

TEST REPORT

Application No.: SUCR2505000434IT
Applicant: Shanghai Sunmi Technology Co.,Ltd.
Address of Applicant: Room 505,No.388,Song Hu Road,Yang Pu District,Shanghai,China
Manufacturer: Shanghai Sunmi Technology Co.,Ltd.
Address of Manufacturer: Room 505,No.388,Song Hu Road,Yang Pu District,Shanghai,China
EUT Description: Wireless Data Terminal
Model No.: TF41A
Trade Mark: SUNMI
FCC ID: 2AH25M3WH
Standards: FCC 47 CFR Part 15, Subpart E
Date of Receipt: May 15, 2025
Date of Test: June 17, 2025 to June 20, 2025
Date of Issue: June 23, 2025

Test Result :	PASS *
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* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

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Version

<i>Revision Record</i>			
<i>Version</i>	<i>Description</i>	<i>Date</i>	<i>Remark</i>
01	Original	June 23, 2025	/

Authorized for issue by:				
Tested By				
		Hayley Zhang / Project Manager		
Approved By				
		Cloud Peng/Technical Manager		

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1 Test Summary

Test Item	FCC Rule No.	Test Requirements	Test Result	Result
Antenna Requirement	15.203/15.407(a)	--	Clause 3.1	PASS
AC Power Line Conducted Emissions	15.407(b)(8)	< FCC 15.207 limits	Clause 3.2	PASS
Duty Cycle	--	No limit.	Clause 3.3	For Report Purpose
Maximum e.i.r.p.	15.407(a)(8)	< 24dBm over the frequency band of Operation, e.i.r.p.	Clause 3.4	PASS
26dB Emission Bandwidth	15.407(a)(11)	The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 megahertz.	Clause 3.5	PASS
99% Occupied Bandwidth	-	No limit.	Clause 3.6	For Report Purpose
Maximum Power Spectral Density	15.407(a)(8)	< -1dBm/MHz e.i.r.p.	Clause 3.7	PASS
In-Band Emissions	15.407(b)(7)	EUT must meet the limits detailed in 15.407(b)(7)	Clause 3.8	PASS
Contention Based Protocol	15.407(d)(6)	EUT must detect AWGN signal with 90% (or better) certainty	Clause 3.9	PASS
Unwanted Emissions that fall Out of the Restricted Bands (Radiated)	15.407(b)(6) 15.205, 15.209	< -27dBm/MHz e.i.r.p. outside of the 5.925 – 7.125GHz band	Clause 3.10	PASS
Unwanted Emissions in the Restricted Bands (Radiated)	15.407(b)(6) 15.205, 15.209	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Clause 3.11	PASS

Remark:

This test report (Report No.: SUCR250500043405) is based on the original test report (Report No.: SUCR250200007205).

Review this report and original report, this report just changing the parts according to the declaration letter from client.

Considering to the difference, pre-scan were performed on the sample in this report to find the items which can be influential to the result in the original test report for fully retest.

Therefore in this report only the power, ac power line conducted emission, Contention Based Protocol and radiated spurious emissions based on the worst case of the original report with report number SUCR250200007205 and other test data in this report are based on the previous report with report number SUCR250200007205.

2 General Information

2.1 Details of Client

Applicant:	Shanghai Sunmi Technology Co.,Ltd.
Address of Applicant:	Room 505, No.388, Song Hu Road, Yang Pu District, Shanghai, China
Manufacturer:	Shanghai Sunmi Technology Co.,Ltd.
Address of Manufacturer:	Room 505, No.388, Song Hu Road, Yang Pu District, Shanghai, China

2.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test engineer:	Ives Cheng, King-p Li

2.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 6336.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

- **FCC –Designation Number: CN1312**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327

2.4 General Description of EUT

Hardware Version:	V1.3	
Software Version:	T602AA_EVT_14.0_SUNMI_202503131820.00-00	
Power Supply:	3.87V from battery	
IEEE 802.11 WLAN Mode Supported:	<input checked="" type="checkbox"/> 802.11ax (20 MHz channel bandwidth) <input checked="" type="checkbox"/> 802.11ax (40 MHz channel bandwidth) <input checked="" type="checkbox"/> 802.11ax (80 MHz channel bandwidth)	
Operation Frequency:	IEEE 802.11 ax(HE20/40/80): 5925 MHz ~ 6425 MHz IEEE 802.11 ax(HE20/40/80): 6425 MHz ~ 6525 MHz IEEE 802.11 ax(HE20/40/80): 6525 MHz ~ 6875 MHz IEEE 802.11 ax(HE20/40/80): 6875 MHz ~ 7125 MHz	
Type of Modulation:	OFDM/OFDMA	
FCC Classification:	6GHz Low Power Indoor Client (6XD)	
Antenna Type:	FPC Antenna	
Smart System:	<input checked="" type="checkbox"/> MIMO	802.11ax: Tx & Rx
Antenna Gain:	UNII-5: 5.81dBi(Ant2); -3.37dBi(Ant3) UNII-6: 3.44dBi(Ant2); -3.87dBi(Ant3) UNII-7: 3.24dBi(Ant2); -3.87dBi(Ant3) UNII-8: -0.39dBi(Ant2); -5.54dBi(Ant3) Note: The antenna gain are derived from the gain information report provided by the manufacturer.	
RF Cable:	2dB	
Remark:	As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.	

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In FCC 15.31, for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table, and the selected channel to perform the test as below:

Frequency range over which device operates	Number of Measurement Frequencies Required	Location of Measurement Frequency in Band of Operation
1 MHz or less	1	centre
1 MHz to 10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near centre, 1 near low end

For UNII-5:

Mode	Channel	Frequency(MHz)
IEEE 802.11ax 20MHz	1	5955
	45	6175
	93	6415
IEEE 802.11ax 40MHz	3	5965
	43	6165
	91	6405
IEEE 802.11ax 80MHz	7	5985
	39	6145

For UNII-6:

Mode	Channel	Frequency(MHz)
IEEE 802.11ax 20MHz	97	6435
	105	6475
	113	6515
IEEE 802.11ax 40MHz	99	6445
	107	6485
	115	6525
IEEE 802.11ax 80MHz	87	6385
	103	6465

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For UNII-7:

Mode	Channel	Frequency(MHz)
IEEE 802.11ax 20MHz	117	6535
	149	6695
	181	6855
	185	6875
IEEE 802.11ax 40MHz	123	6565
	147	6685
	179	6845
IEEE 802.11ax 80MHz	119	6545
	135	6625
	151	6705
	167	6785
	183	6865

For UNII-8:

Mode	Channel	Frequency(MHz)
IEEE 802.11ax 20MHz	189	6895
	209	6995
	233	7115
IEEE 802.11ax 40MHz	187	6885
	195	6925
	203	6965
	227	7085
IEEE 802.11ax 80MHz	199	6945
	215	7025

2.5 Test Environment and Mode

Environment Parameter	101 kPa Selected Values During Tests	
Relative Humidity	44-46 % RH Ambient	
Value	Temperature(°C)	Voltage(V)
NTNV	22~23	3.87
Remark: NV: Normal Voltage NT: Normal Temperature		

2.6 Description of Support Units

The EUT has been tested as an independent unit.

2.7 Worst-case configuration and mode

Low data rate was used to test on antenna port conducted tests and radiated spurious emissions since it has the highest maximum power. Following are the worst-case data rates set for test:

Modulation Type	SISO - Data Rate	MIMO - Data Rate
802.11ax (HE 20)	/	MCS0 (16 Mbps)
802.11ax (HE 40)	/	MCS0 (32 Mbps)
802.11ax (HE 80)	/	MCS0 (68 Mbps)

3 Equipment List

CE Test System					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2025/01/15	2026/01/14
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2025/02/13	2026/02/12
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-03	2025/05/08	2026/05/07
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-04	2025/05/08	2026/05/07
Measurement Software	Tonscend	JS32-CE 4.0.0.2	SUWI-02-09-05	NCR	NCR

RSE Test Equipment					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	2023/06/03	2026/06/02
Temperature and humidity meter*	MingGao	TH101B	SUWI-01-01-05	2025/02/13	2026/02/12
Signal Analyzer	ROHDE & SCHWARZ	FSW43	SUWI-01-02-04	2025/01/20	2026/01/19
Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-07	2024/11/21	2025/11/20
Test receiver	ROHDE & SCHWARZ	ESR7	SUWI-01-10-01	2025/01/15	2026/01/14
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	VULB 9168	SUWI-01-11-04	2023/11/25	2025/11/24
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	2025/05/07	2027/05/06
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2025/05/07	2027/05/06
Active Loop Antenna	SCHWRZBECK MESS-ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2025/05/07	2027/05/06
Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	2025/01/16	2026/01/15
Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	2025/01/16	2026/01/15
Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	2025/01/20	2026/01/19
Measurement Software	Tonscend	JS32-RE V4.0.0.0	SUWI-02-09-04	NCR	NCR

Remark: NCR=No Calibration Requirement.

4 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.54dB
2	RF power density, conducted	±1.03dB
3	Spurious emissions, conducted	±0.54dB
4	Radio Frequency	1%
5	Duty Cycle	±0.37%
6	Occupied Bandwidth	1%
7	Conduction Emission	± 2.90dB (150kHz to 30MHz)
8	Radiated Emission	± 3.13dB (9k -30MHz)
		± 4.8dB (30M -1GHz)
		± 4.8dB (1GHz to 18GHz)
		± 4.80dB (Above 18GHz)

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{cispn/ETSI}$ (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement:	47 CFR Part 15 Section 15.203
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The antenna is FPC Antenna and no consideration of replacement. The best case gain of the antenna is
UNII-5: 5.81dBi(Ant2); -3.37dBi(Ant3)
UNII-6: 3.44dBi(Ant2); -3.87dBi(Ant3)
UNII-7: 3.24dBi(Ant2); -3.87dBi(Ant3)
UNII-8: -0.39dBi(Ant2); -5.54dBi(Ant3)

Note:

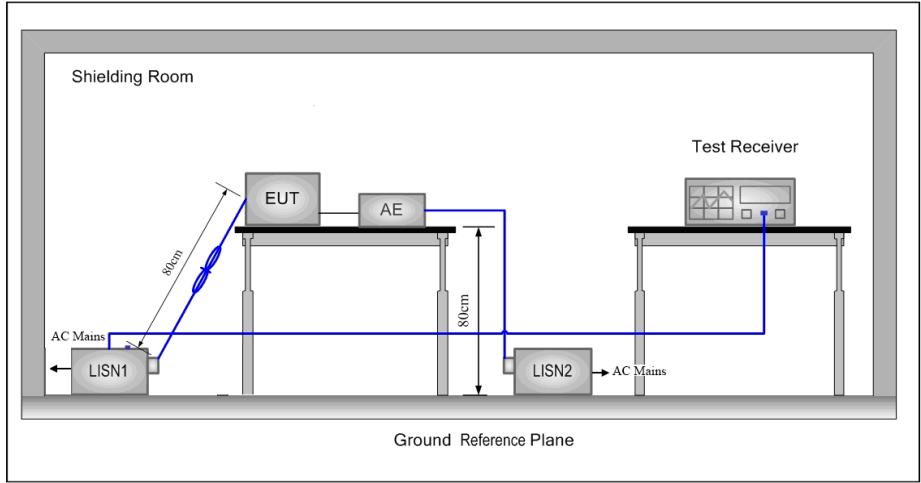
The antenna gain are derived from the gain information report provided by the manufacturer.

Remark:

As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

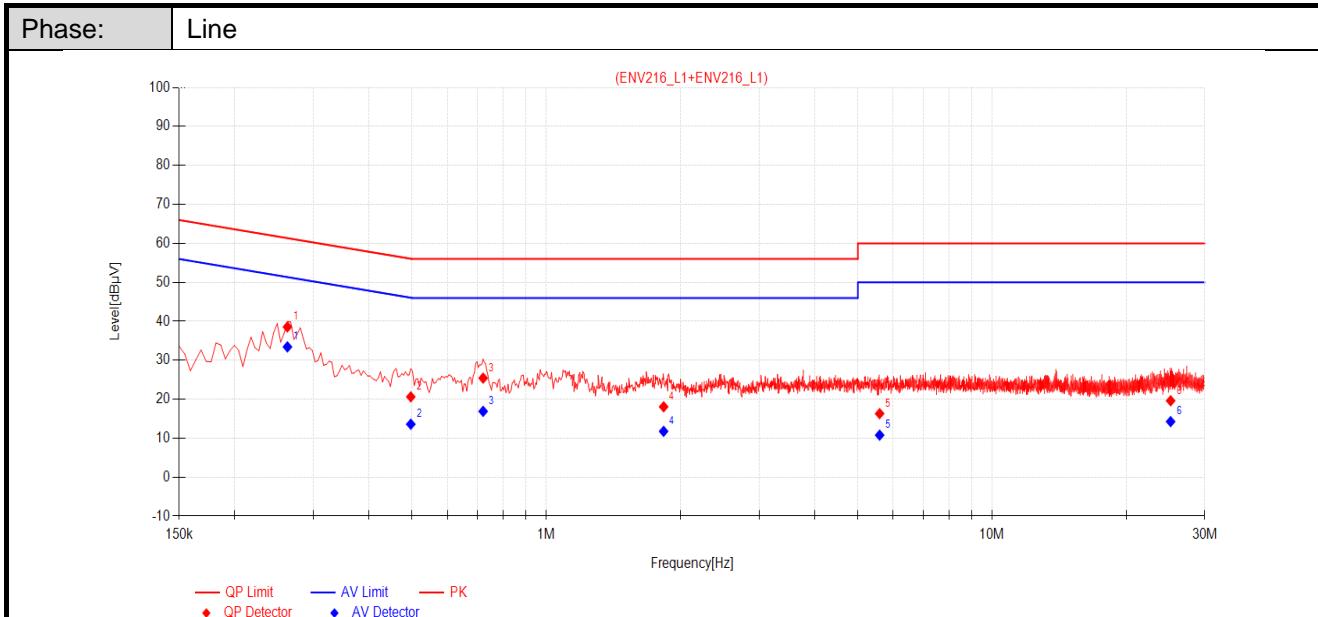
5.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15 Section 15.407(b)		
Test Method:	ANSI C63.10: 2013 Section 6.2		
Test Frequency Range:	150kHz to 30MHz		
Receiver Setup:	RBW = 9kHz, VBW = 30kHz		
Limit:	Frequency range (MHz)		Limit (dBuV)
			Quasi-peak
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test Procedure:	<ol style="list-style-type: none">1) The mains terminal disturbance voltage test was conducted in a shielded room.2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.		

Test Setup:	
Test Mode:	BT Link + WIFI 2.4G Link + WIFI 5G/6E Link
Instruments Used:	Refer to section 3 for details
Test Results:	Pass

Measurement Data

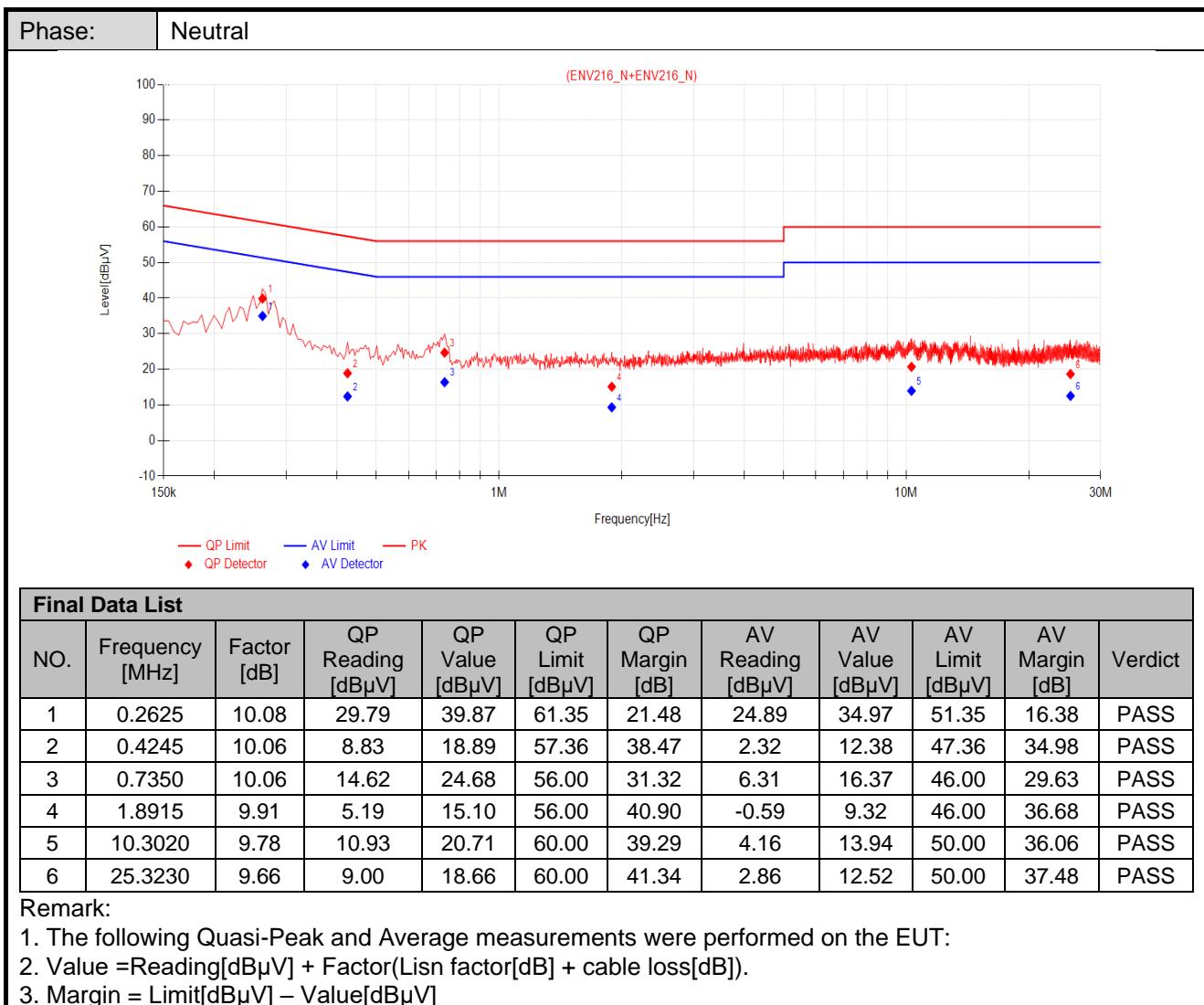
An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



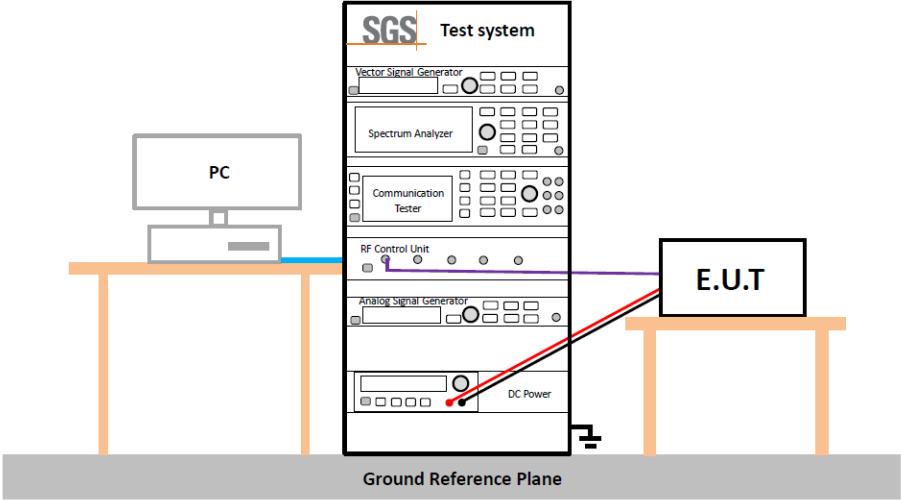
Final Data List												
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict	
1	0.2625	10.07	28.49	38.56	61.35	22.79	23.37	33.44	51.35	17.91	PASS	
2	0.4965	10.07	10.54	20.61	56.06	35.45	3.53	13.60	46.06	32.46	PASS	
3	0.7215	10.06	15.36	25.42	56.00	30.58	6.83	16.89	46.00	29.11	PASS	
4	1.8330	9.84	8.22	18.06	56.00	37.94	1.92	11.76	46.00	34.24	PASS	
5	5.5950	9.82	6.48	16.30	60.00	43.70	0.96	10.78	50.00	39.22	PASS	
6	25.1565	9.66	9.95	19.61	60.00	40.39	4.60	14.26	50.00	35.74	PASS	

Remark:

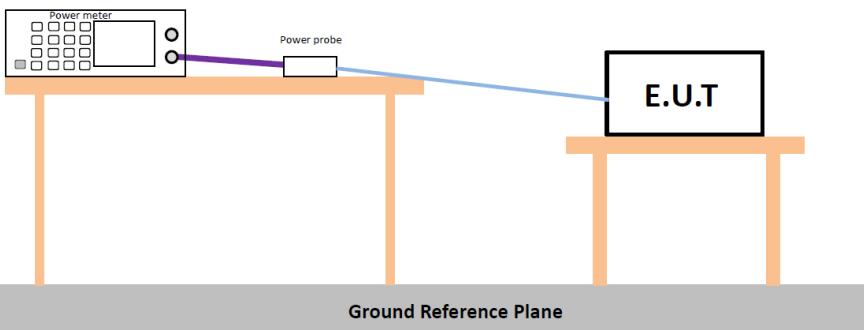
1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Value =Reading[dBμV] + Factor(Lisn factor[dB] + cable loss[dB]).
3. Margin = Limit[dBμV] – Value[dBμV]



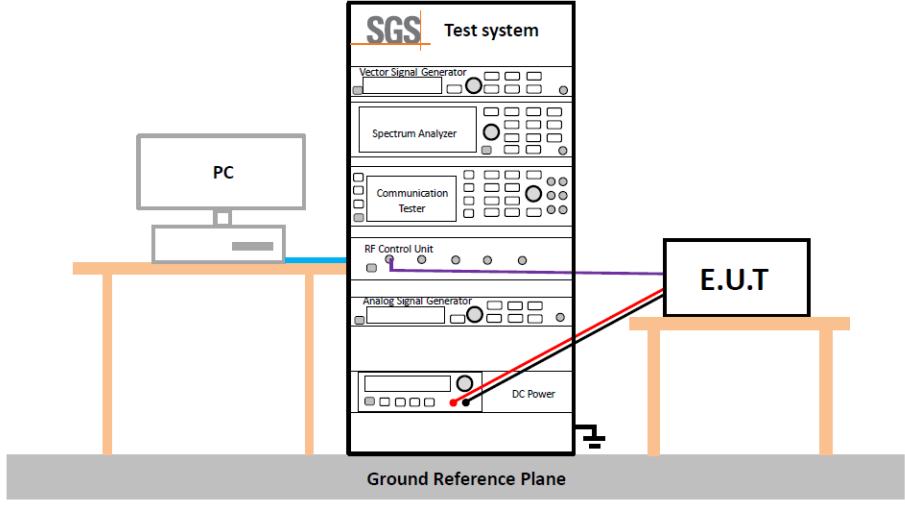
5.3 Duty Cycle

Test Requirement:	ANSI C63.10 :2013 Section 12.2
Test Method:	ANSI C63.10 :2013 Section 12.2
Test Setup:	
Instruments Used:	Refer to section 3 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Refer to section 3.7 for details.
Limit:	No restriction limits
Test Results:	For report purpose
The detailed test data see: Appendix	

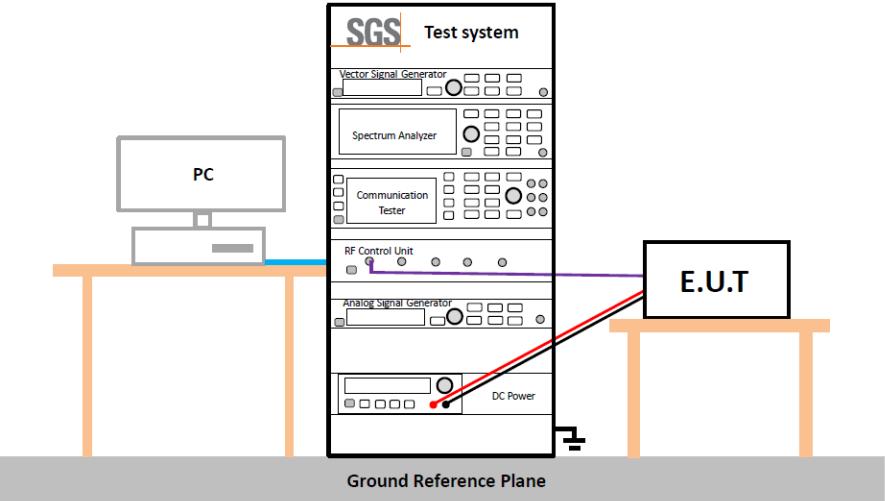
5.4 Maximum e.i.r.p.

