



FCC TEST REPORT

FCC ID: SY4-A02039

On Behalf of

Shanghai Huace Navigation Technology Ltd.

Geodetic GNSS Receiver

Model No.: i93

Prepared for : Shanghai Huace Navigation Technology Ltd.
Address : 577 Songying Road, Qingpu District, 201706 Shanghai, China

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District,
518103, Shenzhen, Guangdong, China

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TEST REPORT DECLARATION

Applicant : Shanghai Huace Navigation Technology Ltd.
Address : 577 Songying Road, Qingpu District, 201706 Shanghai, China
Manufacturer : Shanghai Huace Navigation Technology Ltd.
Address : 577 Songying Road, Qingpu District, 201706 Shanghai, China
EUT Description : Geodetic GNSS Receiver
(A) Model No. : i93
(B) Trademark : 

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart E

ANSI C63.4:2014, ANSI C63.10:2013

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart E limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

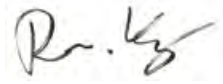
Tested by (name + signature).....:

Lucas Pang
Project Engineer



Approved by (name + signature).....:

Reak Yang
Project Manager



Date of issue.....:

April 18, 2023

Revision History

Revision	Issue Date	Revisions	Revised By
V0	April 18, 2023	Initial released Issue	Lucas Pang

1 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	Section 15.203 Section 7.1.4 RSS-Gen Issue 5	PASS
AC Power Line Conducted Emission	Section 15.207 Section 7.2.4 RSS-GEN(8.8), ANSI C63.10	PASS
Peak Transmit Power	Section 15.407(a), RSS-247 5.4(2)	PASS
Power Spectral Density	Section 15.407(a), RSS-247 5.2(2)	PASS
Undesirable Emission	Section 15.407(b), RSS-247 5.5	PASS
Radiated Emission	Section 15.407(b)&15.209 Section 5.5 RSS-Gen(8.9), RSS-247(5.5), ANSI C63.10	PASS
Band Edge	15.205, RSS-247 Issue 2, ANSI C63.10	PASS
Frequency Stability	15.407(f), RSS-GEN(6.11)	PASS

Remark:

1. Pass: The EUT complies with the essential requirements in the standard.
2. Frequency Stability: The manufacturer stated in the user's manual.
3. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.

1.1 Measurement Uncertainty

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.74dB(Polarize: V)
	3.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for radio frequency	5.06×10^{-8} GHz
Uncertainty for conducted RF Power	0.40dB
Uncertainty for temperature	0.2°C
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2 General Information

2.1 General Description of EUT

EUT Name	: Geodetic GNSS Receiver
Model No.	: i93
DIFF.	: N/A
Power supply	: DC 5V From USB with DC 7.2V From Battery
Radio Technology	: 5G WIFI
Operation Frequency	: 802.11a/n(HT20)/ac(HT20): 5180~5240MHz; 5745~5825MHz 802.11n(HT40)/ac(HT40): 5190~5230MHz; 5755~5795MHz 802.11ac(HT80): 5210MHz, 5775MHz
Channel separation	: 20MHz for 802.11a/ 802.11ac20/ 802.11n(HT20) 40MHz for 802.11ac40/ 802.11n(HT40) 80MHz for 802.11ac80
Modulation technology:	: IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Type	: Internal Antenna, max gain 2.0dBi Antenna information is provided by applicant.
Software version	: 1.0.7
Hardware version	: V1.0.1
Intend use environment	: Residential, commercial and light industrial environment

2.2 Test mode

Transmitting mode Keep the EUT in transmitting with modulation.
EUT was test with 99% duty cycle at its maximum power control level.

Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

2.3 Test Facility

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961

July 25, 2017 Certificated by IC
Registration Number: CN0085

2.4 Description of Support Units

Accessories : /
Manufacturer : /
Model : /
Ratings : /

2.5 Deviation from Standards

None.

2.6 Abnormalities from Standard Conditions

None.

2.7 Other Information Requested by the Customer

None.

2.8 Additional instructions

Software (Used for test) from client

Channel	Power level
Lowest	Default
Middle	Default
Highest	Default

3 Test Instruments list

Equipment	Manufacture	Model No.	Firmware version	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2022.05.17	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2022.08.22	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2022.08.22	1Year
Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-102082-Wa	2022.08.22	1Year
Receiver	R&S	ESCI	4.42 SP1	101165	2022.08.22	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2021.08.30	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2021.08.30	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00059	2021.08.30	2Year
RF Cable	Resenberger	Cable 1	/	RE1	2022.08.22	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2022.08.22	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2022.08.22	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2022.08.22	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2022.08.22	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2022.08.22	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2022.08.23	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	/	00946	2021.08.30	2 Year
Preamplifier	SKET	LNPA_1840-50	/	SK2018101801	2022.08.22	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2022.08.22	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2022.08.22	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000-40-880	/	100631	2022.08.22	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2022.08.22	1 Year
Adjustable attenuator	MWRFTest	N/A	/	N/A	N/A	N/A
10dB Attenuator	Mini-Circuits	DC-6G	/	N/A	N/A	N/A

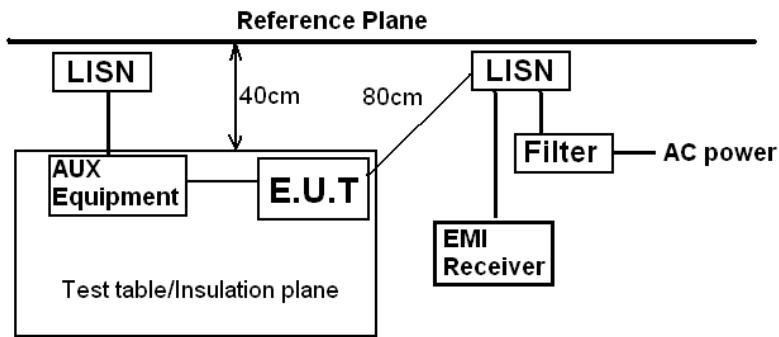
Software Information			
Test Item	Software Name	Manufacturer	Version
RE	EZ-EMC	EZ	Alpha-3A1
CE	EZ-EMC	EZ	Alpha-3A1
RF-CE	MTS 8310	MW	V2.0.0.0

4 Test results and Measurement Data

4.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
E.U.T Antenna:	
The antenna is internal antenna. The best case gain of the antenna is 2.0dBi for 5.15~5.25GHz, 5.725~5.85GHz	

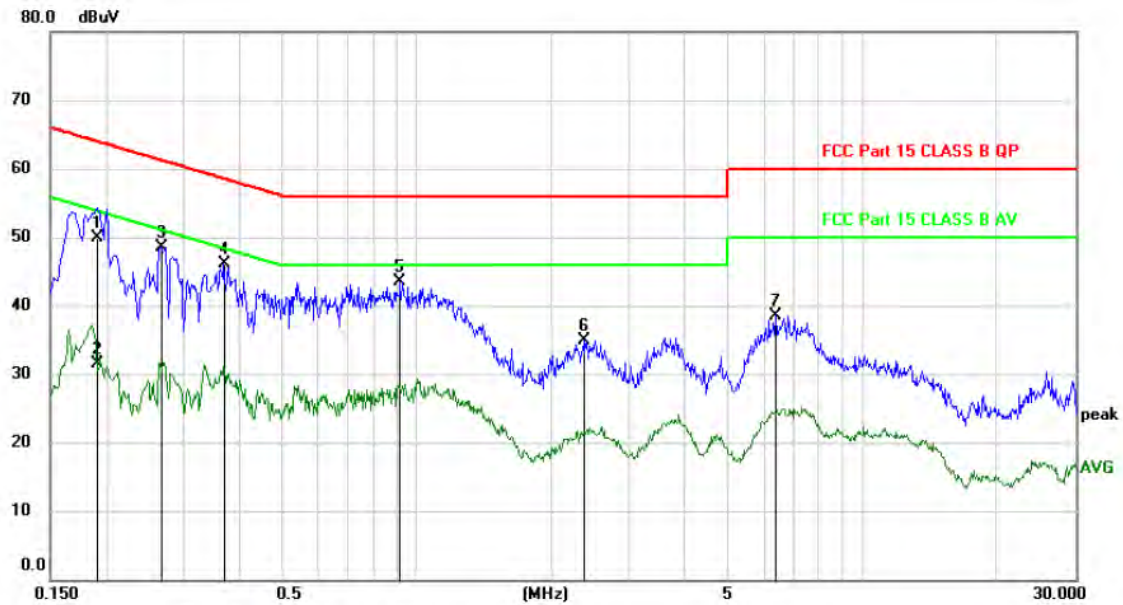
4.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207		
Test Method:	ANSI C63.10:2013		
Test Frequency Range:	150KHz to 30MHz		
Class / Severity:	Class B		
Receiver setup:	RBW=9KHz, VBW=30KHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test procedure	The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.		
Test setup:	 Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m		
Test Instruments:	Refer to section 5.10 for details		
Test mode:	Refer to section 5.3 for details		
Test results:	Pass		

Measurement Data

An initial pre-scan was performed on the line and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Line:

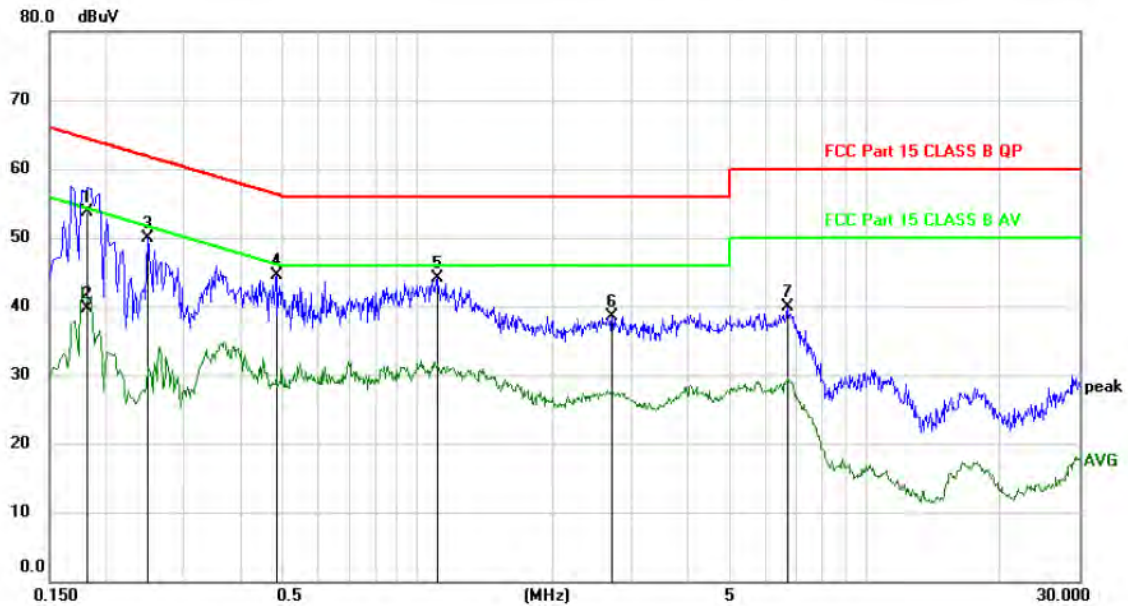


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1920	40.01	9.92	49.93	63.95	-14.02	QP	
2		0.1920	21.52	9.92	31.44	53.95	-22.51	AVG	
3		0.2670	38.62	9.95	48.57	61.21	-12.64	peak	
4	*	0.3690	36.17	9.95	46.12	58.52	-12.40	peak	
5		0.9180	33.53	9.96	43.49	56.00	-12.51	peak	
6		2.3699	25.02	9.90	34.92	56.00	-21.08	peak	
7		6.3780	28.50	10.10	38.60	60.00	-21.40	peak	

*:Maximum data x:Over limit !:over margin

〈Reference Only

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Neutral:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	*	0.1830	43.79	9.93	53.72	64.35	-10.63	QP	
2		0.1830	29.81	9.93	39.74	54.35	-14.61	AVG	
3		0.2490	39.88	9.97	49.85	61.79	-11.94	peak	
4		0.4830	34.46	9.96	44.42	56.29	-11.87	peak	
5		1.1010	34.15	9.90	44.05	56.00	-11.95	peak	
6		2.7150	28.66	9.92	38.58	56.00	-17.42	peak	
7		6.6720	29.75	10.11	39.86	60.00	-20.14	peak	

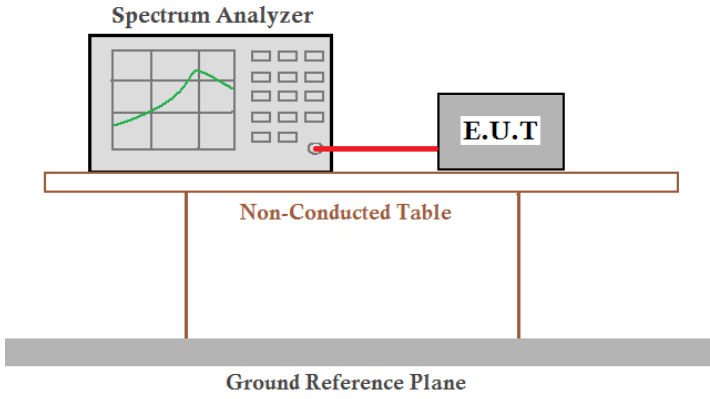
*:Maximum data x:Over limit !:over margin

(Reference Only)

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

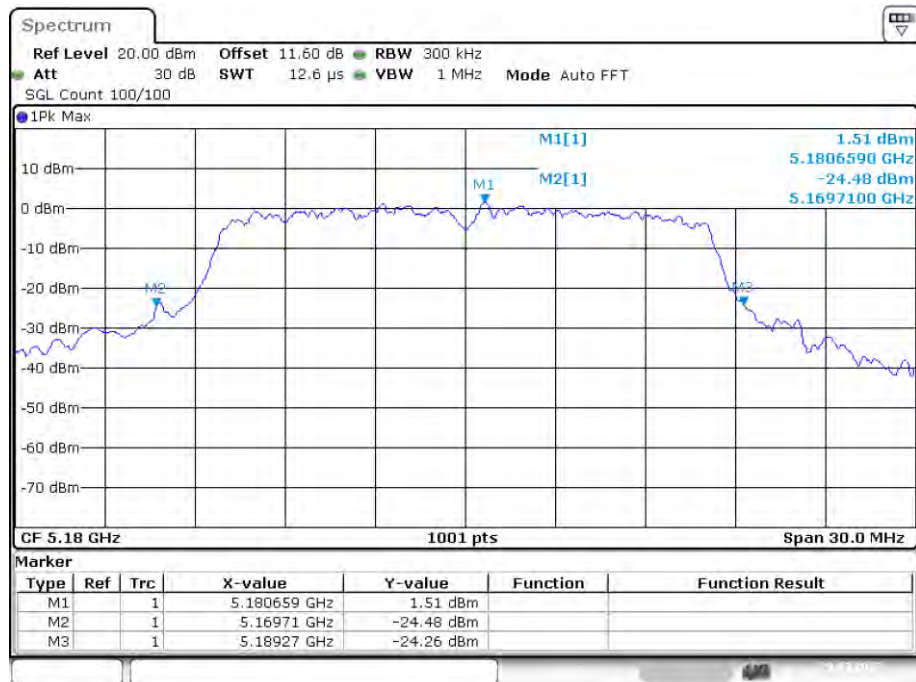
Note: All modes and channels have been tested and only the A 5180MHz mode with the worst data is listed.

4.3 Emission Bandwidth and 99% Occupied Bandwidth

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02r01
Limit:	N/A
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer, shown with a grid and a green trace, is connected to an E.U.T. (Equipment Under Test) box by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a Non-Conducted Table, which is supported by two vertical legs. Below the table, a Ground Reference Plane is indicated by a thick grey bar.
Test procedure:	According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data:**Band 1 (5150-5250 MHz):
-26dB Bandwidth**

Condition	Mode	Frequency (MHz)	Antenna	-26 dB Bandwidth (MHz)	Limit -26 dB Bandwidth (MHz)	Verdict
NVNT	a	5180	Ant1	19.56	0.5	Pass
NVNT	a	5200	Ant1	19.23	0.5	Pass
NVNT	a	5240	Ant1	19.53	0.5	Pass
NVNT	ac20	5180	Ant1	19.38	0.5	Pass
NVNT	ac20	5200	Ant1	19.83	0.5	Pass
NVNT	ac20	5240	Ant1	20.25	0.5	Pass
NVNT	ac40	5190	Ant1	39.42	0.5	Pass
NVNT	ac40	5230	Ant1	39.42	0.5	Pass
NVNT	ac80	5210	Ant1	78.84	0.5	Pass
NVNT	n20	5180	Ant1	19.62	0.5	Pass
NVNT	n20	5200	Ant1	19.8	0.5	Pass
NVNT	n20	5240	Ant1	20.07	0.5	Pass
NVNT	n40	5190	Ant1	39.72	0.5	Pass
NVNT	n40	5230	Ant1	39.66	0.5	Pass

