CFR 47 FCC PART 15 SUBPART E
ISED RSS-247 ISSUE 2

TEST REPORT

For

Ultra Short Throw Laser Projector

FCC MODEL NUMBER: AL-UK535A, AL-UK** (* may be 0-9, A-Z)**
ISED MODEL NUMBER: AL-UK535A

REPORT NUMBER: 4790678406-1-RF-4

ISSUE DATE: January 17, 2023

FCC ID:2ALQL-AL-UK535A
IC:28783-ALUK535A

Prepared for

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Prepared by

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The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products.

Revision History

Rev.	Issue Date	Revisions	Revised By
V0	January 17, 2023	Initial Issue	

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Summary of Test Results

Test Item	Clause	Limit/Requirement	Result
ON TIME AND DUTY CYCLE	ANSI C63.10-2013, Clause 12.2	None; for reporting purposes only.	Pass
6dB AND 26dB EMISSION BANDWIDTH AND 99% OCCUPIED BANDWIDTH	KDB 789033 D02 v02r01 Section C.1	FCC Part 15.407 (a)/(e), RSS-247 Issue 2, Clause 6.2.1.2 RSS-Gen Clause 6.7	Pass
CONDUCTED OUTPUT POWER	KDB 789033 D02 v02r01 Section E.3.a (Method PM)	FCC 15.407 (a) RSS-247 Clause 6.2	Pass
POWER SPECTRAL DENSITY	KDB 789033 D02 v02r01 Section F	FCC 15.407 (a) RSS-247 Clause 6.2	Pass
AC Power Line Conducted Emission	ANSI C63.10-2013, Clause 6.2.	FCC 15.207 RSS-GEN Clause 8.8	Pass
Radiated Emissions and Band Edge Measurement	KDB 789033 D02 v02r01 Section G.3, G.4, G.5, and G.6	FCC 15.407 (b) FCC 15.209 FCC 15.205 RSS-247 Clause 6.2 RSS-GEN Clause 8.9	Pass
FREQUENCY STABILITY		FCC 15.407 (g)	Pass
Dynamic Frequency Selection (Slave)	KDB 905462 D03 Client Without DFS New Rules v01r02	FCC Part 15.407 (h), RSS-247 Issue 2 Clause6.3	N/A
Dynamic Frequency Selection (Master)	KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02	FCC Part 15.407 (h), RSS-247 Issue 2 Clause6.3	N/A
Antenna Requirement	N/A	FCC 47 CFR Part 15.203/ 15.407(a)(1) (2), RSS-Gen Issue 5, Clause 6.8	Pass

Note:
1. N/A: In this whole report not applicable.

*This test report is only published to and used by the applicant, and it is not for evidence purpose in China.
*The measurement result for the sample received is <Pass> according to <CFR 47 FCC PART 15 SUBPART E
ISED RSS-247 ISSUE 2> when <Accuracy Method> decision rule is applied.

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	APPOTRONICS CO., LTD
Address:	20F to 22F, High-Tech Zone Union Tower, No.63 Xuefu Road, Nanshan District Shenzhen 518051 China

Manufacturer Information

Company Name:	APPOTRONICS CO., LTD
Address:	20F to 22F, High-Tech Zone Union Tower, No.63 Xuefu Road, Nanshan District Shenzhen 518051 China

EUT Information

EUT Name:	Ultra Short Throw Laser Projector
FCC Model:	AL-UK535A, AL-UK**** (* may be 0-9, A-Z)
ISED Model:	AL-UK535A
Brand:	APPOTRONICS
Sample Received Date:	December 20, 2022
Sample Status:	Normal
Sample ID:	5645955
Date of Tested:	January 12, 2023 to January 17, 2023

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 FCC PART 15 SUBPART E **ISED RSS-247 ISSUE 2**	**Pass**

Prepared By:

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Checked By:

Denny Huang
Senior Project Engineer

Approved By:

Stephen Guo
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2. TEST METHODOLOGY

All tests were performed in accordance with the standard CFR 47 FCC PART 15 SUBPART E ISED RSS-247 ISSUE 2, ANSI C63.10-2013, CFR 47 FCC Part 2, CFR 47 FCC Part 15, KDB 789033 D02 v02r01, RSS-GEN Issue 5, RSS-247 Issue 2, KDB414788 D01 Radiated Test Site v01, KDB 662911 D01 Multiple Transmitter Output v02r01, KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02, KDB 905462 D03 UNII clients without radar detection New Rules v01r02, KDB 905462 D04 Operational Modes for DFS Testing New Rules v01 and KDB 905462 D06 802 11 Channel Plans New Rules v02.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 4102.01)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1187)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules **ISED (Company No.: 21320)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046. **VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B , the VCCI registration No. is C-20012 and T-20011

Note1:
All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, 523808, People's Republic of China.

Note2:
The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd.
Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

Note3:
For below 30 MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30 MHz had been correlated to measurements performed on an OFS.

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4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction emission	3.62 dB
Radiated Emission (Included Fundamental Emission) (9 kHz ~ 30 MHz)	2.2 dB
Radiated Emission (Included Fundamental Emission) (30 MHz ~ 1 GHz)	4.00 dB
Radiated Emission (Included Fundamental Emission) (1 GHz to 26 GHz)	5.78 dB (1 GHz ~ 18 GHz)
	5.23 dB (18 GHz ~ 26 GHz)
Duty Cycle	±0.028%
Emission Bandwidth and 99% Occupied Bandwidth	±0.0196%
Maximum Conducted Output Power	±0.766 dB
Maximum Power Spectral Density Level	±1.22 dB
Frequency Stability	±2.76%
Conducted Band-edge Compliance	±1.328 dB
Conducted Unwanted Emissions In Non-restricted Frequency Bands	±0.746 dB (9 kHz ~ 1 GHz)
	±1.328dB (1 GHz ~ 26 GHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name	Ultra Short Throw Laser Projector
FCC Model	AL-UK535A, AL-UK**** (* may be 0-9, A-Z)
ISED Model	AL-UK535A
Model difference	AL-UK**** (* may be 0-9, A-Z) have the same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction with AL-UK535A .The difference lies only the model number. all these changes do not degrade the unwanted emissions of the certified product.

Frequency Range:	5180 MHz to 5240 MHz 5745 MHz to 5825 MHz
Type of Modulation:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/HT40: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac VHT20/VHT40/VHT80: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Normal Test Voltage:	AC 120V, 60Hz

5.2. CHANNEL LIST

UNII-1 (For Bandwidth=20MHz)		UNII-1 (For Bandwidth=40MHz)		UNII-1 (For Bandwidth=80MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				
UNII-3 (For Bandwidth=20MHz)		UNII-3 (For Bandwidth=40MHz)		UNII-3 (For Bandwidth=80MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795		
157	5785				
161	5805				
165	5825				

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5.3. MAXIMUM EIRP

UNII-1 BAND(FCC&ISED)

IEEE Std. 802.11	Frequency (MHz)	Maximum Average Conducted Power (dBm)	Max Average EIRP (dBm)
a	5150 ~ 5250	13.76	16.73
n HT20		16.02	18.99
n HT40		12.29	15.26
ac VHT80		12.32	15.29

UNII-3 BAND(FCC&ISED)

IEEE Std. 802.11	Frequency (MHz)	Maximum Average Conducted Power (dBm)
a	5725 ~ 5850	12.90
n HT20		15.77
n HT40		15.17
ac VHT80		17.27

5.4. TEST CHANNEL CONFIGURATION

UNII-1 Test Channel Configuration		
IEEE Std.	Test Channel Number	Frequency
802.11a	CH 36(Low Channel), CH 40(MID Channel), CH 48(High Channel)	5180 MHz, 5200 MHz, 5240 MHz
802.11n HT20	CH 36(Low Channel), CH 40(MID Channel), CH 48(High Channel)	5180 MHz, 5200 MHz, 5240 MHz
802.11n HT40	CH 38(Low Channel), CH 46(High Channel)	5190 MHz, 5230 MHz
802.11ac VHT80	CH 42(Low Channel)	5210 MHz

UNII-3 Test Channel Configuration		
IEEE Std.	Test Channel Number	Frequency
802.11a	CH 149(Low Channel), CH 157(MID Channel), CH 165(High Channel)	5745 MHz, 5785 MHz, 5825 MHz
802.11n HT20	CH 149(Low Channel), CH 157(MID Channel), CH 165(High Channel)	5745 MHz, 5785 MHz, 5825 MHz
802.11n HT40	CH 151(Low Channel), CH 159(High Channel)	5755MHz, 5795MHz
802.11ac VHT80	CH 155(Low Channel)	5775 MHz

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5.5. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter	
Test Software	RF Test Tool

UNII-1

Mode	Rate	Channel	Soft set value	
			ANT 1	ANT 2
11a	6M	36	75	75
		40	75	75
		48	55	70
11n HT20	MCS0	36	75	75
		40	75	75
		48	14	14
11n HT40	MCS0	38	11	11
		46	11	11
11ac VHT20	MCS0	36	Cover by 11n HT20	
		40		
		48		
11ac VHT40	MCS0	38	Cover by 11n HT40	
		46		
11ac VHT80	MCS0	42	45	45

UNII-3

Mode	Rate	Channel	Soft set value	
			ANT1	ANT 2
11a	6M	149	68	68
		157	68	68
		165	60	60
11n HT20	MCS0	149	67	67
		157	67	67
		165	60	60
11n HT40	MCS0	151	60	60
		159	60	60
11ac VHT20	MCS0	149	Cover by 11n HT20	
		157		
		165		
11ac VHT40	MCS0	151	Cover by 11n HT40	
		159		
11ac VHT80	MCS0	155	69	69

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WORSE CASE CONFIGURATIONS

The EUT was tested in the following configuration(s):

Controlled in test mode using a software application on the EUT supplied by customer. The application was used to enable a continuous transmission and to select the mode, test channels, bandwidth, data rates as required.

Test channels referring to section 5.4.

Maximum power setting referring to section 5.5.

Worst case Data Rates declared by the customer:

802.11a 20 mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0
802.11ac VHT20 mode: MCS0
802.11ac VHT40 mode: MCS0
802.11ac VHT80 mode: MCS0

802.11a only support SISO mode.
802.11n HT20/HT40/ac VHT20/VHT40/VHT8 support SISO and MIMO mode.

802.11a SISO mode, Antenna 1 and Antenna 2 has the same power setting, so only Antenna 1 worst case test data were recorded in the report.

802.11n/ac SISO mode and MIMO mode have the same power setting, so only the worst case power mode(MIMO) will be record in the report.

802.11ac VHT20 and VHT40 mode are different from 802.11nHT20 and HT40 only in control messages, so for these 4 modes, only 802.11n HT20 and 802.11n HT40 worst case power modes radiated emission test data are recorded in the report .

The EUT has 2 separate antennas which correspond to 2 separate antenna ports. Core 1 and Core 2 correspond to antenna 1 and antenna 2 respectively.

The measured additional path loss was included in any path loss calculations for all RF cable used during tested.

Conducted output power, power spectral density tests separately on each port with all supported SISO & MIMO port combinations.

Radiated emissions tests were performed with the MIMO modes. These were found to be the worst modulation scheme with regards to emissions after preliminary investigations and, as this mode emits the highest conducted output power level, it was deemed to be the worst case.

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5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna No.	Frequency Band	Antenna Type	Max Antenna Gain (dBi)
1	5150-5850	FPC	2.97
2	5150-5850	FPC	2.96

The EUT support Cyclic Shift Diversity(CDD) mode.

MIMO output power port and MIMO PSD port summing were performed in accordance with KDB 662911 D01. For the CDD results the Directional Gain was calculated in accordance with the following mothed.

For output power measurements:
Directional gain= G_{ANT} + Array Gain = 2.97 dBi
G_{ANT} : equal to the gain of the antenna having the highest gain
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$

For power spectral density (PSD) measurements:
Directional gain= G_{ANT} + Array Gain = 5.98 dBi
Array Gain = 10 log(N_{ANT}/N_{SS}) dB.
N_{ANT} : number of transmit antennas
N_{SS} : number of spatial streams, The worst case directional gain will occur when N_{SS} = 1

IEE Std. 802.11	Transmit and Receive Mode	Description
802.11a	☒1TX, 1RX	ANT 1 or ANT 2 can be used as transmitting/receiving antenna.
802.11n HT20	☒2TX, 2RX	ANT 1 and ANT 2 can be used as transmitting/receiving antenna.
802.11n HT40	☒2TX, 2RX	ANT 1 and ANT 2 can be used as transmitting/receiving antenna.
802.11ac VHT20	☒2TX, 2RX	ANT 1 and ANT 2 can be used as transmitting/receiving antenna.
802.11ac VHT40	☒2TX, 2RX	ANT 1 and ANT 2 can be used as transmitting/receiving antenna.
802.11ac VHT80	☒2TX, 2RX	ANT 1 and ANT 2 can be used as transmitting/receiving antenna.
Note: BT&WLAN 2.4G, BT & WLAN 5G, WLAN 2.4G & WLAN 5G can't transmit simultaneously (Declared by client)		

Note: The value of the antenna gain was declared by customer.

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5.7. SUPPORT UNITS FOR SYSTEM TEST

SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	Specification	Series No.
1	Laptop	Lenovo	ThinkPad E480	Type-C 4k	PF-21465Q
2	Speaker	Behringer	Ms20	N/A	S1600511274
3	Load board	N/A	N/A	N/A	N/A
4	Mouse	DELL	MS111-T	N/A	CN-0X9DCG-71616-590-1RAE
5	Keyboard	DELL	KB216t	N/A	CN-0JVMCW-71616-66R-15A8-A03
6	Earphone	apple	N/A	N/A	N/A
7	Flash Disk	SanDisk	N/A	N/A	N/A

I/O CABLES

Item	Type of cable	Shielded Type	Ferrite Core	Length
1	HDMI Cable	YES	NO	1.5m
2	HDMI Cable	YES	NO	1.5m
3	HDMI Cable	YES	NO	2.0m
4	Optical Cable	NO	NO	1.5m
5	AC Cable	NO	NO	1.5m
6	USB Cable for keyboard	YES	NO	1.5m
7	USB Cable for mouse	YES	NO	1.5m
8	RJ45 Cable	NO	NO	5m
9	Audio Cable	NO	NO	1.0m

ACCESSORIES

Item	Accessory	Brand Name	Model Name	Description
1	Remote control	N/A	N/A	N/A

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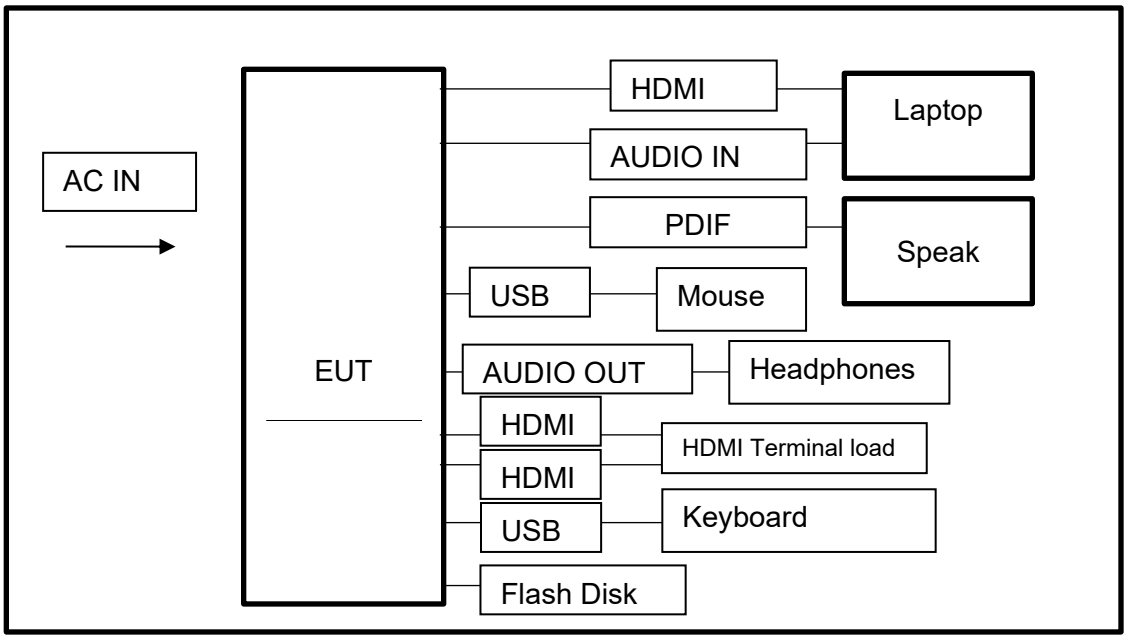
TEST SETUP

The EUT can work in engineering mode with a software through a Laptop.

SETUP DIAGRAM FOR TESTS



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6. MEASURING EQUIPMENT AND SOFTWARE USED

R&S TS 8997 Test System					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
Power sensor, Power Meter	R&S	OSP120	100921	Apr.02,2022	Apr.01,2023
Vector Signal Generator	R&S	SMBV100A	261637	Oct.17, 2022	Oct.16, 2023
Signal Generator	R&S	SMB100A	178553	Oct.17, 2022	Oct.16, 2023
Signal Analyzer	R&S	FSV40	101118	Oct.17, 2022	Oct.16, 2023

Software			
Description	Manufacturer	Name	Version
For R&S TS 8997 Test System	Rohde & Schwarz	EMC 32	10.60.10

Tonsend RF Test System					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
Wideband Radio Communication Tester	R&S	CMW500	155523	Oct.17, 2022	Oct.16, 2023
Wireless Connectivity Tester	R&S	CMW270	1201.0002N75-102	Sep.28, 2022	Sep.27, 2023
PXA Signal Analyzer	Keysight	N9030A	MY55410512	Oct.17, 2022	Oct.16, 2023
MXG Vector Signal Generator	Keysight	N5182B	MY56200284	Oct.17, 2022	Oct.16, 2023
MXG Vector Signal Generator	Keysight	N5172B	MY56200301	Oct.17, 2022	Oct.16, 2023
DC power supply	Keysight	E3642A	MY55159130	Oct.17, 2022	Oct.16, 2023
Temperature & Humidity Chamber	SANMOOD	SG-80-CC-2	2088	Oct.17, 2022	Oct.16, 2023

Software			
Description	Manufacturer	Name	Version
Tonsend SRD Test System	Tonsend	JS1120-3 RF Test System	2.6.77.0518

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Conducted Emissions					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
EMI Test Receiver	R&S	ESR3	101961	Oct.17, 2022	Oct.16, 2023
Two-Line V-Network	R&S	ENV216	101983	Oct.17, 2022	Oct.16, 2023
Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Oct.17, 2022	Oct.16, 2023
Software					
Description			Manufacturer	Name	Version
Test Software for Conducted Emissions			Farad	EZ-EMC	Ver. UL-3A1

Radiated Emissions					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Oct.17, 2022	Oct.16, 2023
Hybrid Log Periodic Antenna	TDK	HLP-3003C	130959	Aug.02, 2021	Aug.01, 2024
Preamplifier	HP	8447D	2944A09099	Oct.17, 2022	Oct.16, 2023
EMI Measurement Receiver	R&S	ESR26	101377	Oct.17, 2022	Oct.16, 2023
Horn Antenna	TDK	HRN-0118	130940	July 20, 2021	July 19, 2024
Preamplifier	TDK	PA-02-0118	TRS-305-00067	Oct.17, 2022	Oct.16, 2023
Horn Antenna	Schwarzbeck	BBHA9170	697	July 20, 2021	July 19, 2024
Preamplifier	TDK	PA-02-2	TRS-307-00003	Oct.17, 2022	Oct.16, 2023
Preamplifier	TDK	PA-02-3	TRS-308-00002	Oct.17, 2022	Oct.16, 2023
Loop antenna	Schwarzbeck	1519B	00008	Dec.14, 2021	Dec.13, 2024
Preamplifier	TDK	PA-02-001-3000	TRS-302-00050	Oct.17, 2022	Oct.16, 2023
Preamplifier	Mini-Circuits	ZX60-83LN-S+	SUP01202035	Oct.17, 2022	Oct.16, 2023
High Pass Filter	Wi	WHKX10-2700-3000-18000-40SS	23	/	/
Highpass Filter	Wainwright	WHKX10-5850-6500-1800-40SS	4	/	/
Band Reject Filter	Wainwright	WRCJV12-5695-5725-5850-5880-40SS	4	/	/
Band Reject Filter	Wainwright	WRCJV20-5120-5150-	2	/	/

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		5350-5380-60SS			
Band Reject Filter	Wainwright	WRCJV20-5440-5470-5725-5755-60SS	1	/	/
Band Reject Filter	Wainwright	WRCJV8-2350-2400-2483.5-2533.5-40SS	4	/	/
Band Reject Filter	Wainwright	WRCD5-1879-1879.85-1880.15-1881-40SS	1	/	/
Notch Filter	Wainwright	WHJ10-882-980-7000-40SS	1	/	/

Software			
Description	Manufacturer	Name	Version
Test Software for Radiated Emissions	Farad	EZ-EMC	Ver. UL-3A1

Other Instrument					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due Date
Temperature humidity probe	OMEGA	ITHX-SD-5	18470007	Oct.22, 2022	Oct.21, 2023
Barometer	Yiyi	Baro	N/A	Oct.24, 2022	Oct.23, 2023
Attenuator	Agilent	8495B	2814a12853	Oct.18, 2022	Oct.17, 2023

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7. ANTENNA PORT TEST RESULTS

7.1. ON TIME AND DUTY CYCLE

LIMITS

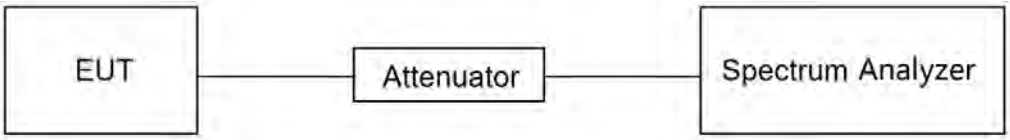
None; for reporting purposes only.

TEST PROCEDURE

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.B.

The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ EBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T, where T is defined in II.B.1.a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

TEST SETUP



TEST ENVIRONMENT

Temperature	25.2℃	Relative Humidity	51.9%
Atmosphere Pressure	101.2kPa	Test Voltage	AC 120V 60Hz

TEST DATE / ENGINEER

Test Date	January 17, 2023	Test By	Walker Yuan

TEST RESULTS

Please refer to section "Test Data" - Appendix H

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7.2. 6DB AND 26DB EMISSION BANDWIDTH AND 99% OCCUPIED BANDWIDTH

LIMITS

CFR 47 FCC Part15, Subpart E ISED RSS-247 ISSUE 2		
Test Item	Limit	Frequency Range (MHz)
26 dB Emission Bandwidth	For reporting purposes only.	5150 ~ 5250
26 dB Emission Bandwidth	For reporting purposes only.	5250 ~ 5350
26 dB Emission Bandwidth	For reporting purposes only.	5470 ~ 5725 (For FCC) 5470 ~ 5600 (For ISED) 5650 ~ 5725 (For ISED)
6 dB Emission Bandwidth	The minimum 6 dB emission bandwidth shall be 500 kHz.	5725 ~ 5850
99 % Occupied Bandwidth	For reporting purposes only.	5150 ~ 5825 (For ISED)

TEST PROCEDURE

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.C1. for 26 dB Emission Bandwidth; section II.C2. for 6 dB Emission Bandwidth; section II.D. for 99 % Occupied Bandwidth.
Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	For 6 dB Emission Bandwidth: RBW=100 kHz For 26 dB Emission bandwidth: approximately 1 % of the EBW. For 99 % Occupied Bandwidth: approximately 1 % ~ 5 % of the OBW.
VBW	For 6 dB Bandwidth: ≥ 3*RBW For 26 dB Bandwidth: >3*RBW For 99 % Bandwidth: >3*RBW
Trace	Max hold
Sweep	Auto couple

a) Use the 99 % power bandwidth function of the instrument, allow the trace to stabilize and report the measured bandwidth.
b) Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6/26 dB relative to the maximum level measured in the fundamental emission.

Calculation for 99 % Bandwidth of UNII-2C and UNII-3 Straddle Channel:

For Example: Fundamental Frequency: 5720 MHz

99 % OBW: 21.00 MHz

Turning Frequency: 5725 MHz

99 % Bandwidth of UNII-2C Band Portion = (5725-(5720-(21.00/2)) = 15.50 MHz

99 % Bandwidth of UNII-3 Band Portion = (5720+(21.00/2)-5725) = 5.50 MHz

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Calculation for 26 dB Bandwidth of UNII-2C Straddle Channel:

For Example: Fundamental frequency: 5720 MHz

26 dB BW: 20.00 MHz

FL: 5710.16 MHz

FH: 5730.16 MHz

Turning Frequency: 5725 MHz

26 dB Bandwidth of UNII-2C Band Portion = 5725-5710.16=14.84 MHz

Calculation for 6dB Bandwidth of UNII-3 Straddle Channel:

For Example: Fundamental frequency: 5720 MHz

6 dB BW: 16.44 MHz

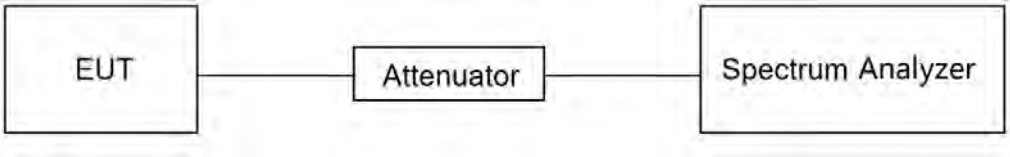
FL: 5711.76 MHz

FH: 5728.2 MHz

Turning Frequency: 5725 MHz

6 dB Bandwidth of UNII-3 band Portion = 5728.2-5725=3.2 MHz

TEST SETUP



TEST ENVIRONMENT

Temperature	25.2℃	Relative Humidity	51.9%
Atmosphere Pressure	101.2kPa	Test Voltage	AC 120V 60Hz

TEST DATE / ENGINEER

Test Date	January 17, 2023	Test By	Walker Yuan

TEST RESULTS

Please refer to section "Test Data" - Appendix A1&A2&A3

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7.3. CONDUCTED OUTPUT POWER

LIMITS

CFR 47 FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	☐ Outdoor Access Point: 1 W (30 dBm) ☐ Indoor Access Point: 1 W (30 dBm) ☐ Fixed Point-To-Point Access Points: 1 W (30 dBm) ☒ Client Devices: 250 mW (24 dBm)	5150 ~ 5250
	Shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.	5250 ~ 5350 5470 ~ 5725
	Shall not exceed 1 Watt (30 dBm).	5725 ~ 5850

ISED RSS-247 ISSUE 2		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power or e.i.r.p.	The maximum e.i.r.p. shall not exceed 200 mW (23 dBm) or 10 + 10 $\log_{10}$B, dBm, whichever power is less. B is the 99 % emission bandwidth in megahertz.	5150 ~ 5250
	a. The maximum conducted output power shall not exceed 250 mW (24 dBm) or 11 + 10 $\log_{10}$B dBm, whichever is less. b. The maximum e.i.r.p. shall not exceed 1.0 W (30 dBm) or 17 + 10 $\log_{10}$B dBm, whichever is less. B is the 99 % emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.	5250 ~ 5350 5470 ~ 5600 5650 ~ 5725
	Shall not exceed 1 Watt (30 dBm). The e.i.r.p. shall not exceed 4 W	5725 ~ 5850

Note:
The above limits are based upon the maximum antenna gain does not exceed 6 dBi.
If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.E.

Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep):
(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(ii) Set RBW = 1 MHz.
(iii) Set VBW ≥ 3 MHz.

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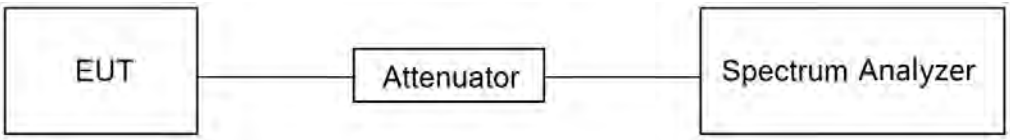
(iv) Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(v) Sweep time = auto.
(vi) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
(vii) If transmit duty cycle < 98 %, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."
(viii) Trace average at least 100 traces in power averaging (rms) mode.
(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

Method PM (Measurement using an RF average power meter):
(i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:
a. The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
b. At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
c. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
(ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in II.B.
(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
(iv) Adjust the measurement in dBm by adding 10 log (1/x) where x is the duty cycle (e.g., 10 log (1/0.25) if the duty cycle is 25 %).

TEST SETUP



TEST ENVIRONMENT

Temperature	25.2℃	Relative Humidity	51.9%
Atmosphere Pressure	101.2kPa	Test Voltage	AC 120V 60Hz

TEST DATE / ENGINEER

Test Date	January 17, 2023	Test By	Walker Yuan

TEST RESULTS

Please refer to section "Test Data" - Appendix B

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7.4. POWER SPECTRAL DENSITY

LIMITS

CFR 47 FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	☐ Outdoor Access Point: 17 dBm/MHz ☐ Indoor Access Point: 17 dBm/MHz ☐ Fixed Point-To-Point Access Points: 17 dBm/MHz ☒ Client Devices: 11 dBm/MHz	5150 ~ 5250
	11 dBm/MHz	5250 ~ 5350 5470 ~ 5725
	30 dBm/500kHz	5725 ~ 5850

ISED RSS-247 ISSUE 2		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.	5150 ~ 5250
	The power spectral density shall not exceed 11 dBm inany 1.0 MHz band.	5250 ~ 5350 5470 ~ 5600 5650 ~ 5725
	30 dBm / 500 kHz	5725 ~ 5850

Note:
The above limits are based upon the maximum antenna gain does not exceed 6 dBi.
If transmitting antennas of directional gain greater than 6 dBi are used, maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.F.

Connect the EUT to the spectrum analyser and use the following settings:

For U-NII-1, U-NII-2A and U-NII-2C band:

Center Frequency	The center frequency of the channel under test
Detector	RMS
RBW	1 MHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

For U-NII-3:

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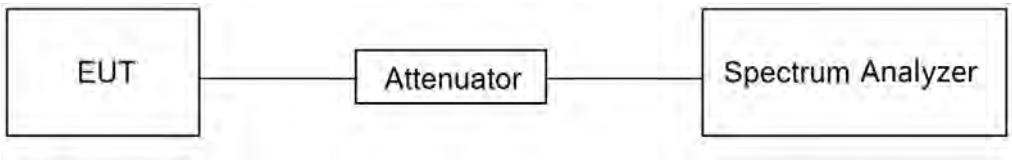
Center Frequency	The center frequency of the channel under test
Detector	RMS
RBW	500 kHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

Allow trace to fully stabilize and Use the peak search function on the instrument to find the peak of the spectrum and record its value.
Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum, the result is the Maximum PSD over 1 MHz / 500 kHz reference bandwidth.

TEST SETUP



TEST ENVIRONMENT

Temperature	25.2℃	Relative Humidity	51.9%
Atmosphere Pressure	101.2kPa	Test Voltage	AC 120V 60Hz

TEST DATE / ENGINEER

Test Date	January 17, 2023	Test By	Walker Yuan

TEST RESULTS

Please refer to section "Test Data" - Appendix C

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7.5. FREQUENCY STABILITY

LIMITS

The frequency of the carrier signal shall be maintained within band of operation.

TEST PROCEDURE

1. The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between 0 °C ~ 40 °C (declared by customer).

2. The temperature was incremented by 10 °C intervals and the unit allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

3. The primary supply voltage is varied from 85 % to 115 % of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	10 kHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

4. While maintaining a constant temperature inside the environmental chamber, turn the EUT on and record the operating frequency at startup, and at 2 minutes, 5minutes, and 10 minutes after the EUT is energized.

5. Allow the trace to stabilize, find the peak value of the power envelope and record the frequency, then calculated the frequency drift.

TEST ENVIRONMENT

	Normal Test Conditions	Extreme Test Conditions
Relative Humidity	20 % - 75 %	/
Atmospheric Pressure	100 kPa ~102 kPa	/
Temperature	T_N (Normal Temperature): 25.1 °C	T_L (Low Temperature): 0 °C
		T_H (High Temperature): 40 °C
Supply Voltage	V_N (Normal Voltage): AC 120 V, 60Hz	V_L (Low Voltage): AC 132 V
		V_H (High Voltage): AC 108 V

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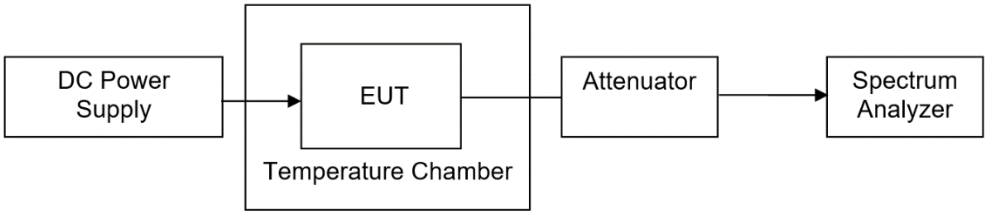
TEST SETUP



TEST ENVIRONMENT

Temperature	25.2℃	Relative Humidity	51.9%
Atmosphere Pressure	101.2kPa	Test Voltage	AC 120V 60Hz

TEST DATE / ENGINEER

Test Date	January 17, 2023	Test By	Walker Yuan

TEST RESULTS

Please refer to section "Test Data" - Appendix G

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8. RADIATED TEST RESULTS

LIMITS

Refer to CFR 47 FCC §15.205, §15.209 and §15.407 (b).

Refer to ISED RSS-GEN Clause 8.9, Clause 8.10 and ISED RSS-247 6.2.

Radiation Disturbance Test Limit for FCC (Class B) (9 kHz ~ 1 GHz)

Emissions radiated outside of the specified frequency bands above 30 MHz			
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m	
		Quasi-Peak	
30 - 88	100	40	
88 - 216	150	43.5	
216 - 960	200	46	
Above 960	500	54	
Above 1000	500	Peak	Average
		74	54

FCC Emissions radiated outside of the specified frequency bands below 30 MHz		
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

ISED General field strength limits at frequencies below 30 MHz

Table 6 – General field strength limits at frequencies below 30 MHz

Frequency	Magnetic field strength (H-Field) (µA/m)	Measurement distance (m)
9 - 490 kHz[Note 1]	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

ISED Restricted bands refer to ISED RSS-GEN Clause 8.10

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Table 7 – Restricted frequency bands[Note 1]		
MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 – 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 – 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 – 8500	
108 – 138		

Note 1: Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

FCC Restricted bands of operation refer to FCC §15.205 (a):

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

Note: [1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2]Above 38.6c

Limits of unwanted/undesirable emission out of the restricted bands refer to CFR 47 FCC §15.407 (b) and ISED RSS-247 6.2.

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1GHz)

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Frequency Range (MHz)	EIRP Limit	Field Strength Limit (dBuV/m) at 3 m
5150~5250 MHz	PK: -27 (dBm/MHz)	PK:68.2(dBμV/m)
5250~5350 MHz		
5470~5725 MHz		
5725~5850 MHz	PK: -27 (dBm/MHz) *1 PK: 10 (dBm/MHz) *2 PK: 15.6 (dBm/MHz) *3 PK: 27 (dBm/MHz) *4	PK: 68.2(dBμV/m) *1 PK: 105.2 (dBμV/m) *2 PK: 110.8(dBμV/m) *3 PK: 122.2 (dBμV/m) *4
Note: *1 beyond 75 MHz or more above of the band edge. *2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. *3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. *4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.		

TEST PROCEDURE

Below 30 MHz

The setting of the spectrum analyser

RBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
VBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
Sweep	Auto

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.4.

2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1 m height antenna tower.

5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

6. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak and average detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak and average detector and reported.

7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KDB 414788.

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8. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω. For example, the measurement frequency X KHz resulted in a level of Y dBuV/m, which is equivalent to Y-51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

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Below 1 GHz and above 30 MHz

The setting of the spectrum analyser

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.5.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

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

5. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

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Above 1 GHz

The setting of the spectrum analyser

RBW	1 MHz
VBW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.G.3 ~ II.G.6.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

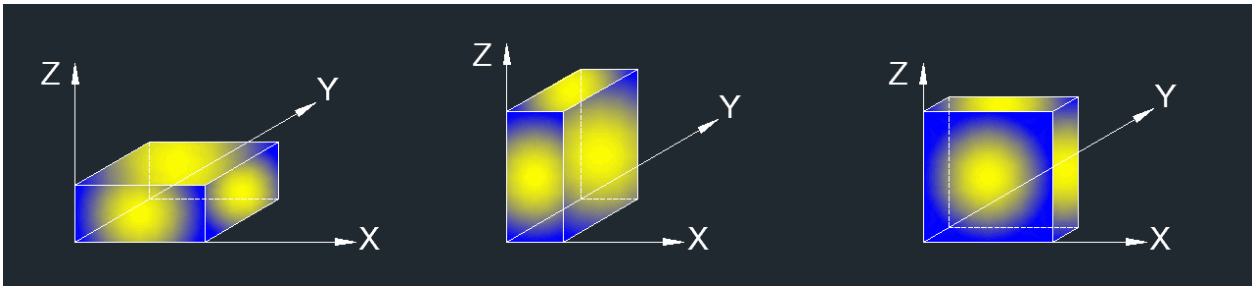
3. The EUT was placed on a turntable with 1.5 m above ground.

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

5. For measurement above 1 GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 7.1.ON TIME AND DUTY CYCLE.

X axis, Y axis, Z axis positions:



Note 1: The manufacturer has recommended that the EUT only be used in the desktop (horizontal) orientation; therefore, all radiated testing was performed in desktop orientation.

The EUT was placed on normal orientation and all radiated emissions were performed with the EUT shown on the setup photo.

Note 2: The EUT was fully exercised with external accessories during the test. In the case of multiple accessory external ports, an external accessory shall be connected to one of each type of port.

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For Band edge note:

1. Measurement = Reading Level + Correct Factor.
2. If the Peak values are less than the Average limit of 54 dBuV/m, the Average result is deemed to comply with Average limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.
5. For the transmitting duration, please refer to clause 7.6.
6. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.
7. Horizontal and Vertical have been tested, only the worst data was recorded in the report.
8. All modes, channels and antennas have been tested, only the worst data was recorded in the report.

For Radiate Spurious emission 1GHz-7GHz note:

Note: 1. Measurement = Reading Level + Correct Factor.
2. If the Peak values are less than the Average limit of 54 dBuV/m, the Average result is deemed to comply with Average limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.
5. For the transmitting duration, please refer to clause 7.6.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band reject filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Since non-restricted band peak emissions are less than the average limit, they also comply with the -27dBm/MHz (68.2dBuV/m) limit.
9. All modes, channels and antennas have been tested, only the worst data was recorded in the report.

For Radiate Spurious emission 7GHz-18GHz note:

Note: 1. Measurement = Reading Level + Correct Factor.
2. If the Peak values are less than the Average limit of 54 dBuV/m, the Average result is deemed to comply with Average limit.
3. Peak: Peak detector.
4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.
5. For the transmitting duration, please refer to clause 7.6.
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.
7. Proper operation of the transmitter prior to adding the filter to the measurement chain.
8. Since non-restricted band peak emissions are less than the average limit, they also comply with the -27dBm/MHz (68.2dBuV/m) limit.
9. All modes, channels and antennas have been tested, only the worst data was recorded in the report.

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For Radiate Spurious emission 9kHz-30MHz note:

Note: 1. Measurement = Reading Level + Correct Factor (dBuA/m= dBuV/m- 20Log10[120π] = dBuV/m- 51.5).

2. If the Peak values are less than the QP limit, the QP result is deemed to comply with QP limit.

3. All 3 polarizations (Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

4. All modes, channels and antennas have been tested, only the worst data was recorded in the report.

For Radiate Spurious emission 18GHz-26GHz note:

Note: 1. Measurement = Reading Level + Correct Factor.

2. If the Peak values are less than the Average limit of 54 dBuV/m, the Average result is deemed to comply with Average limit.

3. Peak: Peak detector.

4. All modes, channels and antennas have been tested, only the worst data was recorded in the report.

For Radiate Spurious emission 26GHz-40GHz note:

Note: 1. Measurement = Reading Level + Correct Factor.

2. If the Peak values are less than the Average limit of 54 dBuV/m, the Average result is deemed to comply with Average limit.

3. Peak: Peak detector.

4. All modes, channels and antennas have been tested, only the worst data was recorded in the report.

For Radiate Spurious emission 30MHz-1GHz note:

1. Result Level = Read Level + Correct Factor.

2. If the Peak values are less than the QP limit, the QP result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

4. All modes, channels and antennas have been tested, only the worst data was recorded in the report.

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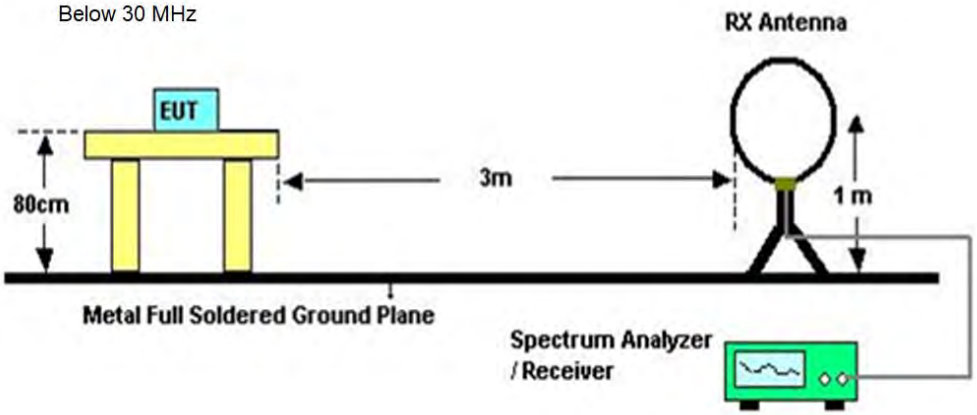
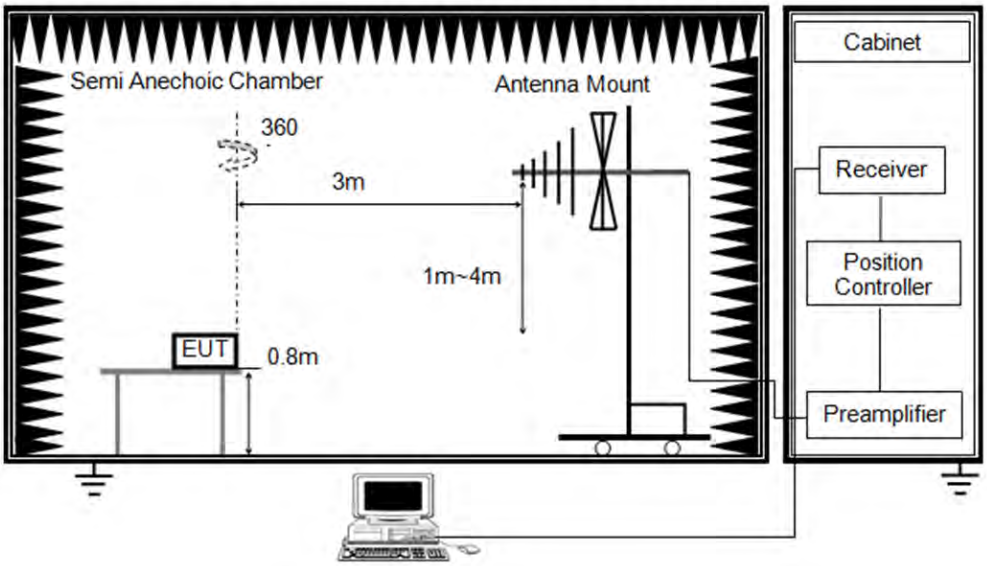
TEST SETUP

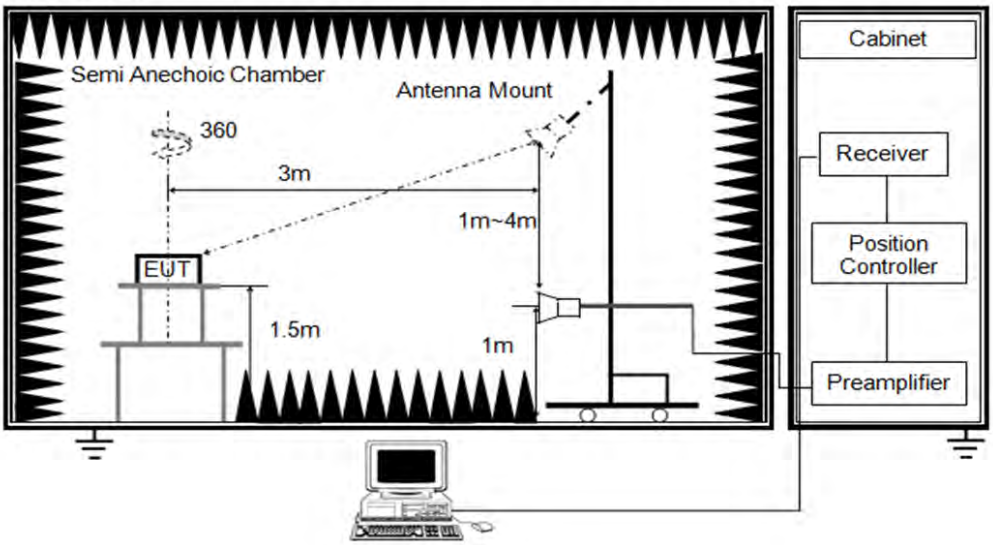
Below 30 MHz



Below 1 GHz and above 30 MHz



Above 1 GHz



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TEST ENVIRONMENT

Temperature	25.2℃	Relative Humidity	65%
Atmosphere Pressure	101kPa	Test Voltage	

TEST DATE / ENGINEER

Test Date	January 16, 2023	Test By	Rex Huang

TEST RESULTS

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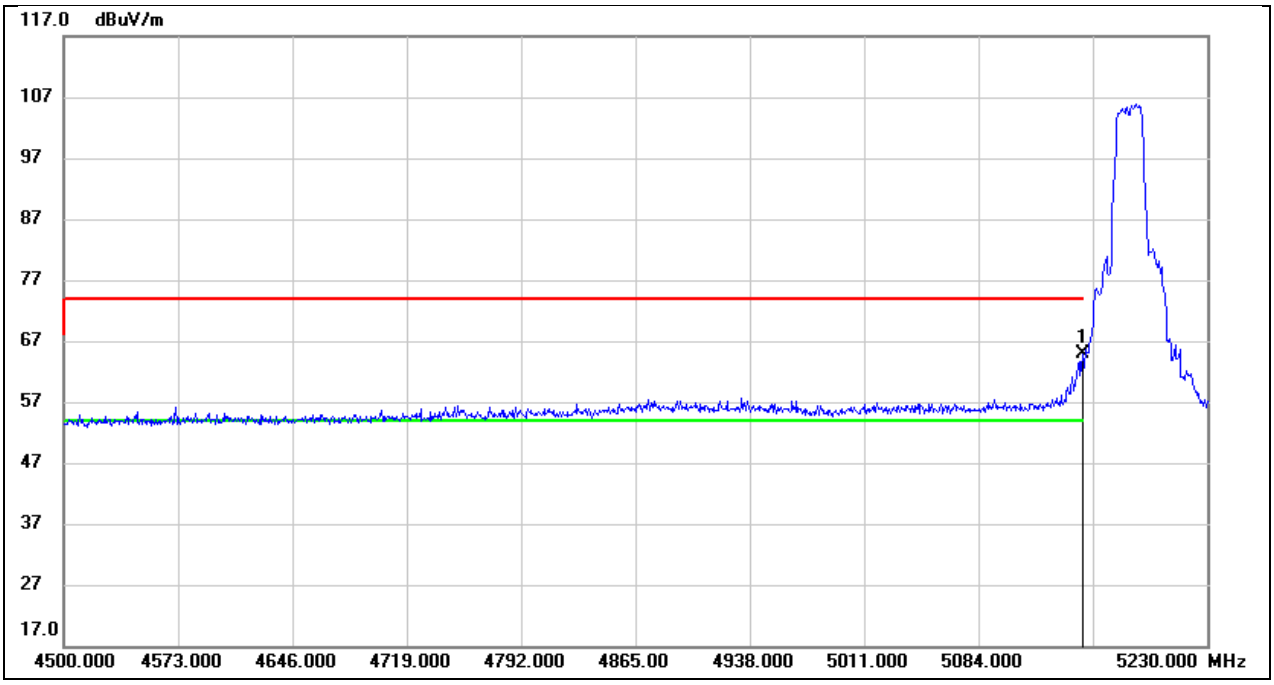
8.1. RESTRICTED BANDEDGE

Test Mode:	802.11a 20 PK	Channel:	5180
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	24.64	40.27	64.91	74.00	-9.09	peak

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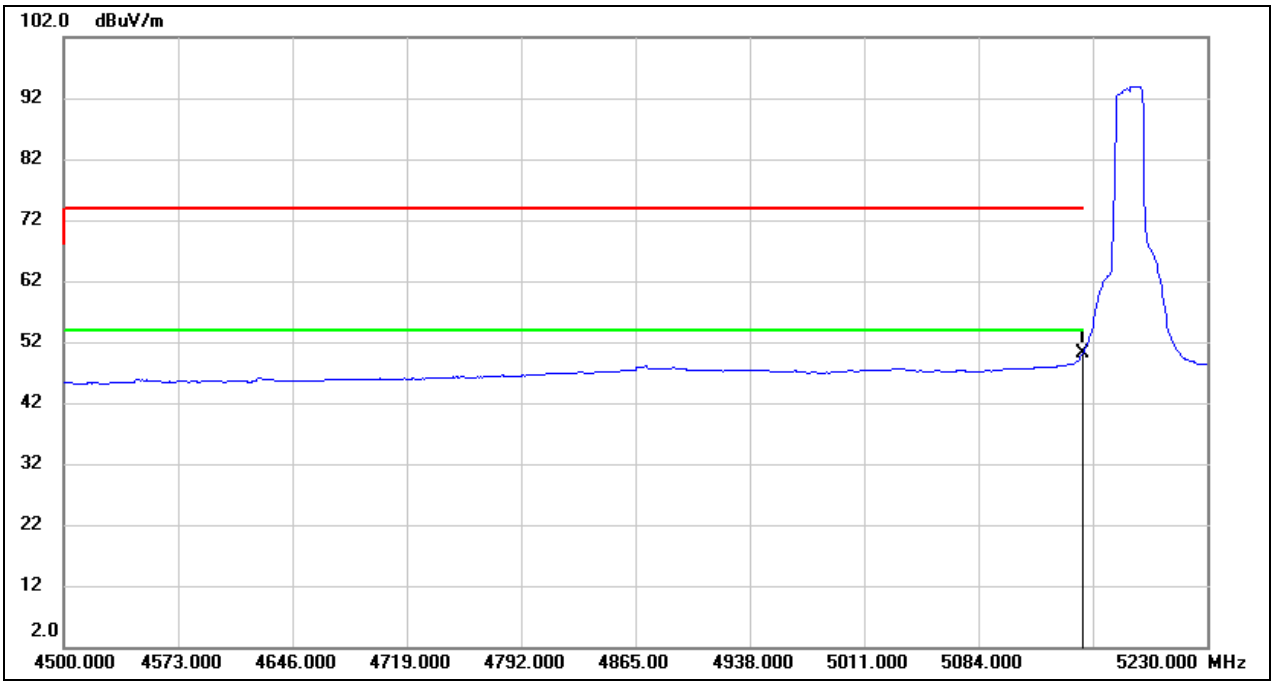
Test Mode:	802.11a 20 AV	Channel:	5180
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5150.000	9.85	40.27	50.12	54.00	-3.88	AVG

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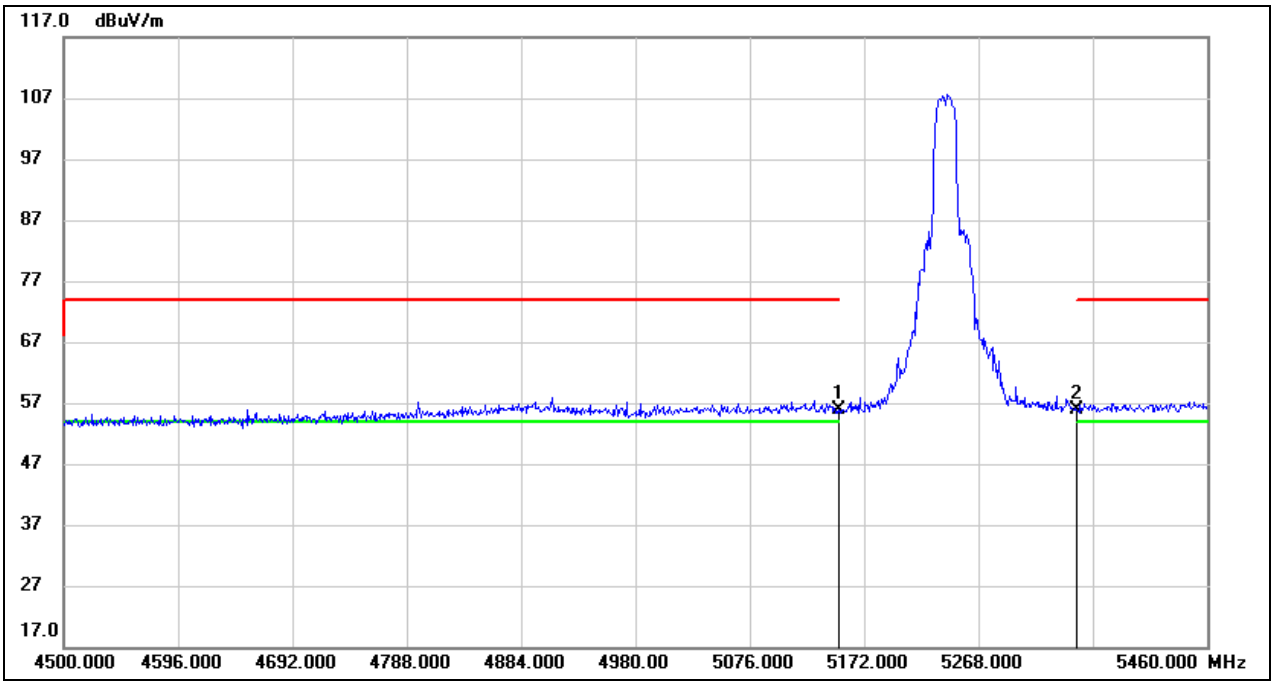
Test Mode:	802.11a 20 PK	Channel:	5240
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5150.000	15.71	40.27	55.98	74.00	-18.02	peak
2	5350.000	15.50	40.49	55.99	74.00	-18.01	peak

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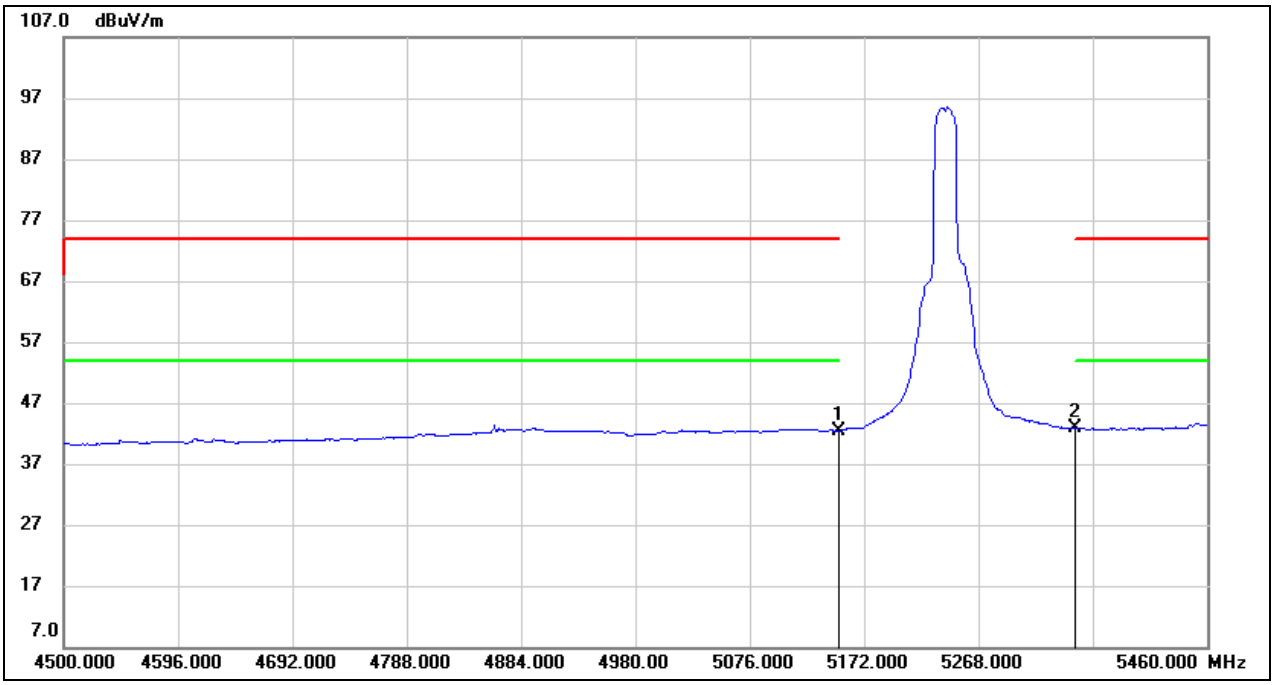
Test Mode:	802.11a 20 AV	Channel:	5240
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5150.000	2.13	40.27	42.40	54.00	-11.60	AVG
2	5350.000	2.40	40.49	42.89	54.00	-11.11	AVG

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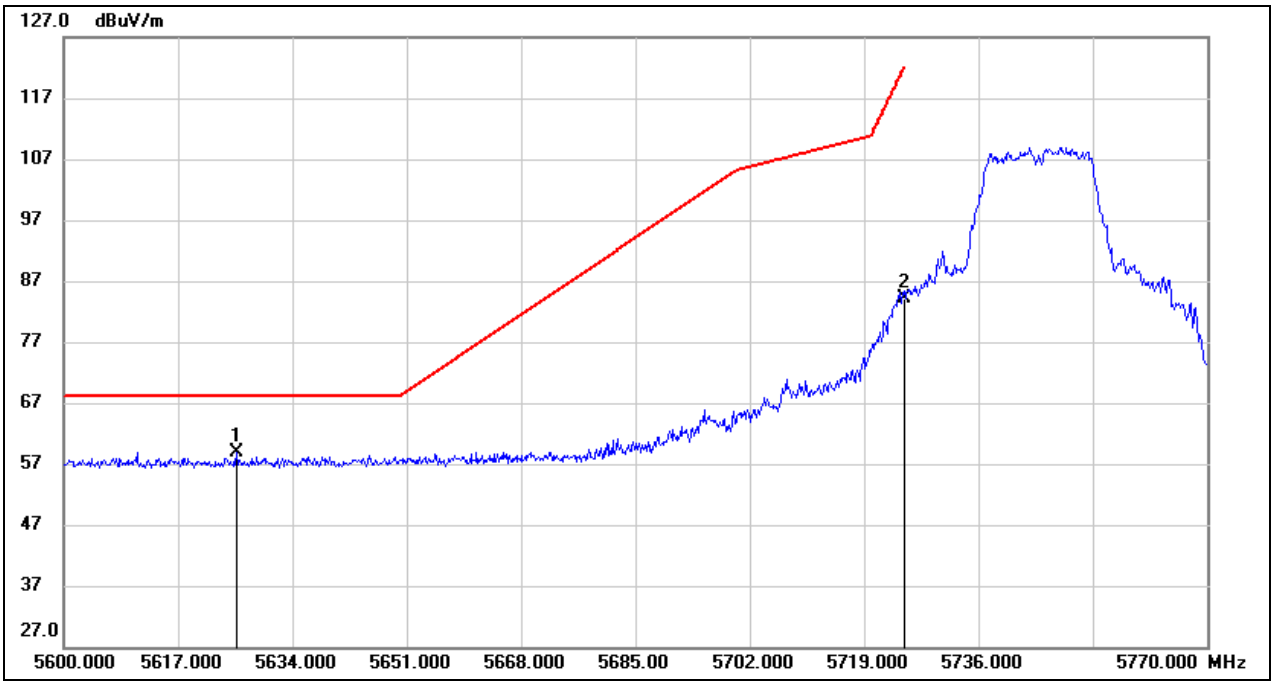
Test Mode:	802.11a 20 PK	Channel:	5745
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5625.670	17.89	41.00	58.89	68.20	-9.31	peak
2	5725.000	42.87	41.27	84.14	122.20	-38.06	peak

