REPORT No.: SZ24040157W03

TEST REPORT

APPLICANT	:	Linkplay Technology Inc.
PRODUCT NAME	:	WiiM Ultra Hi-Res Audio Streamer
MODEL NAME	:	ASR004
BRAND NAME	:	WiiM
FCC ID	:	2BABF-ASR004
STANDARD(S)	:	47 CFR Part 15 Subpart C
RECEIPT DATE	:	2024-04-19
TEST DATE	:	2024-04-26 to 2024-06-01
ISSUE DATE	:	2024-06-07

Edited by: Zeng Xiaoying (Rapporteur)

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MORLAB

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DIRECTORY

Change History		
Version	**Date**	**Reason for change**
1.0	2024-06-07	First edition

1. Summary of Test Result

No.	Section	Description	Test Date	Test Engineer	Result	Method Determination /Remark
1	15.203	Antenna Requirement	N/A	N/A	PASS	No deviation
2	N/A	Duty Cycle of Test Signal	May 15, 2024	Su Xiaoxian	PASS	No deviation
3	15.247(b)	Maximum Peak Conducted Output Power	May 15, 2024 Jun. 03, 2024	Su Xiaoxian	PASS	No deviation
4	15.247(b)	Maximum Average Conducted Output Power	May 15, 2024 Jun. 03, 2024	Su Xiaoxian	PASS	No deviation
5	15.247(a)	Bandwidth	May 15, 2024	Su Xiaoxian	PASS	No deviation
6	15.247(d)	Conducted Spurious Emission and Band Edge	May 24, 2024	Su Xiaoxian	PASS	No deviation
7	15.247(e)	Power Spectral Density	May 15&24, 2024	Su Xiaoxian	PASS	No deviation
8	15.207	Conducted Emission	May 27, 2024	Wang Deyong	PASS	No deviation
9	15.247(d)	Restricted Frequency Bands	May 25, 2024	Gao Jianrou	PASS	No deviation
10	15.209, 15.247(d)	Radiated Emission	May 25, 2024	Gao Jianrou	PASS	No deviation

Note 1: All test items are tested and evaluated in the worse mode with reference to output power results.

Note 2: The tests were performed according to the method of measurements prescribed in ANSI C63.10-2013 and KDB 558074 D01 v05r02.

Note 3: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.

Note 4: When the test result is a critical value, we will use the measurement uncertainty give the

judgment result based on the 95% confidence intervals.

1.1. Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

• 47 CFR Part 15 Subpart C Radio Frequency Devices

1.2. Test Equipment List

1.2.1 Conducted Test Equipment

Equipment	Serial No.	Type	Manufacturer	Cal. Date	Due Date
EXA Signal Analzyer	MY53470836	N9010A	Agilent	2024.02.19	2025.02.18
Power Sensor	MY54180008	U2021XA	Agilent	2023.10.17	2024.10.16
Attenuator	MTJ6004-20	VAT-10+	MTJ Cooperation	N/A	N/A
RF Cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
Coaxial Cable	CB02	RF02	Morlab	N/A	N/A
SMA Connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

1.2.2 Conducted Emission Test Equipment

Equipment	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Receiver	MY56400093	N9038A	KEYSIGHT	2024.01.25	2025.01.24
LISN	8127449	NSLK 8127	Schwarzbeck	2024.02.02	2025.02.01
Pulse Limiter (10dB)	VTSD 9561 F-B #206	VTSD 9561-F	Schwarzbeck	2023.06.27	2024.06.26
RF Coaxial Cable (DC-100MHz)	BNC	MRE04	Qualwave	N/A	N/A

1.2.3 List of Software Used

Description	Manufacturer	Software Version
Test System	MaiWei	2.0.0.0
Morlab EMCR	Morlab	V1.2
TS+ -[JS32-CE]	Tonscend	V2.5.0.0

1.2.4 Radiated Test Equipment

Equipment	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Receiver	MY54130016	N9038A	Agilent	2023.06.21	2024.06.20
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2023.07.01	2024.06.30
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2023.06.26	2024.06.25
Test Antenna – Horn	01774	BBHA 9120D	Schwarzbeck	2023.07.01	2024.06.30
Test Antenna – Horn	BBHA9170 #773	BBHA9170	Schwarzbeck	2023.07.01	2024.06.30
Preamplifier (10MHz-6GHz)	46732	S10M100L3802	LUCIX CORP.	2023.06.27	2024.06.26
Preamplifier (2GHz-18GHz)	61171/61172	S020180L3203	LUCIX CORP.	2023.06.27	2024.06.26
Preamplifier (18GHz-40GHz)	DS77209	DCLNA0118-40C-S	Decentest	2023.07.04	2024.07.03
RF Coaxial Cable (DC-18GHz)	MRE001	PE330	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE002	CLU18	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-18GHz)	MRE003	CLU18	Pasternack	2023.06.27	2024.06.26
RF Coaxial Cable (DC-40GHz)	22290045	QA360-40-KK-0.5	Qualwave	2023.07.04	2024.07.03
RF Coaxial Cable (DC-40GHz)	22290046	QA360-40-KKF-2	Qualwave	2023.07.04	2024.07.03
RF Coaxial Cable (DC-18GHz)	22120181	QA500-18-NN-5	Qualwave	2023.07.04	2024.07.03
Notch Filter	N/A	WRCG-2400-2483.5-60SS	Wainwright	N/A	N/A
Anechoic Chamber	N/A	9m*6m*6m	CRT	2022.05.10	2025.05.09

1.3. Measurement Uncertainty

Test Items	Uncertainty	Remark
Peak Output Power	±2.22dB	Confidence levels of 95%
Power Spectral Density	±2.22dB	Confidence levels of 95%
Bandwidth	±5%	Confidence levels of 95%
Conducted Spurious Emission	±2.77dB	Confidence levels of 95%
Restricted Frequency Bands	±5%	Confidence levels of 95%
Radiated Emission	±2.95dB	Confidence levels of 95%
Conducted Emission	±2.44dB	Confidence levels of 95%

1.4. Testing Laboratory

Laboratory Name	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone	+86 755 36698555
Facsimile	+86 755 36698525
FCC Designation Number	CN1192
FCC Test Firm Registration Number	226174

2. General Description

2.1. Information of Applicant and Manufacturer

Applicant	Linkplay Technology Inc.
Applicant Address	8000 Jarvis Avenue Suite #130, Newark, CA 94560
Manufacturer	Linkplay Technology Inc.
Manufacturer Address	8000 Jarvis Avenue Suite #130, Newark, CA 94560

2.2. Information of EUT

Product Name:	WiiM Ultra Hi-Res Audio Streamer
Sample No.:	1#
Hardware Version:	A98D V02+Main Board V02
Software Version:	Linkplay.5.3.613253
Modulation Technology:	DSSS, OFDM, OFDMA
Modulation Type:	Refer to section2.3
Wireless Technology:	802.11b, 802.11g, 802.11n (HT20), 802.11ax (HEW20)
Operating Frequency Range:	2412MHz–2462MHz
Antenna Type:	PIFA Antenna
Antenna Gain:	ANT1: 3.46dBi; ANT2: 3.46dBi

Note 1: The EUT has two antennas and it operates in single antenna. Both of the two antennas were evaluated separately, only the worst test result (ANT1) were recorded in the test report.

Note 2: We use the dedicated software to control the EUT continuous transmission.

Note 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

2.3. Channel List of EUT

Nominal Channel Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	**1**	**2412**	8	2447
	2	2417	9	2452
	3	2422	10	2457
	4	2427	**11**	**2462**
	5	2432		
	6	**2437**		
	7	2442		

Note 1: The black bold channels were selected for test.

2.4. Test Configuration of EUT

2.4.1.Modulation Type and Data Rate of EUT

Mode	Bandwidth (MHz)	Modulation Technology	Modulation Type	Data Rate	RU Size
802.11b	20	DSSS	**DBPSK**	**1**/2/5.5/11Mbps	N/A
			DQPSK		
			CCK		
802.11g	20	OFDM	**BPSK**	**6**/9/12/18/24/36/48/54 Mbps	N/A
			QPSK		
			16QAM		
			64QAM		
802.11n	20 (HT20/40)	OFDM	**BPSK**	**MCS0**~MCS7	N/A
			QPSK		
			16QAM		
			64QAM		
802.11ax	20 (HEW20)	OFDM/ OFDMA	**BPSK**	**MSC0**~MCS11	26/52/106
			QPSK		
			16QAM		
			64QAM		
			256QAM		
			1024QAM		

Note1: The worst-case mode (bold face) in all data rates has been determined during the pre-scan, only the test data of the worst-case were recorded in this report.

Note2: The RF signal transmission of EUT is controlled by the build-in engineering mode which is provided by the manufacturer. The recorded power setting value is the maximum that the engineering mode has configuration during testing.

2.4.2.802.11ax RU Allocation

BW (MHz)	RU Size			User	RU Offset
	Full (Tone)	Partial			
		(Tone)	BW (MHz)		
20	242	26	2	9	@0/1/2/3/4/5/6/7/8
		52	4	4	@37/38/39/40
		106	8	2	@53/54

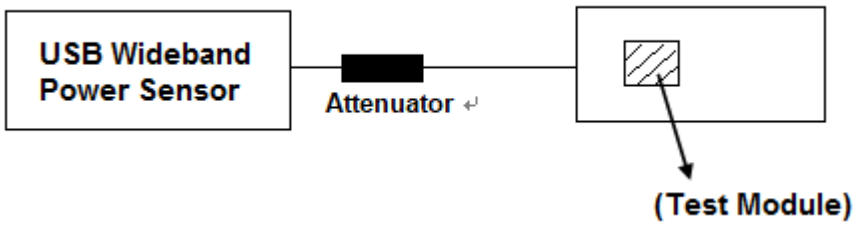
2.5. Test Conditions

Temperature (°C)	15–35
Relative Humidity (%)	30–60
Atmospheric Pressure (kPa)	86–106

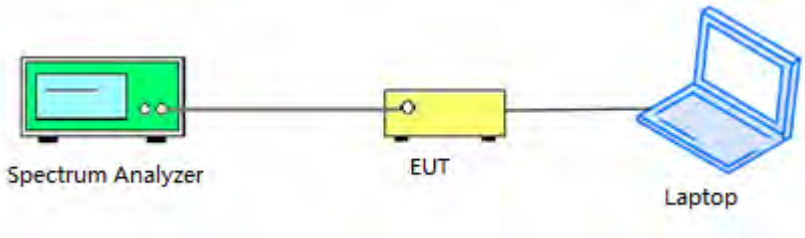
2.6. Test Setup Layout Diagram

2.6.1.Conducted Measurement

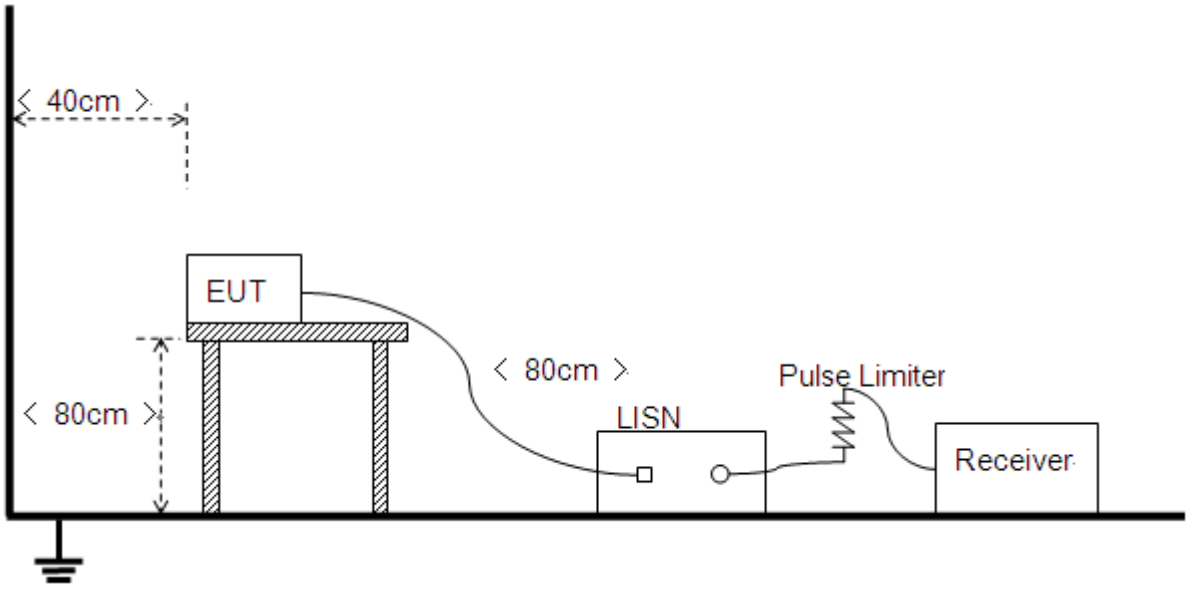
Power item



Other items

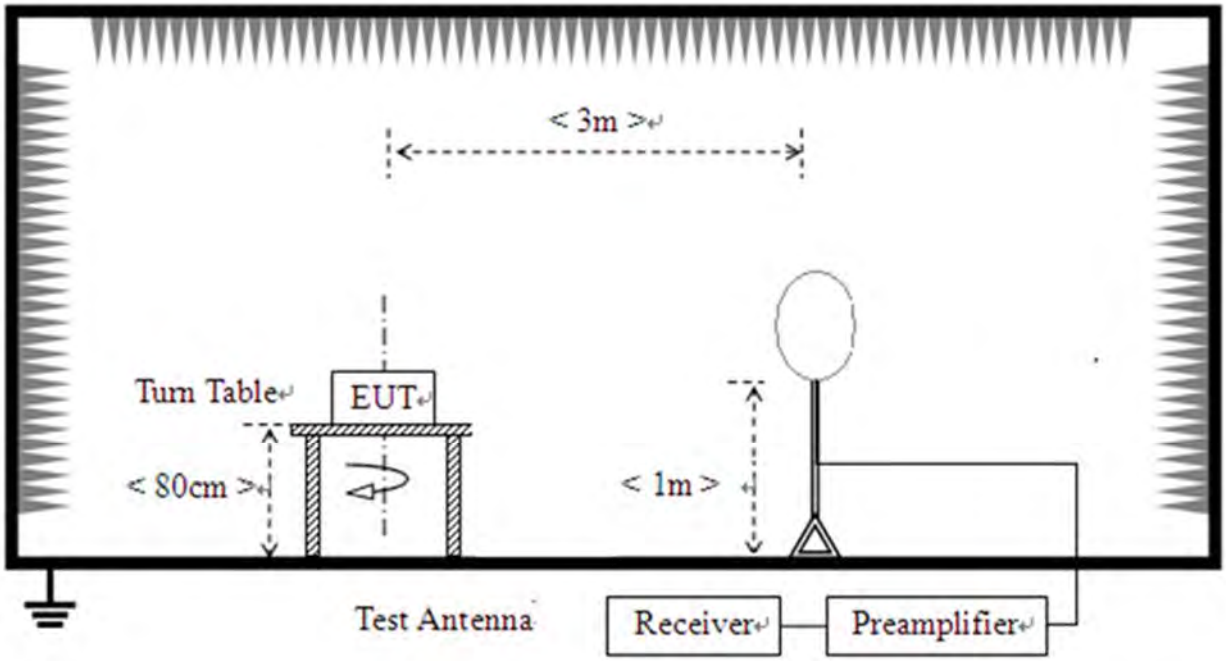


2.6.2.Conducted Emission Measurement

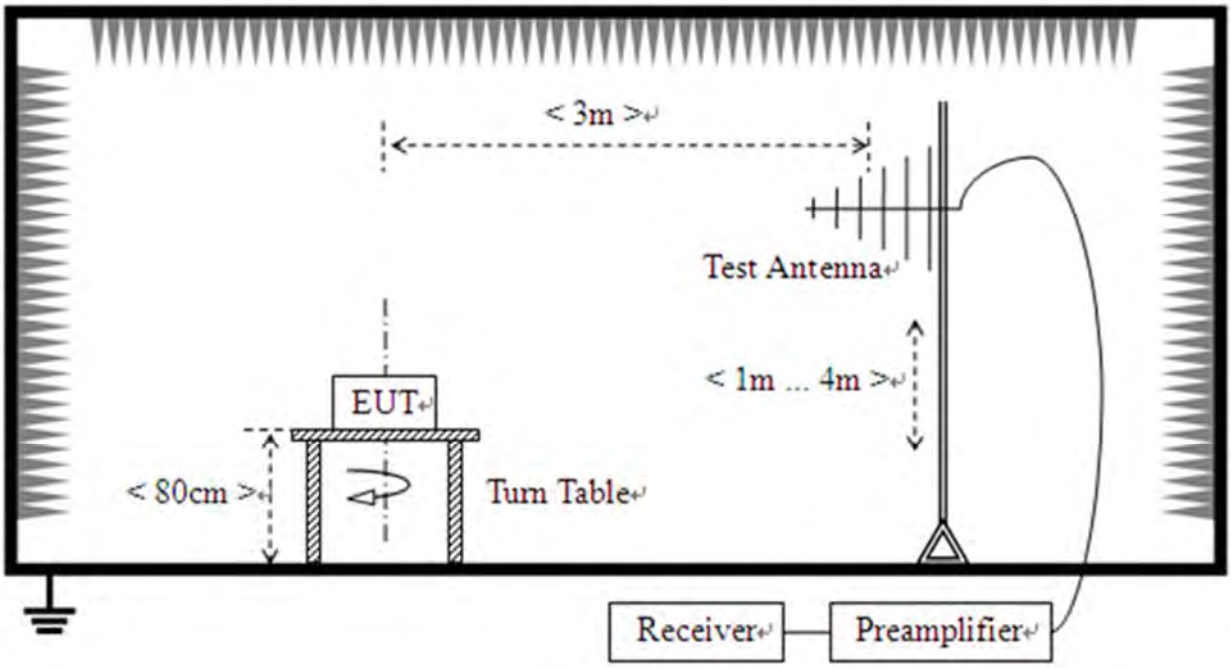


2.6.3.Radiation Measurement

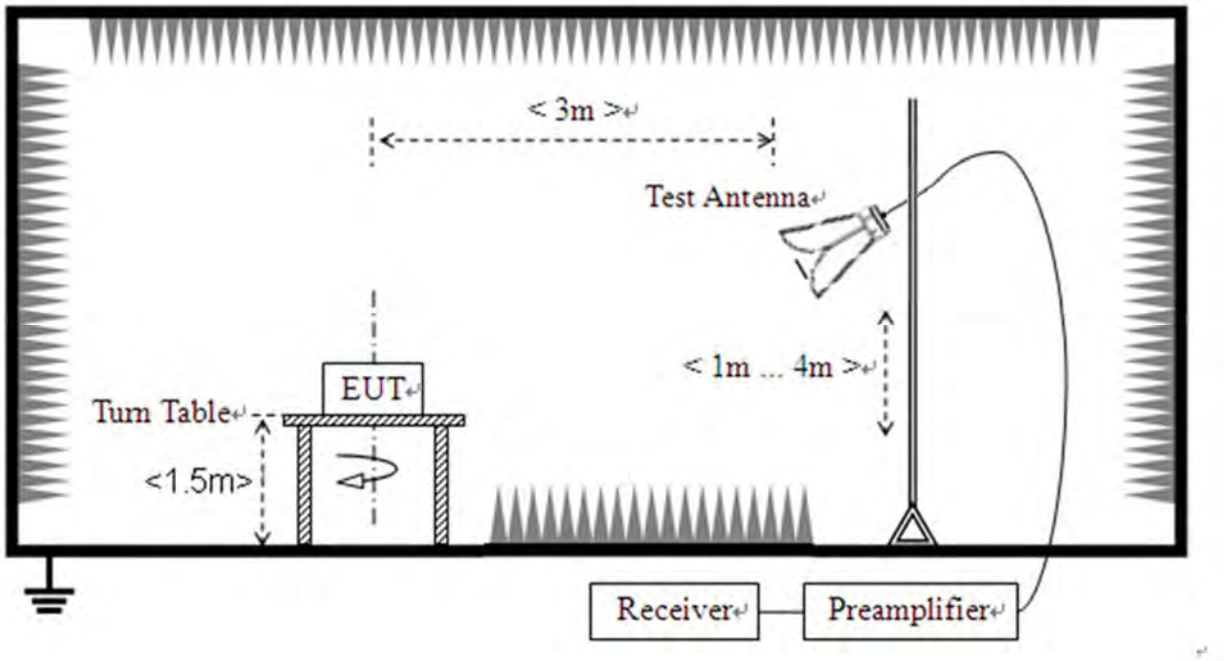
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



3. Test Results

3.1. Antenna Requirement

3.1.1.Requirement

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.1.2.Test Result

The EUT has a PIFA antenna coupled with the I-PEX connector. Please refer to the EUT internal photos.

3.2. Duty Cycle of Test Signal

3.2.1.Requirement

Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%).When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be used to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration(T) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed T at any time that data are being acquired (i.e.,no transmitter OFF-time is to be considered).
When continuous transmission cannot be achieved and sweep triggering/signal gating cannot be implemented, alternative procedures are provided that can be used to measure the average power; however, they will require an additional measurement of the transmitter duty cycle (D). Within this sub clause, the duty cycle refers to the fraction of time over which the transmitter is ON and is transmitting at its maximum power control level. The duty cycle is considered to be constant if variations are less than ±2%; otherwise, the duty cycle is considered to be non constant.

3.2.2.Test Result

Refer to Annex A.1 in this report.

3.3. Maximum Peak and Average Conducted Output Power

3.3.1.Requirement

According to FCC section 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: The maximum conducted output power of the intentional radiator shall not exceed 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in above of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2.Test Procedures

The EUT (Equipment under the test) which is coupled to the USB Wideband Power Sensor; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

3.3.3.Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.3.4.Test Result

Refer to Annex A.2 and A.3 in this report.

3.4.6 dB Bandwidth

3.4.1.Requirement

According to FCC section 15.247(a) (2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

3.4.1.Test Procedures

KDB 558074 Section 8.2 was used in order to prove compliance.

3.4.2.Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.4.3.Test Result

Refer to Annex A.4 in this report.

3.5. Conducted Spurious Emissions and Band Edge

3.5.1.Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

3.5.2.Test Procedures

KDB 558074 Section 8.5 and 8.7 was used in order to prove compliance.

3.5.3.Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.5.4.Test Result

Refer to Annex A.5 and A.6 in this report.

3.6. Power Spectral Density

3.6.1.Requirement

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

3.6.2.Test Procedures

The measured power spectral density was calculated by the reading of the spectrum analyzer and calibration. Following is the test procedure for PSD test:
a) Set analyzer center frequency to channel center frequency
b) Set span to1.5 times DTS
c) Set RBW to 30kHz
d) Set VBW to 100kHz
e) Detector = peak
f) Sweep time = auto couple
g) Trace mode = max hold
h) Allow trace to fully stabilize
i) Use the peak marker function to determine the maximum amplitude level and recorded as PD
j) Use below formula to calculate the Conducted PSD value that at specified RBW:
Conducted PSD=PD-10lg(30k/3k)

3.6.3.Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.6.4.Test Result

Refer to Annex A.7 in this report.

3.7. Conducted Emission

3.7.1.Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

Frequency Range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

Note:

(a) The lower limit shall apply at the band edges.

(b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

3.7.2.Test Procedures

The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10: 2013.

3.7.3.Test Setup Layout

Refer to chapter 2.6.2 in this report.

3.7.4.Test Result

Refer to Annex A.8 in this report.

3.8. Restricted Frequency Bands

3.8.1.Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, 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).

3.8.2.Test Procedures

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.
For the Test Antenna:
Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.
Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1GHz, 100 kHz for f < 1GHz
VBW = 3 MHz
Sweep = auto
Detector function = peak/average
Trace = max hold
Allow the trace to stabilize

3.8.3.Test Setup Layout

Refer to chapter 2.6.3 in this report.

3.8.4.Test Result

Refer to Annex A.9 in this report.

3.9. Radiated Emission

3.9.1.Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note1: For above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
Note2: For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table).

3.9.2.Test Procedures

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz.The antenna to EUT distance is 3meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 30MHz, the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9kHz-90 kHz, 110kHz-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

For measurements below 1GHz the resolution bandwidth is set to 100kHz for peak detection measurements or 120kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements and as applicable for average measurements.

The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions. For measurements above 1 GHz, keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.

3.9.3.Test Setup Layout

Refer to chapter 2.6.3 in this report.

3.9.4.Test Result

Refer to Annex A.10 in this report.

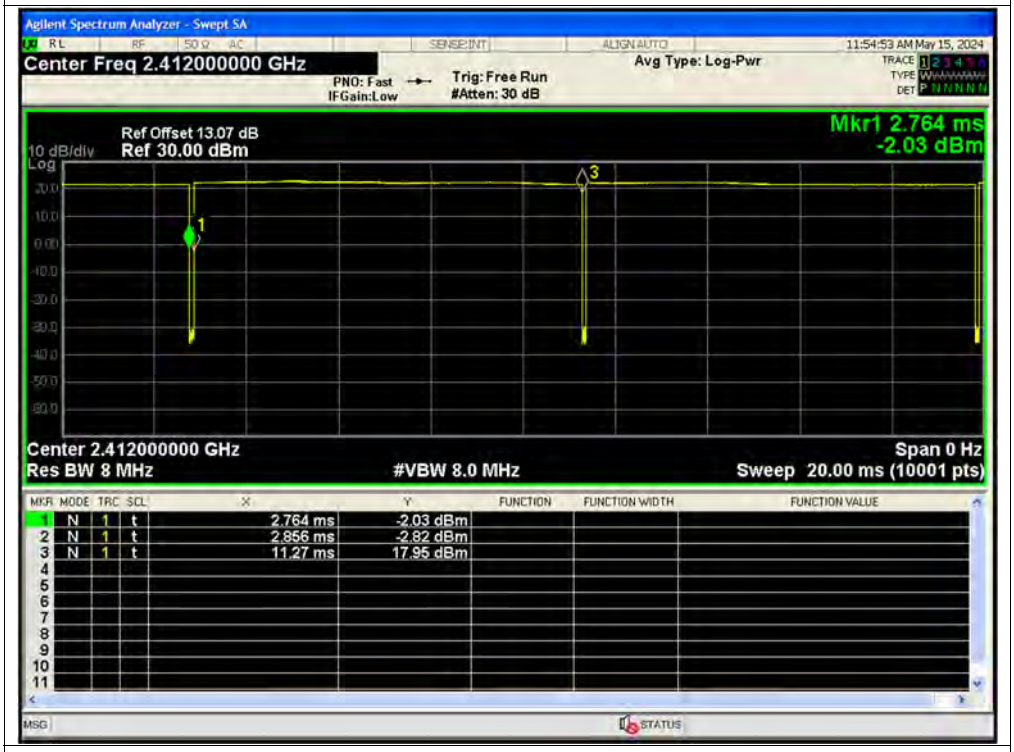
Annex A Test Data and Result

A.1. Duty Cycle of Test Signal

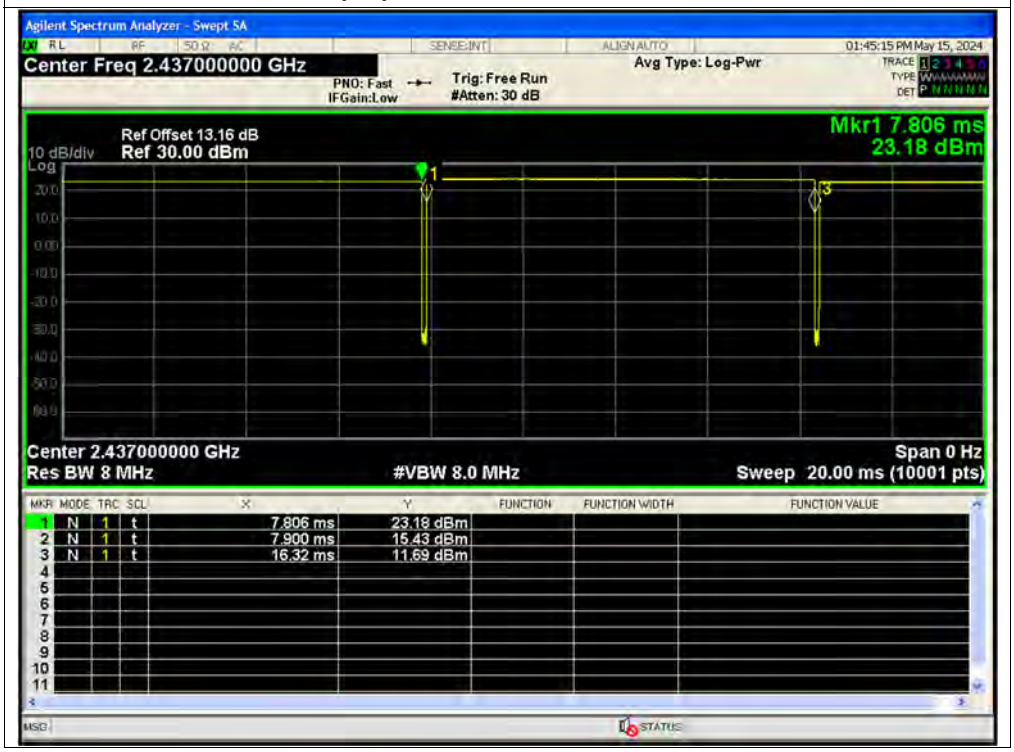
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	b	2412	Ant1	98.92	0.05	0.12
NVNT	b	2437	Ant1	98.9	0.05	0.12
NVNT	b	2462	Ant1	98.9	0.05	0.12
NVNT	b	2412	Ant2	98.9	0.05	0.12
NVNT	b	2437	Ant2	98.9	0.05	0.12
NVNT	b	2462	Ant2	98.9	0.05	0.12
NVNT	g	2412	Ant1	93.32	0.3	0.72
NVNT	g	2437	Ant1	93.32	0.3	0.72
NVNT	g	2462	Ant1	93.45	0.29	0.72
NVNT	g	2412	Ant2	93.45	0.29	0.72
NVNT	g	2437	Ant2	93.45	0.29	0.72
NVNT	g	2462	Ant2	93.44	0.29	0.72
NVNT	n20	2412	Ant1	93.03	0.31	0.76
NVNT	n20	2437	Ant1	93.03	0.31	0.76
NVNT	n20	2462	Ant1	93.04	0.31	0.76
NVNT	n20	2412	Ant2	93.04	0.31	0.76
NVNT	n20	2437	Ant2	93.04	0.31	0.76
NVNT	n20	2462	Ant2	93.04	0.31	0.76
NVNT	ax20	2412	Ant1	91.25	0.4	0.98
NVNT	ax20	2437	Ant1	91.09	0.41	0.98
NVNT	ax20	2462	Ant1	91.25	0.4	0.98
NVNT	ax20	2412	Ant2	91.25	0.4	0.98
NVNT	ax20	2437	Ant2	91.25	0.4	0.98
NVNT	ax20	2462	Ant2	91.07	0.41	0.98
NVNT	ax20 26@0	2412	Ant1	96.48	0.16	0.87
NVNT	ax20 26@0	2437	Ant1	96.64	0.15	0.87
NVNT	ax20 26@0	2412	Ant2	96.48	0.16	0.87
NVNT	ax20 26@0	2437	Ant2	96.64	0.15	0.87
NVNT	ax20 26@8	2462	Ant1	96.64	0.15	0.87
NVNT	ax20 26@8	2462	Ant2	96.48	0.16	0.87
NVNT	ax20 52@37	2412	Ant1	93.54	0.29	1.64
NVNT	ax20 52@37	2437	Ant1	93.54	0.29	1.64

NVNT	ax20 52@37	2412	Ant2	93.54	0.29	1.64
NVNT	ax20 52@37	2437	Ant2	93.54	0.29	1.64
NVNT	ax20 52@40	2462	Ant1	93.83	0.28	1.64
NVNT	ax20 52@40	2462	Ant2	93.54	0.29	1.64
NVNT	ax20 106@53	2412	Ant1	88.52	0.53	3.09
NVNT	ax20 106@53	2437	Ant1	88.52	0.53	3.09
NVNT	ax20 106@53	2412	Ant2	88.52	0.53	3.09
NVNT	ax20 106@53	2437	Ant2	89.01	0.51	3.09
NVNT	ax20 106@54	2462	Ant1	89.07	0.5	3.07
NVNT	ax20 106@54	2462	Ant2	88.52	0.53	3.09

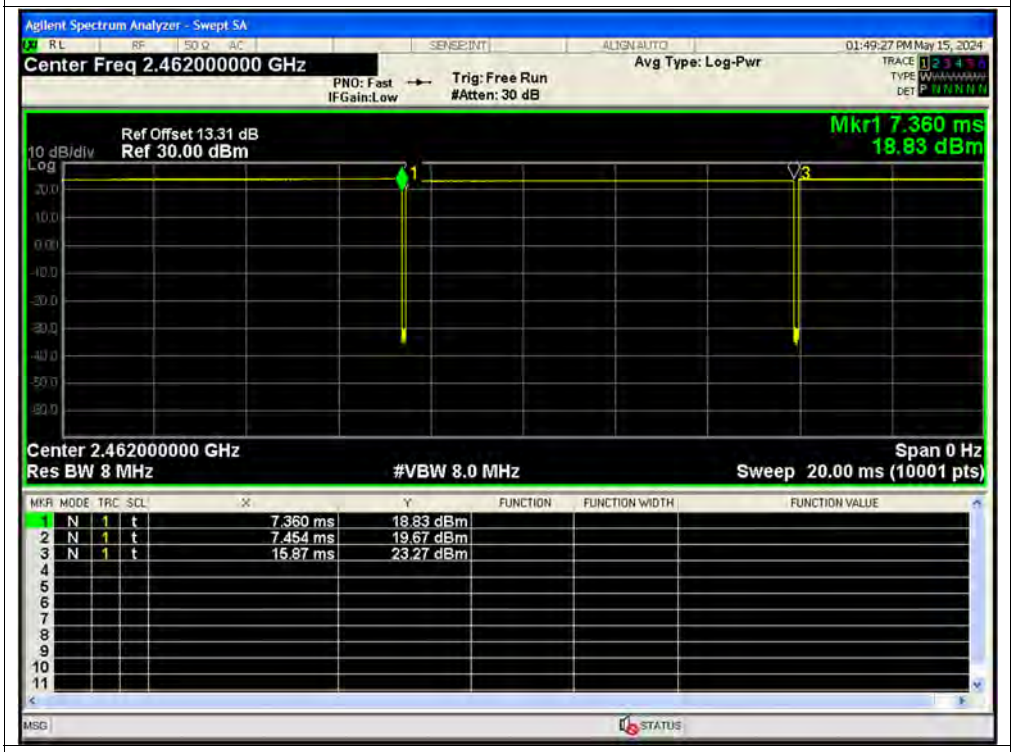
Test Graphs
Duty Cycle NVNT b 2412MHz Ant1