Test Requirement:	47 CFR Part 15 Section 15.407(a)
Test Method:	ANSI C63.10 :2013 Section11.9.2.3
Test Setup:	 <p>* Test with power meter (Detector function: Average)</p>
Test Instruments:	Refer to section 3 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Refer to section 3.7 for details.
Limit:	For client devices operating under the control of an indoor access point in the 5.925-7.125GHz bands, the maximum e.i.r.p. over the frequency band of operation must not exceed 24 dBm.
Test Results:	Pass
The detailed test data see: Appendix	

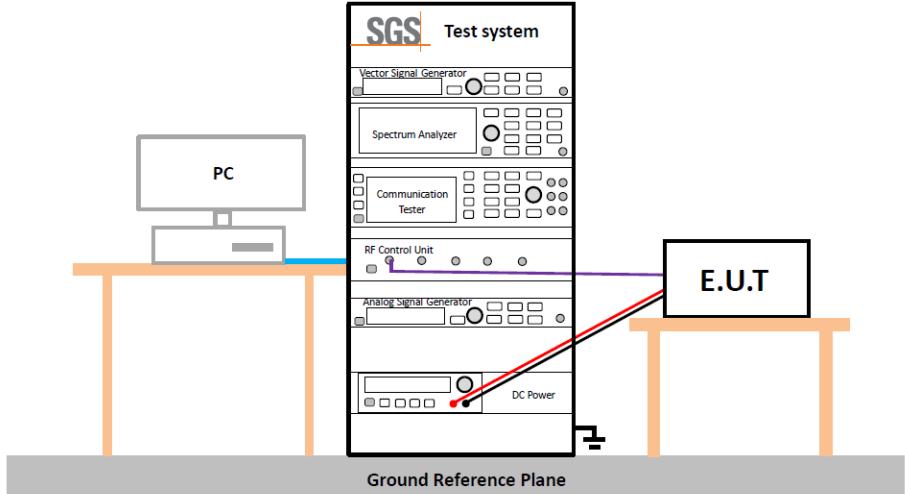
5.5 26dB Emission Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(a), KDB 789033 D02
Test Method:	ANSI C63.10: 2013 Section 11.8 Option 2
Test Setup:	
Instruments Used:	Refer to section 3 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Refer to section 3.7 for details.
Limit:	The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 megahertz.
Test Results:	Pass
The detailed test data see: Appendix	

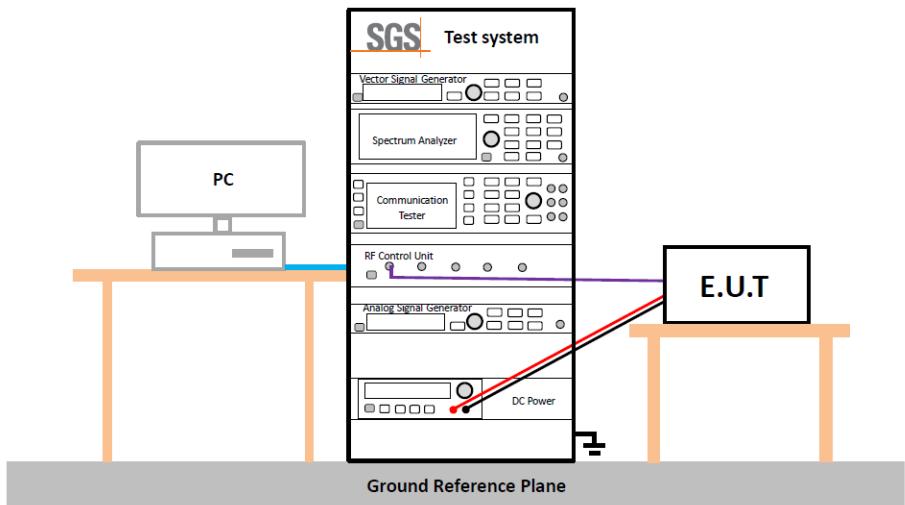
5.6 99% Occupied Bandwidth

Test Requirement:	KDB 789033 D02§ D
Test Method:	ANSI C63.10: 2013 Section 6.9.3
Test Setup:	
Instruments Used:	Refer to section 3 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Refer to section 3.7 for details.
Limit:	No restriction limits
Test Results:	For report purpose
The detailed test data see: Appendix	

5.7 Power Spectral Density

Test Requirement:	47 CFR Part 15 Section 15.407(a)
Test Method:	ANSI C63.10: 2013 Section 11.10.2 KDB 789033 D02 v02r01, Section F.
Test Setup:	
Instruments Used:	Refer to section 3 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Refer to section 3.7 for details.
Limit:	For client devices operating under the control of an indoor access point in the 5.925-7.125GHz bands, the maximum power spectral density must not exceed -1 dBm e.i.r.p. in any 1-megahertz band.
Test Results:	Pass
The detailed test data see: Appendix	

5.8 In-Band Emissions

Test Requirement:	47 CFR Part 15 Section 15.407(b)(7)
Test Method:	KDB 987594 D02 U-NII 6GHz EMC Measurement v01
Test Setup:	 <p>The diagram illustrates the test setup. A 'Test system' block contains a 'Vector Signal Generator', 'Spectrum Analyzer', 'Communication Tester', 'RF Control Unit', 'Analog Signal Generator', and a 'DC Power' source. A 'PC' is connected to the 'Test system' and the 'E.U.T'. The 'E.U.T' is connected to the 'Test system' and sits on a 'Ground Reference Plane'. The 'Test system' is connected to the 'E.U.T' via a red line.</p>
Instruments Used:	Refer to section 3 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Refer to section 3.7 for details. Only the worst case is recorded in the report.
Limit:	For transmitters operating within the 5.925-7.125 GHz bands: Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB.
Test Results:	Pass
The detailed test data see: Appendix	

5.9 Contention Based Protocol

Test Requirement:	47 CFR Part 15 Section 15.407(d)
Test Method:	ANSI C63.10: 2013 KDB 987594 D02 U-NII 6GHz EMC Measurement v01
Test Setup:	
Instruments Used:	Refer to section 3 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Test Procedure:	<ol style="list-style-type: none"> Configure the EUT to transmit with a constant duty cycle. Set the operating parameters of the EUT including power level, operating frequency, modulation and bandwidth. Set the signal analyzer center frequency to the nominal EEUUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of the EUT. Connect the output port of the EUT to the signal analyzer 2, as shown in Figure 2. Ensure that the attenuator 2 provides enough attenuation to not overload the signal analyzer 2 receiver. Monitoring the signal analyzer 2, verify the EUT is operating and transmitting with the parameters set at step two. Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10MHz-wide AWGN signal. Use Table 1 to determine the center frequency of the 10MHz AWGN signal relative to the EUT's channel bandwidth and center frequency. Set the AWGN signal power to an extremely low level (more than 20 dB below the -62 dBm threshold). Connect the AWGN signal source, via a 3-dB splitter, to the signal analyzer 1 and the EUT as shown in Figure 2. Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer 1. Monitor the signal analyzer 2 to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting. (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty. Refer to Table 1 to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step 5, choose a different center frequency for the AWGN signal and repeat the process.
Limit:	Unlicensed low-power indoor devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel and stay off the channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm). The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain. To ensure incumbent operations are

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	reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel. For example, an 802.11 device that plans to transmit a 40 MHz- wide signal (on a primary 20 MHz channel and a secondary 20 MHz channel) must detect energy throughout the entire 40 MHz channel. Additionally, low-power indoor devices must detect co-channel energy with 90% or greater certainty.
Test Results:	Pass

The detailed test data see: **Appendix**

5.10 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15 Section 15.205 and 15.209
Test Method:	ANSI C63.10: 2013 Section 6.4 / 6.5 / 6.6
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)
Test frequency:	9kHz ~ 40GHz(or 10 Harmonic)

Test Setup:

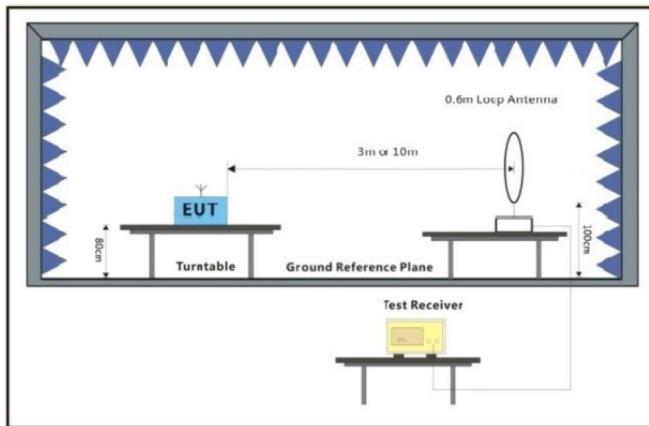


Figure 1. 9kHz to 30MHz

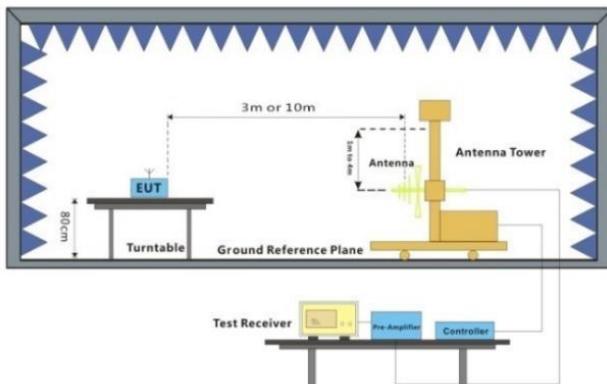


Figure 1. 30MHz to 1GHz

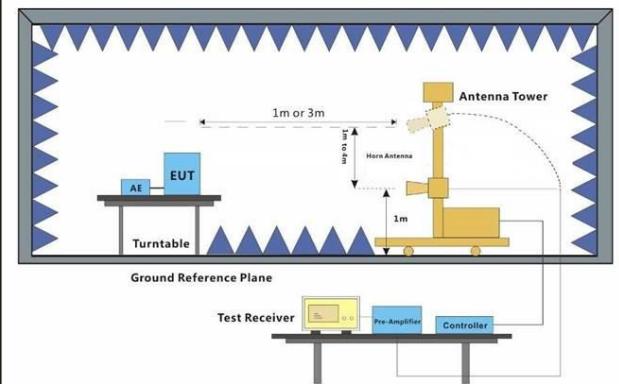


Figure 2. Above 1 GHz

Test Procedure:	<ol style="list-style-type: none"> For below 1GHz test, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. For above 1GHz test, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation (Distance from antenna to EUT is 1m for measurements >18GHz). The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the
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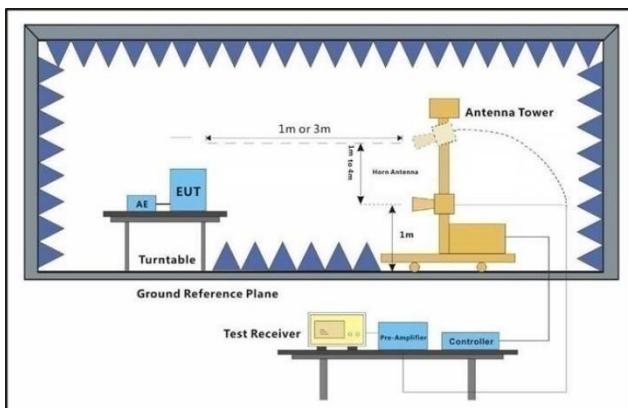
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	<p>maximum reading.</p> <p>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>g. Test the EUT in the outermost channels.</p> <p>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p> <p>j. The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported</p> <p>k. The disturbance above 18GHz was very low, and the harmonics were the highest point could be found when testing, so only the harmonics had been displayed.</p> <p>l. At a measurement distance of 1 meter the limit line was increased by $20 \times \log(3/1) = 9.54$ dB.</p>
Test Configuration:	<p>Measurements below 30MHz</p> <ul style="list-style-type: none">• RBW = 10 kHz• VBW = 30 kHz• Detector = Peak & Average & Quasi-peak• Trace mode = max hold <p>Measurements Below 1000MHz</p> <ul style="list-style-type: none">• RBW = 120 kHz• VBW = 300 kHz• Detector = Quasi-peak• Trace mode = max hold <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none">• RBW = 1 MHz• VBW \geq 3 MHz• Detector = Peak• Sweep time = auto• Trace mode = max hold <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none">• RBW = 1 MHz• VBW = 10Hz, when duty cycle is no less than 98 percent.• VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.
Final Test Mode:	<p>Refer to section 3.7 for details.</p> <p>For below 1GHz part, through pre-scan all channels, but only the worst case is recorded in the report.</p>
Instruments Used:	Refer to section 3 for details
Test Results:	Pass
The detailed test data see: Appendix	

5.11 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15 Section 15.407(b)		
Test Method:	ANSI C63.10: 2013 Section 11.12		
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)		
Limit:	Frequency	Limit (dBuV/m)	Remark
	30MHz-88MHz	40.0	Quasi-peak
	88MHz-216MHz	43.5	Quasi-peak
	216MHz-960MHz	46.0	Quasi-peak
	960MHz-1GHz	54.0	Quasi-peak
	Above 1GHz	54.0	Average Value
		74.0	Peak Value

Test Setup:



Test Procedure:	<ol style="list-style-type: none"> The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel Test the EUT in the outermost channels. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case. Repeat above procedures until all frequencies measured was complete.
Test Configuration:	Measurements Below 1000MHz

	<ul style="list-style-type: none">• RBW = 120 kHz• VBW = 300 kHz• Detector = Quasi-peak• Trace mode = max hold <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none">• RBW = 1 MHz• VBW \geq 3 MHz• Detector = Peak• Sweep time = auto• Trace mode = max hold <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none">• RBW = 1 MHz• VBW = 10Hz, when duty cycle is no less than 98 percent.• VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.
Final Test Mode:	Refer to section 3.7 for details.
Instruments Used:	Refer to section 3 for details
Test Results:	Pass
The detailed test data see: Appendix	

6 Photographs - Setup Photos

Refer to Appendix A.2 BT&WLAN&NFC Setup Photos.

7 Appendix

1. Duty Cycle

1.1 Test Result

1.1.1 ANT2

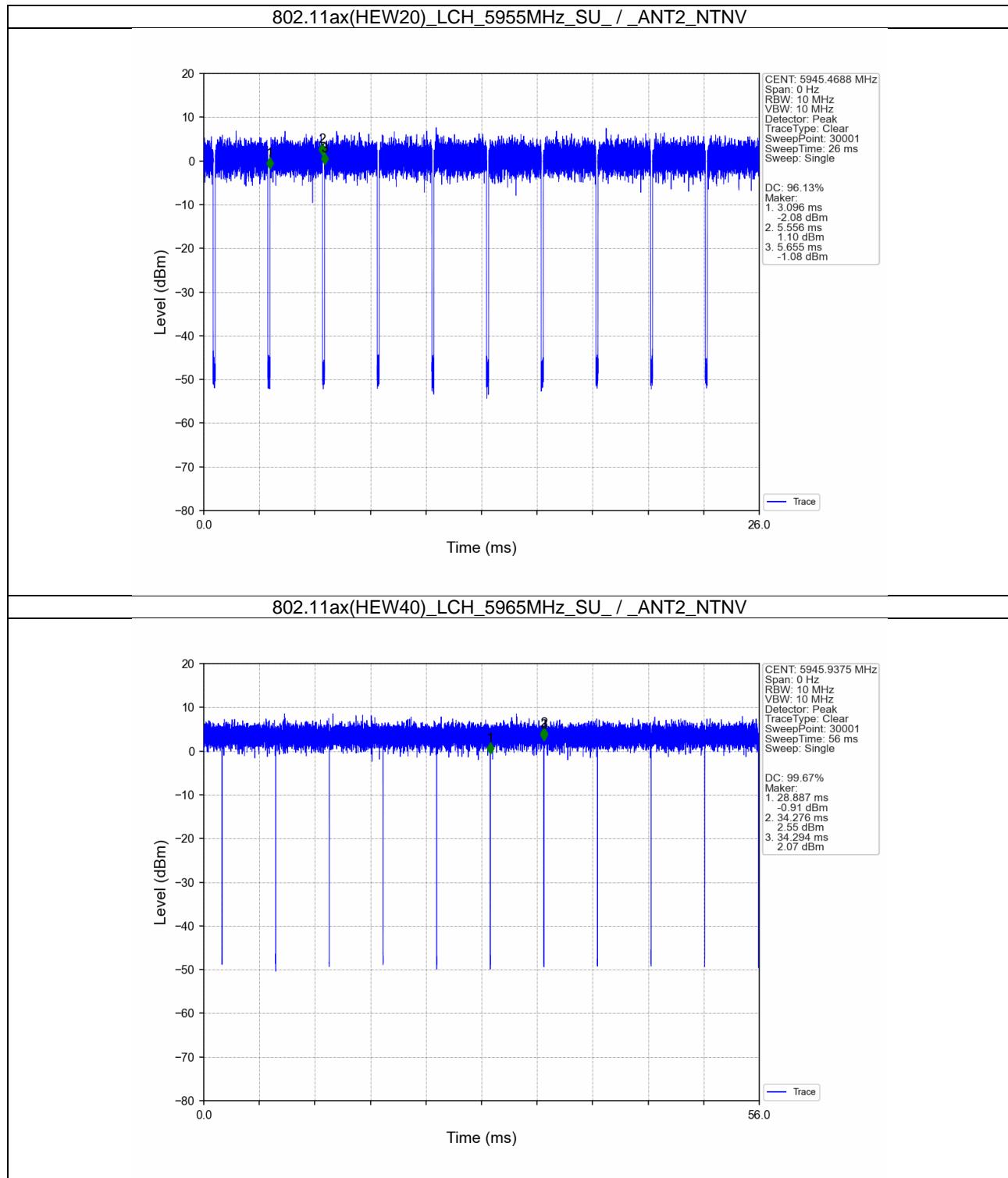
ANT2										
ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
NTNV	802.11ax (HEW20)	MIMO	5955	SU	/	2.460	2.559	96.13	0.17	0.03
	802.11ax (HEW40)	MIMO	5965	SU	/	5.389	5.407	99.67	0.01	0.03
	802.11ax (HEW80)	MIMO	5985	SU	/	5.262	5.281	99.64	0.02	0.04

