Testing Laboratory 3787

RADIO TEST REPORT

FCC ID	:	HEDOAP100E
Equipment	:	802.11ac Wave 2 Dual-Band Enterprise Access Point
Brand Name	:	Edgecore
Model Name	:	OAP100e
Applicant	:	Accton Technology Corp No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077, Taiwan R.O.C.
Manufacturer (1)	:	Accton Technology Corp No. 1, Creation Rd. III, Science-based Industrial Park Hsin Chu 30077, Taiwan R.O.C.
Manufacturer (2)	:	Accton Technology Corporation Zhunan Factory 1F & 4F & 5F , No. 1, Keyi St., Zhunan Township, Miaoli County 350, Taiwan
Standard	:	47 CFR FCC Part 15.247

The product was received on Jul. 27, 2019, and testing was started from Aug. 15, 2019 and completed on Apr. 07, 2022. 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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History of this test report

Report No.	Version	Description	Issued Date
FR972347-06AC	01	Initial issue of report	May 10, 2022

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	-
Note: Reference to Sporton Project No.: 972347.				

Declaration of Conformity:

1. The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to report "Measurement Uncertainty".

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: Jessie Wei

1 General Description

1.1 Information

1.1.1 RF General Information

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

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

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

1.1.2 Antenna Information

Ant.	Port				Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	WLAN 2.4GHz	WLAN 5GHz	Blue tooth	GPS					
1	1	-	-	-	ACCTON	OAP 100-1018-EC	PCB Dipole Antenna	I-PEX	Note 1
2	2	-	-	-	ACCTON	OAP 100-1018-EC	PCB Dipole Antenna	I-PEX	
3		1	-	-	ACCTON	OAP 100-1018-EC	Dipole Antenna	I-PEX	
4		2	-	-	ACCTON	OAP 100-1018-EC	Dipole Antenna	I-PEX	
5	-	-	1	-	ACCTON	OAP 100-1018-EC	PCB Dipole Antenna	I-PEX	
6	-	-	-	1	Master Wave	OAP 100-1018-EC	Chip Antenna	I-PEX	

Note 1

Ant.	Gain (dBi)			
	WLAN 2.4GHz	WLAN 5GHz	Bluetooth	GPS
1	5.4	-	-	-
2	5.66	-	-	-
3	-	8.213	-	-
4	-	8.213	-	-
5	-	-	4.5	-
6	-	-	-	3.76

Note 2: The above information was declared by manufacturer.

<For 2.4GHz Band>

For IEEE 802.11b/g/n mode (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 Band>

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

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

Port 1 and Port 2 could transmit/receive simultaneously.

<Bluetooth>

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

Note 3: Directional gain information

Maximum Output Power	Power Spectral Density
Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$Directional Gain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula :

$$Directional Gain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

NSS1(g1,1) = $10^{G1/20}$; NSS1(g1,2)= $10^{G2/20}$; NSS1(g1,2)= $10^{G3/20}$; NSS1(g1,2)= $10^{G4/20}$

gj,k =(Nss1(g1,1) + Nss1(g1,2) + Nss1(g1,3) + Nss1(g1,4))^2

DG = 10 log[(Nss1(g1,1) + Nss1(g1,2) + Nss1(g1,3) + Nss1(g1,4))^2 / N_{ANT}] => 10 log[($10^{G1/20}$ + $10^{G2/20}$ + $10^{G3/20}$ + $10^{G4/20}$)^2 / N_{ANT}]

Where ;

2.4G G1 = 5.4 ; G2 = 5.66

5G G1 = 8.213 ; G2 = 8.213

2.4G DG = 8.54 dBi

5 GHz U-NII-1 DG = 11.223 dBi

5 GHz U-NII-3 DG = 11.223 dBi

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-LE(1Mbps)	0.628	2.02	405u	3k

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

1.1.4 EUT Operational Condition

EUT Power Type	From PoE or DC 24V			
Function	☒	Point-to-multipoint	☐	Point-to-point
Test Software Version	QDART-Connectivity1.0-00048、QRCT V3.0.264.0、DOS(V6.1.7601)			
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 15.247
- 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 (TAF: 3787)	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.) TEL: 886-3-656-9065 FAX: 886-3-656-9085 Test site Designation No. TW3787 with FCC. Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted	TH02-CB	Owen Hsu	24.5~25.5 / 56~58	Aug. 15, 2019~ Sep. 05, 2019
Radiated below 1GHz	03CH04-CB	Ken Yeh	24.5~25.6 / 56~59	Feb. 15, 2022~ Apr. 07, 2022
Radiated above 1GHz	03CH03-CB	Eason Chen	23.8~26.2 / 59~62	Aug. 23, 2019~ Oct. 07, 2019
AC Conduction	CO01-CB	Joe Chu	21~22 / 51~52	Feb. 18, 2022

Note: The tested sample of the test items (AC Conduction, Radiated below 1GHz) was received on Feb. 15, 2022.

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)

For RF Conducted and Radiated above 1GHz:

Test Items	Uncertainty	Remark
Radiated Emission (1GHz ~ 18GHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	5.1 dB	Confidence levels of 95%
Conducted Emission	2.4 dB	Confidence levels of 95%
Output Power Measurement	1.5 dB	Confidence levels of 95%
Power Density Measurement	2.4 dB	Confidence levels of 95%
Bandwidth Measurement	2%	Confidence levels of 95%

For AC Conduction and Radiated below 1GHz:

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	4.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.5 dB	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	PowerSetting
BT-LE(1Mbps)	-
2402MHz	8
2440MHz	8
2480MHz	8

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Normal Link
1	PoE 1 Mode
2	DC 24V Mode
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 in Z axis + PoE 1 – 2.4GHz
2	EUT in Z axis + DC 24V – 2.4GHz
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 in X axis + PoE 1 – 5GHz
4	EUT in Y axis + PoE 1 – Bluetooth
For operating mode 3 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	CTX
The EUT was performed at X axis, Y axis and Z axis position, and the worst case was found at Y axis. So the measurement will follow this same test configuration.	
1	EUT in Y 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.: FA972347-06 for Co-location RF Exposure Evaluation.	

Note: The PoEs below are for measurement only, would not be marketed.
The PoEs information as below:

Support Unit	Brand	Model Number
PoE 1	CISCO	MA-INJ-5
PoE 2	GME	GME40B-480135FDA

2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link Mode:

During the test, the EUT operation to normal function.

2.4 Accessories

Accessories	
No.	**Equipment Name**
1	Wall-mounted rack*1
2	DC Terminal plug*1
3	Cable glands*2
4	Console cable (RJ-45 to DB-9)*1

2.5 Support Equipment

For AC Conduction:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	PoE 1	CISCO	MA-INJ-5	N/A
B	PoE NB	DELL	E6430	N/A
C	LAN NB	DELL	E6430	N/A
D	2.4G NB	DELL	E6430	N/A
E	5G NB	DELL	E6430	N/A
F	Smart phone	Samsung	Galaxy J2	N/A
G	GPS Simulator	WELNAVIGATE	GS-100	N/A
H	Device	Edgecore	OAP-100	N/A

For Radiated below 1GHz and RF Conducted:

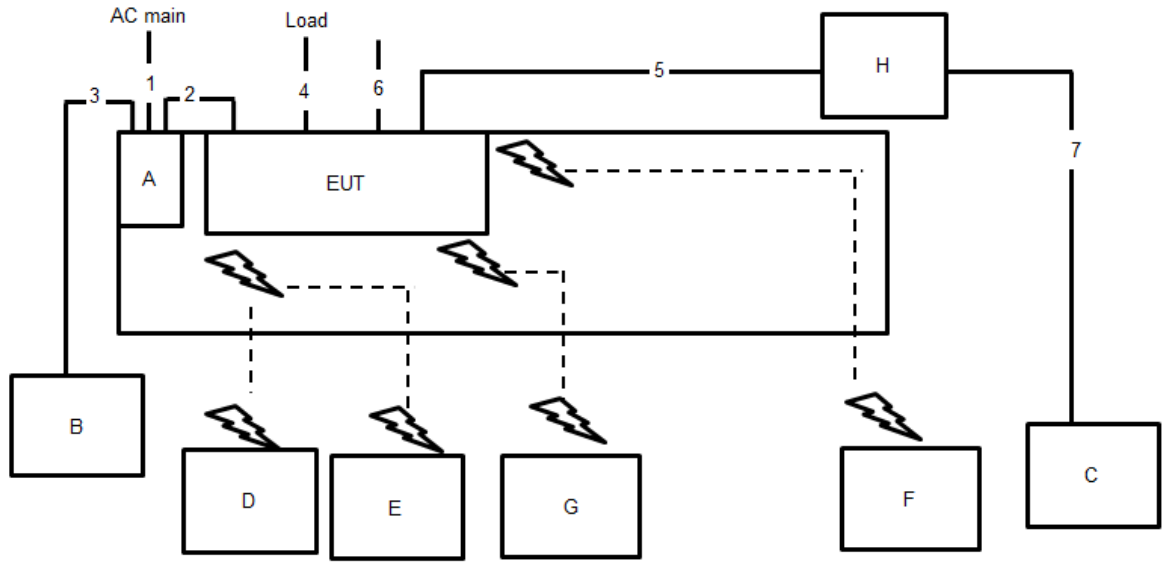
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook	DELL	E4300	N/A
B	PoE 1	CISCO	MA-INJ-5	N/A

For Radiated above 1GHz:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook	DELL	E4300	N/A
B	PoE 2	GME	GME40B-480135FDA	N/A

