



# FCC RADIO TEST REPORT

FCC ID : G954331X  
Equipment Name : DOCSIS Cable Gateway  
Trade Name : Technicolor  
Model Number : CGM4331COM  
Applicant : Technicolor Connected Home USA LLC  
5030 Sugarloaf Parkway, Building 6, Lawrenceville  
Georgia, United States, 30044  
Manufacturer : Technicolor Connected Home USA LLC  
5030 Sugarloaf Parkway, Building 6, Lawrenceville  
Georgia, United States, 30044  
Standard : 47 CFR FCC Part 15.247

The product was received on Sep. 22, 2020, and testing was started from Sep. 29, 2020 and completed on Oct. 21, 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 test results in this variant 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: Cliff Chang

**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**





### Summary of Test Result

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

**Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

**Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: **Sam Chen**  
Report Producer: **Sandy Chuang**



# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std.	Ch. Frequency (MHz)	Channel Number
2400-2483.5	802.15.4	2405-2475	11-25 [15]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	Zigbee	5	1

Note:

- ♦ Zigbee uses a O-QPSK (250kbps) modulation.
- ♦ BWch is the nominal channel bandwidth.

### 1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	-	-	-	-	5.48
2	2	-	-	-	-	5.48

Note 1: The above information was declared by manufacturer.

Note 2: The EUT has two antennas for Zigbee use.

#### For Zigbee (1TX/1RX) :

The EUT supports the antenna with TX and RX diversity functions.

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

### 1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
Zigbee	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)

Note:

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



### 1.1.4 EUT Operational Condition

<b>EUT Power Type</b>	From power adapter		
<b>Beamforming Function</b>	<input type="checkbox"/> With beamforming	<input checked="" type="checkbox"/> Without beamforming	
<b>Function</b>	<input checked="" type="checkbox"/> Point-to-multipoint	<input type="checkbox"/> Point-to-point	
<b>Test Software Version</b>	Telnet		

Note: The above information was declared by manufacturer.

### 1.1.5 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR971031AB

Below is the table for the change of the product with respect to the original one.

<b>Modifications</b>	<b>Performance Checking</b>
Add the second source Front End Module for Zigbee (Brand: Richwave / Model Name: RTC2624).	All test items.



## 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 662911 D01 v02r01
- ◆ FCC KDB 414788 D01 v01r01

## 1.3 Testing Location Information

Testing Location		
<input type="checkbox"/>	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
<input checked="" type="checkbox"/>	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	TH02-CB	Caster Chang	22.8-23.1 °C / 52-58%	Oct. 12, 2020~ Oct. 21, 2020
Radiated <Below 1GHz>	03CH03-CB	JN Tu	23.8-25.7 °C / 54-56%	Sep. 29, 2020~ Oct. 19, 2020
Radiated <Above 1GHz>	03CH06-CB	JN Tu	24.1-25.8 °C / 52-55%	Sep. 29, 2020~ Oct. 19, 2020
AC Conduction	CO01-CB	GN Hou	21-23°C / 62-64 %	Oct. 21, 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)	5.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.9 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.6 dB	Confidence levels of 95%
Conducted Emission	2.8 dB	Confidence levels of 95%
Output Power Measurement	1.4 dB	Confidence levels of 95%
Power Density Measurement	2.8 dB	Confidence levels of 95%
Bandwidth Measurement	0.39%	Confidence levels of 95%



## 2 Test Configuration of EUT

### 2.1 Test Channel Mode

<Ant. 1>

Mode	Power Setting
Zigbee	-
2405MHz	Default
2440MHz	Default
2475MHz	Default

<Ant. 2>

Mode	Power Setting
Zigbee	-
2405MHz	Default
2440MHz	Default
2475MHz	Default





## 2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	AC power-line conducted emissions
<b>Condition</b>	AC power-line conducted measurement for line and neutral
<b>Operating Mode</b>	CTX
1	EUT + Adapter 1
2	EUT + Adapter 2

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands
<b>Test Condition</b>	Conducted measurement at transmit chains
1	Ant. 1
2	Ant. 2

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	Emissions in Restricted Frequency Bands
<b>Test Condition</b>	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.
<b>Operating Mode &lt; 1GHz</b>	CTX
1	EUT + Adapter 1
2	EUT + Adapter 2
<b>Operating Mode &gt; 1GHz</b>	CTX
1	Ant. 1
2	Ant. 2

The Worst Case Mode for Following Conformance Tests	
<b>Tests Item</b>	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
<b>Operating Mode</b>	
1	WLAN 2.4GHz + WLAN 5GHz
2	WLAN 5GHz + Zigbee + Bluetooth
Refer to Sporton Test Report No.: FA092223 for Co-location RF Exposure Evaluation.	

Note: The EUT can only be used at Y axis position.



## 2.3 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

## 2.4 Accessories

Accessories				
No.	Equipment Name	Brand Name	Model Name	Rating
1	Adapter 1	AcBel	ADK002	INPUT: 100-120V~50/60Hz, 1.5A, OUTPUT: 12V, 4.6A
2	Adapter 2	Netbit	NBC56A120460VU	INPUT: 100-120V~50/60Hz, 1.5A, OUTPUT: 12V, 4.6A

## 2.5 Support Equipment

For AC Conduction:

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	LAN NB	DELL	E6430	N/A

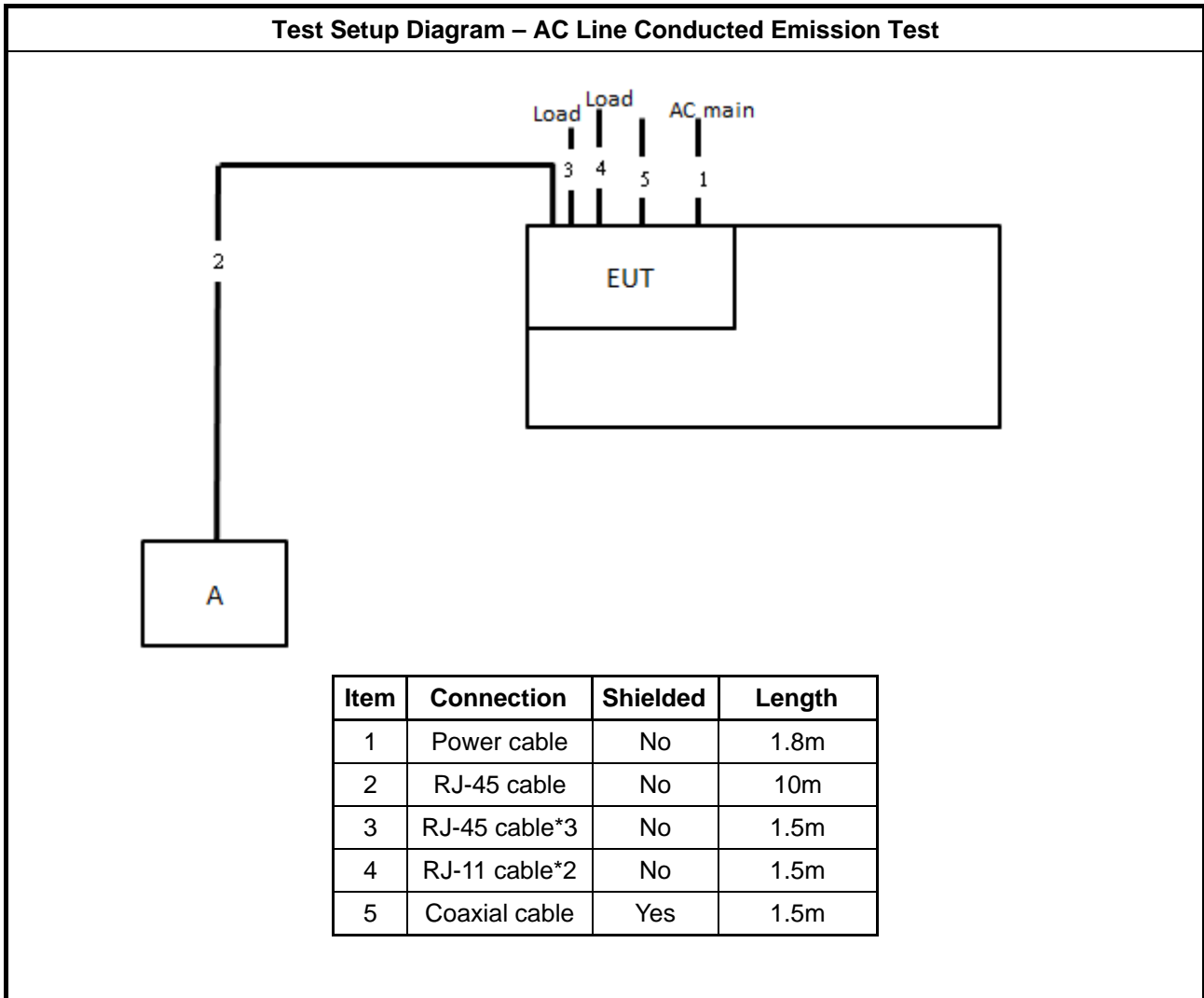
For Radiated:

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

For RF Conducted:

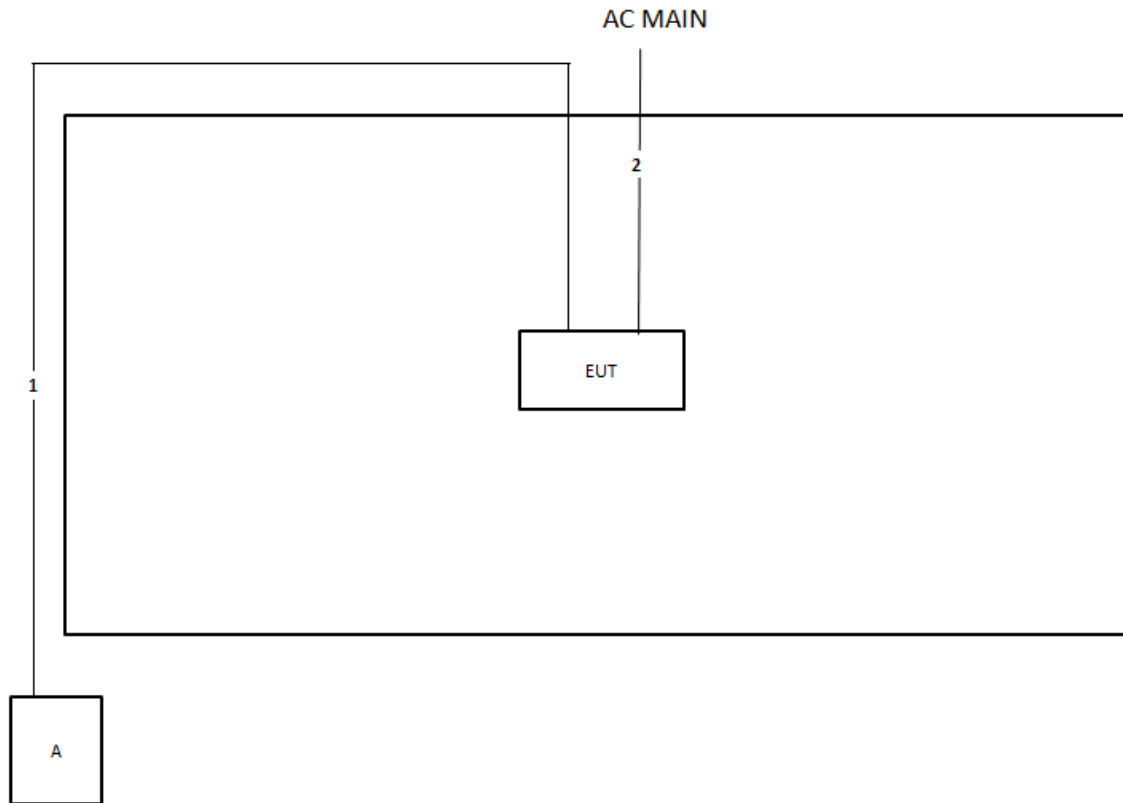
Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	NB	DELL	E4300	N/A

## 2.6 Test Setup Diagram





Test Setup Diagram - Radiated Test



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



### 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.

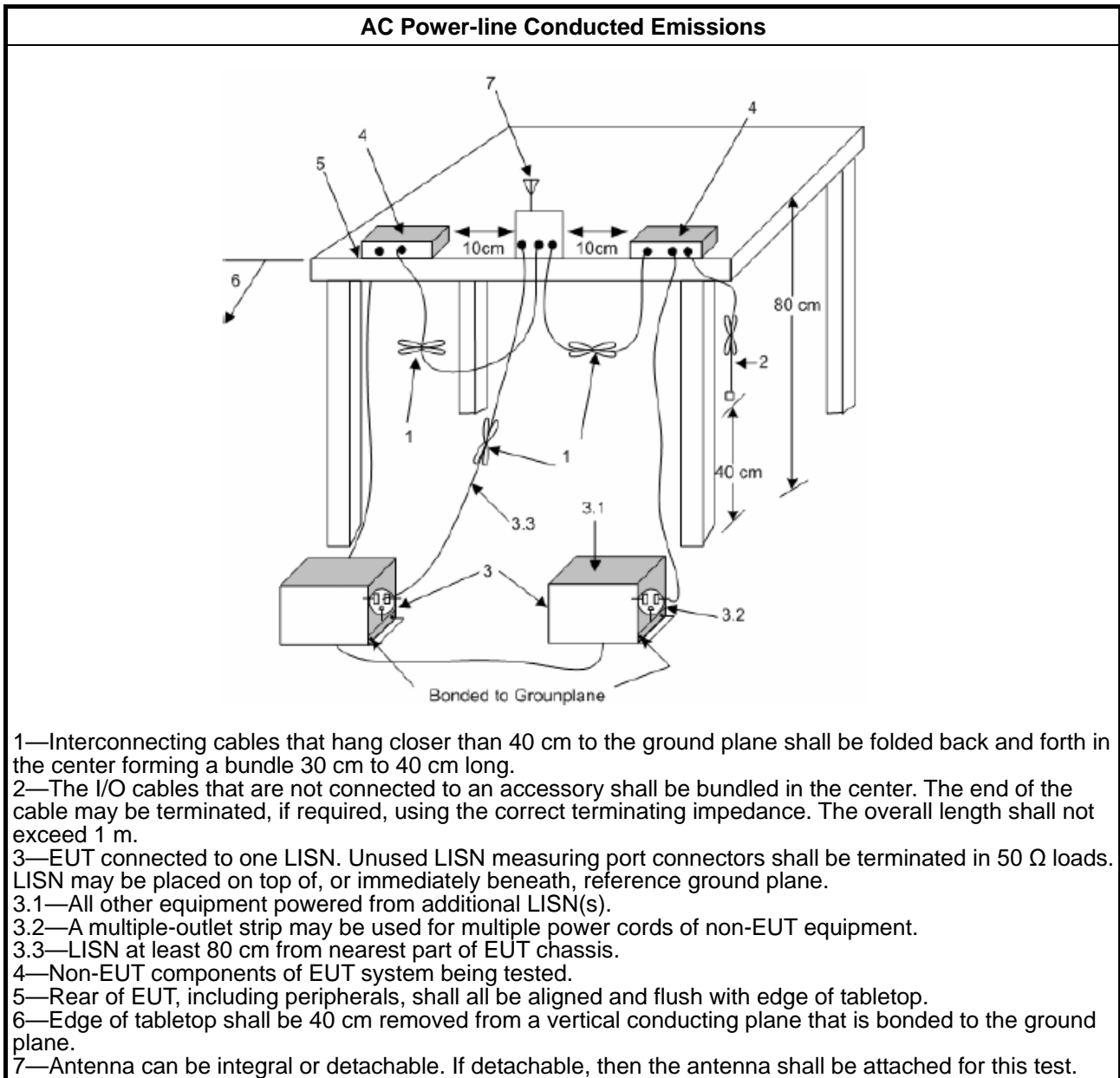
##### 3.1.2 Measuring Instruments

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

##### 3.1.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

### 3.1.4 Test Setup



### 3.1.5 Measurement Results Calculation

The measured Level is calculated using:

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

### 3.1.6 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
<b>Systems using digital modulation techniques:</b>
<ul style="list-style-type: none"> <li>▪ 6 dB bandwidth <math>\geq</math> 500 kHz.</li> </ul>

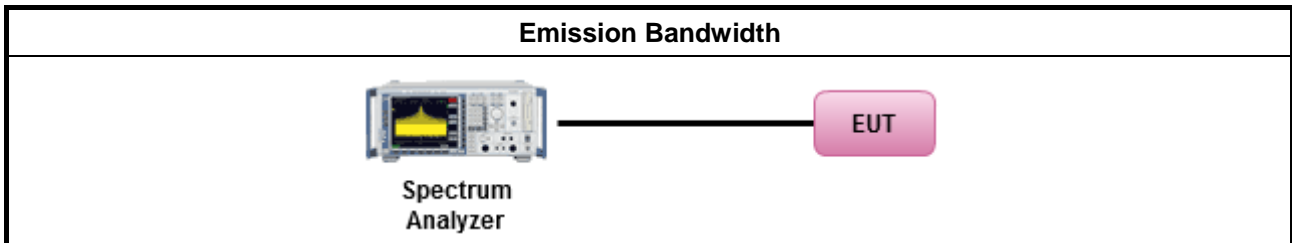
#### 3.2.2 Measuring Instruments

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

#### 3.2.3 Test Procedures

Test Method
<ul style="list-style-type: none"> <li>▪ For the emission bandwidth shall be measured using one of the options below:</li> </ul>
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.1 Option 1 for 6 dB bandwidth measurement.
<input type="checkbox"/> Refer as FCC KDB 558074, clause 8.2 & C63.10 clause 11.8.2 Option 2 for 6 dB bandwidth measurement.
<input type="checkbox"/> 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	
	<ul style="list-style-type: none"><li>▪ If <math>G_{TX} \leq 6</math> dBi, then <math>P_{Out} \leq 30</math> dBm (1 W)</li></ul>
	<ul style="list-style-type: none"><li>▪ Point-to-multipoint systems (P2M): If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)</math> dBm</li></ul>
	<ul style="list-style-type: none"><li>▪ Point-to-point systems (P2P): If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3</math> dBm</li></ul>
	<ul style="list-style-type: none"><li>▪ Smart antenna system (SAS):</li></ul>
	<ul style="list-style-type: none"><li>- Single beam: If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3</math> dBm</li></ul>
	<ul style="list-style-type: none"><li>- Overlap beam: If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3</math> dBm</li></ul>
	<ul style="list-style-type: none"><li>- Aggregate power on all beams: If <math>G_{TX} &gt; 6</math> dBi, then <math>P_{Out} = 30 - (G_{TX} - 6)/3 + 8</math> dB dBm</li></ul>
$P_{Out}$ = 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

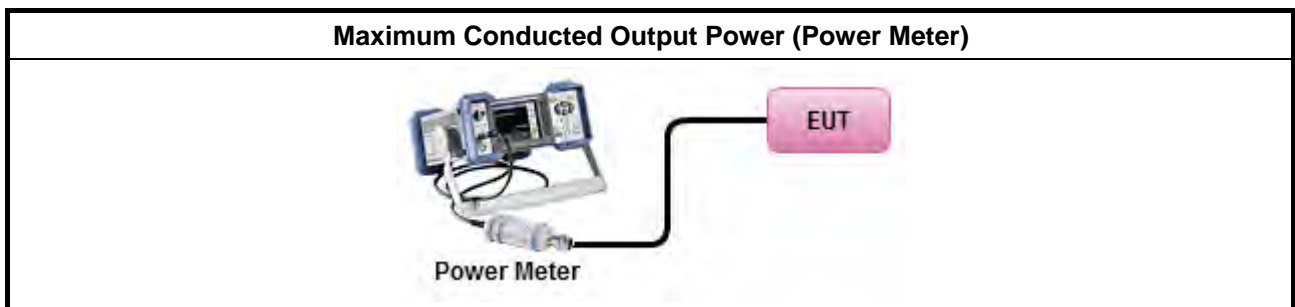
Refer a test equipment and calibration data table in this test report.



**3.3.3 Test Procedures**

<b>Test Method</b>	
<ul style="list-style-type: none"> <li>▪ Maximum Peak Conducted Output Power</li> </ul>	
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.1.1 & C63.10 clause 11.9.1.1 (RBW ≥ EBW method).
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.1.3 & C63.10 clause 11.9.1.3 (peak power meter).
<ul style="list-style-type: none"> <li>▪ Maximum Conducted Output Power</li> </ul>	
[duty cycle ≥ 98% or external video / power trigger]	
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.2 Method AVGSA-1.
	<input type="checkbox"/> 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	
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.4 Method AVGSA-2.
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.5 Method AVGSA-2A (alternative)
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 8.3.2.2 & C63.10 clause 11.9.2.2.6 Method AVGSA-3
	<input type="checkbox"/> 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)	
	<input type="checkbox"/> 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).
	<input checked="" type="checkbox"/> 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).
<ul style="list-style-type: none"> <li>▪ For conducted measurement.</li> </ul>	
	<ul style="list-style-type: none"> <li>▪ 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.</li> </ul>
	<ul style="list-style-type: none"> <li>▪ If multiple transmit chains, EIRP calculation could be following as methods:  <math display="block">P_{total} = P_1 + P_2 + \dots + P_n</math>                     (calculated in linear unit [mW] and transfer to log unit [dBm])  <math display="block">EIRP_{total} = P_{total} + DG</math> </li> </ul>

**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
<ul style="list-style-type: none"> <li>Power Spectral Density (PSD) <math>\leq</math> 8 dBm/3kHz</li> </ul>

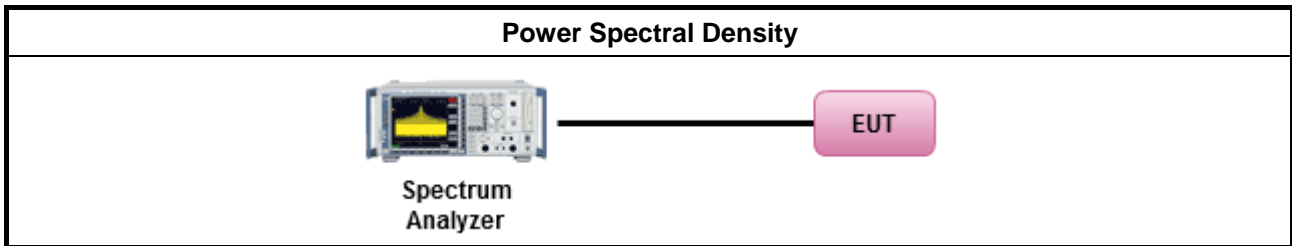
#### 3.4.2 Measuring Instruments

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

#### 3.4.3 Test Procedures

Test Method			
<ul style="list-style-type: none"> <li>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).</li> </ul>			
<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 8.4 & C63.10 clause 11.10 Method Max. PSD.			
<ul style="list-style-type: none"> <li>For conducted measurement.             <ul style="list-style-type: none"> <li>If The EUT supports multiple transmit chains using options given below:                 <table border="1"> <tbody> <tr> <td> <input checked="" type="checkbox"/> 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.                 </td> </tr> <tr> <td> <input type="checkbox"/> 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,                 </td> </tr> <tr> <td> <input type="checkbox"/> 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.                 </td> </tr> </tbody> </table> </li> </ul> </li> </ul>	<input checked="" type="checkbox"/> 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.	<input type="checkbox"/> 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,	<input type="checkbox"/> 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.
<input checked="" type="checkbox"/> 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.			
<input type="checkbox"/> 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,			
<input type="checkbox"/> 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.

