

# FCC Test Report

**Equipment** : 300Mbps Wireless N PCI Express Adapter  
**Brand Name** : TP-Link  
**Model No.** : TL-WN881ND  
**FCC ID** : TE7WN881NDV2  
**Standard** : 47 CFR FCC Part 15.247  
**Operating Band** : 2400 MHz – 2483.5 MHz  
**Function** :  Point-to-multipoint;  Point-to-point  
**Applicant** : TP-Link Technologies Co., Ltd.  
Building 24 (floors 1,3,4,5) and 28 (floors1-4)  
Central Science and Technology Park,Shennan Rd,  
Nanshan, Shenzhen,China  
**Manufacturer** : TP-Link Technologies Co., Ltd.  
Building 24 (floors 1,3,4,5) and 28 (floors1-4)  
Central Science and Technology Park,Shennan Rd,  
Nanshan, Shenzhen,China

The product sample received on Feb. 10, 2017 and completely tested on Mar. 31, 2017. We, SPORTON, 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., the test report shall not be reproduced except in full.

  
Cliff Chang  
SPORTON INTERNATIONAL INC.





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**PHOTOGRAPHS OF EUT V01**



### Summary of Test Result

Conformance Test Specifications				
Report Clause	Ref. Std. Clause	Description	Limit	Result
1.1.2	15.203	Antenna Requirement	FCC 15.203	Complied
3.1	15.207	AC Power-line Conducted Emissions	FCC 15.207	Complied
3.2	15.247(a)	DTS Bandwidth	≥500kHz	Complied
3.3	15.247(b)	Maximum Conducted Output Power	Power [dBm]:30	Complied
3.4	15.247(e)	Power Spectral Density	PSD [dBm/3kHz]:8	Complied
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	Non-Restricted Bands: > 30 dBc	Complied
3.6	15.247(d)	Emissions in Restricted Frequency Bands	Restricted Bands: FCC 15.209	Complied



### Revision History

Report No.	Version	Description	Issued Date
FR720946	Rev. 01	Initial issue of report	May 02, 2017

# 1 General Description

## 1.1 Information

### 1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
2400-2483.5	b, g, n (HT20)	2412-2462	1-11 [11]
2400-2483.5	n (HT40)	2422-2452	3-9 [7]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	802.11b	20	1TX
2.4-2.4835GHz	802.11g	20	2TX
2.4-2.4835GHz	802.11n HT20	20	2TX
2.4-2.4835GHz	802.11n HT40	40	2TX

Note:

- 11b mode uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.
- 11g, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- BWch is the nominal channel bandwidth.
- Nss-Min is the minimum number of spatial streams.
- Nant is the number of outputs. e.g., 2(2,3) means have 2 outputs for port 2 and port 3. 2 means have 2 outputs for port 1 and port 2.

### 1.1.2 Antenna Information

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	TP-Link	3101501266	Dipole Antenna	Reversed-SMA	1.83
2	TP-Link	3101501266	Dipole Antenna	Reversed-SMA	1.83

Note: The EUT has two antennas.

**For IEEE 802.11b mode (1TX, 1RX):**

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

**For IEEE 802.11g/n mode (2TX, 2RX):**

Ant. 1(Port 1) and Ant. 2(Port 2) could transmit/receive simultaneously.



1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)
802.11b	1	0
802.11g	1	0
802.11n HT20	1	0
802.11n HT40	1	0

1.1.4 EUT Operational Condition

<b>EUT Power Type</b>	From host system		
<b>Beamforming Function</b>	<input type="checkbox"/> With beamforming	<input checked="" type="checkbox"/> Without beamforming	



## 1.2 Testing Applied 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
- ◆ FCC KDB 558074 D01 v04
- ◆ FCC KDB 662911 D01 v02r01
- ◆ FCC KDB 412172 D01 v01r01

## 1.3 Testing Location Information

Testing Location		
<input type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055
<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	TH01-CB	Serway Li	20°C / 50%	Mar. 29, 2017
Radiated	03CH01-CB	Welson Chen & Jay Luo & Mason Chen & Justin Li	22°C / 54%	Mar. 02, 2017 ~ Mar. 31, 2017
AC Conduction	CO01-CB	Hank Yang	23°C / 61%	Feb. 23, 2017

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)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.7 dB	Confidence levels of 95%
Output Power Measurement	1.33 dB	Confidence levels of 95%
Power Density Measurement	1.27 dB	Confidence levels of 95%
Bandwidth Measurement	9.74 x10 <sup>-8</sup>	Confidence levels of 95%



## 2 Test Configuration of EUT

### 2.1 Test Channel Mode

Mode	Power Setting
802.11b_(1Mbps)_1TX	-
2412MHz	32
2437MHz	35
2462MHz	30
802.11g_(6Mbps)_2TX	-
2412MHz	43/42
2437MHz	52/52
2462MHz	40/40
802.11n HT20_Nss1,(MCS0)_2TX	-
2412MHz	38/36
2437MHz	44/42
2462MHz	32/30
802.11n HT40_Nss1,(MCS0)_2TX	-
2422MHz	35/33
2437MHz	38/37
2452MHz	28/27



## 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>	Normal Link
1	EUT at Z-axis

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

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>	Normal Link
1	EUT at Z-axis
2	EUT at Y-axis
For operating mode 1 is the worst case and it was record in this test report.	
<b>Operating Mode &gt; 1GHz</b>	CTX
The EUT was performed at Z axis and Y axis position. The worst case was found at Z axis, so it was selected to perform test and its test result was written in the report.	
1	EUT at Z-axis



### 2.3 EUT Operation during Test

For CTX Mode:

The EUT was programmed to be in continuously transmitting mode.

For Normal Link:

During the test, the EUT operation to normal function.

### 2.4 Accessories

N/A

### 2.5 Support Equipment

For Test Site No: CO01-CB

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	AP Router	Planex	GW-AP54SGX	KA220030603014-1
2	LCD Monitor	DELL	1704FPTt	DoC
3	PC	DELL	OPTIPLEX 3010	DoC
4	Keyboard	iCooky	SK068	DoC
5	Mouse	Logitech	M-U0026	DoC
6	Modem	ACEEX	DM1414	IFAXDM1414
7	Printer	EPSON	LQ-300+	N/A

For Test Site No: 03CH01-CB (below 1GHz)

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	PC	DELL	T3400	DoC
2	LCD Monitor	DELL	1704FPTt	DoC
3	Keyboard	iCooky	SK068	DoC
4	Mouse	Logitech	M-U0026	DoC
5	Modem	ACEEX	DM1414	IFAXDM1414
6	Printer	EPSON	LQ-300+	N/A
7	WLAN AP	NETGEAR	WNDR3300v2	PY309300116



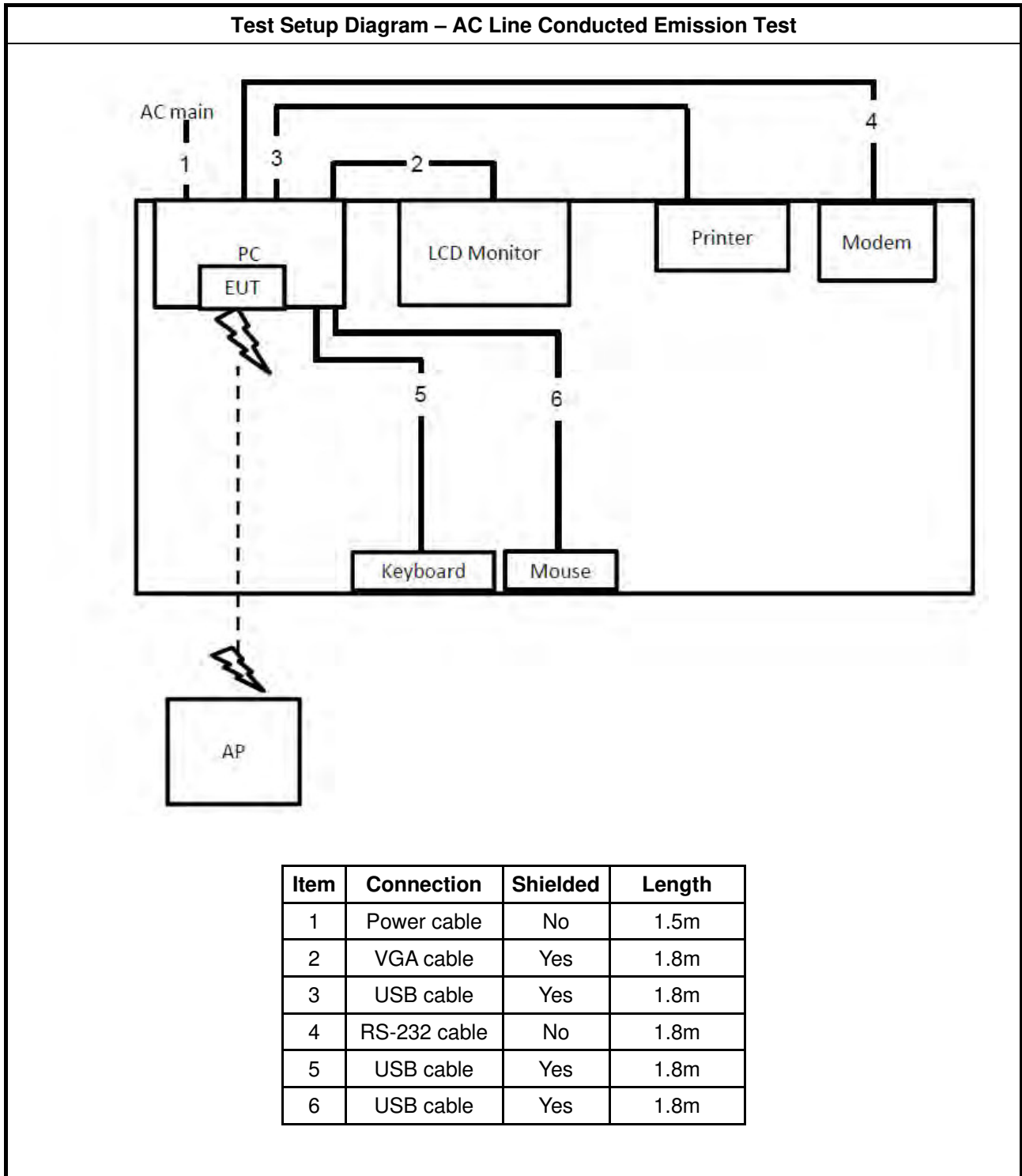
For Test Site No: 03CH01-CB (above 1GHz)

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	PC	DELL	T3400	DoC
2	LCD Monitor	DELL	1704FPTt	DoC
3	Keyboard	iCooky	SK068	DoC
4	Mouse	Logitech	M-U0026	DoC

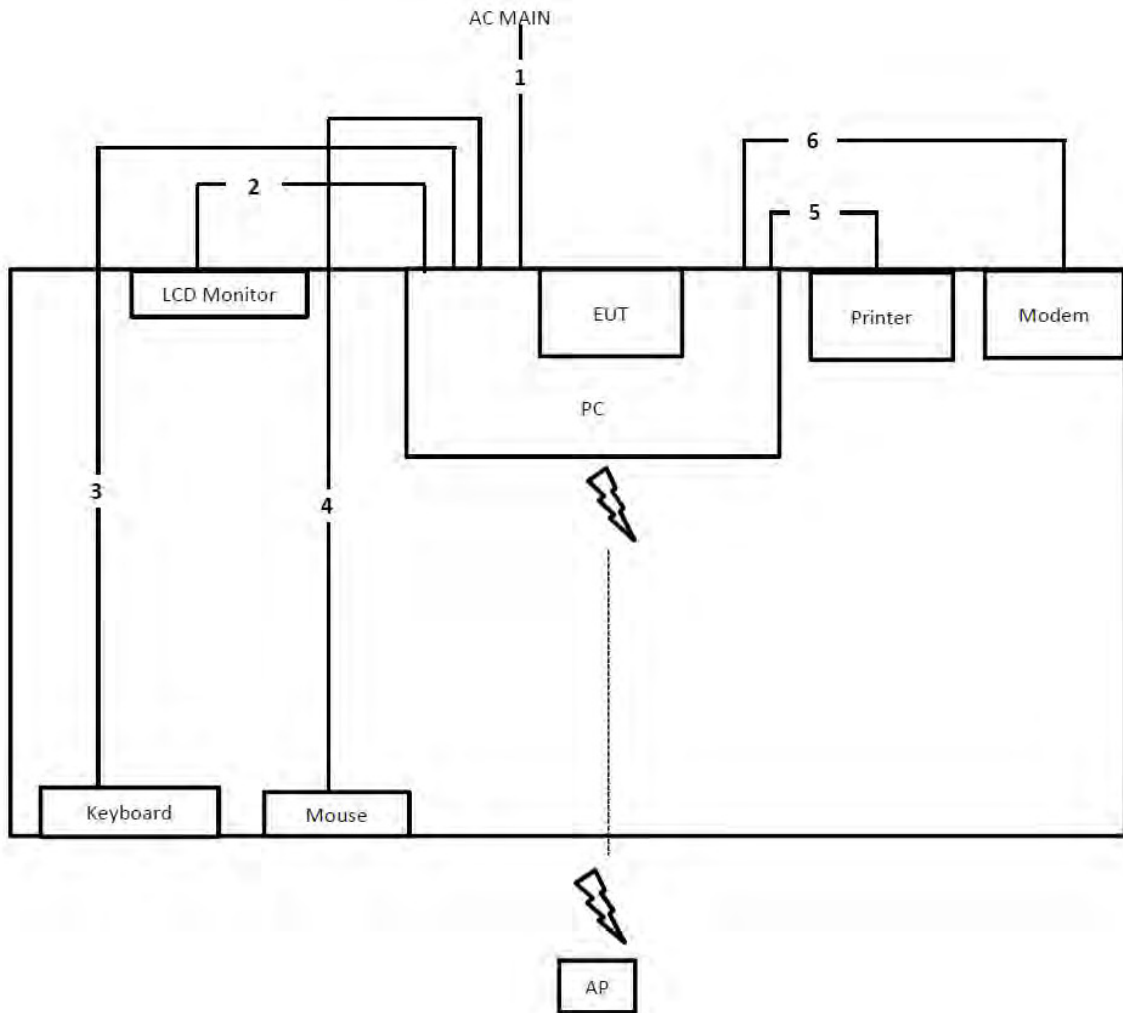
For Test Site No: TH01-CB

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
1	PC	DELL	T3400	DoC
2	LCD Monitor	DELL	1704FPTt	DoC
3	Keyboard	iCooky	SK068	DoC
4	Mouse	Logitech	M-U0026	DoC

## 2.6 Test Setup Diagram

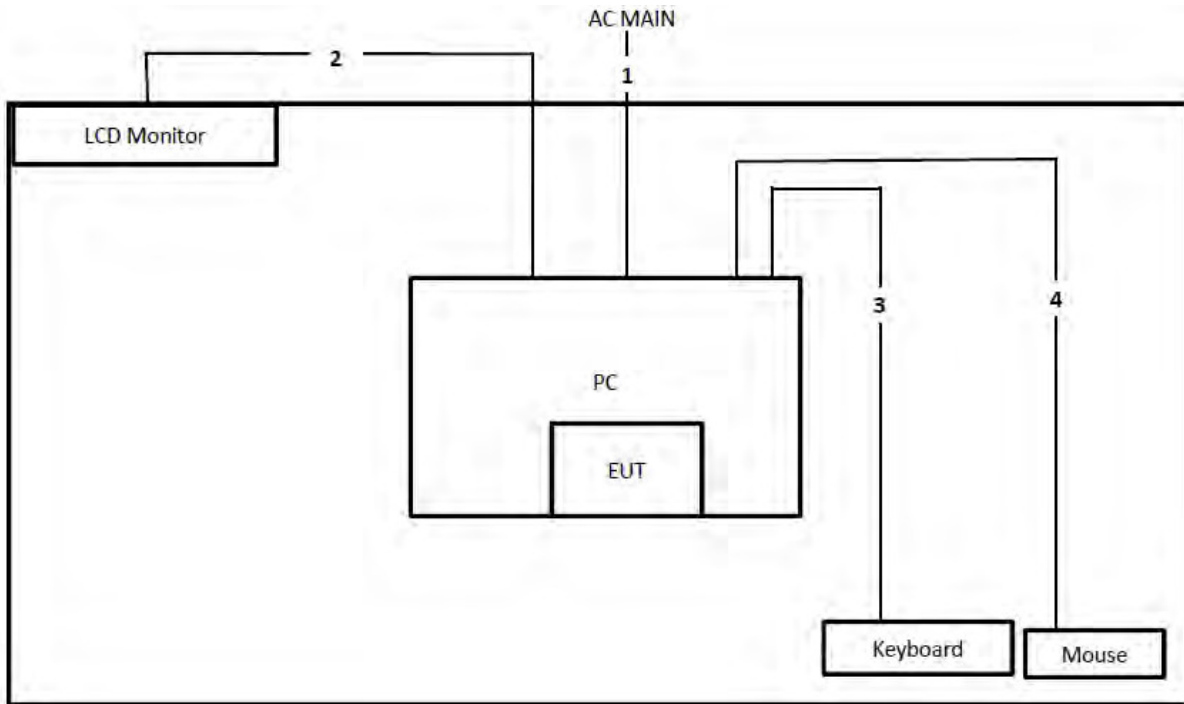


Test Setup Diagram - Radiated Test < 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	VGA cable	Yes	1.8m
3	USB cable	Yes	1.8m
4	USB cable	Yes	1.8m
5	USB cable	Yes	1.8m
6	RS-232 cable	No	1.8m

Test Setup Diagram - Radiated Test > 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	VGA cable	Yes	1.8m
3	USB cable	Yes	1.8m
4	USB cable	Yes	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.

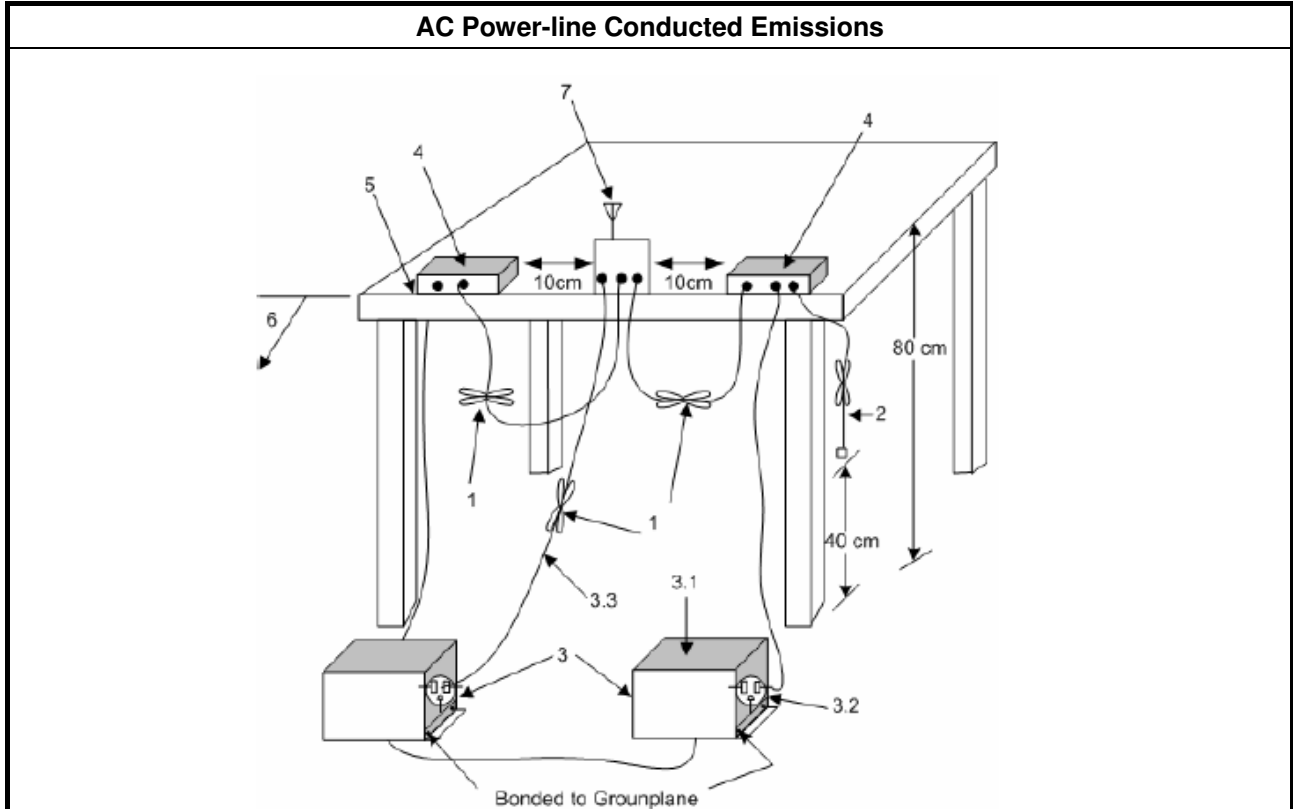
##### 3.1.2 Measuring Instruments

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 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>

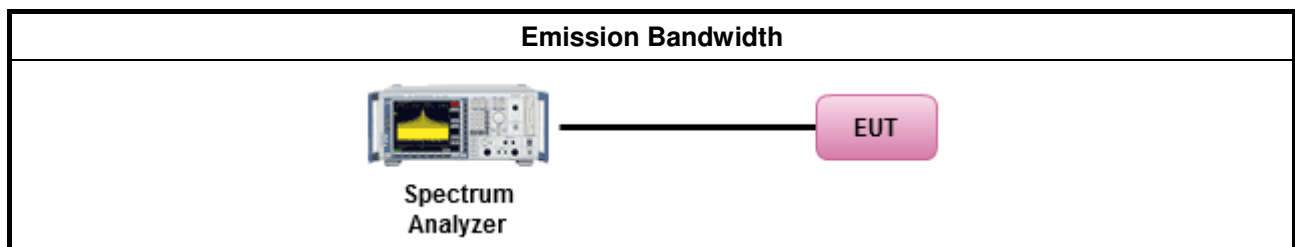
#### 3.2.2 Measuring Instruments

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 8.1 Option 1 for 6 dB bandwidth measurement.
<input type="checkbox"/> Refer as FCC KDB 558074, clause 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	
	▪ 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.	

