

FCC TEST REPORT

(Part 15, Subpart E)

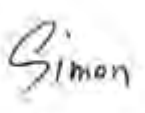
Applicant:	MUNIC
Address:	100 Avenue de Stalingrad 94800 Villejuif – France

Manufacturer or Supplier:	MUNIC
Address:	100 Avenue de Stalingrad 94800 Villejuif – France
Product:	telematics embedded system
Brand Name:	MUNIC
Model Name:	C4D-4G4USAA_V8+
FCC ID:	A6GC4D-4G4USV8
Date of tests:	Nov. 15, 2021 ~ Dec. 21, 2021

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart E, Section 15.407**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
 Date: Dec. 21, 2021	 Date: Dec. 21, 2021

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P21090018RF03	Original release	Dec. 21, 2021

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E		
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT
15.407(b)(6)& 15.207(a)	Conducted Emissions	Compliance
15.407(b) (1/2/3/4/6/7)	Radiated Emission & Band Edge Measurement	Compliance
15.407(a/1/2/3)	Maximum conducted output Power	Compliance
15.407(a/1/2/3)	Peak Power Spectral Density	Compliance
15.407(a)(1/5)	26 dB Bandwidth	Compliance
15.407(e)	6 dB Bandwidth	Compliance
15.203	Antenna Requirement	Compliance

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
AC Power Conducted emissions	±2.70dB
Radiated emissions (30MHz~1GMHz)	±4.98dB
Radiated emissions (1GMHz ~6GMHz)	±4.70dB
Radiated emissions (6GMHz ~18GMHz)	±4.60dB
Radiated emissions (18GMHz ~40GMHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Power Spectral Density	±0.85 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	telematics embedded system
BRAND NAME	MUNIC
MODEL NAME	C4D-4G4USAA_V8+
NOMINAL VOLTAGE	DC13.7V
MODULATION	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to MCS7 802.11ac: up to 390.0Mbps
OPERATING FREQUENCY	5180 ~ 5240MHz, 5745 ~ 5825MHz
NUMBER OF CHANNEL	5180 ~ 5240MHz: 4 for 802.11a, 802.11n, 802.11ac (20MHz) 2 for 802.11n, 802.11ac (40MHz) 1 for 802.11ac (80MHz) 5745 ~ 5825MHz: 4 for 802.11a, 802.11n, 802.11ac (20MHz) 2 for 802.11n, 802.11ac (40MHz) 1 for 802.11ac (80MHz)
AVERAGE POWER	26.30mW for 5180 ~ 5240MHz 27.04mW for 5745 ~ 5825MHz
ANTENNA TYPE	Fixed Internal Antenna with 4.3dBi gain
ANTENNA GAIN	4.3 dBi for 5180 ~ 5240MHz 4.3 dBi for 5745 ~ 5825MHz
HW VERSION	HW.01
SW VERSION	SW.01
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTE:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11a	1TX/1RX
802.11n/802.11ac (20MHz)	1TX/1RX
802.11n/802.11ac (40MHz)	1TX/1RX
802.11ac (80MHz)	1TX/1RX

3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
4. C4D-4G4USAA_V8+ have ESIM and SIM two modes, respectively corresponding to MFF2 SIM and 4FF SIM detail describe in PED , pre-scan two models. worst case mode MFF2 SIM is reflected in this report

List of Accessory:

ACCESSORIES	BRAND	MODEL	SPECIFICATION
Battery 1	Howell	Li-polymer 552535H	Capacity: Li-ion, 450mAh
Battery 2	Akkutronics	382530-PTL	Capacity: Li-ion, 450mAh

2.2 DESCRIPTION OF TEST MODES

FOR 5150 ~ 5250MHz

4 channels are provided for 802.11a, 802.11n, 802.11ac (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n, 802.11ac (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
42	5210 MHz		

FOR 5745 ~ 5850MHz

4 channels are provided for 802.11a, 802.11n,802.11ac (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745 MHz	157	5785 MHz
153	5765 MHz	165	5825 MHz

2 channels are provided for 802.11n, 802.11ac (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
138	5690MHz	155	5775 MHz

2.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE 1G	RE<1G	PLC	APCM	
A	√	√	√	√	DC source with wifi(5G) link

Where

RE 1G: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

NOTE:

The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

NOTE: "-" means no effect.

RADIATED EMISSION TEST (BELOW 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
A	802.11n (20MHz)	5180-5240	36 to 48	48	OFDM	MCS0

RADIATED EMISSION TEST (ABOVE 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
A	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	MCS0
A	802.11n (40MHz)		38 to 46	38, 46	OFDM	MCS0
A	802.11ac (20MHz)		36 to 48	36, 40, 48	OFDM	MCS0
A	802.11ac (40MHz)		38 to 46	38, 46	OFDM	MCS0
A	802.11ac (80MHz)		42	42	OFDM	MCS0
A	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	6.0
A	802.11n (20MHz)		52 to 64	52, 60, 64	OFDM	MCS0
A	802.11n (40MHz)		54 to 62	54, 62	OFDM	MCS0
A	802.11ac (20MHz)		52 to 64	52, 60, 64	OFDM	MCS0
A	802.11ac (40MHz)		54 to 62	54, 62	OFDM	MCS0
A	802.11ac (80MHz)		58	58	OFDM	MCS0
A	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	6.0
A	802.11n (20MHz)		100 to 140	100, 116, 140	OFDM	MCS0
A	802.11n (40MHz)		102 to 134	102, 110, 134	OFDM	MCS0
A	802.11ac (20MHz)		100 to 140	100, 116, 140	OFDM	MCS0
A	802.11ac (40MHz)		102 to 134	102, 110, 134	OFDM	MCS0
A	802.11ac (80MHz)		106	106	OFDM	MCS0
A	802.11a	5745-5850	149 to 165	100, 116, 140	OFDM	6.0
A	802.11n (20MHz)		149 to 165	100, 116, 140	OFDM	MCS0
A	802.11ac (40MHz)		151 to 159	102, 110, 134	OFDM	MCS0
A	802.11ac (20MHz)		149 to 165	100, 116, 140	OFDM	MCS0
A	802.11n (40MHz)		151 to 159	102, 110, 134	OFDM	MCS0
A	802.11ac (80MHz)		155	106	OFDM	MCS0

POWER LINE CONDUCTED EMISSION TEST:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
A	802.11ac (80MHz)	5775	42	42	OFDM	MCS0

BANDEDGE MEASUREMENT:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 48	36 to 48	6.0
A	802.11n (20MHz)		36 to 48	36, 48	36 to 48	MCS0
A	802.11n (40MHz)		38 to 46	38, 46	38 to 46	MCS0
A	802.11ac (20MHz)		36 to 48	36, 48	36 to 48	MCS0
A	802.11ac (40MHz)		38 to 46	38, 46	38 to 46	MCS0
A	802.11ac (80MHz)		42	42	42	MCS0
EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
A	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	MCS0
A	802.11n (40MHz)		151 to 159	151, 159	OFDM	MCS0
A	802.11ac (20MHz)		149 to 165	149, 157, 165	OFDM	MCS0
A	802.11ac (40MHz)		151 to 159	151, 159	OFDM	MCS0
A	802.11ac (80MHz)		155	155	OFDM	MCS0

ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
A	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	MCS0
A	802.11n (40MHz)		38 to 46	38, 46	OFDM	MCS0
A	802.11ac (20MHz)		36 to 48	36, 40, 48	OFDM	MCS0
A	802.11ac (40MHz)		38 to 46	38, 46	OFDM	MCS0
A	802.11ac (80MHz)		42	42	OFDM	MCS0
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
A	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	MCS0
A	802.11n (40MHz)		151 to 159	151, 159	OFDM	MCS0
A	802.11ac (20MHz)		149 to 165	149, 157, 165	OFDM	MCS0
A	802.11ac (40MHz)		151 to 159	151, 159	OFDM	MCS0
A	802.11ac (80MHz)		155	155	OFDM	MCS0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE<1G	23deg. C, 70%RH	DC 13.7V	Star Le
RE>1G	23deg. C, 70%RH	DC 13.7V	Star Le
PLC	25deg. C, 52%RH	DC 13.7V	Carl Xie
APCM	25deg. C, 60%RH	DC 13.7V	Lily Zhao

2.3 DUTY CYCLE OF TEST SIGNAL

Please Refer to Appendix A Of this test report.

