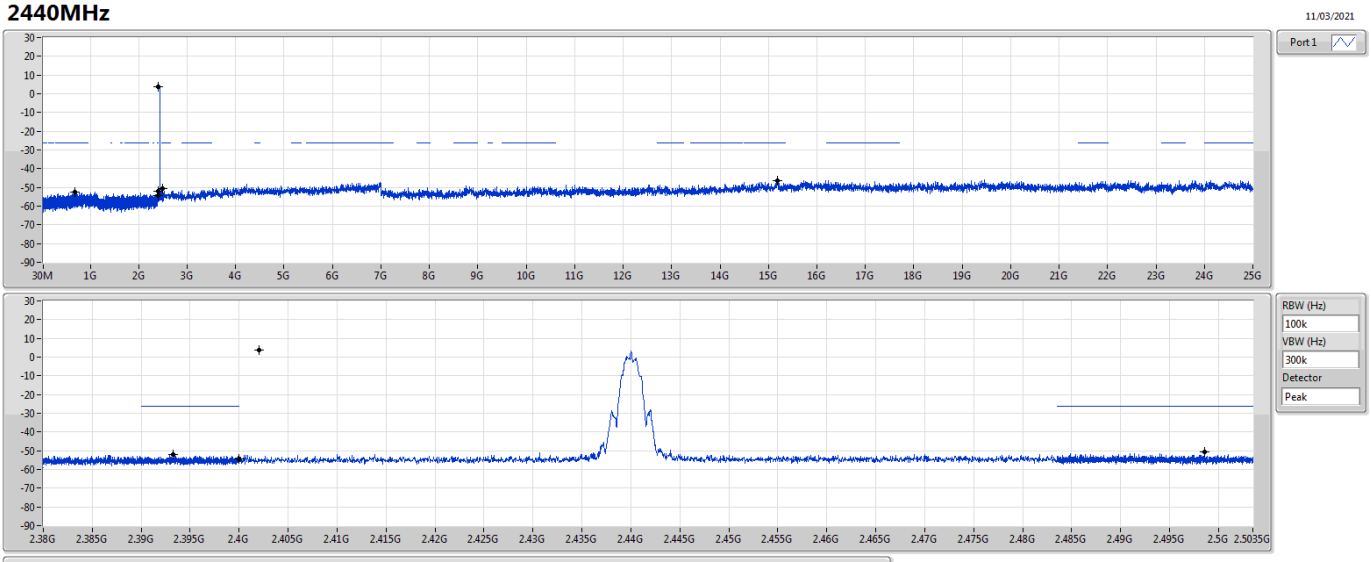
2402MHz



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
2.402G	3.87	-26.13	2.30304G	-52.68	2.4G	-29.38	2.4G	-29.01	2.4964G	-51.32	24.49102G	-45.31	1

BT-LE(2Mbps) **CSE NdB**

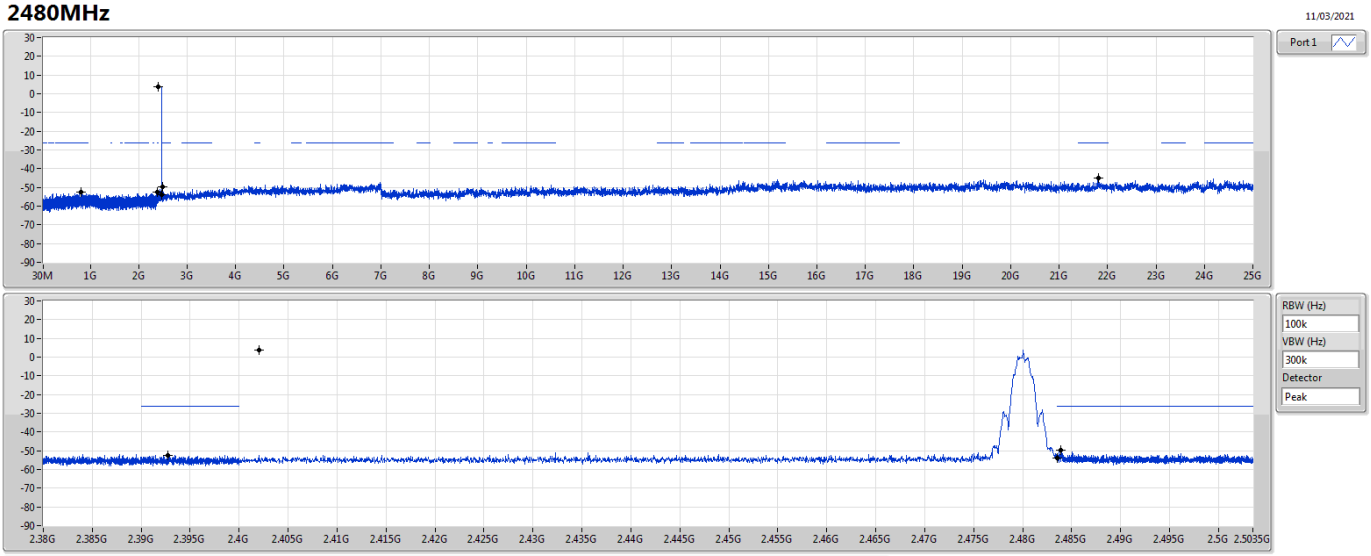
2440MHz



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
2.402G	3.87	-26.13	685.94M	-52.71	2.39326G	-52.20	2.4G	-54.15	2.49853G	-50.69	15.18871G	-46.35	1