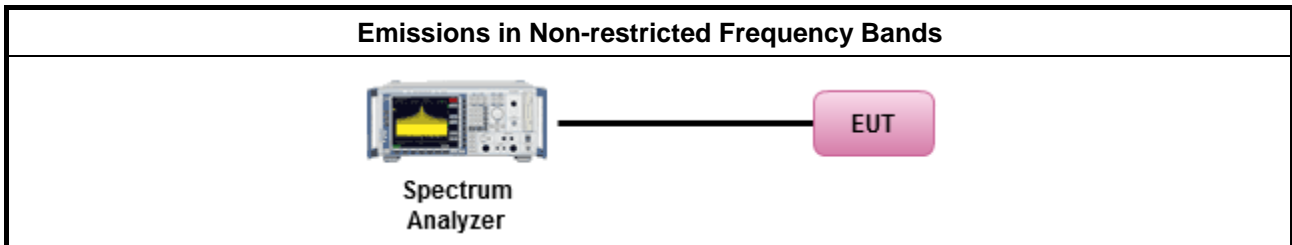
#### 3.5.2 Measuring Instruments

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

#### 3.5.3 Test Procedures

Test Method
<ul style="list-style-type: none"> <li>Refer as FCC KDB 558074, clause 8.5 for unwanted emissions into non-restricted bands.</li> </ul>

#### 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

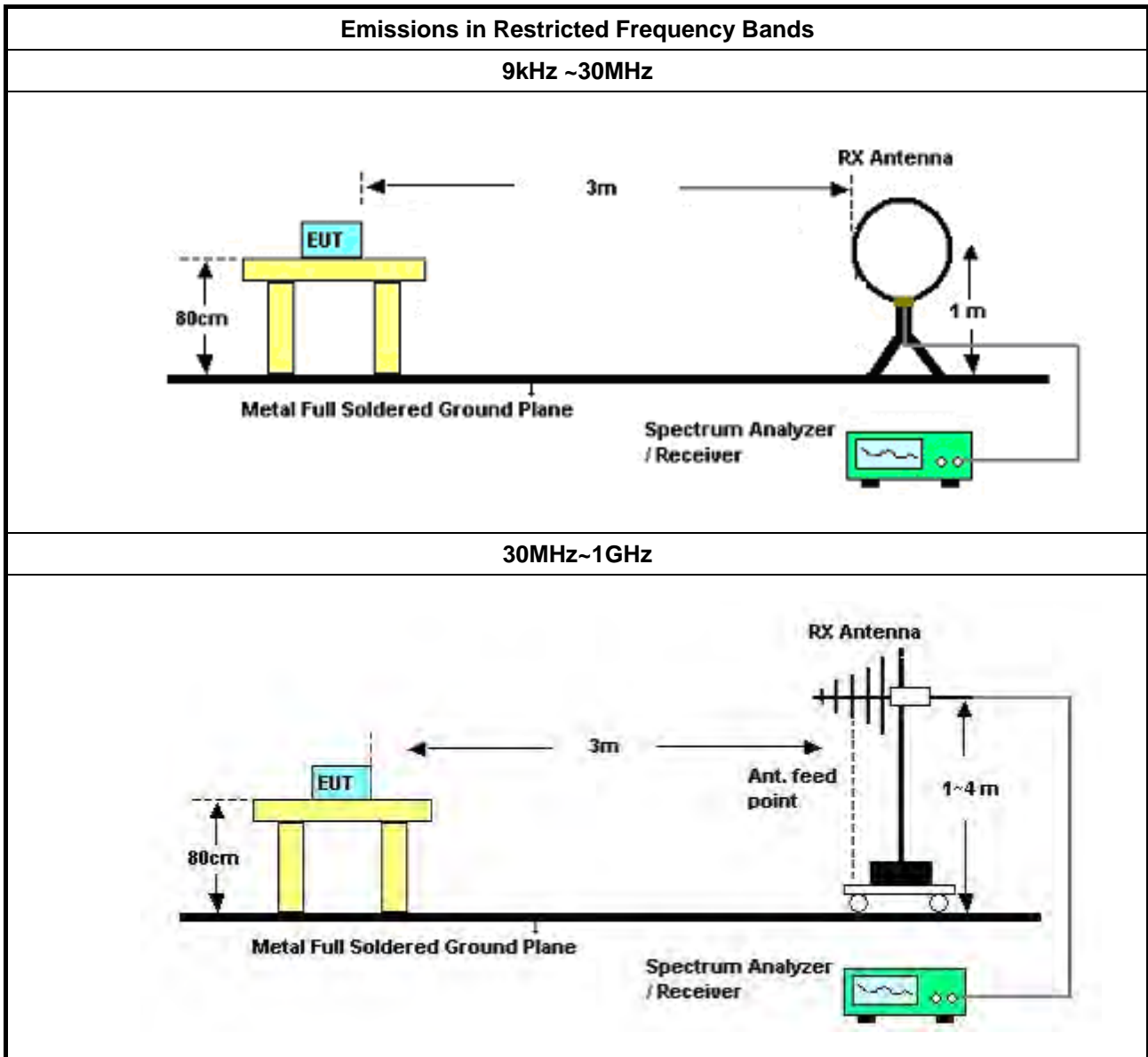
Refer a test equipment and calibration data table in this test report.



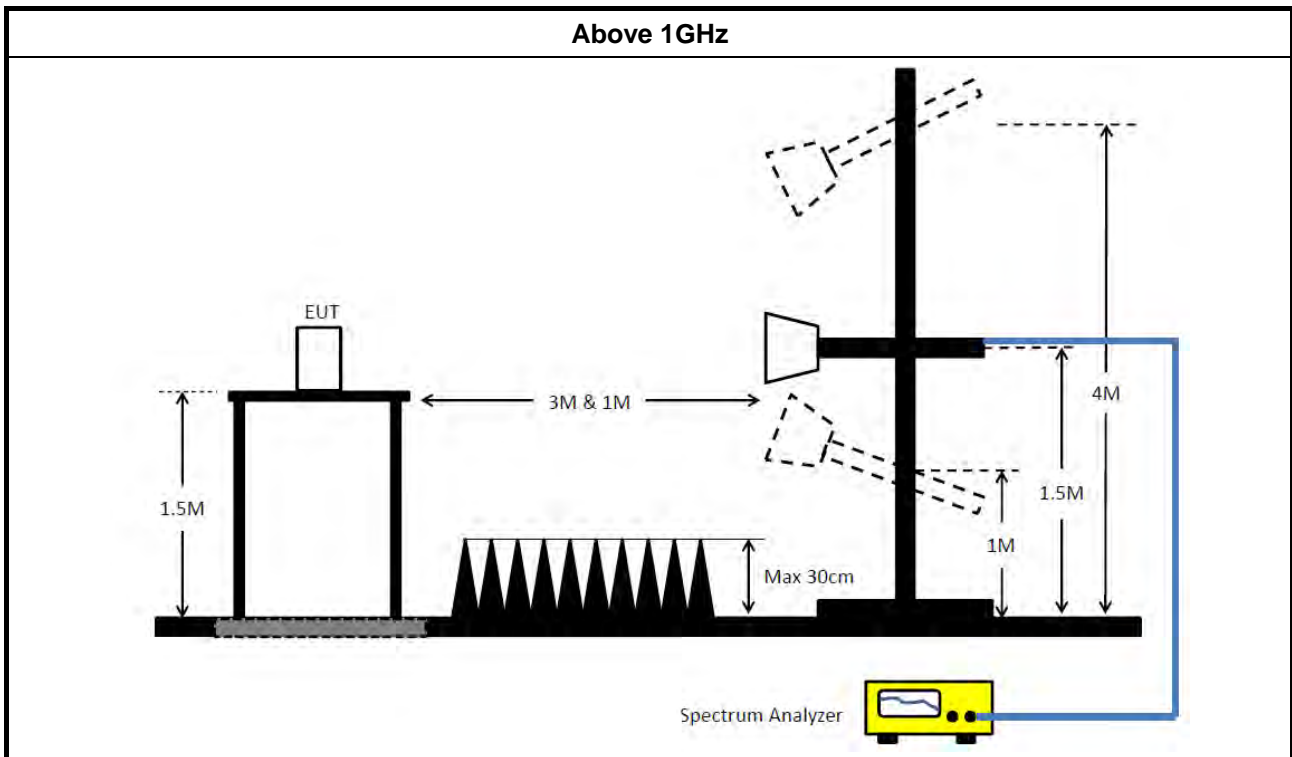
3.6.3 Test Procedures

Test Method	
<ul style="list-style-type: none"> <li>▪ The average emission levels shall be measured in [duty cycle <math>\geq</math> 98 or duty factor].</li> </ul>	
<ul style="list-style-type: none"> <li>▪ 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.</li> </ul>	
<ul style="list-style-type: none"> <li>▪ For the transmitter unwanted emissions shall be measured using following options below:</li> </ul>	
	<ul style="list-style-type: none"> <li>▪ Refer as FCC KDB 558074, clause 8.6 for unwanted emissions into restricted bands.</li> </ul>
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.1(trace averaging for duty cycle $\geq$ 98%).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.2(trace averaging + duty factor).
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.5.3(Reduced VBW $\geq$ 1/T).
<input type="checkbox"/>	Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW $\geq$ 1/T, where T is pulse time.
<input type="checkbox"/>	Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 8.6 & C63.10 clause 11.12.2.4 measurement procedure peak limit.
<ul style="list-style-type: none"> <li>▪ For the transmitter band-edge emissions shall be measured using following options below:</li> </ul>	
	<ul style="list-style-type: none"> <li>▪ Refer as FCC KDB 558074 clause 8.7 &amp; 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.</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Refer as FCC KDB 558074, clause 8.7 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.</li> </ul>
	<ul style="list-style-type: none"> <li>▪ 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).</li> </ul>
	<ul style="list-style-type: none"> <li>▪ 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</li> </ul>
	<ul style="list-style-type: none"> <li>▪ 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.</li> </ul>

### 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	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 26, 2020	Feb. 25, 2021	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	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 20, 2020	May 19, 2021	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Apr. 13, 2020	Apr. 12, 2021	Radiation (03CH03-CB)
Bilog Antenna with 6 dB attenuator	Schaffner	CBL6112B & N-6-06	2928 & AT-N0607	20MHz ~ 2GHz	Feb. 28, 2020	Feb. 27, 2021	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8447D	2944A10259	9kHz ~ 1.3GHz	Jan. 15, 2020	Jan. 14, 2021	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 09, 2020	Jun. 08, 2021	Radiation (03CH03-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	May 13, 2020	May 12, 2021	Radiation (03CH03-CB)
RF Cable-low	Woken	RG402	Low Cable-02+27(spare)	25MHz ~ 1GHz	Jul. 03, 2020	Jul. 02, 2021	Radiation (03CH03-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH03-CB)
Horn Antenna	SCHWARZBECK	BBHA9120D	BBHA 9120D-1292	1GHz~18GHz	Jul. 22, 2020	Jul. 21, 2021	Radiation (03CH06-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 21, 2020	Jul. 20, 2021	Radiation (03CH06-CB)
Pre-Amplifier	Agilent	83017A	MY53270064	0.5GHz ~ 26.5GHz	May 07, 2020	May 06, 2021	Radiation (03CH06-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 08, 2020	Jul. 07, 2021	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSP40	100080	9kHz~40GHz	Oct. 21, 2019	Oct. 20, 2020	Radiation (03CH06-CB)
RF Cable-high	HUBER+SUHNER	RG402	High Cable-05	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)
RF Cable-high	HUBER+SUHNER	RG402	High Cable-05+24	1GHz~18GHz	Oct. 07, 2019	Oct. 06, 2020	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-05+24	1GHz~18GHz	Oct. 05, 2020	Oct. 04, 2021	Radiation (03CH06-CB)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-40G#1	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH06-CB)
RF Cable-high	Woken	RG402	High Cable-40G#2	18GHz ~ 40 GHz	Jul. 16, 2020	Jul. 15, 2021	Radiation (03CH06-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH06-CB)
Spectrum analyzer	R&S	FSV40	101027	9kHz~40GHz	Jul. 27, 2020	Jul. 26, 2021	Conducted (TH02-CB)
Power Sensor	Anritsu	MA2411B	1531343	300MHz~40GHz	Aug. 04, 2020	Aug. 03, 2021	Conducted (TH02-CB)
Power Meter	Anritsu	ML2495A	1728001	300MHz~40GHz	Aug. 04, 2020	Aug. 03, 2021	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-01	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-02	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-03	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-04	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH02-CB)
RF Cable-high	Woken	RG402	High Cable-05	1 GHz – 26.5 GHz	Oct. 05, 2020	Oct. 04, 2021	Conducted (TH02-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conducted (TH02-CB)

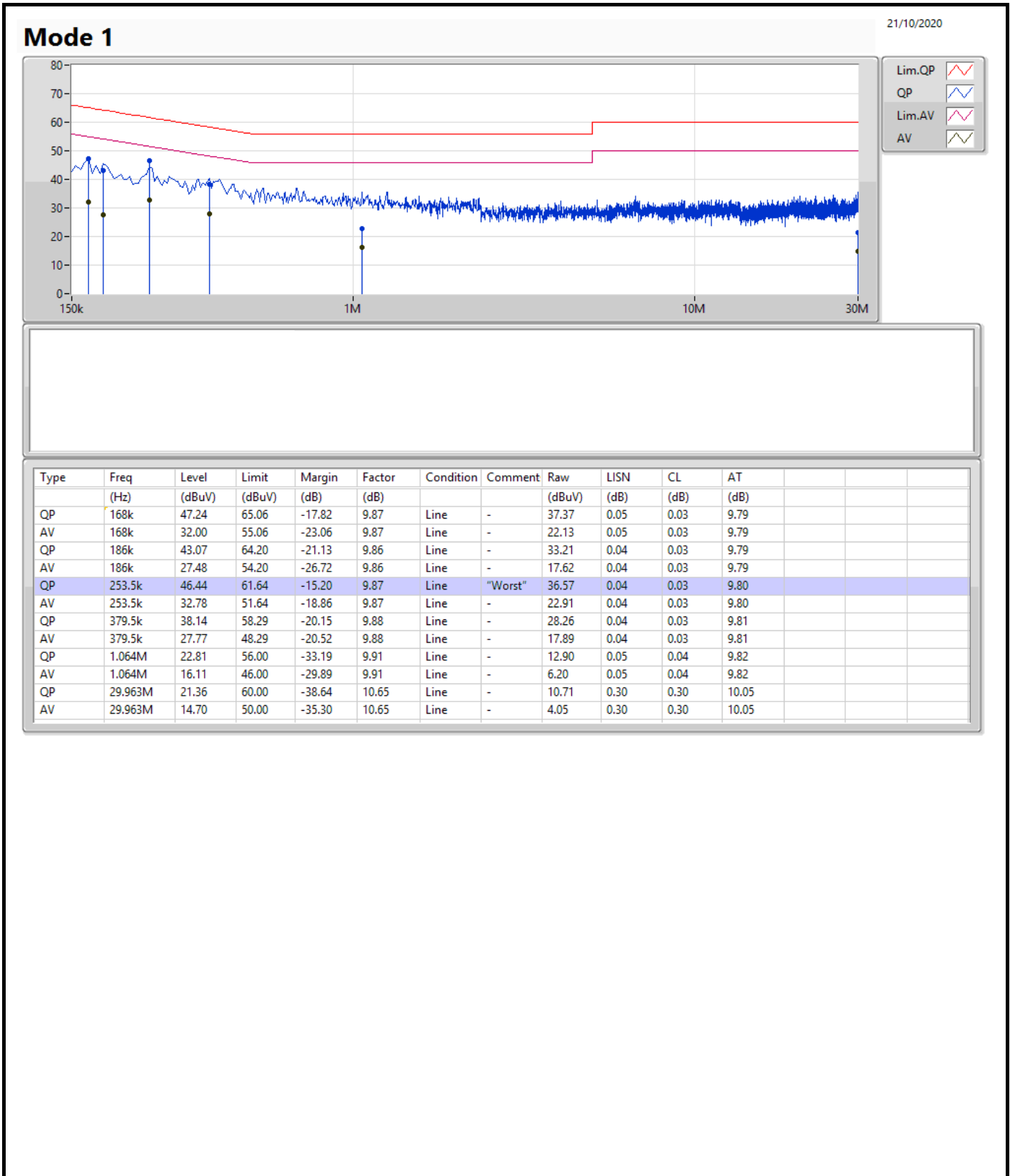
Note: Calibration Interval of instruments listed above is one year.

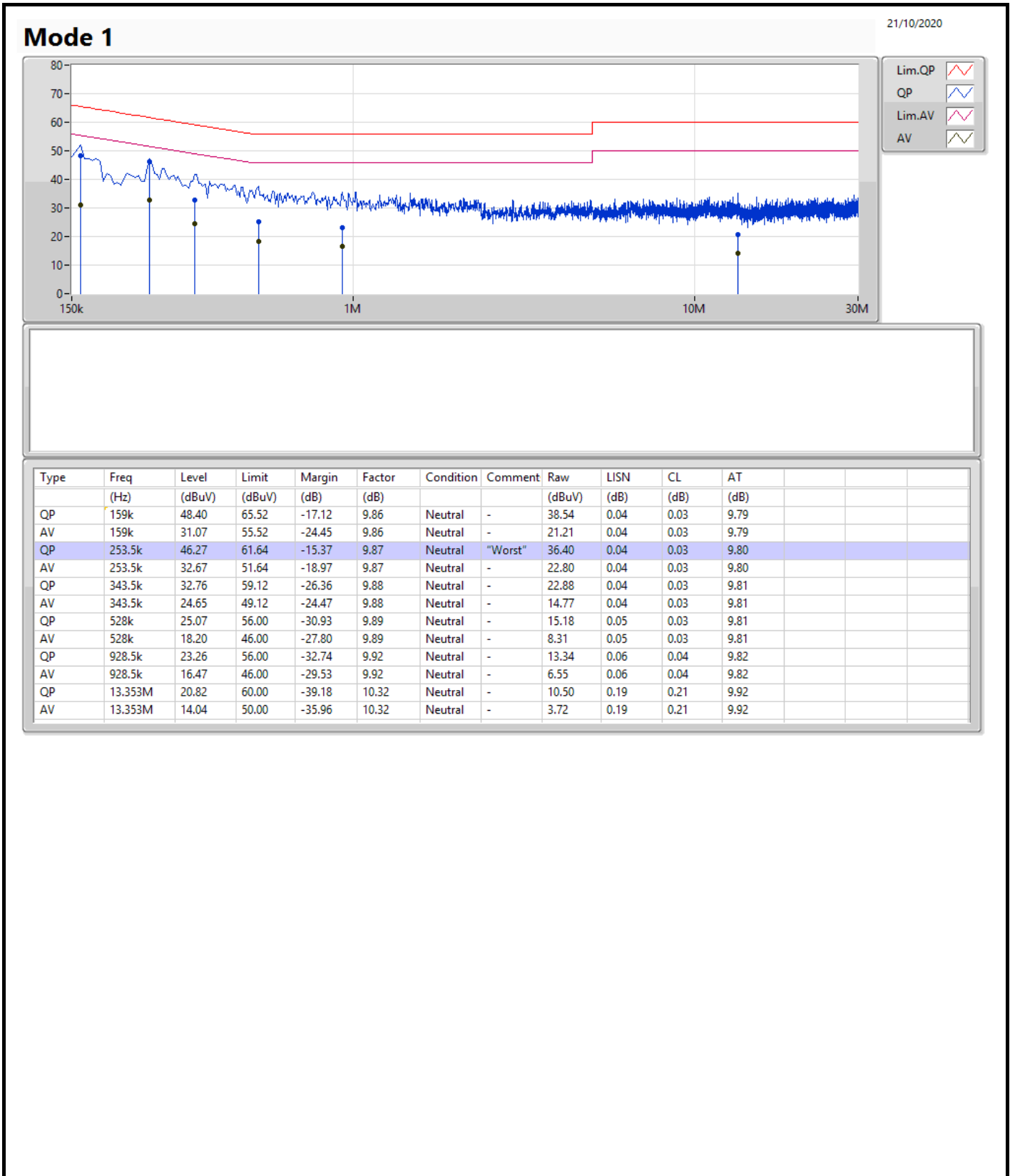
NCR means Non-Calibration required.