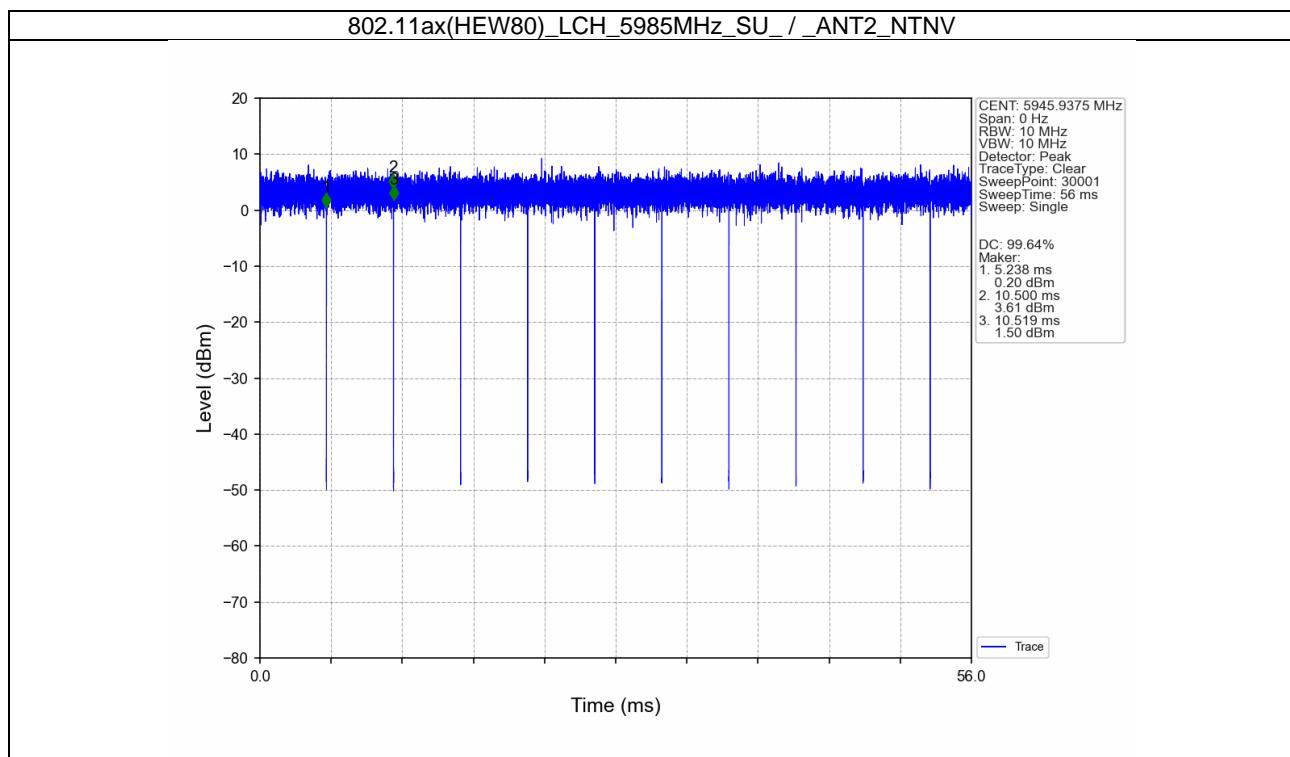
1.1.2 ANT3

ANT3										
ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
NTNV	802.11ax (HEW20)	MIMO	5955	SU	/	2.461	2.559	96.17	0.17	0.00
	802.11ax (HEW40)	MIMO	5965	SU	/	5.391	5.409	99.67	0.01	0.04
	802.11ax (HEW80)	MIMO	5985	SU	/	5.262	5.281	99.64	0.02	0.04

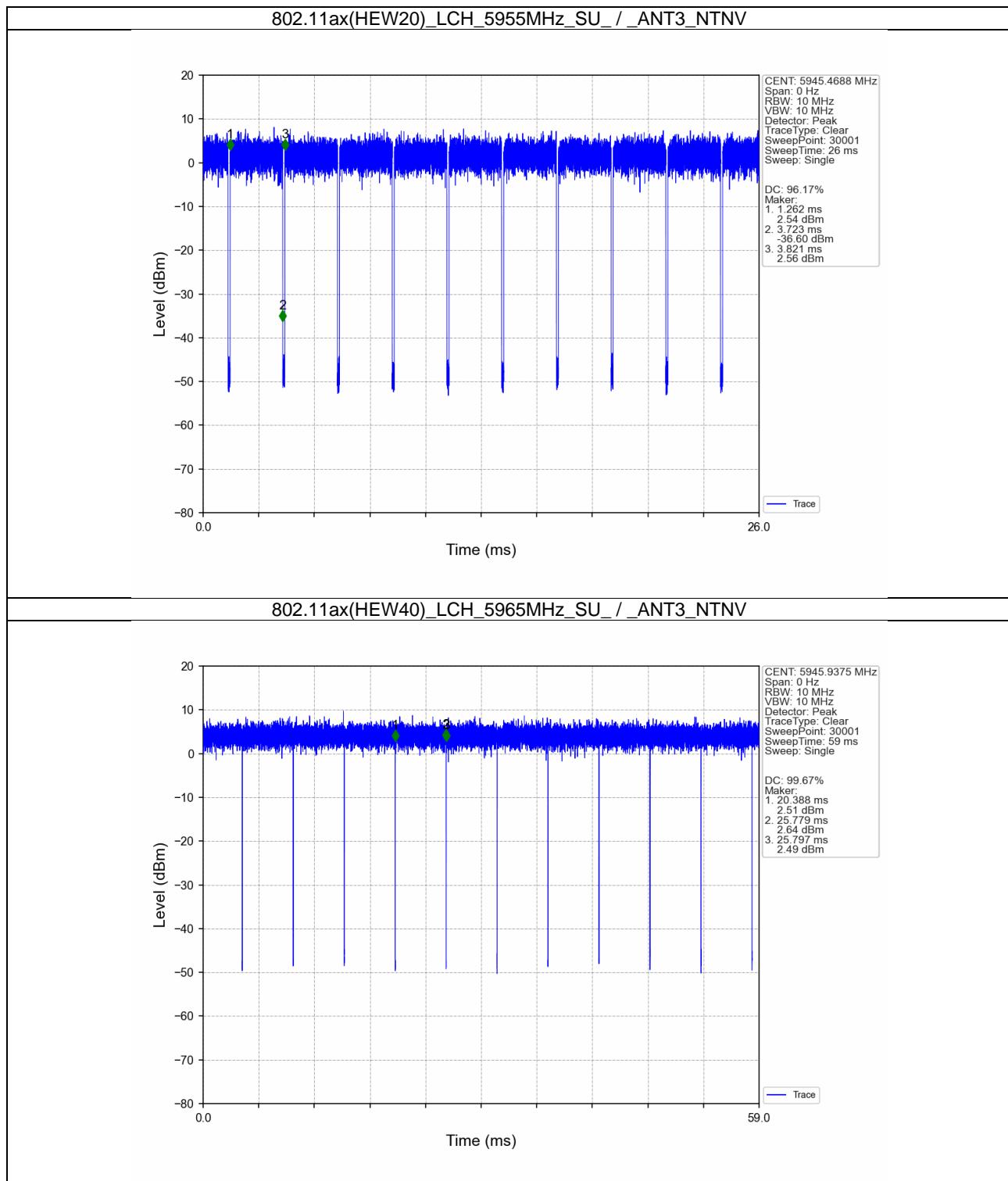
1.2 Test Graph

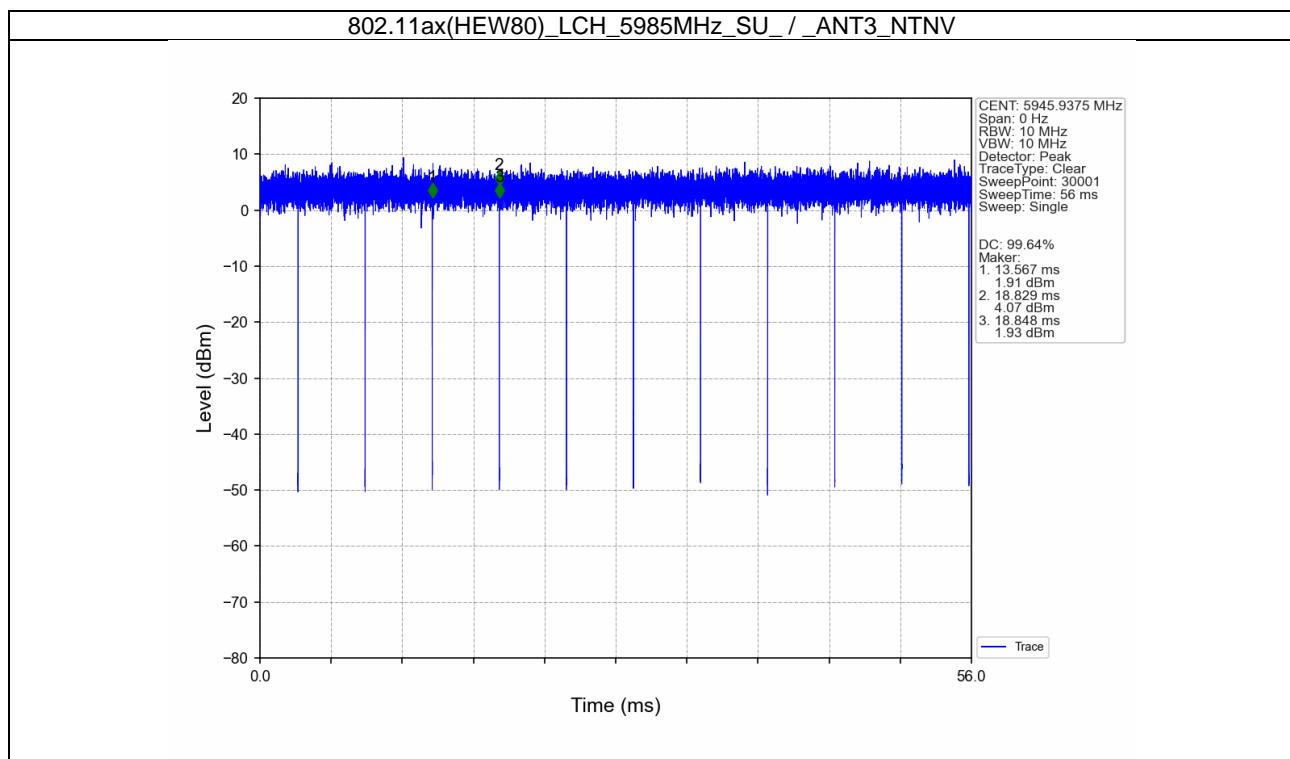
1.2.1 ANT2





1.2.2 ANT3





2. Bandwidth

2.1 Test Result

2.1.1 OBW

ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	99% Occupied Bandwidth (MHz)		Verdict
							Result	Limit	
NTNV	802.11ax (HEW20)	MIMO	5955	SU	/	1	19.232	<=320	Pass
			5955	SU	/	2	19.204	<=320	Pass
			6175	SU	/	1	19.252	<=320	Pass
			6175	SU	/	2	19.181	<=320	Pass
	802.11ax (HEW40)	MIMO	6415	SU	/	1	19.208	<=320	Pass
			6415	SU	/	2	19.191	<=320	Pass
			5965	SU	/	1	38.698	<=320	Pass
			5965	SU	/	2	38.578	<=320	Pass
	802.11ax (HEW80)	MIMO	6165	SU	/	1	38.543	<=320	Pass
			6165	SU	/	2	38.456	<=320	Pass
			6405	SU	/	1	38.577	<=320	Pass
			6405	SU	/	2	38.525	<=320	Pass
	802.11ax (HEW80)	MIMO	5985	SU	/	1	78.840	<=320	Pass
			5985	SU	/	2	78.932	<=320	Pass
			6145	SU	/	1	78.671	<=320	Pass
			6145	SU	/	2	78.700	<=320	Pass
			6385	SU	/	1	78.892	<=320	Pass
			6385	SU	/	2	78.926	<=320	Pass

2.1.2 26dB BW

ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	26dB Bandwidth (MHz)		Verdict
							Result	Limit	
NTNV	802.11ax (HEW20)	MIMO	5955	SU	/	1	21.572	/	Pass
			5955	SU	/	2	21.561	/	Pass
			6175	SU	/	1	21.570	/	Pass
			6175	SU	/	2	21.505	/	Pass
	802.11ax (HEW40)	MIMO	6415	SU	/	1	21.472	/	Pass
			6415	SU	/	2	21.440	/	Pass
			5965	SU	/	1	44.614	/	Pass
			5965	SU	/	2	44.292	/	Pass
	802.11ax (HEW80)	MIMO	6165	SU	/	1	44.633	/	Pass
			6165	SU	/	2	43.823	/	Pass
			6405	SU	/	1	44.679	/	Pass
			6405	SU	/	2	45.309	/	Pass
	802.11ax (HEW80)	MIMO	5985	SU	/	1	88.680	/	Pass
			5985	SU	/	2	90.275	/	Pass
			6145	SU	/	1	88.741	/	Pass
			6145	SU	/	2	89.152	/	Pass
			6385	SU	/	1	89.290	/	Pass
			6385	SU	/	2	88.520	/	Pass

2.1.3 OBW

ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	99% Occupied Bandwidth (MHz)		Verdict
							Result	Limit	

NTNV	802.11ax (HEW20)	MIMO	6435	SU	/	1	19.421	<=320	Pass
			6435	SU	/	2	19.404	<=320	Pass
			6475	SU	/	1	19.471	<=320	Pass
			6475	SU	/	2	19.385	<=320	Pass
			6515	SU	/	1	19.407	<=320	Pass
			6515	SU	/	2	19.420	<=320	Pass
	802.11ax (HEW40)	MIMO	6445	SU	/	1	38.579	<=320	Pass
			6445	SU	/	2	38.479	<=320	Pass
	802.11ax (HEW80)	MIMO	6485	SU	/	1	38.744	<=320	Pass
			6485	SU	/	2	38.515	<=320	Pass
			6465	SU	/	1	78.689	<=320	Pass
			6465	SU	/	2	78.482	<=320	Pass

2.1.4 26dB BW

ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	26dB Bandwidth (MHz)		Verdict
							Result	Limit	
NTNV	802.11ax (HEW20)	MIMO	6435	SU	/	1	22.805	/	Pass
			6435	SU	/	2	23.526	/	Pass
			6475	SU	/	1	23.894	/	Pass
			6475	SU	/	2	23.626	/	Pass
			6515	SU	/	1	23.167	/	Pass
			6515	SU	/	2	23.502	/	Pass
	802.11ax (HEW40)	MIMO	6445	SU	/	1	44.134	/	Pass
			6445	SU	/	2	43.956	/	Pass
	802.11ax (HEW80)	MIMO	6485	SU	/	1	44.651	/	Pass
			6485	SU	/	2	43.751	/	Pass
			6465	SU	/	1	88.356	/	Pass
			6465	SU	/	2	88.204	/	Pass

2.1.5 OBW

ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	99% Occupied Bandwidth (MHz)		Verdict
							Result	Limit	
NTNV	802.11ax (HEW20)	MIMO	6535	SU	/	1	19.259	<=320	Pass
			6535	SU	/	2	19.231	<=320	Pass
			6695	SU	/	1	19.227	<=320	Pass
			6695	SU	/	2	19.215	<=320	Pass
			6855	SU	/	1	19.258	<=320	Pass
			6855	SU	/	2	19.163	<=320	Pass
	802.11ax (HEW40)	MIMO	6565	SU	/	1	38.541	<=320	Pass
			6565	SU	/	2	38.597	<=320	Pass
			6685	SU	/	1	38.605	<=320	Pass
	802.11ax (HEW80)	MIMO	6685	SU	/	2	38.430	<=320	Pass
			6845	SU	/	1	38.444	<=320	Pass
			6845	SU	/	2	38.591	<=320	Pass
	802.11ax (HEW80)	MIMO	6625	SU	/	1	78.882	<=320	Pass
			6625	SU	/	2	78.878	<=320	Pass
			6705	SU	/	1	78.642	<=320	Pass
			6705	SU	/	2	78.803	<=320	Pass
			6785	SU	/	1	78.883	<=320	Pass
			6785	SU	/	2	78.663	<=320	Pass

2.1.6 26dB BW

ENV	Mode	TX	Frequency	RU	RU	ANT	26dB Bandwidth (MHz)	Verdict
-----	------	----	-----------	----	----	-----	----------------------	---------

		Type	(MHz)		Pos		Result	Limit	
NTNV	802.11ax (HEW20)	MIMO	6535	SU	/	1	21.608	/	Pass
						2	21.364	/	Pass
			6695	SU	/	1	21.702	/	Pass
						2	21.461	/	Pass
	802.11ax (HEW40)	MIMO	6855	SU	/	1	21.691	/	Pass
						2	21.437	/	Pass
			6565	SU	/	1	44.573	/	Pass
						2	43.747	/	Pass
	802.11ax (HEW80)	MIMO	6685	SU	/	1	44.895	/	Pass
						2	44.101	/	Pass
			6845	SU	/	1	44.793	/	Pass
						2	44.091	/	Pass
	802.11ax (HEW80)	MIMO	6625	SU	/	1	89.225	/	Pass
						2	88.155	/	Pass
			6705	SU	/	1	89.190	/	Pass
						2	87.878	/	Pass
	802.11ax (HEW80)	MIMO	6785	SU	/	1	88.466	/	Pass
						2	88.319	/	Pass

2.1.7 OBW

ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	99% Occupied Bandwidth (MHz)		Verdict
							Result	Limit	
NTNV	802.11ax (HEW20)	MIMO	6895	SU	/	1	19.503	<=320	Pass
						2	19.439	<=320	Pass
			6995	SU	/	1	19.434	<=320	Pass
						2	19.425	<=320	Pass
	802.11ax (HEW40)	MIMO	7115	SU	/	1	19.480	<=320	Pass
						2	19.432	<=320	Pass
			6925	SU	/	1	38.536	<=320	Pass
						2	38.455	<=320	Pass
	802.11ax (HEW80)	MIMO	7005	SU	/	1	38.505	<=320	Pass
						2	38.527	<=320	Pass
			7085	SU	/	1	38.523	<=320	Pass
						2	38.503	<=320	Pass
	802.11ax (HEW80)	MIMO	6945	SU	/	1	78.865	<=320	Pass
						2	78.952	<=320	Pass
			7025	SU	/	1	78.871	<=320	Pass
						2	78.990	<=320	Pass

2.1.8 26dB BW

ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	26dB Bandwidth (MHz)		Verdict
							Result	Limit	
NTNV	802.11ax (HEW20)	MIMO	6895	SU	/	1	23.106	/	Pass
						2	23.444	/	Pass
			6995	SU	/	1	23.477	/	Pass
						2	22.837	/	Pass
	802.11ax (HEW40)	MIMO	7115	SU	/	1	23.489	/	Pass
						2	23.342	/	Pass
			6925	SU	/	1	43.836	/	Pass
						2	44.530	/	Pass
	802.11ax (HEW80)	MIMO	7005	SU	/	1	44.307	/	Pass
						2	43.981	/	Pass
			7085	SU	/	1	44.378	/	Pass
						2	44.335	/	Pass
	802.11ax	MIMO	6945	SU	/	1	90.846	/	Pass

	(HEW80)					2	89.574	/	Pass
		7025	SU	/	1	88.991	/	Pass	
					2	88.946	/	Pass	

2.1.9 OBW

ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	99% Occupied Bandwidth (MHz)		Verdict
							Result	Limit	
NTNV	802.11ax (HEW20)	MIMO	6875	SU	/	1	19.487	<=320	Pass
						2	19.460	<=320	Pass
	802.11ax (HEW40)	MIMO	6885	SU	/	1	38.492	<=320	Pass
						2	38.511	<=320	Pass
	802.11ax (HEW80)	MIMO	6865	SU	/	1	78.882	<=320	Pass
						2	78.824	<=320	Pass

2.1.10 26dB BW

ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	26dB Bandwidth (MHz)		Verdict
							Result	Limit	
NTNV	802.11ax (HEW20)	MIMO	6875	SU	/	1	23.614	/	Pass
						2	23.507	/	Pass
	802.11ax (HEW40)	MIMO	6885	SU	/	1	44.538	/	Pass
						2	44.526	/	Pass
	802.11ax (HEW80)	MIMO	6865	SU	/	1	90.867	/	Pass
						2	87.773	/	Pass

2.1.11 OBW

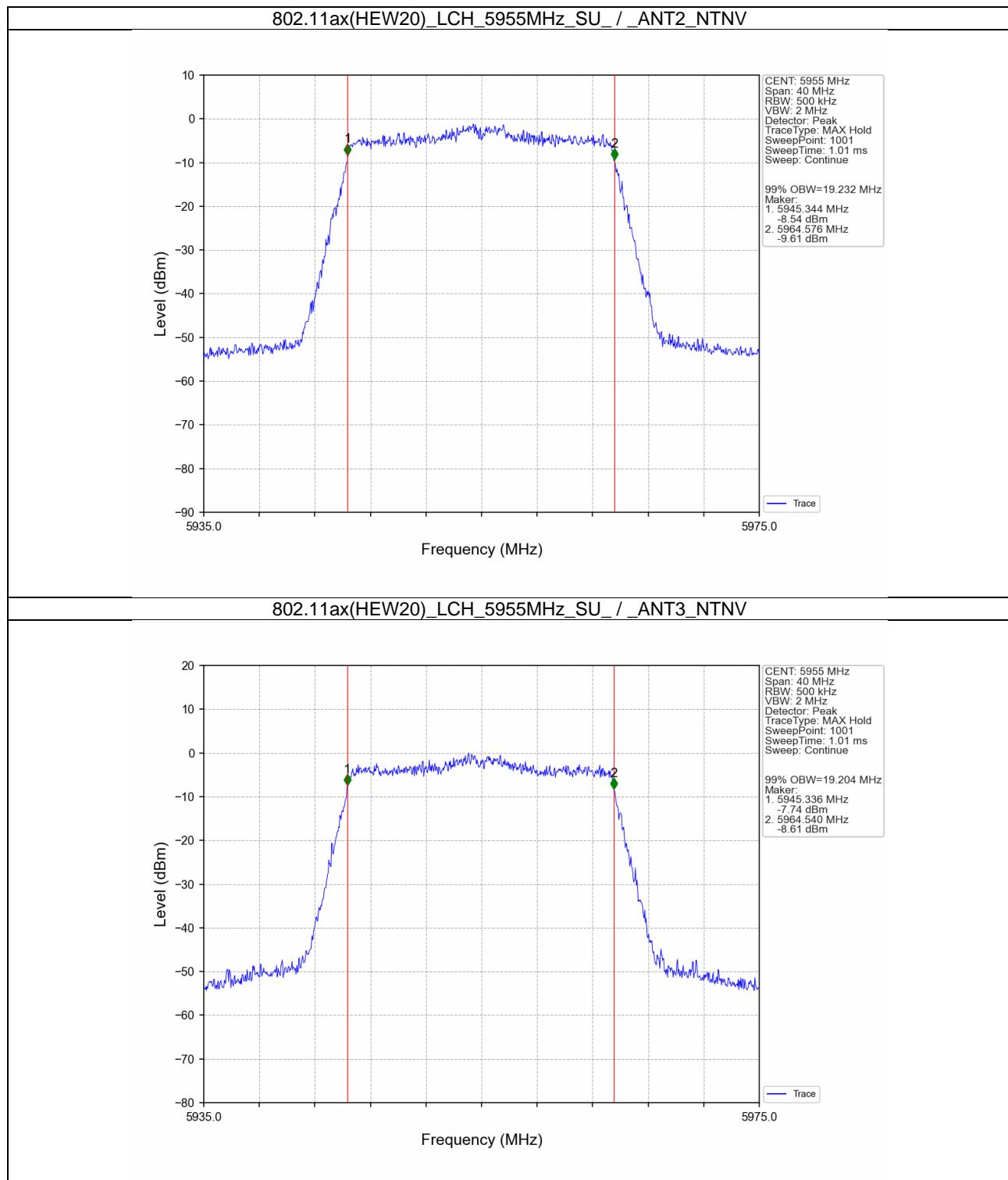
ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	99% Occupied Bandwidth (MHz)		Verdict
							Result	Limit	
NTNV	802.11ax (HEW40)	MIMO	6525	SU	/	1	38.492	<=320	Pass
						2	38.480	<=320	Pass
	802.11ax (HEW80)	MIMO	6545	SU	/	1	79.038	<=320	Pass
						2	79.088	<=320	Pass