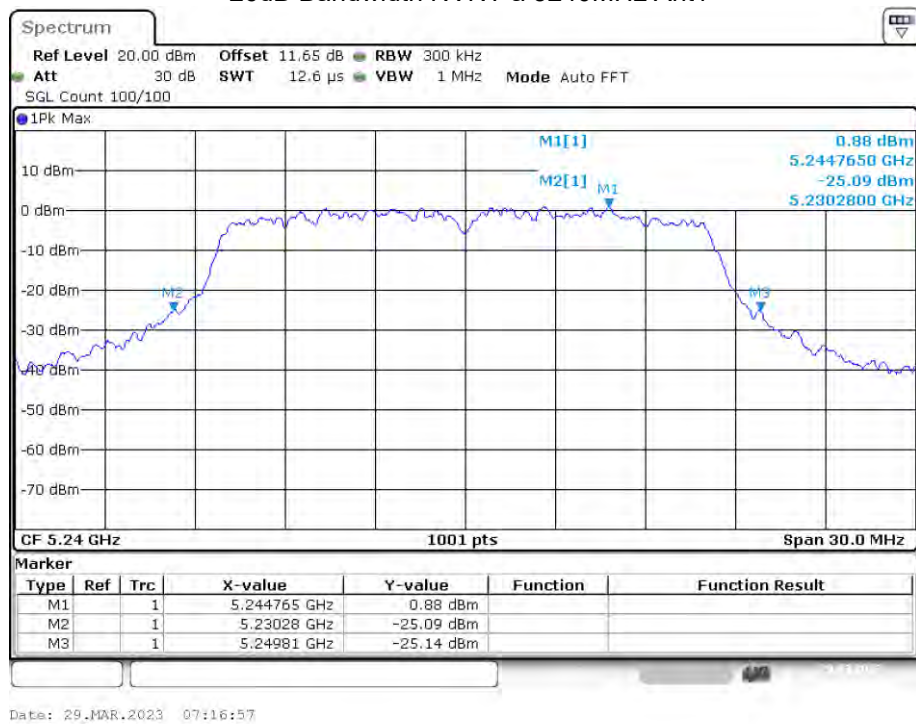
-26dB Bandwidth NVNT a 5180MHz Ant1

Date: 29.MAR.2023 07:09:59

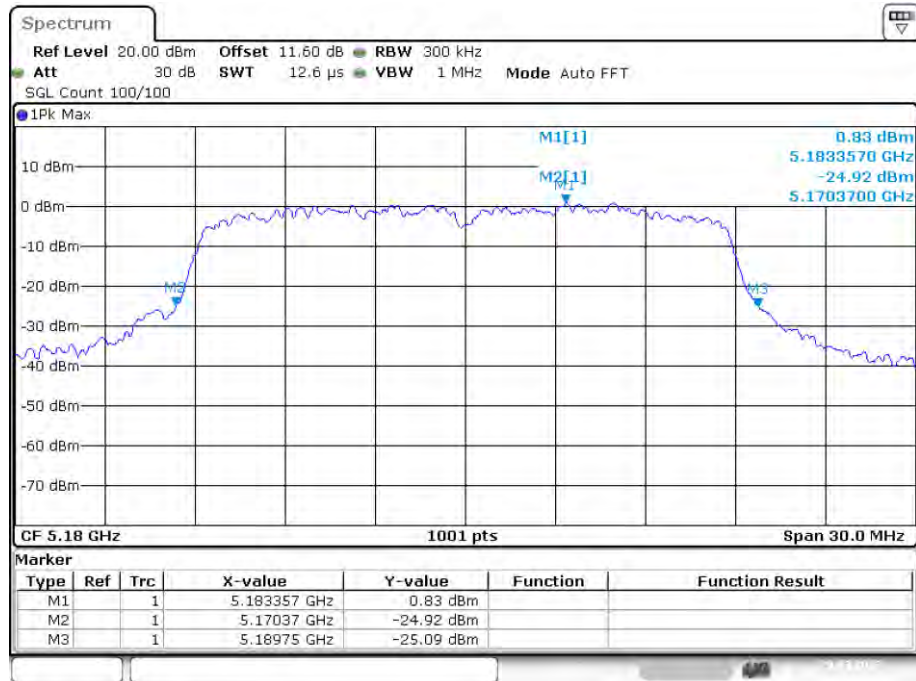
-26dB Bandwidth NVNT a 5200MHz Ant1



-26dB Bandwidth NVNT a 5240MHz Ant1

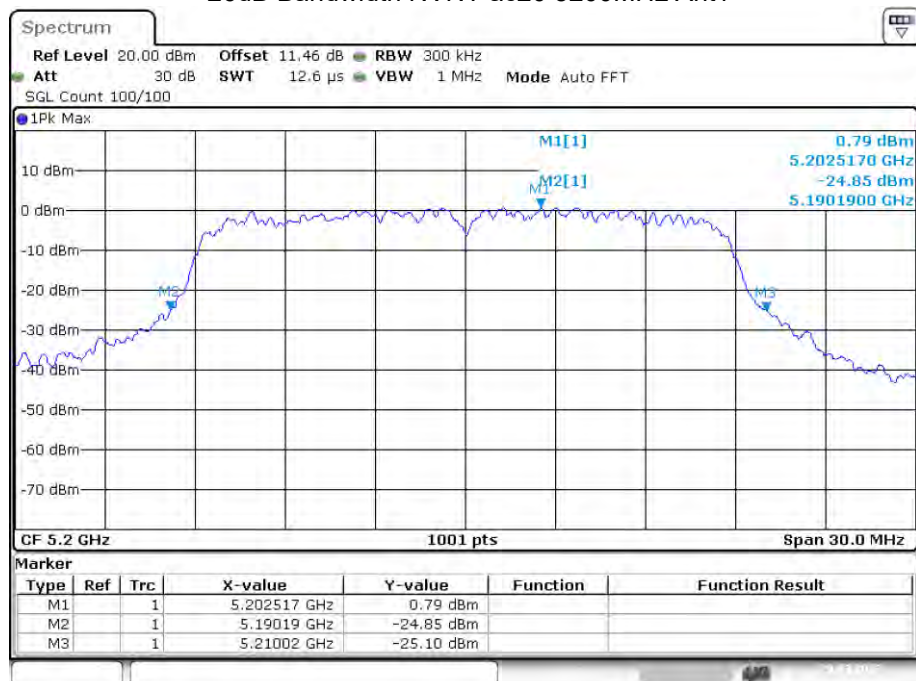


-26dB Bandwidth NVNT ac20 5180MHz Ant1

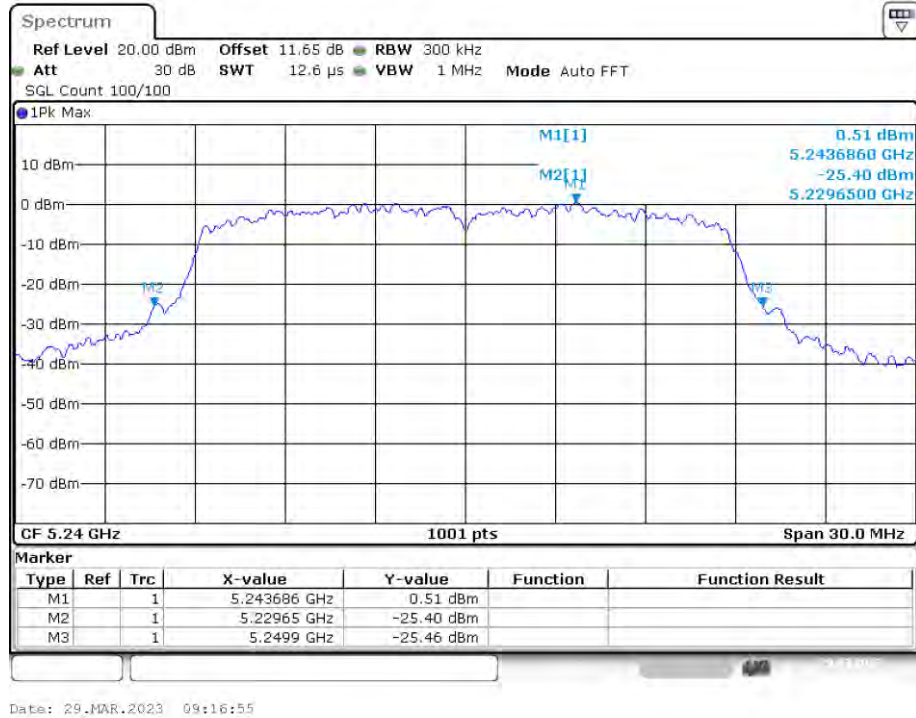
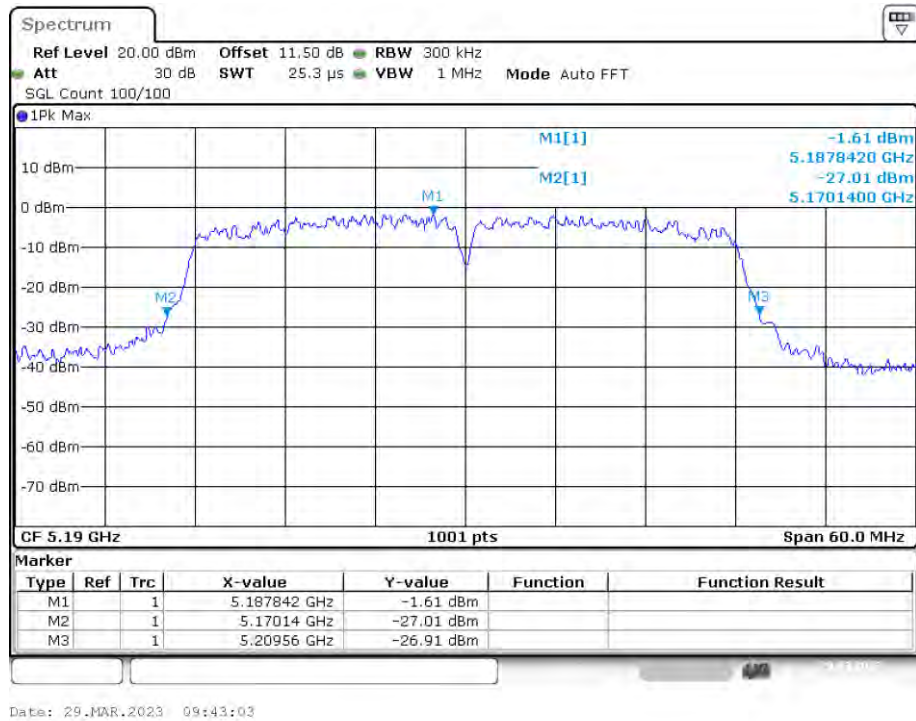


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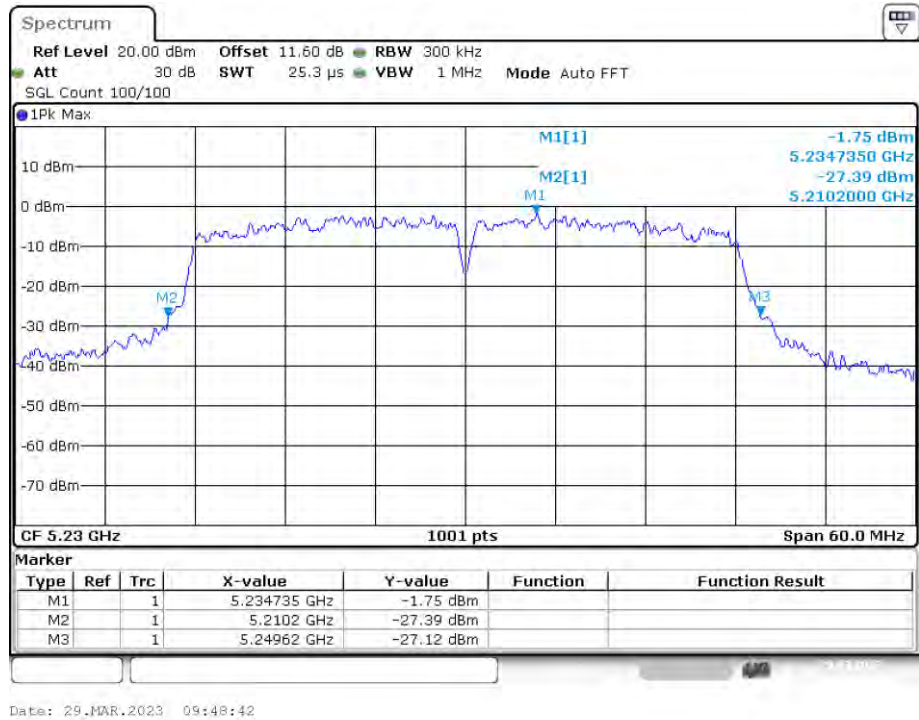
-26dB Bandwidth NVNT ac20 5200MHz Ant1



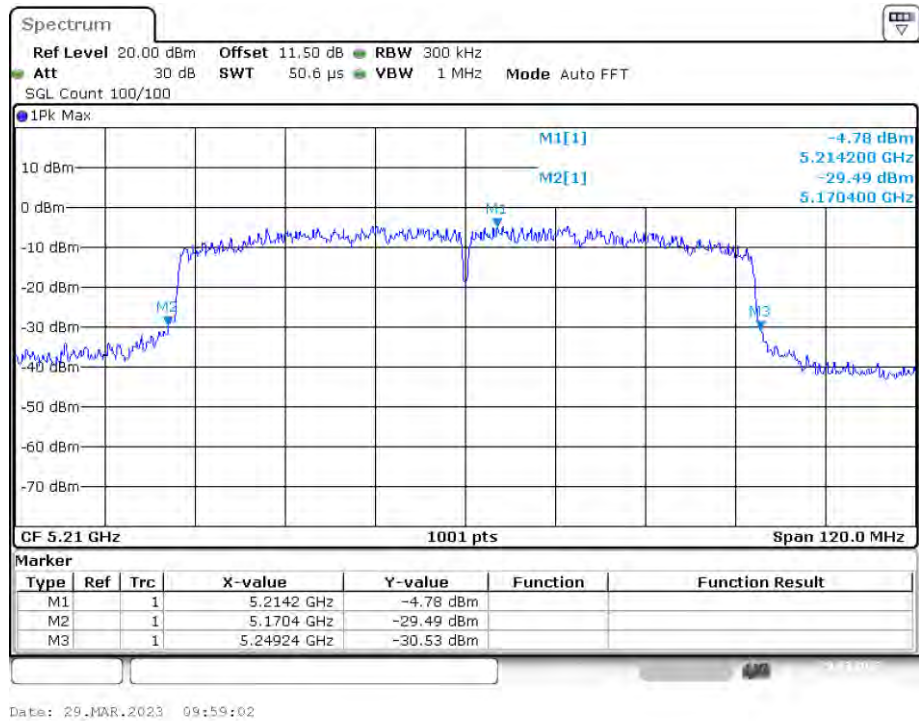
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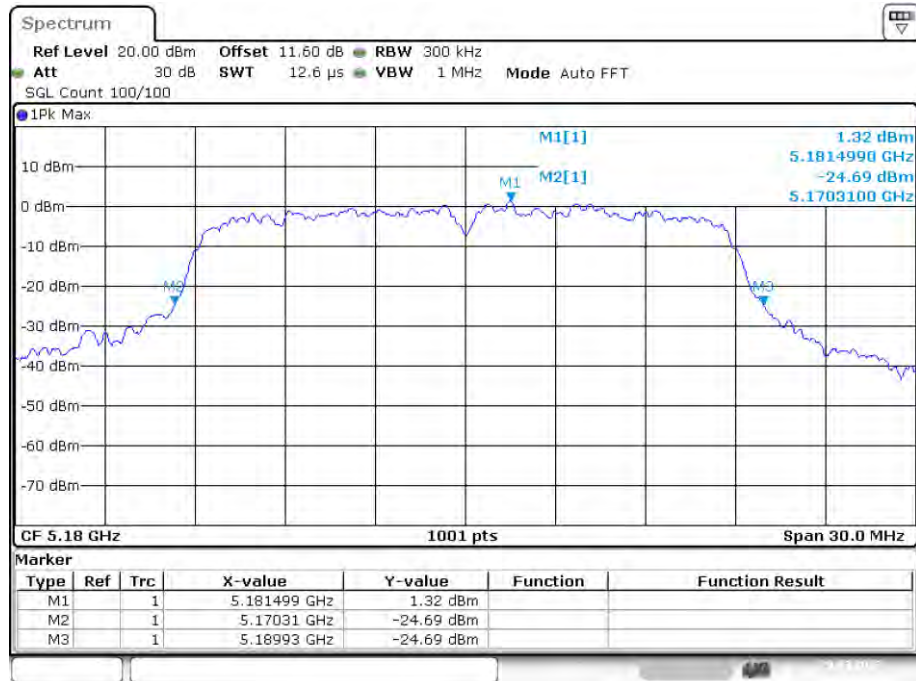
-26dB Bandwidth NVNT ac20 5240MHz Ant1**-26dB Bandwidth NVNT ac40 5190MHz Ant1**

-26dB Bandwidth NVNT ac40 5230MHz Ant1

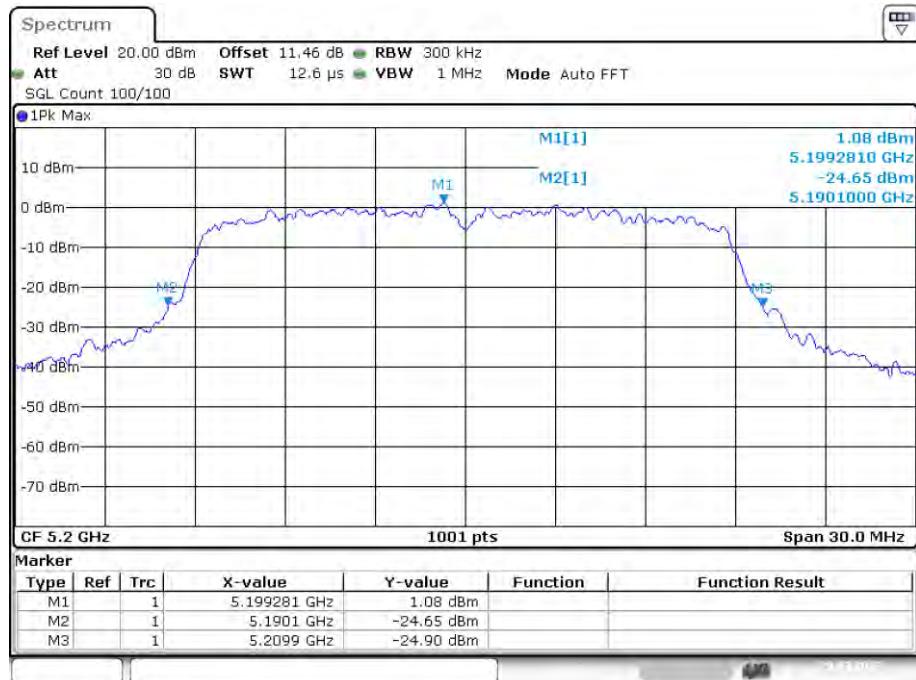


-26dB Bandwidth NVNT ac80 5210MHz Ant1

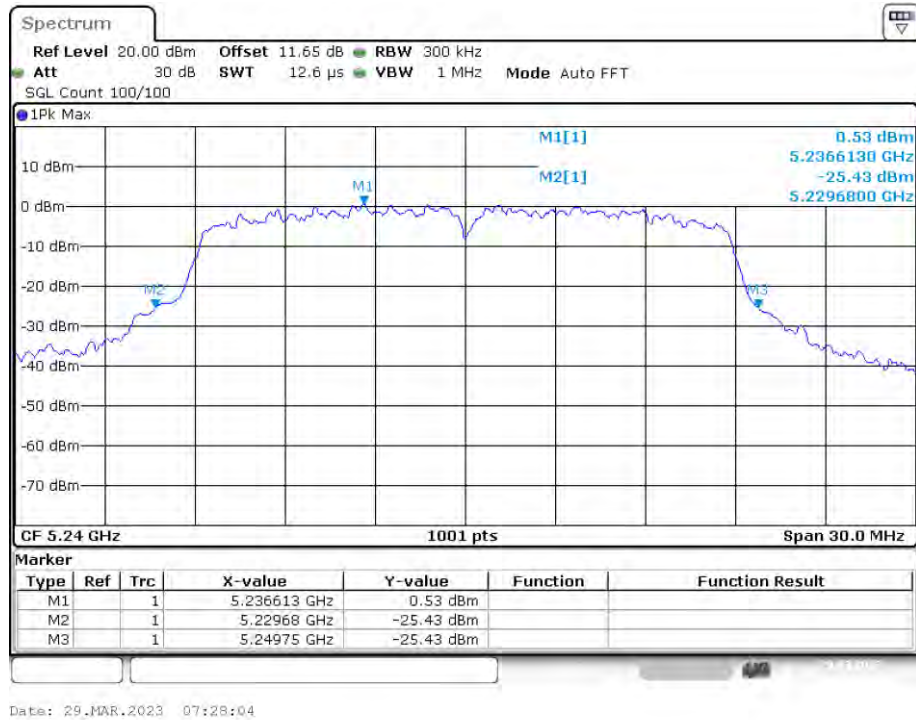
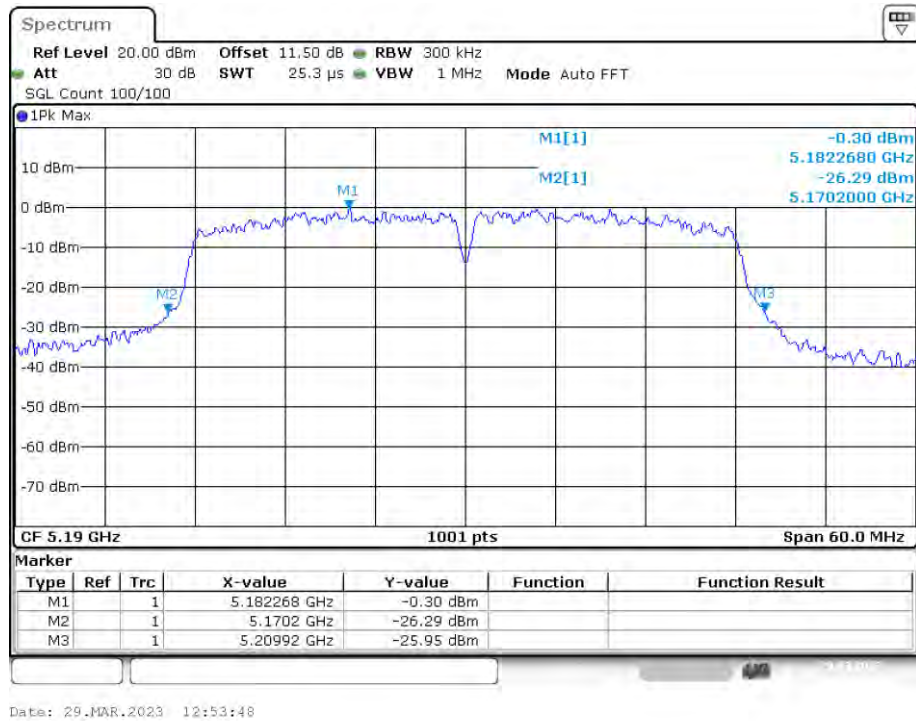