WORST-CASE DATA:

Measured Duty Cycle		
Mode		Duty Cycle [%]
		ANT1
5GHZ	11a	93.95
	11n20	92.68
	11n40	89.94
	11ac20	91.96
	11ac40	86.31
	11ac80	77.76

Note:

Duty cycle of test signal is < 98%, duty factor shall be considered.



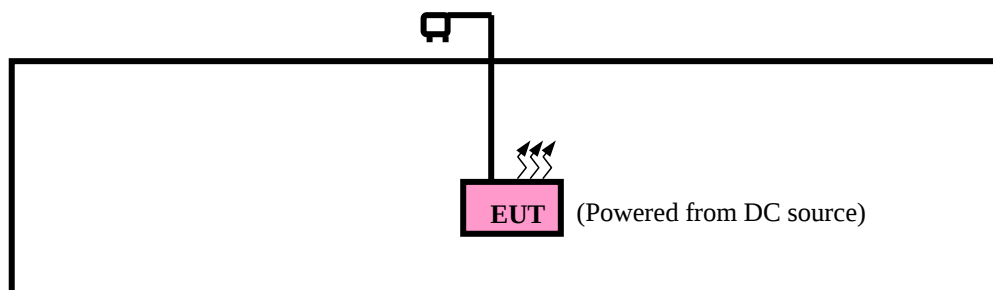
DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC Source	Kikusui/JP	PMX18-5A	N/A	N/A
2	DC Cable	kistler	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 1.5m
2	AC Line: Unshielded, Detachable 1.5m

2.4.1 CONFIGURATION OF SYSTEM UNDER TEST



Test table

2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Certification). The test report has been issued separately.

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107 a CLASS B)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107 b CLASS A)

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	79	66
0.5 ~ 30	73	60

NOTE: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Mar. 03,21	Mar. 02, 22
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 25,21	Feb. 24, 22

NOTE: 1. The test was performed in CE shielded room.

3.1.3 TEST PROCEDURES

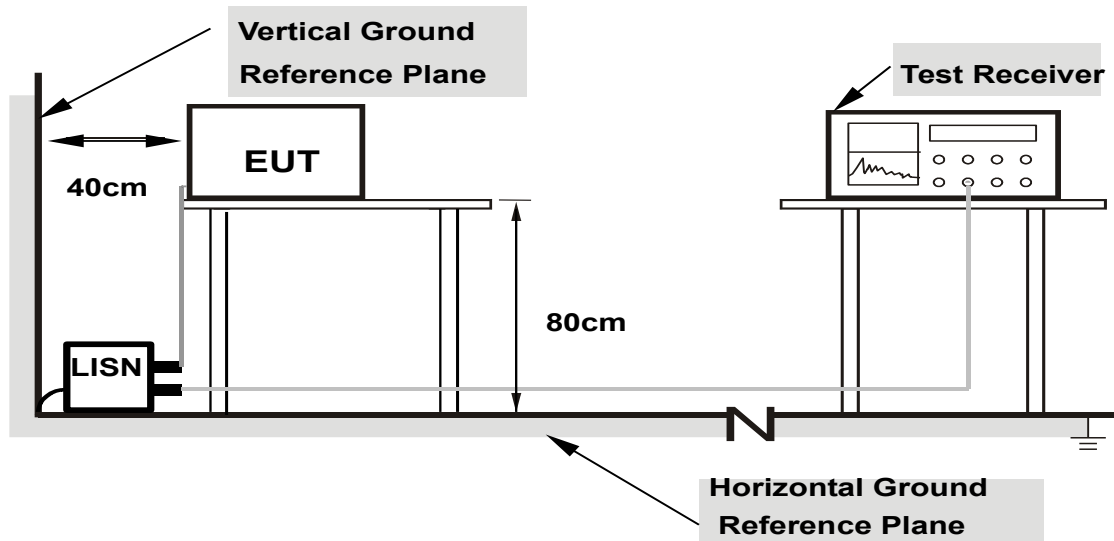
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

3.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power and connected of all equipment.
- b. EUT was operated according to the use type described in the manufacturer's specifications or the user's manual.



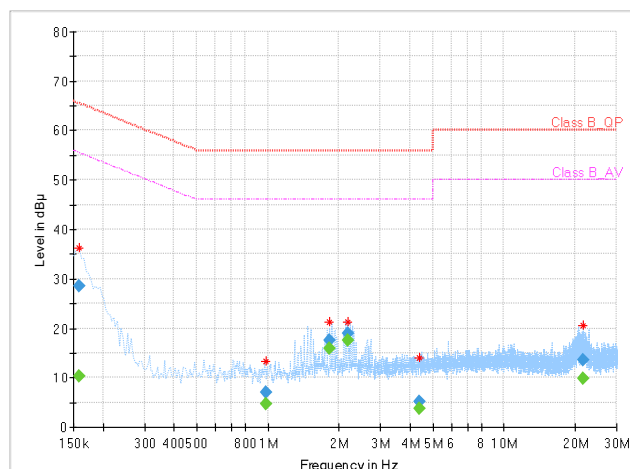
3.1.7 TEST RESULTS

TEST VOLTAGE	Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	TESTED BY	Carl xie

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.158000	---	10.20	55.57	45.37	L1	ON	9.7
0.158000	28.62	---	65.57	36.95	L1	ON	9.7
0.980000	---	4.66	46.00	41.34	L1	ON	9.7
0.980000	6.99	---	56.00	49.01	L1	ON	9.7
1.828000	---	15.96	46.00	30.04	L1	ON	9.7
1.828000	17.44	---	56.00	38.56	L1	ON	9.7
2.184000	---	17.46	46.00	28.54	L1	ON	9.7
2.184000	18.88	---	56.00	37.12	L1	ON	9.7
4.372000	---	3.80	46.00	42.20	L1	ON	9.7
4.372000	5.16	---	56.00	50.84	L1	ON	9.7
21.660000	---	9.81	50.00	40.19	L1	ON	9.8
21.660000	13.59	---	60.00	46.41	L1	ON	9.8

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Limit value - Emission level
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum



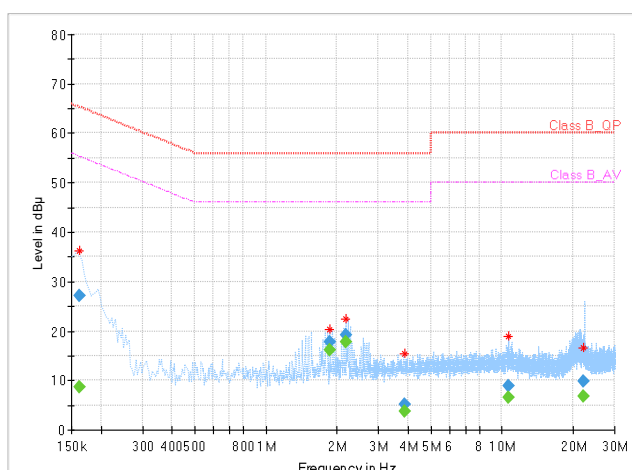


TEST VOLTAGE	Input 120 Vac, 60 Hz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
ENVIRONMENTAL CONDITIONS	26deg. C, 51%RH	TESTED BY	Carl xie

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.162000	---	8.61	55.36	46.75	N	ON	9.7
0.162000	27.13	---	65.36	38.23	N	ON	9.7
1.872000	---	16.26	46.00	29.74	N	ON	9.8
1.872000	17.72	---	56.00	38.28	N	ON	9.8
2.184000	---	17.82	46.00	28.18	N	ON	9.8
2.184000	19.30	---	56.00	36.70	N	ON	9.8
3.880000	---	3.85	46.00	42.15	N	ON	9.8
3.880000	5.16	---	56.00	50.84	N	ON	9.8
10.608000	---	6.49	50.00	43.51	N	ON	9.8
10.608000	8.87	---	60.00	51.13	N	ON	9.8
22.236000	---	6.89	50.00	43.11	N	ON	9.9
22.236000	9.87	---	60.00	50.13	N	ON	9.9

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Limit value - Emission level
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