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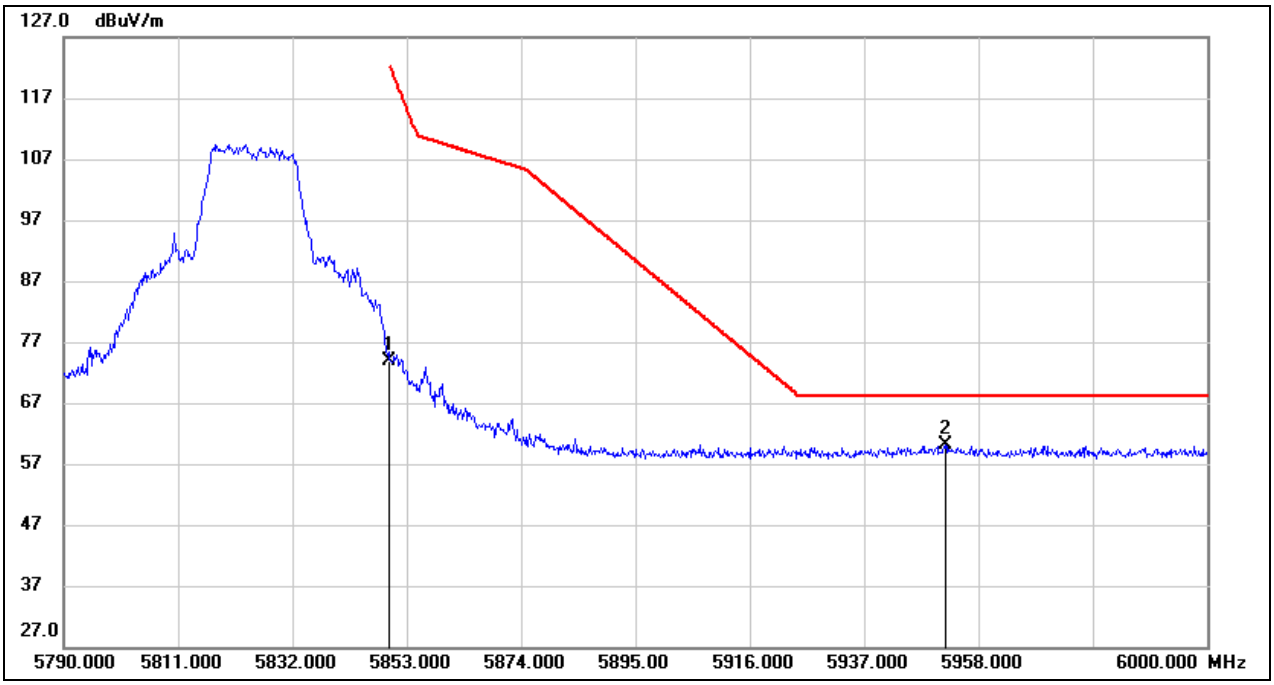
Test Mode:	802.11a 20 PK	Channel:	5825
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	32.22	41.60	73.82	122.20	-48.38	peak
2	5951.910	18.22	41.87	60.09	68.20	-8.11	peak

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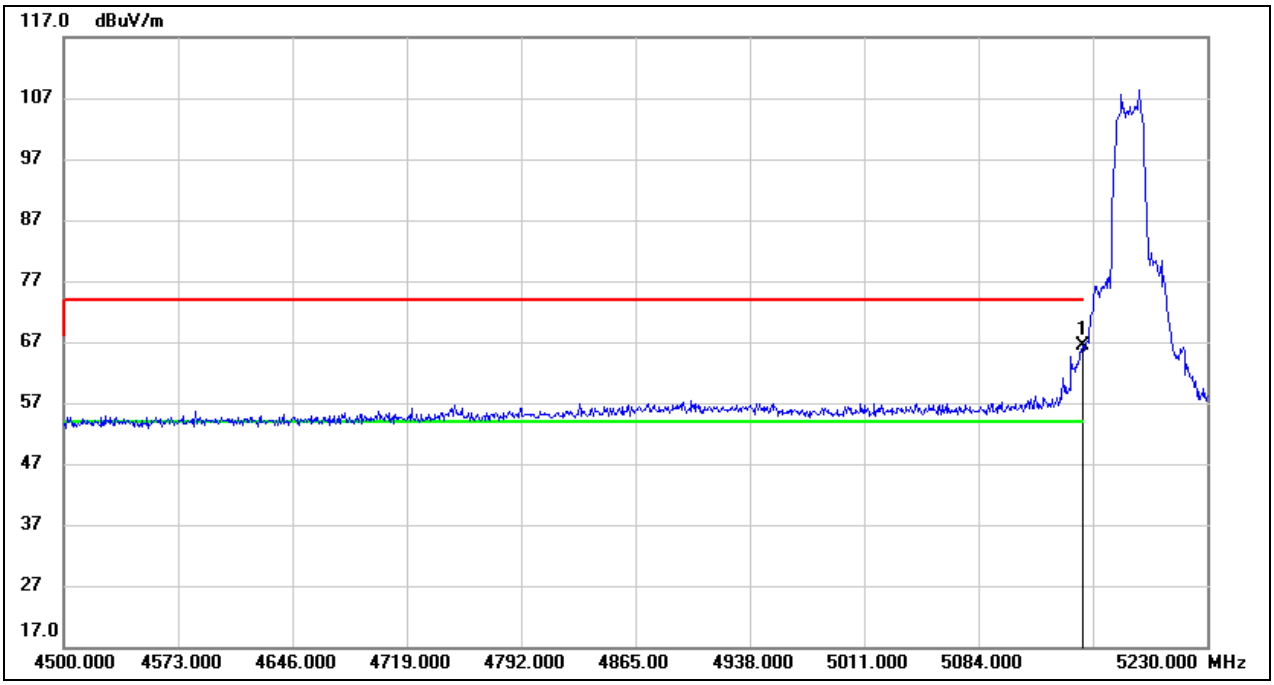
Test Mode:	802.11n HT20 PK	Channel:	5180
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5150.000	26.06	40.27	66.33	74.00	-7.67	peak

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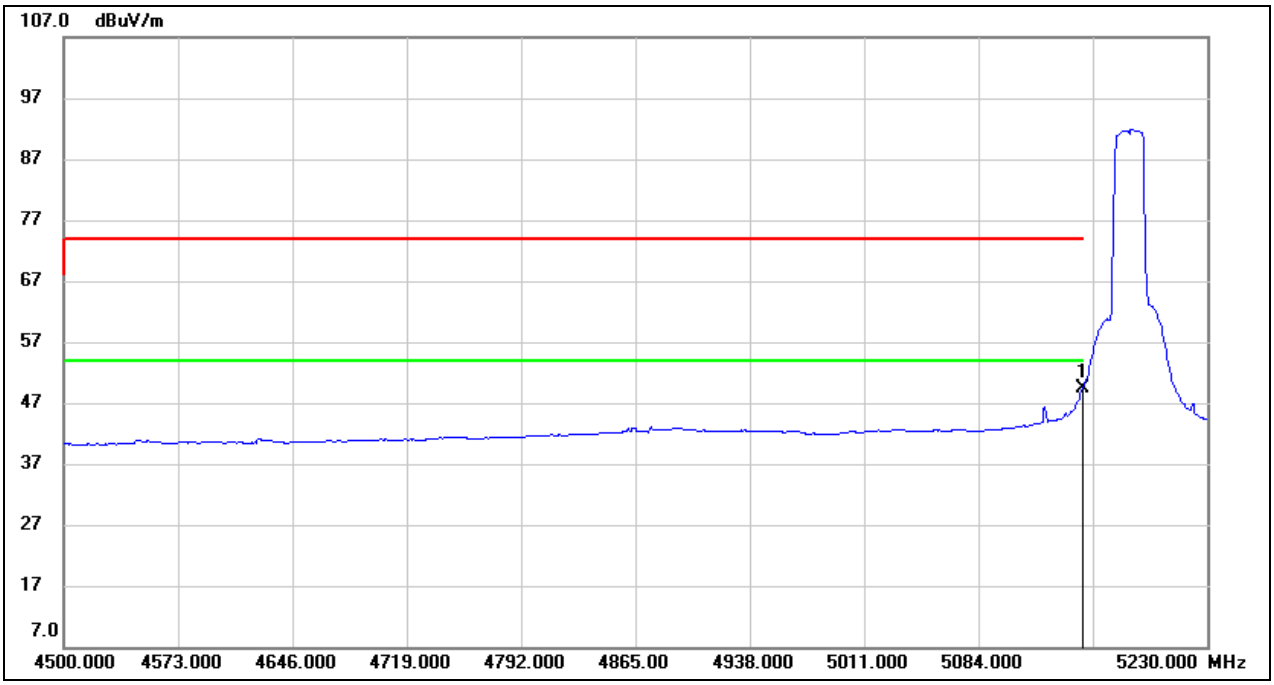
Test Mode:	802.11n HT20 AV	Channel:	5180
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5150.000	9.05	40.27	49.32	54.00	-4.68	AVG

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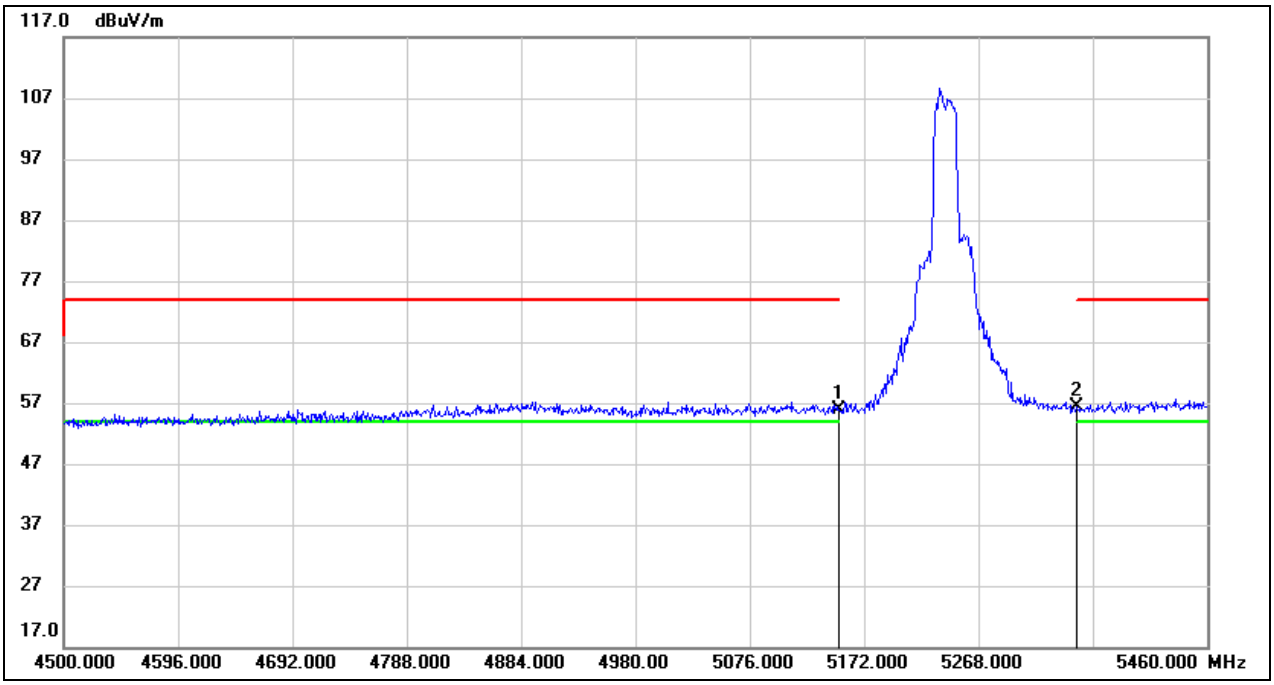
Test Mode:	802.11n HT20 PK	Channel:	5240
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5150.000	15.71	40.27	55.98	74.00	-18.02	peak
2	5350.000	15.89	40.49	56.38	74.00	-17.62	peak

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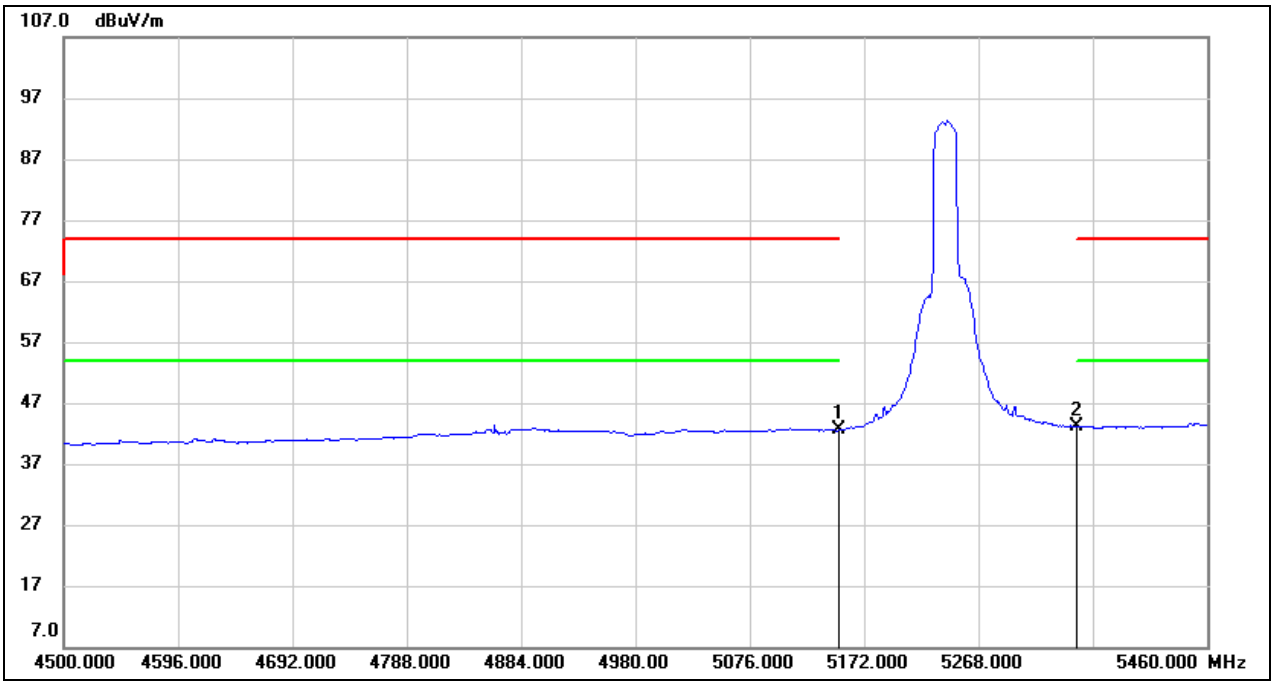
Test Mode:	802.11n HT20 AV	Channel:	5240
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5150.000	2.30	40.27	42.57	54.00	-11.43	AVG
2	5350.000	2.66	40.49	43.15	54.00	-10.85	AVG

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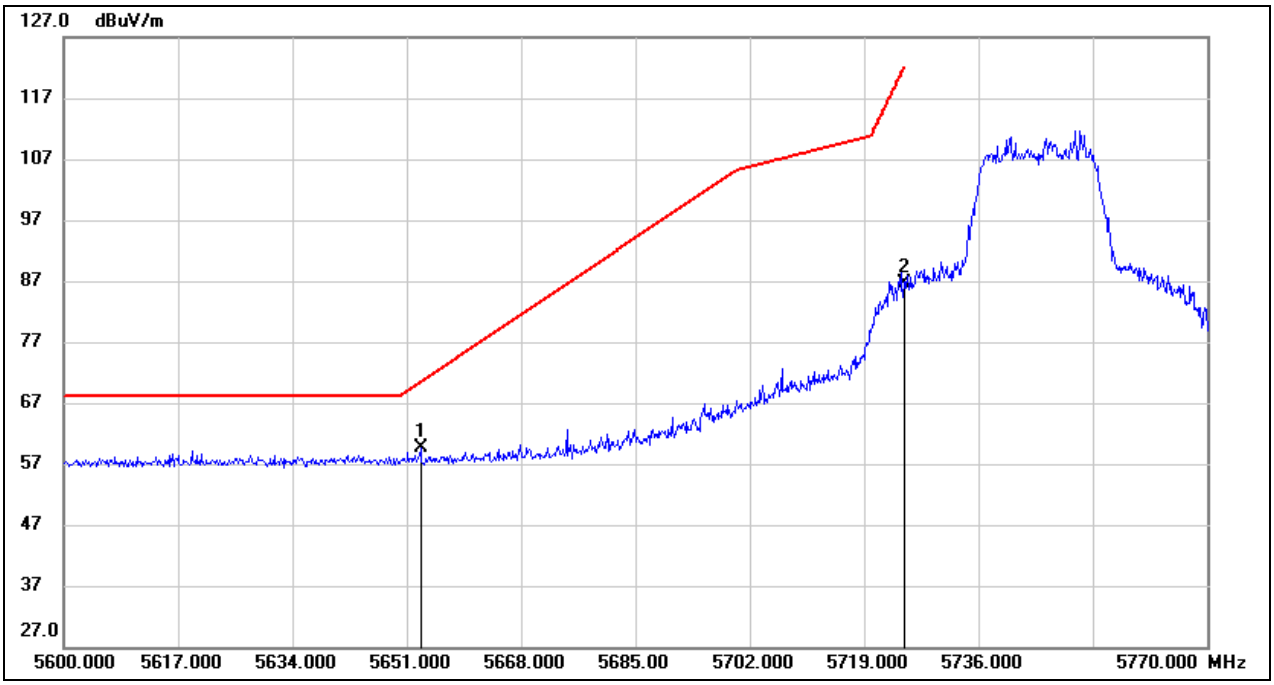
Test Mode:	802.11n HT20 PK	Channel:	5745
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5653.040	18.53	41.07	59.60	70.46	-10.86	peak
2	5725.000	45.28	41.27	86.55	122.20	-35.65	peak

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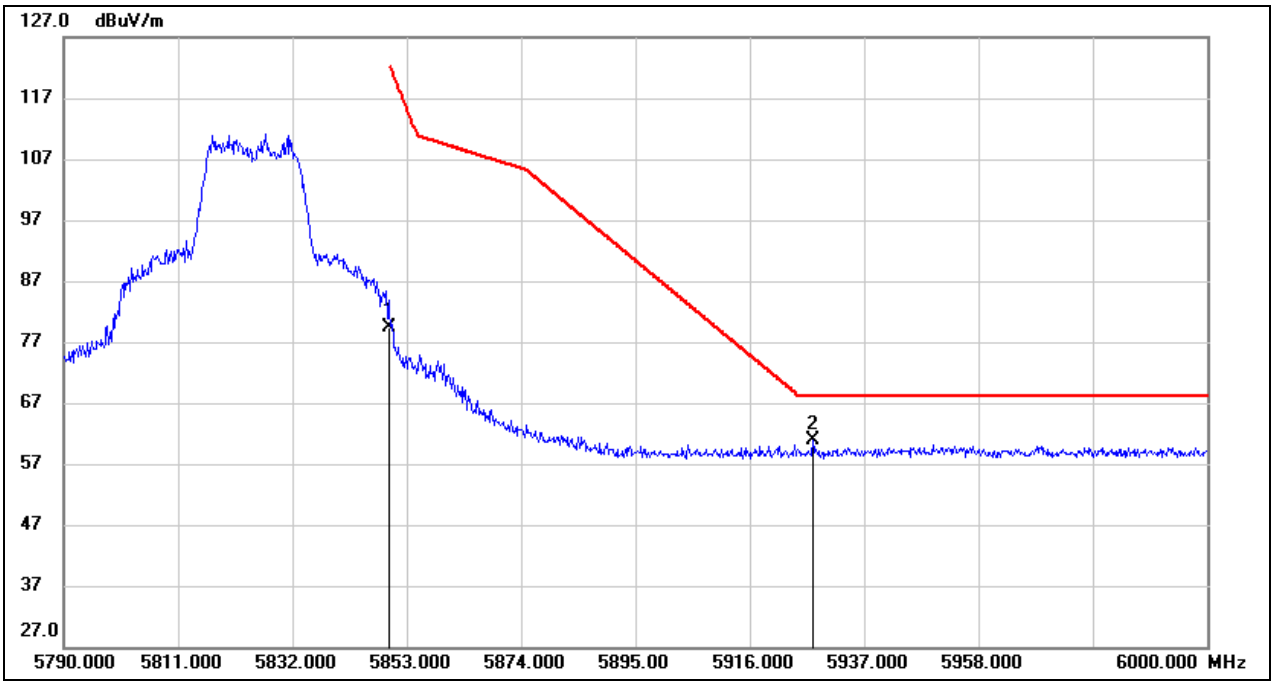
Test Mode:	802.11n HT20 PK	Channel:	5825
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	37.90	41.60	79.50	122.20	-42.70	peak
2	5927.550	18.95	41.81	60.76	68.20	-7.44	peak

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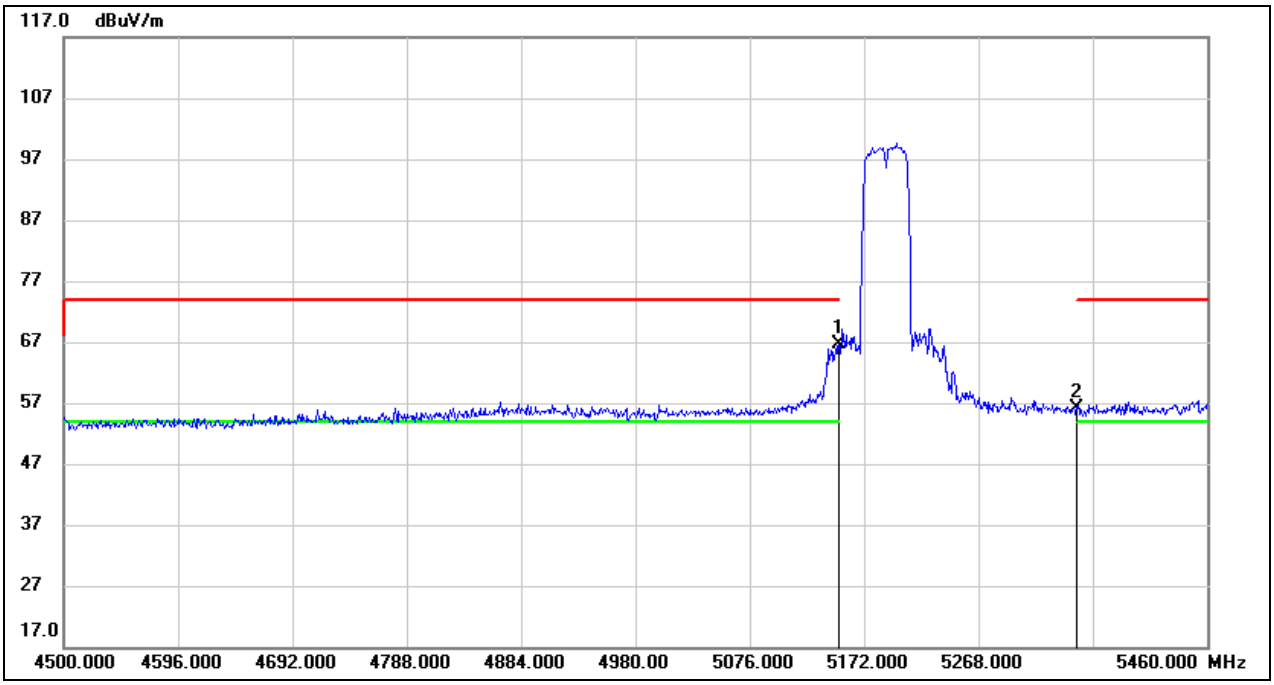
Test Mode:	802.11n HT40 PK	Channel:	5190
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5150.000	26.45	40.27	66.72	74.00	-7.28	peak
2	5350.000	15.52	40.49	56.01	74.00	-17.99	peak

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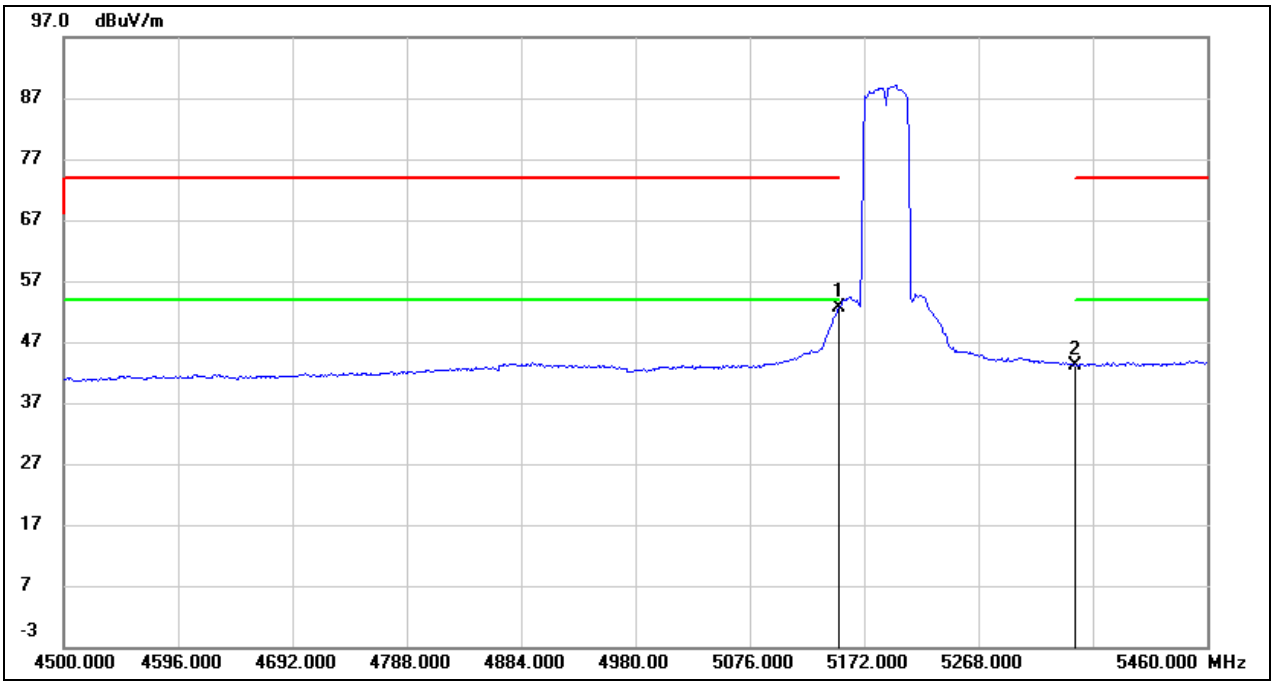
Test Mode:	802.11n HT40 AV	Channel:	5190
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5150.000	12.32	40.27	52.59	54.00	-1.41	AVG
2	5350.000	2.74	40.49	43.23	54.00	-10.77	AVG

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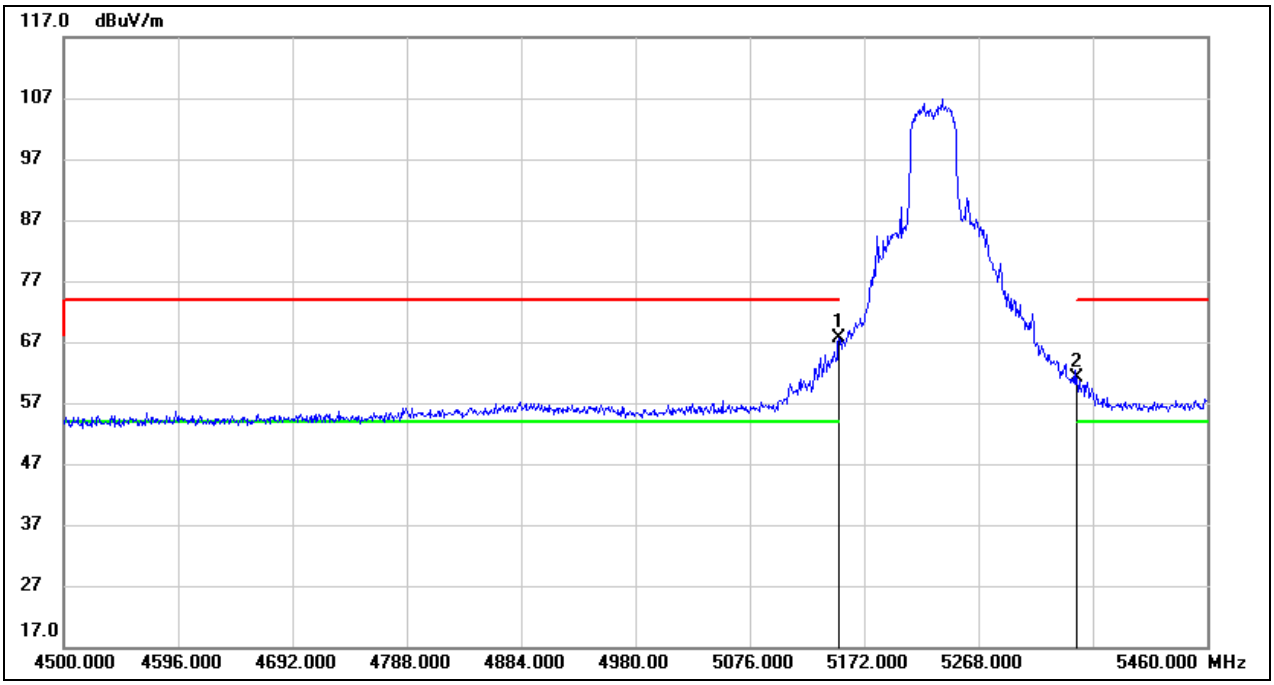
Test Mode:	802.11n HT40 PK	Channel:	5230
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5150.000	27.38	40.27	67.65	74.00	-6.35	peak
2	5350.000	20.74	40.49	61.23	74.00	-12.77	peak

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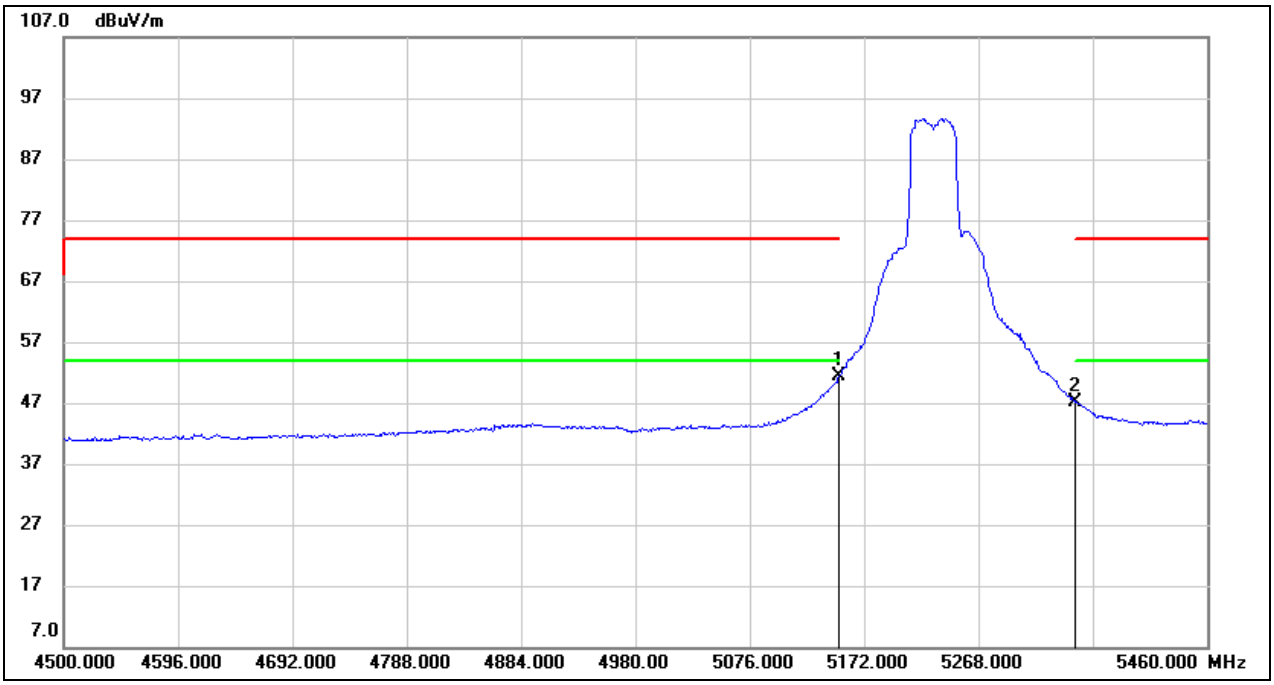
Test Mode:	802.11n HT40 AV	Channel:	5230
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5150.000	11.05	40.27	51.32	54.00	-2.68	AVG
2	5350.000	6.53	40.49	47.02	54.00	-6.98	AVG

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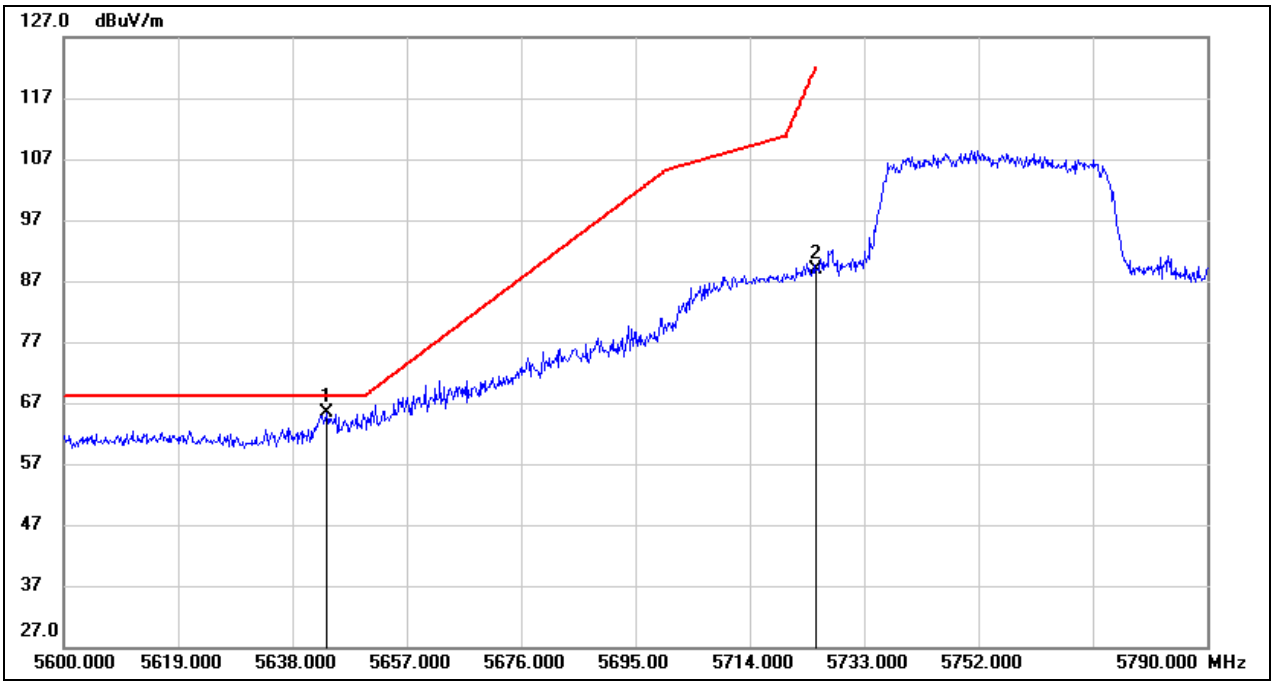
Test Mode:	802.11n HT40 PK	Channel:	5755
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5643.700	24.30	41.04	65.34	68.20	-2.86	peak
2	5725.000	47.57	41.27	88.84	122.20	-33.36	peak

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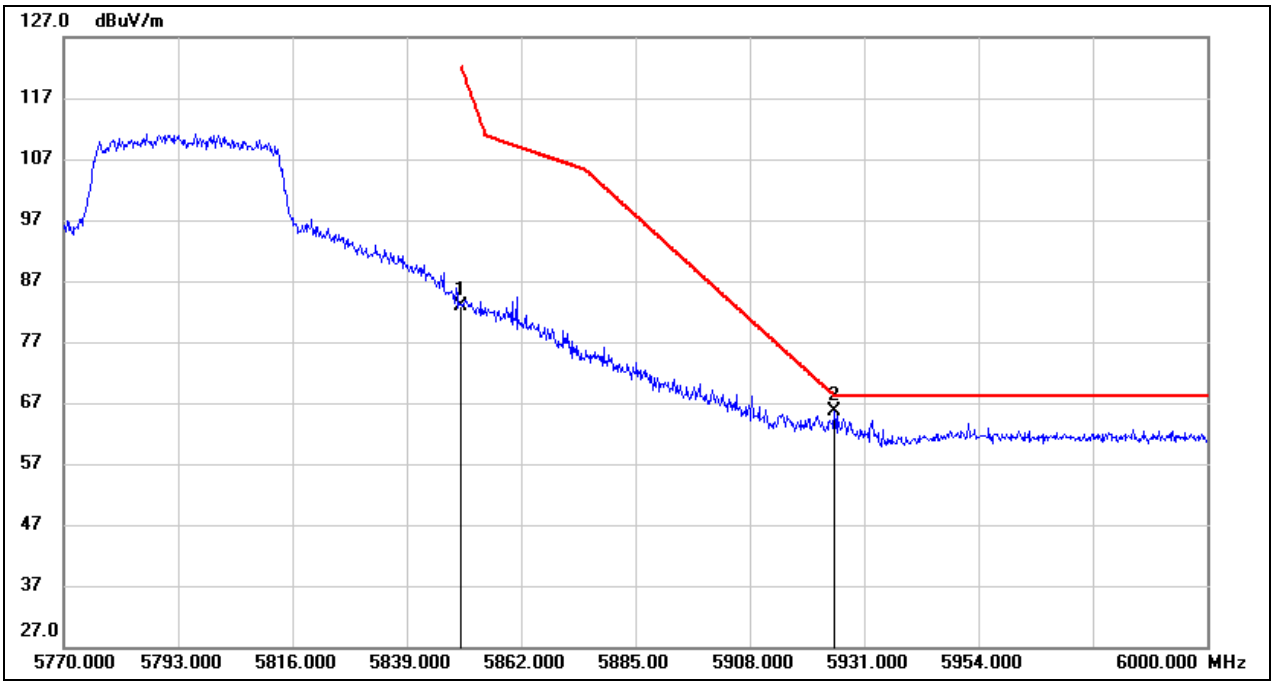
Test Mode:	802.11n HT40 PK	Channel:	5795
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	41.23	41.60	82.83	122.20	-39.37	peak
2	5925.020	23.82	41.80	65.62	68.20	-2.58	peak

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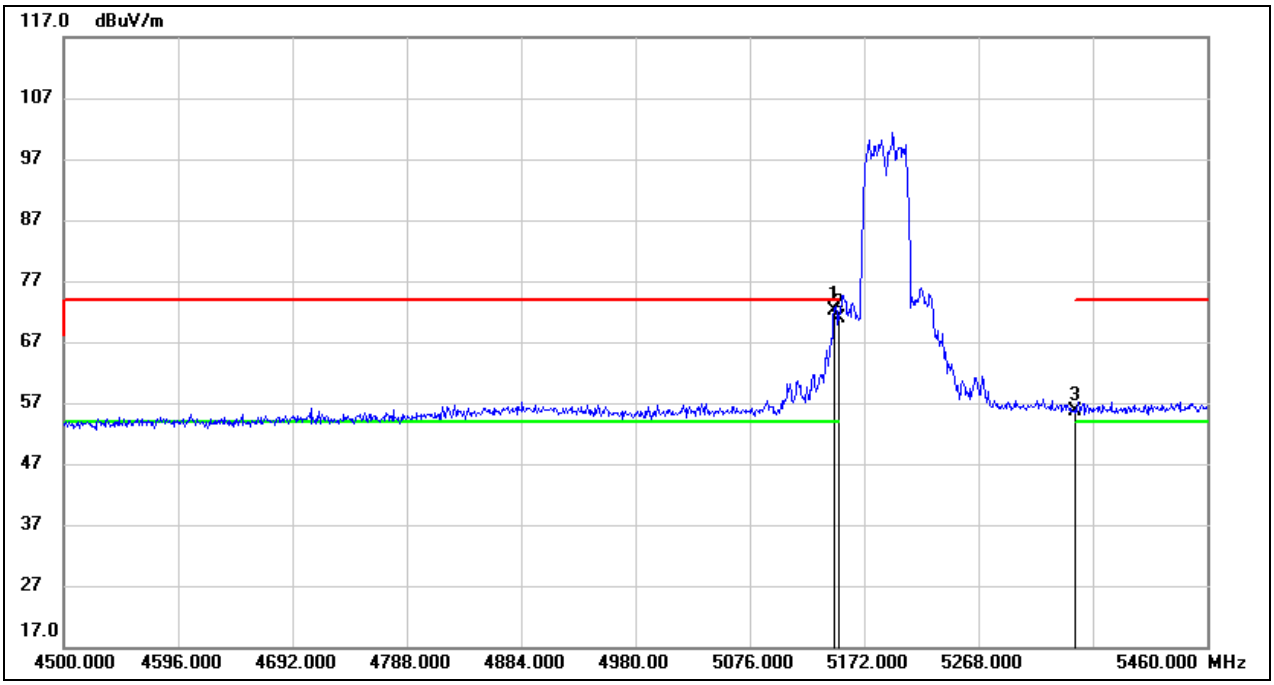
Test Mode:	802.11ac VHT40 PK	Channel:	5190
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5147.040	31.98	40.27	72.25	74.00	-1.75	peak
2	5150.000	30.73	40.27	71.00	74.00	-3.00	peak
3	5350.000	15.11	40.49	55.60	74.00	-18.40	peak

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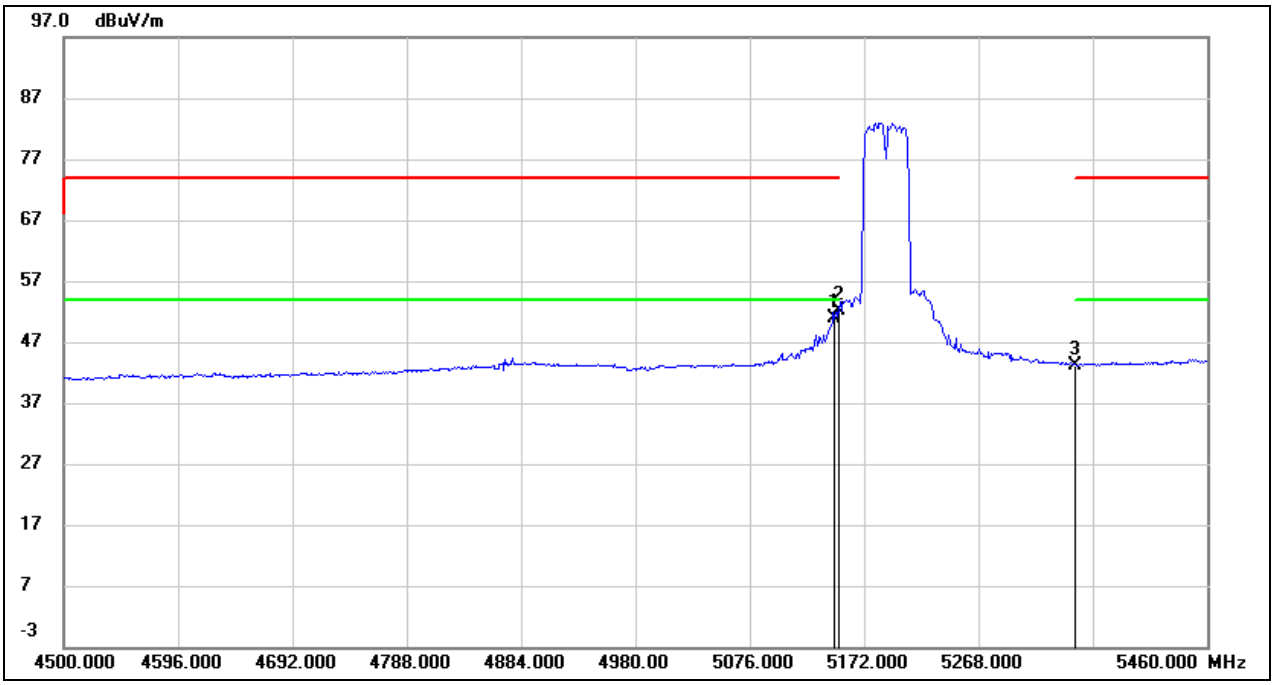
Test Mode:	802.11ac VHT40 AV	Channel:	5190
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5147.040	10.61	40.27	50.88	54.00	-3.12	AVG
2	5150.000	11.88	40.27	52.15	54.00	-1.85	AVG
3	5350.000	2.69	40.49	43.18	54.00	-10.82	AVG

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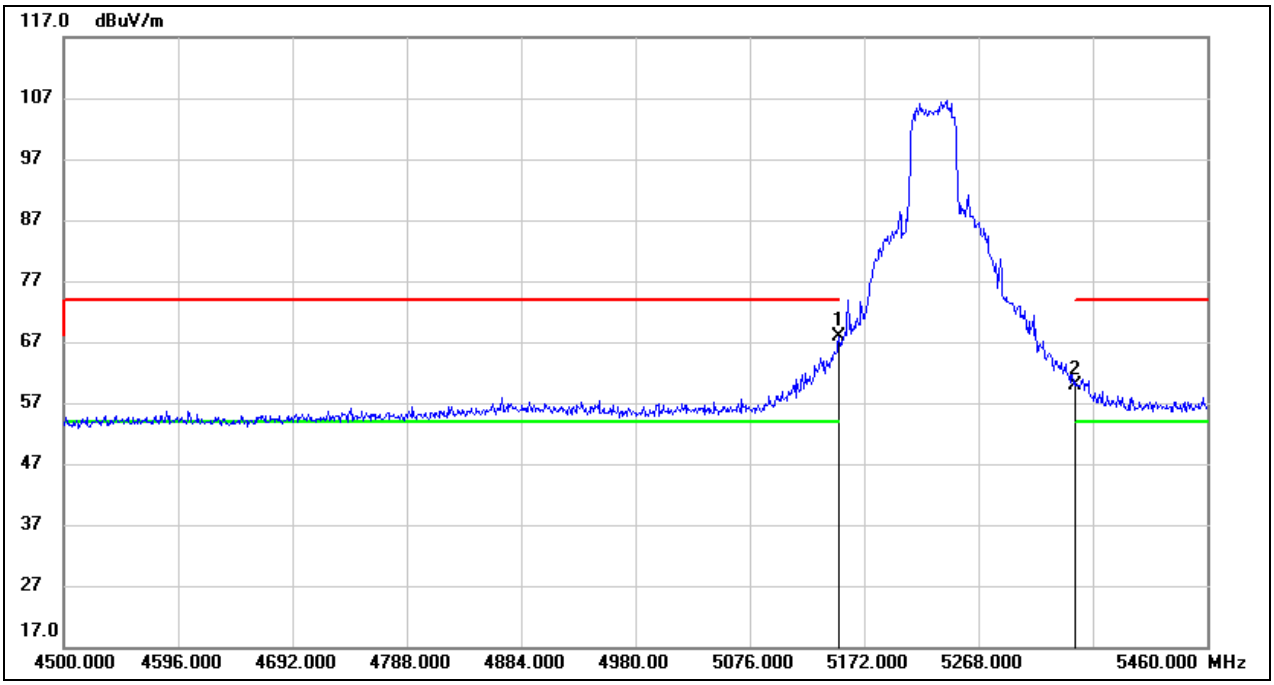
Test Mode:	802.11ac VHT40 PK	Channel:	5230
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5150.000	27.66	40.27	67.93	74.00	-6.07	peak
2	5350.000	19.36	40.49	59.85	74.00	-14.15	peak

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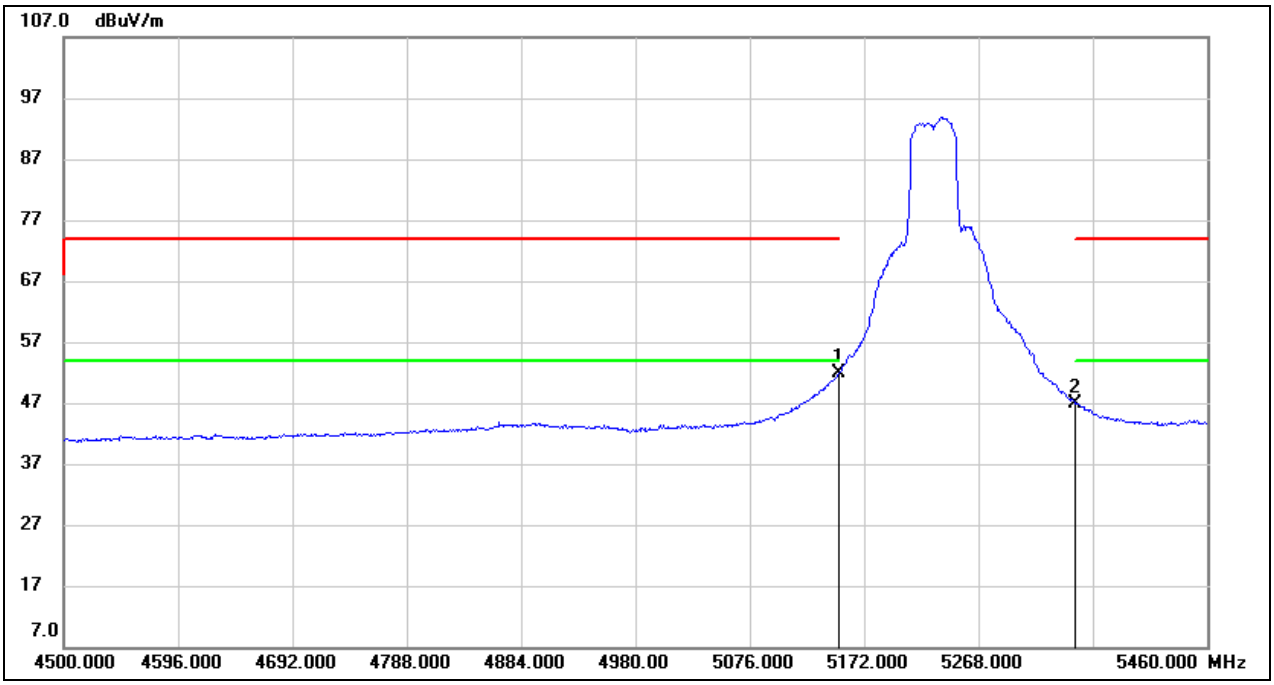
Test Mode:	802.11ac VHT40 AV	Channel:	5230
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5150.000	11.53	40.27	51.80	54.00	-2.20	AVG
2	5350.000	6.39	40.49	46.88	54.00	-7.12	AVG

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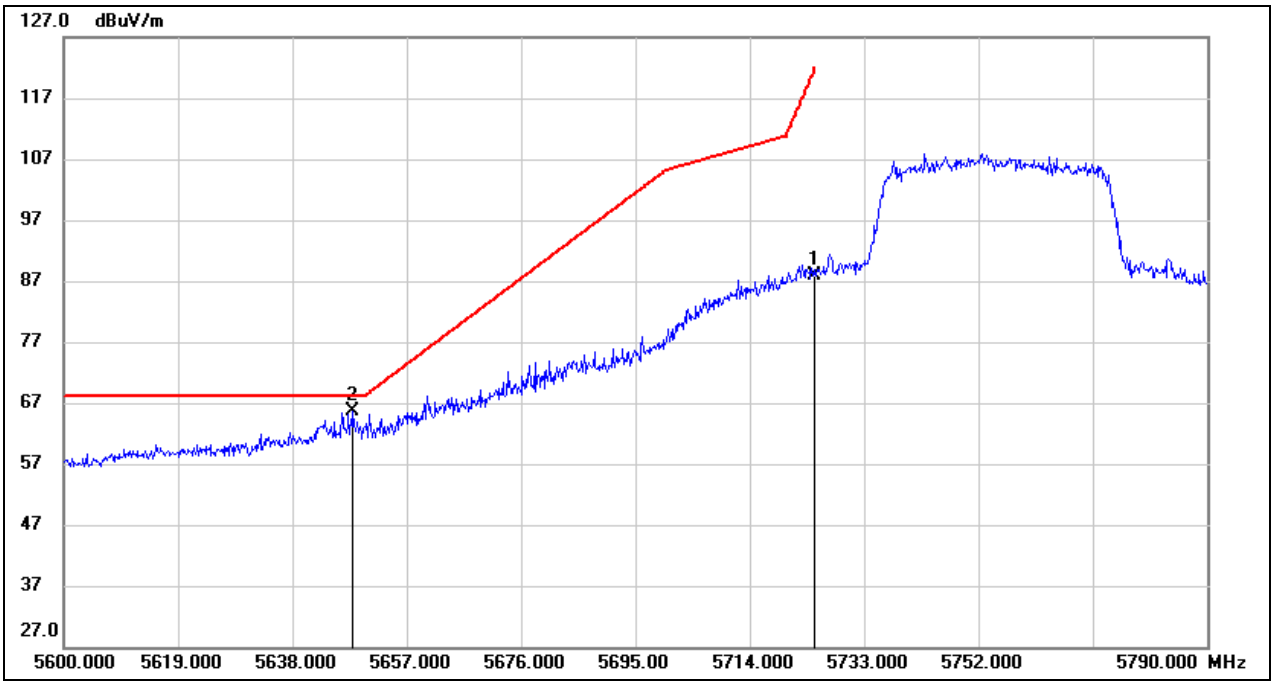
Test Mode:	802.11ac VHT40 PK	Channel:	5755
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5725.000	46.71	41.27	87.98	122.20	-34.22	peak
2	5648.070	24.45	41.06	65.51	68.20	-2.69	peak

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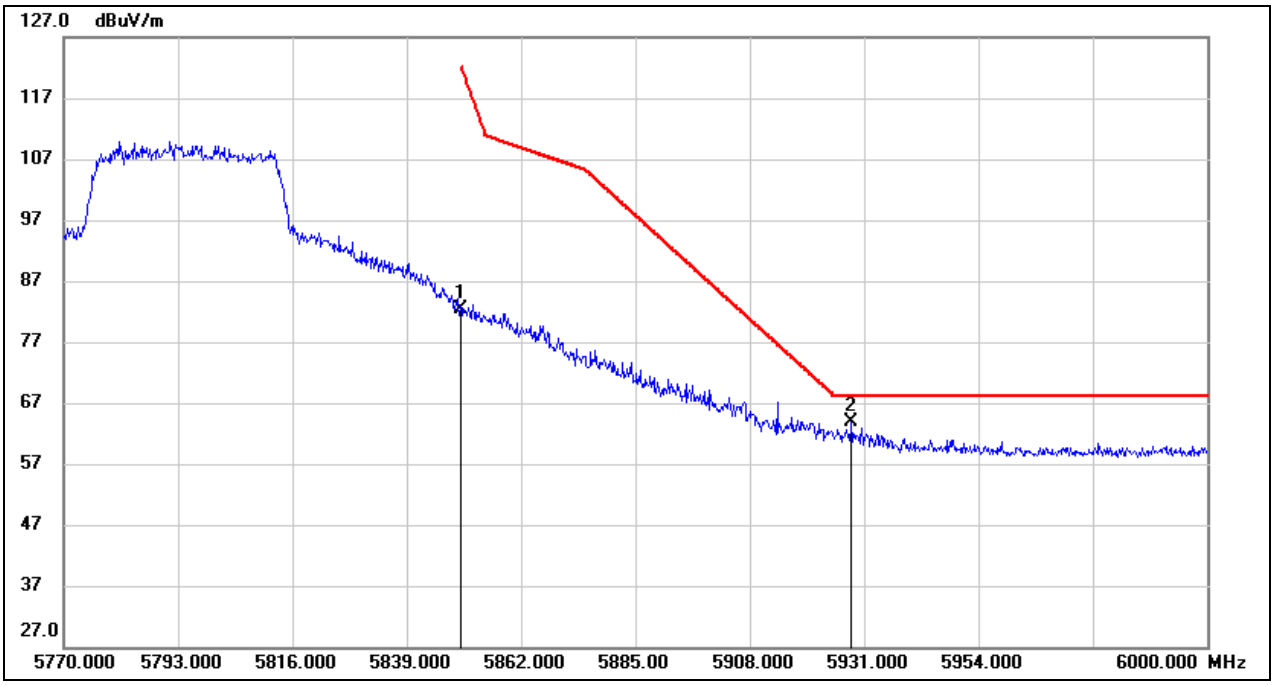
Test Mode:	802.11ac VHT40 PK	Channel:	5795
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	40.80	41.60	82.40	122.20	-39.80	peak
2	5928.470	22.12	41.81	63.93	68.20	-4.27	peak

