



RADIO TEST REPORT

FCC ID : G954981X
Equipment : DOCSIS Cable Gateway
Brand Name : Technicolor
Model Name : CGM4981COM, CGM4981COX
Applicant : Technicolor Connected Home USA LLC
4855 Peachtree Industrial Blvd. Norcross, GA
30092
Manufacturer : Technicolor Connected Home USA LLC
4855 Peachtree Industrial Blvd. Norcross, GA
30092
Standard : 47 CFR FCC Part 15.247

The product was received on Jul. 14, 2021, and testing was started from Aug. 30, 2021 and completed on Sep. 17, 2021. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

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



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TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB-A10_6 Ver1.3



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: Wendy Pan



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
2.4-2.4835GHz	BT-LE(2Mbps)	1.0	1TX

Note:

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

1.1.2 Antenna Information

Ant.	Port					Brand Name	Model Name	Antenna Type	Connector	Gain (dBi)
	WLAN 2.4 GHz	WLAN 5 GHz	WLAN 6E	Zigbee	Bluetooth					
1	1	4	-	-	-	Airgain	N03TCAFB-PK1-B165U	PCB	I-PEX	Note 1
2	2	3	-	-	-	Airgain	N03TCAFE-PK1-G140U	PCB	I-PEX	
3	3	2	-	-	-	Airgain	N03TCAFN-PK1-R150U	PCB	I-PEX	
4	4	1	-	-	-	Airgain	N03TCAFG-PK1-A230U	PCB	I-PEX	
5	-	-	1	-	-	Airgain	N06TCAFC-PK1-B105U	PCB	I-PEX	
6	-	-	2	-	-	Airgain	N06TCAFH-PK1-G200U	PCB	I-PEX	
7	-	-	3	-	-	Airgain	N06TCAFJ-PK1-R150U	PCB	I-PEX	
8	-	-	4	1	-	Airgain	N04TCAFD-PK1-A150U	PCB	I-PEX	
9	-	-	-	2	-	Airgain	N01TCAFM-PK1-W230U	PCB	I-PEX	
10	-	-	-	-	1	Airgain	N01TCAFM-PK1-W190U	PCB	I-PEX	

Note1:

Ant.	Port					Antenna Gain (dBi)							
	WLAN 2.4 GHz	WLAN 5GHz	WLAN 6E	Zigbee	Bluetooth	WLAN 2.4 GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3	WLAN 6E	Zigbee	Bluetooth
1	1	4	-	-	-	2.7	2.59	2.85	2.34	3.5	-	-	-
2	2	3	-	-	-	3.12	2.05	2.62	2.3	3.12	-	-	-
3	3	2	-	-	-	2.57	2.71	1.98	1.87	3.08	-	-	-
4	4	1	-	-	-	2.2	2.18	2.7	2.08	2.02	-	-	-
5	-	-	1	-	-	-	-	-	-	-	3.7	-	-
6	-	-	2	-	-	-	-	-	-	-	4.1	-	-
7	-	-	3	-	-	-	-	-	-	-	3.7	-	-
8	-	-	4	1	-	-	-	-	-	-	5.5	4.8	-
9	-	-	-	2	-	-	-	-	-	-	-	2.5	-
10	-	-	-	-	1	-	-	-	-	-	-	-	4.1



Directional Gain (dBi)					
Band (MHz)	2400-2483.5	5150-5250	5250-5350	5470-5725	5725-5850
Frequency (Hz)	2.45G	5.2G	5.3G	5.6G	5.785G
Ant. 1 Max Gain (dBi)	2.7	2.59	2.85	2.34	3.5
Ant. 2 Max Gain (dBi)	3.12	2.05	2.62	2.3	3.12
Ant. 3 Max Gain (dBi)	2.57	2.71	1.98	1.87	3.08
Ant. 4 Max Gain (dBi)	2.2	2.18	2.7	2.08	2.02
Max Gain (dBi)	3.12	2.71	2.85	2.34	3.5
DG [1SS] (dBi)	5.45	4.96	3.99	4.1	4.82
DG [2SS] (dBi)	3.12	2.71	2.85	2.34	3.5
DG [4SS] (dBi)	0.1	-0.52	-0.64	-1.23	-0.43

Note2: The above information was declared by manufacturer.

The antenna report is provided in the operational description for this application.

The EUT enables WLAN 2.4GHz, 5GHz UNII 1, UNII 3, Zigbee and Bluetooth function only.

For WLAN 2.4GHz function:

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

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

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

For WLAN 5GHz function:

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

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

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

For WLAN 6E function:

For IEEE 802.11ax mode (4TX/4RX):

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

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

For Zigbee function (1TX/1RX):

The EUT supports the Ant.8 and Ant.9 with TX and RX diversity functions.

Both Ant.8 (Port 1) and Ant.9 (Port 2) support transmit and receive functions, but only one of them will be used at one time.

All test results will be recorded in the report.

For Bluetooth function (1TX/1RX):

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

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) $\geq 1/T$
BT-LE(1Mbps)	0.499	3.02	291u	10k
BT-LE(2Mbps)	0.248	6.06	155u	10k

Note:

- ♦ DC is Duty Cycle.
- ♦ DCF is Duty Cycle Factor.

1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter			
Function	☒	Point-to-multipoint	☐	Point-to-point
Test Software Version	Mtool (ver.3.2.1.4)			
Support Mode	☒	LE 1M PHY: 1 Mb/s		
	☐	LE Coded PHY (S=2): 500 Kb/s		
	☐	LE Coded PHY (S=8): 125 Kb/s		
	☒	LE 2M PHY: 2 Mb/s		

Note: The above information was declared by manufacturer.

1.1.5 Table for Multiple Listing

Model Name	Description
CGM4981COM	All the models are identical, the difference model served as marketing strategy.
CGM4981COX	

Note 1: From the above models, model: CGM4981COM was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.



1.2 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15.247
- ♦ 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	TH03-CB	Serway Li	22.1~22.7 / 73~76	Sep. 06, 2021~ Sep. 17, 2021
Radiated<1GHz	10CH01-CB	Peter Wu	23~24 / 58~59	Sep. 16, 2021
Radiated>1GHz	03CH01-CB	Brian Sun	24.2~26.1 / 55-58	Aug. 30, 2021~ Sep. 17, 2021
	03CH02-CB	Brian Sun	24.4~25.5 / 55-58	Jul. 30, 2021~ Sep. 17, 2021
AC Conduction	CO01-CB	Peter Wu	21~23 / 55~57	Sep. 16, 2021

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Test Items	Uncertainty	Remark
Radiated Emission (9kHz ~ 30MHz)	2.0 dB	Confidence levels of 95%
Conducted Emission (150kHz ~ 30MHz)	4.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.5 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.2 dB	Confidence levels of 95%
Conducted Emission	2.5 dB	Confidence levels of 95%
Output Power Measurement	1.3 dB	Confidence levels of 95%
Power Density Measurement	2.5 dB	Confidence levels of 95%
Bandwidth Measurement	0.9%	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
BT-LE(1Mbps)	-
2402MHz	110
2440MHz	110
2480MHz	110
BT-LE(2Mbps)	-
2402MHz	110
2440MHz	110
2480MHz	67

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	Normal Link (WLAN) + CTX (Zigbee)+CTX (Bluetooth) - EUT + Adapter 1
2	Normal Link (WLAN) + CTX (Zigbee)+CTX (Bluetooth) - EUT + Adapter 2
3	Normal Link (WLAN) + CTX (Zigbee)+CTX (Bluetooth) - EUT + Adapter 3
For operating mode 1 is the worst case and it was record in this test report.	

The Worst Case Mode for Following Conformance Tests	
Tests Item	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emissions in Restricted Frequency Bands
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
Operating Mode < 1GHz	Normal Link
1	Normal Link (WLAN) + CTX (Zigbee)+CTX (Bluetooth) - EUT + Adapter 1
2	Normal Link (WLAN) + CTX (Zigbee)+CTX (Bluetooth) - EUT + Adapter 2
3	Normal Link (WLAN) + CTX (Zigbee)+CTX (Bluetooth) - EUT + Adapter 3
For operating mode 2 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 - Co-location RF Exposure Evaluation
Operating Mode	
1	WLAN 2.4GHz+WLAN 5GHz+ Zigbee (Ant.9) +Bluetooth
2	WLAN 2.4GHz+WLAN 5GHz+ Zigbee (Ant.8) +Bluetooth
Refer to Sporton Test Report No.: FA171403 for Co-location RF Exposure Evaluation.	

Note1: The manufacturer declares that the Type-C port can not be used by end-user. It is generally used for updating FW.

Note2: The EUT can only be used in Y axis position.

2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link:

During the test, the EUT operation to normal function.



2.4 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter 1	AcBel	ADK002	INPUT: 100-120V~50/60Hz, 1.5A OUTPUT: 12.0V, 4.6A
Adapter 2	Delta	ADH-55AW BK	INPUT: 100-120V~50/60Hz, 1.2A OUTPUT: 12.0V, 4.6A
Adapter 3	Netbit	NBC56A120460VU	INPUT: 100-120V~50/60Hz, 1.5A OUTPUT: 12.0V, 4.6A

2.5 Support Equipment

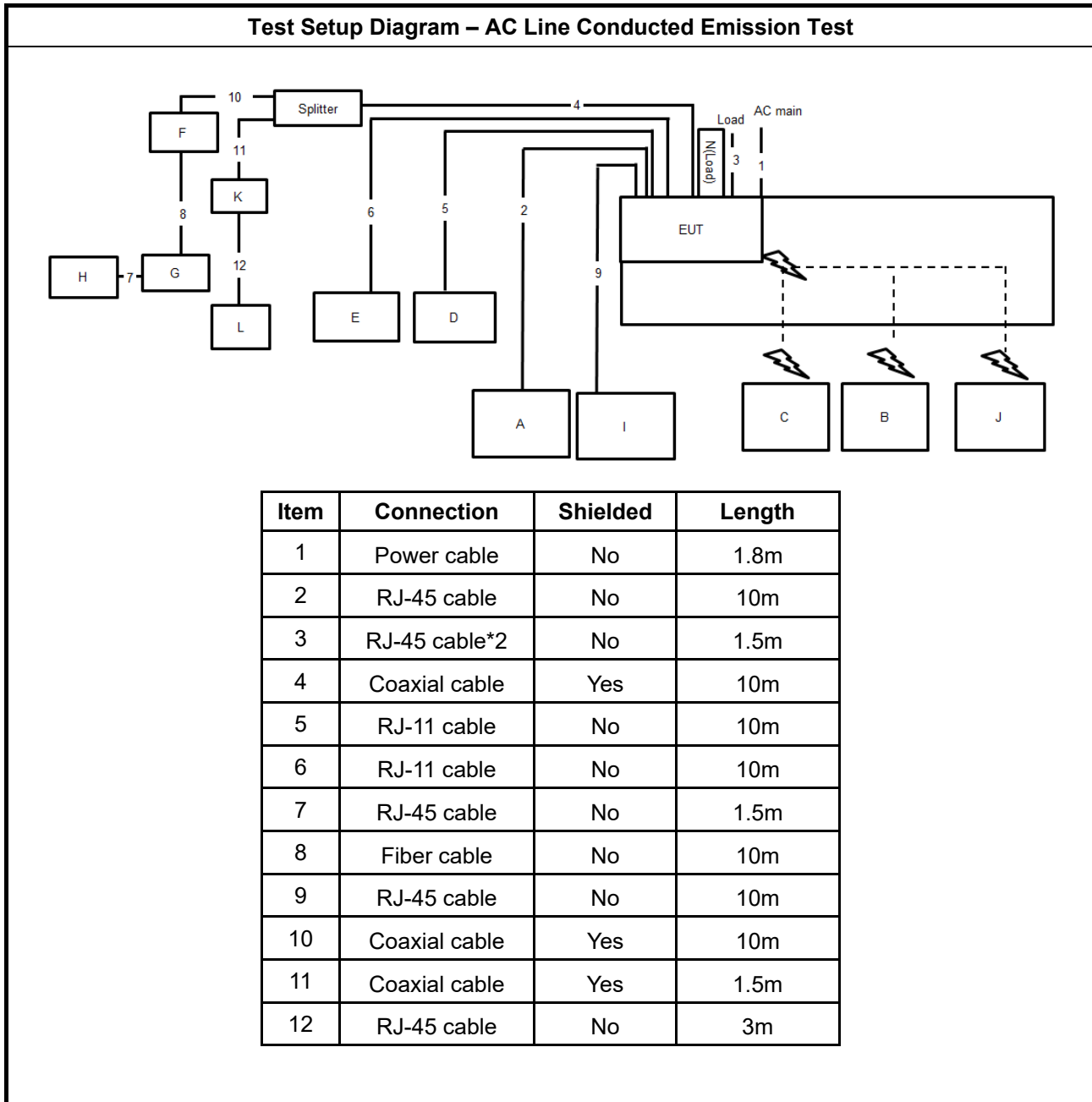
For AC Conduction and Radiated (below 1GHz):

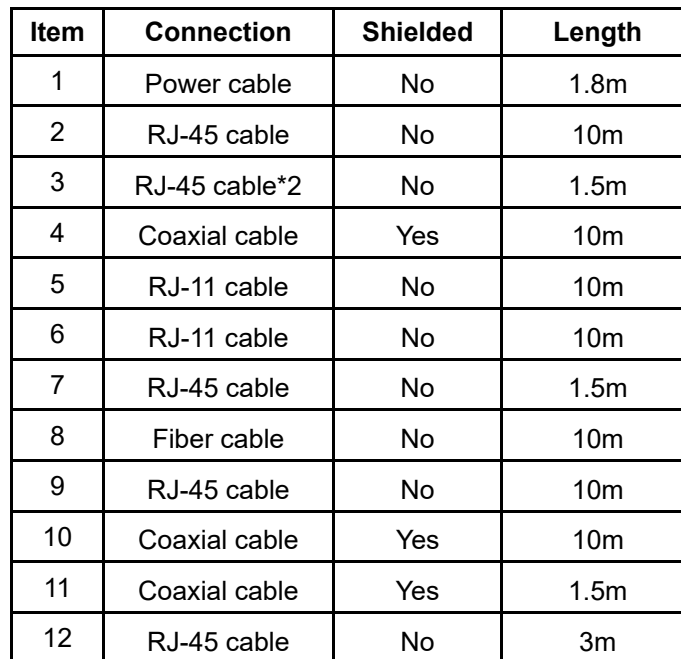
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	LAN NB	DELL	E6430	N/A
B	2.4G NB	DELL	E6430	N/A
C	5G NB	DELL	E6430	N/A
D	Phone1	SAMPO	HT-B 907WL	N/A
E	Phone2	SAMPO	HT-B 907WL	N/A
F	Terminal system	HUAWEI	SmartAX ma5633	N/A
G	Server	HUAWEI	N/A	N/A
H	Terminal system NB	DELL	INSPIRON 3576	N/A
I	2.5G PC	DELL	T3400	N/A
J	6G NB	DELL	AX210	N/A
K	MOCA	N/A	N/A	N/A
L	MOCA NB	DELL	E6430	N/A
N	Type-C Dongle	Transcend	16GB	N/A

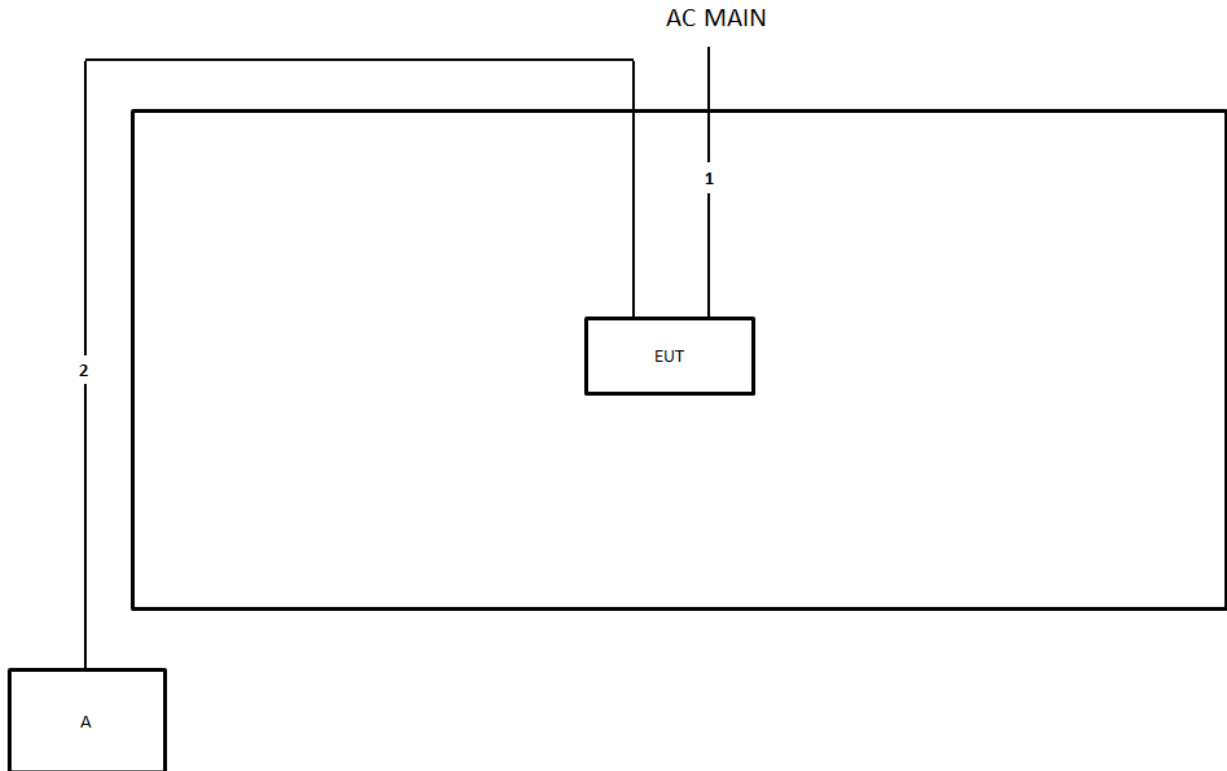
For Radiated (above 1GHz) and RF Conducted:

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

2.6 Test Setup Diagram





Test Setup Diagram - Radiated Test > 1GHz


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



3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50

Note 1: * Decreases with the logarithm of the frequency.