BT-LE(2Mbps) **CSE NdB**

2480MHz



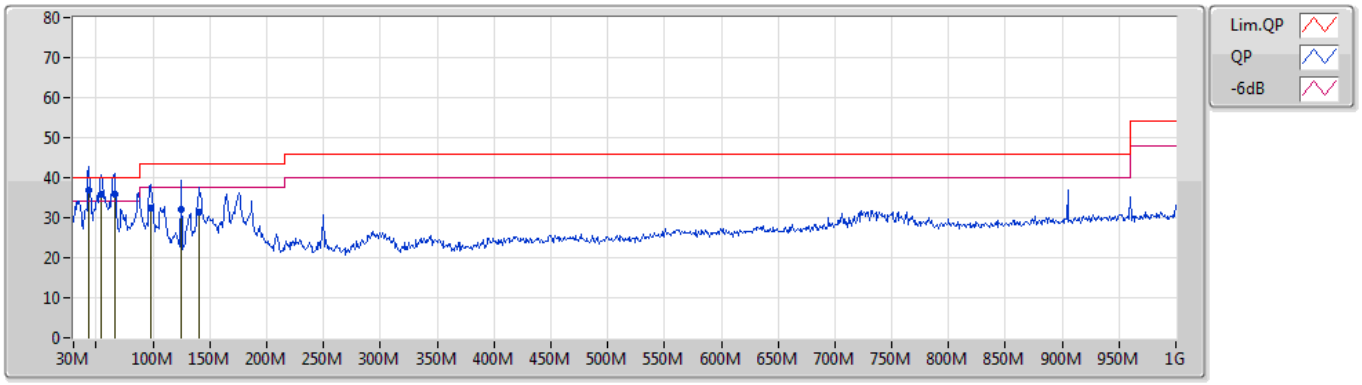
Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.402G	3.87	-26.13	813.43M	-52.54	2.39271G	-52.42	2.4835G	-53.87	2.48389G	-49.62	21.8055G	-45.14	1

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	QP	43.58M	36.94	40.00	-3.06	Vertical

Mode 1

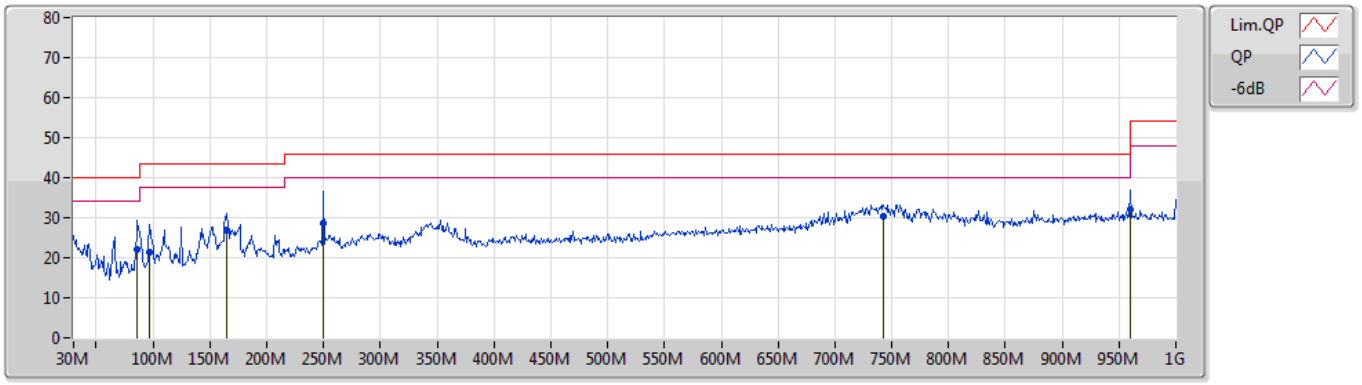
17/03/2021



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/m)	(dB/m)	(dB)	(dB)
QP	43.58M	36.94	40.00	-3.06	-13.67	3	Vertical	165	1.00	"Worst"	50.61	17.19	0.60	31.46
QP	54.25M	35.77	40.00	-4.23	-17.77	3	Vertical	260	1.00	-	53.54	13.28	0.68	31.73
QP	65.89M	36.02	40.00	-3.98	-18.49	3	Vertical	200	1.00	-	54.51	12.52	0.80	31.81
QP	97.9M	32.33	43.50	-11.17	-14.40	3	Vertical	165	1.50	-	46.73	16.39	1.10	31.89
QP	125.06M	32.17	43.50	-11.33	-12.41	3	Vertical	183	1.00	-	44.58	18.06	1.30	31.77
QP	140.58M	31.44	43.50	-12.06	-13.64	3	Vertical	209	1.00	-	45.08	17.07	1.30	32.01

