FCC TEST REPORT
FCC ID:2BFSQ-WL310

Report Number	ZKT-240415L3773-2
Date of Test	Mar. 28, 2024 to Apr. 12, 2024
Date of issue	Apr. 12, 2024
Total number of pages	108
Test Result	PASS
Testing Laboratory	**Shenzhen ZKT Technology Co., Ltd.**
Address	1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China
Applicant's name	**Shenzhen Weizhi Internet Technology Co.,Ltd**
Address	607B, Building B, Jiading Industrial Zone, Langkou Community, Dalang Street, Longhua District, Shenzhen City, China
Manufacturer's name	**Shenzhen Weizhi Internet Technology Co.,Ltd**
Address	607B, Building B, Jiading Industrial Zone, Langkou Community, Dalang Street, Longhua District, Shenzhen City, China
Test specification:	
Standard	FCC CFR Title 47 Part 15 Subpart E Section 15.407 ANSI C63.10:2013 RSS-Gen Issue 5, February 2021 RSS-247 Issue 3 August 2023
Test procedure	/
Non-standard test method	N/A
Test Report Form No	TRF-EL-113_V0
Test Report Form(s) Originator	ZKT Testing
Master TRF	Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Product name	wifi router
Trademark	Refer to Section 3.1
Model/Type reference	DC 12V from adapter

Testing procedure and testing location:

Testing Laboratory..... :	Shenzhen ZKT Technology Co., Ltd.
Address..... :	1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China
Tested by (name + signature)..... :	Alen He
Reviewer (name + signature)..... :	Joe Liu
Approved (name + signature)..... :	Lake Xie

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1. VERSION

Report No.	Version	Description	Approved
ZKT-240415L3773-2	Rev.01	Initial issue of report	Apr. 12, 2024

2.SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.209(a) 15.407 (b) RSS-Gen 8.9 RSS-247 5.5	Spurious Radiated Emissions	PASS	
Duty Cycle	KDB 789033	--	
15.207 RSS-Gen 8.8	Conducted Emission	PASS	
15.407 (a)(12) 2.1049 RSS-Gen 6.6	26 dB and 99% Emission Bandwidth	PASS	
15.407(e) RSS-247 5.2	6 dB bandwidth	PASS	
15.407 (a)(1) 15.407 (a)(3) RSS-247 6.2	Maximum Conducted Output Power&Eirp	PASS	
2.1051, 15.407(b)(1) 15.407(b)(4) RSS-247 6.2	Band Edge	PASS	
15.407 (a)(1) 15.407 (a)(3) RSS-247 6.2	Power Spectral Density	PASS	
15.203 RSS-Gen Section 6.8	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

Test method：KDB 789033 D02 v01r02, KDB 662911 D01 Multiple Transmitter Output v02r01

2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.
Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225
Designation Number: CN1299
IC Registered No.: 27033
CAB identifier: CN0110

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U · where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2 · providing a level of confidence of approximately 95 % 。

No.	Item	Uncertainty
1	3m camber Radiated spurious emission(9KHz-30MHz)	U=4.5dB
2	3m camber Radiated spurious emission(30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission(1GHz-6GHz)	U=4.9dB
4	3m chamber Radiated spurious emission(6GHz-40GHz)	U=5.0dB
5	Conducted disturbance	U=3.2dB
6	RF Band Edge	U=1.68dB
7	RF power conducted	U=1.86dB
8	RF conducted Spurious Emission	U=2.2dB
9	RF Occupied Bandwidth	U=1.8dB
10	RF Power Spectral Density	U=1.75dB
11	humidity uncertainty	U=5.3%
12	Temperature uncertainty	U=0.59℃

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	wifi router	
Model No.:	WL211, WL212, WL213, WL214, WL215, WL216, WL217, WL218, WL219, WL231, WL281, WL282, WL283, WL284, WL285, WL286, WL287, WL288, WL289, WL300, WL301, WL302, WL303, WL304, WL305, WL306, WL307, WL308, WL309, WL310, WL316, WL317, WL318, WL319, WR1200S, WR1800K, WR3000K, WR200, ZW100, XD1800K(M), MS1200K(M), MS1800K(M), 5G-CPE1801K, PW100, X40, U9, M9	
Model Different.:	Only the model names are different.(Main test model: WL310)	
Sample ID	ZKT-2404062964-1	
Sample(s) Status:	Engineer sample	
Product Description	IEEE 802.11 WLAN Mode Supported	☒ 802.11a/n/ac
	Data Rate	802.11a:6/9/12/18/24/36/48/54Mbps 802.11n(HT20):MCS0-MCS7 802.11n(HT40):MCS0-MCS7 802.11ac(VHT20):MCS0-MCS8 802.11ac(VHT40):MCS0-MCS9 802.11ac(VHT80):MCS0-MCS9
	Modulation	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac
	Operating Frequency Range	☒ 5745-5825MHz for 802.11a/n/ac(HT20) ☒ 5755-5795MHz for 802.11n/ac(HT40) ☒ 5775MHz for 802.11ac(HT80)
Channel List	Please refer to the Note 2.	
Antenna Type:	External detachable antenna	
Antenna gain:	ANT 0: 7.66dBi ANT 1: 7.66dBi	
HVIN/Hardware version:	V1.0	
FVIN/Software version:	V1.0	
Power supply:	DC 12V from adapter	
Adapter:	Input:100-240V~ 50/60Hz 0.8A max Output:12V⎓2.0A	

U-NII-3 (5.725-5.85GHz)			
channel	Frequency(MHz)	channel	Frequency(MHz)
149	5745	151	5755
153	5765	155	5775
157	5785	159	5795
161	5805	165	5825

3.2 DESCRIPTION OF TEST MODES

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, the duty cycle >98%, 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.	

Pretest Mode	Description
Mode 1	802.11a/n /ac 20 CH149/CH157/ CH 165 802.11n 40/ac 40 CH151/CH159 802.11ac 80 CH155

Conducted Emission	
Final Test Mode	Description
Mode 1	02.11a/n /ac 20 CH149/CH157/ CH 165 802.11n 40/ac 40 CH151/CH159 802.11ac 80 CH155

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11a/n /ac 20 CH149/CH157/ CH 165 802.11n 40/ac 40 CH151/CH159 802.11ac 80 CH155

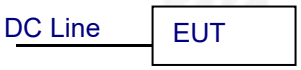
Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

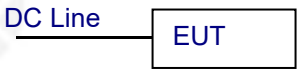
Test Software	Realtek Test Tool
Power level setup	<20dBm

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

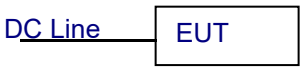
Conducted Emission



Radiated Emission



Conducted Spurious



3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	/	/	/	/	/
A-1	/	/	/	/	/

Item	Shielded Type	Ferrite Core	Length	Note

Note:
(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Conducted emissions Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	N/A	Nov. 14, 2023	Nov. 13, 2024
2	LISN	CYBERTEK	EM5040A	E1850400149	N/A	Nov. 02, 2023	Nov. 01, 2024
3	Test Cable	N/A	C-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
4	Test Cable	N/A	C-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
5	Test Cable	N/A	C-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
6	EMI Test Receiver	R&S	ESCI3	101393	4.42 SP3	Nov. 02, 2023	Nov. 01, 2024
7	Triple-Loop Antenna	N/A	RF300	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
8	Absorbing Clamp	DZ	ZN23201	15034	N/A	Nov. 07, 2023	Nov. 06, 2024
9	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	N/A	\	\

Radiation emissions& Radio Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY55370835	A.17.05	Nov. 02, 2023	Nov. 01, 2024
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Nov. 02, 2023	Nov. 01, 2024
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	100969	4.32	Nov. 02, 2023	Nov. 01, 2024
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	N/A	N/A	Nov. 13, 2023	Nov. 12, 2024
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	N/A	Nov. 13, 2023	Nov. 12, 2024
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	N/A	Nov. 13, 2023	Nov. 12, 2024
7	Loop Antenna	TESEQ	HLA6121	58357	N/A	Nov. 16, 2023	Nov. 15, 2024
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	60747	N/A	Nov. 02, 2023	Nov. 01, 2024
9	Amplifier (1GHz-26.5GHz)	HuiPu	8449B	3008A00315	N/A	Nov. 02, 2023	Nov. 01, 2024
10	Amplifier (500MHz-40GHz)	QuanJuDa	DLE-161	097	N/A	Nov. 02, 2023	Nov. 01, 2024
11	Test Cable	N/A	R-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
12	Test Cable	N/A	R-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
13	Test Cable	N/A	R-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024

14	Test Cable	N/A	RF-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
15	Test Cable	N/A	RF-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
16	Test Cable	N/A	RF-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
17	ESG Signal Generator	Agilent	E4421B	N/A	B.03.84	Nov. 02, 2023	Nov. 01, 2024
18	Signal Generator	Agilent	N5182A	N/A	A.01.87	Nov. 02, 2023	Nov. 01, 2024
19	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	N/A	Nov. 16, 2023	Nov. 15, 2024
20	Wideband Radio Communication Test	R&S	CMW500	106504	V 3.7.22	Nov. 02, 2023	Nov. 01, 2024
21	MWRF Power Meter Test system	MW	MW100-RF CB	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
22	D.C. Power Supply	LongWei	TPR-6405D	N/A	N/A	\	\
23	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	N/A	\	\
24	RF Software	MW	MTS8310	V2.0.0.0	N/A	\	\
25	Turntable	MF	MF-7802BS	N/A	N/A	\	\
26	Antenna tower	MF	MF-7802BS	N/A	N/A	\	\

4.EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013 RSS-Gen Section 8.8
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION Limits

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

Note:

(1) *Decreases with the logarithm of the frequency.

4.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

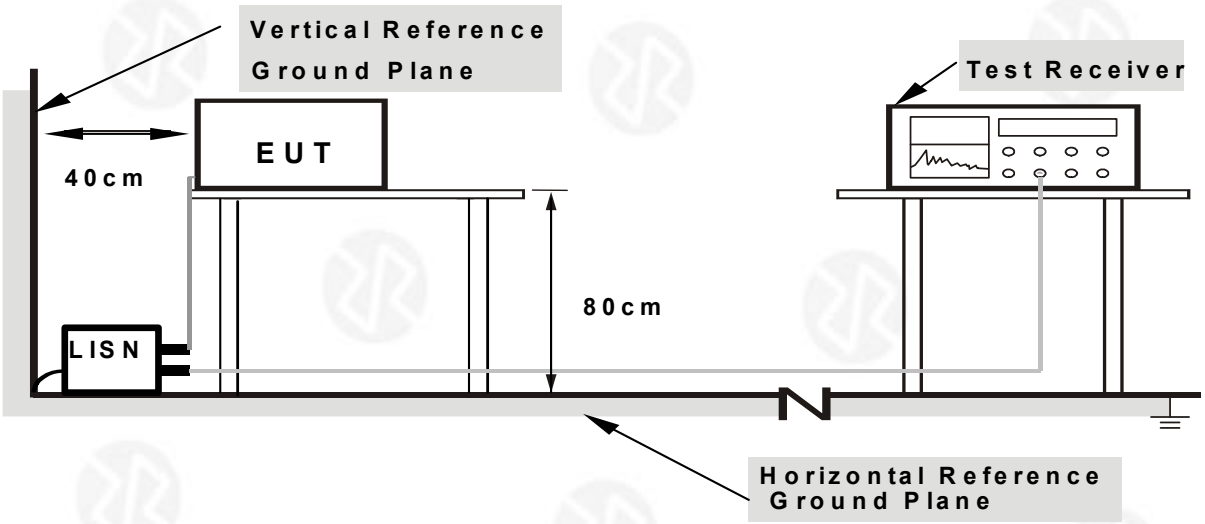
d. LISN at least 80 cm from nearest part of EUT chassis.

e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

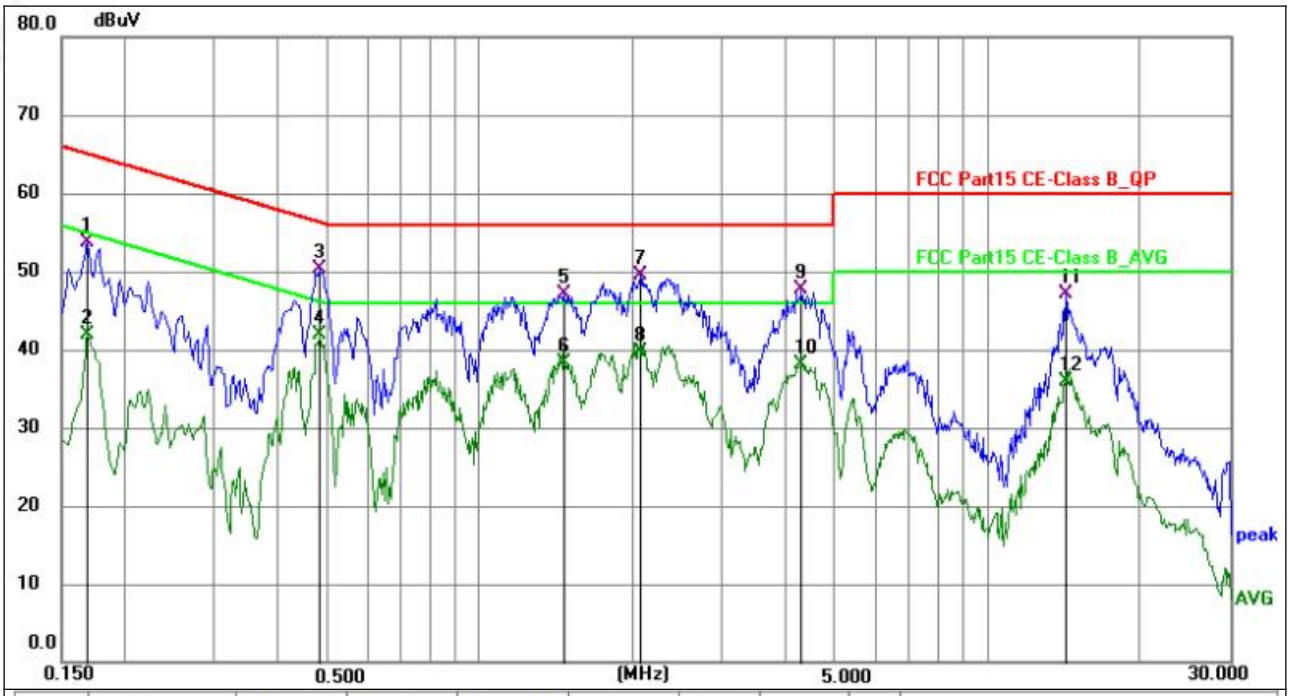
4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

4.1.6 TEST RESULT（Worst case ant0 802.11a 5745MHz）

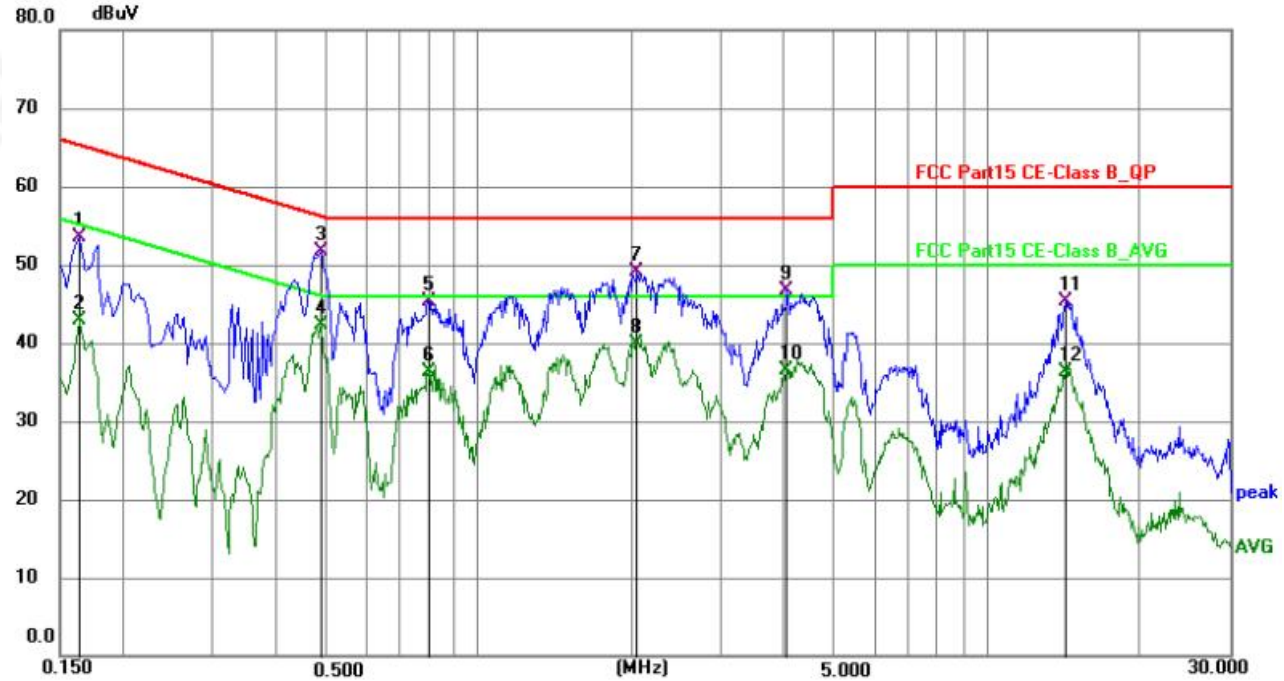
Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa	Phase :	L
Test Voltage ：	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1680	44.08	9.58	53.66	65.06	-11.40	QP	P	
2	0.1680	32.38	9.58	41.96	55.06	-13.10	AVG	P	
3	0.4828	40.59	9.62	50.21	56.29	-6.08	QP	P	
4 *	0.4828	32.30	9.62	41.92	46.29	-4.37	AVG	P	
5	1.4637	37.42	9.61	47.03	56.00	-8.97	QP	P	
6	1.4637	28.60	9.61	38.21	46.00	-7.79	AVG	P	
7	2.0714	39.72	9.71	49.43	56.00	-6.57	QP	P	
8	2.0714	30.09	9.71	39.80	46.00	-6.20	AVG	P	
9	4.2945	38.25	9.53	47.78	56.00	-8.22	QP	P	
10	4.2945	28.51	9.53	38.04	46.00	-7.96	AVG	P	
11	14.2393	37.39	9.77	47.16	60.00	-12.84	QP	P	
12	14.2393	26.19	9.77	35.96	50.00	-14.04	AVG	P	

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa	Phase :	N
Test Voltage ：	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1949	48.01	9.69	57.70	63.83	-6.13	QP	P	
2	0.1949	32.61	9.69	42.30	53.83	-11.53	AVG	P	
3 *	0.2714	45.73	9.69	55.42	61.07	-5.65	QP	P	
4	0.2714	27.33	9.69	37.02	51.07	-14.05	AVG	P	
5	0.3255	44.08	9.67	53.75	59.57	-5.82	QP	P	
6	0.3255	25.81	9.67	35.48	49.57	-14.09	AVG	P	
7	0.4694	41.12	9.62	50.74	56.52	-5.78	QP	P	
8	0.4694	20.31	9.62	29.93	46.52	-16.59	AVG	P	
9	0.6764	39.45	9.71	49.16	56.00	-6.84	QP	P	
10	0.6764	14.45	9.71	24.16	46.00	-21.84	AVG	P	
11	1.2075	39.06	9.56	48.62	56.00	-7.38	QP	P	
12	1.2075	12.97	9.56	22.53	46.00	-23.47	AVG	P	

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(d) and 15.209 RSS-247 Section 5.5 & RSS-Gen Section 8.9, RSS-247 Section 6.2&6.2.1.2&6.2.4.2

4.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407(b): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
According to FCC Part15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009~0.490	2400/F(KHz)	20 log (uV/m)	300
0.490~1.705	2400/F(KHz)	20 log (uV/m)	30
1.705~30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Remark :1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

For FCC Band Edge Limit：
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:
(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
(ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.
(5)The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
(6)Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.
Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in § 15.207.
(7)The provisions of § 15.205 apply to intentional radiators operating under this section.

