Testing Laboratory 1190

FCC RADIO TEST REPORT

FCC ID	:	MSQ-RTAXJG00
Equipment	:	AX5400 Dual Band WiFi Router
Brand Name	:	ASUS
Model Name	:	ZenWiFi XD6/ASUS ZenWiFi XD6/RT-AX5400/XD6 (Refer to section 1.1.6 for detail information)
Applicant	:	ASUSTeK COMPUTER INC. 1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan
Manufacturer (1)	:	Datamax Electronics (DongGuan) Co., Ltd. Niu Shan Foreign Economic Industrial Park, Dong Cheng District, Dong Guan City, Guang Dong, China
Manufacturer (2)	:	Lukisen Electronic Corp. 3F.,No.236,Boai St., Shulin Dist.,New Taipei City 23845, Taiwan
Manufacturer (3)	:	Lih Rong Electronic Enterprise Co.,Ltd. No. 486, Sec. 1, Wanshou Road, Guishan District, Taoyuan City, Taiwan
Standard	:	47 CFR FCC Part 15.247

The product was received on Dec. 09, 2020, and testing was started from Dec. 22, 2021 and completed on Feb. 05, 2021. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications 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. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

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History of this test report

Report No.	Version	Description	Issued Date
FR0D0706AC	01	Initial issue of report	Feb. 09, 2021

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.247(a)	DTS Bandwidth	PASS	-
3.3	15.247(b)	Maximum Conducted Output Power	PASS	-
3.4	15.247(e)	Power Spectral Density	PASS	-
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	-
3.6	15.247(d)	Emissions in Restricted Frequency Bands	PASS	-

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

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(1Mbps)	1	1

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

1.1.2 Antenna Information

Set	Ant.	2.4GHz Port	5GHz Port	Bluetooth	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	2	-	-	M.gear	C660-510545-A (SRF20201842)	PCB Antenna	I-PEX	Note 1
	2	-	2	-	M.gear	C660-510545-A (SRF20201842)	Dipole Antenna	I-PEX	
	3	-	4	-	M.gear	C660-510545-A (SRF20201842)	Dipole Antenna	I-PEX	
	4	1	-	-	M.gear	C660-510545-A (SRF20201842)	PCB Antenna	I-PEX	
	5	-	3	-	M.gear	C660-510545-A (SRF20201842)	Dipole Antenna	I-PEX	
	6	-	1	-	M.gear	C660-510545-A (SRF20201842)	Dipole Antenna	I-PEX	
2	1	2	-	-	PSA	RFPCA351314 IMAB702	PCB Antenna	I-PEX	
	2	-	2	-	PSA	RFPCA351314 IMAB702	Dipole Antenna	I-PEX	
	3	-	4	-	PSA	RFPCA351314I MAB702	Dipole Antenna	I-PEX	
	4	1	-	-	PSA	RFPCA351314I MAB702	PCB Antenna	I-PEX	
	5	-	3	-	PSA	RFPCA351314I MAB702	Dipole Antenna	I-PEX	
	6	-	1	-	PSA	RFPCA351314I MAB702	Dipole Antenna	I-PEX	
3	1	-	-	1	YAGEO	ANT3216A063R 2400A	Chip Antenna	N/A	

Note 1:

Set	Ant.	Gain (dBi)															
		2.4GHz			5GHz Band 1			5GHz Band 2			5GHz Band 3			5GHz Band 4			Bluetooth
		CDD	DG (Nss1)	DG (Nss2)	CDD	DG (Nss1)	DG (Nss2)	CDD	DG (Nss1)	DG (Nss2)	CDD	DG (Nss1)	DG (Nss2)	CDD	DG (Nss1)	DG (Nss2)	
1	1~6	1.21	4.16	-	1.21	6.96	4.14	1.39	7.19	4.37	0.99	6.75	3.93	1.24	7.00	4.25	-
2	1~6	1.21	4.16	-	1.21	6.96	4.14	1.39	7.19	4.37	0.99	6.75	3.93	1.24	7.00	4.25	-
3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.69

Note 2: The above information was declared by manufacturer.

Note 3: The EUT has two set of antenna and each set has six antennas for WLAN. There are the same type, so only the set 1 antenna was selected to test and record in this report.

For 2.4GHz function:

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:

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

Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

For Bluetooth Function (1TX/1RX):

Only Port 1 can be used as transmitting/receiving antenna.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-LE(1Mbps)	0.659	1.81	412.5u	3k

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

1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter			
Function	☒	Point-to-multipoint	☐	Point-to-point
Test Software Version	Mtool_v3.2.1.1			
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.

1.1.5 Table for EUT supports functions

Function	Support Type
AP Router	Master
Bridge	Slave without radar detection
Repeater	Master
Mesh	Master

1.1.6 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	Description
ZenWiFi XD6	All the models are identical, the different model names served as marketing strategy.
ASUS ZenWiFi XD6	
RT-AX5400	
XD6	

Note 1: From the above models, model: XD6 was selected as representative model for the test and its data was recorded in this report.

Note 2: 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			
☐	HWA YA	ADD :	No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)
		TEL :	886-3-327-3456 FAX : 886-3-327-0973
☒	JHUBEI	ADD :	No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302, Taiwan (R.O.C.)
		TEL :	886-3-656-9065 FAX : 886-3-656-9085

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted	TH01-CB	Owen Hsu	23.4~24.4 / 59~63	Jan. 05, 2021 ~ Jan. 28, 2021
Radiated below 1GHz	03CH05-CB	KJ Chang	21.5~22.5 / 54~57	Feb. 05, 2021
Radiated above 1GHz	03CH06-CB	KJ Chang	20.4~21.4 / 55~57	Dec. 22, 2020 ~ Feb. 03, 2021
AC Conduction	CO01-CB	Zack Kuo	20~21 / 47~48	Jan .08, 2021 ~ Feb. 01, 2021

Test site Designation No. TW0006 with FCC.
Test site registered number IC 4086D with Industry Canada.

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(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
Operating Mode	CTX
1	EUT_WLAN 2.4GHz + Adapter 1
2	EUT_WLAN 2.4GHz + Adapter 2
Mode 1 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3~4 will follow this same test mode.	
3	EUT_WLAN 5GHz + Adapter 1
4	EUT_Bluetooth + Adapter 1
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	CTX
1	EUT_WLAN 2.4GHz + Adapter 1
2	EUT_WLAN 2.4GHz + Adapter 2
Mode 1 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3~4 will follow this same test mode.	
3	EUT_WLAN 5GHz + Adapter 1
4	EUT_Bluetooth + Adapter 1
For operating mode 1 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	CTX
1	EUT_Bluetooth

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.: FA0D0706 for Co-location RF Exposure Evaluation.	

2.3 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

2.4 Accessories

Accessories			
Equipment Name	**Brand Name**	**Model Name**	**Rating**
Adapter 1	LEI	MU24D1120200-A1	INPUT: 100-240V ~ 50/60Hz, 0.7A OUTPUT: 12V, 2A
Adapter 2	DVE	DSA-24PFS-12 FUS 120200	INPUT: 100-240V ~ 50/60Hz, 0.8A OUTPUT: 12.0V, 2.0A, 24.0W
Others			
RJ-45 cable 1: Non-shielded, 2m			
Wall-mounted rack*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

For Radiated (below 1GHz):

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
D	PC	DELL	T3400	N/A

For Radiated (above 1GHz):

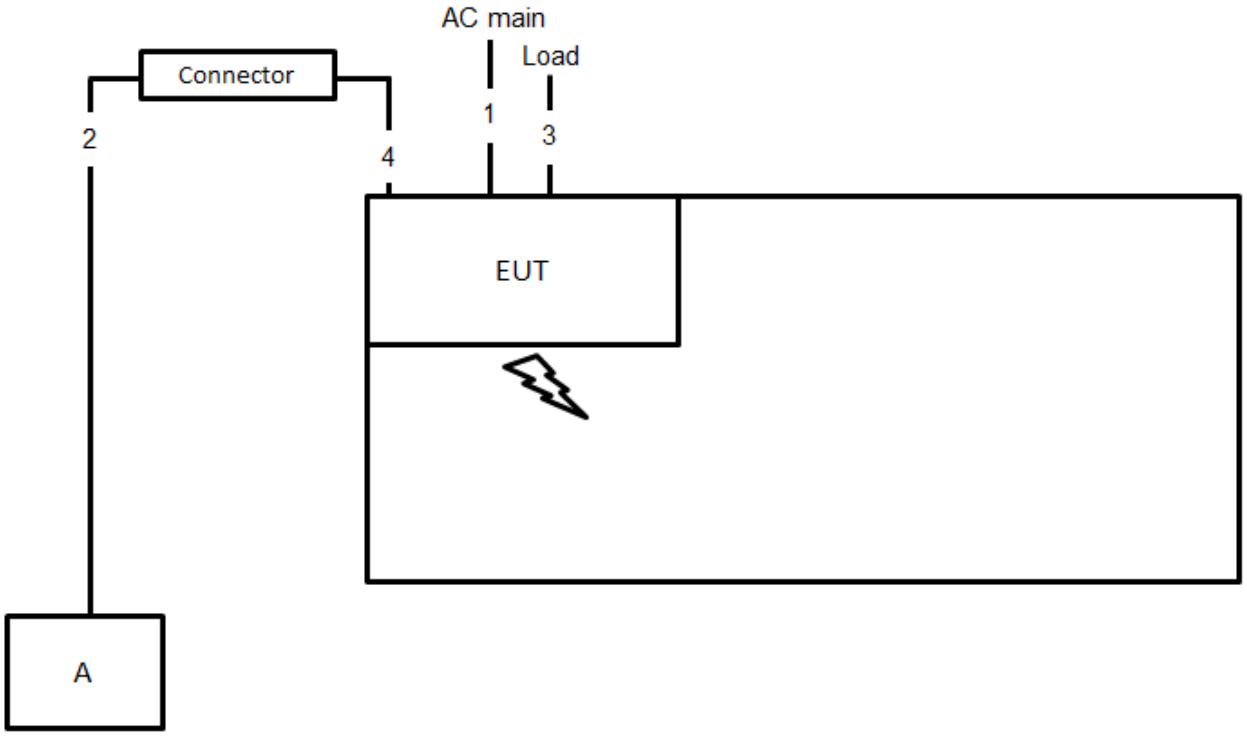
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	NB	DELL	E4300	N/A