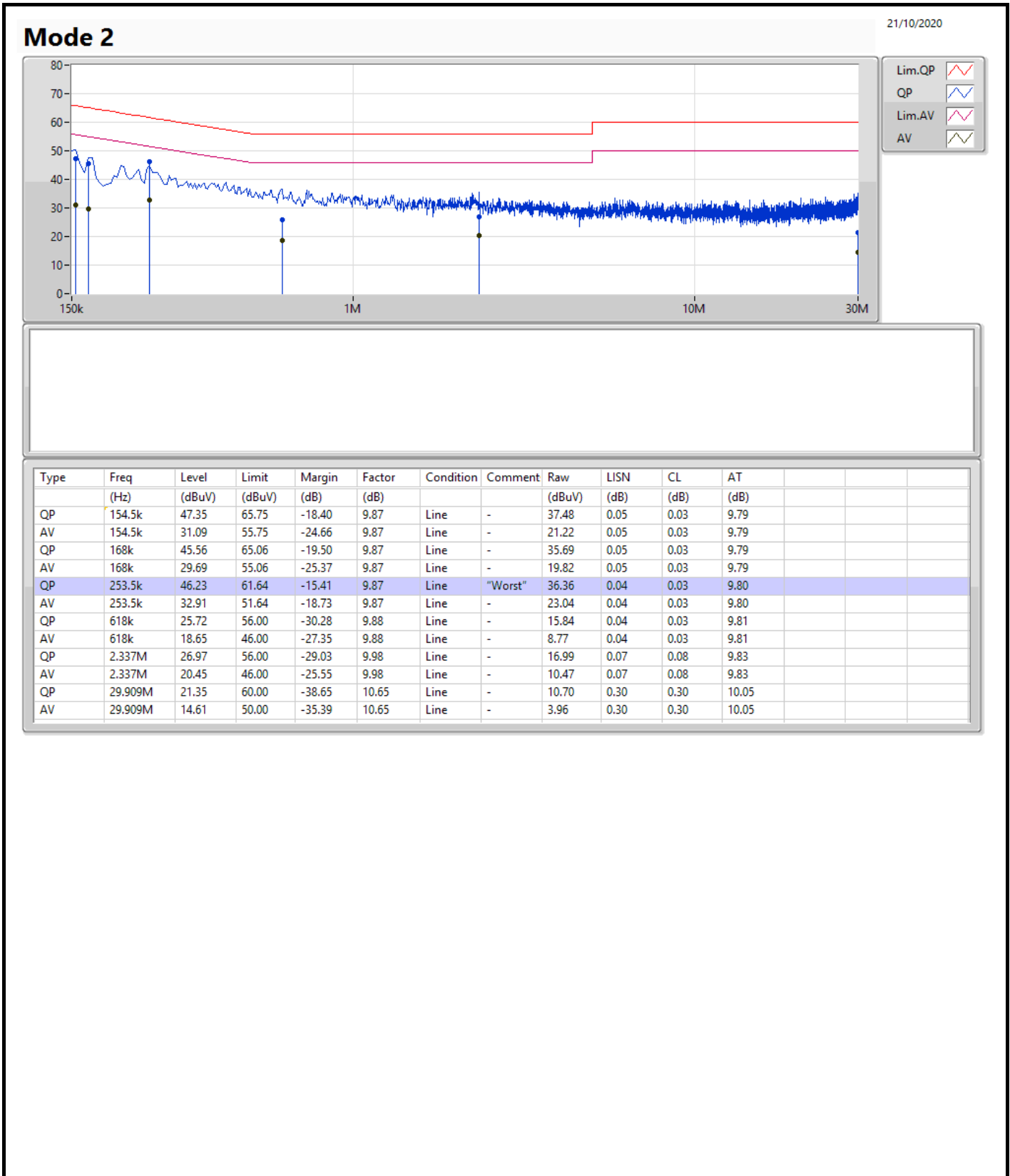


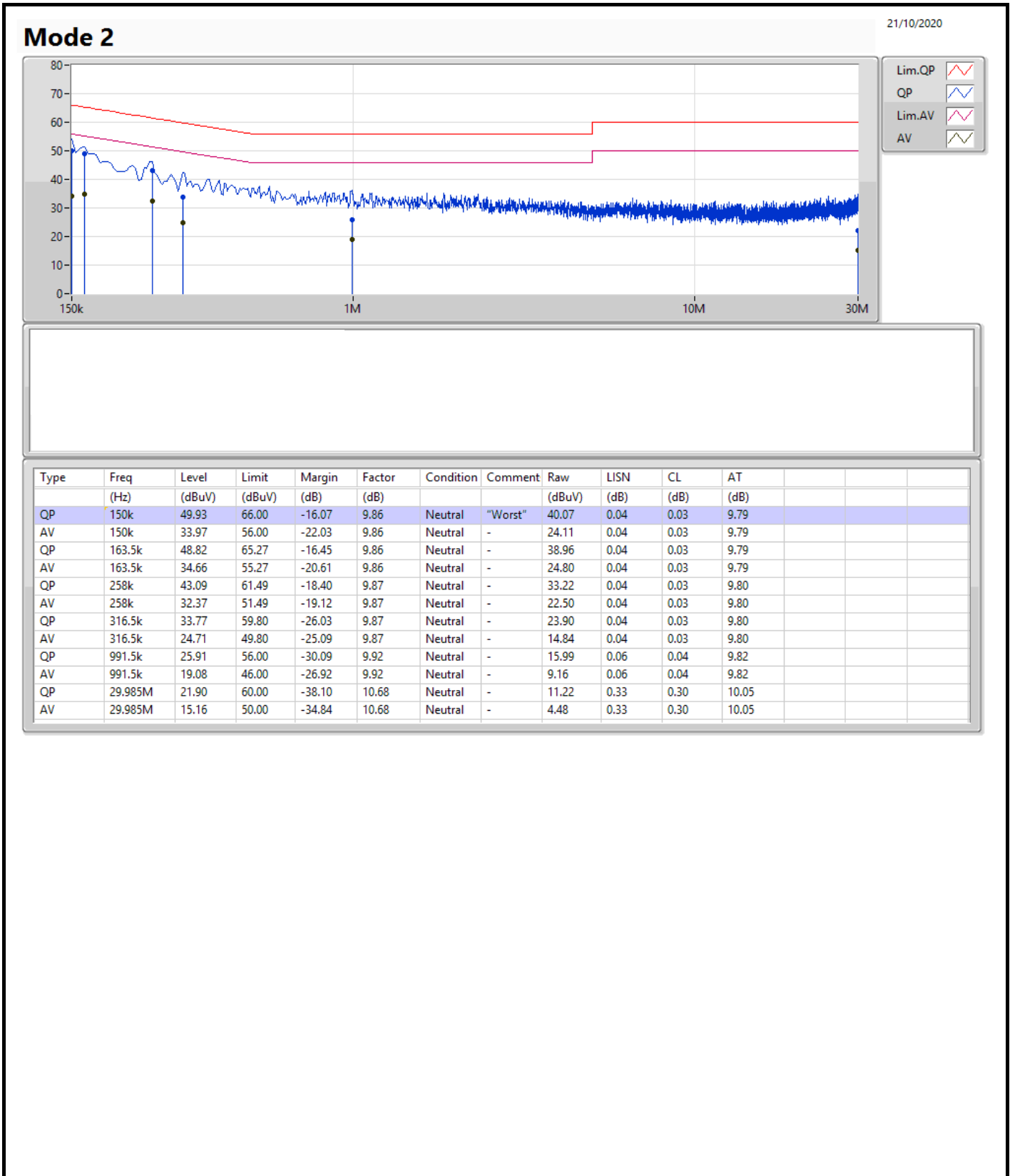
**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	QP	253.5k	46.44	61.64	-15.20	Line
Mode 2	Pass	QP	253.5k	46.23	61.64	-15.41	Line













Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
Zigbee	1.663M	2.255M	2M26G1D	1.644M	2.243M

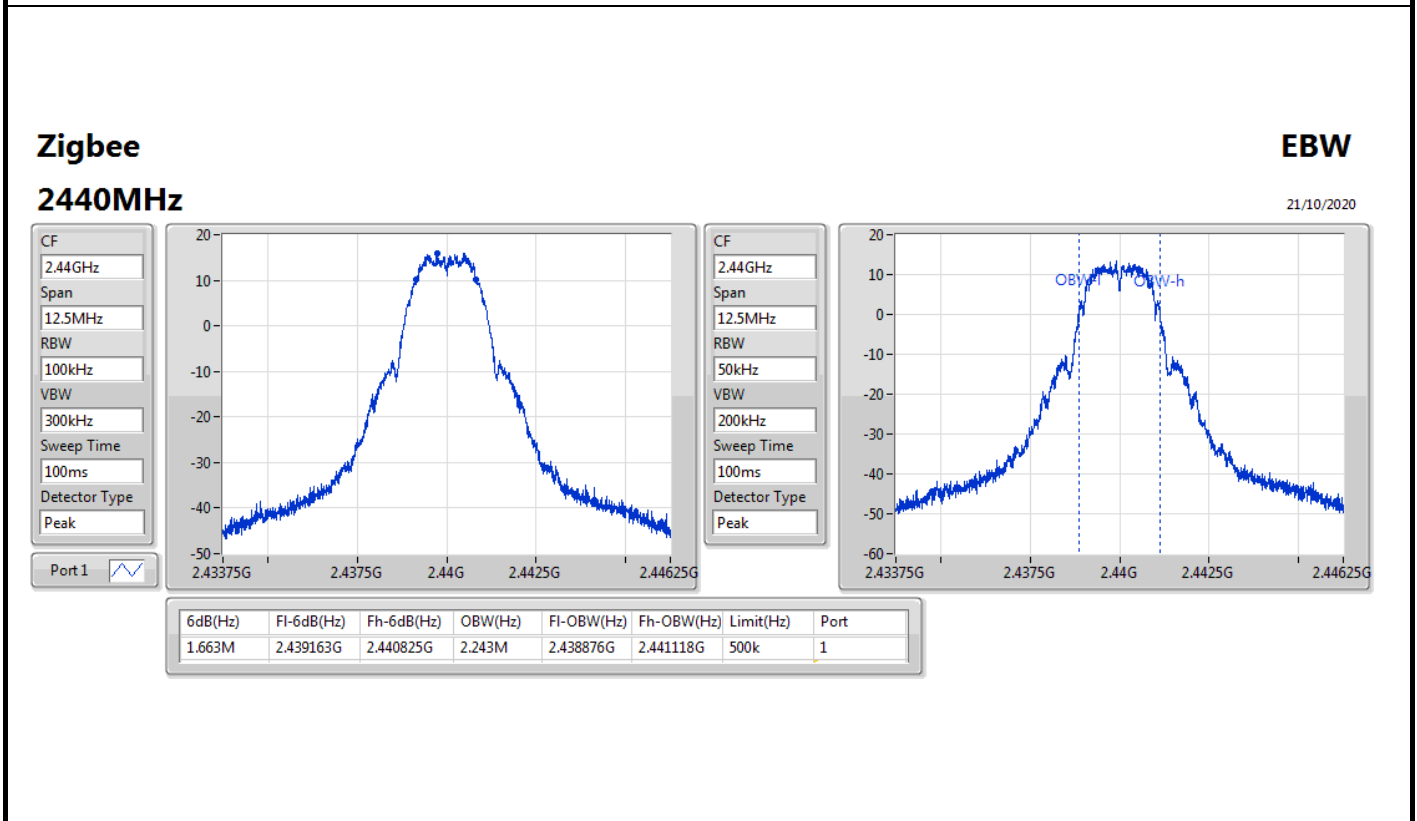
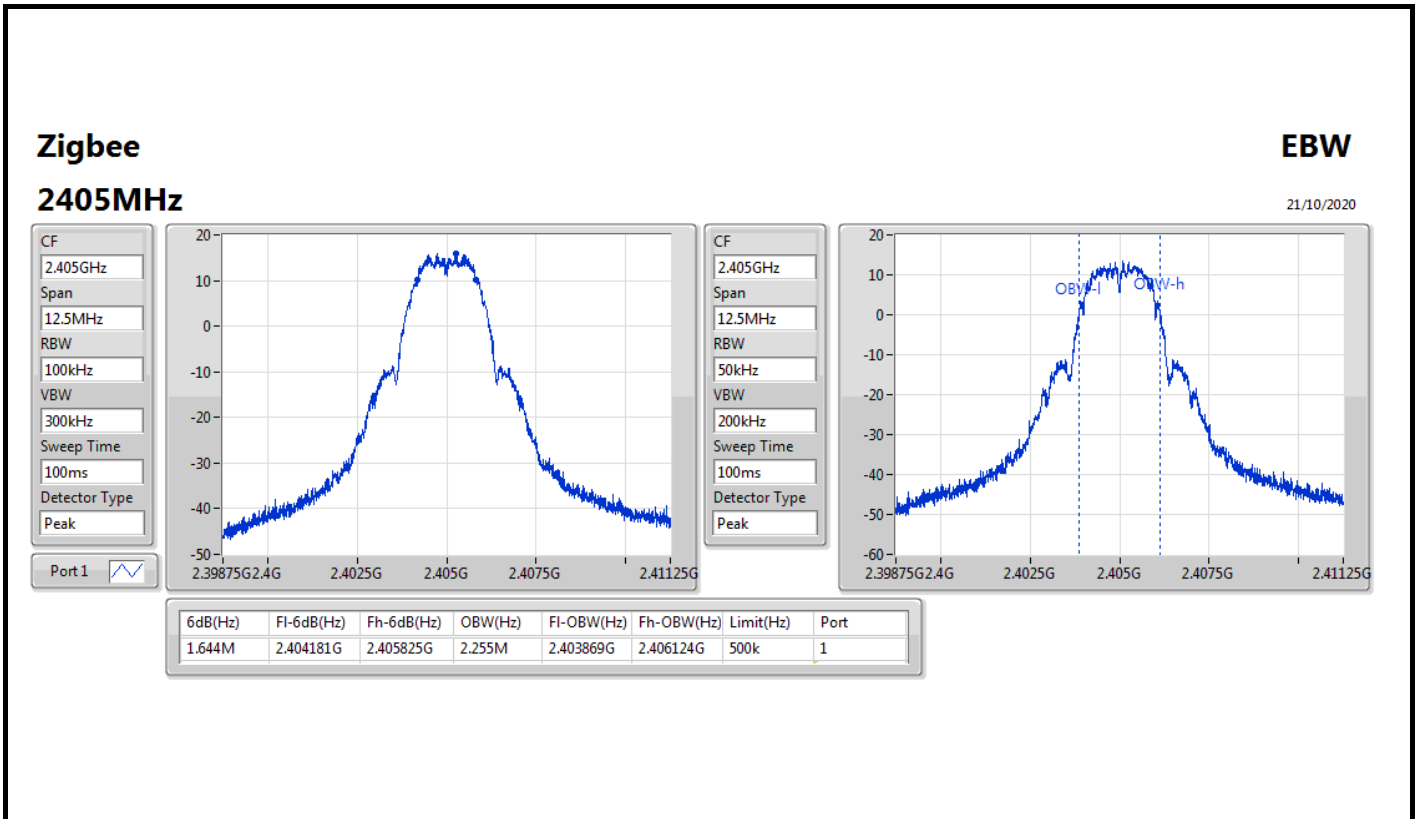
**Max-N dB** = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;  
**Min-N dB** = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

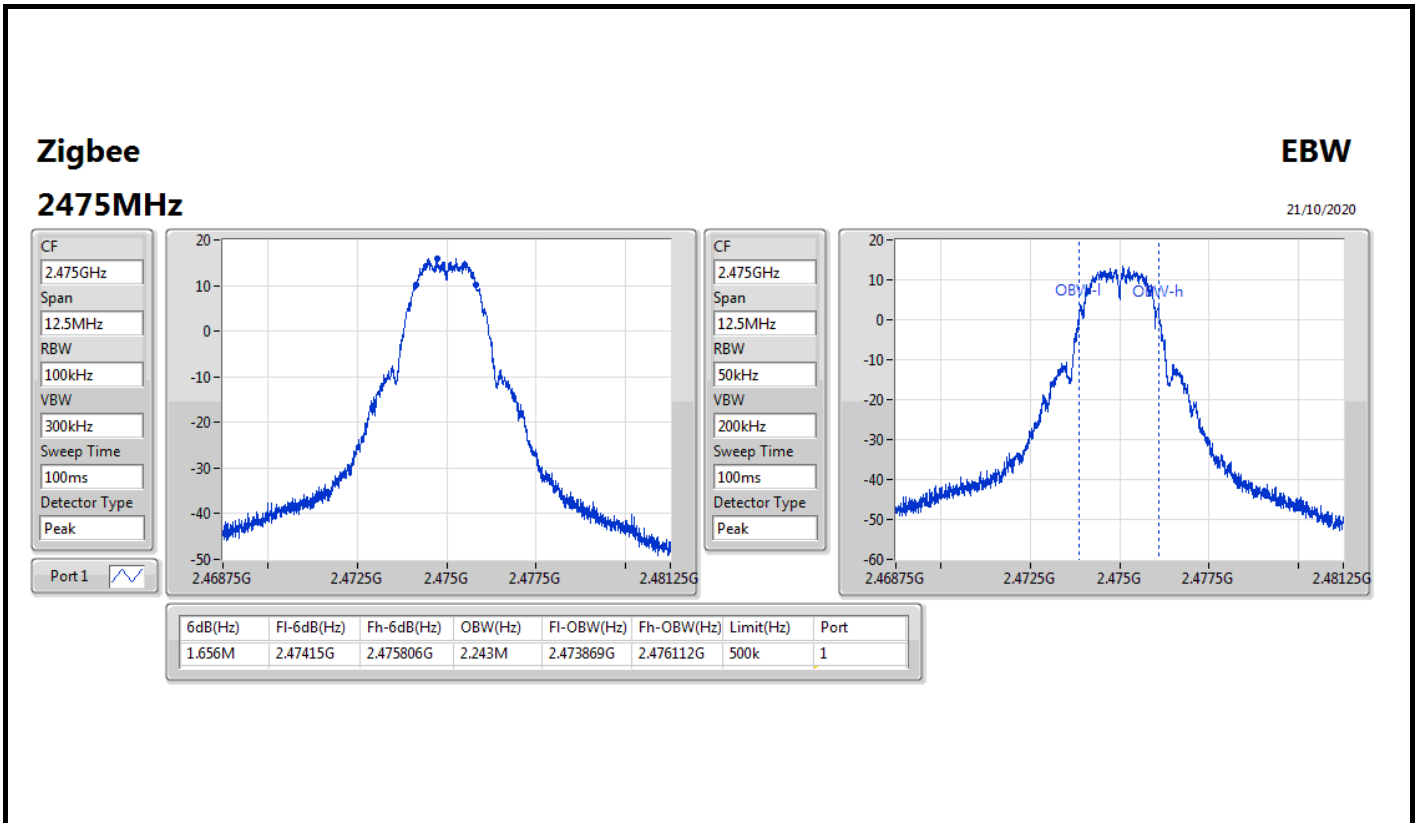


Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
Zigbee	-	-	-	-
2405MHz	Pass	500k	1.644M	2.255M
2440MHz	Pass	500k	1.663M	2.243M
2475MHz	Pass	500k	1.656M	2.243M

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







Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
Zigbee	1.663M	2.249M	2M25G1D	1.663M	2.243M