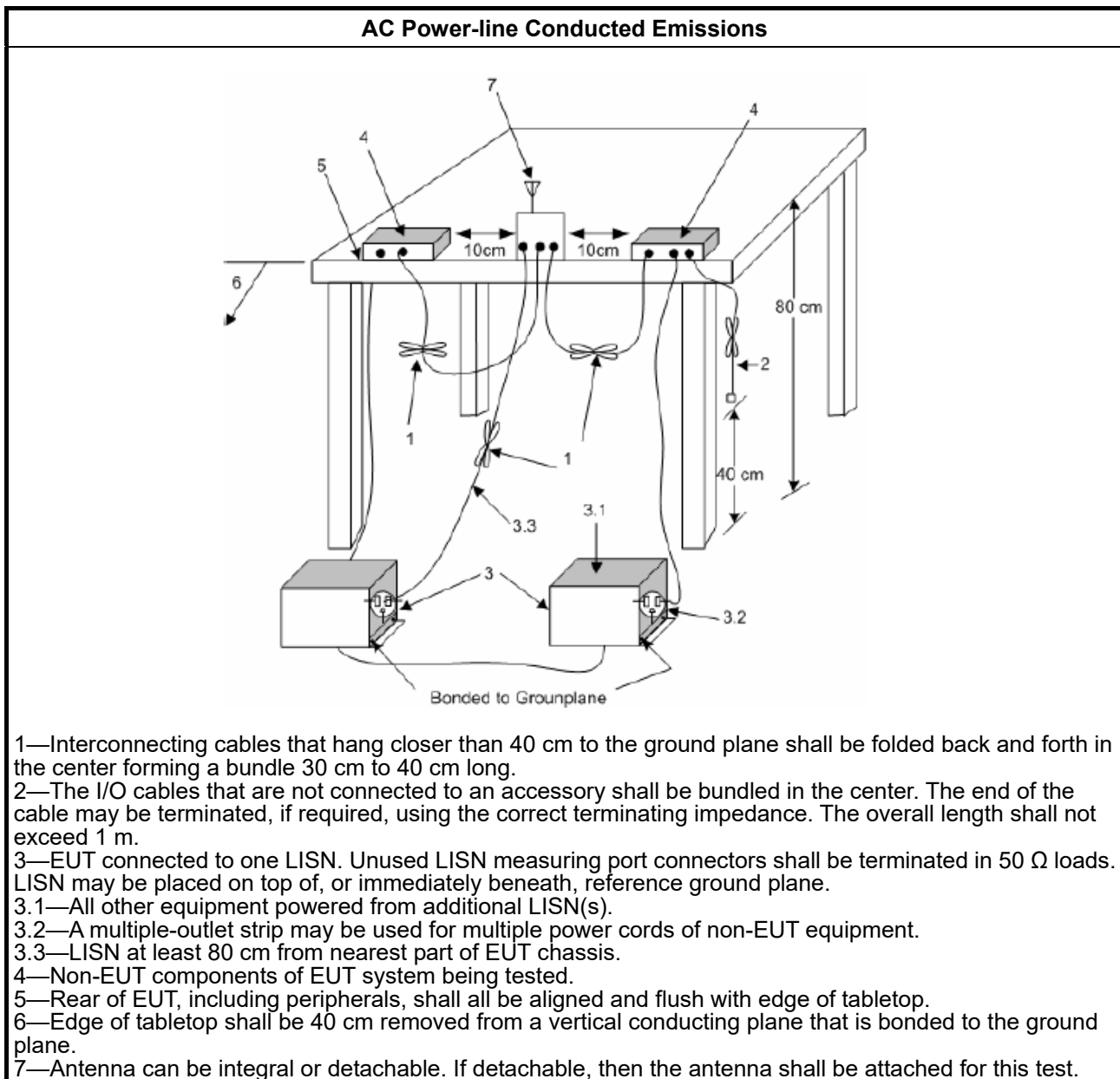
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

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

3.1.4 Test Setup



1.1.1. Measurement Results Calculation

The measured Level is calculated using:

- Corrected Reading: LISN Factor (LISN) + Attenuator (AT/AUX) + Cable Loss (CL) + Read Level (Raw) = Level
- 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 $\geq$ 500 kHz.

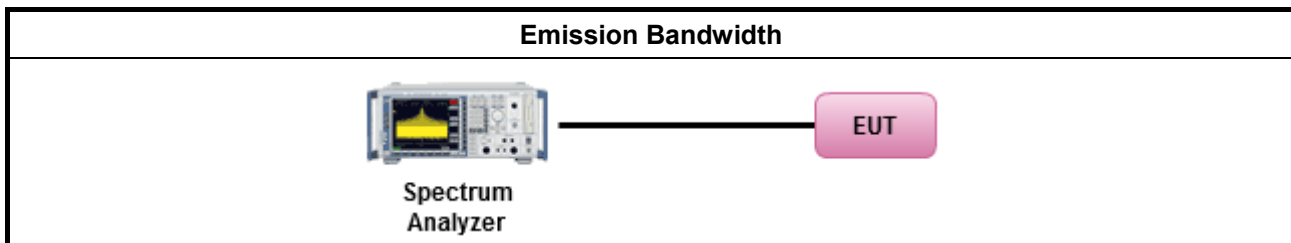
3.2.2 Measuring Instruments

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



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.	

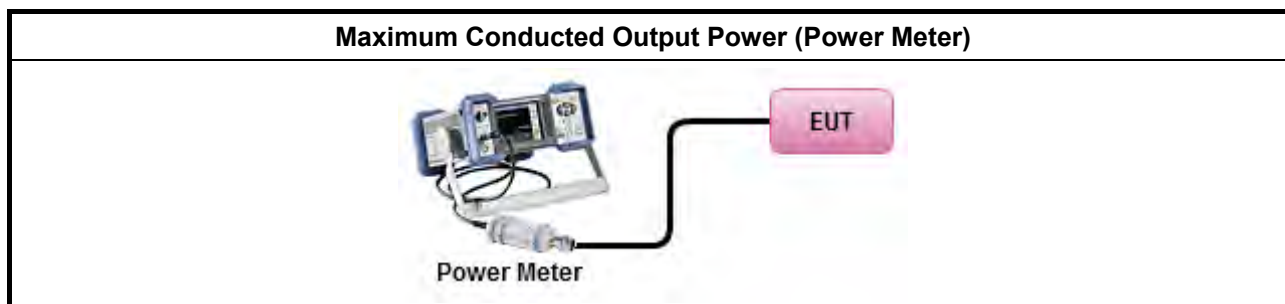
3.3.2 Measuring Instruments

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: $P_{total} = P_1 + P_2 + \dots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$	

3.3.4 Test Setup



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

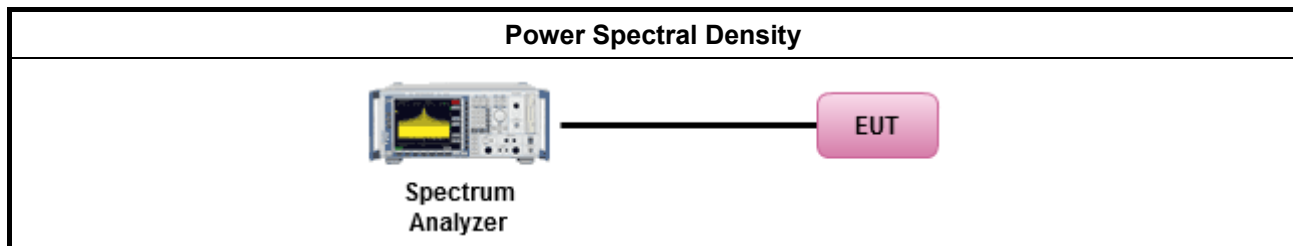
3.4.2 Measuring Instruments

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 $\geq 98\%$ 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



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.	

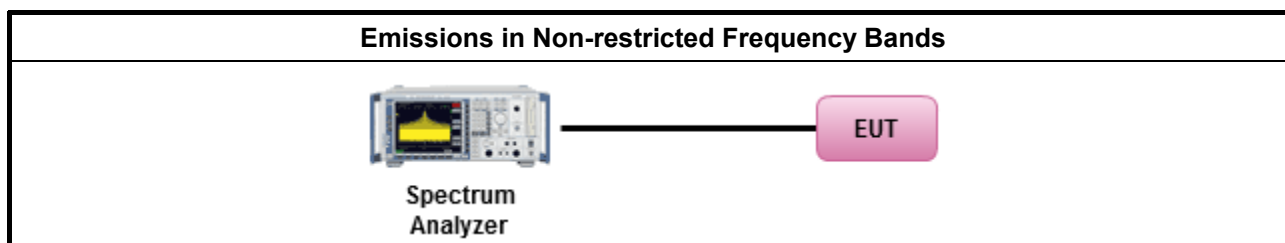
3.5.2 Measuring Instruments

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



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 below 30 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

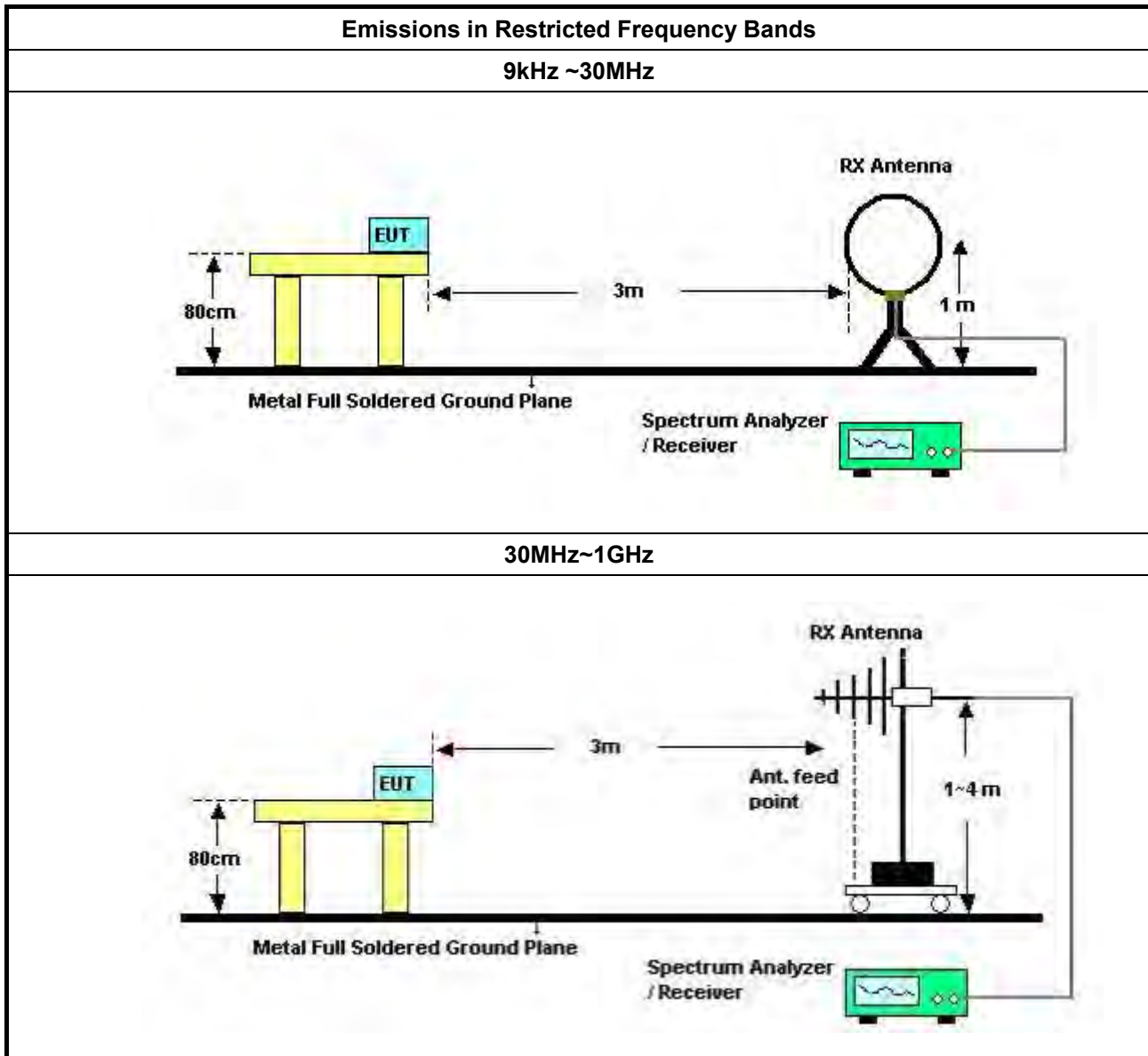
Refer a test equipment and calibration data table in this test report.

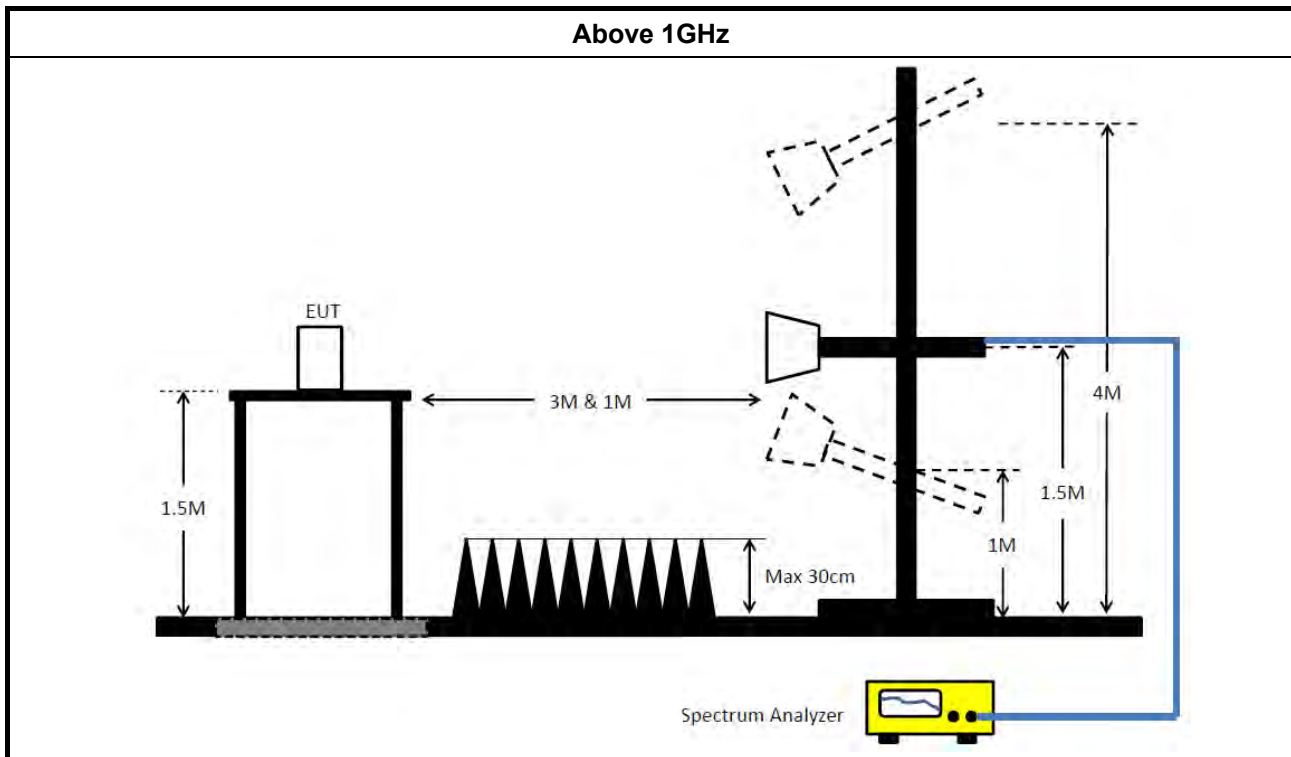


3.6.3 Test Procedures

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 $\geq 98\%$).
	☐ 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 $\geq 1/T$).
	☐ Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW $\geq 1/T$, 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





3.6.5 Measurement Results Calculation

The measured Level is calculated using:

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

3.6.6 Emissions in Restricted Frequency Bands (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10th harmonic or 40 GHz, whichever is appropriate.

3.6.7 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F



4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Mar. 03, 2021	Mar. 02, 2022	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Jan. 06, 2021	Jan. 05, 2022	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Mar. 07, 2021	Mar. 06, 2022	Conduction (CO01-CB)
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Jan. 30, 2021	Jan. 29, 2022	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	May 19, 2021	May 18, 2022	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
10m Semi Anechoic Chamber NSA	TDK	SAC-10M	10CH01-CB	30MHz~1GHz 10m,3m	Jan. 28, 2021	Jan. 27, 2022	Radiation (10CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10783	9kHz ~ 1.3GHz	Mar. 11, 2021	Mar. 10, 2022	Radiation (10CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10784	9kHz ~ 1.3GHz	Mar. 11, 2021	Mar. 10, 2022	Radiation (10CH01-CB)
Low Cable	Woken	SUCOFLEX 104	low cable-01	25MHz ~ 1GHz	Oct. 20, 2020	Oct. 19, 2021	Radiation (10CH01-CB)
High Cable	Woken	SUCOFLEX 104	low cable-02	25MHz ~ 1GHz	Oct. 20, 2020	Oct. 19, 2021	Radiation (10CH01-CB)
Bilog Antenna with 6dB Attenuator	Chase & EMCI	CBL6111A &N-6-06	1543 &AT-N0609	30MHz ~ 1GHz	Jul. 01, 2021	Jun. 30, 2022	Radiation (10CH01-CB)
EMI Test Receiver	Rohde&Schwarz	ESCI	100186	9kHz ~ 3GHz	Jul. 12, 2021	Jul. 11, 2022	Radiation (10CH01-CB)
Spectrum Analyzer	Rohde&Schwarz	FSV30	101026	9kHz ~ 30GHz	Mar. 08, 2021	Mar. 07, 2022	Radiation (10CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 14, 2021	Apr. 13, 2022	Radiation (10CH01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (10CH01-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH01-CB	1GHz ~18GHz 3m	May 07, 2021	May 06, 2022	Radiation (03CH01-CB)
Horn Antenna	ETS-LINDGREN	3115	00075790	750MHz ~ 18GHz	Nov. 06, 2020	Nov. 05, 2021	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 18, 2021	Jun. 17, 2022	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02121	1GHz ~ 26.5GHz	May 20, 2021	May 19, 2022	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 13, 2021	Jul. 12, 2022	Radiation (03CH01-CB)



Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-16	1 GHz ~ 18 GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-16+17	1 GHz ~ 18 GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 15, 2021	Jul. 14, 2022	Radiation (03CH01-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 15, 2021	Jul. 14, 2022	Radiation (03CH01-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH01-CB)
3m Semi Anechoic Chamber VSWR	RIKEN	SAC-3M	03CH02-CB	1GHz ~18GHz 3m	Mar. 27, 2021	Mar. 26, 2022	Radiation (03CH02-CB)
Horn Antenna	EMCO	3115	9610-4976	1GHz ~ 18GHz	May 04, 2021	May 03, 2022	Radiation (03CH02-CB)
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170507	15GHz ~ 40GHz	Jun. 18, 2021	Jun. 17, 2022	Radiation (03CH02-CB)
Pre-Amplifier	Agilent	83017A	MY39501305	1GHz ~ 26.5GHz	Jul. 12, 2021	Jul. 11, 2022	Radiation (03CH02-CB)
Spectrum analyzer	R&S	FSU	100015	9kHz~26GHz	Oct. 15, 2020	Oct. 14, 2021	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18	1GHz ~ 18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-18+19	1GHz ~ 18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 15, 2021	Jul. 14, 2022	Radiation (03CH02-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 15, 2021	Jul. 14, 2022	Radiation (03CH02-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH02-CB)
Spectrum analyzer	R&S	FSV40	101028	9kHz~40GHz	Dec. 31, 2020	Dec. 30, 2021	Conducted (TH03-CB)
Power Sensor	Anritsu	MA2411B	1726195	300MHz~40GHz	Aug. 22, 2021	Aug. 21, 2022	Conducted (TH03-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Aug. 22, 2021	Aug. 21, 2022	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-11	1 GHz ~18 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-12	1 GHz ~18 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-13	1 GHz ~18 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH03-CB)
RF Cable-high	Woken	RG402	High Cable-14	1 GHz ~18 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH03-CB)



RADIO TEST REPORT

Report No. : FR171403AD

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-15	1 GHz –18 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH03-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH03-CB)

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

NCR means Non-Calibration required.



