TEST REPORT

Report No.:	BCTC2404912358-1E
Applicant:	REOLINK INNOVATION LIMITED
Product Name:	WiFi NVR
Test Model:	Reolink Home Hub
Tested Date:	2024-04-28 to 2024-05-13
Issued Date:	2024-06-06

Shenzhen BCTC Testing Co., Ltd.

Product Name:	WiFi NVR
Trademark:	reolink
Model/Type reference:	Reolink Home Hub Hub 1
Prepared For:	REOLINK INNOVATION LIMITED
Address:	FLAT/RM 705 7/F FA YUEN COMMERCIAL BUILDING 75-77 FA YUEN STREET MONG KOK KL HONG KONG
Manufacturer:	REOLINK INNOVATION LIMITED
Address:	FLAT/RM 705 7/F FA YUEN COMMERCIAL BUILDING 75-77 FA YUEN STREET MONG KOK KL HONG KONG
Factory:	Shenzhen Reolink Technology Co., Ltd.
Address:	2-4th Floor, Building 2, YuanLing Industrial Park, ShangWu, Shiyan Street, Bao'an District, Shenzhen, China
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2024-04-28
Sample tested Date:	2024-04-28 to 2024-05-13
Issue Date:	2024-06-06
Report No.:	BCTC2404912358-1E
Test Standards:	EN IEC 62311:2020
Test Results:	PASS
Remark:	This is RED Health test report.

Tested by:

Brave Zeng/ Project Handler

Approved by:

Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

Table Of Content

(Note: N/A Means Not Applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2404912358-1E	2024-06-06	Original	Valid

2. Product Information And Test Setup

2.1 Product Information

Model/Type reference:	Reolink Home Hub Hub 1
Model differences:	All the model are the same circuit and RF module, except model names and appearance of the color.
SRD:	868 MHz
Receiver Category:	2
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	WIFI(2.4GHz): IEEE 802.11b/g/n HT20: 2412MHz-2472MHz IEEE 802.11n HT40: 2422MHz-2462MHz WIFI(5 GHz): 5150MHz-5350MHz, 5470MHz-5725MHz WIFI(5.8GHz): IEEE 802.11a/n/ac HT20/ax HT20: 5745MHz-5825MHz IEEE 802.11n/ac HT40/ax HT40: 5755 MHz-5795MHz IEEE 802.11ac HT80/ax HT80: 5775MHz SRD: 868 MHz
Max. RF output power:	WIFI(2.4GHz) : Antenna A: 12.46 dBm, Antenna B: 12.43 dBm, MIMO: 13.50 dBm WIFI(5.1GHz): Antenna A: 12.62 dBm, Antenna B: 11.21 dBm, MIMO: 14.04 dBm WIFI(5.3GHz): Antenna A: 12.59 dBm, Antenna B: 10.97 dBm, MIMO: 14.61 dBm WIFI(5.6GHz): Antenna A: 11.95 dBm, Antenna B: 9.52 dBm, MIMO: 12.63 dBm WIFI(5.8GHz): Antenna A: 9.21 dBm, Antenna B: 9.74 dBm, MIMO: 11.60 dBm SRD: -17.619 dBm
Type of Modulation:	WIFI(2.4GHz+5.8GHz): DSSS, OFDM WIFI(5GHz): OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM SRD: FSK
Antenna installation:	WIFI(2.4GHz+5 GHz+5.8GHz): Internal antenna
Antenna Gain:	WIFI(2.4GHz): Antenna A: 6.62 dBi, Antenna B: 6.62 dBi WIFI(5 GHz): Antenna A: 6.98 dBi, Antenna B: 6.98 dBi WIFI(5.8GHz): Antenna A: 6.98 dBi, Antenna B: 6.98 dBi SRD: 2.21 dBi Remark: ☒ The antenna gain of the product comes from the antenna report provided by the customer, and the test data is affected by the customer information. ☐ The antenna gain of the product is provided by the customer, and the test data is affected by the customer information.
Ratings:	DC 12V from adapter
Adapter Information:	Model: DCT12W120100EU-B0 Input: 100-240V~50/60Hz 0.3A max. Output: DC 12.0V 1.0A 12.0W

3. Health Requirements

3.1 Limits

According to Council Recommendation: the criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation.

Reference levels for electric, magnetic and electromagnetic fields (0Hz to 300GHz, unperturbed RMS values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density Seq (W/m2)
0-1 Hz	-	3.2×10^4	4×10^4	-
1-8 Hz	10000	$3.2\times10^4/f^2$	$4\times10^4/f^2$	-
8-25 Hz	10000	4000/f	5000/f	-
0.025-0.8 kHz	250/f	4/f	5/f	-
0.8-3 kHz	250/f	5	6.25	-
3-150 kHz	87	5	6.25	-
0.15-1 MHz	87	0.73/f	0.92/f	-
1-10 MHz	$87/f^{1/2}$	0.73/f	0.92/f	-
10-400 MHz	28	0.073	0.095	2
400-2000 MHz	$1.375\ f^{1/2}$	$0.0037\ f^{1/2}$	$0.0046\ f^{1/2}$	f/200
2-300 GHz	61	0.16	0.2	10

Note:
1. f as indicated in the frequency range column.
2. For frequencies between 100 kHz and 10 GHz, Seq, E^2, H^2 and B^2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10 GHz, Seq, E^2, H^2 and B^2 are to be averaged over any $68 / f^{1.05}$ minute period (f in GHz).

3.2 Exposure Evaluation

From Council Recommendation 1999/519/EC table 2, the maximum power density is 10 W/m2.
Power density (S) is calculated by the following formula:
S =PG* Duty factor / 4πR²
P = Peak Power Input to antenna (Watts)
G =Antenna Gain (numeric)
R = distance to the center of radiation of antenna (in meter) = 0.20 m
Note:
1) P (Watts)=(10 ^ (dBm /10))/1000
2) G (Antenna gain in numeric) = 10^ (Antenna gain in dBi /10)
3) Duty factor=1.0
4) π=3.142

	Antenna	Antenna Gain (dBi)	Antenna Gain (numeric)	Max. EIRP Power (dBm)	Max. EIRP Power (W)	Duty factor	Calculated RF Exposure (W/ m²)	Limit (W/ m²)
2.4GHz	A	6.62	4.5920	12.46	0.0176	1.00	0.1609	10
	B	6.62	4.5920	12.43	0.0175	1.00	0.1598	10
	MIMO	6.62	4.5920	13.50	0.0224	1.00	0.2045	10
5.1GHz	A	6.98	4.9888	12.62	0.0183	1.00	0.1814	10
	B	6.98	4.9888	11.21	0.0132	1.00	0.1311	10
	MIMO	6.98	4.9888	14.04	0.0254	1.00	0.2516	10
5.3GHz	A	6.98	4.9888	12.59	0.0182	1.00	0.1802	10
	B	6.98	4.9888	10.97	0.0125	1.00	0.1241	10
	MIMO	6.98	4.9888	14.61	0.0289	1.00	0.2869	10
5.6GHz	A	6.98	4.9888	11.95	0.0157	1.00	0.1555	10
	B	6.98	4.9888	9.52	0.0090	1.00	0.0889	10
	MIMO	6.98	4.9888	12.63	0.0183	1.00	0.1818	10
5.8GHz	A	6.98	4.9888	9.21	0.0083	1.00	0.0827	10
	B	6.98	4.9888	9.74	0.0094	2.00	0.1869	10
	MIMO	6.98	4.9888	11.60	0.0145	3.00	0.4303	10
SRD	/	2.21	1.6634	-17.619	0.0000	1.00	0.0001	4.34

4. EUT Photographs

EUT Photo 1

EUT Photo 2

NOTE: Appendix-Photographs Of EUT Constructional Details.

STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:
1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: 400-788-9558

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FAX: 0755-33229357

Website: http://www.chnbctc.com

Consultation E-mail: bctc@bctc-lab.com.cn

Complaint/Advice E-mail: advice@bctc-lab.com.cn

※※※※※ END ※※※※※

TEST REPORT

Report No.:	BCTC2404912358-4E
Applicant:	REOLINK INNOVATION LIMITED
Product Name:	WiFi NVR
Test Model:	Reolink Home Hub
Tested Date:	2024-04-28 to 2024-05-13
Issued Date:	2024-06-06

Shenzhen BCTC Testing Co., Ltd.

Product Name:	WiFi NVR
Trademark:	reolink
Model/Type reference:	Reolink Home Hub Hub 1
Prepared For:	REOLINK INNOVATION LIMITED
Address:	FLAT/RM 705 7/F FA YUEN COMMERCIAL BUILDING 75-77 FA YUEN STREET MONG KOK KL HONG KONG
Manufacturer:	REOLINK INNOVATION LIMITED
Address:	FLAT/RM 705 7/F FA YUEN COMMERCIAL BUILDING 75-77 FA YUEN STREET MONG KOK KL HONG KONG
Factory:	Shenzhen Reolink Technology Co., Ltd.
Address:	2-4th Floor, Building 2, YuanLing Industrial Park, ShangWu, Shiyan Street, Bao'an District, Shenzhen, China
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2024-04-28
Sample tested Date:	2024-04-28 to 2024-05-13
Issue Date:	2024-06-06
Report No.:	BCTC2404912358-4E
Test Standards	ETSI EN 301 893 V2.1.1 (2017-05)
Test Results	PASS
Remark:	This is WIFI-5.1GHz band radio test report.

Tested by:

Brave Zeng

Brave Zeng/ Project Handler

Approved by:

Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

Table Of Content

(Note: N/A Means Not Applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2404912358-4E	2024-06-06	Original	Valid

2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No.	Results
1	Nominal Centre frequencies	4.2.1	PASS
2	Nominal Channel Bandwidth and Occupied Channel Bandwidth	4.2.2	PASS
3	RF output power, Transmit Power Control (TPC) and Power Density	4.2.3	PASS
4	Transmitter unwanted emissions	4.2.4	PASS
5	Receiver spurious emissions	4.2.5	PASS
6	Dynamic Frequency Selection (DFS)	4.2.6	PASS
7	Adaptivity (Channel Access Mechanism)	4.2.7	PASS
8	Receiver Blocking	4.2.8	PASS
9	User Access Restrictions	4.2.9	PASS
Note: N/A is an abbreviation for Not Applicable and means this test item is not applicable for this device according to the technology characteristic of device.			

3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

RF frequency	1×10^{-7}
RF power, conducted	± 1.0 dB
Conducted emission of receivers	± 1 dB
Radiated emission of transmitter	± 6 dB
Radiated emission of receiver	± 6 dB
Temperature	±1 degree
Humidity	± 5 %

4. Product Information And Test Setup

4.1 Product Information

Model/Type reference	Reolink Home Hub Hub 1
Model differences:	All the model are the same circuit and RF module, except model names and appearance of the color.
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	WIFI(5GHz): 5150MHz-5350MHz, 5470MHz-5725MHz
Max. RF output power:	WIFI(5.1GHz): Antenna A: 12.62 dBm, Antenna B: 11.21 dBm, MIMO: 14.04 dBm WIFI(5.3GHz): Antenna A: 12.59 dBm, Antenna B: 10.97 dBm, MIMO: 14.61 dBm WIFI(5.6GHz): Antenna A: 11.95 dBm, Antenna B: 9.52 dBm, MIMO: 12.63 dBm
Type of Modulation:	WIFI(5GHz): OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM
Antenna installation:	WIFI(5GHz): Internal antenna
Antenna Gain:	WIFI(5GHz): Antenna A: 6.98 dBi, Antenna B: 6.98 dBi Remark: ☒ The antenna gain of the product comes from the antenna report provided by the customer, and the test data is affected by the customer information. ☐ The antenna gain of the product is provided by the customer, and the test data is affected by the customer information.
Ratings:	DC 12V from adapter
Adapter Information:	Model: DCT12W120100EU-B0 Input: 100-240V~50/60Hz 0.3A max. Output: DC 12.0V 1.0A 12.0W

Cable of Product

No.	Cable Type	Quantity	Provider	Length (m)	Shielded	Note
1	--	--	Applicant	---	Yes/No	With a ferrite ring in mid Detachable
2	--	--	BCTC	--	Yes/No	--

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
1.	PC	Lenovo	ThinkPad S2	---	Auxiliary
2.	Router	HUAWEI	WS318	---	Auxiliary
3.	WIFI IP camera	---	---	---	Auxiliary

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

RF General Information			
Frequency Range (MHz)	**IEEE Std. 802.11**	**Ch. Frequency (MHz)**	**Channel Number**
5150-5250	a	5180-5240	36-48 [4]
5250-5350		5260-5320	52-64 [4]
5470-5725		5500-5700	100-140 [11]
5150-5250	n (HT20)	5180-5240	36-48 [4]
5250-5350		5260-5320	52-64 [4]
5470-5725		5500-5700	100-140 [11]
5150-5250	n (HT40)	5190-5230	38-46 [2]
5250-5350		5270-5310	54-62 [2]
5470-5725		5510-5670	102-134 [5]
5150-5250	ac (HT20)/ ax (HT20)	5180-5240	36-48 [4]
5250-5350		5260-5320	52-64 [4]
5470-5725		5500-5700	100-140 [11]
5150-5250	ac (HT40)/ ax (HT40)	5190-5230	38-46 [2]
5250-5350		5270-5310	54-62 [2]
5470-5725		5510-5670	102-134 [5]
5150-5250	ac (HT80)/ ax (HT80)	5210	42 [1]
5250-5350		5290	58 [1]
5470-5725		5530-5610	106-122 [2]
Note 1: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation. Note 2: 802.11ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.			

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test Channel Frequencies Configuration		
Frequency Range (MHz)	**IEEE Std. 802.11**	**Test Channel Freq. (MHz)**
5150-5350MHz	a/n/ac (HT20)/ ax (HT20)	5180, 5260, 5320
5470-5725MHz	a/n/ac (HT20)/ ax (HT20)	5500, 5600, 5700
5150-5350MHz	ac (HT40)/ ax (HT40)	5190, 5310
5470-5725MHz	ac (HT40)/ ax (HT40)	5510, 5670
5150-5350MHz	ac (HT80)/ ax (HT40)	5210, 5290
5470-5725MHz	ac (HT80)/ ax (HT40)	5530, 5610

4.6 Test Environment

1. Normal Test Conditions:

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Temperature(℃):	26
Test Voltage(DC):	12V

2.Extreme Test Conditions:

For tests at extreme temperatures, measurements shall be made over the extremes of the operating temperature range as declared by the manufacturer.

Test Conditions	**LT**	**HT**
Temperature (℃)	0	35

5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	966 chamber	ChengYu	966 Room	966	May 15, 2023	May 14, 2026
2	Receiver	R&S	ESR3	102075	May 16, 2024	May 15, 2025
3	Receiver	R&S	ESRP	101154	May 16, 2024	May 15, 2025
4	Amplifier	Schwarzbeck	BBV9744	9744-0037	May 16, 2024	May 15, 2025
5	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	942	May 29, 2023	May 28, 2024
6	Loop Antenna	Schwarzbeck	FMZB1519B	00014	May 31, 2023	May 30, 2024
7	Amplifier	SKET	LAPA_01G18G-45dB	SK2021040901	May 16, 2024	May 15, 2025
8	Horn Antenna	Schwarzbeck	BBHA9120D	1541	May 31, 2023	May 30, 2024
9	Preamplifier	MITEQ	TTA1840-35-HG	2034381	May 16, 2024	May 15, 2025
10	Horn antenna	Schwarzbeck	BBHA9170	00822	May 31, 2023	May 30, 2024
11	Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	100363	May 16, 2024	May 15, 2025
12	Software	Frad	EZ-EMC	FA-03A2 RE	\	\
13	Spectrum Analyzer	Keysight	N9020A	MY49100060	May 16, 2024	May 15, 2025
14	Signal Generator	Keysight	N5182B	MY56200519	May 16, 2024	May 15, 2025
15	Signal Generator	Keysight	83711B	US37100131	Sept. 05, 2023	Sept. 04, 2024
16	Communication test set	R&S	CMW500	126173	Nov. 13. 2023	Nov. 12, 2024
17	D.C. Power Supply	LongWei	TPR-6405D	\	Nov. 13. 2023	Nov. 12, 2024
18	Programmable constant temperature and humidity test chamber	DGBELL	BTKS5-150C	\	Jul. 01, 2023	Jun. 30, 2024
19	Radio frequency control box	MAIWEI	MW100-RFCB	\	\	\
20	Software	MAIWEI	MTS 8310	\	\	\

6. Information As Required

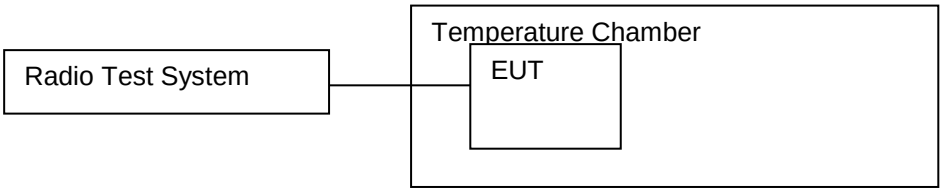
ETSI EN 301 893 V2.1.1 Annex G

a) The Nominal Channel Bandwidth(s):
Refer to section 4.4 channel list.
b) For Load Based Equipment that supports multi-channel operation:
N/A
c) The different transmit operating modes (see clause 5.3.3.2) (tick all that apply):
☐Operating mode 1: Single Antenna Equipment
☐a) Equipment with only 1 antenna
d) In case of Smart Antenna Systems or multiple antenna systems:
• The number of Receive chains: ..... • The number of Transmit chains: ..... • Equal power distribution among the transmit chains: ☐Yes ☐No • In case of beamforming, the maximum (additional) beamforming gain: ..... Db NOTE: Beamforming gain does not include the basic gain of a single antenna (assembly).
e) TPC feature available:
☐Yes ☒No
f) For equipment with TPC range:
The lowest and highest power level (or lowest and highest e.i.r.p. level in case of integrated antenna equipment),intended antenna assemblies and corresponding operating frequency range for the TPC range (or for each of the TPC ranges if more than one is implemented).
g) For equipment without a TPC range:
Power Setting 1: Max.
h) The DFS related operating mode(s) of the equipment:
N/A
i) User access restrictions (please check box below to confirm):
N/A
j) For equipment with Off-Channel CAC functionality:
N/A
k) The equipment can operate in ad-hoc mode:
N/A
l) Operating Frequency Range(s):
Refer to section 4.1.
m) The extreme operating temperature and supply voltage range that apply to the equipment:
Refer to section 4.6
n) The test sequence/test software used (see also ETSI EN 301 893 (V2.1.1), clause 5.3.1.2):
Provide by manufacturer.
o) Type of Equipment:
☒Stand-alone ☐Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment) ☐Plug-in radio device (Equipment intended for a variety of host systems) ☐Other .....
p) Adaptivity (Channel Access Mechanism):
☐Frame Based Equipment ☒Load Based Equipment
q) With regards to Adaptivity for Frame Based Equipment
☐The Frame Based Equipment operates as an Initiating Device ☐The Frame Based Equipment operates as an Responding Device ☐The Frame Based Equipment can operate as an Initiating Device and as a Responding Device
r) With regards to Adaptivity for Load Based Equipment
N/A
s) The equipment supports a geo-location capability as defined in clause 4.2.10 of ETSI EN 301 893 V2.1.1:

☐Yes ☒No
t) The minimum performance criteria (see ETSI EN 301 893 V2.1.1, clause 4.2.8.3) that corresponds to the intended use of the equipment:
The minimum performance criterion is a PER of less than or equal to 10 %.
u) The theoretical maximum radio performance of the equipment (e.g. maximum throughput) (see ETSI EN 301 893 V2.1.1, clause 5.4.9.3.1):
N/A

7. Nominal Centre Frequencies

7.1 Block Diagram Of Test Setup



7.2 Limit

The Nominal Centre Frequencies (fc) for a Nominal Channel Bandwidth of 20 MHz are defined by equation (1). See also figure 3.
fc = 5 160 + (g × 20) MHz, where 0 ≤ g ≤ 9 or 16 ≤ g ≤ 27 and where g shall be an integer.
A maximum offset of the Nominal Centre Frequency of ±200 kHz is permitted. Where the manufacturer decides to make use of this frequency offset, the manufacturer shall declare the actual centre frequencies used by the equipment.
See clause 5.4.1, item a).
The actual centre frequency for any given channel shall be maintained within the range fc ± 20 ppm.
Equipment may have simultaneous transmissions on more than one Operating Channel with a Nominal Channel Bandwidth of 20 MHz.

7.3 Test Procedure

This method is an alternative to the above method in case the UUT cannot be operated in an un-modulated mode.
The UUT shall be connected to spectrum analyser.
Max Hold shall be selected and the centre frequency adjusted to that of the UUT.
The peak value of the power envelope shall be measured and noted. The span shall be reduced and the marker moved in a positive frequency increment until the upper, (relative to the centre frequency), -10 dBc point is reached. This value shall be noted as f1.
The marker shall then be moved in a negative frequency increment until the lower, (relative to the centre frequency), -10 dBc point is reached. This value shall be noted as f2.
The centre frequency is calculated as (f1 + f2) / 2.

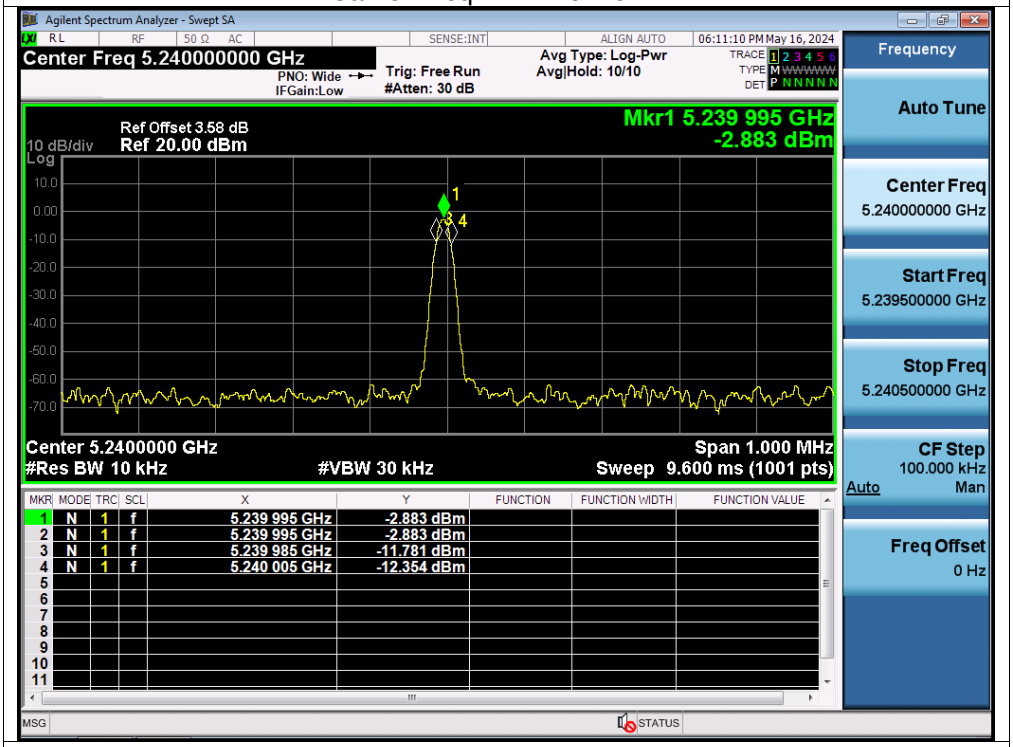
7.4 Test Result

ANT A

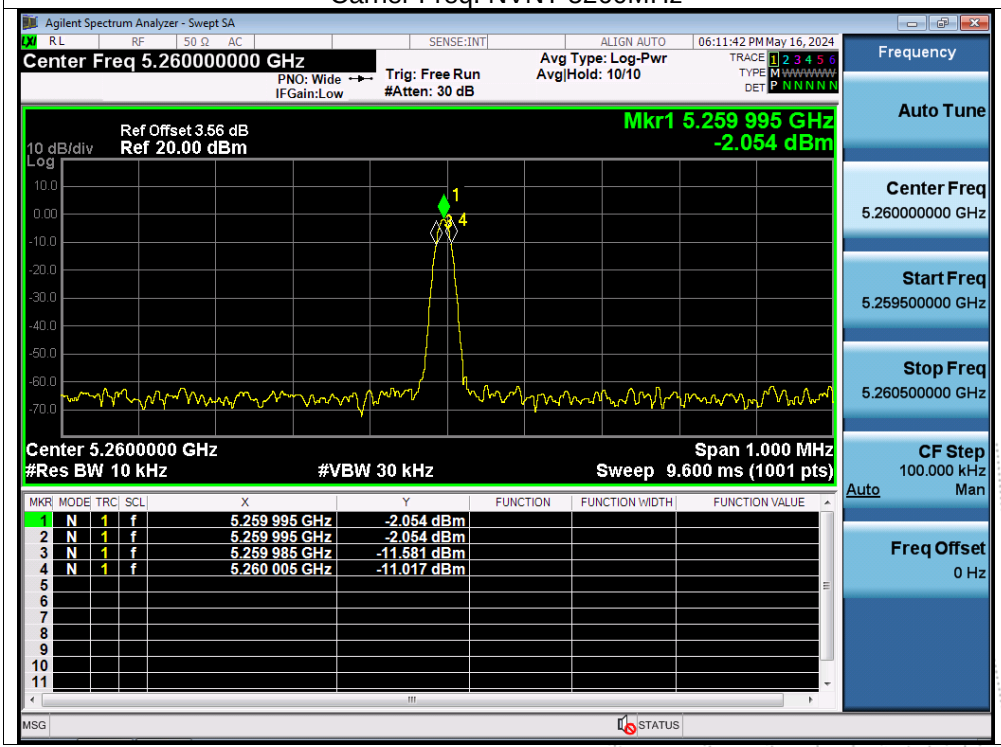
Condition	Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
NVNT	5240	5239.995	-5000	-0.95	20	Pass
NVNT	5260	5259.995	-5000	-0.95	20	Pass
NVNT	5230	5229.996	-4000	-0.76	20	Pass
NVNT	5550	5549.995	-5000	-0.9	20	Pass
NVNT	5290	5289.995	-5000	-0.95	20	Pass
NVNT	5530	5529.995	-5000	-0.9	20	Pass

Test Graphs

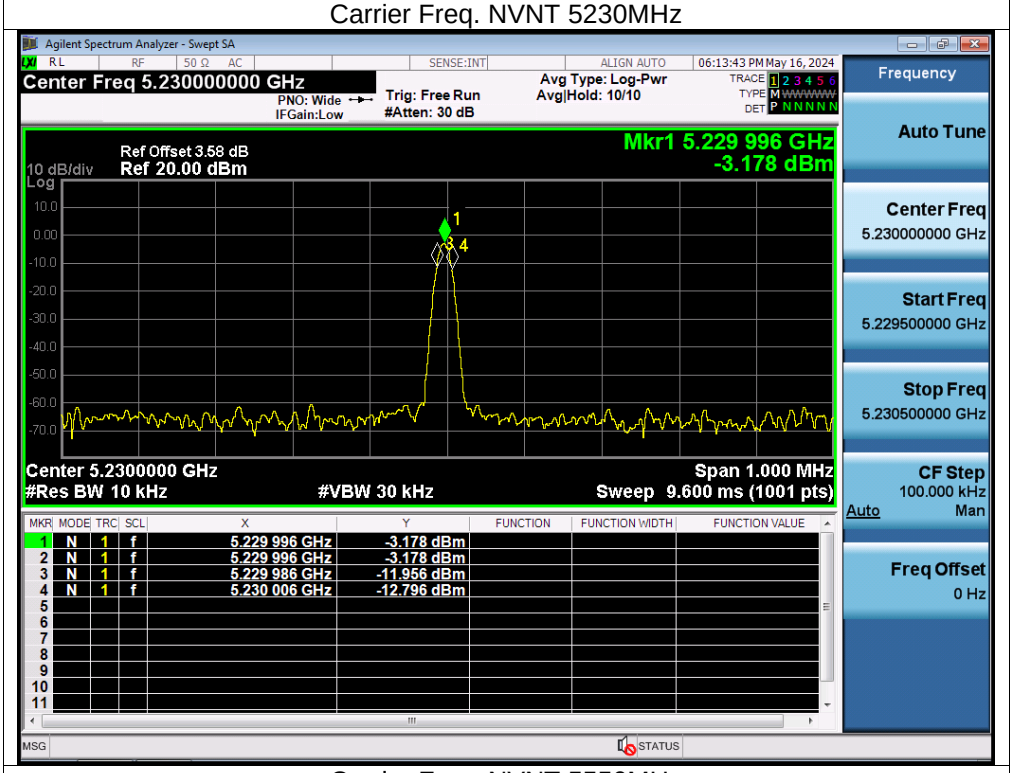
Carrier Freq. NVNT 5240MHz



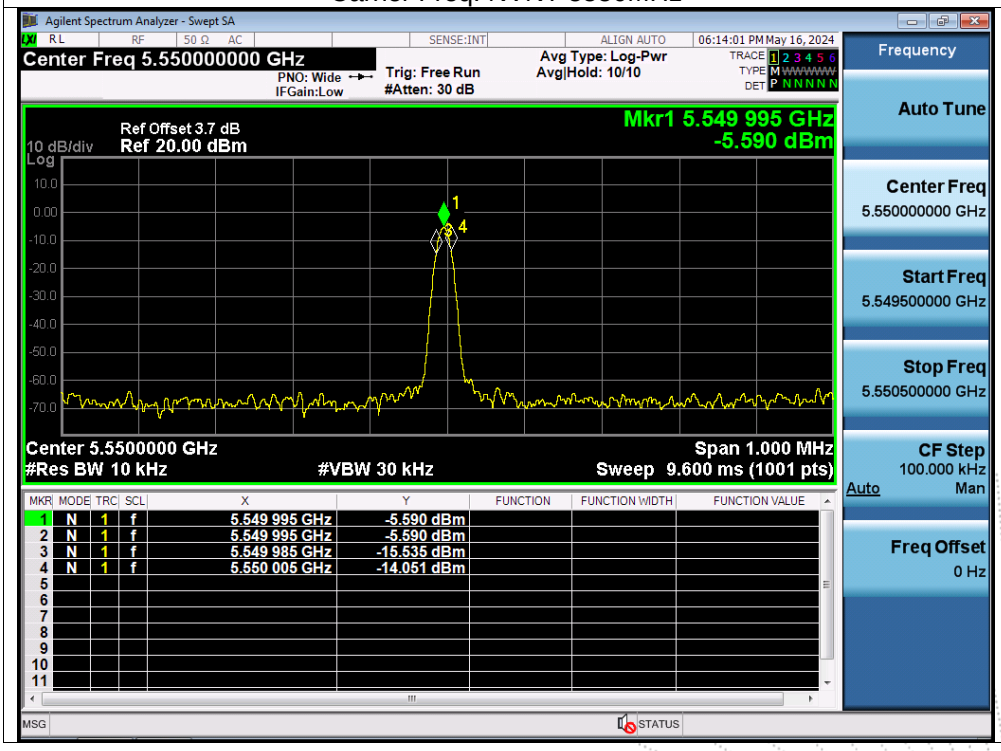
Carrier Freq. NVNT 5260MHz



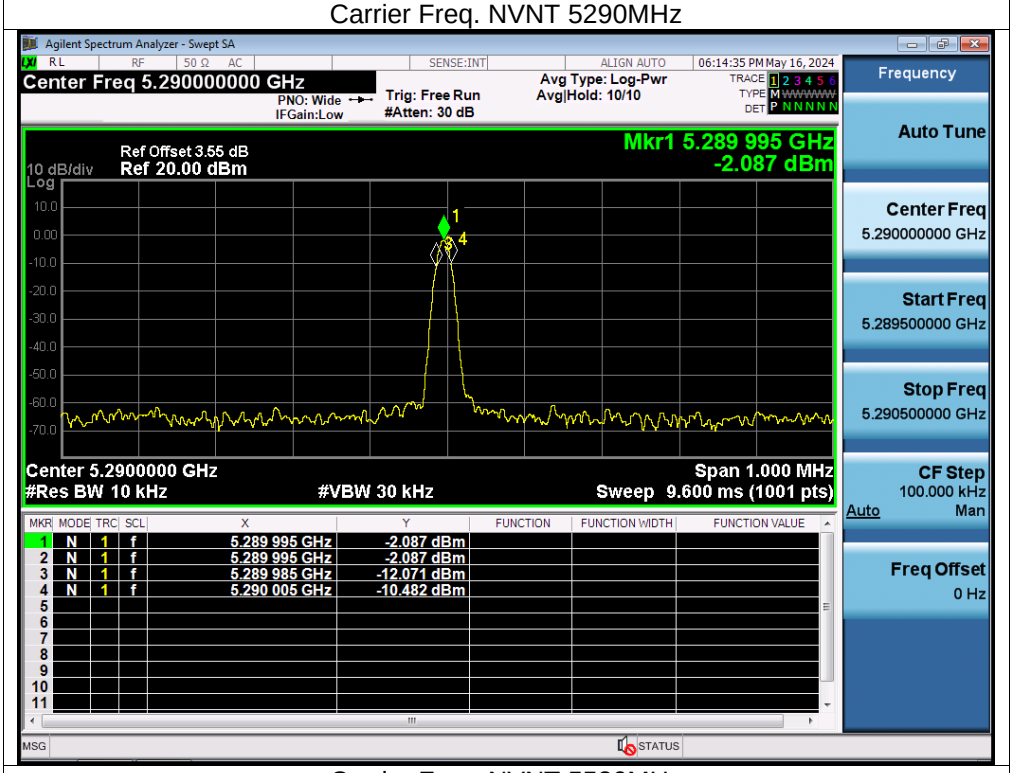
Carrier Freq. NVNT 5230MHz



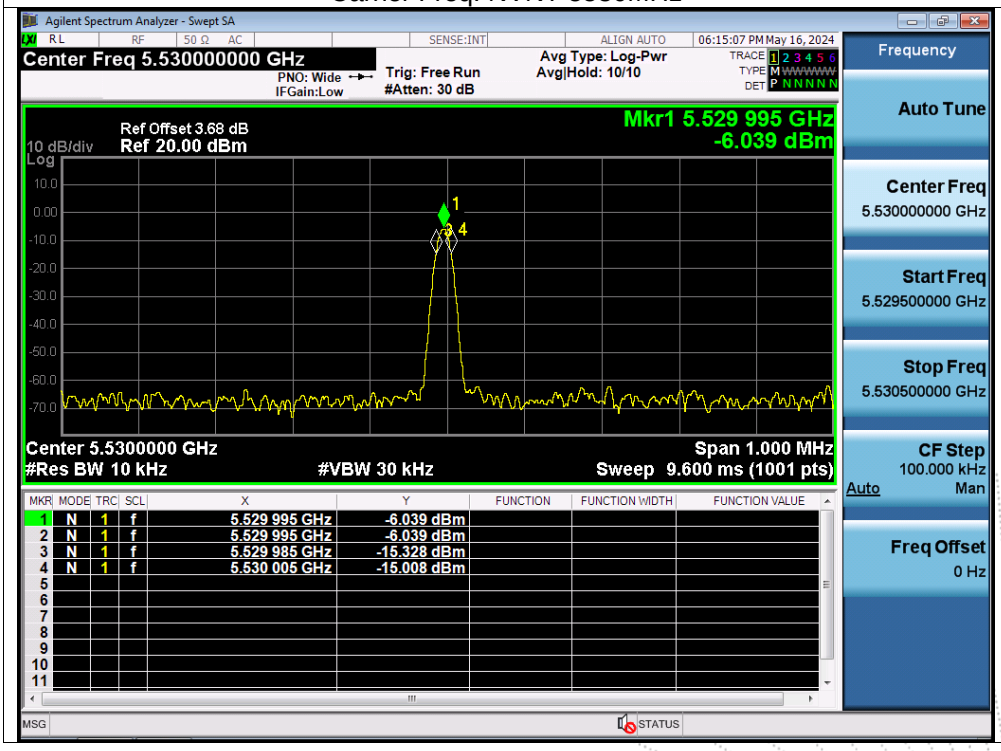
Carrier Freq. NVNT 5550MHz



Carrier Freq. NVNT 5290MHz



Carrier Freq. NVNT 5530MHz

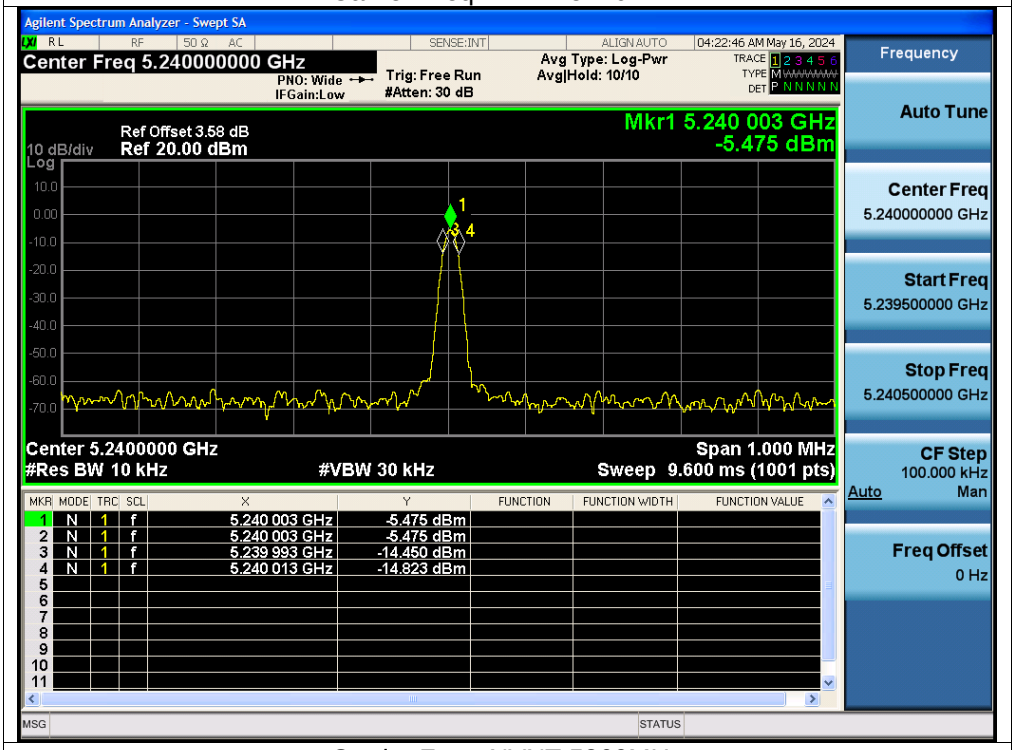


ANT B

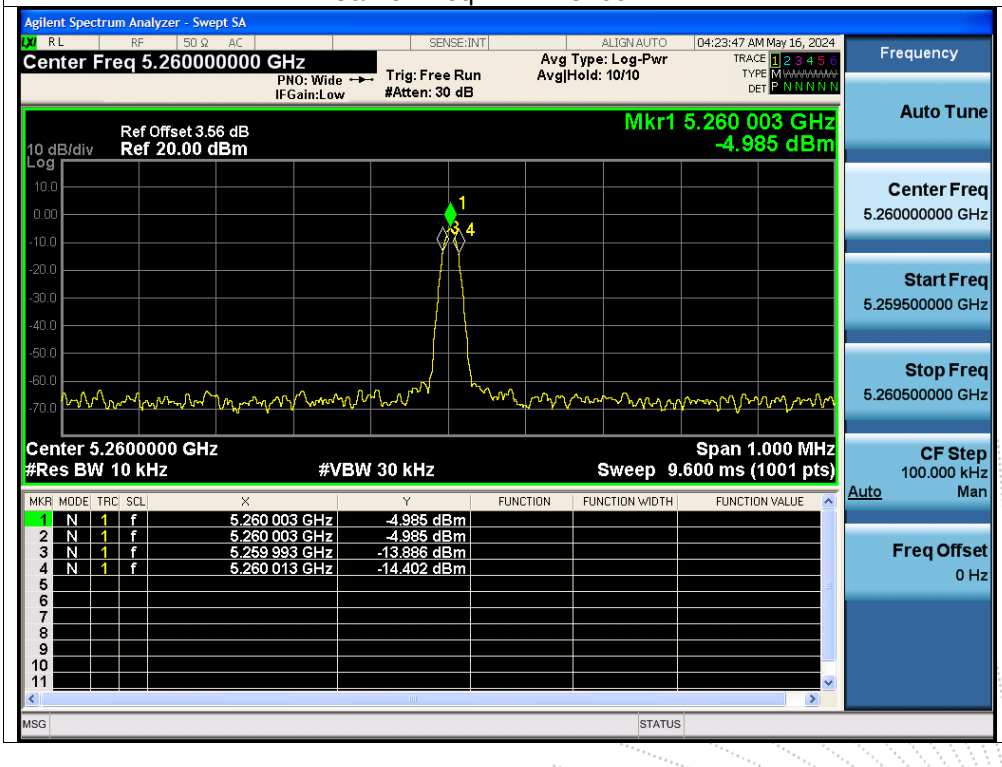
Condition	Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
NVNT	5240	5240.003	3000	0.57	20	Pass
NVNT	5260	5260.003	3000	0.57	20	Pass
NVNT	5230	5230.003	3000	0.57	20	Pass
NVNT	5550	5550.003	3000	0.54	20	Pass
NVNT	5290	5290.003	3000	0.57	20	Pass
NVNT	5530	5530.003	3000	0.54	20	Pass

Test Graphs

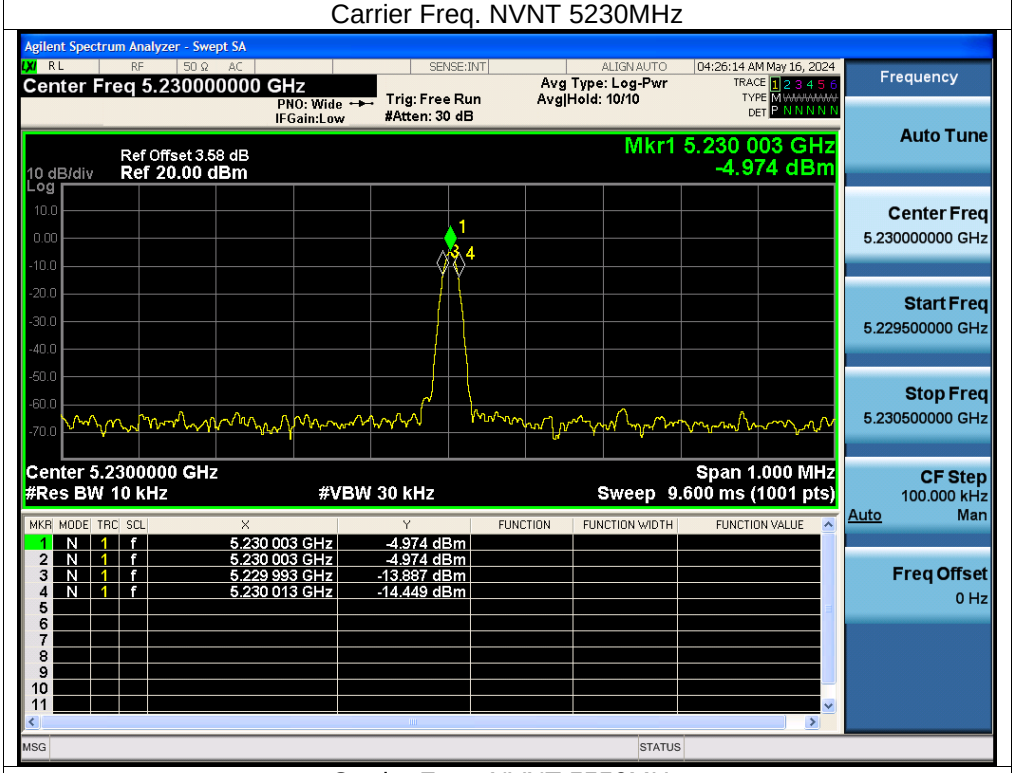
Carrier Freq. NVNT 5240MHz



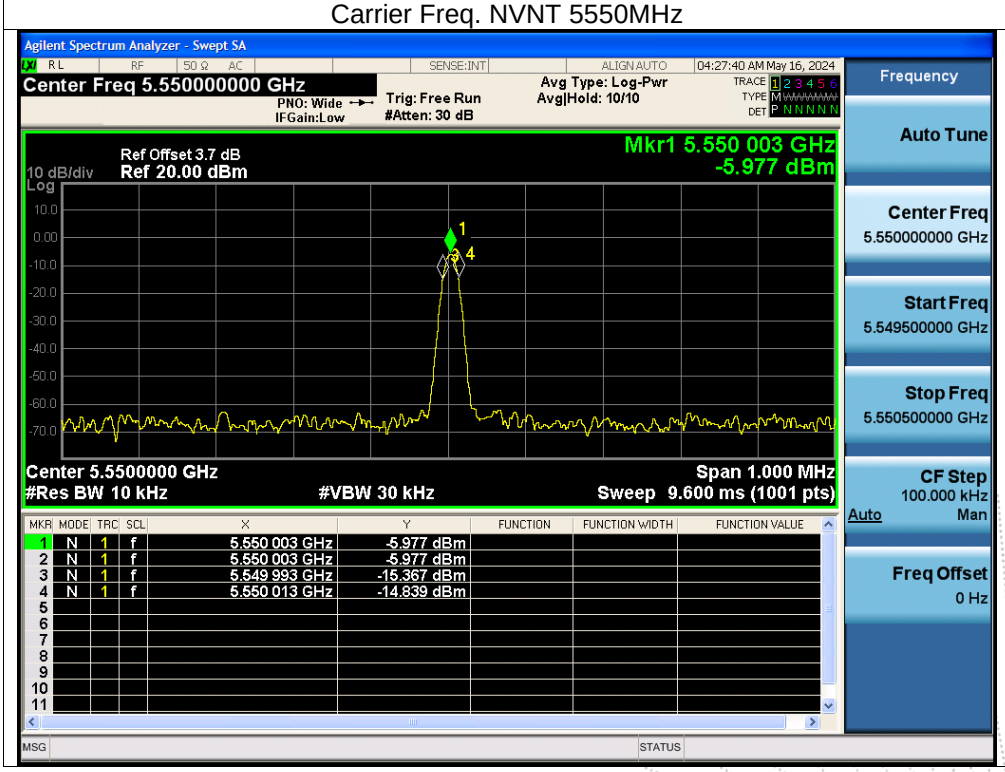
Carrier Freq. NVNT 5260MHz



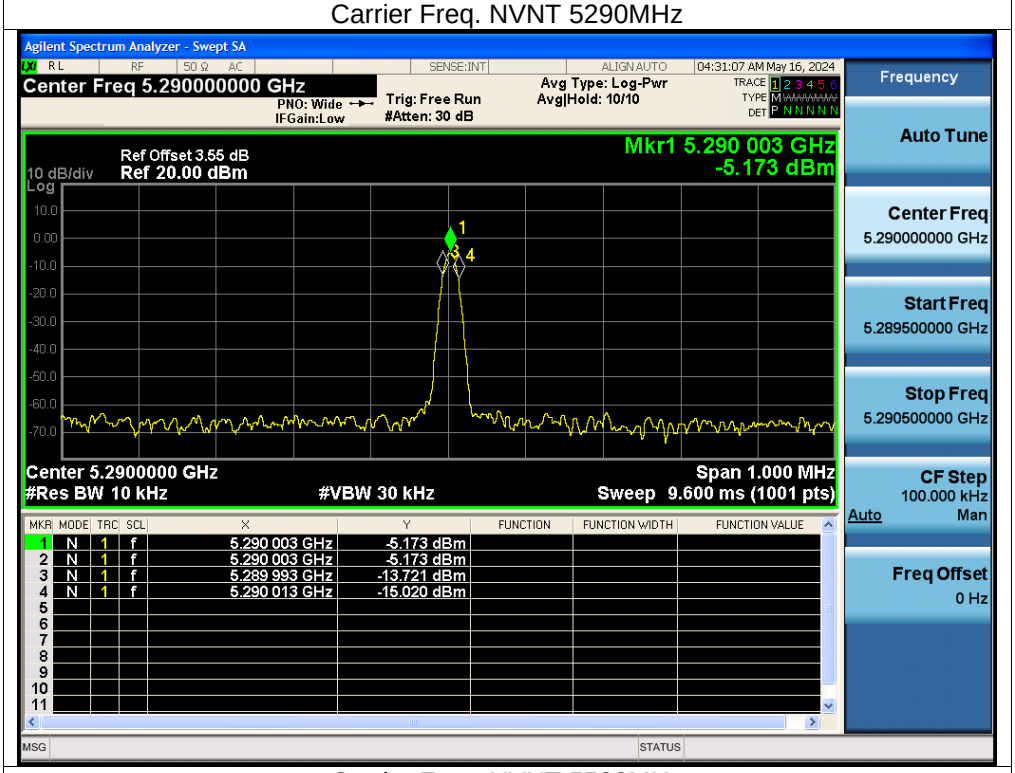
Carrier Freq. NVNT 5230MHz



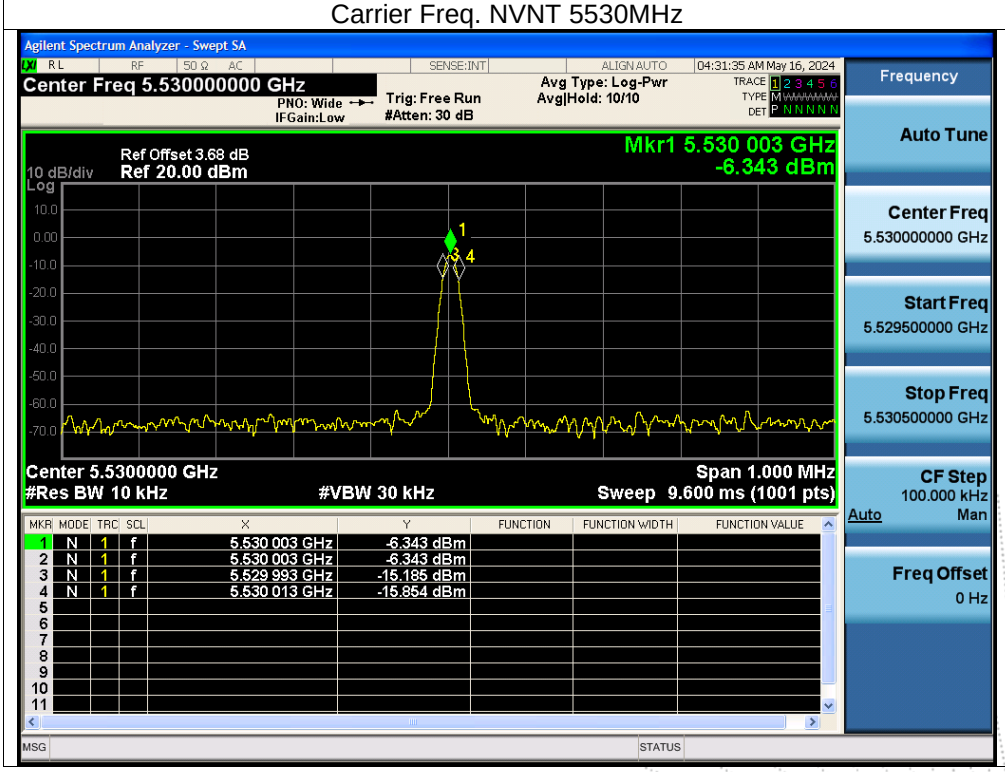
Carrier Freq. NVNT 5550MHz



Carrier Freq. NVNT 5290MHz

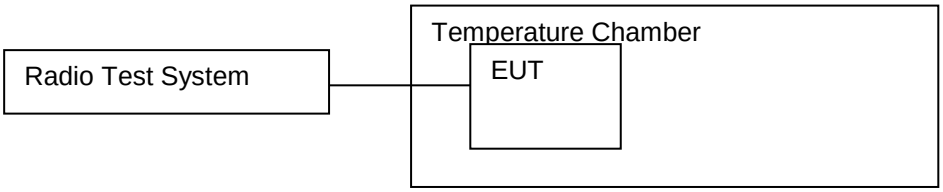


Carrier Freq. NVNT 5530MHz



8. Nominal Channel Bandwidth And Occupied Channel Bandwidth

8.1 Block Diagram Of Test Setup



8.2 Limit

The Nominal Channel Bandwidth for a single Operating Channel shall be 20 MHz.
Alternatively, equipment may implement a lower Nominal Channel Bandwidth with a minimum of 5 MHz, providing they still comply with the Nominal Centre Frequencies defined in clause 4.2.1 (20 MHz raster).
The Occupied Channel Bandwidth shall be between 80 % and 100 % of the Nominal Channel Bandwidth.
In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet this requirement.
The Occupied Channel Bandwidth might change with time/payload.

8.3 Test Procedure

Step 1:
• Connect the UUT to the spectrum analyser and use the following settings:
- Centre Frequency: The centre frequency of the channel under test
- Resolution Bandwidth: 100 kHz
- Video Bandwidth: 300 kHz
- Frequency Span: 2 × Nominal Bandwidth (e.g. 40 MHz for a 20 MHz channel)
- Sweep time: > 1 s; for larger Nominal Bandwidths, the sweep time may be increased until a value where the sweep time has no impact on the RMS value of the signal
- Detector Mode: RMS
- Trace Mode: Max Hold

Step 2:
• Wait for the trace to stabilize.

Step 3:
• Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.
• Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.
The measurement described in step 1 to step 3 above shall be repeated in case of simultaneous transmissions in non-adjacent channels.

8.4 Test Result

ANT A

Condition	Mode	Frequency (MHz)	Center Frequency (MHz)	OBW (MHz)	Verdict
NVNT	a	5240	5239.982	16.342	Pass
NVNT	a	5260	5259.985	16.34	Pass
NVNT	n20	5240	5239.979	17.561	Pass
NVNT	n20	5260	5259.986	17.562	Pass
NVNT	n40	5230	5229.994	36.078	Pass
NVNT	n40	5550	5550.016	36.114	Pass
NVNT	ac20	5240	5239.984	17.558	Pass
NVNT	ac20	5260	5259.986	17.557	Pass
NVNT	ac40	5230	5229.994	36.092	Pass
NVNT	ac40	5550	5550.021	36.111	Pass
NVNT	ac80	5290	5290.07	75.489	Pass
NVNT	ac80	5530	5530.113	75.571	Pass
NVNT	ax40	5230	5229.999	37.679	Pass
NVNT	ax40	5550	5550.027	37.703	Pass
NVNT	ax80	5290	5290.038	76.796	Pass
NVNT	ax80	5530	5530.117	**76.81**	Pass

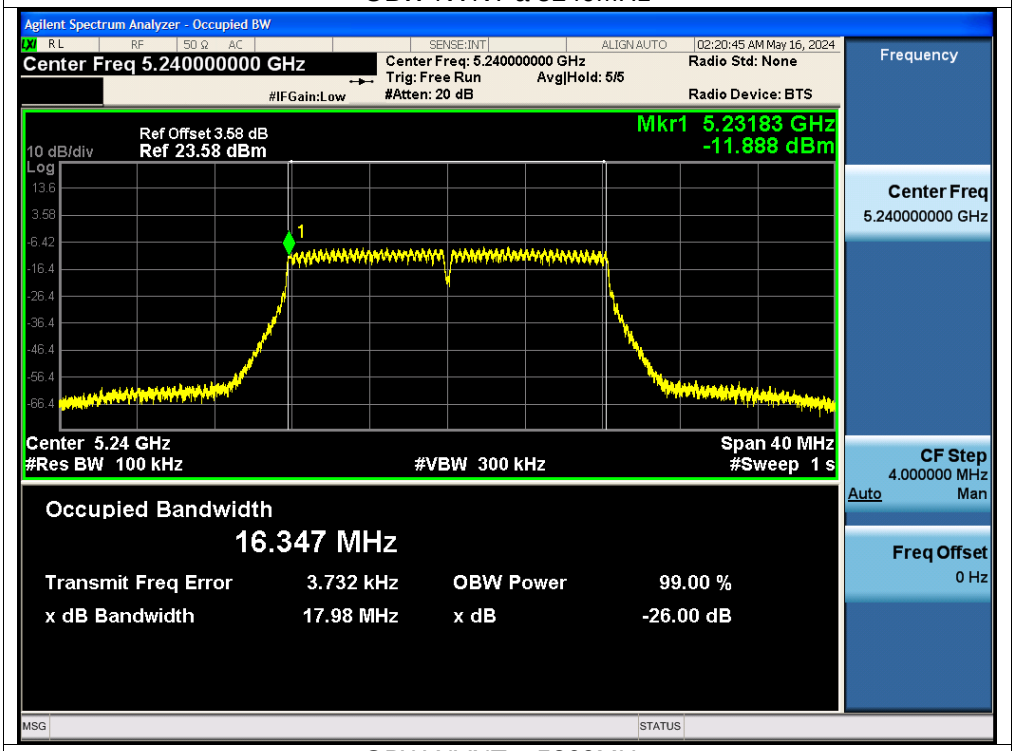
ANT B

Condition	Mode	Frequency (MHz)	Center Frequency (MHz)	OBW (MHz)	Verdict
NVNT	a	5240	5240.004	16.347	Pass
NVNT	a	5260	5260.001	16.346	Pass
NVNT	n20	5240	5239.999	17.566	Pass
NVNT	n20	5260	5259.997	17.565	Pass
NVNT	n40	5230	5229.996	36.12	Pass
NVNT	n40	5550	5550.016	36.123	Pass
NVNT	ac20	5240	5240	17.565	Pass
NVNT	ac20	5260	5259.996	17.563	Pass
NVNT	ac40	5230	5229.998	36.11	Pass
NVNT	ac40	5550	5550.024	36.129	Pass
NVNT	ac80	5290	5289.972	75.67	Pass
NVNT	ac80	5530	5530.103	75.601	Pass
NVNT	ax40	5230	5230	37.685	Pass
NVNT	ax40	5550	5550.028	37.71	Pass
NVNT	ax80	5290	5289.972	**76.833**	Pass
NVNT	ax80	5530	5530.122	76.786	Pass

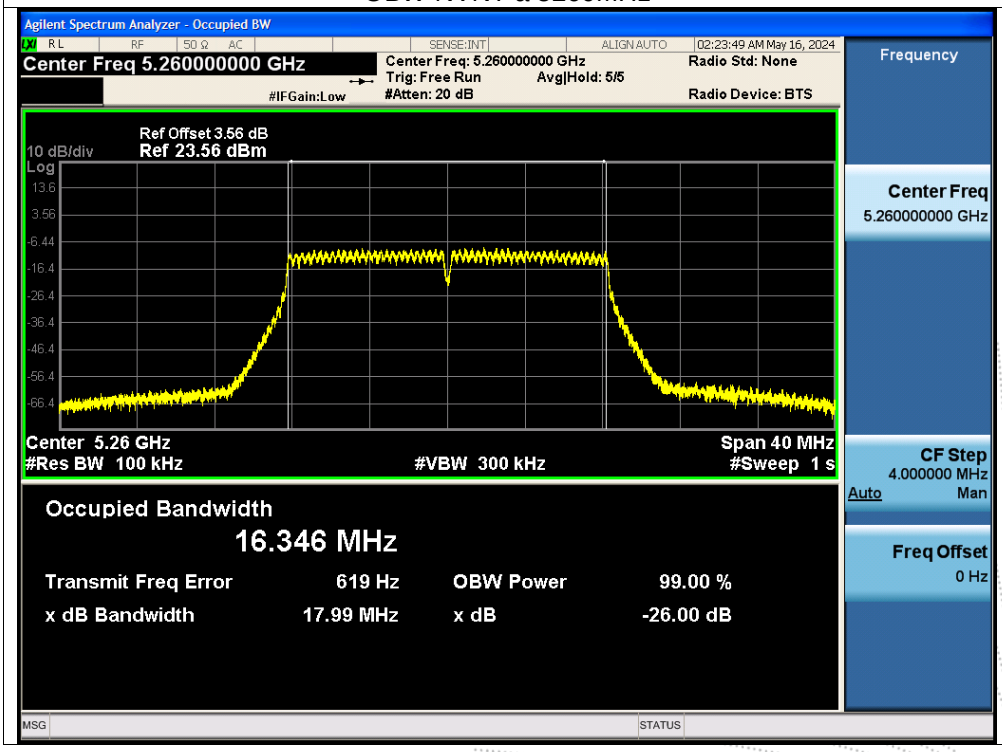
Note: A(B) Represent the value of antenna A and B, The worst data is Antenna B, only shown Antenna B Plot.