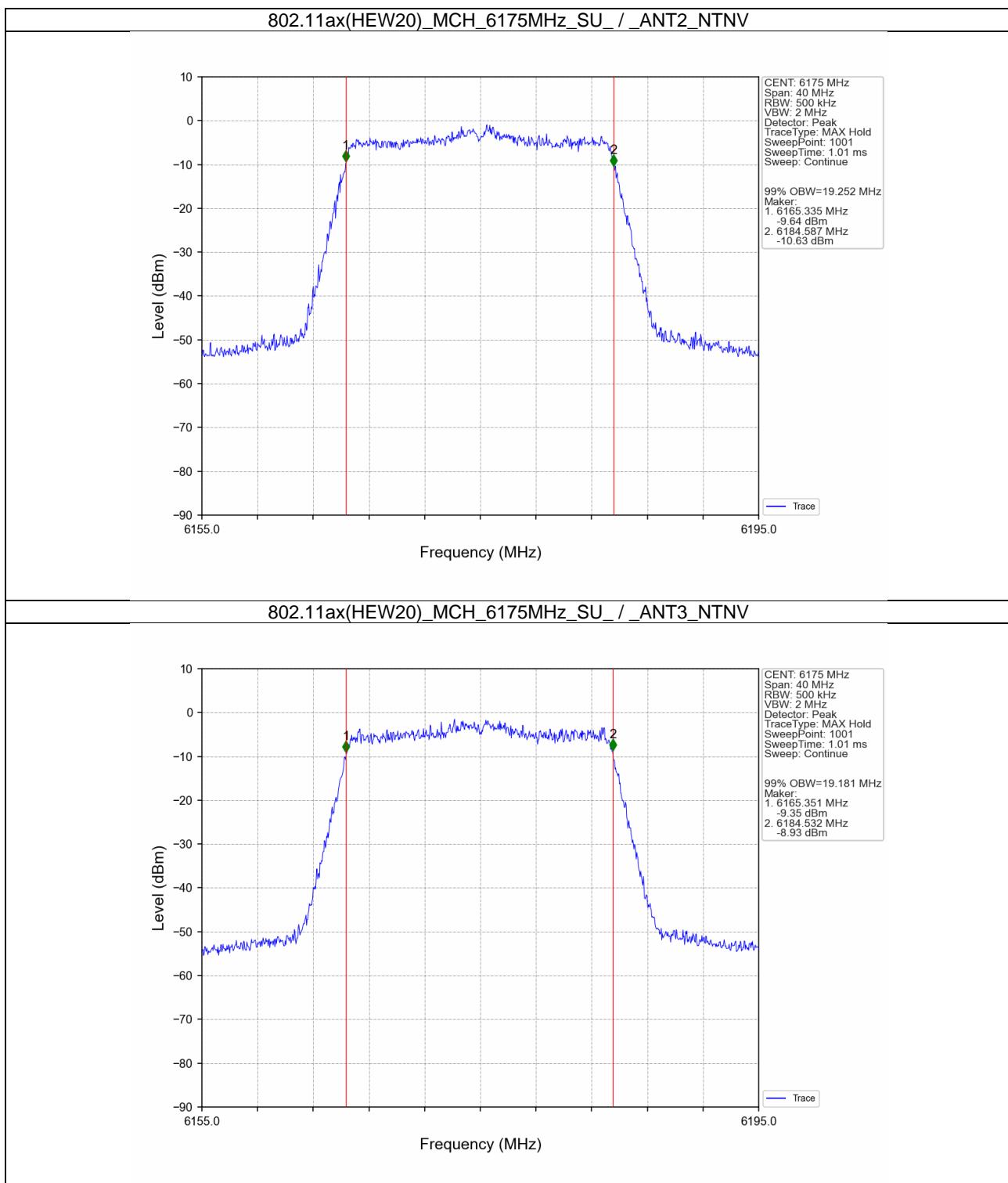
2.1.12 26dB BW

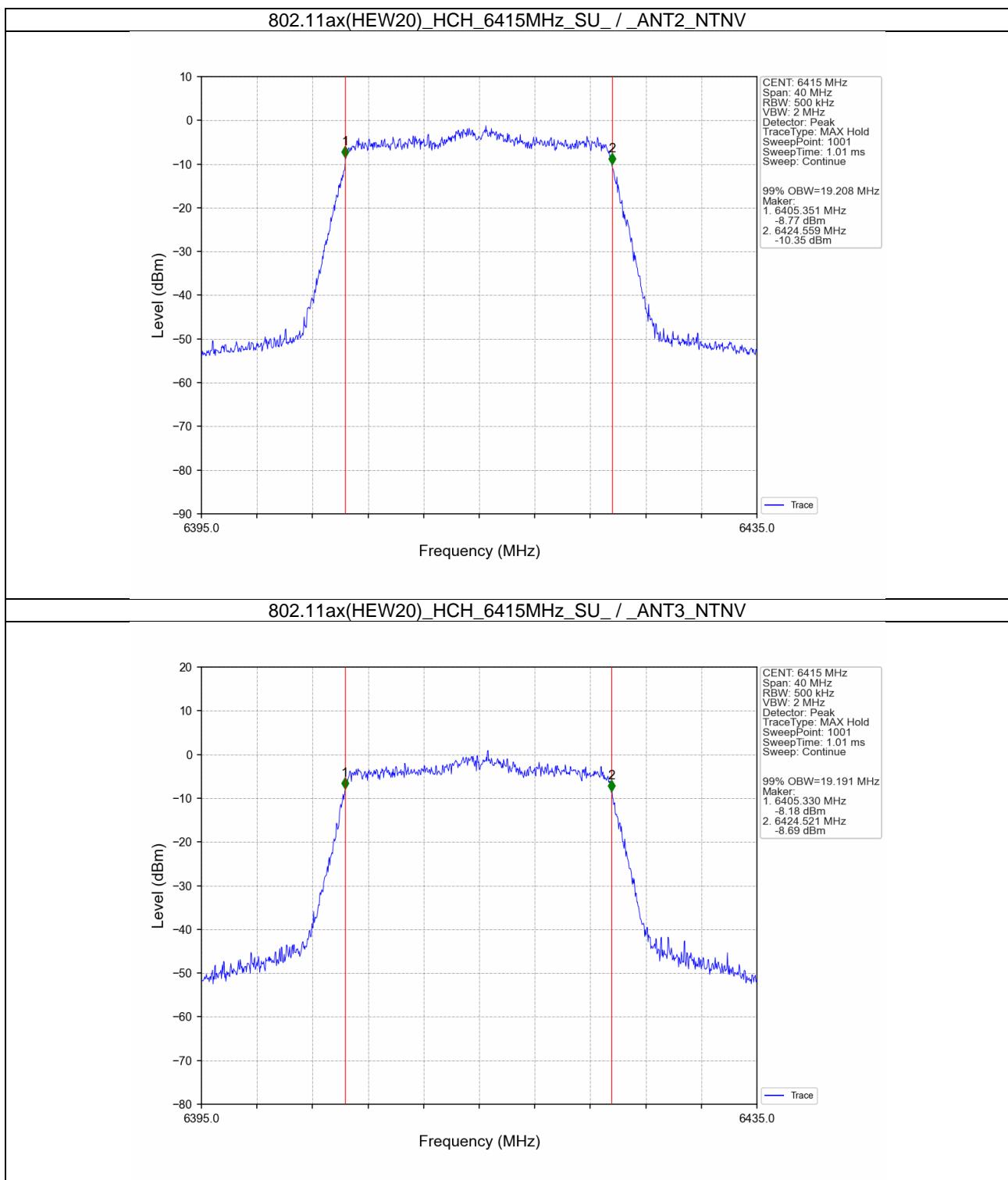
ENV	Mode	TX Type	Frequency (MHz)	RU	RU Pos	ANT	26dB Bandwidth (MHz)		Verdict
							Result	Limit	
NTNV	802.11ax (HEW40)	MIMO	6525	SU	/	1	44.475	/	Pass
						2	44.067	/	Pass
	802.11ax (HEW80)	MIMO	6545	SU	/	1	90.002	/	Pass
						2	88.302	/	Pass