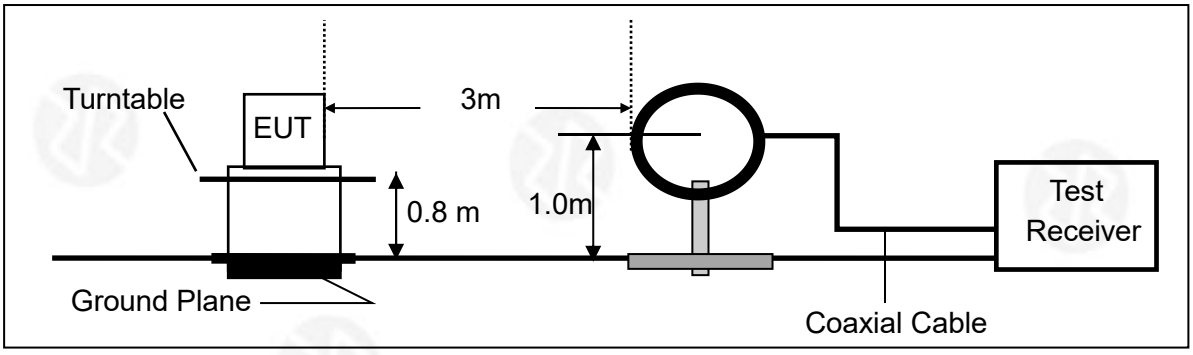
For IC Band Edge Limit：
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band:
a) 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;
b) 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;
c) 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and
d) -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

4.2.3 MEASURING INSTRUMENTS

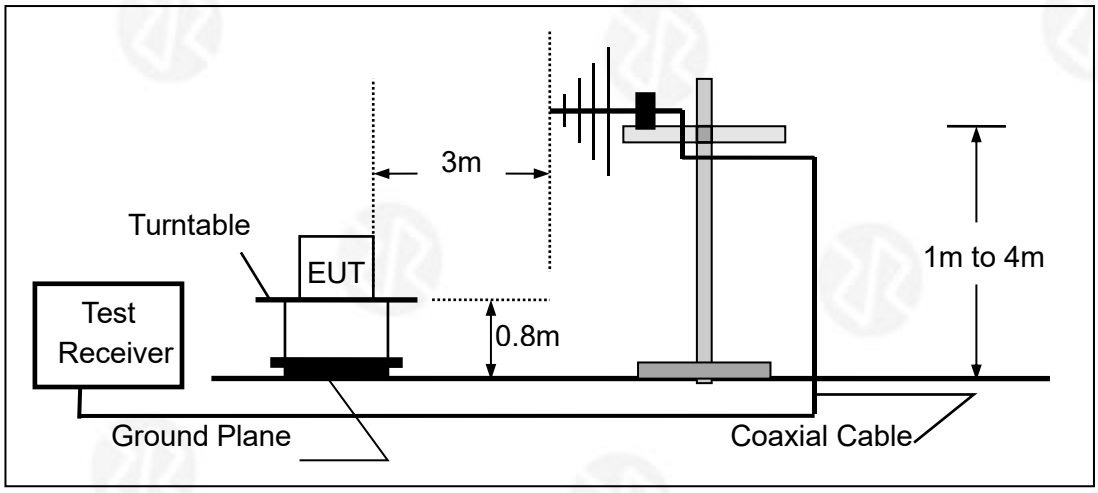
The Measuring equipment is listed in the section 6.3 of this test report.

4.2.4 TEST CONFIGURATION

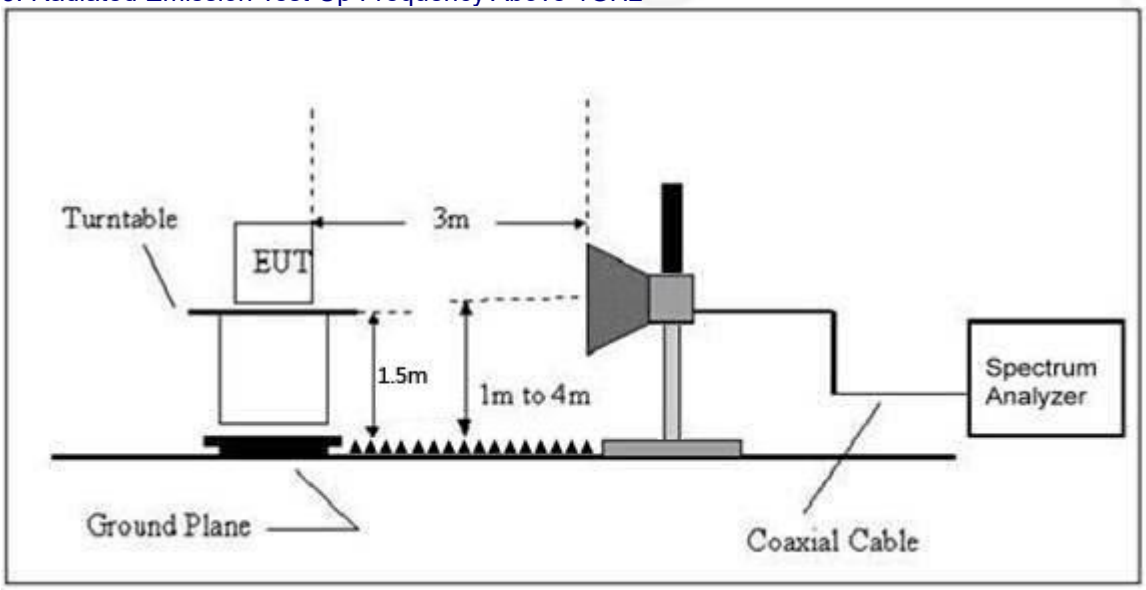
1.For radiated emissions below 30MHz



2.For radiated emissions from 30MHz to 1000MHz



3. Radiated Emission Test-Up Frequency Above 1GHz



4.2.5 TEST PROCEDURE

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.
This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT.
Use the following spectrum analyzer settings:

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where RBWCF [dB] =10*lg(100 [kHz]/narrower RBW [kHz]). , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

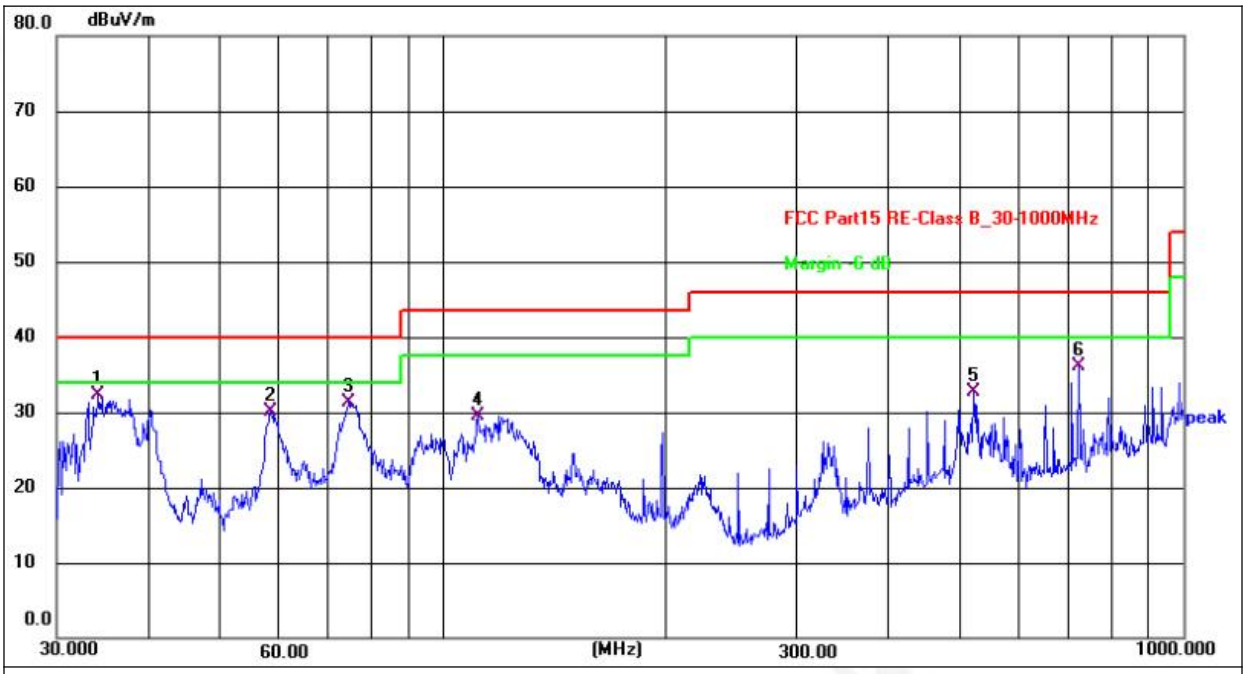
4.2.6 TEST RESULT

Between 9KHz – 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

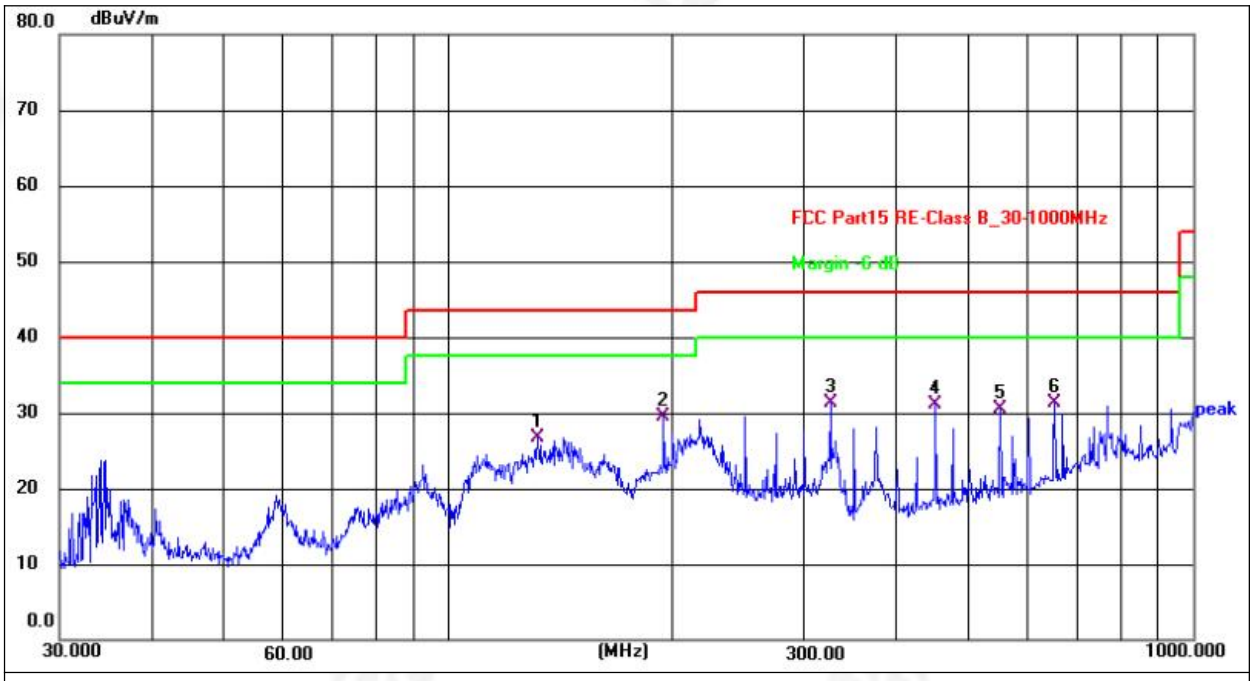
Between 30MHz – 1GHz

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	34.1560	48.88	-16.61	32.27	40.00	-7.73	QP			P	
2	58.4074	47.26	-17.23	30.03	40.00	-9.97	QP			P	
3	74.3955	50.56	-19.31	31.25	40.00	-8.75	QP			P	
4	111.3468	48.37	-18.89	29.48	43.50	-14.02	QP			P	
5	520.8882	43.20	-10.40	32.80	46.00	-13.20	QP			P	
6	721.7258	42.44	-6.33	36.11	46.00	-9.89	QP			P	

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	131.7577	44.18	-17.49	26.69	43.50	-16.81	QP			P	
2 *	194.4534	48.31	-18.87	29.44	43.50	-14.06	QP			P	
3	325.5958	46.59	-15.34	31.25	46.00	-14.75	QP			P	
4	451.1350	42.99	-11.82	31.17	46.00	-14.83	QP			P	
5	550.9480	40.28	-9.72	30.56	46.00	-15.44	QP			P	
6	651.9417	39.05	-7.71	31.34	46.00	-14.66	QP			P	

Remarks:
1.Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2.The emission levels of other frequencies are very lower than the limit and not show in test report.
3.The test data shows only the worst case 802.11n20 5745Mhz mode

Between 1GHz – 40GHz

Temperature：	26℃	Relative Humidity：	54%
Pressure：	1010 hPa	Test Voltage ：	AC 120V/60Hz
Test Mode ：	5.8G TX(Record Worst case test data in the Report)		

802.11a ant0

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:5745MHz									
V	10360.00	52.00	30.55	5.77	24.66	52.17	74.00	-21.83	PK
V	10360.00	43.97	30.55	5.77	24.66	43.85	54.00	-10.15	AV
V	15540.00	54.81	30.33	6.32	24.55	55.35	74.00	-18.65	PK
V	15540.00	43.16	30.33	6.32	24.55	43.70	54.00	-10.30	AV
V	20720.00	54.67	30.85	7.45	24.69	55.96	74.00	-18.04	PK
V	20720.00	43.16	30.85	7.45	24.69	44.45	54.00	-9.55	AV
V	25900.00	50.73	31.02	8.99	25.57	54.27	74.00	-19.73	PK
V	25900.00	43.61	31.02	8.99	25.57	47.15	54.00	-6.85	AV
H	10360.00	52.19	30.55	5.77	24.66	52.07	74.00	-21.93	PK
H	10360.00	43.75	30.55	5.77	24.66	43.63	54.00	-10.37	AV
H	15540.00	51.35	30.33	6.32	24.55	51.89	74.00	-22.11	PK
H	15540.00	44.00	30.33	6.32	24.55	44.54	54.00	-9.46	AV
H	20720.00	54.66	30.85	7.45	24.69	55.95	74.00	-18.05	PK
H	20720.00	43.05	30.85	7.45	24.69	44.34	54.00	-9.66	AV
H	25900.00	51.29	31.02	8.99	25.57	54.83	74.00	-19.17	PK
H	25900.00	43.82	31.02	8.99	25.57	47.36	54.00	-6.64	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:5785MHz									
V	10400.00	53.68	30.55	5.77	24.66	53.56	74.00	-20.44	PK
V	10400.00	43.27	30.55	5.77	24.66	43.15	54.00	-10.85	AV
V	15600.00	50.44	30.33	6.32	24.55	50.98	74.00	-23.02	PK
V	15600.00	43.91	30.33	6.32	24.55	44.45	54.00	-9.55	AV
V	20800.00	52.58	30.85	7.45	24.69	53.87	74.00	-20.13	PK
V	20800.00	43.56	30.85	7.45	24.69	44.85	54.00	-9.15	AV
V	26000.00	54.22	31.02	8.99	25.57	57.76	74.00	-16.24	PK
V	26000.00	43.92	31.02	8.99	25.57	47.46	54.00	-6.54	AV
H	10400.00	54.04	30.55	5.77	24.66	53.92	74.00	-20.08	PK
H	10400.00	43.54	30.55	5.77	24.66	43.42	54.00	-10.58	AV
H	15600.00	52.13	30.33	6.32	24.55	52.67	74.00	-21.33	PK
H	15600.00	43.86	30.33	6.32	24.55	44.40	54.00	-9.60	AV
H	20800.00	54.44	30.85	7.45	24.69	55.73	74.00	-18.27	PK
H	20800.00	43.57	30.85	7.45	24.69	44.86	54.00	-9.14	AV
H	26000.00	52.88	31.02	8.99	25.57	56.42	74.00	-17.58	PK
H	26000.00	43.92	31.02	8.99	25.57	47.46	54.00	-6.54	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel:5825MHz									
V	10480.00	51.19	30.55	5.77	24.66	51.07	74.00	-22.93	PK
V	10480.00	43.21	30.55	5.77	24.66	43.09	54.00	-10.91	AV
V	15720.00	50.36	30.33	6.32	24.55	50.90	74.00	-23.10	PK
V	15720.00	43.42	30.33	6.32	24.55	43.96	54.00	-10.04	AV
V	20960.00	54.34	30.85	7.45	24.69	55.63	74.00	-18.37	PK
V	20960.00	43.58	30.85	7.45	24.69	44.87	54.00	-9.13	AV
V	26200.00	54.82	31.02	8.99	25.57	58.36	74.00	-15.64	PK
V	26200.00	43.79	31.02	8.99	25.57	47.33	54.00	-6.67	AV
H	10480.00	50.84	30.55	5.77	24.66	50.72	74.00	-23.28	PK
H	10480.00	43.31	30.55	5.77	24.66	43.19	54.00	-10.81	AV
H	15720.00	52.88	30.33	6.32	24.55	53.42	74.00	-20.58	PK
H	15720.00	43.59	30.33	6.32	24.55	44.13	54.00	-9.87	AV
H	20960.00	52.90	30.85	7.45	24.69	54.19	74.00	-19.81	PK
H	20960.00	43.38	30.85	7.45	24.69	44.67	54.00	-9.33	AV
H	26200.00	54.12	31.02	8.99	25.57	57.66	74.00	-16.34	PK
H	26200.00	43.13	31.02	8.99	25.57	46.67	54.00	-7.33	AV

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Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:5755MHz									
V	11510.00	50.06	30.55	5.77	24.66	49.94	74.00	-24.06	PK
V	11510.00	43.93	30.55	5.77	24.66	43.81	54.00	-10.19	AV
V	17265.00	51.25	30.33	6.32	24.55	51.79	74.00	-22.21	PK
V	17265.00	43.25	30.33	6.32	24.55	43.79	54.00	-10.21	AV
V	23020.00	50.79	30.85	7.45	24.69	52.08	74.00	-21.92	PK
V	23020.00	43.92	30.85	7.45	24.69	45.21	54.00	-8.79	AV
V	28775.00	51.81	31.02	8.99	25.57	55.35	74.00	-18.65	PK
V	28775.00	43.85	31.02	8.99	25.57	47.39	54.00	-6.61	AV
H	11510.00	51.25	30.55	5.77	24.66	51.13	74.00	-22.87	PK
H	11510.00	43.81	30.55	5.77	24.66	43.69	54.00	-10.31	AV
H	17265.00	54.10	30.33	6.32	24.55	54.64	74.00	-19.36	PK
H	17265.00	43.65	30.33	6.32	24.55	44.19	54.00	-9.81	AV
H	46040.00	51.36	30.85	7.45	24.69	52.65	74.00	-21.35	PK
H	46040.00	43.67	30.85	7.45	24.69	44.96	54.00	-9.04	AV
H	28775.00	53.30	31.02	8.99	25.57	56.84	74.00	-17.16	PK
H	28775.00	43.49	31.02	8.99	25.57	47.03	54.00	-6.97	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel:5795MHz									
V	11590.00	52.86	30.55	5.77	24.66	52.74	74.00	-21.26	PK
V	11590.00	43.73	30.55	5.77	24.66	43.61	54.00	-10.39	AV
V	17385.00	53.15	30.33	6.32	24.55	53.69	74.00	-20.31	PK
V	17385.00	43.92	30.33	6.32	24.55	44.46	54.00	-9.54	AV
V	23180.00	52.58	30.85	7.45	24.69	53.87	74.00	-20.13	PK
V	23180.00	43.30	30.85	7.45	24.69	44.59	54.00	-9.41	AV
V	28975.00	52.68	31.02	8.99	25.57	56.22	74.00	-17.78	PK
V	28975.00	43.38	31.02	8.99	25.57	46.92	54.00	-7.08	AV
H	11590.00	51.18	30.55	5.77	24.66	51.06	74.00	-22.94	PK
H	11590.00	43.90	30.55	5.77	24.66	43.78	54.00	-10.22	AV
H	17385.00	52.74	30.33	6.32	24.55	53.28	74.00	-20.72	PK
H	17385.00	43.69	30.33	6.32	24.55	44.23	54.00	-9.77	AV
H	46360.00	52.08	30.85	7.45	24.69	53.37	74.00	-20.63	PK
H	46360.00	43.63	30.85	7.45	24.69	44.92	54.00	-9.08	AV
H	28975.00	54.35	31.02	8.99	25.57	57.89	74.00	-16.11	PK
H	28975.00	43.28	31.02	8.99	25.57	46.82	54.00	-7.18	AV

