FCC RF Test Report

For

Shenzhen MiaoMing Intelligent Technology Co.,Ltd

Test Standards:	Part 15 Subpart E §15. 407
Product Description:	WD_RTL8821CE_V10
Tested Model:	WD_RTL8821CE_V10
Additional Model No.:	WD_8821CE_M.2_V10, WD_8821CE_PCIE_V10
FCC ID:	2AXHEWDRTL8821CE
Classification	(NII)Unlicensed National Information Infrastructure
Report No.:	EC2008042RF04
Tested Date:	2020-09-07 to 2020-10-14
Issued Date:	2020-10-14
Prepared By:	Jerry Wang Jerry Wang / Engineer
Approved By:	Bacon Wu Bacon Wu / RF Manager

Hunan Ecloud Testing Technology Co., Ltd.

Building A1, Changsha E Center, No. 18 Xiangtai Avenue, Liuyang Economic and Technological Development Zone, Hunan, P.R.C

Tel.: +86-731-89634887 Fax.: +86-731-89634887

www.hn-ecloud.com

Note: The test results in this report apply exclusively to the tested model / sample. Without written approval of Hunan Ecloud Testing Technology Co., Ltd., the test report shall not be reproduced except in full.

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2020.10.14	Valid	Original Report

TABLE OF CONTENTS

1 TEST LABORATORY 5

1.1 Test facility 5

2 GENERAL DESCRIPTION 6

2.1 Applicant 6
2.2 Manufacturer 6
2.3 General Description Of EUT 6
2.4 Modification of EUT 7
2.5 Applicable Standards 7

3 TEST CONFIGURATION OF EQUIPMENT UNDER TEST 8

3.1 Carrier Frequency and Channel 8
3.2 Test Mode 8
3.3 Support Equipment 9
3.4 Test Setup 10
3.5 Measurement Results Explanation Example 13

4 TEST RESULT 14

4.1 26dB and 99% Occupied Bandwidth Measurement 14
4.2 Maximum Conducted Output Power Measurement 15
4.3 Power Spectral Density Measurement 16
4.4 Unwanted Emissions Measurement 17
4.5 AC Conducted Emission Measurement 109
4.6 Frequency Stability Measurement 112
4.7 Automatically Discontinue Transmission 113
4.8 Antenna Requirements 114

5 LIST OF MEASURING EQUIPMENT 115

6 UNCERTAINTY OF EVALUATION 117

APPENDIX A1: EMISSION BANDWIDTH 118

APPENDIX A2: OCCUPIED CHANNEL BANDWIDTH 126

APPENDIX B: MAXIMUM CONDUCTED OUTPUT POWER 134

APPENDIX C: MAXIMUM POWER SPECTRAL DENSITY 142

APPENDIX D: FREQUENCY STABILITY 150

APPENDIX E. SETUP PHOTOGRAPHS 155

Summary of Test Result

FCC Rule	Description	Limit	Result	Remark
2.1049 15.403(i)	26dB & 99% Bandwidth	>500kHz	Pass	U-NII-3
15.407(a)	Maximum Conducted Output Power	≤30dBm	Pass	U-NII-3
15.407(a)	Power Spectral Density	≤30dBm/500kHz	Pass	U-NII-3
15.407(b)	Unwanted Emissions	15.407(b) 15.209(a)	Pass	Under limit 4.44 dB at 15600 MHz
15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.68 dB at 0.200 MHz
15.407(g)	Frequency Stability	Within Operation Band	Pass	
15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	
15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	

1 Test Laboratory

1.1 Test facility

CNAS (accreditation number: L11138)

Hunan Ecloud Testing Technology Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1244 , Test Firm Registration Number: 793308)

Hunan Ecloud Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

ISED(CAB identifier: CN0012, ISED# :24347)

Hunan Ecloud Testing Technology Co., Ltd. has been listed on the Wireless Device Testing Laboratories list of innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements.

A2LA (Certificate Code: 4895.01)

Hunan Ecloud Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

2 General Description

2.1 Applicant

Shenzhen MiaoMing Intelligent Technology Co.,Ltd
South 3F, building A, Chudong Science and Technology Park, No.111 Shaxin Road, Tangxia Town, Dongguan, Guangdong, China

2.2 Manufacturer

Shenzhen MiaoMing Intelligent Technology Co.,Ltd
South 3F, building A, Chudong Science and Technology Park, No.111 Shaxin Road, Tangxia Town, Dongguan, Guangdong, China

2.3 General Description Of EUT

PRODUCT	WD_RTL8821CE_V10
MODEL NO.	WD_RTL8821CE_V10
Additional NO.	WD_8821CE_M.2_V10, WD_8821CE_PCIE_V10
Difference Description	Only the model name is different
FCC ID	2AXHEWDRTL8821CE
POWER SUPPLY	120Vac for Host Device 3.3Vdc for EUT
MODULATION TECHNOLOGY	256QAM,64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TYPE	802.11a/n/ac : OFDM
OPERATING FREQUENCY	U-NII-1:5150~5250MHz
MAX. OUTPUT POWER	802.11a : 10.99 dBm (0.0126 W) 802.11n HT20 : 10.25 dBm (0.0106 W) 802.11n HT40 : 10.42 dBm (0.0110 W) 802.11ac VHT20 : 10.20 dBm (0.0105 W) 802.11ac VHT40 : 10.48 dBm (0.0112 W) 802.11ac VHT80 : 7.86 dBm (0.0061 W)
ANTENNA TYPE	External Antenna with 0dBi gain at U-NII-1
HW version	WD_RTL8821CE-V10
SW version	N/A
I/O PORTS	Refer to user’s manual

NOTE:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the user's manual.

2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

2.4 Modification of EUT

No modifications are made to the EUT during all test items.

2.5 Applicable Standards

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

- FCC Part 15 Subpart E §15.407
- ANSI C63.10-2013
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04

Remark:

1. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

3 Test Configuration of Equipment Under Test

3.1 Carrier Frequency and Channel

U-NII-1

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	40	5200 MHz
38	5190 MHz	46	5230 MHz
40	5200 MHz	48	5240 MHz
42	5210 MHz		

3.2 Test Mode

Based on the baseline scan, the worst - case data rates were:

MODULATION	DATA RATE
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

3.2.1 Antenna Port Conducted Measurement

Summary table of Test Cases				
Test Item	Modulation			
	802.11 a	802.11n HT20/ 802.11ac VHT20	802.11n HT40/ 802.11ac VHT40	802.11ac VHT80
U-NII-1	Mode 1: CH36 Mode 2: CH40 Mode 3: CH48	Mode 4: CH36 Mode 5: CH40 Mode 6: CH48	Mode 7: CH38 Mode 8: CH46	Mode 9: CH42

3.2.2 Radiated Emission Test (Below 1GHz)

Radiated Test Cases	802.11ac VHT80
	Mode 9: CH42

Note : 1. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna

diversity architecture) and packet type. It was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

2. Following channel(s) was (were) selected for the final test as listed above

3.2.3 Radiated Bandedge and Radiated Emission Test (Above 1GHz)

Summary table of Test Cases				
Test Item	**Modulation**			
	802.11 a	**802.11n HT20/ 802.11ac VHT20**	**802.11n HT40/ 802.11ac VHT40**	**802.11ac VHT80**
U-NII-1	Mode 1: CH36 Mode 2: CH40 Mode 3: CH48	Mode 4: CH36 Mode 5: CH40 Mode 6: CH48	Mode 7: CH38 Mode 8: CH46	Mode 9: CH42

Note : 1. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type. It was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

2. Following channel(s) was (were) selected for the final test as listed above

3.2.4 Power Line Conducted Emission Test:

AC Conducted Emission	Mode 1 : 5G WLAN Linking + Ping + DC3.3V power supply

3.3 Support Equipment

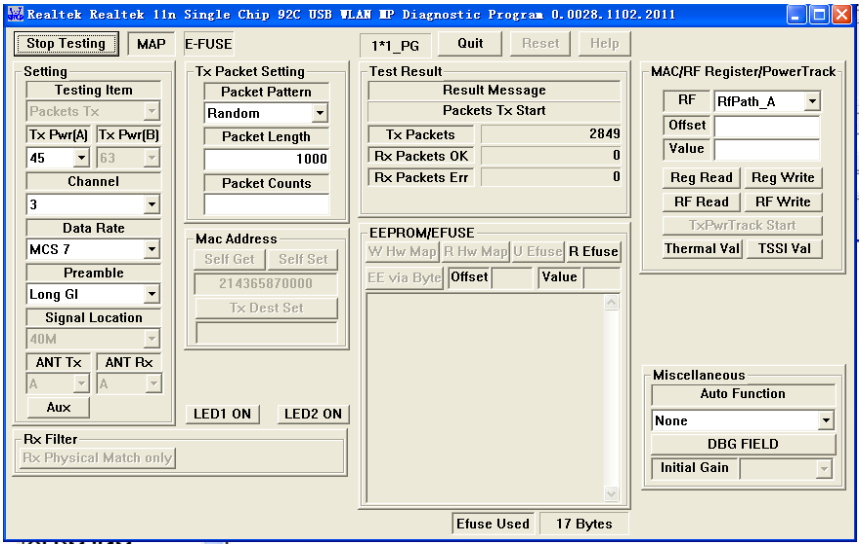
Manufacturer	Description	Model	Serial Number	Certificate
Lenovo	Notebook	Xiaoxinchao5000	PF0QPQMH	FCC sDoC
NETGEAR	Dual band WiFi AP	R7800	N/A	FCC ID:PY315100319
Lenovo	PC	T4900d	SS24542038	FCC sDoC
Lenovo	LCD monitor	LS2014wA	U15FVGW7	FCC sDoC
NA	Test Fixture	WD_8821CE_EVB_TEST	N/A	N/A
NA	DC Power Line	N/A	N/A	N/A
Lenovo	Wired Keyboard	LXH-JME2209U	60937461	FCC sDoC
Logitech	Wired Mouse	M-U0026	1826HS0070D8	FCC sDoC
N/A	PCIE extension	N/A	N/A	N/A

	cable			
GMTC	WiFi ANT/FPC /L=55mm x2	IP15A3	304WIFI0094	N/A
Keysight	DC Power Supply	E3646A	MY55346284	FCC sDoC

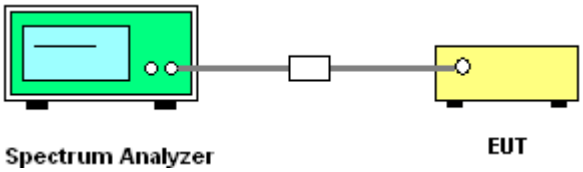
3.4 Test Setup

The EUT is continuously communicating to the WIFI tester during the tests.

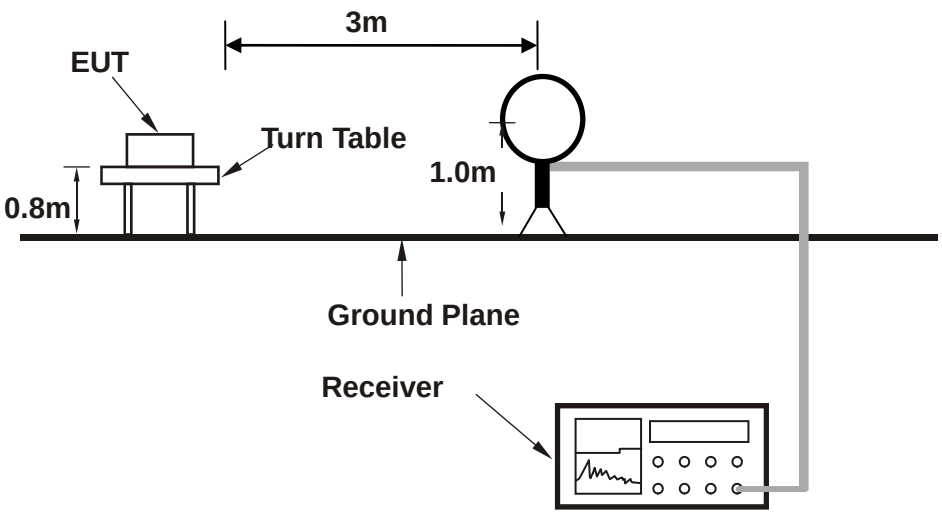
EUT was set in the Hidden menu mode to enable WIFI communications.



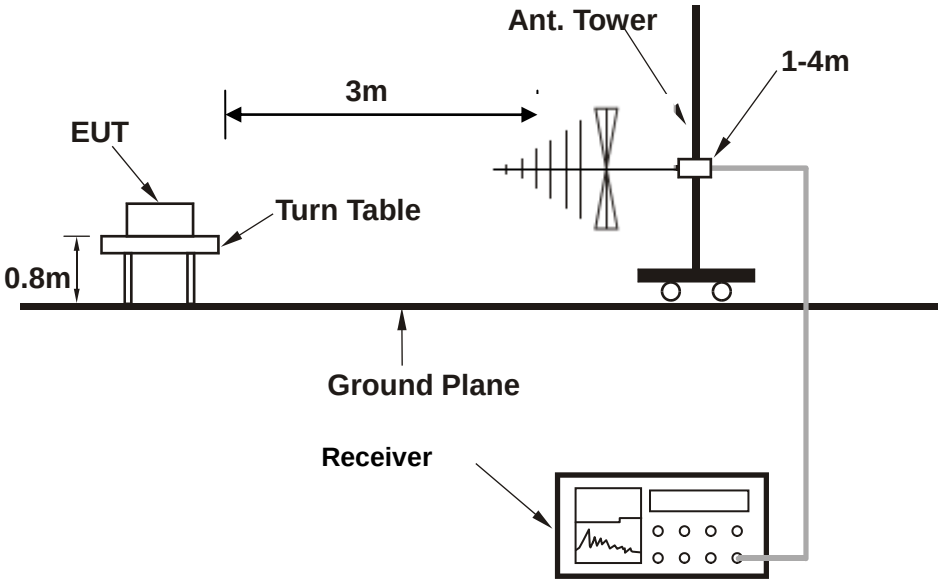
Setup diagram for Conducted Test



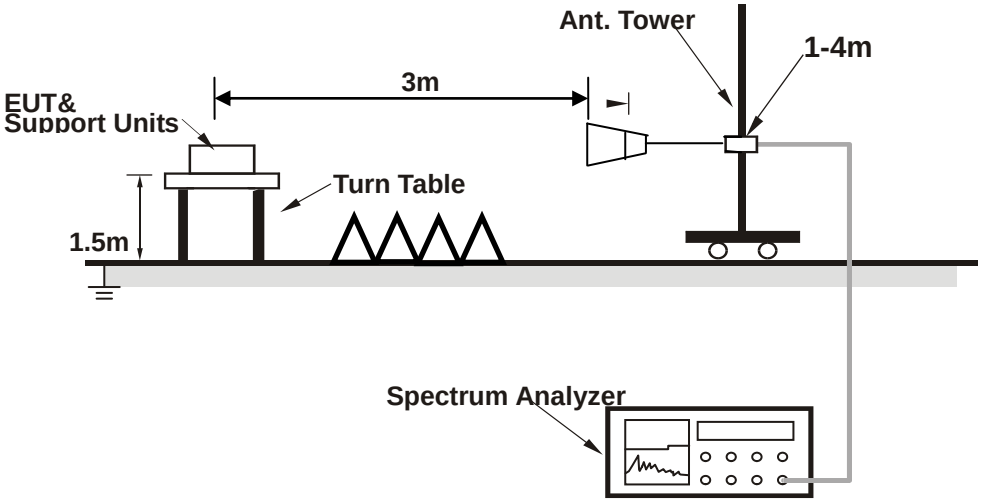
Setup diagram for Raidation(9KHz~30MHz) Test



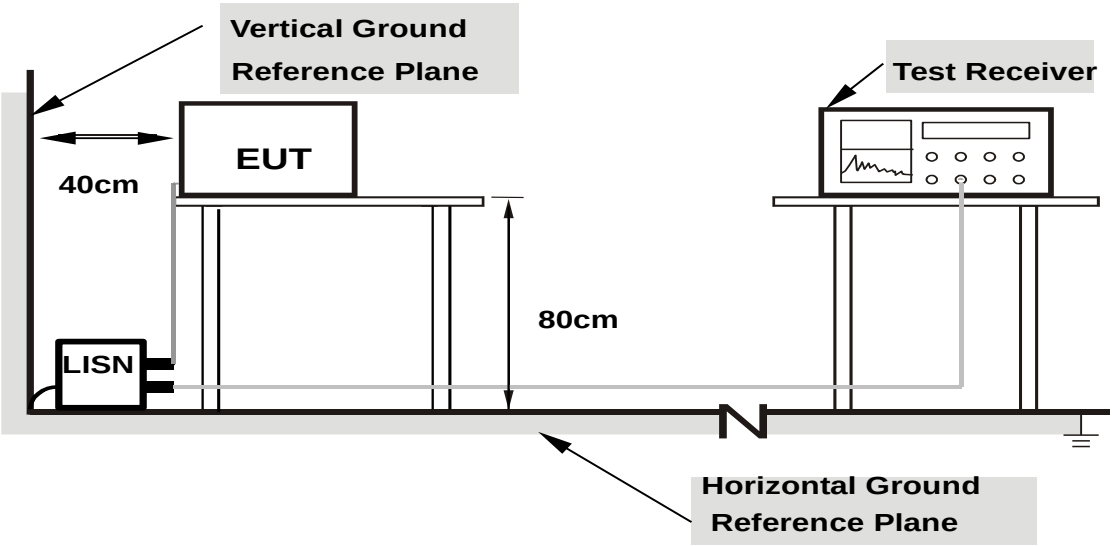
Setup diagram for Raidation(Below 1G) Test



Setup diagram for Raidation(Above1G) Test



Setup diagram for AC Conducted Emission Test



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.5 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 5 + 10 = 15 (dB)

For all radiated test items:

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

Over Limit (dB μ V/m) = Level(dB μ V/m) - Limit Level (dB μ V/m)

4 Test Result

4.1 26dB and 99% Occupied Bandwidth Measurement

4.1.1 Limit of 26dB and 99% Bandwidth

There is no limit bandwidth for U-NII-1

4.1.2 Test Procedures

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
4. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW Sweep=auto,Detector = Peak, Trace Mode = Max Hold, Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.
5. Mark the peak frequency and –26dB (upper and lower) frequency.
6. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement.
7. Repeat the procedures as list above until all test default channels (low, middle, and high) are completed.
8. Measure and record the results in the test report.

4.1.3 Test Result of 26dB Bandwidth

Refer to Appendix A1 of this test report.

4.1.4 Test Result of 99% Bandwidth

Refer to Appendix A2 of this test report.

4.2 Maximum Conducted Output Power Measurement

4.2.1 Limit of Output Power

Operation Band	EUT Category		Limit
U-NII-1		Access Point(Mater Device)	1 Watt(30dBm)
		Fixed point-to-point Acess Ponit	1 Watt(30dBm)
	√	Mobile and portable clinet device	250mW(23.98dBm)
U-NII-2A			250mW(23.98dBm) or 11dBm+10 log B
U-NII-2C			250mW(23.98dBm) or 11dBm+10 log B
U-NII-3			1 W(30dBm)

4.2.2 Test Procedures

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.
4. Spectrum Analyzer is used as the auxiliary test equipment to conduct the output power measurement.
5. Set span to encompass the entire emission bandwidth (EBW) of the signal. Set sweep trigger to “free run.”, RBW = 1 MHz, Set VBW ≥ 1/T, where T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, Sweep time = auto, Detector = peak..
6. Video filtering shall be applied to power signal (rms), it shall be set to operate on a linear voltage signal.
7. Trace mode = max hold. Allow max hold to run for at least 60 seconds
8. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.

4.2.3 Test Result of Output Power

Refer to Appendix B of this test report.

4.3 Power Spectral Density Measurement

4.3.1 Limits of Power Spectral Density

Operztion Band	EUT Category		Limit
U-NII-1		Access Point(Mater Device)	17dBm/MHz
		Fixed point-to-point Acess Ponit	
	√	Mobile and portable clinet device	11dBm/ MHz
U-NII-2A			11dBm/ MHz
U-NII-2C			11dBm/ MHz
U-NII-3			30 dBm/500kHz

4.3.2 Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
4. Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging(SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
5. User the cursor on spectrum to peak search the highest level of trace.
6. Record the max. reading and add 10 log(1/duty cycle).
7. Repeat above procedures until all default test channel (low, middle, and high) was complete.

4.3.3 Test Result of Power Spectral Density

Refer to Appendix C of this test report.

4.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part15.205.

4.4.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of –27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

EIRP (dBm)	Field Strength at 3m (dBμV/m)
-17	78.2
-27	68.2

4.4.2 Test Procedures

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW=3*RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
   (3) For average measurement:
   VBW = 10 Hz, when duty cycle is no less than 98 percent.
   VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
5. Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP.
6. Convert the resultant EIRP to an equivalent electric field strength using the following relationship:

   $E = EIRP - 20 \log d + 104.8$

   Where:

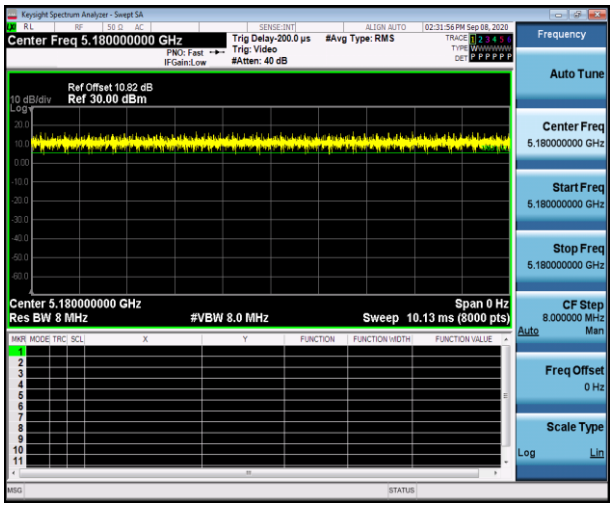
   E is the electric field strength in dBμV/m

   EIRP is the equivalent isotropically radiated power in dBm

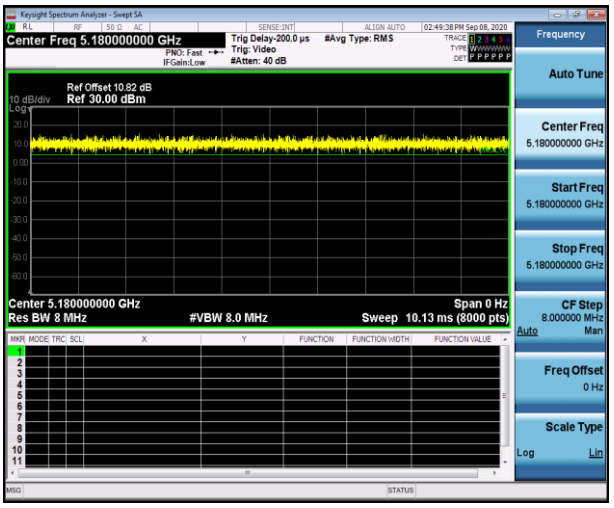
   d is the specified measurement distance in m

   E[dBμV/m] = EIRP[dBm] + 95.2, for d = 3 m.
7. Compare the resultant electric field strength level with the applicable regulatory limit.