For RF Conducted:

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

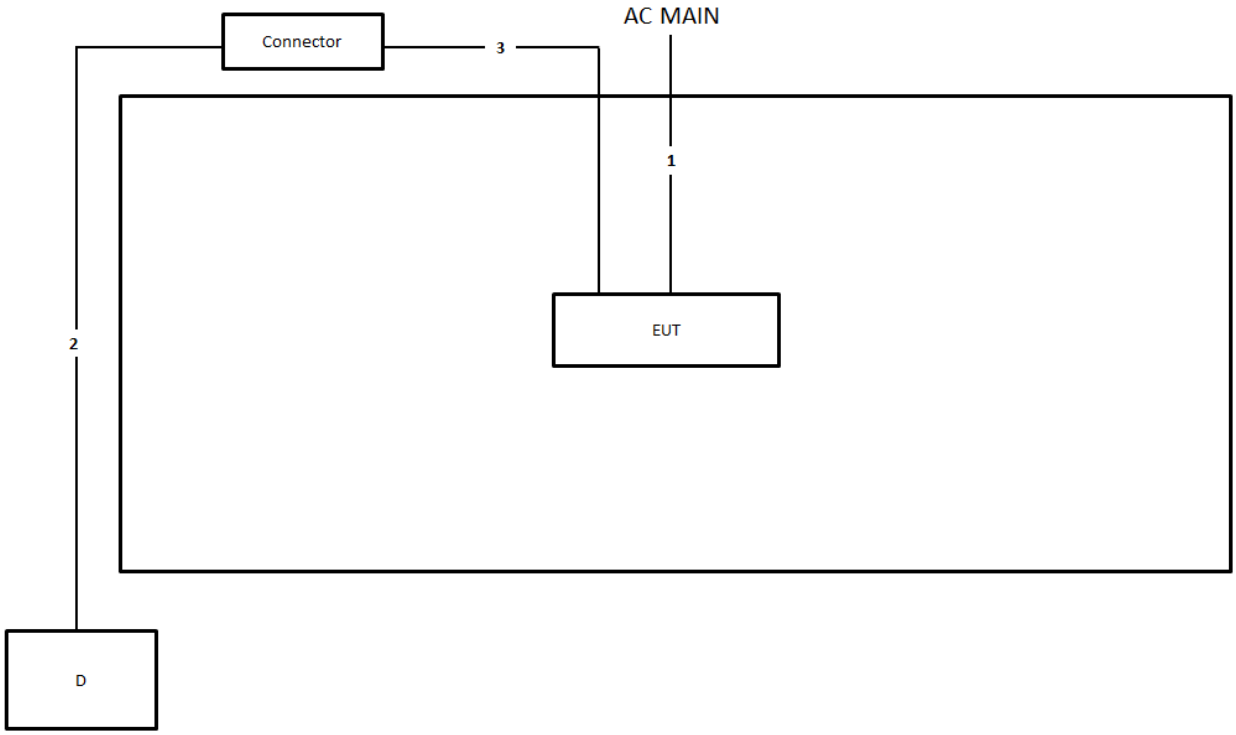
2.6 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



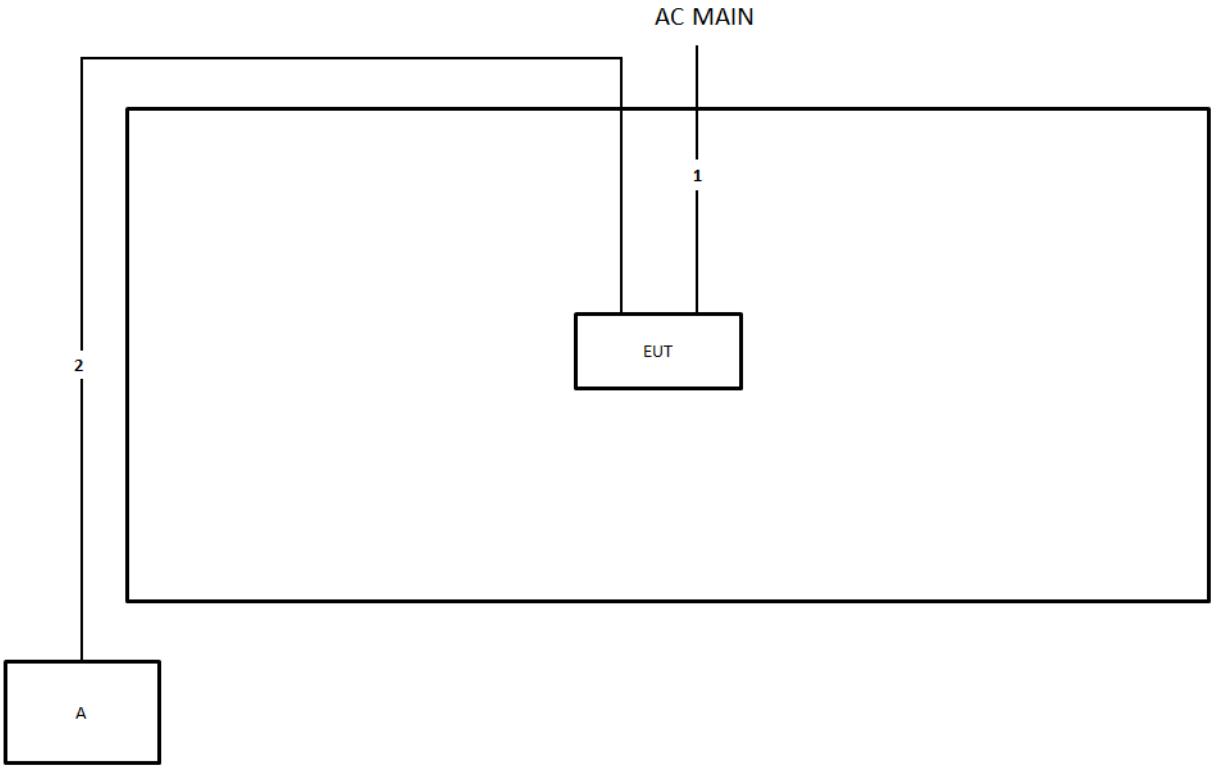
Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m
3	RJ-45 cable*3	No	1.5m
4	RJ-45 cable	No	2m

Test Setup Diagram - Radiated Test < 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	2m

Test Setup Diagram - Radiated Test > 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.8m
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

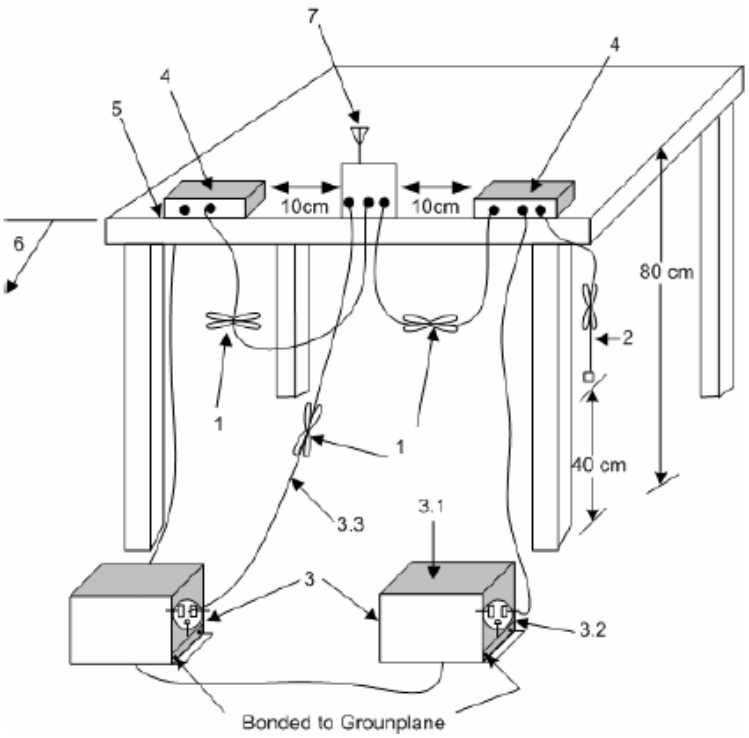
Refer a test equipment and calibration data table in this test report.

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.

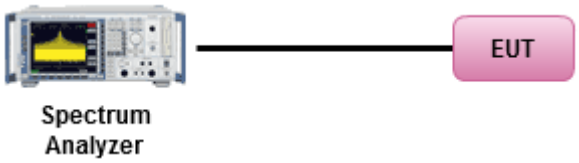
3.2.2 Measuring Instruments

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

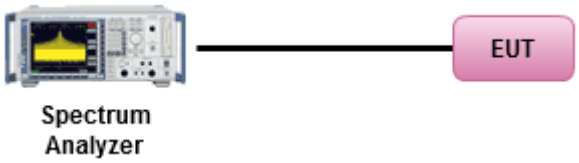
3.4.2 Measuring Instruments

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.	

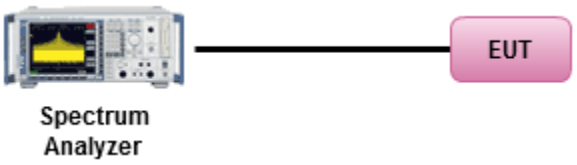
3.5.2 Measuring Instruments

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.