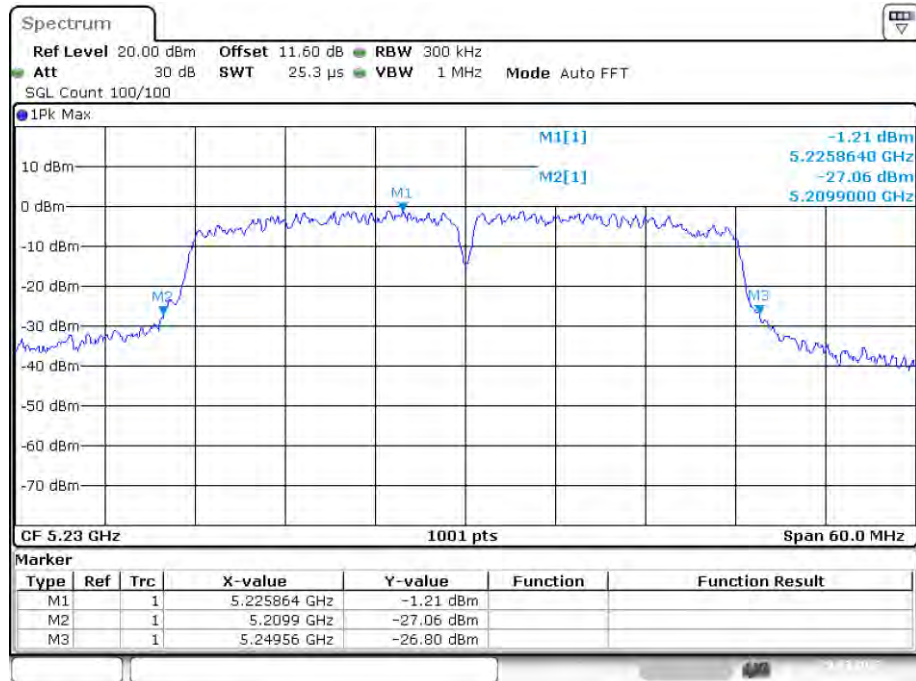
-26dB Bandwidth NVNT n20 5180MHz Ant1

Date: 29.MAR.2023 07:21:39

-26dB Bandwidth NVNT n20 5200MHz Ant1

Date: 29.MAR.2023 07:24:57

-26dB Bandwidth NVNT n20 5240MHz Ant1**-26dB Bandwidth NVNT n40 5190MHz Ant1**

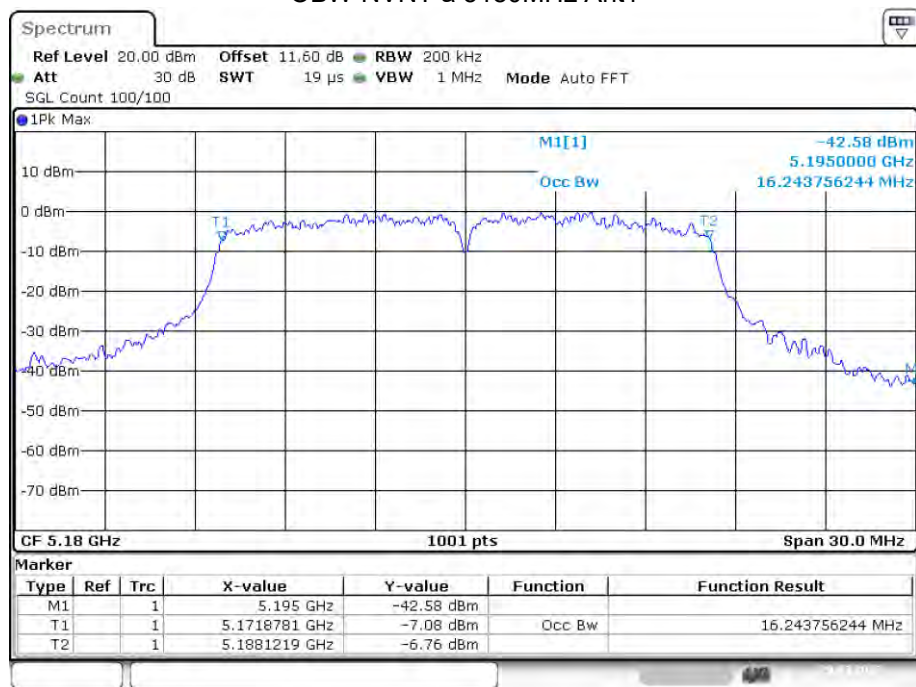
-26dB Bandwidth NVNT n40 5230MHz Ant1

Date: 29.MAR.2023 12:59:06

Occupied Channel Bandwidth

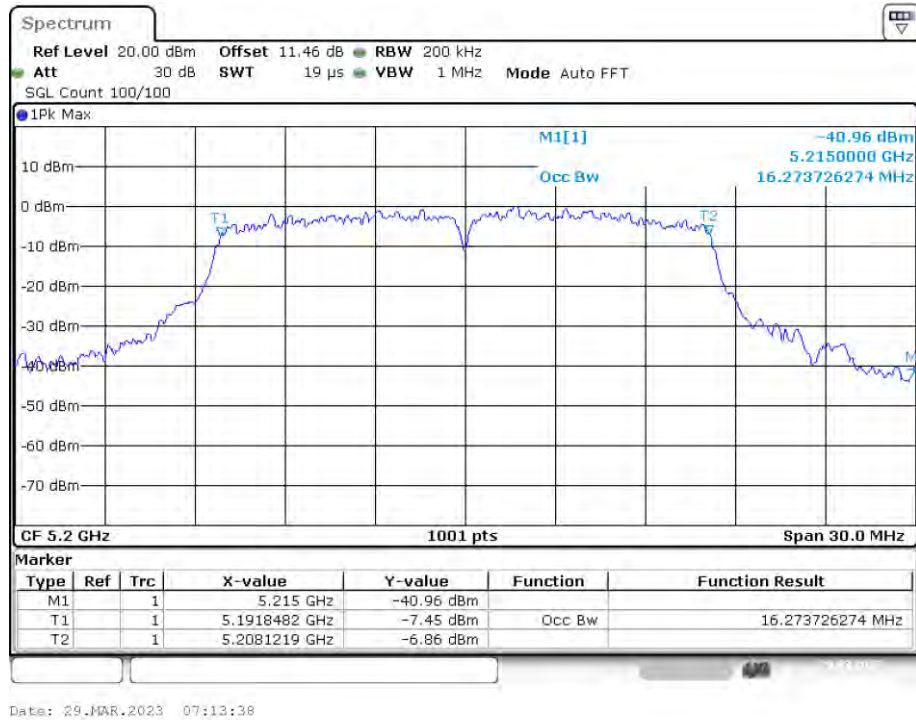
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	a	5180	Ant1	16.244
NVNT	a	5200	Ant1	16.274
NVNT	a	5240	Ant1	16.214
NVNT	ac20	5180	Ant1	17.383
NVNT	ac20	5200	Ant1	17.413
NVNT	ac20	5240	Ant1	17.383
NVNT	ac40	5190	Ant1	35.724
NVNT	ac40	5230	Ant1	35.844
NVNT	ac80	5210	Ant1	74.685
NVNT	n20	5180	Ant1	17.383
NVNT	n20	5200	Ant1	17.413
NVNT	n20	5240	Ant1	17.443
NVNT	n40	5190	Ant1	35.844
NVNT	n40	5230	Ant1	35.784

OBW NVNT a 5180MHz Ant1

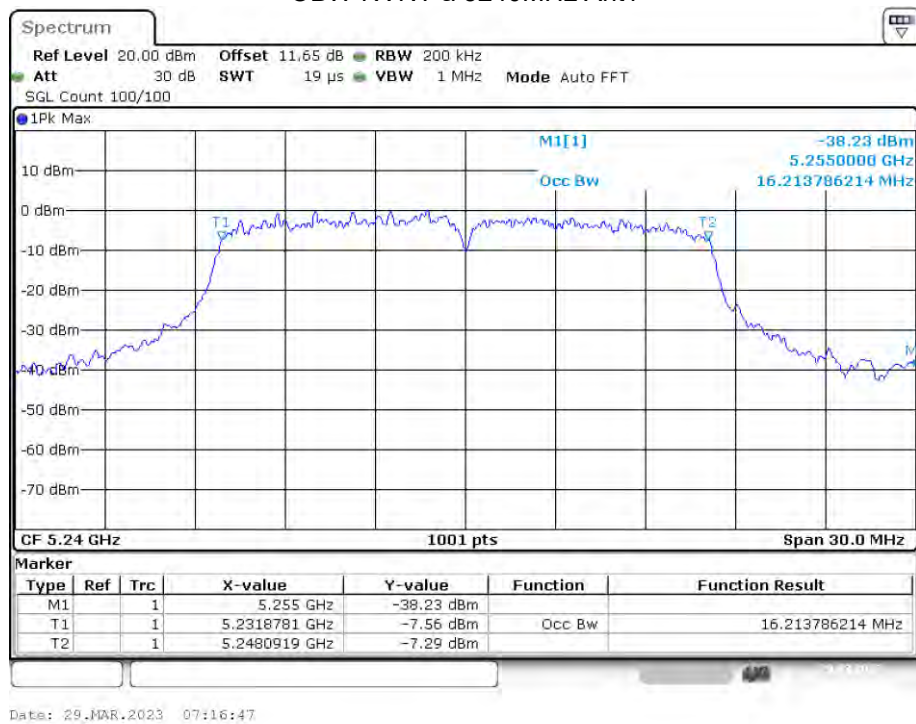


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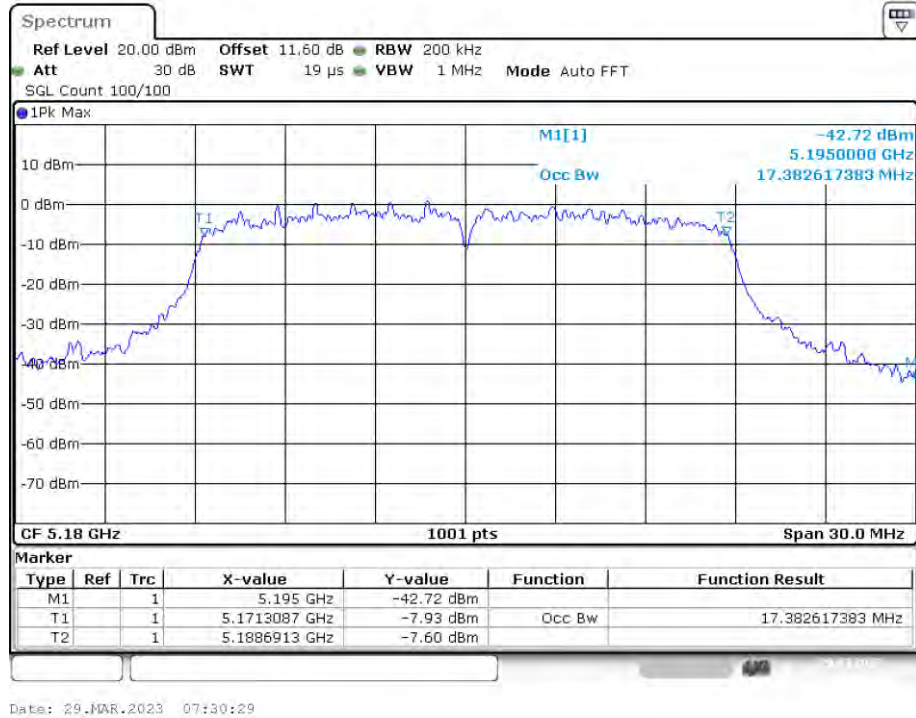
OBW NVNT a 5200MHz Ant1