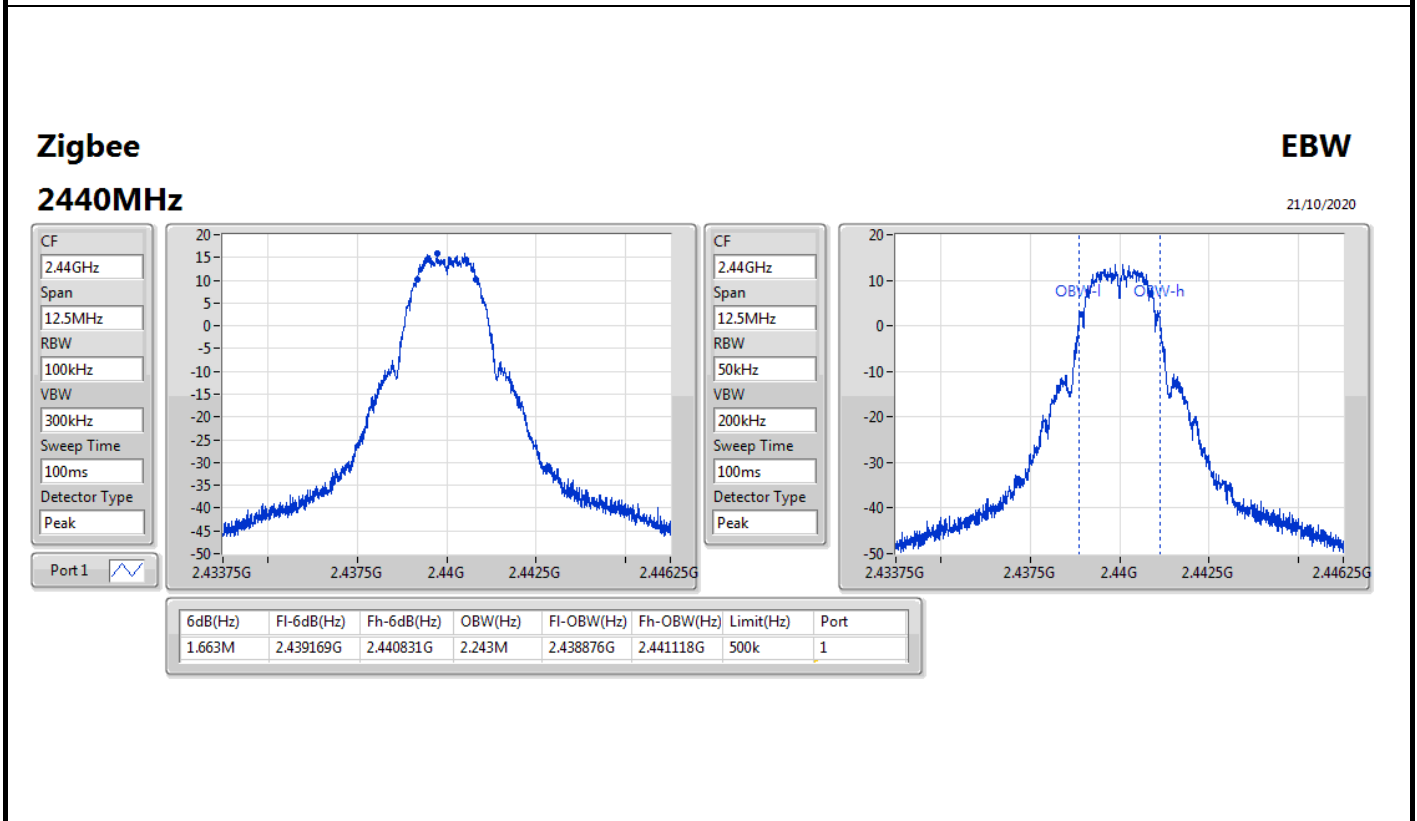
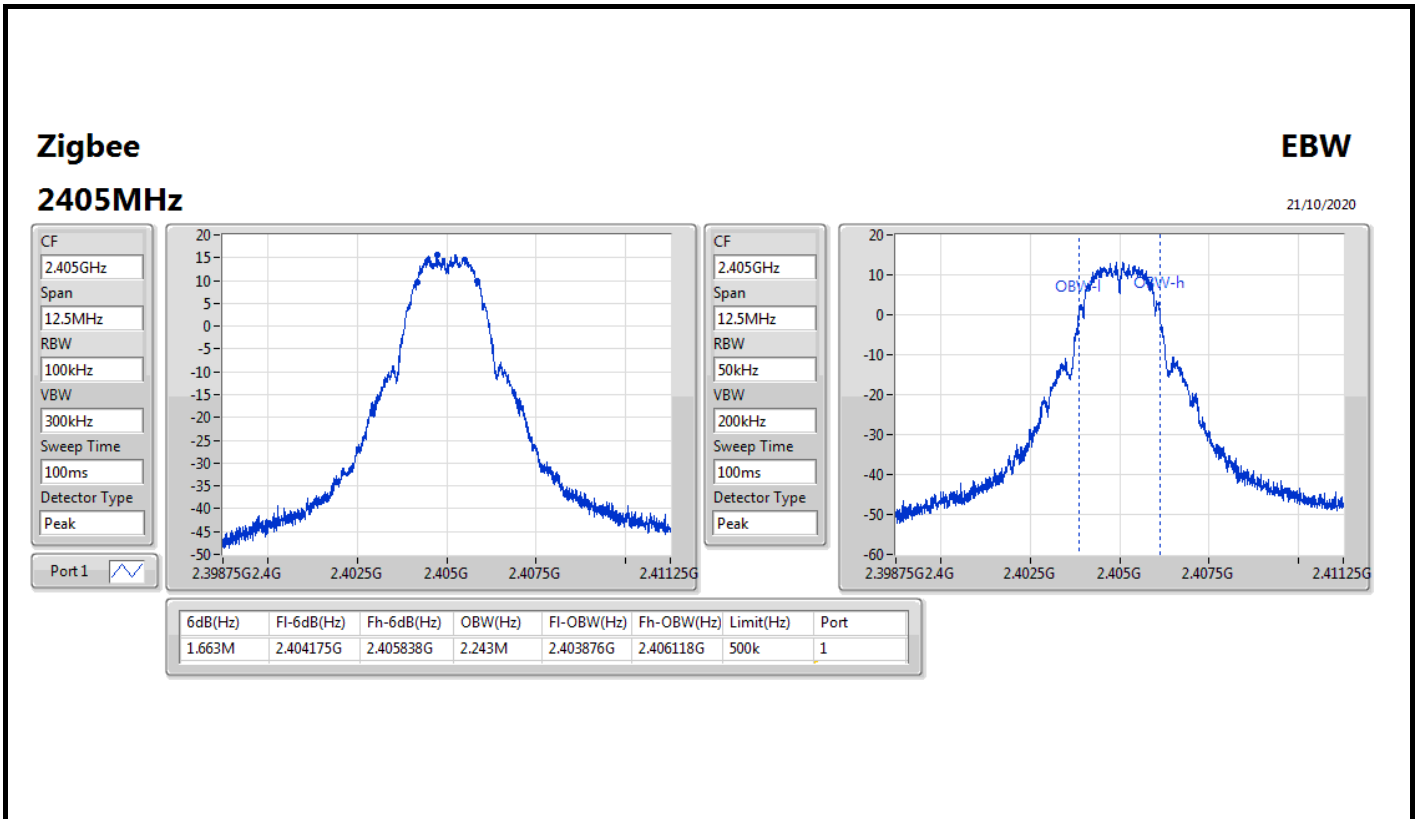
**Max-N dB** = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;  
**Min-N dB** = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

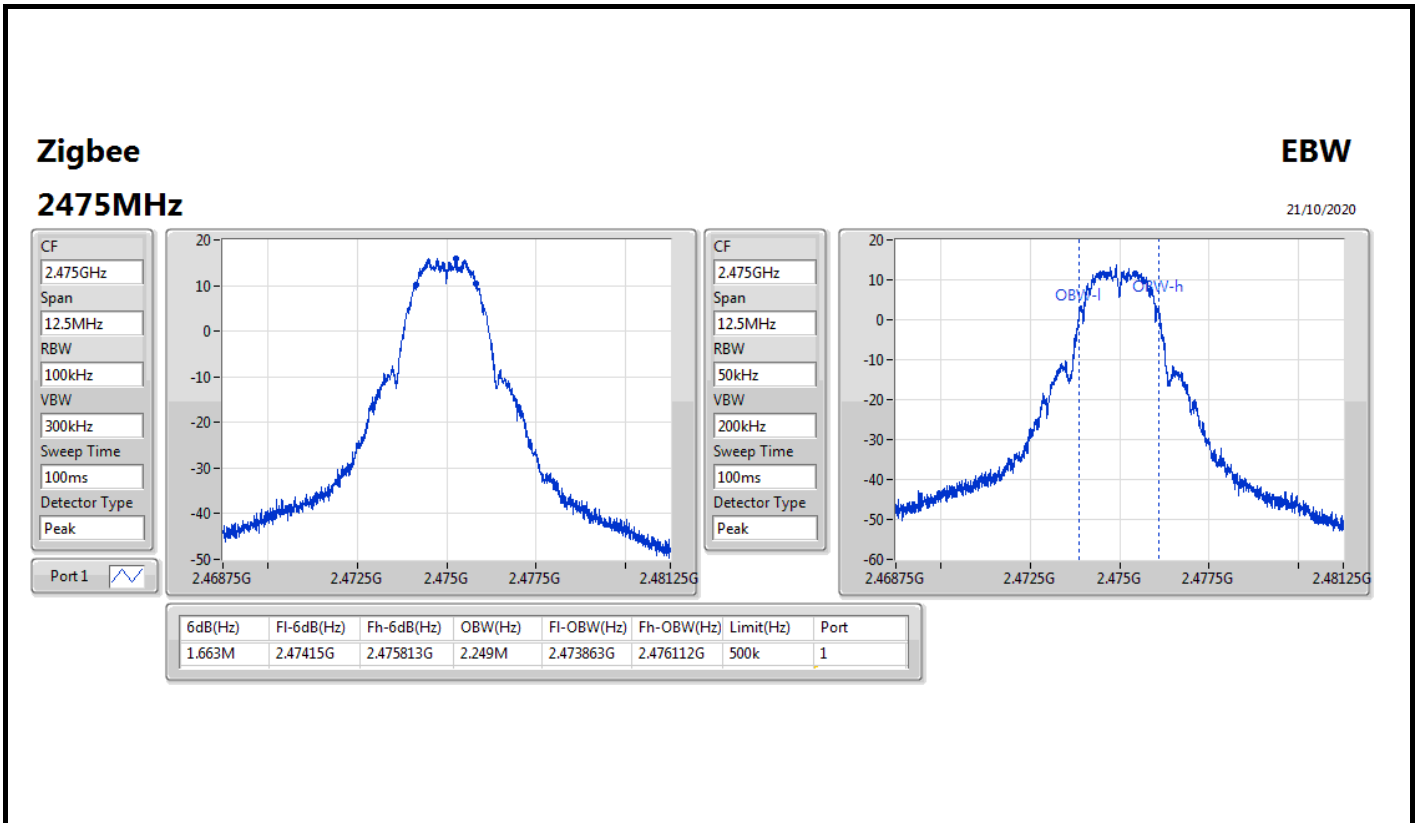


Result

Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
Zigbee	-	-	-	-
2405MHz	Pass	500k	1.663M	2.243M
2440MHz	Pass	500k	1.663M	2.243M
2475MHz	Pass	500k	1.663M	2.249M

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









**Summary**

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
Zigbee	19.91	0.09795



**Result**

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)
Zigbee	-	-	-	-	-
2405MHz	Pass	5.48	19.71	19.71	30.00
2440MHz	Pass	5.48	19.91	19.91	30.00
2475MHz	Pass	5.48	19.83	19.83	30.00

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



**Summary**

Mode	Total Power (dBm)	Total Power (W)
2.4-2.4835GHz	-	-
Zigbee	19.88	0.09727



**Result**

Mode	Result	DG (dBi)	Port 1 (dBm)	Total Power (dBm)	Power Limit (dBm)
Zigbee	-	-	-	-	-
2405MHz	Pass	5.48	19.67	19.67	30.00
2440MHz	Pass	5.48	19.88	19.88	30.00
2475MHz	Pass	5.48	19.86	19.86	30.00

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



**Summary**

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
Zigbee	3.58

RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;

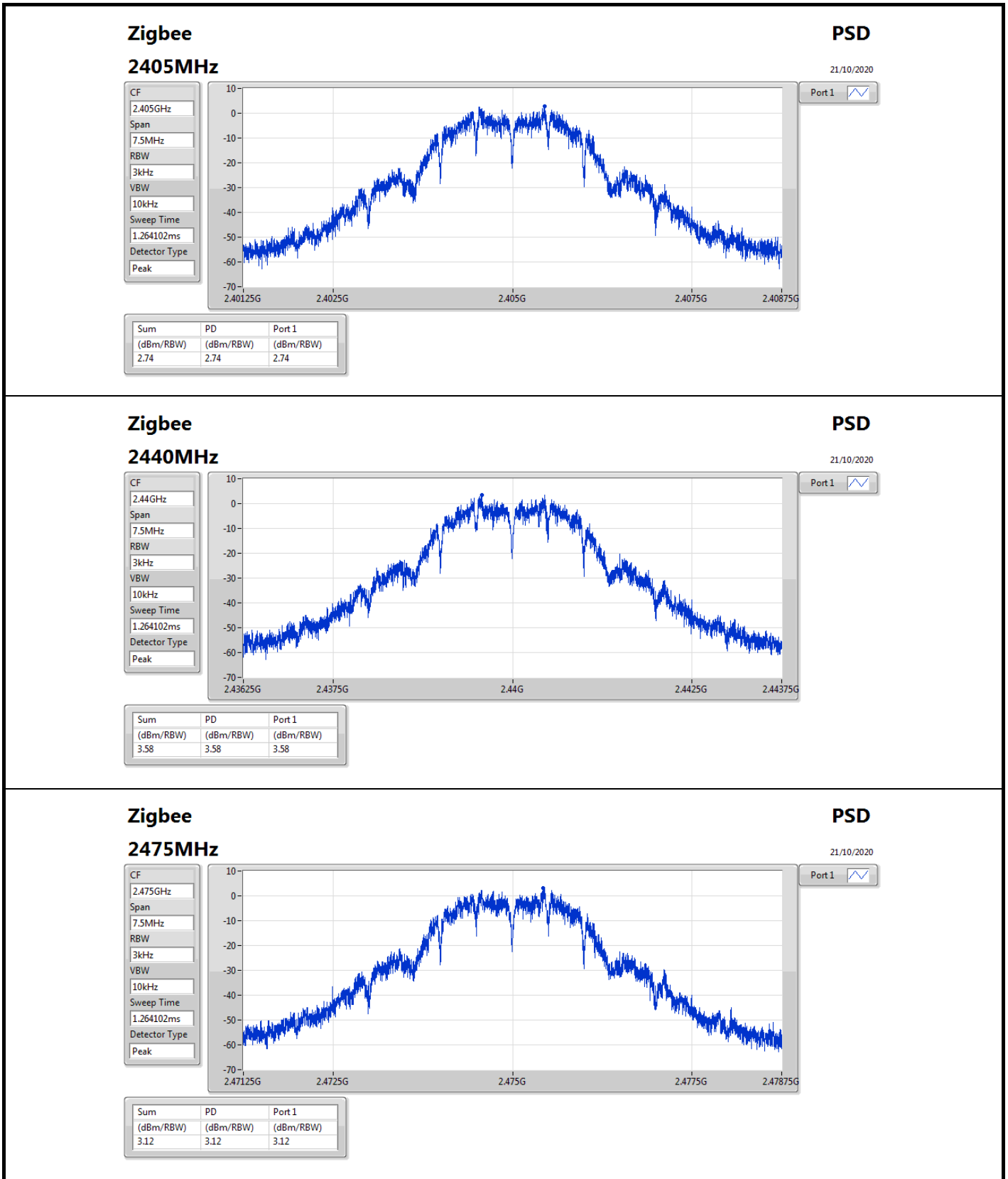


Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
Zigbee	-	-	-	-	-
2405MHz	Pass	5.48	2.74	2.74	8.00
2440MHz	Pass	5.48	3.58	3.58	8.00
2475MHz	Pass	5.48	3.12	3.12	8.00

DG = Directional Gain; RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;

PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X power density;





**Summary**

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
Zigbee	3.29

RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;



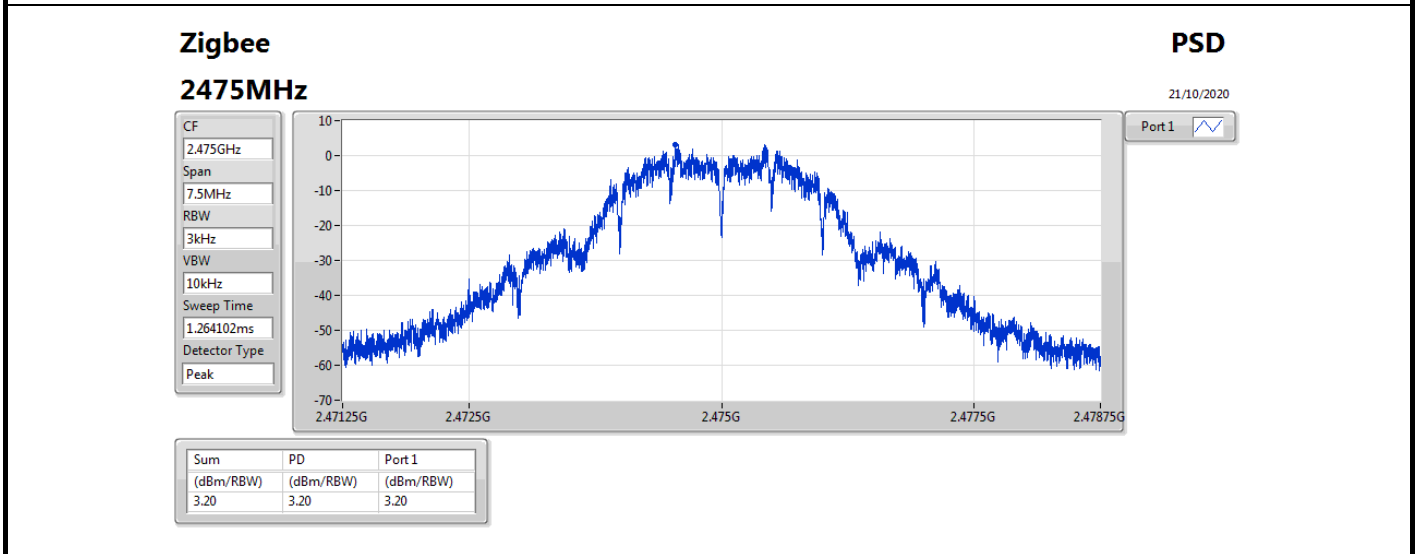
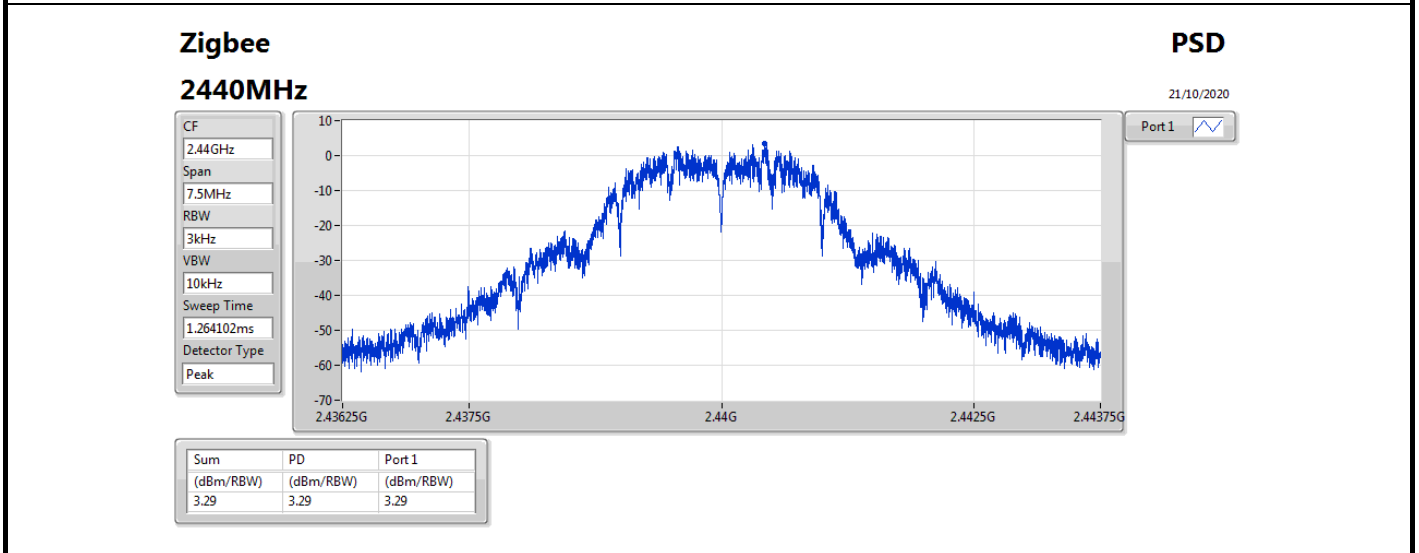
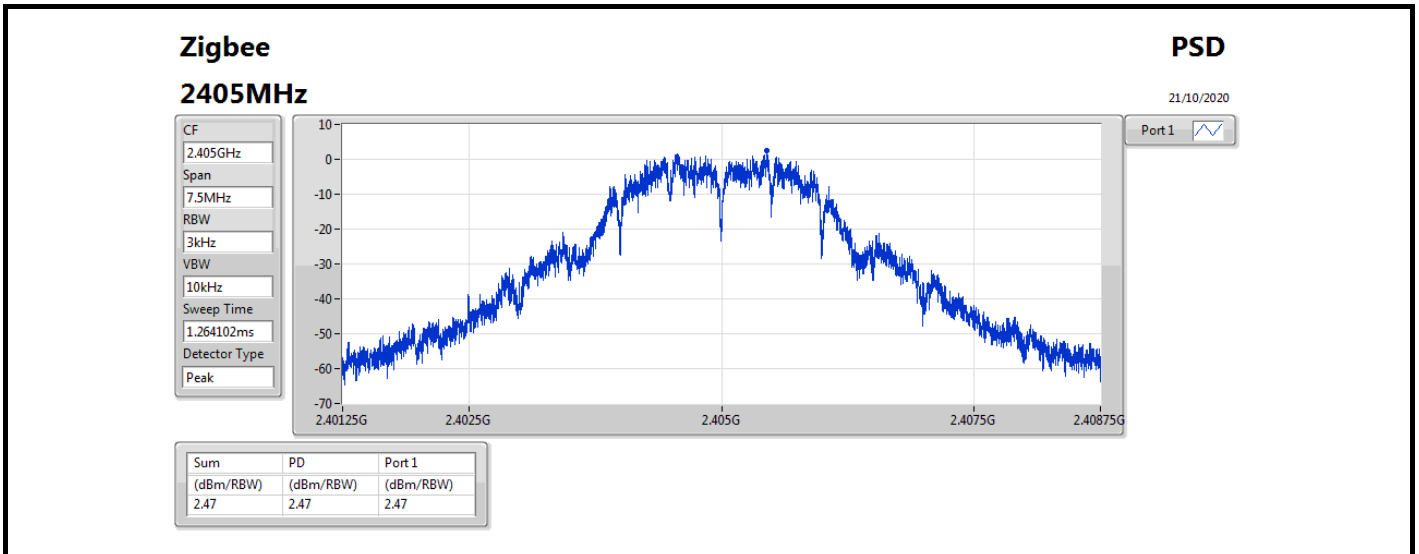


Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
Zigbee	-	-	-	-	-
2405MHz	Pass	5.48	2.47	2.47	8.00
2440MHz	Pass	5.48	3.29	3.29	8.00
2475MHz	Pass	5.48	3.20	3.20	8.00

DG = Directional Gain; RBW = 500 kHz for 5.725-5.85GHz band / 1MHz for other band;

PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X power density;