Mode 1

17/03/2021



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/m)	(dB/m)	(dB)	(dB)
QP	86.26M	22.21	40.00	-17.79	-16.89	3	Horizontal	150	2.00	-	39.10	13.91	1.00	31.80
QP	96.93M	21.27	43.50	-22.23	-14.59	3	Horizontal	176	2.00	-	35.86	16.20	1.10	31.89
QP	164.83M	26.93	43.50	-16.57	-14.61	3	Horizontal	62	1.50	-	41.54	15.72	1.42	31.75
QP	250.19M	28.69	46.00	-17.31	-12.28	3	Horizontal	246	1.50	-	40.97	17.77	1.90	31.95
QP	742.95M	30.20	46.00	-15.80	-3.73	3	Horizontal	57	1.50	"Worst"	33.93	24.99	3.59	32.31
QP	960M	32.00	54.00	-22.00	-1.43	3	Horizontal	260	1.00	-	33.43	26.36	4.32	32.11

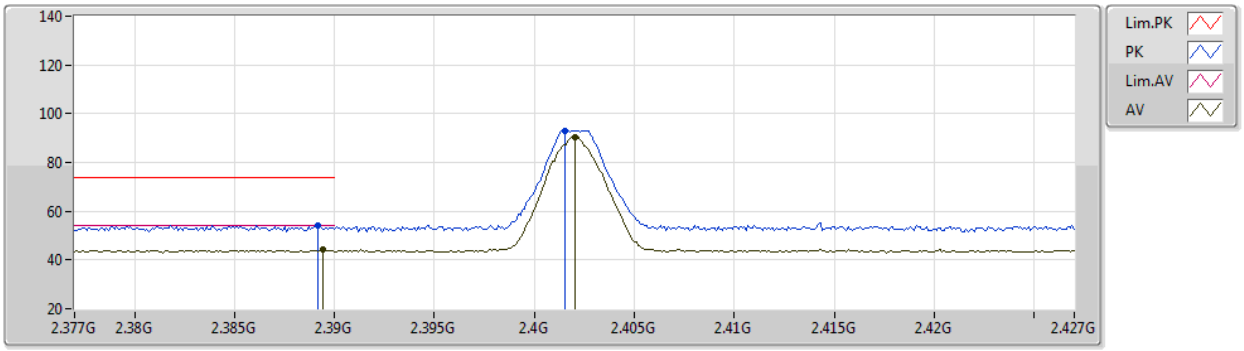
Summary

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(2Mbps)	Pass	AV	2.4835G	49.90	54.00	-4.10	3	Horizontal	263	1.40	-

BT-LE(2Mbps)

2402MHz_TX

10/03/2021



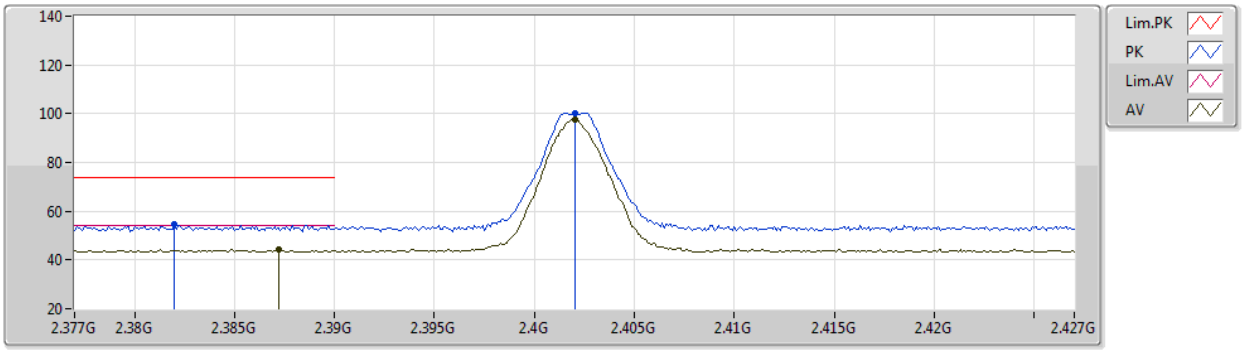
EUT Z_1TX
Setting Default
06-E-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.3892G	54.21	74.00	-19.79	23.53	3	Vertical	16	2.76	-	27.60	3.08	-
AV	2.3894G	44.27	54.00	-9.73	13.59	3	Vertical	16	2.76	-	27.60	3.08	-
PK	2.4015G	93.17	Inf	-Inf	62.48	3	Vertical	16	2.76	-	27.59	3.10	-
AV	2.402G	90.22	Inf	-Inf	59.53	3	Vertical	16	2.76	-	27.59	3.10	-