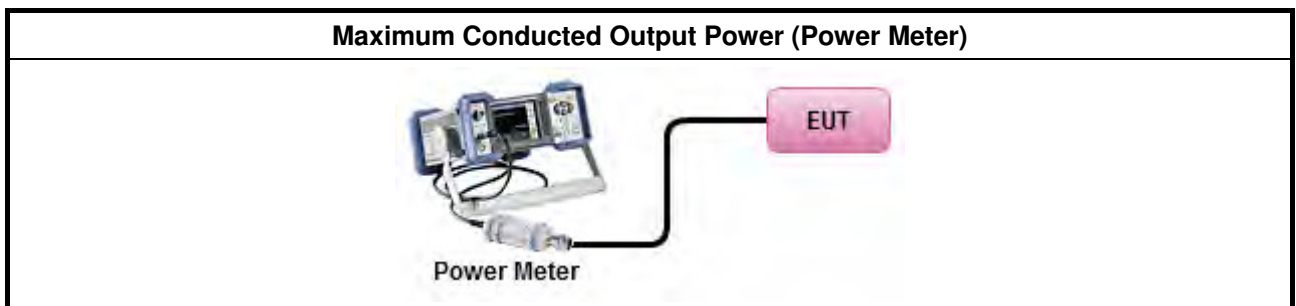
#### 3.3.2 Measuring Instruments

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

### 3.3.3 Test Procedures

Test Method	
<ul style="list-style-type: none"> <li>Maximum Peak Conducted Output Power</li> </ul>	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.1.1 Option 1 (RBW ≥ EBW method).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.1.2 Option 2 (peak power meter for VBW ≥ DTS BW)
<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 9.2.2.2 Method AVGSA-1 (spectral trace averaging).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.2.2.3 Method AVGSA-1 Alt. (slow sweep speed)
duty cycle < 98% and average over on/off periods with duty factor	
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
RF power meter and average over on/off periods with duty factor or gated trigger	
<input checked="" type="checkbox"/>	Refer as FCC KDB 558074, clause 9.2.3 Method AVGPM-G (using an RF average power meter).
<input type="checkbox"/>	Refer as FCC KDB 558074, clause 9.1.2 PKPM1 Peak power meter method.
<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>

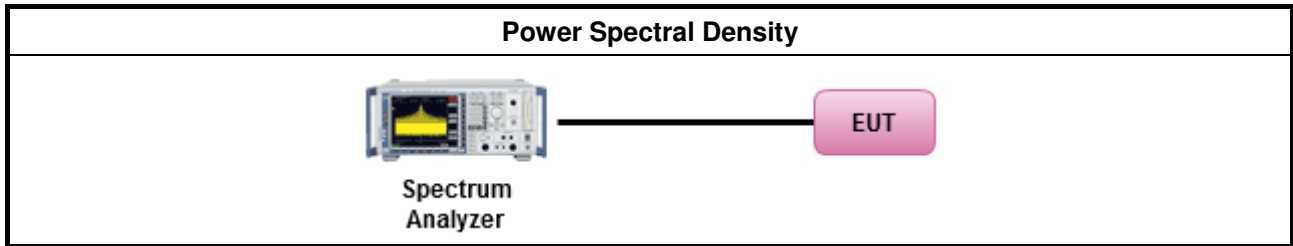
#### 3.4.2 Measuring Instruments

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 10.2 Method PKPSD (RBW=3-100kHz; Detector=peak). [duty cycle $\geq$ 98% or external video / power trigger]
<input type="checkbox"/> Refer as FCC KDB 558074, clause 10.3 Method AVGPSD-1 (spectral trace averaging).
<input type="checkbox"/> Refer as FCC KDB 558074, clause 10.4 Method AVGPSD-2 (slow sweep speed) duty cycle < 98% and average over on/off periods with duty factor
<input type="checkbox"/> Refer as FCC KDB 558074, clause 10.5 Method AVGPSD-1 Alt (spectral trace averaging).
<input type="checkbox"/> Refer as FCC KDB 558074, clause 10.6 Method AVGPSD-2 Alt. (slow sweep speed)
<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:           <ul style="list-style-type: none"> <li> <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.               </li> <li> <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,               </li> <li> <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.               </li> </ul> </li> </ul>

### 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 (dB)
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.

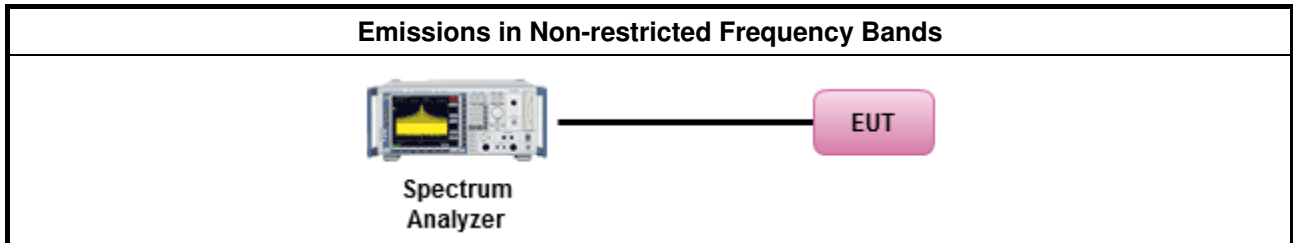
#### 3.5.2 Measuring Instruments

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 11 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.

#### 3.6.2 Measuring Instruments

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

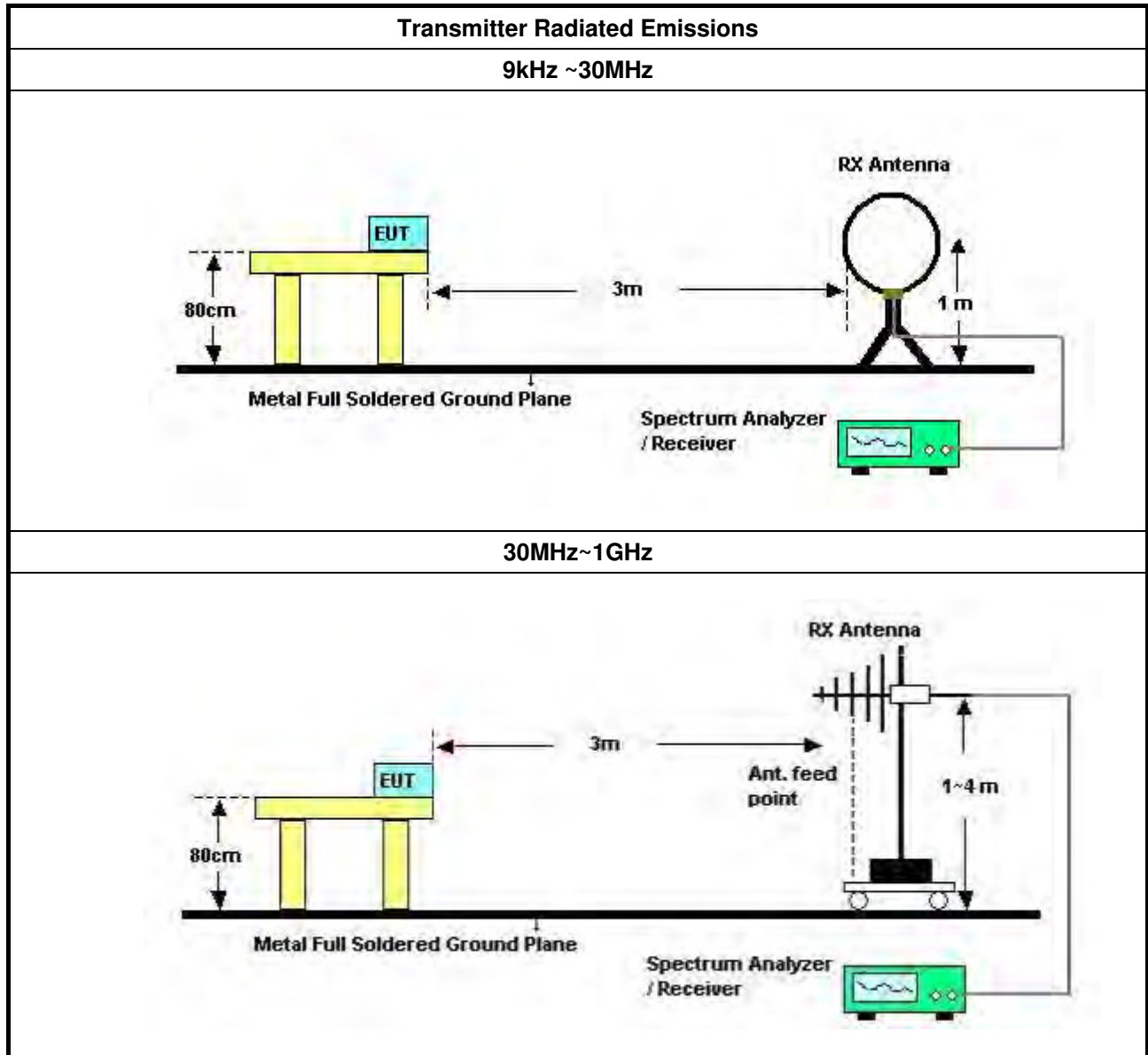


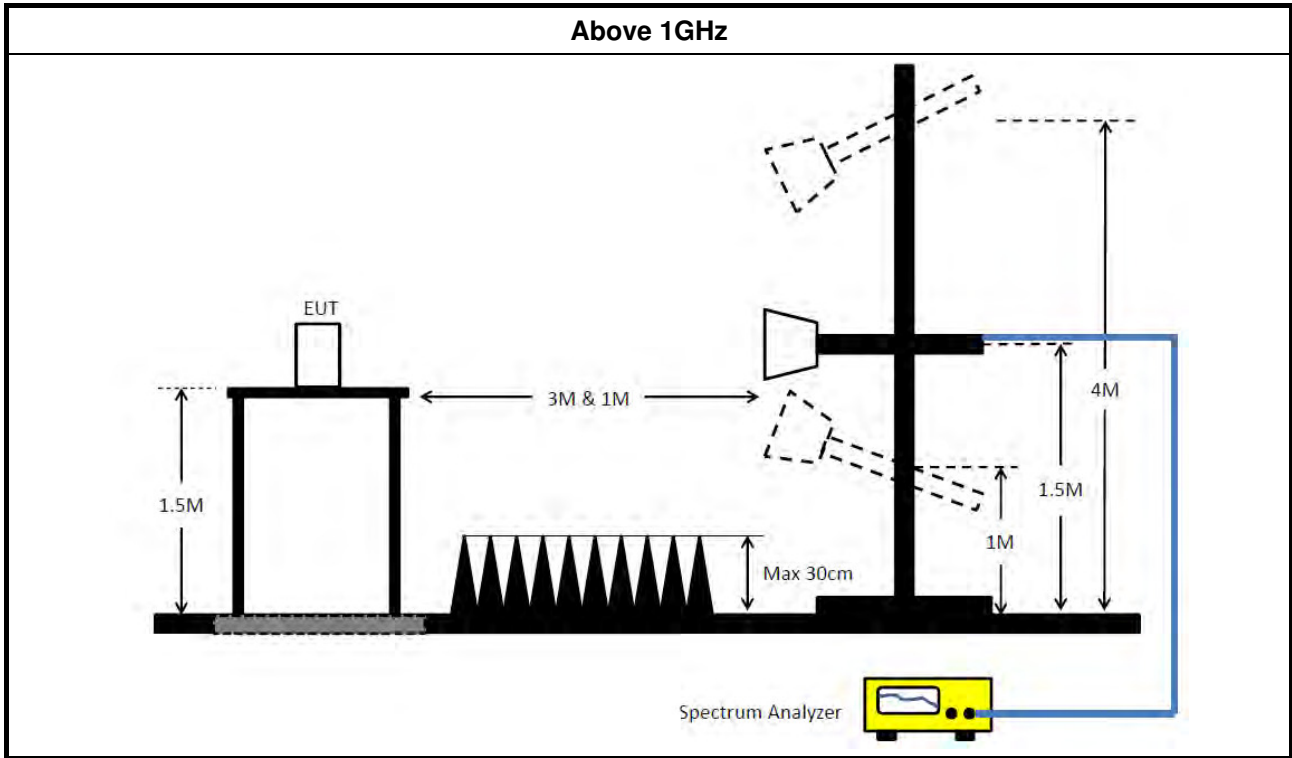
### 3.6.3 Test Procedures

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 6.9.2.2 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 12 for unwanted emissions into restricted bands.</li> </ul>
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.5.1 Option 1 (trace averaging for duty cycle $\geq$ 98%)
	<input type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.5.2 Option 2 (trace averaging + duty factor).
	<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 12.2.5.3 Option 3 (Reduced VBW $\geq$ 1/T).
	<input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW $\geq$ 1/T, where T is pulse time.
	<input type="checkbox"/> Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
	<input checked="" type="checkbox"/> Refer as FCC KDB 558074, clause 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 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 13.2 (ANSI C63.10, clause 6.9.3) for marker-delta method for band-edge measurements.</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Refer as FCC KDB 558074, clause 13.3 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 and cabinet radiation measurement, refer as FCC KDB 558074, clause 12.2.2.</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 Transmitter Radiated Unwanted Emissions (Below 30MHz)

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

### 3.6.6 Test Result of Transmitter Radiated Unwanted Emissions

Refer as Appendix F



## 4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Jan. 23, 2017	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 14, 2016	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 21, 2016	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 24, 2016	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMC1	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 30, 2016	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 10, 2016	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 25, 2016	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Mar. 15, 2016	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Mar. 13, 2017	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 16, 2017	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jun. 28, 2016	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 21, 2016	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 16, 2016	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz	Oct. 24, 2016	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-10-7	N/A	N/A	Radiation (03CH01-CB)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2016*	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 26, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-6	1 GHz~26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-7	1 GHz~26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-8	1 GHz~26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-9	1 GHz~26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz~26.5 GHz	Oct. 24, 2016	Conducted (TH01-CB)
Cable	Marvelous Microwave	n/a	Cable-REF-1	9k-1GHz	Oct. 21, 2016	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 22, 2016	Conducted (TH01-CB)

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

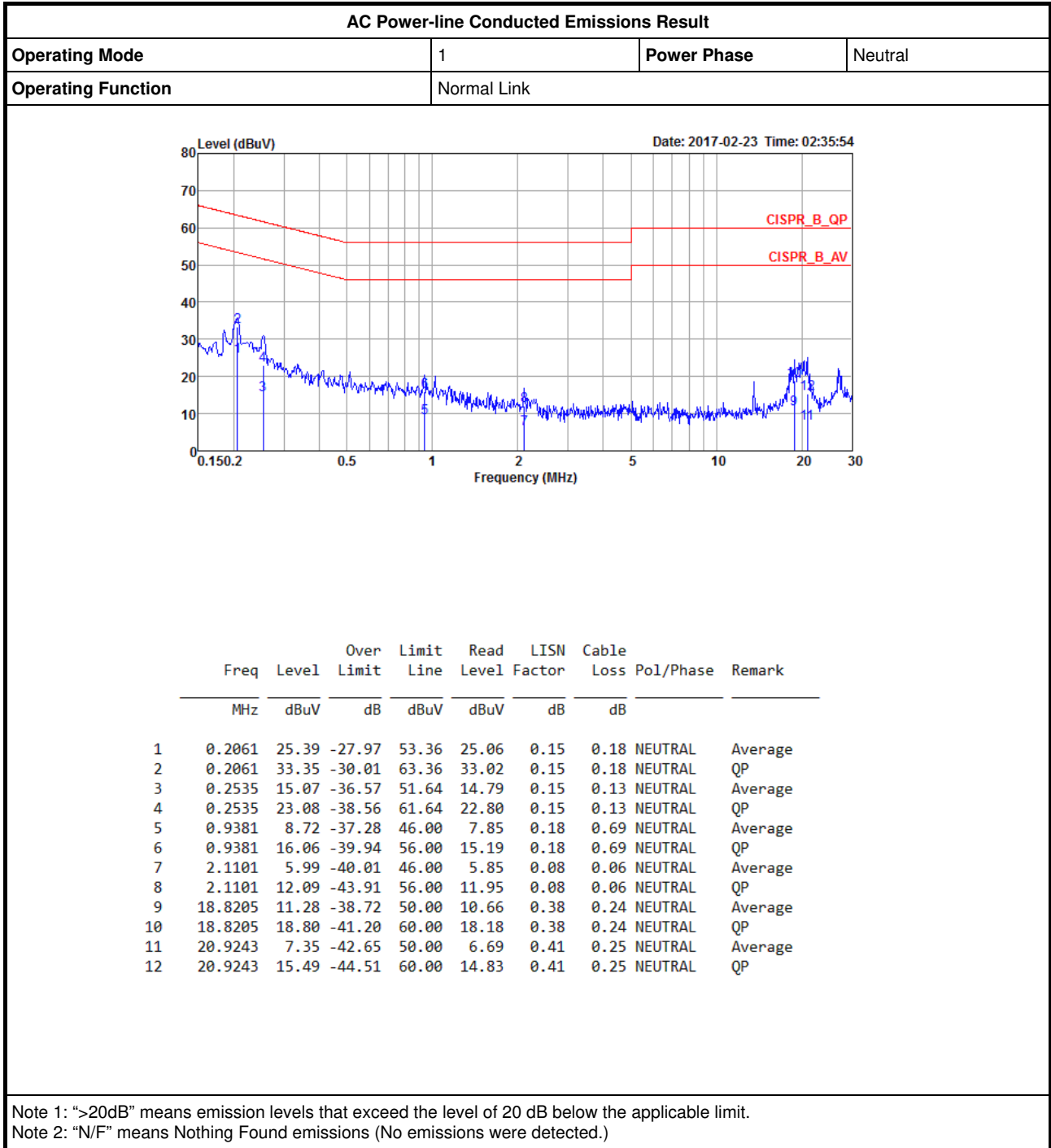
“\*” Calibration Interval of instruments listed above is two years.

NCR means Non-Calibration required.



# AC Power-line Conducted Emissions Result

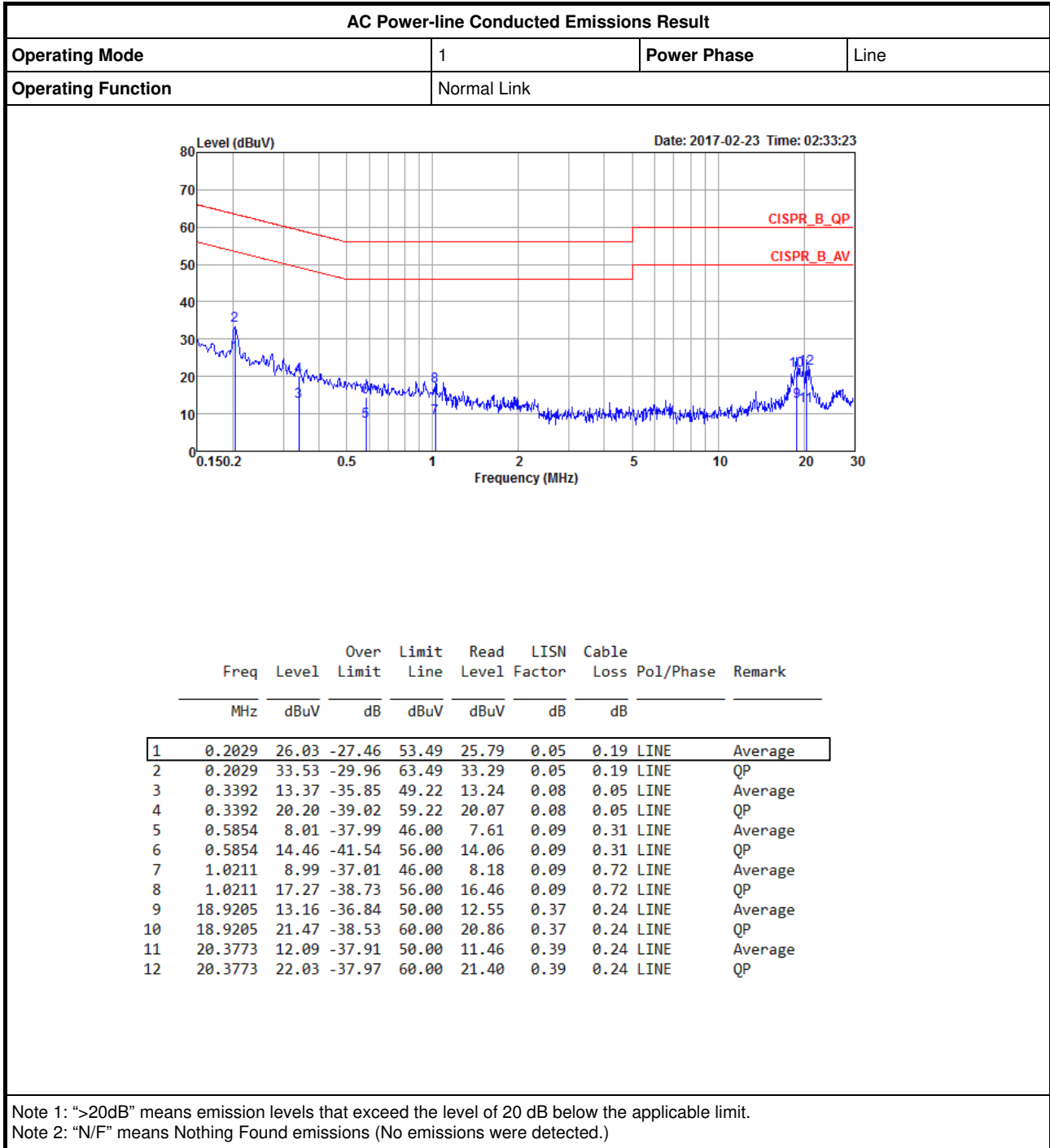
Appendix A





# AC Power-line Conducted Emissions Result

Appendix A





**Summary**

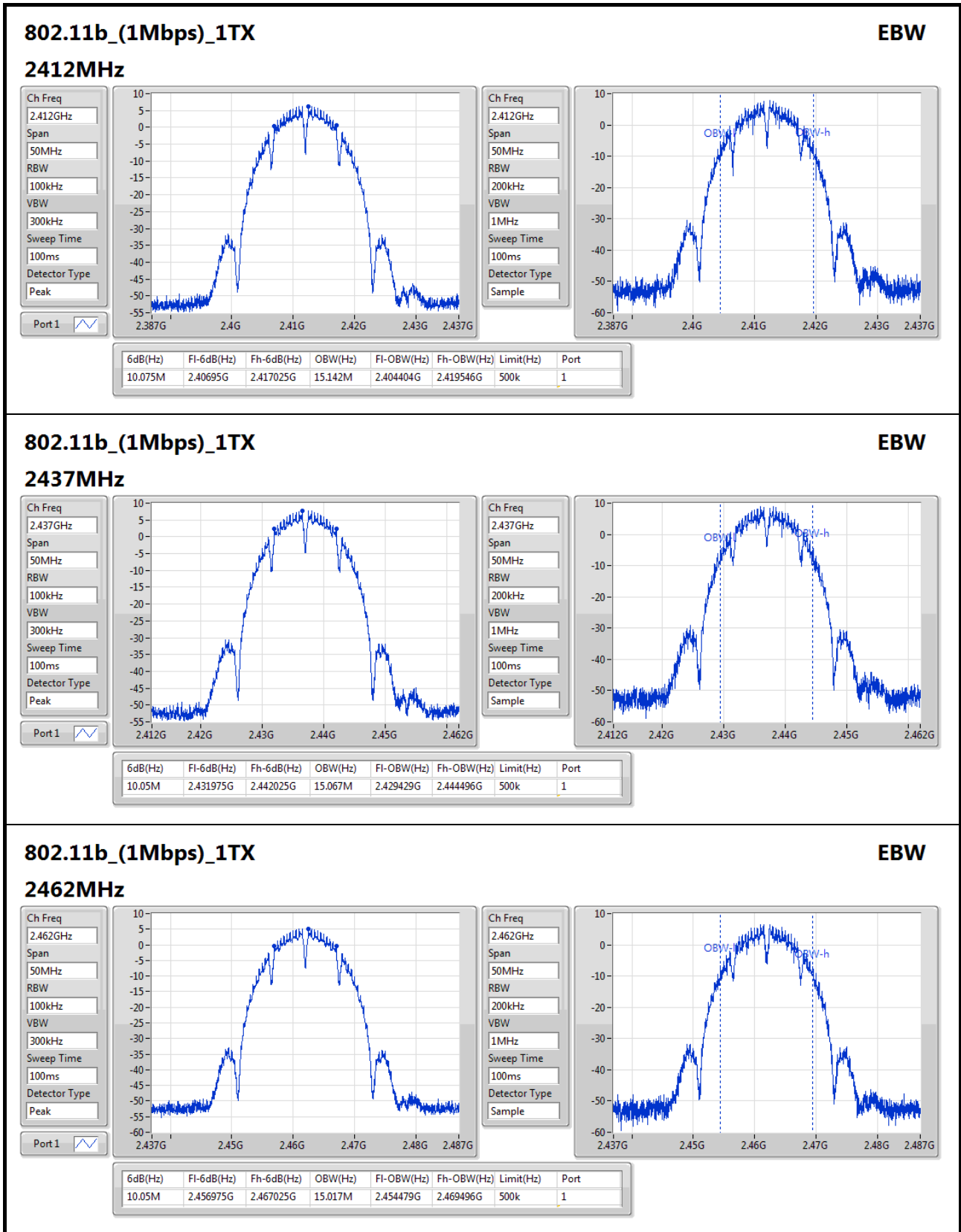
Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
802.11b_(1Mbps)_1TX	-	-	-	-	-
2.4-2.4835GHz	10.075M	15.142M	15M1G1D	10.05M	15.017M
802.11g_(6Mbps)_2TX	-	-	-	-	-
2.4-2.4835GHz	16.575M	24.438M	24M4D1D	16.4M	16.492M
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-
2.4-2.4835GHz	17.825M	17.766M	17M8D1D	17.775M	17.716M
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-
2.4-2.4835GHz	36.4M	36.232M	36M2D1D	36.3M	36.032M