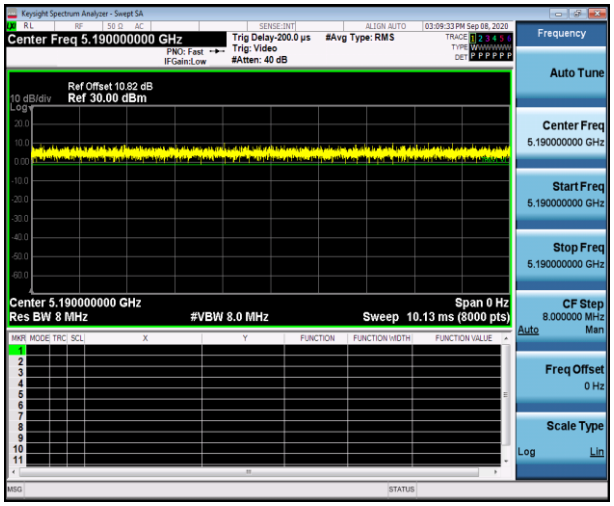
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	100	-	-	10Hz
802.11n HT20	100	-	-	10Hz
802.11n HT40	100	-	-	10Hz
802.11ac HT20	100	-	-	10Hz
802.11ac HT40	100	-	-	10Hz
802.11ac HT80	100	-	-	10Hz



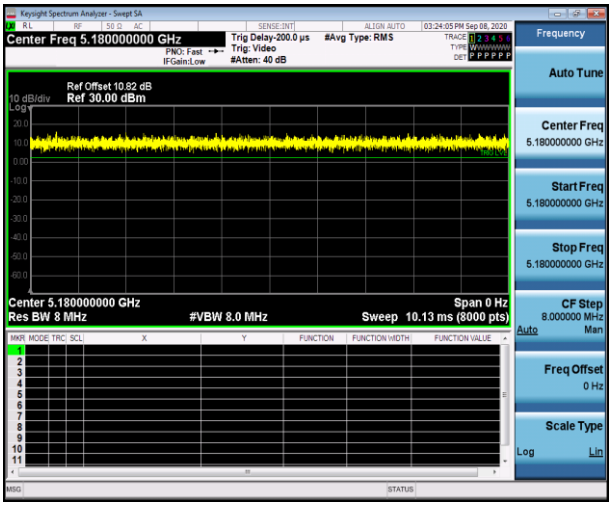
802.11a



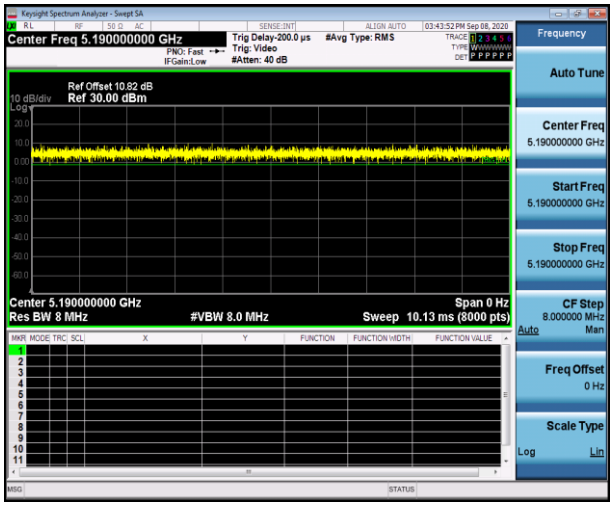
802.11n HT20



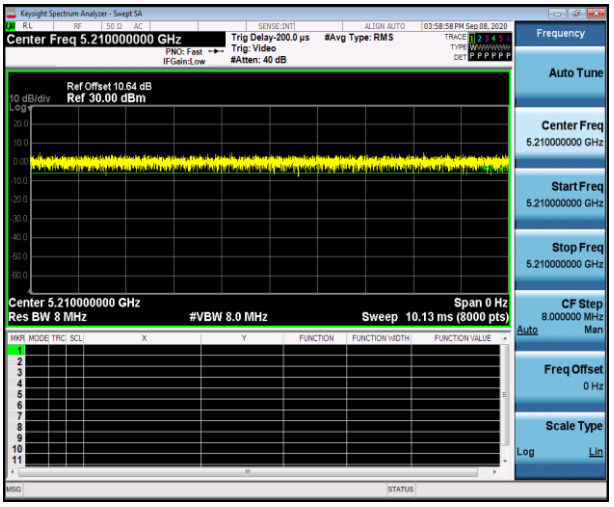
802.11n HT40



802.11ac HT20



802.11ac HT40



802.11ac HT80

8. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

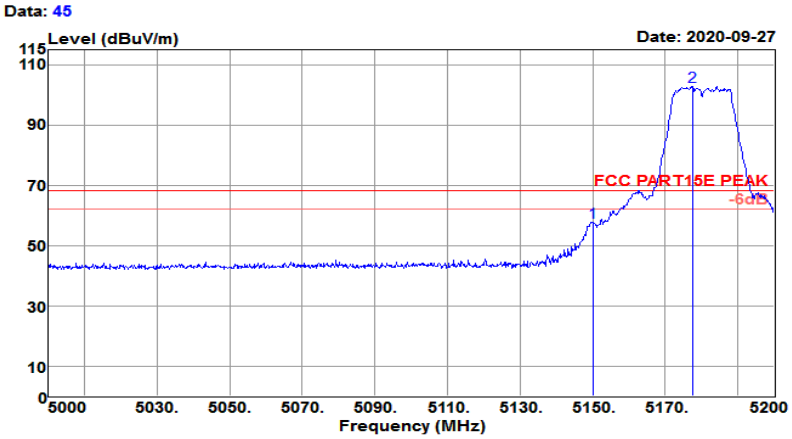
4.4.3 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

4.4.4 Test Result of Radiated Spurious at Band Edges

Test Mode :	802.11a CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Horizontal

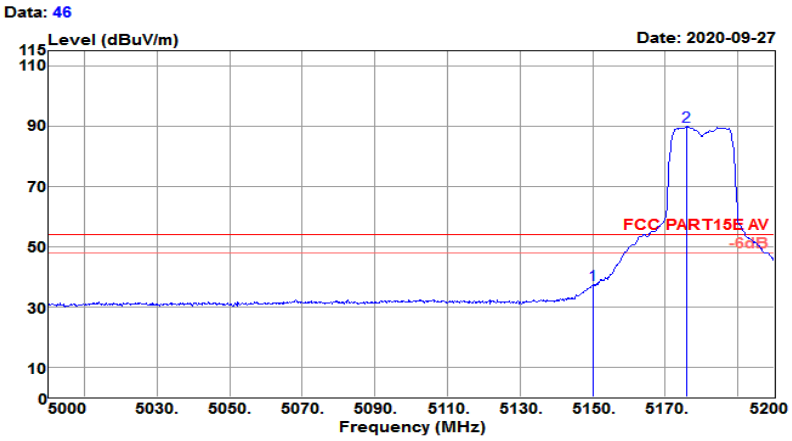
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
                --------------------------                    ----------------
Test Mode     : 802.11a CH36 (5180MHz)        Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	56.35	31.32	5.65	35.70	57.62	68.20	-10.58	Peak
5177.600	101.50	31.34	5.68	35.66	102.86	68.20	34.66	Peak

Test Mode :	802.11a CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Horizontal

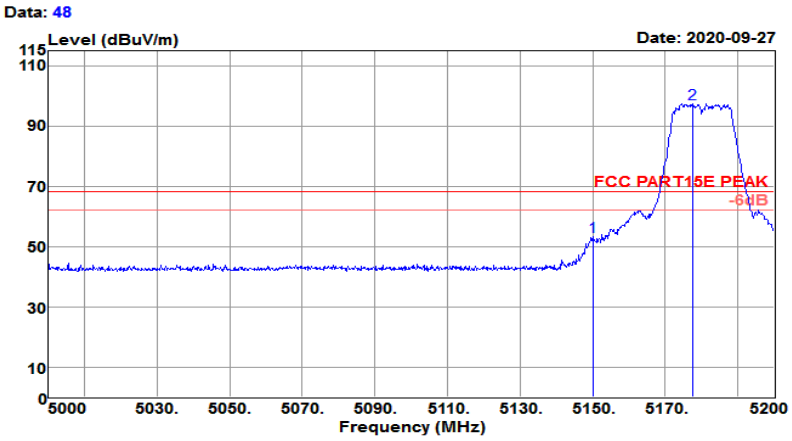
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
                --------------------------                    ----------------
Test Mode     : 802.11a CH36 (5180MHz)        Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	35.92	31.32	5.65	35.70	37.19	54.00	-16.81	Average
5176.000	88.44	31.34	5.68	35.67	89.79	54.00	35.79	Average

Test Mode :	802.11a CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Vertical

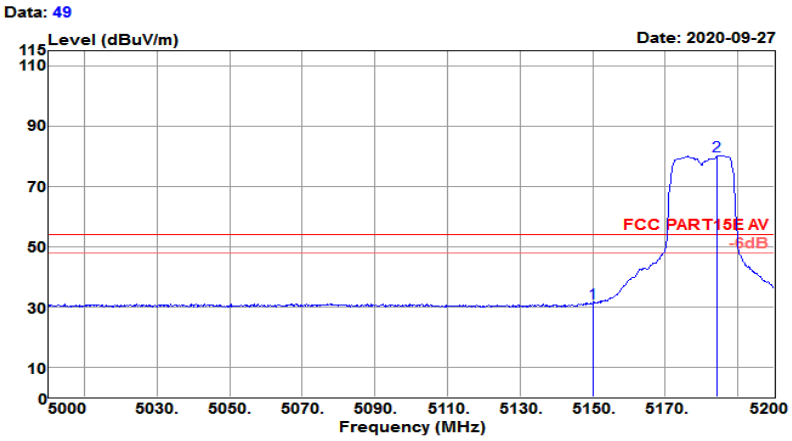
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
                --------------------------                    ----------------
Test Mode     : 802.11a CH36 (5180MHz)        Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	51.94	31.32	5.65	35.70	53.21	68.20	-14.99	Peak
5177.600	95.89	31.34	5.68	35.66	97.25	68.20	29.05	Peak

Test Mode :	802.11a CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Vertical

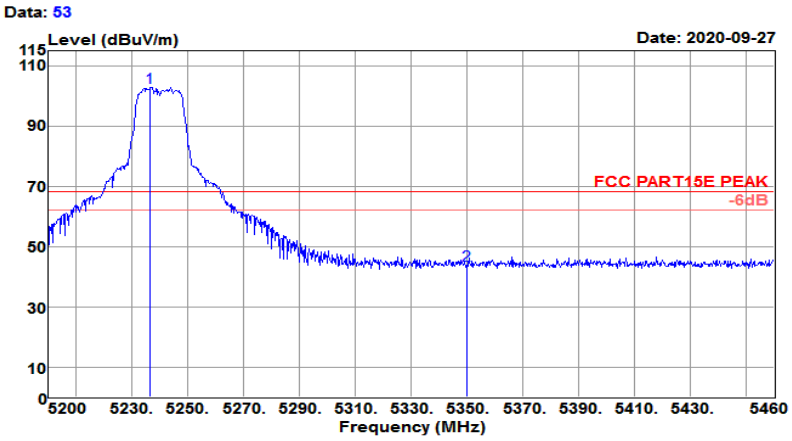
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11a CH36 (5180MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	30.09	31.32	5.65	35.70	31.36	54.00	-22.64	Average
5184.400	78.82	31.35	5.69	35.66	80.20	54.00	26.20	Average

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Horizontal

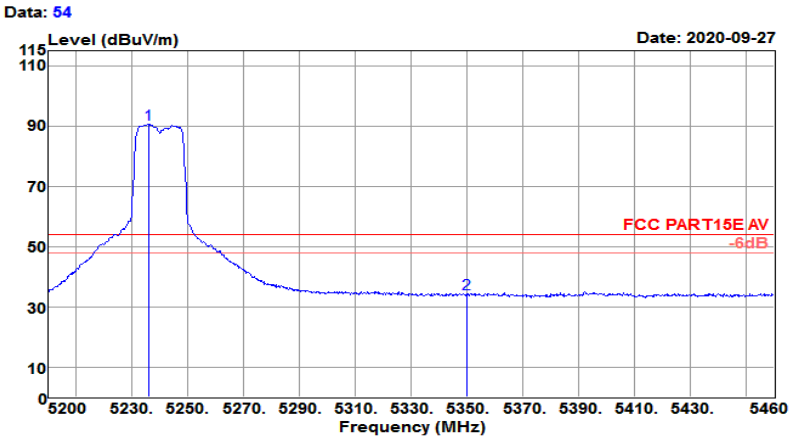
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11a CH48 (5240MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5236.660	101.22	31.39	5.70	35.58	102.73	68.20	34.53	Peak
5350.000	42.13	31.48	5.71	35.43	43.89	68.20	-24.31	Peak

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Horizontal

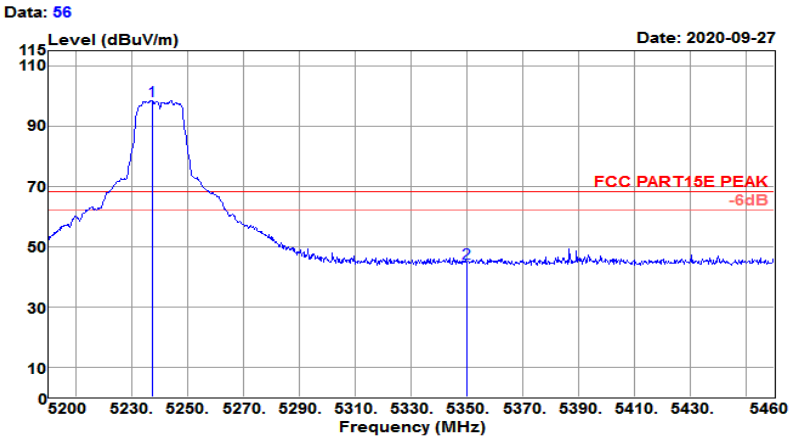
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
                --------------------------                    ----------------
Test Mode     : 802.11a CH48 (5240MHz)        Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5235.880	89.23	31.39	5.70	35.58	90.74	54.00	36.74	Average
5350.000	32.35	31.48	5.71	35.43	34.11	54.00	-19.89	Average

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Vertical

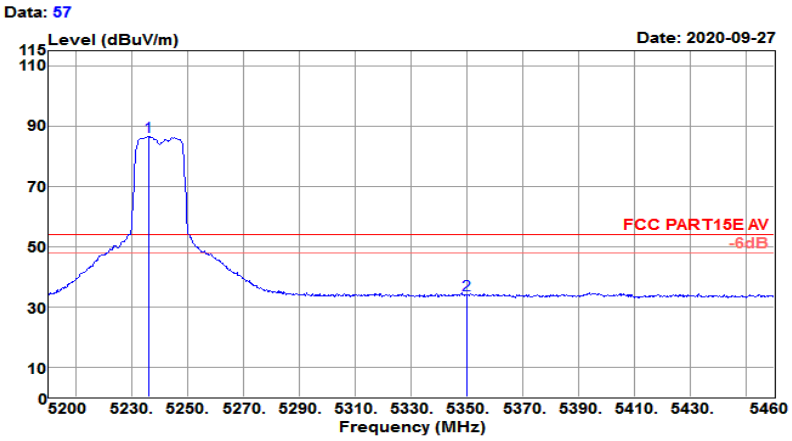
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11a CH48 (5240MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5237.440	97.00	31.39	5.70	35.58	98.51	68.20	30.31	Peak
5350.000	42.86	31.48	5.71	35.43	44.62	68.20	-23.58	Peak

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Vertical

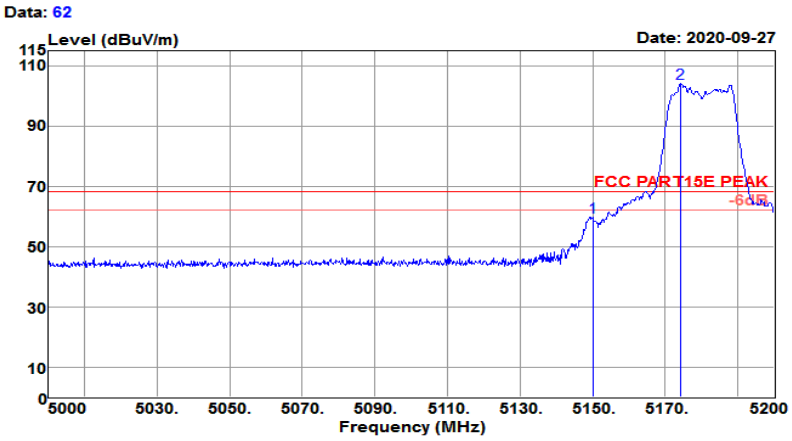
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11a CH48 (5240MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5235.880	85.11	31.39	5.70	35.58	86.62	54.00	32.62	Average
5350.000	32.07	31.48	5.71	35.43	33.83	54.00	-20.17	Average

Test Mode :	802.11n HT20 CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Horizontal

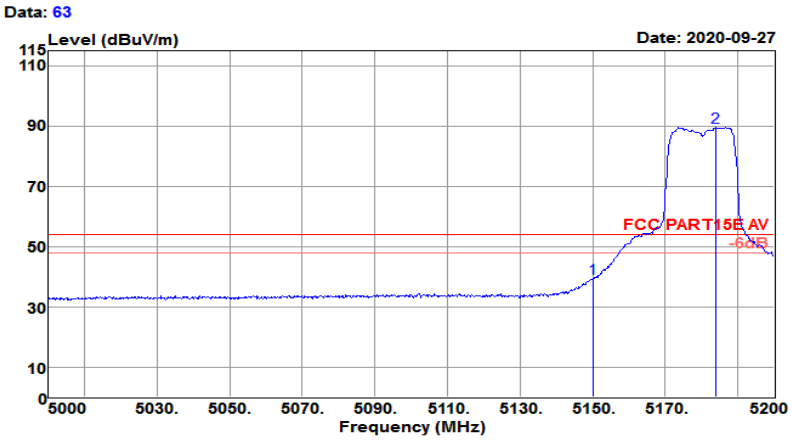
```
Test Site     : 3m Chamber                      Temp/Humi     : 19℃/60%
                --------------------------                      ----------------
Tested by     : Jack                            Pol/Phase     : HORIZONTAL
                --------------------------                      ----------------
Test Mode     : 802.11n HT20 CH36 (5180MHz)     Power rating: DC 3.0V~3.6V
                --------------------------                      ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	58.48	31.32	5.65	35.70	59.75	68.20	-8.45	Peak
5174.400	102.79	31.34	5.68	35.67	104.14	68.20	35.94	Peak

Test Mode :	802.11n HT20 CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Horizontal

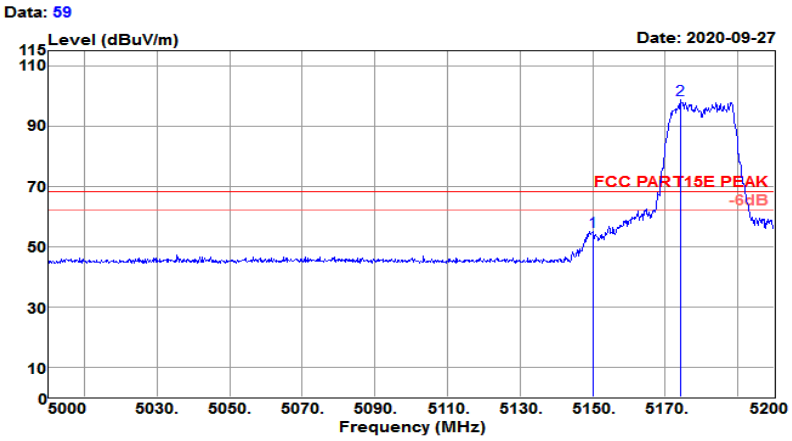
```
Test Site     : 3m Chamber                      Temp/Humi     : 19℃/60%
                --------------------------                      ----------------
Tested by     : Jack                            Pol/Phase     : HORIZONTAL
                --------------------------                      ----------------
Test Mode     : 802.11n HT20 CH36 (5180MHz)     Power rating: DC 3.0V~3.6V
                --------------------------                      ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	37.99	31.32	5.65	35.70	39.26	54.00	-14.74	Average
5184.000	88.16	31.35	5.68	35.66	89.53	54.00	35.53	Average

Test Mode :	802.11n HT20 CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.2GHz	**Polarization :**	Vertical

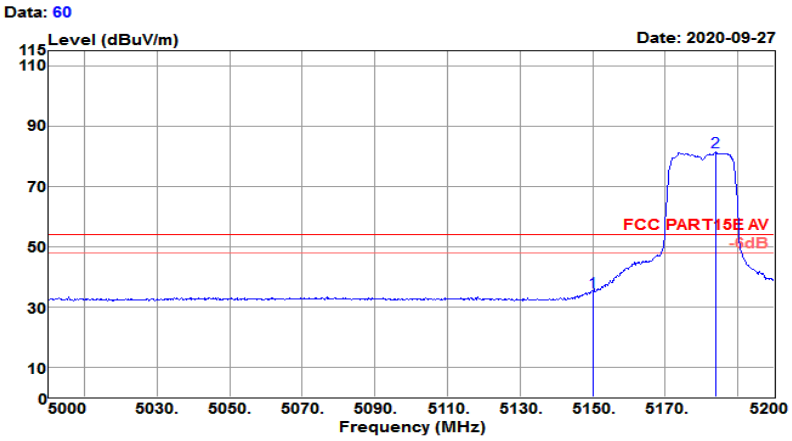
```
Test Site     : 3m Chamber                      Temp/Humi     : 19℃/60%
Tested by     : Jack                            Pol/Phase     : VERTICAL
Test Mode     : 802.11n HT20 CH36 (5180MHz)     Power rating: DC 3.0V~3.6V
EUT           : WD_RTL8821CE_V10
Model No.     : WD_RTL8821CE_V10
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	53.77	31.32	5.65	35.70	55.04	68.20	-13.16	Peak
5174.200	97.52	31.34	5.68	35.67	98.87	68.20	30.67	Peak

Test Mode :	802.11n HT20 CH36 5180MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	5.0GHz~5.2GHz	Polarization :	Vertical

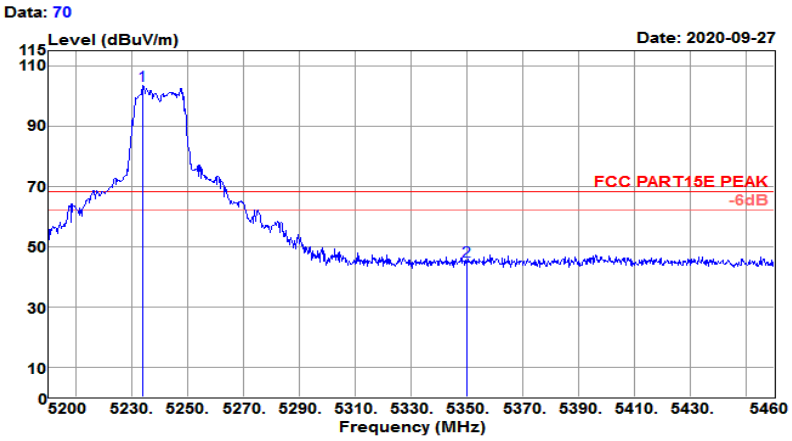
```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : VERTICAL
             --------------------------                   ----------------
Test Mode    : 802.11n HT20 CH36 (5180MHz)   Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	33.81	31.32	5.65	35.70	35.08	54.00	-18.92	Average
5184.000	79.90	31.35	5.68	35.66	81.27	54.00	27.27	Average

Test Mode :	802.11n HT20 CH48 5240MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	5.2GHz~5.46GHz	Polarization :	Horizontal

