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TEST REPORT

Test Result:	Pass*
Date of Issue:	2024-08-01
Date of Test:	2024-06-05 to 2024-07-31
Date of Receipt:	2024-06-04
Standard(s) :	47 CFR Part 15, Subpart E 15.407
Trade Mark:	Tesla
Model No.:	TAF68E
EUT Name:	Wi-Fi & Bluetooth Module
Equipment Under Test (EUT):	
Address of Manufacturer:	3500 Deer Creek Rd, Palo Alto, CA 94304 USA
Manufacturer:	TESLA INC
Address of Applicant:	3500 Deer Creek Rd, Palo Alto, CA 94304 USA
Applicant:	TESLA INC
FCC ID:	2AEIM-TAF68E
Application No.:	KSCR2406000993AT

* In the configuration tested, the EUT complied with the standards specified above.

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	Revision Record							
Version	Version Description Date							
00	Original	2024-08-01	/					

Authorized for issue by:		
Tested By	Maker Qi	
	Maker_Qi/Project Engineer	-
Approved By	Verry Hon	
	Terry Hou /Reviewer	-



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2 Test Summary

Radio Spectrum Technical Requirement						
ltem	Standard	Method	Requirement	Result		
Antenna Requirement	47 CFR Part 15, Subpart E 15.407	N/A	47 CFR Part 15, Subpart C 15.203	Customer Declaration		
Transmission in the Absence of Data		N/A	47 CFR Part 15, Subpart E 15.407 (c)	Customer Declaration		

Radio Spectrum Matter Part							
ltem	Standard	Method	Requirement	Result			
Conducted Emissions at AC Power Line (150kHz-30MHz)		ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207 & Subpart E 15.407 b(9)	Pass			
Duty Cycle		KDB 789033 II B 1	KDB 789033 D02 II B 1	Pass			
99% Bandwidth		KDB 789033 II D	N/A	Pass			
26dB Emission bandwidth		KDB 789033 D02 II C 1	47 CFR Part 15, Subpart E 15.407 (a)	Pass			
Minimum 6 dB bandwidth (5.725- 5.85 GHz band)		KDB 789033 D02 II C 2	47 CFR Part 15, Subpart E 15.407 (e)	Pass			
Maximum Conducted output power	47 CFR Part 15, Subpart E 15.407	KDB 789033 D02 II E	47 CFR Part 15, Subpart E 15.407 (a)	Pass			
Peak Power spectrum density		KDB 789033 D02 II F	47 CFR Part 15, Subpart E 15.407 (a)	Pass			
Radiated Emissions (Below 1GHz)		KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)	Pass			
Radiated Emissions (Above 1GHz)		KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)	Pass			
Radiated Emissions which fall in the restricted bands		KDB 789033 D02 II G	47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)	Pass			
Frequency Stability		ANSI C63.10 (2013) Section 6.8	47 CFR Part 15, Subpart E 15.407 (g)	Pass			
Channel Move Time		KDB 905462 D02 Section 7.8.3	KDB 905462 D02 Section 5.1	Pass			
Channel Closing Transmission Time		KDB 905462 D02 Section 7.8.3	KDB 905462 D02 Section 5.1	Pass			



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4 General Information

4.1 Details of E.U.T.

Power supply:	DC 3.3-4.8V,Typ: 3.85V				
Test voltage:	DC 3.85V				
	U-NII-1: 5180-5240MHz (4 Channels);				
Operation	U-NII-2A: 5260-5320MHz (4 Channels);				
Frequency/Number of channels (20MHz):	U-NII-2C: 5500-5700MHz (11 Channels);				
	U-NII-3: 5745-5825MHz (5 Channels)				
	U-NII-1: 5190-5230MHz (2 Channels);				
Operation	U-NII-2A: 5270-5310MHz (2 Channels);				
Frequency/Number of channels/(40MHz):	U-NII-2C: 5510-5670MHz (5 Channels);				
	U-NII-3: 5755-5795MHz (2 Channels)				
	U-NII-1: 5210MHz (1 Channel);				
Operation	U-NII-2A: 5290MHz (1 Channels);				
Frequency/Number of channels (80MHz):	U-NII-2C: 5530-5610MHz (2 Channels);				
	U-NII-3: 5775MHz (1 Channel)				
Operation Frequency/Number of channels (160MHz):	U-NII-2A : 5250MHz(1 Channels);U-NII-2C: 5570MHz (1 Channels)				
	OFDM (64QAM, 16QAM, QPSK, BPSK);				
Modulation Type:	802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM);				
modulation Type.	802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM);				
	802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024-QAM)				
Channel Spacing:	802.11a/n/ac/ax 20: 20MHz; 802.11n/ac/ax 40: 40MHz;				
Channel Spacing.	802.11ac/ax 80: 80MHz; 802.11ac/ax 160: 160MHz				
DFS Function:	Slave without Radar detection				
TPC Function:	Support TPC function				
Antenna Type:	External antenna				
Antenna Gain:	5150MHz~5250MHz: ANT5(WIFI0): 4.4dBi (Provided by the manufacturer) ANT6(WIFI1): 3.2dBi (Provided by the manufacturer) 5250MHz~5350MHz: ANT5(WIFI0): 4.4dBi (Provided by the manufacturer) ANT6(WIFI1): 3.5dBi (Provided by the manufacturer) 5470MHz~5725MHz: ANT5(WIFI0): 5.3dBi (Provided by the manufacturer) ANT6(WIFI1): 4.5dBi (Provided by the manufacturer) 5725MHz~5850MHz: ANT5(WIFI0): 4.7dBi (Provided by the manufacturer) ANT6(WIFI1): 3.5dBi (Provided by the manufacturer) Directional Gain: 5150MHz~5250MHz:3.84dBi (The transmitted signal is Uncorrelated) 5250MHz~5350MHz:3.97dBi (The transmitted signal is Uncorrelated) 5470MHz~5725MHz:4.92dBi (The transmitted signal is Uncorrelated) 5470MHz~5850MHz:4.14dBi (The transmitted signal is Uncorrelated)				



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4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
AC Adapter	/	/	/
Notebook	LENOVO	K27	EB24537645

4.3 Power level setting using in test

	802	.11a	802.11r	n(HT20)	802.11a	:(VHT20)	802.11ax	(HEW20)
Channel	Ant 1	Ant 2	Ant 2	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2
36	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
40	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
48	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
52	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
60	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
64	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
100	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
116	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
140	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
144	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
149	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
157	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
165	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
	802.11n(HT40)		802.11a	802.11ac(VHT40) 802.11		(HEW40)		
Channel	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2		
38	17	17	17	17	17	17		
46	17	17	17	17	17	17		
54	17	17	17	17	17	17		
62	17	17	17	17	17	17		
102	17	17	17	17	17	17		
110	17	17	17	17	17	17		
134	17	17	17	17	17	17		
142	17	17	17	17	17	17		
151	17	17	17	17	17	17		
159	17	17	17	17	17	17		



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Channel	802.11ac	802.11ac(VHT80)		(HEW80)
Channel	Ant 1	Ant 2	Ant 1	Ant 2
42	16.5	16.5	16.5	16.5
58	16.5	16.5	16.5	16.5
106	16.5	16.5	16.5	16.5
122	16.5	16.5	16.5	16.5
138	16.5	16.5	16.5	16.5
155	16.5	16.5	16.5	16.5
Ohannah	802.11ac	(VHT160)	802.11ax((HEW160)
Channel	Ant 1	Ant 2	Ant 1	Ant 2
50	16	16	16	16
114	16	16	16	16



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4.4 Measurement Uncertainty

No.	ltem	Measurement Uncertainty				
1	Radio Frequency	8.4 x 10 ⁻⁸				
2	Timeout	2s				
3	Duty Cycle	0.37%				
4	Occupied Bandwidth	3%				
5	RF Conducted Power	0.6dB				
6	RF Power Density	2.9dB				
7	Conducted Spurious Emissions	0.75dB				
8	RF Radiated Power	5.2dB (Below 1GHz)				
0	RF Radiated Power	5.9dB (Above 1GHz)				
		4.2dB (Below 30MHz)				
9	Radiated Spurious Emission Test	4.5dB (30MHz-1GHz)				
9		5.1dB (1GHz-18GHz)				
		5.4dB (Above 18GHz)				
10	Temperature Test	1°C				
11	Humidity Test	3%				
12	Supply Voltages	1.5%				
13	Time	3%				
Note: approx						



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4.5 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).

2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).

3. Sample source: sent by customer.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

• ISED

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

• VCCI

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None



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5 Equipment List

ltem	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
Condu	cted Emission at Mains Terr	ninals				
1	EMI Test Receive	R&S	ESCI	KS301101	01/15/2024	01/14/2025
2	LISN	R&S	ENV216	KS301197	01/15/2024	01/14/2025
3	LISN	Schwarzbeck	NNLK 8129	KS301091	01/15/2024	01/14/2025
4	Pulse Limiter	R&S	ESH3-Z2	KUS1902E001	01/15/2024	01/14/2025
5	CE test Cable	Thermax	/	CZ301102	01/15/2024	01/14/2025
6	Test Software	Farad	EZ-EMC	/	N.C.R	N.C.R
RF Con	ducted Test					
1	Spectrum Analyzer	Keysight	N9020A	KUS1911E004-2	08/24/2023	08/23/2024
2	Spectrum Analyzer	Keysight	N9020A	KUS2001M001-2	08/24/2023	08/23/2024
3	Spectrum Analyzer	Keysight	N9030B	KSEM021-1	01/15/2024	01/14/2025
4	Signal Generator	R&S	SMBV100B	KSEM032	03/19/2024	03/18/2025
5	Signal Generator	R&S	SMW200A	KSEM020-1	08/24/2023	08/23/2024
6	Signal Generator	Agilent	N5182A	KUS2001M001-1	08/24/2023	08/23/2024
7	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	08/24/2023	08/23/2024
8	Radio Communication Analyzer	Anritsu	MT8821C	KSEM002-1	03/19/2024	03/18/2025
9	Universal Radio Communication Tester	R&S	CMW500	KUS1911E004-1	08/24/2023	08/23/2024
10	Switcher	TST	FY562	KUS2001M001-4	01/15/2024	01/14/2025
11	AC Power Source	EXTECH	6605	KS301178	N.C.R	N.C.R
12	DC Power Supply	Aglient	E3632A	KS301180	N.C.R	N.C.R
13	Conducted Test Cable	Thermax	RF01-RF04	CZ301111- CZ301120	01/15/2024	01/14/2025
14	Temp. / Humidity Chamber	TERCHY	MHK-120AK	KS301190	08/24/2023	08/23/2024
15	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-5	03/19/2024	03/18/2025
16	Software	BST	TST-PASS	/	NCR	NCR
RF Rad	liated Test	1			,	
1	Spectrum Analyzer	R&S	FSV40	KUS1806E003	08/24/2023	08/23/2024
2	Universal Radio Communication Tester	R&S	CMW500	KSEM009-1	03/19/2024	03/18/2025
3	Signal Generator	Agilent	E8257C	KS301066	08/24/2023	08/23/2024
4	Loop Antenna	COM-POWER	AL-130R	KUS1806E001	03/18/2023	03/17/2025
5	Bilog Antenna	TESEQ	CBL 6112D	KUS1806E005	06/29/2023	06/28/2025
6	Bilog Antenna	TESEQ	CBL 6112D	KUS1806E006	03/19/2024	03/18/2025
7	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	KS301079	08/24/2023	08/23/2024
8	Horn-antenna(1-18GHz)	ETS- LINDGREN	3117	KS301186	04/07/2023	04/06/2025
9	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	CZ301058	01/07/2024	01/06/2026
10	Amplifier(30MHz~18GHz)	PANSHAN TECHNOLOGY	LNA:1~18G	KSEM010-1	01/15/2024	01/14/2025
11	Amplifier(18~40GHz)	PANSHAN TECHNOLOGY	LNA180400G40	KSEM038	08/24/2023	08/23/2024
12	RE Test Cable	REBES MICROWAVE	/	CZ301097	08/24/2023	08/23/2024
13	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-4	03/19/2024	03/18/2025
14	Software	Faratronic	EZ_EMC-v 3A1	/	NCR	NCR
15	Software	ESE	E3_V 6.111221a	/	NCR	NCR



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6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is External Antenna on the main PCB and no consideration of replacement. The best case gain of the U-NII-1: ANT5(WIFI0) 4.4dBi, ANT6(WIFI1) 3.2dBi; U-NII-2A: ANT5(WIFI0) 4.4dBi, ANT6(WIFI1) 3.5dBi, U-NII-2C: ANT5(WIFI0) 5.3dBi, ANT6(WIFI1) 4.5dBi, U-NII-3: ANT5(WIFI0) 4.7dBi, ANT6(WIFI1) 3.5dBi.

Antenna location: Refer to internal photo.



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Directional Gain Calculations for MIMO:

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

Basic methodology with NANT transmit antennas, each with the same directional gain GANT dBi, being driven by NANT transmitter outputs of equal power. Directional gain is to be computed as follows:

- If any transmit signals are correlated with each other, Directional gain = GANT + 10 log(NANT) dBi
- If all transmit signals are completely uncorrelated with each other, Directional gain = GANT

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, ..., GN dBi

- If transmit signals are correlated, then Directional gain = 10 log[(10G1 /20 + 10G2 /20 + ··· + 10GN /20)2 /NANT] dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]
- If all transmit signals are completely uncorrelated, then Directional gain = 10 log[(10G1 /10 + 10G2 /10 + ··· + 10GN /10)/NANT] dBi

Directional gain may be calculated by using the formulas applicable to equal gain antennas with GANT set equal to the gain of the antenna having the highest gain.

Operation Frequency	ANT5(WIFI0) (dBi)	ANT6(WIFI1) (dBi)	Directional gain For Power(dBi)	Directional gain For PSD(dBi)
5150 MHz to 5250 MHz	4.4	3.2	3.84	3.84
5250 MHz to 5350 MHz	4.4	3.5	3.97	3.97
5470 MHz to 5725 MHz	5.3	4.5	4.92	4.92
5725 MHz to 5850 MHz	4.7	3.5	4.14	4.14

All antennas have the same gain:

5150 MHz to 5250 MHz:

Power Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0 PSD Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0 5250 MHz to 5350 MHz: Power Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0 PSD Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0 5470 MHz to 5725 MHz: Power Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0 PSD Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0 PSD Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0 PSD Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0 PSD Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0

PSD Limit Reduction = Directional gain - 6dBi, (Directional gain < 6dBi) =0



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6.2 Transmission in the Absence of Data

6.2.1 Test Requirement:

47 CFR Part 15, Subpart E 15.407 (c)

6.2.2 Conclusion

Conclusion

Standard Requirement:

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 signalling 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 a description of how this requirement is met.

EUT Details:

WIFI chip support automatically discontinue transmission in case of either absence of information to transmit or operational failure, if the chip detect absence of information to transmit or operational failure, it will be automatically shut off.



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7 Radio Spectrum Matter Test Results

7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement47 CFR Part 15, Subpart C 15.207 & Subpart E 15.407 b(9)Test Method:ANSI C63.10 (2013) Section 6.2

Limit:

	Conducted limit(dB μ V)		
Frequency of emission(MHz)	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.			

7.1.1 E.U.T. Operation

Operating Environment:

Temperature:	20.5 °C	Humidity:	54.0 % RH	Atmospheric Pressure:	1010	mbar
l'emperature:	20.5 °C	Humidity:	54.0 % RH	Atmospheric Pressure:	1010	mbar

7.1.2 Test Mode Description

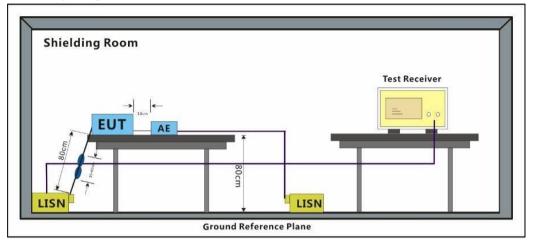
Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	02	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.
Final test	03	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.



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7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50 μ H + 50hm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

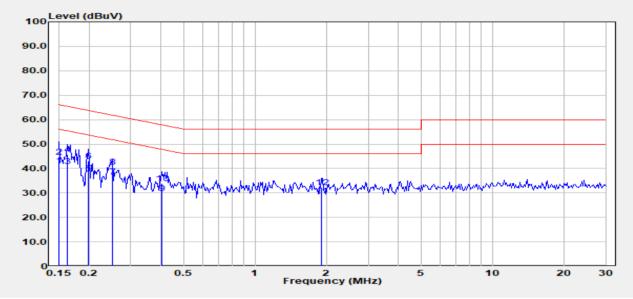
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: Level=Read Level+ Cable Loss+ LISN Factor



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No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1500	20.82	20.25	41.08	56.00	-14.92	Average
2	0.1500	24.58	20.25	44.83	66.00	-21.17	QP
3	0.1615	20.76	20.20	40.97	55.38	-14.42	Average
4	0.1615	25.66	20.20	45.86	65.38	-19.52	QP
5	0.1997	17.97	20.06	38.03	53.62	-15.59	Average
6	0.1997	23.04	20.06	43.10	63.62	-20.53	QP
7	0.2521	16.49	20.07	36.56	51.69	-15.13	Average
8	0.2521	20.49	20.07	40.56	61.69	-21.12	QP
9	0.4061	9.75	20.06	29.81	47.73	-17.92	Average
10	0.4061	13.77	20.06	33.83	57.73	-23.90	QP
11	1.9080	8.69	20.05	28.75	46.00	-17.25	Average
12	1.9080	12.08	20.05	32.13	56.00	-23.87	QP

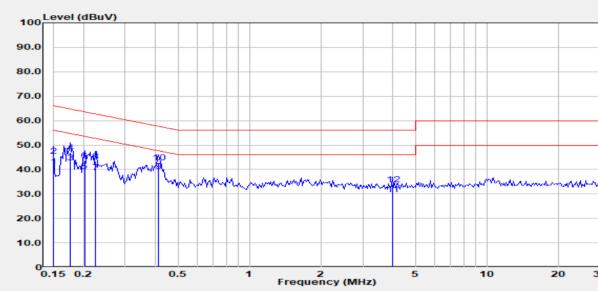
Test Mode: 01; Line: Live line



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No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1500	21.05	20.18	41.23	56.00	-14.77	Average
2	0.1500	25.42	20.18	45.61	66.00	-20.39	QP
3	0.1758	22.74	20.15	42.89	54.68	-11.79	Average
4	0.1758	26.74	20.15	46.88	64.68	-17.80	QP
5	0.2018	19.21	20.11	39.32	53.54	-14.21	Average
6	0.2018	23.54	20.11	43.65	63.54	-19.89	QP
7	0.2244	18.72	20.10	38.83	52.66	-13.83	Average
8	0.2244	23.32	20.10	43.42	62.66	-19.23	QP
9	0.4148	19.10	20.08	39.19	47.55	-8.36	Average
10	0.4148	22.85	20.08	42.94	57.55	-14.61	QP
11	4.0062	9.84	19.91	29.75	46.00	-16.25	Average
12	4.0062	14.06	19.91	33.98	56.00	-22.02	QP

Test Mode: 01; Line: Neutral Line



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7.2 Maximum Conducted output power

Test Requirement	47 CFR Part 15, Subpart E 15.407 (a)
Test Method:	KDB 789033 D02 II E

Limit:

Frequen	cy band(MHz)	Limit
E1E0	5250	≤1W(30dBm) for master device
5150-	-5250	≤250mW(24dBm) for client device
5250-	·5350	≤250mW(24dBm) or 11dBm+10logB*
5470-	·5725	≤250mW(24dBm) or 11dBm+10logB*
5725-	5850	≤1W(30dBm)
Remark:	* Where B is the	e 26dB emission bandwidth in MHz.
	The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of a rms-equivalent voltage.	

7.2.1 E.U.T. Operation

Operating Environment:

Temperature:	20.5 °C	Humidity:	54.0 % RH	Atmospheric Pressure:	1010	mbar
			• • • • • • • • • •			

7.2.2 Test Mode Description

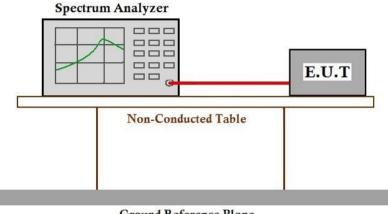
Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	02	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.
Final test	03	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.



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7.2.3 **Test Setup Diagram**



Ground Reference Plane

7.2.4 **Measurement Procedure and Data**

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

Please Refer to Appendix for Details



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7.3 Radiated Emissions (Below 1GHz)

Test Requirement47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)Test Method:KDB 789033 D02 II G

Limit:

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
960-1000	500	3

7.3.1 E.U.T. Operation

Operating Environment: Temperature: 22.1 °C

Humidity: 56.2 % RH

Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

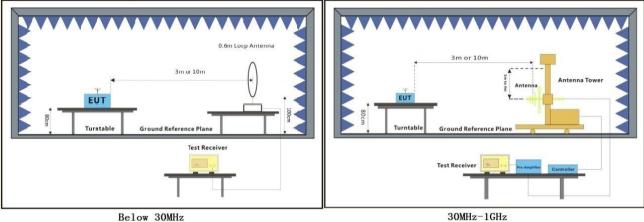
Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	02	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.
Final test	03	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.



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7.3.3 Test Setup Diagram



7.3.4 **Measurement Procedure and Data**

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. For emission below 1GHz, through the pre-scan found the worst case is the lowest channel of 802.11a. Only the worst case is recorded in the report.

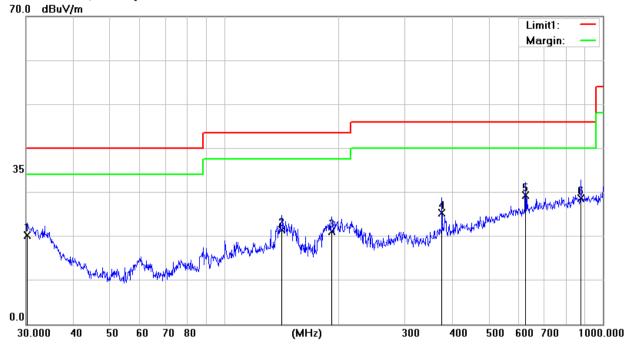
3. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

4. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.



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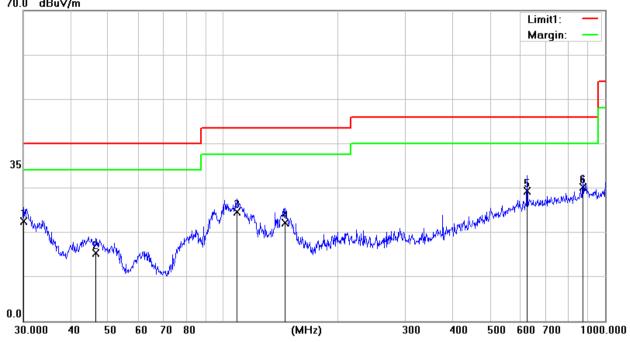


No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	30.2111	0.88	19.25	20.13	40.00	-19.87	100	270	QP
2	141.8262	7.59	13.87	21.46	43.50	-22.04	200	224	QP
3	192.4186	9.16	11.89	21.05	43.50	-22.45	100	360	QP
4	375.9385	8.37	16.99	25.36	46.00	-20.64	100	235	QP
5	625.0780	6.44	22.91	29.35	46.00	-16.65	100	357	QP
6	875.2470	3.30	25.26	28.56	46.00	-17.44	400	131	QP



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No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	30.0000	3.14	19.42	22.56	40.00	-17.44	100	291	QP
2	46.5030	7.36	7.90	15.26	40.00	-24.74	100	135	QP
3	108.6470	10.89	13.64	24.53	43.50	-18.97	100	2	QP
4	145.3506	9.39	12.77	22.16	43.50	-21.34	200	359	QP
5	625.0780	6.45	22.91	29.36	46.00	-16.64	100	0	QP
6	875.2470	4.86	25.26	30.12	46.00	-15.88	400	357	QP

Test Mode: 01; Polarity: Vertical 70.0 dBuV/m



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7.4 Radiated Emissions (Above 1GHz)

Test Requirement	47 CFR Part 15, Subpart C 15.209 & Subpart E 15.407(b)
Test Method:	KDB 789033 D02 II G

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)				
Above 1GHz	500	3				
*(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.						
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.						
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.						
(4) For transmitters operating in the 5.725-5.85 GHz band:						

(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.4.1 E.U.T. Operation

Operating Environment:

Temperature:	22.1 °C	Humidity:	53.9 % RH	Atmospheric Pressure:	1010	mbar
•		•		•		

Pre-scan / Mode Description Final test Code TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and Final test 01 found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160. Only the data of worst case is recorded in the report. TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and Final test 02 found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report. TX mode (U-NII-2C) Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and 03 found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 Final test is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.

7.4.2 Test Mode Description

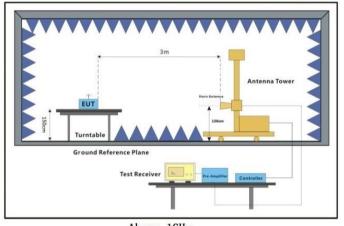


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Final test04TX mode (U-NII-3) _Keep the EUT in continuor modulation types. All data rates for each modulat found the data rate @ 6Mbps is the worst case of IE is the worst case of IEEE 802.11n/ac/ax 20/40/80, recorded in the report.	ation type have been tested and EEE 802.11a; data rate @ MCS0
--	---

7.4.3 Test Setup Diagram



Above 1GHz



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7.4.4 Measurement Procedure and Data

a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

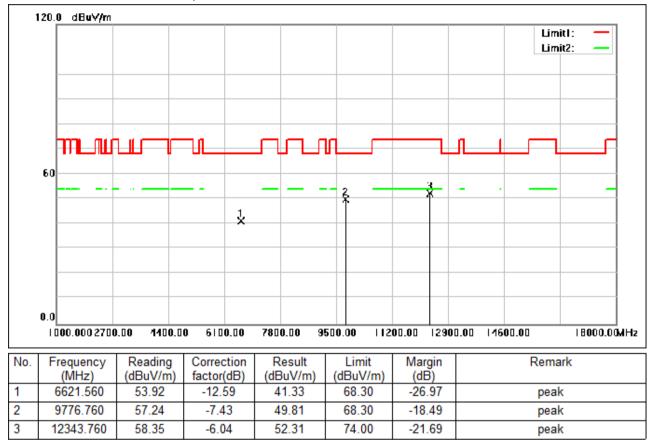
4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

5. For devices with multiple operating modes, measurements on the middle channel is used to determine the worst-case mode(s). Only the worst case mode with the highest output power and the mode with the highest output power spectral density for each modulation family (e.g., OFDM and direct sequence spread spectrum) is recorded in the test report.



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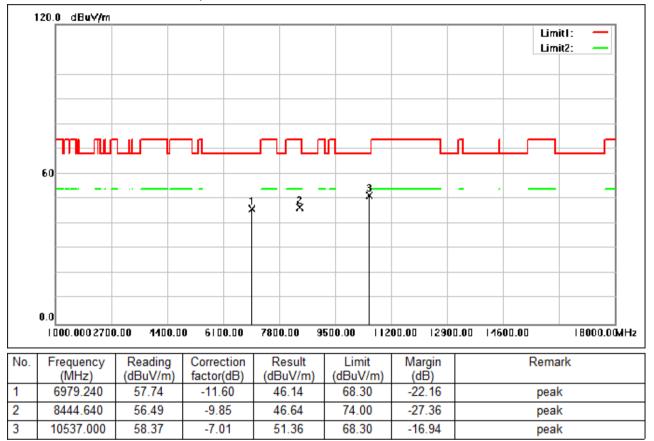


Test Mode: 01; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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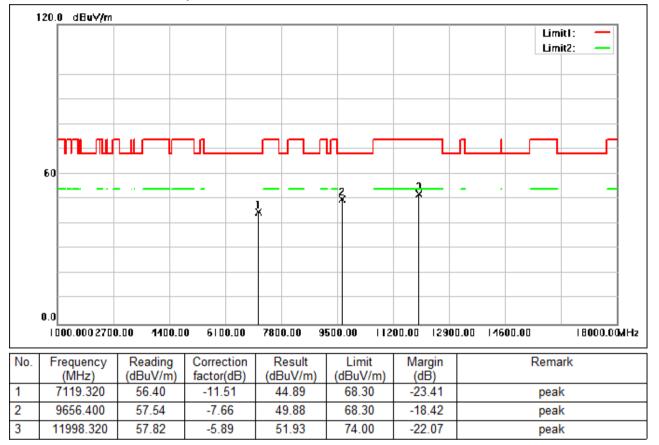


Test Mode: 01; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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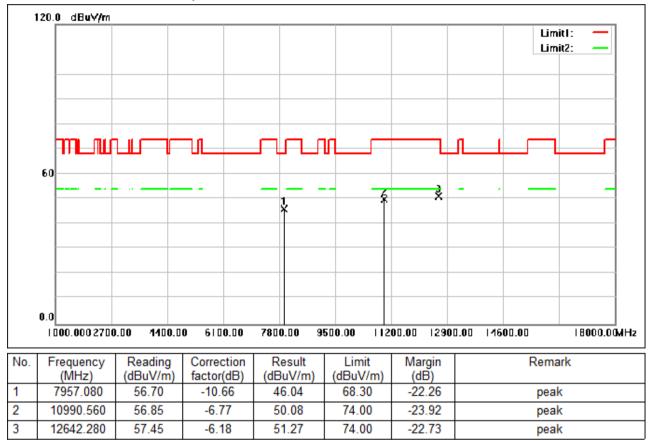


Test Mode: 01; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:middle



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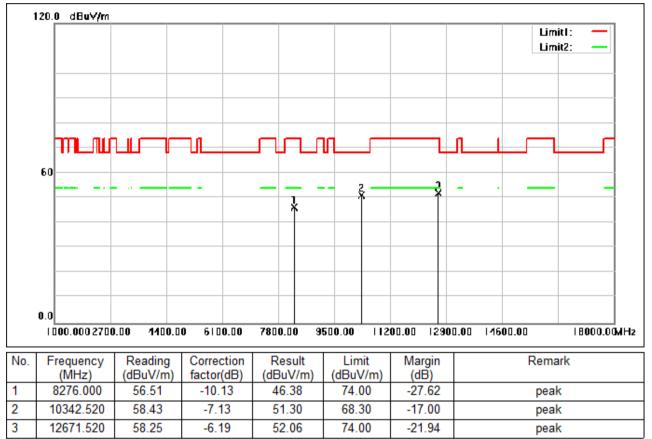


Test Mode: 01; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:middle



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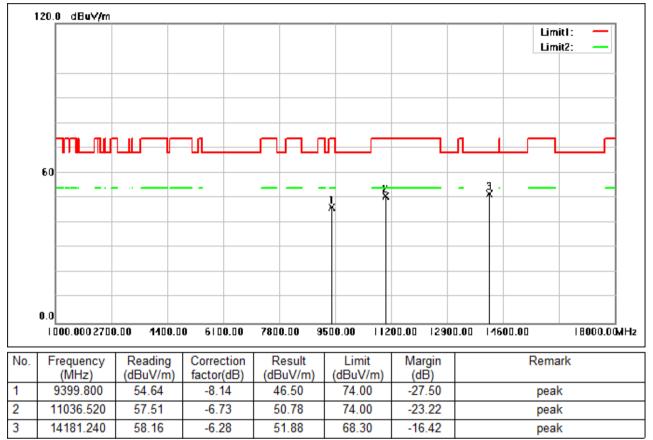


Test Mode: 01; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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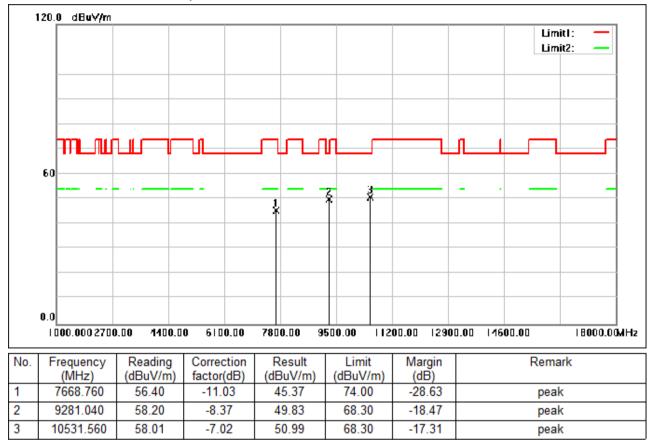


Test Mode: 01; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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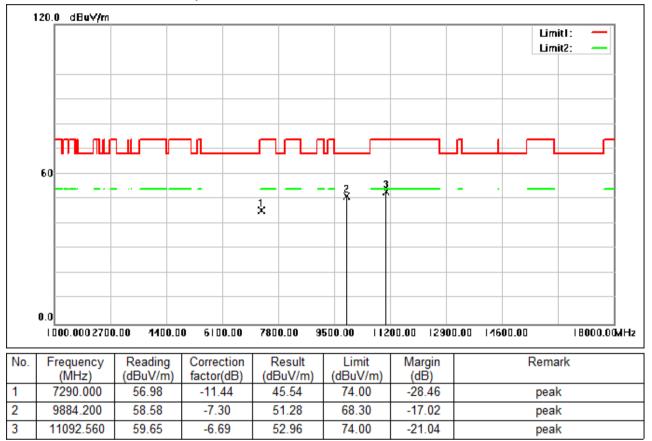


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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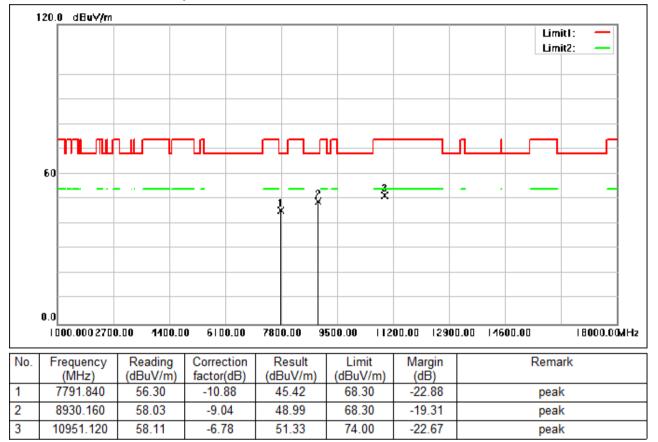


Test Mode: 01; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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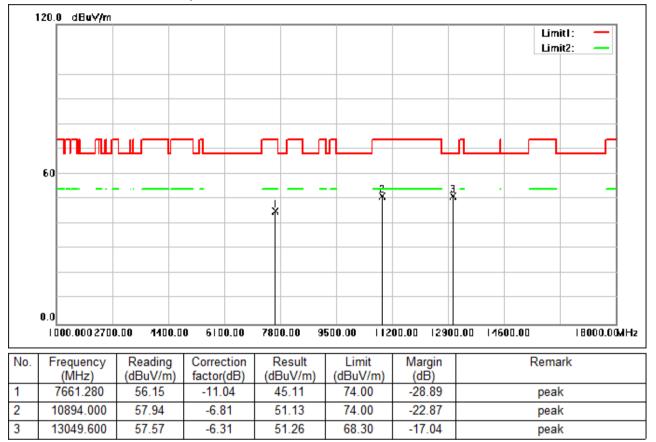


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:middle



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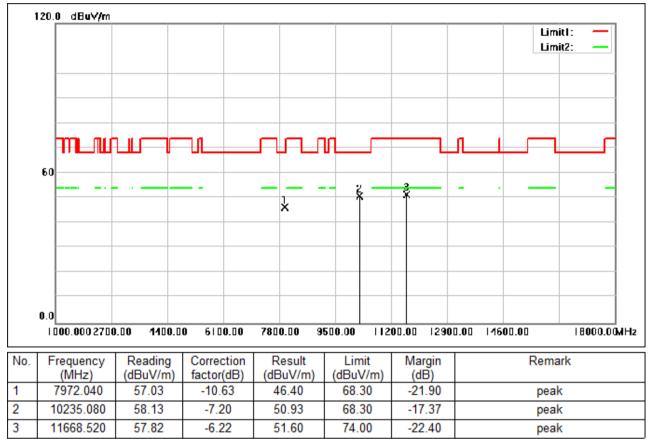


