FCC RADIO TEST REPORT

FCC ID	:	2AWNEKDE20102
Equipment	:	Home Entertainment Hub
Brand Name	:	E1 by Ericsson
Model Name	:	KDE20102
Applicant	:	Ericsson AB 21-23 Torshamnsgatan Stockholm, 16480 Sweden
Manufacturer	:	CyberTAN Technology Inc. No. 99, Park Avenue III Science-based Industrial Park Hsinchu Taiwan 308
Standard	:	47 CFR FCC Part 15.247

The product was received on Mar. 27, 2020, and testing was started from Apr. 07, 2020 and completed on May 22, 2020. 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

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

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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Photographs of EUT v01

History of this test report

Report No.	Version	Description	Issued Date
FR031609AD	01	Initial issue of report	Aug. 05, 2020
FR031609AD	02	Changing the support type of bridge function to “Slave without radar detection” from “Master”.	Aug. 07, 2020

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:

1. The test configuration, test mode and test software were written in this test report are declared by the manufacturer.
2. 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: Cindy Peng

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

For WLAN 2.4GHz / WLAN 5GHz / Bluetooth / Zigbee function:

Ant.	Port		Brand	Model Name	Type	Connector	Gain (dBi)	
	WLAN 2.4GHz	WLAN 5GHz B1					WLAN 2.4GHz	WLAN 5GHz B1
1	1	1	Airgain	N2420DSRD	PCB	I-PEX	2.2	3.1
2	2	2	Airgain	N2420DSRF	PCB	I-PEX	2.7	3.3
Ant.	**Port**		**Brand**	**Model Name**	**Type**	**Connector**	**Gain (dBi)**	
	WLAN 5GHz B4	**Zigbee**					**WLAN 5GHz B4**	**Zigbee**
3	1	1	Airgain	N2420DSRC	PCB	I-PEX	3.1	2.8
Ant.	**Port**		**Brand**	**Model Name**	**Type**	**Connector**	**Gain (dBi)**	
	WLAN 5GHz B4	**Bluetooth**					**WLAN 5GHz B4**	**Bluetooth**
4	2	1	Airgain	N2420DSRE	PCB	I-PEX	3.1	2.7

Note1: B1 means band 1, B4 means band 4.
Note2: The above information was declared by manufacturer.
Note3: For WLAN 2.4GHz function (2TX/2RX):
The WLAN 2.4GHz supports the b, g, n, VHT.
Port 1 and Port 2 could transmit/receive simultaneously.
Note4: For WLAN 5GHz Band 1 function (2TX/2RX):
The WLAN 5GHz Band 1 supports the a, n, ac.
Port 1 and Port 2 could transmit/receive simultaneously.
Note5: For WLAN 5GHz Band 4 function (2TX/2RX):
The WLAN 5GHz Band 4 supports the a, n, ac.
Port 1 and Port 2 could transmit/receive simultaneously.
Note6: For Zigbee function (1TX/1RX):
Only Port 1 can be used as transmitting/receiving.
Note7: For Bluetooth function (1TX/1RX):
Only Port 1 can be used as transmitting/receiving.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-BR (1Mbps)	0.474	3.24	2.899m	1k
BT-EDR (2Mbps)	0.498	3.03	2.906m	1k
BT-EDR (3Mbps)	0.499	3.02	2.908m	1k

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	Blue Test3			
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 of WWAN Module

The EUT contains a LTE module, the detail information as following.

Brand Name	Model Name	FCC ID	Function
Telit	LN960A16	RI7LN960A16	LTE: Band 2/4/5/7/12/13/14/17/25/26/30/38/41/66

1.1.6 Table for EUT Supports Functions

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

Note: The “AP mode” has been selected to test and recorded in the test report 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, Lane 724, Bo-ai St., Jhubei 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	Test Date
RF Conducted	TH03-CB	Owen Hsu	23.5~25.5°C / 53~55%	Apr. 10, 2020~May 08, 2020
Radiated Below 1GHz (Mode 1~Mode 3)	03CH06-CB	JN Du	22.7~23.5°C / 53~57%	Apr. 13, 2020~May 22, 2020
Radiated Below 1GHz (Mode 4~Mode 6)	03CH06-CB	Eason Chen	22.7~23.5°C / 53~57%	Apr. 09, 2020~May 14, 2020
Radiated Above 1GHz	03CH03-CB, 03CH04-CB	Eason Chen	22.7~23.5°C / 53~57%	Apr. 09, 2020~May 14, 2020
AC Conduction	CO01-CB	Ryo Fan	21~22°C / 60~63%	Apr. 07, 2020

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 (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
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%

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	10
2440MHz	7
2480MHz	7

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral
Operating Mode	Normal Link
1	AP mode with LTE Link: Band 2 – EUT + Adapter 1 + Power cable
2	AP mode with LTE Link: Band 4 – EUT + Adapter 2 + Power cable
For operating mode 2 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	WLAN 2.4GHz + Adapter 1
2	WLAN 5GHz Band 1 + Adapter 1
3	WLAN 5GHz Band 4 + Adapter 1
4	Bluetooth + Adapter 1
5	Zigbee + Adapter 1
Mode 4 has been evaluated to be the worst case among Mode 1~5, thus measurement for Mode 6 will follow this same test mode.	
6	Bluetooth + Adapter 2
For operating mode 6 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	CTX

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Radiated Emission Co-location
Test Condition	Radiated measurement
Operating Mode	Normal Link
The Operating Mode of Radiated Emission Co-location as below: 1. WLAN 2.4GHz + WLAN 5GHz Band 1 2. WLAN 5GHz Band 4 + Bluetooth 3. WLAN 5GHz Band 4 + Zigbee After evaluating, the full function generated the worst case, thus the measurement will follow this same test configuration.	
1	WLAN 2.4GHz + WLAN 5GHz Band 1 + WLAN 5GHz Band 4 + Bluetooth + Zigbee
Refer to Appendix G for Radiated Emission Co-location.	

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 Band 1 + WLAN 5GHz Band 4 + Bluetooth + Zigbee + LTE
Refer to Sporton Test Report No.: FA031609 for Co-location RF Exposure Evaluation.	

Note: The EUT can only be used Z axis.

2.3 EUT Operation during Test

For CTX Mode:
The EUT was programmed to be in continuously transmitting mode.

For Normal Link:
During the test, the EUT operation to normal function.

2.4 Accessories

Accessories					
No.	**Equipment Name**	**Brand Name**	**Model Name**	**Rating**	**Remark**
1	Adapter 1	FSP	FSP100-A1AR3	INPUT: 100-240V~50-60Hz, 1.4A OUTPUT: 5V, 3A / 9V, 3A 12V, 3A / 15V, 3A 20V, 5.0A 100W MAX.	With the cable: Non-shielded, 1.6m
2	Adapter 2	DELTA	ADH-100CR B	INPUT: 100-240V~1.8A, 50-60Hz OUTPUT: 5.0V, 3.0A, 15.0W or 9.0V, 3.0A 15.0V, 3.0A or 20.0V, 5.0A 100.0W.	With the cable: Non-shielded, 1.6m
Others					
3	HDMI cable*1: Shielded, 1.5m				
4	USB-C to USB-A cable*1: Shielded, 0.1m				
5	Power cable*1: Non-shielded, 1m				

2.5 Support Equipment

For AC Conduction:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	TV	ASUS	VP28U	N/A
B	Micro SD card	Transcend	TS16GUSDHC10	N/A
C	SIM card	N/A	N/A	N/A
D	LAN NB	DELL	E6430	N/A
E	WAN NB	DELL	E6430	N/A
F	2.4G NB	DELL	E6430	N/A
G	5G-1 NB	DELL	E6430	N/A
H	5G-2 NB	DELL	E6430	N/A
I	Bluetooth speaker	Wei Xuan	S06B	N/A
J	Zigbee device	N/A	N/A	N/A
K	LTE base station	Anritsu	MT8820C	N/A
L	Air mouse	HENGCHUANGYU	HCY-57B	2AOBUHCY-57B

For Radiated:

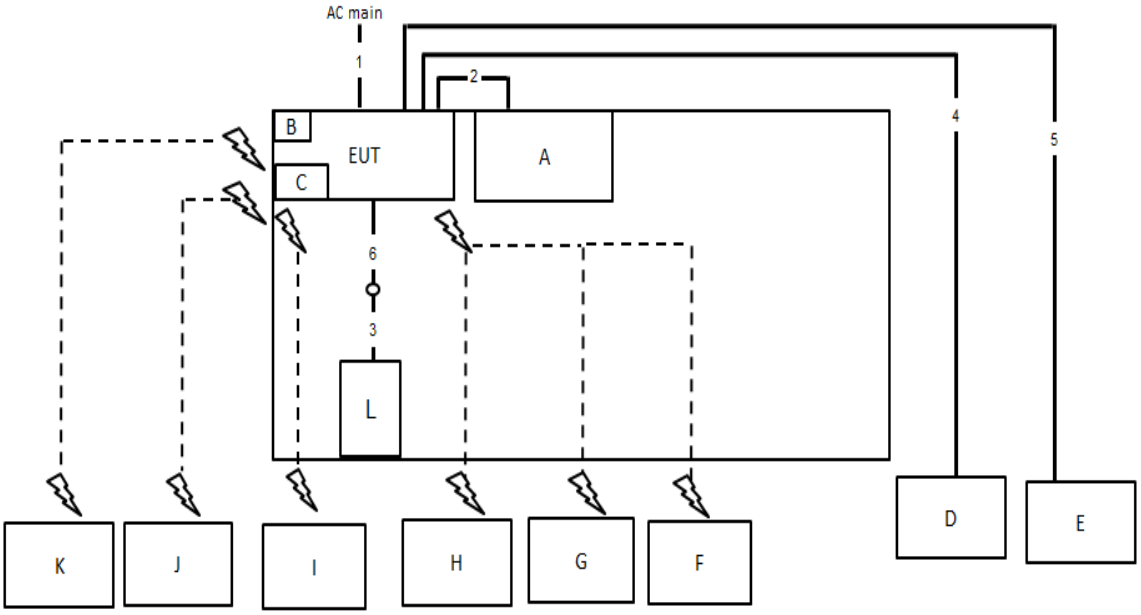
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	LCD Monitor	DELL	1704FPTt	N/A
B	USB Hub	IOTNPCI	HB-16	N/A
C	Keyboard	iCooky	SK068	N/A
D	Mouse	Logitech	M-U0026	N/A

For RF Conducted:

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

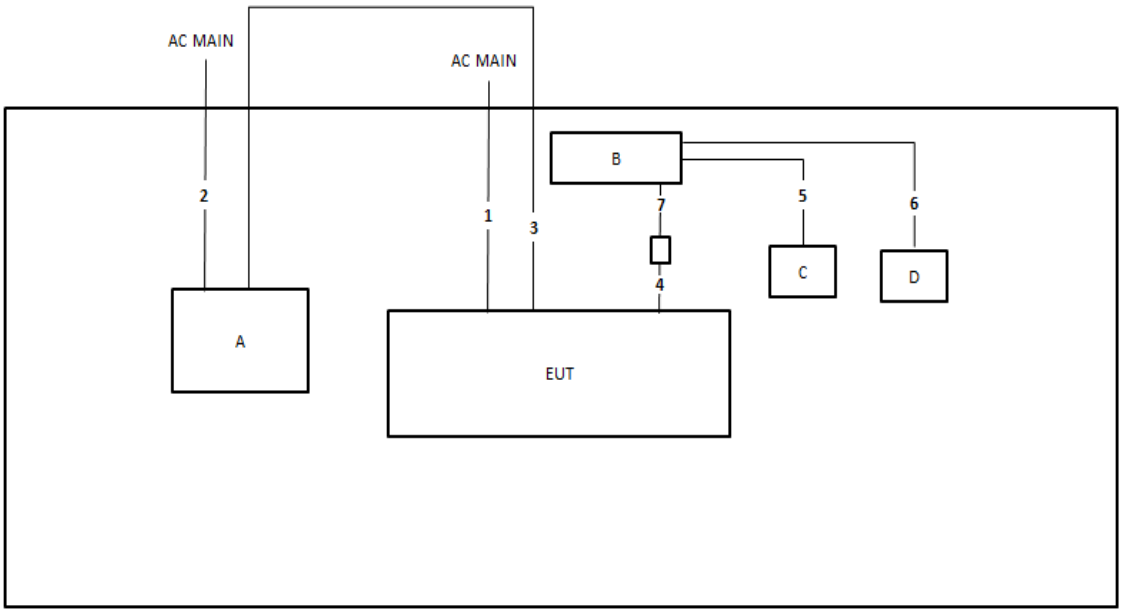
2.6 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length
1	Power cable	No	2.6m
2	HDMI cable	Yes	1.5m
3	USB cable	Yes	0.9m
4	RJ-45 cable	No	10m
5	RJ-45 cable	No	10m
6	USB cable	Yes	0.1m

Test Setup Diagram - Radiated Test



Item	Connection	Shielded	Length
1	Power cable	No	2.6m
2	Power cable	No	1.5m
3	HDMI cable	Yes	1.5m
4	USB cable	Yes	0.1m
5	USB cable	Yes	1.8m
6	USB cable	Yes	1.8m
7	USB cable	Yes	0.9m

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

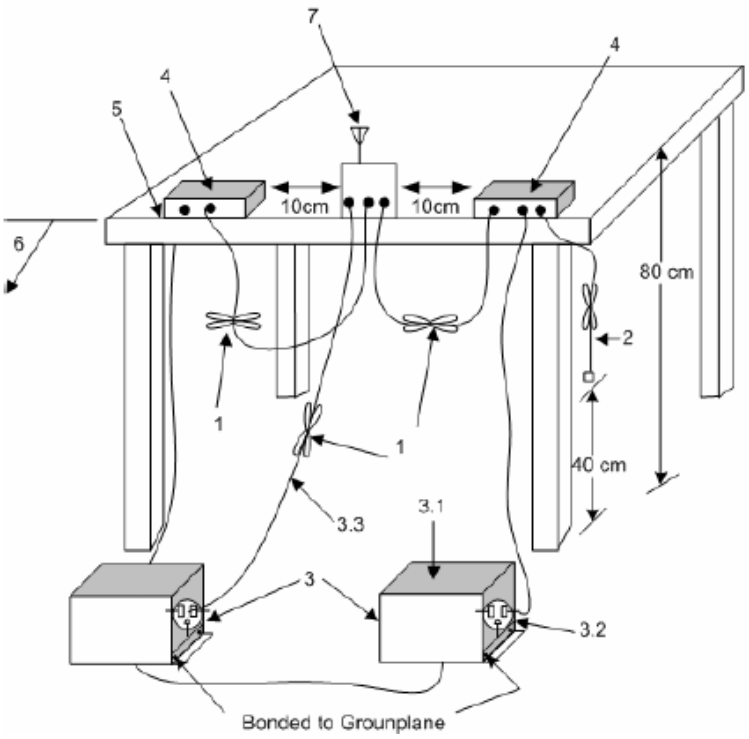
Refer a test equipment and calibration data table in this test report.

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.

3.1.5 Measurement Results Calculation

The measured Level is calculated using:

a. Corrected Reading (dBuV) = LISN Factor + Cable Loss + Read Level = Level

b. Margin = - Limit + (Read Level + LISN Factor + Cable Loss)

3.1.6 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
Systems using digital modulation techniques:
▪ 6 dB bandwidth ≥ 500 kHz.

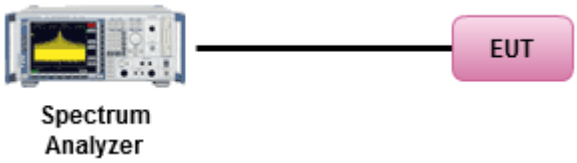
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

Test Method	
▪ For the emission bandwidth shall be measured using one of the options below:	
	☒ Refer as 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

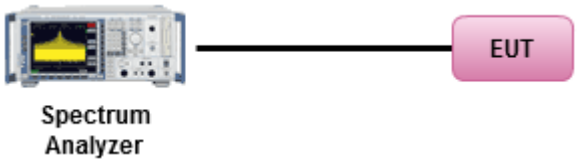
Refer a test equipment and calibration data table in this test report.

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

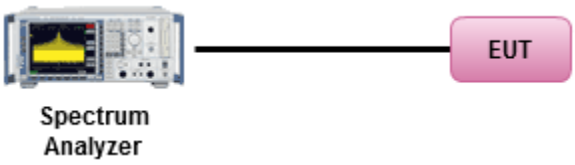
Refer a test equipment and calibration data table in this test report.

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.

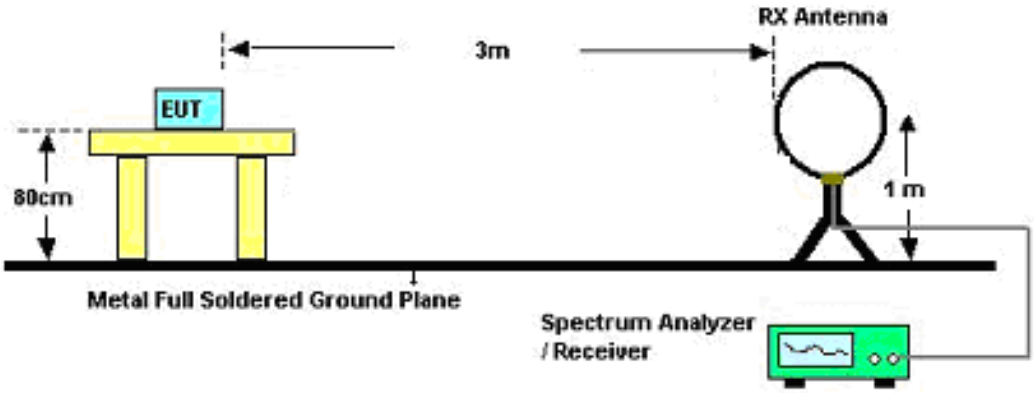
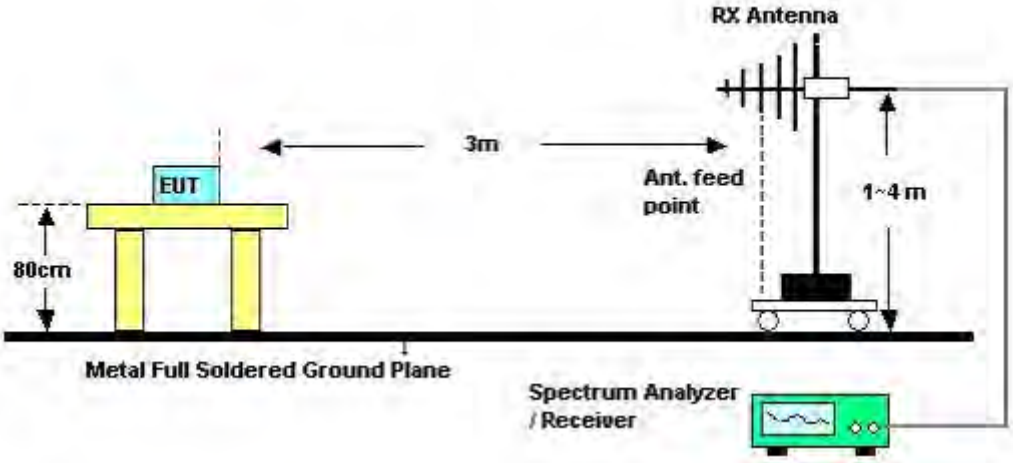
3.6.2 Measuring Instruments