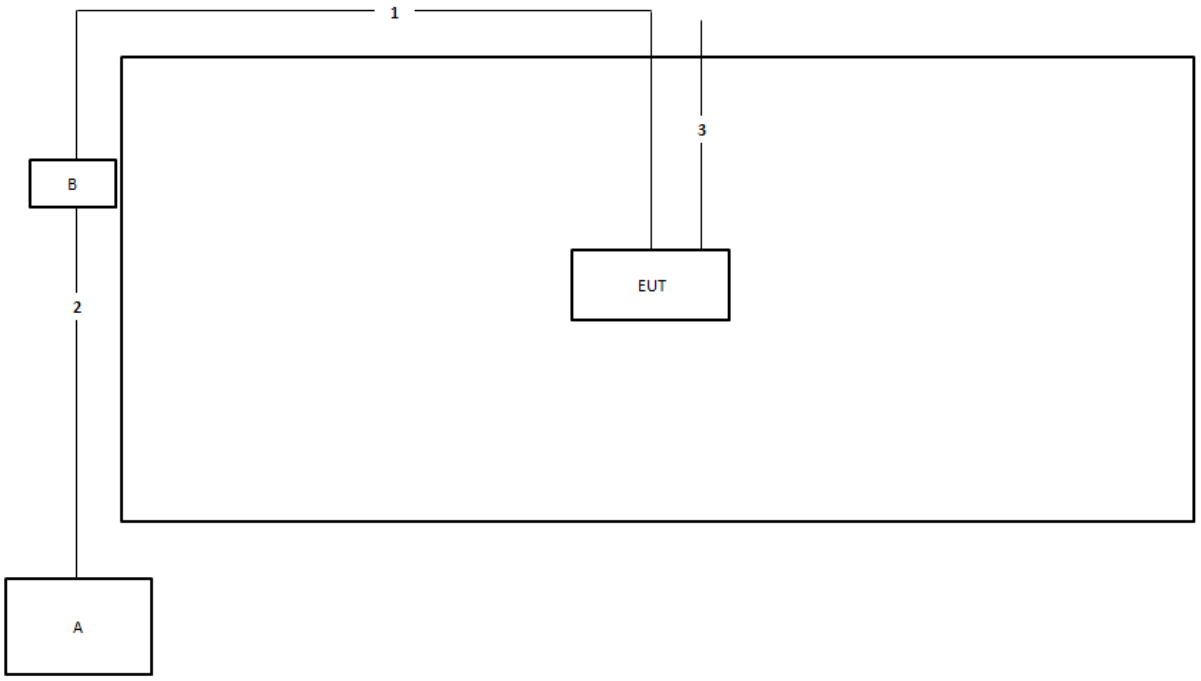
2.6 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



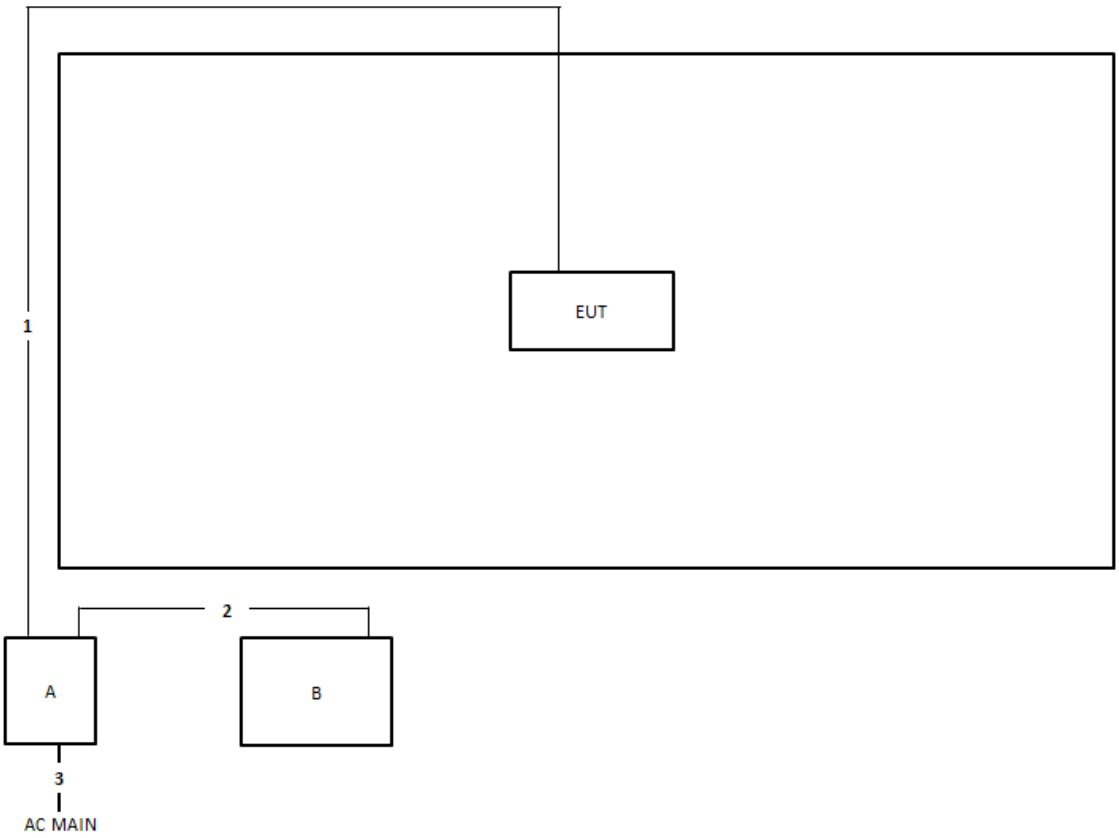
Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	No	3m
3	RJ-45 cable	No	10m
4	Console cable	No	1.8m
5	RJ-45 cable	No	10m
6	Ground cable	No	1.8m
7	RJ-45 cable	No	1m
1	Power cable	No	1.8m

Test Setup Diagram - Radiated Test < 1GHz



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

Test Setup Diagram - Radiated Test > 1GHz



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

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

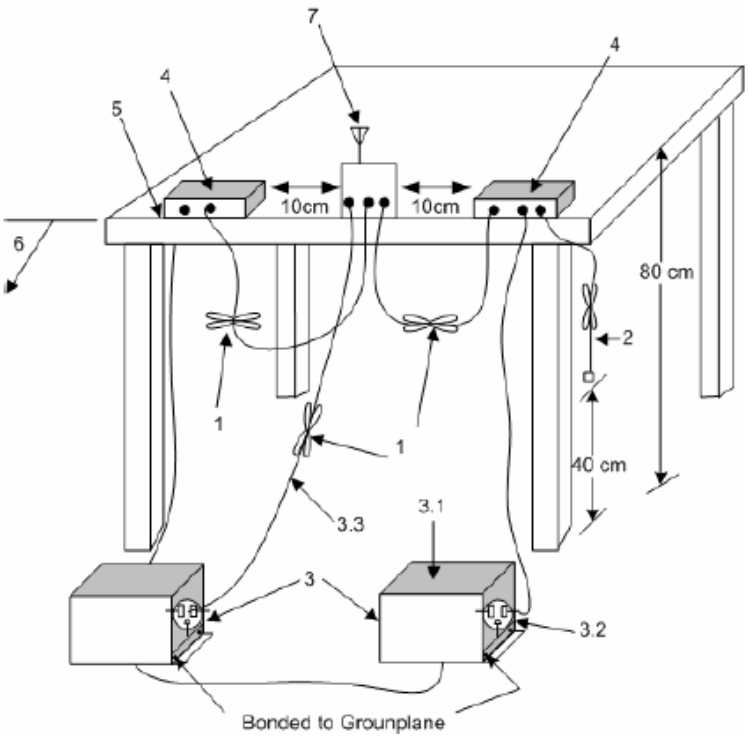
Refer a test equipment and calibration data table in this test report.

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.

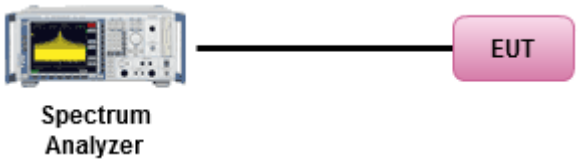
3.2.2 Measuring Instruments

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

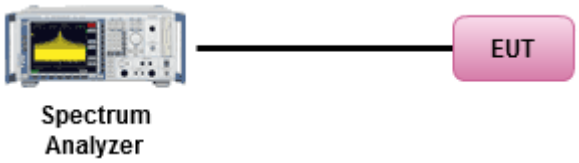
3.4.2 Measuring Instruments

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

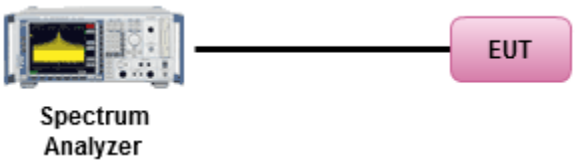
Refer a test equipment and calibration data table in this test report.

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.

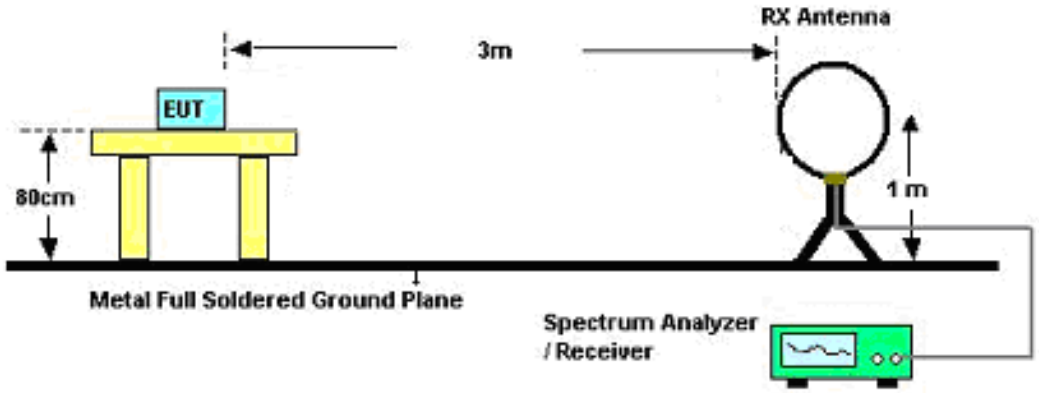
3.6.3 Test Procedures

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.	