Test Graphs

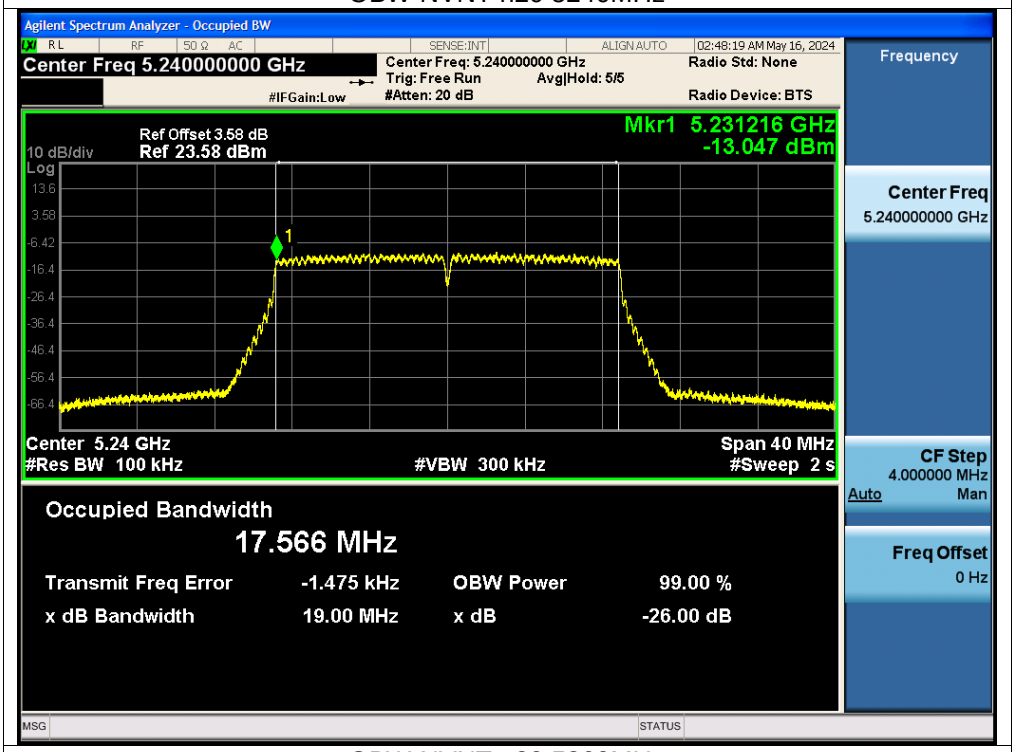
OBW NVNT a 5240MHz



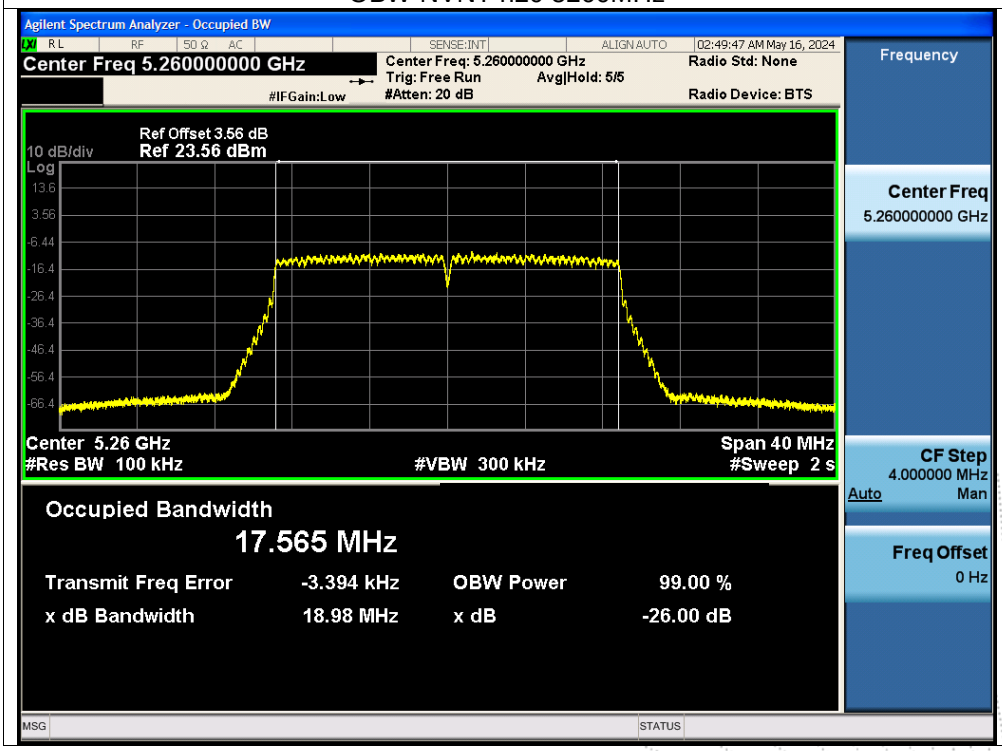
OBW NVNT a 5260MHz



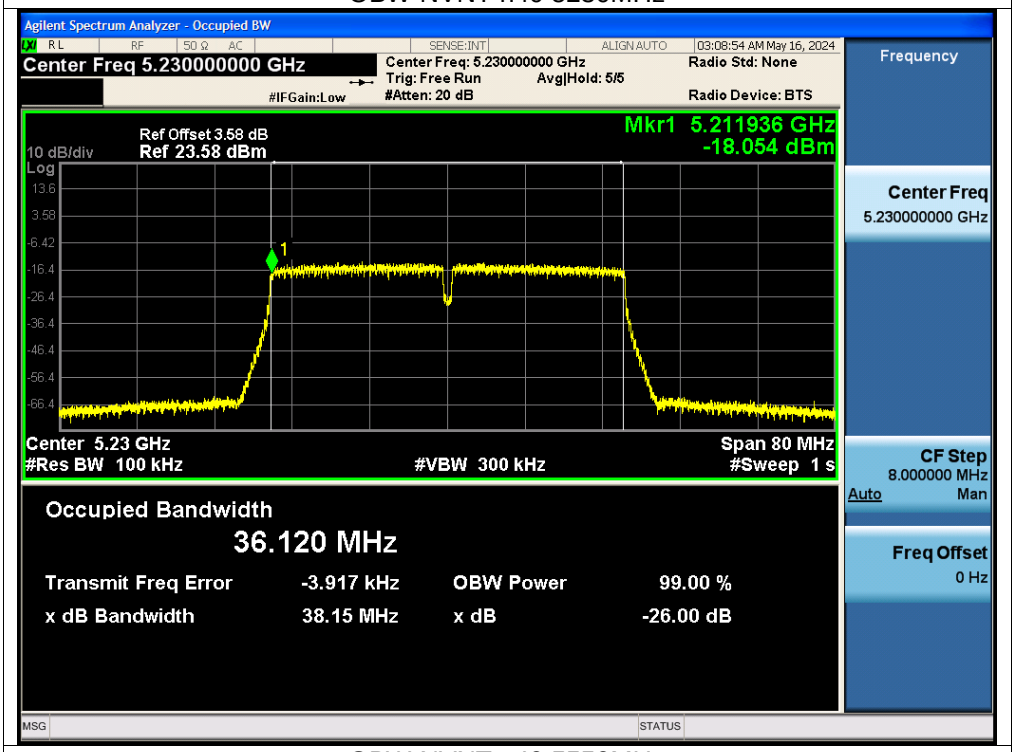
OBW NVNT n20 5240MHz



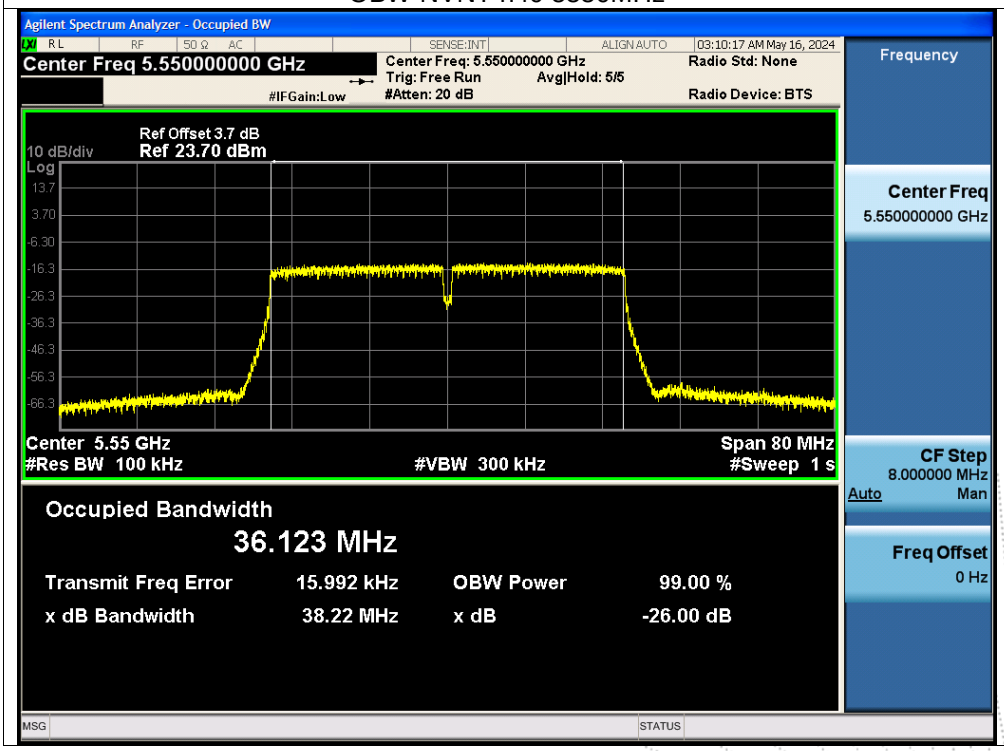
OBW NVNT n20 5260MHz



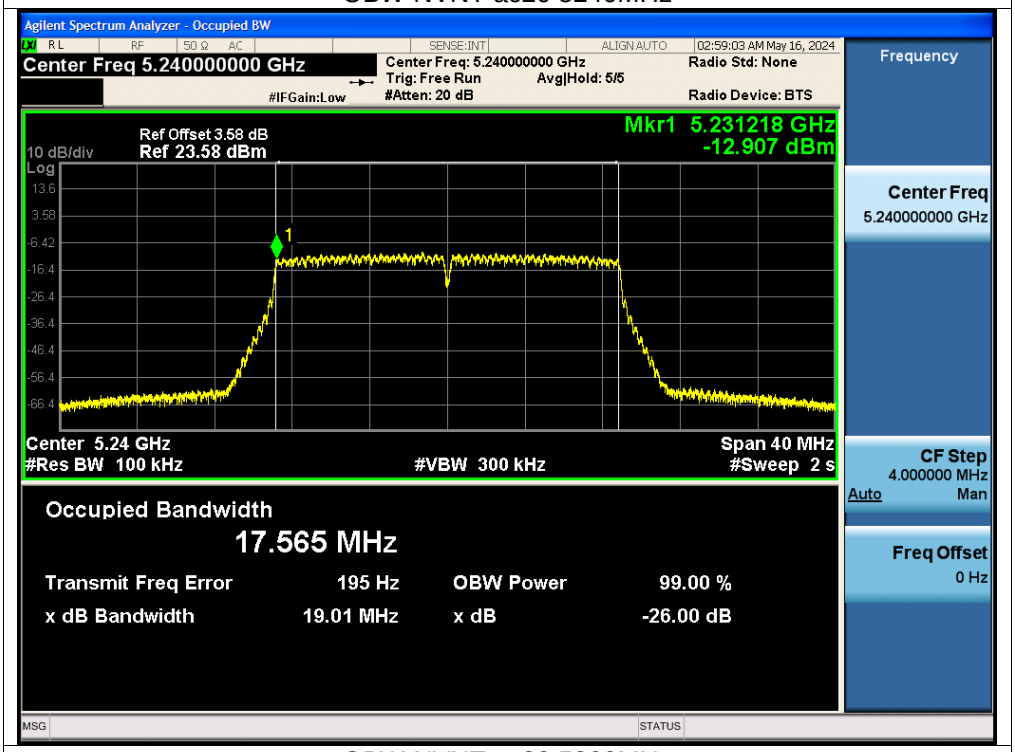
OBW NVNT n40 5230MHz



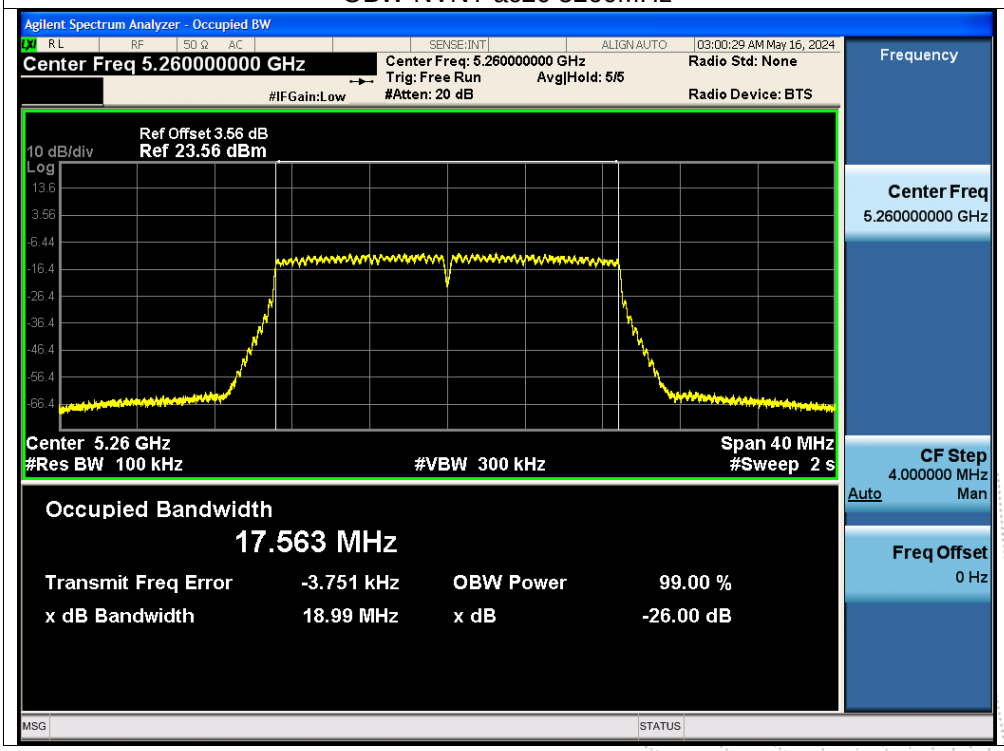
OBW NVNT n40 5550MHz



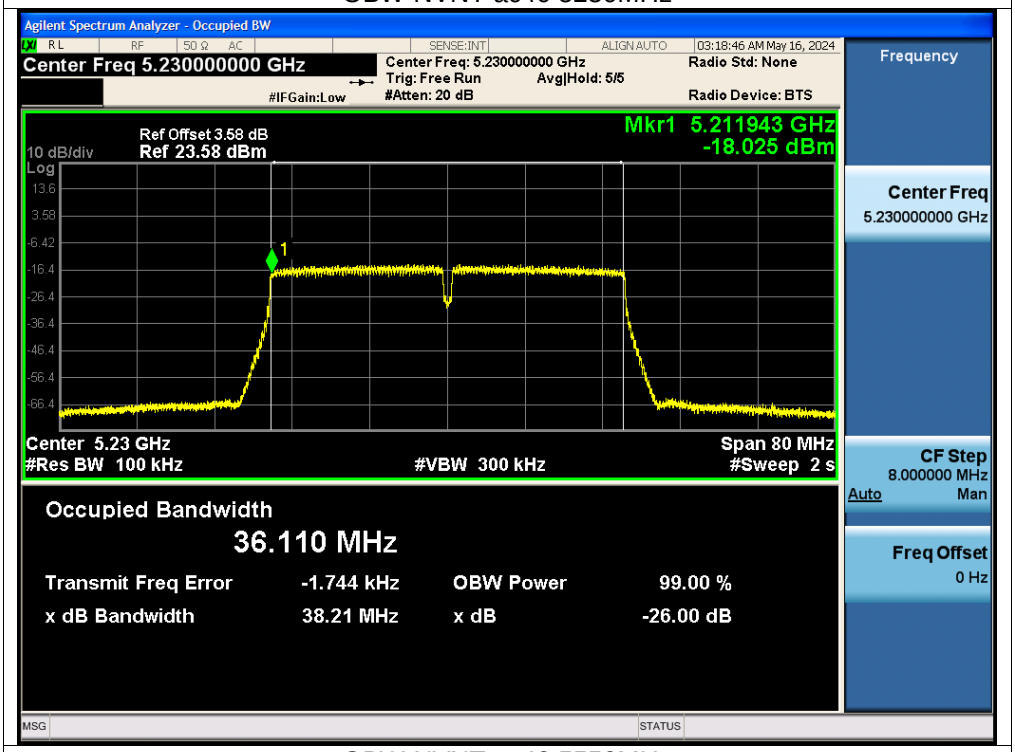
OBW NVNT ac20 5240MHz



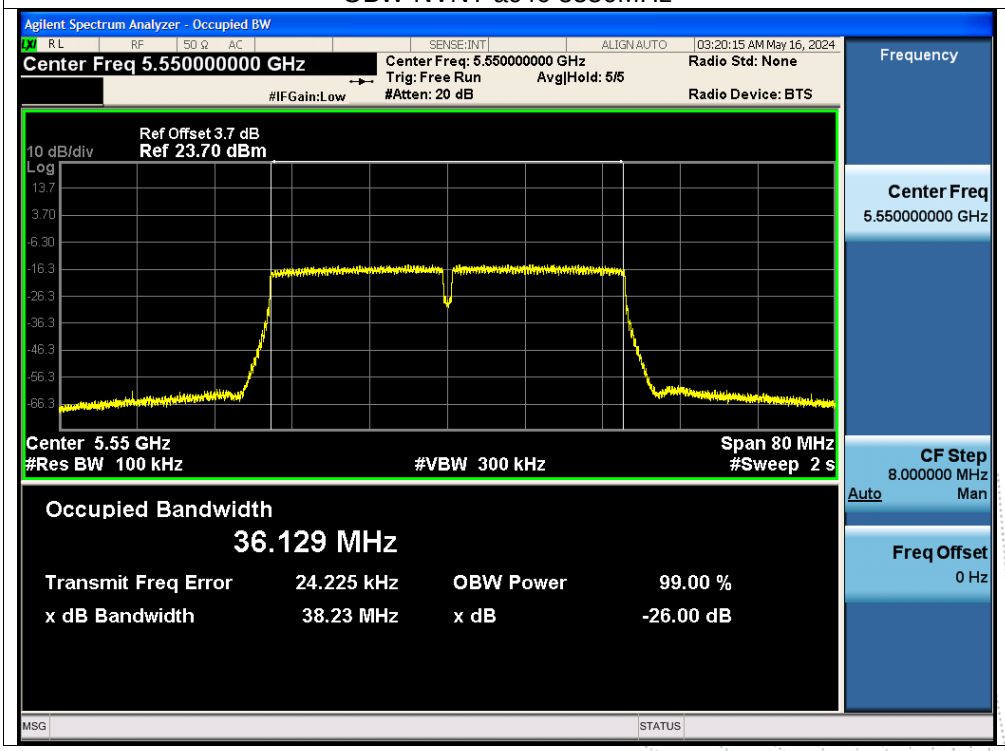
OBW NVNT ac20 5260MHz



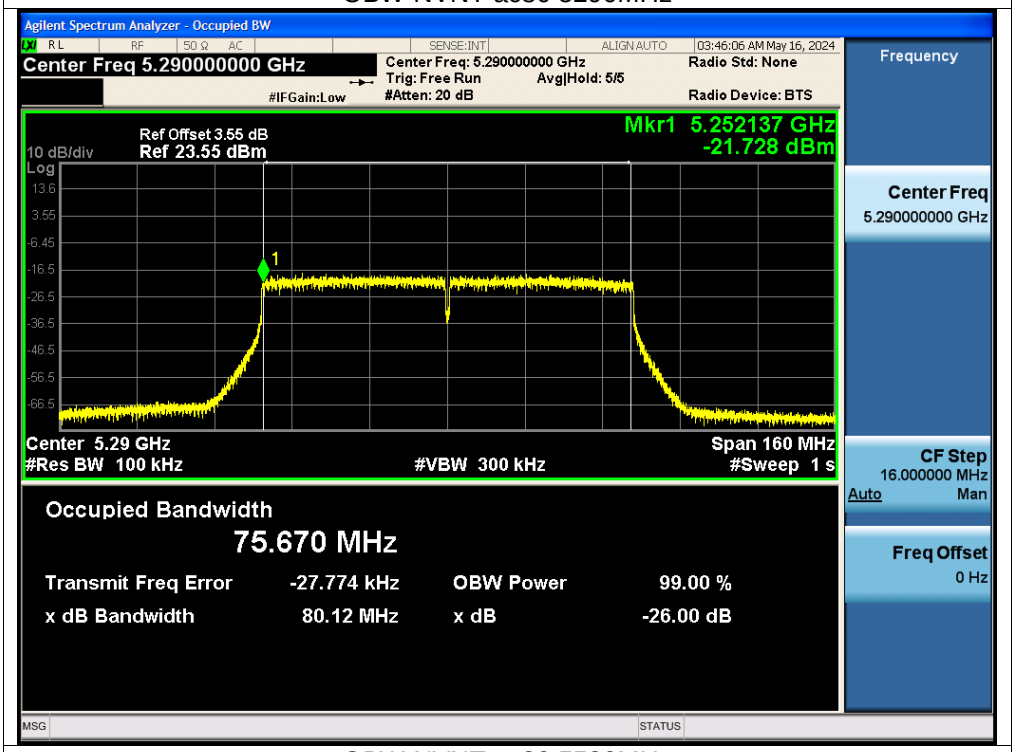
OBW NVNT ac40 5230MHz



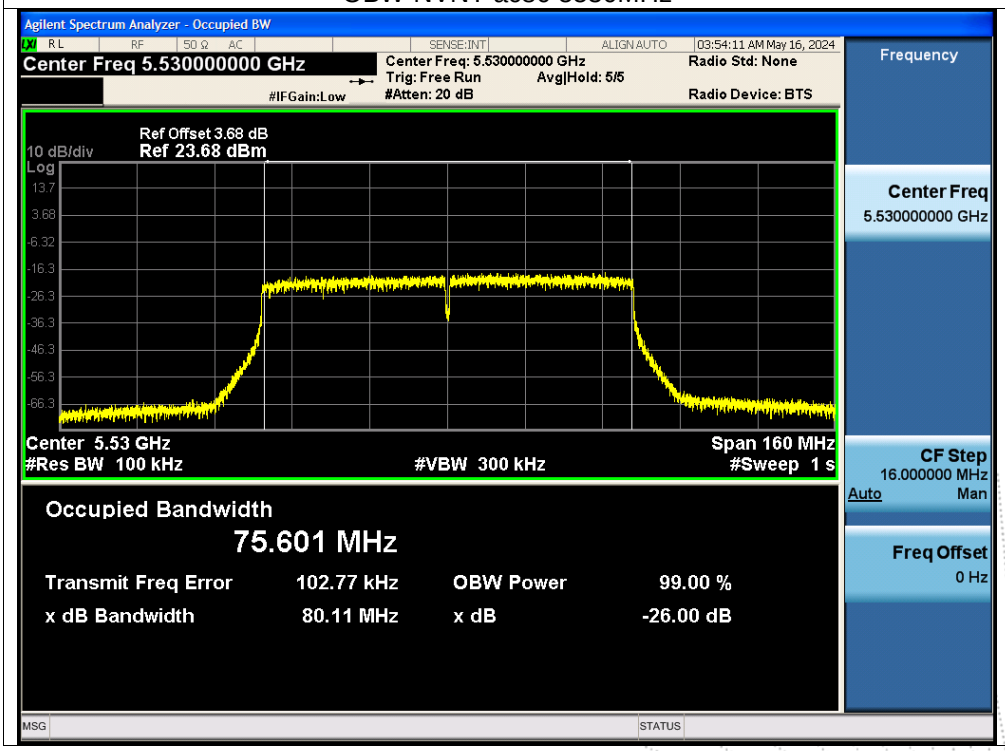
OBW NVNT ac40 5550MHz



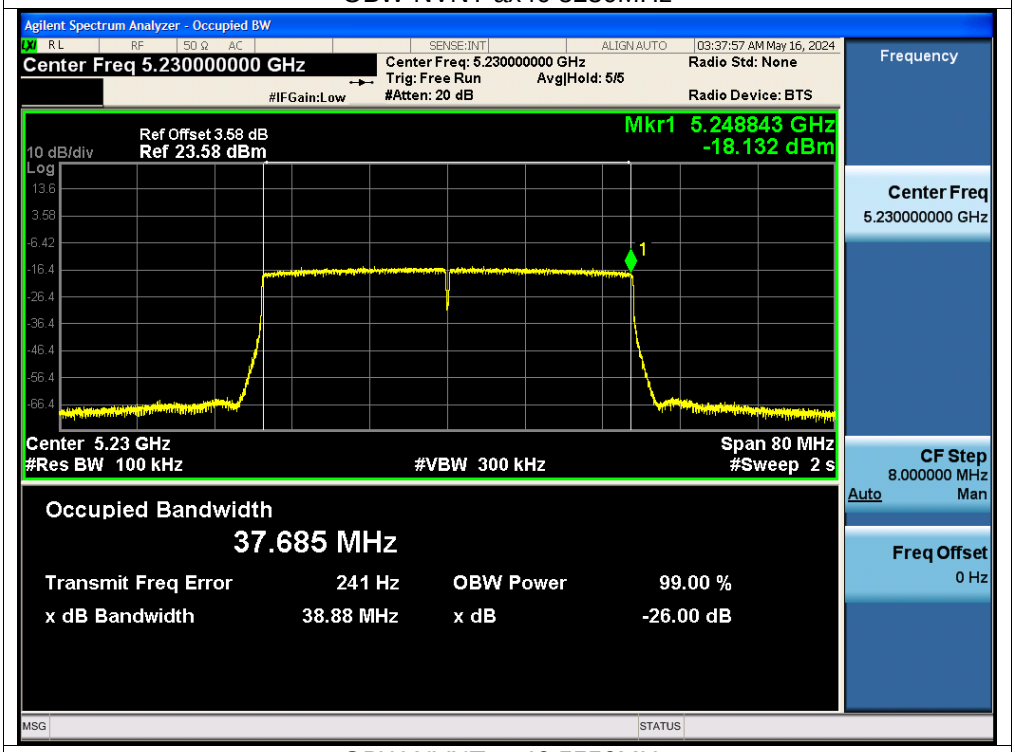
OBW NVNT ac80 5290MHz



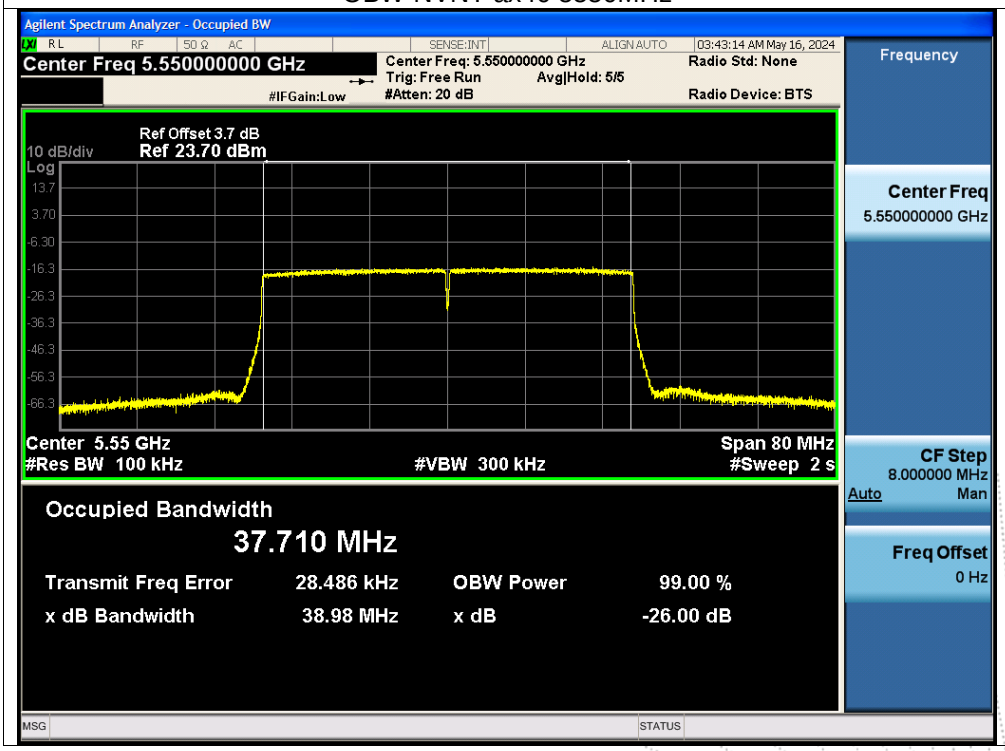
OBW NVNT ac80 5530MHz



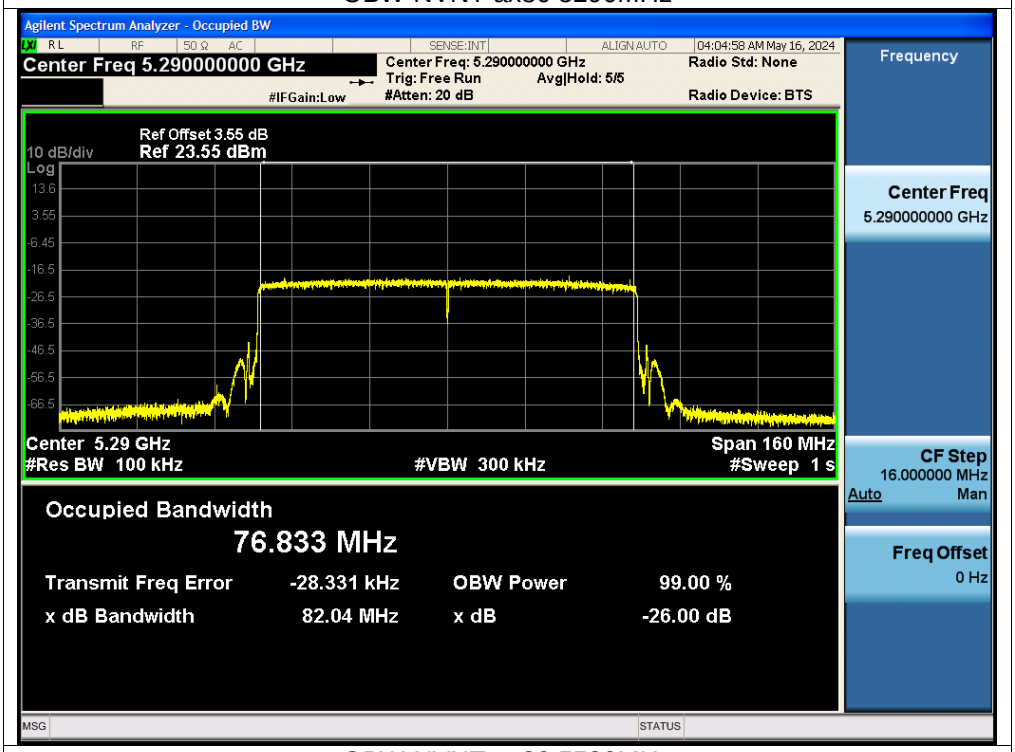
OBW NVNT ax40 5230MHz



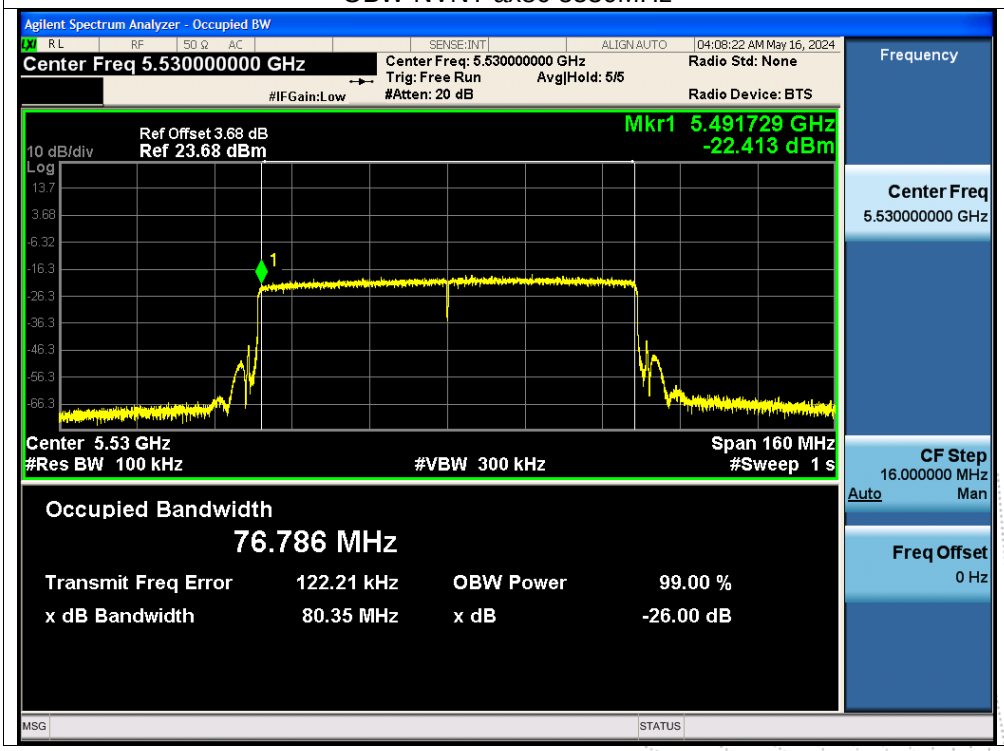
OBW NVNT ax40 5550MHz



OBW NVNT ax80 5290MHz

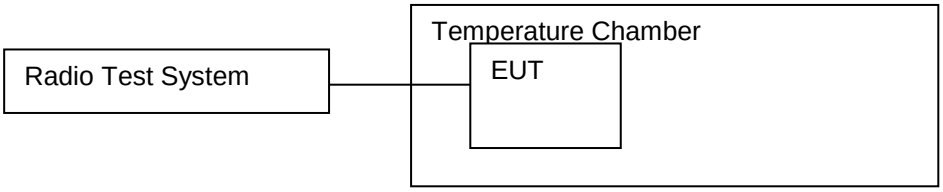


OBW NVNT ax80 5530MHz



9. RF Output Power, Transmit Power Control (TPC)

9.1 Block Diagram Of Test Setup



9.2 Limit

Frequency range (MHz)	Mean e.i.r.p. limit for P_H (dBm)		Mean e.i.r.p. density limit (dBm/MHz)	
	with TPC	without TPC	with TPC	without TPC
5 150 to 5 350	23	20/23 (see note 1)	10	7/10 (see note 2)
5 470 to 5 725	30 (see note 3)	27 (see note 3)	17 (see note 3)	14 (see note 3)

NOTE 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 23 dBm.
NOTE 2: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 10 dBm/MHz.
NOTE 3: Slave devices without a *Radar Interference Detection* function shall comply with the limits for the frequency range 5 250 MHz to 5 350 MHz.

9.3 Test Procedure

This option is for equipment that operates only in one sub-band or that is capable for operation in two sub-bands simultaneously but, for the purpose of the testing, the equipment can be configured to:
• operate in a continuous transmit mode or with a constant duty cycle (x), and
• operate only in one sub-band.

Step 1:
For equipment configured into a continuous transmit mode (x = 1), proceed immediately with step 2.
• The output power of the transmitter shall be coupled to a matched diode detector or equivalent thereof. The output of the diode detector shall be connected to the vertical channel of an oscilloscope.
• The combination of the diode detector and the oscilloscope shall be capable of faithfully reproducing the duty cycle of the transmitter output signal.
• The observed duty cycle of the transmitter (Tx on / (Tx on + Tx off)) shall be noted as x ($0 < x \leq 1$), and recorded in the test report.

Step 2:
• The RF output power shall be determined using a wideband RF power meter with a thermocouple detector or an equivalent thereof and with an integration period that exceeds the repetition period of the transmitter by a factor 5 or more. The observed value shall be noted as A (in dBm).
• In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, the output power of each transmit chain shall be measured separately to calculate the total power (value A in dBm) for the UUT.

Step 3:
• The RF output power at the highest power level PH (e.i.r.p.) shall be calculated from the above measured power output A (in dBm), the observed duty cycle x, the stated antenna gain G in dBi and if applicable the beamforming gain Y in dB, according to the formula below. This value shall be recorded in the test report. If more than one antenna assembly is intended for this power setting or TPC range, the gain of the antenna assembly with the highest gain shall be used.
PH = A + G + Y + 10 × log (1 / x) (dBm). (5)
• This value PH shall be compared to the applicable limit contained in table 2 of clause 4.2.3.2.2.

9.4 Test Result

Remark: PH = A + G + Y + 10 × log (1 / x) (dBm)
Antenna A Gain G=6.98 dBi, Antenna B Gain G=6.98 dBi, beamforming gain Y= 0 dB, duty cycle X=100%

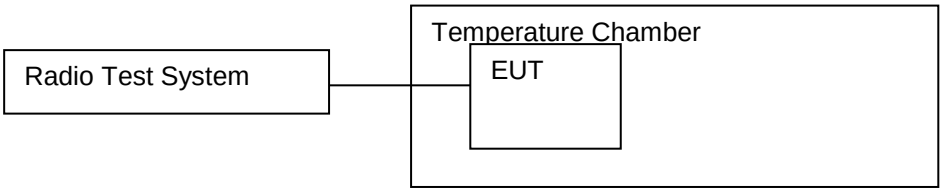
Condition	Mode	Frequency (MHz)	Max EIRP (dBm) ANT A	Max EIRP (dBm) ANT B	Total EIRP (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	**12.62**	**11.21**	/	23	Pass
NVNT	a	5320	12.59	10.97	/	23	Pass
NVNT	a	5500	10.74	7.4	/	23	Pass
NVNT	a	5700	11.95	9.52	/	23	Pass
NVNT	n20	5180	11.28	10.23	13.80	23	Pass
NVNT	n20	5320	12.51	10.07	14.47	23	Pass
NVNT	n20	5500	8.61	6.3	10.62	23	Pass
NVNT	n20	5700	10.12	8.4	12.35	23	Pass
NVNT	n40	5190	10.08	9.25	12.70	23	Pass
NVNT	n40	5310	11.13	9.16	13.27	23	Pass
NVNT	n40	5510	7.5	5.47	9.61	23	Pass
NVNT	n40	5670	8.59	6.88	10.83	23	Pass
NVNT	ac20	5180	11.38	10.24	13.86	23	Pass
NVNT	ac20	5320	12.54	10.04	14.48	23	Pass
NVNT	ac20	5500	8.65	6.24	10.62	23	Pass
NVNT	ac20	5700	10.22	8.36	12.40	23	Pass
NVNT	ac40	5190	10.12	9.22	12.70	23	Pass
NVNT	ac40	5310	11.04	9.13	13.20	23	Pass
NVNT	ac40	5510	7.54	6.05	9.87	23	Pass
NVNT	ac40	5670	8.57	6.81	10.79	23	Pass
NVNT	ac80	5210	7.69	8.41	11.08	23	Pass
NVNT	ac80	5290	8.65	8.39	11.53	23	Pass
NVNT	ac80	5530	5.62	5.46	8.55	23	Pass
NVNT	ac80	5610	6.04	6.13	9.10	23	Pass
NVNT	ax20	5180	10.95	11.1	14.04	23	Pass
NVNT	ax20	5240	10.64	10.92	13.79	23	Pass
NVNT	ax20	5260	11.17	10.96	14.08	23	Pass
NVNT	ax20	5320	12.26	10.81	**14.61**	23	Pass
NVNT	ax20	5500	8.36	7.13	10.80	23	Pass

NVNT	ax20	5700	9.93	9.29	12.63	23	Pass
NVNT	ax40	5190	10.08	9.97	13.04	23	Pass
NVNT	ax40	5310	11.15	10.01	13.63	23	Pass
NVNT	ax40	5510	7.51	6.42	10.01	23	Pass
NVNT	ax40	5670	8.61	7.87	11.27	23	Pass
NVNT	ax80	5210	7.8	8.57	11.21	23	Pass
NVNT	ax80	5290	8.74	8.52	11.64	23	Pass
NVNT	ax80	5530	5.67	5.53	8.61	23	Pass
NVNT	ax80	5610	6.13	6.31	9.23	23	Pass
NVLT	a	5180	12.48	11.07	/	23	Pass
NVLT	a	5320	12.49	10.94	/	23	Pass
NVLT	a	5500	10.64	7.30	/	23	Pass
NVLT	a	5700	11.89	9.45	/	23	Pass
NVLT	n20	5180	11.26	10.23	13.79	23	Pass
NVLT	n20	5320	12.46	9.97	14.40	23	Pass
NVLT	n20	5500	8.47	6.15	10.47	23	Pass
NVLT	n20	5700	10.10	8.26	12.29	23	Pass
NVLT	n40	5190	9.98	9.19	12.62	23	Pass
NVLT	n40	5310	11.06	9.13	13.21	23	Pass
NVLT	n40	5510	7.43	5.36	9.53	23	Pass
NVLT	n40	5670	8.47	6.78	10.71	23	Pass
NVLT	ac20	5180	11.36	10.24	13.85	23	Pass
NVLT	ac20	5320	12.44	10.01	14.40	23	Pass
NVLT	ac20	5500	8.56	6.16	10.53	23	Pass
NVLT	ac20	5700	10.14	8.26	12.31	23	Pass
NVLT	ac40	5190	10.05	9.18	12.65	23	Pass
NVLT	ac40	5310	11.03	9.06	13.16	23	Pass
NVLT	ac40	5510	7.48	5.95	9.79	23	Pass
NVLT	ac40	5670	8.57	6.72	10.75	23	Pass
NVLT	ac80	5210	7.63	8.27	10.97	23	Pass
NVLT	ac80	5290	8.56	8.32	11.45	23	Pass
NVLT	ac80	5530	5.58	5.42	8.51	23	Pass
NVLT	ac80	5610	6.03	6.03	9.04	23	Pass
NVLT	ax20	5180	10.82	11.05	13.95	23	Pass
NVLT	ax20	5240	10.51	10.88	13.71	23	Pass
NVLT	ax20	5260	11.14	10.87	14.02	23	Pass
NVLT	ax20	5320	12.20	10.78	14.56	23	Pass
NVLT	ax20	5500	8.31	7.11	10.76	23	Pass
NVLT	ax20	5700	9.85	9.18	12.54	23	Pass
NVLT	ax40	5190	9.97	9.84	12.92	23	Pass
NVLT	ax40	5310	11.02	9.93	13.52	23	Pass
NVLT	ax40	5510	7.45	6.40	9.96	23	Pass
NVLT	ax40	5670	8.47	7.80	11.16	23	Pass
NVLT	ax80	5210	7.66	8.44	11.08	23	Pass

NVLT	ax80	5290	8.63	8.48	11.57	23	Pass
NVLT	ax80	5530	5.62	5.38	8.51	23	Pass
NVLT	ax80	5610	6.07	6.26	9.18	23	Pass
NVHT	a	5180	12.45	10.93	/	23	Pass
NVHT	a	5320	12.37	10.91	/	23	Pass
NVHT	a	5500	10.58	7.22	/	23	Pass
NVHT	a	5700	11.79	9.42	/	23	Pass
NVHT	n20	5180	11.23	10.11	13.72	23	Pass
NVHT	n20	5320	12.41	9.94	14.36	23	Pass
NVHT	n20	5500	8.43	6.13	10.44	23	Pass
NVHT	n20	5700	10.10	8.21	12.26	23	Pass
NVHT	n40	5190	9.96	9.10	12.56	23	Pass
NVHT	n40	5310	10.92	9.03	13.09	23	Pass
NVHT	n40	5510	7.31	5.31	9.43	23	Pass
NVHT	n40	5670	8.42	6.67	10.64	23	Pass
NVHT	ac20	5180	11.24	10.09	13.71	23	Pass
NVHT	ac20	5320	12.44	10.00	14.40	23	Pass
NVHT	ac20	5500	8.44	6.05	10.42	23	Pass
NVHT	ac20	5700	10.00	8.15	12.19	23	Pass
NVHT	ac40	5190	10.03	9.04	12.57	23	Pass
NVHT	ac40	5310	10.91	9.02	13.08	23	Pass
NVHT	ac40	5510	7.40	5.94	9.74	23	Pass
NVHT	ac40	5670	8.43	6.70	10.66	23	Pass
NVHT	ac80	5210	7.61	8.13	10.89	23	Pass
NVHT	ac80	5290	8.45	8.22	11.35	23	Pass
NVHT	ac80	5530	5.52	5.38	8.46	23	Pass
NVHT	ac80	5610	6.00	5.98	9.00	23	Pass
NVHT	ax20	5180	10.82	10.91	13.88	23	Pass
NVHT	ax20	5240	10.41	10.88	13.66	23	Pass
NVHT	ax20	5260	11.14	10.77	13.97	23	Pass
NVHT	ax20	5320	12.07	10.73	14.46	23	Pass
NVHT	ax20	5500	8.19	7.04	10.67	23	Pass
NVHT	ax20	5700	9.82	9.07	12.47	23	Pass
NVHT	ax40	5190	9.92	9.74	12.84	23	Pass
NVHT	ax40	5310	10.94	9.89	13.45	23	Pass
NVHT	ax40	5510	7.40	6.29	9.89	23	Pass
NVHT	ax40	5670	8.43	7.77	11.12	23	Pass
NVHT	ax80	5210	7.60	8.39	11.03	23	Pass
NVHT	ax80	5290	8.48	8.45	11.47	23	Pass
NVHT	ax80	5530	5.58	5.25	8.43	23	Pass
NVHT	ax80	5610	5.93	6.18	9.07	23	Pass

10. Power Density

10.1 Block Diagram Of Test Setup



10.2 Limit

Frequency range (MHz)	Mean e.i.r.p. limit for P_H (dBm)		Mean e.i.r.p. density limit (dBm/MHz)	
	with TPC	without TPC	with TPC	without TPC
5 150 to 5 350	23	20/23 (see note 1)	10	7/10 (see note 2)
5 470 to 5 725	30 (see note 3)	27 (see note 3)	17 (see note 3)	14 (see note 3)

NOTE 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 23 dBm.
NOTE 2: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 10 dBm/MHz.
NOTE 3: Slave devices without a *Radar Interference Detection* function shall comply with the limits for the frequency range 5 250 MHz to 5 350 MHz.

10.3 Test Procedure

This option is for equipment that can be configured to operate in a continuous transmit mode or with a constant duty cycle (x).

Step 1:

• Connect the UUT to the spectrum analyser and use the following settings:
- Centre Frequency: The centre frequency of the channel under test
- RBW: 1 MHz
- VBW: 3 MHz
- Frequency Span: 2 × Nominal Bandwidth (e.g. 40 MHz for a 20 MHz channel)
- Detector Mode: Peak
- Trace Mode: Max Hold

Step 2:

• When the trace is complete, find the peak value of the power envelope and record the frequency.

Step 3:

• Make the following changes to the settings of the spectrum analyser:
- Centre Frequency: Equal to the frequency recorded in step 2
- Frequency Span: 3 MHz
- RBW: 1 MHz
- VBW: 3 MHz
- Sweep Time: 1 minute
- Detector Mode: RMS
- Trace Mode: Max Hold

Step 4:
• When the trace is complete, the trace shall be captured using the "Hold" or "View" option on the spectrum analyser.
• Find the peak value of the trace and place the analyser marker on this peak. This level is recorded as the highest mean power (Power Density) D in a 1 MHz band.
• Alternatively, where a spectrum analyser is equipped with a function to measure spectral Power Density, this function may be used to display the Power Density D in dBm / MHz.
• In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, the Power Density of each transmit chain shall be measured separately to calculate the total Power Density (value D in dBm / MHz) for the UUT.
Step 5:
• The maximum spectral Power Density e.i.r.p. is calculated from the above measured Power Density D, the observed duty cycle x (see clause 5.4.4.2.1.1.2, step 1), the applicable antenna assembly gain G in dBi and if applicable the beamforming gain Y in dB, according to the formula below. This value shall be recorded in the test report. If more than one antenna assembly is intended for this power setting, the gain of the antenna assembly with the highest gain shall be used:

$$PD = D + G + Y + 10 \times \log (1 / x) \text{ (dBm / MHz)} \quad (14)$$

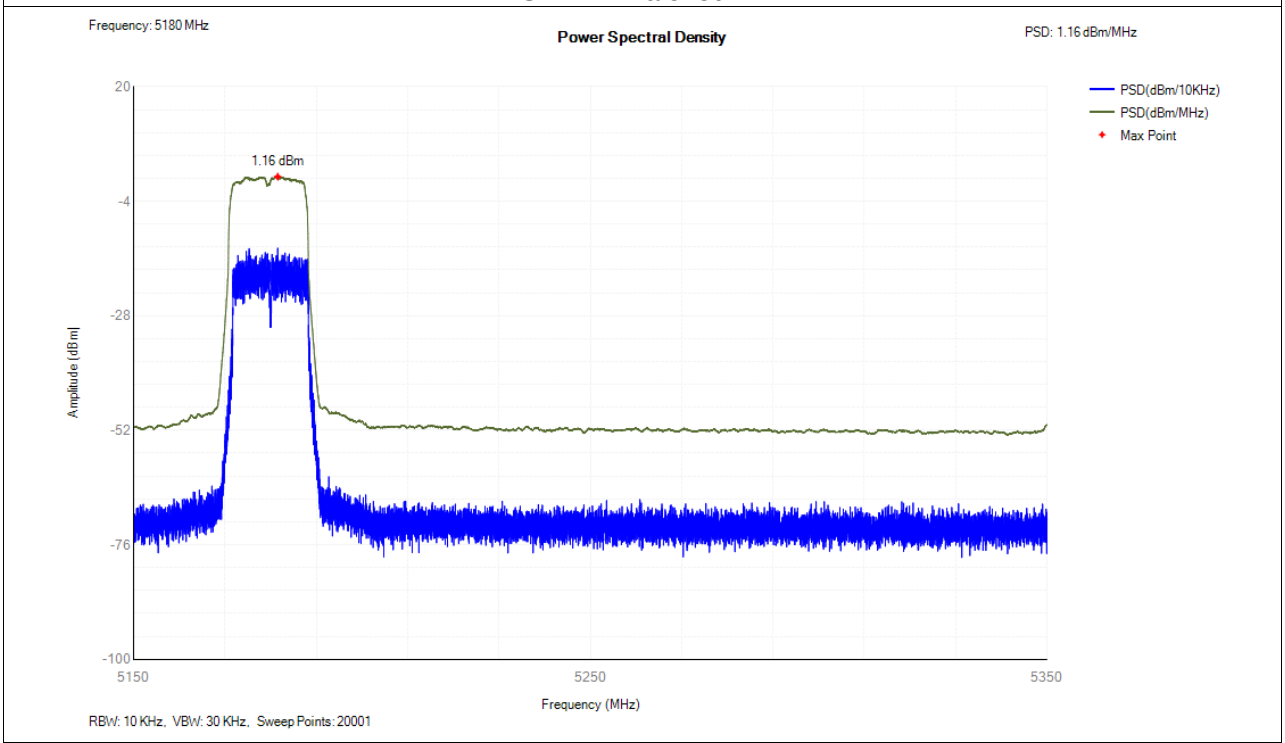
10.4 Test Result

Remark: PH = A + G + Y + 10 × log (1 / x) (dBm)
Antenna A Gain G=6.98 dBi, Antenna B Gain G=6.98 dBi, beamforming gain Y= 0 dB, duty cycle X=100%

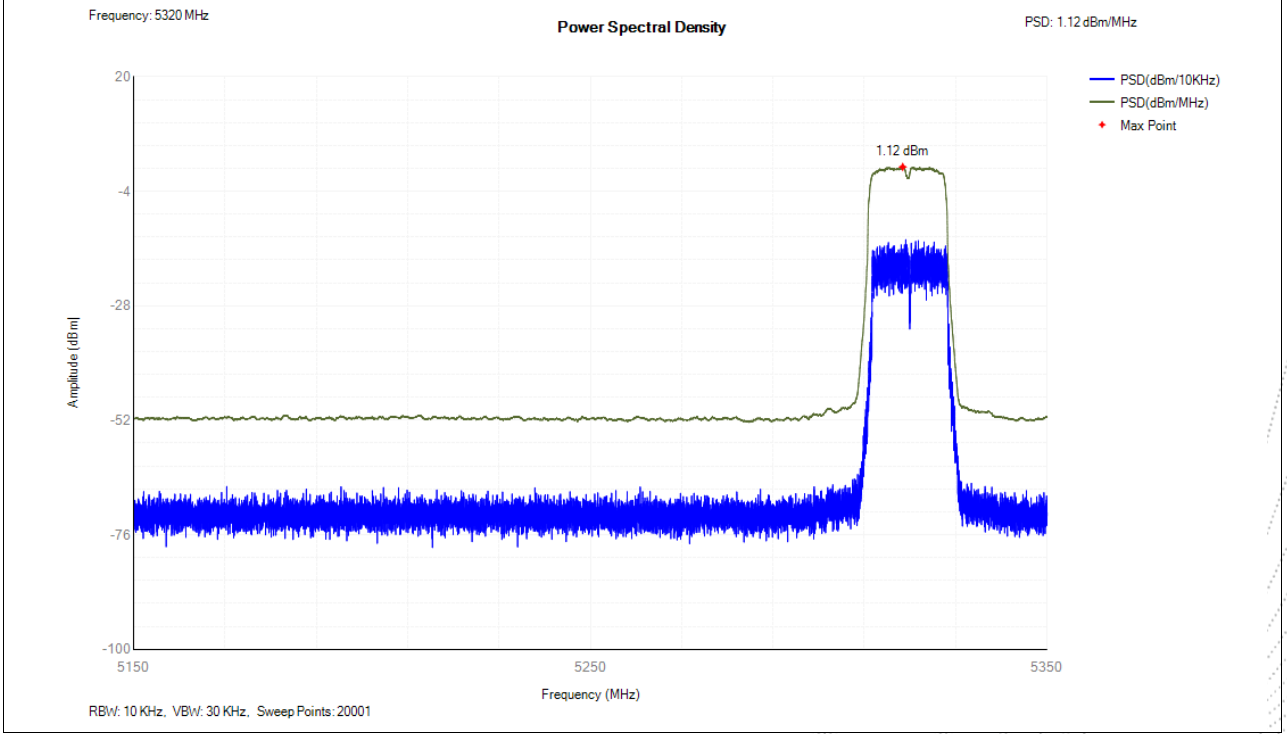
Condition	Mode	Frequency (MHz)	Max PSD (dBm/MHz) ANT A	Max PSD (dBm/MHz) ANT B	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	a	5180	**1.16**	-0.14	/	10	Pass
NVNT	a	5320	1.12	-1.71	/	10	Pass
NVNT	a	5500	-0.54	-2.48	/	10	Pass
NVNT	a	5700	1.03	-1.55	/	10	Pass
NVNT	n20	5180	-0.45	-1.81	1.93	10	Pass
NVNT	n20	5320	1.04	-3	2.48	10	Pass
NVNT	n20	5500	-2.91	-3.3	-0.09	10	Pass
NVNT	n20	5700	-1.35	-3.01	0.91	10	Pass
NVNT	n40	5190	-4.27	-6.19	-2.11	10	Pass
NVNT	n40	5310	-3.52	-7.08	-1.93	10	Pass
NVNT	n40	5510	-6.76	-7.05	-3.89	10	Pass
NVNT	n40	5670	-5.75	-6.79	-3.23	10	Pass
NVNT	ac20	5180	0.12	-2.1	2.16	10	Pass
NVNT	ac20	5320	1.25	-2.92	2.66	10	Pass
NVNT	ac20	5500	-2.76	-3.45	-0.08	10	Pass
NVNT	ac20	5700	-1.36	-2.85	0.97	10	Pass
NVNT	ac40	5190	-4.42	-6.09	-2.16	10	Pass
NVNT	ac40	5310	-3.52	-7.27	-1.99	10	Pass
NVNT	ac40	5510	-6.72	-7.39	-4.03	10	Pass
NVNT	ac40	5670	-5.73	-6.73	-3.19	10	Pass
NVNT	ac80	5210	-9.78	-9.93	-6.84	10	Pass
NVNT	ac80	5290	-8.83	-10.65	-6.64	10	Pass
NVNT	ac80	5530	-11.75	-10.38	-8.00	10	Pass
NVNT	ac80	5610	-11.25	-9.65	-7.37	10	Pass
NVNT	ax20	5180	-0.86	-2.27	1.50	10	Pass
NVNT	ax20	5240	-1.25	-2.52	1.17	10	Pass
NVNT	ax20	5260	-0.62	-2.96	1.38	10	Pass
NVNT	ax20	5320	0.18	-3.53	1.72	10	Pass
NVNT	ax20	5500	-3.54	-3.78	-0.65	10	Pass
NVNT	ax20	5700	-1.72	-3.35	0.55	10	Pass
NVNT	ax40	5190	-4.86	-6.38	-2.54	10	Pass
NVNT	ax40	5310	-3.51	-7.08	-1.93	10	Pass
NVNT	ax40	5510	-6.91	-7.29	-4.09	10	Pass
NVNT	ax40	5670	-6.17	-6.83	-3.48	10	Pass
NVNT	ax80	5210	-9.68	-9.81	-6.73	10	Pass
NVNT	ax80	5290	-8.75	-11	-6.72	10	Pass
NVNT	ax80	5530	-11.55	-10.18	-7.80	10	Pass
NVNT	ax80	5610	-11.38	-10.13	-7.70	10	Pass

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A Plot.

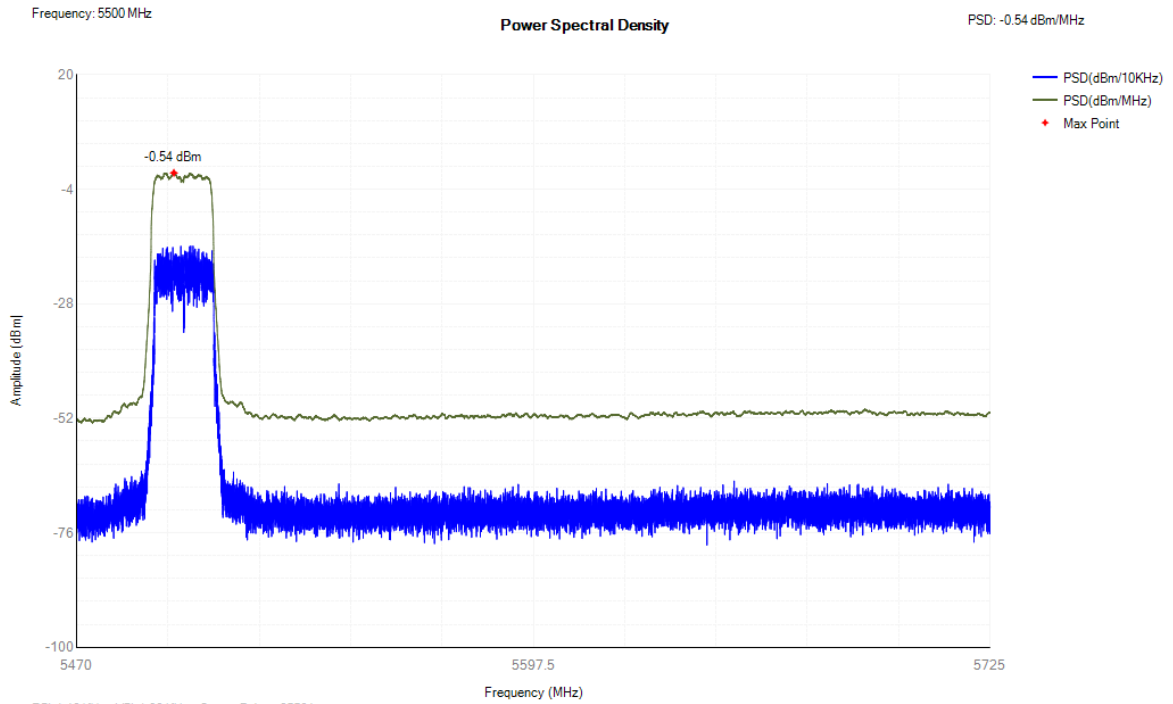
Test Graphs
PSD NVNT a 5180MHz



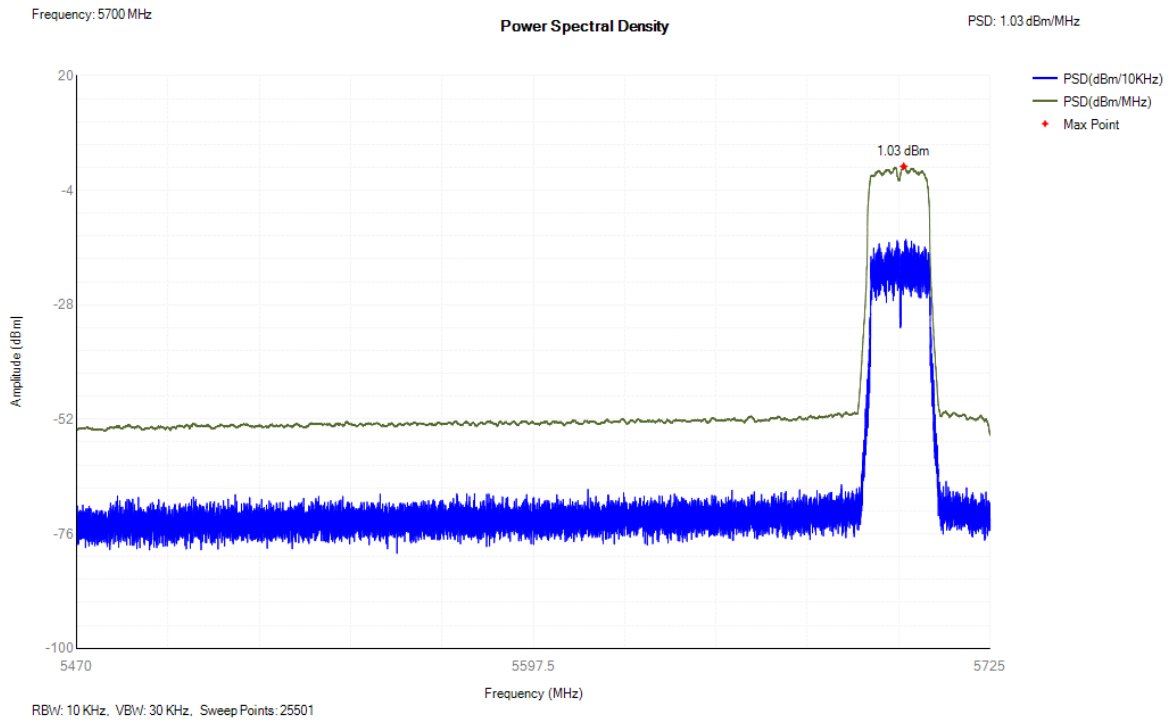
PSD NVNT a 5320MHz



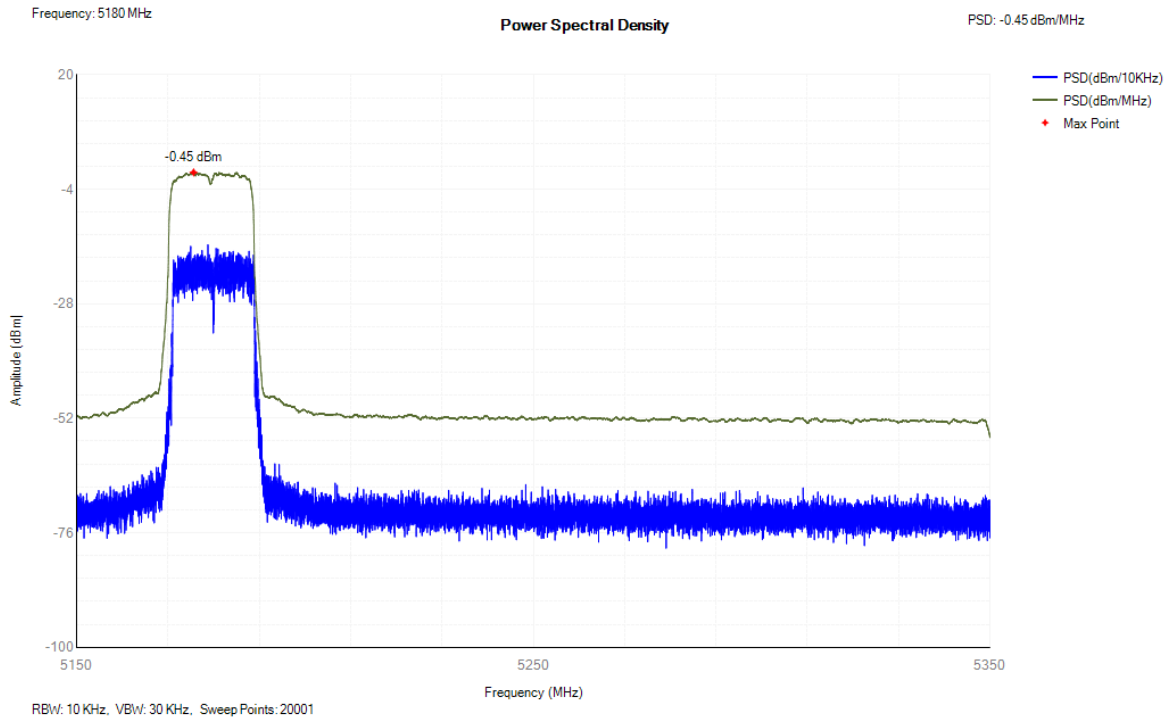
PSD NVNT a 5500MHz



PSD NVNT a 5700MHz



PSD NVNT n20 5180MHz



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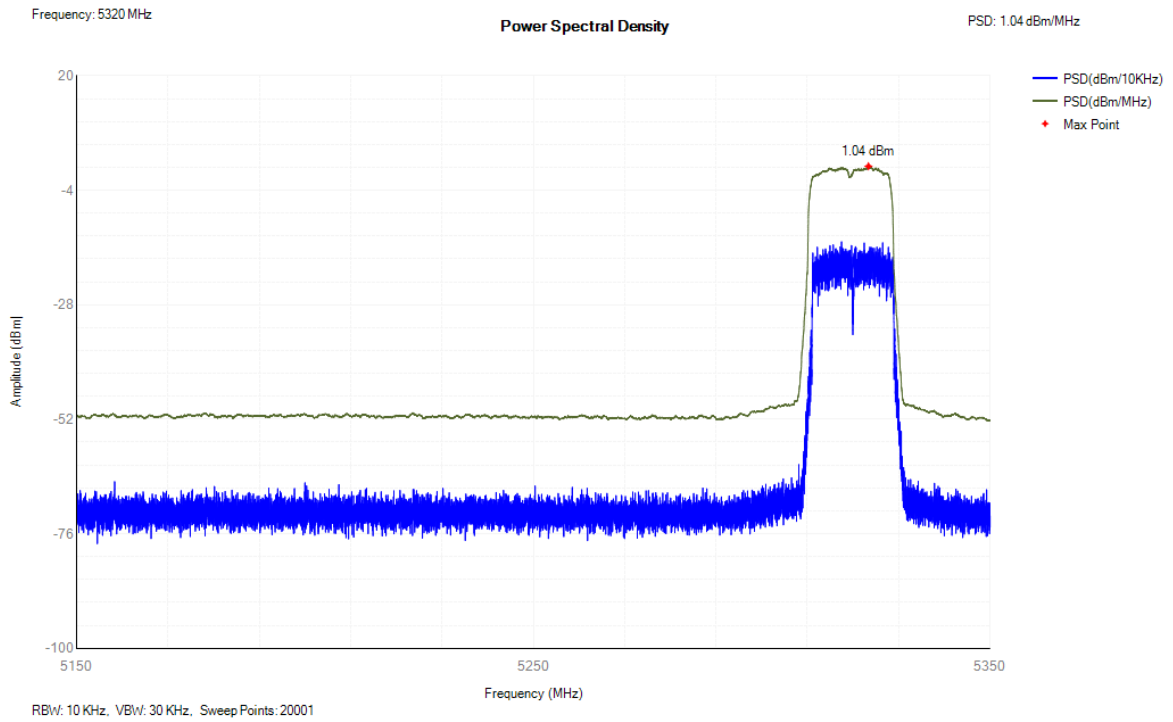
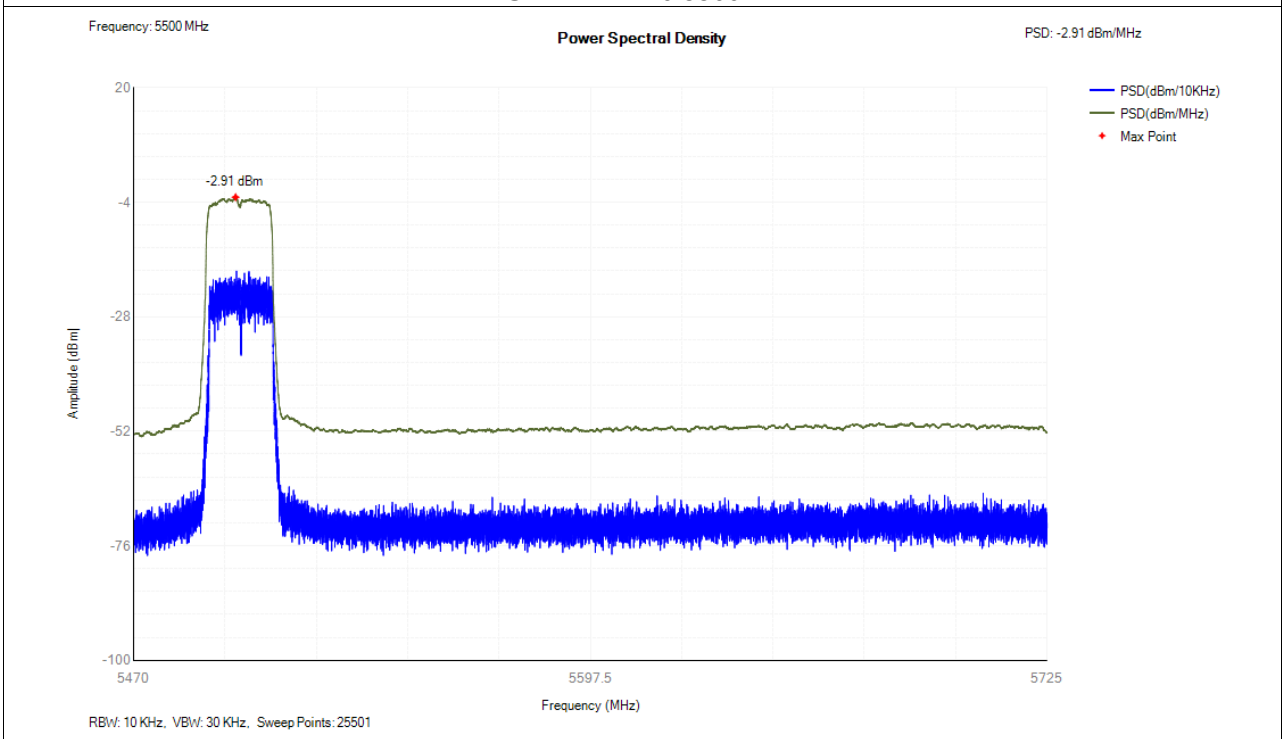


PSD NVNT n20 5500MHz



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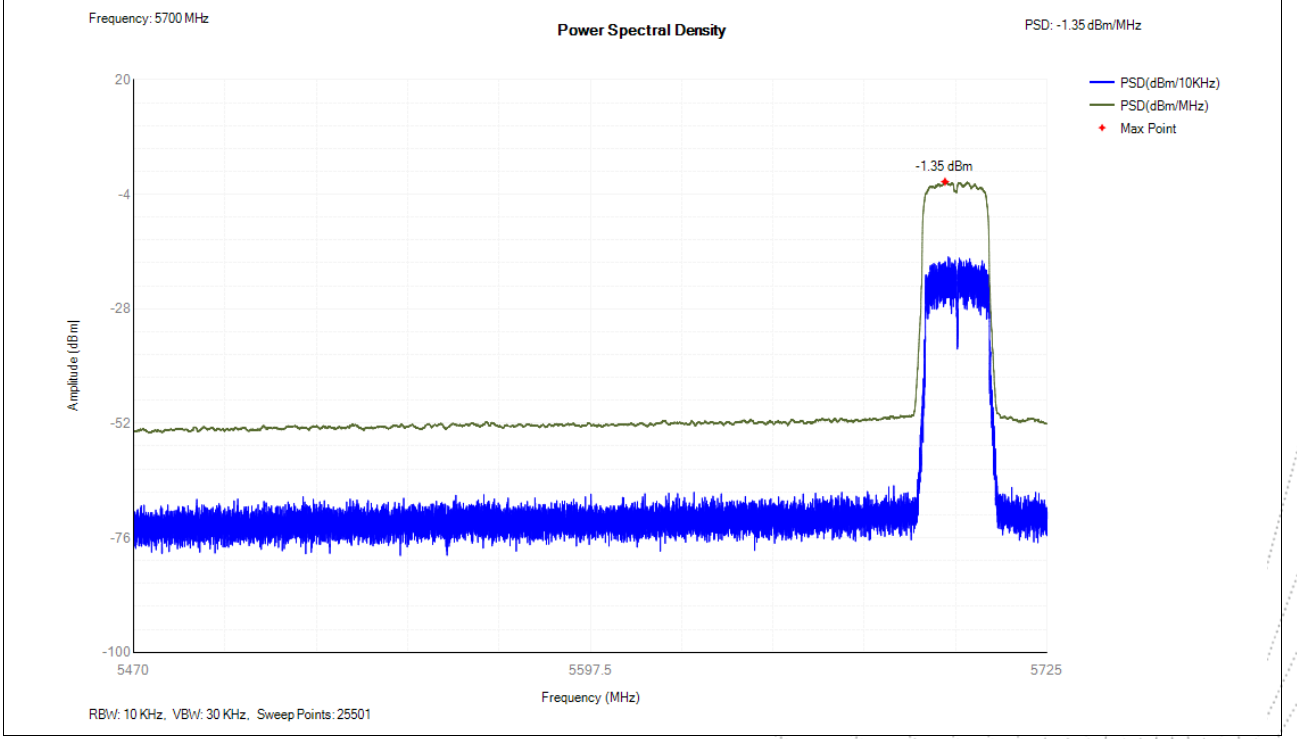
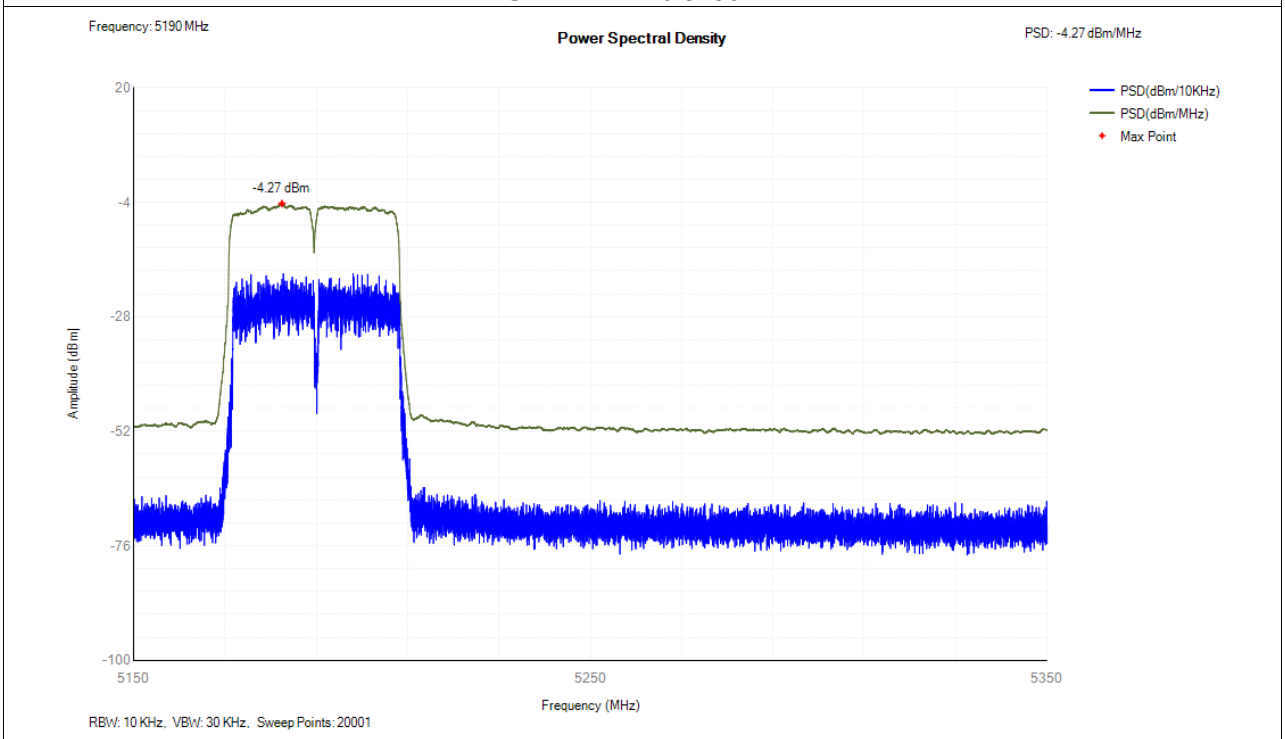
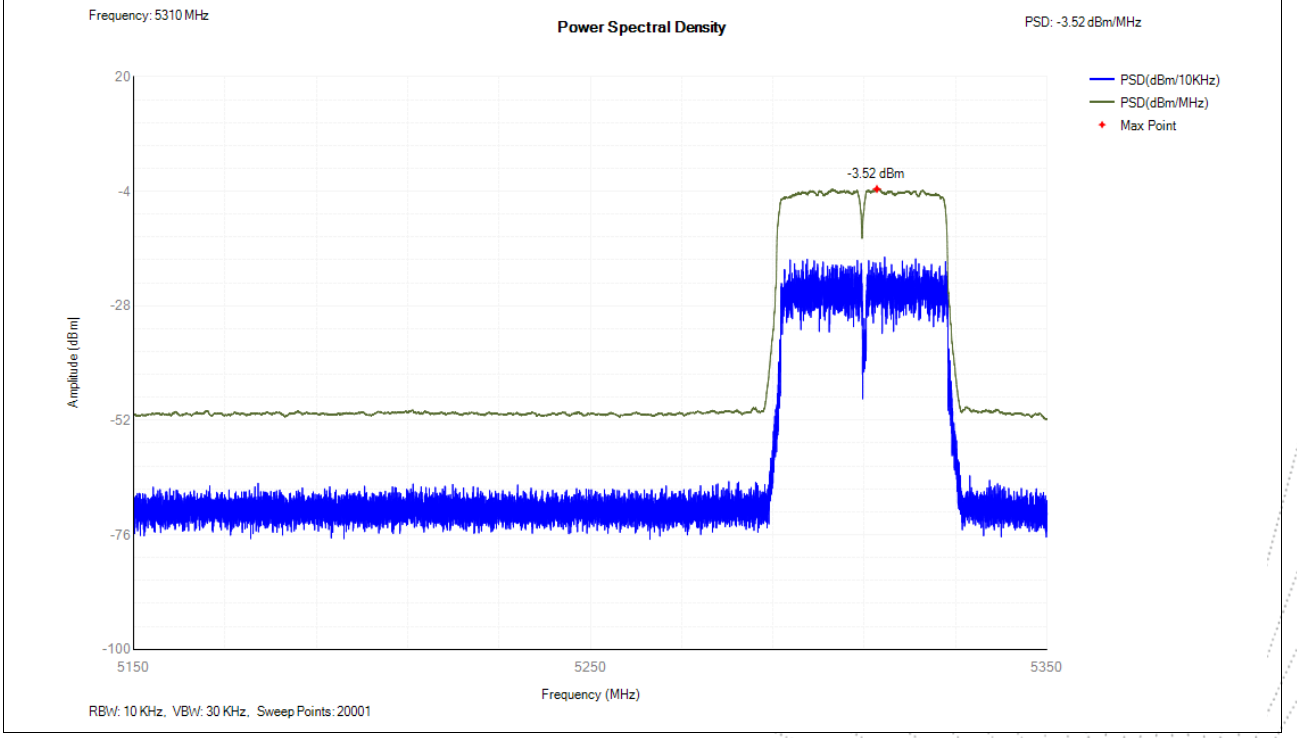


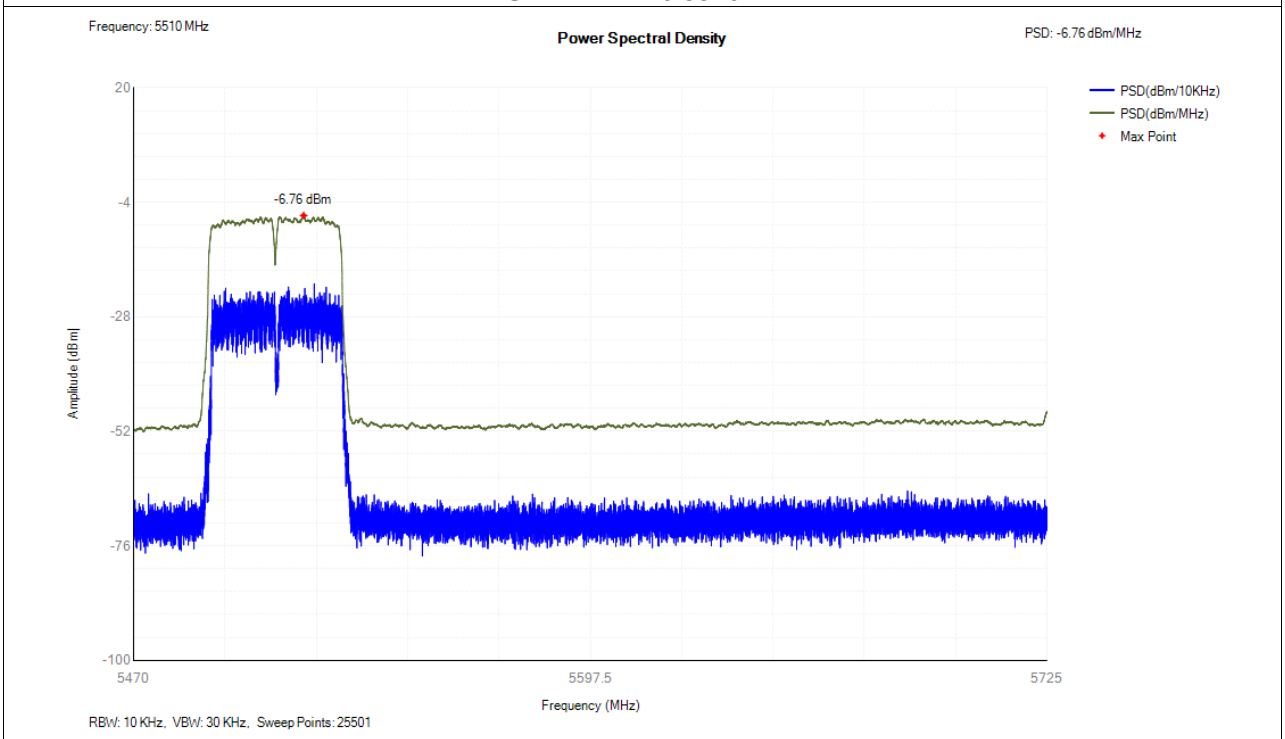
PSD NVNT n40 5190MHz



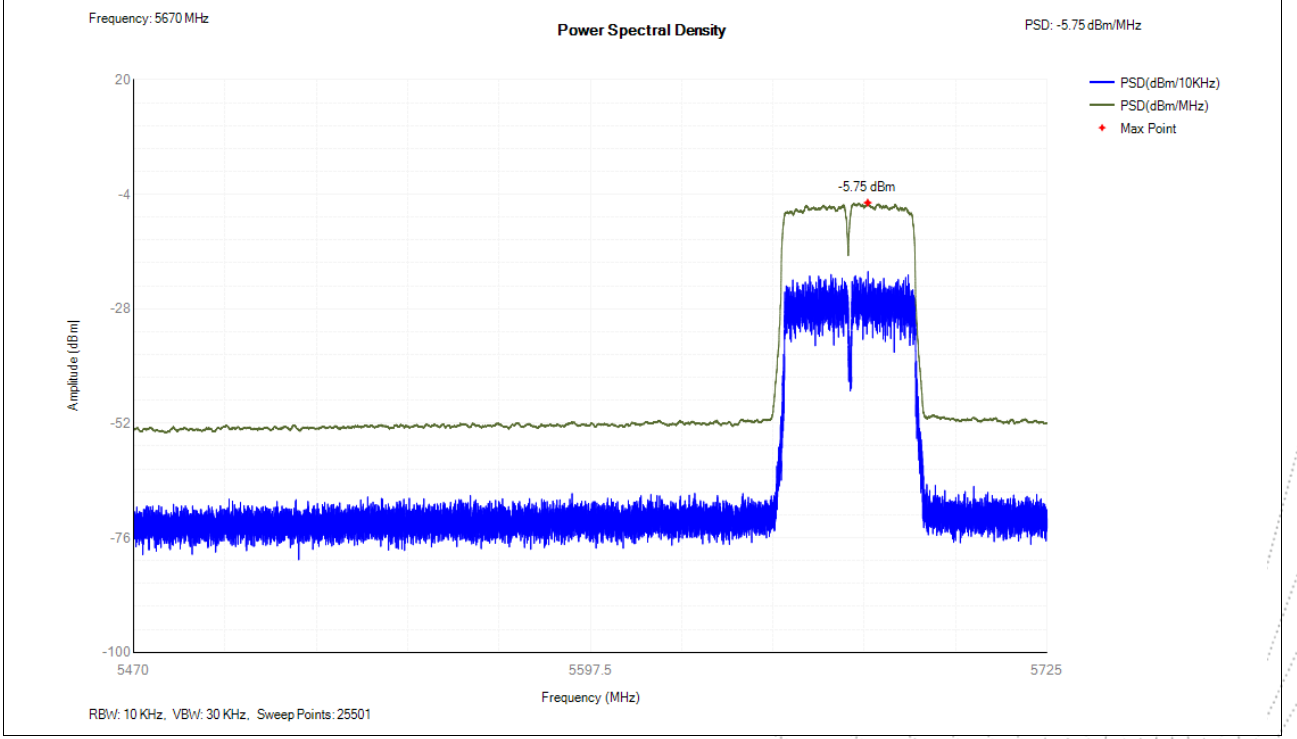
PSD NVNT n40 5310MHz



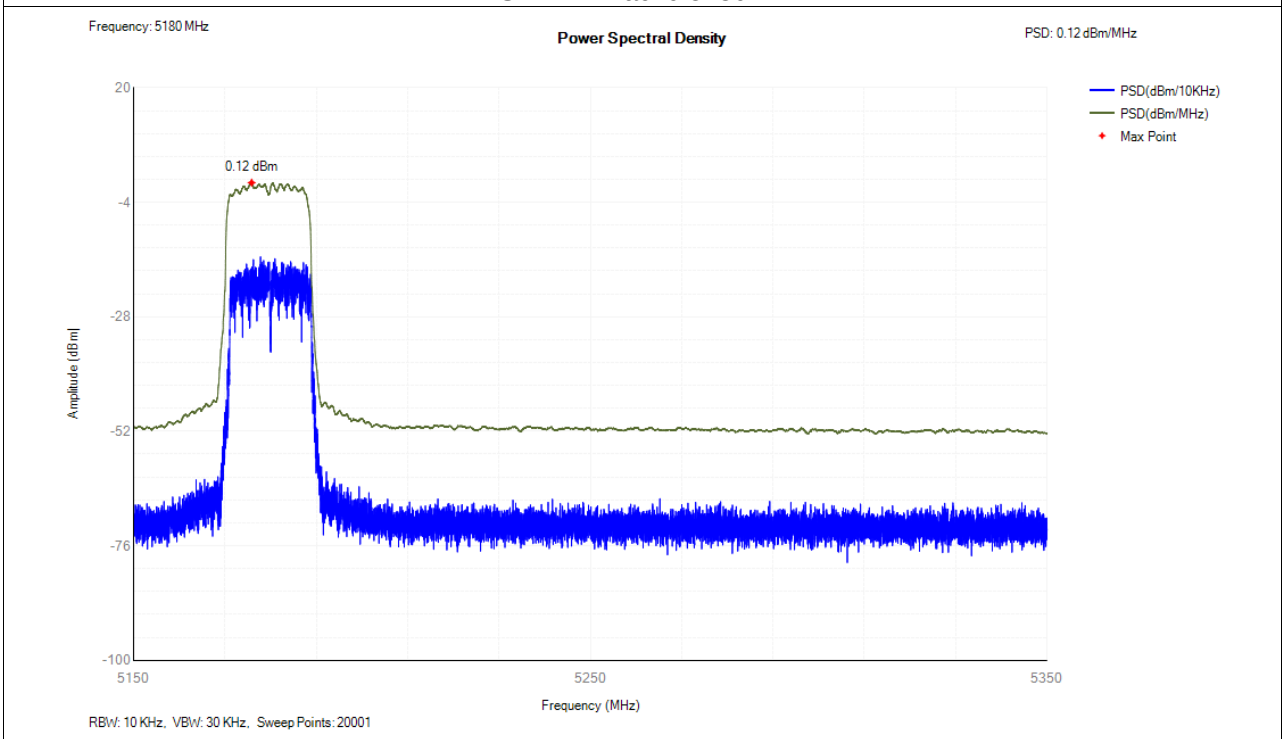
PSD NVNT n40 5510MHz



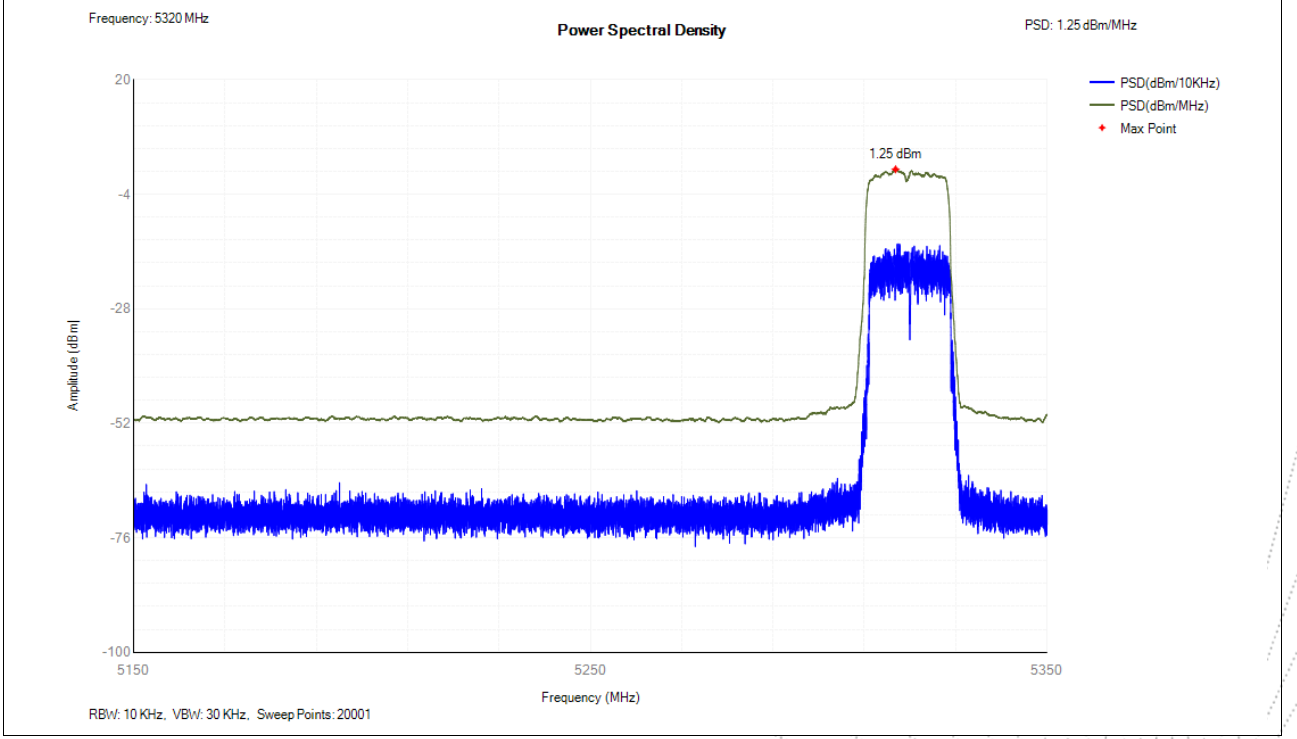
PSD NVNT n40 5670MHz



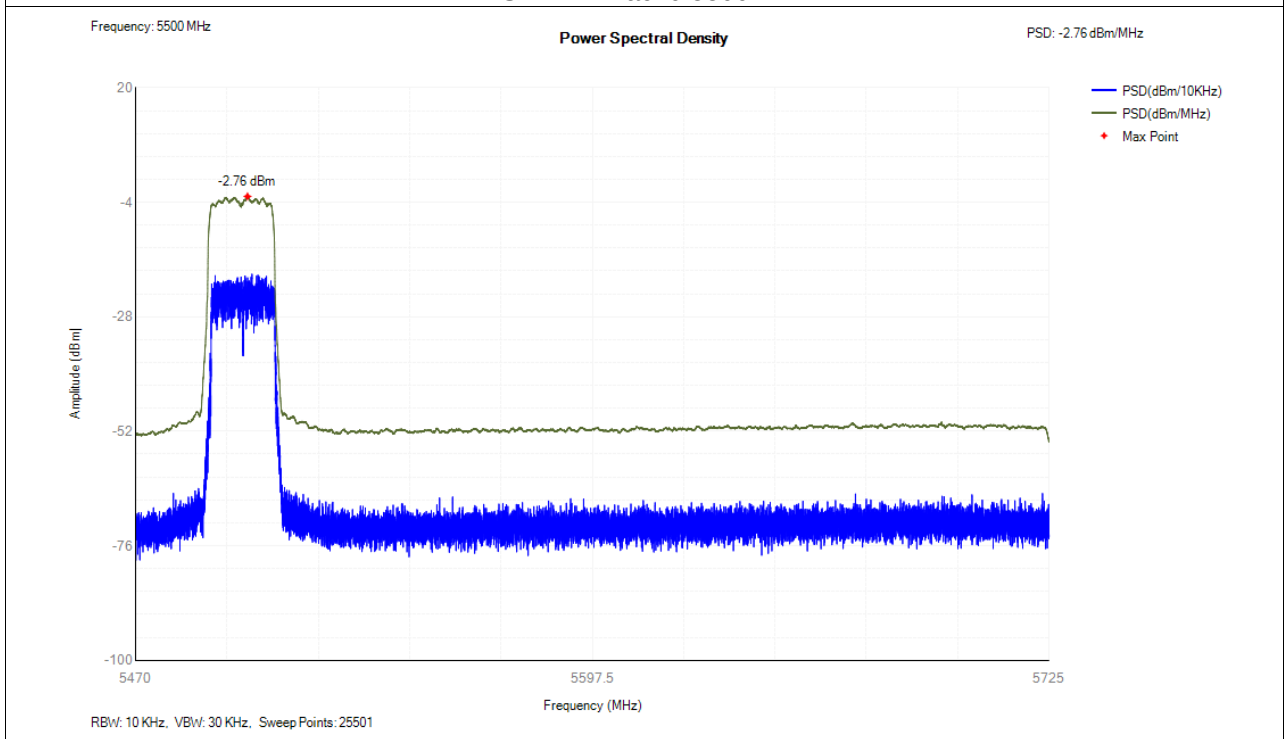
PSD NVNT ac20 5180MHz



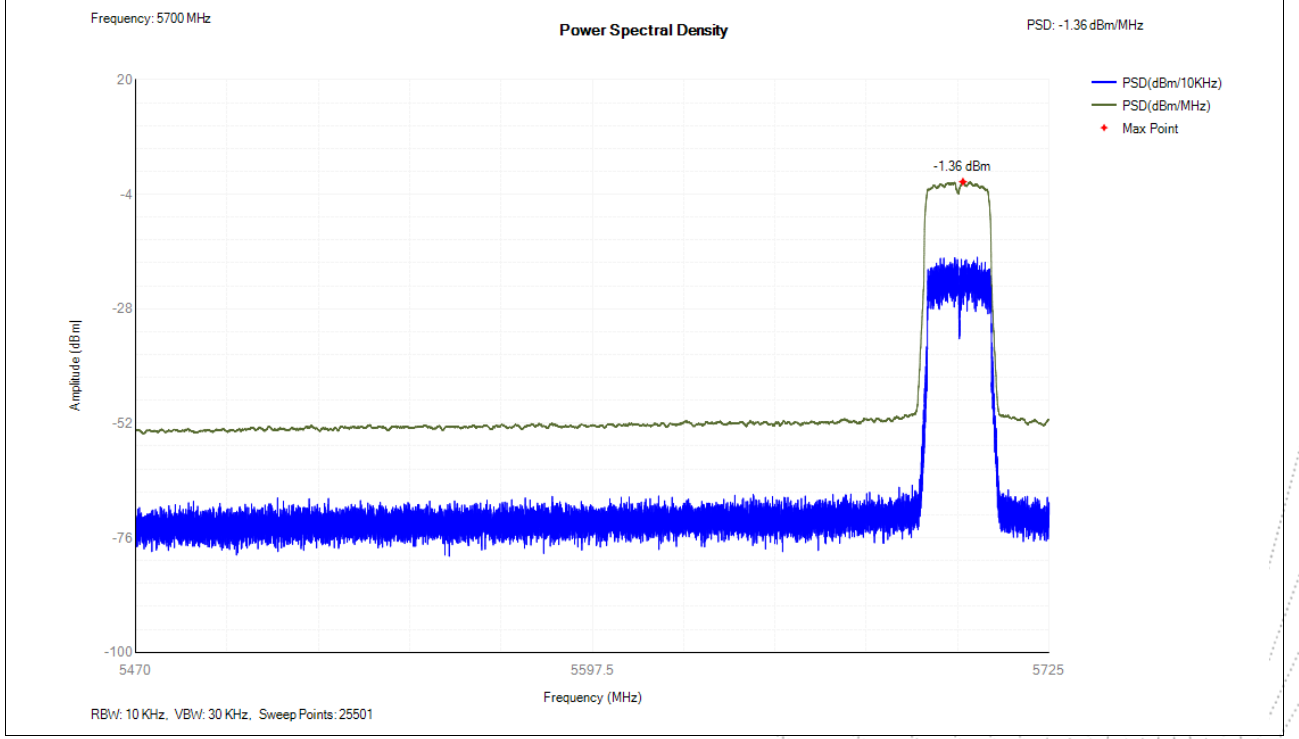
PSD NVNT ac20 5320MHz



PSD NVNT ac20 5500MHz



PSD NVNT ac20 5700MHz



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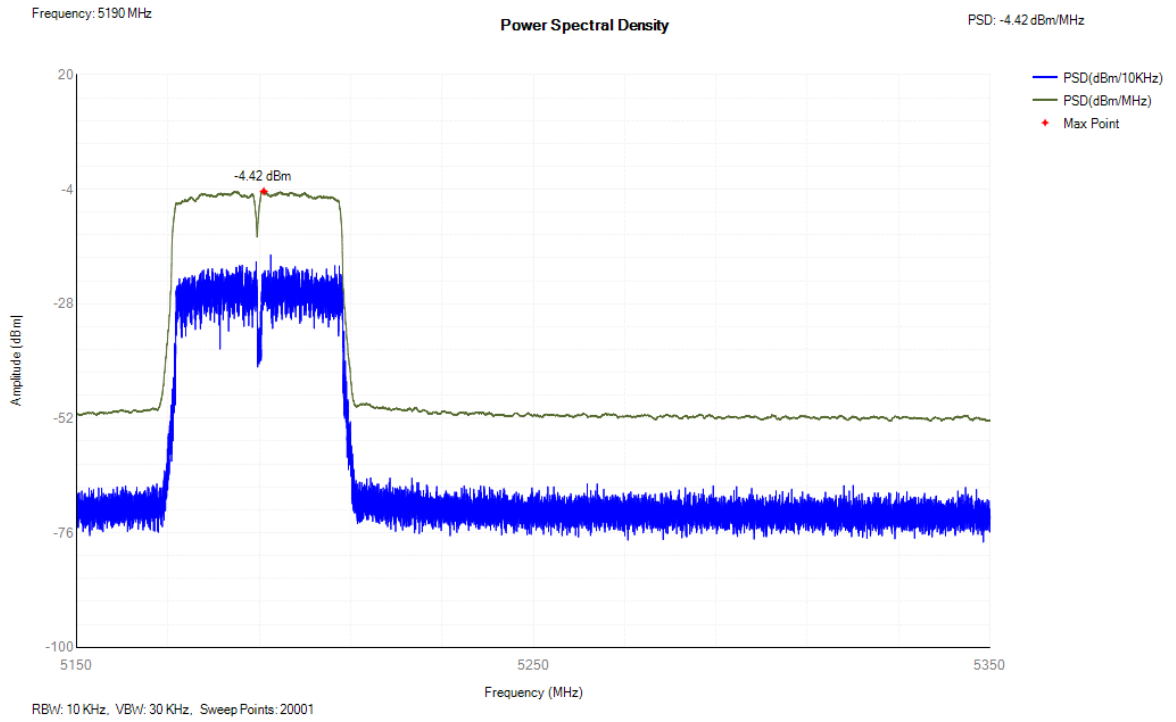
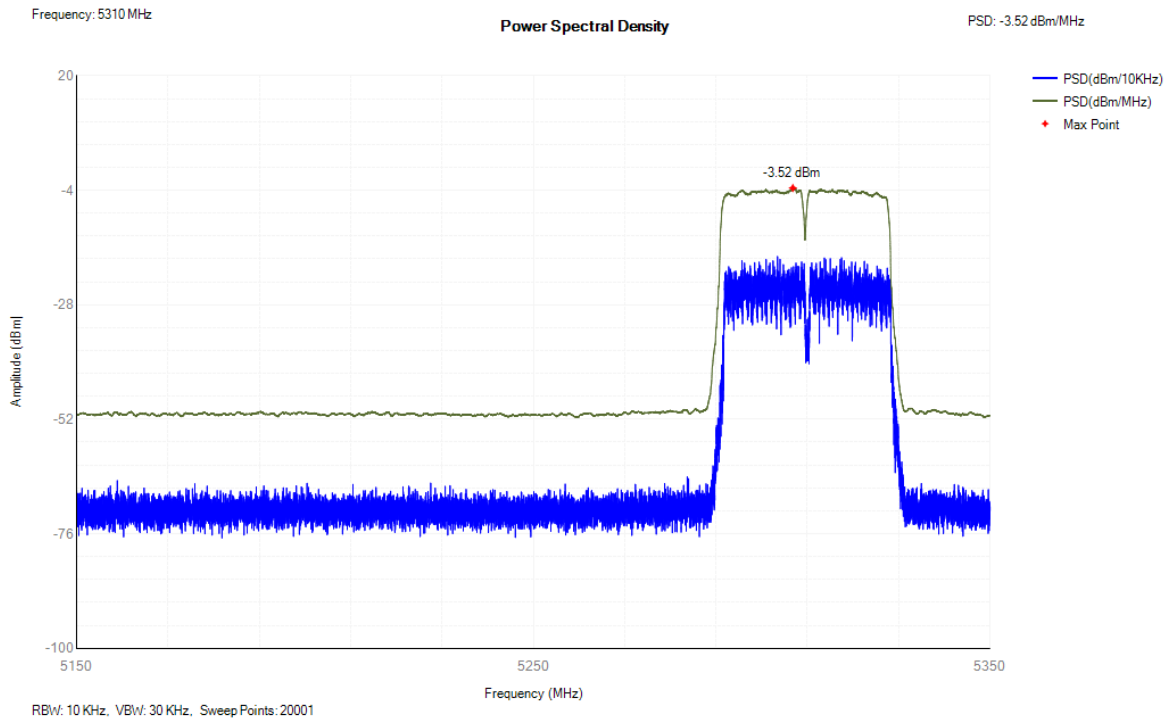
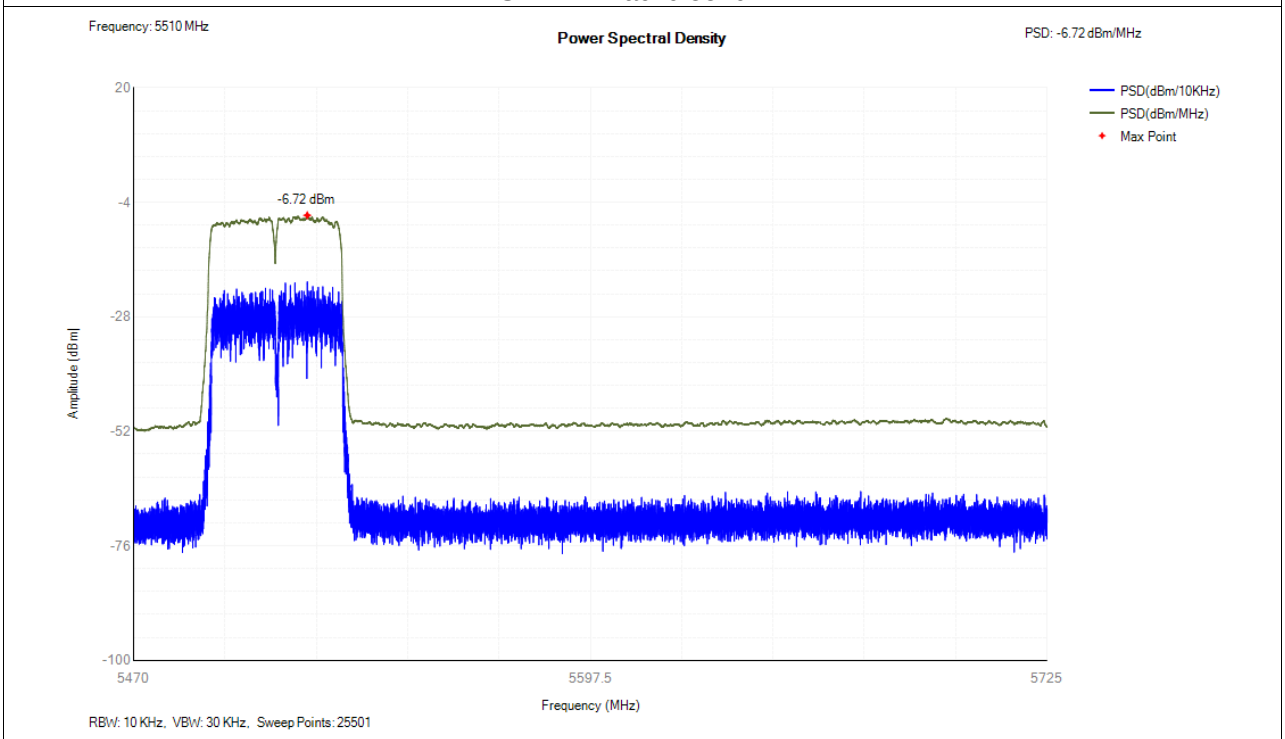