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

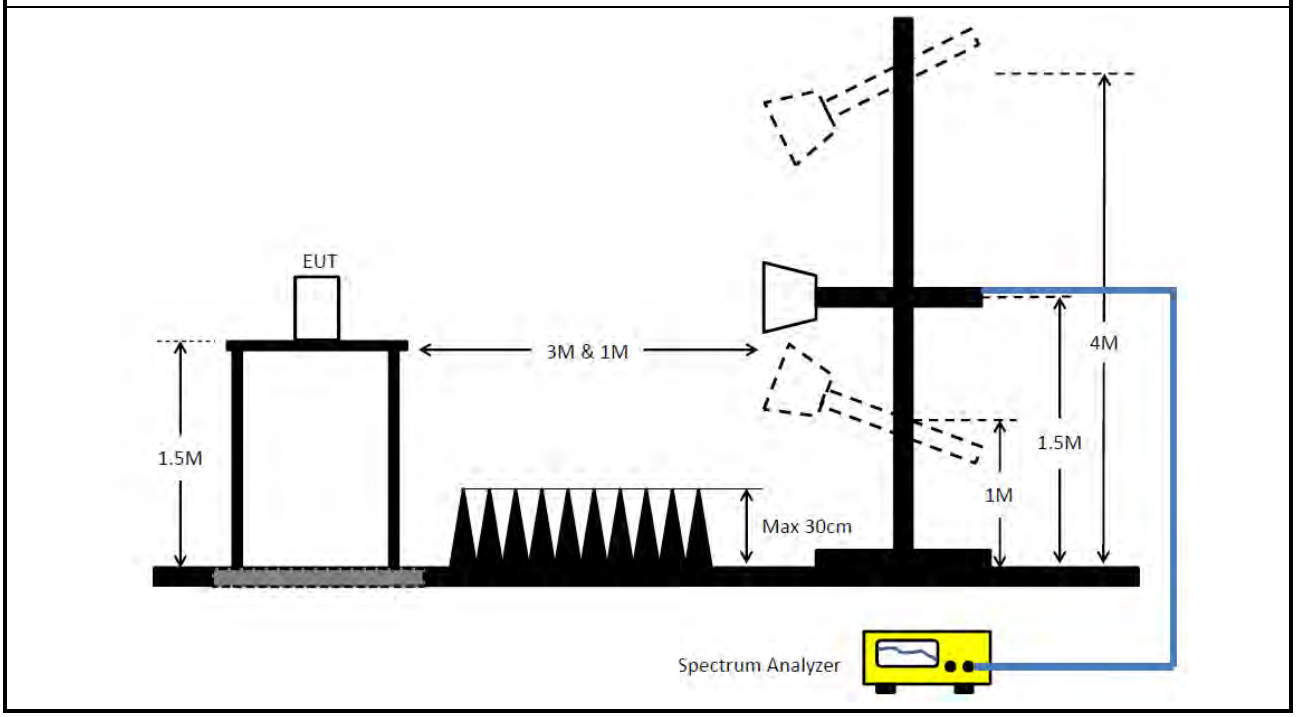
3.6.3 Test Procedures

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 + Cable Loss + Read Level - Preamp Factor (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 10 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	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Feb. 26, 2020	Feb. 25, 2021	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 25, 2019	Dec. 24, 2020	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)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 21, 2019	May 20, 2020	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	31244	9kHz - 30 MHz	Mar. 16, 2020	Mar. 15, 2021	Radiation (03CH06-CB)
Bilog Antenna with 6 dB attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37878 & AT-N0606	20MHz ~ 2GHz	Aug. 03, 2019	Aug. 02, 2020	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	310N	187290	0.1MHz ~ 1GHz	May 07, 2019	May 06, 2020	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	310N	187290	0.1MHz ~ 1GHz	Apr. 28, 2020	Apr. 27, 2021	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Oct. 21, 2019	Oct. 20, 2020	Radiation (03CH06-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 15, 2019	May 14, 2020	Radiation (03CH06-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 13, 2020	May 12, 2021	Radiation (03CH06-CB)
RF Cable-low	HUBER+SUHNER	RG402	Low Cable-05+24	30MHz~1GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)
Horn Antenna	ETS・Lindgren	3115	6821	750MHz~18GHz	Jan. 20, 2020	Jan. 19, 2021	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. 19, 2019	Dec.18, 2020	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)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH03-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH03-CB)
Horn Antenna	ETS・Lindgren	3115	00143147	750MHz~18GHz	Oct. 22, 2019	Oct. 21, 2020	Radiation (03CH04-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 12, 2019	Jun. 11, 2020	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	83017A	MY53270063	0.5GHz ~ 26.5GHz	Mar. 11, 2020	Mar. 10, 2021	Radiation (03CH04-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 03, 2019	Jul. 02, 2020	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Dec. 18, 2019	Dec. 17, 2020	Radiation (03CH04-CB
RF Cable-high	Woken	RG402	High Cable-21	1GHz - 18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21+22	1GHz - 18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 24, 2019	Jul. 23, 2020	Radiation (03CH04-CB)
Spectrum analyzer	R&S	FSV40	101028	9kHz~40GHz	Nov. 01, 2019	Oct. 31, 2020	Conducted (TH03-CB)
Power Sensor	Anritsu	MA2411B	1726195	300MHz~40GHz	Aug. 13, 2019	Aug. 12, 2020	Conducted (TH03-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Aug. 13, 2019	Aug. 12, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-11	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-12	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-13	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-14	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-15	1 GHz – 26.5 GHz	Oct. 07, 2019	Oct. 06, 2020	Conducted (TH03-CB)

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

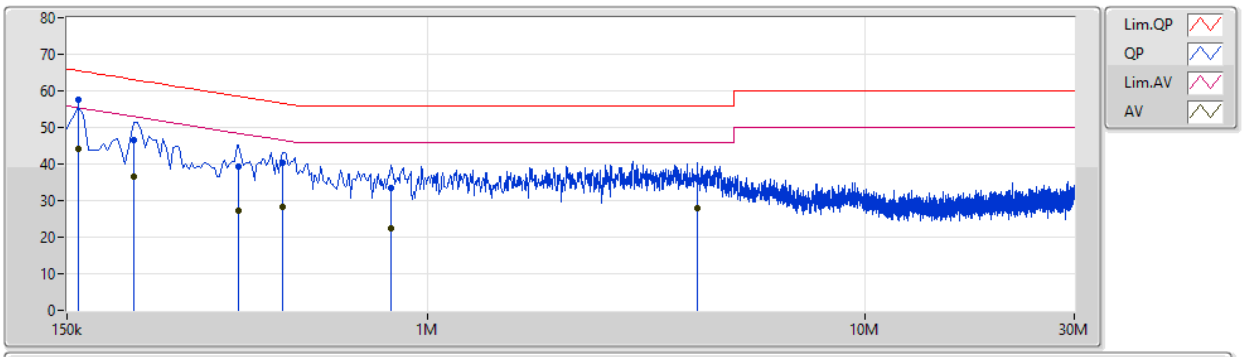
N.C.R. means Non-Calibration required.

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition
Mode 2	Pass	QP	159k	57.62	65.52	-7.90	9.90	Line

Mode 2

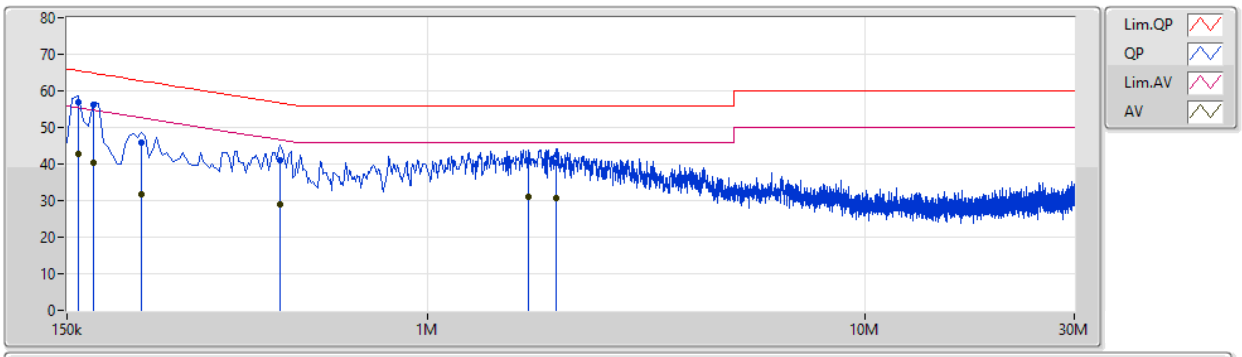
07/04/2020



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	AF	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	159k	57.62	65.52	-7.90	9.90	Line	"Worst"	47.72	0.05	0.06	9.79
AV	159k	43.97	55.52	-11.55	9.90	Line	-	34.07	0.05	0.06	9.79
QP	213k	46.71	63.09	-16.38	9.89	Line	-	36.82	0.04	0.06	9.79
AV	213k	36.43	53.09	-16.66	9.89	Line	-	26.54	0.04	0.06	9.79
QP	370.5k	39.20	58.49	-19.29	9.91	Line	-	29.29	0.04	0.06	9.81
AV	370.5k	27.15	48.49	-21.34	9.91	Line	-	17.24	0.04	0.06	9.81
QP	465k	40.36	56.61	-16.25	9.91	Line	-	30.45	0.04	0.06	9.81
AV	465k	28.11	46.61	-18.50	9.91	Line	-	18.20	0.04	0.06	9.81
QP	825k	33.37	56.00	-22.63	9.95	Line	-	23.42	0.05	0.08	9.82
AV	825k	22.50	46.00	-23.50	9.95	Line	-	12.55	0.05	0.08	9.82
QP	4.137M	35.79	56.00	-20.21	10.07	Line	-	25.72	0.09	0.17	9.81
AV	4.137M	27.77	46.00	-18.23	10.07	Line	-	17.70	0.09	0.17	9.81

Mode 2

07/04/2020



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	AF	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	159k	56.94	65.52	-8.58	9.89	Neutral	"Worst"	47.05	0.04	0.06	9.79
AV	159k	42.78	55.52	-12.74	9.89	Neutral	-	32.89	0.04	0.06	9.79
QP	172.5k	56.04	64.83	-8.79	9.89	Neutral	-	46.15	0.04	0.06	9.79
AV	172.5k	40.41	54.83	-14.42	9.89	Neutral	-	30.52	0.04	0.06	9.79
QP	222k	45.94	62.75	-16.81	9.89	Neutral	-	36.05	0.04	0.06	9.79
AV	222k	31.58	52.75	-21.17	9.89	Neutral	-	21.69	0.04	0.06	9.79
QP	460.5k	41.11	56.69	-15.58	9.91	Neutral	-	31.20	0.04	0.06	9.81
AV	460.5k	28.82	46.69	-17.87	9.91	Neutral	-	18.91	0.04	0.06	9.81
QP	1.698M	40.60	56.00	-15.40	10.01	Neutral	-	30.59	0.07	0.11	9.83
AV	1.698M	30.92	46.00	-15.08	10.01	Neutral	-	20.91	0.07	0.11	9.83
QP	1.968M	40.28	56.00	-15.72	10.02	Neutral	-	30.26	0.07	0.12	9.83
AV	1.968M	30.85	46.00	-15.15	10.02	Neutral	-	20.83	0.07	0.12	9.83

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)	706.25k	1.033M	1M03F1D	703.75k	1.027M

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

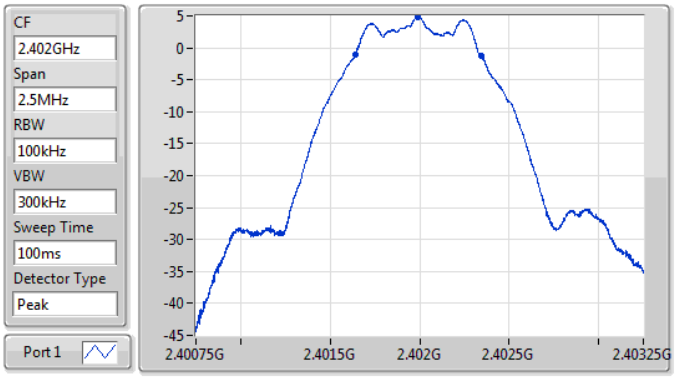
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	703.75k	1.027M
2440MHz	Pass	500k	705k	1.027M
2480MHz	Pass	500k	706.25k	1.033M