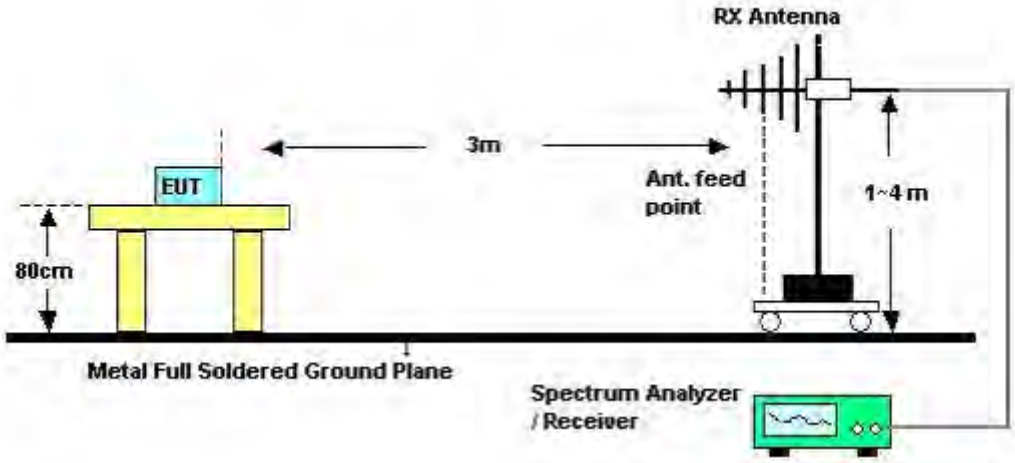
3.6.4 Test Setup

Emissions in Restricted Frequency Bands

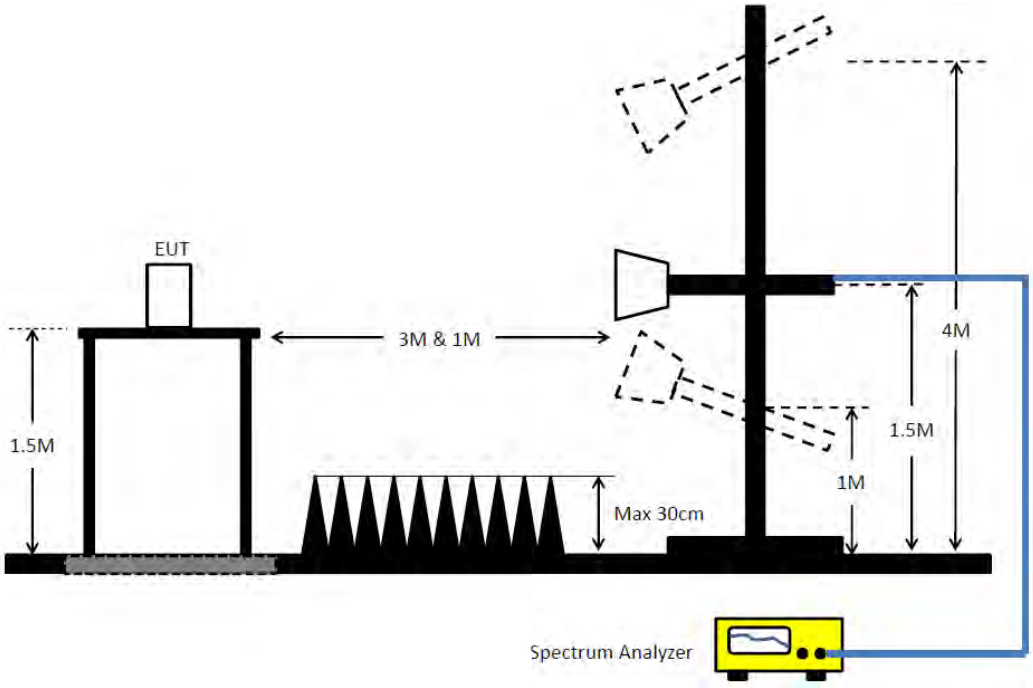
9kHz ~30MHz



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	Feb. 09, 2022	Feb. 08, 2023	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Mar. 07, 2021	Mar. 06, 2022	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 10, 2022	Feb. 09, 2023	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 19, 2021	May 18, 2022	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. 14, 2021	Apr. 13, 2022	Radiation (03CH04-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH04-CB	30 MHz ~ 1 GHz	Aug. 08, 2021	Aug. 07, 2022	Radiation (03CH04-CB)
BILOG ANTENNA with 6 dB attenuator	Schaffner & EMCI	CBL6112B & N-6-06	22021&AT-N0607	30MHz ~ 1GHz	Oct. 09, 2021	Oct. 08, 2022	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	310N	187291	0.1MHz ~ 1GHz	Dec. 16, 2021	Dec. 15, 2022	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Feb. 19, 2021	Feb. 18, 2022	Radiation (03CH04-CB
Signal Analyzer	R&S	FSV40	101904	9kHz ~ 40GHz	Apr. 15, 2021	Apr. 14, 2022	Radiation (03CH04-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 21, 2021	Jun. 20, 2022	Radiation (03CH04-CB)
RF Cable-low	Woken	RG402	Low Cable-03+67	30MHz – 1GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH04-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH04-CB)
Horn Antenna	ETS・Lindgren	3115	6821	750MHz~18GHz	Jan. 24, 2019	Jan. 23, 2020	Radiation (03CH03-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jun. 27, 2019	Jun. 26, 2020	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Dec. 20, 2018	Dec. 19, 2019	Radiation (03CH03-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 19, 2019	Jun. 18, 2020	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+27	1GHz ~ 18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-27	1GHz ~ 18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH03-CB)

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH03-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH03-CB)
Spectrum analyzer	R&S	FSV40	101027	9kHz~40GHz	Jul. 02, 2019	Jul. 01, 2020	Conducted (TH02-CB)
Power Sensor	Agilent	E9327A	US40442088	50MHz~18GHz	Jan. 15, 2019	Jan. 14, 2020	Conducted (TH02-CB)
Power Meter	Agilent	E4416A	GB41291199	50MHz~18GHz	Jan. 15, 2019	Jan. 14, 2020	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-01	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-02	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-03	1 GHz –26.5 GHz	Oct. 24, 2018	Oct. 23, 2019	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-04	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-05	1 GHz –26.5 GHz	Oct. 08, 2018	Oct. 07, 2019	Conducted (TH02-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH02-CB)

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

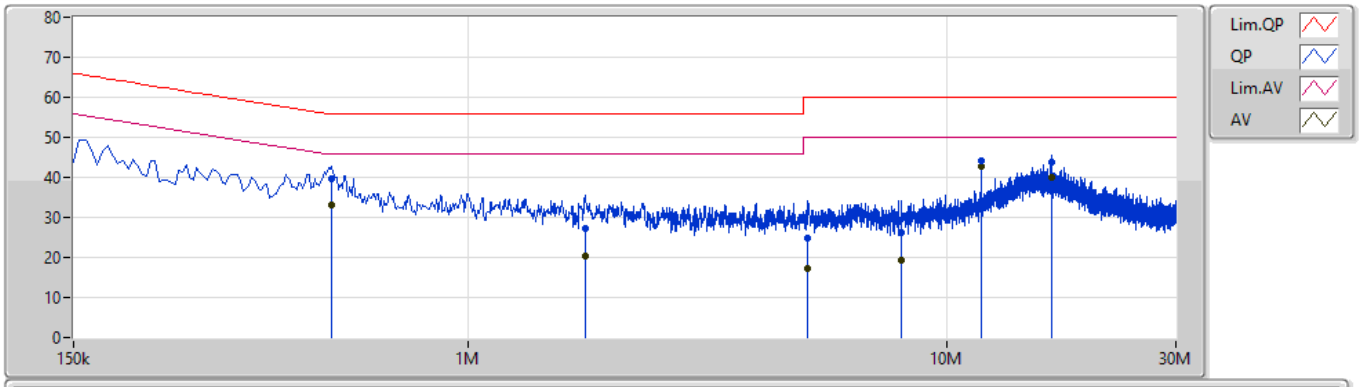
NCR means Non-Calibration required.

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	AV	11.76M	42.68	50.00	-7.32	Line

Mode 1

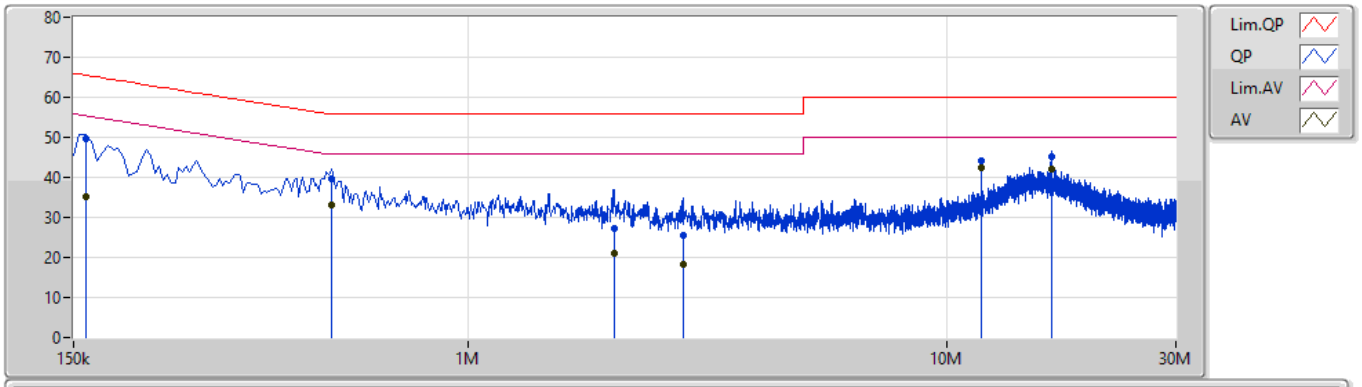
18/02/2022



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	519k	39.60	56.00	-16.40	9.98	Line	-	29.62	0.05	0.04	9.89
AV	519k	33.02	46.00	-12.98	9.98	Line	-	23.04	0.05	0.04	9.89
QP	1.757M	27.15	56.00	-28.85	10.03	Line	-	17.12	0.08	0.06	9.89
AV	1.757M	20.50	46.00	-25.50	10.03	Line	-	10.47	0.08	0.06	9.89
QP	5.105M	24.80	60.00	-35.20	10.18	Line	-	14.62	0.15	0.13	9.90
AV	5.105M	17.14	50.00	-32.86	10.18	Line	-	6.96	0.15	0.13	9.90
QP	7.998M	26.17	60.00	-33.83	10.26	Line	-	15.91	0.20	0.15	9.91
AV	7.998M	19.27	50.00	-30.73	10.26	Line	-	9.01	0.20	0.15	9.91
QP	11.76M	44.23	60.00	-15.77	10.32	Line	-	33.91	0.24	0.16	9.92
AV	11.76M	42.68	50.00	-7.32	10.32	Line	"Worst"	32.36	0.24	0.16	9.92
QP	16.467M	43.70	60.00	-16.30	10.43	Line	-	33.27	0.29	0.19	9.95
AV	16.467M	40.07	50.00	-9.93	10.43	Line	-	29.64	0.29	0.19	9.95

Mode 1

18/02/2022



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	159k	49.58	65.52	-15.94	9.96	Neutral	-	39.62	0.03	0.04	9.89
AV	159k	35.06	55.52	-20.46	9.96	Neutral	-	25.10	0.03	0.04	9.89
QP	519k	39.52	56.00	-16.48	9.97	Neutral	-	29.55	0.04	0.04	9.89
AV	519k	33.16	46.00	-12.84	9.97	Neutral	-	23.19	0.04	0.04	9.89
QP	2.013M	27.31	56.00	-28.69	10.03	Neutral	-	17.28	0.07	0.07	9.89
AV	2.013M	21.12	46.00	-24.88	10.03	Neutral	-	11.09	0.07	0.07	9.89
QP	2.805M	25.60	56.00	-30.40	10.06	Neutral	-	15.54	0.08	0.09	9.89
AV	2.805M	18.29	46.00	-27.71	10.06	Neutral	-	8.23	0.08	0.09	9.89
QP	11.76M	44.09	60.00	-15.91	10.30	Neutral	-	33.79	0.22	0.16	9.92
AV	11.76M	42.51	50.00	-7.49	10.30	Neutral	"Worst"	32.21	0.22	0.16	9.92
QP	16.463M	45.14	60.00	-14.86	10.40	Neutral	-	34.74	0.26	0.19	9.95
AV	16.463M	42.08	50.00	-7.92	10.40	Neutral	-	31.68	0.26	0.19	9.95