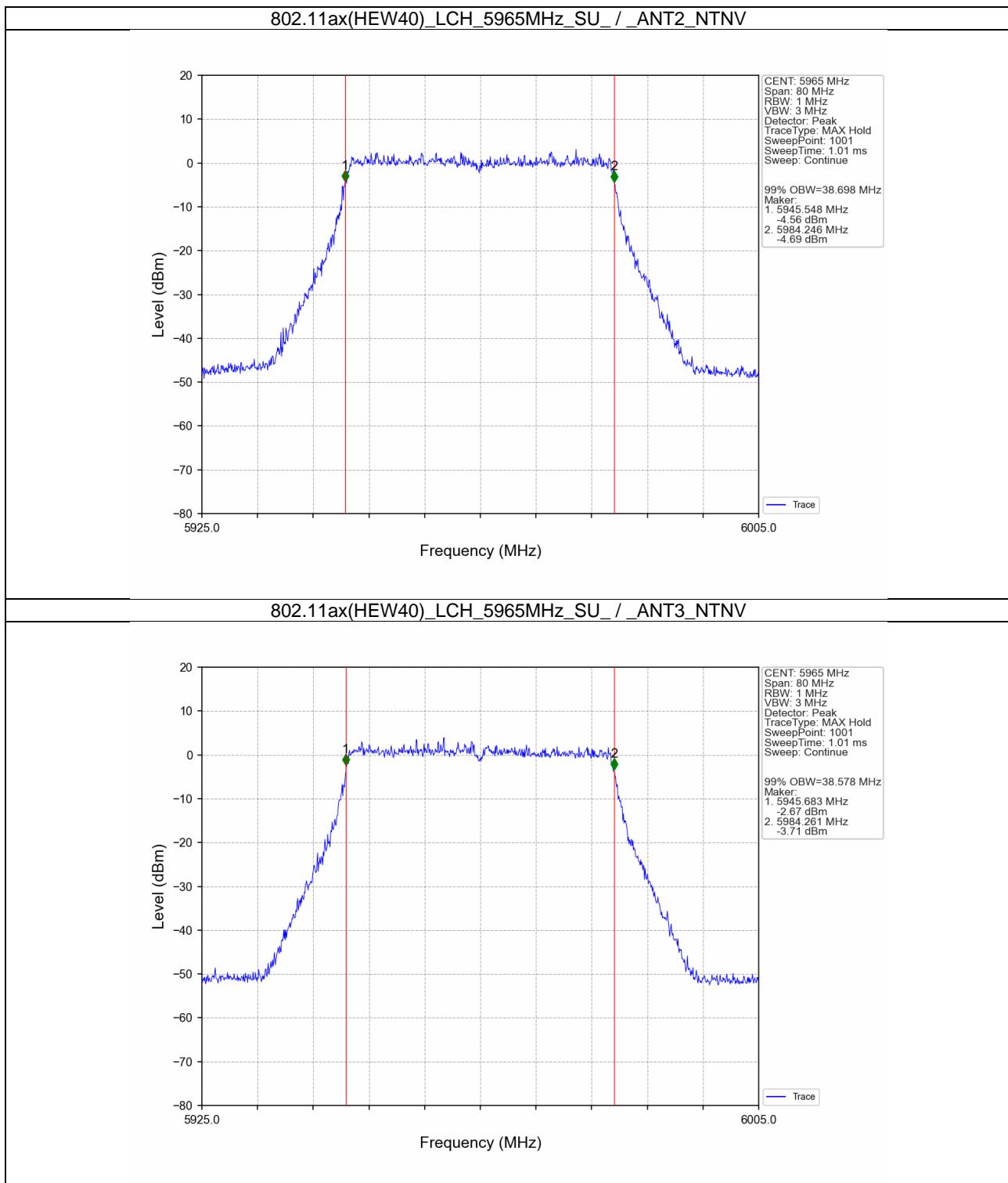
2.2 Test Graph

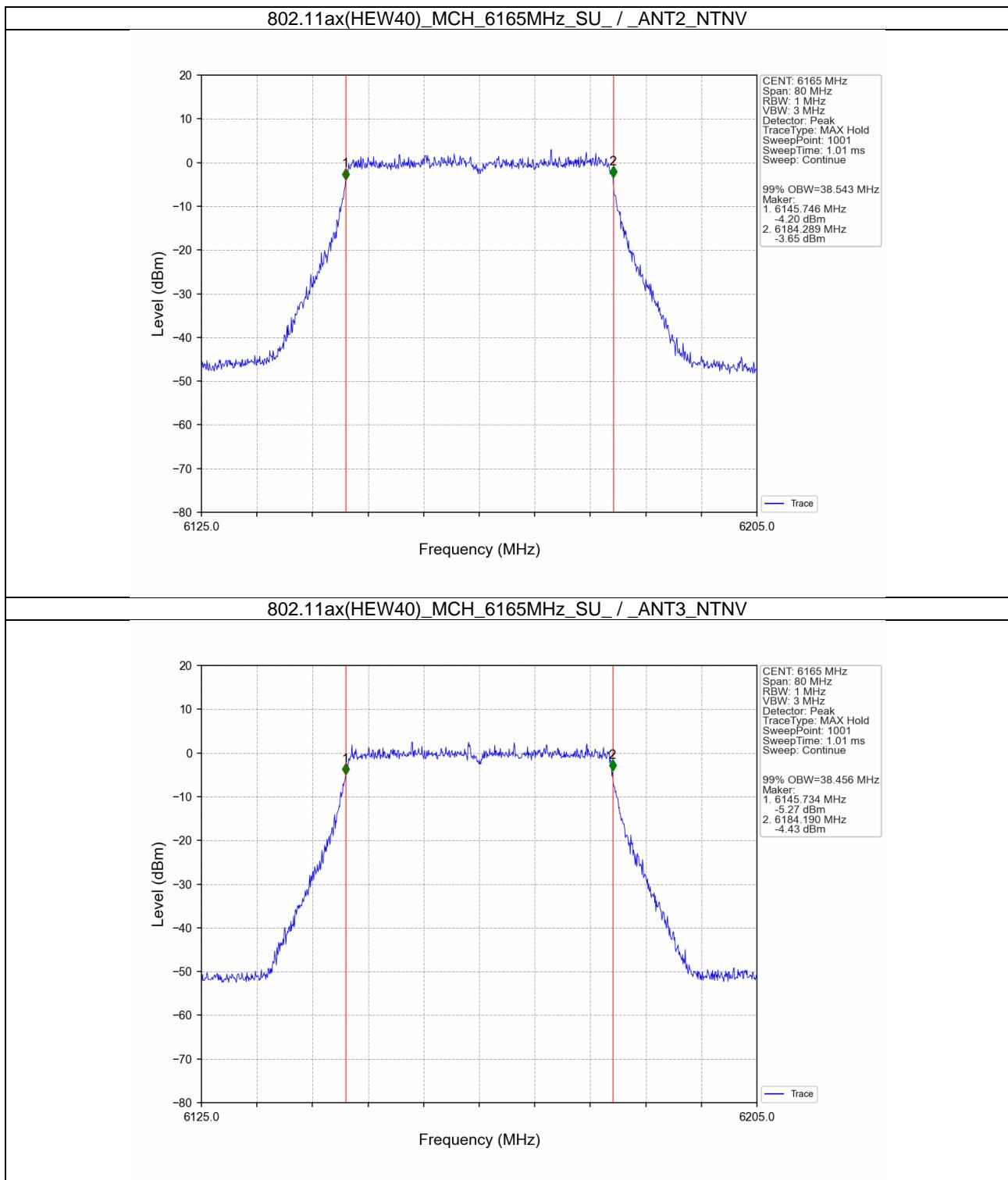
2.2.1 OBW

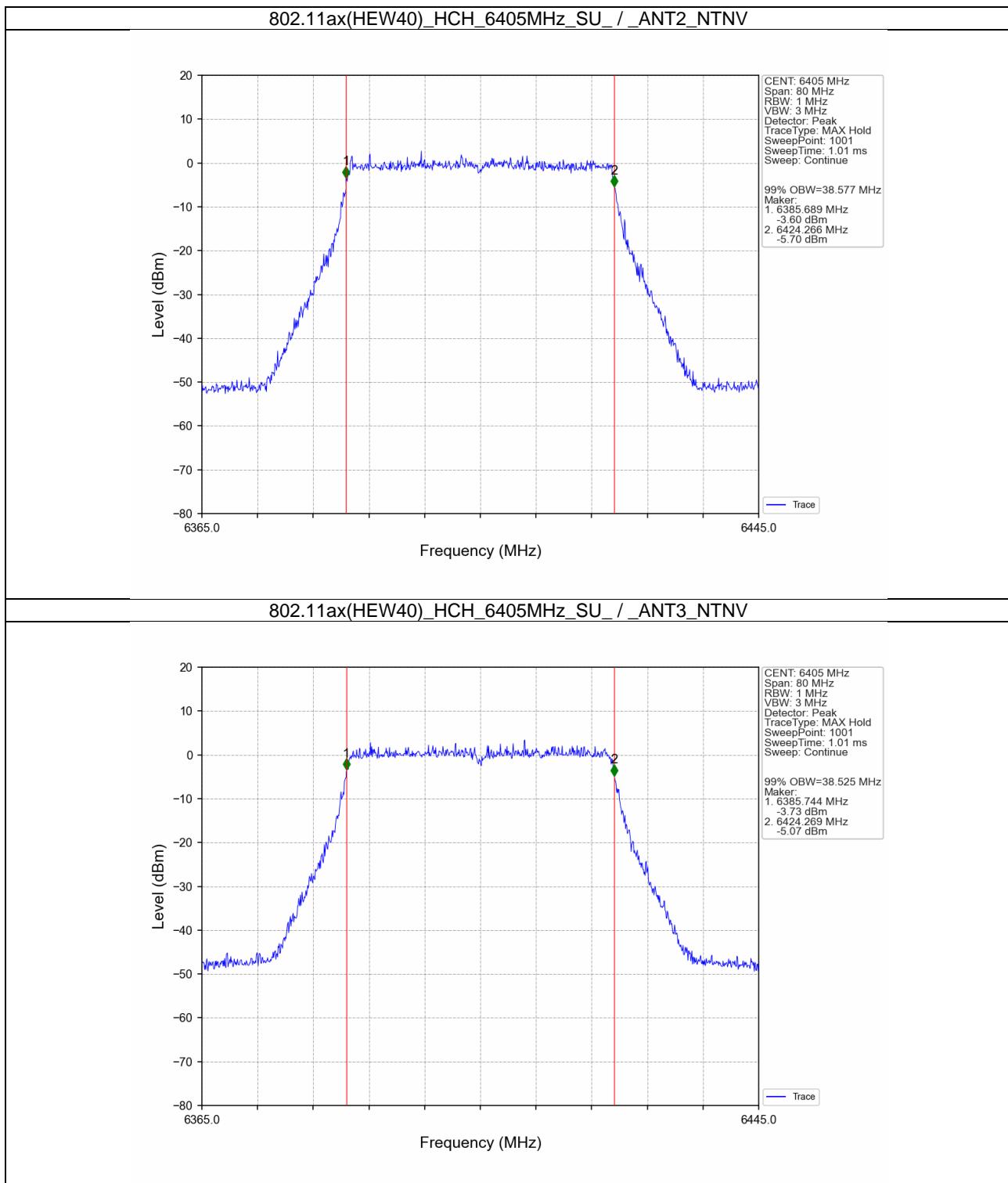


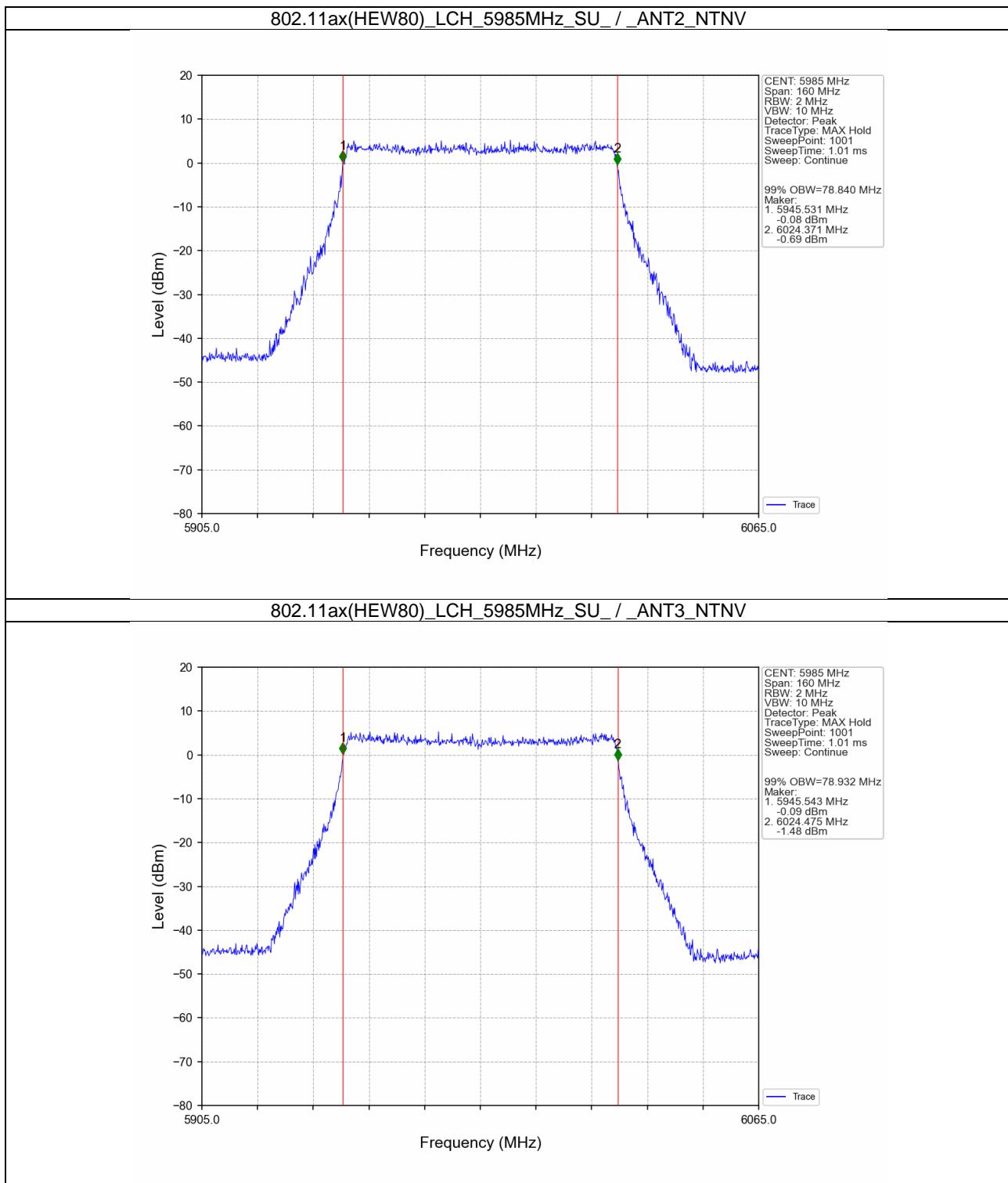


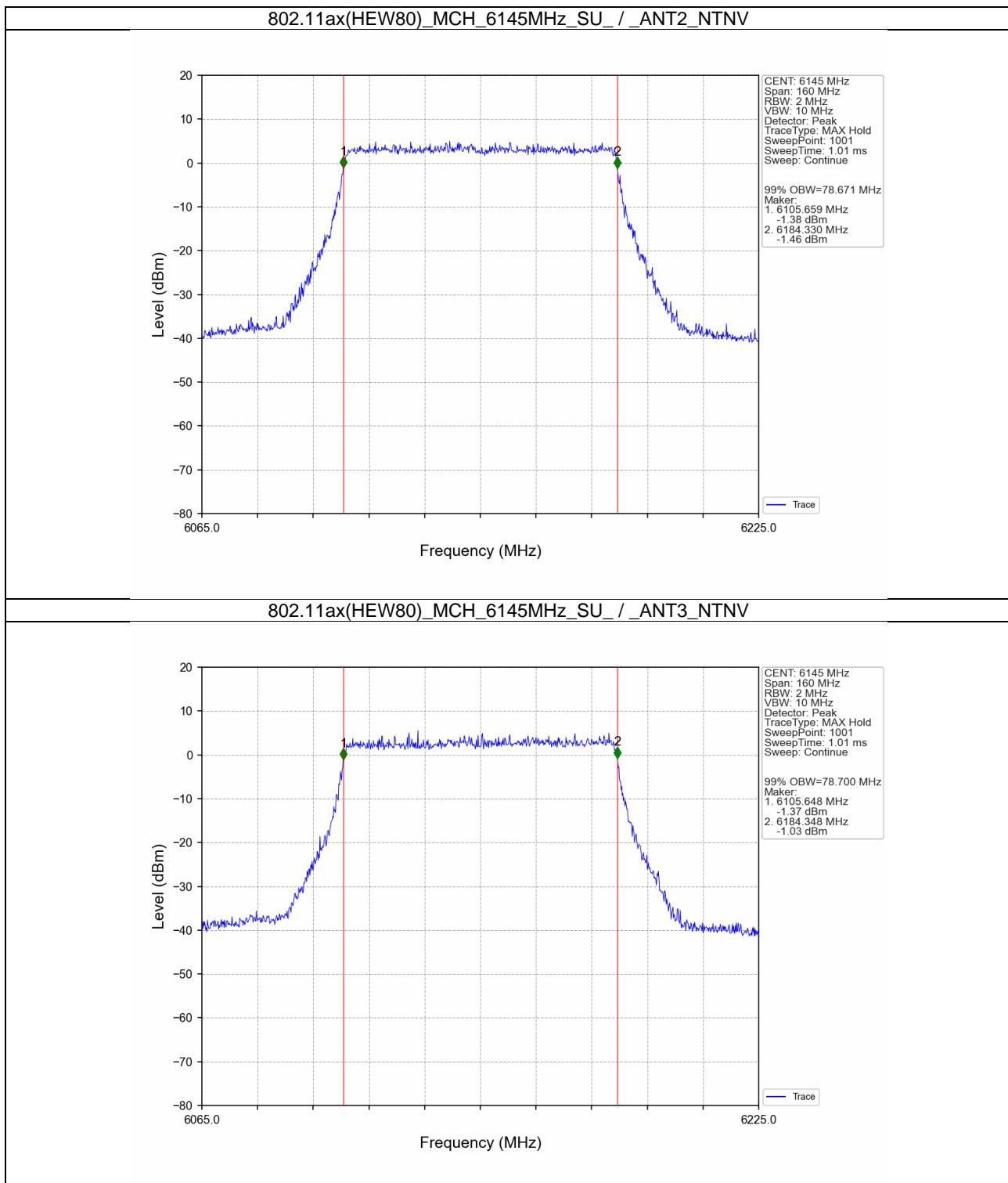


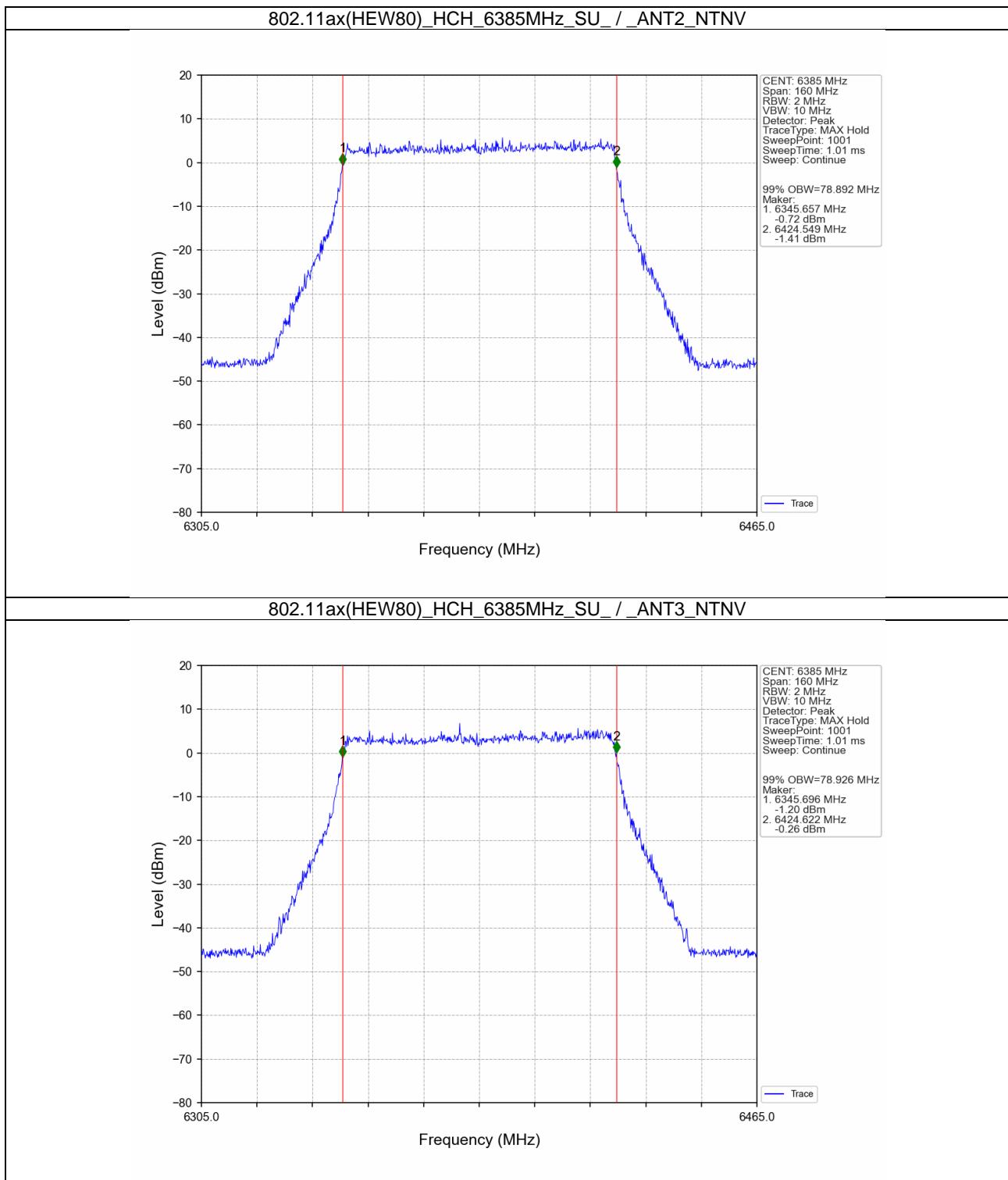




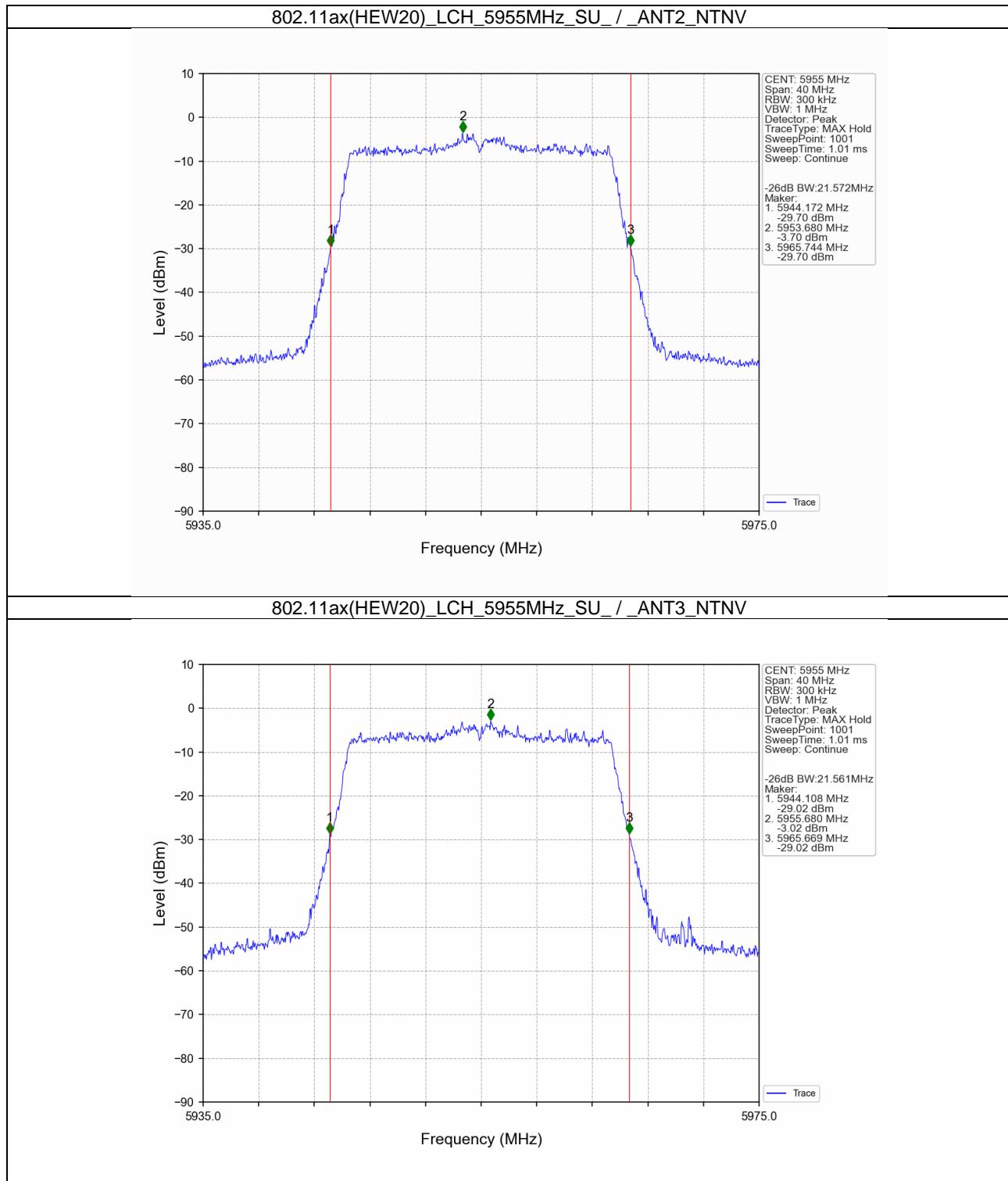


