FCC RADIO TEST REPORT

FCC ID	:	MSQ-RTAXHP00
Equipment	:	Wireless-AX6000 Dual Band Gigabit Router
Brand Name	:	ASUS
Model Name	:	RT-AX88U, RT-AX6000, RT-AX88P, RT-AX88R, RT-AX88A
Applicant	:	ASUSTeK COMPUTER INC. 4F, No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan
Manufacturer (1)	:	Compal Networking (KunShan) Co., LTD. No. 520, Nanbang Rd., Economic & Technical Development Zone Kunshan, Jiangsu Province China
Manufacturer (2)	:	ASKEY TECHNOLOGY (JIANG SU) LTD NO1388, Jiao Tong Road, Wujiang Economic Technological Development Area Jiangsu Province 215200 China
Standard	:	47 CFR FCC Part 15.407

The product was received on Dec. 18, 2017, and testing was started from Feb. 21, 2018 and completed on Jun. 11, 2018. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this 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: Sam Chen

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

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History of this test report

Report No.	Version	Description	Issued Date
FR780707-03	01	Initial issue of report	Aug. 08, 2018

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	15.407(a)	Emission Bandwidth	PASS	-
3.2	15.407(a)	Maximum Conducted Output Power	PASS	-
3.3	15.407(a)	Peak Power Spectral Density	PASS	-
3.4	15.407(b)	Unwanted Emissions	PASS	-

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. 802.11	Ch. Frequency (MHz)	Channel Number
5150-5250	a, n (HT20), ac (VHT20), ax (HE20)	5180-5240	36-48 [4]
5250-5350		5260-5320	52-64 [4]
5470-5725		5500-5720	100-144 [12]
5725-5850		5745-5825	149-165 [5]
5150-5250	n (HT40), ac (VHT40), ax (HE40)	5190-5230	38-46 [2]
5250-5350		5270-5310	54-62 [2]
5470-5725		5510-5710	102-142 [6]
5725-5850		5755-5795	151-159 [2]
5150-5250	ac (VHT80), ax (HE80)	5210	42 [1]
5250-5350		5290	58 [1]
5470-5725		5530-5690	106-138 [3]
5725-5850		5775	155 [1]
5150-5350	ac (VHT160), ax (HE160)	5250	50 [1]
5470-5725		5570	114 [1]

Band	Mode	BWch (MHz)	Nant
5.15-5.25GHz	802.11a	20	4TX
5.15-5.25GHz	802.11n HT20	20	4TX
5.15-5.25GHz	802.11n HT40	40	4TX
5.15-5.25GHz	802.11ac VHT20	20	4TX
5.15-5.25GHz	802.11ac VHT40	40	4TX
5.15-5.25GHz	802.11ac VHT80	80	4TX
5.15-5.25GHz	802.11ac VHT160	160	4TX
5.15-5.25GHz	802.11n HT20-BF	20	4TX
5.15-5.25GHz	802.11n HT40-BF	40	4TX
5.15-5.25GHz	802.11ac VHT20-BF	20	4TX
5.15-5.25GHz	802.11ac VHT40-BF	40	4TX
5.15-5.25GHz	802.11ac VHT80-BF	80	4TX
5.15-5.25GHz	802.11ac VHT160-BF	160	4TX
5.15-5.25GHz	HE20	20	4TX
5.15-5.25GHz	HE40	40	4TX
5.15-5.25GHz	HE80	80	4TX
5.15-5.25GHz	HE160	160	4TX
5.15-5.25GHz	HE20,BF	20	4TX
5.15-5.25GHz	HE40,BF	40	4TX
5.15-5.25GHz	HE80,BF	80	4TX
5.15-5.25GHz	HE160,BF	160	4TX
5.25-5.35GHz	802.11a	20	4TX
5.25-5.35GHz	802.11n HT20	20	4TX
5.25-5.35GHz	802.11n HT40	40	4TX
5.25-5.35GHz	802.11ac VHT20	20	4TX
5.25-5.35GHz	802.11ac VHT40	40	4TX
5.25-5.35GHz	802.11ac VHT80	80	4TX
5.25-5.35GHz	802.11ac VHT160	160	4TX
5.25-5.35GHz	802.11n HT20-BF	20	4TX
5.25-5.35GHz	802.11n HT40-BF	40	4TX
5.25-5.35GHz	802.11ac VHT20-BF	20	4TX
5.25-5.35GHz	802.11ac VHT40-BF	40	4TX
5.25-5.35GHz	802.11ac VHT80-BF	80	4TX
5.25-5.35GHz	802.11ac VHT160-BF	160	4TX
5.25-5.35GHz	HE20	20	4TX
5.25-5.35GHz	HE40	40	4TX
5.25-5.35GHz	HE80	80	4TX
5.25-5.35GHz	HE160	160	4TX
5.25-5.35GHz	HE20,BF	20	4TX

Band	Mode	BWch (MHz)	Nant
5.25-5.35GHz	HE40,BF	40	4TX
5.25-5.35GHz	HE80,BF	80	4TX
5.25-5.35GHz	HE160,BF	160	4TX
5.47-5.725GHz	802.11a	20	4TX
5.47-5.725GHz	802.11n HT20	20	4TX
5.725-5.85GHz	802.11n HT20	20	4TX
5.47-5.725GHz	802.11n HT40	40	4TX
5.47-5.725GHz	802.11ac VHT20	20	4TX
5.47-5.725GHz	802.11ac VHT40	40	4TX
5.47-5.725GHz	802.11ac VHT80	80	4TX
5.47-5.725GHz	802.11ac VHT160	160	4TX
5.47-5.725GHz	802.11n HT20-BF	20	4TX
5.47-5.725GHz	802.11n HT40-BF	40	4TX
5.47-5.725GHz	802.11ac VHT20-BF	20	4TX
5.47-5.725GHz	802.11ac VHT40-BF	40	4TX
5.47-5.725GHz	802.11ac VHT80-BF	80	4TX
5.47-5.725GHz	802.11ac VHT160-BF	160	4TX
5.47-5.725GHz	HE20	20	4TX
5.47-5.725GHz	HE40	40	4TX
5.47-5.725GHz	HE80	80	4TX
5.47-5.725GHz	HE160	160	4TX
5.47-5.725GHz	HE20,BF	20	4TX
5.47-5.725GHz	HE40,BF	40	4TX
5.47-5.725GHz	HE80,BF	80	4TX
5.47-5.725GHz	HE160,BF	160	4TX
5.725-5.85GHz	802.11a	20	4TX
5.725-5.85GHz	802.11n HT20	20	4TX
5.725-5.85GHz	802.11n HT40	40	4TX
5.725-5.85GHz	802.11ac VHT20	20	4TX
5.725-5.85GHz	802.11ac VHT40	40	4TX
5.725-5.85GHz	802.11ac VHT80	80	4TX
5.725-5.85GHz	802.11n HT20-BF	20	4TX
5.725-5.85GHz	802.11ac VHT20-BF	20	4TX
5.725-5.85GHz	802.11n HT40-BF	40	4TX
5.725-5.85GHz	802.11ac VHT40-BF	40	4TX
5.725-5.85GHz	802.11ac VHT80-BF	80	4TX
5.725-5.85GHz	HEW20	20	4TX
5.725-5.85GHz	HEW40	40	4TX
5.725-5.85GHz	HEW80	80	4TX
5.725-5.85GHz	HEW20,BF	20	4TX

Band	Mode	BWch (MHz)	Nant
5.725-5.85GHz	HEW40,BF	40	4TX
5.725-5.85GHz	HEW80,BF	80	4TX

Note:
- 11a, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.
- VHT20, VHT40, VHT80 and VHT160 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- HEW20, HEW40, HEW80 and HEW160 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM 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

Set	2.4G Port	5G Port	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	1	2	M.gear	C660-510411-A	Dipole Antenna	Reverse SMA Plug	Note 1
	2	1					
	3	4					
	4	3					
2	-		PSA	RFDPA171300SBLB820	Dipole Antenna	Reverse SMA Plug	

Note1:

Set	2.4G Port	5G Port	Gain (dBi)			
			2.4GHz	5GHz Band 1 / Band 2	5GHz Band 3	5GHz Band 4
1	1	2	1.94	2.33	2.35	1.94
	2	1				
	3	4				
	4	3				
2	-		1.85	2.24	2.32	1.86

Note2: The EUT has two sets of antennas because set 1 & set 2 are the same type antennas, only the higher gain antenna “set 1” was tested.

<For 2.4GHz Band>

For IEEE 802.11b/g/n/ac/ax mode <4TX/4RX>:

Port 1, Port 2, Port 3 and Port 4 will transmit/receive the same signal simultaneously.

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

<For 5GHz Band>

For IEEE 802.11a/n/ac/ax mode <4TX/4RX>:

Port 1, Port 2, Port 3 and Port 4 will transmit/receive the same signal simultaneously.

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

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
HE160	0.906	0.429	288.75u	10k
HE160,BF	0.952	0.214	3.834m	300
802.11ac VHT160	0.969	0.137	2.24m	1k
802.11ac VHT160-BF	0.67	1.74	13.395m	1k

1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter			
Beamforming Function	☒	With beamforming for 802.11n/ac/ax in 2.4GHz and 5GHz.	☐	Without beamforming
Weather Band	☒	With 5600~5650MHz	☐	Without 5600~5650MHz
Function	☐	Outdoor P2M	☒	Indoor P2M
	☐	Fixed P2P	☐	Client
TPC Function	☒	With TPC	☐	Without TPC
Test Software Version	accessMTool_3_0_0_5			

1.1.5 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	Description
RT-AX88U	All the models are identical, the different model names served as marketing strategy.
RT-AX6000	
RT-AX88P	
RT-AX88R	
RT-AX88A	

From the above models, model: RT-AX88U was selected as representative model for the test and its data was recorded in this report.

1.1.6 Table for SKU information

EUT No.	SKU No. / Brand Name	P/N
1	SKU 1 / SWAPnet	NS604804
2	SKU 2 / Mingtek	HN4821CG

Note: The SKU does not affect the test result of RF tests, so only SKU 1 was tested and recorded in this report.

1.1.7 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR780707-01AB

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

Modifications	Performance Checking
1. Updating some power settings of 160MHz in ac mode. 2. Adding the bandwidth 160MHz for 5GHz ax mode (Thus change the firmware version).	1. Emission Bandwidth 2. Maximum Conducted Output Power 3. Peak Power Spectral Density 4. Unwanted Emissions (Above 1GHz)
3. Adding the function of Zero Wait for bandwidth 20/40/80 in DFS band.	There's no influence in this test report.
4. Adding the bridge mode. 5. Adding the extender mode. 6. Adding the home mesh mode.	It's no need to re-test.

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 789033 D02 v02r01
- FCC KDB 662911 D01 v02r01

1.3 Testing Location Information

Testing Location			
☐	HWA YA	ADD :	No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.).
		TEL :	886-3-327-3456 FAX : 886-3-327-0973
☒	JHUBEI	ADD :	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
		TEL :	886-3-656-9065 FAX : 886-3-656-9085

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH01-CB	Serway Li	20°C / 20%	Feb. 21, 2018~ Mar. 07 2018
Radiated	03CH01-CB	Cola Fan	22°C / 54%	May 10, 2018~ Jun. 11, 2018

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
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	9.74×10^{-8}	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	PowerSetting
802.11ac VHT160_Nss1,(MCS0)_4TX	-
5250MHz Straddle 5.15-5.25GHz	73
5250MHz Straddle 5.25-5.35GHz	73
HE160_Nss1,(MCS0)_4TX	-
5250MHz Straddle 5.15-5.25GHz	72
5250MHz Straddle 5.25-5.35GHz	72
5570MHz	70
HE160,BF_Nss1,(MCS0)_4TX	-
5250MHz Straddle 5.15-5.25GHz	70
5250MHz Straddle 5.25-5.35GHz	70
5570MHz	63

Note: 1.VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than 802.11ac VHT20 and VHT40.
2.There are two modes of EUT, one is beamforming mode, and the other is non-beamforming mode for 802.11ac/ax. All test results were recorded in the report.

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emission Bandwidth Maximum Conducted Output Power Peak Power Spectral Density
Test Condition	Conducted measurement at transmit chains
Test Mode	EUT 1 + AP Router (Master) Mode

The Worst Case Mode for Following Conformance Tests	
Tests Item	Unwanted Emissions
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
Operating Mode > 1GHz	CTX
Test Mode	EUT 1 + AP Router (Master) Mode

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
Operating Mode	
1	EUT 1 + AP Router (Master) Mode + WLAN 2.4GHz + WLAN 5GHz
Refer to Sporton Test Report No.: FA780707-03 for Co-location RF Exposure Evaluation.	

Note:

1. The EUT supports below functions:
(1) AP Router (Master)
(2) Client without radar detection
(3) Bridge (Client without radar detection)
(4) Repeater (Master)
(5) Mesh (Client without radar detection)
2. The EUT only be used at Z axis.

2.3 EUT Operation during Test

For CTX Mode:

non-beamforming mode:

The EUT was programmed to be in continuously transmitting mode.

beamforming mode:

For Conducted Mode:

The EUT was programmed to be in continuously transmitting mode.

For Radiated Mode:

During the test, the following programs under WIN 7 were executed.

The program was executed as follows:

1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under Telnet.
3. Executed "Telnet" to link with the remote workstation to transmit and receive packet by RX Device and transmit duty cycle no less than 98%.

2.4 Accessories

Accessories				
Equipment Name	**Brand Name**	**Model Name**	**type**	**Rating**
Adapter 1	DELTA	ADP-45BW B	-	INPUT: 100-240V ~ 1.2A, 50-60Hz OUTPUT: 19V, 2.37A
Adapter 2	PI	AD883J20	010K-7LF	INPUT: 100-240V ~ 50/60Hz, 1.0A OUTPUT: 19V, 2.37A
Adapter 3	PI	AD2066320	010-1LF	INPUT: 100-240V ~ 50/60Hz, 1.0A OUTPUT: 19V, 2.37A
Adapter 4	DELTA	ADP-45BW Y	-	INPUT: 100-240V ~ 50-60Hz, 1.2A OUTPUT: 19V, 2.37A
Other				
RJ-45 cable*1, Non-shielded, 1.5m				

Note: The power adapter does not affect the test result of RF tests, so only adapter 1 was tested and recorded in this report.