Test Mode: 01; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:middle



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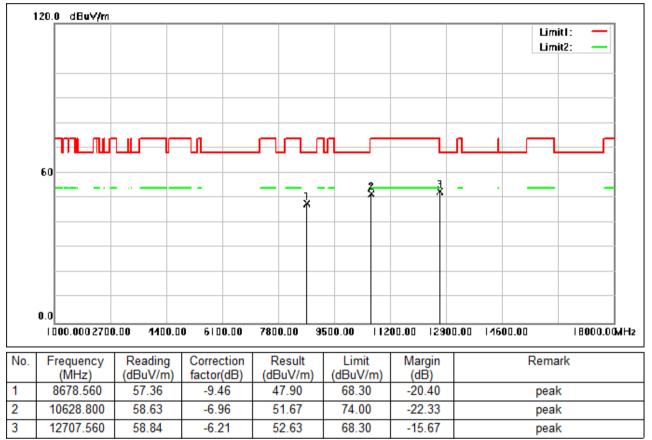


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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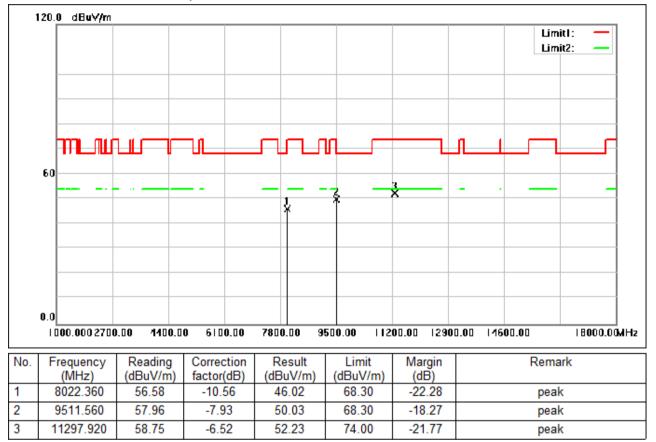


Test Mode: 01; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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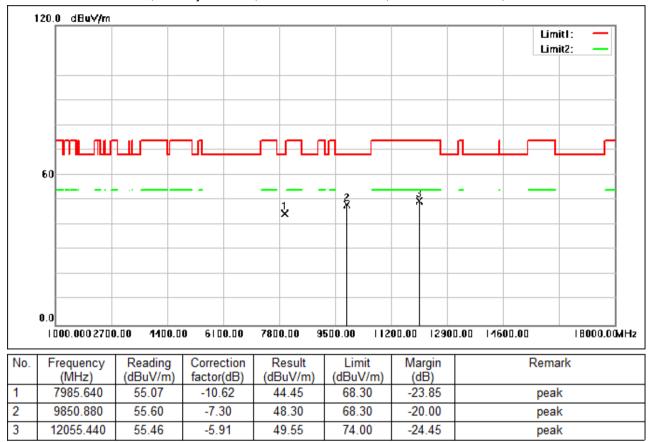


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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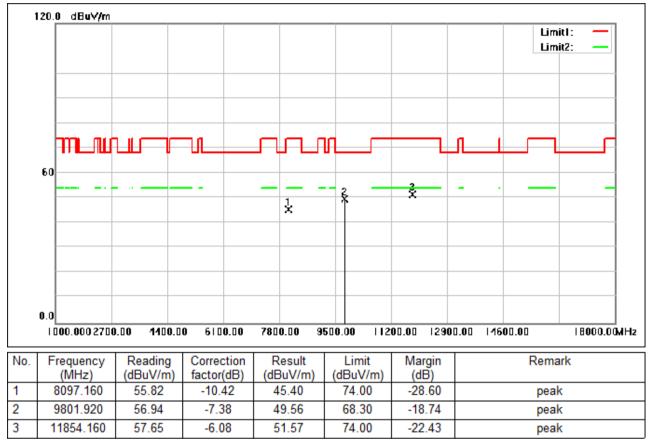


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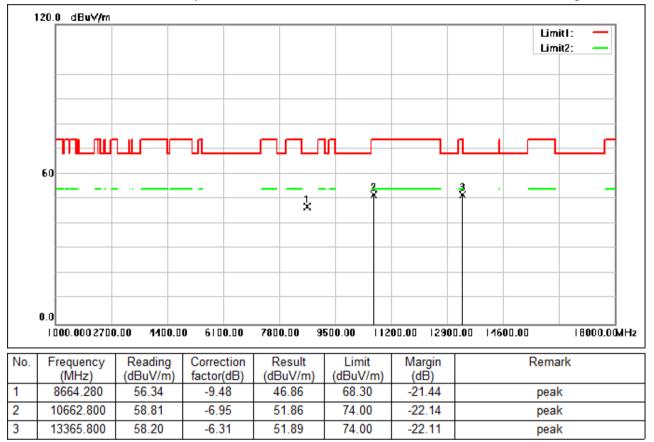


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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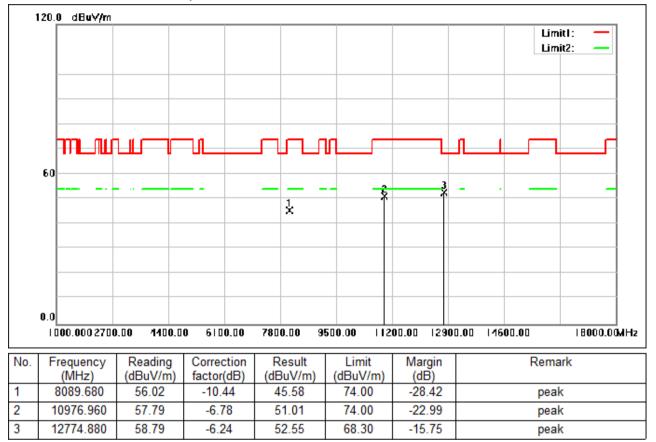


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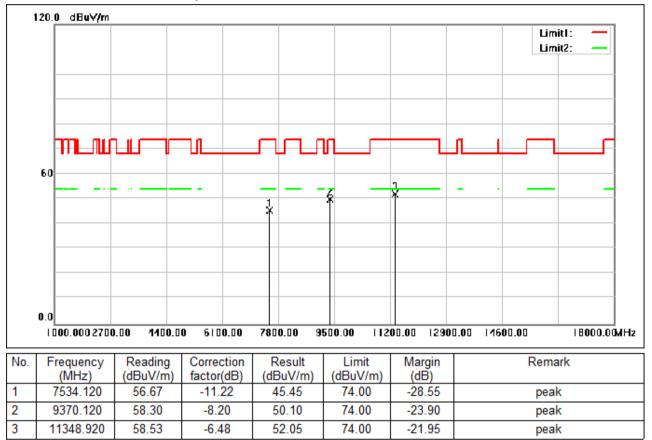


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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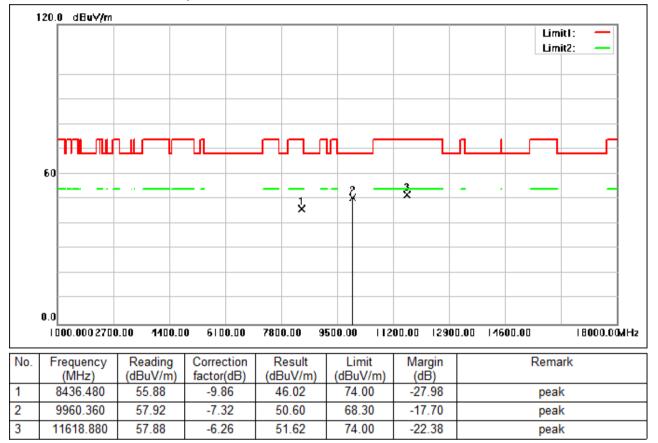


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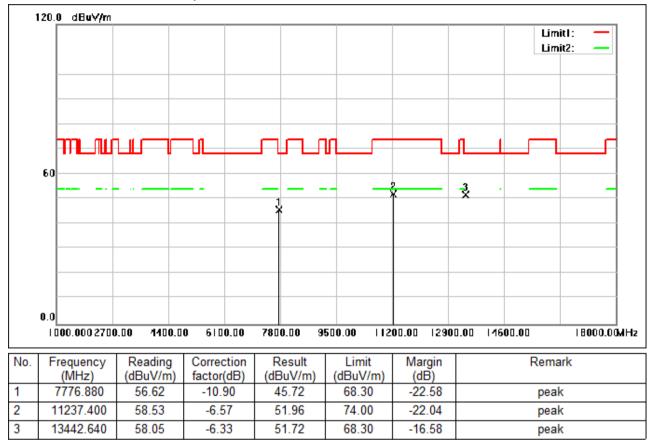


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:160MHz; Channel:Low



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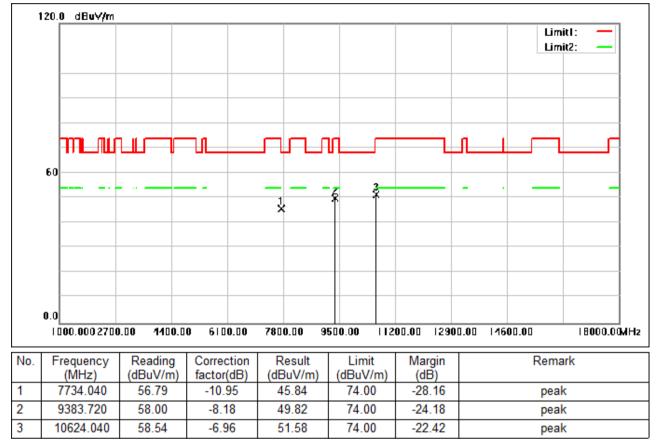


Test Mode: 01; Polarity: Vertical; Modulation:802.11ac; Bandwidth:160MHz; Channel:Low



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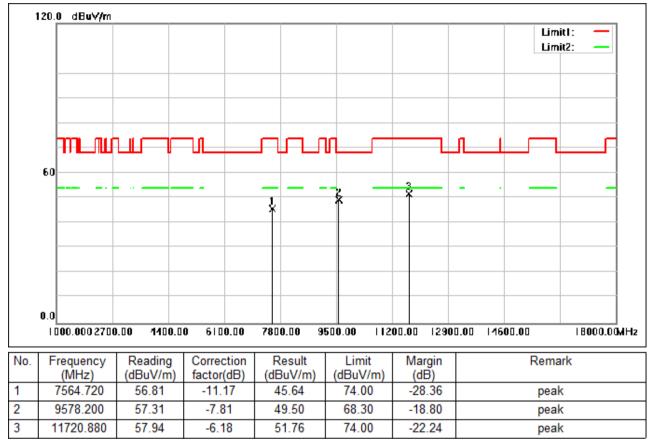


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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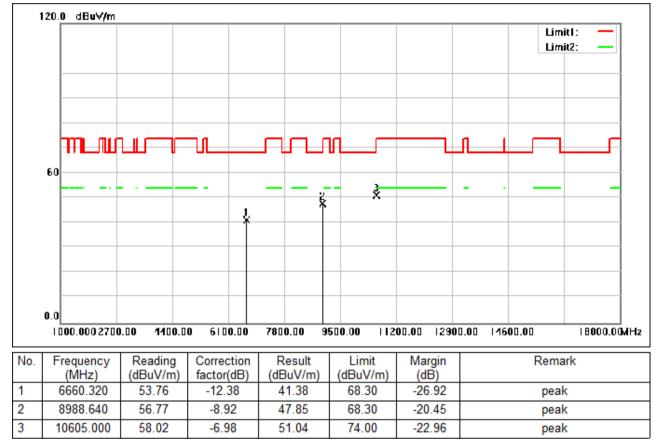


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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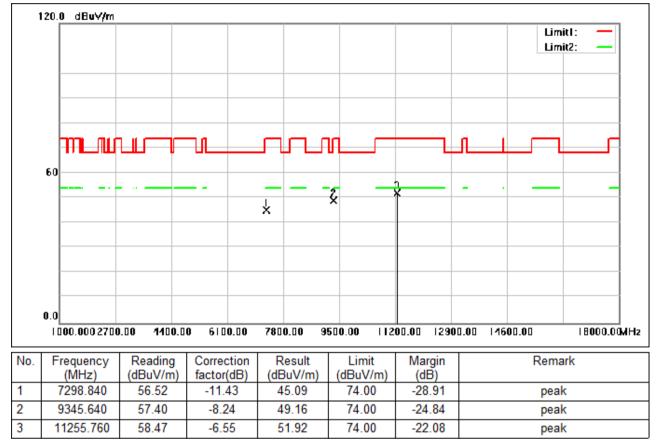


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:middle



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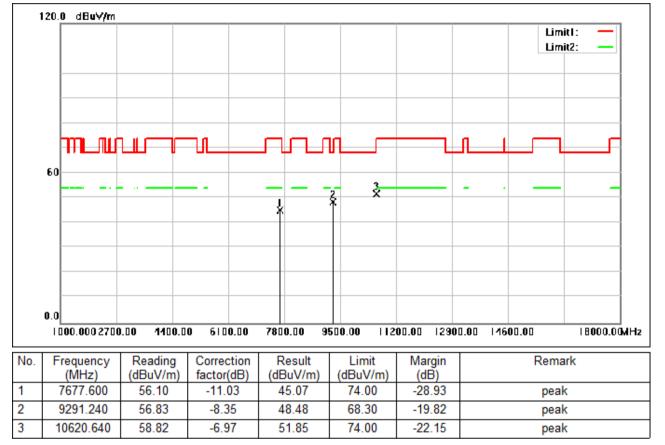


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:middle



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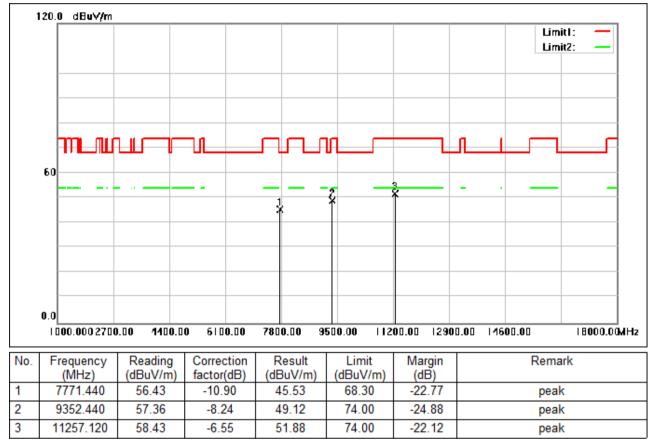


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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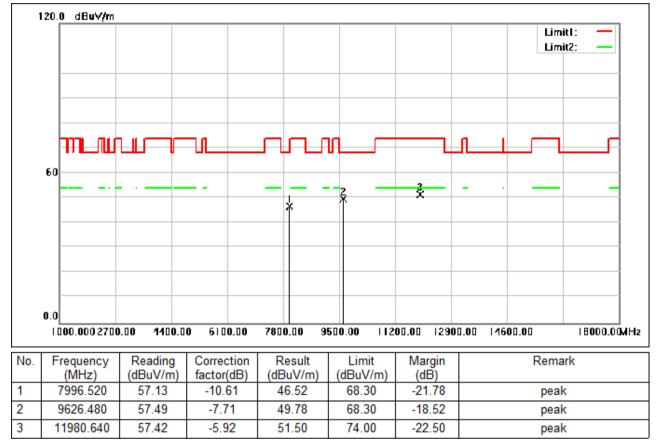


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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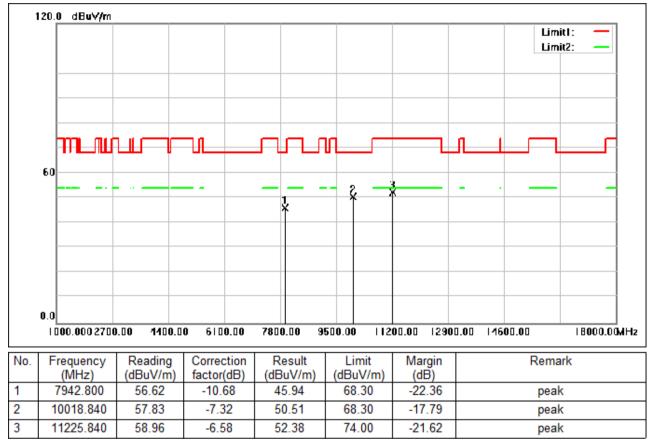


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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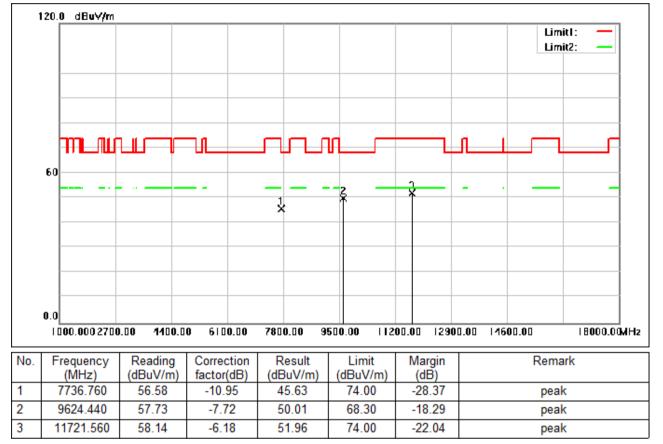


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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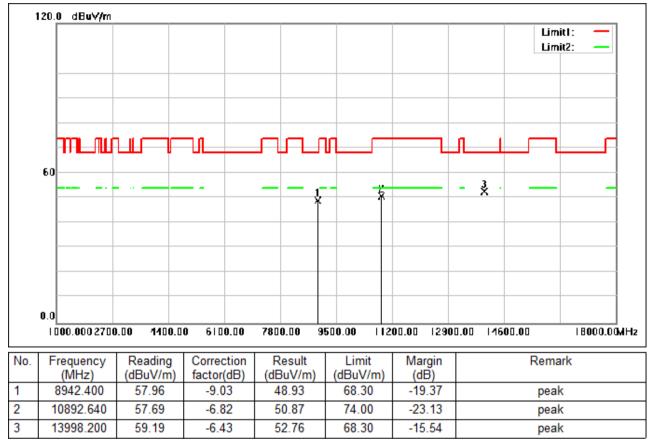


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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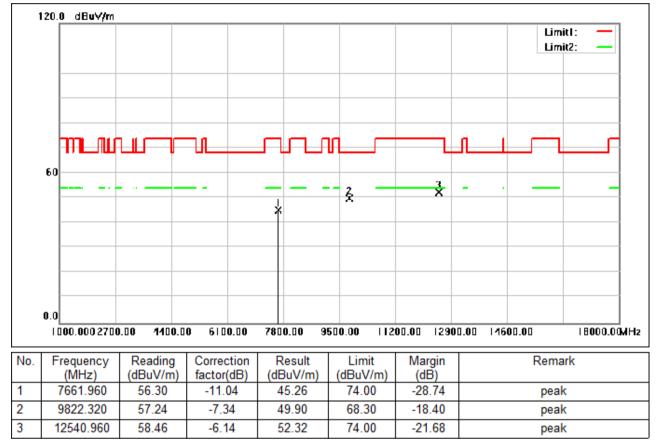


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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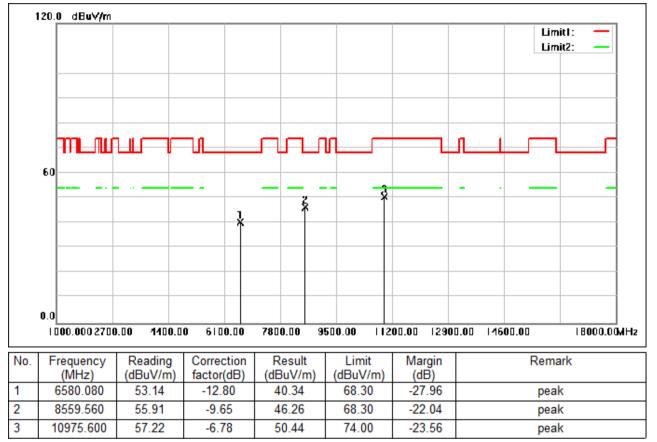


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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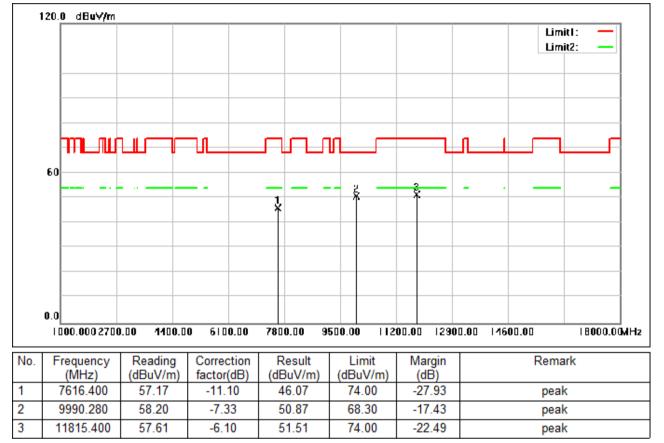


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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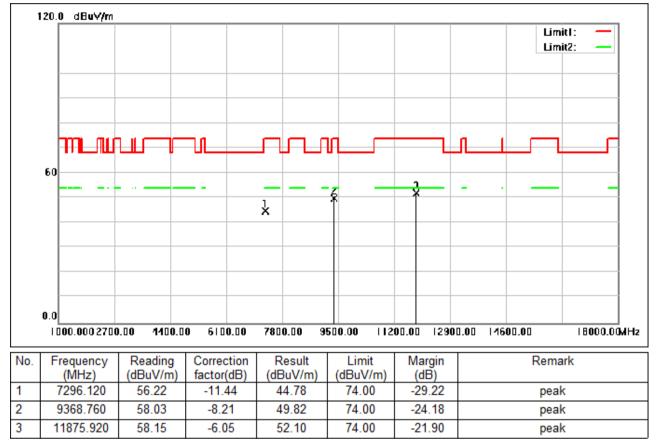


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:160MHz; Channel:Low



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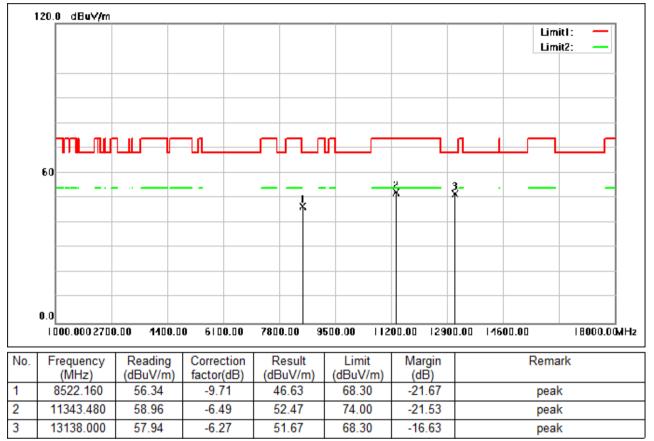


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:160MHz; Channel:Low



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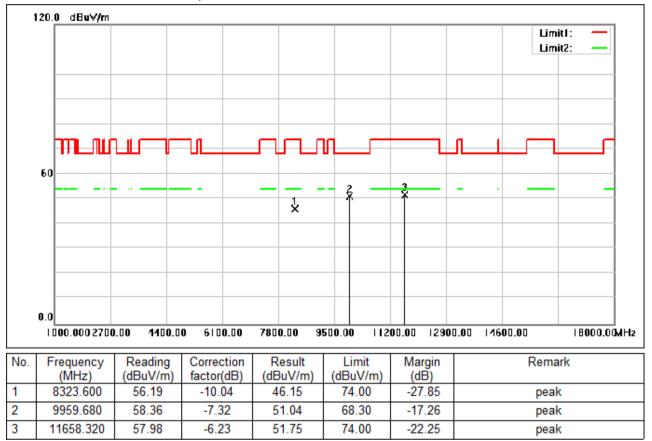


Test Mode: 02; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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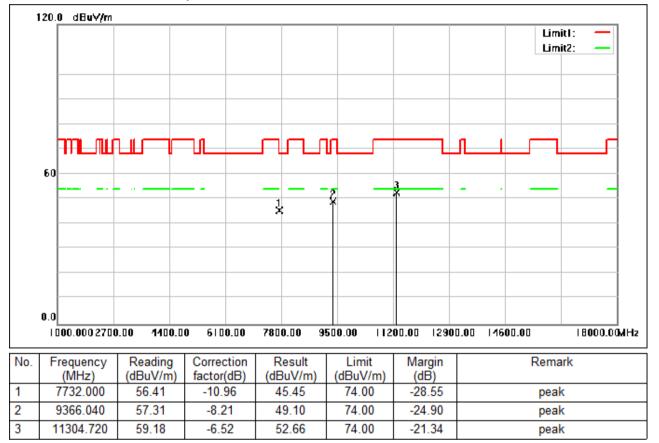


Test Mode: 02; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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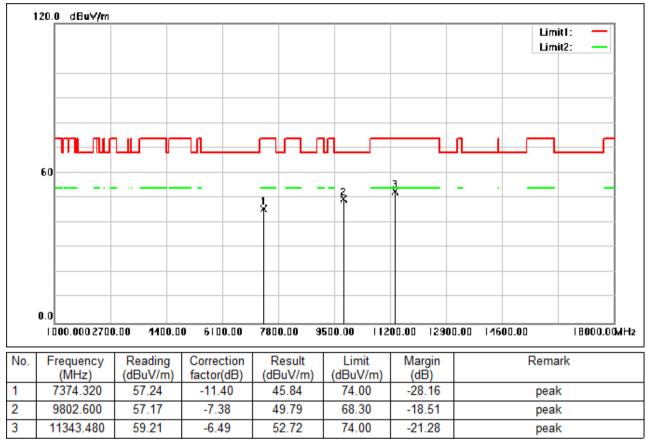


Test Mode: 02; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:middle



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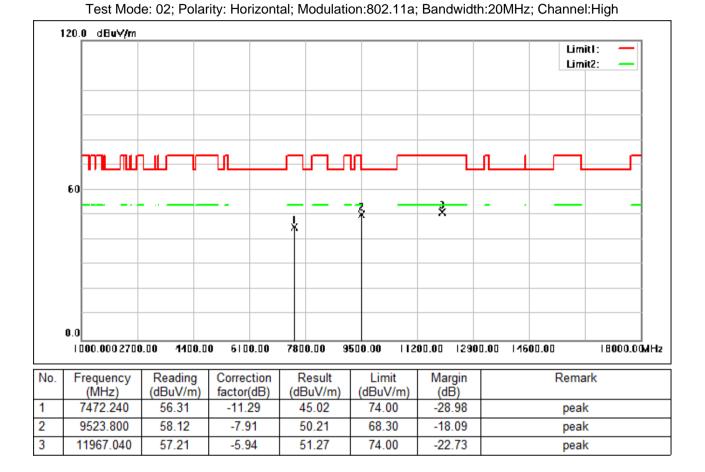


Test Mode: 02; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:middle



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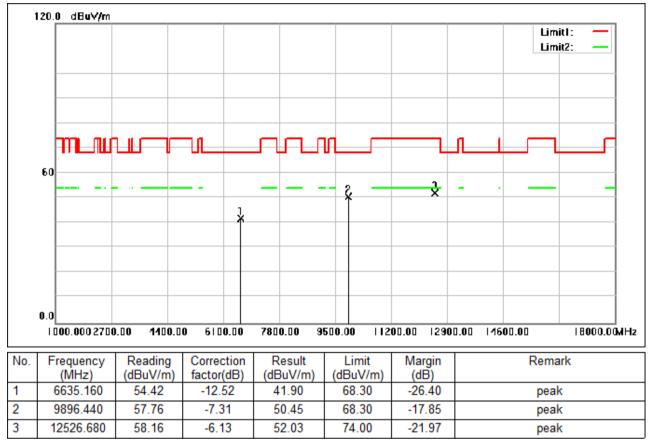
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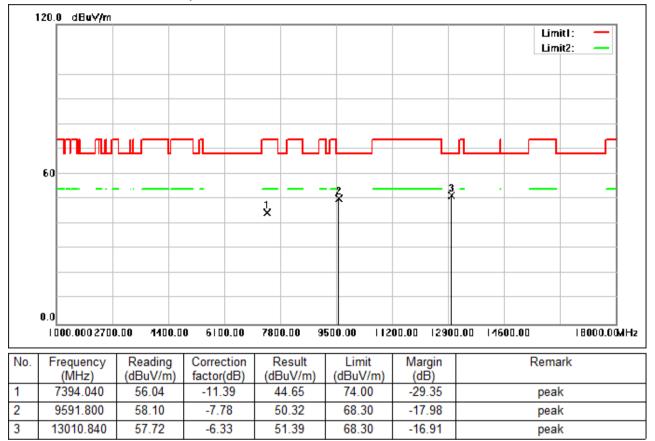


Test Mode: 02; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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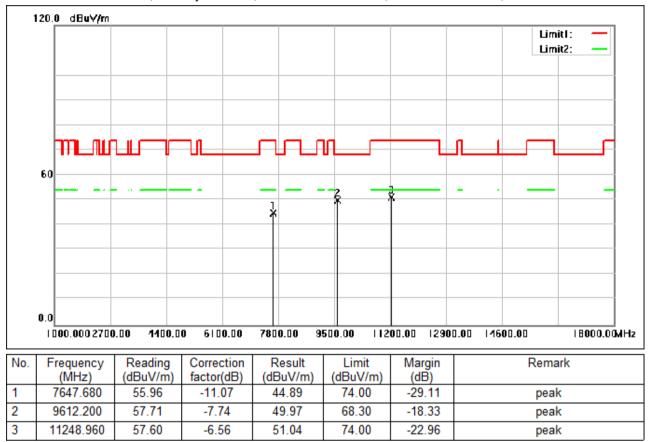


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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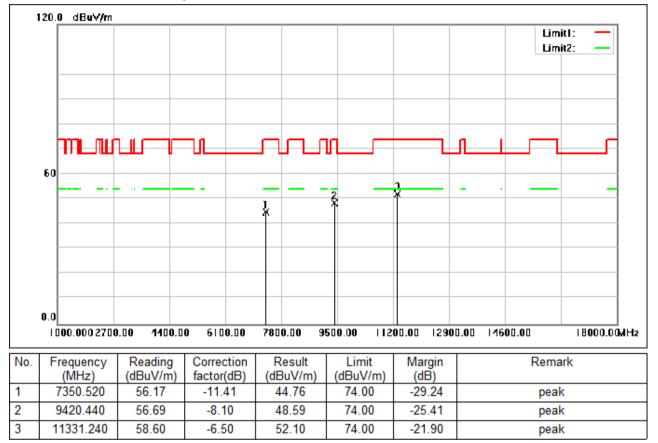


Test Mode: 02; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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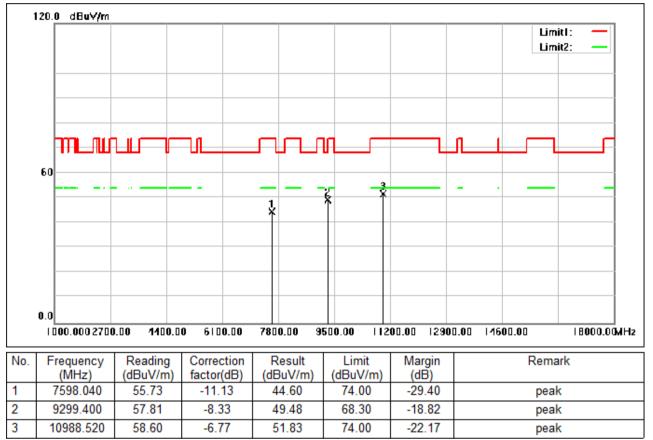


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:middle



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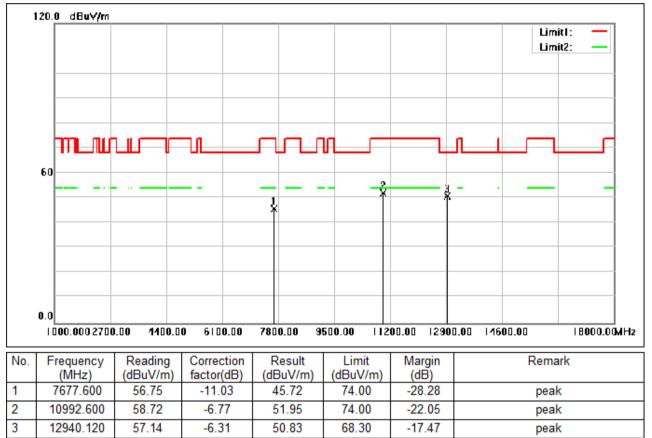


Test Mode: 02; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:middle



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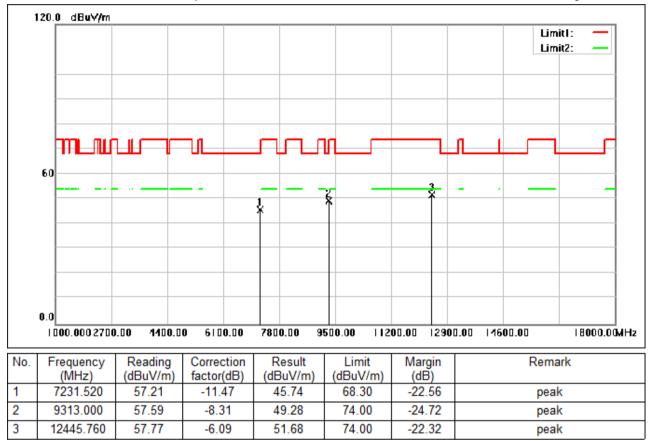


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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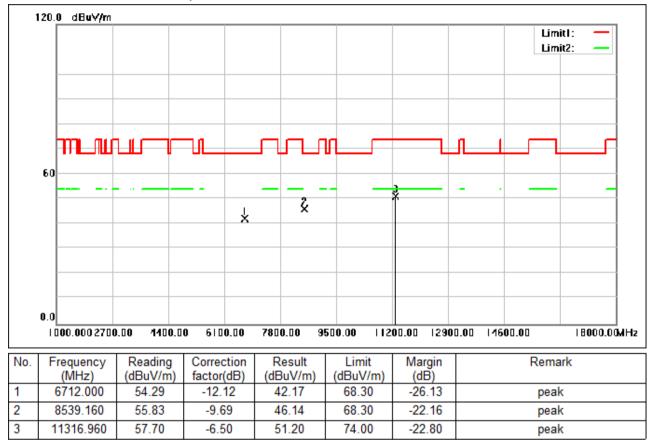


Test Mode: 02; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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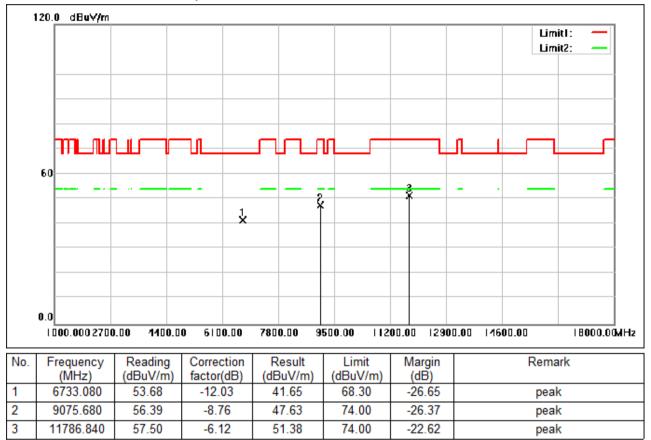


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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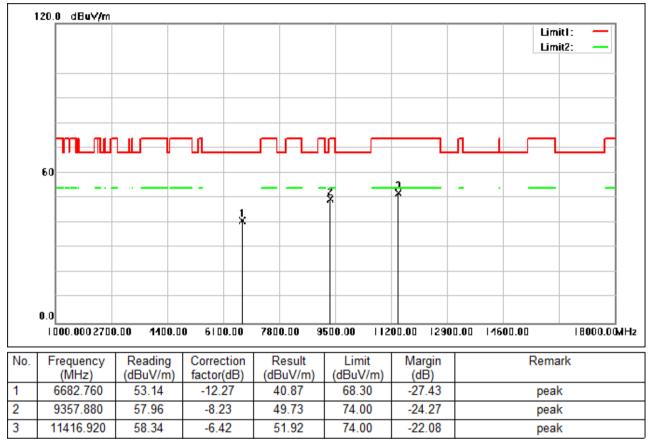