Conducted Emissions at Powerline

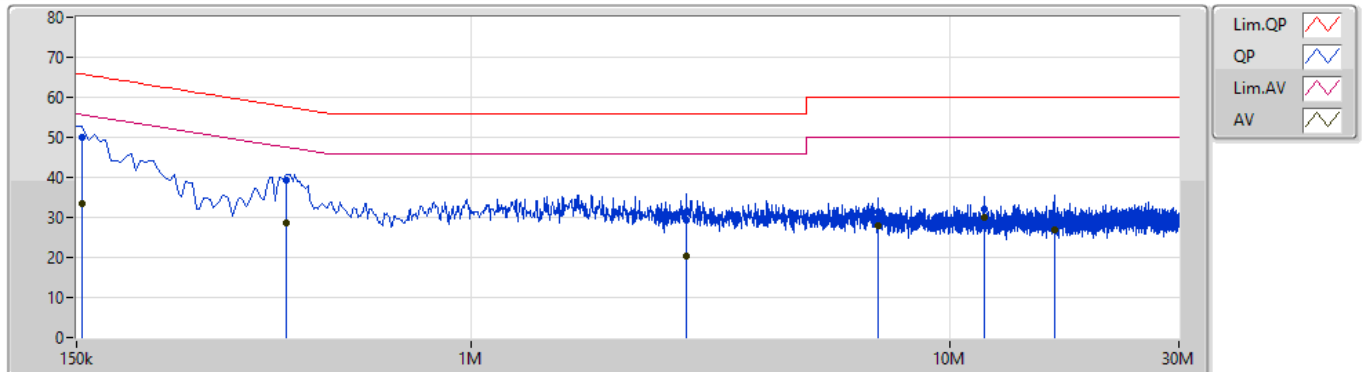
Appendix A

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	QP	150k	52.16	66.00	-13.84	Neutral

Mode 1

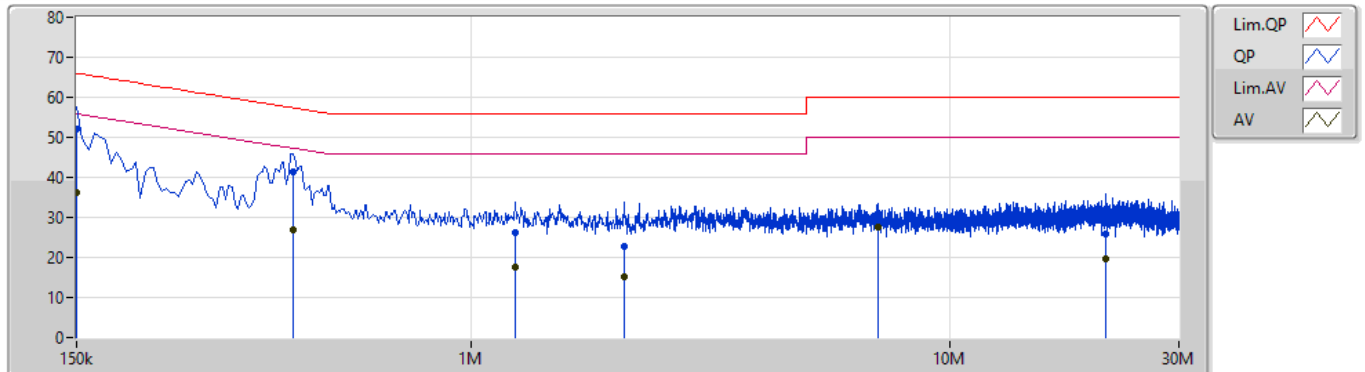
16/09/2021



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	154.5k	49.95	65.75	-15.80	9.89	Line	"Worst"	40.06	0.04	0.04	9.81			
AV	154.5k	33.31	55.75	-22.44	9.89	Line	-	23.42	0.04	0.04	9.81			
QP	411k	39.44	57.63	-18.19	9.90	Line	-	29.54	0.04	0.04	9.82			
AV	411k	28.63	47.63	-19.00	9.90	Line	-	18.73	0.04	0.04	9.82			
QP	2.805M	29.43	56.00	-26.57	10.04	Line	-	19.39	0.11	0.09	9.84			
AV	2.805M	20.31	46.00	-25.69	10.04	Line	-	10.27	0.11	0.09	9.84			
QP	7.058M	31.41	60.00	-28.59	10.22	Line	-	21.19	0.19	0.14	9.89			
AV	7.058M	27.95	50.00	-22.05	10.22	Line	-	17.73	0.19	0.14	9.89			
QP	11.76M	31.99	60.00	-28.01	10.30	Line	-	21.69	0.24	0.16	9.90			
AV	11.76M	29.84	50.00	-20.16	10.30	Line	-	19.54	0.24	0.16	9.90			
QP	16.467M	29.25	60.00	-30.75	10.42	Line	-	18.83	0.29	0.19	9.94			
AV	16.467M	26.77	50.00	-23.23	10.42	Line	-	16.35	0.29	0.19	9.94			

Mode 1

16/09/2021



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comment	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)			
QP	150k	52.16	66.00	-13.84	9.88	Neutral	"Worst"	42.28	0.03	0.04	9.81			
AV	150k	36.07	56.00	-19.93	9.88	Neutral	-	26.19	0.03	0.04	9.81			
QP	424.5k	41.47	57.36	-15.89	9.89	Neutral	-	31.58	0.03	0.04	9.82			
AV	424.5k	26.80	47.36	-20.56	9.89	Neutral	-	16.91	0.03	0.04	9.82			
QP	1.235M	26.37	56.00	-29.63	9.94	Neutral	-	16.43	0.06	0.05	9.83			
AV	1.235M	17.54	46.00	-28.46	9.94	Neutral	-	7.60	0.06	0.05	9.83			
QP	2.085M	22.61	56.00	-33.39	9.96	Neutral	-	12.65	0.07	0.07	9.82			
AV	2.085M	15.01	46.00	-30.99	9.96	Neutral	-	5.05	0.07	0.07	9.82			
QP	7.058M	30.89	60.00	-29.11	10.19	Neutral	-	20.70	0.16	0.14	9.89			
AV	7.058M	27.45	50.00	-22.55	10.19	Neutral	-	17.26	0.16	0.14	9.89			
QP	21.174M	26.02	60.00	-33.98	10.55	Neutral	-	15.47	0.31	0.24	10.00			
AV	21.174M	19.52	50.00	-30.48	10.55	Neutral	-	8.97	0.31	0.24	10.00			

**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)	661.25k	1.029M	1M03F1D	658.75k	1.022M
BT-LE(2Mbps)	1.149M	2.04M	2M04F1D	1.144M	2.026M

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

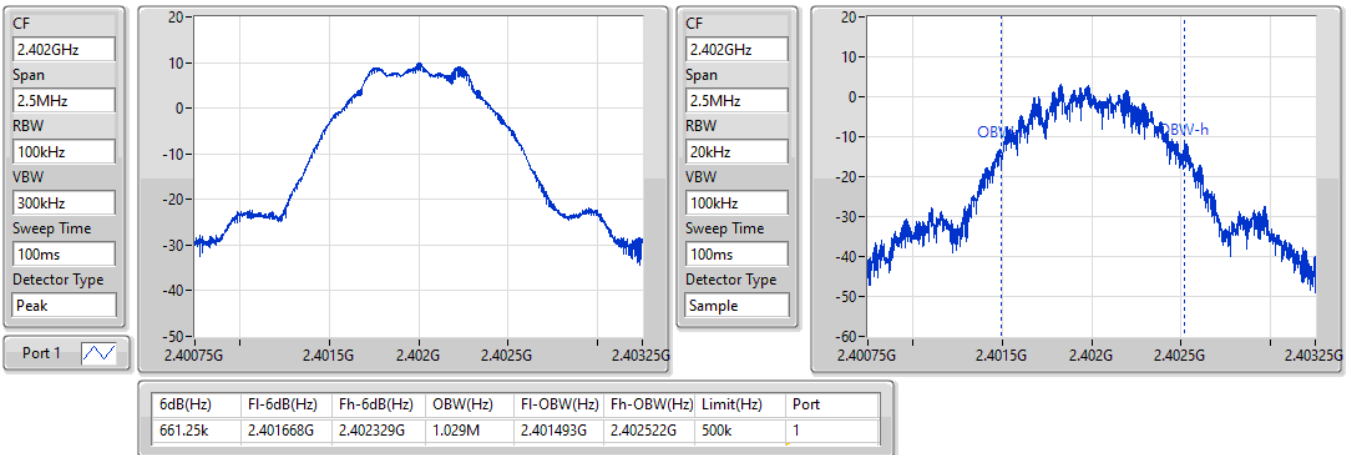
Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	661.25k	1.029M
2440MHz	Pass	500k	658.75k	1.027M
2480MHz	Pass	500k	661.25k	1.022M
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	500k	1.149M	2.026M
2440MHz	Pass	500k	1.144M	2.039M
2480MHz	Pass	500k	1.148M	2.04M

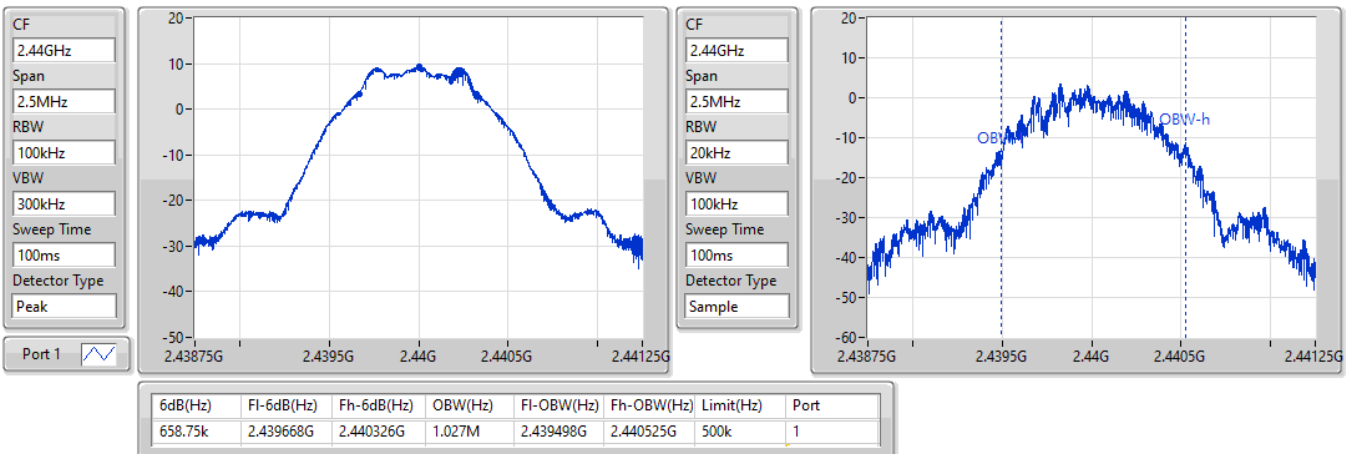
Port X-N dB = Port X 6dB down bandwidth;
Port X-OBW = Port X 99% occupied bandwidth

BT-LE(1Mbps)
2402MHz
EBW-DTS

13/09/2021

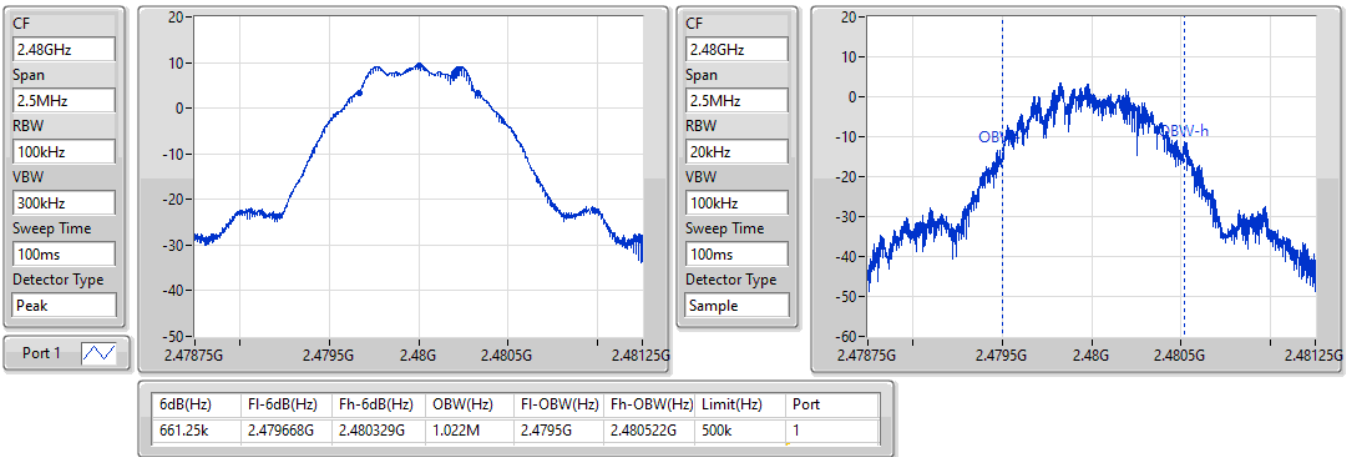

BT-LE(1Mbps)
2440MHz
EBW-DTS

13/09/2021

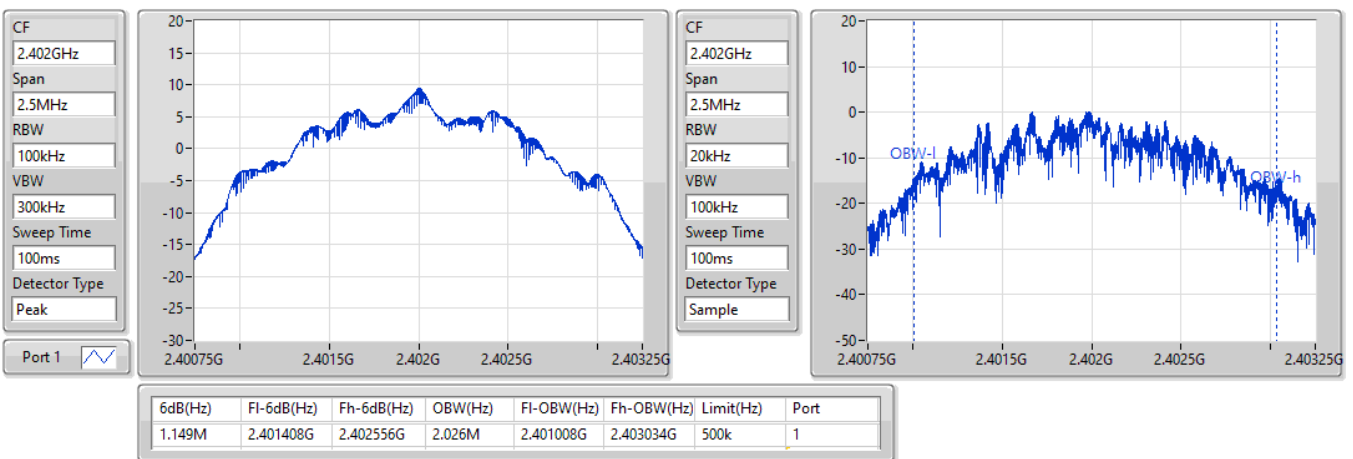


BT-LE(1Mbps)
EBW-DTS
2480MHz

13/09/2021


BT-LE(2Mbps)
EBW-DTS
2402MHz

13/09/2021

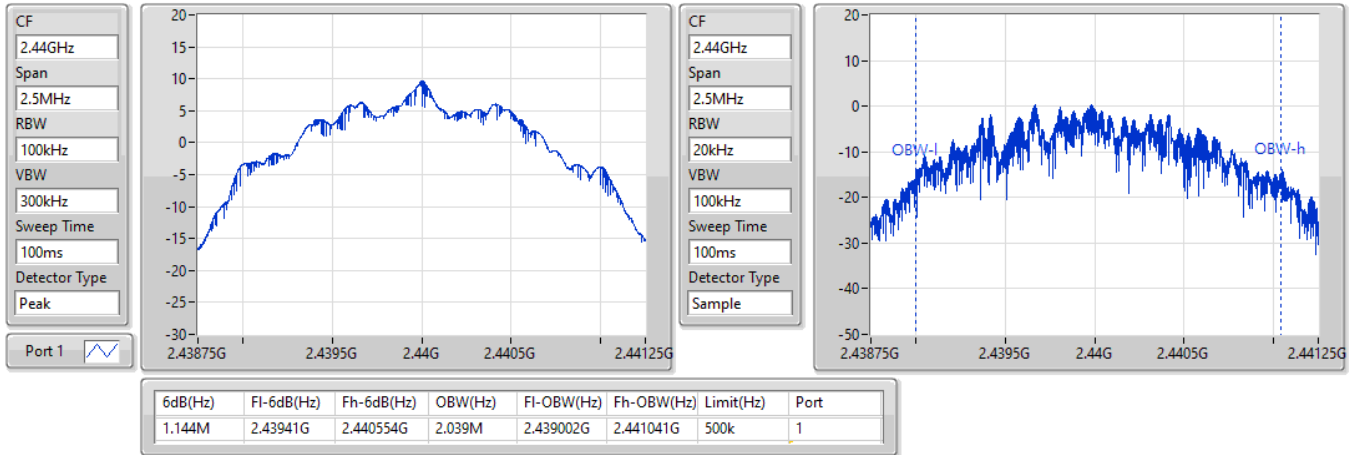


BT-LE(2Mbps)