Full Spectrum





3.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

3.2.2 LIMITS OF UNWANTED EMISSION

RESTRICTED BANDS	APPLICABLE TO	LIMIT	
	789033 D02 General UNII Test Procedures New Rules v02r01	FIELD STRENGTH AT 3m (dBµV/m)	
		PK : 74	AV : 54
OUT OF THE RESTRICTED BANDS	APPLICABLE TO	EIRP LIMIT (dBm/MHz)	EQUIVALENT FIELD STRENGTH AT 3m (dBµV/m)
	15.407(b)(1)	PK : -27	PK : 68.3
	15.407(b)(2)		
	15.407(b)(3)		
	15.407(b)(4)	See note 2 (FCC 16-24)	

NOTE: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000 \sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

2. All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

3.2.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 05,21	Mar. 04,22
Horn Antenna	ETS-LINDGREN	3117	00168728	Apr. 02, 21	Apr. 01, 22
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Aug. 25, 21	Aug. 24, 22
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 03,21	Jun. 02,22
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 27,21	Apr. 26,22
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 30,21	Apr. 29,22
DC Source	Kikusui/JP	PMX18-5A	0000001	Aug. 25,21	Aug. 24,22

- NOTE:**
1. The calibration interval of the above test instruments is 12 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 2. The test was performed in 3m Chamber.
 3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

3.2.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

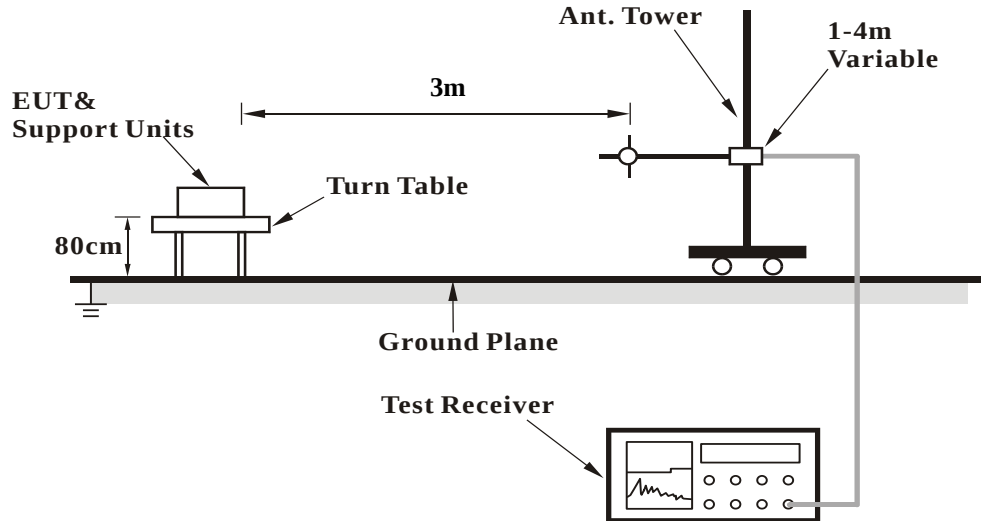
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

3.2.5 DEVIATION FROM TEST STANDARD

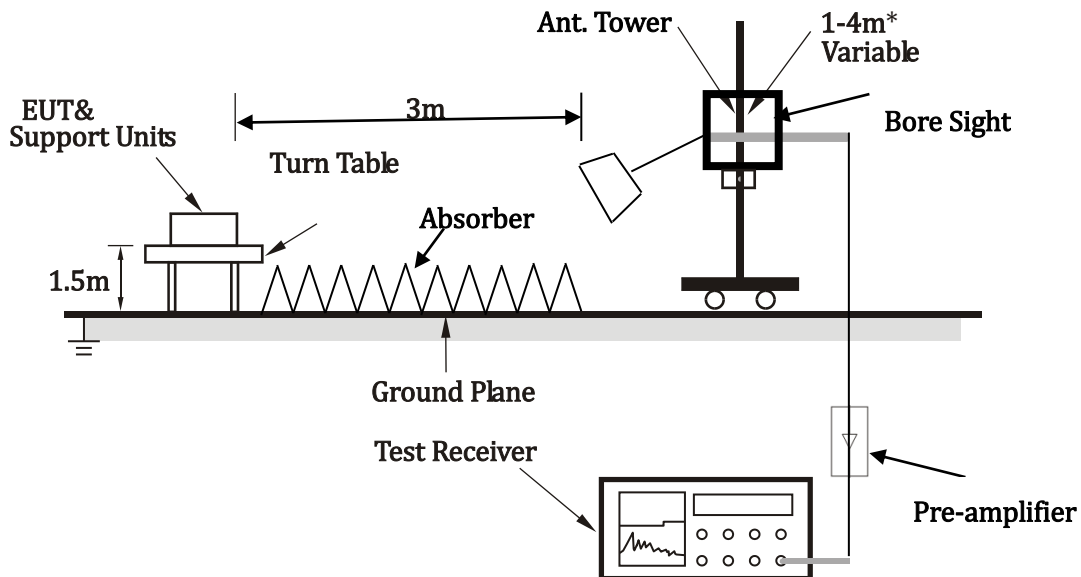
No deviation.

3.2.6 TEST SETUP

< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).



Test Report No.: W7L-P21090018RF03

3.2.7 EUT OPERATING CONDITION

- a. Set the EUT under full load condition and placed them on a testing table.
- b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- c. The necessary accessories enable the EUT in full functions.



3.2.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

Band 1

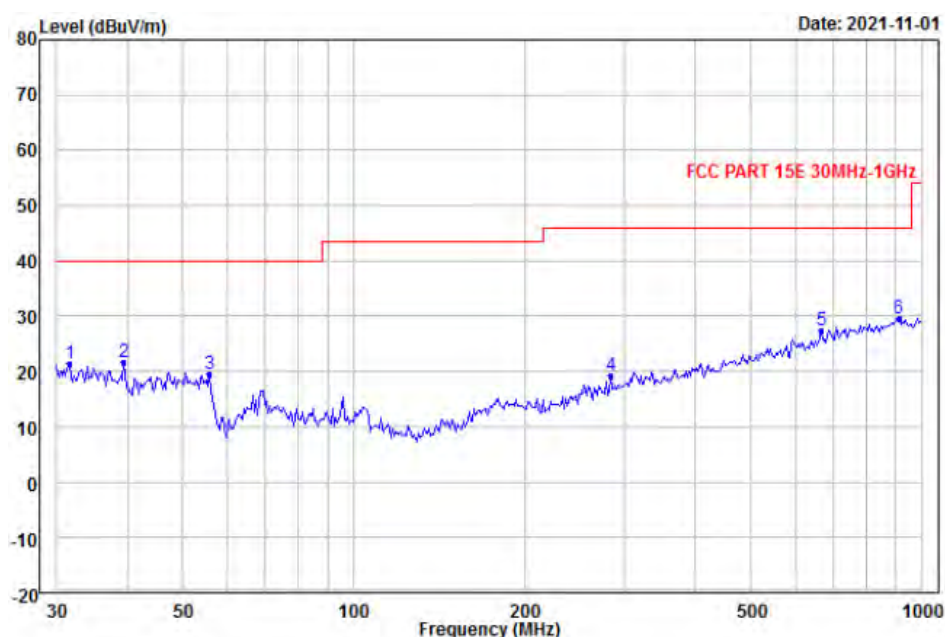
802.11n (20MHz)

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
31.513	21.43	26.23	40.00	-18.57	23.35	0.66	28.81	300	0	QP
39.459	21.62	29.48	40.00	-18.38	20.07	0.87	28.80	300	0	QP
55.678	19.56	36.81	40.00	-20.44	10.70	0.82	28.77	300	0	QP
284.261	19.26	26.50	46.00	-26.74	19.16	1.62	28.02	300	0	QP
665261	27.48	26.76	46.00	-18.52	27.78	2.34	29.40	300	0	QP
912.695	29.63	25.26	46.00	-16.37	30.39	2.83	28.85	300	0	QP

REMARKS:

1. Emission level (dBuV/m) = Read level (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

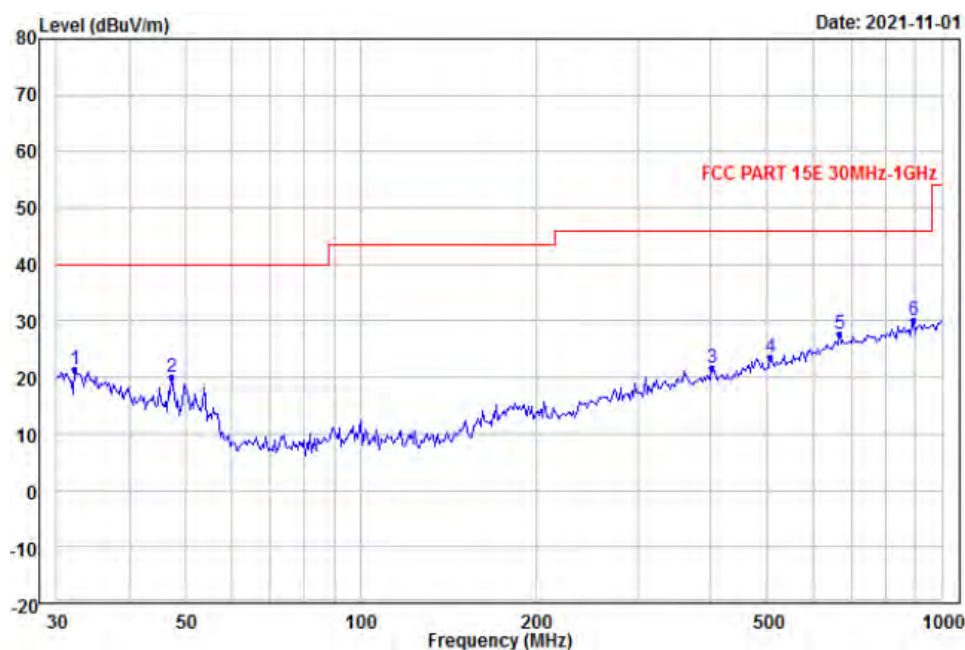


CHANNEL	Channel 48	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
32.184	21.32	26.21	40.00	-18.68	23.24	0.68	28.81	200	360	QP
47.369	20.01	32.79	40.00	-19.99	15.19	0.81	28.78	200	360	QP
401.105	21.63	26.16	46.00	-24.37	22.22	1.90	28.65	200	360	QP
505.789	23.66	26.37	46.00	-22.34	24.53	2.07	29.31	200	360	QP
665.261	27.78	27.06	46.00	-18.22	27.28	2.34	29.40	200	360	QP
893.656	30.04	25.81	46.00	-15.96	30.37	2.77	28.91	200	360	QP

REMARKS:

1. Emission level (dBuV/m) = Read level (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.





ABOVE 1GHz WORST-CASE DATA:

Note: For higher frequency, the emission is too low to be detected.

Band 1

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	69.66	71.89	74	-4.34	34.32	9.78	46.33	200	332	Peak
5150	51.34	53.37	54	-2.66	34.32	9.78	46.33	200	332	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	72.58	74.45	74	-1.42	34.68	9.78	46.33	100	82	Peak
5150	53.35	55.22	54	-0.65	34.68	9.78	46.33	100	82	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 5180MHz: Fundamental frequency.



802.11a

CHANNEL	TX Channel 44	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
10440	46.56	40.88	74	-27.44	37.54	14.06	45.92	200	332	Peak
15660	47.37	36.40	74	-26.63	39.99	17.01	46.03	200	332	Peak
10440	34.46	28.78	54	-19.54	37.54	14.06	45.92	200	332	Average
15660	35.84	24.87	54	-18.16	39.99	17.01	46.03	200	332	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
10440	44.85	39.05	74	-29.15	37.66	14.06	45.92	100	82	Peak
15660	48.30	37.23	74	-25.70	40.09	17.01	46.03	100	82	Peak
10440	33.16	27.36	54	-20.84	37.66	14.06	45.92	100	82	Average
15660	36.18	25.11	54	-17.82	40.09	17.01	46.03	100	82	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 5220MHz: Fundamental frequency.



802.11a

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5350	51.01	52.32	74	-22.99	34.48	10.18	45.97	200	332	Peak
5350	35.50	36.81	54	-18.50	34.48	10.18	45.97	200	332	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5350	51.76	52.63	74	-22.24	34.92	10.18	45.97	100	82	Peak
5350	36.09	36.96	54	-17.91	34.92	10.18	45.97	100	82	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 5240MHz: Fundamental frequency.



802.11n (20MHz)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	69.15	71.38	74	-4.85	34.32	9.78	46.33	100	340	Peak
5150	46.66	48.89	54	-7.34	34.32	9.78	46.33	100	340	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	70.40	72.27	74	-3.60	34.68	9.78	34.68	100	110	Peak
5150	49.98	51.85	54	-4.02	34.68	9.78	34.68	100	110	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 5180MHz: Fundamental frequency.



802.11n (20MHz)

CHANNEL	TX Channel 44	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
10440	48.02	42.34	74	-25.98	37.54	14.06	45.92	100	325	Peak
15660	46.94	35.97	74	-27.06	39.99	17.01	46.03	100	325	Peak
10440	33.86	28.18	54	-20.14	37.54	14.06	45.92	100	325	Average
15660	35.92	25.95	54	-18.08	39.99	17.01	46.03	100	325	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
10440	45.59	39.79	74	-28.41	37.66	14.06	45.92	100	165	Peak
15660	47.77	36.70	74	-26.23	40.09	17.01	46.03	100	165	Peak
10440	33.16	27.36	54	-20.84	37.66	14.06	45.92	100	165	Average
15660	36.02	24.95	54	-17.98	40.09	17.01	46.03	100	165	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 5220MHz: Fundamental frequency.



802.11n (20MHz)

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5350	50.77	52.08	74	-23.23	34.48	1018	45.97	100	340	Peak
5350	35.48	36.79	54	-18.52	34.48	1018	45.97	100	340	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5350	52.40	53.27	74	-21.60	34.92	10.18	45.79	100	110	Peak
5350	35.85	36.72	54	-18.15	34.92	10.18	45.79	100	110	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
2. 5240MHz: Fundamental frequency.

802.11n (40MHz)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	69.14	71.37	74	-4.86	34.32	9.78	46.33	103	340	Peak
5150	52.48	54.71	54	-1.52	34.32	9.78	46.33	103	340	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	71.18	73.05	74	-2.82	34.68	9.78	46.33	115	120	Peak
5150	52.94	54.81	54	-1.06	34.68	9.78	46.33	115	120	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 5190MHz: Fundamental frequency.

802.11n (40MHz)

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5350	52.84	54.15	74	-21.16	34.48	10.18	45.79	103	340	Peak
5350	35.71	37.02	54	-18.29	34.48	10.18	45.79	103	340	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5350	55.06	55.93	74	-18.94	34.92	10.18	45.79	115	120	Peak
5350	36.10	36.97	54	-17.90	34.92	10.18	45.79	115	120	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 5230MHz: Fundamental frequency.

802.11ac (80MHz)

CHANNEL	TX Channel 42	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	64.58	66.81	74	-9.42	34.32	9.78	46.33	103	340	Peak
5150	49.95	52.18	54	-4.05	34.32	9.78	46.33	103	340	Average
5350	52.03	53.34	74	-21.97	34.48	10.18	45.97	103	340	Peak
5350	36.51	37.82	54	-17.49	34.48	10.18	45.97	103	340	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	68.81	70.48	74	-5.39	34.68	9.78	46.33	100	120	Peak
5150	51.72	53.39	54	-2.28	34.68	9.78	46.33	100	120	Average
5350	52.88	53.75	74	-21.12	34.92	10.18	45.97	100	120	Peak
5350	37.20	38.07	54	-16.80	34.92	10.18	45.97	100	120	Average

REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Emission level – Limit value.
- 5210MHz: Fundamental frequency.