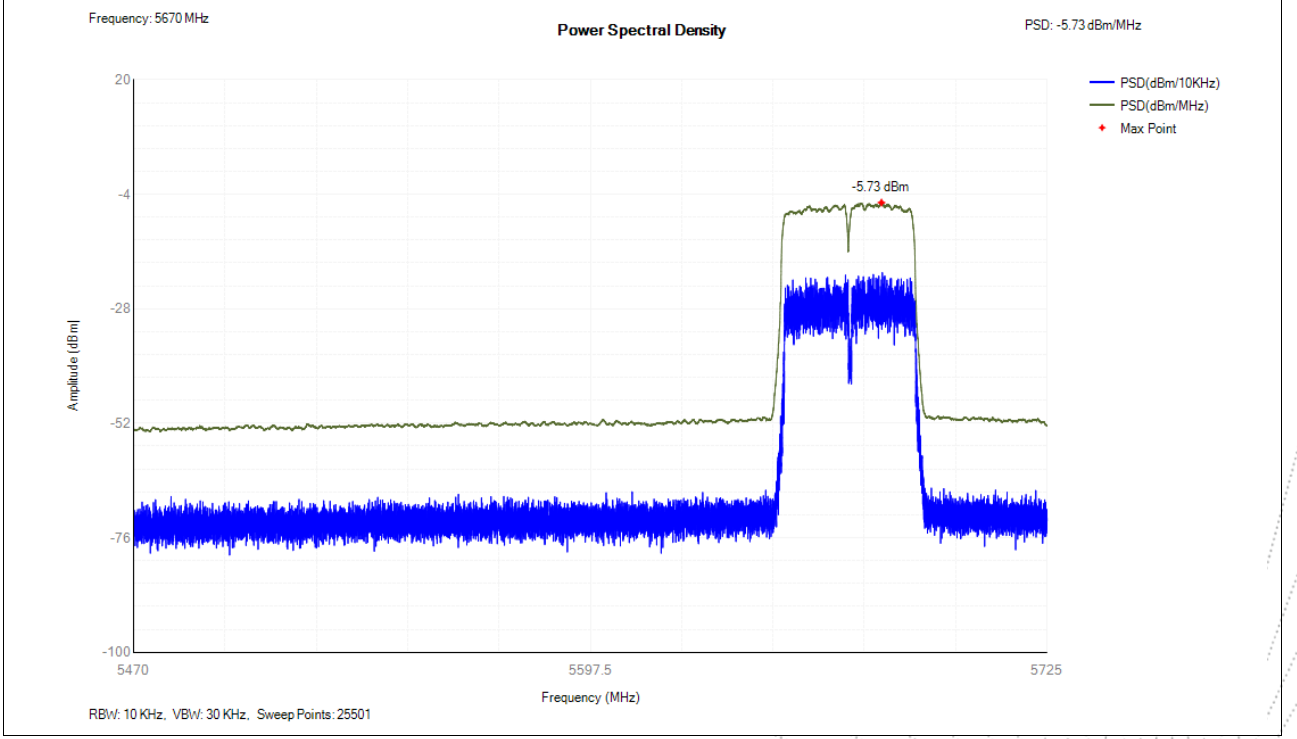
PSD NVNT ac40 5310MHz



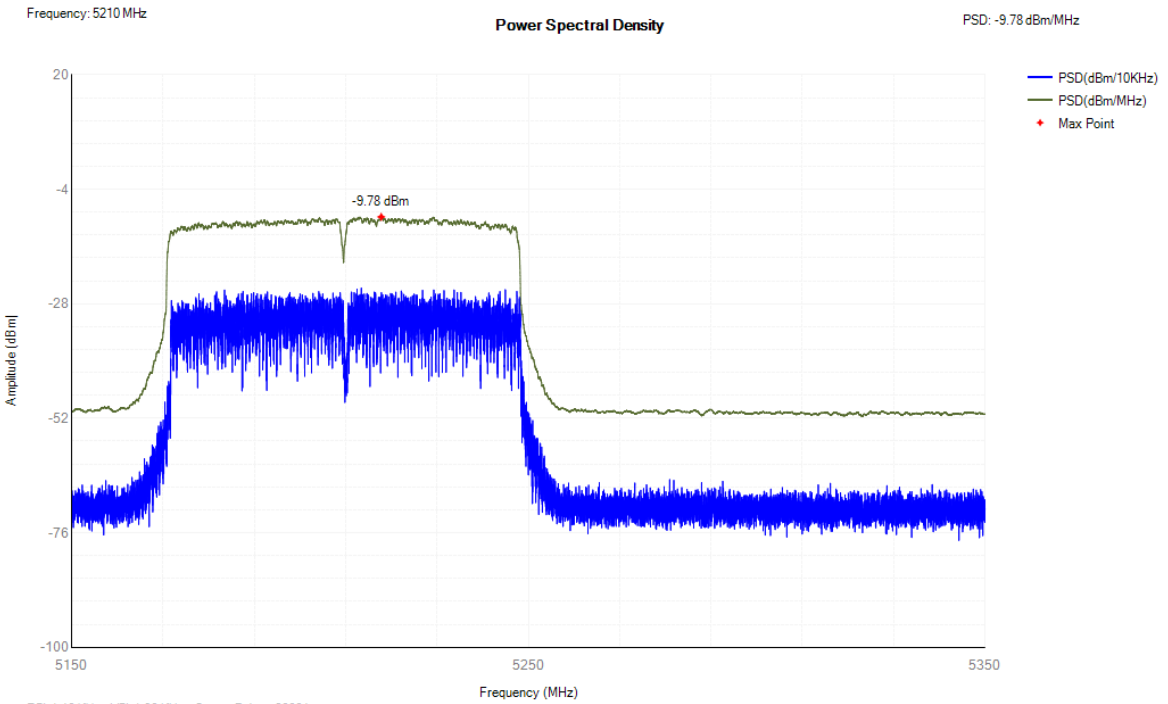
PSD NVNT ac40 5510MHz



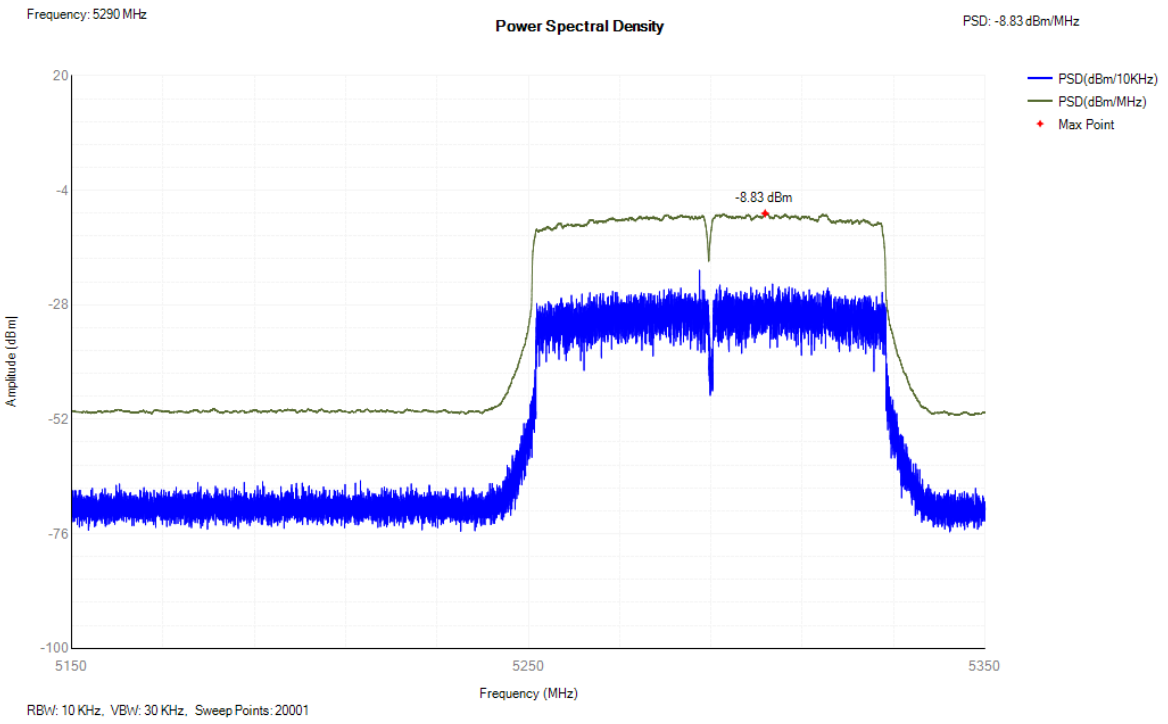
PSD NVNT ac40 5670MHz



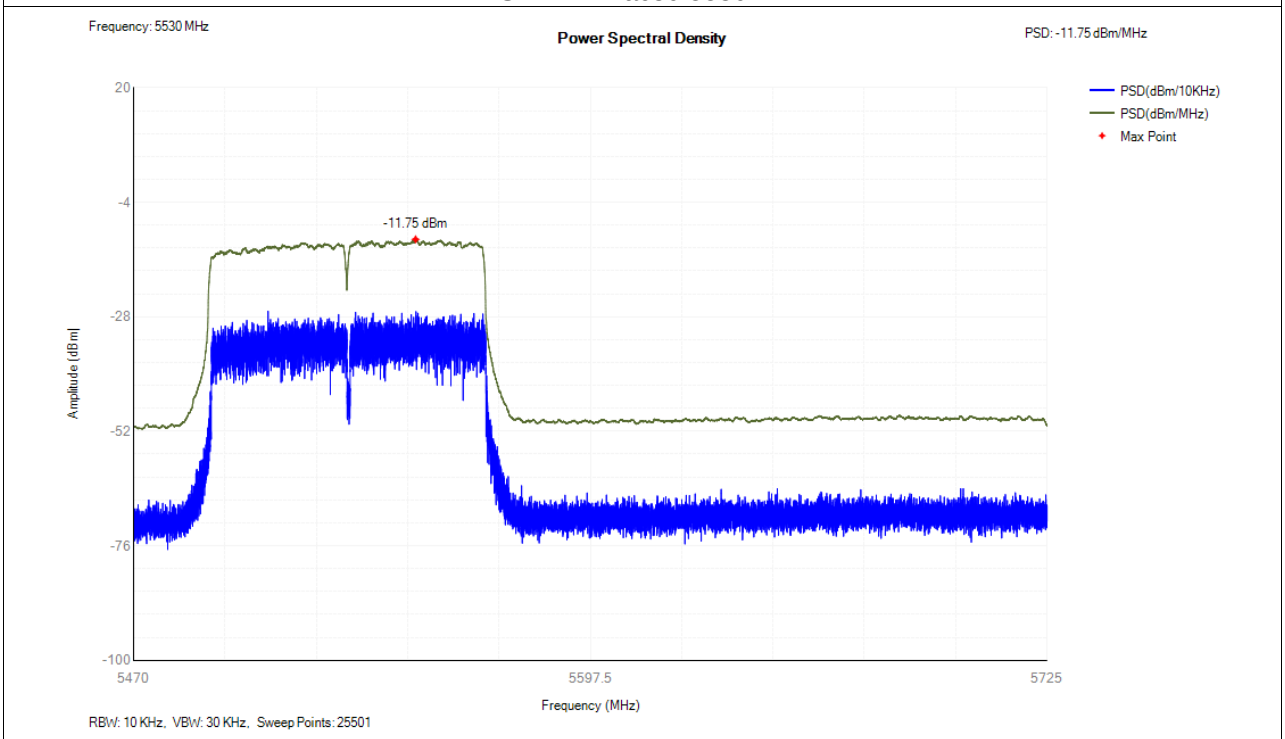
PSD NVNT ac80 5210MHz



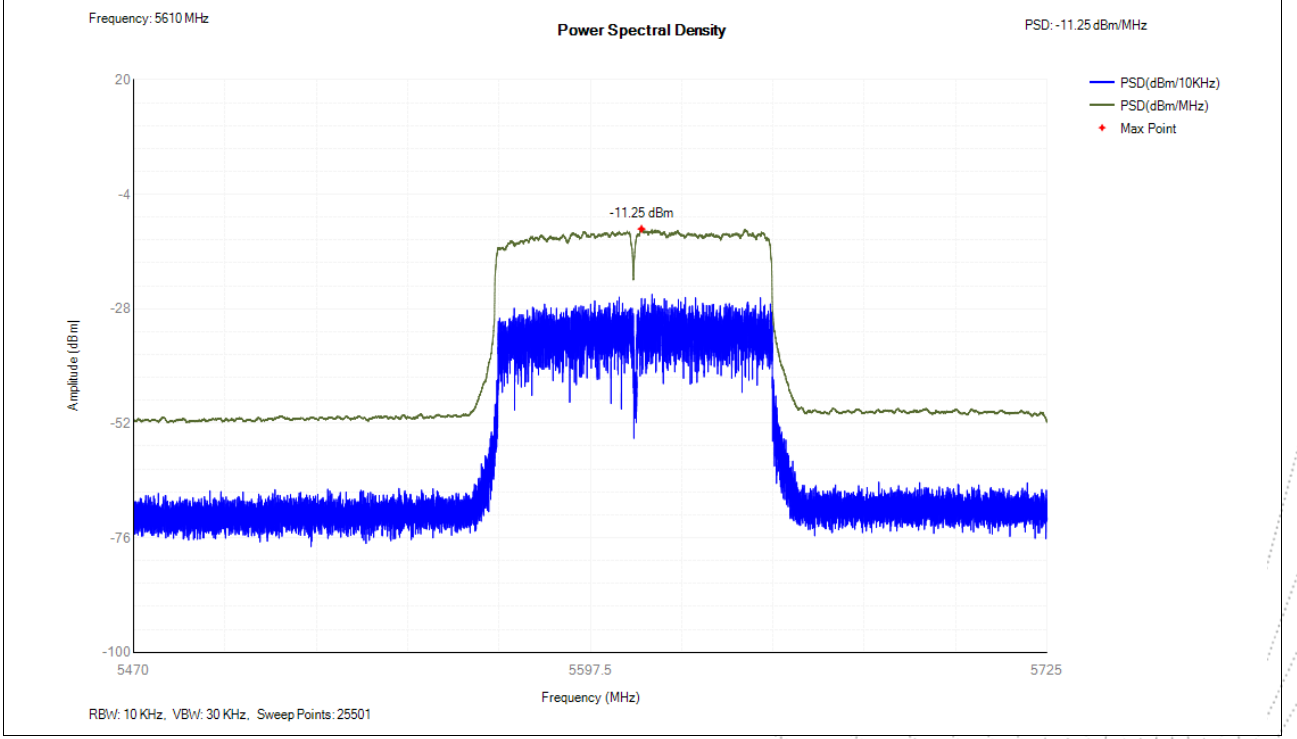
PSD NVNT ac80 5290MHz



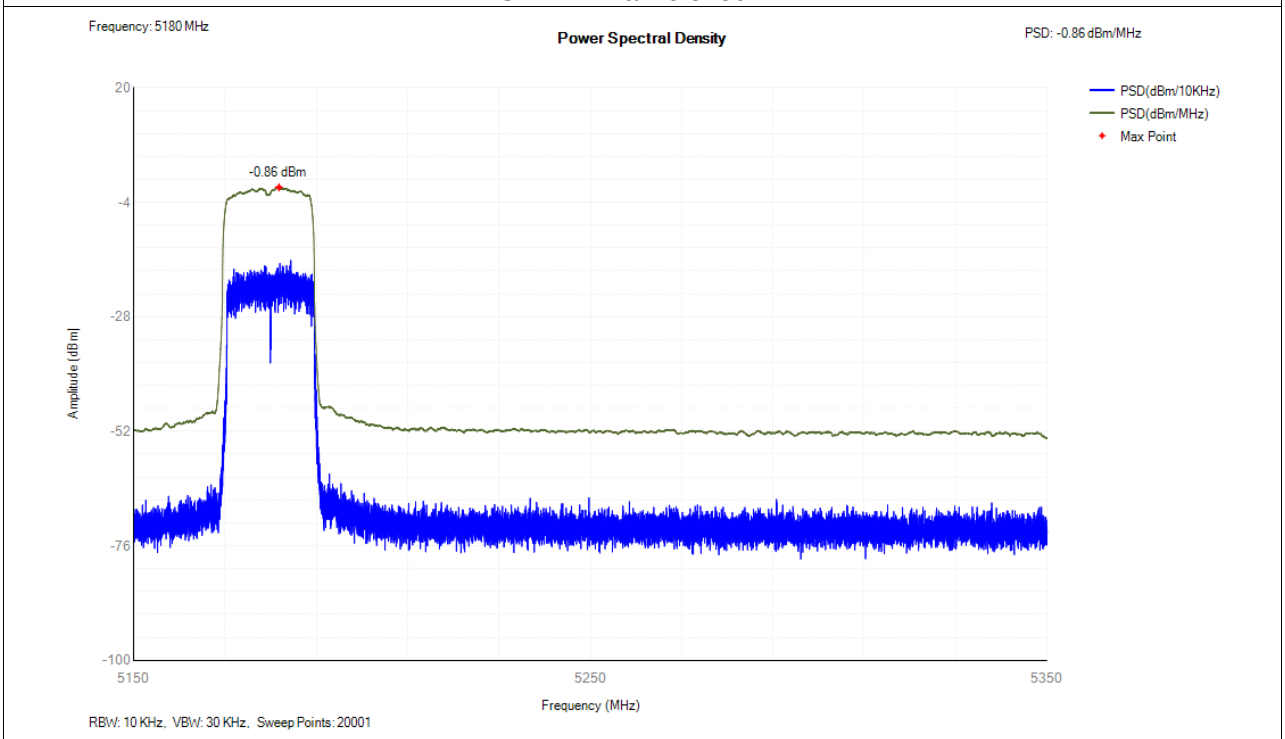
PSD NVNT ac80 5530MHz



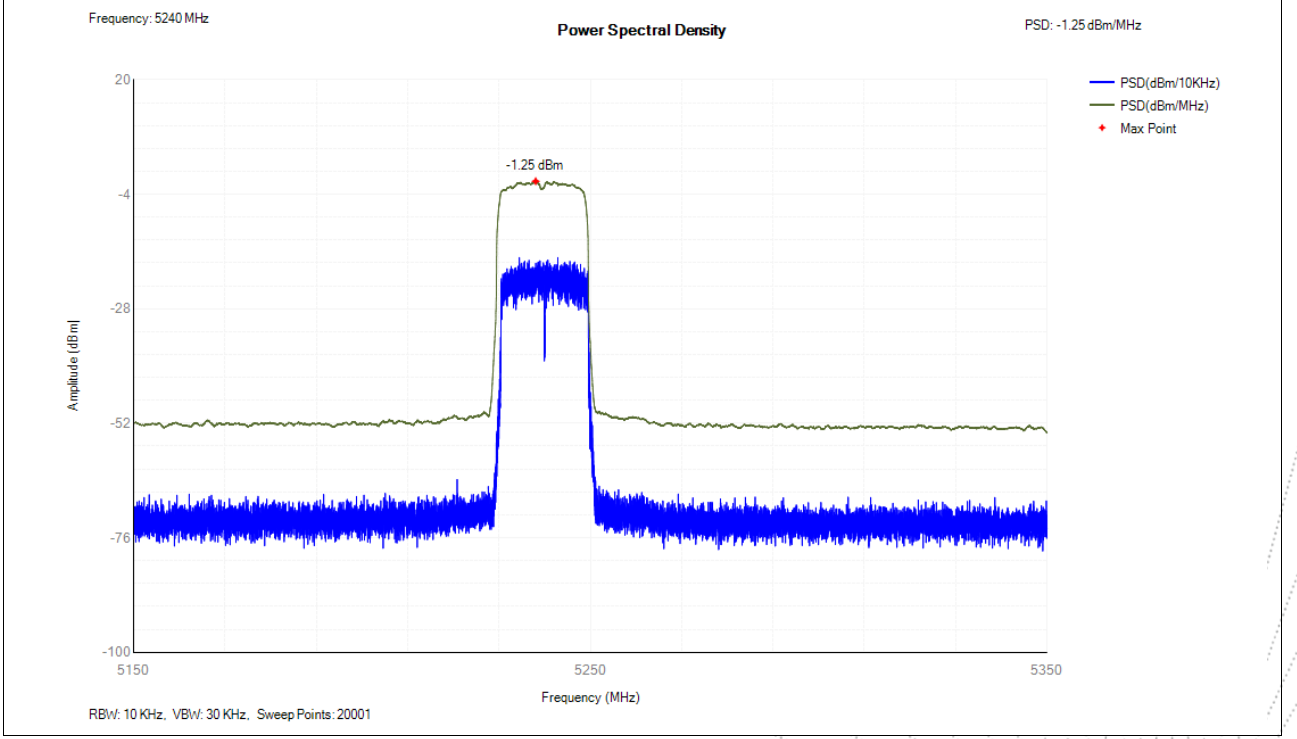
PSD NVNT ac80 5610MHz



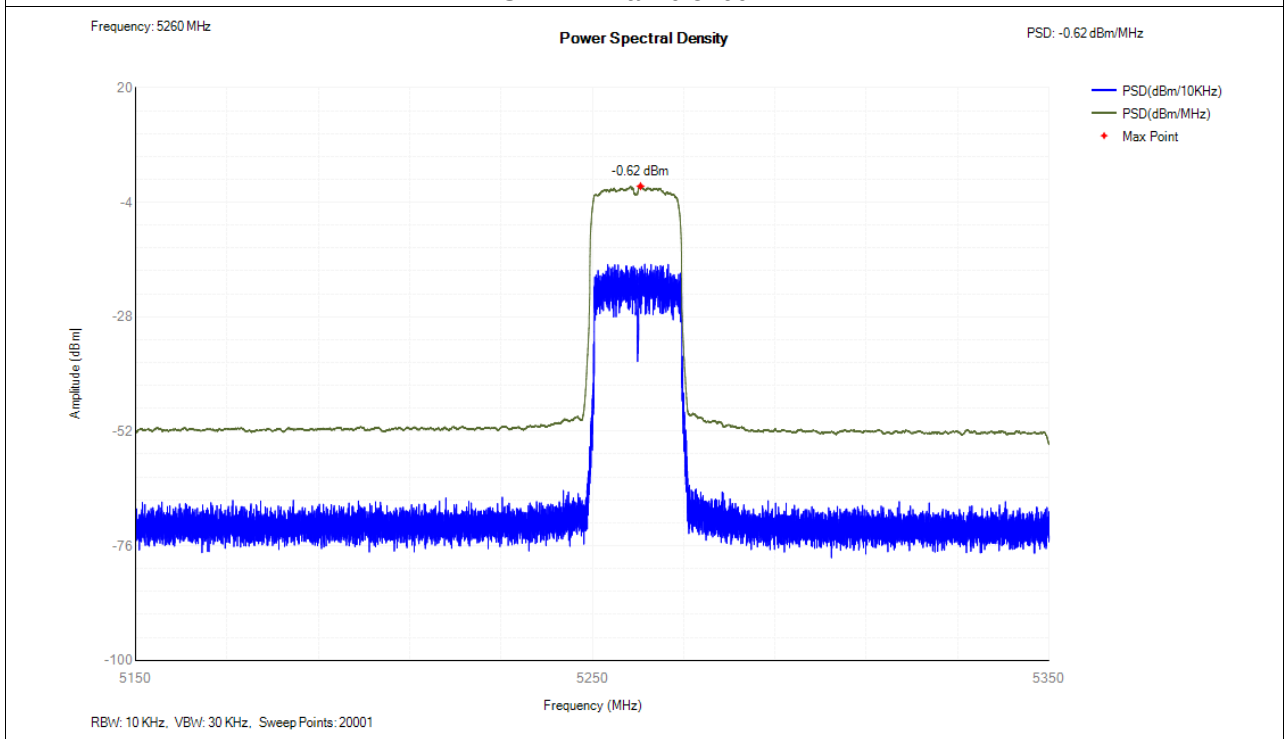
PSD NVNT ax20 5180MHz



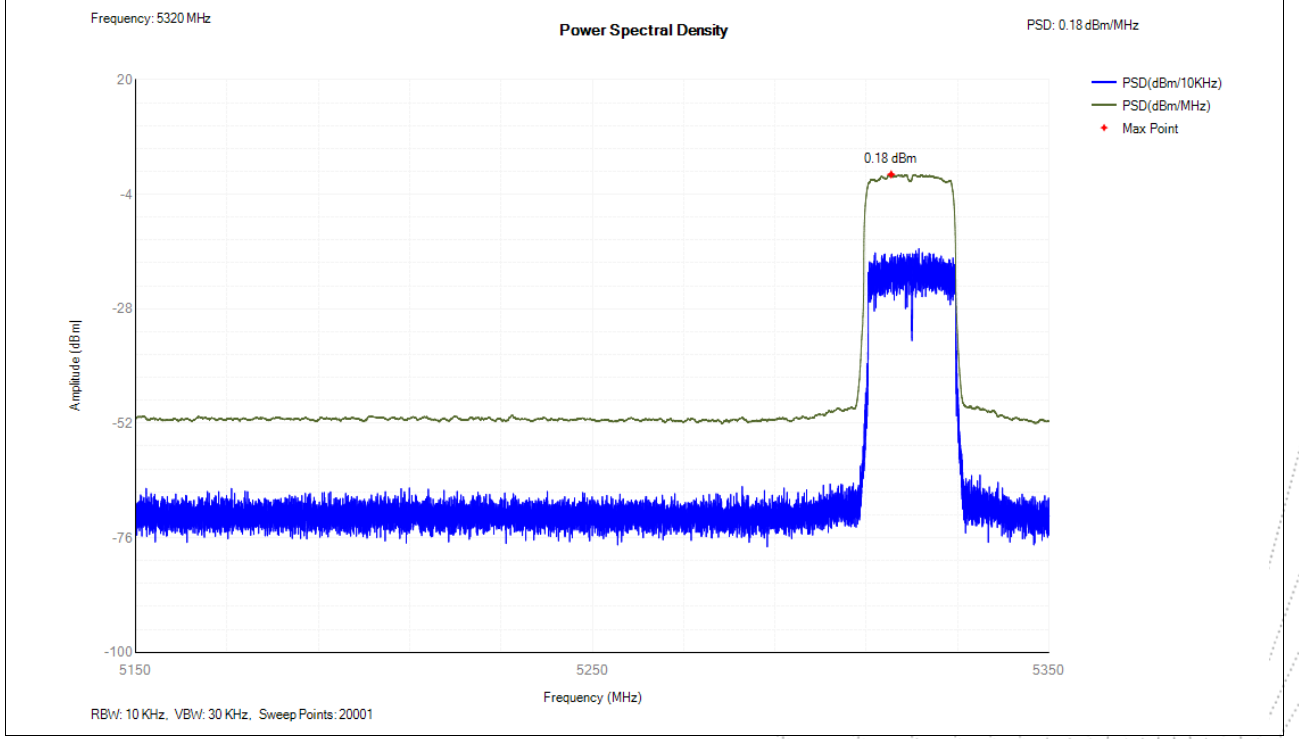
PSD NVNT ax20 5240MHz



PSD NVNT ax20 5260MHz



PSD NVNT ax20 5320MHz



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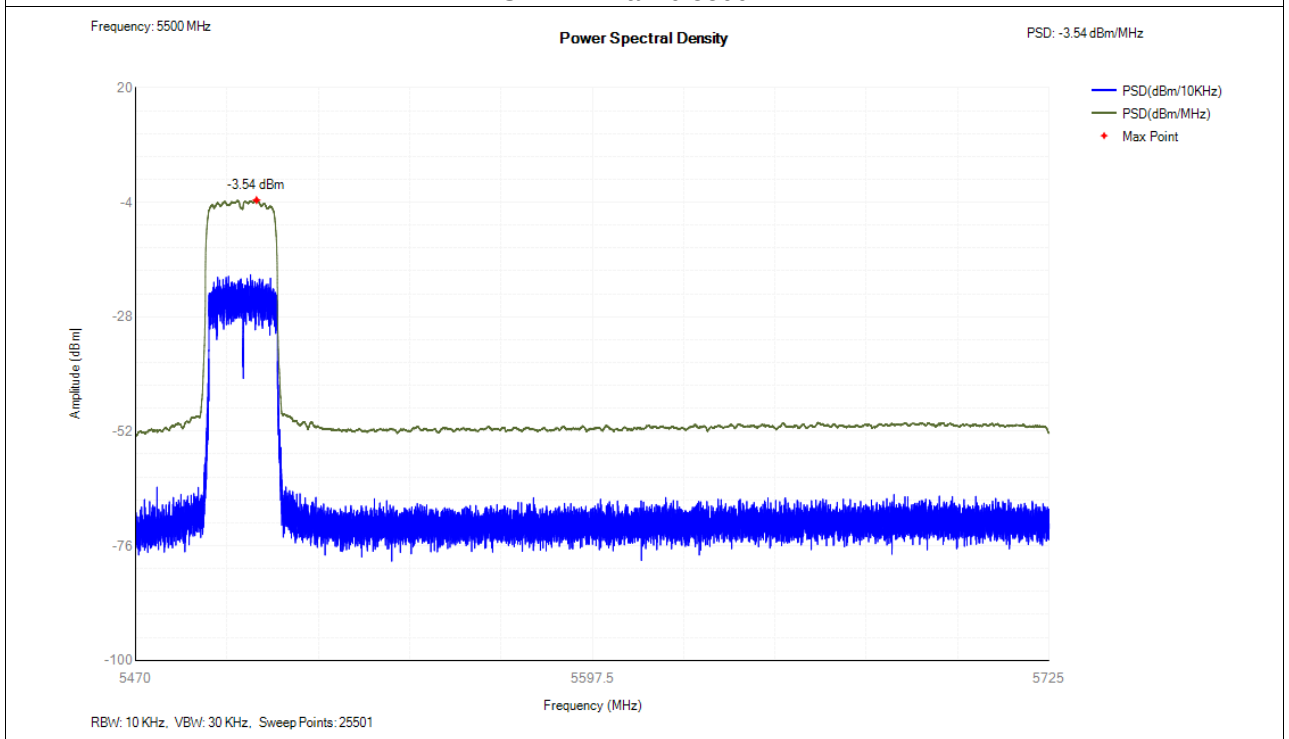
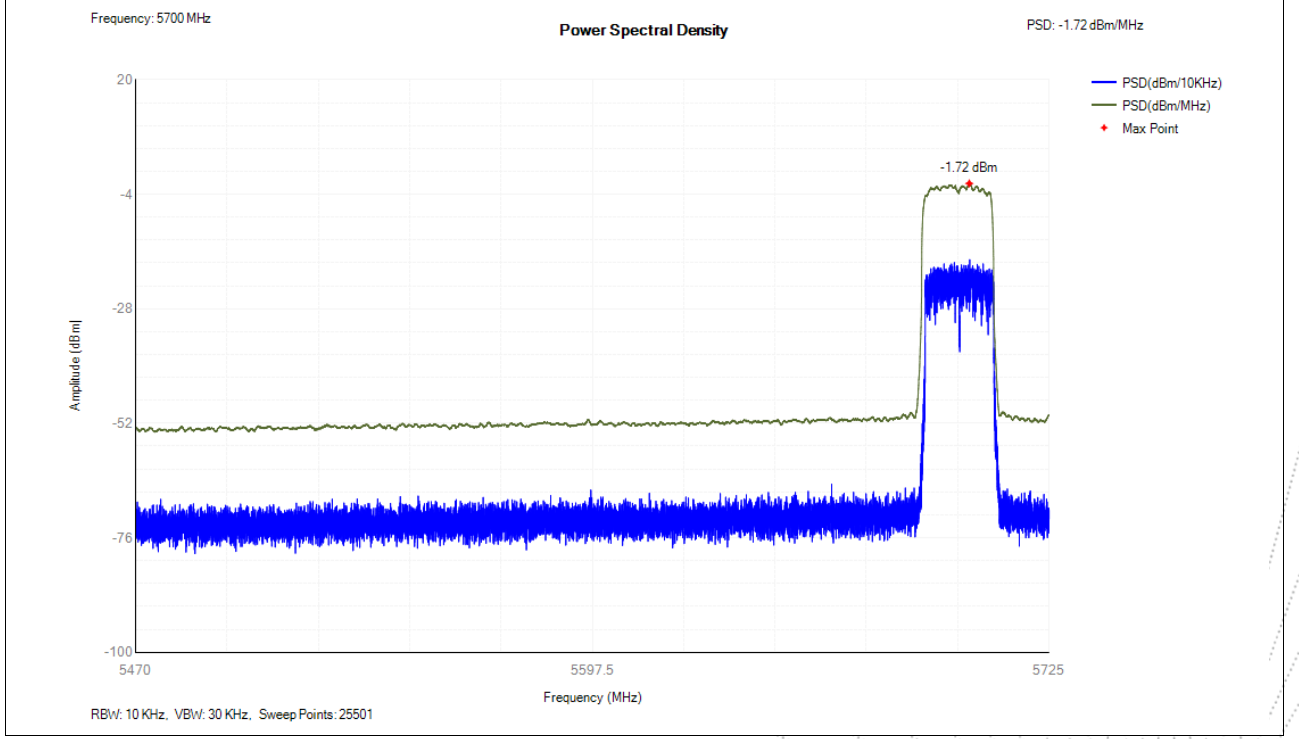
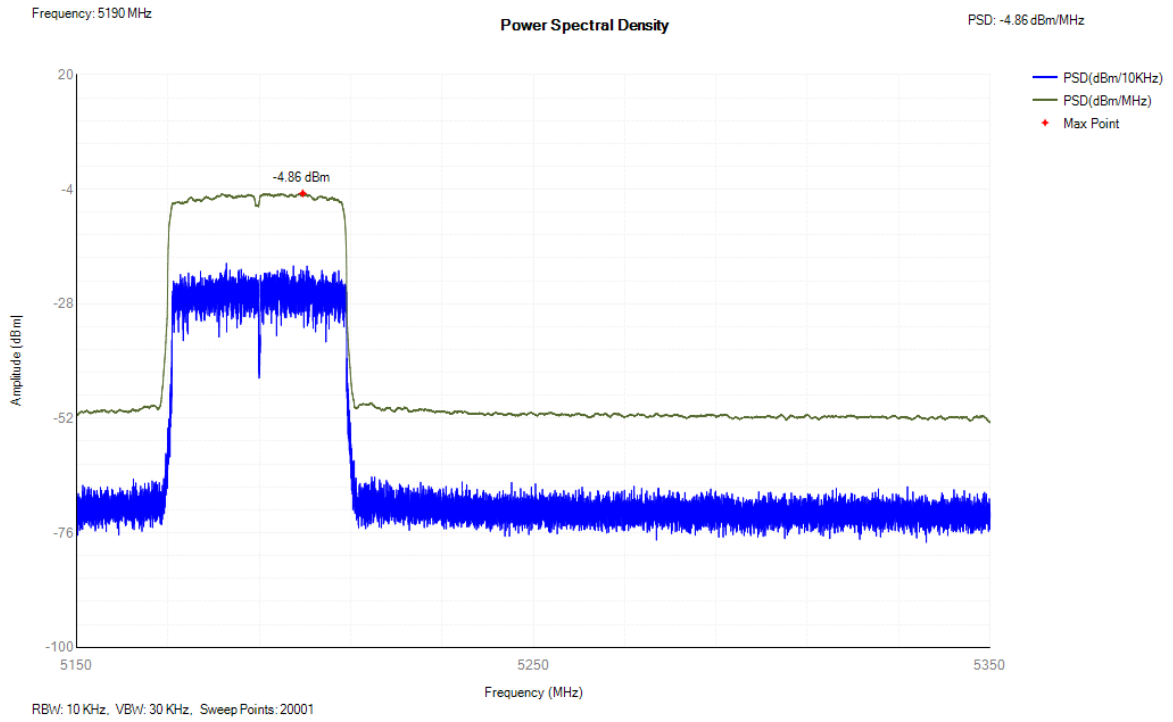


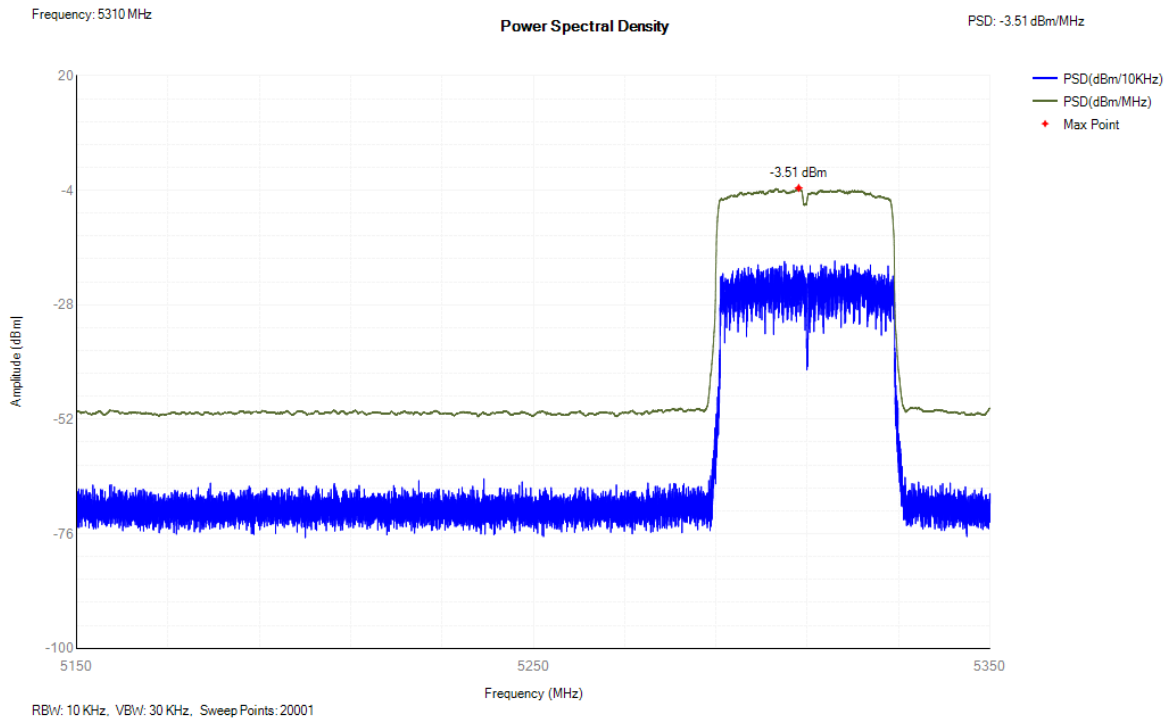
PSD NVNT ax20 5700MHz



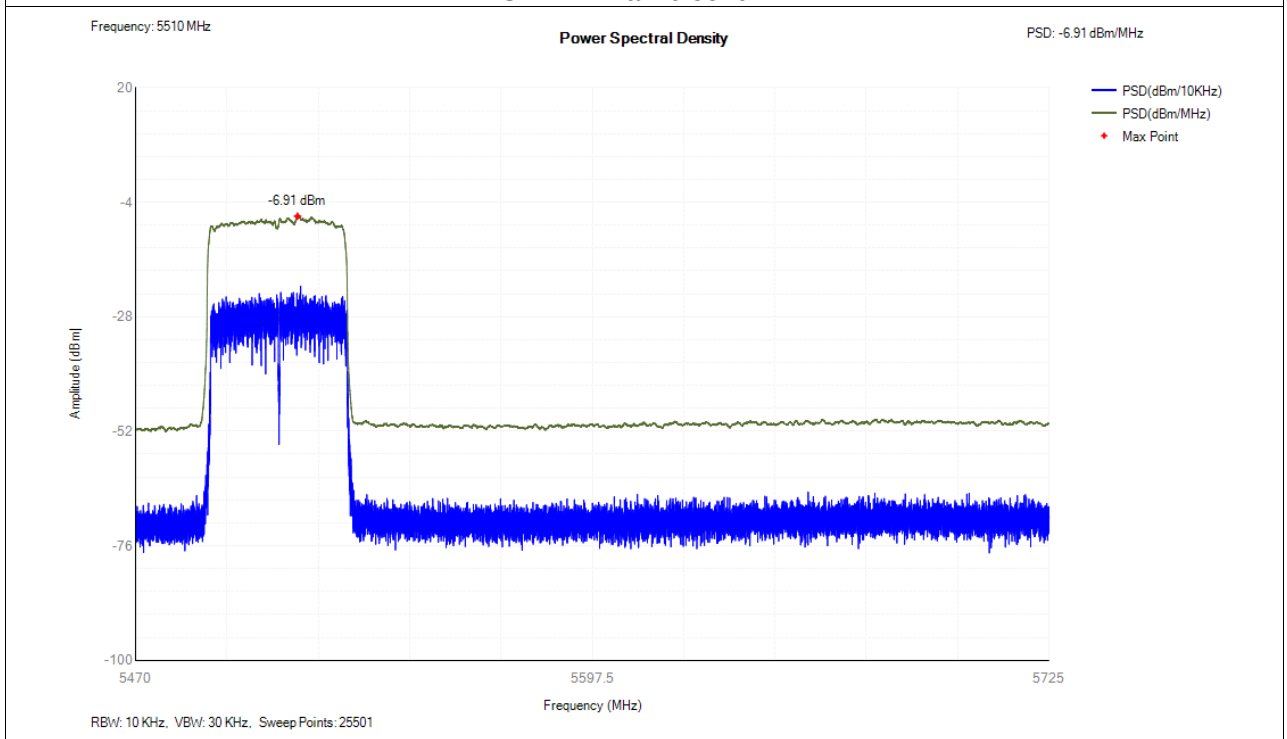
PSD NVNT ax40 5190MHz



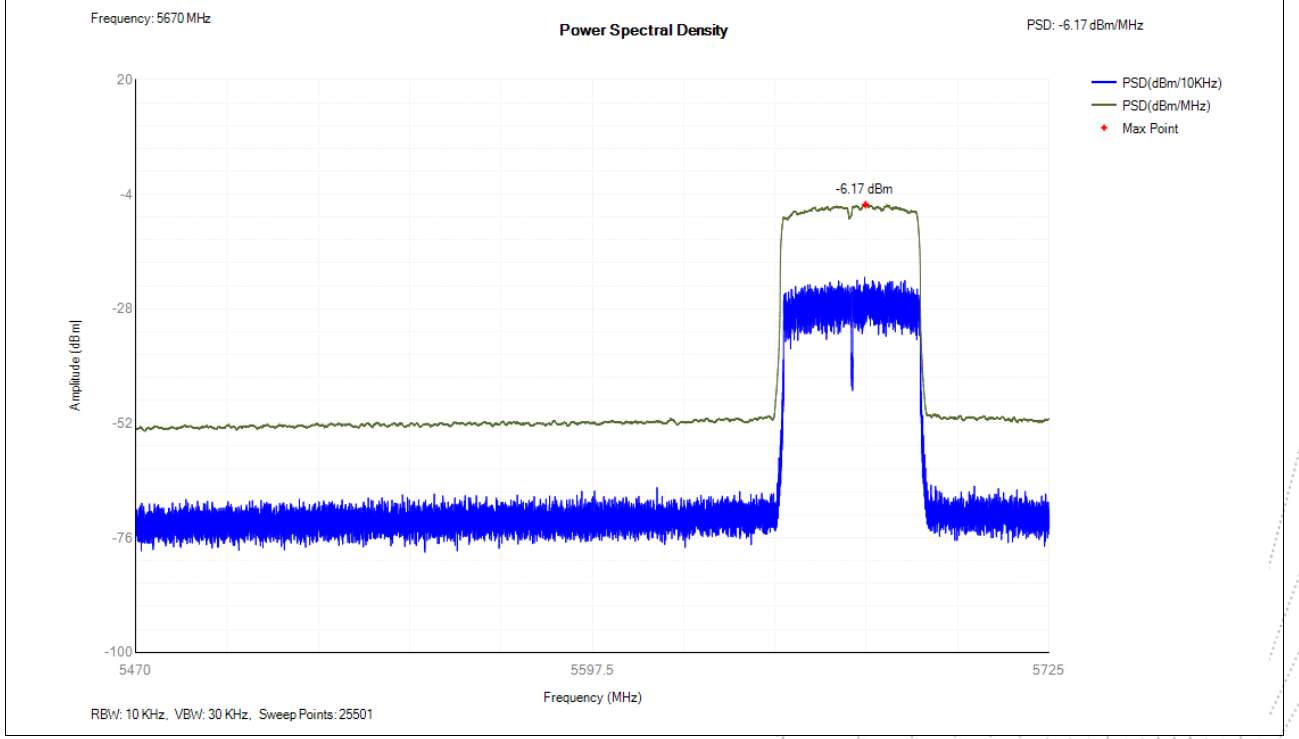
PSD NVNT ax40 5310MHz



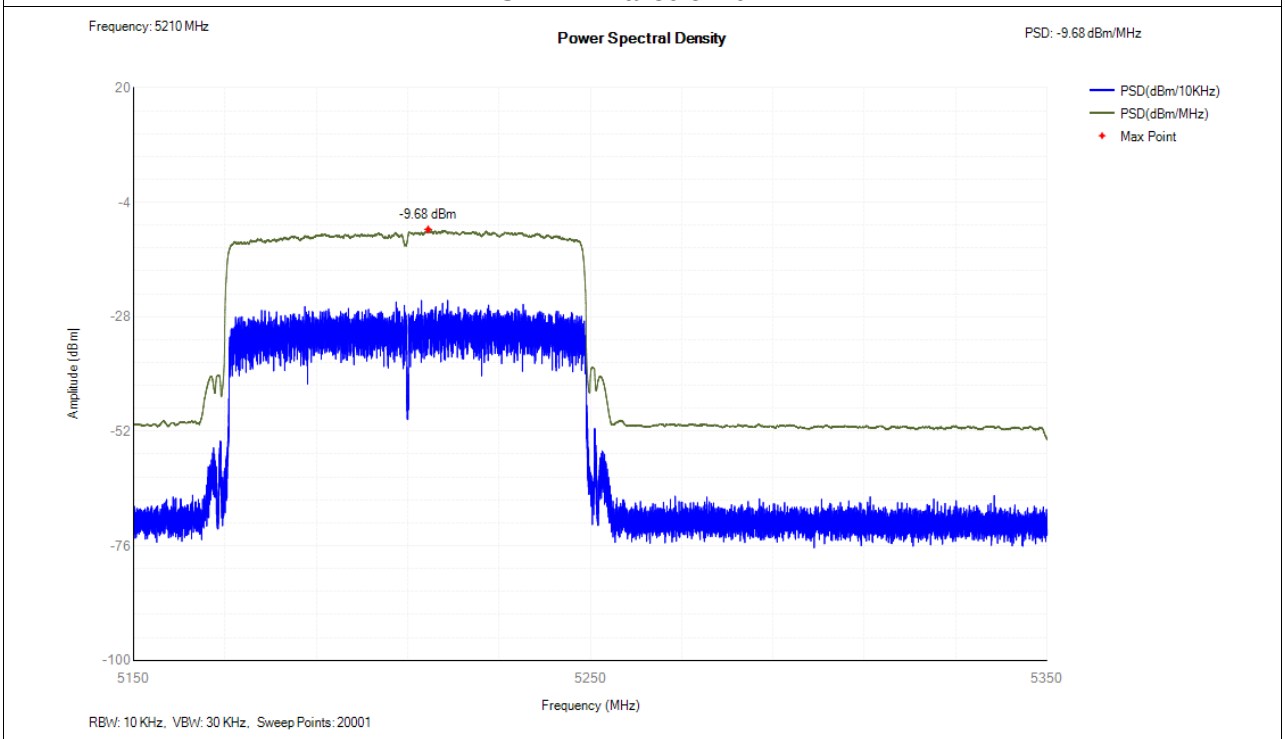
PSD NVNT ax40 5510MHz



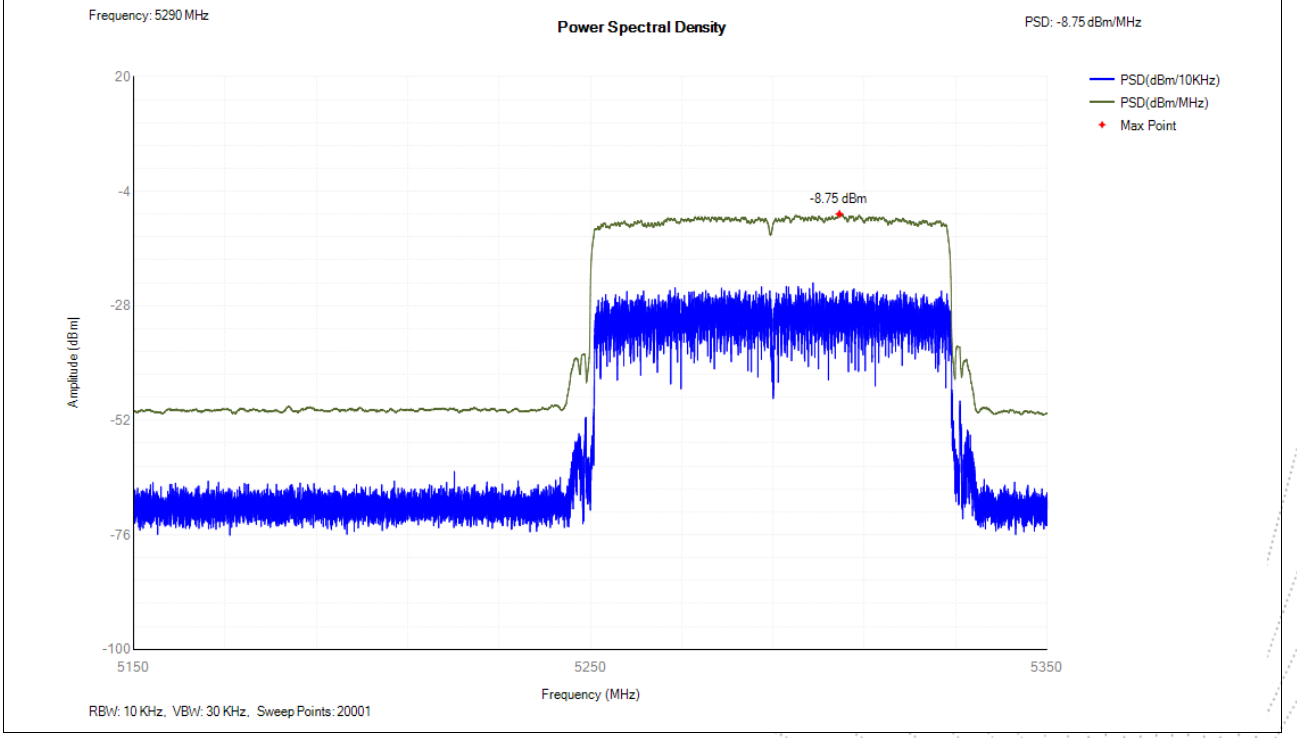
PSD NVNT ax40 5670MHz



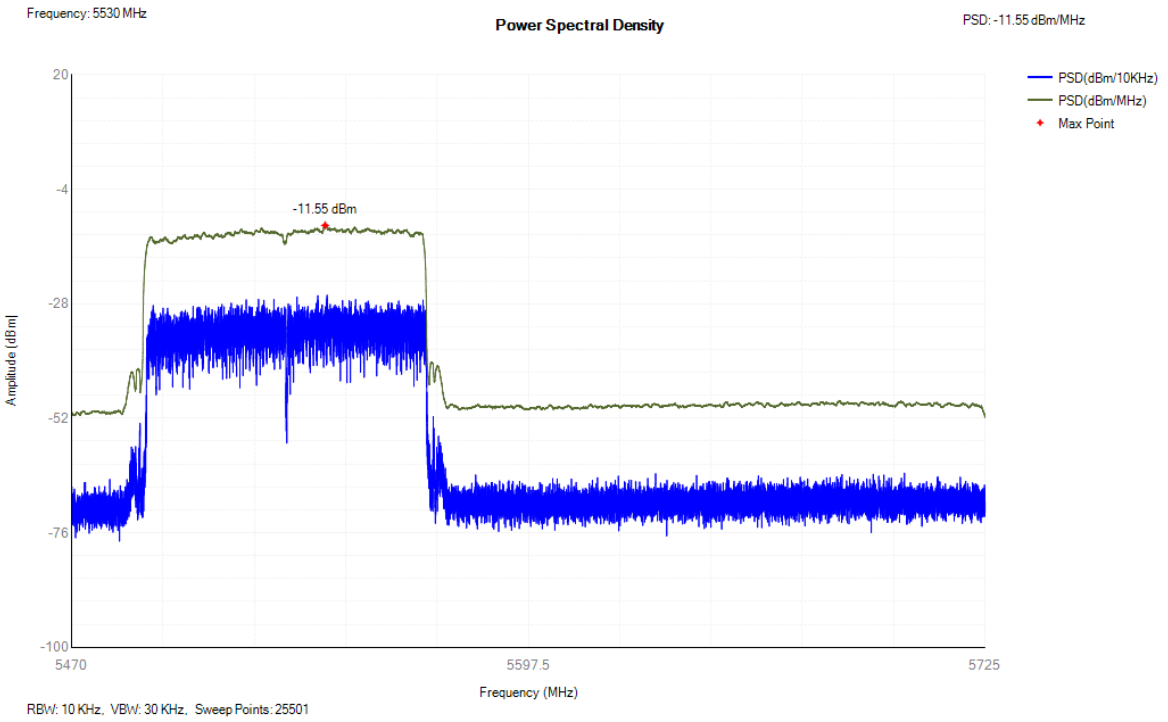
PSD NVNT ax80 5210MHz



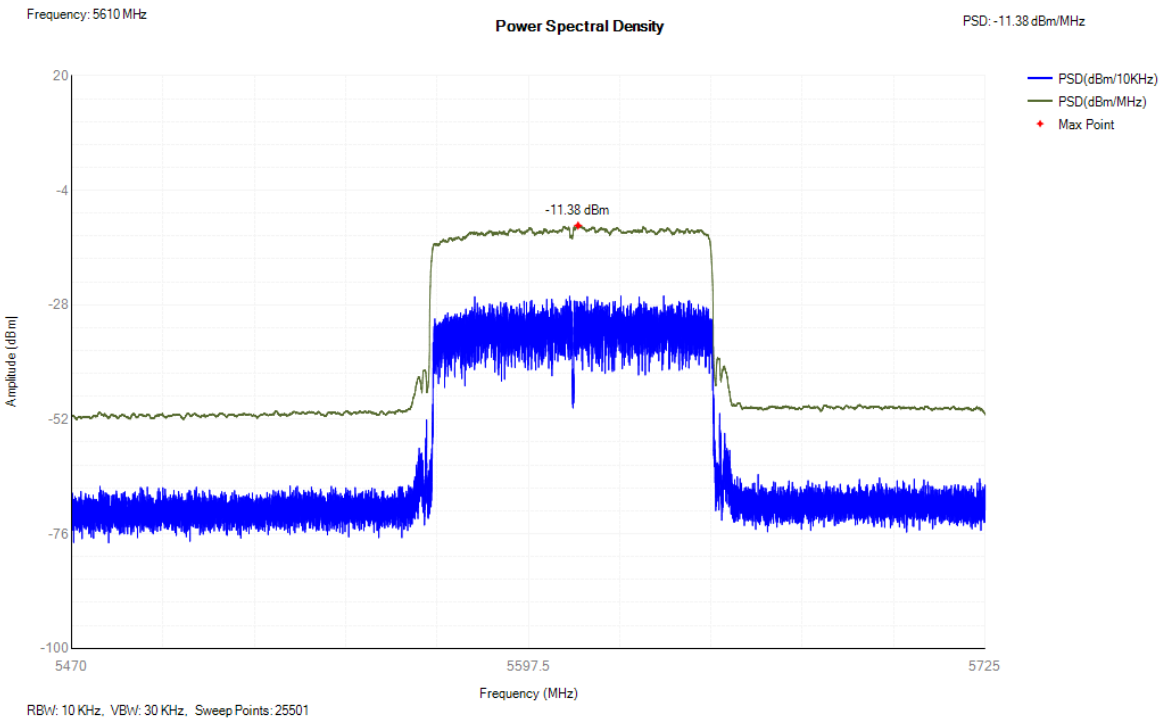
PSD NVNT ax80 5290MHz



PSD NVNT ax80 5530MHz



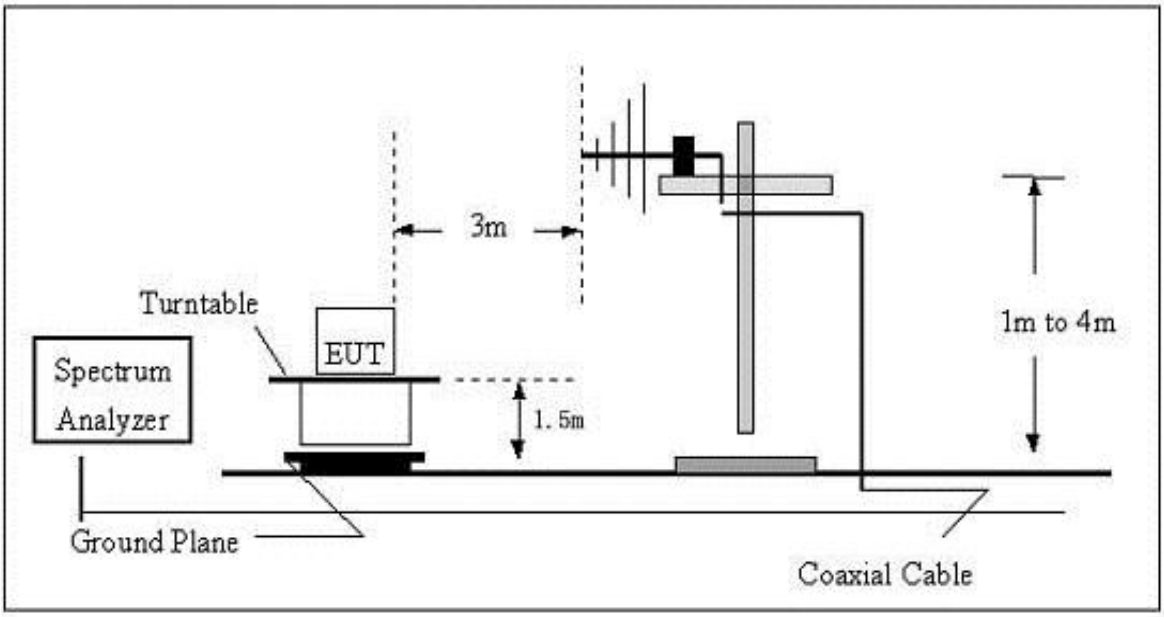
PSD NVNT ax80 5610MHz



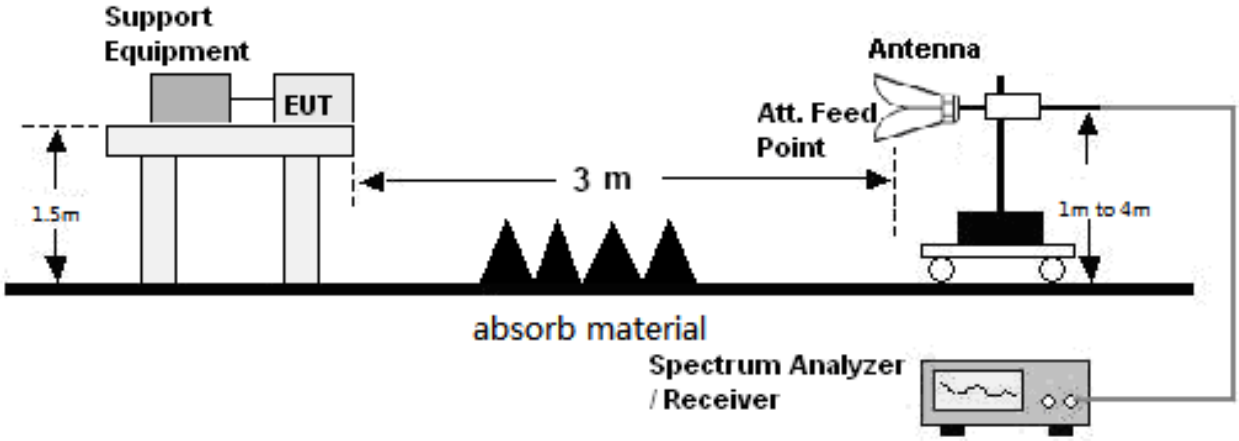
11. Transmitter Unwanted Emissions In The Spurious Domain

11.1 Block Diagram Of Test Setup

(A)Radiated Emission Test Set-Up Frequency Below 1GHz.



(B)Radiated Emission Test Set-Up Frequency Above 1GHz.



11.2 Limits

Frequency range	Maximum power, e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz/300KHz
47 MHz to 74 MHz	-54 dBm	100 kHz/300KHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz/300KHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz/300KHz
118 MHz to 174 MHz	-36 dBm	100 kHz/300KHz
174 MHz to 230 MHz	-54 dBm	100 kHz/300KHz
230 MHz to 470 MHz	-36 dBm	100 kHz/300KHz
470 MHz to 862 MHz	-54 dBm	100 kHz/300KHz
862 MHz to 1 GHz	-36 dBm	100 kHz/300KHz
1 GHz to 5.15 GHz	-30 dBm	1 MHz/3MHz
5.35 GHz to 5.47 GHz	-30 dBm	1 MHz/3MHz
5.725 GHz to 26 GHz	-30 dBm	1 MHz/3MHz

11.3 Test Procedure

30MHz ~ 1GHz:
a. The Product was placed on the nonconductive turntable 1.5m above the ground in a full anechoic chamber.
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.
Above 1GHz:
a. The Product was placed on the non-conductive turntable 1.5 m above the ground in a full anechoic chamber..
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

11.4 Test Results

Test Mode: Transmitting 802.11n20 (ANT A)
5.1 G

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
802.11n20 low channel								
543.49	-33.29	209	1.5	H	-27.98	-61.27	-54	-7.27
543.49	-33.83	286	1.8	V	-27.98	-61.81	-54	-7.81
10360.00	-36.15	80	1.8	H	-9.36	-45.51	-30	-15.51
10360.00	-38.46	320	1.3	V	-9.36	-47.82	-30	-17.82
15540.00	-41.21	153	1.6	H	-7.84	-49.05	-30	-19.05
15540.00	-41.57	320	1.9	V	-7.84	-49.41	-30	-19.41
802.11n20 Mid channel								
543.49	-32.93	101	1.0	H	-27.98	-60.92	-54	-6.92
543.49	-33.30	40	2.0	V	-27.98	-61.28	-54	-7.28
10400.00	-35.48	105	1.1	H	-9.30	-44.78	-30	-14.78
10400.00	-38.57	106	1.5	V	-9.30	-47.87	-30	-17.87
15600.00	-41.67	88	1.8	H	-7.82	-49.49	-30	-19.49
15600.00	-41.16	251	1.8	V	-7.82	-48.98	-30	-18.98
802.11n20 high channel								
543.49	-32.90	244	1.9	H	-27.98	-60.88	-54	-6.88
543.49	-33.66	126	1.6	V	-27.98	-61.65	-54	-7.65
10480.00	-36.78	360	1.8	H	-9.18	-45.96	-30	-15.96
10480.00	-37.60	315	1.5	V	-9.18	-46.78	-30	-16.78
15720.00	-41.75	357	1.6	H	-7.78	-49.53	-30	-19.53
15720.00	-42.41	118	1.5	V	-7.78	-50.19	-30	-20.19

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

5.3 G

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
802.11n20 low channel								
541.83	-34.93	290	2.0	H	-27.99	-62.92	-54	-8.92
541.83	-32.50	295	1.8	V	-27.99	-60.49	-54	-6.49
10520.00	-34.92	46	1.2	H	-9.12	-44.04	-30	-14.04
10520.00	-39.04	313	1.7	V	-9.12	-48.16	-30	-18.16
15780.00	-45.56	271	1.3	H	-7.77	-53.33	-30	-23.33
15780.00	-52.20	88	1.7	V	-7.77	-59.97	-30	-29.97
802.11n20 Mid channel								
541.83	-34.37	199	1.5	H	-27.99	-62.36	-54	-8.36
541.83	-32.41	264	1.8	V	-27.99	-60.40	-54	-6.40
10560.00	-35.52	282	1.4	H	-9.60	-45.12	-30	-15.12
10560.00	-38.77	16	1.1	V	-9.60	-48.37	-30	-18.37
15840.00	-46.16	85	1.3	H	-7.75	-53.91	-30	-23.91
15840.00	-52.26	242	1.8	V	-7.75	-60.01	-30	-30.01
802.11n20 high channel								
541.83	-34.21	184	2.0	H	-27.99	-62.19	-54	-8.19
541.83	-32.68	169	1.6	V	-27.99	-60.67	-54	-6.67
10640.00	-34.96	36	1.8	H	-8.94	-43.90	-30	-13.90
10640.00	-39.63	355	1.4	V	-8.94	-48.57	-30	-18.57
15960.00	-46.45	343	1.5	H	-7.71	-54.16	-30	-24.16
15960.00	-51.36	355	1.0	V	-7.71	-59.07	-30	-29.07

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

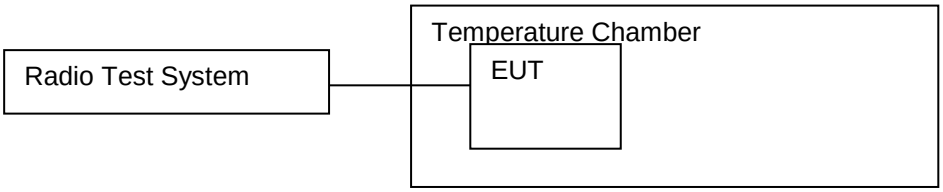
5.6G G

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct	Absolute Level	Result	
			Height	Polar	Factor		Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dBm)	(dBm)	(dBm)	(dB)
802.11n20 low channel								
565.14	-33.97	166	1.7	H	-27.91	-61.88	-54	-7.88
565.14	-34.63	118	1.8	V	-27.91	-62.54	-54	-8.54
11000.00	-39.07	184	1.1	H	-8.40	-47.47	-30	-17.47
11000.00	-38.09	295	1.0	V	-8.40	-46.49	-30	-16.49
16500.00	-47.99	164	1.9	H	-6.09	-54.08	-30	-24.08
16500.00	-50.80	176	1.5	V	-6.09	-56.89	-30	-26.89
802.11n20 Mid channel								
565.14	-33.39	99	1.6	H	-27.91	-61.29	-54	-7.29
565.14	-33.84	9	2.0	V	-27.91	-61.74	-54	-7.74
11200.00	-39.36	40	1.9	H	-8.56	-47.92	-30	-17.92
11200.00	-37.83	55	1.7	V	-8.56	-46.39	-30	-16.39
16800.00	-48.63	156	1.6	H	-5.12	-53.75	-30	-23.75
16800.00	-50.35	10	1.3	V	-5.12	-55.47	-30	-25.47
802.11n20 high channel								
565.14	-33.22	25	1.3	H	-27.91	-61.13	-54	-7.13
565.14	-34.25	22	1.9	V	-27.91	-62.16	-54	-8.16
11400.00	-39.13	320	2.0	H	-8.72	-47.85	-30	-17.85
11400.00	-38.65	22	1.3	V	-8.72	-47.37	-30	-17.37
17100.00	-48.08	166	1.9	H	-3.92	-52.00	-30	-22.00
17100.00	-49.84	119	2.0	V	-3.92	-53.76	-30	-23.76

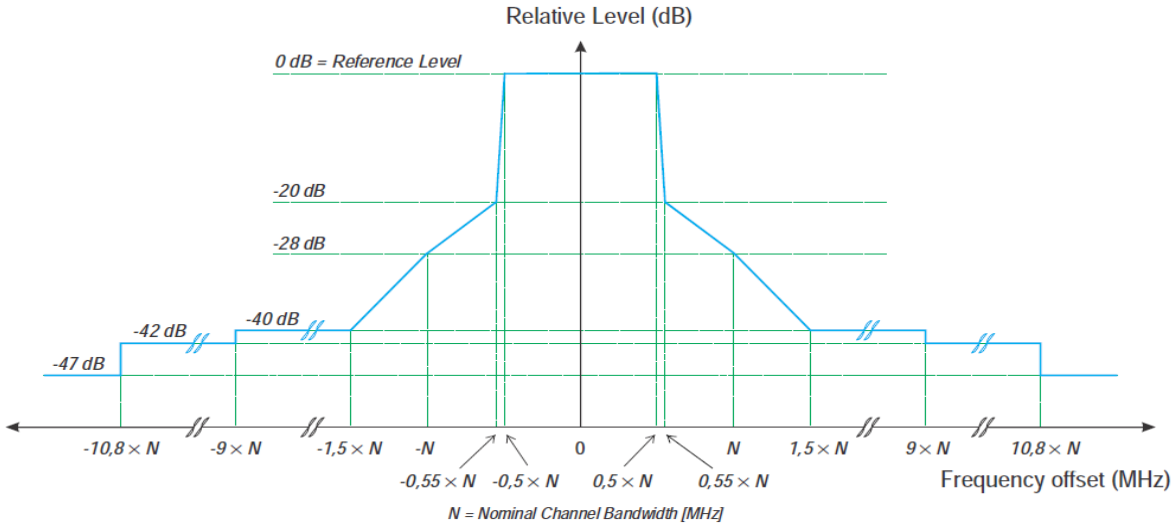
Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

12. Transmitter Unwanted Emissions In The Out-Of-Band Domain

12.1 Block Diagram Of Test Setup



12.2 Limit



12.3 Test Procedure

The UUT shall be configured for continuous transmit mode (duty cycle equal to 100 %). If this is not possible, then option 2 shall be used.

Step 1: Determination of the reference average power level.

• Spectrum analyser settings:
- Resolution bandwidth: 1 MHz
- Video bandwidth: 30 kHz
- Detector mode: Peak
- Trace mode: Video Average
- Sweep Time: Coupled
- Centre Frequency: Centre frequency of the channel being tested
- Span: 2 × Nominal Channel Bandwidth

• Use the marker to find the highest average power level of the power envelope of the UUT. This level shall be used as the reference level for the relative measurements.

Step 2: Determination of the relative average power levels.

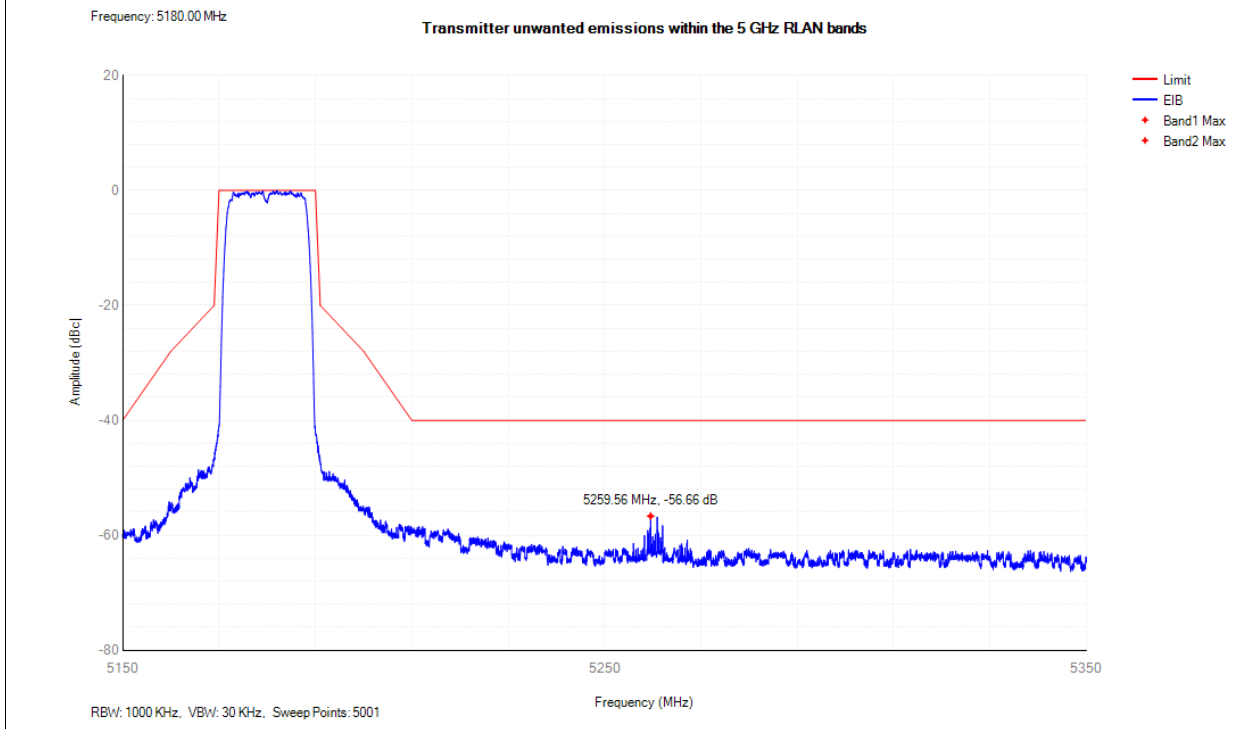
• Adjust the frequency range of the spectrum analyser to allow the measurement to be performed within the sub-bands 5 150 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz. No other parameter of the spectrum analyser should be changed.

• Compare the relative power envelope of the UUT with the limits defined in clause 4.2.4.2.2.