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)	702.5k	1.026M	1M03F1D	691.25k	1.026M

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

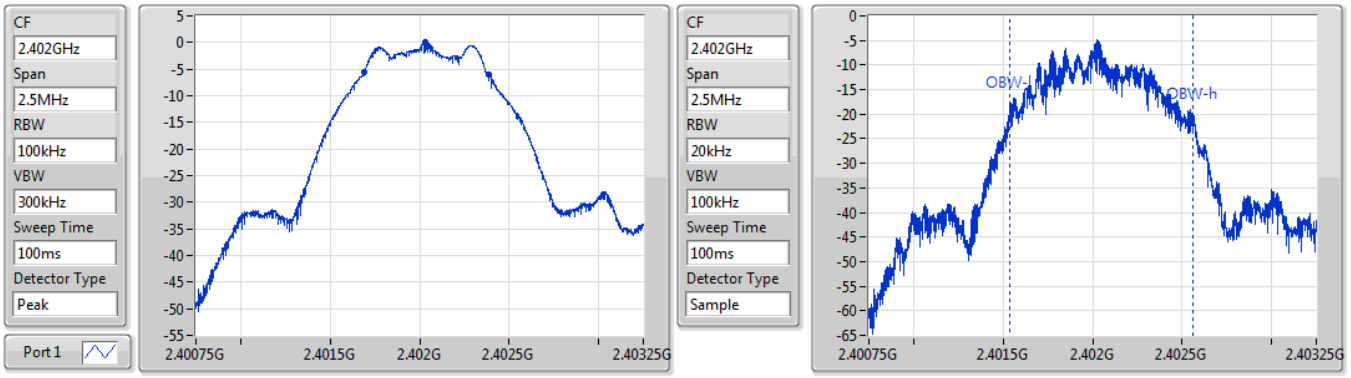
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	697.5k	1.026M
2440MHz	Pass	500k	691.25k	1.026M
2480MHz	Pass	500k	702.5k	1.026M

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

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

2402MHz

04/09/2019

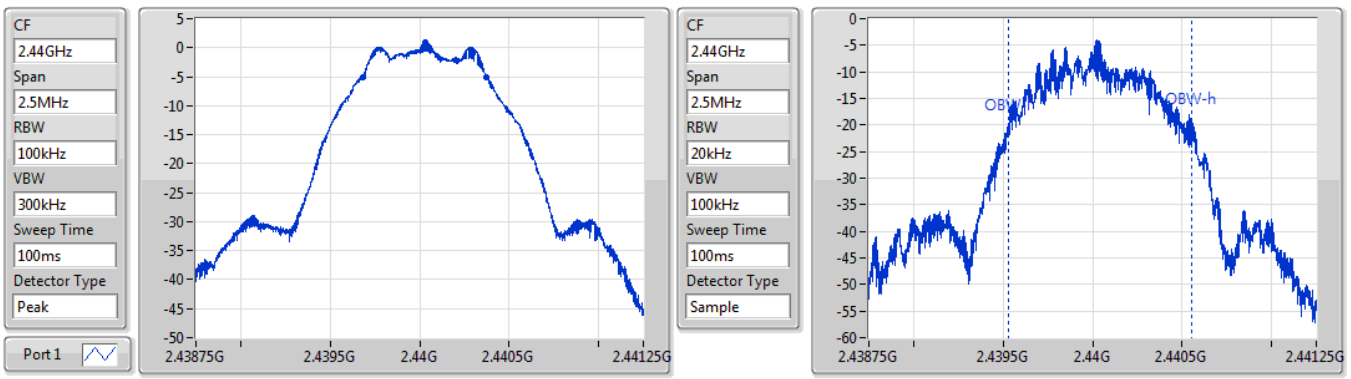


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
697.5k	2.40169G	2.402388G	1.026M	2.401534G	2.40256G	500k	1

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

2440MHz

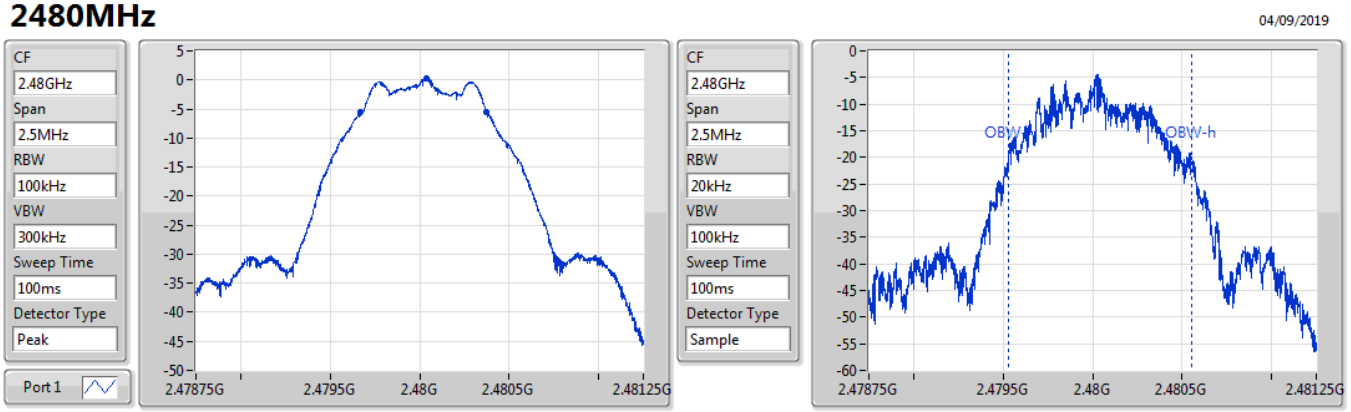
04/09/2019



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
691.25k	2.439681G	2.440373G	1.026M	2.439526G	2.440552G	500k	1

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

2480MHz



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
702.5k	2.479669G	2.480371G	1.026M	2.479528G	2.480553G	500k	1

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	1.12	0.00129

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.50	0.27	30.00
2440MHz	Pass	4.50	1.12	30.00
2480MHz	Pass	4.50	0.67	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-15.43

RBW=3 kHz.

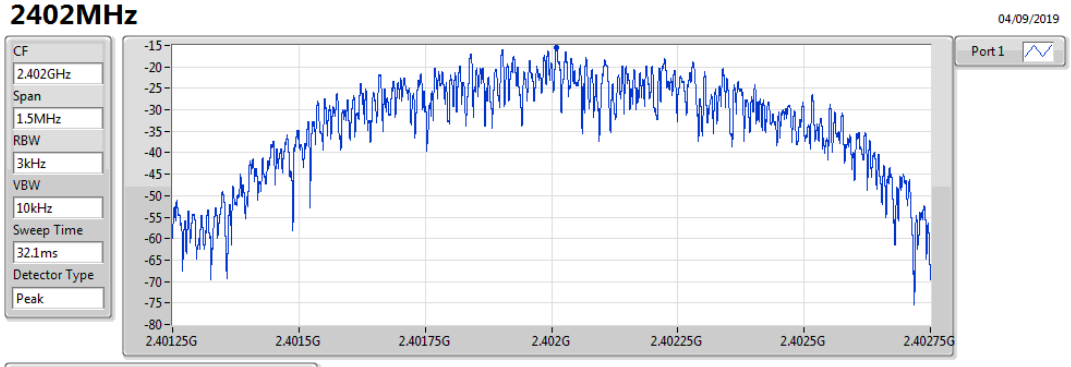
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.50	-15.43	8.00
2440MHz	Pass	4.50	-15.76	8.00
2480MHz	Pass	4.50	-15.64	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**

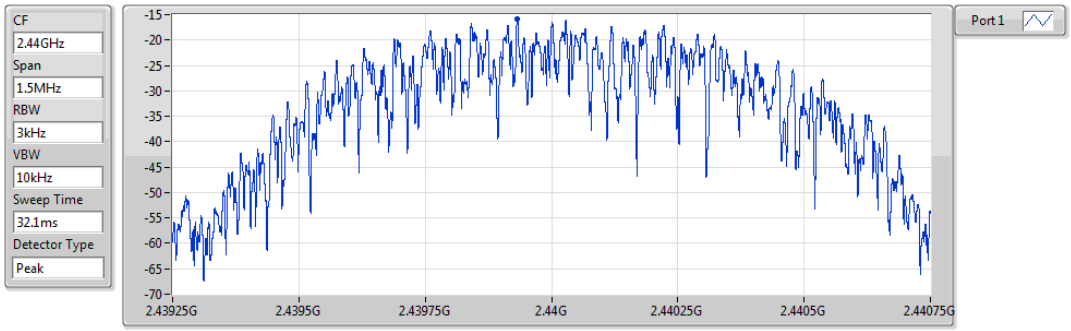
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-15.43	-15.43	-15.43

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

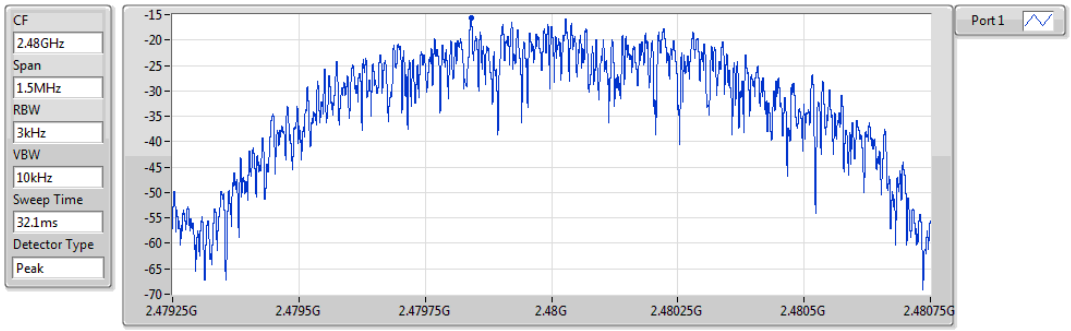
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-15.76	-15.76	-15.76