Test Mode: 02; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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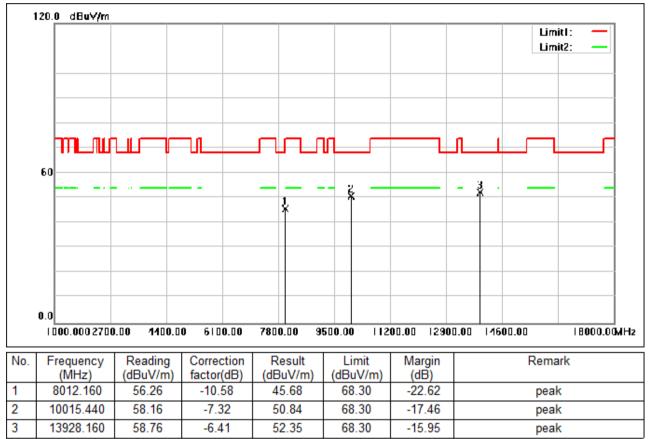


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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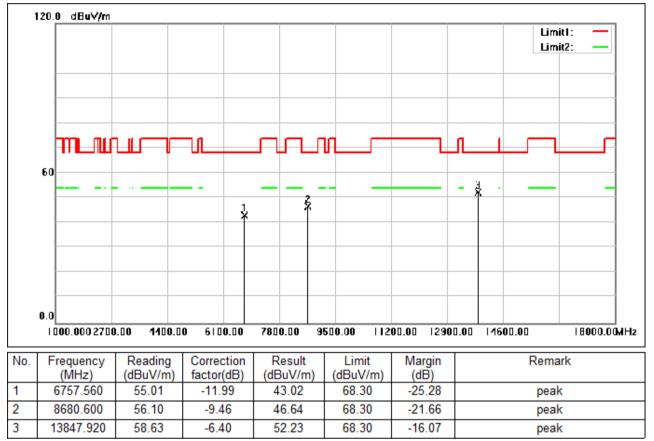


Test Mode: 02; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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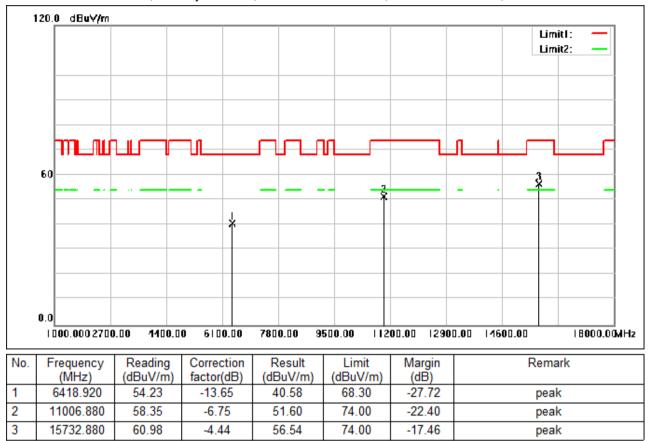


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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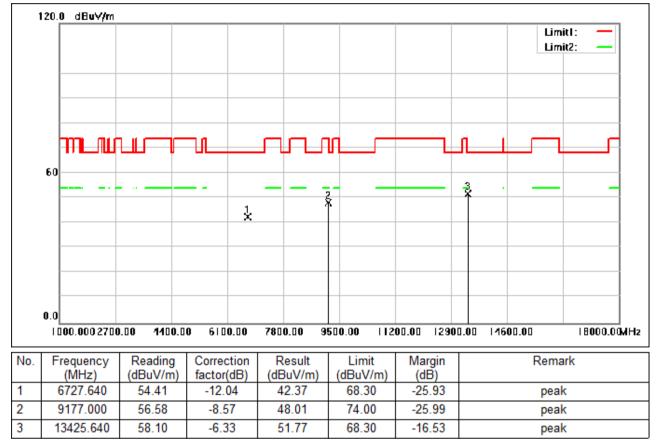


Test Mode: 02; Polarity: Vertical; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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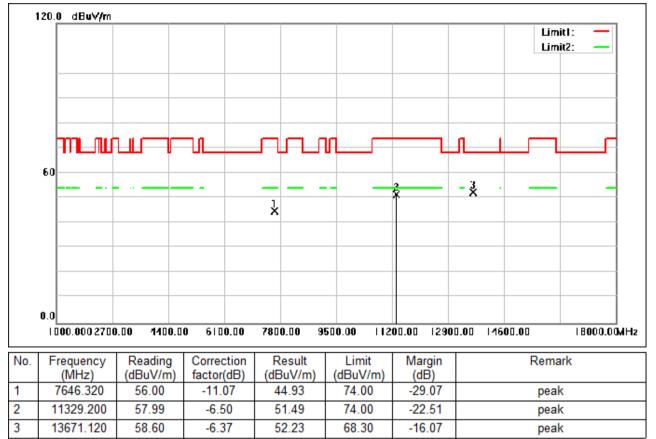


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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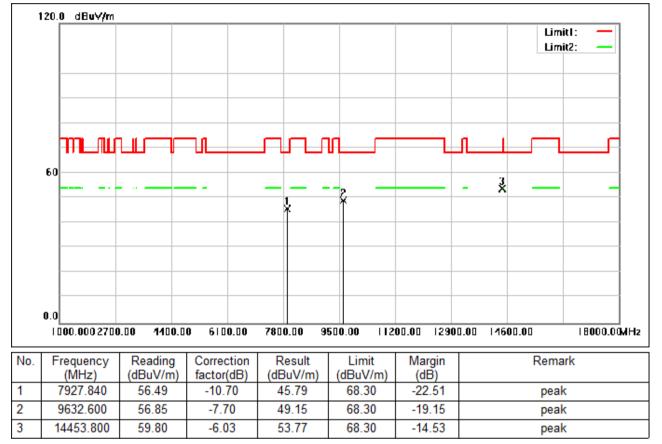


Test Mode: 02; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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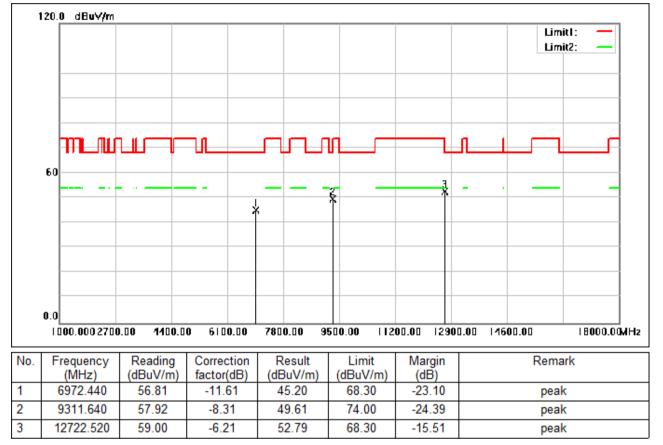


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:middle



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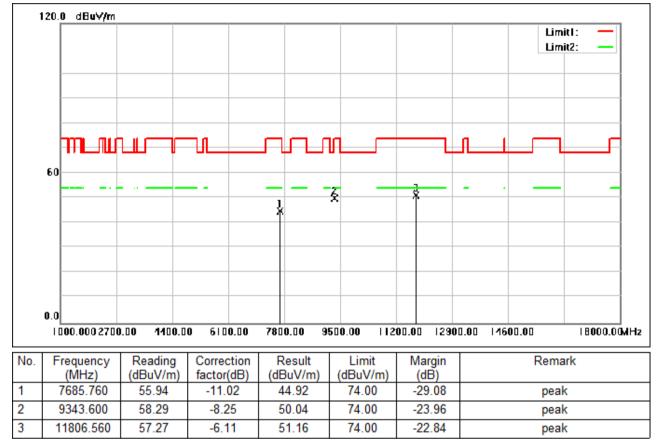


Test Mode: 02; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:middle



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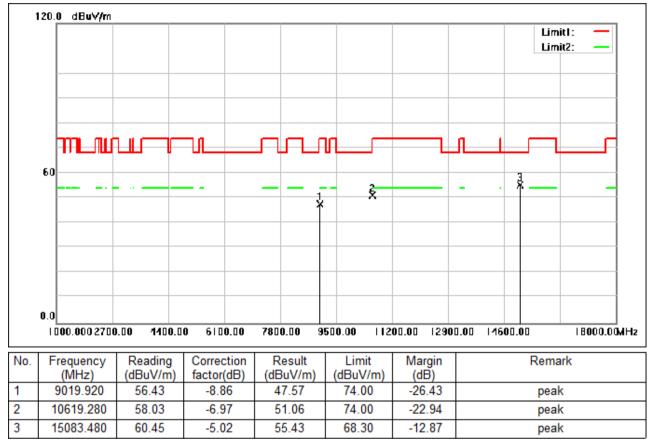


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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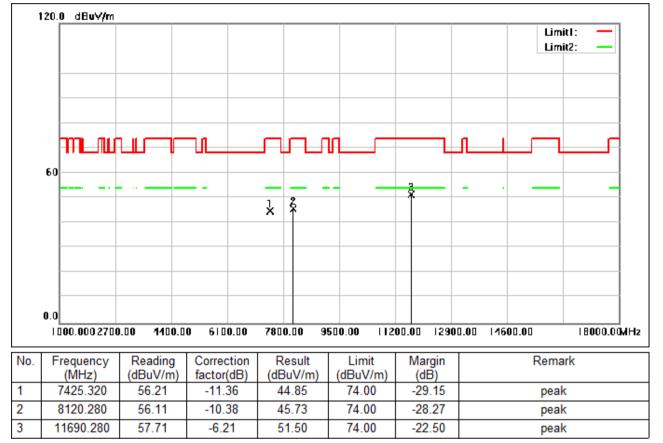


Test Mode: 02; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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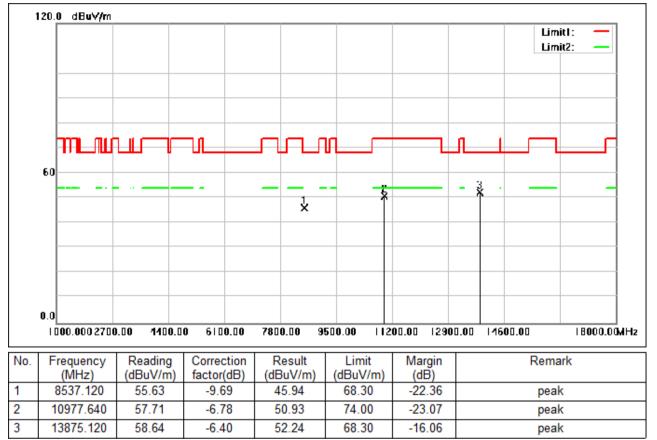


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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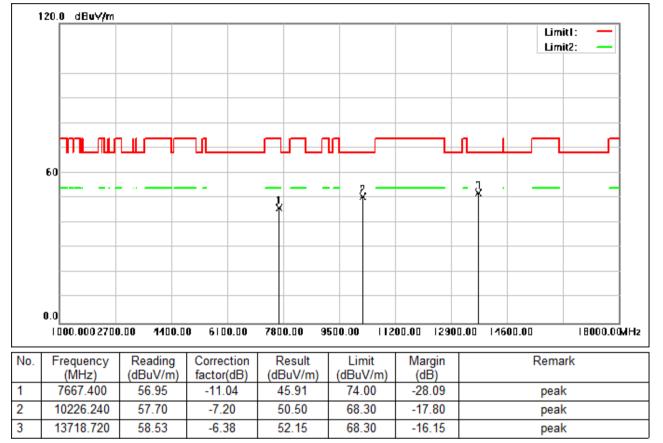


Test Mode: 02; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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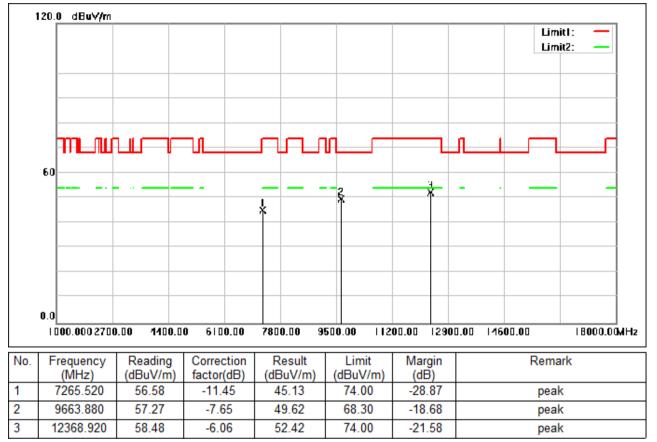


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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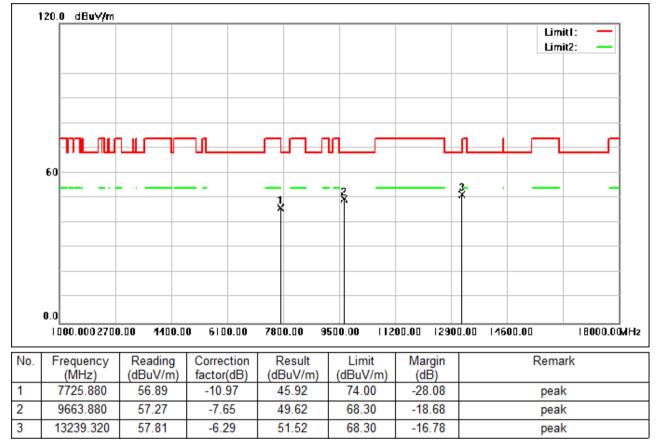


Test Mode: 02; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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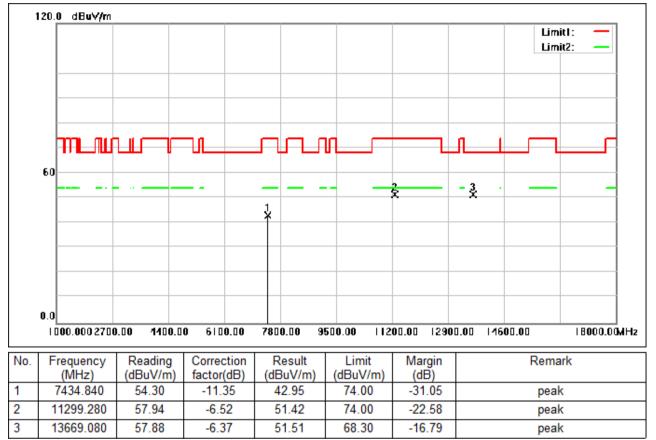


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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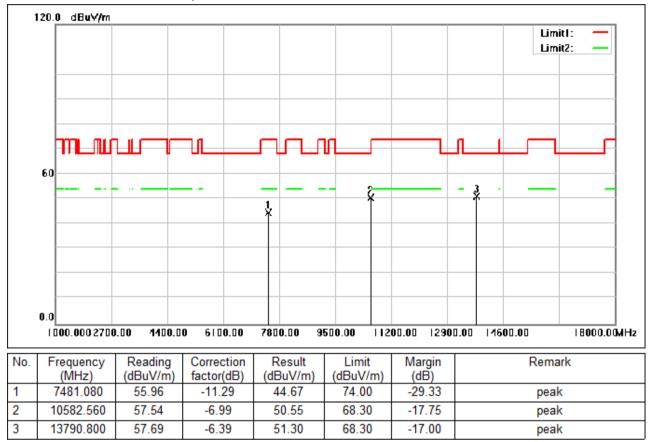


Test Mode: 02; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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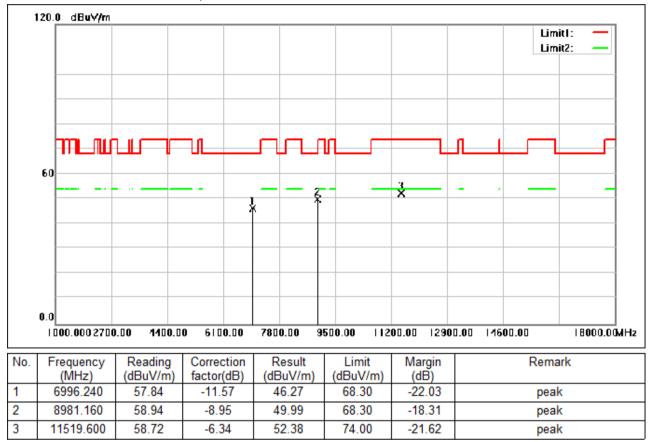


Test Mode: 03; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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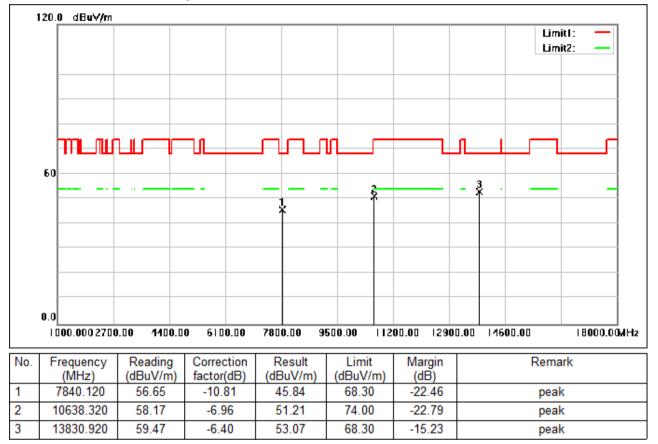


Test Mode: 03; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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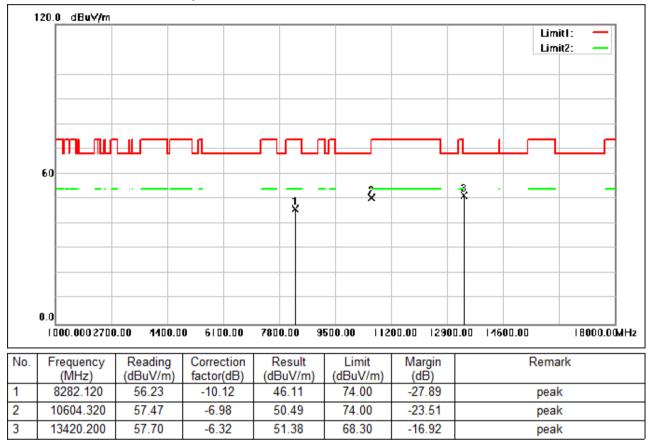


Test Mode: 03; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:middle



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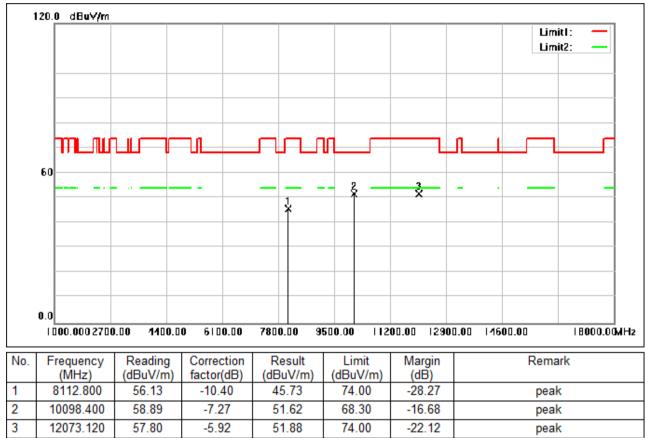


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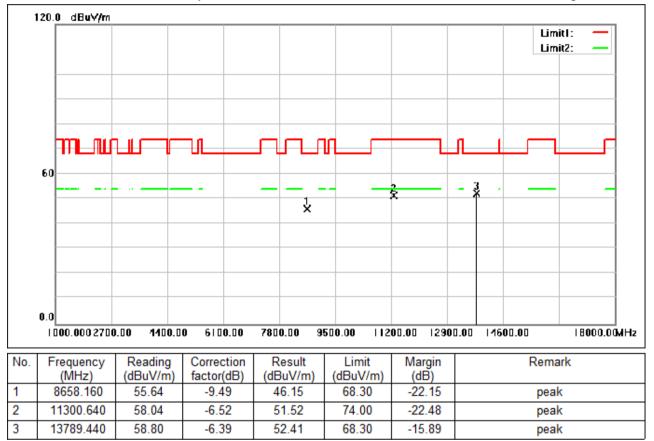


Test Mode: 03; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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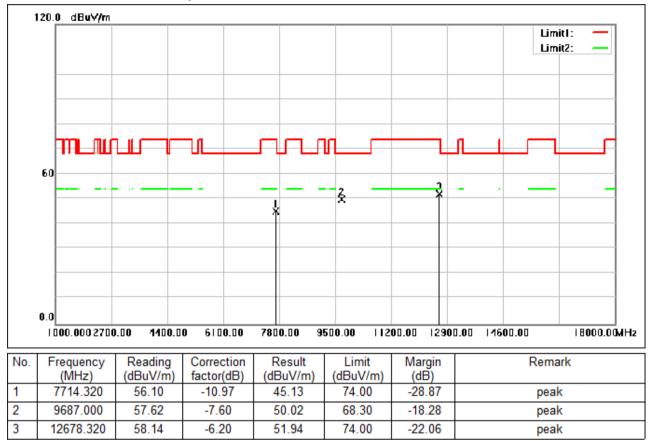


Test Mode: 03; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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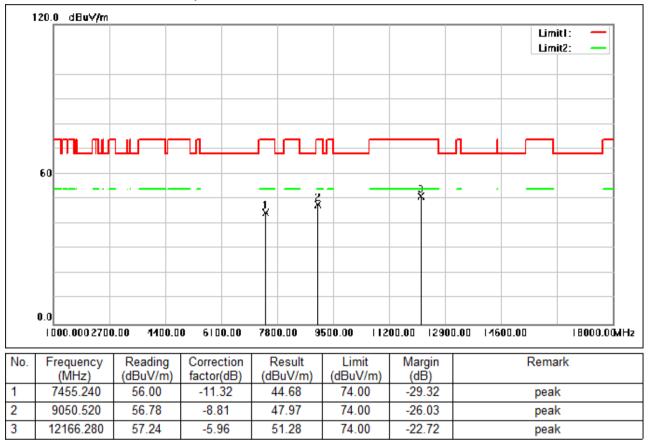


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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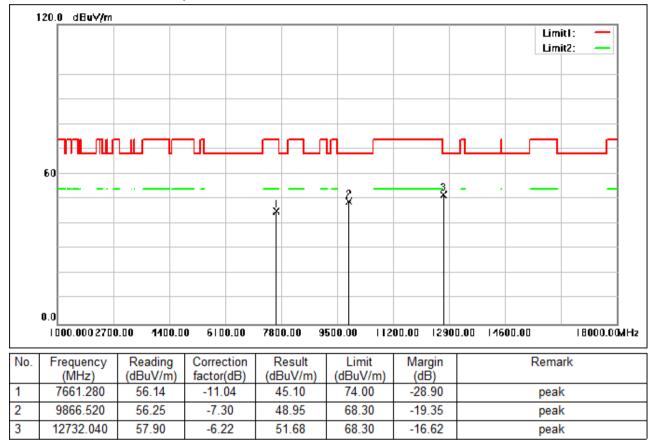


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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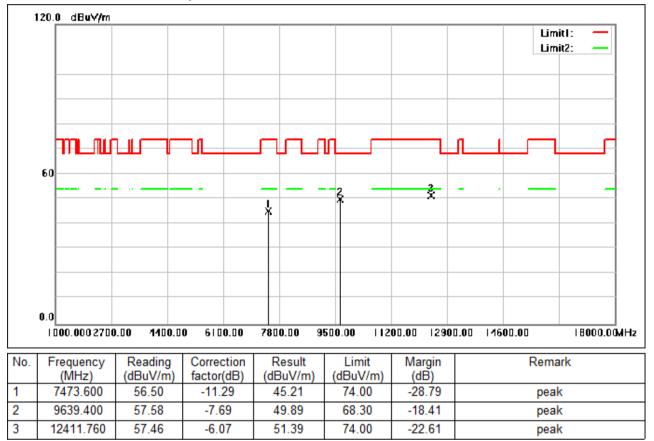


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:middle



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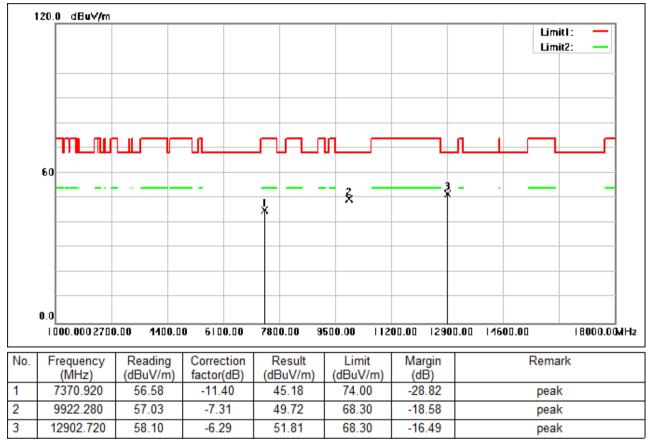


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:middle



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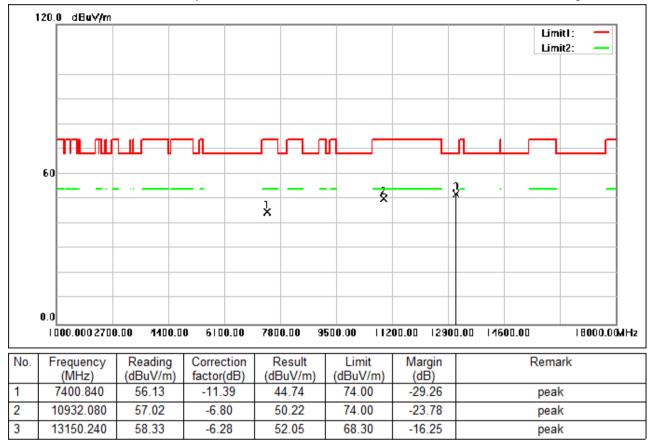


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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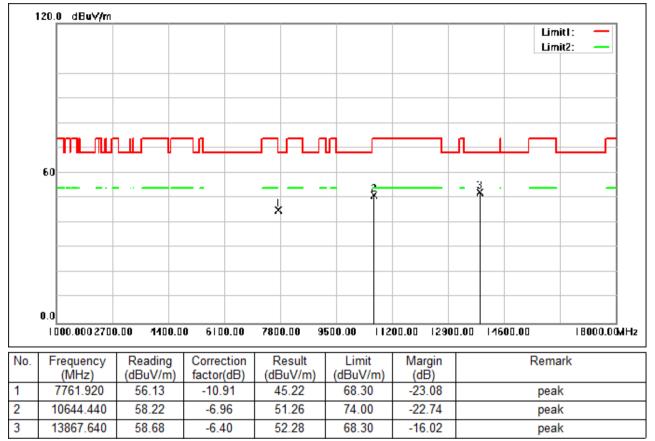


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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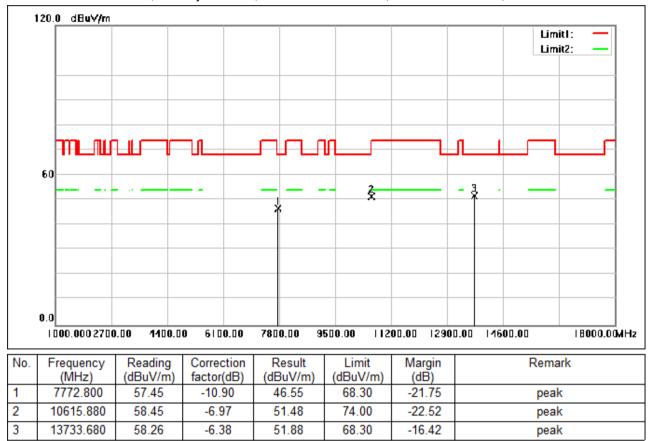


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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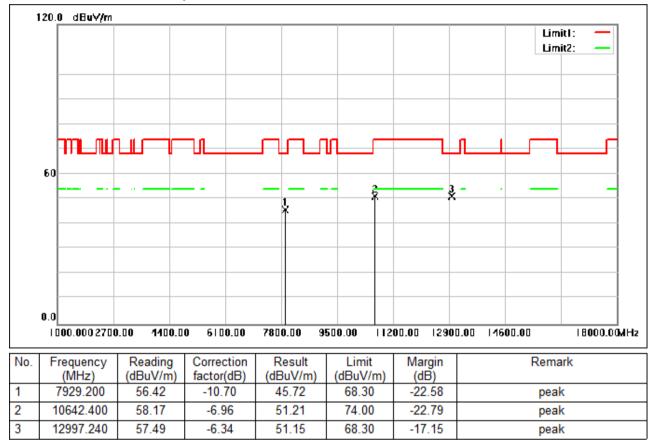


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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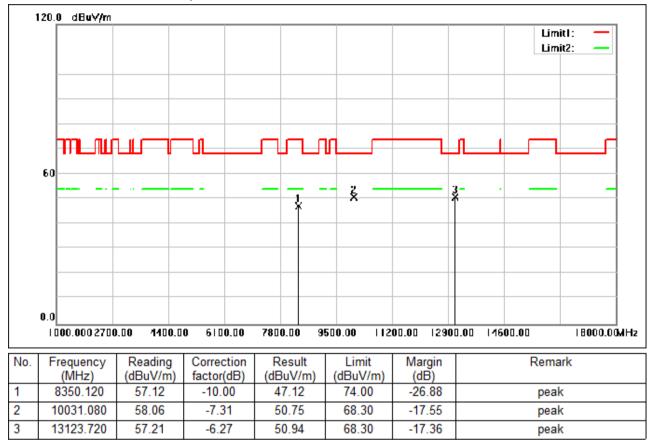


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:middle



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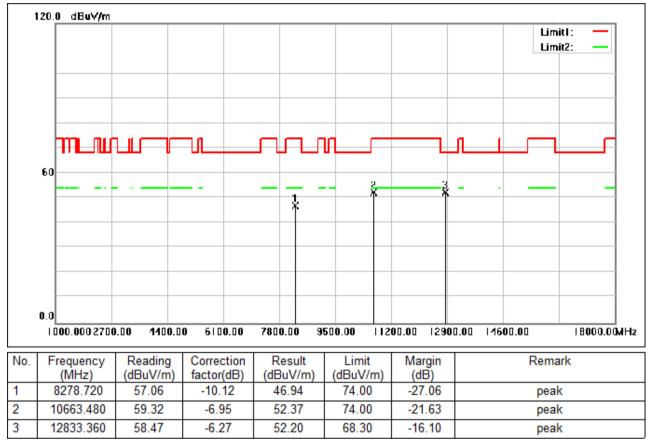


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:middle



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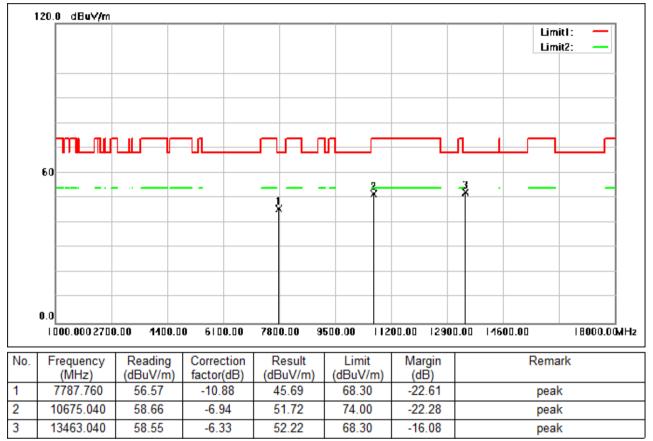


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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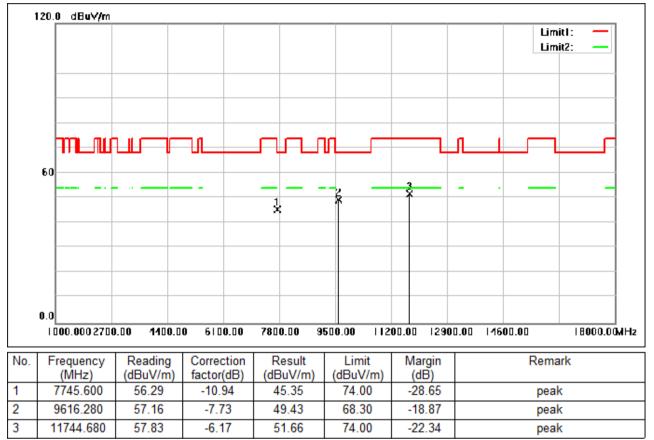


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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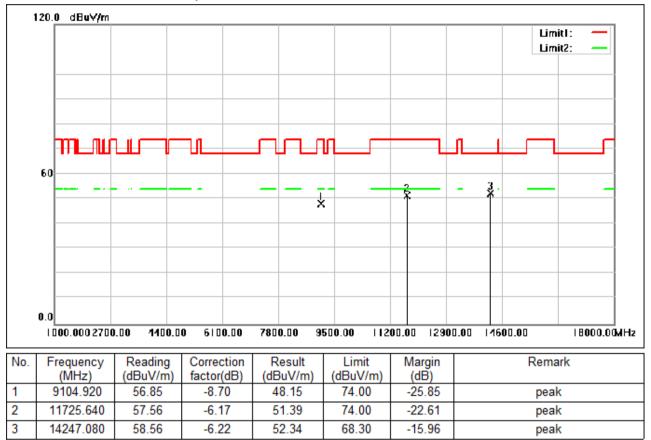


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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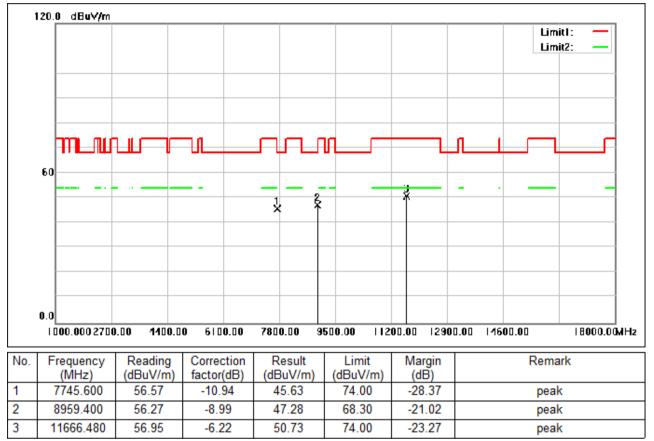


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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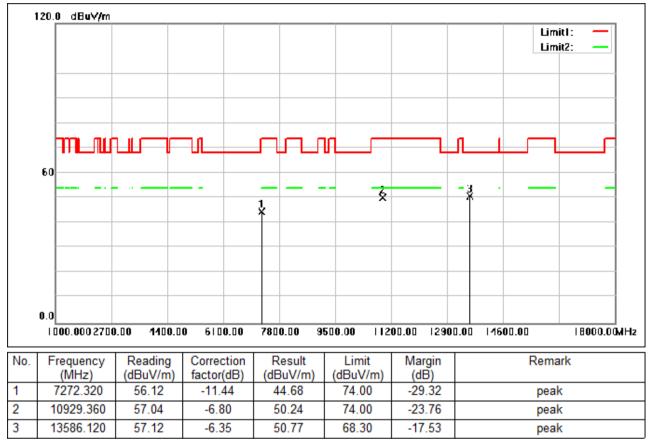


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:High



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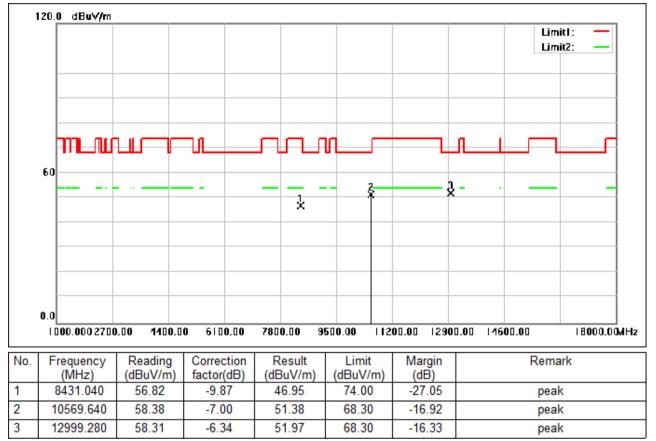