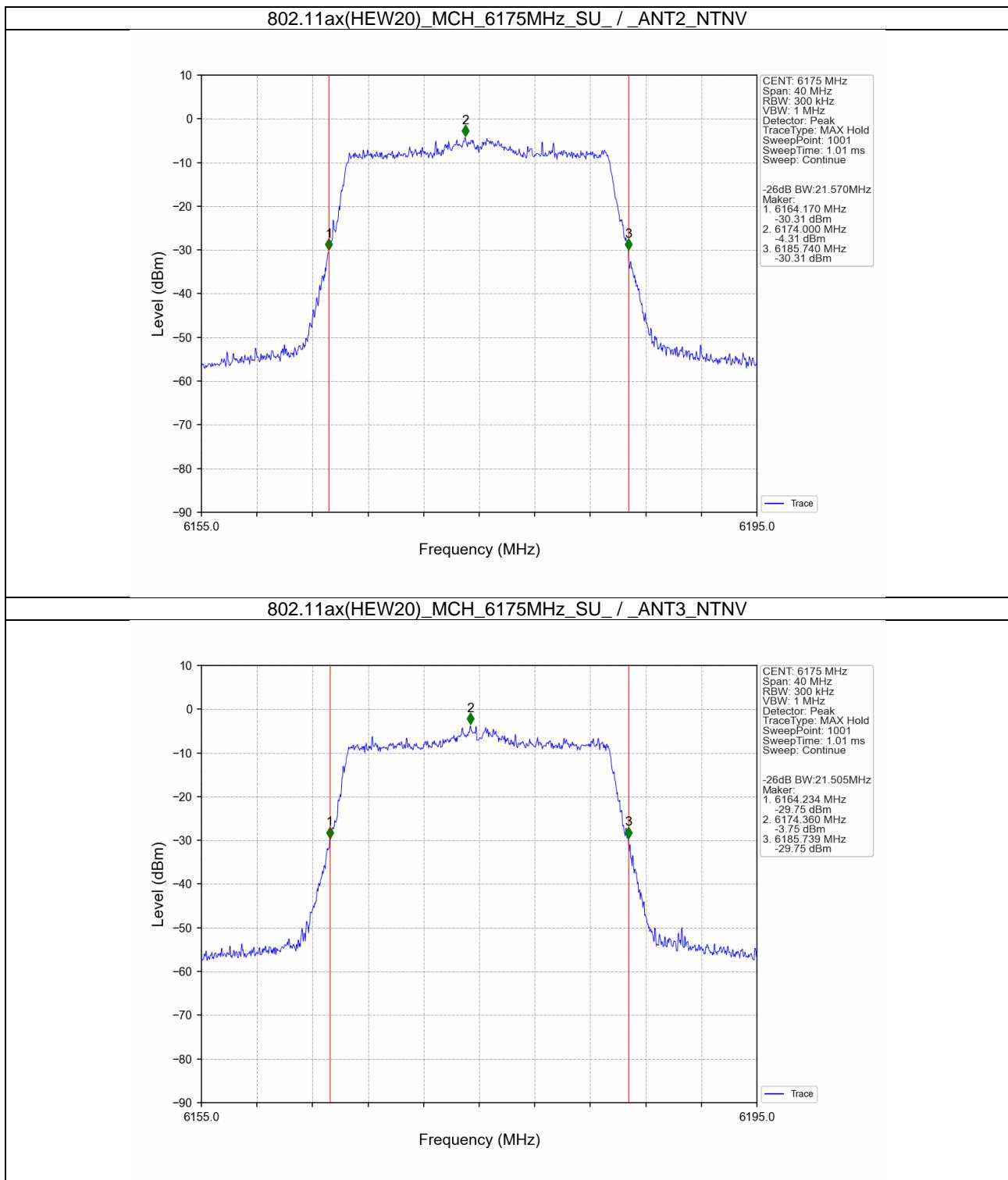


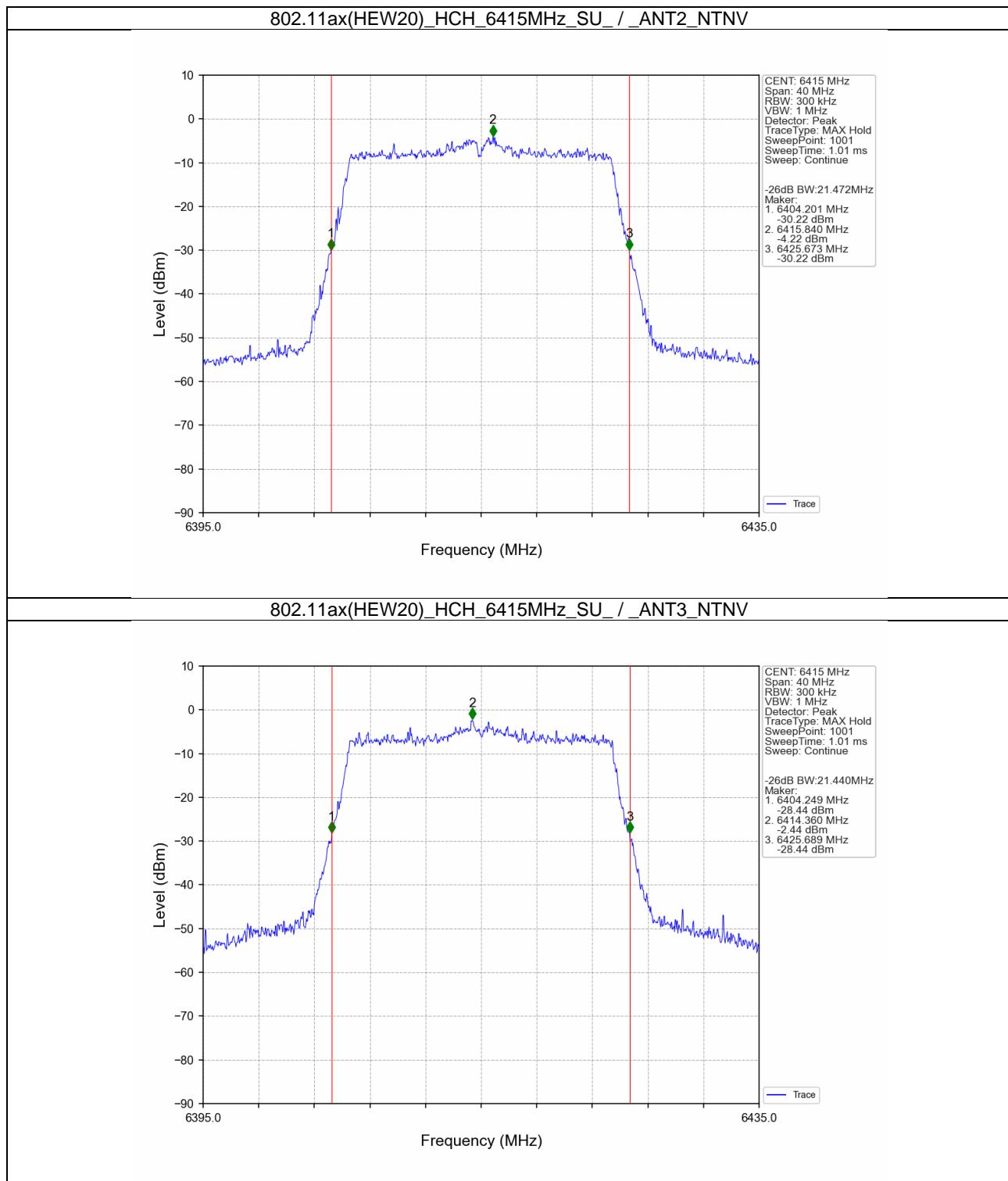


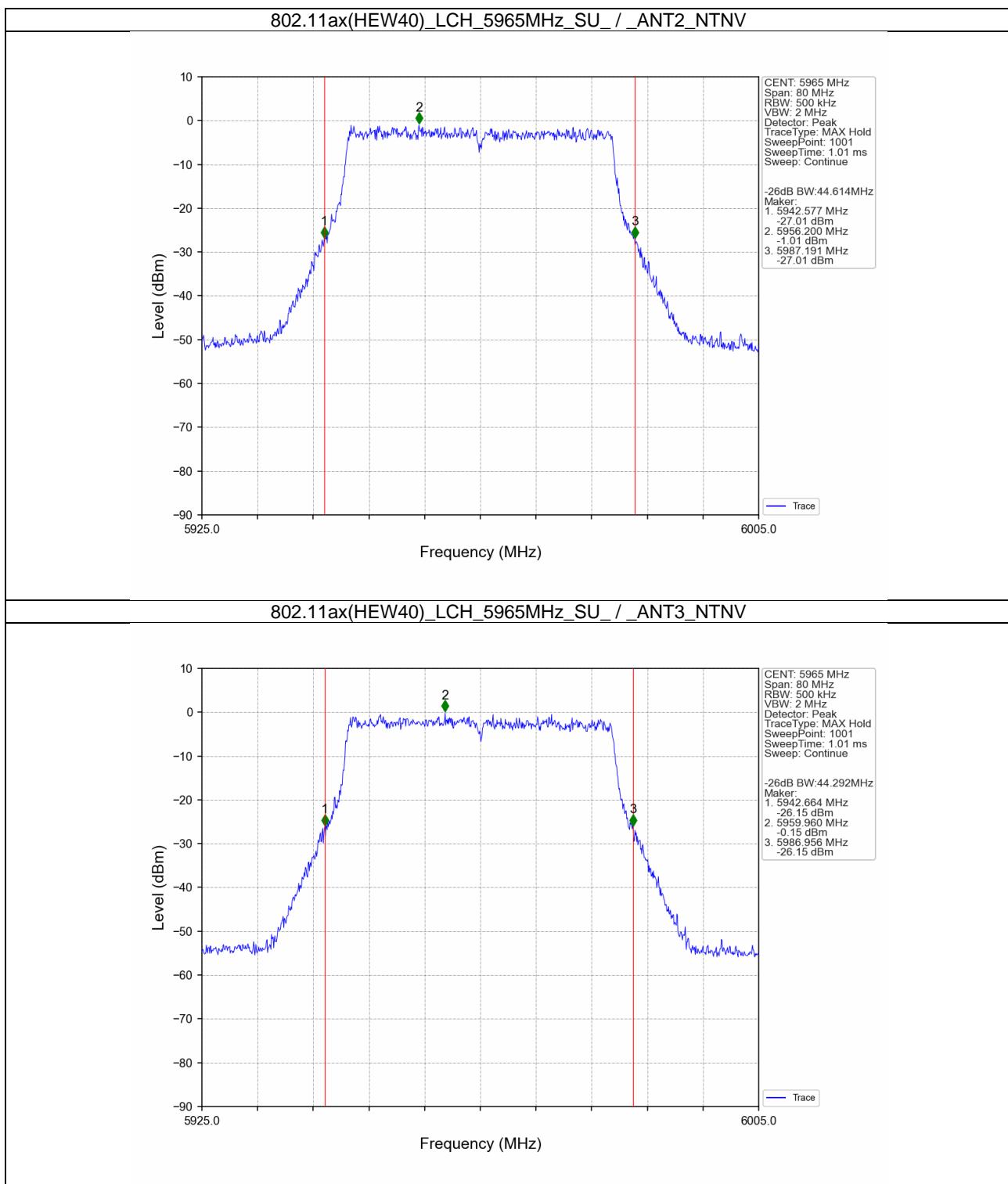


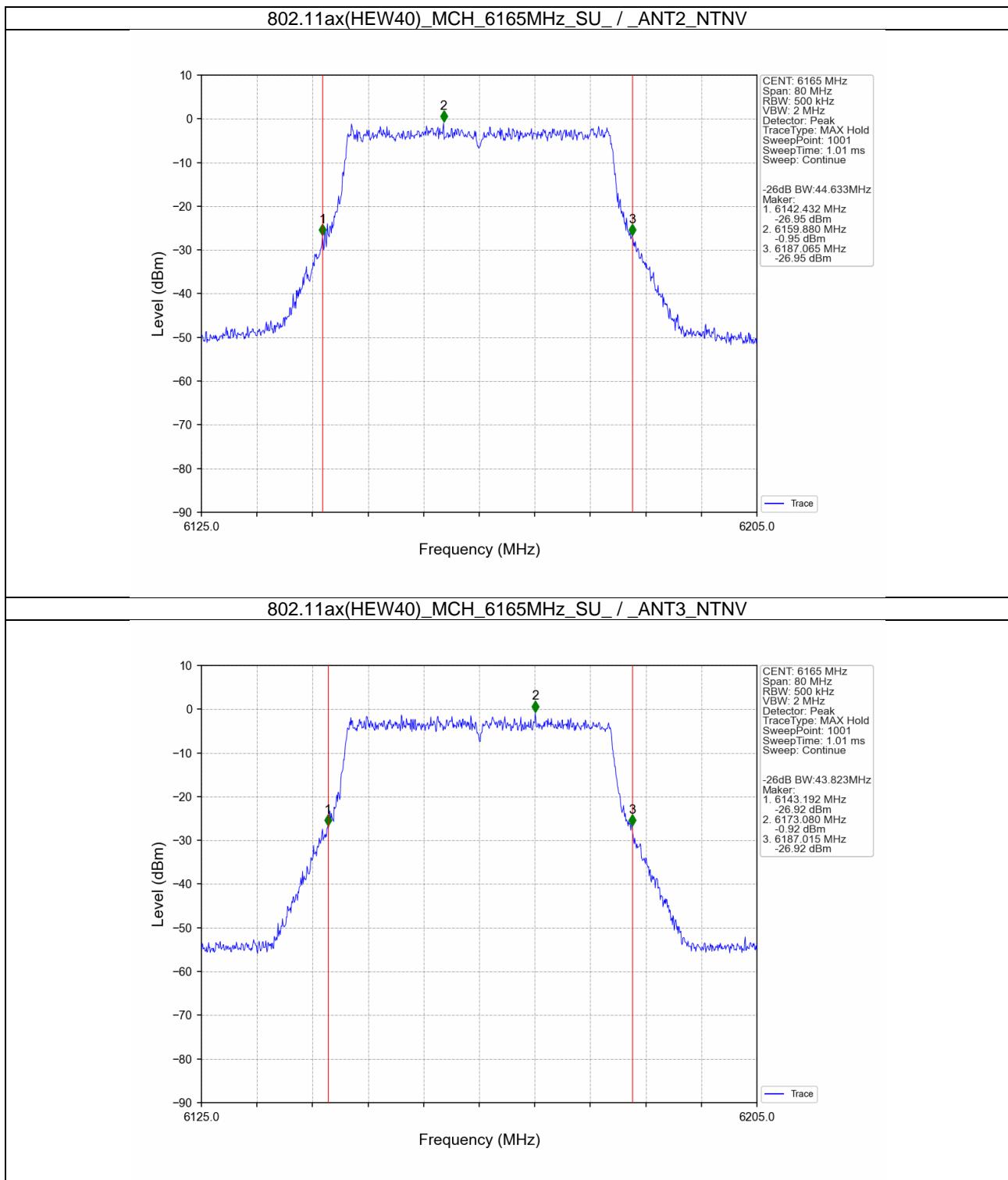
2.2.2 26dB BW

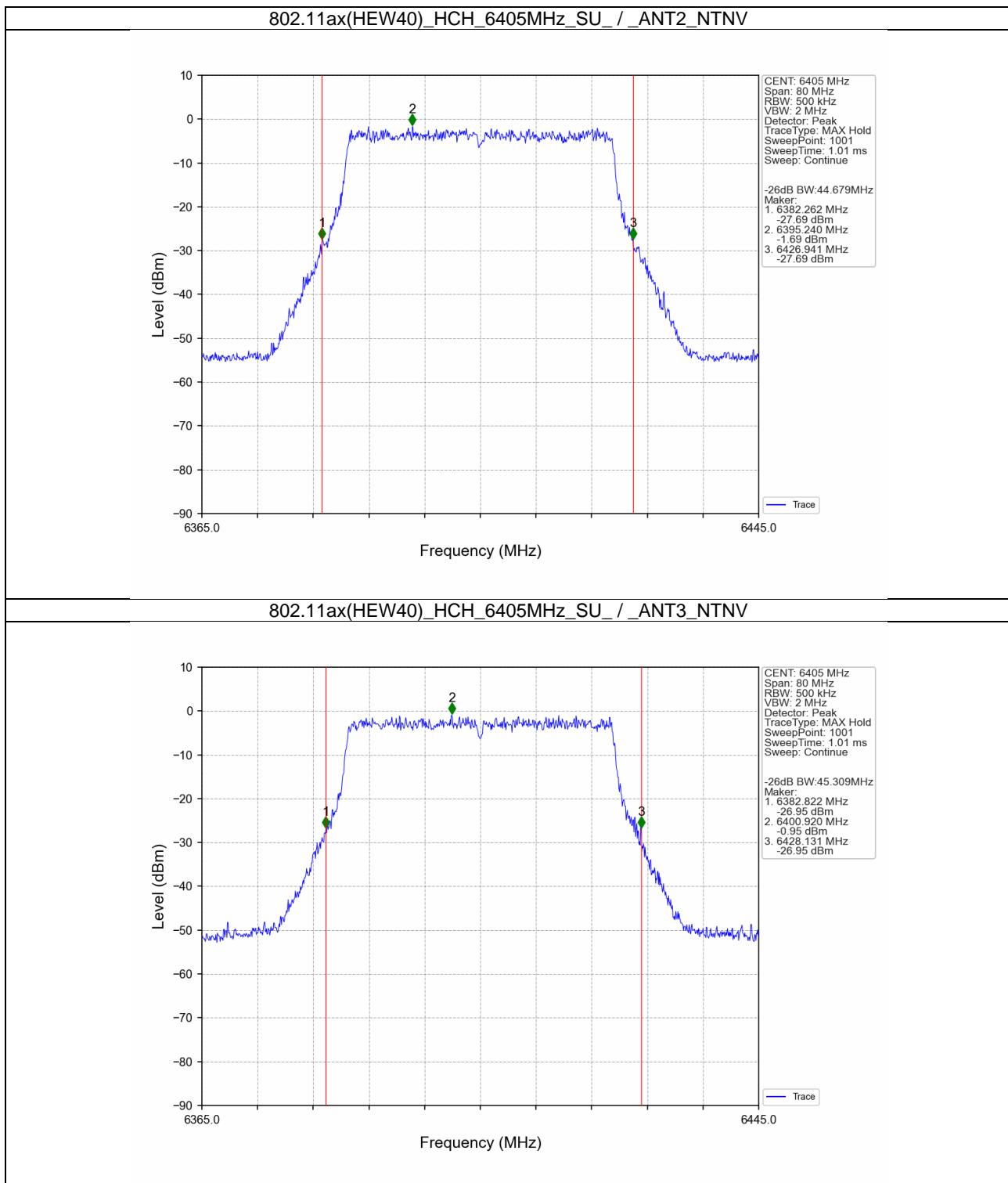


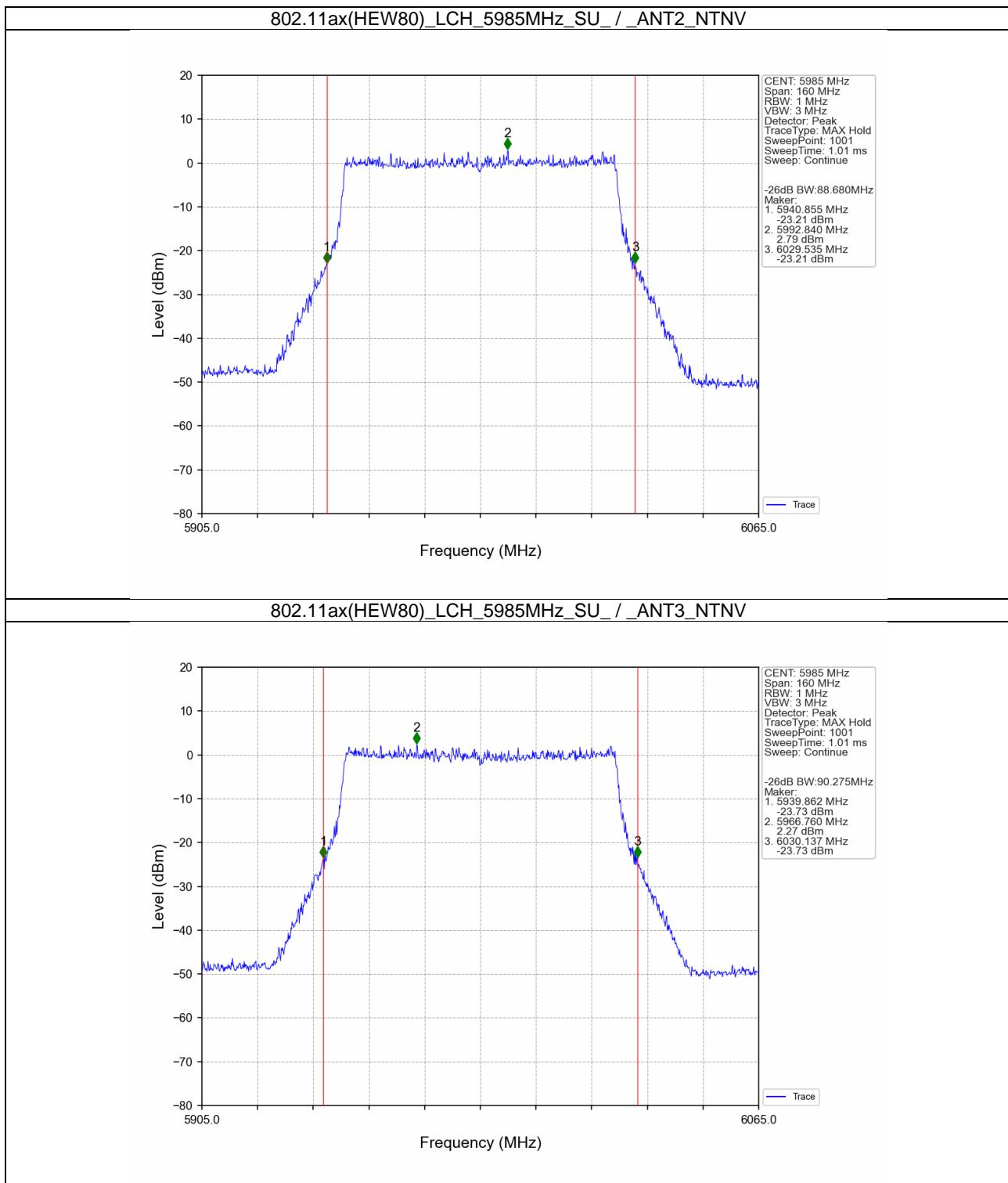


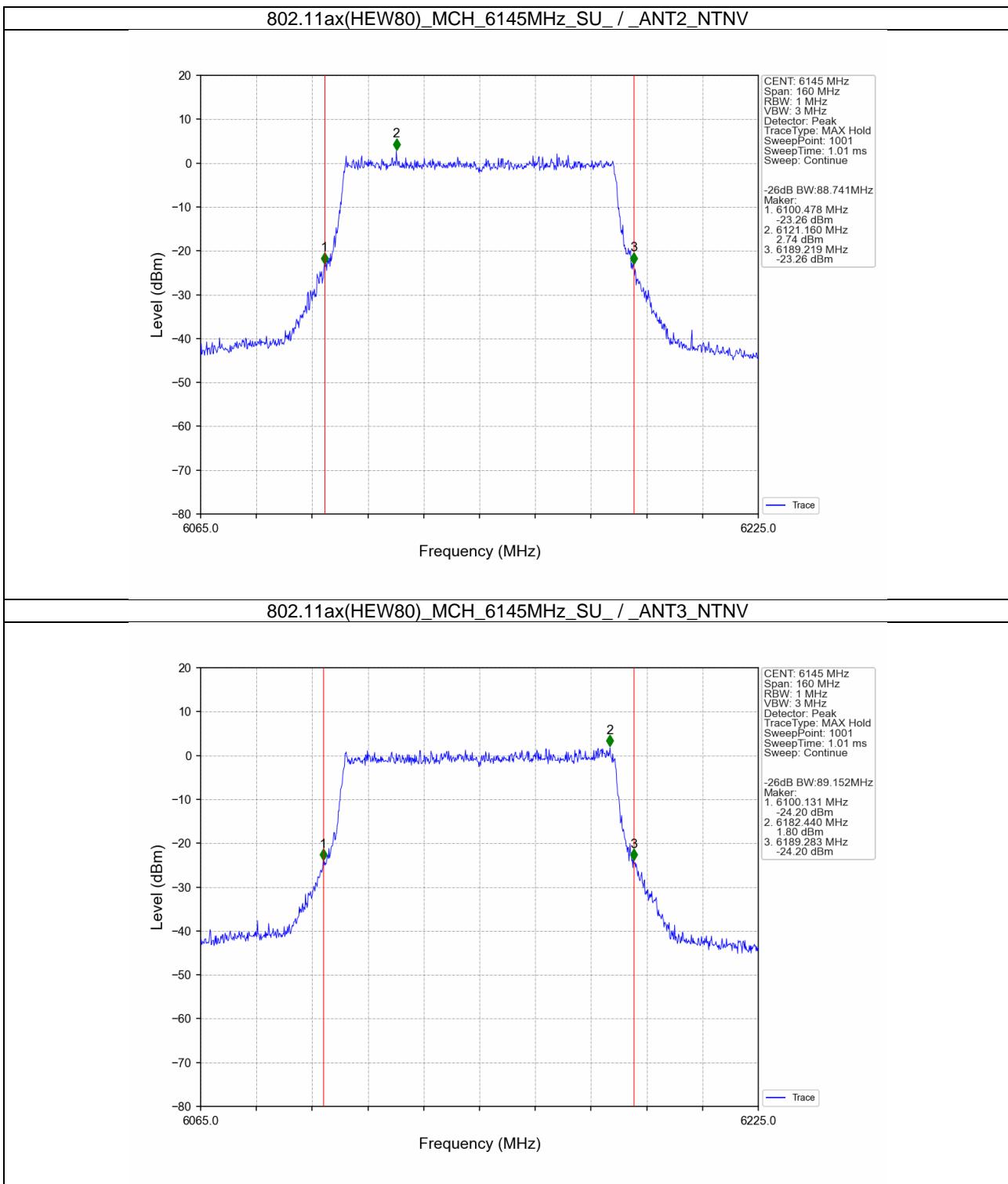