EBW-DTS

2440MHz

13/09/2021

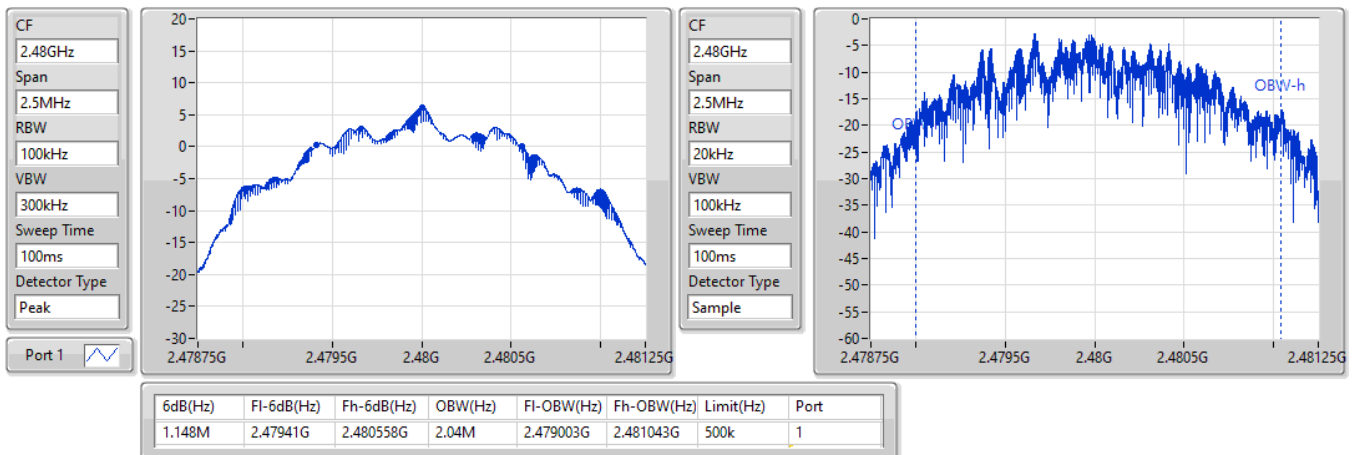


BT-LE(2Mbps)

EBW-DTS

2480MHz

13/09/2021





Average Power-DTS

Appendix C

Summary

Mode	Power (dBm)	Power (W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	9.78	0.00951
BT-LE(2Mbps)	9.34	0.00859

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.10	9.55	30.00
2440MHz	Pass	4.10	9.78	30.00
2480MHz	Pass	4.10	9.73	30.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	4.10	9.27	30.00
2440MHz	Pass	4.10	9.34	30.00
2480MHz	Pass	4.10	6.27	30.00

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



Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LF(1Mbps)	-5.28
BT-LF(2Mbps)	-8.04

RBW = 3kHz;

Result

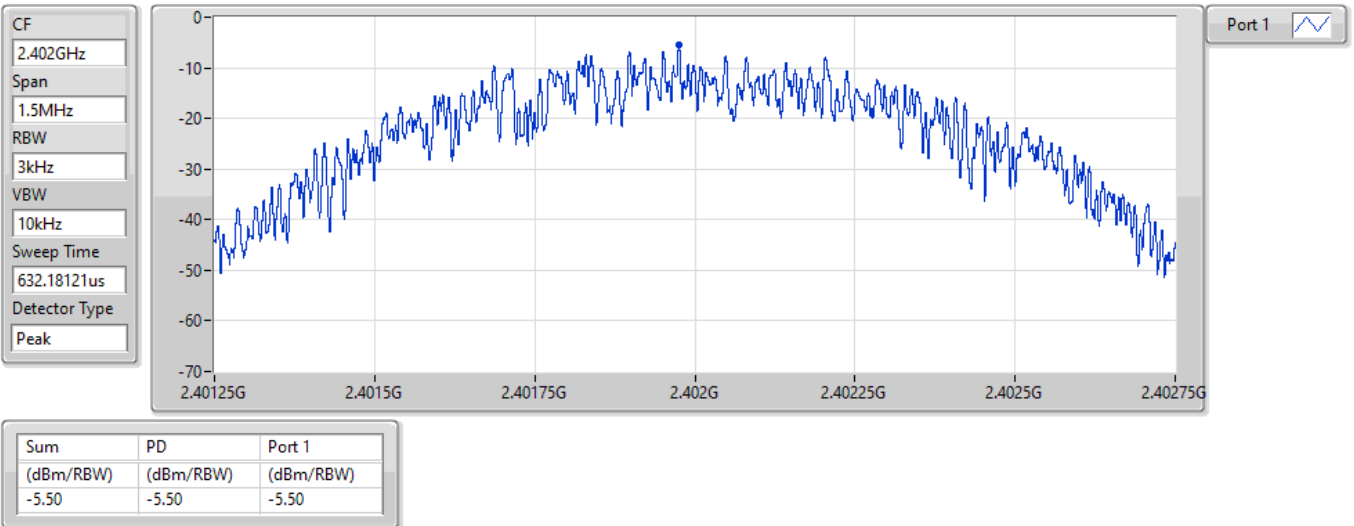
Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	4.10	-5.50	8.00
2440MHz	Pass	4.10	-5.37	8.00
2480MHz	Pass	4.10	-5.28	8.00
BT-LE(2Mbps)	-	-	-	-
2402MHz	Pass	4.10	-8.20	8.00
2440MHz	Pass	4.10	-8.04	8.00
2480MHz	Pass	4.10	-13.92	8.00

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

BT-LE(1Mbps)

2402MHz

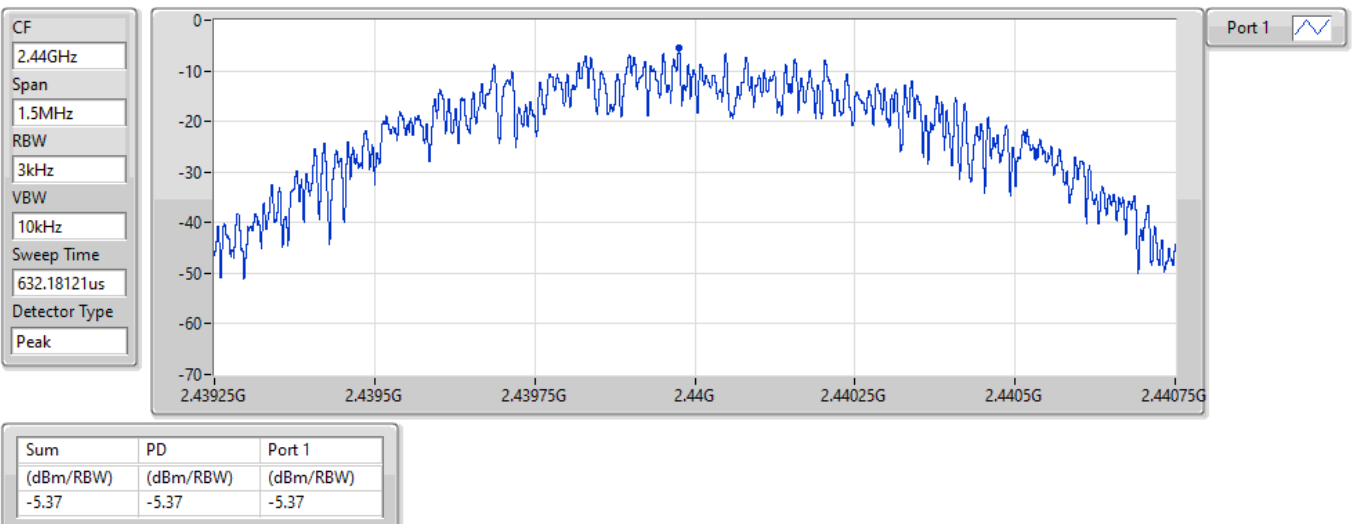
13/09/2021



BT-LE(1Mbps)

2440MHz

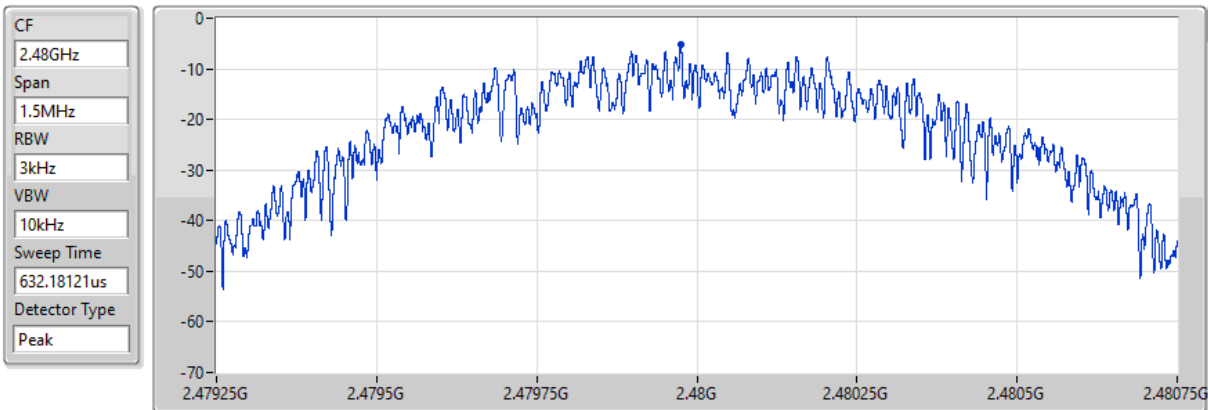
13/09/2021



BT-LE(1Mbps)

2480MHz

13/09/2021

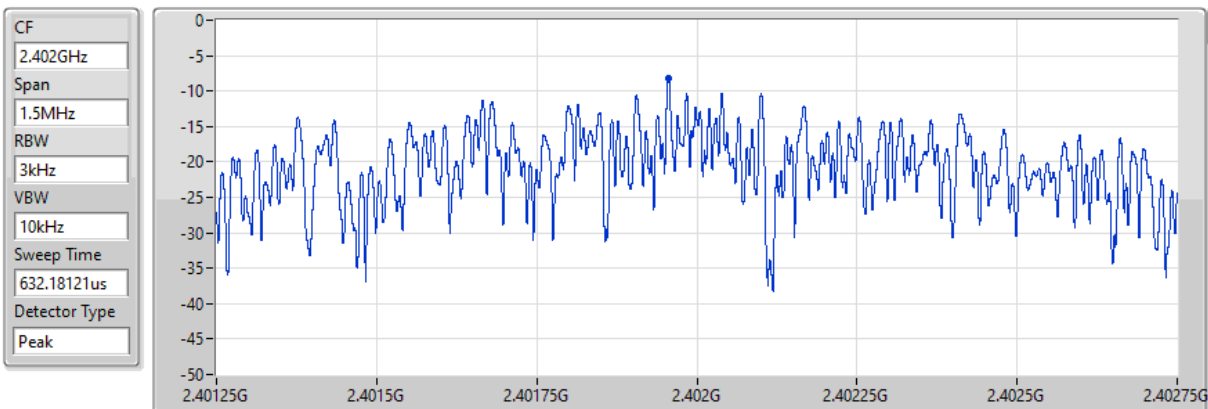


Sum	PD	Port 1
(dBm/Hz)	(dBm/Hz)	(dBm/Hz)
-5.28	-5.28	-5.28

BT-LE(2Mbps)

2402MHz

13/09/2021

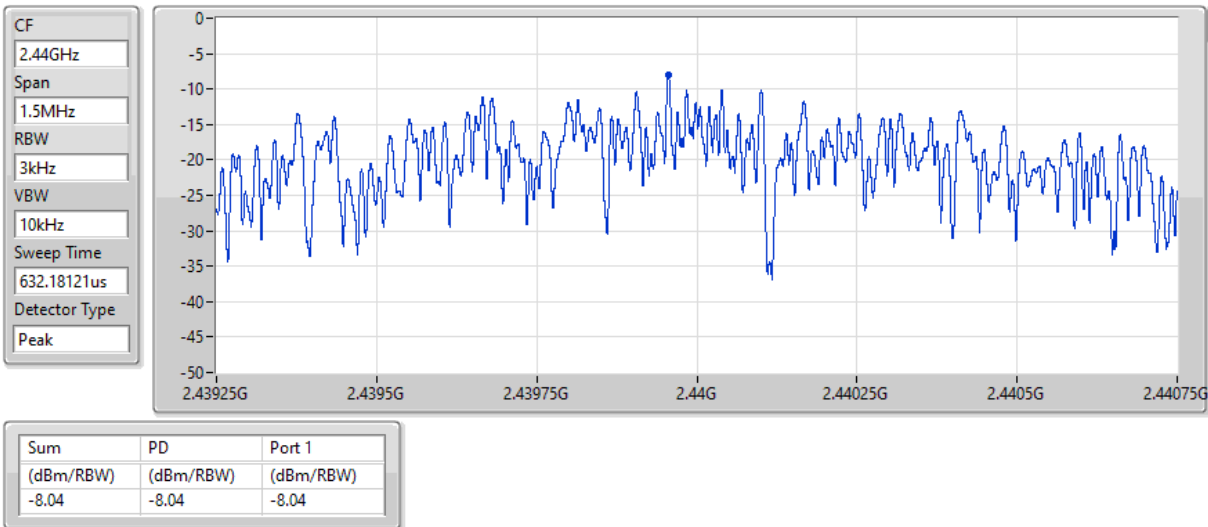


Sum	PD	Port 1
(dBm/Hz)	(dBm/Hz)	(dBm/Hz)
-8.20	-8.20	-8.20

BT-LE(2Mbps)

2440MHz

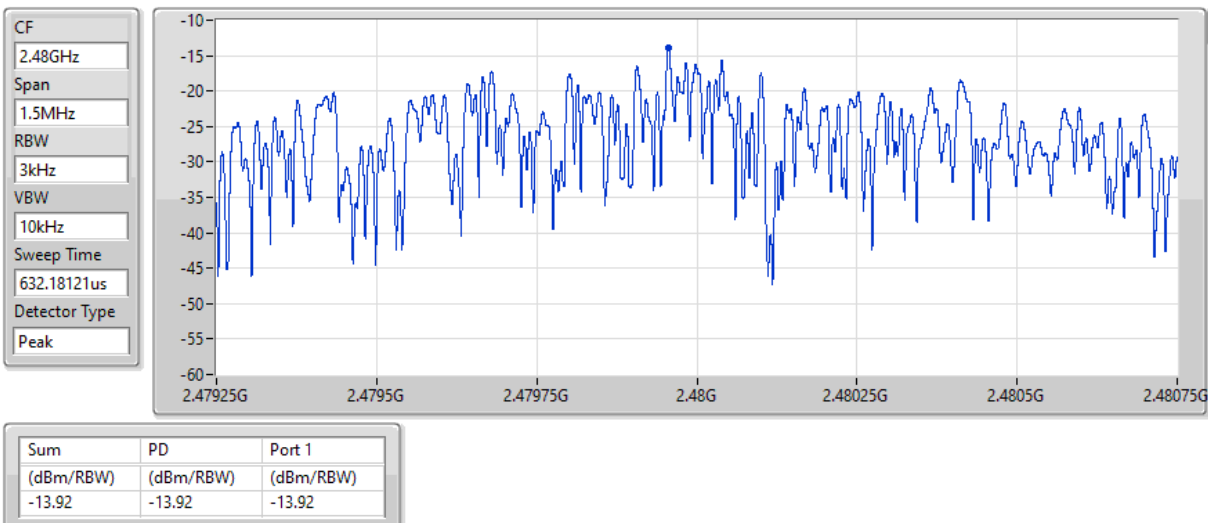
13/09/2021



BT-LE(2Mbps)

2480MHz

13/09/2021





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	9.29	-20.71	159.84M	-50.36	2.39986G	-40.85	2.4G	-40.58	2.49184G	-50.24	6.77502G	-46.01	1
BT-LE(2Mbps)	Pass	2.44G	9.23	-20.77	2.145G	-52.79	2.39999G	-22.47	2.4G	-24.09	2.49948G	-51.26	6.08888G	-46.26	1