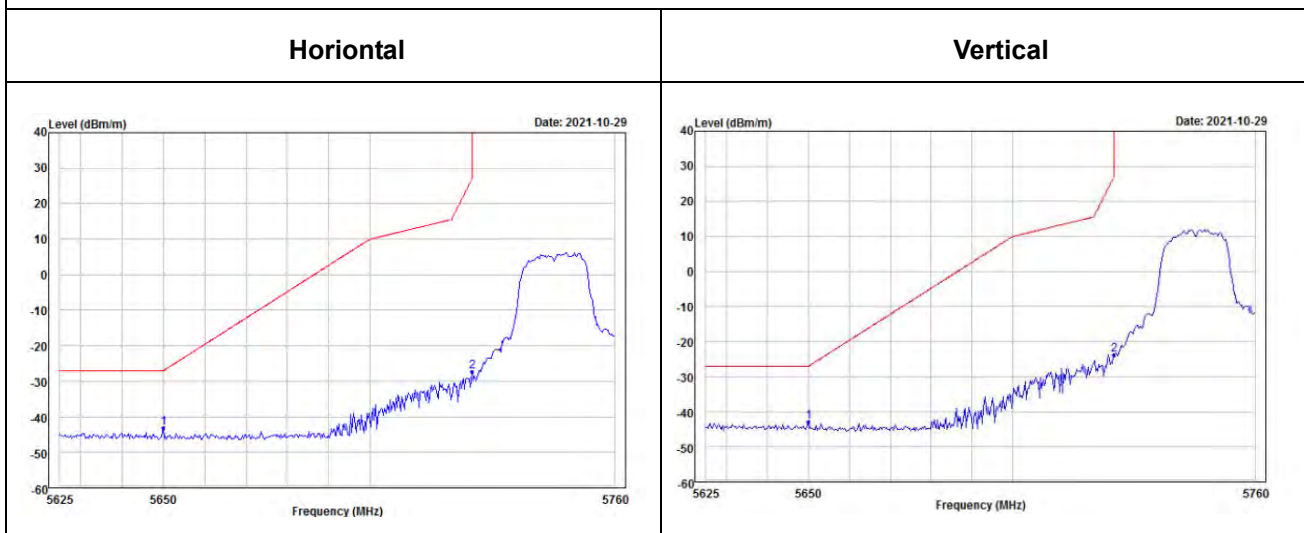
Band 4:

Oobe Data

802.11a-CH149

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5650.00	-43.15	-54.26	-27	-16.15	34.84	21.88	45.61	200	0	Peak
5725.00	-27.25	-38.32	27	-54.25	34.96	21.68	45.57	200	0	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5650.00	-42.77	-54.35	-27	-15.77	35.31	21.88	45.61	300	0	Peak
5725.00	-23.64	-35.16	27	-50.64	35.41	21.68	45.57	300	0	Peak

CH 149



802.11a-CH157

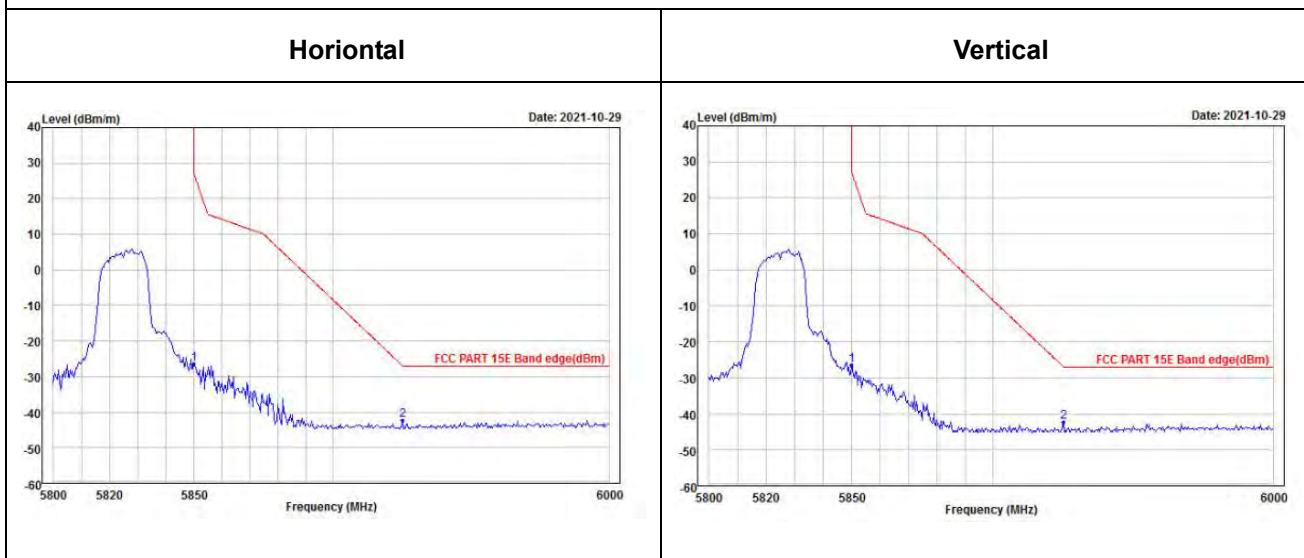
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
11570	46.60	40.18	74	-27.40	38.17	14.34	46.09	200	0	Peak
17355	48.37	35.77	74	-25.63	41.47	17.90	46.77	200	0	Peak
11570	32.48	26.06	54	-21.52	38.17	14.34	46.09	200	0	Average
17355	37.01	24.41	54	-16.99	41.47	17.90	46.77	200	0	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
11570	47.74	41.19	74	-26.26	38.30	14.34	46.09	300	0	Peak
17355	48.12	35.46	74	-25.88	41.53	17.90	46.77	300	0	Peak
11570	34.32	27.77	54	-19.68	38.30	14.34	46.09	300	0	Average
17355	36.79	24.13	54	-17.21	41.53	17.90	46.77	300	0	Average

OOBE DATA

802.11a-CH165

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5850.00	-26.58	-37.72	27	-53.58	35.16	21.47	45.49	300	0	Peak
5929.00	-42.29	-53.57	-27	-15.29	35.28	21.44	45.44	300	0	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5850.00	-26.60	-38.17	27	-53.60	35.59	21.47	45.49	200	0	Peak
5929.00	-42.42	-54.11	-27	-15.42	35.69	21.44	45.44	200	0	Peak

CH 165

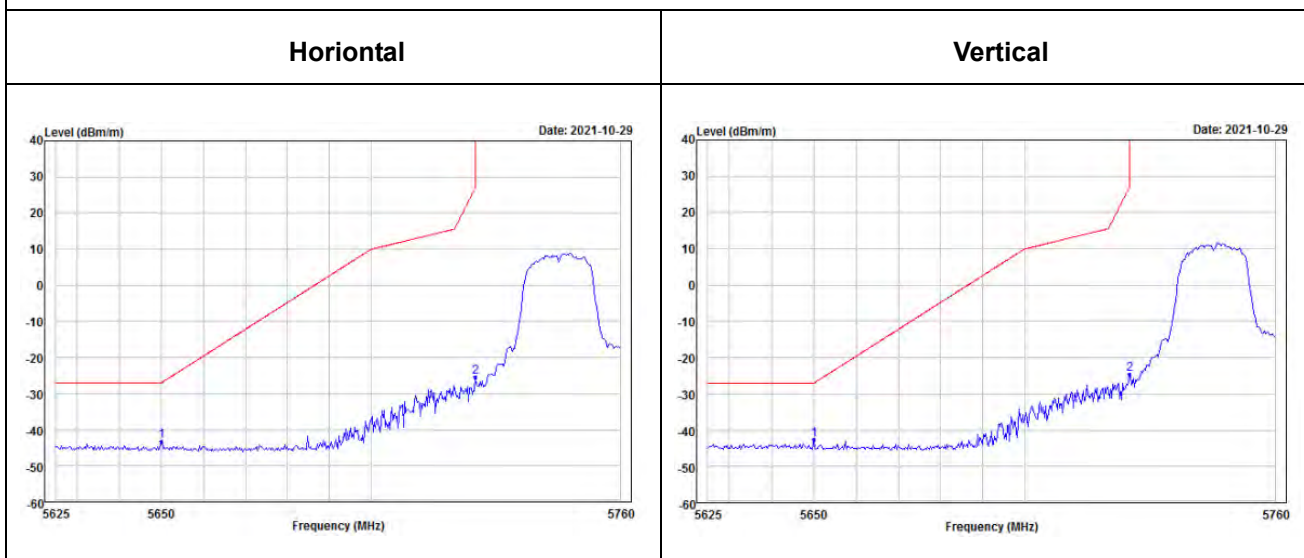


OOBE DATA

802.11n (20MHZ)--CH 149

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV /m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5650.00	-43.20	-54.31	-27	-16.20	34.84	21.88	45.61	300	0	Peak
5725.00	-25.52	-36.59	27	-52.52	34.96	21.68	45.57	300	0	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV /m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5650.00	-42.44	-54.02	-27	-15.44	35.31	21.88	45.61	200	360	Peak
5725.00	-24.47	-35.99	27	-51.47	35.41	21.68	45.57	200	360	Peak