802.11ac80 MIMO

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:5775MHz									
V	11550.00	51.61	30.55	5.77	24.66	51.49	74.00	-22.51	PK
V	11550.00	43.46	30.55	5.77	24.66	43.48	54.00	-10.52	AV
V	17325.00	50.97	30.33	6.32	24.55	54.16	74.00	-19.84	PK
V	17325.00	43.76	30.33	6.32	24.55	43.66	54.00	-10.34	AV
V	23100.00	52.31	30.85	7.45	24.69	53.63	74.00	-20.37	PK
V	23100.00	43.55	30.85	7.45	24.69	44.52	54.00	-9.48	AV
V	28875.00	53.13	31.02	8.99	25.57	56.82	74.00	-17.18	PK
V	28875.00	43.40	31.02	8.99	25.57	47.86	54.00	-6.14	AV
H	11550.00	54.67	30.55	5.77	24.66	53.14	74.00	-20.86	PK
H	11550.00	43.93	30.55	5.77	24.66	43.13	54.00	-10.87	AV
H	17325.00	50.63	30.33	6.32	24.55	52.82	74.00	-21.18	PK
H	17325.00	43.90	30.33	6.32	24.55	43.19	54.00	-10.81	AV
H	46200.00	51.57	30.85	7.45	24.69	54.46	74.00	-19.54	PK
H	46200.00	43.91	30.85	7.45	24.69	44.82	54.00	-9.18	AV
H	28875.00	53.27	31.02	8.99	25.57	54.88	74.00	-19.12	PK
H	28875.00	43.56	31.02	8.99	25.57	45.75	54.00	-8.25	AV

Remark:
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
4.-27dBm(EIRP)=68.3dBuV/m(Field strength at 3m), According to the test results of the above table, while fulfill the requirements of out-of-band spurious

5.POWER SPECTRAL DENSITY TEST

5.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(3)&RSS 247 section 6.2.1.1/6.2.4.1

Power limits For FCC:

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Power limits For IC:

5.15-5.25 GHz bands

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

5.25-5.35 GHz bands

a) The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;

b) The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

5.47-5.725 GHz bands

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

5.725-5.85 GHz bands

The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to point operations exclude the use of point-to-multipoint3 systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

5.2 TEST PROCEDURE

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/T, where T is defined in section II.B.I.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

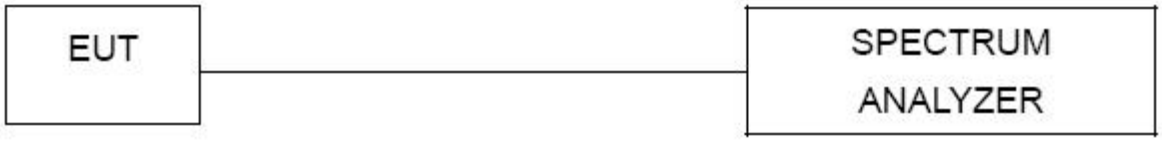
5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST METHOD

KDB662911 D01 MULTIPLE TRANSMITTER OUTPUT V02R01
KDB789033 D02 GENERAL U-NII TEST PROCEDURES NEW RULES V02R01, SECTION F

5.5 TEST SETUP



5.6 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

5.7 TEST RESULTS

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1015 hPa	Test Voltage：	AC 120V/60Hz
Test Mode ：	TX		

ANT0:

Mode	Frequency (MHz)	Conducted PSD (dBm)	Duty Factor (dB)	Total PSD (dBm)	Limit (dBm)	Verdict
a	5745	-2.16	0	-2.16	28.34	Pass
a	5785	-2.55	0	-2.55	28.34	Pass
a	5825	-2.57	0	-2.57	28.34	Pass
n20	5745	-1.01	0	-1.01	28.34	Pass
n20	5785	-1.35	0	-1.35	28.34	Pass
n20	5825	-1.55	0	-1.55	28.34	Pass
n40	5755	-6.65	0	-6.65	28.34	Pass
n40	5795	-6.9	0	-6.9	28.34	Pass
ac20	5745	0.24	0	0.24	28.34	Pass
ac20	5785	-0.74	0	-0.74	28.34	Pass
ac20	5825	-0.98	0	-0.98	28.34	Pass
ac40	5755	-6.62	0	-6.62	28.34	Pass
ac40	5795	-6.93	0	-6.93	28.34	Pass
ac80	5775	-9.45	0	-9.45	28.34	Pass

ANT1:

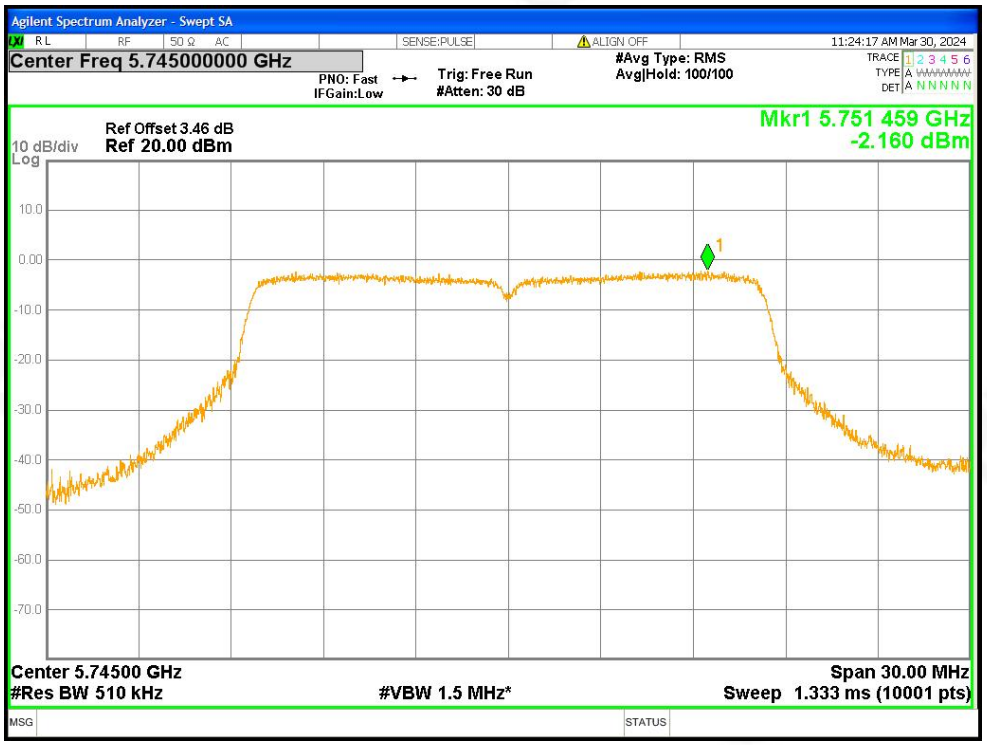
Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm)	Duty Factor (dB)	Total PSD (dBm)	Limit (dBm)	Verdict
a	5745	Ant1	-2.21	0	-2.21	28.34	Pass
a	5785	Ant1	-2.21	0	-2.21	28.34	Pass
a	5825	Ant1	-2.54	0	-2.54	28.34	Pass
n20	5745	Ant1	-0.73	0	-0.73	28.34	Pass
n20	5785	Ant1	-0.86	0	-0.86	28.34	Pass
n20	5825	Ant1	-1.35	0	-1.35	28.34	Pass
n40	5755	Ant1	-6.57	0	-6.57	28.34	Pass
n40	5795	Ant1	-7.05	0	-7.05	28.34	Pass
ac20	5745	Ant1	-0.76	0	-0.76	28.34	Pass
ac20	5785	Ant1	-0.85	0	-0.85	28.34	Pass
ac20	5825	Ant1	-1.16	0	-1.16	28.34	Pass
ac40	5755	Ant1	-6.62	0	-6.62	28.34	Pass
ac40	5795	Ant1	-6.8	0	-6.8	28.34	Pass
ac80	5775	Ant1	-9.65	0	-9.65	28.34	Pass

Band	Operation mode	CH	Power Spectral Density (dBm/0.5Mhz)			
			Ant 0	Ant 1	Total	Limit (dBm)
U-NII-3	802.11n(HT20)	Low	-1.01	-0.73	2.14	25.33
		Middle	-1.35	-0.86	1.91	25.33
		High	-1.55	-1.35	1.56	25.33
	802.11n(HT40)	Low	-6.65	-6.57	-3.60	25.33
		High	-6.9	-7.05	-3.96	25.33
	802.11ac(HT20)	Low	0.24	-0.76	2.78	25.33
		Middle	-0.74	-0.85	2.22	25.33
		High	-0.98	-1.16	1.94	25.33
	802.11ac(HT40)	Low	-6.62	-6.62	-3.61	25.33
		High	-6.93	-6.8	-3.85	25.33
	802.11ac(HT80)	Low	-9.45	-9.65	-6.54	25.33

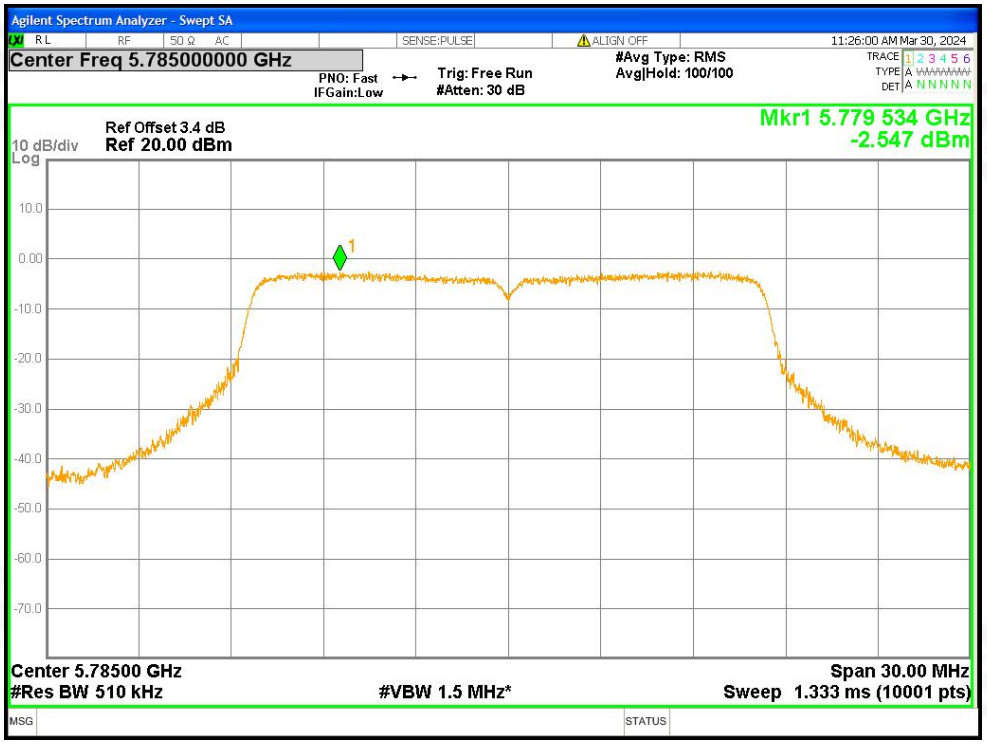
EUT suppots MIMO mode for 802.11n/ac mode, Direction Gain=antenna gain+10*log(X)=7.66+3.01=10.67(X is the number of antennas, it is should be 2)

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Ant0



PSD NVNT a 5745MHz



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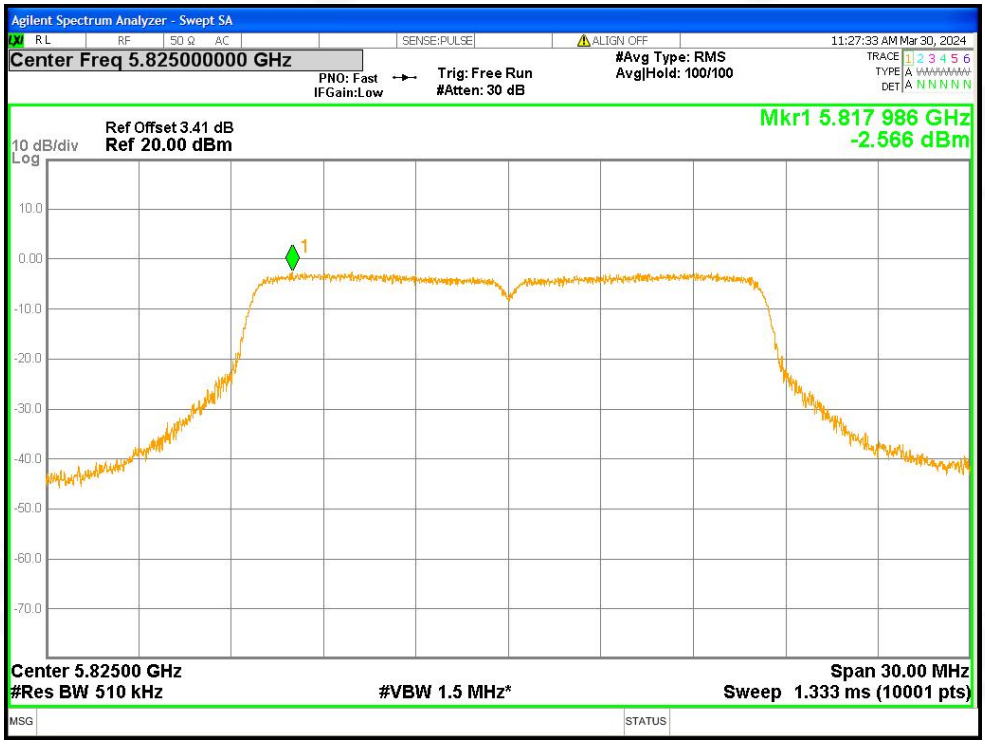

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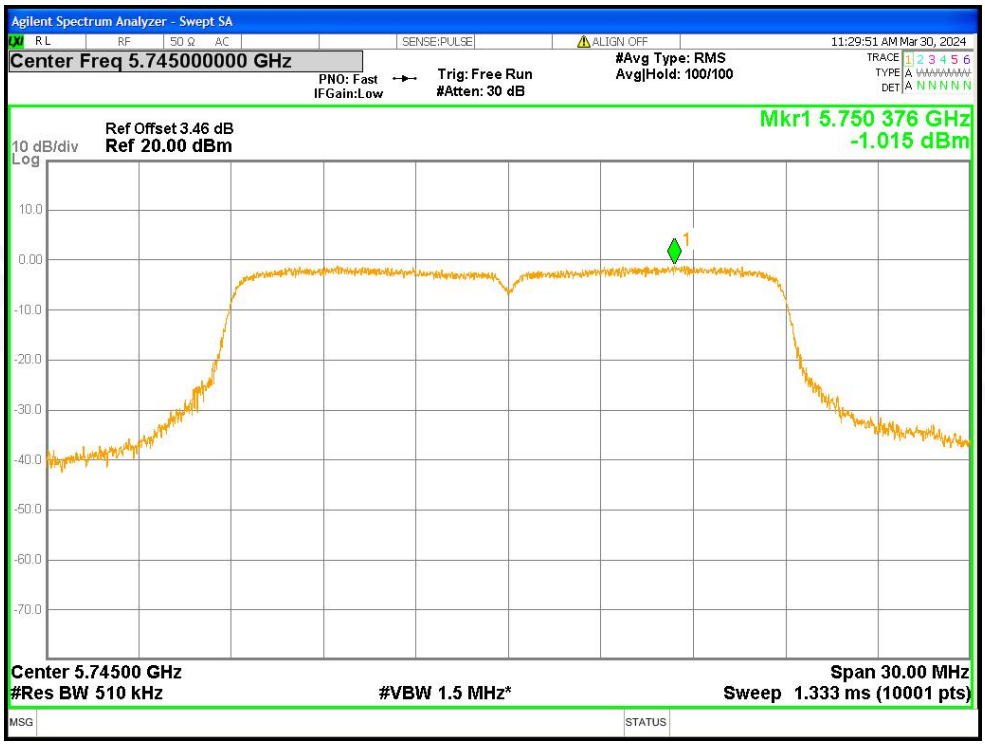

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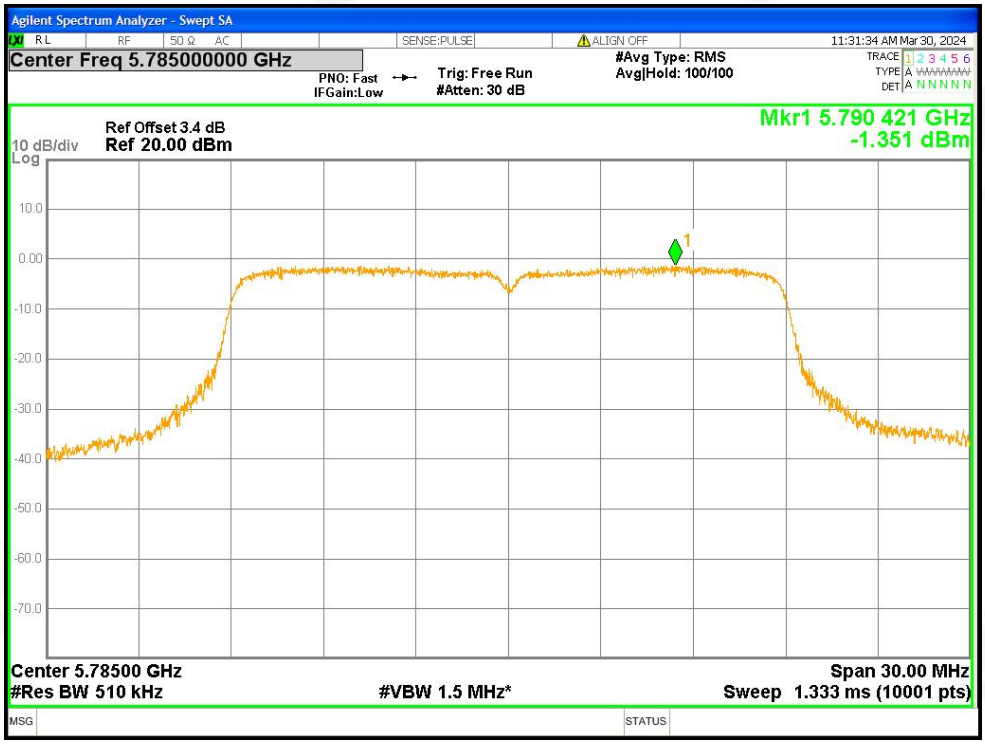