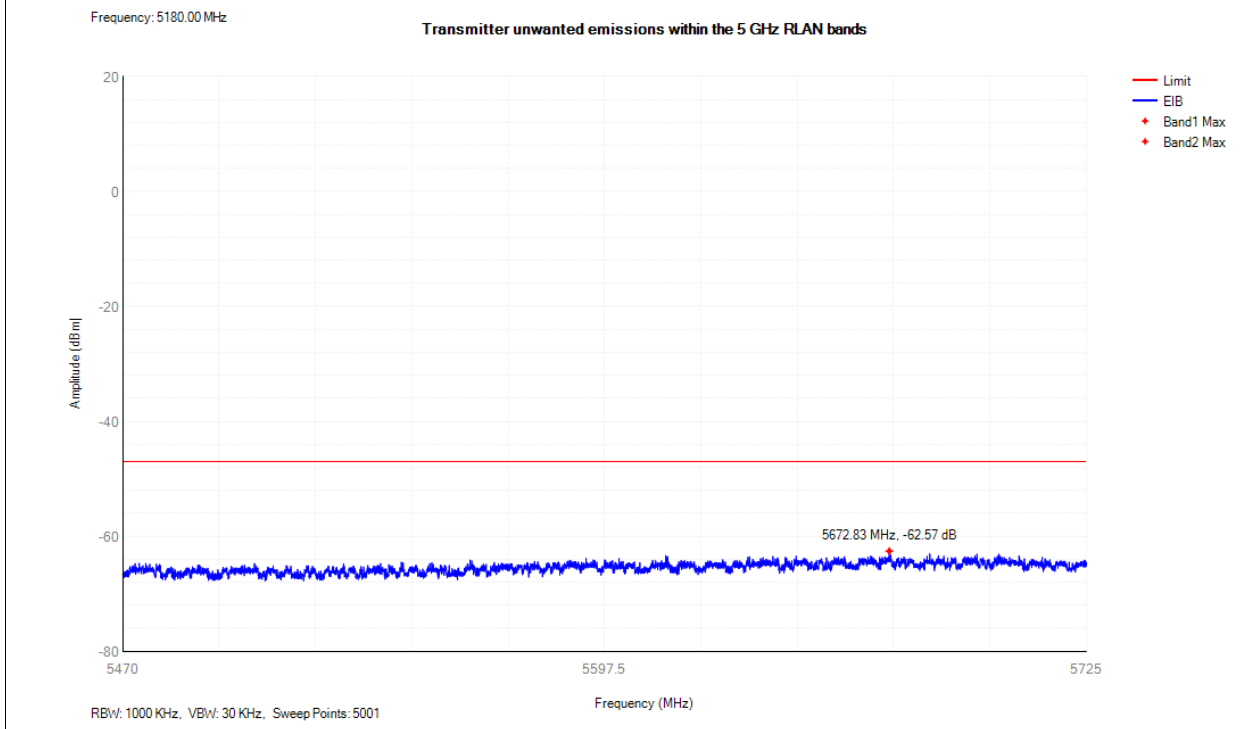
12.4 Test Result

Antenna A Test Plots (the worst data)

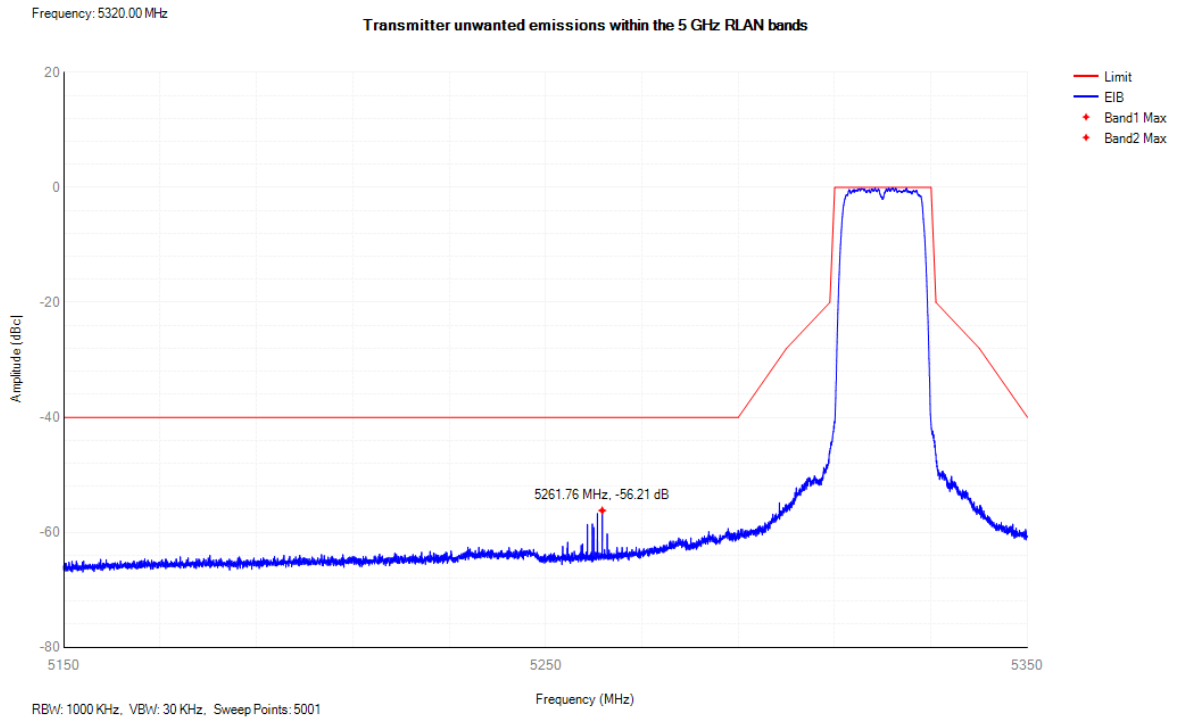
Test Graphs
Tx. Emissions EIB NVNT a 5180MHz Sub Band1



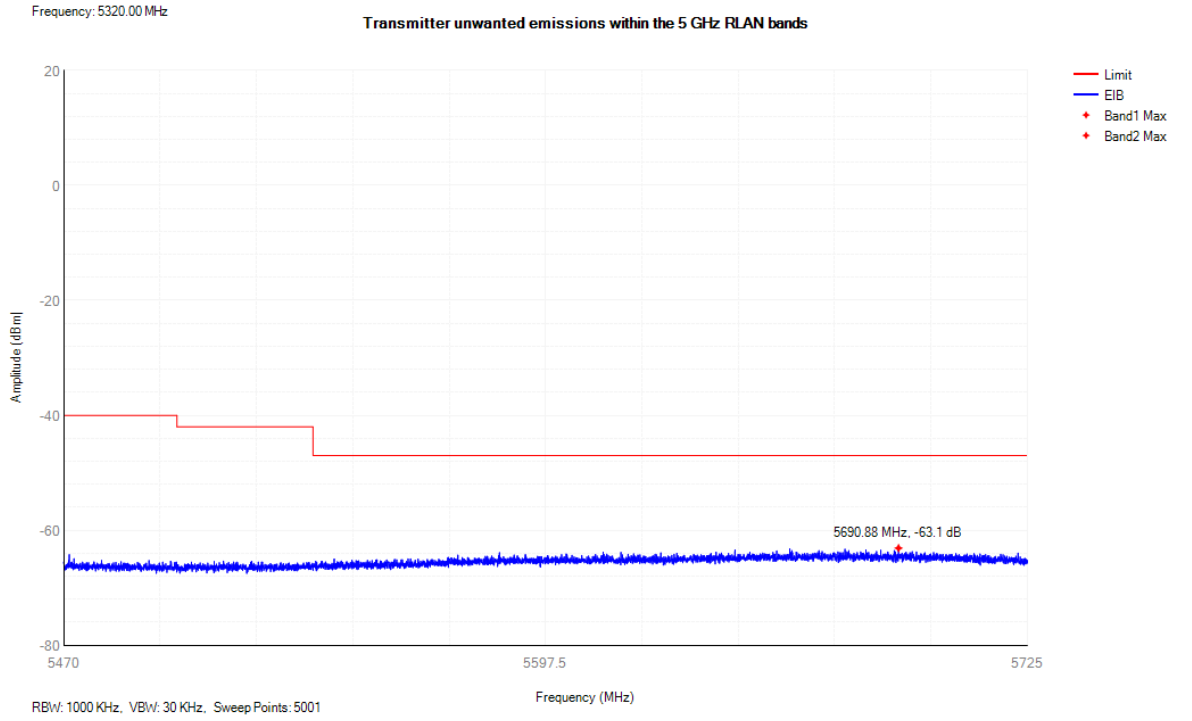
Tx. Emissions EIB NVNT a 5180MHz Sub Band2



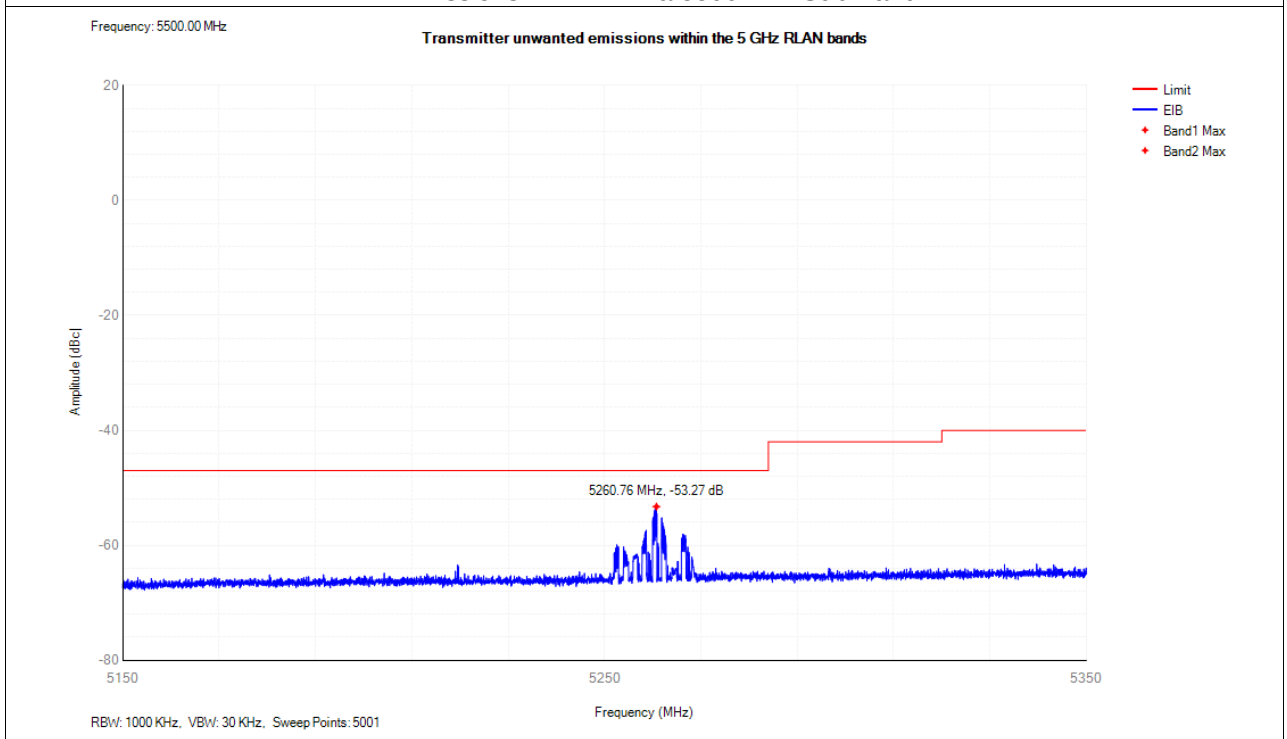
Tx. Emissions EIB NVNT a 5320MHz Sub Band1



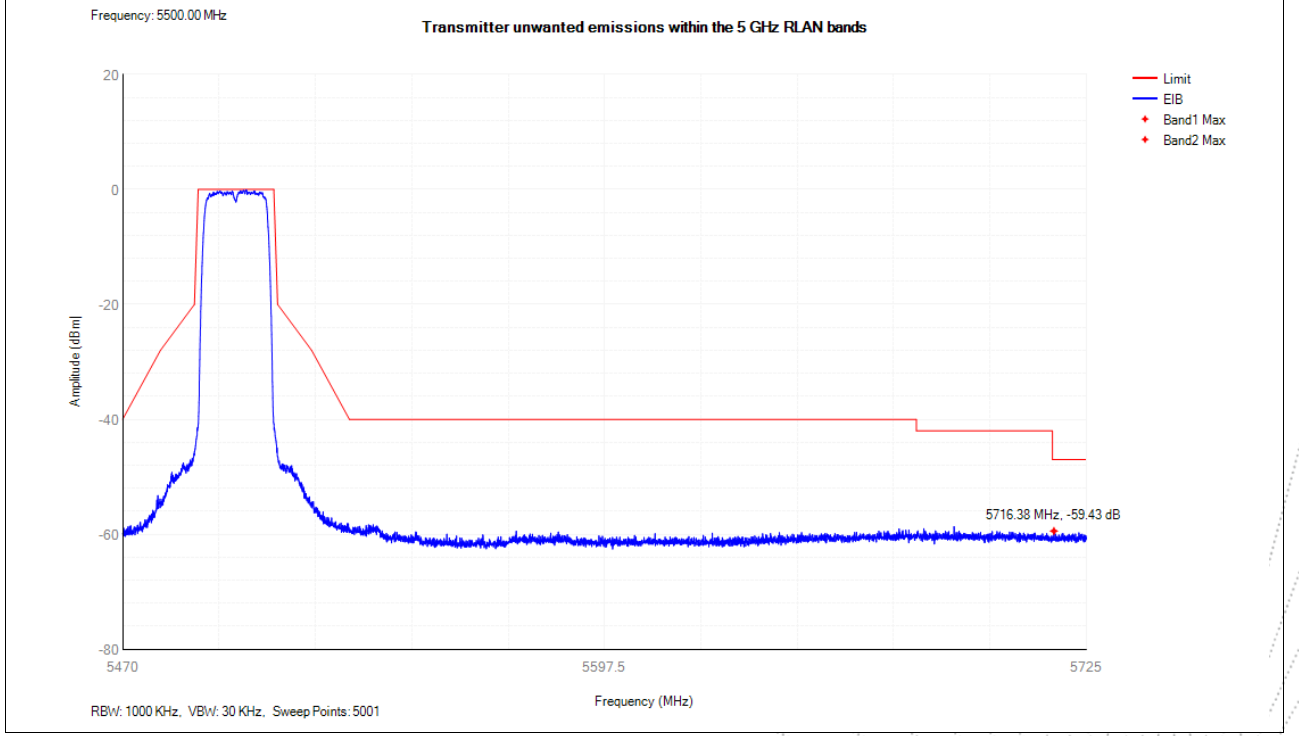
Tx. Emissions EIB NVNT a 5320MHz Sub Band2



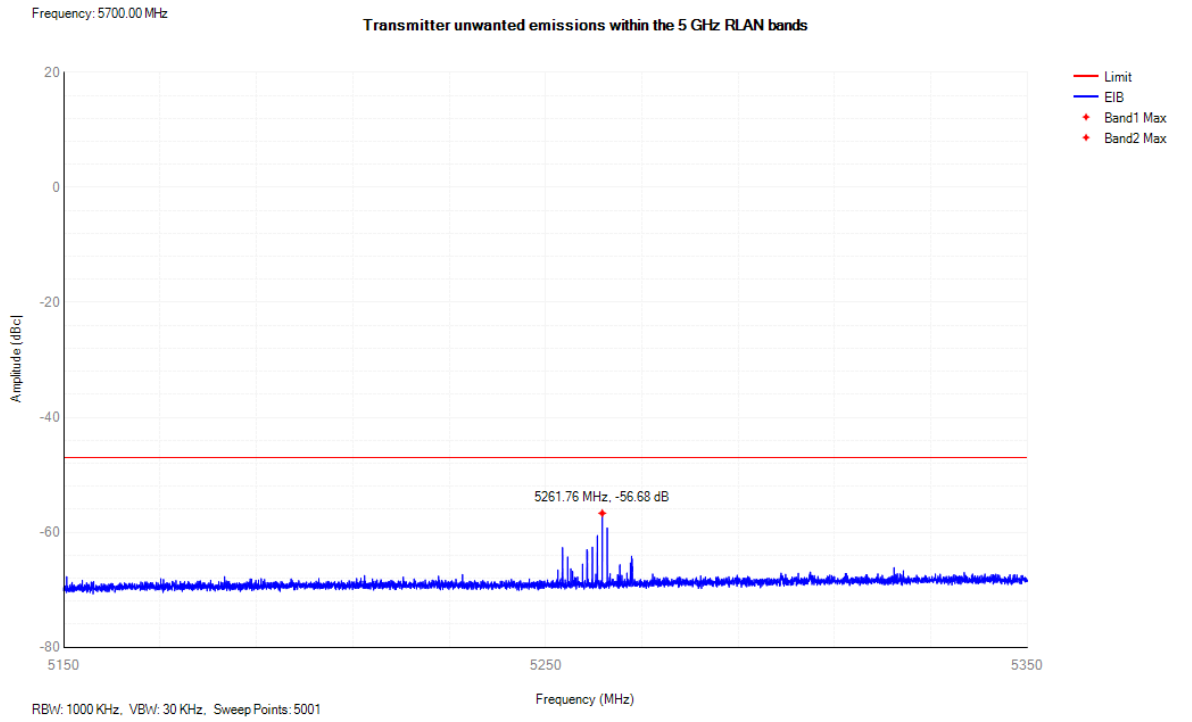
Tx. Emissions EIB NVNT a 5500MHz Sub Band1



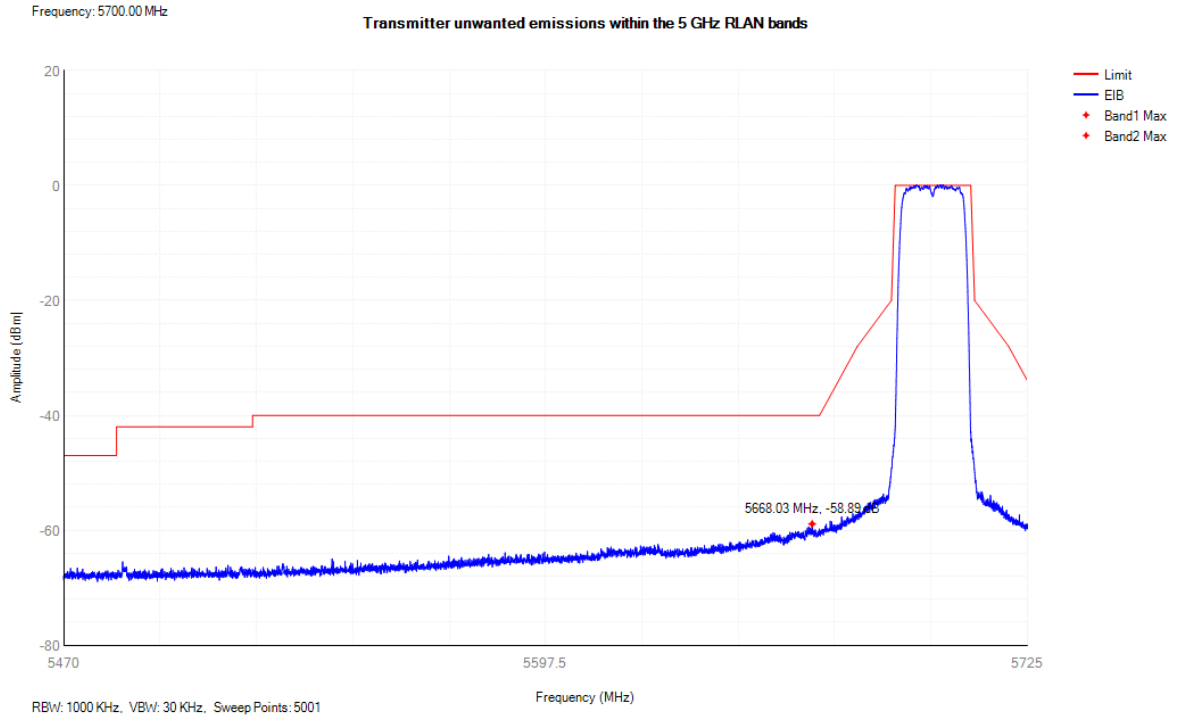
Tx. Emissions EIB NVNT a 5500MHz Sub Band2



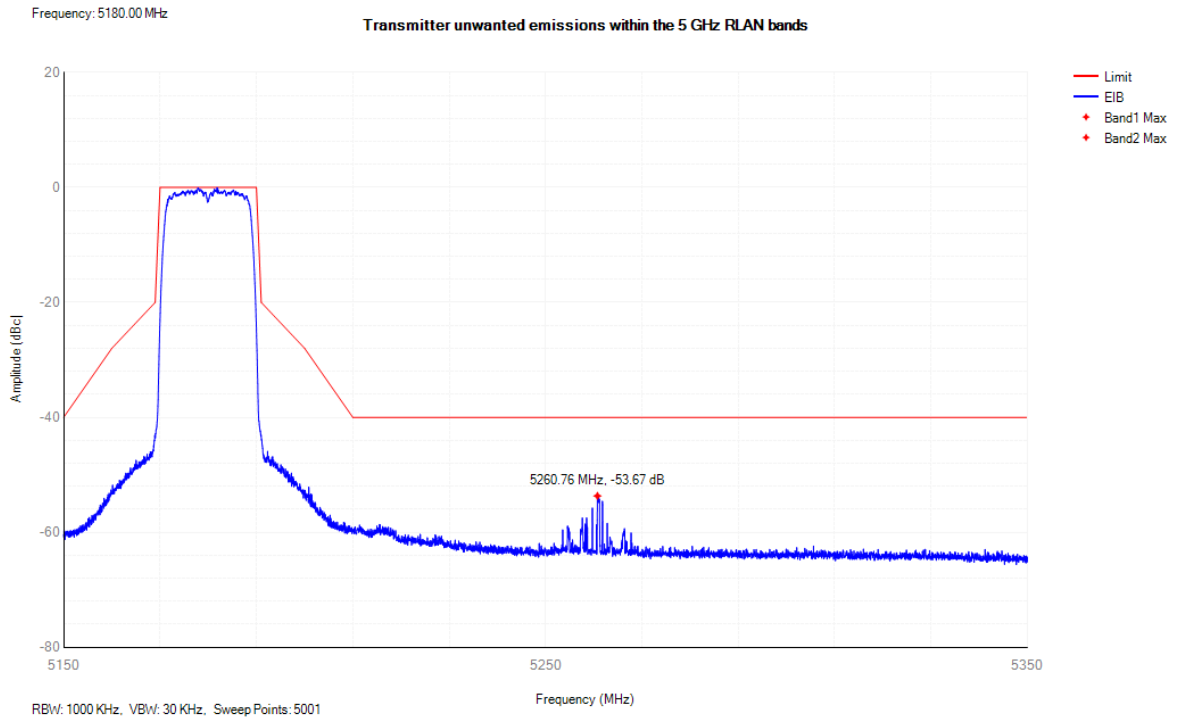
Tx. Emissions EIB NVNT a 5700MHz Sub Band1



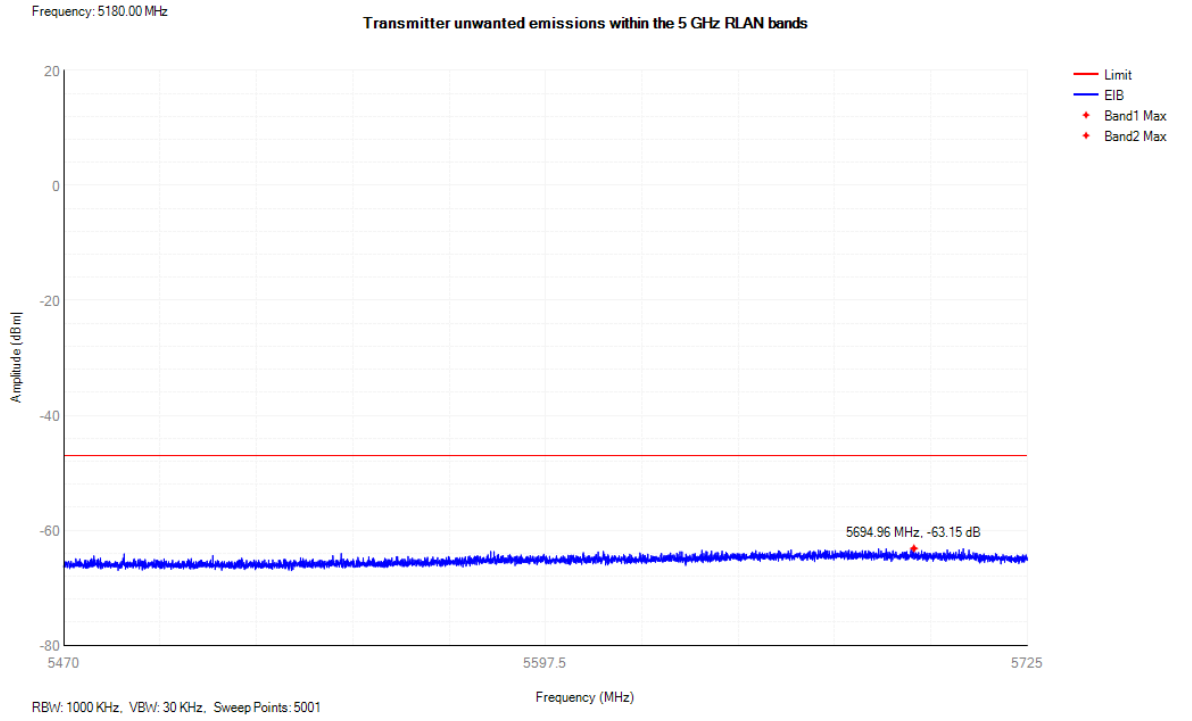
Tx. Emissions EIB NVNT a 5700MHz Sub Band2



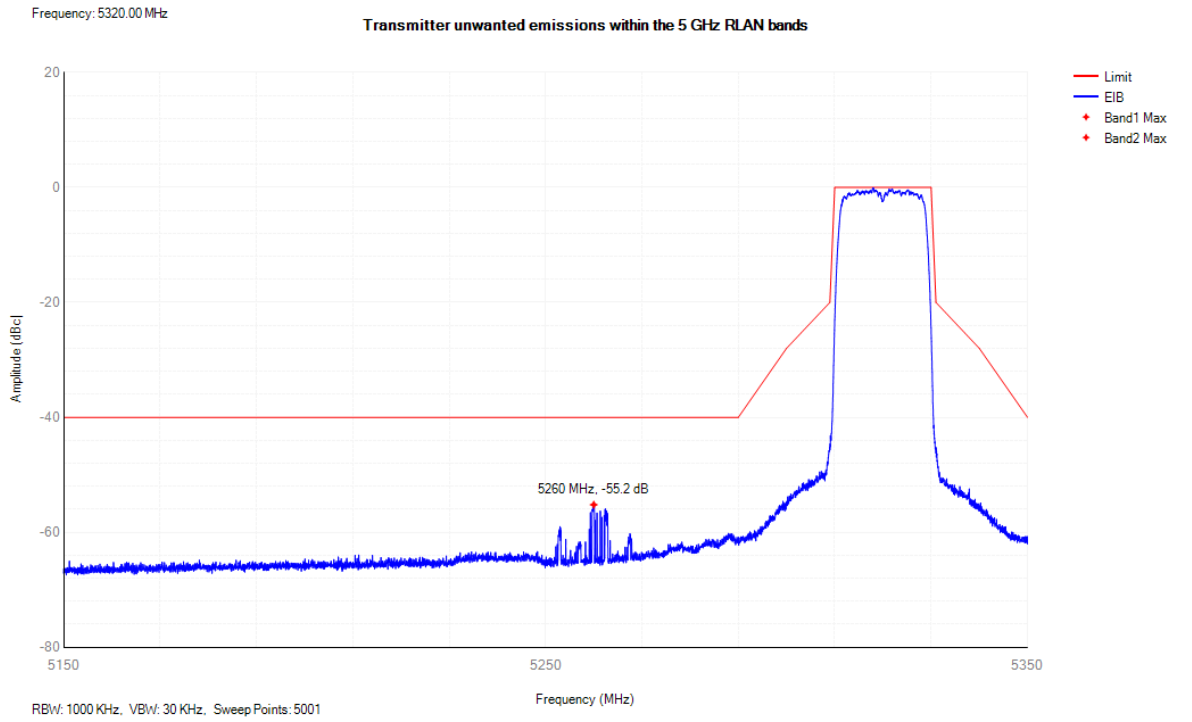
Tx. Emissions EIB NVNT n20 5180MHz Sub Band1



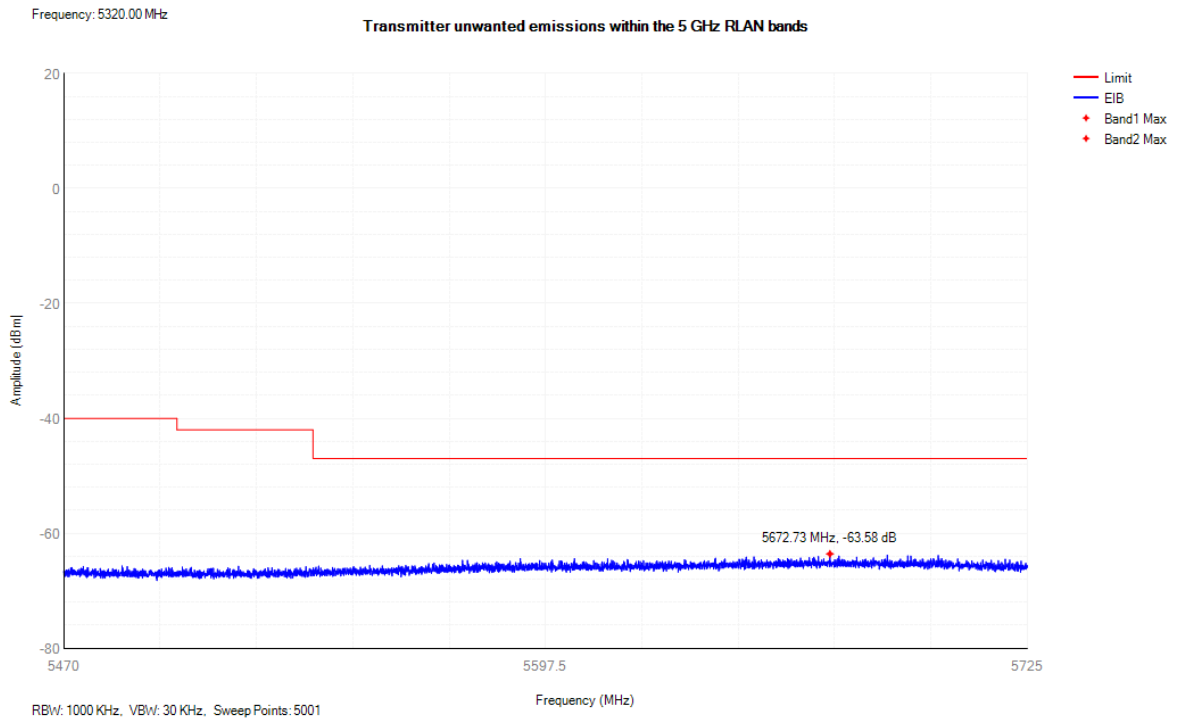
Tx. Emissions EIB NVNT n20 5180MHz Sub Band2



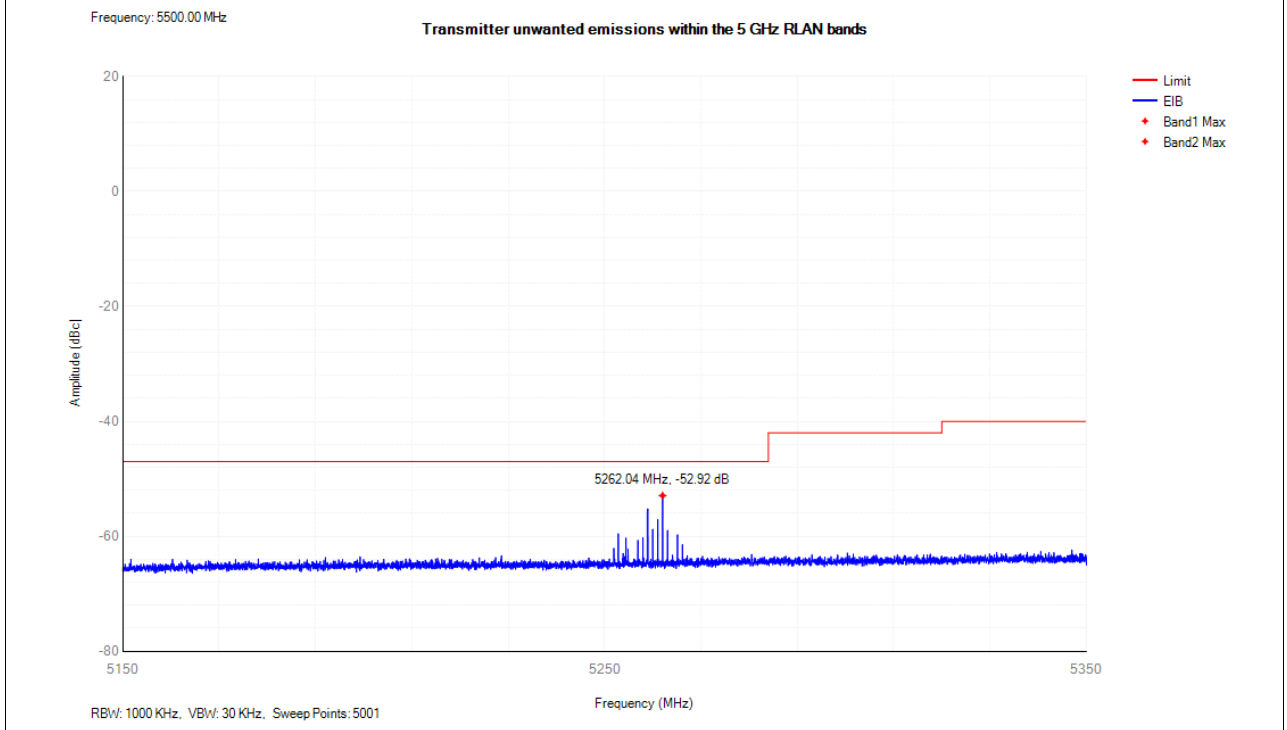
Tx. Emissions EIB NVNT n20 5320MHz Sub Band1



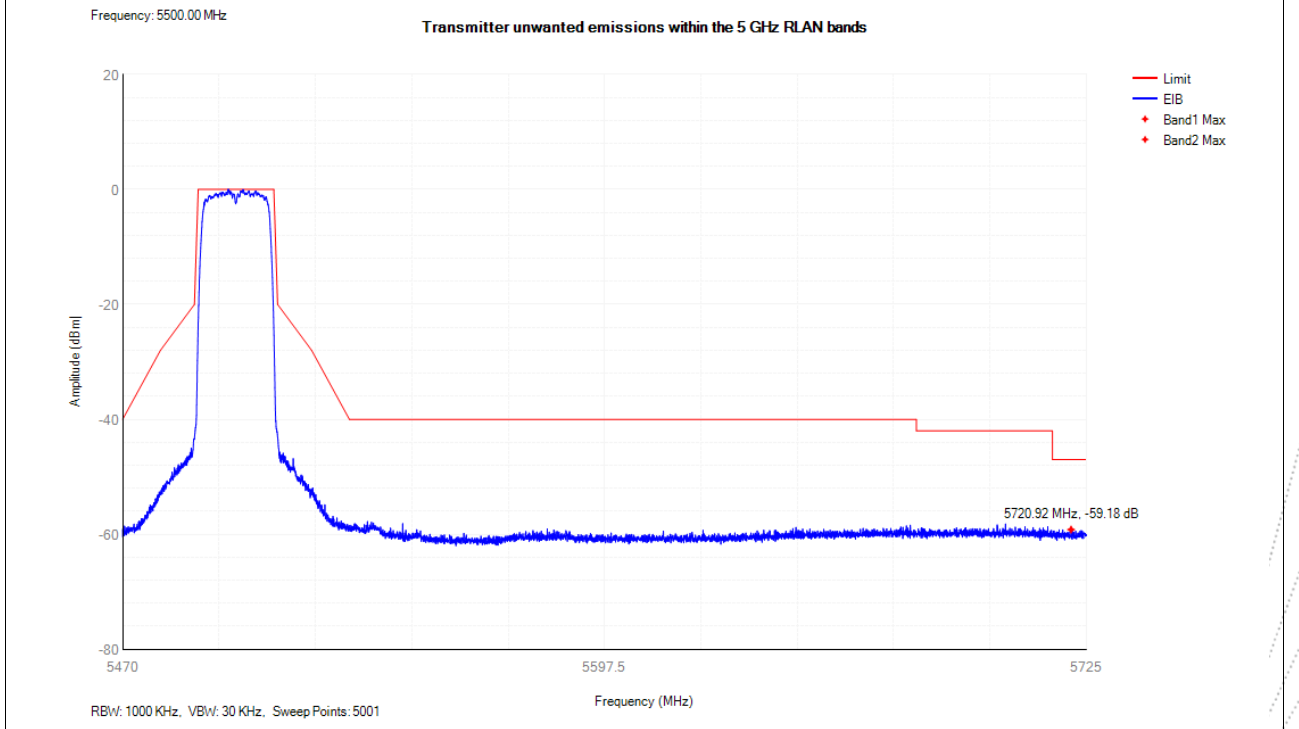
Tx. Emissions EIB NVNT n20 5320MHz Sub Band2



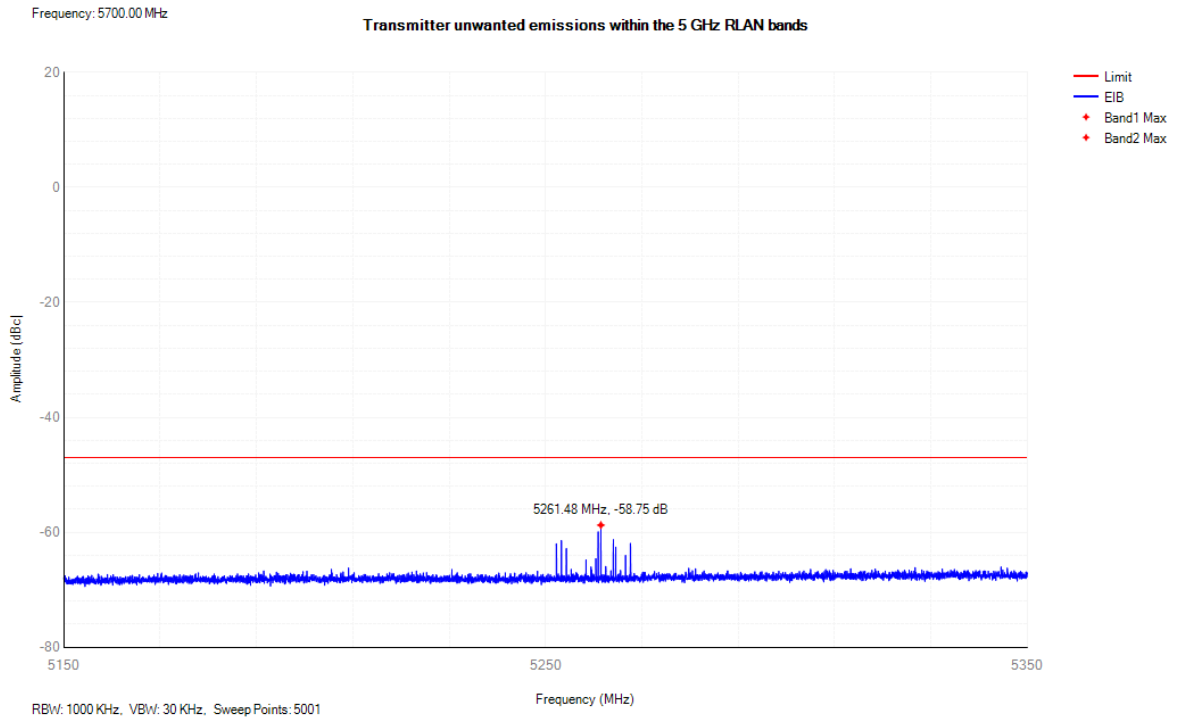
Tx. Emissions EIB NVNT n20 5500MHz Sub Band1



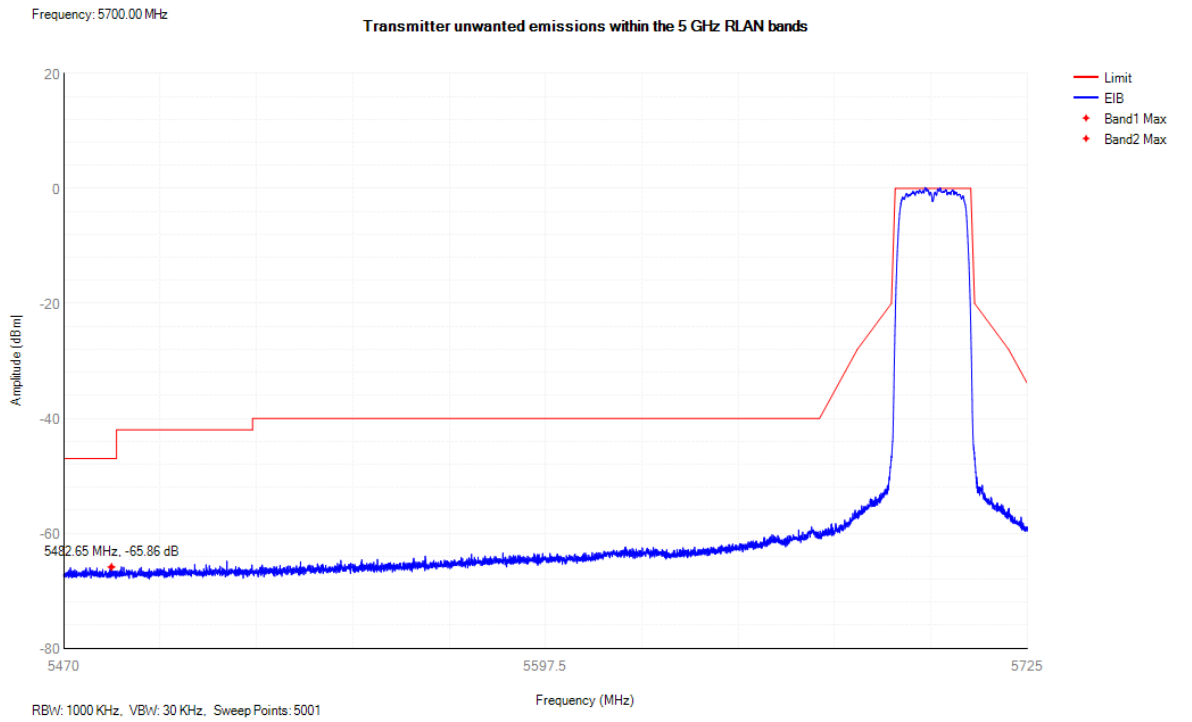
Tx. Emissions EIB NVNT n20 5500MHz Sub Band2



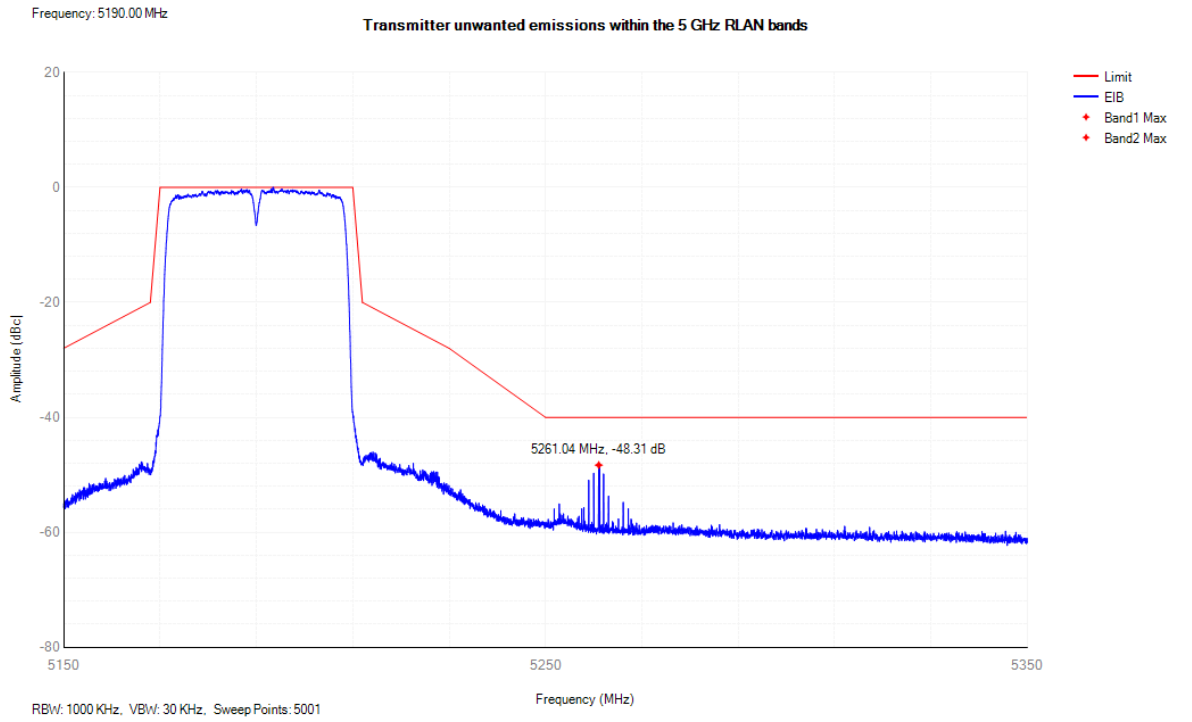
Tx. Emissions EIB NVNT n20 5700MHz Sub Band1



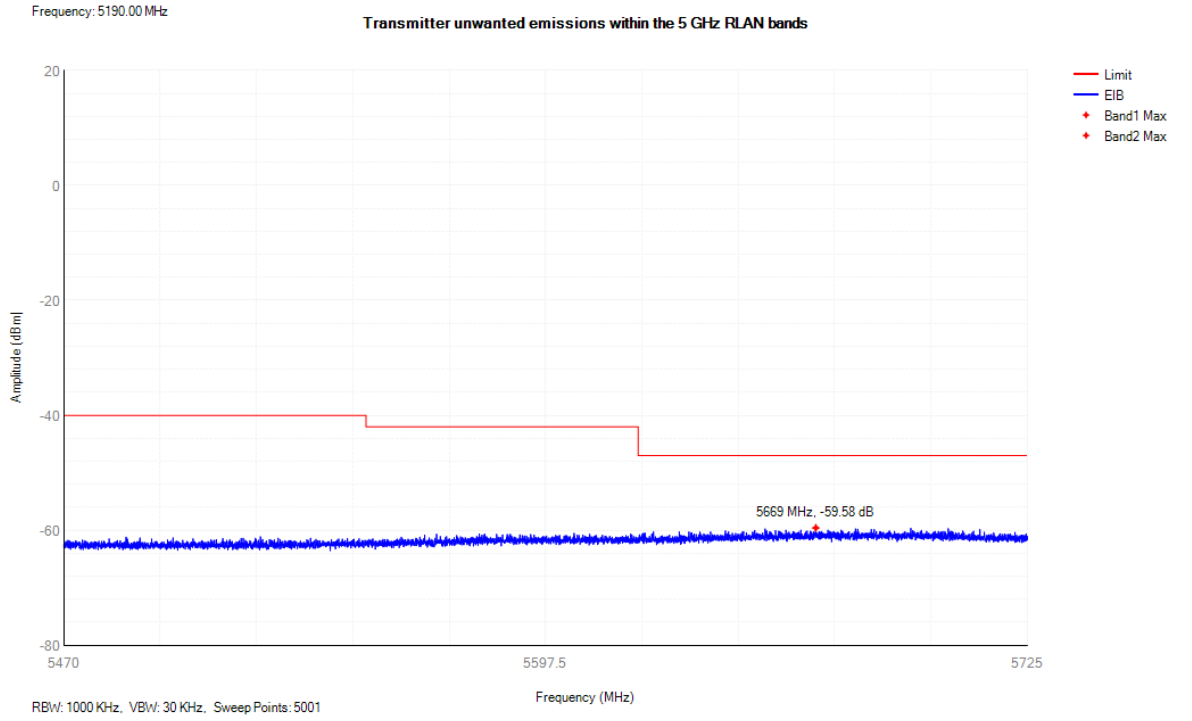
Tx. Emissions EIB NVNT n20 5700MHz Sub Band2



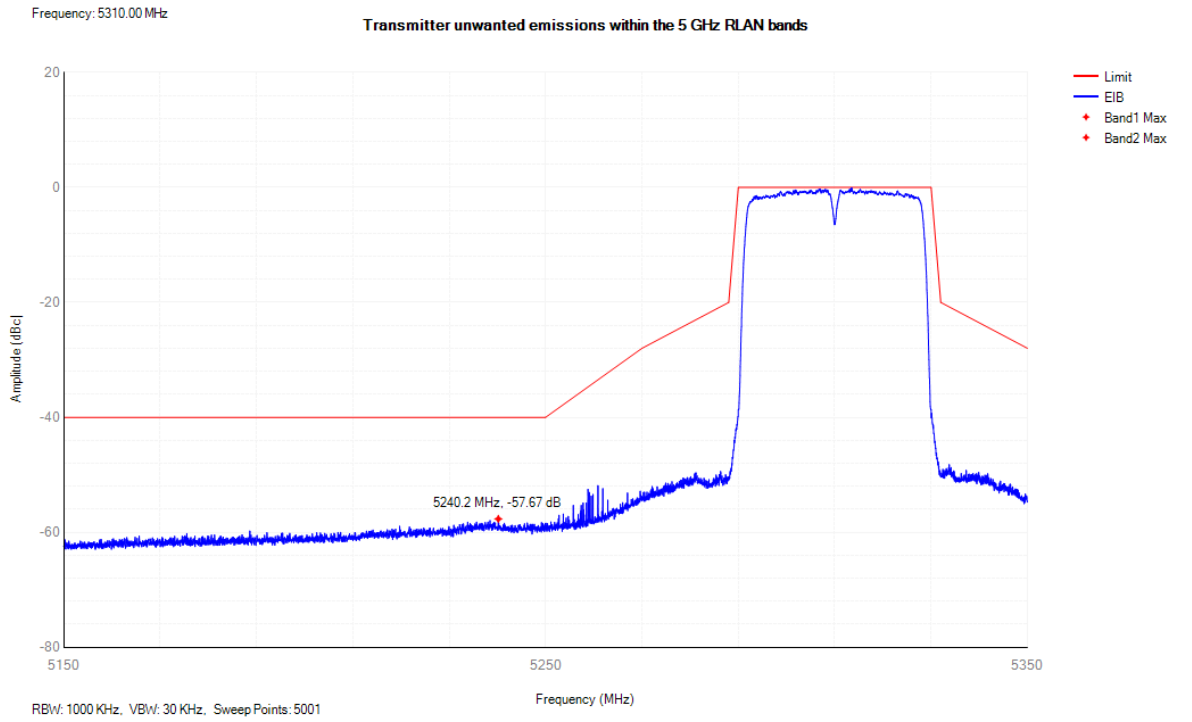
Tx. Emissions EIB NVNT n40 5190MHz Sub Band1



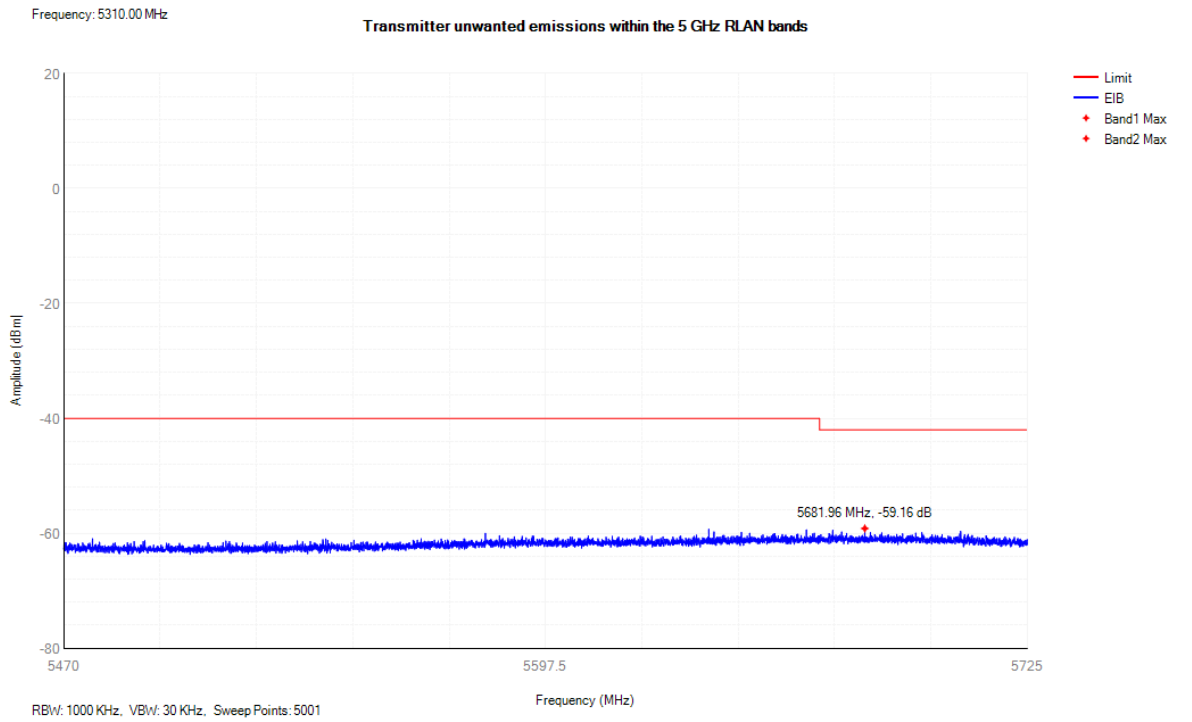
Tx. Emissions EIB NVNT n40 5190MHz Sub Band2



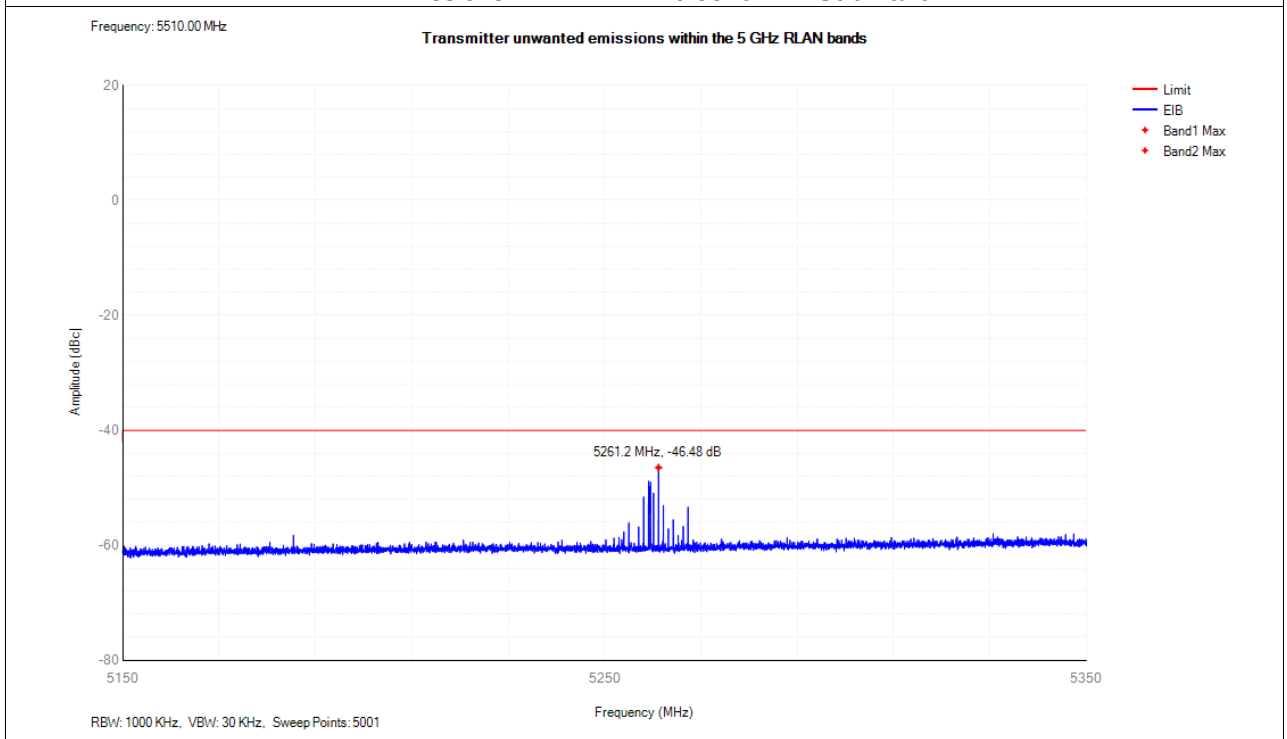
Tx. Emissions EIB NVNT n40 5310MHz Sub Band1



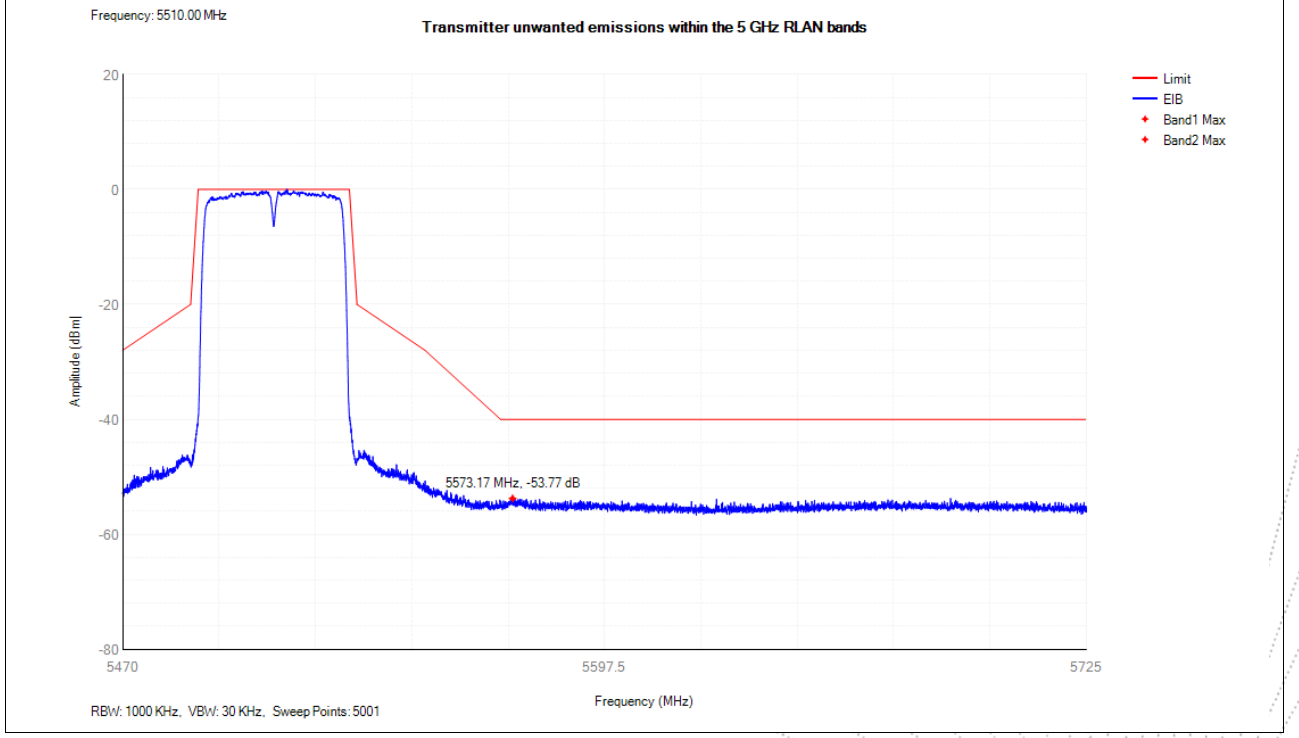
Tx. Emissions EIB NVNT n40 5310MHz Sub Band2



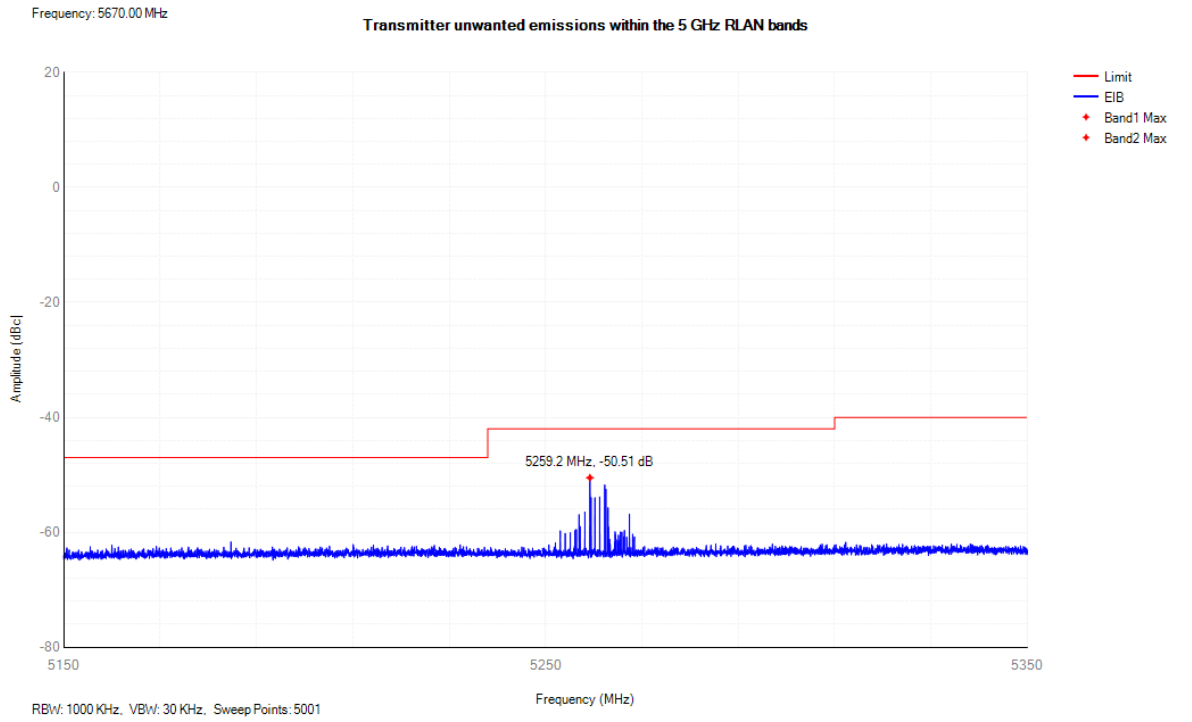
Tx. Emissions EIB NVNT n40 5510MHz Sub Band1



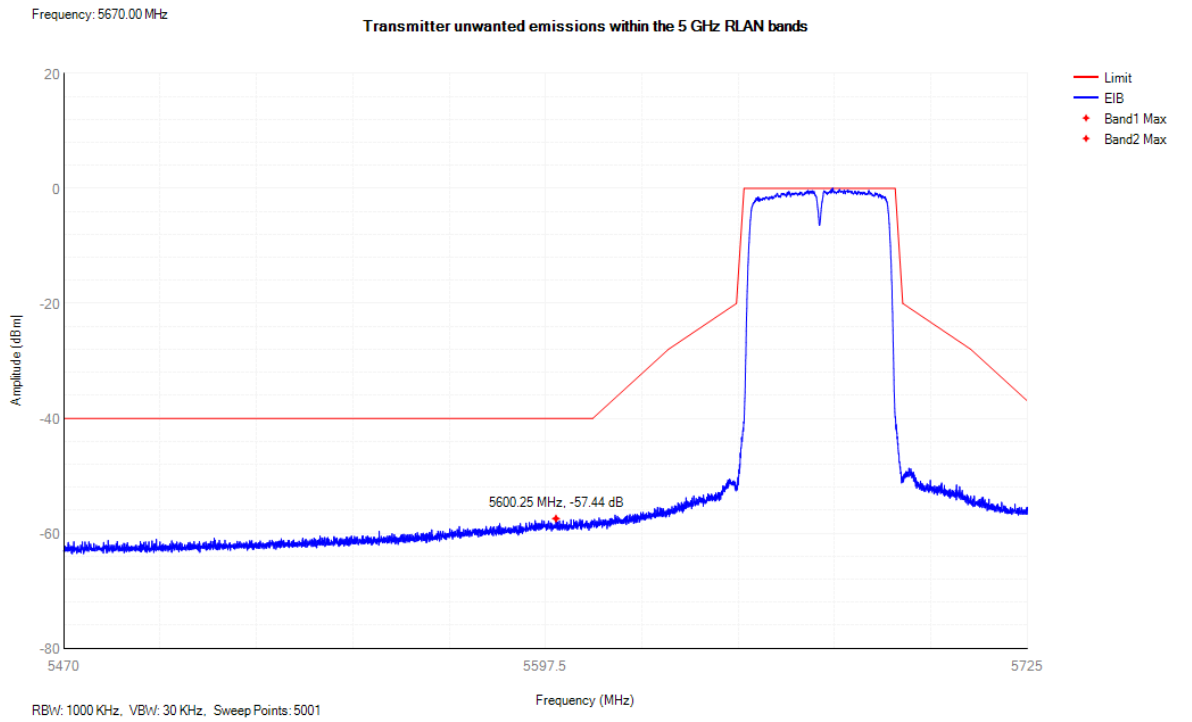
Tx. Emissions EIB NVNT n40 5510MHz Sub Band2



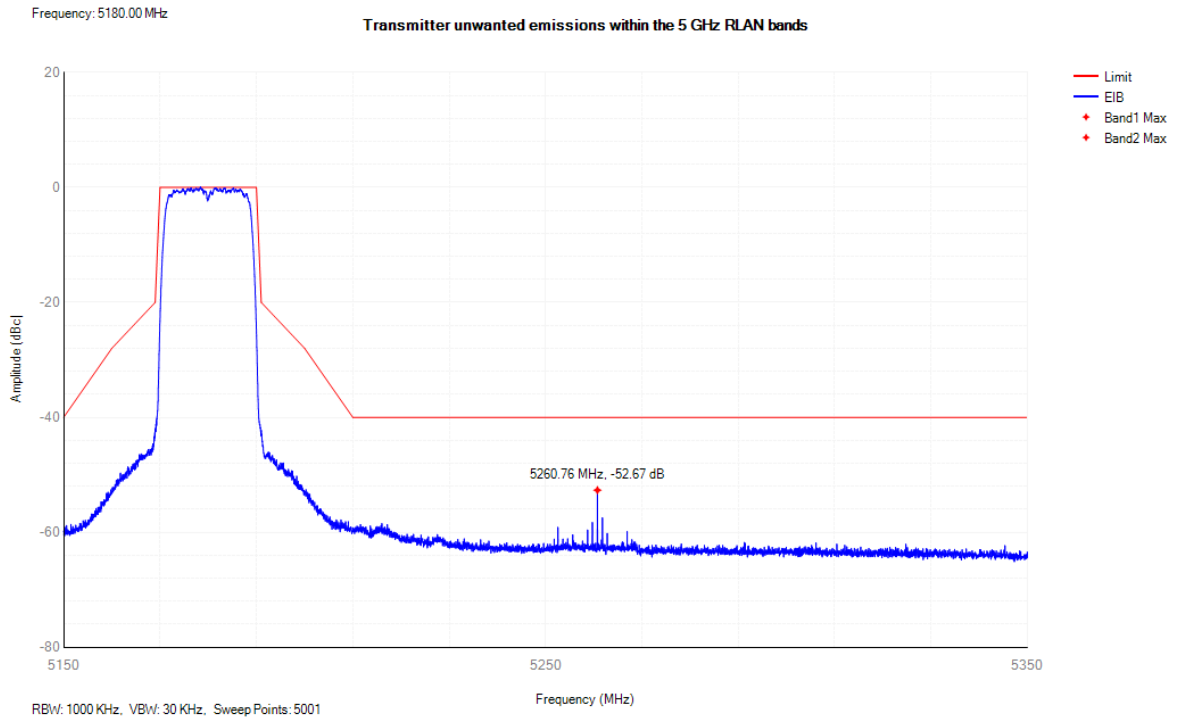
Tx. Emissions EIB NVNT n40 5670MHz Sub Band1



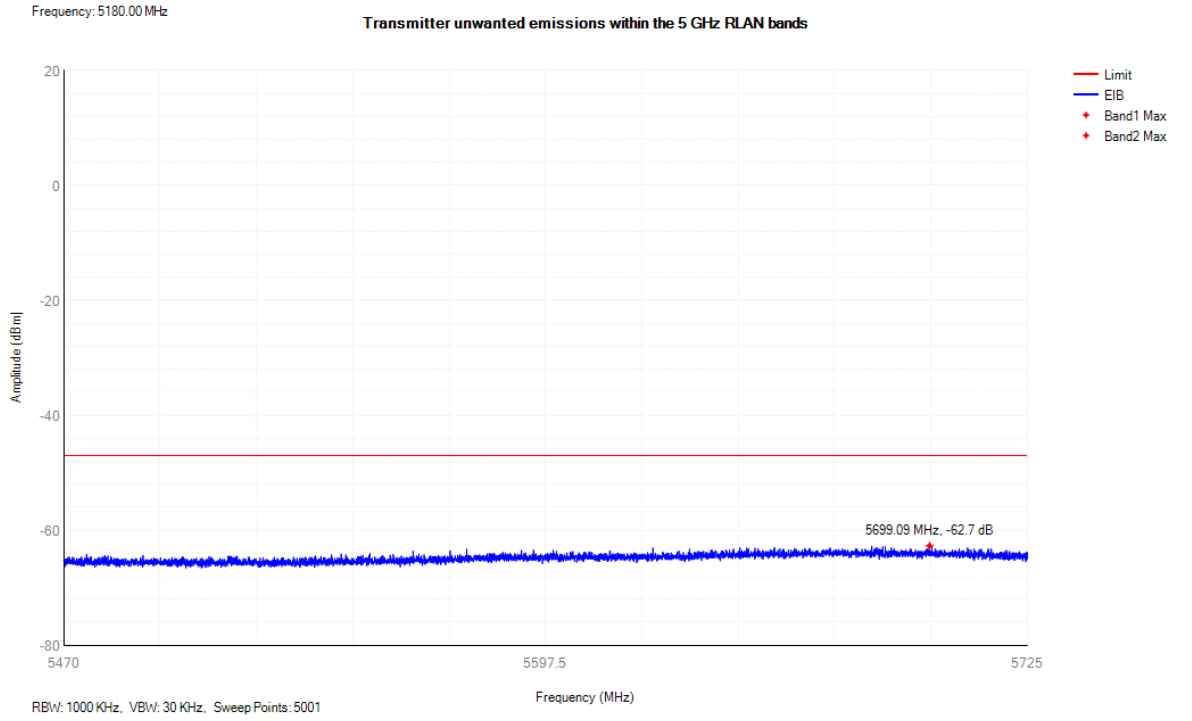
Tx. Emissions EIB NVNT n40 5670MHz Sub Band2



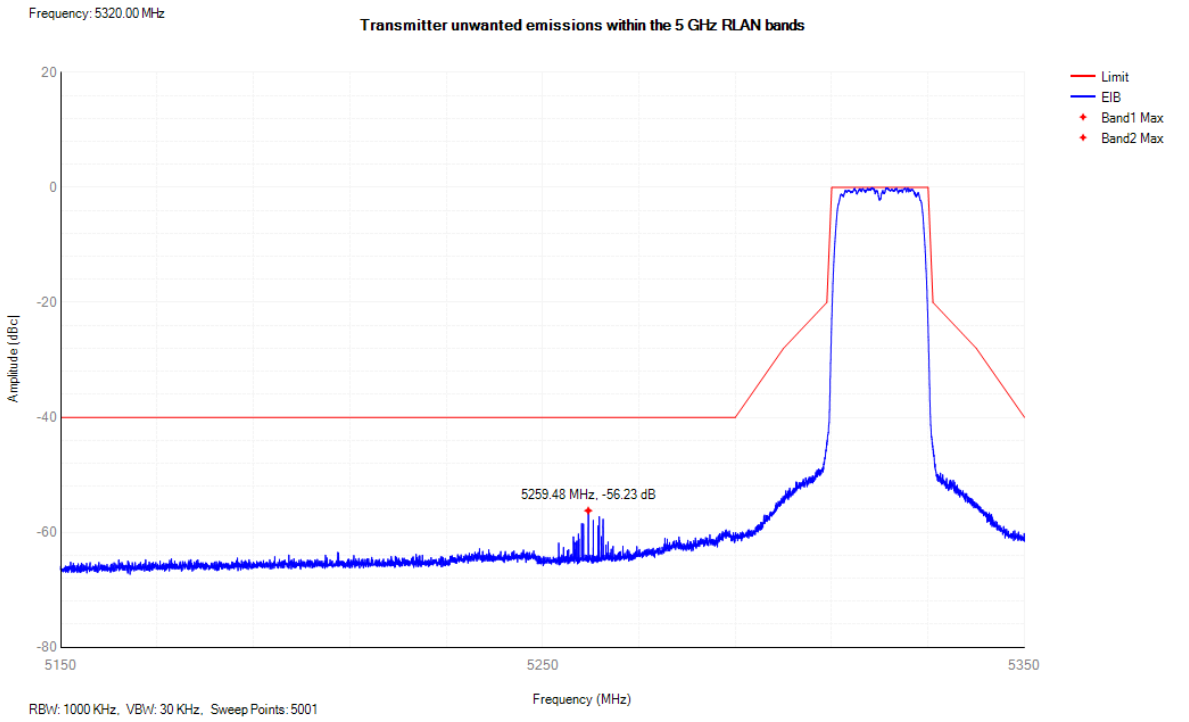
Tx. Emissions EIB NVNT ac20 5180MHz Sub Band1



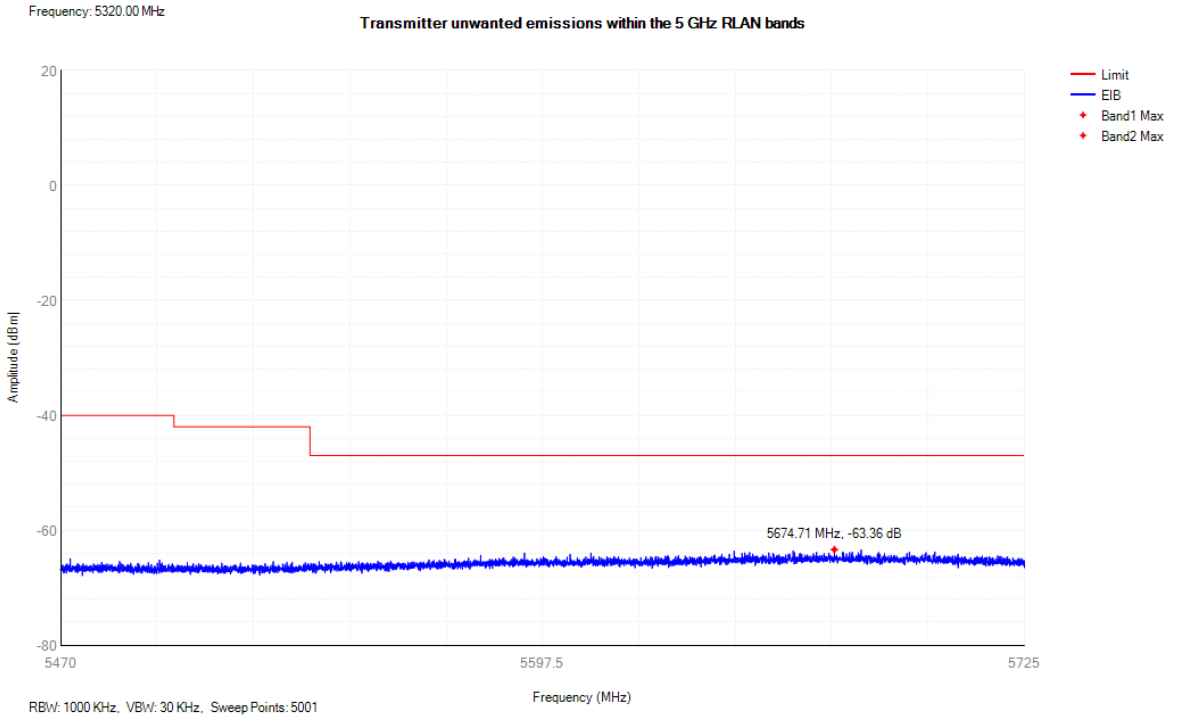
Tx. Emissions EIB NVNT ac20 5180MHz Sub Band2



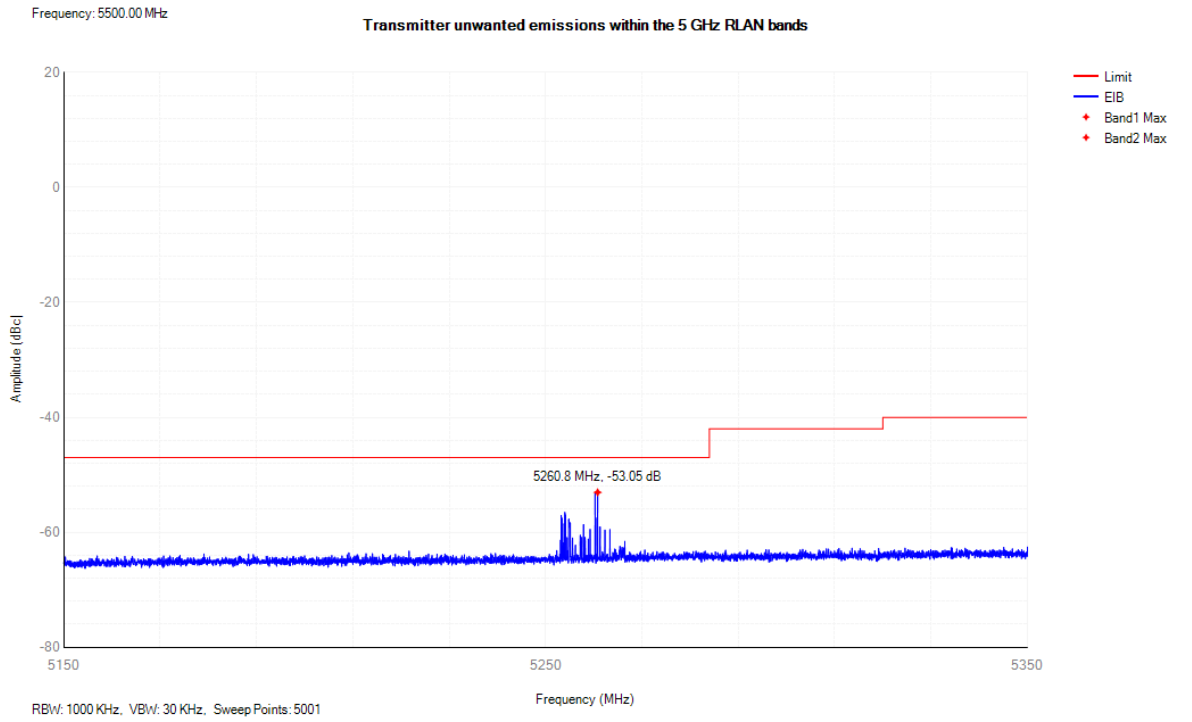
Tx. Emissions EIB NVNT ac20 5320MHz Sub Band1



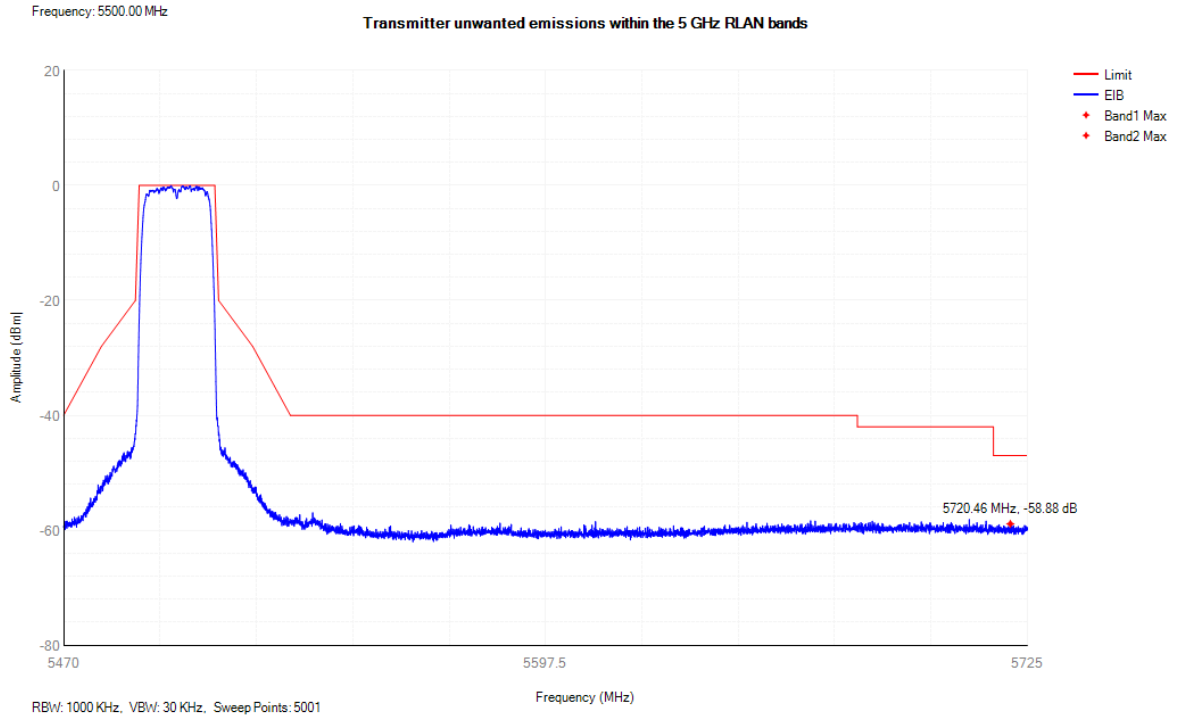
Tx. Emissions EIB NVNT ac20 5320MHz Sub Band2