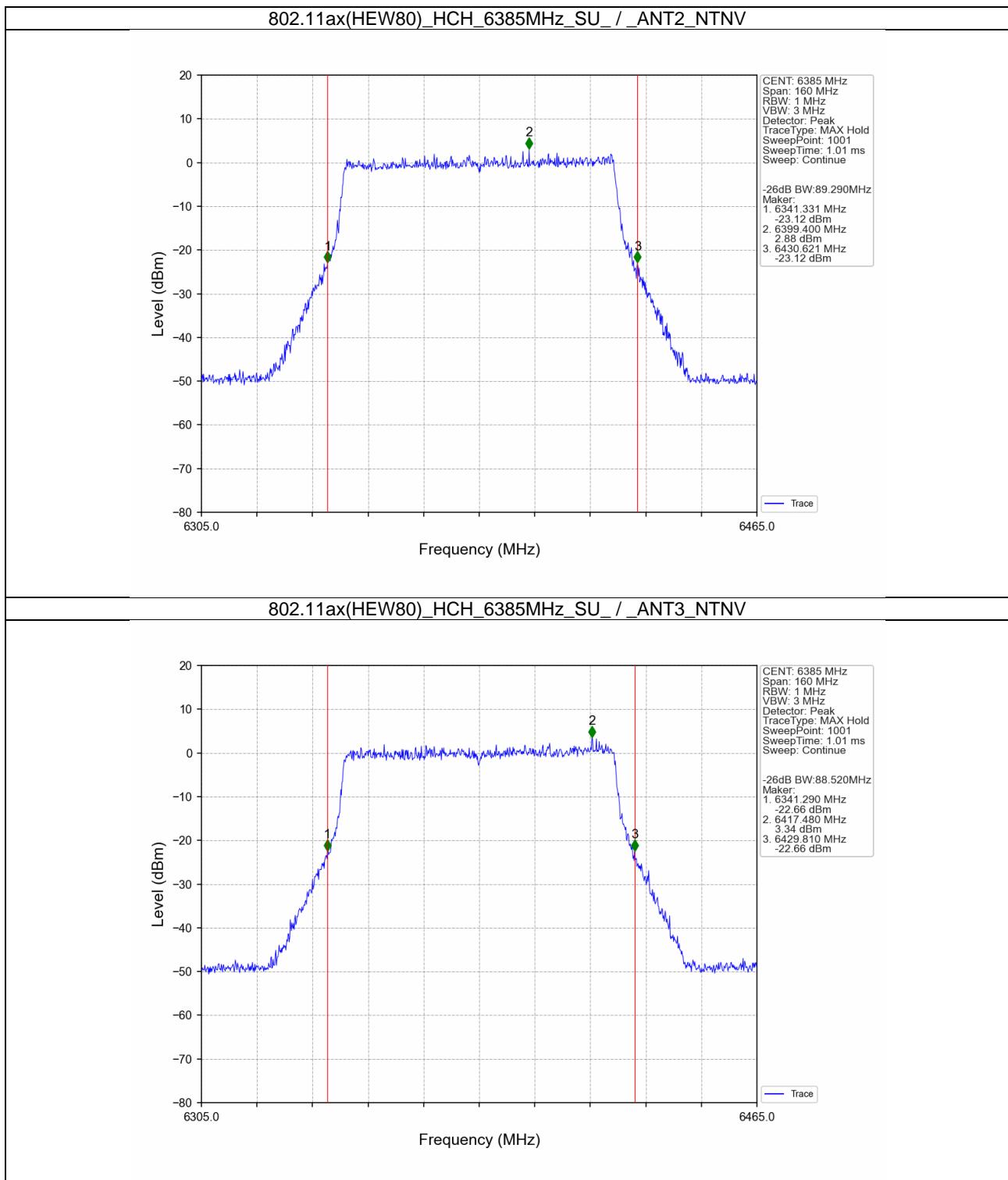




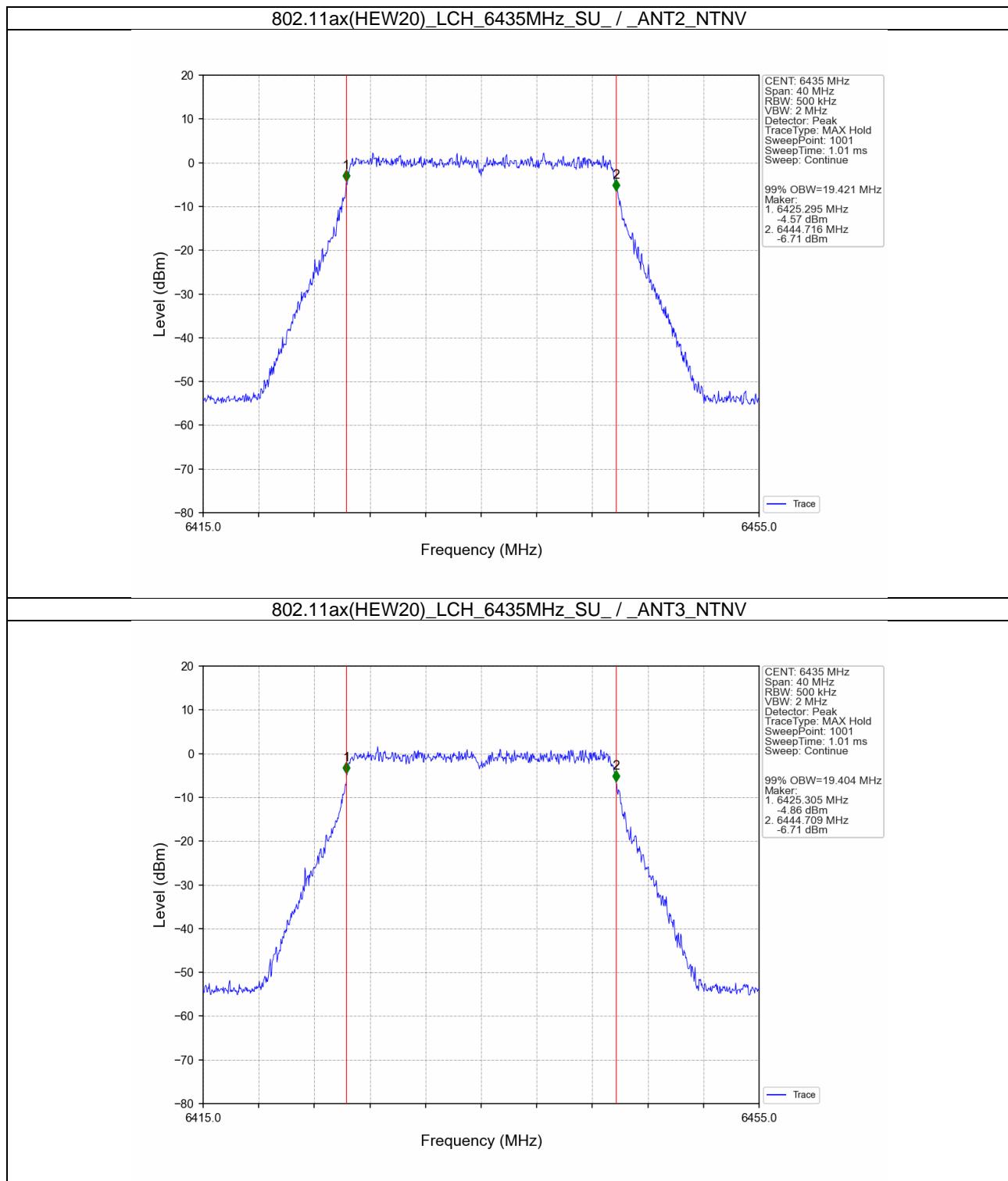


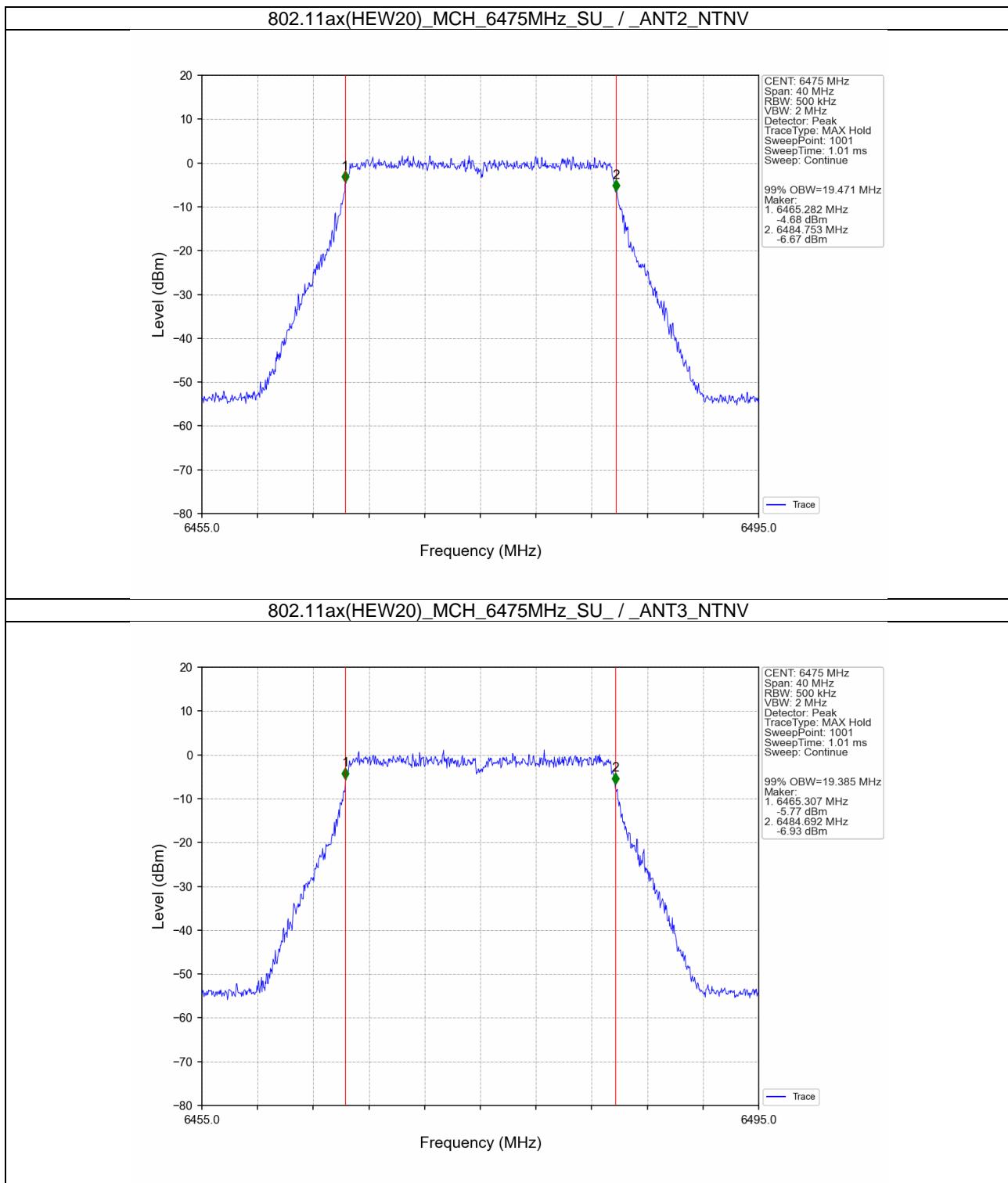


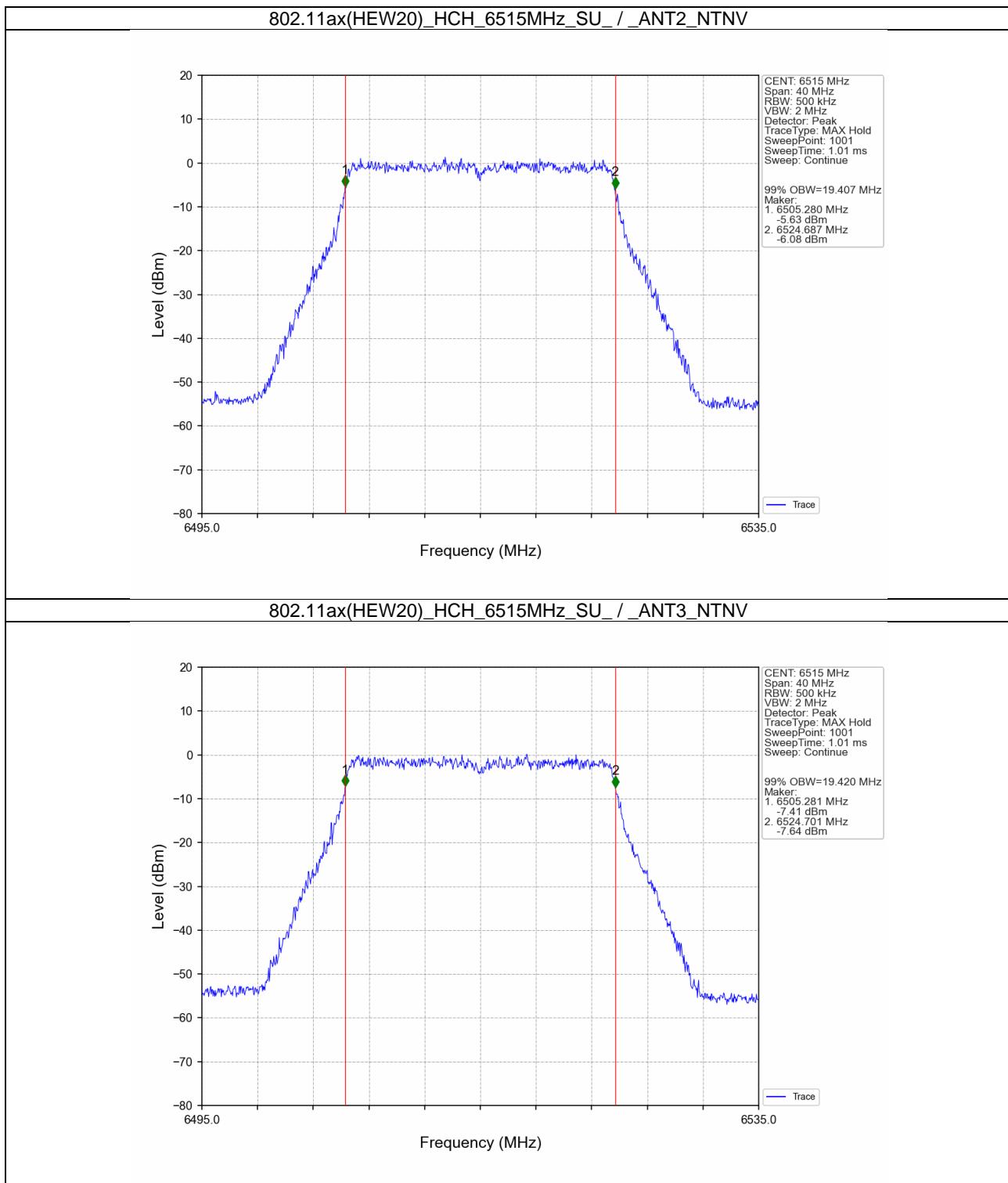


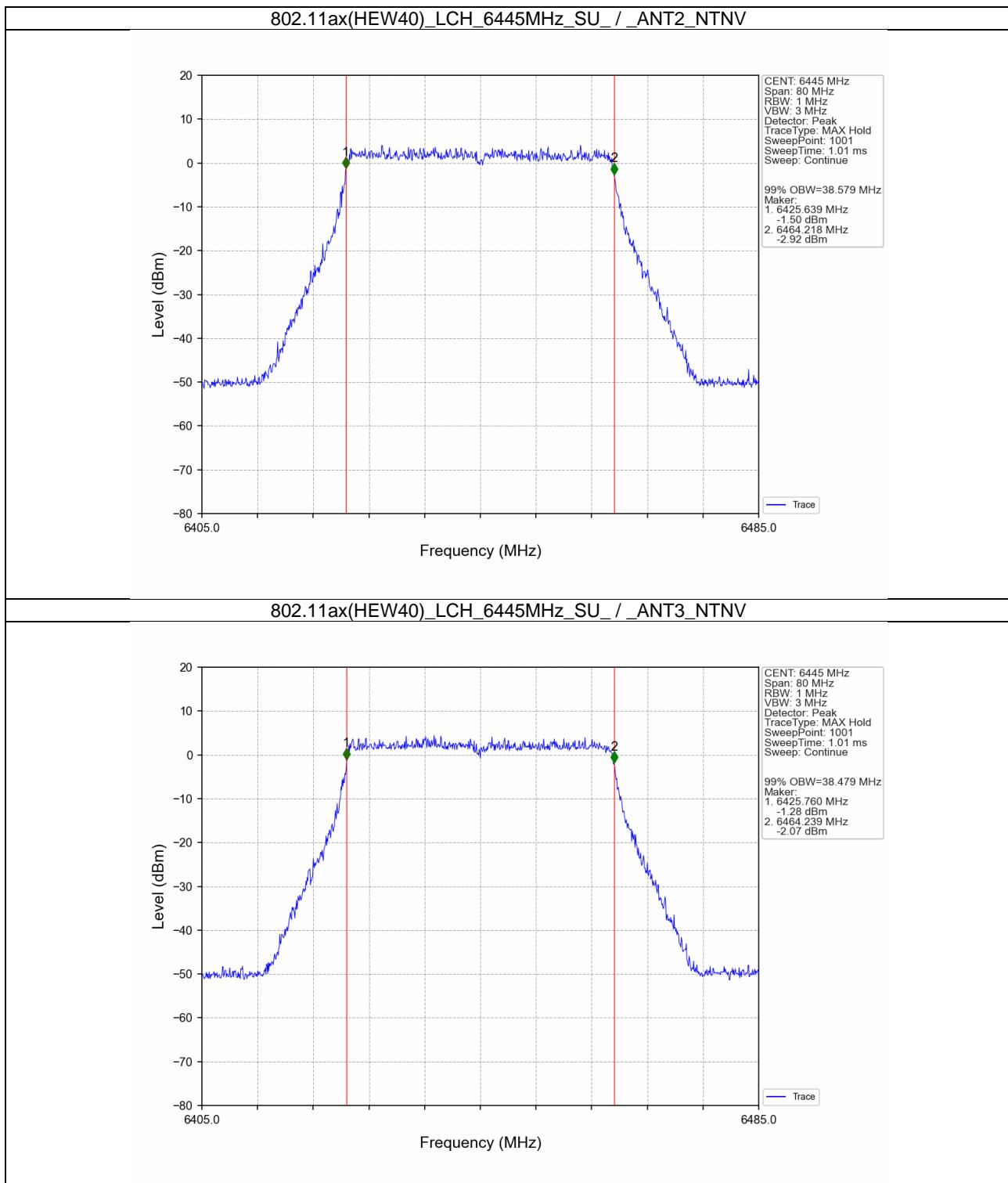


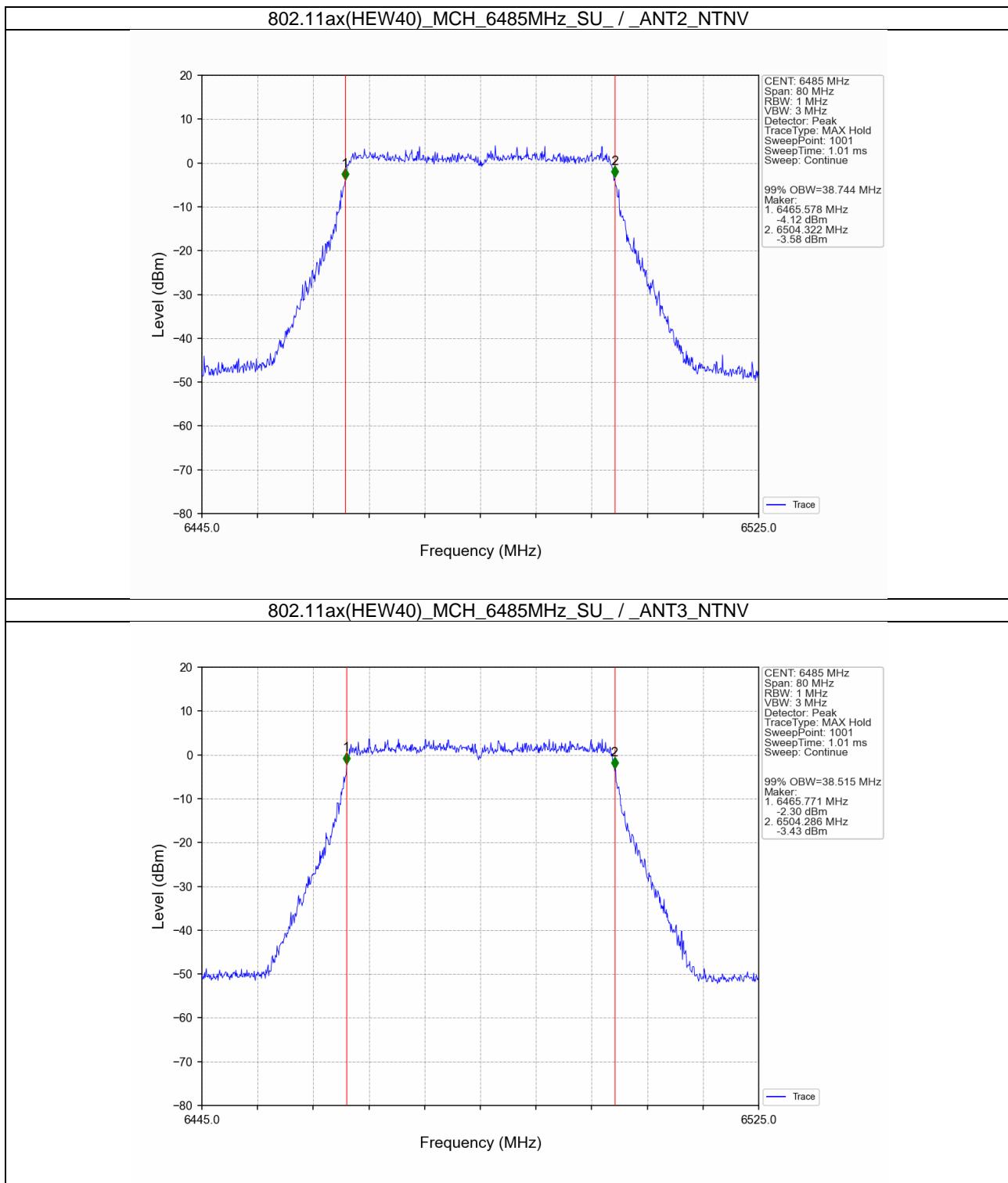
2.2.3 OBW

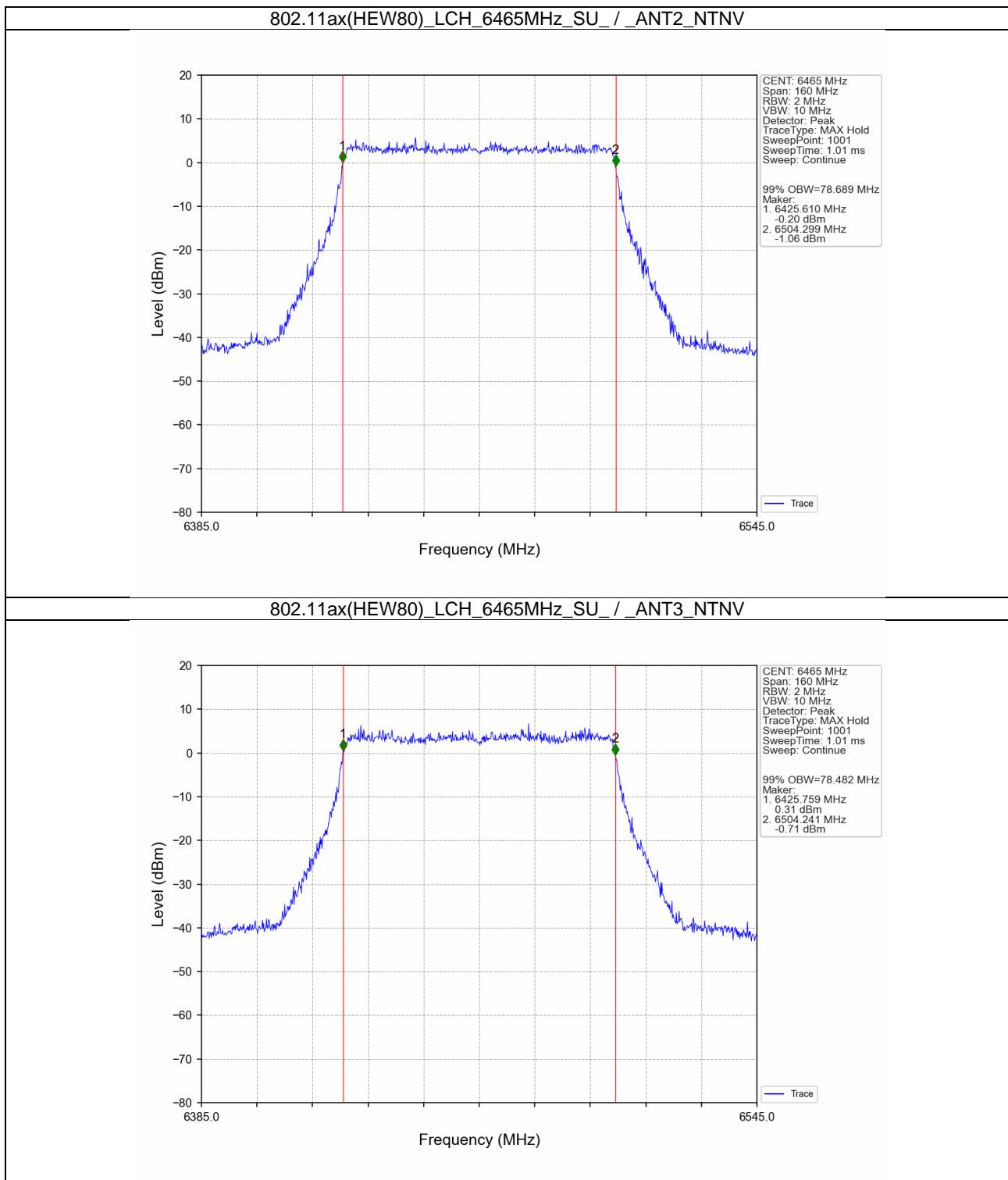