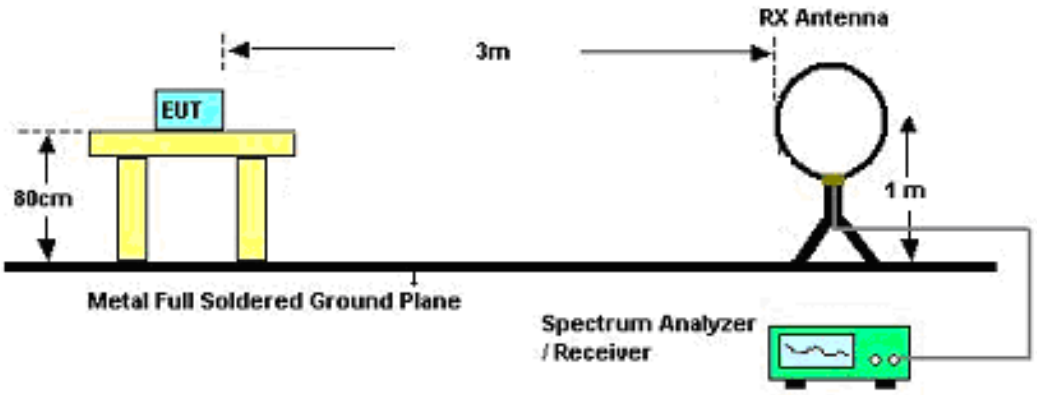
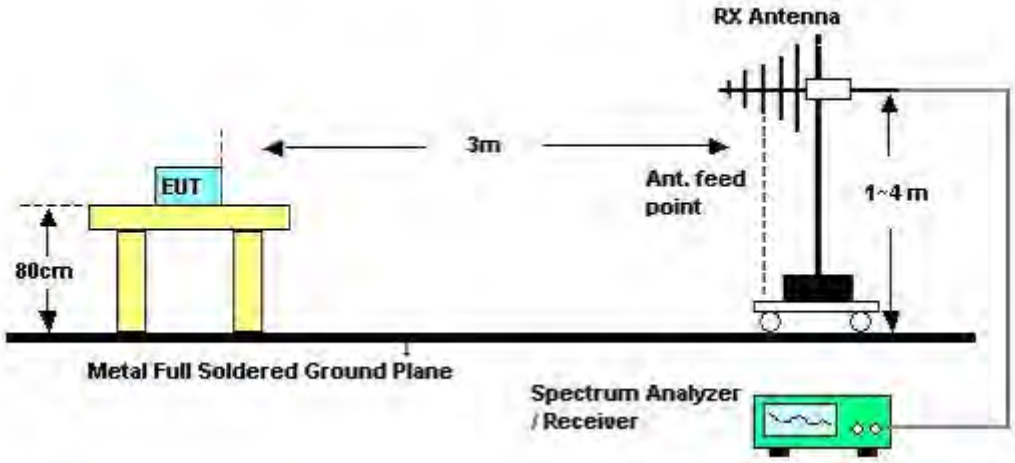
3.6.2 Measuring Instruments

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

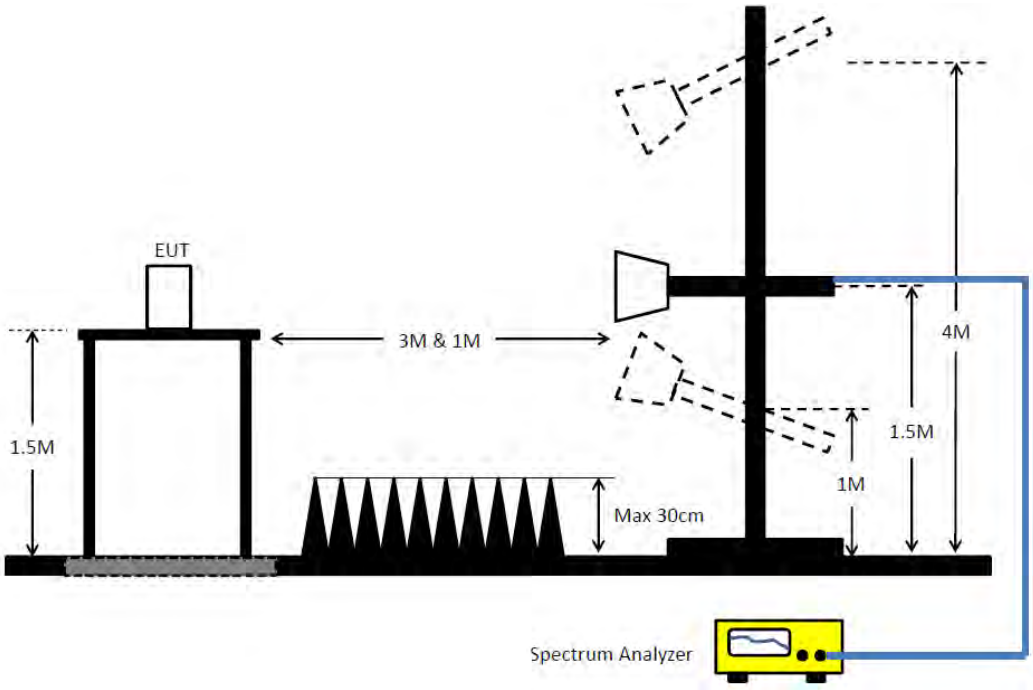
3.6.3 Test Procedures

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	Feb. 26, 2020	Feb. 25, 2021	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	8127647	9kHz ~ 30MHz	Feb. 25, 2020	Feb. 24, 2021	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Jan. 31, 2020	Jan. 30, 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)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 10, 2020	Aug. 09, 2021	Radiation (03CH05-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 13, 2020	Apr. 12, 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)

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-05	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
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. 07, 2020	Feb. 06, 2021	Conducted (TH01-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Feb. 07, 2020	Feb. 06, 2021	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.

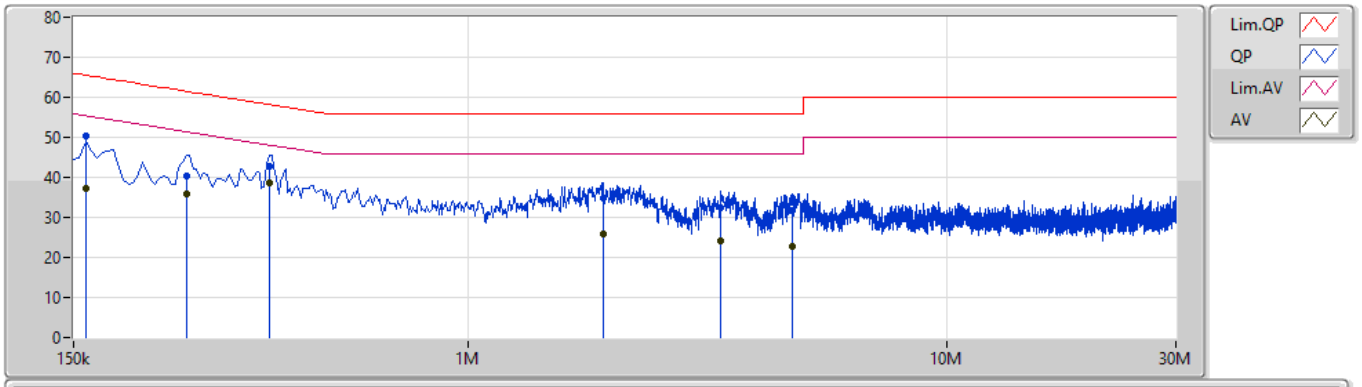
N.C.R. means Non-Calibration required.

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	384k	39.06	48.20	-9.14	Neutral

Mode 1

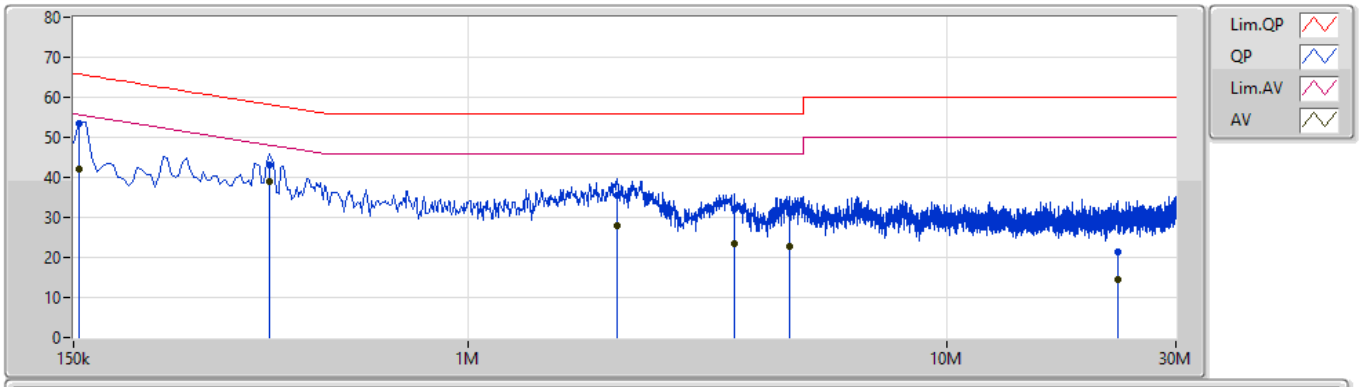
01/02/2021



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	159k	50.20	65.52	-15.32	9.89	Line	-	40.31	0.05	0.03	9.81
AV	159k	37.27	55.52	-18.25	9.89	Line	-	27.38	0.05	0.03	9.81
QP	258k	40.37	61.49	-21.12	9.88	Line	-	30.49	0.04	0.03	9.81
AV	258k	35.84	51.49	-15.65	9.88	Line	-	25.96	0.04	0.03	9.81
QP	384k	42.93	58.20	-15.27	9.89	Line	-	33.04	0.04	0.03	9.82
AV	384k	38.49	48.20	-9.71	9.89	Line	"Worst"	28.60	0.04	0.03	9.82
QP	1.91M	35.00	56.00	-21.00	9.95	Line	-	25.05	0.06	0.07	9.82
AV	1.91M	25.78	46.00	-20.22	9.95	Line	-	15.83	0.06	0.07	9.82
QP	3.368M	32.47	56.00	-23.53	10.06	Line	-	22.41	0.08	0.12	9.86
AV	3.368M	24.02	46.00	-21.98	10.06	Line	-	13.96	0.08	0.12	9.86
QP	4.758M	31.88	56.00	-24.12	10.12	Line	-	21.76	0.11	0.13	9.88
AV	4.758M	22.84	46.00	-23.16	10.12	Line	-	12.72	0.11	0.13	9.88

Mode 1

01/02/2021



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	154.5k	53.28	65.75	-12.47	9.88	Neutral	-	43.40	0.04	0.03	9.81
AV	154.5k	42.00	55.75	-13.75	9.88	Neutral	-	32.12	0.04	0.03	9.81
QP	384k	43.10	58.20	-15.10	9.89	Neutral	-	33.21	0.04	0.03	9.82
AV	384k	39.06	48.20	-9.14	9.89	Neutral	"Worst"	29.17	0.04	0.03	9.82
QP	2.049M	35.68	56.00	-20.32	9.96	Neutral	-	25.72	0.07	0.07	9.82
AV	2.049M	27.91	46.00	-18.09	9.96	Neutral	-	17.95	0.07	0.07	9.82
QP	3.597M	32.10	56.00	-23.90	10.07	Neutral	-	22.03	0.09	0.12	9.86
AV	3.597M	23.60	46.00	-22.40	10.07	Neutral	-	13.53	0.09	0.12	9.86
QP	4.7M	31.14	56.00	-24.86	10.11	Neutral	-	21.03	0.10	0.13	9.88
AV	4.7M	22.65	46.00	-23.35	10.11	Neutral	-	12.54	0.10	0.13	9.88
QP	22.758M	21.39	60.00	-38.61	10.59	Neutral	-	10.80	0.25	0.33	10.01
AV	22.758M	14.45	50.00	-35.55	10.59	Neutral	-	3.86	0.25	0.33	10.01