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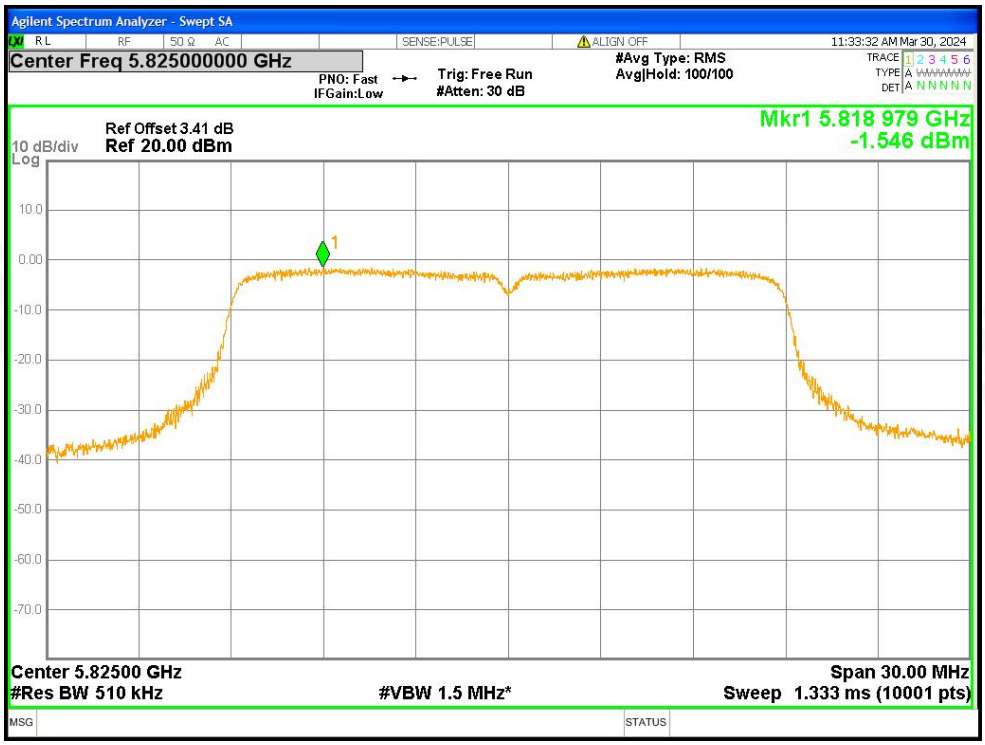

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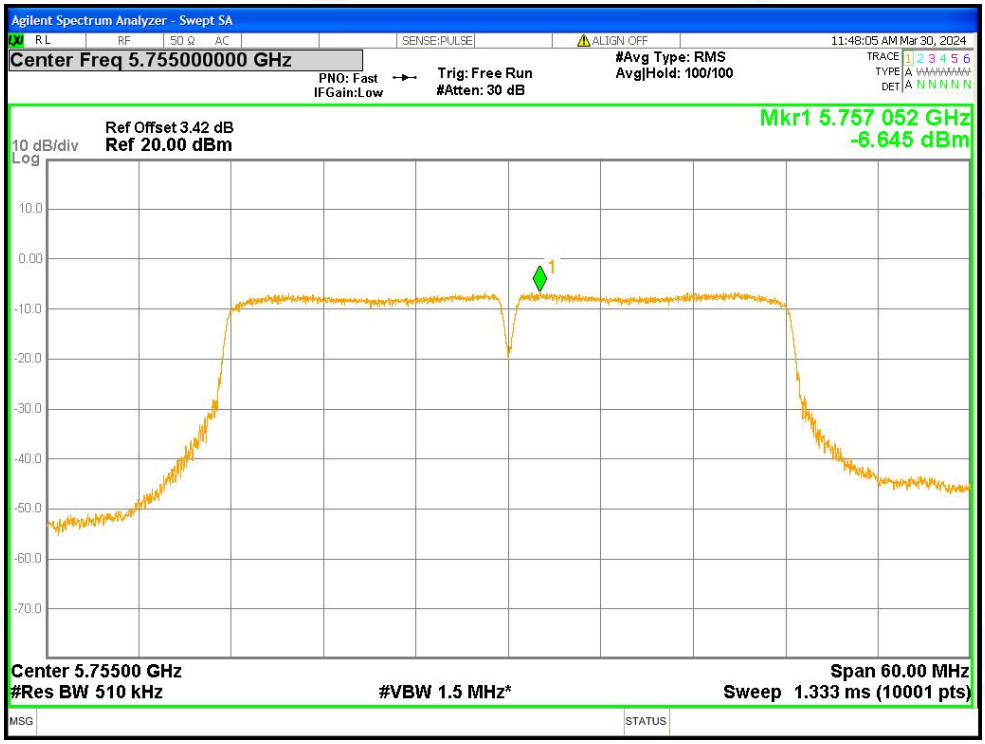
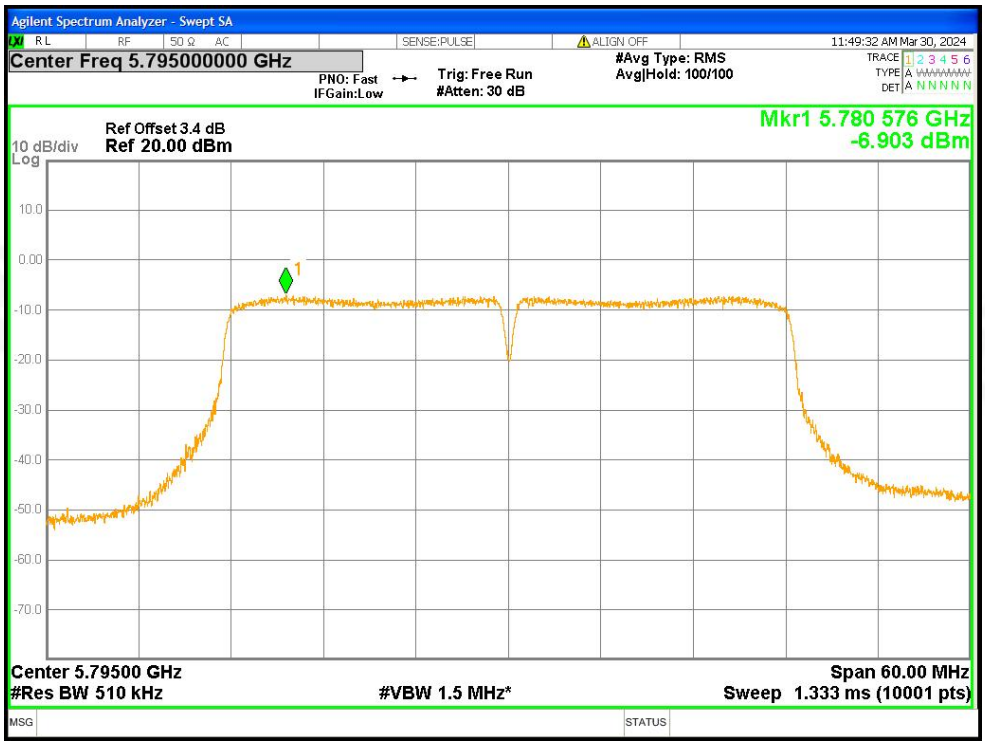


PSD NVNT n40 5755MHz



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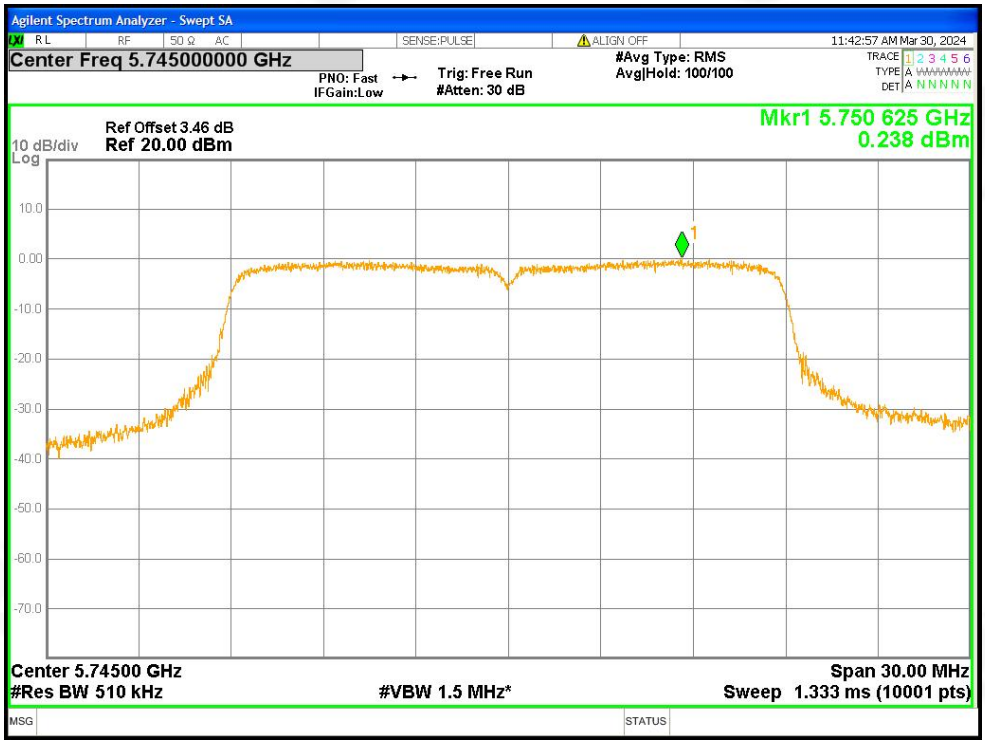

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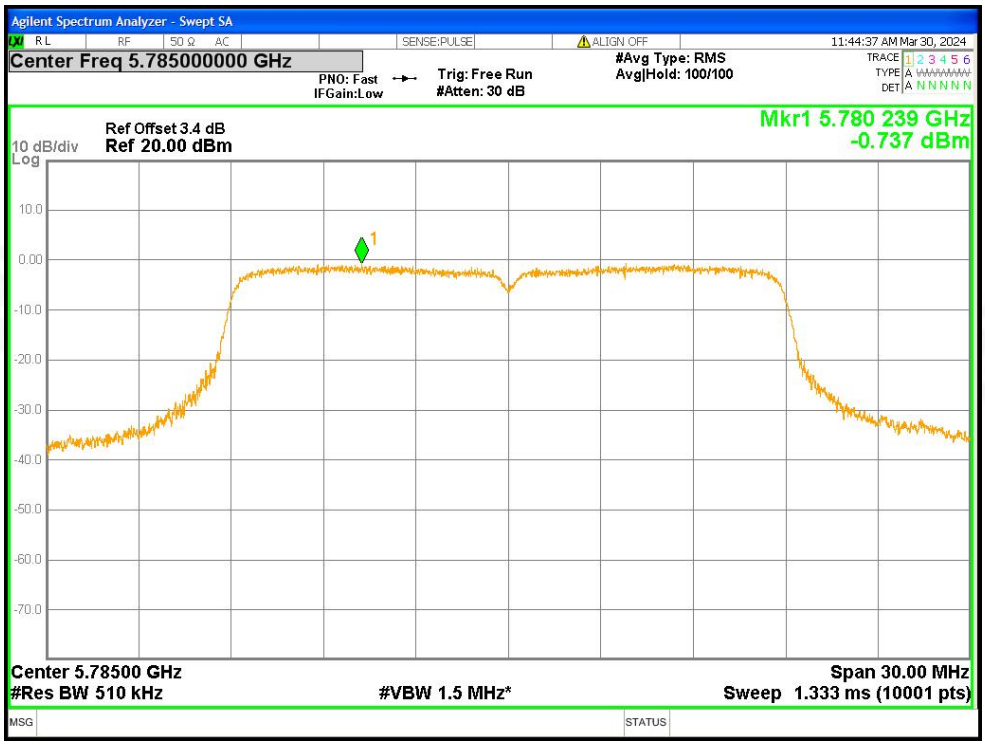

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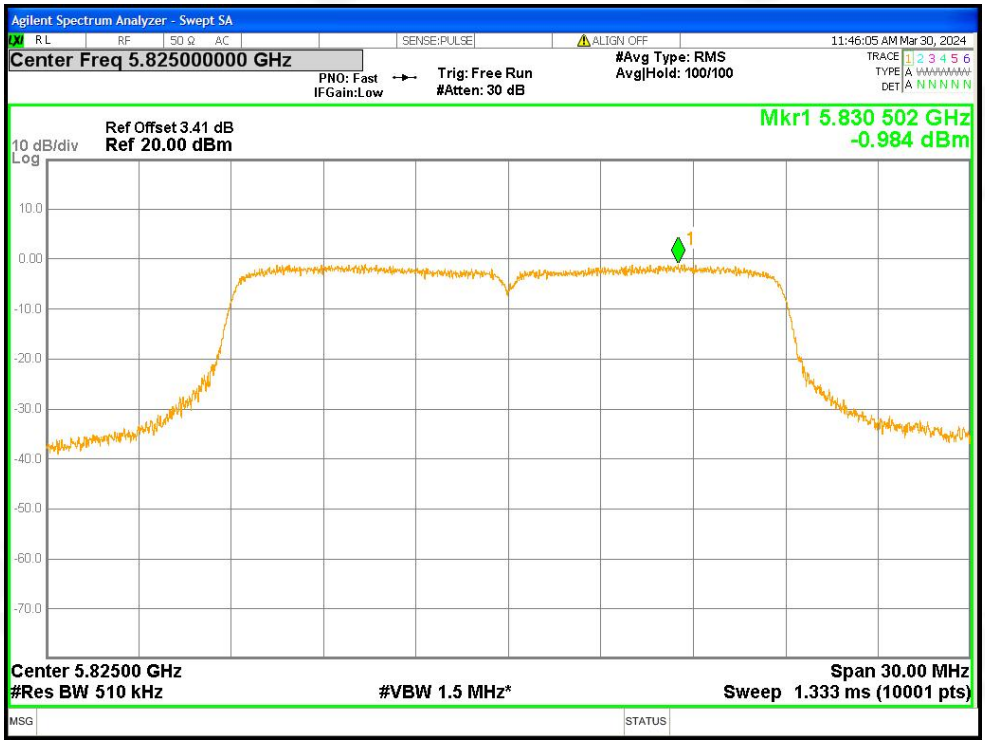

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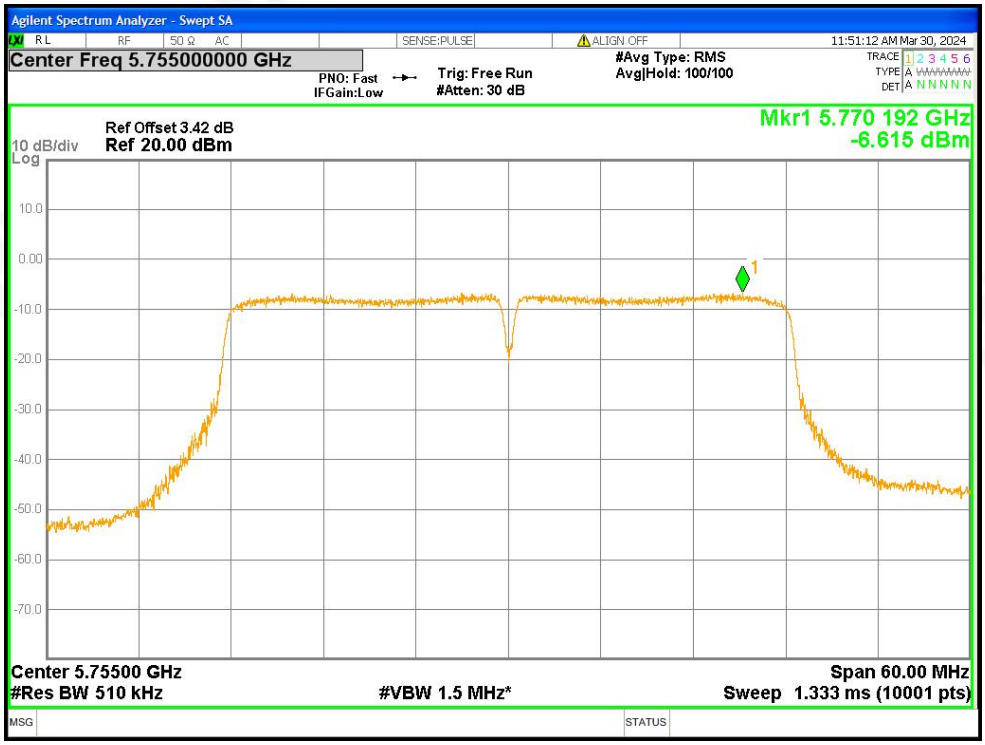

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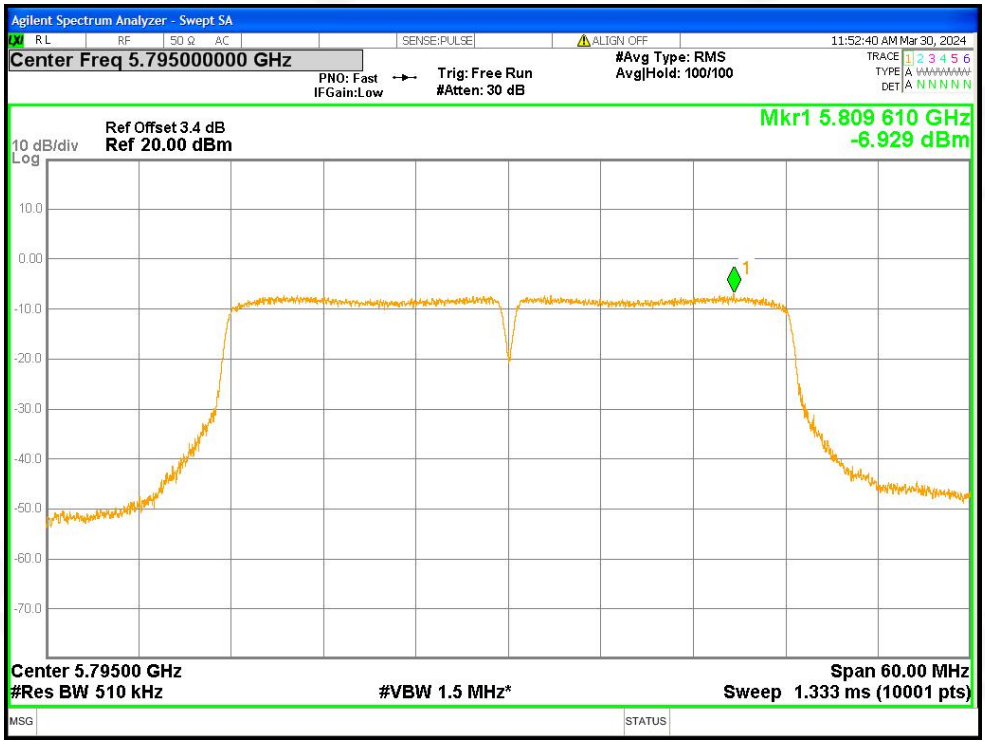