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:80MHz; Channel:High



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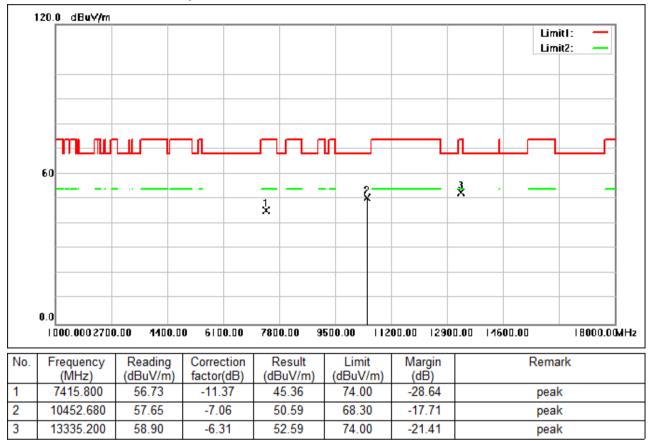


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:Middle



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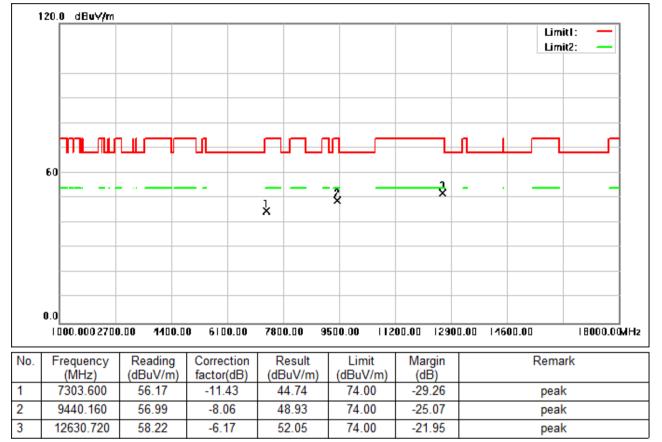


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:80MHz; Channel:Middle



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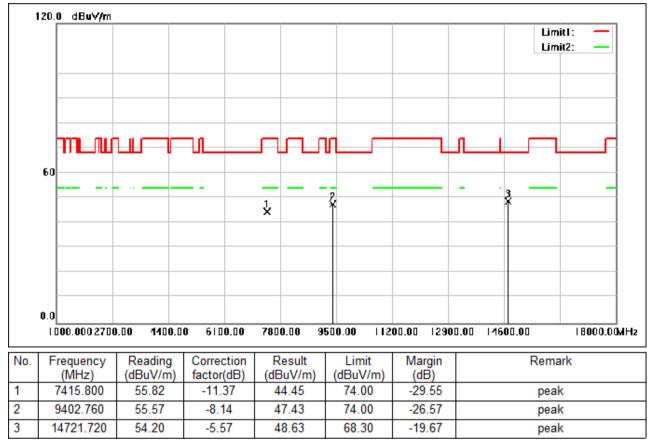


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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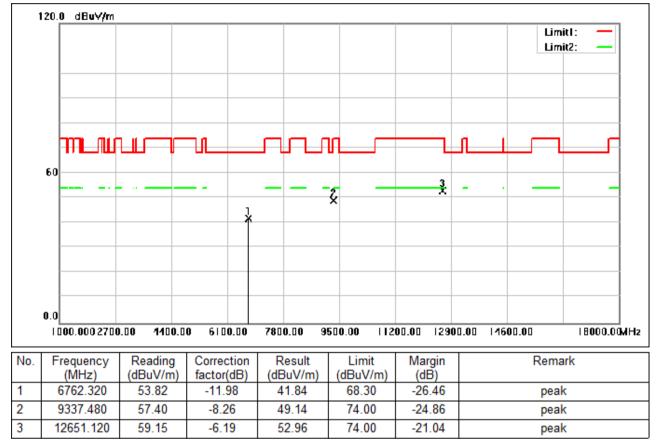


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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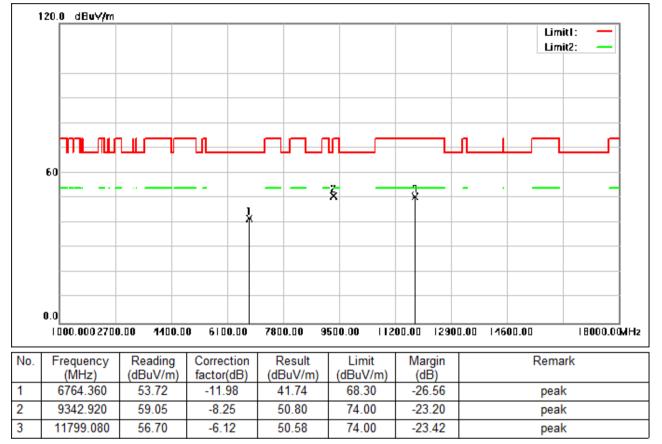


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:middle



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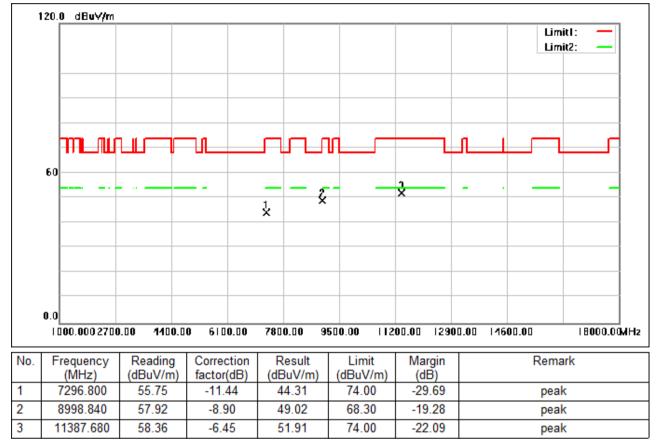


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:middle



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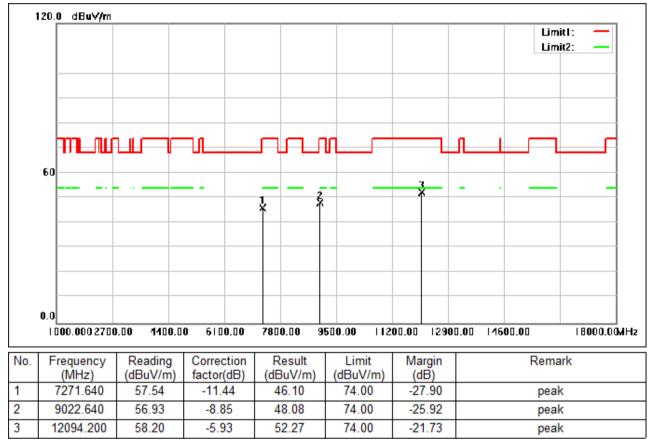


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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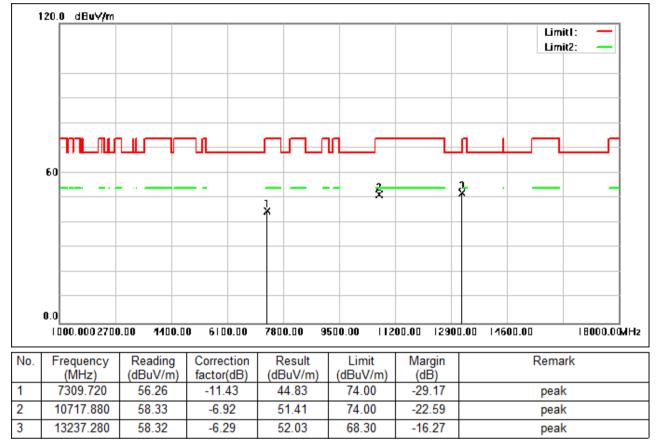


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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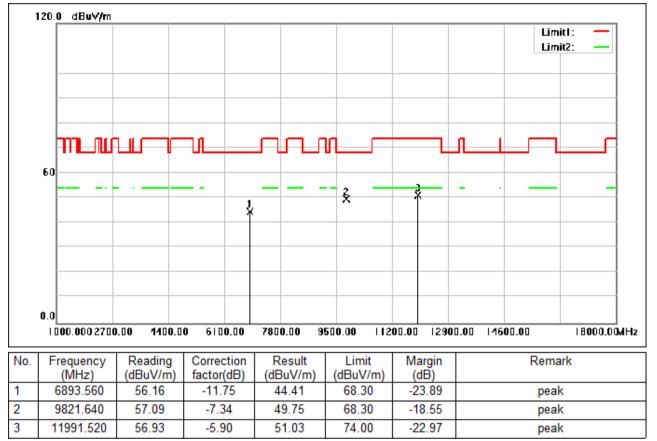


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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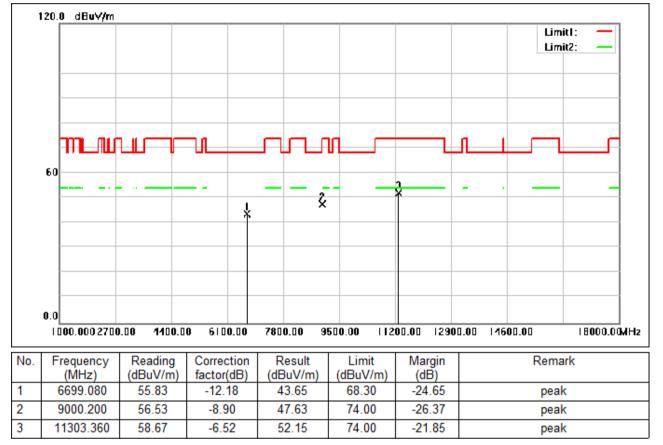


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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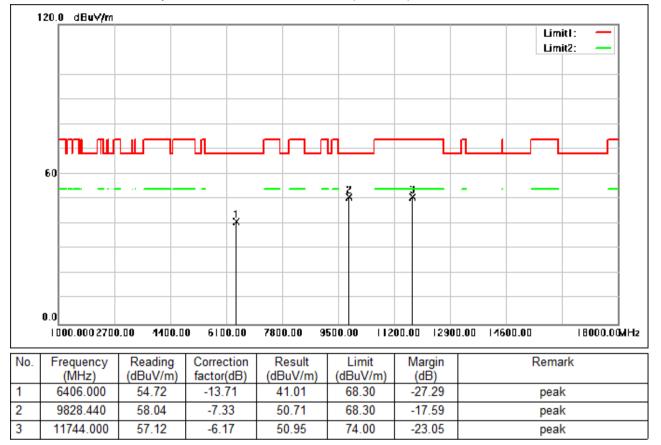


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:middle



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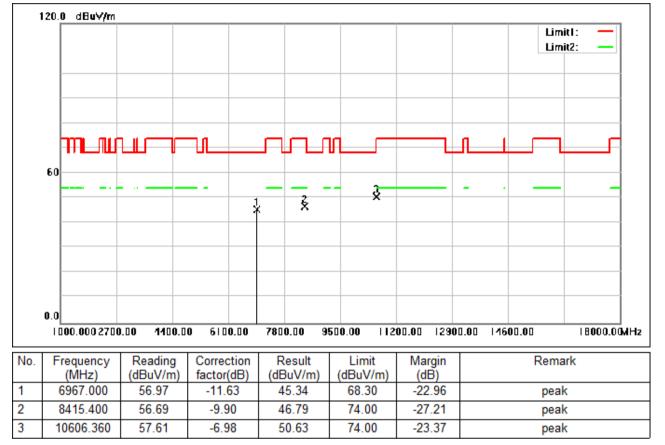


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:middle



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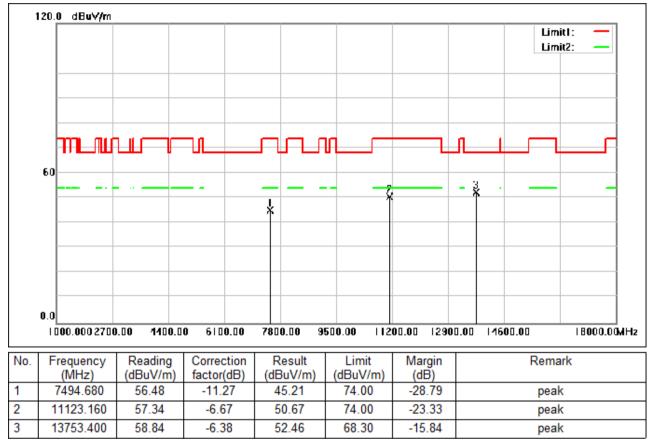


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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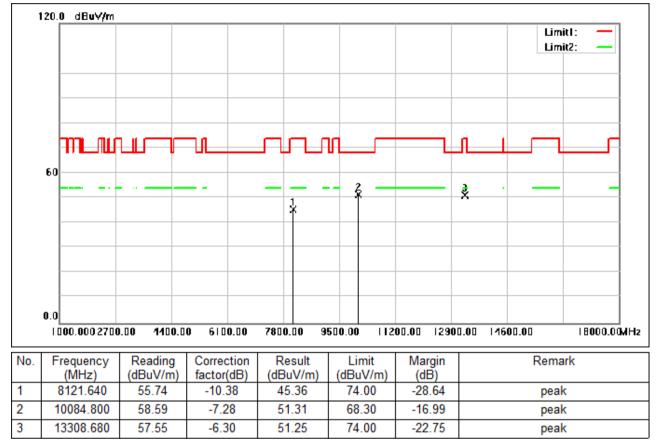


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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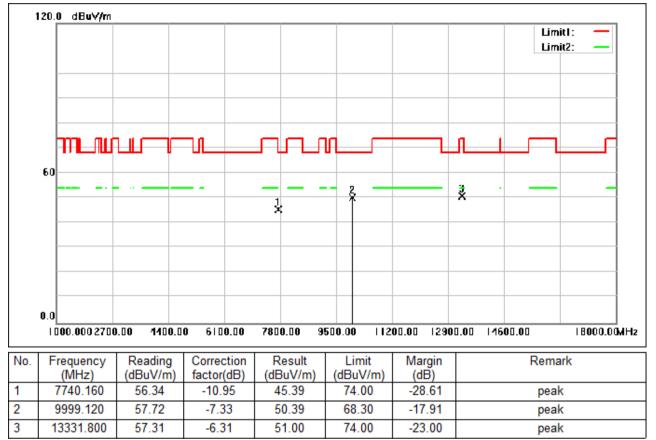


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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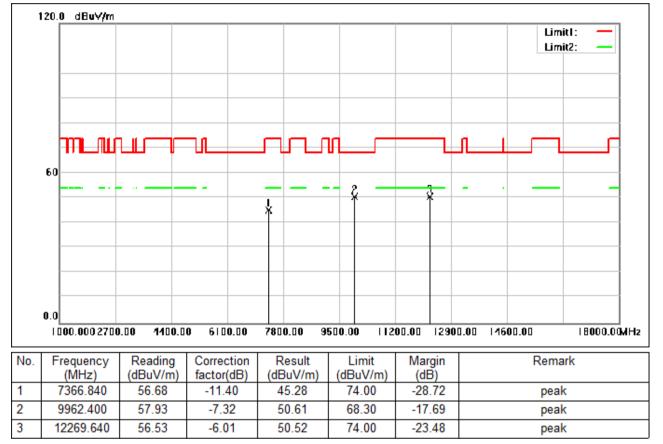


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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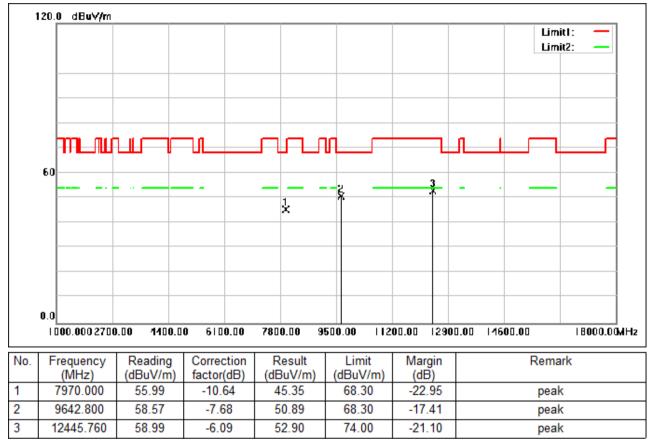


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:High



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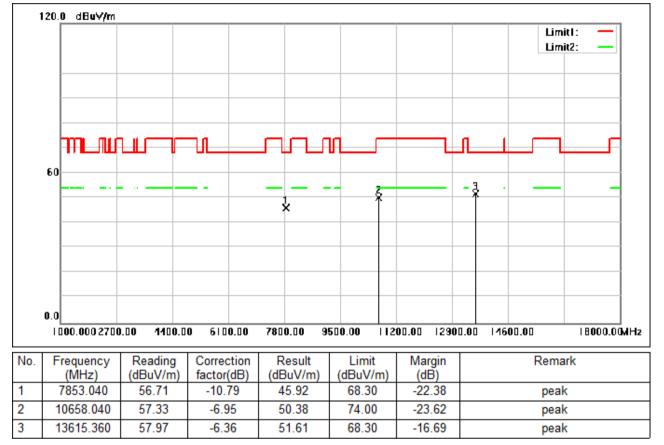


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:High



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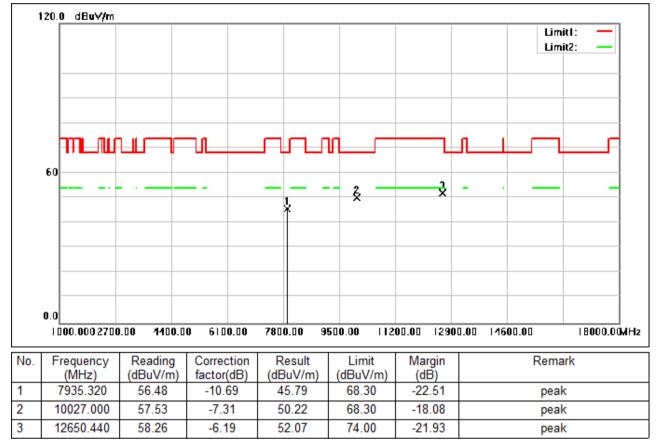


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Middle



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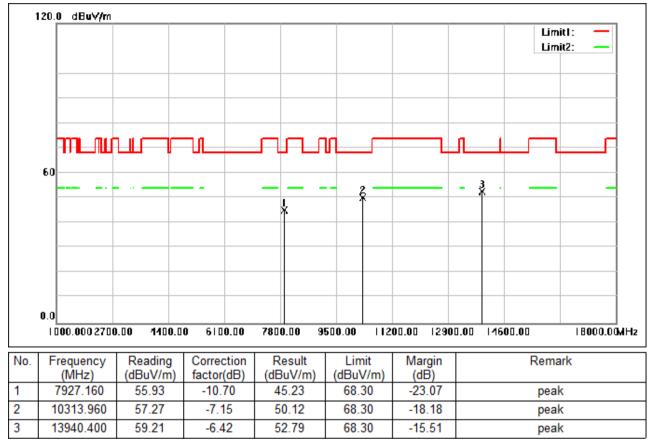


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Middle



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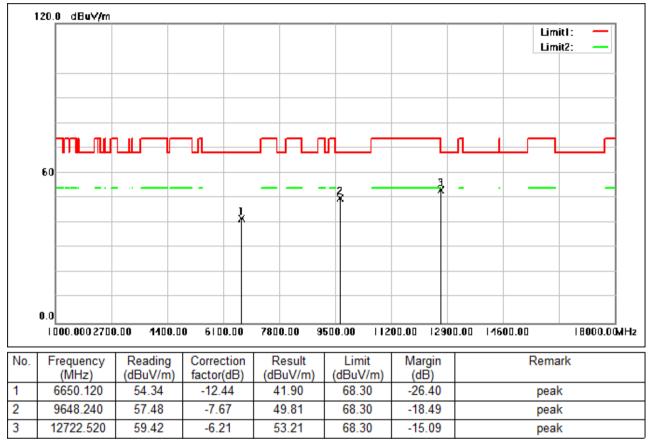


Test Mode: 04; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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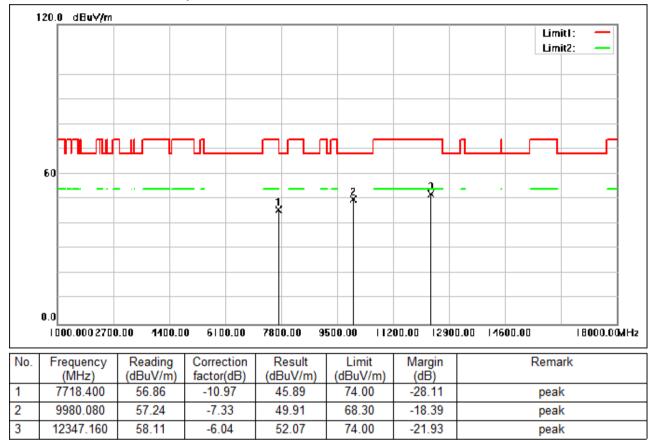


Test Mode: 04; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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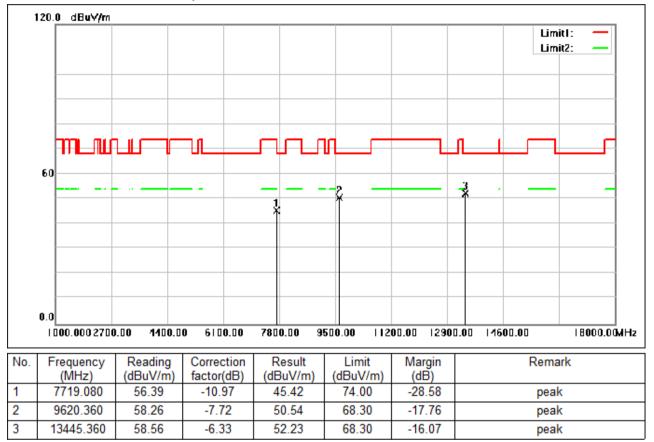


Test Mode: 04; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:middle



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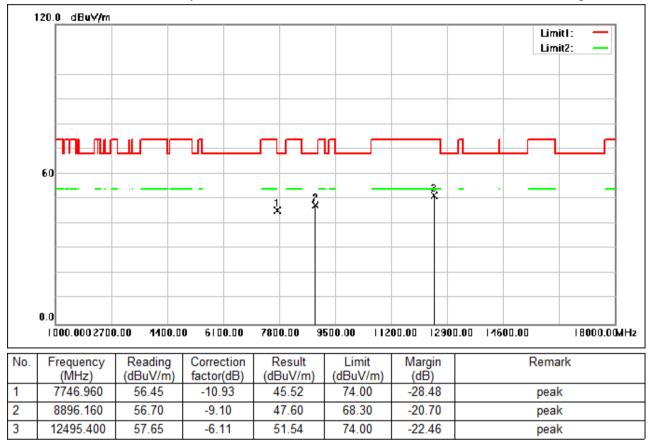


Test Mode: 04; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:middle



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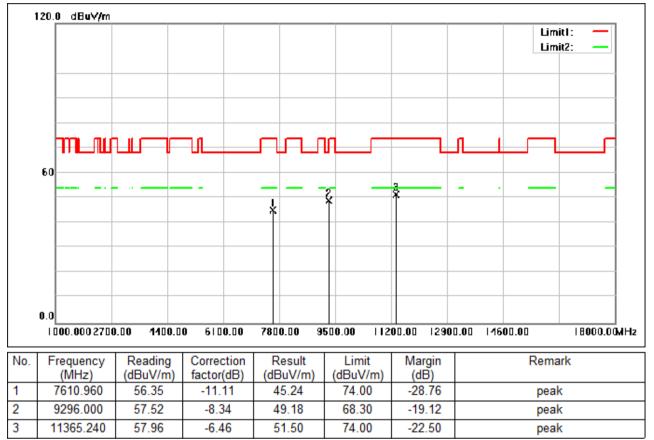


Test Mode: 04; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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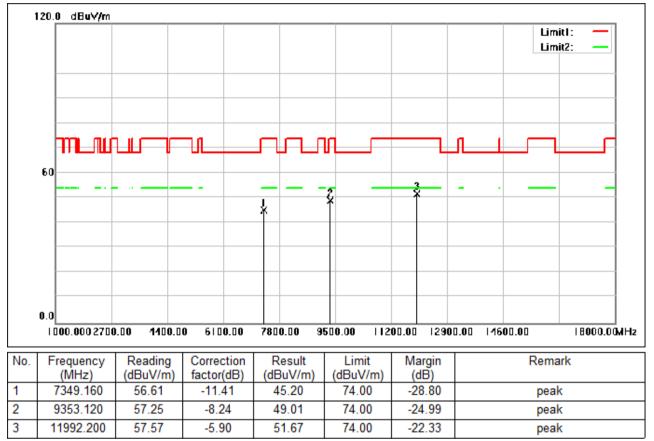


Test Mode: 04; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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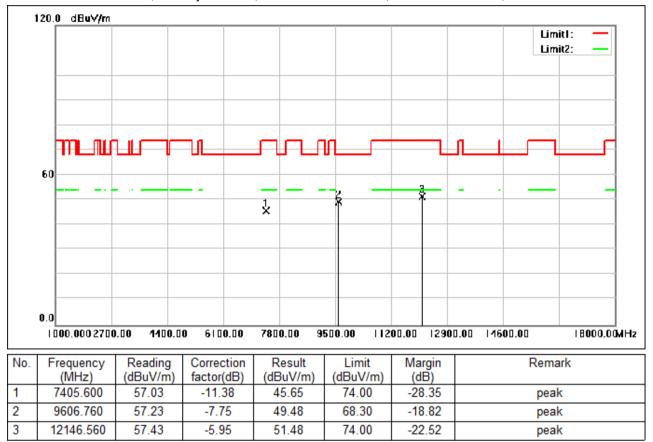


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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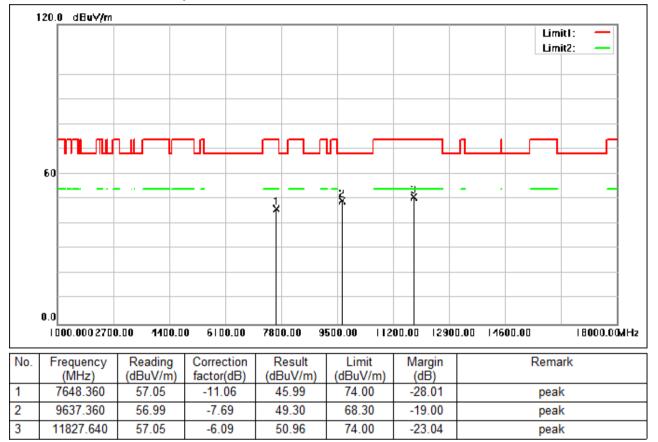


Test Mode: 04; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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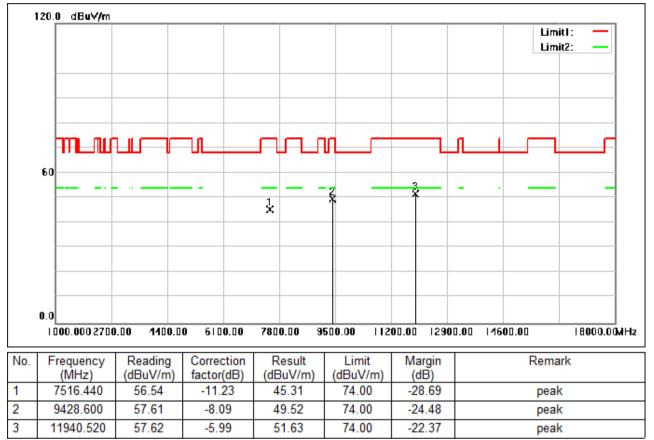


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:middle



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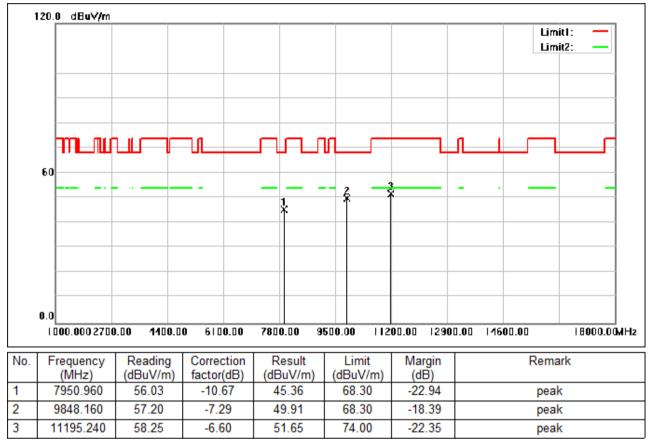


Test Mode: 04; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:middle



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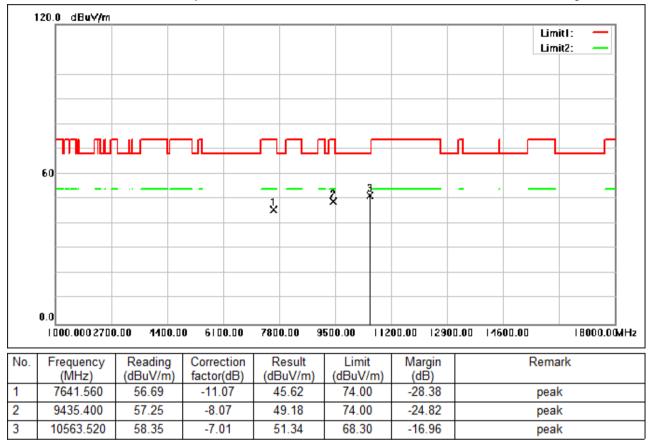


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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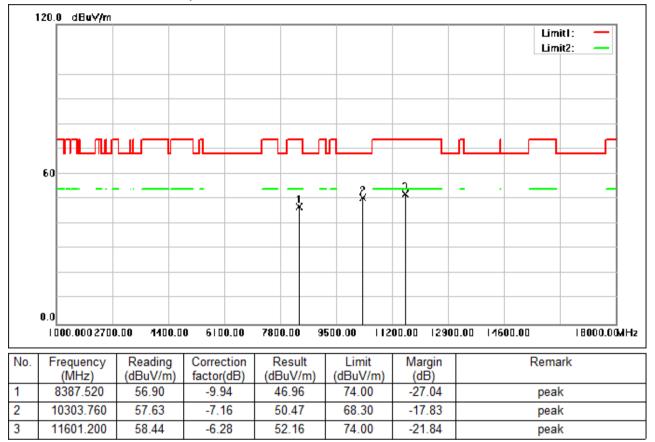


Test Mode: 04; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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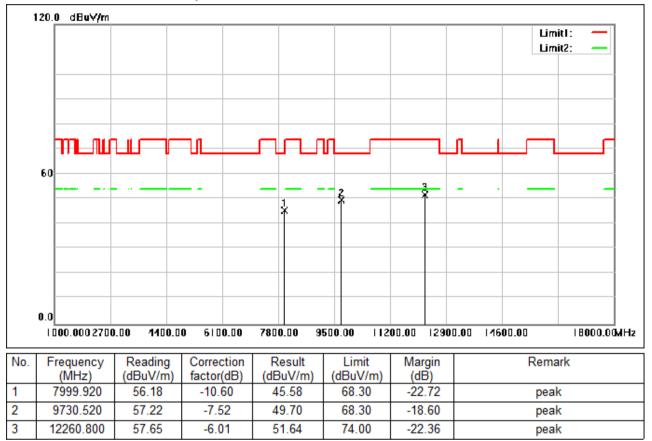


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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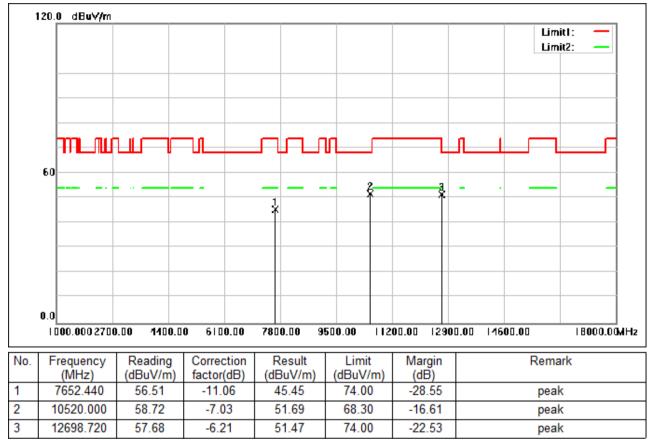


Test Mode: 04; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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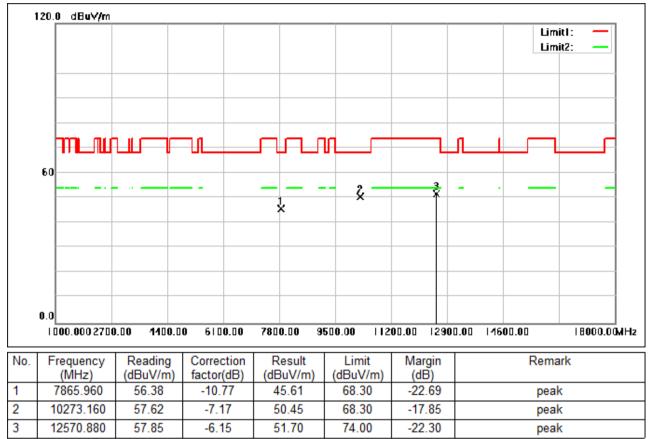


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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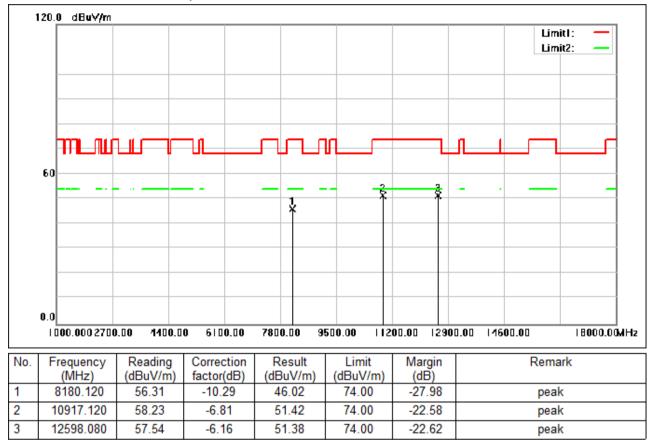


Test Mode: 04; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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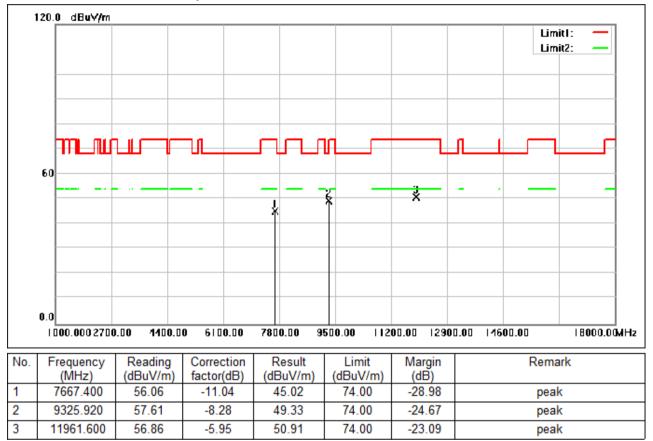


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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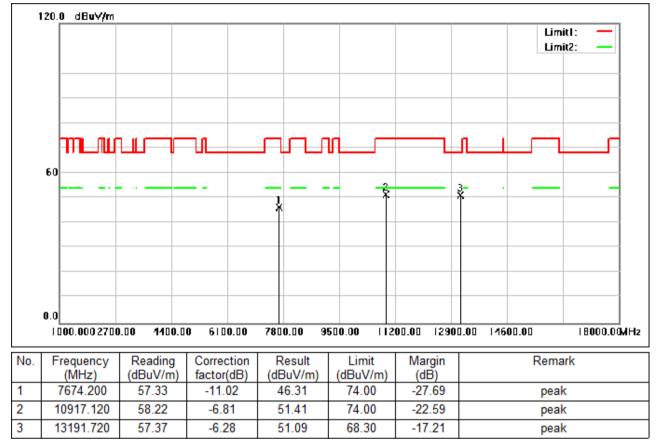