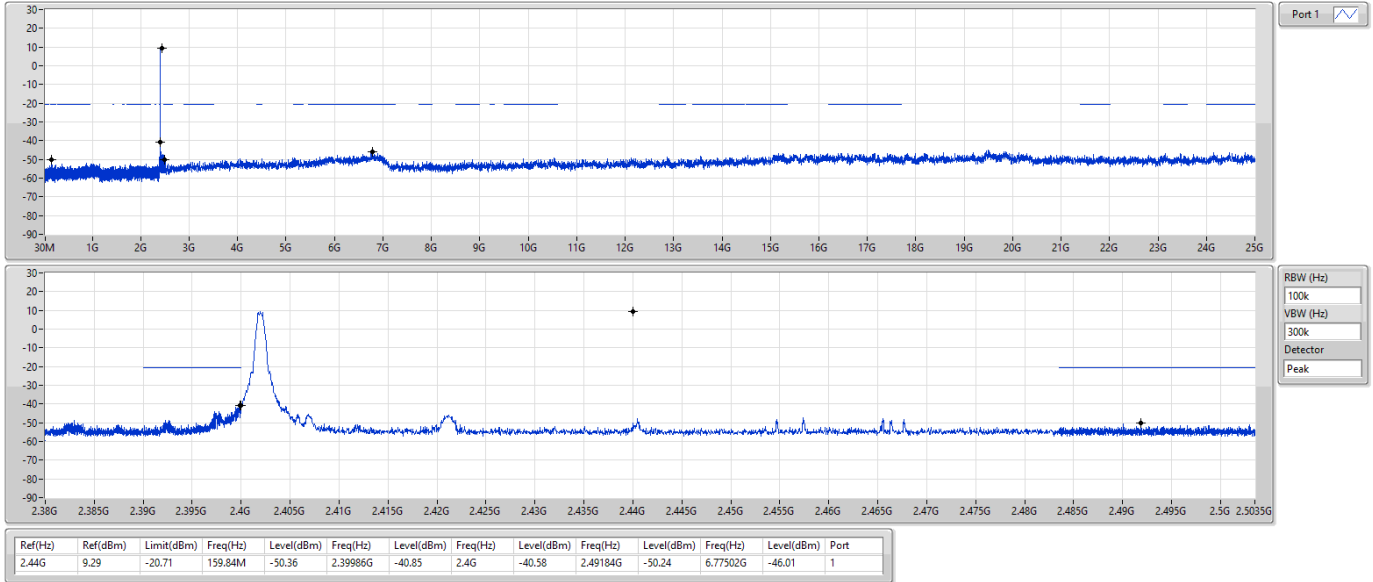
Result

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	9.29	-20.71	159.84M	-50.36	2.39986G	-40.85	2.4G	-40.58	2.49184G	-50.24	6.77502G	-46.01	1
2440MHz	Pass	2.44G	9.29	-20.71	2.01134G	-52.61	2.39347G	-51.74	2.4G	-54.88	2.50277G	-50.47	17.17122G	-46.38	1
2480MHz	Pass	2.44G	9.29	-20.71	1.97081G	-51.74	2.39771G	-51.61	2.4835G	-48.21	2.49879G	-44.89	6.58099G	-45.19	1
BT-LE(2Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.44G	9.23	-20.77	2.145G	-52.79	2.39999G	-22.47	2.4G	-24.09	2.49948G	-51.26	6.08888G	-46.26	1
2440MHz	Pass	2.44G	9.23	-20.77	860.14M	-51.96	2.39404G	-50.78	2.4835G	-54.77	2.48465G	-51.57	16.42883G	-45.76	1
2480MHz	Pass	2.44G	9.23	-20.77	529.38M	-52.35	2.39847G	-51.89	2.4835G	-50.34	2.48382G	-47.03	16.91813G	-45.51	1

BT-LE(1Mbps)

CSEndB-DTS

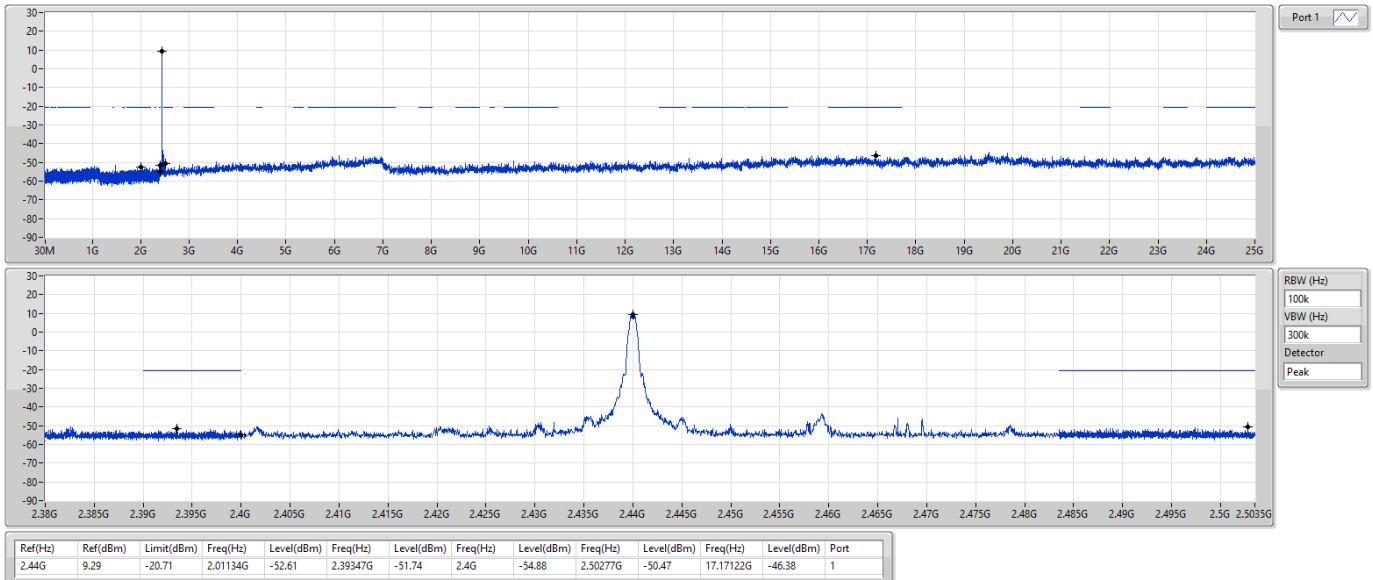
2402MHz



BT-LE(1Mbps)

CSEndB-DTS

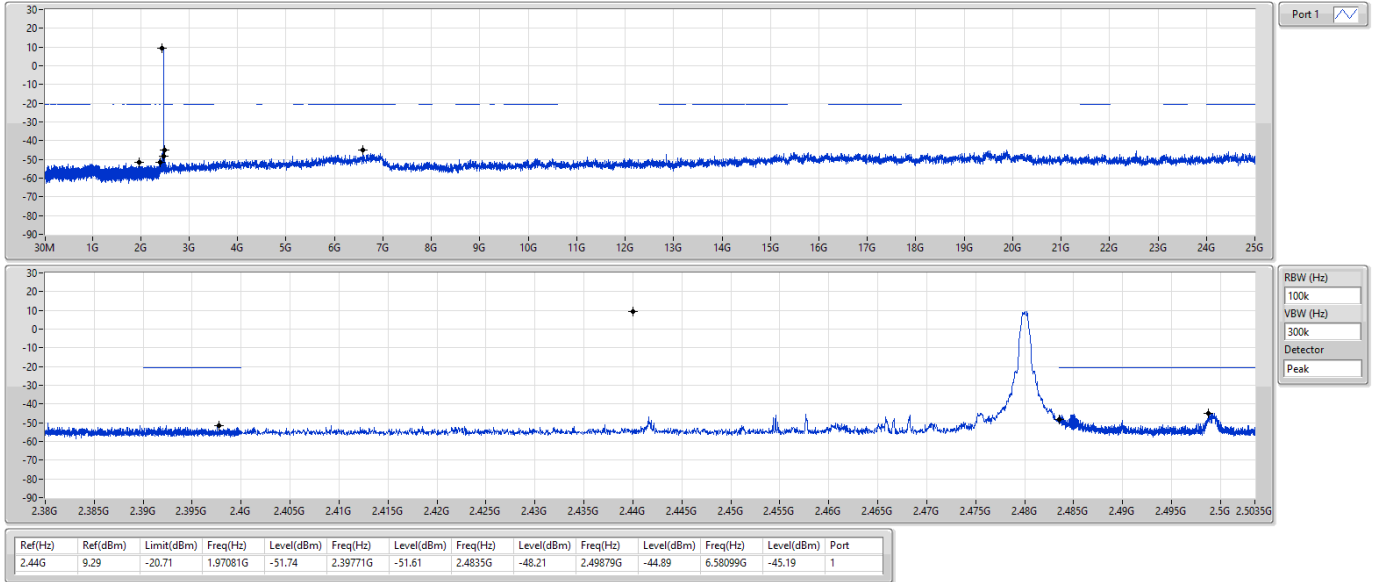
2440MHz



BT-LE(1Mbps)

CSEndB-DTS

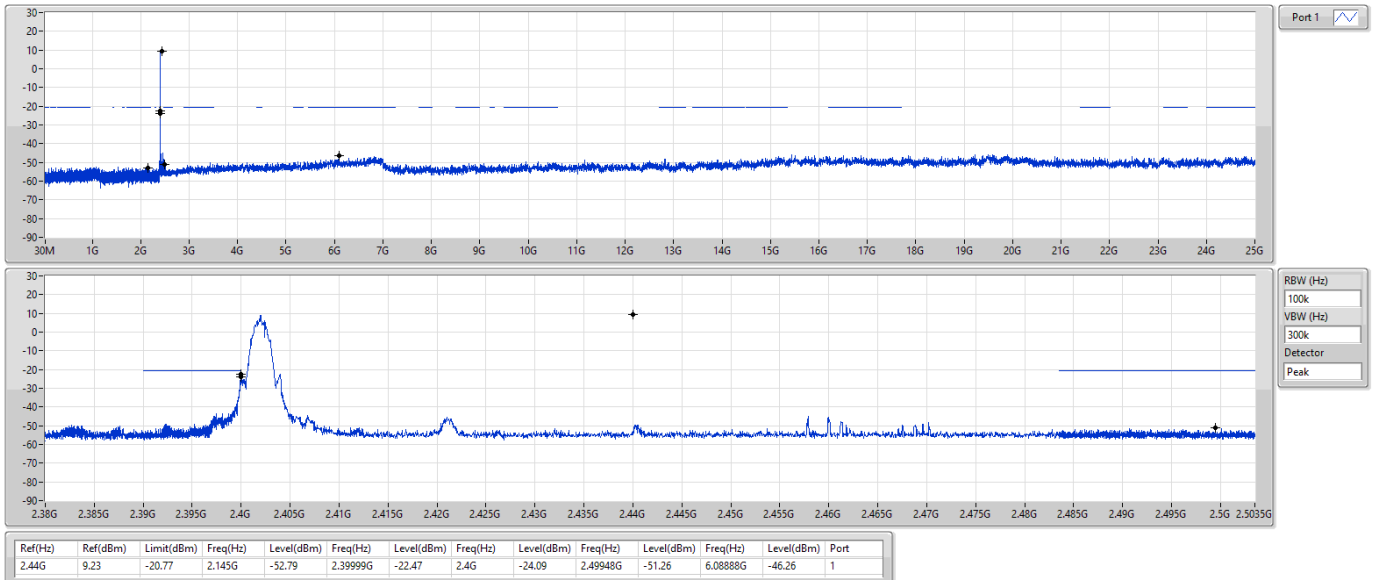
2480MHz



BT-LE(2Mbps)

CSEndB-DTS

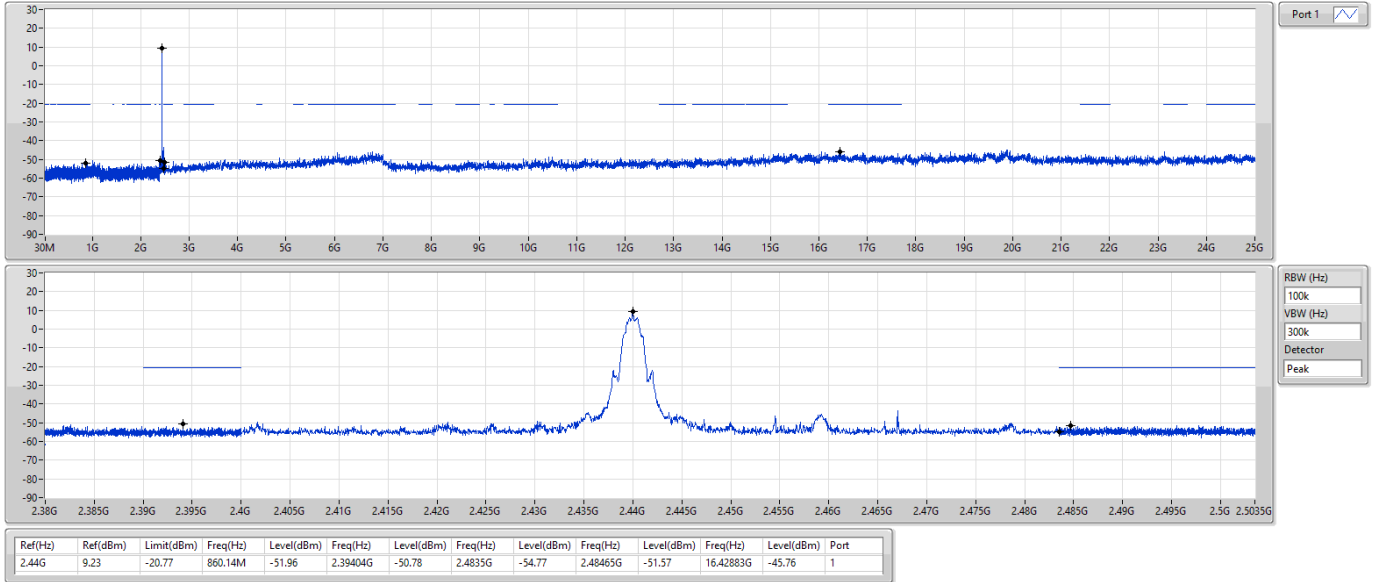
2402MHz



BT-LE(2Mbps)

CSEndB-DTS

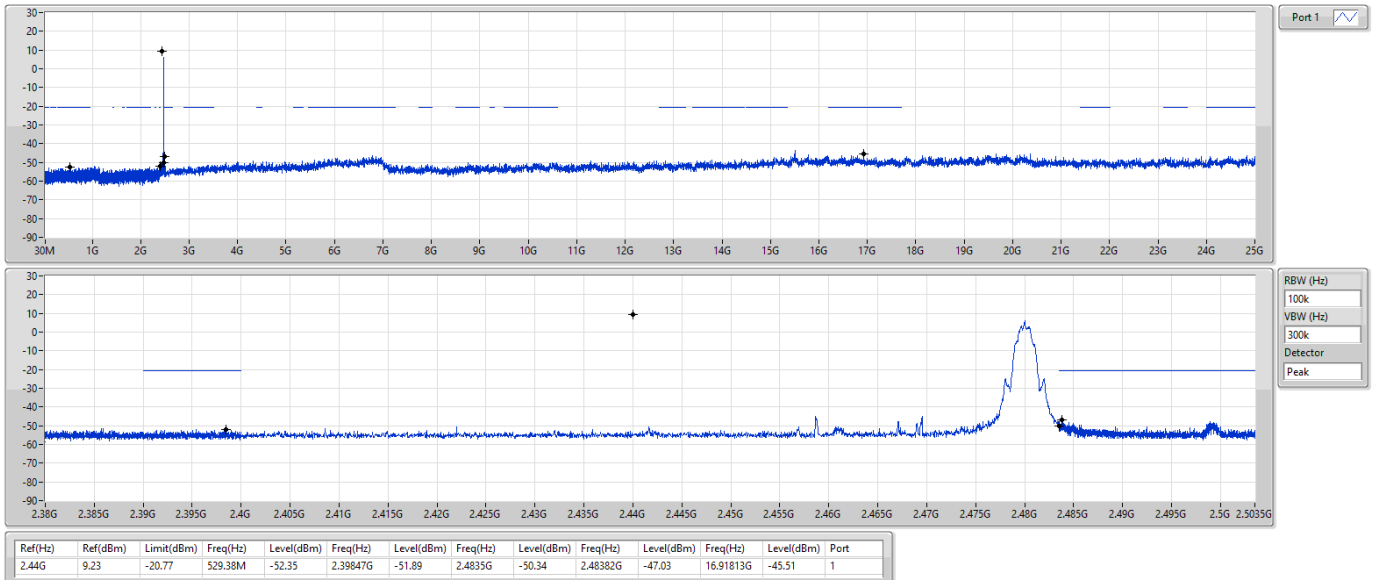
2440MHz



BT-LE(2Mbps)

CSEndB-DTS

2480MHz





Radiated Emissions below 1GHz

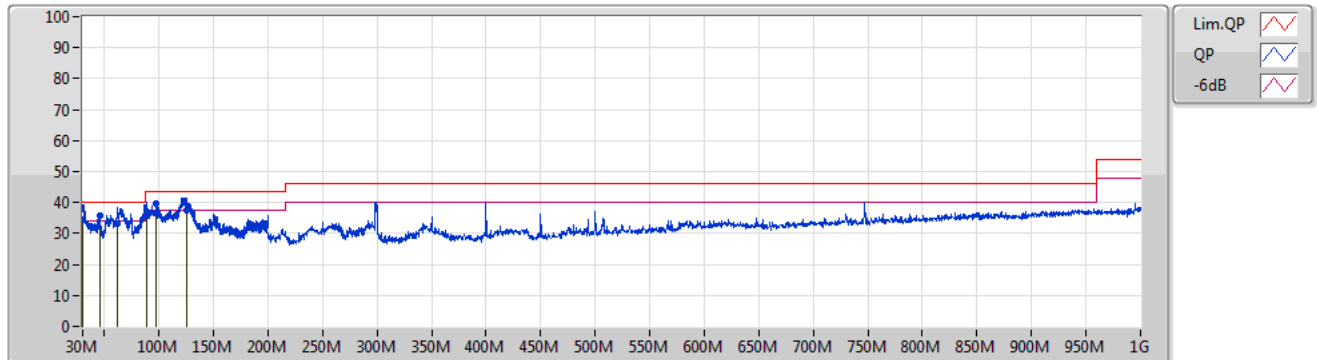
Appendix F.1

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 2	Pass	PK	46.07M	35.95	40.00	-4.05	Vertical