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)	656.25k	1.031M	1M03F1D	656.25k	1.028M

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

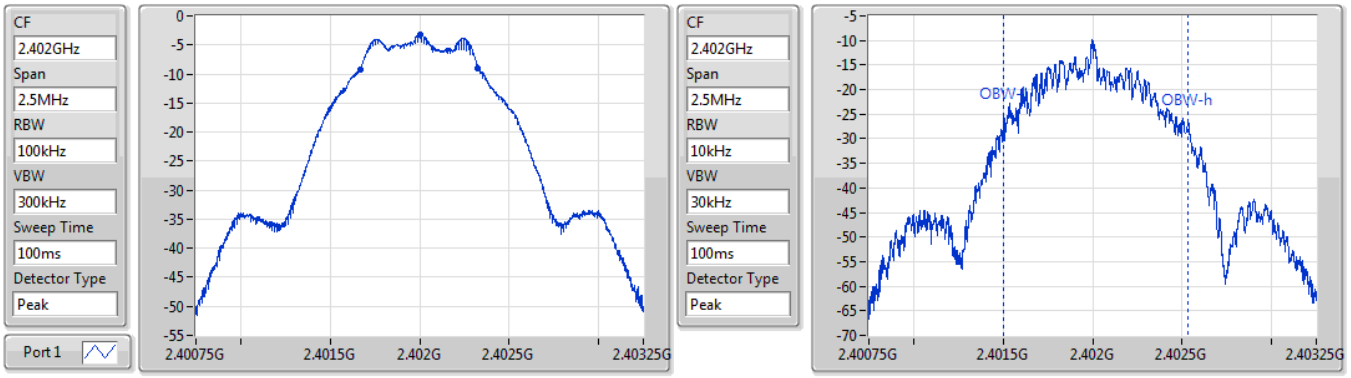
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	656.25k	1.028M
2440MHz	Pass	500k	656.25k	1.031M
2480MHz	Pass	500k	656.25k	1.029M

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

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

2402MHz

22/01/2021

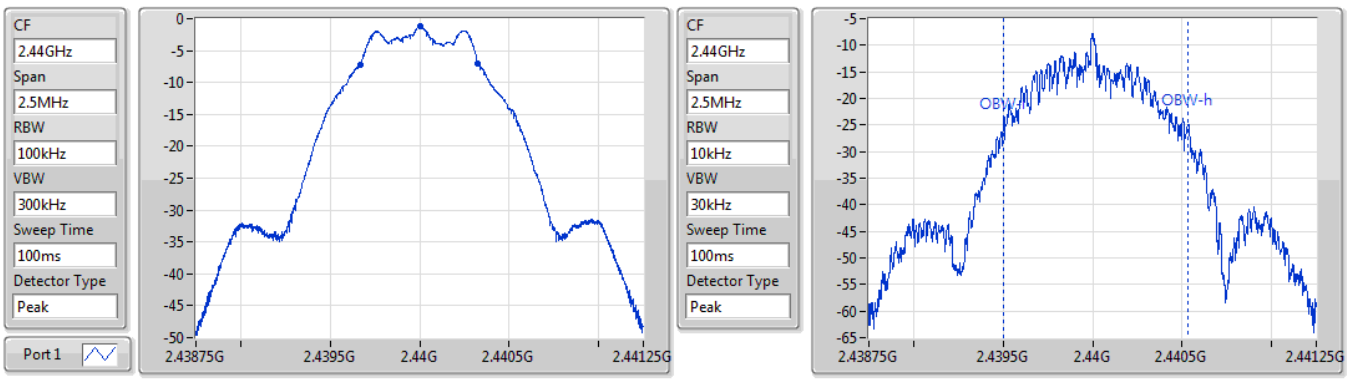


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
656.25k	2.40167G	2.402326G	1.028M	2.401501G	2.40253G	500k	1

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

2440MHz

22/01/2021

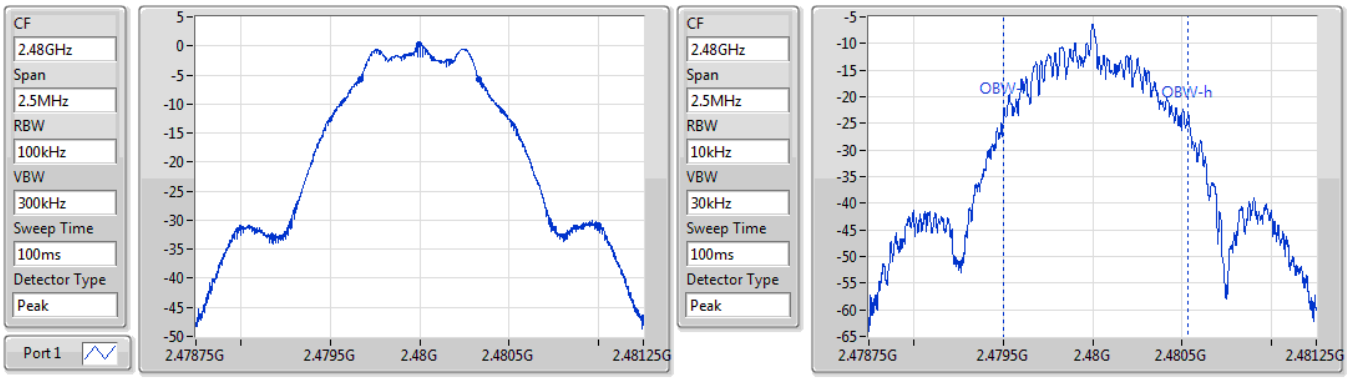


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
656.25k	2.43967G	2.440326G	1.031M	2.439499G	2.44053G	500k	1

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

2480MHz

22/01/2021



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
656.25k	2.479671G	2.480328G	1.029M	2.4795G	2.48053G	500k	1

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	0.62	0.00115

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	1.69	-2.61	30.00
2440MHz	Pass	1.69	-1.21	30.00
2480MHz	Pass	1.69	0.62	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-14.85

RBW=3 kHz.

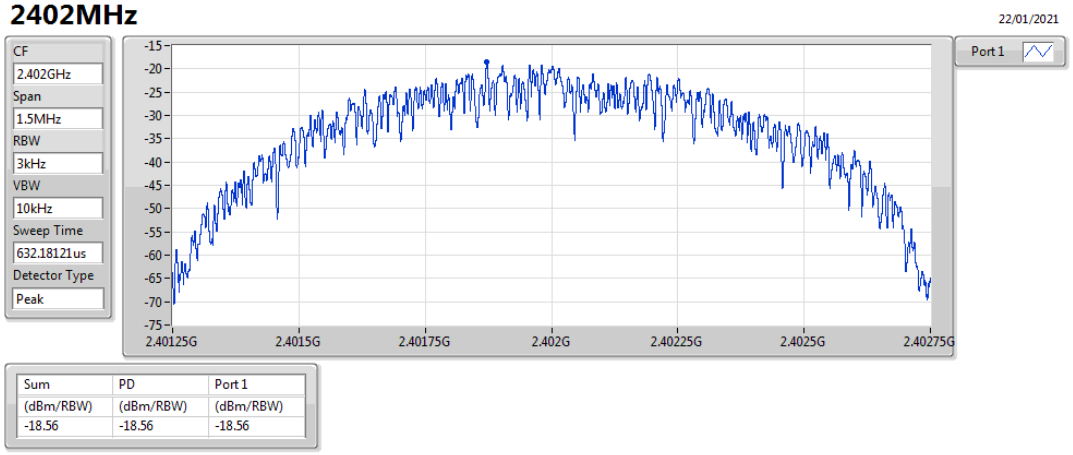
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	1.69	-18.56	8.00
2440MHz	Pass	1.69	-16.26	8.00
2480MHz	Pass	1.69	-14.85	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(1Mbps) **PSD**

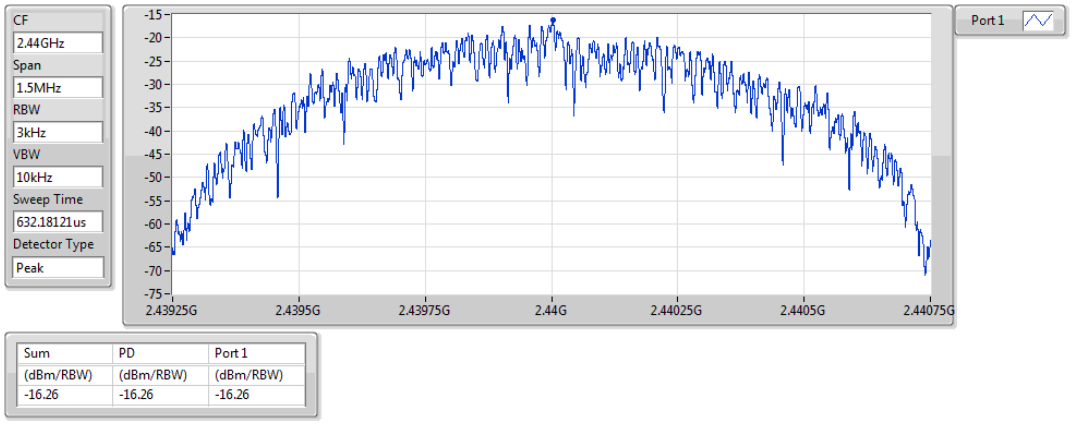
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-18.56	-18.56	-18.56