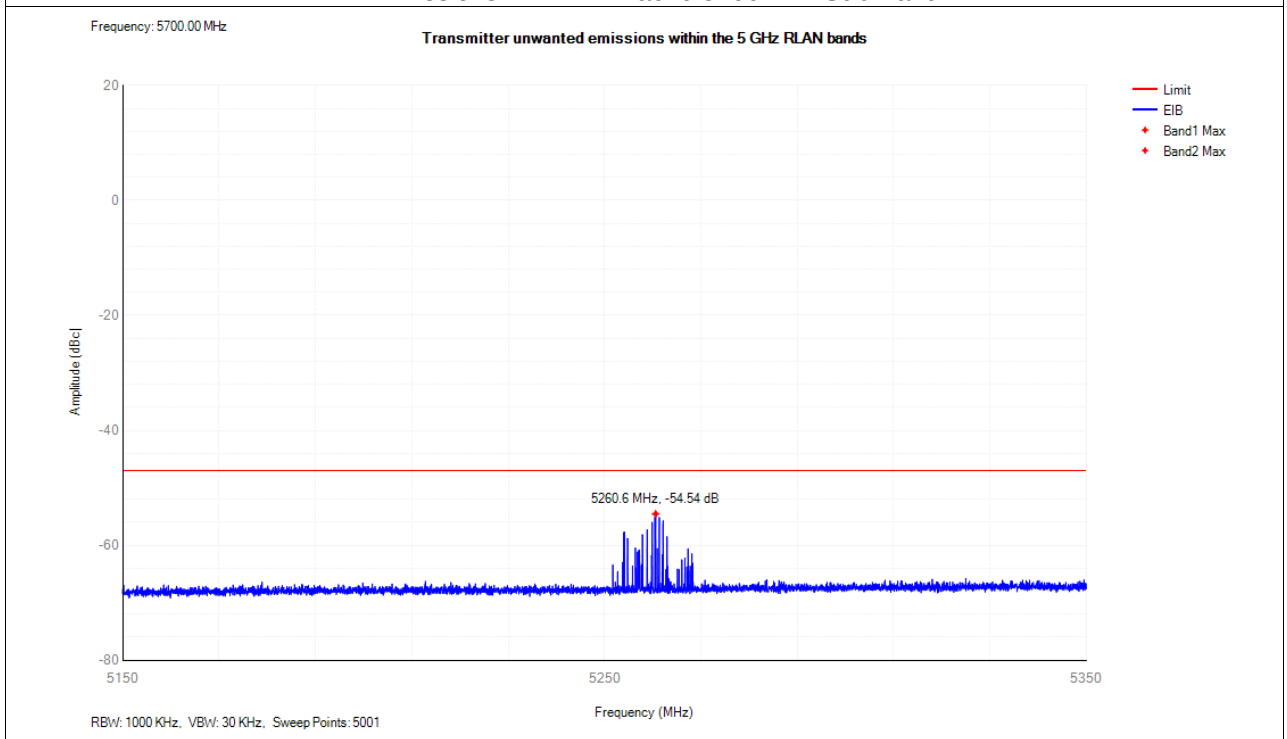
Tx. Emissions EIB NVNT ac20 5500MHz Sub Band1



Tx. Emissions EIB NVNT ac20 5500MHz Sub Band2



Tx. Emissions EIB NVNT ac20 5700MHz Sub Band1



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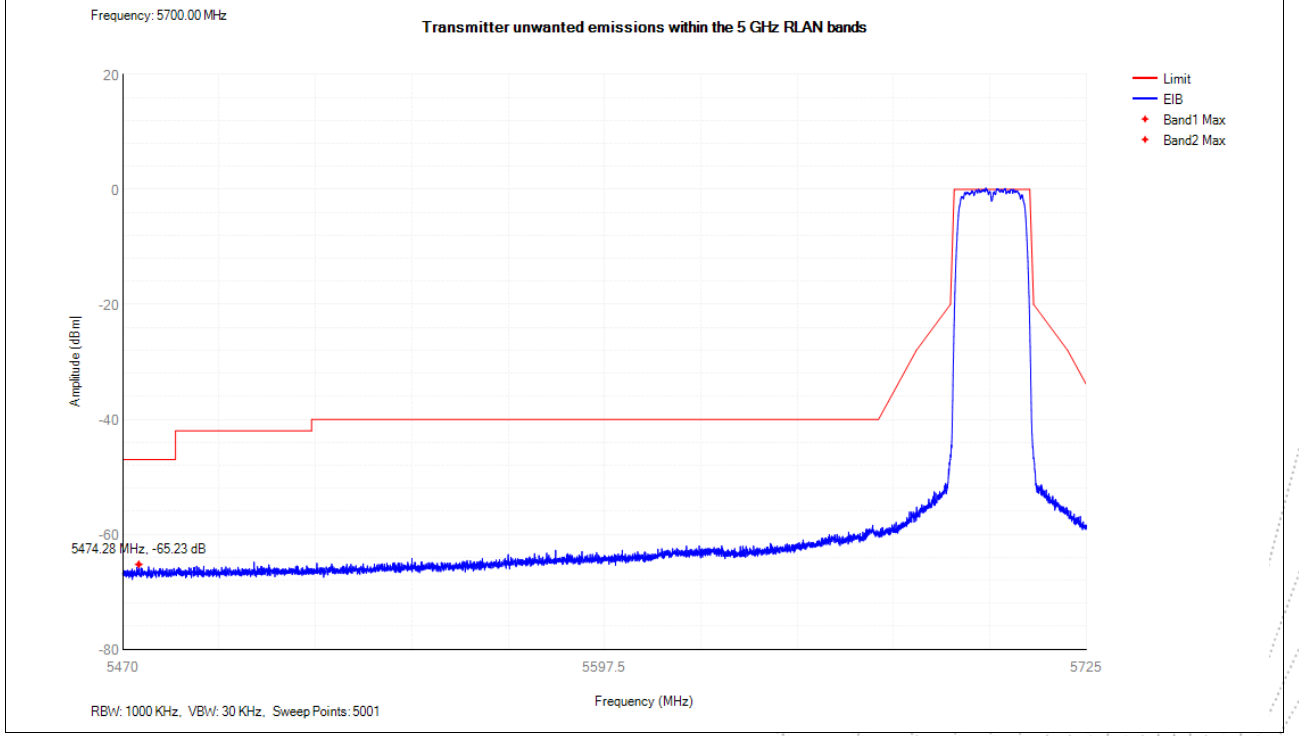

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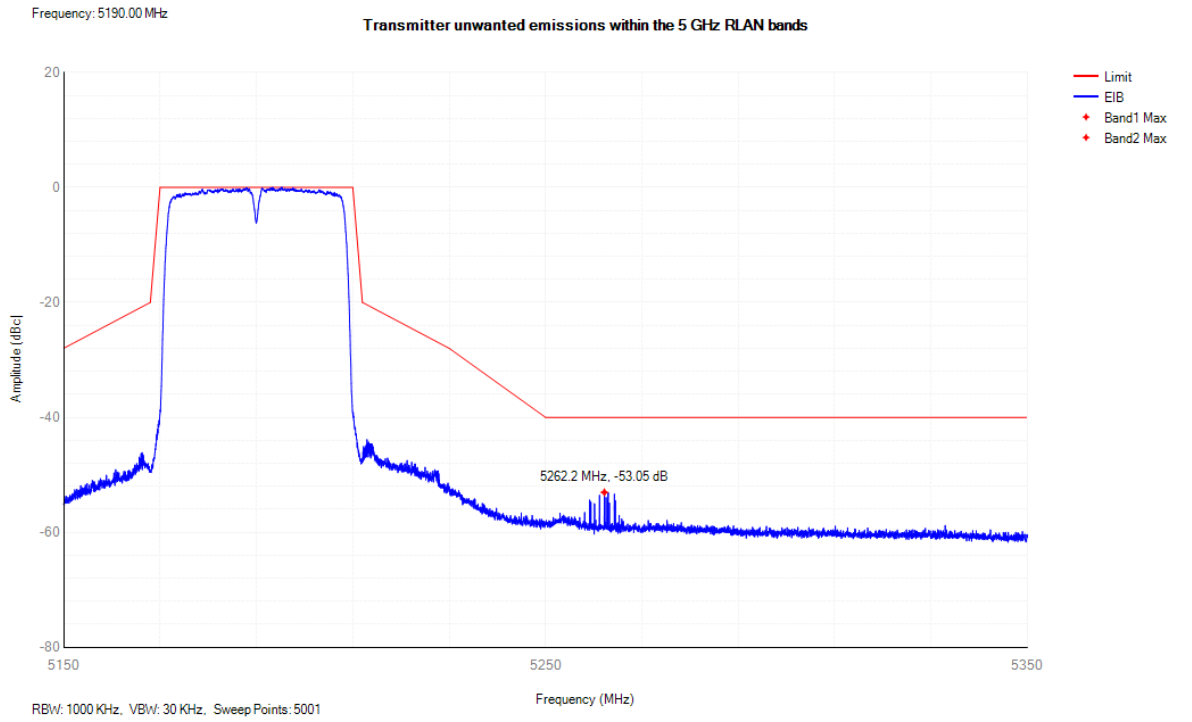

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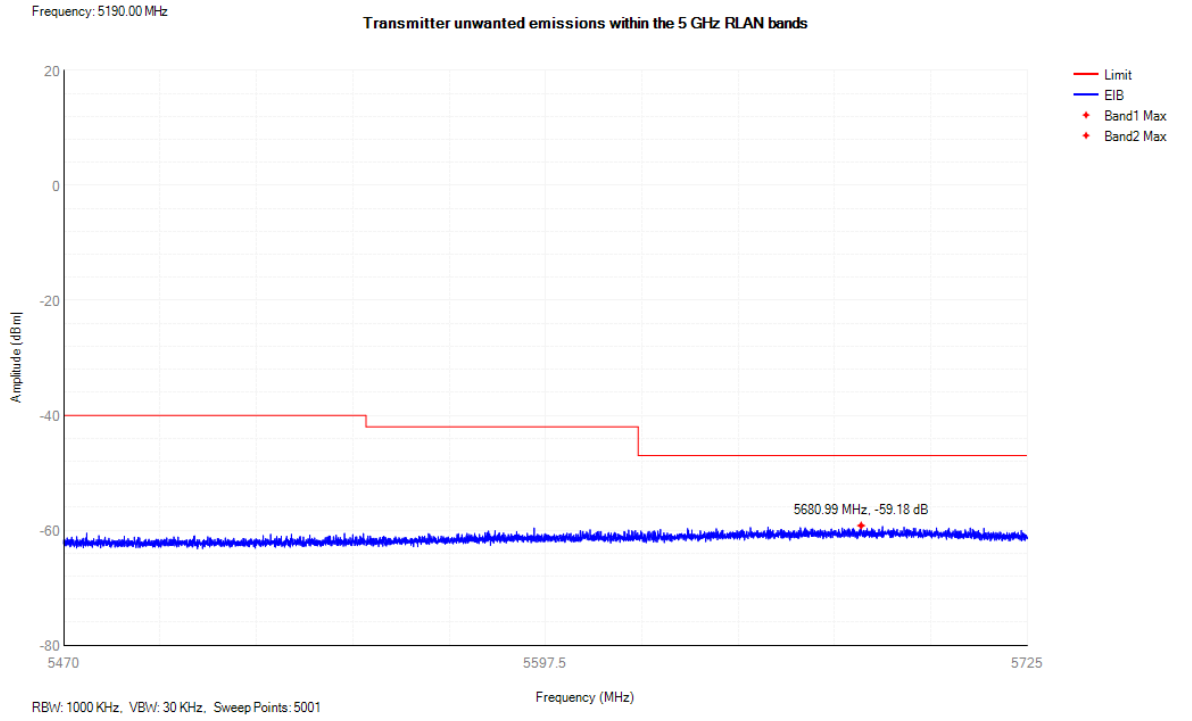

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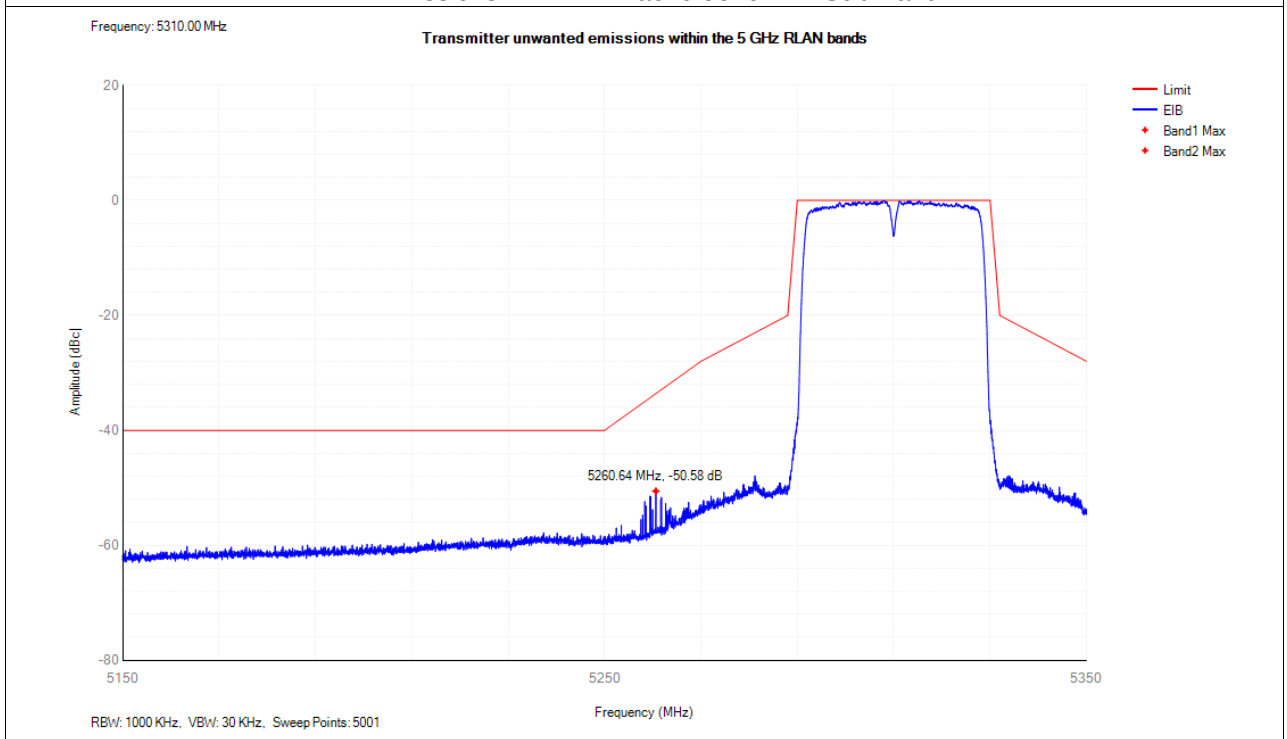
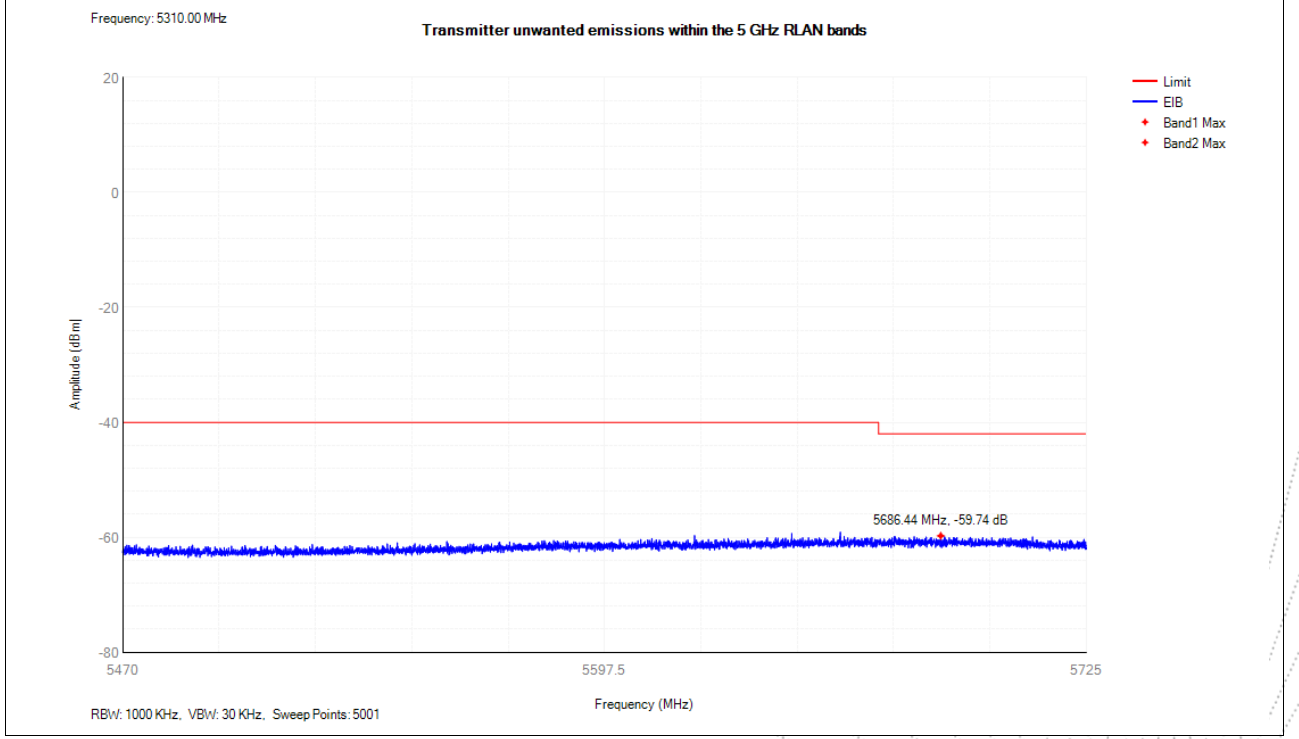


Tx. Emissions EIB NVNT ac40 5310MHz Sub Band2



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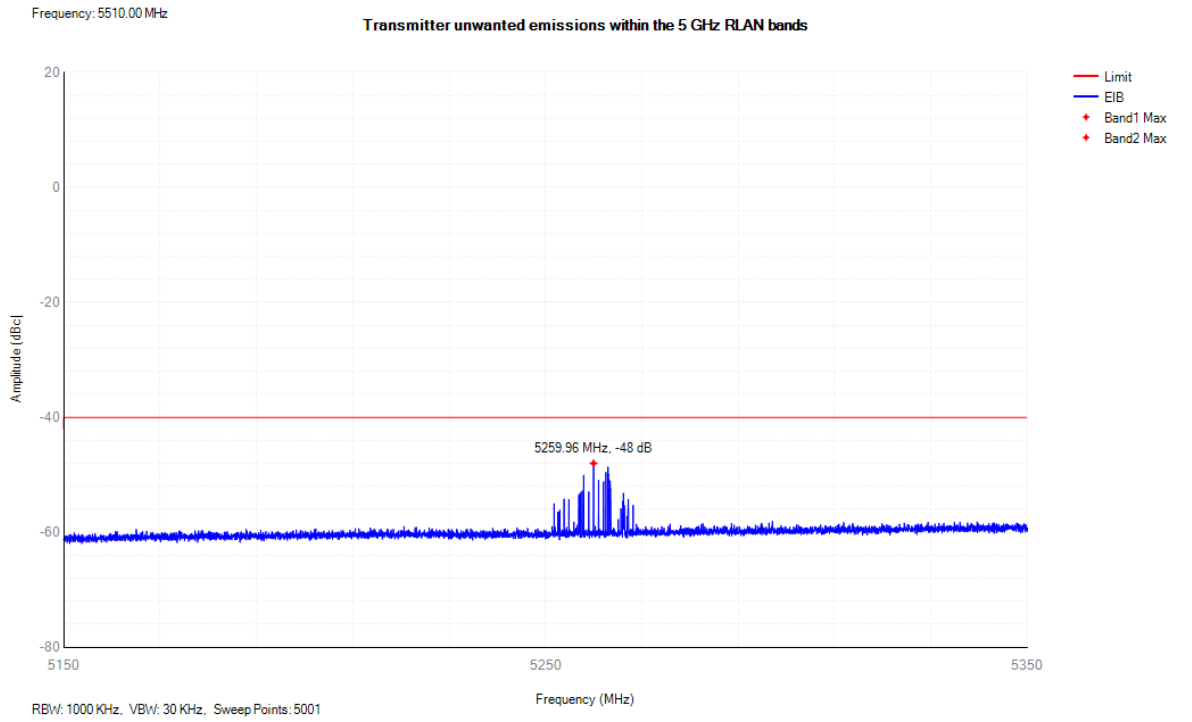
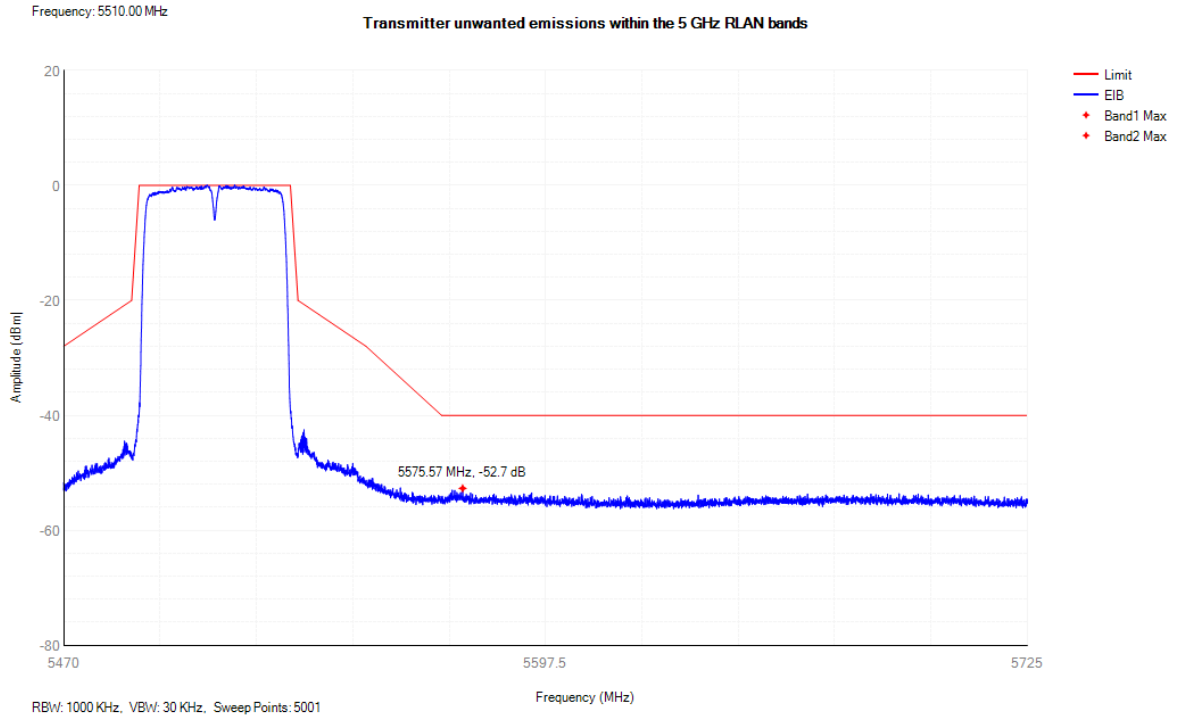
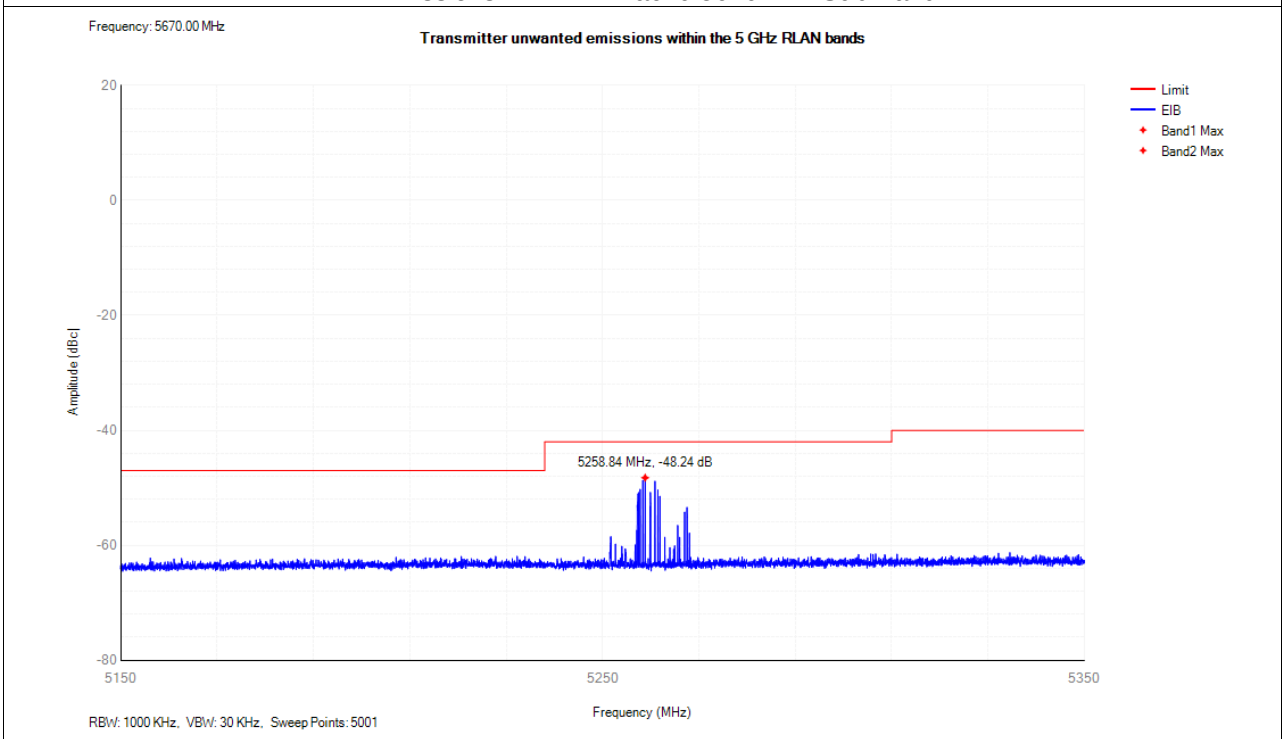


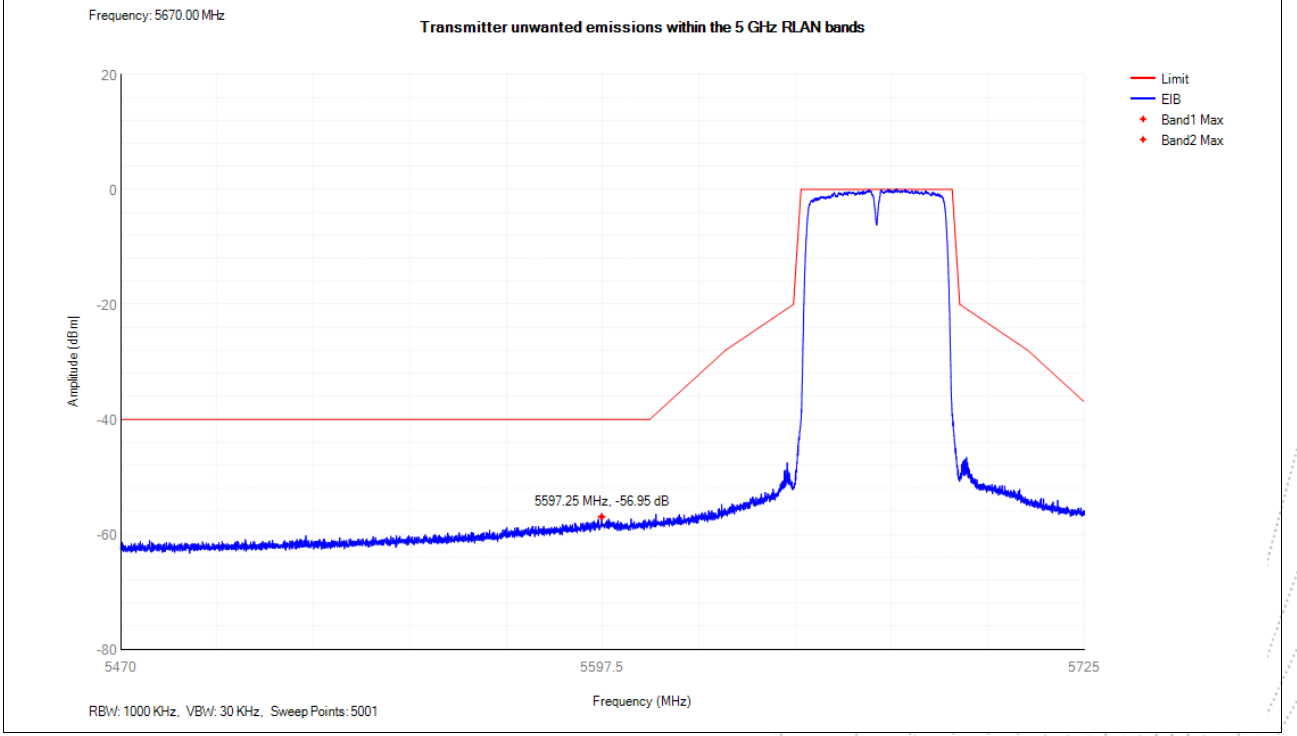
Tx. Emissions EIB NVNT ac40 5510MHz Sub Band2



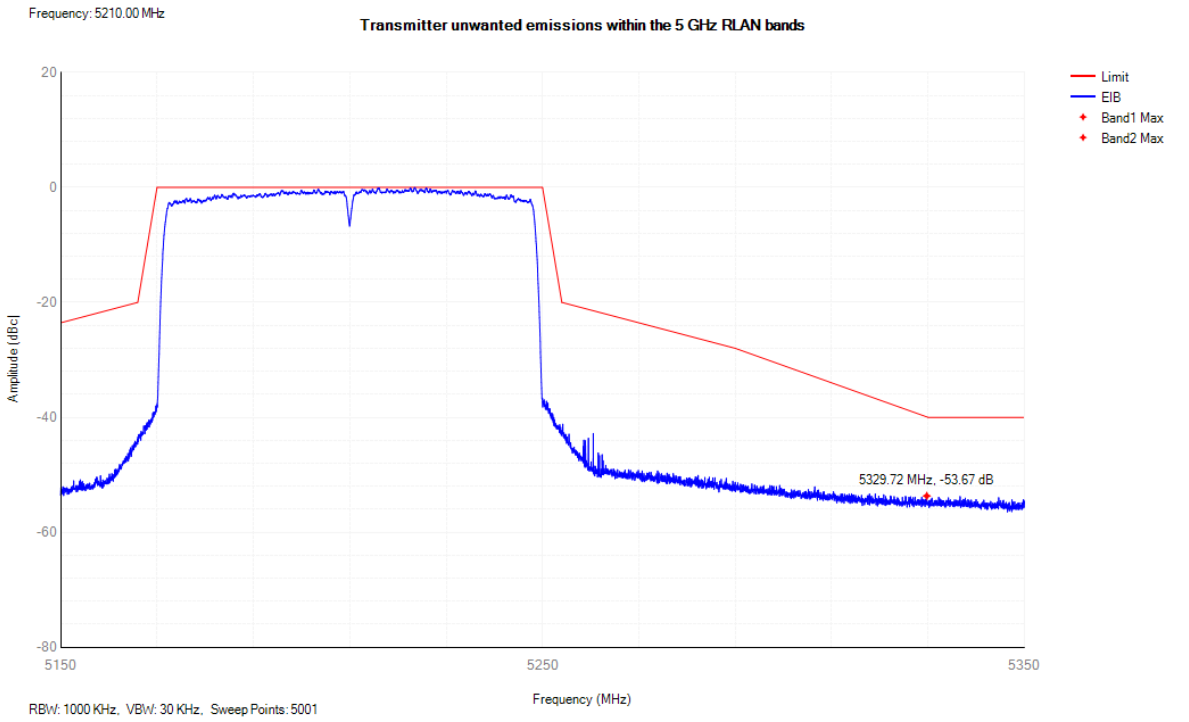
Tx. Emissions EIB NVNT ac40 5670MHz Sub Band1



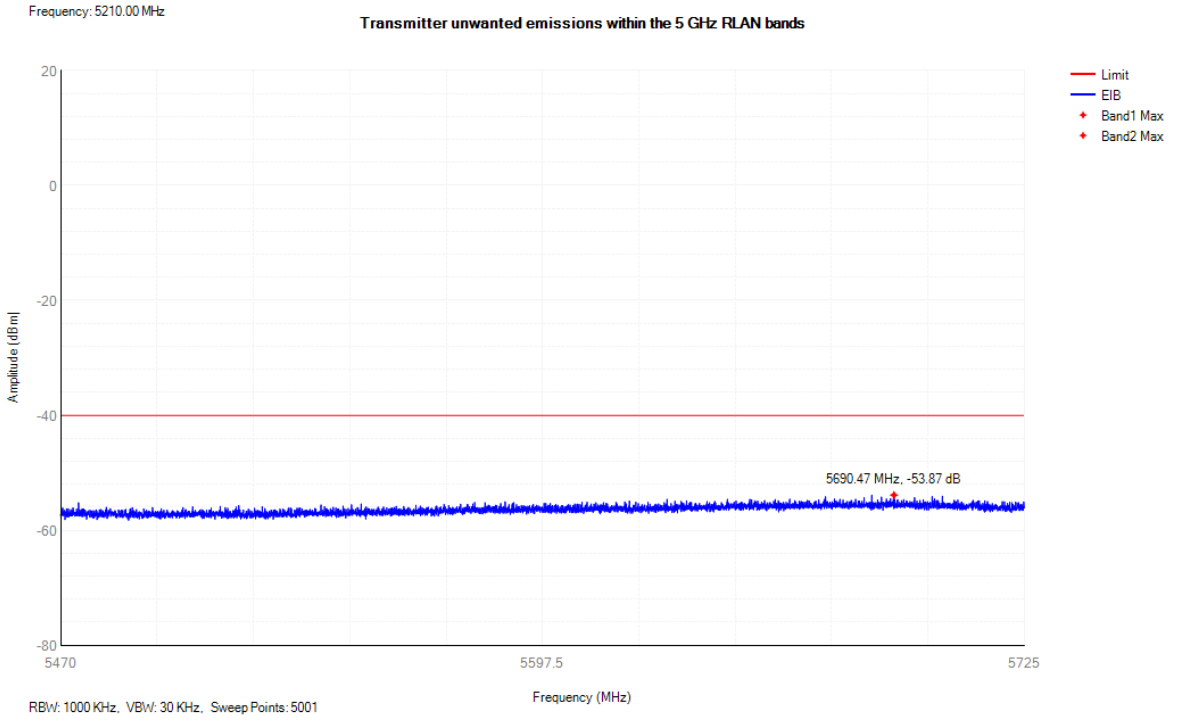
Tx. Emissions EIB NVNT ac40 5670MHz Sub Band2



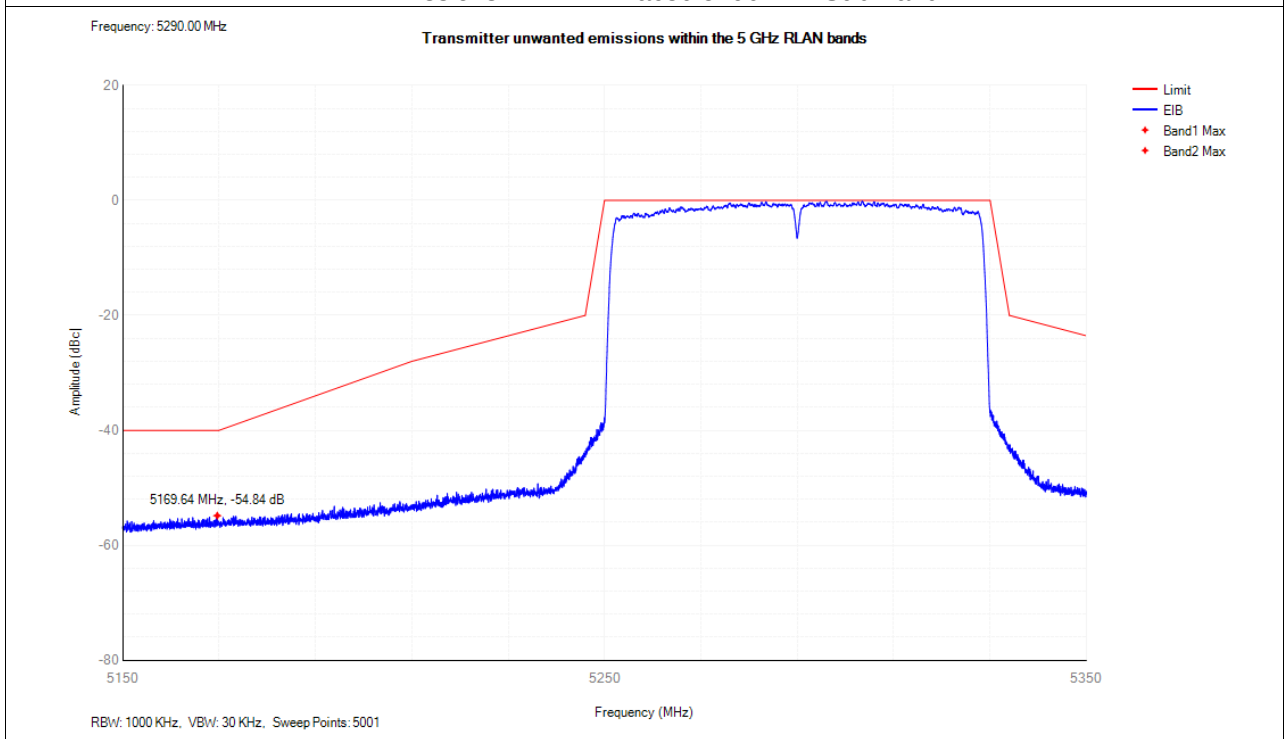
Tx. Emissions EIB NVNT ac80 5210MHz Sub Band1



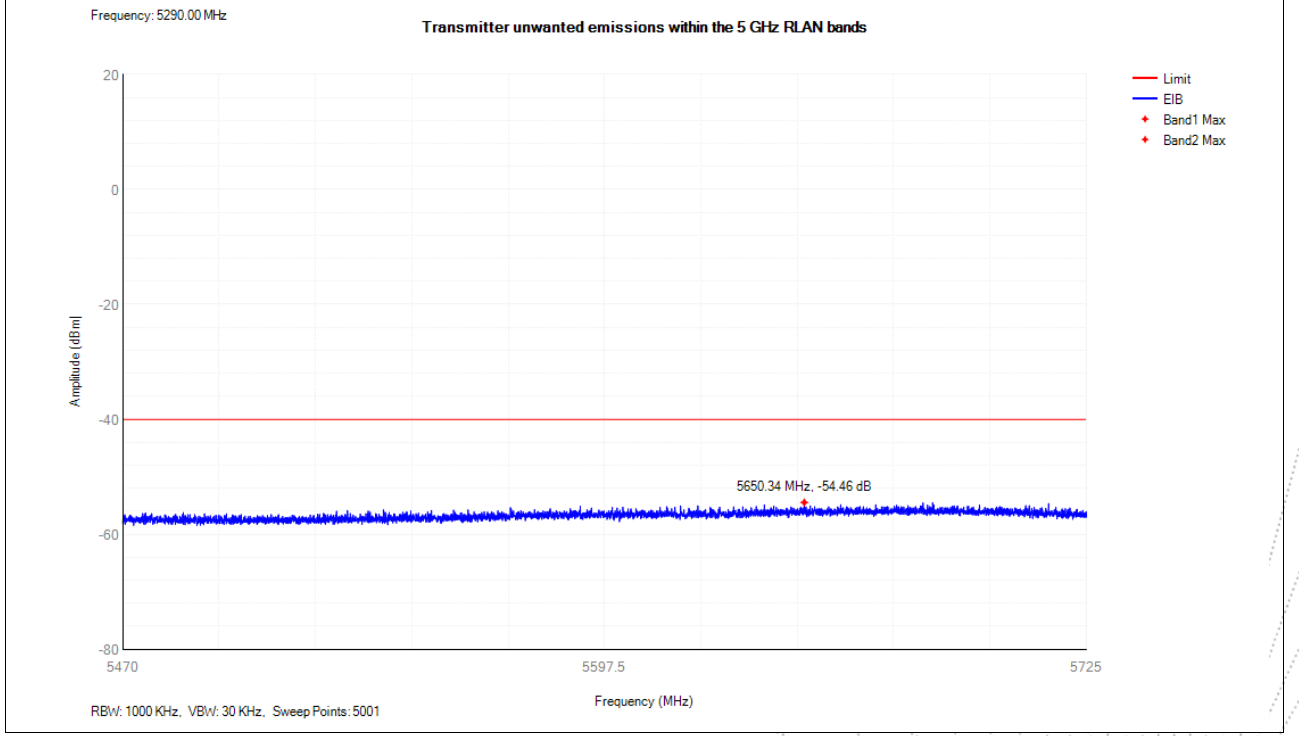
Tx. Emissions EIB NVNT ac80 5210MHz Sub Band2



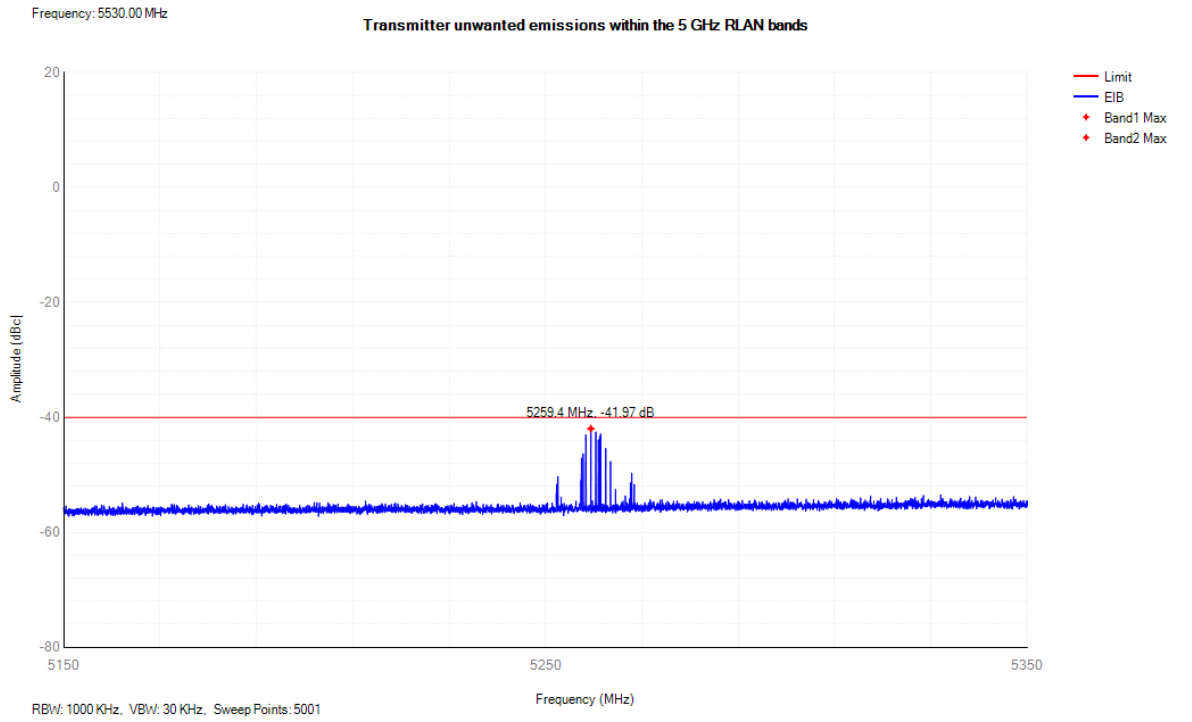
Tx. Emissions EIB NVNT ac80 5290MHz Sub Band1



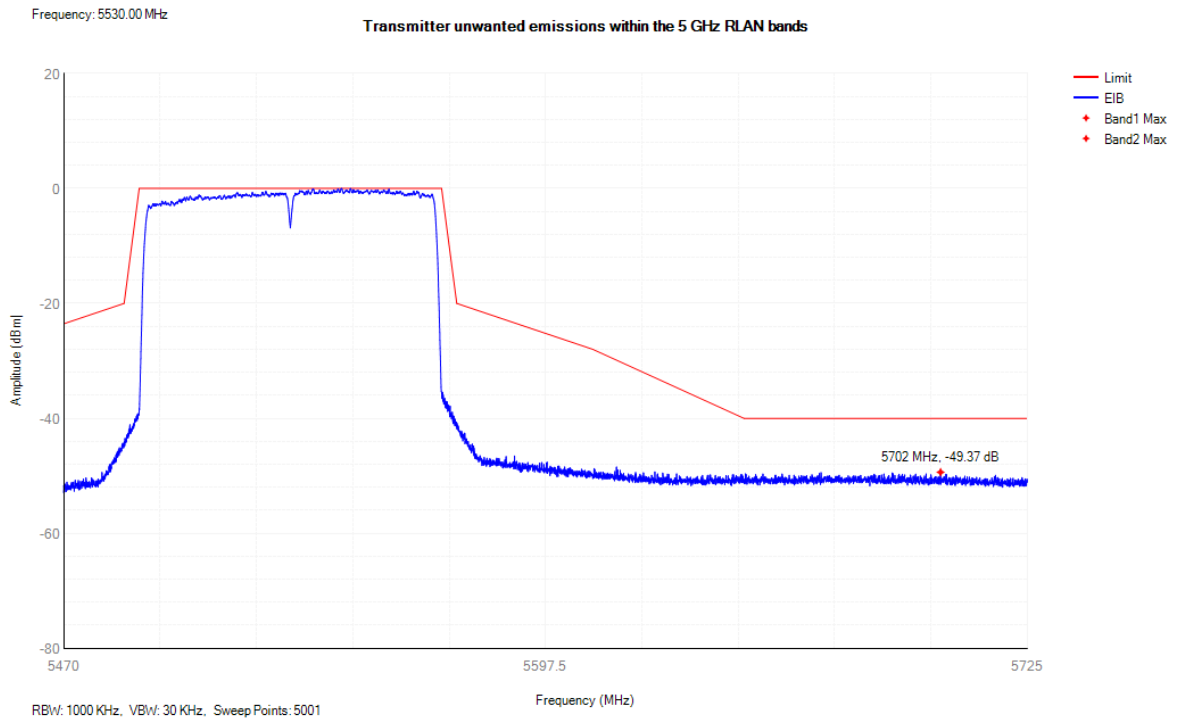
Tx. Emissions EIB NVNT ac80 5290MHz Sub Band2



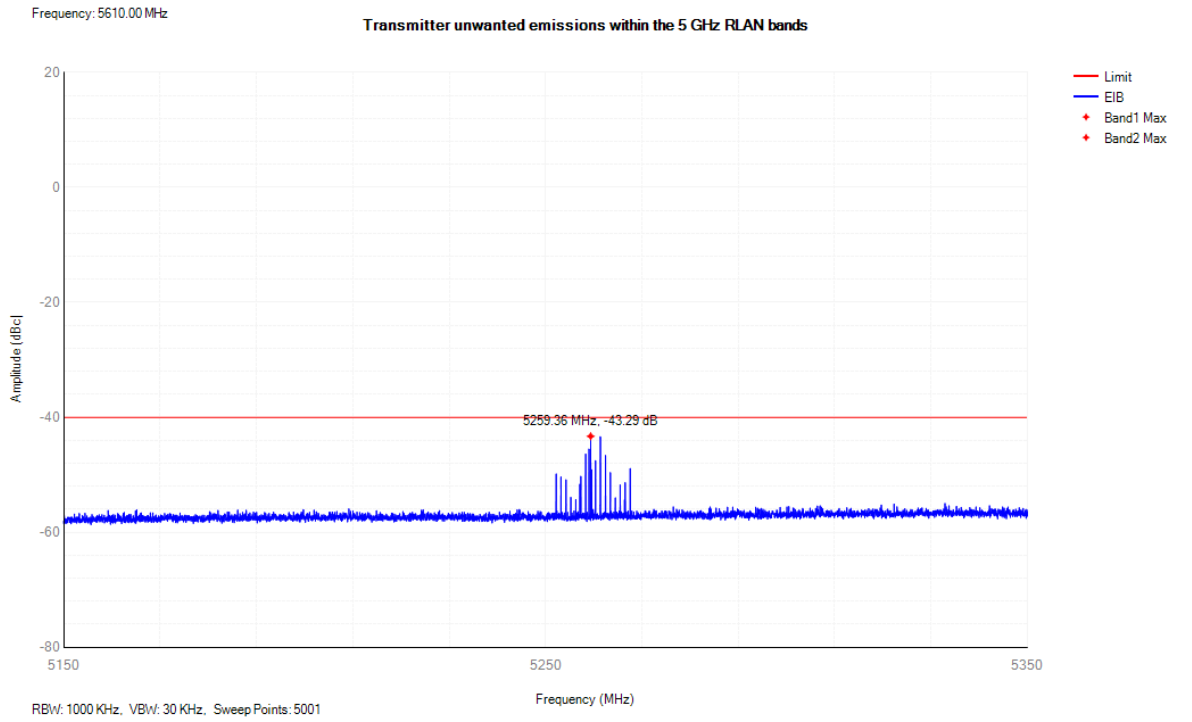
Tx. Emissions EIB NVNT ac80 5530MHz Sub Band1



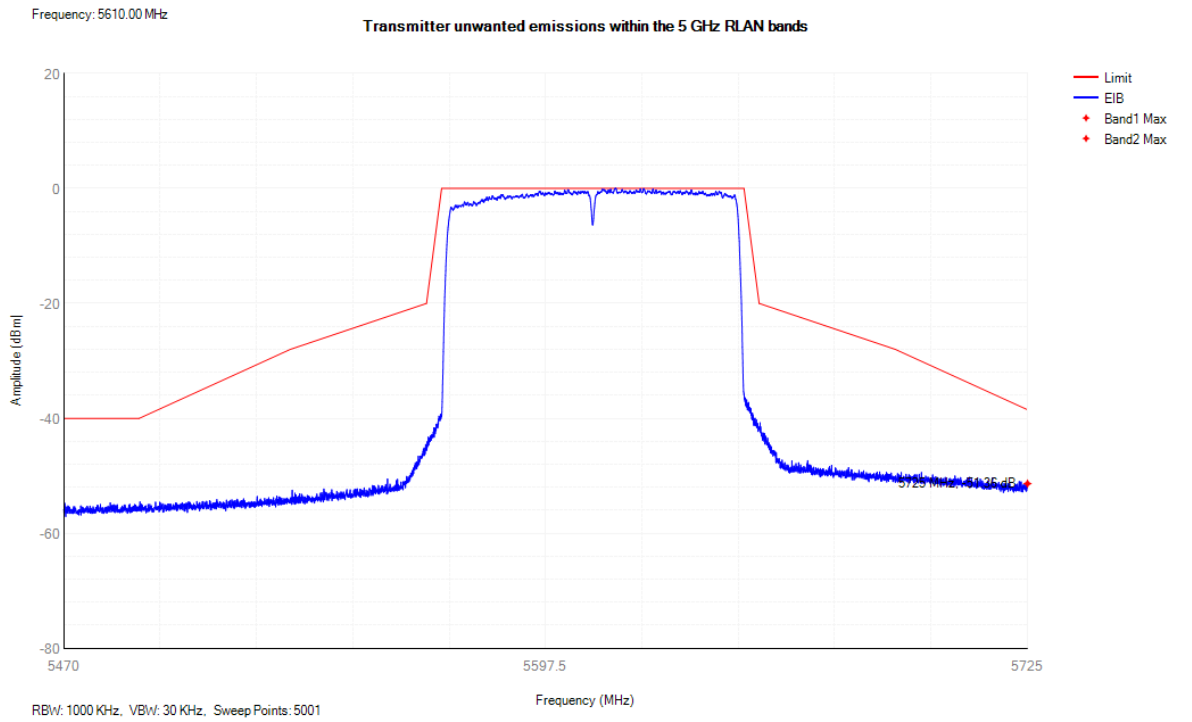
Tx. Emissions EIB NVNT ac80 5530MHz Sub Band2



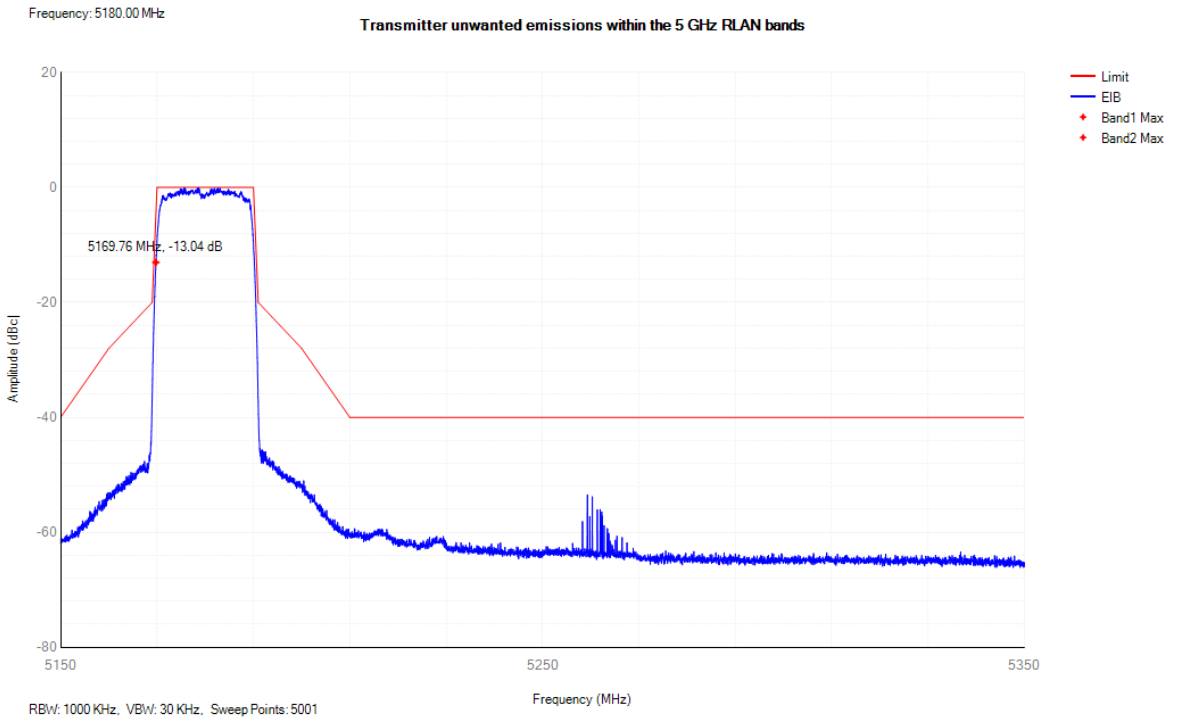
Tx. Emissions EIB NVNT ac80 5610MHz Sub Band1



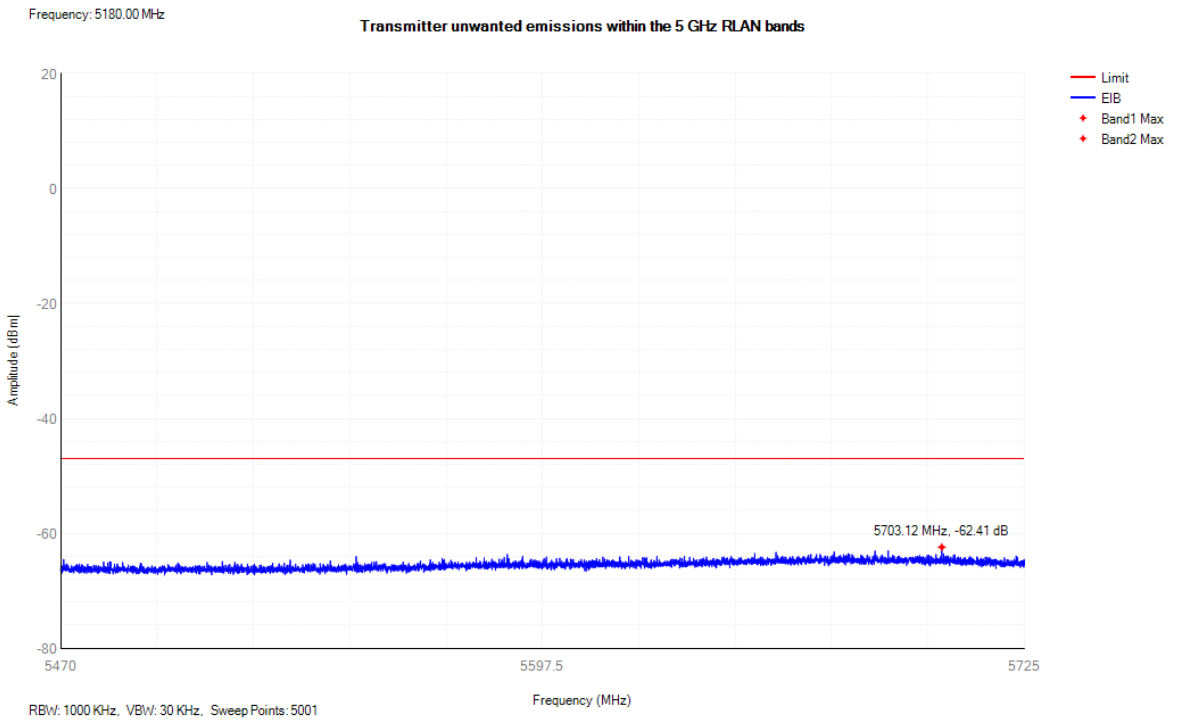
Tx. Emissions EIB NVNT ac80 5610MHz Sub Band2



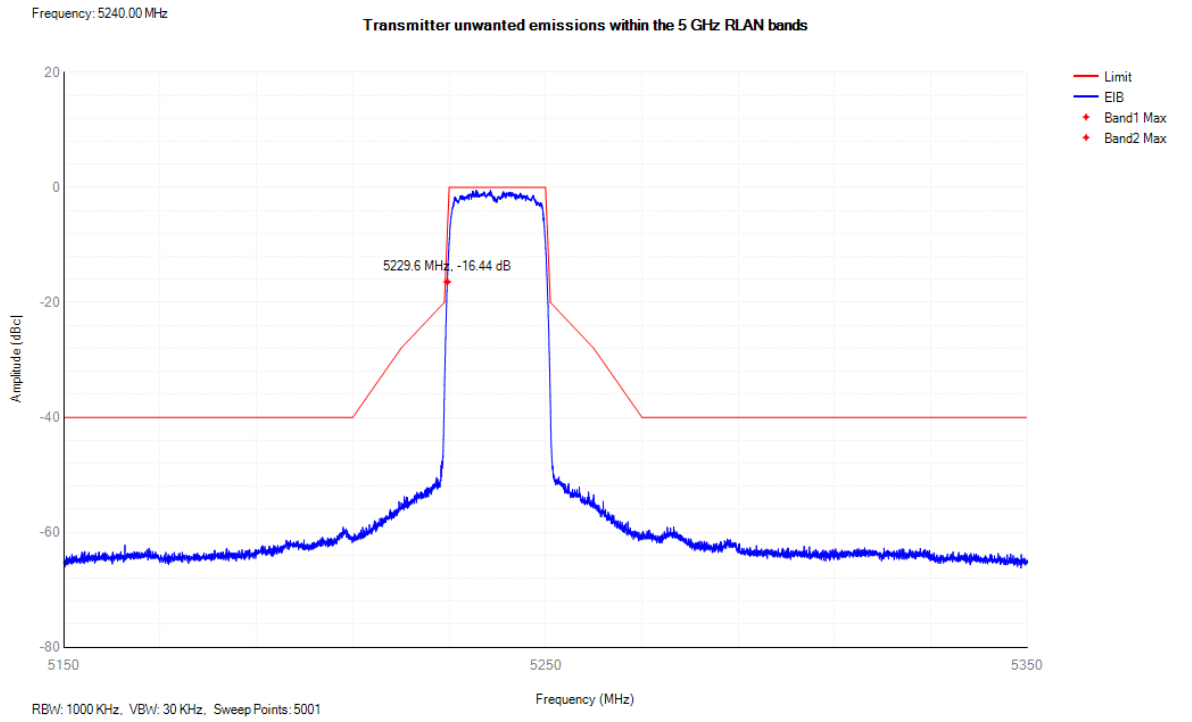
Tx. Emissions EIB NVNT ax20 5180MHz Sub Band1



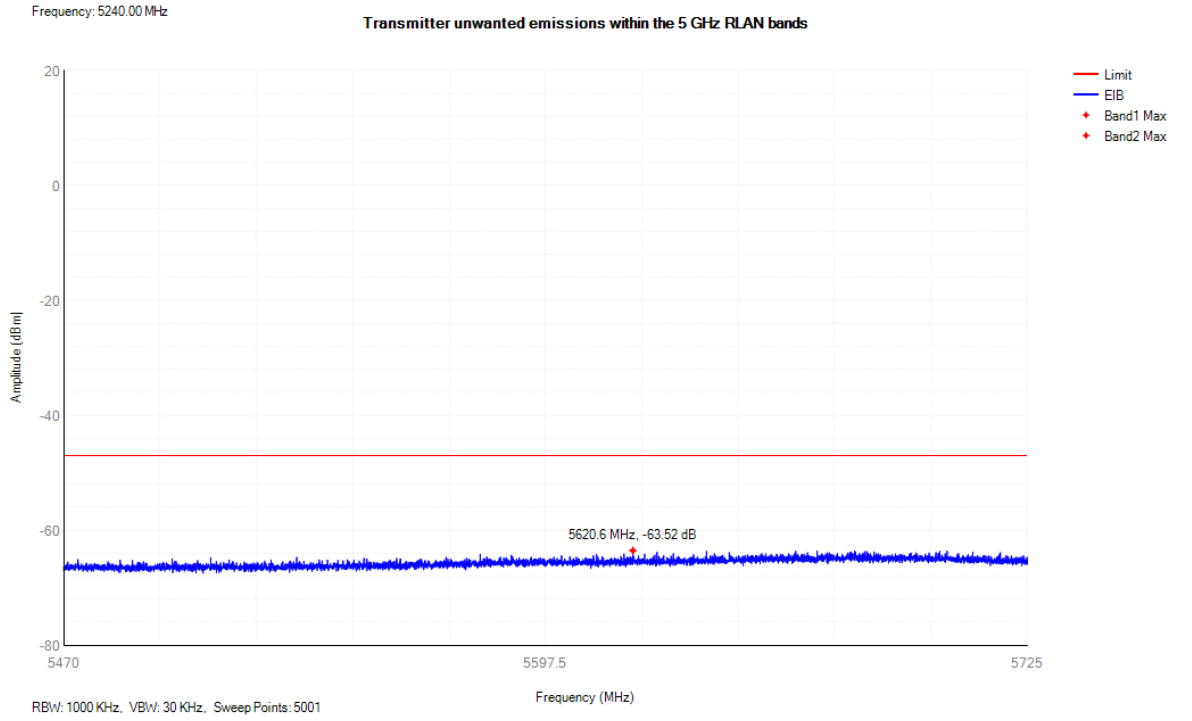
Tx. Emissions EIB NVNT ax20 5180MHz Sub Band2



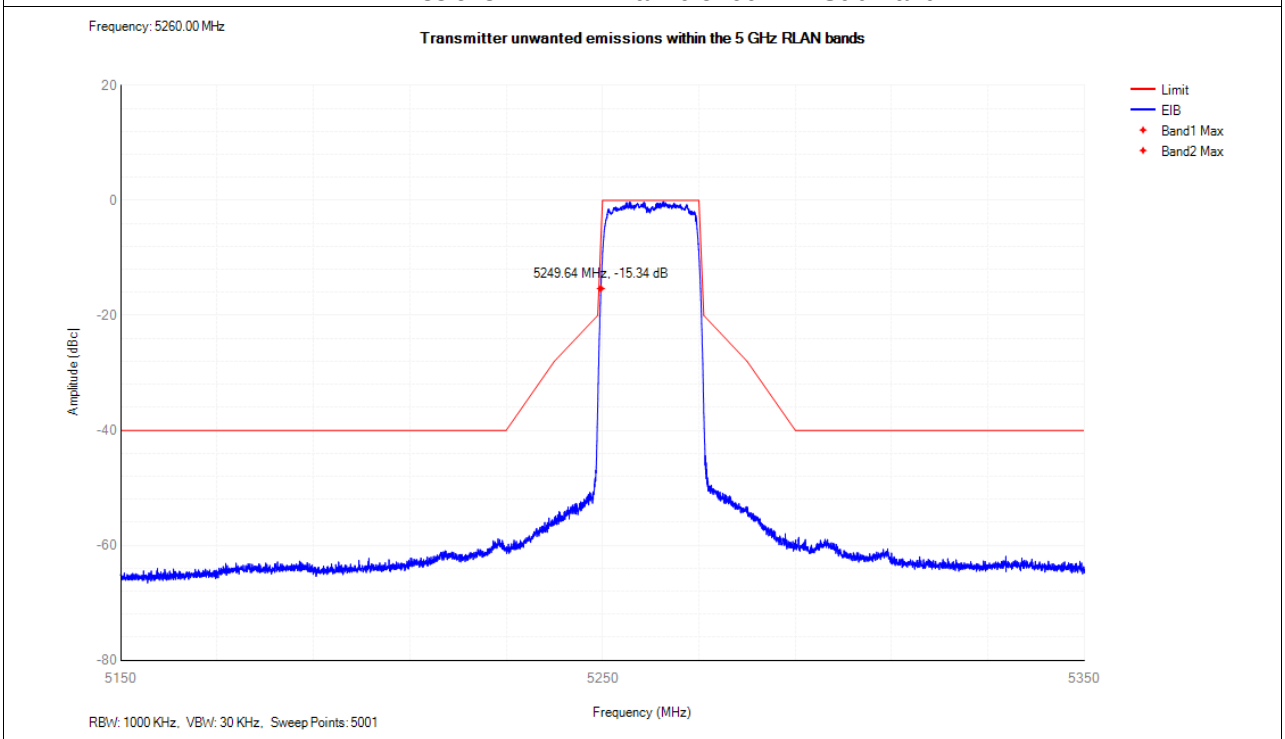
Tx. Emissions EIB NVNT ax20 5240MHz Sub Band1



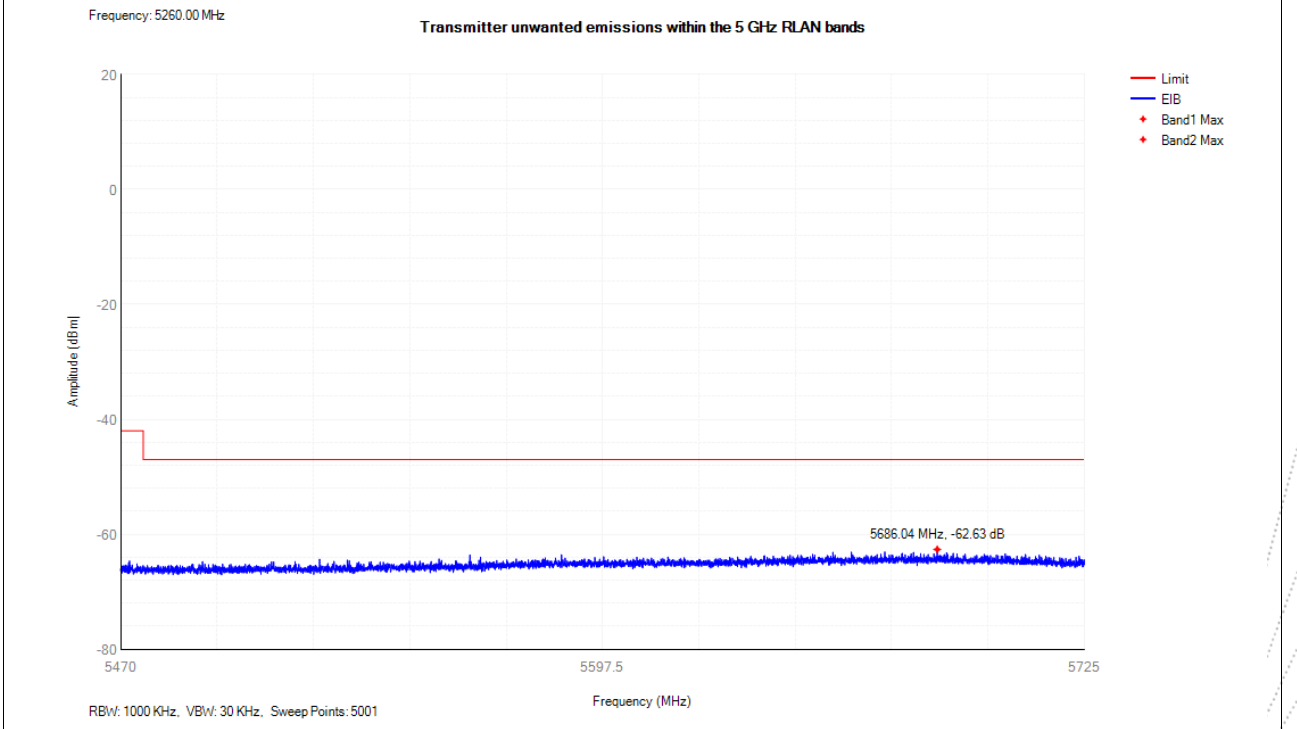
Tx. Emissions EIB NVNT ax20 5240MHz Sub Band2



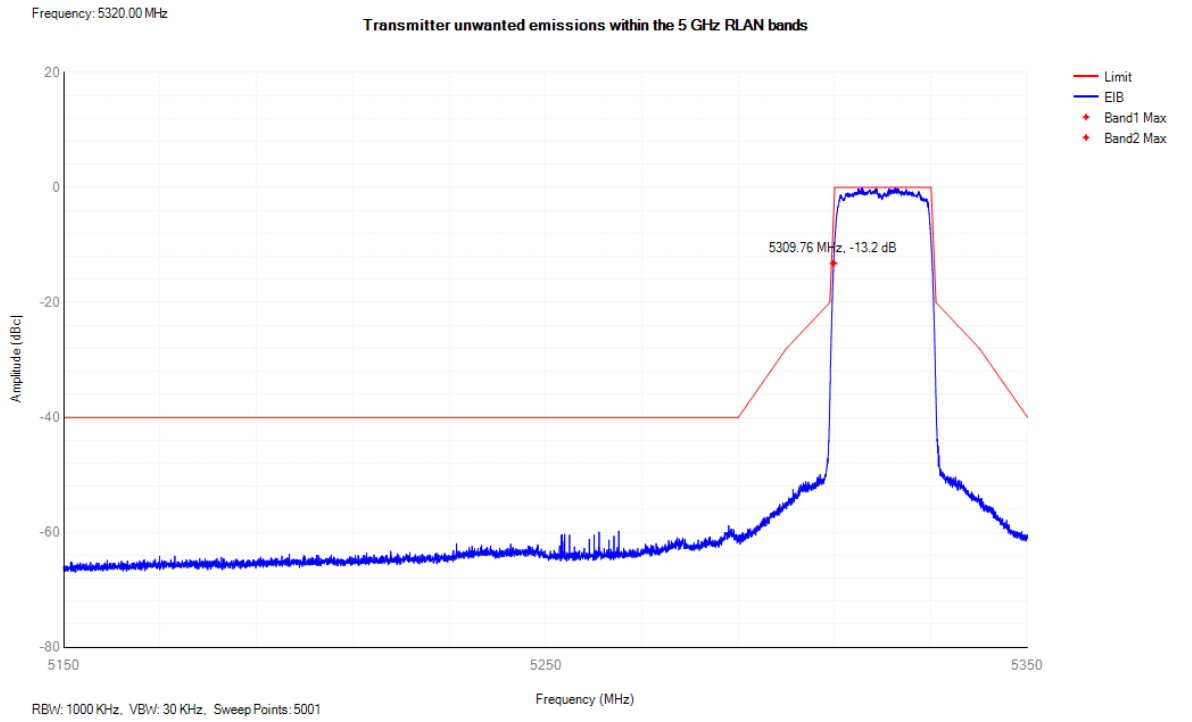
Tx. Emissions EIB NVNT ax20 5260MHz Sub Band1



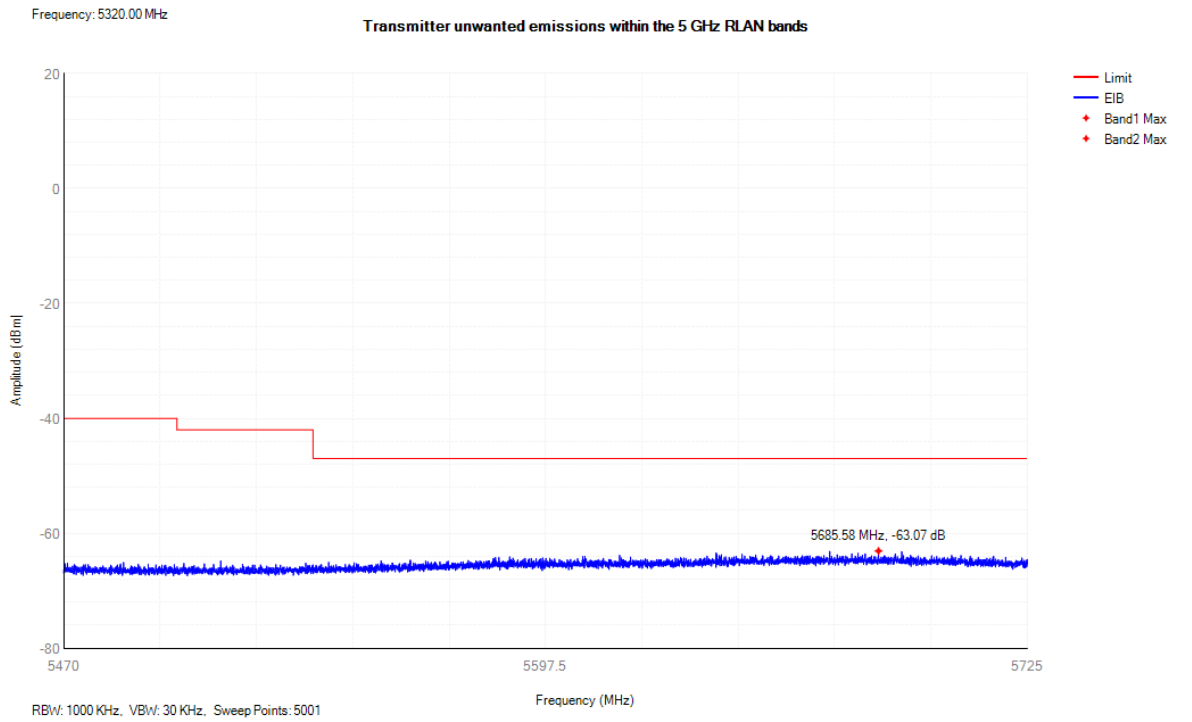
Tx. Emissions EIB NVNT ax20 5260MHz Sub Band2



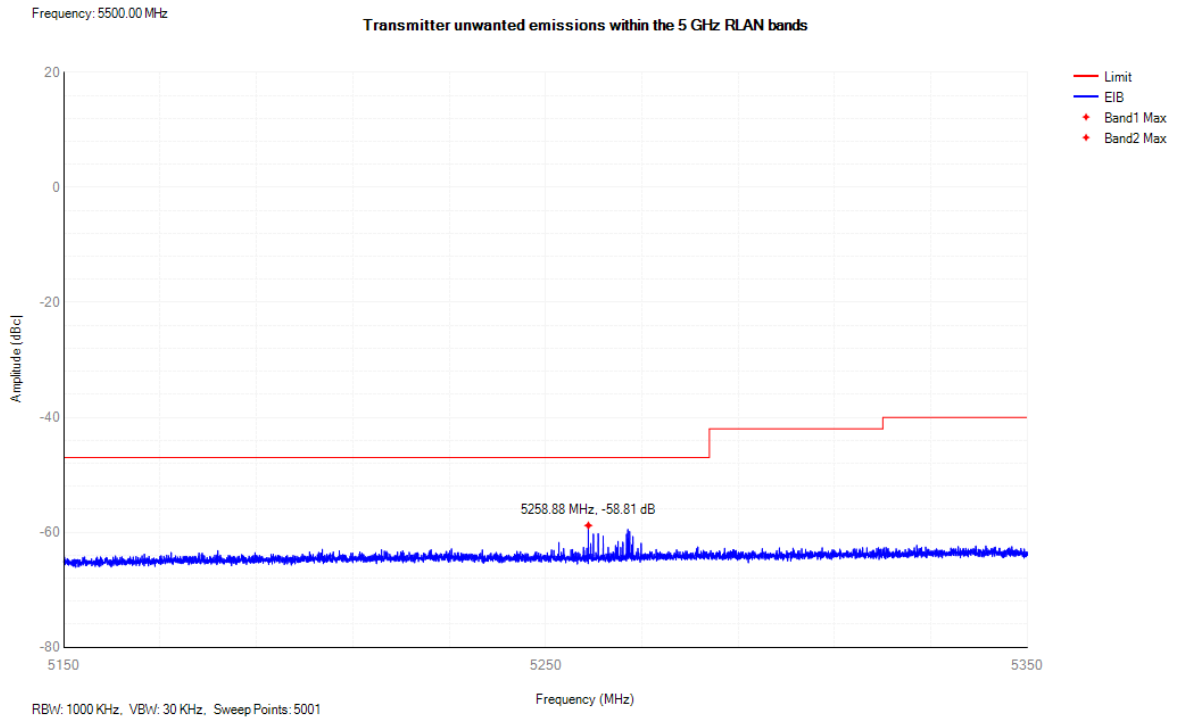
Tx. Emissions EIB NVNT ax20 5320MHz Sub Band1