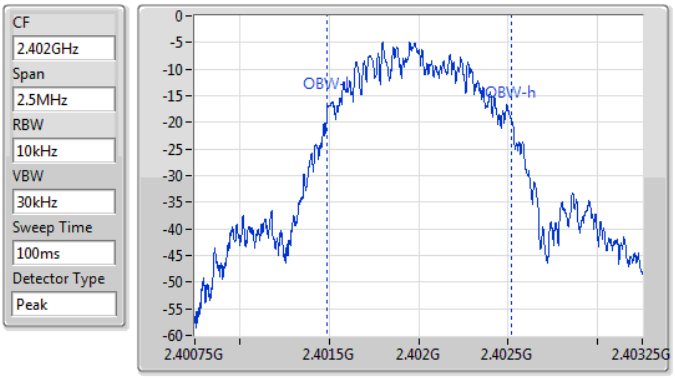
Port X-N dB = Port **X** 6dB down bandwidth; **Port X-OBW** = Port **X** 99% occupied bandwidth;

BT-LE(1Mbps) EBW

2402MHz

10/04/2020



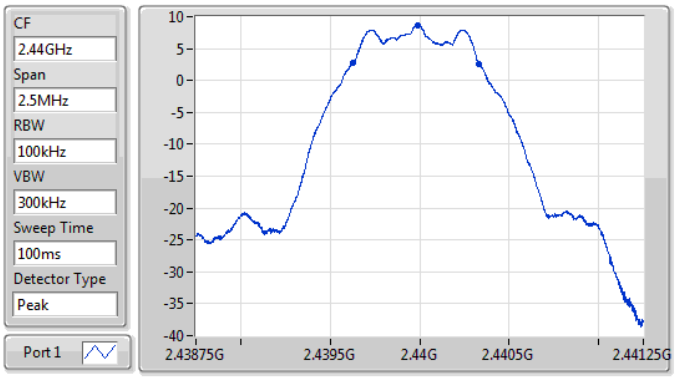


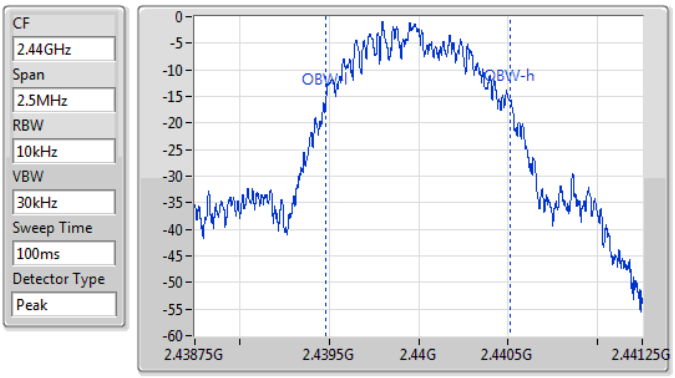
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
703.75k	2.40164G	2.402344G	1.027M	2.401489G	2.402516G	500k	1

BT-LE(1Mbps) EBW

2440MHz

10/04/2020



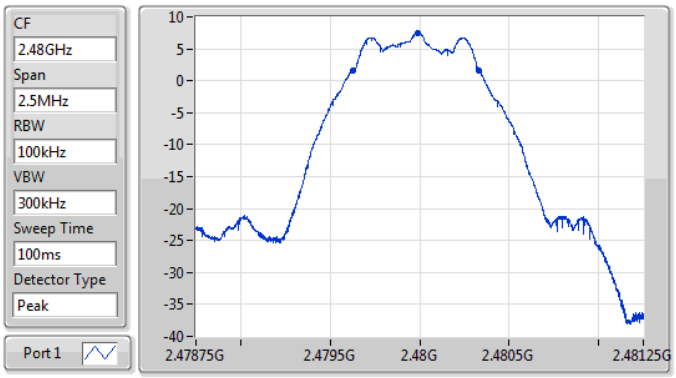


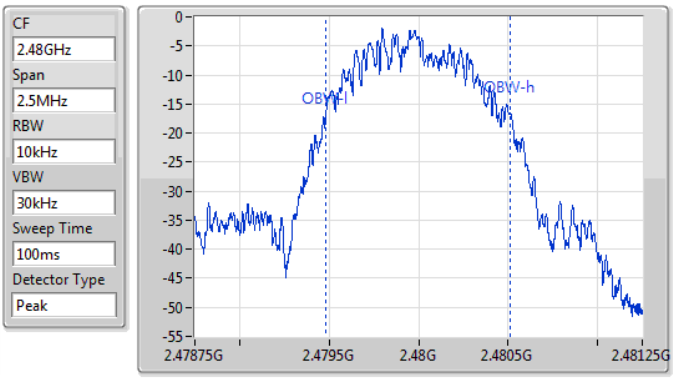
6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
705k	2.439626G	2.440331G	1.027M	2.439483G	2.44051G	500k	1

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

2480MHz

10/04/2020





6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
706.25k	2.479625G	2.480331G	1.033M	2.479479G	2.480512G	500k	1

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	4.58	0.00287

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	2.70	4.55	30.00
2440MHz	Pass	2.70	4.58	30.00
2480MHz	Pass	2.70	4.33	30.00

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

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-7.06

RBW=3 kHz.

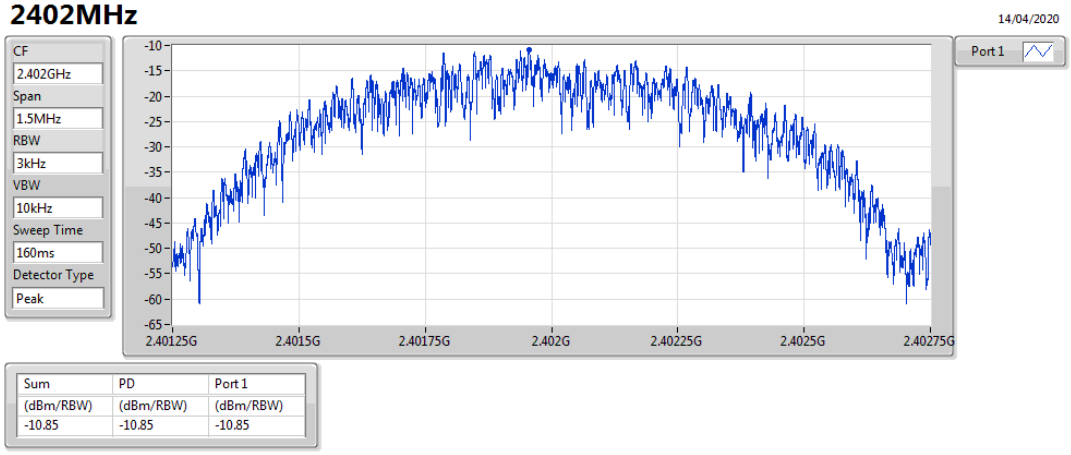
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	2.70	-10.85	8.00
2440MHz	Pass	2.70	-7.06	8.00
2480MHz	Pass	2.70	-11.87	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**

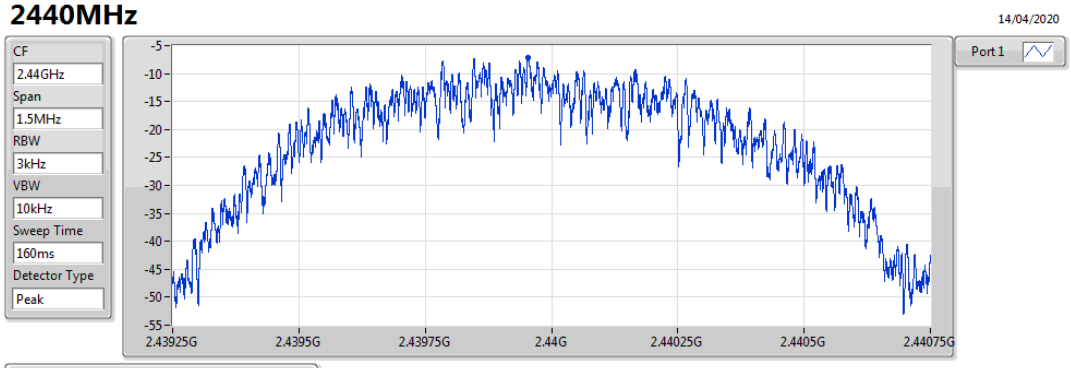
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-10.85	-10.85	-10.85

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

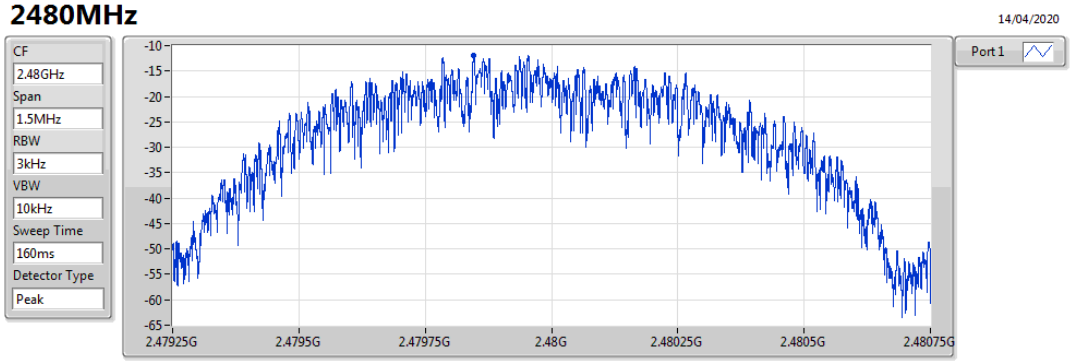
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-7.06	-7.06	-7.06