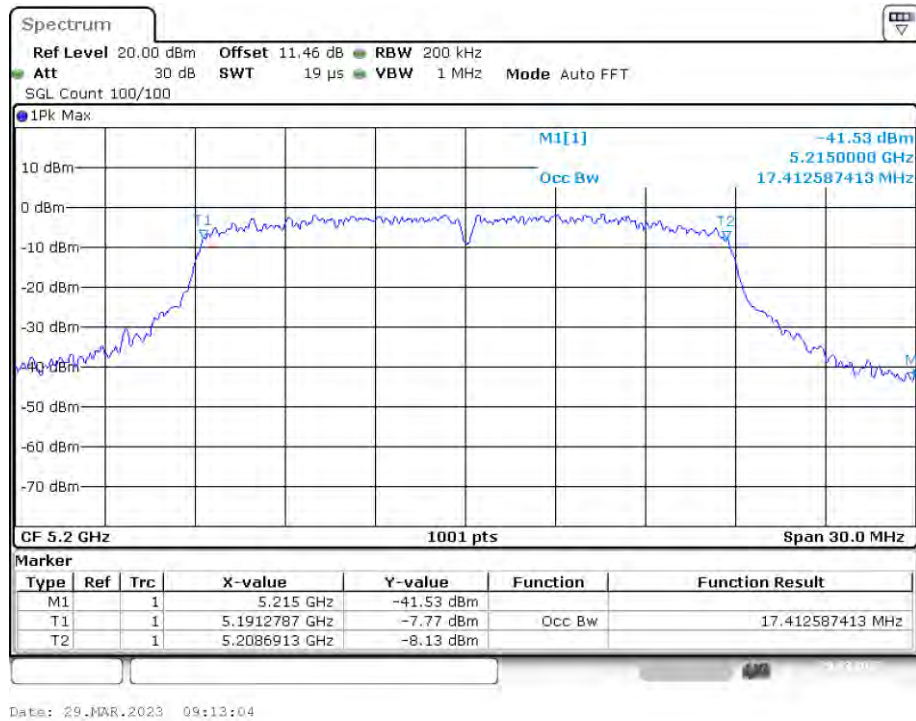
OBW NVNT a 5240MHz Ant1



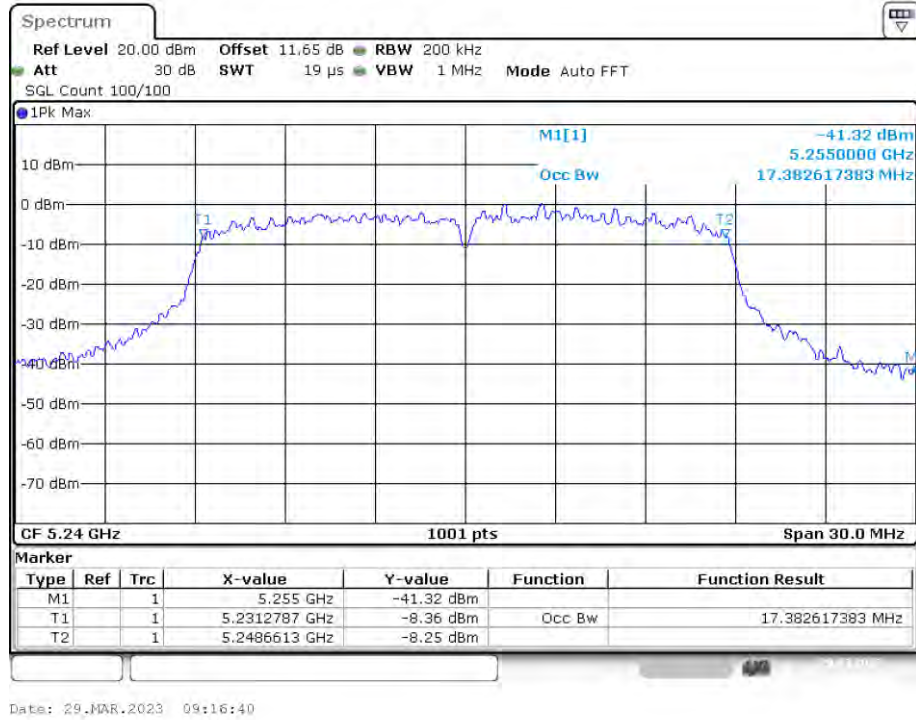
OBW NVNT ac20 5180MHz Ant1



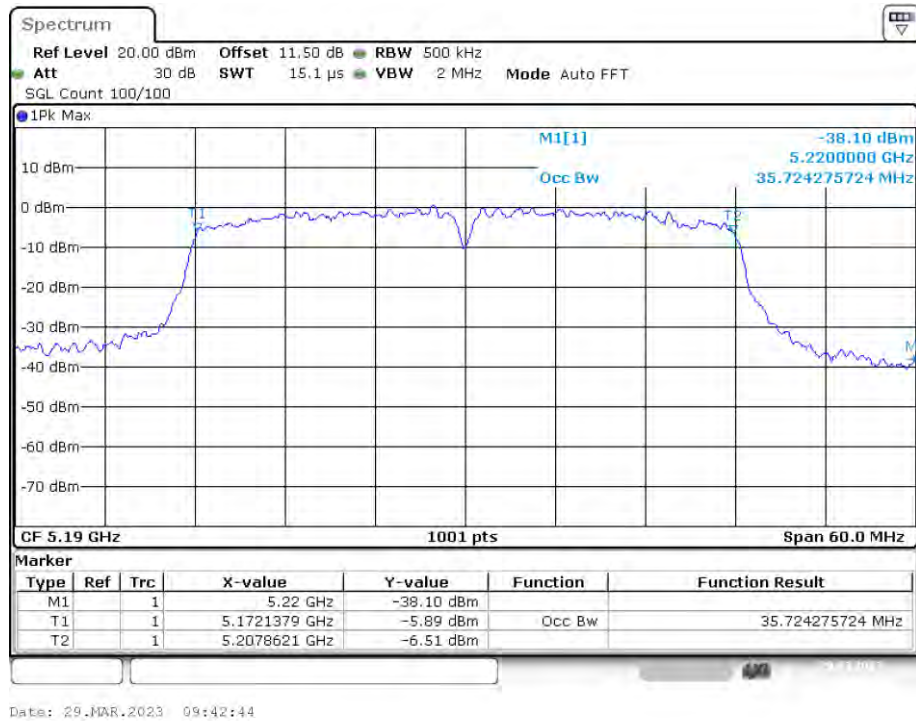
OBW NVNT ac20 5200MHz Ant1



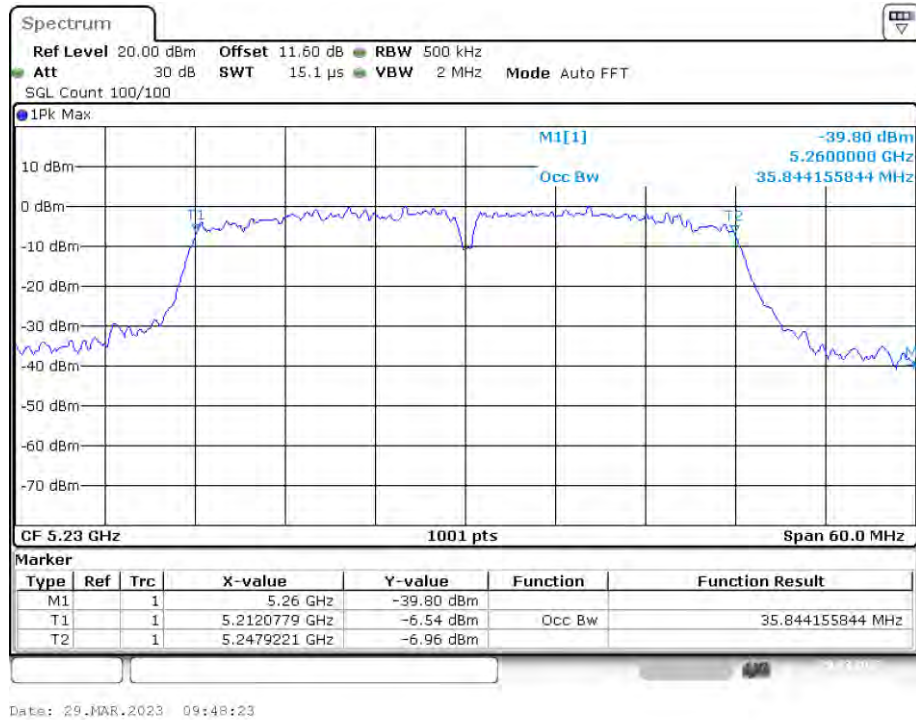
OBW NVNT ac20 5240MHz Ant1



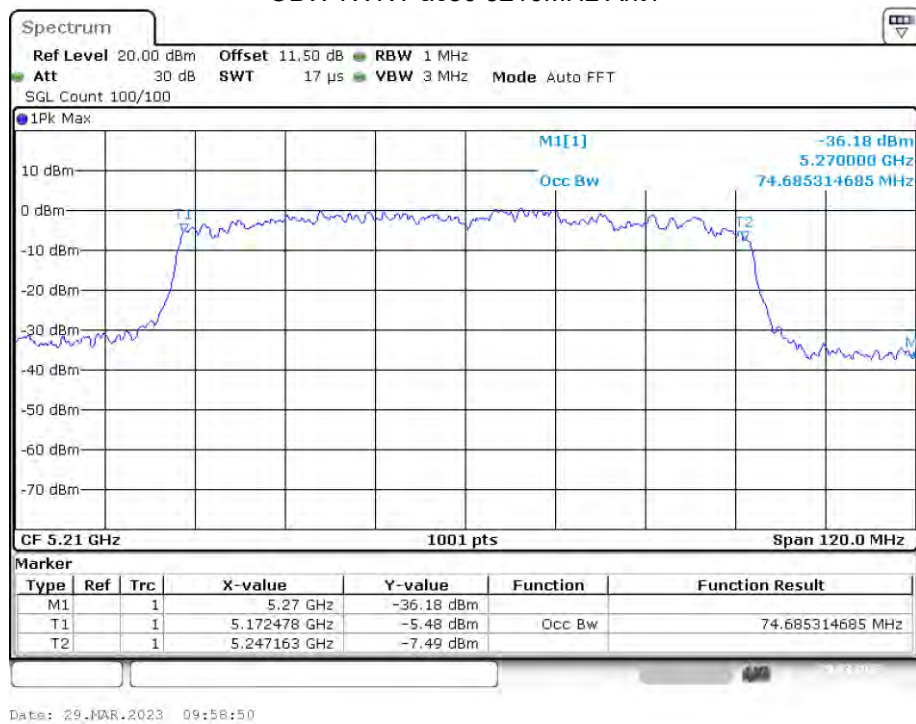
OBW NVNT ac40 5190MHz Ant1



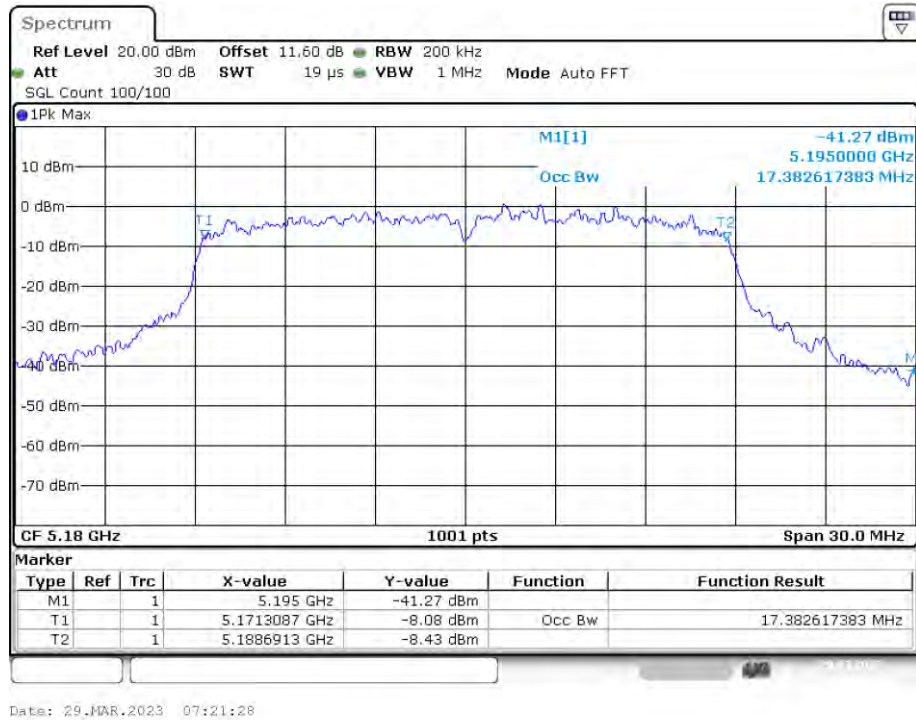
OBW NVNT ac40 5230MHz Ant1



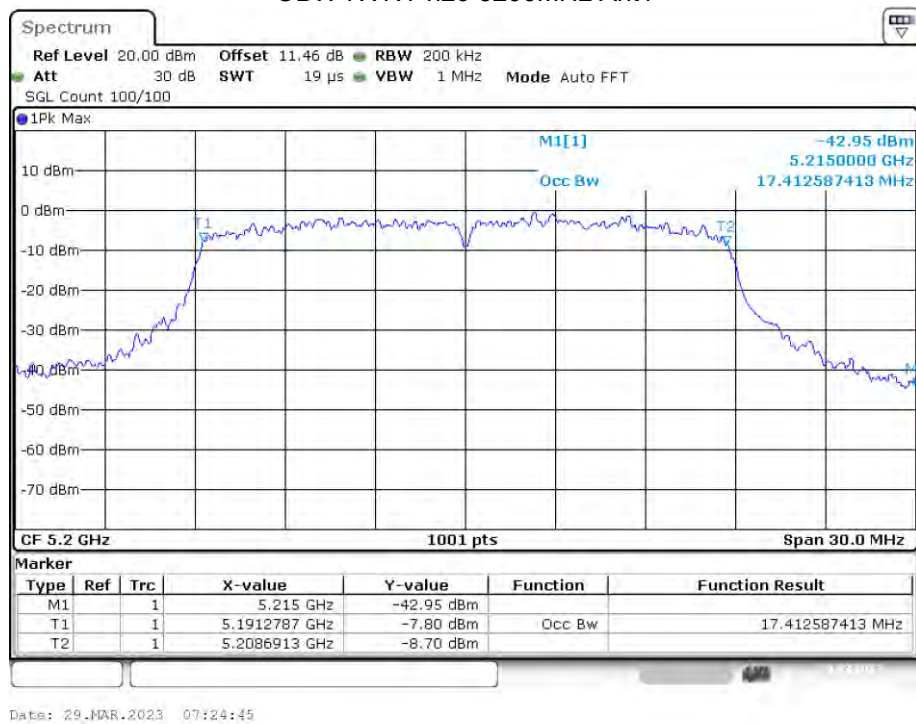
OBW NVNT ac80 5210MHz Ant1



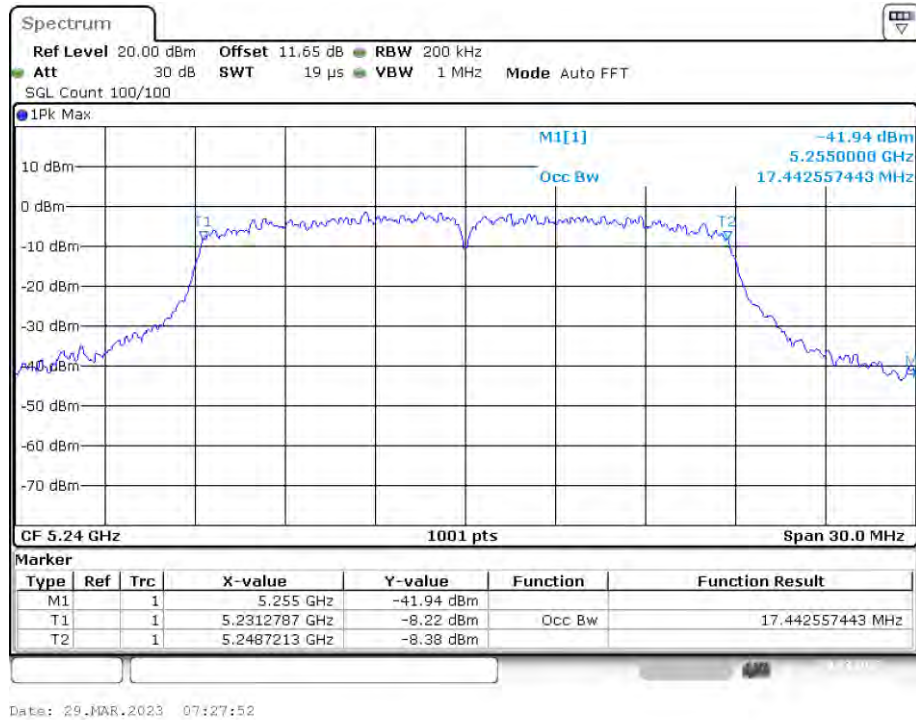
OBW NVNT n20 5180MHz Ant1



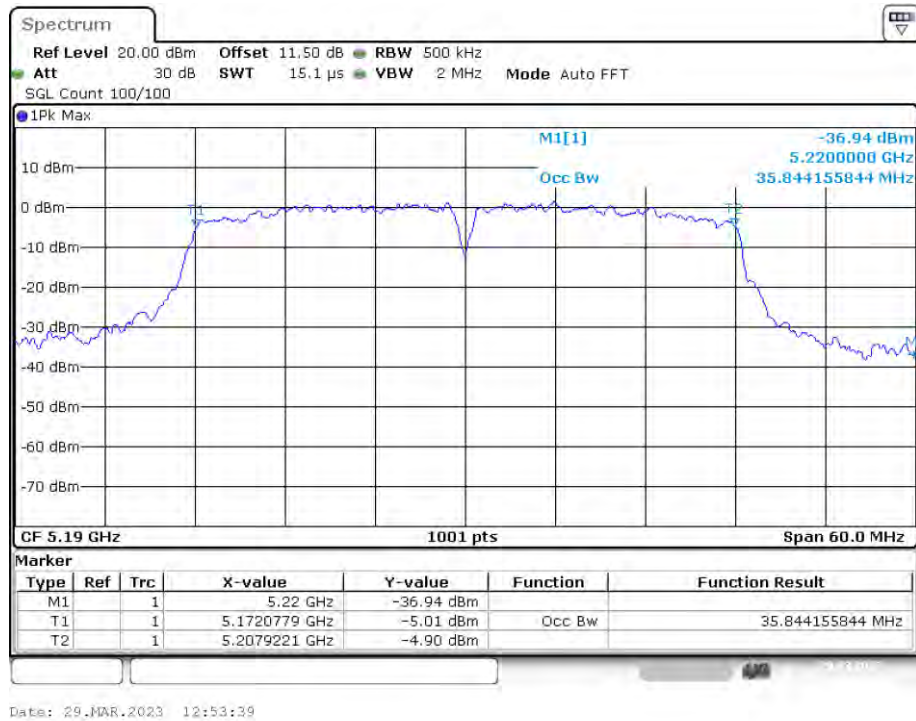
OBW NVNT n20 5200MHz Ant1



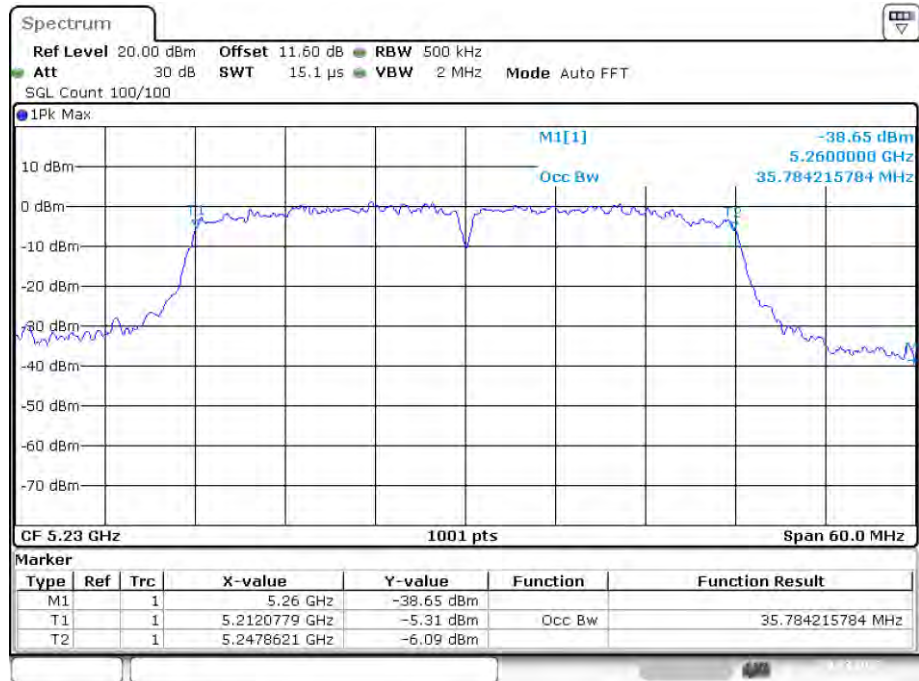
OBW NVNT n20 5240MHz Ant1



OBW NVNT n40 5190MHz Ant1



OBW NVNT n40 5230MHz Ant1

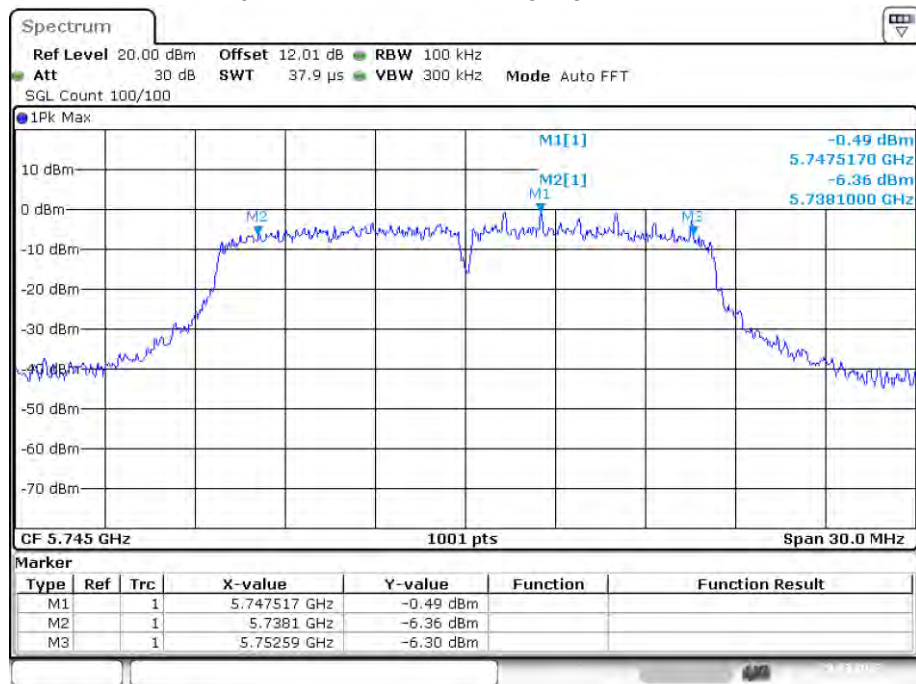


Date: 29.MAR.2023 12:58:55

**Band 4 (5725-5850 MHz):
-6dB Bandwidth**

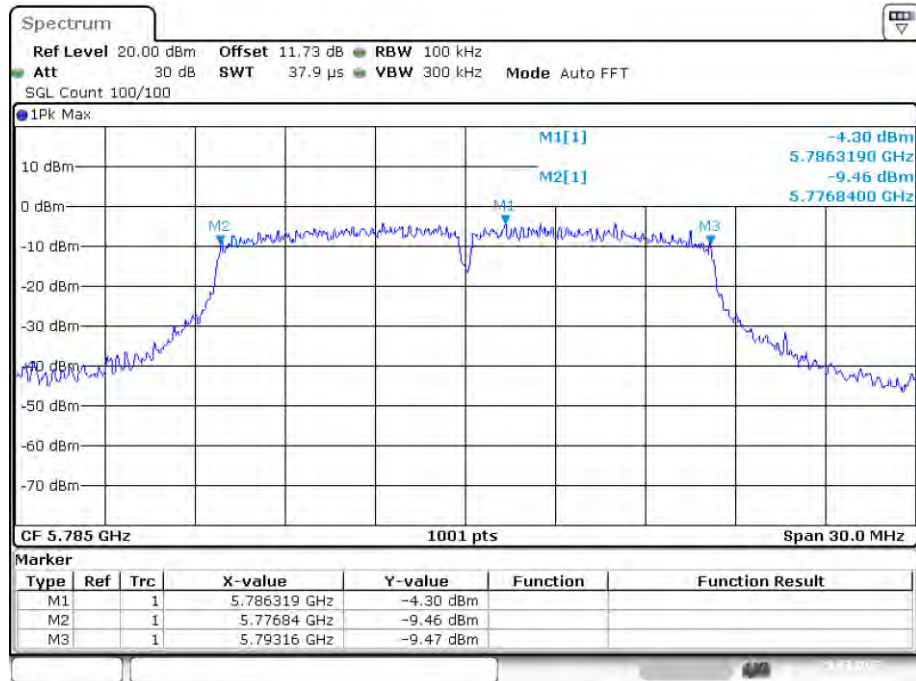
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	a	5745	Ant1	14.49	0.5	Pass
NVNT	a	5785	Ant1	16.32	0.5	Pass
NVNT	a	5825	Ant1	14.43	0.5	Pass
NVNT	ac20	5745	Ant1	17.19	0.5	Pass
NVNT	ac20	5785	Ant1	15.48	0.5	Pass
NVNT	ac20	5825	Ant1	17.16	0.5	Pass
NVNT	ac40	5755	Ant1	35.76	0.5	Pass
NVNT	ac40	5795	Ant1	35.04	0.5	Pass
NVNT	ac80	5775	Ant1	62.64	0.5	Pass
NVNT	n20	5745	Ant1	16.83	0.5	Pass
NVNT	n20	5785	Ant1	15.09	0.5	Pass
NVNT	n20	5825	Ant1	16.92	0.5	Pass
NVNT	n40	5755	Ant1	35.28	0.5	Pass
NVNT	n40	5795	Ant1	31.98	0.5	Pass