BT-LE(2Mbps)

2402MHz_TX

10/03/2021



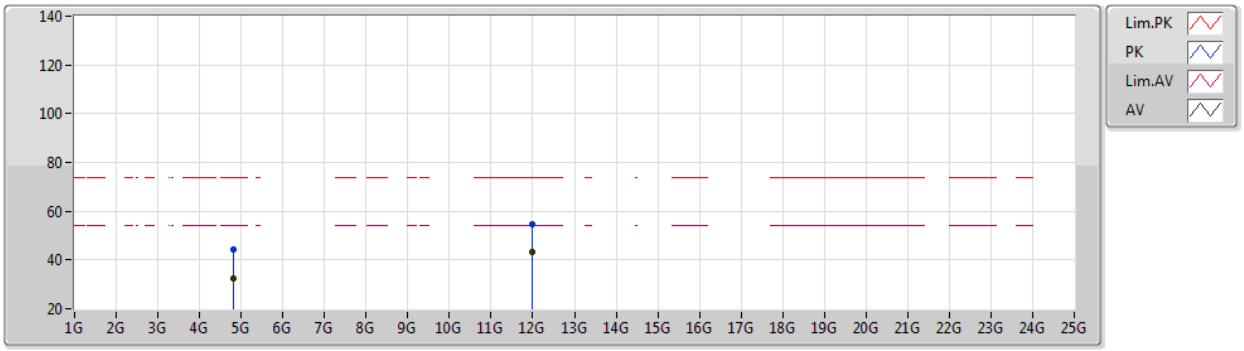
EUT Z_1TX
Setting Default
06-E-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.382G	54.52	74.00	-19.48	23.86	3	Horizontal	243	1.00	-	27.60	3.06	-
AV	2.3872G	44.37	54.00	-9.63	13.70	3	Horizontal	243	1.00	-	27.60	3.07	-
PK	2.402G	100.22	Inf	-Inf	69.53	3	Horizontal	243	1.00	-	27.59	3.10	-
AV	2.402G	97.46	Inf	-Inf	66.77	3	Horizontal	243	1.00	-	27.59	3.10	-

BT-LE(2Mbps)

2402MHz_TX

10/03/2021



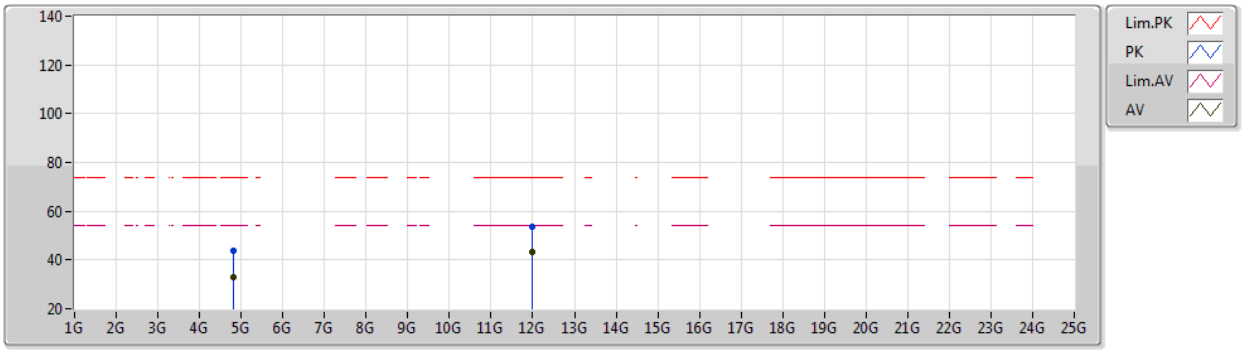
EUT Z_1TX
Setting Default
06-E-C-4

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.8092G	44.27	74.00	-29.73	39.99	3	Vertical	69	2.72	-	31.04	5.00	31.76
AV	4.8012G	32.66	54.00	-21.34	28.43	3	Vertical	69	2.72	-	31.00	5.00	31.77
PK	11.9784G	54.67	74.00	-19.33	41.49	3	Vertical	36	1.81	-	38.86	8.49	34.17
AV	11.9732G	43.38	54.00	-10.62	30.21	3	Vertical	36	1.81	-	38.85	8.49	34.17

BT-LE(2Mbps)