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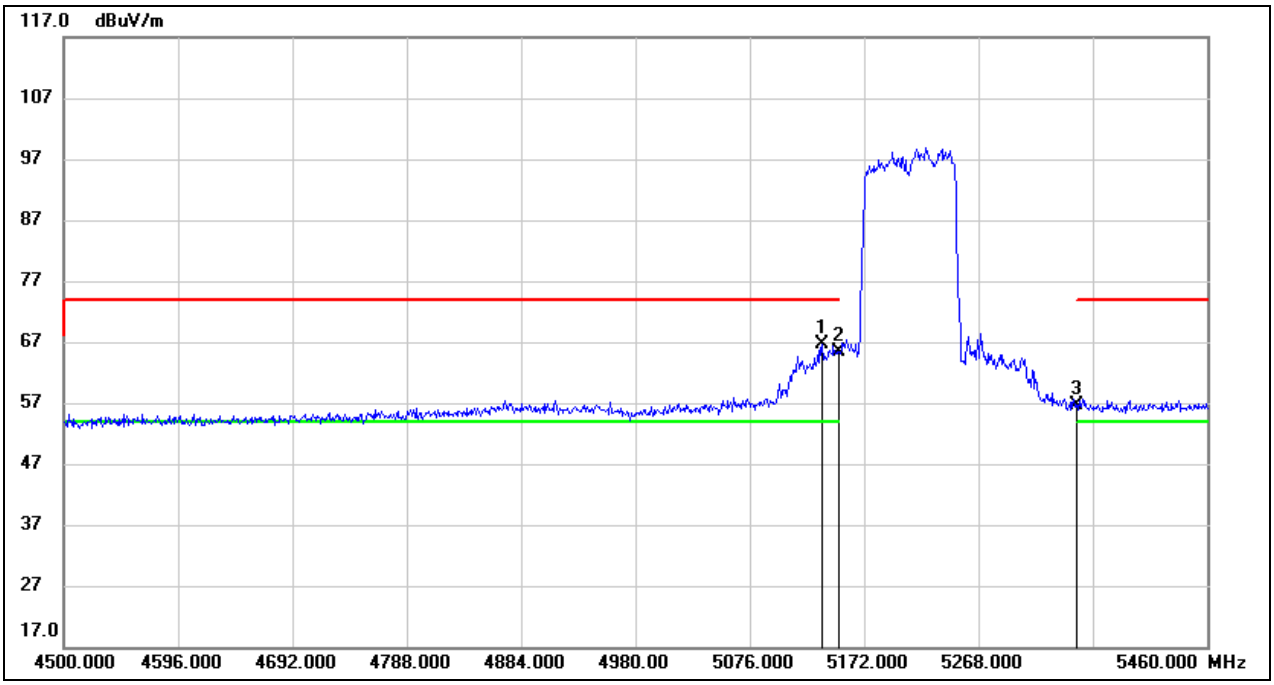
Test Mode:	802.11ac VHT80 PK	Channel:	5210
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5136.480	26.33	40.26	66.59	74.00	-7.41	peak
2	5150.000	25.06	40.27	65.33	74.00	-8.67	peak
3	5350.000	16.19	40.49	56.68	74.00	-17.32	peak

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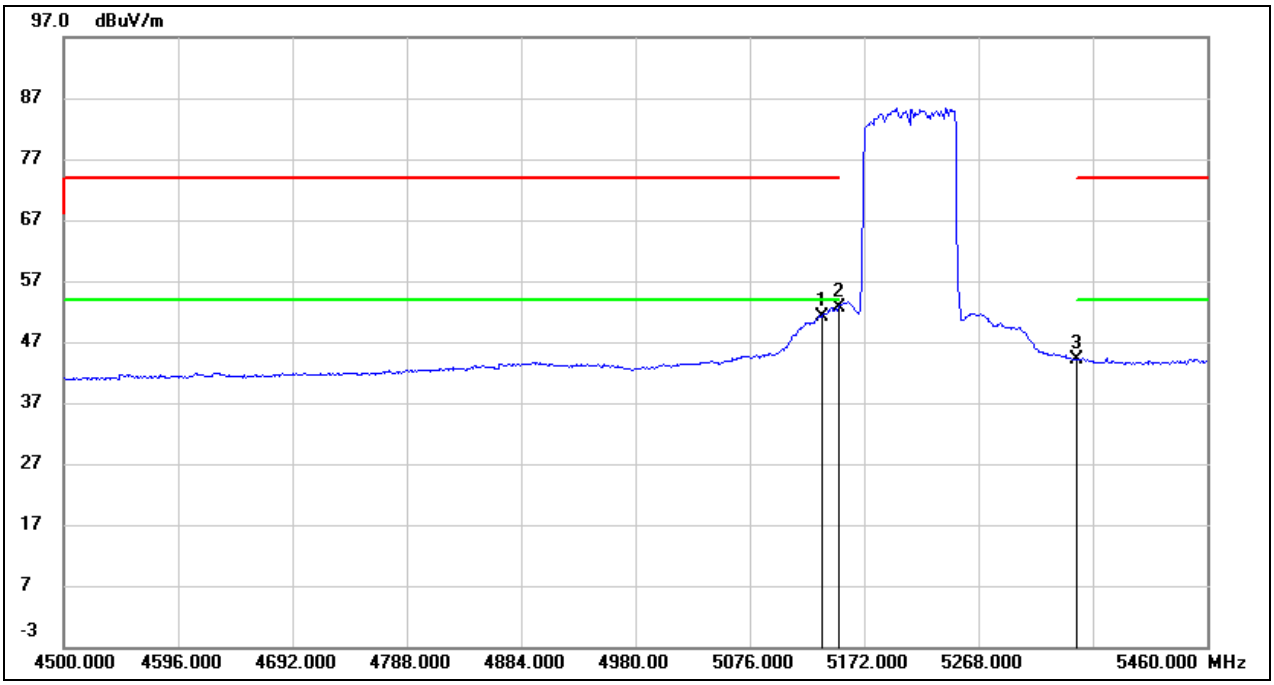
Test Mode:	802.11ac VHT80 AV	Channel:	5210
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5136.480	10.99	40.26	51.25	54.00	-2.75	AVG
2	5150.000	12.35	40.27	52.62	54.00	-1.38	AVG
3	5350.000	3.63	40.49	44.12	54.00	-9.88	AVG

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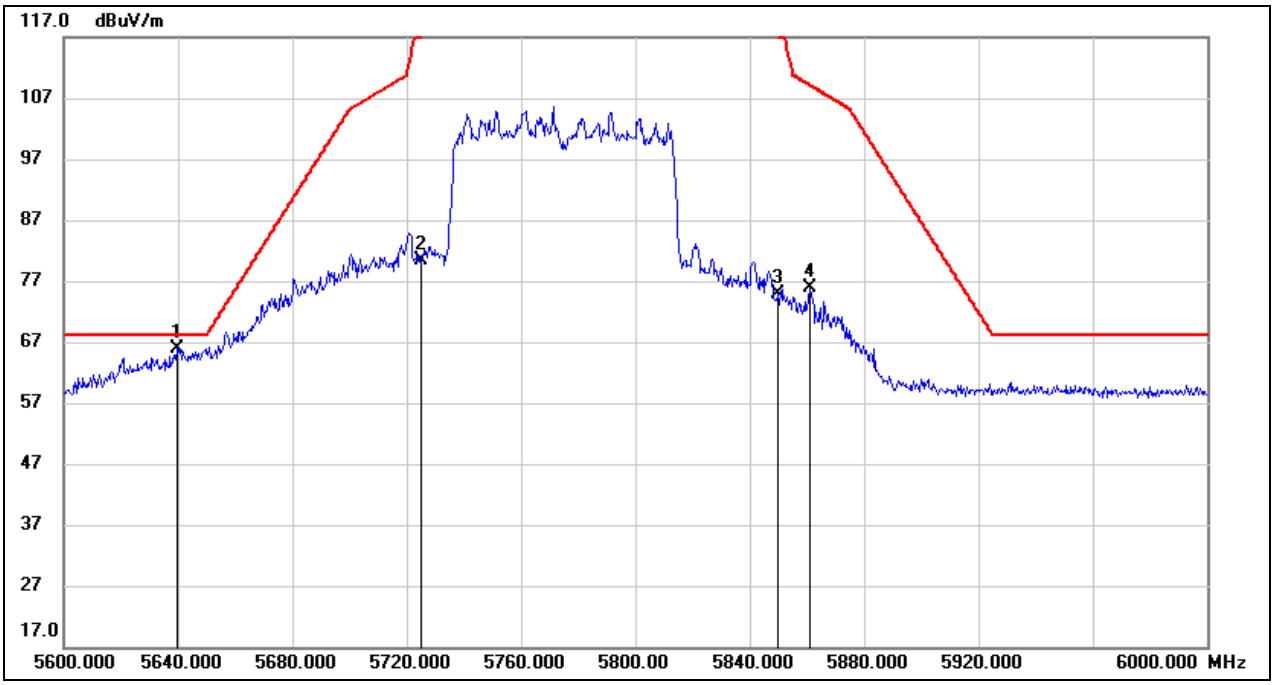
Test Mode:	802.11ac VHT80 PK	Channel:	5775
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5639.600	24.96	41.03	65.99	68.20	-2.21	peak
2	5725.000	39.16	41.27	80.43	122.20	-41.77	peak
3	5850.000	33.17	41.60	74.77	122.20	-47.43	peak
4	5861.200	34.23	41.63	75.86	109.06	-33.20	peak

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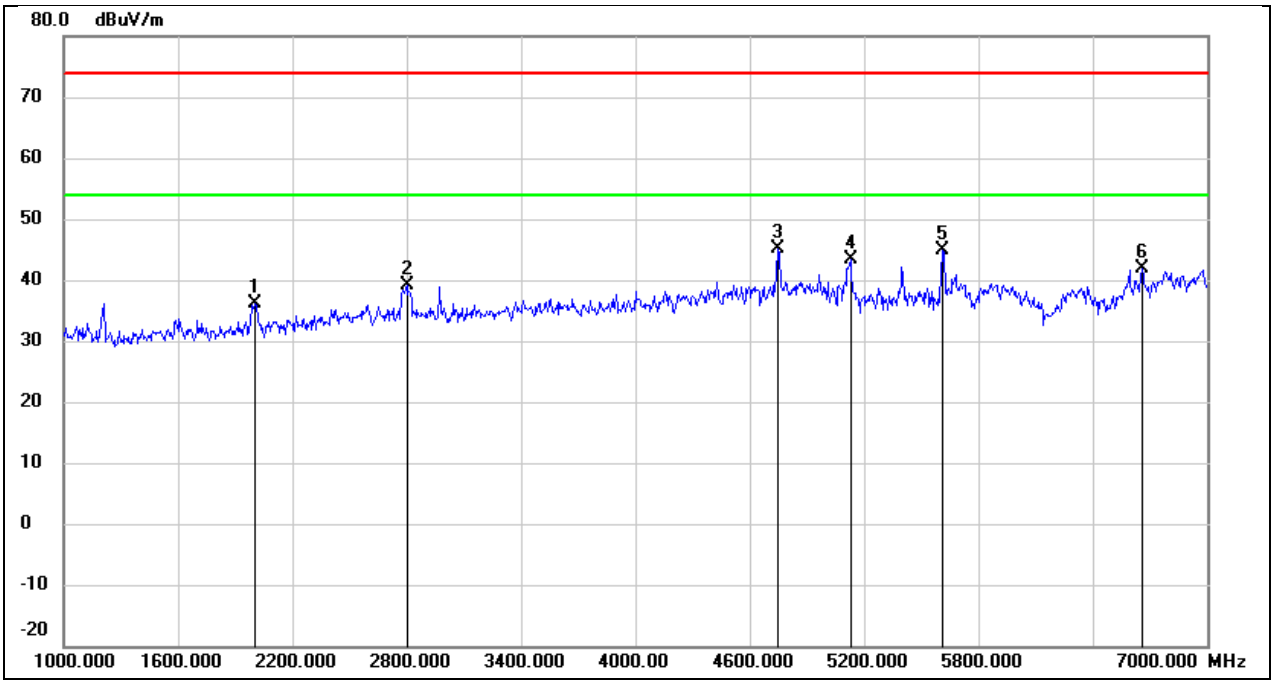
8.2. SPURIOUS EMISSIONS(1 GHZ~7 GHZ)

Test Mode:	802.11a 20	Channel:	5180
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2002.000	47.18	-11.05	36.13	74.00	-37.87	peak
2	2800.000	46.80	-7.58	39.22	74.00	-34.78	peak
3	4744.000	46.33	-1.17	45.16	74.00	-28.84	peak
4	5128.000	43.30	0.00	43.30	74.00	-30.70	peak
5	5614.000	44.09	0.74	44.83	74.00	-29.17	peak
6	6658.000	37.47	4.49	41.96	74.00	-32.04	peak

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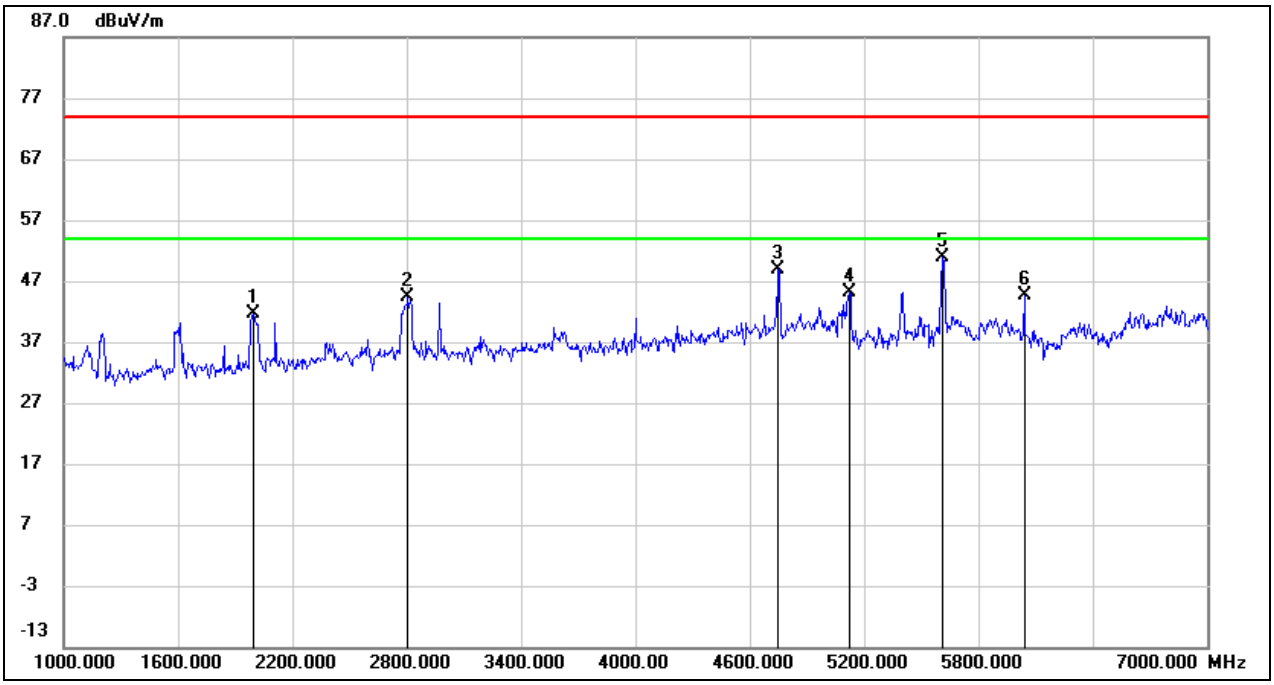
Test Mode:	802.11a 20	Channel:	5180
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1996.000	52.81	-11.07	41.74	74.00	-32.26	peak
2	2806.000	51.91	-7.57	44.34	74.00	-29.66	peak
3	4750.000	50.11	-1.14	48.97	74.00	-25.03	peak
4	5122.000	45.27	-0.02	45.25	74.00	-28.75	peak
5	5614.000	50.18	0.74	50.92	74.00	-23.08	peak
6	6040.000	42.62	1.99	44.61	74.00	-29.39	peak

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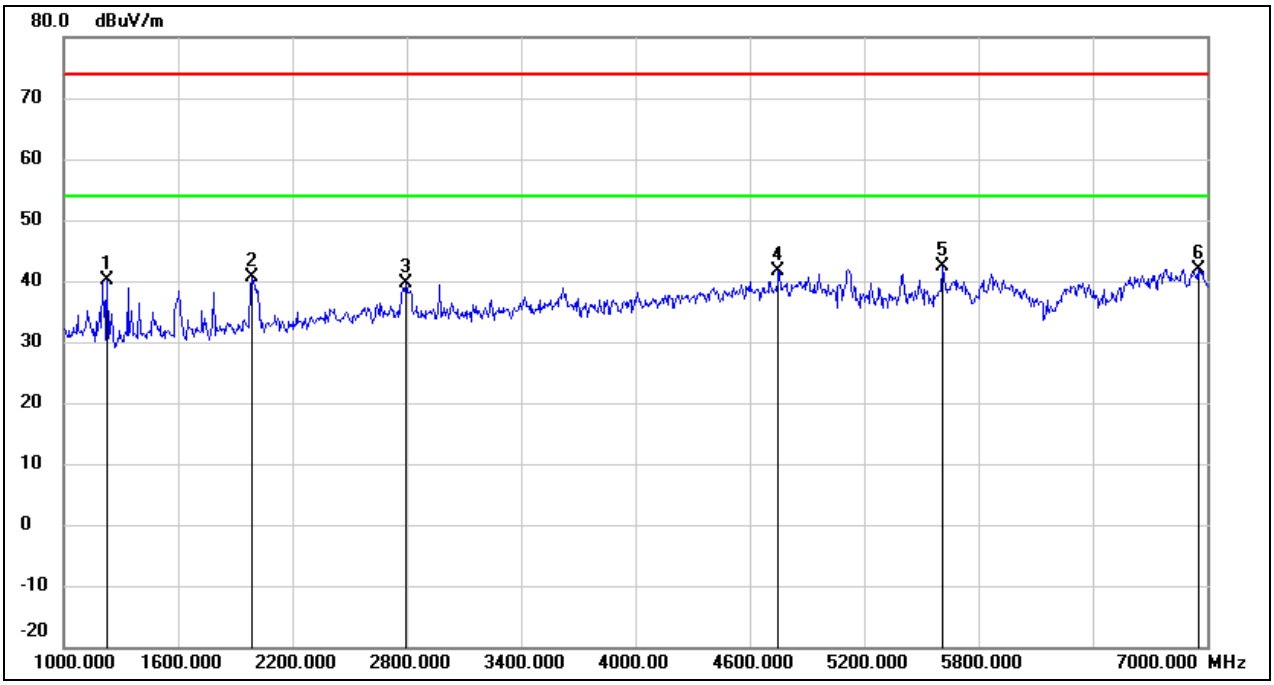
Test Mode:	802.11a 20	Channel:	5200
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1228.000	54.17	-13.97	40.20	74.00	-33.80	peak
2	1990.000	51.71	-11.09	40.62	74.00	-33.38	peak
3	2794.000	47.17	-7.60	39.57	74.00	-34.43	peak
4	4750.000	42.80	-1.14	41.66	74.00	-32.34	peak
5	5608.000	41.73	0.73	42.46	74.00	-31.54	peak
6	6952.000	35.92	5.96	41.88	74.00	-32.12	peak

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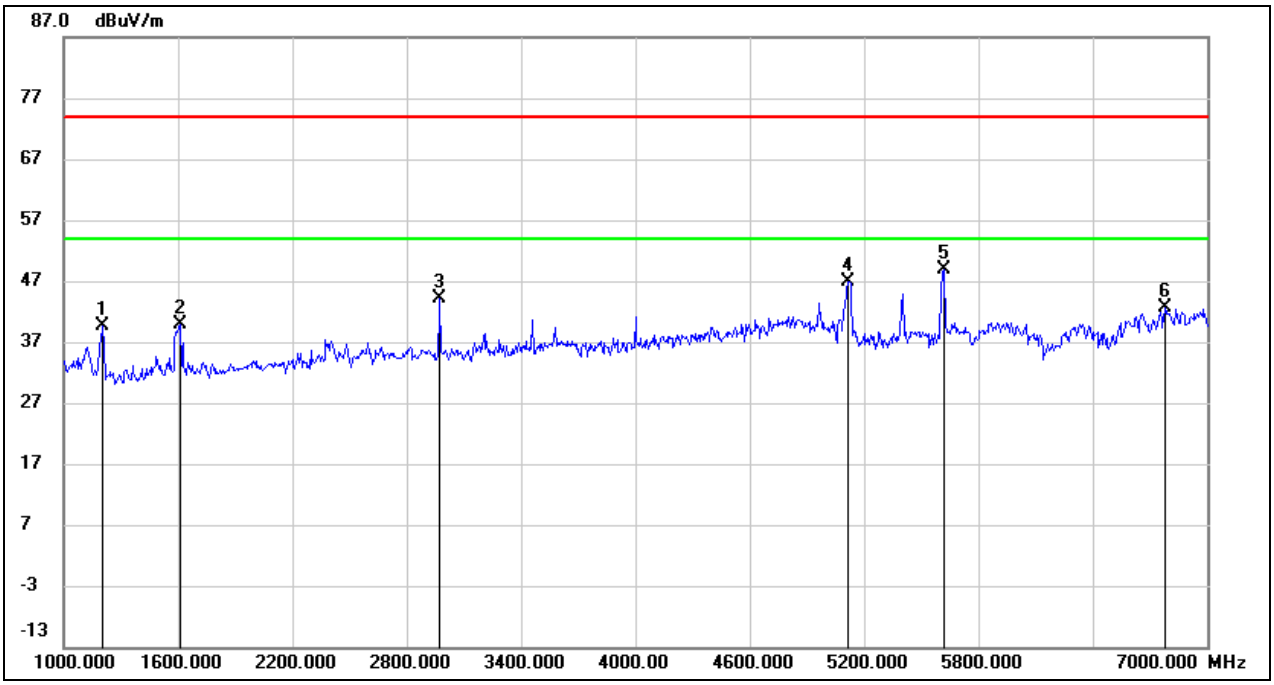
Test Mode:	802.11a 20	Channel:	5200
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1204.000	53.84	-14.09	39.75	74.00	-34.25	peak
2	1612.000	52.13	-12.34	39.79	74.00	-34.21	peak
3	2974.000	51.15	-7.06	44.09	74.00	-29.91	peak
4	5116.000	47.00	-0.02	46.98	74.00	-27.02	peak
5	5620.000	48.13	0.76	48.89	74.00	-25.11	peak
6	6778.000	37.45	5.10	42.55	74.00	-31.45	peak

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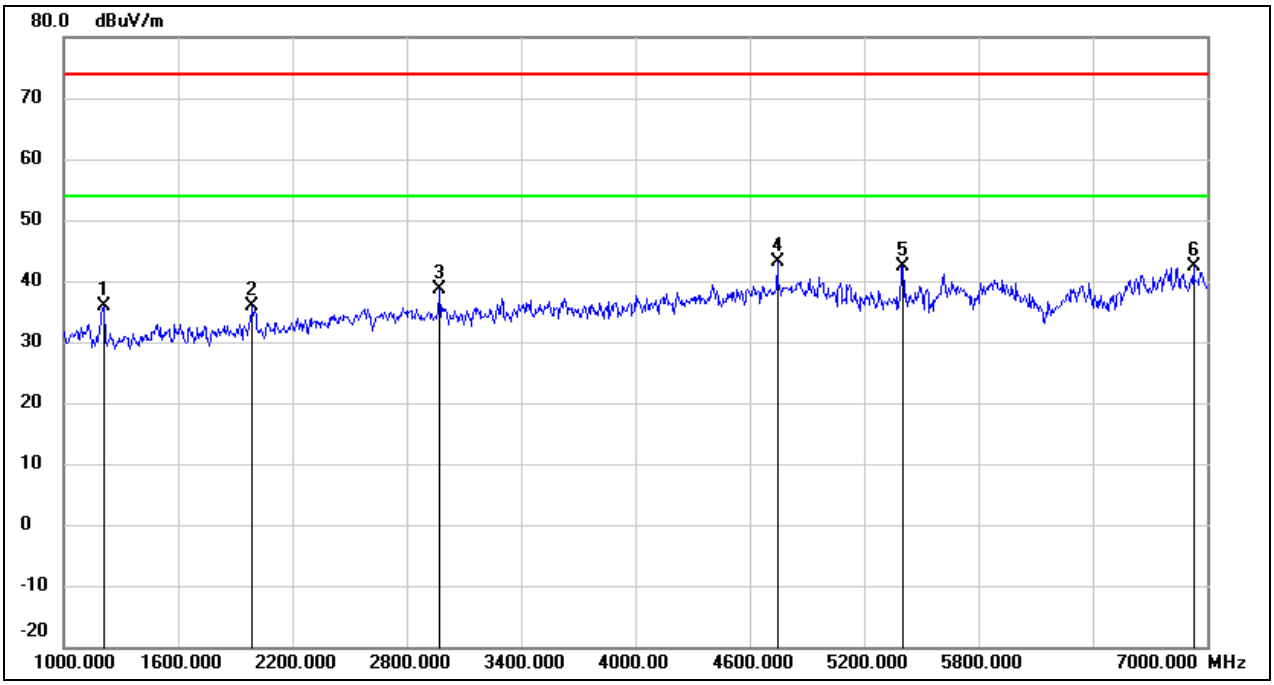
Test Mode:	802.11a 20	Channel:	5240
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1210.000	49.84	-14.06	35.78	74.00	-38.22	peak
2	1990.000	46.87	-11.09	35.78	74.00	-38.22	peak
3	2974.000	45.72	-7.06	38.66	74.00	-35.34	peak
4	4744.000	44.19	-1.17	43.02	74.00	-30.98	peak
5	5404.000	42.10	0.31	42.41	74.00	-31.59	peak
6	6928.000	36.65	5.85	42.50	74.00	-31.50	peak

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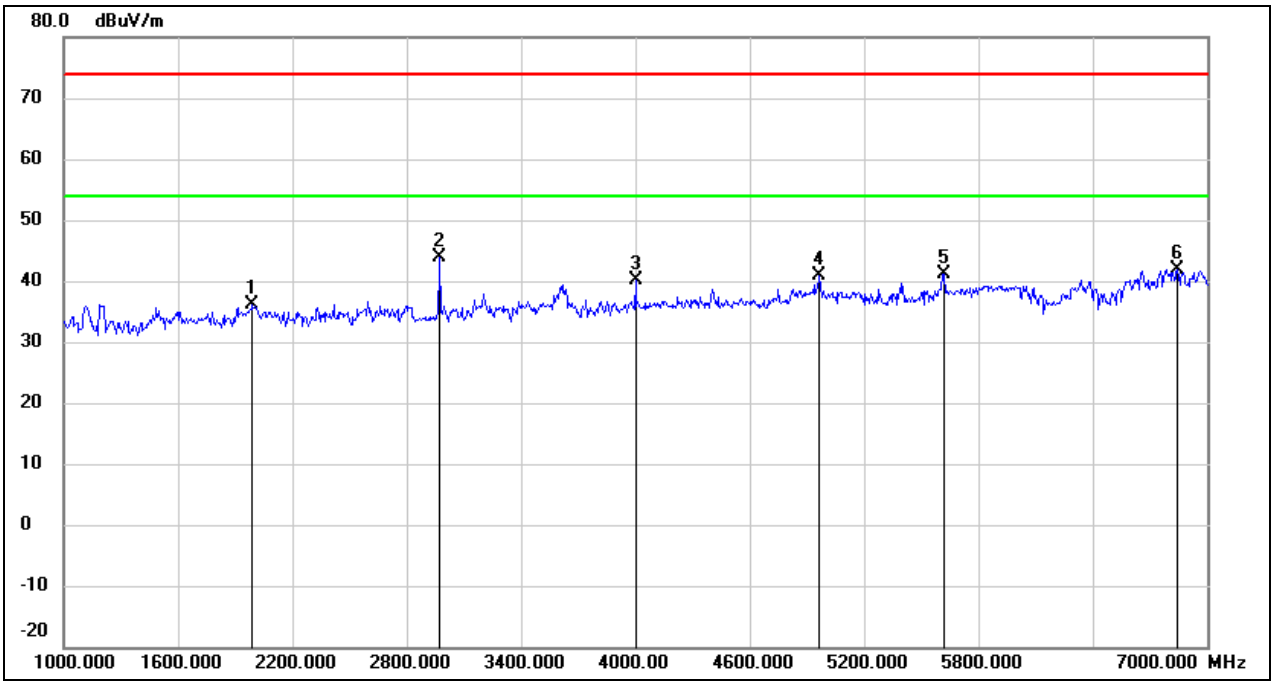
Test Mode:	802.11a 20	Channel:	5240
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1990.000	47.24	-11.09	36.15	74.00	-37.85	peak
2	2974.000	50.96	-7.06	43.90	74.00	-30.10	peak
3	4000.000	44.62	-4.48	40.14	74.00	-33.86	peak
4	4966.000	41.27	-0.28	40.99	74.00	-33.01	peak
5	5620.000	40.46	0.76	41.22	74.00	-32.78	peak
6	6844.000	36.45	5.43	41.88	74.00	-32.12	peak

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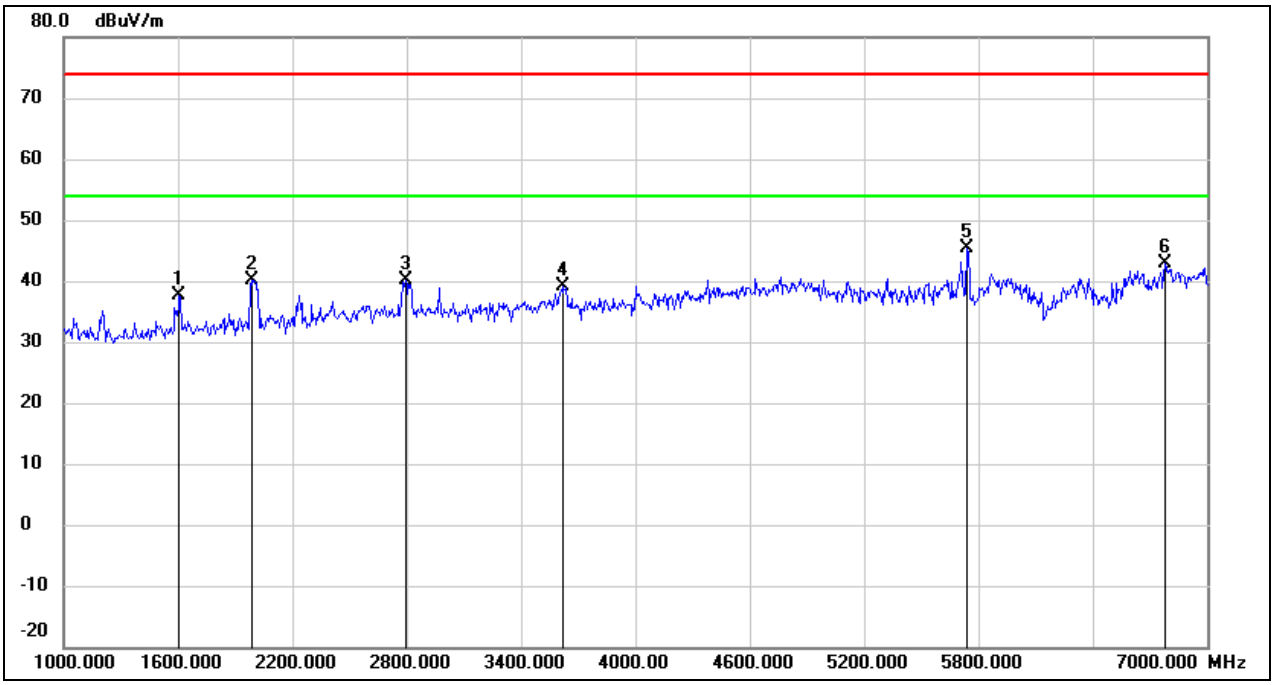
Test Mode:	802.11a 20	Channel:	5745
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1606.000	49.97	-12.36	37.61	74.00	-36.39	peak
2	1984.000	51.35	-11.11	40.24	74.00	-33.76	peak
3	2794.000	47.67	-7.60	40.07	74.00	-33.93	peak
4	3622.000	44.62	-5.52	39.10	74.00	-34.90	peak
5	5740.000	44.31	1.10	45.41	74.00	-28.59	peak
6	6778.000	37.75	5.10	42.85	74.00	-31.15	peak

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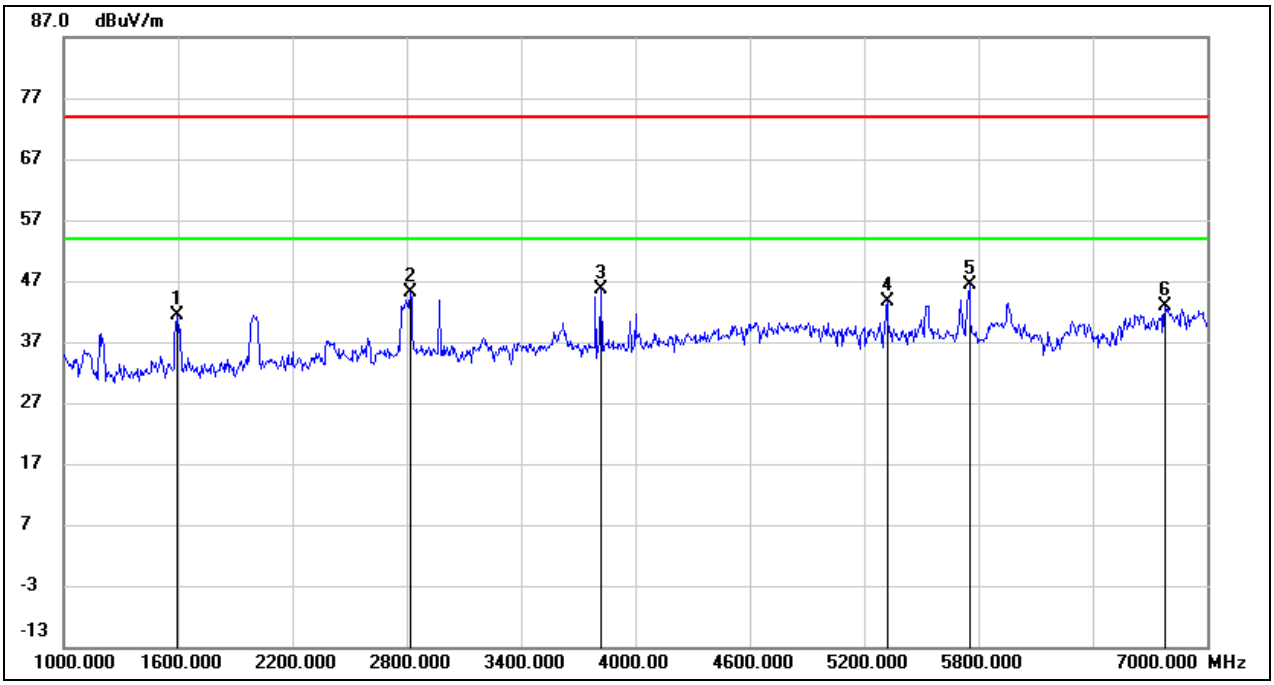
Test Mode:	802.11a 20	Channel:	5745
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1594.000	53.83	-12.40	41.43	74.00	-32.57	peak
2	2818.000	52.58	-7.53	45.05	74.00	-28.95	peak
3	3820.000	50.48	-4.97	45.51	74.00	-28.49	peak
4	5320.000	43.49	0.21	43.70	74.00	-30.30	peak
5	5752.000	45.22	1.14	46.36	74.00	-27.64	peak
6	6778.000	37.88	5.10	42.98	74.00	-31.02	peak

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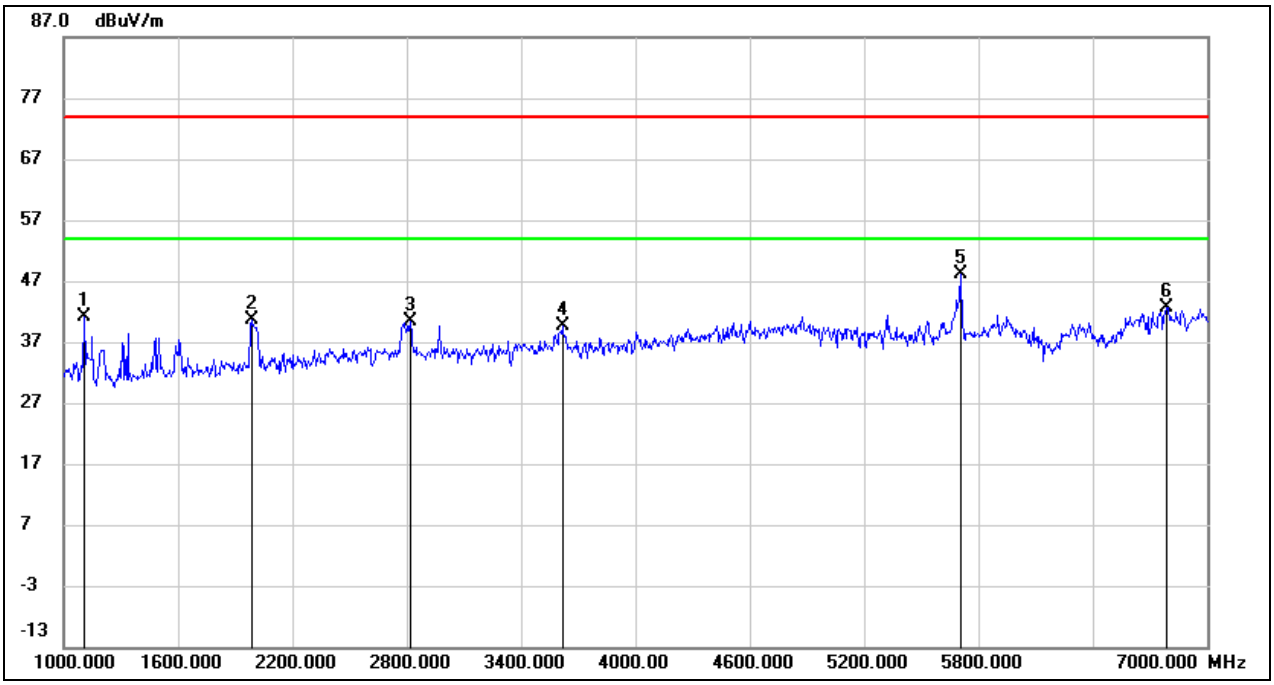
Test Mode:	802.11a 20	Channel:	5785
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1108.000	55.60	-14.53	41.07	74.00	-32.93	peak
2	1984.000	51.82	-11.11	40.71	74.00	-33.29	peak
3	2818.000	47.84	-7.53	40.31	74.00	-33.69	peak
4	3616.000	45.08	-5.53	39.55	74.00	-34.45	peak
5	5704.000	47.17	1.00	48.17	74.00	-25.83	peak
6	6790.000	37.45	5.15	42.60	74.00	-31.40	peak

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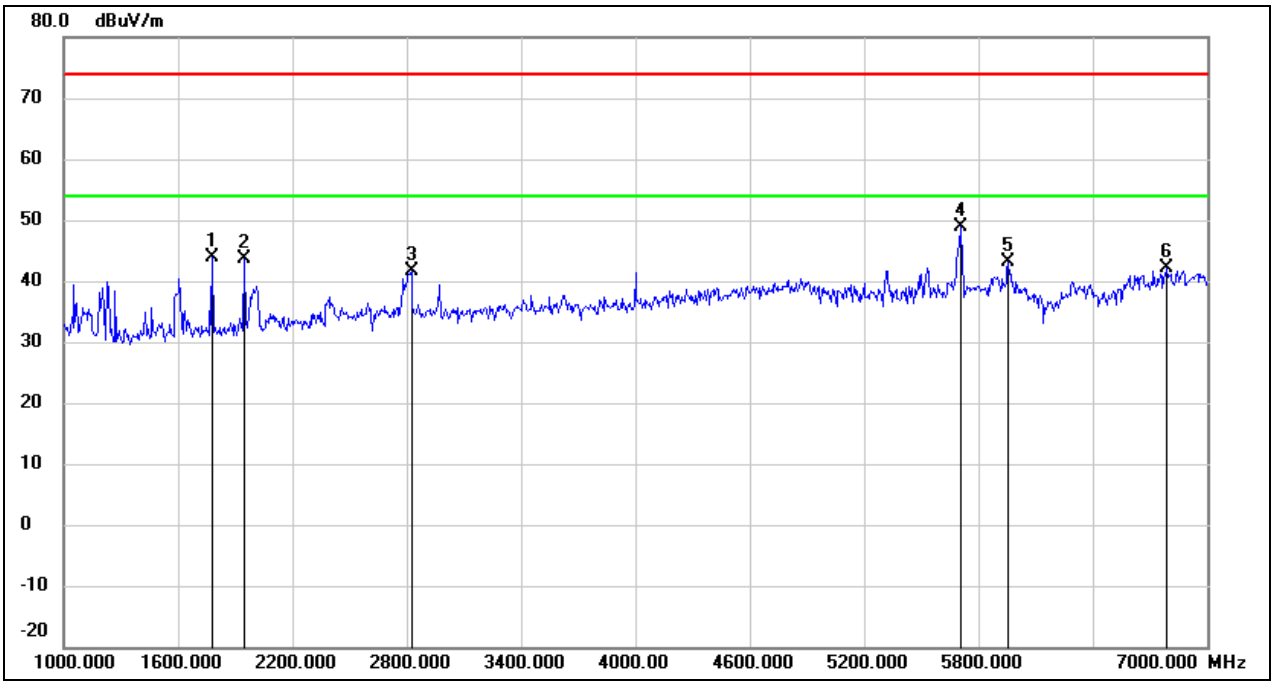
Test Mode:	802.11a 20	Channel:	5785
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1780.000	55.73	-11.79	43.94	74.00	-30.06	peak
2	1948.000	54.84	-11.23	43.61	74.00	-30.39	peak
3	2824.000	49.09	-7.51	41.58	74.00	-32.42	peak
4	5704.000	47.93	1.00	48.93	74.00	-25.07	peak
5	5956.000	41.30	1.73	43.03	74.00	-30.97	peak
6	6790.000	36.93	5.15	42.08	74.00	-31.92	peak

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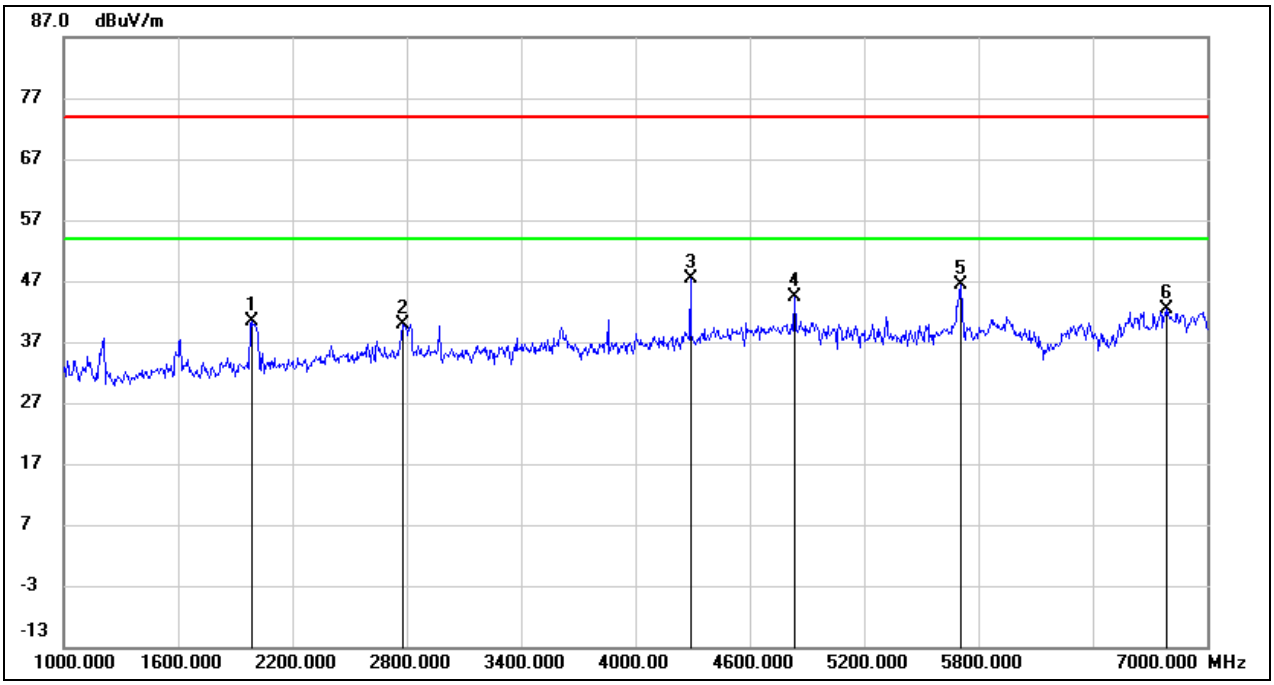
Test Mode:	802.11a 20	Channel:	5825
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1984.000	51.41	-11.11	40.30	74.00	-33.70	peak
2	2776.000	47.48	-7.66	39.82	74.00	-34.18	peak
3	4288.000	50.62	-3.13	47.49	74.00	-26.51	peak
4	4834.000	45.08	-0.81	44.27	74.00	-29.73	peak
5	5704.000	45.32	1.00	46.32	74.00	-27.68	peak
6	6784.000	37.26	5.13	42.39	74.00	-31.61	peak

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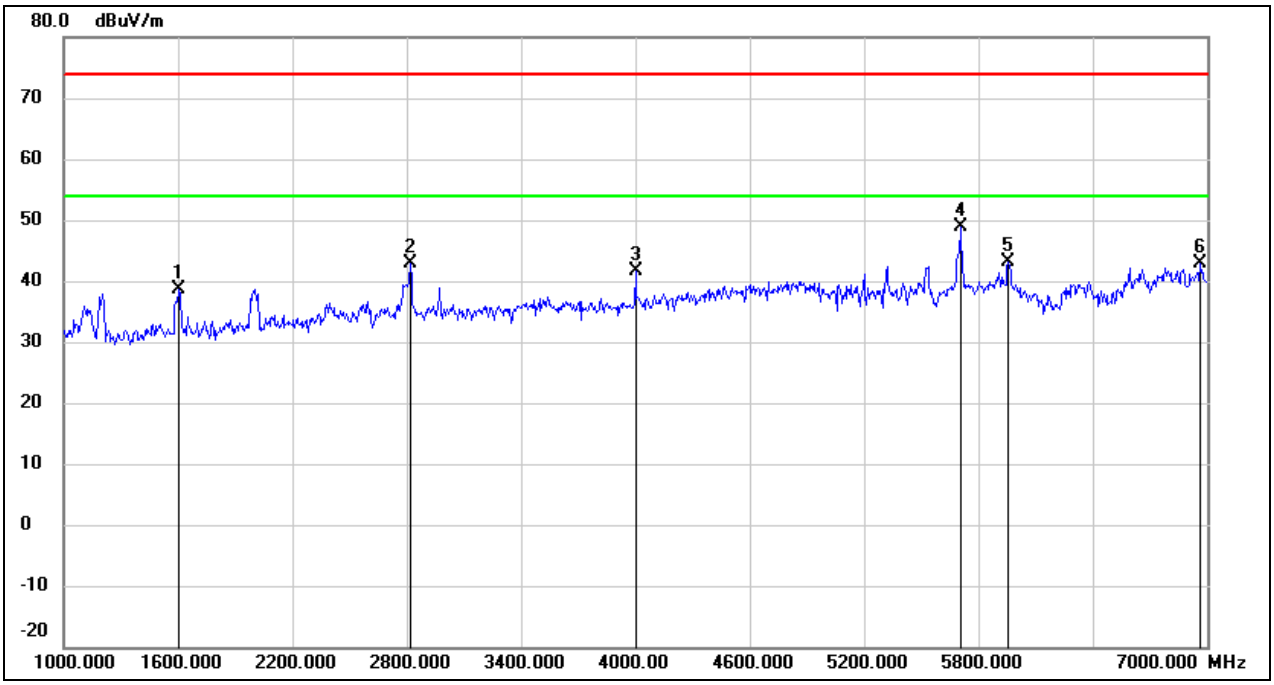
Test Mode:	802.11a 20	Channel:	5825
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1606.000	50.89	-12.36	38.53	74.00	-35.47	peak
2	2818.000	50.35	-7.53	42.82	74.00	-31.18	peak
3	4000.000	46.11	-4.48	41.63	74.00	-32.37	peak
4	5704.000	47.88	1.00	48.88	74.00	-25.12	peak
5	5956.000	41.50	1.73	43.23	74.00	-30.77	peak
6	6964.000	36.76	6.03	42.79	74.00	-31.21	peak

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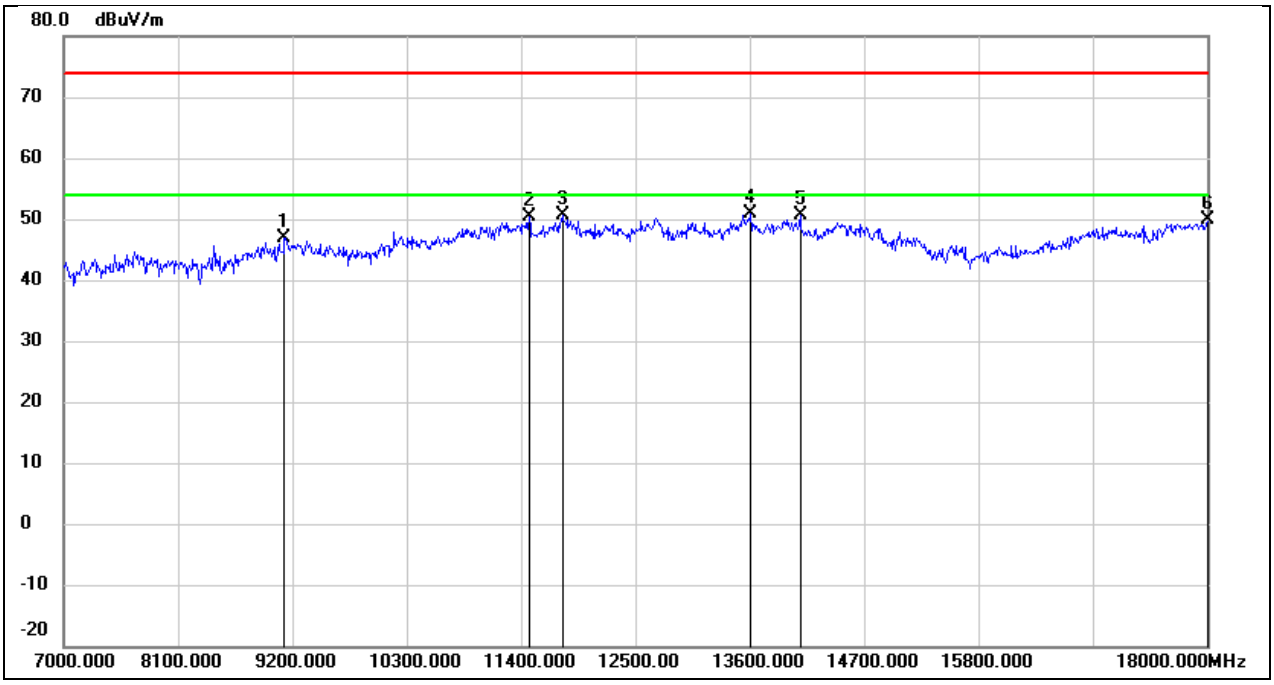
8.3. SPURIOUS EMISSIONS(7 GHZ~18 GHZ)

Test Mode:	802.11a 20	Channel:	5180
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9123.000	36.49	10.42	46.91	74.00	-27.09	peak
2	11477.000	33.72	16.67	50.39	74.00	-23.61	peak
3	11796.000	33.35	17.32	50.67	74.00	-23.33	peak
4	13611.000	29.86	20.92	50.78	74.00	-23.22	peak
5	14084.000	29.11	21.52	50.63	74.00	-23.37	peak
6	18000.000	23.73	26.12	49.85	74.00	-24.15	peak

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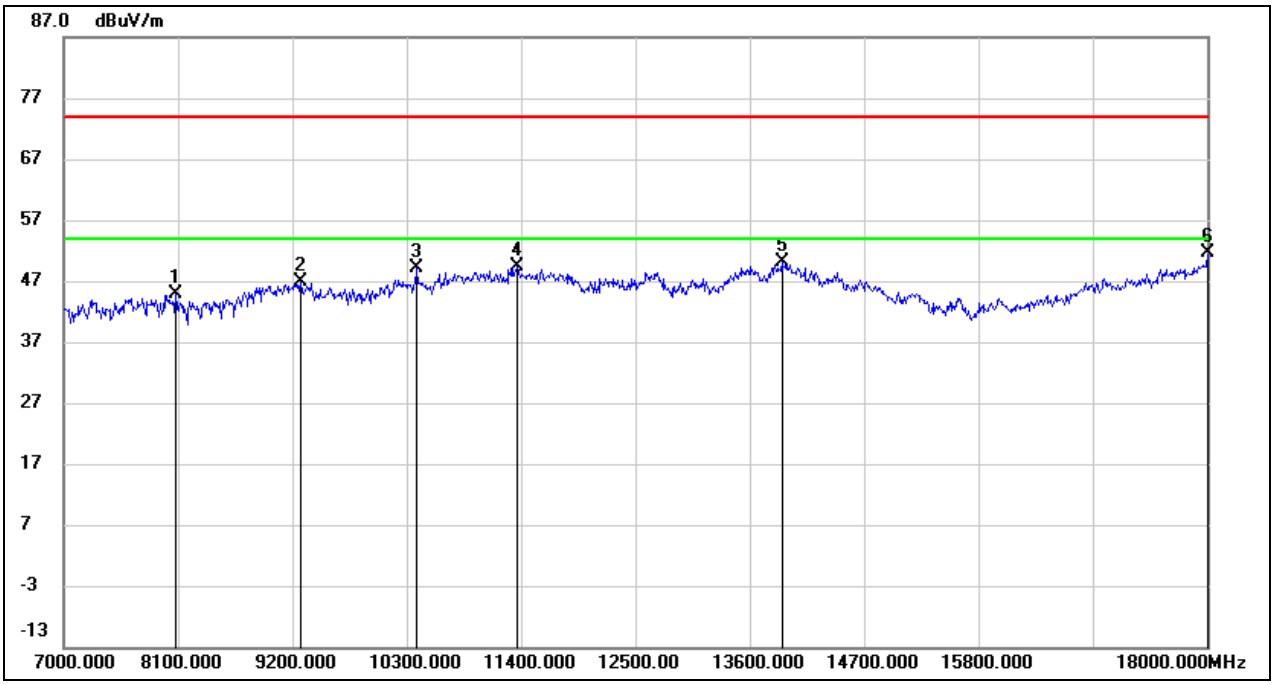
Test Mode:	802.11a 20	Channel:	5180
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	8078.000	38.43	6.51	44.94	74.00	-29.06	peak
2	9277.000	36.34	10.51	46.85	74.00	-27.15	peak
3	10399.000	36.52	12.61	49.13	74.00	-24.87	peak
4	11367.000	33.24	16.22	49.46	74.00	-24.54	peak
5	13908.000	28.46	21.66	50.12	74.00	-23.88	peak
6	18000.000	25.60	26.12	51.72	74.00	-22.28	peak

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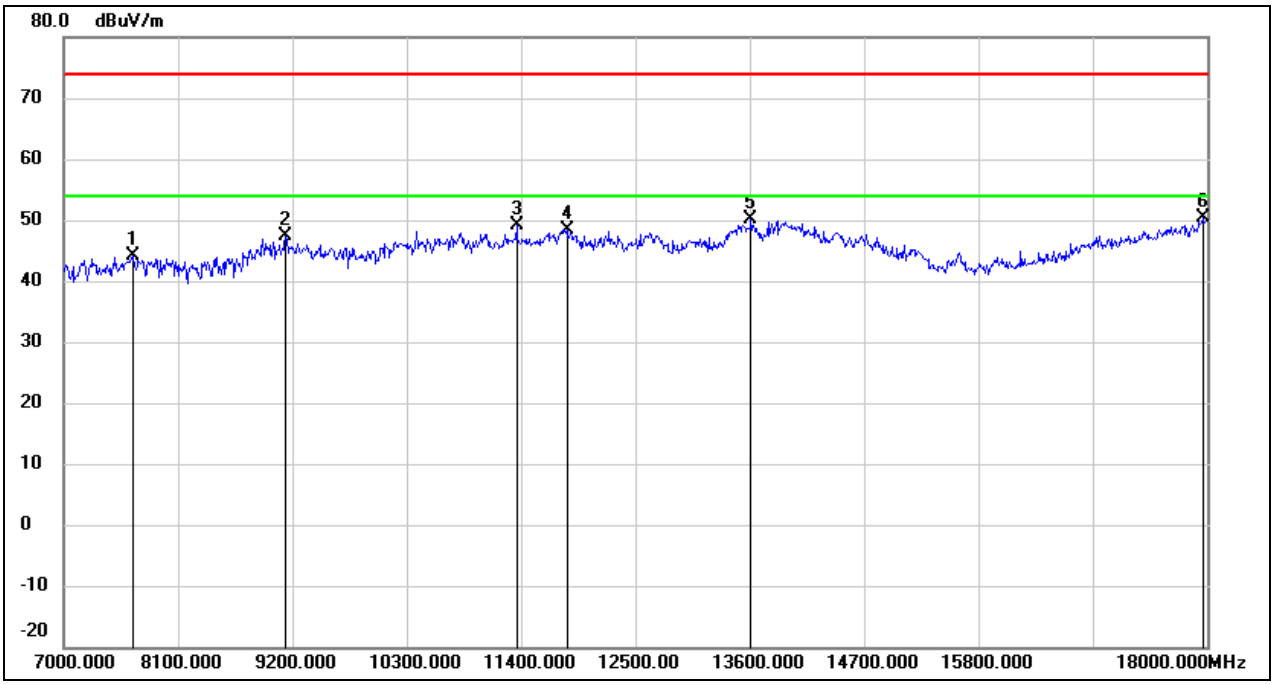
Test Mode:	802.11a 20	Channel:	5200
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7660.000	37.50	6.73	44.23	74.00	-29.77	peak
2	9134.000	36.91	10.41	47.32	74.00	-26.68	peak
3	11356.000	32.96	16.19	49.15	74.00	-24.85	peak
4	11840.000	30.94	17.40	48.34	74.00	-25.66	peak
5	13611.000	29.14	20.92	50.06	74.00	-23.94	peak
6	17956.000	24.52	25.82	50.34	74.00	-23.66	peak

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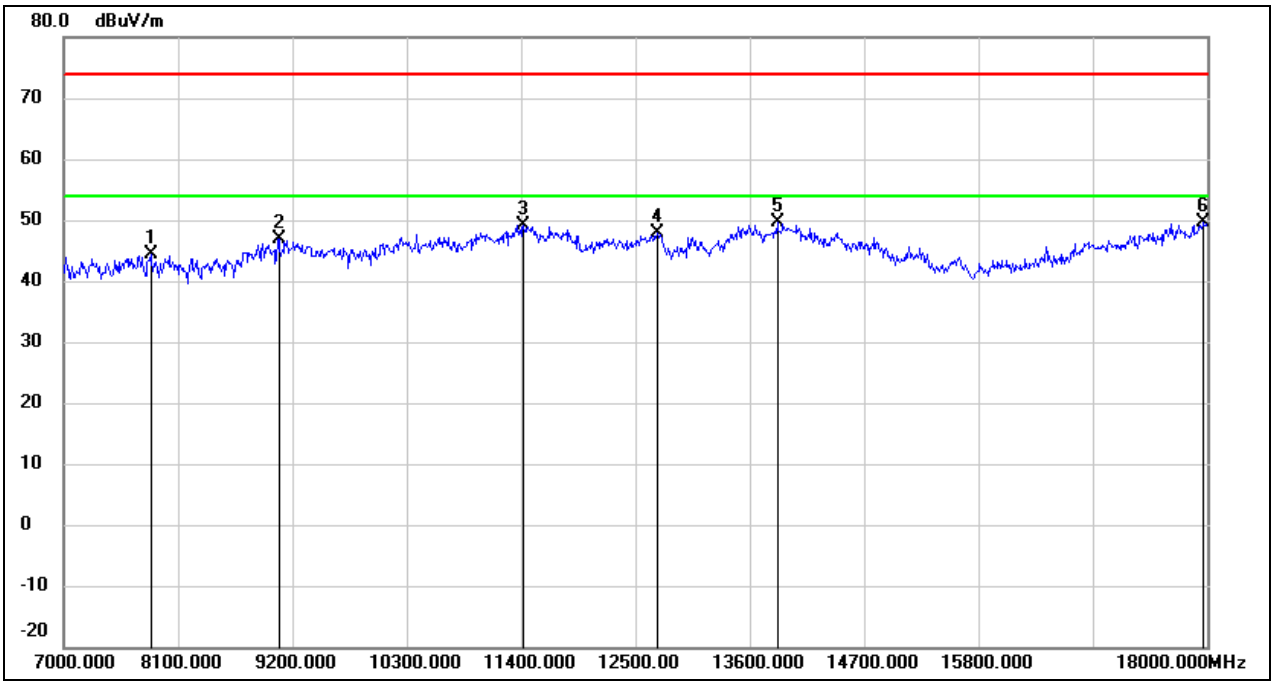
Test Mode:	802.11a 20	Channel:	5200
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7836.000	37.79	6.58	44.37	74.00	-29.63	peak
2	9068.000	36.57	10.39	46.96	74.00	-27.04	peak
3	11422.000	32.76	16.46	49.22	74.00	-24.78	peak
4	12709.000	29.71	18.09	47.80	74.00	-26.20	peak
5	13864.000	28.07	21.53	49.60	74.00	-24.40	peak
6	17967.000	23.86	25.89	49.75	74.00	-24.25	peak