16/09/2021

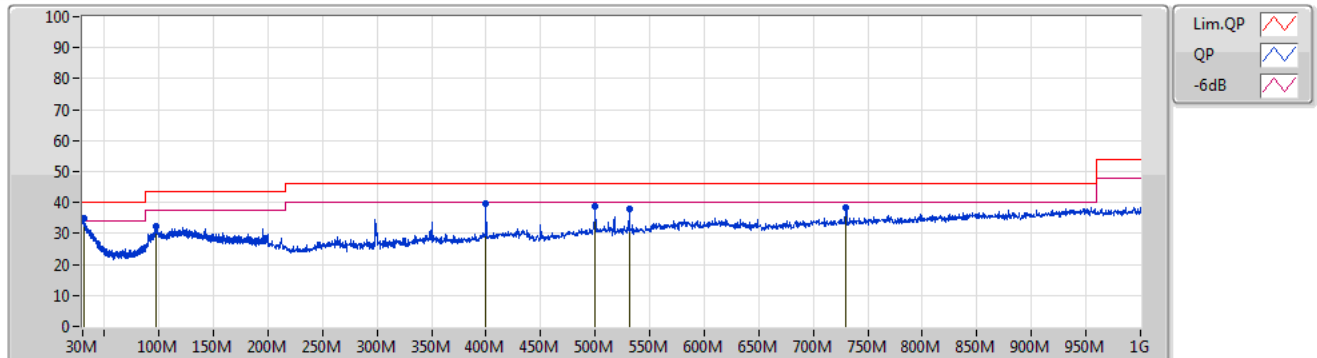
Mode 2



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
QP	30M	34.30	40.00	-5.70	-3.09	3	Vertical	43	1.00	-	37.39	23.79	1.00	27.88
PK	46.07M	35.95	40.00	-4.05	-11.20	3	Vertical	247	1.00	"Worst"	47.15	15.31	1.42	27.93
QP	62.05M	33.30	40.00	-6.70	-13.64	3	Vertical	97	2.00	-	46.94	12.44	1.74	27.82
QP	88.23M	36.08	43.50	-7.42	-11.14	3	Vertical	58	4.00	-	47.22	14.51	2.20	27.85
PK	97.49M	39.45	43.50	-4.05	-9.10	3	Vertical	54	2.00	-	48.55	16.37	2.35	27.82
QP	125.03M	37.55	43.50	-5.95	-6.71	3	Vertical	193	1.00	-	44.26	18.12	2.78	27.61

16/09/2021

Mode 2



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	31.45M	34.85	40.00	-5.15	-3.65	3	Horizontal	213	1.00	"Worst"	38.50	23.18	1.06	27.89
PK	97.07M	32.31	43.50	-11.19	-9.19	3	Horizontal	359	1.00	-	41.50	16.29	2.34	27.82
PK	400M	39.78	46.00	-6.22	-6.81	3	Horizontal	294	4.00	-	46.59	16.23	4.30	27.34
PK	500M	38.63	46.00	-7.37	-5.58	3	Horizontal	297	2.00	-	44.21	17.52	4.80	27.90
PK	531.6M	38.12	46.00	-7.88	-5.04	3	Horizontal	359	2.00	-	43.16	17.88	4.99	27.91
PK	729.6M	38.40	46.00	-7.60	-1.00	3	Horizontal	9	2.00	-	39.40	20.70	5.92	27.62

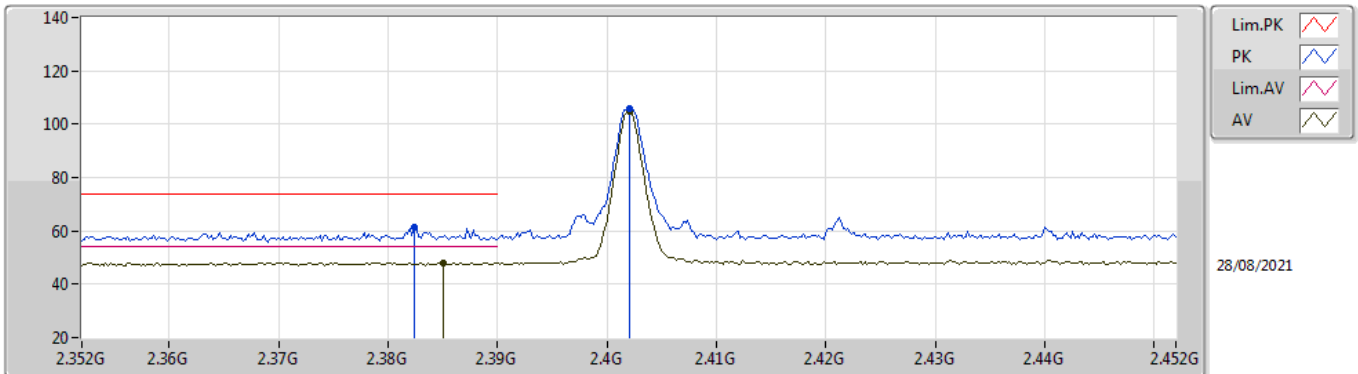


Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
BT-LE(2Mbps)	Pass	AV	2.4835G	53.98	54.00	-0.02	3	Vertical	13	1.09	-

BT-LE(1Mbps)

2402MHz_TX

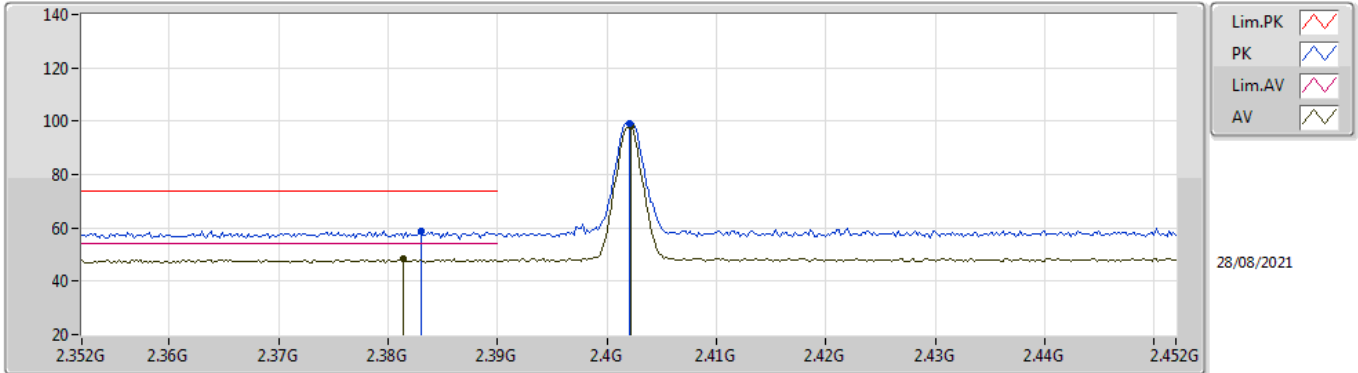


EUT V_1TX
Setting 110
02-B-G-2

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.3824G	61.39	74.00	-12.61	30.62	3	Vertical	0	1.03	-	28.36	2.41	-	
AV	2.385G	48.13	54.00	-5.87	17.35	3	Vertical	0	1.03	-	28.37	2.41	-	
PK	2.402G	105.71	Inf	-Inf	74.91	3	Vertical	0	1.03	-	28.40	2.40	-	
AV	2.402G	104.65	Inf	-Inf	73.85	3	Vertical	0	1.03	-	28.40	2.40	-	

BT-LE(1Mbps)

2402MHz_TX

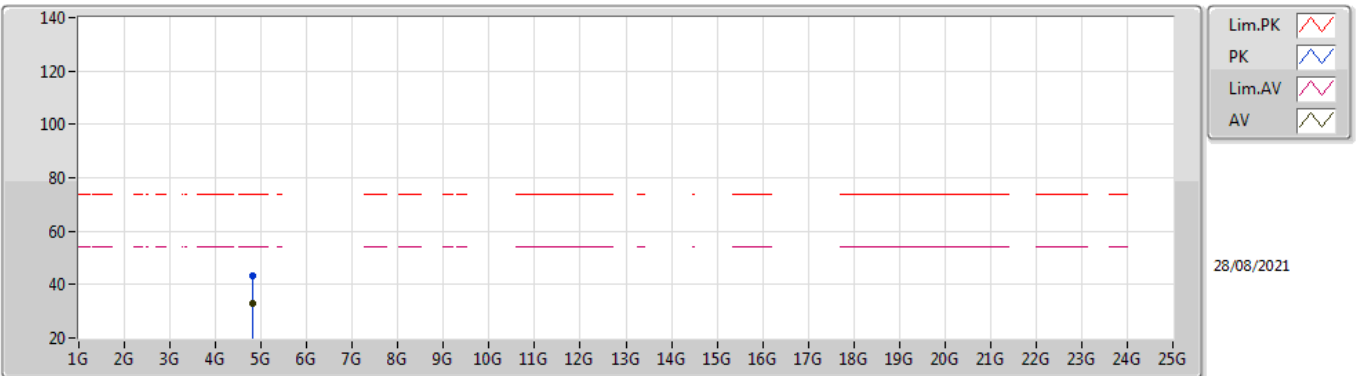


EUT V_1TX
Setting 110
02-B-G-2

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	2.383G	58.92	74.00	-15.08	28.14	3	Horizontal	320	1.98	-	28.37	2.41	-	
AV	2.3814G	48.64	54.00	-5.36	17.87	3	Horizontal	320	1.98	-	28.36	2.41	-	
PK	2.402G	99.34	Inf	-Inf	68.54	3	Horizontal	320	1.98	-	28.40	2.40	-	
AV	2.4022G	98.33	Inf	-Inf	67.53	3	Horizontal	320	1.98	-	28.40	2.40	-	

BT-LE(1Mbps)

2402MHz_TX

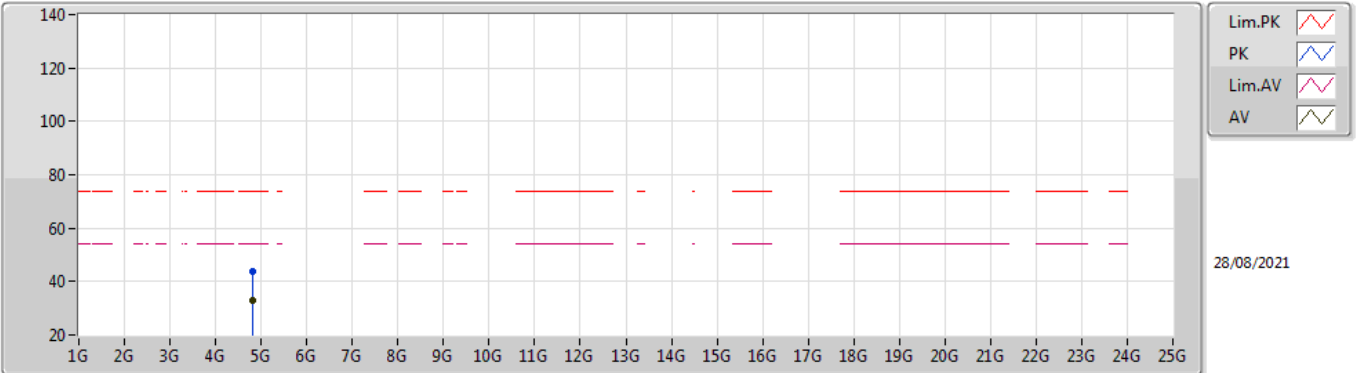


EUT V_1TX
Setting 110
02-B-G-2

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	4.80328G	43.50	74.00	-30.50	38.32	3	Vertical	337	1.80	-	32.71	4.70	32.23	
AV	4.80798G	32.82	54.00	-21.18	27.62	3	Vertical	337	1.80	-	32.73	4.70	32.23	

BT-LE(1Mbps)

2402MHz_TX

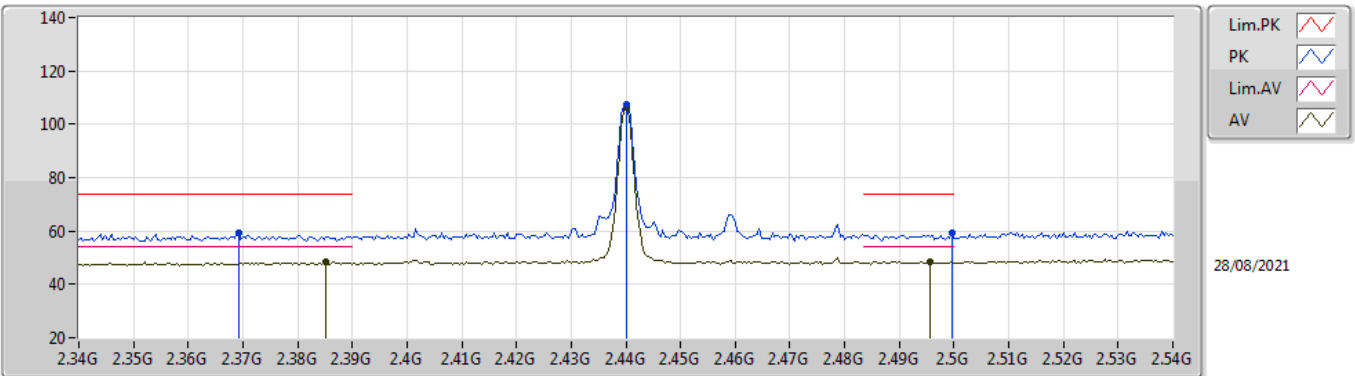


EUT V_1TX
Setting 110
02-B-G-2

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.80428G	43.72	74.00	-30.28	38.53	3	Horizontal	47	1.79	-	32.72	4.70	32.23
AV	4.80378G	32.94	54.00	-21.06	27.75	3	Horizontal	47	1.79	-	32.72	4.70	32.23

BT-LE(1Mbps)

2440MHz_TX

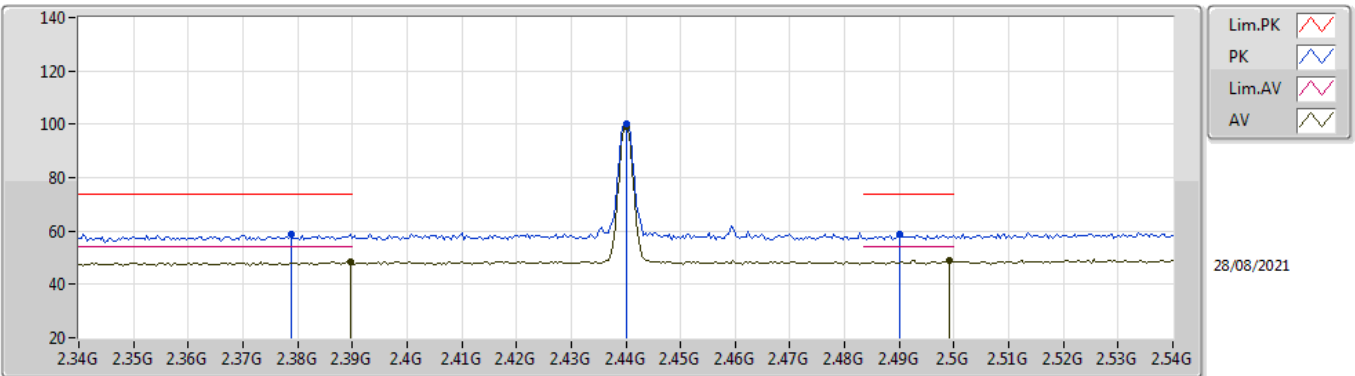


EUT V_1TX
Setting 110
02-B-G-2

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3692G	59.31	74.00	-14.69	28.55	3	Vertical	356	1.00	-	28.34	2.42	-
AV	2.3852G	48.49	54.00	-5.51	17.71	3	Vertical	356	1.00	-	28.37	2.41	-
PK	2.44G	107.30	Inf	-Inf	76.48	3	Vertical	356	1.00	-	28.40	2.42	-
AV	2.44G	106.19	Inf	-Inf	75.37	3	Vertical	356	1.00	-	28.40	2.42	-
PK	2.4996G	59.34	74.00	-14.66	28.29	3	Vertical	356	1.00	-	28.60	2.45	-
AV	2.4956G	48.48	54.00	-5.52	17.45	3	Vertical	356	1.00	-	28.58	2.45	-

BT-LE(1Mbps)

2440MHz_TX

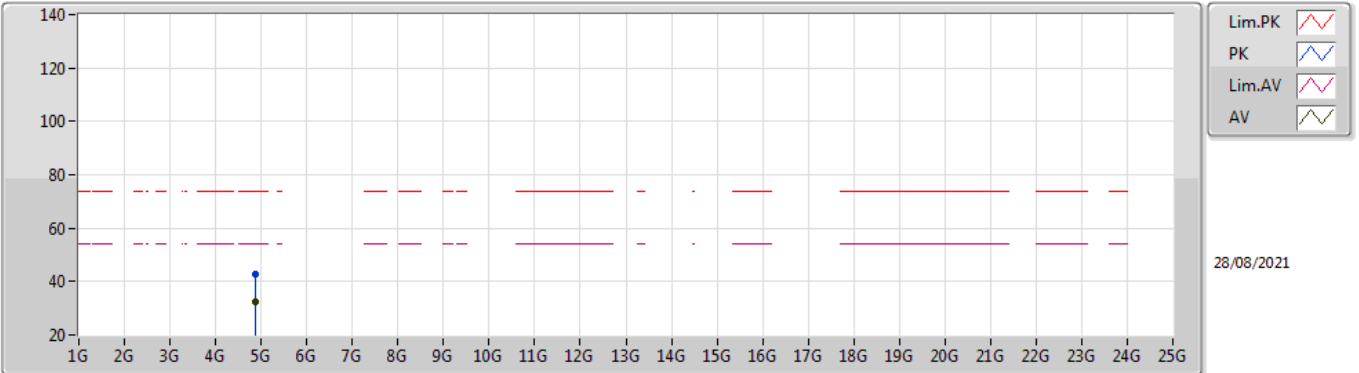


EUT V_1TX
Setting 110
02-B-G-2

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3788G	58.81	74.00	-15.19	28.04	3	Horizontal	317	2.21	-	28.36	2.41	-
AV	2.3896G	48.54	54.00	-5.46	17.75	3	Horizontal	317	2.21	-	28.38	2.41	-
PK	2.44G	100.38	Inf	-Inf	69.56	3	Horizontal	317	2.21	-	28.40	2.42	-
AV	2.44G	99.39	Inf	-Inf	68.57	3	Horizontal	317	2.21	-	28.40	2.42	-
PK	2.49G	58.85	74.00	-15.15	27.85	3	Horizontal	317	2.21	-	28.56	2.44	-
AV	2.4992G	48.93	54.00	-5.07	17.88	3	Horizontal	317	2.21	-	28.60	2.45	-

BT-LE(1Mbps)