**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;

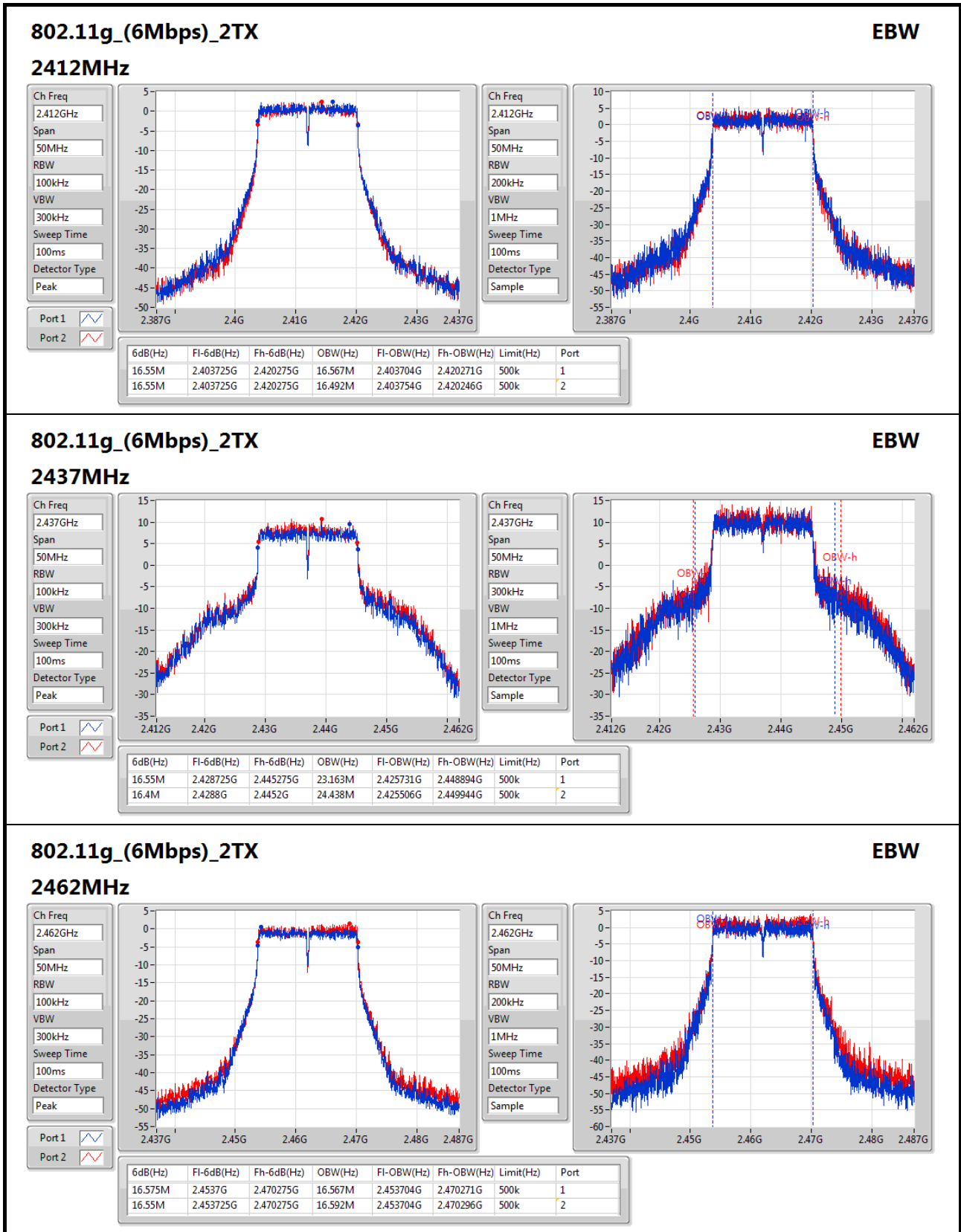
**Result**

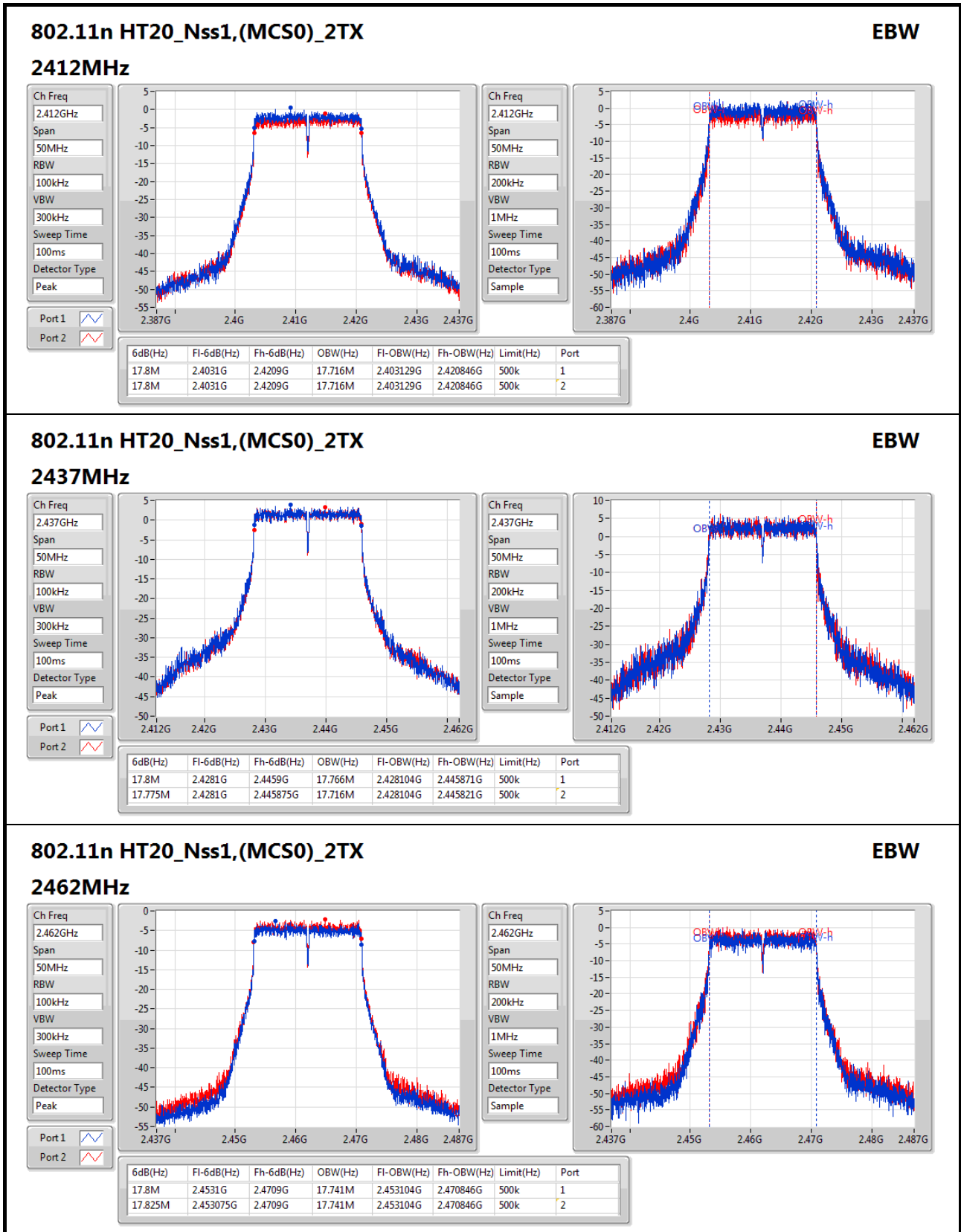
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)	Port 2-N dB (Hz)	Port 2-OBW (Hz)
802.11b_(1Mbps)_1TX	-	-	-	-	-	-
2412MHz	Pass	500k	10.075M	15.142M		
2437MHz	Pass	500k	10.05M	15.067M		
2462MHz	Pass	500k	10.05M	15.017M		
802.11g_(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	16.55M	16.567M	16.55M	16.492M
2437MHz	Pass	500k	16.55M	23.163M	16.4M	24.438M
2462MHz	Pass	500k	16.575M	16.567M	16.55M	16.592M
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	500k	17.8M	17.716M	17.8M	17.716M
2437MHz	Pass	500k	17.8M	17.766M	17.775M	17.716M
2462MHz	Pass	500k	17.8M	17.741M	17.825M	17.741M
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	500k	36.4M	36.082M	36.4M	36.232M
2437MHz	Pass	500k	36.4M	36.032M	36.4M	36.032M
2452MHz	Pass	500k	36.3M	36.132M	36.4M	36.132M

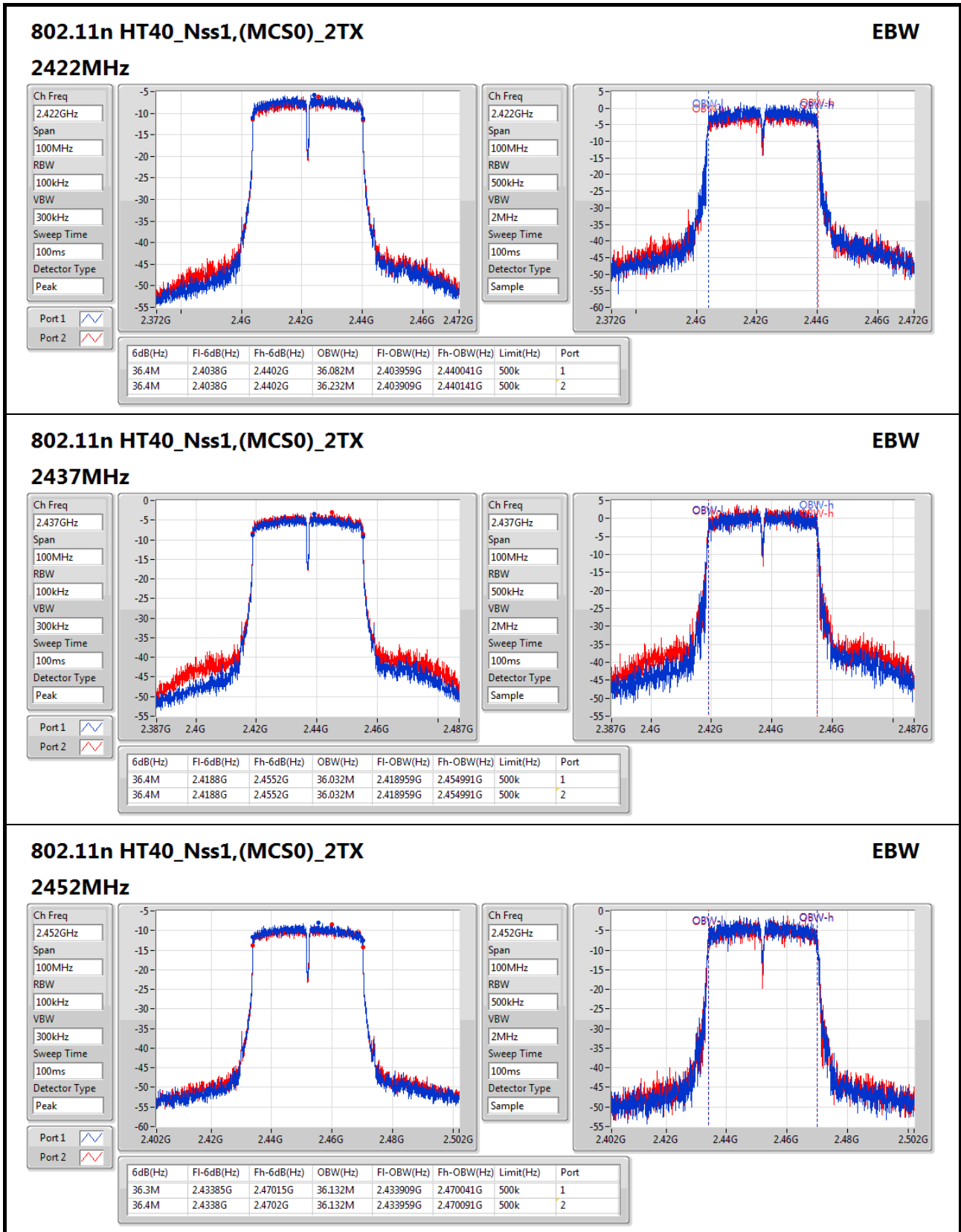
**Port X-N dB** = Port X 6dB down bandwidth; **Port X-OBW** = Port X 99% occupied bandwidth;













Summary

Mode	Total Power (dBm)	Total Power (W)
802.11b_(1Mbps)_1TX	-	-
2.4-2.4835GHz	17.14	0.05176
802.11g_(6Mbps)_2TX	-	-
2.4-2.4835GHz	20.49	0.11194
802.11n HT20_Nss1,(MCS0)_2TX	-	-
2.4-2.4835GHz	19.93	0.09840
802.11n HT40_Nss1,(MCS0)_2TX	-	-
2.4-2.4835GHz	16.43	0.04395

Result

Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Total Power (dBm)	Power Limit (dBm)
802.11b_(1Mbps)_1TX	-	-	-	-	-	-
2412MHz	Pass	1.83	15.96		15.96	30.00
2437MHz	Pass	1.83	17.14		17.14	30.00
2462MHz	Pass	1.83	15.12		15.12	30.00
802.11g_(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	1.83	13.53	13.25	16.40	30.00
2437MHz	Pass	1.83	17.27	17.68	20.49	30.00
2462MHz	Pass	1.83	11.91	12.59	15.27	30.00
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	1.83	14.42	13.22	16.87	30.00
2437MHz	Pass	1.83	17.04	16.79	19.93	30.00
2462MHz	Pass	1.83	10.99	10.26	13.65	30.00
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	1.83	11.71	11.62	14.68	30.00
2437MHz	Pass	1.83	13.24	13.59	16.43	30.00
2452MHz	Pass	1.83	8.71	9.01	11.87	30.00

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



Summary

Mode	PD (dBm/RBW)
802.11b_(1Mbps)_1TX	-
2.4-2.4835GHz	-12.04
802.11g_(6Mbps)_2TX	-
2.4-2.4835GHz	-1.90
802.11n HT20_Nss1,(MCS0)_2TX	-
2.4-2.4835GHz	-6.88
802.11n HT40_Nss1,(MCS0)_2TX	-
2.4-2.4835GHz	-12.78

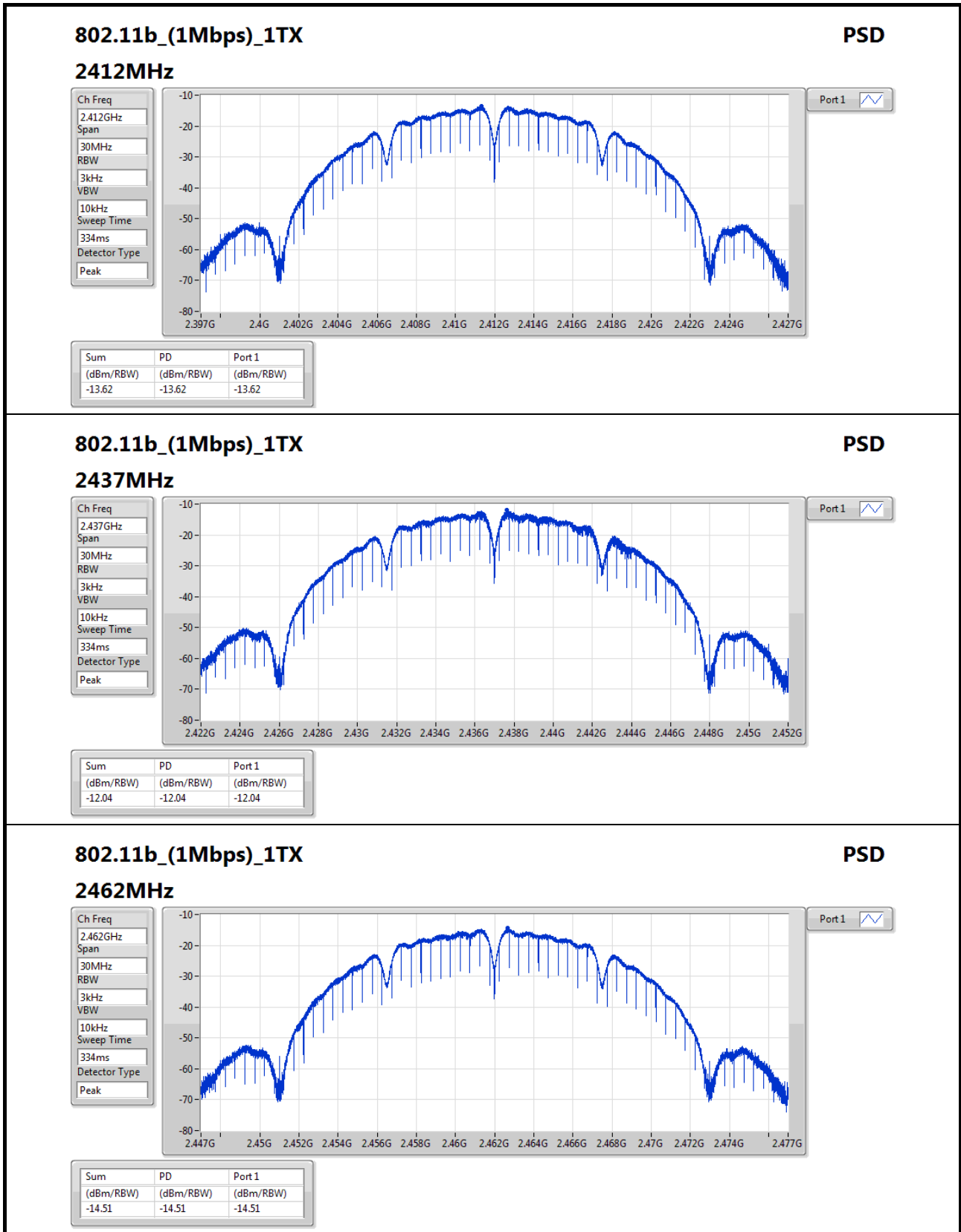
RBW=3kHz.