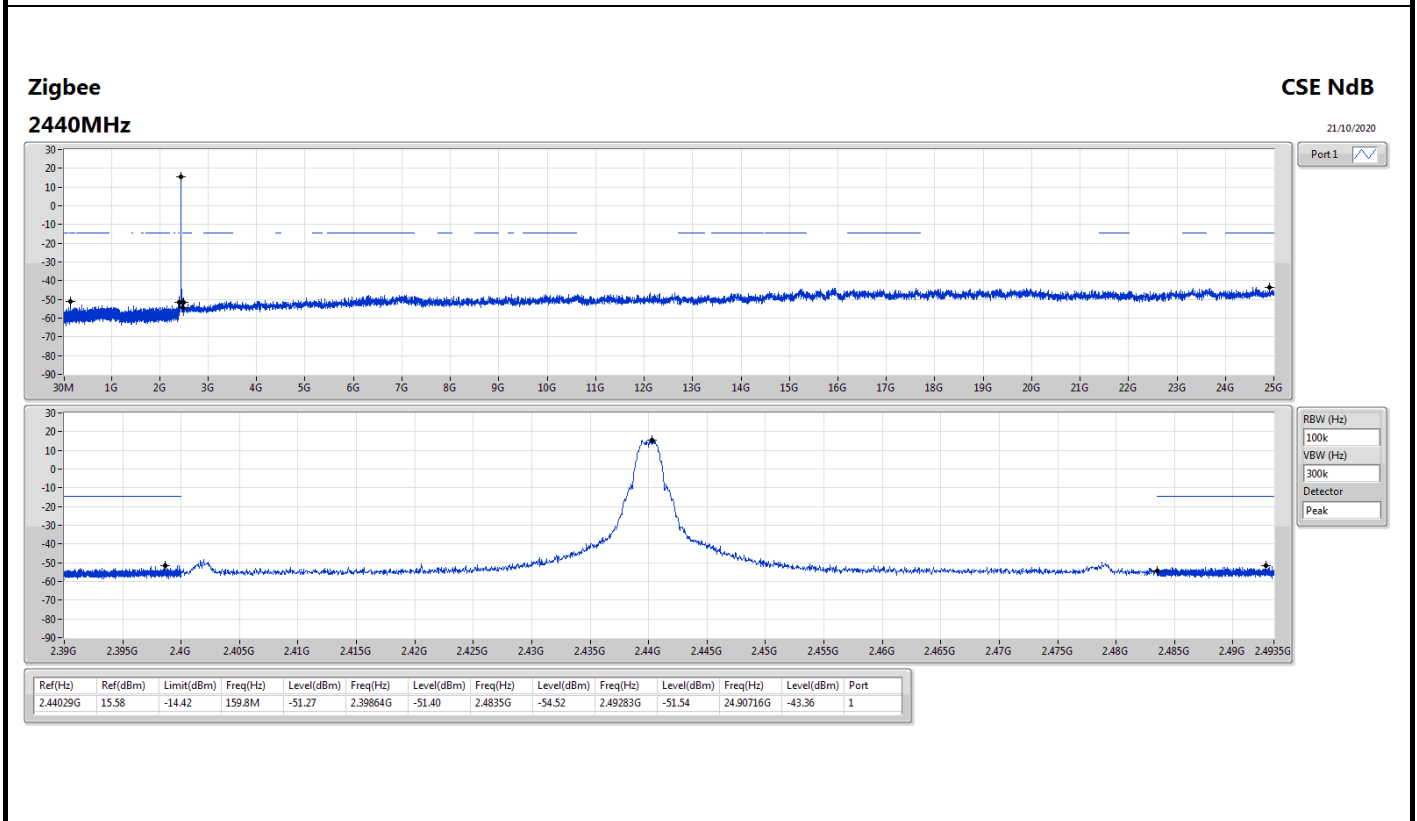
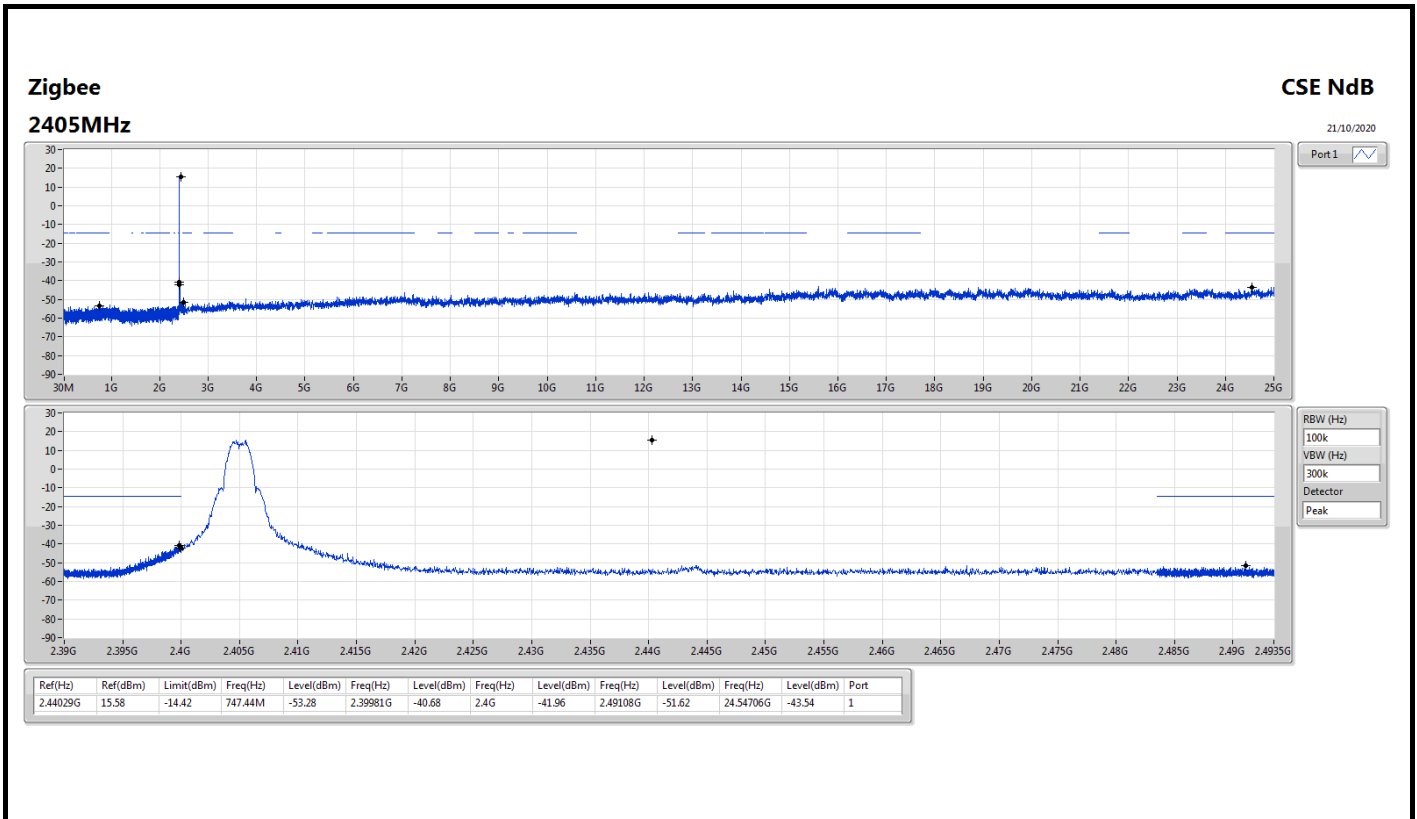
Summary

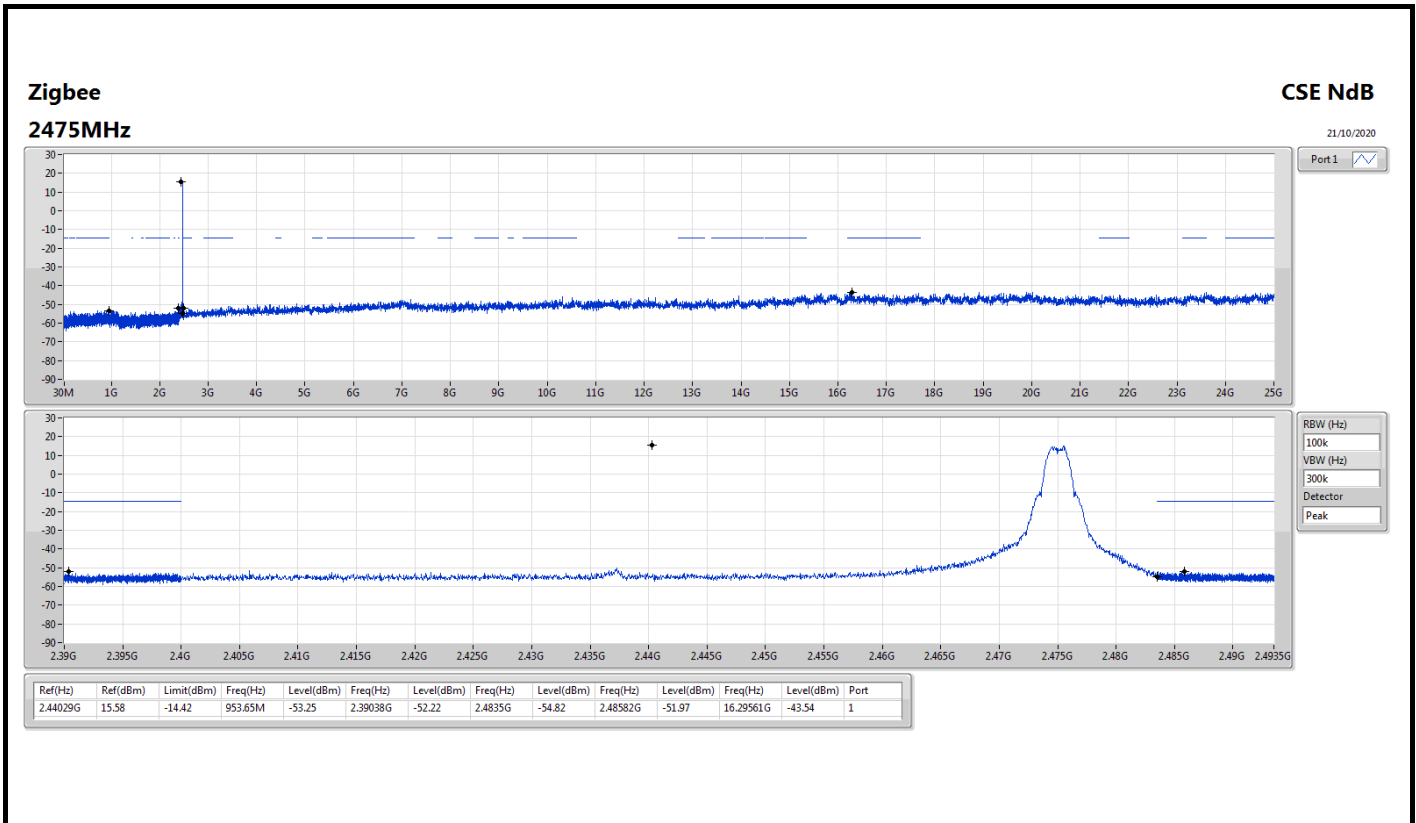
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	2.44029G	15.58	-14.42	747.44M	-53.28	2.39981G	-40.68	2.4G	-41.96	2.49108G	-51.62	24.54706G	-43.54	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
Zigbee	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2405MHz	Pass	2.44029G	15.58	-14.42	747.44M	-53.28	2.39981G	-40.68	2.4G	-41.96	2.49108G	-51.62	24.54706G	-43.54	1
2440MHz	Pass	2.44029G	15.58	-14.42	159.8M	-51.27	2.39864G	-51.40	2.4835G	-54.52	2.49283G	-51.54	24.90716G	-43.36	1
2475MHz	Pass	2.44029G	15.58	-14.42	953.65M	-53.25	2.39038G	-52.22	2.4835G	-54.82	2.48582G	-51.97	16.29561G	-43.54	1







Summary

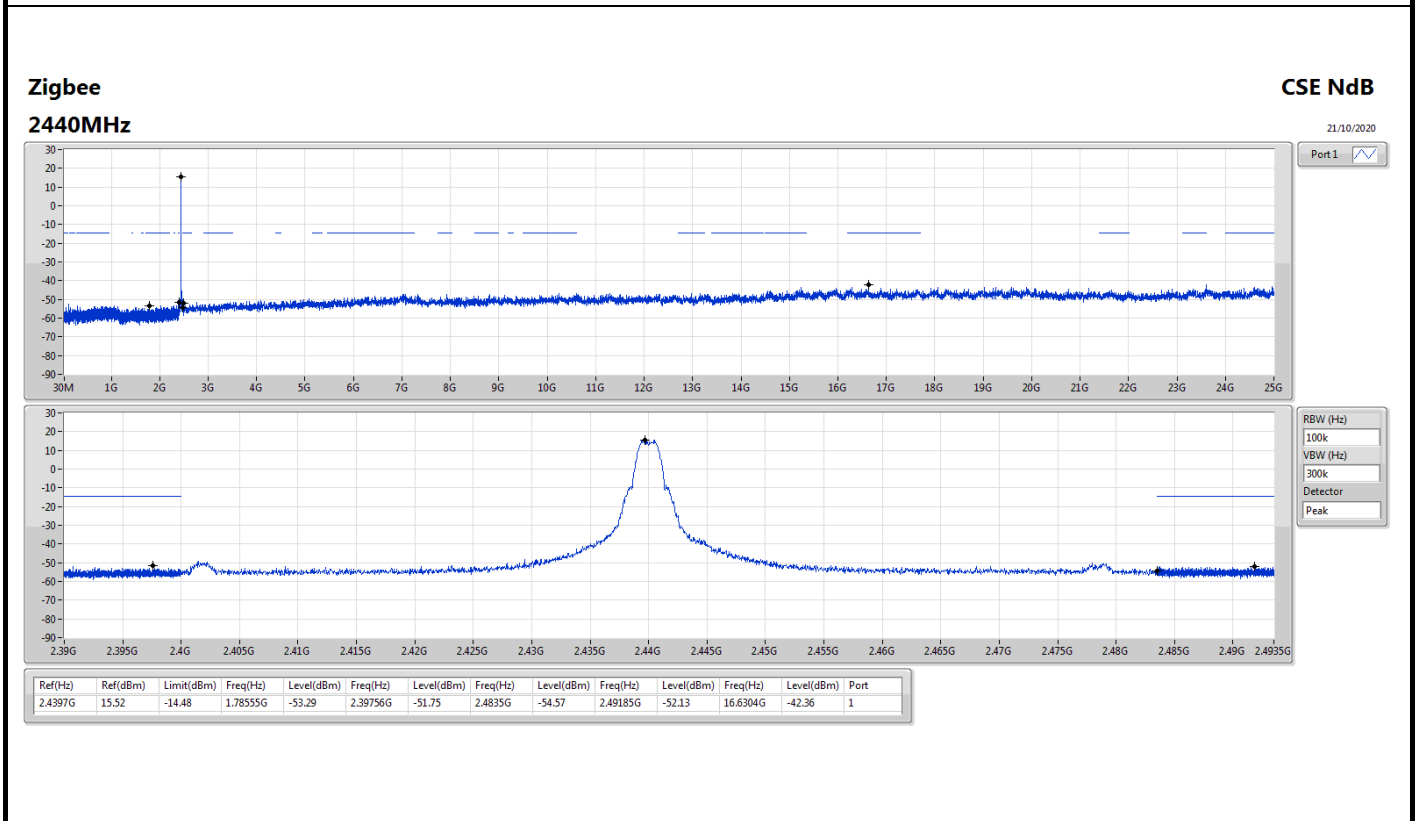
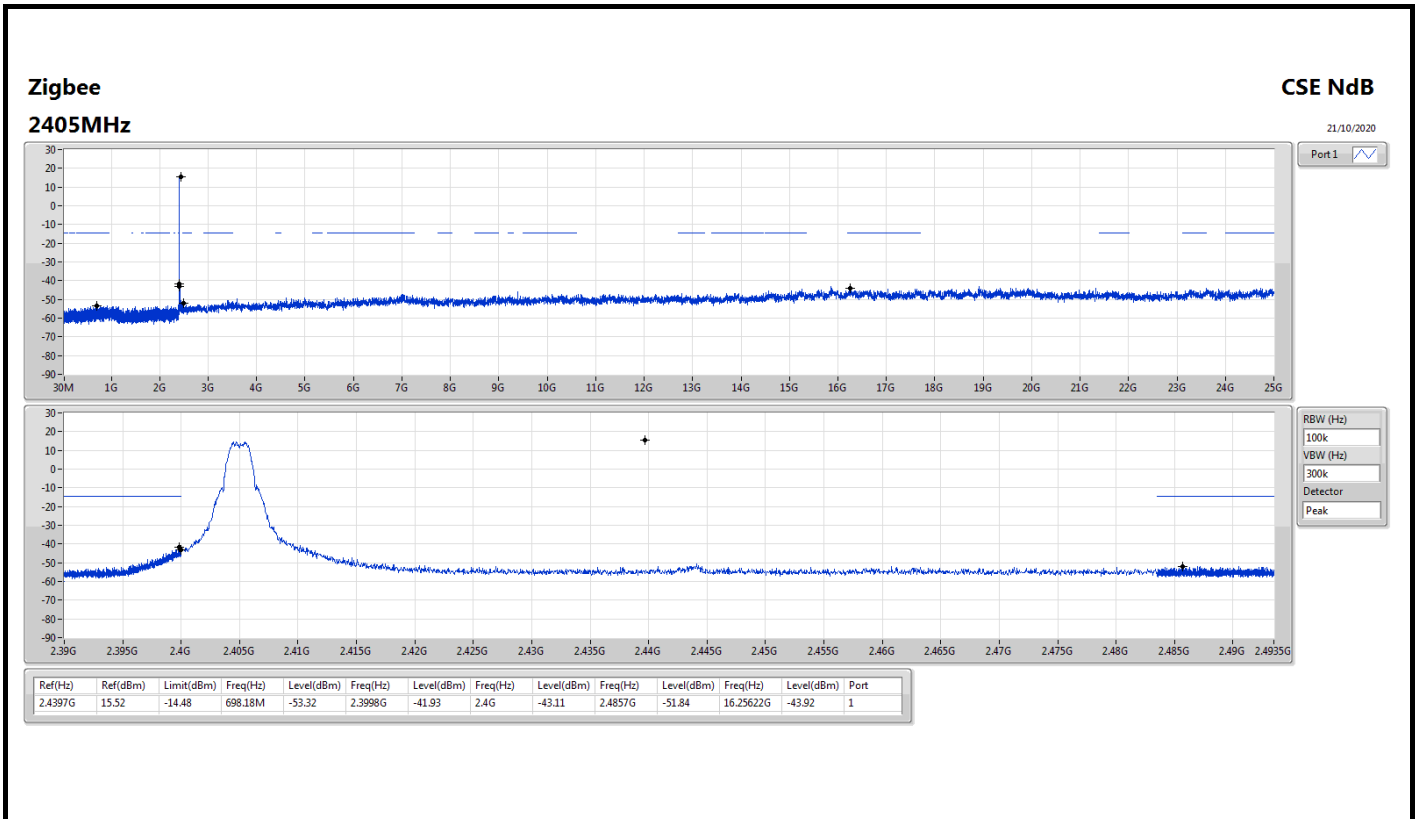
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	2.4397G	15.52	-14.48	698.18M	-53.32	2.3998G	-41.93	2.4G	-43.11	2.4857G	-51.84	16.25622G	-43.92	1

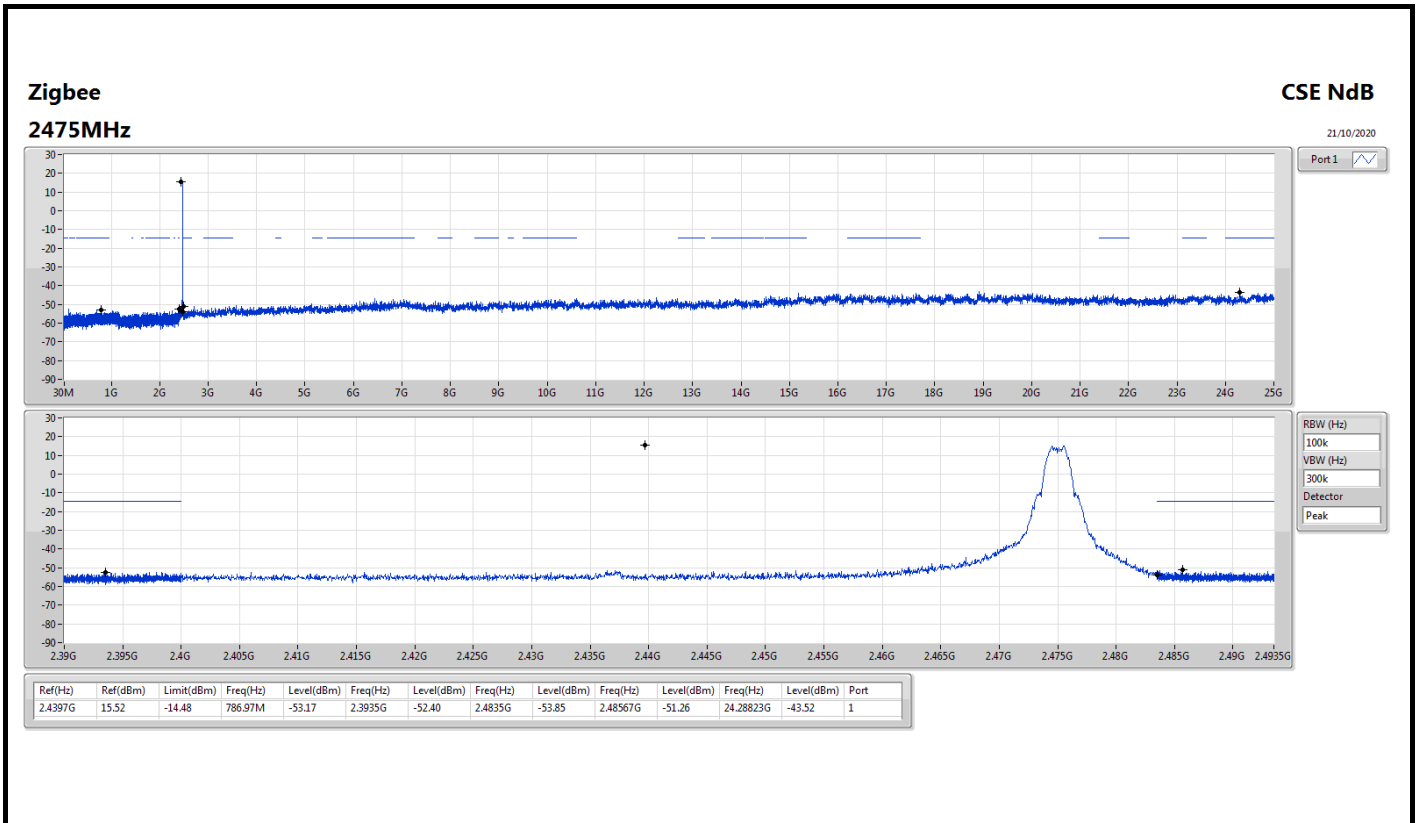


**Result**

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
Zigbee	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2405MHz	Pass	2.4397G	15.52	-14.48	698.18M	-53.32	2.3998G	-41.93	2.4G	-43.11	2.4857G	-51.84	16.25622G	-43.92	1
2440MHz	Pass	2.4397G	15.52	-14.48	1.78555G	-53.29	2.39756G	-51.75	2.4835G	-54.57	2.49185G	-52.13	16.6304G	-42.36	1
2475MHz	Pass	2.4397G	15.52	-14.48	786.97M	-53.17	2.3935G	-52.40	2.4835G	-53.85	2.48567G	-51.26	24.28823G	-43.52	1