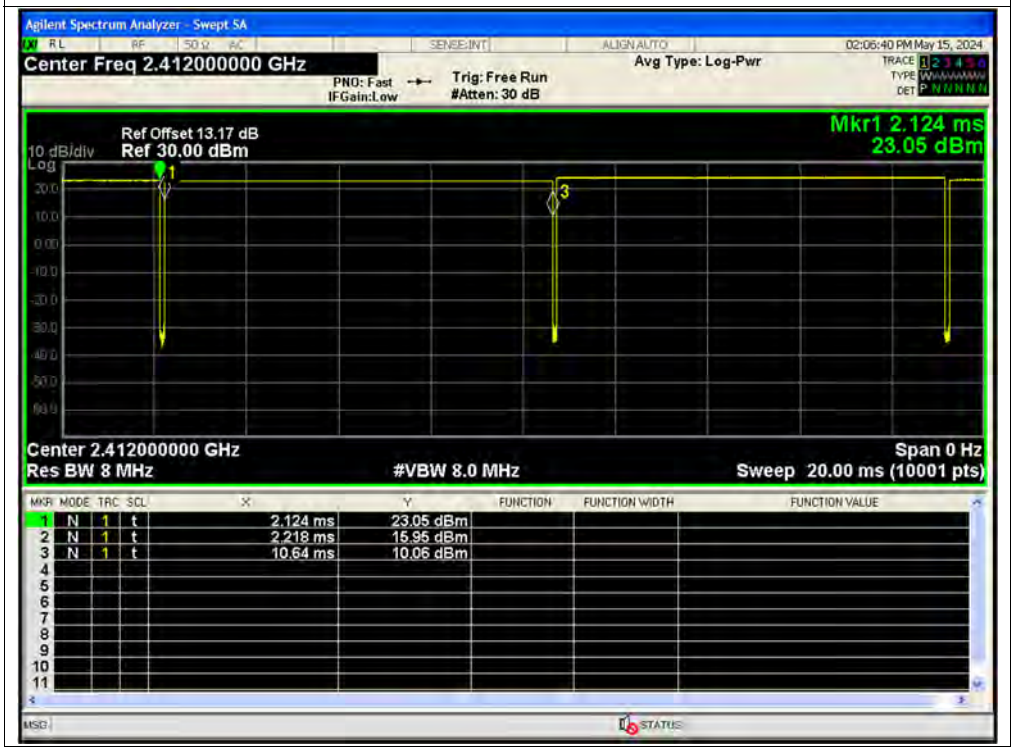
Duty Cycle NVNT b 2437MHz Ant1



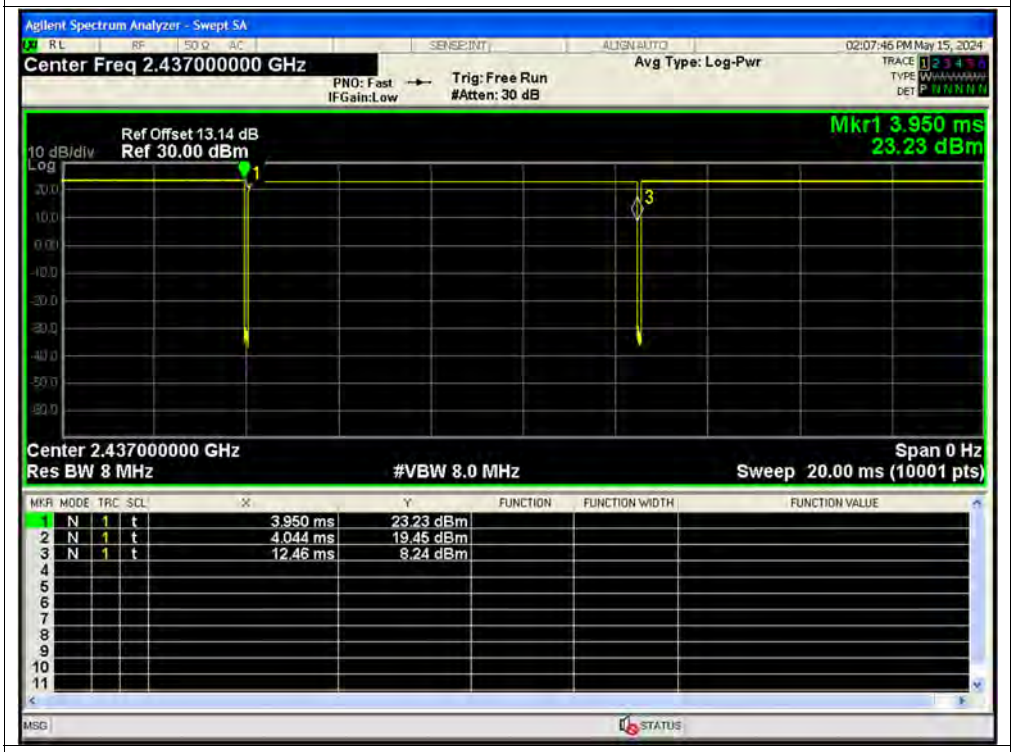
Duty Cycle NVNT b 2462MHz Ant1



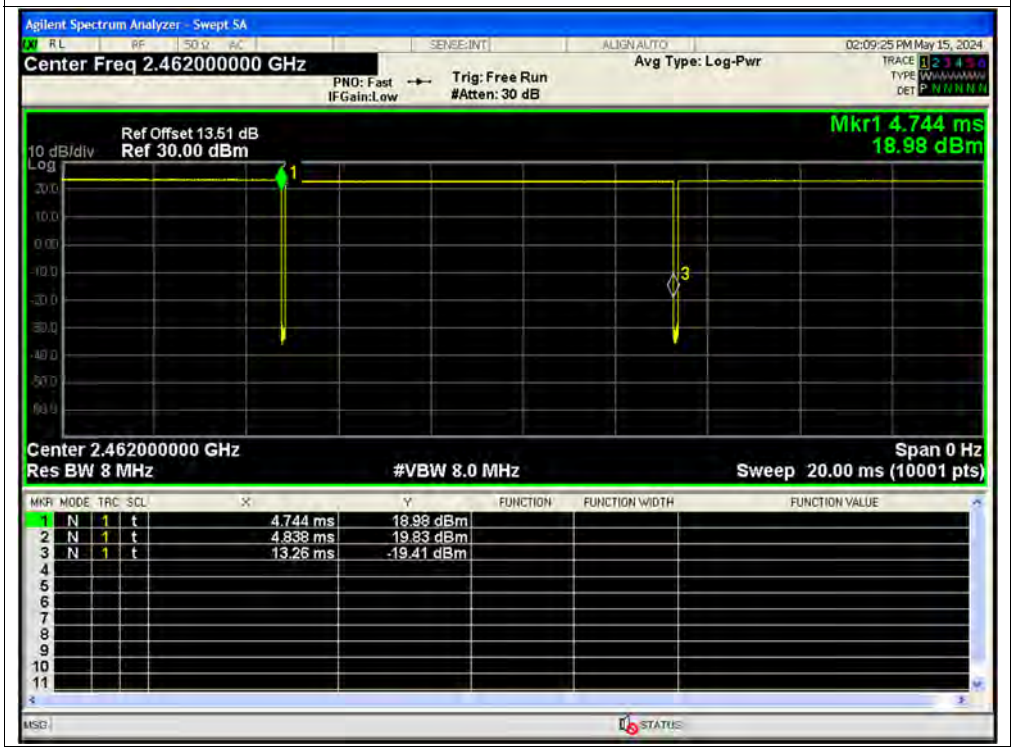
Duty Cycle NVNT b 2412MHz Ant2



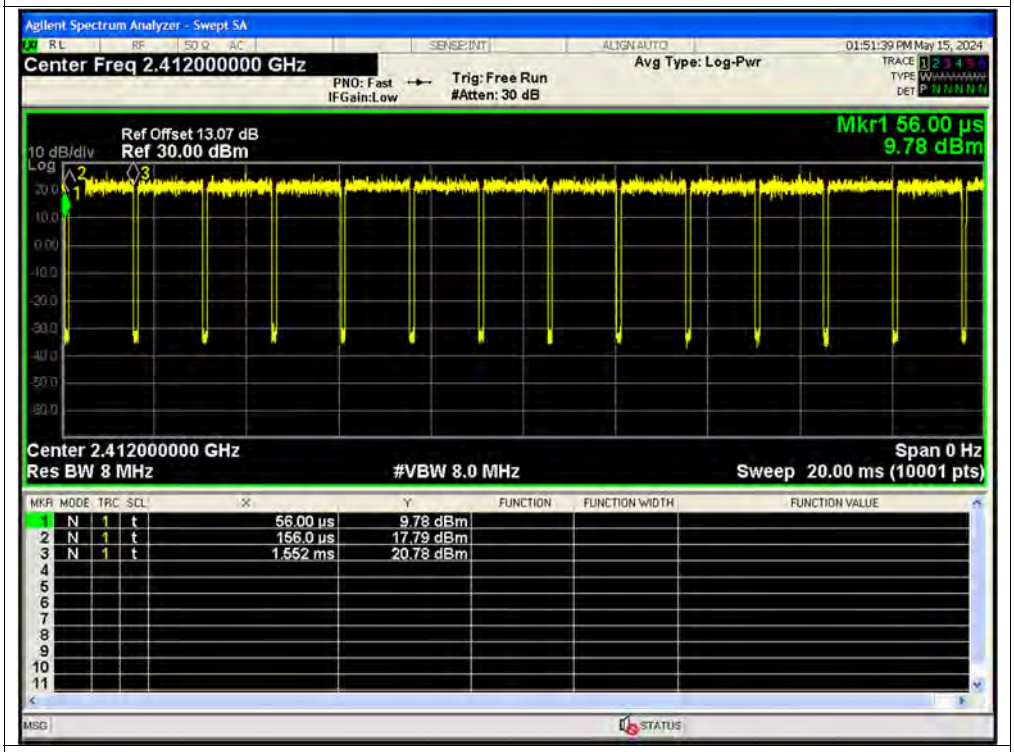
Duty Cycle NVNT b 2437MHz Ant2



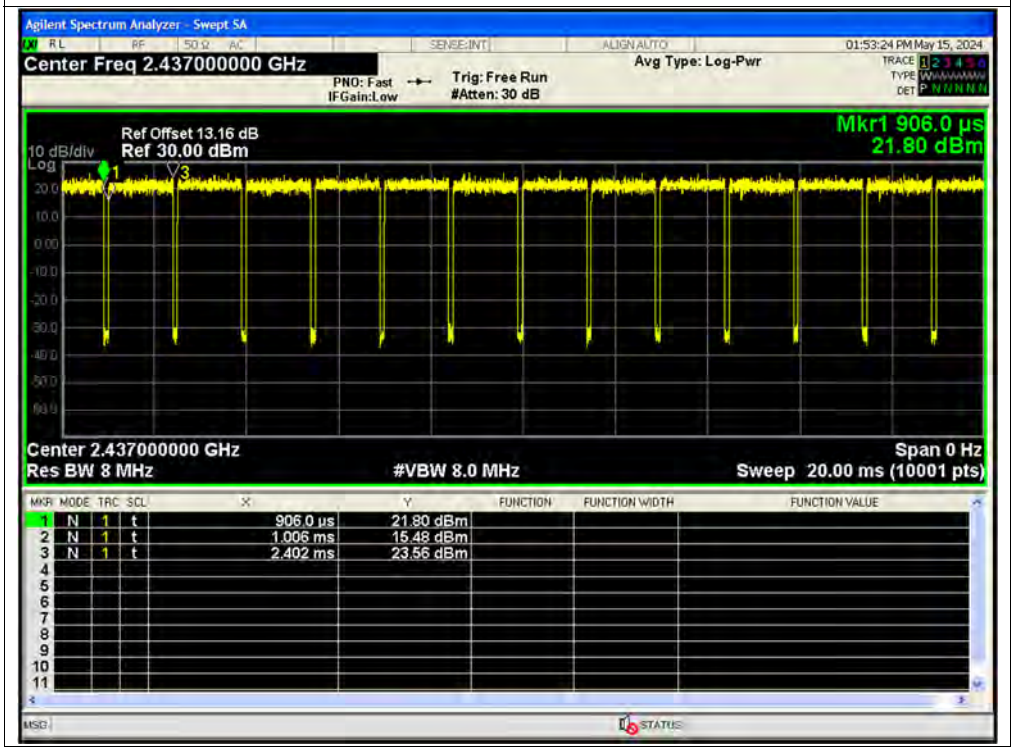
Duty Cycle NVNT b 2462MHz Ant2



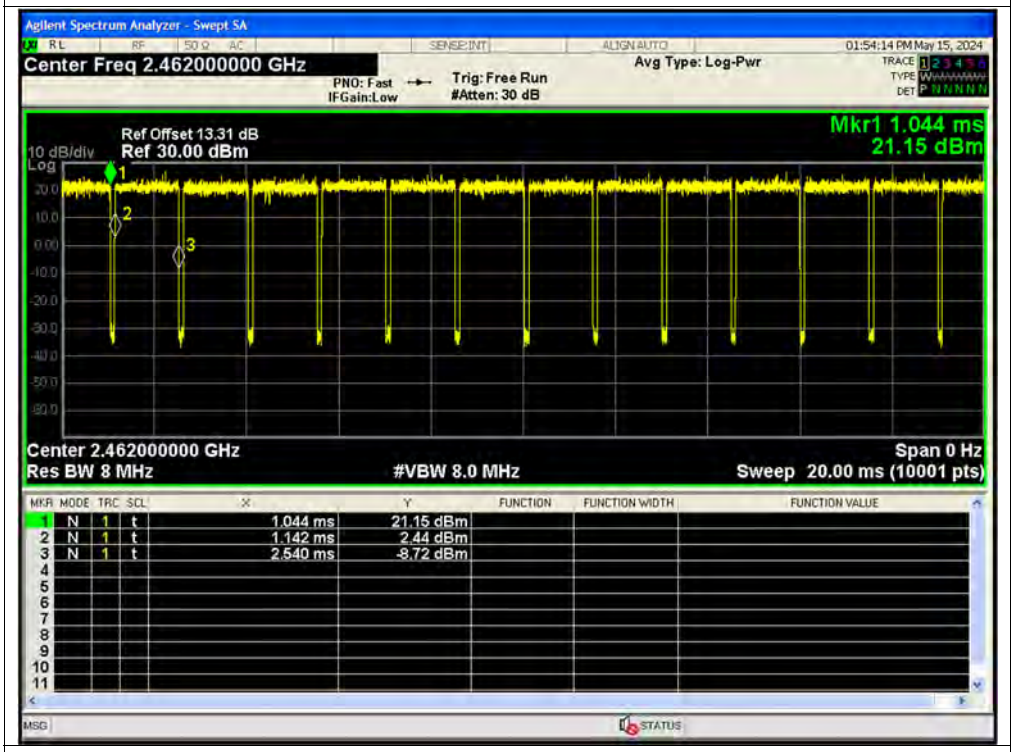
Duty Cycle NVNT g 2412MHz Ant1



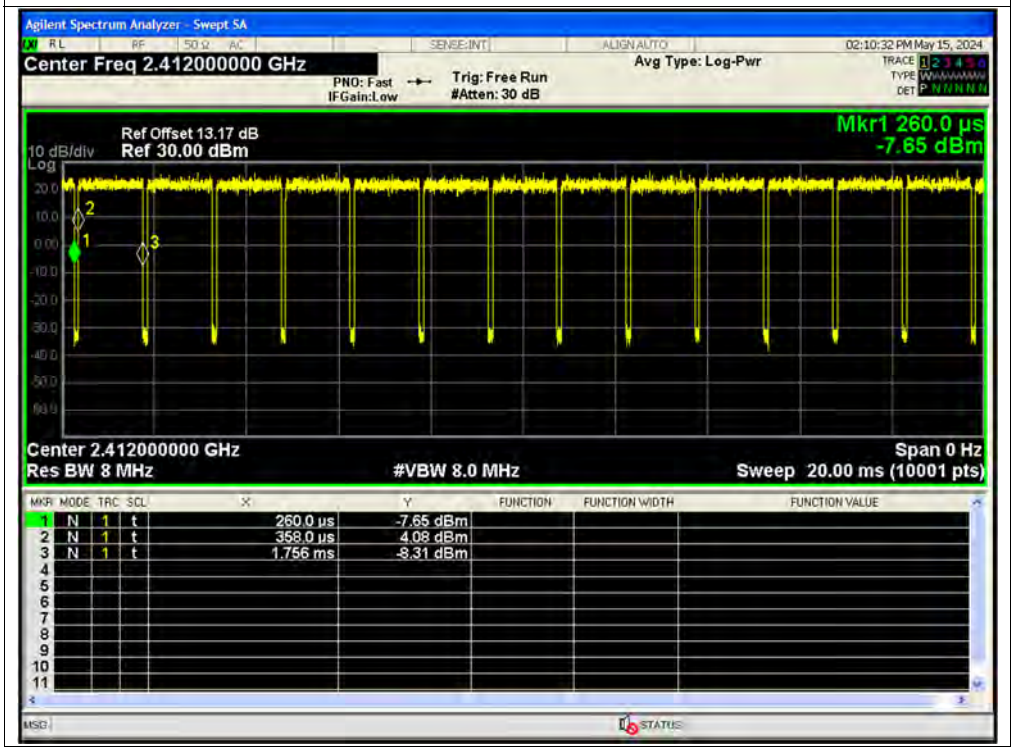
Duty Cycle NVNT g 2437MHz Ant1



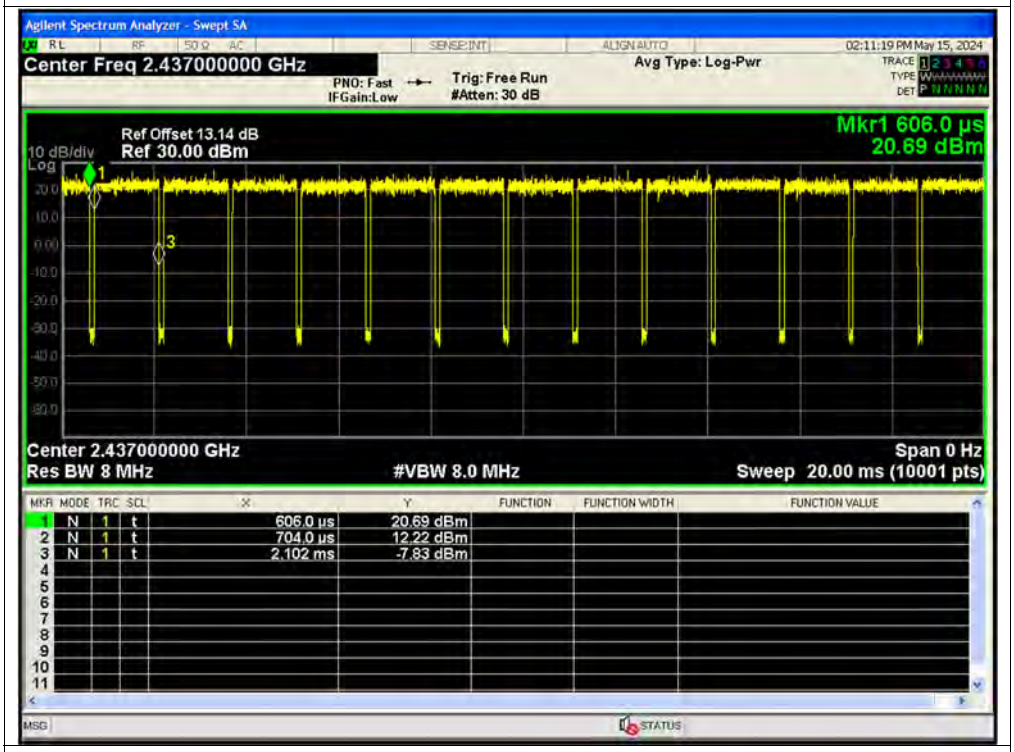
Duty Cycle NVNT g 2462MHz Ant1



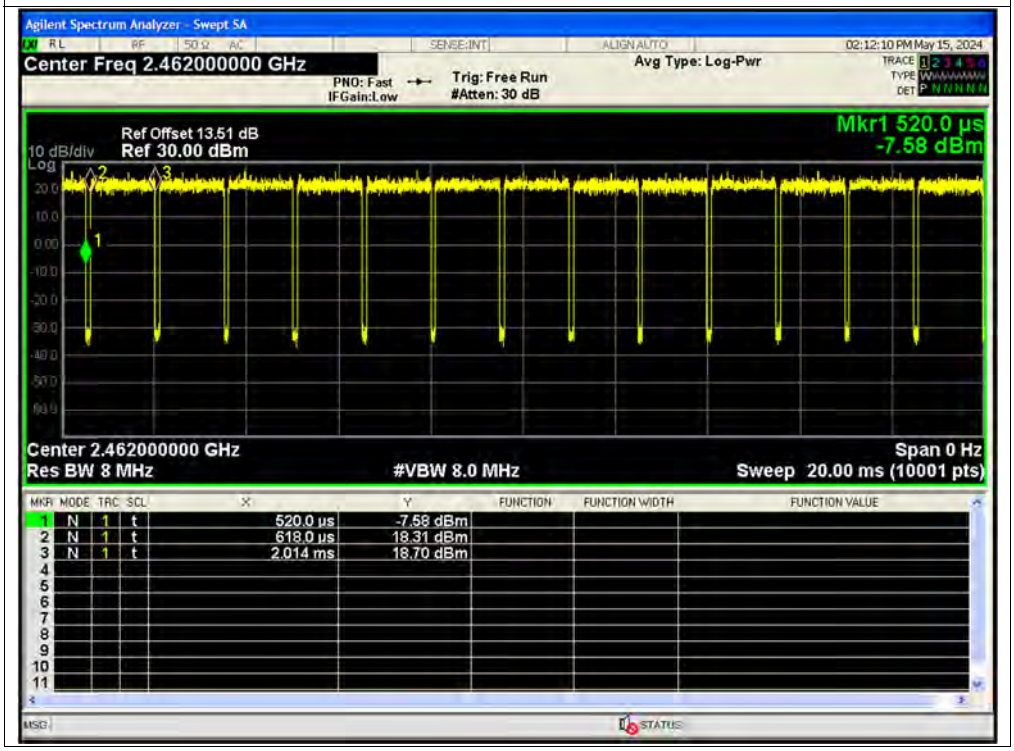
Duty Cycle NVNT g 2412MHz Ant2



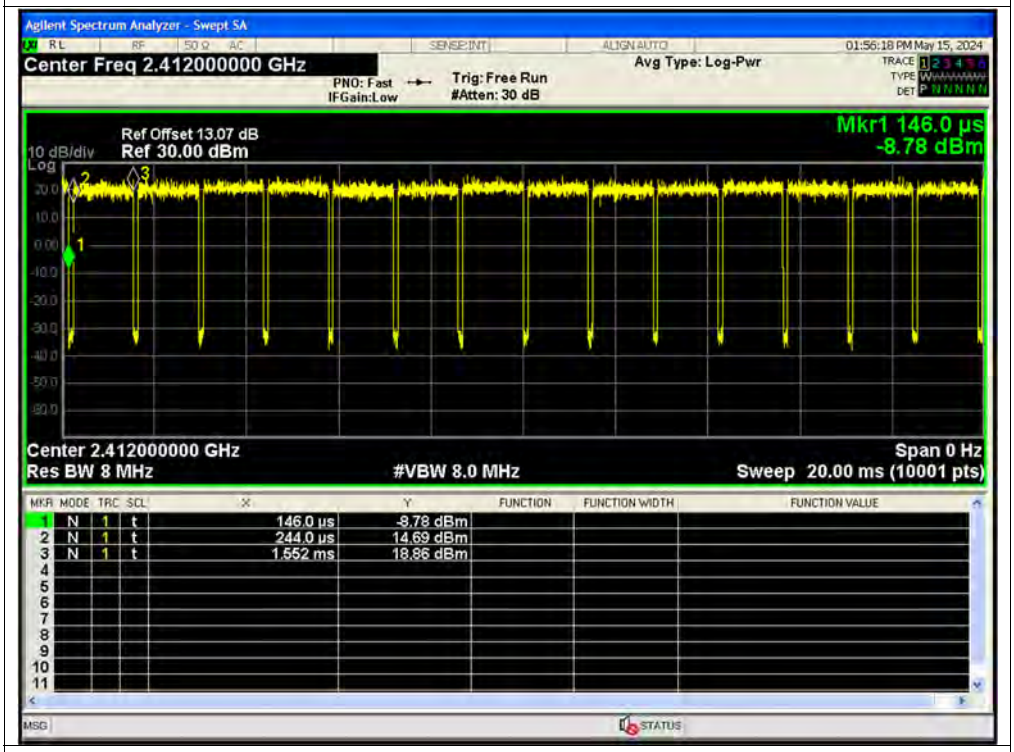
Duty Cycle NVNT g 2437MHz Ant2



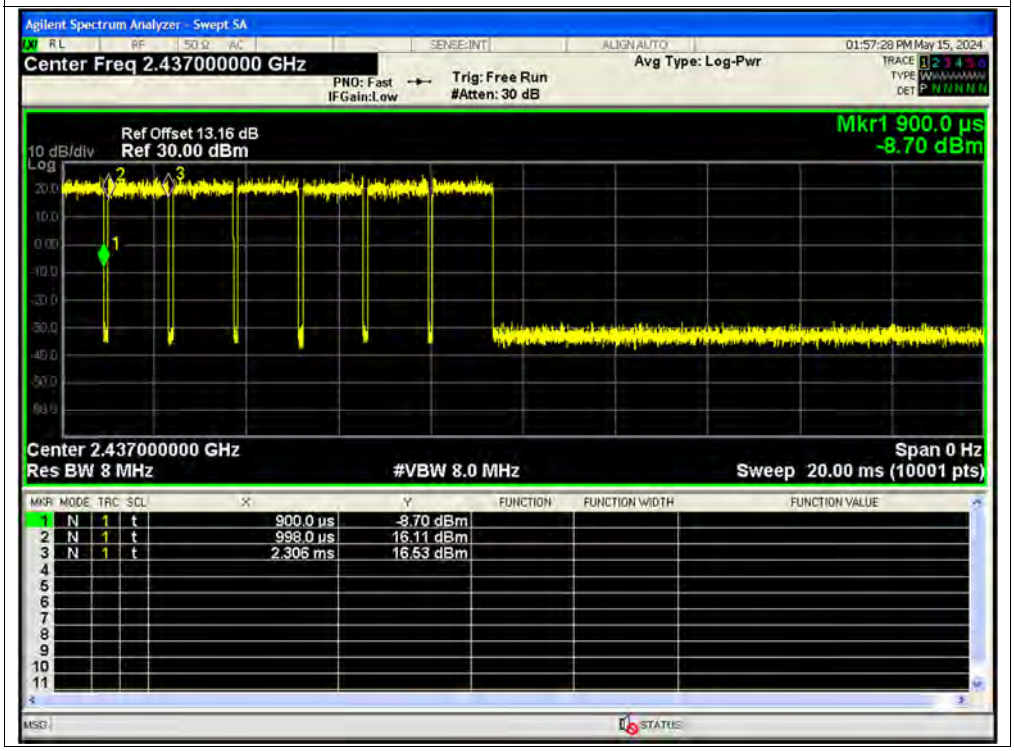
Duty Cycle NVNT g 2462MHz Ant2



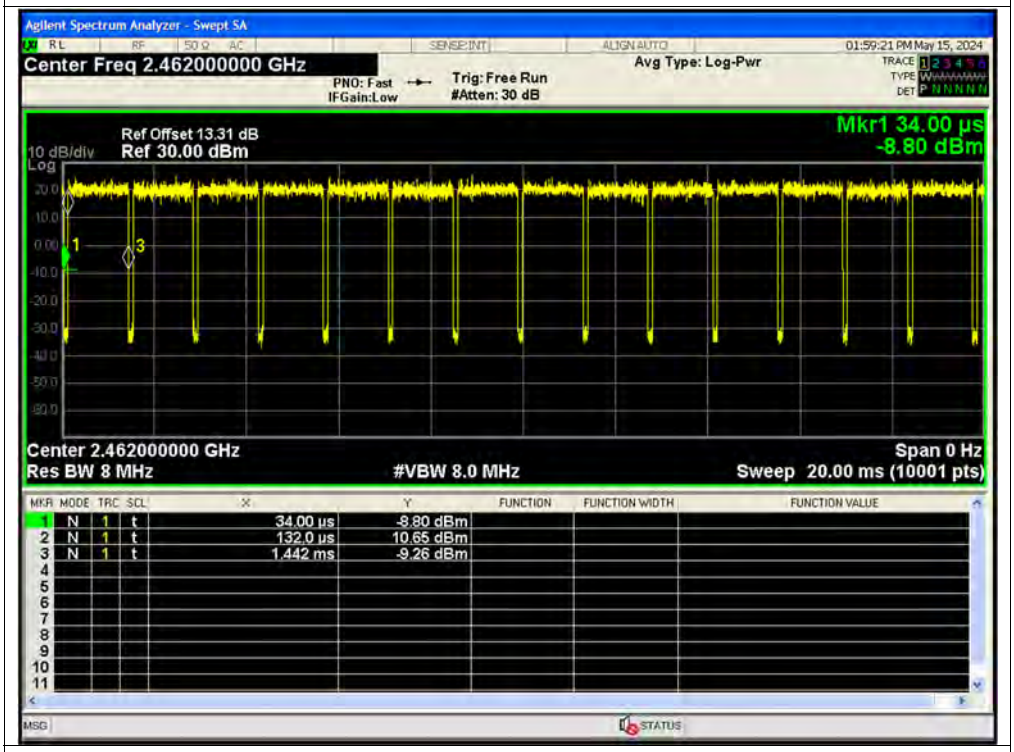
Duty Cycle NVNT n20 2412MHz Ant1



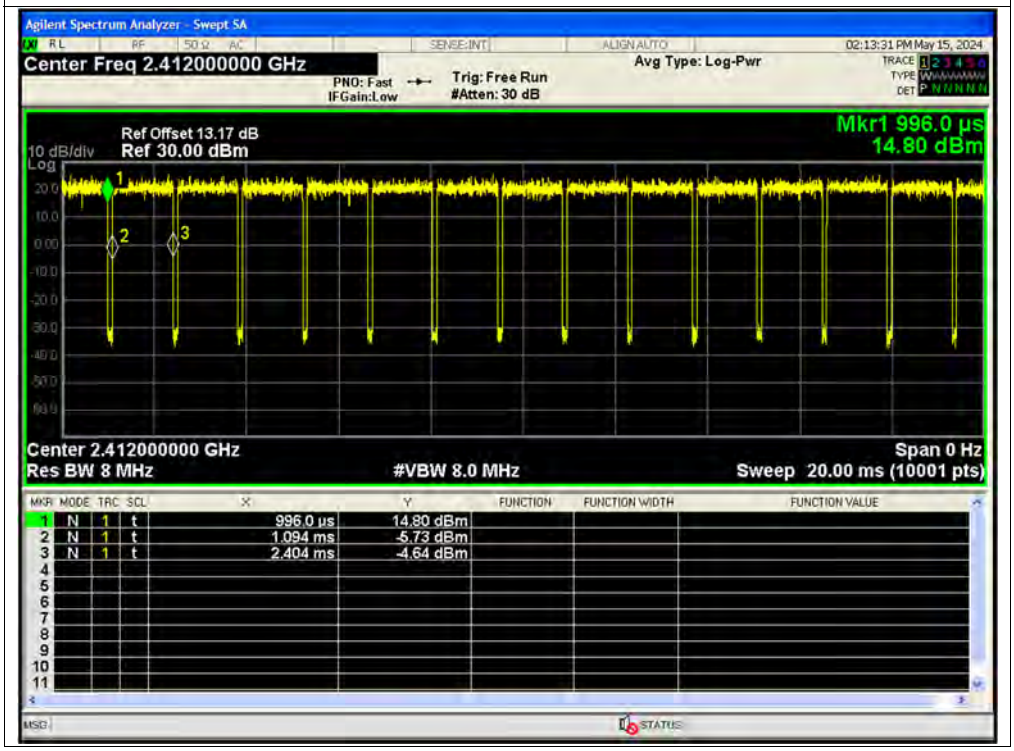
Duty Cycle NVNT n20 2437MHz Ant1



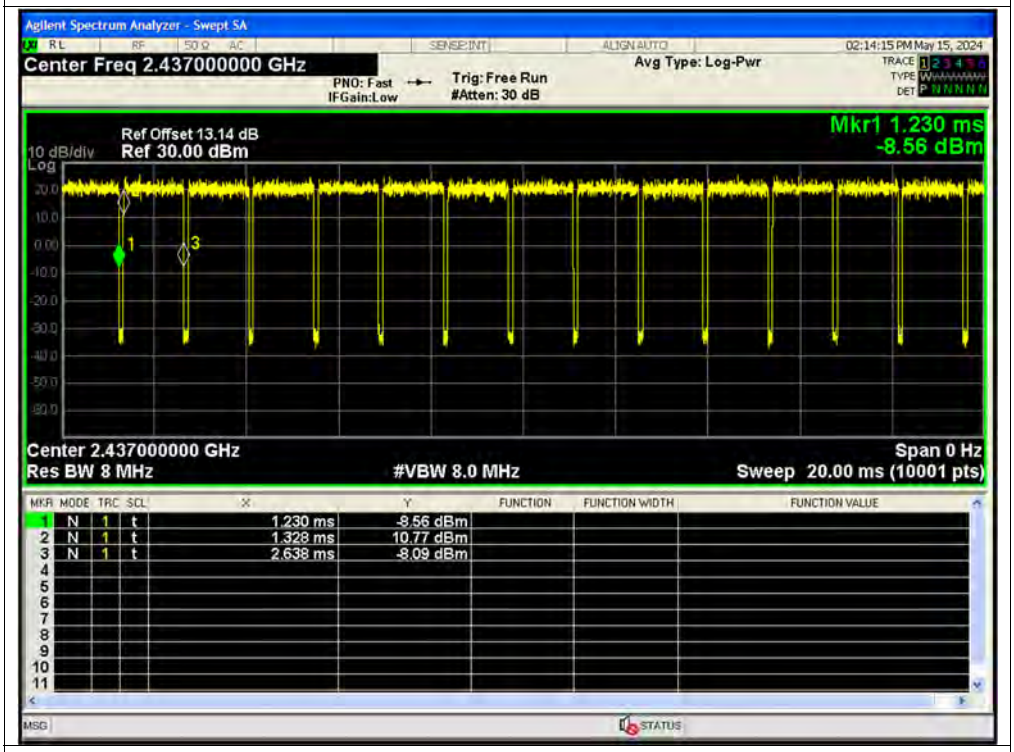
Duty Cycle NVNT n20 2462MHz Ant1



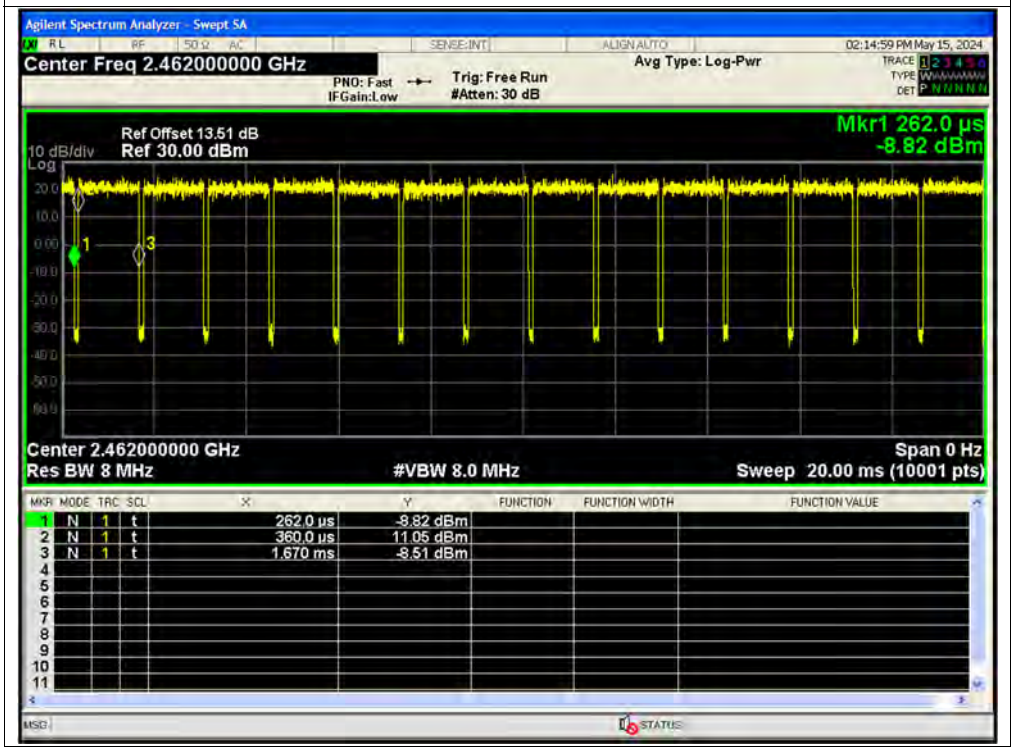
Duty Cycle NVNT n20 2412MHz Ant2



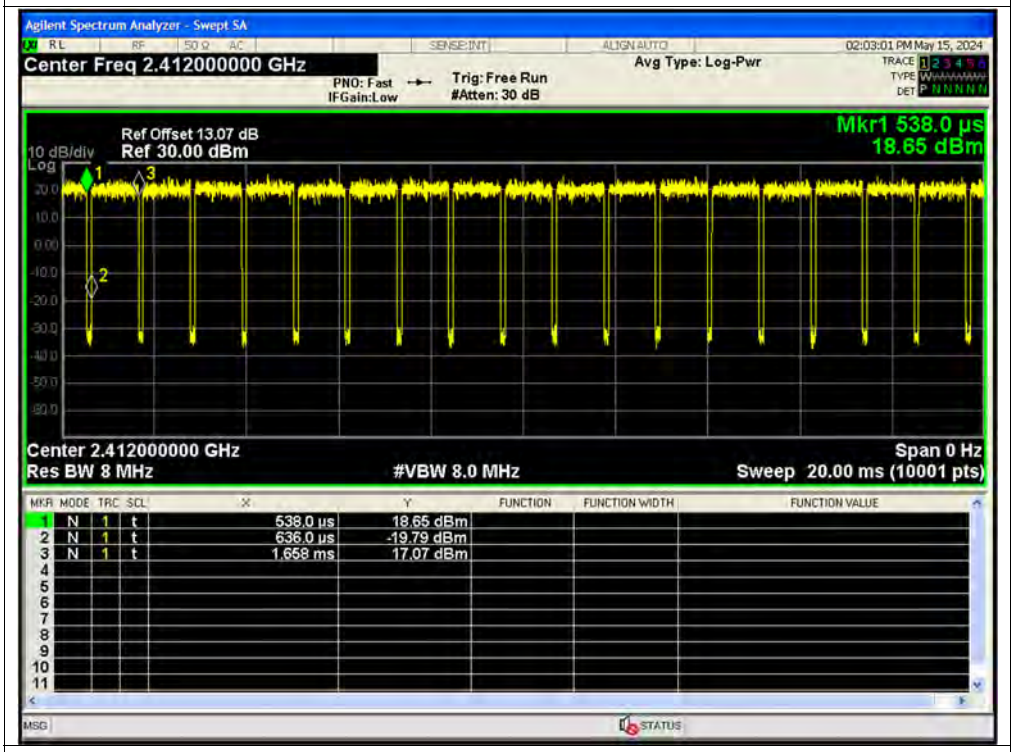
Duty Cycle NVNT n20 2437MHz Ant2



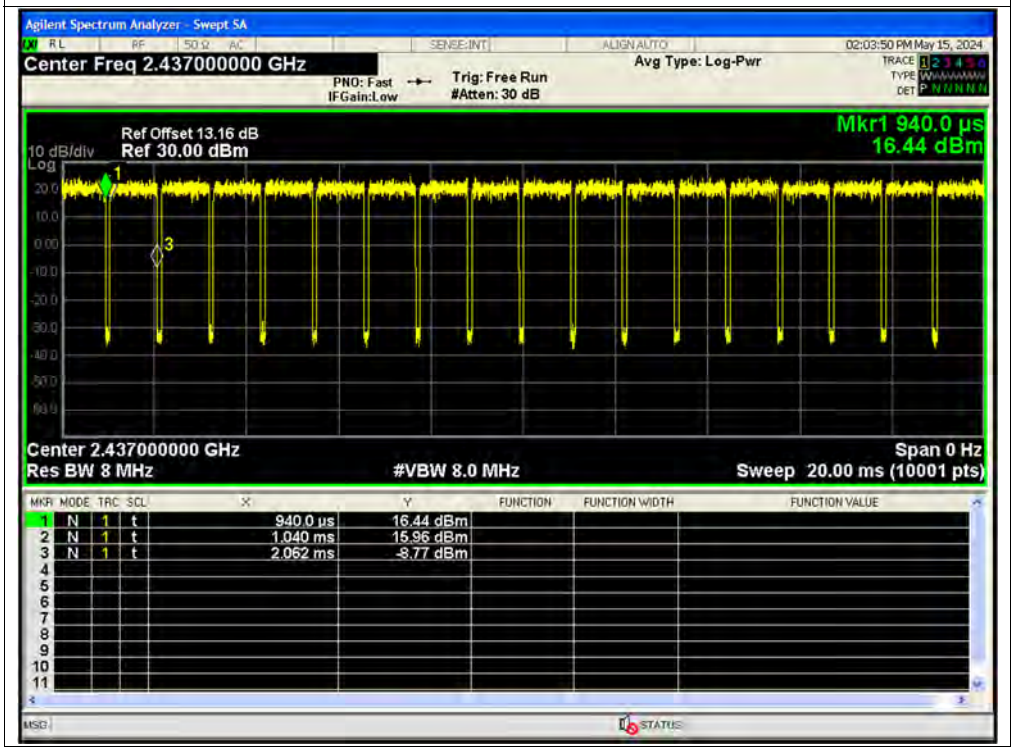
Duty Cycle NVNT n20 2462MHz Ant2



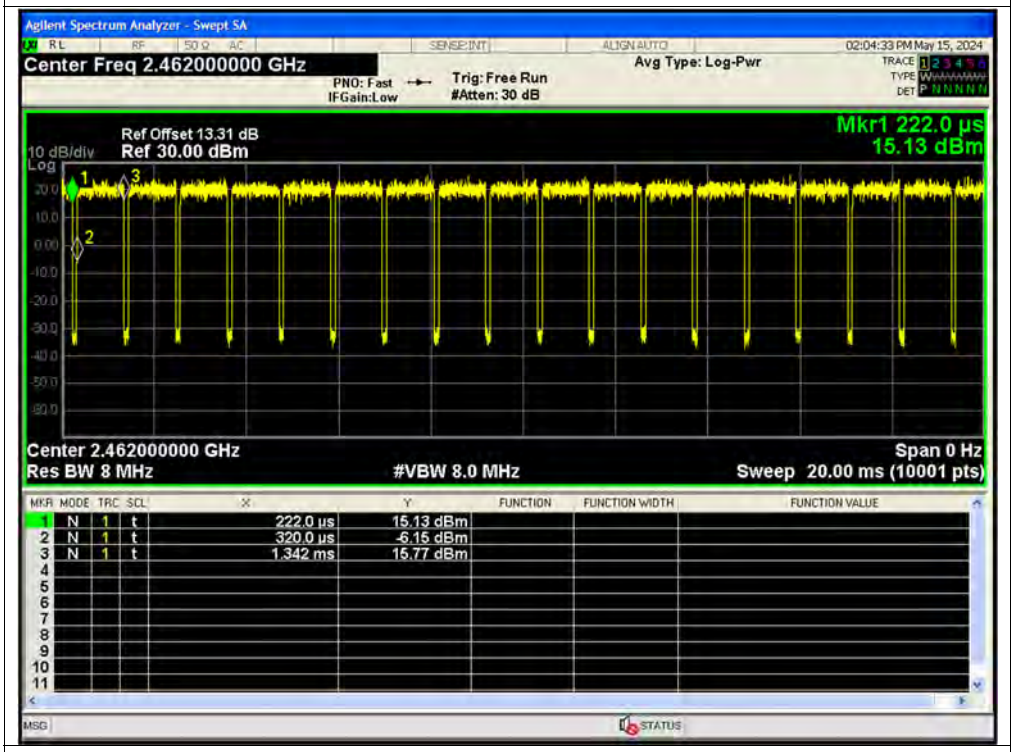
Duty Cycle NVNT ax20 2412MHz Ant1



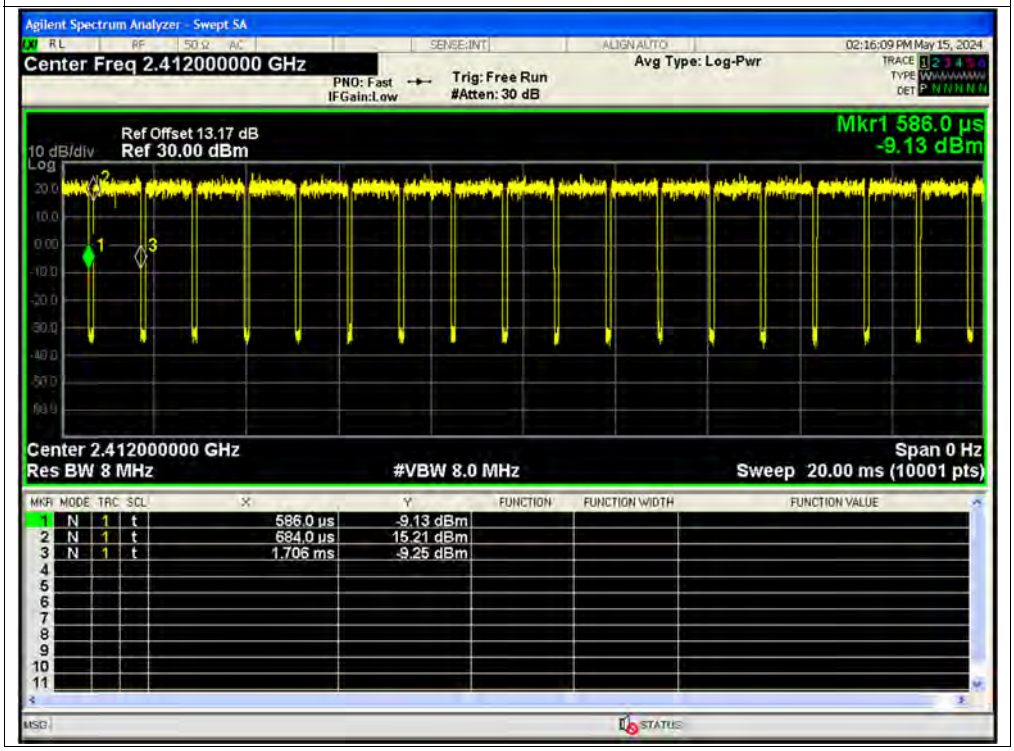
Duty Cycle NVNT ax20 2437MHz Ant1



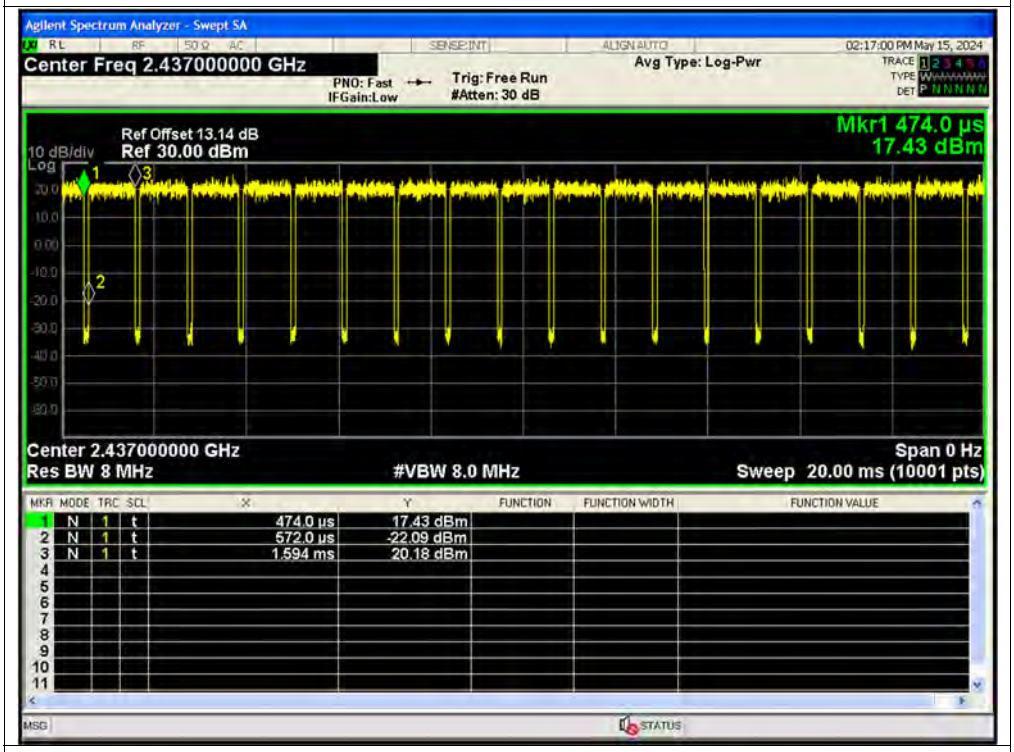
Duty Cycle NVNT ax20 2462MHz Ant1