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

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-11.87	-11.87	-11.87

Summary

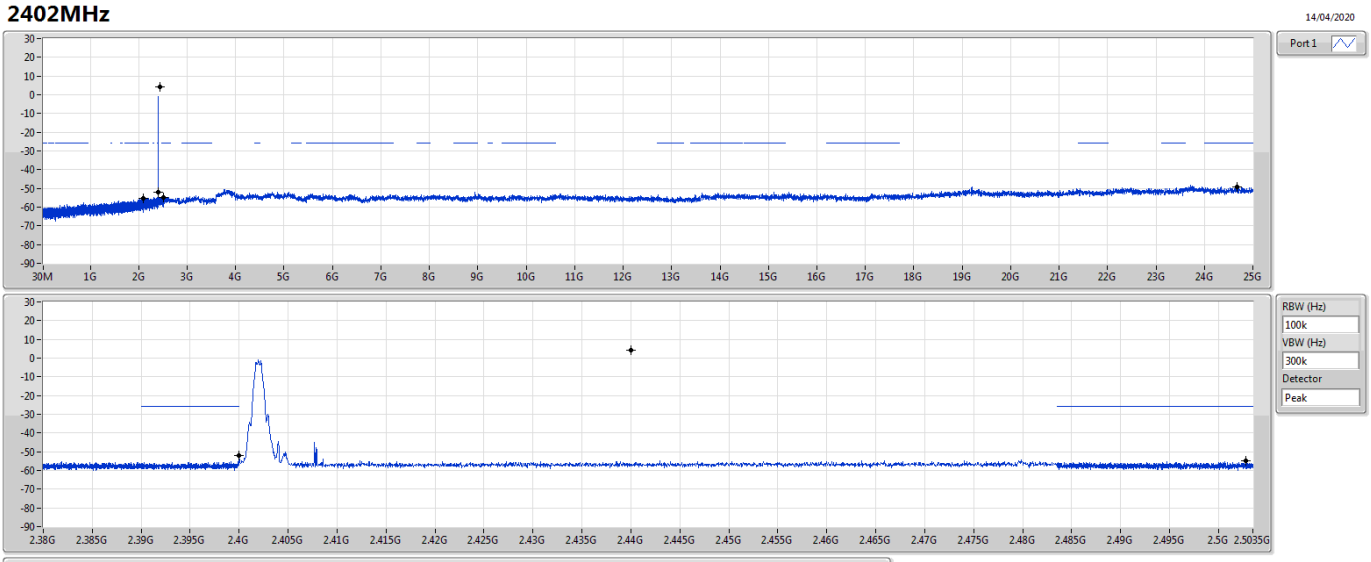
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.44G	4.03	-25.97	2.09359G	-55.42	2.39998G	-52.15	2.4G	-52.12	2.50282G	-55.02	24.67942G	-49.17	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	4.03	-25.97	2.09359G	-55.42	2.39998G	-52.15	2.4G	-52.12	2.50282G	-55.02	24.67942G	-49.17	1
2440MHz	Pass	2.44G	4.03	-25.97	2.16821G	-54.22	2.39274G	-55.32	2.4G	-56.91	2.49219G	-54.93	24.02421G	-49.01	1
2480MHz	Pass	2.44G	4.03	-25.97	2.11592G	-54.55	2.39728G	-55.05	2.4835G	-56.19	2.50104G	-54.34	24.08327G	-48.53	1

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

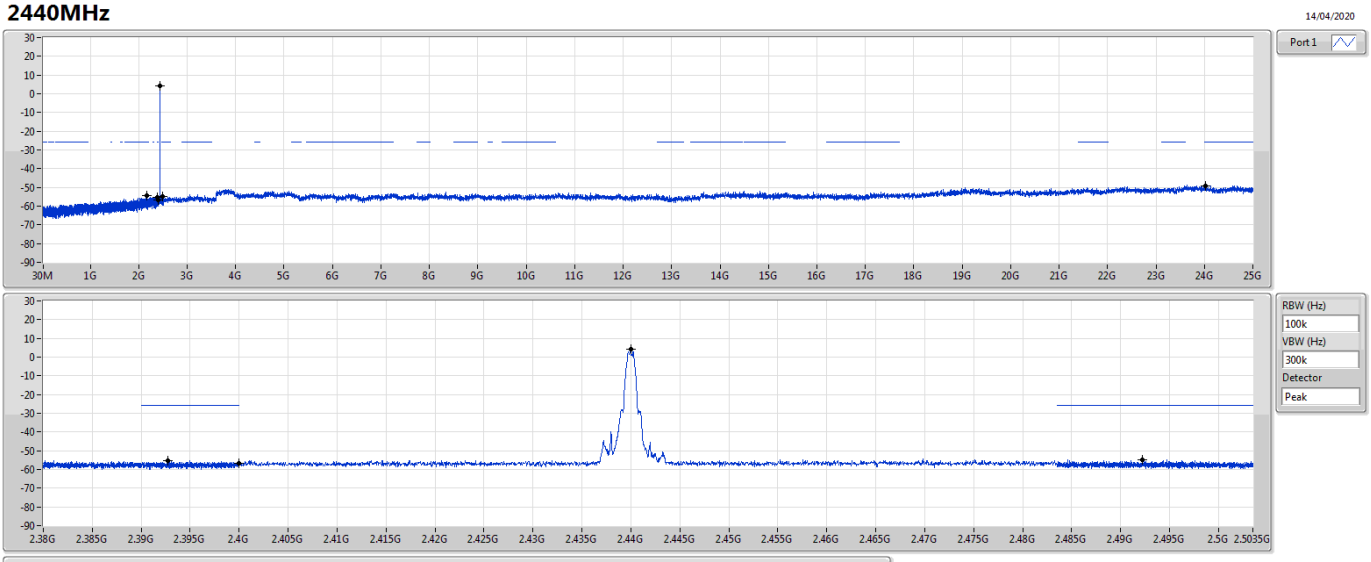
2402MHz



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	4.03	-25.97	2.09359G	-55.42	2.39998G	-52.15	2.4G	-52.12	2.50282G	-55.02	24.67942G	-49.17	1

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

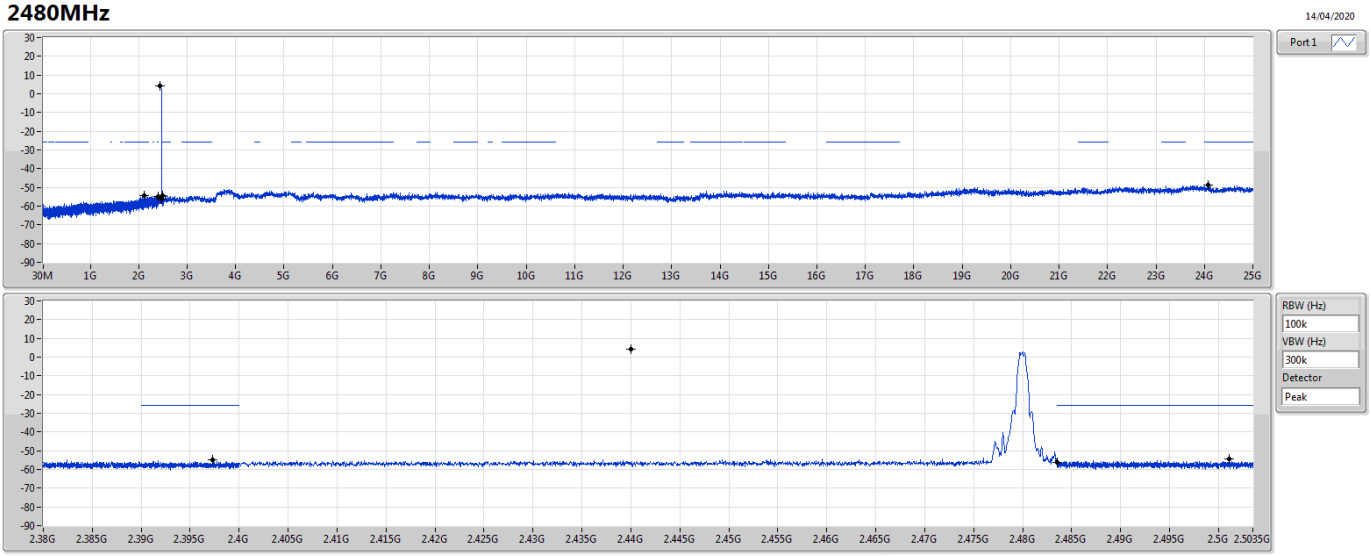
2440MHz



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	4.03	-25.97	2.16821G	-54.22	2.39274G	-55.32	2.4G	-56.91	2.49219G	-54.93	24.02421G	-49.01	1

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

2480MHz

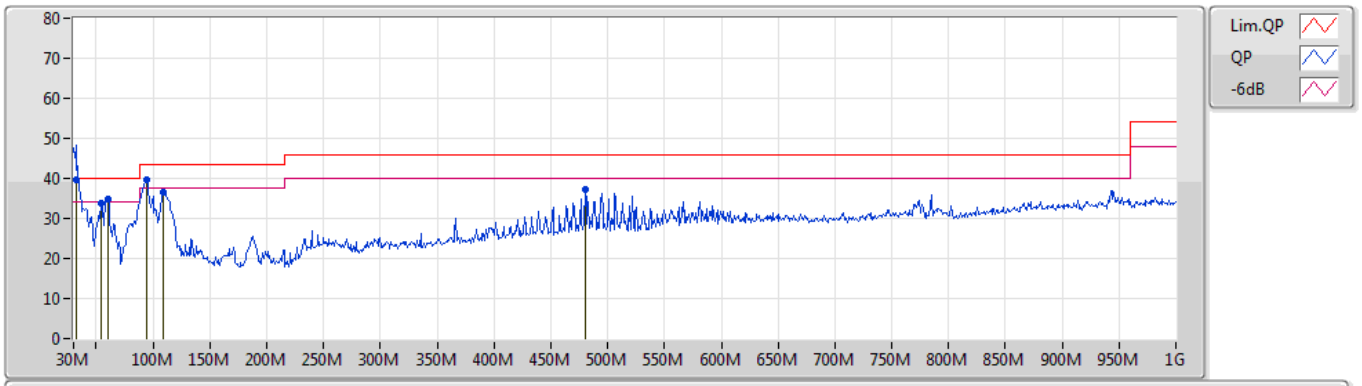


Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.44G	4.03	-25.97	2.11592G	-54.55	2.39728G	-55.05	2.4835G	-56.19	2.50104G	-54.34	24.08327G	-48.53	1

Summary

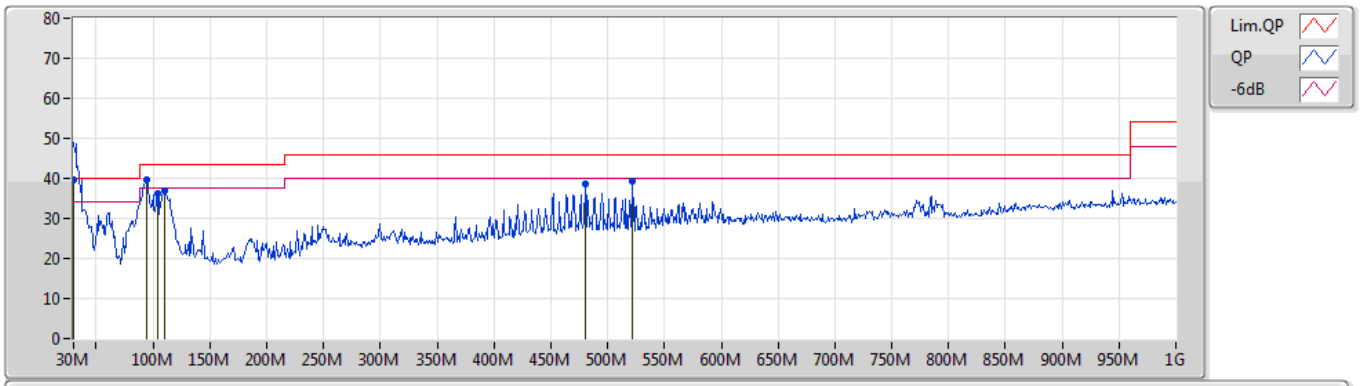
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 6	Pass	QP	30M	39.75	40.00	-0.25	Horizontal