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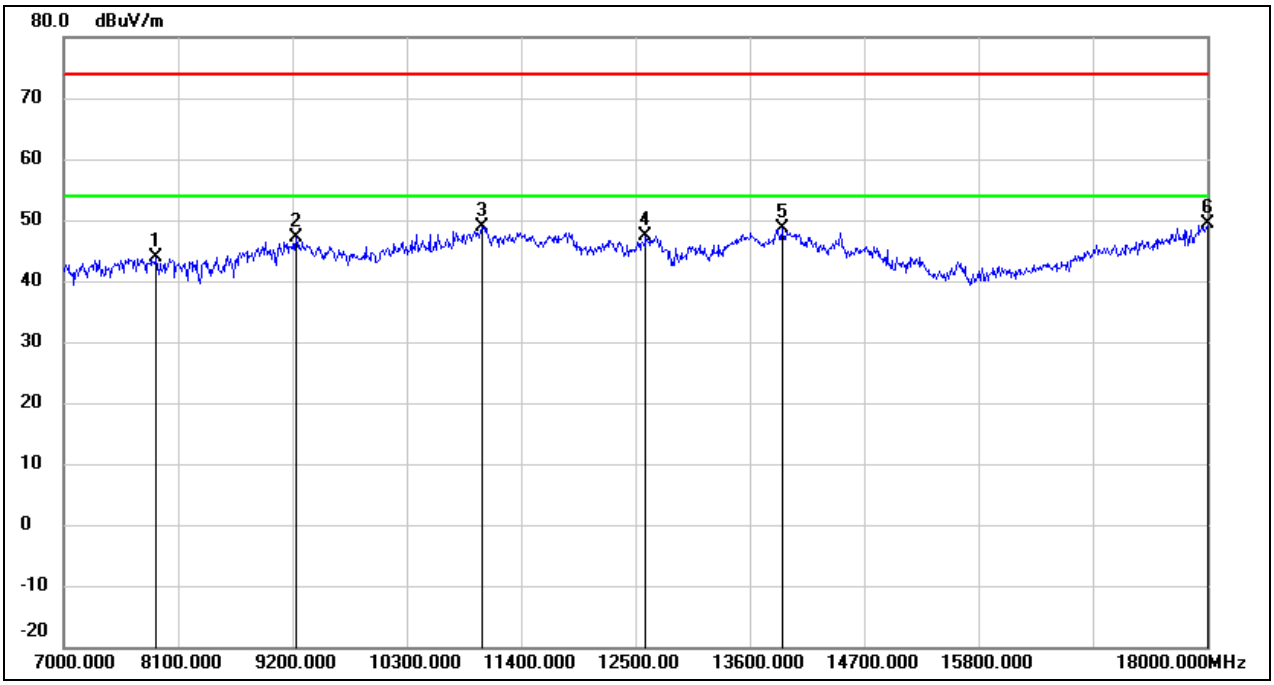
Test Mode:	802.11a 20	Channel:	5240
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7891.000	37.30	6.52	43.82	74.00	-30.18	peak
2	9233.000	36.58	10.48	47.06	74.00	-26.94	peak
3	11026.000	34.03	14.82	48.85	74.00	-25.15	peak
4	12599.000	29.37	17.95	47.32	74.00	-26.68	peak
5	13908.000	26.99	21.66	48.65	74.00	-25.35	peak
6	18000.000	23.14	26.12	49.26	74.00	-24.74	peak

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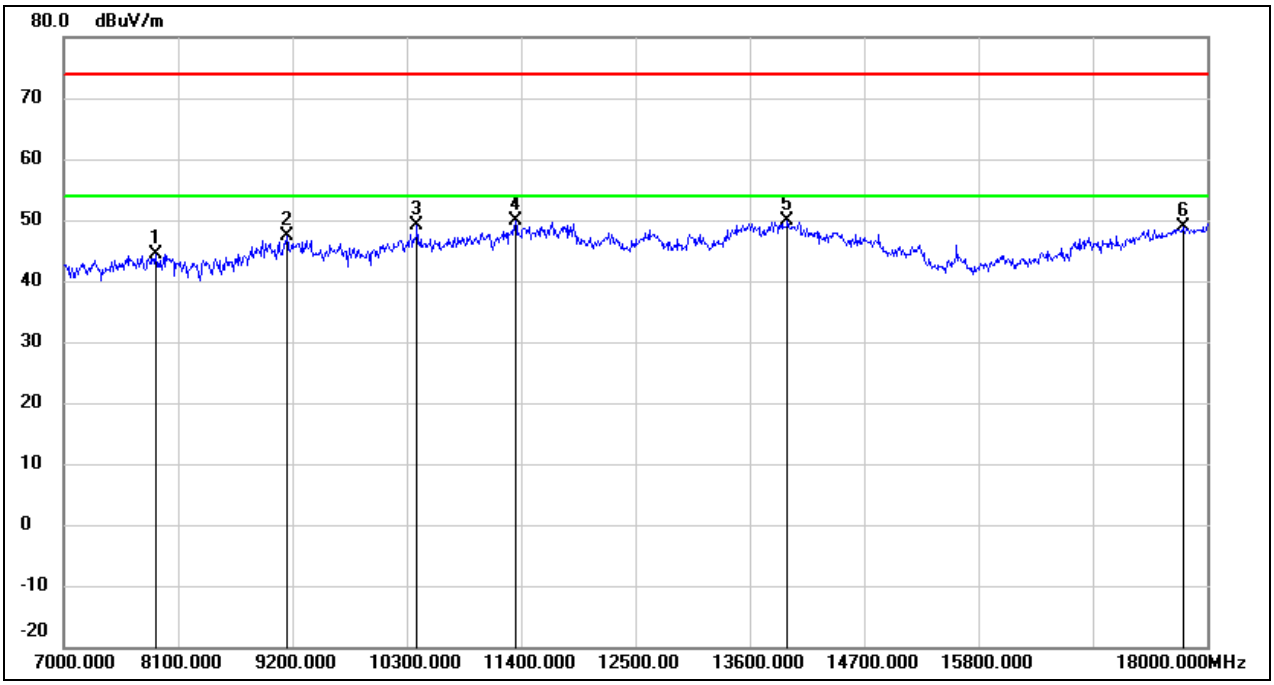
Test Mode:	802.11a 20	Channel:	5240
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7891.000	37.78	6.52	44.30	74.00	-29.70	peak
2	9145.000	36.91	10.43	47.34	74.00	-26.66	peak
3	10399.000	36.53	12.61	49.14	74.00	-24.86	peak
4	11345.000	33.63	16.14	49.77	74.00	-24.23	peak
5	13963.000	28.12	21.78	49.90	74.00	-24.10	peak
6	17769.000	24.24	24.53	48.77	74.00	-25.23	peak

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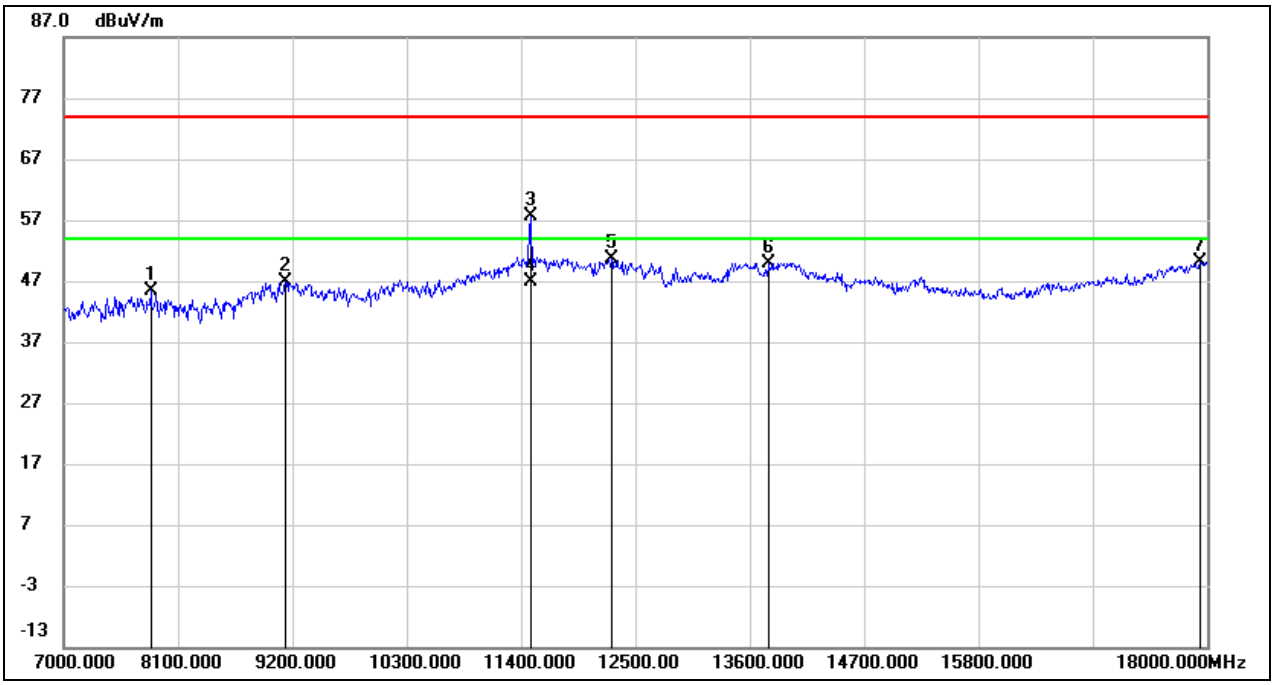
Test Mode:	802.11a 20	Channel:	5745
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7836.000	38.82	6.58	45.40	74.00	-28.60	peak
2	9134.000	36.47	10.41	46.88	74.00	-27.12	peak
3	11488.000	40.91	16.72	57.63	74.00	-16.37	peak
4	11488.000	30.20	16.72	46.92	54.00	-7.08	AVG
5	12269.000	32.94	17.77	50.71	74.00	-23.29	peak
6	13787.000	28.60	21.35	49.95	74.00	-24.05	peak
7	17934.000	24.41	25.67	50.08	74.00	-23.92	peak

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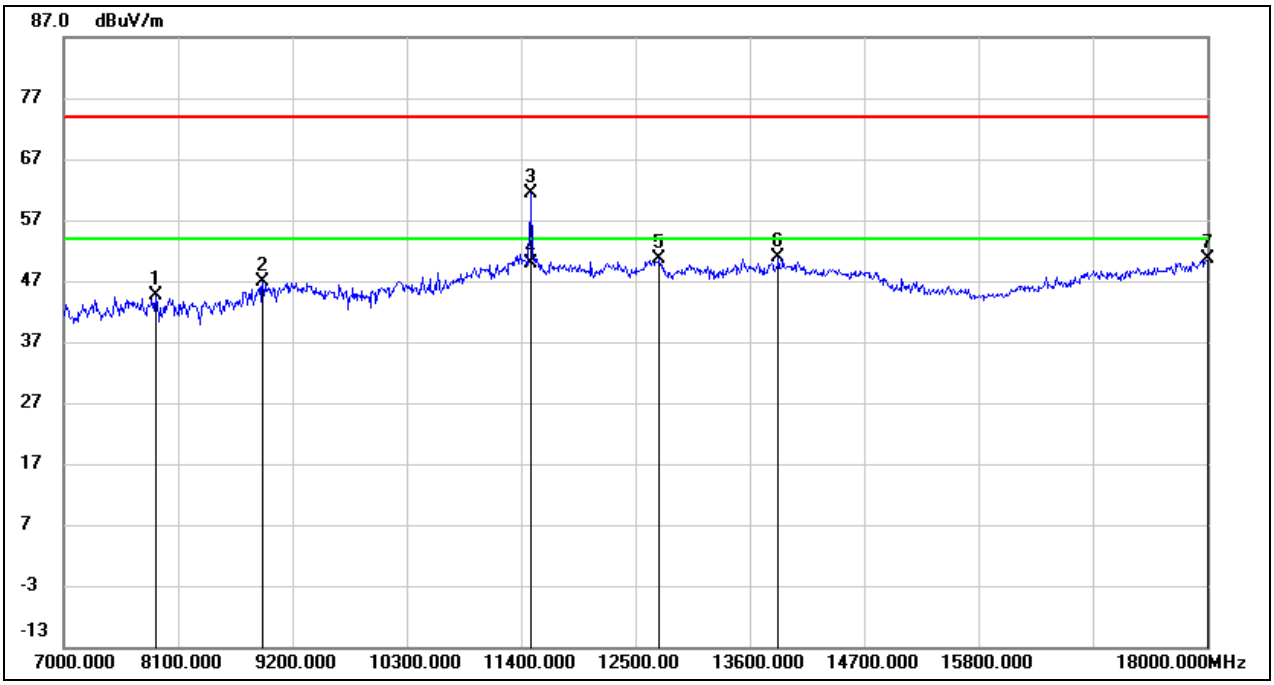
Test Mode:	802.11a 20	Channel:	5745
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7880.000	38.18	6.54	44.72	74.00	-29.28	peak
2	8914.000	37.03	9.75	46.78	74.00	-27.22	peak
3	11499.000	44.67	16.77	61.44	74.00	-12.56	peak
4	11499.000	33.09	16.77	49.86	54.00	-4.14	AVG
5	12731.000	32.39	18.12	50.51	74.00	-23.49	peak
6	13875.000	29.19	21.57	50.76	74.00	-23.24	peak
7	18000.000	24.59	26.12	50.71	74.00	-23.29	peak

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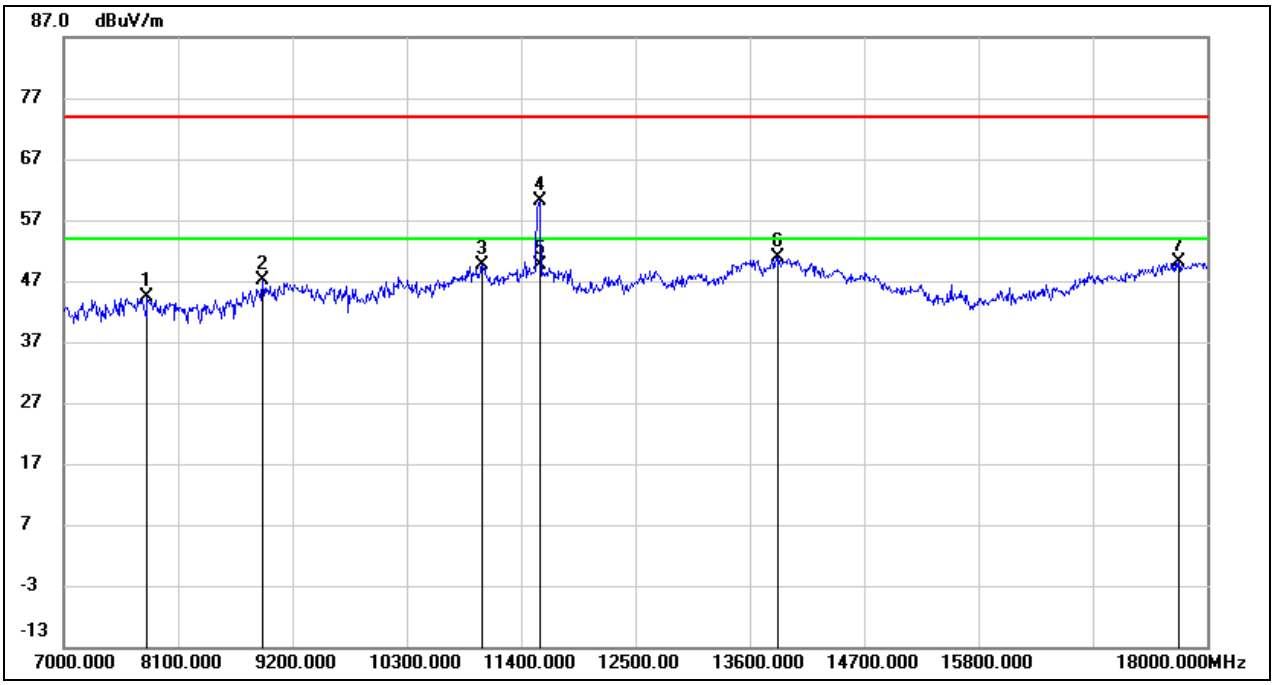
Test Mode:	802.11a 20	Channel:	5785
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7803.000	37.74	6.60	44.34	74.00	-29.66	peak
2	8914.000	37.38	9.75	47.13	74.00	-26.87	peak
3	11026.000	34.78	14.82	49.60	74.00	-24.40	peak
4	11576.000	43.12	16.91	60.03	74.00	-13.97	peak
5	11576.000	32.68	16.91	49.59	54.00	-4.41	AVG
6	13864.000	29.47	21.53	51.00	74.00	-23.00	peak
7	17725.000	25.96	24.24	50.20	74.00	-23.80	peak

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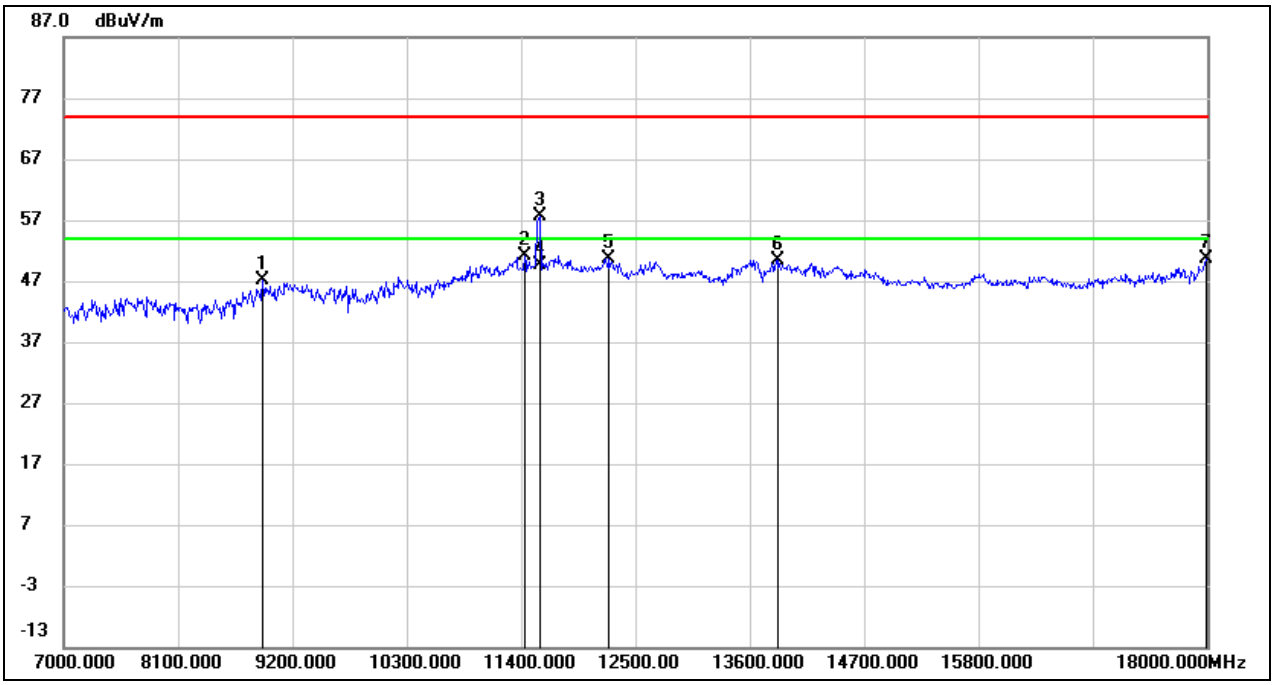
Test Mode:	802.11a 20	Channel:	5785
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	8914.000	37.38	9.75	47.13	74.00	-26.87	peak
2	11433.000	34.67	16.50	51.17	74.00	-22.83	peak
3	11576.000	40.62	16.91	57.53	74.00	-16.47	peak
4	11576.000	32.66	16.91	49.57	54.00	-4.43	AVG
5	12247.000	32.90	17.77	50.67	74.00	-23.33	peak
6	13864.000	28.97	21.53	50.50	74.00	-23.50	peak
7	17989.000	24.66	26.04	50.70	74.00	-23.30	peak

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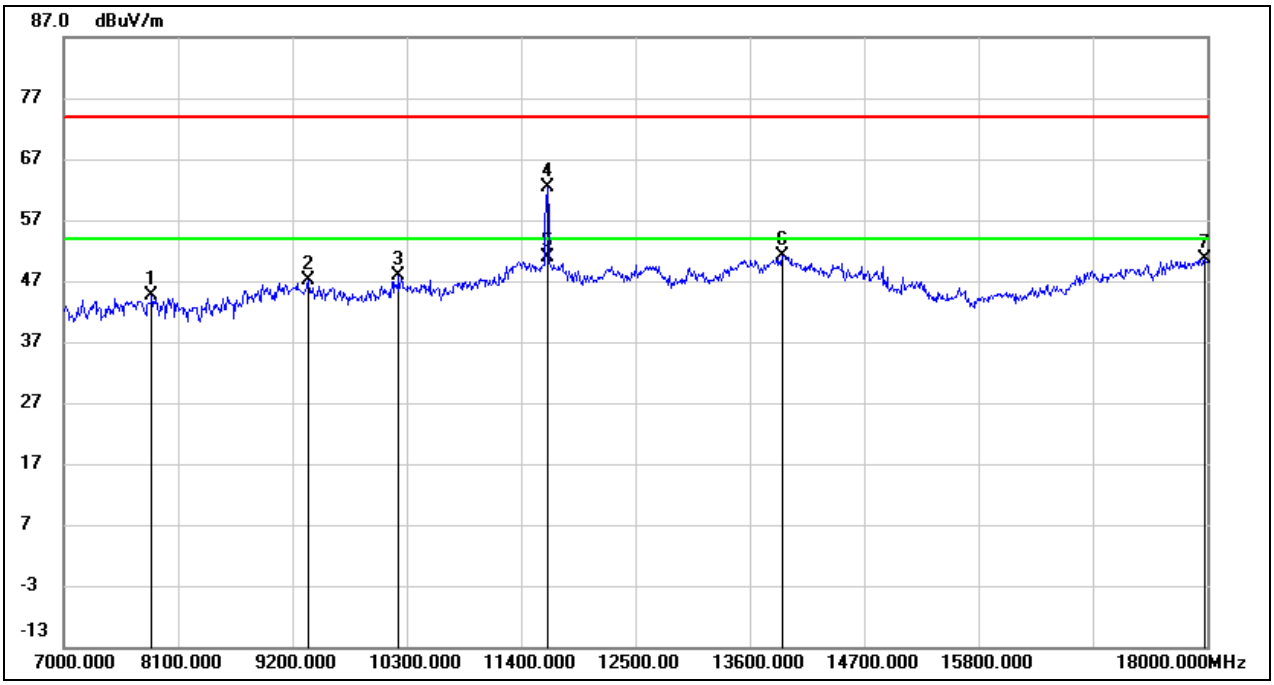
Test Mode:	802.11a 20	Channel:	5825
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7847.000	37.98	6.57	44.55	74.00	-29.45	peak
2	9354.000	36.56	10.56	47.12	74.00	-26.88	peak
3	10223.000	35.52	12.24	47.76	74.00	-26.24	peak
4	11653.000	45.23	17.05	62.28	74.00	-11.72	peak
5	11653.000	33.77	17.05	50.82	54.00	-3.18	AVG
6	13919.000	29.57	21.68	51.25	74.00	-22.75	peak
7	17978.000	24.60	25.97	50.57	74.00	-23.43	peak

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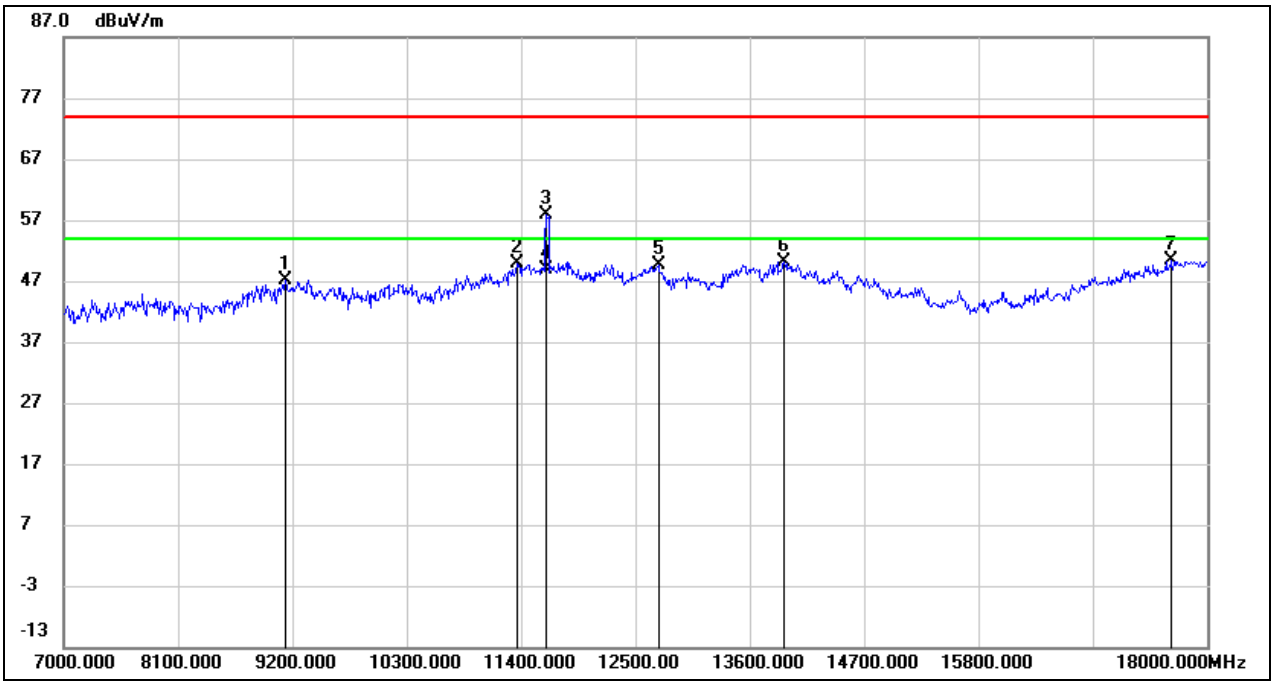
Test Mode:	802.11a 20	Channel:	5825
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9134.000	36.78	10.41	47.19	74.00	-26.81	peak
2	11367.000	33.74	16.22	49.96	74.00	-24.04	peak
3	11642.000	40.81	17.03	57.84	74.00	-16.16	peak
4	11642.000	31.90	17.03	48.93	54.00	-5.07	AVG
5	12720.000	31.49	18.09	49.58	74.00	-24.42	peak
6	13930.000	28.50	21.71	50.21	74.00	-23.79	peak
7	17659.000	26.64	23.78	50.42	74.00	-23.58	peak

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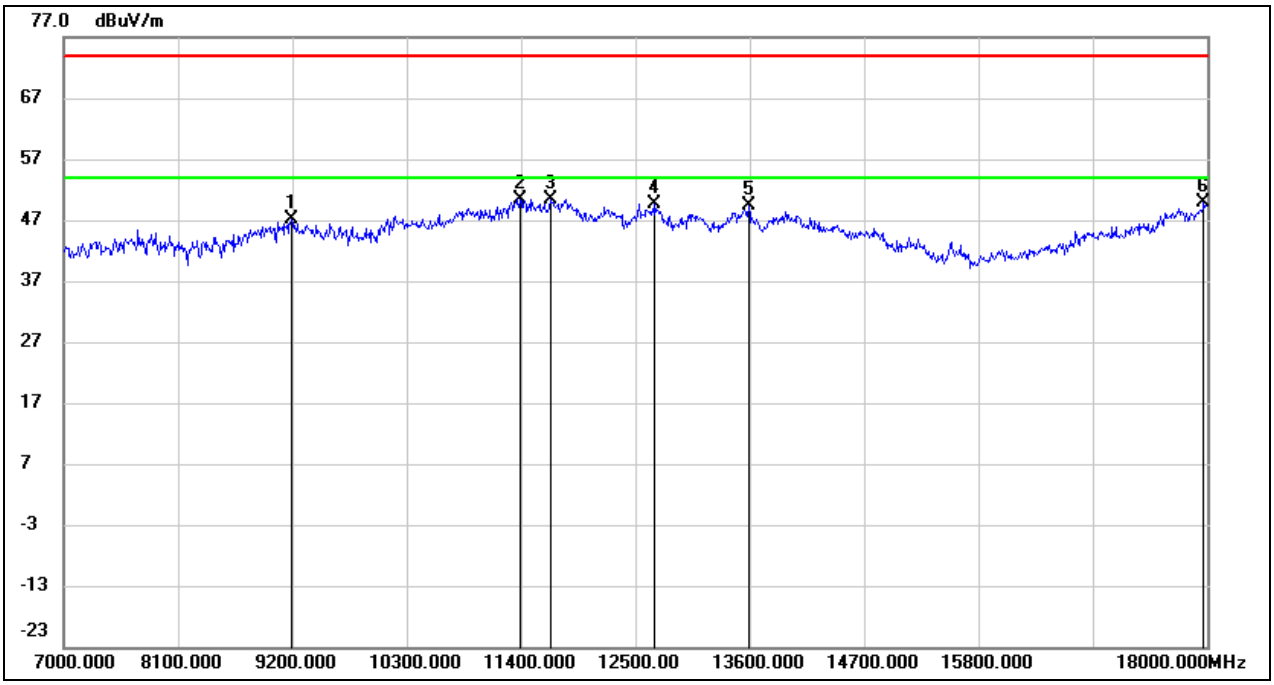
Test Mode:	802.11n HT20	Channel:	5180
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9189.000	36.55	10.46	47.01	74.00	-26.99	peak
2	11389.000	34.19	16.31	50.50	74.00	-23.50	peak
3	11686.000	33.25	17.12	50.37	74.00	-23.63	peak
4	12687.000	31.56	18.05	49.61	74.00	-24.39	peak
5	13589.000	28.59	20.86	49.45	74.00	-24.55	peak
6	17967.000	23.89	25.89	49.78	74.00	-24.22	peak

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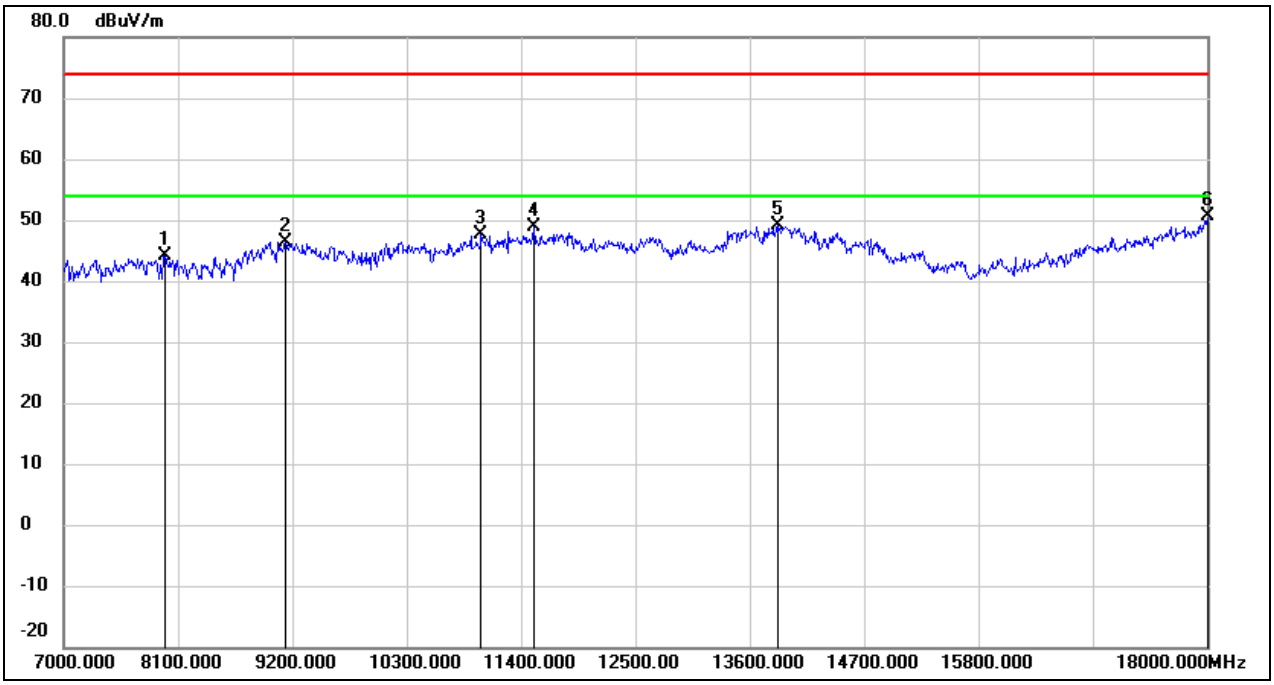
Test Mode:	802.11n HT20	Channel:	5180
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7979.000	37.79	6.45	44.24	74.00	-29.76	peak
2	9134.000	36.05	10.41	46.46	74.00	-27.54	peak
3	11015.000	32.88	14.79	47.67	74.00	-26.33	peak
4	11521.000	32.02	16.82	48.84	74.00	-25.16	peak
5	13864.000	27.60	21.53	49.13	74.00	-24.87	peak
6	18000.000	24.44	26.12	50.56	74.00	-23.44	peak

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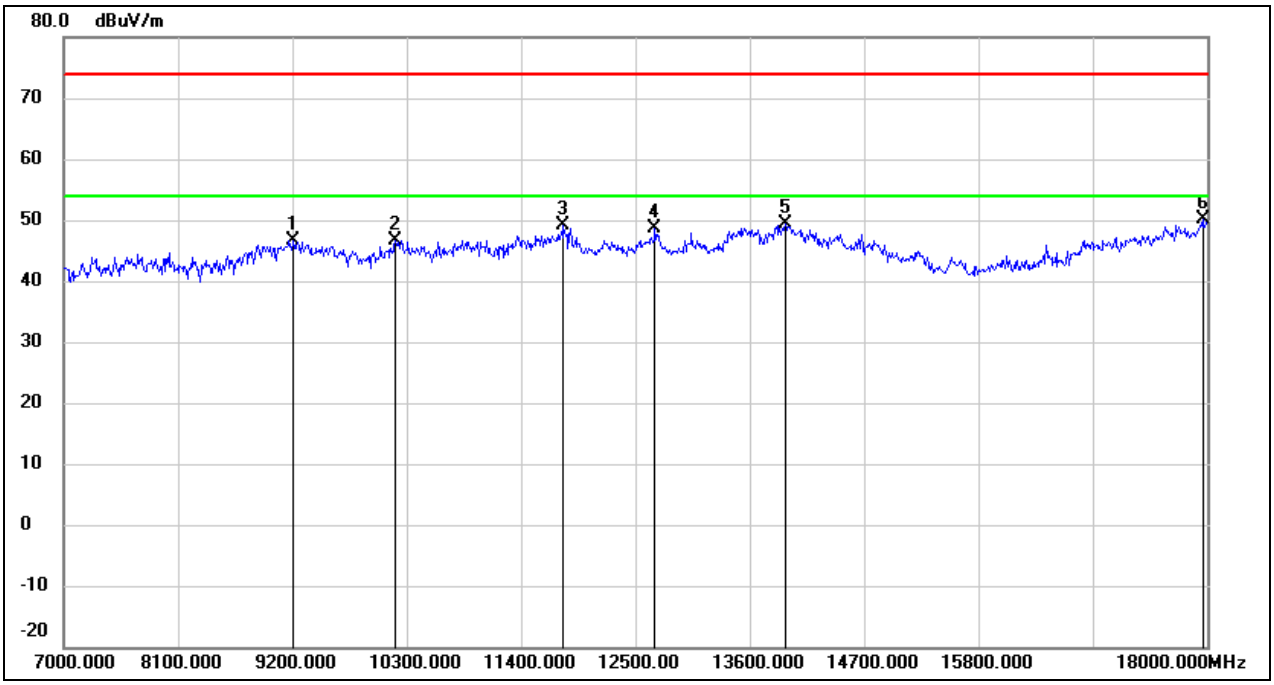
Test Mode:	802.11n HT20	Channel:	5200
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9211.000	36.19	10.47	46.66	74.00	-27.34	peak
2	10190.000	34.35	12.18	46.53	74.00	-27.47	peak
3	11807.000	31.90	17.34	49.24	74.00	-24.76	peak
4	12687.000	30.62	18.05	48.67	74.00	-25.33	peak
5	13941.000	27.60	21.73	49.33	74.00	-24.67	peak
6	17956.000	24.23	25.82	50.05	74.00	-23.95	peak

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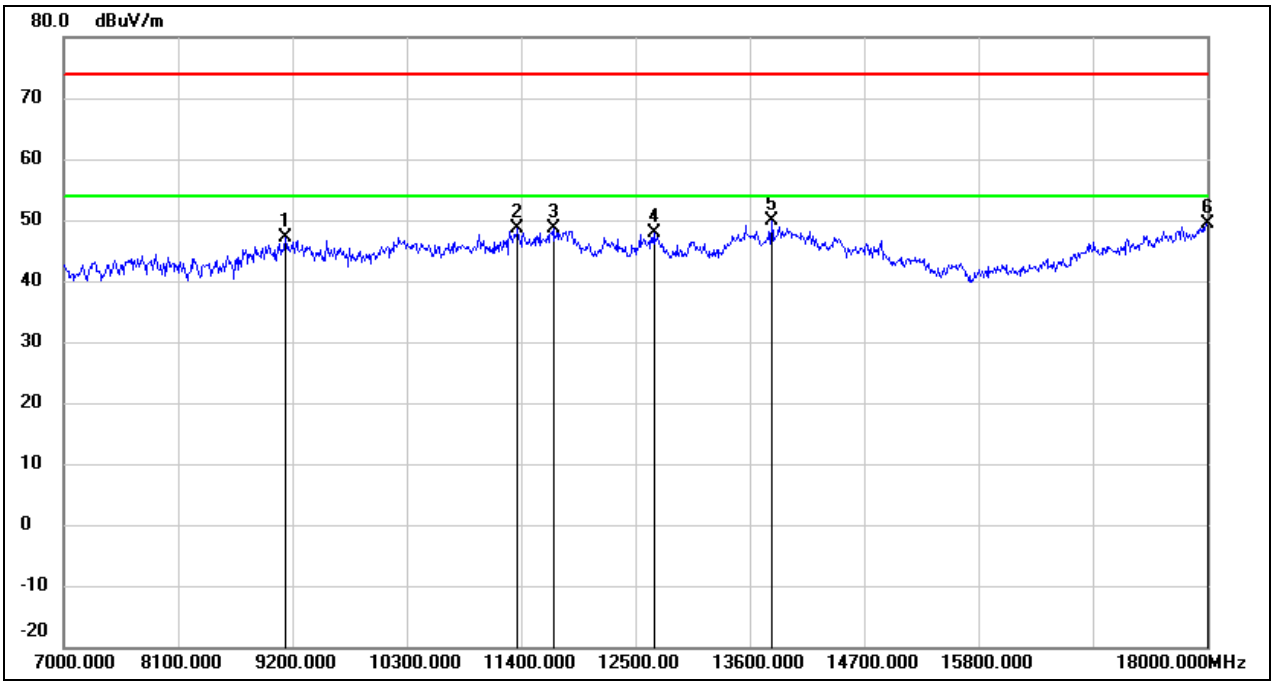
Test Mode:	802.11n HT20	Channel:	5200
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9134.000	36.84	10.41	47.25	74.00	-26.75	peak
2	11367.000	32.49	16.22	48.71	74.00	-25.29	peak
3	11708.000	31.37	17.16	48.53	74.00	-25.47	peak
4	12676.000	29.81	18.05	47.86	74.00	-26.14	peak
5	13809.000	28.48	21.41	49.89	74.00	-24.11	peak
6	18000.000	23.16	26.12	49.28	74.00	-24.72	peak

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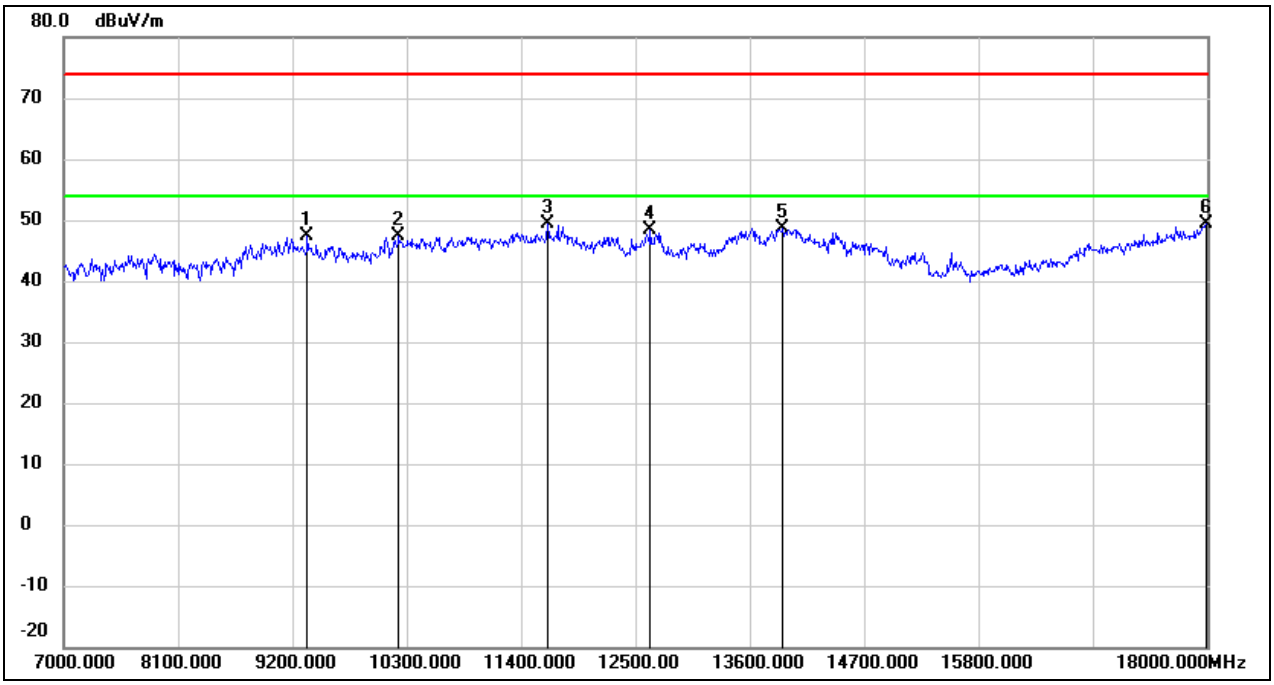
Test Mode:	802.11n HT20	Channel:	5240
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9343.000	36.74	10.55	47.29	74.00	-26.71	peak
2	10223.000	35.06	12.24	47.30	74.00	-26.70	peak
3	11653.000	32.22	17.05	49.27	74.00	-24.73	peak
4	12643.000	30.41	18.01	48.42	74.00	-25.58	peak
5	13919.000	27.04	21.68	48.72	74.00	-25.28	peak
6	17989.000	23.27	26.04	49.31	74.00	-24.69	peak

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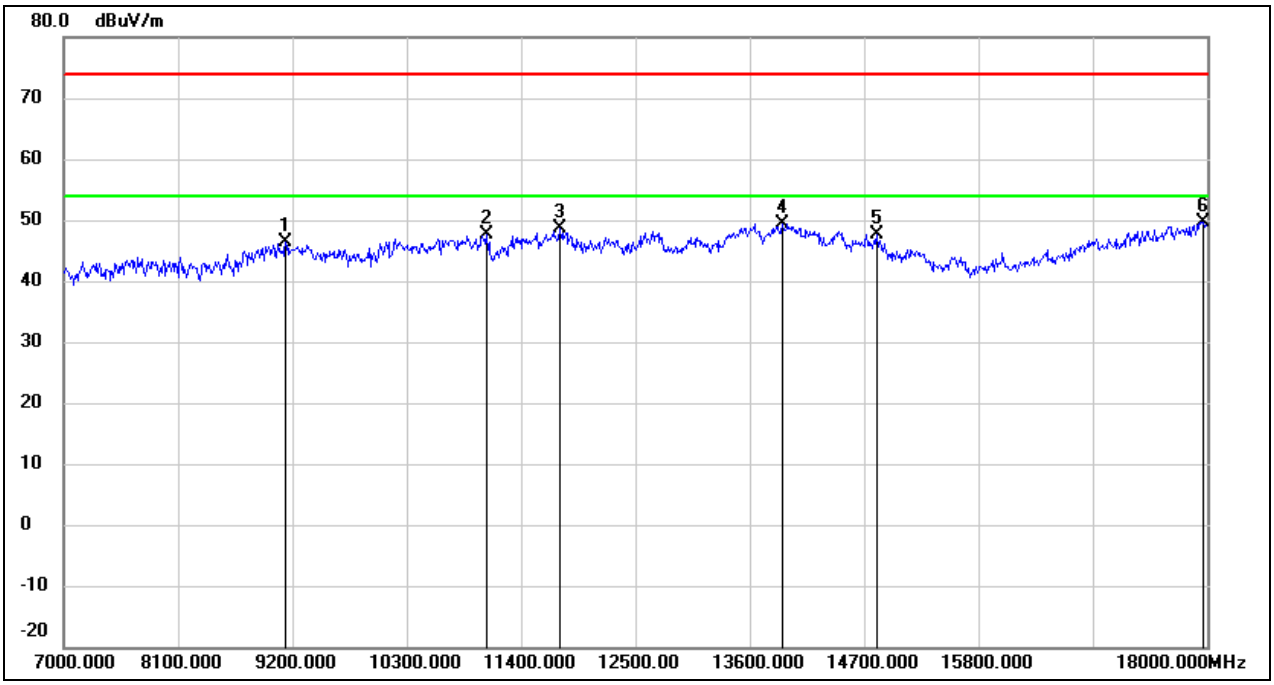
Test Mode:	802.11n HT20	Channel:	5240
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9134.000	36.07	10.41	46.48	74.00	-27.52	peak
2	11070.000	32.65	15.01	47.66	74.00	-26.34	peak
3	11774.000	31.24	17.28	48.52	74.00	-25.48	peak
4	13908.000	27.84	21.66	49.50	74.00	-24.50	peak
5	14821.000	29.11	18.42	47.53	74.00	-26.47	peak
6	17956.000	23.91	25.82	49.73	74.00	-24.27	peak

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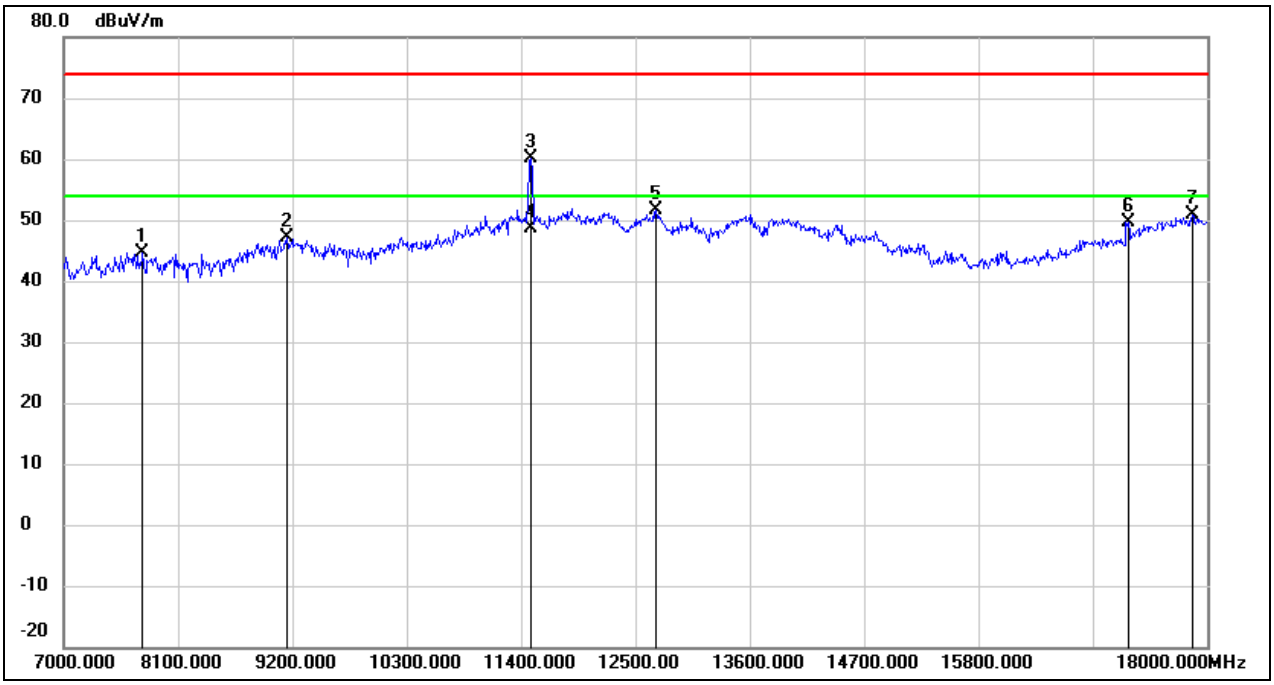
Test Mode:	802.11n HT20	Channel:	5745
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7759.000	38.00	6.64	44.64	74.00	-29.36	peak
2	9145.000	36.74	10.43	47.17	74.00	-26.83	peak
3	11488.000	43.32	16.72	60.04	74.00	-13.96	peak
4	11488.000	31.96	16.72	48.68	54.00	-5.32	AVG
5	12698.000	33.59	18.08	51.67	74.00	-22.33	peak
6	17241.000	28.06	21.62	49.68	74.00	-24.32	peak
7	17857.000	25.71	25.14	50.85	74.00	-23.15	peak

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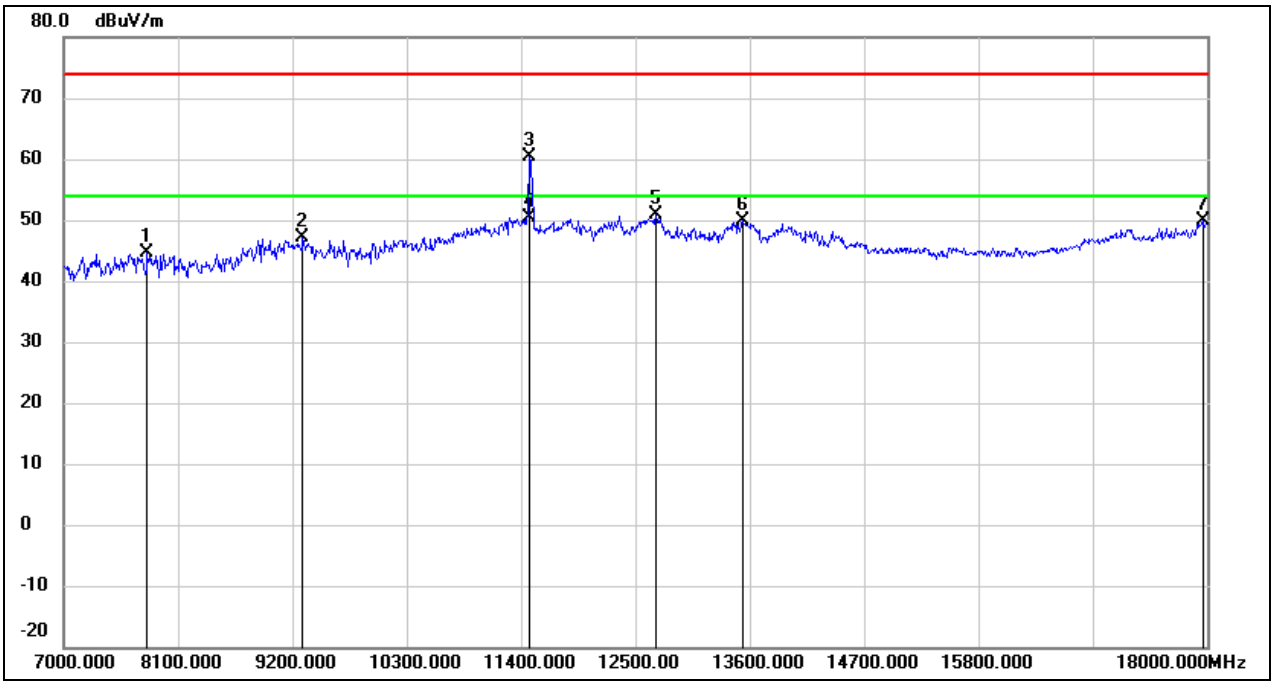
Test Mode:	802.11n HT20	Channel:	5745
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	7803.000	37.91	6.60	44.51	74.00	-29.49	peak
2	9299.000	36.71	10.53	47.24	74.00	-26.76	peak
3	11477.000	43.75	16.67	60.42	74.00	-13.58	peak
4	11477.000	33.59	16.67	50.26	54.00	-3.74	AVG
5	12698.000	32.85	18.08	50.93	74.00	-23.07	peak
6	13534.000	29.11	20.73	49.84	74.00	-24.16	peak
7	17956.000	24.16	25.82	49.98	74.00	-24.02	peak

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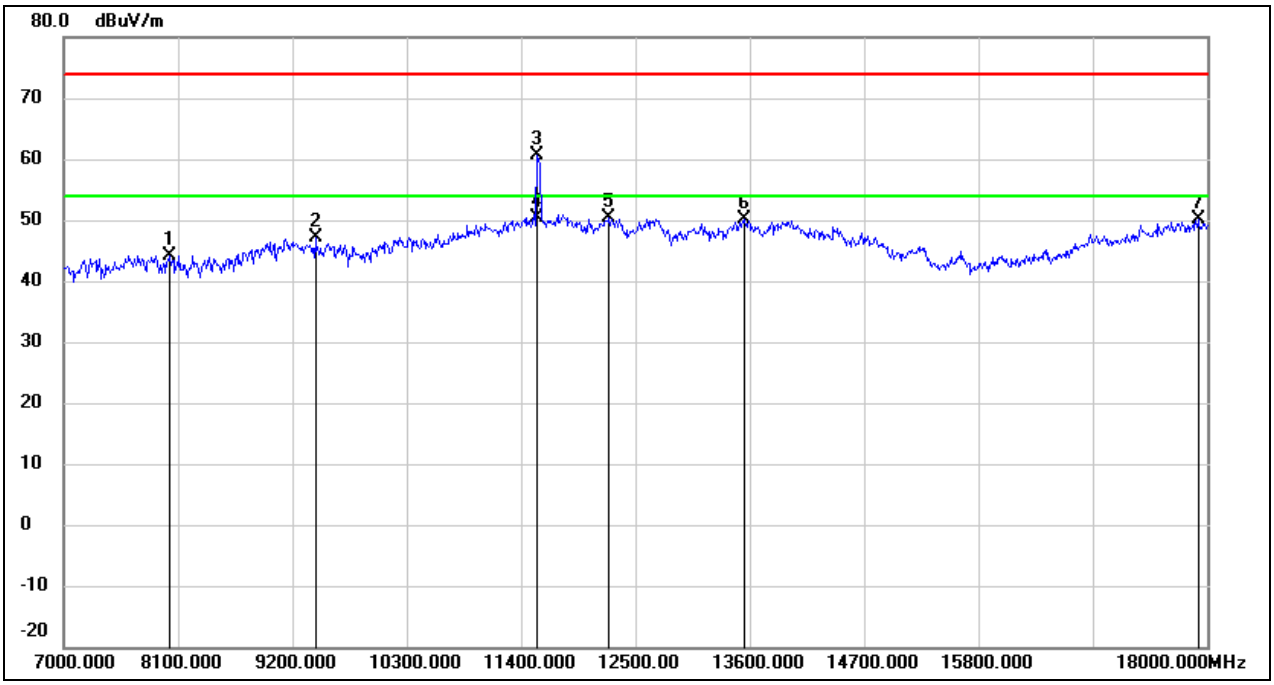
Test Mode:	802.11n HT20	Channel:	5785
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	8012.000	37.80	6.44	44.24	74.00	-29.76	peak
2	9420.000	36.55	10.60	47.15	74.00	-26.85	peak
3	11554.000	43.67	16.87	60.54	74.00	-13.46	peak
4	11554.000	33.47	16.87	50.34	54.00	-3.66	AVG
5	12247.000	32.56	17.77	50.33	74.00	-23.67	peak
6	13545.000	29.32	20.75	50.07	74.00	-23.93	peak
7	17912.000	24.50	25.52	50.02	74.00	-23.98	peak

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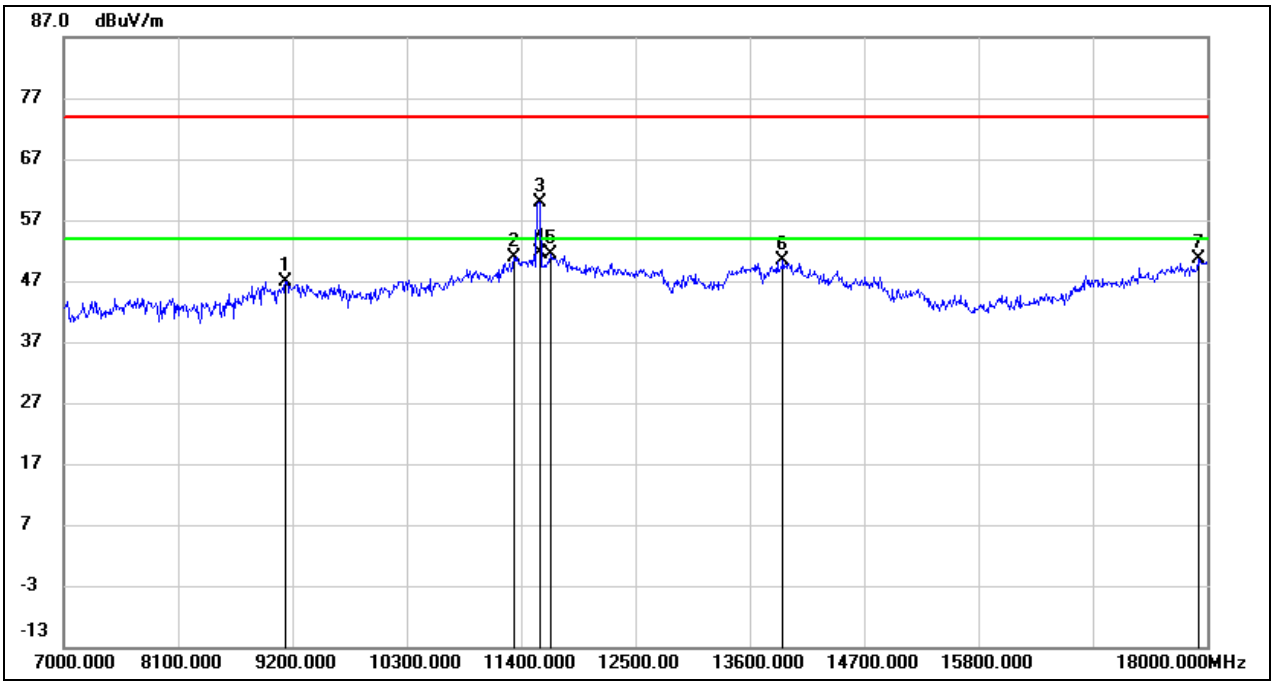
Test Mode:	802.11n HT20	Channel:	5785
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9134.000	36.57	10.41	46.98	74.00	-27.02	peak
2	11334.000	34.74	16.09	50.83	74.00	-23.17	peak
3	11576.000	43.08	16.91	59.99	74.00	-14.01	peak
4	11576.000	34.68	16.91	51.59	54.00	-2.41	AVG
5	11686.000	34.19	17.12	51.31	74.00	-22.69	peak
6	13919.000	28.77	21.68	50.45	74.00	-23.55	peak
7	17912.000	25.11	25.52	50.63	74.00	-23.37	peak