CH 149



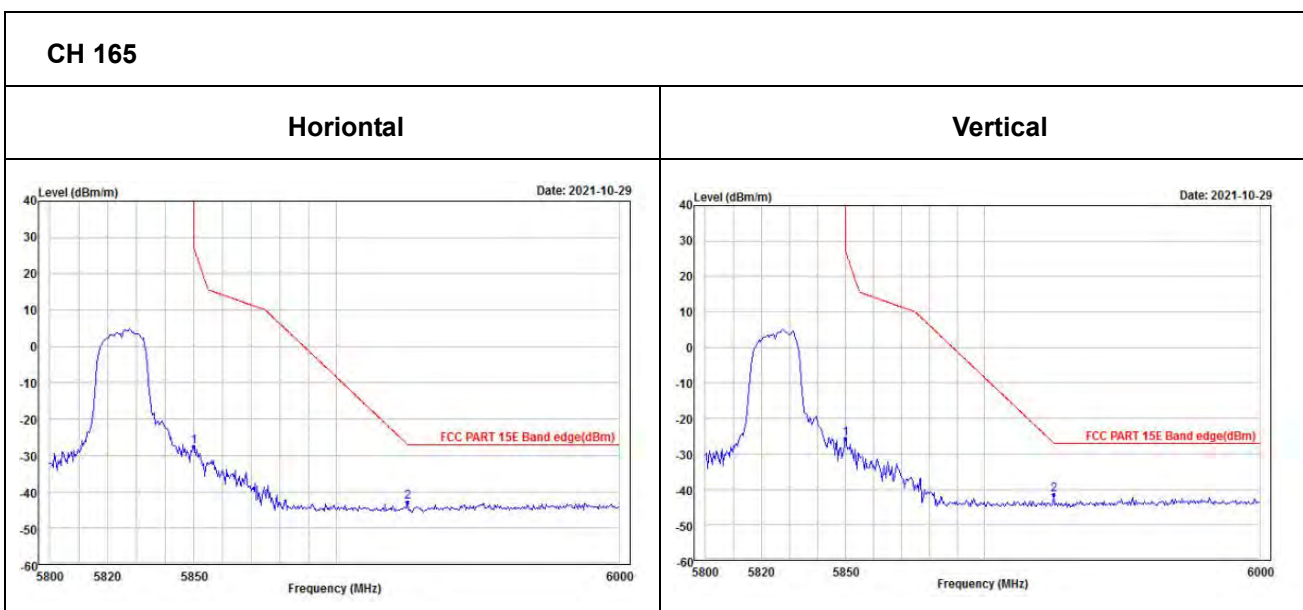
802.11n (20MHZ)--CH 157

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
11570	46.78	40.36	74	-27.22	38.17	14.34	46.09	200	0	Peak
17355	48.03	35.43	74	-25.97	41.47	17.90	46.77	200	0	Peak
11570	32.48	26.06	54	-21.52	38.17	14.34	46.09	200	0	Average
17355	36.92	24.32	54	-17.08	41.47	17.90	46.77	200	0	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
11570	47.80	41.25	74	-26.20	38.30	14.34	46.09	300	0	Peak
17355	47.95	35.29	74	-26.05	41.53	17.90	46.77	300	0	Peak
11570	32.54	25.99	54	-21.46	38.30	14.34	46.09	300	0	Average
17355	36.97	24.31	54	-17.03	41.53	17.90	46.77	300	0	Average

OOBE DATA

802.11n (20MHz) -- CH 165

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5850.00	-27.47	-38.61	27	-54.47	35.16	21.47	45.49	300	360	Peak
5925.00	-42.96	-54.24	-27	-15.96	35.28	21.44	45.44	300	360	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5850.00	-25.69	-37.26	27	-52.69	35.59	21.47	45.49	200	0	Peak
5925.00	-41.49	-53.18	-27	-14.49	35.69	21.44	45.44	200	0	Peak

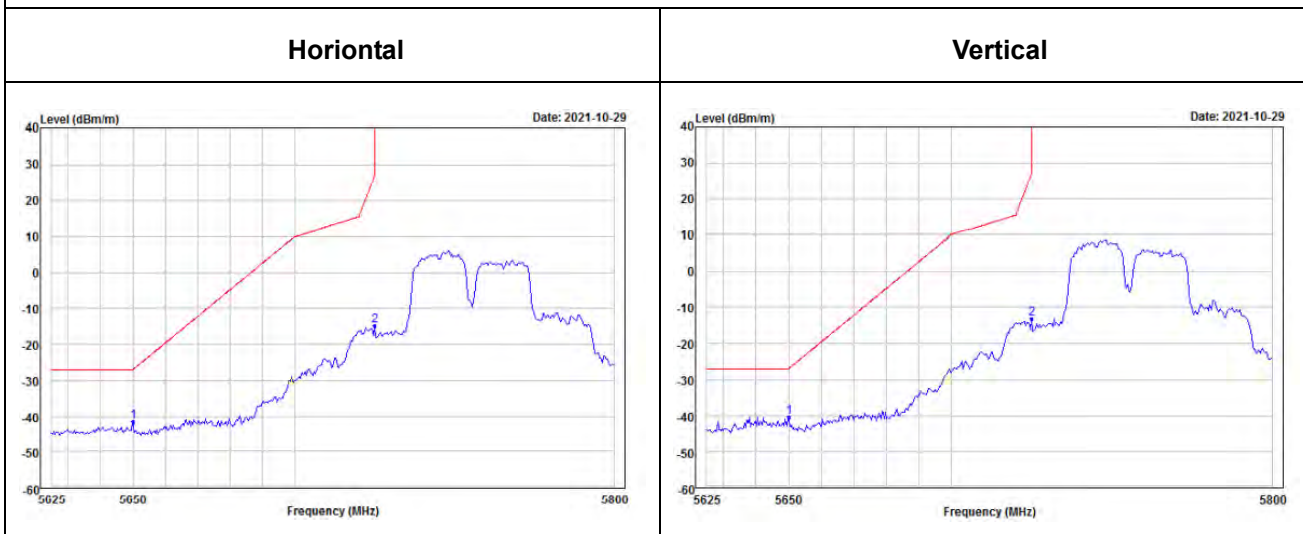


OOBE DATA

802.11n (40MHZ)-- CH 151

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5650.00	-41.59	-52.70	-27	-14.59	34.84	21.88	45.61	300	360	Peak
5725.00	-14.68	-25.75	27	-41.68	34.96	21.68	45.57	300	360	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5650.00	-40.28	-51.86	-27	-13.28	35.31	21.88	45.61	200	0	Peak
5725.00	-13.02	-24.54	27	-40.02	35.41	21.68	45.57	200	0	Peak