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

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-15.64	-15.64	-15.64

Summary

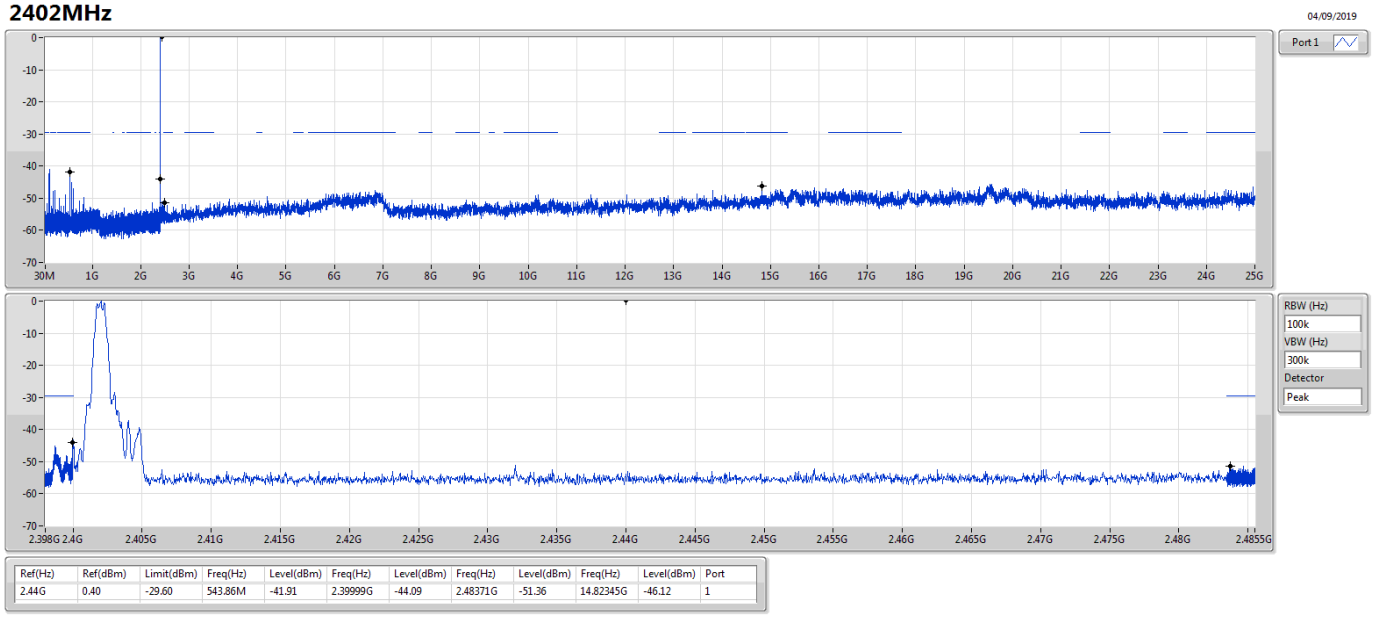
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.44G	0.40	-29.60	95.71M	-41.48	2.39923G	-51.87	2.48504G	-51.57	24.45965G	-46.66	1

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)	Port
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.44G	0.40	-29.60	543.86M	-41.91	2.39999G	-44.09	2.48371G	-51.36	14.82345G	-46.12	1
2440MHz	Pass	2.44G	0.40	-29.60	95.71M	-41.48	2.39923G	-51.87	2.48504G	-51.57	24.45965G	-46.66	1
2480MHz	Pass	2.44G	0.40	-29.60	543.86M	-42.35	2.39932G	-52.08	2.48351G	-50.47	17.48016G	-46.52	1

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

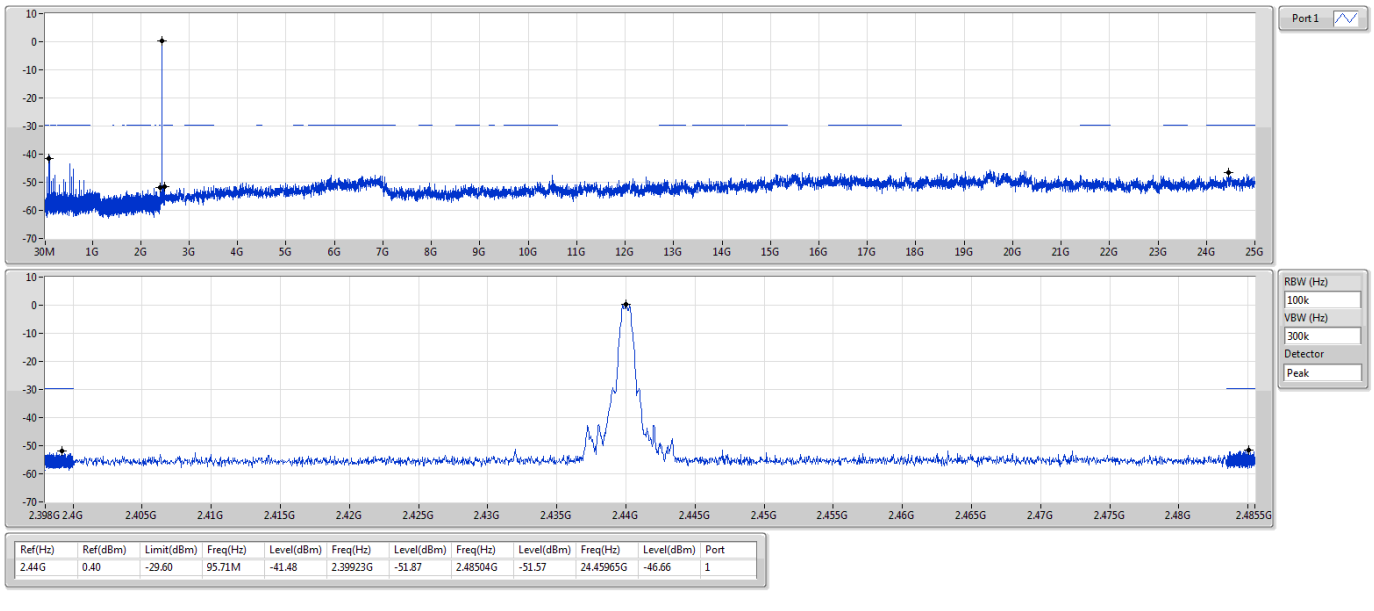
2402MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44G	0.40	-29.60	543.86M	-41.91	2.39999G	-44.09	2.48371G	-51.36	14.82345G	-46.12	1

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

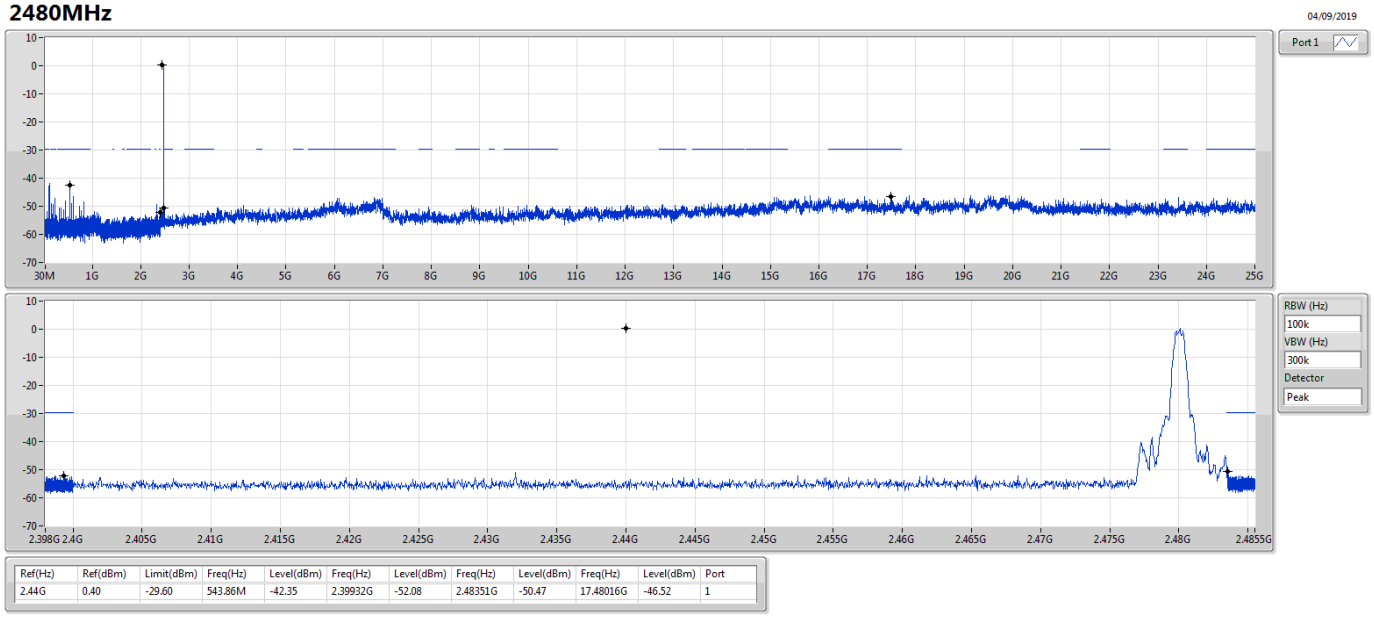
2440MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44G	0.40	-29.60	95.71M	-41.48	2.39923G	-51.87	2.48504G	-51.57	24.45965G	-46.66	1

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

2480MHz

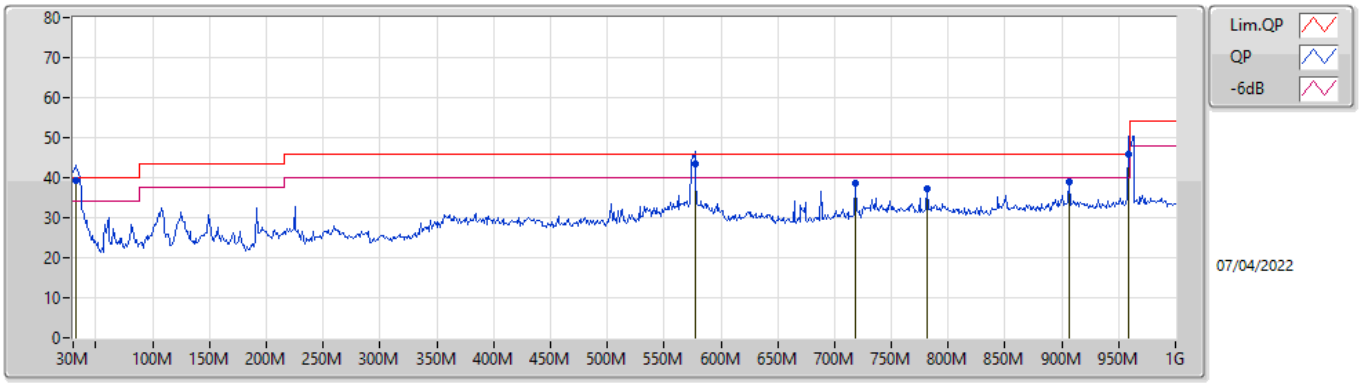


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44G	0.40	-29.60	543.86M	-42.35	2.39932G	-52.08	2.48351G	-50.47	17.48016G	-46.52	1