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

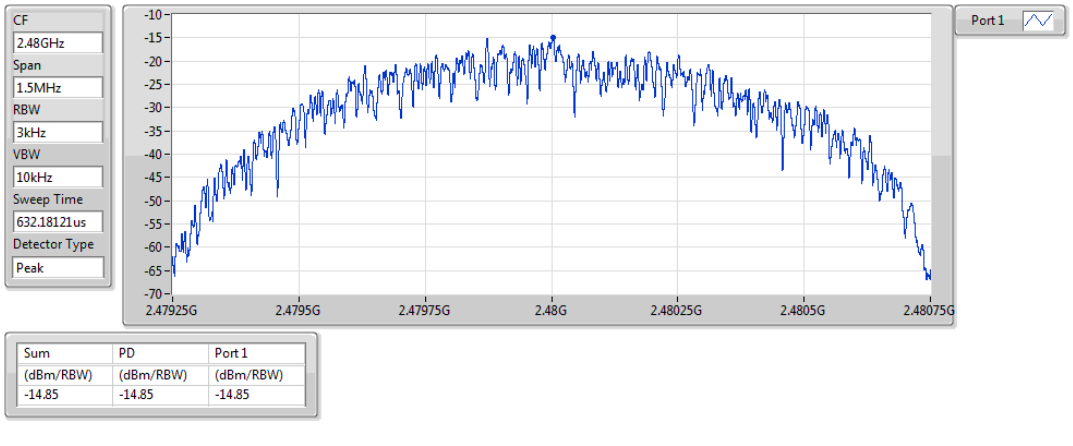
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-16.26	-16.26	-16.26

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

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-14.85	-14.85	-14.85

Summary

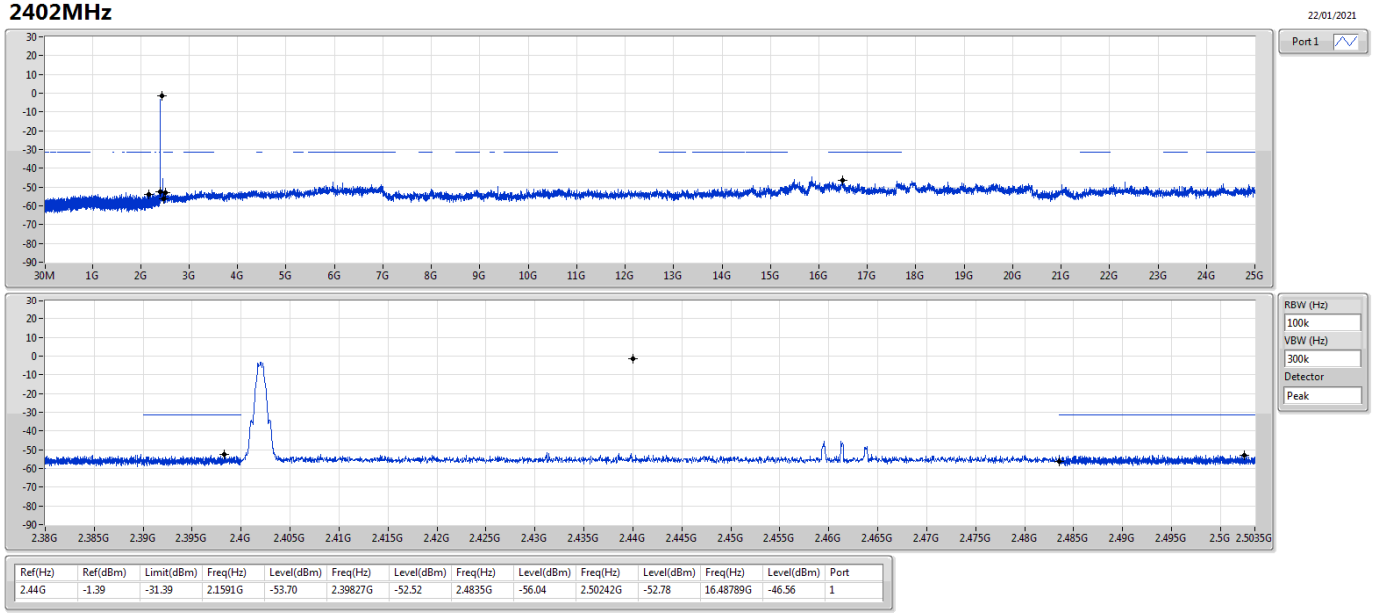
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.44G	-1.39	-31.39	2.05599G	-54.19	2.39278G	-52.30	2.4835G	-54.92	2.49512G	-51.69	17.63521G	-46.58	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	-1.39	-31.39	2.1591G	-53.70	2.39827G	-52.52	2.4835G	-56.04	2.50242G	-52.78	16.48789G	-46.56	1
2440MHz	Pass	2.44G	-1.39	-31.39	2.05599G	-54.19	2.39278G	-52.30	2.4835G	-54.92	2.49512G	-51.69	17.63521G	-46.58	1
2480MHz	Pass	2.44G	-1.39	-31.39	958.54M	-53.57	2.39821G	-53.33	2.4835G	-55.00	2.4935G	-52.34	17.62677G	-45.55	1

BT-LE(1Mbps) **CSE NdB**

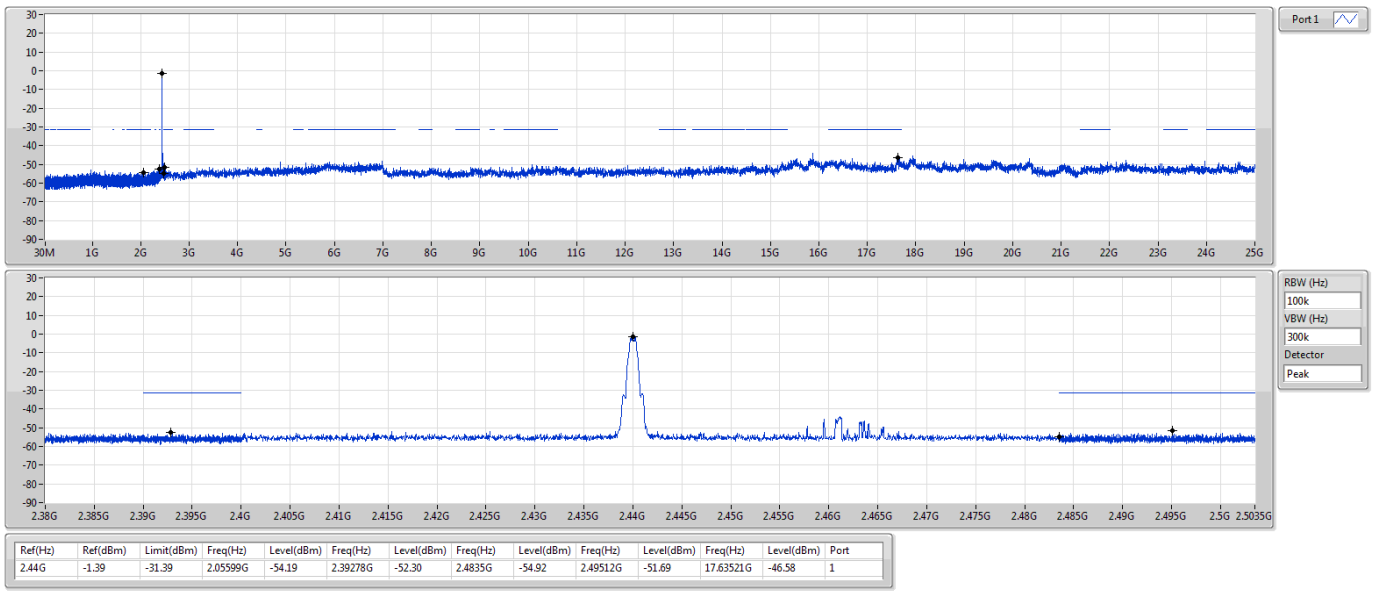
2402MHz



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
2.44G	-1.39	-31.39	2.1591G	-53.70	2.39827G	-52.52	2.4835G	-56.04	2.50242G	-52.78	16.48789G	-46.56	1

BT-LE(1Mbps) **CSE NdB**

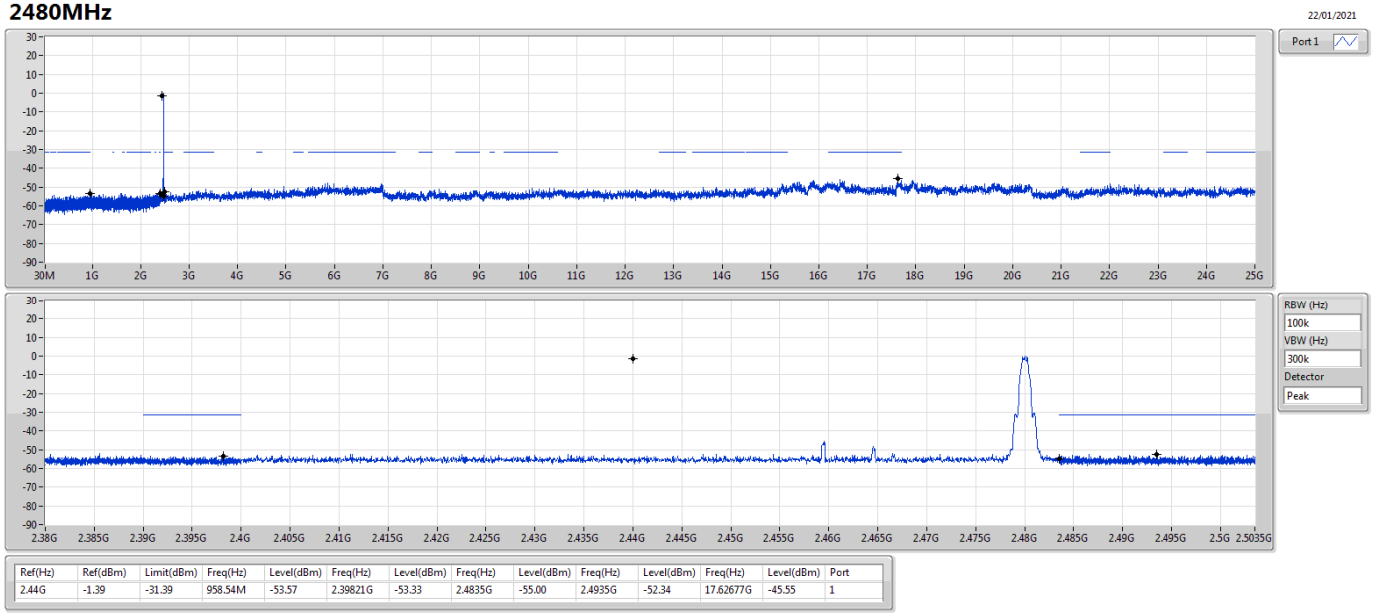
2440MHz



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
2.44G	-1.39	-31.39	2.05599G	-54.19	2.39278G	-52.30	2.4835G	-54.92	2.49512G	-51.69	17.63521G	-46.58	1