2440MHz_TX

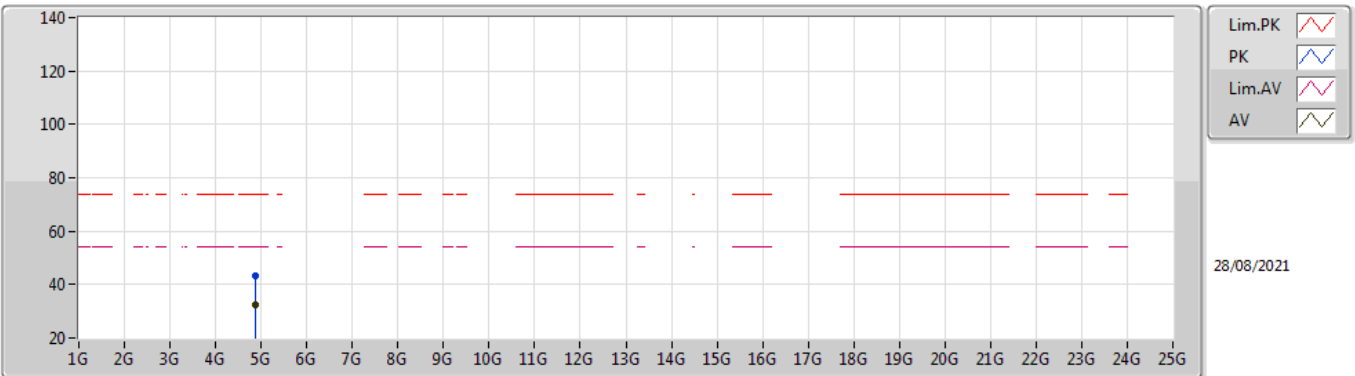


EUT V_1TX
Setting 110
02-B-G-2

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	4.87536G	42.76	74.00	-31.24	37.31	3	Vertical	229	1.44	-	32.95	4.70	32.20	
AV	4.87578G	32.32	54.00	-21.68	26.87	3	Vertical	229	1.44	-	32.95	4.70	32.20	

BT-LE(1Mbps)

2440MHz_TX

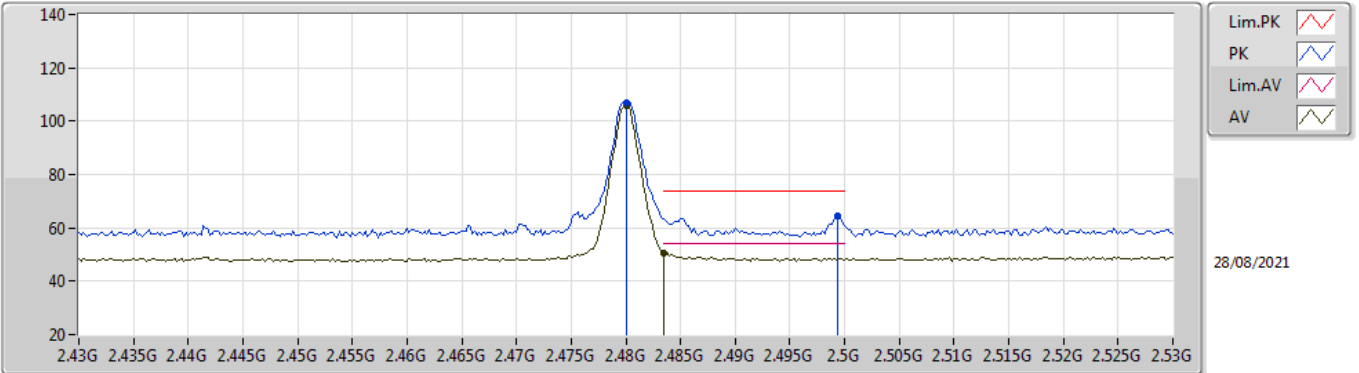


EUT V_1TX
Setting 110
02-B-G-2

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.88016G	43.35	74.00	-30.65	37.89	3	Horizontal	127	1.21	-	32.96	4.70	32.20
AV	4.88028G	32.43	54.00	-21.57	26.97	3	Horizontal	127	1.21	-	32.96	4.70	32.20

BT-LE(1Mbps)

2480MHz_TX

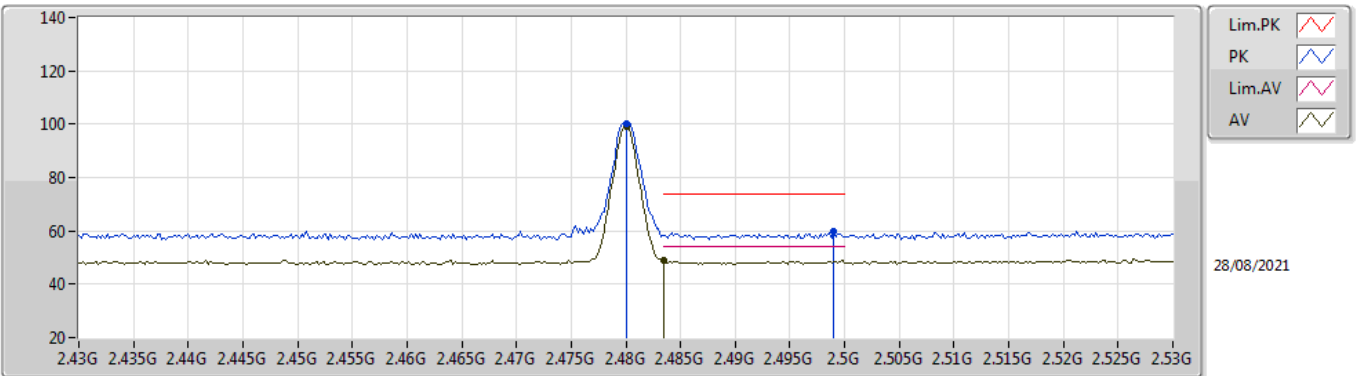


EUT V_1TX
Setting 110
02-B-G-2

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.48G	107.09	Inf	-Inf	76.13	3	Vertical	323	1.40	-	28.52	2.44	-	
AV	2.48G	105.99	Inf	-Inf	75.03	3	Vertical	323	1.40	-	28.52	2.44	-	
PK	2.4994G	64.42	74.00	-9.58	33.37	3	Vertical	323	1.40	-	28.60	2.45	-	
AV	2.4835G	50.67	54.00	-3.33	19.70	3	Vertical	323	1.40	-	28.53	2.44	-	

BT-LE(1Mbps)

2480MHz_TX

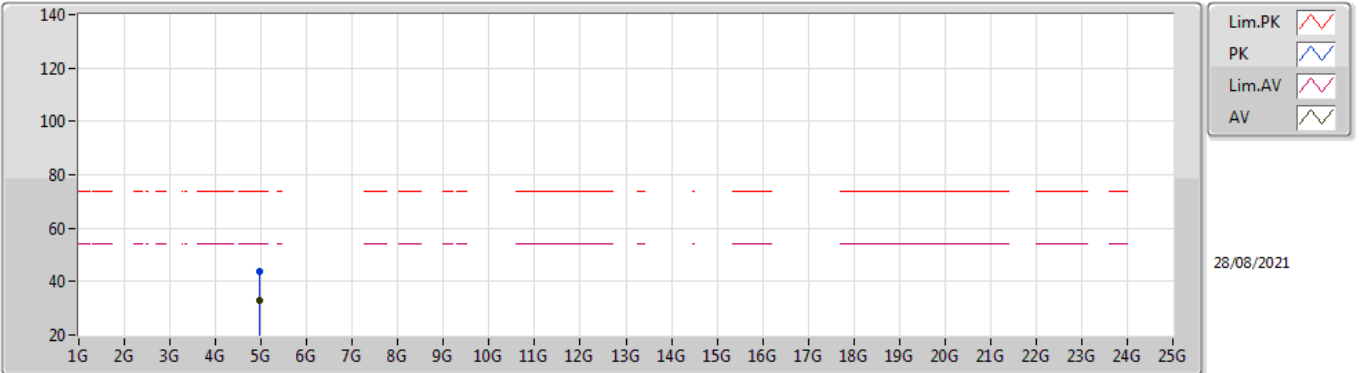


EUT V_1TX
Setting 110
02-B-G-2

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.48G	100.27	Inf	-Inf	69.31	3	Horizontal	51	1.29	-	28.52	2.44	-	
AV	2.48G	99.12	Inf	-Inf	68.16	3	Horizontal	51	1.29	-	28.52	2.44	-	
PK	2.499G	60.07	74.00	-13.93	29.02	3	Horizontal	51	1.29	-	28.60	2.45	-	
AV	2.4835G	48.83	54.00	-5.17	17.86	3	Horizontal	51	1.29	-	28.53	2.44	-	

BT-LE(1Mbps)

2480MHz_TX

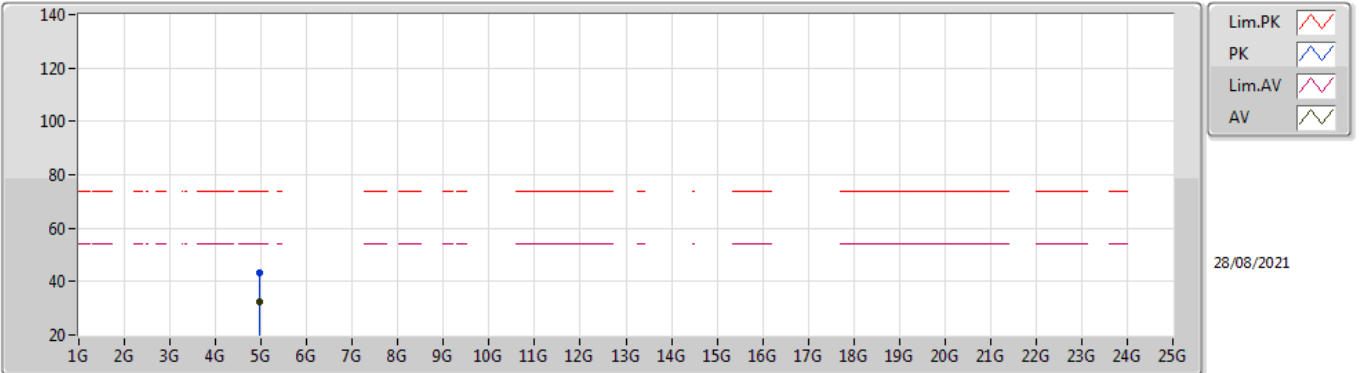


EUT V_1TX
Setting 110
02-B-G-2

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.95952G	43.71	74.00	-30.29	37.90	3	Vertical	188	1.80	-	33.28	4.70	32.17
AV	4.95806G	32.91	54.00	-21.09	27.11	3	Vertical	188	1.80	-	33.28	4.70	32.18

BT-LE(1Mbps)

2480MHz_TX

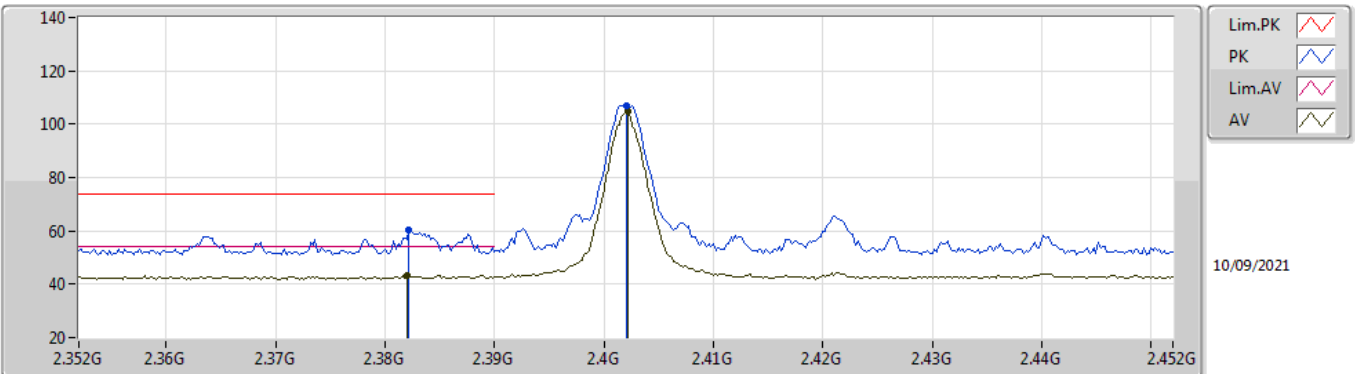


EUT V_1TX
Setting 110
02-B-G-2

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.95552G	43.28	74.00	-30.72	37.47	3	Horizontal	316	1.75	-	33.29	4.70	32.18
AV	4.95726G	32.38	54.00	-21.62	26.57	3	Horizontal	316	1.75	-	33.29	4.70	32.18

BT-LE(2Mbps)

2402MHz_TX

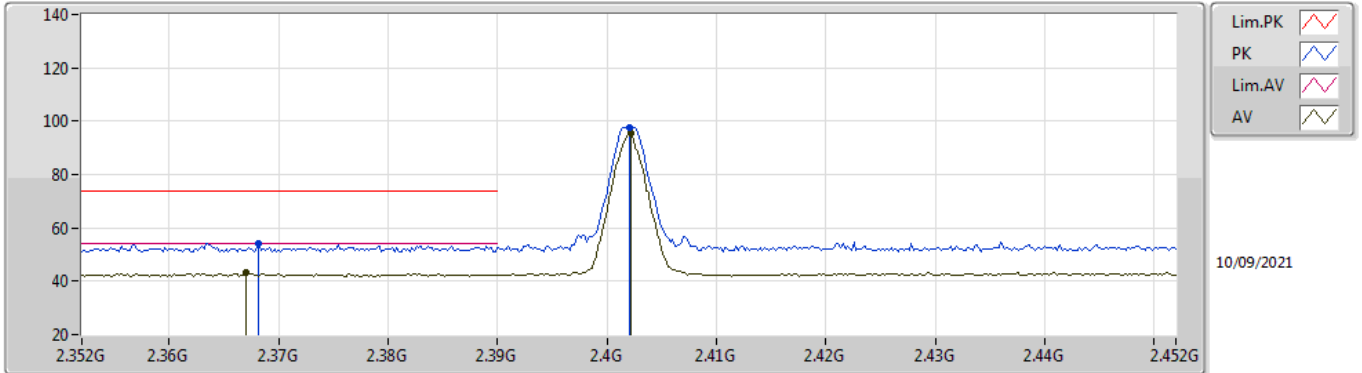


EUT_V_1TX
Setting 110
01-A-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.3822G	60.19	74.00	-13.81	30.65	3	Vertical	0	1.12	-	27.36	2.18	-	
AV	2.382G	43.41	54.00	-10.59	13.87	3	Vertical	0	1.12	-	27.36	2.18	-	
PK	2.402G	106.97	Inf	-Inf	77.37	3	Vertical	0	1.12	-	27.40	2.20	-	
AV	2.4022G	104.85	Inf	-Inf	75.25	3	Vertical	0	1.12	-	27.40	2.20	-	

BT-LE(2Mbps)

2402MHz_TX

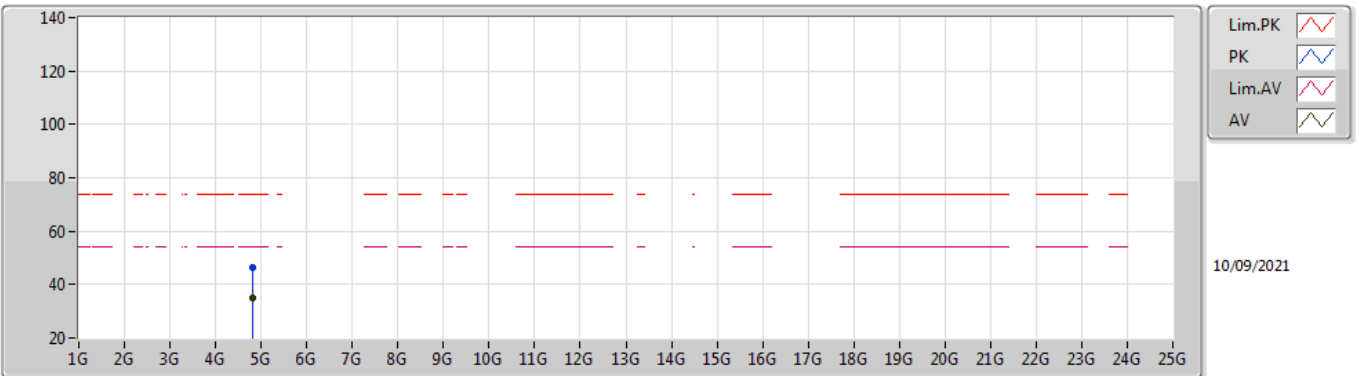


EUT V_1TX
Setting 110
01-A-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.3682G	54.01	74.00	-19.99	24.50	3	Horizontal	6	1.80	-	27.34	2.17	-	
AV	2.367G	43.25	54.00	-10.75	13.75	3	Horizontal	6	1.80	-	27.33	2.17	-	
PK	2.402G	97.50	Inf	-Inf	67.90	3	Horizontal	6	1.80	-	27.40	2.20	-	
AV	2.4022G	95.42	Inf	-Inf	65.82	3	Horizontal	6	1.80	-	27.40	2.20	-	

BT-LE(2Mbps)

2402MHz_TX

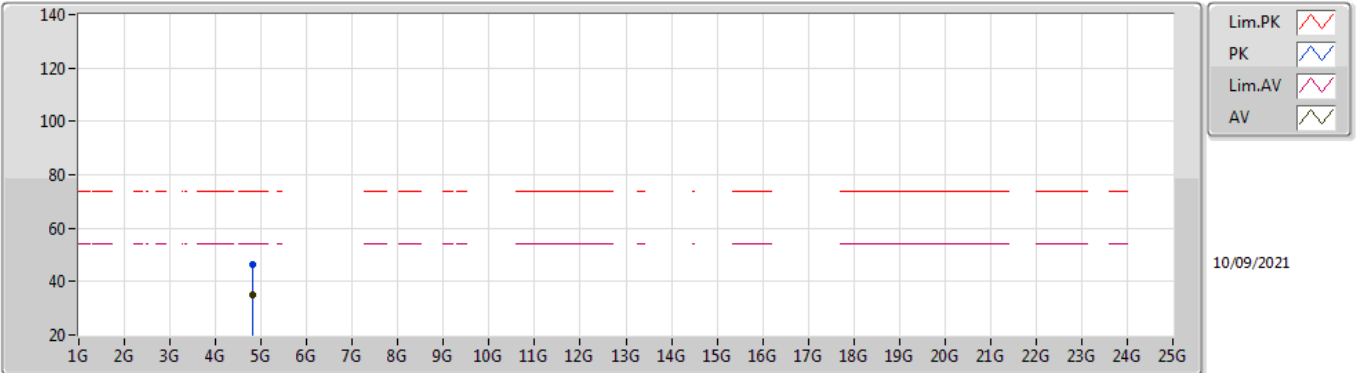


EUT V_1TX
Setting 110
01-A-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	4.80413G	46.43	74.00	-27.57	42.30	3	Vertical	347	1.80	-	32.12	5.00	32.99	
AV	4.80568G	35.08	54.00	-18.92	30.94	3	Vertical	347	1.80	-	32.13	5.00	32.99	