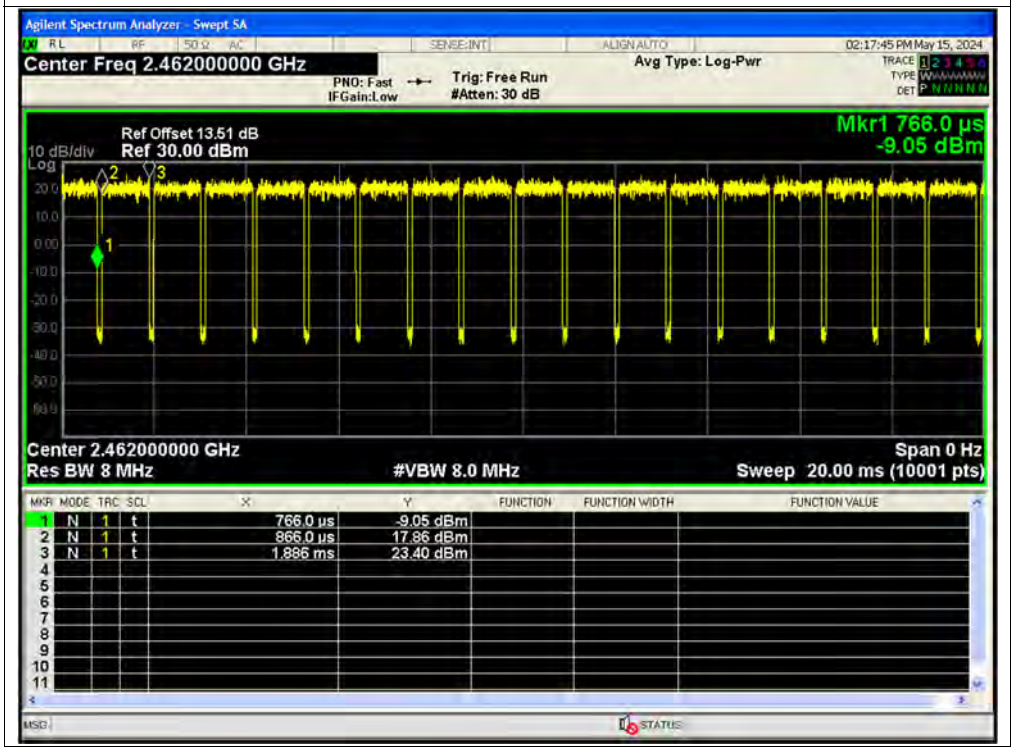
Duty Cycle NVNT ax20 2412MHz Ant2



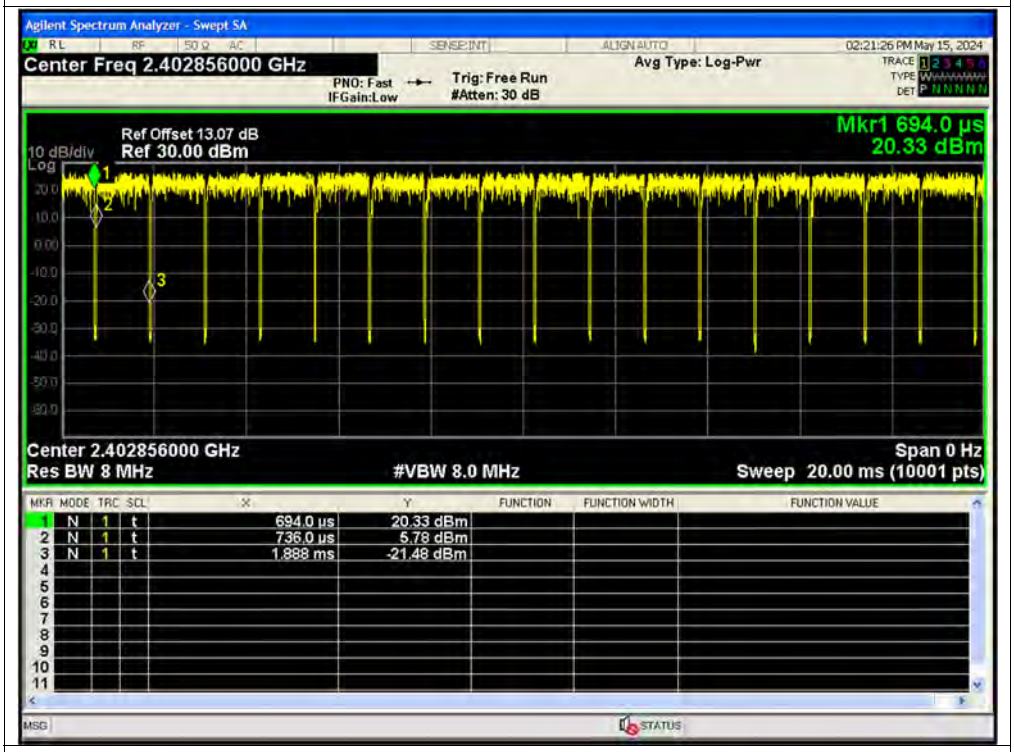
Duty Cycle NVNT ax20 2437MHz Ant2



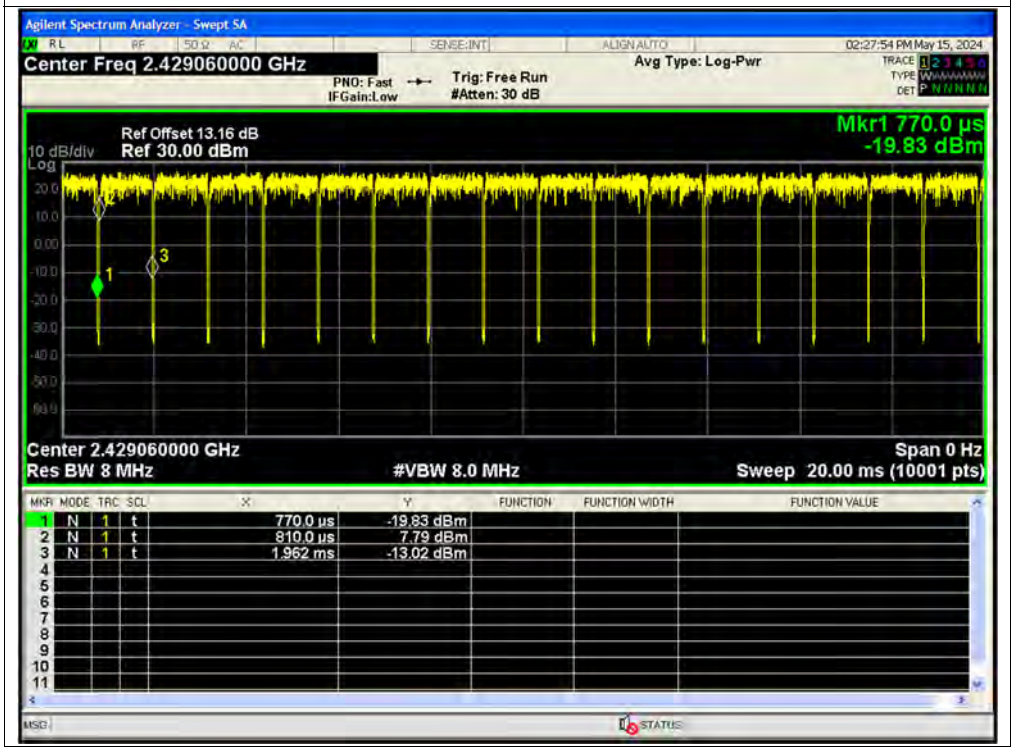
Duty Cycle NVNT ax20 2462MHz Ant2



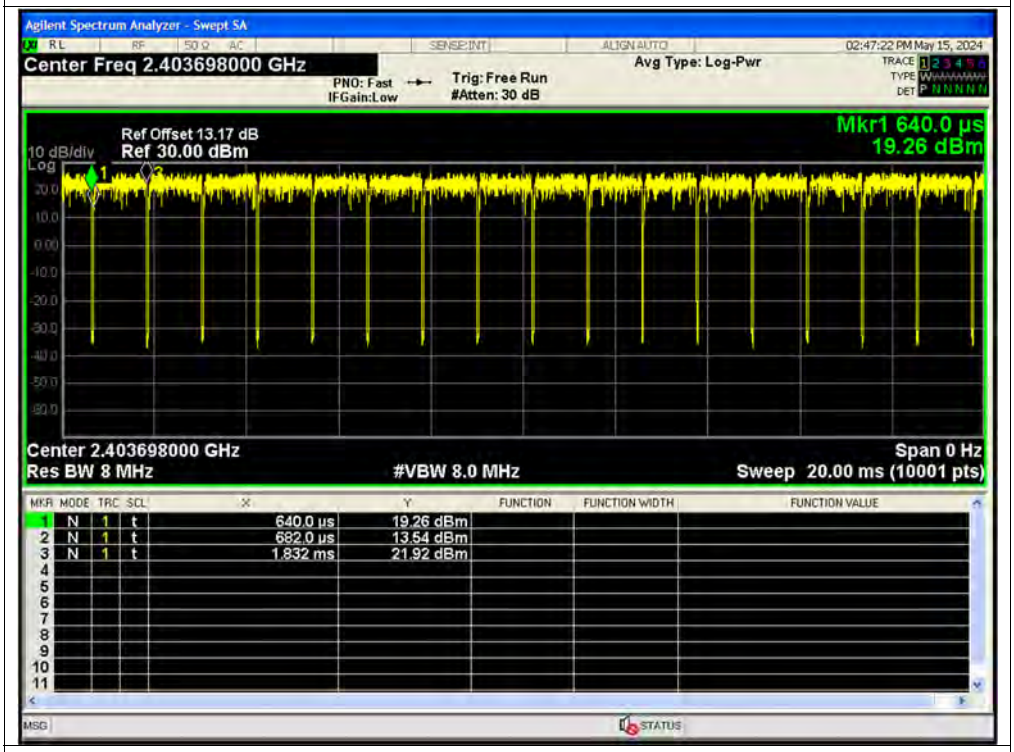
Duty Cycle NVNT ax20 26@0 2412MHz Ant1



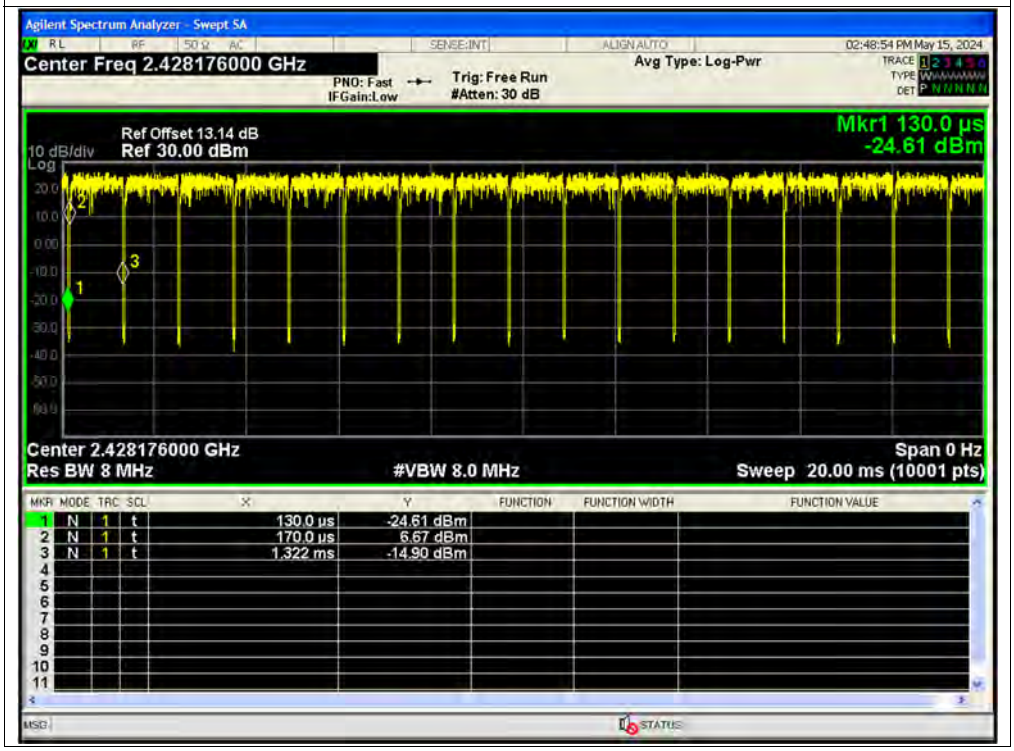
Duty Cycle NVNT ax20 26@0 2437MHz Ant1



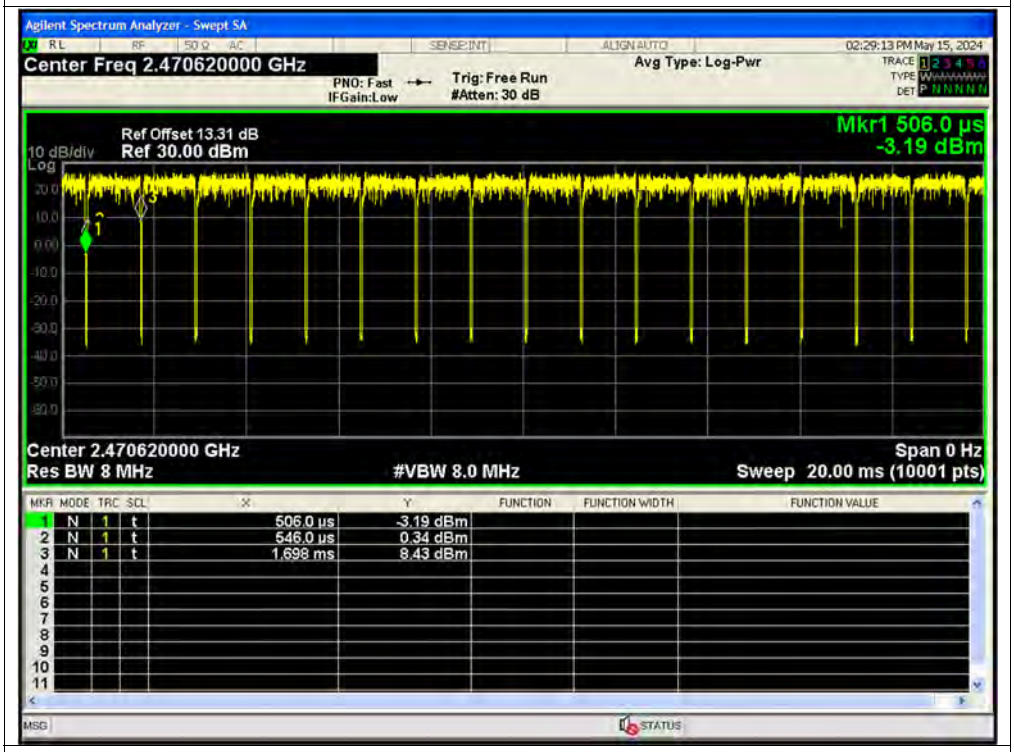
Duty Cycle NVNT ax20 26@0 2412MHz Ant2



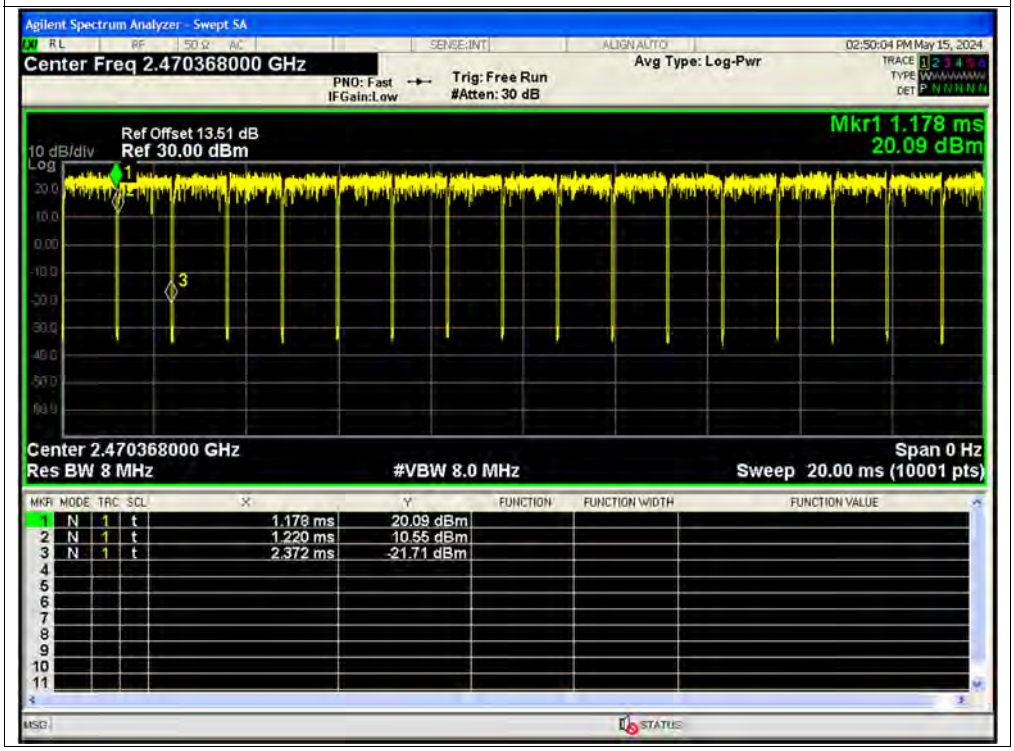
Duty Cycle NVNT ax20 26@0 2437MHz Ant2



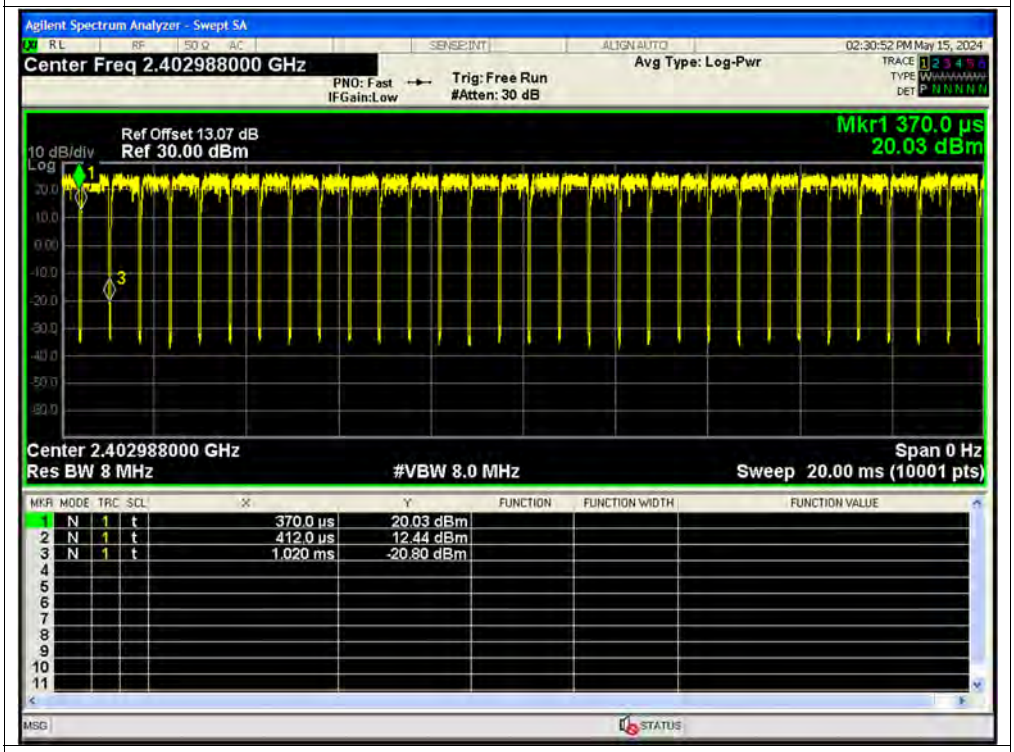
Duty Cycle NVNT ax20 26@8 2462MHz Ant1



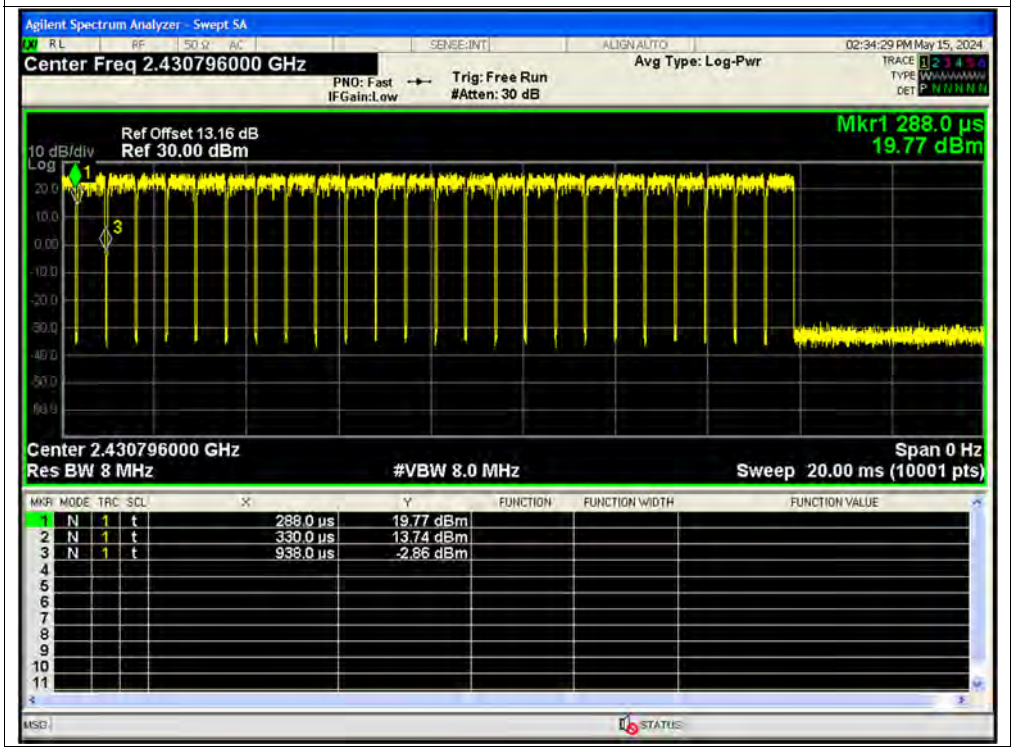
Duty Cycle NVNT ax20 26@8 2462MHz Ant2



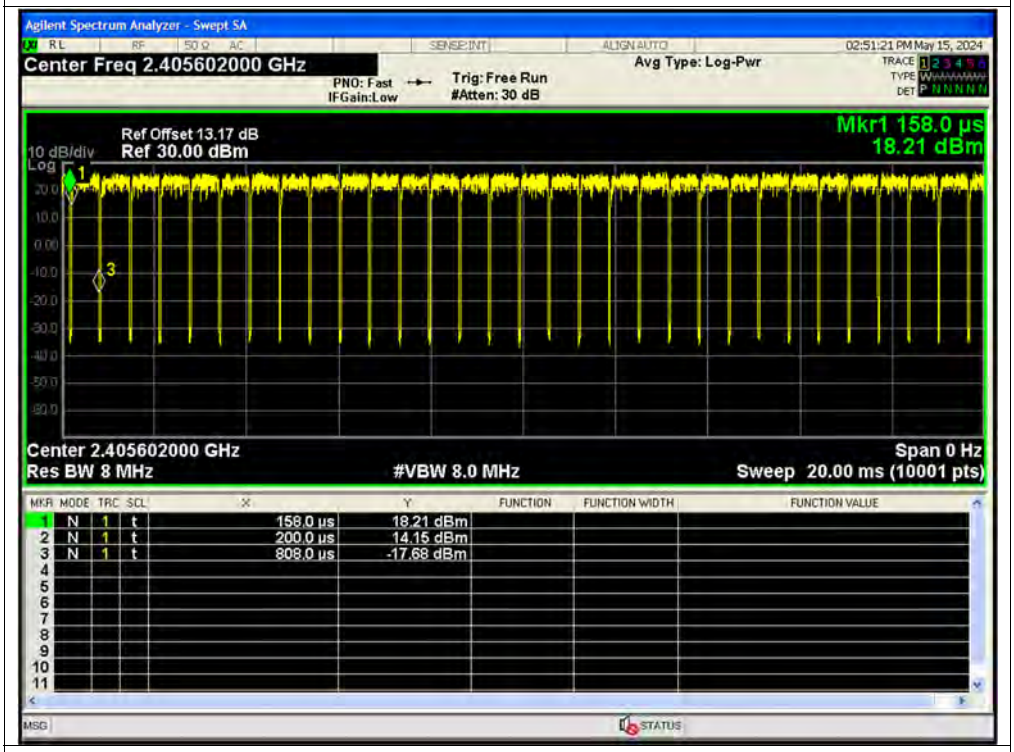
Duty Cycle NVNT ax20 52@37 2412MHz Ant1



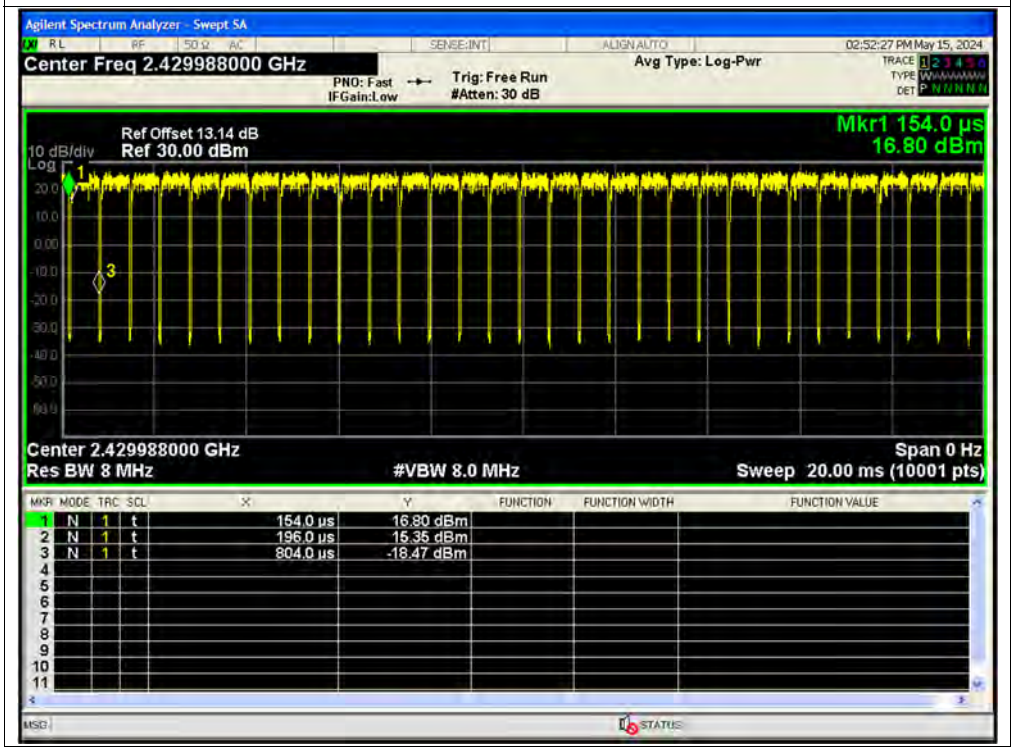
Duty Cycle NVNT ax20 52@37 2437MHz Ant1



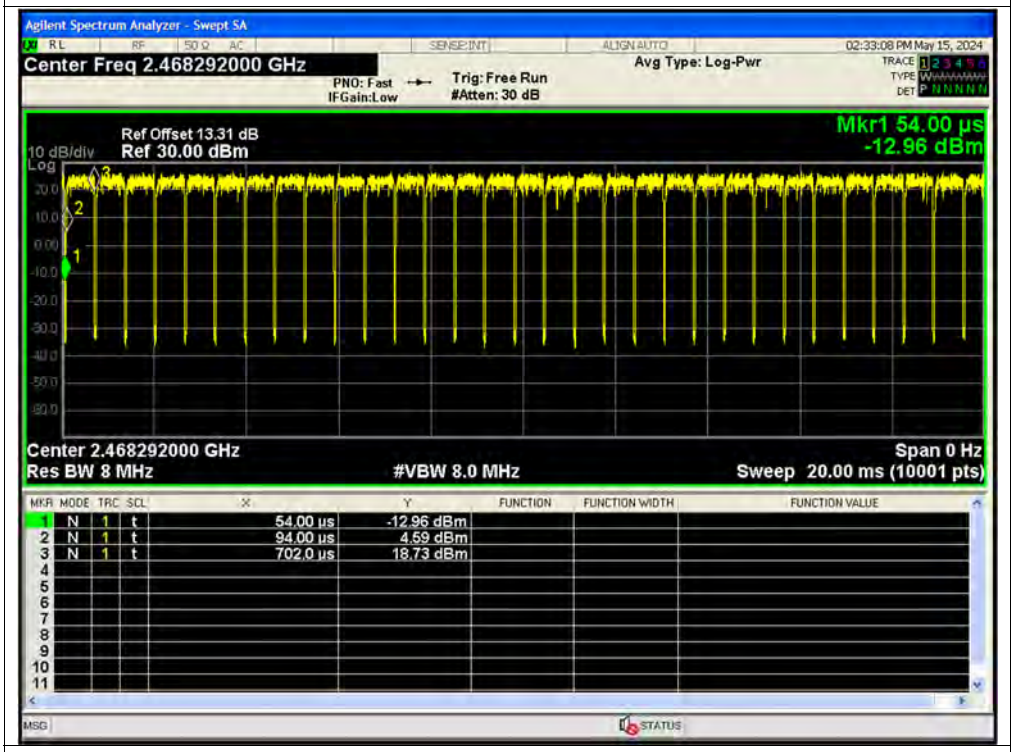
Duty Cycle NVNT ax20 52@37 2412MHz Ant2



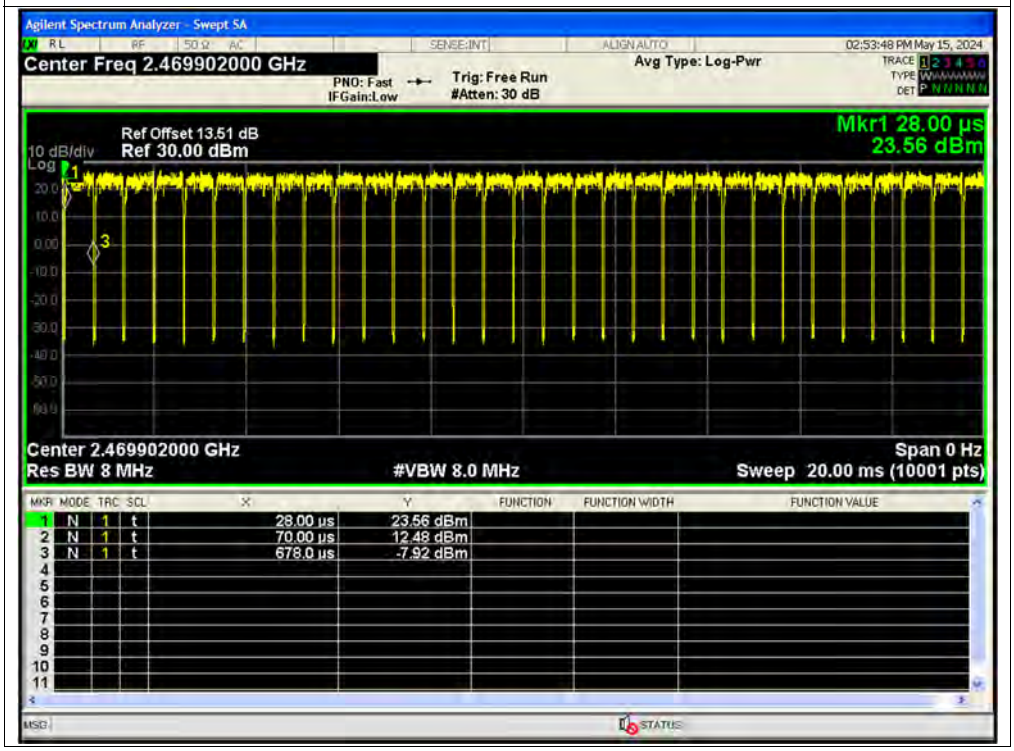
Duty Cycle NVNT ax20 52@37 2437MHz Ant2



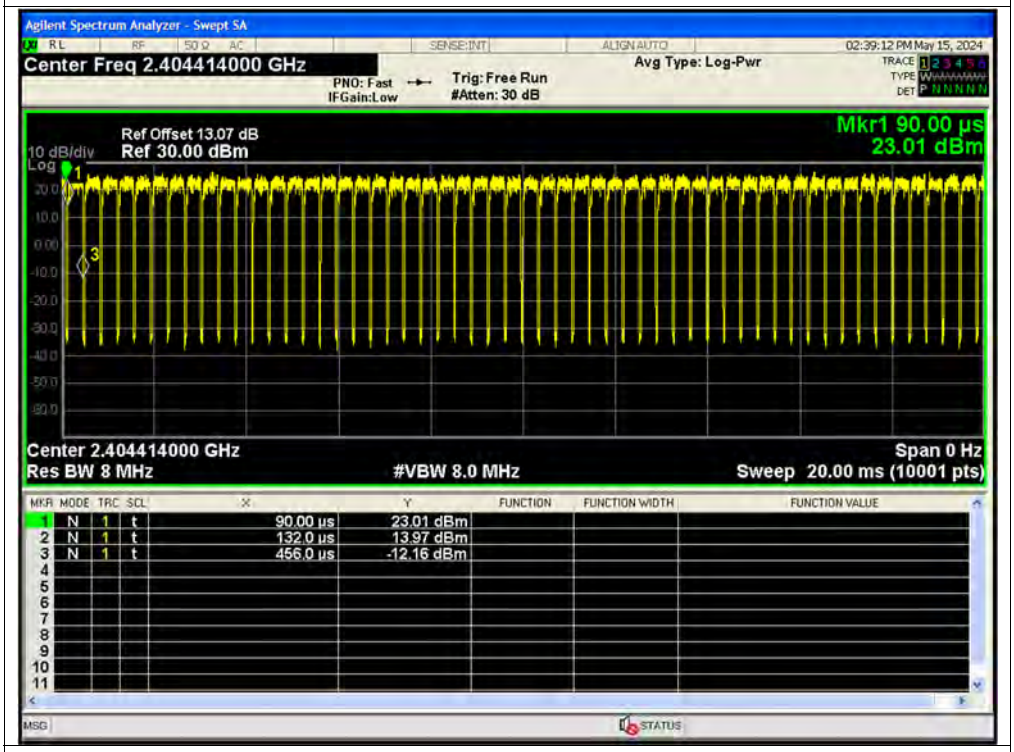
Duty Cycle NVNT ax20 52@40 2462MHz Ant1



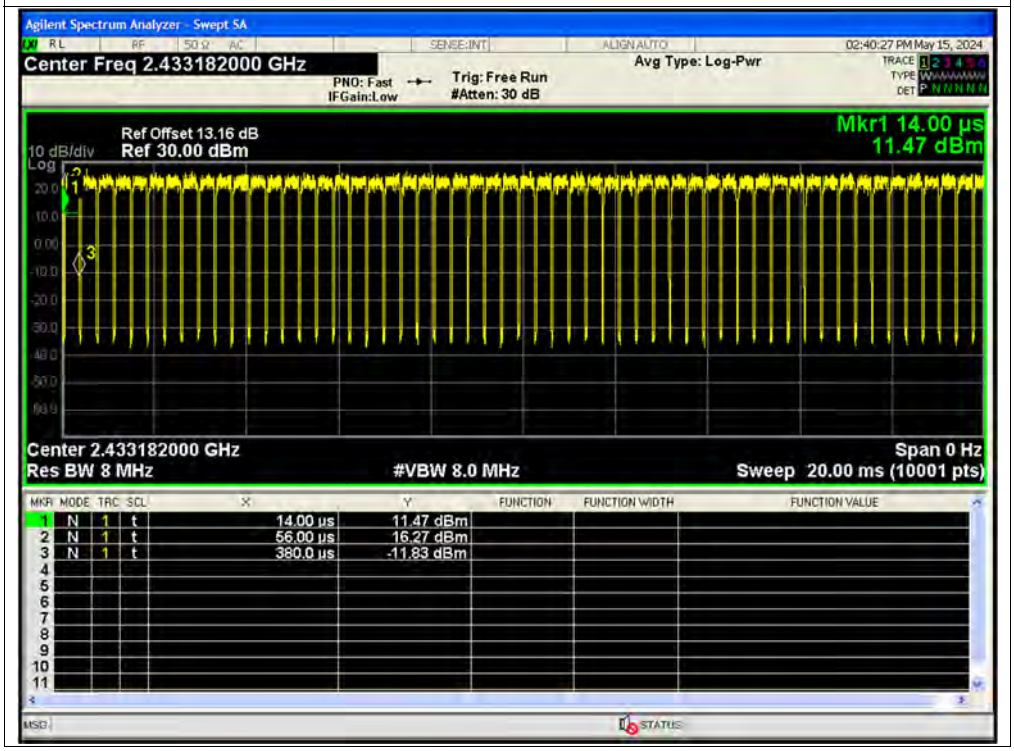
Duty Cycle NVNT ax20 52@40 2462MHz Ant2



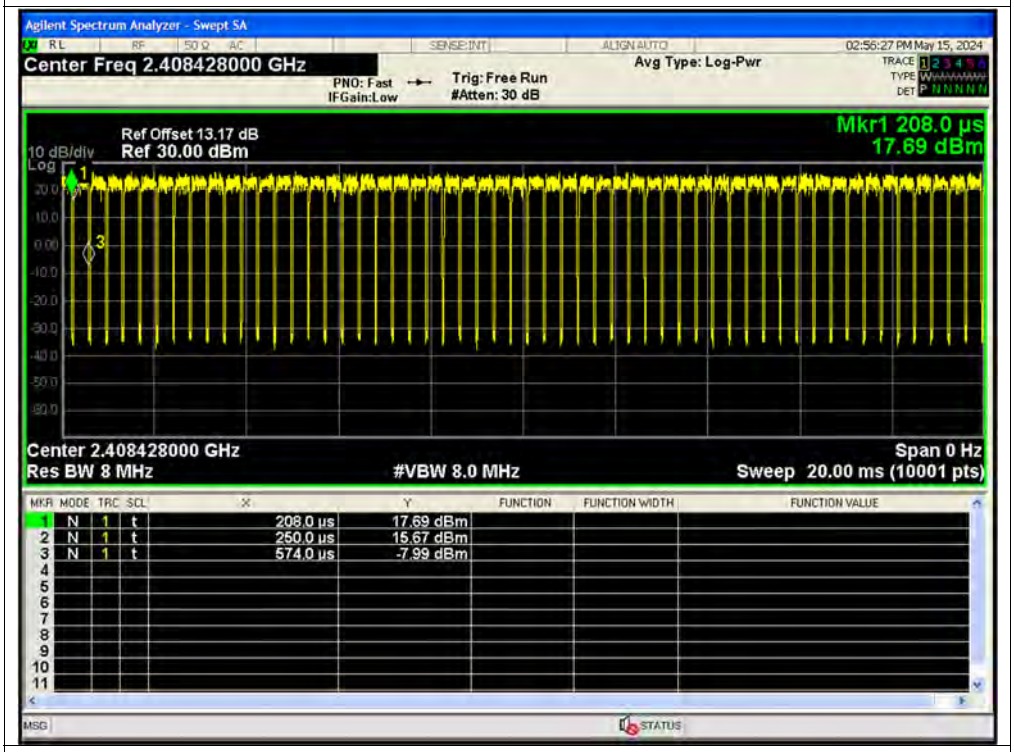
Duty Cycle NVNT ax20 106@53 2412MHz Ant1



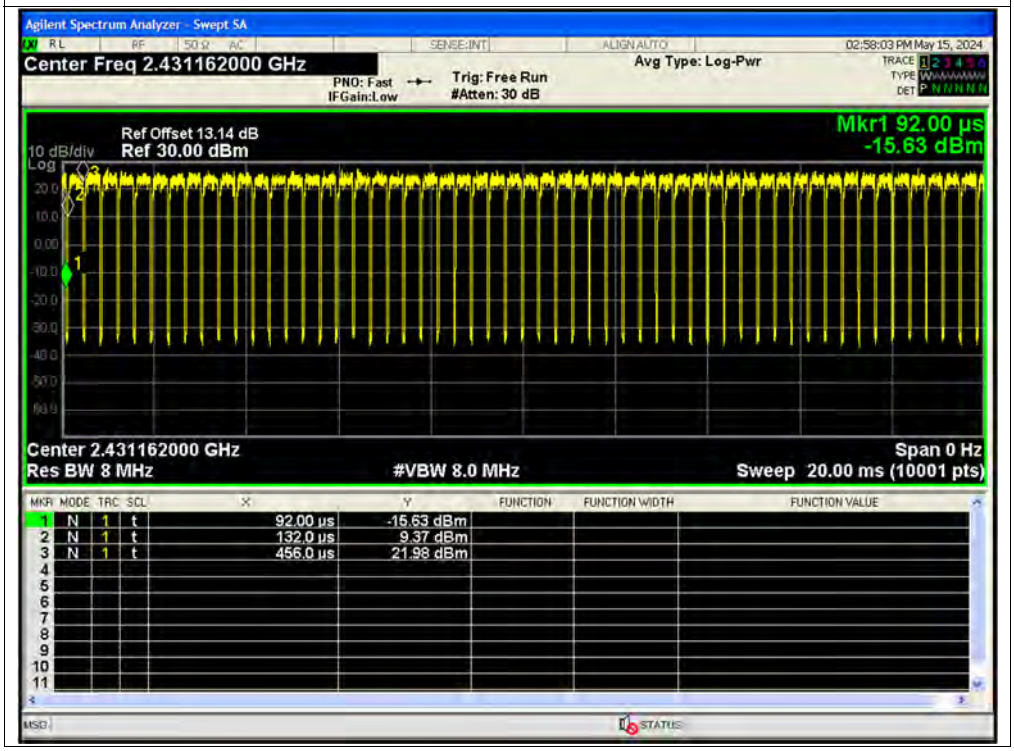
Duty Cycle NVNT ax20 106@53 2437MHz Ant1



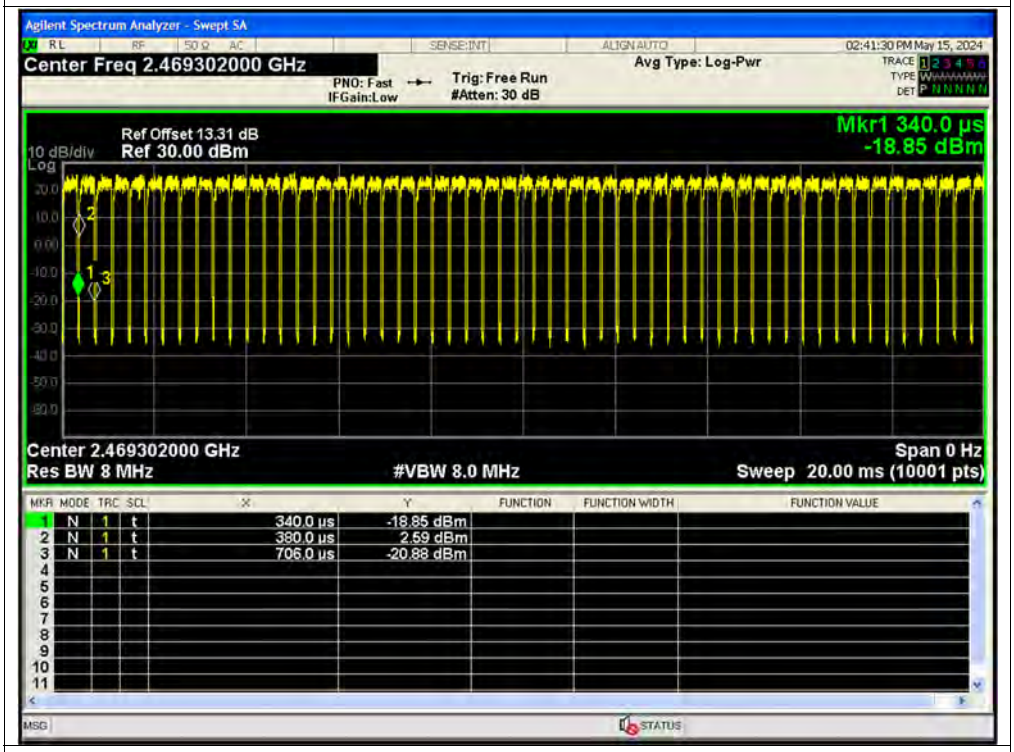
Duty Cycle NVNT ax20 106@53 2412MHz Ant2