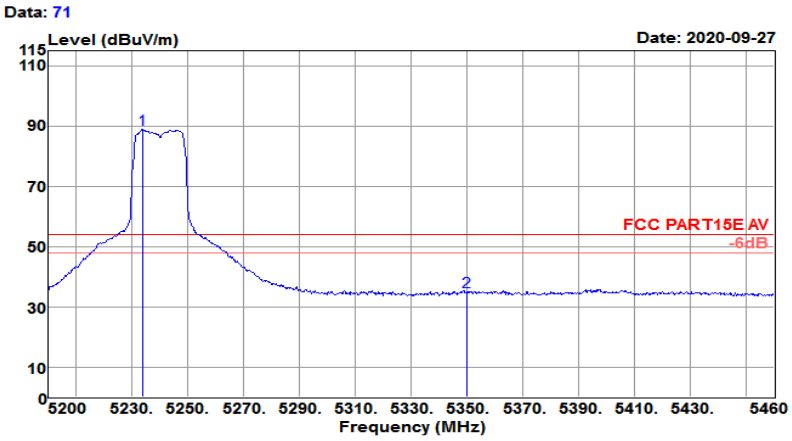
```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : HORIZONTAL
             --------------------------                   ----------------
Test Mode    : 802.11n HT20 CH48 (5240MHz)   Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5234.060	101.86	31.39	5.70	35.59	103.36	68.20	35.16	Peak
5350.000	43.23	31.48	5.71	35.43	44.99	68.20	-23.21	Peak

Test Mode :	802.11n HT20 CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Horizontal

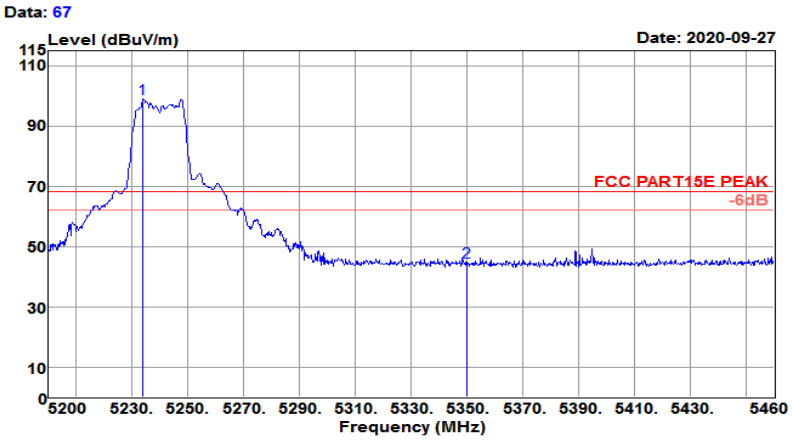
```
Test Site     : 3m Chamber                      Temp/Humi     : 19℃/60%
                --------------------------                      ----------------
Tested by     : Jack                            Pol/Phase     : HORIZONTAL
                --------------------------                      ----------------
Test Mode     : 802.11n HT20 CH48 (5240MHz)     Power rating: DC 3.0V~3.6V
                --------------------------                      ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5233.800	87.38	31.39	5.70	35.59	88.88	54.00	34.88	Average
5350.000	33.17	31.48	5.71	35.43	34.93	54.00	-19.07	Average

Test Mode :	802.11n HT20 CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Vertical

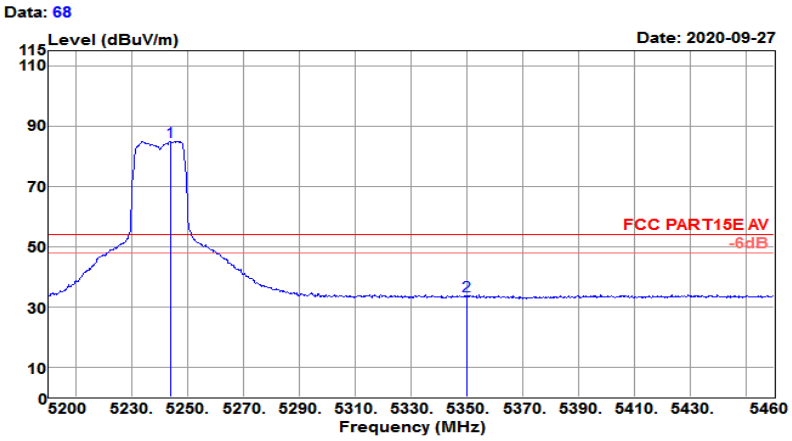
```
Test Site     : 3m Chamber                      Temp/Humi     : 19℃/60%
                --------------------------                      ----------------
Tested by     : Jack                            Pol/Phase     : VERTICAL
                --------------------------                      ----------------
Test Mode     : 802.11n HT20 CH48 (5240MHz)     Power rating: DC 3.0V~3.6V
                --------------------------                      ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5234.060	97.51	31.39	5.70	35.59	99.01	68.20	30.81	Peak
5350.000	42.92	31.48	5.71	35.43	44.68	68.20	-23.52	Peak

Test Mode :	802.11n HT20 CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Vertical

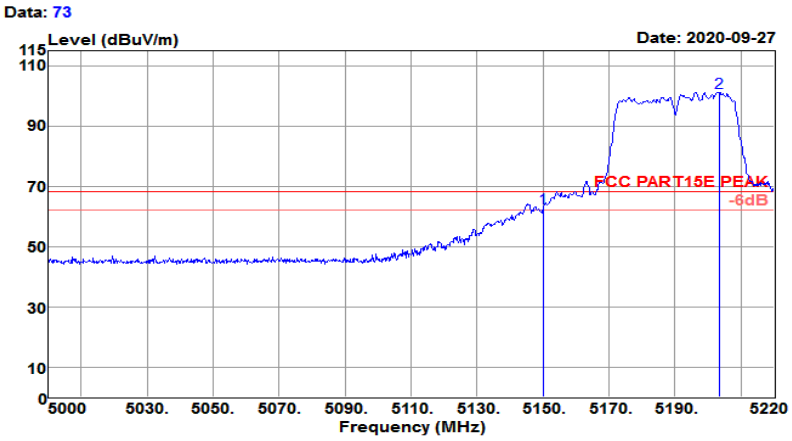
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
                --------------------------                    ----------------
Test Mode     : 802.11n HT20 CH48 (5240MHz)   Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5243.940	83.29	31.40	5.70	35.57	84.82	54.00	30.82	Average
5350.000	31.70	31.48	5.71	35.43	33.46	54.00	-20.54	Average

Test Mode :	802.11n HT40 CH38 5190MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.22GHz	**Polarization :**	Horizontal

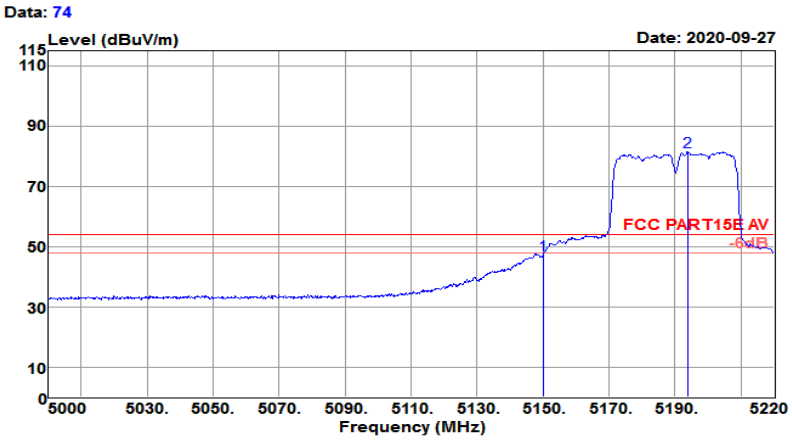
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
Test Mode     : 802.11n HT40 CH38(5190MHz)    Power rating: DC 3.0V~3.6V
EUT           : WD_RTL8821CE_V10
Model No.     : WD_RTL8821CE_V10
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	61.44	31.32	5.65	35.70	62.71	68.20	-5.49	Peak
5203.500	99.83	31.36	5.70	35.63	101.26	68.20	33.06	Peak

Test Mode :	802.11n HT40 CH38 5190MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.22GHz	**Polarization :**	Horizontal

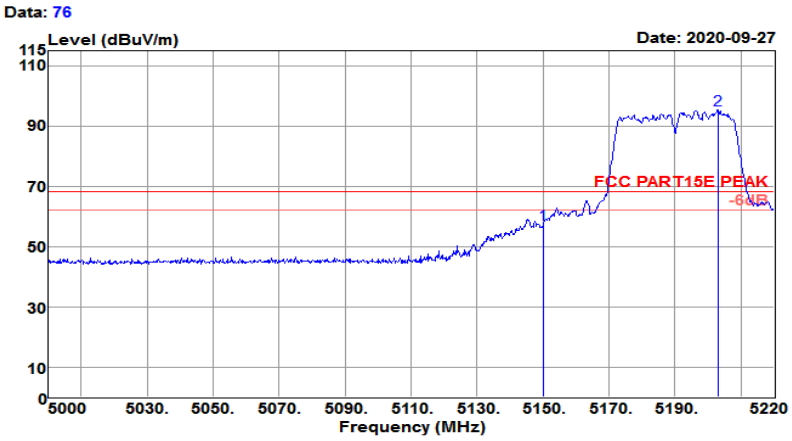
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
                --------------------------                    ----------------
Test Mode     : 802.11n HT40 CH38(5190MHz)    Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	45.83	31.32	5.65	35.70	47.10	54.00	-6.90	Average
5193.820	79.99	31.36	5.69	35.64	81.40	54.00	27.40	Average

Test Mode :	802.11n HT40 CH38 5190MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.22GHz	**Polarization :**	Vertical

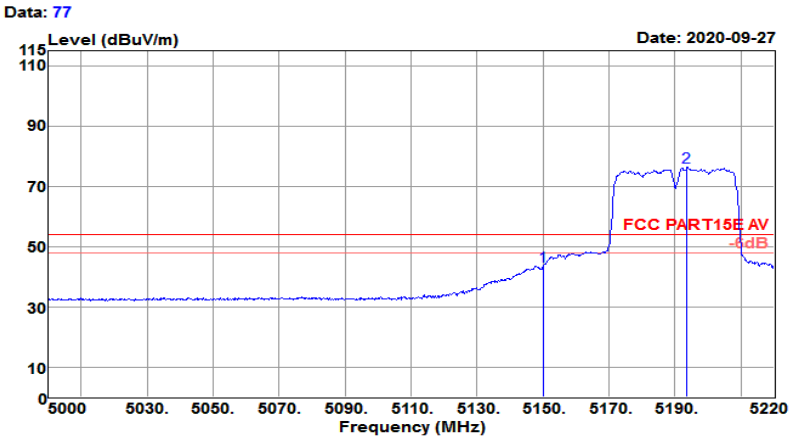
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
Tested by     : Jack                          Pol/Phase     : VERTICAL
Test Mode     : 802.11n HT40 CH38(5190MHz)    Power rating: DC 3.0V~3.6V
EUT           : WD_RTL8821CE_V10
Model No.     : WD_RTL8821CE_V10
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	56.15	31.32	5.65	35.70	57.42	68.20	-10.78	Peak
5203.060	93.75	31.36	5.70	35.63	95.18	68.20	26.98	Peak

Test Mode :	802.11n HT40 CH38 5190MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.22GHz	**Polarization :**	Vertical

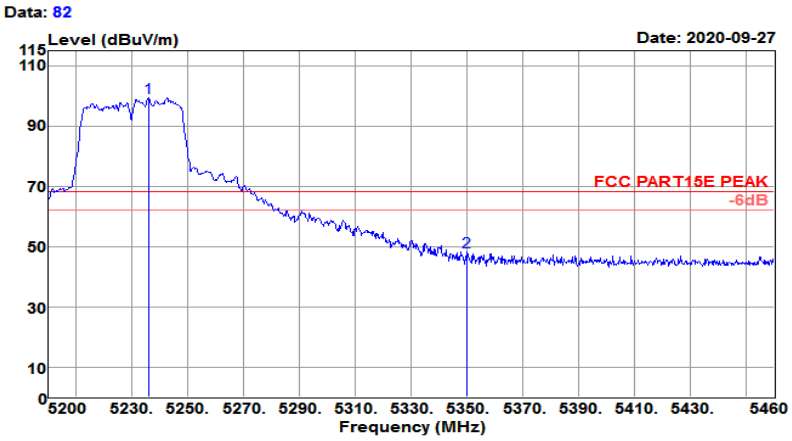
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
                --------------------------                    ----------------
Test Mode     : 802.11n HT40 CH38(5190MHz)    Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	42.02	31.32	5.65	35.70	43.29	54.00	-10.71	Average
5193.600	74.92	31.35	5.69	35.64	76.32	54.00	22.32	Average

Test Mode :	802.11n HT40 CH46 5230MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Horizontal

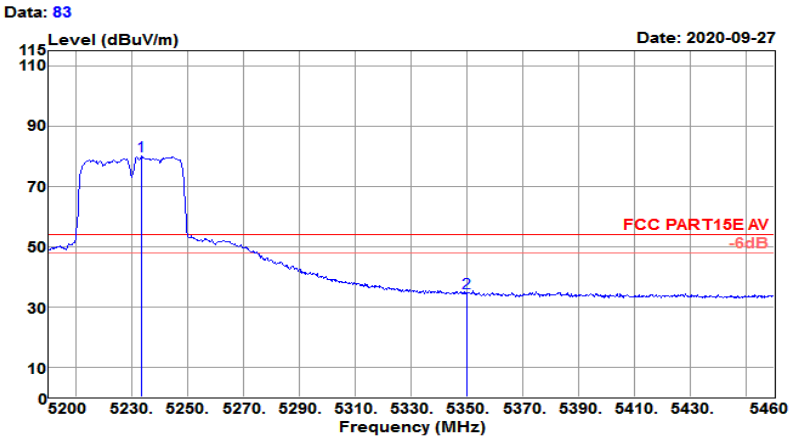
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
Test Mode     : 802.11n HT40 CH46(5230MHz)    Power rating: DC 3.0V~3.6V
EUT           : WD_RTL8821CE_V10
Model No.     : WD_RTL8821CE_V10
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5235.880	97.76	31.39	5.70	35.58	99.27	68.20	31.07	Peak
5350.000	46.30	31.48	5.71	35.43	48.06	68.20	-20.14	Peak

Test Mode :	802.11n HT40 CH46 5230MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Horizontal

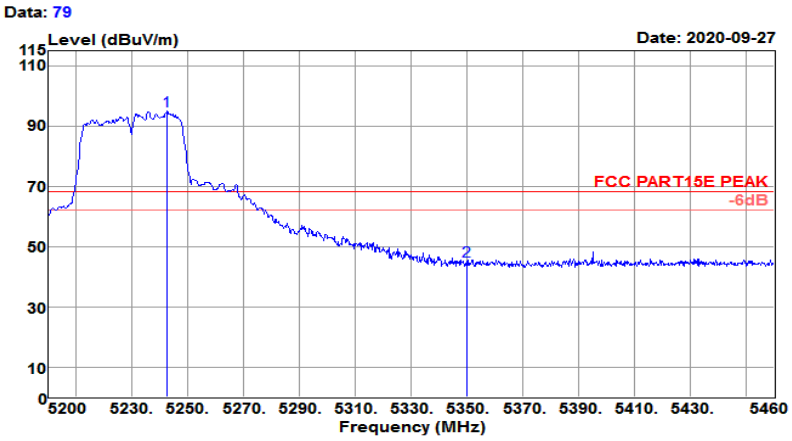
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
                --------------------------                    ----------------
Test Mode     : 802.11n HT40 CH46(5230MHz)    Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5233.540	78.45	31.39	5.70	35.59	79.95	54.00	25.95	Average
5350.000	32.73	31.48	5.71	35.43	34.49	54.00	-19.51	Average

Test Mode :	802.11n HT40 CH46 5230MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Vertical

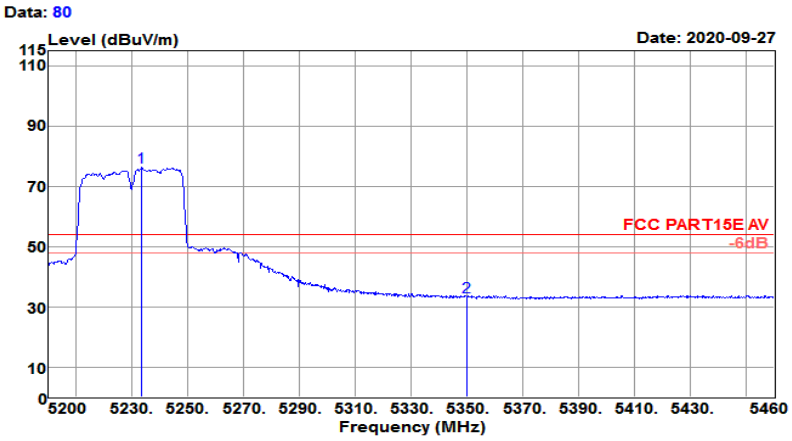
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
Tested by     : Jack                          Pol/Phase     : VERTICAL
Test Mode     : 802.11n HT40 CH46(5230MHz)    Power rating: DC 3.0V~3.6V
EUT           : WD_RTL8821CE_V10
Model No.     : WD_RTL8821CE_V10
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5242.640	93.37	31.39	5.70	35.58	94.88	68.20	26.68	Peak
5350.000	43.50	31.48	5.71	35.43	45.26	68.20	-22.94	Peak

Test Mode :	802.11n HT40 CH46 5230MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.2GHz~5.46GHz	**Polarization :**	Vertical

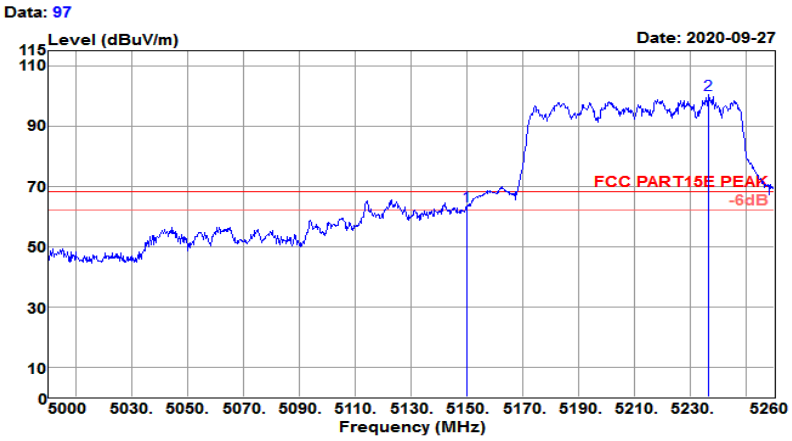
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
                --------------------------                    ----------------
Test Mode     : 802.11n HT40 CH46(5230MHz)    Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5233.540	74.72	31.39	5.70	35.59	76.22	54.00	22.22	Average
5350.000	31.62	31.48	5.71	35.43	33.38	54.00	-20.62	Average

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.26GHz	**Polarization :**	Horizontal

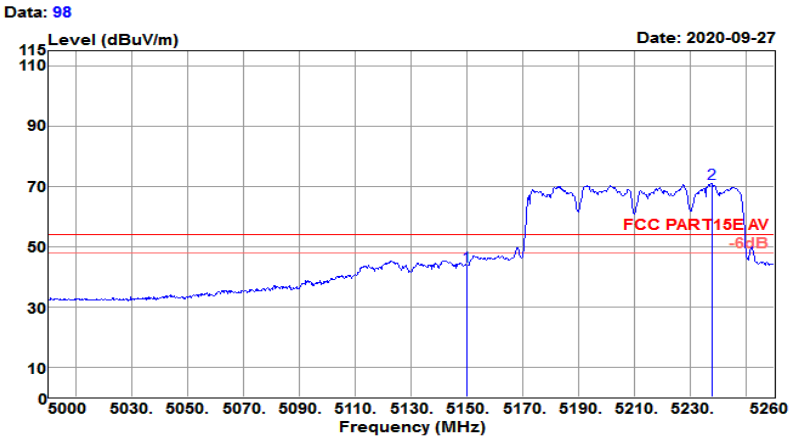
```
Test Site     : 3m Chamber                      Temp/Humi     : 19℃/60%
Tested by     : Jack                            Pol/Phase     : HORIZONTAL
Test Mode     : 802.11ac VHT80 CH42(5210MHz)    Power rating: DC 3.0V~3.6V
EUT           : WD_RTL8821CE_V10
Model No.     : WD_RTL8821CE_V10
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	62.10	31.32	5.65	35.70	63.37	68.20	-4.83	Peak
5236.340	98.87	31.39	5.70	35.58	100.38	68.20	32.18	Peak

Test Mode :	802.11ac VHT80 CH42 5210MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	5.0GHz~5.26GHz	Polarization :	Horizontal

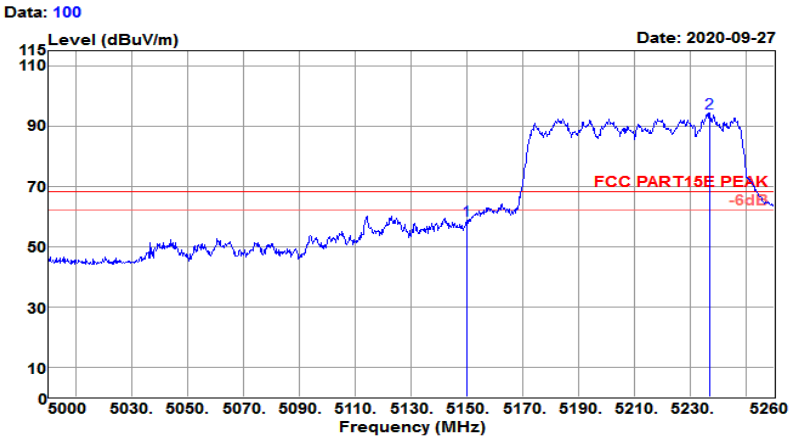
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11ac VHT80 CH42(5210MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	42.16	31.32	5.65	35.70	43.43	54.00	-10.57	Average
5237.640	69.41	31.39	5.70	35.58	70.92	54.00	16.92	Average

Test Mode :	802.11ac VHT80 CH42 5210MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	5.0GHz~5.26GHz	Polarization :	Vertical

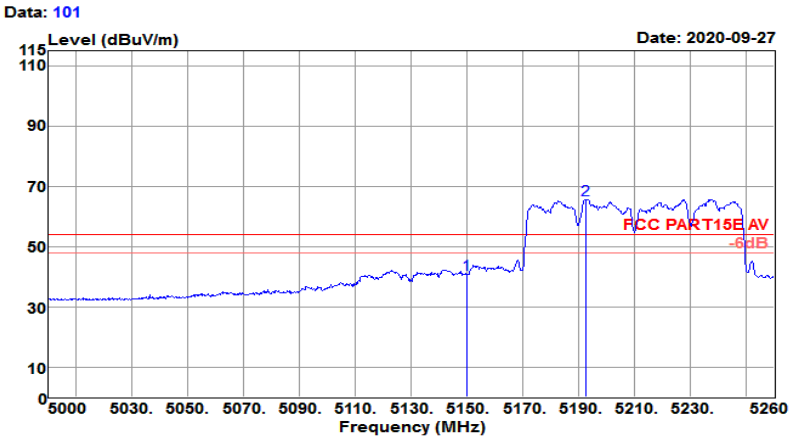
```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : VERTICAL
             --------------------------                   ----------------
Test Mode    : 802.11ac VHT80 CH42(5210MHz)  Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	57.45	31.32	5.65	35.70	58.72	68.20	-9.48	Peak
5236.860	92.71	31.39	5.70	35.58	94.22	68.20	26.02	Peak

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.0GHz~5.26GHz	**Polarization :**	Vertical

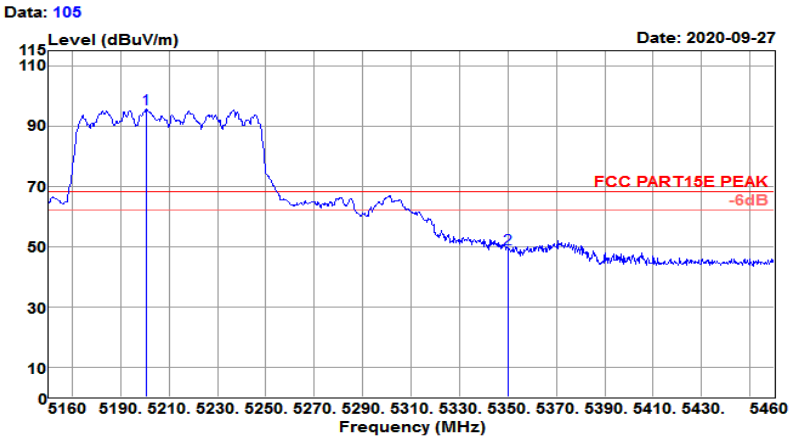
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11ac VHT80 CH42(5210MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5150.000	39.38	31.32	5.65	35.70	40.65	54.00	-13.35	Average
5192.660	64.20	31.35	5.69	35.64	65.60	54.00	11.60	Average

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.16GHz~5.46GHz	**Polarization :**	Horizontal

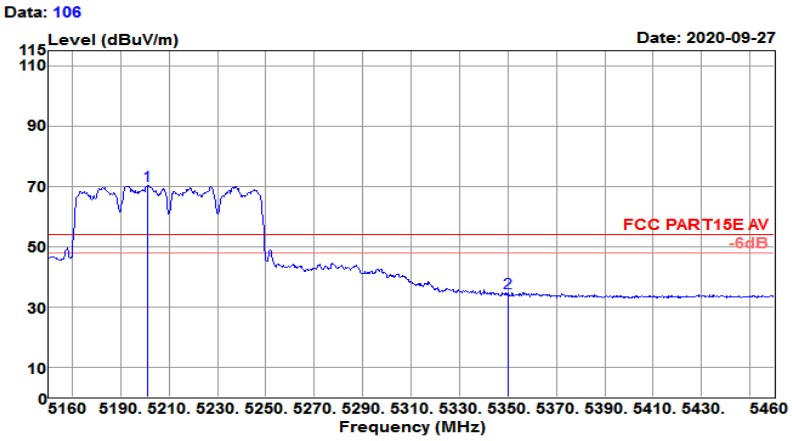
```
Test Site     : 3m Chamber                      Temp/Humi     : 19℃/60%
                --------------------------                      ----------------
Tested by     : Jack                            Pol/Phase     : HORIZONTAL
                --------------------------                      ----------------
Test Mode     : 802.11ac VHT80 CH42(5210MHz)    Power rating: DC 3.0V~3.6V
                --------------------------                      ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5200.800	94.27	31.36	5.70	35.63	95.70	68.20	27.50	Peak
5350.000	47.38	31.48	5.71	35.43	49.14	68.20	-19.06	Peak