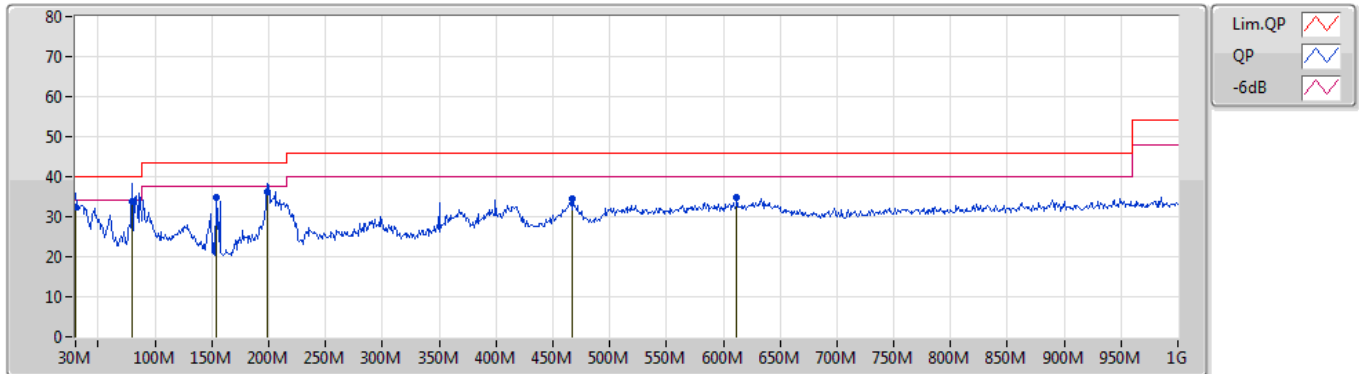


**Summary**

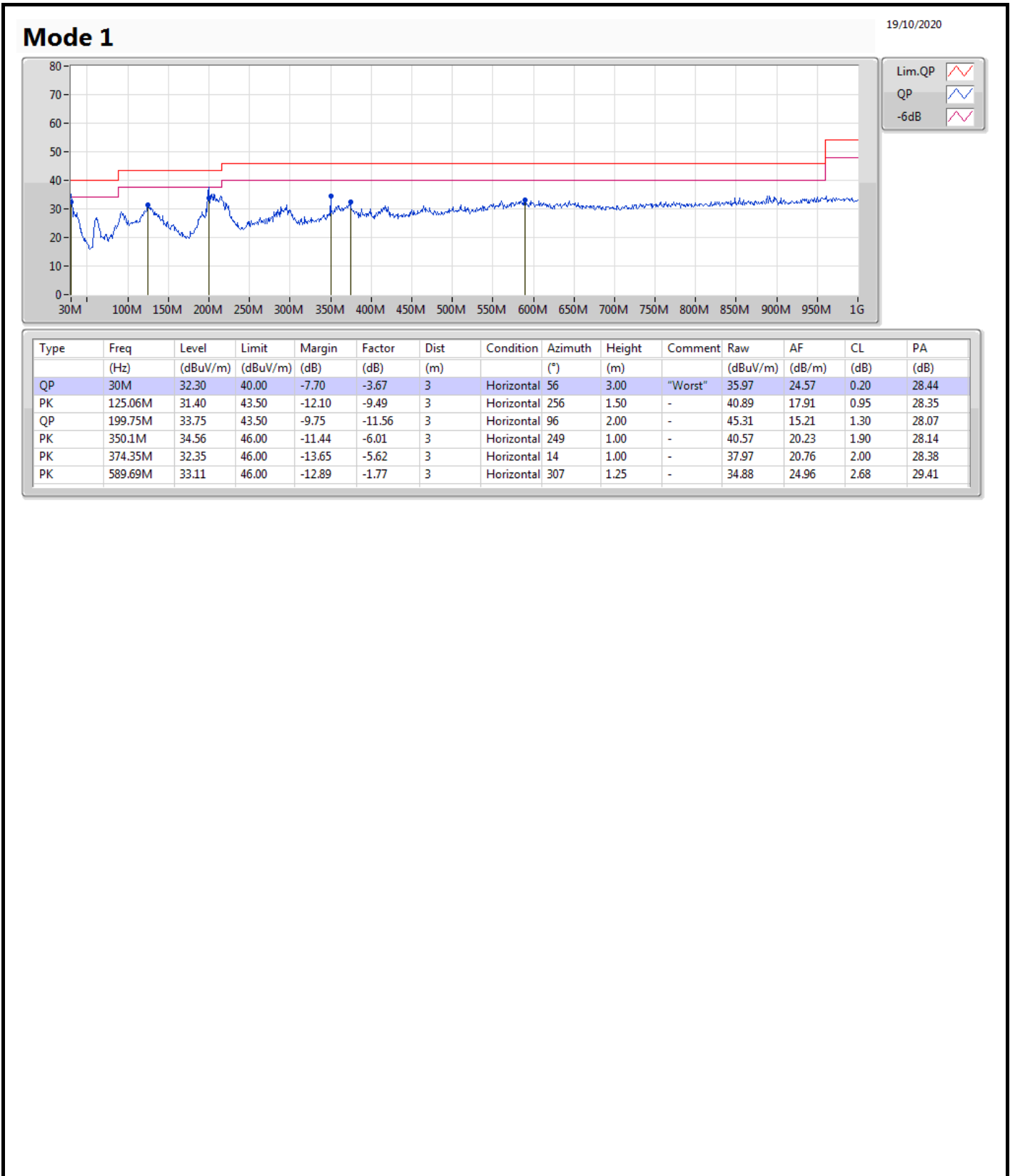
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	QP	79.47M	33.94	40.00	-6.06	Vertical
Mode 2	Pass	QP	79.47M	33.67	40.00	-6.33	Vertical

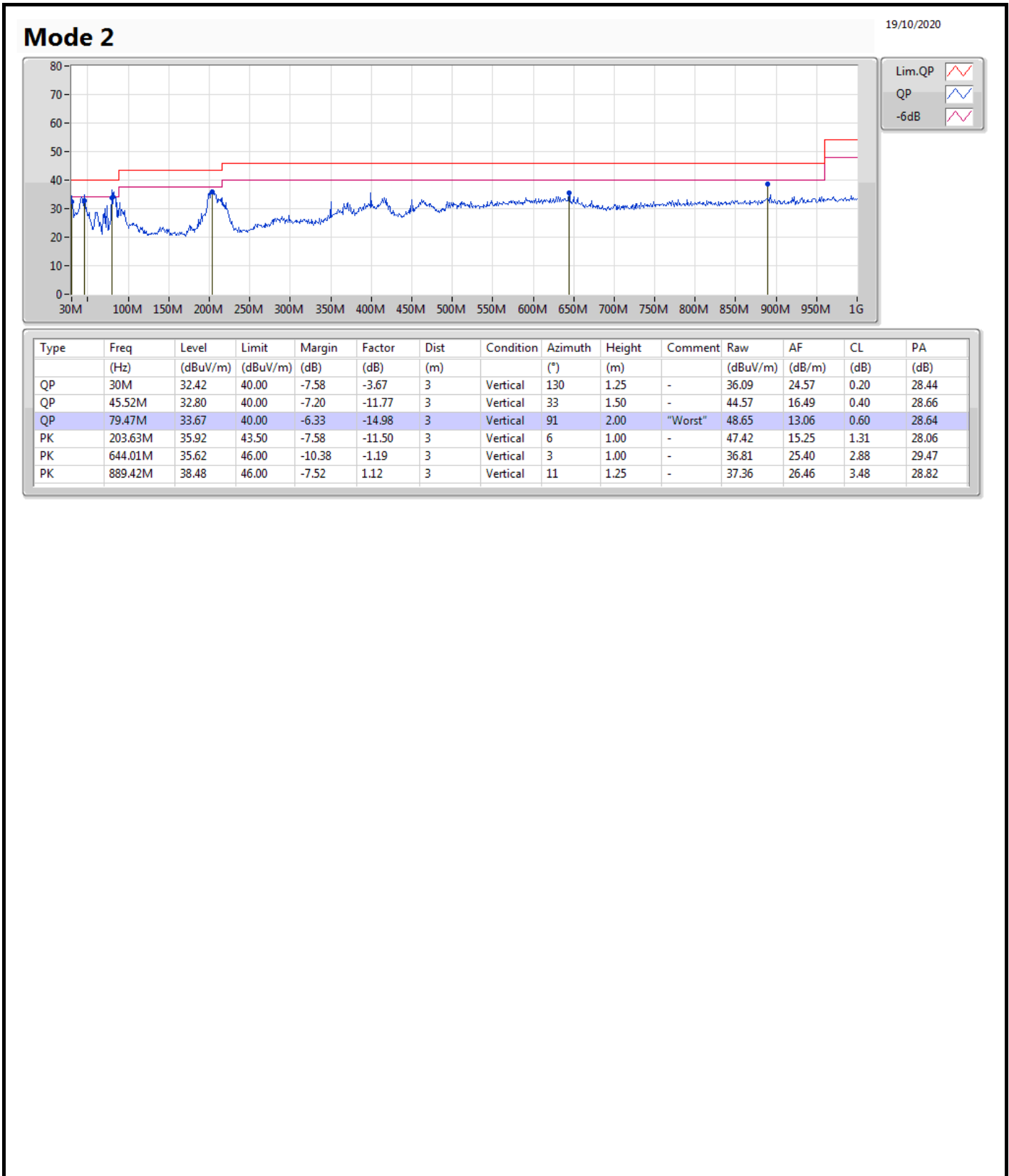
Mode 1

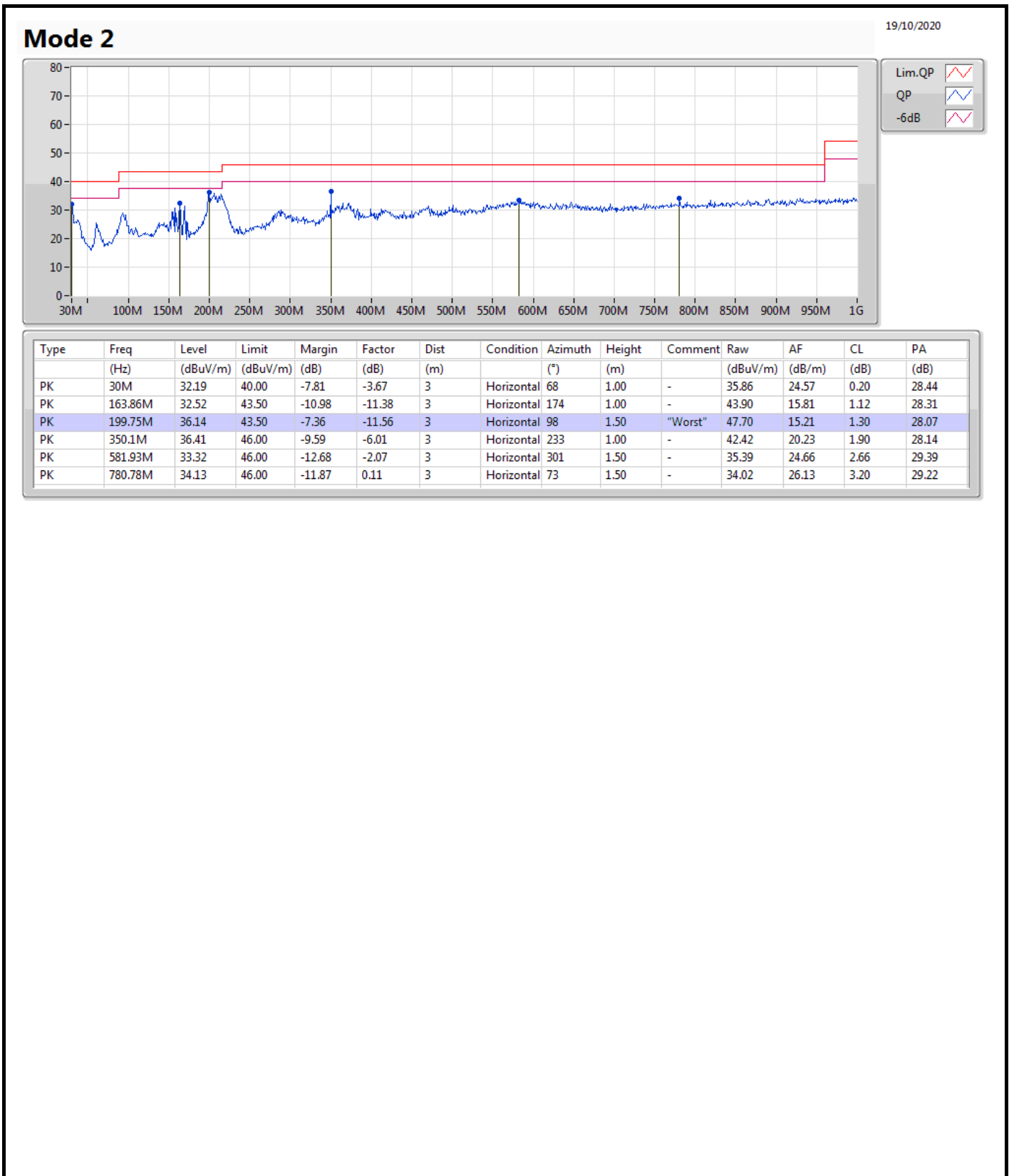
19/10/2020



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	32.32	40.00	-7.68	-3.67	3	Vertical	124	3.00	-	35.99	24.57	0.20	28.44
QP	79.47M	33.94	40.00	-6.06	-14.98	3	Vertical	358	1.50	"Worst"	48.92	13.06	0.60	28.64
PK	154.16M	34.91	43.50	-8.59	-11.11	3	Vertical	10	3.00	-	46.02	16.13	1.10	28.34
QP	198.78M	36.28	43.50	-7.22	-11.65	3	Vertical	360	1.00	-	47.93	15.13	1.29	28.07
PK	466.5M	34.35	46.00	-11.65	-3.41	3	Vertical	173	1.00	-	37.76	23.22	2.37	29.00
PK	612M	34.73	46.00	-11.27	-1.59	3	Vertical	23	1.00	-	36.32	25.11	2.75	29.45









Summary

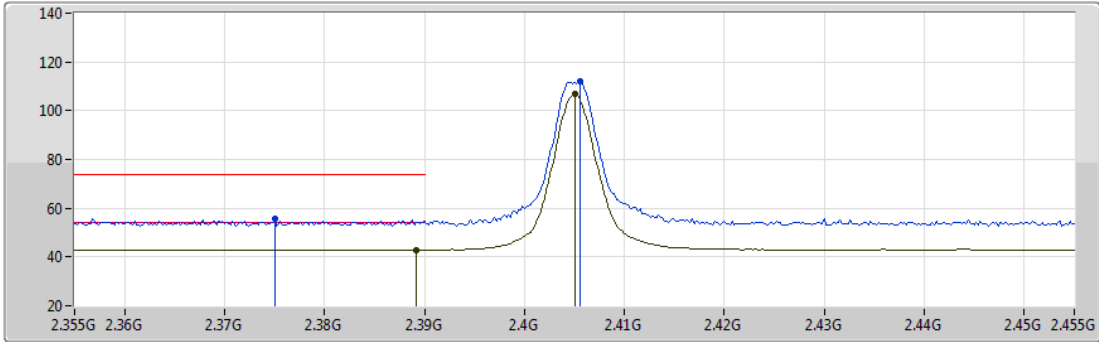
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	AV	12.0278G	46.64	54.00	-7.36	3	Horizontal	119	1.73	-







Zigbee

08/10/2020

2405MHz\_TX



Lim.PK   
 PK   
 Lim.AV   
 AV 

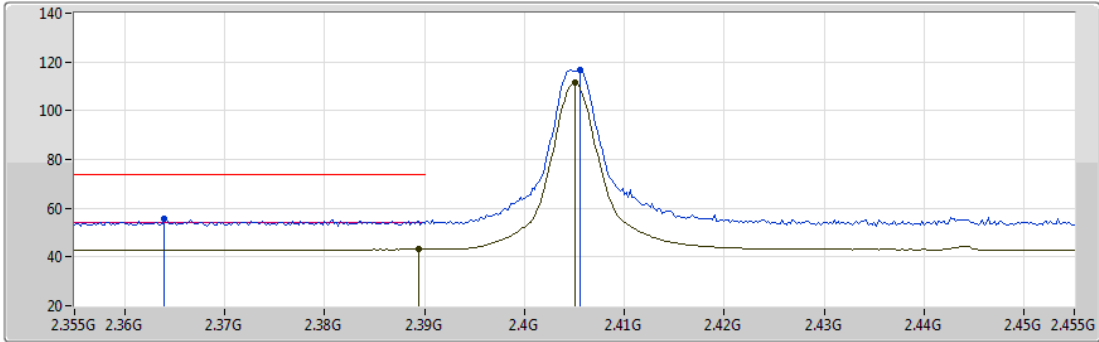
EUT Y\_1TX\_ANT1  
 Setting default  
 06-F-B-4

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	2.375G	55.82	74.00	-18.18	25.17	3	Vertical	93	2.82	-	27.60	3.05	-
AV	2.3892G	42.96	54.00	-11.04	12.28	3	Vertical	93	2.82	-	27.60	3.08	-
PK	2.4056G	111.90	Inf	-Inf	81.21	3	Vertical	93	2.82	-	27.58	3.11	-
AV	2.405G	106.79	Inf	-Inf	76.11	3	Vertical	93	2.82	-	27.58	3.10	-

### Zigbee

08/10/2020

### 2405MHz\_TX



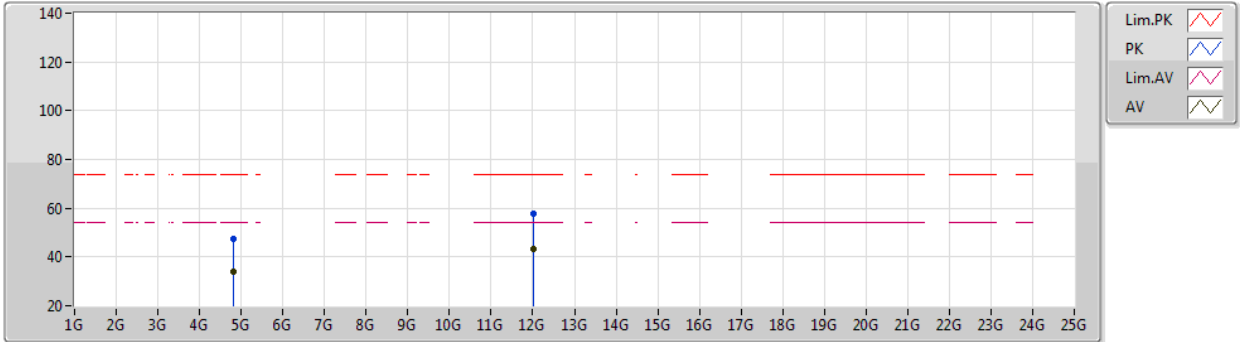
EUT Y\_1TX\_ANT1  
Setting default  
06-F-B-4

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	2.364G	55.79	74.00	-18.21	25.16	3	Horizontal	189	1.79	-	27.60	3.03	-
AV	2.3894G	43.16	54.00	-10.84	12.48	3	Horizontal	189	1.79	-	27.60	3.08	-
PK	2.4056G	116.71	Inf	-Inf	86.02	3	Horizontal	189	1.79	-	27.58	3.11	-
AV	2.405G	111.48	Inf	-Inf	80.80	3	Horizontal	189	1.79	-	27.58	3.10	-

### Zigbee

08/10/2020

### 2405MHz\_TX



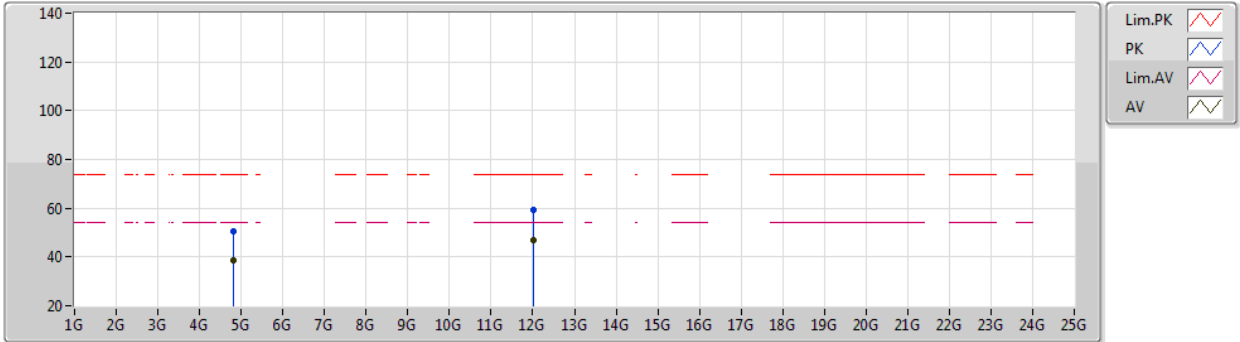
EUT Y\_1TX\_ANT1  
Setting default  
06-F-B-4

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	4.81068G	47.24	74.00	-26.76	42.96	3	Vertical	278	1.73	-	31.04	5.00	31.76
AV	4.809G	34.09	54.00	-19.91	29.81	3	Vertical	278	1.73	-	31.04	5.00	31.76
PK	12.02208G	57.52	74.00	-16.48	44.27	3	Vertical	38	1.80	-	38.90	8.51	34.16
AV	12.02208G	43.45	54.00	-10.55	30.20	3	Vertical	38	1.80	-	38.90	8.51	34.16