2402MHz_TX

10/03/2021



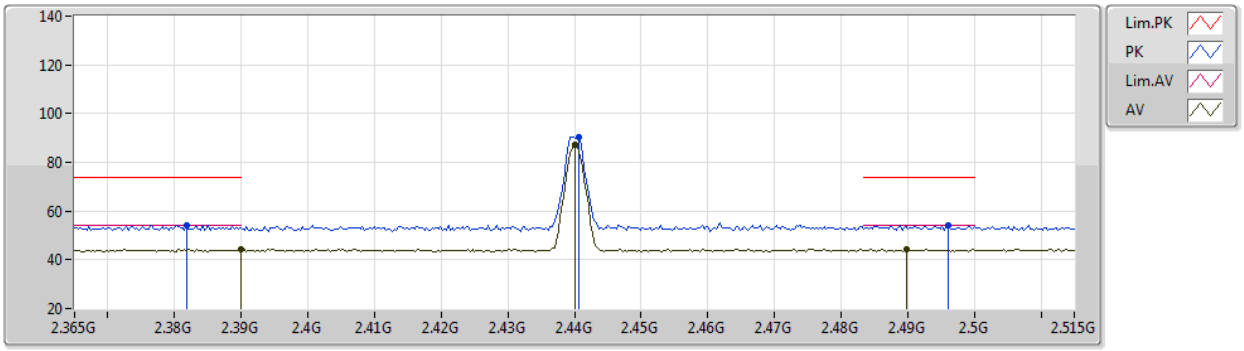
EUT Z_1TX
Setting Default
06-E-C-4

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.8032G	43.94	74.00	-30.06	39.70	3	Horizontal	219	1.92	-	31.01	5.00	31.77
AV	4.8024G	32.75	54.00	-21.25	28.51	3	Horizontal	219	1.92	-	31.01	5.00	31.77
PK	11.974G	53.71	74.00	-20.29	40.54	3	Horizontal	23	2.89	-	38.85	8.49	34.17
AV	11.9768G	43.13	54.00	-10.87	29.96	3	Horizontal	23	2.89	-	38.85	8.49	34.17

BT-LE(2Mbps)

2440MHz_TX

10/03/2021



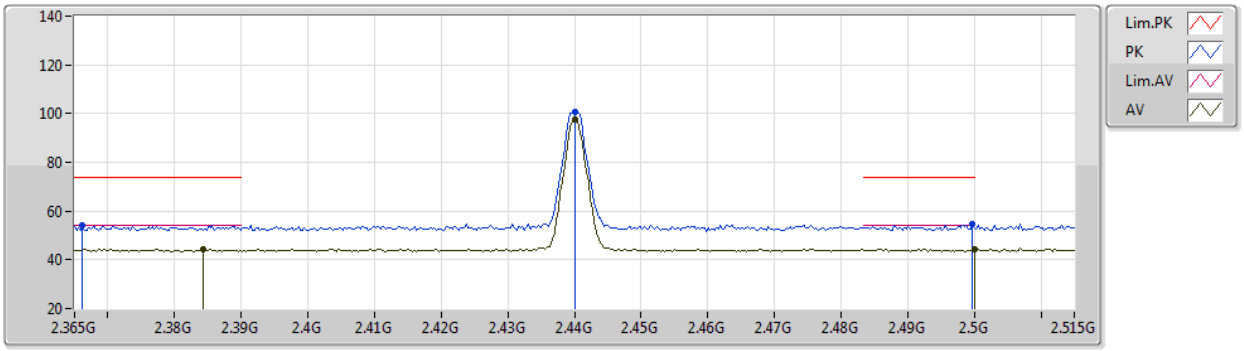
EUT Z_1TX
Setting Default
06-E-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.3818G	54.37	74.00	-19.63	23.71	3	Vertical	297	1.13	-	27.60	3.06	-
AV	2.3899G	44.37	54.00	-9.63	13.69	3	Vertical	297	1.13	-	27.60	3.08	-
PK	2.4406G	90.34	Inf	-Inf	59.76	3	Vertical	297	1.13	-	27.44	3.14	-
AV	2.44G	87.46	Inf	-Inf	56.88	3	Vertical	297	1.13	-	27.44	3.14	-
PK	2.4961G	54.39	74.00	-19.61	23.79	3	Vertical	297	1.13	-	27.40	3.20	-
AV	2.4898G	44.23	54.00	-9.77	13.64	3	Vertical	297	1.13	-	27.40	3.19	-

BT-LE(2Mbps)