-6dB Bandwidth NVNT a 5745MHz Ant1



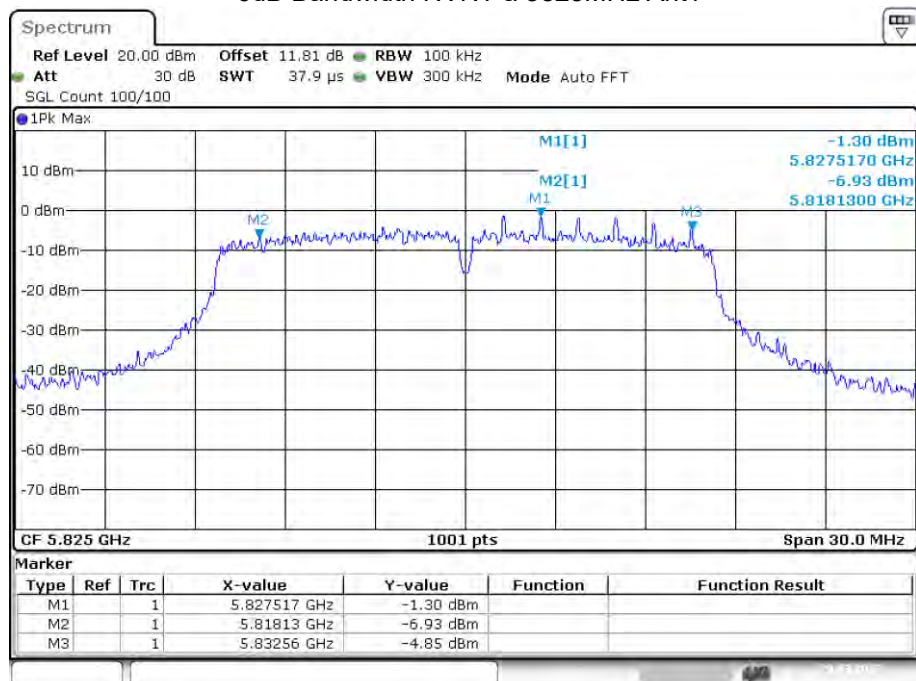
Date: 29.MAR.2023 10:48:04

-6dB Bandwidth NVNT a 5785MHz Ant1



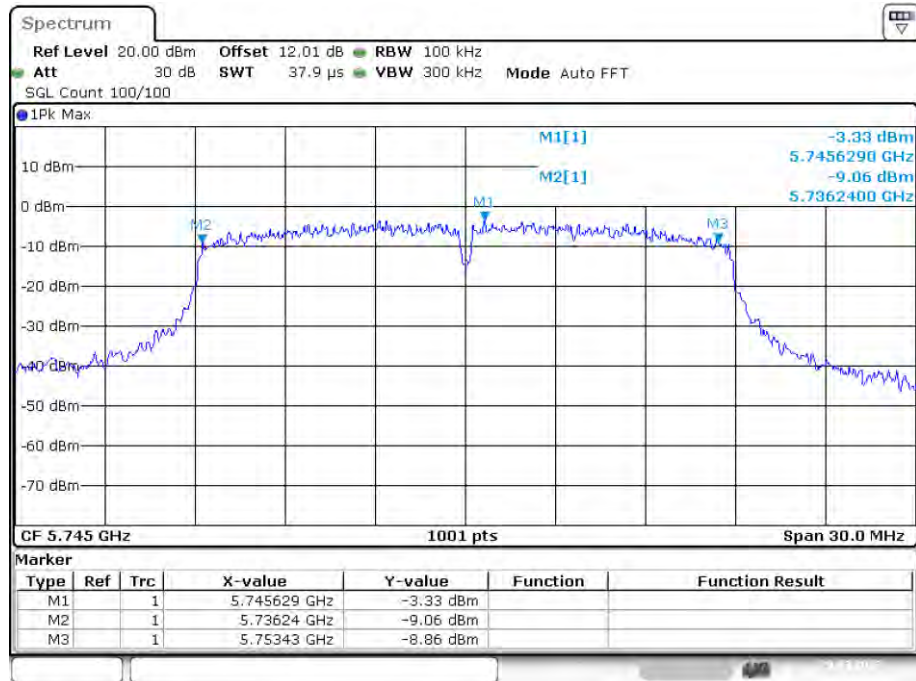
Date: 29.MAR.2023 10:51:22

-6dB Bandwidth NVNT a 5825MHz Ant1



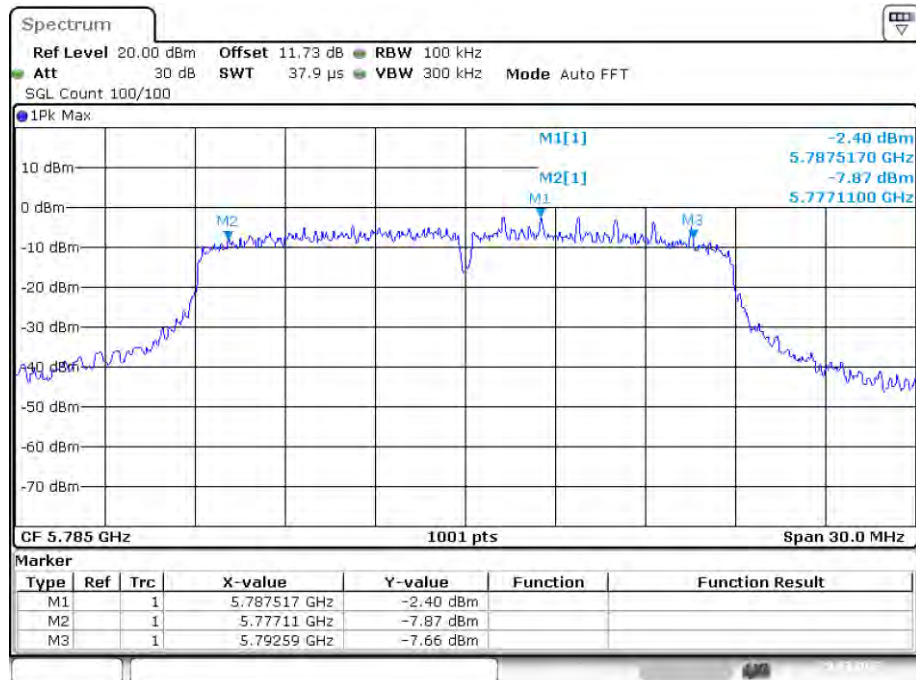
Date: 29.MAR.2023 10:55:00

-6dB Bandwidth NVNT ac20 5745MHz Ant1



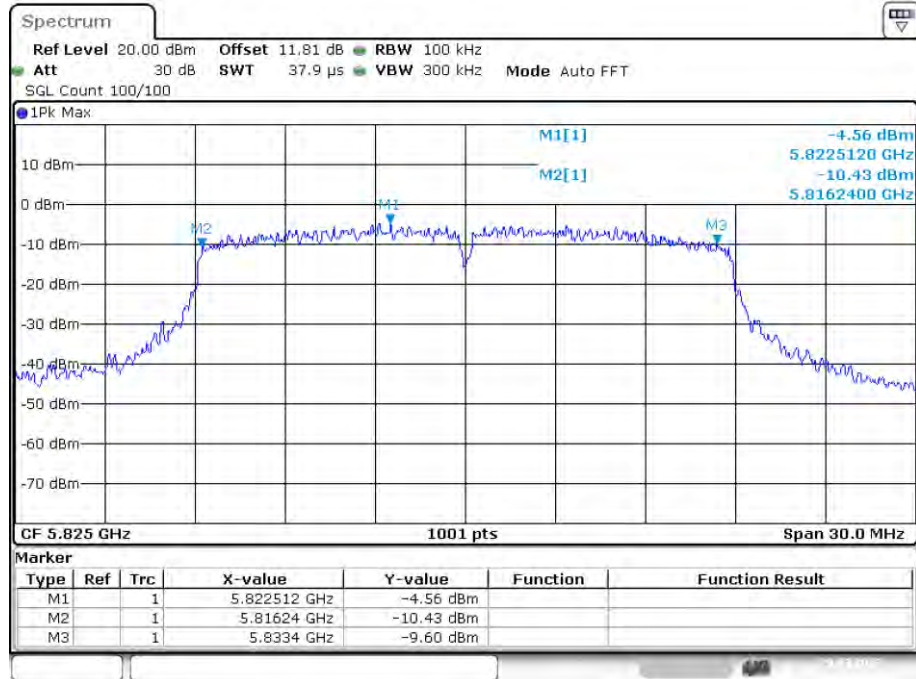
Date: 29.MAR.2023 11:10:23

-6dB Bandwidth NVNT ac20 5785MHz Ant1



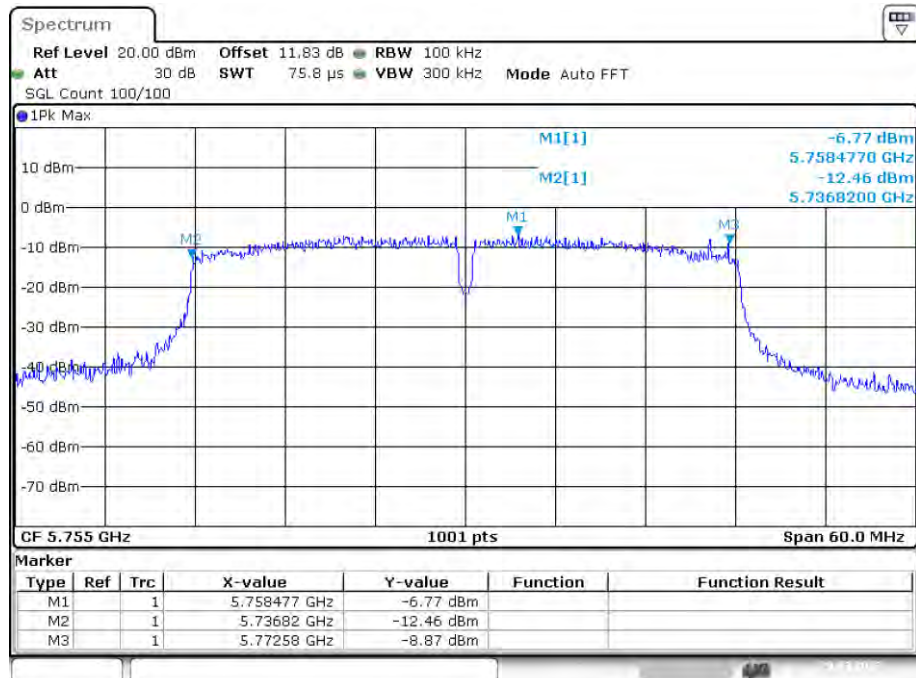
Date: 29.MAR.2023 11:15:08

-6dB Bandwidth NVNT ac20 5825MHz Ant1

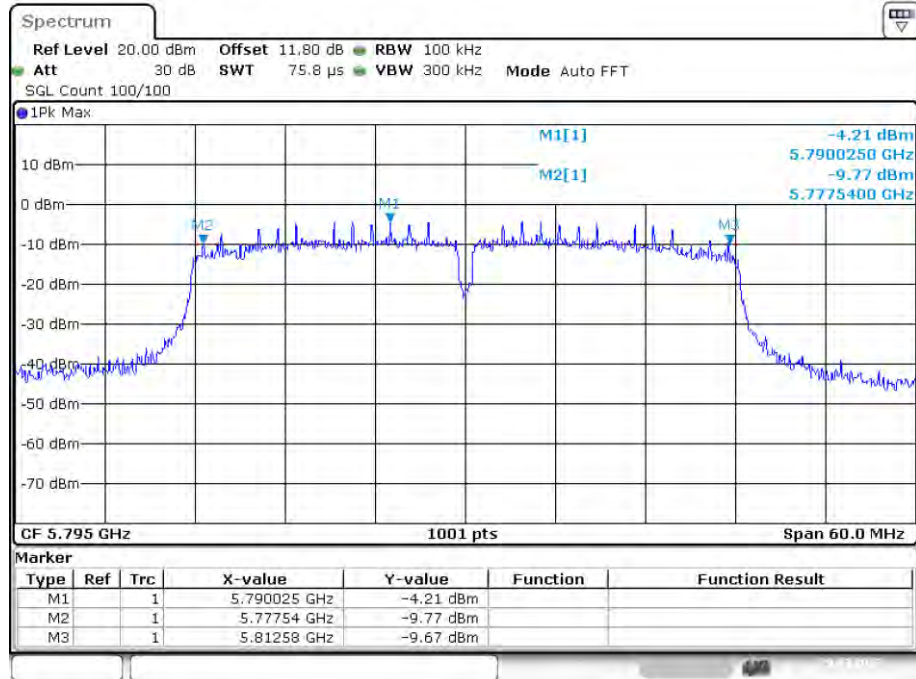


Date: 29.MAR.2023 11:18:42

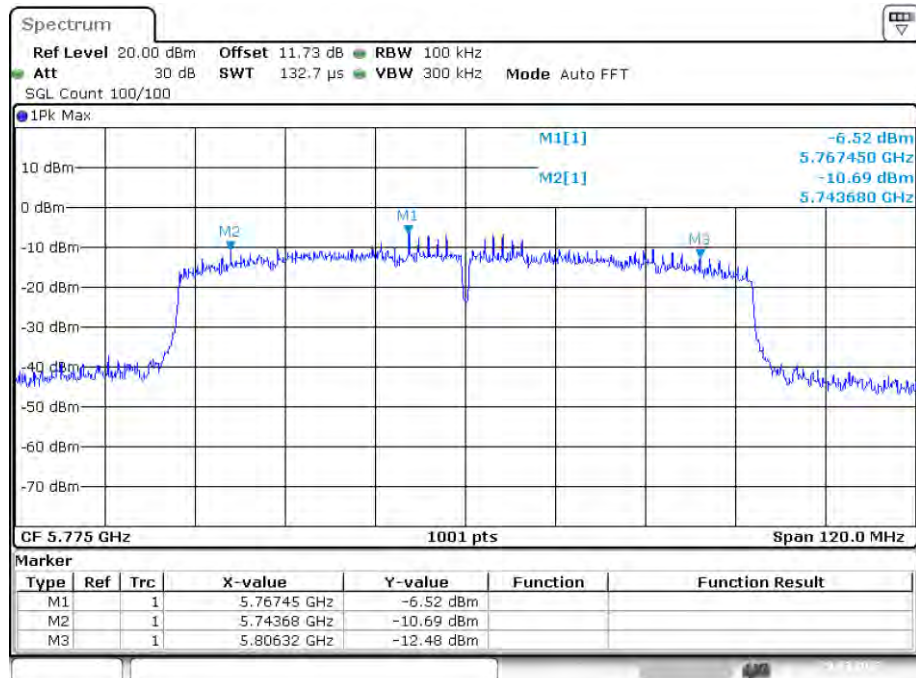
-6dB Bandwidth NVNT ac40 5755MHz Ant1



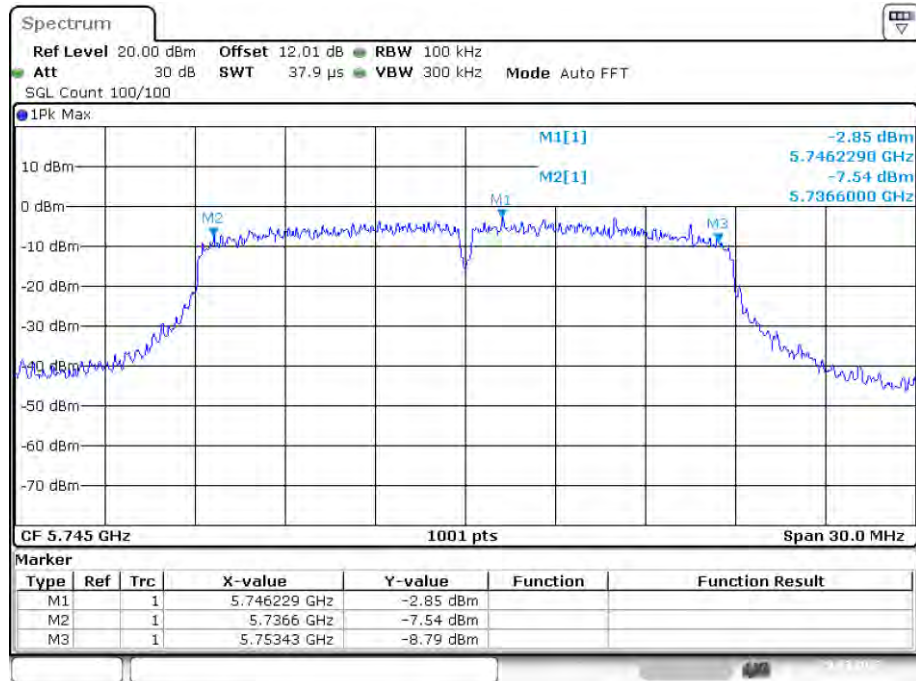
Date: 29.MAR.2023 11:31:32

-6dB Bandwidth NVNT ac40 5795MHz Ant1

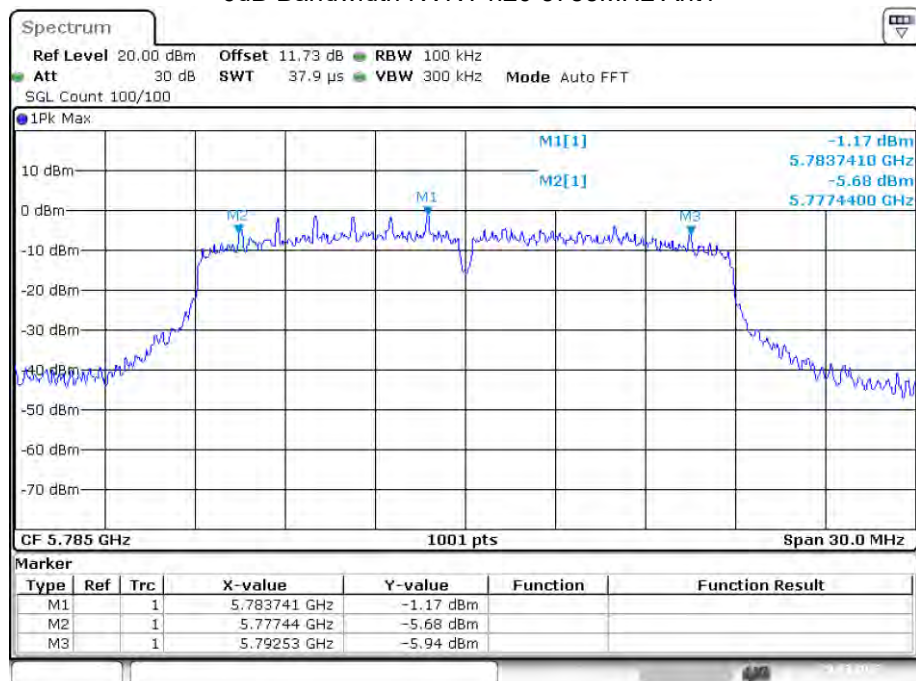
Date: 29.MAR.2023 11:36:38

-6dB Bandwidth NVNT ac80 5775MHz Ant1

Date: 29.MAR.2023 11:48:48

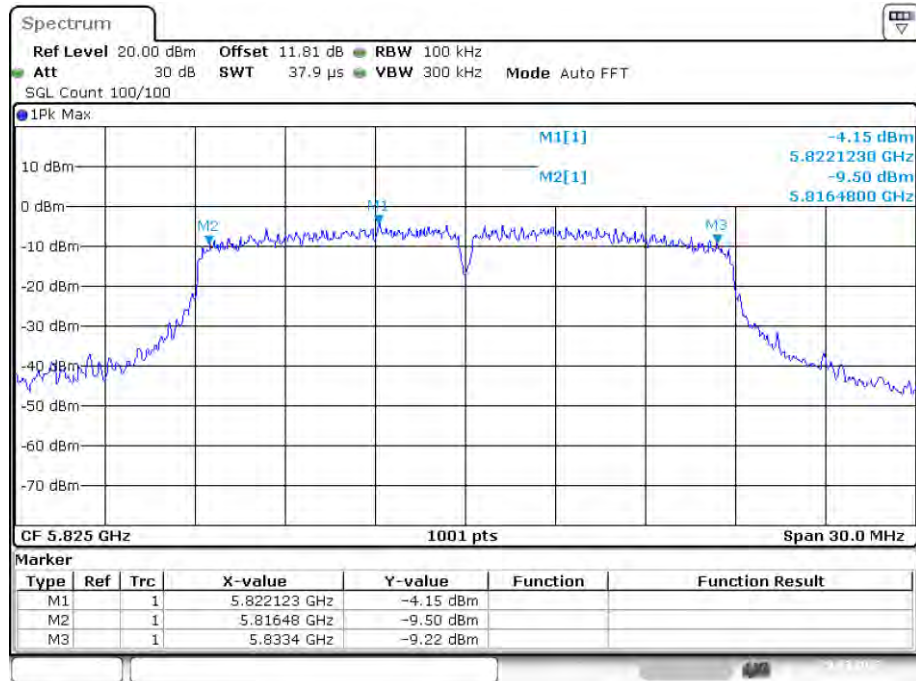
-6dB Bandwidth NVNT n20 5745MHz Ant1

Date: 29.MAR.2023 10:58:20

-6dB Bandwidth NVNT n20 5785MHz Ant1

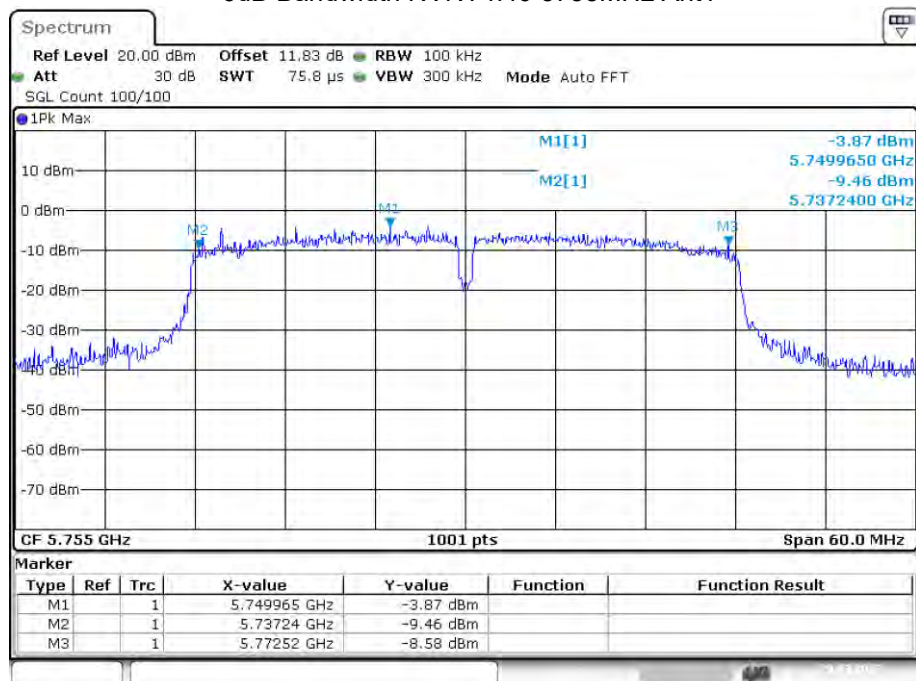
Date: 29.MAR.2023 11:02:12

-6dB Bandwidth NVNT n20 5825MHz Ant1



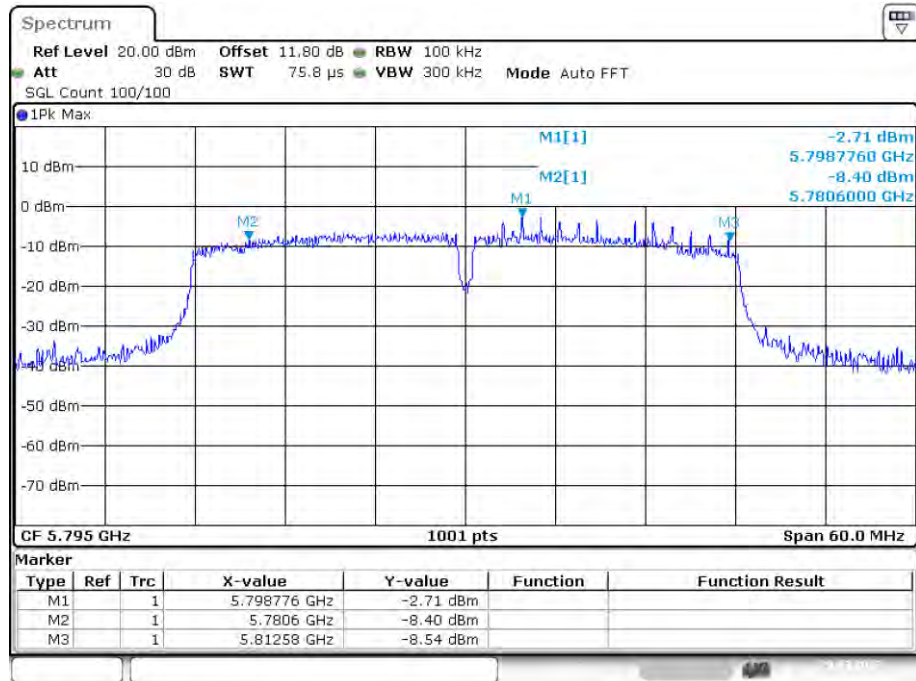
Date: 29.MAR.2023 11:05:42

-6dB Bandwidth NVNT n40 5755MHz Ant1



Date: 29.MAR.2023 12:48:37

-6dB Bandwidth NVNT n40 5795MHz Ant1

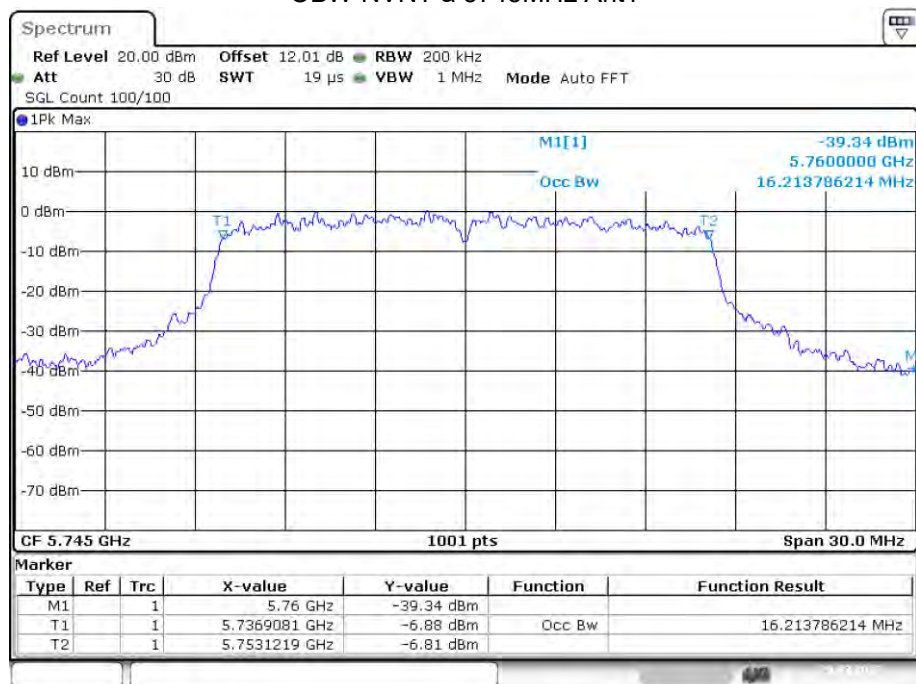


Date: 29.MAR.2023 12:44:03

Occupied Channel Bandwidth

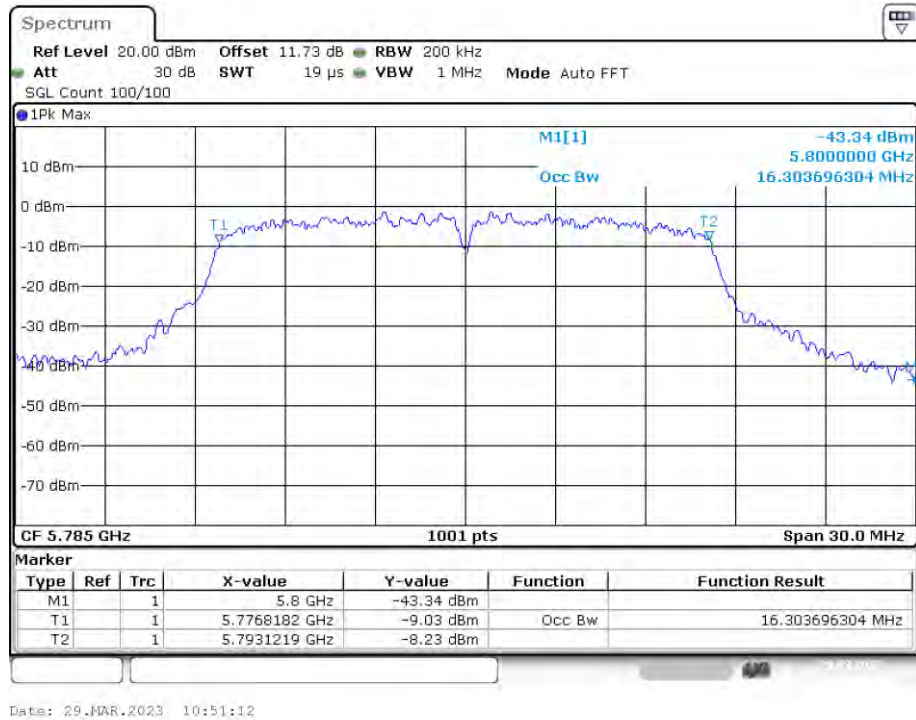
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	a	5745	Ant1	16.214
NVNT	a	5785	Ant1	16.304
NVNT	a	5825	Ant1	16.244
NVNT	ac20	5745	Ant1	17.353
NVNT	ac20	5785	Ant1	17.443
NVNT	ac20	5825	Ant1	17.383
NVNT	ac40	5755	Ant1	35.724
NVNT	ac40	5795	Ant1	35.724
NVNT	ac80	5775	Ant1	74.805
NVNT	n20	5745	Ant1	17.413
NVNT	n20	5785	Ant1	17.383
NVNT	n20	5825	Ant1	17.413
NVNT	n40	5755	Ant1	35.844
NVNT	n40	5795	Ant1	35.904