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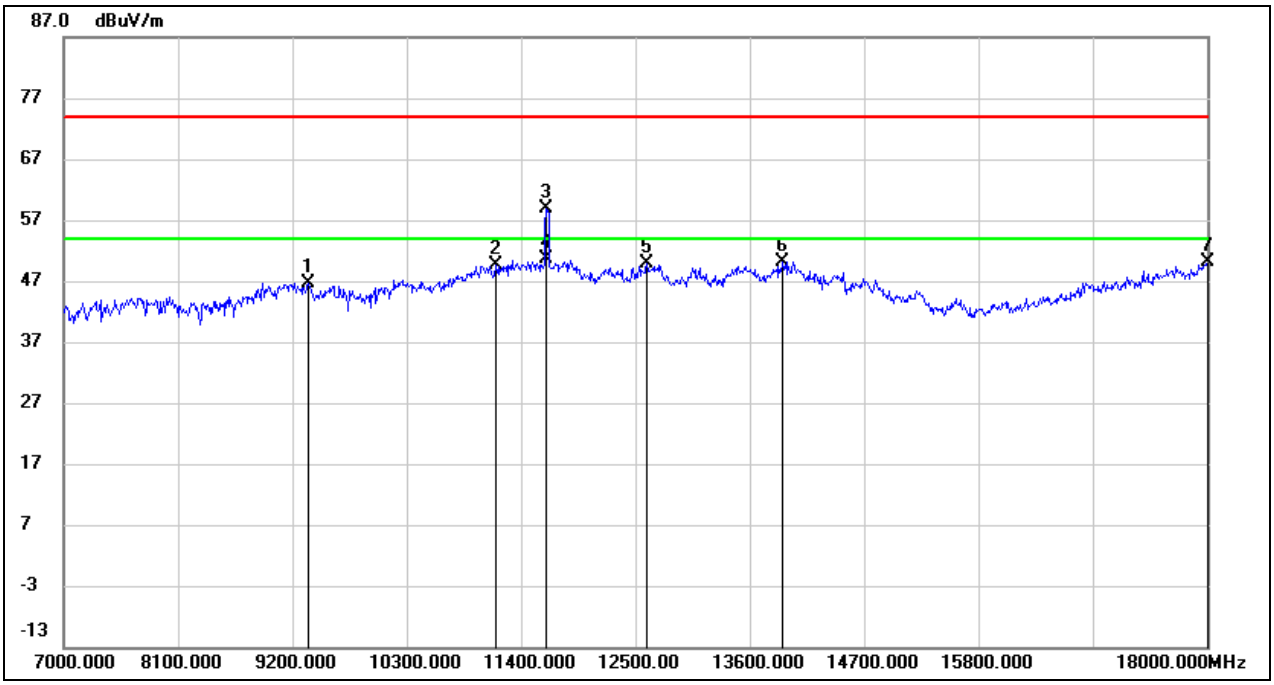
Test Mode:	802.11n HT20	Channel:	5825
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9354.000	36.18	10.56	46.74	74.00	-27.26	peak
2	11158.000	34.17	15.37	49.54	74.00	-24.46	peak
3	11642.000	41.96	17.03	58.99	74.00	-15.01	peak
4	11642.000	33.63	17.03	50.66	54.00	-3.34	AVG
5	12610.000	31.98	17.97	49.95	74.00	-24.05	peak
6	13919.000	28.54	21.68	50.22	74.00	-23.78	peak
7	18000.000	24.03	26.12	50.15	74.00	-23.85	peak

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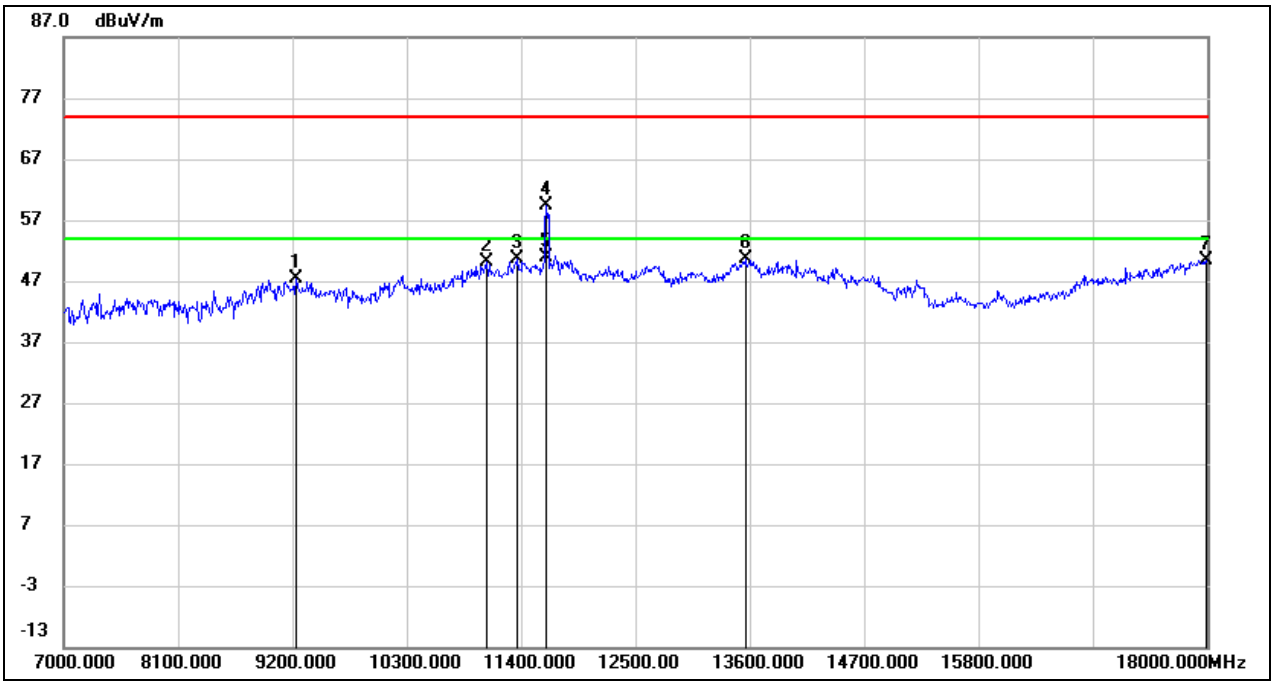
Test Mode:	802.11n HT20	Channel:	5825
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9233.000	37.02	10.48	47.50	74.00	-26.50	peak
2	11070.000	35.14	15.01	50.15	74.00	-23.85	peak
3	11367.000	34.38	16.22	50.60	74.00	-23.40	peak
4	11642.000	42.34	17.03	59.37	74.00	-14.63	peak
5	11642.000	33.73	17.03	50.76	54.00	-3.24	AVG
6	13556.000	29.79	20.78	50.57	74.00	-23.43	peak
7	17989.000	24.46	26.04	50.50	74.00	-23.50	peak

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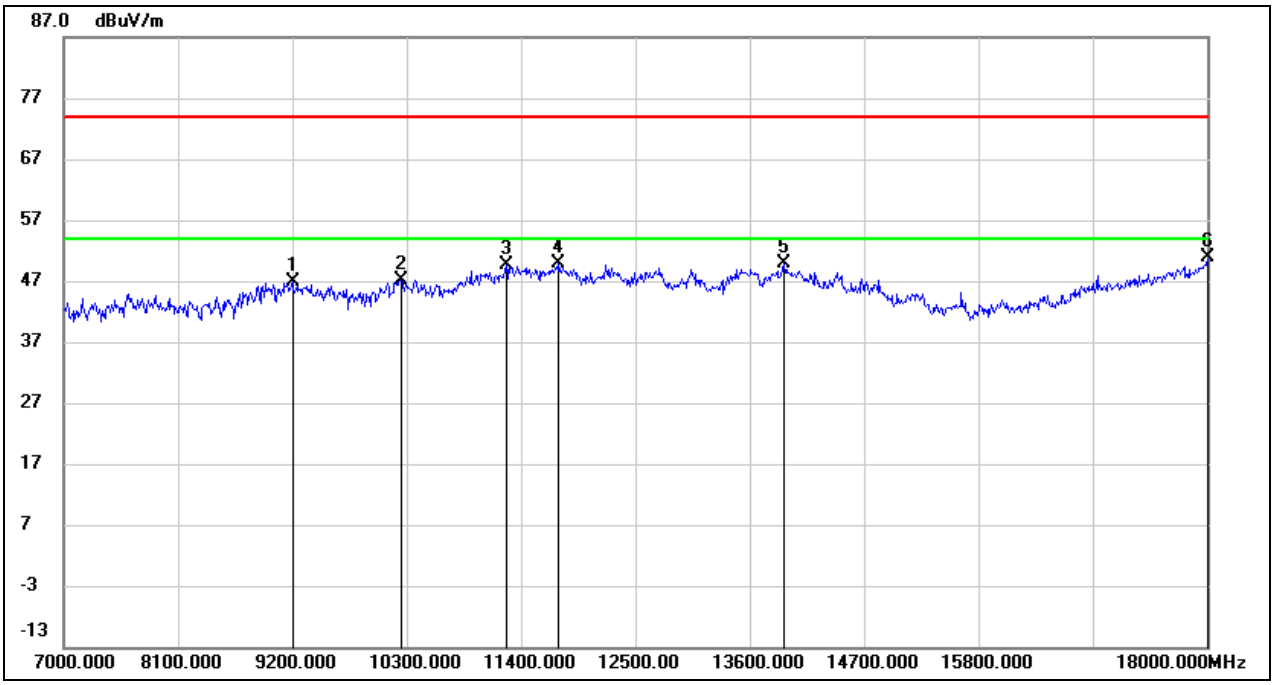
Test Mode:	802.11n HT40	Channel:	5190
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9200.000	36.38	10.46	46.84	74.00	-27.16	peak
2	10245.000	34.96	12.28	47.24	74.00	-26.76	peak
3	11257.000	33.82	15.78	49.60	74.00	-24.40	peak
4	11763.000	32.54	17.26	49.80	74.00	-24.20	peak
5	13930.000	28.10	21.71	49.81	74.00	-24.19	peak
6	18000.000	24.77	26.12	50.89	74.00	-23.11	peak

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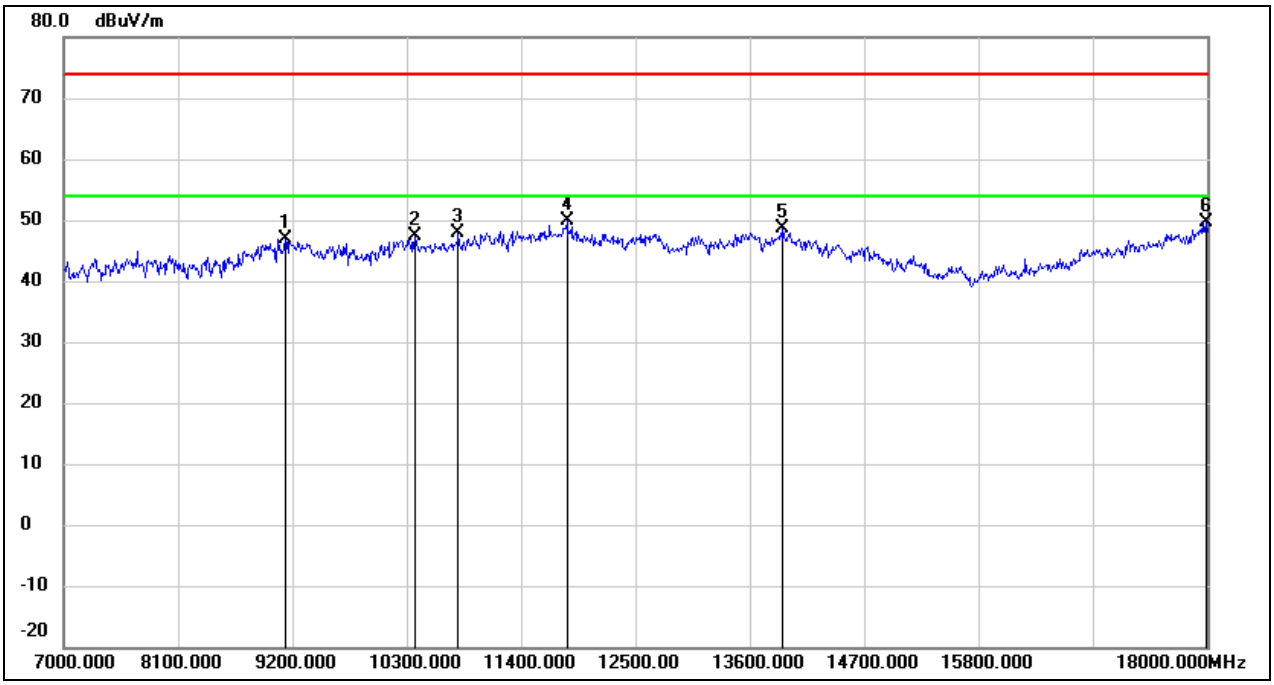
Test Mode:	802.11n HT40	Channel:	5190
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9134.000	36.46	10.41	46.87	74.00	-27.13	peak
2	10377.000	34.75	12.56	47.31	74.00	-26.69	peak
3	10795.000	33.89	13.94	47.83	74.00	-26.17	peak
4	11840.000	32.46	17.40	49.86	74.00	-24.14	peak
5	13919.000	26.94	21.68	48.62	74.00	-25.38	peak
6	17989.000	23.66	26.04	49.70	74.00	-24.30	peak

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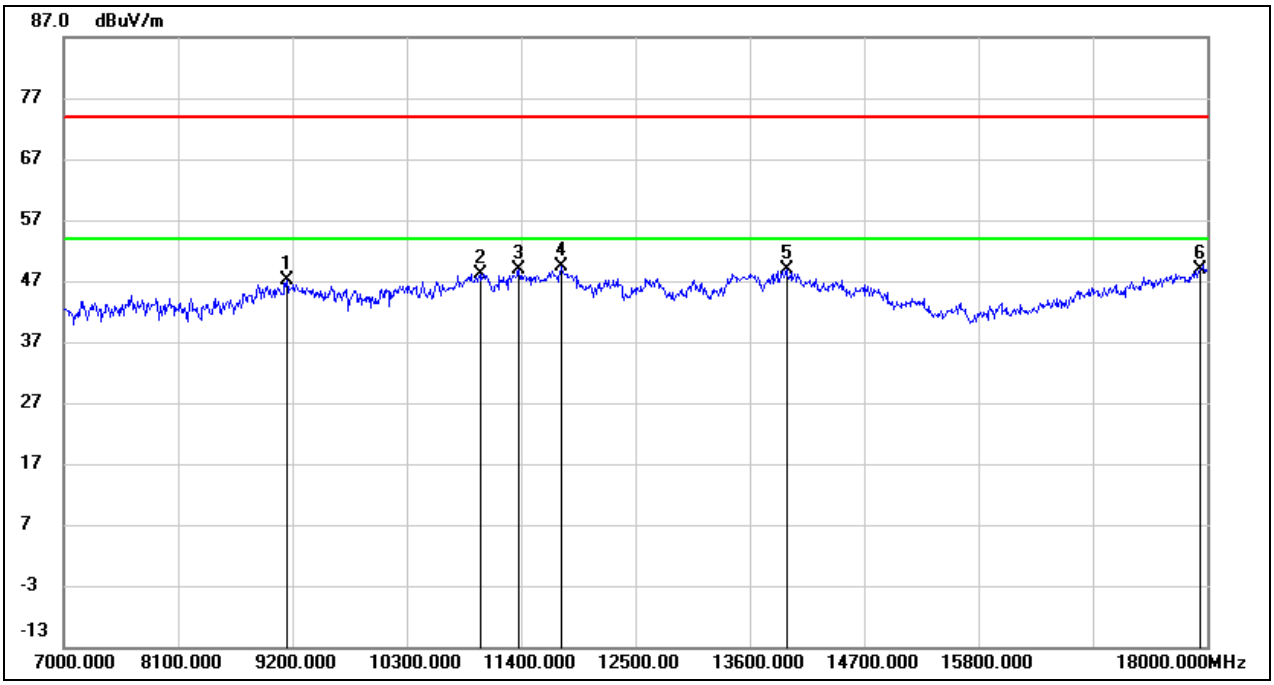
Test Mode:	802.11n HT40	Channel:	5230
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9145.000	36.60	10.43	47.03	74.00	-26.97	peak
2	11015.000	33.43	14.79	48.22	74.00	-25.78	peak
3	11378.000	32.54	16.26	48.80	74.00	-25.20	peak
4	11785.000	32.05	17.30	49.35	74.00	-24.65	peak
5	13952.000	27.02	21.76	48.78	74.00	-25.22	peak
6	17934.000	23.25	25.67	48.92	74.00	-25.08	peak

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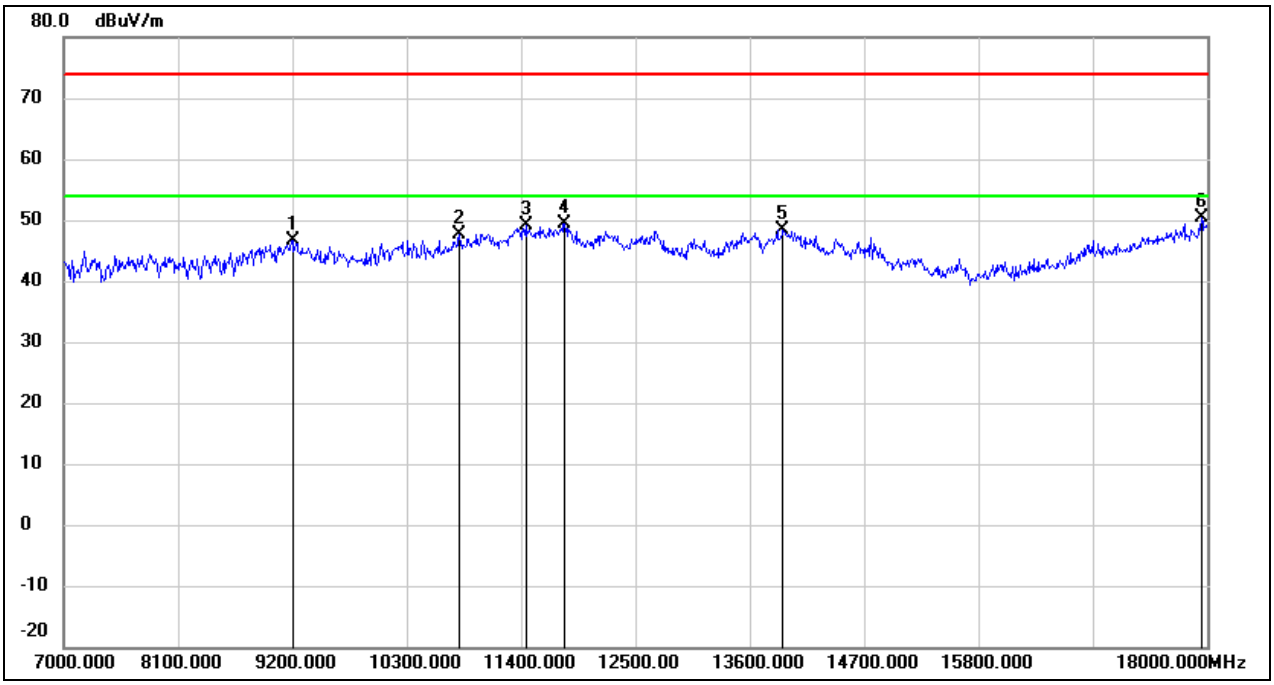
Test Mode:	802.11n HT40	Channel:	5230
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9200.000	36.26	10.46	46.72	74.00	-27.28	peak
2	10806.000	33.72	13.98	47.70	74.00	-26.30	peak
3	11444.000	32.70	16.53	49.23	74.00	-24.77	peak
4	11818.000	32.11	17.36	49.47	74.00	-24.53	peak
5	13919.000	26.73	21.68	48.41	74.00	-25.59	peak
6	17945.000	24.53	25.75	50.28	74.00	-23.72	peak

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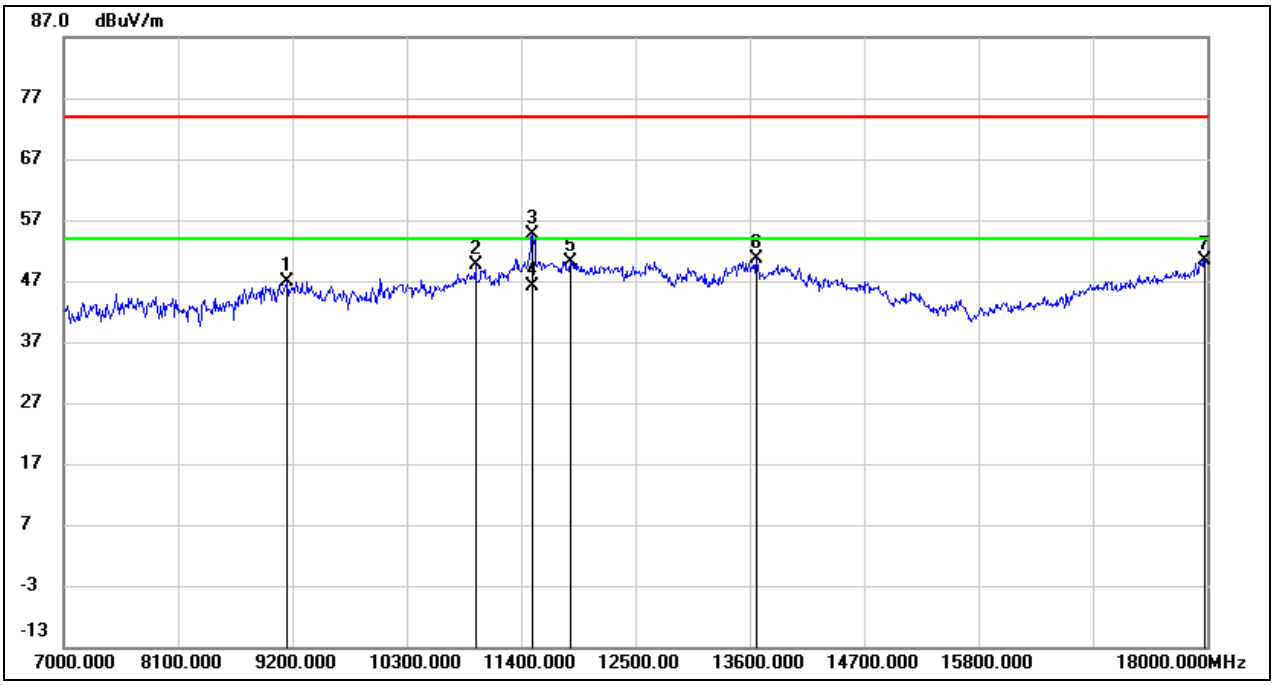
Test Mode:	802.11n HT40	Channel:	5755
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9145.000	36.49	10.43	46.92	74.00	-27.08	peak
2	10960.000	35.08	14.57	49.65	74.00	-24.35	peak
3	11510.000	37.87	16.79	54.66	74.00	-19.34	peak
4	11510.000	29.34	16.79	46.13	54.00	-7.87	AVG
5	11873.000	32.74	17.46	50.20	74.00	-23.80	peak
6	13666.000	29.52	21.05	50.57	74.00	-23.43	peak
7	17978.000	24.53	25.97	50.50	74.00	-23.50	peak

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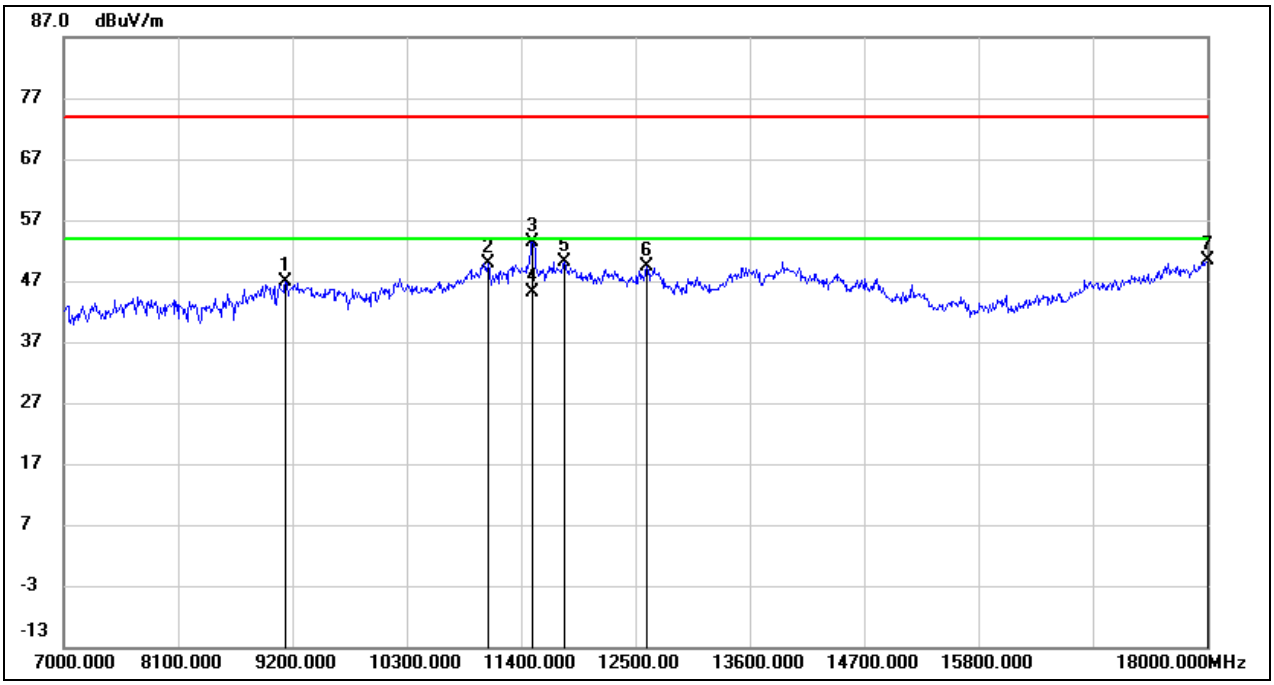
Test Mode:	802.11n HT40	Channel:	5755
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9134.000	36.36	10.41	46.77	74.00	-27.23	peak
2	11081.000	34.81	15.05	49.86	74.00	-24.14	peak
3	11510.000	36.50	16.79	53.29	74.00	-20.71	peak
4	11510.000	28.41	16.79	45.20	54.00	-8.80	AVG
5	11818.000	32.77	17.36	50.13	74.00	-23.87	peak
6	12610.000	31.36	17.97	49.33	74.00	-24.67	peak
7	18000.000	24.22	26.12	50.34	74.00	-23.66	peak

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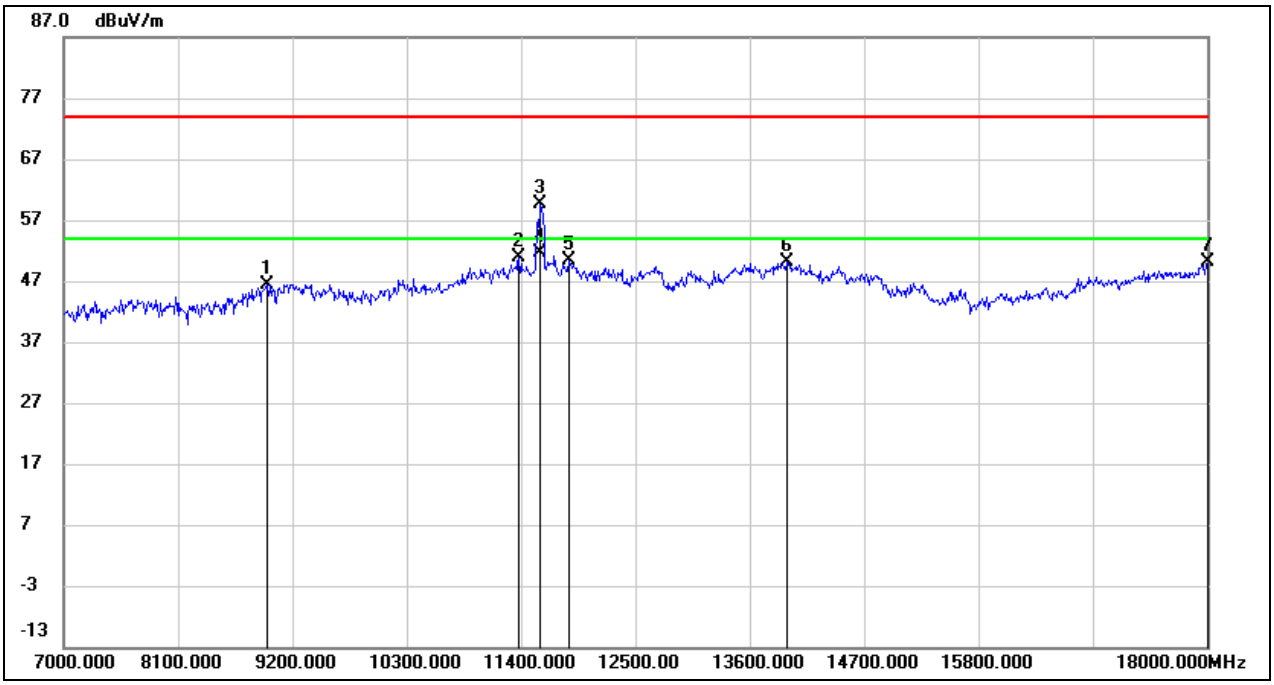
Test Mode:	802.11n HT40	Channel:	5795
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	8958.000	36.45	10.05	46.50	74.00	-27.50	peak
2	11378.000	34.56	16.26	50.82	74.00	-23.18	peak
3	11587.000	42.64	16.93	59.57	74.00	-14.43	peak
4	11587.000	34.67	16.93	51.60	54.00	-2.40	AVG
5	11862.000	33.05	17.45	50.50	74.00	-23.50	peak
6	13963.000	28.47	21.78	50.25	74.00	-23.75	peak
7	18000.000	24.07	26.12	50.19	74.00	-23.81	peak

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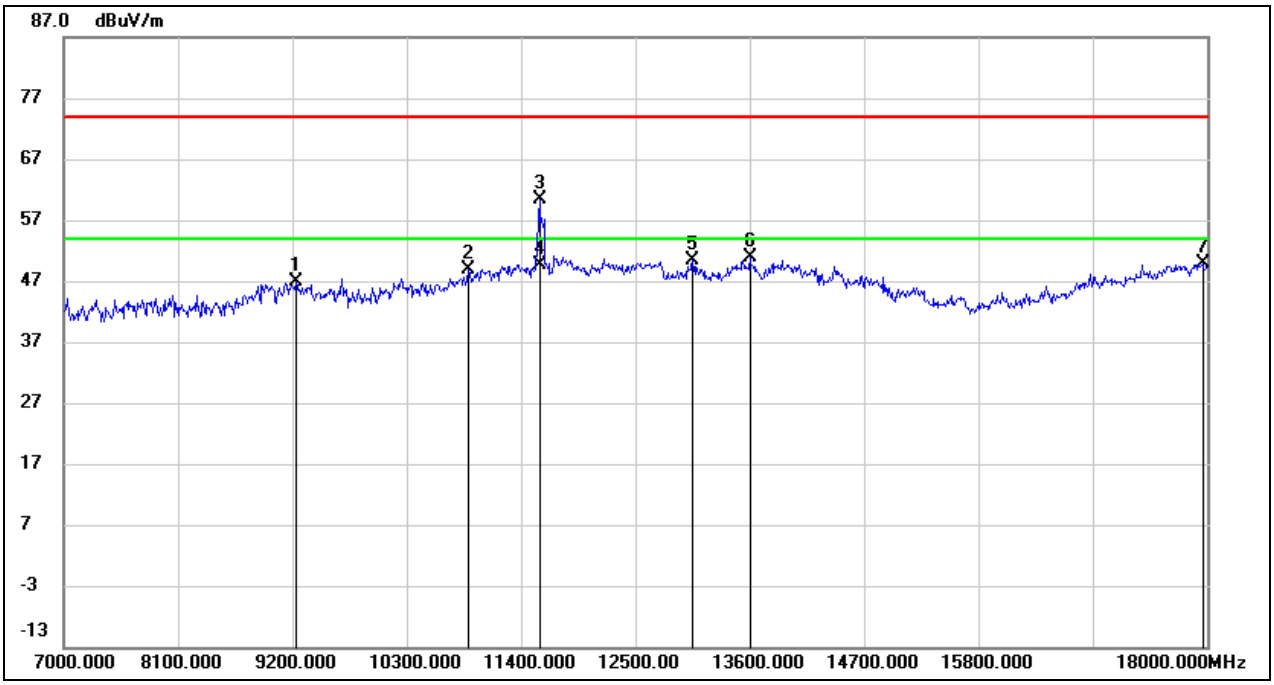
Test Mode:	802.11n HT40	Channel:	5795
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9233.000	36.39	10.48	46.87	74.00	-27.13	peak
2	10894.000	34.64	14.32	48.96	74.00	-25.04	peak
3	11576.000	43.51	16.91	60.42	74.00	-13.58	peak
4	11576.000	32.79	16.91	49.70	54.00	-4.30	AVG
5	13050.000	31.68	18.66	50.34	74.00	-23.66	peak
6	13600.000	29.90	20.89	50.79	74.00	-23.21	peak
7	17956.000	24.07	25.82	49.89	74.00	-24.11	peak

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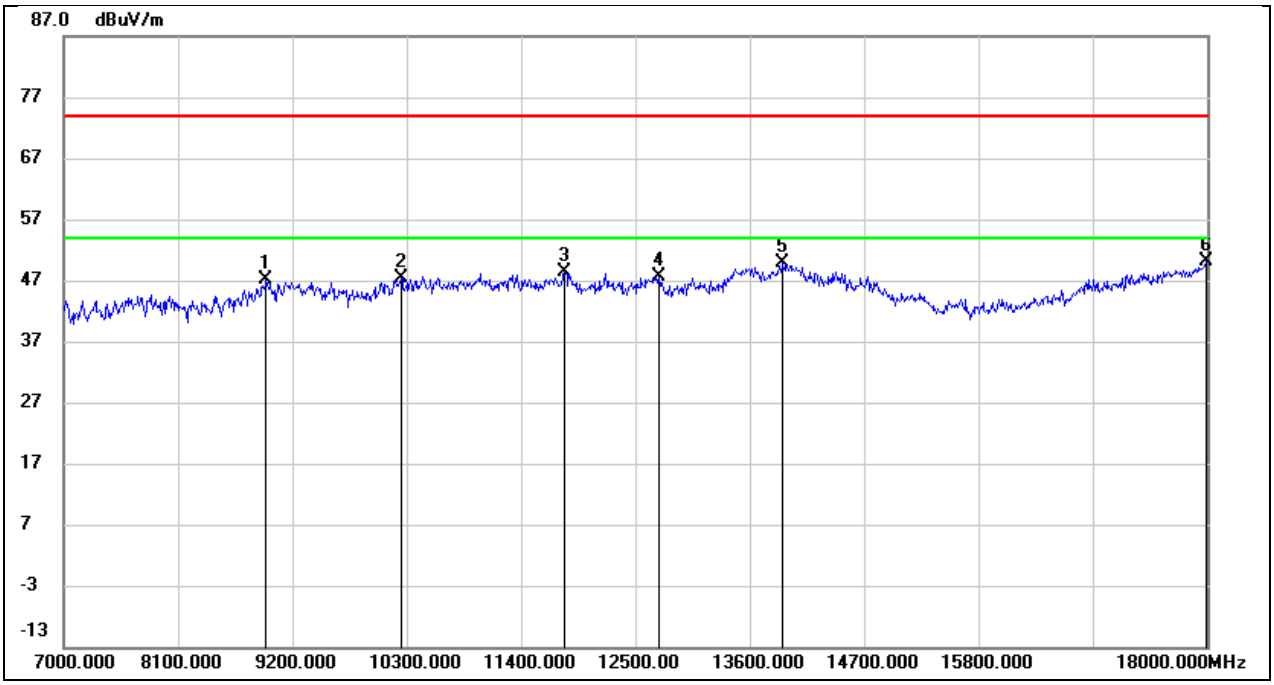
Test Mode:	802.11ac VHT80	Channel:	5210
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	8947.000	37.03	9.98	47.01	74.00	-26.99	peak
2	10245.000	35.14	12.28	47.42	74.00	-26.58	peak
3	11818.000	31.04	17.36	48.40	74.00	-25.60	peak
4	12720.000	29.44	18.09	47.53	74.00	-26.47	peak
5	13919.000	28.29	21.68	49.97	74.00	-24.03	peak
6	17989.000	24.14	26.04	50.18	74.00	-23.82	peak

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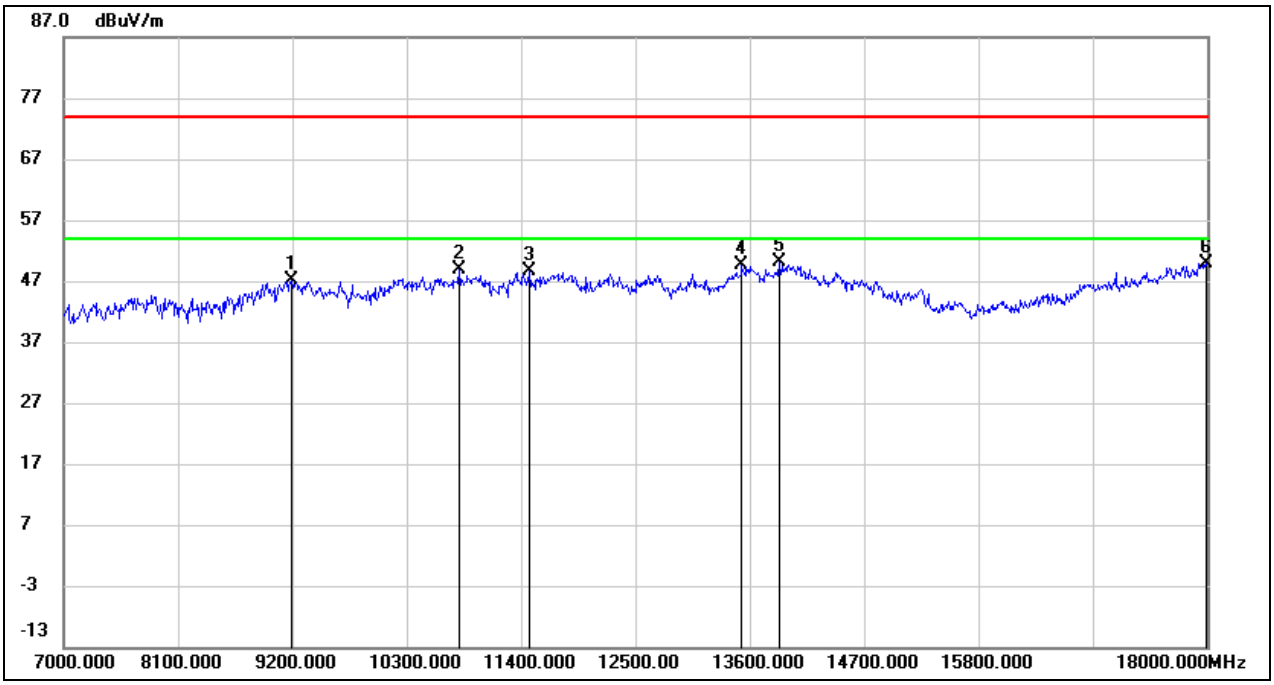
Test Mode:	802.11ac VHT80	Channel:	5210
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9189.000	36.78	10.46	47.24	74.00	-26.76	peak
2	10806.000	34.80	13.98	48.78	74.00	-25.22	peak
3	11477.000	32.02	16.67	48.69	74.00	-25.31	peak
4	13523.000	28.98	20.70	49.68	74.00	-24.32	peak
5	13886.000	28.58	21.60	50.18	74.00	-23.82	peak
6	17989.000	23.96	26.04	50.00	74.00	-24.00	peak

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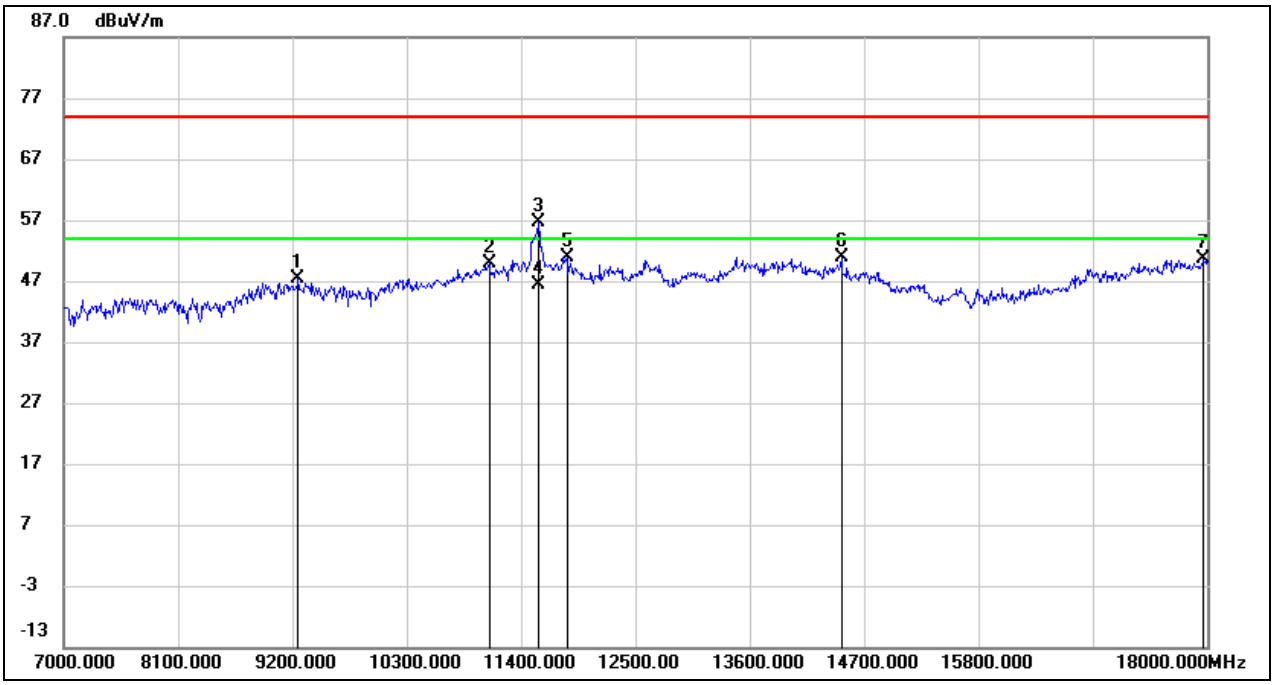
Test Mode:	802.11ac VHT80	Channel:	5775
Polarity:	Horizontal	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	9255.000	36.94	10.51	47.45	74.00	-26.55	peak
2	11092.000	34.81	15.10	49.91	74.00	-24.09	peak
3	11565.000	39.66	16.89	56.55	74.00	-17.45	peak
4	11565.000	29.51	16.89	46.40	54.00	-7.60	AVG
5	11840.000	33.58	17.40	50.98	74.00	-23.02	peak
6	14480.000	30.91	19.87	50.78	74.00	-23.22	peak
7	17967.000	24.72	25.89	50.61	74.00	-23.39	peak

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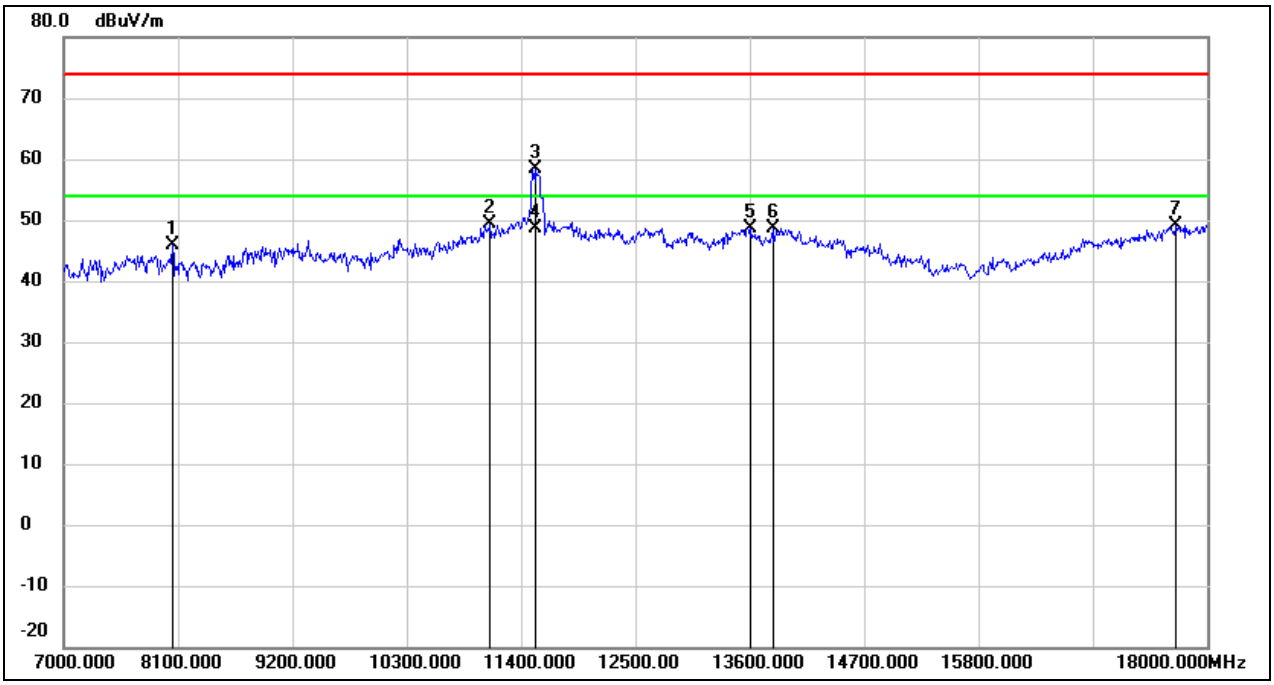
Test Mode:	802.11ac VHT80	Channel:	5775
Polarity:	Vertical	Test Voltage:	AC 120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	8045.000	39.31	6.47	45.78	74.00	-28.22	peak
2	11103.000	34.23	15.15	49.38	74.00	-24.62	peak
3	11543.000	41.65	16.84	58.49	74.00	-15.51	peak
4	11543.000	31.77	16.84	48.61	54.00	-5.39	AVG
5	13611.000	27.78	20.92	48.70	74.00	-25.30	peak
6	13820.000	27.26	21.43	48.69	74.00	-25.31	peak
7	17703.000	25.12	24.09	49.21	74.00	-24.79	peak

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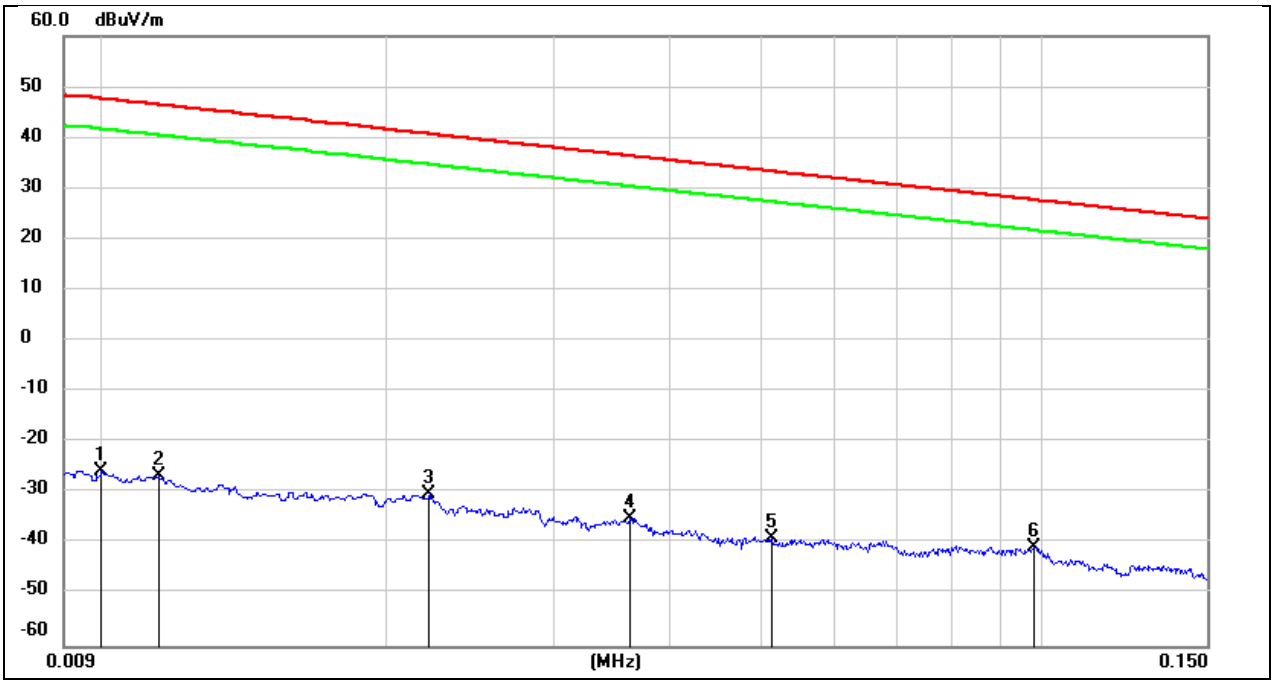
8.4. SPURIOUS EMISSIONS(9 KHZ~30 MHZ)

Test Mode:	802.11a20	Channel:	5180
Polarity:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0100	75.72	-101.40	-25.68	47.60	-73.28	peak
2	0.0114	74.88	-101.40	-26.52	46.46	-72.98	peak
3	0.0221	71.13	-101.35	-30.22	40.71	-70.93	peak
4	0.0362	66.51	-101.42	-34.91	36.43	-71.34	peak
5	0.0514	62.68	-101.48	-38.80	33.38	-72.18	peak
6	0.0981	61.27	-101.78	-40.51	27.77	-68.28	peak

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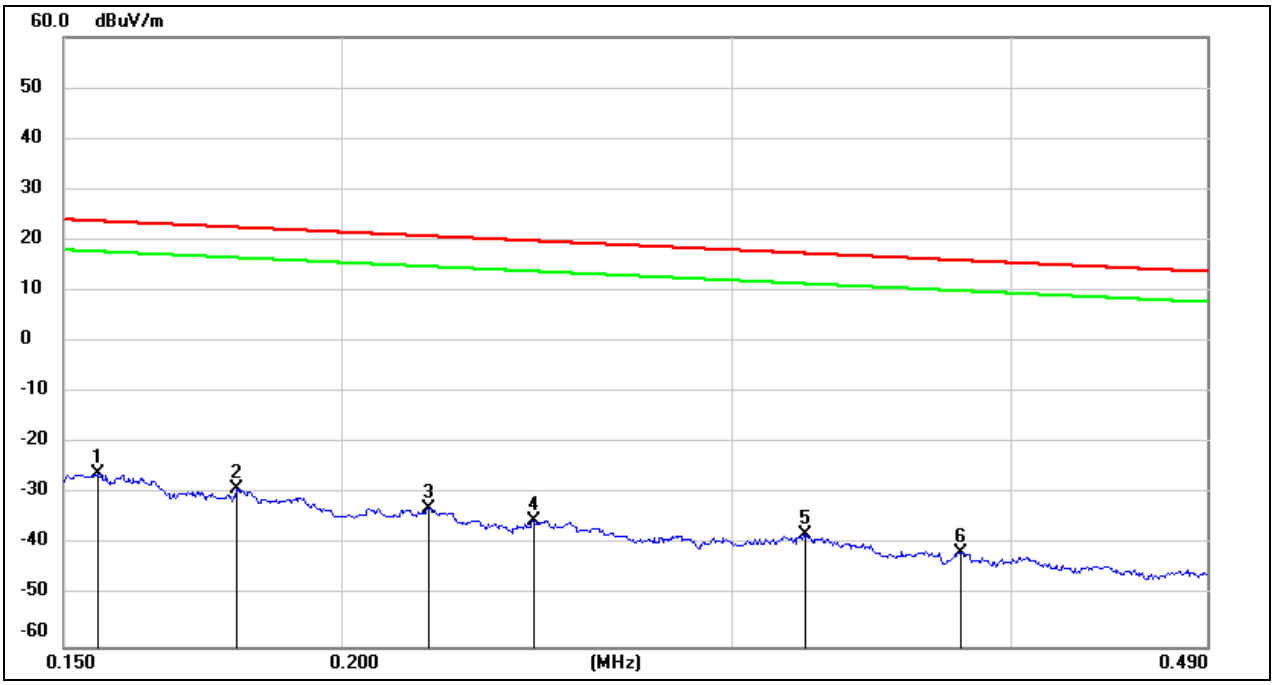
Test Mode:	802.11a20	Channel:	5180
Polarity:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1554	75.77	-101.65	-25.88	23.77	-49.65	peak
2	0.1794	72.77	-101.68	-28.91	22.53	-51.44	peak
3	0.2190	68.77	-101.75	-32.98	20.79	-53.77	peak
4	0.2442	66.53	-101.79	-35.26	19.85	-55.11	peak
5	0.3234	63.98	-101.88	-37.90	17.41	-55.31	peak
6	0.3800	60.52	-101.94	-41.42	16.01	-57.43	peak

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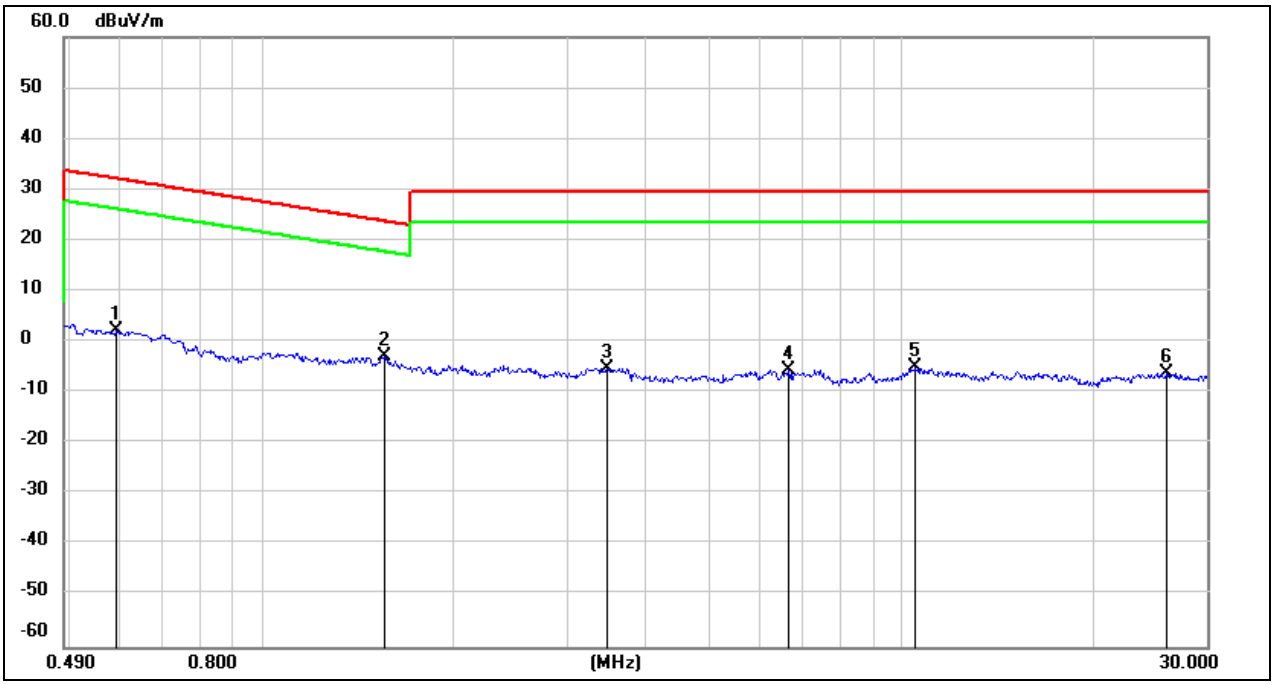
Test Mode:	802.11a20	Channel:	5180
Polarity:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.5917	64.24	-62.08	2.16	32.16	-30.00	peak
2	1.5564	59.18	-62.02	-2.84	23.76	-26.60	peak
3	3.4704	56.35	-61.46	-5.11	29.54	-34.65	peak
4	6.6576	55.60	-61.26	-5.66	29.54	-35.20	peak
5	10.5234	55.81	-60.82	-5.01	29.54	-34.55	peak
6	25.8978	54.26	-60.36	-6.10	29.54	-35.64	peak