2440MHz_TX

10/03/2021



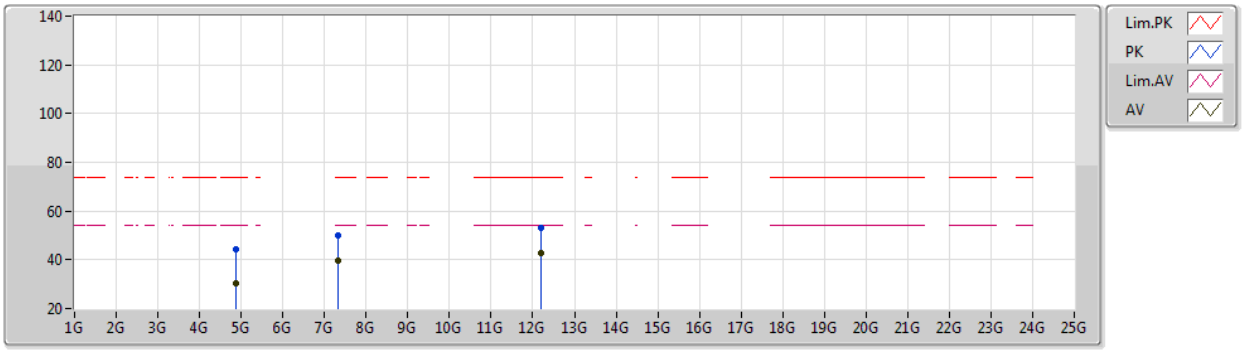
EUT Z_1TX
Setting Default
06-E-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.3662G	54.28	74.00	-19.72	23.65	3	Horizontal	240	1.00	-	27.60	3.03	-
AV	2.3842G	44.33	54.00	-9.67	13.66	3	Horizontal	240	1.00	-	27.60	3.07	-
PK	2.44G	100.46	Inf	-Inf	69.88	3	Horizontal	240	1.00	-	27.44	3.14	-
AV	2.44G	97.59	Inf	-Inf	67.01	3	Horizontal	240	1.00	-	27.44	3.14	-
PK	2.4997G	54.49	74.00	-19.51	23.89	3	Horizontal	240	1.00	-	27.40	3.20	-
AV	2.5G	44.38	54.00	-9.62	13.78	3	Horizontal	240	1.00	-	27.40	3.20	-

BT-LE(2Mbps)

2440MHz_TX

10/03/2021



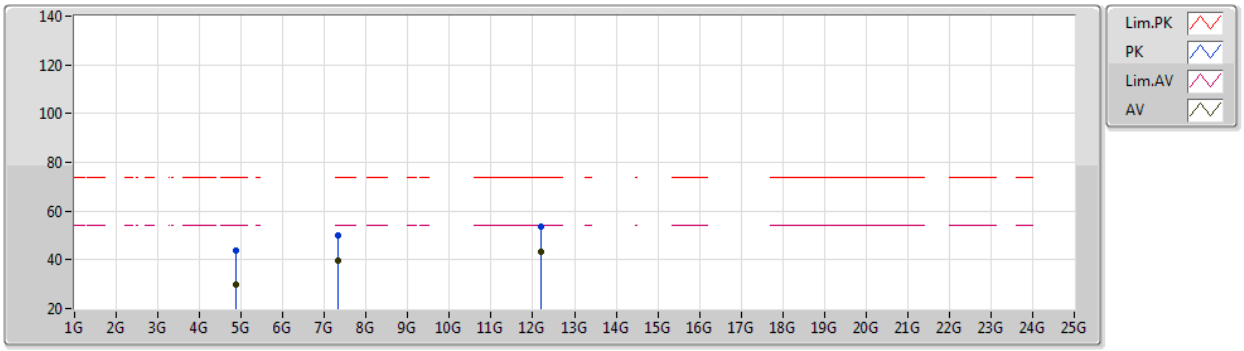
EUT Z_1TX
Setting Default
06-E-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.88147G	44.35	74.00	-29.65	39.88	3	Vertical	184	1.19	-	31.14	5.00	31.67
AV	4.87901G	30.11	54.00	-23.89	25.65	3	Vertical	184	1.19	-	31.14	5.00	31.68
PK	7.32224G	50.10	74.00	-23.90	40.85	3	Vertical	163	1.80	-	36.31	6.10	33.16
AV	7.32089G	39.90	54.00	-14.10	30.64	3	Vertical	163	1.80	-	36.32	6.10	33.16
PK	12.19999G	52.98	74.00	-21.02	39.55	3	Vertical	114	1.91	-	38.90	8.61	34.08
AV	12.19947G	42.78	54.00	-11.22	29.35	3	Vertical	114	1.91	-	38.90	8.61	34.08

BT-LE(2Mbps)