OBW NVNT a 5745MHz Ant1

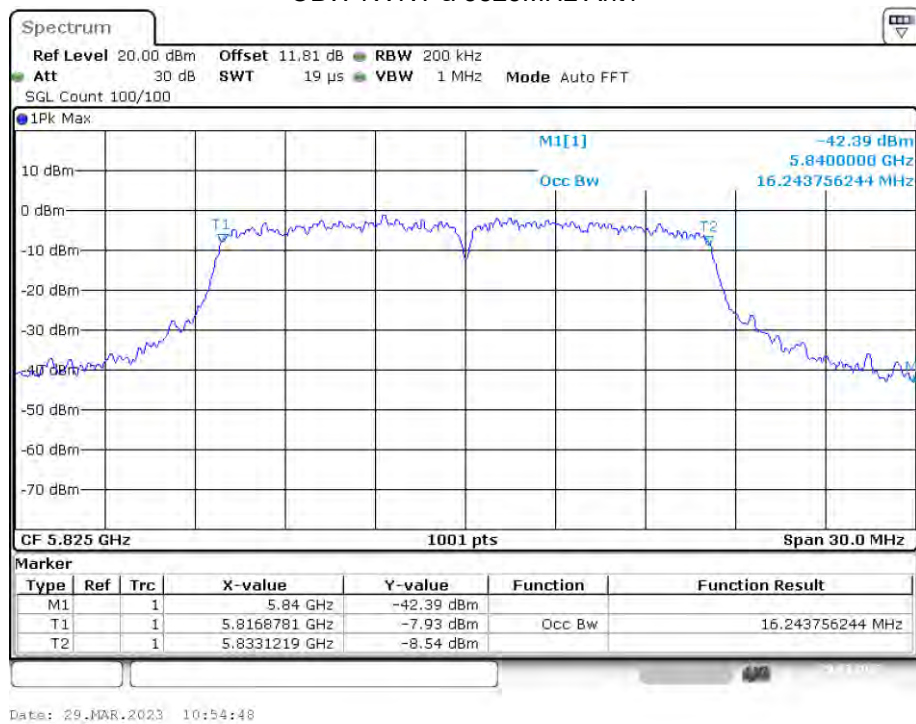


Date: 29.MAR.2023 10:47:55

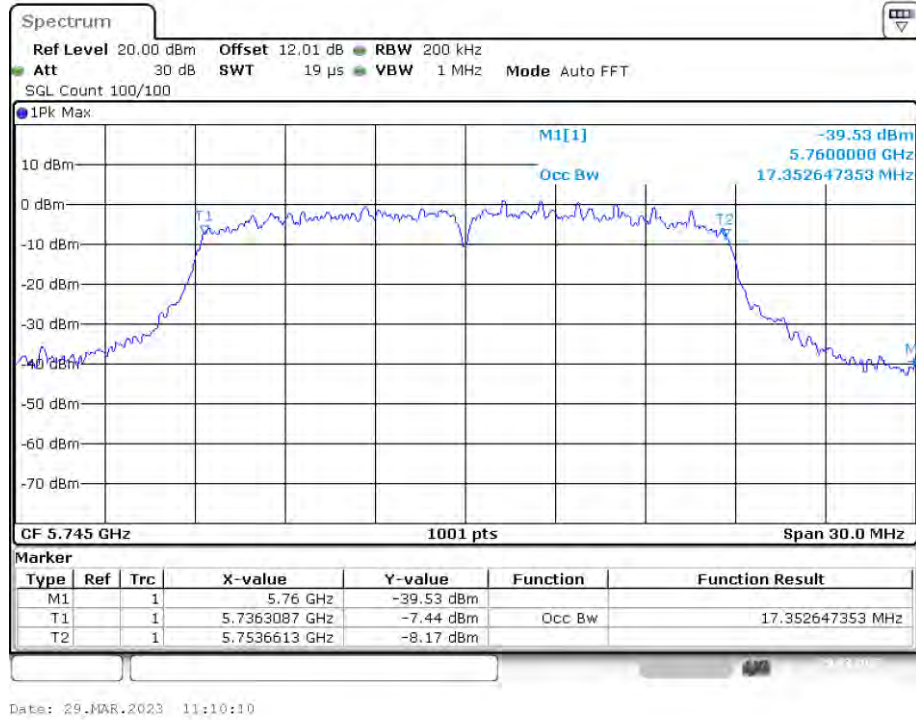
OBW NVNT a 5785MHz Ant1



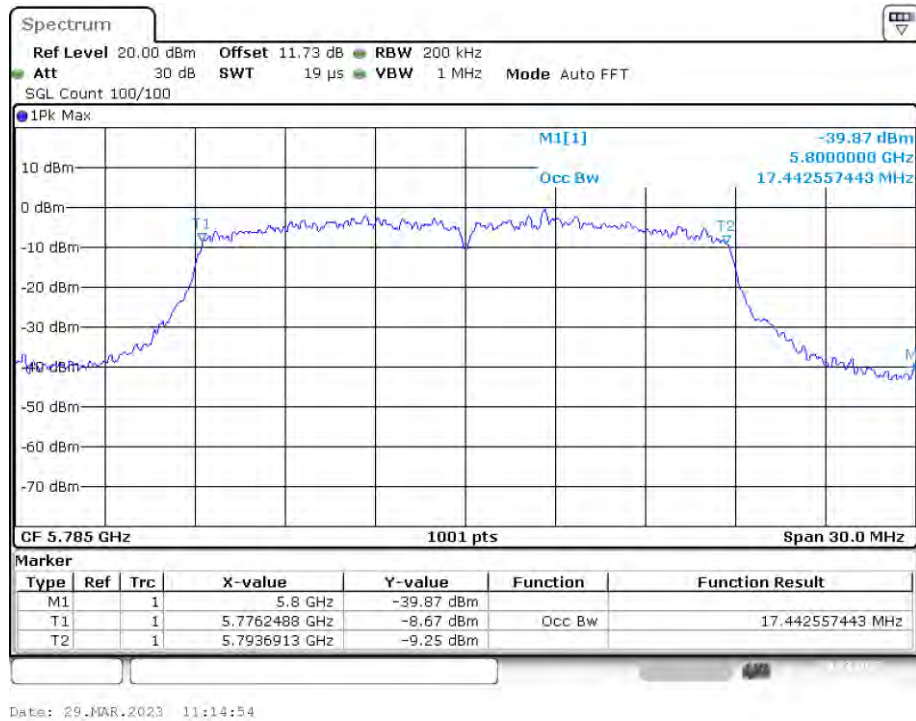
OBW NVNT a 5825MHz Ant1



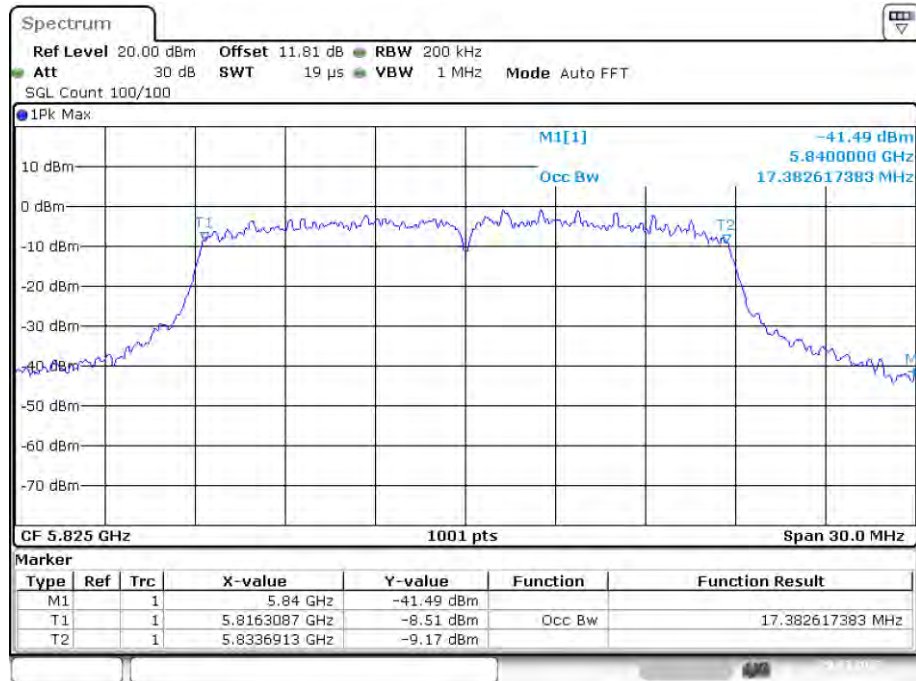
OBW NVNT ac20 5745MHz Ant1



OBW NVNT ac20 5785MHz Ant1

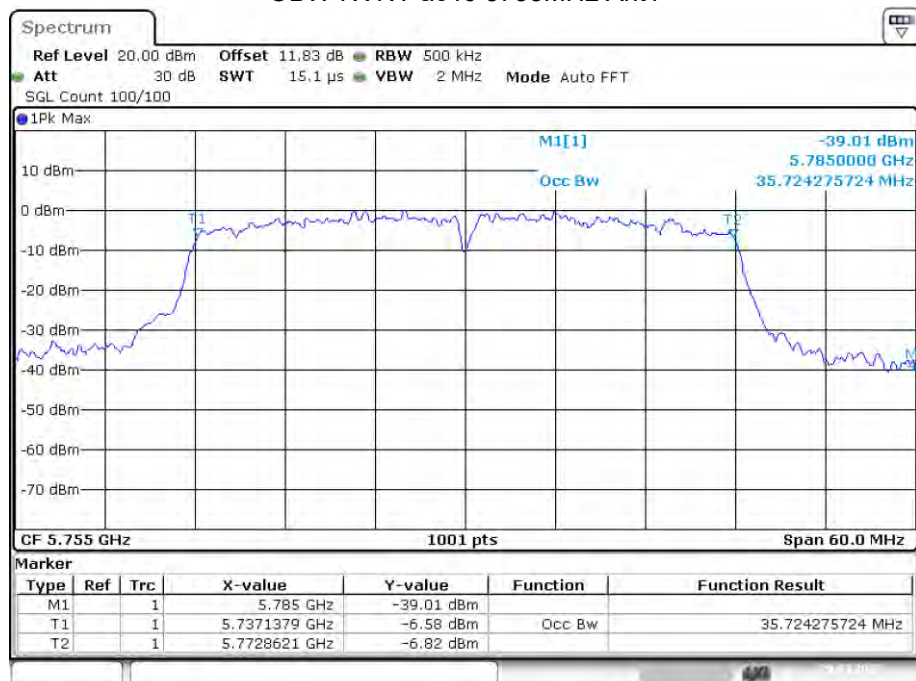


OBW NVNT ac20 5825MHz Ant1



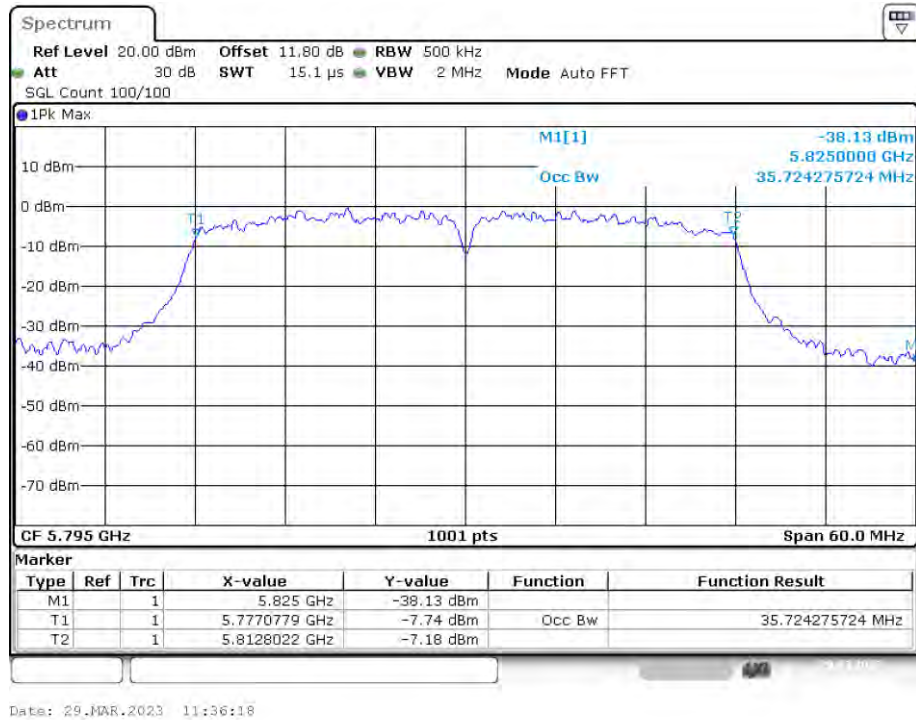
Date: 29.MAR.2023 11:18:27

OBW NVNT ac40 5755MHz Ant1

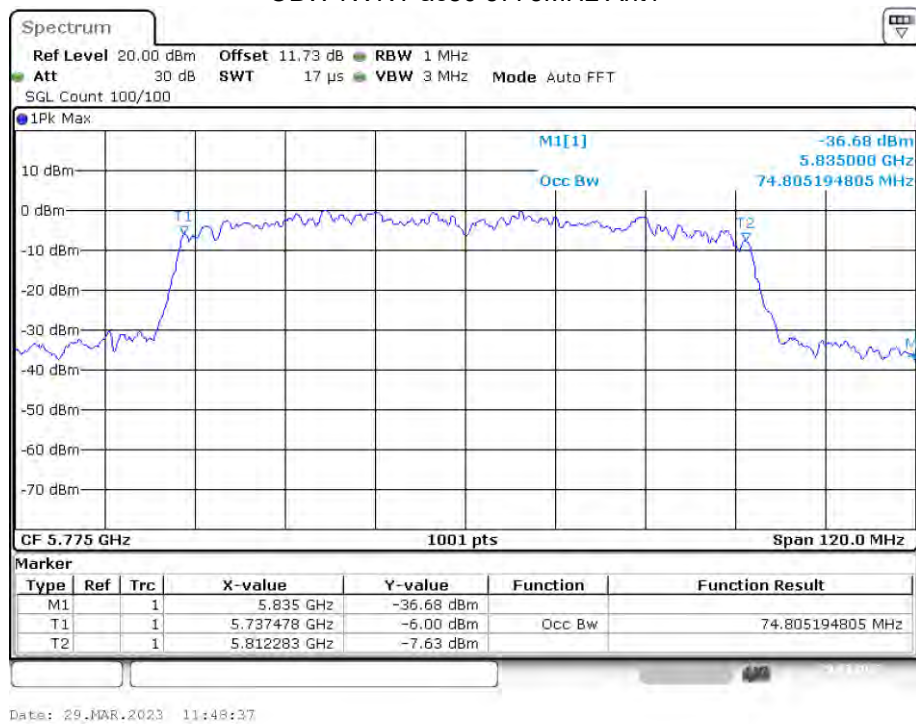


Date: 29.MAR.2023 11:31:13

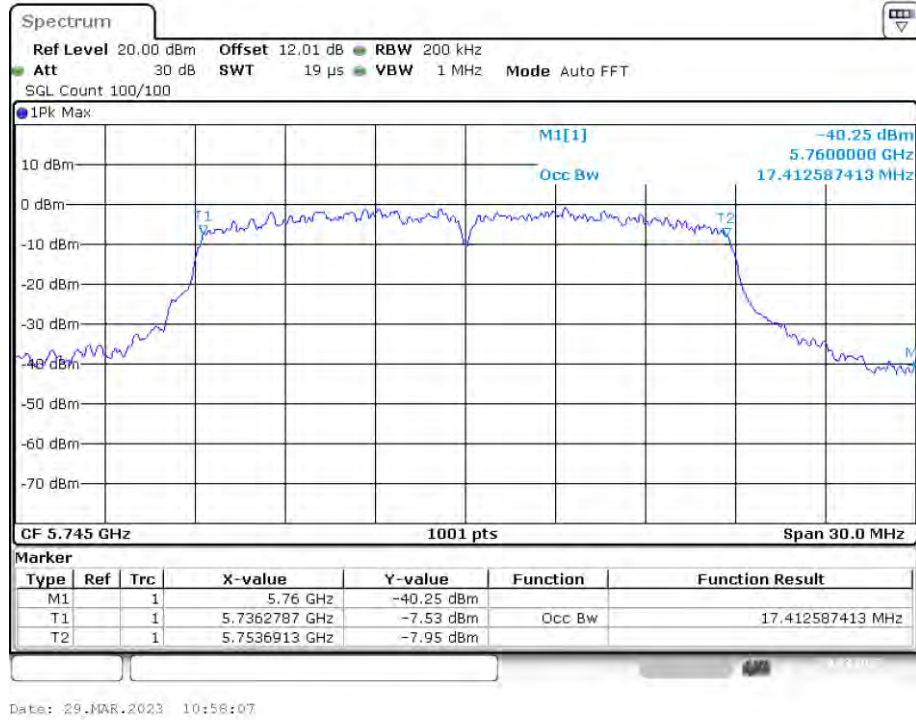
OBW NVNT ac40 5795MHz Ant1



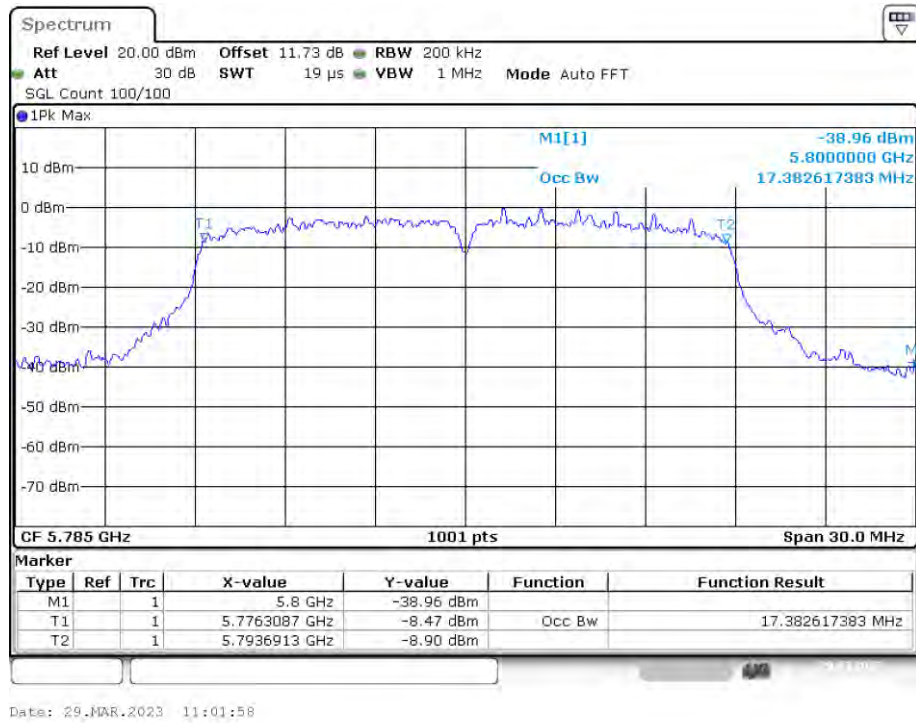
OBW NVNT ac80 5775MHz Ant1



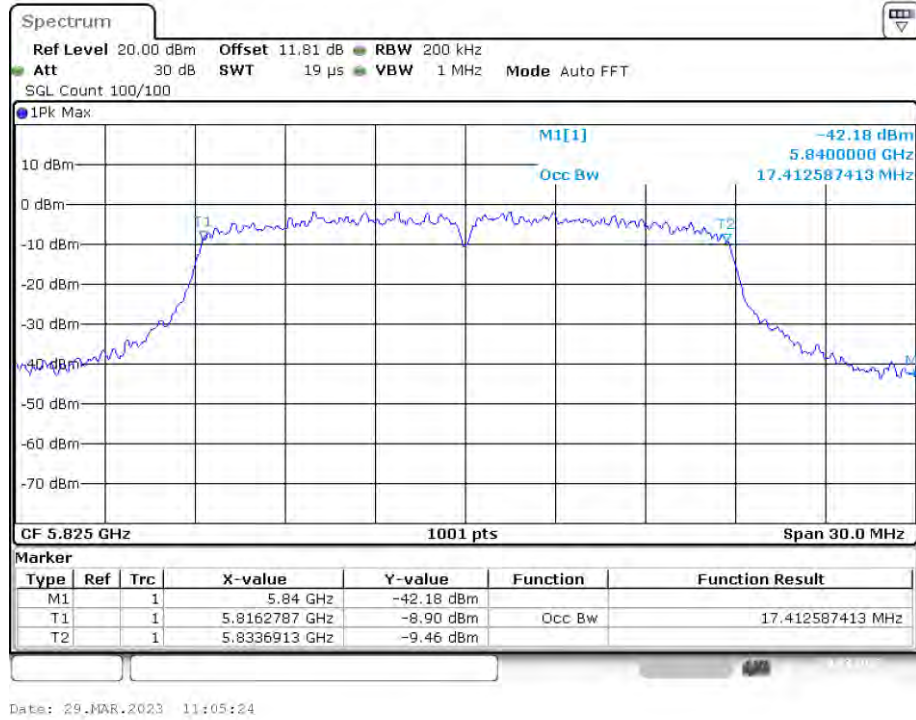
OBW NVNT n20 5745MHz Ant1



OBW NVNT n20 5785MHz Ant1



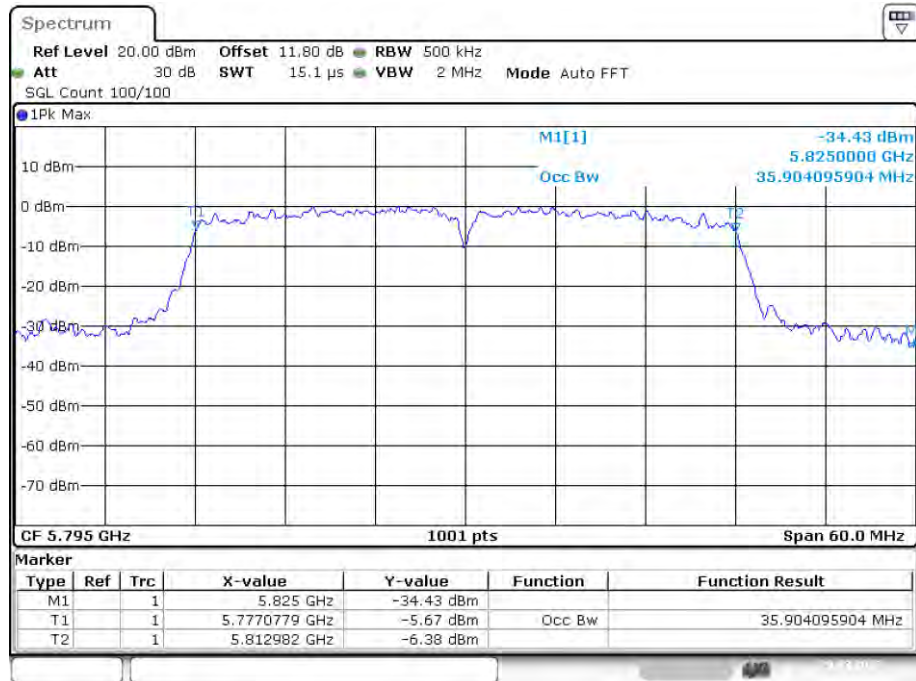
OBW NVNT n20 5825MHz Ant1



OBW NVNT n40 5755MHz Ant1

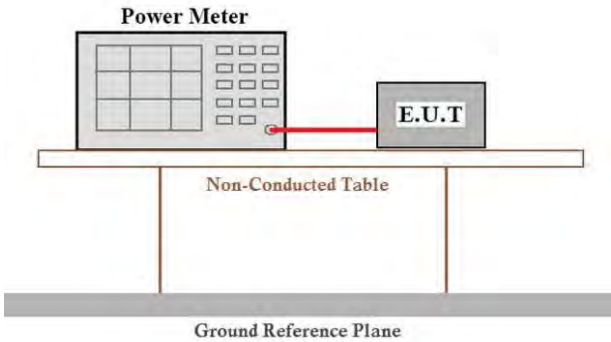


OBW NVNT n40 5795MHz Ant1



Date: 29.MAR.2023 12:43:53

4.4 Peak Transmit Power

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02r01
Limit:	For the band 5.15-5.25GHz, 5.25-5.35GHz, 5.47-5.725GHz, the maximum conducted output power over the frequency bands of operation shall not exceed 250mW. For the band 5.725-5.85GHz, the maximum conducted output power over the frequency bands of operation shall not exceed 1W.
Test setup:	 The diagram illustrates the test setup. A 'Power Meter' is connected to an 'E.U.T.' (Equipment Under Test) by a red cable. Both the Power Meter and the E.U.T. are placed on a 'Non-Conducted Table'. This table is supported by two vertical legs and sits on a 'Ground Reference Plane'.
Test procedure:	Measurement using an RF average power meter (i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied a) The EUT is configured to transmit continuously or to transmit with a constant duty cycle. b) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level. c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five. (ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B). (iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter. (iv) Adjust the measurement in dBm by adding $10 \log(1/x)$ where x is the duty cycle (e.g., $10 \log(1/0.25)$ if the duty cycle is 25 percent).
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

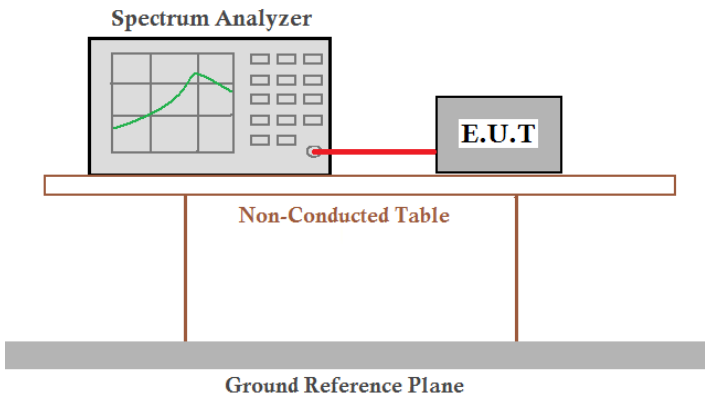
Measurement Data**Band 1 (5150-5250 MHz)**

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5745	Ant1	19.607	0	19.607	30	Pass
NVNT	a	5785	Ant1	18.486	0	18.486	30	Pass
NVNT	a	5825	Ant1	18.437	0	18.437	30	Pass
NVNT	ac20	5745	Ant1	19.64	0	19.64	30	Pass
NVNT	ac20	5785	Ant1	18.468	0	18.468	30	Pass
NVNT	ac20	5825	Ant1	18.291	0	18.291	30	Pass
NVNT	ac40	5755	Ant1	19.508	0	19.508	30	Pass
NVNT	ac40	5795	Ant1	18.746	0	18.746	30	Pass
NVNT	ac80	5775	Ant1	19.307	0	19.307	30	Pass
NVNT	n20	5745	Ant1	19.579	0	19.579	30	Pass
NVNT	n20	5785	Ant1	18.564	0	18.564	30	Pass
NVNT	n20	5825	Ant1	18.434	0	18.434	30	Pass
NVNT	n40	5755	Ant1	21.19	0	21.19	30	Pass
NVNT	n40	5795	Ant1	20.274	0	20.274	30	Pass

Band 4 (5725 – 5850 MHz)

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant1	19.751	0	19.751	24	Pass
NVNT	a	5200	Ant1	19.493	0	19.493	24	Pass
NVNT	a	5240	Ant1	19.064	0	19.064	24	Pass
NVNT	ac20	5180	Ant1	19.741	0	19.741	24	Pass
NVNT	ac20	5200	Ant1	19.619	0	19.619	24	Pass
NVNT	ac20	5240	Ant1	19.143	0	19.143	24	Pass
NVNT	ac40	5190	Ant1	20.039	0	20.039	24	Pass
NVNT	ac40	5230	Ant1	19.559	0	19.559	24	Pass
NVNT	ac80	5210	Ant1	20.16	0	20.16	24	Pass
NVNT	n20	5180	Ant1	19.635	0	19.635	24	Pass
NVNT	n20	5200	Ant1	19.455	0	19.455	24	Pass
NVNT	n20	5240	Ant1	19.102	0	19.102	24	Pass
NVNT	n40	5190	Ant1	21.41	0	21.41	24	Pass
NVNT	n40	5230	Ant1	20.898	0	20.898	24	Pass

4.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02r01
Limit:	$\leq 11.00\text{dBm/MHz}$ for 5150MHz-5250MHz, 5250-5350MHz and 5470-5725 MHz $\leq 30.00\text{dBm/500KHz}$ for 5725MHz-5850MHz
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
Test procedure:	1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power..." 2) Use the peak search function on the instrument to find the peak of the spectrum. 3) Make the following adjustments to the peak value of the spectrum, if applicable: a) If Method SA-2 or SA-2 Alternative was used, add $10 \log(1/x)$, where x is the duty cycle, to the peak of the spectrum. b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging. 4) The result is the PSD.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data**Band 1 (5150 - 5250 MHz)**

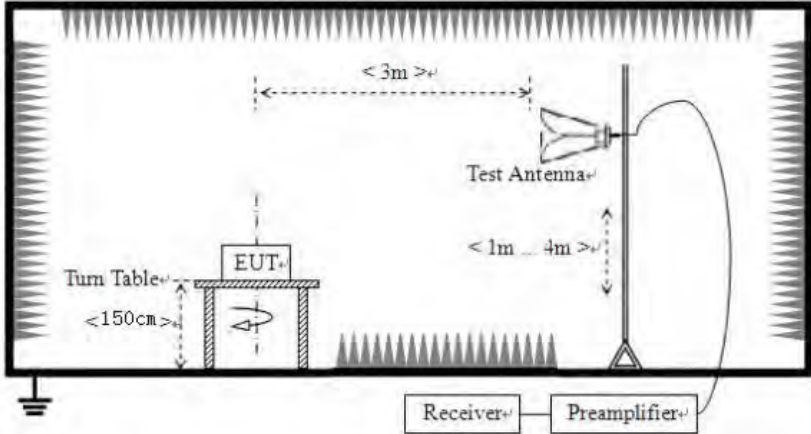
Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant1	9.227	11	Pass
NVNT	a	5200	Ant1	9.147	11	Pass
NVNT	a	5240	Ant1	8.554	11	Pass
NVNT	ac20	5180	Ant1	9.953	11	Pass
NVNT	ac20	5200	Ant1	9.505	11	Pass
NVNT	ac20	5240	Ant1	8.578	11	Pass
NVNT	ac40	5190	Ant1	6.078	11	Pass
NVNT	ac40	5230	Ant1	6.214	11	Pass
NVNT	ac80	5210	Ant1	6.427	11	Pass
NVNT	n20	5180	Ant1	9.137	11	Pass
NVNT	n20	5200	Ant1	8.826	11	Pass
NVNT	n20	5240	Ant1	8.305	11	Pass
NVNT	n40	5190	Ant1	8.016	11	Pass
NVNT	n40	5230	Ant1	7.355	11	Pass

Band 4 (5725 - 5850 MHz)

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	a	5745	Ant1	6.209	30	Pass
NVNT	a	5785	Ant1	5.042	30	Pass
NVNT	a	5825	Ant1	5.05	30	Pass
NVNT	ac20	5745	Ant1	5.829	30	Pass
NVNT	ac20	5785	Ant1	4.53	30	Pass
NVNT	ac20	5825	Ant1	4.725	30	Pass
NVNT	ac40	5755	Ant1	2.421	30	Pass
NVNT	ac40	5795	Ant1	1.403	30	Pass
NVNT	ac80	5775	Ant1	0.806	30	Pass
NVNT	n20	5745	Ant1	5.806	30	Pass
NVNT	n20	5785	Ant1	4.759	30	Pass
NVNT	n20	5825	Ant1	4.734	30	Pass
NVNT	n40	5755	Ant1	3.69	30	Pass
NVNT	n40	5795	Ant1	3.402	30	Pass

4.6 Band Edge

Test Requirement:	FCC Part15 E Section 15.407 and 15.205																								
Test Method:	ANSI C63.10:2013																								
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																								
Receiver setup:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr><tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr></table>					Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value	AV	1MHz	3MHz	Average Value	