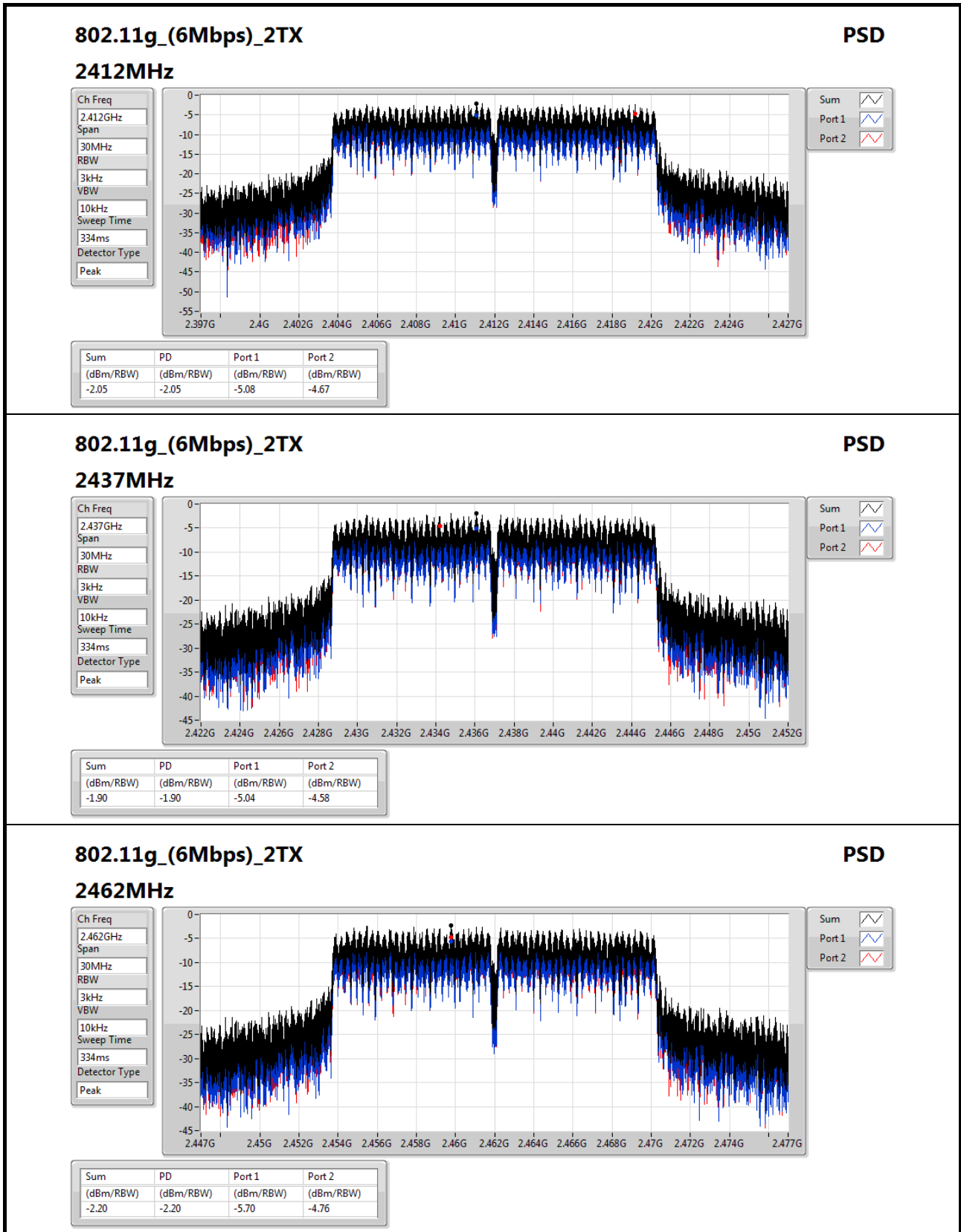
Result

Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11b_(1Mbps)_1TX	-	-	-	-	-	-
2412MHz	Pass	1.83	-13.62		-13.62	8.00
2437MHz	Pass	1.83	-12.04		-12.04	8.00
2462MHz	Pass	1.83	-14.51		-14.51	8.00
802.11g_(6Mbps)_2TX	-	-	-	-	-	-
2412MHz	Pass	4.84	-5.08	-4.67	-2.05	8.00
2437MHz	Pass	4.84	-5.04	-4.58	-1.90	8.00
2462MHz	Pass	4.84	-5.70	-4.76	-2.20	8.00
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2412MHz	Pass	4.84	-13.37	-14.81	-11.43	8.00
2437MHz	Pass	4.84	-9.87	-9.91	-6.88	8.00
2462MHz	Pass	4.84	-16.41	-15.85	-13.11	8.00
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-
2422MHz	Pass	4.84	-16.62	-17.12	-13.85	8.00
2437MHz	Pass	4.84	-16.02	-14.23	-12.78	8.00
2452MHz	Pass	4.84	-21.06	-19.60	-18.48	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;




**802.11g\_(6Mbps)\_2TX**
**PSD**

**2462MHz**

Ch Freq  
2.462GHz

Span  
30MHz

RBW  
3kHz

VBW  
10kHz

Sweep Time  
334ms

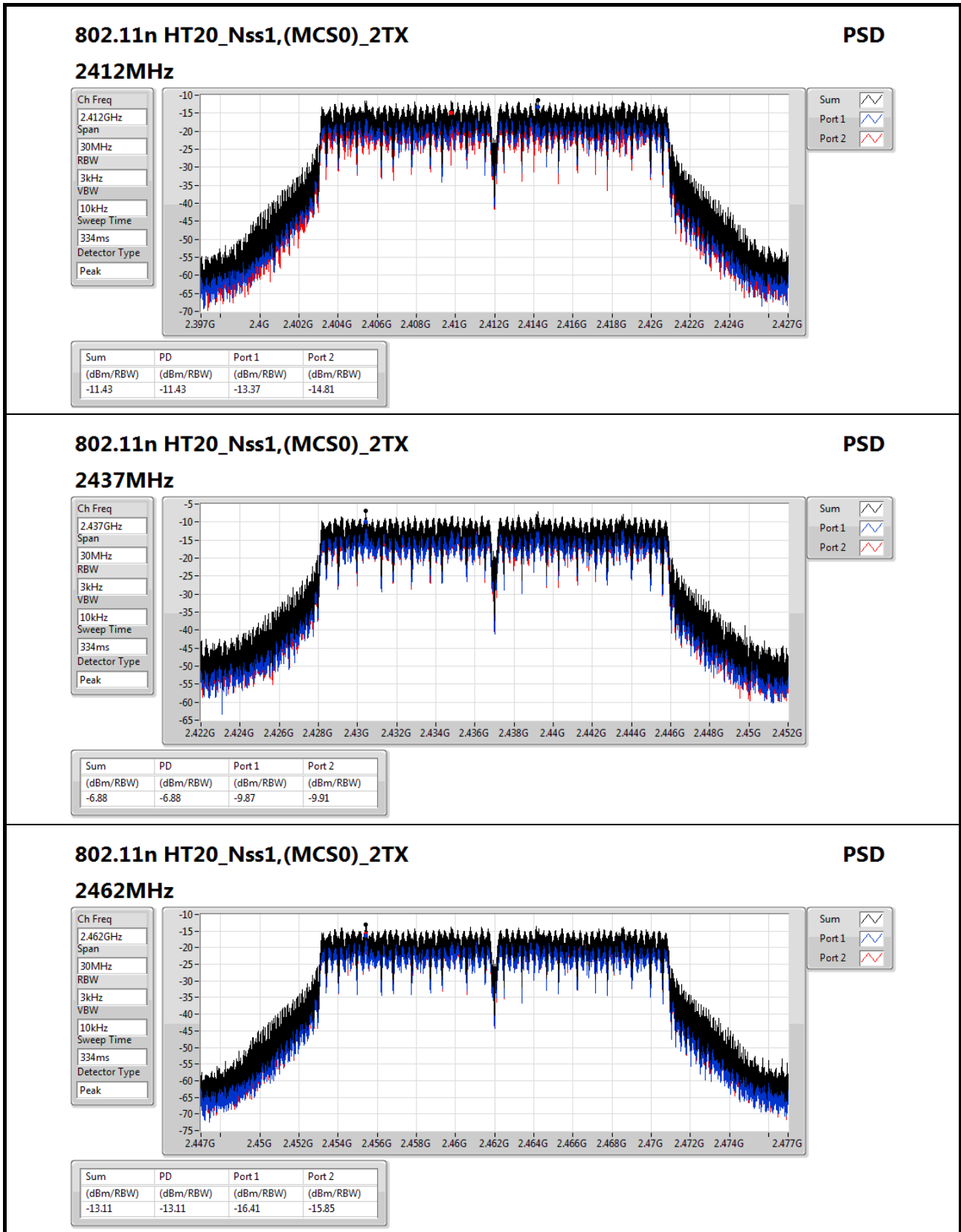
Detector Type  
Peak

Sum

Port 1

Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-2.20	-2.20	-5.70	-4.76



### 802.11n HT20\_Nss1,(MCS0)\_2TX

#### 2462MHz

### PSD

Ch Freq  
2.462GHz

Span  
30MHz

RBW  
3kHz

VBW  
10kHz

Sweep Time  
334ms

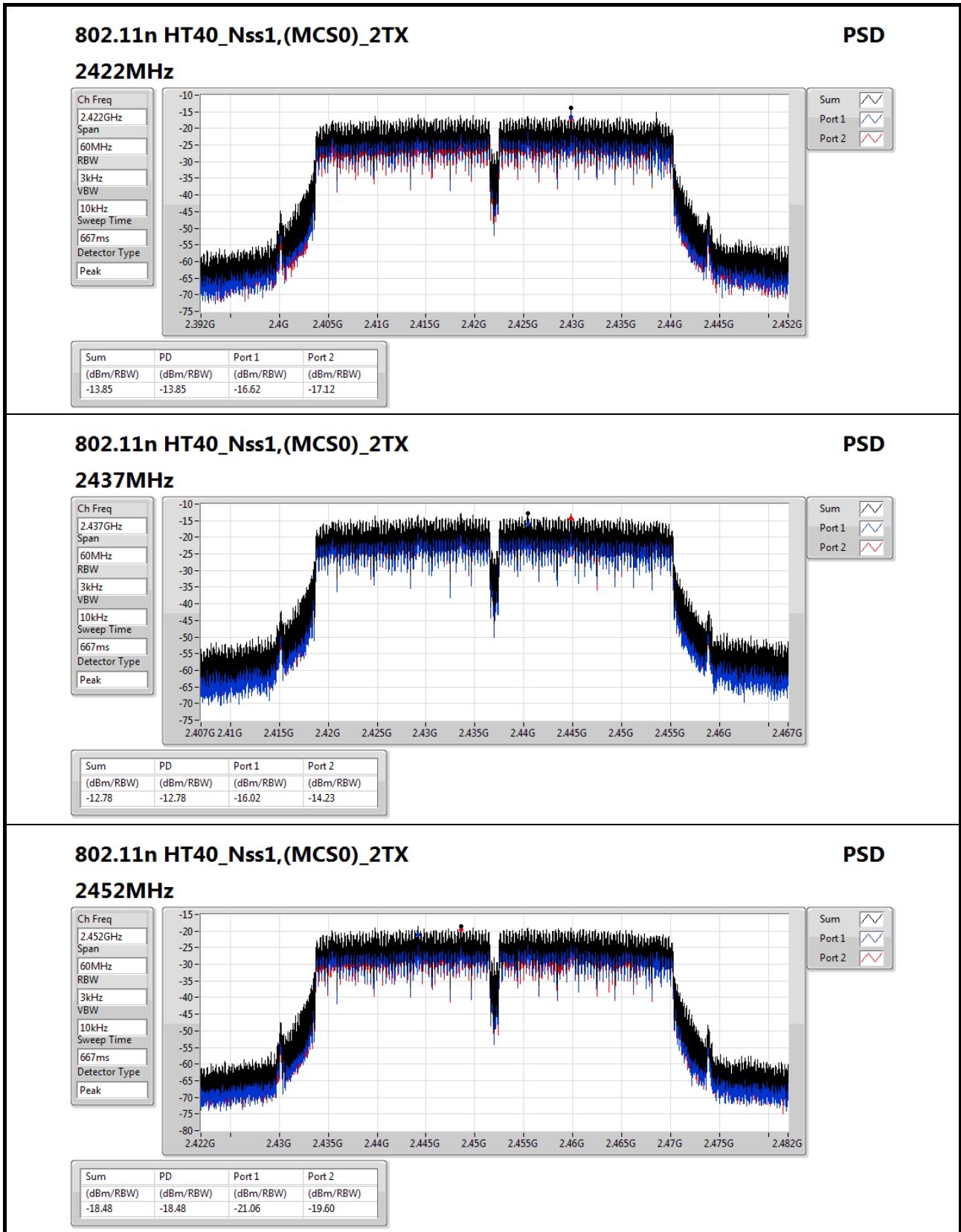
Detector Type  
Peak

Sum

Port 1

Port 2




**802.11n HT40\_Nss1,(MCS0)\_2TX**
**PSD**

**2452MHz**

Ch Freq  
2.452GHz

Span  
60MHz

RBW  
3kHz

VBW  
10kHz

Sweep Time  
667ms

Detector Type  
Peak

Sum

Port 1

Port 2

Sum	PD	Port 1	Port 2
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-18.48	-18.48	-21.06	-19.60

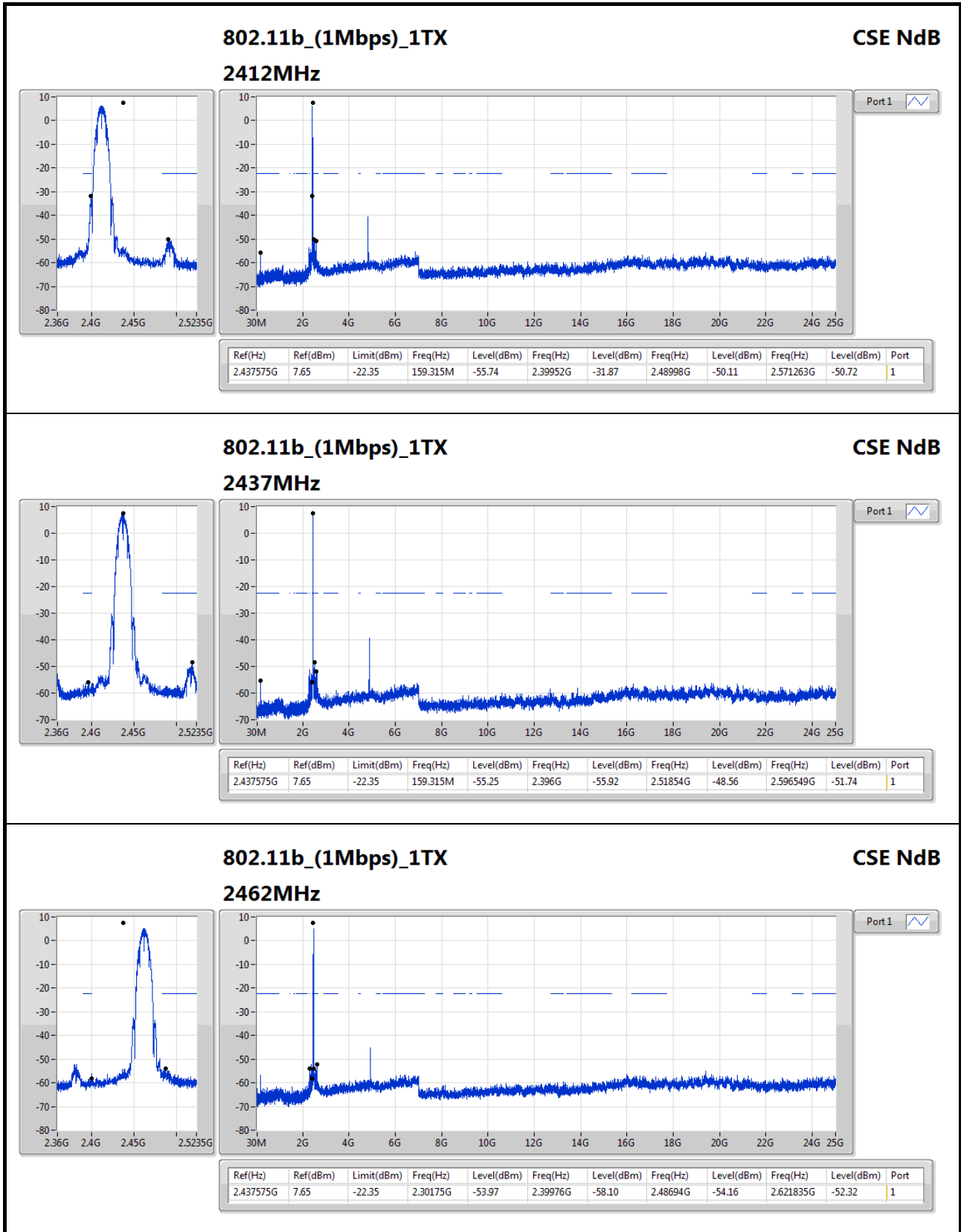


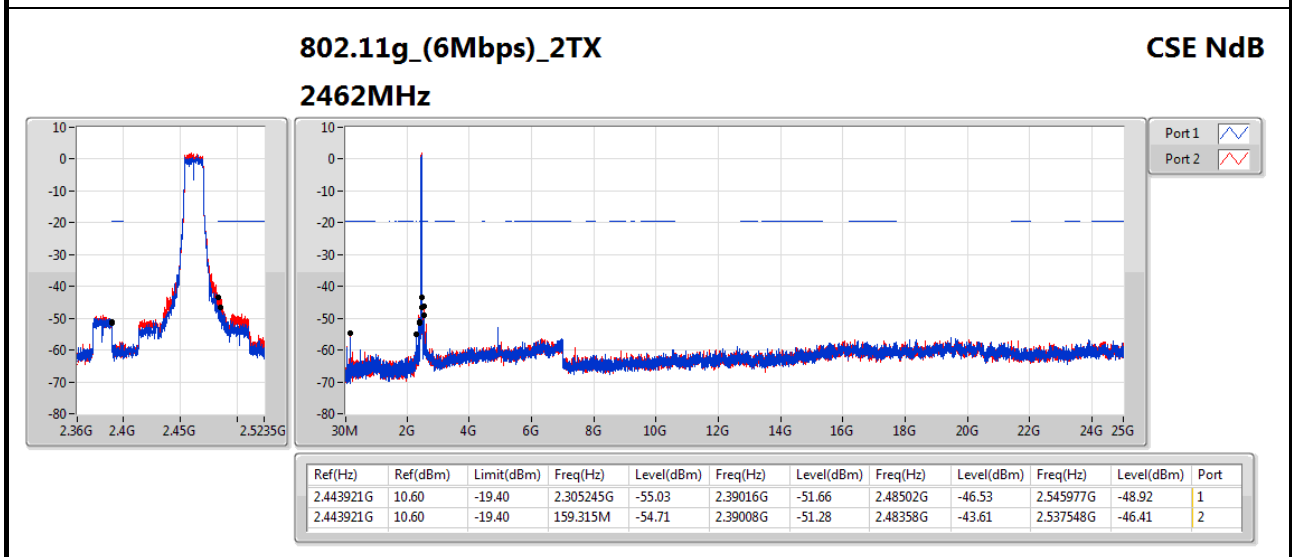
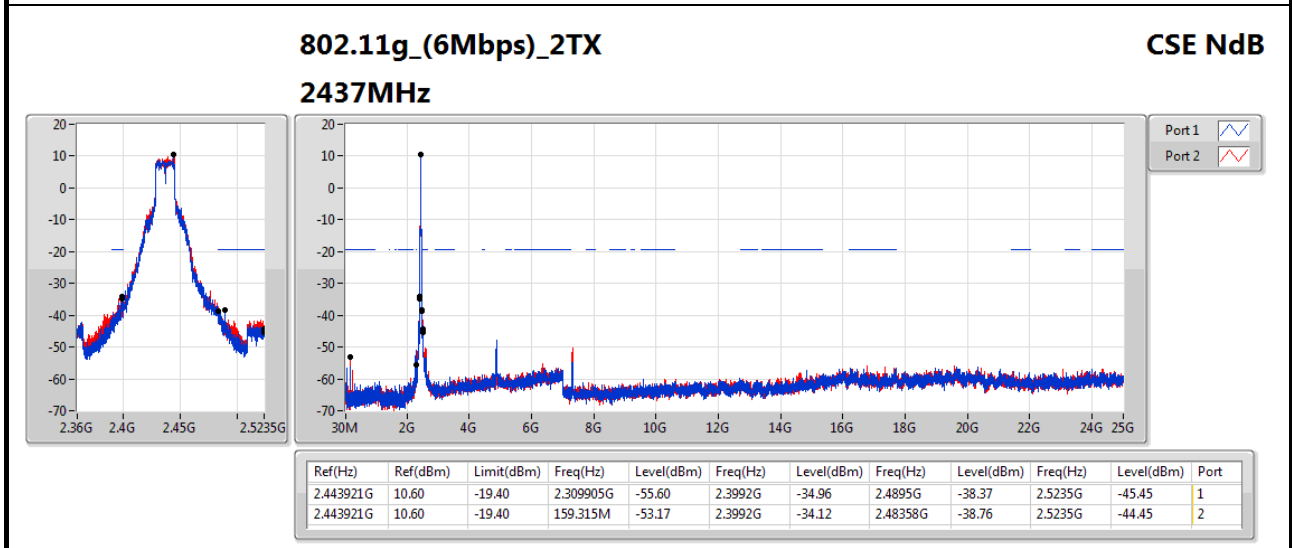
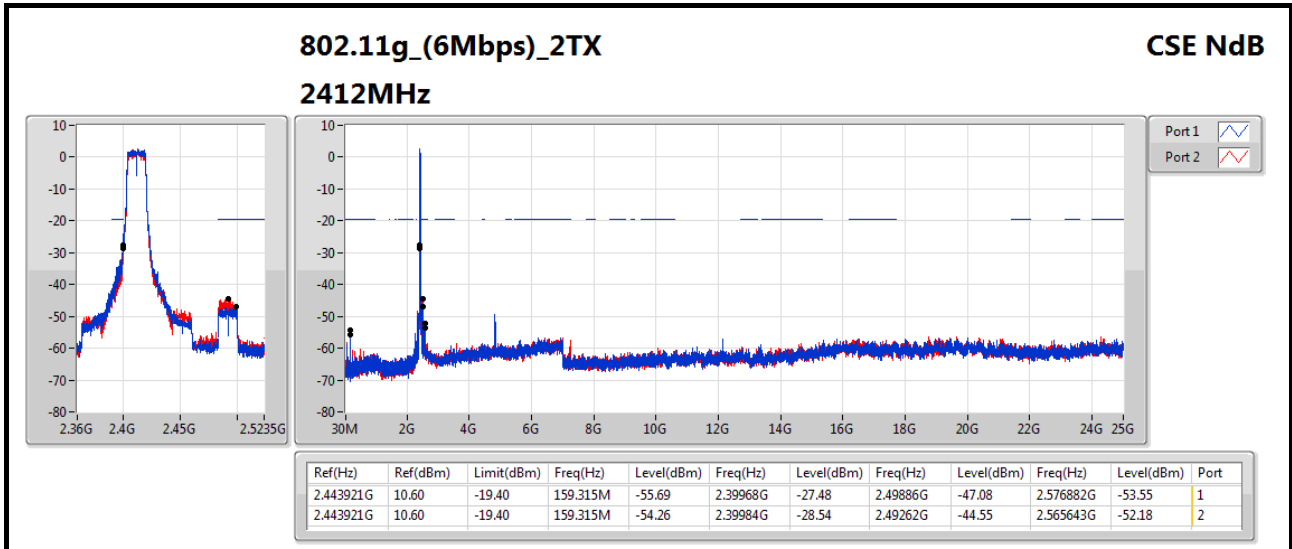
Summary

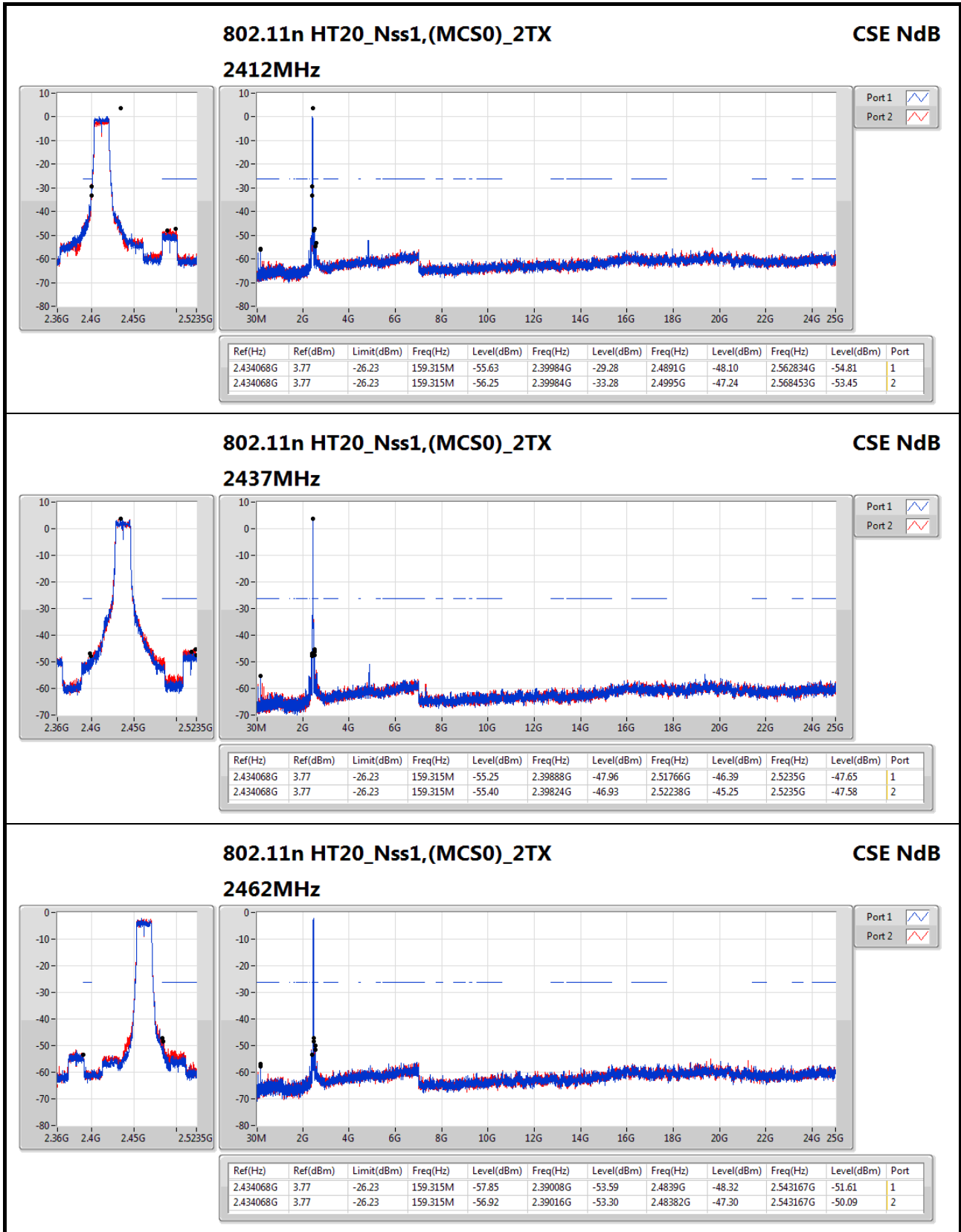
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-
2.4-2.4835GHz	Pass	2.434068G	3.77	-26.23	159.315M	-55.63	2.39984G	-29.28	2.4891G	-48.10	2.562834G	-54.81	1