BT-LE(1Mbps) **CSE NdB**

2480MHz



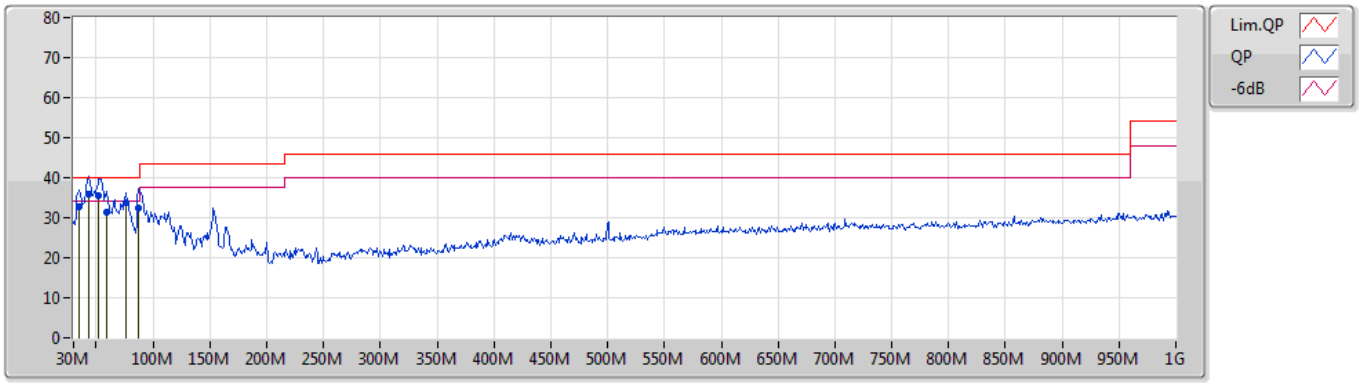
Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44G	-1.39	-31.39	958.54M	-53.57	2.39821G	-53.33	2.4835G	-55.00	2.4935G	-52.34	17.62677G	-45.55	1

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	QP	43.58M	35.93	40.00	-4.07	Vertical

Mode 1

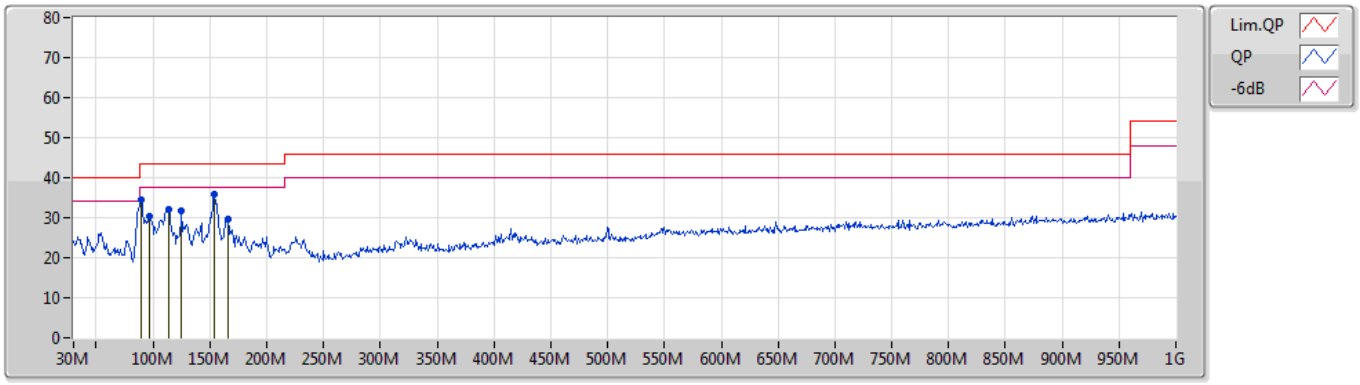
05/02/2021



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	34.85M	32.64	40.00	-7.36	-9.22	3	Vertical	37	1.00	-	41.86	21.76	0.50	31.48
QP	43.58M	35.93	40.00	-4.07	-13.67	3	Vertical	255	1.00	"Worst"	49.60	17.19	0.60	31.46
QP	52.31M	35.44	40.00	-4.56	-17.14	3	Vertical	203	1.00	-	52.58	13.88	0.65	31.67
QP	59.1M	31.36	40.00	-8.64	-18.20	3	Vertical	4	1.50	-	49.56	12.82	0.78	31.80
QP	75.59M	33.87	40.00	-6.13	-18.32	3	Vertical	124	1.50	-	52.19	12.53	0.90	31.75
QP	87.23M	32.43	40.00	-7.57	-16.69	3	Vertical	264	1.50	-	49.12	14.12	1.00	31.81

Mode 1

05/02/2021



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)
PK	89.17M	34.57	43.50	-8.93	-16.32	3	Horizontal	290	2.00	-	50.89	14.52	1.00	31.84
PK	96.93M	30.30	43.50	-13.20	-14.59	3	Horizontal	37	2.00	-	44.89	16.20	1.10	31.89
PK	113.42M	32.17	43.50	-11.33	-12.56	3	Horizontal	235	3.00	-	44.73	17.97	1.23	31.76
PK	125.06M	31.84	43.50	-11.66	-12.41	3	Horizontal	279	3.00	-	44.25	18.06	1.30	31.77
PK	154.16M	35.94	43.50	-7.56	-14.30	3	Horizontal	97	2.00	"Worst"	50.24	16.11	1.37	31.78
PK	165.8M	29.60	43.50	-13.90	-14.67	3	Horizontal	279	1.50	-	44.27	15.66	1.43	31.76

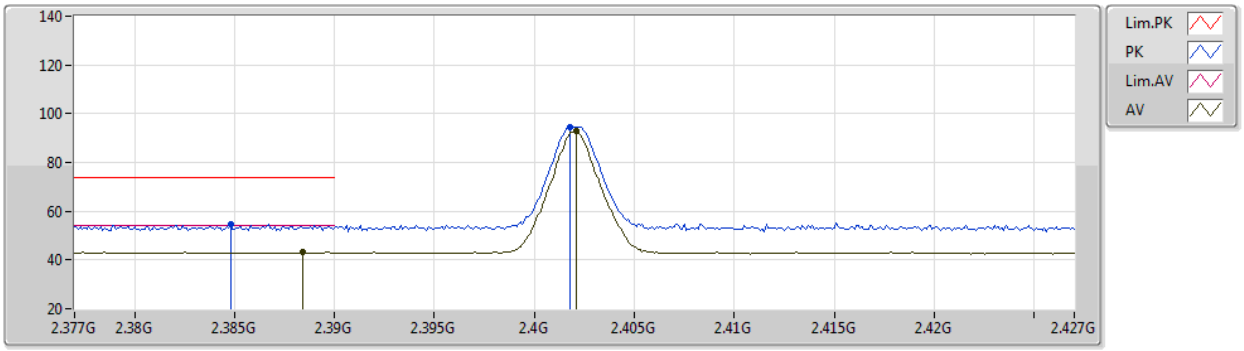
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	4.9575G	45.09	54.00	-8.91	3	Vertical	26	1.80	-

BT-LE(1Mbps)

2402MHz_TX

11/06/2020



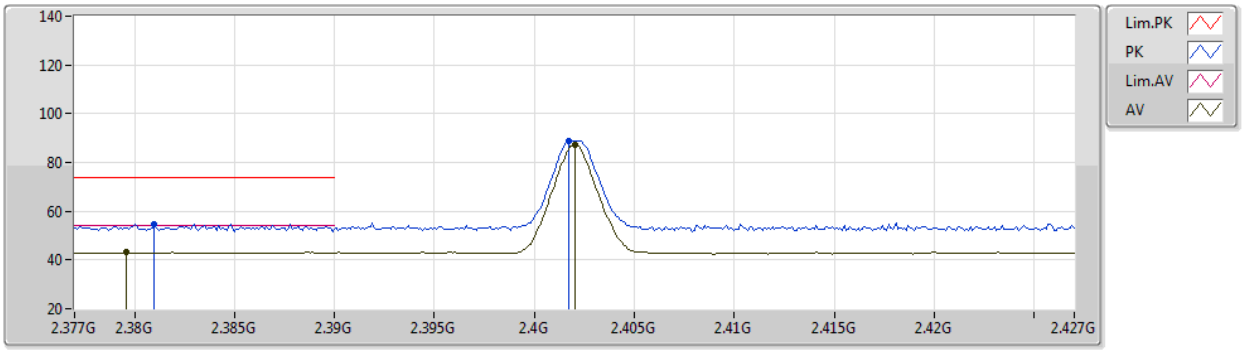
EUT Y_1TX
Setting Default
06-C-S-5

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	2.3848G	54.41	74.00	-19.59	23.74	3	Vertical	155	1.02	-	27.60	3.07	-
AV	2.3884G	43.11	54.00	-10.89	12.43	3	Vertical	155	1.02	-	27.60	3.08	-
PK	2.4018G	94.49	Inf	-Inf	63.80	3	Vertical	155	1.02	-	27.59	3.10	-
AV	2.4021G	92.96	Inf	-Inf	62.27	3	Vertical	155	1.02	-	27.59	3.10	-

BT-LE(1Mbps)