Test Mode: 04; Polarity: Vertical; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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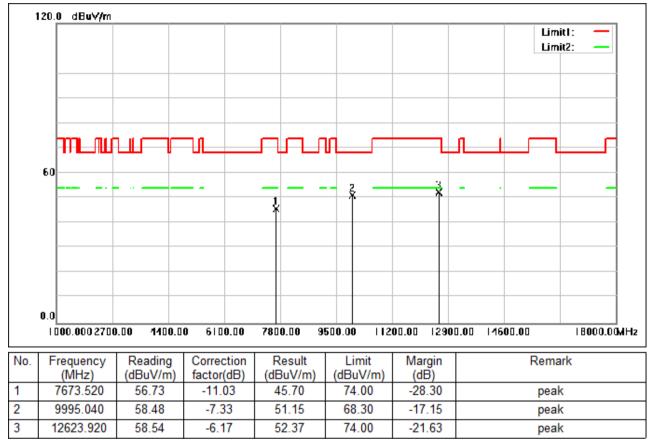


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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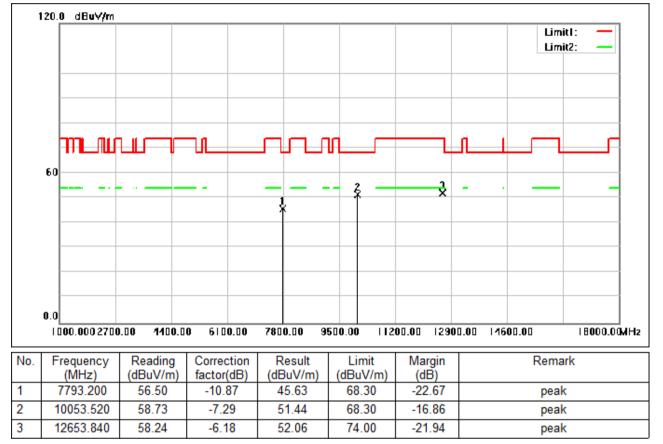


Test Mode: 04; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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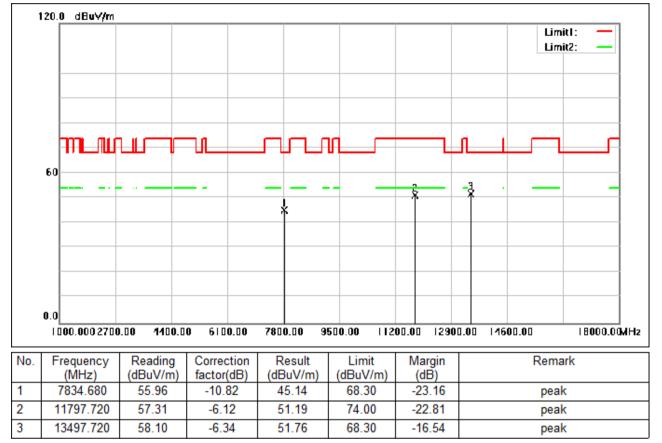


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:middle



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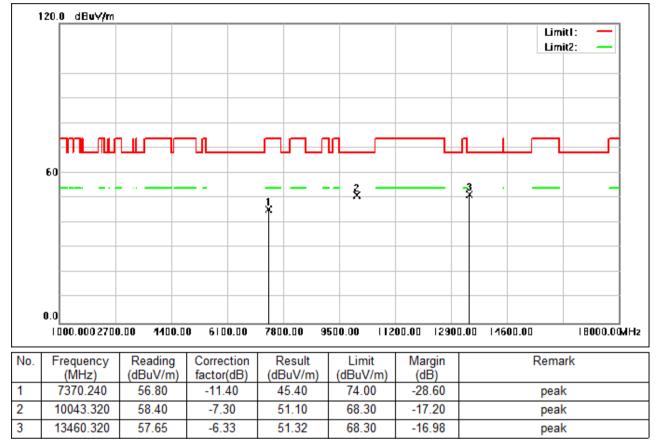


Test Mode: 04; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:middle



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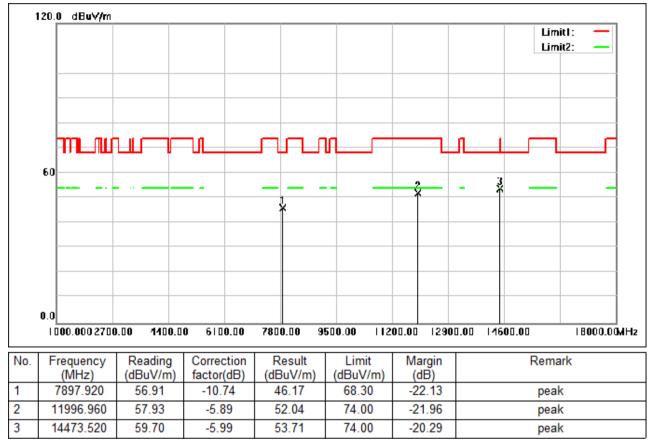


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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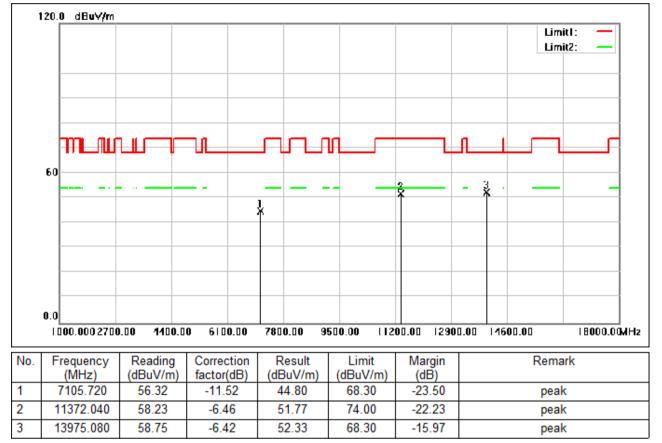


Test Mode: 04; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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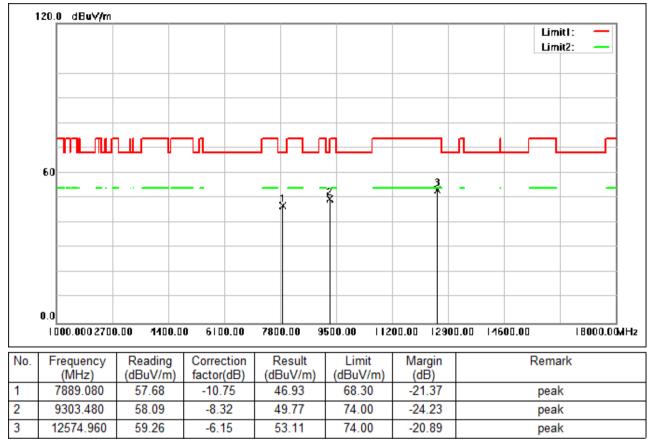


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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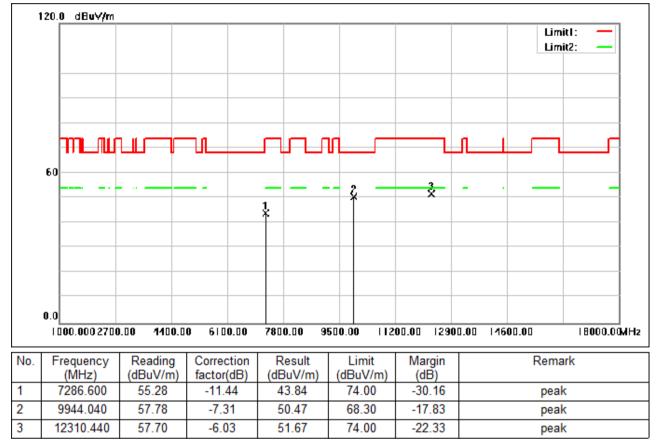


Test Mode: 04; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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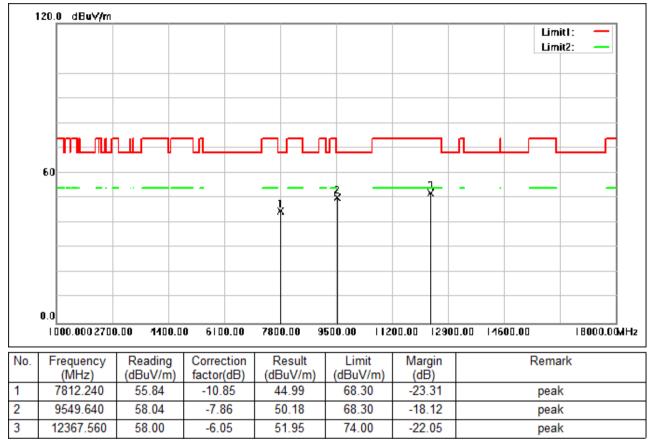


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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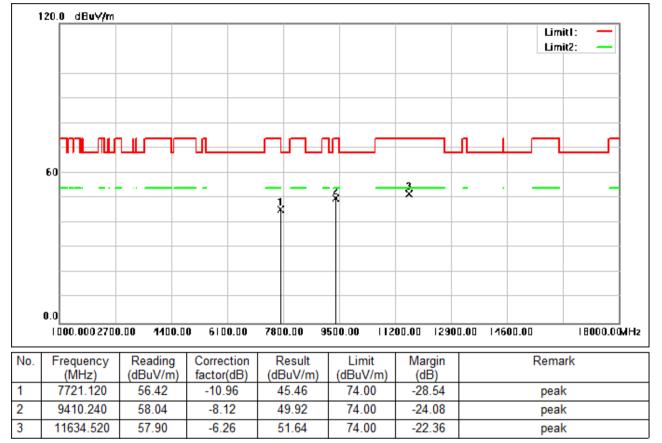


Test Mode: 04; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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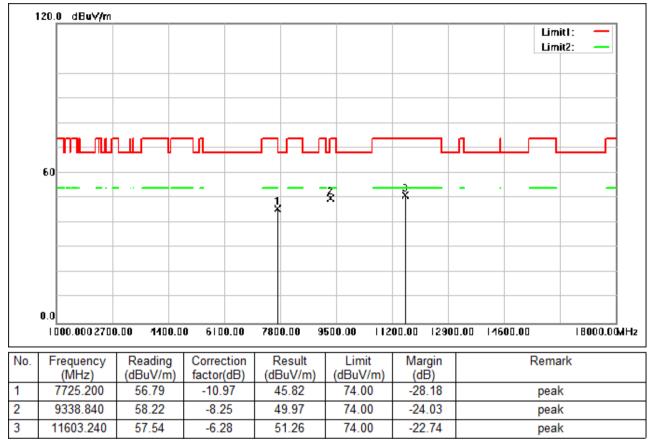


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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Test Mode: 04; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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7.5 Radiated Emissions which fall in the restricted bands

47 CFR Part 15, Subpart C 15,209 & Subpart E 15,407(b) Test Requirement KDB 789033 D02 II G Test Method:

Limit:

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

*(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

7.5.1 E.U.T. Operation

Operating Environment: Temperature: 22.3 °C

Humidity: 55.1 % RH

Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.

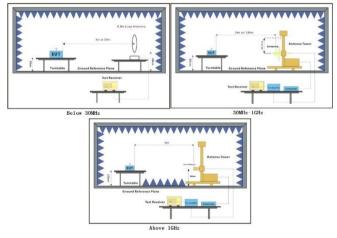


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Final test	02	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.	
Final test	03	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.	
Final test	04	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.	

7.5.3 Test Setup Diagram





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7.5.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

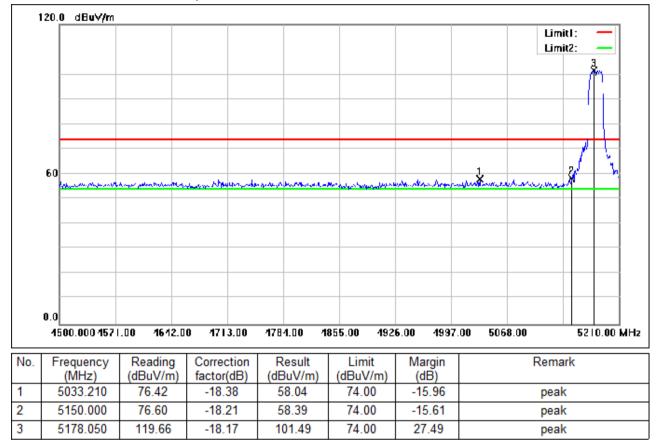
j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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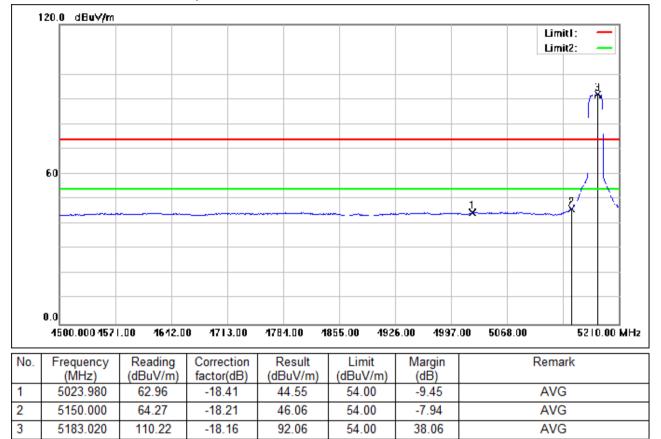


Test Mode: 01; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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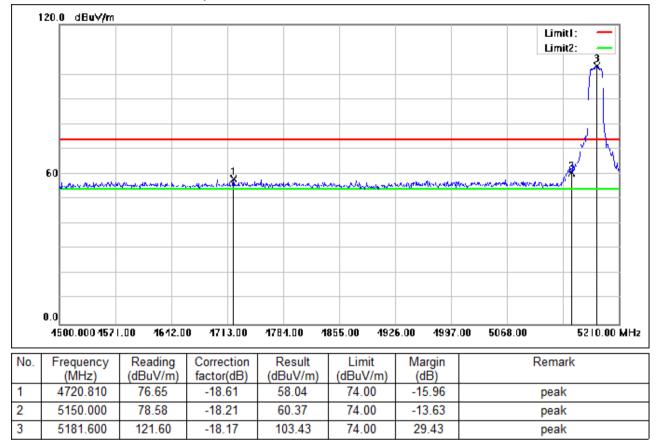


Test Mode: 01; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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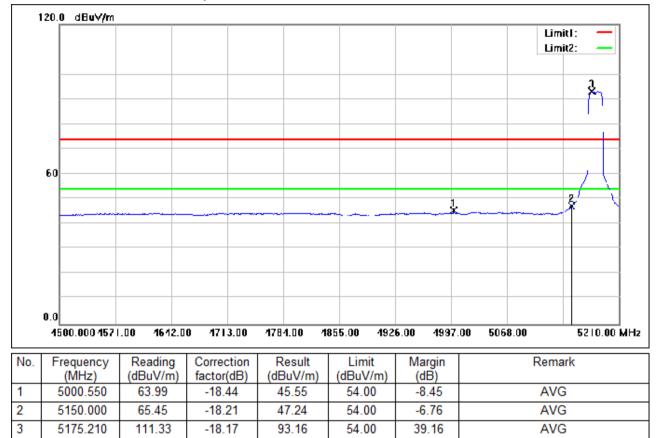


Test Mode: 01; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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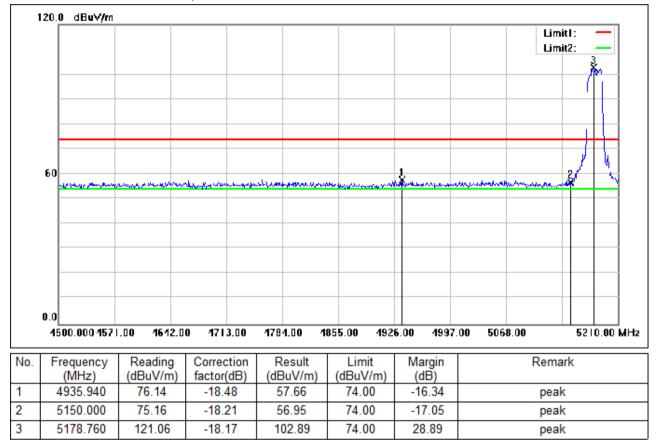


Test Mode: 01; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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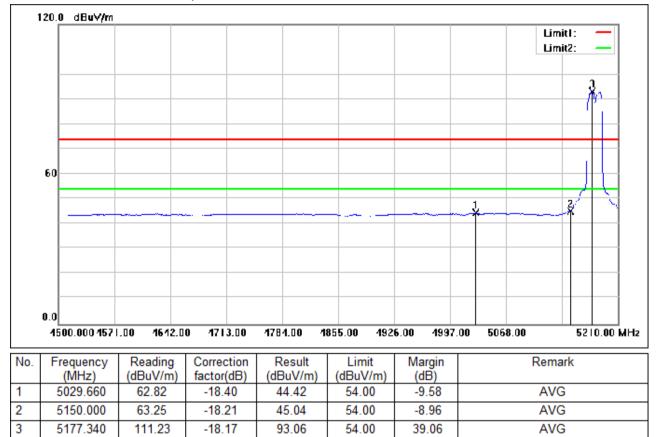


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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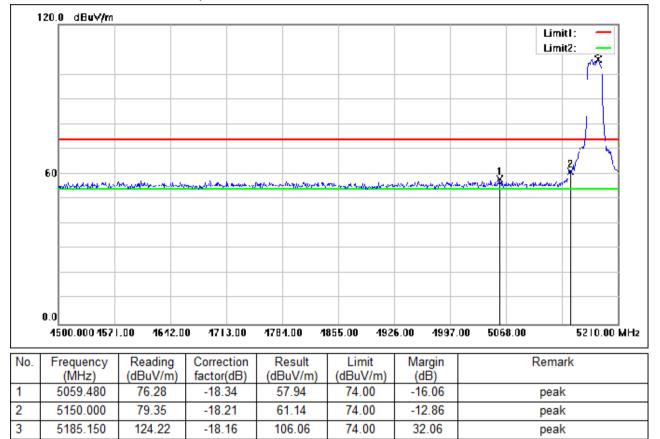


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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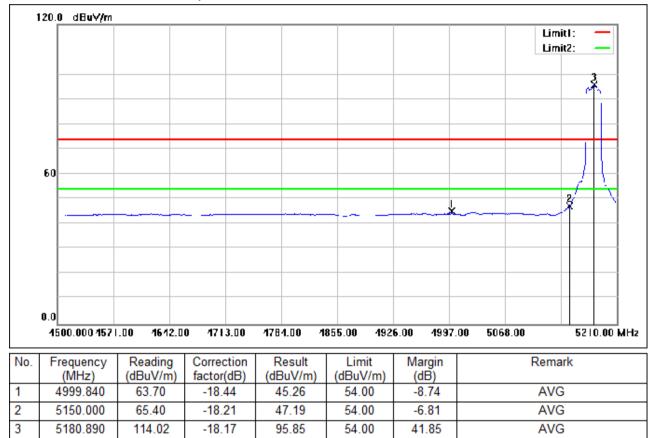


Test Mode: 01; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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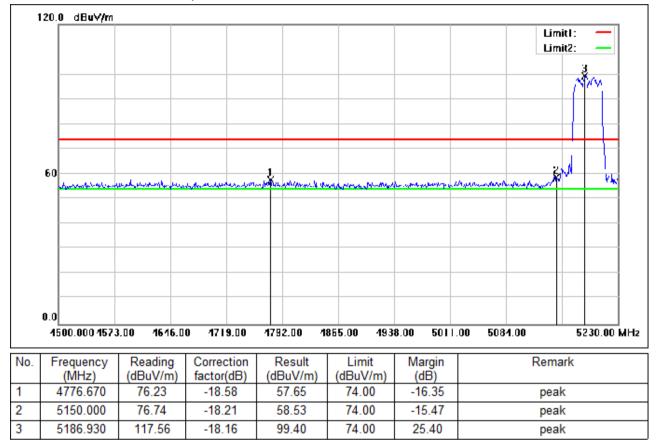


Test Mode: 01; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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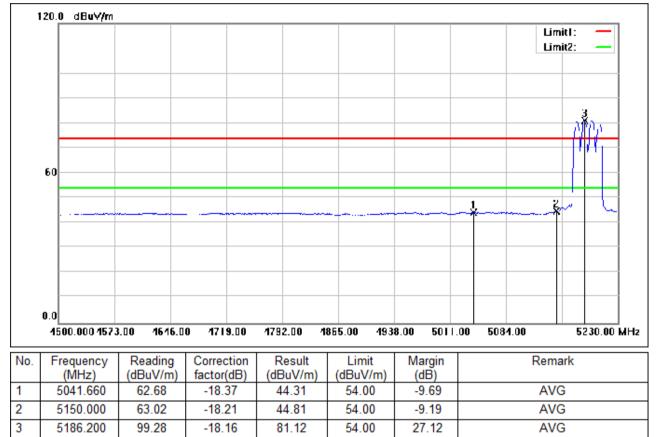


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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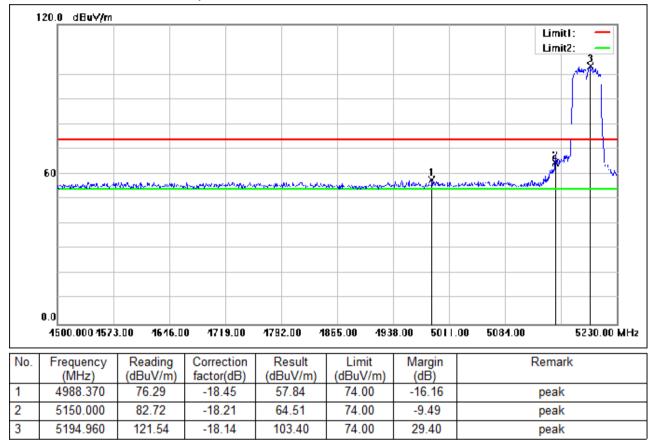


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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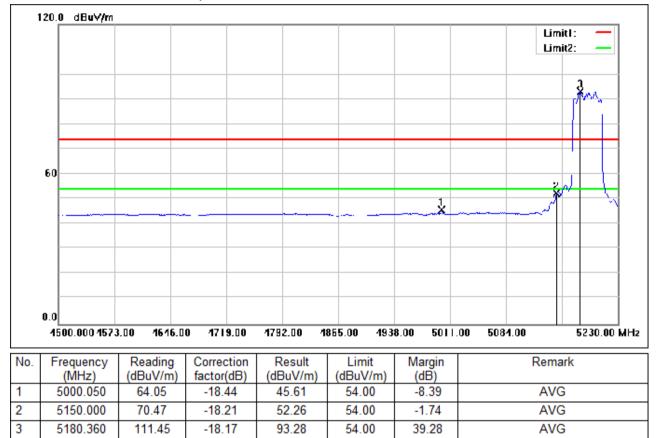


Test Mode: 01; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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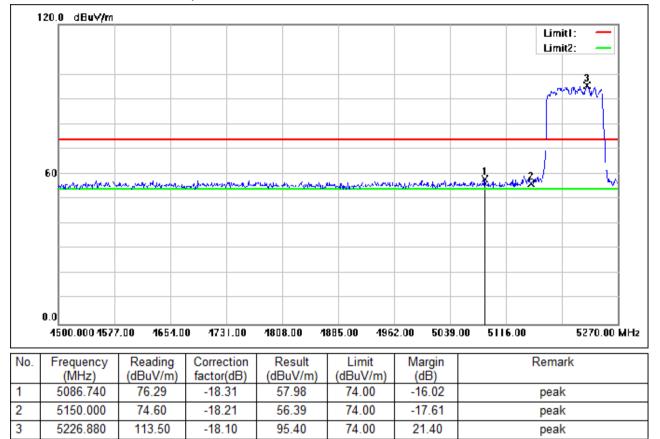


Test Mode: 01; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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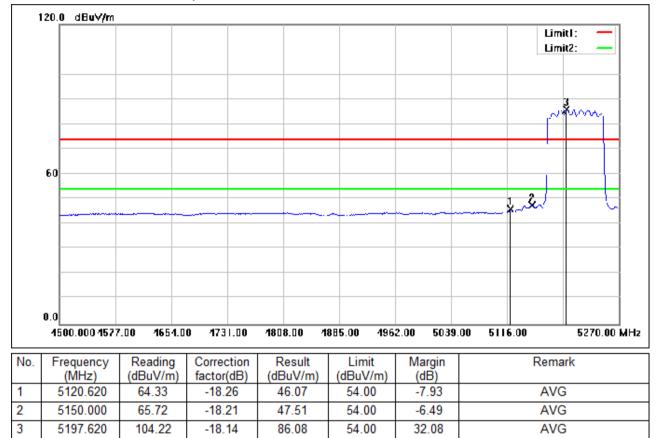


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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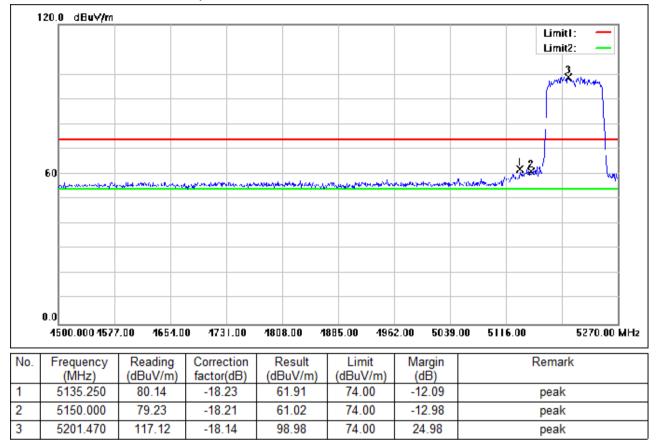


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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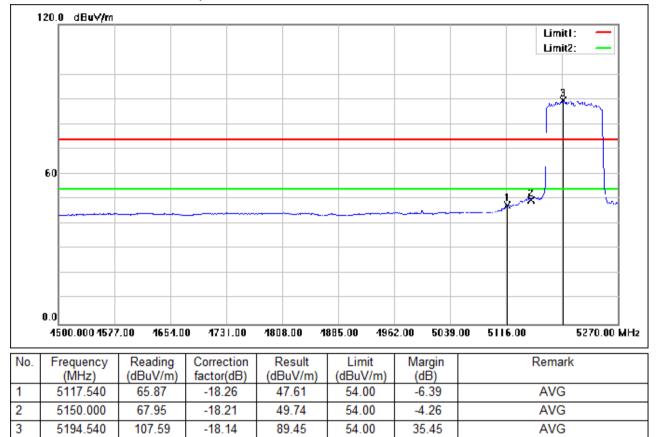


Test Mode: 01; Polarity: Vertical; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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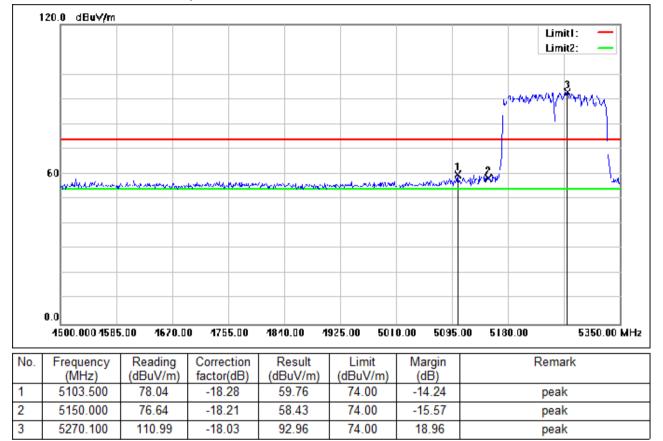


Test Mode: 01; Polarity: Vertical; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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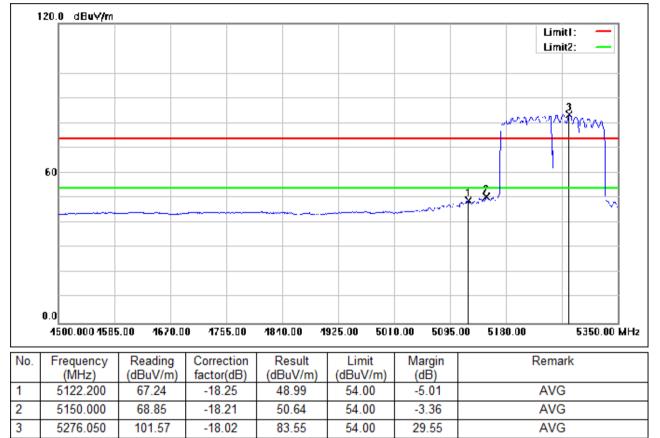


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:160MHz; Channel:Low



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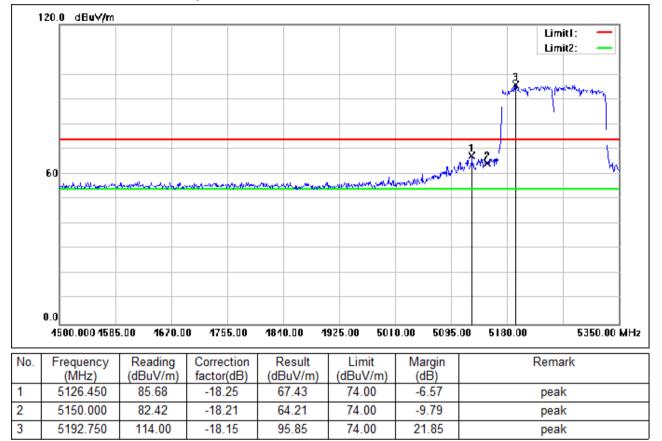


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:160MHz; Channel:Low



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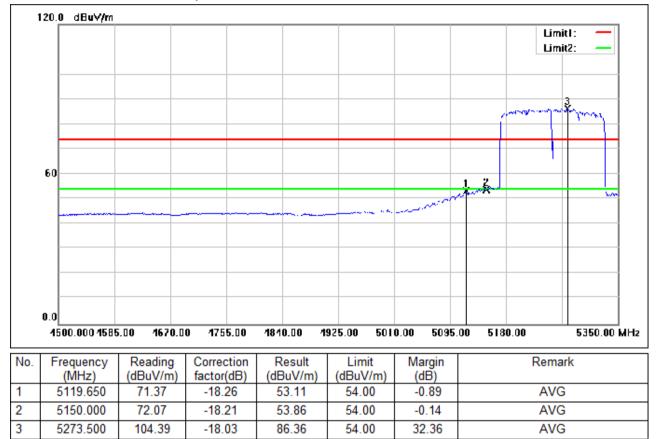


Test Mode: 01; Polarity: Vertical; Modulation:802.11ac; Bandwidth:160MHz; Channel:Low



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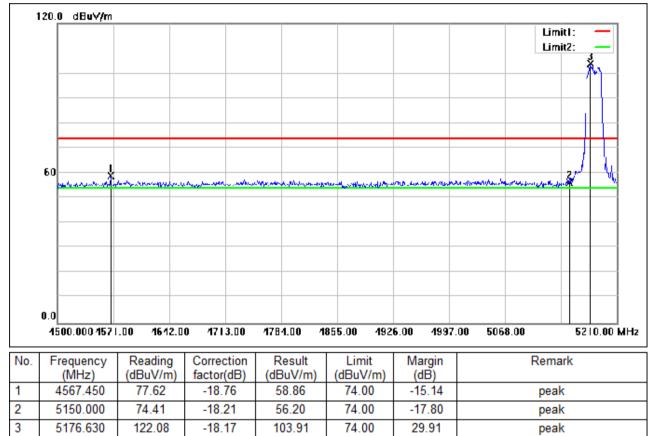


Test Mode: 01; Polarity: Vertical; Modulation:802.11ac; Bandwidth:160MHz; Channel:Low



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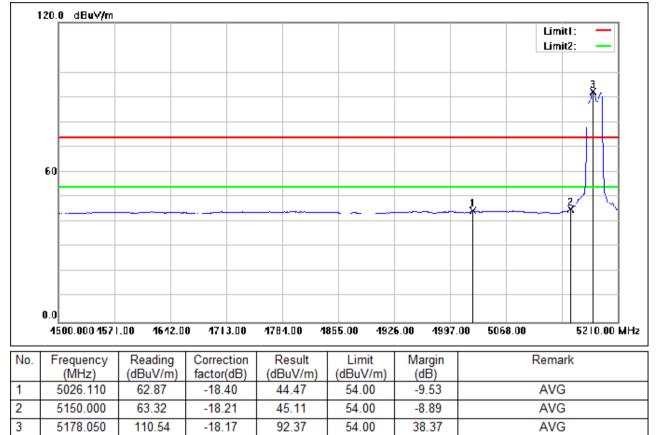


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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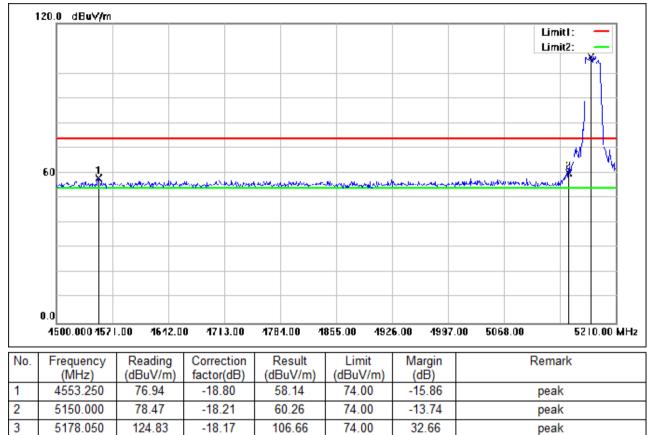


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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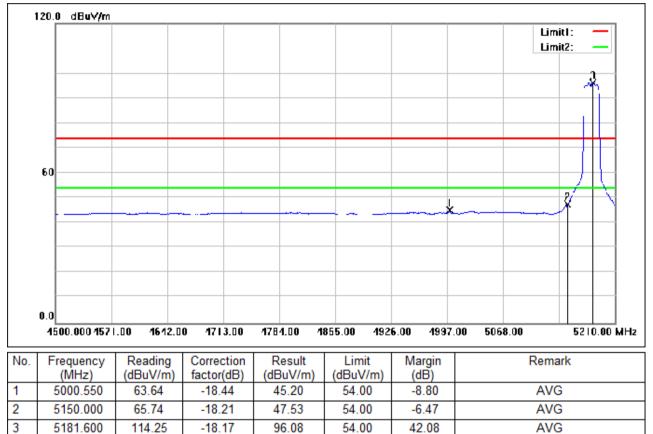


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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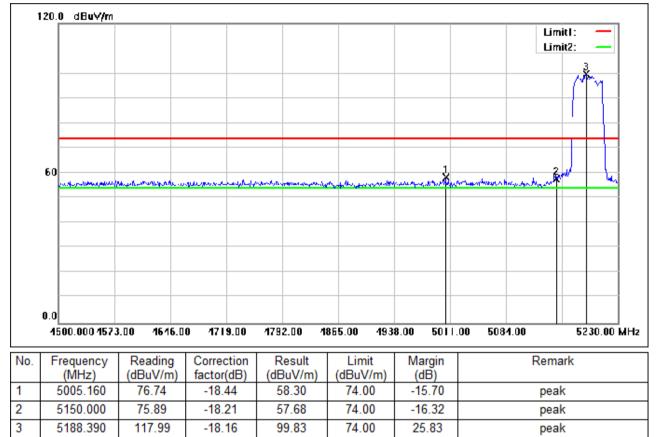