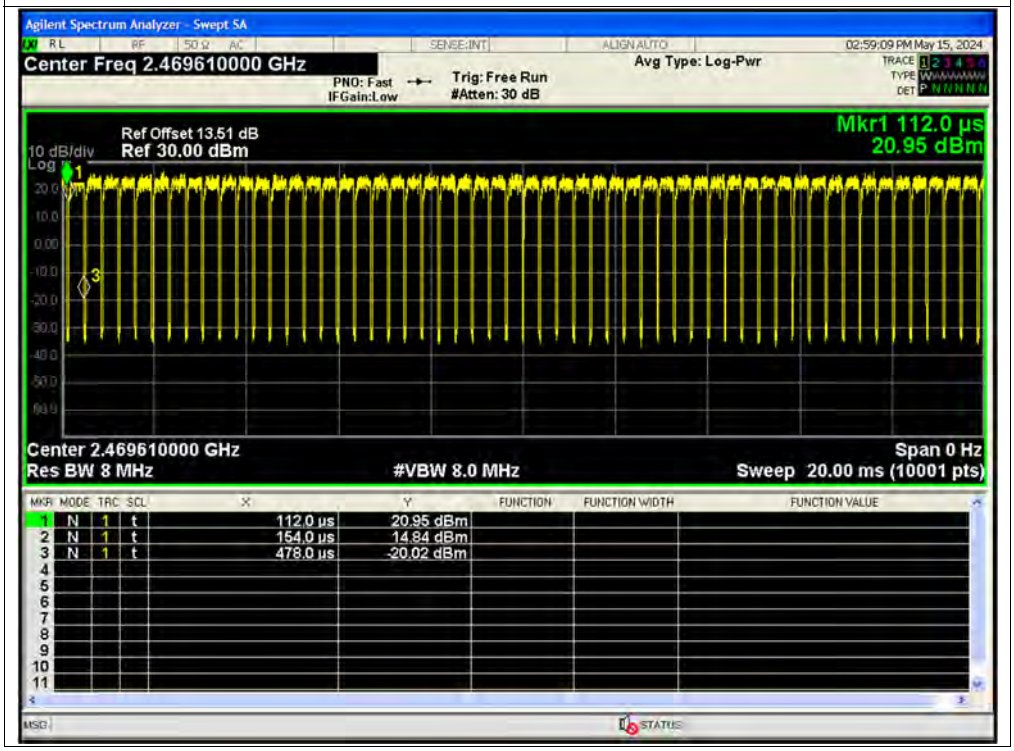
Duty Cycle NVNT ax20 106@53 2437MHz Ant2



Duty Cycle NVNT ax20 106@54 2462MHz Ant1



Duty Cycle NVNT ax20 106@54 2462MHz Ant2

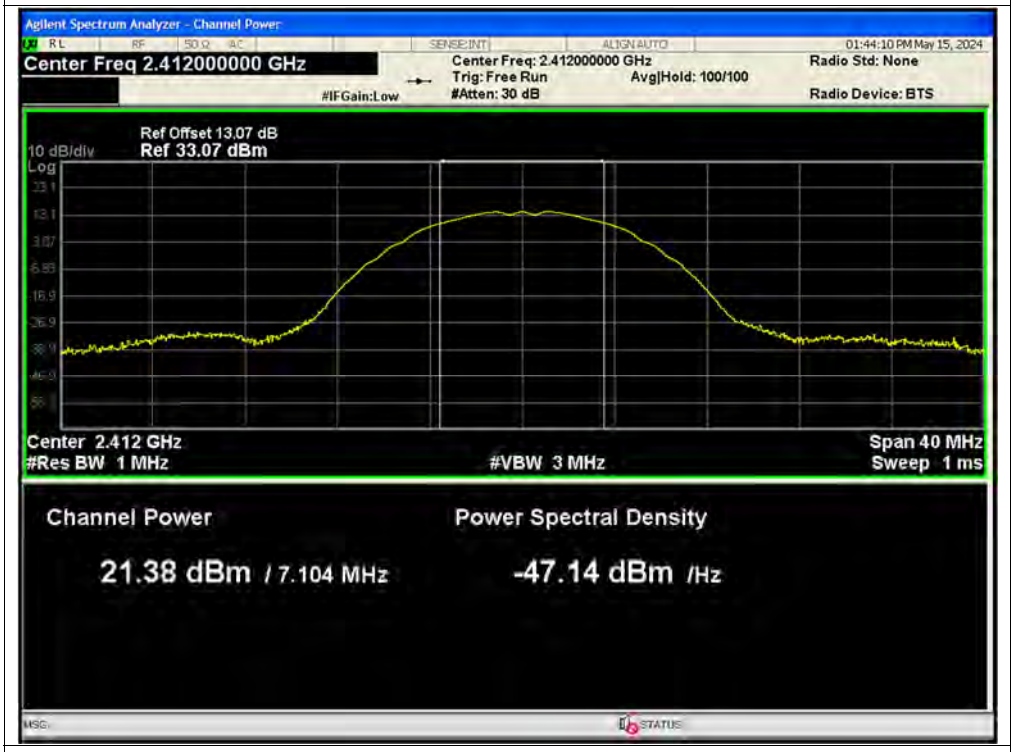


A.2. Maximum Peak Conducted Output Power

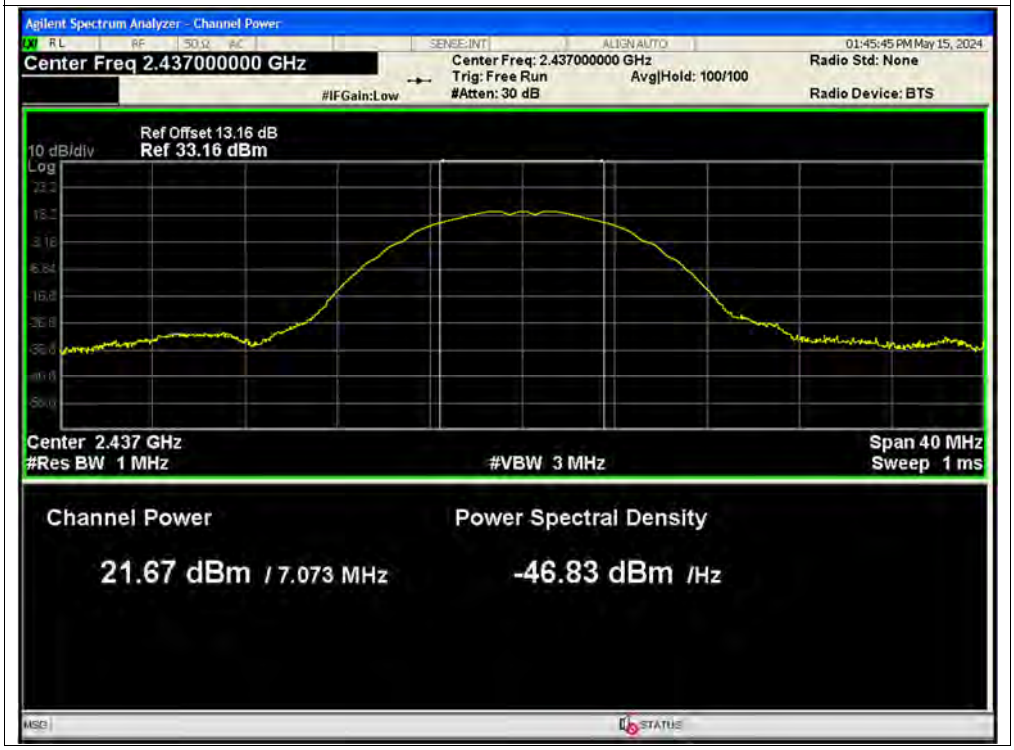
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Total Conducted Power (dBm)	Total Conducted Power (W)	Limit Conducted (dBm)	Verdict
NVNT	b	2412	Ant1	21.38	21.38	0.1374	30	Pass
NVNT	b	2437	Ant1	21.67	21.67	0.14689	30	Pass
NVNT	b	2462	Ant1	21.26	21.26	0.13366	30	Pass
NVNT	b	2412	Ant2	21.79	21.79	0.15101	30	Pass
NVNT	b	2437	Ant2	21.7	21.7	0.14791	30	Pass
NVNT	b	2462	Ant2	21.82	21.82	0.15205	30	Pass
NVNT	g	2412	Ant1	23.91	23.91	0.24604	30	Pass
NVNT	g	2437	Ant1	26.29	26.29	0.4256	30	Pass
NVNT	g	2462	Ant1	22.39	22.39	0.17338	30	Pass
NVNT	g	2412	Ant2	20.22	20.22	0.1052	30	Pass
NVNT	g	2437	Ant2	26.47	26.47	0.44361	30	Pass
NVNT	g	2462	Ant2	19.82	19.82	0.09594	30	Pass
NVNT	n20	2412	Ant1	22.28	22.28	0.16904	30	Pass
NVNT	n20	2437	Ant1	25.46	25.46	0.35156	30	Pass
NVNT	n20	2462	Ant1	21.64	21.64	0.14588	30	Pass
NVNT	n20	2412	Ant2	19.22	19.22	0.08356	30	Pass
NVNT	n20	2437	Ant2	25.41	25.41	0.34754	30	Pass
NVNT	n20	2462	Ant2	18.44	18.44	0.06982	30	Pass
NVNT	ax20	2412	Ant1	22.26	22.26	0.16827	30	Pass
NVNT	ax20	2437	Ant1	26.13	26.13	0.4102	30	Pass
NVNT	ax20	2462	Ant1	21.56	21.56	0.14322	30	Pass
NVNT	ax20	2412	Ant2	18.81	18.81	0.07603	30	Pass
NVNT	ax20	2437	Ant2	26.37	26.37	0.43351	30	Pass
NVNT	ax20	2462	Ant2	17.77	17.77	0.05984	30	Pass
NVNT	ax20 26@0	2412	Ant1	23.92	23.92	0.2466	30	Pass
NVNT	ax20 26@0	2437	Ant1	25.43	25.43	0.34914	30	Pass
NVNT	ax20 26@0	2412	Ant2	22.16	22.16	0.16444	30	Pass
NVNT	ax20 26@0	2437	Ant2	25.43	25.43	0.34914	30	Pass
NVNT	ax20 26@8	2462	Ant1	24.39	24.39	0.27479	30	Pass
NVNT	ax20 26@8	2462	Ant2	20.97	20.97	0.12503	30	Pass
NVNT	ax20 52@37	2412	Ant1	27.23	27.23	0.52845	30	Pass
NVNT	ax20 52@37	2437	Ant1	27.02	27.02	0.5035	30	Pass
NVNT	ax20 52@37	2412	Ant2	27.26	27.26	0.53211	30	Pass

NVNT	ax20 52@37	2437	Ant2	27.12	27.12	0.51523	30	Pass
NVNT	ax20 52@40	2462	Ant1	27	27	0.50119	30	Pass
NVNT	ax20 52@40	2462	Ant2	27.35	27.35	0.54325	30	Pass
NVNT	ax20 106@53	2412	Ant1	27.51	27.51	0.56364	30	Pass
NVNT	ax20 106@53	2437	Ant1	26.75	26.75	0.47315	30	Pass
NVNT	ax20 106@53	2412	Ant2	27.27	27.27	0.53333	30	Pass
NVNT	ax20 106@53	2437	Ant2	27.12	27.12	0.51523	30	Pass
NVNT	ax20 106@54	2462	Ant1	27.1	27.1	0.51286	30	Pass
NVNT	ax20 106@54	2462	Ant2	27.6	27.6	0.57544	30	Pass

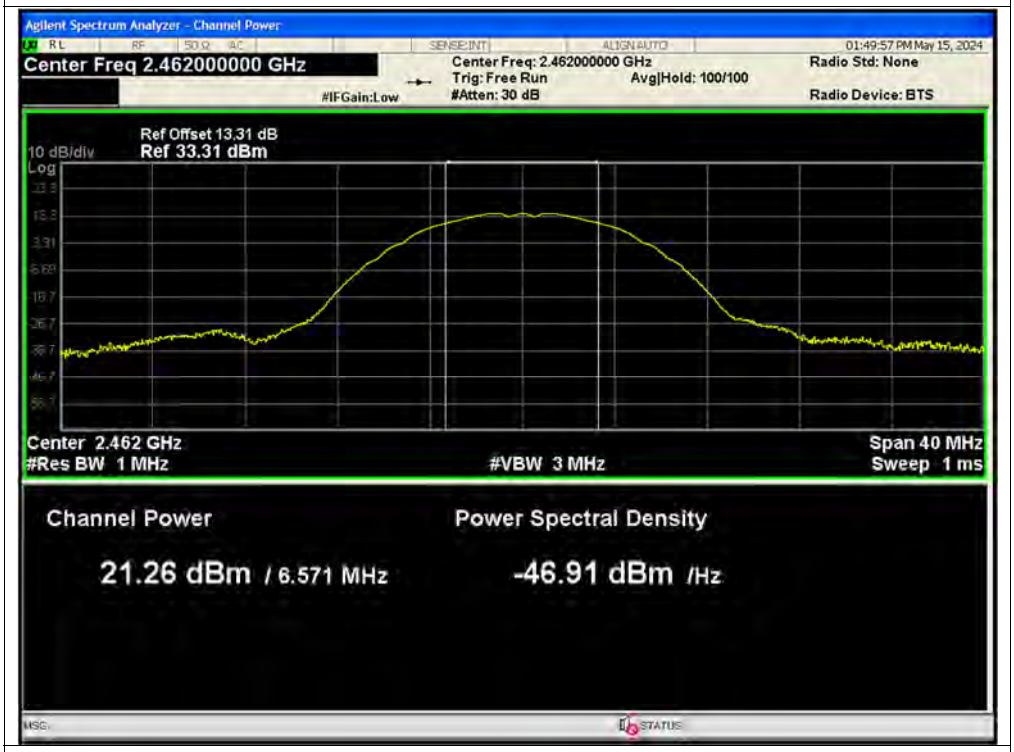
Test Graphs
Peak Power NVNT b 2412MHz Ant1



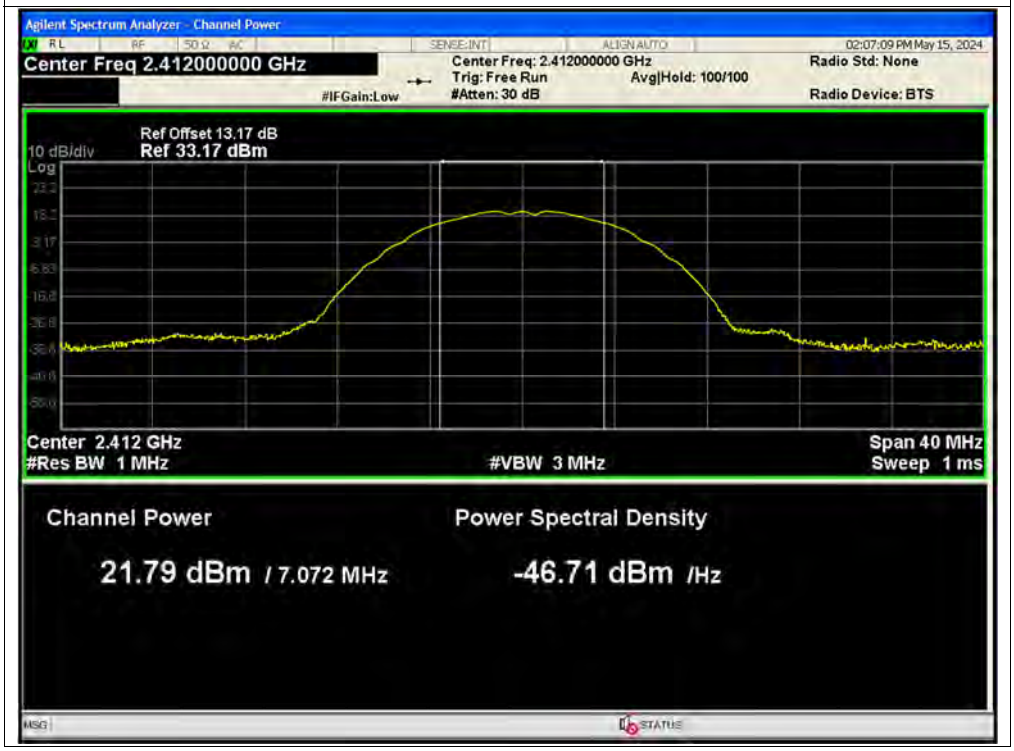
Peak Power NVNT b 2437MHz Ant1



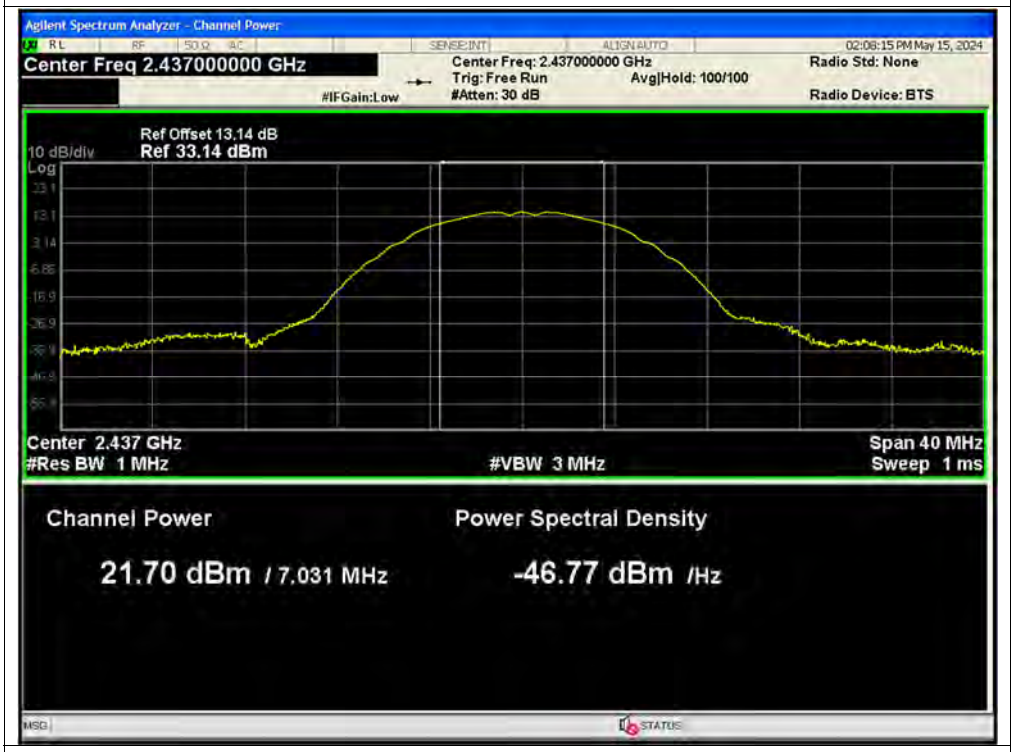
Peak Power NVNT b 2462MHz Ant1



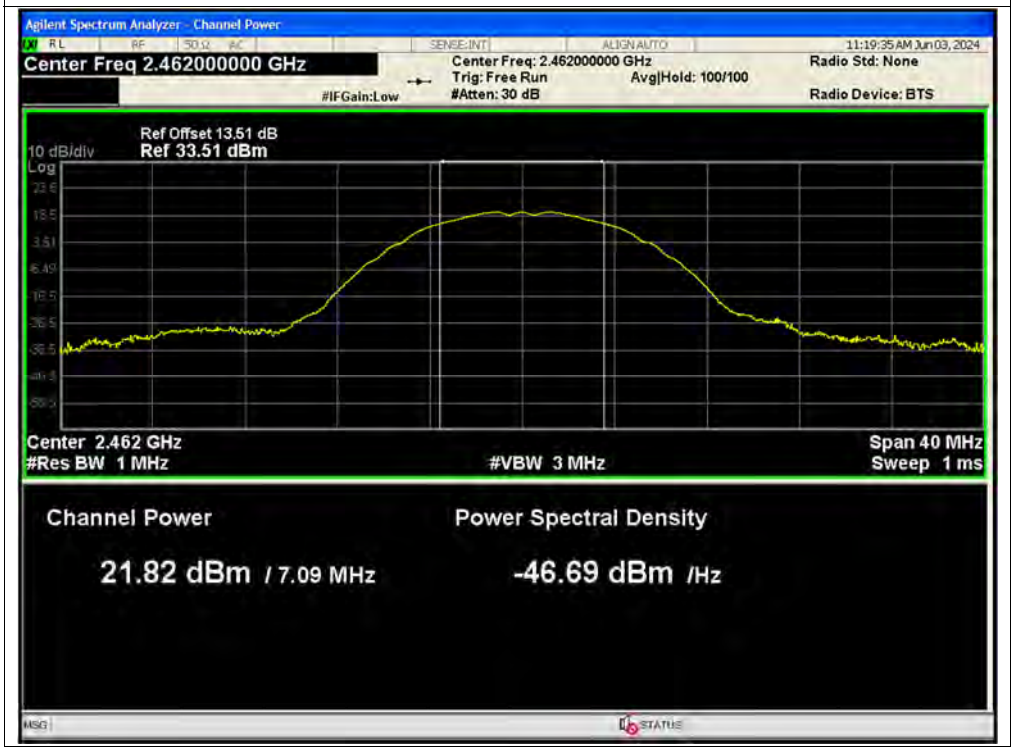
Peak Power NVNT b 2412MHz Ant2



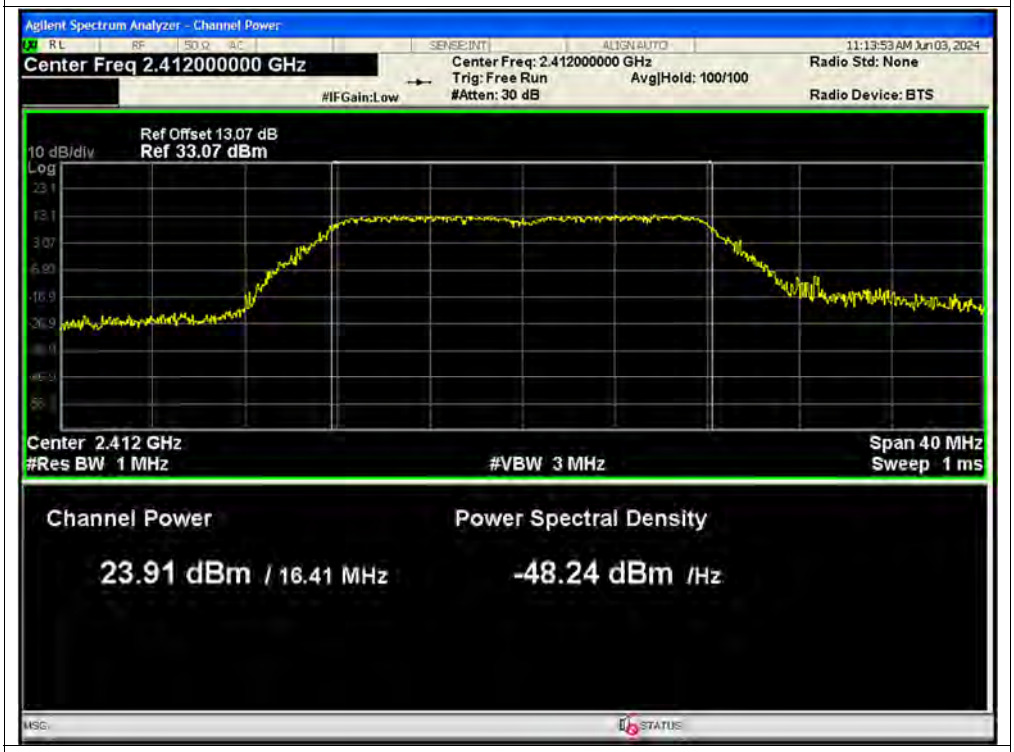
Peak Power NVNT b 2437MHz Ant2



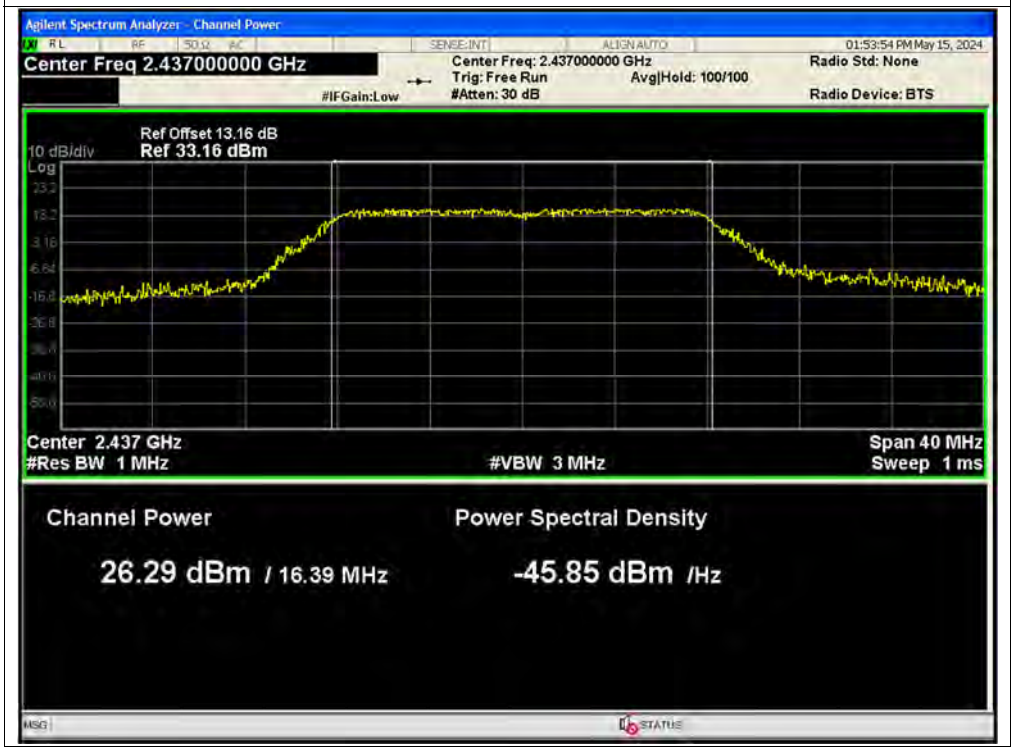
Peak Power NVNT b 2462MHz Ant2



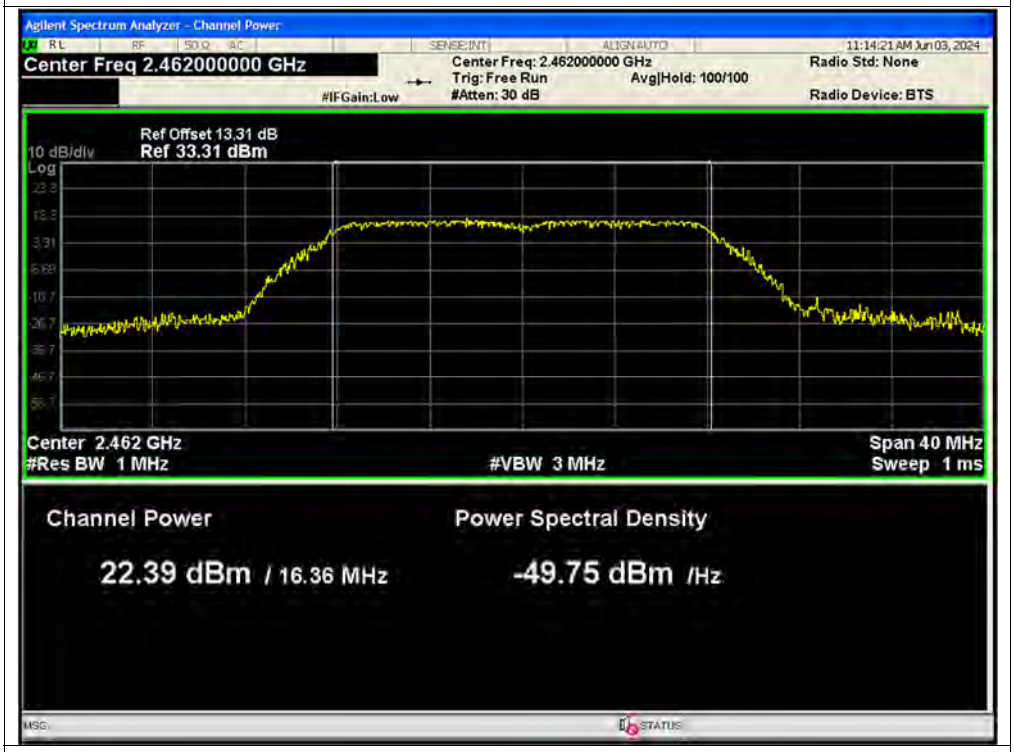
Peak Power NVNT g 2412MHz Ant1



Peak Power NVNT g 2437MHz Ant1



Peak Power NVNT g 2462MHz Ant1



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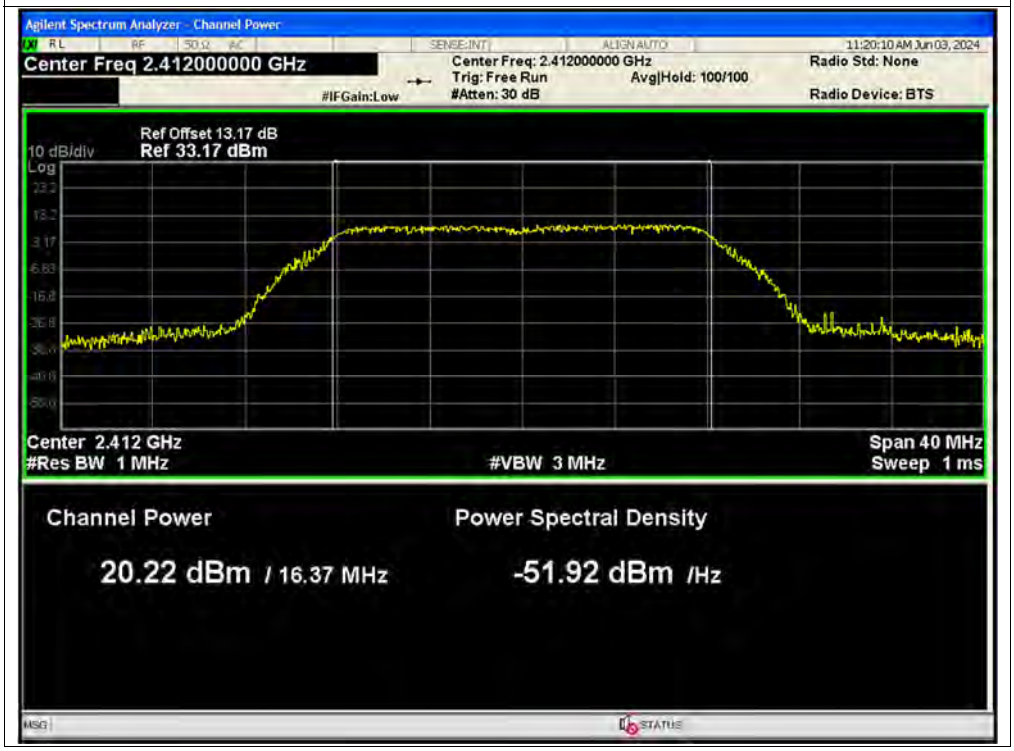
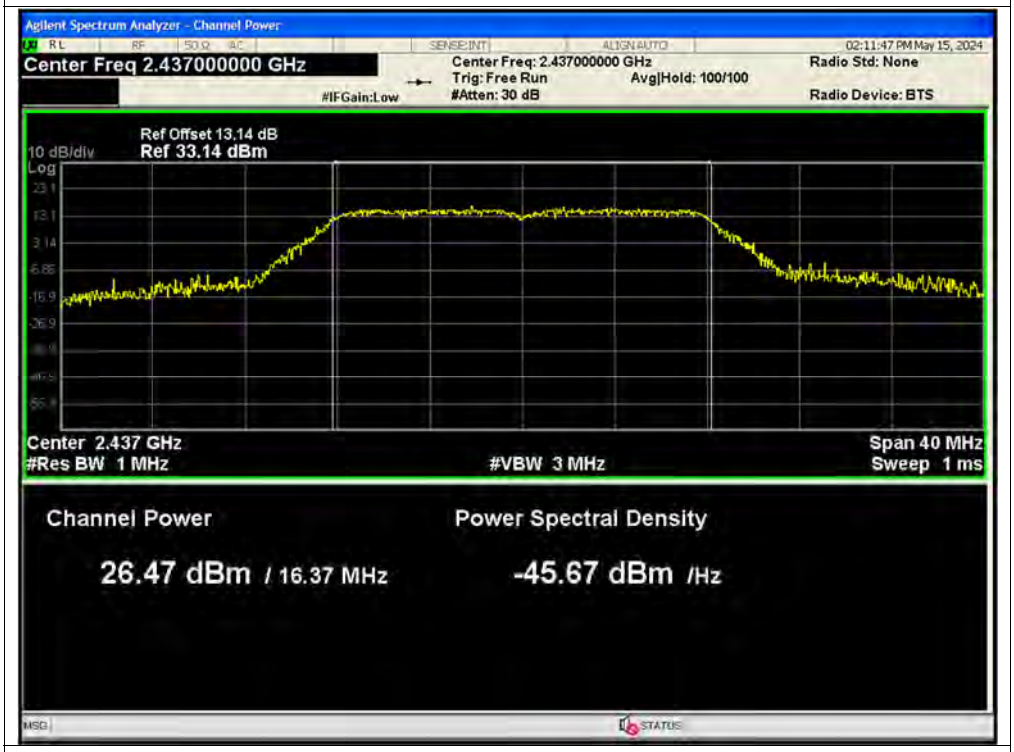
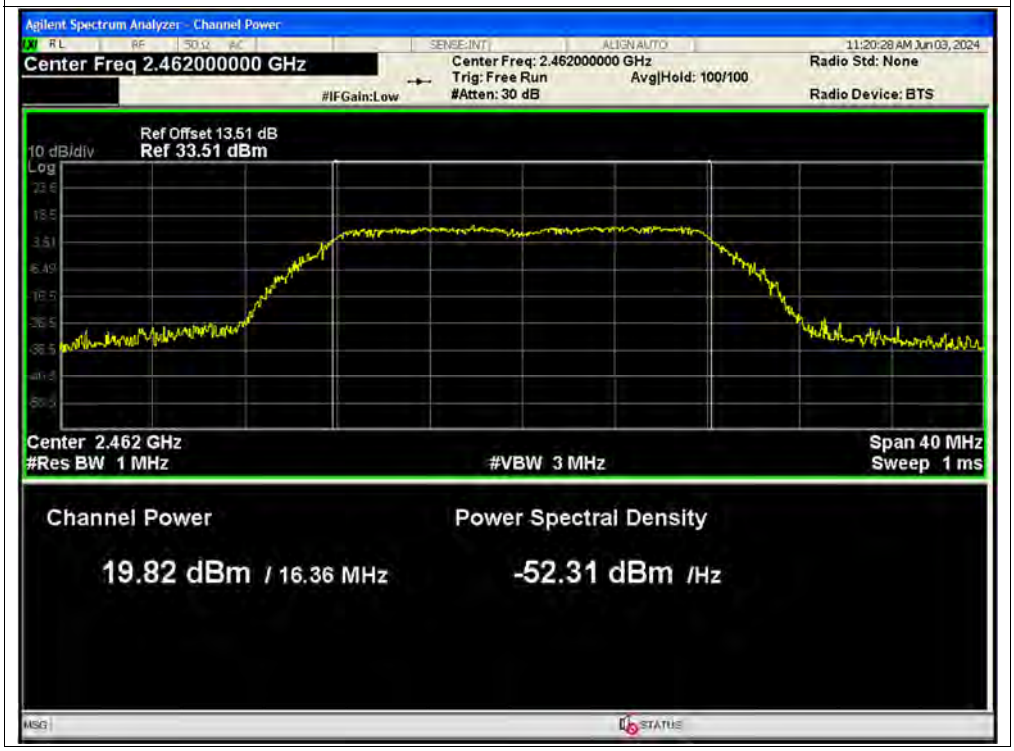


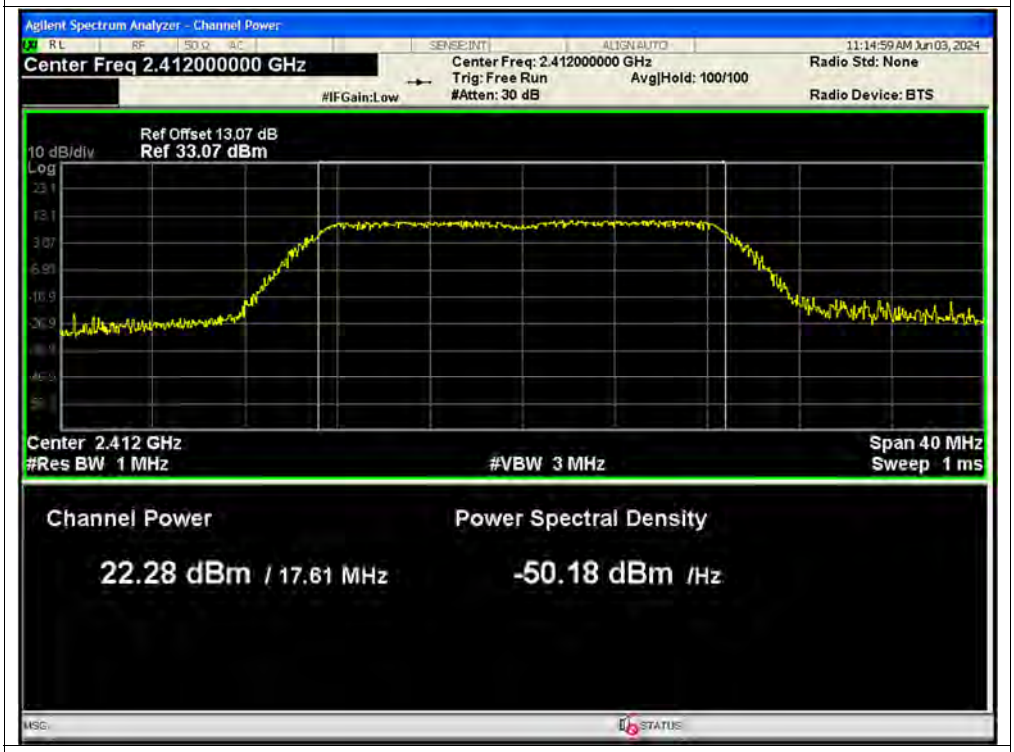
Peak Power NVNT g 2437MHz Ant2



Peak Power NVNT g 2462MHz Ant2



Peak Power NVNT n20 2412MHz Ant1



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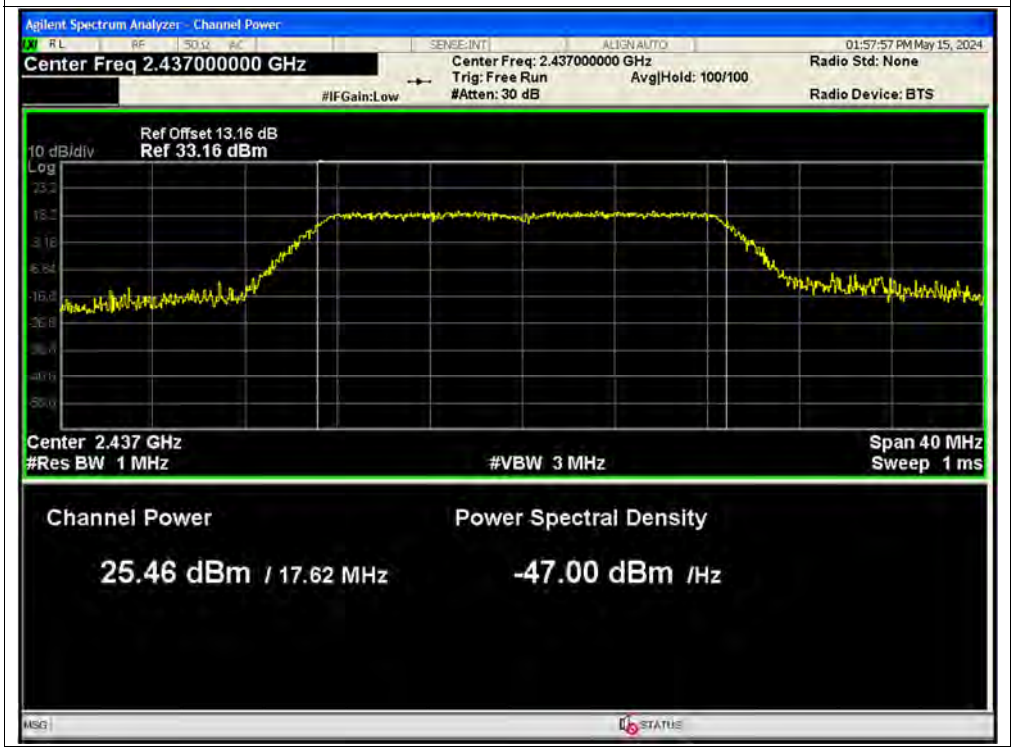

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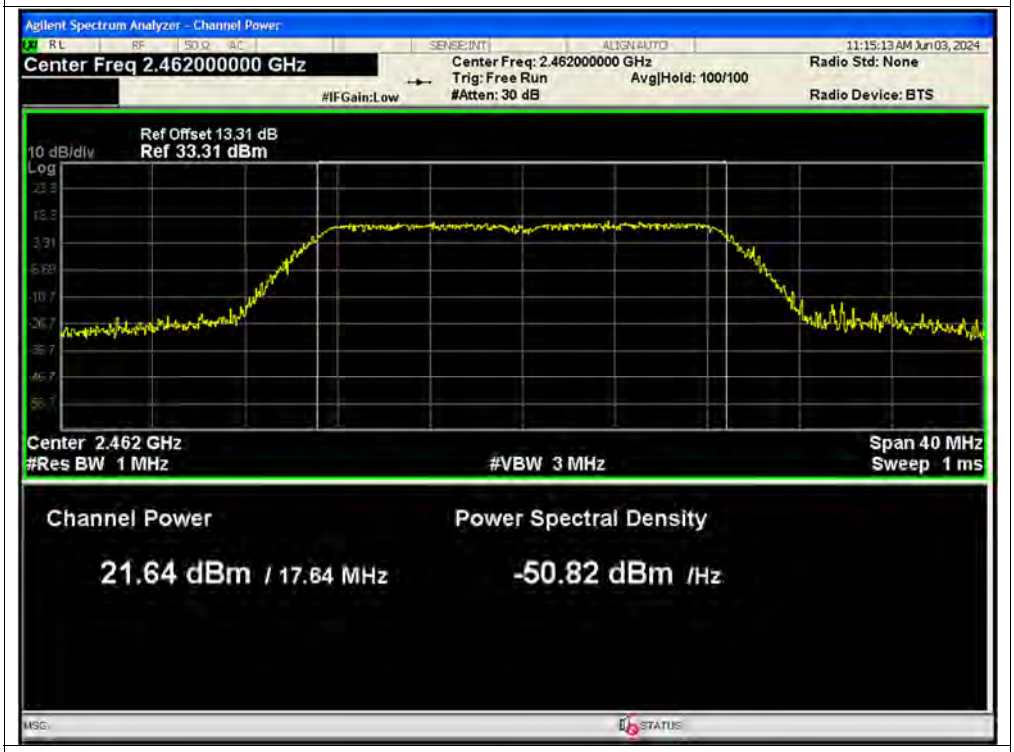