Summary

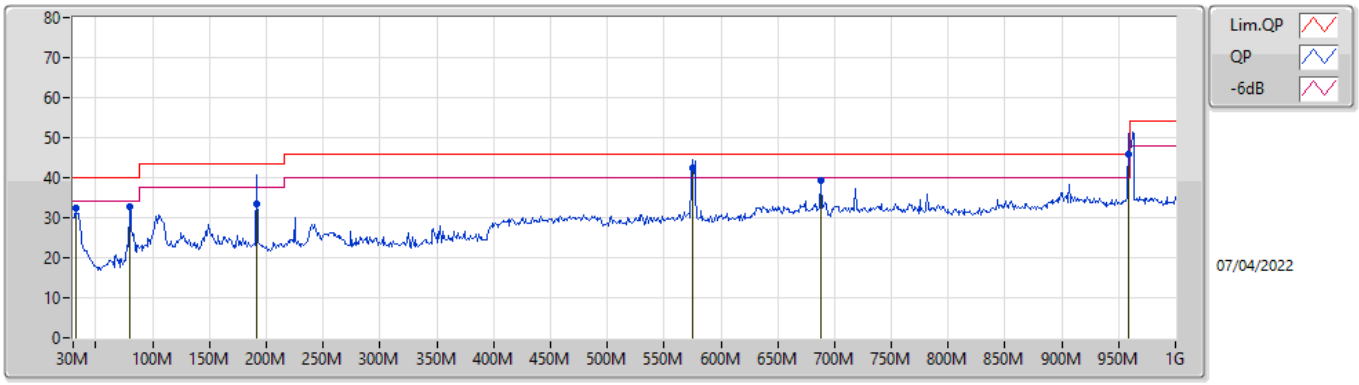
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 3	Pass	QP	958.29M	45.95	46.00	-0.05	Horizontal

Mode 3



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
QP	31.94M	39.25	40.00	-0.75	-8.04	3	Vertical	354	1.00	-	47.29	22.59	1.54	32.17
QP	577.08M	43.46	46.00	-2.54	-5.05	3	Vertical	131	1.00	-	48.51	24.76	3.10	32.91
PK	718.7M	38.79	46.00	-7.21	-4.19	3	Vertical	147	1.25	-	42.98	25.69	3.44	33.32
PK	781.75M	37.12	46.00	-8.88	-4.20	3	Vertical	250	1.25	-	41.32	25.75	3.56	33.51
PK	906.88M	39.10	46.00	-6.90	-2.15	3	Vertical	3	2.00	-	41.25	26.95	3.90	33.00
QP	958.29M	45.73	46.00	-0.27	-1.39	3	Vertical	234	1.00	"Worst"	47.12	27.01	3.90	32.30

Mode 3



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	31.94M	32.52	40.00	-7.48	-8.04	3	Horizontal	254	2.00	-	40.56	22.59	1.54	32.17
PK	79.47M	32.67	40.00	-7.33	-17.57	3	Horizontal	131	1.50	-	50.24	12.75	1.80	32.12
QP	191.99M	33.59	43.50	-9.91	-14.94	3	Horizontal	90	1.25	-	48.53	15.08	2.06	32.08
QP	575.14M	42.55	46.00	-3.45	-5.07	3	Horizontal	173	1.25	-	47.62	24.74	3.10	32.91
PK	687.66M	39.21	46.00	-6.79	-4.68	3	Horizontal	191	1.00	-	43.89	25.25	3.38	33.31
QP	958.29M	45.95	46.00	-0.05	-1.39	3	Horizontal	115	1.25	"Worst"	47.34	27.01	3.90	32.30

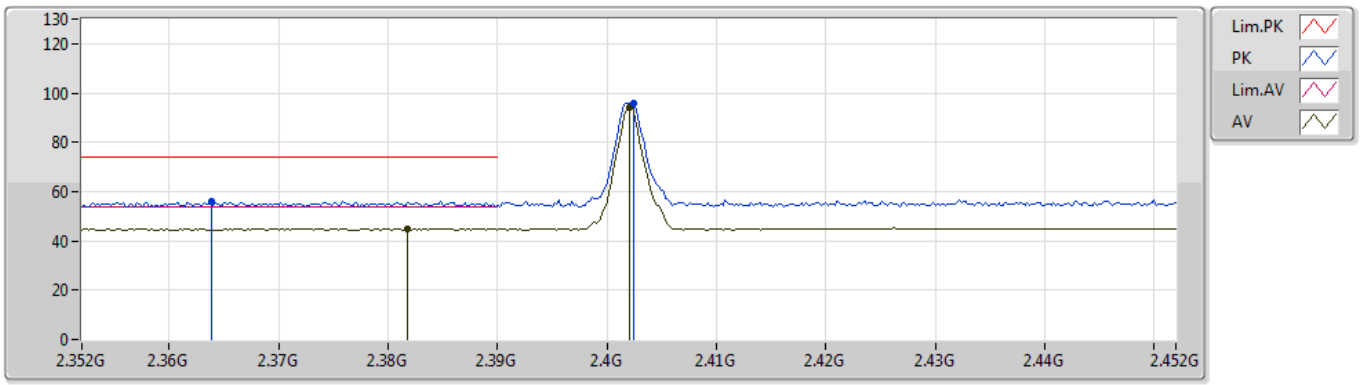
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	2.4835G	50.43	54.00	-3.57	32.25	3	Horizontal	90	1.18	-

BT-LE(1Mbps)

04/09/2019

2402MHz_TX



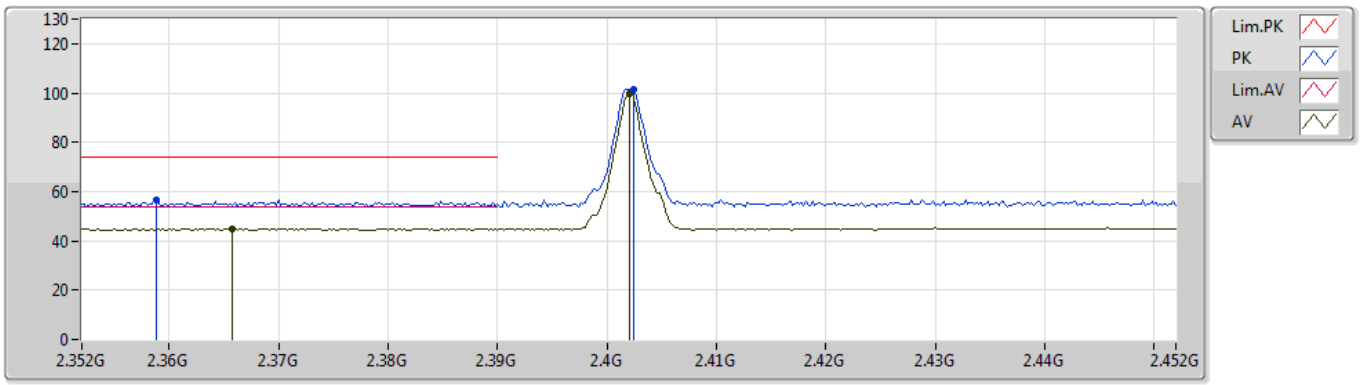
EUT Y_1TX
Setting 8
03-W-3
FSP(100080)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)
PK	2.3638G	56.21	74.00	-17.79	31.86	3	Vertical	20	2.63	-	24.35
AV	2.3818G	44.91	54.00	-9.09	31.91	3	Vertical	20	2.63	-	13.00
PK	2.4024G	95.79	Inf	-Inf	31.97	3	Vertical	20	2.63	-	63.82
AV	2.402G	94.30	Inf	-Inf	31.97	3	Vertical	20	2.63	-	62.33

BT-LE(1Mbps)

2402MHz_TX

04/09/2019



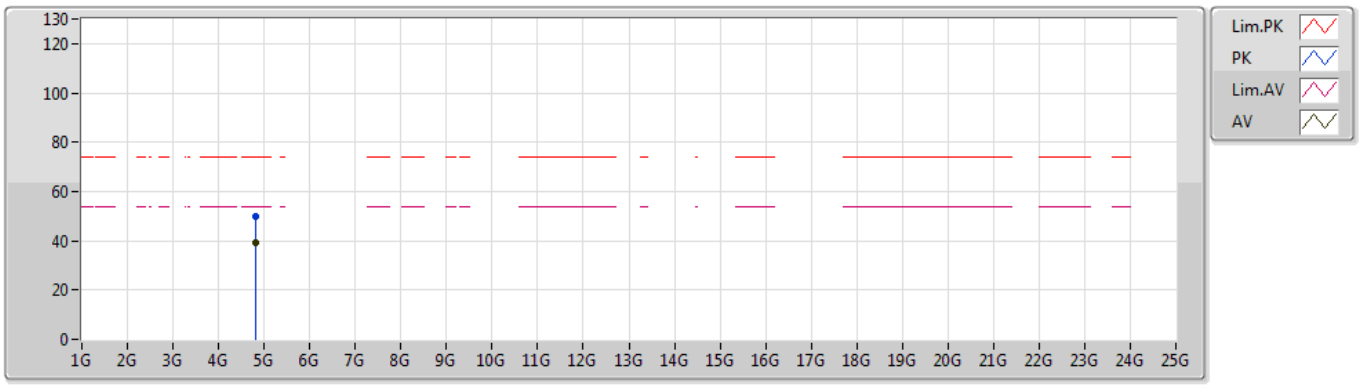
EUT Y_1TX
Setting 8
03-W-3
FSP(100080)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)
PK	2.3588G	56.58	74.00	-17.42	31.85	3	Horizontal	111	2.19	-	24.73
AV	2.3658G	44.94	54.00	-9.06	31.86	3	Horizontal	111	2.19	-	13.08
PK	2.4024G	101.35	Inf	-Inf	31.97	3	Horizontal	111	2.19	-	69.38
AV	2.402G	99.87	Inf	-Inf	31.97	3	Horizontal	111	2.19	-	67.90