2.5 Support Equipment

For Test Site No: 03CH01-CB (above 1GHz)
<For Non-Beamforming Mode>

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

<For Beamforming Mode>

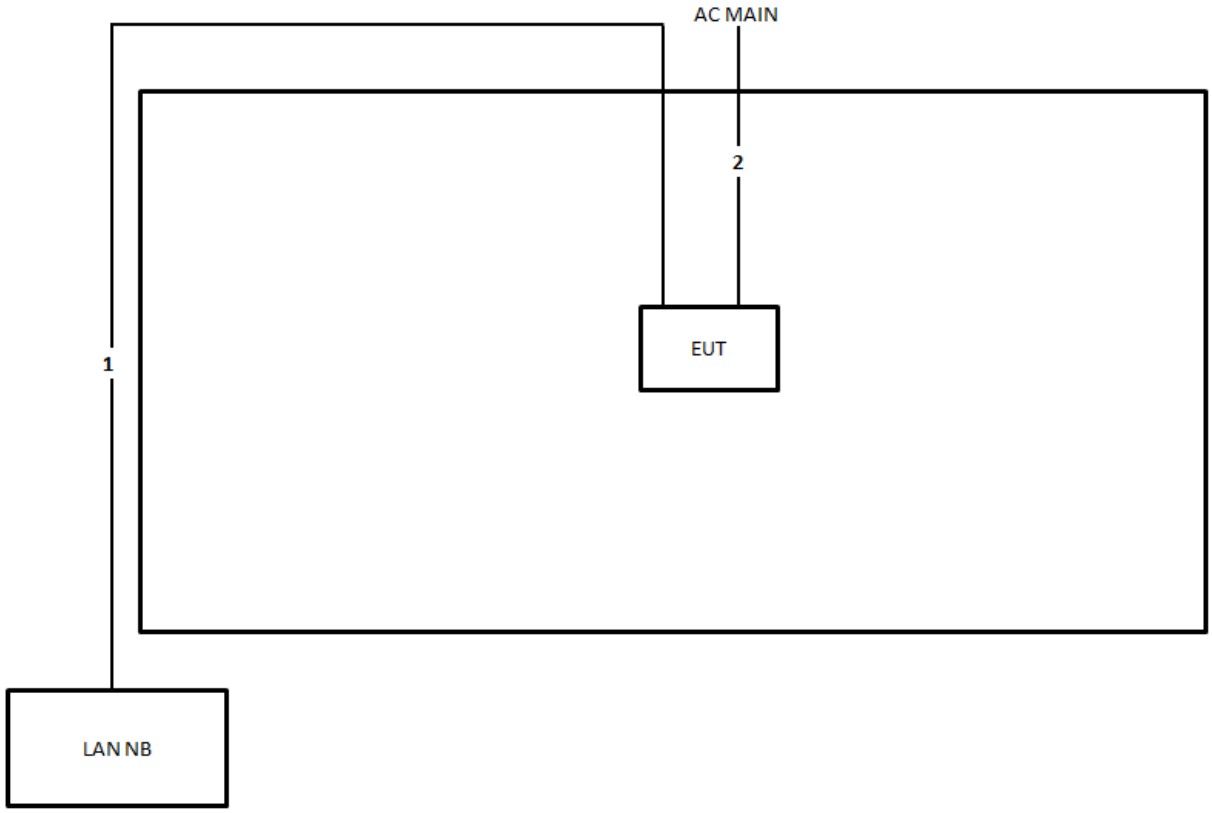
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook*2	DELL	E4300	N/A
2	RX Device	AVAGO	43684MCH5	N/A

For Test Site No: TH01-CB

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

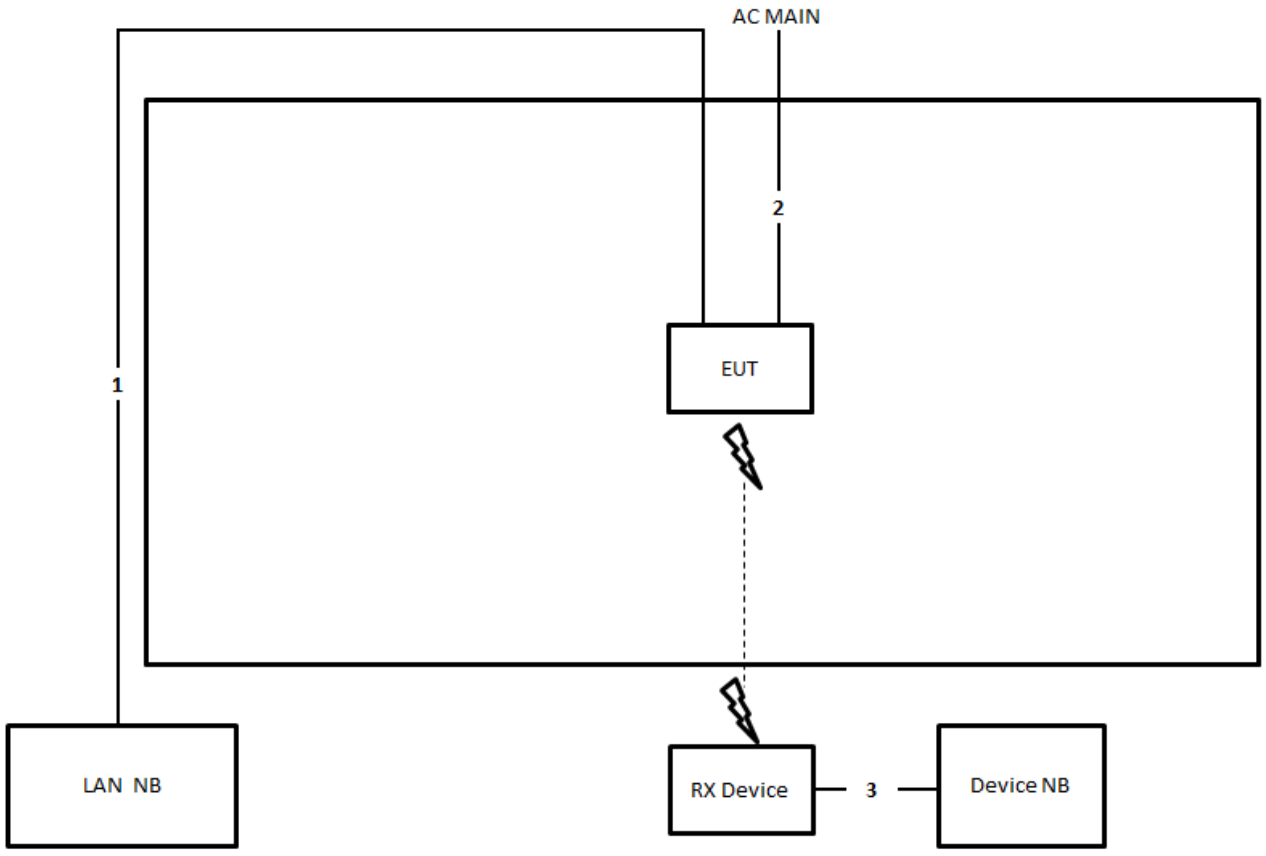
2.6 Test Setup Diagram

Test Setup Diagram - Radiated Test / For non-beamforming mode



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	Power cable	No	2.3m

Test Setup Diagram - Radiated Test / For beamforming mode



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	Power cable	No	2.3m
3	RJ-45 cable	No	1.5m

3 Transmitter Test Result

3.1 Emission Bandwidth

3.1.1 Emission Bandwidth Limit

Emission Bandwidth Limit	
UNII Devices	
☒	For the 5.15-5.25 GHz band, N/A
☒	For the 5.25-5.35 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
☒	For the 5.47-5.725 GHz band, the maximum conducted output power shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz.
☐	For the 5.725-5.85 GHz band, 6 dB emission bandwidth ≥ 500kHz.
LE-LAN Devices	
☐	For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
☐	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
☐	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
☐	For the 5.725-5.85 GHz band, 6 dB emission bandwidth ≥ 500kHz.

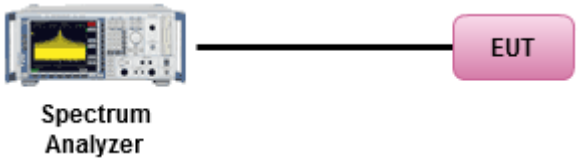
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

Test Method		
▪	For the emission bandwidth shall be measured using one of the options below:	
	☒	Refer as FCC KDB 789033, clause C for EBW and clause D for OBW measurement.
	☐	Refer as ANSI C63.10, clause 6.9.1 for occupied bandwidth testing.
	☐	Refer as IC RSS-Gen, clause 4.6 for bandwidth testing.

3.1.4 Test Setup

Emission Bandwidth


3.1.5 Test Result of Emission Bandwidth

Refer as Appendix A

3.2 Maximum Conducted Output Power

3.2.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit	
UNII Devices	
☒	For the 5.15-5.25 GHz band:
	▪ Outdoor AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6). e.i.r.p. at any elevation angle above 30 degrees ≤ 125mW [21dBm]
	▪ Indoor AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6)
	▪ Point-to-point AP: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W If G_{TX} > 23 dBi, then P_{Out} = 30 – (G_{TX} – 23).
	▪ Mobile or Portable Client: the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW. If G_{TX} > 6 dBi, then P_{Out} = 24 – (G_{TX} – 6).
☒	For the 5.25-5.35 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 dBi, then P_{Out} = 24 – (G_{TX} – 6).
☒	For the 5.47-5.725 GHz band, the maximum conducted output power (P_{Out}) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If G_{TX} > 6 dBi, then P_{Out} = 24 – (G_{TX} – 6).
☐	For the 5.725-5.85 GHz band:
	▪ Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6).
	▪ Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W.
LE-LAN Devices	
☐	For the 5.15-5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
☐	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
☐	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
☐	For the 5.725-5.85 GHz band:
	▪ Point-to-multipoint systems (P2M): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W. If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6).
	▪ Point-to-point systems (P2P): the maximum conducted output power (P_{Out}) shall not exceed the lesser of 1 W.
P_{Out} = maximum conducted output power in dBm, **G_{TX}** = the maximum transmitting antenna directional gain in dBi.	

3.2.2 Measuring Instruments

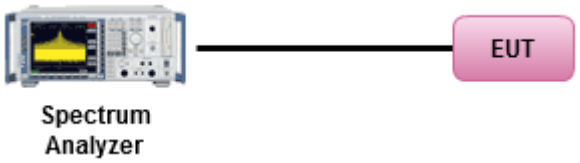
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

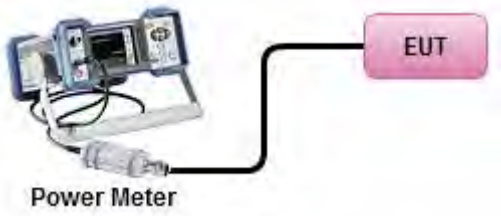
Test Method	
▪ Maximum Conducted Output Power	
	Average over on/off periods with duty factor
	☒ Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).
	☐ Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)
	Wideband RF power meter and average over on/off periods with duty factor
	☒ Refer as FCC KDB 789033, clause E Method PM-G (using an RF average power meter).
▪ For conducted measurement.	
	▪ If the EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
	▪ If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \ldots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.2.4 Test Setup

For Straddle channel test:

RF Output Power (Spectrum Analyzer)


For other test:

RF Output Power (Power Meter)


3.2.5 Test Result of Maximum Conducted Output Power

Refer as Appendix B

3.3 Peak Power Spectral Density

3.3.1 Peak Power Spectral Density Limit

Peak Power Spectral Density Limit	
UNII Devices	
☒	For the 5.15-5.25 GHz band:
	▪ Outdoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 6 dBi, then P_{Out} = 17 – (G_{TX} – 6).
	▪ Indoor AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 6 dBi, then P_{Out} = 17 – (G_{TX} – 6).
	▪ Point-to-point AP: the peak power spectral density (PPSD) shall not exceed the lesser of 17dBm/MHz. If G_{TX} > 23 dBi, then P_{Out} = 17 – (G_{TX} – 23).
	▪ Mobile or Portable Client: the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G_{TX} > 6 dBi, then PPSD= 11 – (G_{TX} – 6)..
☒	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G_{TX} > 6 dBi, then PPSD= 11 – (G_{TX} – 6).
☒	For the 5.47-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz. If G_{TX} > 6 dBi, then PPSD= 11 – (G_{TX} – 6).
☐	For the 5.725-5.85 GHz band:
	▪ Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If G_{TX} > 6 dBi, then PPSD= 30 – (G_{TX} – 6).
	▪ Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.
LE-LAN Devices	
☐	For the 5.15-5.25 GHz band, the e.i.r.p. peak power spectral density (PPSD) ≤ 10 dBm/MHz.
☐	For the 5.25-5.35 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz.
	▪ e.i.r.p. greater than 200 mW shall comply with the following e.i.r.p. at different elevations, where θ is the angle above the local horizontal plane (of the Earth) as shown below: -13 dBW/MHz for 0° ≤ θ < 8° ; -13 − 0.716 (θ-8) dBW/MHz for 8° ≤ θ < 40° -35.9 − 1.22 (θ-40) dBW/MHz for 40° ≤ θ ≤ 45° ; -42 dBW/MHz for θ > 45°
☐	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the peak power spectral density (PPSD) ≤ 11 dBm/MHz.
☐	For the 5.725-5.85 GHz band:
	▪ Point-to-multipoint systems (P2M): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz. If G_{TX} > 6 dBi, then PPSD= 30 – (G_{TX} – 6).
	▪ Point-to-point systems (P2P): the peak power spectral density (PPSD) ≤ 30 dBm/500kHz.
PPSD = peak power spectral density that he same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz **G_{TX}** = the maximum transmitting antenna directional gain in dBi.	

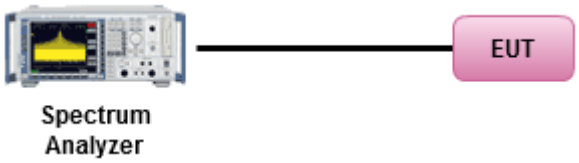
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

Test Method		
▪ Peak power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the peak power spectral density and use the peak search function on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density shall be measured using below options:		
	☐ Refer as FCC KDB 789033, F)5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth	
	[duty cycle ≥ 98% or external video / power trigger]	
	☒ Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).	
	☐ Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)	
	duty cycle < 98% and average over on/off periods with duty factor	
	☒ Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).	
	☐ Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)	
▪ For conducted measurement.		
	▪ If the EUT supports multiple transmit chains using options given below:	
		☒ Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.
		☐ Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,
		☐ Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.
	▪	If multiple transmit chains, EIRP PPSD calculation could be following as methods: $PPSD_{total} = PPSD_1 + PPSD_2 + \ldots + PPSD_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = PPSD_{total} + DG$

3.3.4 Test Setup

Power Spectral Density


3.3.5 Test Result of Peak Power Spectral Density

Refer as Appendix C

3.4 Unwanted Emissions

3.4.1 Transmitter Radiated Unwanted Emissions Limit

Unwanted emissions below 1 GHz and restricted band emissions above 1GHz 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.