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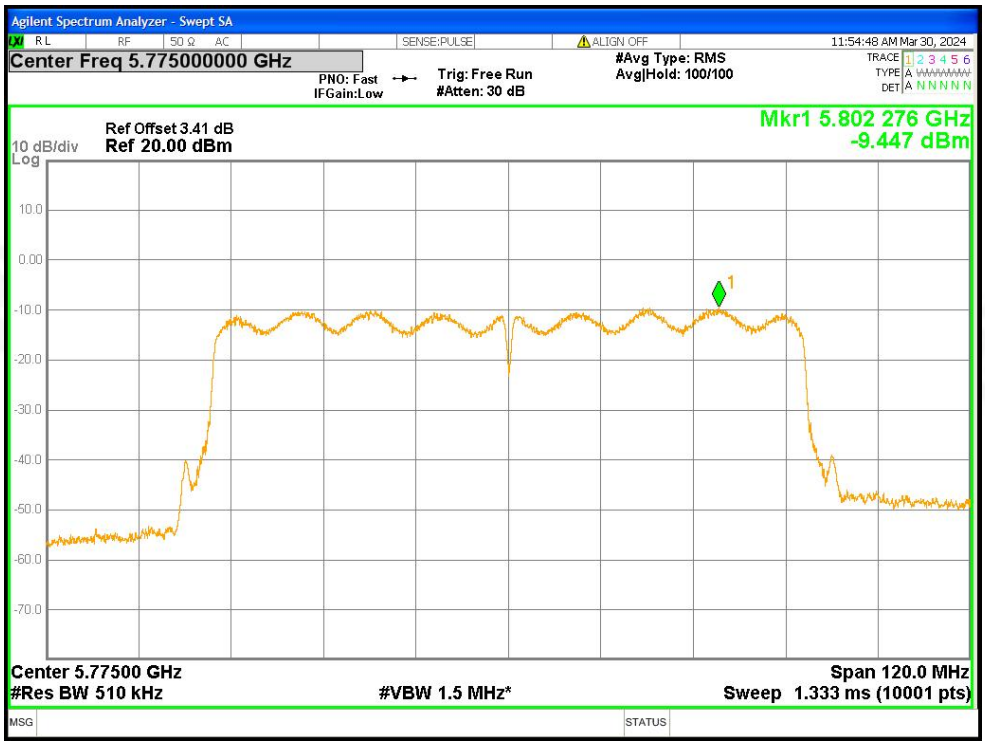
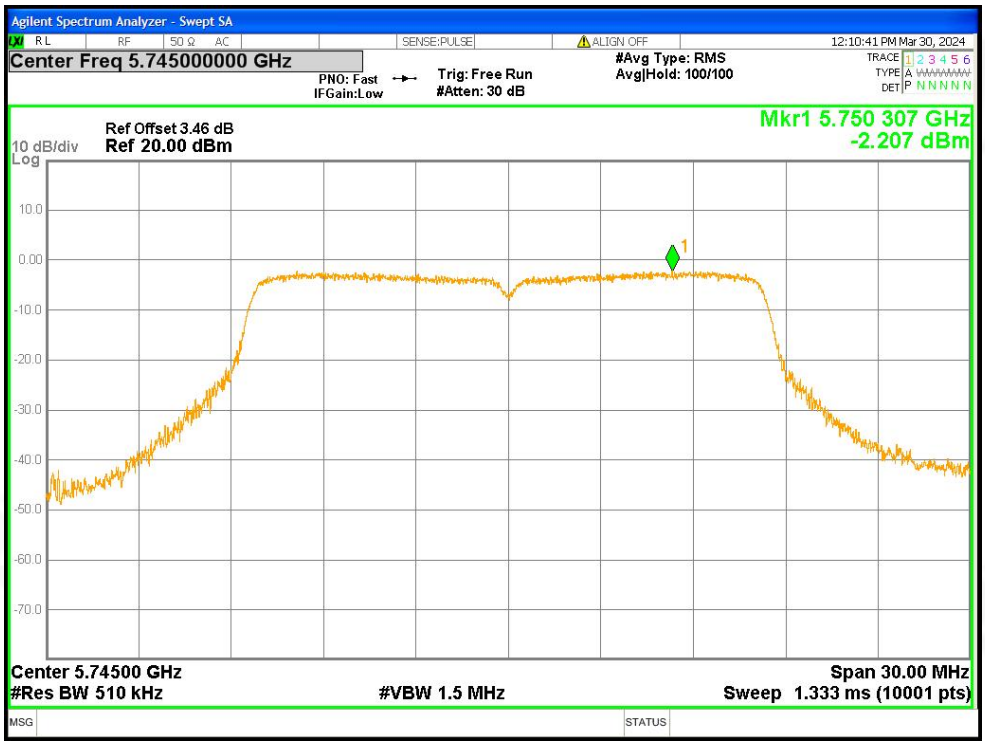
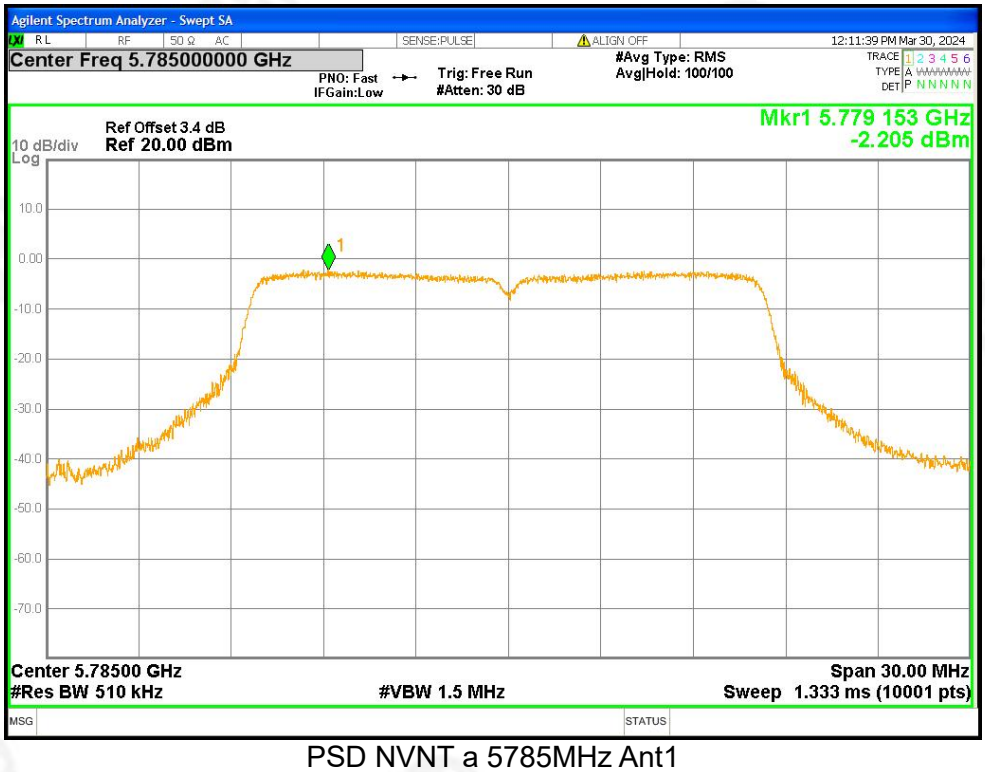


PSD NVNT ac80 5775MHz

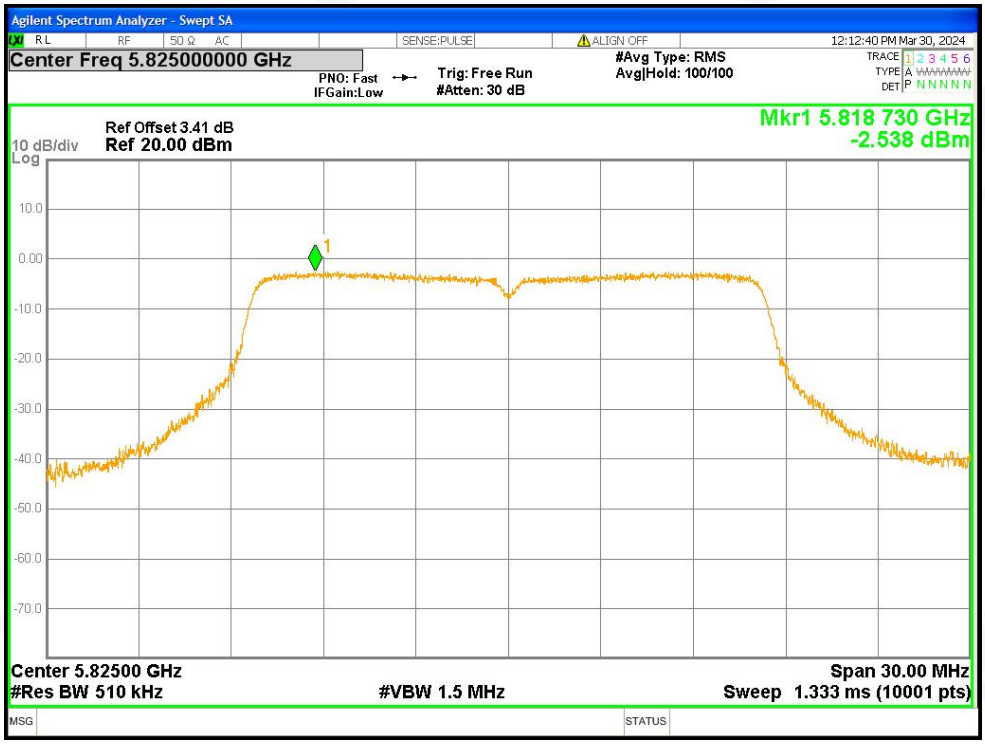
Ant1



PSD NVNT a 5745MHz Ant1



PSD NVNT a 5785MHz Ant1



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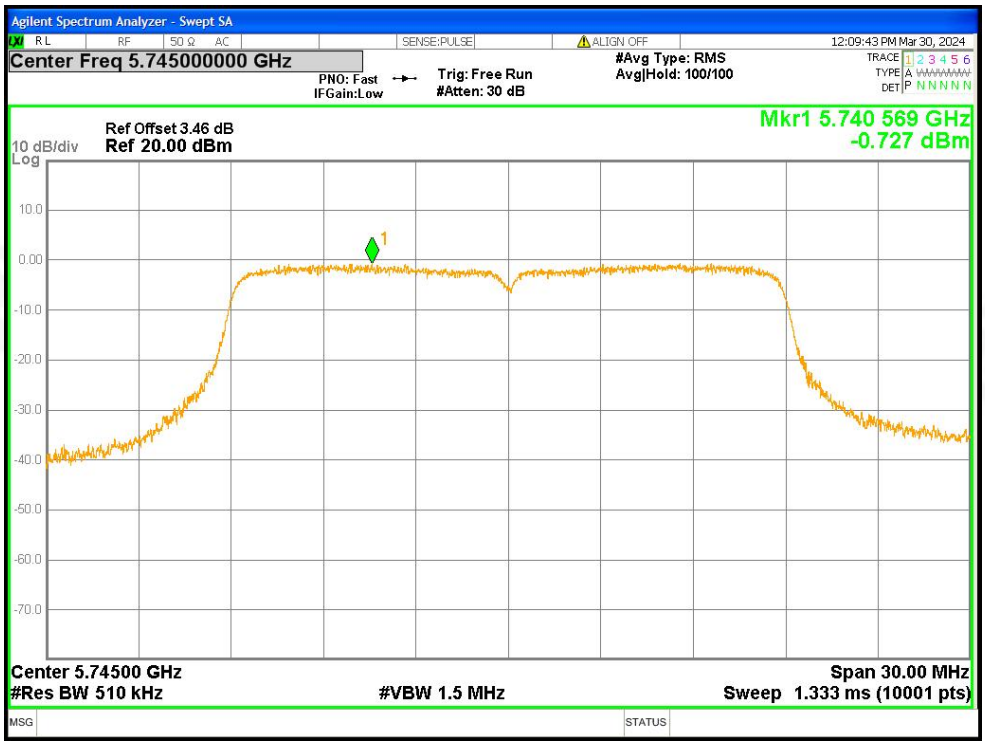
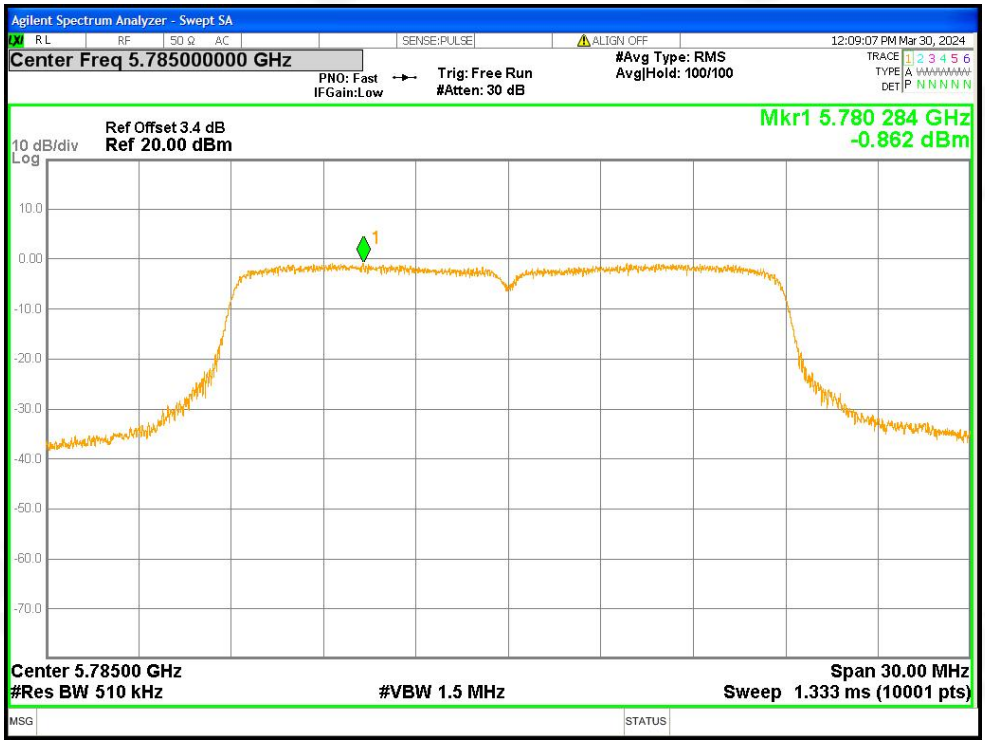


PSD NVNT n20 5745MHz Ant1



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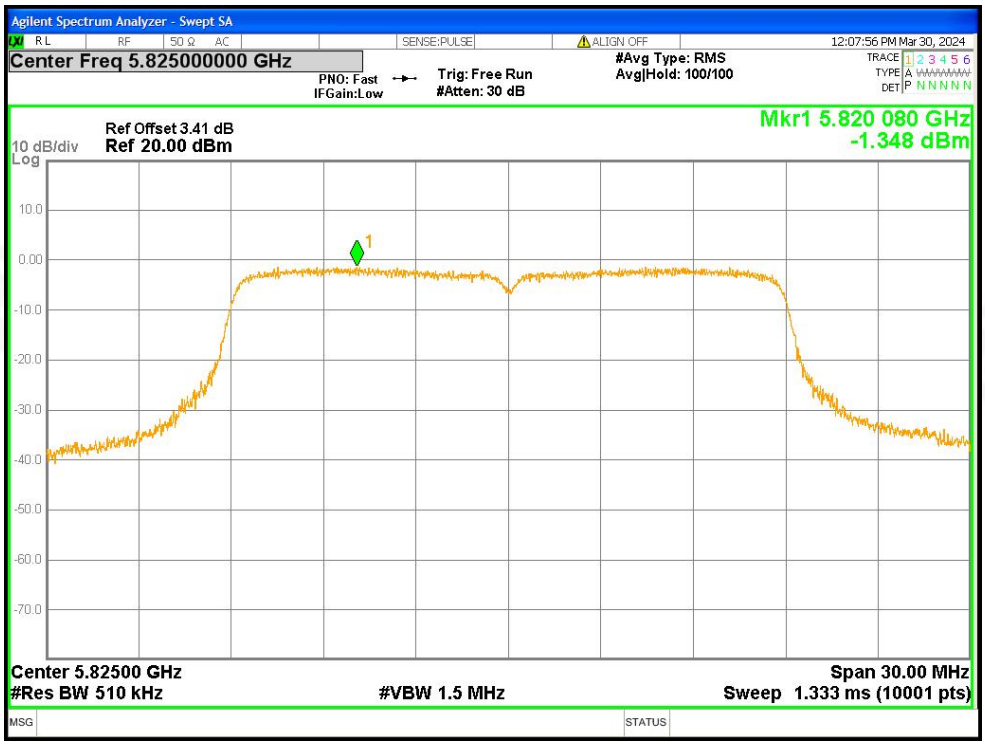

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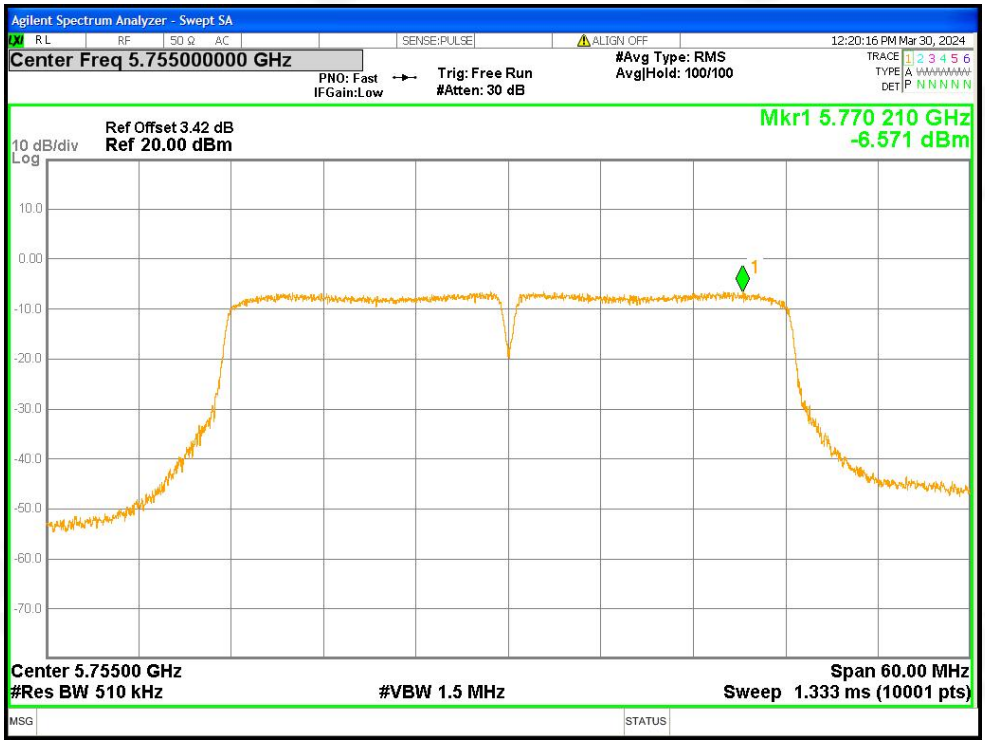
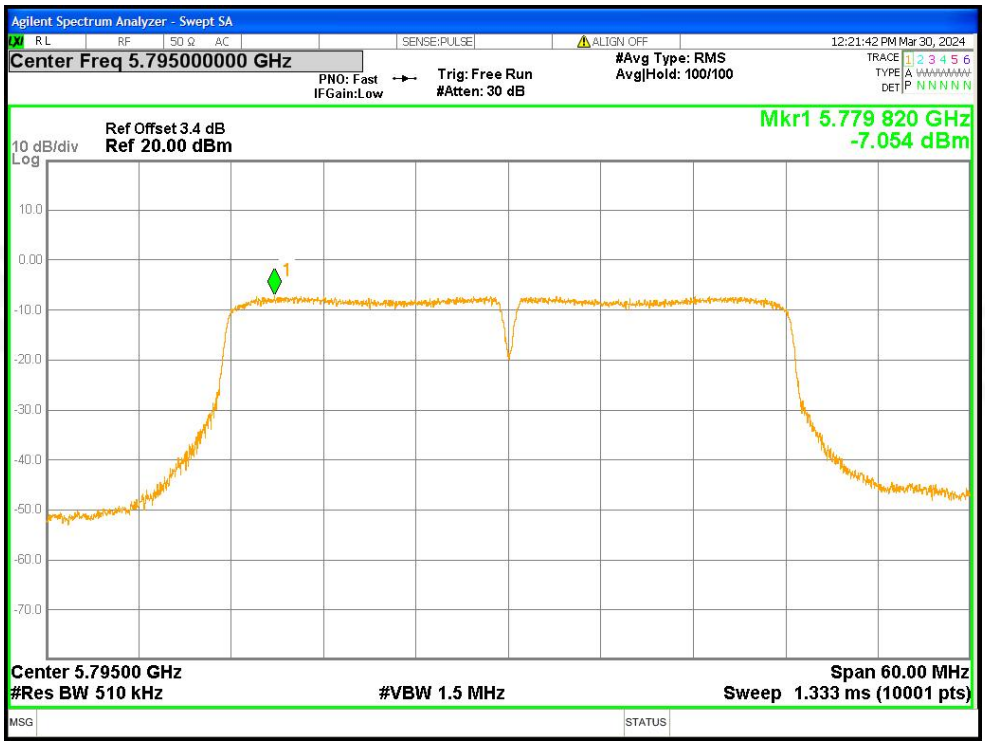