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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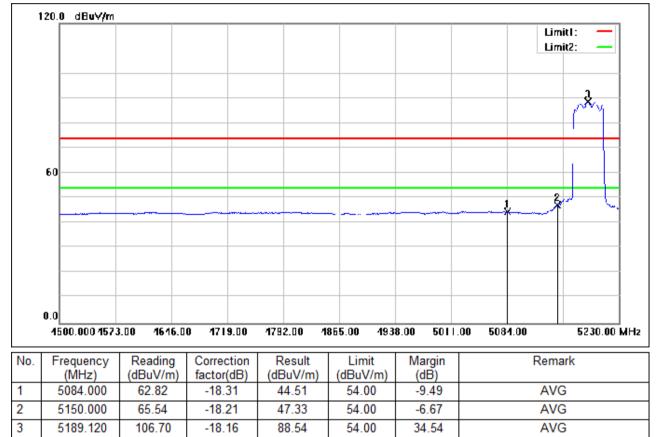


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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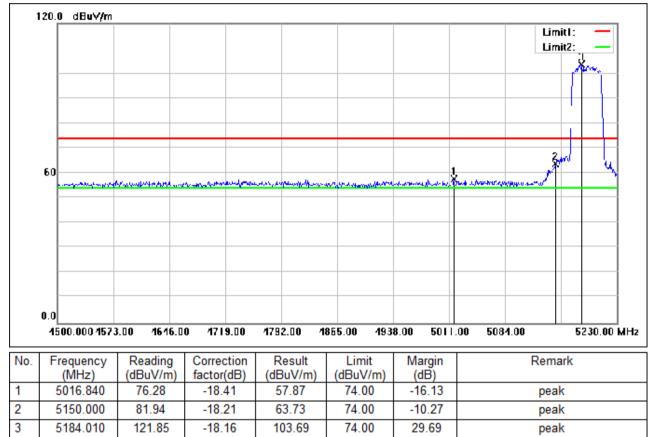


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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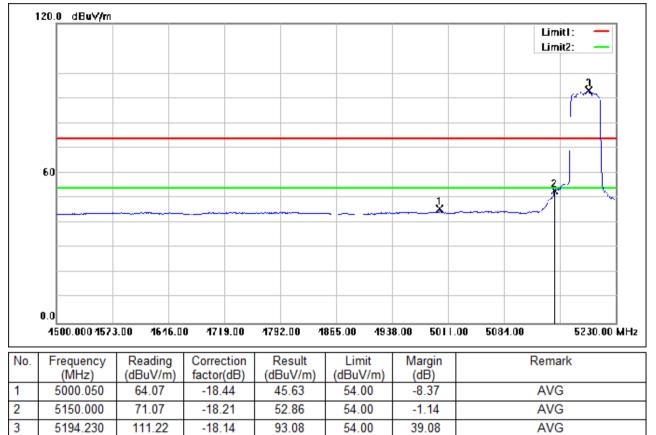


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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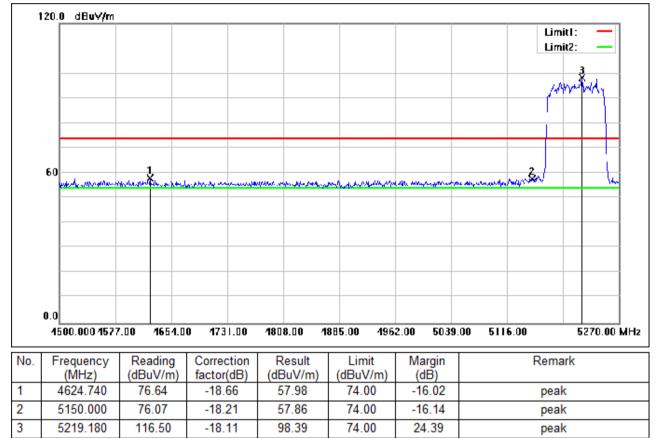


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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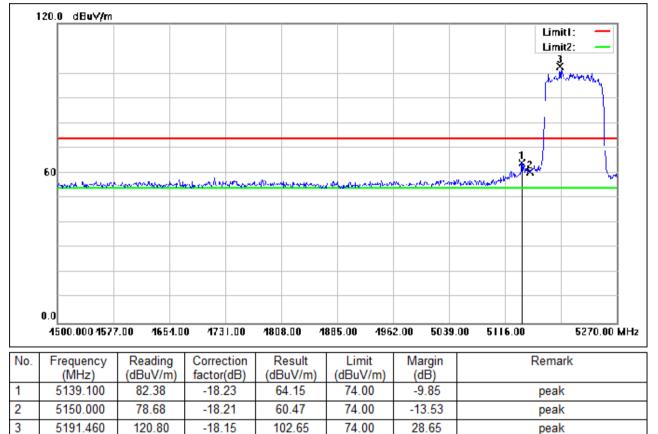


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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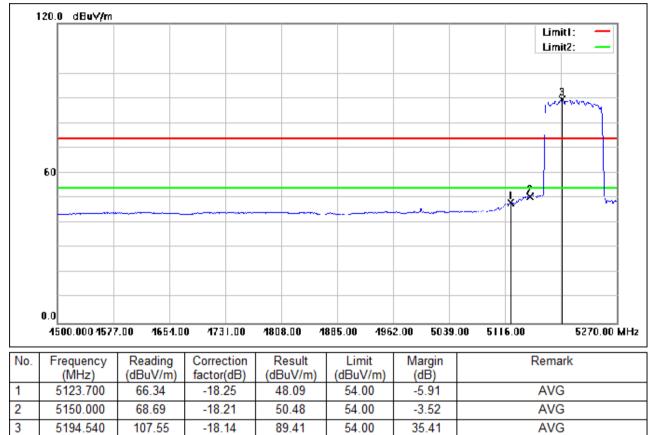


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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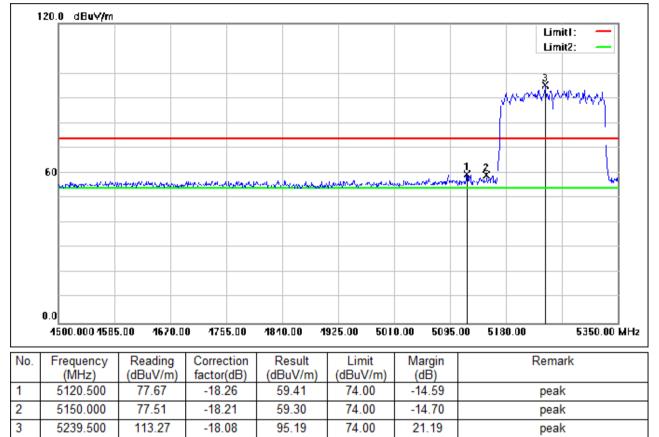


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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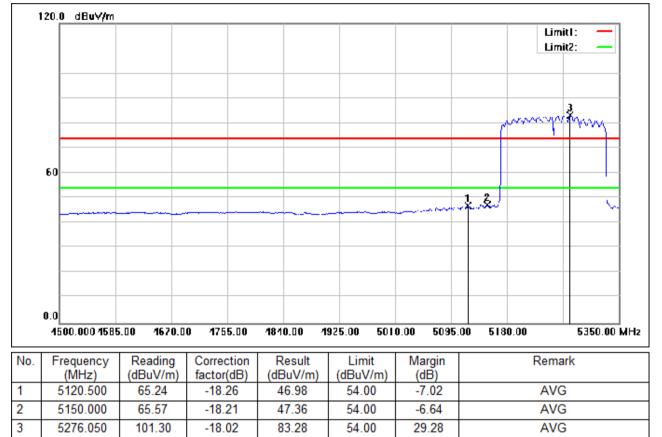


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:160MHz; Channel:Low



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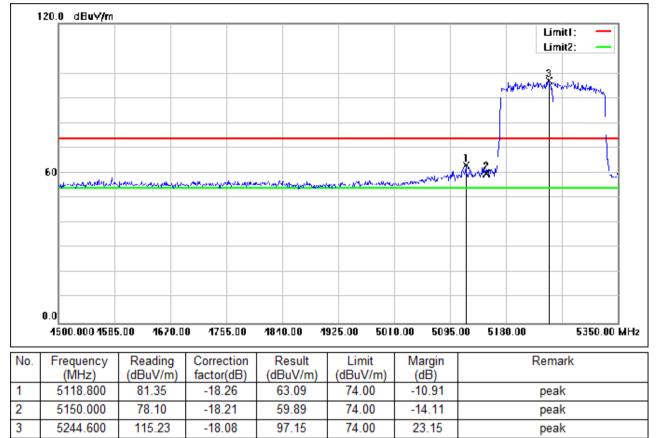


Test Mode: 01; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:160MHz; Channel:Low



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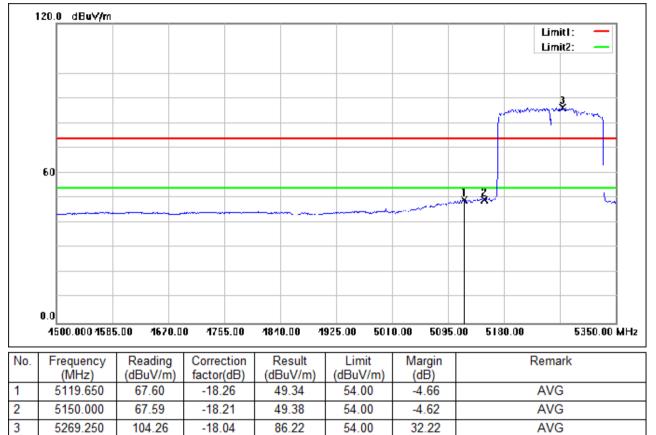


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:160MHz; Channel:Low



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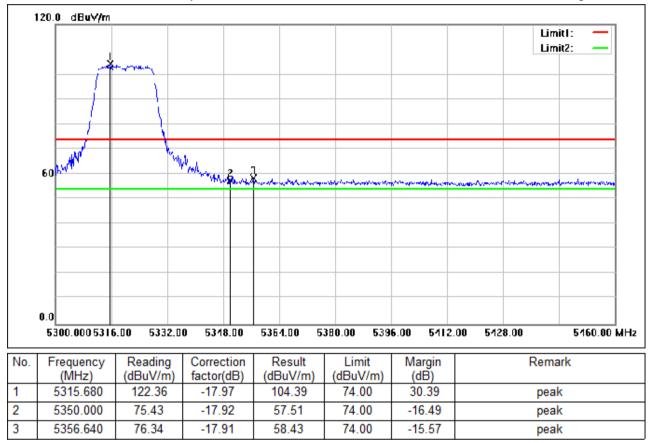


Test Mode: 01; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:160MHz; Channel:Low



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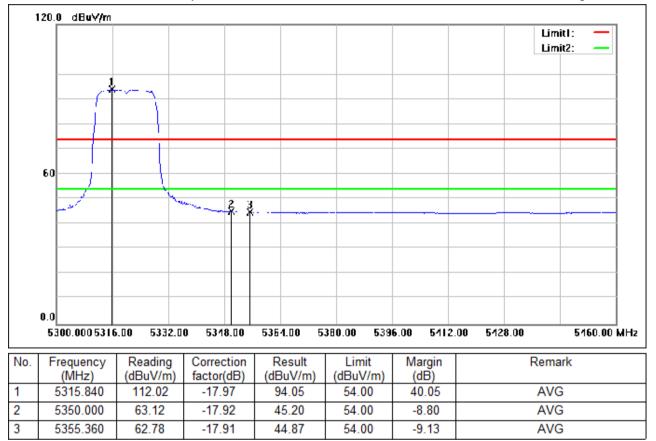


Test Mode: 02; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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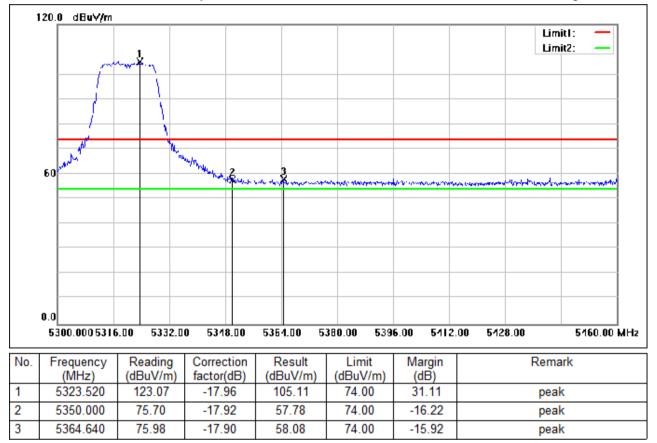


Test Mode: 02; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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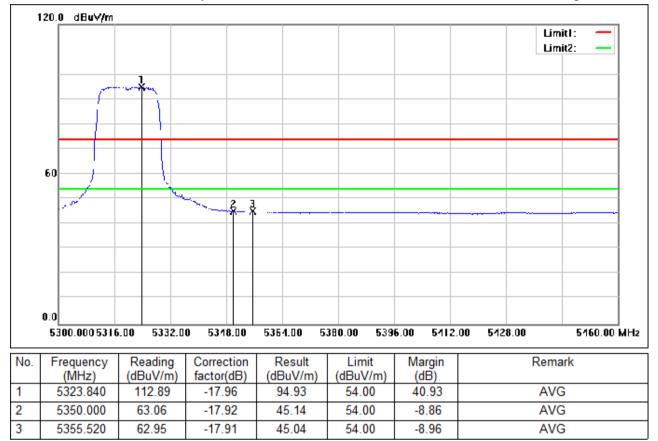


Test Mode: 02; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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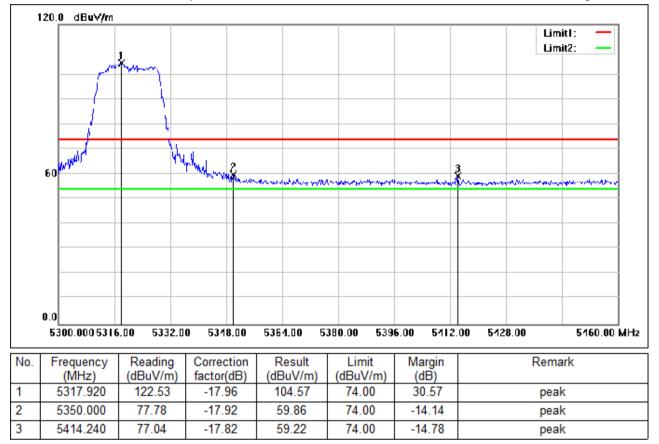


Test Mode: 02; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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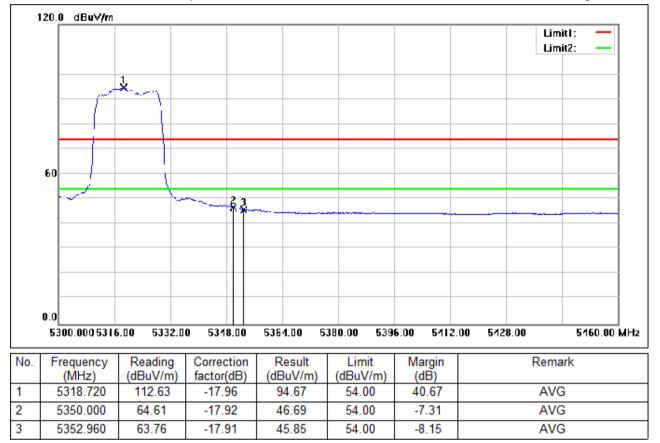


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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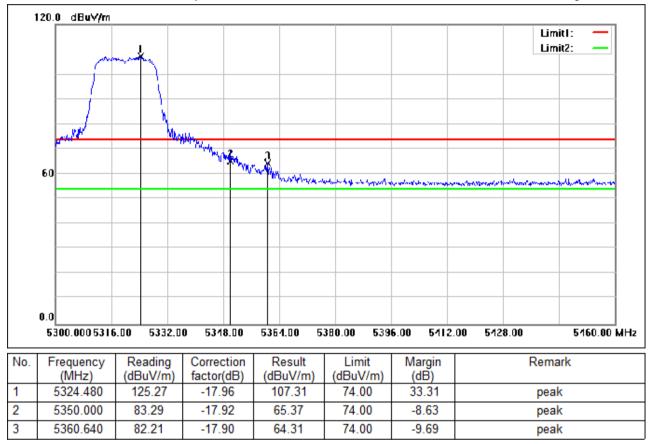


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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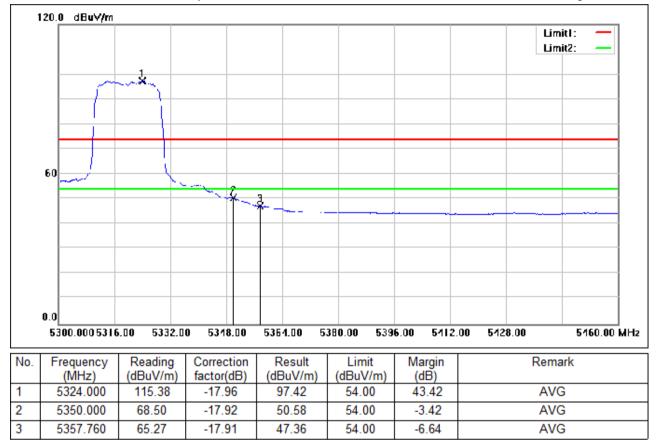


Test Mode: 02; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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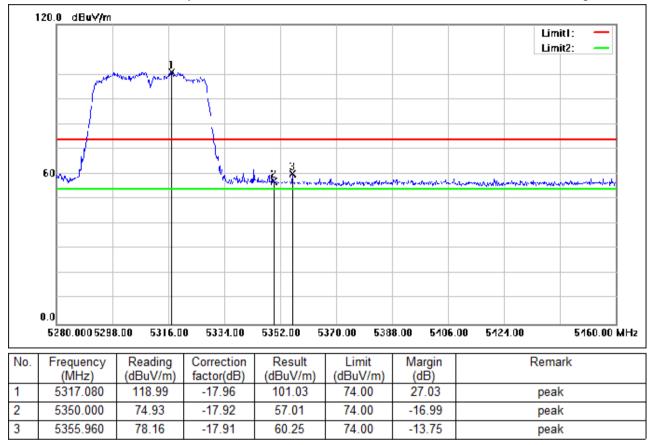


Test Mode: 02; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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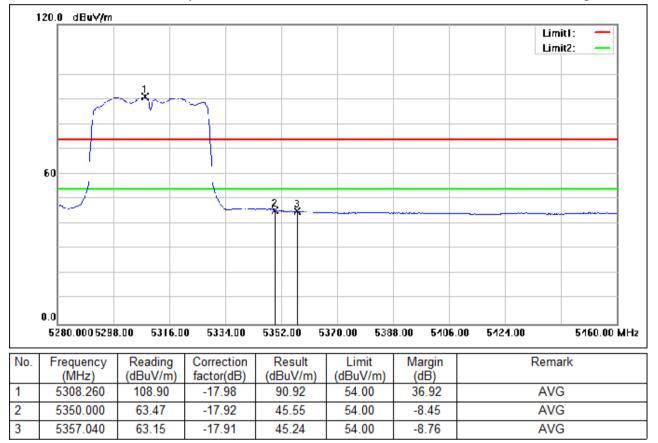


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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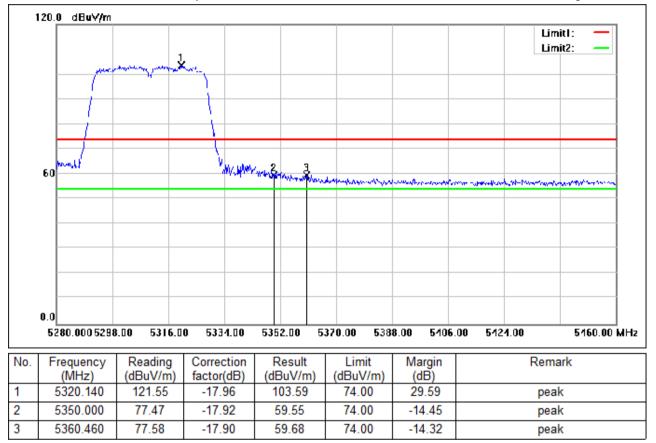


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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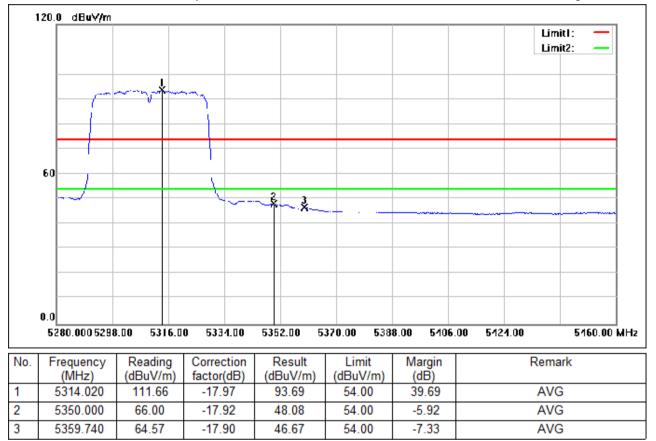


Test Mode: 02; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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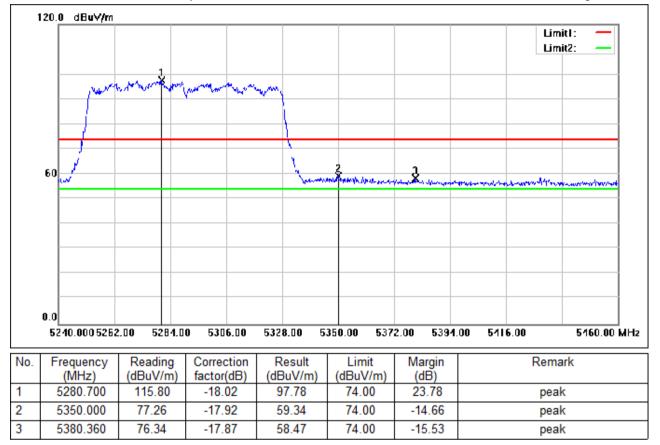


Test Mode: 02; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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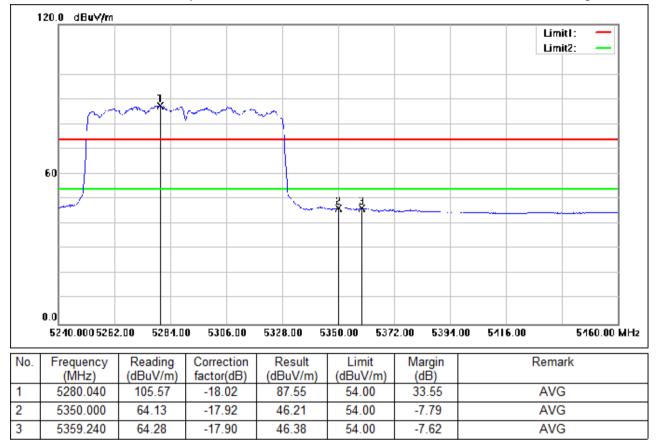


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:High



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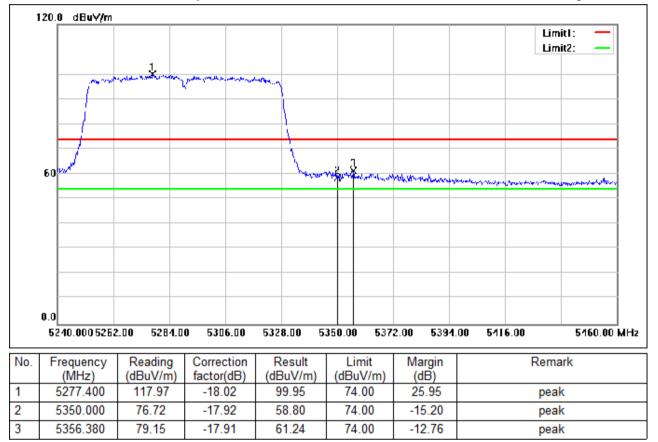


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:High



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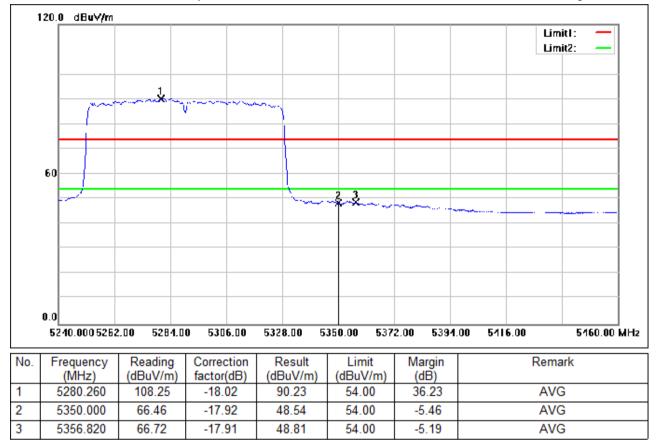


Test Mode: 02; Polarity: Vertical; Modulation:802.11ac; Bandwidth:80MHz; Channel:High



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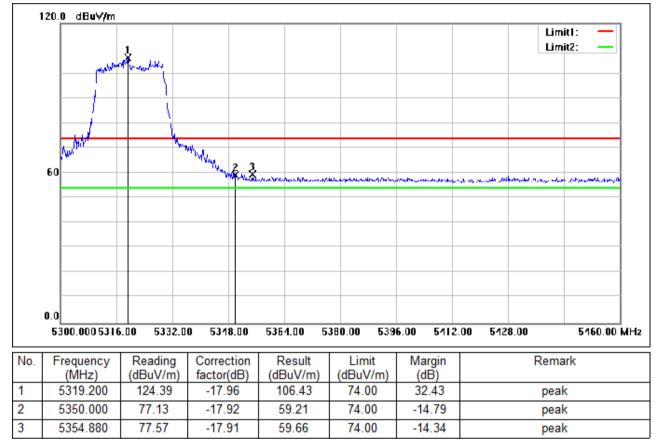


Test Mode: 02; Polarity: Vertical; Modulation:802.11ac; Bandwidth:80MHz; Channel:High



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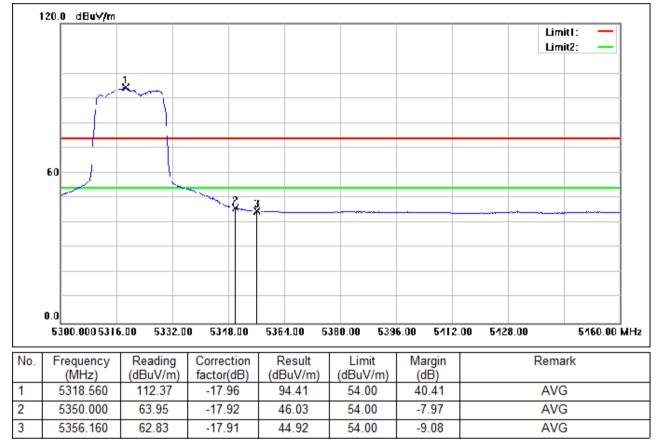


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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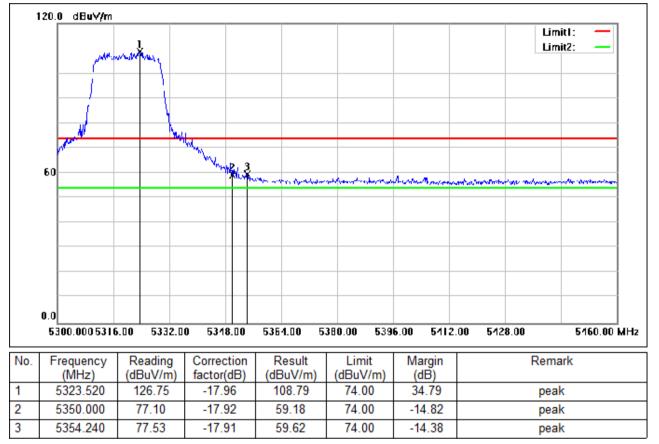


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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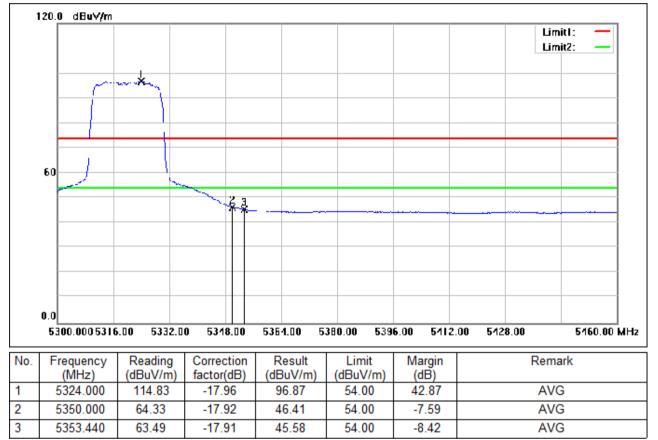


Test Mode: 02; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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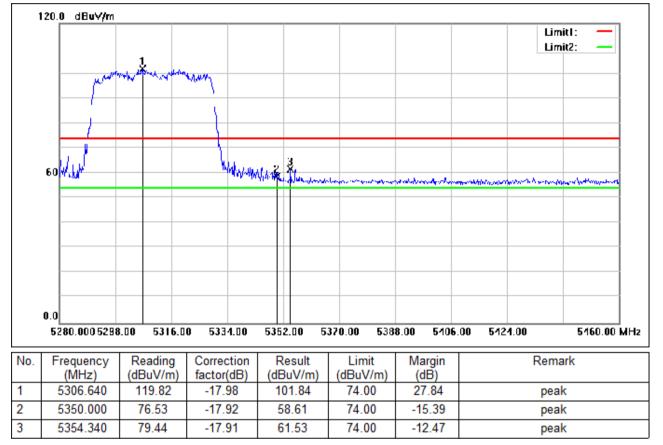


Test Mode: 02; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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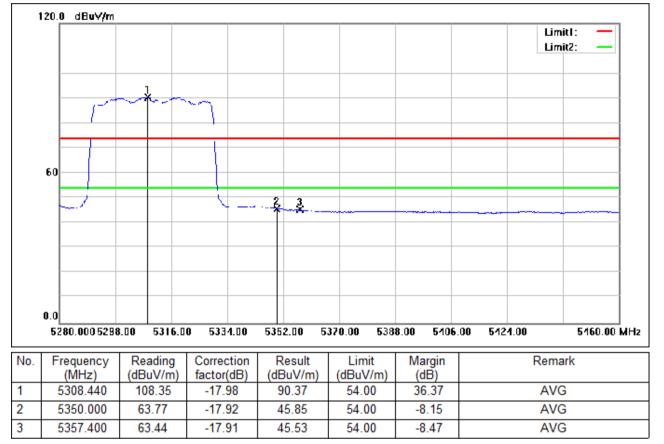


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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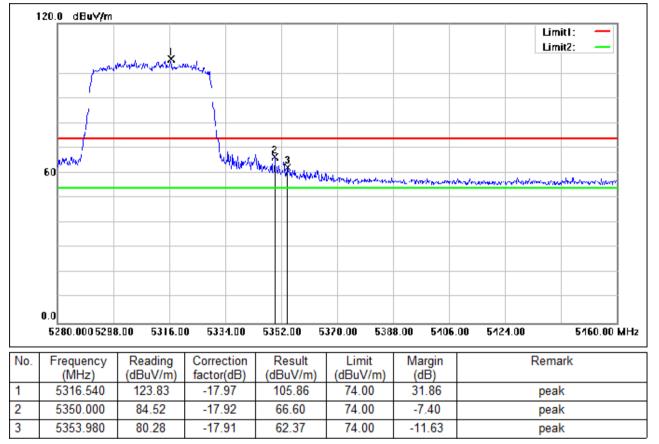


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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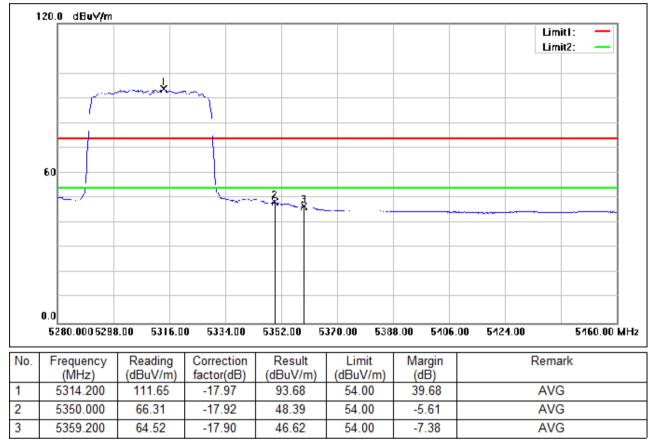


Test Mode: 02; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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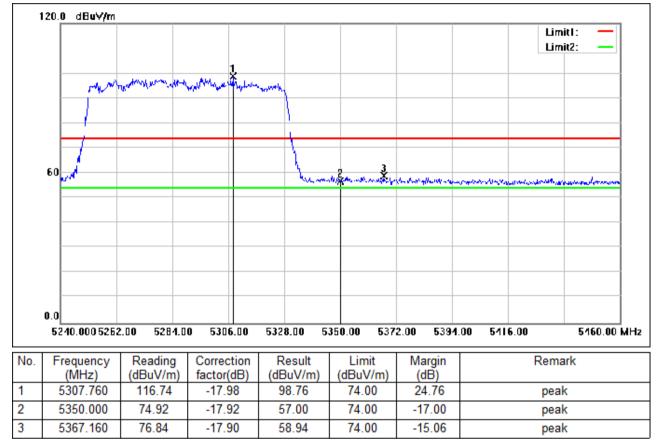


Test Mode: 02; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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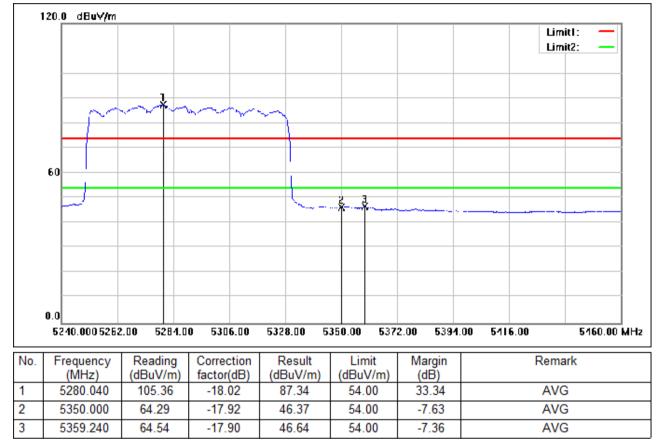


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:High



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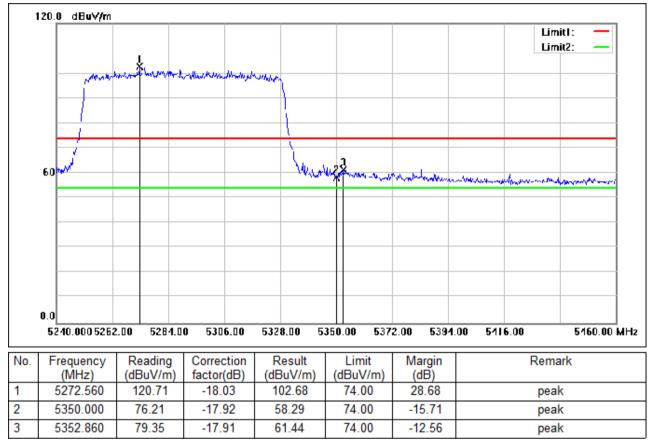


Test Mode: 02; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:High



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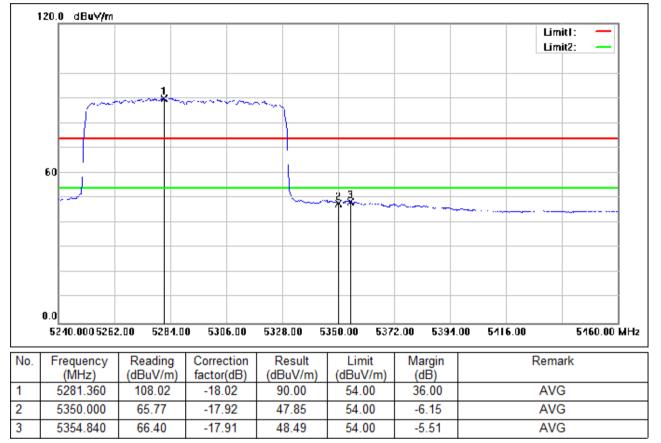