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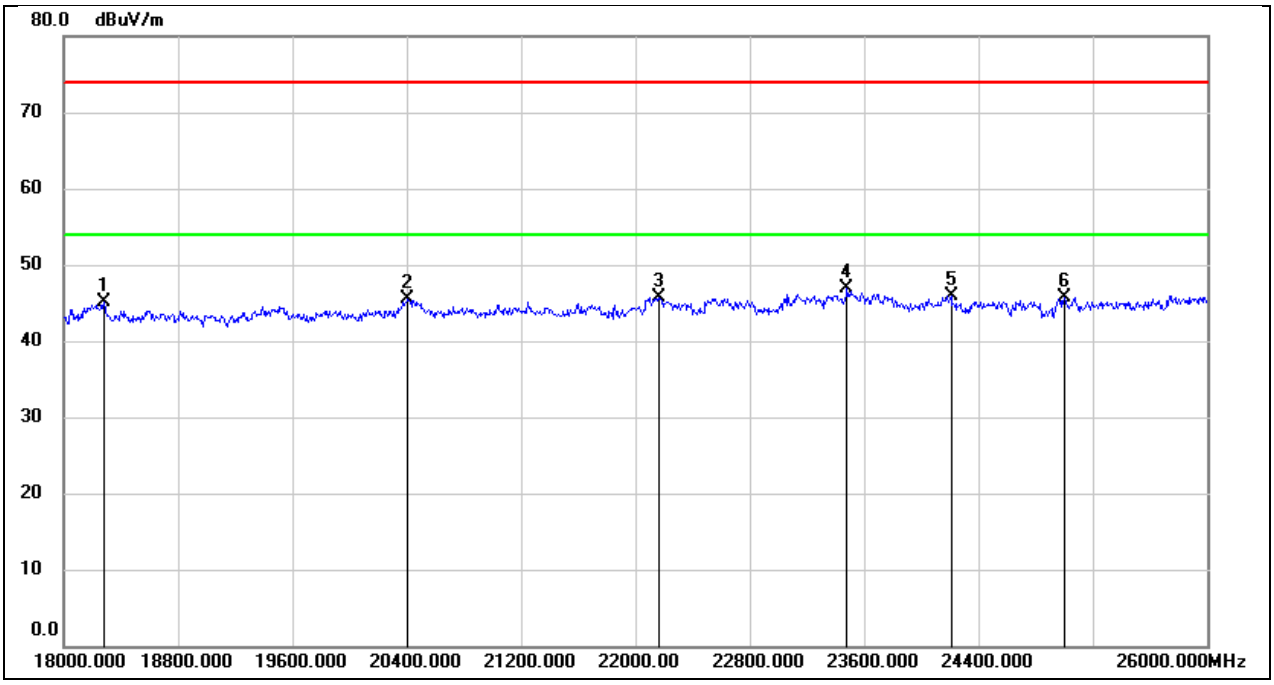
8.5. SPURIOUS EMISSIONS(18 GHZ~26 GHZ)

Test Mode:	802.11a 20	Channel:	5180
Polarity:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18280.000	50.61	-5.52	45.09	74.00	-28.91	peak
2	20408.000	50.86	-5.45	45.41	74.00	-28.59	peak
3	22160.000	50.08	-4.31	45.77	74.00	-28.23	peak
4	23480.000	50.04	-3.16	46.88	74.00	-27.12	peak
5	24208.000	48.71	-2.81	45.90	74.00	-28.10	peak
6	25000.000	47.86	-2.10	45.76	74.00	-28.24	peak

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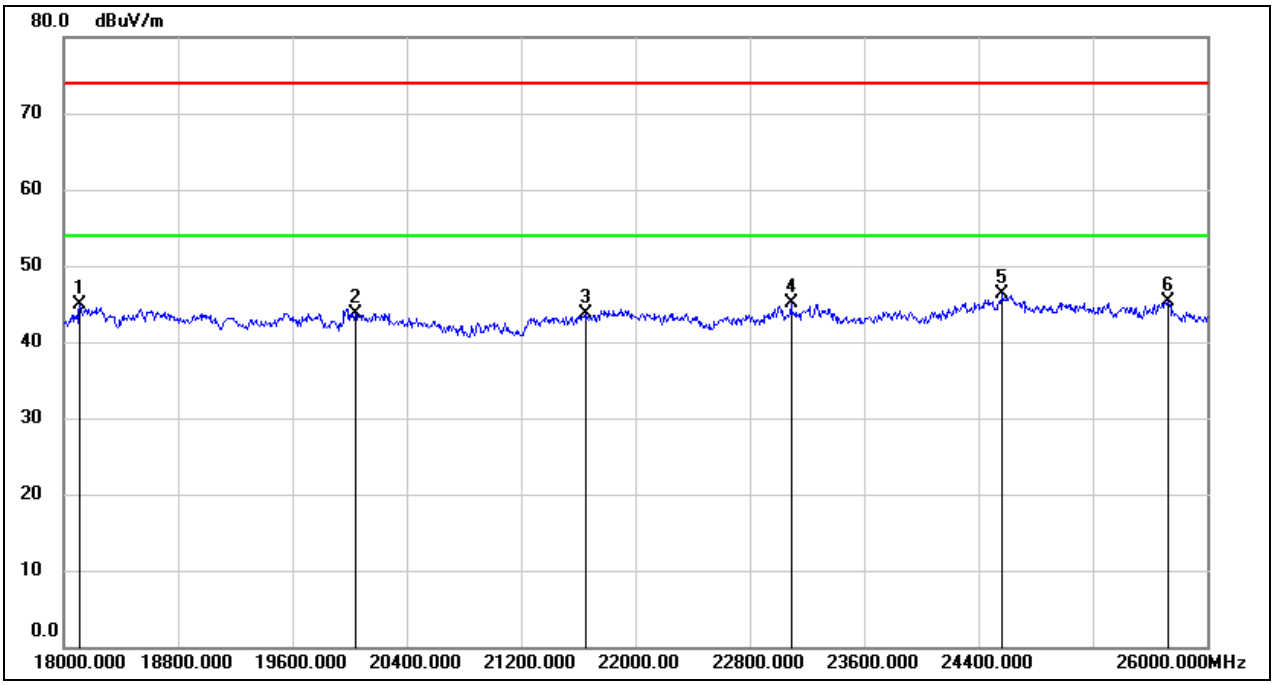
Test Mode:	802.11a 20	Channel:	5180
Polarity:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	18112.000	50.46	-5.47	44.99	74.00	-29.01	peak
2	20040.000	49.21	-5.48	43.73	74.00	-30.27	peak
3	21648.000	48.12	-4.48	43.64	74.00	-30.36	peak
4	23088.000	48.52	-3.41	45.11	74.00	-28.89	peak
5	24568.000	48.60	-2.33	46.27	74.00	-27.73	peak
6	25728.000	46.11	-0.72	45.39	74.00	-28.61	peak

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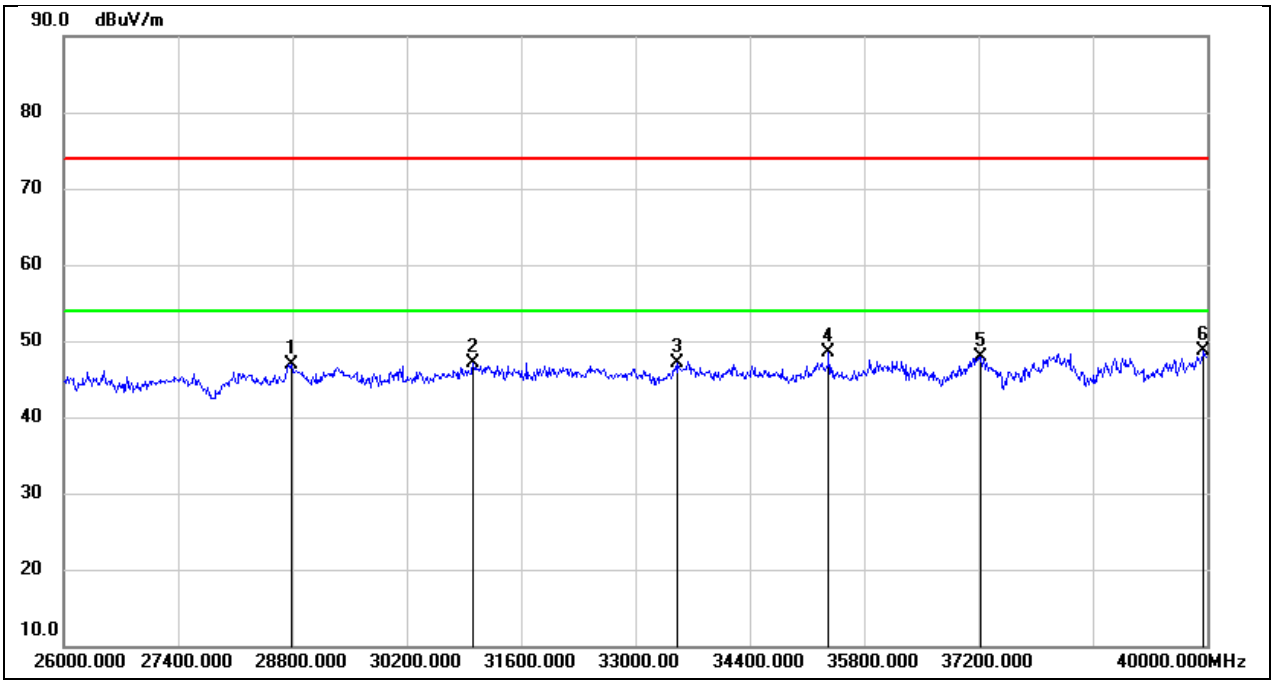
8.6. SPURIOUS EMISSIONS(26 GHZ~40 GHZ)

Test Mode:	802.11a 20	Channel:	5180
Polarity:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	28786.000	47.49	-0.64	46.85	74.00	-27.15	peak
2	31012.000	47.83	-0.71	47.12	74.00	-26.88	peak
3	33518.000	46.52	0.56	47.08	74.00	-26.92	peak
4	35366.000	45.90	2.59	48.49	74.00	-25.51	peak
5	37228.000	44.73	3.14	47.87	74.00	-26.13	peak
6	39958.000	43.58	5.12	48.70	74.00	-25.30	peak

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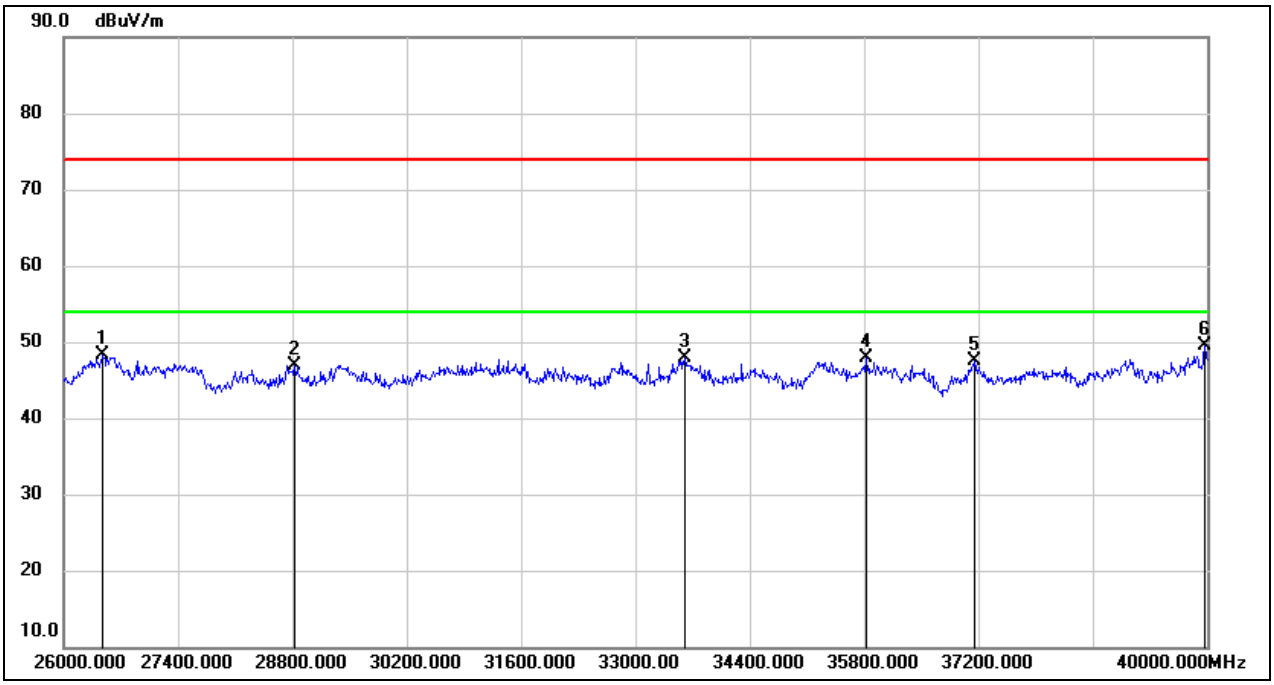
Test Mode:	802.11a 20	Channel:	5180
Polarity:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	26476.000	53.03	-4.78	48.25	74.00	-25.75	peak
2	28828.000	47.63	-0.79	46.84	74.00	-27.16	peak
3	33602.000	47.51	0.46	47.97	74.00	-26.03	peak
4	35828.000	44.25	3.67	47.92	74.00	-26.08	peak
5	37158.000	44.34	3.17	47.51	74.00	-26.49	peak
6	39972.000	44.45	5.13	49.58	74.00	-24.42	peak

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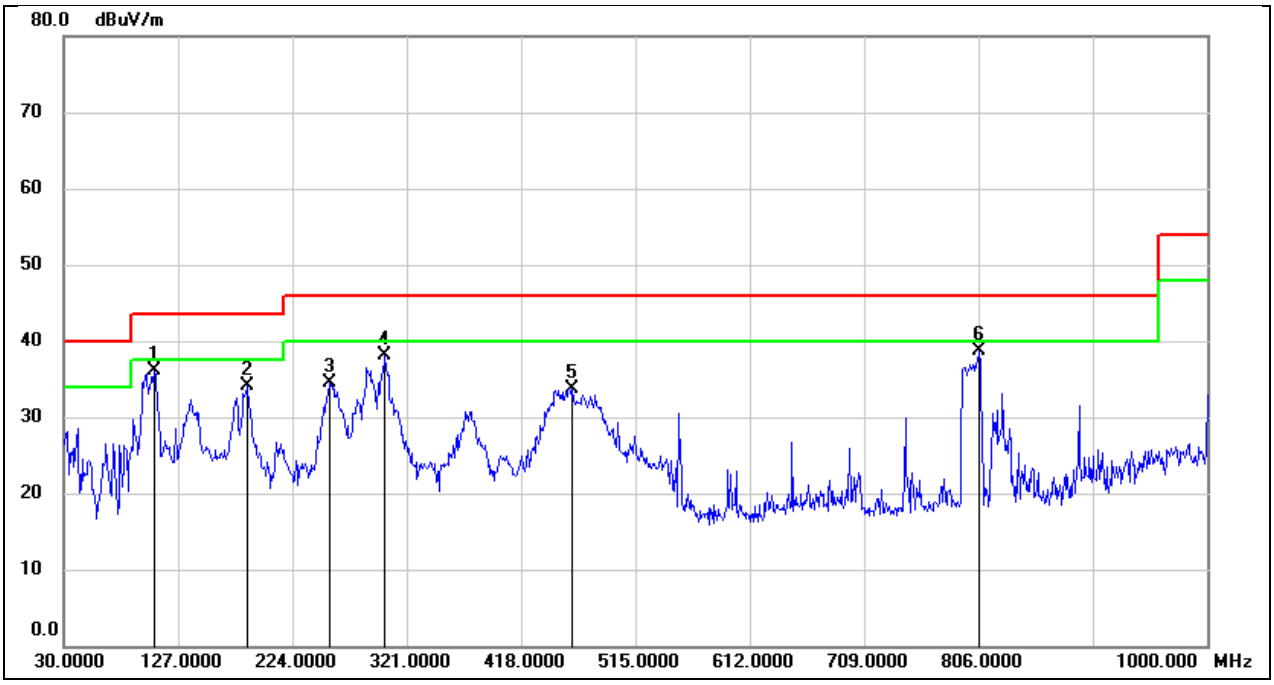
8.7. SPURIOUS EMISSIONS(30 MHZ~1 GHZ)

Test Mode:	802.11a 20	Channel:	5180
Polarity:	Horizontal	Test Voltage:	AC120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	106.6300	56.74	-20.65	36.09	43.50	-7.41	QP
2	185.2000	50.76	-16.75	34.01	43.50	-9.49	QP
3	256.0100	53.24	-18.69	34.55	46.00	-11.45	QP
4	302.5700	53.35	-15.25	38.10	46.00	-7.90	QP
5	461.6500	45.82	-12.11	33.71	46.00	-12.29	QP
6	806.9699	45.99	-7.20	38.79	46.00	-7.21	QP

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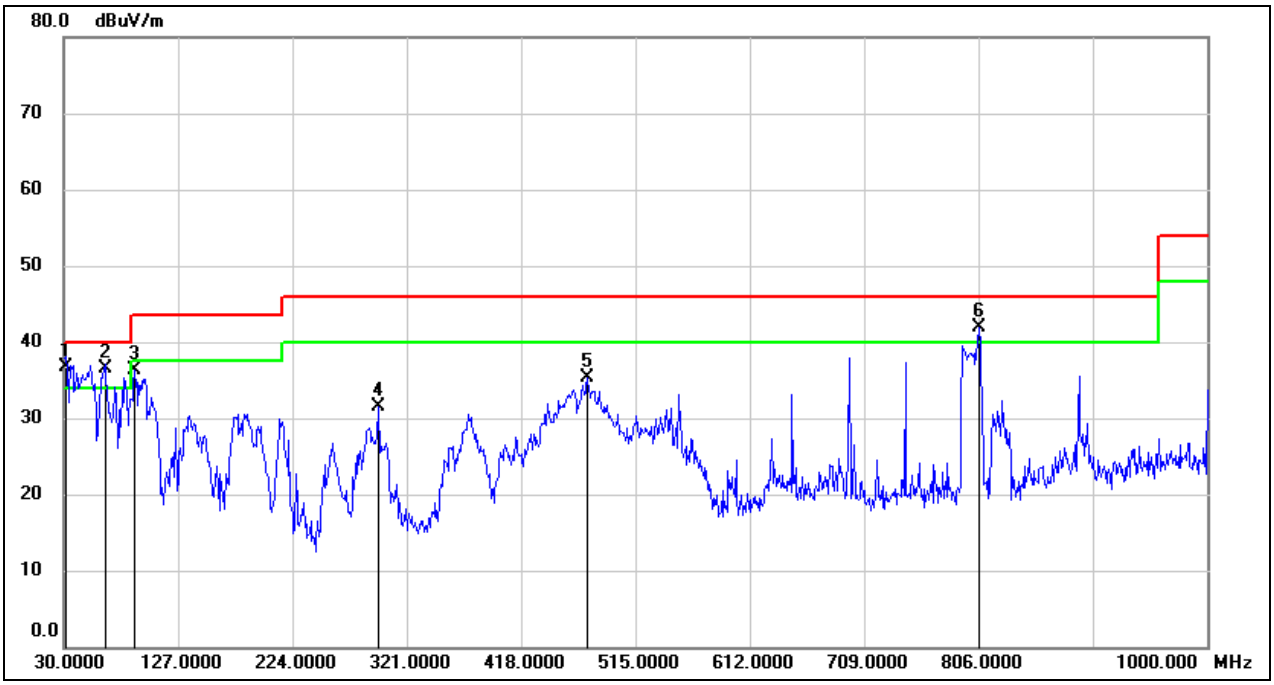
Test Mode:	802.11a 20	Channel:	5180
Polarity:	Vertical	Test Voltage:	AC120V_60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	31.9400	55.82	-19.13	36.69	40.00	-3.31	QP
2	64.9200	56.95	-20.54	36.41	40.00	-3.59	QP
3	90.1400	58.29	-21.95	36.34	43.50	-7.16	QP
4	296.7500	47.09	-15.50	31.59	46.00	-14.41	QP
5	474.2600	47.15	-11.93	35.22	46.00	-10.78	QP
6	806.9699	49.17	-7.20	41.97	46.00	-4.03	QP

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9. AC POWER LINE CONDUCTED EMISSION

LIMITS

Please refer to CFR 47 FCC §15.207 (a) and ISED RSS-Gen Clause 8.8

FREQUENCY (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

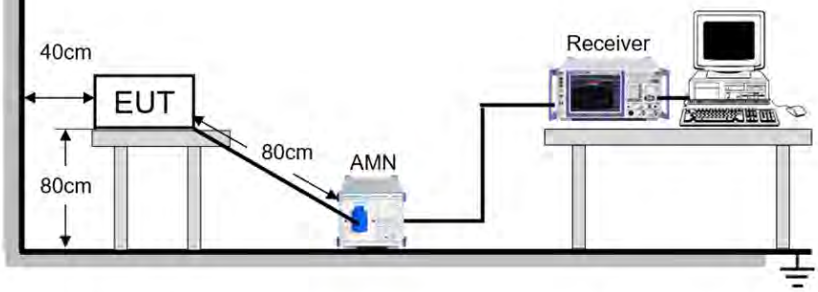
TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 6.2.

The EUT is put on a table of non-conducting material that is 80 cm high. The vertical conducting wall of shielding is located 40 cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2013.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9 kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

TEST SETUP



TEST ENVIRONMENT

Temperature	21.5℃	Relative Humidity	53.2%
Atmosphere Pressure	101kPa	Test Voltage	

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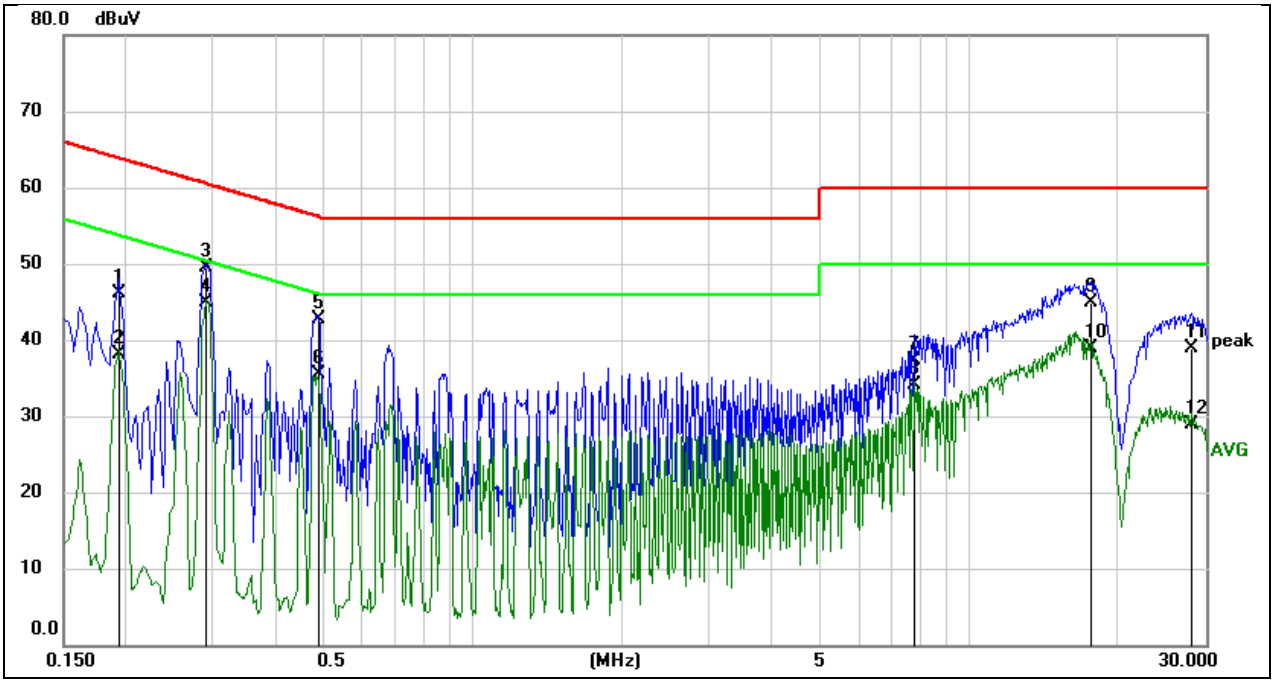
TEST DATE / ENGINEER

Test Date	January 16, 2023	Test By	Karl Wu

TEST RESULTS

Test Mode:	802.11a20	Channel:	5180
Line:	Line		



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1932	36.57	9.59	46.16	63.90	-17.74	QP
2	0.1932	28.50	9.59	38.09	53.90	-15.81	AVG
3	0.2915	40.00	9.59	49.59	60.48	-10.89	QP
4	0.2915	35.41	9.59	45.00	50.48	-5.48	AVG
5	0.4865	33.17	9.60	42.77	56.23	-13.46	QP
6	0.4865	25.90	9.60	35.50	46.23	-10.73	AVG
7	7.8107	27.59	9.72	37.31	60.00	-22.69	QP
8	7.8107	24.42	9.72	34.14	50.00	-15.86	AVG
9	17.6199	35.04	9.79	44.83	60.00	-15.17	QP
10	17.6199	29.04	9.79	38.83	50.00	-11.17	AVG
11	28.0094	29.07	9.76	38.83	60.00	-21.17	QP
12	28.0094	19.20	9.76	28.96	50.00	-21.04	AVG

Note:
1. Result = Reading + Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz ~ 150 kHz), 9 kHz (150 kHz ~ 30 MHz).
4. Step size: 80 Hz (0.009 MHz ~ 0.15 MHz), 4 kHz (0.15 MHz ~ 30 MHz), Scan time: auto.

Note: All the modes have been tested, only the worst data was recorded in the report.

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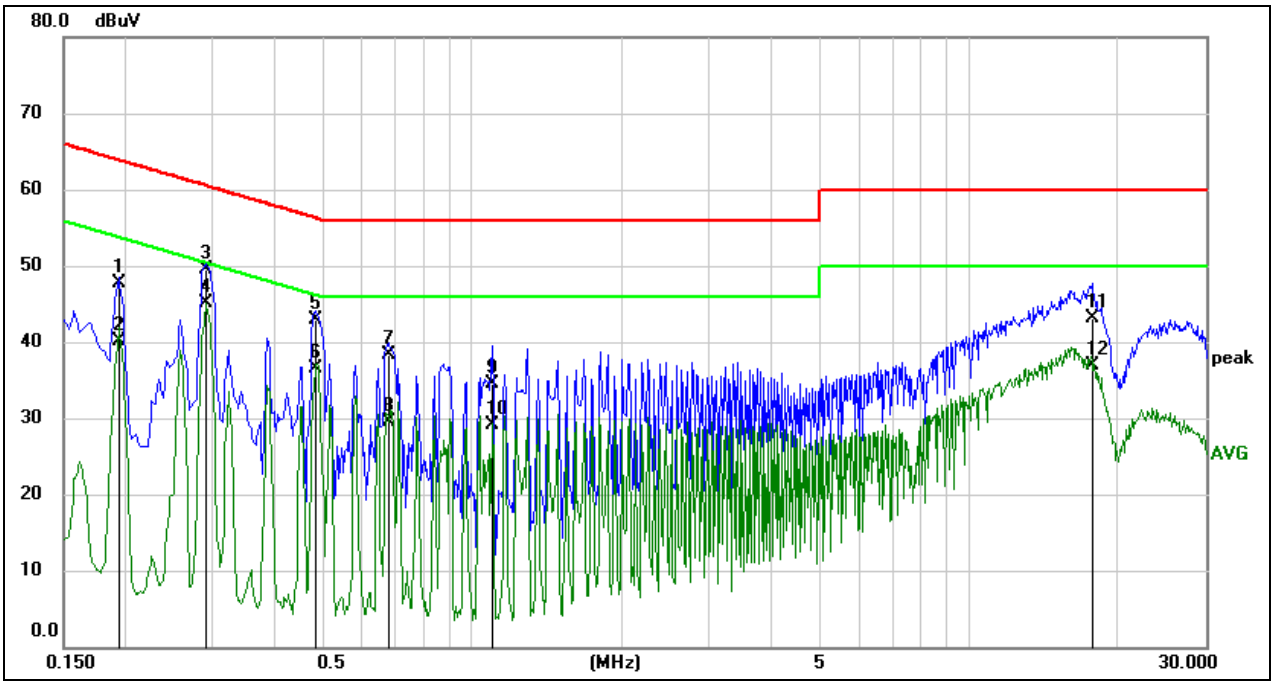
Test Mode:	802.11a20	Channel:	5180
Line:	Neutral		



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1940	38.12	9.59	47.71	63.86	-16.15	QP
2	0.1940	30.53	9.59	40.12	53.86	-13.74	AVG
3	0.2901	40.00	9.59	49.59	60.52	-10.93	QP
4	0.2901	35.43	9.59	45.02	50.52	-5.50	AVG
5	0.4817	33.33	9.60	42.93	56.31	-13.38	QP
6	0.4817	26.87	9.60	36.47	46.31	-9.84	AVG
7	0.6781	28.79	9.60	38.39	56.00	-17.61	QP
8	0.6781	19.86	9.60	29.46	46.00	-16.54	AVG
9	1.0973	24.96	9.61	34.57	56.00	-21.43	QP
10	1.0973	19.50	9.61	29.11	46.00	-16.89	AVG
11	17.6841	33.39	9.80	43.19	60.00	-16.81	QP
12	17.6841	27.15	9.80	36.95	50.00	-13.05	AVG

Note:
1. Result = Reading + Correct Factor.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz ~ 150 kHz), 9 kHz (150 kHz ~ 30 MHz).
4. Step size: 80 Hz (0.009 MHz ~ 0.15 MHz), 4 kHz (0.15 MHz ~ 30 MHz), Scan time: auto.

Note: All the modes have been tested, only the worst data was recorded in the report.

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10. ANTENNA REQUIREMENT

REQUIREMENT

Please refer to FCC part 15.203
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 permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Please refer to FCC part 15.247(b)(4)
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DESCRIPTION

Pass

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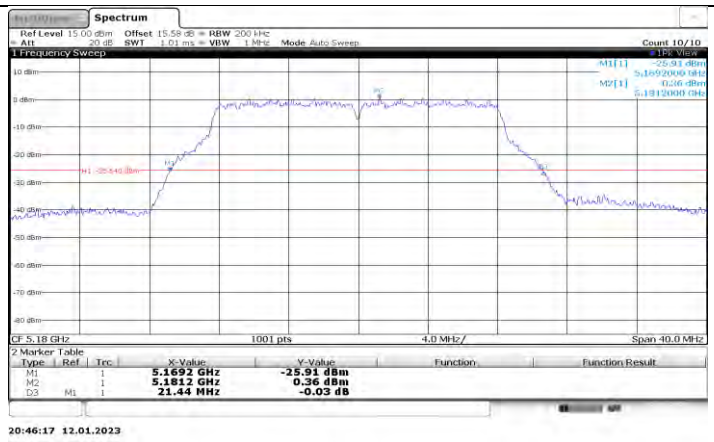
11. TEST DATA

11.1. APPENDIX A1: EMISSION BANDWIDTH

11.1.1. Test Result

Test Mode	Antenna	Channel	26db EBW [MHz]	FL[MHz]	FH[MHz]	Verdict
11A	Ant1	5180	21.44	5169.20	5190.64	PASS
	Ant2	5180	21.48	5169.28	5190.76	PASS
	Ant1	5200	21.44	5189.08	5210.52	PASS
	Ant2	5200	21.52	5189.20	5210.72	PASS
	Ant1	5240	21.44	5229.24	5250.68	PASS
	Ant2	5240	21.48	5229.24	5250.72	PASS
	Ant1	5745	21.36	5734.12	5755.48	PASS
	Ant2	5745	21.60	5734.04	5755.64	PASS
	Ant1	5785	21.52	5774.12	5795.64	PASS
	Ant2	5785	21.52	5774.20	5795.72	PASS
	Ant1	5825	21.44	5814.08	5835.52	PASS
	Ant2	5825	21.56	5814.16	5835.72	PASS
11N20MIMO	Ant1	5180	21.56	5169.12	5190.68	PASS
	Ant2	5180	20.76	5169.44	5190.20	PASS
	Ant1	5200	21.56	5189.16	5210.72	PASS
	Ant2	5200	21.72	5189.24	5210.96	PASS
	Ant1	5240	21.48	5229.20	5250.68	PASS
	Ant2	5240	21.64	5229.16	5250.80	PASS
	Ant1	5745	21.56	5734.04	5755.60	PASS
	Ant2	5745	21.52	5734.20	5755.72	PASS
	Ant1	5785	21.96	5774.00	5795.96	PASS
	Ant2	5785	21.64	5774.08	5795.72	PASS
	Ant1	5825	21.60	5814.08	5835.68	PASS
	Ant2	5825	21.44	5814.20	5835.64	PASS
11N40MIMO	Ant1	5190	40.72	5169.60	5210.32	PASS
	Ant2	5190	39.84	5170.08	5209.92	PASS
	Ant1	5230	40.40	5209.76	5250.16	PASS
	Ant2	5230	39.92	5210.08	5250.00	PASS
	Ant1	5755	40.56	5734.52	5775.08	PASS
	Ant2	5755	40.40	5734.76	5775.16	PASS
	Ant1	5795	40.64	5774.52	5815.16	PASS
	Ant2	5795	40.24	5774.92	5815.16	PASS
11AC80MIMO	Ant1	5210	82.24	5169.04	5251.28	PASS
	Ant2	5210	80.32	5170.16	5250.48	PASS
	Ant1	5775	83.04	5733.08	5816.12	PASS
	Ant2	5775	80.80	5734.52	5815.32	PASS

11.1.2. Test Graphs



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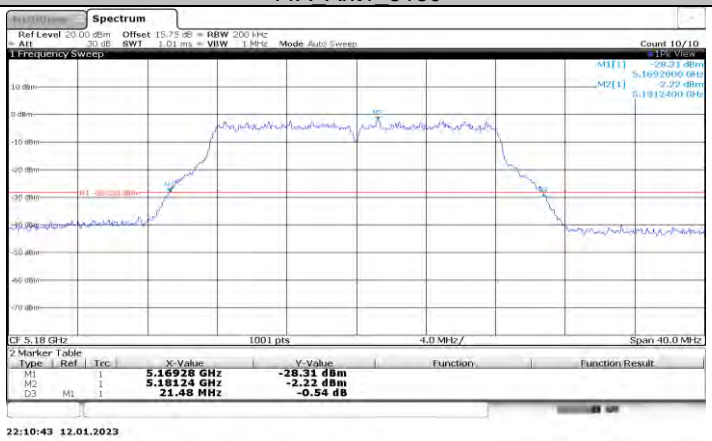
11A_Ant1_5180



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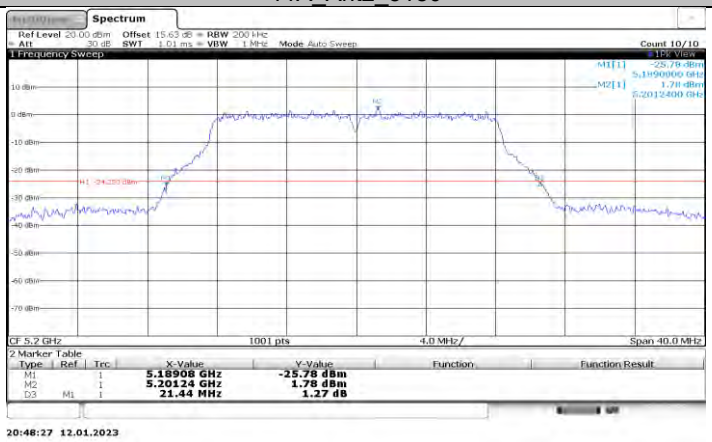

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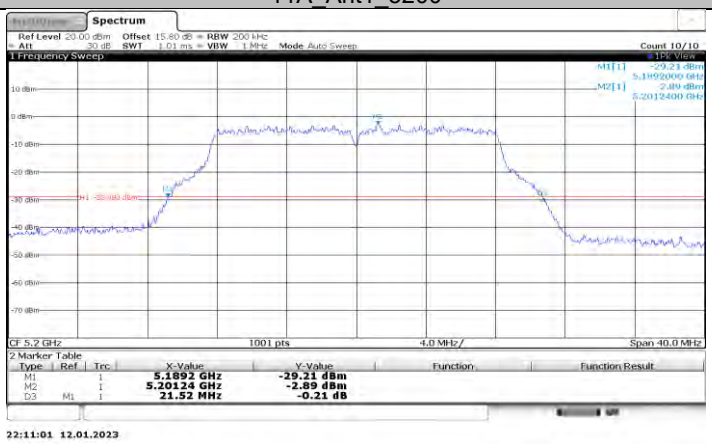

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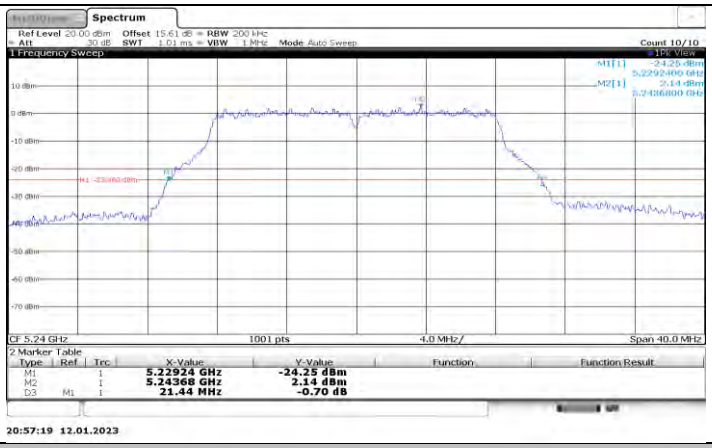

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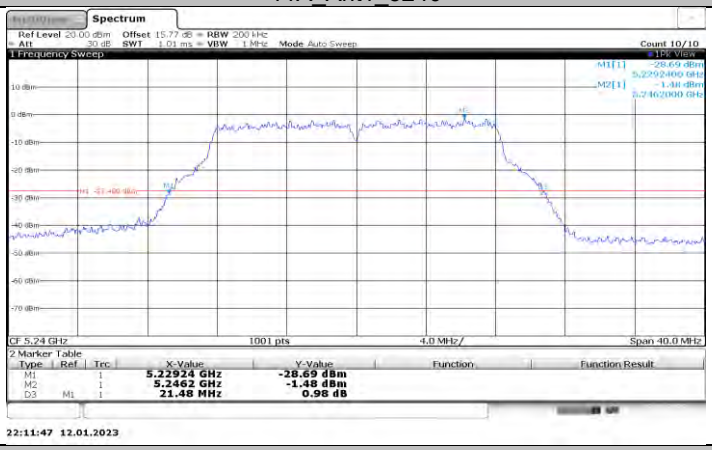

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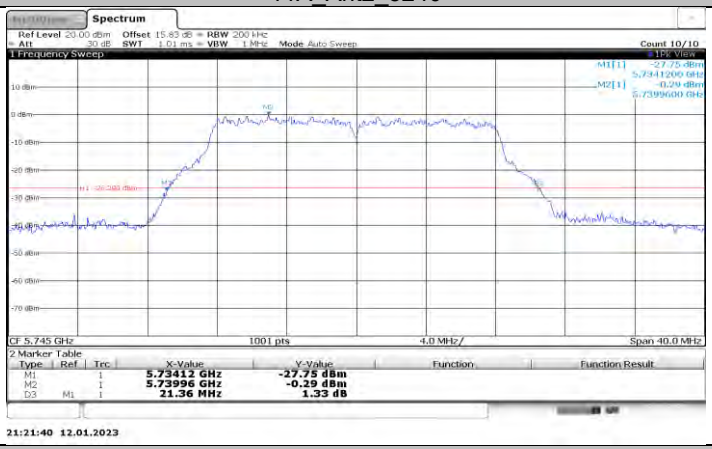

11A_Ant1_5745

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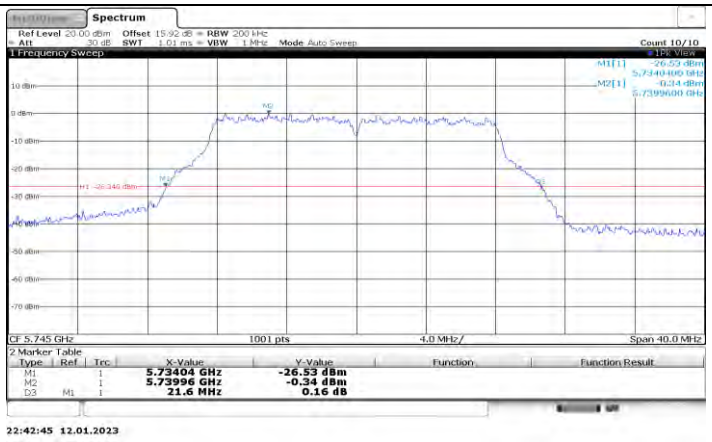

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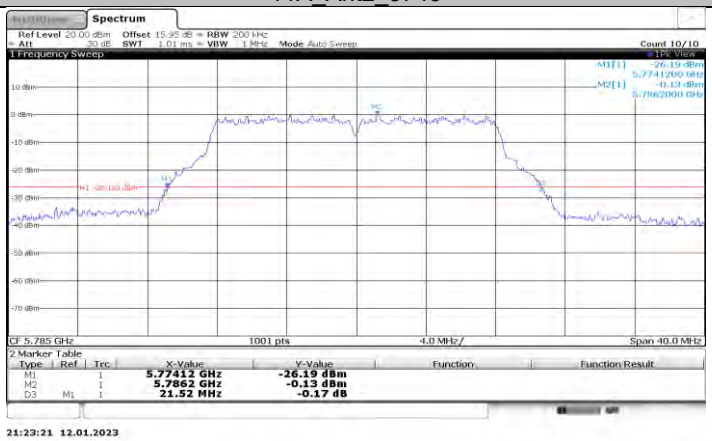

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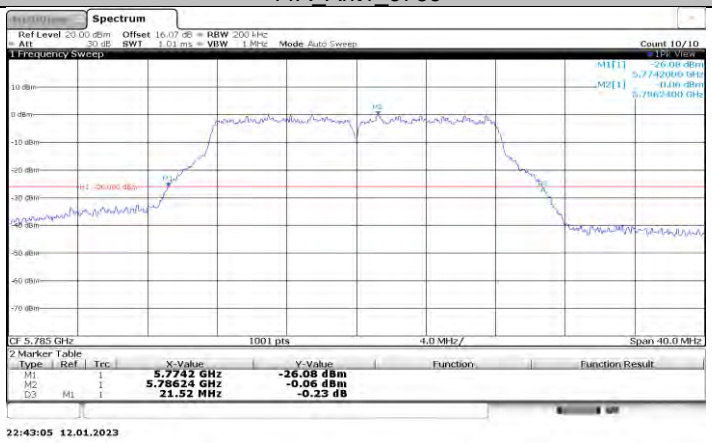

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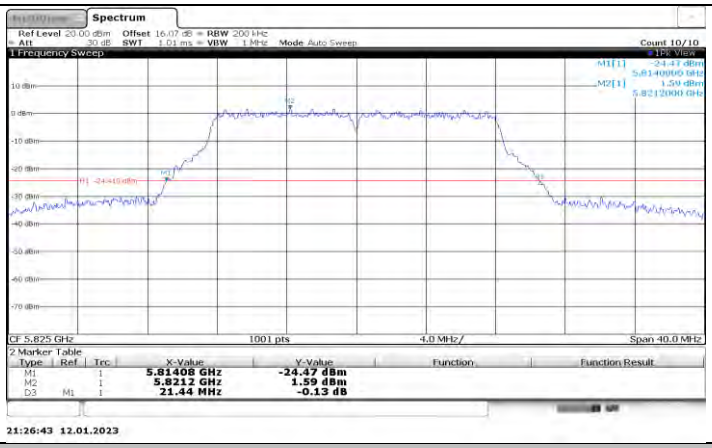

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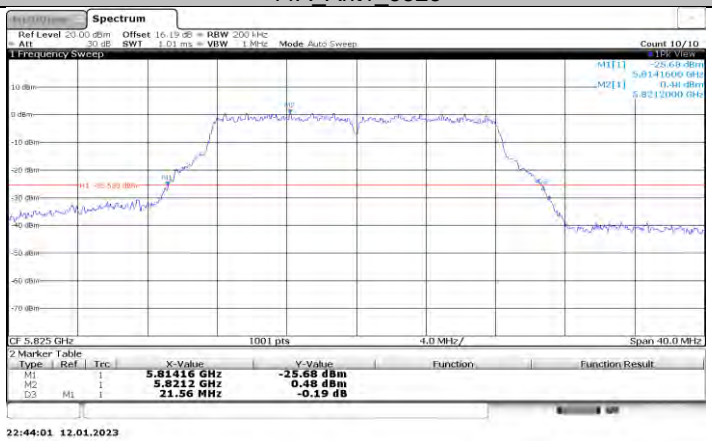

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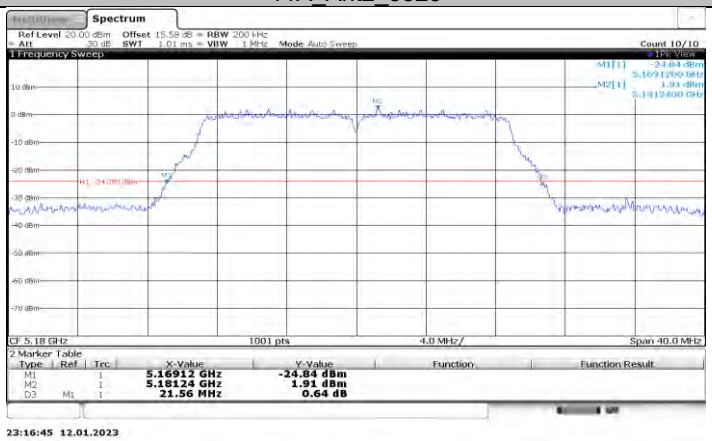

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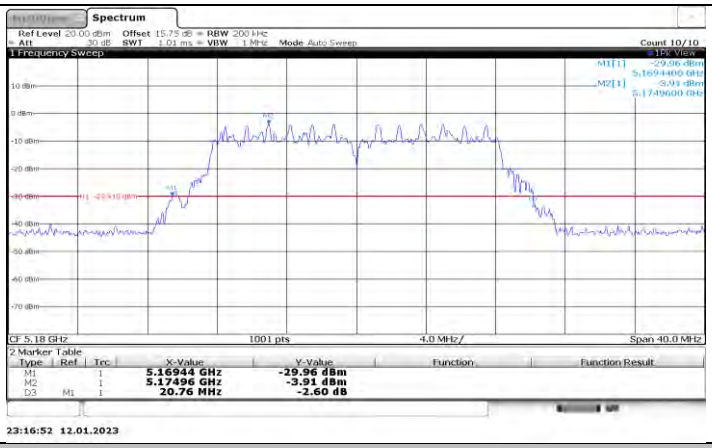

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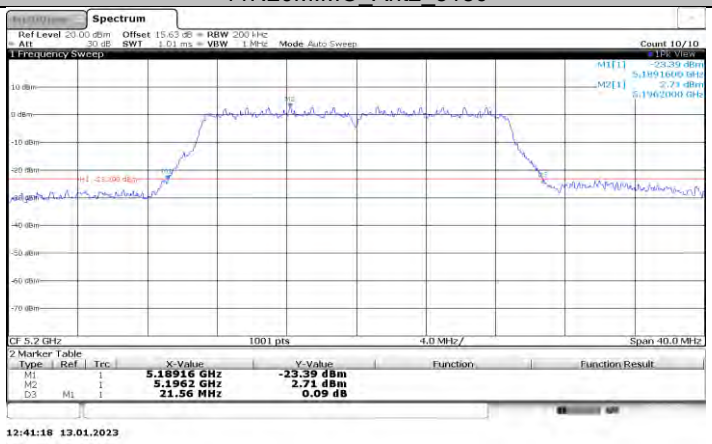

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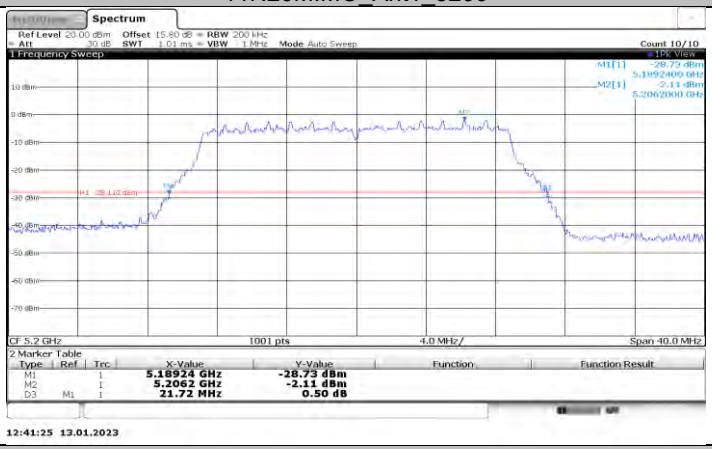

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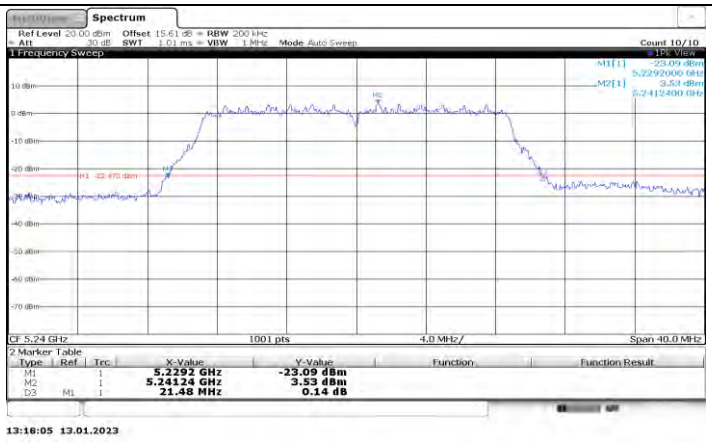

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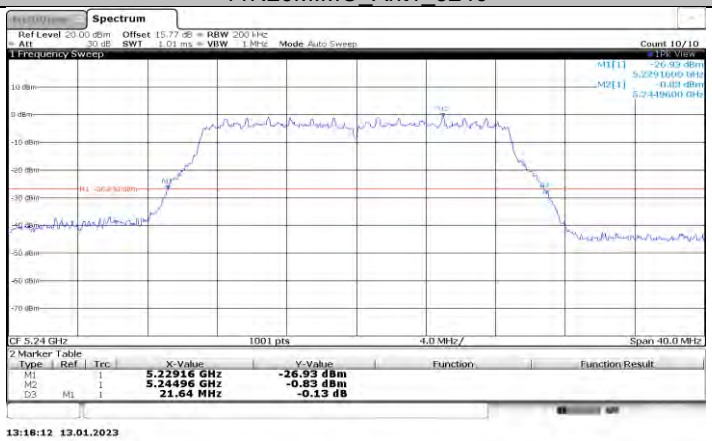

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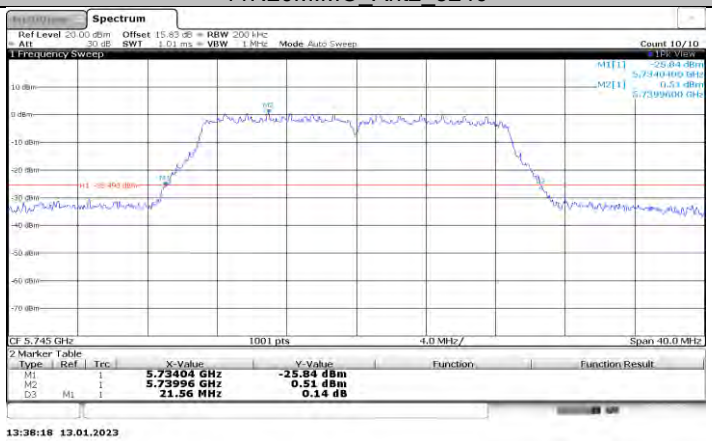

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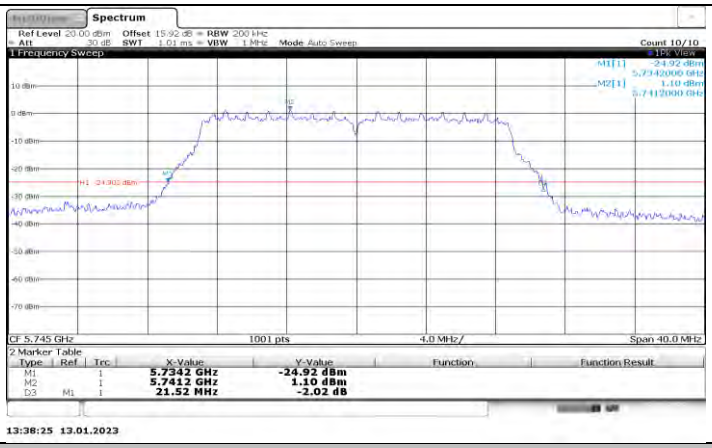

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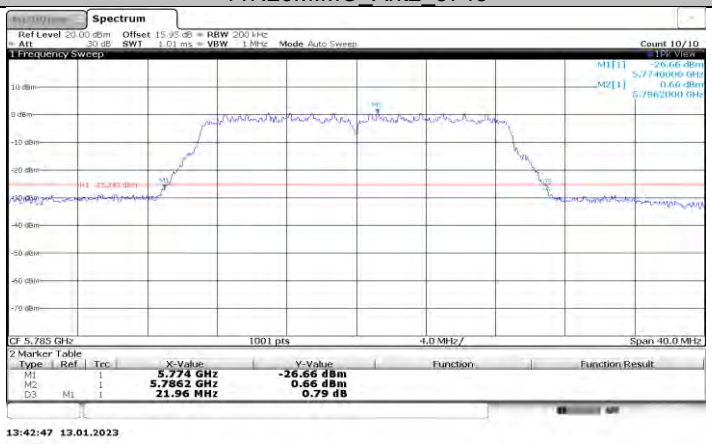

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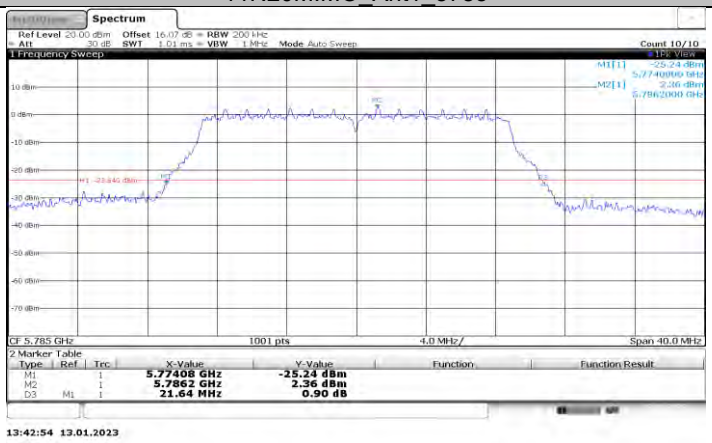

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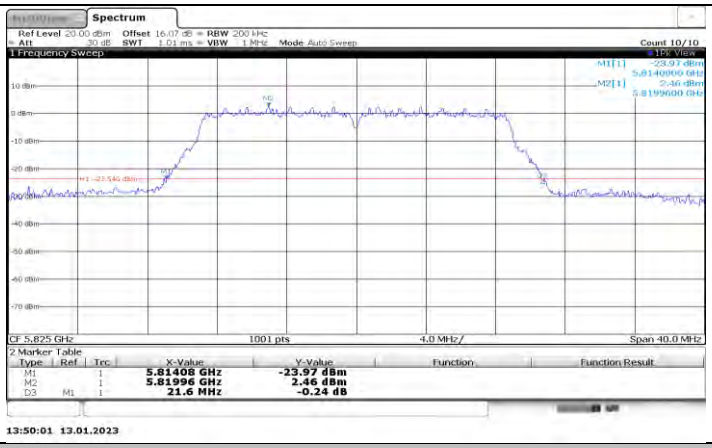

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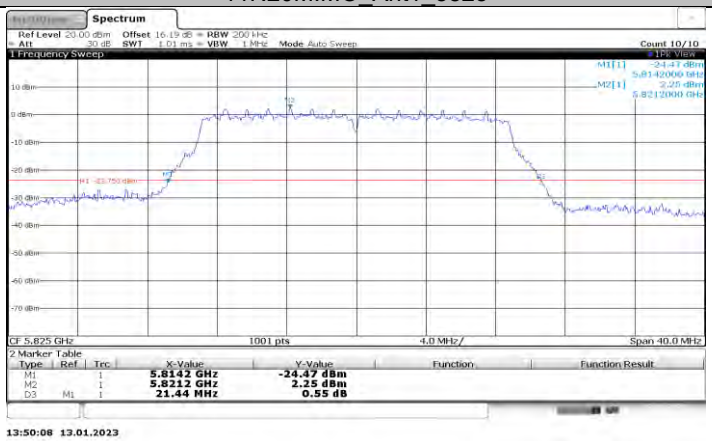

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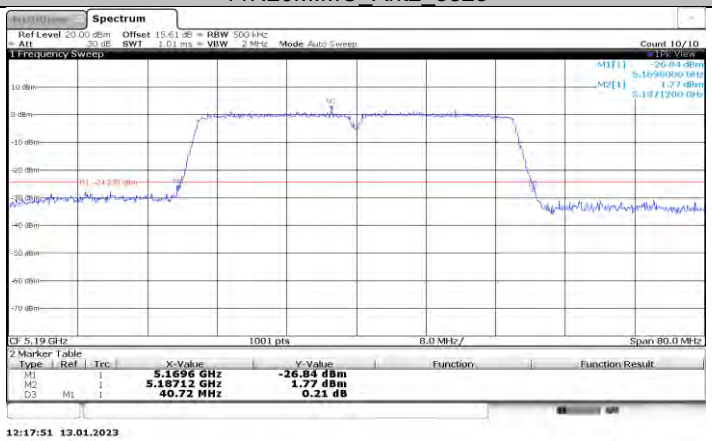

11N40MIMO_Ant1_5190

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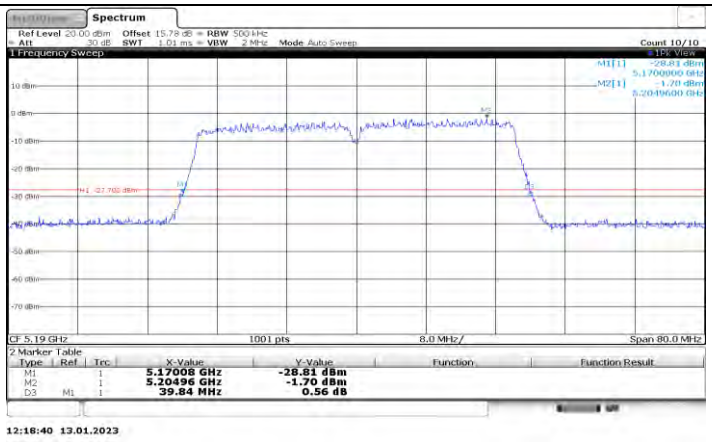

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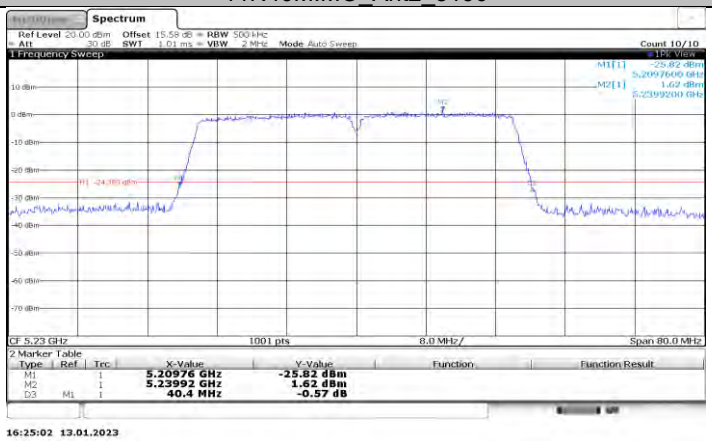