### Zigbee

08/10/2020

### 2405MHz\_TX



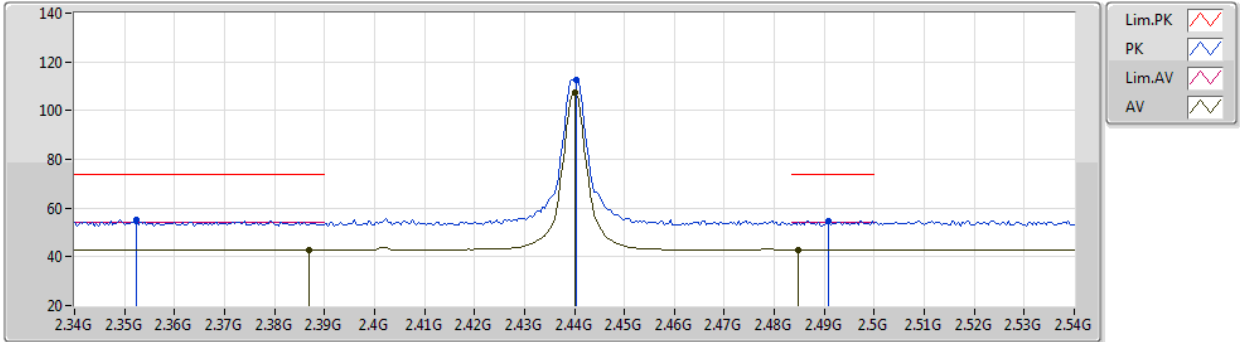
EUT Y\_1TX\_ANT1  
Setting default  
06-F-B-4

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	4.81096G	50.53	74.00	-23.47	46.25	3	Horizontal	53	1.80	-	31.04	5.00	31.76
AV	4.81096G	38.44	54.00	-15.56	34.16	3	Horizontal	53	1.80	-	31.04	5.00	31.76
PK	12.02792G	59.35	74.00	-14.65	46.09	3	Horizontal	119	1.73	-	38.90	8.52	34.16
AV	12.0278G	46.64	54.00	-7.36	33.38	3	Horizontal	119	1.73	-	38.90	8.52	34.16

Zigbee

08/10/2020

2440MHz\_TX



EUT Y\_1TX\_ANT1  
Setting default  
06-F-B-4

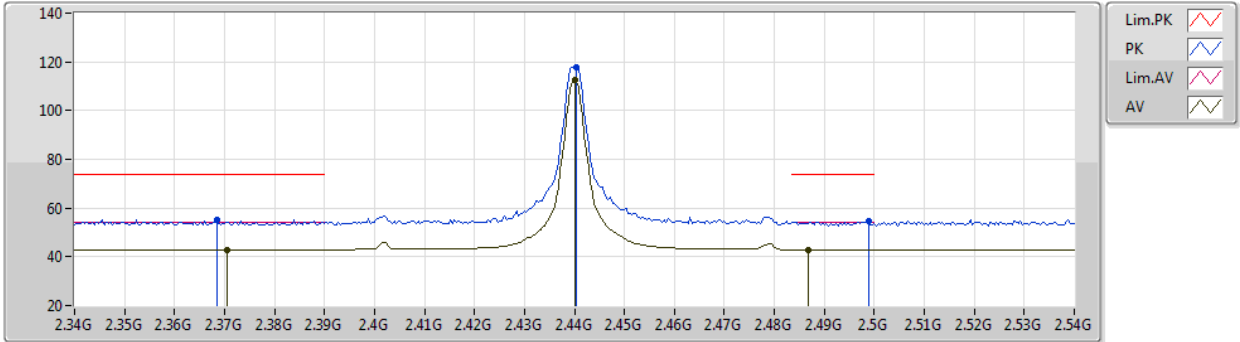
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	2.3524G	55.08	74.00	-18.92	24.48	3	Vertical	86	2.76	-	27.60	3.00	-
AV	2.3868G	42.91	54.00	-11.09	12.24	3	Vertical	86	2.76	-	27.60	3.07	-
PK	2.4404G	112.60	Inf	-Inf	82.02	3	Vertical	86	2.76	-	27.44	3.14	-
AV	2.44G	107.50	Inf	-Inf	76.92	3	Vertical	86	2.76	-	27.44	3.14	-
PK	2.4908G	54.73	74.00	-19.27	24.14	3	Vertical	86	2.76	-	27.40	3.19	-
AV	2.4848G	42.92	54.00	-11.08	12.34	3	Vertical	86	2.76	-	27.40	3.18	-



Zigbee

2440MHz\_TX

08/10/2020



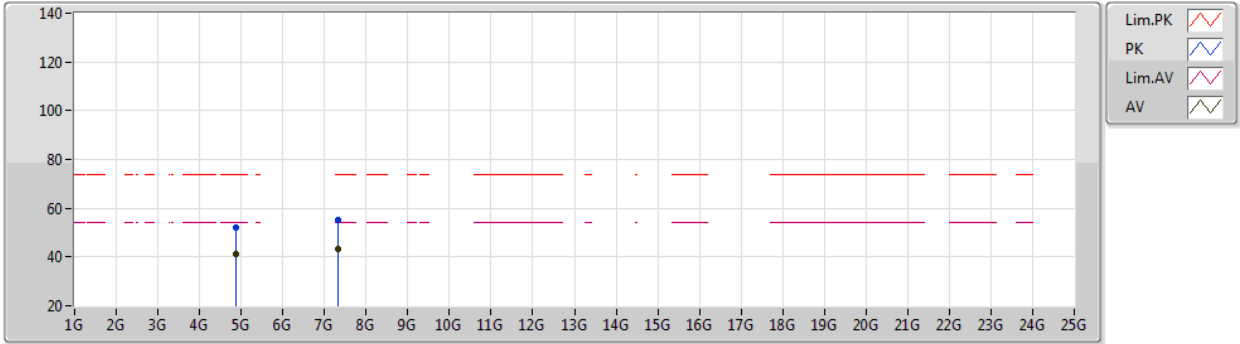
EUT Y\_1TX\_ANT1  
Setting default  
06-F-B-4

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	55.38	74.00	-18.62	24.74	3	Horizontal	186	1.80	-	27.60	3.04	-
AV	2.3704G	43.00	54.00	-11.00	12.36	3	Horizontal	186	1.80	-	27.60	3.04	-
PK	2.4404G	117.77	Inf	-Inf	87.19	3	Horizontal	186	1.80	-	27.44	3.14	-
AV	2.44G	112.58	Inf	-Inf	82.00	3	Horizontal	186	1.80	-	27.44	3.14	-
PK	2.4988G	54.42	74.00	-19.58	23.82	3	Horizontal	186	1.80	-	27.40	3.20	-
AV	2.4868G	42.99	54.00	-11.01	12.40	3	Horizontal	186	1.80	-	27.40	3.19	-

### Zigbee

08/10/2020

### 2440MHz\_TX



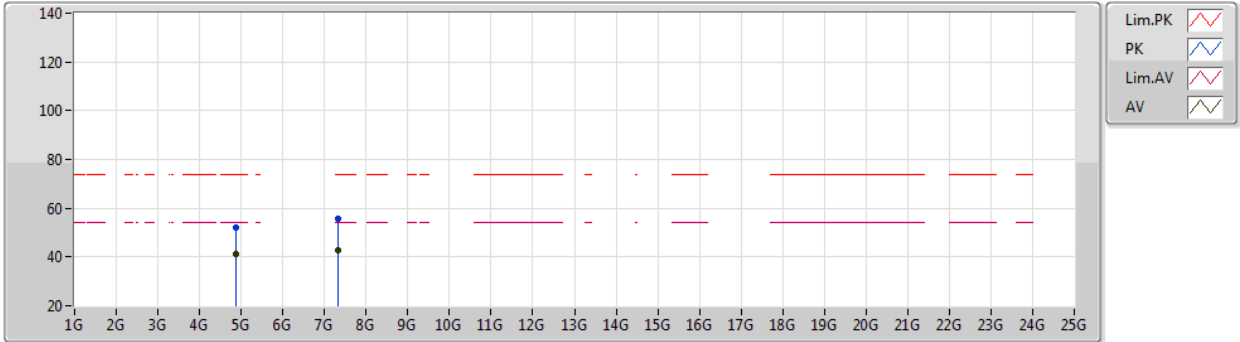
EUT Y\_1TX\_ANT1  
Setting default  
06-F-B-4

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	4.88116G	51.84	74.00	-22.16	47.37	3	Vertical	86	2.03	-	31.14	5.00	31.67
AV	4.88096G	41.02	54.00	-12.98	36.56	3	Vertical	86	2.03	-	31.14	5.00	31.68
PK	7.3184G	55.25	74.00	-18.75	45.98	3	Vertical	72	2.01	-	36.33	6.10	33.16
AV	7.32152G	43.17	54.00	-10.83	33.92	3	Vertical	72	2.01	-	36.31	6.10	33.16

### Zigbee

08/10/2020

### 2440MHz\_TX



EUT Y\_1TX\_ANT1  
Setting default  
06-F-B-4

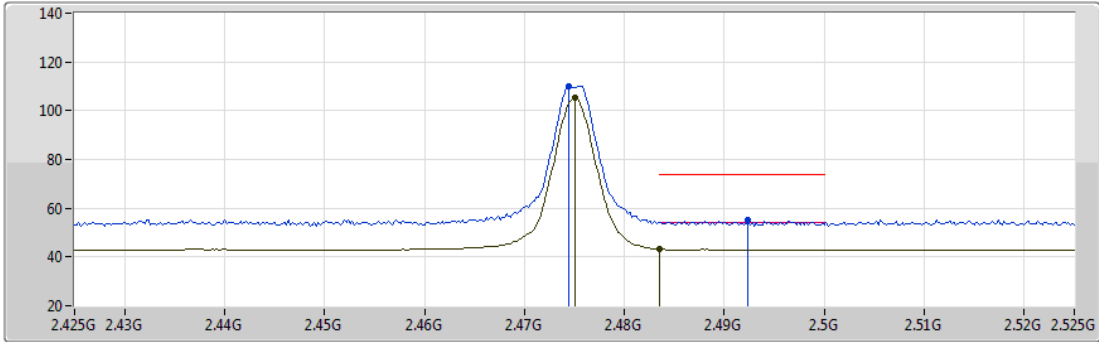
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.881G	51.96	74.00	-22.04	47.50	3	Horizontal	24	2.32	-	31.14	5.00	31.68
AV	4.881G	41.28	54.00	-12.72	36.82	3	Horizontal	24	2.32	-	31.14	5.00	31.68
PK	7.32152G	55.69	74.00	-18.31	46.44	3	Horizontal	137	1.79	-	36.31	6.10	33.16
AV	7.32156G	43.00	54.00	-11.00	33.75	3	Horizontal	137	1.79	-	36.31	6.10	33.16



Zigbee

08/10/2020

2475MHz\_TX



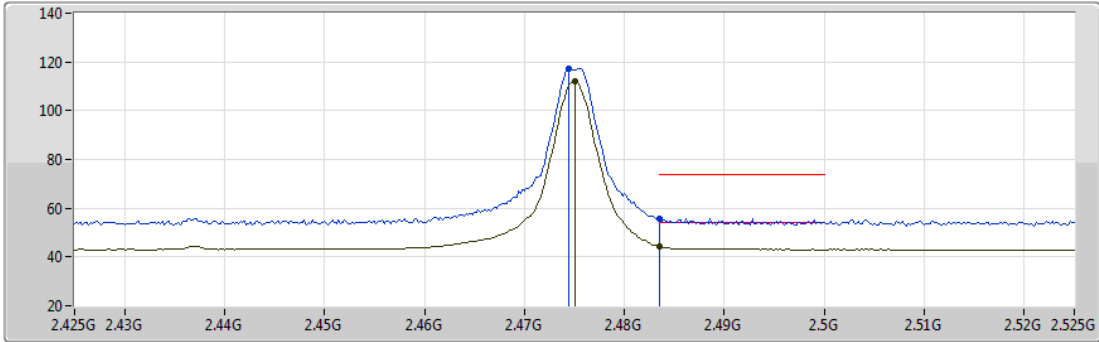
EUT Y\_1TX\_ANT1  
Setting default  
06-F-B-4

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	2.4744G	110.25	Inf	-Inf	79.68	3	Vertical	267	2.92	-	27.40	3.17	-
AV	2.475G	105.27	Inf	-Inf	74.70	3	Vertical	267	2.92	-	27.40	3.17	-
PK	2.4924G	55.06	74.00	-18.94	24.47	3	Vertical	267	2.92	-	27.40	3.19	-
AV	2.4835G	43.17	54.00	-10.83	12.59	3	Vertical	267	2.92	-	27.40	3.18	-

### Zigbee

08/10/2020

### 2475MHz\_TX



Lim.PK  
 PK  
 Lim.AV  
 AV

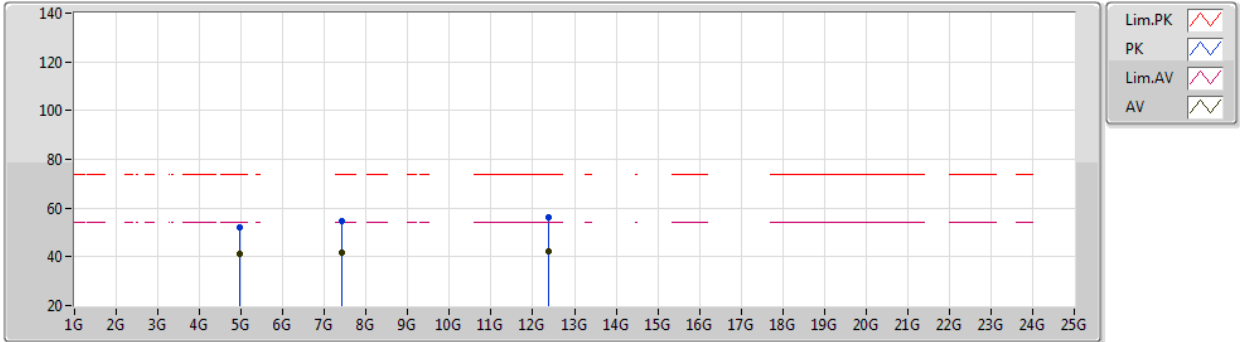
EUT Y\_1TX\_ANT1  
Setting default  
06-F-B-4

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	2.4744G	117.45	Inf	-Inf	86.88	3	Horizontal	163	1.78	-	27.40	3.17	-
AV	2.475G	112.26	Inf	-Inf	81.69	3	Horizontal	163	1.78	-	27.40	3.17	-
PK	2.4835G	55.68	74.00	-18.32	25.10	3	Horizontal	163	1.78	-	27.40	3.18	-
AV	2.4835G	44.24	54.00	-9.76	13.66	3	Horizontal	163	1.78	-	27.40	3.18	-

### Zigbee

08/10/2020

### 2475MHz\_TX



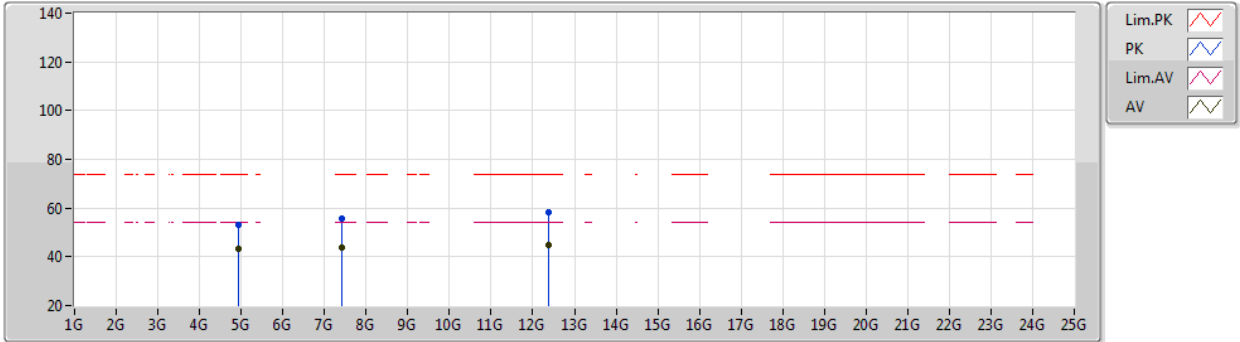
EUT Y\_1TX\_ANT1  
Setting default  
06-F-B-4

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	4.95112G	51.94	74.00	-22.06	47.23	3	Vertical	85	2.00	-	31.30	5.00	31.59
AV	4.95092G	41.26	54.00	-12.74	36.55	3	Vertical	85	2.00	-	31.30	5.00	31.59
PK	7.42336G	54.43	74.00	-19.57	45.24	3	Vertical	57	1.66	-	36.29	6.11	33.21
AV	7.4234G	41.88	54.00	-12.12	32.69	3	Vertical	57	1.66	-	36.29	6.11	33.21
PK	12.36924G	56.06	74.00	-17.94	42.77	3	Vertical	249	2.45	-	38.59	8.70	34.00
AV	12.37236G	42.11	54.00	-11.89	28.83	3	Vertical	249	2.45	-	38.58	8.70	34.00

### Zigbee

08/10/2020

### 2475MHz\_TX



EUT Y\_1TX\_ANT1  
Setting default  
06-F-B-4

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	4.949G	53.20	74.00	-20.80	48.49	3	Horizontal	74	1.00	-	31.30	5.00	31.59
AV	4.94896G	43.05	54.00	-10.95	38.34	3	Horizontal	74	1.00	-	31.30	5.00	31.59
PK	7.42336G	55.86	74.00	-18.14	46.67	3	Horizontal	86	1.88	-	36.29	6.11	33.21
AV	7.4234G	43.74	54.00	-10.26	34.55	3	Horizontal	86	1.88	-	36.29	6.11	33.21
PK	12.3778G	58.53	74.00	-15.47	45.25	3	Horizontal	78	2.23	-	38.57	8.71	34.00
AV	12.37772G	44.90	54.00	-9.10	31.62	3	Horizontal	78	2.23	-	38.57	8.71	34.00



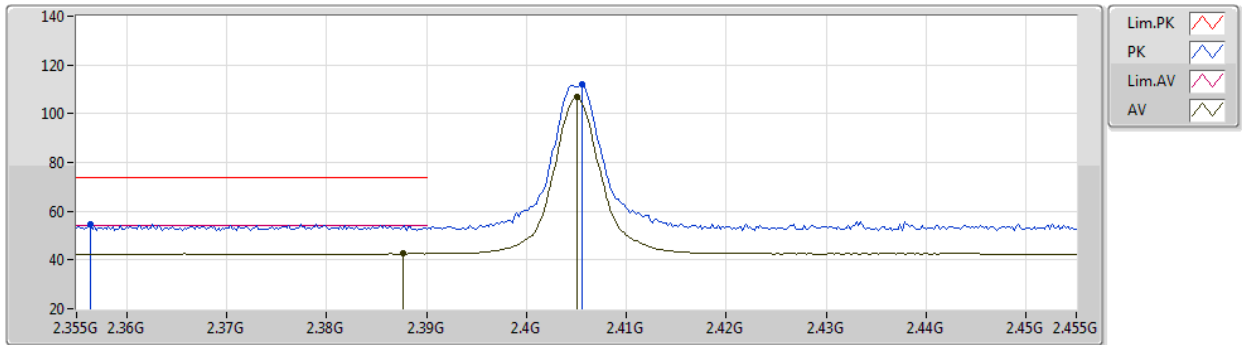
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-
Zigbee	Pass	AV	12.02774G	47.54	54.00	-6.46	3	Horizontal	304	1.69	-

### Zigbee

08/10/2020

### 2405MHz\_TX



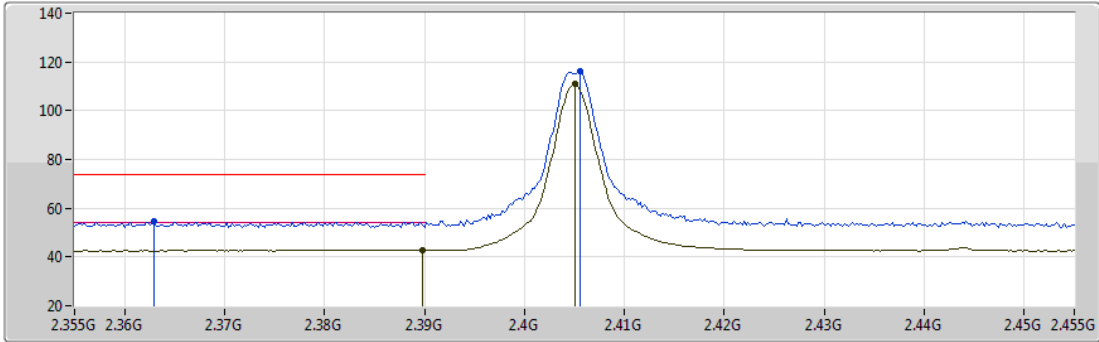
EUT Y\_1TX\_ANT2  
Setting default  
06-F-J-5

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	2.3564G	54.68	74.00	-19.32	24.07	3	Vertical	187	2.25	-	27.60	3.01	-
AV	2.3876G	42.55	54.00	-11.45	11.87	3	Vertical	187	2.25	-	27.60	3.08	-
PK	2.4056G	112.00	Inf	-Inf	81.31	3	Vertical	187	2.25	-	27.58	3.11	-
AV	2.405G	106.70	Inf	-Inf	76.02	3	Vertical	187	2.25	-	27.58	3.10	-