Un-restricted band emissions above 1GHz Limit	
Operating Band	**Limit**
☒ 5.15 - 5.25 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
☒ 5.25 - 5.35 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
☒ 5.47 - 5.725 GHz	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
☐ 5.725 - 5.85 GHz	Follow 15.407(b)(4)(ii), the emission limits in § 15.247(d), 30dBc in any 100 kHz bandwidth outside the operating frequency band.

Note 1: 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).

3.4.2 Measuring Instruments

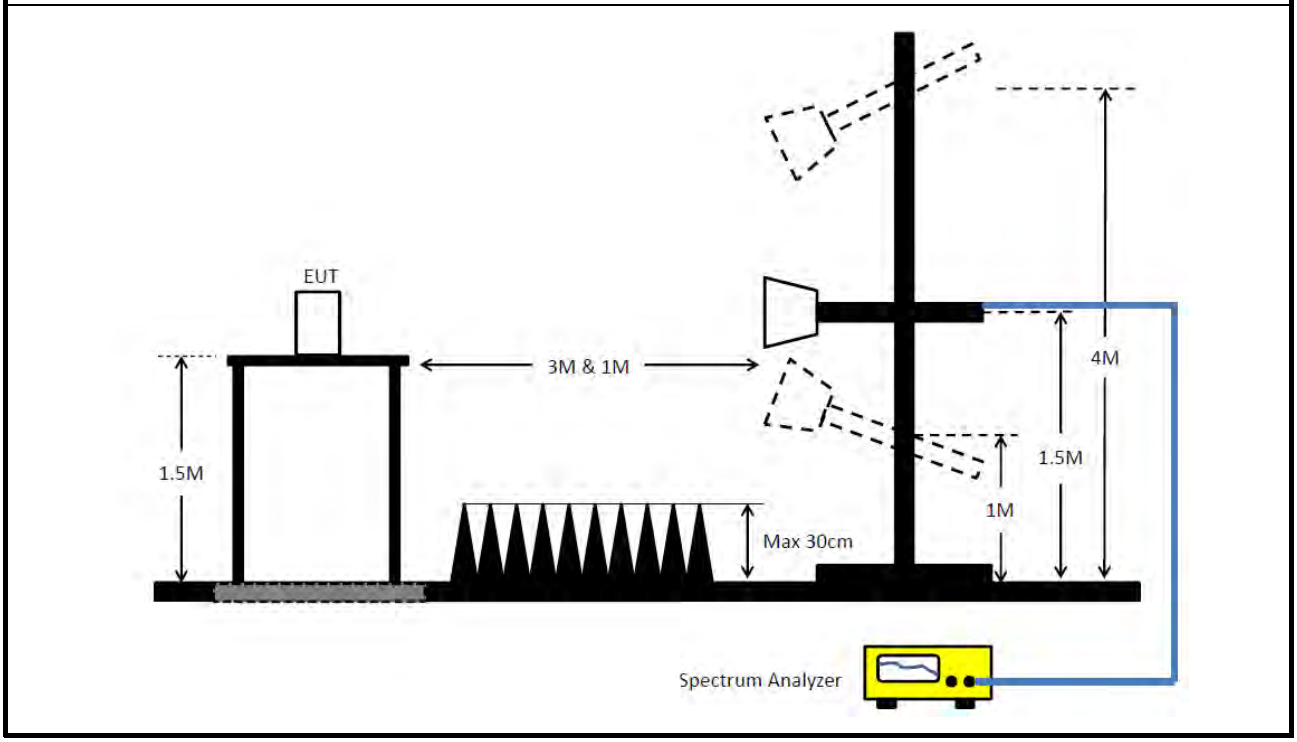
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method		
▪ 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. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. 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).		
▪ The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].		
▪ For the transmitter unwanted emissions shall be measured using following options below:		
	▪ Refer as FCC KDB 789033, clause H)2) for unwanted emissions into non-restricted bands.	
	▪ Refer as Clause 11.11 of ANSI C63.10-2013 and/or in Section 11.0 of KDB Publication 558074 for unwanted emissions into non-restricted bands.	
	▪ Refer as FCC KDB 789033, clause H)1) for unwanted emissions into restricted bands.	
		☐ Refer as FCC KDB 789033, H)6) Method AD (Trace Averaging).
		☒ Refer as FCC KDB 789033, H)6) Method VB (Reduced VBW).
		☐ Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.
		☐ Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
		☒ Refer as FCC KDB 789033, clause H)5) measurement procedure peak limit.
		☐ Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
▪ For radiated measurement.		
	▪ Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.	
	▪ Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.	
	▪ Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.	
▪ The any unwanted emissions level shall not exceed the fundamental emission level.		
▪ All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.		

3.4.4 Test Setup

Transmitter Radiated Unwanted Emissions
Above 1GHz



3.4.5 Test Result of Transmitter Unwanted Emissions

Refer as Appendix D

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Horn Antenna	EMCO	3115	00075790	750MHz ~ 18GHz	Nov. 20, 2017	Nov. 19, 2018	Radiation (03CH01-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Jul. 05, 2017	Jul. 04, 2018	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Jan. 09, 2018	Jan. 08, 2019	Radiation (03CH01-CB)
Pre-Amplifier	MITEQ	TTA1840-35-HG	1864479	18GHz ~ 40GHz	Jul. 10, 2017	Jul. 09, 2018	Radiation (03CH01-CB)
Spectrum Analyzer	R&S	FSP40	100056	9kHz ~ 40GHz	Nov. 23, 2017	Nov. 22, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-16+17	N/A	1 GHz ~ 18 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#1	N/A	18GHz ~ 40 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-40G#2	N/A	18GHz ~ 40 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSV40	100979	9kHz~40GHz	Dec. 21, 2017	Dec. 20, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-06	1 GHz – 26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-07	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-08	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-09	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
RF Cable-high	Woken	RG402	High Cable-10	1 GHz –26.5 GHz	Oct. 11, 2017	Oct. 10, 2018	Conducted (TH01-CB)
Power Sensor	Agilent	U2021XA	MY53410001	50MHz~18GHz	Nov. 20, 2017	Nov. 19, 2018	Conducted (TH01-CB)

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

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
5.15-5.25GHz	-	-	-	-	-
802.11ac VHT160_Nss1,(MCS0)_4TX	80.96M	75.642M	75M6D1D	80.64M	75.402M
HE160_Nss1,(MCS0)_4TX	80.72M	76.922M	76M9D1D	80.24M	76.762M
HE160,BF_Nss1,(MCS0)_4TX	80.64M	76.922M	76M9D1D	80.32M	76.682M
5.25-5.35GHz	-	-	-	-	-
802.11ac VHT160_Nss1,(MCS0)_4TX	81.28M	75.722M	75M7D1D	80.88M	75.562M
HE160_Nss1,(MCS0)_4TX	80.96M	77.081M	77M1D1D	80.48M	76.682M
HE160,BF_Nss1,(MCS0)_4TX	80.96M	77.081M	77M1D1D	80.4M	76.842M
5.47-5.725GHz	-	-	-	-	-
HE160_Nss1,(MCS0)_4TX	163.6M	155.122M	155MD1D	162.8M	154.323M
HE160,BF_Nss1,(MCS0)_4TX	163.4M	154.723M	155MD1D	163M	154.323M

Max-N dB = Maximum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;
Max-OBW = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth for 5.725-5.85GHz band / Maximum 26dB down bandwidth for other band;
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)	Port 3-N dB (Hz)	Port 3-OBW (Hz)	Port 4-N dB (Hz)	Port 4-OBW (Hz)
802.11ac VHT160_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5250MHz Straddle 5.15-5.25GHz	Pass	Inf	80.88M	75.402M	80.64M	75.642M	80.96M	75.562M	80.96M	75.562M
5250MHz Straddle 5.25-5.35GHz	Pass	Inf	80.88M	75.562M	80.96M	75.562M	80.96M	75.562M	81.28M	75.722M
HE160_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5250MHz Straddle 5.15-5.25GHz	Pass	Inf	80.24M	76.922M	80.72M	76.762M	80.64M	76.922M	80.72M	76.922M
5250MHz Straddle 5.25-5.35GHz	Pass	Inf	80.96M	77.081M	80.48M	76.682M	80.8M	76.762M	80.72M	76.842M
5570MHz	Pass	Inf	163.6M	155.122M	163.2M	154.723M	162.8M	154.323M	163.2M	154.323M
HE160,BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-	-	-
5250MHz Straddle 5.15-5.25GHz	Pass	Inf	80.64M	76.922M	80.32M	76.682M	80.64M	76.682M	80.56M	76.922M
5250MHz Straddle 5.25-5.35GHz	Pass	Inf	80.96M	77.081M	80.96M	77.001M	80.4M	76.842M	80.8M	76.922M
5570MHz	Pass	Inf	163.4M	154.323M	163M	154.523M	163.2M	154.323M	163.2M	154.723M

Port X-N dB = Port **X** 6dB down bandwidth for 5.725-5.85GHz band / 26dB down bandwidth for other band
Port X-OBW = Port **X** 99% occupied bandwidth;

802.11ac VHT160_Nss1,(MCS0)_4TX

EBW

5250MHz Straddle 5.15-5.25GHz

18/05/2018

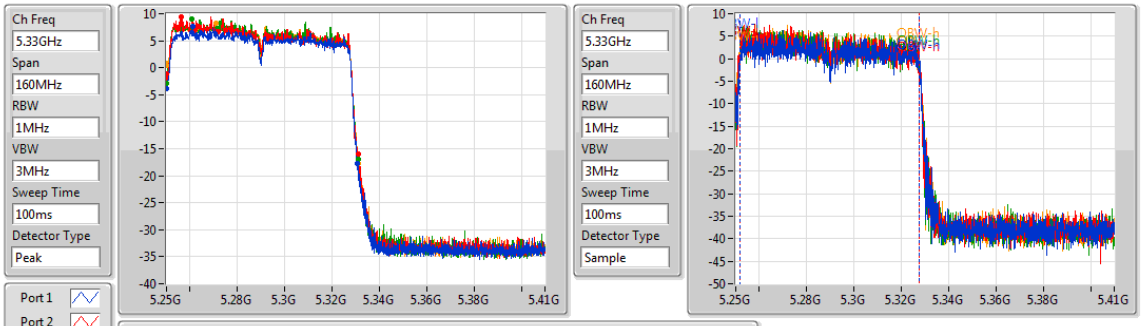
26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
80.88M	5.16912G	5.25G	75.402M	5.172559G	5.247961G	Inf	1
80.64M	5.16936G	5.25G	75.642M	5.172559G	5.248201G	Inf	2
80.96M	5.16904G	5.25G	75.562M	5.172559G	5.248121G	Inf	3
80.96M	5.16904G	5.25G	75.562M	5.172559G	5.248121G	Inf	4

802.11ac VHT160_Nss1,(MCS0)_4TX

EBW

5250MHz Straddle 5.25-5.35GHz

18/05/2018



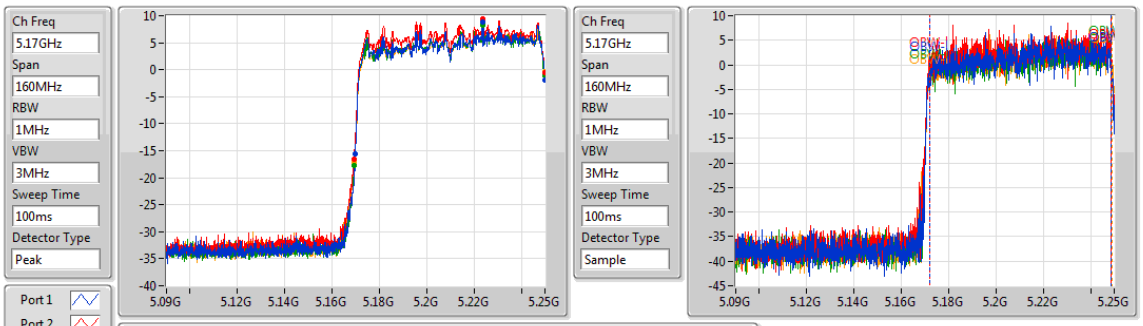
26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
80.88M	5.25G	5.33088G	75.562M	5.251879G	5.327441G	Inf	1
80.96M	5.25G	5.33096G	75.562M	5.251799G	5.327361G	Inf	2
80.96M	5.25G	5.33096G	75.562M	5.251799G	5.327361G	Inf	3
81.28M	5.25G	5.33128G	75.722M	5.251719G	5.327441G	Inf	4

HE160_Nss1,(MCS0)_4TX

EBW

5250MHz Straddle 5.15-5.25GHz

17/05/2018

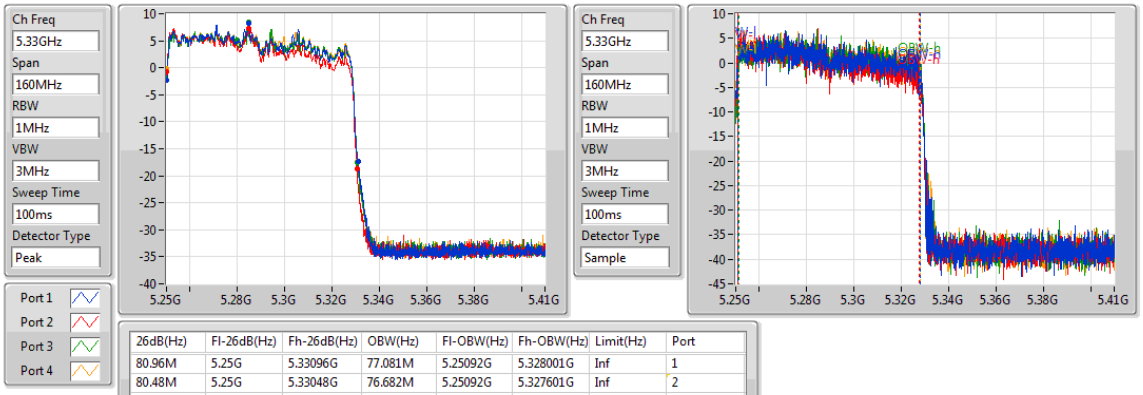


26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
80.24M	5.16976G	5.25G	76.922M	5.171839G	5.248761G	Inf	1
80.72M	5.16928G	5.25G	76.762M	5.171839G	5.248601G	Inf	2
80.64M	5.16936G	5.25G	76.922M	5.171839G	5.248761G	Inf	3
80.72M	5.16928G	5.25G	76.922M	5.172079G	5.249G	Inf	4