Frequency	Detector	RBW	VBW	Remark																					
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value																					
Above 1GHz	Peak	1MHz	3MHz	Peak Value																					
	AV	1MHz	3MHz	Average Value																					
Limit:	<table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr><tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr><tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr><tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr><tr><td>68.2</td><td>Peak Value</td></tr></table> Undesirable emission limits: (1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. (2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band. (3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.					Frequency	Limit (dBuV/m @3m)	Remark	30MHz-88MHz	40.0	Quasi-peak Value	88MHz-216MHz	43.5	Quasi-peak Value	216MHz-960MHz	46.0	Quasi-peak Value	960MHz-1GHz	54.0	Quasi-peak Value	Above 1GHz	54.0	Average Value	68.2	Peak Value
Frequency	Limit (dBuV/m @3m)	Remark																							
30MHz-88MHz	40.0	Quasi-peak Value																							
88MHz-216MHz	43.5	Quasi-peak Value																							
216MHz-960MHz	46.0	Quasi-peak Value																							
960MHz-1GHz	54.0	Quasi-peak Value																							
Above 1GHz	54.0	Average Value																							
	68.2	Peak Value																							
Test Procedure:	a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.																								
Test setup:	Above 1GHz																								

	
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Remark:

According to KDB 789033 D02 v02r01 section G) 1) (d), for For measurements above 1000 MHz @ 3m distance, the limit of field strength is computed as follows:

$$E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2,$$

For example, if EIRP = -27dBm

$$E[\text{dBuV/m}] = -27 + 95.2 = 68.2\text{dBuV/m}.$$

Measurement Data:**Band1**

Mode:		802.11a		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	34.08	17.18	51.26	68.20	-16.94	PK
V	5150.00	35.49	17.18	52.67	68.20	-15.53	PK
Mode:		802.11a		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	26.10	17.18	43.28	54.00	-10.72	AV
V	5150.00	25.13	17.18	42.31	54.00	-11.69	AV
Mode:		802.11a		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	35.59	17.18	52.77	68.20	-15.43	PK
V	5350.00	35.35	17.18	52.53	68.20	-15.67	PK
Mode:		802.11a		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	24.34	17.18	41.52	54.00	-12.48	AV
V	5350.00	24.00	17.18	41.18	54.00	-12.82	AV

Mode:		802.11n(HT20)		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	37.42	17.18	54.60	68.20	-13.60	PK
V	5150.00	35.71	17.18	52.89	68.20	-15.31	PK
Mode:		802.11n(HT20)		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	25.50	17.18	42.68	54.00	-11.32	AV
V	5150.00	25.62	17.18	42.80	54.00	-11.20	AV
Mode:		802.11n(HT20)		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	33.68	17.18	50.86	68.20	-17.34	PK
V	5350.00	34.64	17.18	51.82	68.20	-16.38	PK
Mode:		802.11n(HT20)		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	28.02	17.18	45.20	54.00	-8.80	AV
V	5350.00	23.48	17.18	40.66	54.00	-13.34	AV

Mode:		802.11ac(HT20)		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	35.99	17.18	53.17	68.20	-15.03	PK
V	5150.00	33.59	17.18	50.77	68.20	-17.43	PK
Mode:		802.11ac(HT20)		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	24.86	17.18	42.04	54.00	-11.96	AV
V	5150.00	26.77	17.18	43.95	54.00	-10.05	AV
Mode:		802.11ac(HT20)		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	34.31	17.18	51.49	68.20	-16.71	PK
V	5350.00	36.38	17.18	53.56	68.20	-14.64	PK
Mode:		802.11ac(HT20)		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	26.65	17.18	43.83	54.00	-10.17	AV
V	5350.00	25.15	17.18	42.33	54.00	-11.67	AV

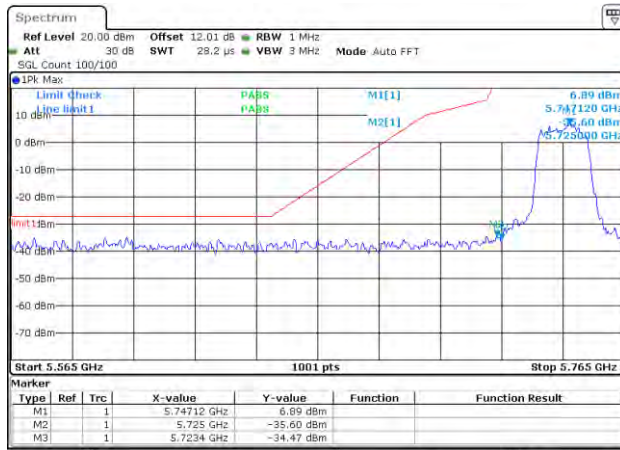
Mode:		802.11n(HT40)		Frequency:		5190MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	34.48	17.18	51.66	68.20	-16.54	PK
V	5150.00	33.07	17.18	50.25	68.20	-17.95	PK
Mode:		802.11n(HT40)		Frequency:		5190MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	26.33	17.18	43.51	54.00	-10.49	AV
V	5150.00	23.93	17.18	41.11	54.00	-12.89	AV
Mode:		802.11n(HT40)		Frequency:		5230MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	34.98	17.18	52.16	68.20	-16.04	PK
V	5350.00	34.67	17.18	51.85	68.20	-16.35	PK
Mode:		802.11n(HT40)		Frequency:		5230MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	25.91	17.18	43.09	54.00	-10.91	AV
V	5350.00	26.16	17.18	43.34	54.00	-10.66	AV

Mode:		802.11ac(HT40)		Frequency:		5190MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	34.85	17.18	52.03	68.20	-16.17	PK
V	5150.00	33.41	17.18	50.59	68.20	-17.61	PK
Mode:		802.11ac(HT40)		Frequency:		5190MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	26.35	17.18	43.53	54.00	-10.47	AV
V	5150.00	26.89	17.18	44.07	54.00	-9.93	AV
Mode:		802.11ac(HT40)		Frequency:		5230MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	33.78	17.18	50.96	68.20	-17.24	PK
V	5350.00	36.37	17.18	53.55	68.20	-14.65	PK
Mode:		802.11ac(HT40)		Frequency:		5230MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	25.18	17.18	42.36	54.00	-11.64	AV
V	5350.00	24.88	17.18	42.06	54.00	-11.94	AV

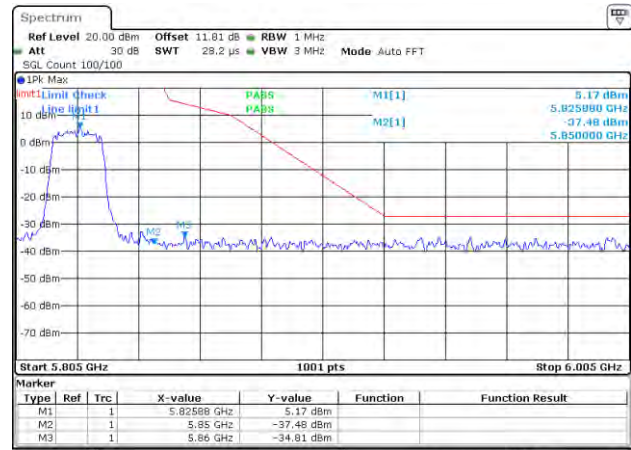
Mode:		802.11ac(HT80)		Frequency:		5210MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	34.12	17.18	51.30	68.20	-16.90	PK
V	5150.00	33.86	17.18	51.04	68.20	-17.16	PK
Mode:		802.11ac(HT80)		Frequency:		5210MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150.00	26.88	17.18	44.06	54.00	-9.94	AV
V	5150.00	27.13	17.18	44.31	54.00	-9.69	AV
Mode:		802.11ac(HT80)		Frequency:		5210MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	36.60	17.18	53.78	68.20	-14.42	PK
V	5350.00	36.63	17.18	53.81	68.20	-14.39	PK
Mode:		802.11ac(HT80)		Frequency:		5210MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350.00	28.07	17.18	45.25	54.00	-8.75	AV
V	5350.00	25.14	17.18	42.32	54.00	-11.68	AV