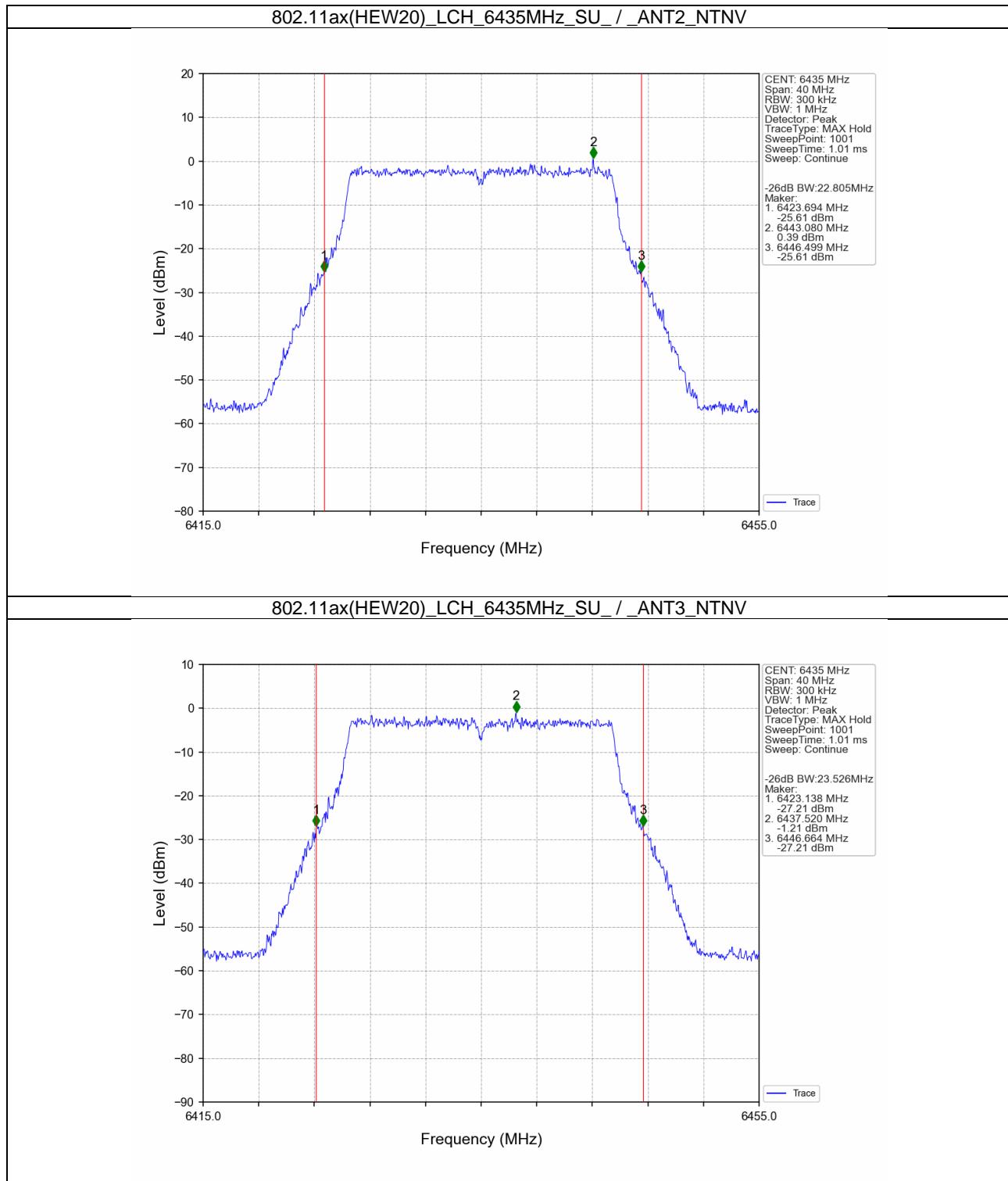


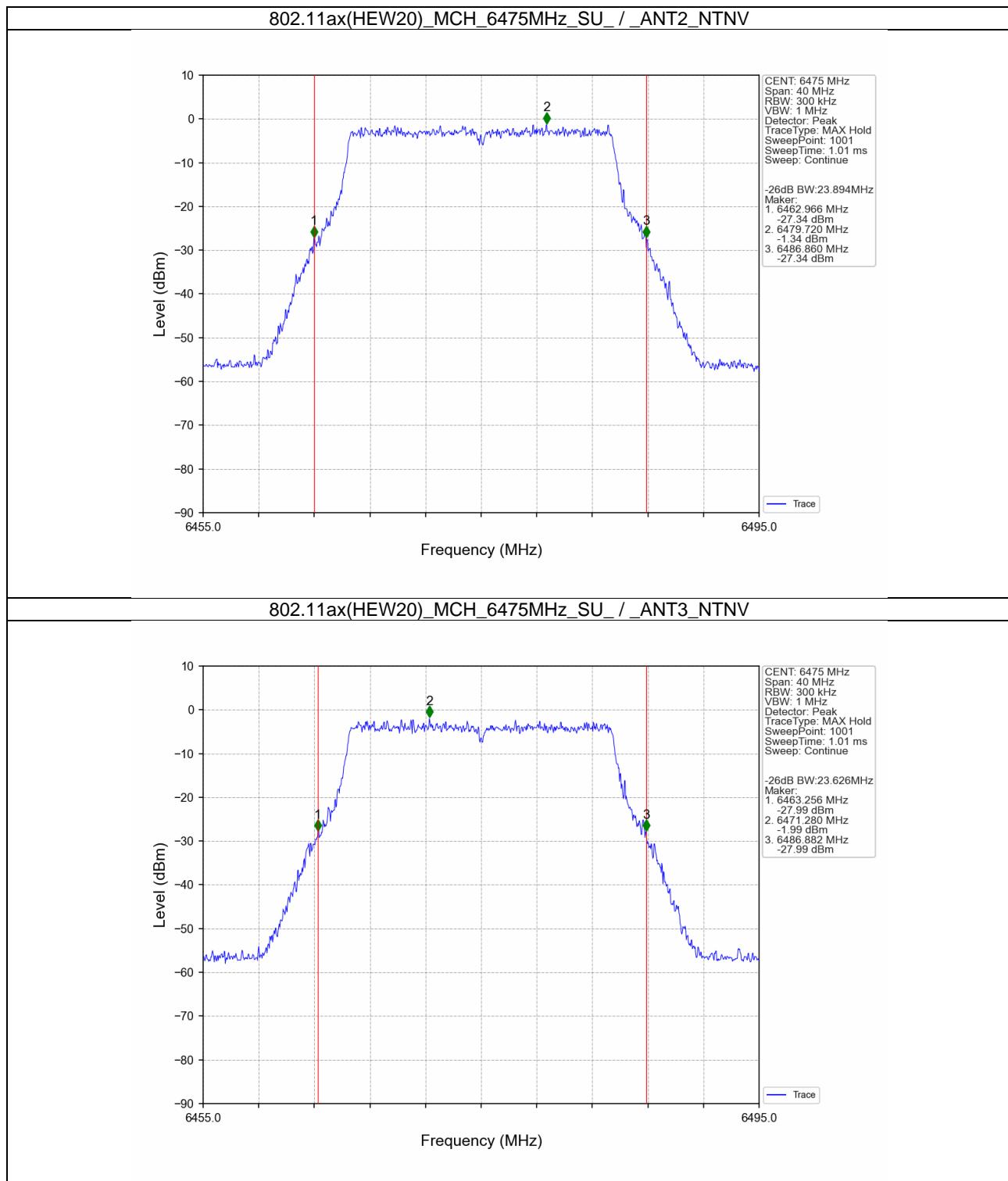


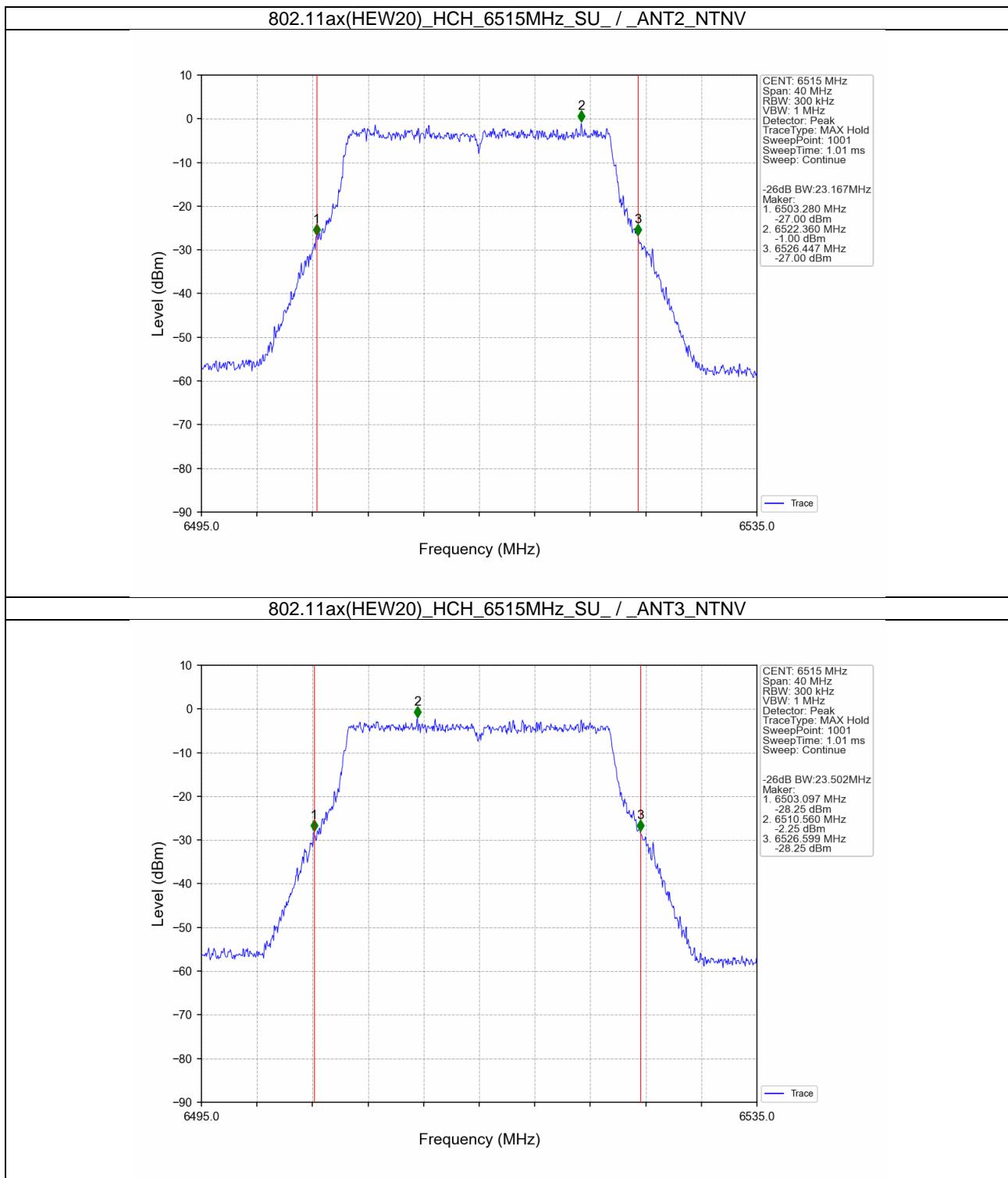


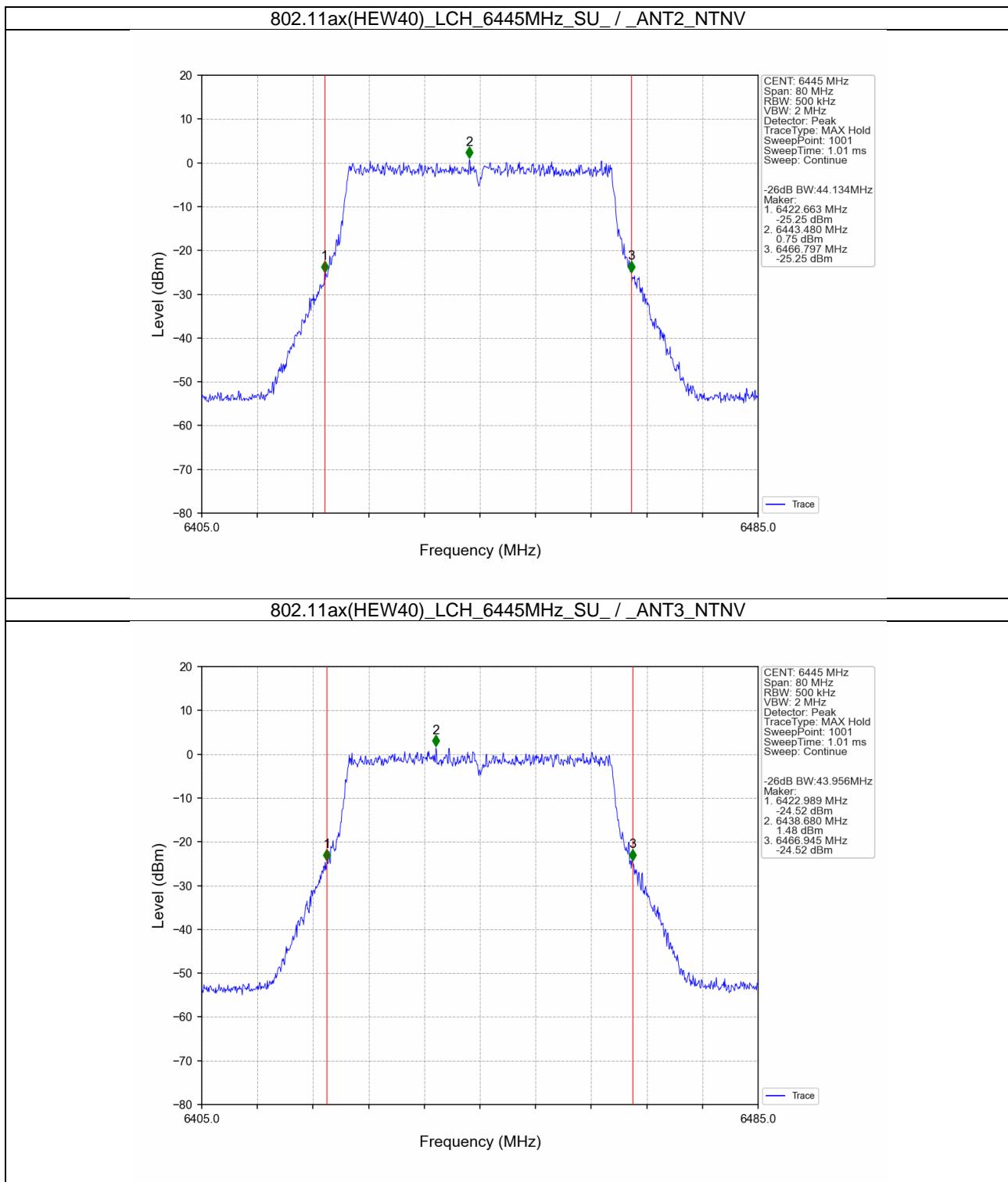


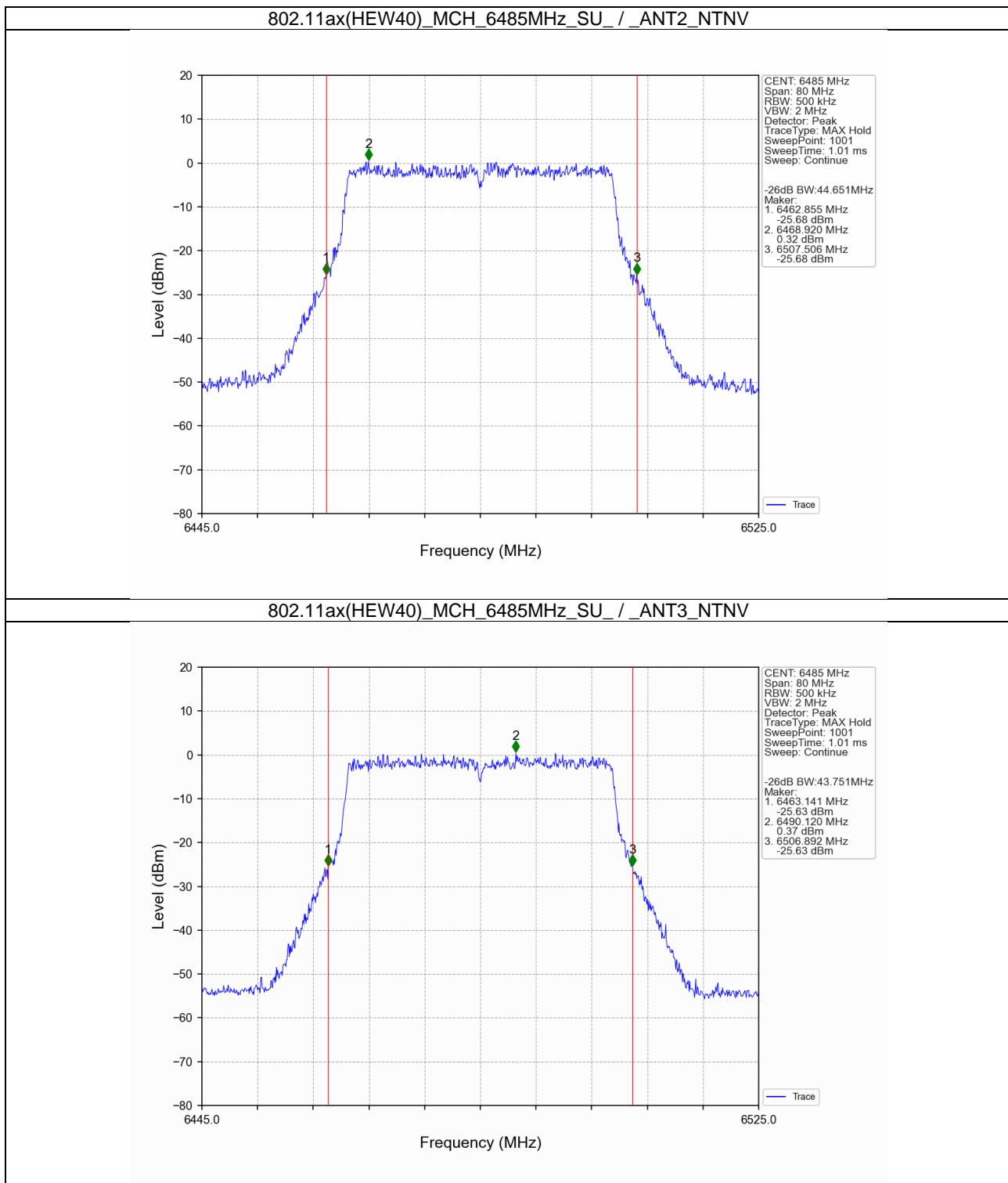
2.2.4 26dB BW

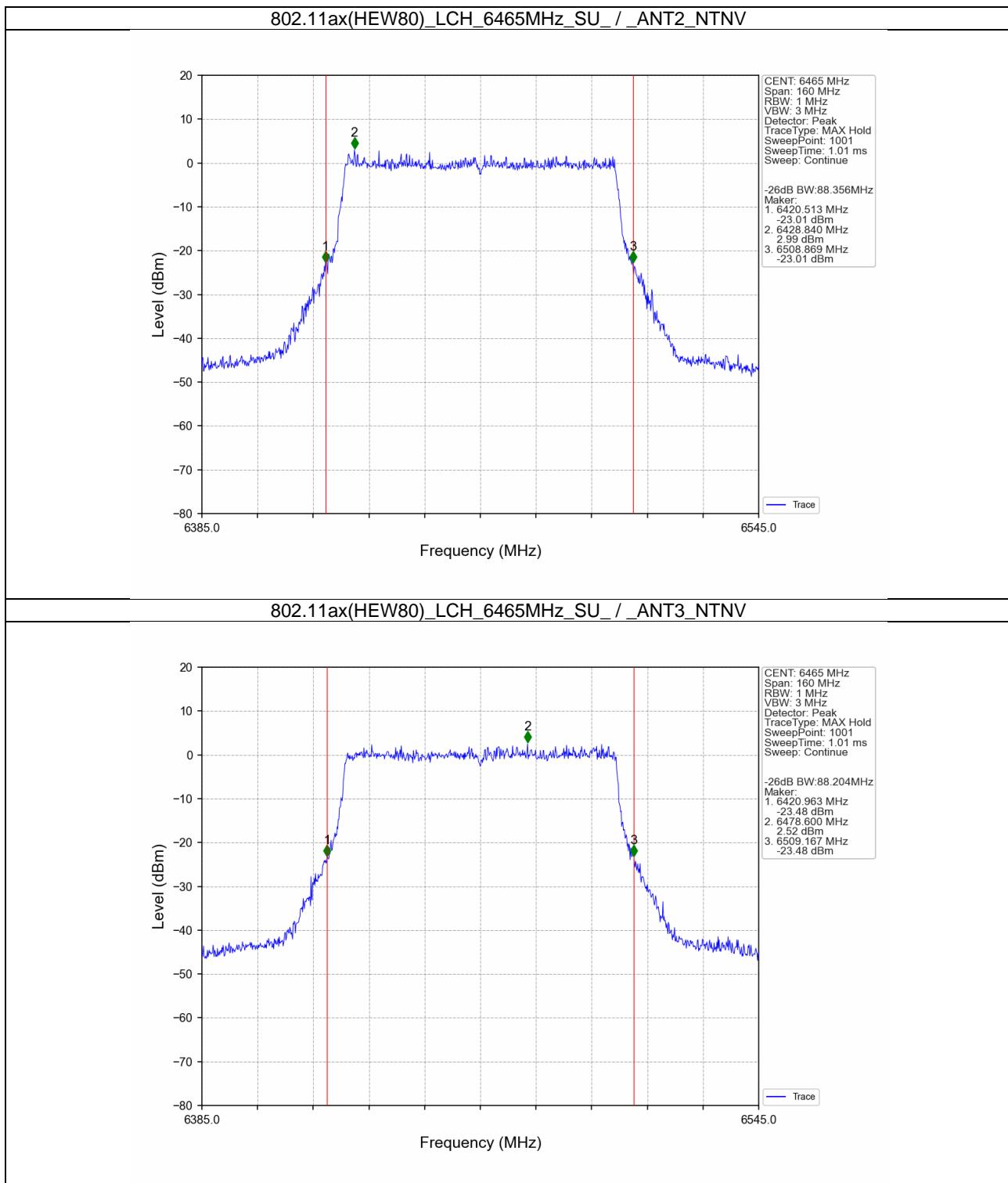












2.2.5 OBW