HE160_Nss1,(MCS0)_4TX **EBW**

5250MHz Straddle 5.25-5.35GHz

17/05/2018

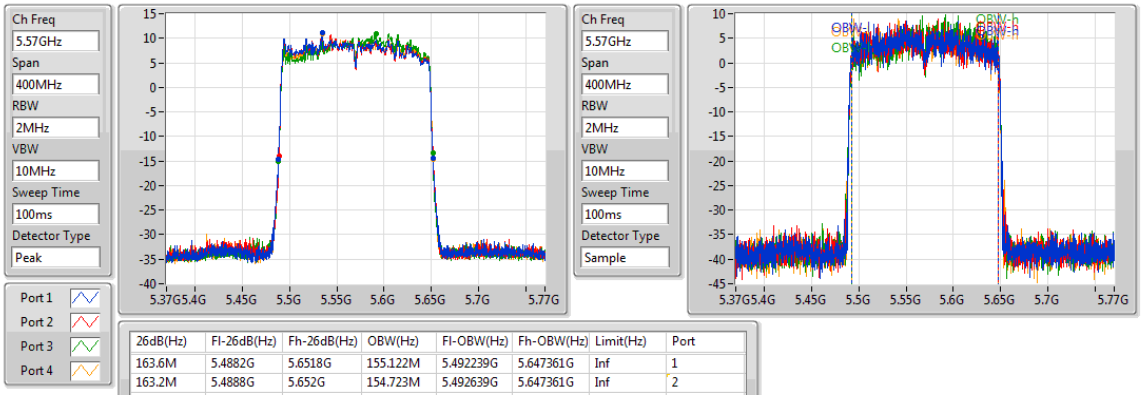


26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
80.96M	5.25G	5.33096G	77.081M	5.25092G	5.328001G	Inf	1
80.48M	5.25G	5.33048G	76.682M	5.25092G	5.327601G	Inf	2
80.8M	5.25G	5.3308G	76.762M	5.251159G	5.327921G	Inf	3
80.72M	5.25G	5.33072G	76.842M	5.251G	5.327841G	Inf	4

HE160_Nss1,(MCS0)_4TX **EBW**

5570MHz

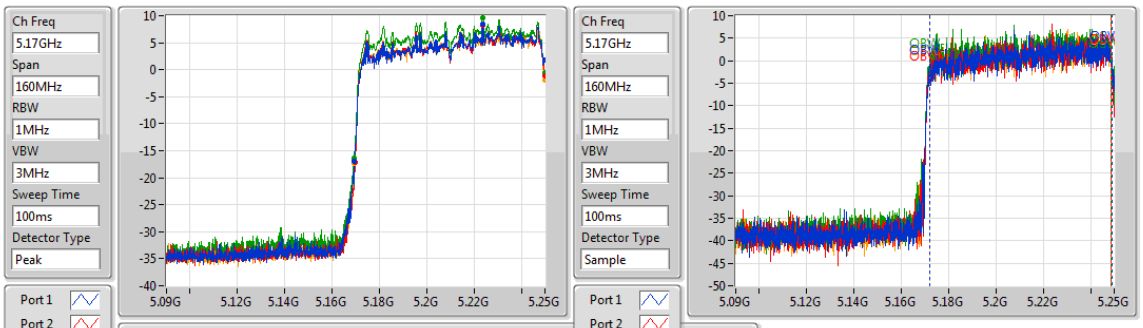
30/04/2018



26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
163.6M	5.4882G	5.6518G	155.122M	5.492239G	5.647361G	Inf	1
163.2M	5.4888G	5.652G	154.723M	5.492639G	5.647361G	Inf	2
162.8M	5.4886G	5.6514G	154.323M	5.493038G	5.647361G	Inf	3
163.2M	5.4886G	5.6518G	154.323M	5.492639G	5.646962G	Inf	4

HE160,BF_Nss1,(MCS0)_4TX **EBW**

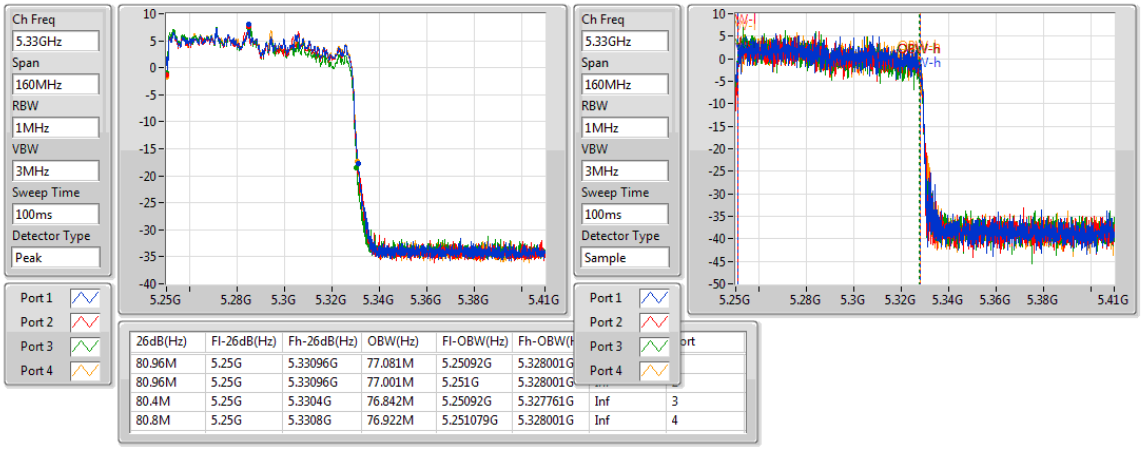
5250MHz Straddle 5.15-5.25GHz



26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
80.64M	5.16936G	5.25G	76.922M	5.171999G	5.248921G		
80.32M	5.16968G	5.25G	76.682M	5.172079G	5.248761G		
80.64M	5.16936G	5.25G	76.682M	5.171999G	5.248681G	Inf	3
80.56M	5.16944G	5.25G	76.922M	5.171919G	5.248841G	Inf	4

HE160,BF_Nss1,(MCS0)_4TX **EBW**

5250MHz Straddle 5.25-5.35GHz

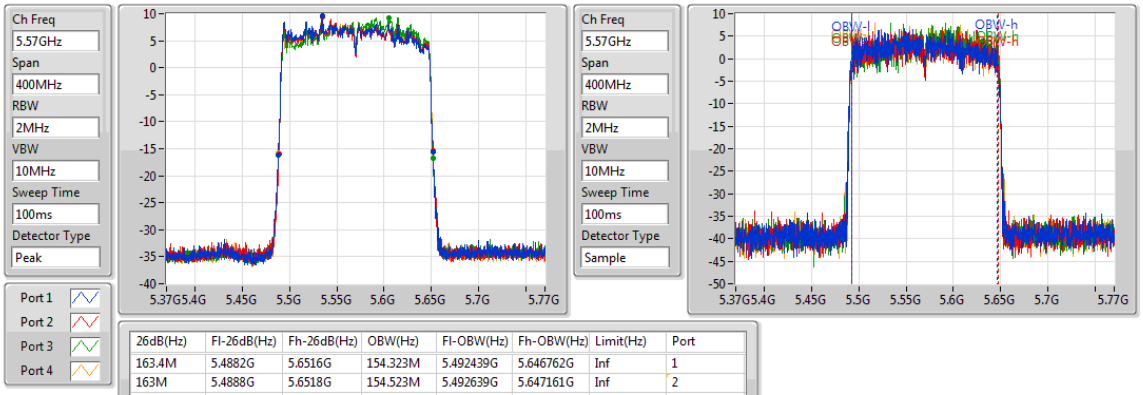


26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
80.96M	5.25G	5.33096G	77.081M	5.25092G	5.328001G	Inf	1
80.96M	5.25G	5.33096G	77.001M	5.251G	5.328001G	Inf	2
80.4M	5.25G	5.3304G	76.842M	5.25092G	5.327761G	Inf	3
80.8M	5.25G	5.3308G	76.922M	5.251079G	5.328001G	Inf	4

HE160,BF_Nss1,(MCS0)_4TX **EBW**

5570MHz

30/04/2018



26dB(Hz)	Fl-26dB(Hz)	Fh-26dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
163.4M	5.4882G	5.6516G	154.323M	5.492439G	5.646762G	Inf	1
163M	5.4888G	5.6518G	154.523M	5.492639G	5.647161G	Inf	2
163.2M	5.4886G	5.6518G	154.323M	5.493038G	5.647361G	Inf	3
163.2M	5.4886G	5.6518G	154.723M	5.492839G	5.647561G	Inf	4

Summary

Mode	Total Power (dBm)	Total Power (W)
5.15-5.25GHz	-	-
802.11ac VHT160_Nss1,(MCS0)_4TX	22.54	0.17947
HE160_Nss1,(MCS0)_4TX	21.71	0.14825
HE160,BF_Nss1,(MCS0)_4TX	21.29	0.13459
5.25-5.35GHz	-	-
802.11ac VHT160_Nss1,(MCS0)_4TX	22.35	0.17179
HE160_Nss1,(MCS0)_4TX	21.17	0.13092
HE160,BF_Nss1,(MCS0)_4TX	20.71	0.11776
5.47-5.725GHz	-	-
HE160_Nss1,(MCS0)_4TX	23.31	0.21429
HE160,BF_Nss1,(MCS0)_4TX	21.60	0.14454

Result

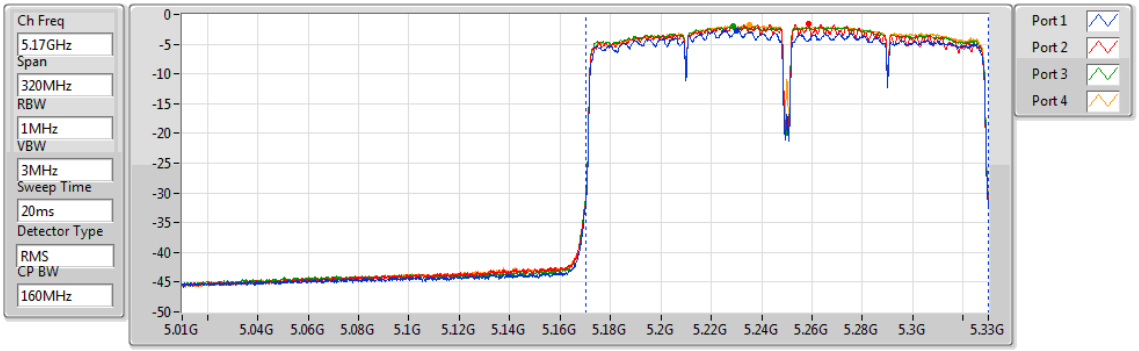
Mode	Result	DG (dBi)	Port 1 (dBm)	Port 2 (dBm)	Port 3 (dBm)	Port 4 (dBm)	Total Power (dBm)	Power Limit (dBm)
802.11ac VHT160_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5250MHz Straddle 5.15-5.25GHz	Pass	2.33	15.79	16.57	16.77	16.88	22.54	30.00
5250MHz Straddle 5.25-5.35GHz	Pass	2.33	15.43	16.36	16.62	16.77	22.35	23.98
HE160_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5250MHz Straddle 5.15-5.25GHz	Pass	2.33	15.31	16.55	15.28	15.49	21.71	30.00
5250MHz Straddle 5.25-5.35GHz	Pass	2.33	15.21	14.53	15.28	15.50	21.17	23.98
5570MHz	Pass	2.35	17.22	17.04	17.63	17.26	23.31	23.98
HE160,BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5250MHz Straddle 5.15-5.25GHz	Pass	8.35	14.86	14.62	16.32	15.07	21.29	27.65
5250MHz Straddle 5.25-5.35GHz	Pass	8.35	14.81	14.50	14.55	14.87	20.71	21.63
5570MHz	Pass	8.37	15.55	15.42	15.71	15.65	21.60	21.61

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

802.11ac VHT160_Nss1,(MCS0)_4TX — AV Power

5250MHz Straddle 5.15-5.25GHz

18/05/2018



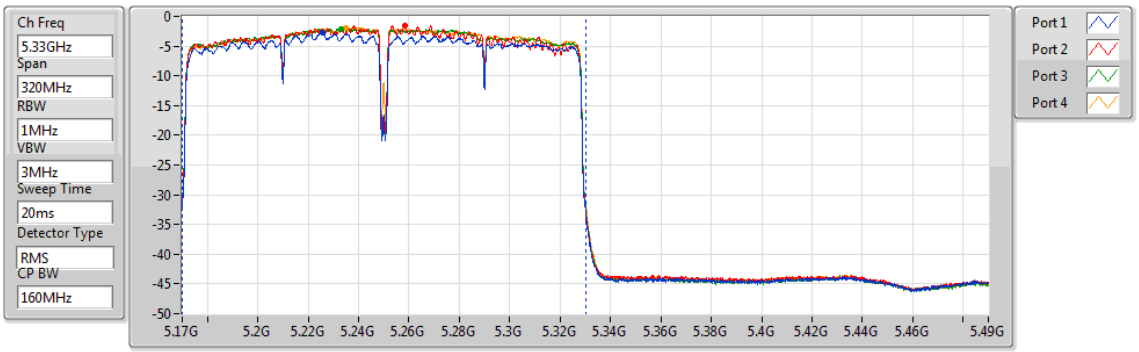
Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)	P2(dBm)	P3(dBm)	P4(dBm)
22.54	15.79	16.57	16.77	16.88