CH 151

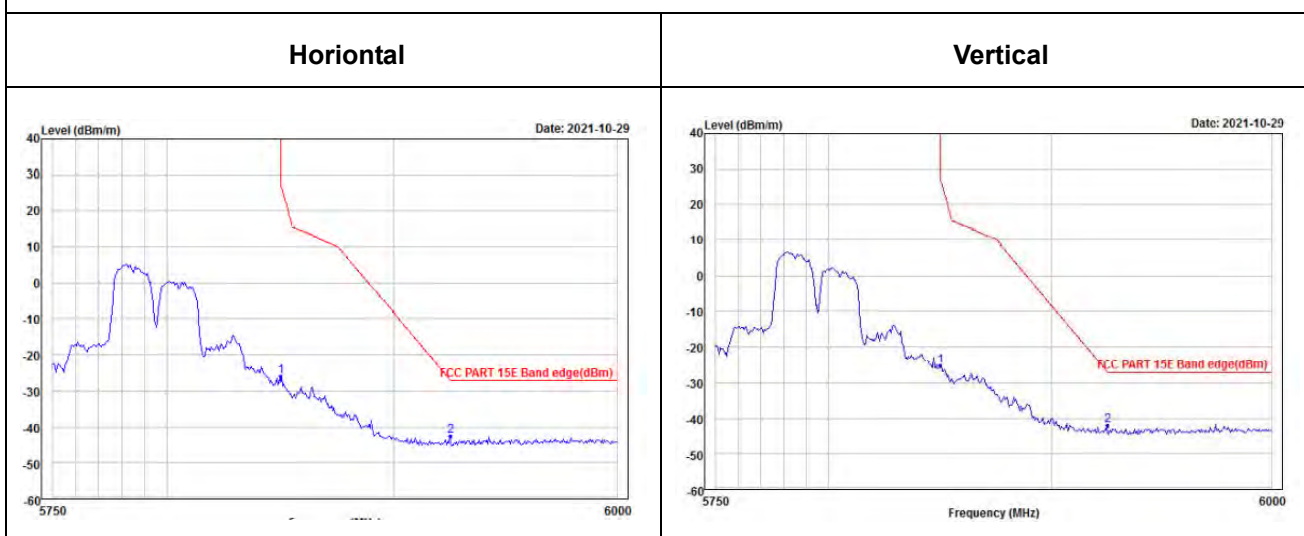


OOBE DATA

802.11n (40MHZ)-- CH 159

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5850.00	-25.92	-37.06	27	-52.92	35.16	21.47	45.49	300	360	Peak
5925.00	-42.54	-53.82	-27	-15.54	35.28	21.44	45.44	300	360	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5850.00	-25.29	-36.86	27	-52.29	35.59	21.47	45.49	200	0	Peak
5925.00	-41.92	-53.61	-27	-14.92	35.69	21.44	45.44	200	0	Peak

CH 159



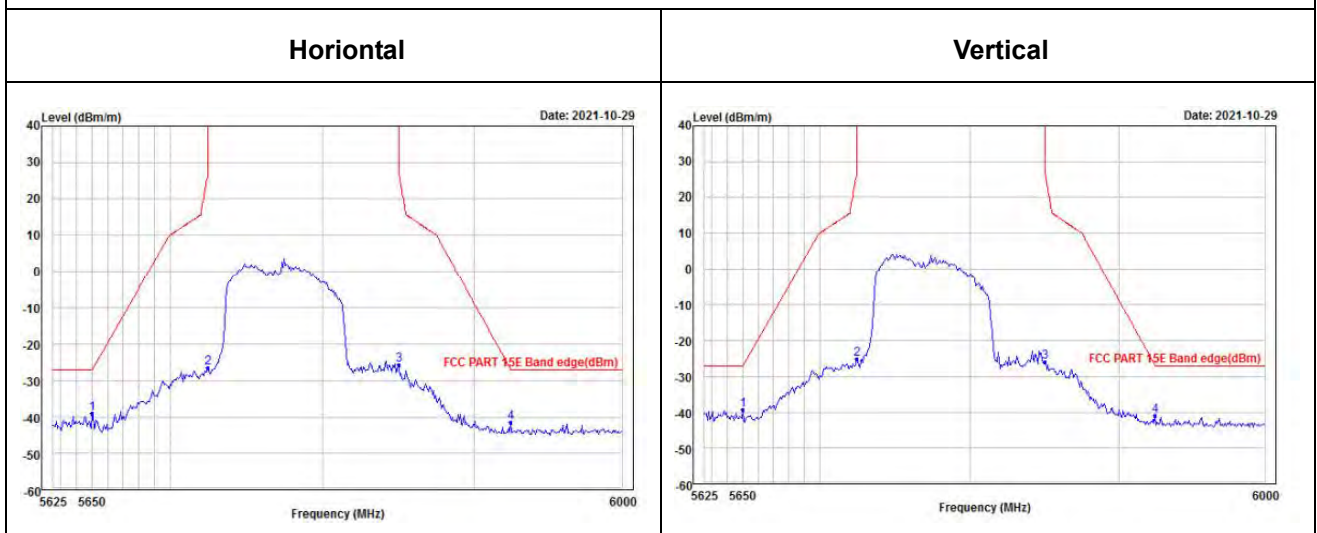


OOBE DATA

802.11ac (80MHZ) --CH 155

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5650.00	-39.07	-50.18	-27	-12.07	34.84	21.88	45.61	300	360	Peak
5725.00	-26.59	-37.66	27	-53.59	34.96	21.68	45.57	300	360	Peak
5850.00	-25.56	-36.70	27	-52.56	35.16	21.47	45.49	300	360	Peak
5925.00	-41.49	-52.77	-27	-14.49	35.28	21.44	45.44	300	360	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5650.00	-39.21	-50.79	-27	-12.21	35.31	21.88	45.61	200	0	Peak
5725.00	-25.10	-36.62	27	-52.10	35.41	21.68	45.57	200	0	Peak
5850.00	-25.81	-37.38	27	-52.81	35.59	21.47	45.49	200	0	Peak
5925.00	-40.88	-52.57	-27	-13.88	35.69	21.44	45.44	200	0	Peak

CH 155



3.3 OUT OF BAND EMISSION MEASUREMENT

3.3.2 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

OUT OF THE RESTRICTED BANDS	APPLICABLE TO	EIRP LIMIT (dBm/MHz)
	15.407(b)(1)	-27
	15.407(b)(2)	
	15.407(b)(3)	
	15.407(b)(4)	See note

NOTE:

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

3.3.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 03,21	Jun. 02,22
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	Jun. 03,21	Jun. 02,22

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in RF OVEN ROOM.
3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

3.3.4 TEST PROCEDURES

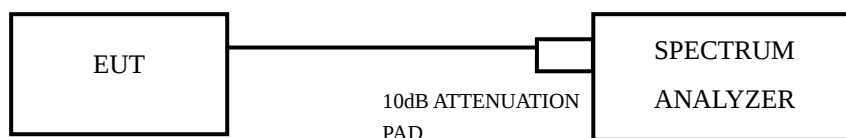
- a. Check the calibration of the measurement instrument using either an internal calibrator or a known signal from an external generator.
- b. The resolution bandwidth is set to 1MHzThe Video bandwidth is set to $\geq 1\text{MHz}$,report the peak value out of oprating band.
- c. Repeat above procedures until all frequencies measured wre complete.

NOTE: All modes of operation were investigated and the worst-case emissions are reported,antenna gain was added into the test result.

3.3.5 DEVIATION FROM TEST STANDARD

No deviation.

3.3.6 TEST SETUP



3.3.7 EUT OPERATING CONDITION

- a. Set the EUT under full load condition and placed them on a testing table.
- b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- c. The necessary accessories enable the EUT in full functions.



Test Report No.: W7L-P21090018RF03

3.3.8 TEST RESULTS

Please Refer to Appendix A Of this test report.

3.4 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

3.4.2 LIMITS OF MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

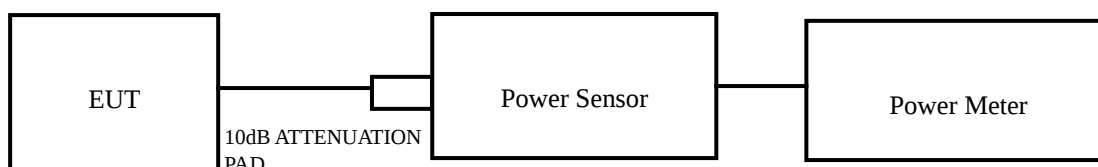
Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
		Client devices	250mW (24 dBm)
U-NII-3			1 Watt (30 dBm)

NOTE: Where B is the 26dB emission bandwidth in MHz.

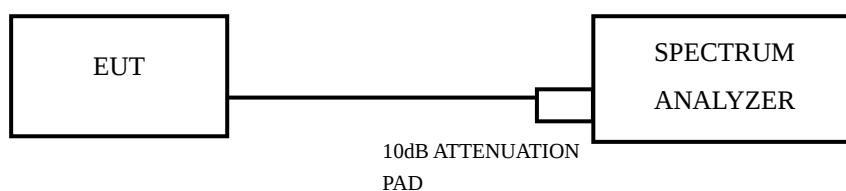
3.4.3 TEST SETUP

FOR POWER OUTPUT MEASUREMENT

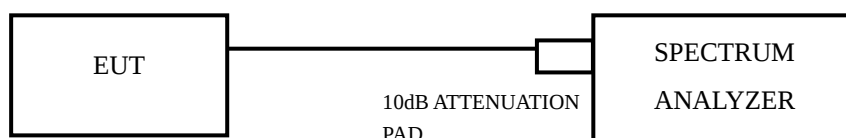
802.11a, 802.11n (20MHz), 802.11n (40MHz) TEST CONFIGURATION



11ac TEST CONFIGURATION



FOR 26dB BANDWIDTH



3.4.4 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Meter	ANRITSU	ML2495A	1506002	Feb. 25,21	Feb. 24,22
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Apr. 27,20	Apr. 26,21
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Apr. 26,21	Apr. 25,22
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	Feb. 25,21	Feb. 24,22
Power Sensor	ANRITSU	MA2411B	1339352	Feb. 25,21	Feb. 24,22

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.