2402MHz_TX

11/06/2020



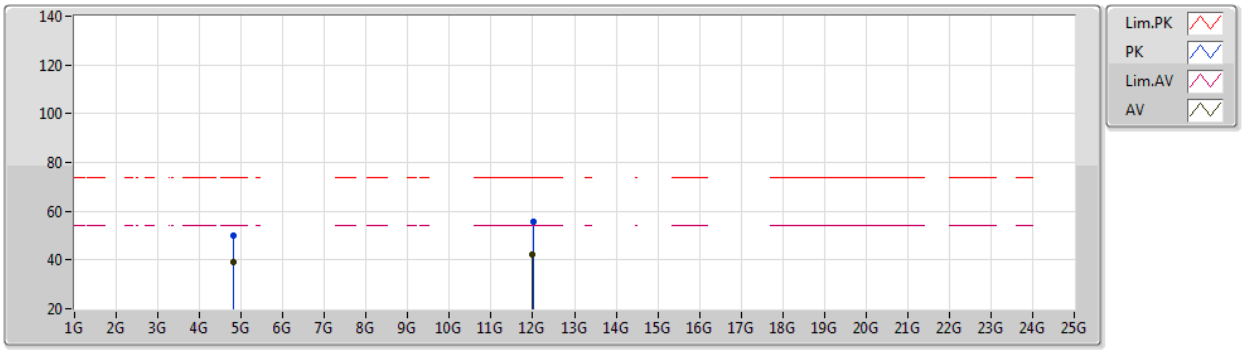
EUT Y_1TX
Setting Default
06-C-S-5

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	2.381G	54.80	74.00	-19.20	24.14	3	Horizontal	163	1.76	-	27.60	3.06	-
AV	2.3796G	43.08	54.00	-10.92	12.42	3	Horizontal	163	1.76	-	27.60	3.06	-
PK	2.4017G	88.78	Inf	-Inf	58.09	3	Horizontal	163	1.76	-	27.59	3.10	-
AV	2.402G	87.25	Inf	-Inf	56.56	3	Horizontal	163	1.76	-	27.59	3.10	-

BT-LE(1Mbps)

2402MHz_TX

11/06/2020



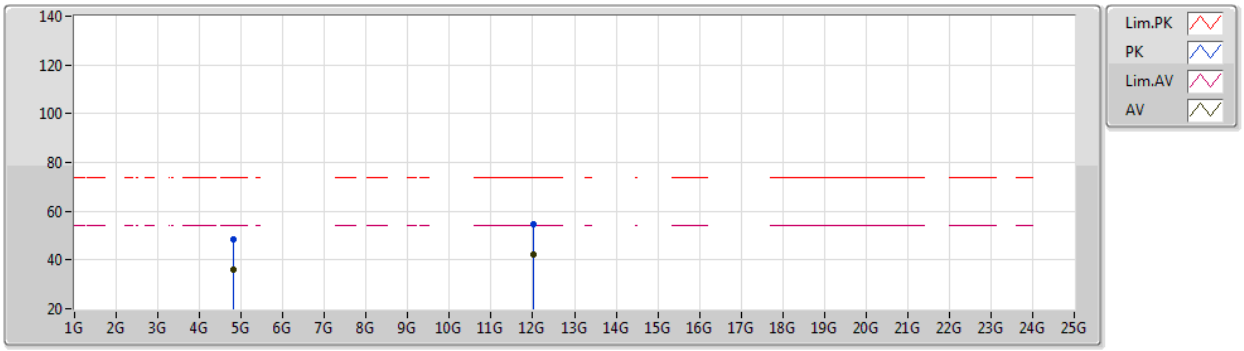
EUT Y_1TX
Setting Default
06-C-S-5

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	4.80908G	49.94	74.00	-24.06	45.66	3	Vertical	3	1.80	-	31.04	5.00	31.76
AV	4.81212G	39.05	54.00	-14.95	34.76	3	Vertical	3	1.80	-	31.05	5.00	31.76
PK	12.00236G	55.59	74.00	-18.41	42.36	3	Vertical	127	1.80	-	38.90	8.50	34.17
AV	12.00008G	42.33	54.00	-11.67	29.10	3	Vertical	127	1.80	-	38.90	8.50	34.17

BT-LE(1Mbps)

2402MHz_TX

11/06/2020



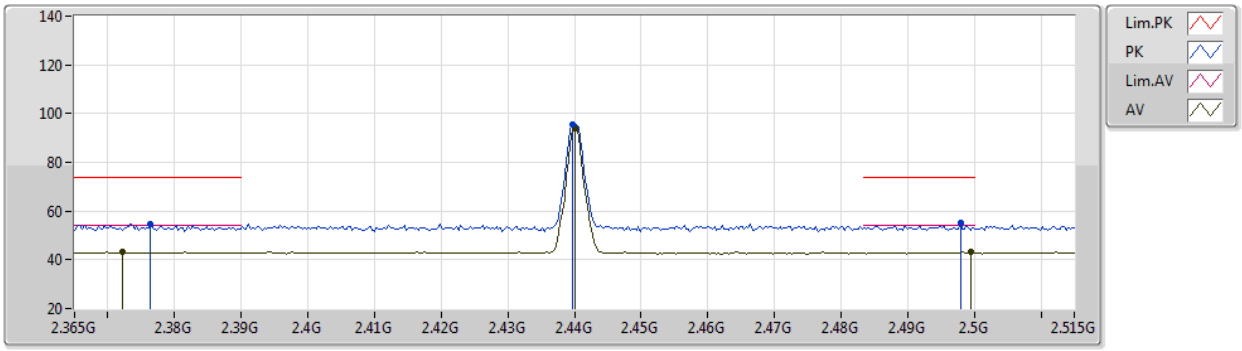
EUT Y_1TX
Setting Default
06-C-S-5

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	4.81112G	48.34	74.00	-25.66	44.06	3	Horizontal	192	1.80	-	31.04	5.00	31.76
AV	4.8056G	36.18	54.00	-17.82	31.93	3	Horizontal	192	1.80	-	31.02	5.00	31.77
PK	12.00752G	54.53	74.00	-19.47	41.30	3	Horizontal	144	1.80	-	38.90	8.50	34.17
AV	12.00992G	42.39	54.00	-11.61	29.15	3	Horizontal	144	1.80	-	38.90	8.51	34.17

BT-LE(1Mbps)

2440MHz_TX

11/06/2020



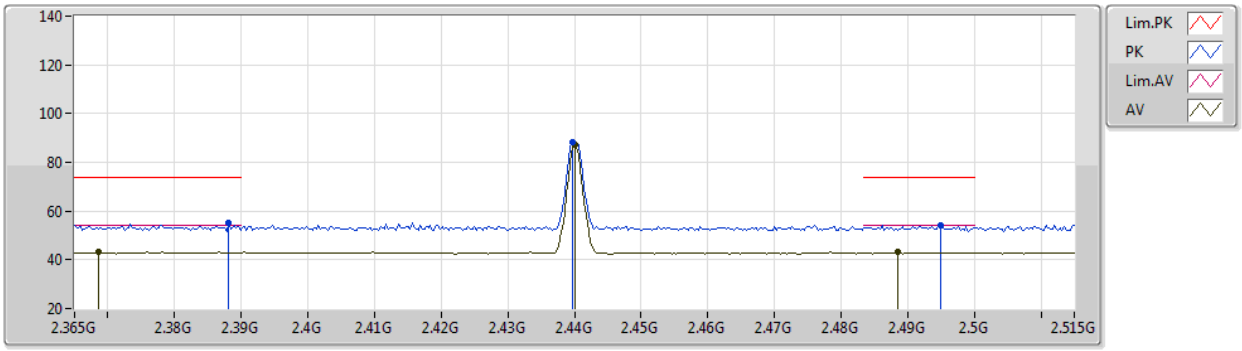
EUT Y_1TX
Setting Default
06-C-S-5

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	2.3764G	54.59	74.00	-19.41	23.94	3	Vertical	152	1.10	-	27.60	3.05	-
AV	2.3722G	43.10	54.00	-10.90	12.46	3	Vertical	152	1.10	-	27.60	3.04	-
PK	2.4397G	95.56	Inf	-Inf	64.98	3	Vertical	152	1.10	-	27.44	3.14	-
AV	2.44G	94.12	Inf	-Inf	63.54	3	Vertical	152	1.10	-	27.44	3.14	-
PK	2.4979G	54.93	74.00	-19.07	24.33	3	Vertical	152	1.10	-	27.40	3.20	-
AV	2.4994G	43.20	54.00	-10.80	12.60	3	Vertical	152	1.10	-	27.40	3.20	-

BT-LE(1Mbps)

2440MHz_TX

11/06/2020



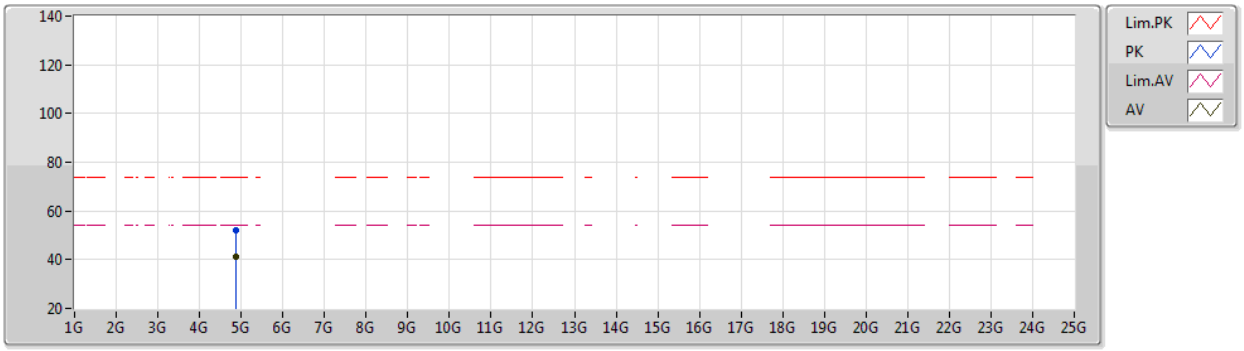
EUT Y_1TX
Setting Default
06-C-S-5

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	2.3881G	55.32	74.00	-18.68	24.64	3	Horizontal	164	2.25	-	27.60	3.08	-
AV	2.3686G	43.10	54.00	-10.90	12.46	3	Horizontal	164	2.25	-	27.60	3.04	-
PK	2.4397G	88.47	Inf	-Inf	57.89	3	Horizontal	164	2.25	-	27.44	3.14	-
AV	2.44G	87.00	Inf	-Inf	56.42	3	Horizontal	164	2.25	-	27.44	3.14	-
PK	2.4949G	54.07	74.00	-19.93	23.48	3	Horizontal	164	2.25	-	27.40	3.19	-
AV	2.4886G	43.02	54.00	-10.98	12.43	3	Horizontal	164	2.25	-	27.40	3.19	-

BT-LE(1Mbps)