Test Mode :	802.11ac VHT80 CH42 5210MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	5.16GHz~5.46GHz	Polarization :	Horizontal

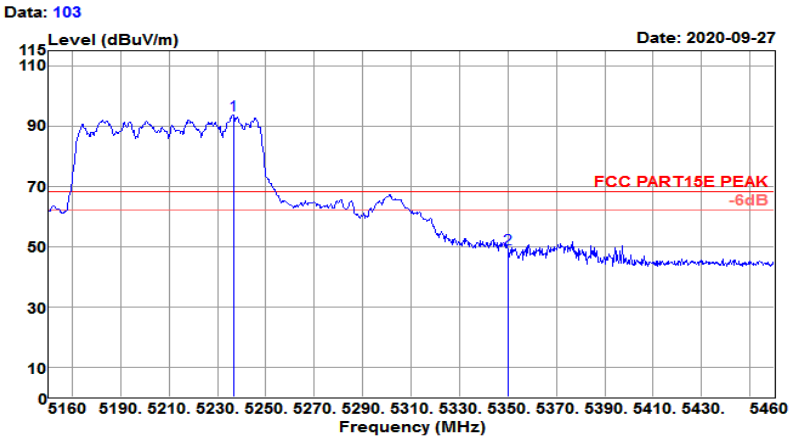
```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : HORIZONTAL
             --------------------------                   ----------------
Test Mode    : 802.11ac VHT80 CH42(5210MHz)  Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5201.100	68.93	31.36	5.70	35.63	70.36	54.00	16.36	Average
5350.000	32.81	31.48	5.71	35.43	34.57	54.00	-19.43	Average

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.16GHz~5.46GHz	**Polarization :**	Vertical

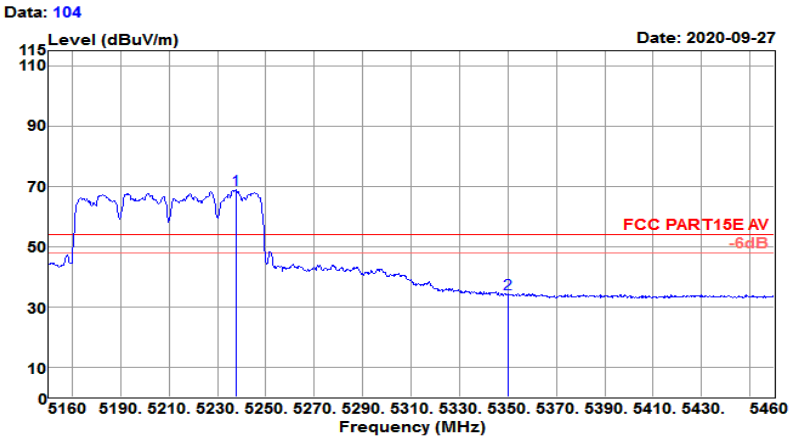
```
Test Site     : 3m Chamber                      Temp/Humi     : 19℃/60%
Tested by     : Jack                            Pol/Phase     : VERTICAL
Test Mode     : 802.11ac VHT80 CH42(5210MHz)    Power rating: DC 3.0V~3.6V
EUT           : WD_RTL8821CE_V10
Model No.     : WD_RTL8821CE_V10
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5236.500	92.17	31.39	5.70	35.58	93.68	68.20	25.48	Peak
5350.000	47.47	31.48	5.71	35.43	49.23	68.20	-18.97	Peak

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	5.16GHz~5.46GHz	**Polarization :**	Vertical

```
Test Site     : 3m Chamber                      Temp/Humi     : 19℃/60%
Tested by     : Jack                            Pol/Phase     : VERTICAL
Test Mode     : 802.11ac VHT80 CH42(5210MHz)    Power rating: DC 3.0V~3.6V
EUT           : WD_RTL8821CE_V10
Model No.     : WD_RTL8821CE_V10
```

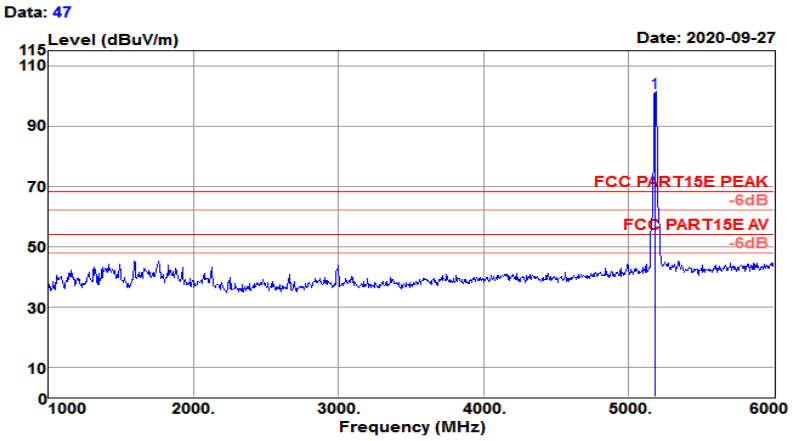


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5237.700	67.24	31.39	5.70	35.58	68.75	54.00	14.75	Average
5350.000	32.67	31.48	5.71	35.43	34.43	54.00	-19.57	Average

4.4.1 Test Result of Radiated Spurious Emission (1GHz ~ 10th Harmonic)

Test Mode :	802.11a CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Horizontal

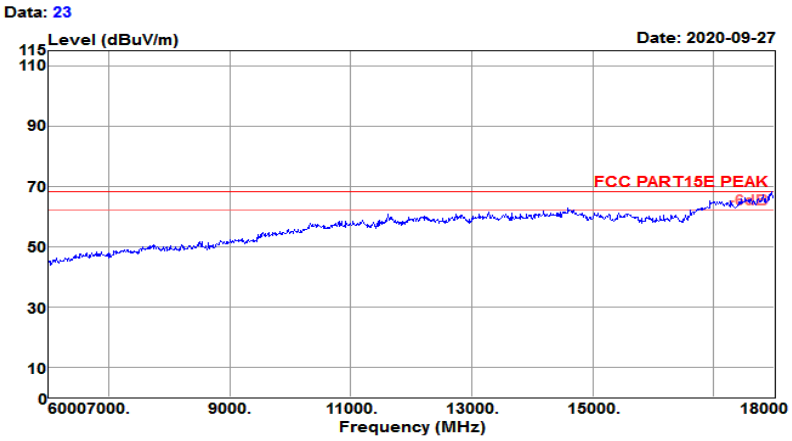
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
Test Mode     : 802.11a CH36 (5180MHz)        Power rating: DC 3.0V~3.6V
EUT           : WD_RTL8821CE_V10
Model No.     : WD_RTL8821CE_V10
```



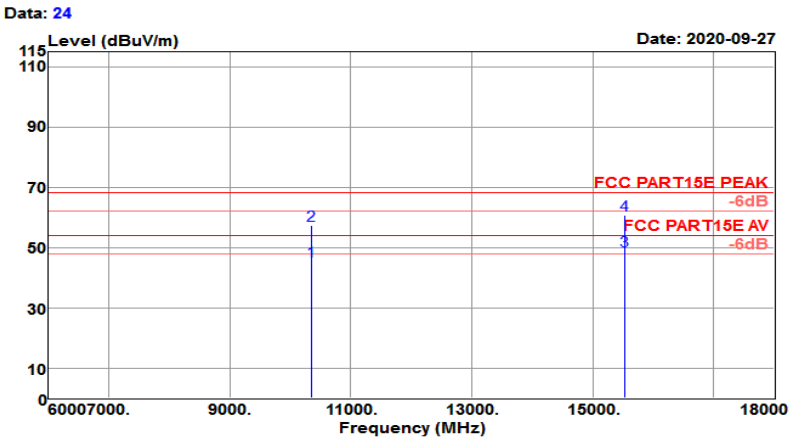
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5180.000	99.74	31.34	5.68	35.66	101.10	68.20	32.90	Peak

Test Mode :	802.11a CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	6GHz~18GHz	**Polarization :**	Horizontal

```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
                --------------------------                    ----------------
Test Mode     : 802.11a CH36 (5180MHz)        Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11a CH36 (5180MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

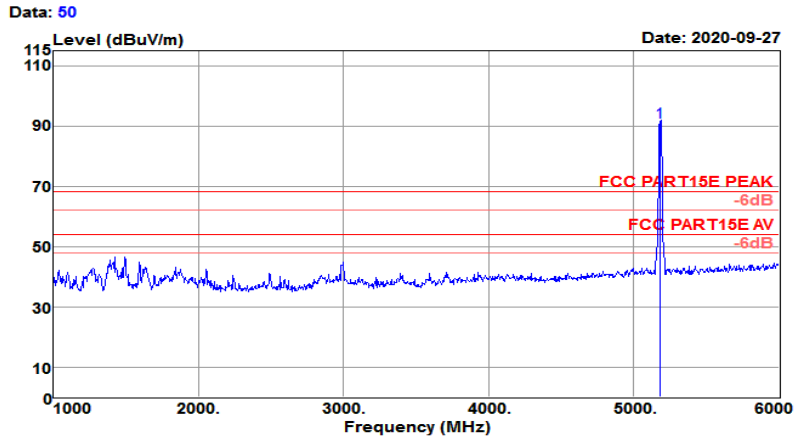


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10360.000	52.03	39.20	11.90	57.57	45.56	54.00	-8.44	Average
10360.000	63.72	39.20	11.90	57.57	57.25	68.20	-10.95	Peak
15540.000	52.14	38.43	16.34	58.05	48.86	54.00	-5.14	Average
15540.000	64.17	38.43	16.34	58.05	60.89	68.20	-7.31	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11a CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Vertical

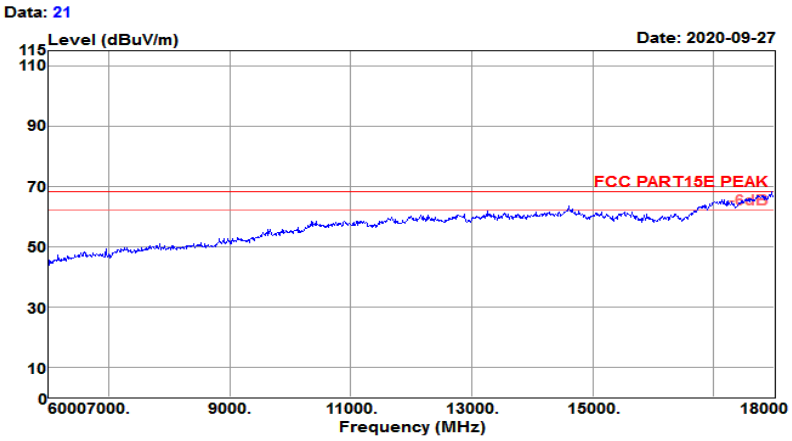
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11a CH36 (5180MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



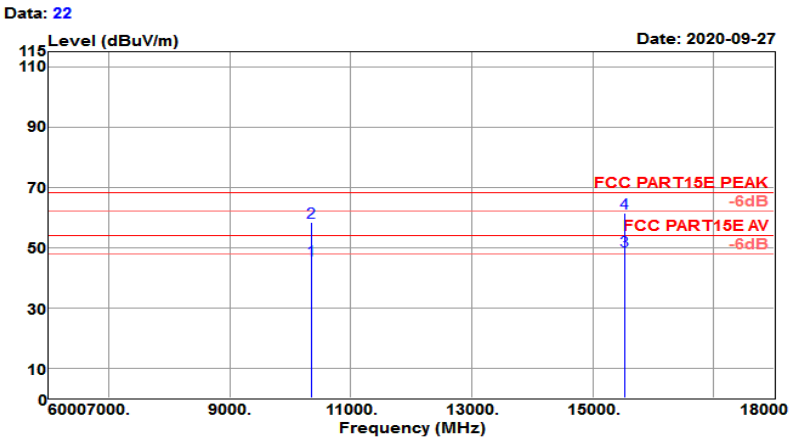
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5180.000	90.01	31.34	5.68	35.66	91.37	68.20	23.17	Peak

Test Mode :	802.11a CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	6GHz~18GHz	**Polarization :**	Vertical

```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
                --------------------------                    ----------------
Test Mode     : 802.11a CH36 (5180MHz)        Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11a CH36 (5180MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

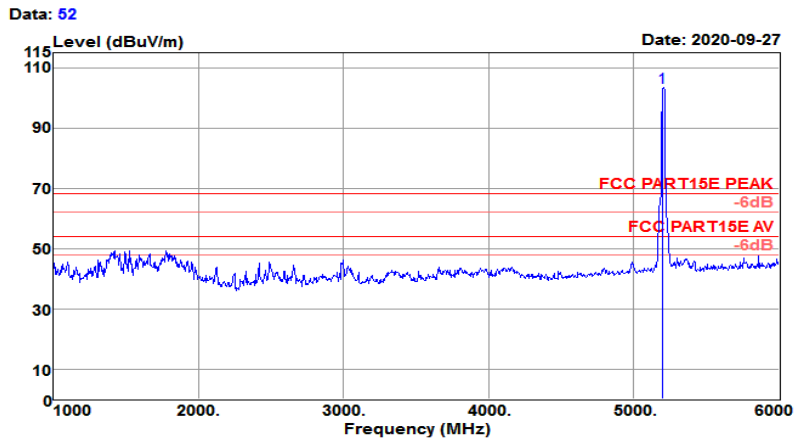


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10360.000	52.12	39.20	11.90	57.57	45.65	54.00	-8.35	Average
10360.000	64.94	39.20	11.90	57.57	58.47	68.20	-9.73	Peak
15540.000	52.30	38.43	16.34	58.05	49.02	54.00	-4.98	Average
15540.000	64.56	38.43	16.34	58.05	61.28	68.20	-6.92	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11a CH40 5200MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Horizontal

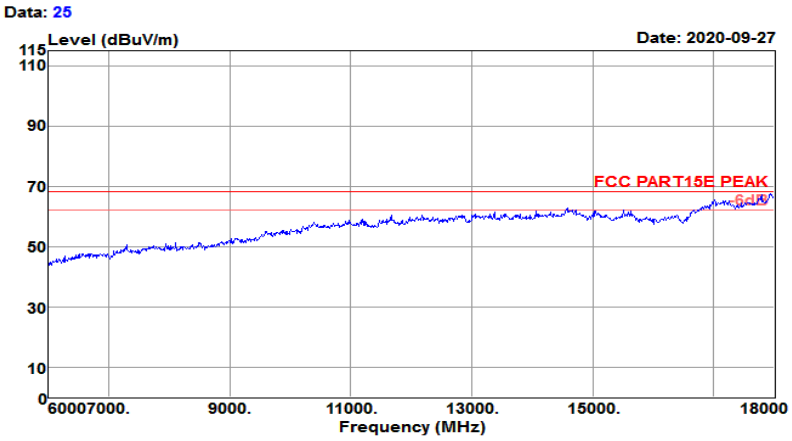
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11a CH40 (5200MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



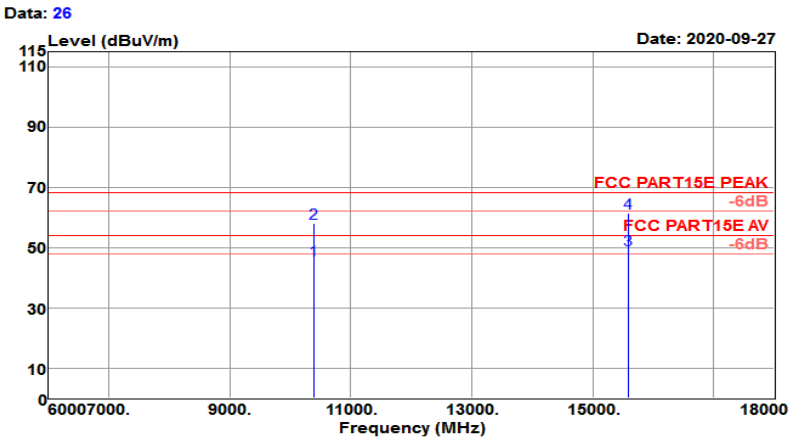
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5200.000	102.04	31.36	5.70	35.63	103.47	68.20	35.27	Peak

Test Mode :	802.11a CH40 5200MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	6GHz~18GHz	**Polarization :**	Horizontal

```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
                --------------------------                    ----------------
Test Mode     : 802.11a CH40 (5200MHz)        Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11a CH40 (5200MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

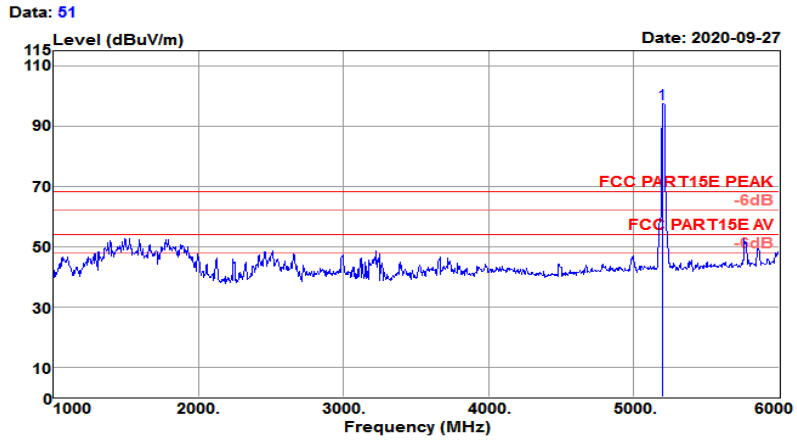


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10400.000	52.10	39.26	11.96	57.54	45.78	54.00	-8.22	Average
10400.000	64.38	39.26	11.96	57.54	58.06	68.20	-10.14	Peak
15600.000	52.84	38.32	16.28	58.11	49.33	54.00	-4.67	Average
15600.000	65.04	38.32	16.28	58.11	61.53	68.20	-6.67	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11a CH40 5200MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Vertical

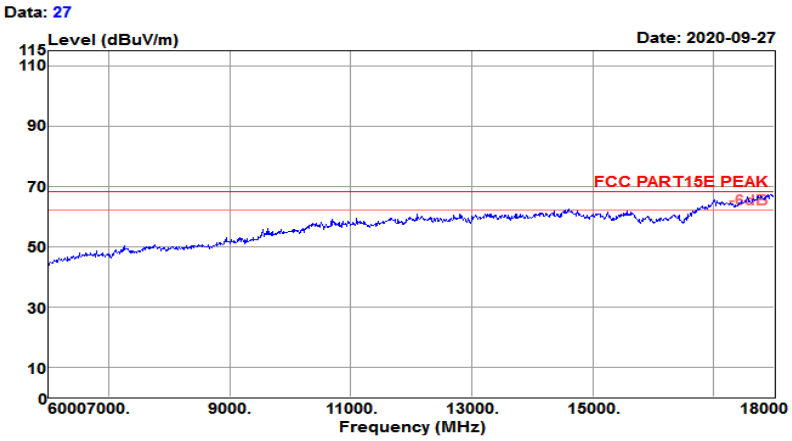
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11a CH40 (5200MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



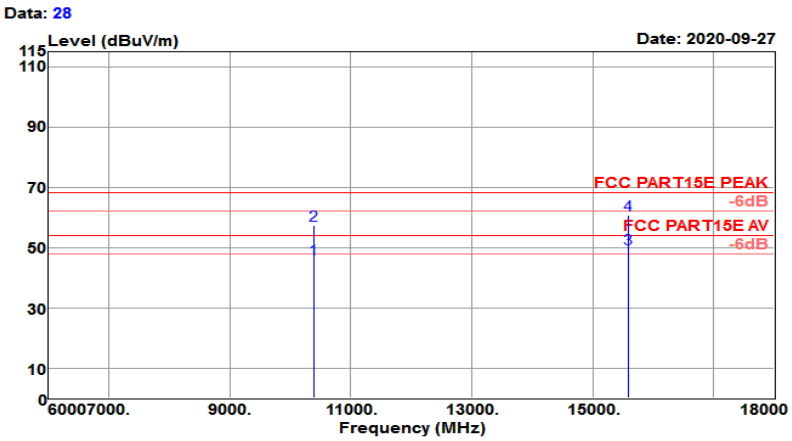
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5200.000	96.10	31.36	5.70	35.63	97.53	68.20	29.33	Peak