BT-LE(1Mbps)

2402MHz_TX

04/09/2019



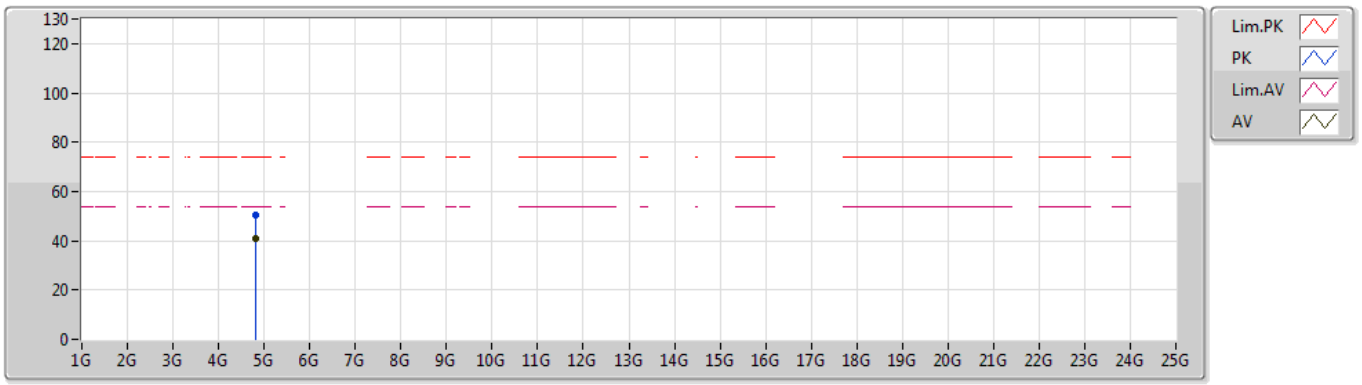
EUT Y_1TX
Setting 8
03-W-3
FSP(100080)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)
PK	4.80373G	49.71	74.00	-24.29	4.67	3	Vertical	165	1.27	-	45.04
AV	4.80405G	39.33	54.00	-14.67	4.67	3	Vertical	165	1.27	-	34.66

BT-LE(1Mbps)

2402MHz_TX

04/09/2019



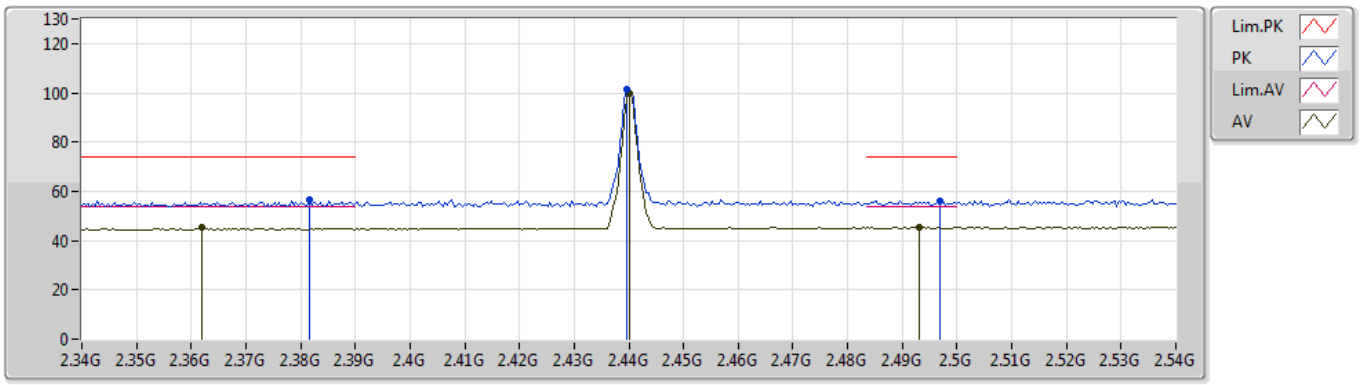
EUT Y_1TX
Setting 8
03-W-3
FSP(100080)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)
PK	4.80348G	50.46	74.00	-23.54	4.67	3	Horizontal	5	1.63	-	45.79
AV	4.80384G	40.65	54.00	-13.35	4.67	3	Horizontal	5	1.63	-	35.98

BT-LE(1Mbps)

2440MHz_TX

04/09/2019



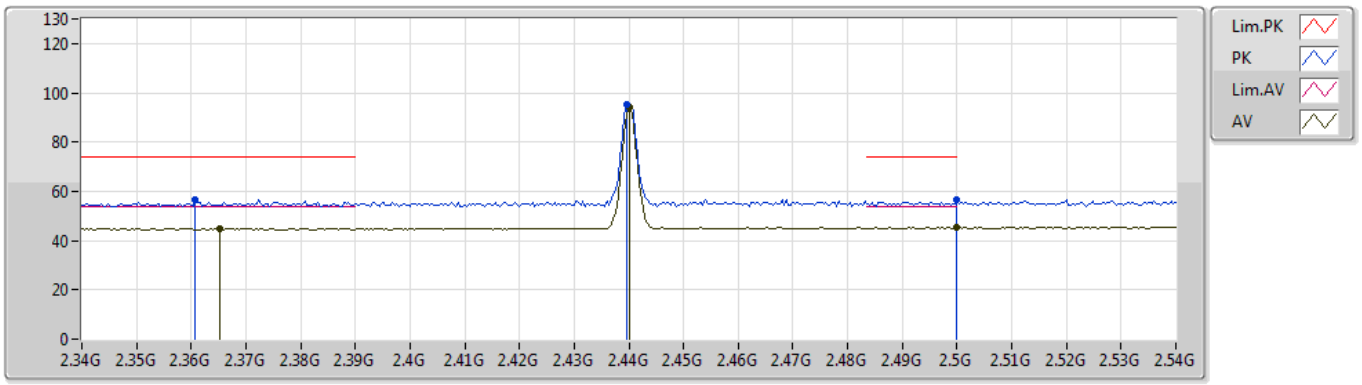
EUT Y_1TX
Setting 8
03-E-2
FSP(100080)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)
PK	2.3816G	56.44	74.00	-17.56	31.91	3	Vertical	188	1.50	-	24.53
AV	2.362G	45.24	54.00	-8.76	31.85	3	Vertical	188	1.50	-	13.39
PK	2.4396G	101.37	Inf	-Inf	32.10	3	Vertical	188	1.50	-	69.27
AV	2.44G	99.83	Inf	-Inf	32.10	3	Vertical	188	1.50	-	67.73
PK	2.4968G	56.00	74.00	-18.00	32.30	3	Vertical	188	1.50	-	23.70
AV	2.4932G	45.36	54.00	-8.64	32.29	3	Vertical	188	1.50	-	13.07

BT-LE(1Mbps)

2440MHz_TX

04/09/2019



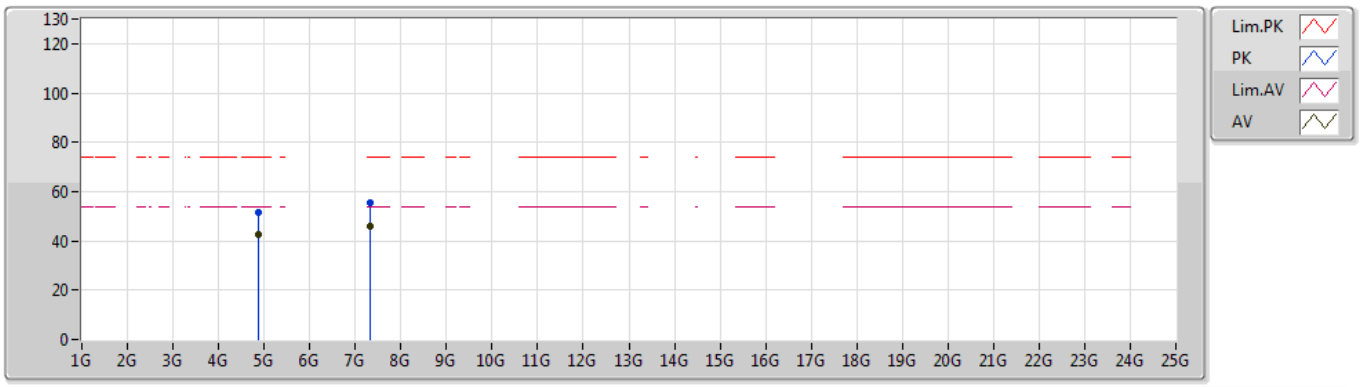
EUT Y_1TX
Setting 8
03-E-2
FSP(100080)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)
PK	2.3608G	56.44	74.00	-17.56	31.85	3	Horizontal	119	1.21	-	24.59
AV	2.3652G	44.88	54.00	-9.12	31.86	3	Horizontal	119	1.21	-	13.02
PK	2.4396G	95.42	Inf	-Inf	32.10	3	Horizontal	119	1.21	-	63.32
AV	2.44G	93.89	Inf	-Inf	32.10	3	Horizontal	119	1.21	-	61.79
PK	2.5G	56.38	74.00	-17.62	32.31	3	Horizontal	119	1.21	-	24.07
AV	2.5G	45.31	54.00	-8.69	32.31	3	Horizontal	119	1.21	-	13.00

BT-LE(1Mbps)

2440MHz_TX

04/09/2019



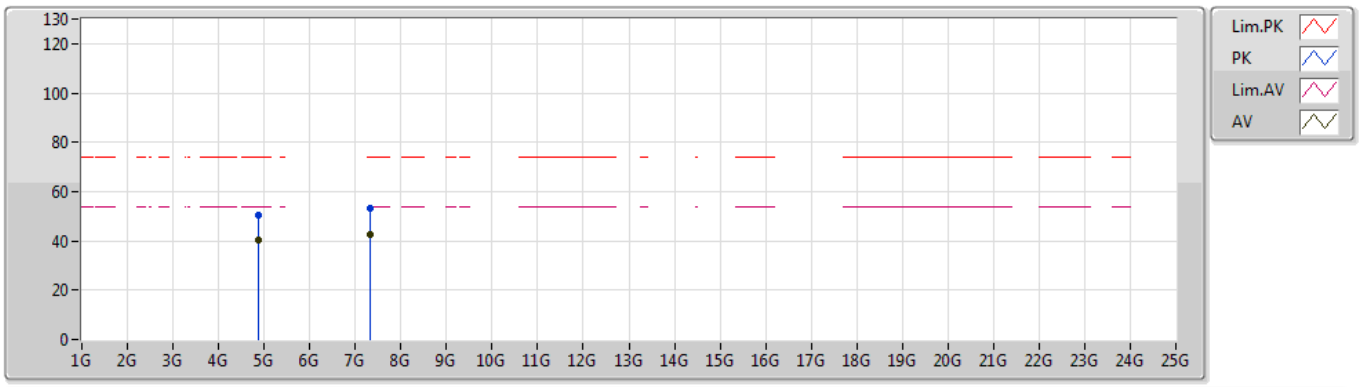
EUT Y_1TX
Setting 8
03-E-2
FSP(100080)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)
PK	4.87958G	51.64	74.00	-22.36	4.81	3	Vertical	177	1.01	-	46.83
AV	4.88G	42.36	54.00	-11.64	4.81	3	Vertical	177	1.01	-	37.55
PK	7.31916G	55.40	74.00	-18.60	9.01	3	Vertical	156	1.05	-	46.39
AV	7.31934G	45.88	54.00	-8.12	9.01	3	Vertical	156	1.05	-	36.87