Tx. Emissions EIB NVNT ax20 5320MHz Sub Band2



Tx. Emissions EIB NVNT ax20 5500MHz Sub Band1



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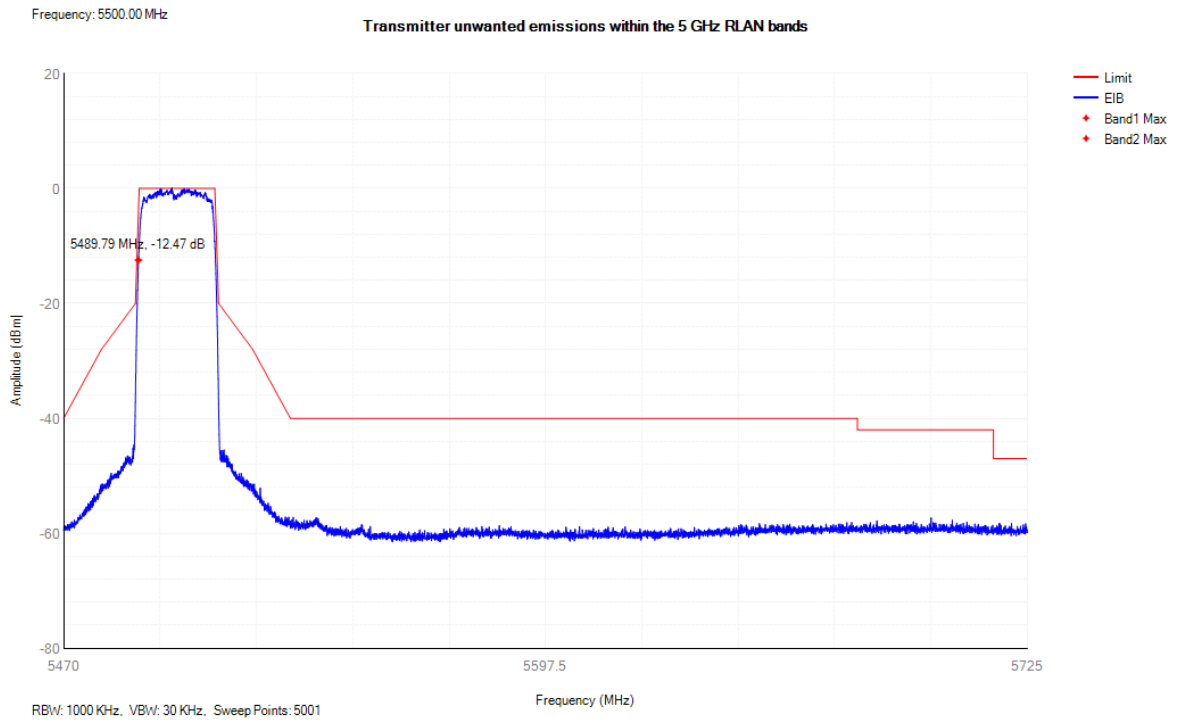
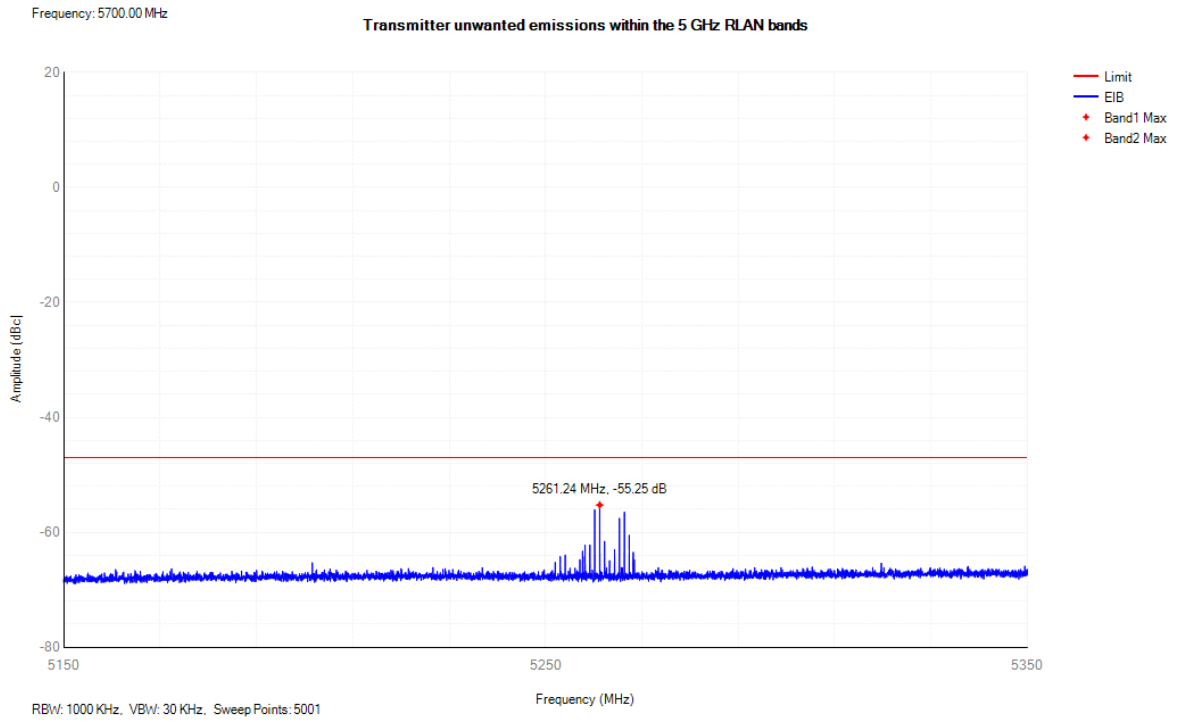


Tx. Emissions EIB NVNT ax20 5700MHz Sub Band1



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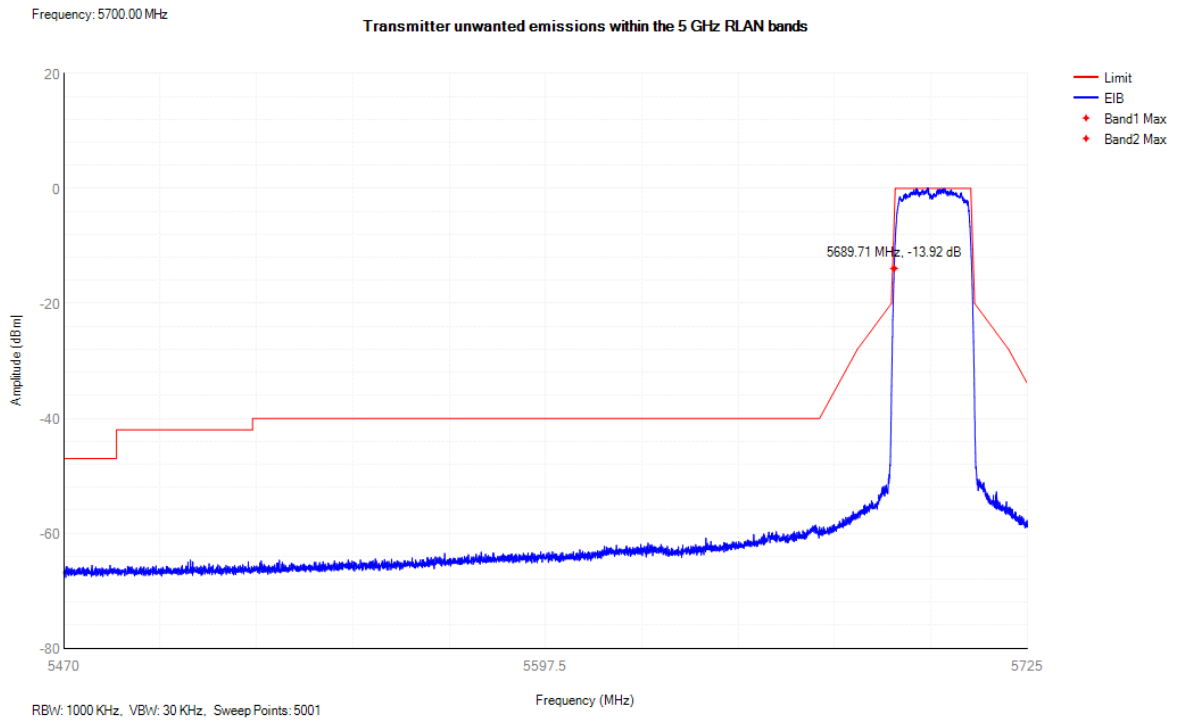
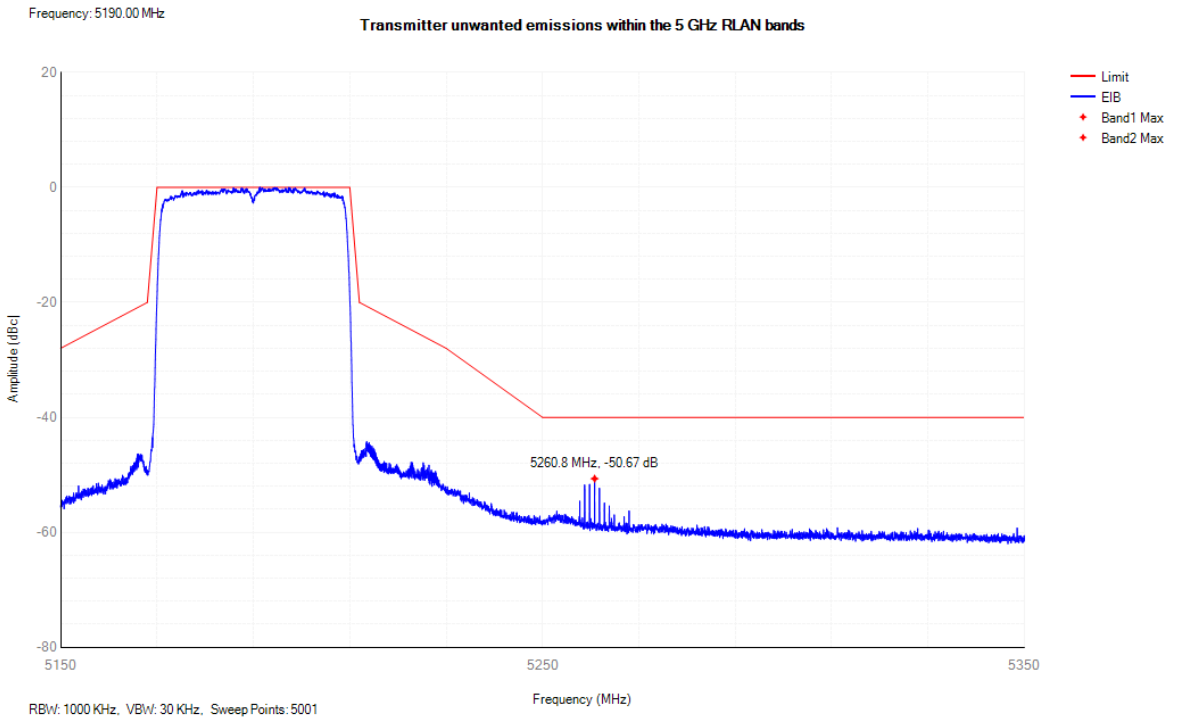
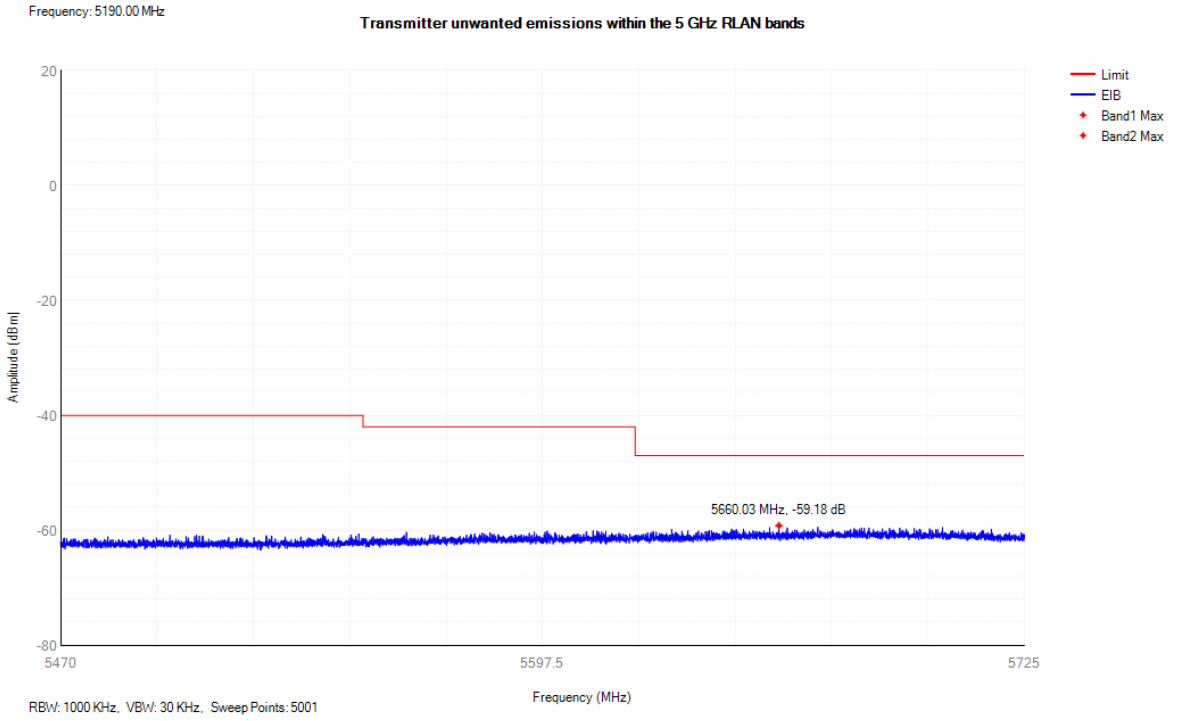


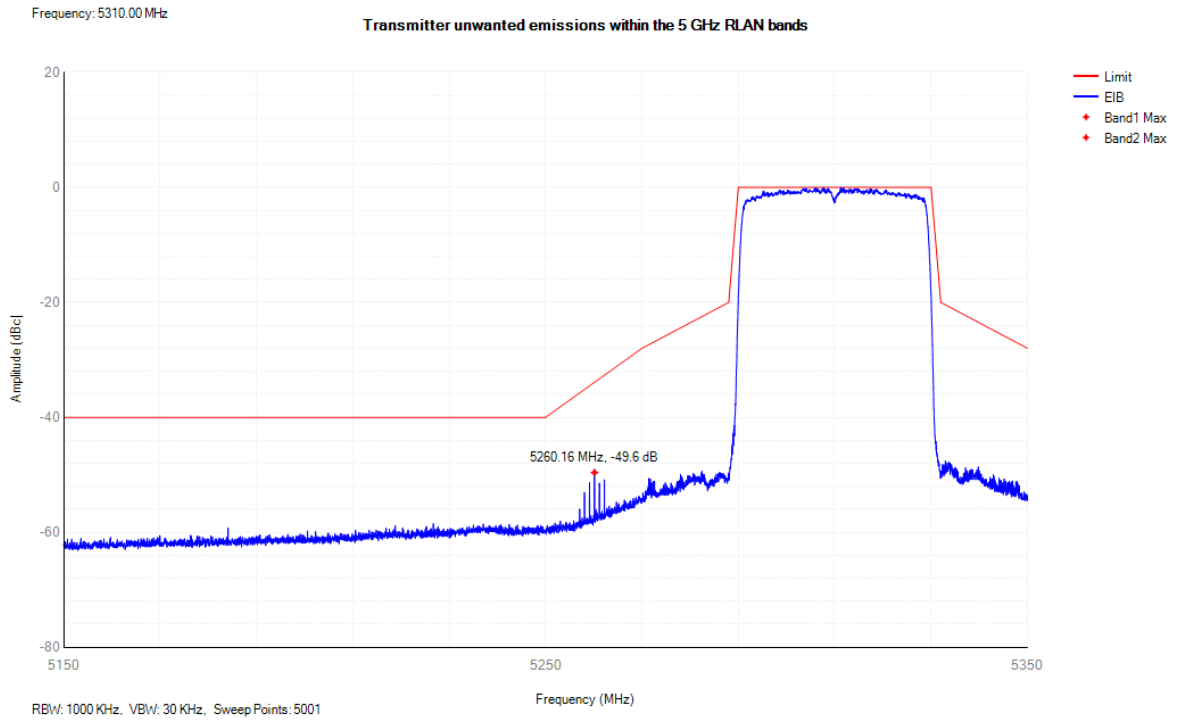
Tx. Emissions EIB NVNT ax40 5190MHz Sub Band1



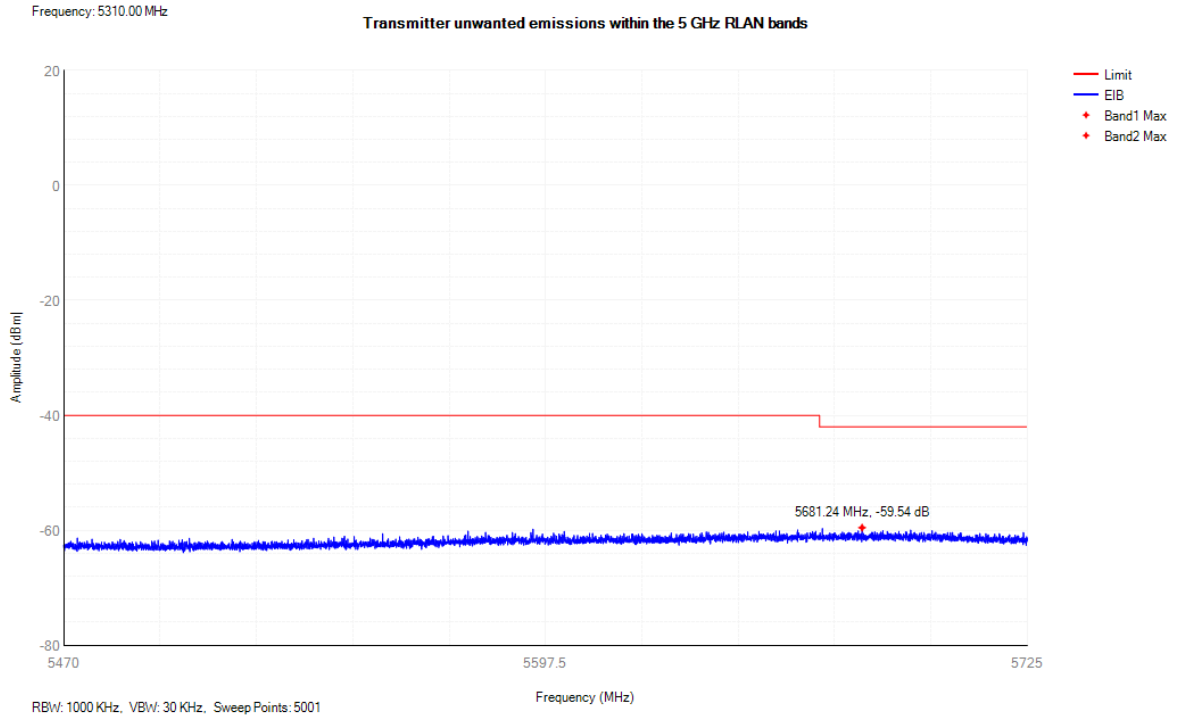
Tx. Emissions EIB NVNT ax40 5190MHz Sub Band2



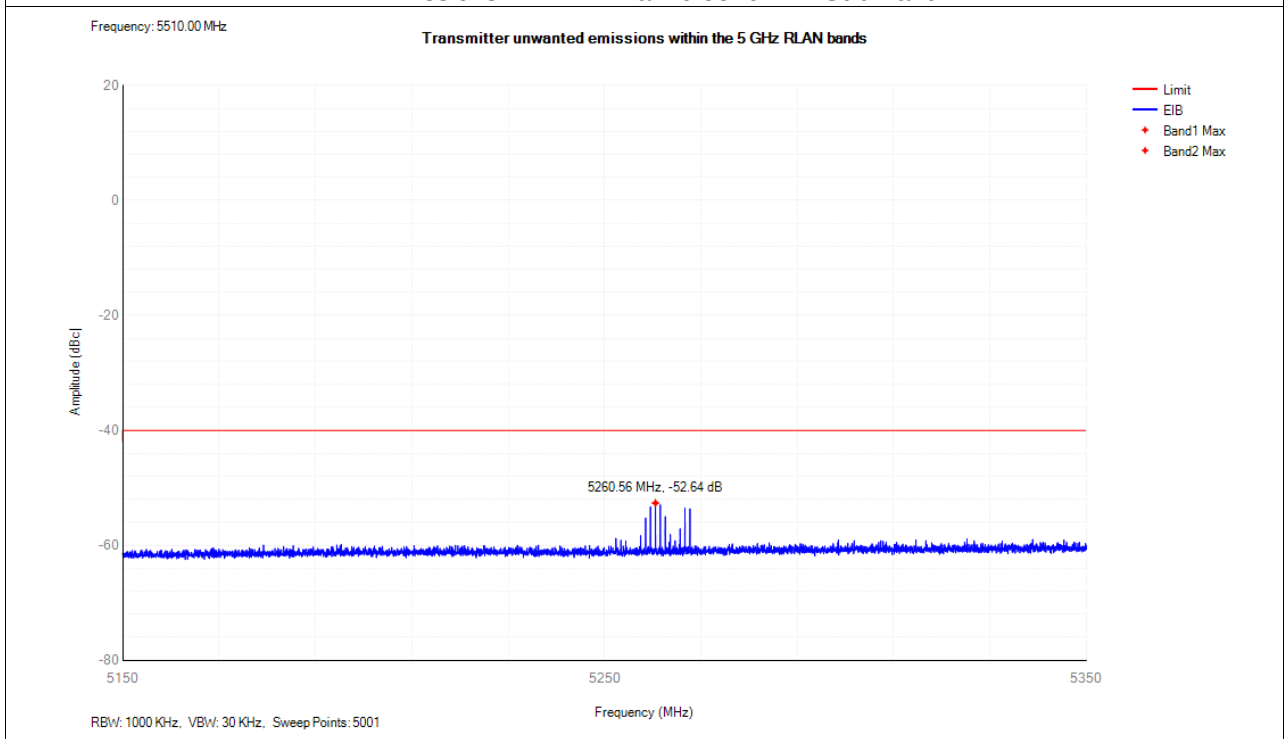
Tx. Emissions EIB NVNT ax40 5310MHz Sub Band1



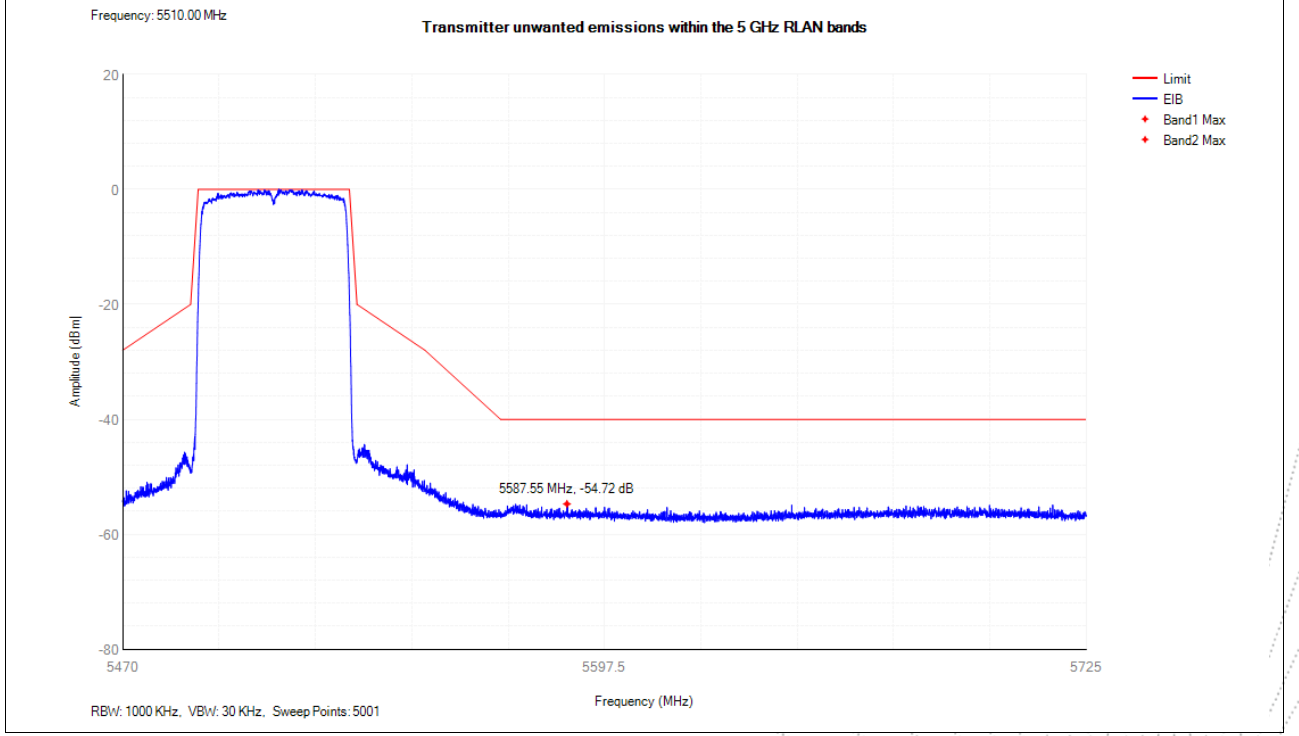
Tx. Emissions EIB NVNT ax40 5310MHz Sub Band2



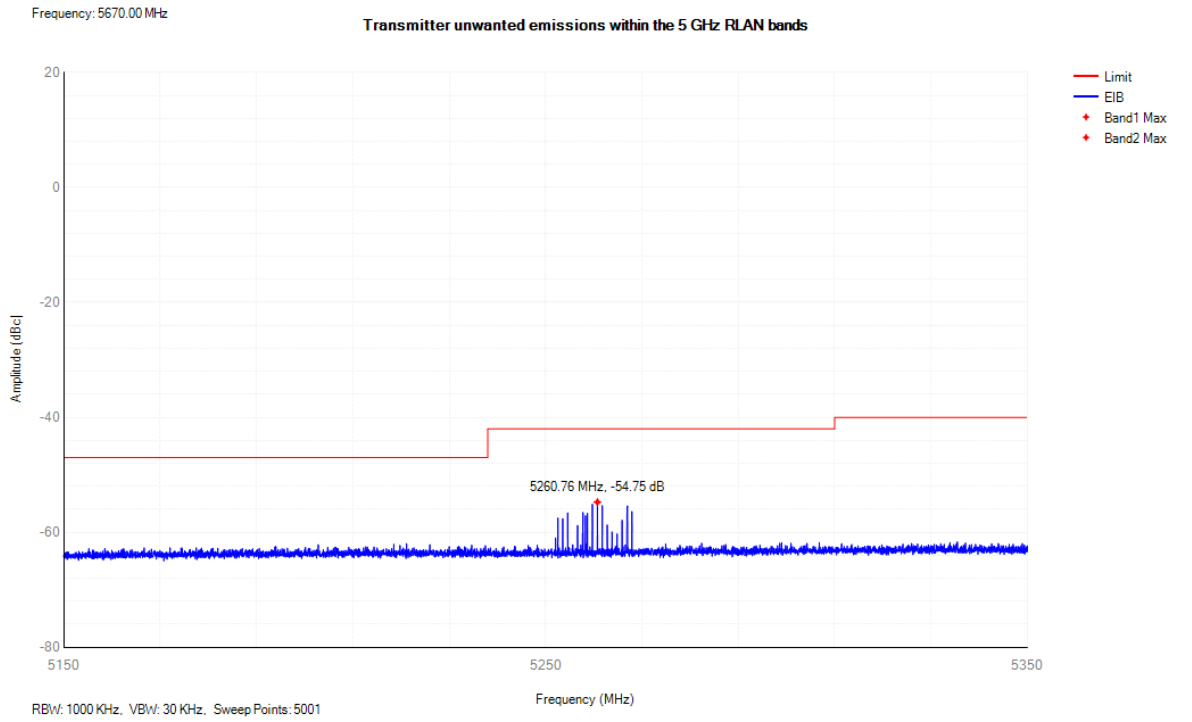
Tx. Emissions EIB NVNT ax40 5510MHz Sub Band1



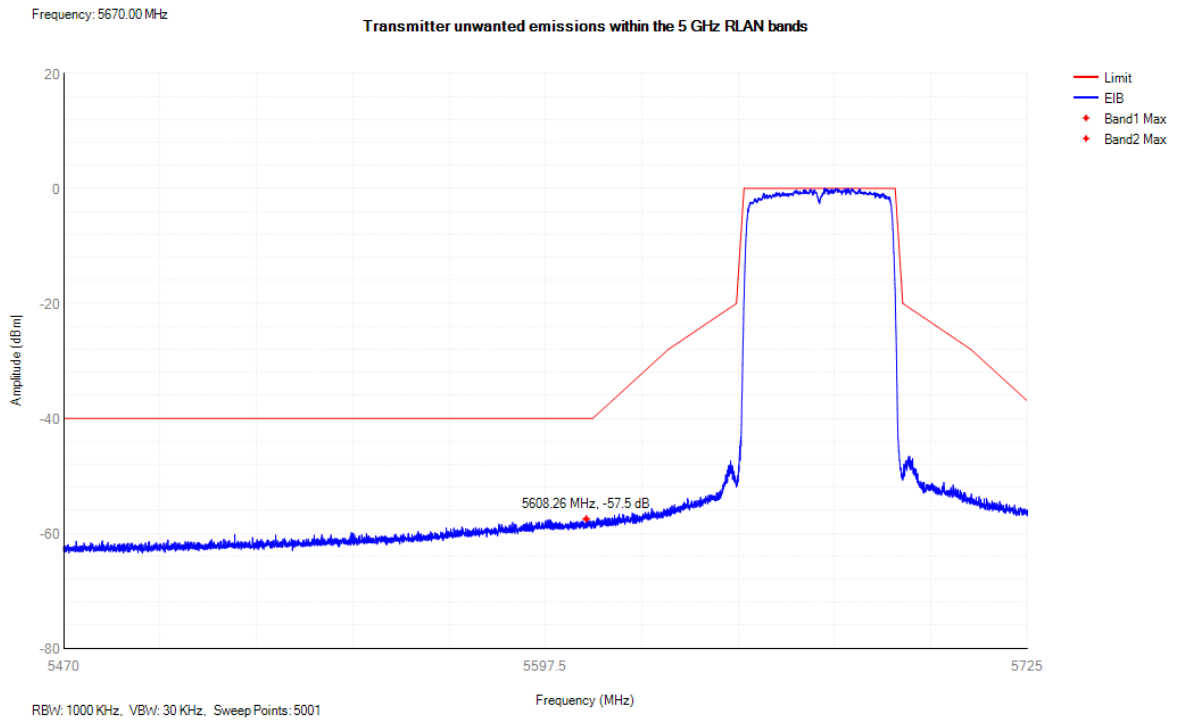
Tx. Emissions EIB NVNT ax40 5510MHz Sub Band2



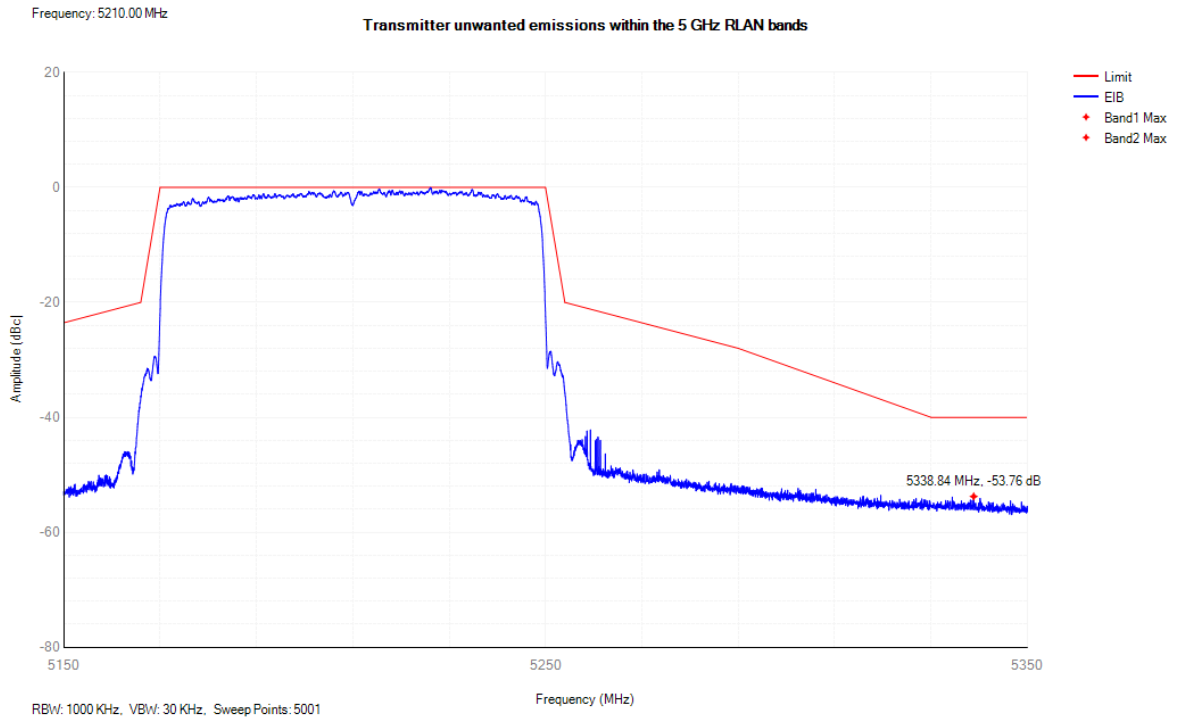
Tx. Emissions EIB NVNT ax40 5670MHz Sub Band1



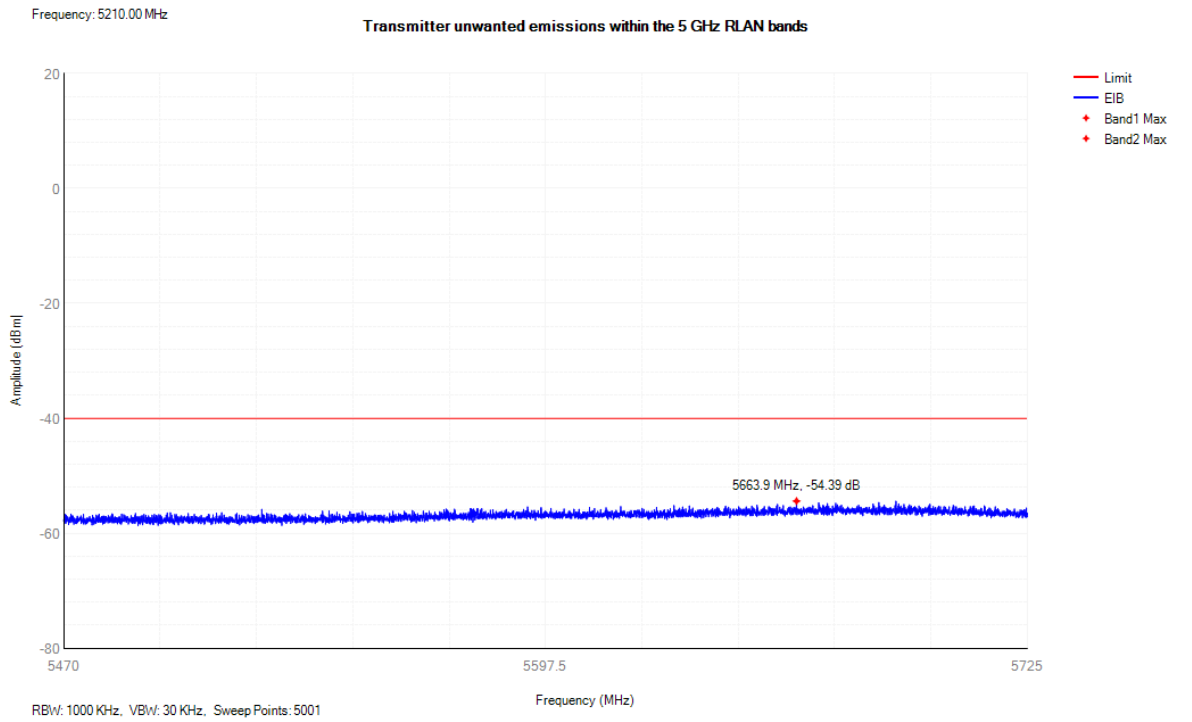
Tx. Emissions EIB NVNT ax40 5670MHz Sub Band2



Tx. Emissions EIB NVNT ax80 5210MHz Sub Band1



Tx. Emissions EIB NVNT ax80 5210MHz Sub Band2



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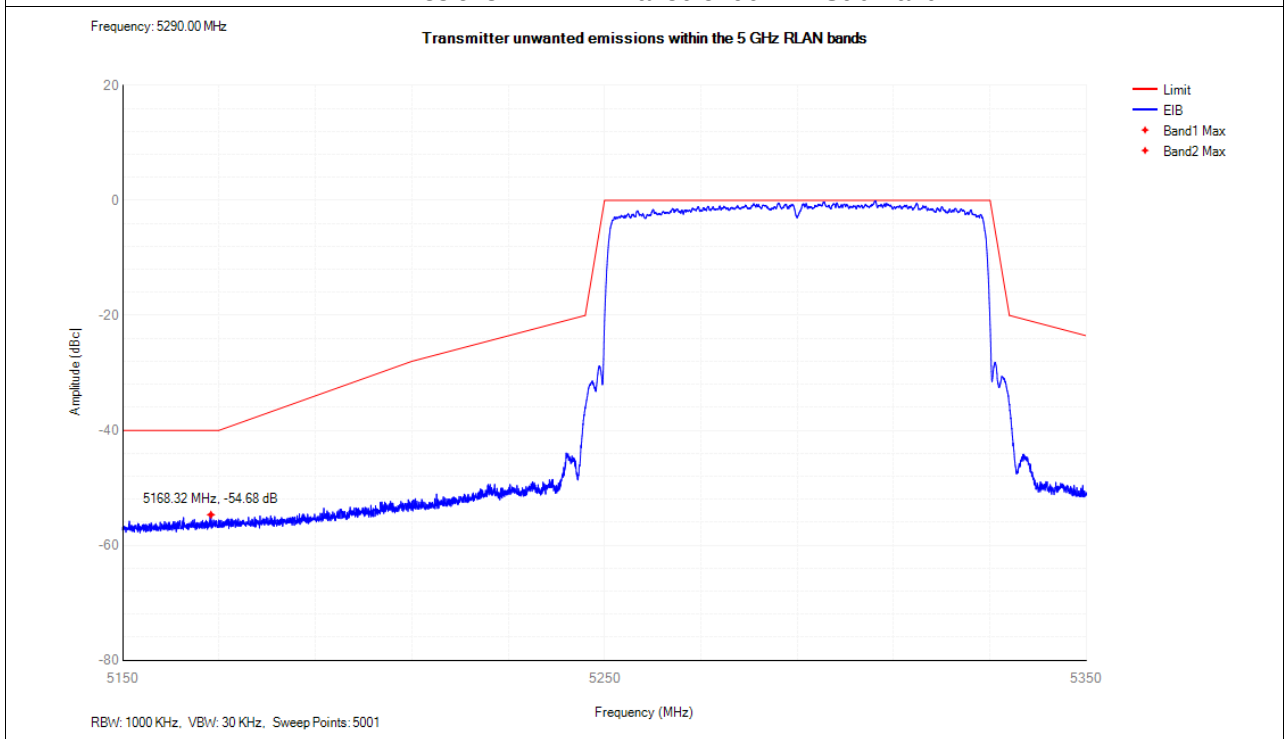
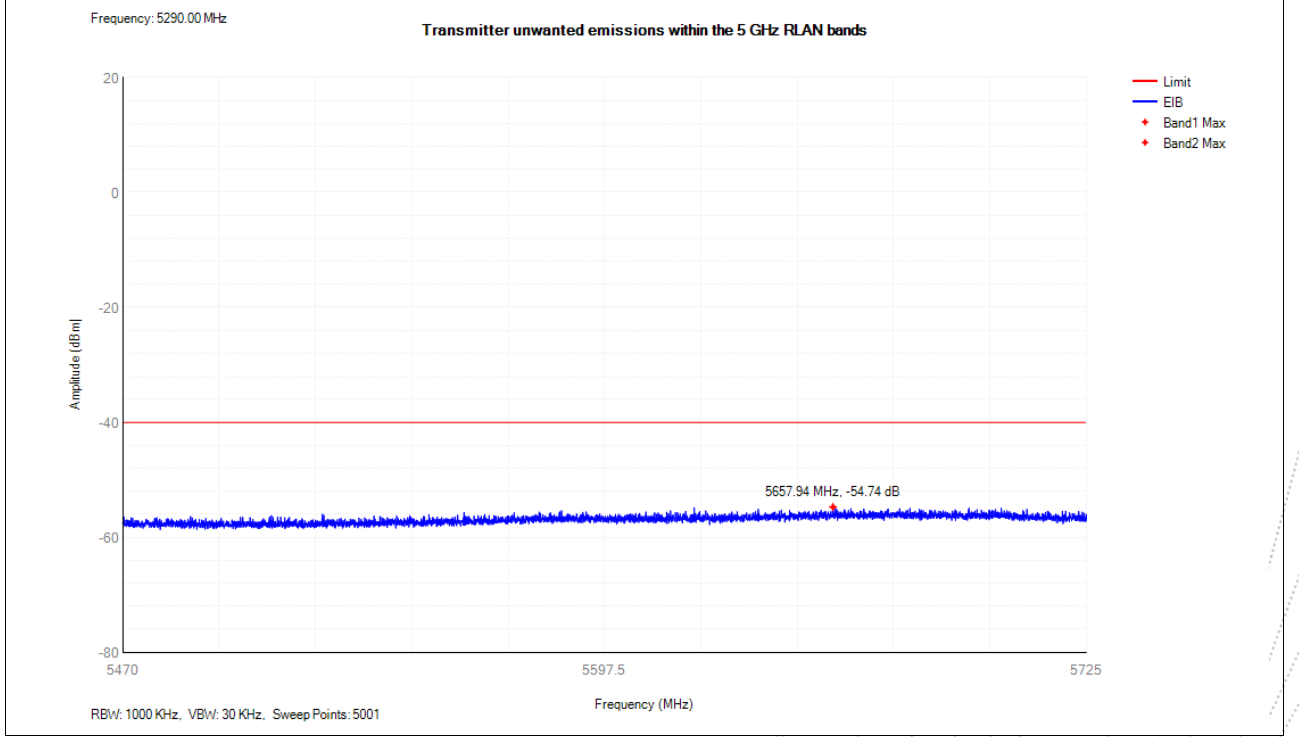
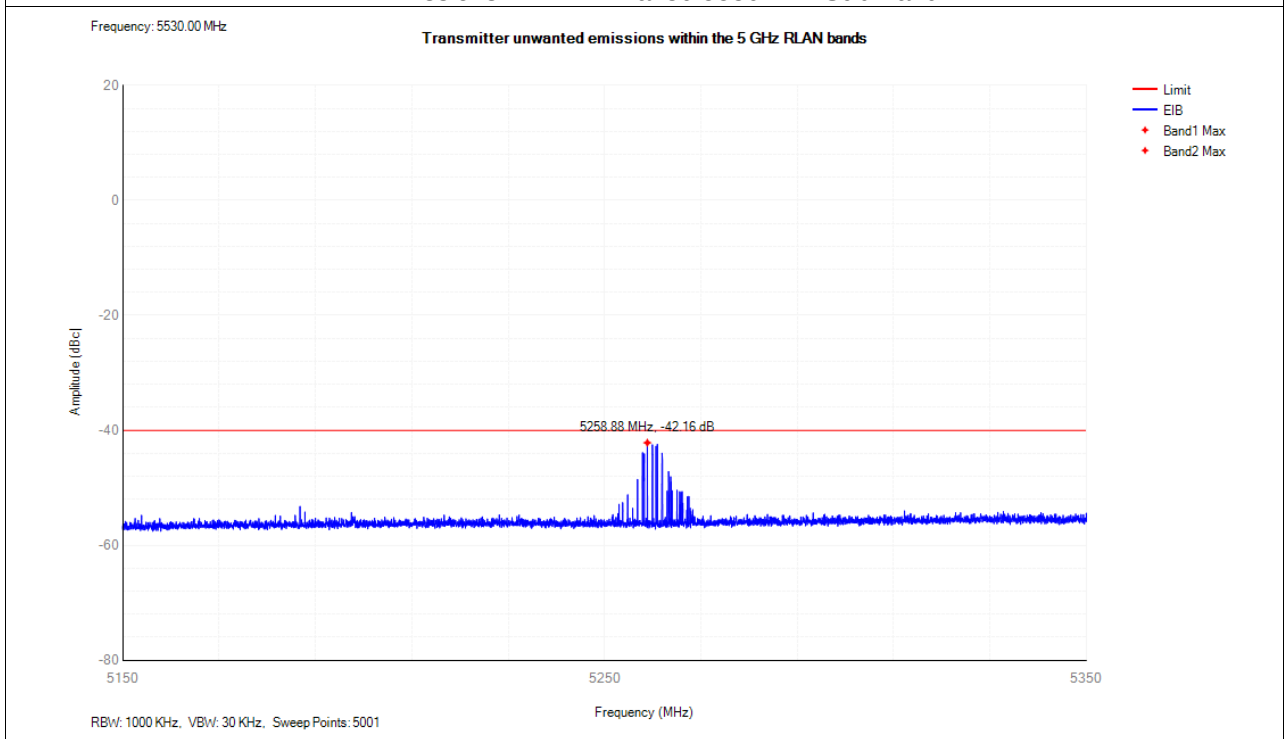


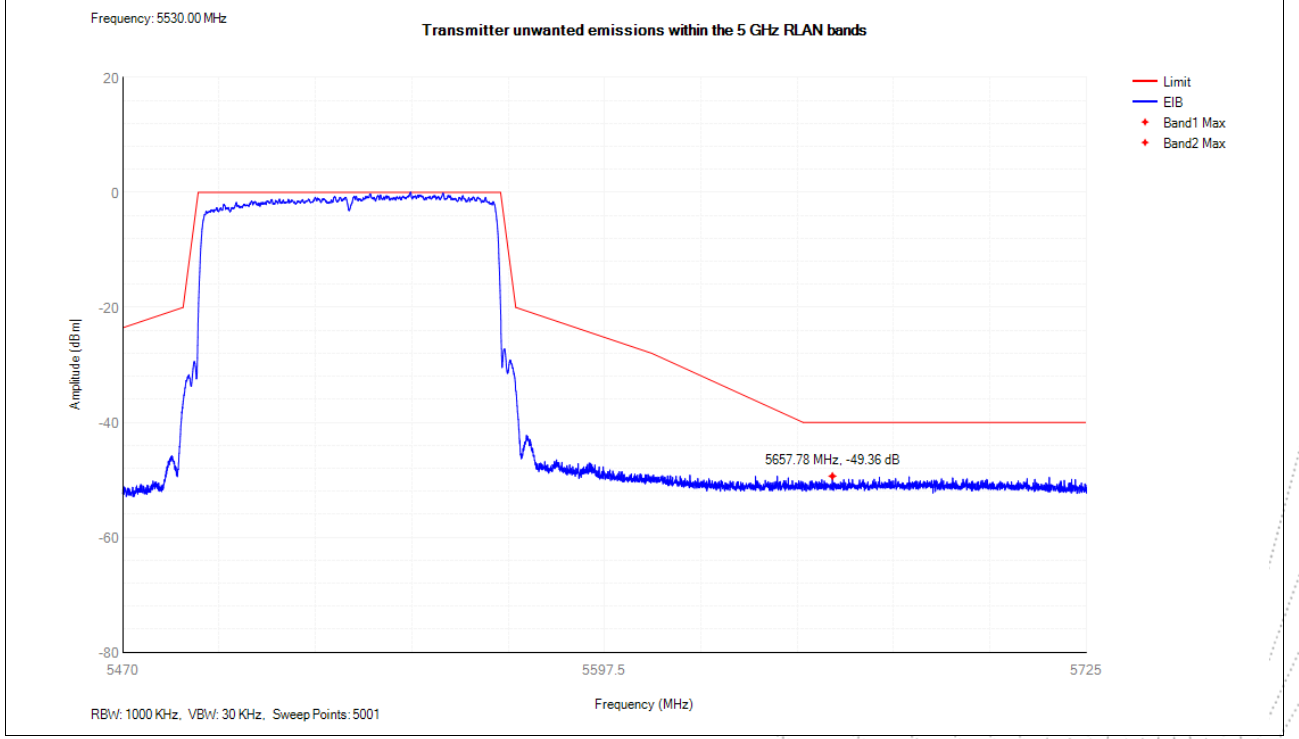
Tx. Emissions EIB NVNT ax80 5290MHz Sub Band2



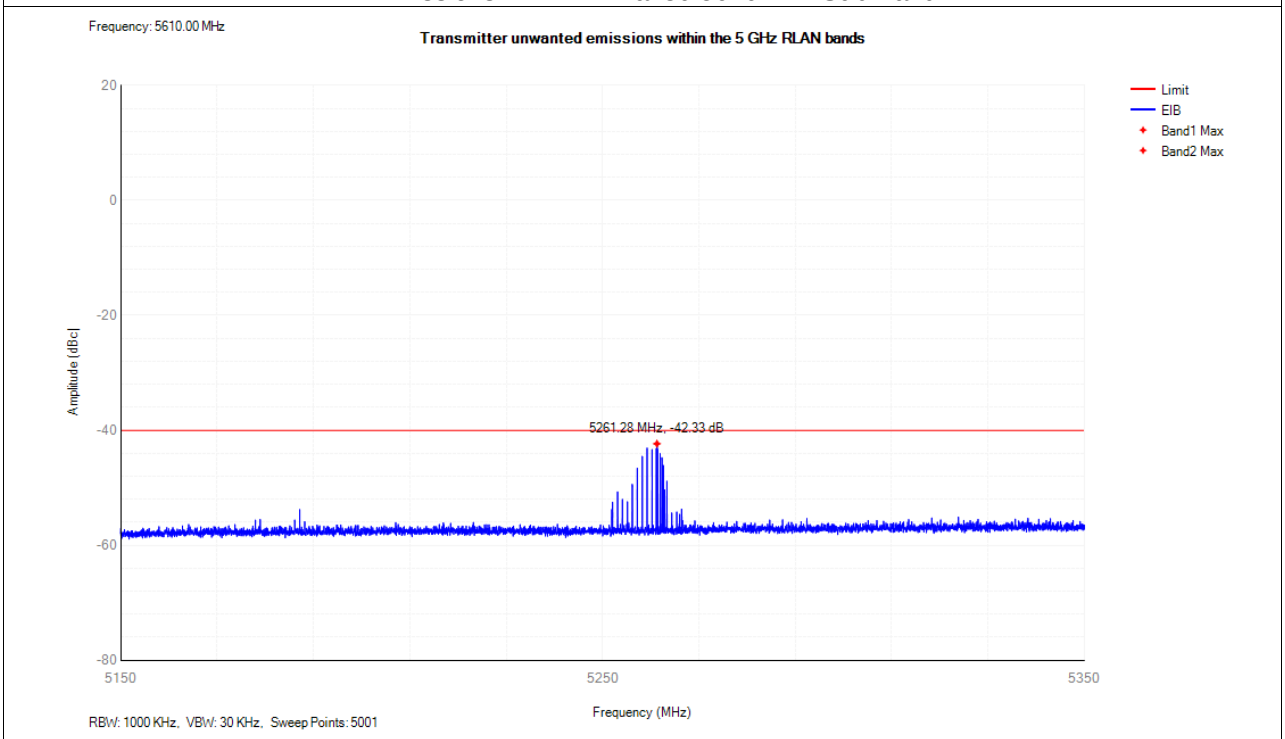
Tx. Emissions EIB NVNT ax80 5530MHz Sub Band1



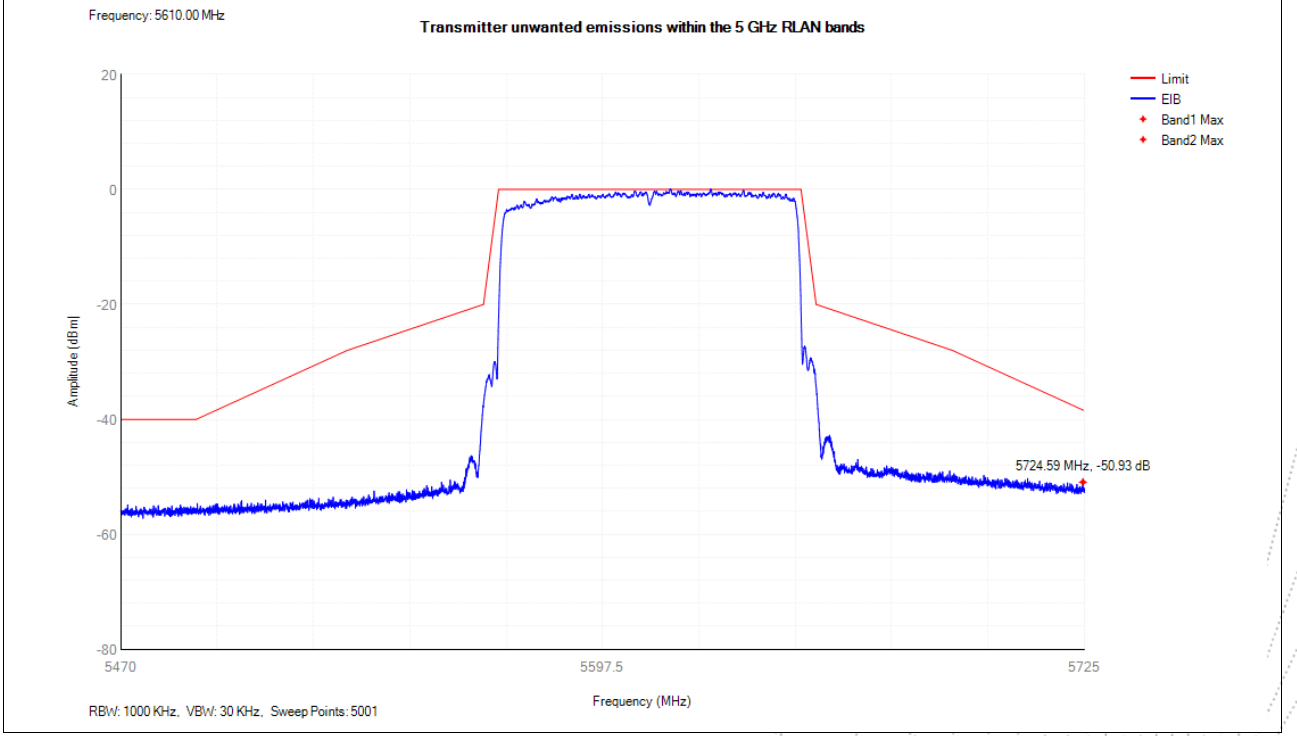
Tx. Emissions EIB NVNT ax80 5530MHz Sub Band2



Tx. Emissions EIB NVNT ax80 5610MHz Sub Band1



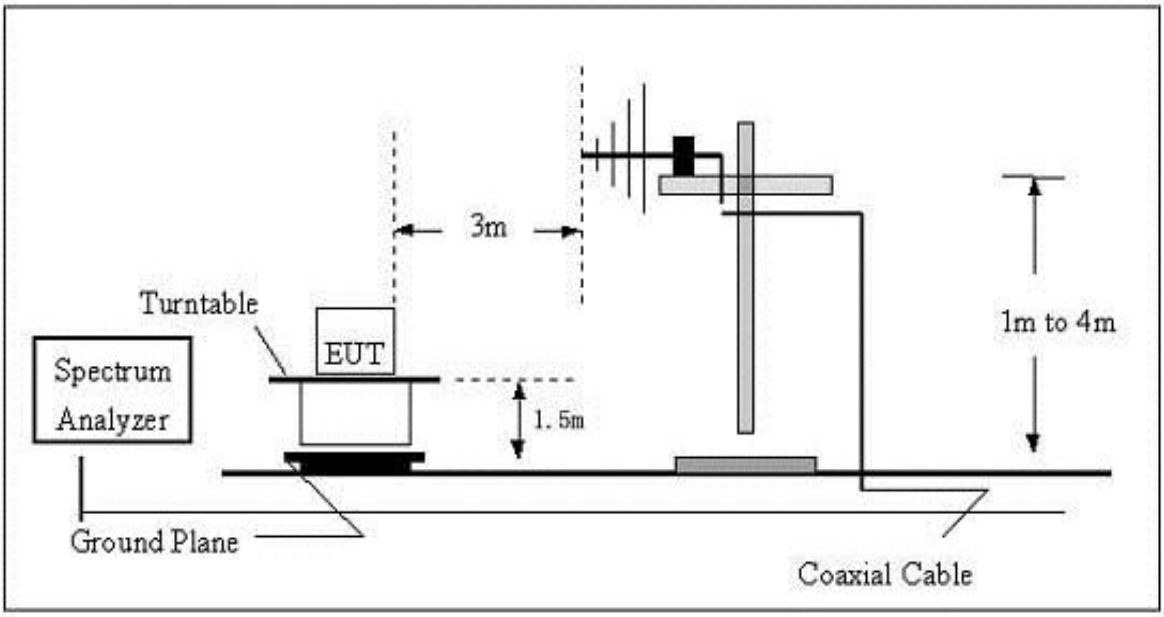
Tx. Emissions EIB NVNT ax80 5610MHz Sub Band2



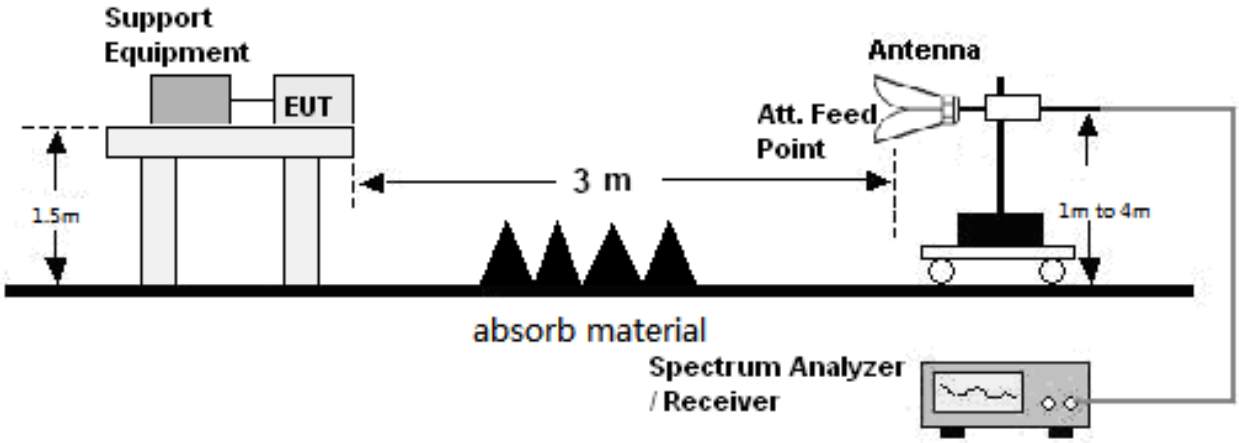
13. Receiver Spurious Emissions

13.1 Block Diagram Of Test Setup

(A)Radiated Emission Test Set-Up Frequency Below 1GHz.



(B)Radiated Emission Test Set-Up Frequency Above 1GHz.



13.2 Limits

Frequency(MHz)	Limit
30-1000	-57dBm
1000-12750	-47dBm

13.3 Test Procedure

30MHz ~ 1GHz:
a. The Product was placed on the nonconductive turntable 1.5m above the ground in a full anechoic chamber.
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.
Above 1GHz:
a. The Product was placed on the non-conductive turntable 1.5 m above the ground in a full anechoic chamber..
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

13.4 Test Results

All modes have been tested and reports show data in the worst mode
Test Mode: Transmitting 802.11n20 (ANT A, the worst case)
5.1G

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
802.11n20 low channel								
303.98	-34.60	56	1.5	H	-28.93	-63.52	-57.00	-6.52
303.98	-35.37	348	1.1	V	-28.93	-64.30	-57.00	-7.30
3019.03	-38.34	22	1.8	H	-23.56	-61.90	-47.00	-14.90
3019.03	-36.59	324	1.4	V	-23.56	-60.16	-47.00	-13.16
802.11n20 Mid channel								
303.98	-34.17	131	1.7	H	-28.93	-63.10	-57.00	-6.10
303.98	-34.94	158	1.6	V	-28.93	-63.87	-57.00	-6.87
3019.03	-38.31	60	1.7	H	-23.56	-61.87	-47.00	-14.87
3019.03	-37.01	224	1.5	V	-23.56	-60.57	-47.00	-13.57
802.11n20 high channel								
303.98	-35.25	323	1.1	H	-28.93	-64.17	-57.00	-7.17
303.98	-35.06	88	1.6	V	-28.93	-63.99	-57.00	-6.99
3019.03	-38.10	194	1.4	H	-23.56	-61.66	-47.00	-14.66
3019.03	-37.33	82	1.6	V	-23.56	-60.90	-47.00	-13.90

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

5.3G

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
802.11n20 low channel								
378.49	-36.21	244	1.9	H	-28.67	-64.88	-57.00	-7.88
378.49	-35.64	340	1.9	V	-28.67	-64.31	-57.00	-7.31
3116.40	-38.46	298	1.6	H	-23.37	-61.83	-47.00	-14.83
3116.40	-35.23	152	1.7	V	-23.37	-58.59	-47.00	-11.59
802.11n20 Mid channel								
378.49	-35.91	285	1.4	H	-28.67	-64.59	-57.00	-7.59
378.49	-34.71	36	1.9	V	-28.67	-63.38	-57.00	-6.38
3116.40	-39.44	272	1.3	H	-23.37	-62.81	-47.00	-15.81
3116.40	-35.81	275	1.9	V	-23.37	-59.18	-47.00	-12.18
802.11n20 high channel								
378.49	-36.22	92	1.2	H	-28.67	-64.89	-57.00	-7.89
378.49	-36.39	270	1.5	V	-28.67	-65.06	-57.00	-8.06
3116.40	-37.69	264	2.0	H	-23.37	-61.05	-47.00	-14.05
3116.40	-35.56	323	1.2	V	-23.37	-58.93	-47.00	-11.93

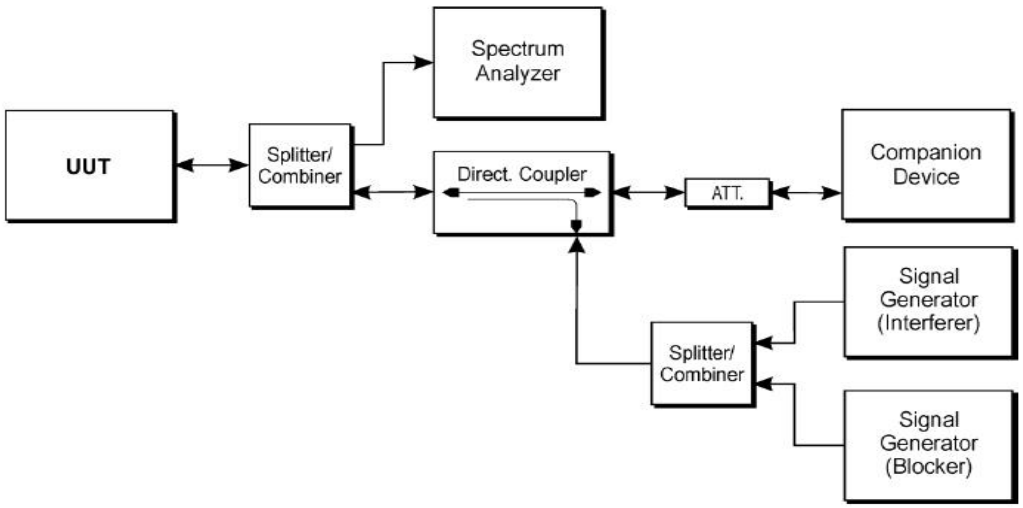
Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
802.11n20 low channel								
344.47	-36.90	107	1.2	H	-28.79	-65.69	-57.00	-8.69
344.47	-35.21	319	2.0	V	-28.79	-64.00	-57.00	-7.00
2951.63	-37.96	134	1.9	H	-23.75	-61.70	-47.00	-14.70
2951.63	-41.86	359	1.3	V	-23.75	-65.60	-47.00	-18.60
802.11n20 Mid channel								
344.47	-37.06	138	1.7	H	-28.79	-65.84	-57.00	-8.84
344.47	-36.03	201	1.8	V	-28.79	-64.82	-57.00	-7.82
2951.63	-38.32	260	1.6	H	-23.75	-62.06	-47.00	-15.06
2951.63	-41.25	250	1.3	V	-23.75	-64.99	-47.00	-17.99
802.11n20 high channel								
344.47	-38.02	334	1.7	H	-28.79	-66.81	-57.00	-9.81
344.47	-35.45	346	1.5	V	-28.79	-64.23	-57.00	-7.23
2951.63	-37.37	91	1.8	H	-23.75	-61.12	-47.00	-14.12
2951.63	-41.75	46	1.9	V	-23.75	-65.50	-47.00	-18.50

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

14. Adaptivity

14.1 Block Diagram Of Test Setup



14.2 Limit

Requirement	Operational Mode		
	Frame Based Equipment	**Load Based Equipment (CCA using 'energy detect')**	**Load Based Equipment (CCA not using any of the mechanisms referenced)**
Minimum Clear Channel Assessment (CCA) Time	20 us (see note 1)	(see note 2)	20 us (see note 1)
Maximum Channel Occupancy (COT) Time	1ms to 10 ms	(see note 2)	(13/32)*q ms (see note 3)
Minimum Idle Period	5% of COT	(see note 2)	NA
Extended CCA check	NA	(see note 2)	N*CCA (see note 4)
Short Control Signalling Transmissions	Maximum duty cycle of 5% within an observation period of 50 ms (see note 5)		

Note 1: The CCA time used by the equipment shall be declared by the manufacturer.
Note 2: LBT based spectrum sharing mechanism based on the Clear Channel Assessment (CCA) mode using 'energy detect', as described in IEEE 802.11™-2007[9], clauses 15 and 17, in IEEE 802.11n™-2009[10], clauses 20.
Note 3: q is selected by the manufacturer in the range [4…32]
Note 4: The value of N shall be randomly selected in the range [1…q]
Note 5: Adaptive equipment may or may not have Short Control Signaling Transmissions.

14.3 Test Procedure

Step 1:
• The UUT shall connect to a companion device during the test. The signal generator, the spectrum analyser, the UUT, the traffic source and the companion device are connected using a set-up equivalent to the example given by figure 14 although the interference source is switched off at this point in time. The spectrum analyser is used to monitor the transmissions of the UUT in response to the interference signal. The traffic source might be part of the UUT itself.
• The received signal level (wanted signal from the companion device) at the UUT shall be sufficient to maintain a reliable link for the duration of the test. A typical value for the received signal level which can be used in most cases is -50 dBm/MHz.
• The analyser shall be set as follows:
- RBW: ≥ Occupied Channel Bandwidth (if the analyser does not support this setting, the highest available setting shall be used)
- VBW: ≥ RBW (if the analyser does not support this setting, the highest available setting shall be used)
- Detector Mode: RMS
- Centre Frequency: Equal to the centre frequency of the operating channel
- Span: 0 Hz
- Sweep time: > 2 × Channel Occupancy Time
- Trace Mode: Clear/Write
- Trigger Mode: Video or RF/IF Power
Step 2:
• Configure the traffic source so that it fills the UUT's buffers to a level causing the UUT to always have transmissions queued (buffer-ready-for-transmission condition) towards the companion device. Where this is not possible, the UUT shall be configured to occupy the Channel Occupancy Time of the Fixed Frame Period to the highest extent possible.
• To avoid adverse effects on the measurement results, a unidirectional traffic source should be used. An example of such a unidirectional traffic source not triggering reverse traffic on higher layer protocols is UDP.

14.4 Test Result

PASS

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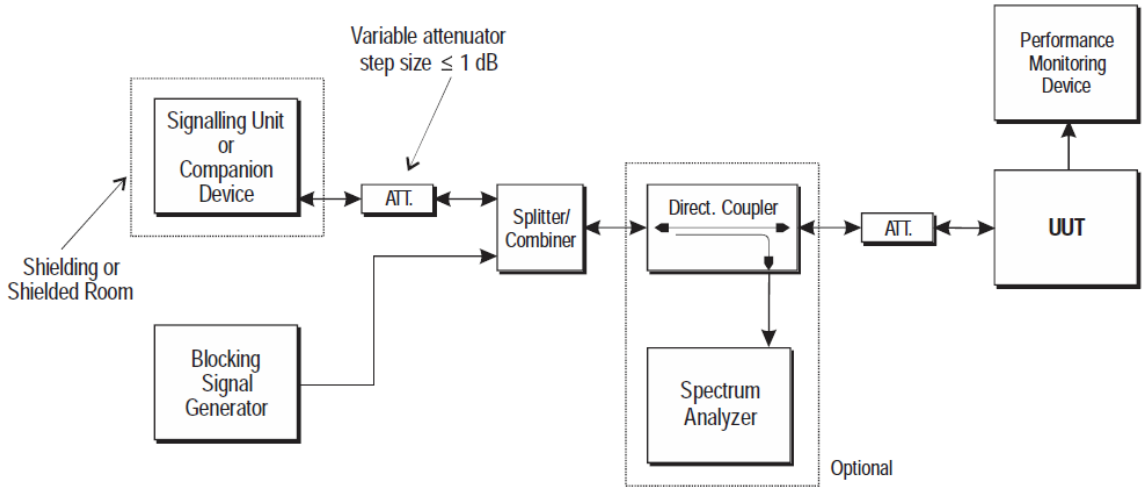
15. Receiver Blocking

15.1 Block Diagram Of Test Setup



15.2 Limit

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)		Type of blocking signal
		Master or Slave with radar detection (see table D.2, note 2)	Slave without radar detection (see table D.2, note 2)	
Pmin + 6 dB	5 100	-53	-59	Continuous Wave
Pmin + 6 dB	4 900 5 000 5 975	-47	-53	Continuous Wave
NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.8.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.				

15.3 Test Procedure

Step 1:
• The UUT shall be set to the first operating frequency to be tested (see clause 5.3.2).
Step 2:
• The blocking signal generator is set to the first frequency as defined in table 9.
Step 3:
• With the blocking signal generator switched off a communication link is set up between the UUT and the associated companion device using the test setup shown in figure 18. The attenuation of the variable attenuator shall be increased in 1 dB steps to a value at which the minimum performance criteria as specified in clause 4.2.8.3 is still met. The resulting level for the wanted signal at the input of the UUT is Pmin.
• This signal level (Pmin) is increased by 6 dB resulting in a new level (Pmin + 6 dB) of the wanted signal at the UUT receiver input.
Step 4:
• The level of the blocking signal at the UUT input is set to the level provided in table 9. It shall be verified and recorded in the test report that the performance criteria as specified in clause 4.2.8.3 are met.
• If the performance criteria as specified in clause 4.2.8.3 are met, the level of the blocking signal at the UUT may be further increased (e.g. in steps of 1 dB) until the level whereby the performance criteria as specified in clause 4.2.8.3 are no longer met. The highest level at which the performance criteria are met is recorded in the test report.
Step 5:
• Repeat step 4 for each remaining combination of frequency and level as specified in table 9.
Step 6:
• Repeat step 2 to step 5 with the UUT operating at the other operating frequencies at which the blocking test has to be performed. See clause 5.3.2.

15.4 Test Result

5.1G
Antenna A

Transmitting	P_{min}(dBm)	Blocking Frequency (MHz)	Blocking Power(dBm)	Measured PER(%)	Limit (%)
5180	-74	5100	-59	2.03	10
5180	-74	4900	-53	3.48	10
5180	-74	5000	-53	1.04	10
5180	-74	5975	-53	3.02	10
5240	-73	5100	-59	1.89	10
5240	-73	4900	-53	6.89	10
5240	-73	5000	-53	3.80	10
5240	-73	5975	-53	6.54	10

Antenna B

Transmitting	P_{min}(dBm)	Blocking Frequency (MHz)	Blocking Power(dBm)	Measured PER(%)	Limit (%)
5180	-74	5100	-59	1.06	10
5180	-74	4900	-53	3.66	10
5180	-74	5000	-53	1.15	10
5180	-74	5975	-53	3.60	10
5240	-73	5100	-59	2.20	10
5240	-73	4900	-53	2.06	10
5240	-73	5000	-53	1.88	10
5240	-73	5975	-53	5.78	10

5.3G

Antenna A

Transmitting	P_{min}(dBm)	Blocking Frequency (MHz)	Blocking Power(dBm)	Measured PER(%)	Limit (%)
5260	-74	5100	-59	2.63	10
5260	-74	4900	-53	2.11	10
5260	-74	5000	-53	3.81	10
5260	-74	5975	-53	1.44	10
5320	-73	5100	-59	4.00	10
5320	-73	4900	-53	5.30	10
5320	-73	5000	-53	7.22	10
5320	-73	5975	-53	3.65	10

Antenna B

Transmitting	P_{min}(dBm)	Blocking Frequency (MHz)	Blocking Power(dBm)	Measured PER(%)	Limit (%)
5260	-74	5100	-59	1.73	10
5260	-74	4900	-53	1.08	10
5260	-74	5000	-53	4.25	10
5260	-74	5975	-53	1.39	10
5320	-73	5100	-59	3.42	10
5320	-73	4900	-53	6.68	10
5320	-73	5000	-53	7.41	10
5320	-73	5975	-53	1.95	10

5.6G

Antenna A

Transmitting	P_{min}(dBm)	Blocking Frequency (MHz)	Blocking Power(dBm)	Measured PER(%)	Limit (%)
5500	-74	5100	-59	1.10	10
5500	-74	4900	-53	3.71	10
5500	-74	5000	-53	1.37	10
5500	-74	5975	-53	1.27	10
5700	-73	5100	-59	1.49	10
5700	-73	4900	-53	7.59	10
5700	-73	5000	-53	3.04	10
5700	-73	5975	-53	7.39	10

Antenna B

Transmitting	P_{min}(dBm)	Blocking Frequency (MHz)	Blocking Power(dBm)	Measured PER(%)	Limit (%)
5500	-74	5100	-59	2.72	10
5500	-74	4900	-53	1.61	10
5500	-74	5000	-53	3.45	10
5500	-74	5975	-53	5.82	10
5700	-73	5100	-59	6.88	10
5700	-73	4900	-53	4.41	10
5700	-73	5000	-53	6.28	10
5700	-73	5975	-53	9.66	10

16. Dynamic Frequency Selection (DFS)

16.1 Radar Detection Threshold

A radar burst using a test signal defined in table D.4 of EN 301 893 is generated on selected channel during the Channel Availability Check Time at a level defined in clause 5.3.8.2.1.1.
The test was performed 20 times and each time a unique radar test signal was generated from options provided in table D.4. When selecting these 20 unique radar test signals, the radar test signals #1 to #6 from table D.4 were included as well as variations of pulse width, pulse repetition frequency and number of different PRFs (if applicable) within the ranges given.

Result: N/A,The UUT is a slave device and maximum transmit power less than 200 mW e.i.r.p.

16.2 In service Monitoring

Test Specification

Test Requirement: ETSI EN 301 893 clause 4.2.6.2.4

Test Method: ETSI EN 301 893 clause 5.4.8.2.1.5

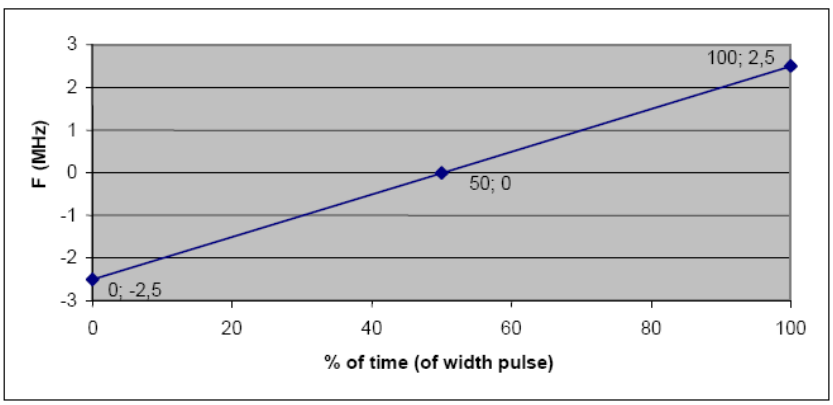
Limit:

The In-Service Monitoring shall be used to monitor each Operating Channel.
The In-Service-Monitoring shall start immediately after the RLAN device has started transmissions on a channel.
During the In-Service Monitoring, the RLAN device shall be capable of detecting any of the radar test signals that fall within the ranges given by table D.4 with a level above the Radar Detection Threshold defined in table D.2.

Table D.4: Parameters of radar test signals

Radar test signal # (see note 1 to note 3)	Pulse width W (µs)		Pulse repetition frequency PRF (PPS)		Number of different PRFs	Pulses per burst for each PRF (PPB) (see note 5)
	Min	Max	Min	Max		
1	0,5	5	200	1 000	1	10 (see note 6)
2	0,5	15	200	1 600	1	15 (see note 6)
3	0,5	15	2 300	4 000	1	25
4	20	30	2 000	4 000	1	20
5	0,5	2	300	400	2/3	10 (see note 6)
6	0,5	2	400	1 200	2/3	15 (see note 6)

NOTE 1: Radar test signals #1 to #4 are constant PRF based signals. See figure D.1. These radar test signals are intended to simulate also radars using a packet based Staggered PRF. See figure D.2.
NOTE 2: Radar test signal #4 is a modulated radar test signal. The modulation to be used is a chirp modulation with a ±2,5 MHz frequency deviation which is described below.



NOTE 3: Radar test signals #5 and #6 are single pulse based Staggered PRF radar test signals using 2 or 3 different PRF values. For radar test signal #5, the difference between the PRF values chosen shall be between 20 PPS and 50 PPS. For radar test signal #6, the difference between the PRF values chosen shall be between 80 PPS and 400 PPS. See figure D.3.
NOTE 4: Apart for the Off-Channel CAC testing, the radar test signals above shall only contain a single burst of pulses. See figure D.1, figure D.3 and figure D.4.
For the Off-Channel CAC testing, repetitive bursts shall be used for the total duration of the test. See figure D.2 and figure D.5. See also clause 4.2.6.2.3, clause 5.4.8.2.1.4.2 and clause 5.4.8.2.1.4.3.
NOTE 5: The total number of pulses in a burst is equal to the number of pulses for a single PRF multiplied by the number of different PRFs used.
NOTE 6: For the CAC and Off-Channel CAC requirements, the minimum number of pulses (for each PRF) for any of the radar test signals to be detected in the band 5 600 MHz to 5 650 MHz shall be 18.

Table D.2: Radar Detection Threshold Levels

e.i.r.p. Spectral Density (dBm/MHz)	Value (see note 1 and note 2)
10	-62 dBm
NOTE 1: This is the level at the input of the receiver of an RLAN device with a maximum e.i.r.p. density of 10 dBm/MHz and assuming a 0 dBi receive antenna. For devices employing different e.i.r.p. spectral density and/or a different receive antenna gain G (dBi) the Radar Detection Threshold Level at the receiver input follows the following relationship: DFS Detection Threshold (dBm) = -62 + 10 - e.i.r.p. Spectral Density (dBm/MHz) + G (dBi); however the Radar Detection Threshold Level shall not be less than -64 dBm assuming a 0 dBi receive antenna gain.	
NOTE 2: Slave devices with a maximum e.i.r.p. of less than 23 dBm do not have to implement radar detection unless these devices are used in fixed outdoor point to point or fixed outdoor point to multipoint applications (see clause 4.2.6.1.3).	

The minimum required detection probability associated with a given radar test signal is defined in table D.5.

Table D.5: Detection probability

Parameter	Detection Probability (P_d)	
	Channels whose nominal bandwidth falls partly or completely within the 5 600 MHz to 5 650 MHz band	Other channels
CAC, Off-Channel CAC	99,99 %	60 %
In-Service Monitoring	60 %	60 %
NOTE: P_d gives the probability of detection per simulated radar burst and represents a minimum level of detection performance under defined conditions. Therefore P_d does not represent the overall detection probability for any particular radar under real life conditions.		

Test Setup:

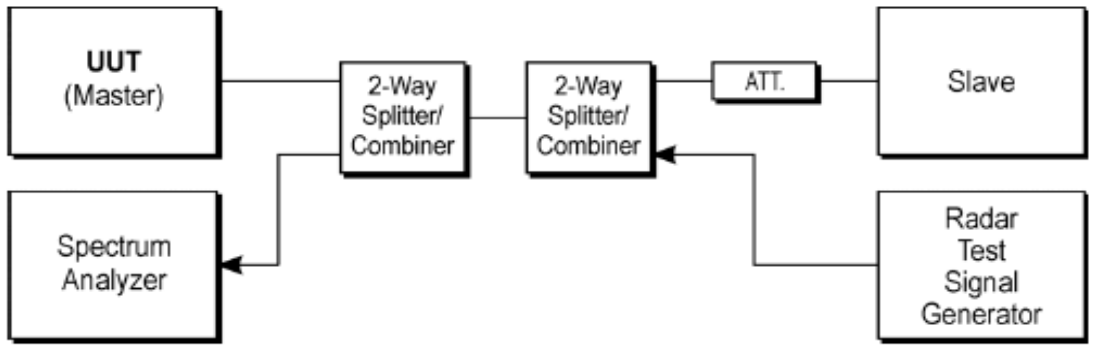


Figure 4: Set-up A

Test Procedure:

1.Test performed with tested device in normal conditions. The UUT was tested as a master device.
2. The test “Set-up A” was used. Radar test signals are injected into the UUT. This set-up also contained an RLAN device operating in slave mode which is associated with the UUT. When performing DFS testing, a power splitter/combiner has been used to combine all the receive chains(antenna inputs) into a single test point. The insertion loss of the splitter/combiner has been taken into account.

Test Instrument: Refer to Item 4.3

Test Result: **N/A,** The UUT is a slave device and maximum transmit power less than 200 mW e.i.r.p.

16.3 Channel Shutdown and Non-Occupancy period

Test Specification

Test Requirement: ETSI EN 301 893 clause 4.2.6.2.5 and 4.2.6.2.6

Test Method: ETSI EN 301 893 clause 5.4.8.2.1.6

Limit:

The Channel Move Time shall not exceed the limit defined in table D.1.
The Channel Closing Transmission Time shall not exceed the limit defined in table D.1.
The Non-Occupancy Period shall not be less than the value defined in table D.1.

Table D.1: DFS requirement values

Parameter	Value
Channel Availability Check Time	60 s (see note 1)
Minimum Off-Channel CAC Time	6 minutes (see note 2)
Maximum Off-Channel CAC Time	4 hours (see note 2)
Channel Move Time	10 s
Channel Closing Transmission Time	1 s
Non-Occupancy Period	30 minutes
NOTE 1: For channels whose nominal bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the *Channel Availability Check Time* shall be 10 minutes.	
NOTE 2: For channels whose nominal bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the *Off-Channel CAC Time* shall be within the range 1 hour to 24 hours.	