2440MHz_TX

10/03/2021



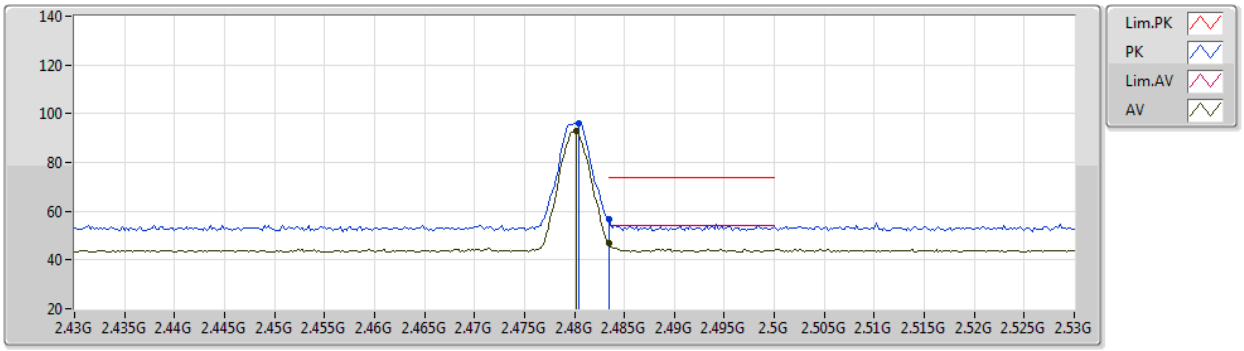
EUT Z_1TX
Setting Default
06-E-S-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.87769G	43.86	74.00	-30.14	39.40	3	Horizontal	195	1.80	-	31.14	5.00	31.68
AV	4.88162G	29.87	54.00	-24.13	25.40	3	Horizontal	195	1.80	-	31.14	5.00	31.67
PK	7.31867G	50.03	74.00	-23.97	40.76	3	Horizontal	322	2.50	-	36.33	6.10	33.16
AV	7.31995G	39.80	54.00	-14.20	30.54	3	Horizontal	322	2.50	-	36.32	6.10	33.16
PK	12.20075G	53.57	74.00	-20.43	40.14	3	Horizontal	182	2.98	-	38.90	8.61	34.08
AV	12.19951G	43.33	54.00	-10.67	29.90	3	Horizontal	182	2.98	-	38.90	8.61	34.08

BT-LE(2Mbps)

2480MHz_TX

10/03/2021



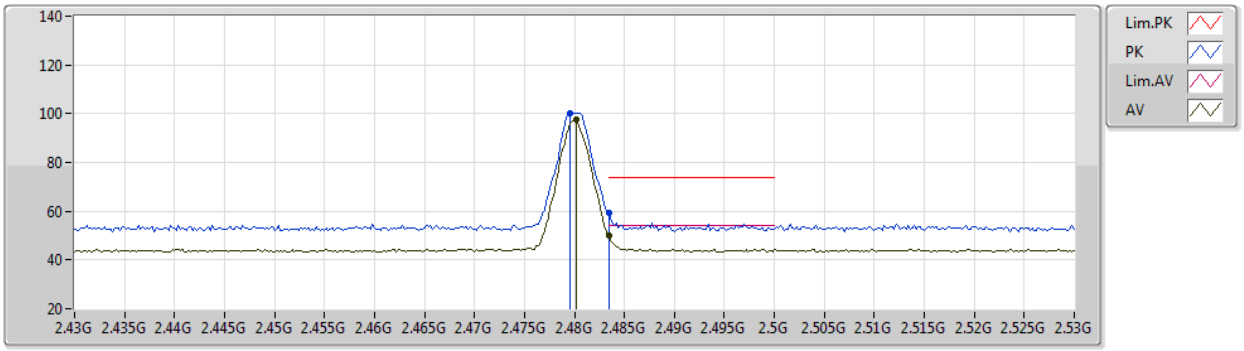
EUT Z_1TX
Setting Default
06-E-C-4

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.4804G	95.91	Inf	-Inf	65.33	3	Vertical	13	2.90	-	27.40	3.18	-
AV	2.4802G	92.94	Inf	-Inf	62.36	3	Vertical	13	2.90	-	27.40	3.18	-
PK	2.4835G	56.90	74.00	-17.10	26.32	3	Vertical	13	2.90	-	27.40	3.18	-
AV	2.4835G	46.79	54.00	-7.21	16.21	3	Vertical	13	2.90	-	27.40	3.18	-

BT-LE(2Mbps)