### Zigbee

08/10/2020

### 2405MHz\_TX



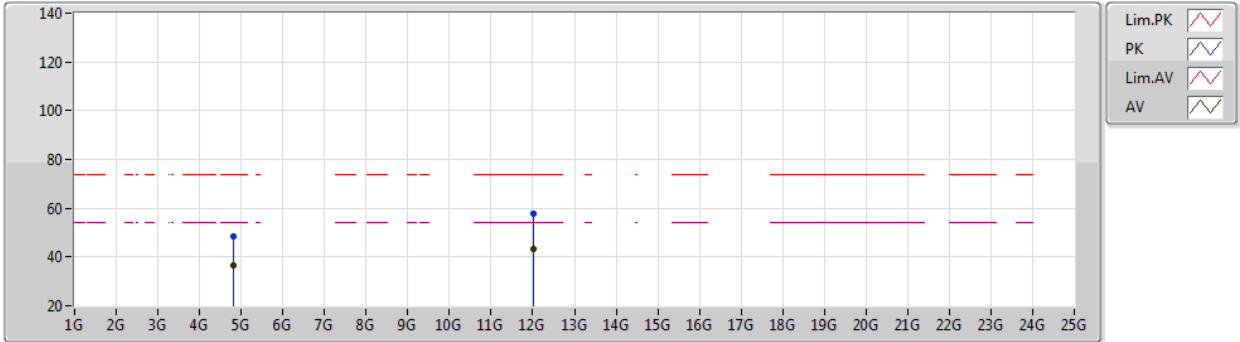
EUT Y\_1TX\_ANT2  
Setting default  
06-F-J-5

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	2.363G	54.43	74.00	-19.57	23.80	3	Horizontal	181	2.35	-	27.60	3.03	-
AV	2.3898G	42.73	54.00	-11.27	12.05	3	Horizontal	181	2.35	-	27.60	3.08	-
PK	2.4056G	116.00	Inf	-Inf	85.31	3	Horizontal	181	2.35	-	27.58	3.11	-
AV	2.405G	110.87	Inf	-Inf	80.19	3	Horizontal	181	2.35	-	27.58	3.10	-

### Zigbee

08/10/2020

### 2405MHz\_TX



EUT Y\_1TX\_ANT2  
Setting default  
06-F-J-5

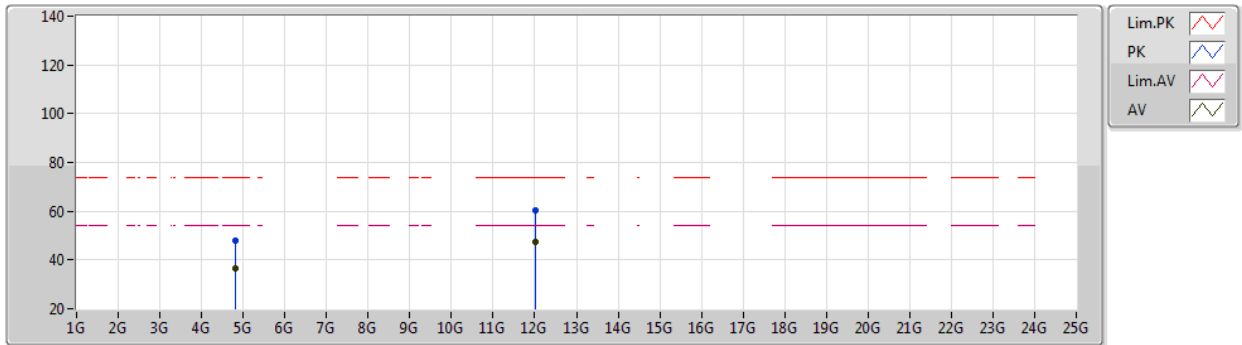
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.8089G	48.33	74.00	-25.67	44.05	3	Vertical	261	2.96	-	31.04	5.00	31.76
AV	4.80896G	36.40	54.00	-17.60	32.12	3	Vertical	261	2.96	-	31.04	5.00	31.76
PK	12.02758G	57.94	74.00	-16.06	44.68	3	Vertical	226	1.80	-	38.90	8.52	34.16
AV	12.02218G	43.53	54.00	-10.47	30.28	3	Vertical	226	1.80	-	38.90	8.51	34.16



### Zigbee

08/10/2020

### 2405MHz\_TX



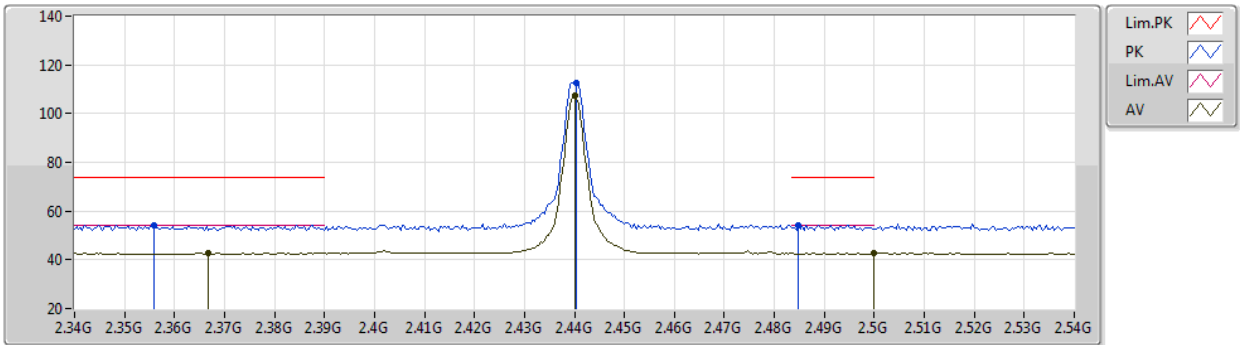
EUT Y\_1TX\_ANT2  
Setting default  
06-F-J-5

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	4.8088G	47.99	74.00	-26.01	43.71	3	Horizontal	142	1.67	-	31.04	5.00	31.76
AV	4.81104G	36.59	54.00	-17.41	32.31	3	Horizontal	142	1.67	-	31.04	5.00	31.76
PK	12.02752G	60.29	74.00	-13.71	47.03	3	Horizontal	304	1.69	-	38.90	8.52	34.16
AV	12.02774G	47.54	54.00	-6.46	34.28	3	Horizontal	304	1.69	-	38.90	8.52	34.16

### Zigbee

08/10/2020

### 2440MHz\_TX



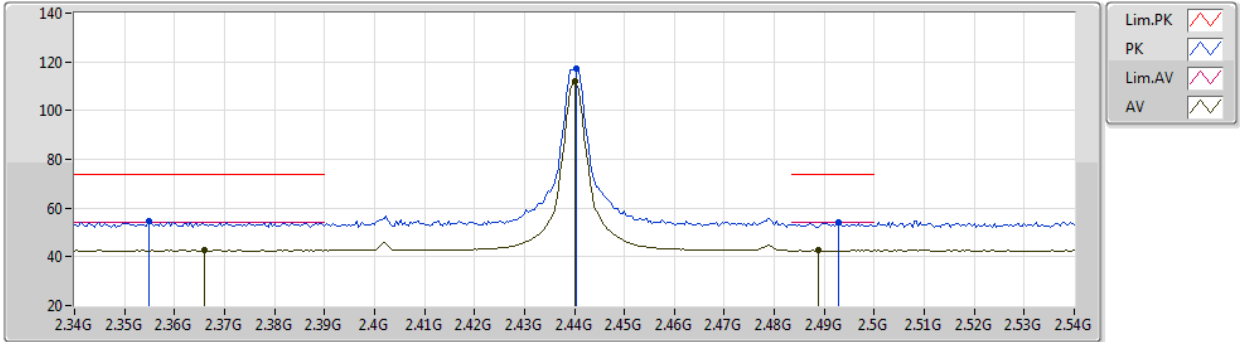
EUT Y\_1TX\_ANT2  
Setting default  
06-F-J-5

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	2.356G	54.21	74.00	-19.79	23.60	3	Vertical	194	1.96	-	27.60	3.01	-
AV	2.3668G	42.55	54.00	-11.45	11.92	3	Vertical	194	1.96	-	27.60	3.03	-
PK	2.4404G	112.56	Inf	-Inf	81.98	3	Vertical	194	1.96	-	27.44	3.14	-
AV	2.44G	107.35	Inf	-Inf	76.77	3	Vertical	194	1.96	-	27.44	3.14	-
PK	2.4848G	54.39	74.00	-19.61	23.81	3	Vertical	194	1.96	-	27.40	3.18	-
AV	2.5G	42.57	54.00	-11.43	11.97	3	Vertical	194	1.96	-	27.40	3.20	-

Zigbee

08/10/2020

2440MHz\_TX



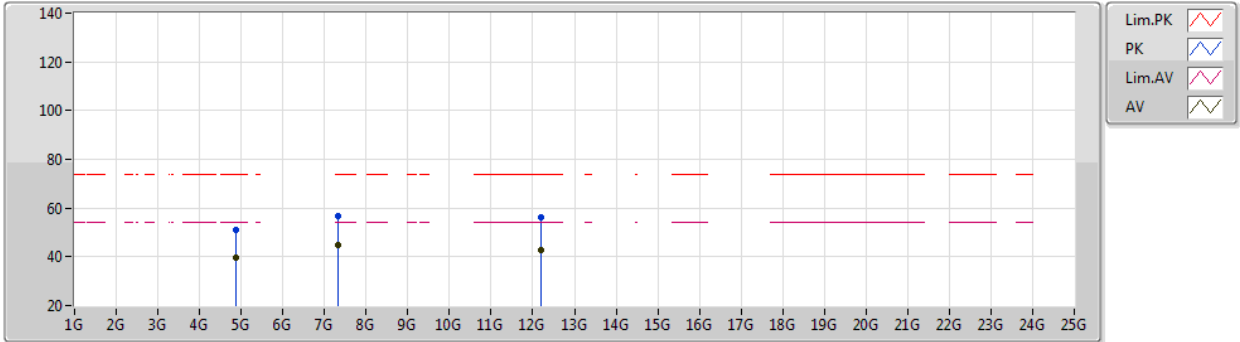
EUT Y\_1TX\_ANT2  
Setting default  
06-F-J-5

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	2.3548G	54.64	74.00	-19.36	24.03	3	Horizontal	177	2.33	-	27.60	3.01	-
AV	2.366G	42.56	54.00	-11.44	11.93	3	Horizontal	177	2.33	-	27.60	3.03	-
PK	2.4404G	117.02	Inf	-Inf	86.44	3	Horizontal	177	2.33	-	27.44	3.14	-
AV	2.44G	111.83	Inf	-Inf	81.25	3	Horizontal	177	2.33	-	27.44	3.14	-
PK	2.4928G	54.00	74.00	-20.00	23.41	3	Horizontal	177	2.33	-	27.40	3.19	-
AV	2.4888G	42.58	54.00	-11.42	11.99	3	Horizontal	177	2.33	-	27.40	3.19	-

### Zigbee

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### 2440MHz\_TX



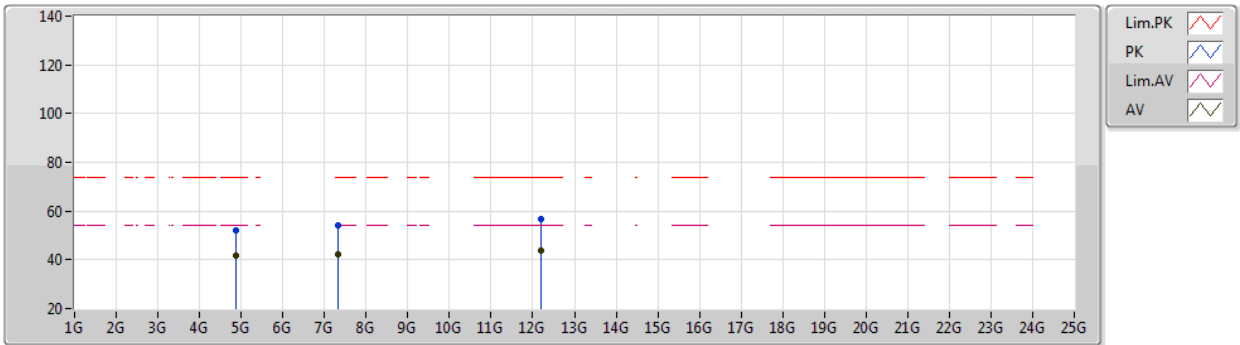
EUT Y\_1TX\_ANT2  
Setting default  
06-F-J-5

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	4.88102G	50.89	74.00	-23.11	46.43	3	Vertical	301	1.84	-	31.14	5.00	31.68
AV	4.88098G	39.68	54.00	-14.32	35.22	3	Vertical	301	1.84	-	31.14	5.00	31.68
PK	7.31836G	56.63	74.00	-17.37	47.36	3	Vertical	256	1.71	-	36.33	6.10	33.16
AV	7.32156G	44.84	54.00	-9.16	35.59	3	Vertical	256	1.71	-	36.31	6.10	33.16
PK	12.20138G	56.19	74.00	-17.81	42.76	3	Vertical	323	1.73	-	38.90	8.61	34.08
AV	12.20288G	42.78	54.00	-11.22	29.35	3	Vertical	323	1.73	-	38.90	8.61	34.08

### Zigbee

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### 2440MHz\_TX



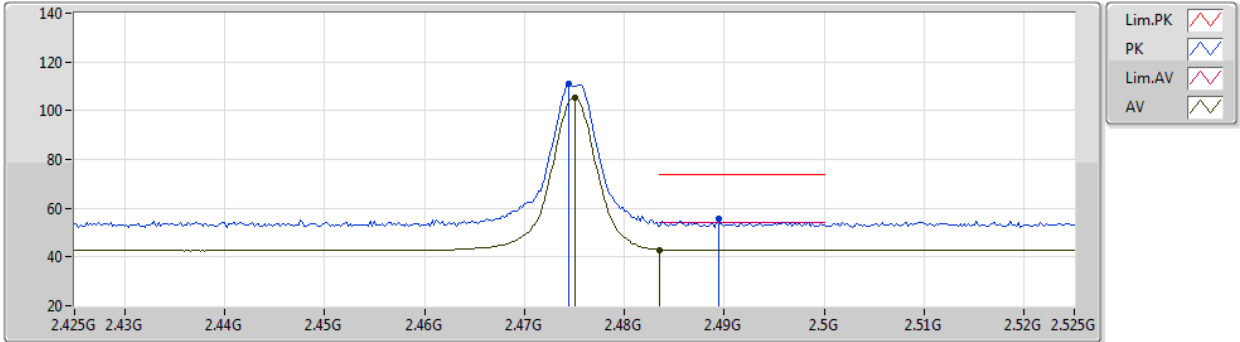
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Setting default  
06-F-J-5

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	4.879G	51.92	74.00	-22.08	47.46	3	Horizontal	235	1.86	-	31.14	5.00	31.68
AV	4.88094G	41.82	54.00	-12.18	37.36	3	Horizontal	235	1.86	-	31.14	5.00	31.68
PK	7.3183G	54.34	74.00	-19.66	45.07	3	Horizontal	266	1.78	-	36.33	6.10	33.16
AV	7.31836G	42.36	54.00	-11.64	33.09	3	Horizontal	266	1.78	-	36.33	6.10	33.16
PK	12.19698G	56.47	74.00	-17.53	43.04	3	Horizontal	288	1.73	-	38.90	8.61	34.08
AV	12.1972G	43.71	54.00	-10.29	30.28	3	Horizontal	288	1.73	-	38.90	8.61	34.08

Zigbee

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2475MHz\_TX



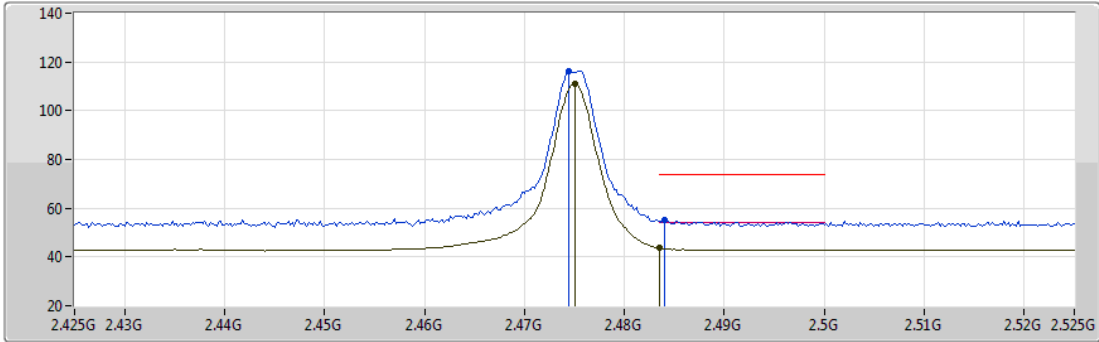
EUT Y\_1TX\_ANT2  
Setting default  
06-F-J-5

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	2.4744G	110.93	Inf	-Inf	80.36	3	Vertical	169	1.83	-	27.40	3.17	-
AV	2.475G	105.57	Inf	-Inf	75.00	3	Vertical	169	1.83	-	27.40	3.17	-
PK	2.4894G	55.83	74.00	-18.17	25.24	3	Vertical	169	1.83	-	27.40	3.19	-
AV	2.4835G	42.96	54.00	-11.04	12.38	3	Vertical	169	1.83	-	27.40	3.18	-

### Zigbee

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### 2475MHz\_TX



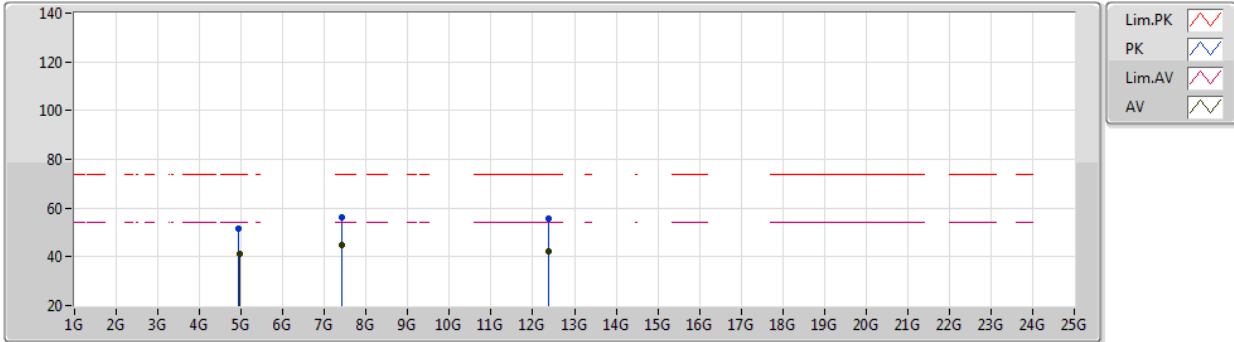
EUT Y\_1TX\_ANT2  
Setting default  
06-F-J-5

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	2.4744G	116.35	Inf	-Inf	85.78	3	Horizontal	169	1.60	-	27.40	3.17	-
AV	2.475G	111.15	Inf	-Inf	80.58	3	Horizontal	169	1.60	-	27.40	3.17	-
PK	2.484G	55.15	74.00	-18.85	24.57	3	Horizontal	169	1.60	-	27.40	3.18	-
AV	2.4835G	43.59	54.00	-10.41	13.01	3	Horizontal	169	1.60	-	27.40	3.18	-

### Zigbee

08/10/2020

### 2475MHz\_TX



EUT Y\_1TX\_ANT2  
Setting default  
06-F-J-5

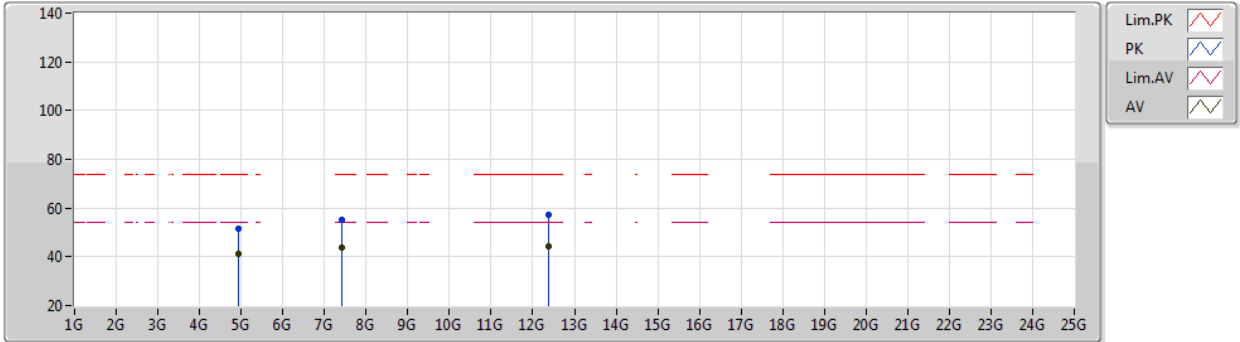
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	4.94872G	51.73	74.00	-22.27	47.03	3	Vertical	306	1.79	-	31.29	5.00	31.59
AV	4.95094G	41.31	54.00	-12.69	36.60	3	Vertical	306	1.79	-	31.30	5.00	31.59
PK	7.42314G	56.26	74.00	-17.74	47.07	3	Vertical	253	1.72	-	36.29	6.11	33.21
AV	7.42348G	44.86	54.00	-9.14	35.67	3	Vertical	253	1.72	-	36.29	6.11	33.21
PK	12.37264G	55.47	74.00	-18.53	42.19	3	Vertical	232	1.76	-	38.58	8.70	34.00
AV	12.3722G	42.24	54.00	-11.76	28.96	3	Vertical	232	1.76	-	38.58	8.70	34.00



### Zigbee

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### 2475MHz\_TX



EUT Y\_1TX\_ANT2  
Setting default  
06-F-J-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	4.949G	51.76	74.00	-22.24	47.05	3	Horizontal	249	2.03	-	31.30	5.00	31.59
AV	4.949G	41.26	54.00	-12.74	36.55	3	Horizontal	249	2.03	-	31.30	5.00	31.59
PK	7.4234G	55.34	74.00	-18.66	46.15	3	Horizontal	222	1.80	-	36.29	6.11	33.21
AV	7.42648G	43.55	54.00	-10.45	34.34	3	Horizontal	222	1.80	-	36.31	6.11	33.21
PK	12.37238G	57.42	74.00	-16.58	44.14	3	Horizontal	258	2.21	-	38.58	8.70	34.00
AV	12.3727G	44.40	54.00	-9.60	31.12	3	Horizontal	258	2.21	-	38.58	8.70	34.00