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	6GHz~18GHz	**Polarization :**	Vertical

```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
               --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
               --------------------------                    ----------------
Test Mode     : 802.11a CH40 (5200MHz)        Power rating: DC 3.0V~3.6V
               --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
               --------------------------
Model No.     : WD_RTL8821CE_V10
               --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11a CH40 (5200MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

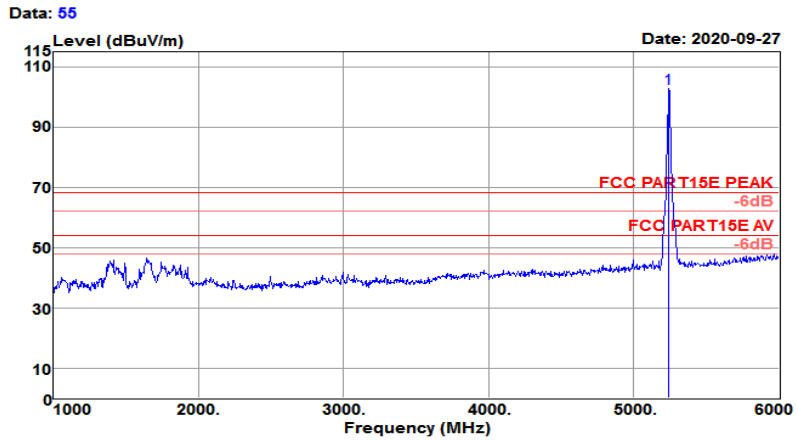


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10400.000	52.32	39.26	11.96	57.54	46.00	54.00	-8.00	Average
10400.000	63.67	39.26	11.96	57.54	57.35	68.20	-10.85	Peak
15600.000	53.07	38.32	16.28	58.11	49.56	54.00	-4.44	Average
15600.000	64.29	38.32	16.28	58.11	60.78	68.20	-7.42	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Horizontal

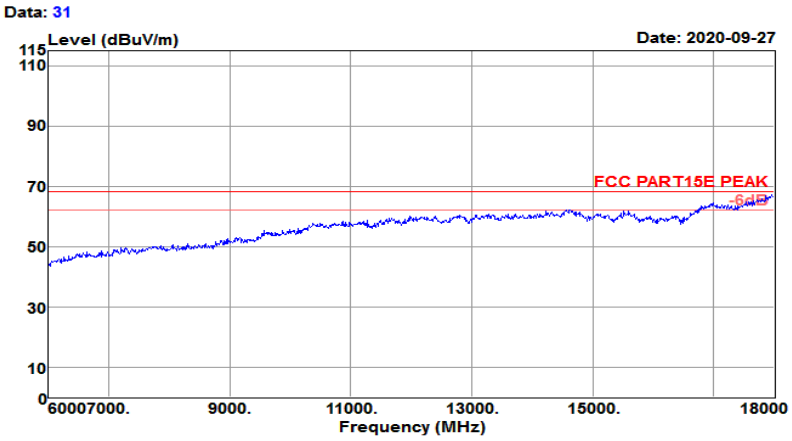
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11a CH48 (5240MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



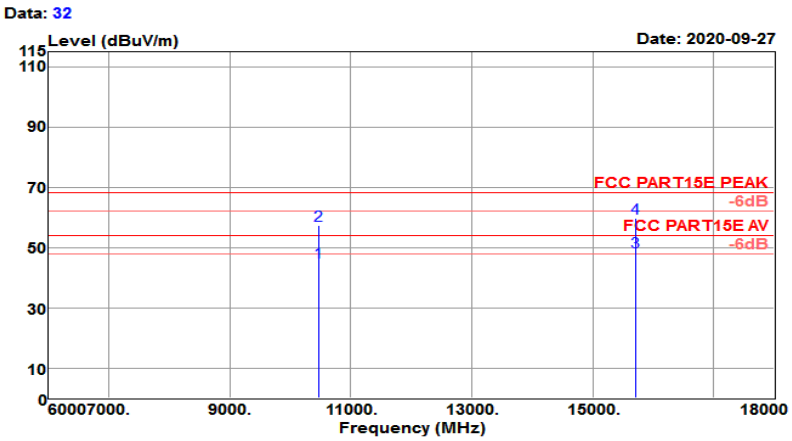
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5240.000	101.17	31.39	5.70	35.58	102.68	68.20	34.48	Peak

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	6GHz~18GHz	**Polarization :**	Horizontal

```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
              --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
              --------------------------                    ----------------
Test Mode     : 802.11a CH48 (5240MHz)        Power rating: DC 3.0V~3.6V
              --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
              --------------------------
Model No.     : WD_RTL8821CE_V10
              --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11a CH48 (5240MHz)	Power rating:	DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

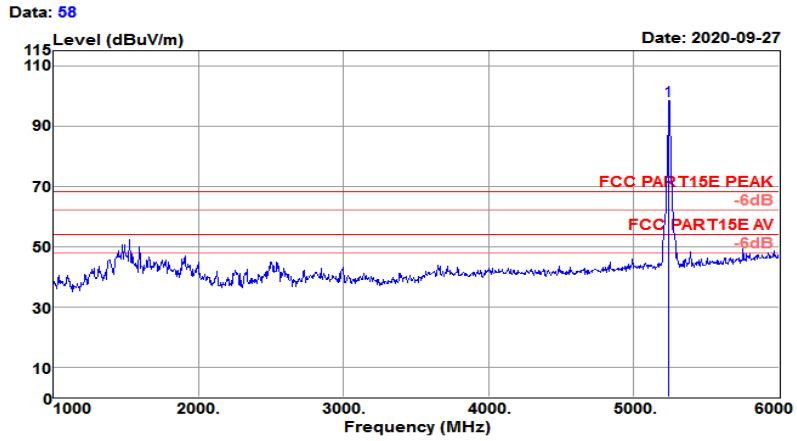


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10480.000	51.21	39.37	12.07	57.49	45.16	54.00	-8.84	Average
10480.000	63.50	39.37	12.07	57.49	57.45	68.20	-10.75	Peak
15720.000	52.39	38.10	16.15	58.24	48.40	54.00	-5.60	Average
15720.000	63.65	38.10	16.15	58.24	59.66	68.20	-8.54	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Vertical

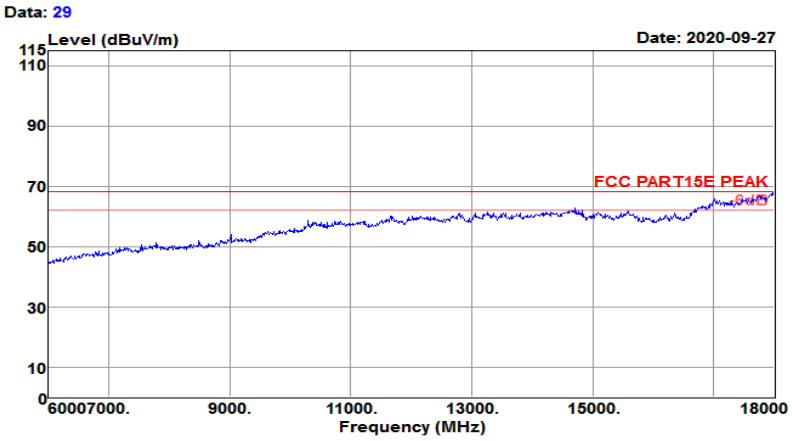
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11a CH48 (5240MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



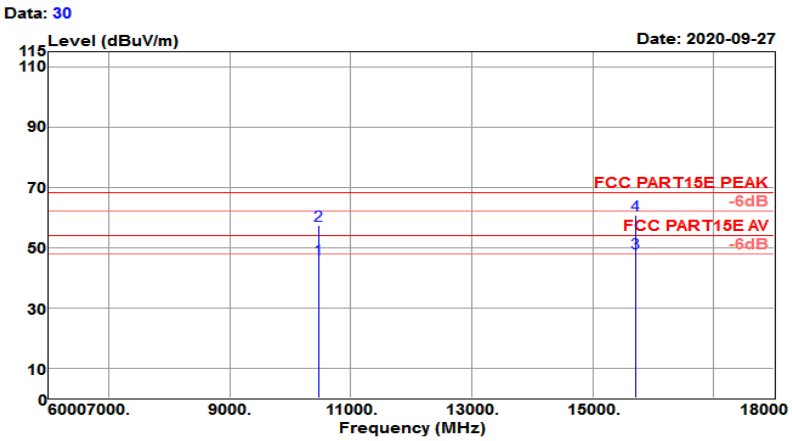
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5240.000	96.81	31.39	5.70	35.58	98.32	68.20	30.12	Peak

Test Mode :	802.11a CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	6GHz~18GHz	**Polarization :**	Vertical

```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
                --------------------------                    ----------------
Test Mode     : 802.11a CH48 (5240MHz)        Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11a CH48 (5240MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

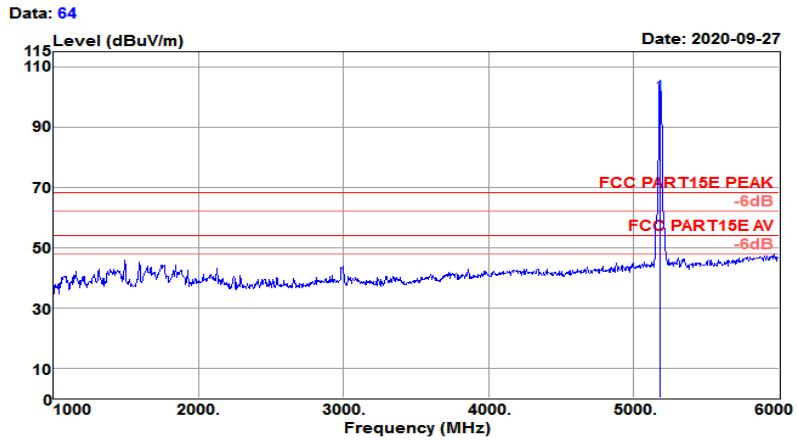


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10480.000	52.03	39.37	12.07	57.49	45.98	54.00	-8.02	Average
10480.000	63.28	39.37	12.07	57.49	57.23	68.20	-10.97	Peak
15720.000	52.17	38.10	16.15	58.24	48.18	54.00	-5.82	Average
15720.000	64.60	38.10	16.15	58.24	60.61	68.20	-7.59	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11n HT20 CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Horizontal

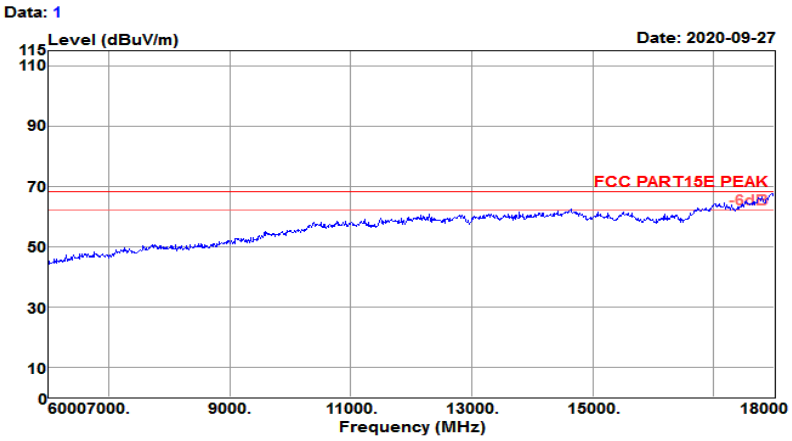
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11n HT20 CH36 (5180MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



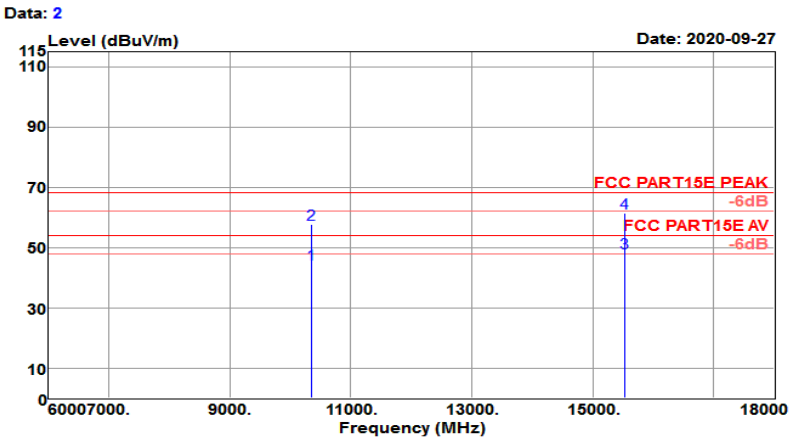
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5180.000	99.52	31.34	5.68	35.66	100.88	68.20	32.68	Peak

Test Mode :	802.11n HT20 CH36 5180MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	6GHz~18GHz	Polarization :	Horizontal

```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : HORIZONTAL
             --------------------------                   ----------------
Test Mode    : 802.11n HT20 CH36 (5180MHz)   Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11n HT20 CH36 (5180MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

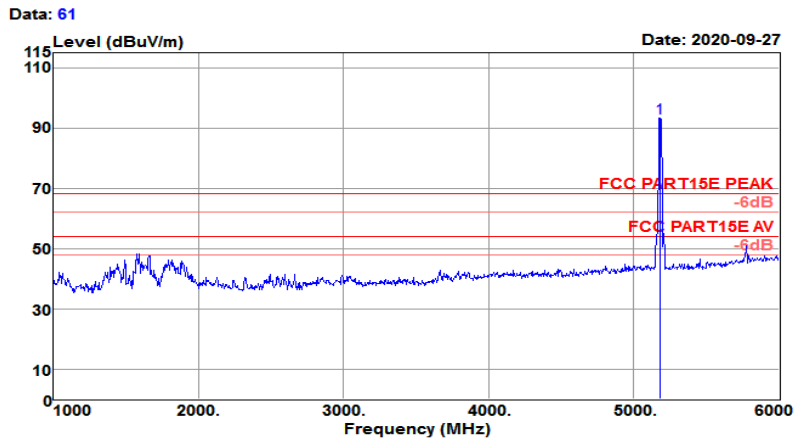


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10360.000	51.02	39.20	11.90	57.57	44.55	54.00	-9.45	Average
10360.000	64.16	39.20	11.90	57.57	57.69	68.20	-10.51	Peak
15540.000	51.42	38.43	16.34	58.05	48.14	54.00	-5.86	Average
15540.000	64.70	38.43	16.34	58.05	61.42	68.20	-6.78	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11n HT20 CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Vertical

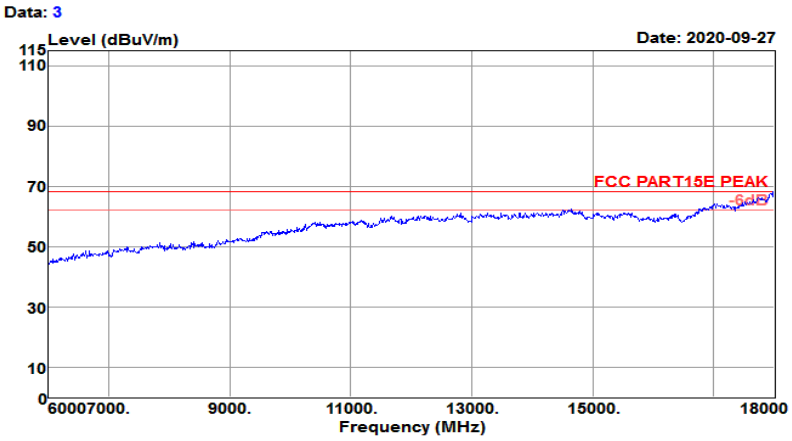
```
Test Site     : 3m Chamber                      Temp/Humi     : 19℃/60%
                --------------------------                      ----------------
Tested by     : Jack                            Pol/Phase     : VERTICAL
                --------------------------                      ----------------
Test Mode     : 802.11n HT20 CH36 (5180MHz)     Power rating: DC 3.0V~3.6V
                --------------------------                      ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



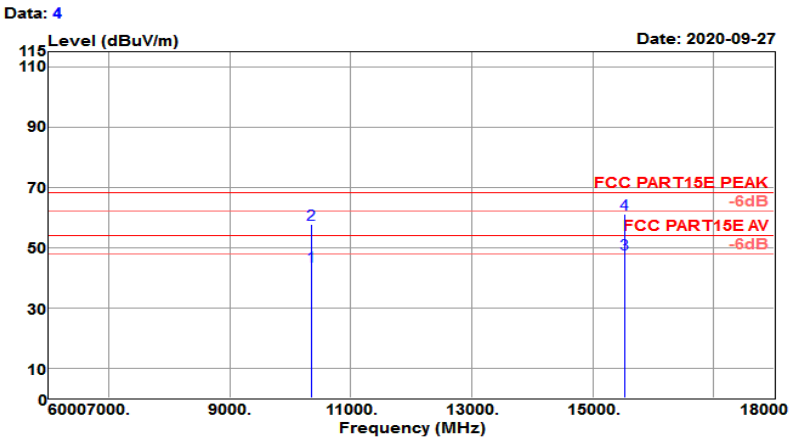
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5180.000	91.85	31.34	5.68	35.66	93.21	68.20	25.01	Peak

Test Mode :	802.11n HT20 CH36 5180MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	6GHz~18GHz	**Polarization :**	Vertical

```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
                --------------------------                    ----------------
Test Mode     : 802.11n HT20 CH36 (5180MHz)   Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11n HT20 CH36 (5180MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

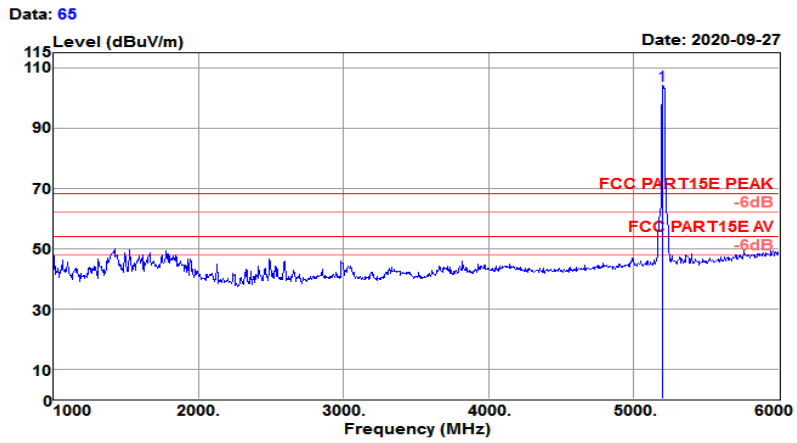


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10360.000	50.19	39.20	11.90	57.57	43.72	54.00	-10.28	Average
10360.000	64.21	39.20	11.90	57.57	57.74	68.20	-10.46	Peak
15540.000	51.25	38.43	16.34	58.05	47.97	54.00	-6.03	Average
15540.000	64.45	38.43	16.34	58.05	61.17	68.20	-7.03	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11n HT20 CH40 5200MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Horizontal

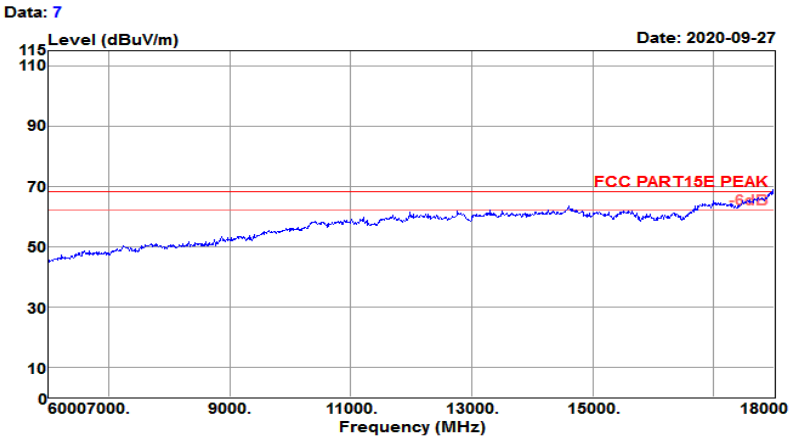
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
                --------------------------                    ----------------
Test Mode     : 802.11n HT20 CH40 (5200MHz)   Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



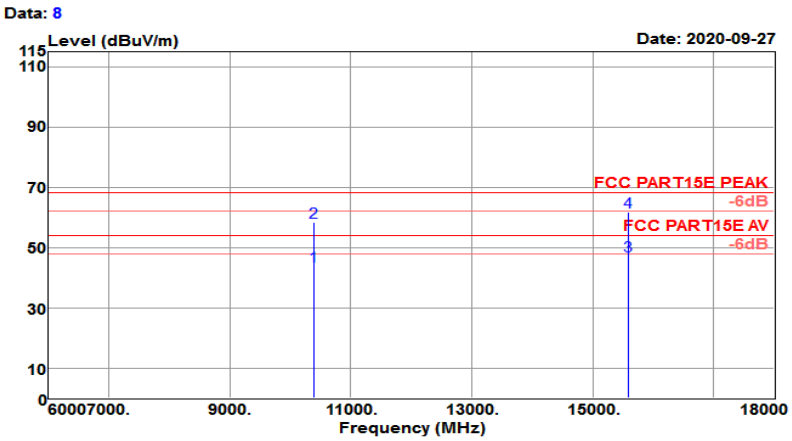
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5200.000	102.65	31.36	5.70	35.63	104.08	68.20	35.88	Peak

Test Mode :	802.11n HT20 CH40 5200MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	6GHz~18GHz	Polarization :	Horizontal

```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : HORIZONTAL
             --------------------------                   ----------------
Test Mode    : 802.11n HT20 CH40 (5200MHz)   Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11n HT20 CH40 (5200MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

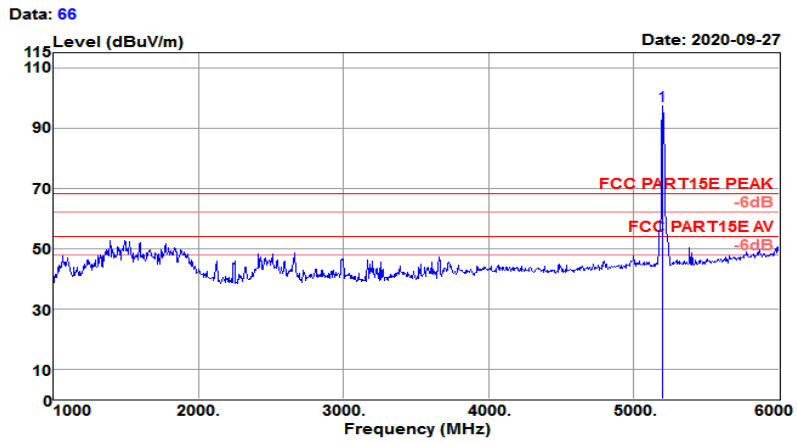


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10400.000	50.12	39.26	11.96	57.54	43.80	54.00	-10.20	Average
10400.000	64.82	39.26	11.96	57.54	58.50	68.20	-9.70	Peak
15600.000	50.63	38.32	16.28	58.11	47.12	54.00	-6.88	Average
15600.000	65.24	38.32	16.28	58.11	61.73	68.20	-6.47	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11n HT20 CH40 5200MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Vertical

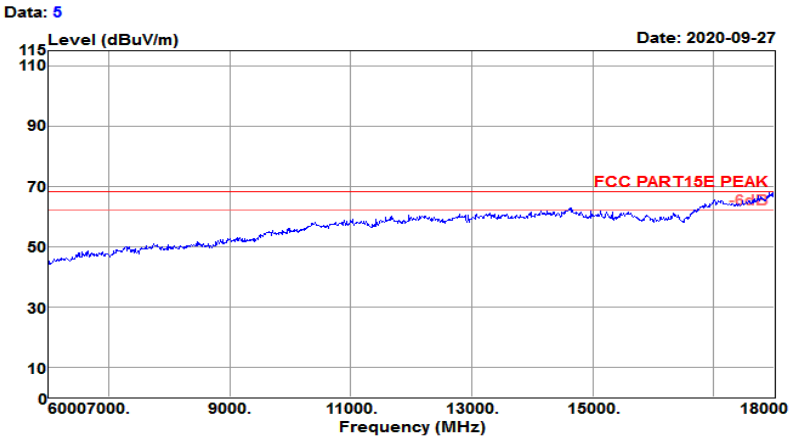
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
                --------------------------                    ----------------
Test Mode     : 802.11n HT20 CH40 (5200MHz)   Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



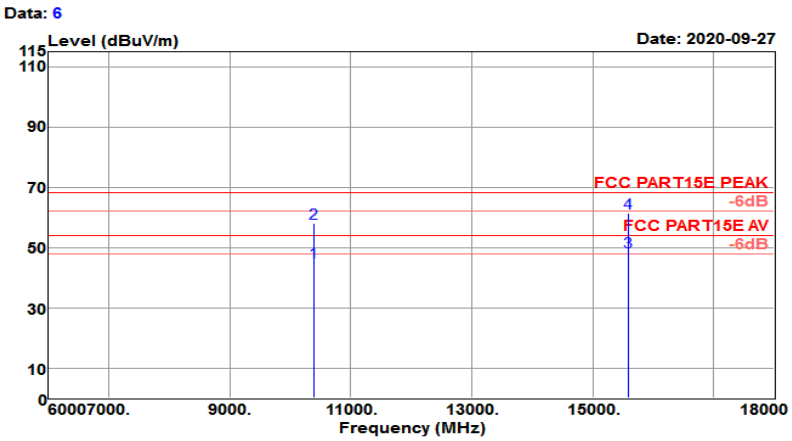
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5200.000	95.94	31.36	5.70	35.63	97.37	68.20	29.17	Peak

Test Mode :	802.11n HT20 CH40 5200MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	6GHz~18GHz	**Polarization :**	Vertical