PSD NVNT n40 5755MHz Ant1



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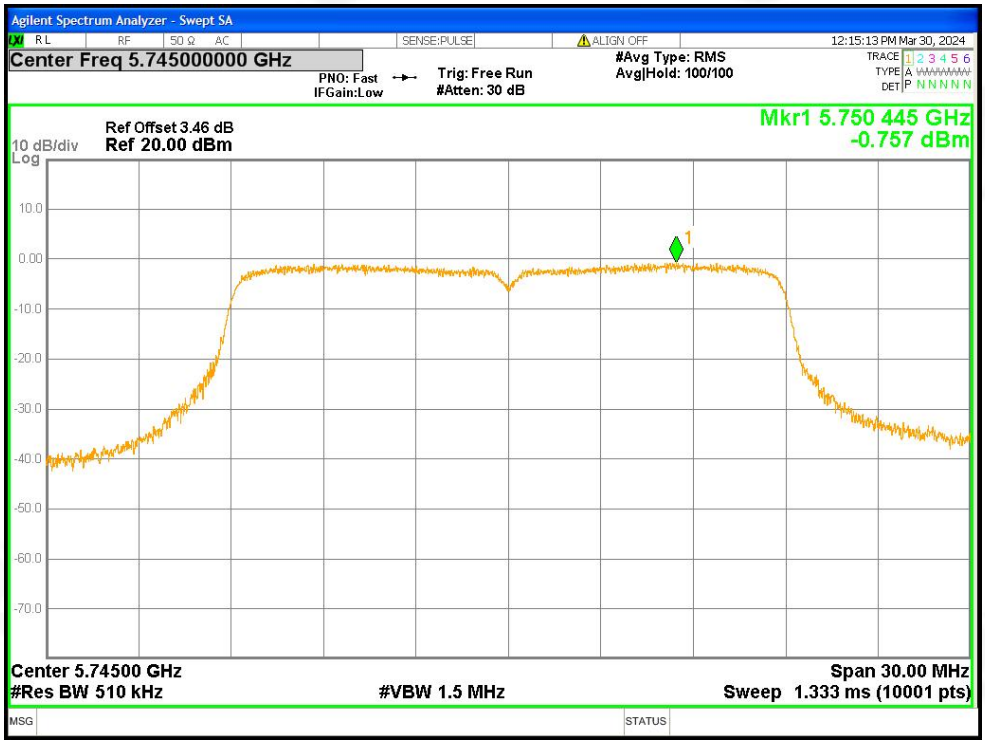

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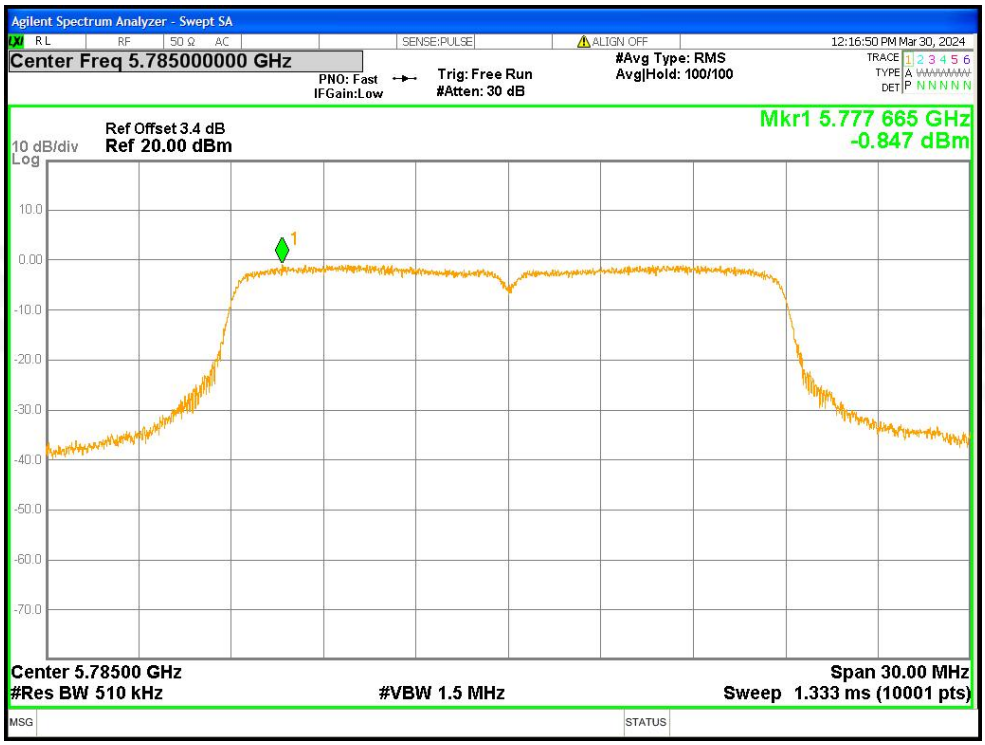

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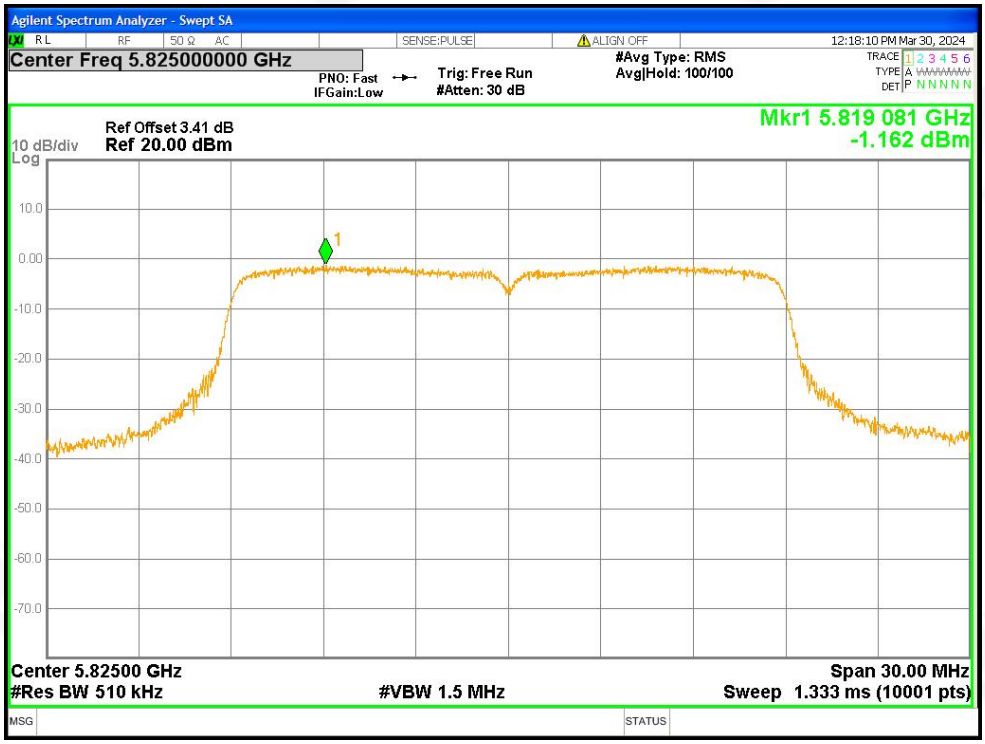

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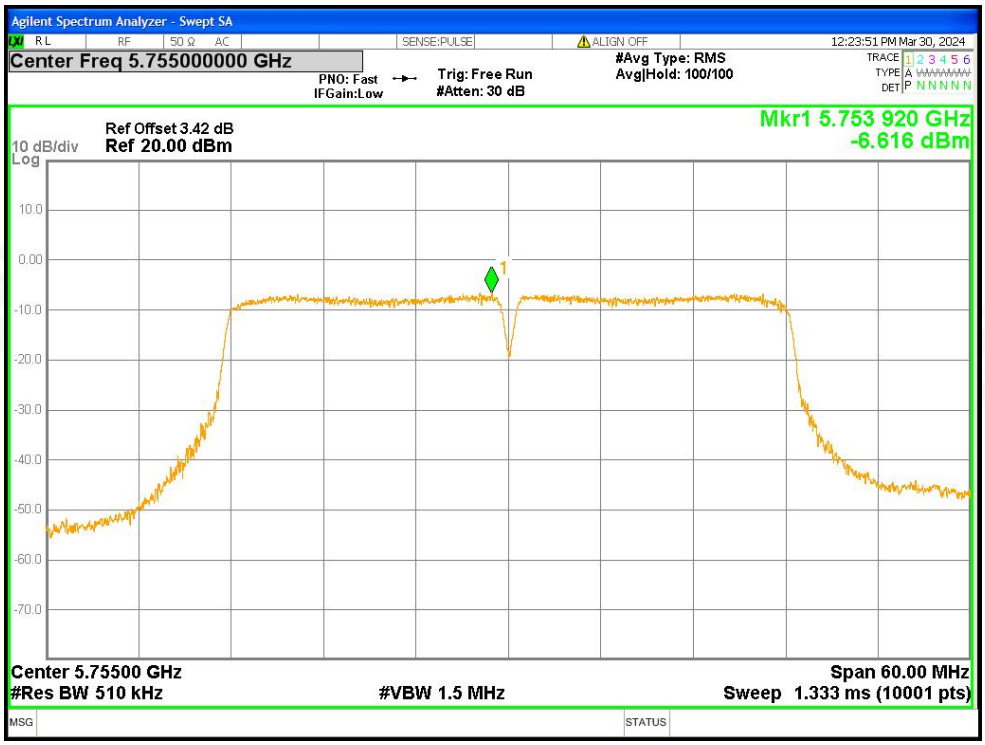

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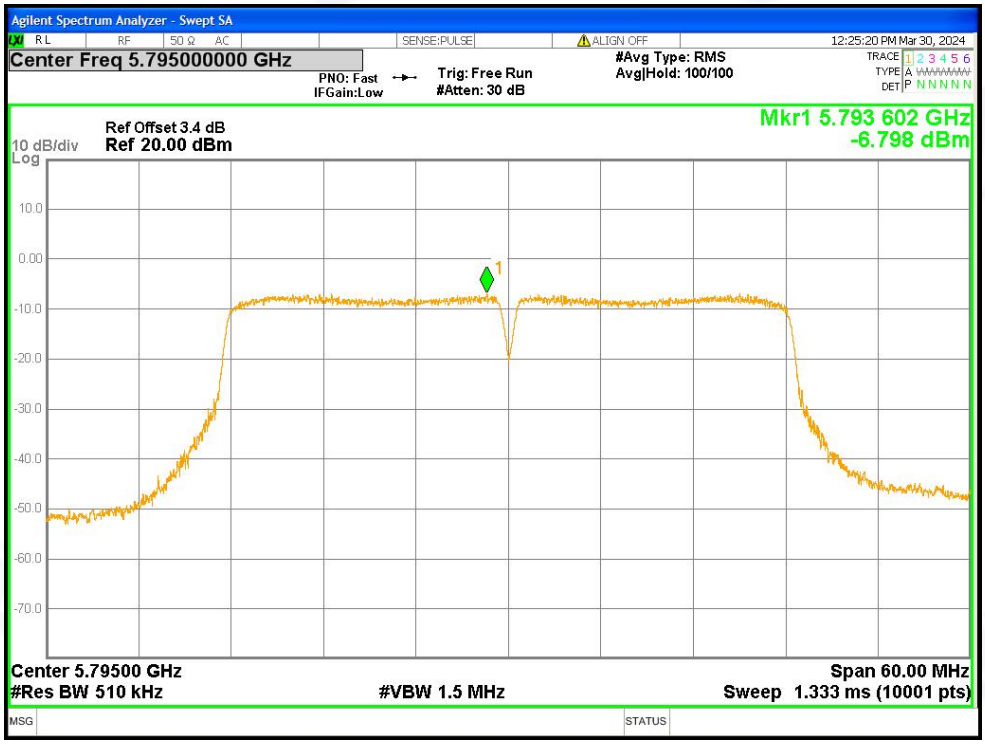

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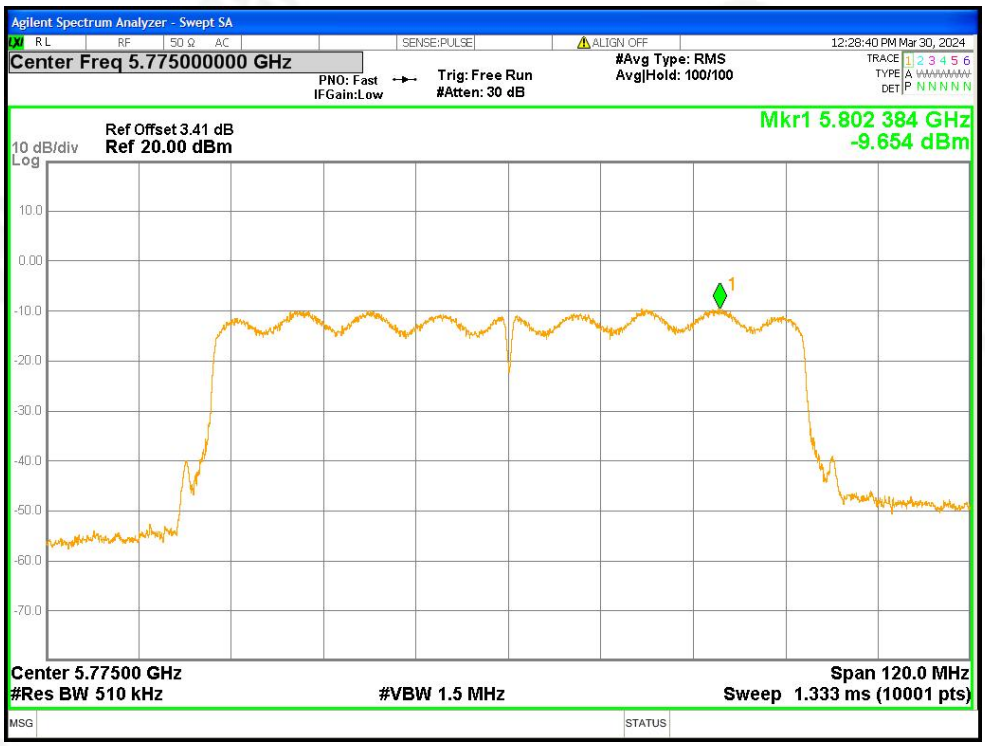


PSD NVNT ac80 5775MHz Ant1

6.26DB & 6DB & 99% EMISSION BANDWIDTH

6.1 APPLIED PROCEDURES / LIMIT

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band, the minimum bandwidth 6 dB bandwidth of U-NII devices shall be at least 500KHz. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

IC BW Limit

Frequency band 5725-5850 MHz：

For equipment operating in the band 5725-5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

Frequency band 5150-5250 MHz

The 26 dB bandwidth may fall into the 5250-5350 MHz band; however, if the occupied bandwidth also falls within the 5250-5350 MHz band, the transmission is considered as intentional and the devices shall comply with all requirements in the band 5250-5350 MHz including implementing dynamic frequency selection (DFS)and TPC, on the portion of the emission that resides in the 5250-5350 MHz band.

6.2 TEST PROCEDURE

a) Set RBW = 100KHz.

b) Set the VBW > RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.

2. Set span = 1.5 times to 5.0 times the OBW.

3. Set RBW = 1 % to 5 % of the OBW

4. Set VBW ≥ 3 · RBW

5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

6. Use the 99 % power bandwidth function of the instrument (if available).

7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

6.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

6.4 TEST RESULTS

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX		

Ant0

Mode	Frequency (MHz)	99% OBW (MHz)
a	5745	16.519
a	5785	16.537
a	5825	16.541
n20	5745	17.71
n20	5785	17.68
n20	5825	17.686
n40	5755	36.131
n40	5795	36.172
ac20	5745	17.737
ac20	5785	17.701
ac20	5825	17.704
ac40	5755	36.129
ac40	5795	36.178
ac80	5775	75.26

Ant1

Mode	Frequency (MHz)	99% OBW (MHz)
a	5745	16.543
a	5785	16.56
a	5825	16.523
n20	5745	17.714
n20	5785	17.684
n20	5825	17.715
n40	5755	36.119
n40	5795	36.136
ac20	5745	17.689
ac20	5785	17.696
ac20	5825	17.684
ac40	5755	36.152
ac40	5795	36.161
ac80	5775	75.339

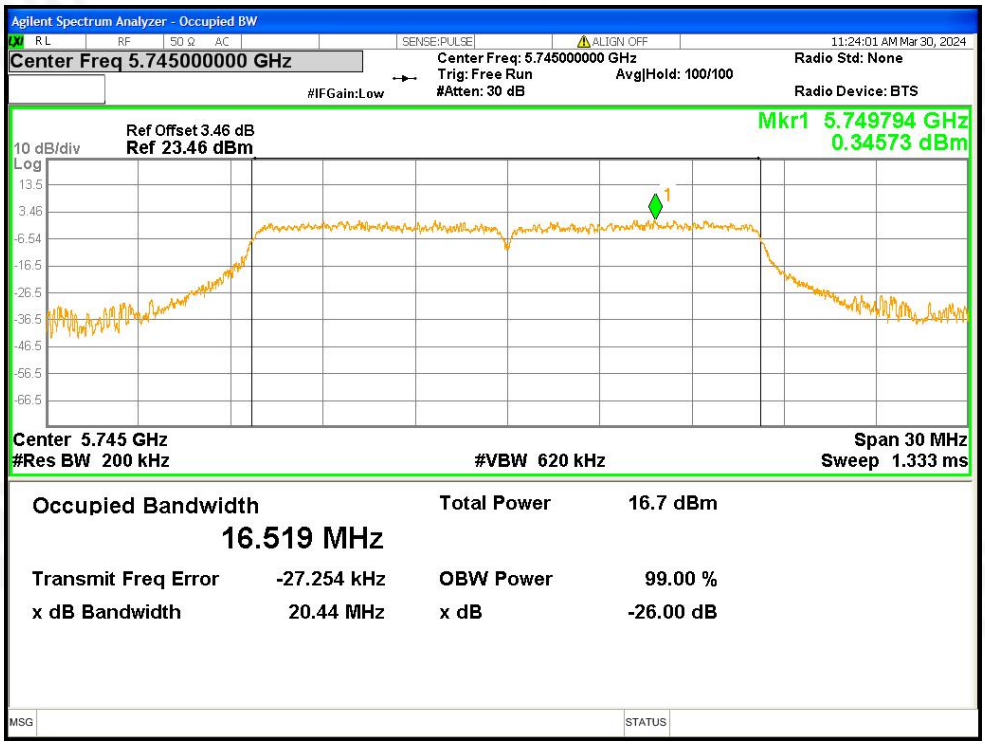
Ant0

Mode	Frequency (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
a	5745	16.553	0.5	Pass
a	5785	16.496	0.5	Pass
a	5825	16.515	0.5	Pass
n20	5745	17.645	0.5	Pass
n20	5785	17.646	0.5	Pass
n20	5825	17.757	0.5	Pass
n40	5755	36.401	0.5	Pass
n40	5795	36.437	0.5	Pass
ac20	5745	17.649	0.5	Pass
ac20	5785	17.674	0.5	Pass
ac20	5825	17.624	0.5	Pass
ac40	5755	36.403	0.5	Pass
ac40	5795	36.398	0.5	Pass
ac80	5775	76.058	0.5	Pass