Test Setup:

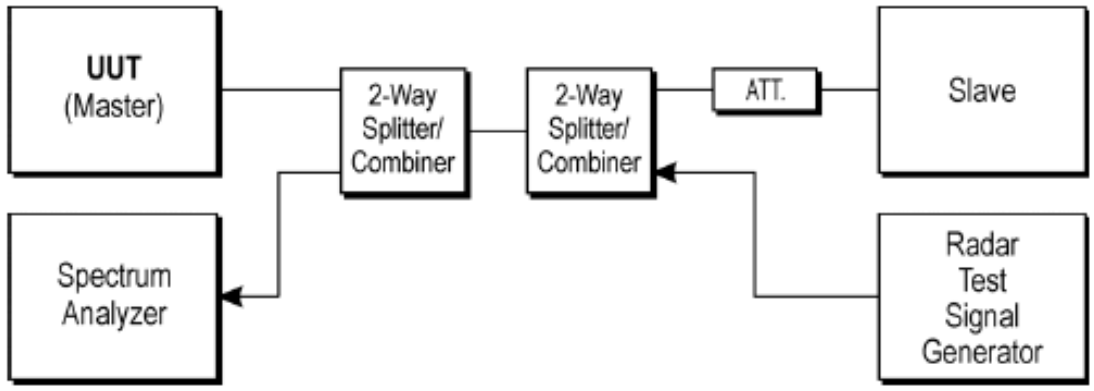


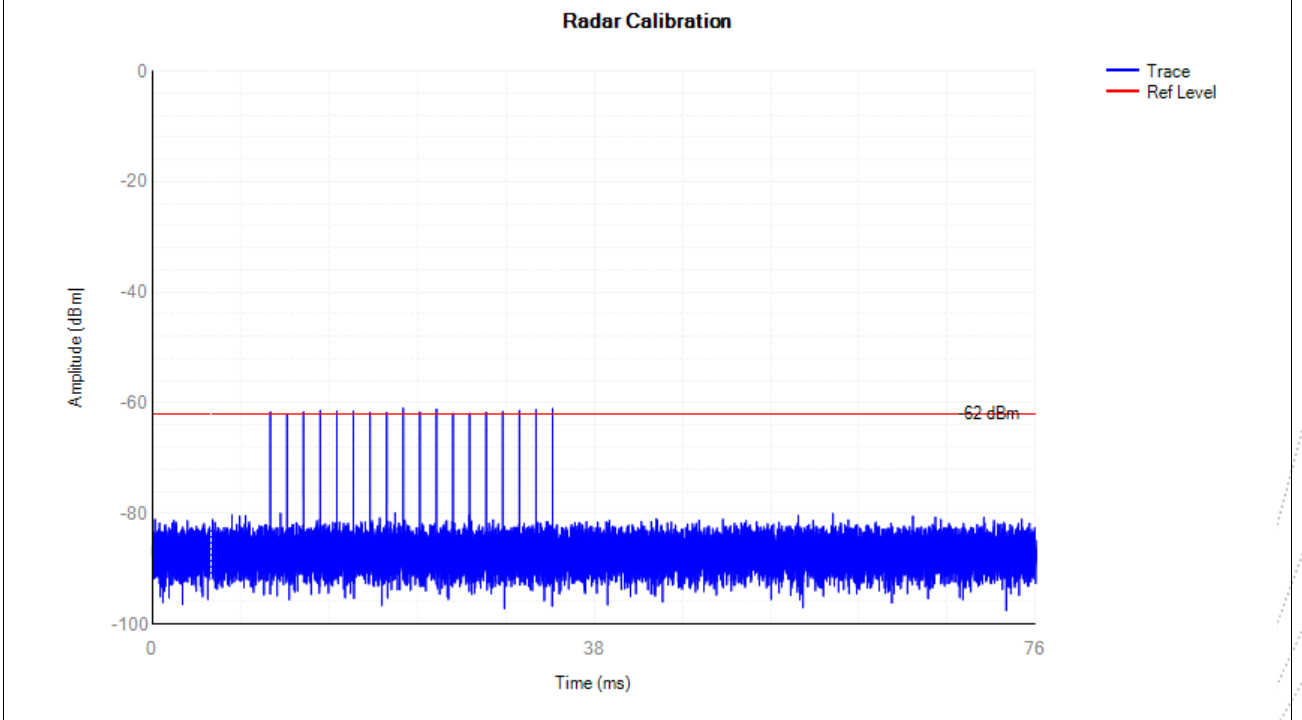
Figure 4: Set-up A

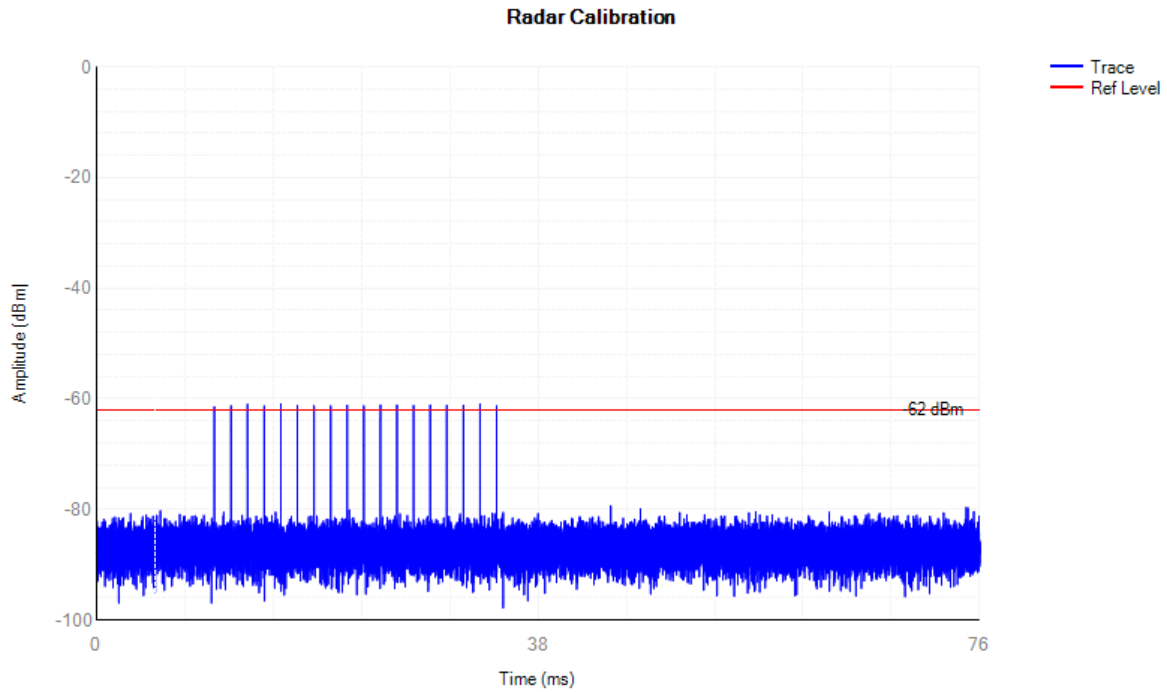
Test Procedure:
1.Test performed with tested device in normal conditions. The UUT was tested as a master device.
2. The test “Set-up A” was used. Radar test signals are injected into the UUT. This set-up also contained an RLAN device operating in slave mode which is associated with the UUT. When performing DFS testing, a power splitter/combiner has been used to combine all the receive chains(antenna inputs) into a single test point. The insertion loss of the splitter/combiner has been taken into account.

Test Instrument: Refer to Item 4.3

Test Result: PASS
Note: While the UUT was transmitting a test transmission sequence in accordance with clause 5.3.1.2 on the selected channel at a certain time T0, a single burst test signal was generated on selected channel using the reference DFS test signal defined in table D.3 and at a level of up to 10 dB above the level defined in clause 5.4.8.2.1.1. T1 denotes the end of the radar burst. The transmissions of the UUT following the end of the burst (T1) on the selected channel were observed for a period greater than to the Channel Move Time defined in table D.1. The aggregate duration (Channel Closing Transmission Time) of all transmissions from the UUT on selected channel during the Channel Move Time was compared to the limit defined in table D.1. T2 denotes the instant when the UUT has ceased all transmissions on the selected channel. Following instant T2, the selected channel was observed for a period equal to the Non-Occupancy Period (T3-T2) to verify that the UUT does not resume any transmissions on this channel.

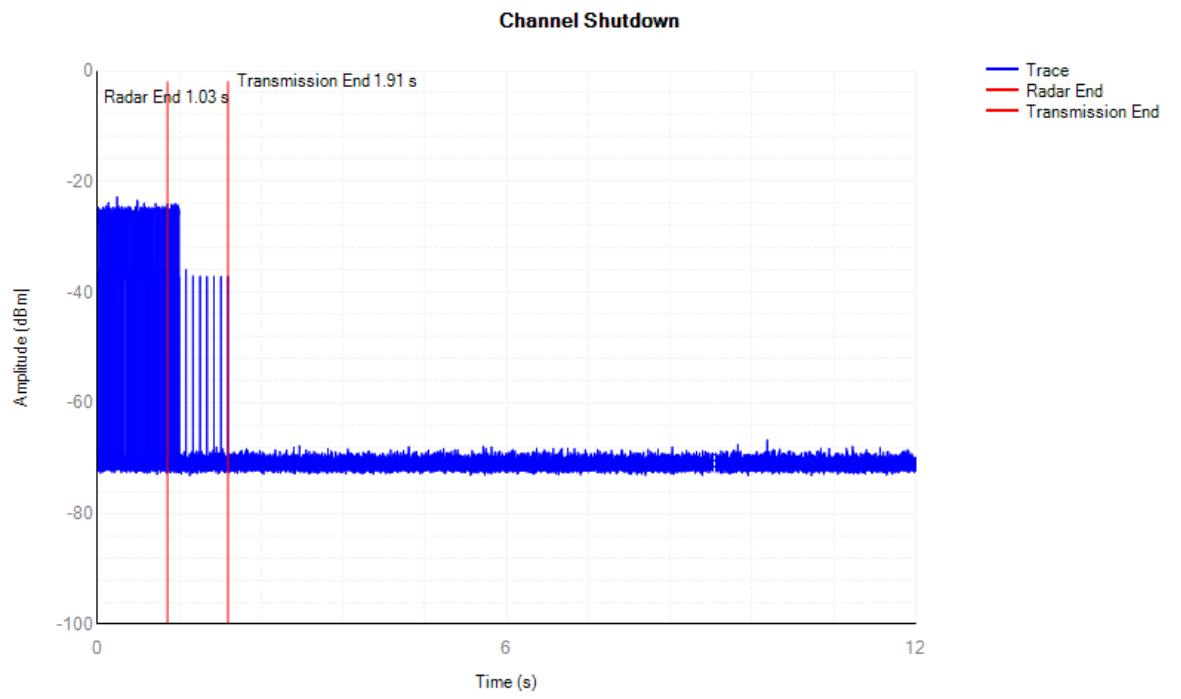
Test Graphs
5290MHz DFS_CE_Ref

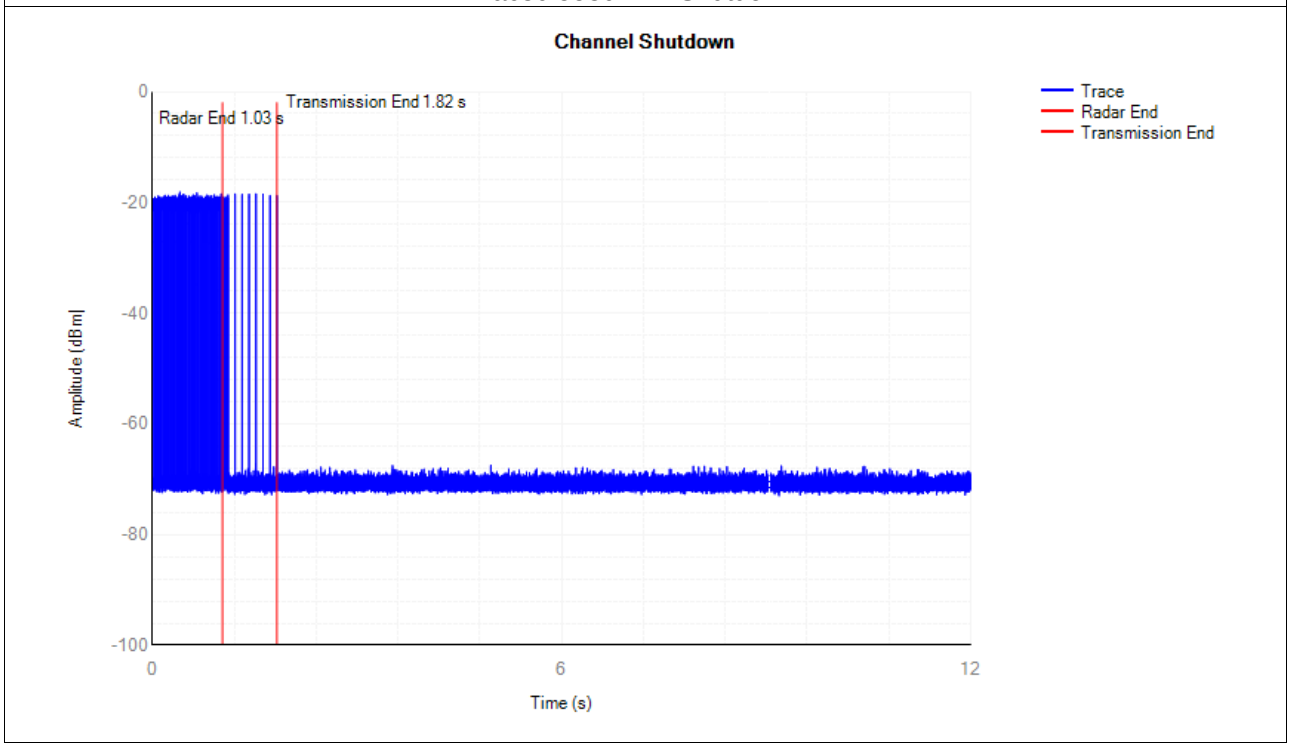


5530MHz DFS_CE_Ref


Mode	Frequency (MHz)	Channel Move Time (s)	Limit Channel Move Time (s)	Close Transmission Time (s)	Limit Close Transmission Time (s)	Verdict
ac80	5290	0.8858	10	0.0632	1	Pass
ac80	5530	0.7986	10	0.04	1	Pass

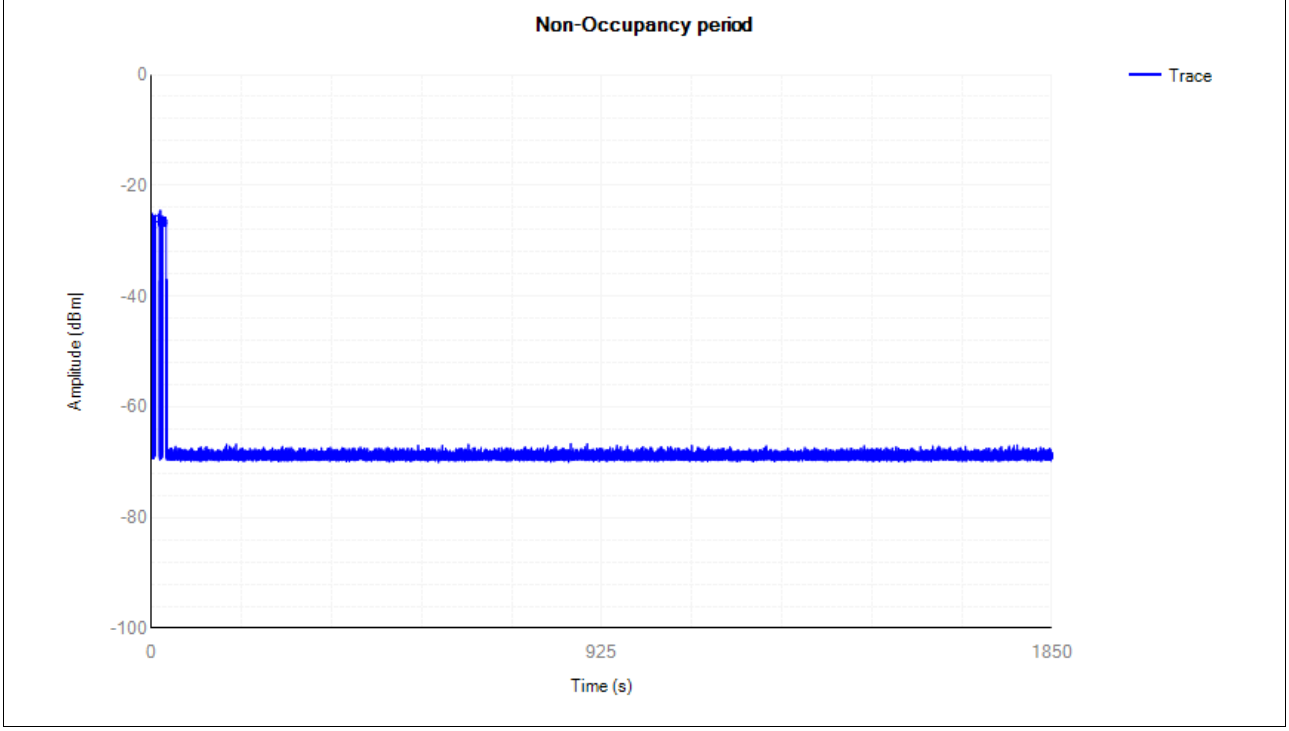
Test Graphs
ac80 5290MHz Shutdown

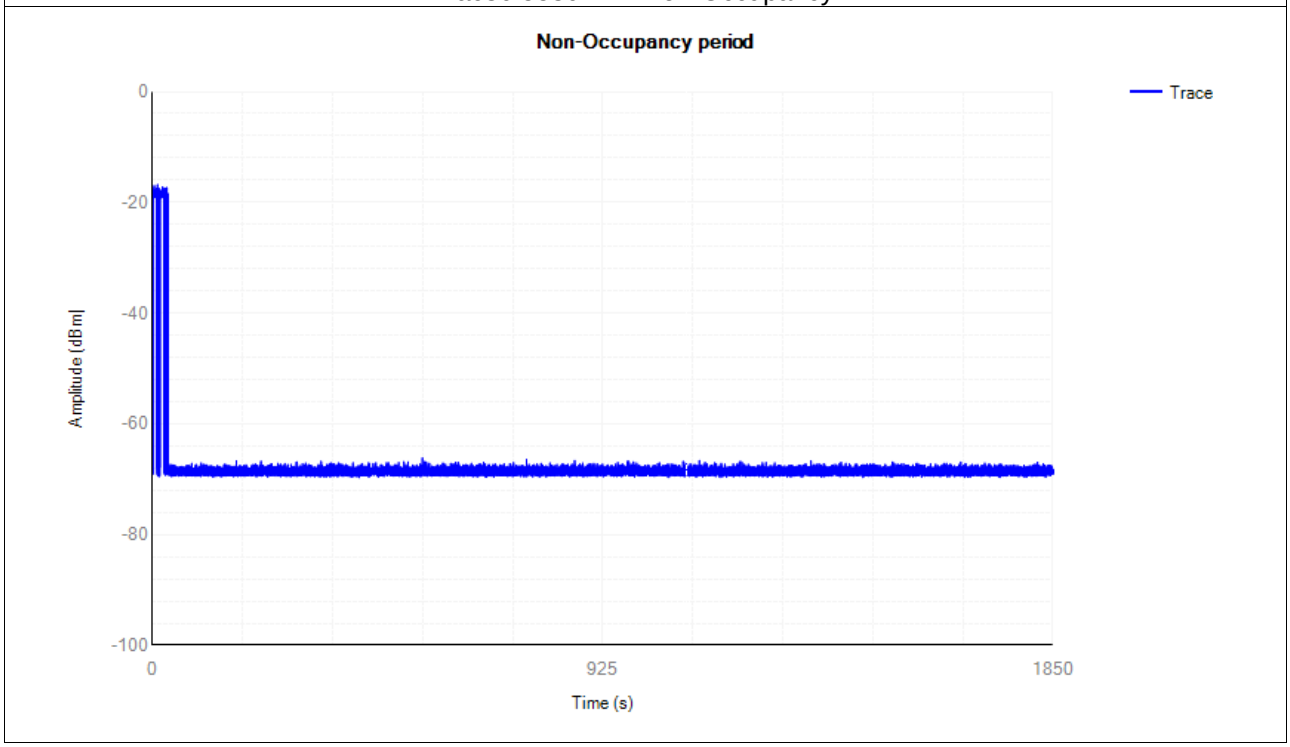


ac80 5530MHz Shutdown


Non-Occupancy Period Result				
Modulation Mode	Freq. (MHz)	Non-Occupancy Period		
		Measured	Limit	Verdict
AC80	5290	>30min	30min	PASS
AC80	5530	>30min	30min	PASS
1850 sec Timing Plot				

Test Graphs
ac80 5290MHz Non-Occupancy



ac80 5530MHz Non-Occupancy


16.4 Uniform Spreading

Test Specification

Test Requirement: ETSI EN 301 893 clause 4.2.6.2.7

Test Method: N/A

Limit:

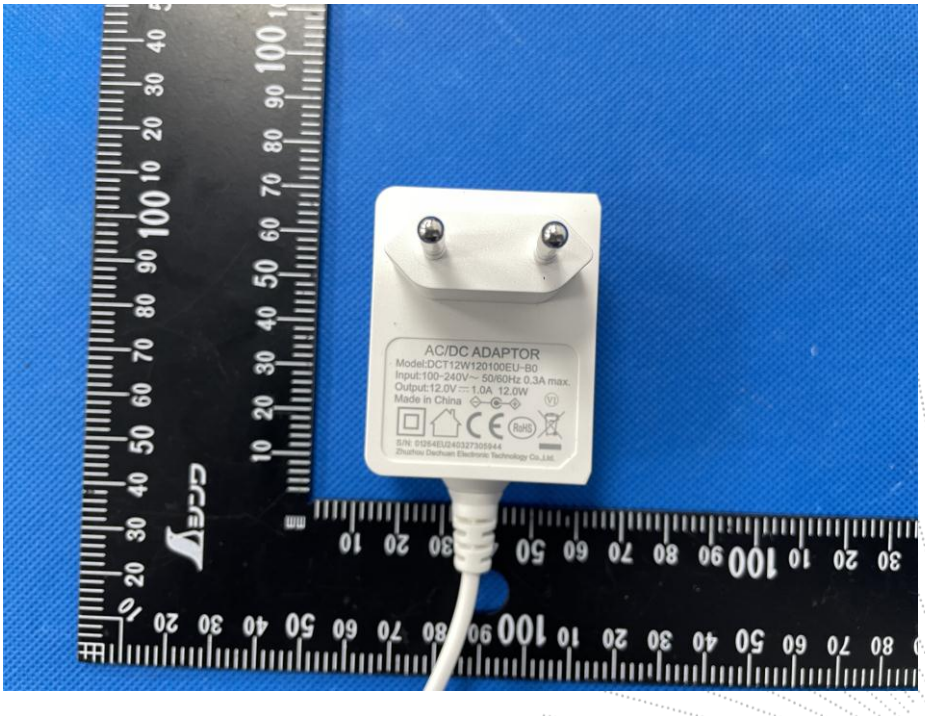
Each of the declared Channel Plans (refer to EN301893 clause 3.1) shall make use of at least 60 % of the spectrum available in the applicable sub-band(s).
The Uniform Spreading is limited to the usable channels being declared as part of the channel plan.
Usable channels do not include channels which are precluded by either:
1) the intended outdoor usage of the RLAN; or
2) previous detection of a radar on the channel (Unavailable Channel or Unusable Channel); or
3) national regulations; or
4) the restriction to only operate in the band 5 150 MHz to
5250 MHz for RLAN devices without a radar detection capability. Each of the Usable Channels shall be used with approximately equal probability. RLAN equipment for which the declared channel plan includes channels whose nominal bandwidth falls completely or partly within the band
5600 MHz to 5650 MHz may omit these channels from the list of Usable Channels at initial power up or at initial installation. Channels being used by other RLAN equipment may be omitted from the list of Usable Channels.

Result: N/A, The UUT is a slave device.

17. EUT Photographs

EUT Photo 1

EUT Photo 2

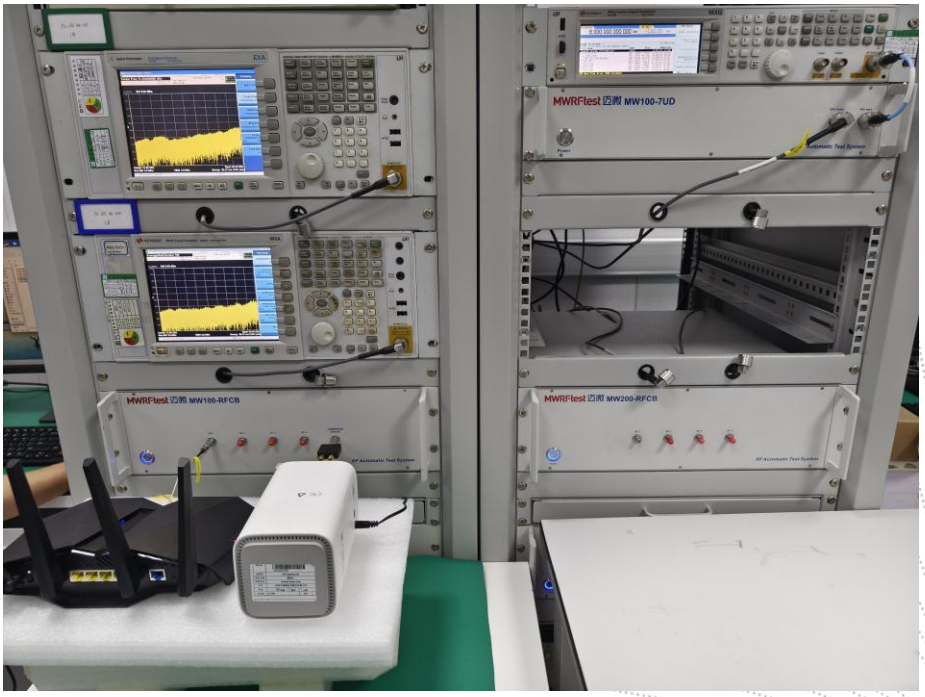


NOTE: Appendix-Photographs Of EUT Constructional Details.

18. EUT Test Setup Photographs

Spurious emissions

DFS



STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:
1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: 400-788-9558

P.C.: 518103

FAX: 0755-33229357

Website: http://www.chnbctc.com

Consultation E-mail: bctc@bctc-lab.com.cn

Complaint/Advice E-mail: advice@bctc-lab.com.cn

※※※※※ END ※※※※※

TEST REPORT

Report No.:	BCTC2404912358-5E
Applicant:	REOLINK INNOVATION LIMITED
Product Name:	WiFi NVR
Test Model:	Reolink Home Hub
Tested Date:	2024-04-28 to 2024-05-13
Issued Date:	2024-06-06

Shenzhen BCTC Testing Co., Ltd.

Product Name:	WiFi NVR
Trademark:	reolink
Model/Type reference:	Reolink Home Hub Hub 1
Prepared For:	REOLINK INNOVATION LIMITED
Address:	FLAT/RM 705 7/F FA YUEN COMMERCIAL BUILDING 75-77 FA YUEN STREET MONG KOK KL HONG KONG
Manufacturer:	REOLINK INNOVATION LIMITED
Address:	FLAT/RM 705 7/F FA YUEN COMMERCIAL BUILDING 75-77 FA YUEN STREET MONG KOK KL HONG KONG
Factory:	Shenzhen Reolink Technology Co., Ltd.
Address:	2-4th Floor, Building 2, YuanLing Industrial Park, ShangWu, Shiyan Street, Bao'an District, Shenzhen, China
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2024-04-28
Sample tested Date:	2024-04-28 to 2024-05-13
Issue Date:	2024-06-06
Report No.:	BCTC2404912358-5E
Test Standards	ETSI EN 300 440 V2.2.1 (2018-07)
Test Results	PASS
Remark:	This is WIFI-5.8GHz band radio test report.

Tested by:

Brave Zeng/ Project Handler

Approved by:

Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

Table Of Content

(Note: N/A Means Not Applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2404912358-5E	2024-06-06	Original	Valid

2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No.	Results
Transmitter Parameters			
1	Equivalent isotropically radiated power (e.i.r.p.)	4.2.2	PASS
2	Permitted range of operating frequencies	4.2.3	PASS
3	Spurious radiation for transmitter	4.2.4	PASS
4	Duty Cycle	4.2.5.4	No Restriction
5	Additional requirements for FHSS equipment	4.2.6	N/A[1]
6	Adjacent channel selectivity	4.3.3	N/A[2]
7	Blocking or desensitization	4.3.4	PASS
8	Spurious radiation for receiver	4.3.5	PASS
9	Spectrum access techniques	4.4	N/A[3]
10	GBSAR antenna pattern	4.6.4	N/A[4]
11	Limits for GBSAR	Annex I	N/A[4]

This product is equipment Category 2 receivers
Note[1]:Applies to Equipment utilizing FHSS modulation
Note[2]:Applies to equipment Category 1 receivers
Note[3]:Applies to Equipment which are not using duty cycle restrictions for media access
Note[4]:Applies only GBSAR systems

3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

RF frequency	1×10^{-7}
RF power, conducted	1.38dB
Conducted spurious emission (30MHz-1GHz)	1.28dB
Conducted spurious emission (1GHz-18GHz)	1.576dB
Radiated Spurious emission (30MHz-1GHz)	4.3dB
Radiated Spurious emission (1GHz-18GHz)	4.5dB
Temperature	0.59℃
Humidity	5.3%

4. Product Information And Test Setup

4.1 Product Information

Model/Type reference	Reolink Home Hub Hub 1
Model differences:	All the model are the same circuit and RF module, except model names and appearance of the color.
Hardware Version:	V1.0
Software Version:	V1.0
Type of Modulation:	WIFI(5.8GHz): IEEE 802.11a/n/ac HT20/ax HT20: 5745MHz-5825MHz IEEE 802.11n/ac HT40/ax HT40: 5755 MHz-5795MHz IEEE 802.11ac HT80/ax HT80: 5775MHz
Max. RF output power:	WIFI(5.8GHz): Antenna A: 9.21 dBm, Antenna B: 9.74 dBm, MIMO: 11.60 dBm
Type of Modulation:	WIFI(5.8GHz): DSSS, OFDM
Antenna installation:	WIFI(5.8GHz): Internal antenna
Antenna Gain:	WIFI(5.8GHz): Antenna A: 6.98 dBi, Antenna B: 6.98 dBi Remark: ☒ The antenna gain of the product comes from the antenna report provided by the customer, and the test data is affected by the customer information. ☐ The antenna gain of the product is provided by the customer, and the test data is affected by the customer information.
Ratings:	DC 12V from adapter
Adapter Information:	Model: DCT12W120100EU-B0 Input: 100-240V~50/60Hz 0.3A max. Output: DC 12.0V 1.0A 12.0W

Cable of Product

No.	Cable Type	Quantity	Provider	Length (m)	Shielded	Note
1	--	--	Applicant	---	Yes/No	With a ferrite ring in mid Detachable
2	--	--	BCTC	--	Yes/No	--

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
1.	PC	Lenovo	ThinkPad S2	---	Auxiliary
2.	Router	HUAWEI	WS318	---	Auxiliary
3.	WIFI IP camera	---	---	---	Auxiliary

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)
149	5745	151	5755	153	5765	157	5785
159	5795	161	5805	165	5825		

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode	Low channel	Middle channel	High channel
Transmitting(802.11a)	5745MHz	5785MHz	5825MHz
Transmitting(802.11n HT20)	5745MHz	5785MHz	5825MHz
Transmitting(802.11n HT40)	5755MHz	/	5795MHz
Transmitting(802.11ac HT20)	5745MHz	5785MHz	5825MHz
Transmitting(802.11ac HT40)	5755MHz	/	5795MHz
Transmitting(802.11ac HT80)	/	5775MHz	/
Transmitting(802.11ax HT20)	5745MHz	5785MHz	5825MHz
Transmitting(802.11ax HT40)	5755MHz	/	5795MHz
Transmitting(802.11ax HT80)	/	5775MHz	/
Receiving(802.11a)	5745MHz	5785MHz	5825MHz
Receiving(802.11n HT20)	5745MHz	5785MHz	5825MHz
Receiving(802.11n HT40)	5755MHz	/	5795MHz
Receiving(802.11ac HT20)	5745MHz	5785MHz	5825MHz
Receiving(802.11ac HT40)	5755MHz	/	5795MHz
Receiving(802.11ac HT80)	/	5775MHz	/
Receiving(802.11ax HT20)	5745MHz	5785MHz	5825MHz
Receiving(802.11ax HT40)	5755MHz	/	5795MHz
Receiving(802.11ax HT80)	/	5775MHz	/

4.6 Test Environment

1. Normal Test Conditions:

Humidity(%):	54
Atmospheric Pressure(kPa):	101
Temperature(℃):	26
Test Voltage(DC):	12V

2.Extreme Test Conditions:
For tests at extreme temperatures, measurements shall be made over the extremes of the operating temperature range as declared by the manufacturer.
For tests at extreme voltages, measurements shall be made over the extremes of the power source voltage range as declared by the manufacturer.

Test Conditions	LTLV	LTHV	HTLV	HTHV
Temperature (℃)	0	0	45	45
Test Voltage (DC)	10.8	13.2	10.8	13.2

5. Test Facility And Test Instrument Used

5.1 Test Facility

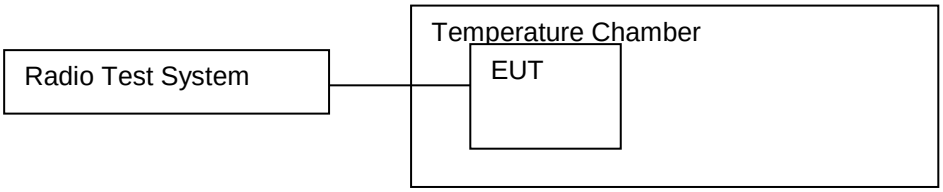
All measurement facilities used to collect the measurement data are located at 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	966 chamber	ChengYu	966 Room	966	May 15, 2023	May 14, 2026
2	Receiver	R&S	ESR3	102075	May 16, 2024	May 15, 2025
3	Receiver	R&S	ESRP	101154	May 16, 2024	May 15, 2025
4	Amplifier	Schwarzbeck	BBV9744	9744-0037	May 16, 2024	May 15, 2025
5	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	942	May 29, 2023	May 28, 2024
6	Loop Antenna	Schwarzbeck	FMZB1519B	00014	May 31, 2023	May 30, 2024
7	Amplifier	SKET	LAPA_01G18G-45dB	SK2021040901	May 16, 2024	May 15, 2025
8	Horn Antenna	Schwarzbeck	BBHA9120D	1541	May 31, 2023	May 30, 2024
9	Preamplifier	MITEQ	TTA1840-35-HG	2034381	May 16, 2024	May 15, 2025
10	Horn antenna	Schwarzbeck	BBHA9170	00822	May 31, 2023	May 30, 2024
11	Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	100363	May 16, 2024	May 15, 2025
12	Software	Frad	EZ-EMC	FA-03A2 RE	\	\
13	Spectrum Analyzer	Keysight	N9020A	MY49100060	May 16, 2024	May 15, 2025
14	Signal Generator	Keysight	N5182B	MY56200519	May 16, 2024	May 15, 2025
15	Signal Generator	Keysight	83711B	US37100131	Sept. 05, 2023	Sept. 04, 2024
16	Communication test set	R&S	CMW500	126173	Nov. 13. 2023	Nov. 12, 2024
17	D.C. Power Supply	LongWei	TPR-6405D	\	Nov. 13. 2023	Nov. 12, 2024
18	Programmable constant temperature and humidity test chamber	DGBELL	BTKS5-150C	\	Jul. 01, 2023	Jun. 30, 2024
19	Radio frequency control box	MAIWEI	MW100-RFCB	\	\	\
20	Software	MAIWEI	MTS 8310	\	\	\

6. Equivalent Isotropically Radiated Power (E.I.R.P.)

6.1 Block Diagram Of Test Setup



6.2 Limit

25mW(14dBm)

6.3 Test Procedure

Step 1:
• using a suitable means, the output of the transmitter shall be coupled to a matched diode detector;
• the output of the diode detector shall be connected to the vertical channel of an oscilloscope;
• the combination of the diode detector and the oscilloscope shall be capable of faithfully reproducing the envelope peaks and the duty cycle of the transmitter output signal;
• the observed duty cycle of the transmitter (Tx on/(Tx on + Tx off)) shall be noted as x, (0 < x < 1) and recorded.
Step 2:
• the average output power of the transmitter shall be determined using a wideband, calibrated RF power meter with a matched thermocouple detector or an equivalent thereof and, where applicable, with an integration period that exceeds the repetition period of the transmitter by a factor 5 or more. The observed value shall be recorded as "A" (in dBm);
• the e.i.r.p. shall be calculated from the above measured power output A, the observed duty cycle x, and the applicable antenna assembly gain "G" in dBi, according to the formula:
- P = A + G + 10 log (1/x);

6.4 Test Result

Remark: PH = A + G + Y + 10 × log (1 / x) (dBm)
Antenna A Gain G=6.98 dBi, Antenna B Gain G=6.98 dBi, beamforming gain Y= 0 dB, duty cycle X=100%

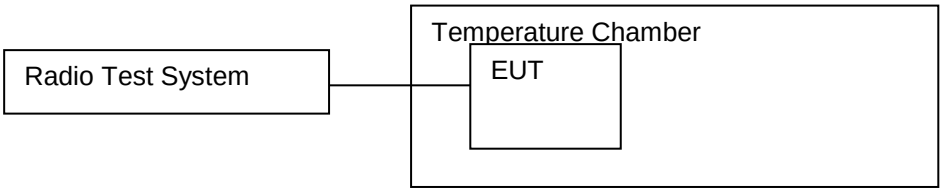
Modulation	Test conditions (Temperature)	Antenna	Low Channel		Middle Channel		High Channel	
			EIRP	Total EIRP	EIRP	Total EIRP	EIRP	Total EIRP
802.11a	NVNT	A	8.83	/	**9.21**	/	8.87	/
		B	**9.74**	/	8.74	/	9.5	/
	LTLV	A	8.55	/	9.16	/	8.70	/
		B	9.46	/	8.50	/	9.45	/
	LTHV	A	8.35	/	8.88	/	8.64	/
		B	8.97	/	8.46	/	9.24	/
	HTLV	A	8.35	/	9.02	/	8.53	/
		B	9.37	/	8.55	/	9.02	/
	HTHV	A	8.33	/	8.94	/	8.19	/
		B	9.21	/	8.33	/	8.53	/
802.11n (HT20)	NVNT	A	8.16	11.54	6.96	10.74	8.37	11.02
		B	8.87		8.38		7.61	
	LTLV	A	7.99	11.27	6.69	10.58	8.23	10.92
		B	8.51		8.31		7.57	
	LTHV	A	7.85	10.99	6.62	10.42	8.07	10.81
		B	8.12		8.07		7.51	
	HTLV	A	8.04	11.44	6.83	10.61	8.27	10.90
		B	8.78		8.25		7.47	
	HTHV	A	8.04	11.20	6.58	10.38	8.19	10.81
		B	8.34		8.03		7.37	
802.11n (HT40)	NVNT	A	8.65	11.26	/	/	6.23	9.76
		B	7.8		/		7.21	
	LTLV	A	8.39	11.01	/	/	6.03	9.64
		B	7.58		/		7.16	
	LTHV	A	8.36	10.82	/	/	5.81	9.42
		B	7.19		/		6.94	
	HTLV	A	8.22	10.94	/	/	6.05	9.63
		B	7.62		/		7.13	
	HTHV	A	7.91	10.78	/	/	5.75	9.44
		B	7.61		/		7.01	
802.11ac (HT20)	NVNT	A	8.4	10.90	8.29	10.66	6.07	8.78
		B	7.32		6.91		5.44	
	LTLV	A	8.33	10.71	8.18	10.48	5.92	8.69
		B	6.96		6.62		5.42	
	LTHV	A	7.91	10.33	8.05	10.30	5.64	8.52
		B	6.64		6.37		5.38	
	HTLV	A	8.38	10.70	8.16	10.56	5.91	8.56
		B	6.87		6.85		5.16	

	HTHV	A	8.26	10.63	7.88	10.37	5.79	8.41
		B	6.86		6.76		4.97	
802.11ac (HT40)	NVNT	A	6.19	9.42	/	/	7.22	10.87
		B	6.61		/		8.42	
	LTLV	A	5.93	9.22	/	/	7.01	10.68
		B	6.46		/		8.24	
	LTHV	A	5.72	8.90	/	/	6.90	10.53
		B	6.06		/		8.07	
	HTLV	A	5.63	8.99	/	/	7.15	10.79
		B	6.30		/		8.33	
	HTHV	A	5.29	8.57	/	/	7.04	10.71
		B	5.82		/		8.28	
802.11ac (HT80)	NVNT	A	/	/	8.2	**11.60**	/	/
		B	/		8.94		/	
	LTLV	A	/	/	7.99	11.35	/	/
		B	/		8.67		/	
	LTHV	A	/	/	7.75	11.23	/	/
		B	/		8.64		/	
	HTLV	A	/	/	8.02	11.50	/	/
		B	/		8.91		/	
	HTHV	A	/	/	7.88	11.43	/	/
		B	/		8.89		/	
802.11ax (HT20)	NVNT	A	6.08	8.81	6.46	10.55	5.51	8.39
		B	5.5		8.41		5.24	
	LTLV	A	5.62	8.57	6.36	10.34	5.25	8.17
		B	5.50		8.12		5.05	
	LTHV	A	5.14	8.16	6.27	10.26	5.04	7.98
		B	5.15		8.04		4.89	
	HTLV	A	6.06	8.77	6.39	10.52	5.34	8.18
		B	5.43		8.40		5.00	
	HTHV	A	5.93	8.64	6.34	10.40	5.25	7.99
		B	5.31		8.23		4.70	
802.11ax (HT40)	NVNT	A	8.72	11.22	/	/	7.84	10.28
		B	7.62		/		6.62	
	LTLV	A	8.47	10.89	/	/	7.59	10.14
		B	7.20		/		6.60	
	LTHV	A	7.77	10.37	/	/	7.49	10.01
		B	6.90		/		6.44	
	HTLV	A	8.59	11.10	/	/	7.80	10.23
		B	7.52		/		6.56	
	HTHV	A	7.95	10.63	/	/	7.55	10.01
		B	7.27		/		6.38	
802.11ax (HT80)	NVNT	A	/	/	6.11	9.50	/	/
		B	/		6.84		/	
	LTLV	A	/	/	5.86	9.35	/	/
		B	/		6.77		/	

	LTHV	A	/	/	5.59	9.08	/	/
		B	/		6.51		/	
	HTLV	A	/	/	5.95	9.34	/	/
		B	/		6.67		/	
	HTHV	A	/	/	5.91	9.20	/	/
		B	/		6.45		/	
Limit			≤25mW (14dBm)					
Remark: P = A + G + Y,G=Antenna gain, x=100%								

7. Permitted Range Of Operating Frequencies

7.1 Block Diagram Of Test Setup



7.2 Limit

5725 MHz to 5875 MHz

7.3 Test Procedure

a) put the spectrum analyser in video averaging mode with a minimum of 50 sweeps selected;
b) select the lowest operating frequency of the equipment under test and activate the transmitter with modulation applied. The RF emission of the equipment shall be displayed on the spectrum analyser;
c) using the marker of the spectrum analyser, find the lowest frequency below the operating frequency at which the spectral power density drops below the level given in clause 4.2.3. This frequency shall be recorded in the test report;
d) select the highest operating frequency of the equipment under test and find the highest frequency at which the spectral power density drops below the value given in clause 4.2.3. This frequency shall be recorded in the test report;
e) the difference between the frequencies measured in steps c) and d) is the operating frequency range. It shall be recorded in the test report.

7.4 Test Result

(Antenna B The Worst Data)
802.11 a

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5736.68	/	16.724
	/	5833.32	16.633
LTLV	5736.03	/	16.668
	/	5832.62	16.570
LTHV	5735.66	/	16.661
	/	5832.18	16.390
HTHV	5735.11	/	16.632
	/	5831.34	16.216
HTLV	5734.61	/	16.534
	/	5830.80	16.099

802.11 AC20

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5736.04	/	17.621
	/	5833.96	17.610
LTLV	5735.43	/	17.556
	/	5833.24	17.370
LTHV	5735.00	/	17.340
	/	5832.74	17.224
HTHV	5734.81	/	17.129
	/	5831.87	16.959
HTLV	5734.07	/	17.034
	/	5831.52	16.882

802.11 AC40

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5736.60	/	36.647
	/	5813.40	36.619
LTLV	5736.16	/	36.385
	/	5813.03	36.474
LTHV	5735.41	/	36.333
	/	5812.66	36.372
HTHV	5734.64	/	36.111
	/	5812.10	36.103
HTLV	5734.11	/	36.081
	/	5812.03	35.878

802.11 AC80

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5736.60	/	76.142
	/	5813.40	77.154
LTLV	5735.60	/	75.947
	/	5812.71	76.917
LTHV	5734.78	/	75.885
	/	5811.89	76.636
HTHV	5734.22	/	75.604
	/	5811.18	76.509
HTLV	5733.30	/	75.465
	/	5810.55	76.277

802.11 AX20

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5735.48	/	18.934
	/	5834.52	18.974
LTLV	5734.62	/	18.703
	/	5834.41	18.691
LTHV	5733.77	/	18.415
	/	5834.38	18.538
HTHV	5733.42	/	18.396
	/	5833.57	18.457
HTLV	5733.25	/	18.256
	/	5832.72	18.411

802.11 AX40

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5735.72	/	38.154
	/	5814.20	38.196
LTLV	5735.12	/	38.113
	/	5814.04	38.170
LTHV	5734.59	/	38.022
	/	5813.98	38.147
HTHV	5734.07	/	37.988
	/	5813.32	38.137
HTLV	5733.92	/	37.965
	/	5812.40	38.092

802.11 AX80

Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5735.80	/	77.383
	/	5813.88	77.387
LTLV	5735.07	/	77.180
	/	5813.50	77.120
LTHV	5734.84	/	77.169
	/	5812.85	77.008
HTHV	5734.74	/	76.898
	/	5812.56	76.808
HTLV	5734.47	/	76.816
	/	5811.70	76.733

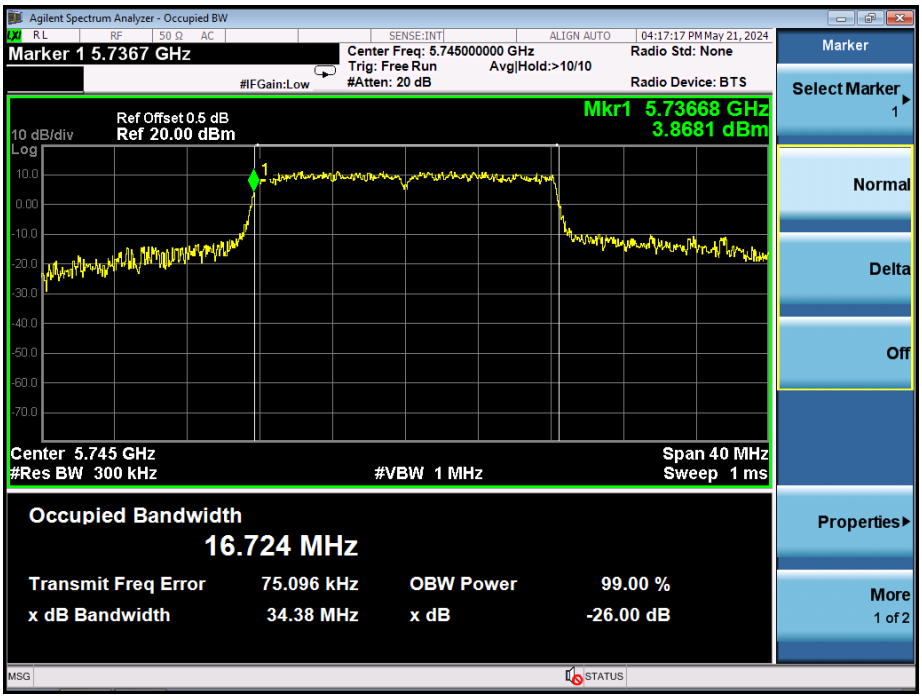
802.11 N20

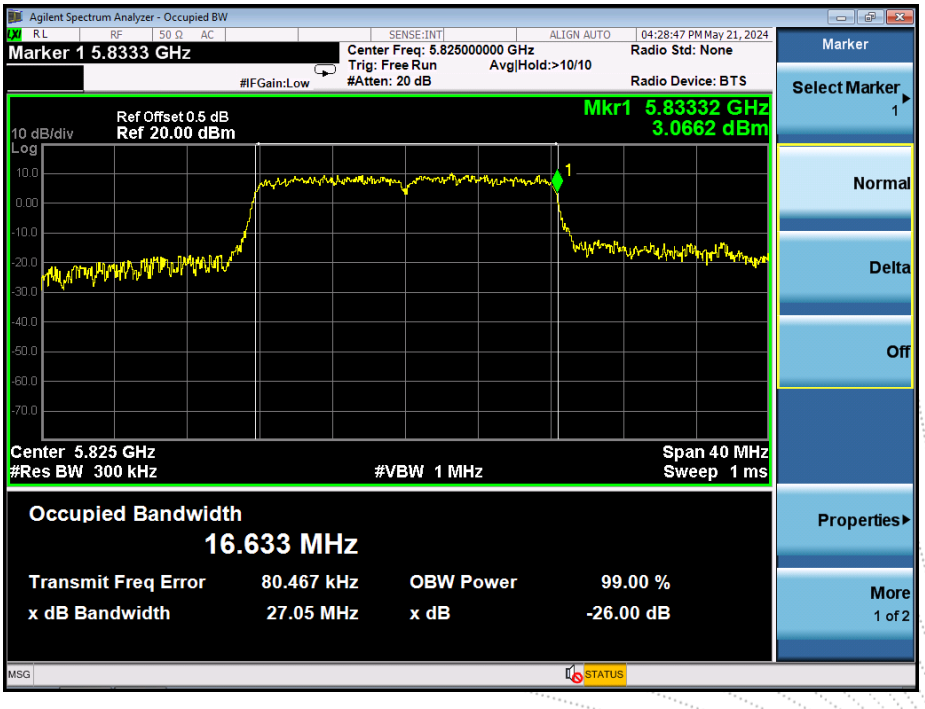
Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5736.28	/	17.555
	/	5833.84	17.574
LTLV	5736.27	/	17.447
	/	5833.34	17.338
LTHV	5735.49	/	17.255
	/	5833.13	17.151
HTHV	5734.93	/	17.254
	/	5832.39	16.978
HTLV	5734.62	/	17.145
	/	5831.54	16.930

802.11 N40

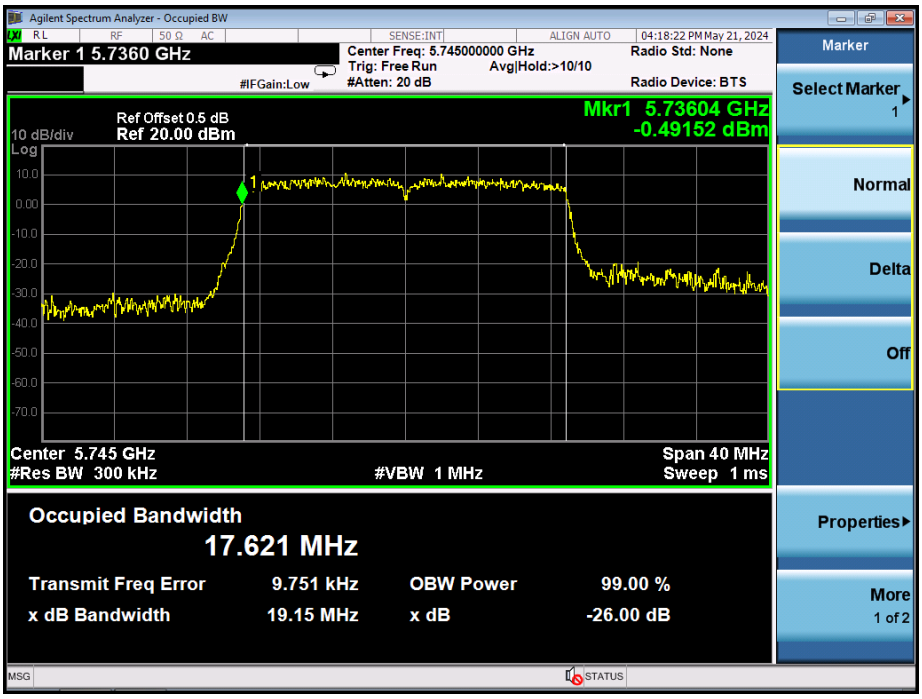
Test Conditions	Frequencies (MHz) at -30dBm/30kHz (EIRP)		Occupied Channel (MHz)
	Lowest Frequency (fL)	Highest Frequency (fH)	
Normal	5736.76	/	36.664
	/	5813.48	36.689
LTLV	5735.81	/	36.422
	/	5813.34	36.686
LTHV	5735.15	/	36.369
	/	5812.64	36.464
HTHV	5735.04	/	36.209
	/	5811.79	36.241
HTLV	5734.82	/	36.031
	/	5811.00	35.966

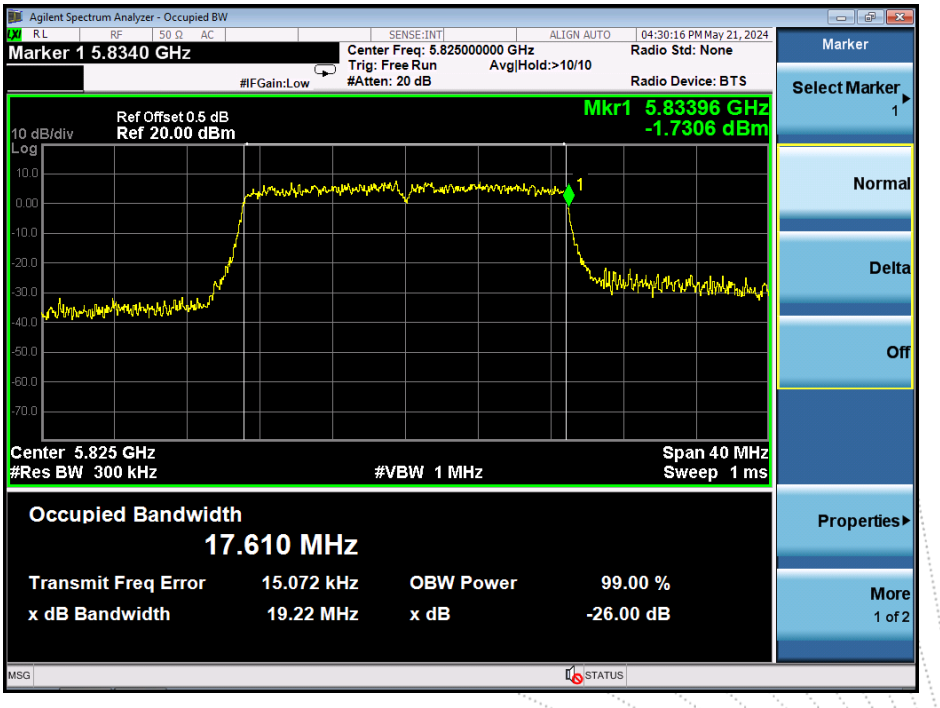
Note: A(B) Represent the value of antenna A and B, The worst data is Antenna B, only shown Antenna B Plot.
A MODE



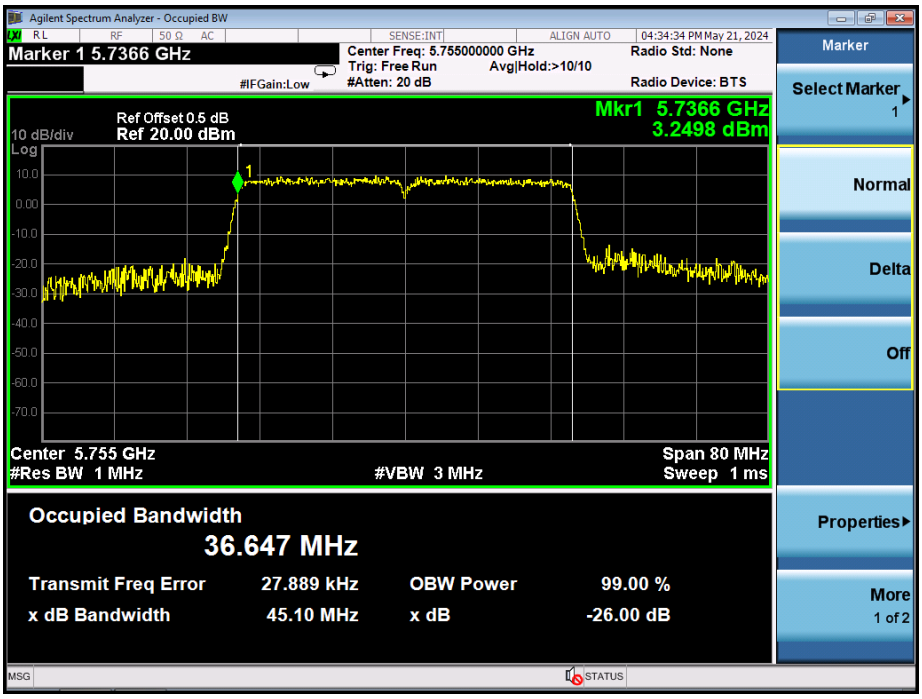


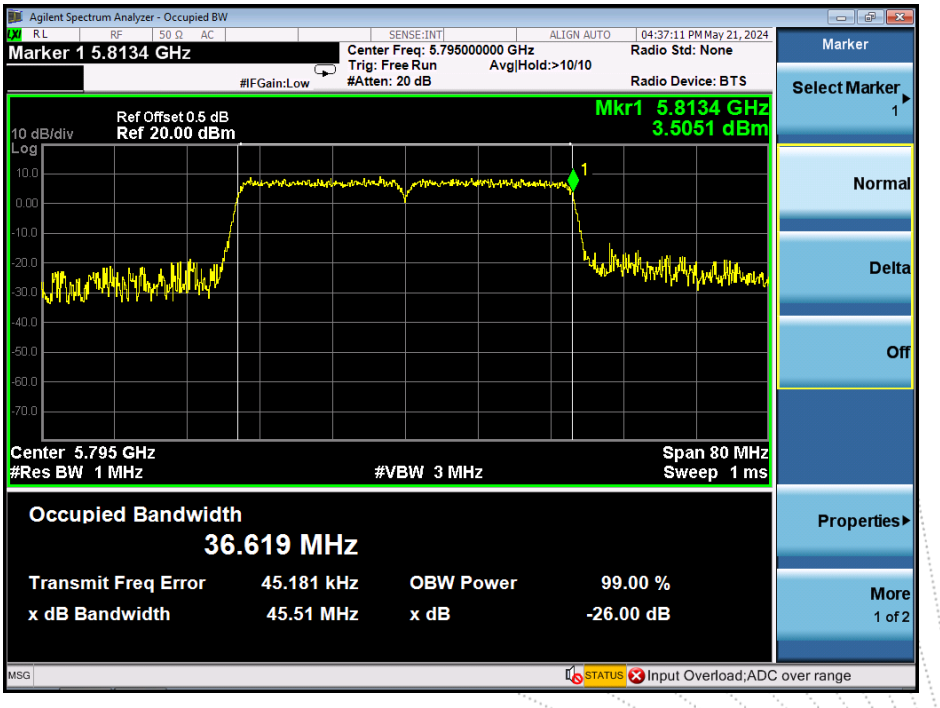
AC20 MODE


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7360 GHz
Center Freq: 5.745000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.73604 GHz
-0.49152 dBm
Center 5.745 GHz
#Res BW 300 kHz
#VBW 1 MHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
17.621 MHz
Transmit Freq Error 9.751 kHz
OBW Power 99.00 %
x dB Bandwidth 19.15 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

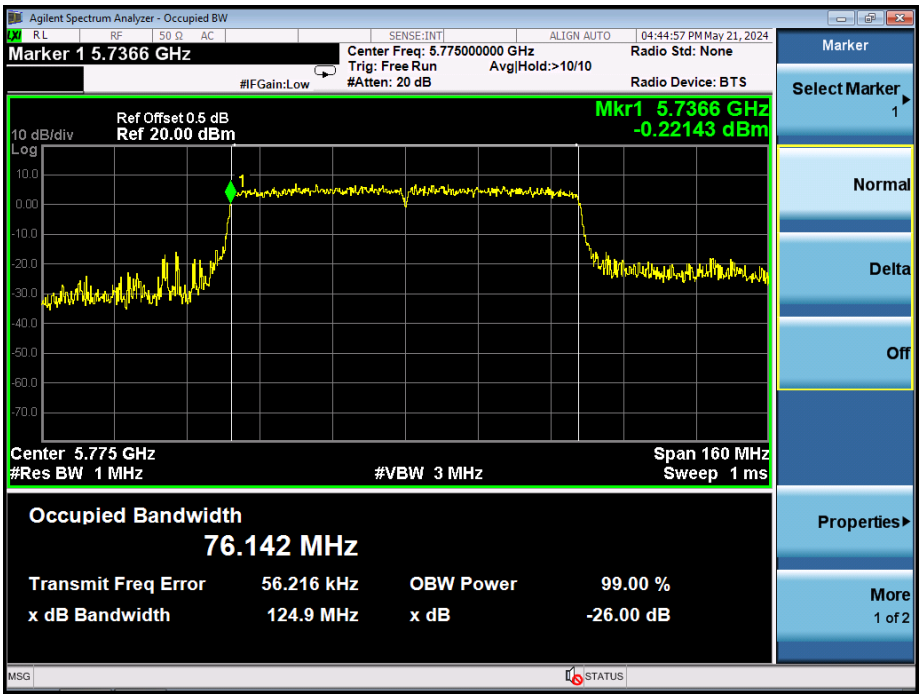

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8340 GHz
Center Freq: 5.825000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.83396 GHz
-1.7306 dBm
Center 5.825 GHz
#Res BW 300 kHz
#VBW 1 MHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
17.610 MHz
Transmit Freq Error 15.072 kHz
OBW Power 99.00 %
x dB Bandwidth 19.22 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

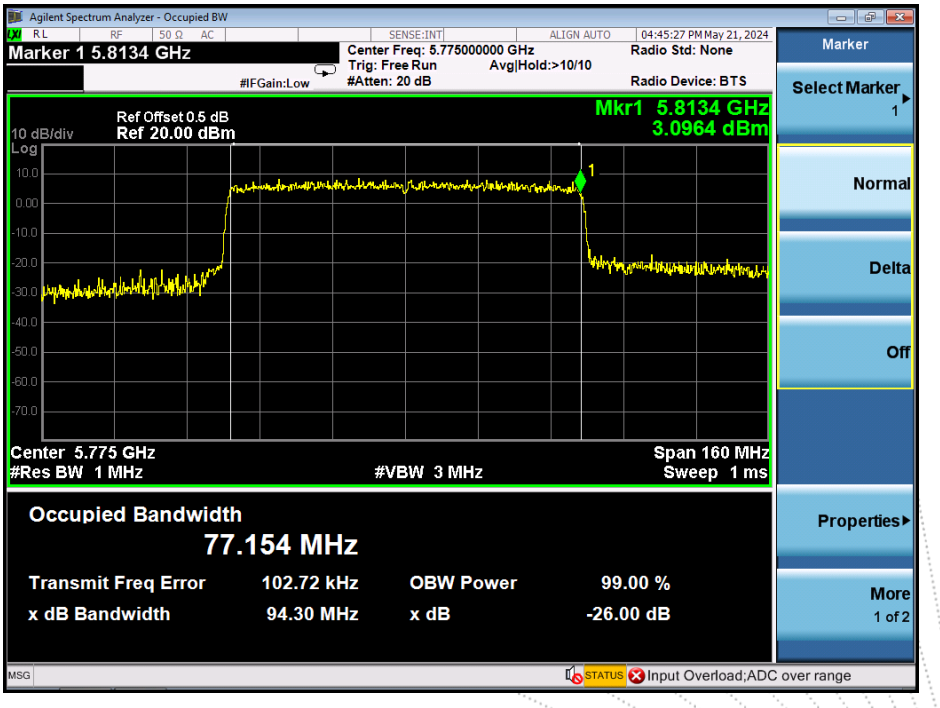
AC40 MODE


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7366 GHz
Center Freq: 5.755000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
04:34:34 PM May 21, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.7366 GHz
3.2498 dBm
Center 5.755 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
36.647 MHz
Transmit Freq Error 27.889 kHz
OBW Power 99.00 %
x dB Bandwidth 45.10 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
STATUS

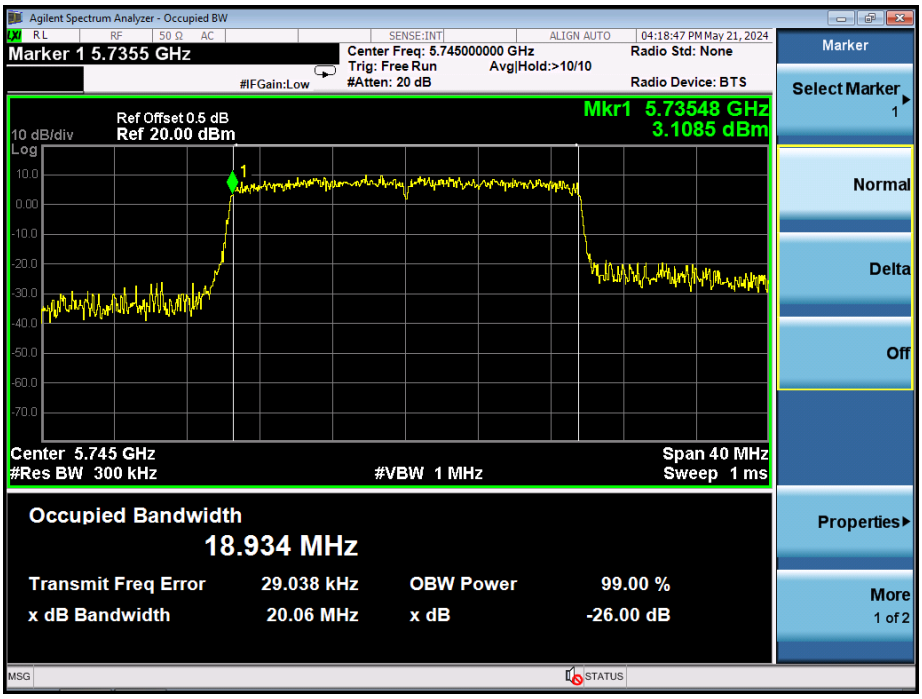

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8134 GHz
Center Freq: 5.795000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
04:37:11 PM May 21, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.8134 GHz
3.5051 dBm
Center 5.795 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
36.619 MHz
Transmit Freq Error 45.181 kHz
OBW Power 99.00 %
x dB Bandwidth 45.51 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
STATUS
Input Overload;ADC over range

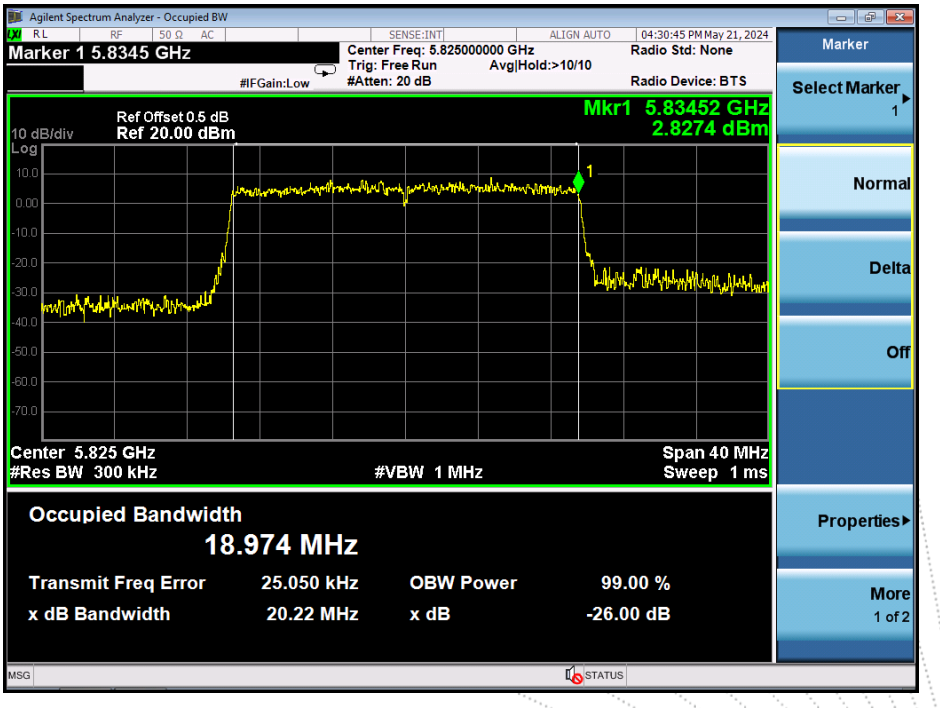
AC80 MODE


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7366 GHz
Center Freq: 5.775000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
04:44:57 PM May 21, 2024
#IFGain:Low
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.7366 GHz
-0.22143 dBm
Center 5.775 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 160 MHz
Sweep 1 ms
Occupied Bandwidth
76.142 MHz
Transmit Freq Error 56.216 kHz
OBW Power 99.00 %
x dB Bandwidth 124.9 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS

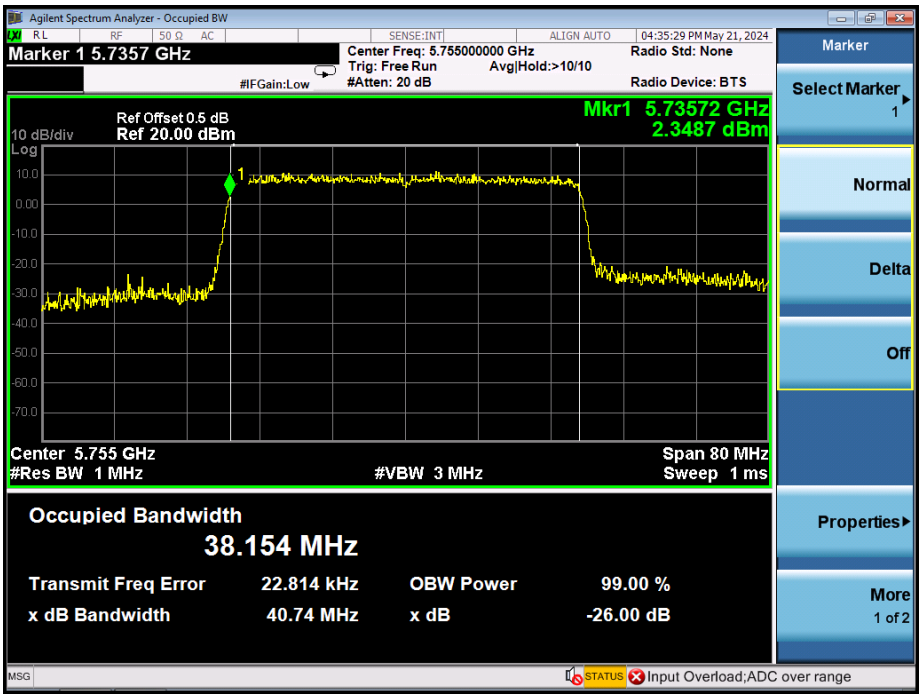

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8134 GHz
Center Freq: 5.775000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
04:45:27 PM May 21, 2024
#IFGain:Low
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.8134 GHz
3.0964 dBm
Center 5.775 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 160 MHz
Sweep 1 ms
Occupied Bandwidth
77.154 MHz
Transmit Freq Error 102.72 kHz
OBW Power 99.00 %
x dB Bandwidth 94.30 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS
Input Overload;ADC over range

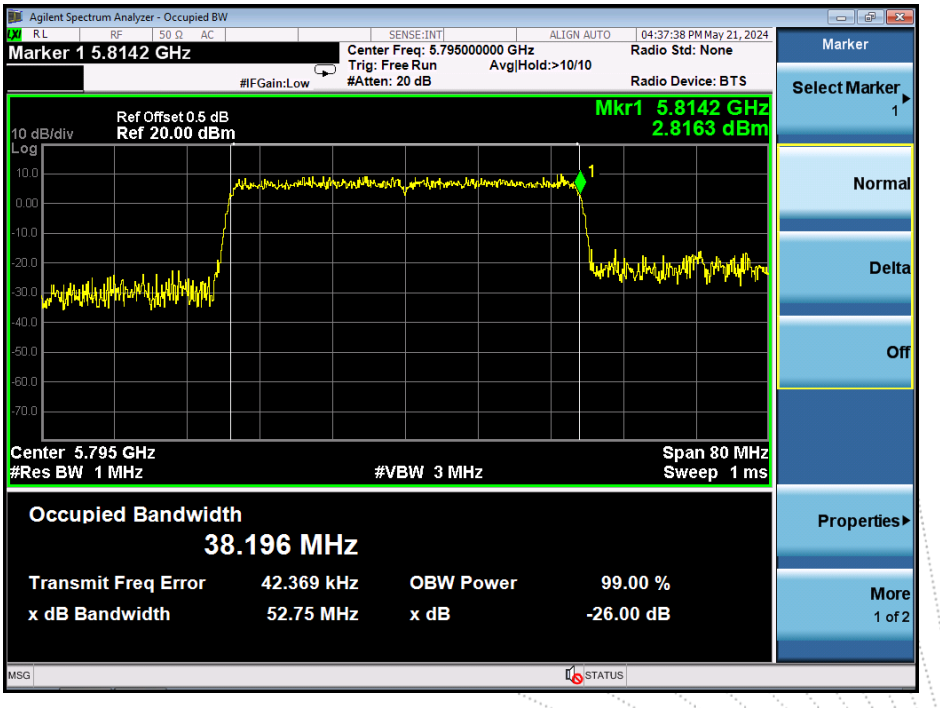
AX20 MODE


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7355 GHz
Center Freq: 5.745000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.73548 GHz
3.1085 dBm
Center 5.745 GHz
#Res BW 300 kHz
#VBW 1 MHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
18.934 MHz
Transmit Freq Error 29.038 kHz
OBW Power 99.00 %
x dB Bandwidth 20.06 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

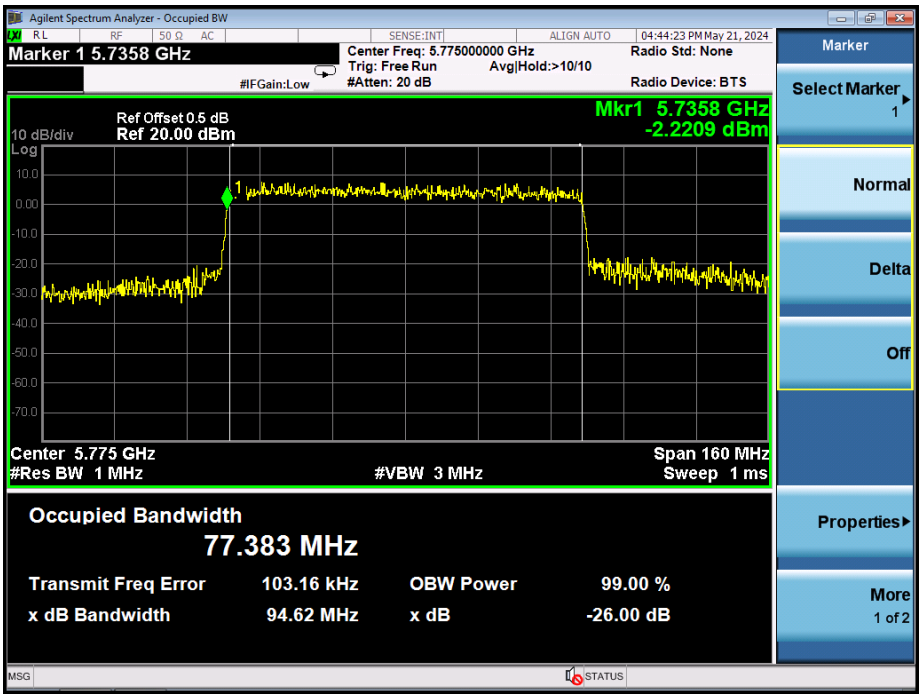

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8345 GHz
Center Freq: 5.825000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
#IFGain:Low
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.83452 GHz
2.8274 dBm
Center 5.825 GHz
#Res BW 300 kHz
#VBW 1 MHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
18.974 MHz
Transmit Freq Error 25.050 kHz
OBW Power 99.00 %
x dB Bandwidth 20.22 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

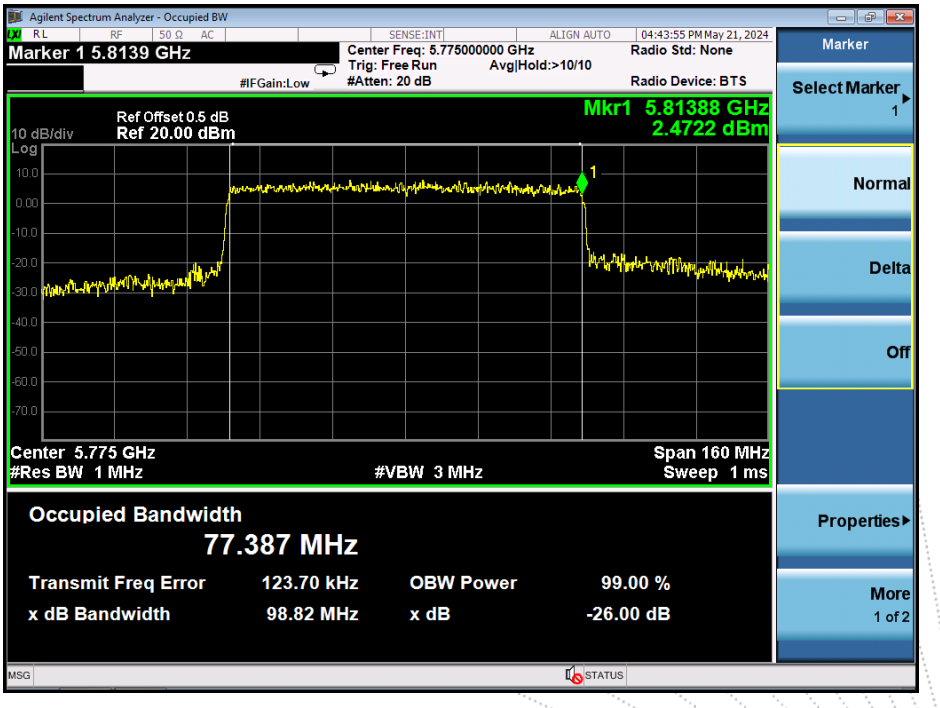
AX40 MODE


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7357 GHz
Center Freq: 5.755000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
04:35:29 PM May 21, 2024
#IFGain:Low
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.73572 GHz
2.3487 dBm
Center 5.755 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
38.154 MHz
Transmit Freq Error 22.814 kHz
OBW Power 99.00 %
x dB Bandwidth 40.74 MHz
x dB -26.00 dB
Input Overload;ADC over range
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

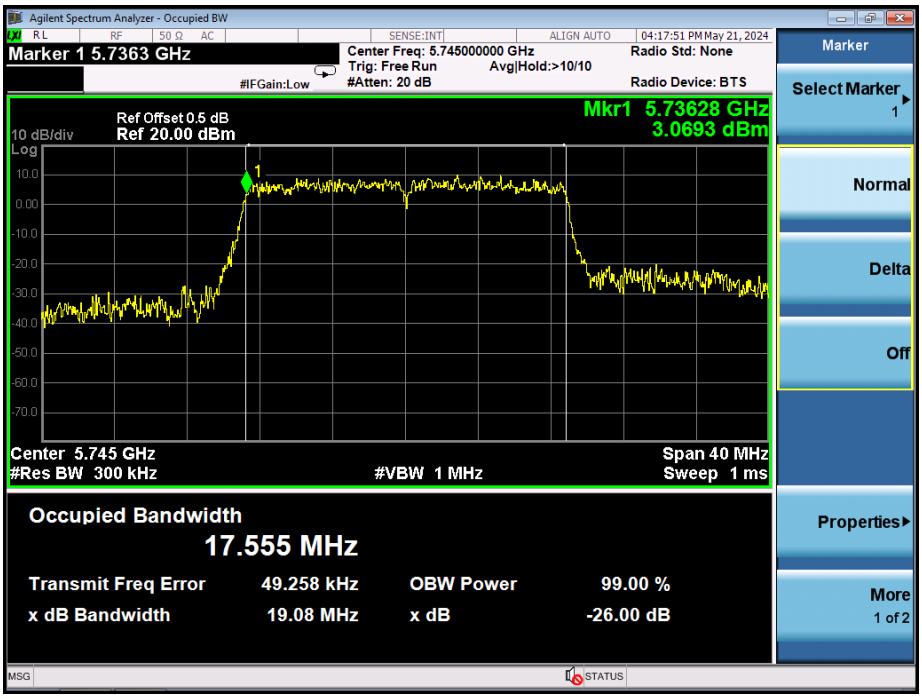

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8142 GHz
Center Freq: 5.795000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
04:37:38 PM May 21, 2024
#IFGain:Low
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.8142 GHz
2.8163 dBm
Center 5.795 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
38.196 MHz
Transmit Freq Error 42.369 kHz
OBW Power 99.00 %
x dB Bandwidth 52.75 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