```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
              --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
              --------------------------                    ----------------
Test Mode     : 802.11n HT20 CH40 (5200MHz)   Power rating: DC 3.0V~3.6V
              --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
              --------------------------
Model No.     : WD_RTL8821CE_V10
              --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11n HT20 CH40 (5200MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

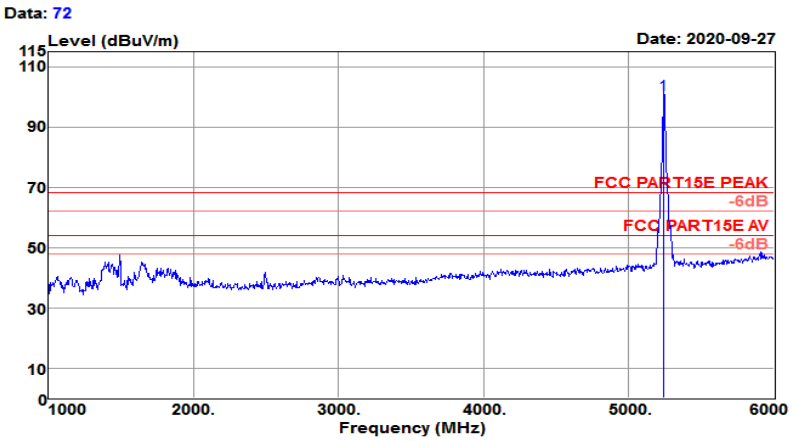


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10400.000	51.30	39.26	11.96	57.54	44.98	54.00	-9.02	Average
10400.000	64.37	39.26	11.96	57.54	58.05	68.20	-10.15	Peak
15600.000	52.04	38.32	16.28	58.11	48.53	54.00	-5.47	Average
15600.000	65.06	38.32	16.28	58.11	61.55	68.20	-6.65	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11n HT20 CH48 5240MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Horizontal

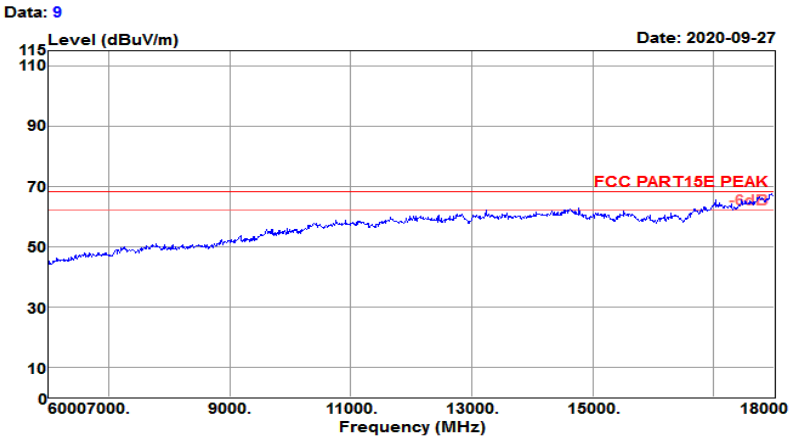
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11n HT20 CH48 (5240MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



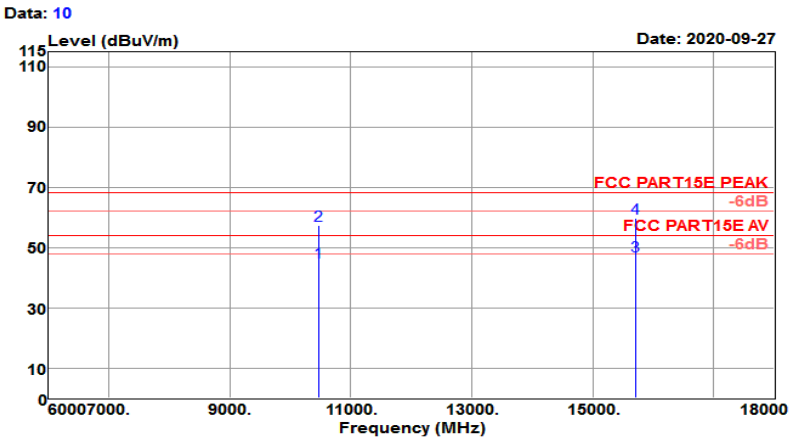
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5240.000	99.25	31.39	5.70	35.58	100.76	68.20	32.56	Peak

Test Mode :	802.11n HT20 CH48 5240MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	6GHz~18GHz	Polarization :	Horizontal

```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : HORIZONTAL
             --------------------------                   ----------------
Test Mode    : 802.11n HT20 CH48 (5240MHz)   Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11n HT20 CH48 (5240MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

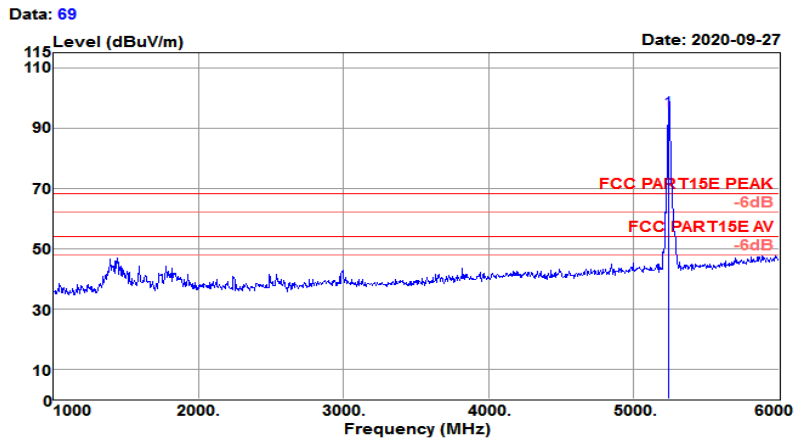


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10480.000	51.11	39.37	12.07	57.49	45.06	54.00	-8.94	Average
10480.000	63.27	39.37	12.07	57.49	57.22	68.20	-10.98	Peak
15720.000	51.29	38.10	16.15	58.24	47.30	54.00	-6.70	Average
15720.000	63.69	38.10	16.15	58.24	59.70	68.20	-8.50	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11n HT20 CH48 5240MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	1GHz~6GHz	Polarization :	Vertical

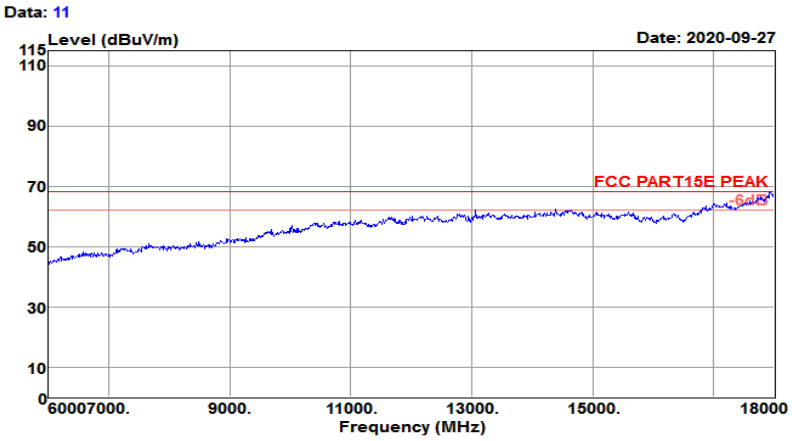
```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : VERTICAL
             --------------------------                   ----------------
Test Mode    : 802.11n HT20 CH48 (5240MHz)   Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



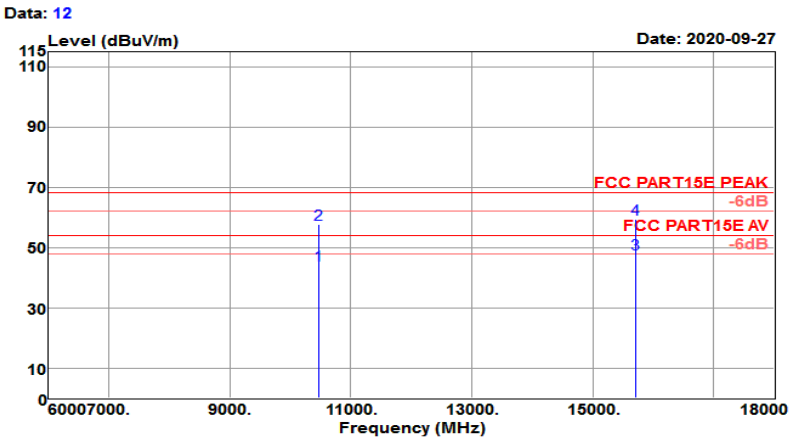
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5240.000	94.25	31.39	5.70	35.58	95.76	68.20	27.56	Peak

Test Mode :	802.11n HT20 CH48 5240MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	6GHz~18GHz	Polarization :	Vertical

```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : VERTICAL
             --------------------------                   ----------------
Test Mode    : 802.11n HT20 CH48 (5240MHz)   Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11n HT20 CH48 (5240MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

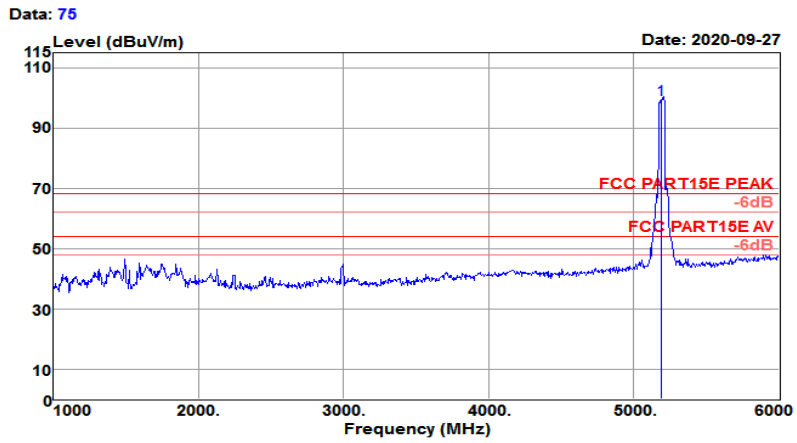


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10480.000	50.24	39.37	12.07	57.49	44.19	54.00	-9.81	Average
10480.000	63.73	39.37	12.07	57.49	57.68	68.20	-10.52	Peak
15720.000	51.68	38.10	16.15	58.24	47.69	54.00	-6.31	Average
15720.000	63.46	38.10	16.15	58.24	59.47	68.20	-8.73	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11n HT40 CH38 5190MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Horizontal

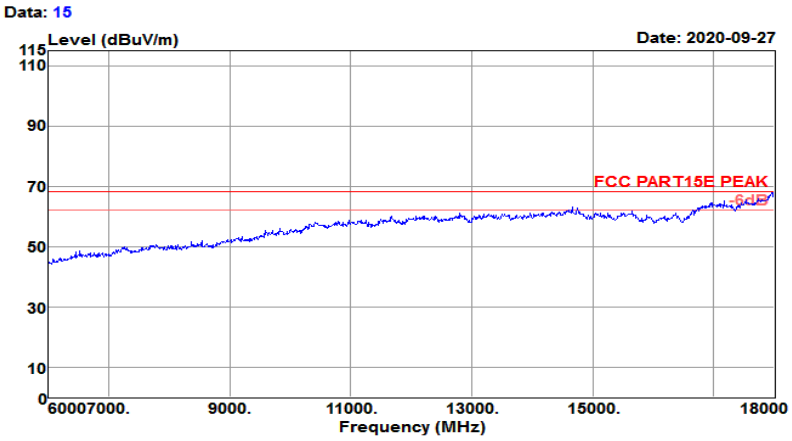
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : HORIZONTAL
                --------------------------                    ----------------
Test Mode     : 802.11n HT40 CH38(5190MHz)    Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



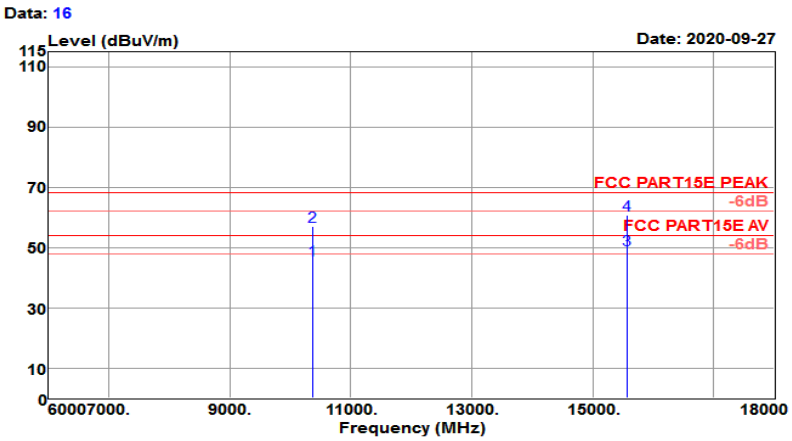
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5190.000	97.86	31.35	5.69	35.65	99.25	68.20	31.05	Peak

Test Mode :	802.11n HT40 CH38 5190MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	6GHz~18GHz	Polarization :	Horizontal

```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : HORIZONTAL
             --------------------------                   ----------------
Test Mode    : 802.11n HT40 CH38 (5190MHz)   Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11n HT40 CH38 (5190MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

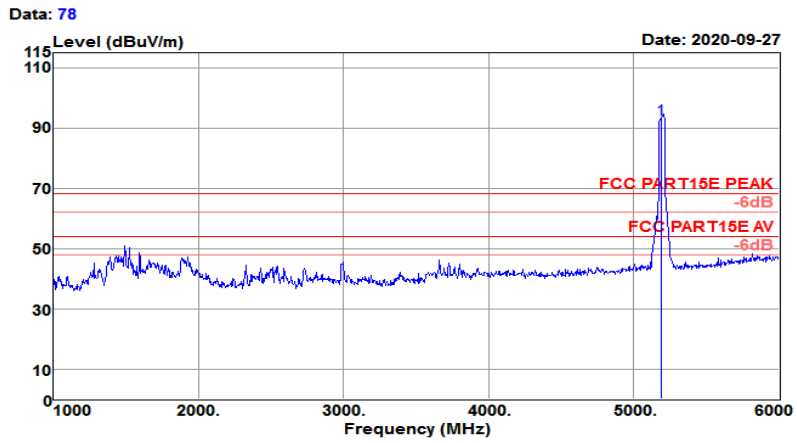


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10380.000	52.27	39.23	11.93	57.55	45.88	54.00	-8.12	Average
10380.000	63.29	39.23	11.93	57.55	56.90	68.20	-11.30	Peak
15570.000	52.75	38.37	16.31	58.08	49.35	54.00	-4.65	Average
15570.000	64.06	38.37	16.31	58.08	60.66	68.20	-7.54	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11n HT40 CH38 5190MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Vertical

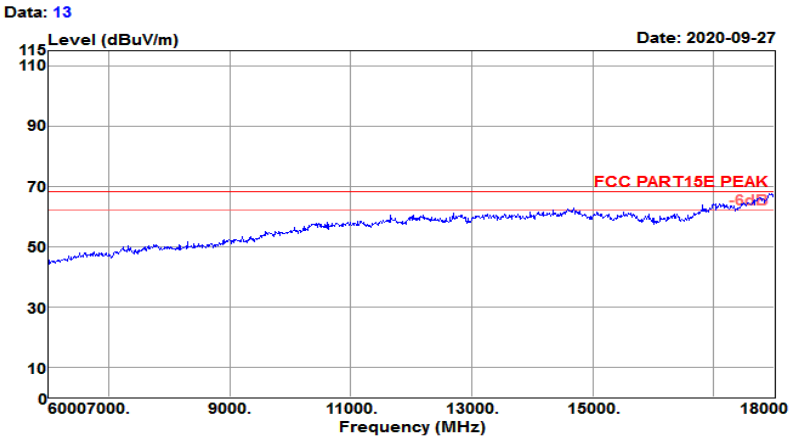
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
                --------------------------                    ----------------
Test Mode     : 802.11n HT40 CH38(5190MHz)    Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



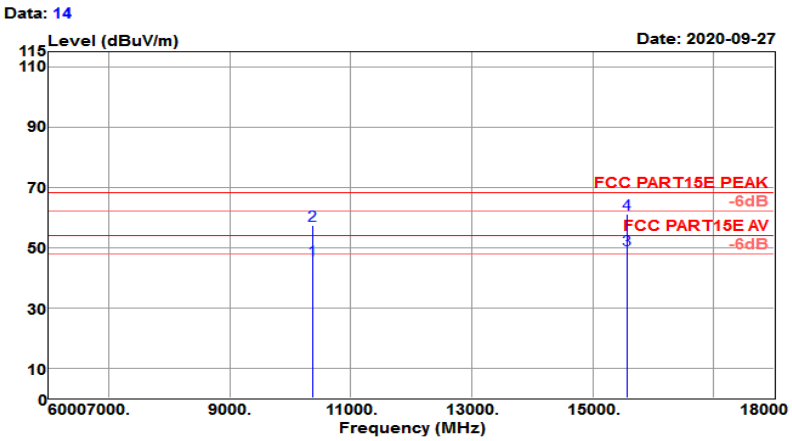
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5190.000	91.51	31.35	5.69	35.65	92.90	68.20	24.70	Peak

Test Mode :	802.11n HT40 CH38 5190MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	6GHz~18GHz	**Polarization :**	Vertical

```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
              --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
              --------------------------                    ----------------
Test Mode     : 802.11n HT40 CH38 (5190MHz)   Power rating: DC 3.0V~3.6V
              --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
              --------------------------
Model No.     : WD_RTL8821CE_V10
              --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11n HT40 CH38 (5190MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

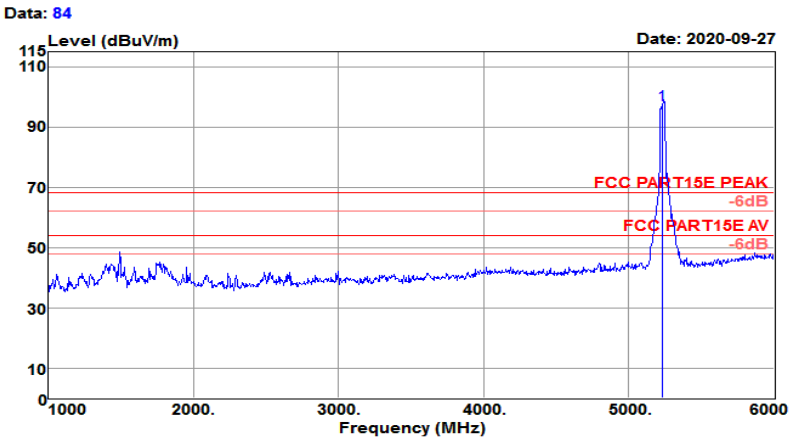


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10380.000	52.14	39.23	11.93	57.55	45.75	54.00	-8.25	Average
10380.000	63.79	39.23	11.93	57.55	57.40	68.20	-10.80	Peak
15570.000	52.70	38.37	16.31	58.08	49.30	54.00	-4.70	Average
15570.000	64.52	38.37	16.31	58.08	61.12	68.20	-7.08	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11n HT40 CH46 5230MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Horizontal

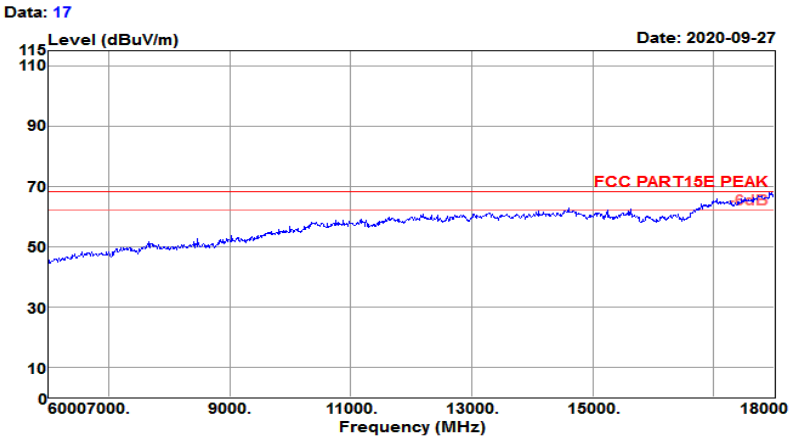
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11n HT40 CH46(5230MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



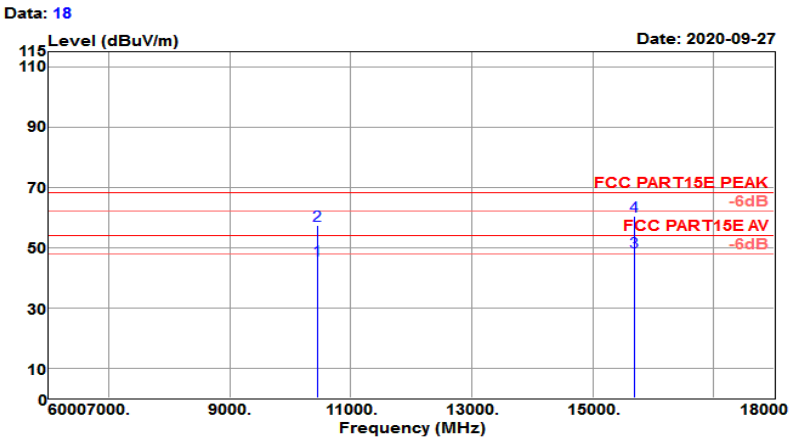
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5230.000	96.04	31.38	5.70	35.59	97.53	68.20	29.33	Peak

Test Mode :	802.11n HT40 CH46 5230MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	6GHz~18GHz	Polarization :	Horizontal

```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : HORIZONTAL
             --------------------------                   ----------------
Test Mode    : 802.11n HT40 CH46 (5230MHz)   Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11n HT40 CH46 (5230MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

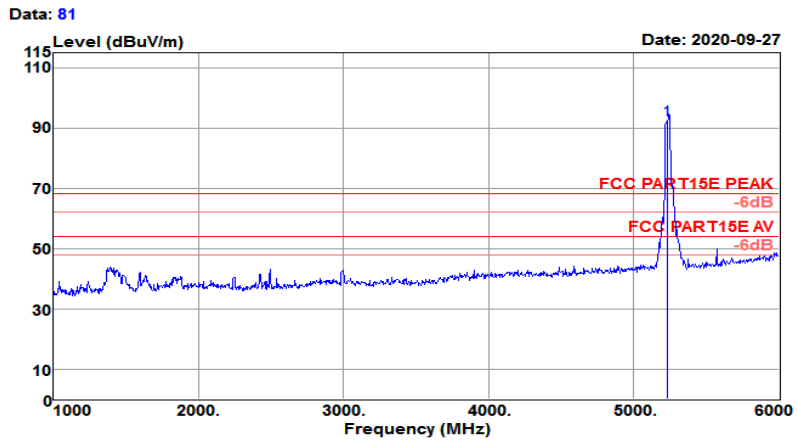


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10460.000	51.93	39.34	12.04	57.50	45.81	54.00	-8.19	Average
10460.000	63.40	39.34	12.04	57.50	57.28	68.20	-10.92	Peak
15690.000	52.26	38.16	16.18	58.21	48.39	54.00	-5.61	Average
15690.000	64.21	38.16	16.18	58.21	60.34	68.20	-7.86	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11n HT40 CH46 5230MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Vertical