Band4

802.11a

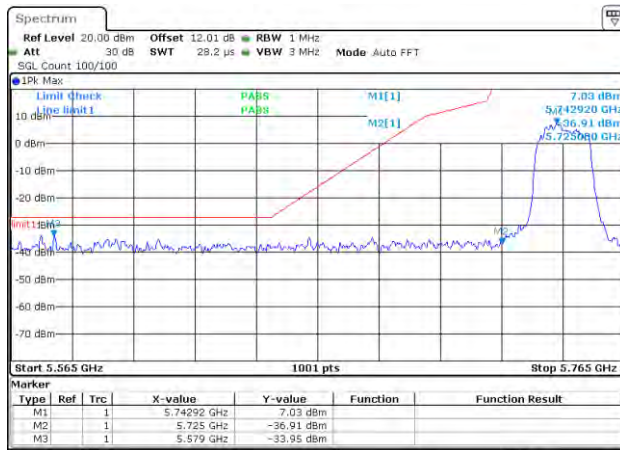


Low: 5745MHz

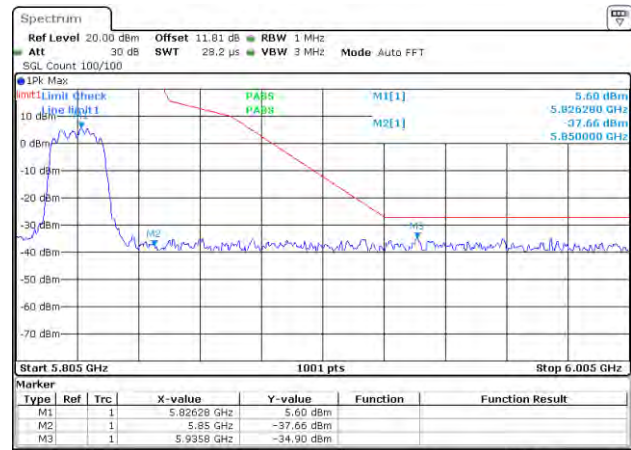


High: 5825MHz

802.11n(HT20)

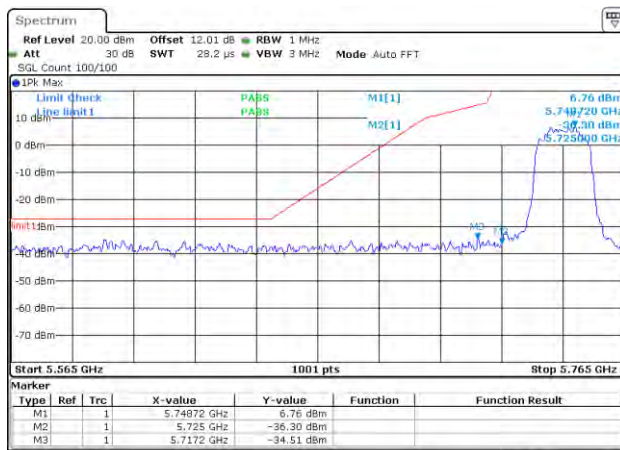


Low: 5745MHz

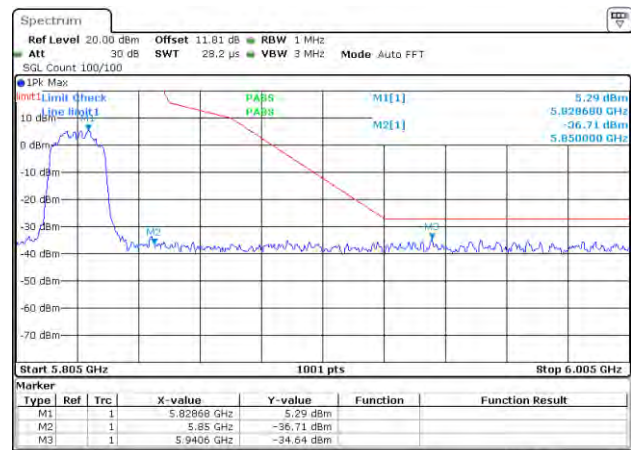


High: 5825MHz

802.11ac(HT20)

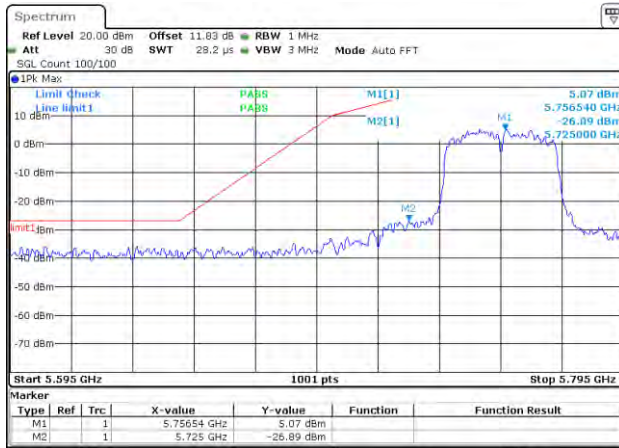


Low: 5745MHz

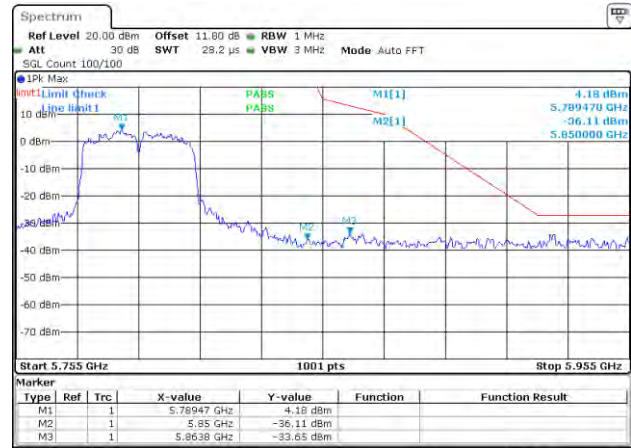


High: 5825MHz

802.11n(HT40)

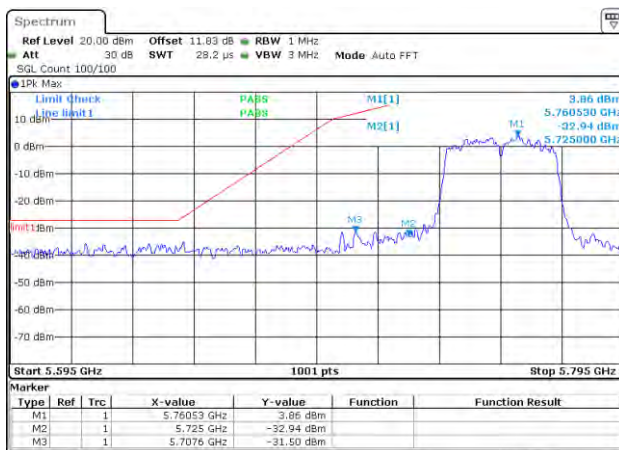


Low: 5755MHz

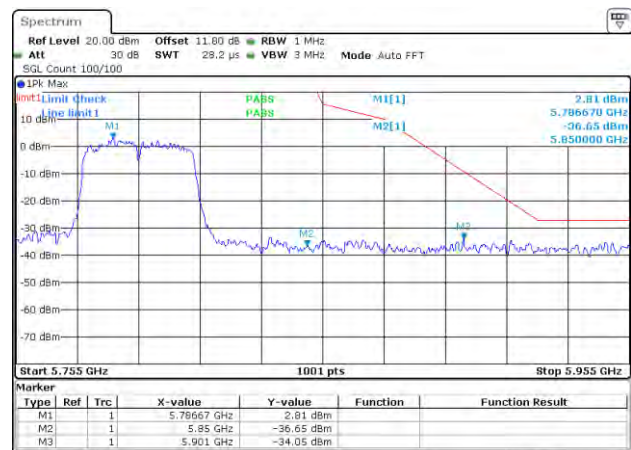


High: 5795MHz

802.11ac(HT40)

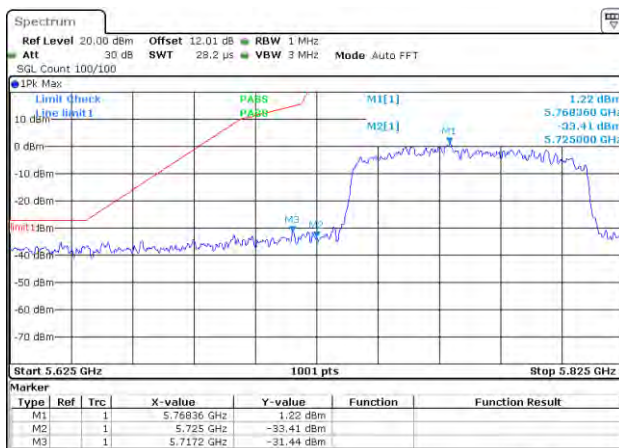


Low: 5755MHz

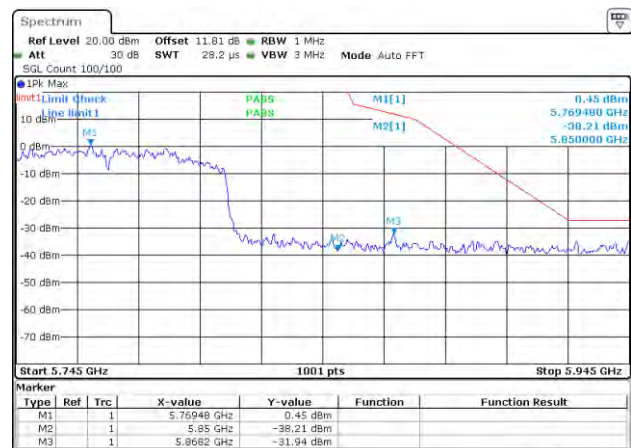


High: 5795MHz

802.11ac(HT80)



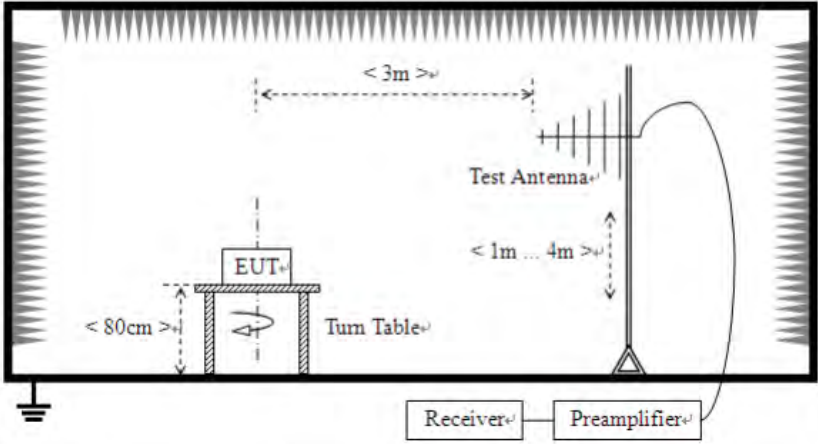
5775MHz

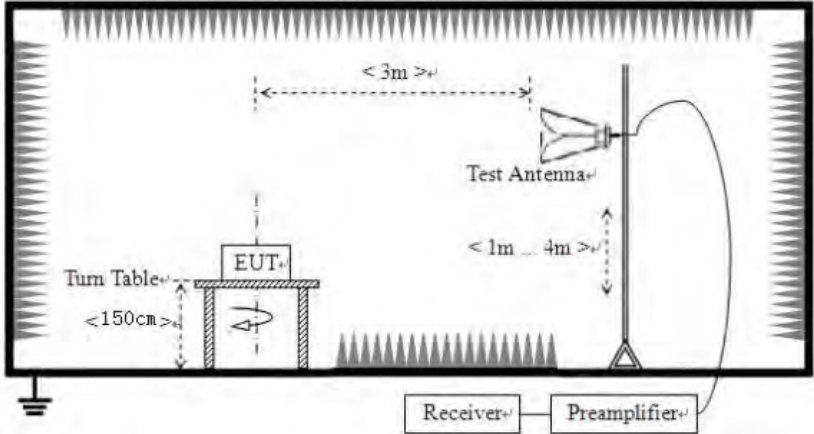


5775MHz

4.7 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	30MHz to 40GHz				
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		AV	1MHz	3MHz	Average Value
Limit:	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.0		Quasi-peak Value
	88MHz-216MHz		43.5		Quasi-peak Value
	216MHz-960MHz		46.0		Quasi-peak Value
	960MHz-1GHz		54.0		Quasi-peak Value
	Above 1GHz		74.0		Peak Value
			54.0		Average Value
Test Procedure:	Substitution method was performed to determine the actual ERP emission levels of the EUT. The following test procedure as below: 1>.Below 1GHz test procedure: 1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 2>.Above 1GHz test procedure: 1. On the test site as test setup graph above,the EUT shall be placed at the 1.5m support on the turntable and in the position closest to normal use as declared by the provider. 2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver. 3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test. 4. The test antenna shall be raised and lowered from 1m to 4m until a				

	maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver. - Repeat step 4 for test frequency with the test antenna polarized horizontally. - Remove the transmitter and replace it with a substitution antenna - Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output. - Repeat step 7 with both antennas horizontally polarized for each test frequency. - Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula: $\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$ where: Pg is the generator output power into the substitution antenna.
Test setup:	Below 1GHz  Above 1GHz

	
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

Measurement Data:**Below 1GHz**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
33.91	48.56	11.25	0.59	30.08	30.32	40	-9.68	Vertical
55.24	40.70	11.93	0.81	29.96	23.48	40	-16.52	Vertical
121.08	46.31	9.4	1.36	29.57	27.50	43.5	-16.00	Vertical
172.88	42.78	8.5	1.7	29.31	23.67	43.5	-19.83	Vertical
440.60	36.68	16.29	3.05	29.41	26.61	46	-19.39	Vertical
860.34	33.65	21.83	4.69	29.14	31.03	46	-14.97	Vertical
65.15	35.61	8.73	0.9	29.89	15.35	40	-24.65	Horizontal
100.35	34.21	11.73	1.19	29.7	17.43	43.5	-26.07	Horizontal
269.80	45.16	12.53	2.22	29.79	30.12	46	-15.88	Horizontal
350.55	36.50	14.5	2.62	29.73	23.89	46	-22.11	Horizontal
627.87	36.23	19.43	3.83	29.27	30.22	46	-15.78	Horizontal
955.98	41.45	22.54	5.06	29.1	39.95	46	-6.05	Horizontal

Above 1GHz:**802.11a(HT20) 5180MHz**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.86	28.24	11.25	14.62	32.65	21.46	74	-52.54	Vertical
15540.33	30.59	11.93	17.66	34.46	25.72	74	-48.28	Vertical
10360.79	32.70	9.4	14.62	32.65	24.07	74	-49.93	Horizontal
15540.07	32.15	8.5	17.66	34.46	23.85	74	-50.15	Horizontal

802.11a(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.33	28.57	11.25	14.62	32.65	21.79	74	-52.21	Vertical
15540.27	30.30	11.93	17.66	34.46	25.43	74	-48.57	Vertical
10360.31	32.34	9.4	14.62	32.65	23.71	74	-50.29	Horizontal
15540.24	32.05	8.5	17.66	34.46	23.75	74	-50.25	Horizontal

802.11a(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.76	28.83	11.25	14.62	32.65	22.05	74	-51.95	Vertical
15540.97	31.19	11.93	17.66	34.46	26.32	74	-47.68	Vertical
10360.81	32.38	9.4	14.62	32.65	23.75	74	-50.25	Horizontal
15540.56	32.26	8.5	17.66	34.46	23.96	74	-50.04	Horizontal

802.11n(HT20) 5180MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.52	28.73	11.25	14.62	32.65	21.95	74	-52.05	Vertical
15540.05	30.68	11.93	17.66	34.46	25.81	74	-48.19	Vertical
10360.88	32.86	9.4	14.62	32.65	24.23	74	-49.77	Horizontal
15540.11	32.20	8.5	17.66	34.46	23.90	74	-50.10	Horizontal

802.11n(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.92	28.78	11.25	14.62	32.65	22.00	74	-52.00	Vertical
15540.80	30.30	11.93	17.66	34.46	25.43	74	-48.57	Vertical
10360.60	32.31	9.4	14.62	32.65	23.68	74	-50.32	Horizontal
15540.34	31.63	8.5	17.66	34.46	23.33	74	-50.67	Horizontal

802.11n(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.20	28.77	11.25	14.62	32.65	21.99	74	-52.01	Vertical
15540.87	30.47	11.93	17.66	34.46	25.60	74	-48.40	Vertical
10360.38	32.58	9.4	14.62	32.65	23.95	74	-50.05	Horizontal
15540.64	31.48	8.5	17.66	34.46	23.18	74	-50.82	Horizontal

802.11ac(HT20) 5180MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.98	28.87	11.25	14.62	32.65	22.09	74	-51.91	Vertical
15540.61	31.02	11.93	17.66	34.46	26.15	74	-47.85	Vertical
10360.42	32.85	9.4	14.62	32.65	24.22	74	-49.78	Horizontal
15540.65	32.08	8.5	17.66	34.46	23.78	74	-50.22	Horizontal

802.11ac(HT20) 5200MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.65	28.40	11.25	14.62	32.65	21.62	74	-52.38	Vertical
15540.83	30.34	11.93	17.66	34.46	25.47	74	-48.53	Vertical
10360.47	32.45	9.4	14.62	32.65	23.82	74	-50.18	Horizontal
15540.28	32.26	8.5	17.66	34.46	23.96	74	-50.04	Horizontal

802.11ac(HT20) 5240MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.07	28.56	11.25	14.62	32.65	21.78	74	-52.22	Vertical
15540.35	30.90	11.93	17.66	34.46	26.03	74	-47.97	Vertical
10360.28	32.20	9.4	14.62	32.65	23.57	74	-50.43	Horizontal
15540.04	32.36	8.5	17.66	34.46	24.06	74	-49.94	Horizontal

802.11n(HT40) 5190MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.85	28.82	11.25	14.62	32.65	22.04	74	-51.96	Vertical
15540.65	30.87	11.93	17.66	34.46	26.00	74	-48.00	Vertical
10360.02	32.98	9.4	14.62	32.65	24.35	74	-49.65	Horizontal
15540.37	31.91	8.5	17.66	34.46	23.61	74	-50.39	Horizontal

802.11n(HT40) 5230MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.97	28.81	11.25	14.62	32.65	22.03	74	-51.97	Vertical
15540.70	30.68	11.93	17.66	34.46	25.81	74	-48.19	Vertical
10360.61	32.69	9.4	14.62	32.65	24.06	74	-49.94	Horizontal
15540.75	32.24	8.5	17.66	34.46	23.94	74	-50.06	Horizontal

802.11ac(HT40) 5190MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.90	28.47	11.25	14.62	32.65	21.69	74	-52.31	Vertical
15540.74	31.16	11.93	17.66	34.46	26.29	74	-47.71	Vertical
10360.50	32.62	9.4	14.62	32.65	23.99	74	-50.01	Horizontal
15540.72	31.48	8.5	17.66	34.46	23.18	74	-50.82	Horizontal

802.11ac(HT40) 5230MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.54	29.07	11.25	14.62	32.65	22.29	74	-51.71	Vertical
15540.77	31.14	11.93	17.66	34.46	26.27	74	-47.73	Vertical
10360.38	32.73	9.4	14.62	32.65	24.10	74	-49.90	Horizontal
15540.84	32.27	8.5	17.66	34.46	23.97	74	-50.03	Horizontal

802.11ac(HT80) 5210MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
10360.86	28.19	11.25	14.62	32.65	21.41	74	-52.59	Vertical
15540.48	30.38	11.93	17.66	34.46	25.51	74	-48.49	Vertical
10360.63	32.49	9.4	14.62	32.65	23.86	74	-50.14	Horizontal
15540.83	32.02	8.5	17.66	34.46	23.72	74	-50.28	Horizontal

Note:

1. Level = Read Level + Antenna Factor+ Cable loss- Preamplifier Factor.
2. The test trace is same as the ambient noise (the test frequency range: 18GHz~40GHz), therefore no data appear in the report.
3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.
4. This Report only show the test plots of the worst case (U-NII-1).

4.8 Frequency stability

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

Measurement Data:

Mode	Voltage (V)	FHL (5180MHz)	Deviation (KHz)	FHH (5240MHz)	Deviation (KHz)
Band 1 (5150-5250 MHz)	DC 6.29V	5179.991	9	5239.989	11
	DC 7.20V	5179.992	8	5239.989	11
	DC 8.51V	5179.987	13	5239.992	8
Mode	Voltage (V)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
Band 4 (5725-5850 MHz)	DC 6.29V	5744.990	10	5824.987	13
	DC 7.20V	5744.986	14	5824.992	8
	DC 8.51V	5744.991	9	5824.992	8

Mode	Temperature (°C)	FHL (5180MHz)	Deviation (KHz)	FHH (5240MHz)	Deviation (KHz)
Band 1 (5150-5250 MHz)	-20°C	5179.990	10	5239.986	14
	-10°C	5179.991	9	5239.992	8
	-5°C	5179.990	10	5239.990	10
	0°C	5179.990	10	5239.991	9
	+10°C	5179.989	11	5239.991	9
	+20°C	5179.987	13	5239.990	10
	+30°C	5179.992	8	5239.989	11
	+40°C	5179.991	9	5239.989	11
	+50°C	5179.990	10	5239.987	13
Mode	Temperature (°C)	FHL (5745MHz)	Deviation (KHz)	FHH (5825MHz)	Deviation (KHz)
Band 4 (5725-5850 MHz)	-20°C	5744.987	13	5824.986	14
	-10°C	5744.988	12	5824.987	13
	-5°C	5744.989	11	5824.991	9
	0°C	5744.992	8	5824.991	9
	+10°C	5744.988	12	5824.990	10
	+20°C	5744.990	10	5824.988	12
	+30°C	5744.987	13	5824.991	9
	+40°C	5744.988	12	5824.991	9
	+50°C	5744.991	9	5824.988	12

-----END OF REPORT-----