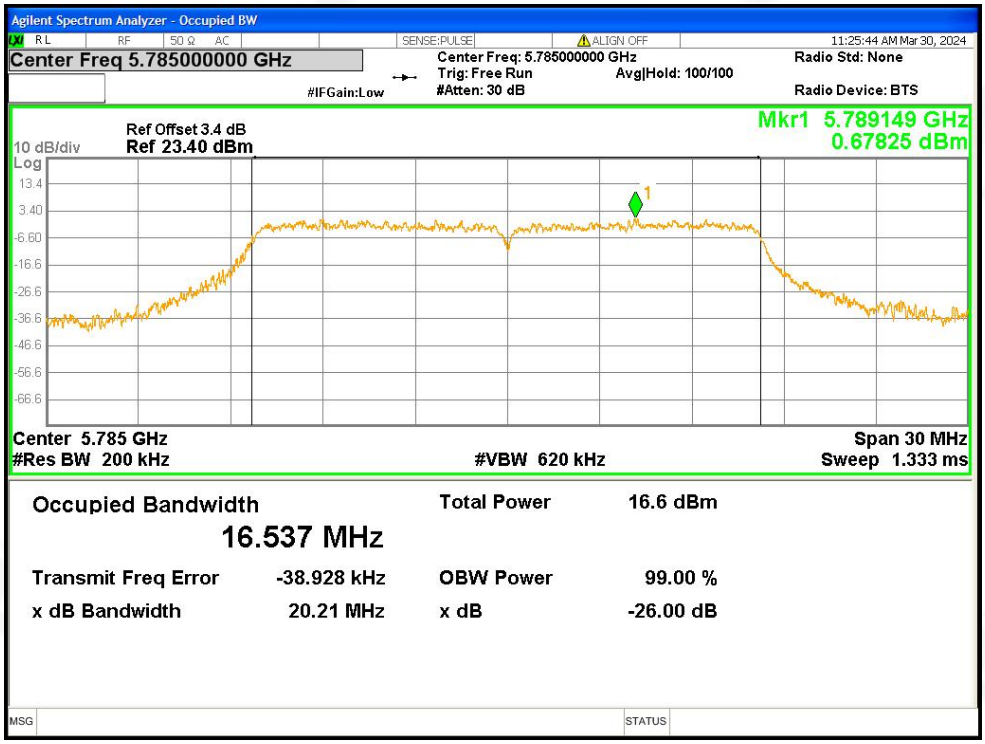
Ant1

Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
a	5745	Ant1	16.532	0.5	Pass
a	5785	Ant1	16.516	0.5	Pass
a	5825	Ant1	16.507	0.5	Pass
n20	5745	Ant1	17.652	0.5	Pass
n20	5785	Ant1	17.658	0.5	Pass
n20	5825	Ant1	17.629	0.5	Pass
n40	5755	Ant1	36.367	0.5	Pass
n40	5795	Ant1	36.42	0.5	Pass
ac20	5745	Ant1	17.676	0.5	Pass
ac20	5785	Ant1	17.621	0.5	Pass
ac20	5825	Ant1	17.701	0.5	Pass
ac40	5755	Ant1	36.393	0.5	Pass
ac40	5795	Ant1	36.436	0.5	Pass
ac80	5775	Ant1	76.056	0.5	Pass