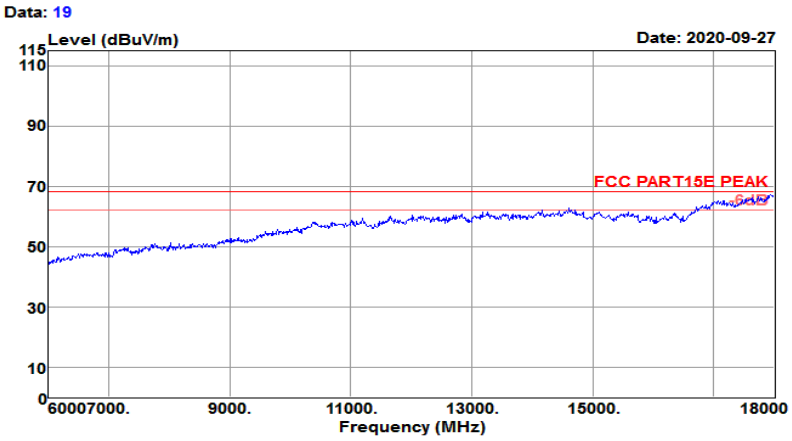
```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
                --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
                --------------------------                    ----------------
Test Mode     : 802.11n HT40 CH46(5230MHz)    Power rating: DC 3.0V~3.6V
                --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
                --------------------------
Model No.     : WD_RTL8821CE_V10
                --------------------------
```



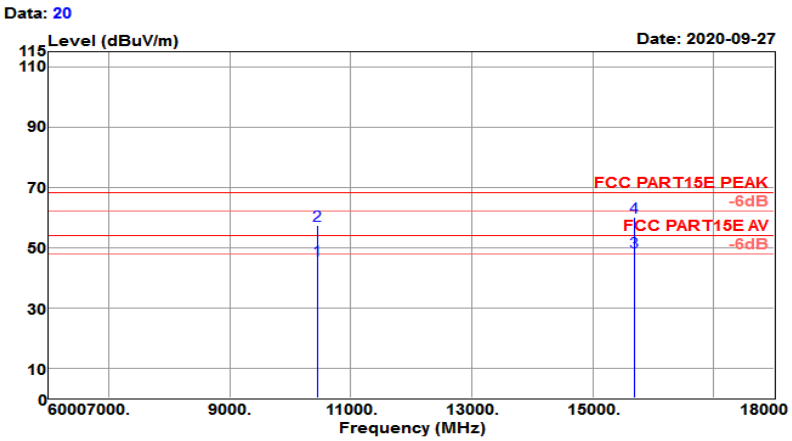
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5230.000	90.99	31.38	5.70	35.59	92.48	68.20	24.28	Peak

Test Mode :	802.11n HT40 CH46 5230MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	6GHz~18GHz	**Polarization :**	Vertical

```
Test Site     : 3m Chamber                    Temp/Humi     : 19℃/60%
              --------------------------                    ----------------
Tested by     : Jack                          Pol/Phase     : VERTICAL
              --------------------------                    ----------------
Test Mode     : 802.11n HT40 CH46 (5230MHz)   Power rating: DC 3.0V~3.6V
              --------------------------                    ----------------
EUT           : WD_RTL8821CE_V10
              --------------------------
Model No.     : WD_RTL8821CE_V10
              --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11n HT40 CH46 (5230MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

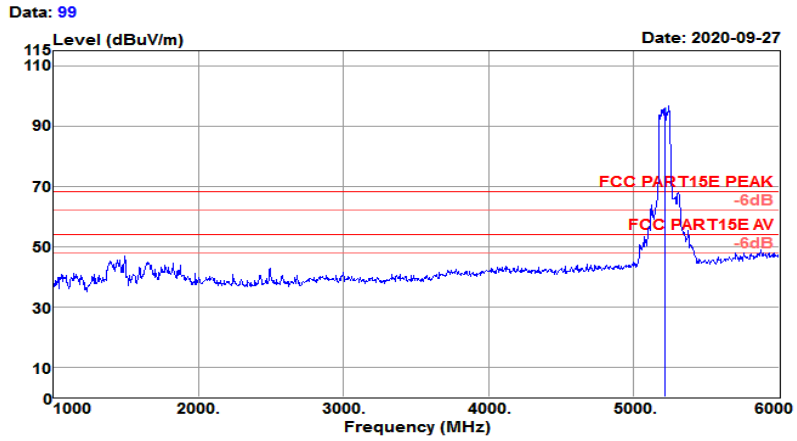


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10460.000	51.92	39.34	12.04	57.50	45.80	54.00	-8.20	Average
10460.000	63.40	39.34	12.04	57.50	57.28	68.20	-10.92	Peak
15690.000	52.23	38.16	16.18	58.21	48.36	54.00	-5.64	Average
15690.000	63.99	38.16	16.18	58.21	60.12	68.20	-8.08	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Horizontal

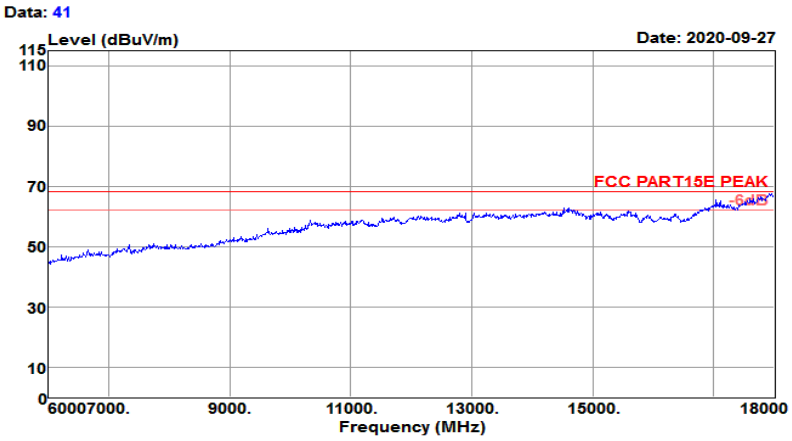
Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11ac VHT80 CH42(5210MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



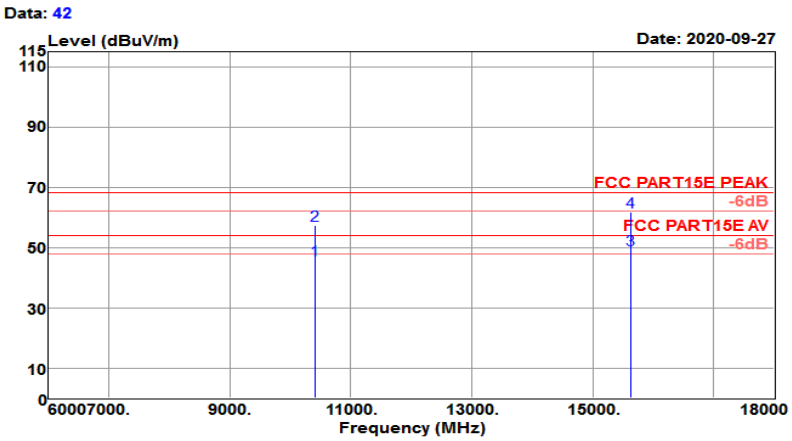
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5210.000	89.93	31.37	5.70	35.62	91.38	68.20	23.18	Peak

Test Mode :	802.11ac VHT80 CH42 5210MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	6GHz~18GHz	Polarization :	Horizontal

```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : HORIZONTAL
             --------------------------                   ----------------
Test Mode    : 802.11ac VHT80 CH42(5210MHz)  Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: HORIZONTAL
Test Mode	: 802.11ac VHT80 CH42(5210MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		

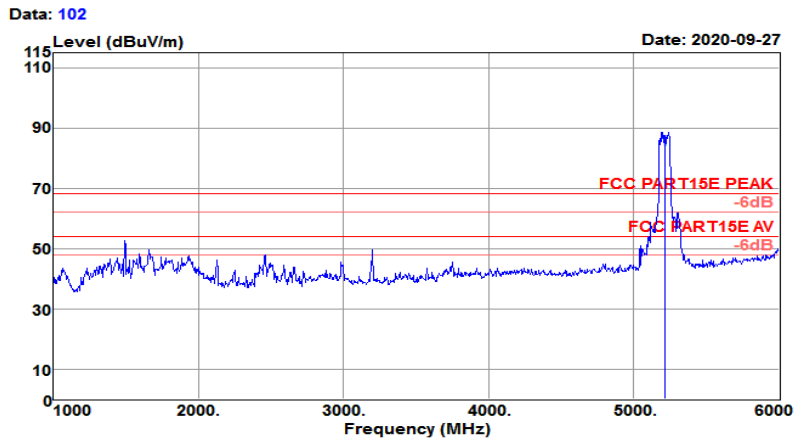


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10420.000	51.96	39.29	11.98	57.53	45.70	54.00	-8.30	Average
10420.000	63.50	39.29	11.98	57.53	57.24	68.20	-10.96	Peak
15630.000	52.95	38.27	16.24	58.15	49.31	54.00	-4.69	Average
15630.000	65.24	38.27	16.24	58.15	61.60	68.20	-6.60	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Test Mode :	802.11ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	1GHz~6GHz	**Polarization :**	Vertical

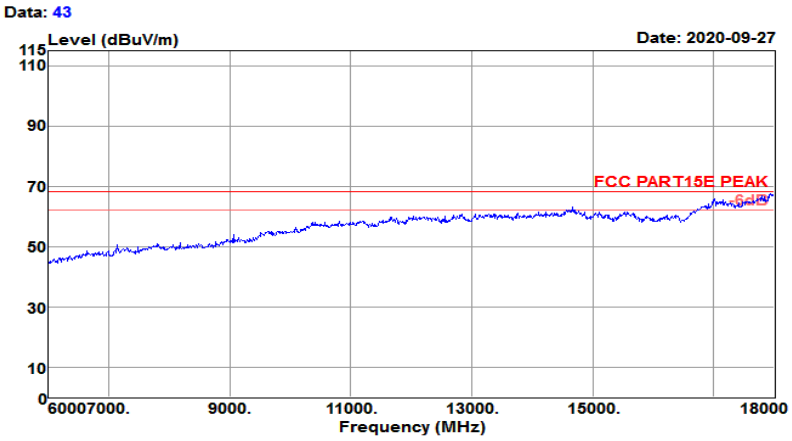
```
Test Site     : 3m Chamber                      Temp/Humi     : 19℃/60%
Tested by     : Jack                            Pol/Phase     : VERTICAL
Test Mode     : 802.11ac VHT80 CH42(5210MHz)    Power rating: DC 3.0V~3.6V
EUT           : WD_RTL8821CE_V10
Model No.     : WD_RTL8821CE_V10
```



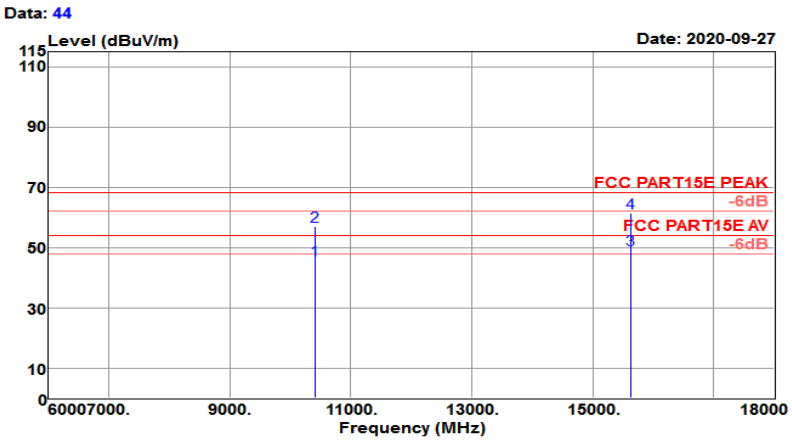
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
5210.000	81.25	31.37	5.70	35.62	82.70	68.20	14.50	Peak

Test Mode :	802.11ac VHT80 CH42 5210MHz	Temperature :	21~23℃
Test Engineer :	Jack Liu	Relative Humidity :	63~65%
Frequencey Range	6GHz~18GHz	Polarization :	Vertical

```
Test Site    : 3m Chamber                    Temp/Humi    : 19℃/60%
             --------------------------                   ----------------
Tested by    : Jack                          Pol/Phase    : VERTICAL
             --------------------------                   ----------------
Test Mode    : 802.11ac VHT80 CH42(5210MHz)  Power rating: DC 3.0V~3.6V
             --------------------------                   ----------------
EUT          : WD_RTL8821CE_V10
             --------------------------
Model No.    : WD_RTL8821CE_V10
             --------------------------
```



Test Site	: 3m Chamber	Temp/Humi	: 19℃/60%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11ac VHT80 CH42(5210MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



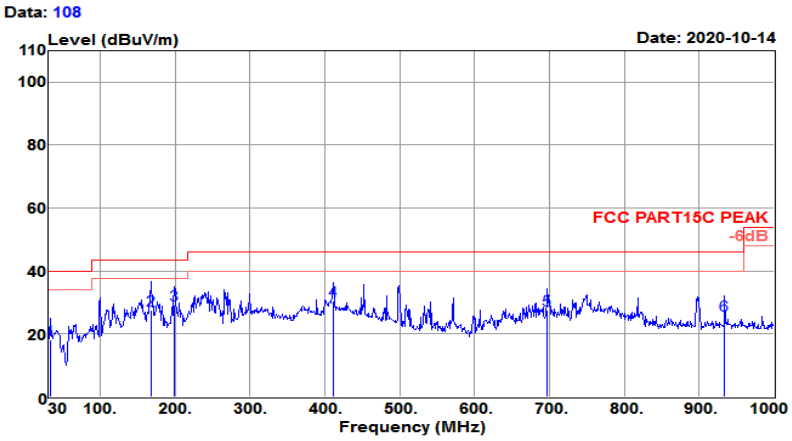
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
10420.000	52.14	39.29	11.98	57.53	45.88	54.00	-8.12	Average
10420.000	63.37	39.29	11.98	57.53	57.11	68.20	-11.09	Peak
15630.000	52.93	38.27	16.24	58.15	49.29	54.00	-4.71	Average
15630.000	65.21	38.27	16.24	58.15	61.57	68.20	-6.63	Peak

Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

4.4.2 Test Result of Radiated Spurious Emission (30MHz ~ 1GHz)

Test Mode :	802.11 ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	30MHz~1GHz	**Polarization :**	Horizontal

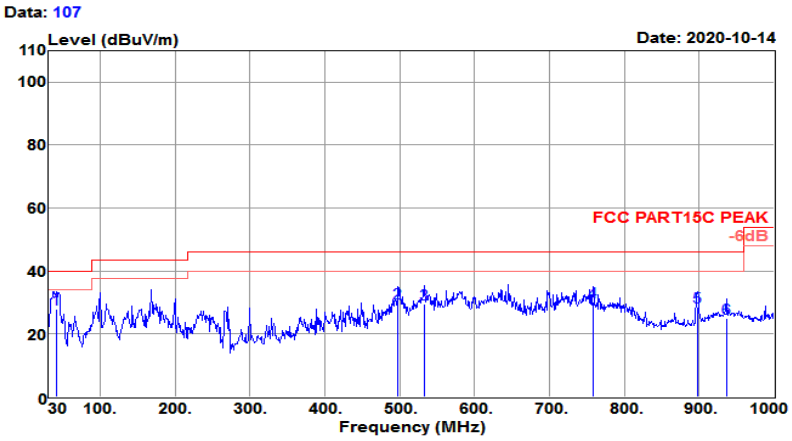
```
Test Site     : 3m Chamber                      Temp/Humi     : 25℃/64%
Tested by     : Jack                            Pol/Phase     : HORIZONTAL
Test Mode     : 802.11ac VHT80 CH42(5210MHz)    Power rating: DC 3.0V~3.6V
EUT           : WD_RTL8821CE_V10
Model No.     : WD_RTL8821CE_V10
```



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
32.910	37.86	11.78	1.11	32.45	18.30	40.00	-21.70	QP
167.740	44.17	13.41	2.51	32.48	27.61	43.50	-15.89	QP
198.780	48.29	10.66	2.72	32.47	29.20	43.50	-14.30	QP
411.210	42.91	16.14	4.02	32.56	30.51	46.00	-15.49	QP
697.360	33.95	21.17	5.23	32.64	27.71	46.00	-18.29	QP
934.040	27.86	24.11	6.14	32.15	25.96	46.00	-20.04	QP

Test Mode :	802.11 ac VHT80 CH42 5210MHz	**Temperature :**	21~23℃
Test Engineer :	Jack Liu	**Relative Humidity :**	63~65%
Frequencey Range	30MHz~1GHz	**Polarization :**	Vertical

Test Site	: 3m Chamber	Temp/Humi	: 25℃/64%
Tested by	: Jack	Pol/Phase	: VERTICAL
Test Mode	: 802.11ac VHT80 CH42(5210MHz)	Power rating	: DC 3.0V~3.6V
EUT	: WD_RTL8821CE_V10		
Model No.	: WD_RTL8821CE_V10		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
41.640	46.39	12.70	1.25	32.48	27.86	40.00	-12.14	QP
497.540	40.19	17.87	4.42	32.63	29.85	46.00	-16.15	QP
532.460	38.96	18.68	4.60	32.65	29.59	46.00	-16.41	QP
757.500	34.81	22.23	5.59	32.45	30.18	46.00	-15.82	QP
897.180	31.23	23.46	6.10	32.19	28.60	46.00	-17.40	QP
935.980	26.95	24.15	6.14	32.15	25.09	46.00	-20.91	QP

4.5 AC Conducted Emission Measurement

4.5.1 Limit of AC Conducted Emission

FCC §15.207

IC RSS-GEN 8.8

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

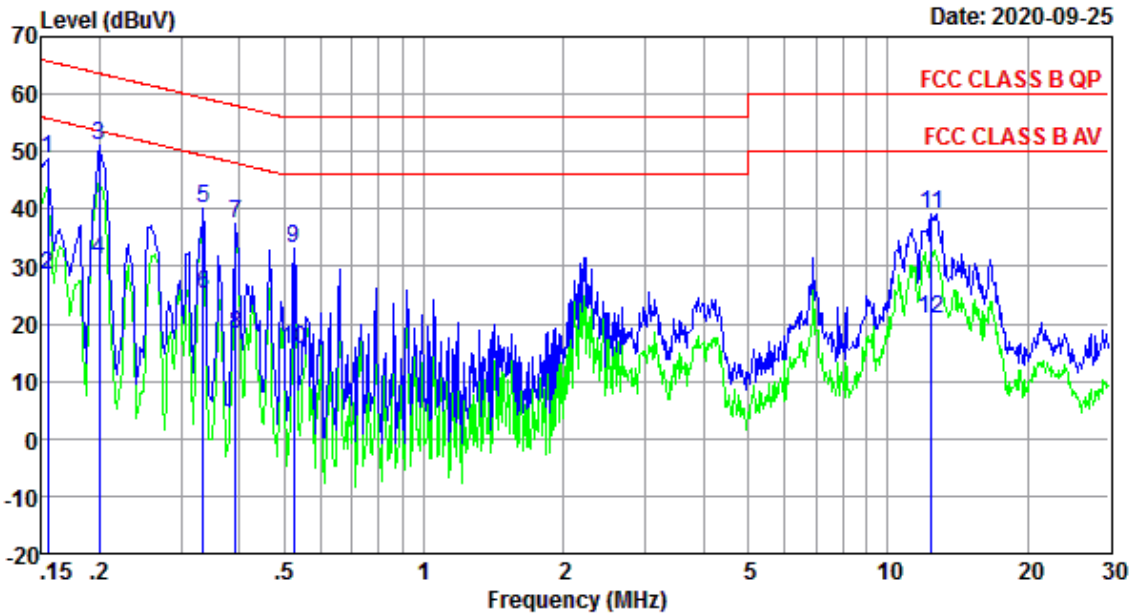
*Decreases with the logarithm of the frequency.

4.5.2 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

4.5.3 Test Result of AC Conducted Emission

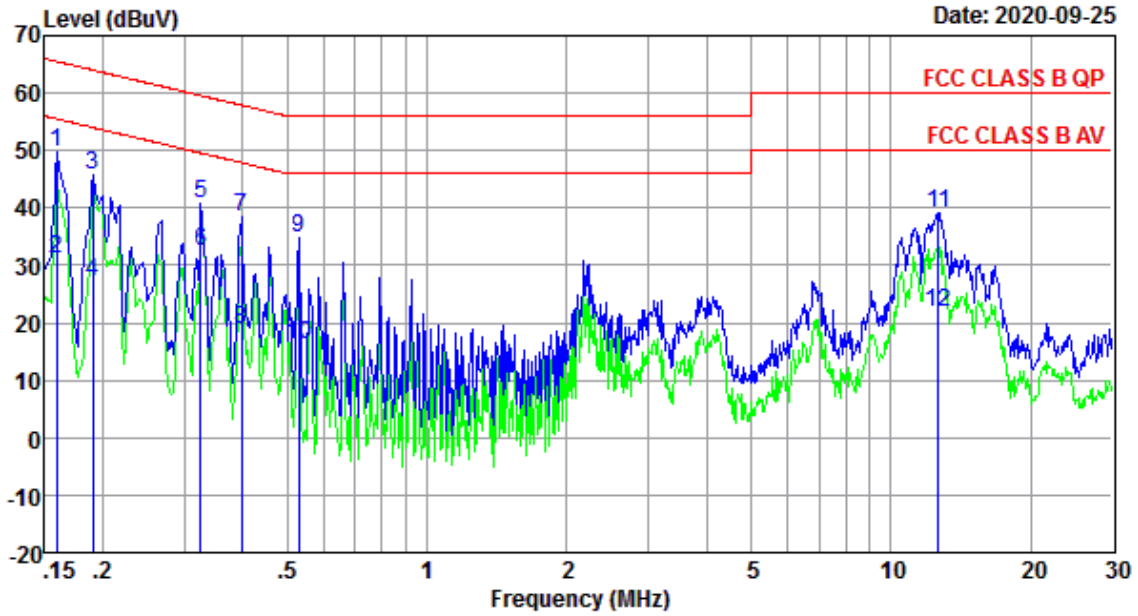
Test Mode :	Mode 1	**Temperature :**	21~23℃
Test Engineer :	Jerry Wang	**Relative Humidity :**	41~43%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	5G WLAN Linking + Ping + DC3.3V power supply		



Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	Result level dBuV	Limit level dBuV	Over limit dB	Remark
0.155	39.09	9.54	0.02	48.65	65.74	-17.09	QP
0.155	19.07	9.54	0.02	28.63	55.74	-27.11	Average
0.200	41.36	9.55	0.03	50.94	63.62	-12.68	QP
0.200	21.64	9.55	0.03	31.22	53.62	-22.40	Average
0.334	30.40	9.55	0.02	39.97	59.35	-19.38	QP
0.334	15.74	9.55	0.02	25.31	49.35	-24.04	Average
0.393	27.77	9.56	0.02	37.35	57.99	-20.64	QP
0.393	8.45	9.56	0.02	18.03	47.99	-29.96	Average
0.524	23.72	9.56	0.02	33.30	56.00	-22.70	QP
0.524	5.81	9.56	0.02	15.39	46.00	-30.61	Average
12.449	29.20	9.95	0.10	39.25	60.00	-20.75	QP
12.449	10.76	9.95	0.10	20.81	50.00	-29.19	Average

Result Level= Reading Level + LISN Factor + Cable Loss

Test Mode :	Mode 1	**Temperature :**	21~23℃
Test Engineer :	Jerry Wang	**Relative Humidity :**	41~43%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	5G WLAN Linking + Ping + DC3.3V power supply		



Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	Result level dBuV	Limit level dBuV	Over limit dB	Remark
0.159	40.30	9.56	0.02	49.88	65.52	-15.64	QP
0.159	21.65	9.56	0.02	31.23	55.52	-24.29	Average
0.190	36.27	9.56	0.03	45.86	64.02	-18.16	QP
0.190	17.57	9.56	0.03	27.16	54.02	-26.86	Average
0.325	31.34	9.58	0.02	40.94	59.57	-18.63	QP
0.325	22.87	9.58	0.02	32.47	49.57	-17.10	Average
0.398	28.74	9.58	0.02	38.34	57.90	-19.56	QP
0.398	9.36	9.58	0.02	18.96	47.90	-28.94	Average
0.529	25.30	9.59	0.02	34.91	56.00	-21.09	QP
0.529	6.58	9.59	0.02	16.19	46.00	-29.81	Average
12.649	29.06	10.04	0.10	39.20	60.00	-20.80	QP
12.649	11.82	10.04	0.10	21.96	50.00	-28.04	Average

Result Level= Reading Level + LISN Factor + Cable Loss

4.6 Frequency Stability Measurement

4.6.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

4.6.2 Test Procedures

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

4.6.3 Test Result of Frequency Stability

Refer to Appendix D of this test report.