2480MHz_TX

10/03/2021



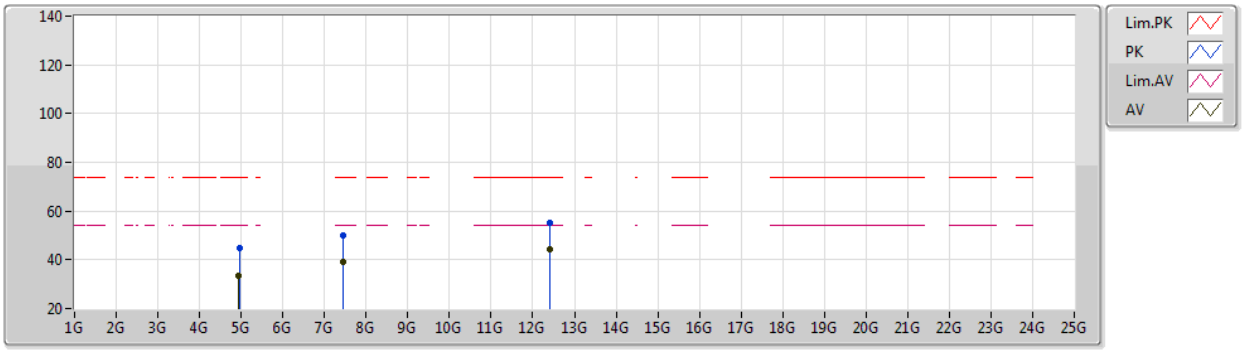
EUT Z_1TX
Setting Default
06-E-C-4

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	2.4796G	100.36	Inf	-Inf	69.78	3	Horizontal	263	1.40	-	27.40	3.18	-
AV	2.4802G	97.52	Inf	-Inf	66.94	3	Horizontal	263	1.40	-	27.40	3.18	-
PK	2.4835G	59.51	74.00	-14.49	28.93	3	Horizontal	263	1.40	-	27.40	3.18	-
AV	2.4835G	49.90	54.00	-4.10	19.32	3	Horizontal	263	1.40	-	27.40	3.18	-

BT-LE(2Mbps)

2480MHz_TX

10/03/2021



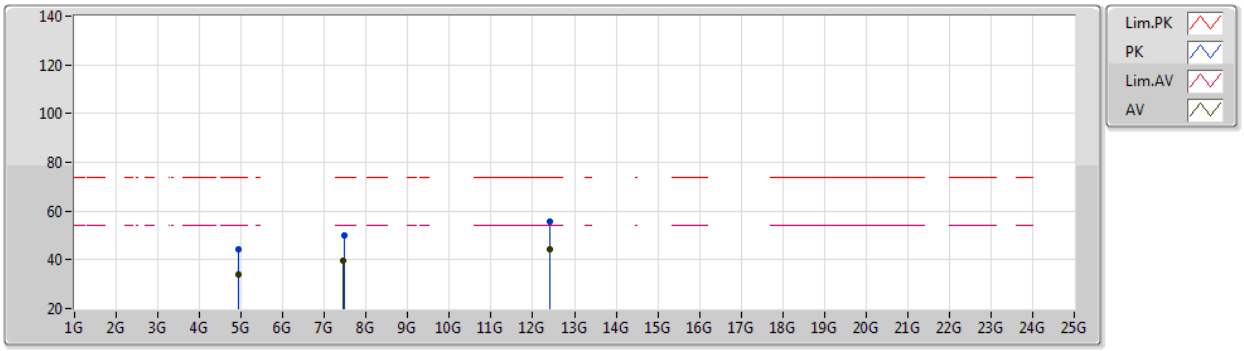
EUT Z_1TX
Setting Default
06-E-C-4

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.9538G	44.76	74.00	-29.24	40.03	3	Vertical	82	2.21	-	31.32	5.00	31.59
AV	4.9406G	33.32	54.00	-20.68	28.66	3	Vertical	82	2.21	-	31.26	5.00	31.60
PK	7.4412G	49.88	74.00	-24.12	40.62	3	Vertical	175	2.69	-	36.36	6.12	33.22
AV	7.4446G	39.19	54.00	-14.81	29.91	3	Vertical	175	2.69	-	36.38	6.12	33.22
PK	12.4088G	55.15	74.00	-18.85	41.91	3	Vertical	320	1.54	-	38.50	8.72	33.98
AV	12.4076G	44.23	54.00	-9.77	30.99	3	Vertical	320	1.54	-	38.50	8.72	33.98

BT-LE(2Mbps)

2480MHz_TX

10/03/2021



EUT Z_1TX
Setting Default
06-E-C-4

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	4.9474G	44.24	74.00	-29.76	39.54	3	Horizontal	79	2.34	-	31.29	5.00	31.59
AV	4.943G	34.04	54.00	-19.96	29.37	3	Horizontal	79	2.34	-	31.27	5.00	31.60
PK	7.4644G	50.12	74.00	-23.88	40.79	3	Horizontal	65	1.51	-	36.43	6.13	33.23
AV	7.4592G	39.75	54.00	-14.25	30.43	3	Horizontal	65	1.51	-	36.42	6.13	33.23
PK	12.40118G	55.73	74.00	-18.27	42.50	3	Horizontal	215	2.13	-	38.50	8.72	33.99
AV	12.40111G	44.17	54.00	-9.83	30.94	3	Horizontal	215	2.13	-	38.50	8.72	33.99