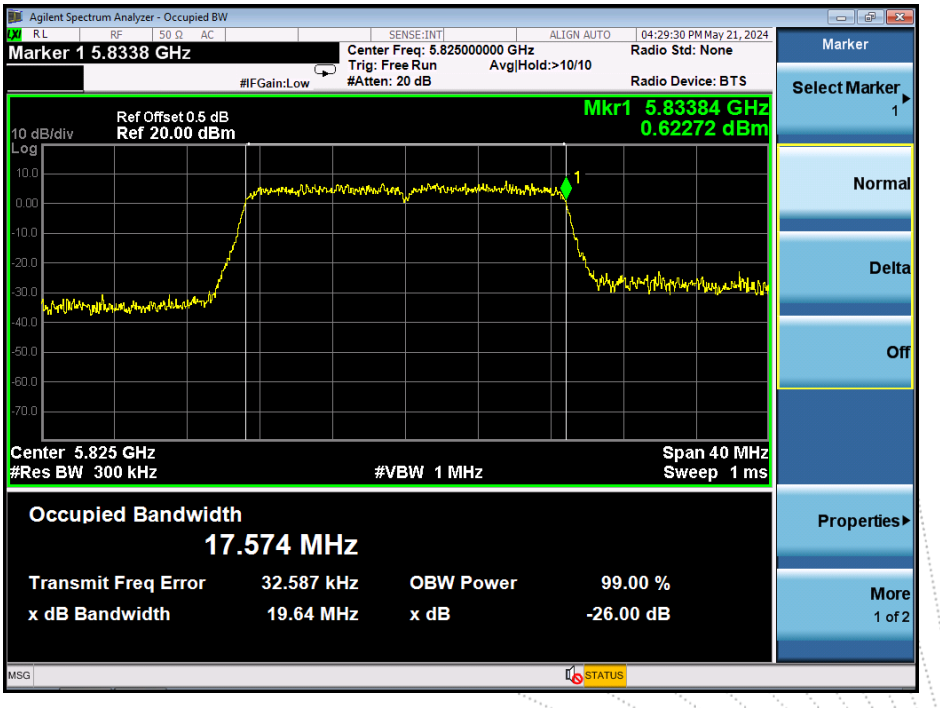
AX80 MODE


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7358 GHz
Center Freq: 5.775000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.7358 GHz
-2.2209 dBm
Center 5.775 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 160 MHz
Sweep 1 ms
Occupied Bandwidth
77.383 MHz
Transmit Freq Error 103.16 kHz
OBW Power 99.00 %
x dB Bandwidth 94.62 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

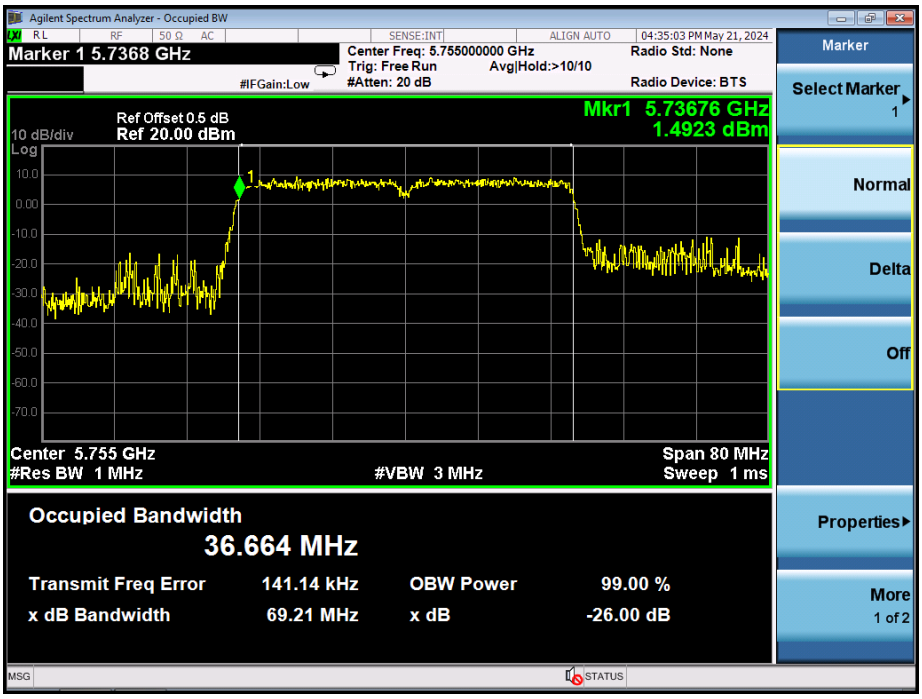

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8139 GHz
Center Freq: 5.775000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.81388 GHz
2.4722 dBm
Center 5.775 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 160 MHz
Sweep 1 ms
Occupied Bandwidth
77.387 MHz
Transmit Freq Error 123.70 kHz
OBW Power 99.00 %
x dB Bandwidth 98.82 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

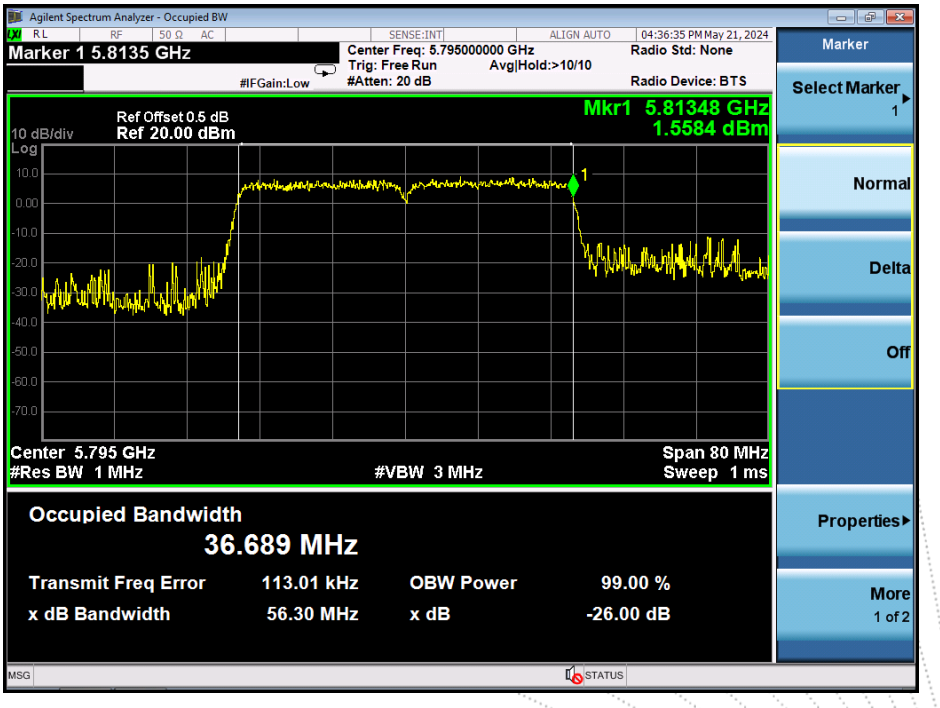
N20 MODE


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7363 GHz
Center Freq: 5.745000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.73628 GHz
3.0693 dBm
Center 5.745 GHz
#Res BW 300 kHz
#VBW 1 MHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
17.555 MHz
Transmit Freq Error 49.258 kHz
OBW Power 99.00 %
x dB Bandwidth 19.08 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8338 GHz
Center Freq: 5.825000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.83384 GHz
0.62272 dBm
Center 5.825 GHz
#Res BW 300 kHz
#VBW 1 MHz
Span 40 MHz
Sweep 1 ms
Occupied Bandwidth
17.574 MHz
Transmit Freq Error 32.587 kHz
OBW Power 99.00 %
x dB Bandwidth 19.64 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2

N40 MODE

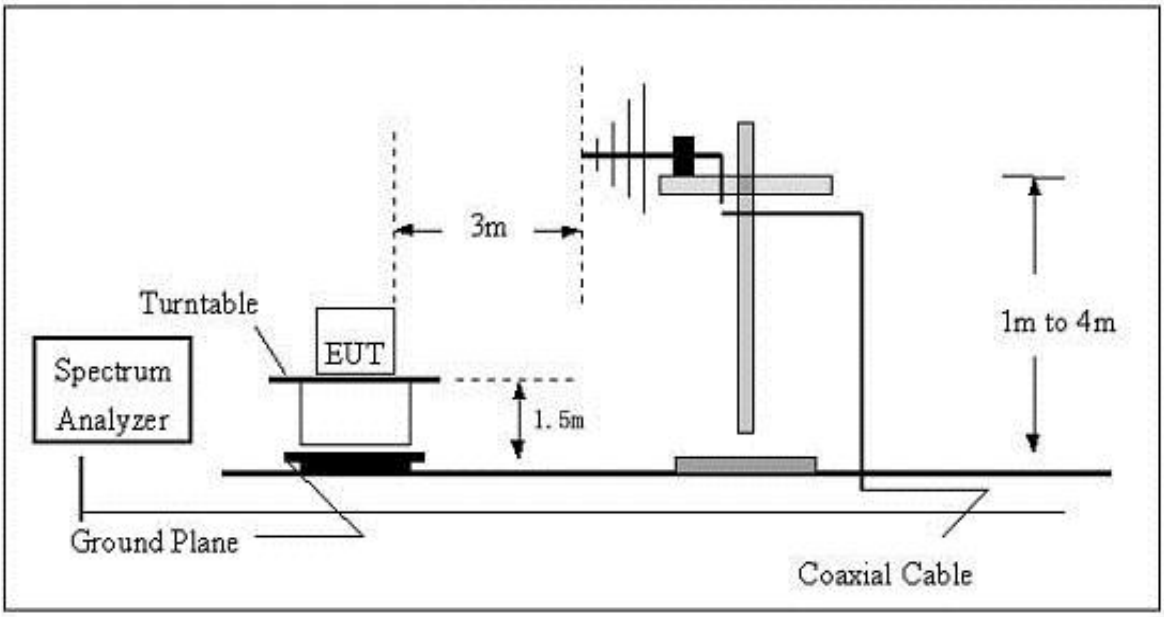

Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.7368 GHz
#IFGain:Low
Center Freq: 5.755000000 GHz
Trig: Free Run
#Atten: 20 dB
Avg|Hold:>10/10
Radio Std: None
Radio Device: BTS
04:35:03 PM May 21, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.73676 GHz
1.4923 dBm
Center 5.755 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
36.664 MHz
Transmit Freq Error 141.14 kHz
OBW Power 99.00 %
x dB Bandwidth 69.21 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS


Agilent Spectrum Analyzer - Occupied BW
Marker 1 5.8135 GHz
#IFGain:Low
Center Freq: 5.795000000 GHz
Trig: Free Run
#Atten: 20 dB
Avg|Hold:>10/10
Radio Std: None
Radio Device: BTS
04:36:35 PM May 21, 2024
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 5.81348 GHz
1.5584 dBm
Center 5.795 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 80 MHz
Sweep 1 ms
Occupied Bandwidth
36.689 MHz
Transmit Freq Error 113.01 kHz
OBW Power 99.00 %
x dB Bandwidth 56.30 MHz
x dB -26.00 dB
Marker
Select Marker
Normal
Delta
Off
Properties
More
1 of 2
MSG
STATUS

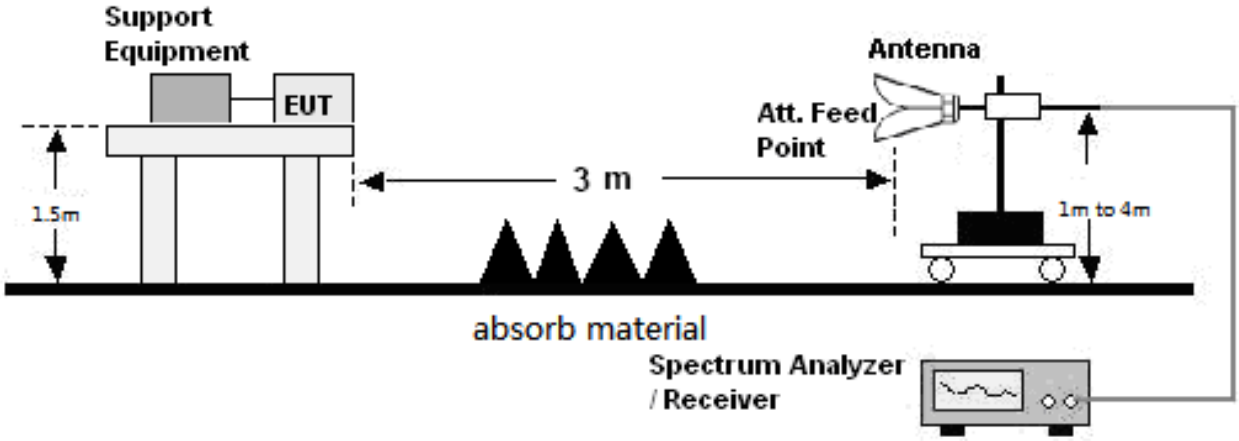
8. Spurious Emissions For Transmitter

8.1 Block Diagram Of Test Setup

(A)Radiated Emission Test Set-Up Frequency Below 1GHz.



(B)Radiated Emission Test Set-Up Frequency Above 1GHz.



8.2 Limits

Table 3: Spurious emissions

Frequency ranges State	47 MHz to 74 MHz 87,5 MHz to 108 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other frequencies ≤ 1 000 MHz	Frequencies > 1 000 MHz
Operating	4 nW	250 nW	1 µW
Standby	2 nW	2 nW	20 nW

8.3 Test Procedure

30MHz ~ 1GHz:
a. The Product was placed on the nonconductive turntable 1.5m above the ground in a full anechoic chamber.
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.
Above 1GHz:
a. The Product was placed on the non-conductive turntable 1.5 m above the ground in a full anechoic chamber..
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

8.4 Test Results

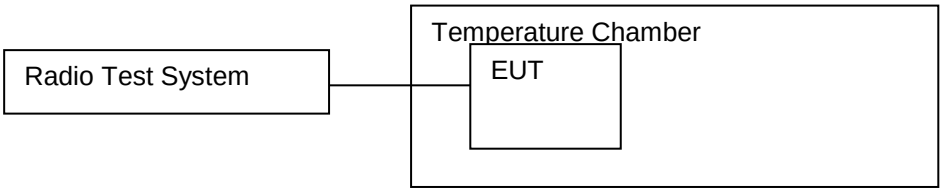
All modes have been tested and reports show data in the worst mode
Test Mode: 802.11n20 (Antenna A)

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
802.11n20 low channel								
574.32	-33.29	62	1.8	H	-27.87	-61.17	-54	-7.17
574.32	-36.43	165	1.9	V	-27.87	-64.30	-54	-10.30
11490.00	-39.88	141	1.4	H	-8.79	-48.67	-30	-18.67
11490.00	-39.33	54	1.8	V	-8.79	-48.12	-30	-18.12
17235.00	-54.28	7	1.1	H	-3.18	-57.46	-30	-27.46
17235.00	-55.66	249	1.7	V	-3.18	-58.84	-30	-28.84
802.11n20 Mid channel								
574.32	-33.02	191	1.6	H	-27.87	-60.89	-54	-6.89
574.32	-36.41	251	1.8	V	-27.87	-64.28	-54	-10.28
11570.00	-40.41	188	1.1	H	-8.86	-49.27	-30	-19.27
11570.00	-39.24	26	1.8	V	-8.86	-48.10	-30	-18.10
17355.00	-55.16	302	1.8	H	-2.52	-57.68	-30	-27.68
17355.00	-56.23	114	1.0	V	-2.52	-58.75	-30	-28.75
802.11n20 high channel								
574.32	-32.99	305	1.6	H	-27.87	-60.86	-54	-6.86
574.32	-35.89	21	1.7	V	-27.87	-63.77	-54	-9.77
11650.00	-40.05	305	1.5	H	-8.92	-48.97	-30	-18.97
11650.00	-38.56	280	1.7	V	-8.92	-47.48	-30	-17.48
17475.00	-55.20	200	1.6	H	-1.86	-57.06	-30	-27.06
17475.00	-56.34	130	1.3	V	-1.86	-58.20	-30	-28.20

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

9. TX Duty Cycle

9.1 Block Diagram Of Test Setup



9.2 Limit

No Restriction

9.3 Test Procedure

An assessment of the overall Duty Cycle shall be made for a representative period of Tobs over the observation bandwidth Fobs. Unless otherwise specified, Tobs is 1 hour and the observation bandwidth Fobs is the operational frequency band.
The representative period shall be the most active one in normal use of the device. As a guide "Normal use" is considered as representing the behaviour of the device during transmission of 99 % of the [emissions] generated during its operational lifetime.
Procedures such setup, commissioning, and maintenance are not considered part of normal operation.
For manual operated or event dependant devices, with or without software controlled functions, the manufacturer shall declare whether the device once triggered, follows a pre-programmed cycle, or whether the transmitter remains on until the trigger is released or the device is manually reset. The manufacturer shall also give a description of the application
for the device and include a typical usage pattern. The typical usage pattern as declared by the manufacturer shall be used to determine the duty cycle and compare to the limit in table 4.
Where an acknowledgement is required, the additional transmitter on-time shall be included and declared by the manufacturer.

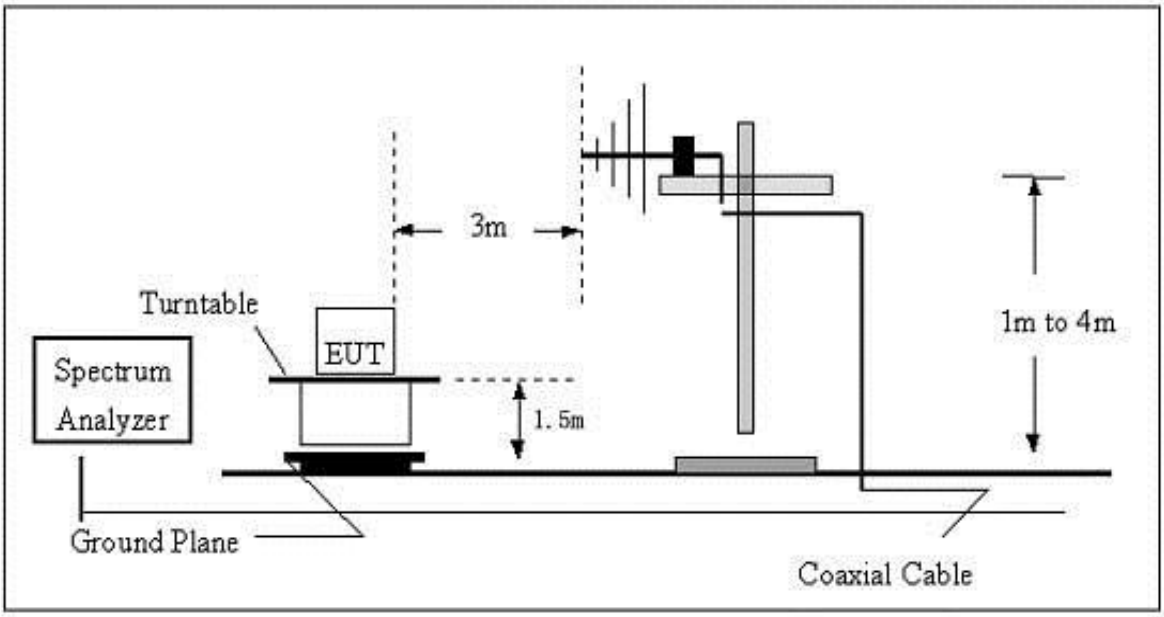
9.4 Test Result

For generic use devices operating at frequency range 5725-5875MHz, according to ETSI EN 300 440 V2.2.1 (2018-07), the duty cycle is no restriction.

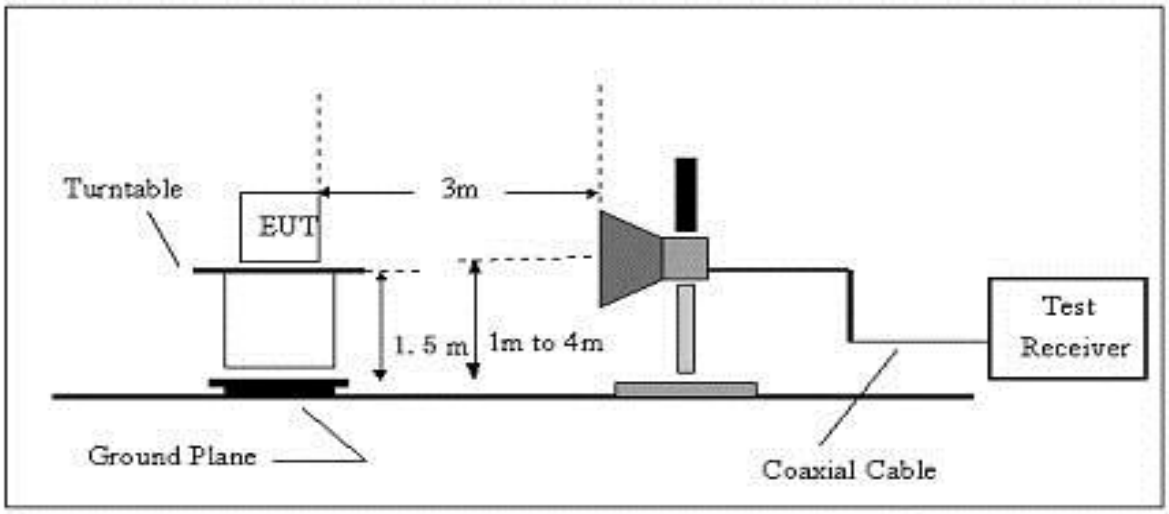
10. Spurious Emissions For Receiver

10.1 Block Diagram Of Test Setup

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



10.2 Limits

According to the Final draft ETSI EN 300 440 V2.2.1 (2018-05) Section 4.3.5.4, the power of any spurious emission shall not exceed 2 nW in the range 25 MHz to 1 GHz and shall not exceed 20 nW on frequencies above 1 GHz.

10.3 Test Procedure

30MHz ~ 1GHz:
a. The Product was placed on the nonconductive turntable 1.5m above the ground in a full anechoic chamber.
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.
Above 1GHz:
a. The Product was placed on the non-conductive turntable 1.5 m above the ground in a full anechoic chamber..
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

10.4 Test Results

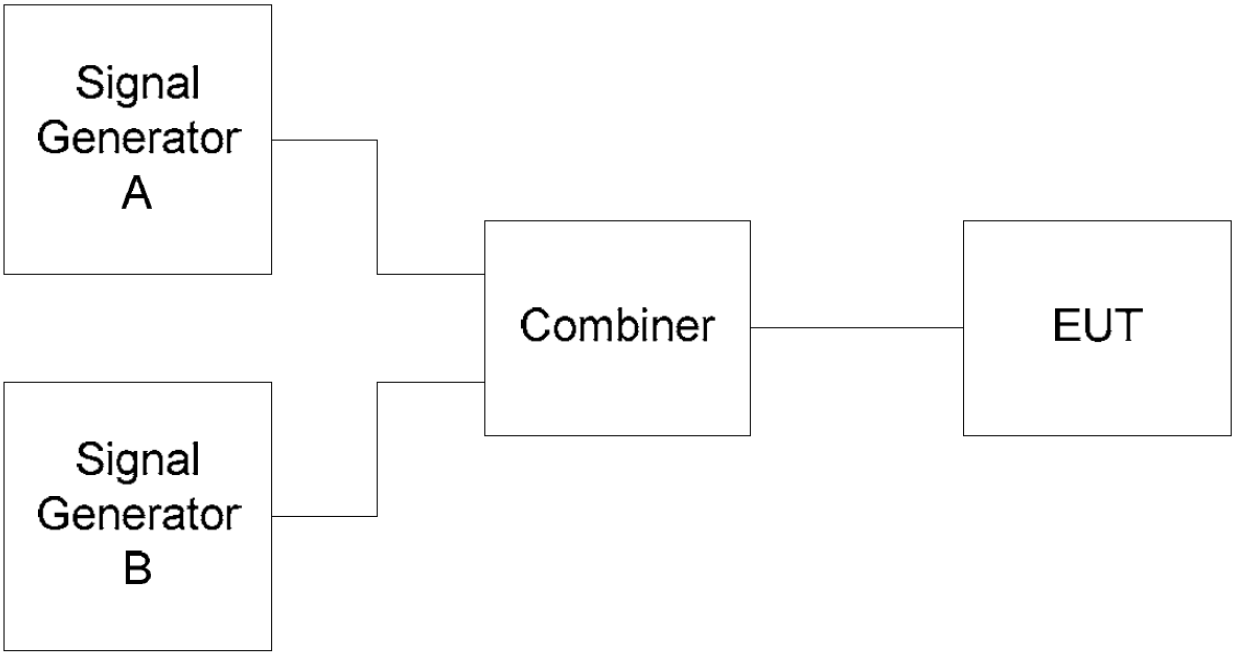
All modes have been tested and reports show data in the worst mode
Test Mode: 802.11a (ANT A)

Fre-quency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
802.11a low channel								
437.45	-36.12	60	1.9	H	-28.43	-64.55	-57.00	-7.55
437.45	-35.03	330	1.1	V	-28.43	-63.45	-57.00	-6.45
3025.19	-34.76	133	1.5	H	-23.55	-58.31	-47.00	-11.31
3025.19	-39.27	205	1.0	V	-23.55	-62.82	-47.00	-15.82
802.11a Mid channel								
437.45	-36.76	84	1.3	H	-28.43	-65.19	-57.00	-8.19
437.45	-35.06	137	1.6	V	-28.43	-63.48	-57.00	-6.48
3025.19	-34.13	221	1.3	H	-23.55	-57.68	-47.00	-10.68
3025.19	-39.57	291	1.6	V	-23.55	-63.11	-47.00	-16.11
802.11a high channel								
437.45	-36.24	247	1.5	H	-28.43	-64.66	-57.00	-7.66
437.45	-35.44	183	1.5	V	-28.43	-63.87	-57.00	-6.87
3025.19	-34.56	240	1.4	H	-23.55	-58.11	-47.00	-11.11
3025.19	-39.45	297	1.4	V	-23.55	-63.00	-47.00	-16.00

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

11. Blocking Or Desensitization

11.1 Block Diagram Of Test Setup



11.2 Limit

The adjacent channel selectivity of the equipment under specified conditions shall not be less than -30 dBm + k. The correction factor, k, is as follows:

Table 6: Limits for blocking or desensitization

Receiver category	Limit
1	-30 dBm + k
2	-45 dBm + k
3	-60 dBm + k

The correction factor, k, is as follows:

$$k = -20\log f - 10\log BW$$

Where:
-f is the frequency in GHz;
-BW is the occupied bandwidth in MHz.
The factor k is limited within the following:

$$-40 \text{ dB} < k < 0 \text{ dB}.$$

The measured blocking level shall be stated in the test report.

11.3 Test Procedure

This measurement shall be conducted under normal conditions.
Two signal generators A and B shall be connected to the receiver via a combining network to the receiver, either:
a) via a test fixture or a test antenna to the receiver integrated, dedicated or test antenna; or
b) directly to the receiver permanent or temporary antenna connector.

The method of coupling to the receiver shall be stated in the test report.
Signal generator A shall be at the nominal frequency of the receiver, with normal modulation of the wanted signal. Signal generator B shall be unmodulated and shall be adjusted to a test frequency at approximately 10 times, 20 times and 50 times of the occupied bandwidth above upper band edge of occupied bandwidth. Initially signal generator B shall be switched off and using signal generator A the level which still gives sufficient response shall be established. The output level of generator A shall then be increased by 3 dB. Signal generator B is then switched on and adjusted until the wanted criteria are met. This level shall be recorded.
The measurement shall be repeated with the test frequency for signal generator B at 10 times, 20 times and 50 times of the occupied bandwidth below the lower band edge of the occupied bandwidth.
The blocking or desensitization shall be recorded as the level in dBm of lowest level of the unwanted signal (generator B).
For tagging systems (e.g. RF identification, anti-theft, access control, location and similar systems) signal generator A may be replaced by a physical tag positioned at 70 % of the measured system range in metres. In this case, the blocking or desensitization shall be recorded as the ratio in dB of lowest level of the unwanted signal (generator B) resulting in a non-read of the tag. to the declared sensitivity of the receiver +3 dB.

11.4 Test Result

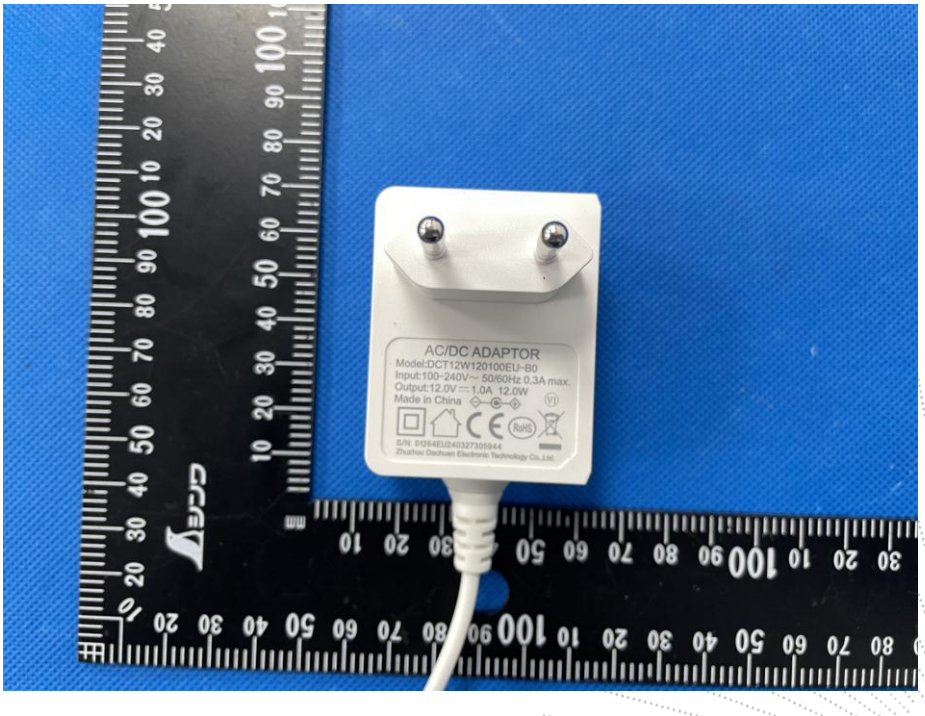
The Worst mode 802.11a(Ant B)

Receiver category 2				
Channel Frequency (MHz)	**unwanted test signal Frequency**	**Signal generator B (Level)**	**Limit (dBm)**	**Margin (dBm)**
5745	Centre Frequency – 10*BW	-63.00	-72.39	-9.39
	Centre Frequency + 10*BW	-63.00		-9.39
	Centre Frequency – 20*BW	-59.00		-13.39
	Centre Frequency + 20*BW	-60.00		-12.39
	Centre Frequency – 50*BW	-43.00		-29.39
	Centre Frequency + 50*BW	-42.00		-30.39
5825	Centre Frequency – 10*BW	-65.00	-72.51	-7.51
	Centre Frequency + 10*BW	-61.00		-11.51
	Centre Frequency – 20*BW	-56.00		-16.51
	Centre Frequency + 20*BW	-57.00		-15.51
	Centre Frequency – 50*BW	-44.00		-28.51
	Centre Frequency + 50*BW	-43.00		-29.51
Receiver BW=16.601MHz; $K_{5745MHz}$=−20log 5.745 −10log16.601=-27.39 $K_{5825MHz}$=−20log 5.825 −10log16.601=-28.51				

12. EUT Photographs

EUT Photo 1

EUT Photo 2



NOTE: Appendix-Photographs Of EUT Constructional Details.

13. EUT Test Setup Photographs

Spurious emissions

STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:
1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: 400-788-9558

P.C.: 518103

FAX: 0755-33229357

Website: http://www.chnbctc.com

Consultation E-mail: bctc@bctc-lab.com.cn

Complaint/Advice E-mail: advice@bctc-lab.com.cn

※※※※※ END ※※※※※

TEST REPORT

Report No.:	BCTC2404912358-6E
Applicant:	REOLINK INNOVATION LIMITED
Product Name:	WiFi NVR
Test Model:	Reolink Home Hub
Tested Date:	2024-04-28 to 2024-05-13
Issued Date:	2024-06-06

Shenzhen BCTC Testing Co., Ltd.

Product Name:	WiFi NVR
Trademark:	reolink
Model/Type reference:	Reolink Home Hub Hub 1
Prepared For:	REOLINK INNOVATION LIMITED
Address:	FLAT/RM 705 7/F FA YUEN COMMERCIAL BUILDING 75-77 FA YUEN STREET MONG KOK KL HONG KONG
Manufacturer:	REOLINK INNOVATION LIMITED
Address:	FLAT/RM 705 7/F FA YUEN COMMERCIAL BUILDING 75-77 FA YUEN STREET MONG KOK KL HONG KONG
Factory:	Shenzhen Reolink Technology Co., Ltd.
Address:	2-4th Floor, Building 2, YuanLing Industrial Park, ShangWu, Shiyan Street, Bao'an District, Shenzhen, China
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2024-04-28
Sample tested Date:	2024-04-28 to 2024-05-13
Issue Date:	2024-06-06
Report No.:	BCTC2404912358-6E
Test Standards:	ETSI EN 300 220-1 V3.1.1 (2017-02) ETSI EN 300 220-2 V3.2.1 (2018-06)
Test Results:	PASS
Remark:	This is SRD 868MHz radio test report.

Tested by:

Brave Zeng

Brave Zeng/ Project Handler

Approved by:

Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

Table Of Content

(Note: N/A Means Not Applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2404912358-6E	2024-06-06	Original	Valid

2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No.	Results
Transmitter Parameters			
1	Operating frequency	4.2.1	PASS
2	Unwanted emissions in the spurious domain	4.2.2	PASS
3	TX effective radiated power	4.3.1	PASS
4	TX Maximum e.r.p. spectral density	4.3.2	N/A
5	TX Duty cycle	4.3.3	PASS
6	TX Occupied bandwidth	4.3.4	PASS
7	TX out of band emissions	4.3.5	PASS
8	TX Transient	4.3.6	PASS
9	TX Adjacent channel power	4.3.7	N/A
10	TX behavior under low voltage conditions	4.3.8	PASS
11	TX Adaptive power control	4.3.9	N/A
12	TX FHSS	4.3.10	N/A
13	TX Short term behavior	4.3.11	N/A
Receiver Parameters			
14	RX spurious	4.4.1	PASS
15	Clear channel assessment threshold	4.5.2	N/A
16	Polite spectrum access timing parameters	4.5.3	N/A
17	RX Blocking	4.4.2	PASS
18	Adaptive Frequency Agility	4.5.4	N/A
Note: N/A is an abbreviation for Not Applicable and means this test item is not applicable for this device according to the technology characteristic of device.			

3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Uncertainty
1	Occupancy bandwidth	U=±54.3Hz
2	Adjacent channel power	U=±1.3dB
3	Conducted Adjacent channel power	U=±1.38dB
4	Conducted output power Above 1G	U=±1.0dB
5	Conducted output power below 1G	U=±0.9dB
6	Power Spectral Density , Conduction	U=±1.0dB
7	Conduction spurious emissions	U=±2.8dB
8	Out of band emission	U=±54Hz
9	3m camber Radiated spurious emission(30MHz-1GHz)	U=±4.3dB
10	3m chamber Radiated spurious emission(1GHz-18GHz)	U=±4.5dB
11	humidity uncertainty	U=±5.3%
12	Temperature uncertainty	U=±0.59℃
13	Supply voltages	U=±3%
14	Time	U=±5%

4. Product Information And Test Setup

4.1 Product Information

Model/Type reference:	Reolink Home Hub Hub 1
Model differences:	All the model are the same circuit and RF module, except model names and appearance of the color.
SRD:	868 MHz
Receiver Category:	2
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	868 MHz
Max. RF output power:	-17.619 dBm
Type of Modulation:	FSK
Antenna installation:	Internal antenna
Antenna Gain:	2.21 dBi Remark: ☒ The antenna gain of the product comes from the antenna report provided by the customer, and the test data is affected by the customer information. ☐ The antenna gain of the product is provided by the customer, and the test data is affected by the customer information.
Ratings:	DC 12V from adapter
Adapter Information:	Model: DCT12W120100EU-B0 Input: 100-240V~50/60Hz 0.3A max. Output: DC 12.0V 1.0A 12.0W

Cable of Product

No.	Cable Type	Quantity	Provider	Length (m)	Shielded	Note
1	--	--	Applicant	---	Yes/No	With a ferrite ring in mid Detachable
2	--	--	BCTC	--	Yes/No	--

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
1.	PC	Lenovo	ThinkPad S2	---	Auxiliary
2.	Router	HUAWEI	WS318	---	Auxiliary
3.	WIFI IP camera	---	---	---	Auxiliary

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

N/A

4.5 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test mode	Low channel	Middle channel	High channel
Transmitting	/	868 MHz	/
Receiving	/	868 MHz	/

4.6 Test Environment

1. Normal Test Conditions:

Temperature(℃):	26℃
Humidity(%):	54%
Atmospheric Pressure(kPa):	101kpa
Test Voltage(DC):	12V

2.Extreme Test Conditions:

For tests at extreme temperatures, measurements shall be made over the extremes of the operating temperature range as declared by the manufacturer.

For tests at extreme voltages, measurements shall be made over the extremes of the power source voltage range as declared by the manufacturer.

Test Conditions	LTLV	LTHV	HTHV	HTLV
Temperature (℃)	0	40	0	40
Test Voltage (DC)	10.8	13.2	10.8	13.2

5. Test Facility And Test Instrument Used

5.1 Test Facility

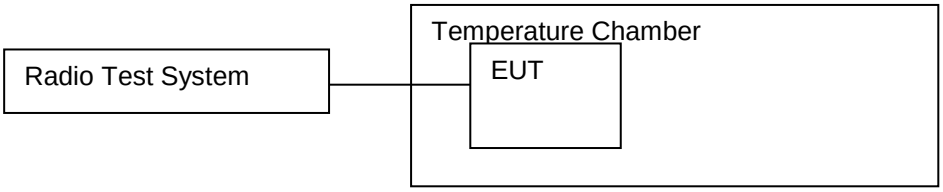
All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	966 chamber	ChengYu	966 Room	966	May 15, 2023	May 14, 2026
2	Receiver	R&S	ESR3	102075	May 16, 2024	May 15, 2025
3	Receiver	R&S	ESRP	101154	May 16, 2024	May 15, 2025
4	Amplifier	Schwarzbeck	BBV9744	9744-0037	May 16, 2024	May 15, 2025
5	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	942	May 29, 2023	May 28, 2024
6	Loop Antenna	Schwarzbeck	FMZB1519B	00014	May 31, 2023	May 30, 2024
7	Amplifier	SKET	LAPA_01G18G-45dB	SK2021040901	May 16, 2024	May 15, 2025
8	Horn Antenna	Schwarzbeck	BBHA9120D	1541	May 31, 2023	May 30, 2024
9	Preamplifier	MITEQ	TTA1840-35-HG	2034381	May 16, 2024	May 15, 2025
10	Horn antenna	Schwarzbeck	BBHA9170	00822	May 31, 2023	May 30, 2024
11	Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	100363	May 16, 2024	May 15, 2025
12	Software	Frad	EZ-EMC	FA-03A2 RE	\	\
13	Spectrum Analyzer	Keysight	N9020A	MY49100060	May 16, 2024	May 15, 2025
14	Signal Generator	Keysight	N5182B	MY56200519	May 16, 2024	May 15, 2025
15	Signal Generator	Keysight	83711B	US37100131	Sept. 05, 2023	Sept. 04, 2024
16	Communication test set	R&S	CMW500	126173	Nov. 13. 2023	Nov. 12, 2024
17	D.C. Power Supply	LongWei	TPR-6405D	\	Nov. 13. 2023	Nov. 12, 2024
18	Programmable constant temperature and humidity test chamber	DGBELL	BTKS5-150C	\	Jul. 01, 2023	Jun. 30, 2024
19	Radio frequency control box	MAIWEI	MW100-RFCB	\	\	\
20	Software	MAIWEI	MTS 8310	\	\	\

6. Operating Frequency

6.1 Block Diagram Of Test Setup



6.2 Limit

Short Range Devices frequency ranges :863 MHz to 876 MHz

6.3 Test Procedure

N/A

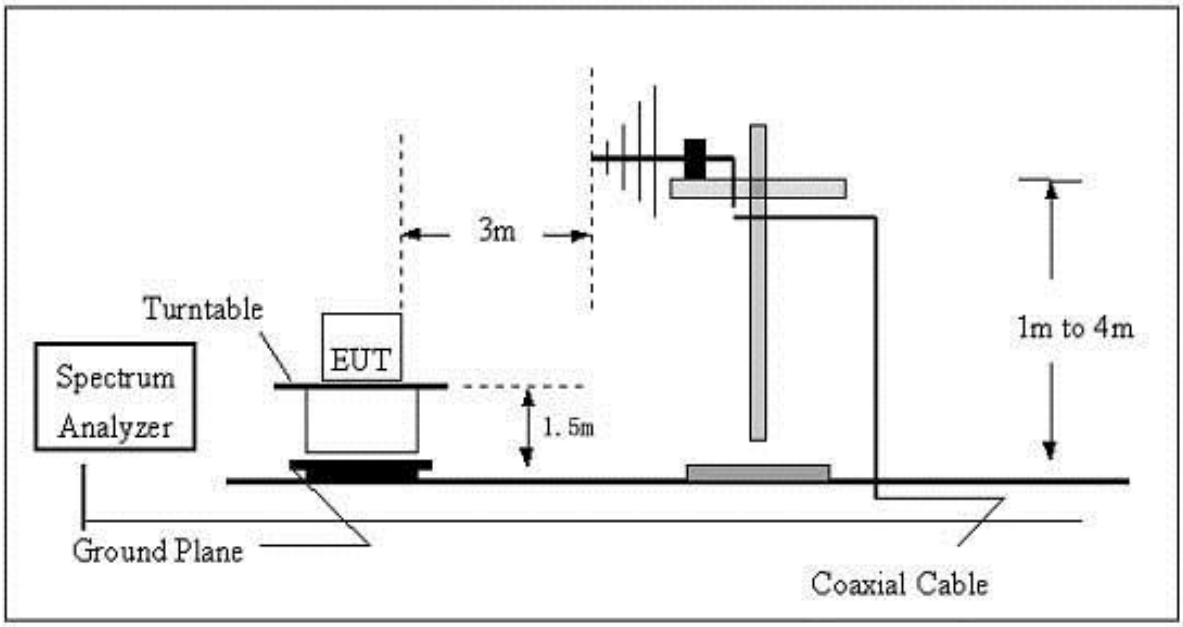
6.4 Test Result

Operational frequency band 868 MHz declared by the manufacturer.

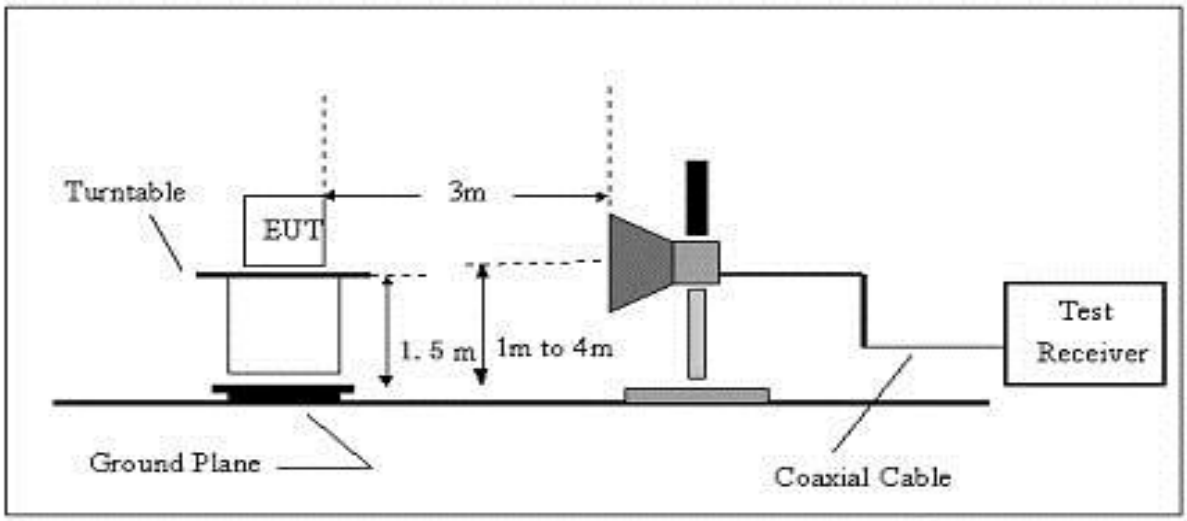
7. Unwanted Emissions In The Spurious Domain

7.1 Block Diagram Of Test Setup

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



7.2 Limits

Frequency range	Maximum power, e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	RBW/VBW
30 MHz to 47 MHz	-36 dBm	100 kHz/300KHz
47 MHz to 74 MHz	-54 dBm	100 kHz/300KHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz/300KHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz/300KHz
118 MHz to 174 MHz	-36 dBm	100 kHz/300KHz
174 MHz to 230 MHz	-54 dBm	100 kHz/300KHz
230 MHz to 470 MHz	-36 dBm	100 kHz/300KHz
470 MHz to 862 MHz	-54 dBm	100 kHz/300KHz
862 MHz to 1 GHz	-36 dBm	100 kHz/300KHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz/3MHz

7.3 Test Procedure

30MHz ~ 1GHz:
a. The Product was placed on the nonconductive turntable 1.5m above the ground in a full anechoic chamber.
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.
Above 1GHz:
a. The Product was placed on the non-conductive turntable 1.5 m above the ground in a full anechoic chamber..
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

7.4 Test Results

Above 1GHz

868 MHz Tx mode							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
2604.011	150	271	-43.42	-30	-13.42	Pass	H
3472.968	149	350	-45.46	-30	-15.46	Pass	H
4341.698	152	117	-58.97	-30	-28.97	Pass	H
5208.886	148	81	-54.91	-30	-24.91	Pass	H
6077.771	147	338	-57.00	-30	-27.00	Pass	H
9555.158	154	190	-53.29	-30	-23.29	Pass	H
2608.080	154	346	-49.54	-30	-19.54	Pass	V
3476.895	151	348	-57.54	-30	-27.54	Pass	V
4344.661	152	206	-56.13	-30	-26.13	Pass	V
5215.047	152	98	-59.10	-30	-29.10	Pass	V
7820.725	148	77	-55.08	-30	-25.08	Pass	V
9552.516	151	174	-53.66	-30	-23.66	Pass	V

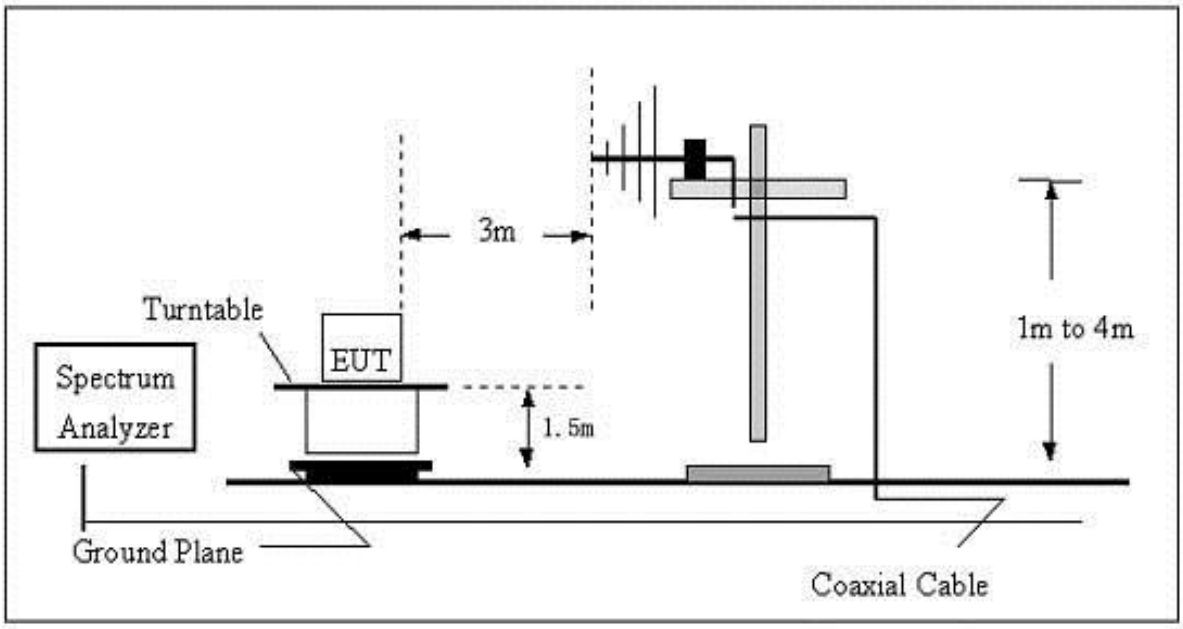
Below 1GHz

868 MHz Tx mode							
Frequency (MHz)	Height (cm)	Azimuth (deg)	Spurious Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
33.80	151	73	-67.63	-36	-31.63	Pass	H
70.45	151	111	-71.01	-54	-17.01	Pass	H
90.63	149	4	-70.75	-54	-16.75	Pass	H
190.02	150	49	-70.73	-54	-16.73	Pass	H
305.65	148	219	-59.98	-36	-23.98	Pass	H
1737.80	149	132	-45.09	-30	-15.09	Pass	H
35.64	152	341	-66.97	-36	-30.97	Pass	V
74.14	151	40	-70.74	-36	-34.74	Pass	V
204.21	150	215	-71.35	-54	-17.35	Pass	V
357.98	148	2	-64.82	-36	-28.82	Pass	V
477.69	149	239	-66.43	-54	-12.43	Pass	V
1737.80	152	14	-51.10	-30	-21.10	Pass	V

8. TX Effective Radiated Power

8.1 Block Diagram Of Test Setup

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



8.2 Limits

Frequency(MHz)	Limit(ERP,mW)
868	10
1736	25

8.3 Test Procedure

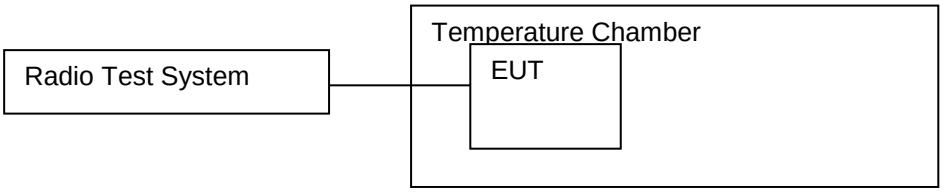
30MHz ~ 1GHz:
a. The Product was placed on the nonconductive turntable 1.5m above the ground in a full anechoic chamber.
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

8.4 Test Results

Measurement Conditions		Operation Frequency (MHz)	EIRP (dBm) L	EIRP (dBm) R	Limit (dBm)	Result
Temperature	Voltage					
Normal	Normal	868	**-17.619**	-17.953	10	PASS
High	High	868	-17.664	-18.047	10	PASS
	Low	868	-18.376	-18.342	10	PASS
Low	High	868	-18.936	-19.196	10	PASS
	Low	868	-19.196	-19.582	10	PASS

9. TX Duty Cycle

9.1 Block Diagram Of Test Setup



9.2 Limit

Limit: 10%

9.3 Test Procedure

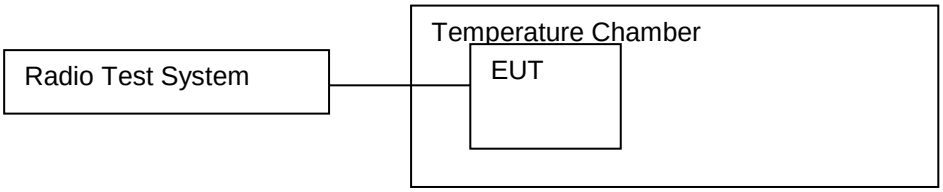
Duty cycle is the ratio expressed as a percentage, of the cumulative duration of transmissions Ton_cum within an observation interval T_{obs}. $DC=(T_{on\_cum}/T_{obs})F_{obs}$.
on an observation bandwidth Fobs.
Unless otherwise specified, T_{obs} is 1 hour and the observation bandwidth F_{obs} is the operational frequency band.
Each transmission consists of an RF emission, or sequence of RF emissions separated by intervals < T_{Dis}.

9.4 Test Result

The Duty cycle is 5.12%.

10. TX Occupied Bandwidth

10.1 Block Diagram Of Test Setup



10.2 Limit

The Operating Channel shall be declared and shall reside entirely within the Operational Frequency Band. The Maximum Occupied Bandwidth at 99 % shall reside entirely within the Operating Channel defined by F_{low} and F_{high}.

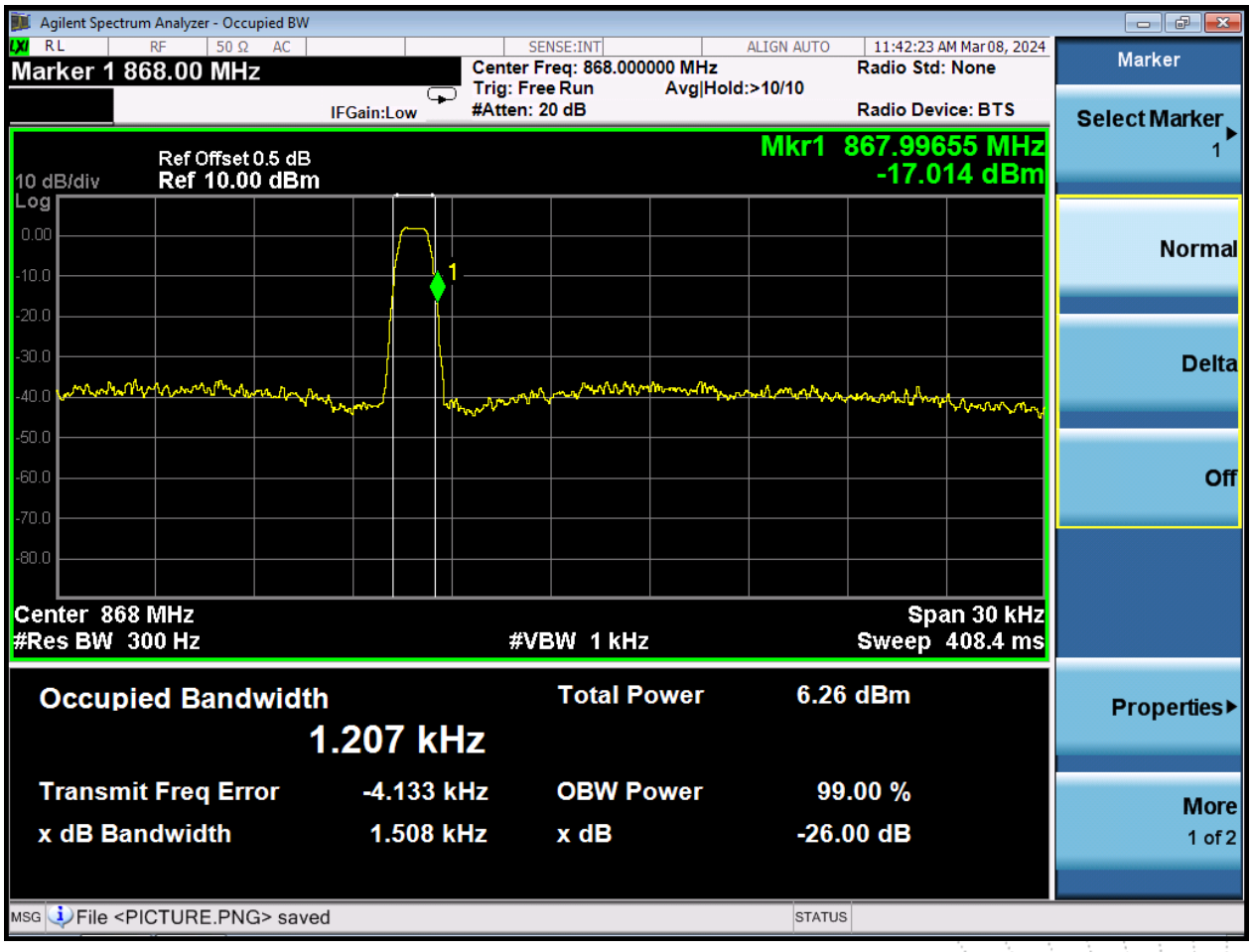
10.3 Test Procedure

Setting	Value	Notes
Centre frequency	The nominal Operating Frequency	The highest or lowest Operating Frequency as declared by the manufacturer
RBW	1 % to 3 % of OCW without being below 100 Hz	
VBW	3 x RBW	Nearest available analyser setting to 3 x RBW
Span	At least 2 x Operating Channel width	Span should be large enough to include all major components of the signal and its side bands
Detector Mode	RMS	
Trace	Max hold	

Step 1:
Operation of the EUT shall be started, on the highest operating frequency as declared by the manufacturer, with the appropriate test signal.
The signal attenuation shall be adjusted to ensure that the signal power envelope is sufficiently above the noise floor of the analyzer to avoid the noise signals on either side of the power envelope being included in the measurement.
Step 2:
When the trace is completed the peak value of the trace shall be located and the analyzer marker placed on this peak.
Step 3:
The 99 % occupied bandwidth function of the spectrum analyzer shall be used to measure the occupied bandwidth of the signal.

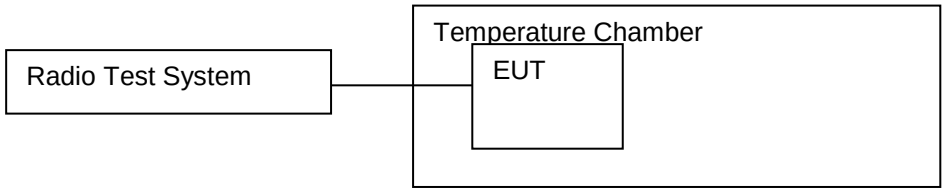
10.4 Test Result

The OBW is 1.207 kHz.



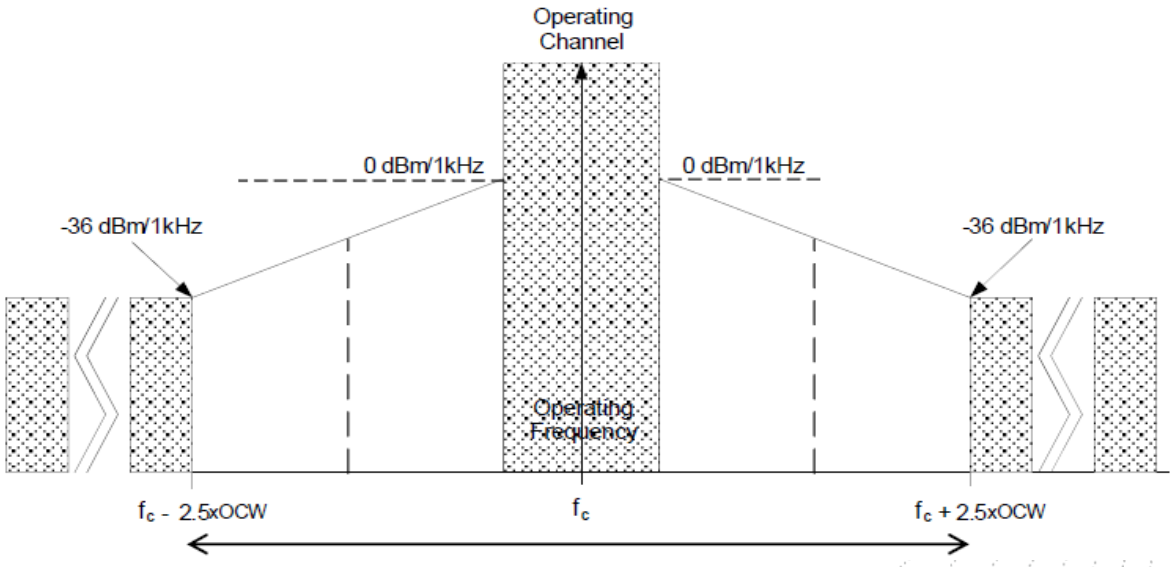
11. TX Out Of Band Emissions

11.1 Block Diagram Of Test Setup



11.2 Limit

Domain	Frequency Range	RBW_{REF}	Max power limit
OOB limits applicable to Operational Frequency Band (See Figure 6)	$f \le f_{low\_OFB}$ - 400 kHz	10 kHz	-36 dBm
	F_{low_OFB} - 400 kHz $\le f \le f_{low\_OFB}$ - 200 kHz	1 kHz	-36 dBm
	f_{low} - 200 kHz $\le f < f_{low\_OFB}$	1 kHz	See Figure 6
	$f = f_{low\_OFB}$	1 kHz	0 dBm
	$f = f_{high\_OFB}$	1 kHz	0 dBm
	$F_{high\_OFB} < f \le f_{high\_OFB}$ + 200 kHz	1 kHz	See Figure 6
	F_{high_OFB} + 200 kHz $\le f \le f_{high\_OFB}$ + 400 kHz	1 kHz	-36 dBm
	F_{high_OFB} + 400 kHz $\le f$	10 kHz	-36 dBm
OOB limits applicable to Operating Channel (See Figure 5)	$f = f_c$ - 2.5 x OCW	1 kHz	-36 dBm
	f_c - 2,5 x OCW $\le f \le f_c$ - 0,5 x OCW	1 kHz	See Figure 5
	$f = f_c$ - 0,5 x OCW	1 kHz	0 dBm
	$f = f_c$ + 0,5 x OCW	1 kHz	0 dBm
	f_c + 0,5 x OCW $\le f \le f_c$ + 2,5 x OCW	1 kHz	See Figure 5
	$f = f_c$ + 2,5 x OCW	1 kHz	-36 dBm
NOTE: f is the measurement frequency. f_c is the Operating Frequency. F_{low_OFB} is the lower edge of the Operational Frequency Band. F_{high_OFB} is the upper edge of the Operational Frequency Band. OCW is the operating channel bandwidth.			



11.3 Test Procedure

Spectrum Analyser Setting	Value	Notes
Centre frequency	Operating Frequency	
Span	6 x Operating Channel width	
RBW	1 kHz (see note)	Resolution bandwidth for Out Of Band domain measurements
Detector Function	RMS	
Trace Mode	Linear AVG	Applies only for EUT generating D-M2 test signal. An appropriate number of samples should be averaged to give a stable reading
	Max Hold	Applies only for EUT generating D-M2a or D-M3 test signal.
NOTE: If the value of RBW used is different from RBW_{REF} in clause 5.8.2, use the bandwidth correction in clause 4.3.10.1.		

Step 1:
Operation of the EUT shall be started, on the highest operating frequency as declared by the manufacturer, with the appropriate test signal.
The signal shape is recorded when stable and shall be below the spectrum mask Out Of Band for operating channel.
Step 2:
The test equipment shall be reconfigured as appropriate for the parameter shown below.

Spectrum Analyser Setting	Value	Notes
Centre frequency	fc_{low}	The lowest Operating Frequency in the band
Span	2 x (500 kHz + fc_{low} - f_{low_OFB})	Ensures that the left most mask specification remains within the span
NOTE: f_{low_OFB} is the lower edge of the Operational Frequency Band.		

Operation of the EUT is restarted, with the appropriate test signal, on the lowest operating frequency as declared by the manufacturer.
If the equipment is using only one operating Frequency in the operational Frequency Band, measurement shall be performed the nominal operating frequency.
The signal shape is recorded when stable; and shall be below the spectrum mask for operating channel and the spectrum mask for operational frequency band.

Step 3:
The test equipment shall be reconfigured as appropriate for the parameter shown below.

Spectrum Analyser Setting	Value	Notes
Centre frequency	fc_{high}	the highest Operating Frequency in the band
Span	2 x (500 kHz + f_{high_OFB} - fc_{high})	Ensures that the rightmost mask specification remains within the span
NOTE: f_{high_OFB} is the higher edge of the operational frequency Band.		

Operation of the EUT is restarted, with the appropriate test signal, on the highest Operating Frequency as declared by the manufacturer.
If the equipment is using only one Operating Frequency in the Operational Frequency Band, measurement shall be performed at the nominal Operating Frequency

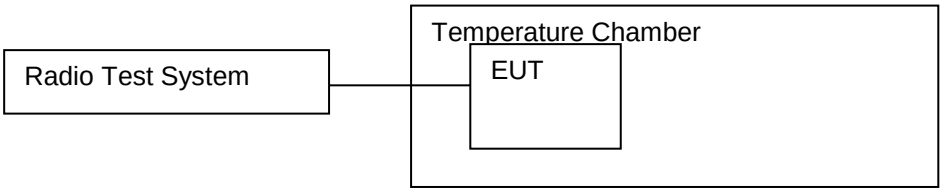
The signal shape is recorded when stable and shall be below the spectrum mask for Out Of Band emissions for operating channel and for operational Frequency Band.
Step 4:
For frequency agile devices, the measurement shall be repeated in each Operational Frequency Band.
Step 5:
Where required (see clause 5.8.3.1 condition 1), the measurements in step 1 to step 5 shall be repeated under extreme test conditions.

11.4 Test Result

Frequency Range	**Test Result (dBm)**	**Max power limit (dBm)**
f ≤ flow_OFB - 400 kHz	-49.29	-36
Flow_OFB - 400 kHz ≤ f ≤ flow_OFB - 200 kHz	-49.05	-36
flow - 200 kHz ≤ f < flow_OFB	-33.66	See Figure 6
f = flow_OFB	-18.32	0
f = fhigh_OFB	-18.64	0
Fhigh_OFB < f ≤ fhigh_OFB + 200 kHz	-30.99	See Figure 6
Fhigh_OFB + 200 kHz ≤ f ≤ fhigh_OFB + 400 kHz	-49.84	-36
Fhigh_OFB + 400 kHz ≤ f	-48.27	-36
Remark: The limits decrease linearly with the logarithm .		

12. TX Transient

12.1 Block Diagram Of Test Setup



12.2 Limit

Absolute offset from centre frequency	RBW_{REF}	Peak power limit applicable at measurement points
≤ 400 kHz	1 kHz	0 dBm
> 400 kHz	1 kHz	-27 dBm

12.3 Test Procedure

The output of the EUT shall be connected to a spectrum analyzer or equivalent measuring equipment. The measurement shall be undertaken in zero span mode. The analyzer's centre frequency shall be set to an offset from the operating centre frequency. These offset values and their corresponding RBW configurations are listed below.

Measurement points: offset from centre frequency	Analyser RBW	RBW_{REF}
-0,5 x OCW - 3 kHz 0,5 x OCW + 3 kHz Not applicable for OCW < 25 kHz	1 kHz	1kHz
±12,5 kHz or ±OCW whichever is the greater	Max (RBW pattern 1, 3, 10 kHz) ≤ Offset frequency/6 (see note)	1 kHz
-0,5 x OCW - 400 kHz 0,5 x OCW + 400 kHz	100 kHz	1 kHz
-0,5 x OCW -1 200 kHz 0,5 x OCW + 1 200 kHz	300 kHz	1 kHz
NOTE: Max (RBW pattern 1, 3, 10 kHz) means the maximum bandwidth that falls into the commonly implemented 1, 3, 10 kHz RBW filter bandwidth incremental pattern of spectrum analysers. EXAMPLE: If OCW is 25 kHz then the RBW value corresponding to one OCW offset frequency is 3 kHz. The rest of the analyser settings are listed in Table 25, and if OCW is 250 kHz then the RBW value corresponding to one OCW offset frequency is 30 kHz.		

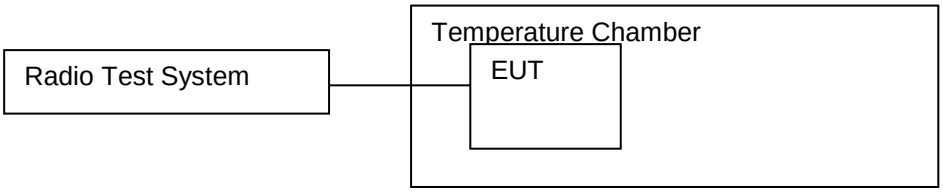
12.4 Test Result

SRD

Absolute offset from centre frequency	Test result
≤ 400 kHz	-18.43 dBm
> 400 kHz	-43.61 dBm

13. TX Behavior Under Low Voltage Conditions

13.1 Block Diagram Of Test Setup



13.2 Limit

The equipment shall either:
a) remain in the Operating Channel OC without exceeding any applicable limits (e.g. Duty Cycle); or
b) reduce its effective radiated power below the Spurious Emission limits without exceeding any applicable limits (e.g. Duty Cycle); or
c) shut down, (ceasing function);
as the voltage falls below the manufacturers declared operating voltage.

13.3 Test Procedure

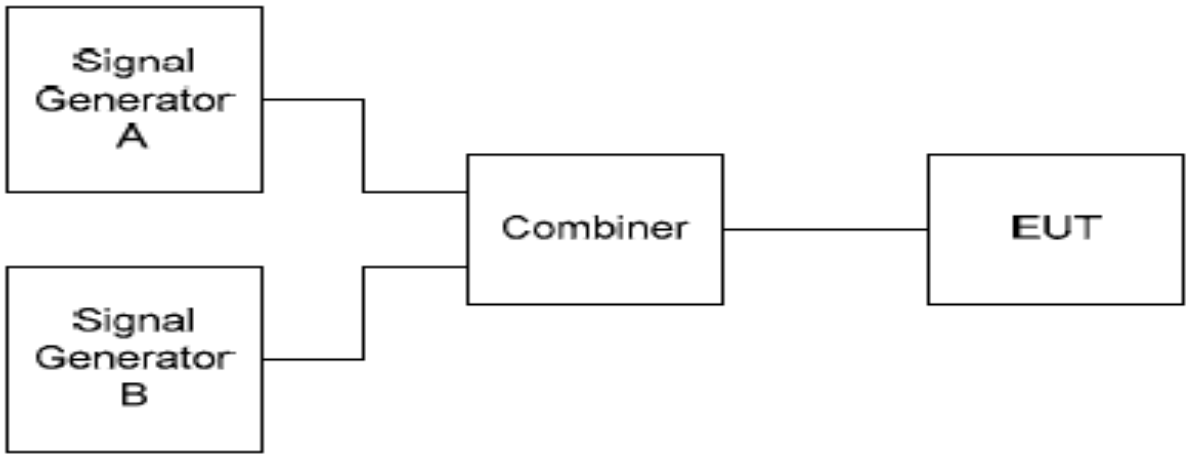
Step 1:
Operation of the EUT shall be started, on Operating Frequency as declared by the manufacturer, with the appropriate test signal and with the EUT operating at nominal operating voltage.
The centre frequency of the transmitted signal shall be measured and noted.
Step 2:
The operating voltage shall be reduced by appropriate steps until the voltage reaches zero.
The centre frequency of the transmitted signal shall be measured and noted.
Any abnormal behaviour shall be noted.

13.4 Test Result

Test Voltage(V)		**Test result**
DC	13.20	ok
DC	12.00	ok
DC	10.80	ok
DC	9.60	ok
DC	8.40	fail

14. RX Blocking

14.1 Block Diagram Of Test Setup



14.2 Limit

RX category 3

Requirement	Limits
	Receiver category 3
Blocking at ±2 MHz from OC edge f_{high} and f_{low}	≥ -80 dBm
Blocking at ±10 MHz from OC edge f_{high} and f_{low}	≥ -60 dBm
Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater	≥ -60 dBm

RX category 2

Requirement	Limits
	Receiver category 2
Blocking at ±2 MHz from OC edge f_{high} and f_{low}	≥ -69 dBm
Blocking at ±10 MHz from OC edge f_{high} and f_{low}	≥ -44 dBm
Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater	≥ -44 dBm

RX category 1.5

Requirement	Limits
	Receiver category 1.5
Blocking at ±2 MHz from OC edge f_{high} and f_{low}	≥ -43 dBm
Blocking at ±10 MHz from OC edge f_{high} and f_{low}	≥ -33 dBm
Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater	≥ -33 dBm

RX category 1

Requirement	Limits
	Receiver category 1
Blocking at ±2 MHz from Centre Frequency	≥ -20 dBm
Blocking at ±10 MHz from Centre Frequency	≥ -20 dBm
Blocking at ±5 % of Centre Frequency or 15 MHz, whichever is the greater	≥ -20 dBm

14.3 Test Procedure

Signal generator A shall be set to an appropriate modulated test signal at the operating frequency of the EUT receiver.
Signal generator B shall be unmodulated.
Measurements shall be carried out at frequencies of the unwanted signal at approximately the frequency(ies) offset(s) defined in technical requirement avoiding those frequencies at which spurious responses occur. Additional
measurement points may be requested by technical requirements clause.
If several operational frequency bands are used by the equipment, at least one blocking measurement by bands has to be performed.
Step 1:
Signal generator B shall be powered off. Signal generator A shall be set to the minimum level which gives the wanted performance criterion of EUT or the reference level in Table 32, whichever is the higher The output level of generator A shall then be increased by 3 dB unless otherwise specified in technical requirement.
Step 2:
Signal generator B is powered on and set to operate at the nominal operating frequency - offset frequency. Signal generator B is then switched on and the signal amplitude is adjusted to the minimum level at which the wanted performance criterion is not achieved.
With signal generator B settings unchanged, the receiver shall be replaced with a suitable RF power measuring equipment. The power into the measuring equipment shall be measured and noted.
The blocking level is then the conducted power received from generator B at the EUT antenna connector. This can either be measured on the antenna connector for conducted test or be calculated for radiated test (see clause C.5.4).
The blocking level shall be higher or equal to the blocking power level requested in the technical requirement clause.
Step 3:
The measurement in steps 1 to 3 shall be repeated with signal offsets at required frequencies.

Step 4:
The information shown in below Table shall be recorded in the test report for each measured signal level and unwanted signal offset.

Value	Notes
Operating Frequency	Nominal centre frequency of the receiver
Signal generator A	Power level of signal generator A
Blocking level	Power level of signal generator B

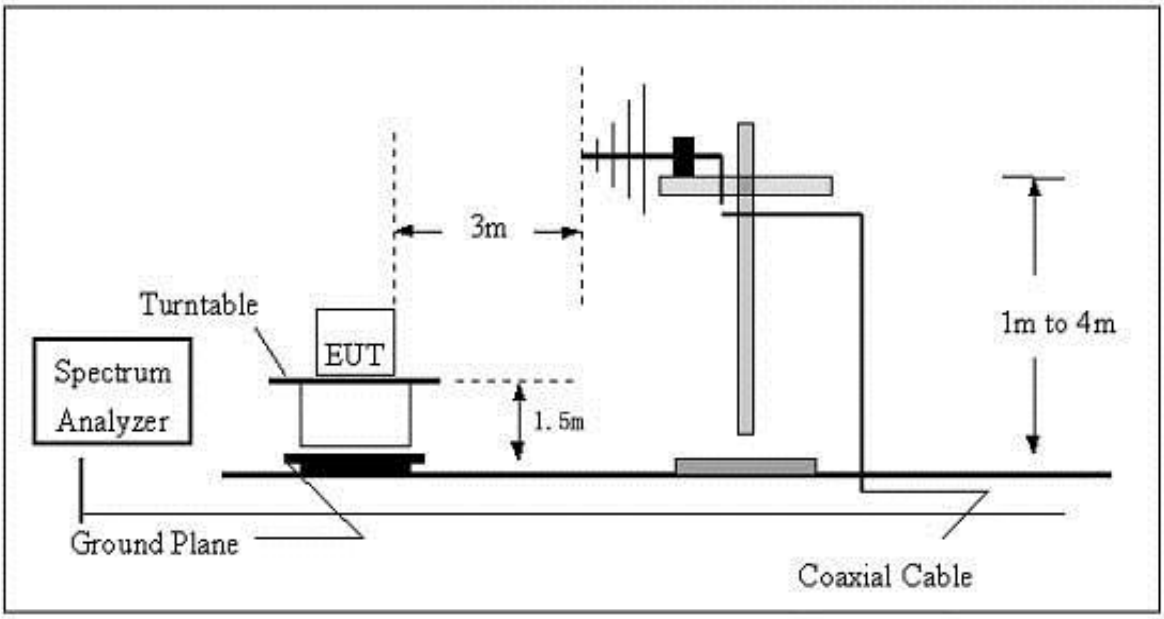
14.4 Test Result:

Requirement (MHz)	**Result (dBm)**	**Limit Receiver category 2 (dBm)**
Blocking at -2 MHz from OC edge f_{low}	-48.81	≥ -69
Blocking at +2 MHz from OC edge f_{high}	-47.51	≥ -69
Blocking at -10 MHz from OC edge f_{low}	-36.74	≥ -44
Blocking at +10 MHz from OC edge f_{high}	-35.44	≥ -44
Blocking at -5 % of Centre Frequency edge f_{low}	-30.52	≥ -44
Blocking at +5 % of Centre Frequency edge f_{high}	-34.62	≥ -44

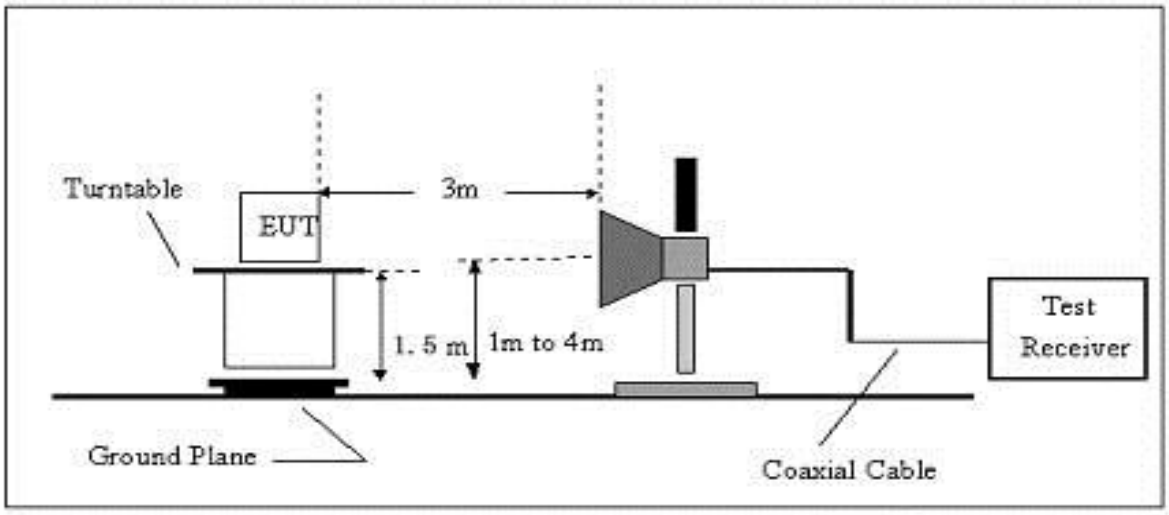
15. Receiver Spurious Emissions

15.1 Block Diagram Of Test Setup

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



15.2 Limits

Frequency(MHz)	Limit	Bandwidth
30-1000	-57dBm	100 kHz
1000-12750	-47dBm	1 MHz

15.3 Test Procedure

30MHz ~ 1GHz:

a. The Product was placed on the nonconductive turntable 1.5m above the ground in a full anechoic chamber.

b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Above 1GHz:

a. The Product was placed on the non-conductive turntable 1.5 m above the ground in a full anechoic chamber..

b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

15.4 Test Results

All modes have been tested and reports show data in the worst mode

Frequency	Receiver Reading	Turn table Angle	RX Antenna		Correct Factor	Absolute Level	Result	
			Height	Polar			Limit	Margin
(MHz)	(dBm)	Degree	(m)	(H/V)	(dB)	(dBm)	(dBm)	(dB)
868MHz								
310.19	-37.55	339	1.7	H	-28.91	-66.45	-57.00	-9.45
310.19	-35.81	233	1.0	V	-28.91	-64.71	-57.00	-7.71
2952.38	-37.63	138	1.9	H	-23.74	-61.37	-47.00	-14.37
2952.38	-35.47	25	1.4	V	-23.74	-59.22	-47.00	-12.22

Remark:
Absolute Level = Receiver Reading + Factor
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

16. EUT Photographs

EUT Photo 1

EUT Photo 2

NOTE: Appendix-Photographs Of EUT Constructional Details.

17. EUT Test Setup Photographs

Spurious emissions

STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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