14/05/2020



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	31.94M	39.52	40.00	-0.48	-7.46	3	Vertical	323	2.00	"Worst"	46.98	23.40	1.54	32.40
PK	54.25M	33.89	40.00	-6.11	-18.38	3	Vertical	348	3.00	-	52.27	12.80	1.48	32.66
PK	60.07M	34.74	40.00	-5.26	-18.69	3	Vertical	254	1.00	-	53.43	12.23	1.60	32.52
PK	94.02M	39.61	43.50	-3.89	-14.81	3	Vertical	201	4.00	-	54.42	15.52	2.00	32.33
PK	108.57M	36.65	43.50	-6.85	-12.85	3	Vertical	354	1.00	-	49.50	17.41	2.19	32.45
PK	480.08M	37.25	46.00	-8.75	-4.40	3	Vertical	284	1.25	-	41.65	23.28	4.48	32.16

14/05/2020



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	30M	39.75	40.00	-0.25	-6.64	3	Horizontal	88	3.00	"Worst"	46.39	24.21	1.50	32.35
PK	94.02M	39.67	43.50	-3.83	-14.81	3	Horizontal	45	4.00	-	54.48	15.52	2.00	32.33
PK	103.72M	36.31	43.50	-7.19	-13.28	3	Horizontal	98	2.00	-	49.59	16.98	2.14	32.40
PK	110.51M	36.90	43.50	-6.60	-12.71	3	Horizontal	245	1.25	-	49.61	17.56	2.21	32.48
PK	480.08M	38.63	46.00	-7.37	-4.40	3	Horizontal	162	1.25	-	43.03	23.28	4.48	32.16
PK	521.79M	39.48	46.00	-6.52	-4.19	3	Horizontal	293	4.00	-	43.67	23.41	4.73	32.33

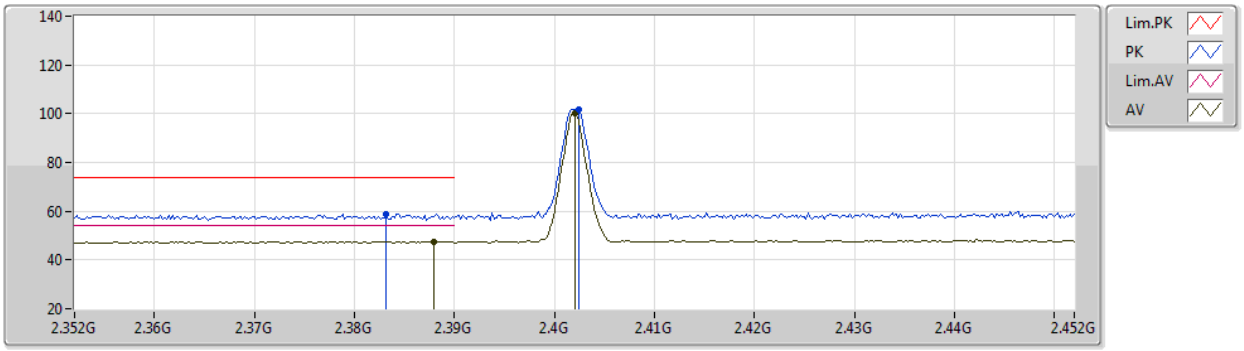
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	2.4835G	53.42	54.00	-0.58	3	Vertical	351	1.71	-

BT-LE(1Mbps)

2402MHz_TX

10/04/2020



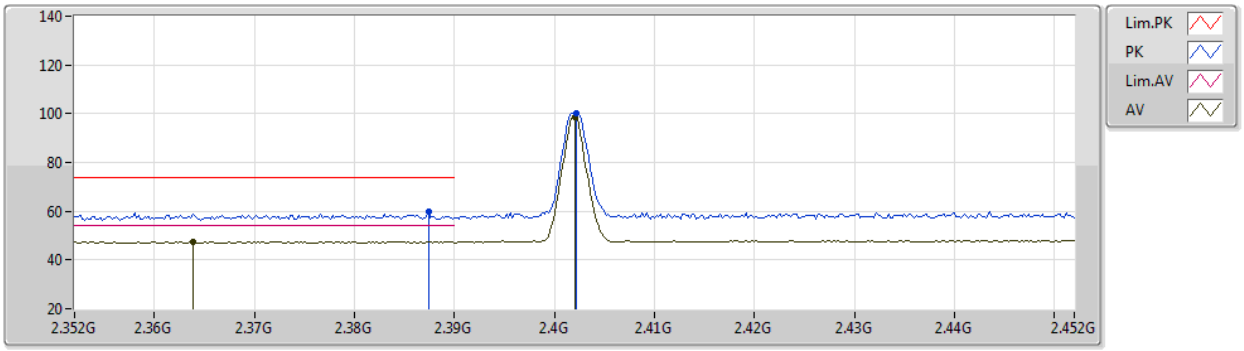
EUT Z_1TX
Setting 10
03-B-S-7

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	2.3832G	58.93	74.00	-15.07	26.93	3	Vertical	351	1.62	-	28.27	3.73	-
AV	2.388G	47.59	54.00	-6.41	15.58	3	Vertical	351	1.62	-	28.28	3.73	-
PK	2.4024G	101.97	Inf	-Inf	69.92	3	Vertical	351	1.62	-	28.31	3.74	-
AV	2.402G	100.33	Inf	-Inf	68.28	3	Vertical	351	1.62	-	28.31	3.74	-

BT-LE(1Mbps)

2402MHz_TX

10/04/2020



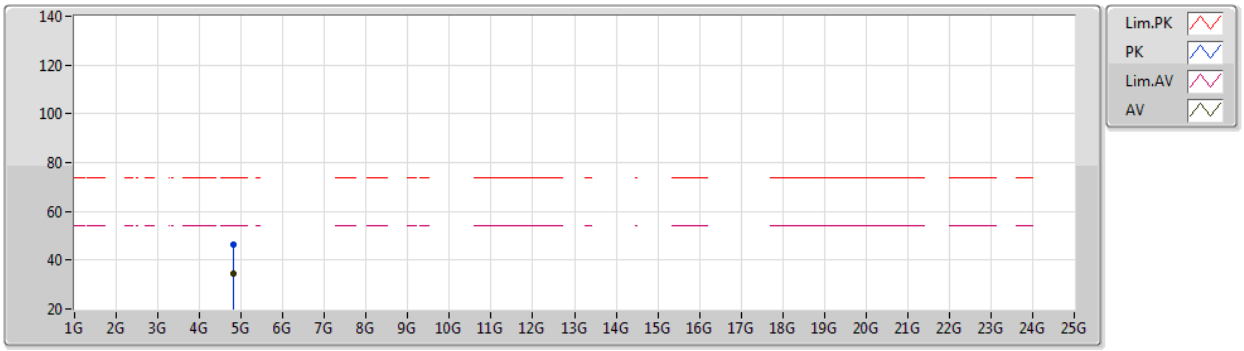
EUT Z_1TX
Setting 10
03-B-S-7

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	2.3874G	60.01	74.00	-13.99	28.01	3	Horizontal	10	1.25	-	28.27	3.73	-
AV	2.3638G	47.58	54.00	-6.42	15.63	3	Horizontal	10	1.25	-	28.23	3.72	-
PK	2.4022G	100.37	Inf	-Inf	68.32	3	Horizontal	10	1.25	-	28.31	3.74	-
AV	2.402G	98.74	Inf	-Inf	66.69	3	Horizontal	10	1.25	-	28.31	3.74	-

BT-LE(1Mbps)

2402MHz_TX

10/04/2020



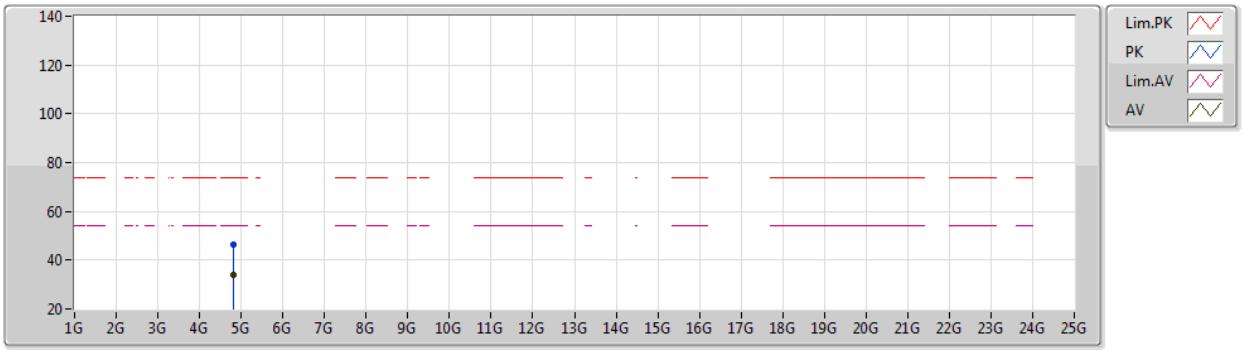
EUT Z_1TX
Setting 10
03-B-S-7

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	4.80421G	46.63	74.00	-27.37	41.40	3	Vertical	18	1.70	-	33.51	6.56	34.84
AV	4.80399G	34.27	54.00	-19.73	29.04	3	Vertical	18	1.70	-	33.51	6.56	34.84

BT-LE(1Mbps)

2402MHz_TX

10/04/2020



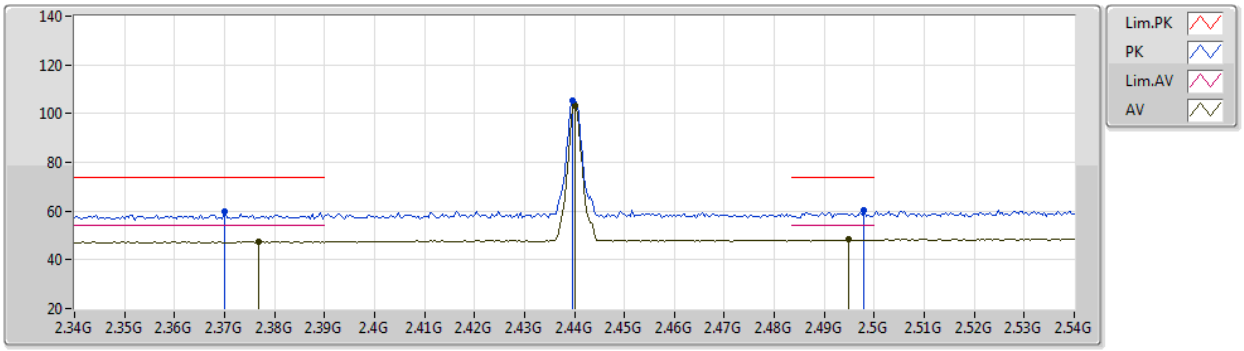
EUT Z_1TX
Setting 10
03-B-S-7

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	4.80271G	46.22	74.00	-27.78	40.99	3	Horizontal	107	1.80	-	33.51	6.56	34.84
AV	4.80212G	33.75	54.00	-20.25	28.53	3	Horizontal	107	1.80	-	33.50	6.56	34.84