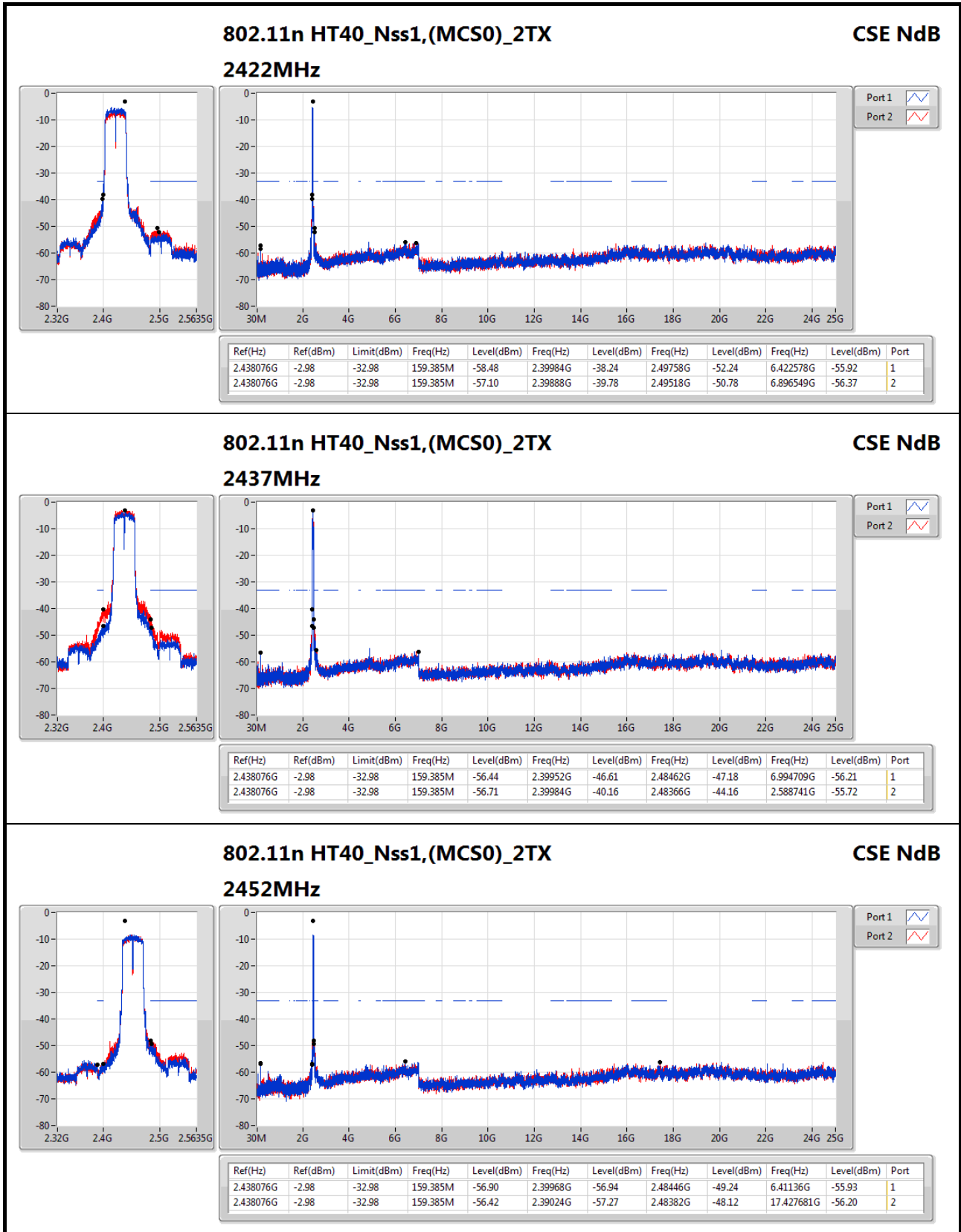
Result

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
802.11b_(1Mbps)_1TX	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.437575G	7.65	-22.35	159.315M	-55.74	2.39952G	-31.87	2.48998G	-50.11	2.571263G	-50.72	1
2437MHz	Pass	2.437575G	7.65	-22.35	159.315M	-55.25	2.396G	-55.92	2.51854G	-48.56	2.596549G	-51.74	1
2462MHz	Pass	2.437575G	7.65	-22.35	2.30175G	-53.97	2.39976G	-58.10	2.48694G	-54.16	2.621835G	-52.32	1
802.11g_(6Mbps)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.443921G	10.60	-19.40	159.315M	-55.69	2.39968G	-27.48	2.49886G	-47.08	2.576882G	-53.55	1
2412MHz	Pass	2.443921G	10.60	-19.40	159.315M	-54.26	2.39984G	-28.54	2.49262G	-44.55	2.565643G	-52.18	2
2437MHz	Pass	2.443921G	10.60	-19.40	2.309905G	-55.60	2.3992G	-34.96	2.4895G	-38.37	2.5235G	-45.45	1
2437MHz	Pass	2.443921G	10.60	-19.40	159.315M	-53.17	2.3992G	-34.12	2.48358G	-38.76	2.5235G	-44.45	2
2462MHz	Pass	2.443921G	10.60	-19.40	2.305245G	-55.03	2.39016G	-51.66	2.48502G	-46.53	2.545977G	-48.92	1
2462MHz	Pass	2.443921G	10.60	-19.40	159.315M	-54.71	2.39008G	-51.28	2.48358G	-43.61	2.537548G	-46.41	2
802.11n HT20_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-
2412MHz	Pass	2.434068G	3.77	-26.23	159.315M	-55.63	2.39984G	-29.28	2.4891G	-48.10	2.562834G	-54.81	1
2412MHz	Pass	2.434068G	3.77	-26.23	159.315M	-56.25	2.39984G	-33.28	2.4995G	-47.24	2.568453G	-53.45	2
2437MHz	Pass	2.434068G	3.77	-26.23	159.315M	-55.25	2.39888G	-47.96	2.51766G	-46.39	2.5235G	-47.65	1
2437MHz	Pass	2.434068G	3.77	-26.23	159.315M	-55.40	2.39824G	-46.93	2.52238G	-45.25	2.5235G	-47.58	2
2462MHz	Pass	2.434068G	3.77	-26.23	159.315M	-57.85	2.39008G	-53.59	2.4839G	-48.32	2.543167G	-51.61	1
2462MHz	Pass	2.434068G	3.77	-26.23	159.315M	-56.92	2.39016G	-53.30	2.48382G	-47.30	2.543167G	-50.09	2
802.11n HT40_Nss1,(MCS0)_2TX	-	-	-	-	-	-	-	-	-	-	-	-	-
2422MHz	Pass	2.438076G	-2.98	-32.98	159.385M	-58.48	2.39984G	-38.24	2.49758G	-52.24	6.422578G	-55.92	1
2422MHz	Pass	2.438076G	-2.98	-32.98	159.385M	-57.10	2.39888G	-39.78	2.49518G	-50.78	6.896549G	-56.37	2
2437MHz	Pass	2.438076G	-2.98	-32.98	159.385M	-56.44	2.39952G	-46.61	2.48462G	-47.18	6.994709G	-56.21	1
2437MHz	Pass	2.438076G	-2.98	-32.98	159.385M	-56.71	2.39984G	-40.16	2.48366G	-44.16	2.588741G	-55.72	2
2452MHz	Pass	2.438076G	-2.98	-32.98	159.385M	-56.90	2.39968G	-56.94	2.48446G	-49.24	6.41136G	-55.93	1
2452MHz	Pass	2.438076G	-2.98	-32.98	159.385M	-56.42	2.39024G	-57.27	2.48382G	-48.12	17.427681G	-56.20	2



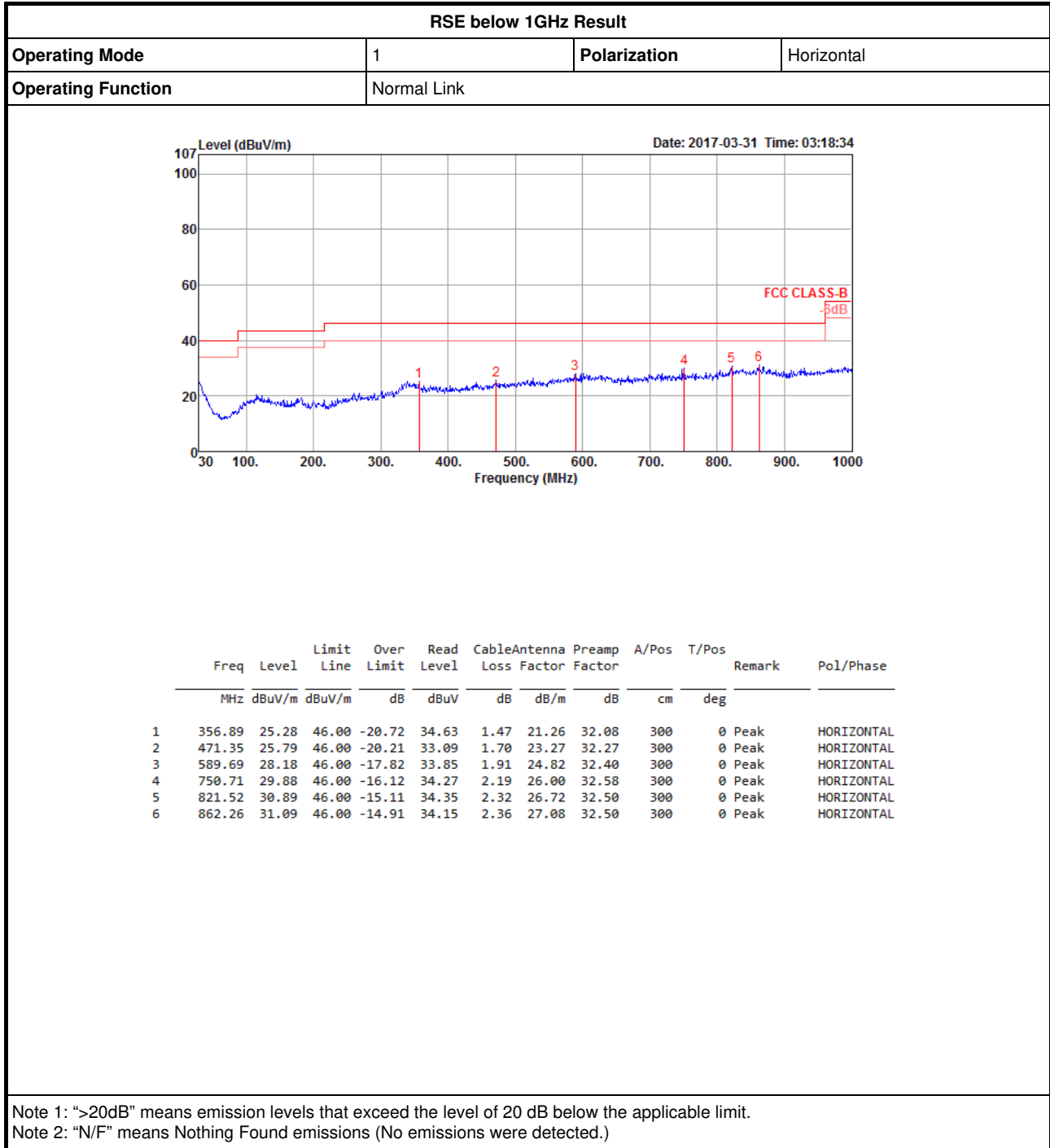






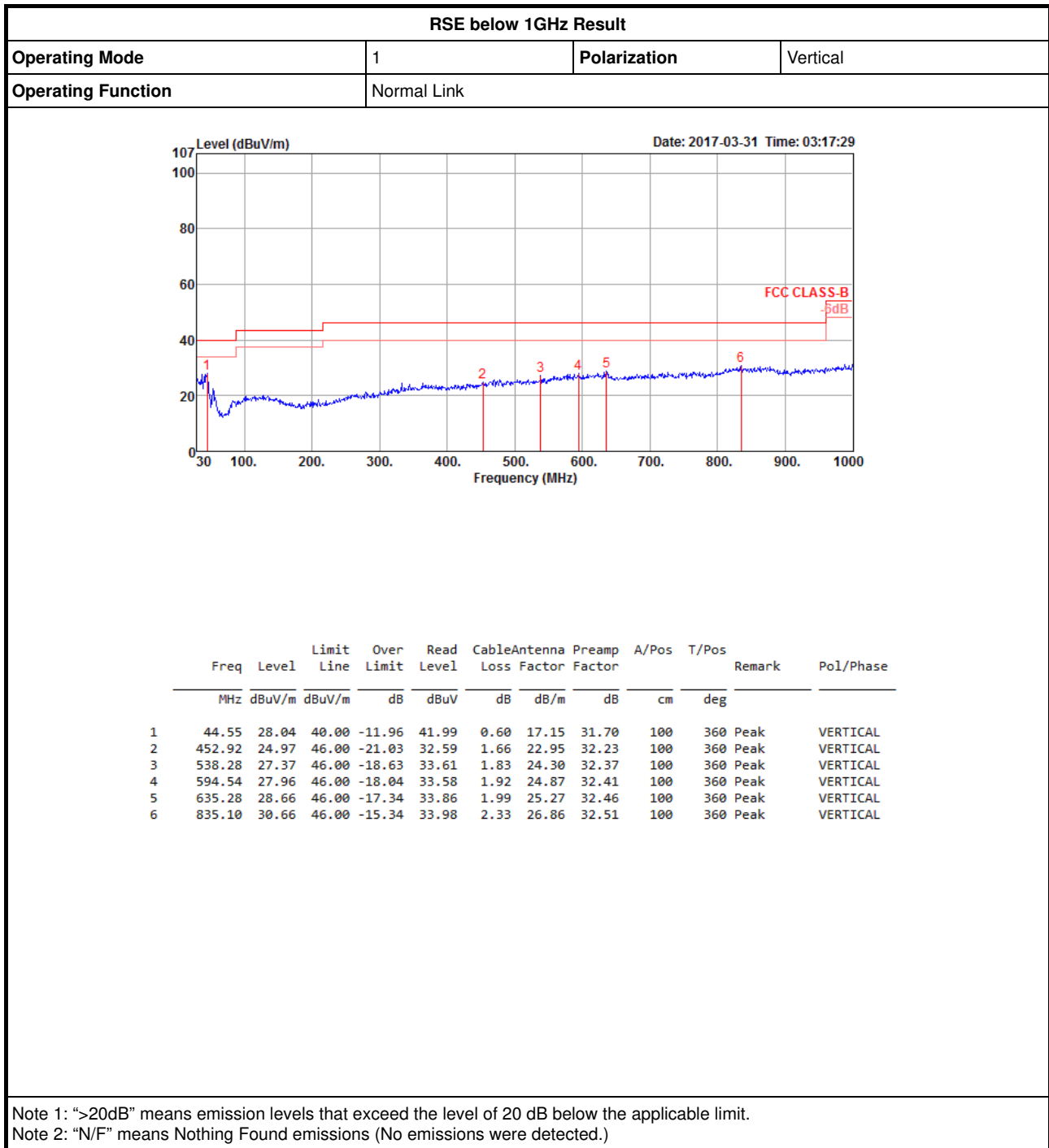


# RSE below 1GHz Result





# RSE below 1GHz Result





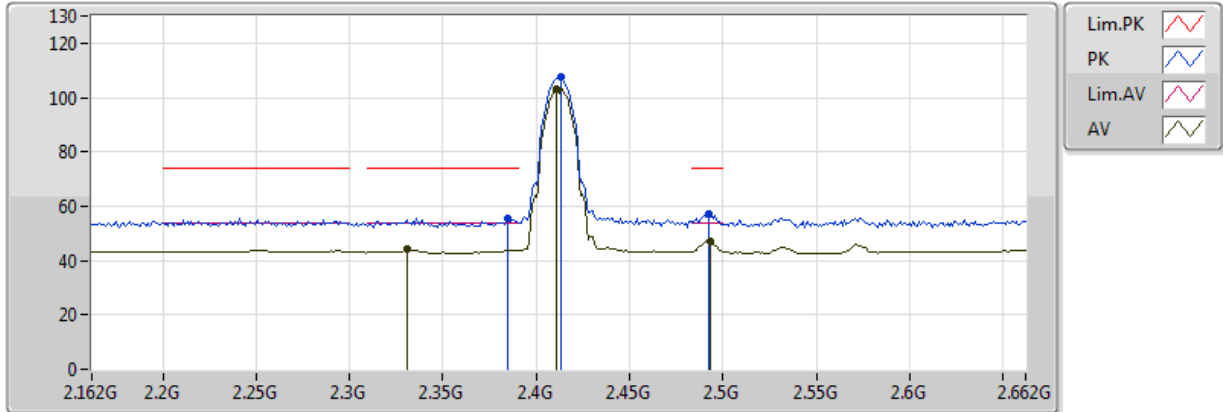


Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Pol. (H/V)	Azimuth (°)	Height (m)	Comments
802.11b_(1Mbps)_1TX	-	-	-	-	-	-	-	-	-	-	-	-
2.4-2.4835GHz	Pass	AV	4.923988G	53.98	54.00	-0.02	3.70	3	V	317	1.94	-

### 802.11b\_(1Mbps)\_1TX

### 2412MHz\_TX



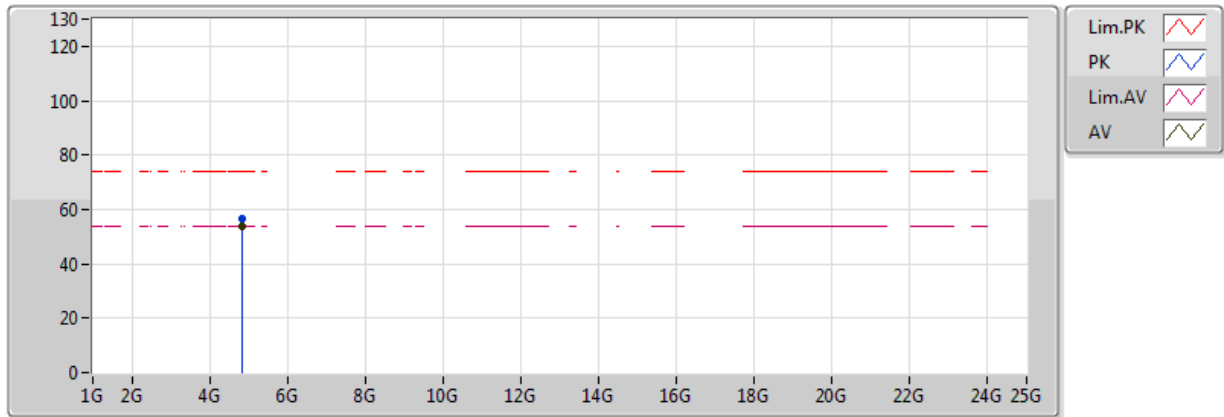
20170328  
 EUT\_Z\_1TX\_ANT A  
 Setting:32  
 01-W-3  
 FSV(101027)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.331G	44.00	54.00	-10.00	31.12	3	V	317	1.47	-
AV	2.411G	103.35	Inf	-Inf	31.01	3	V	317	1.47	-
AV	2.493G	47.14	54.00	-6.86	30.91	3	V	317	1.47	-
PK	2.385G	55.46	74.00	-18.54	31.04	3	V	317	1.47	-
PK	2.413G	107.38	Inf	-Inf	31.00	3	V	317	1.47	-
PK	2.492G	56.96	74.00	-17.04	30.91	3	V	317	1.47	-



### 802.11b\_(1Mbps)\_1TX

### 2412MHz\_TX

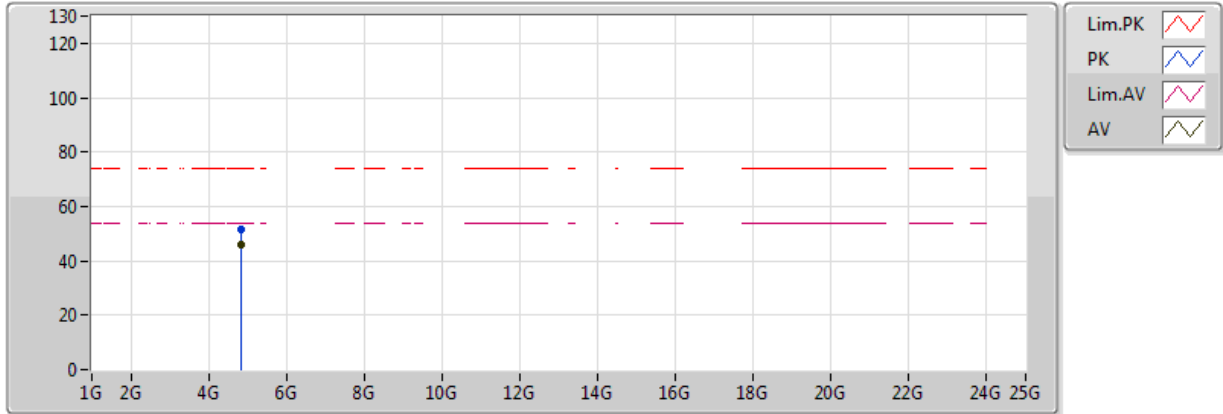


20170328  
 EUT\_Z\_1TX\_ANT A  
 Setting:32  
 01-W-3  
 FSV(101027)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.823964G	53.98	54.00	-0.02	3.40	3	V	318	2.23	-
PK	4.823912G	56.46	74.00	-17.54	3.40	3	V	318	2.23	-