BT-LE(1Mbps)

2440MHz_TX

04/09/2019



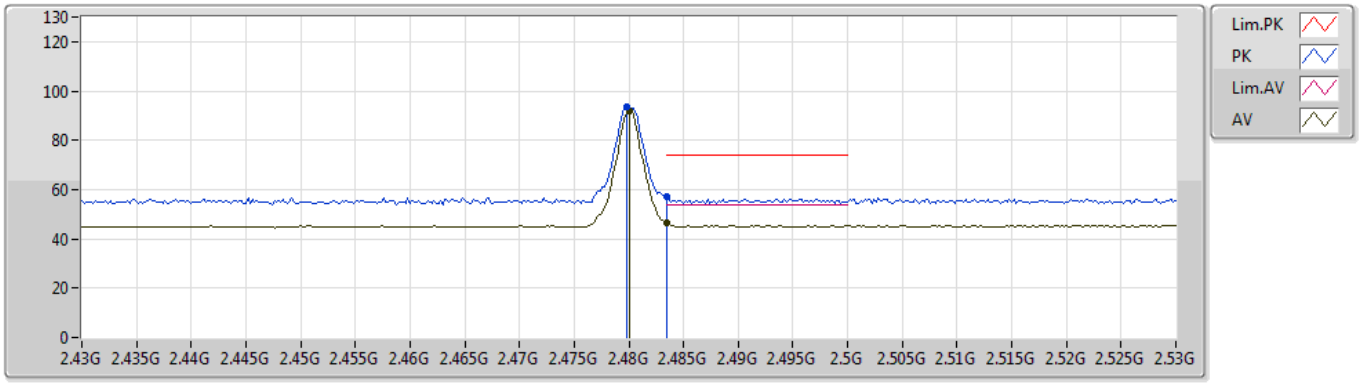
EUT Y_1TX
Setting 8
03-E-2
FSP(100080)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)
PK	4.87946G	50.24	74.00	-23.76	4.81	3	Horizontal	112	1.06	-	45.43
AV	4.88012G	40.35	54.00	-13.65	4.81	3	Horizontal	112	1.06	-	35.54
PK	7.31939G	53.06	74.00	-20.94	9.01	3	Horizontal	251	1.24	-	44.05
AV	7.3194G	42.39	54.00	-11.61	9.01	3	Horizontal	251	1.24	-	33.38

BT-LE(1Mbps)

2480MHz_TX

04/09/2019



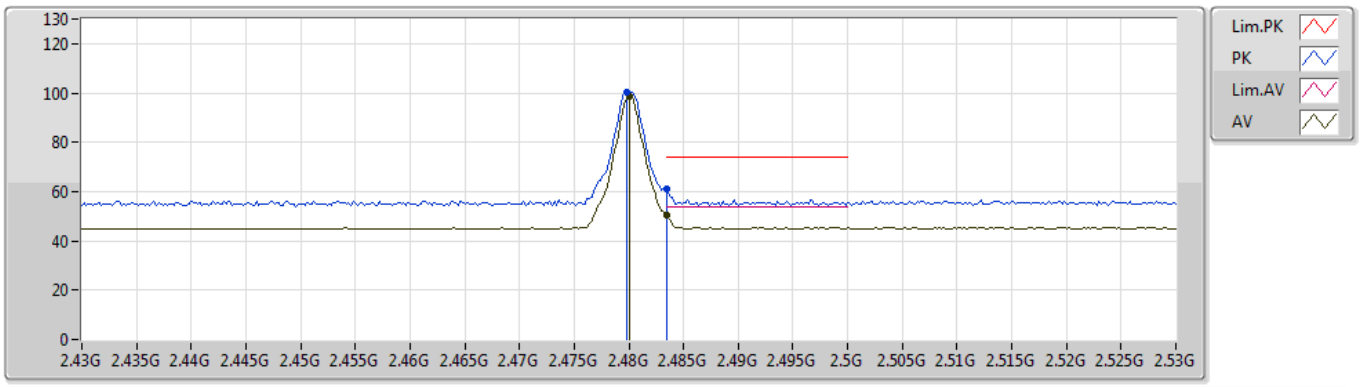
EUT Y_1TX
Setting 8
03-W-3
FSP(100080)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)
PK	2.4798G	93.45	Inf	-Inf	32.24	3	Vertical	31	1.58	-	61.21
AV	2.48G	91.77	Inf	-Inf	32.24	3	Vertical	31	1.58	-	59.53
PK	2.4835G	57.27	74.00	-16.73	32.25	3	Vertical	31	1.58	-	25.02
AV	2.4835G	46.50	54.00	-7.50	32.25	3	Vertical	31	1.58	-	14.25

BT-LE(1Mbps)

2480MHz_TX

04/09/2019



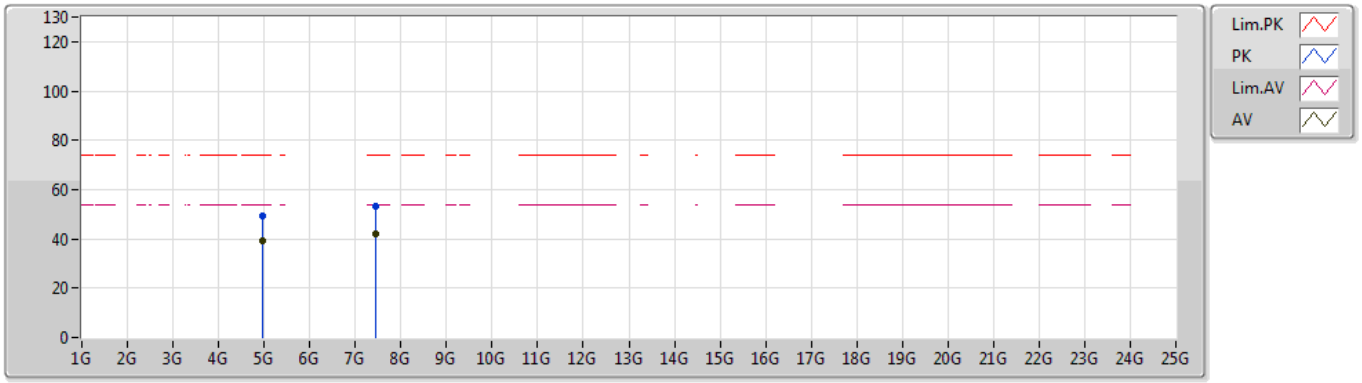
EUT Y_1TX
Setting 8
03-W-3
FSP(100080)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)
PK	2.4798G	100.25	Inf	-Inf	32.24	3	Horizontal	90	1.18	-	68.01
AV	2.48G	98.73	Inf	-Inf	32.24	3	Horizontal	90	1.18	-	66.49
PK	2.4835G	60.80	74.00	-13.20	32.25	3	Horizontal	90	1.18	-	28.55
AV	2.4835G	50.43	54.00	-3.57	32.25	3	Horizontal	90	1.18	-	18.18

BT-LE(1Mbps)

2480MHz_TX

04/09/2019



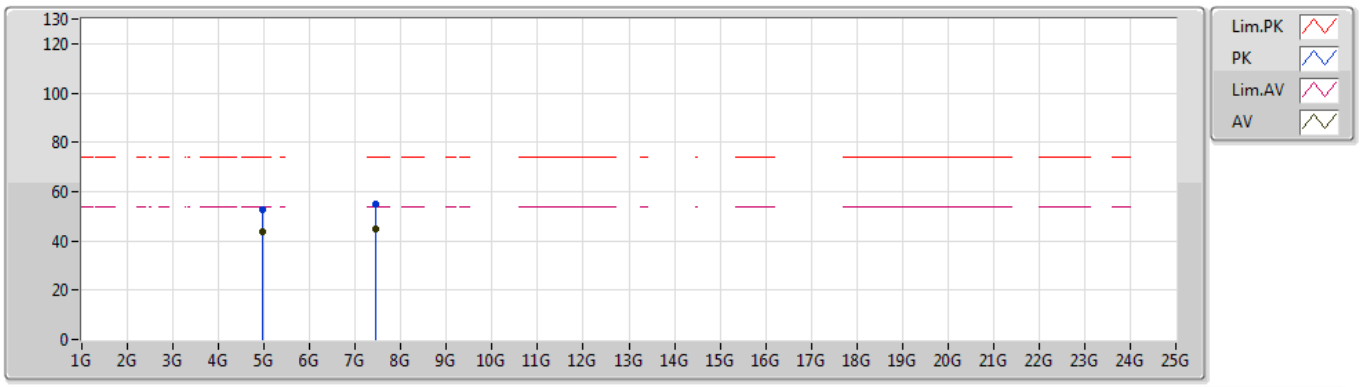
EUT Y_1TX
Setting 8
03-W-3
FSP(100080)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)
PK	4.95952G	49.50	74.00	-24.50	4.96	3	Vertical	170	1.34	-	44.54
AV	4.95983G	39.02	54.00	-14.98	4.96	3	Vertical	170	1.34	-	34.06
PK	7.43979G	53.40	74.00	-20.60	9.14	3	Vertical	32	2.09	-	44.26
AV	7.43923G	42.11	54.00	-11.89	9.14	3	Vertical	32	2.09	-	32.97

BT-LE(1Mbps)

2480MHz_TX

04/09/2019



EUT Y_1TX
Setting 8
03-W-3
FSP(100080)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)
PK	4.96042G	52.49	74.00	-21.51	4.96	3	Horizontal	33	1.84	-	47.53
AV	4.95996G	43.65	54.00	-10.35	4.96	3	Horizontal	33	1.84	-	38.69
PK	7.4392G	54.69	74.00	-19.31	9.14	3	Horizontal	34	1.47	-	45.55
AV	7.43949G	44.87	54.00	-9.13	9.14	3	Horizontal	34	1.47	-	35.73