BT-LE(2Mbps)

2402MHz_TX

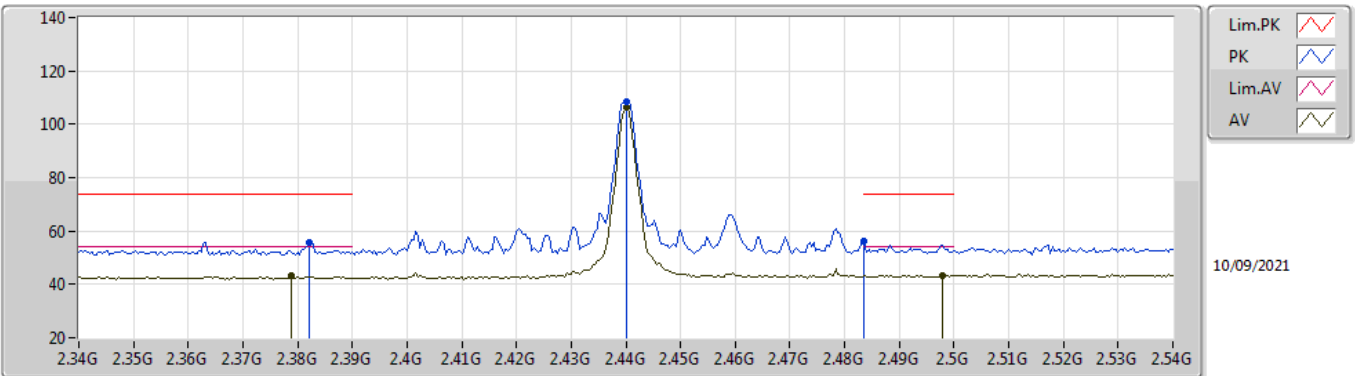


EUT V_1TX
Setting 110
01-A-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.8046G	46.15	74.00	-27.85	42.01	3	Horizontal	221	1.80	-	32.13	5.00	32.99
AV	4.8017G	35.13	54.00	-18.87	31.01	3	Horizontal	221	1.80	-	32.11	5.00	32.99

BT-LE(2Mbps)

2440MHz_TX

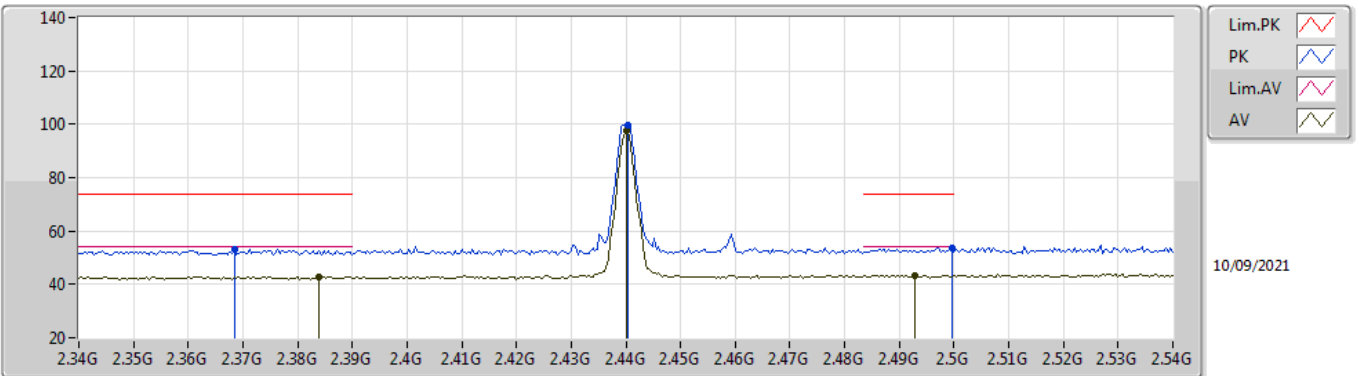


EUT_V_1TX
Setting 110
01-A-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.382G	55.90	74.00	-18.10	26.36	3	Vertical	6	1.00	-	27.36	2.18	-
AV	2.3788G	43.25	54.00	-10.75	13.71	3	Vertical	6	1.00	-	27.36	2.18	-
PK	2.44G	108.45	Inf	-Inf	78.73	3	Vertical	6	1.00	-	27.48	2.24	-
AV	2.44G	106.38	Inf	-Inf	76.66	3	Vertical	6	1.00	-	27.48	2.24	-
PK	2.4835G	56.19	74.00	-17.81	26.21	3	Vertical	6	1.00	-	27.70	2.28	-
AV	2.498G	43.18	54.00	-10.82	13.09	3	Vertical	6	1.00	-	27.79	2.30	-

BT-LE(2Mbps)

2440MHz_TX

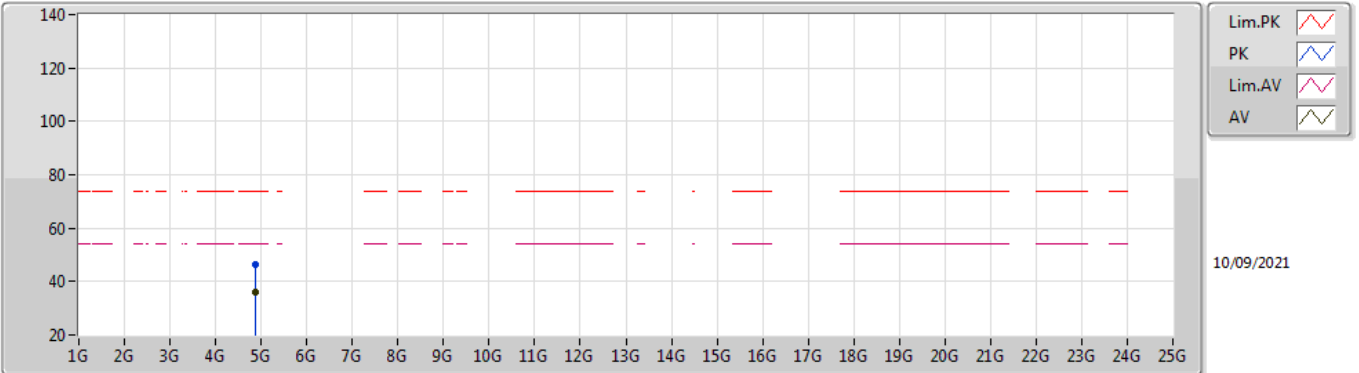


EUT_V_1TX
Setting 110
01-A-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3684G	53.19	74.00	-20.81	23.68	3	Horizontal	27	2.65	-	27.34	2.17	-
AV	2.384G	42.92	54.00	-11.08	13.37	3	Horizontal	27	2.65	-	27.37	2.18	-
PK	2.4404G	99.66	Inf	-Inf	69.94	3	Horizontal	27	2.65	-	27.48	2.24	-
AV	2.44G	97.46	Inf	-Inf	67.74	3	Horizontal	27	2.65	-	27.48	2.24	-
PK	2.4996G	53.75	74.00	-20.25	23.65	3	Horizontal	27	2.65	-	27.80	2.30	-
AV	2.4928G	43.43	54.00	-10.57	13.38	3	Horizontal	27	2.65	-	27.76	2.29	-

BT-LE(2Mbps)

2440MHz_TX

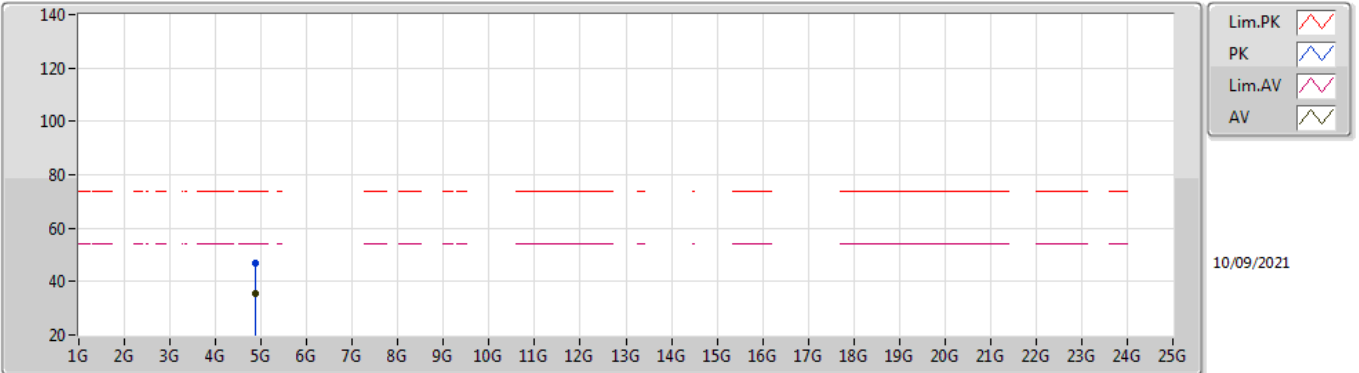


EUT V_1TX
Setting 110
01-A-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.88162G	46.48	74.00	-27.52	41.96	3	Vertical	67	1.32	-	32.46	5.04	32.98
AV	4.88234G	36.05	54.00	-17.95	31.53	3	Vertical	67	1.32	-	32.46	5.04	32.98

BT-LE(2Mbps)

2440MHz_TX

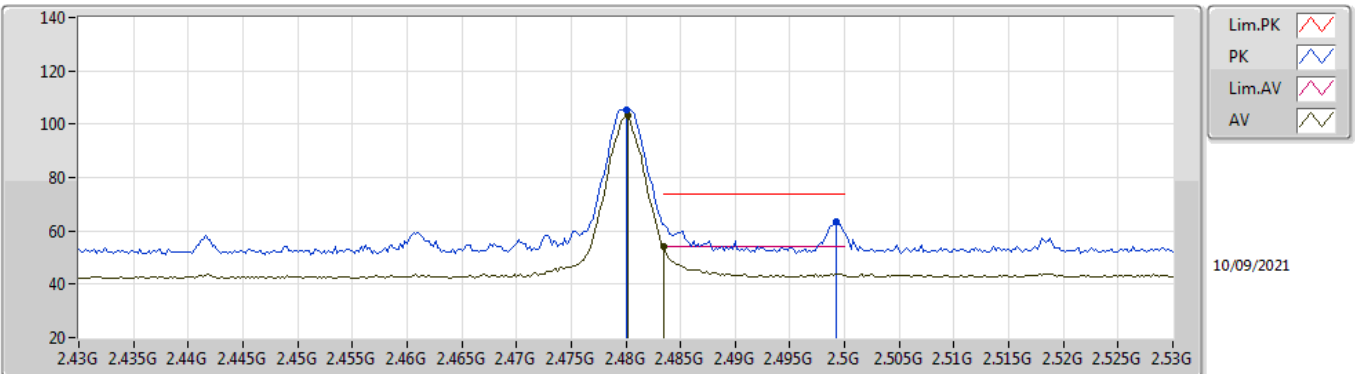


EUT V_1TX
Setting 110
01-A-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.88222G	46.87	74.00	-27.13	42.35	3	Horizontal	155	1.09	-	32.46	5.04	32.98
AV	4.87863G	35.71	54.00	-18.29	31.19	3	Horizontal	155	1.09	-	32.46	5.04	32.98

BT-LE(2Mbps)

2480MHz_TX

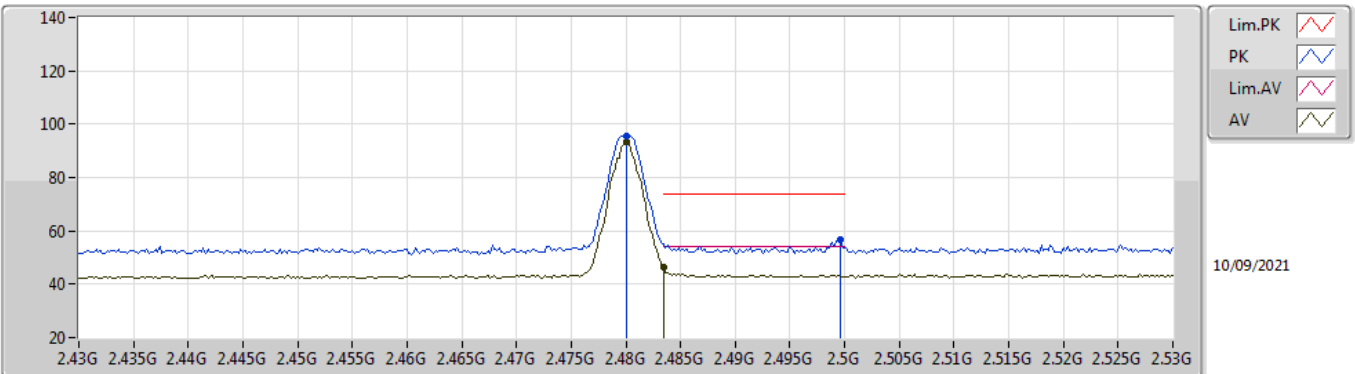


EUT_V_1TX
Setting 67
01-A-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	2.48G	105.25	Inf	-Inf	75.29	3	Vertical	13	1.09	-	27.68	2.28	-	
AV	2.4802G	103.21	Inf	-Inf	73.25	3	Vertical	13	1.09	-	27.68	2.28	-	
PK	2.4992G	63.24	74.00	-10.76	33.14	3	Vertical	13	1.09	-	27.80	2.30	-	
AV	2.4835G	53.98	54.00	-0.02	24.00	3	Vertical	13	1.09	-	27.70	2.28	-	

BT-LE(2Mbps)

2480MHz_TX

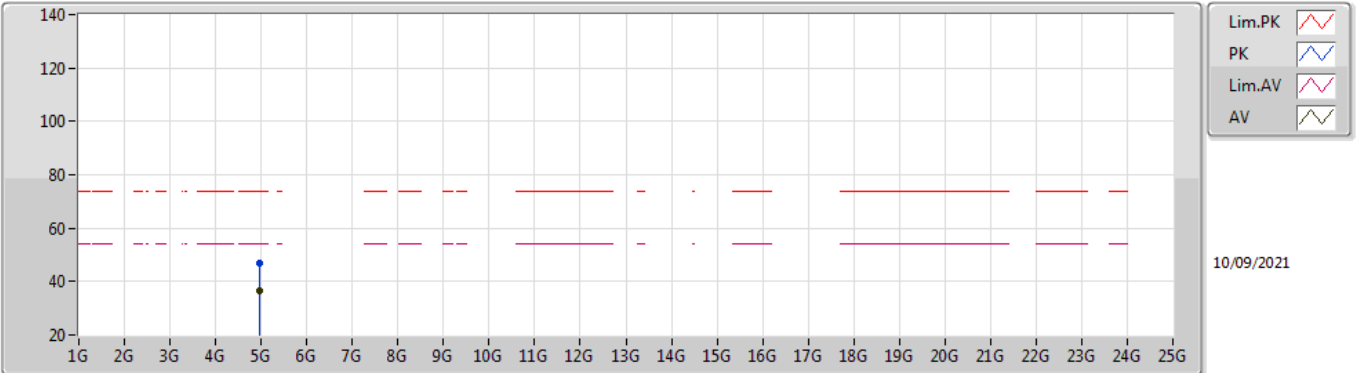


EUT V_1TX
Setting 67
01-A-R-5

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA	
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)	
PK	2.48G	95.32	Inf	-Inf	65.36	3	Horizontal	117	1.23	-	27.68	2.28	-	
AV	2.48G	93.23	Inf	-Inf	63.27	3	Horizontal	117	1.23	-	27.68	2.28	-	
PK	2.4996G	56.73	74.00	-17.27	26.63	3	Horizontal	117	1.23	-	27.80	2.30	-	
AV	2.4835G	46.15	54.00	-7.85	16.17	3	Horizontal	117	1.23	-	27.70	2.28	-	

BT-LE(2Mbps)

2480MHz_TX

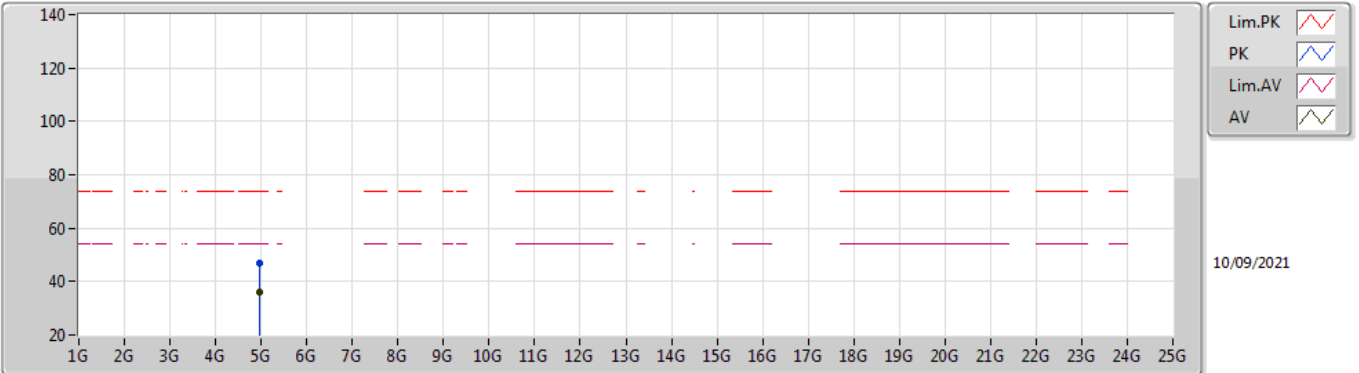


EUT Y_1TX
Setting 67
01-A-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.9595G	46.66	74.00	-27.34	41.77	3	Vertical	231	1.78	-	32.78	5.08	32.97
AV	4.95796G	36.47	54.00	-17.53	31.58	3	Vertical	231	1.78	-	32.78	5.08	32.97

BT-LE(2Mbps)

2480MHz_TX



EUT V_1TX
Setting 67
01-A-R-5

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.95902G	46.84	74.00	-27.16	41.95	3	Horizontal	105	2.28	-	32.78	5.08	32.97
AV	4.95911G	36.29	54.00	-17.71	31.40	3	Horizontal	105	2.28	-	32.78	5.08	32.97