### 802.11b\_(1Mbps)\_1TX

### 2412MHz\_TX

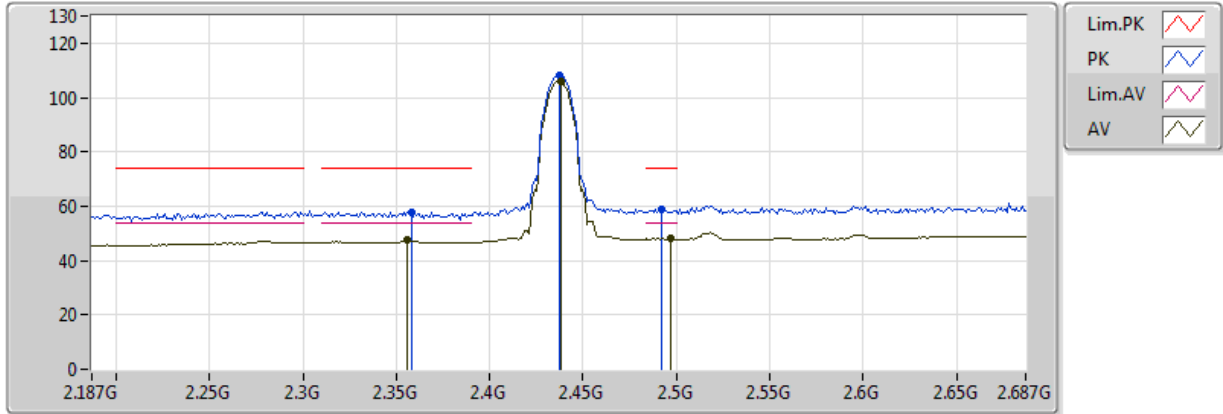


20170328  
 EUT\_Z\_1TX\_ANT A  
 Setting:32  
 01-W-3  
 FSV(101027)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.824G	46.13	54.00	-7.87	3.40	3	H	68	1.40	-
PK	4.823836G	51.35	74.00	-22.65	3.40	3	H	68	1.40	-

### 802.11b\_(1Mbps)\_1TX

### 2437MHz\_TX

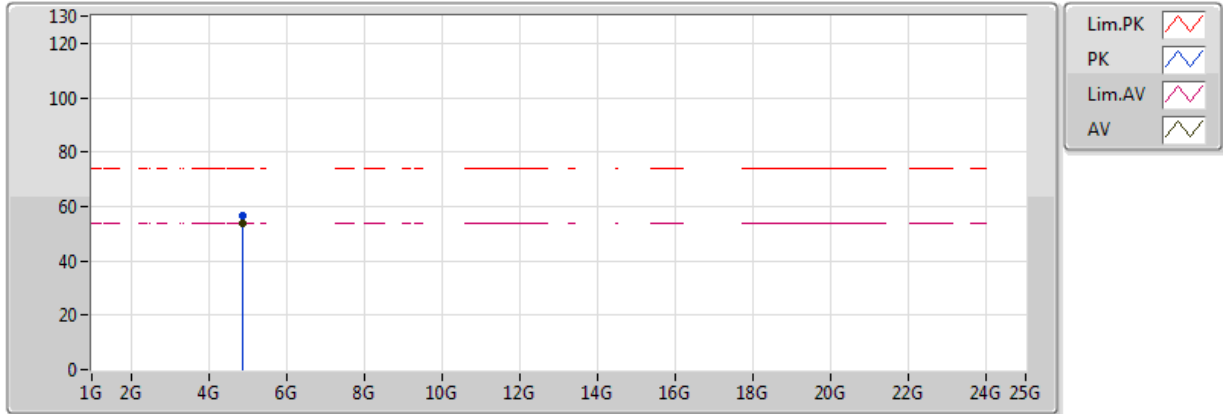


20170328  
 EUT\_Z\_1TX\_ANT A  
 Setting:35  
 01-W-3  
 FSV(101027)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.356G	47.39	54.00	-6.61	31.83	3	V	315	1.02	-
AV	2.438G	106.13	Inf	-Inf	32.03	3	V	315	1.02	-
AV	2.497G	47.97	54.00	-6.03	32.17	3	V	315	1.02	-
PK	2.358G	57.98	74.00	-16.02	31.83	3	V	315	1.02	-
PK	2.437G	108.37	Inf	-Inf	32.03	3	V	315	1.02	-
PK	2.492G	58.70	74.00	-15.30	32.16	3	V	315	1.02	-

### 802.11b\_(1Mbps)\_1TX

### 2437MHz\_TX

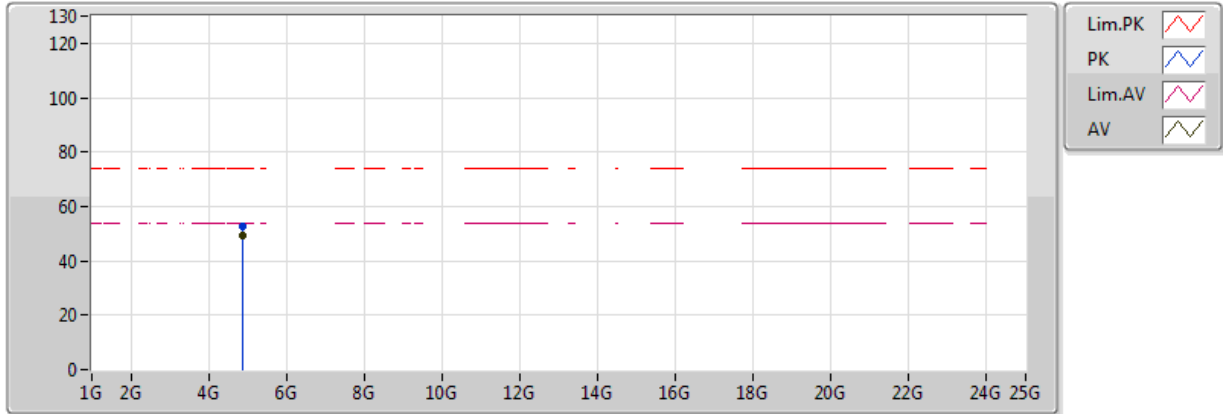


20170322  
 EUT\_Z\_1TX\_ANT A  
 Setting:35  
 01-W-3  
 FSP(100304)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.874G	53.95	54.00	-0.05	3.55	3	V	55	1.87	-
PK	4.87404G	56.49	74.00	-17.51	3.55	3	V	55	1.87	-

### 802.11b\_(1Mbps)\_1TX

### 2437MHz\_TX

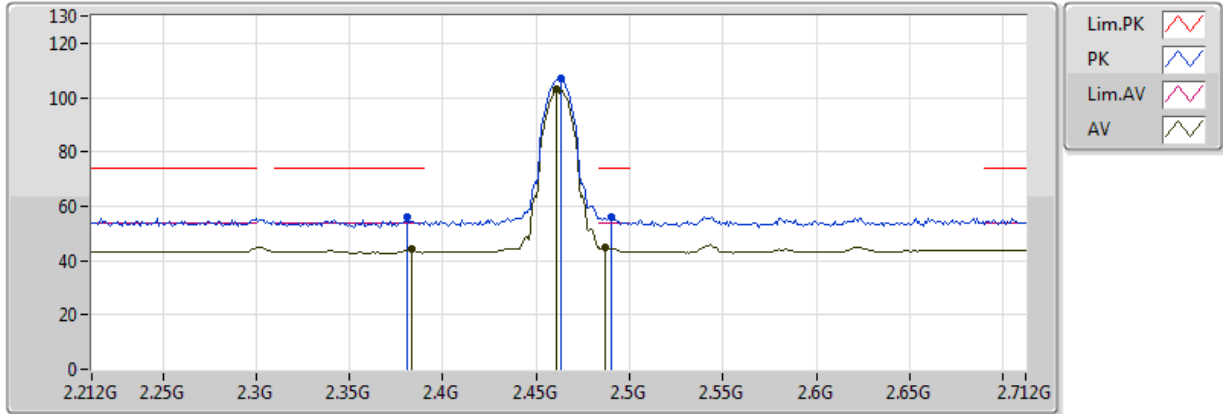


20170322  
 EUT\_Z\_1TX\_ANT A  
 Setting:35  
 01-W-3  
 FSP(100304)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.874012G	49.15	54.00	-4.85	3.55	3	H	191	2.39	-
PK	4.874024G	52.93	74.00	-21.07	3.55	3	H	191	2.39	-

### 802.11b\_(1Mbps)\_1TX

### 2462MHz\_TX



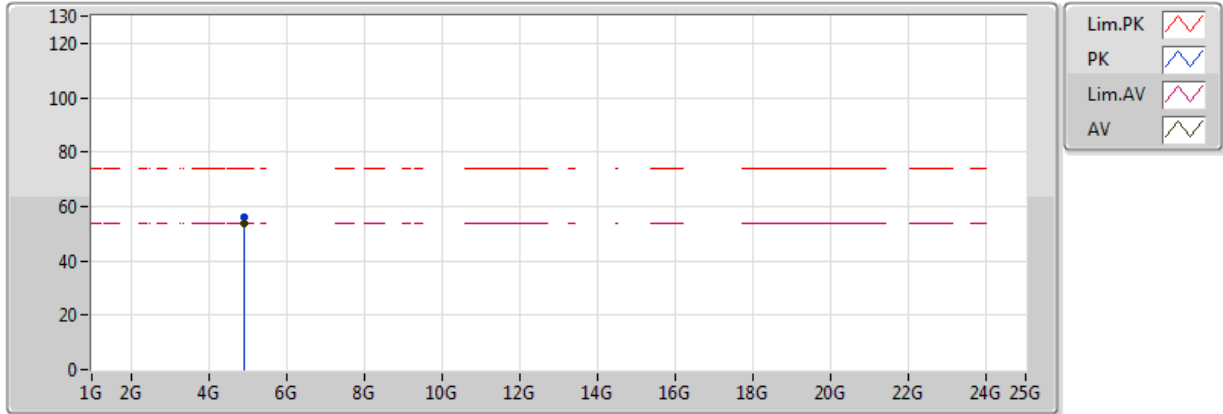
20170328  
 EUT\_Z\_1TX\_ANT A  
 Setting:30  
 01-W-3  
 FSP(100080)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.383G	44.10	54.00	-9.90	31.05	3	V	324	1.78	-
AV	2.461G	102.88	Inf	-Inf	30.95	3	V	324	1.78	-
AV	2.487G	44.86	54.00	-9.14	30.92	3	V	324	1.78	-
PK	2.381G	56.02	74.00	-17.98	31.05	3	V	324	1.78	-
PK	2.463G	106.94	Inf	-Inf	30.94	3	V	324	1.78	-
PK	2.49G	55.83	74.00	-18.17	30.91	3	V	324	1.78	-



### 802.11b\_(1Mbps)\_1TX

### 2462MHz\_TX

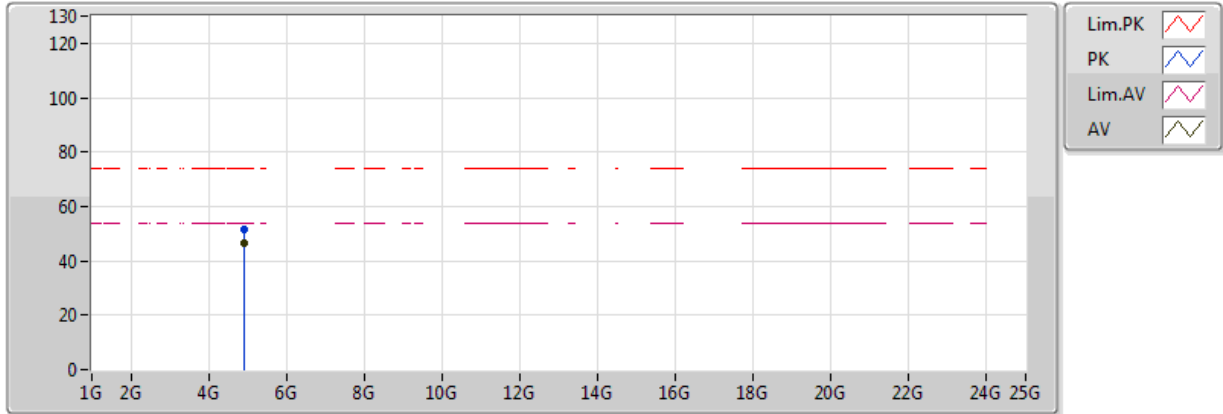


20170328  
 EUT\_Z\_1TX\_ANT A  
 Setting:30  
 01-W-3  
 FSP(100080)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.923988G	53.98	54.00	-0.02	3.70	3	V	317	1.94	-
PK	4.924088G	55.80	74.00	-18.20	3.70	3	V	317	1.94	-

### 802.11b\_(1Mbps)\_1TX

### 2462MHz\_TX

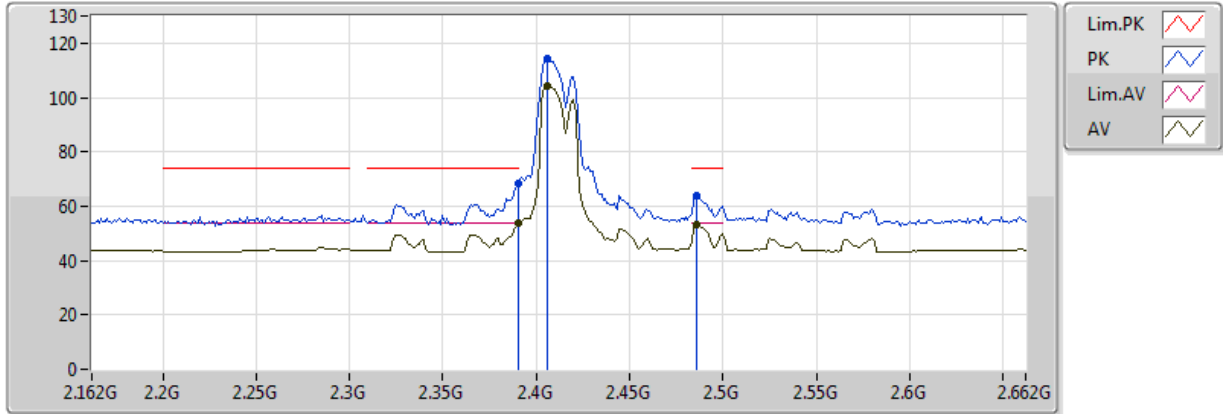


20170328  
 EUT\_Z\_1TX\_ANT A  
 Setting:30  
 01-W-3  
 FSP(100080)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.924032G	46.76	54.00	-7.24	3.70	3	H	147	2.64	-
PK	4.924064G	51.45	74.00	-22.55	3.70	3	H	147	2.64	-

### 802.11g\_(6Mbps)\_2TX

### 2412MHz\_TX

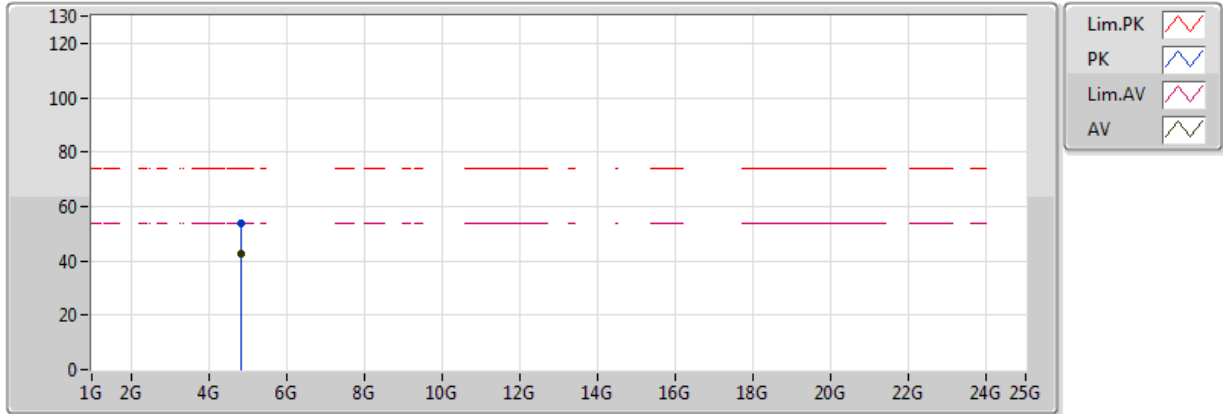


20170322  
 EUT\_Z\_2TX  
 Setting:43/42  
 01-W-3  
 FSP(100304)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.389998G	53.63	54.00	-0.37	31.04	3	V	336	1.36	-
AV	2.406G	104.45	Inf	-Inf	31.01	3	V	336	1.36	-
AV	2.486G	53.00	54.00	-1.00	30.92	3	V	336	1.36	-
PK	2.389998G	68.28	74.00	-5.72	31.04	3	V	336	1.36	-
PK	2.406G	114.21	Inf	-Inf	31.01	3	V	336	1.36	-
PK	2.486G	63.75	74.00	-10.25	30.92	3	V	336	1.36	-

### 802.11g\_(6Mbps)\_2TX

### 2412MHz\_TX



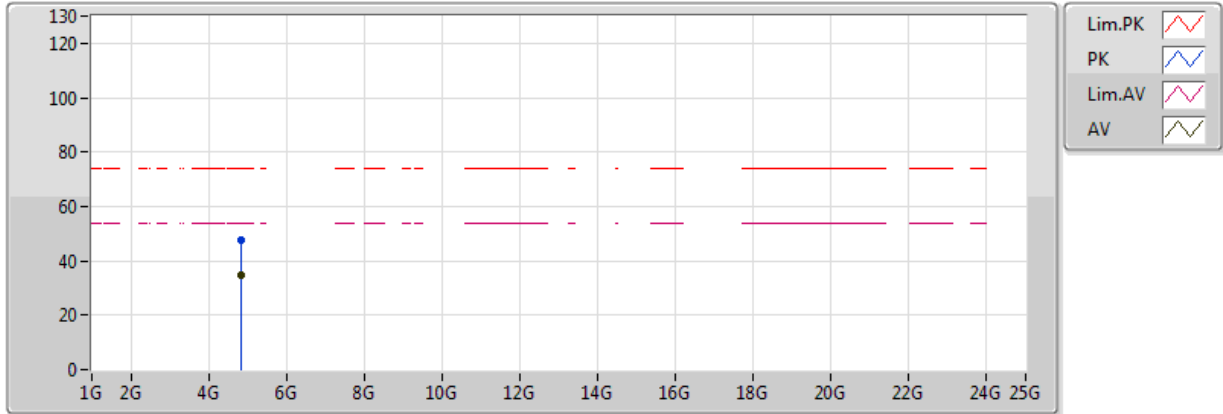
20170328  
 EUT\_Z\_2TX  
 Setting:43/42  
 01-W-3  
 FSP(100080)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.823972G	42.61	54.00	-11.39	3.40	3	V	337	2.50	-
PK	4.824116G	53.71	74.00	-20.29	3.40	3	V	337	2.50	-



### 802.11g\_(6Mbps)\_2TX

### 2412MHz\_TX

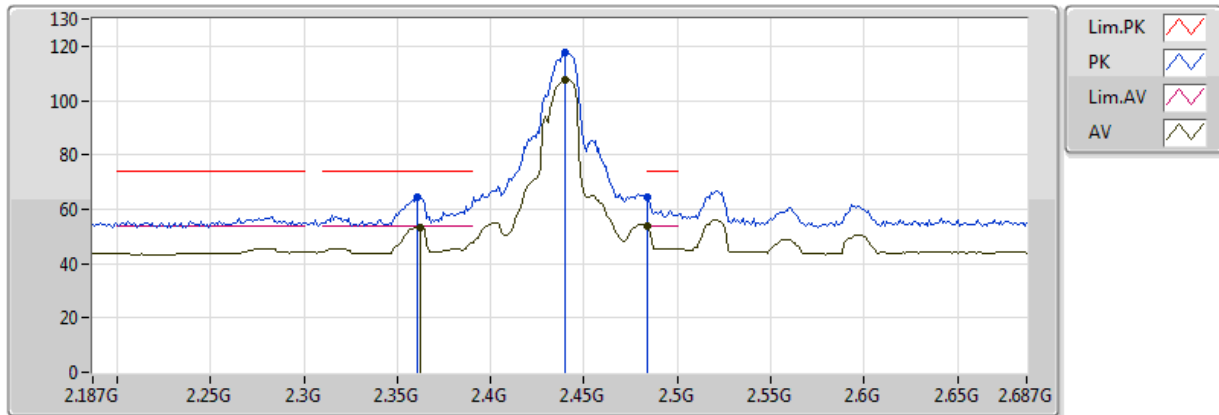


20170328  
 EUT\_Z\_2TX  
 Setting:43/42  
 01-W-3  
 FSP(100080)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.824068G	34.65	54.00	-19.35	3.40	3	H	297	1.29	-
PK	4.824012G	47.42	74.00	-26.58	3.40	3	H	297	1.29	-

### 802.11g\_(6Mbps)\_2TX

### 2437MHz\_TX

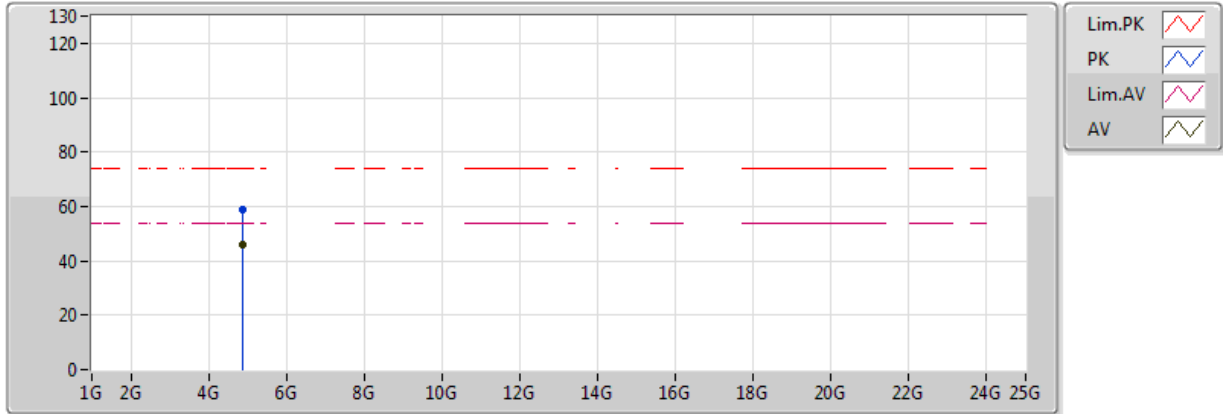


20170322  
 EUT\_Z\_2TX  
 Setting:52/52  
 01-W-3  
 FSP(100304)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.362G	53.50	54.00	-0.50	31.08	3	V	336	1.36	-
AV	2.44G	107.66	Inf	-Inf	30.97	3	V	336	1.36	-
AV	2.483502G	53.74	54.00	-0.26	30.92	3	V	336	1.36	-
PK	2.361G	64.16	74.00	-9.84	31.08	3	V	336	1.36	-
PK	2.44G	117.60	Inf	-Inf	30.97	3	V	336	1.36	-
PK	2.484G	64.61	74.00	-9.39	30.92	3	V	336	1.36	-