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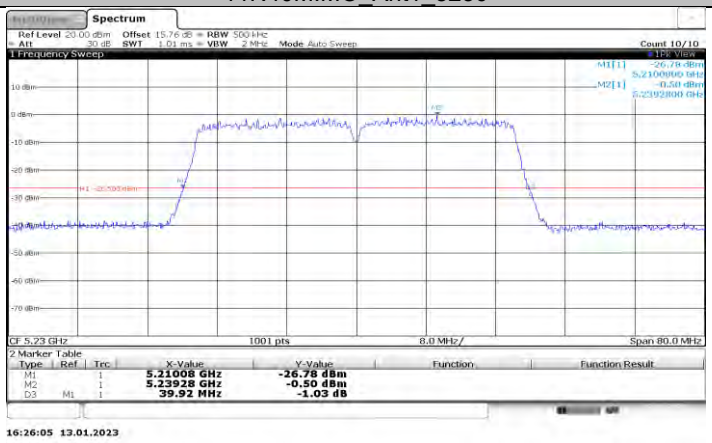

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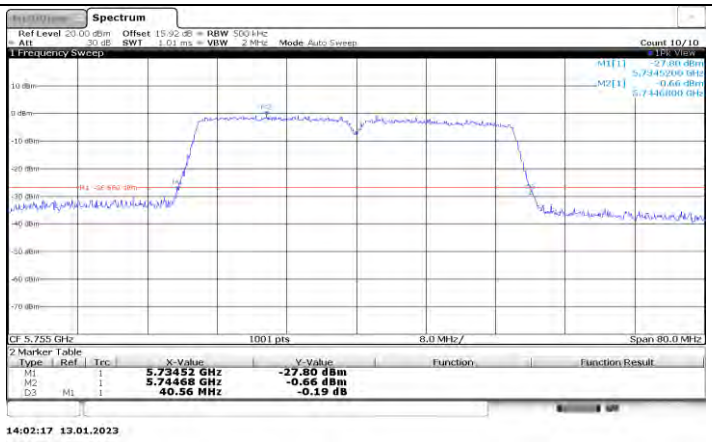

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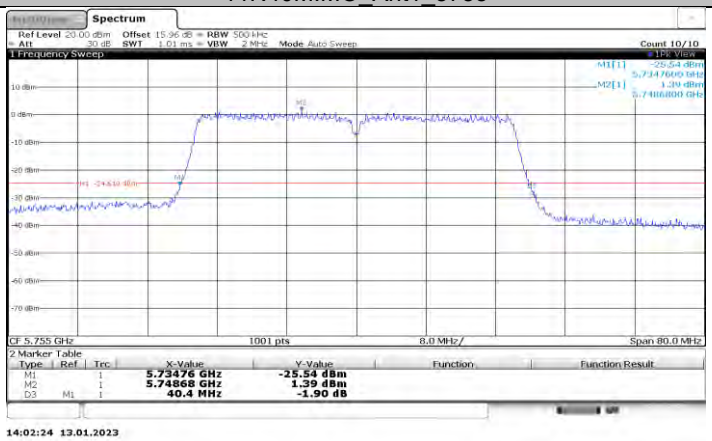

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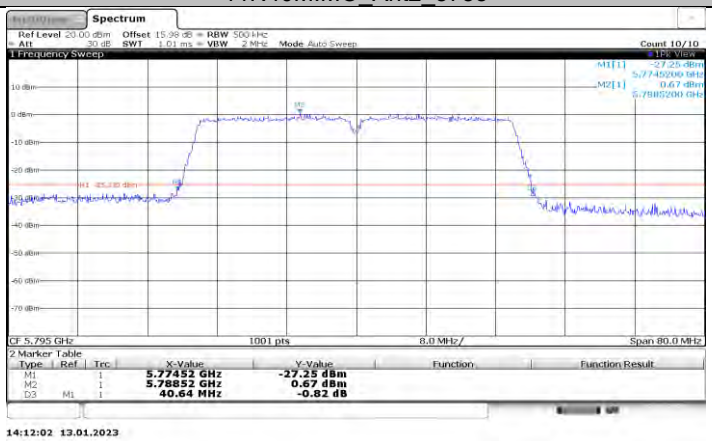

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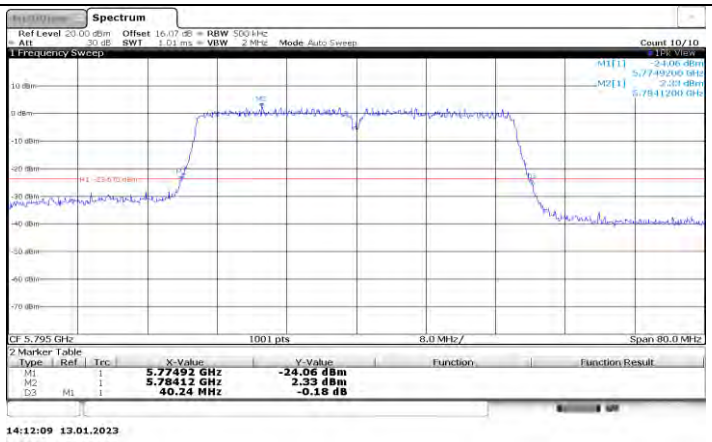

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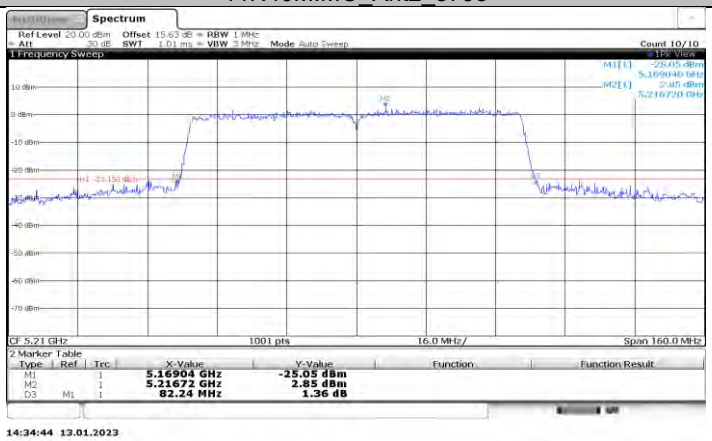

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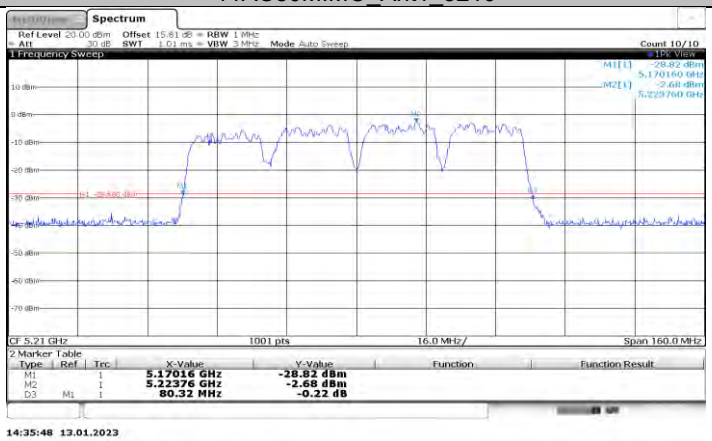

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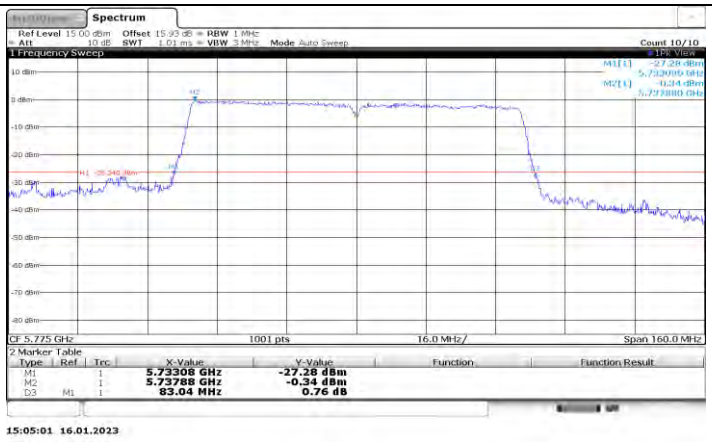

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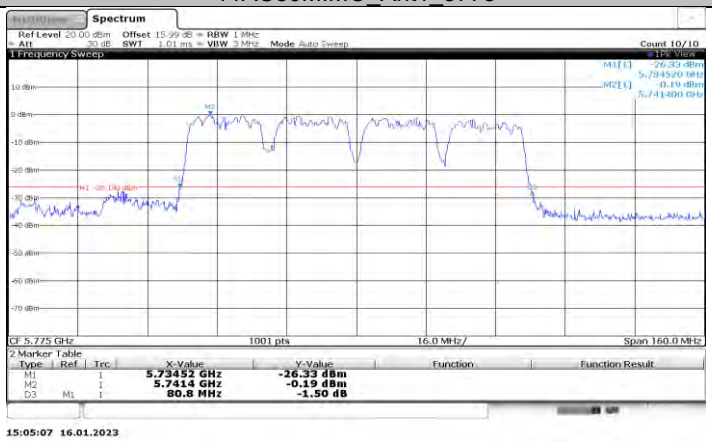

11AC80MIMO_Ant2_5775

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11.2. APPENDIX A2: OCCUPIED CHANNEL BANDWIDTH

11.2.1. Test Result

Test Mode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
11A	Ant1	5180	18.56	5170.7356	5189.2960	PASS
	Ant2	5180	18.269	5170.8265	5189.0951	PASS
	Ant1	5200	17.84	5190.9759	5208.8159	PASS
	Ant2	5200	18.124	5190.9214	5209.0456	PASS
	Ant1	5240	17.783	5231.0579	5248.8410	PASS
	Ant2	5240	17.997	5231.0579	5249.0549	PASS
	Ant1	5745	17.855	5735.8387	5753.6942	PASS
	Ant2	5745	18.175	5735.6521	5753.8268	PASS
	Ant1	5785	17.929	5775.9243	5793.8535	PASS
	Ant2	5785	18.561	5775.5612	5794.1217	PASS
	Ant1	5825	17.861	5815.8978	5833.7588	PASS
	Ant2	5825	17.891	5815.8631	5833.7545	PASS
11N20MIMO	Ant1	5180	18.99	5170.4611	5189.4507	PASS
	Ant2	5180	18.634	5170.7746	5189.4084	PASS
	Ant1	5200	19.249	5190.3973	5209.6468	PASS
	Ant2	5200	18.437	5190.8393	5209.2763	PASS
	Ant1	5240	19.91	5230.3047	5250.2150	PASS
	Ant2	5240	18.313	5230.7985	5249.1120	PASS
	Ant1	5745	19.302	5735.1221	5754.4236	PASS
	Ant2	5745	18.573	5735.5970	5754.1703	PASS
	Ant1	5785	19.763	5775.0807	5794.8432	PASS
	Ant2	5785	18.629	5775.5777	5794.2066	PASS
	Ant1	5825	19.89	5814.9357	5834.8262	PASS
	Ant2	5825	18.802	5815.4665	5834.2686	PASS
11N40MIMO	Ant1	5190	36.746	5171.5509	5208.2970	PASS
	Ant2	5190	36.643	5171.7820	5208.4252	PASS
	Ant1	5230	36.666	5211.6710	5248.3365	PASS
	Ant2	5230	36.605	5211.7035	5248.3089	PASS
	Ant1	5755	37.4	5735.9428	5773.3430	PASS
	Ant2	5755	36.813	5736.3969	5773.2103	PASS
	Ant1	5795	37.573	5776.0708	5813.6440	PASS
	Ant2	5795	36.926	5776.3853	5813.3118	PASS
11AC80MIMO	Ant1	5210	76.774	5171.7417	5248.5158	PASS
	Ant2	5210	75.77	5172.4351	5248.2055	PASS
	Ant1	5775	76.988	5736.1185	5813.1069	PASS
	Ant2	5775	76.706	5736.2879	5812.9943	PASS

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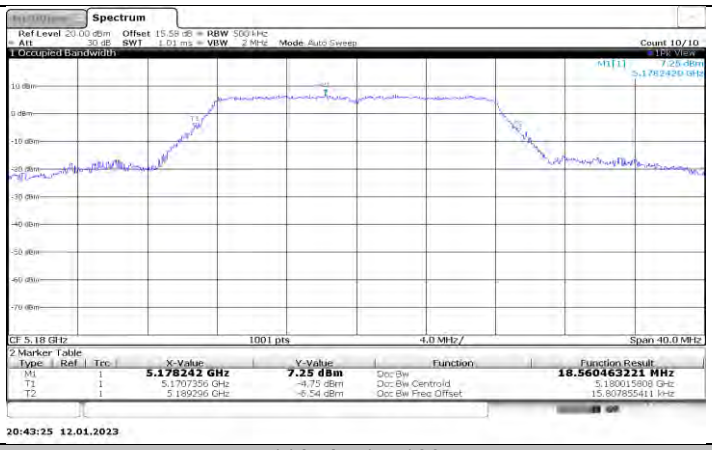
11.2.2. Test Graphs



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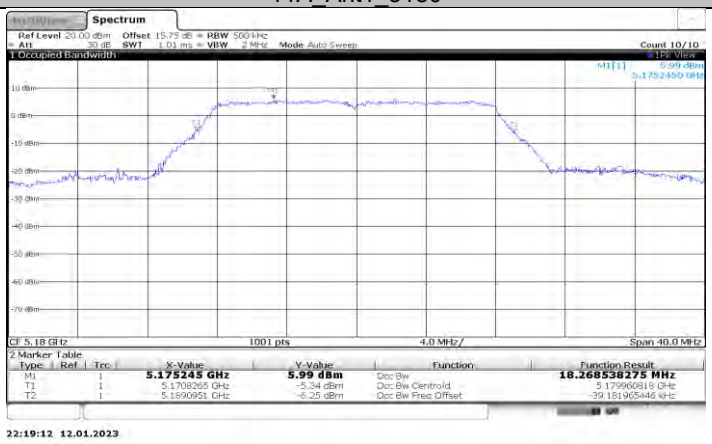

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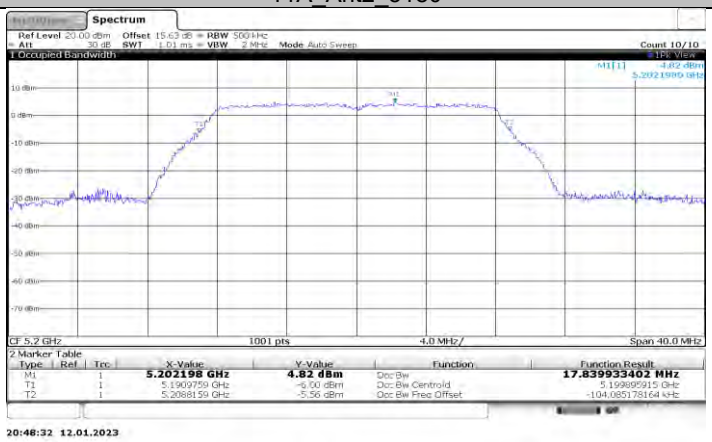

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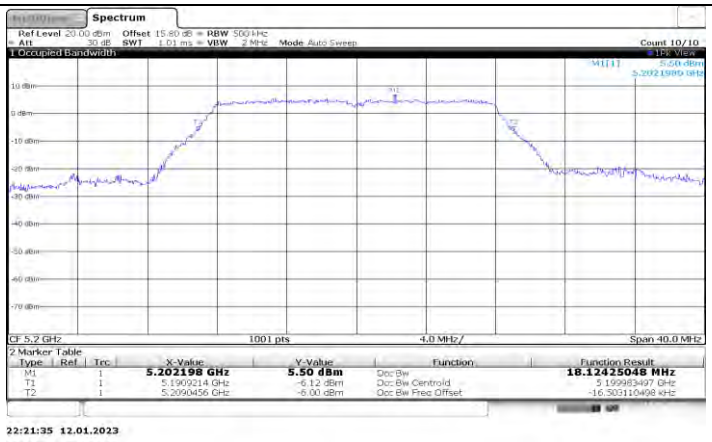

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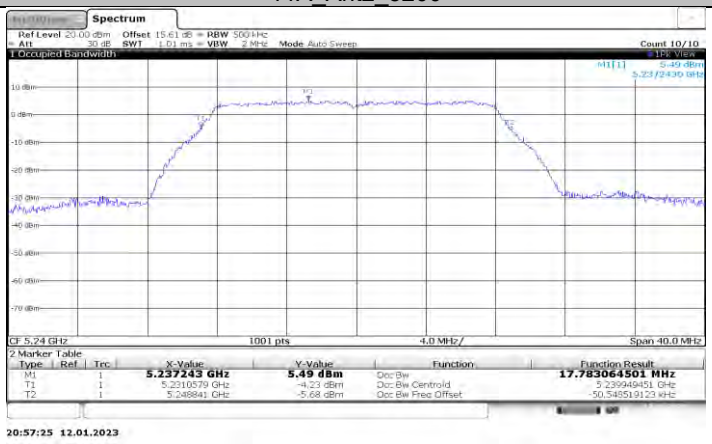

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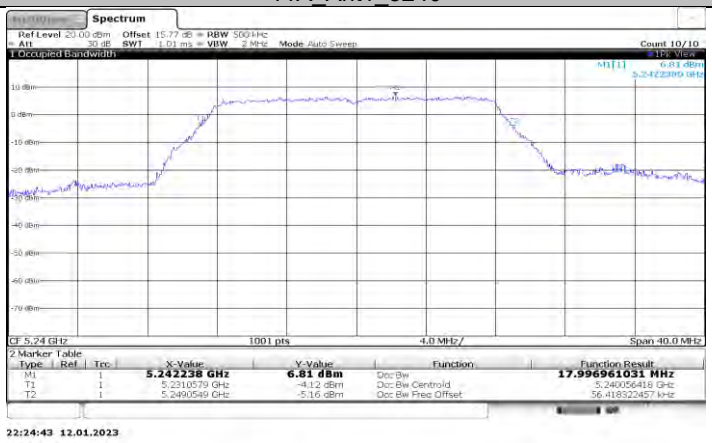

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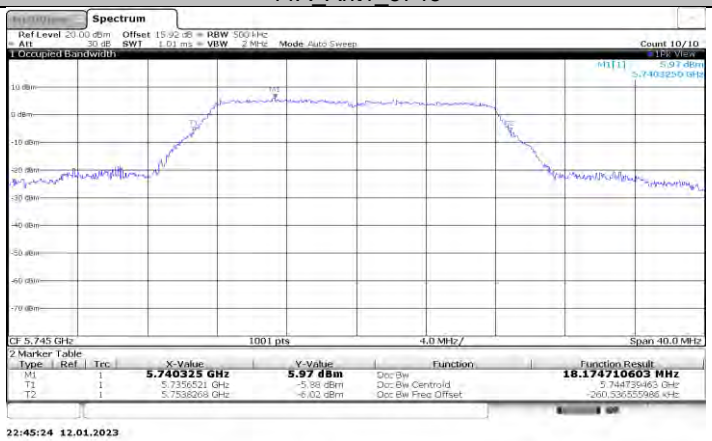

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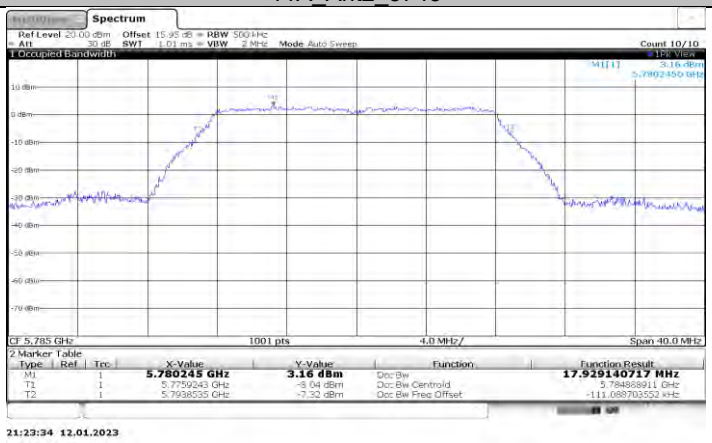

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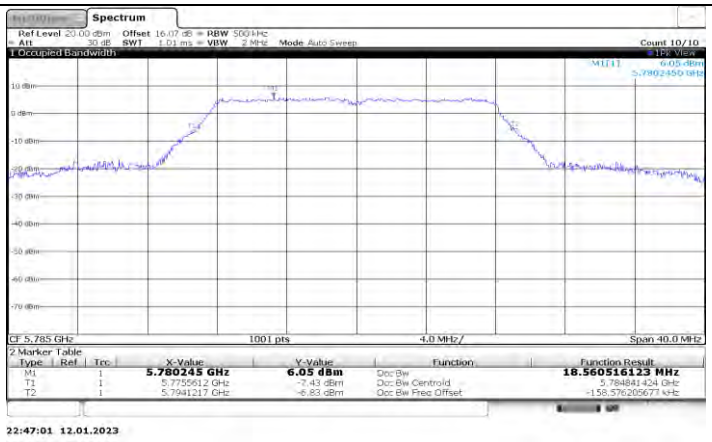

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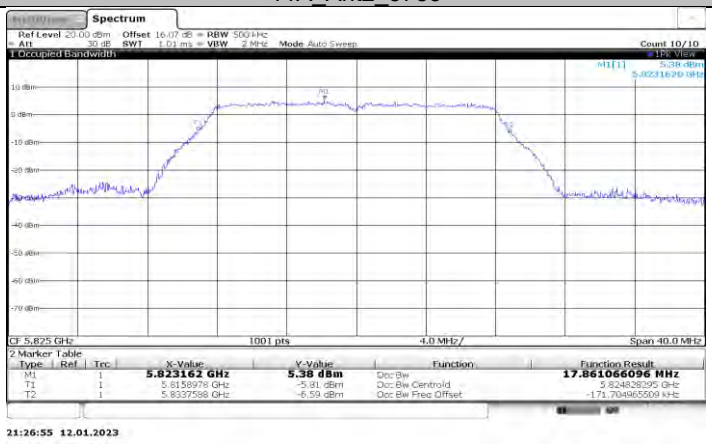

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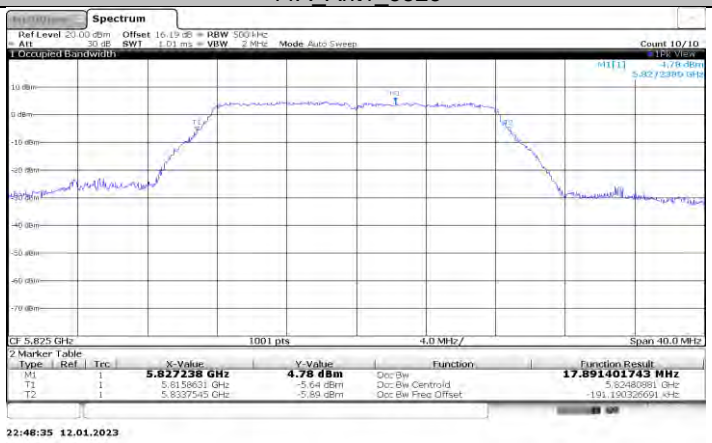

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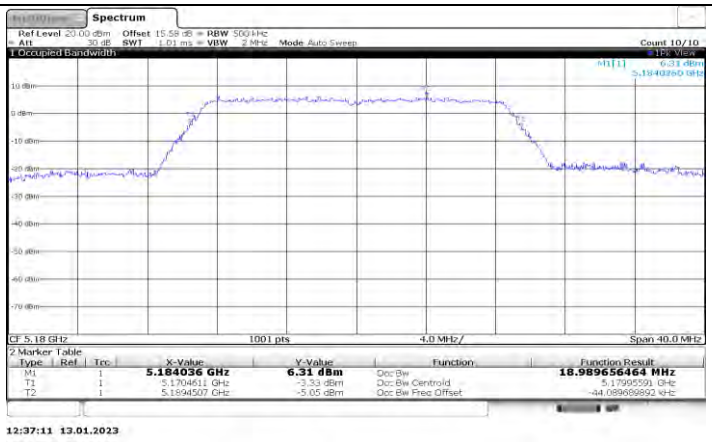

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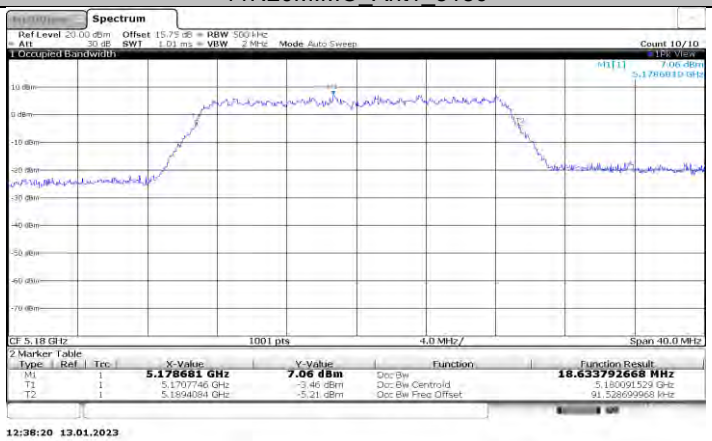

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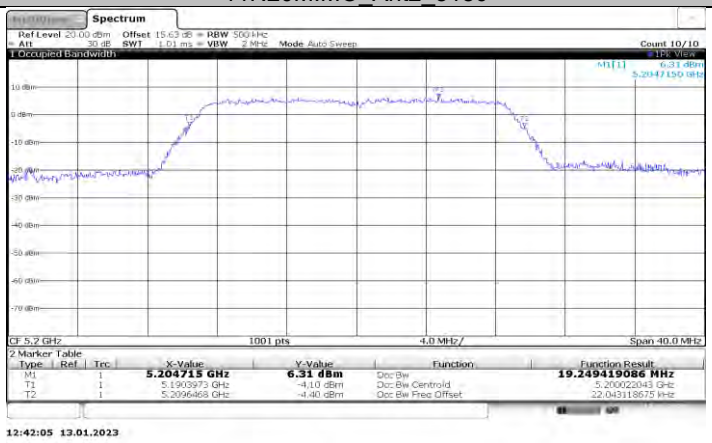

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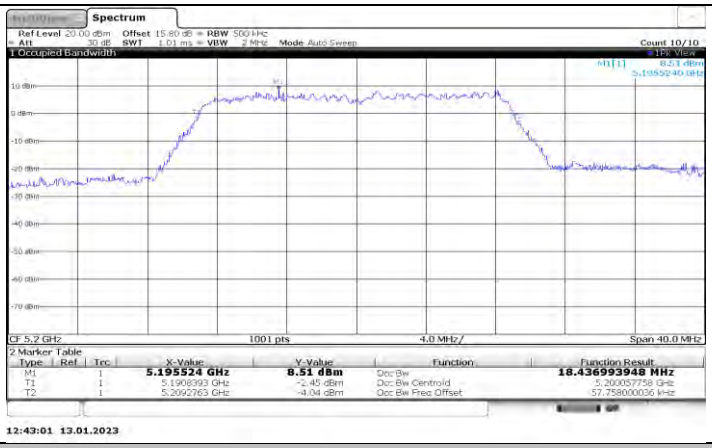

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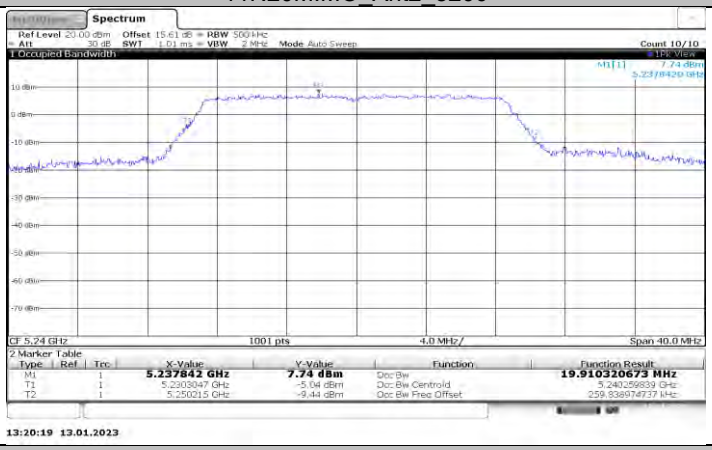

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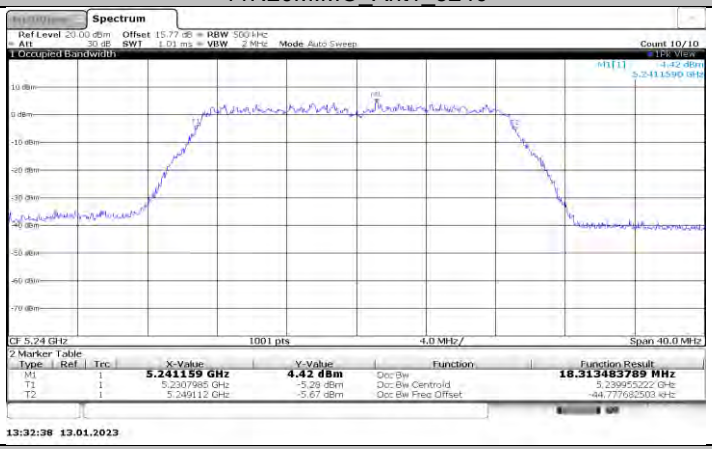

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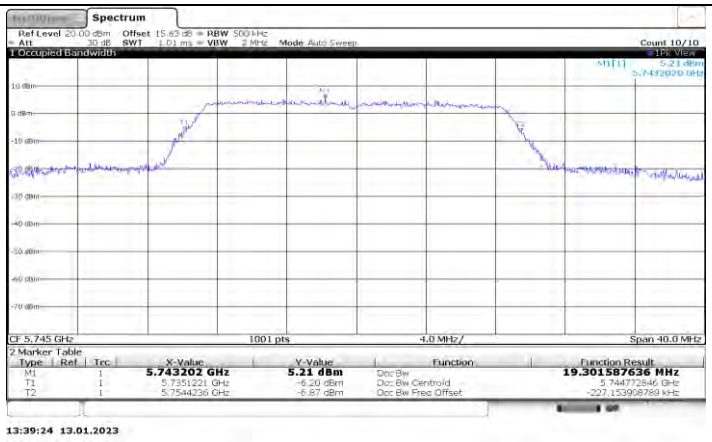

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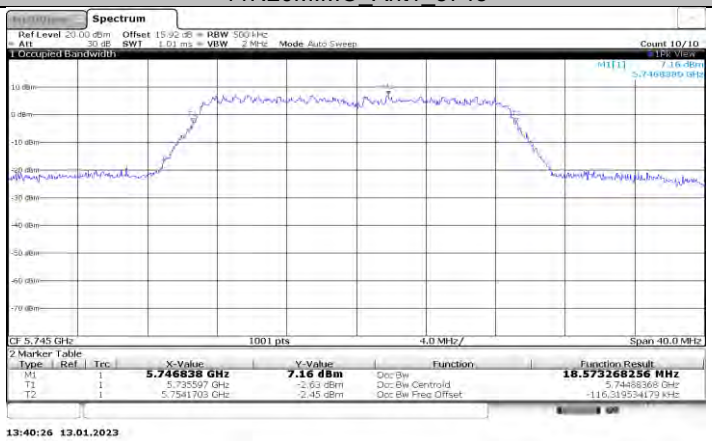

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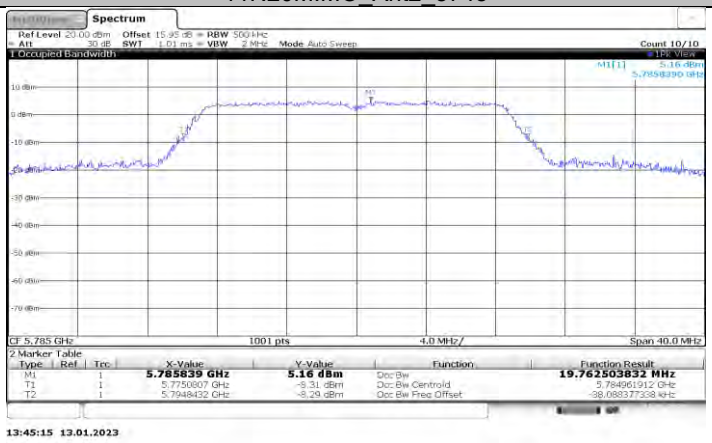

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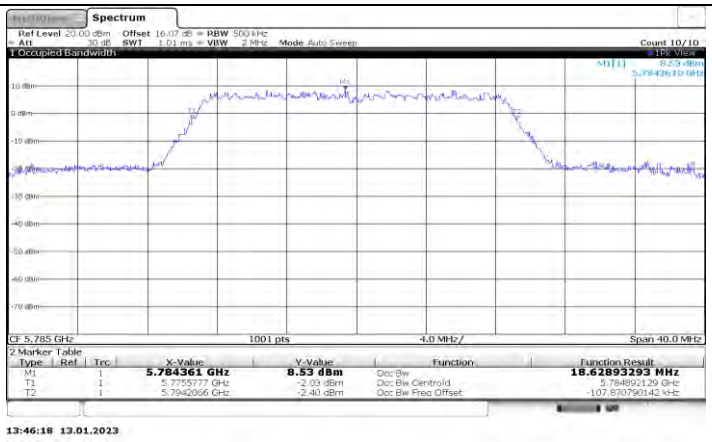

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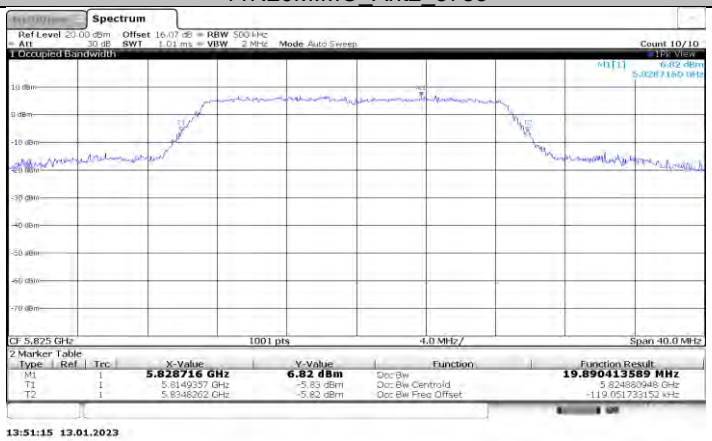

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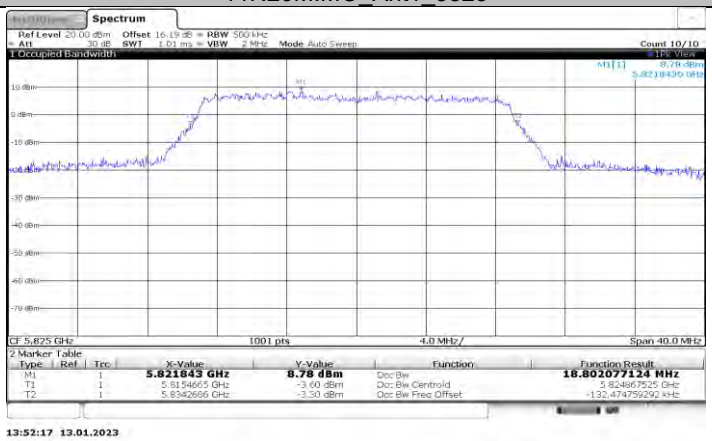

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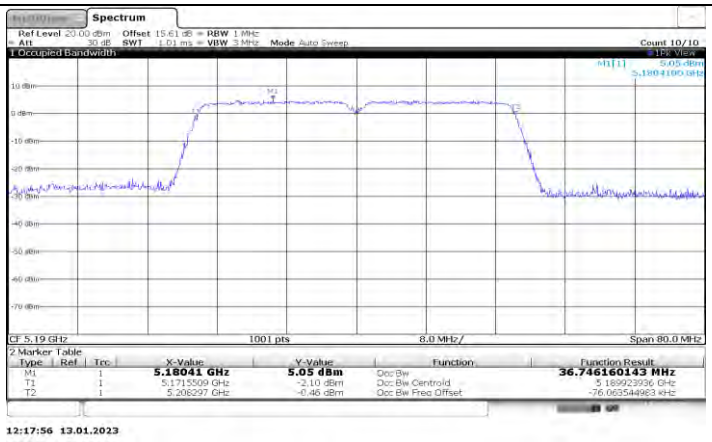

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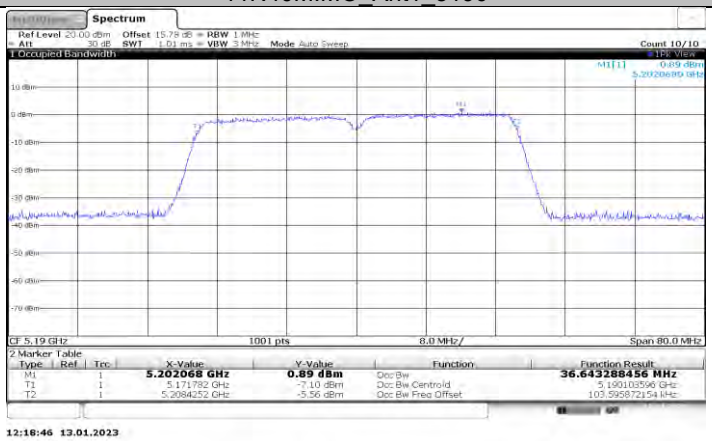

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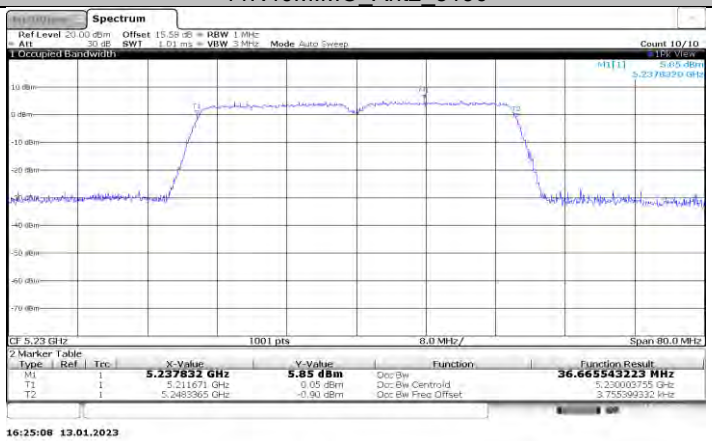

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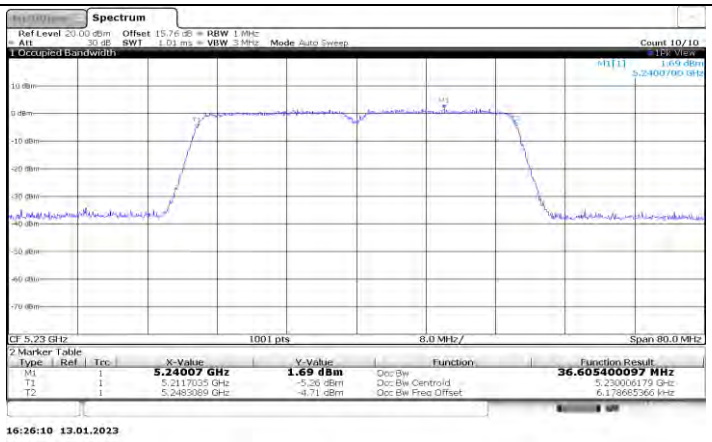

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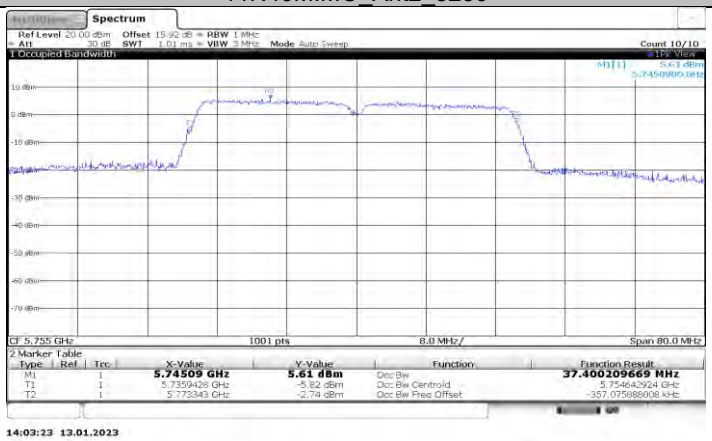

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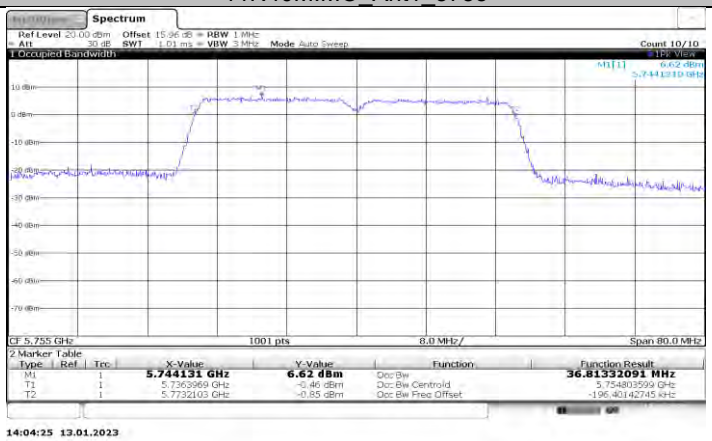

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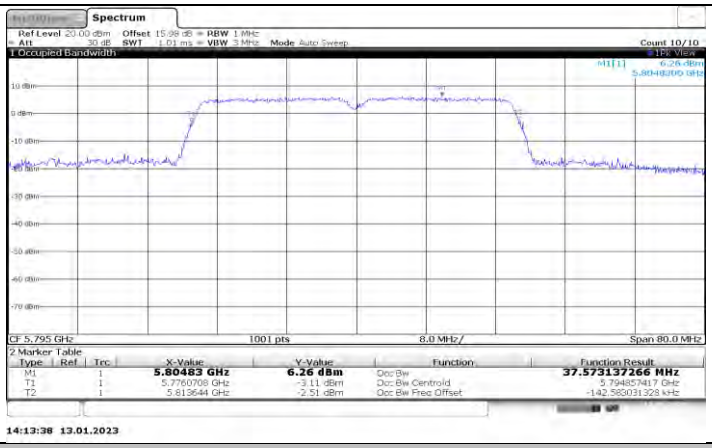

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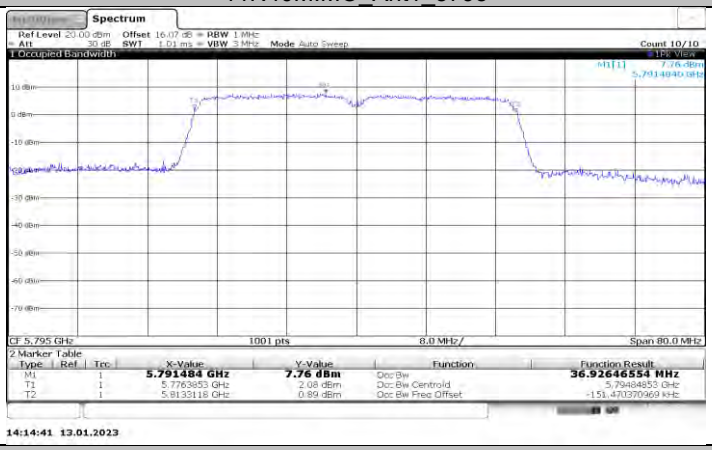

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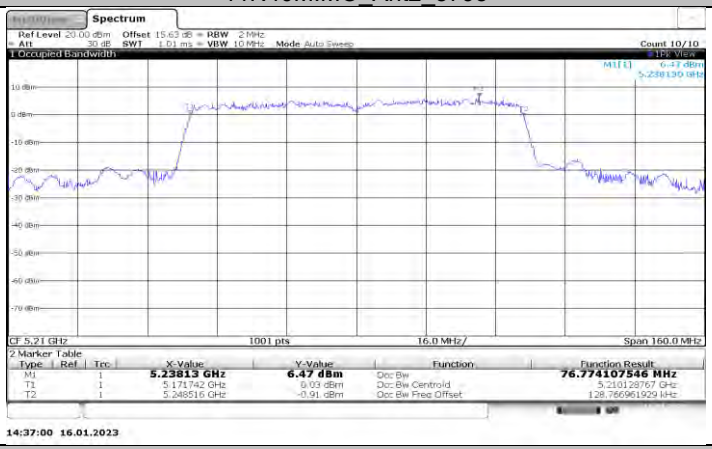

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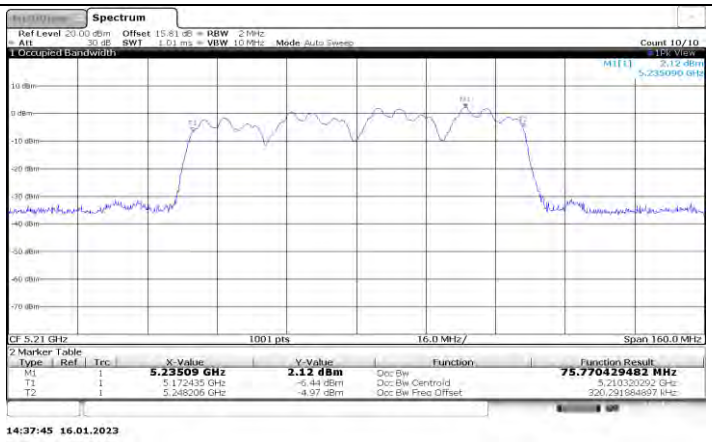

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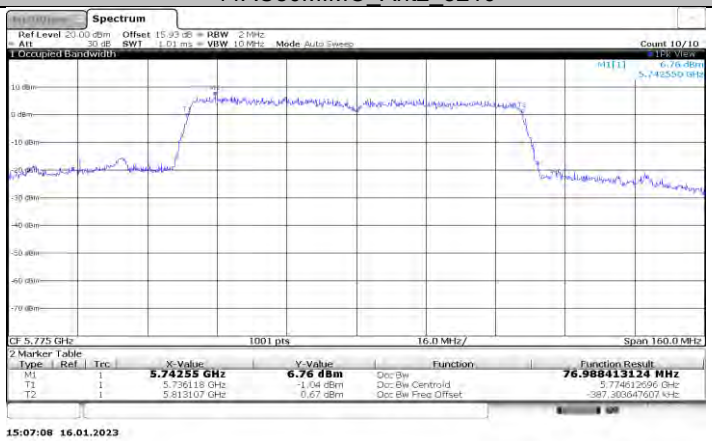

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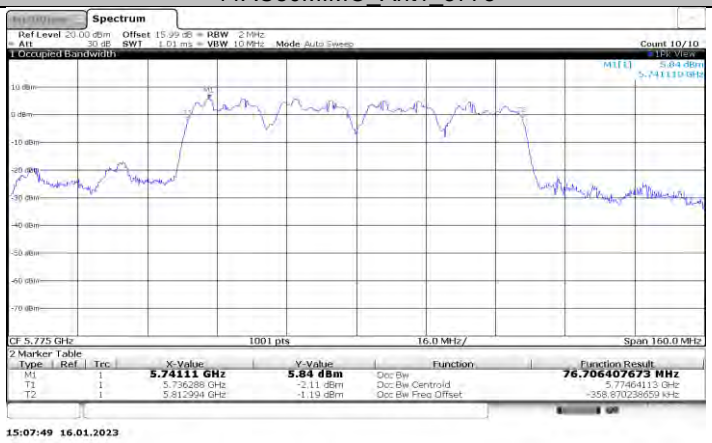

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11.3. APPENDIX A3: 6dB EMISSION BANDWIDTH

11.3.1. Test Result

Test Mode	Antenna	Channel	6db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	16.12	5736.76	5752.88	0.5	PASS
	Ant2	5745	16.08	5736.76	5752.84	0.5	PASS
	Ant1	5785	16.36	5776.76	5793.12	0.5	PASS
	Ant2	5785	16.36	5776.76	5793.12	0.5	PASS
	Ant1	5825	16.36	5816.76	5833.12	0.5	PASS
	Ant2	5825	16.32	5816.76	5833.08	0.5	PASS
11N20MIMO	Ant1	5745	17.16	5736.16	5753.32	0.5	PASS
	Ant2	5745	17.60	5736.12	5753.72	0.5	PASS
	Ant1	5785	17.56	5776.16	5793.72	0.5	PASS
	Ant2	5785	17.60	5776.12	5793.72	0.5	PASS
	Ant1	5825	17.56	5816.16	5833.72	0.5	PASS
	Ant2	5825	17.60	5816.12	5833.72	0.5	PASS
11N40MIMO	Ant1	5755	35.92	5736.76	5772.68	0.5	PASS
	Ant2	5755	36.32	5736.76	5773.08	0.5	PASS
	Ant1	5795	36.32	5776.76	5813.08	0.5	PASS
	Ant2	5795	36.32	5776.76	5813.08	0.5	PASS
11AC80MIMO	Ant1	5775	75.68	5736.76	5812.44	0.5	PASS
	Ant2	5775	75.68	5736.76	5812.44	0.5	PASS

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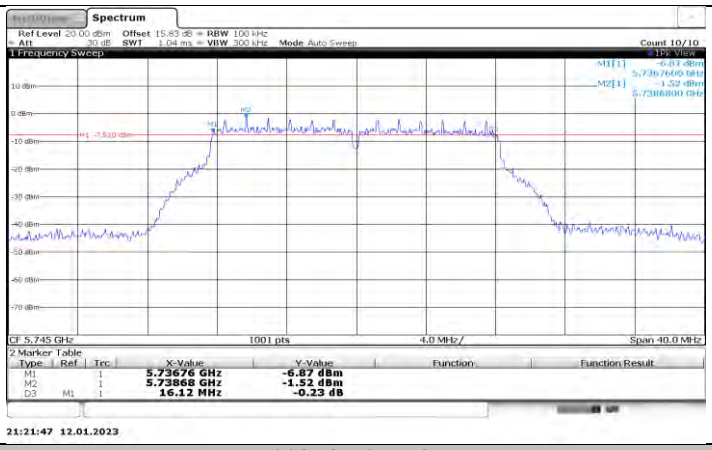
11.3.2. Test Graphs



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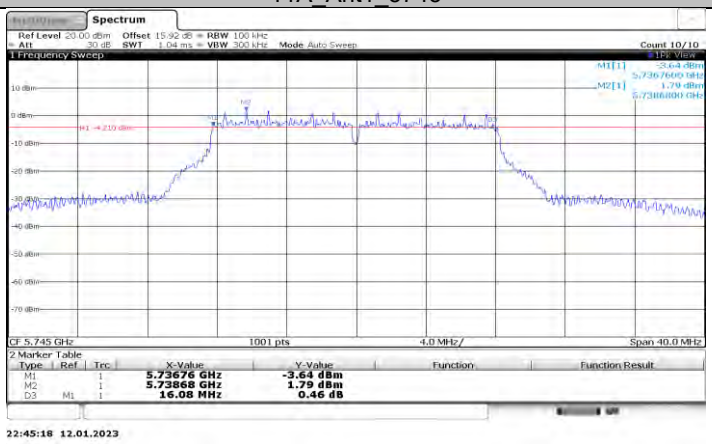

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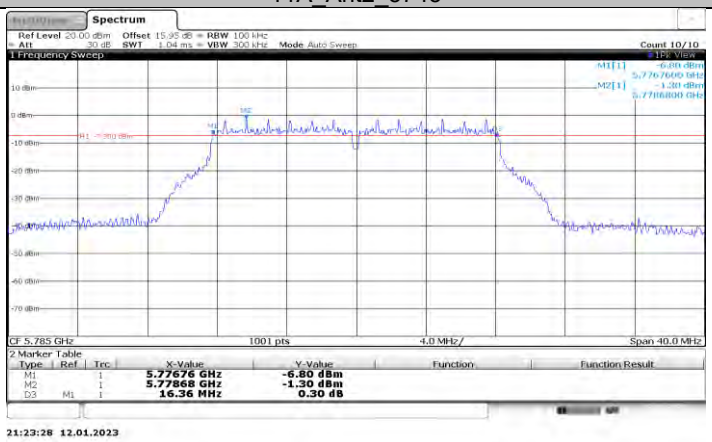

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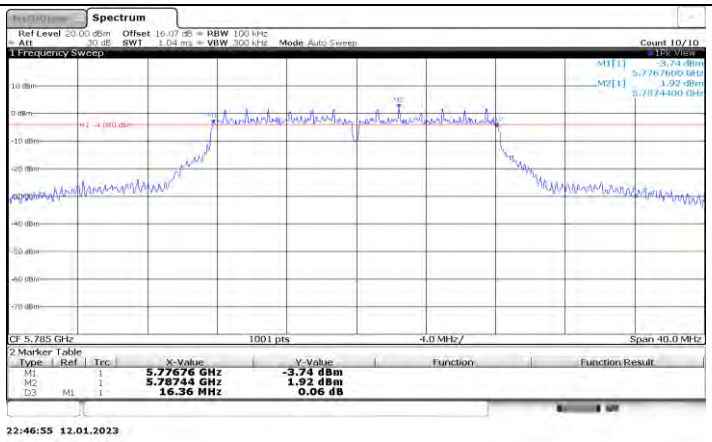

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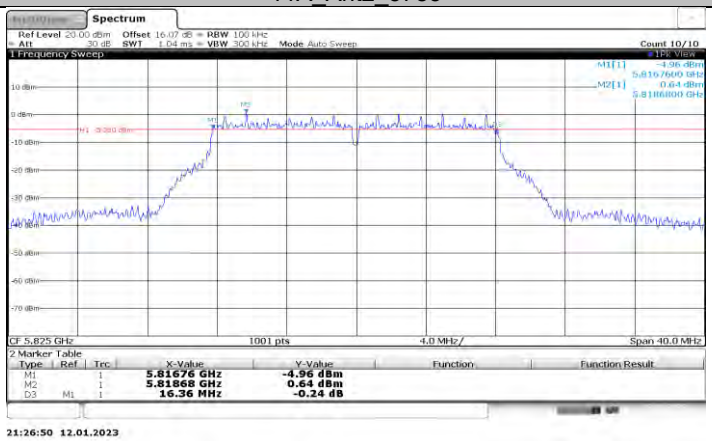

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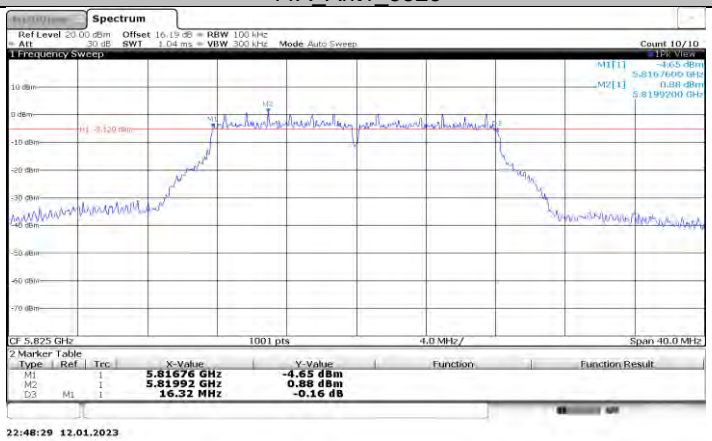

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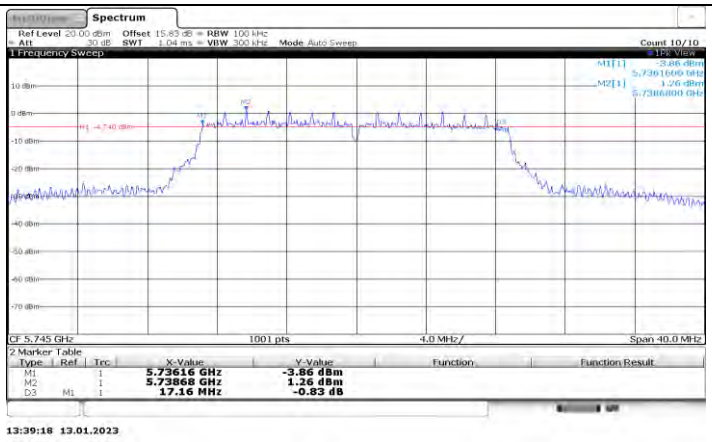

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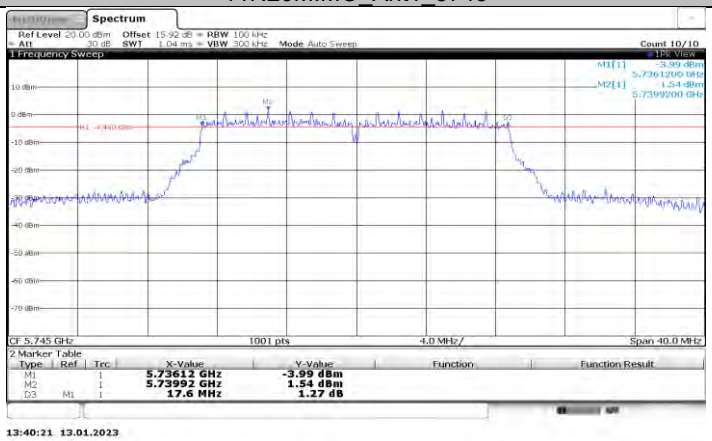

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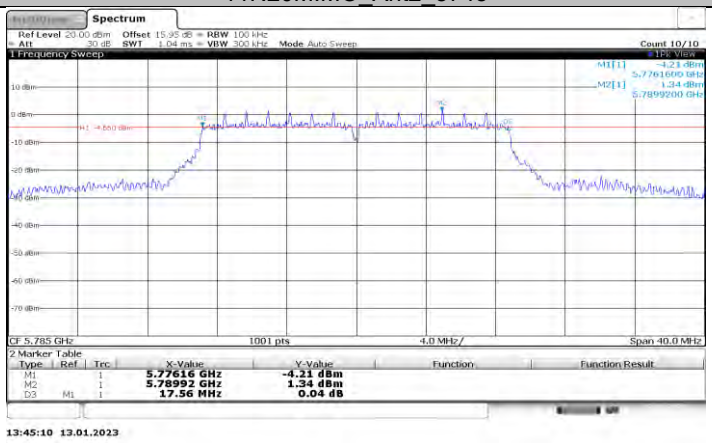

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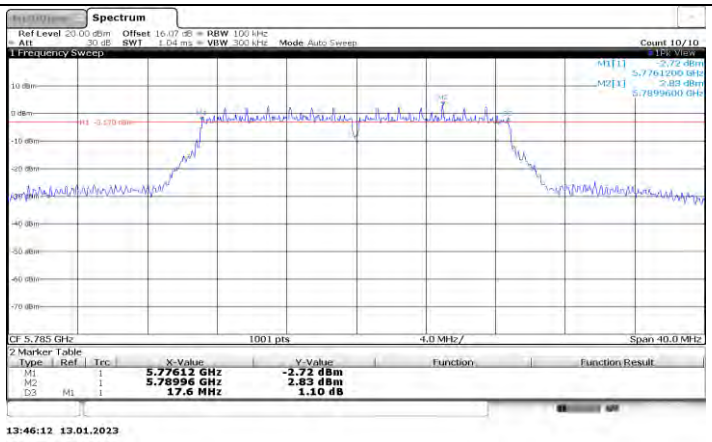