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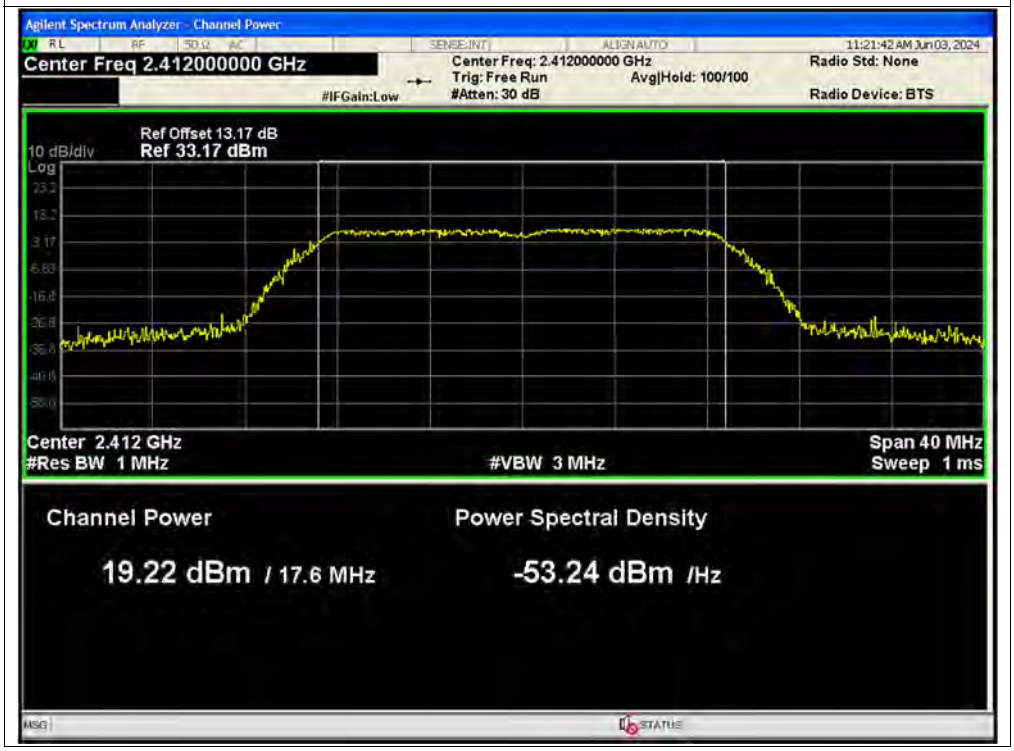

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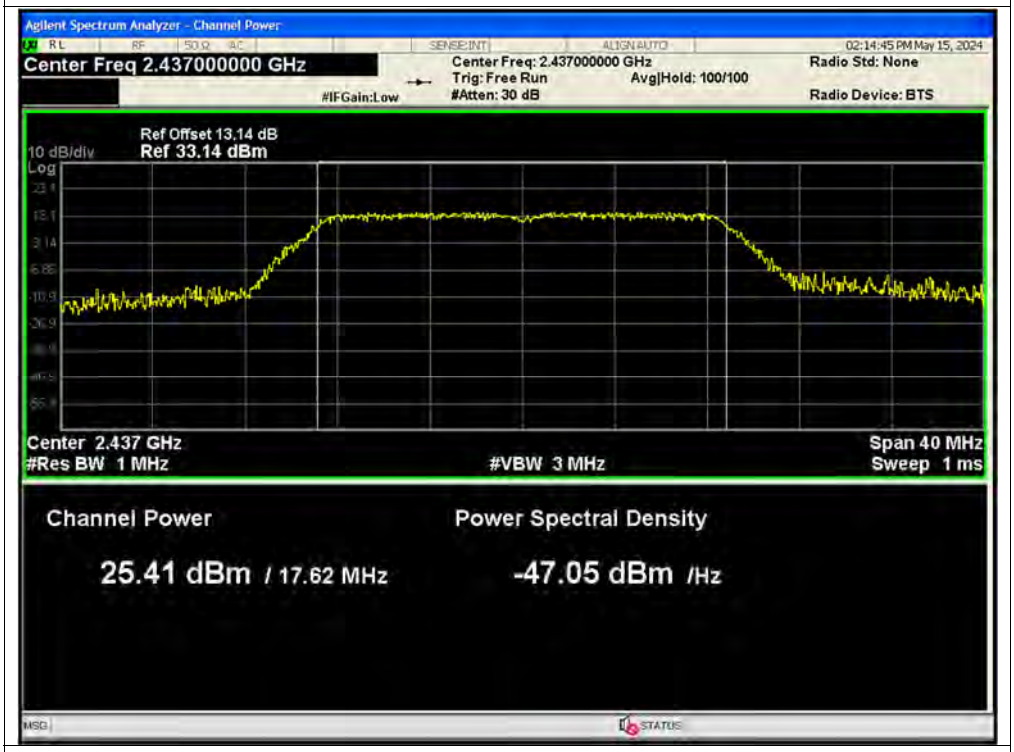

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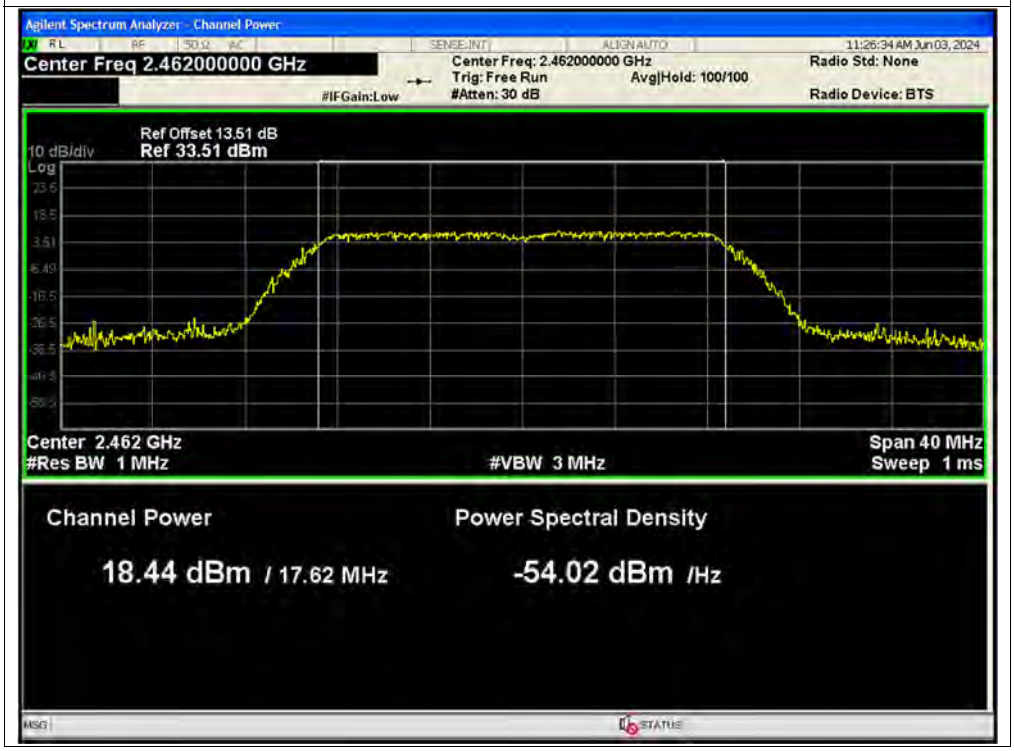

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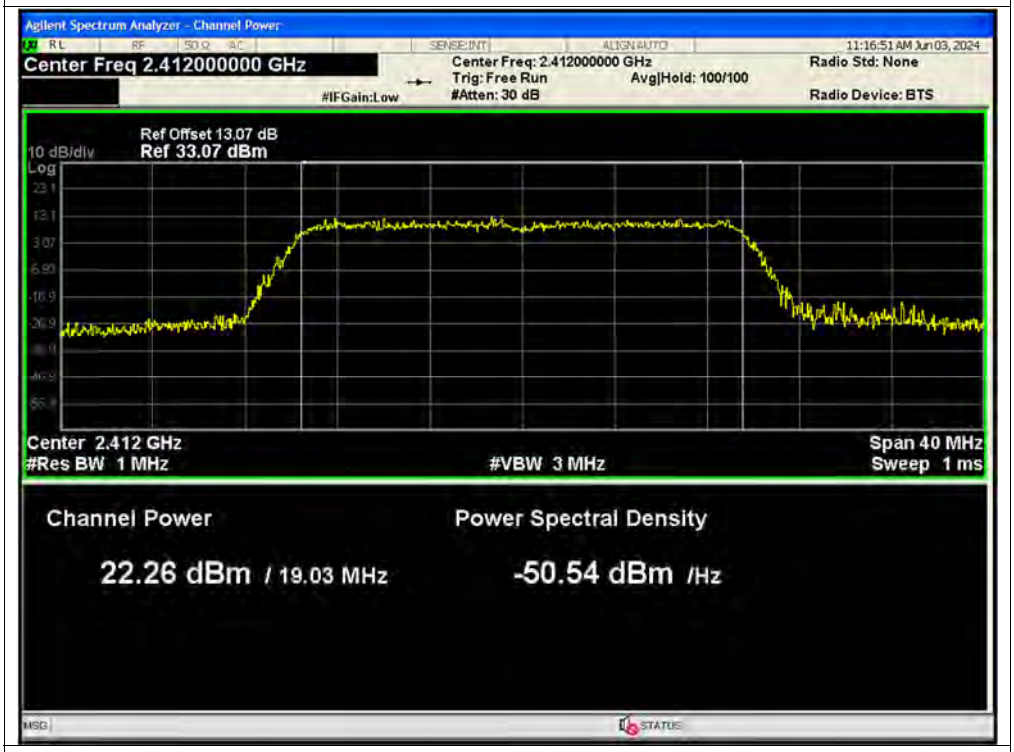

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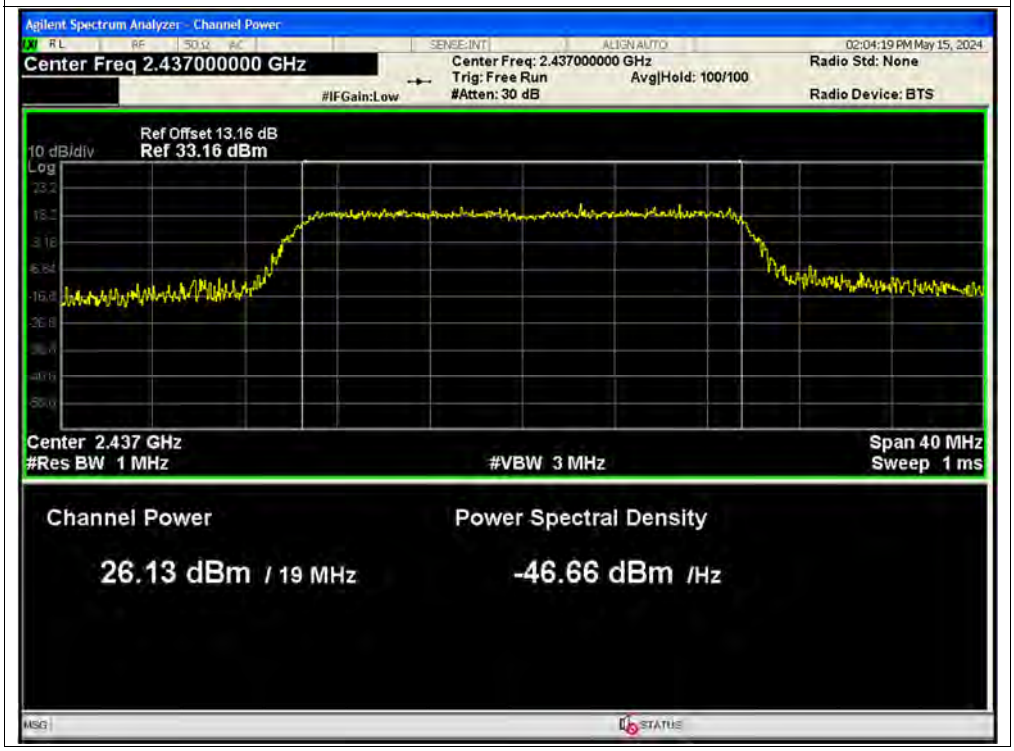

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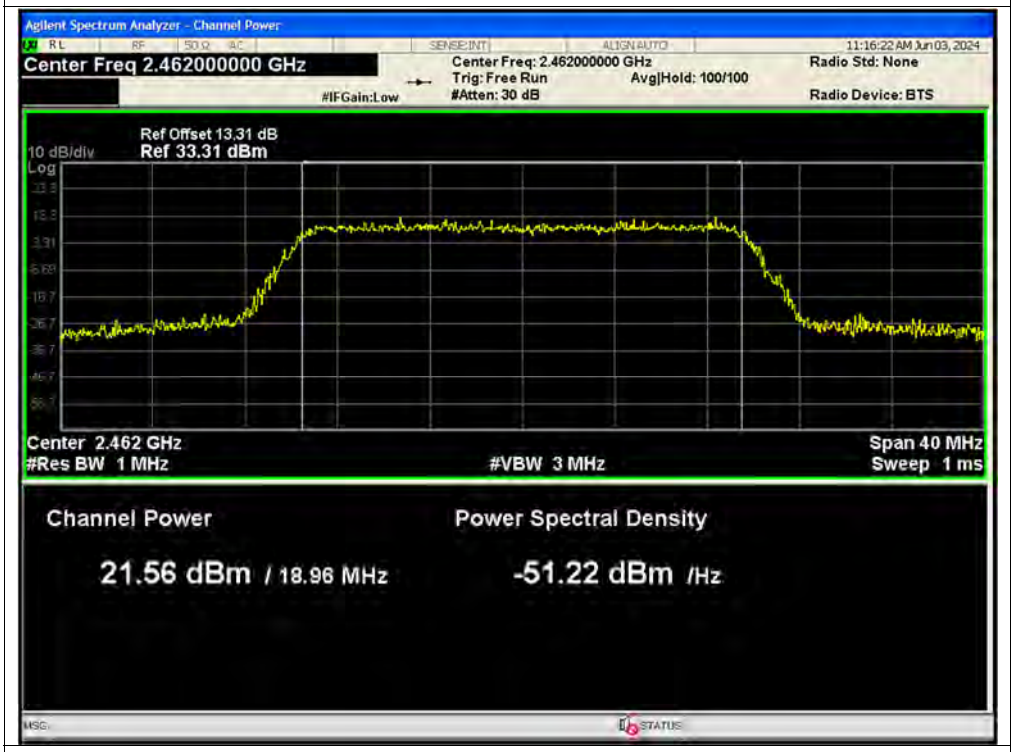

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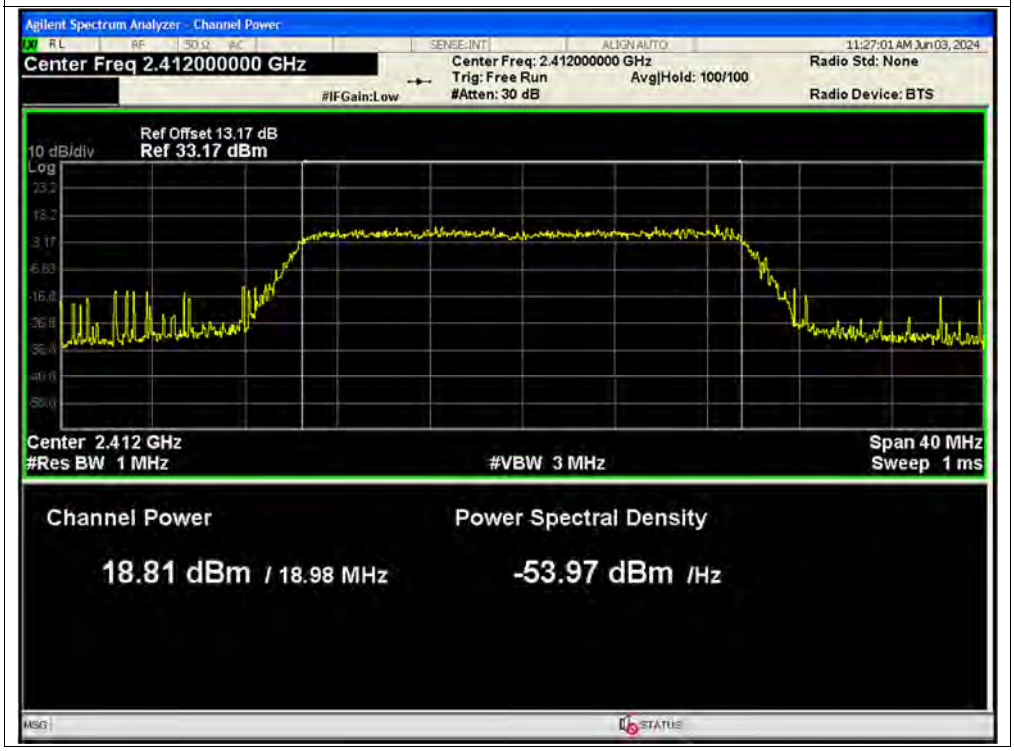

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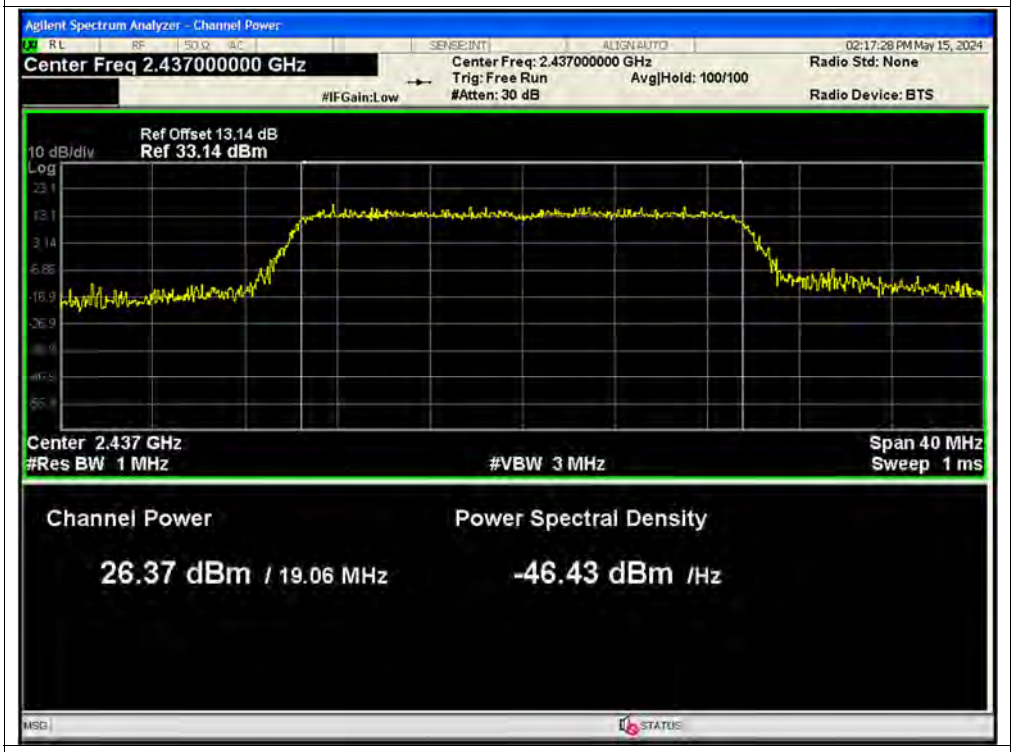
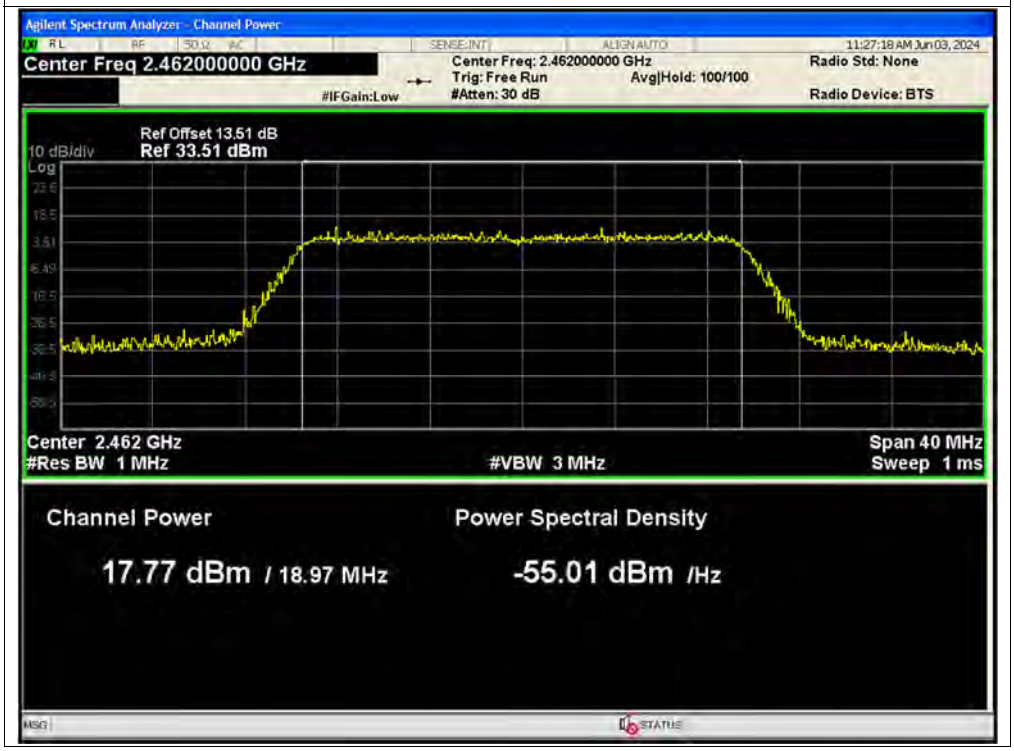


Peak Power NVNT ax20 2462MHz Ant2



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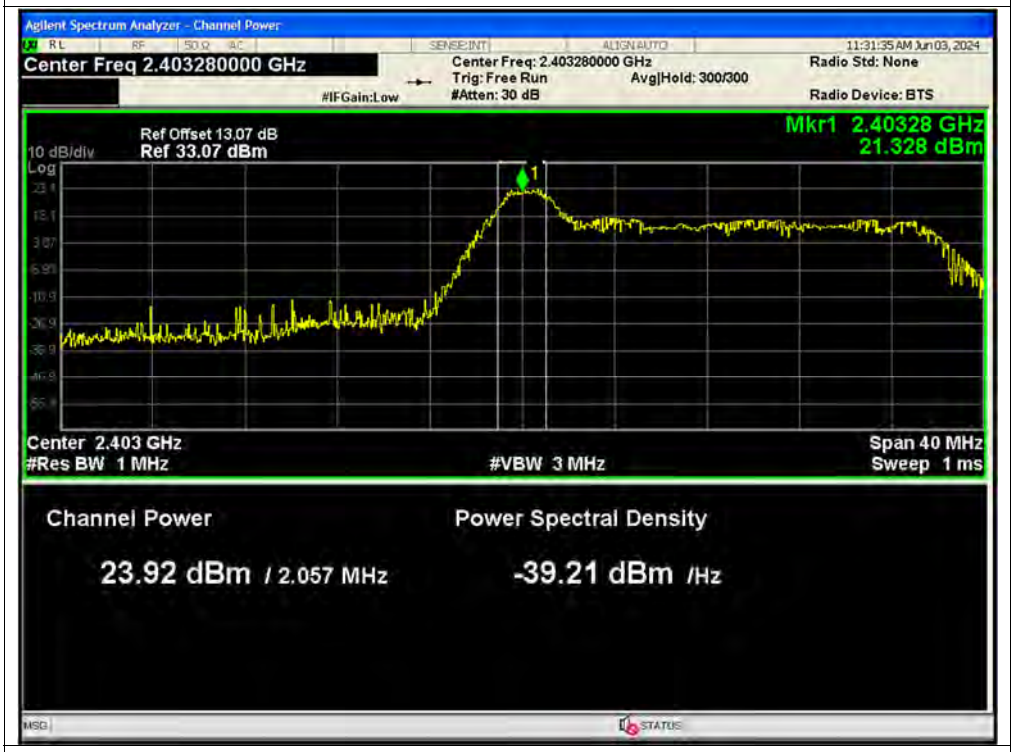
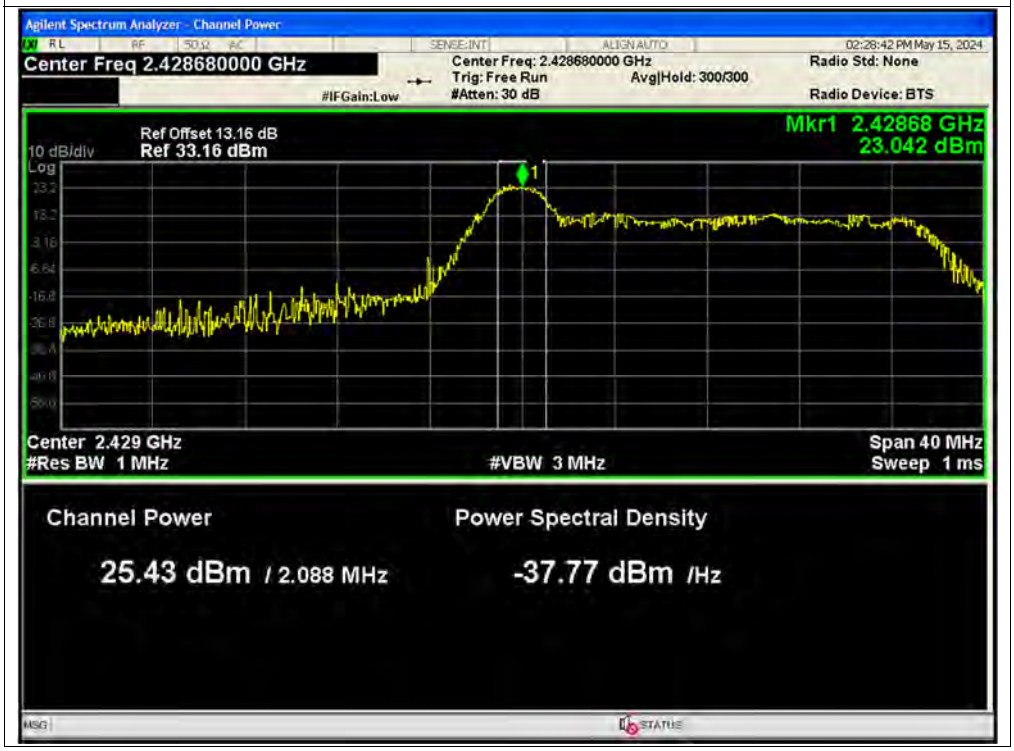
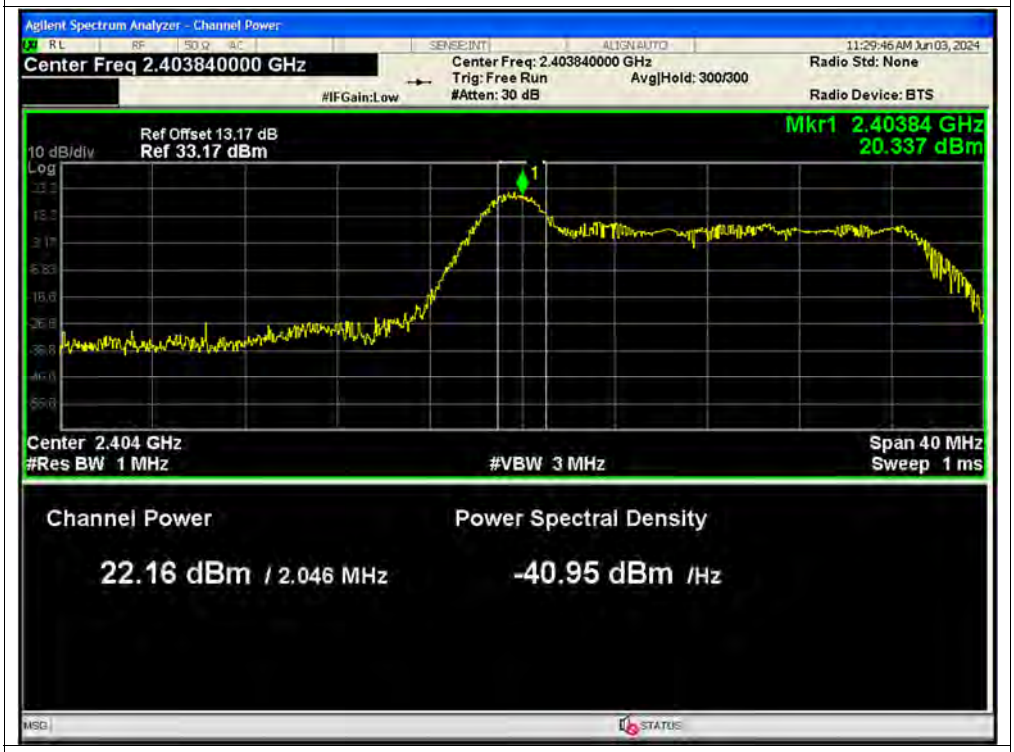