### 802.11g\_(6Mbps)\_2TX

### 2437MHz\_TX

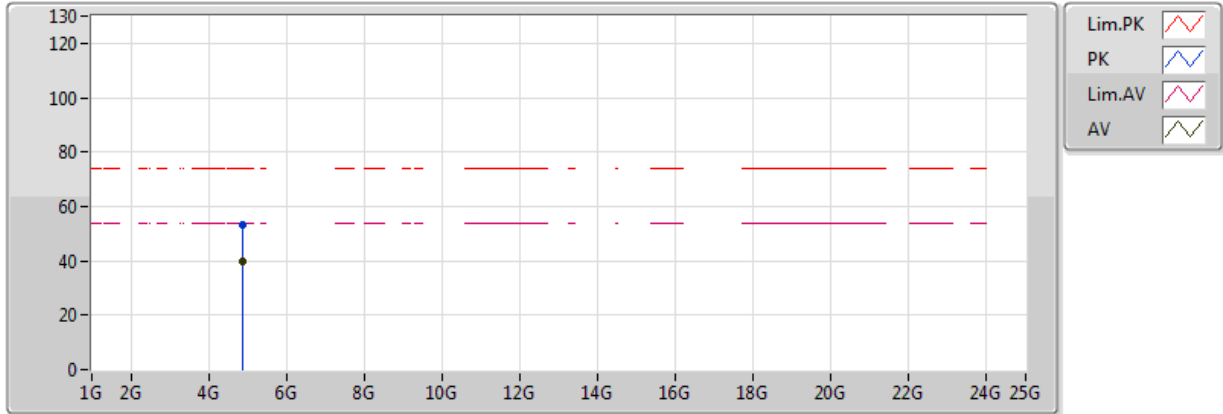


20170328  
 EUT\_Z\_2TX  
 Setting:52/52  
 01-W-3  
 FSP(100080)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.87269G	45.78	54.00	-8.22	3.55	3	V	326	2.13	-
PK	4.87189G	58.59	74.00	-15.41	3.55	3	V	326	2.13	-

### 802.11g\_(6Mbps)\_2TX

### 2437MHz\_TX



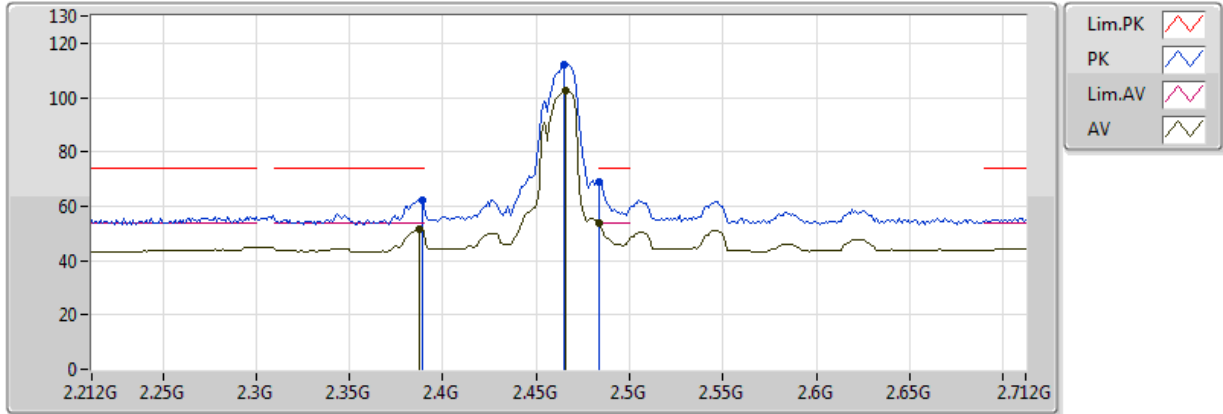
20170328  
 EUT\_Z\_2TX  
 Setting:52/52  
 01-W-3  
 FSP(100080)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.87266G	39.91	54.00	-14.09	3.55	3	H	54	1.04	-
PK	4.87189G	53.40	74.00	-20.60	3.55	3	H	54	1.04	-



### 802.11g\_(6Mbps)\_2TX

### 2462MHz\_TX

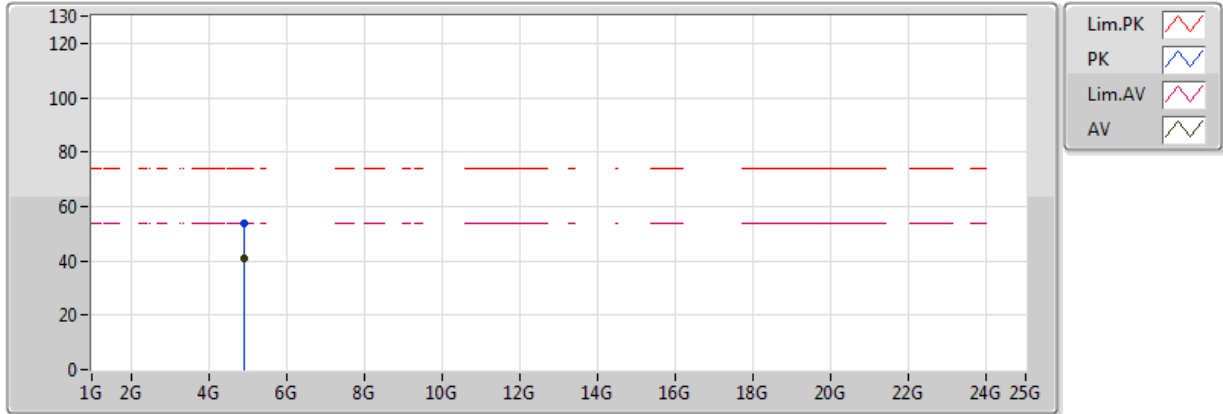


20170322  
 EUT\_Z\_2TX  
 Setting:40/40  
 01-W-3  
 FSP(100304)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.387G	51.47	54.00	-2.53	31.04	3	V	332	1.14	-
AV	2.466G	102.37	Inf	-Inf	30.94	3	V	332	1.14	-
AV	2.483502G	53.97	54.00	-0.03	30.92	3	V	332	1.14	-
PK	2.389G	62.21	74.00	-11.79	31.04	3	V	332	1.14	-
PK	2.465G	112.12	Inf	-Inf	30.94	3	V	332	1.14	-
PK	2.483502G	69.16	74.00	-4.84	30.92	3	V	332	1.14	-

### 802.11g\_(6Mbps)\_2TX

### 2462MHz\_TX



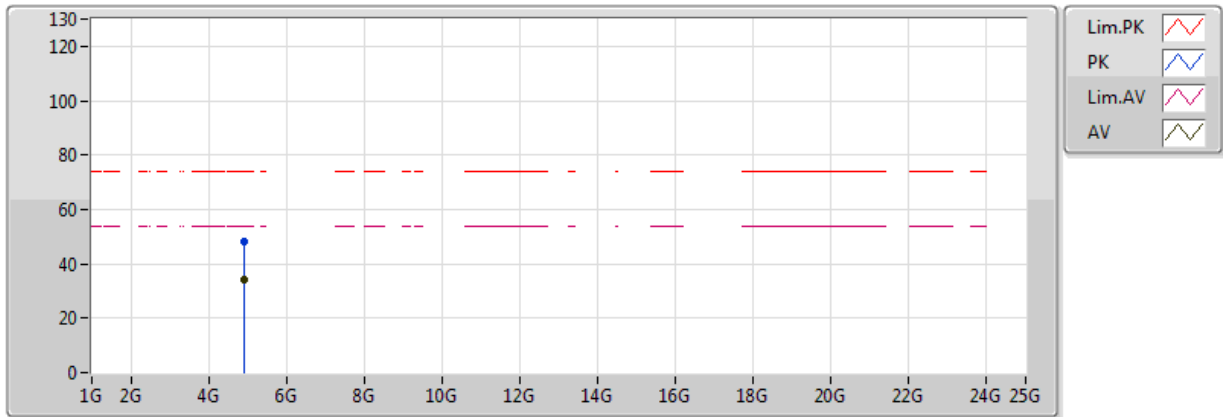
20170328  
EUT\_Z\_2TX  
Setting:40/40  
01-W-3  
FSP(100080)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.92403G	40.83	54.00	-13.17	3.70	3	V	332	2.35	-
PK	4.924078G	53.91	74.00	-20.09	3.70	3	V	332	2.35	-



### 802.11g\_(6Mbps)\_2TX

### 2462MHz\_TX

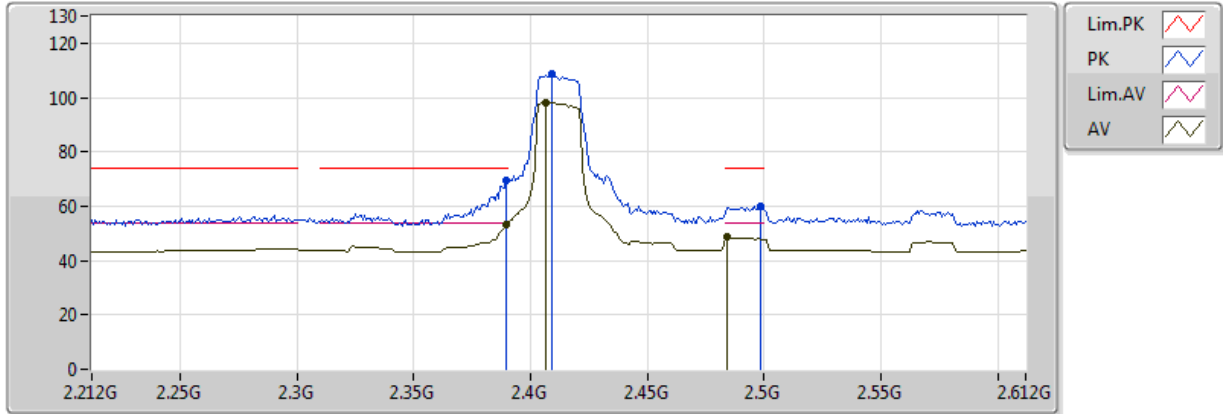


20170328  
 EUT\_Z\_2TX  
 Setting:40/40  
 01-W-3  
 FSP(100080)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.92409G	34.41	54.00	-19.59	3.70	3	H	298	1.10	-
PK	4.92418G	48.05	74.00	-25.95	3.70	3	H	298	1.10	-

### 802.11n HT20\_Nss1,(MCS0)\_2TX

### 2412MHz\_TX



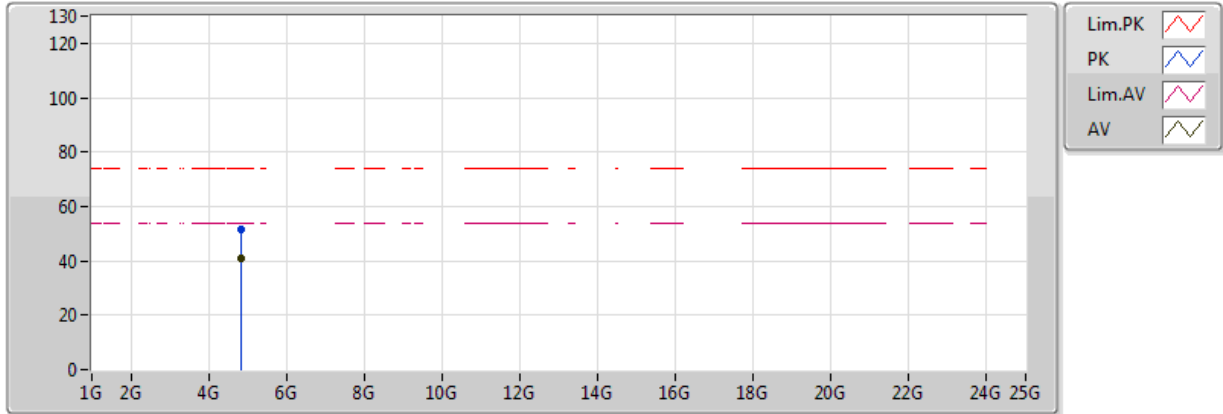
20170322  
 EUT\_Z\_2TX  
 Setting:38/36  
 01-W-3  
 FSP(100304)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.3896G	53.42	54.00	-0.58	31.04	3	V	294	1.50	-
AV	2.4064G	98.03	Inf	-Inf	31.01	3	V	294	1.50	-
AV	2.484G	48.62	54.00	-5.38	30.92	3	V	294	1.50	-
PK	2.3896G	69.21	74.00	-4.79	31.04	3	V	294	1.50	-
PK	2.4088G	108.74	Inf	-Inf	31.01	3	V	294	1.50	-
PK	2.4984G	60.06	74.00	-13.94	30.90	3	V	294	1.50	-



### 802.11n HT20\_Nss1,(MCS0)\_2TX

### 2412MHz\_TX

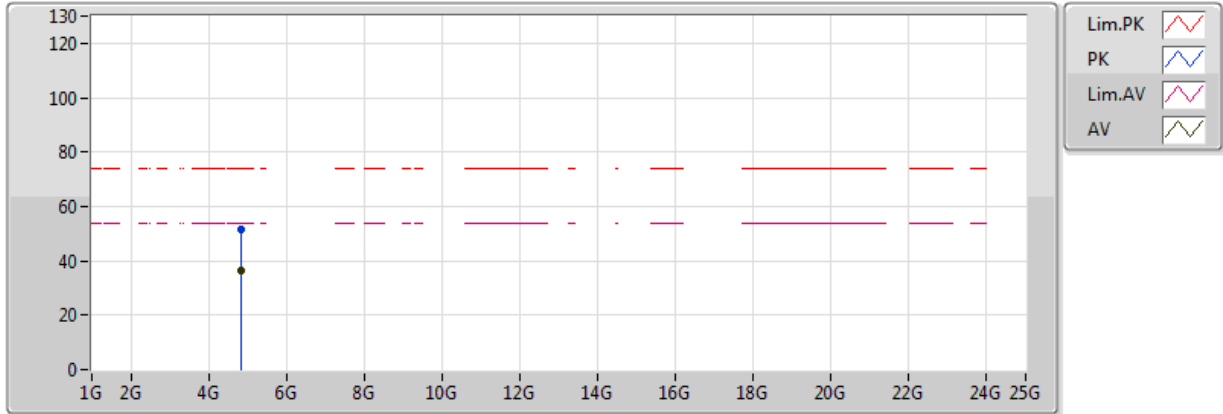


20170328  
 EUT\_Z\_2TX  
 Setting:38/36  
 01-S-6  
 FSP(100080)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.824028G	40.99	54.00	-13.01	3.40	3	V	335	2.51	-
PK	4.823844G	51.49	74.00	-22.51	3.40	3	V	335	2.51	-

### 802.11n HT20\_Nss1,(MCS0)\_2TX

### 2412MHz\_TX

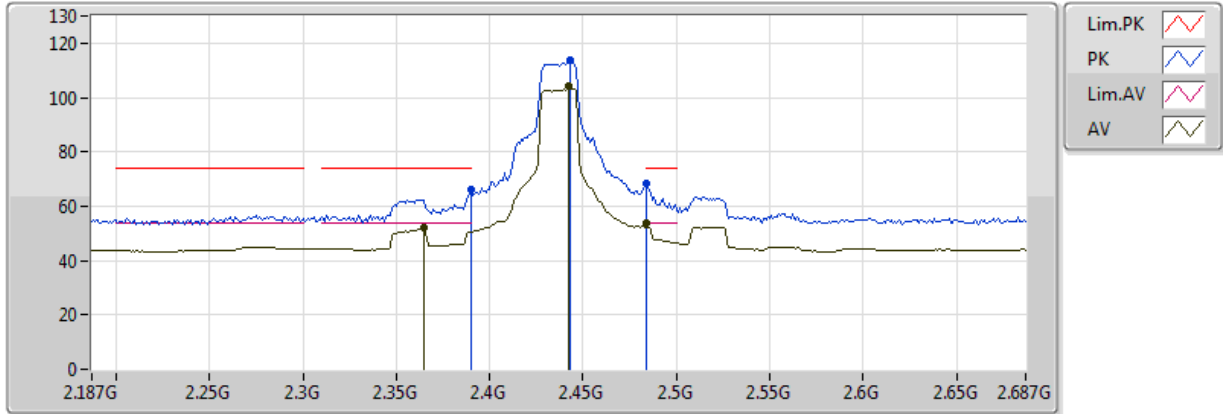


20170328  
EUT\_Z\_2TX  
Setting:38/36  
01-S-6  
FSP(100080)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.82406G	36.61	54.00	-17.39	4.72	3	H	69	1.39	-
PK	4.82367G	51.59	74.00	-22.41	4.72	3	H	69	1.39	-

### 802.11n HT20\_Nss1,(MCS0)\_2TX

### 2437MHz\_TX

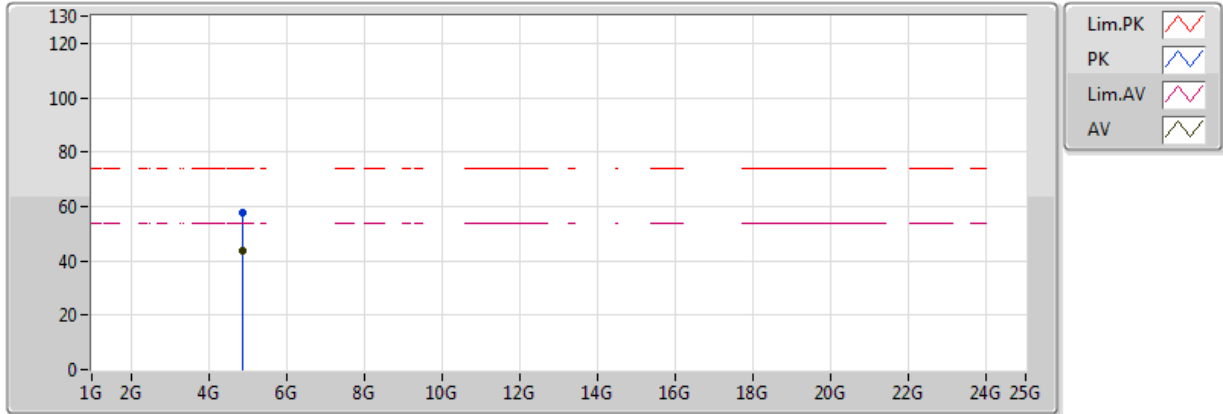


20170322  
 EUT\_Z\_2TX  
 Setting:44/42  
 01-W-3  
 FSP(100304)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.365G	52.20	54.00	-1.80	31.85	3	V	305	1.74	-
AV	2.442G	104.19	Inf	-Inf	32.04	3	V	305	1.74	-
AV	2.483502G	53.52	54.00	-0.48	32.14	3	V	305	1.74	-
PK	2.39G	66.21	74.00	-7.79	31.91	3	V	305	1.74	-
PK	2.443G	113.96	Inf	-Inf	32.04	3	V	305	1.74	-
PK	2.483502G	68.40	74.00	-5.60	32.14	3	V	305	1.74	-

### 802.11n HT20\_Nss1,(MCS0)\_2TX

### 2437MHz\_TX



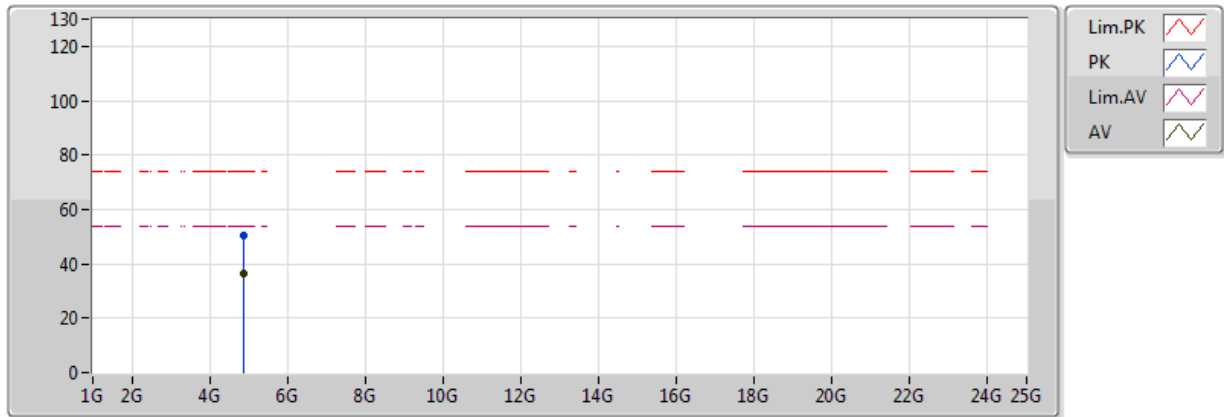
20170302  
 EUT\_Z\_2TX  
 Setting:44/42  
 01-S-6  
 FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.87392G	43.87	54.00	-10.13	4.82	3	V	324	2.15	-
PK	4.87368G	57.68	74.00	-16.32	4.82	3	V	324	2.15	-



### 802.11n HT20\_Nss1,(MCS0)\_2TX

### 2437MHz\_TX

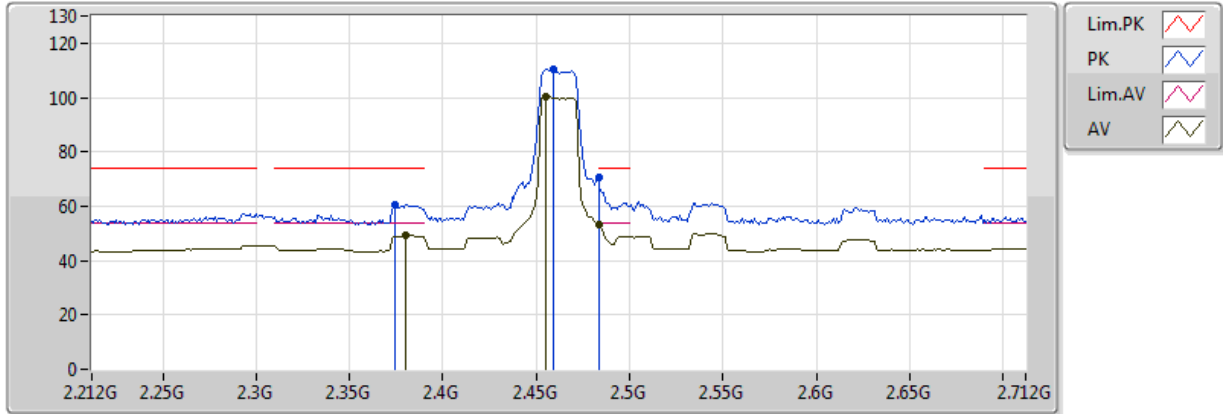


20170302  
 EUT\_Z\_2TX  
 Setting:44/42  
 01-S-6  
 FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.87394G	36.39	54.00	-17.61	4.82	3	H	68	1.42	-
PK	4.87232G	50.47	74.00	-23.53	4.81	3	H	68	1.42	-