Test Mode: 02; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:High



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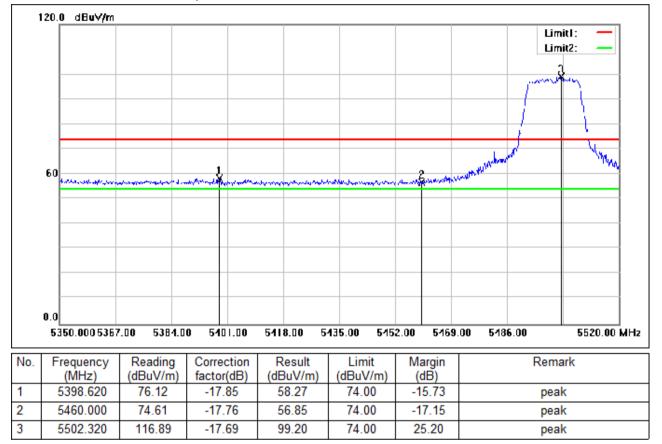


Test Mode: 02; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:High



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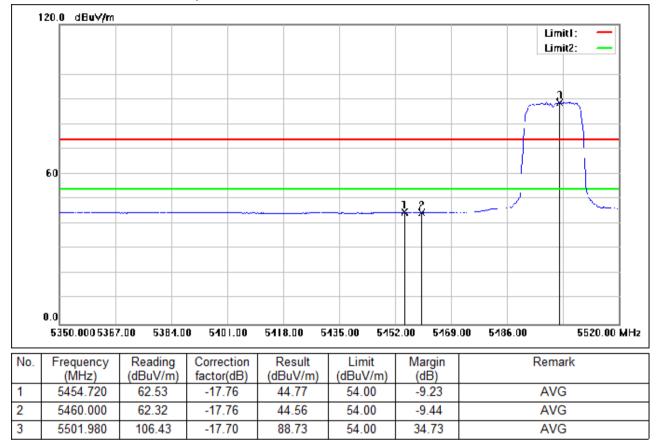


Test Mode: 03; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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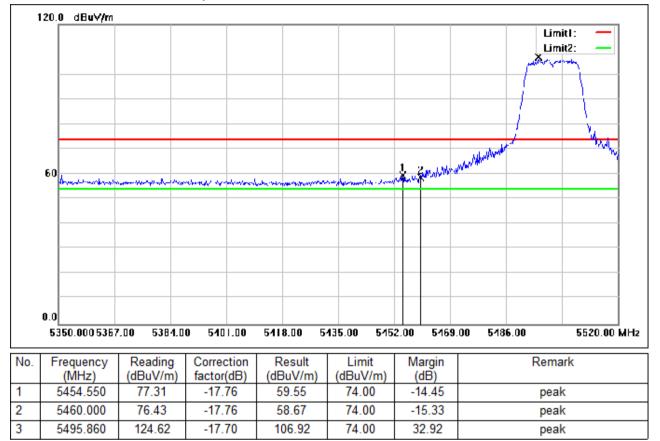


Test Mode: 03; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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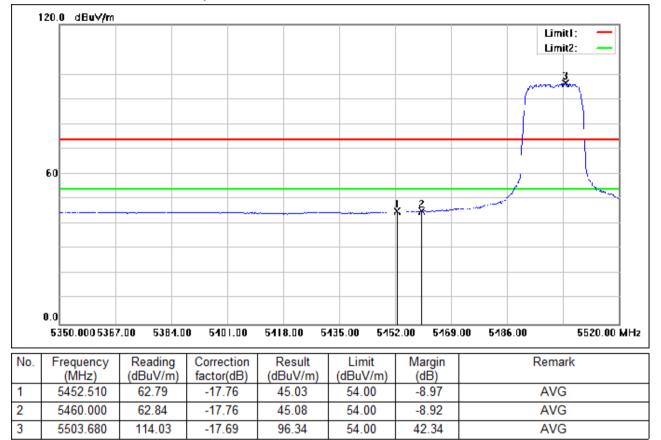


Test Mode: 03; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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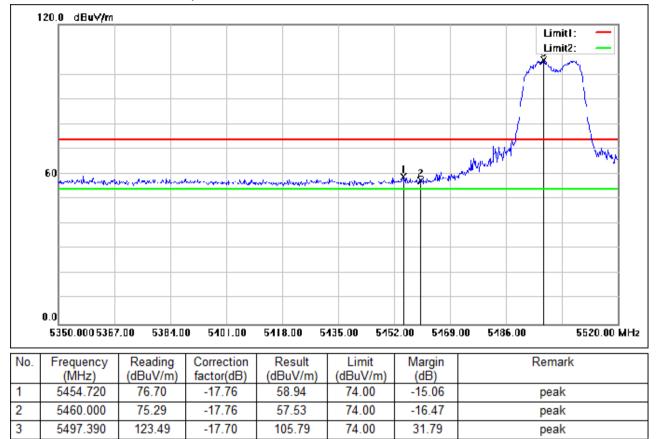


Test Mode: 03; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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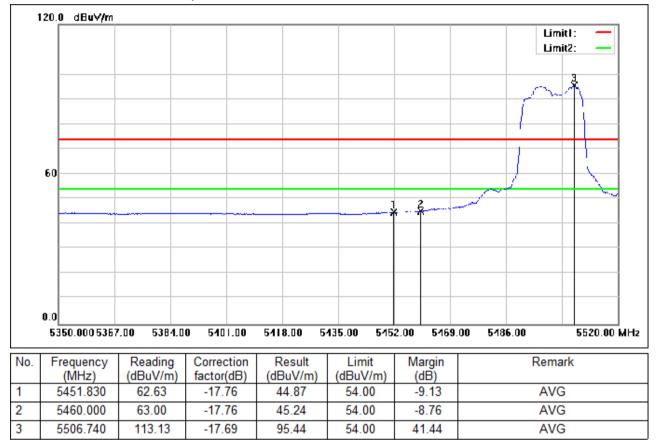


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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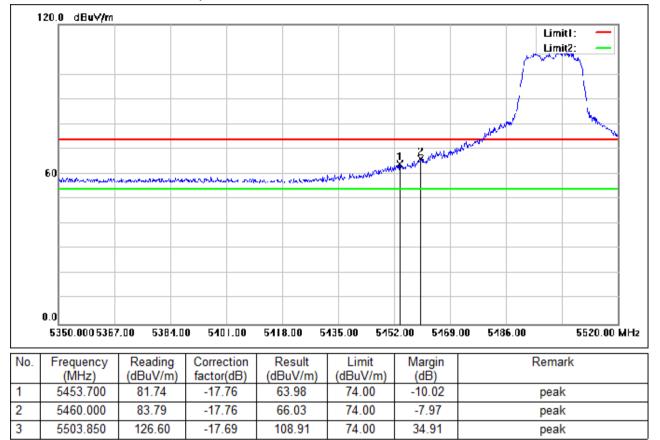


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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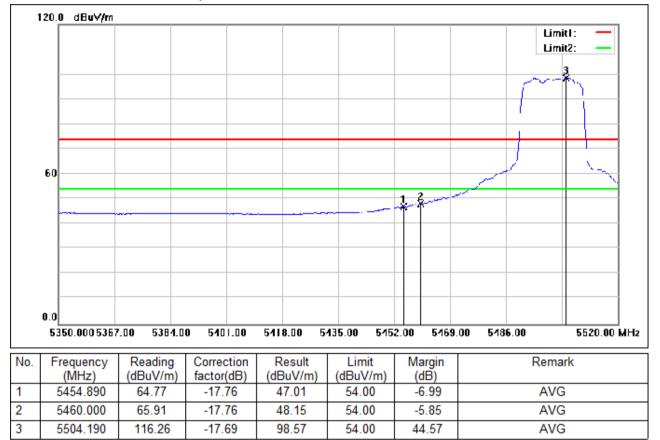


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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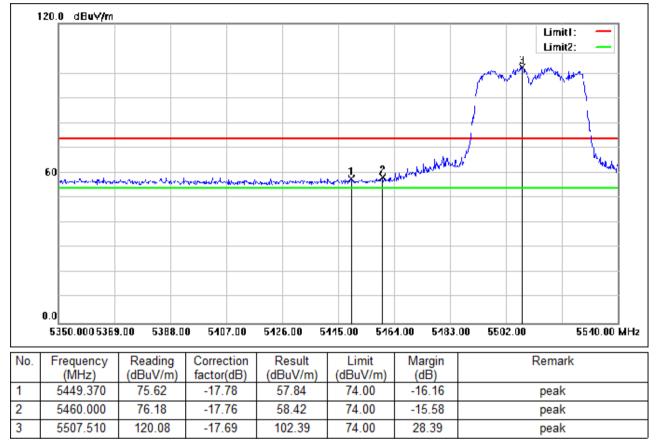


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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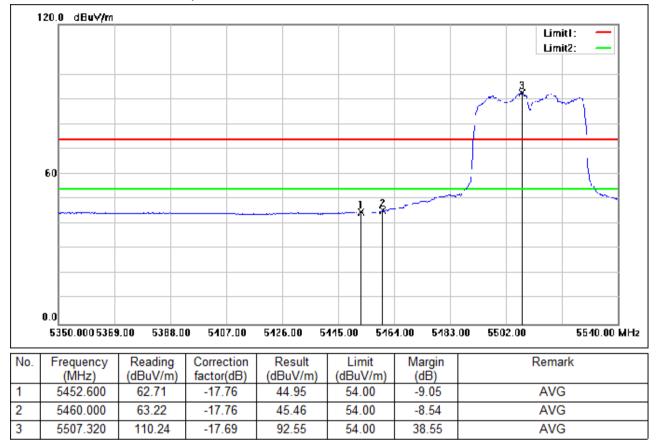


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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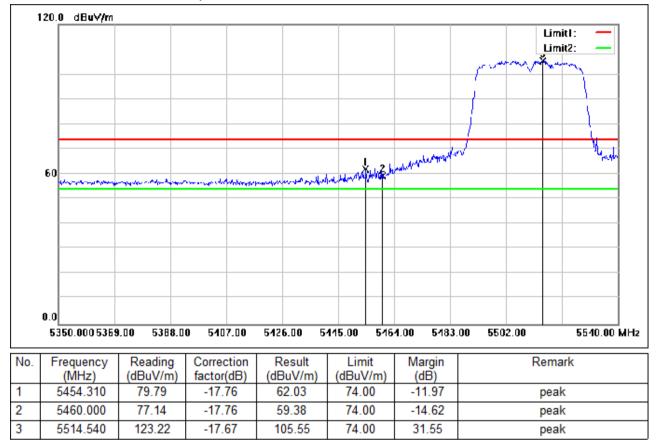


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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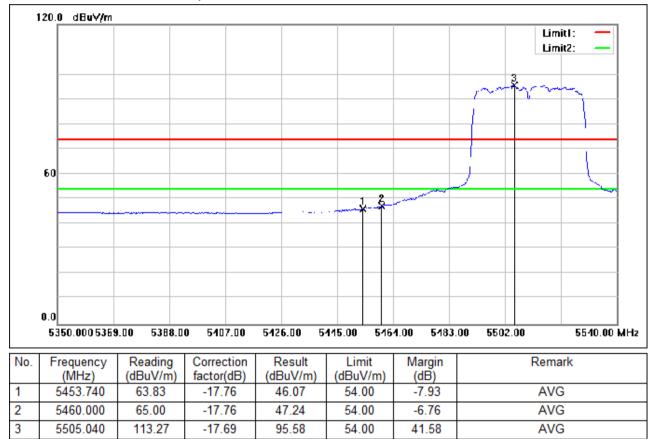


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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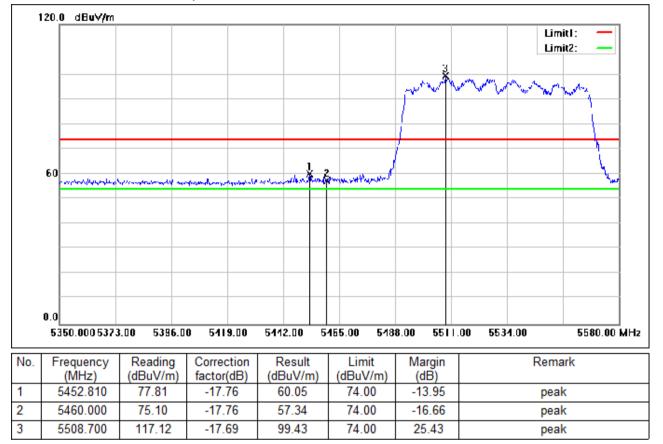


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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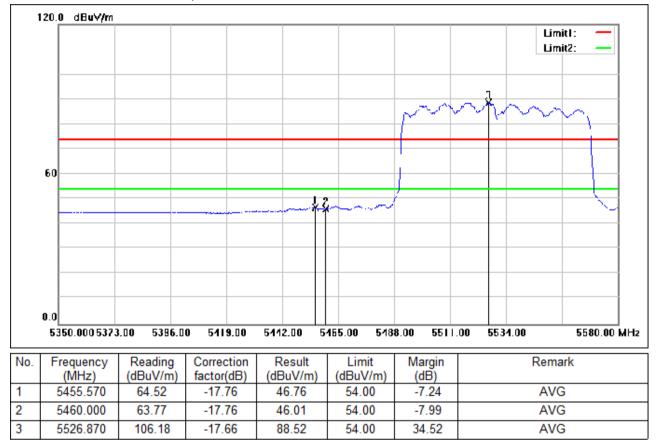


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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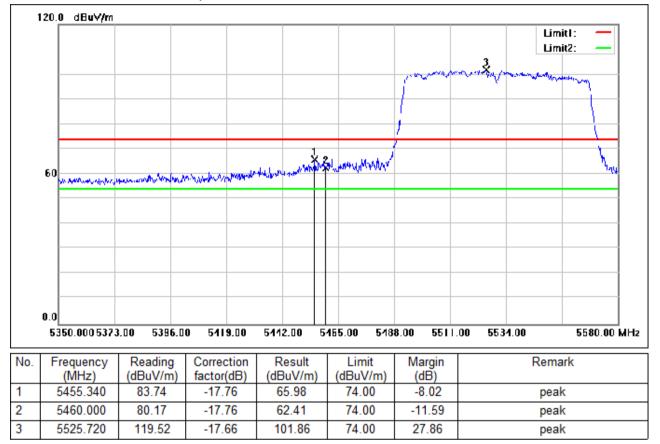


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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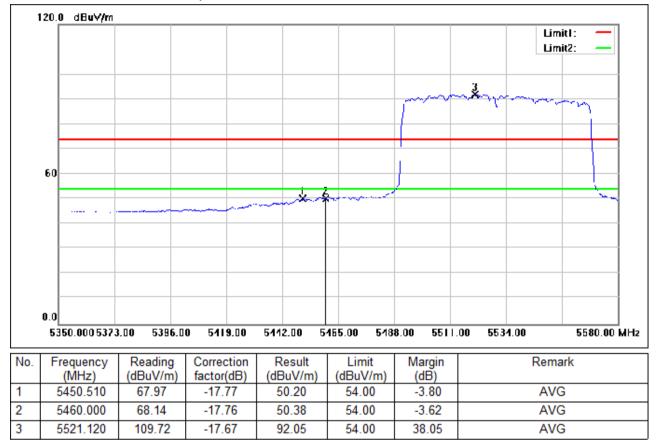


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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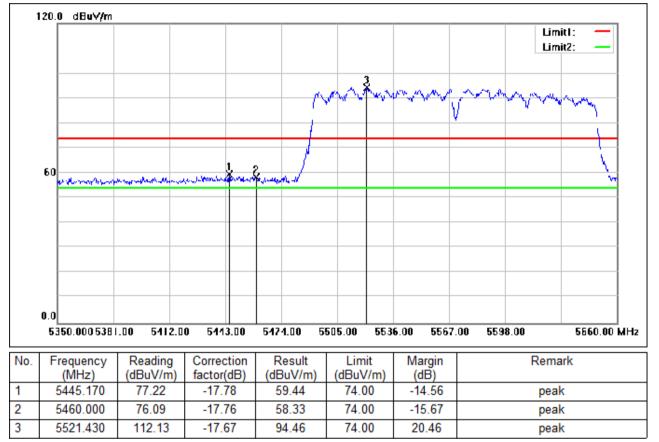


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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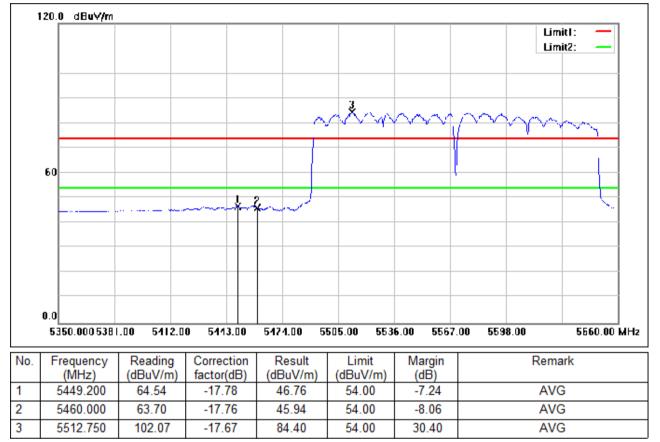


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:160MHz; Channel:Low



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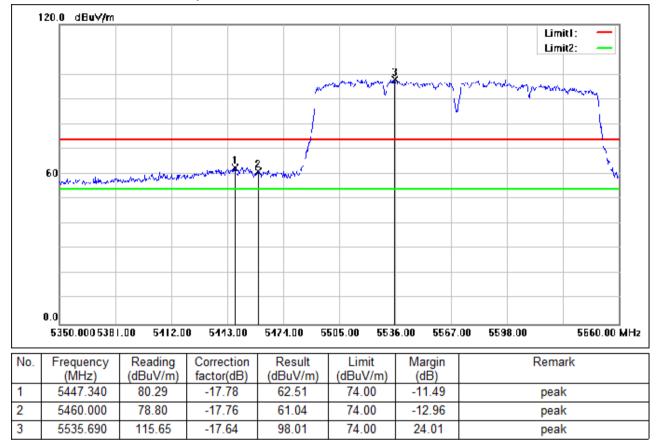


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:160MHz; Channel:Low



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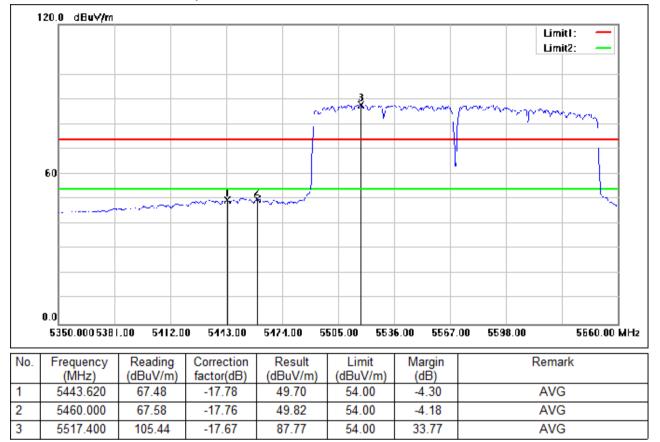


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:160MHz; Channel:Low



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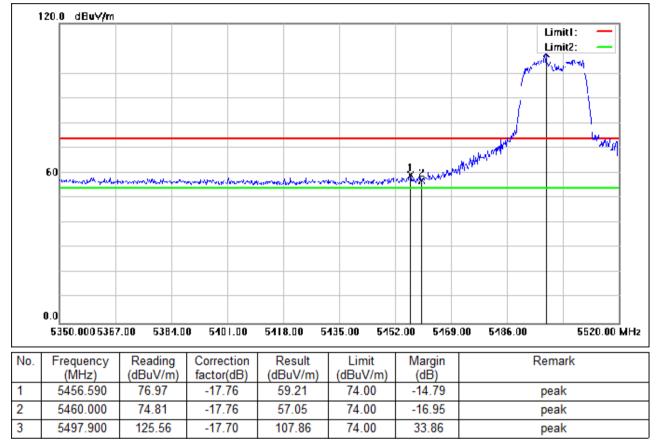


Test Mode: 03; Polarity: Vertical; Modulation:802.11ac; Bandwidth:160MHz; Channel:Low



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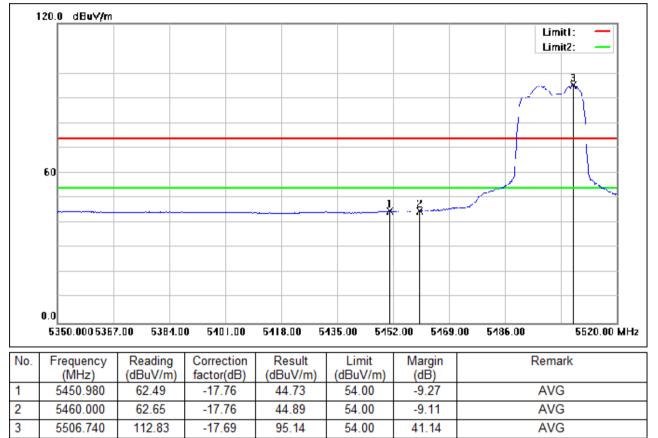


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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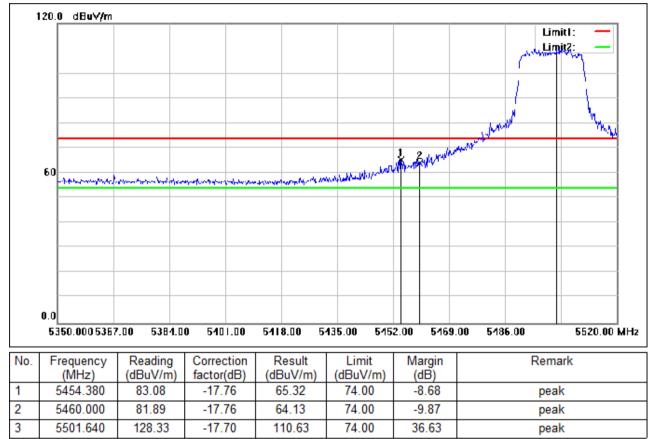


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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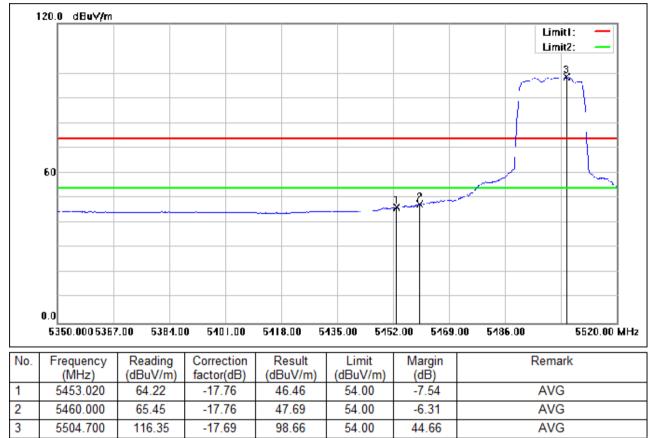


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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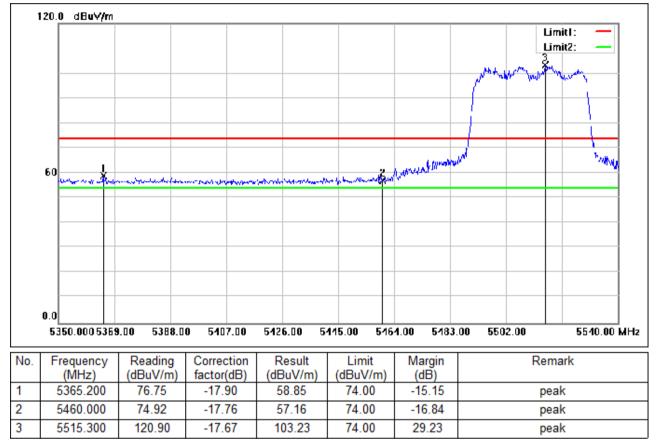


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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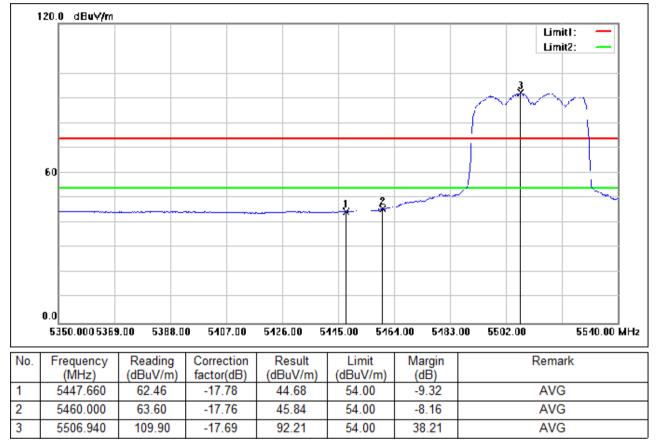


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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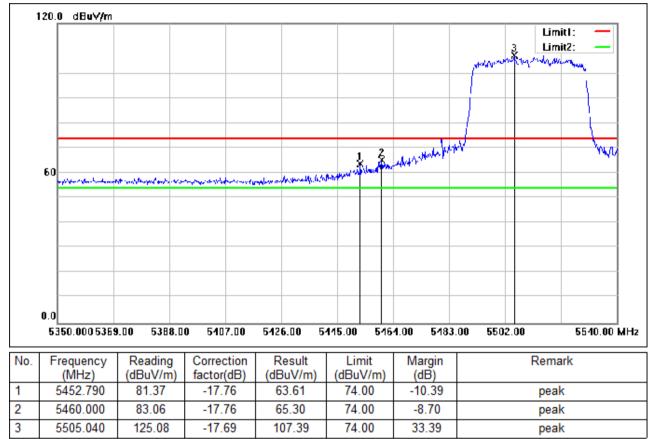


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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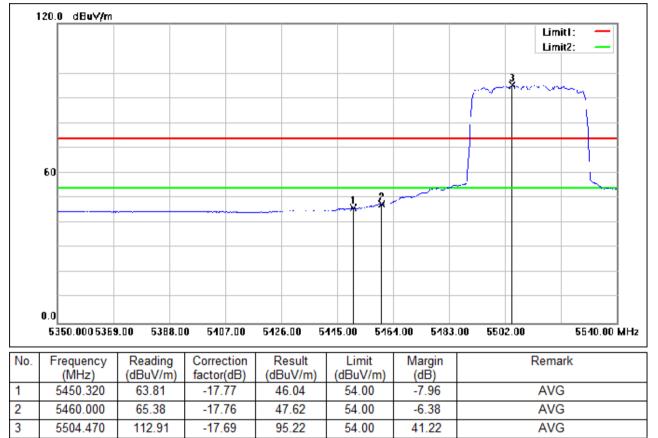


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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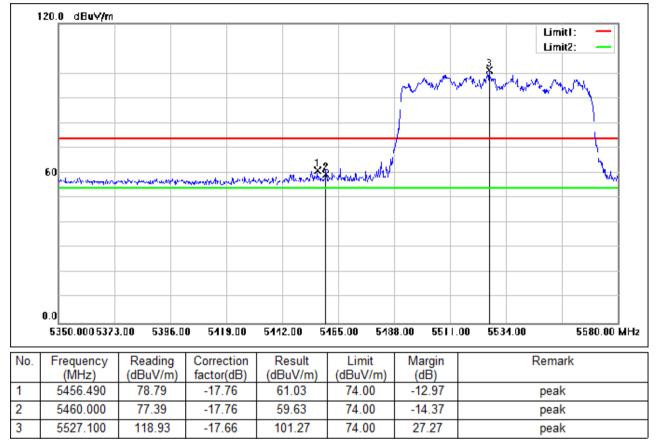


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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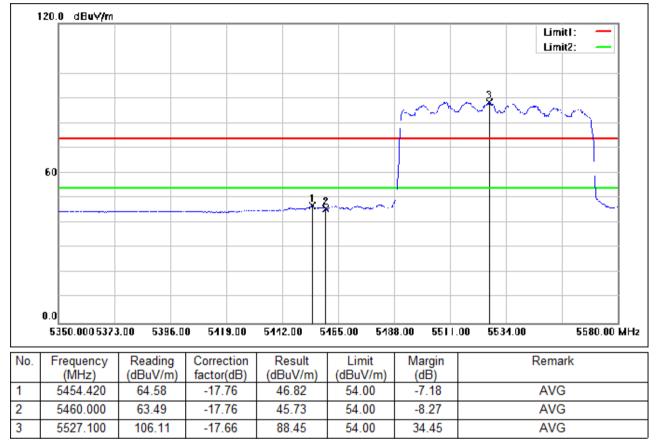


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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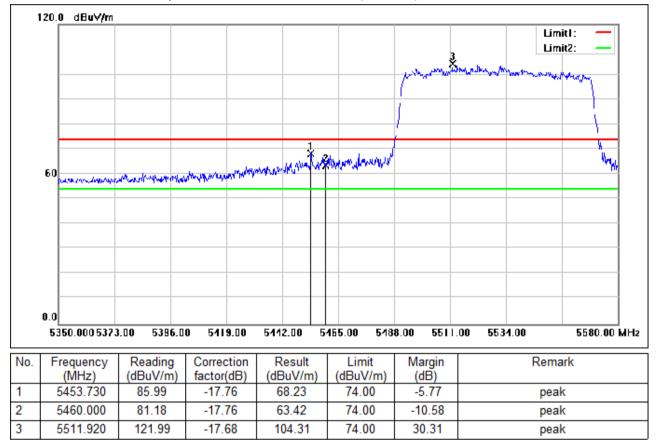


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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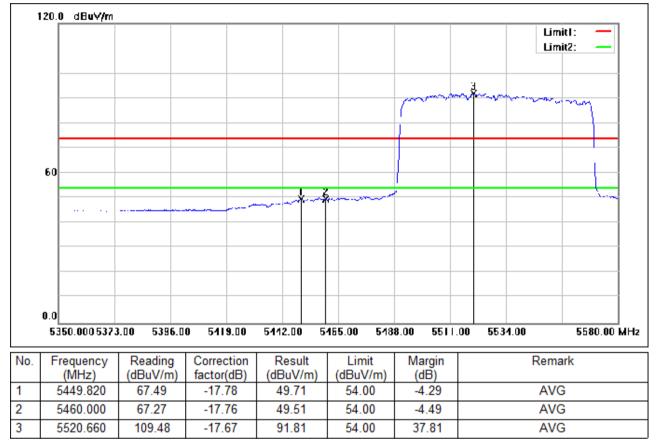


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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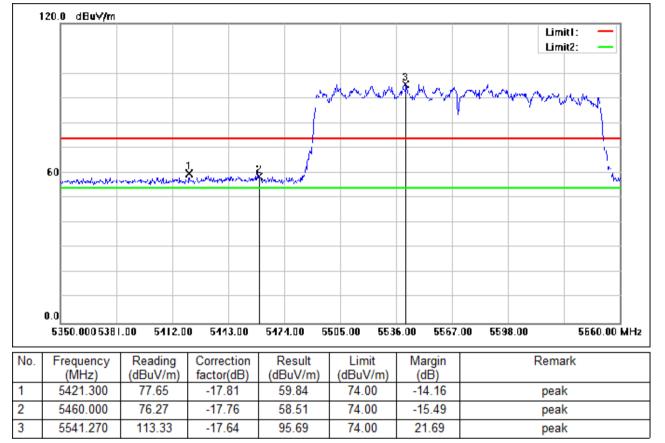


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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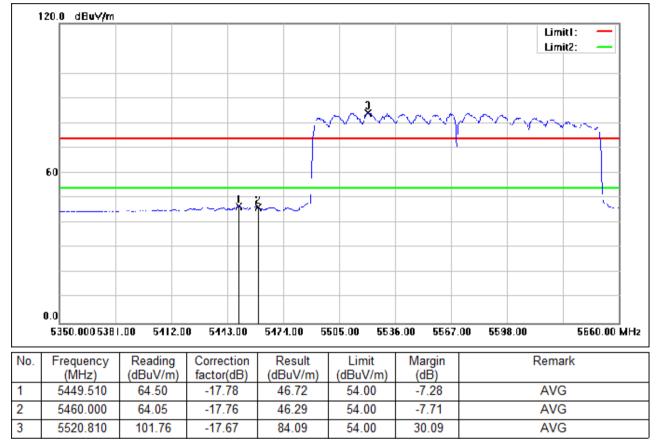


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:160MHz; Channel:Low



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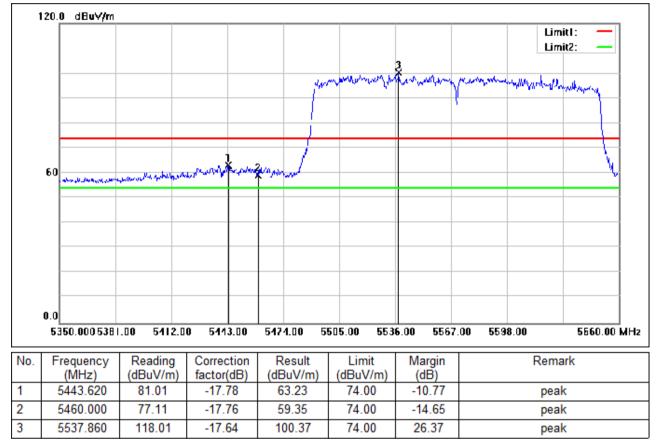


Test Mode: 03; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:160MHz; Channel:Low



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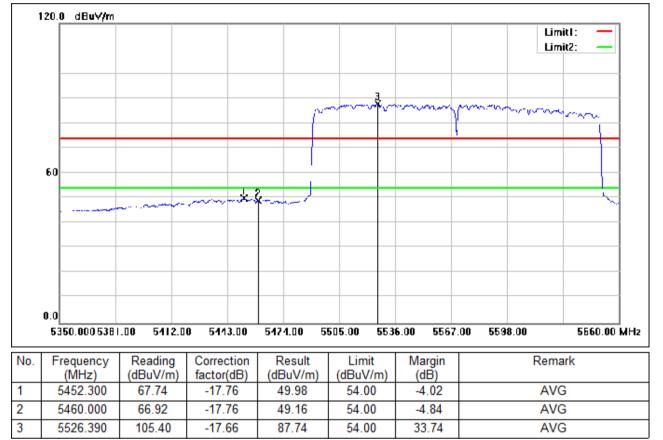


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:160MHz; Channel:Low



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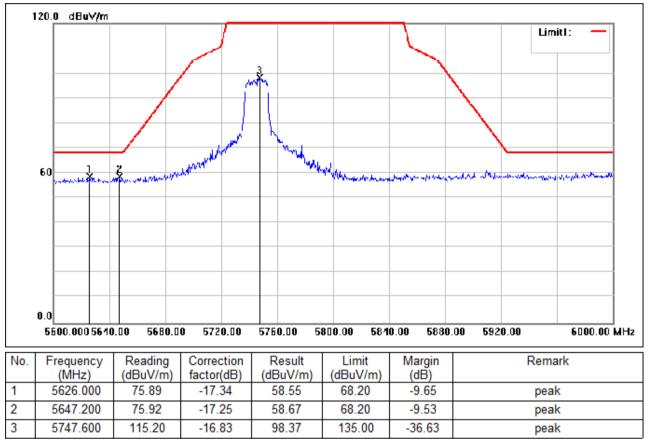


Test Mode: 03; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:160MHz; Channel:Low



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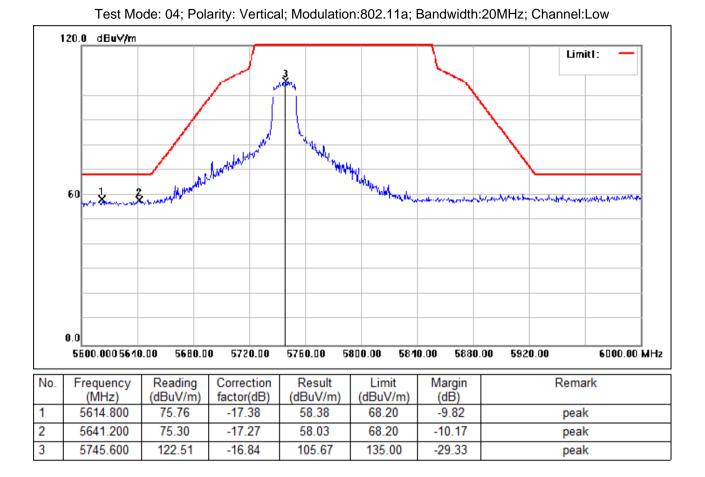