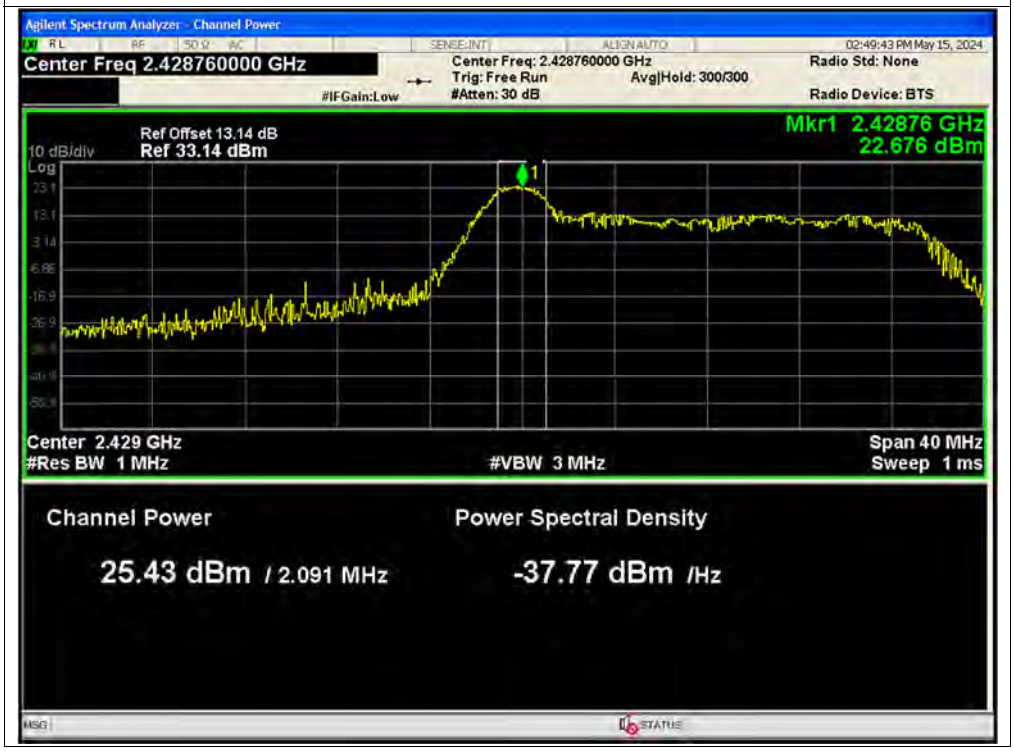
Peak Power NVNT ax20 26@0 2437MHz Ant1



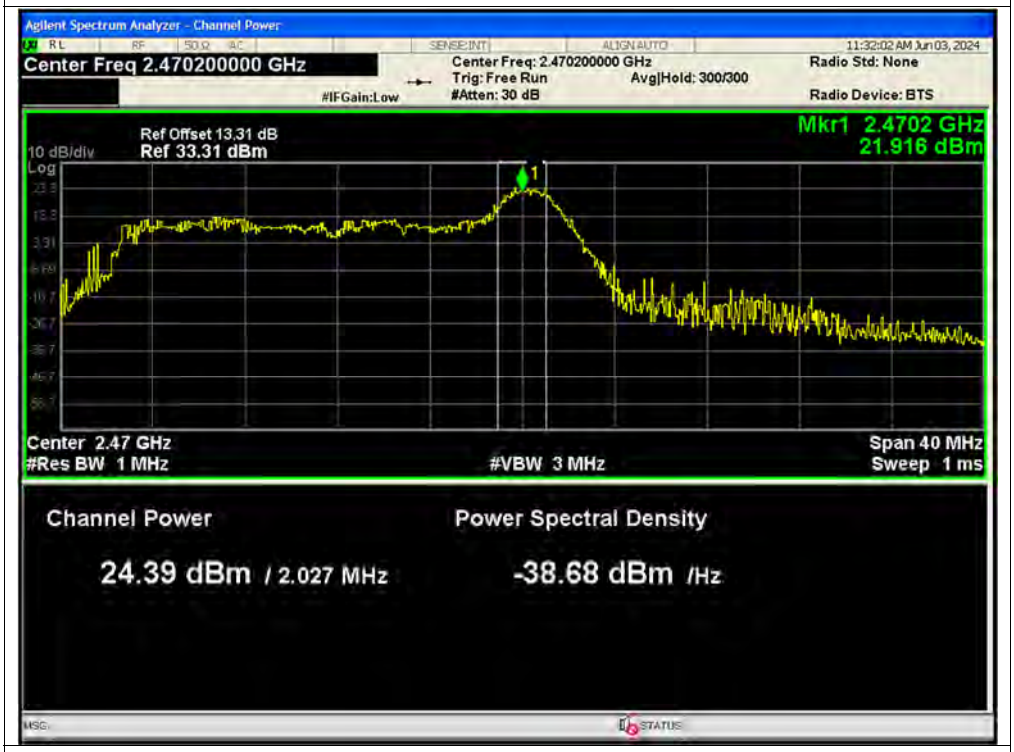
Peak Power NVNT ax20 26@0 2412MHz Ant2



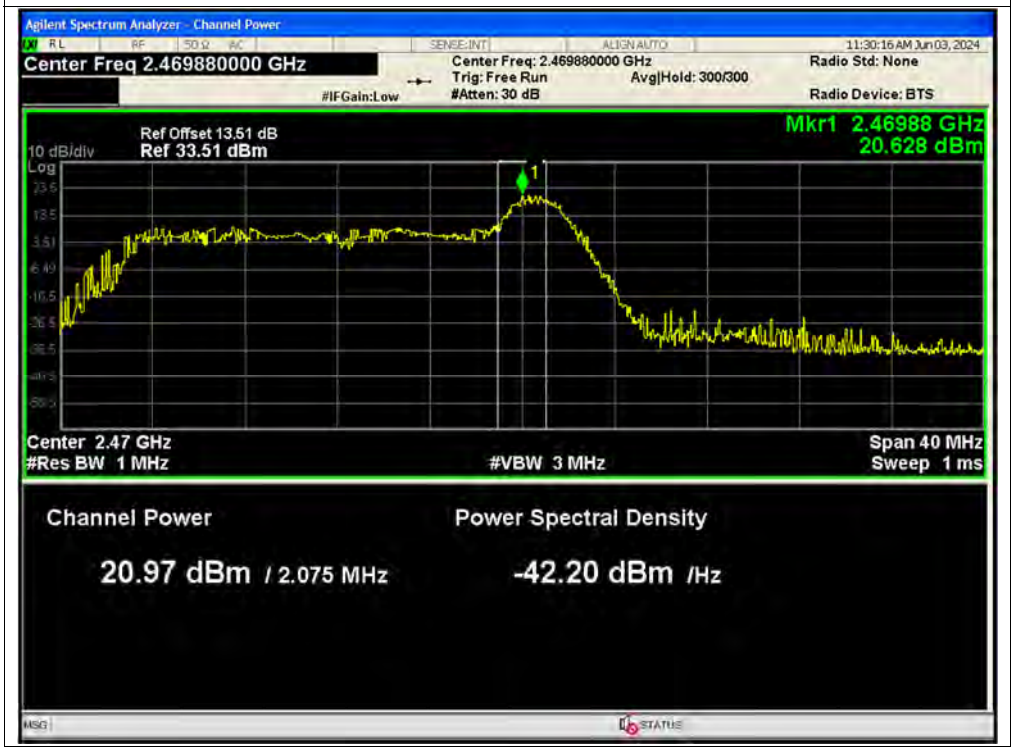
Peak Power NVNT ax20 26@0 2437MHz Ant2



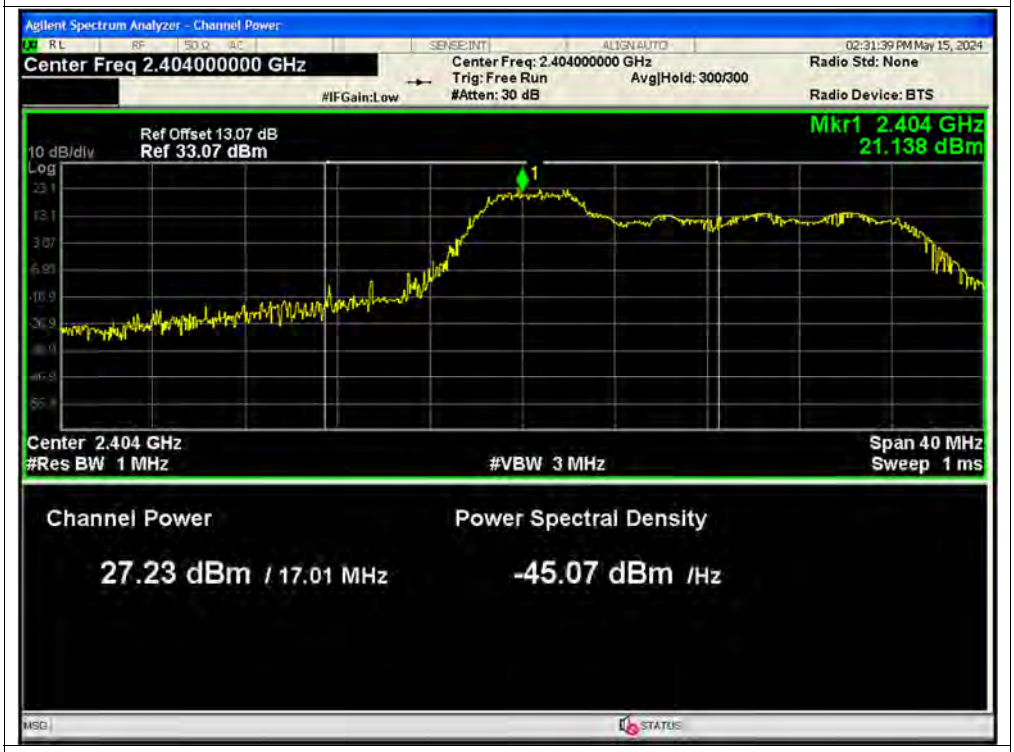
Peak Power NVNT ax20 26@8 2462MHz Ant1



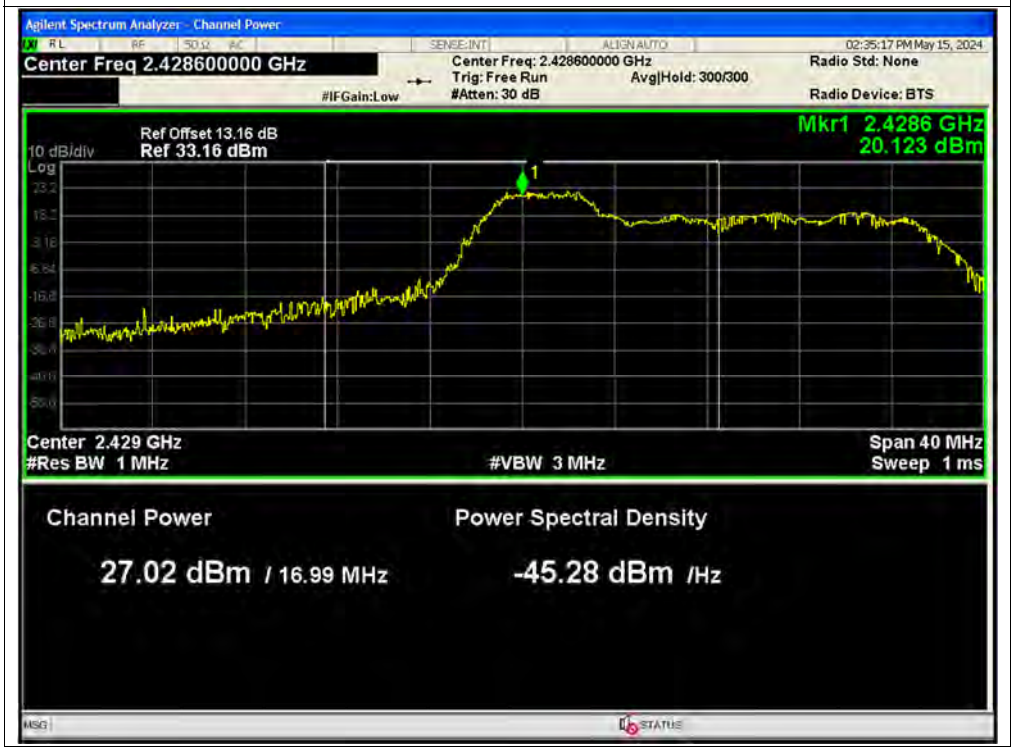
Peak Power NVNT ax20 26@8 2462MHz Ant2



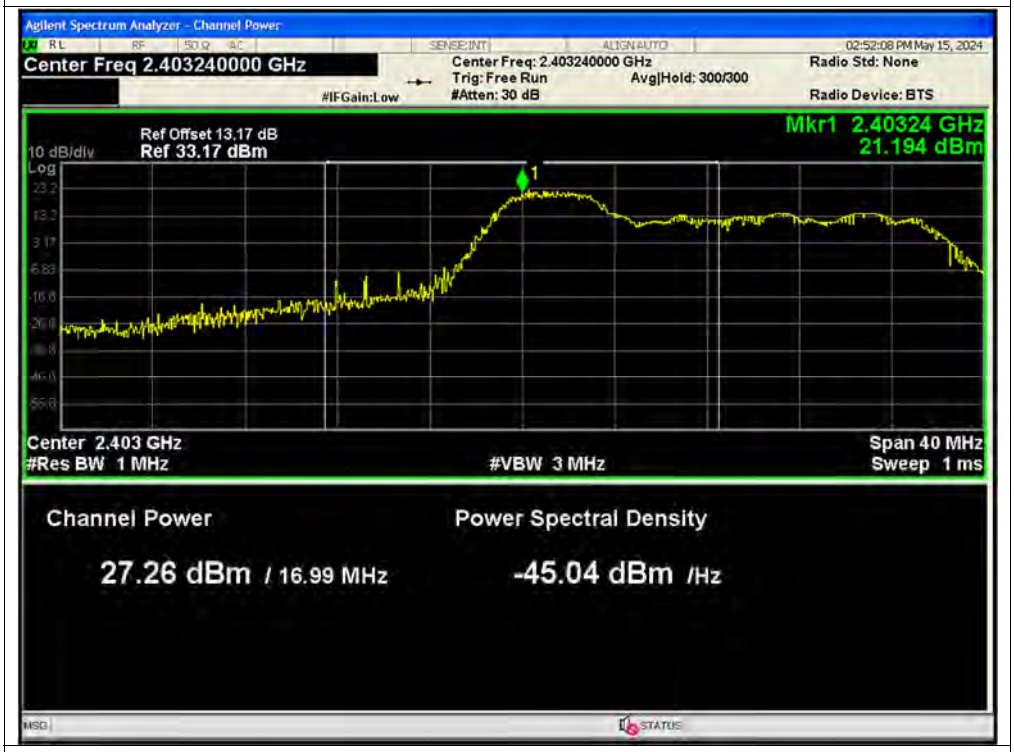
Peak Power NVNT ax20 52@37 2412MHz Ant1



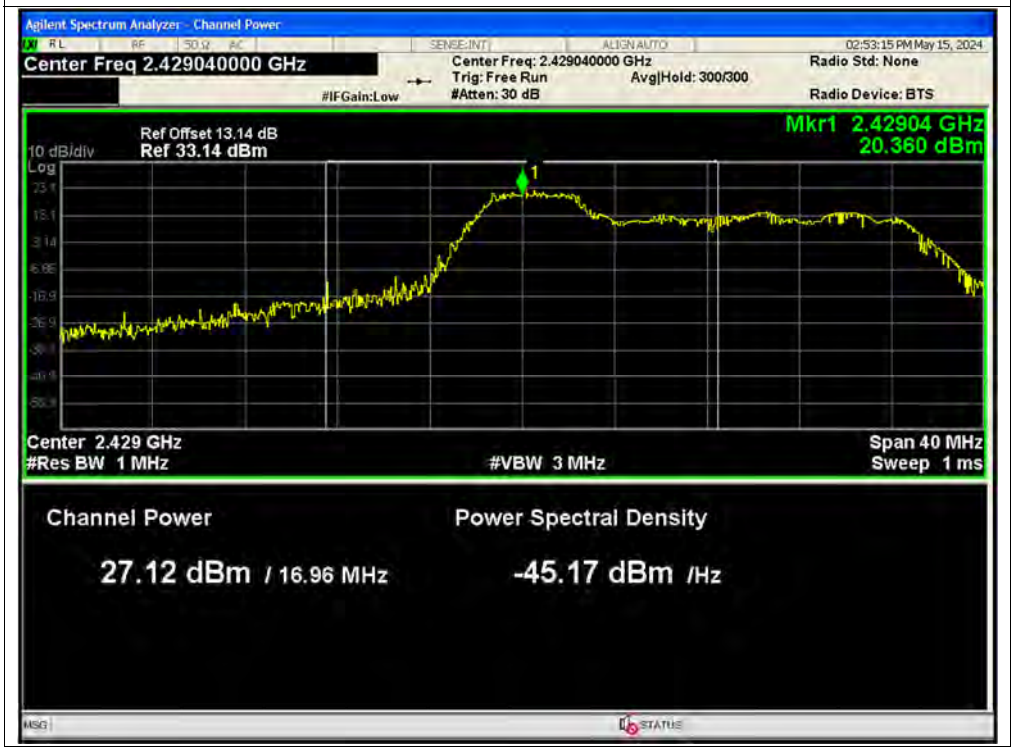
Peak Power NVNT ax20 52@37 2437MHz Ant1



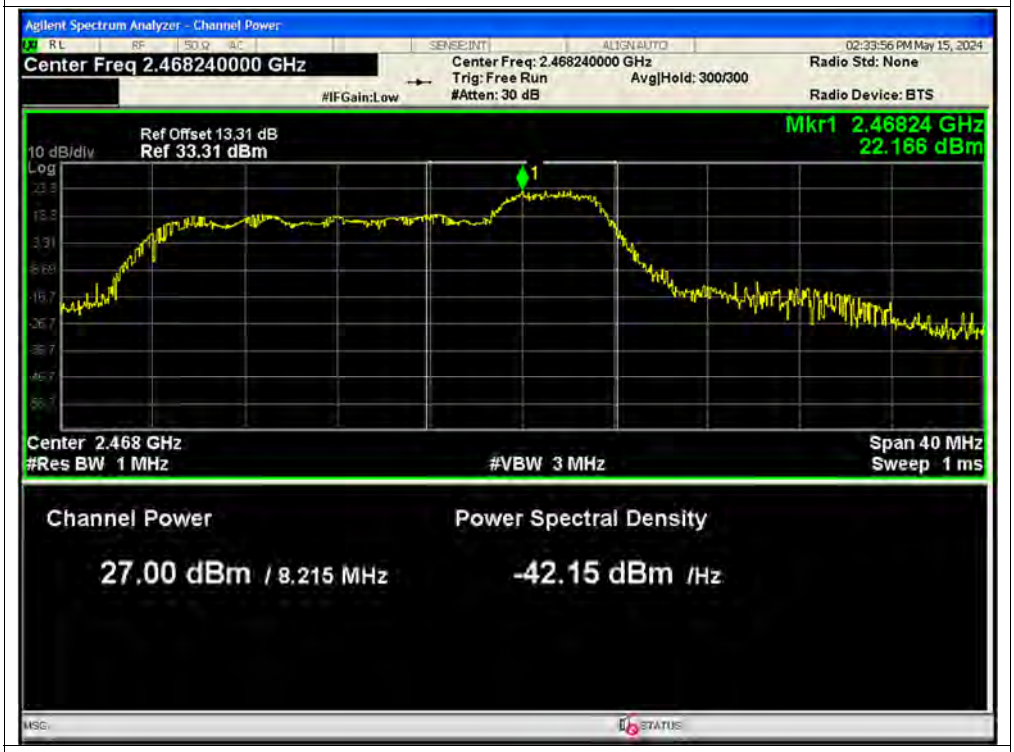
Peak Power NVNT ax20 52@37 2412MHz Ant2



Peak Power NVNT ax20 52@37 2437MHz Ant2

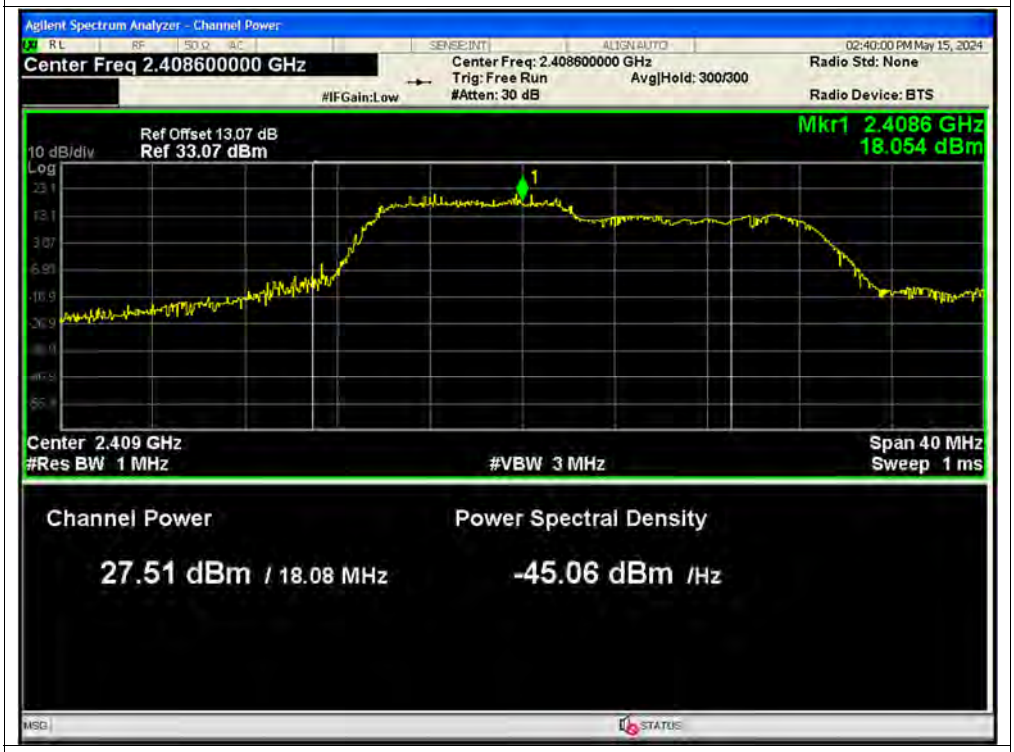


Peak Power NVNT ax20 52@40 2462MHz Ant1

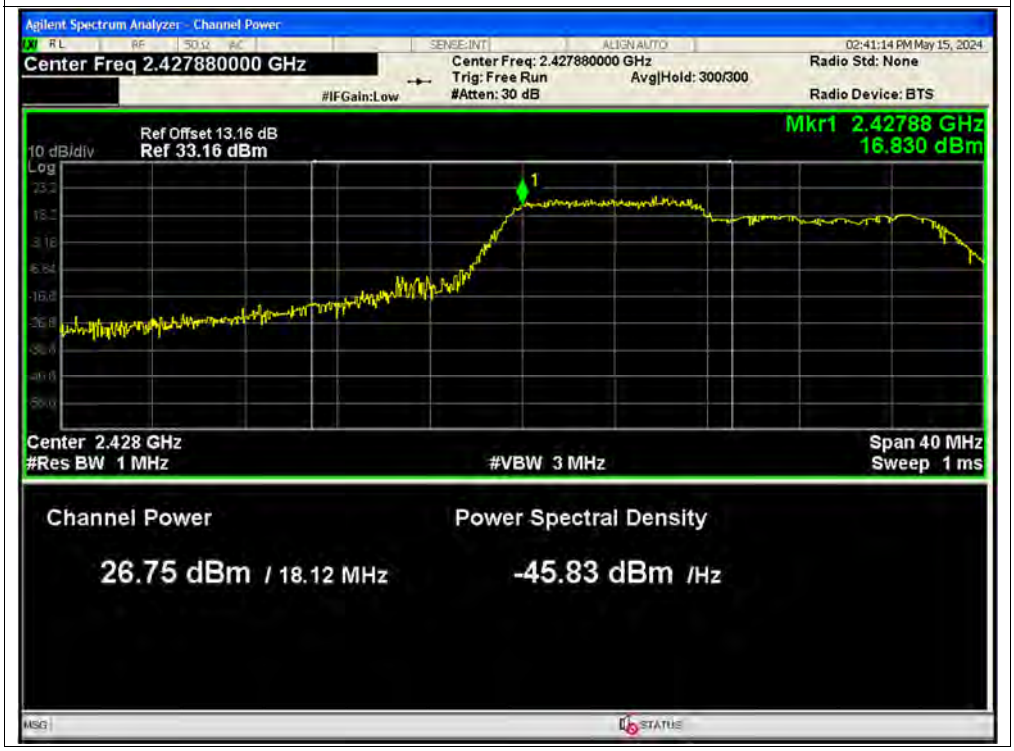


Peak Power NVNT ax20 52@40 2462MHz Ant2

Peak Power NVNT ax20 106@53 2412MHz Ant1

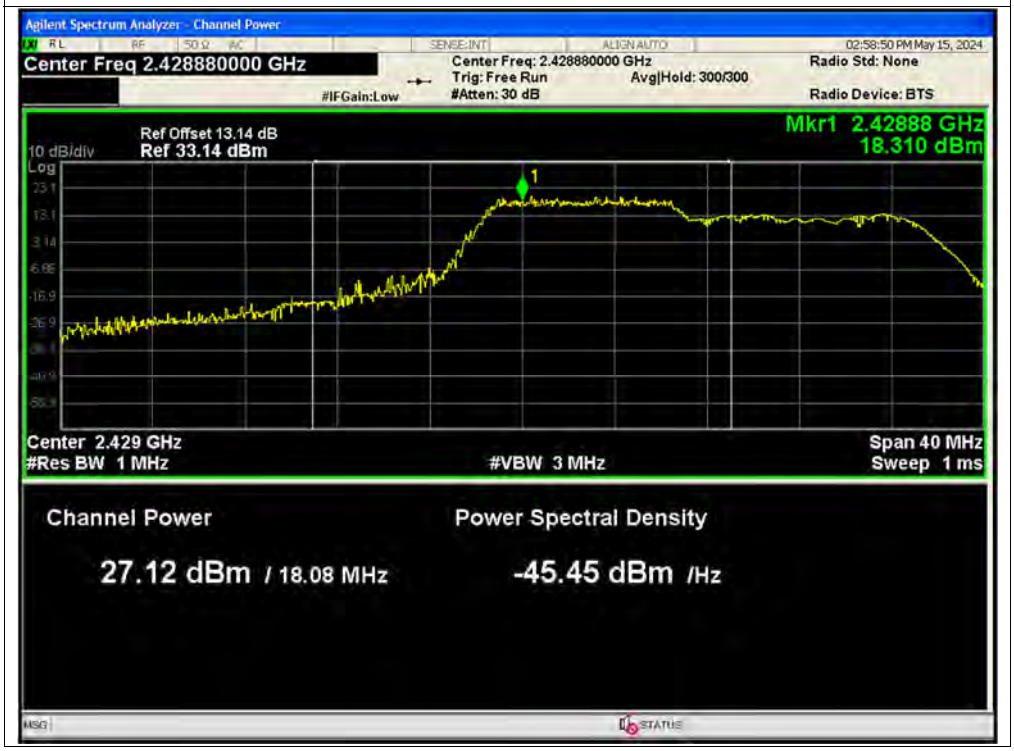


Peak Power NVNT ax20 106@53 2437MHz Ant1



Peak Power NVNT ax20 106@53 2412MHz Ant2

Peak Power NVNT ax20 106@53 2437MHz Ant2



Peak Power NVNT ax20 106@54 2462MHz Ant1

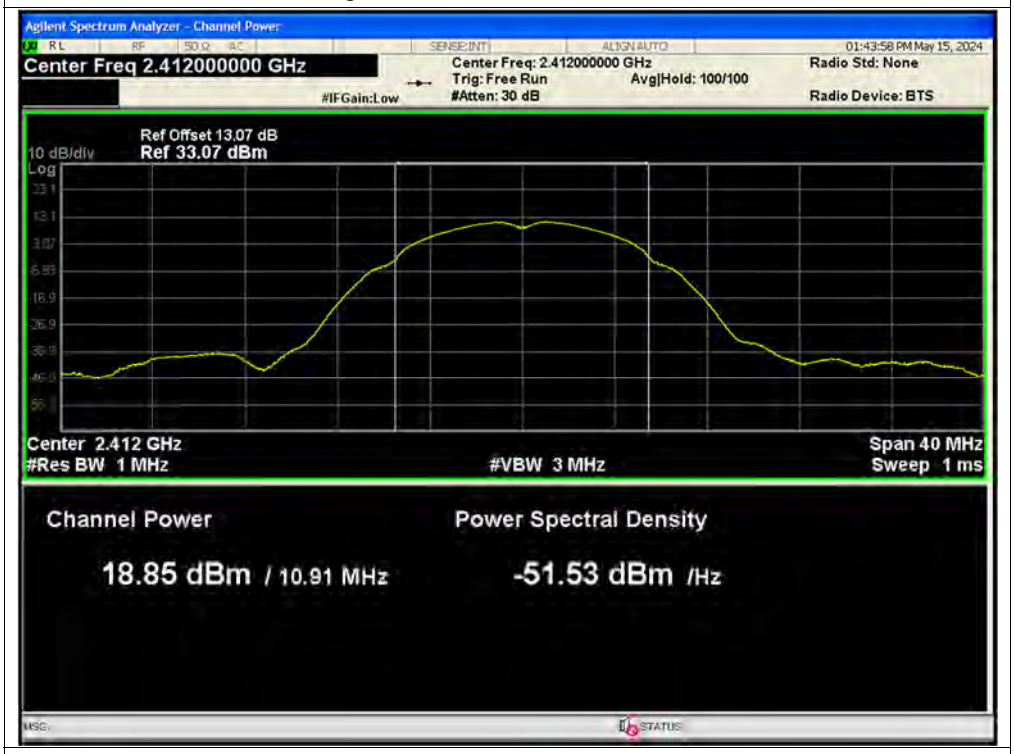
Peak Power NVNT ax20 106@54 2462MHz Ant2

A.3. Maximum Average Conducted Output Power

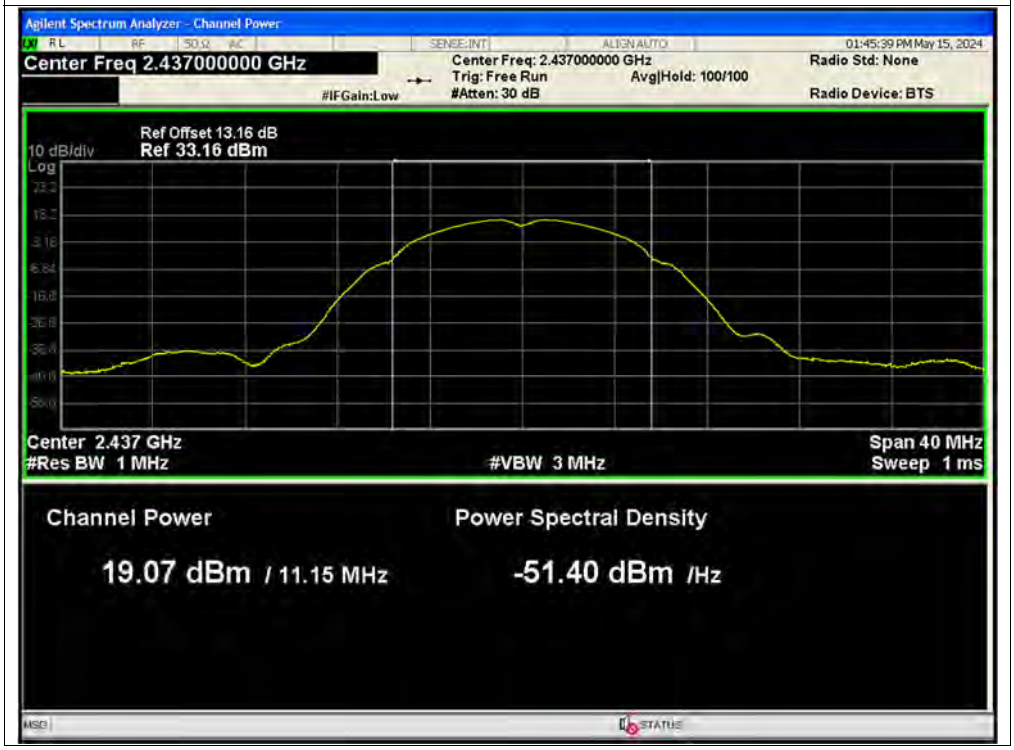
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Conducted Power (dBm)	Total Conducted Power (W)	Limit Conducted (dBm)	Verdict
NVNT	b	2412	Ant1	18.85	0.05	18.9	0.07762	30	Pass
NVNT	b	2437	Ant1	19.07	0.05	19.12	0.08166	30	Pass
NVNT	b	2462	Ant1	18.93	0.05	18.98	0.07907	30	Pass
NVNT	b	2412	Ant2	19.21	0.05	19.26	0.08433	30	Pass
NVNT	b	2437	Ant2	19.21	0.05	19.26	0.08433	30	Pass
NVNT	b	2462	Ant2	19.18	0.05	19.23	0.08375	30	Pass
NVNT	g	2412	Ant1	16.46	0.3	16.76	0.04742	30	Pass
NVNT	g	2437	Ant1	18.85	0.3	19.15	0.08222	30	Pass
NVNT	g	2462	Ant1	14.77	0.29	15.06	0.03206	30	Pass
NVNT	g	2412	Ant2	12.68	0.29	12.97	0.01982	30	Pass
NVNT	g	2437	Ant2	18.83	0.29	19.12	0.08166	30	Pass
NVNT	g	2462	Ant2	12.21	0.29	12.5	0.01778	30	Pass
NVNT	n20	2412	Ant1	14.95	0.31	15.26	0.03357	30	Pass
NVNT	n20	2437	Ant1	17.77	0.31	18.08	0.06427	30	Pass
NVNT	n20	2462	Ant1	13.98	0.31	14.29	0.02685	30	Pass
NVNT	n20	2412	Ant2	11.54	0.31	11.85	0.01531	30	Pass
NVNT	n20	2437	Ant2	17.77	0.31	18.08	0.06427	30	Pass
NVNT	n20	2462	Ant2	10.74	0.31	11.05	0.01274	30	Pass
NVNT	ax20	2412	Ant1	13.95	0.4	14.35	0.02723	30	Pass
NVNT	ax20	2437	Ant1	17.89	0.41	18.3	0.06761	30	Pass
NVNT	ax20	2462	Ant1	13.3	0.4	13.7	0.02344	30	Pass
NVNT	ax20	2412	Ant2	10.39	0.4	10.79	0.01199	30	Pass
NVNT	ax20	2437	Ant2	17.79	0.4	18.19	0.06592	30	Pass
NVNT	ax20	2462	Ant2	9.23	0.41	9.64	0.0092	30	Pass
NVNT	ax20 26@0	2412	Ant1	16.32	0.16	16.48	0.04446	30	Pass
NVNT	ax20 26@0	2437	Ant1	18.19	0.15	18.34	0.06823	30	Pass
NVNT	ax20 26@0	2412	Ant2	14.54	0.16	14.7	0.02951	30	Pass
NVNT	ax20 26@0	2437	Ant2	18.08	0.15	18.23	0.06653	30	Pass
NVNT	ax20	2462	Ant1	17.09	0.15	17.24	0.05297	30	Pass

	26@8								
NVNT	ax20 26@8	2462	Ant2	13.63	0.16	13.79	0.02393	30	Pass
NVNT	ax20 52@37	2412	Ant1	17.94	0.29	18.23	0.06653	30	Pass
NVNT	ax20 52@37	2437	Ant1	17.89	0.29	18.18	0.06577	30	Pass
NVNT	ax20 52@37	2412	Ant2	18.03	0.29	18.32	0.06792	30	Pass
NVNT	ax20 52@37	2437	Ant2	18	0.29	18.29	0.06745	30	Pass
NVNT	ax20 52@40	2462	Ant1	17.82	0.28	18.1	0.06457	30	Pass
NVNT	ax20 52@40	2462	Ant2	18.1	0.29	18.39	0.06902	30	Pass
NVNT	ax20 106@53	2412	Ant1	17.75	0.53	18.28	0.0673	30	Pass
NVNT	ax20 106@53	2437	Ant1	17.61	0.53	18.14	0.06516	30	Pass
NVNT	ax20 106@53	2412	Ant2	17.96	0.53	18.49	0.07063	30	Pass
NVNT	ax20 106@53	2437	Ant2	17.86	0.51	18.37	0.06871	30	Pass
NVNT	ax20 106@54	2462	Ant1	17.64	0.5	18.14	0.06516	30	Pass
NVNT	ax20 106@54	2462	Ant2	17.82	0.53	18.35	0.06839	30	Pass

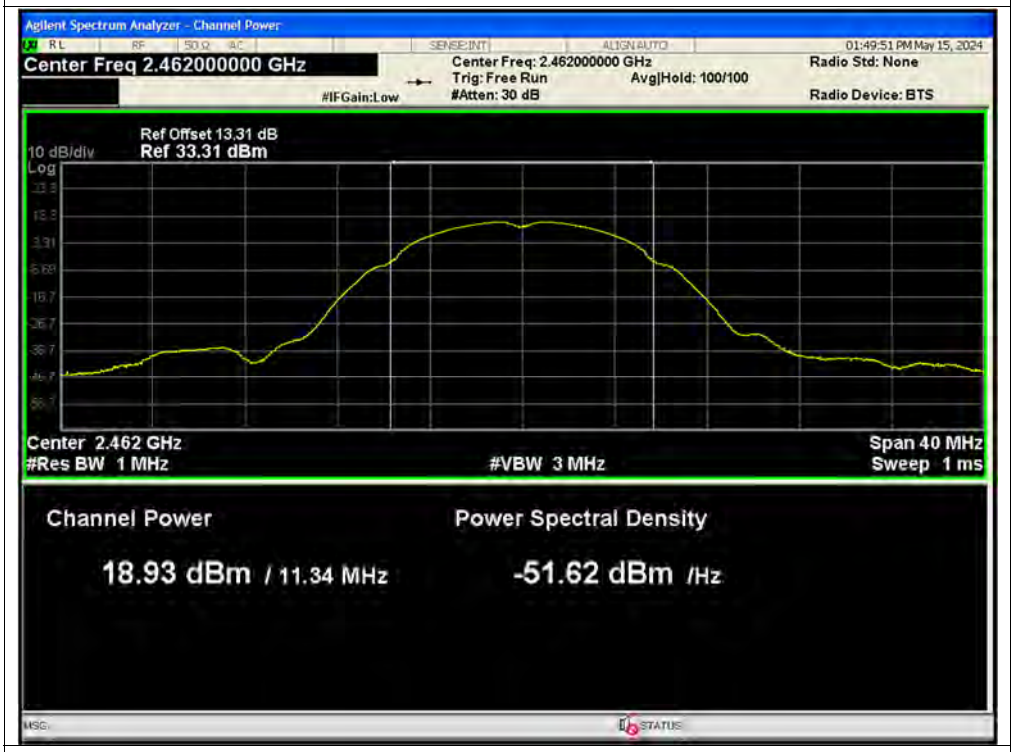
Test Graphs
Average Power NVNT b 2412MHz Ant1



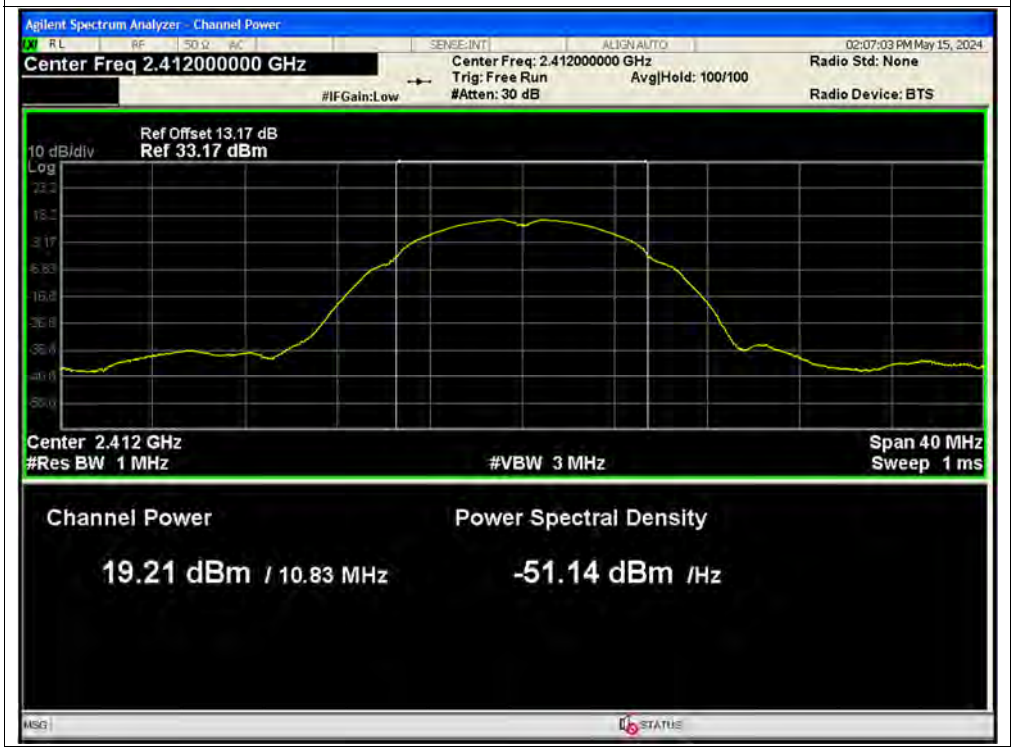
Average Power NVNT b 2437MHz Ant1



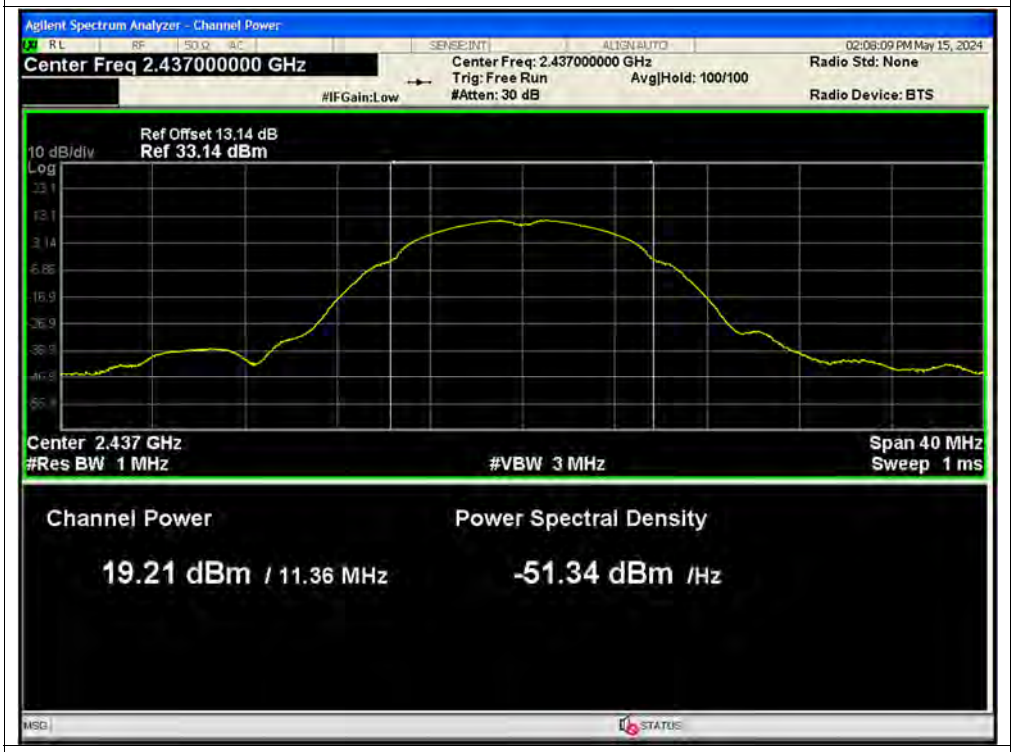
Average Power NVNT b 2462MHz Ant1



Average Power NVNT b 2412MHz Ant2



Average Power NVNT b 2437MHz Ant2



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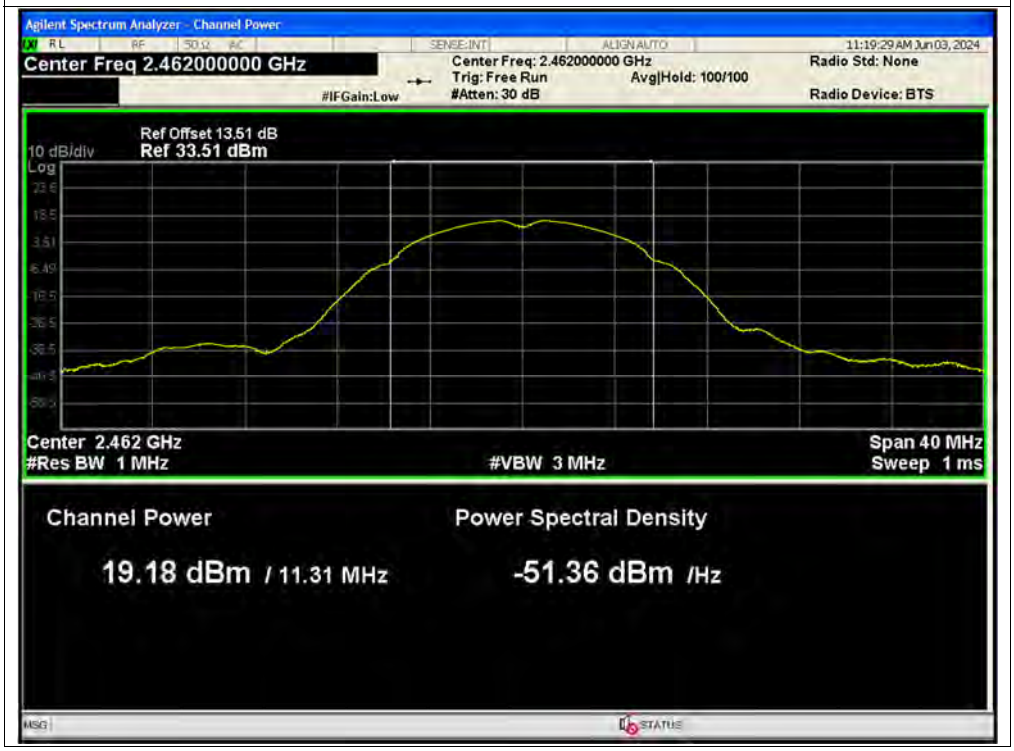

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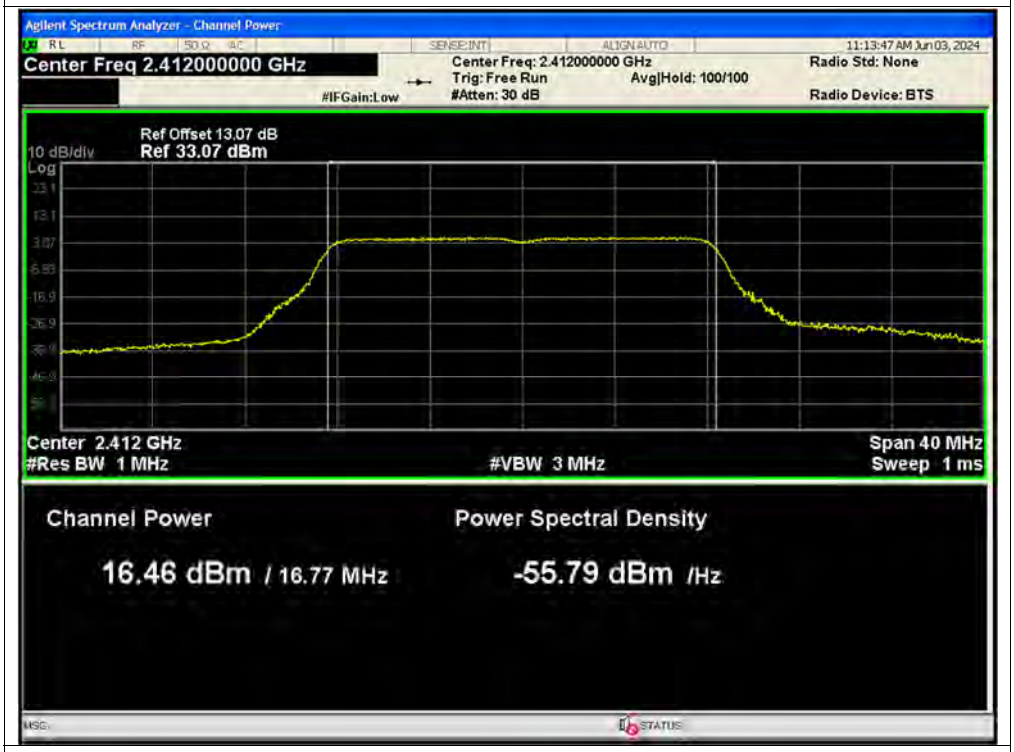

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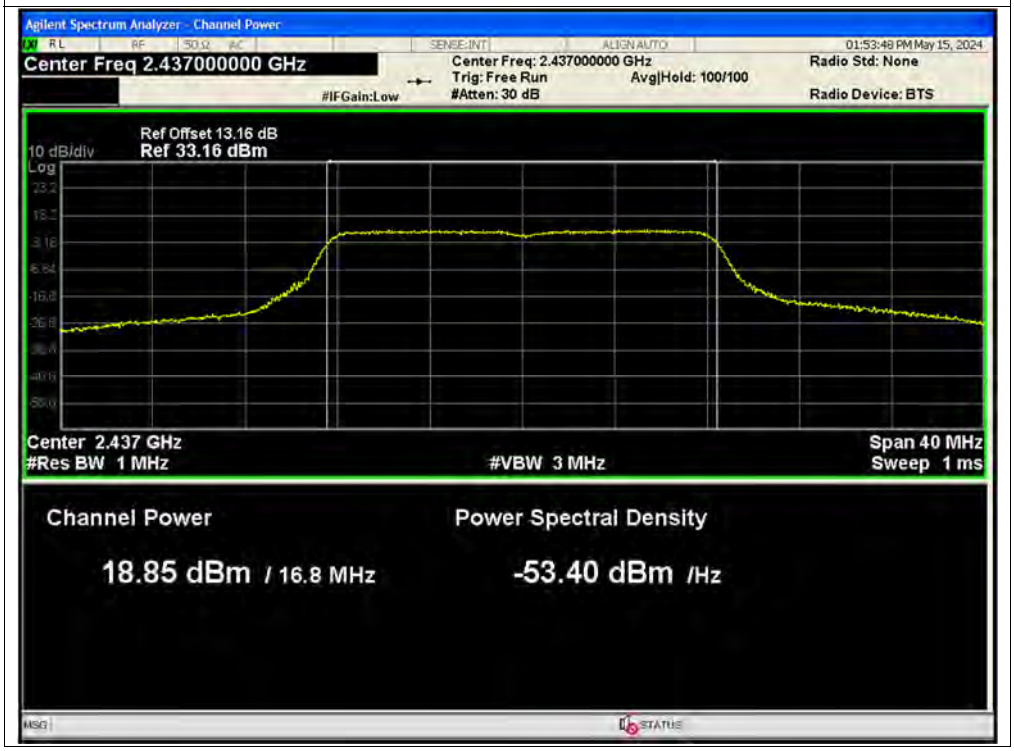
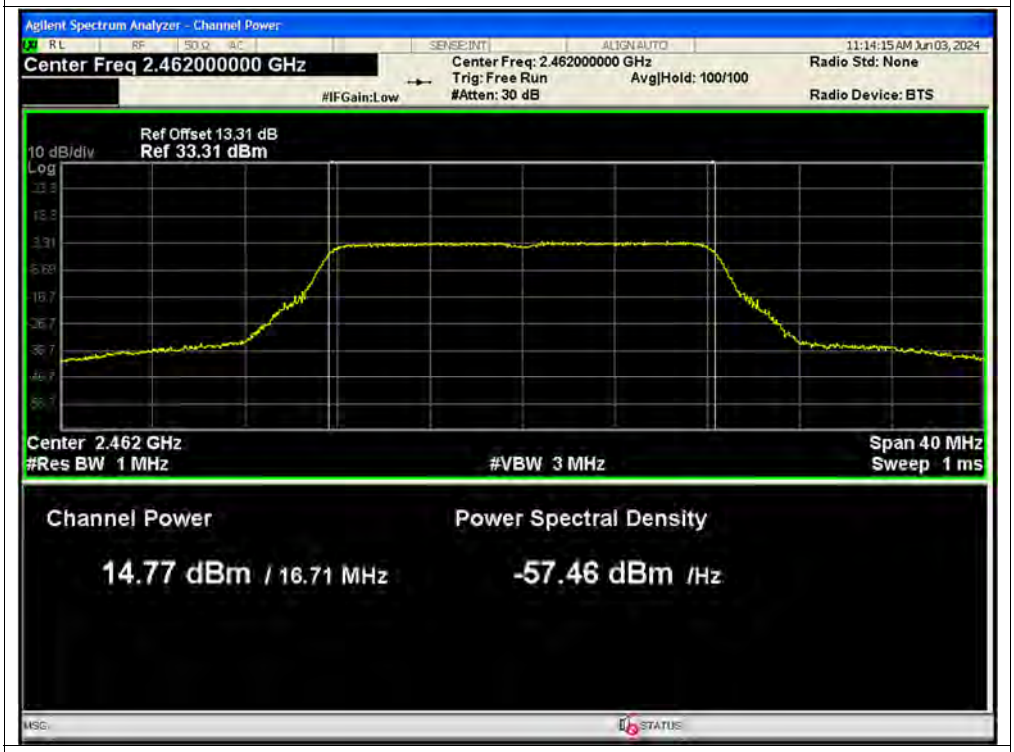