802.11ac VHT160_Nss1,(MCS0)_4TX — AV Power

5250MHz Straddle 5.25-5.35GHz

18/05/2018



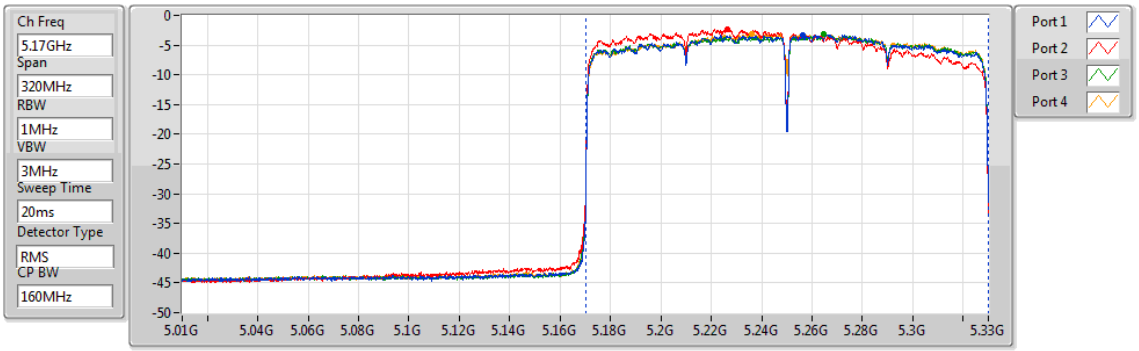
Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)	P2(dBm)	P3(dBm)	P4(dBm)
22.35	15.43	16.36	16.62	16.77

HE160_Nss1,(MCS0)_4TX — AV Power

5250MHz Straddle 5.15-5.25GHz

17/05/2018



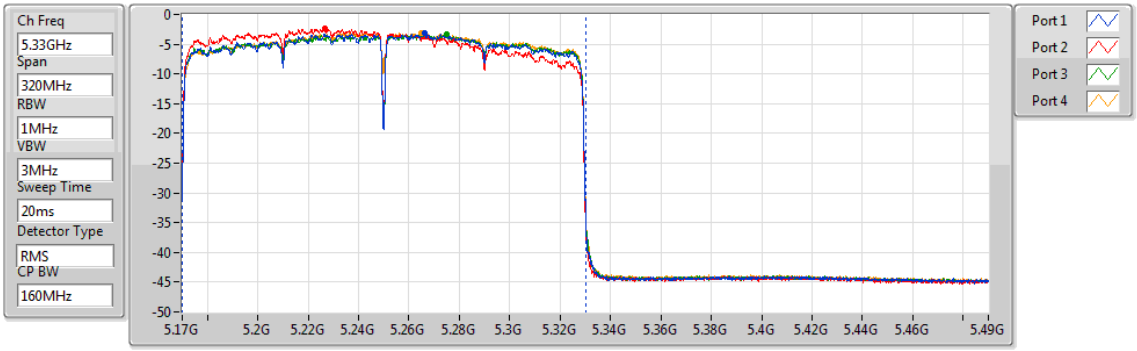
Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)	P2(dBm)	P3(dBm)	P4(dBm)
21.71	15.31	16.55	15.28	15.49

HE160_Nss1,(MCS0)_4TX — AV Power

5250MHz Straddle 5.25-5.35GHz

17/05/2018

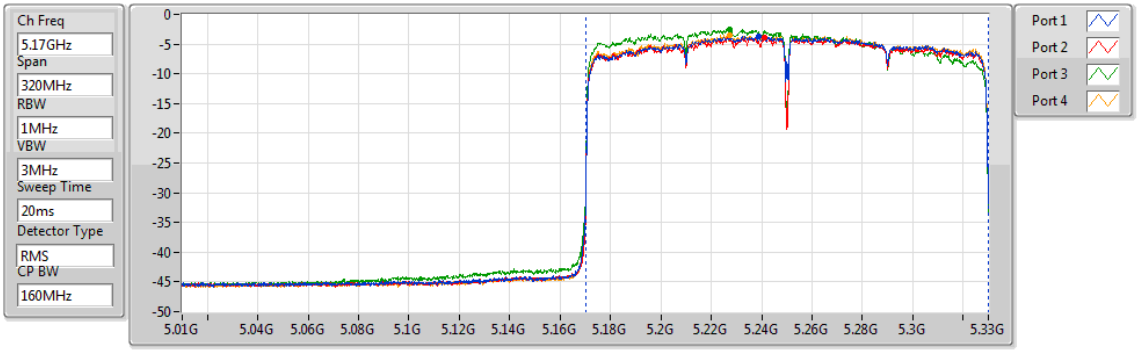


Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)	P2(dBm)	P3(dBm)	P4(dBm)
21.17	15.21	14.53	15.28	15.50

HE160,BF_Nss1,(MCS0)_4TX — AV Power

5250MHz Straddle 5.15-5.25GHz

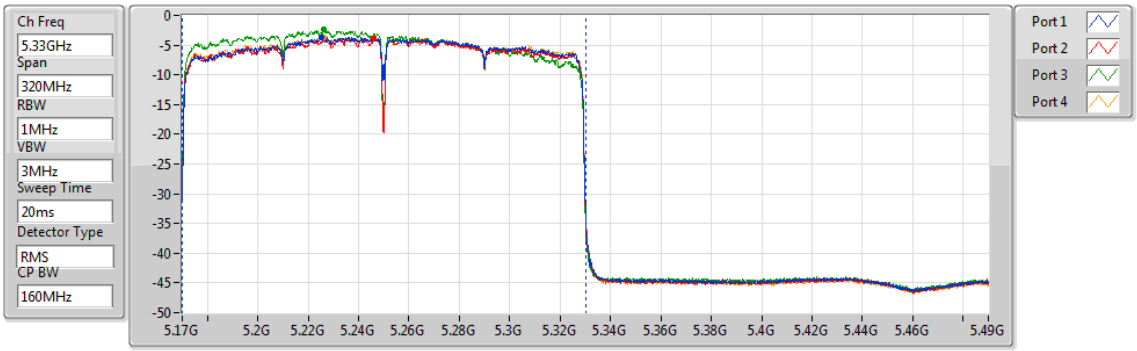


Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)	P2(dBm)	P3(dBm)	P4(dBm)
21.29	14.86	14.62	16.32	15.07

HE160,BF_Nss1,(MCS0)_4TX — AV Power

5250MHz Straddle 5.25-5.35GHz



Sum=Total Power
PX=Port X

Sum(dBm)	P1(dBm)	P2(dBm)	P3(dBm)	P4(dBm)
20.71	14.81	14.50	14.55	14.87

Summary

Mode	PD (dBm/RBW)
5.15-5.25GHz	-
802.11ac VHT160_Nss1,(MCS0)_4TX	3.65
HE160_Nss1,(MCS0)_4TX	2.76
HE160,BF_Nss1,(MCS0)_4TX	2.40
5.25-5.35GHz	-
802.11ac VHT160_Nss1,(MCS0)_4TX	3.62
HE160_Nss1,(MCS0)_4TX	2.52
HE160,BF_Nss1,(MCS0)_4TX	2.01
5.47-5.725GHz	-
HE160_Nss1,(MCS0)_4TX	1.92
HE160,BF_Nss1,(MCS0)_4TX	0.32

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

Result

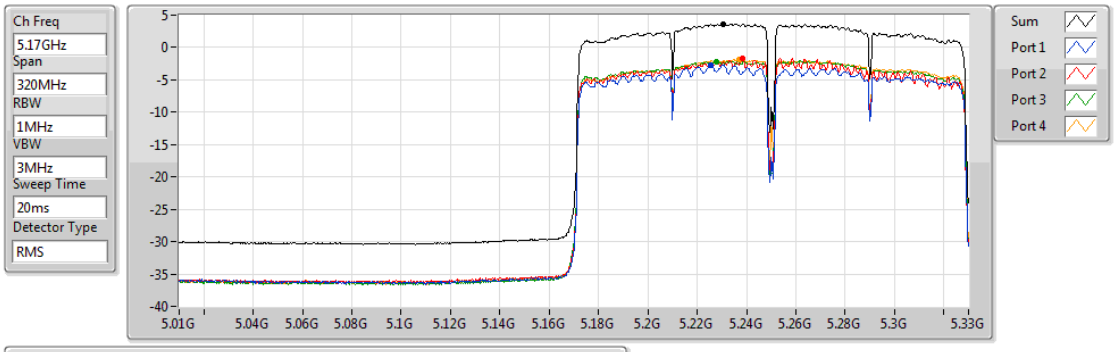
Mode	Result	DG (dBi)	Port 1 (dBm/RBW)	Port 2 (dBm/RBW)	Port 3 (dBm/RBW)	Port 4 (dBm/RBW)	PD (dBm/RBW)	PD Limit (dBm/RBW)
802.11ac VHT160_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5250MHz Straddle 5.15-5.25GHz	Pass	8.35	-2.69	-1.73	-2.14	-1.89	3.65	14.65
5250MHz Straddle 5.25-5.35GHz	Pass	8.35	-3.30	-1.59	-2.00	-1.90	3.62	8.65
HE160_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5250MHz Straddle 5.15-5.25GHz	Pass	8.35	-3.45	-2.52	-3.67	-3.14	2.76	14.65
5250MHz Straddle 5.25-5.35GHz	Pass	8.35	-3.29	-3.30	-3.48	-3.22	2.52	8.65
5570MHz	Pass	8.37	-4.29	-3.71	-2.99	-4.29	1.92	8.63
HE160,BF_Nss1,(MCS0)_4TX	-	-	-	-	-	-	-	-
5250MHz Straddle 5.15-5.25GHz	Pass	8.35	-3.85	-4.05	-2.55	-3.72	2.40	14.65
5250MHz Straddle 5.25-5.35GHz	Pass	8.35	-4.11	-4.28	-3.61	-3.84	2.01	8.65
5570MHz	Pass	8.37	-5.85	-5.53	-4.45	-5.80	0.32	8.63

DG = Directional Gain; **RBW** = 500kHz 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 Xpower density;

802.11ac VHT160_Nss1,(MCS0)_4TX PSD

5250MHz Straddle 5.15-5.25GHz

18/05/2018

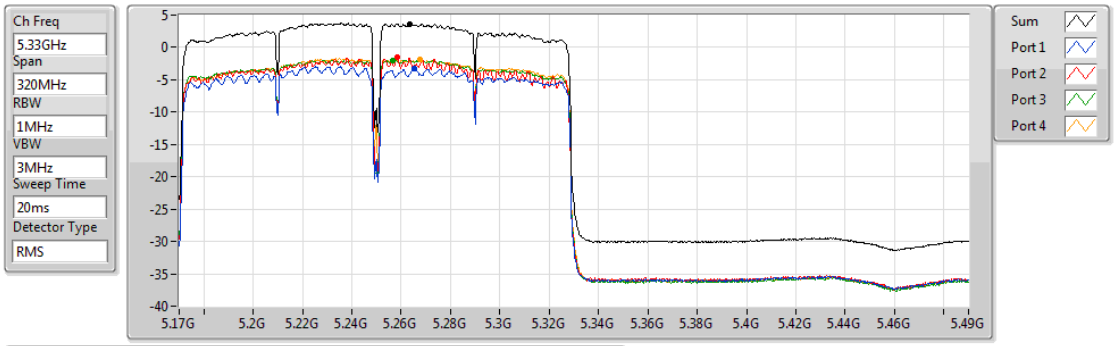


Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
3.65	3.65	-2.69	-1.73	-2.14	-1.89

802.11ac VHT160_Nss1,(MCS0)_4TX PSD

5250MHz Straddle 5.25-5.35GHz

18/05/2018

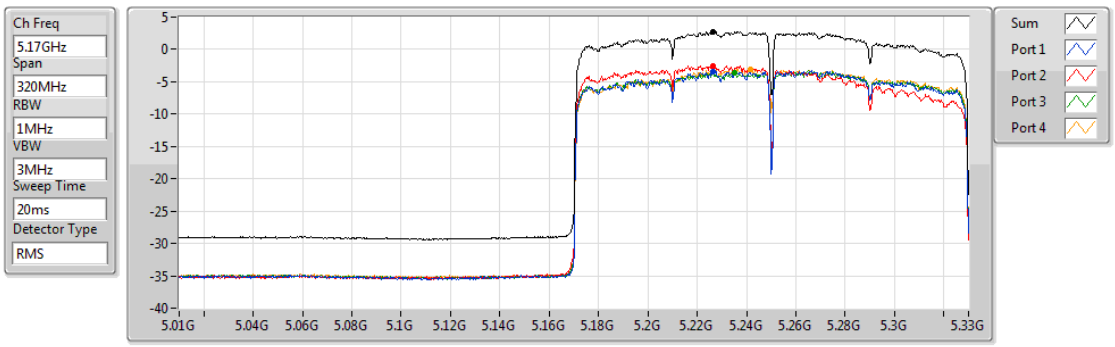


Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
3.62	3.62	-3.30	-1.59	-2.00	-1.90

HE160_Nss1,(MCS0)_4TX PSD

5250MHz Straddle 5.15-5.25GHz

17/05/2018

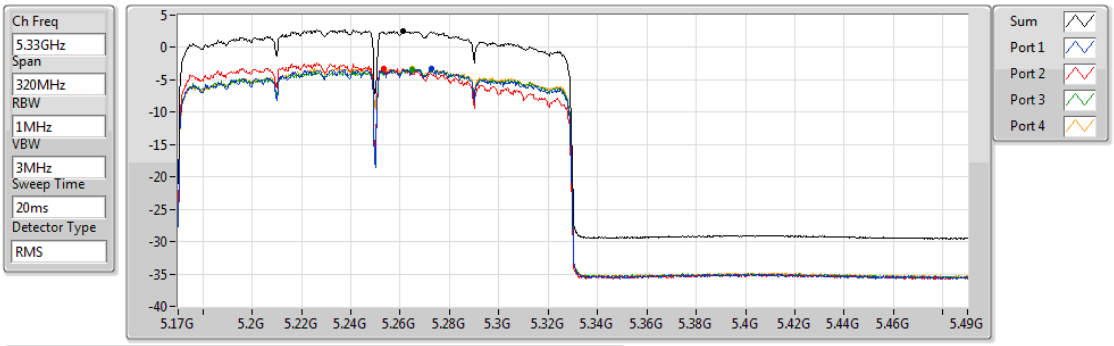


Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
2.76	2.76	-3.45	-2.52	-3.67	-3.14