BT-LE(1Mbps)

2440MHz_TX

10/04/2020



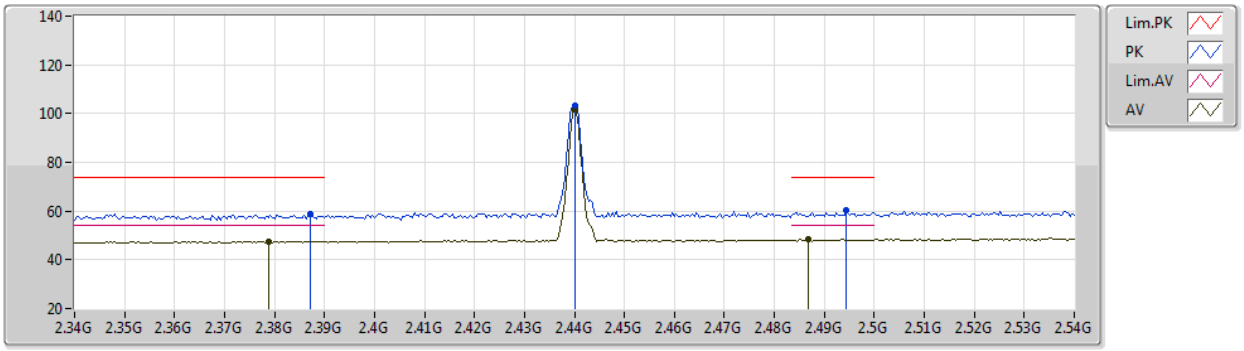
EUT Z_1TX
Setting 10
03-B-S-7

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	2.37G	59.66	74.00	-14.34	27.70	3	Vertical	360	2.71	-	28.24	3.72	-
AV	2.3768G	47.55	54.00	-6.45	15.57	3	Vertical	360	2.71	-	28.25	3.73	-
PK	2.4396G	105.12	Inf	-Inf	72.94	3	Vertical	360	2.71	-	28.42	3.76	-
AV	2.44G	103.53	Inf	-Inf	71.35	3	Vertical	360	2.71	-	28.42	3.76	-
PK	2.498G	60.44	74.00	-13.56	28.05	3	Vertical	360	2.71	-	28.59	3.80	-
AV	2.4948G	48.27	54.00	-5.73	15.89	3	Vertical	360	2.71	-	28.58	3.80	-

BT-LE(1Mbps)

2440MHz_TX

10/04/2020



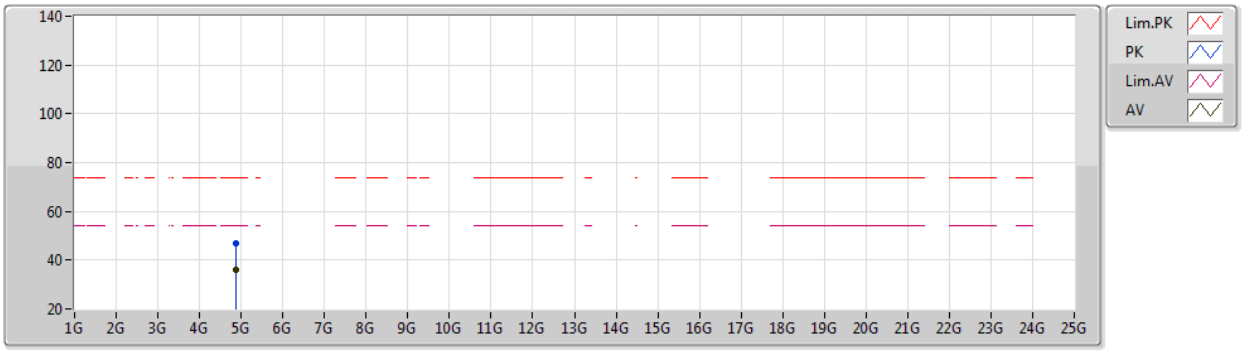
EUT Z_1TX
Setting 10
03-B-S-7

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	2.3872G	58.80	74.00	-15.20	26.80	3	Horizontal	10	1.45	-	28.27	3.73	-
AV	2.3788G	47.53	54.00	-6.47	15.54	3	Horizontal	10	1.45	-	28.26	3.73	-
PK	2.44G	103.25	Inf	-Inf	71.07	3	Horizontal	10	1.45	-	28.42	3.76	-
AV	2.44G	101.80	Inf	-Inf	69.62	3	Horizontal	10	1.45	-	28.42	3.76	-
PK	2.4944G	60.20	74.00	-13.80	27.82	3	Horizontal	10	1.45	-	28.58	3.80	-
AV	2.4868G	48.37	54.00	-5.63	16.02	3	Horizontal	10	1.45	-	28.56	3.79	-

BT-LE(1Mbps)

2440MHz_TX

10/04/2020



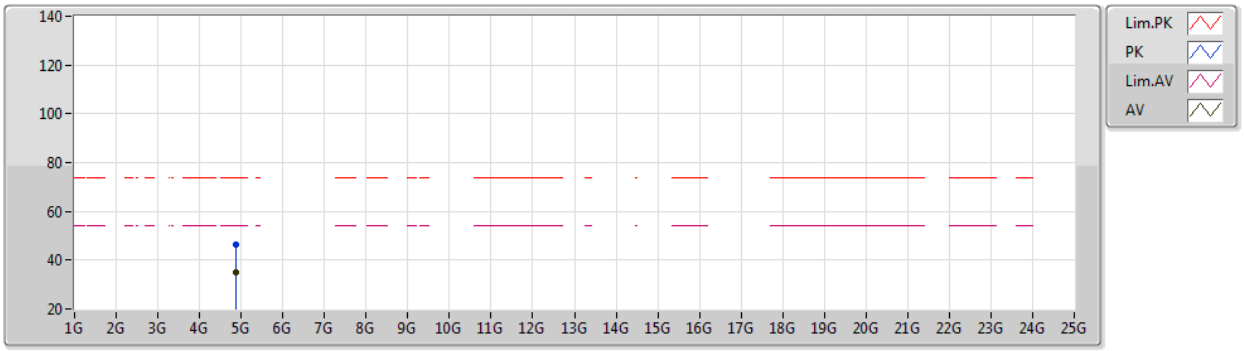
EUT Z_1TX
Setting 10
03-B-S-7

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	4.87977G	46.91	74.00	-27.09	41.45	3	Vertical	161	1.00	-	33.66	6.58	34.78
AV	4.87958G	35.98	54.00	-18.02	30.52	3	Vertical	161	1.00	-	33.66	6.58	34.78

BT-LE(1Mbps)

2440MHz_TX

10/04/2020



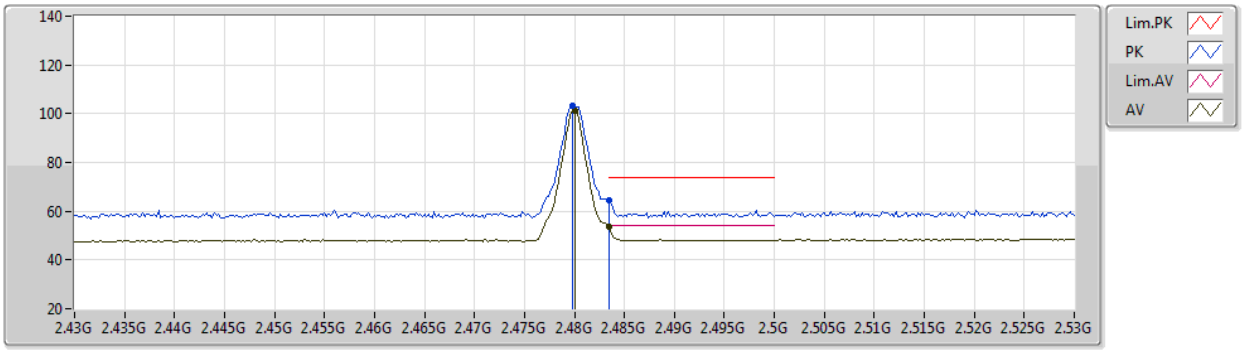
EUT Z_1TX
Setting 10
03-B-S-7

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	4.87956G	46.38	74.00	-27.62	40.92	3	Horizontal	221	1.24	-	33.66	6.58	34.78
AV	4.87939G	34.96	54.00	-19.04	29.50	3	Horizontal	221	1.24	-	33.66	6.58	34.78

BT-LE(1Mbps)

2480MHz_TX

10/04/2020



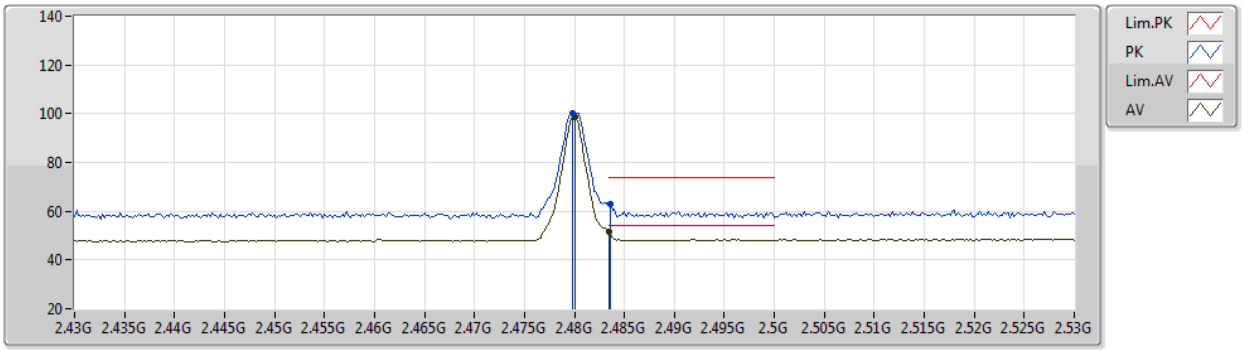
EUT Z_1TX
Setting 10
03-B-S-7

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	103.06	Inf	-Inf	70.73	3	Vertical	351	1.71	-	28.54	3.79	-
AV	2.48G	101.44	Inf	-Inf	69.11	3	Vertical	351	1.71	-	28.54	3.79	-
PK	2.4835G	64.69	74.00	-9.31	32.35	3	Vertical	351	1.71	-	28.55	3.79	-
AV	2.4835G	53.42	54.00	-0.58	21.08	3	Vertical	351	1.71	-	28.55	3.79	-