Average Power NVNT g 2462MHz Ant1



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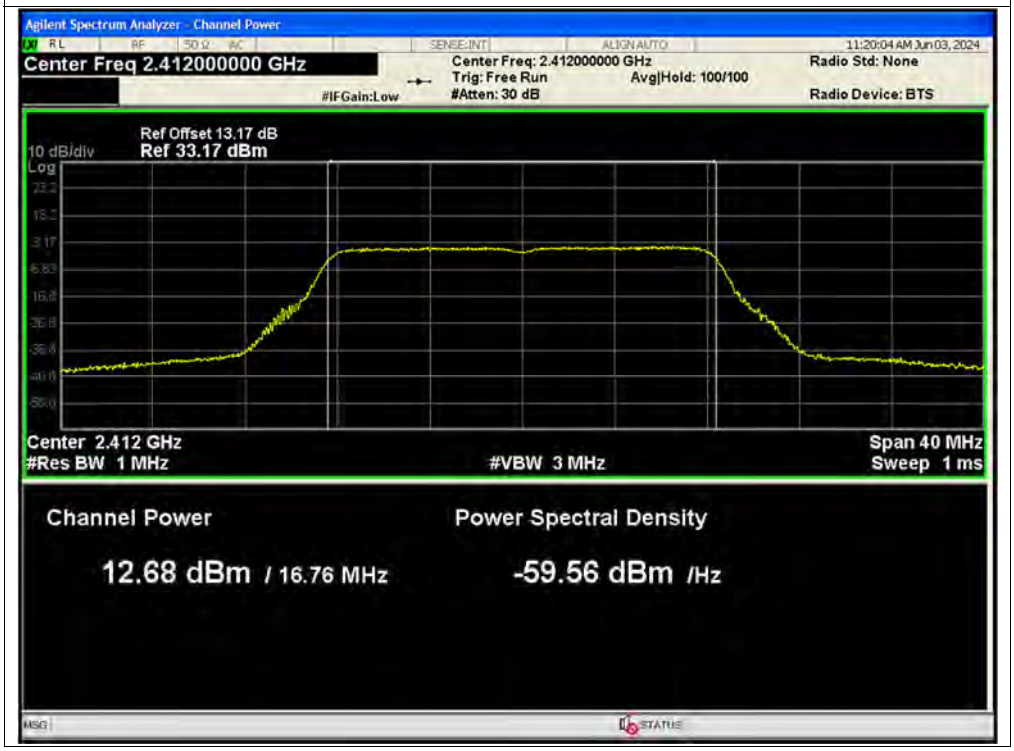
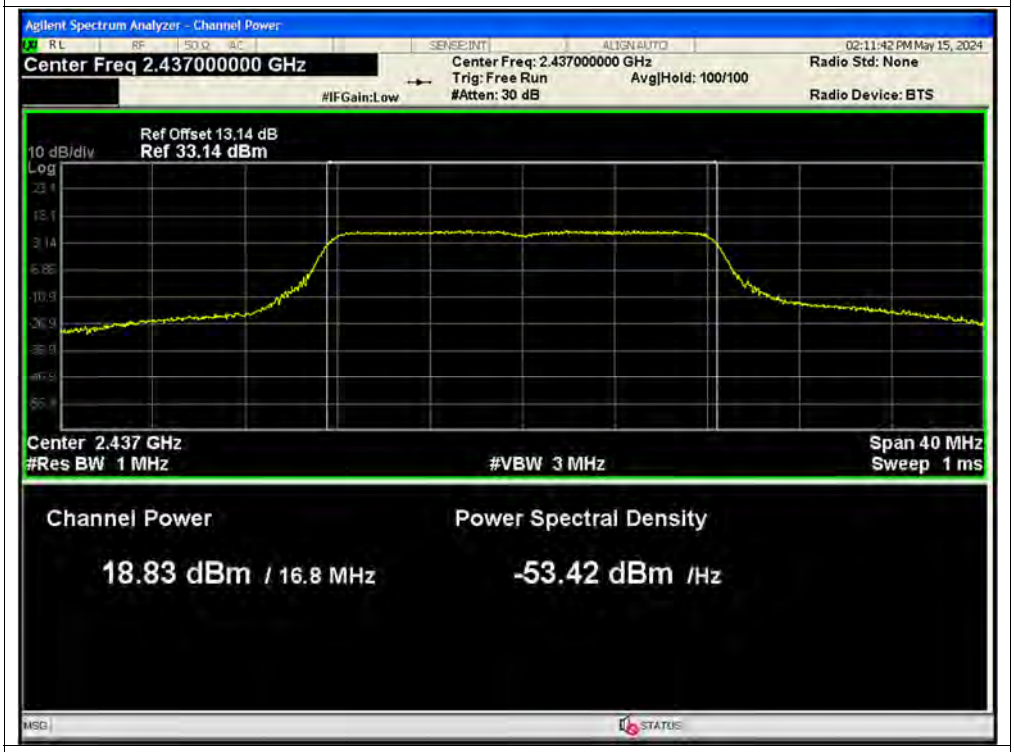
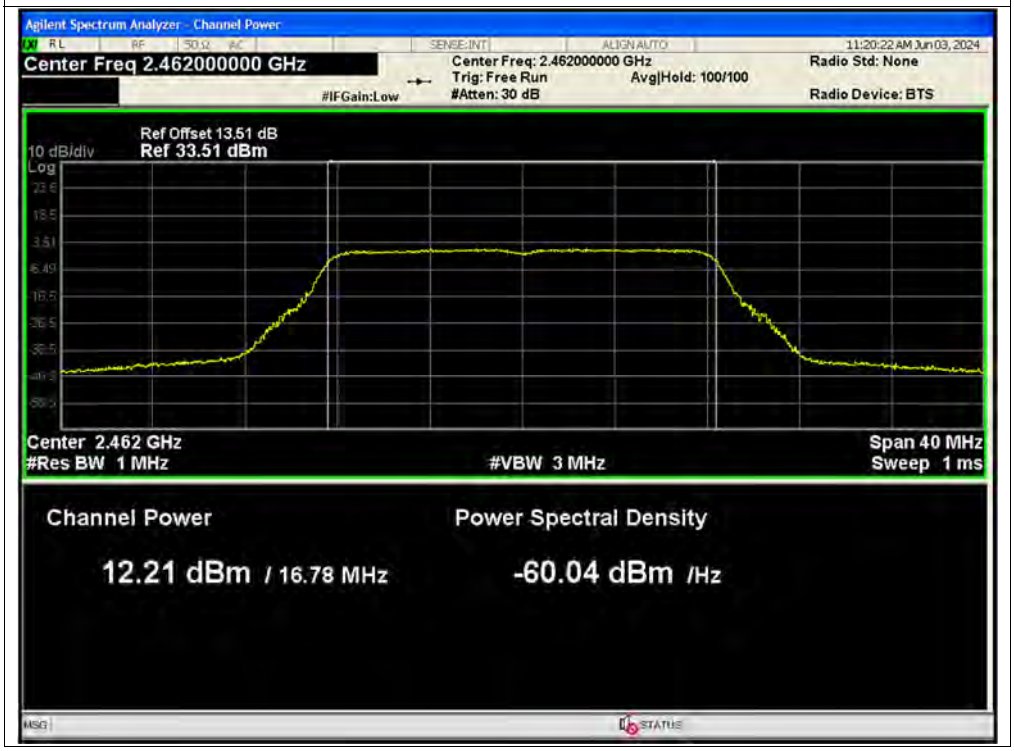


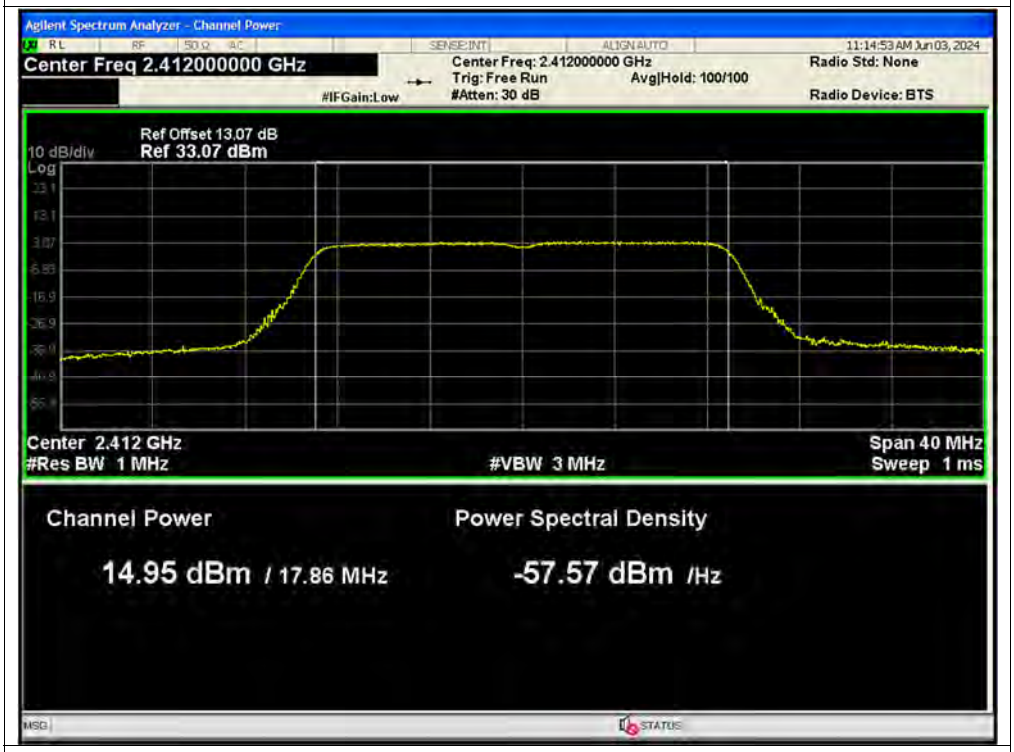
Average Power NVNT g 2437MHz Ant2



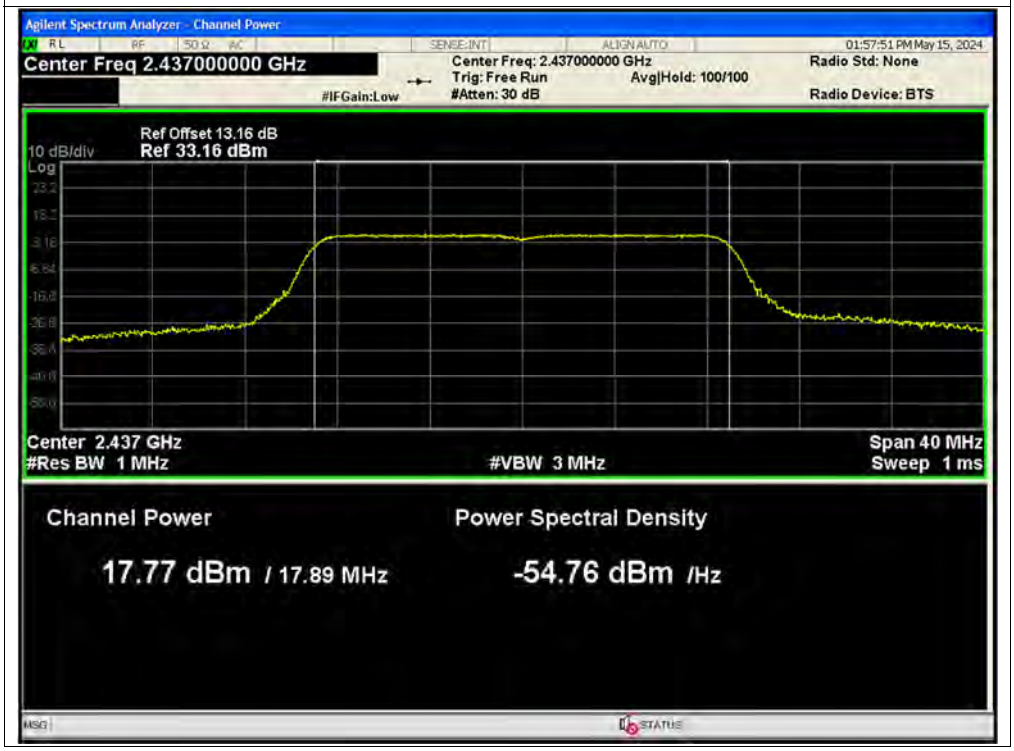
Average Power NVNT g 2462MHz Ant2



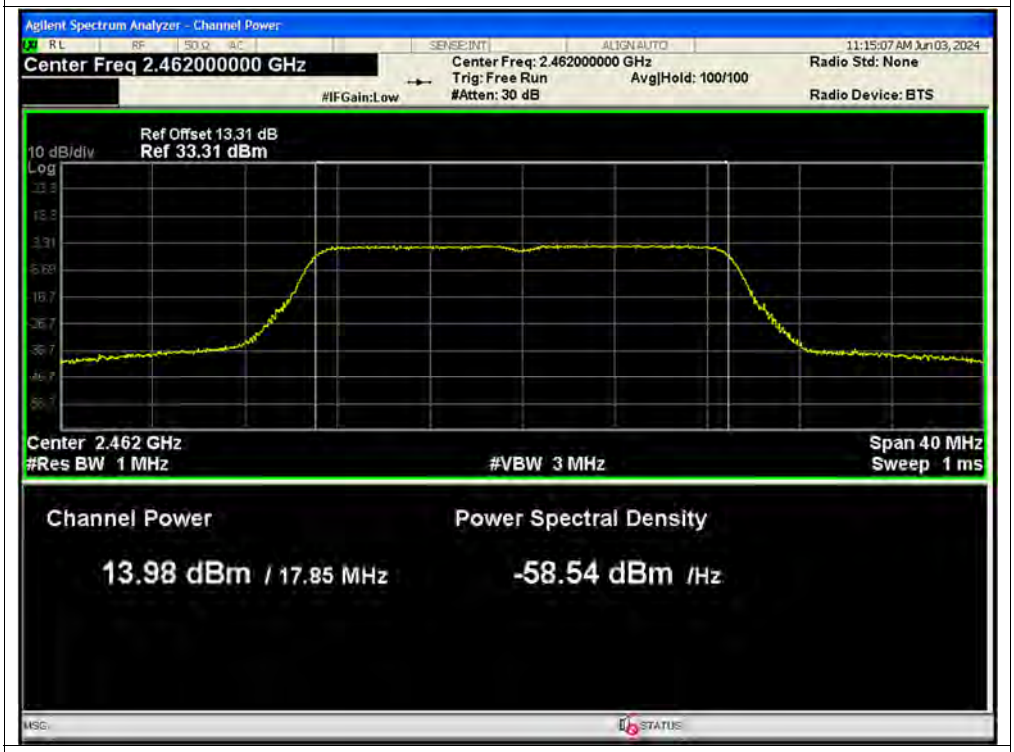
Average Power NVNT n20 2412MHz Ant1



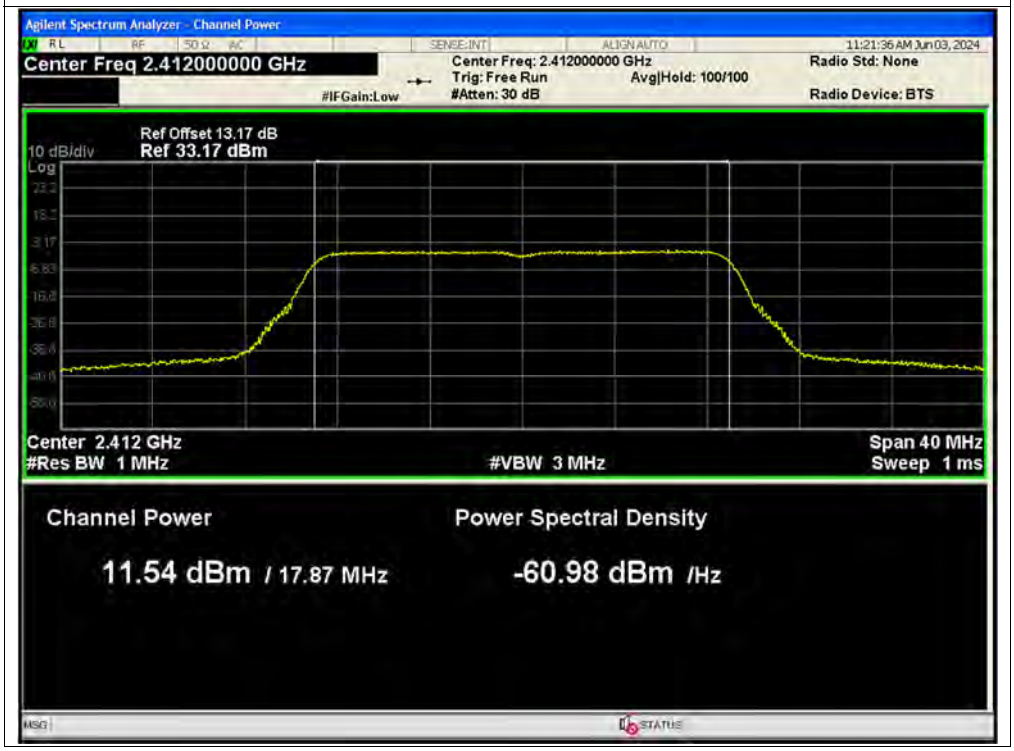
Average Power NVNT n20 2437MHz Ant1



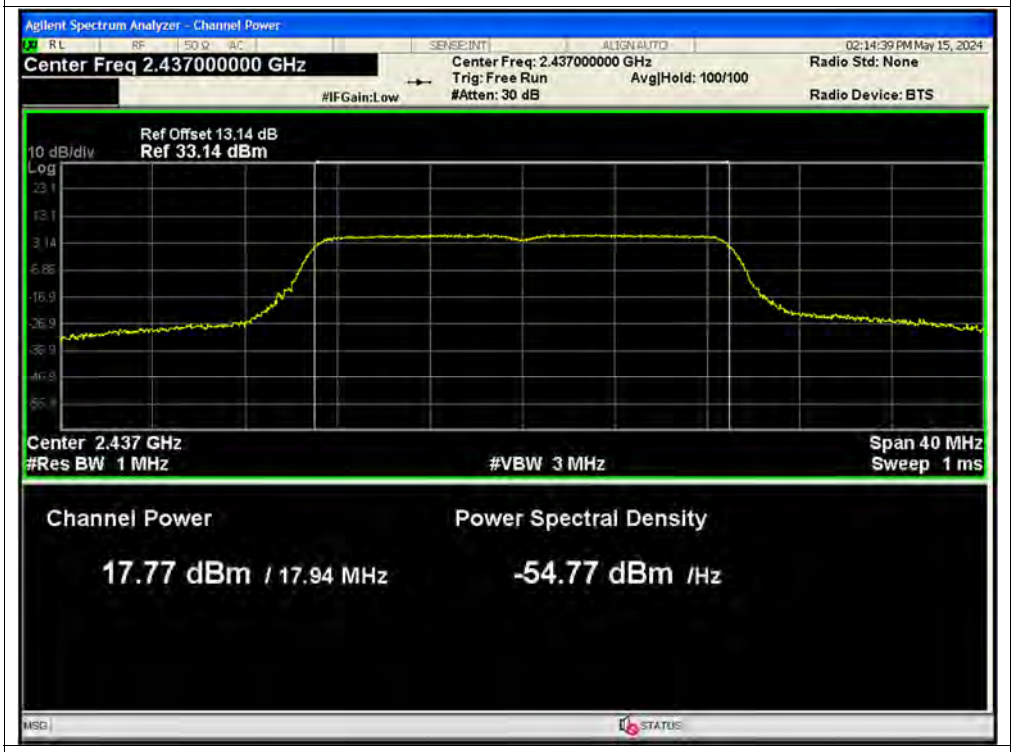
Average Power NVNT n20 2462MHz Ant1



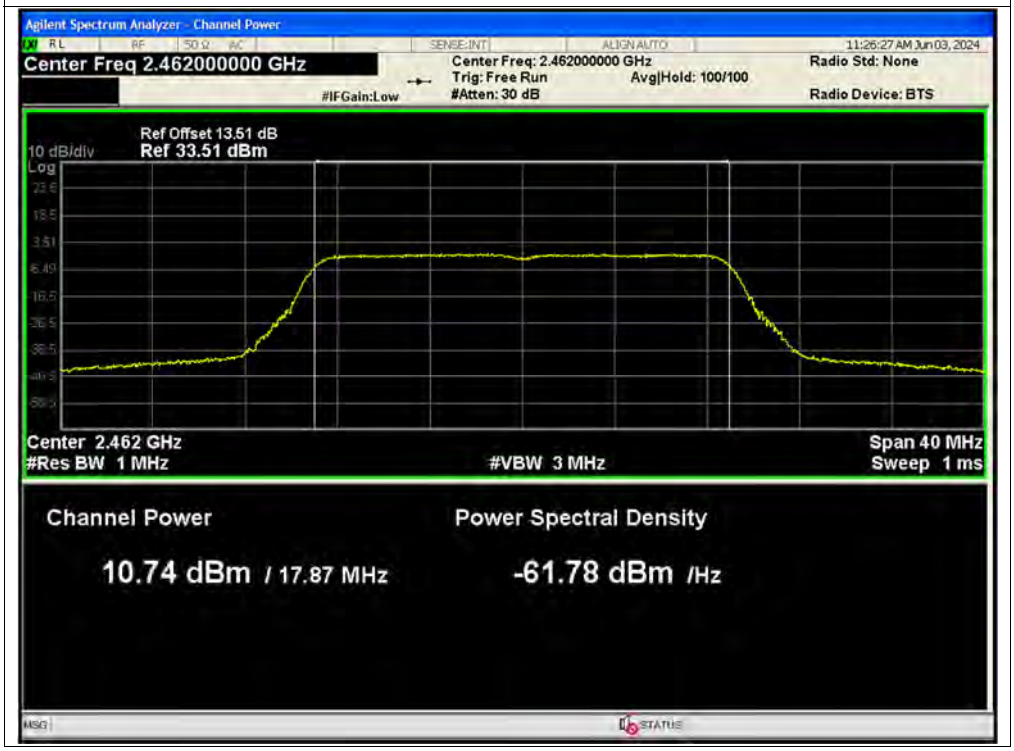
Average Power NVNT n20 2412MHz Ant2



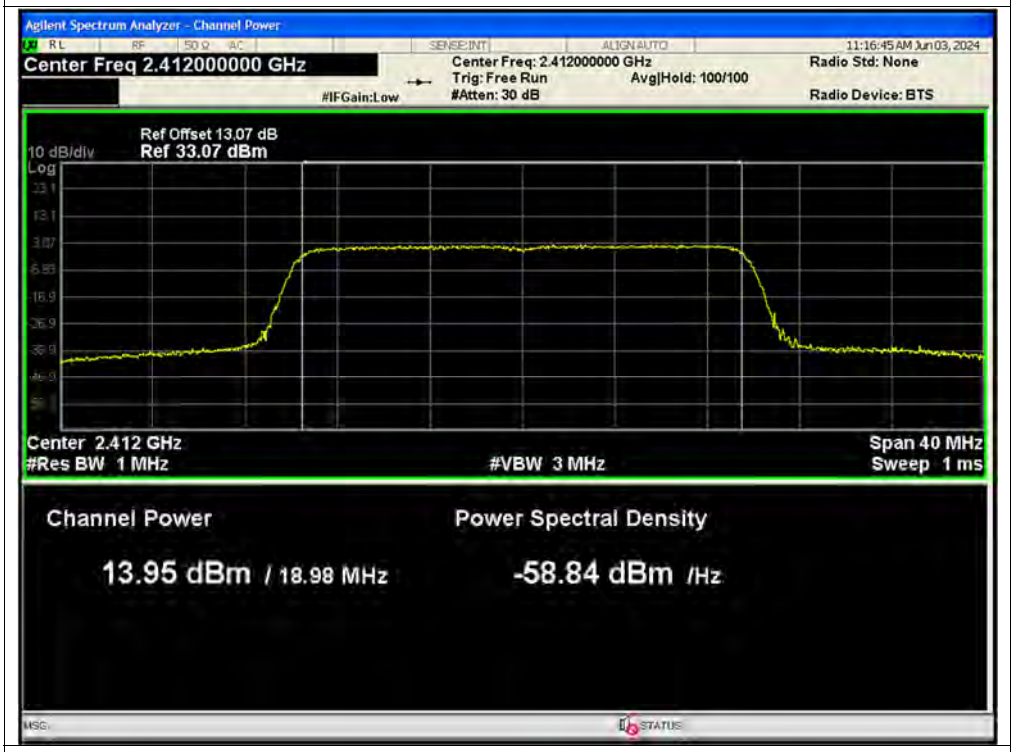
Average Power NVNT n20 2437MHz Ant2



Average Power NVNT n20 2462MHz Ant2



Average Power NVNT ax20 2412MHz Ant1



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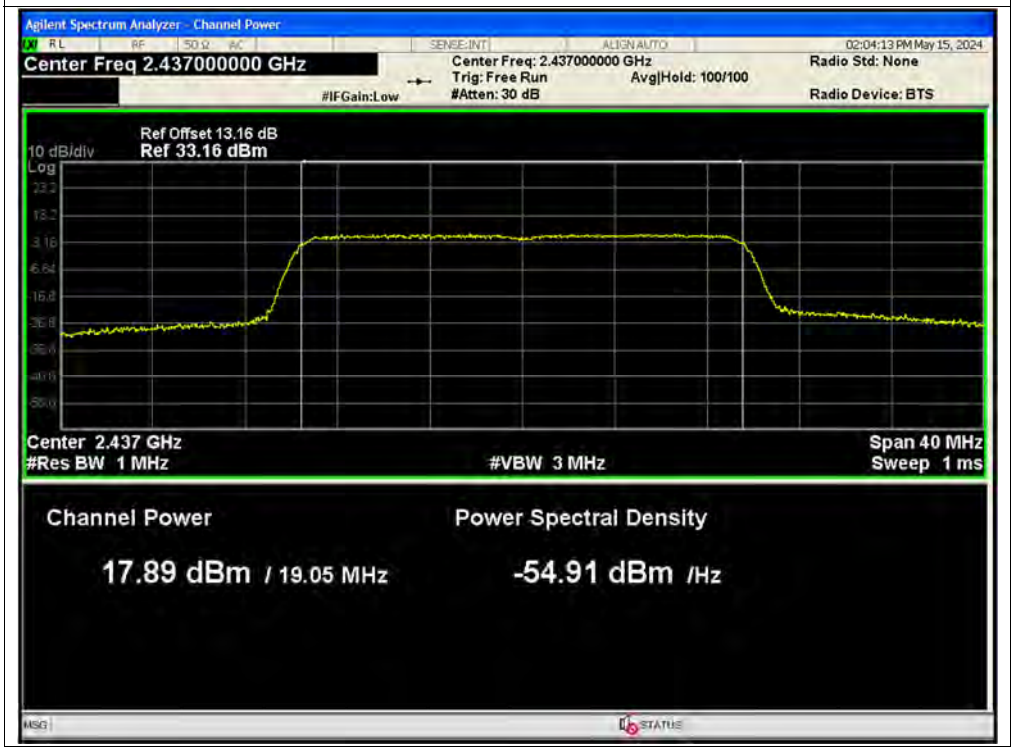

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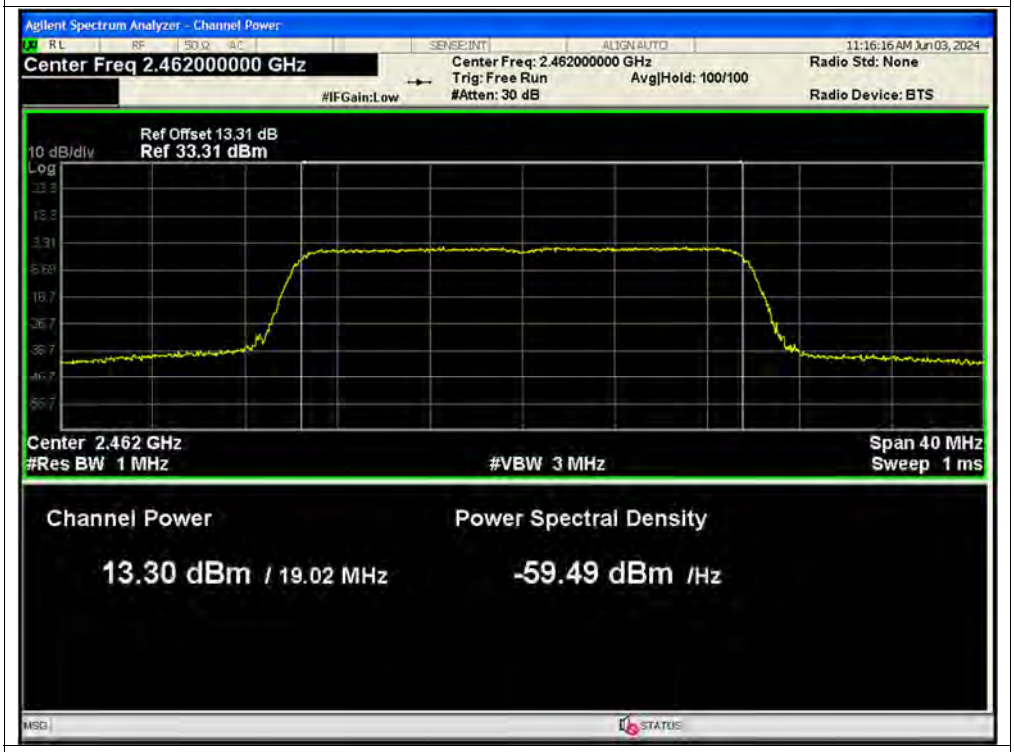
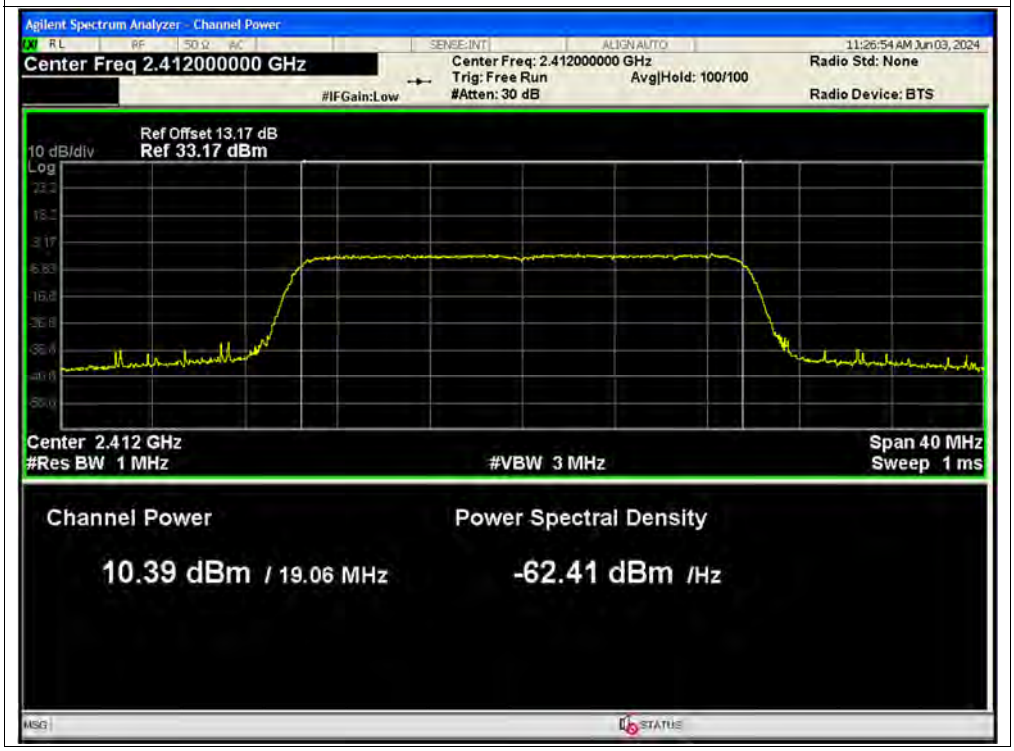
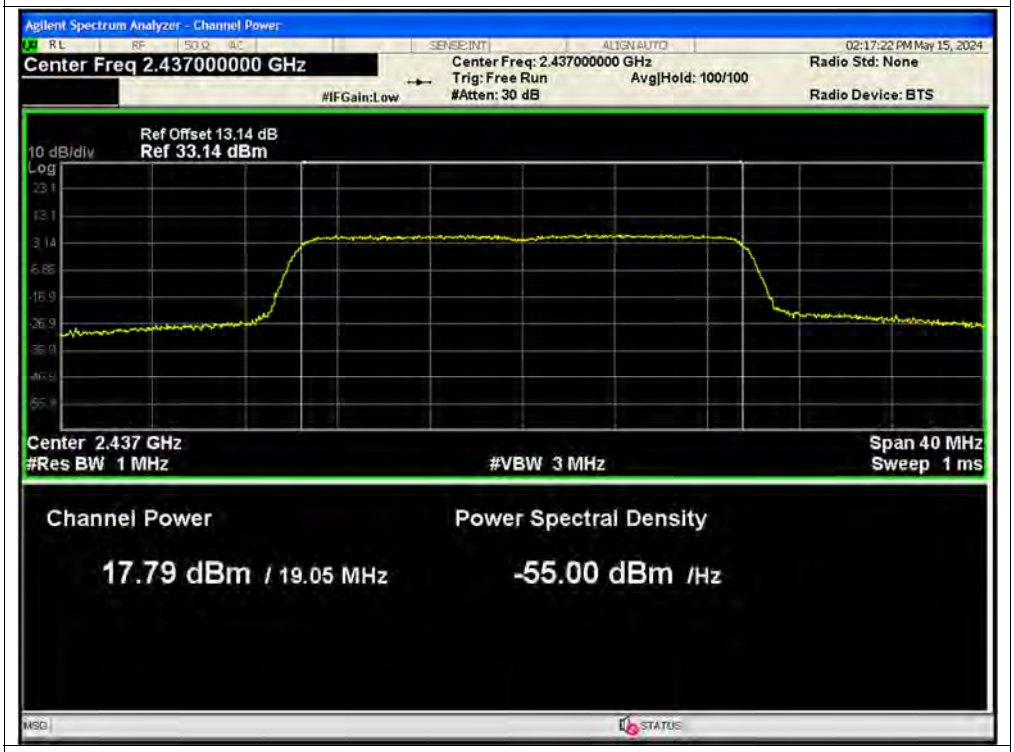


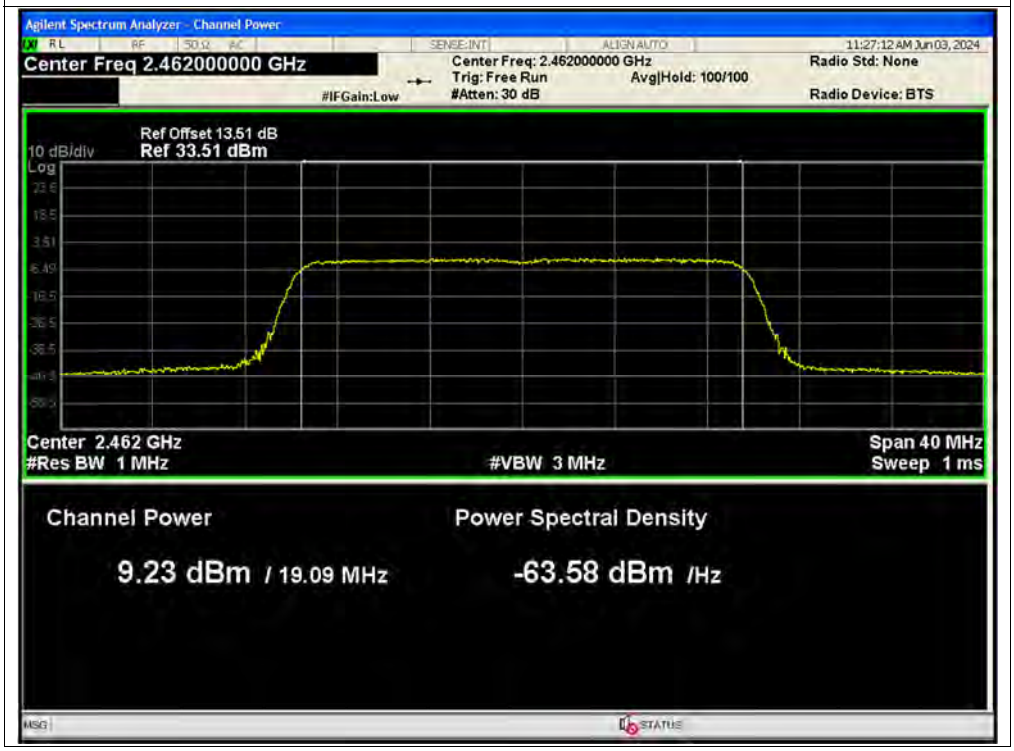
Average Power NVNT ax20 2412MHz Ant2



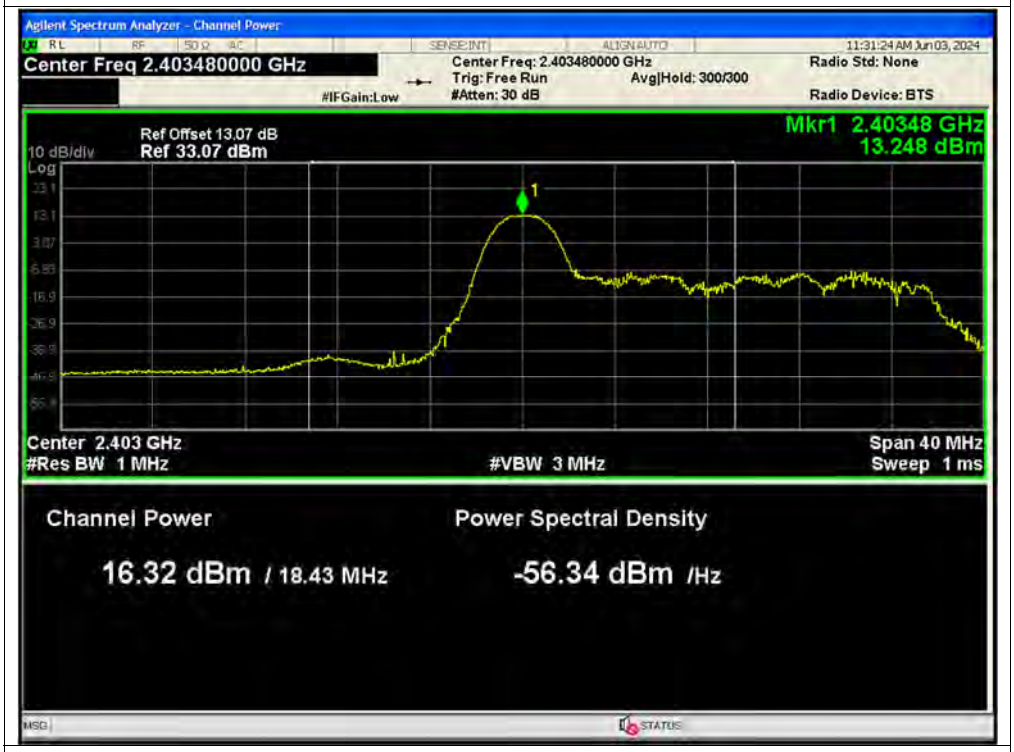
Average Power NVNT ax20 2437MHz Ant2



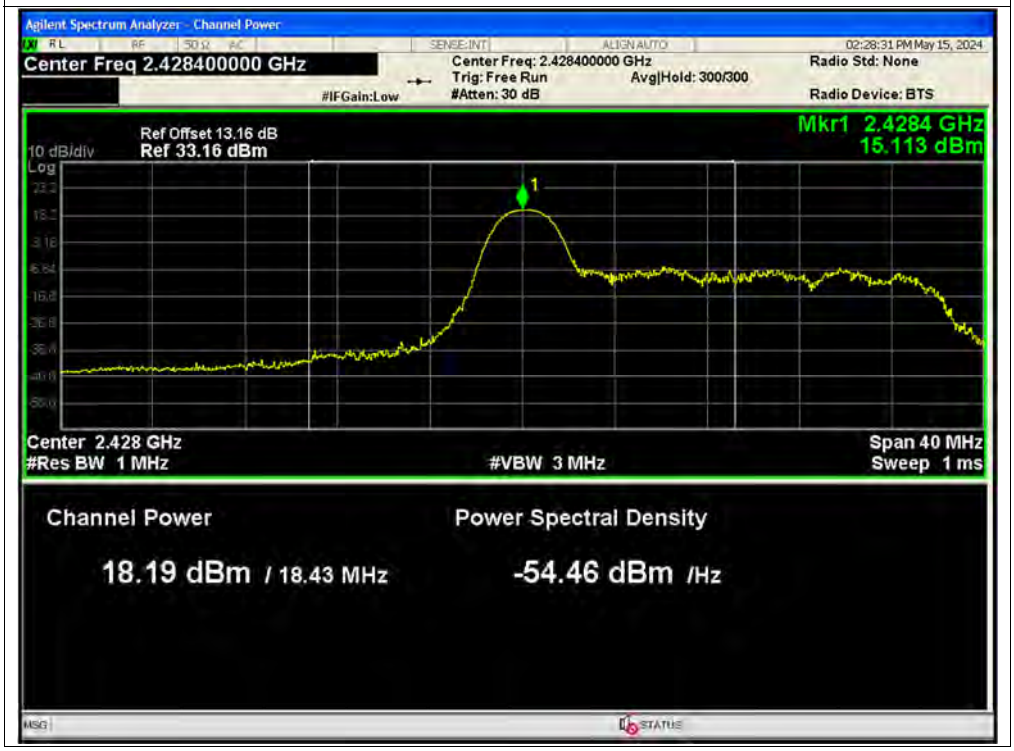
Average Power NVNT ax20 2462MHz Ant2



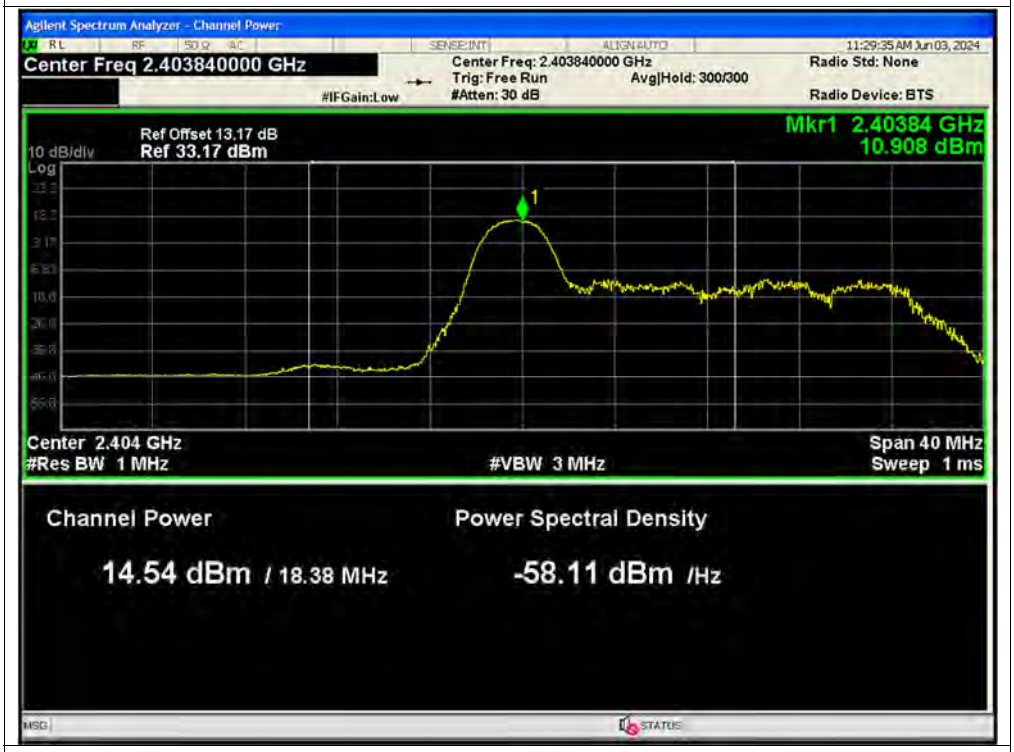
Average Power NVNT ax20 26@0 2412MHz Ant1