4.7 Automatically Discontinue Transmission

4.7.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

4.7.2 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

4.8 Antenna Requirements

4.8.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.8.2 Antenna Connected Construction

An External antenna design is used.

4.8.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date	Remark
Spectrum Analyzer	Keysight	N9010A	MY56070788	2020-01-15	2021-01-14	Conducted
Power Sensor	Keysight	U2021XA	MY56510025	2020-01-16	2021-01-15	Conducted
Power Sensor	Keysight	U2021XA	MY57030005	2020-01-16	2021-01-15	Conducted
Power Sensor	Keysight	U2021XA	MY56510018	2020-01-16	2021-01-15	Conducted
Power Sensor	Keysight	U2021XA	MY56480002	2020-01-16	2021-01-15	Conducted
Thermal Chamber	Howkin	UHL-34	19111801	2020-05-09	2021-05-08	Conducted
Base Station	R&S	CMW 270	101231	2020-01-16	2021-01-15	Conducted
Signal Generator (Interferer)	Keysight	N5182B	MY56200384	2020-02-21	2021-02-20	Conducted
Signal Generator (Blocker)	Keysight	N5171B	MY56200661	2020-01-15	2021-01-14	Conducted

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV 40	101433	2020-01-16	2021-01-15	Radiation
Amplifier	Sonoma	310	363917	2020-01-15	2021-01-14	Radiation
Amplifier	Schwarzbeck	BBV 9718	327	2020-01-15	2021-01-14	Radiation
Amplifier	Narda	TTA1840-35-HG	2034380	2020-05-22	2021-05-21	Radiation
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-051	2020-02-14	2023-02-13	Radiation
Broadband Antenna	Schwarzbeck	VULB 9168	9168-757	2018-08-31	2021-08-30	Radiation
Horn Antenna	Schwarzbeck	BBHA 9120 D	1677	2020-02-14	2023-02-13	Radiation
Horn Antenna	COM-POWER	AH-1840	101117	2018-06-20	2021-06-19	Radiation
Test Software	Audix	E3	6.111221a	N/A	N/A	Radiation
Filter	Micro-Tronics	BRM 50702	G266	N/A	N/A	Radiation

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Due Date	Remark
LISN	R&S	ENV216	102125	2020-01-08	2021-01-07	Conducted
LISN	R&S	ENV432	101327	2020-01-08	2021-01-07	Conducted
EMI Test Receiver	R&S	ESR3	102143	2020-01-16	2021-01-15	Conducted
EMI Test Software	Audix	E3	N/A	N/A	N/A	Conducted

N/A: No Calibration Required

6 Uncertainty of Evaluation

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.42dB
Radiated emissions	30MHz ~ 1GMHz	2.50dB
	1GHz ~ 18GHz	3.51dB
	18GHz ~ 40GHz	3.96dB

MEASUREMENT	UNCERTAINTY
Occupied Channel Bandwidth	±196.4Hz
RF output power, conducted	±2.31dB
Power density, conducted	±2.31dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

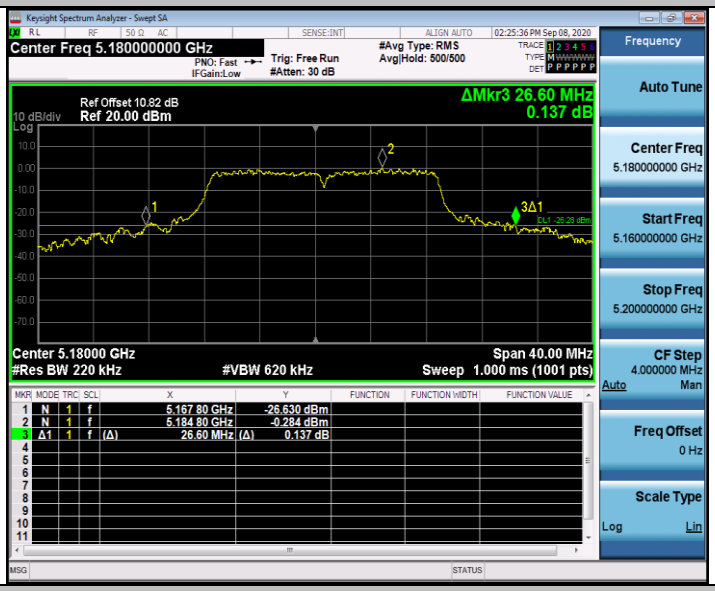
Appendix A1: Emission Bandwidth

Test Result

TestMode	Antenna	Channel	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	26.600	5167.800	5194.400	---	PASS
		5200	28.520	5185.920	5214.440	---	PASS
		5240	34.520	5224.000	5258.520	---	PASS
11N20SISO	Ant1	5180	21.720	5169.760	5191.480	---	PASS
		5200	30.400	5187.120	5217.520	---	PASS
		5240	30.520	5226.480	5257.000	---	PASS
11N40SISO	Ant1	5190	41.760	5169.760	5211.520	---	PASS
		5230	72.640	5194.720	5267.360	---	PASS
11AC20SISO	Ant1	5180	21.960	5169.960	5191.920	---	PASS
		5200	32.600	5187.160	5219.760	---	PASS
		5240	32.440	5225.640	5258.080	---	PASS
11AC40SISO	Ant1	5190	41.600	5169.920	5211.520	---	PASS
		5230	72.480	5194.640	5267.120	---	PASS
11AC80SISO	Ant1	5210	85.120	5170.000	5255.120	---	PASS

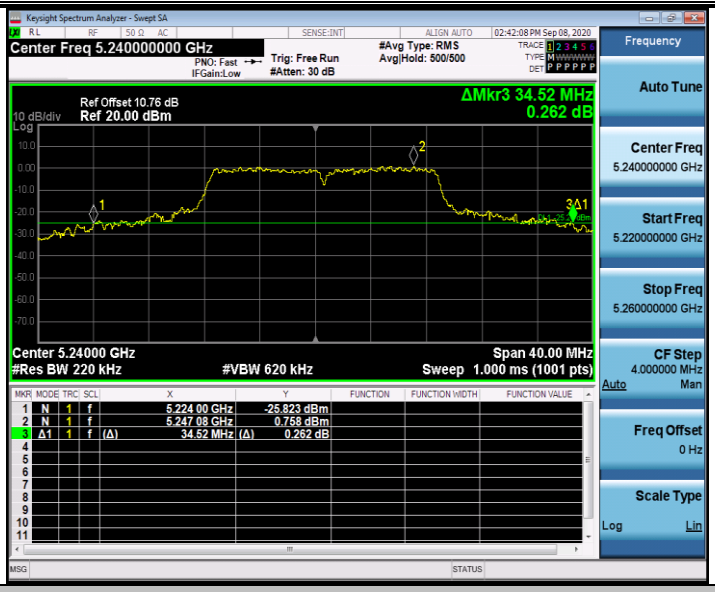
Test Graphs

11A_Ant1_5180

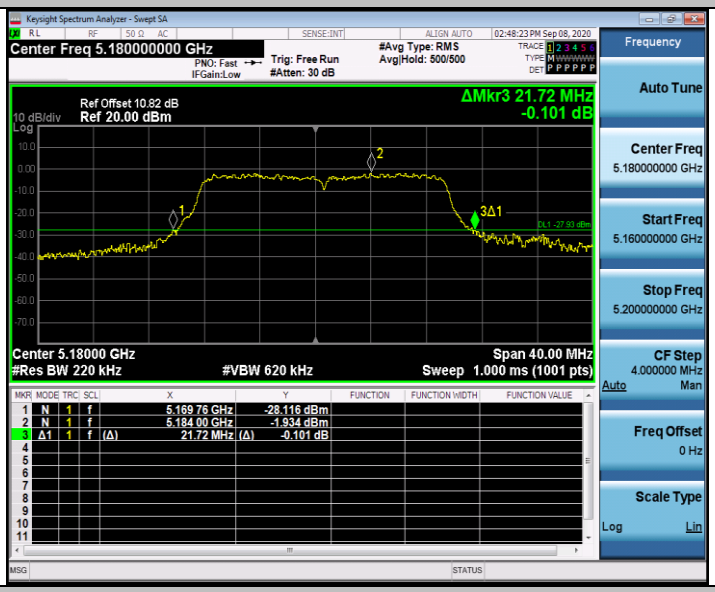


11A_Ant1_5200

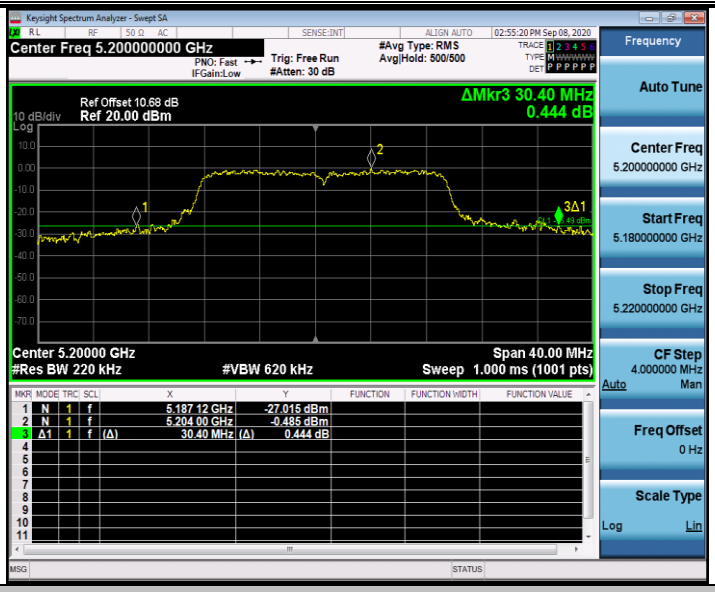
11A_Ant1_5240



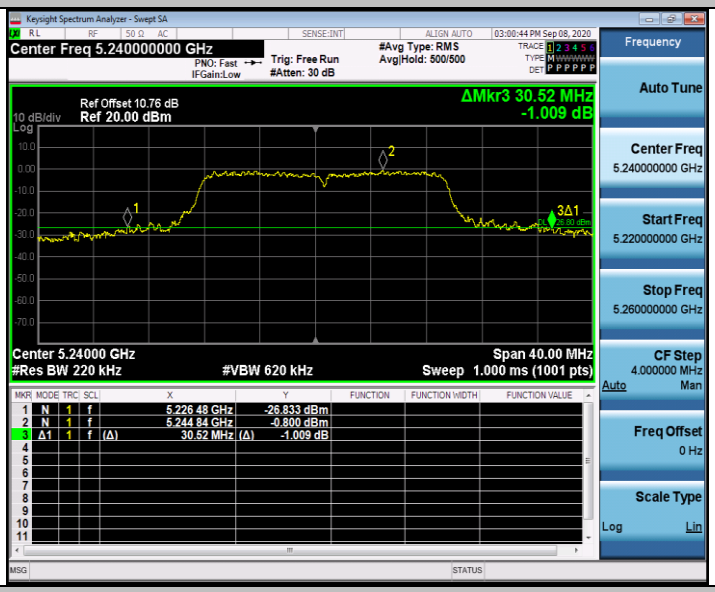
11N20SISO_Ant1_5180



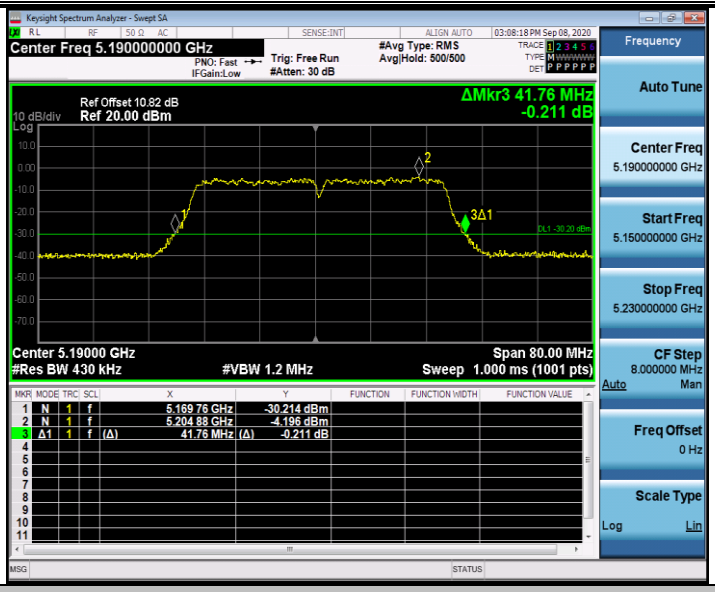
11N20SISO_Ant1_5200



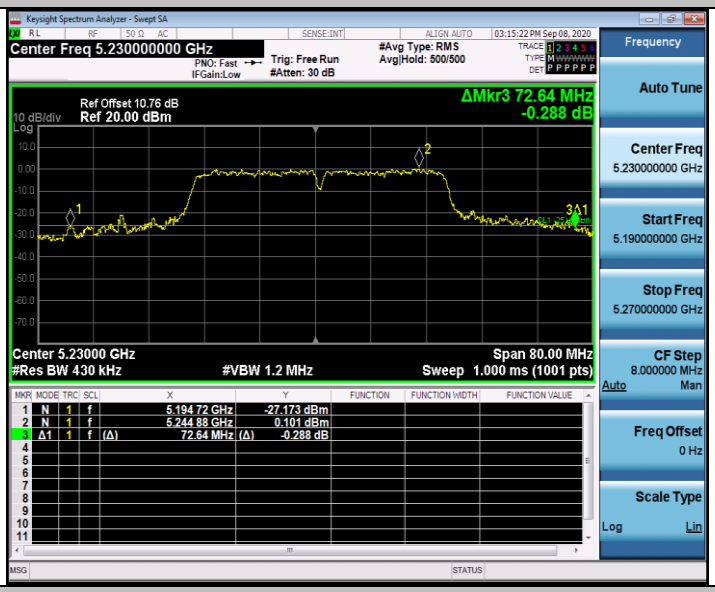
11N20SISO_Ant1_5240



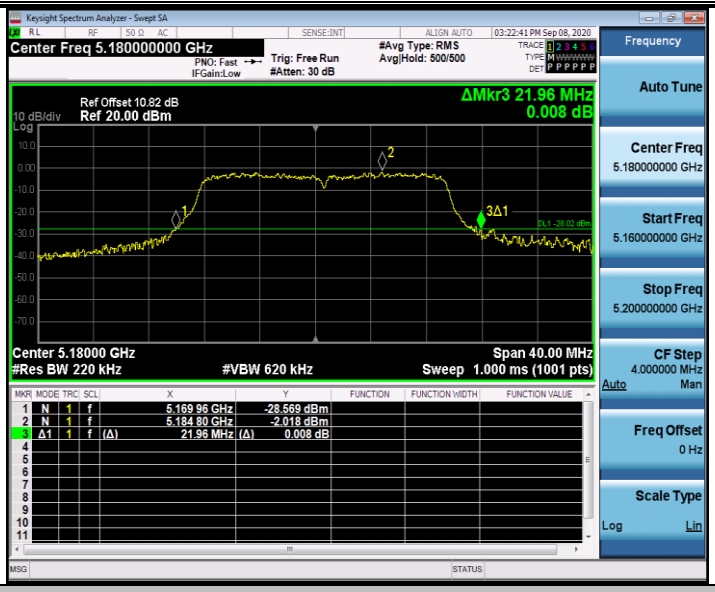
11N40SISO_Ant1_5190



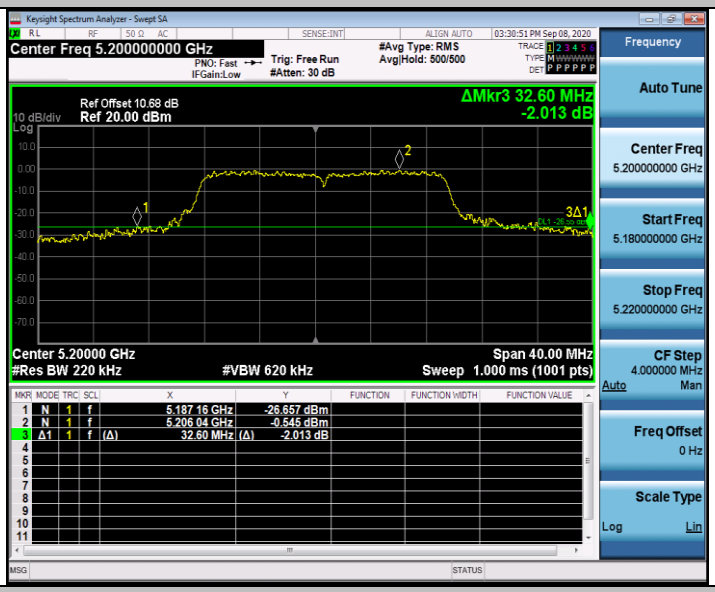
11N40SISO_Ant1_5230



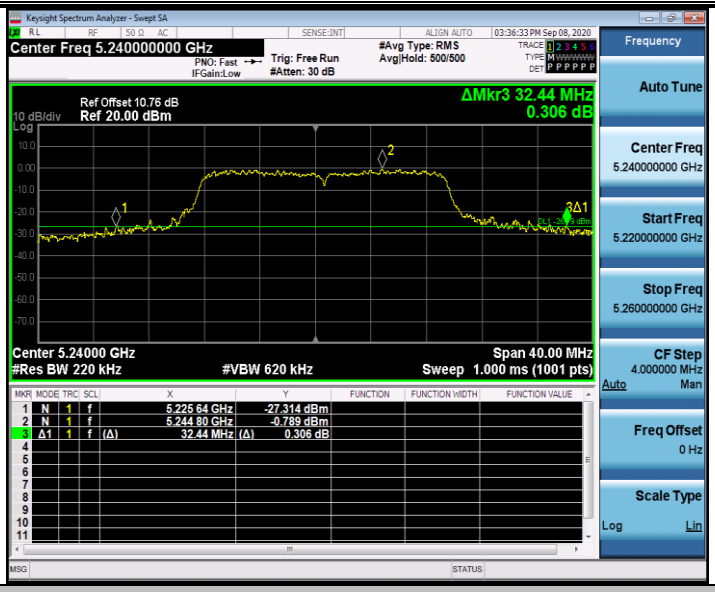
11AC20SISO_Ant1_5180



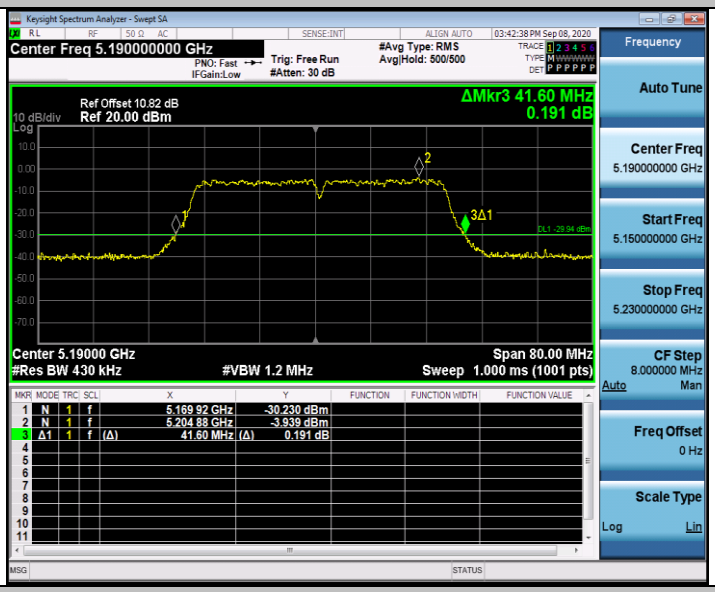
11AC20SISO_Ant1_5200



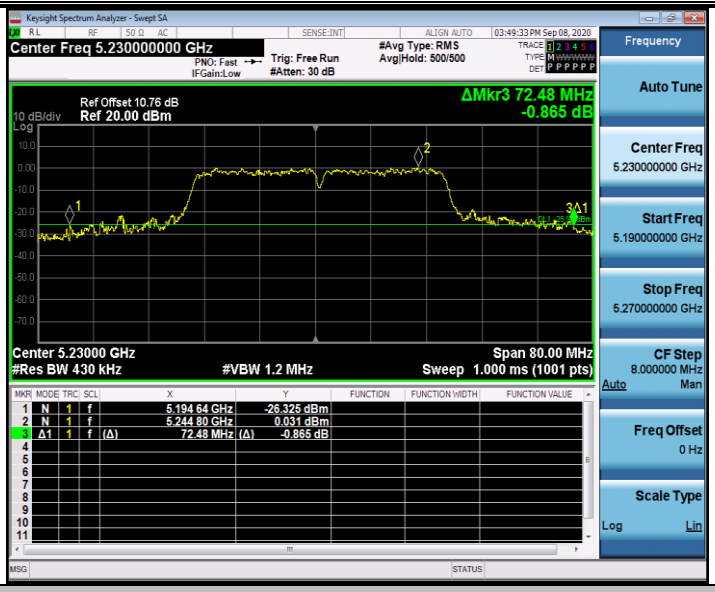
11AC20SISO_Ant1_5240



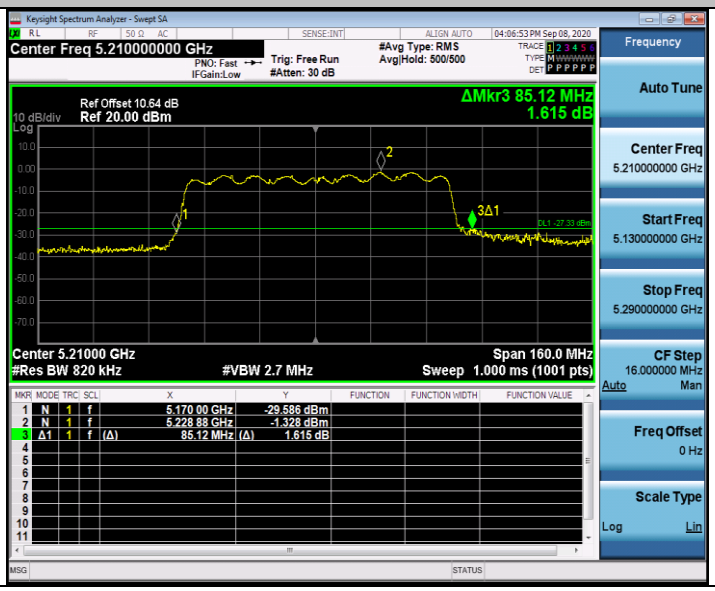
11AC40SISO_Ant1_5190



11AC40SISO_Ant1_5230



11AC80SISO_Ant1_5210



Appendix A2: Occupied channel bandwidth

Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.382	5171.899	5189.281	---	PASS
		5200	17.468	5191.854	5209.322	---	PASS
		5240	18.826	5231.518	5250.344	---	PASS
11N20SISO	Ant1	5180	17.995	5171.615	5189.610	---	PASS
		5200	18.409	5191.480	5209.889	---	PASS
		5240	18.321	5231.493	5249.814	---	PASS
11N40SISO	Ant1	5190	36.575	5172.416	5208.991	---	PASS
		5230	37.532	5212.130	5249.662	---	PASS
11AC20SISO	Ant1	5180	18.004	5171.607	5189.611	---	PASS
		5200	18.426	5191.475	5209.901	---	PASS
		5240	18.386	5231.484	5249.870	---	PASS
11AC40SISO	Ant1	5190	36.609	5172.397	5209.006	---	PASS
		5230	37.488	5212.126	5249.614	---	PASS
11AC80SISO	Ant1	5210	75.518	5173.113	5248.631	---	PASS