HE160_Nss1,(MCS0)_4TX PSD

5250MHz Straddle 5.25-5.35GHz

17/05/2018

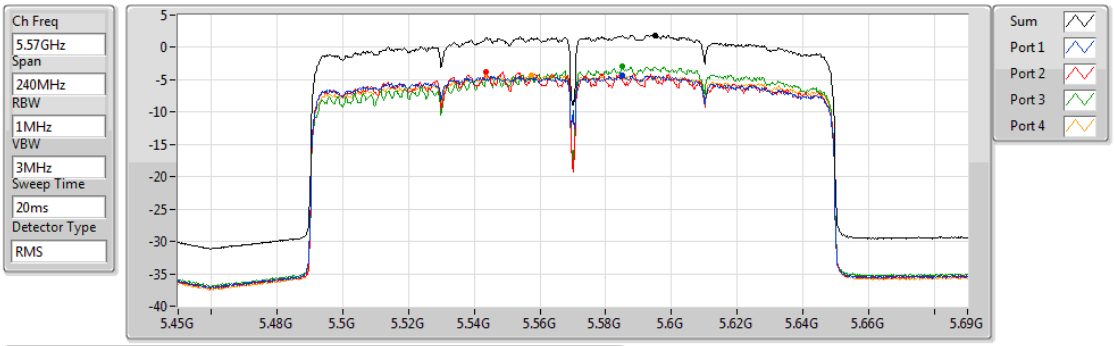


Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
2.52	2.52	-3.29	-3.30	-3.48	-3.22

HE160_Nss1,(MCS0)_4TX PSD

5570MHz

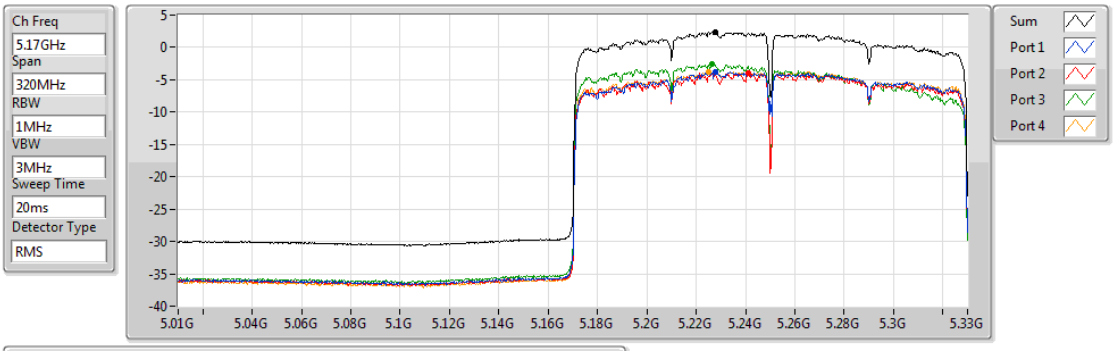
30/04/2018



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
1.92	1.92	-4.29	-3.71	-2.99	-4.29

HE160,BF_Nss1,(MCS0)_4TX PSD

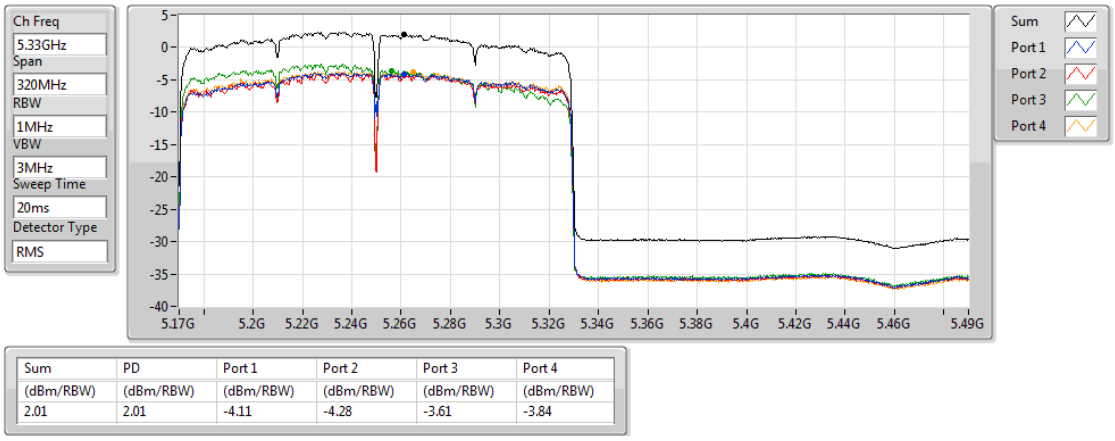
5250MHz Straddle 5.15-5.25GHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
2.40	2.40	-3.85	-4.05	-2.55	-3.72

HE160,BF_Nss1,(MCS0)_4TX **PSD**

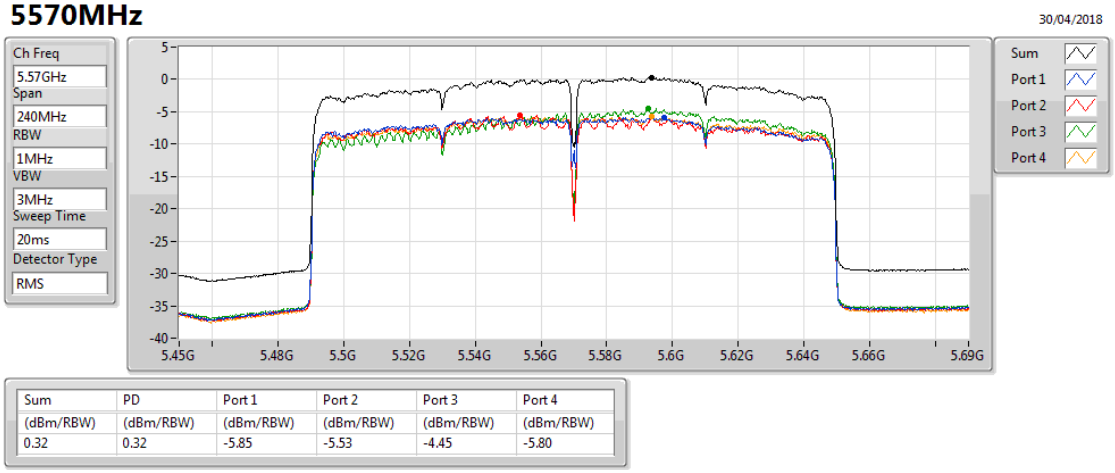
5250MHz Straddle 5.25-5.35GHz



Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
2.01	2.01	-4.11	-4.28	-3.61	-3.84

HE160,BF_Nss1,(MCS0)_4TX **PSD**

5570MHz



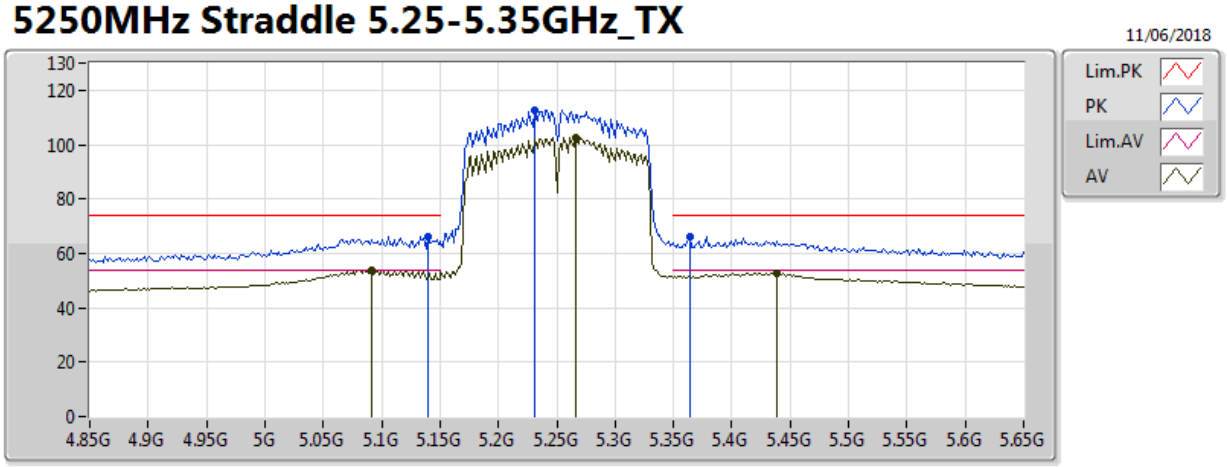
Sum	PD	Port 1	Port 2	Port 3	Port 4
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
0.32	0.32	-5.85	-5.53	-4.45	-5.80

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
5.47-5.725GHz	-	-	-	-	-	-	-	-	-	-	-	-
HEW160_Nss1,(MCS0)_4TX	Pass	AV	5.426G	53.93	54.00	-0.07	7.82	3	Vertical	28	1.86	-

802.11ac VHT160_Nss1,(MCS0)_4TX

5250MHz Straddle 5.25-5.35GHz_TX

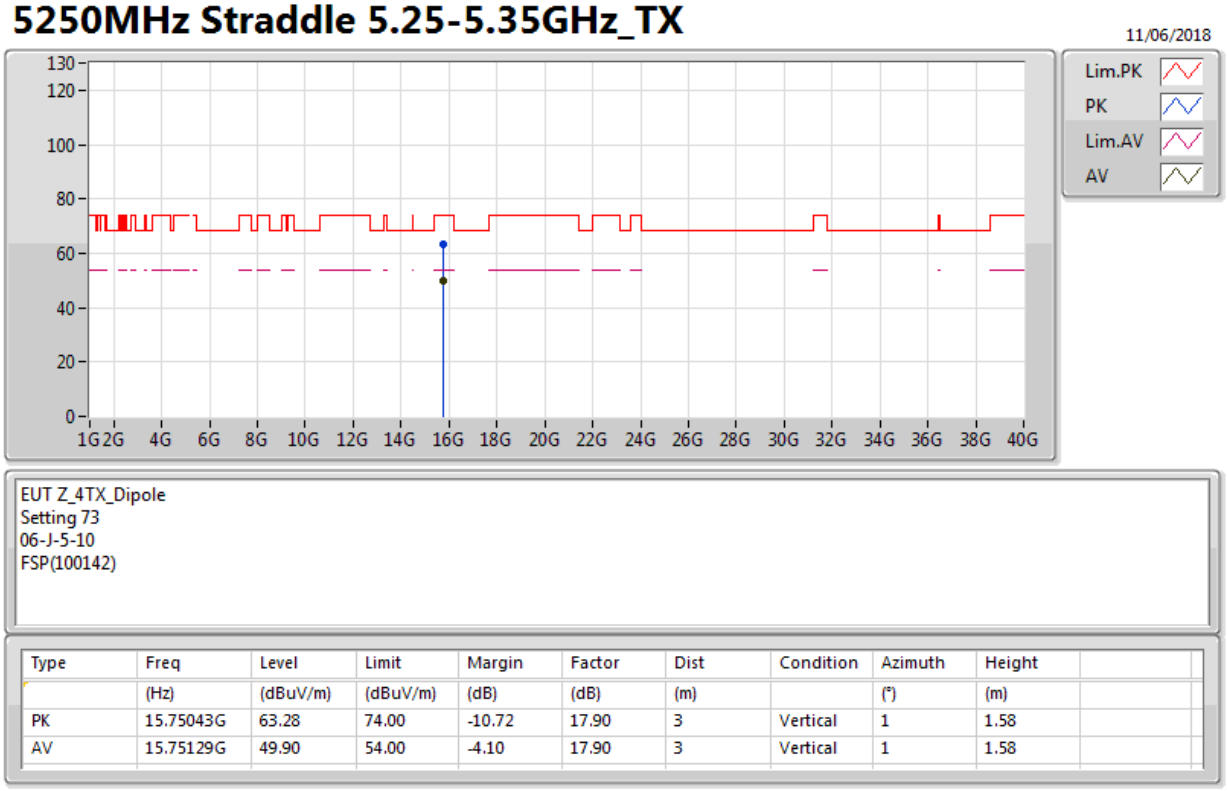


EUT Z_4TX_Dipole
Setting 73
06-J-5-10
FSP(100142)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
PK	5.1396G	66.38	74.00	-7.62	7.37	3	Vertical	30	2.43
AV	5.0916G	53.83	54.00	-0.17	7.30	3	Vertical	30	2.43
PK	5.2308G	112.77	Inf	-Inf	7.51	3	Vertical	30	2.43
AV	5.266G	102.57	Inf	-Inf	7.56	3	Vertical	30	2.43
PK	5.3636G	66.20	74.00	-7.80	7.70	3	Vertical	30	2.43
AV	5.4388G	52.76	54.00	-1.24	7.79	3	Vertical	30	2.43

802.11ac VHT160_Nss1,(MCS0)_4TX

5250MHz Straddle 5.25-5.35GHz_TX

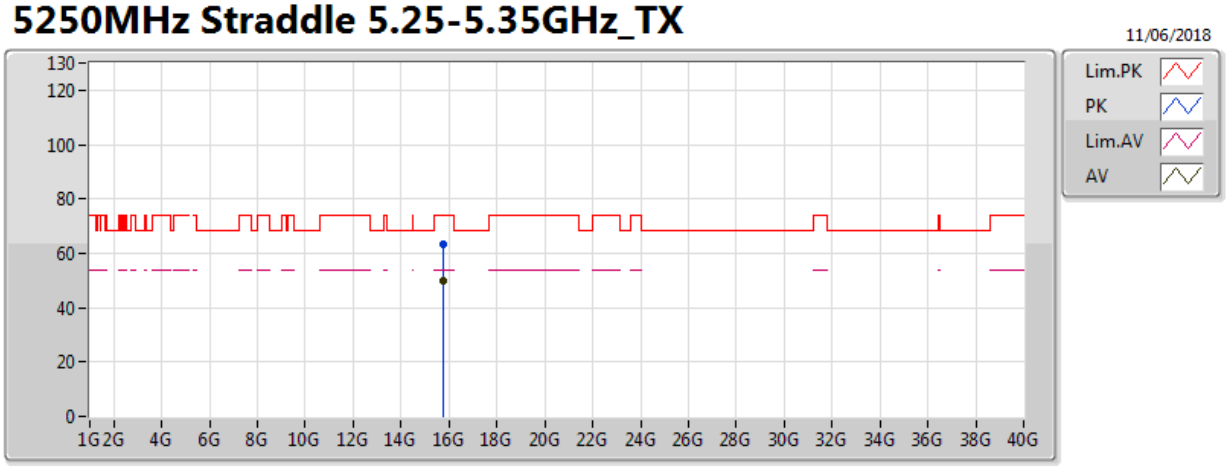


EUT Z_4TX_Dipole
Setting 73
06-J-5-10
FSP(100142)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
PK	15.75043G	63.28	74.00	-10.72	17.90	3	Vertical	1	1.58
AV	15.75129G	49.90	54.00	-4.10	17.90	3	Vertical	1	1.58