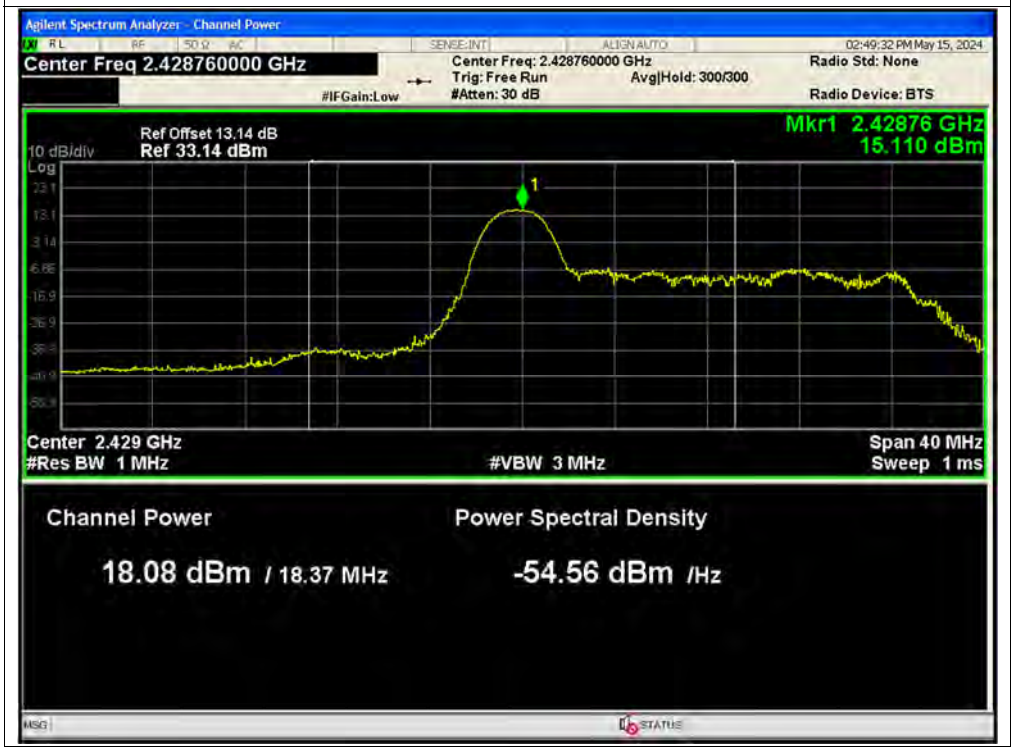
Average Power NVNT ax20 26@0 2437MHz Ant1



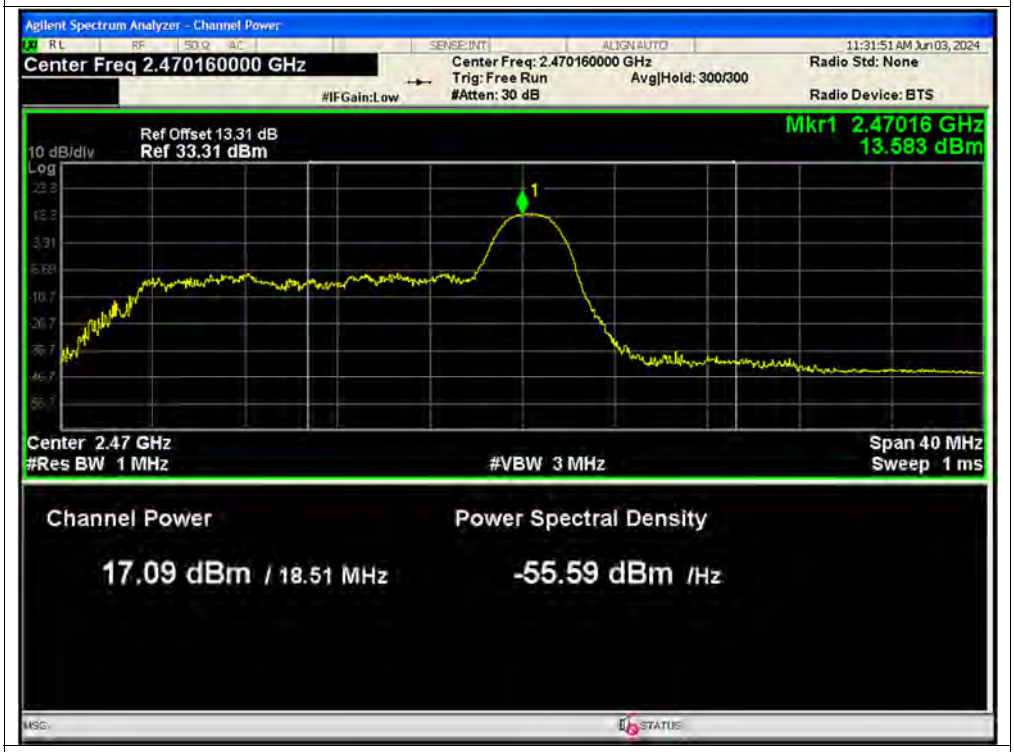
Average Power NVNT ax20 26@0 2412MHz Ant2



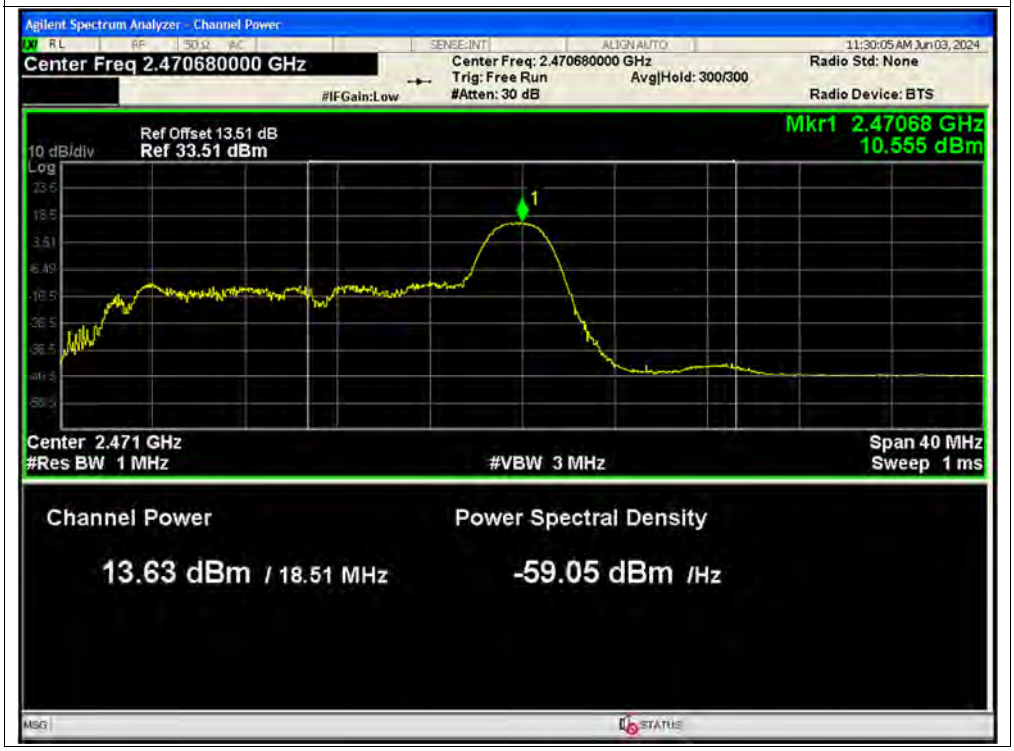
Average Power NVNT ax20 26@0 2437MHz Ant2



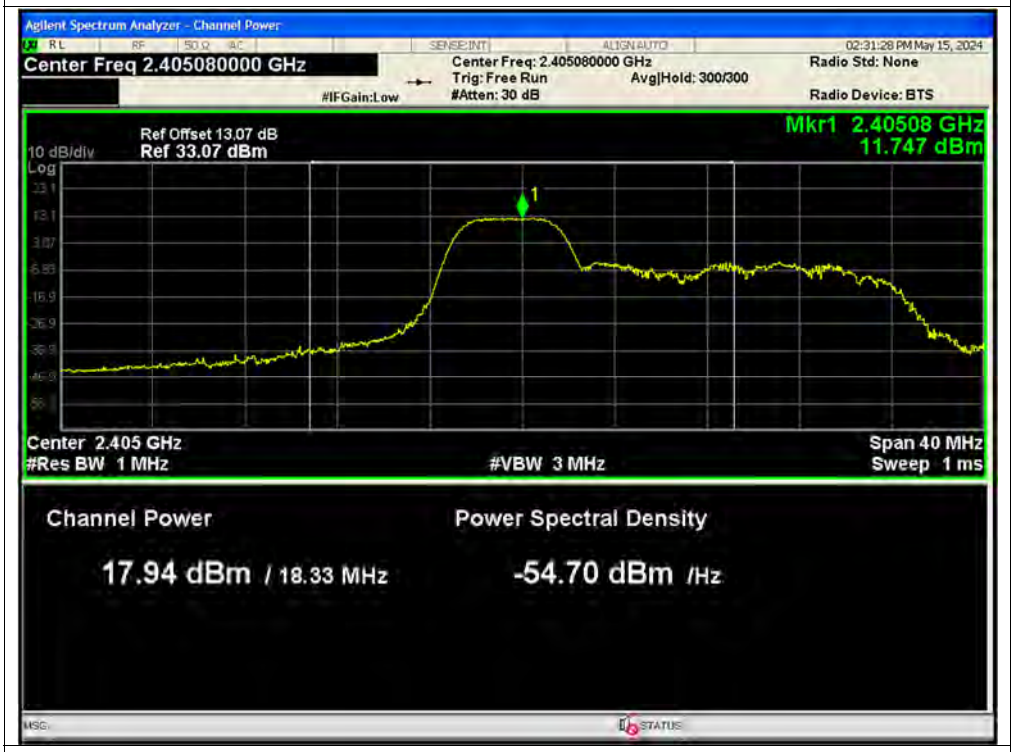
Average Power NVNT ax20 26@8 2462MHz Ant1



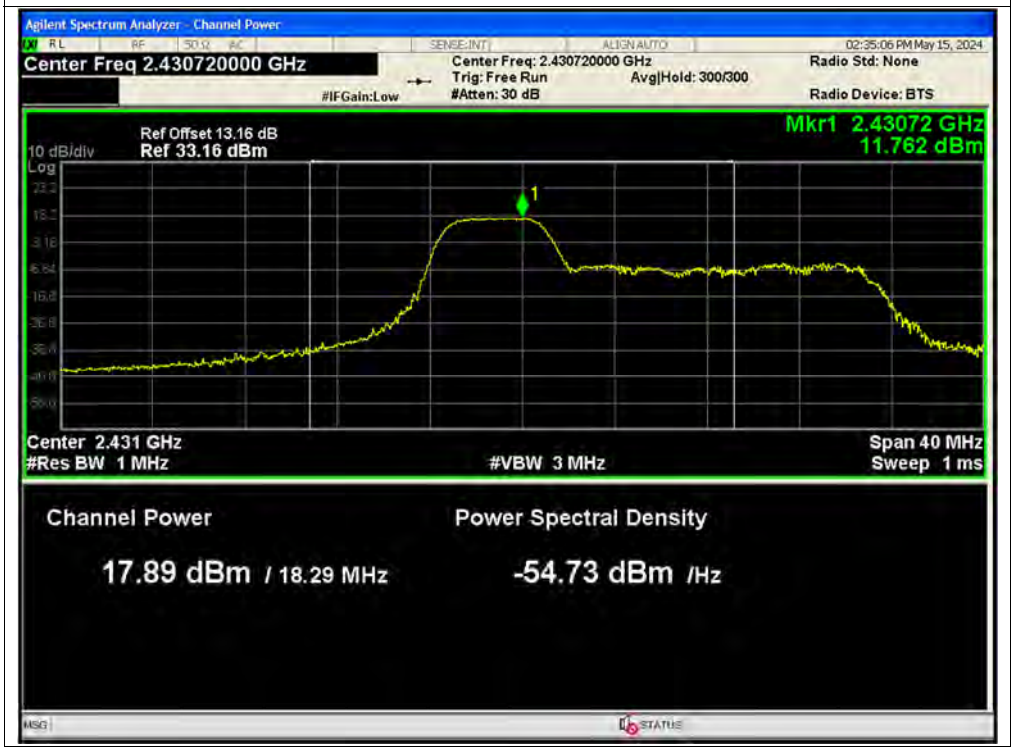
Average Power NVNT ax20 26@8 2462MHz Ant2



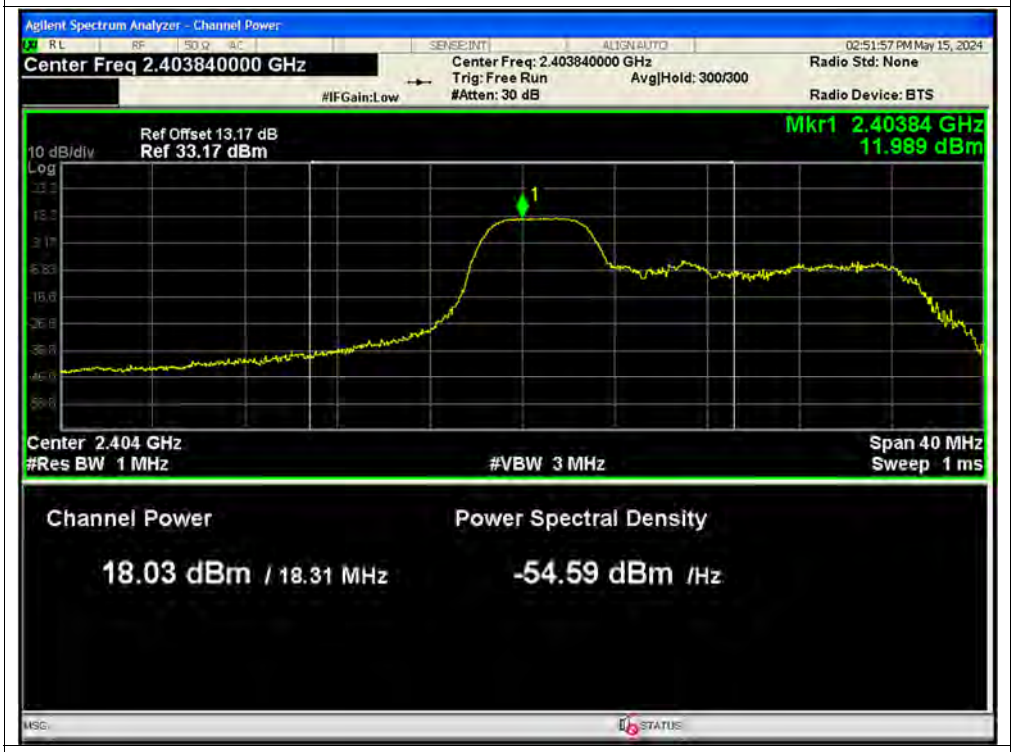
Average Power NVNT ax20 52@37 2412MHz Ant1



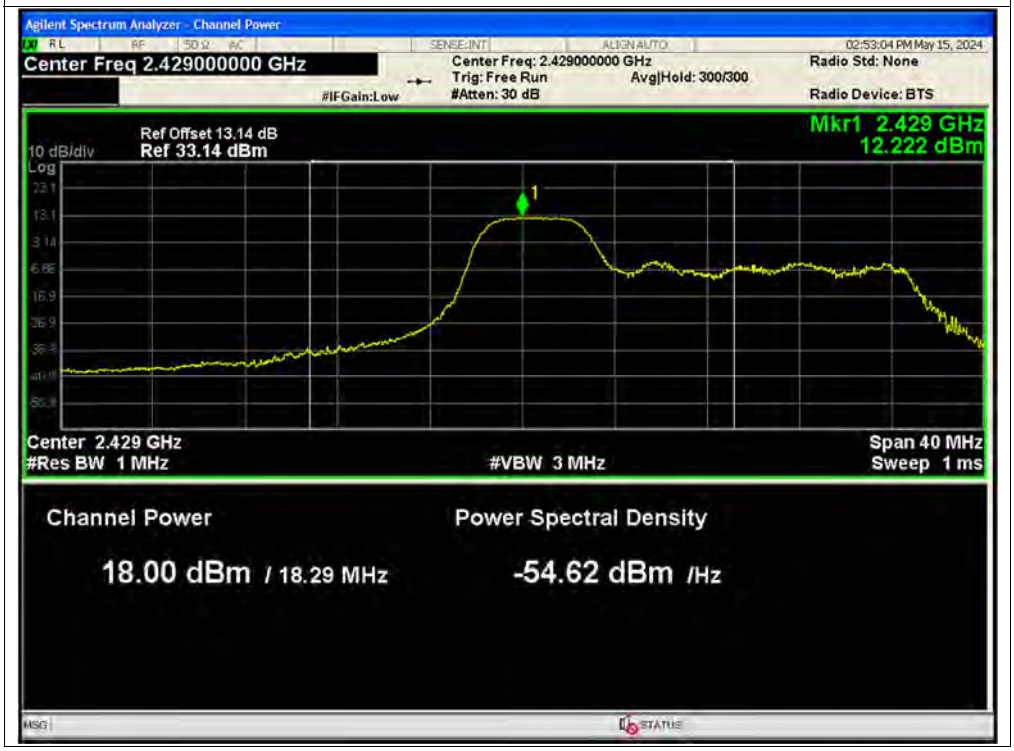
Average Power NVNT ax20 52@37 2437MHz Ant1



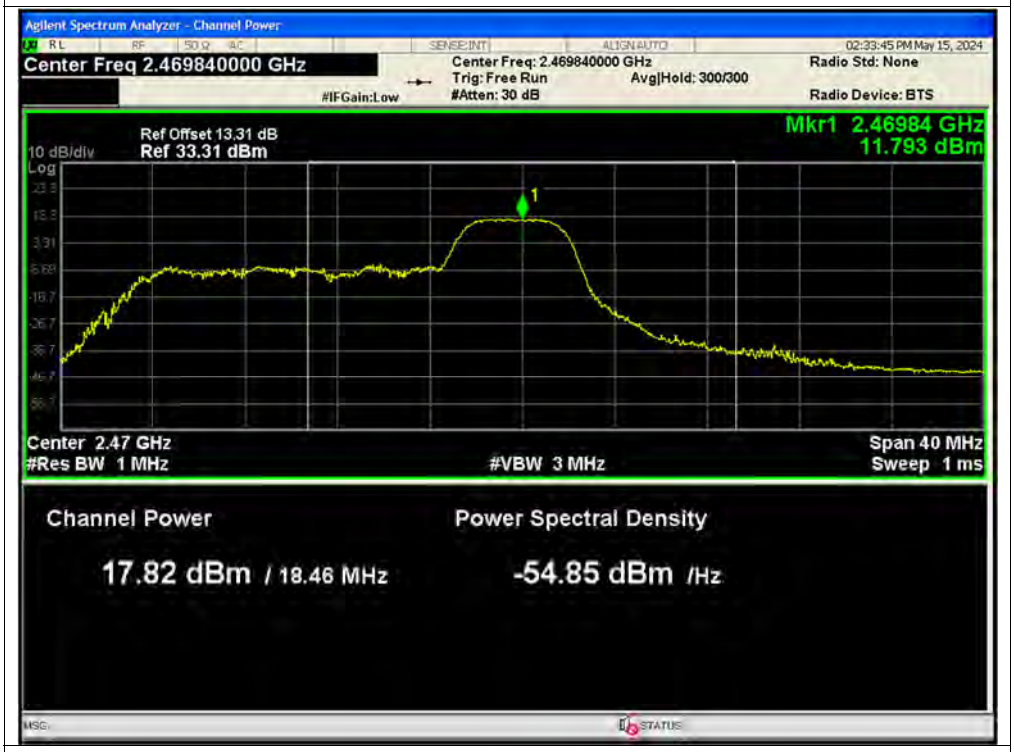
Average Power NVNT ax20 52@37 2412MHz Ant2



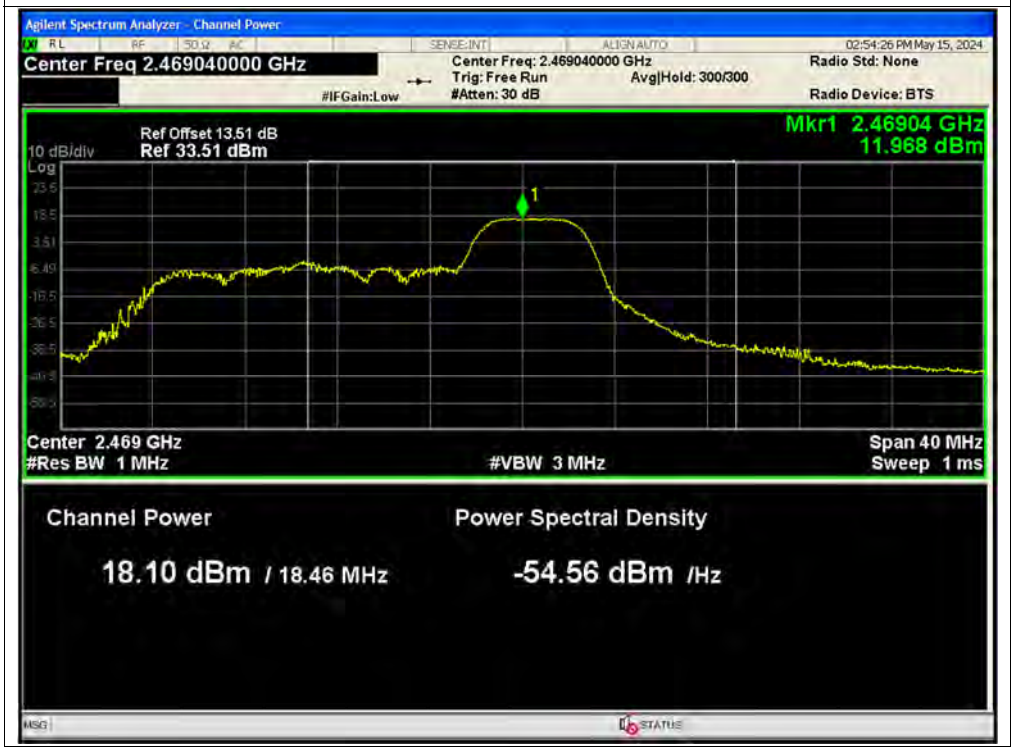
Average Power NVNT ax20 52@37 2437MHz Ant2



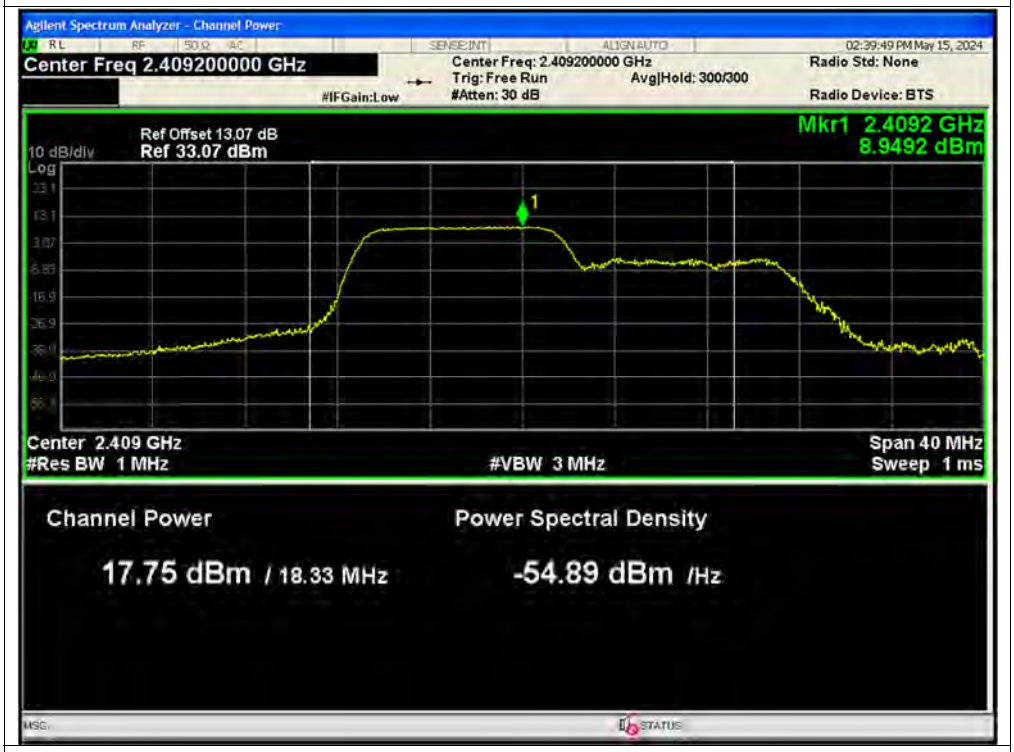
Average Power NVNT ax20 52@40 2462MHz Ant1



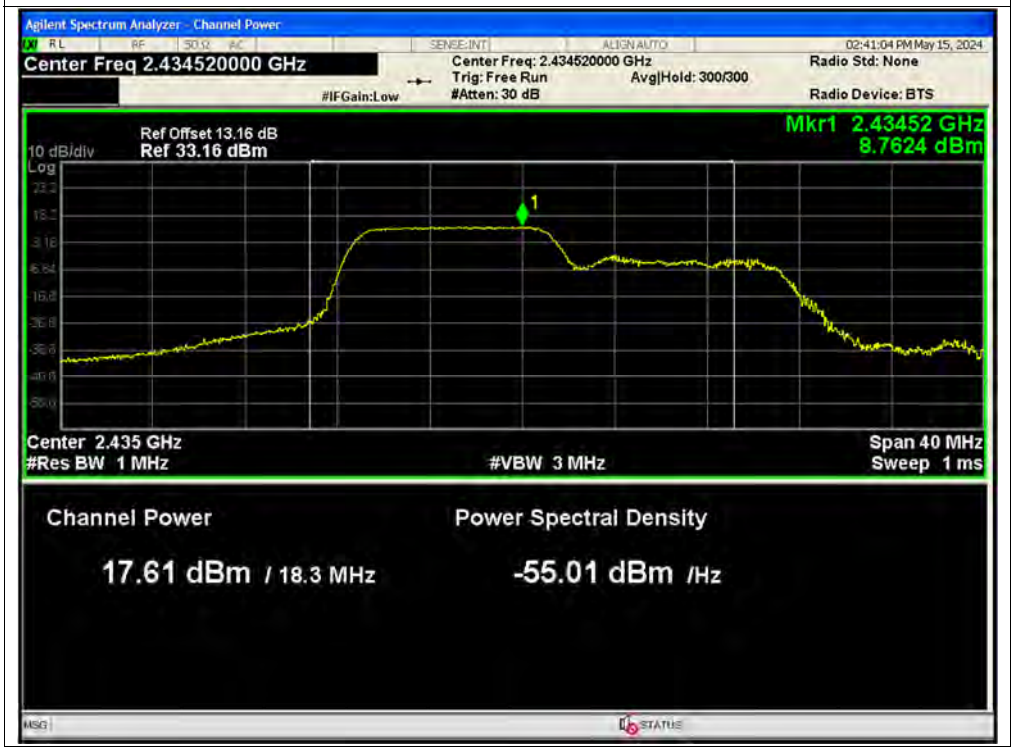
Average Power NVNT ax20 52@40 2462MHz Ant2



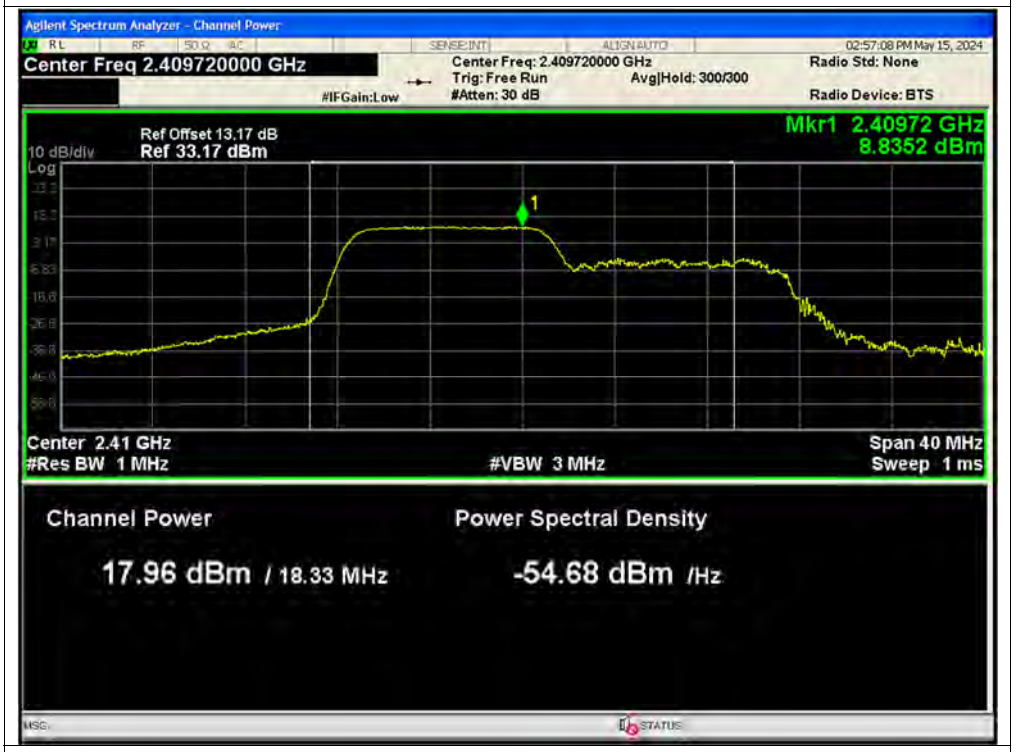
Average Power NVNT ax20 106@53 2412MHz Ant1



Average Power NVNT ax20 106@53 2437MHz Ant1

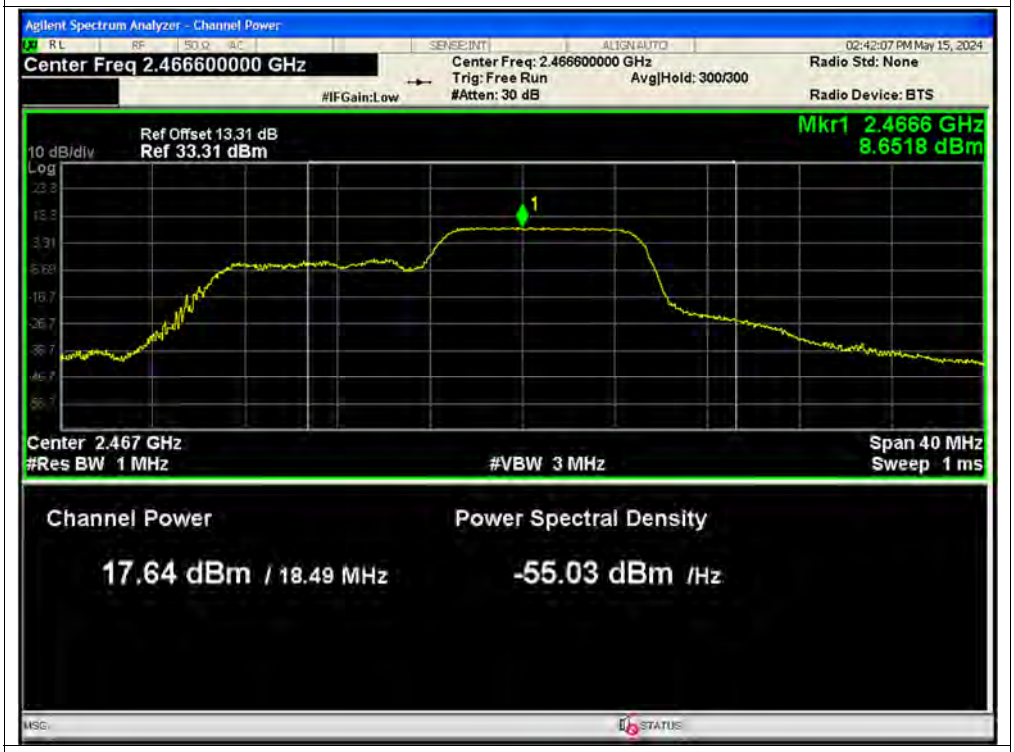


Average Power NVNT ax20 106@53 2412MHz Ant2

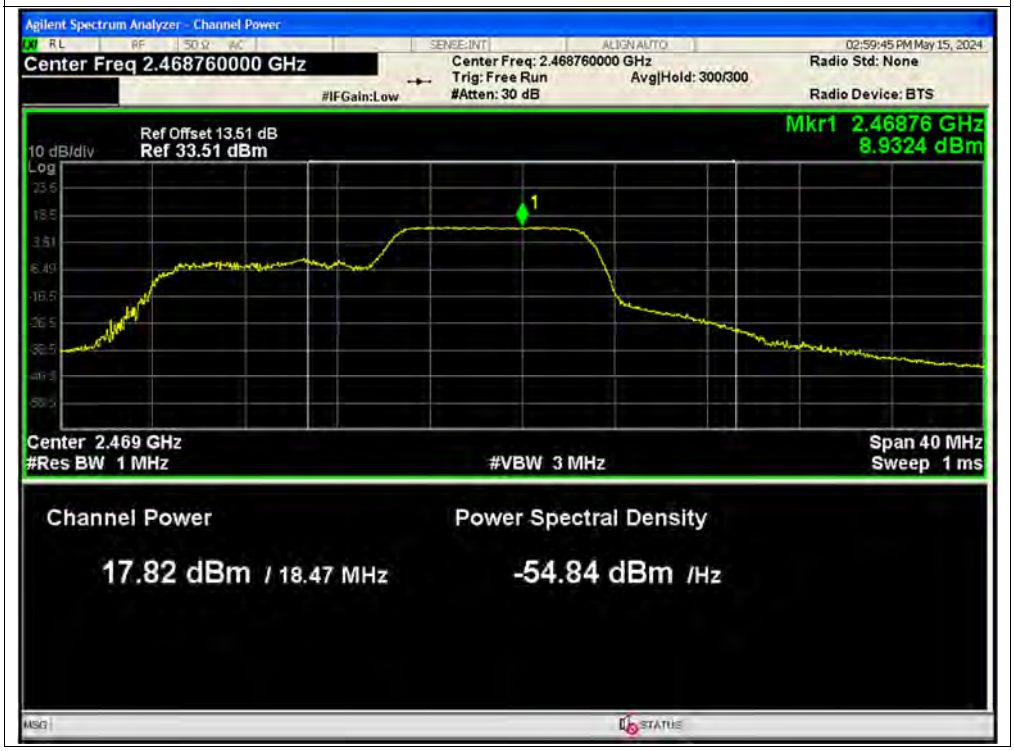


Average Power NVNT ax20 106@53 2437MHz Ant2

Average Power NVNT ax20 106@54 2462MHz Ant1



Average Power NVNT ax20 106@54 2462MHz Ant2



A.4. 6 dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	b	2412	Ant1	7.104	0.5	Pass
NVNT	b	2437	Ant1	7.073	0.5	Pass
NVNT	b	2462	Ant1	6.571	0.5	Pass
NVNT	b	2412	Ant2	7.072	0.5	Pass
NVNT	b	2437	Ant2	7.031	0.5	Pass
NVNT	b	2462	Ant2	7.09	0.5	Pass
NVNT	g	2412	Ant1	16.41	0.5	Pass
NVNT	g	2437	Ant1	16.389	0.5	Pass
NVNT	g	2462	Ant1	16.363	0.5	Pass
NVNT	g	2412	Ant2	16.366	0.5	Pass
NVNT	g	2437	Ant2	16.369	0.5	Pass
NVNT	g	2462	Ant2	16.363	0.5	Pass
NVNT	n20	2412	Ant1	17.607	0.5	Pass
NVNT	n20	2437	Ant1	17.624	0.5	Pass
NVNT	n20	2462	Ant1	17.636	0.5	Pass
NVNT	n20	2412	Ant2	17.598	0.5	Pass
NVNT	n20	2437	Ant2	17.622	0.5	Pass
NVNT	n20	2462	Ant2	17.616	0.5	Pass
NVNT	ax20	2412	Ant1	19.03	0.5	Pass
NVNT	ax20	2437	Ant1	18.999	0.5	Pass
NVNT	ax20	2462	Ant1	18.961	0.5	Pass
NVNT	ax20	2412	Ant2	18.983	0.5	Pass
NVNT	ax20	2437	Ant2	19.055	0.5	Pass
NVNT	ax20	2462	Ant2	18.973	0.5	Pass
NVNT	ax20 26@0	2412	Ant1	2.057	0.5	Pass
NVNT	ax20 26@0	2437	Ant1	2.088	0.5	Pass
NVNT	ax20 26@0	2412	Ant2	2.046	0.5	Pass
NVNT	ax20 26@0	2437	Ant2	2.091	0.5	Pass
NVNT	ax20 26@8	2462	Ant1	2.027	0.5	Pass
NVNT	ax20 26@8	2462	Ant2	2.075	0.5	Pass
NVNT	ax20 52@37	2412	Ant1	17.005	0.5	Pass
NVNT	ax20 52@37	2437	Ant1	16.991	0.5	Pass
NVNT	ax20 52@37	2412	Ant2	16.991	0.5	Pass
NVNT	ax20 52@37	2437	Ant2	16.955	0.5	Pass
NVNT	ax20 52@40	2462	Ant1	8.215	0.5	Pass

NVNT	ax20 52@40	2462	Ant2	15.731	0.5	Pass
NVNT	ax20 106@53	2412	Ant1	18.077	0.5	Pass
NVNT	ax20 106@53	2437	Ant1	18.118	0.5	Pass
NVNT	ax20 106@53	2412	Ant2	18.121	0.5	Pass
NVNT	ax20 106@53	2437	Ant2	18.084	0.5	Pass
NVNT	ax20 106@54	2462	Ant1	17.096	0.5	Pass
NVNT	ax20 106@54	2462	Ant2	17.102	0.5	Pass

Test Graphs
-6dB Bandwidth NVNT b 2412MHz Ant1

-6dB Bandwidth NVNT b 2437MHz Ant1

-6dB Bandwidth NVNT b 2462MHz Ant1

-6dB Bandwidth NVNT b 2412MHz Ant2

-6dB Bandwidth NVNT b 2437MHz Ant2

-6dB Bandwidth NVNT b 2462MHz Ant2

-6dB Bandwidth NVNT g 2412MHz Ant1

-6dB Bandwidth NVNT g 2437MHz Ant1

-6dB Bandwidth NVNT g 2462MHz Ant1

-6dB Bandwidth NVNT g 2412MHz Ant2

-6dB Bandwidth NVNT g 2437MHz Ant2

-6dB Bandwidth NVNT g 2462MHz Ant2

-6dB Bandwidth NVNT n20 2412MHz Ant1

-6dB Bandwidth NVNT n20 2437MHz Ant1

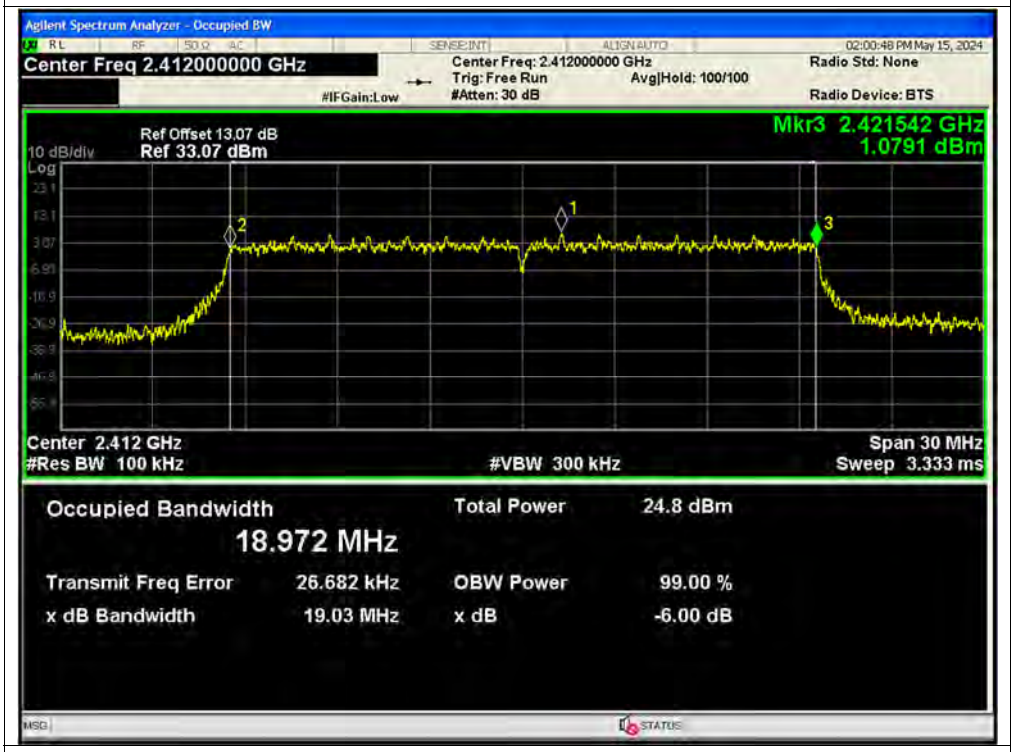
-6dB Bandwidth NVNT n20 2462MHz Ant1

-6dB Bandwidth NVNT n20 2412MHz Ant2

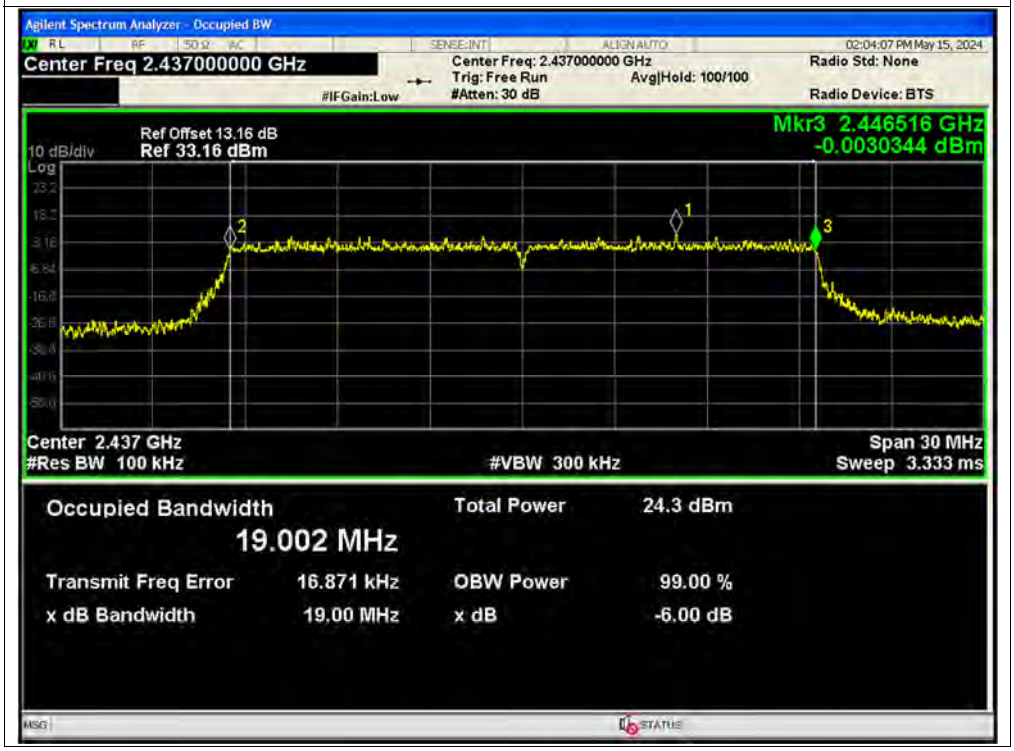
-6dB Bandwidth NVNT n20 2437MHz Ant2

-6dB Bandwidth NVNT n20 2462MHz Ant2

-6dB Bandwidth NVNT ax20 2412MHz Ant1



-6dB Bandwidth NVNT ax20 2437MHz Ant1



-6dB Bandwidth NVNT ax20 2462MHz Ant1

-6dB Bandwidth NVNT ax20 2412MHz Ant2