BT-LE(1Mbps)

2480MHz_TX

10/04/2020



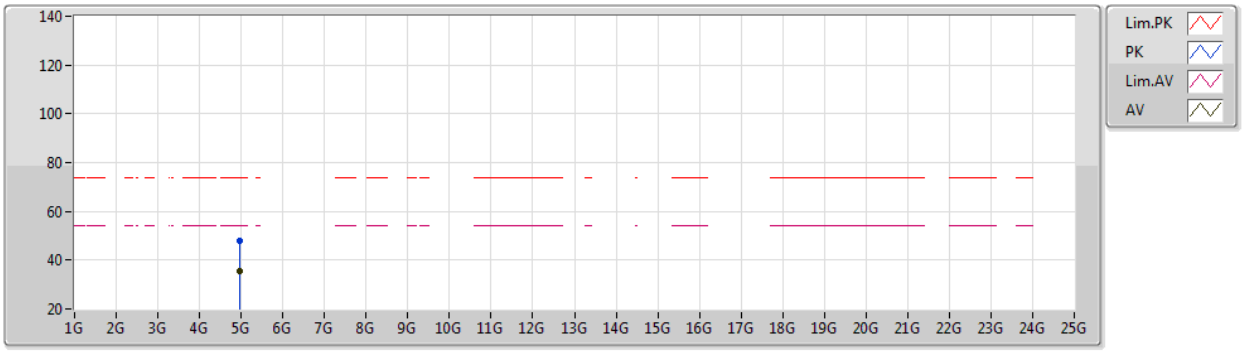
EUT Z_1TX
Setting 10
03-B-S-7

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	100.29	Inf	-Inf	67.96	3	Horizontal	16	1.07	-	28.54	3.79	-
AV	2.48G	98.72	Inf	-Inf	66.39	3	Horizontal	16	1.07	-	28.54	3.79	-
PK	2.4836G	62.71	74.00	-11.29	30.37	3	Horizontal	16	1.07	-	28.55	3.79	-
AV	2.4835G	51.53	54.00	-2.47	19.19	3	Horizontal	16	1.07	-	28.55	3.79	-

BT-LE(1Mbps)

2480MHz_TX

10/04/2020



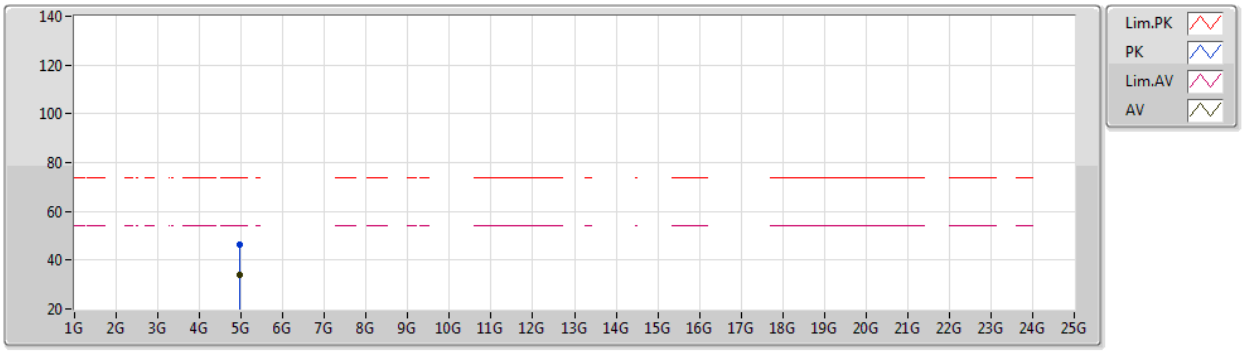
EUT Z_1TX
Setting 10
03-B-S-7

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	4.95929G	47.96	74.00	-26.04	42.24	3	Vertical	246	1.31	-	33.82	6.61	34.71
AV	4.95942G	35.75	54.00	-18.25	30.03	3	Vertical	246	1.31	-	33.82	6.61	34.71

BT-LE(1Mbps)

2480MHz_TX

10/04/2020



EUT Z_1TX
Setting 10
03-B-S-7

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	4.96112G	46.23	74.00	-27.77	40.50	3	Horizontal	22	1.80	-	33.82	6.61	34.70
AV	4.95758G	34.18	54.00	-19.82	28.46	3	Horizontal	22	1.80	-	33.82	6.61	34.71

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	AV	1.33521G	50.00	54.00	-4.00	Vertical

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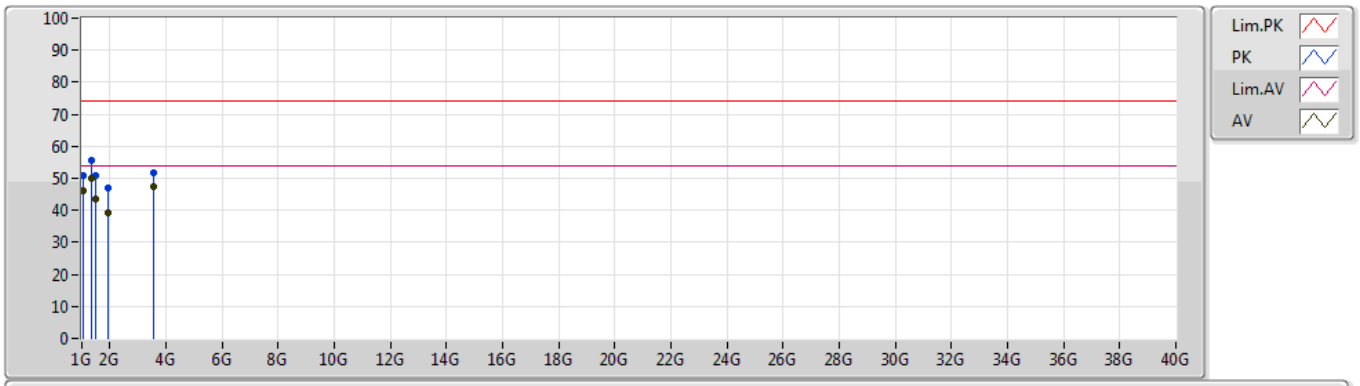

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	1.03881G	50.86	74.00	-23.14	-11.49	3	Vertical	213	1.50	-	62.35	23.68	2.25	37.42
AV	1.0384G	46.00	54.00	-8.00	-11.50	3	Vertical	213	1.50	-	57.50	23.68	2.25	37.43
PK	1.33518G	55.72	74.00	-18.28	-8.31	3	Vertical	185	1.42	-	64.03	25.28	2.55	36.14
AV	1.33521G	50.00	54.00	-4.00	-8.31	3	Vertical	185	1.42	"Worst"	58.31	25.28	2.55	36.14
PK	1.48352G	50.65	74.00	-23.35	-7.32	3	Vertical	152	1.00	-	57.97	25.60	2.68	35.60
AV	1.48357G	43.54	54.00	-10.46	-7.32	3	Vertical	152	1.00	-	50.86	25.60	2.68	35.60
PK	1.91991G	46.77	74.00	-27.23	-4.97	3	Vertical	127	1.57	-	51.74	27.00	3.08	35.05
AV	1.92017G	39.23	54.00	-14.77	-4.97	3	Vertical	127	1.57	-	44.20	27.00	3.08	35.05
PK	3.56057G	51.75	74.00	-22.25	0.72	3	Vertical	213	1.00	-	51.03	30.62	4.22	34.12
AV	3.56037G	47.23	54.00	-6.77	0.72	3	Vertical	213	1.00	-	46.51	30.62	4.22	34.12

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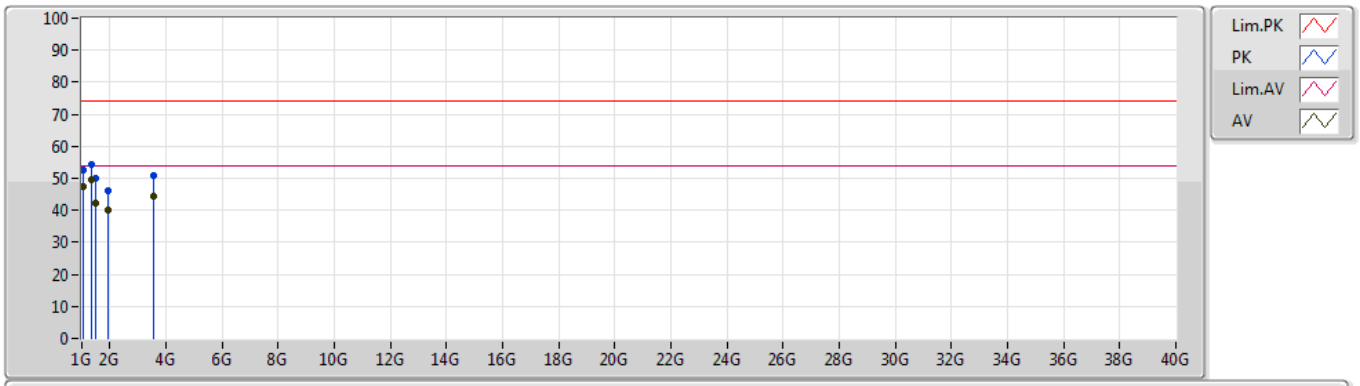

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	1.03849G	52.63	74.00	-21.37	-11.50	3	Horizontal	52	1.28	-	64.13	23.68	2.25	37.43
AV	1.03849G	47.40	54.00	-6.60	-11.50	3	Horizontal	52	1.28	-	58.90	23.68	2.25	37.43
PK	1.33518G	54.17	74.00	-19.83	-8.31	3	Horizontal	59	1.24	-	62.48	25.28	2.55	36.14
AV	1.33521G	49.63	54.00	-4.37	-8.31	3	Horizontal	59	1.24	"Worst"	57.94	25.28	2.55	36.14
PK	1.4836G	49.96	74.00	-24.04	-7.32	3	Horizontal	240	1.00	-	57.28	25.60	2.68	35.60
AV	1.48349G	42.27	54.00	-11.73	-7.32	3	Horizontal	240	1.00	-	49.59	25.60	2.68	35.60
PK	1.92005G	45.94	74.00	-28.06	-4.97	3	Horizontal	141	1.00	-	50.91	27.00	3.08	35.05
AV	1.92015G	40.23	54.00	-13.77	-4.97	3	Horizontal	141	1.00	-	45.20	27.00	3.08	35.05
PK	3.56036G	50.83	74.00	-23.17	0.72	3	Horizontal	151	1.00	-	50.11	30.62	4.22	34.12
AV	3.56035G	44.54	54.00	-9.46	0.72	3	Horizontal	151	1.00	-	43.82	30.62	4.22	34.12