2440MHz_TX

11/06/2020



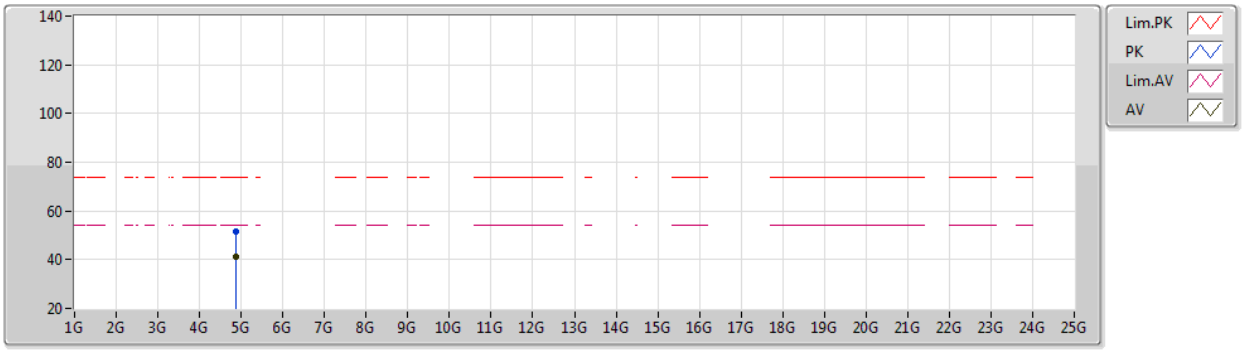
EUT Y_1TX
Setting Default
06-C-S-5

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	4.8825G	52.03	74.00	-21.97	47.56	3	Vertical	108	2.11	-	31.14	5.00	31.67
AV	4.8808G	41.07	54.00	-12.93	36.61	3	Vertical	108	2.11	-	31.14	5.00	31.68

BT-LE(1Mbps)

2440MHz_TX

11/06/2020



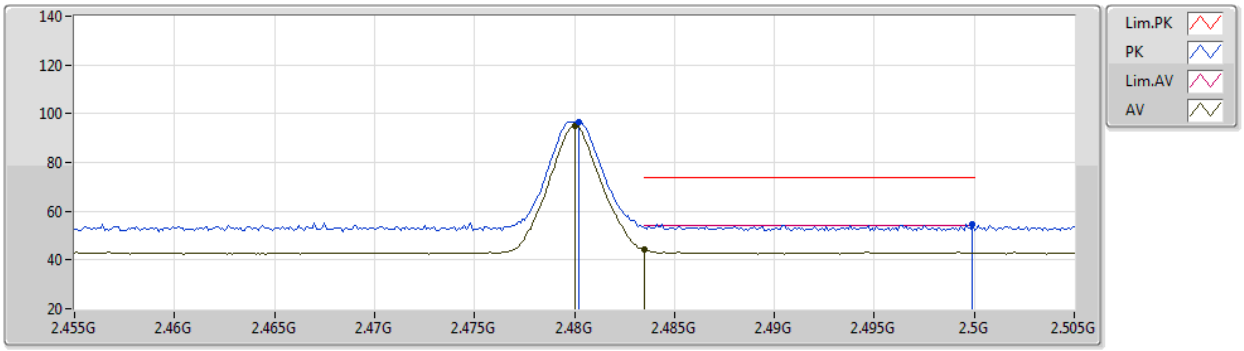
EUT Y_1TX
Setting Default
06-C-S-5

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	4.88246G	51.70	74.00	-22.30	47.23	3	Horizontal	265	2.52	-	31.14	5.00	31.67
AV	4.87546G	41.42	54.00	-12.58	36.95	3	Horizontal	265	2.52	-	31.15	5.00	31.68

BT-LE(1Mbps)

2480MHz_TX

11/06/2020



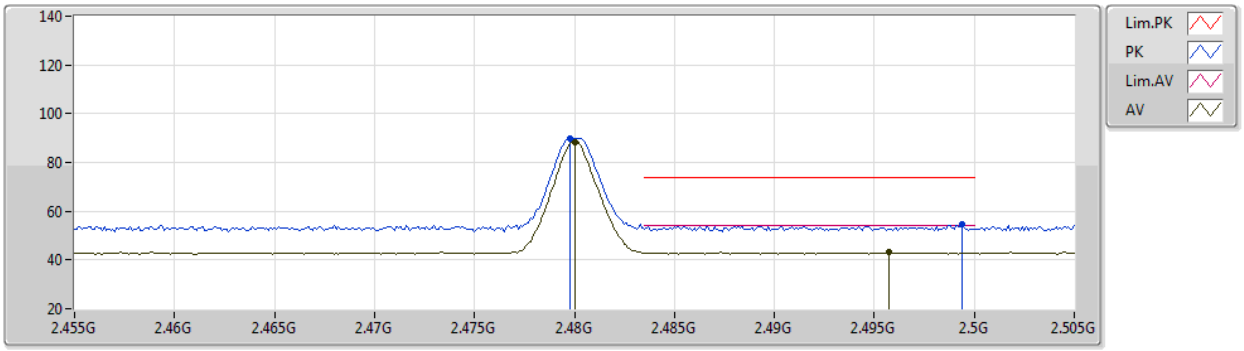
EUT Y_1TX
Setting Default
06-C-S-5

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	2.4802G	96.60	Inf	-Inf	66.02	3	Vertical	153	1.00	-	27.40	3.18	-
AV	2.48G	95.07	Inf	-Inf	64.49	3	Vertical	153	1.00	-	27.40	3.18	-
PK	2.4999G	54.66	74.00	-19.34	24.06	3	Vertical	153	1.00	-	27.40	3.20	-
AV	2.4835G	44.10	54.00	-9.90	13.52	3	Vertical	153	1.00	-	27.40	3.18	-

BT-LE(1Mbps)

2480MHz_TX

11/06/2020



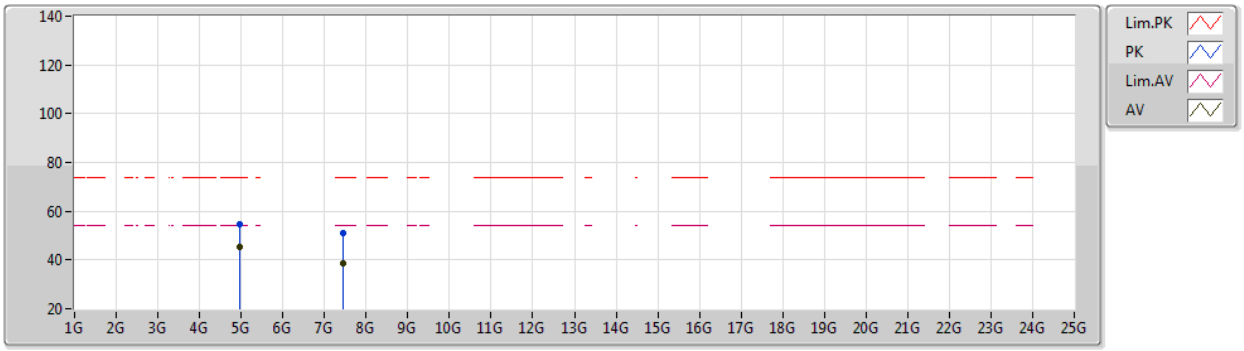
EUT Y_1TX
Setting Default
06-C-S-5

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	2.4798G	89.98	Inf	-Inf	59.40	3	Horizontal	196	1.59	-	27.40	3.18	-
AV	2.48G	88.48	Inf	-Inf	57.90	3	Horizontal	196	1.59	-	27.40	3.18	-
PK	2.4994G	54.72	74.00	-19.28	24.12	3	Horizontal	196	1.59	-	27.40	3.20	-
AV	2.4957G	43.09	54.00	-10.91	12.49	3	Horizontal	196	1.59	-	27.40	3.20	-

BT-LE(1Mbps)

2480MHz_TX

11/06/2020



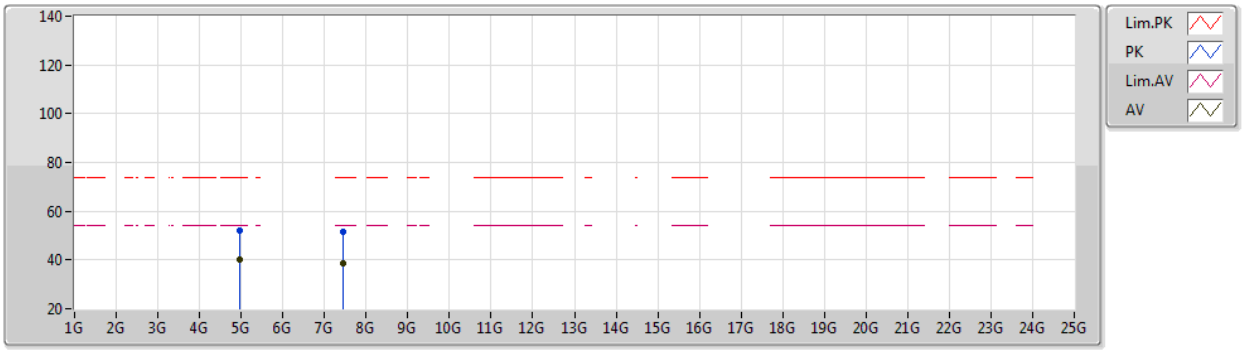
EUT Y_1TX
Setting Default
06-C-S-5

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	4.96452G	54.57	74.00	-19.43	49.78	3	Vertical	26	1.80	-	31.36	5.00	31.57
AV	4.9575G	45.09	54.00	-8.91	40.34	3	Vertical	26	1.80	-	31.33	5.00	31.58
PK	7.43586G	51.21	74.00	-22.79	41.97	3	Vertical	360	1.80	-	36.34	6.12	33.22
AV	7.4413G	38.65	54.00	-15.35	29.38	3	Vertical	360	1.80	-	36.37	6.12	33.22

BT-LE(1Mbps)

2480MHz_TX

11/06/2020



EUT Y_1TX
Setting Default
06-C-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	4.95624G	51.90	74.00	-22.10	47.16	3	Horizontal	198	1.70	-	31.32	5.00	31.58
AV	4.96408G	40.32	54.00	-13.68	35.53	3	Horizontal	198	1.70	-	31.36	5.00	31.57
PK	7.43778G	51.38	74.00	-22.62	42.13	3	Horizontal	349	1.45	-	36.35	6.12	33.22
AV	7.44352G	38.77	54.00	-15.23	29.50	3	Horizontal	349	1.45	-	36.37	6.12	33.22