802.11ac VHT160_Nss1,(MCS0)_4TX

5250MHz Straddle 5.25-5.35GHz_TX

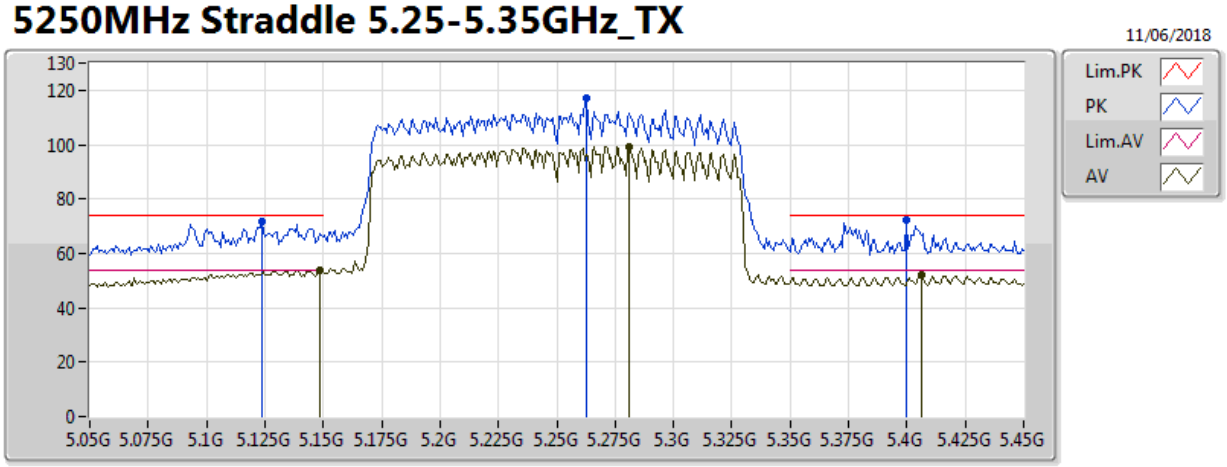


EUT Z_4TX_Dipole
Setting 73
06-J-5-10
FSP(100142)

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
PK	15.75812G	63.26	74.00	-10.74	17.88	3	Horizontal	242	1.50
AV	15.74352G	49.98	54.00	-4.02	17.92	3	Horizontal	242	1.50

HEW160_Nss1,(MCS0)_4TX

5250MHz Straddle 5.25-5.35GHz_TX



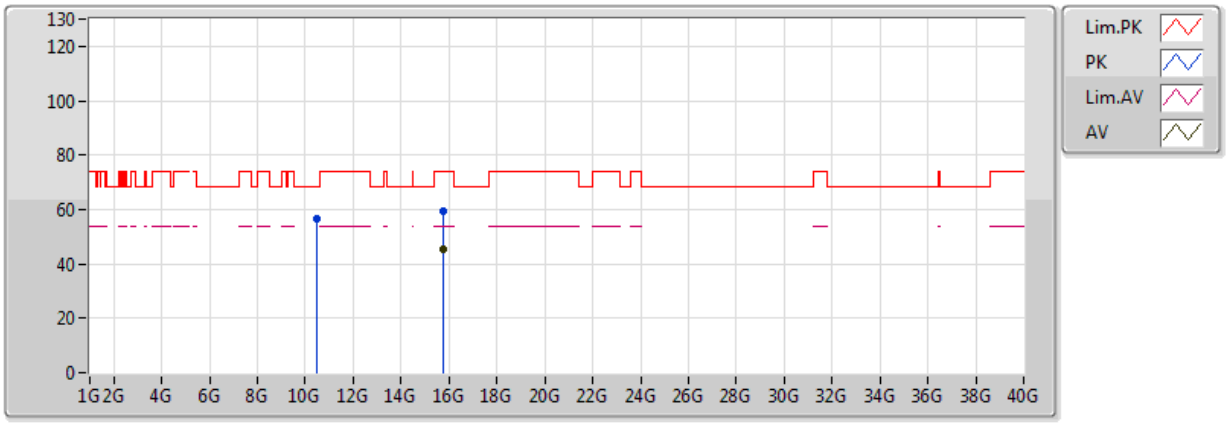
EUT Z Dipole_4TX
Setting 72
06-B-1-10
FSP

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
PK	5.1236G	71.49	74.00	-2.51	4.99	3	Vertical	174	2.64
AV	5.1484G	53.82	54.00	-0.18	5.01	3	Vertical	174	2.64
PK	5.2628G	117.02	Inf	-Inf	5.15	3	Vertical	174	2.64
AV	5.2812G	99.45	Inf	-Inf	5.17	3	Vertical	174	2.64
PK	5.3996G	72.13	74.00	-1.87	5.31	3	Vertical	174	2.64
AV	5.406G	52.35	54.00	-1.65	5.31	3	Vertical	174	2.64

HEW160_Nss1,(MCS0)_4TX

5250MHz Straddle 5.25-5.35GHz_TX

11/06/2018



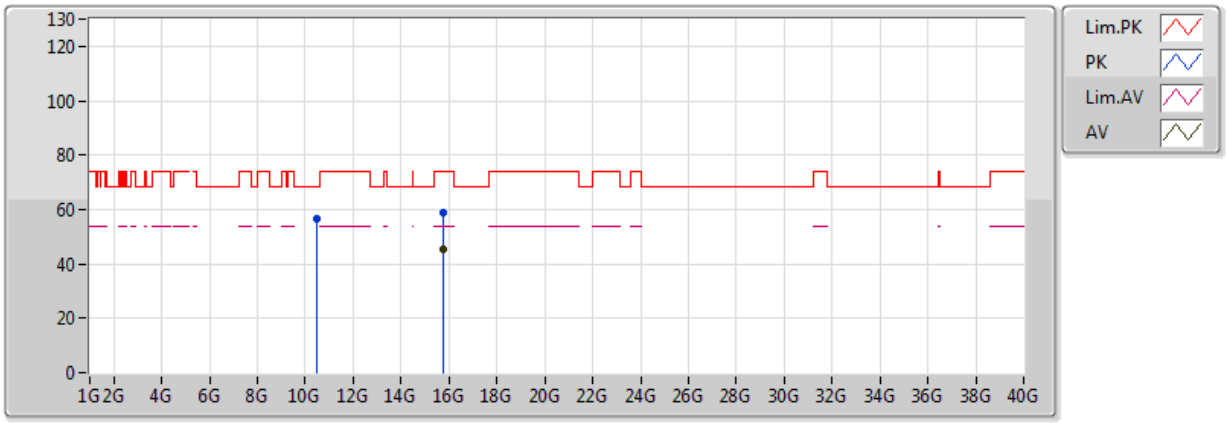
EUT Z Dipole_4TX
Setting 72
06-B-1
FSP

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
PK	10.50338G	56.73	68.20	-11.47	15.97	3	Vertical	91	1.50
PK	15.75228G	59.16	74.00	-14.84	16.99	3	Vertical	177	2.03
AV	15.74622G	45.37	54.00	-8.63	17.01	3	Vertical	177	2.03

HEW160_Nss1,(MCS0)_4TX

5250MHz Straddle 5.25-5.35GHz_TX

11/06/2018

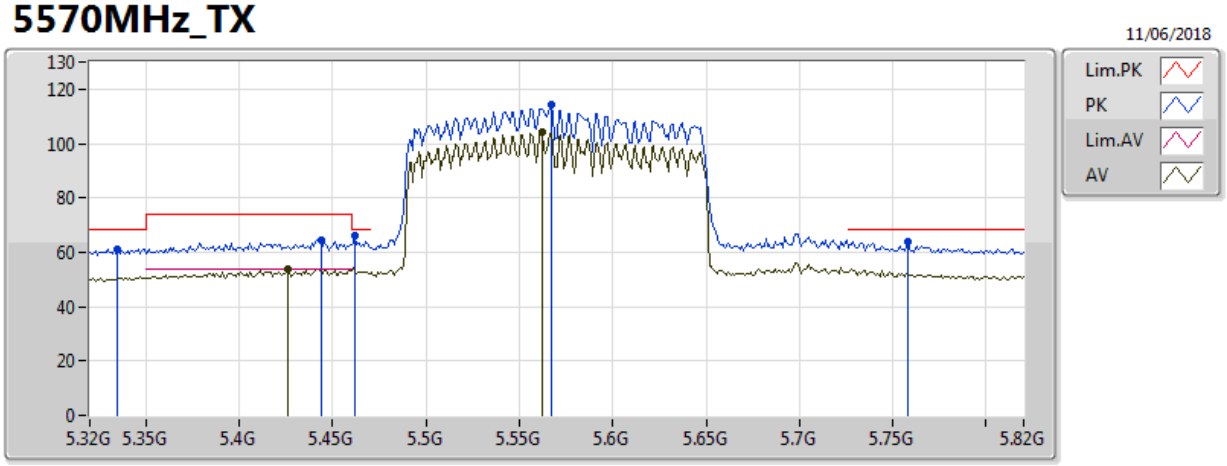


EUT Z Dipole_4TX
Setting 72
06-B-1
FSP

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
PK	10.50446G	56.60	68.20	-11.60	15.97	3	Horizontal	237	1.50
PK	15.74612G	58.99	74.00	-15.01	17.01	3	Horizontal	28	1.50
AV	15.74724G	45.27	54.00	-8.73	17.01	3	Horizontal	28	1.50

HEW160_Nss1,(MCS0)_4TX

5570MHz_TX

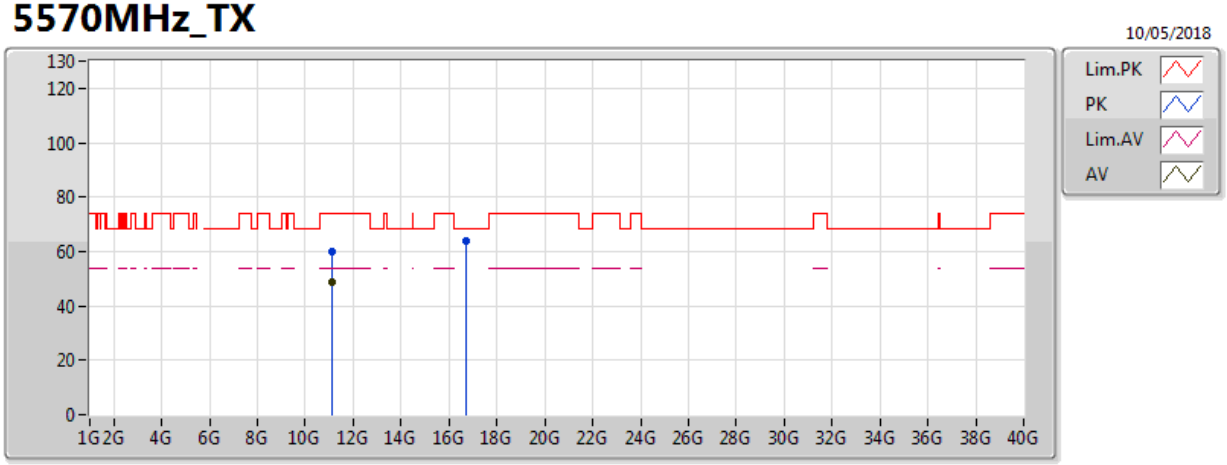


EUT Z Dipole_4TX
Setting 70
06-B-1-10
FSP

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
AV	5.426G	53.93	54.00	-0.07	7.82	3	Vertical	28	1.86
AV	5.562G	104.03	Inf	-Inf	7.97	3	Vertical	28	1.86
PK	5.335G	61.05	68.20	-7.15	7.70	3	Vertical	28	1.86
PK	5.444G	64.62	74.00	-9.38	7.84	3	Vertical	28	1.86
PK	5.462G	66.31	68.20	-1.89	7.86	3	Vertical	28	1.86
PK	5.567G	114.04	Inf	-Inf	7.97	3	Vertical	28	1.86
PK	5.758G	63.72	68.20	-4.48	8.32	3	Vertical	28	1.86

HEW160_Nss1,(MCS0)_4TX

5570MHz_TX

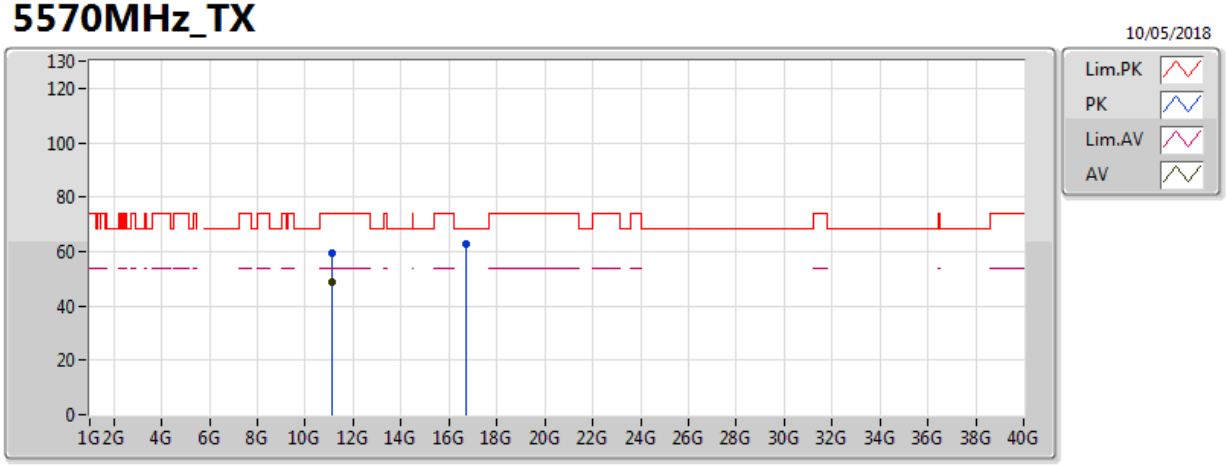


EUT Z Dipole_4TX
Setting 70
06-B-1
FSP

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
PK	11.14246G	59.82	74.00	-14.18	18.05	3	Vertical	102	2.97
AV	11.1434G	48.99	54.00	-5.01	18.05	3	Vertical	102	2.97
PK	16.70718G	63.93	68.20	-4.27	20.09	3	Vertical	3	1.77