Test Mode: 04; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:Low



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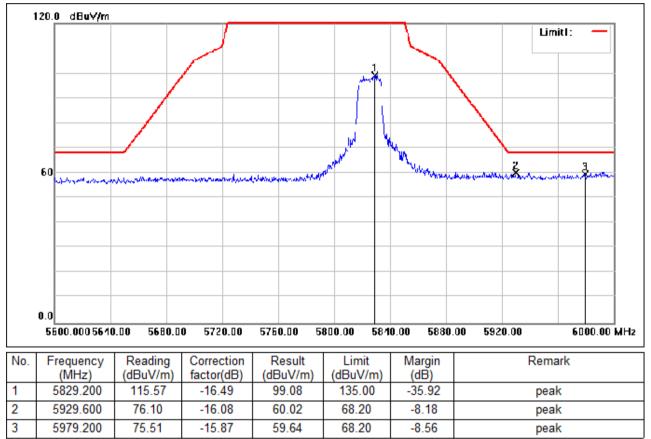
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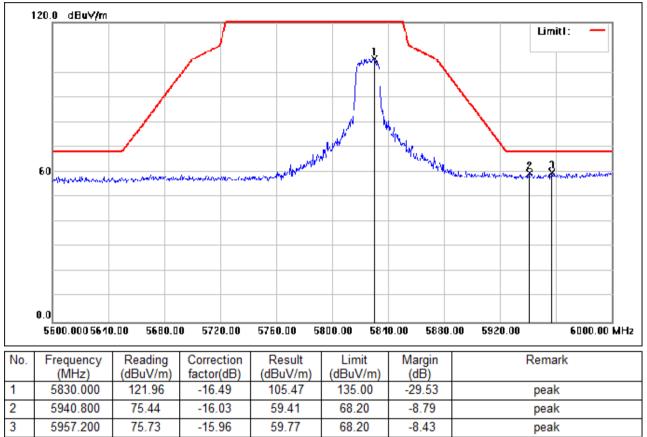


Test Mode: 04; Polarity: Horizontal; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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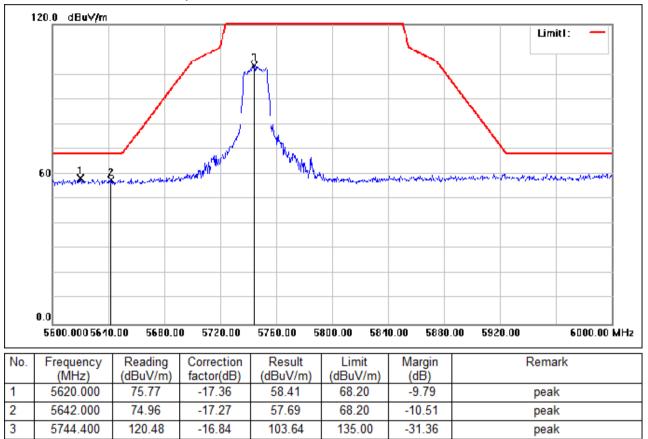


Test Mode: 04; Polarity: Vertical; Modulation:802.11a; Bandwidth:20MHz; Channel:High



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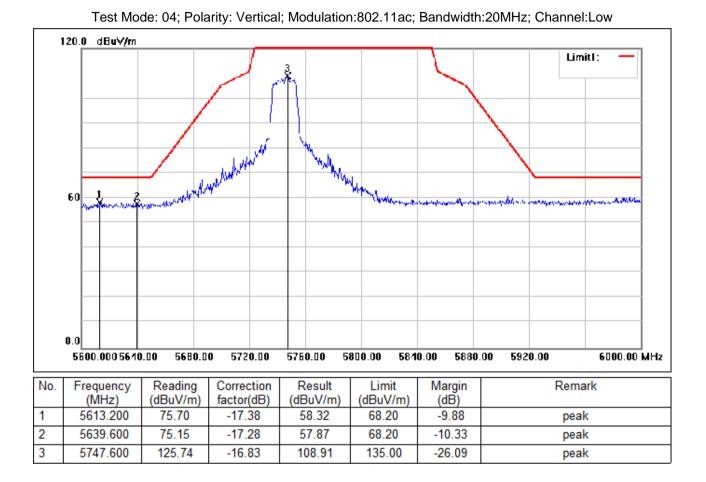


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:Low



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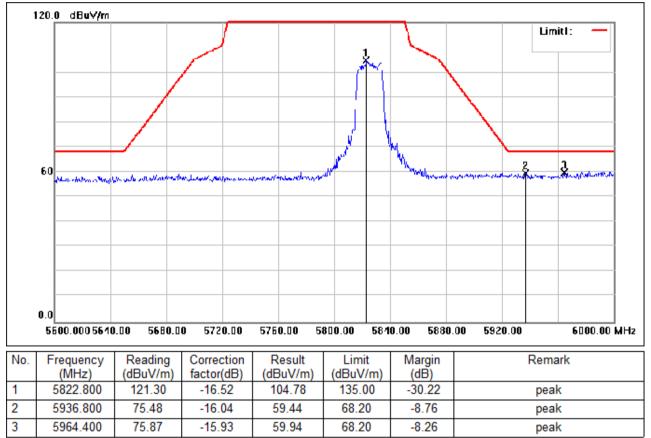
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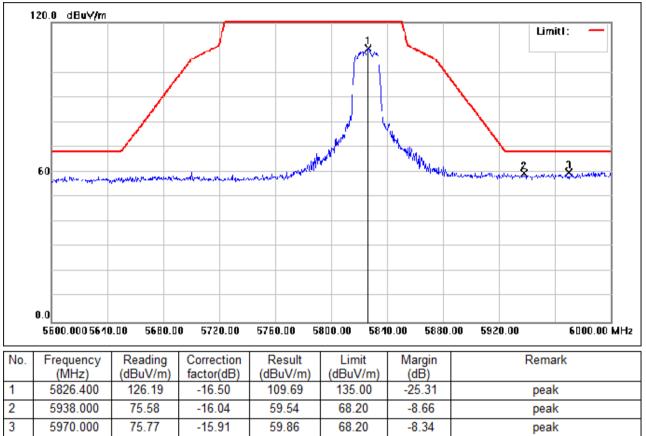


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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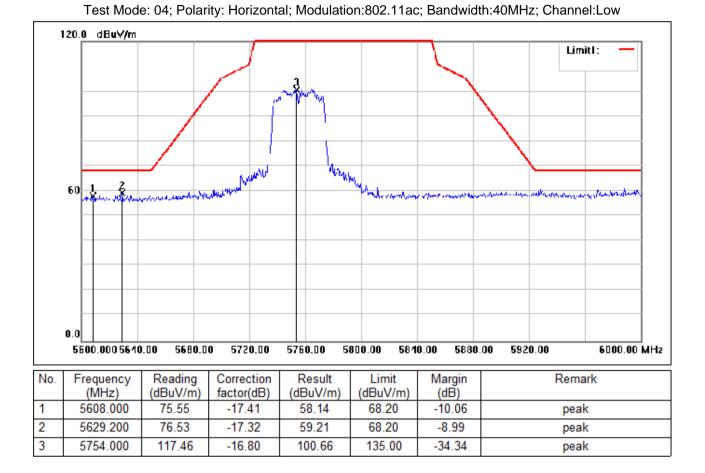


Test Mode: 04; Polarity: Vertical; Modulation:802.11ac; Bandwidth:20MHz; Channel:High



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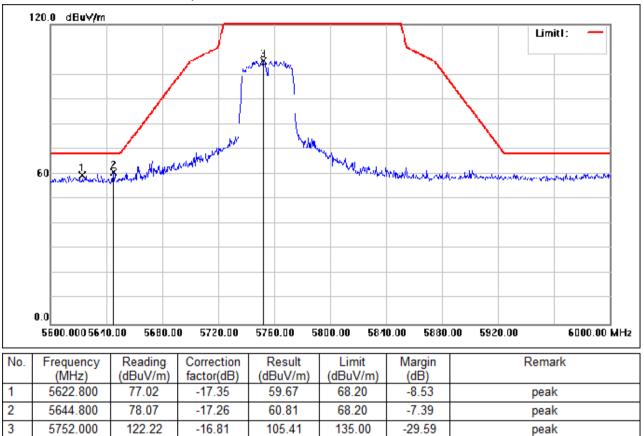
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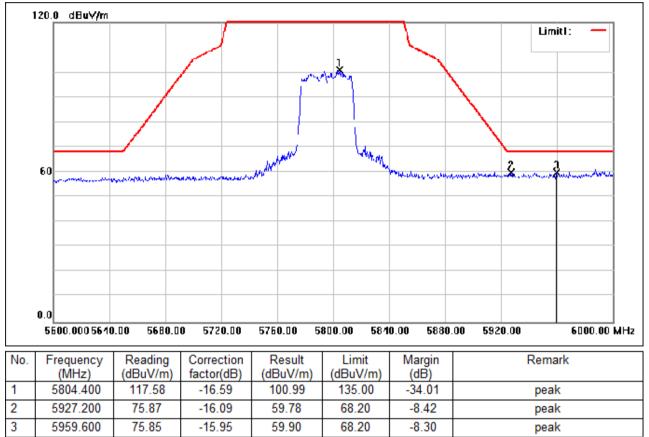


Test Mode: 04; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:Low



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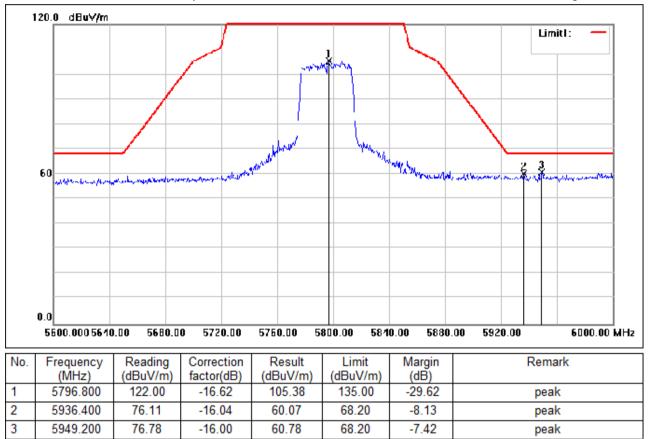


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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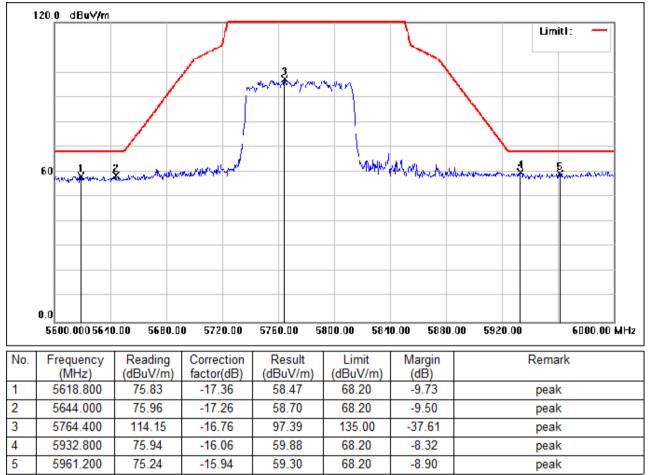


Test Mode: 04; Polarity: Vertical; Modulation:802.11ac; Bandwidth:40MHz; Channel:High



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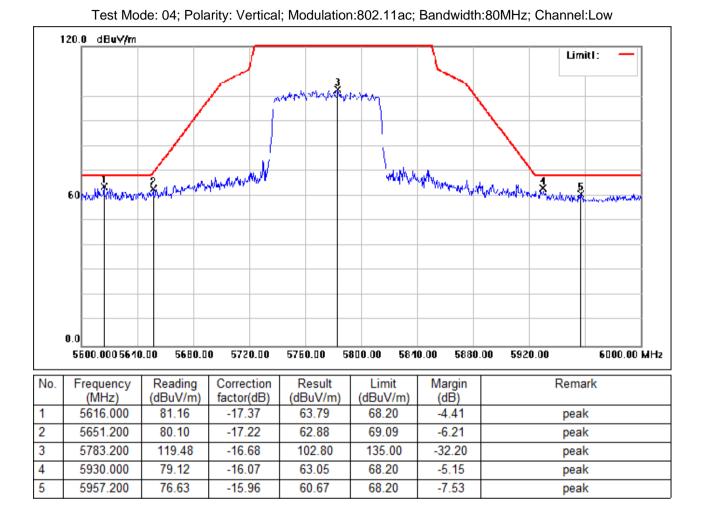


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ac; Bandwidth:80MHz; Channel:Low



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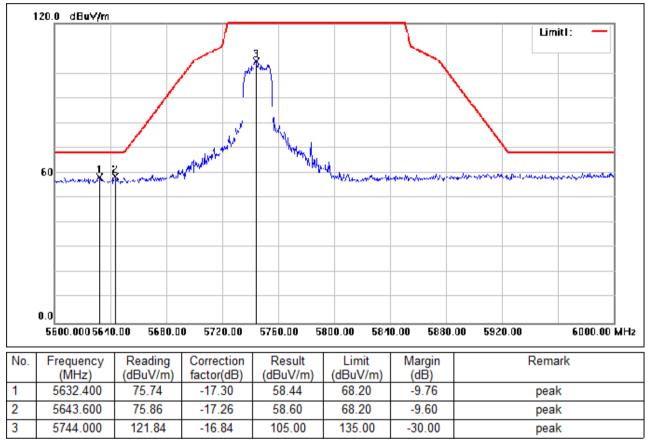
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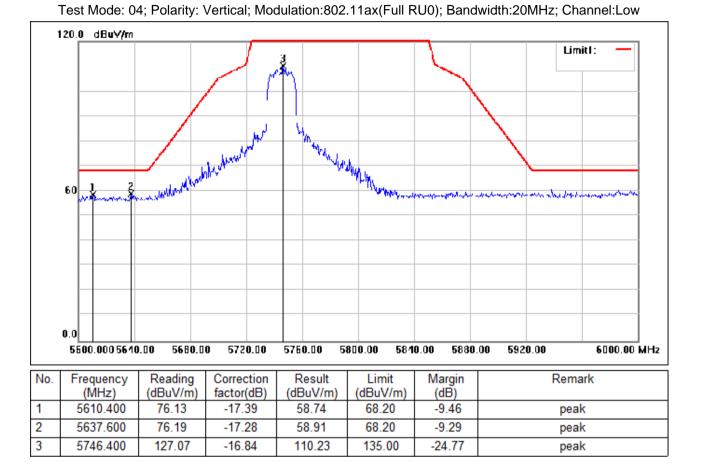


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:Low



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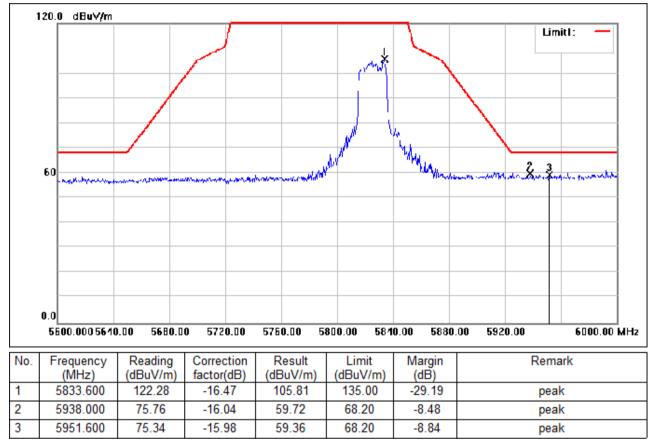
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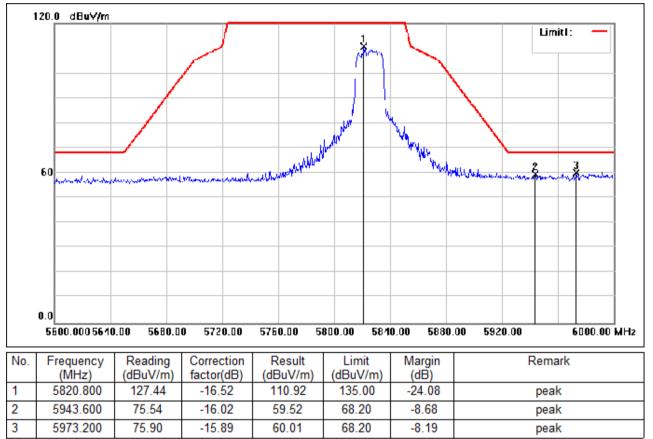


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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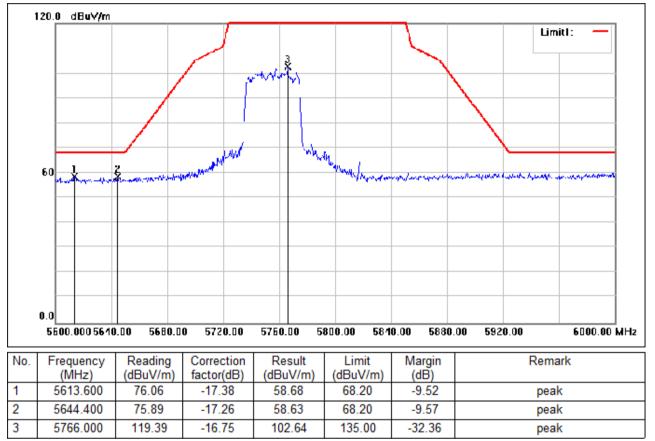


Test Mode: 04; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:20MHz; Channel:High



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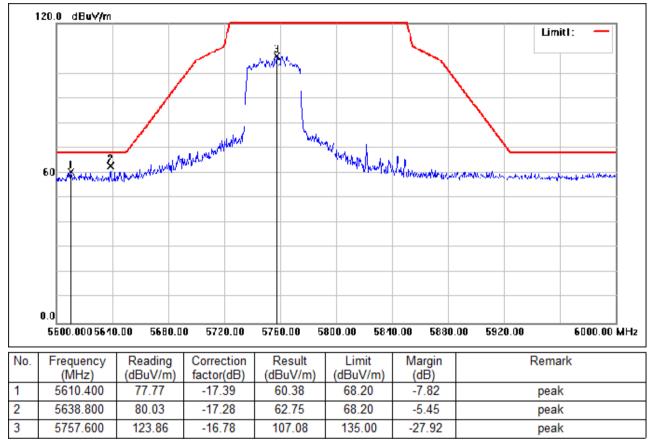


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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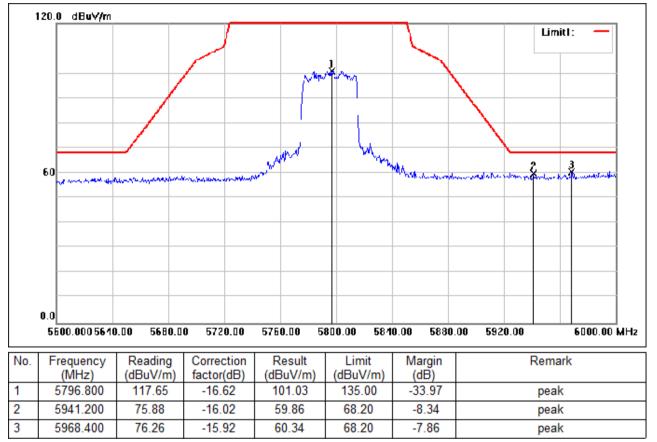


Test Mode: 04; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:Low



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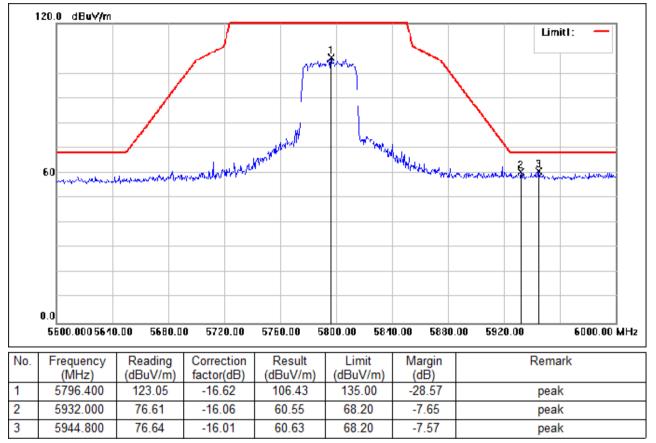


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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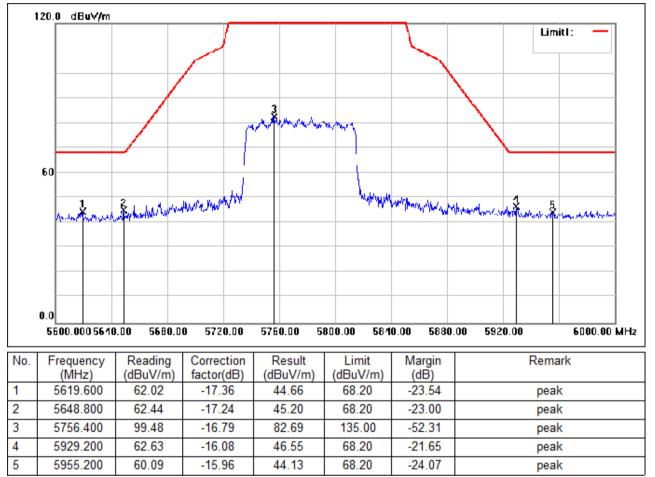


Test Mode: 04; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:40MHz; Channel:High



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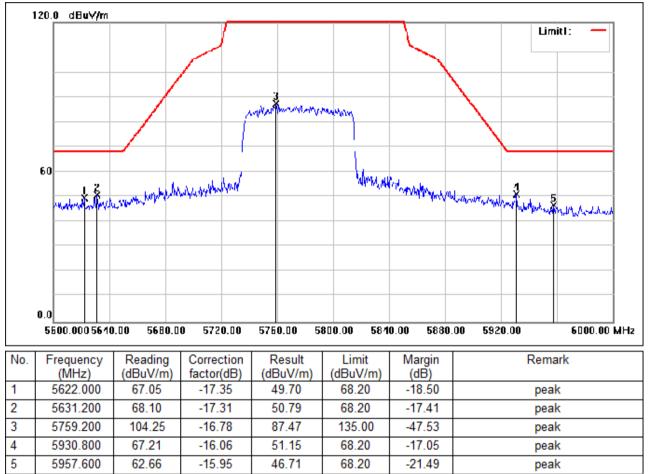


Test Mode: 04; Polarity: Horizontal; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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Test Mode: 04; Polarity: Vertical; Modulation:802.11ax(Full RU0); Bandwidth:80MHz; Channel:Low



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7.6 Channel Move Time

Test Requirement	KDB 905462 D02 Section 5.1
Test Method:	KDB 905462 D02 Section 7.8.3

Limit:

		Applicability		
Test item	Limit	Master Device or client with Radar Detection	Client without Radar Detection	
Non-occupancy period	Minimum 30 minutes	Yes	Not required	
Channel Availability Check Time	60 seconds	Yes	Not required	
Channel Move Time	10 seconds See Note 1.	Yes	Yes	
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.	Yes	Yes	
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.	Yes	Not required	

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

7.6.1 E.U.T. Operation

Operating Environment: Temperature: 20.5 °C

.5 °C ⊦

Humidity: 54.0 % RH

Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

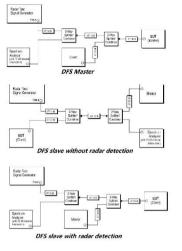
Pre-scan / Final test	Mode Code	Description
Final test	05	Normal operating_Keep the EUT communication with the companion device.



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7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

1) The radar pulse generator is setup to provide a pulse at frequency that the master and client are operating. A type 0 radar pulse with a 1us pulse width and a 1428us PRI is used for the testing.

2) The vector signal generator is adjusted to provide the radar burst (18 pulses) at the level of approximately -61dBm at the antenna port of the master device.

3) A trigger is provided from the pulse generator to the DFS monitoring system in order to capture the traffic and the occurrence of the radar pulse.

4) EUT will associate with the master at channel. The file "iperf.exe" specified by the FCC is streamed from the PC 2 through the master and the client device to the PC 1 and played in full motion video using Media Player Classic Ver. 6.4.8.6 in order to properly load the network for the entire period of the test.

5) When radar burst with a level equal to the DFS Detection Threshold +1dB is generated on the operating channel of the U-NII device. At time T0 the radar waveform generator sends a burst of pulse of the radar waveform at Detection Threshold +1dB.

6) Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). One 15 seconds plot is reported for the Short Pulse Radar Type 0. The plot for the Short Pulse Radar Types start at the end of the radar burst. The Channel Move Time will be calculated based on the zoom in 600ms plot of the Short Pulse Radar Type.

7) Measurement of the aggregate duration of the Channel Closed Transmission Time method. With the spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by: Dwell (0.3ms) = S (12000ms) / B (4000); where Dwell is the dwell time per spectrum analyzer sampling bin, S is sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by: C (ms)= N X Dwell (0.3ms); where C is the Closing Time, N is the number of spectrum analyzer sampling bins (intermittent control signals) showing a U-NII transmission and Dwell is the dwell time per bin.

8) Measurement the EUT for more than 30 minutes following the channel move time to verify that no transmission or beacons occur on this channel.



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7.7 Duty Cycle

Test Requirement	KDB 789033 D02 II B 1
Test Method:	KDB 789033 II B 1

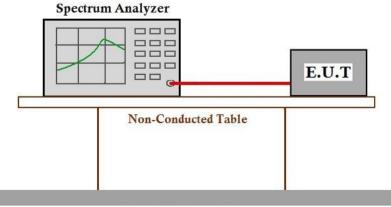
7.7.1 E.U.T. Operation

Operating Environment: Temperature: 20.5 °C Humidity: 54.0 % RH Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan /	Mode	Description
Final test	Code	Description
Final test	01	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	02	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.
Final test	03	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.

7.7.3 Test Setup Diagram



Ground Reference Plane



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7.7.4 Measurement Procedure and Data



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7.8 99% Bandwidth

Test RequirementN/ATest Method:KDB 789033 II D

7.8.1 E.U.T. Operation

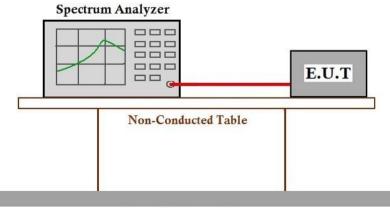
Operating Environment: Temperature: 20.5 °C Humidity: 54.0 % RH Atmospheric Pre

Atmospheric Pressure: 1010 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	02	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.
Final test	03	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



Ground Reference Plane



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7.8.4 Measurement Procedure and Data



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7.9 26dB Emission bandwidth

Test Requirement	47 CFR Part 15, Subpart E 15.407 (a)
Test Method:	KDB 789033 D02 II C 1

7.9.1 E.U.T. Operation

Operating Environment: Temperature: 20.5 °C

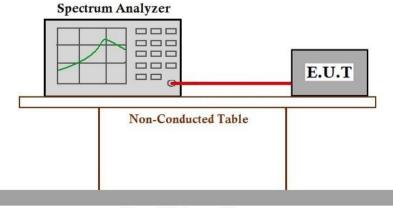
Humidity: 54.0 % RH

Atmospheric Pressure: 1010 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	02	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.
Final test	03	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.

7.9.3 Test Setup Diagram



Ground Reference Plane



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7.9.4 Measurement Procedure and Data



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7.10 Minimum 6 dB bandwidth (5.725-5.85 GHz band)

Test Requirement	47 CFR Part 15, Subpart E 15.407 (e)
Test Method:	KDB 789033 D02 II C 2

Limit:

Frequency band(MHz)	Limit
5725-5850	≥500 kHz

7.10.1 E.U.T. Operation

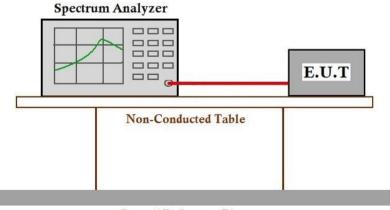
Operating Environment:

Temperature:	20.5 °C	Humidity:	54.0 % RH	Atmospheric Pressure:	1010	mbar

7.10.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	04	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.

7.10.3 Test Setup Diagram



Ground Reference Plane

7.10.4 Measurement Procedure and Data



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7.11 Peak Power spectrum density

Test Requirement	47 CFR Part 15, Subpart E 15.407 (a)
Test Method:	KDB 789033 D02 II F

Limit:

Frequency b	and(MHz)	Limit
5150-5250		≤17dBm in 1MHz for master device
5150-5	250	≤11dBm in 1MHz for client device
5250-5	i350 ≤11dBm in 1MHz for client device	
5470-5	5725 ≤11dBm in 1MHz for client device	
5725-5	≤30dBm in 500 kHz	
Remark:	The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test.	

7.11.1 E.U.T. Operation

Operating Environment: Temperature: 20.5 °C Humidity: 54.0 % RH Atmospheric Pressure: 1010 mbar

7.11.2 Test Mode Description

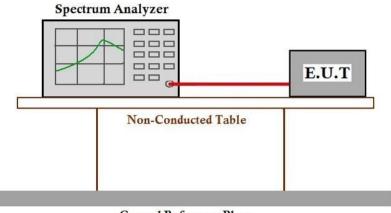
Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	02	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.
Final test	03	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.



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7.11.3 Test Setup Diagram



Ground Reference Plane

7.11.4 Measurement Procedure and Data



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7.12 Frequency Stability

Test Requirement	47 CFR Part 15, Subpart E 15.407 (g)
Test Method:	ANSI C63.10 (2013) Section 6.8

7.12.1 E.U.T. Operation

Operating Environment: Temperature: 20.5 °C Hum

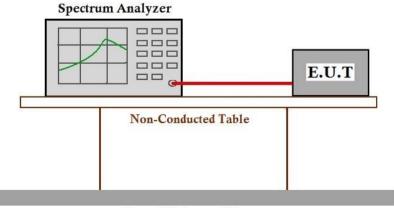
Humidity: 54.0 % RH

Atmospheric Pressure: 1010 mbar

7.12.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode (U-NII-1)_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	02	TX mode (U-NII-2A) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.
Final test	03	TX mode (U-NII-2C) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80/160, Only the data of worst case is recorded in the report.
Final test	04	TX mode (U-NII-3) _Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 6Mbps is the worst case of IEEE 802.11a; data rate @ MCS0 is the worst case of IEEE 802.11n/ac/ax 20/40/80, Only the data of worst case is recorded in the report.

7.12.3 Test Setup Diagram



Ground Reference Plane



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7.12.4 Measurement Procedure and Data



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7.13 Channel Move Time

Test Requirement	KDB 905462 D02 Section 5.1
Test Method:	KDB 905462 D02 Section 7.8.3

Limit:

		Applicability		
Test item	Limit	Master Device or client with Radar Detection	Client without Radar Detection	
Non-occupancy period	Minimum 30 minutes	Yes	Not required	
Channel Availability Check Time	60 seconds	Yes	Not required	
Channel Move Time	10 seconds See Note 1.	Yes	Yes	
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.	Yes	Yes	
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.	Yes	Not required	

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

7.13.1 E.U.T. Operation

Operating Environment:

Temperature: 22 °C

Humidity: 48 % RH

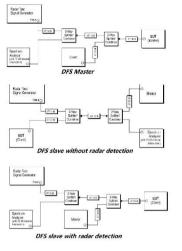
Atmospheric Pressure: 1010 mbar



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7.13.2 Test Setup Diagram



7.13.3 Measurement Procedure and Data

1) The radar pulse generator is setup to provide a pulse at frequency that the master and client are operating. A type 0 radar pulse with a 1us pulse width and a 1428us PRI is used for the testing.

2) The vector signal generator is adjusted to provide the radar burst (18 pulses) at the level of approximately -61dBm at the antenna port of the master device.

3) A trigger is provided from the pulse generator to the DFS monitoring system in order to capture the traffic and the occurrence of the radar pulse.

4) EUT will associate with the master at channel. The file "iperf.exe" specified by the FCC is streamed from the PC 2 through the master and the client device to the PC 1 and played in full motion video using Media Player Classic Ver. 6.4.8.6 in order to properly load the network for the entire period of the test.

5) When radar burst with a level equal to the DFS Detection Threshold +1dB is generated on the operating channel of the U-NII device. At time T0 the radar waveform generator sends a burst of pulse of the radar waveform at Detection Threshold +1dB.

6) Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). One 15 seconds plot is reported for the Short Pulse Radar Type 0. The plot for the Short Pulse Radar Types start at the end of the radar burst. The Channel Move Time will be calculated based on the zoom in 600ms plot of the Short Pulse Radar Type.

7) Measurement of the aggregate duration of the Channel Closed Transmission Time method. With the spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by: Dwell (0.3ms) = S (12000ms) / B (4000); where Dwell is the dwell time per spectrum analyzer sampling bin, S is sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by: C (ms)= N X Dwell (0.3ms); where C is the Closing Time, N is the number of spectrum analyzer sampling bins (intermittent control signals) showing a U-NII transmission and Dwell is the dwell time per bin.

8) Measurement the EUT for more than 30 minutes following the channel move time to verify that no transmission or beacons occur on this channel.



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7.14 Channel Closing Transmission Time

Test Requirement	KDB 905462 D02 Section 5.1
Test Method:	KDB 905462 D02 Section 7.8.3

Limit:

		Applicability		
Test item	Limit	Master Device or client with Radar Detection	Client without Radar Detection	
Non-occupancy period	Minimum 30 minutes	Yes	Not required	
Channel Availability Check Time	60 seconds	Yes	Not required	
Channel Move Time	10 seconds See Note 1.	Yes	Yes	
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.	Yes	Yes	
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.	Yes	Not required	

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

7.14.1 E.U.T. Operation

Operating Enviror	nment:					
Temperature:	20.5 °C	Humidity:	54.0 % RH	Atmospheric Pressure:	1010	mbar

7.14.2 Test Mode Description

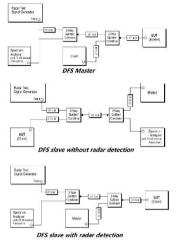
Pre-scan / Final test	Mode Code	Description
Final test	05	Normal operating_Keep the EUT communication with the companion device.



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7.14.3 Test Setup Diagram



7.14.4 Measurement Procedure and Data

1) The radar pulse generator is setup to provide a pulse at frequency that the master and client are operating. A type 0 radar pulse with a 1us pulse width and a 1428us PRI is used for the testing.

2) The vector signal generator is adjusted to provide the radar burst (18 pulses) at the level of approximately -61dBm at the antenna port of the master device.

3) A trigger is provided from the pulse generator to the DFS monitoring system in order to capture the traffic and the occurrence of the radar pulse.

4) EUT will associate with the master at channel. The file "iperf.exe" specified by the FCC is streamed from the PC 2 through the master and the client device to the PC 1 and played in full motion video using Media Player Classic Ver. 6.4.8.6 in order to properly load the network for the entire period of the test.

5) When radar burst with a level equal to the DFS Detection Threshold +1dB is generated on the operating channel of the U-NII device. At time T0 the radar waveform generator sends a burst of pulse of the radar waveform at Detection Threshold +1dB.

6) Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). One 15 seconds plot is reported for the Short Pulse Radar Type 0. The plot for the Short Pulse Radar Types start at the end of the radar burst. The Channel Move Time will be calculated based on the zoom in 600ms plot of the Short Pulse Radar Type.

7) Measurement of the aggregate duration of the Channel Closed Transmission Time method. With the spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by: Dwell (0.3ms) = S (12000ms) / B (4000); where Dwell is the dwell time per spectrum analyzer sampling bin, S is sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by: C (ms)= N X Dwell (0.3ms); where C is the Closing Time, N is the number of spectrum analyzer sampling bins (intermittent control signals) showing a U-NII transmission and Dwell is the dwell time per bin.

8) Measurement the EUT for more than 30 minutes following the channel move time to verify that no transmission or beacons occur on this channel.



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8 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2406000993AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for KSCR2406000993AT

- End of the Report -