### 802.11n HT20\_Nss1,(MCS0)\_2TX

### 2462MHz\_TX



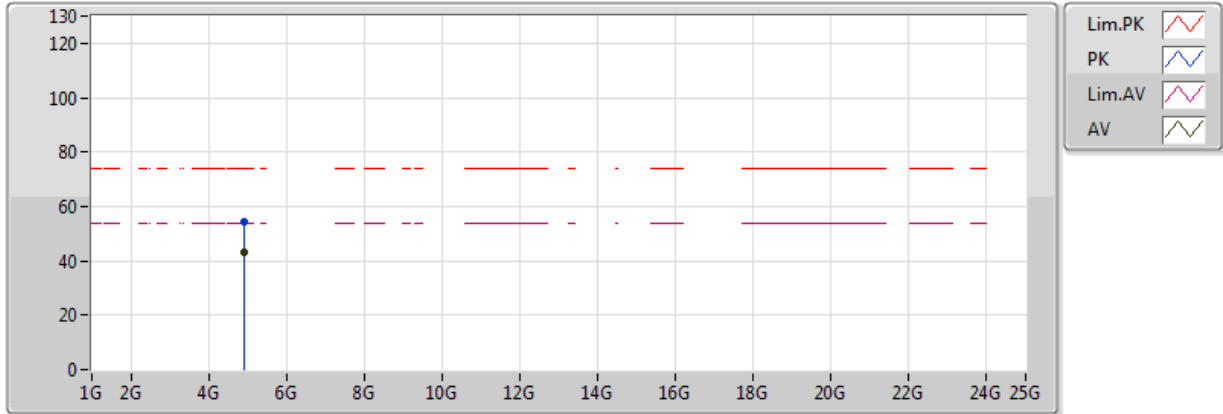
20170322  
 EUT\_Z\_2TX  
 Setting:32/30  
 01-W-3  
 FSP(100304)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.38G	49.22	54.00	-4.78	31.05	3	V	356	1.83	-
AV	2.455G	100.27	Inf	-Inf	30.95	3	V	356	1.83	-
AV	2.483502G	53.32	54.00	-0.68	30.92	3	V	356	1.83	-
PK	2.374G	60.79	74.00	-13.21	31.06	3	V	356	1.83	-
PK	2.459G	110.62	Inf	-Inf	30.95	3	V	356	1.83	-
PK	2.483502G	70.82	74.00	-3.18	30.92	3	V	356	1.83	-



802.11n HT20\_Nss1,(MCS0)\_2TX

2462MHz\_TX

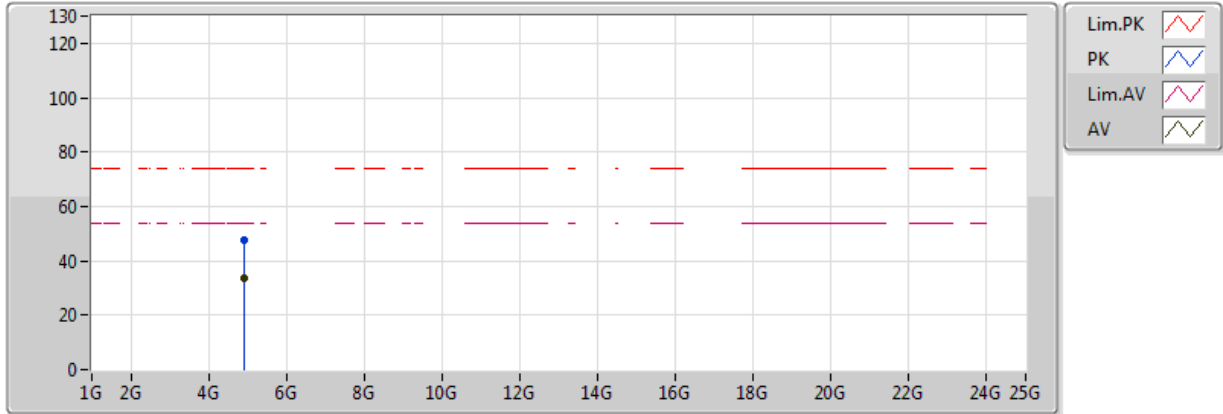


20170302  
 EUT\_Z\_2TX  
 Setting:32/30  
 01-S-6  
 FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.924G	43.25	54.00	-10.75	4.92	3	V	331	2.30	-
PK	4.92386G	54.15	74.00	-19.85	4.92	3	V	331	2.30	-

### 802.11n HT20\_Nss1,(MCS0)\_2TX

### 2462MHz\_TX

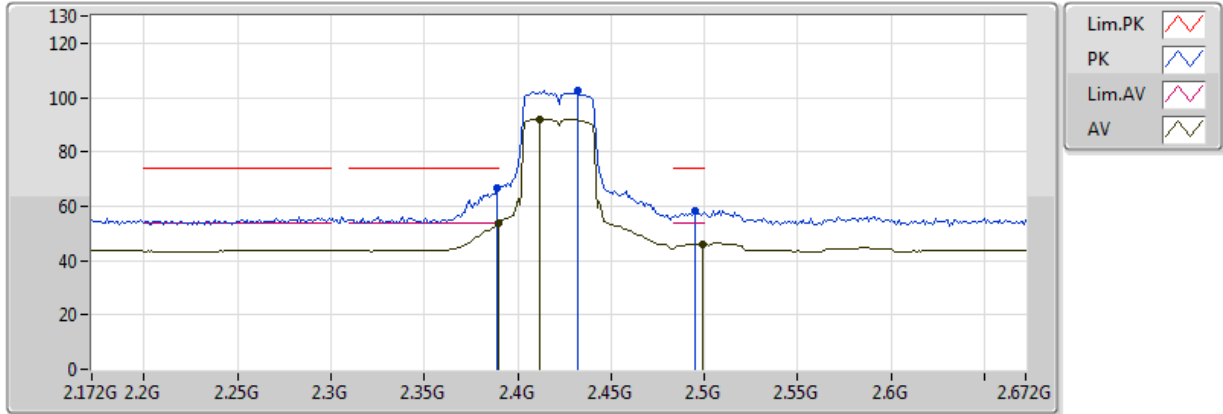


20170302  
 EUT\_Z\_2TX  
 Setting:32/30  
 01-S-6  
 FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.923944G	33.83	54.00	-20.17	4.92	3	H	148	1.56	-
PK	4.924312G	47.37	74.00	-26.63	4.92	3	H	148	1.56	-

### 802.11n HT40\_Nss1,(MCS0)\_2TX

### 2422MHz\_TX

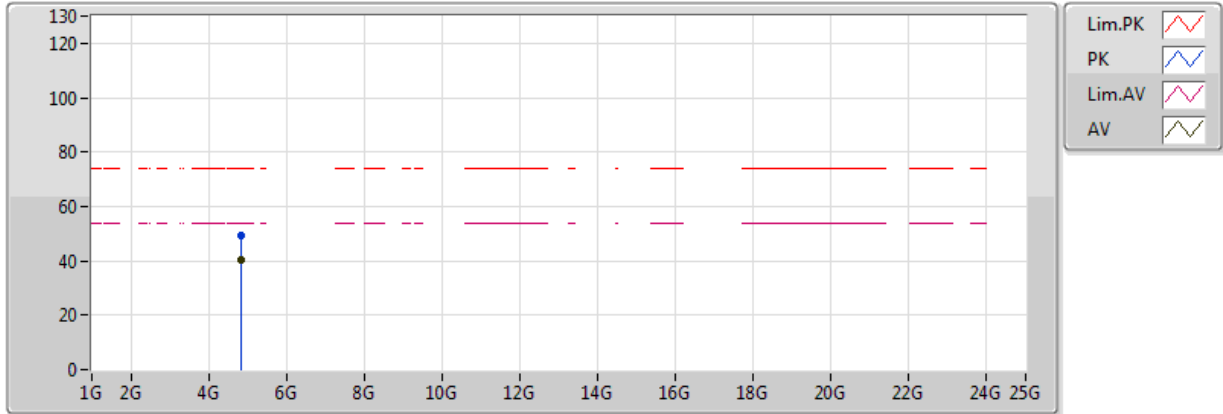


20170322  
EUT\_Z\_2TX  
Setting:35/33  
01-W-3  
FSP(100304)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.389998G	53.92	54.00	-0.08	31.04	3	V	298	1.47	-
AV	2.412G	92.10	Inf	-Inf	31.01	3	V	298	1.47	-
AV	2.499G	46.10	54.00	-7.90	30.90	3	V	298	1.47	-
PK	2.389G	66.90	74.00	-7.10	31.04	3	V	298	1.47	-
PK	2.432G	102.29	Inf	-Inf	30.98	3	V	298	1.47	-
PK	2.495G	58.53	74.00	-15.47	30.91	3	V	298	1.47	-

### 802.11n HT40\_Nss1,(MCS0)\_2TX

### 2422MHz\_TX

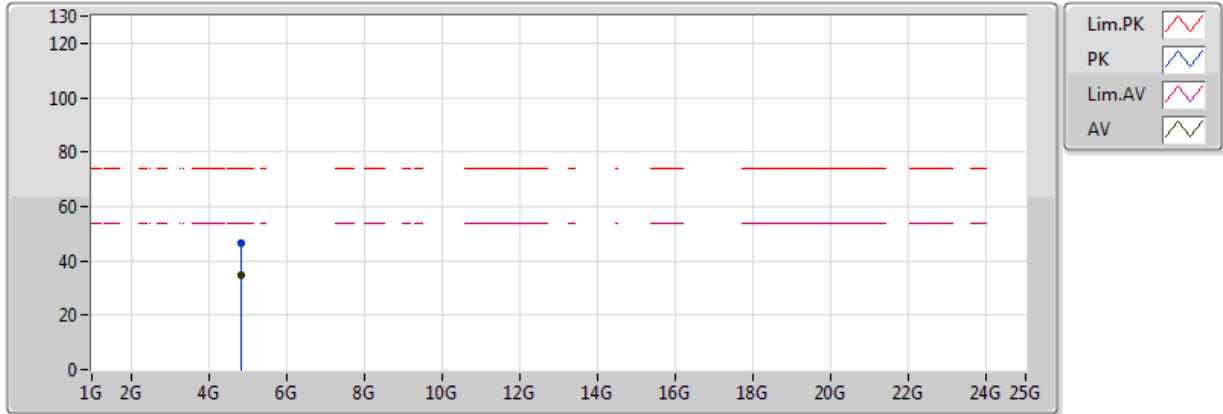


20170302  
 EUT\_Z\_2TX  
 Setting:35/33  
 01-S-6  
 FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.843988G	40.57	54.00	-13.43	4.76	3	V	333	2.73	-
PK	4.844052G	49.58	74.00	-24.42	4.76	3	V	333	2.73	-

### 802.11n HT40\_Nss1,(MCS0)\_2TX

### 2422MHz\_TX

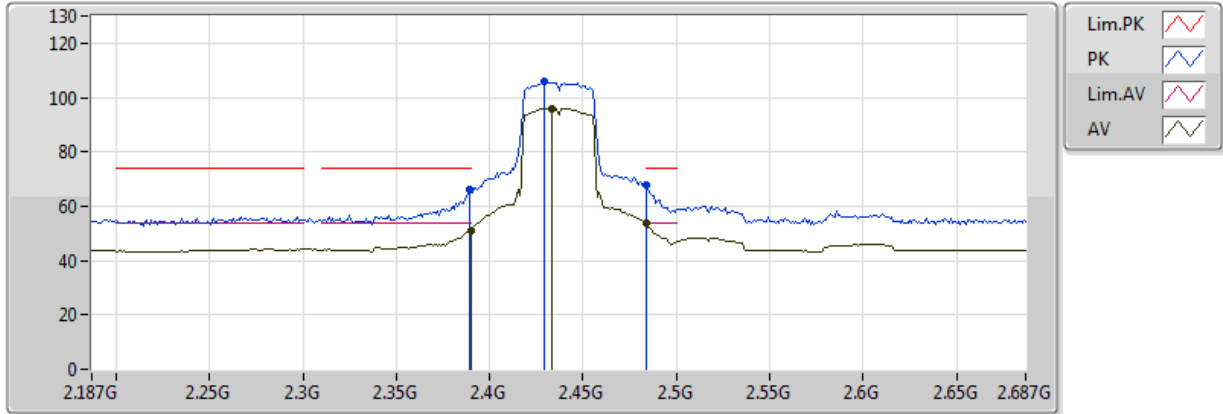


20170302  
 EUT\_Z\_2TX  
 Setting:35/33  
 01-S-6  
 FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.844016G	34.70	54.00	-19.30	4.76	3	H	298	1.19	-
PK	4.84432G	46.75	74.00	-27.25	4.76	3	H	298	1.19	-

### 802.11n HT40\_Nss1,(MCS0)\_2TX

### 2437MHz\_TX



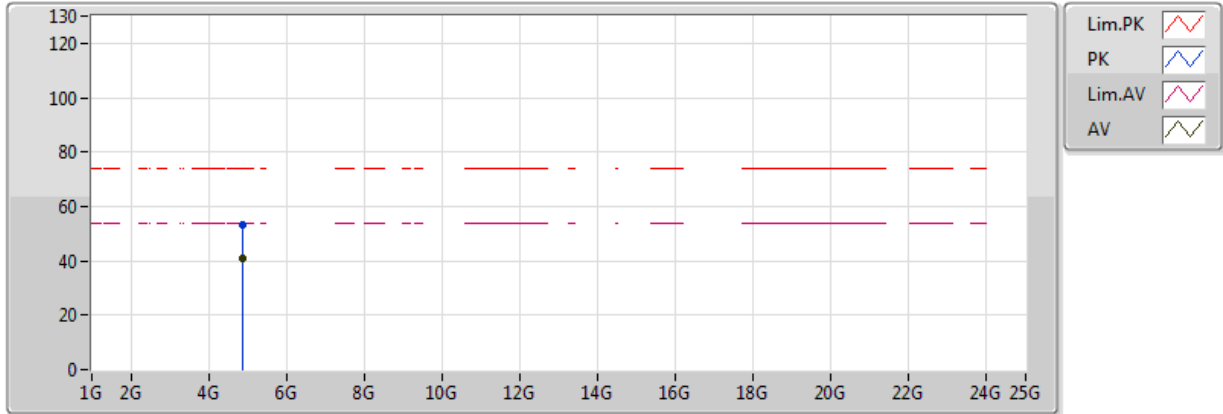
20170322  
 EUT\_Z\_2TX  
 Setting:38/37  
 01-W-3  
 FSP(100304)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.389998G	51.27	54.00	-2.73	31.04	3	V	306	1.72	-
AV	2.433G	96.00	Inf	-Inf	30.98	3	V	306	1.72	-
AV	2.483502G	53.75	54.00	-0.25	30.92	3	V	306	1.72	-
PK	2.389G	66.27	74.00	-7.73	31.04	3	V	306	1.72	-
PK	2.429G	105.99	Inf	-Inf	30.99	3	V	306	1.72	-
PK	2.483502G	67.99	74.00	-6.01	30.92	3	V	306	1.72	-



### 802.11n HT40\_Nss1,(MCS0)\_2TX

### 2437MHz\_TX

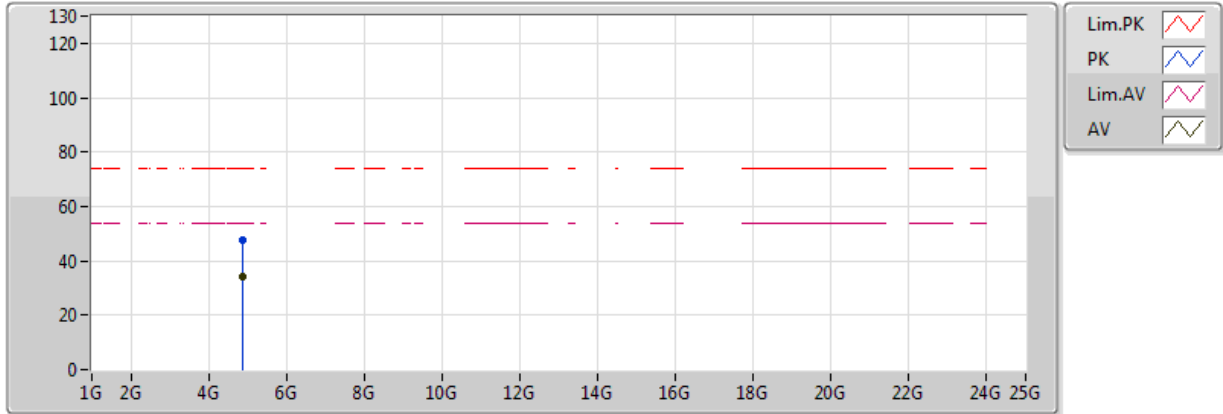


20170302  
 EUT\_Z\_2TX  
 Setting:38/37  
 01-S-6  
 FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.873988G	41.15	54.00	-12.85	4.82	3	V	338	2.24	-
PK	4.873976G	53.02	74.00	-20.98	4.82	3	V	338	2.24	-

### 802.11n HT40\_Nss1,(MCS0)\_2TX

### 2437MHz\_TX

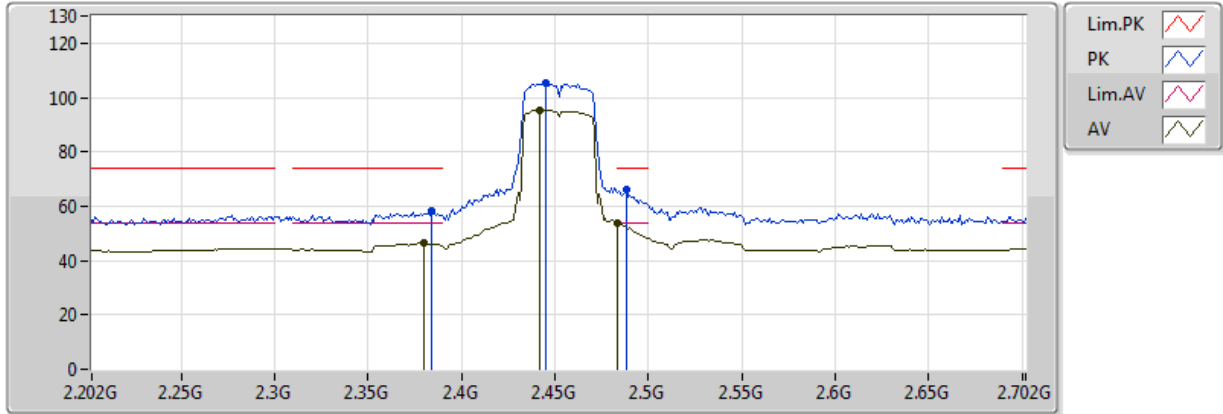


20170302  
 EUT\_Z\_2TX  
 Setting:38/37  
 01-S-6  
 FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.87396G	34.45	54.00	-19.55	4.82	3	H	297	1.23	-
PK	4.873776G	47.70	74.00	-26.30	4.82	3	H	297	1.23	-

### 802.11n HT40\_Nss1,(MCS0)\_2TX

### 2452MHz\_TX

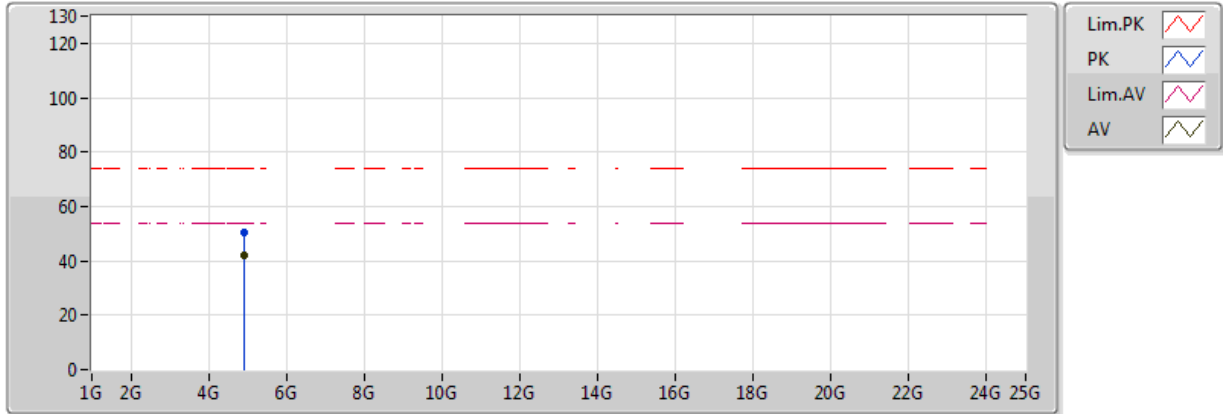


20170322  
 EUT\_Z\_2TX  
 Setting:28/27  
 01-W-3  
 FSP(100304)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	2.38G	46.37	54.00	-7.63	31.05	3	V	351	1.91	-
AV	2.442G	95.53	Inf	-Inf	30.97	3	V	351	1.91	-
AV	2.483502G	53.94	54.00	-0.06	30.92	3	V	351	1.91	-
PK	2.384G	58.04	74.00	-15.96	31.04	3	V	351	1.91	-
PK	2.445G	105.19	Inf	-Inf	30.97	3	V	351	1.91	-
PK	2.488G	66.37	74.00	-7.63	30.91	3	V	351	1.91	-

### 802.11n HT40\_Nss1,(MCS0)\_2TX

### 2452MHz\_TX

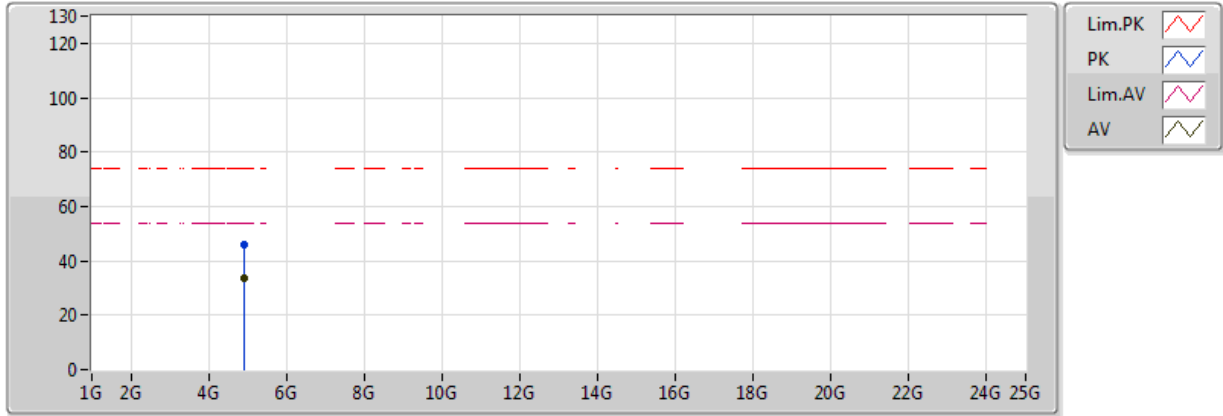


20170302  
 EUT\_Z\_2TX  
 Setting:28/27  
 01-S-6  
 FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.904012G	41.75	54.00	-12.25	4.88	3	V	331	2.32	-
PK	4.903904G	50.60	74.00	-23.40	4.88	3	V	331	2.32	-

### 802.11n HT40\_Nss1,(MCS0)\_2TX

### 2452MHz\_TX



20170302  
 EUT\_Z\_2TX  
 Setting:28/27  
 01-S-6  
 FSP(100019)

Type	Freq(Hz)	Level(dBuV/m)	Limit(dBuV/m)	Margin(dB)	Factor(dB)	Dist(m)	Pol.(H/V)	Azimuth(°)	Height(m)	Comments
AV	4.904G	33.46	54.00	-20.54	4.88	3	H	291	1.20	-
PK	4.904224G	46.10	74.00	-27.90	4.88	3	H	291	1.20	-