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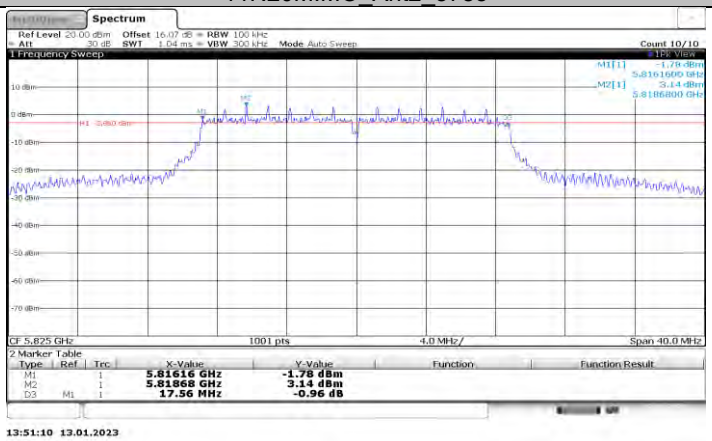
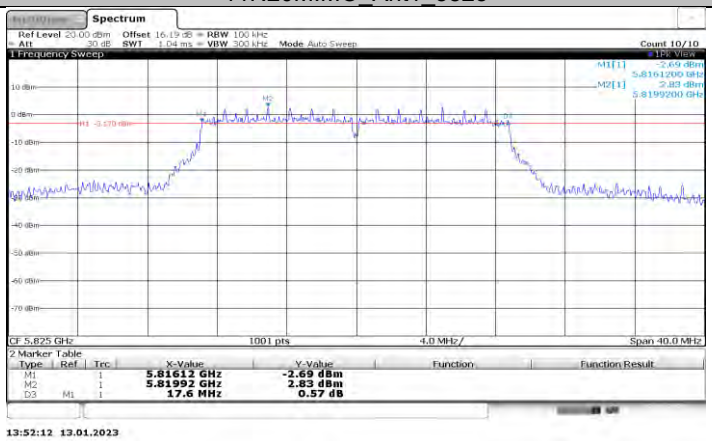


11N20MIMO_Ant1_5825



11N20MIMO_Ant2_5825

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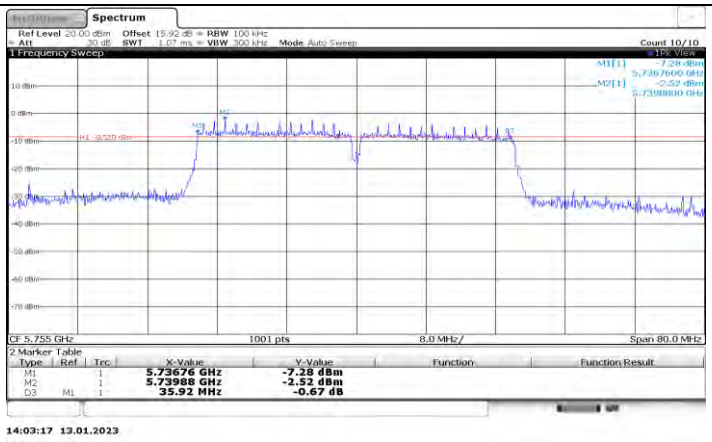

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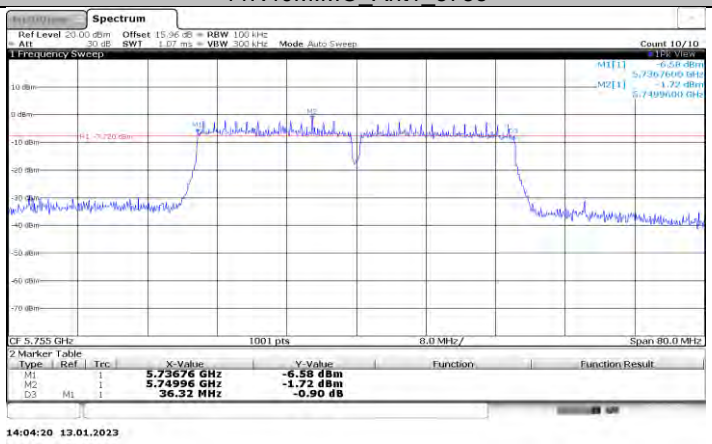

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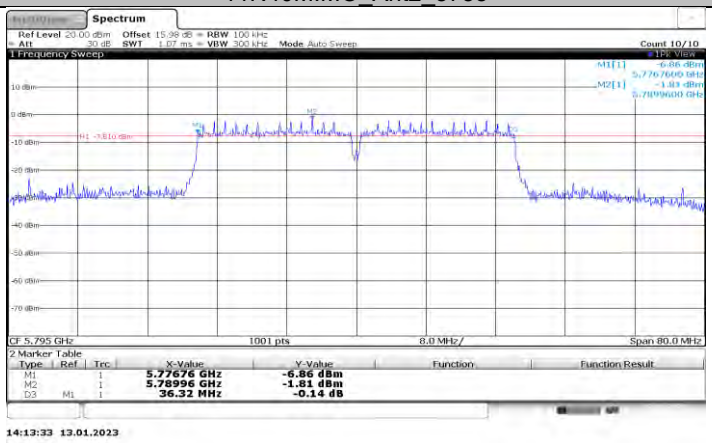

11N40MIMO_Ant1_5795

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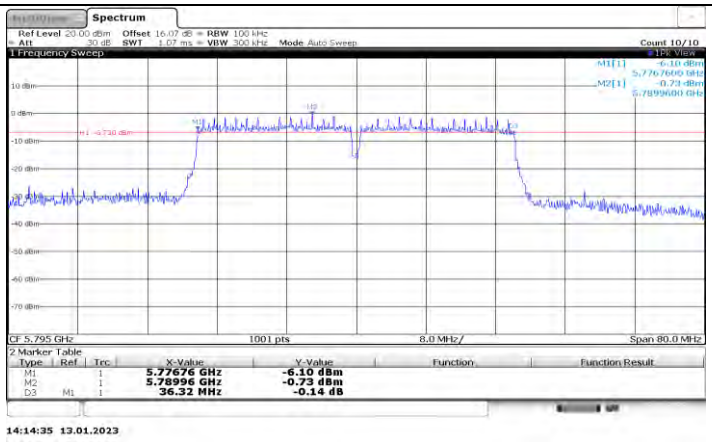
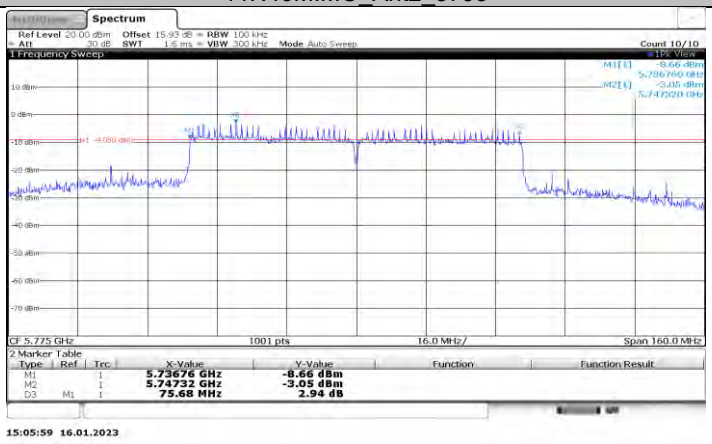
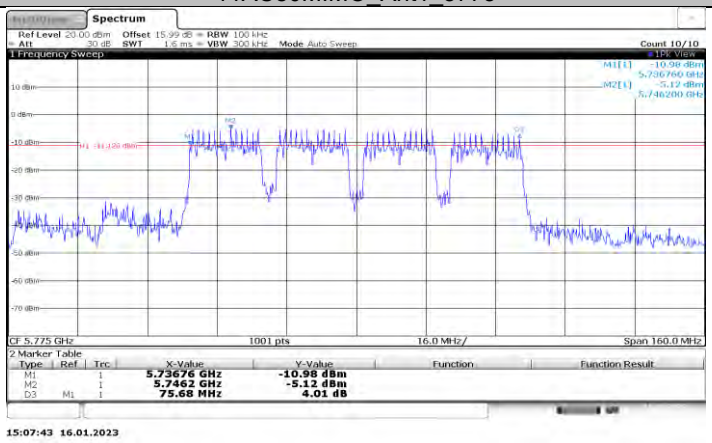


11N40MIMO_Ant2_5795



11AC80MIMO_Ant1_5775



11AC80MIMO_Ant2_5775

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11.4. APPENDIX B: MAXIMUM CONDUCTED OUTPUT POWER

11.4.1. Test Result

Test Mode	Antenna	Channel	Power [dBm]	FCC Limit [dBm]	ISED Limit [dBm]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
11A	Ant1	5180	13.76	≤23.98	---	16.73	≤22.82	PASS
	Ant2	5180	12.55	≤23.98	---	15.52	≤22.75	PASS
	Ant1	5200	13.74	≤23.98	---	16.71	≤22.64	PASS
	Ant2	5200	12.24	≤23.98	---	15.21	≤22.71	PASS
	Ant1	5240	13.54	≤23.98	---	16.51	≤22.63	PASS
	Ant2	5240	12.06	≤23.98	---	15.03	≤22.68	PASS
	Ant1	5745	12.04	≤30.00	≤30.00	15.01	---	PASS
	Ant2	5745	12.35	≤30.00	≤30.00	15.32	---	PASS
	Ant1	5785	12.59	≤30.00	≤30.00	15.56	---	PASS
	Ant2	5785	12.90	≤30.00	≤30.00	15.87	---	PASS
	Ant1	5825	12.53	≤30.00	≤30.00	15.50	---	PASS
	Ant2	5825	11.73	≤30.00	≤30.00	14.70	---	PASS
11N20MIMO	Ant1	5180	12.76	≤23.98	---	15.73	≤22.92	PASS
	Ant2	5180	12.01	≤23.98	---	14.98	≤22.83	PASS
	total	5180	15.41	≤23.98	---	18.38	≤22.83	PASS
	Ant1	5200	12.87	≤23.98	---	15.84	≤22.97	PASS
	Ant2	5200	13.15	≤23.98	---	16.12	≤22.79	PASS
	total	5200	16.02	≤23.98	---	18.99	≤22.79	PASS
	Ant1	5240	13.71	≤23.98	---	16.68	≤23.12	PASS
	Ant2	5240	12.05	≤23.98	---	15.02	≤22.76	PASS
	total	5240	15.97	≤23.98	---	18.94	≤22.76	PASS
	Ant1	5745	11.51	≤30.00	≤30.00	14.48	---	PASS
	Ant2	5745	12.27	≤30.00	≤30.00	15.24	---	PASS
	total	5745	14.92	≤30.00	≤30.00	17.89	---	PASS
	Ant1	5785	11.91	≤30.00	≤30.00	14.88	---	PASS
	Ant2	5785	13.47	≤30.00	≤30.00	16.44	---	PASS
	total	5785	15.77	≤30.00	≤30.00	18.74	---	PASS
	Ant1	5825	12.16	≤30.00	≤30.00	15.13	---	PASS
	Ant2	5825	12.03	≤30.00	≤30.00	15.00	---	PASS
	total	5825	15.11	≤30.00	≤30.00	18.08	---	PASS
11N40MIMO	Ant1	5190	10.82	≤23.98	---	13.79	≤23	PASS
	Ant2	5190	5.18	≤23.98	---	8.15	≤23	PASS
	total	5190	11.87	≤23.98	---	14.84	≤23	PASS
	Ant1	5230	10.90	≤23.98	---	13.87	≤23	PASS
	Ant2	5230	6.67	≤23.98	---	9.64	≤23	PASS
	total	5230	12.29	≤23.98	---	15.26	≤23	PASS
	Ant1	5755	10.81	≤30.00	≤30.00	13.78	---	PASS
	Ant2	5755	11.20	≤30.00	≤30.00	14.17	---	PASS
	total	5755	14.02	≤30.00	≤30.00	16.99	---	PASS
	Ant1	5795	11.95	≤30.00	≤30.00	14.92	---	PASS
	Ant2	5795	12.36	≤30.00	≤30.00	15.33	---	PASS
	total	5795	15.17	≤30.00	≤30.00	18.14	---	PASS
11AC80MIMO	Ant1	5210	10.64	≤23.98	---	13.61	≤23	PASS
	Ant2	5210	7.37	≤23.98	---	10.34	≤23	PASS
	total	5210	12.32	≤23.98	---	15.29	≤23	PASS
	Ant1	5775	13.07	≤30.00	≤30.00	16.04	---	PASS
	Ant2	5775	15.19	≤30.00	≤30.00	18.16	---	PASS
	total	5775	17.27	≤30.00	≤30.00	20.24	---	PASS

Note: 1. Conducted Power=Meas. Level+ Correction Factor
2. The Duty Cycle Factor (refer to section 7.1) had already compensated to the test data.

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11.5. APPENDIX C: MAXIMUM POWER SPECTRAL DENSITY

11.5.1. Test Result

Test Mode	Antenna	Channel	Power [dBm/MHz]	Limit [dBm/MHz]	EIRP [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A	Ant1	5180	2.6	≤11.00	5.47	10	PASS
	Ant2	5180	1.38	≤11.00	4.25	10	PASS
	Ant1	5200	2.57	≤11.00	5.44	10	PASS
	Ant2	5200	1.2	≤11.00	4.07	10	PASS
	Ant1	5240	2.32	≤11.00	5.19	10	PASS
	Ant2	5240	1.22	≤11.00	4.09	10	PASS
	Ant1	5745	-1.86	≤30.00	1.01	---	PASS
	Ant2	5745	-1.39	≤30.00	1.48	---	PASS
	Ant1	5785	-1.63	≤30.00	1.24	---	PASS
	Ant2	5785	-1.38	≤30.00	1.49	---	PASS
	Ant1	5825	-1.6	≤30.00	1.27	---	PASS
	Ant2	5825	-2.31	≤30.00	0.56	---	PASS
11N20MIMO	Ant1	5180	1.21	≤11.00	4.08	10	PASS
	Ant2	5180	0.72	≤11.00	3.59	10	PASS
	total	5180	3.98	≤11.00	6.85	10	PASS
	Ant1	5200	1.36	≤11.00	4.23	10	PASS
	Ant2	5200	1.9	≤11.00	4.77	10	PASS
	total	5200	4.65	≤11.00	7.52	10	PASS
	Ant1	5240	1.14	≤11.00	4.01	10	PASS
	Ant2	5240	0.87	≤11.00	3.74	10	PASS
	total	5240	4.02	≤11.00	6.89	10	PASS
	Ant1	5745	-2.53	≤30.00	0.34	---	PASS
	Ant2	5745	-2.02	≤30.00	0.85	---	PASS
	total	5745	0.74	≤30.00	3.61	---	PASS
	Ant1	5785	-2.11	≤30.00	0.76	---	PASS
	Ant2	5785	-0.83	≤30.00	2.04	---	PASS
	total	5785	1.59	≤30.00	4.46	---	PASS
	Ant1	5825	-2.2	≤30.00	0.67	---	PASS
	Ant2	5825	-2.14	≤30.00	0.73	---	PASS
	total	5825	0.84	≤30.00	3.71	---	PASS
11N40MIMO	Ant1	5190	-3.67	≤11.00	-0.80	10	PASS
	Ant2	5190	-8.61	≤11.00	-5.74	10	PASS
	total	5190	-2.46	≤11.00	0.41	10	PASS
	Ant1	5230	-3.29	≤11.00	-0.42	10	PASS
	Ant2	5230	-7.69	≤11.00	-4.82	10	PASS
	total	5230	-1.94	≤11.00	0.93	10	PASS
	Ant1	5755	-5.93	≤30.00	-3.06	---	PASS
	Ant2	5755	-5.84	≤30.00	-2.97	---	PASS
	total	5755	-2.87	≤30.00	0.00	---	PASS
	Ant1	5795	-5.24	≤30.00	-2.37	---	PASS
	Ant2	5795	-4.71	≤30.00	-1.84	---	PASS
	total	5795	-1.96	≤30.00	0.91	---	PASS
11AC80MIMO	Ant1	5210	-6.68	≤11.00	-3.81	10	PASS
	Ant2	5210	-7.27	≤11.00	-4.40	10	PASS
	total	5210	-3.95	≤11.00	-1.08	10	PASS
	Ant1	5775	-6.76	≤30.00	-3.89	---	PASS
	Ant2	5775	-1.52	≤30.00	1.35	---	PASS
	total	5775	-0.38	≤30.00	2.49	---	PASS

Note：1.The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.
2.The Duty Cycle Factor and RBW Factor is compensated in the graph.

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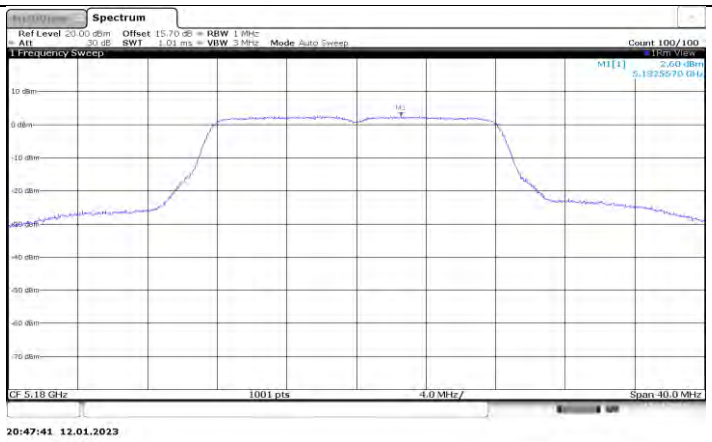
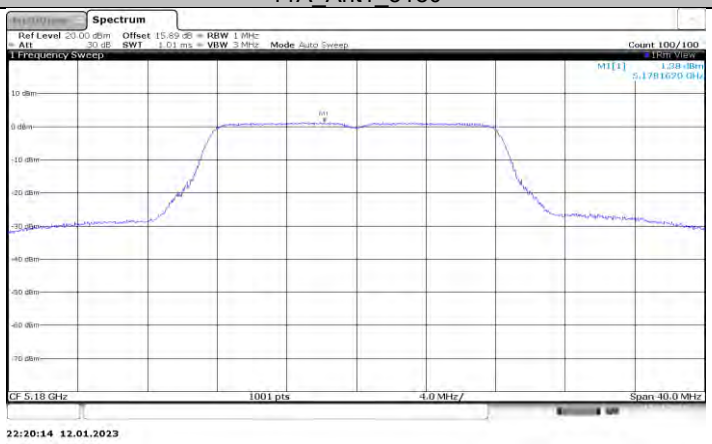
11.5.2. Test Graphs



11A_Ant1_5180



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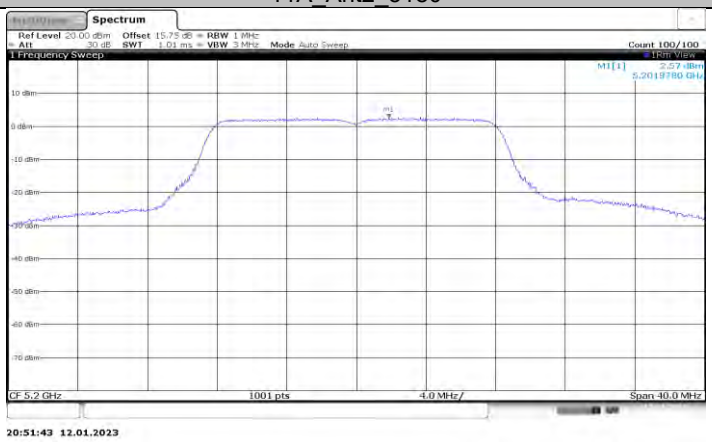

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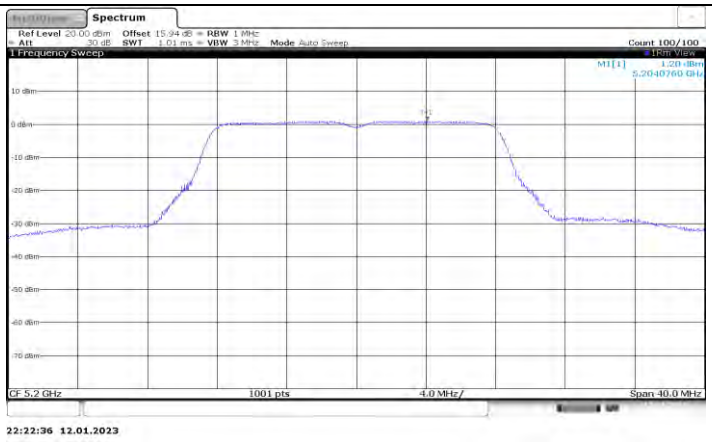

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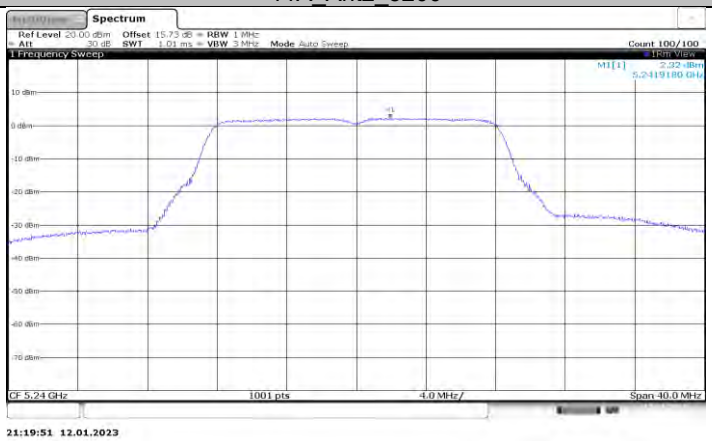

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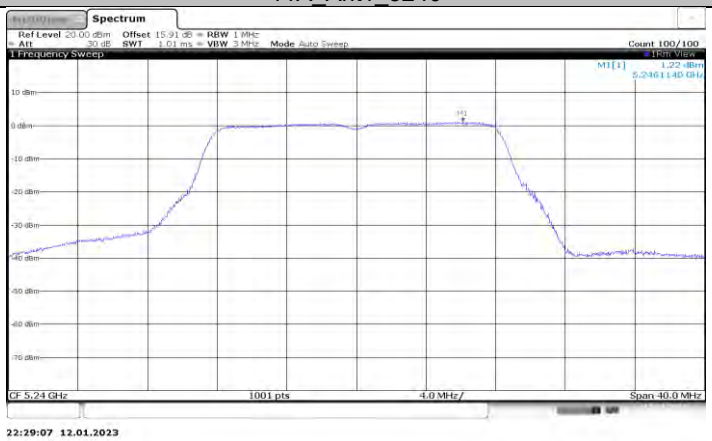

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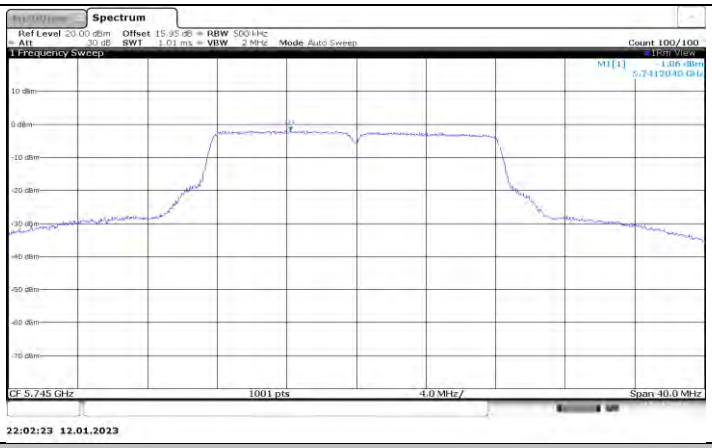

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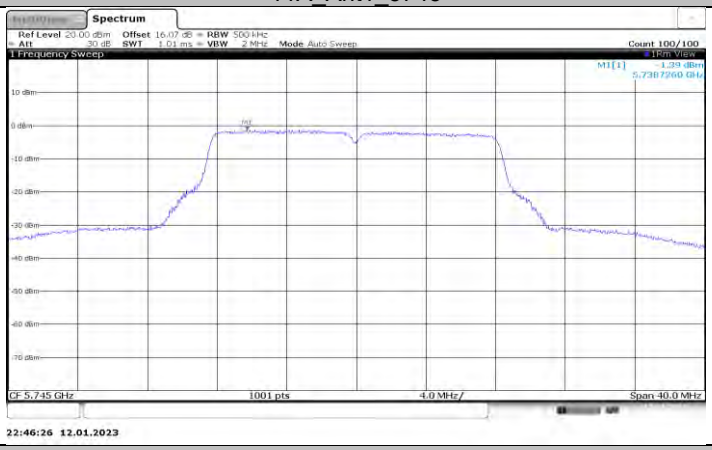

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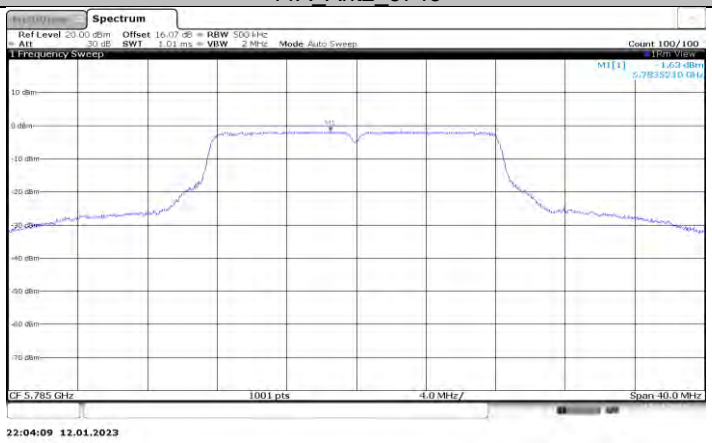

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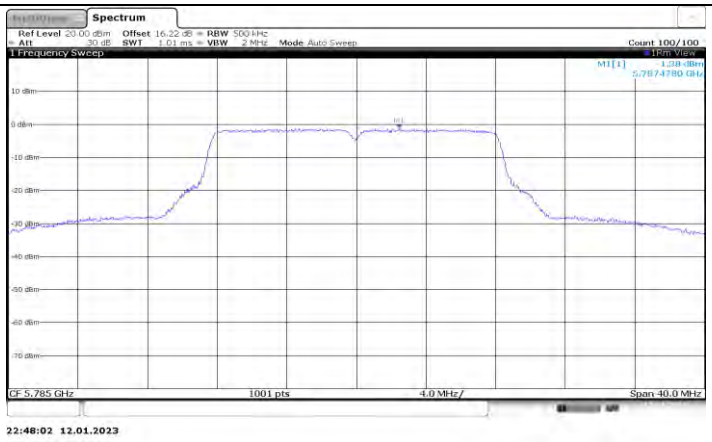

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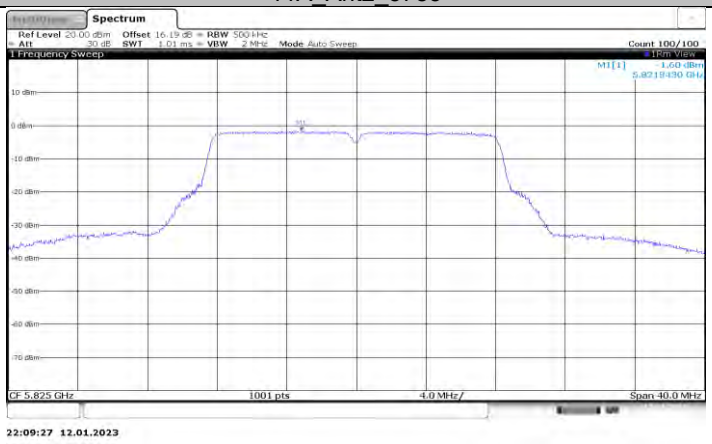
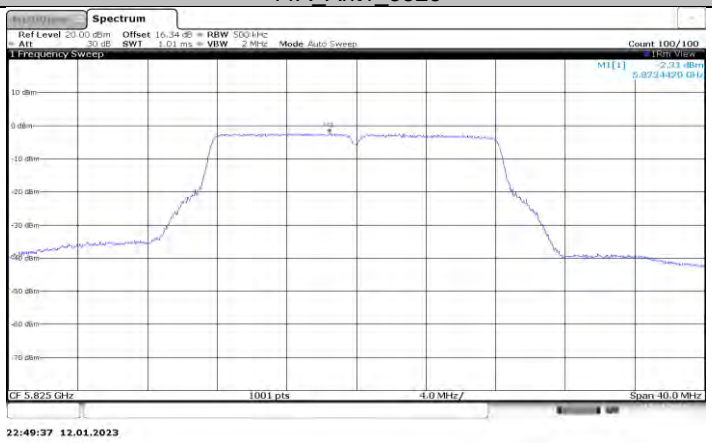


11A_Ant1_5825



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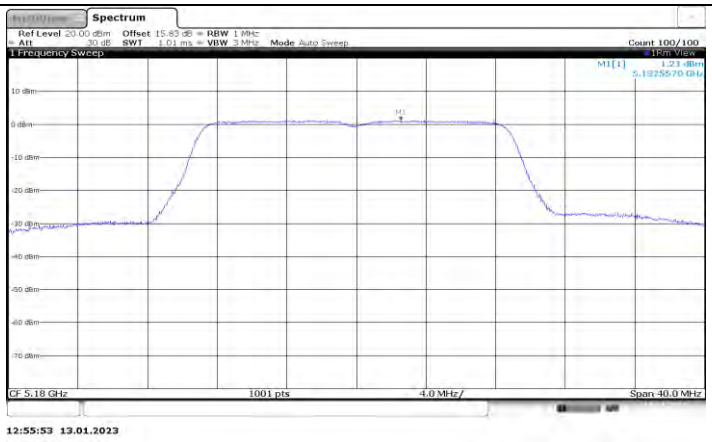

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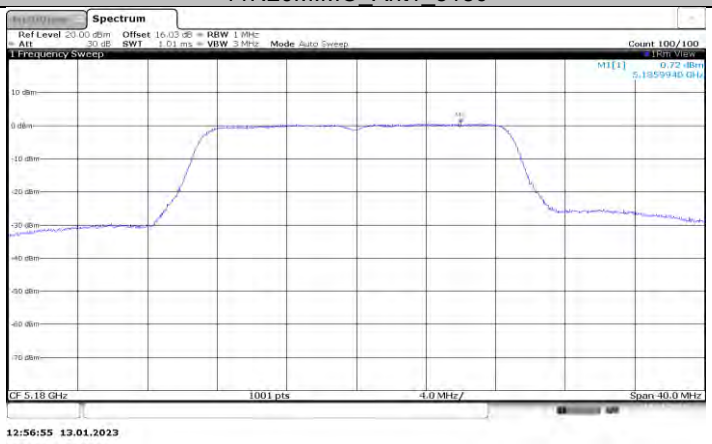

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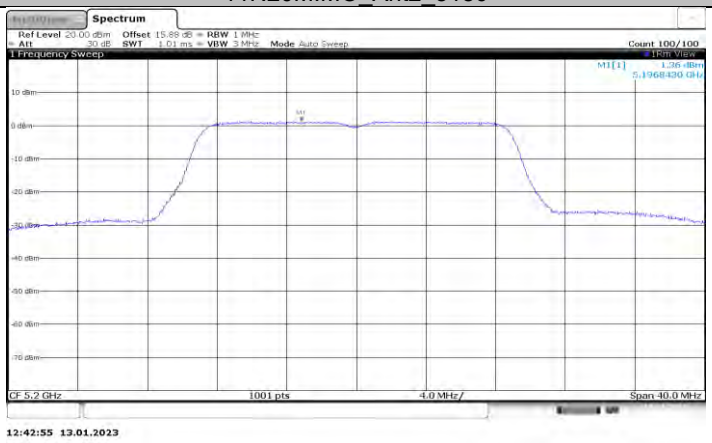

11N20MIMO_Ant1_5200

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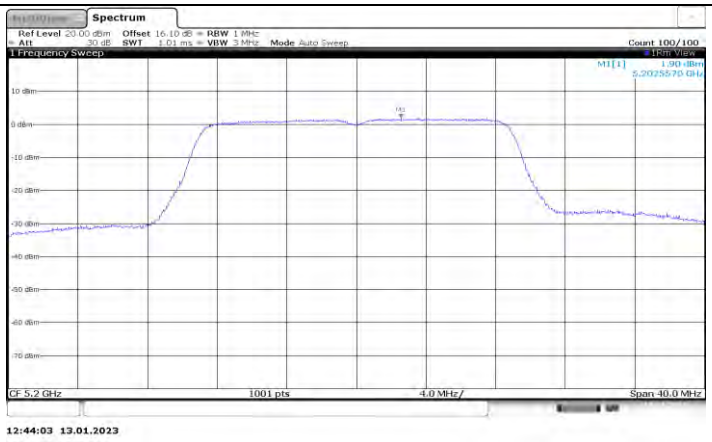

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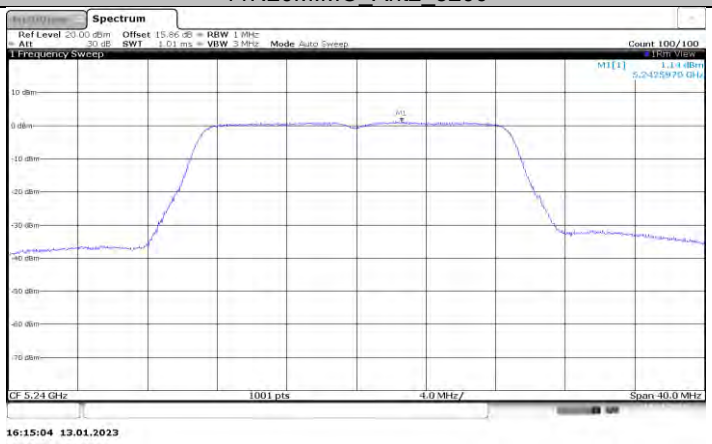
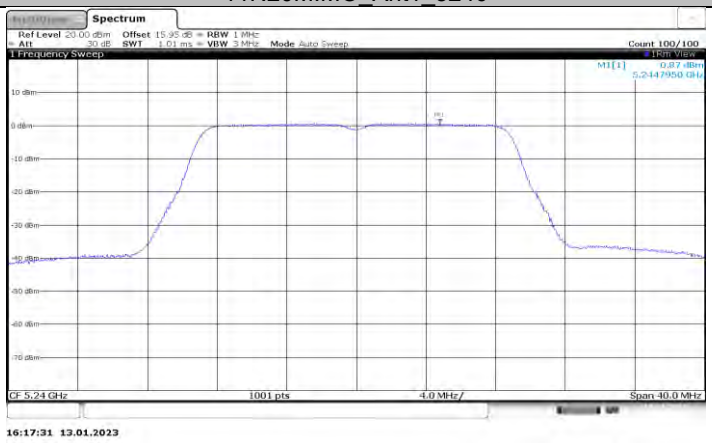


11N20MIMO_Ant1_5240



11N20MIMO_Ant2_5240

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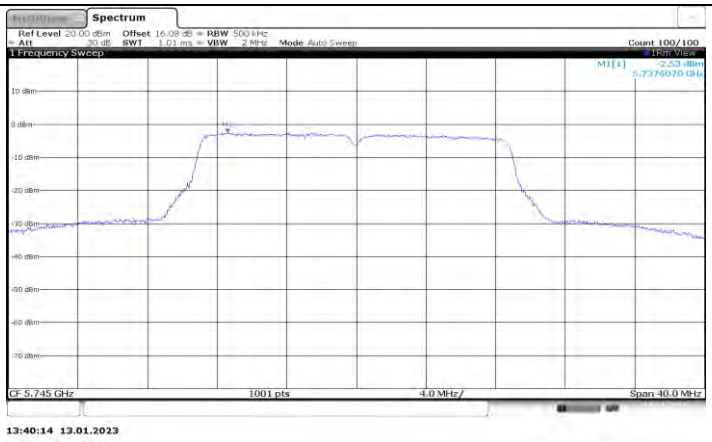

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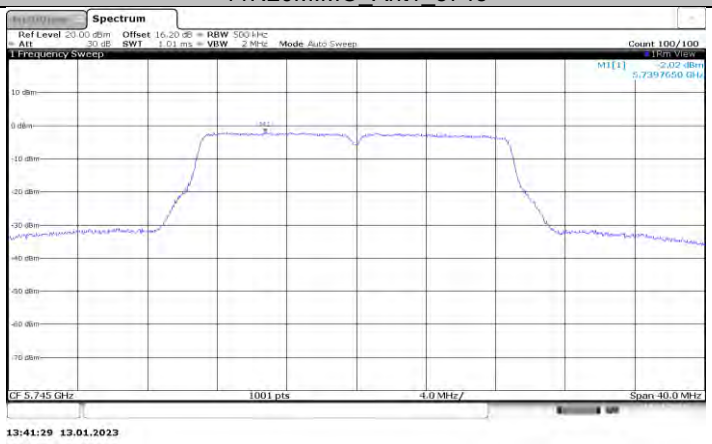
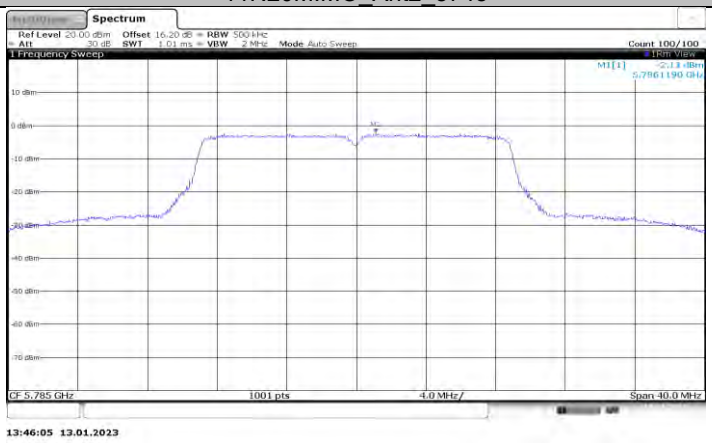


11N20MIMO_Ant2_5745



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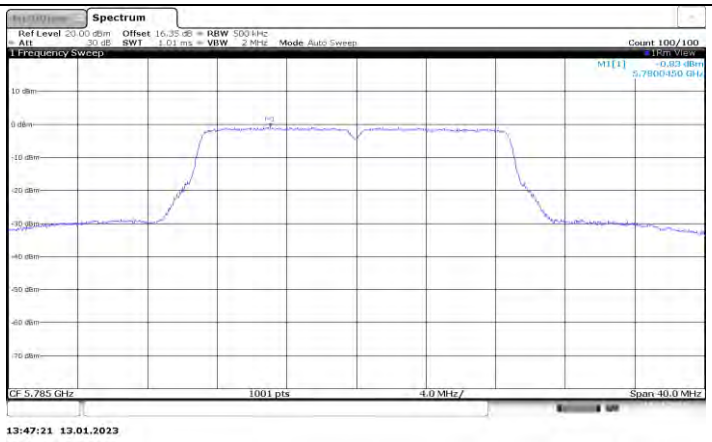

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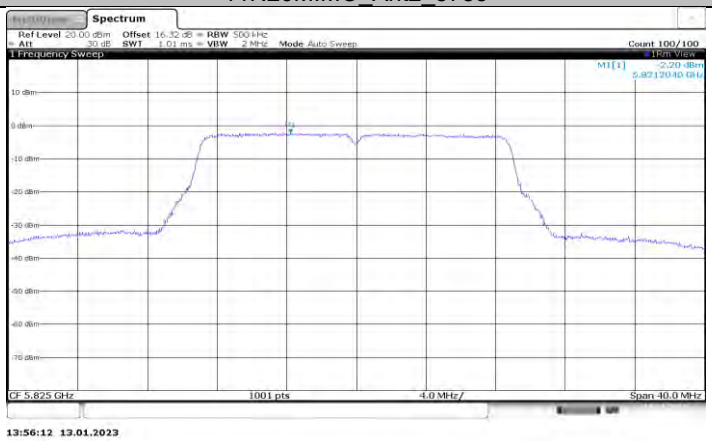

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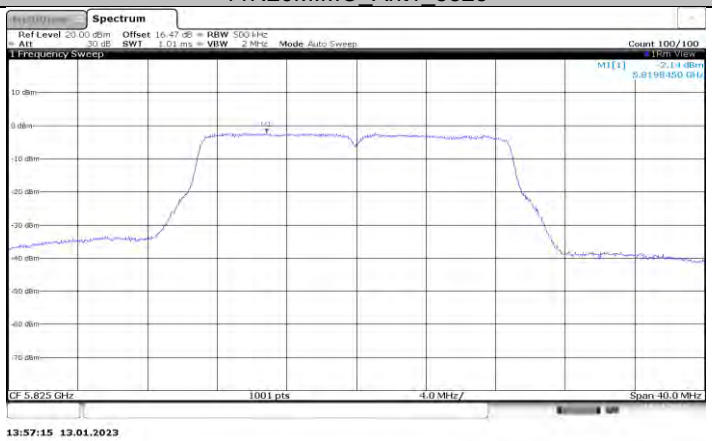

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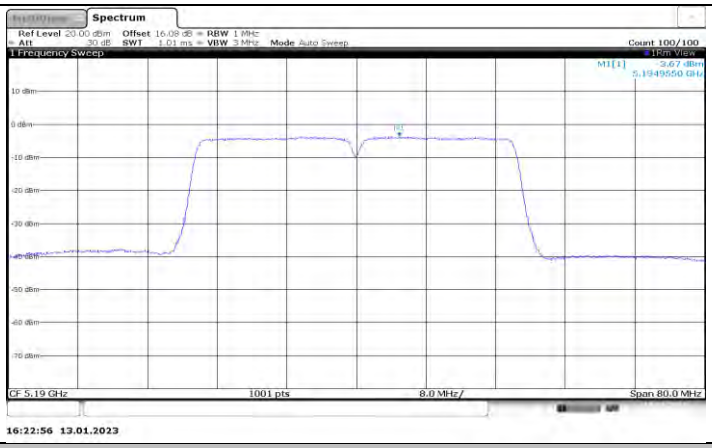

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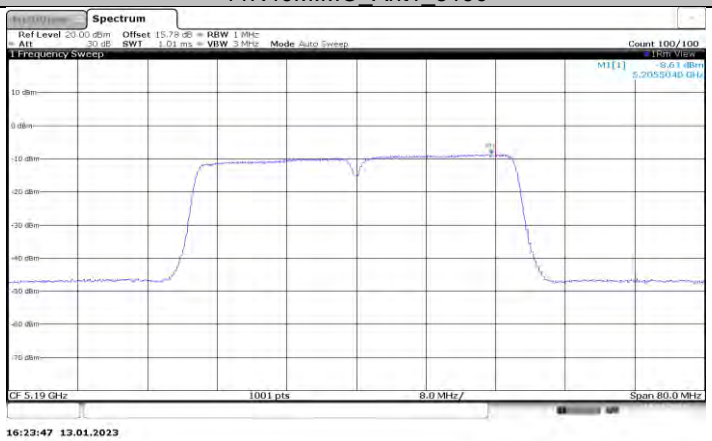

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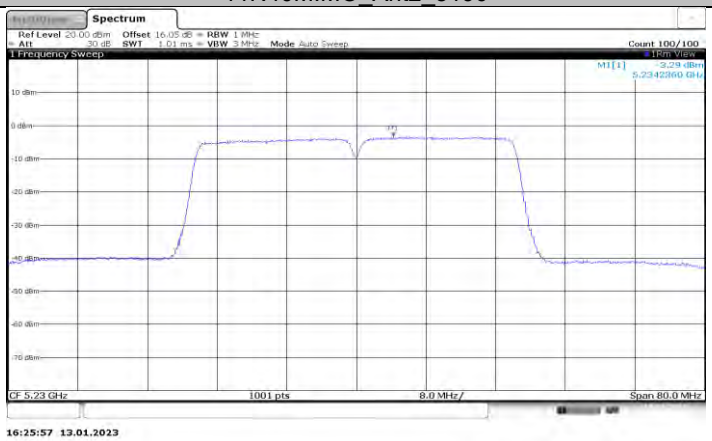

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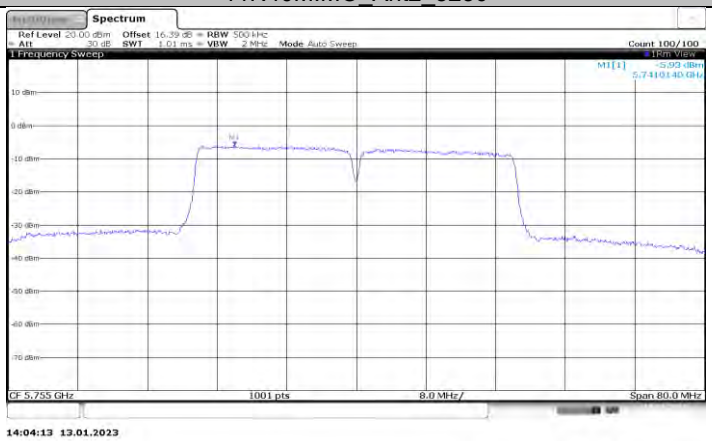

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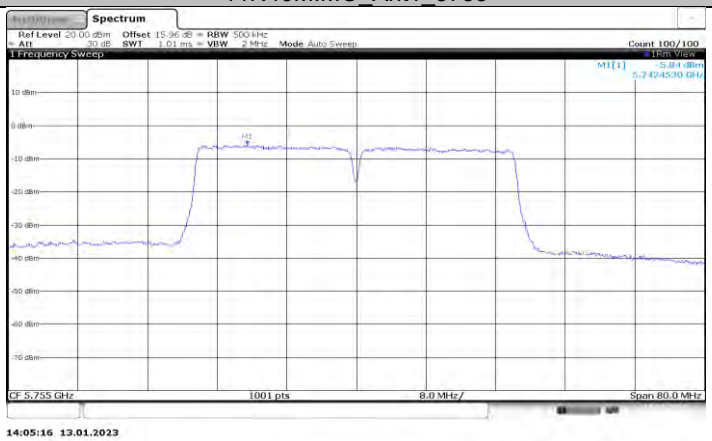

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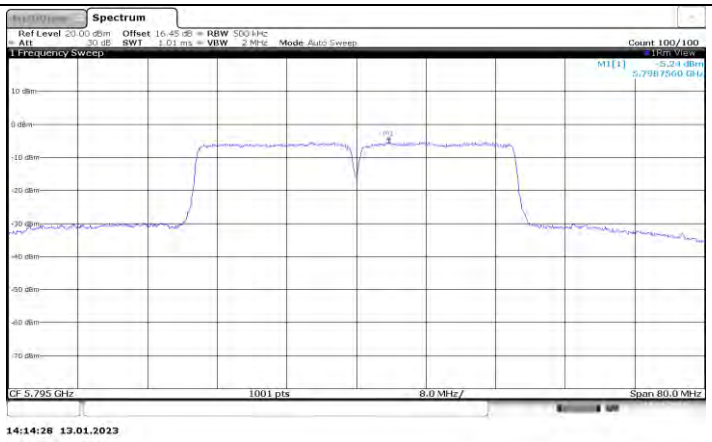

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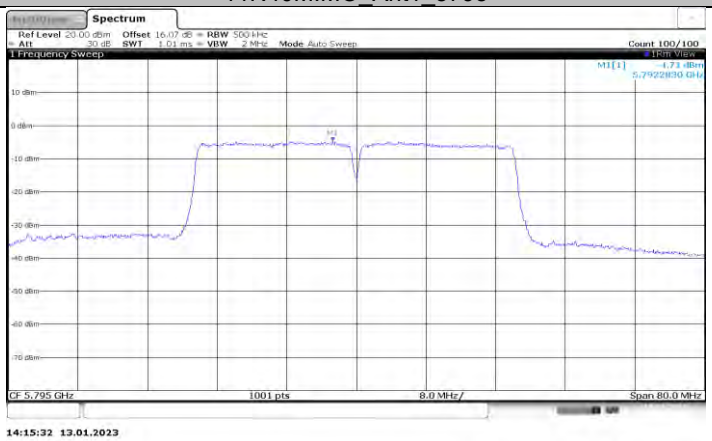

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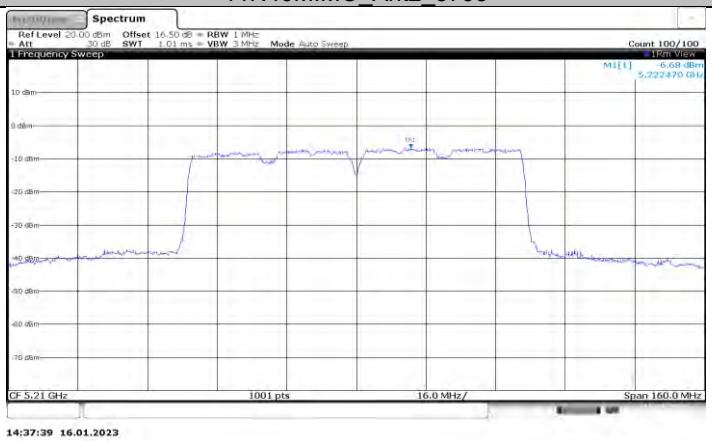

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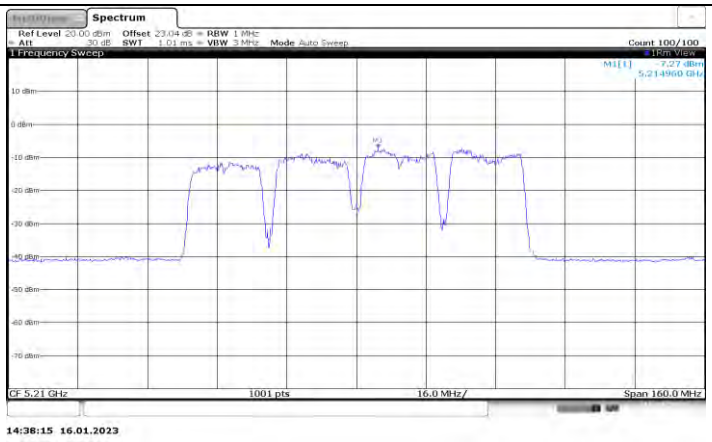

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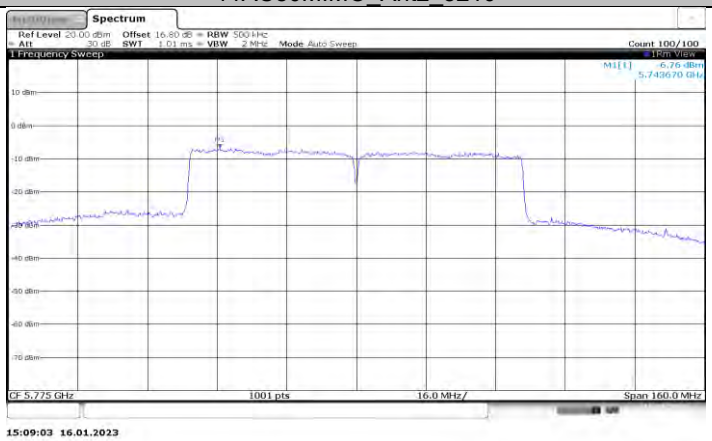

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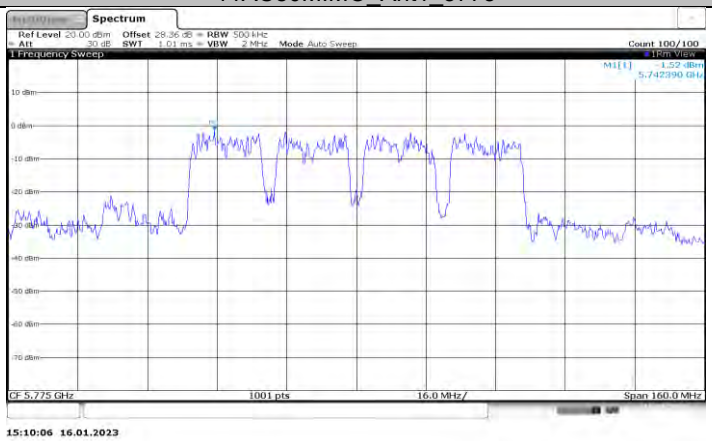

11AC80MIMO_Ant2_5775

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11.6. APPENDIX G: FREQUENCY STABILITY

11.6.1. Test Result

Frequency Error vs. Voltage									
802.11a20:5200MHz									
Temp.	Volt.	0 Minute		2 Minute		5 Minute		10 Minute	
		Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)
TN	VL	5200.0146	2.81	5200.0070	1.34	5199.9986	-0.27	5199.9889	-2.14
TN	VN	5199.9951	-0.93	5199.9934	-1.27	5200.0069	1.33	5200.0206	3.96
TN	VH	5199.9860	-2.70	5199.9898	-1.96	5199.9871	-2.49	5200.0140	2.69

Frequency Error vs. Temperature									
802.11a:5200MHz									
Temp.	Volt.	0 Minute		2 Minute		5 Minute		10 Minute	
		Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)
40	VN	5199.9961	-0.76	5200.0057	1.09	5199.9958	-0.81	5200.0107	2.06
30	VN	5199.9793	-3.98	5199.9788	-4.07	5199.9765	-4.52	5200.0212	4.07
20	VN	5199.9839	-3.10	5199.9755	-4.71	5199.9889	-2.13	5200.0088	1.70
10	VN	5200.0101	1.94	5199.9913	-1.68	5200.0118	2.27	5200.0231	4.44
0	VN	5200.0050	0.97	5200.0243	4.67	5199.9974	-0.51	5199.9883	-2.25

Note:
1. All antennas, test modes and test channels have been tested, only the worst data record in the report.
2. For the detail Test Conditions, please refer to section 10 TEST ENVIRONMENT.

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Frequency Error vs. Voltage									
802.11a:5825MHz									
Temp.	Volt.	0 Minute		2 Minute		5 Minute		10 Minute	
		Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)
TN	VL	5825.0109	1.87	5824.9791	-3.58	5824.9818	-3.12	5824.9790	-3.60
TN	VN	5825.0172	2.94	5825.0196	3.36	5825.0122	2.09	5824.9941	-1.02
TN	VH	5824.9981	-0.32	5824.9791	-3.59	5824.9953	-0.81	5824.9832	-2.88

Frequency Error vs. Temperature									
802.11a:5825MHz									
Temp.	Volt.	0 Minute		2 Minute		5 Minute		10 Minute	
		Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)	Freq.Error (MHz)	Tolerance (ppm)
40	VN	5824.9776	-3.84	5824.9787	-3.65	5825.0148	2.54	5824.9958	-0.72
30	VN	5825.0078	1.35	5825.0117	2.02	5825.0238	4.08	5824.9910	-1.54
20	VN	5825.0035	0.59	5824.9937	-1.08	5825.0200	3.43	5825.0200	3.43
10	VN	5824.9941	-1.01	5825.0047	0.81	5824.9846	-2.64	5825.0165	2.84
0	VN	5825.0063	1.09	5824.9886	-1.95	5824.9991	-0.15	5825.0242	4.16

Note:
1. All antennas, test modes and test channels have been tested, only the worst data record in the report.
2. For the detail Test Conditions, please refer to section 10 TEST ENVIRONMENT.

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11.7. APPENDIX H: DUTY CYCLE

11.7.1. Test Result

Test Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)	Final setting For VBW (kHz)
11A	1.38	1.42	0.9718	97.18	0.12	0.72	1
11N20MIMO	0.67	0.71	0.9437	94.37	0.25	1.49	2
11N40MIMO	0.35	0.39	0.8974	89.74	0.47	2.86	3
11AC80MIMO	0.09	0.11	0.8182	81.82	0.87	11.11	12

Note:
Duty Cycle Correction Factor=10log (1/x).
Where: x is Duty Cycle (Linear)
Where: T is On Time
If that calculated VBW is not available on the analyzer then the next higher value should be used.

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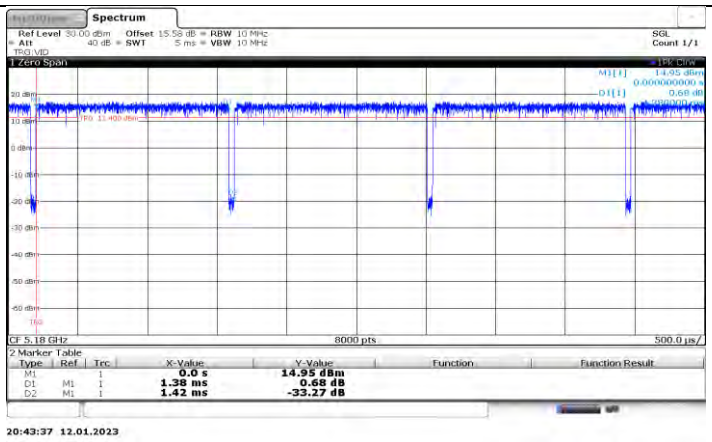
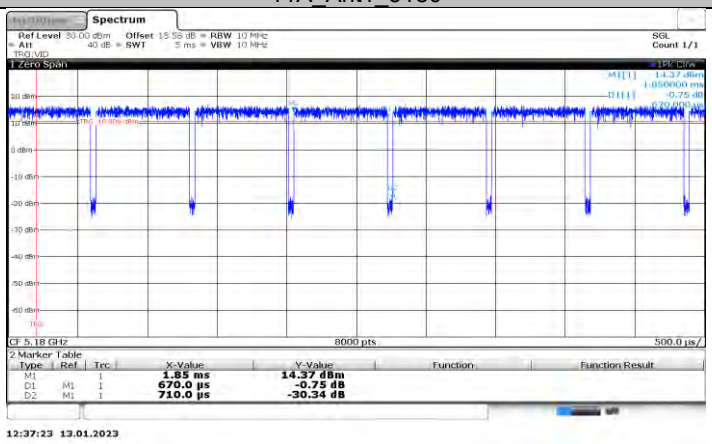
11.7.2. Test Graphs



11A_Ant1_5180



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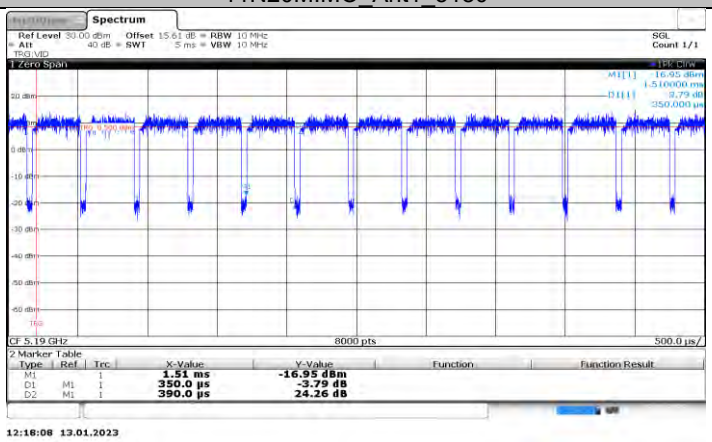

11N40MIMO_Ant1_5190

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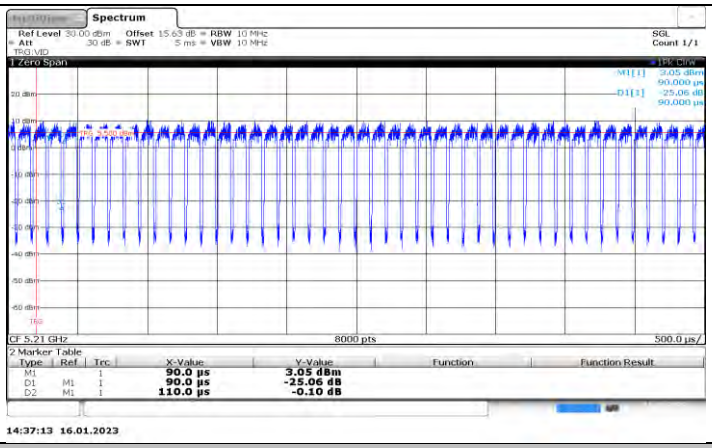

11AC80MIMO_Ant1_5210

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