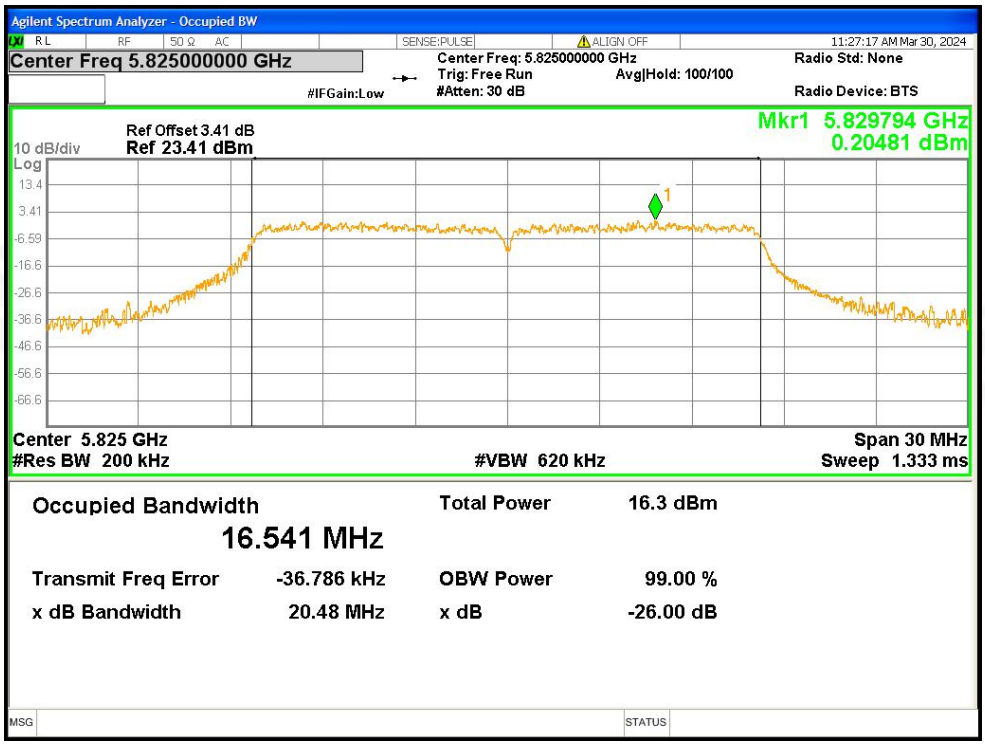
Ant 0



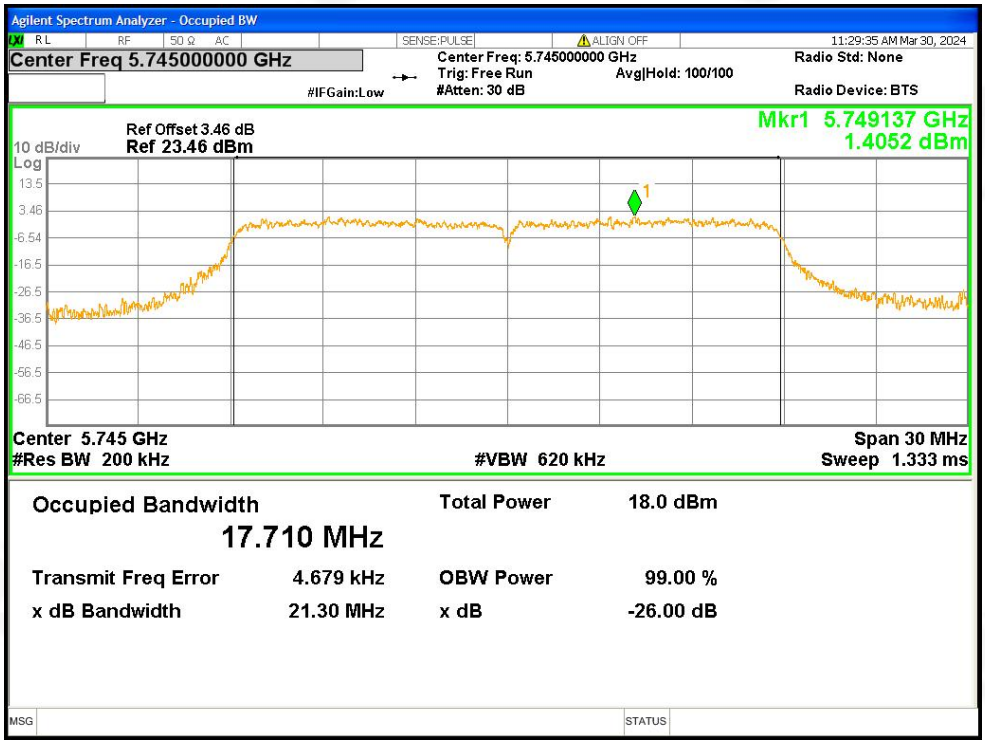
OBW NVNT a 5745MHz



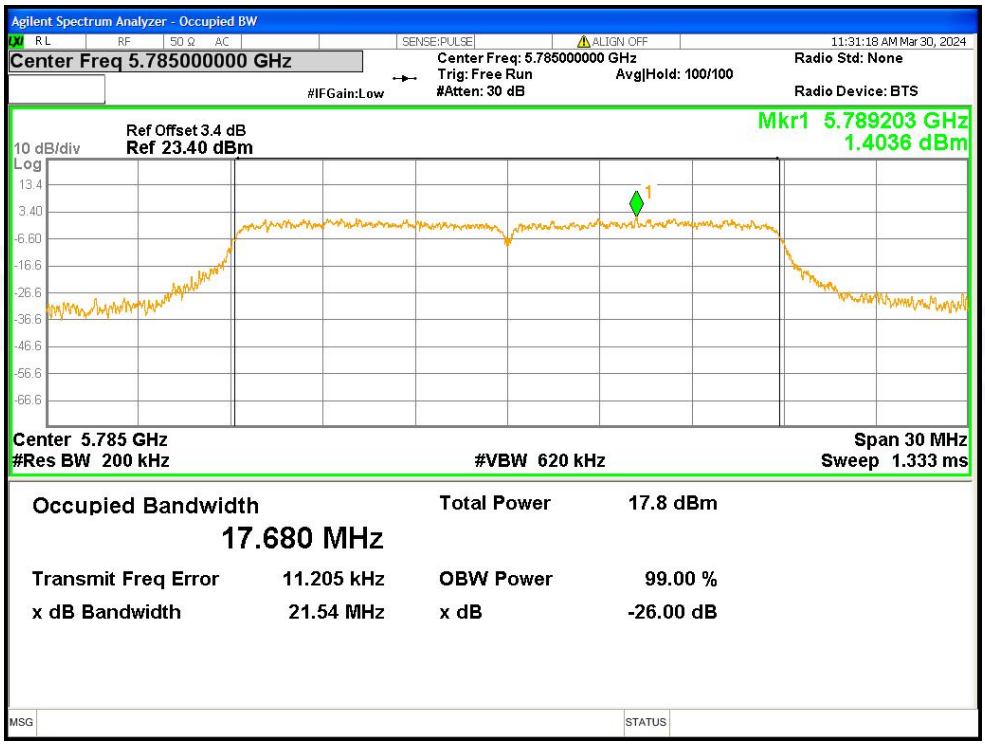
OBW NVNT a 5785MHz



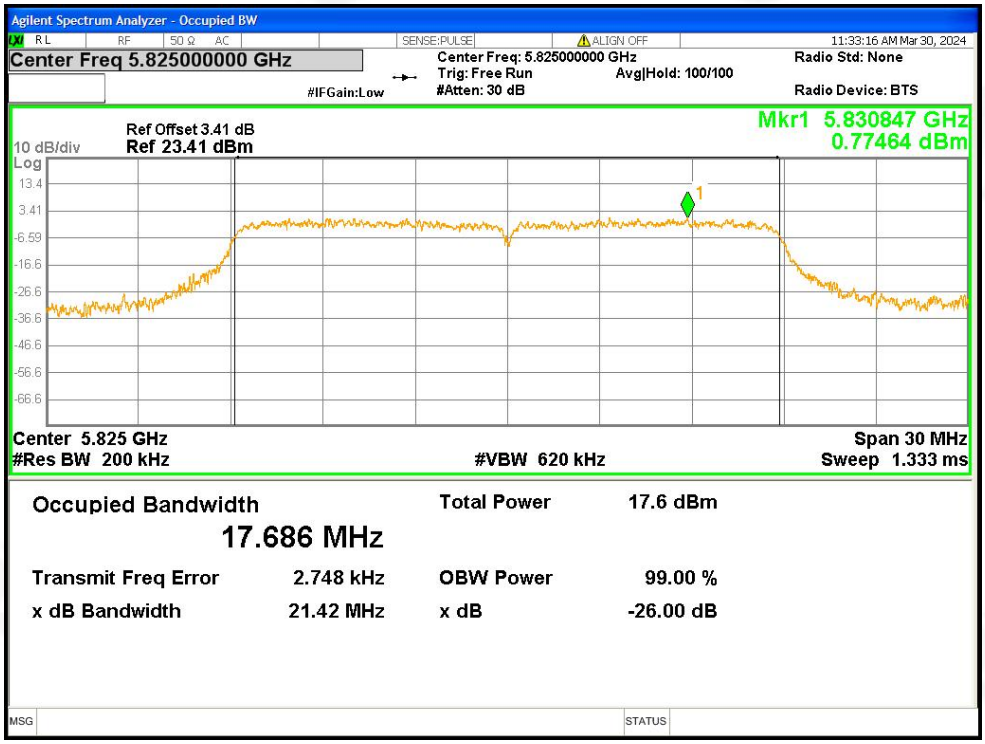
OBW NVNT a 5825MHz



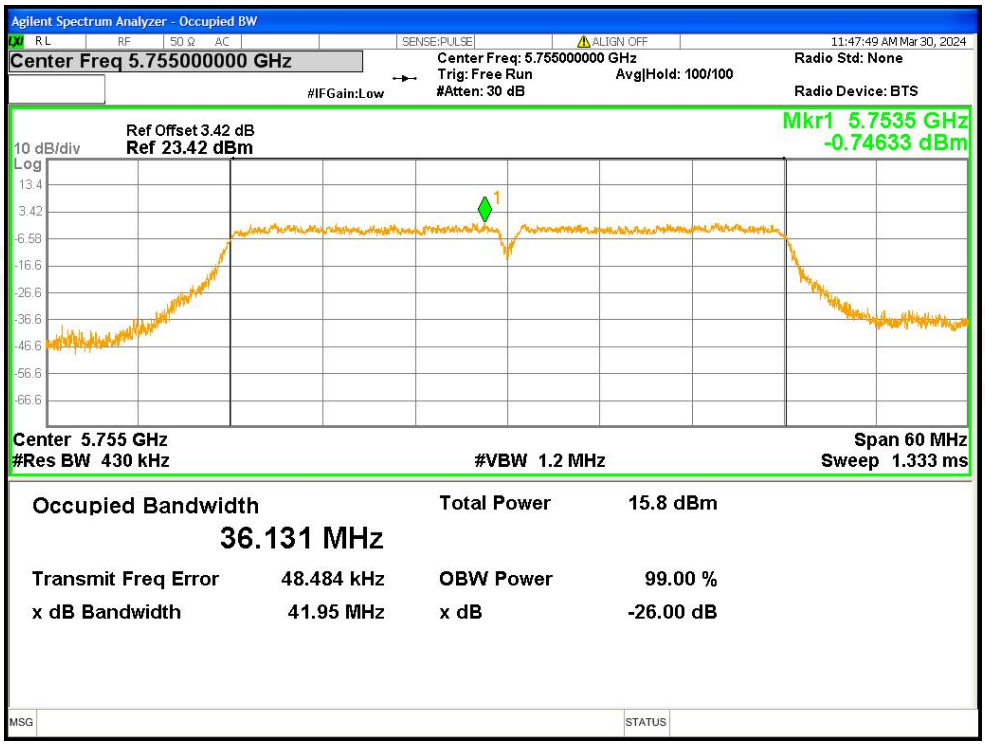
OBW NVNT n20 5745MHz



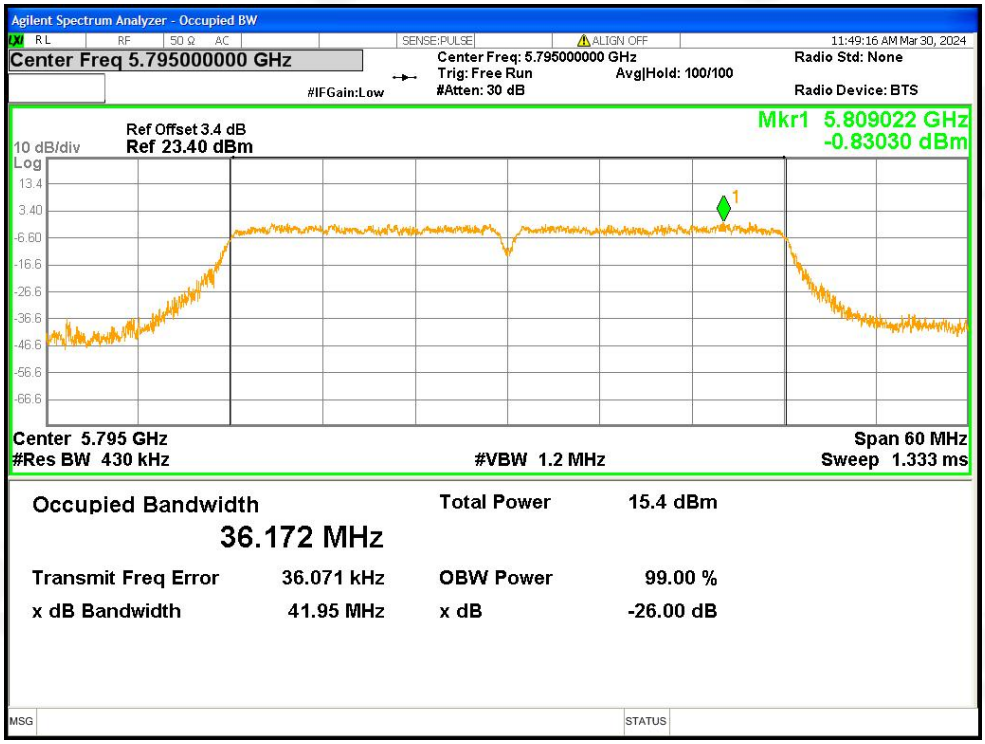
OBW NVNT n20 5785MHz



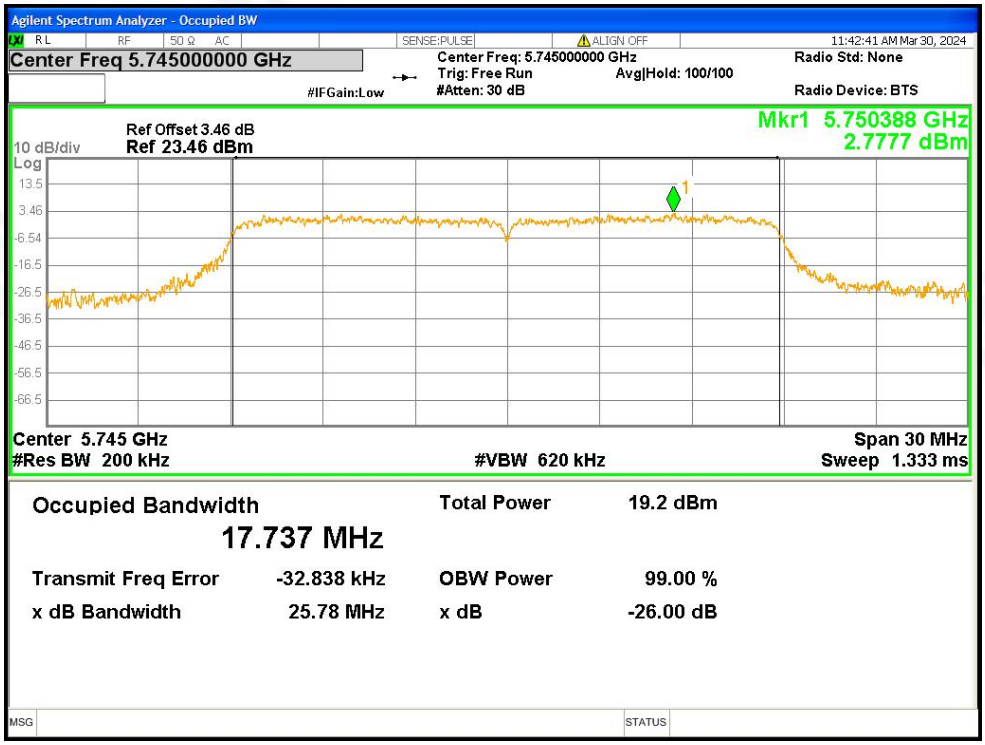
OBW NVNT n20 5825MHz



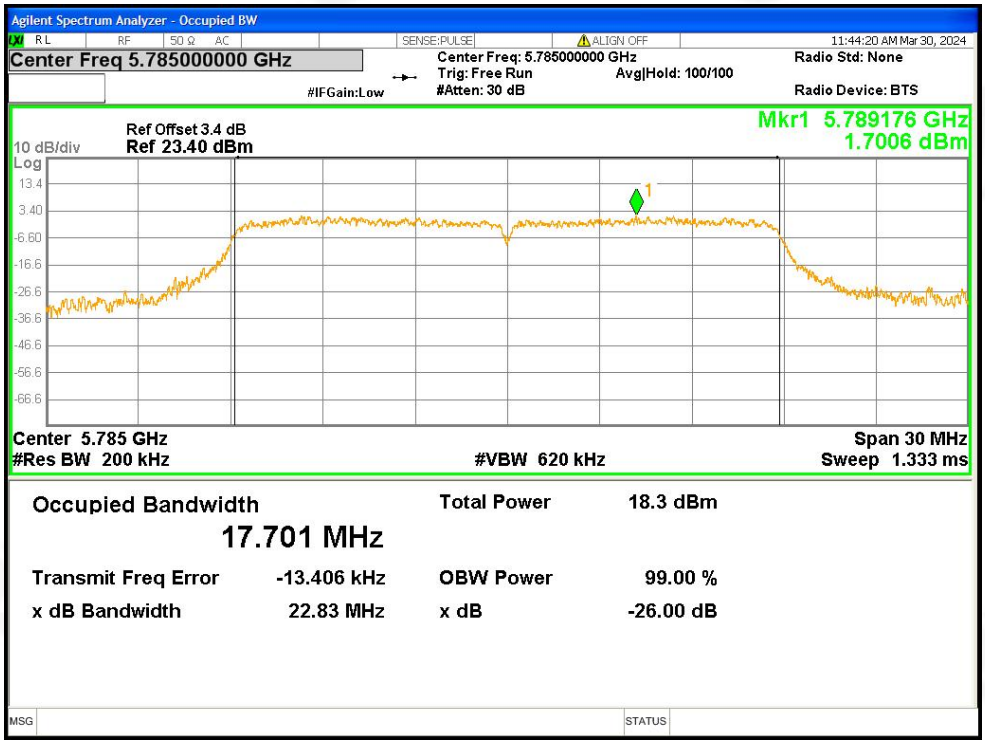
OBW NVNT n40 5755MHz



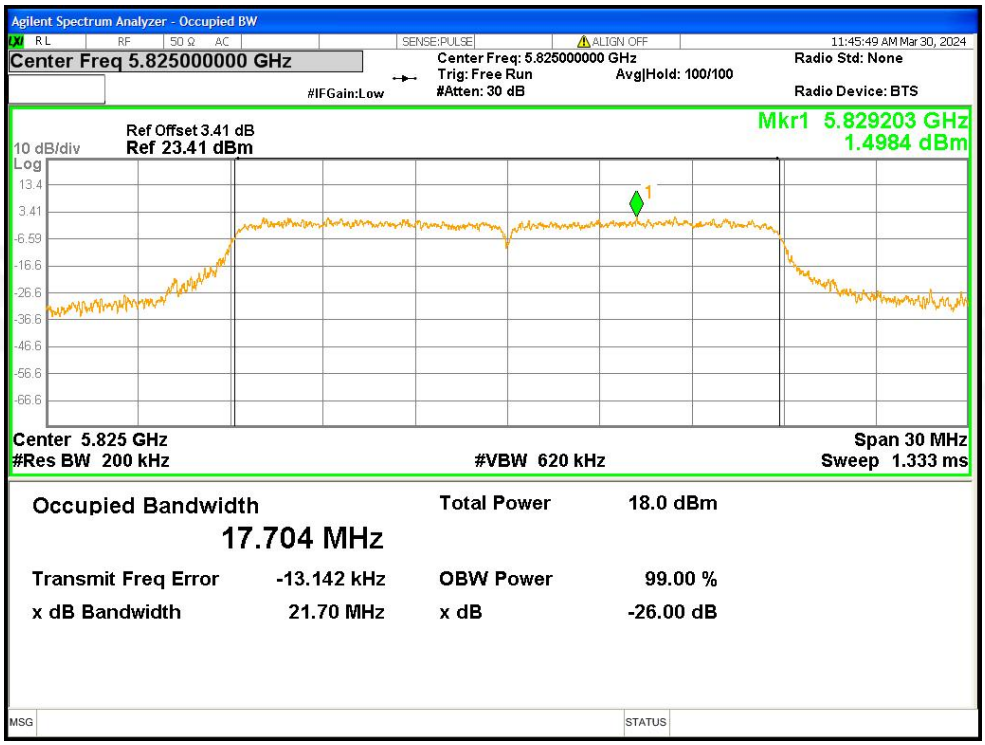
OBW NVNT n40 5795MHz



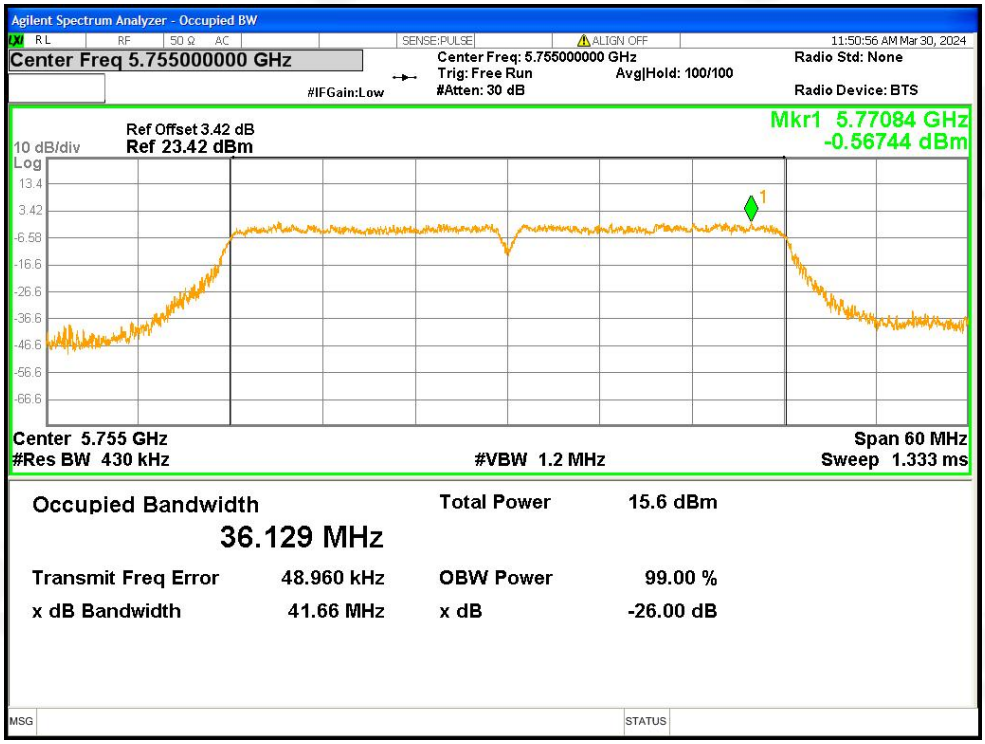
OBW NVNT ac20 5745MHz



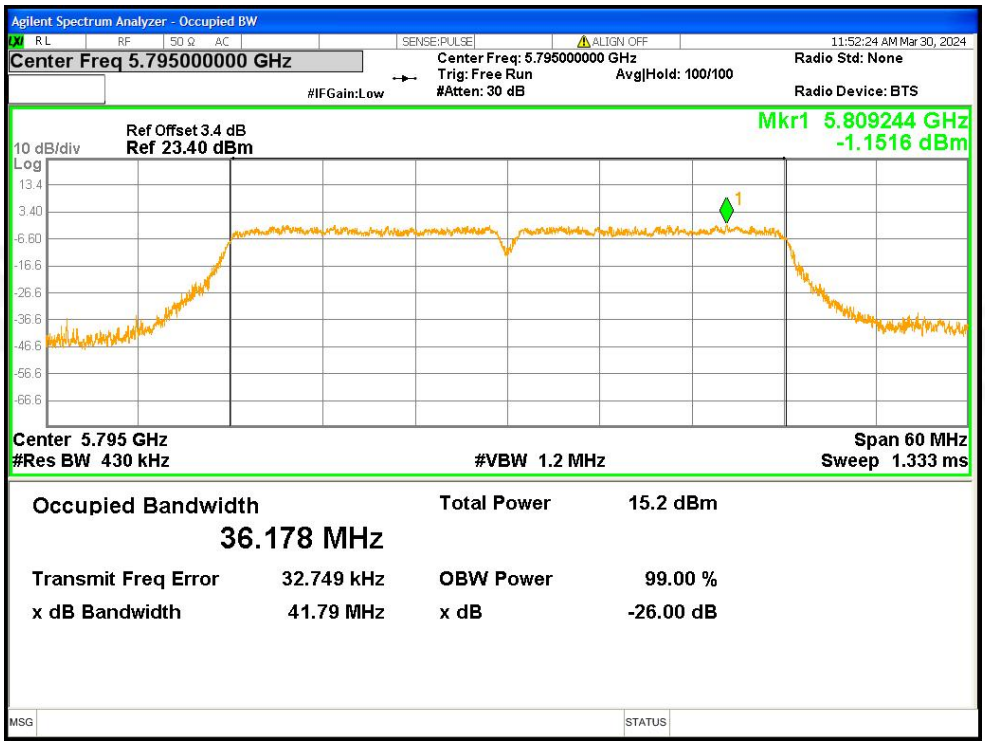
OBW NVNT ac20 5785MHz



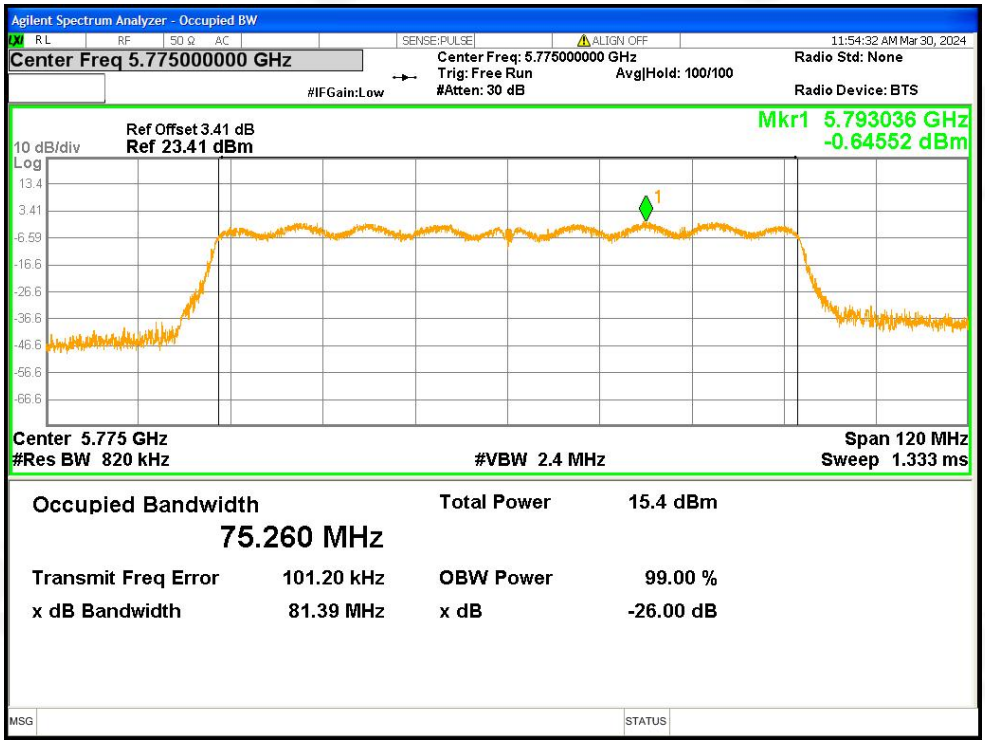
OBW NVNT ac20 5825MHz



OBW NVNT ac40 5755MHz

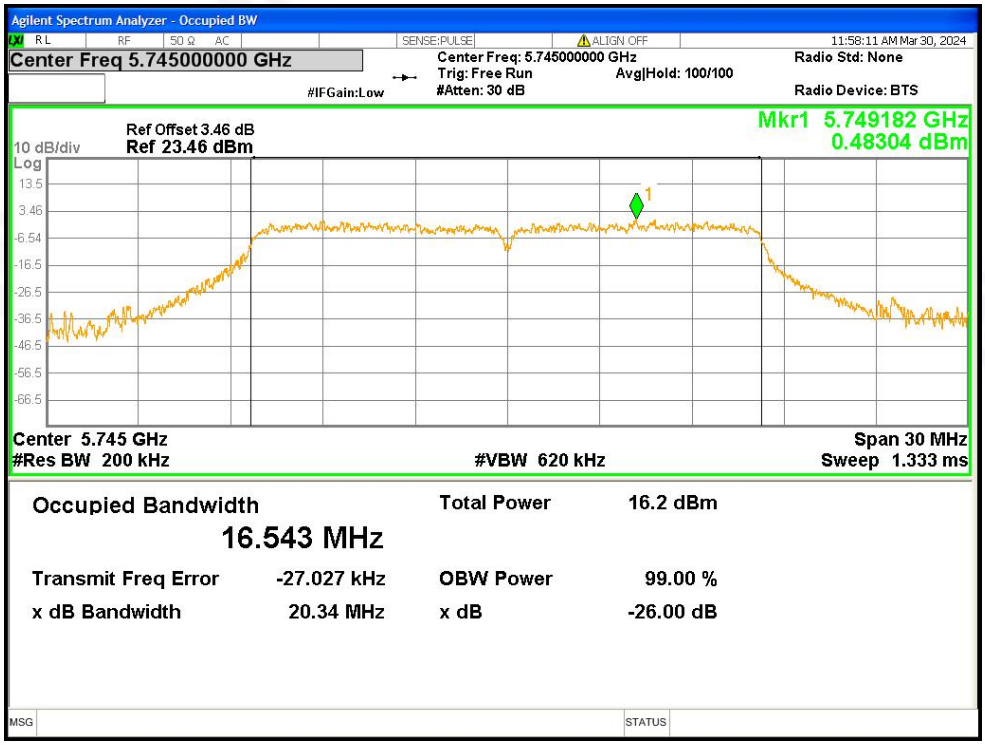


OBW NVNT ac40 5795MHz

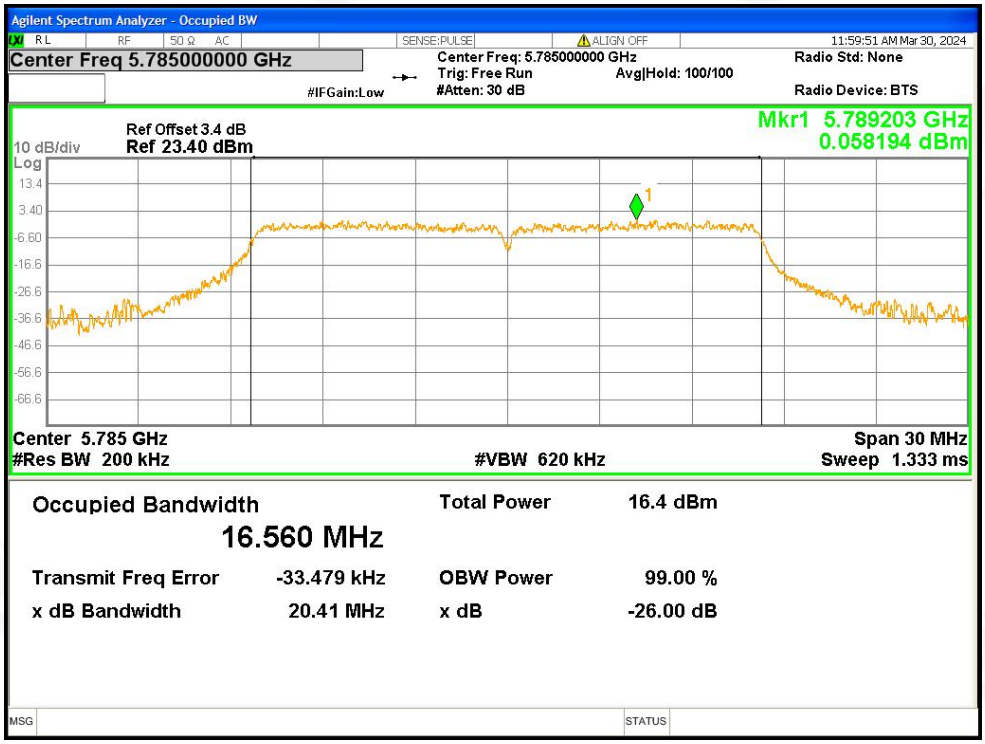


OBW NVNT ac80 5775MHz

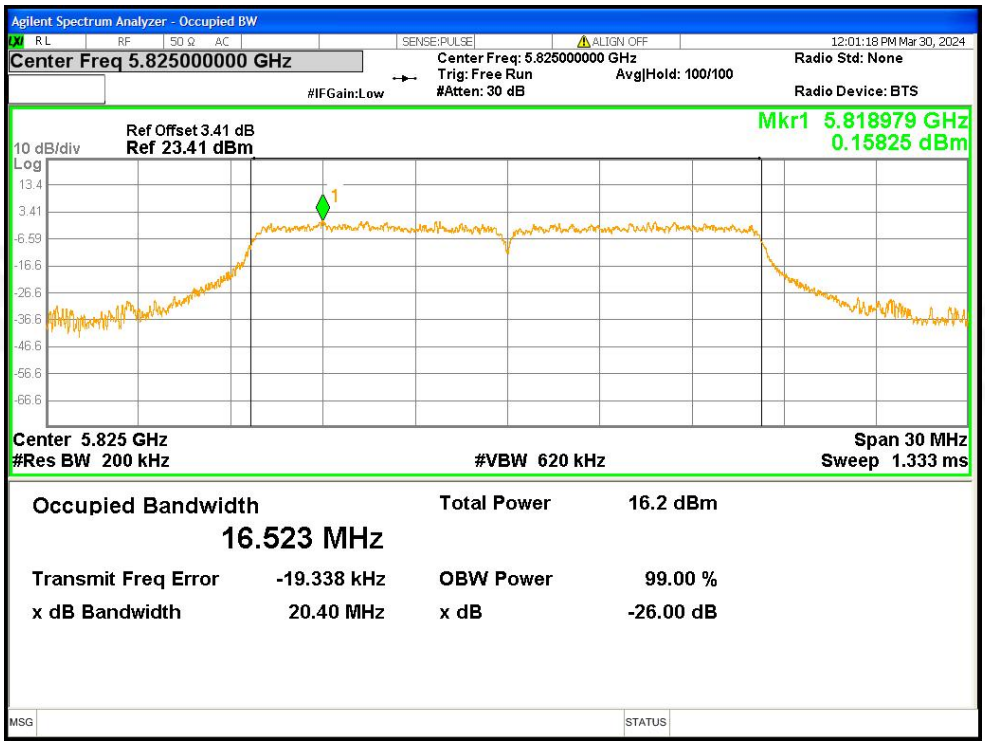
Ant1



OBW NVNT a 5745MHz Ant1



OBW NVNT a 5785MHz Ant1



OBW NVNT a 5825MHz Ant1