HEW160_Nss1,(MCS0)_4TX

5570MHz_TX

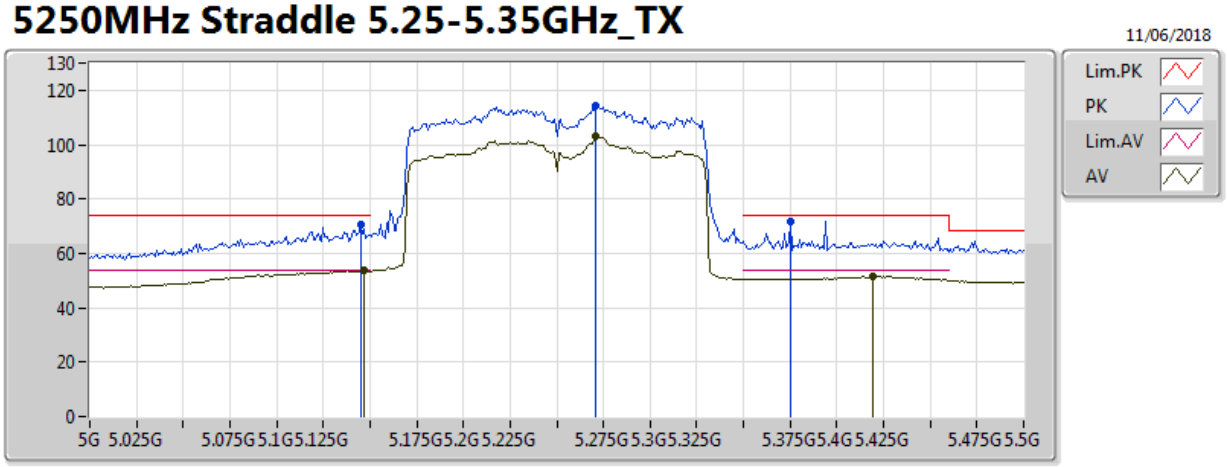


EUT Z Dipole_4TX
Setting 70
06-B-1
FSP

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
PK	11.1367G	59.50	74.00	-14.50	18.05	3	Horizontal	210	1.01
AV	11.13504G	48.75	54.00	-5.25	18.05	3	Horizontal	210	1.01
PK	16.7111G	62.99	68.20	-5.21	20.11	3	Horizontal	21	1.50

HEW160,BF_Nss1,(MCS0)_4TX

5250MHz Straddle 5.25-5.35GHz_TX



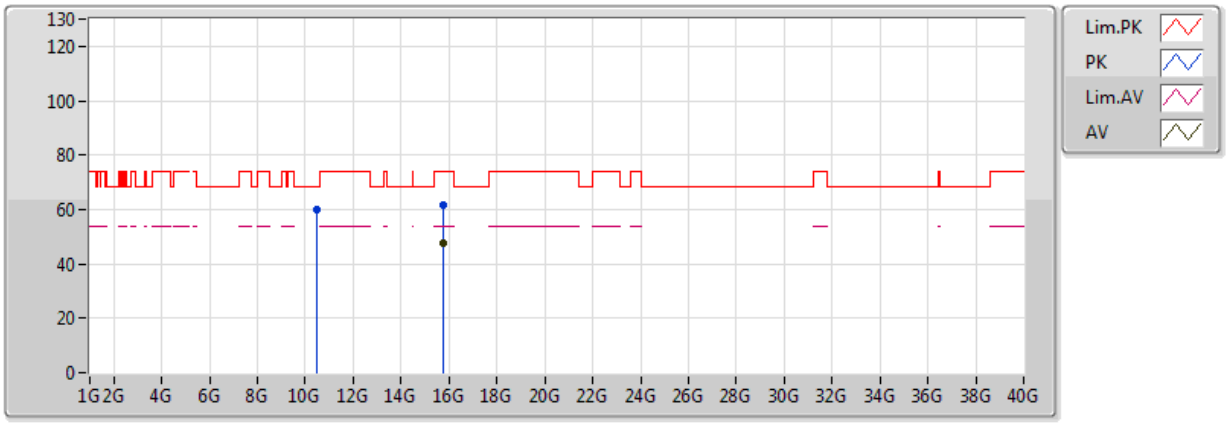
EUT Z Dipole_4TX
Setting 70
06-B-1-10
FSP

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
AV	5.147G	53.63	54.00	-0.37	7.42	3	Vertical	272	1.90
AV	5.271G	102.95	Inf	-Inf	7.61	3	Vertical	272	1.90
AV	5.419G	51.45	54.00	-2.55	7.82	3	Vertical	272	1.90
PK	5.145G	70.49	74.00	-3.51	7.42	3	Vertical	272	1.90
PK	5.271G	114.58	Inf	-Inf	7.61	3	Vertical	272	1.90
PK	5.375G	71.99	74.00	-2.01	7.77	3	Vertical	272	1.90

HEW160,BF_Nss1,(MCS0)_4TX

5250MHz Straddle 5.25-5.35GHz_TX

11/06/2018



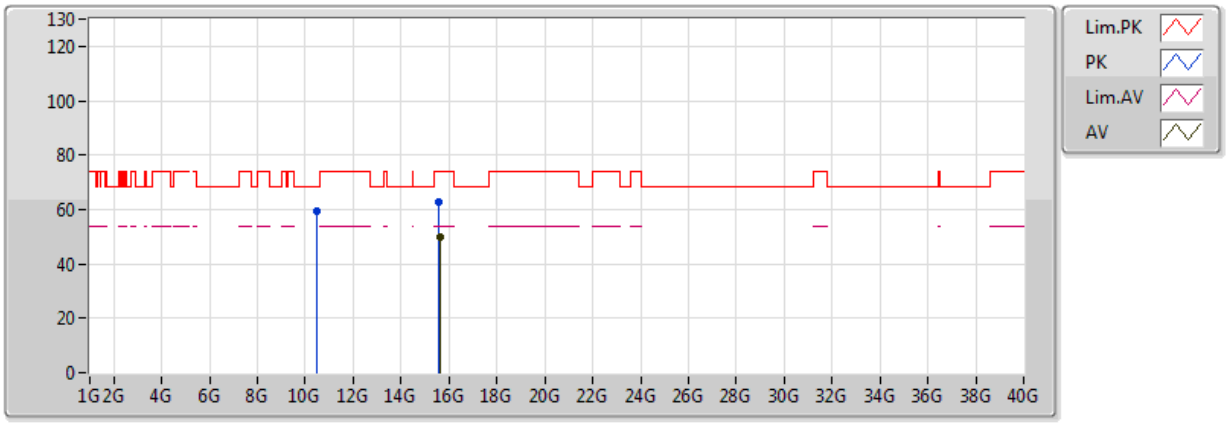
EUT Z Dipole_4TX
Setting 70
06-B-1
FSP

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
PK	10.49536G	59.85	68.20	-8.35	17.06	3	Vertical	312	1.50
PK	15.74804G	61.83	74.00	-12.17	17.97	3	Vertical	58	1.50
AV	15.75288G	47.89	54.00	-6.11	17.95	3	Vertical	58	1.50

HEW160,BF_Nss1,(MCS0)_4TX

5250MHz Straddle 5.25-5.35GHz_TX

11/06/2018

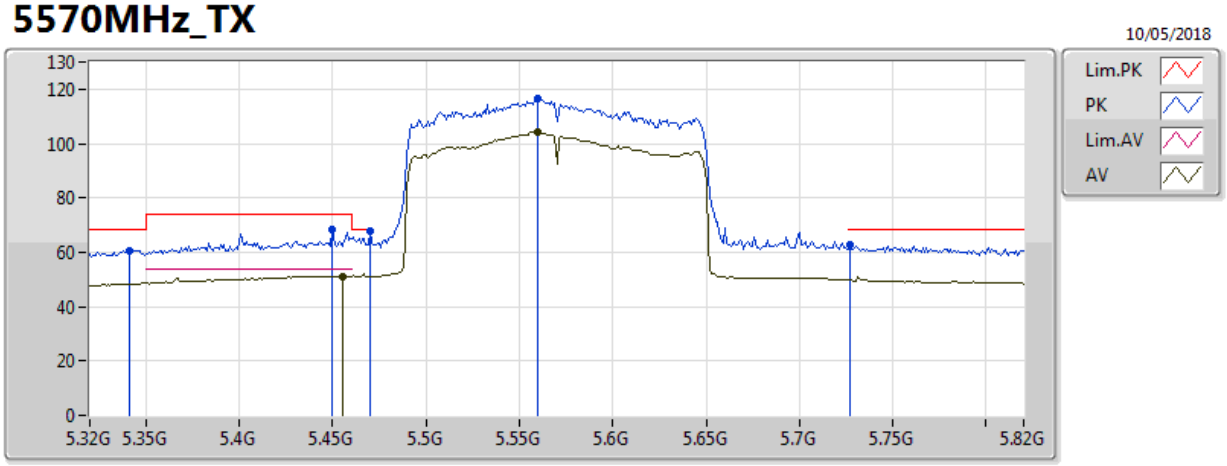


EUT Z Dipole_4TX
Setting 70
06-B-1
FSP

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
PK	10.495G	59.46	68.20	-8.74	17.05	3	Horizontal	1	1.50
PK	15.578G	62.90	74.00	-11.10	18.51	3	Horizontal	213	1.50
AV	15.603G	50.03	54.00	-3.97	18.43	3	Horizontal	213	1.50

HEW160,BF_Nss1,(MCS0)_4TX

5570MHz_TX

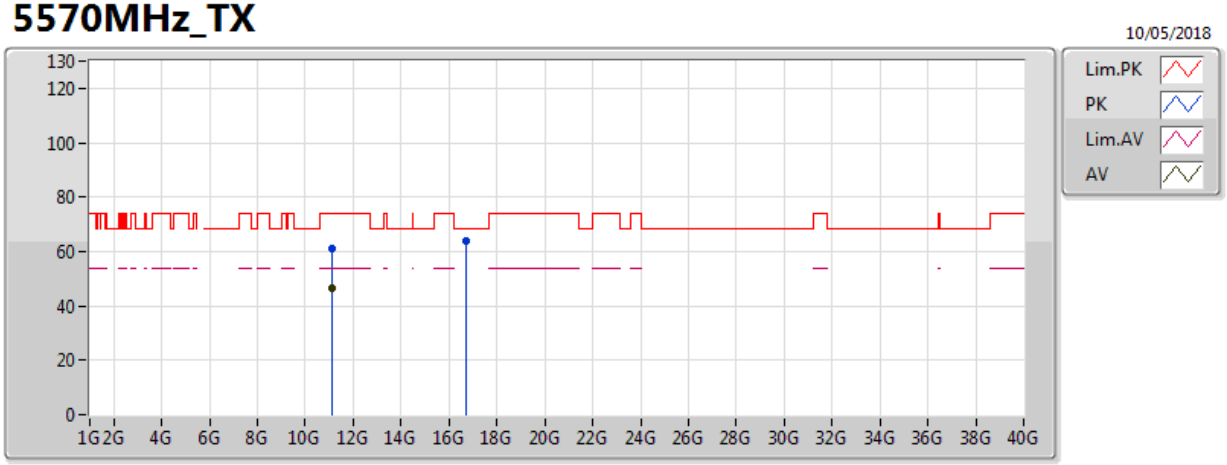


EUT Z Dipole_4TX
Setting 68
06-B-1-10
FSP

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
AV	5.455G	51.25	54.00	-2.75	7.85	3	Vertical	80	1.78
AV	5.56G	104.27	Inf	-Inf	7.96	3	Vertical	80	1.78
PK	5.341G	60.60	68.20	-7.60	7.71	3	Vertical	80	1.78
PK	5.45G	68.45	74.00	-5.55	7.84	3	Vertical	80	1.78
PK	5.469995G	67.59	68.20	-0.61	7.87	3	Vertical	80	1.78
PK	5.56G	116.42	Inf	-Inf	7.96	3	Vertical	80	1.78
PK	5.727G	62.69	68.20	-5.51	8.26	3	Vertical	80	1.78

HEW160,BF_Nss1,(MCS0)_4TX

5570MHz_TX

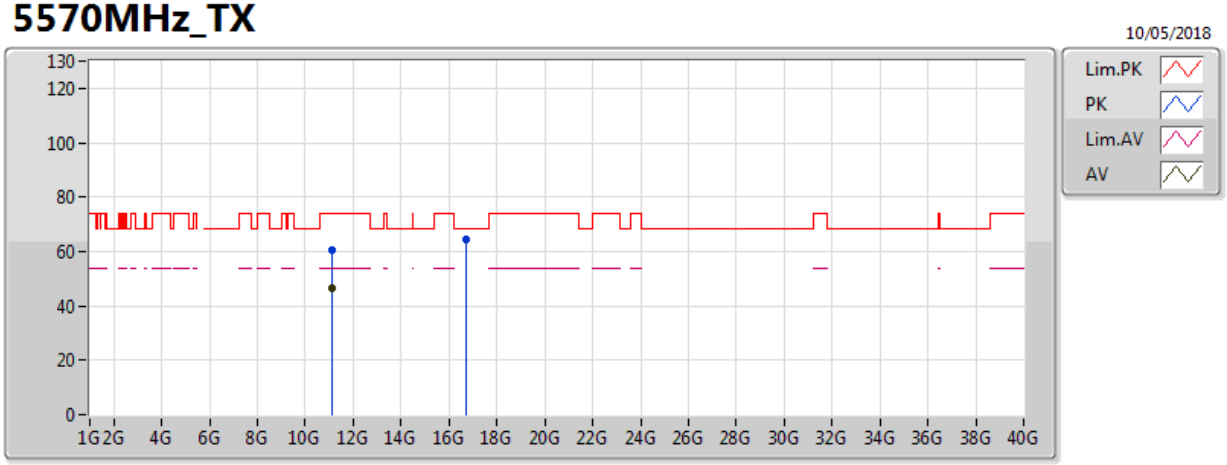


EUT Z Dipole_4TX
Setting 68
06-B-1
FSP

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
PK	11.13868G	60.82	74.00	-13.18	18.05	3	Vertical	223	1.50
AV	11.14006G	46.64	54.00	-7.36	18.05	3	Vertical	223	1.50
PK	16.71176G	64.00	68.20	-4.20	20.11	3	Vertical	302	1.50

HEW160,BF_Nss1,(MCS0)_4TX

5570MHz_TX



EUT Z Dipole_4TX
Setting 68
06-B-1
FSP

Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)
PK	11.14252G	60.69	74.00	-13.31	18.05	3	Horizontal	290	2.91
AV	11.14234G	46.39	54.00	-7.61	18.05	3	Horizontal	290	2.91
PK	16.7113G	64.26	68.20	-3.94	20.11	3	Horizontal	310	1.50