3.4.5 TEST PROCEDURE

FOR POWER MEASUREMENT

For 802.11a, 802.11n (20MHz), 802.11n (40MHz)

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

For 802.11ac (80MHz)

1. Measure the duty cycle, x , of the transmitter output signal as described in II.B.
2. Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
3. Set RBW = 1 MHz.
4. Set VBW $\geq$ 3 MHz.
5. Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$. (This ensures that bin-to-bin spacing is $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins.)
6. Sweep time = auto.
7. Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
8. Do not use sweep triggering. Allow the sweep to "free run."
9. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
10. Add $10 \log (1/x)$, where x is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add $10 \log (1/0.25) = 6 \text{ dB}$ if the duty cycle is 25%.

FOR 99 PERCENT OCCUPIED BANDWIDTH

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

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW $\geq 3 \cdot$ RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

FOR 26dB BANDWIDTH

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

FOR 6dB BANDWIDTH

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.4.6 DEVIATION FROM TEST STANDARD

No deviation.

3.4.7 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



Test Report No.: W7L-P21090018RF03

3.4.8 TEST RESULTS

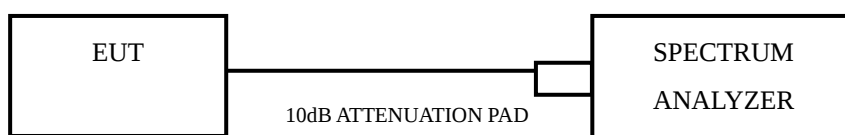
Please Refer to Appendix A Of this test report.

3.5 MAXIMUM POWER SPECTRAL DENSITY MEASUREMENT

3.5.2 LIMITS OF MAXIMUM POWER SPECTRAL DENSITY MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
		Client devices	11dBm/ MHz
U-NII-3			30dBm/ 500kHz

3.5.3 TEST SETUP



3.5.4 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.5.5 TEST PROCEDURES

Using method SA-2

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 1 MHz, Set VBW $\geq$ 3 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to "free run".
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Add $10 \log (1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission).
- 7) Record the max value

3.5.6 DEVIATION FROM TEST STANDARD

No deviation.

3.5.7 EUT OPERATING CONDITIONS

Same as 3.1.6.



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3.5.8 TEST RESULTS

Please Refer to Appendix A Of this test report.

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

APPENDIX A:

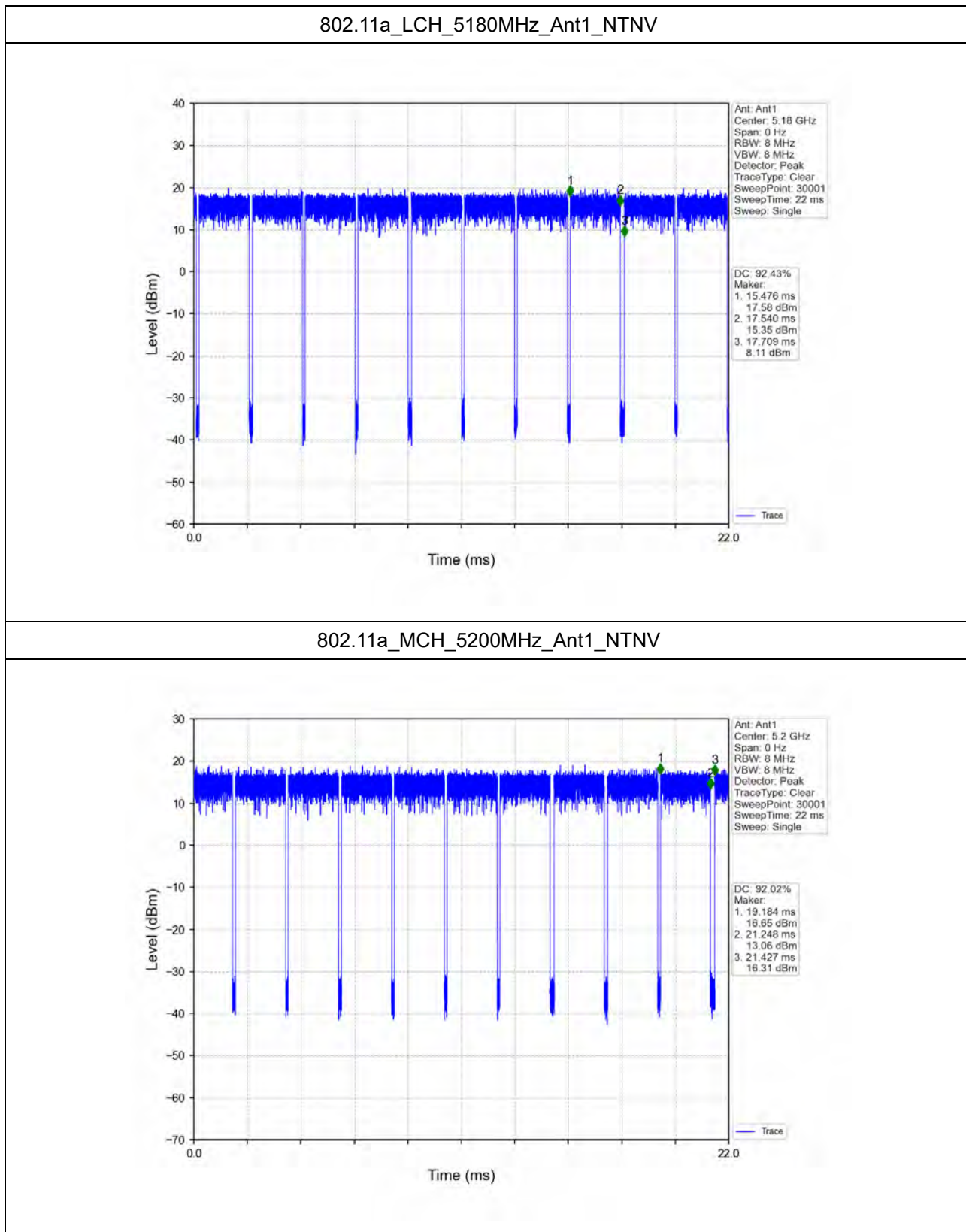
Duty Cycle TEST RESULT

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11a	SISO	5180	2.064	2.233	92.43	0.34	2.69
		5200	2.064	2.243	92.02	0.36	3.08
		5240	2.064	2.243	92.02	0.36	3.05
		5745	2.064	2.242	92.06	0.36	3.05
		5785	2.064	2.224	92.81	0.32	2.29
		5825	2.064	2.197	93.95	0.27	1.18
802.11n (HT20)	SISO	5180	1.925	2.103	91.54	0.38	3.24
		5200	1.924	2.103	91.49	0.39	3.28
		5240	1.923	2.084	92.27	0.35	2.47
		5745	1.923	2.102	91.48	0.39	3.28
		5785	1.923	2.102	91.48	0.39	3.28
		5825	1.924	2.076	92.68	0.33	2.49
802.11n (HT40)	SISO	5190	0.948	1.117	84.87	0.71	5.87
		5230	0.948	1.126	84.19	0.75	5.77
		5755	0.948	1.054	89.94	0.46	0.03
		5795	0.948	1.127	84.12	0.75	6.53
802.11ac (VHT20)	SISO	5180	1.932	2.111	91.52	0.38	3.26
		5200	1.933	2.102	91.96	0.36	2.85
		5240	1.931	2.110	91.52	0.39	3.26
		5745	1.932	4.132	46.76	3.30	40.07
		5785	1.931	2.110	91.52	0.39	3.26
		5825	1.931	2.110	91.52	0.39	3.26

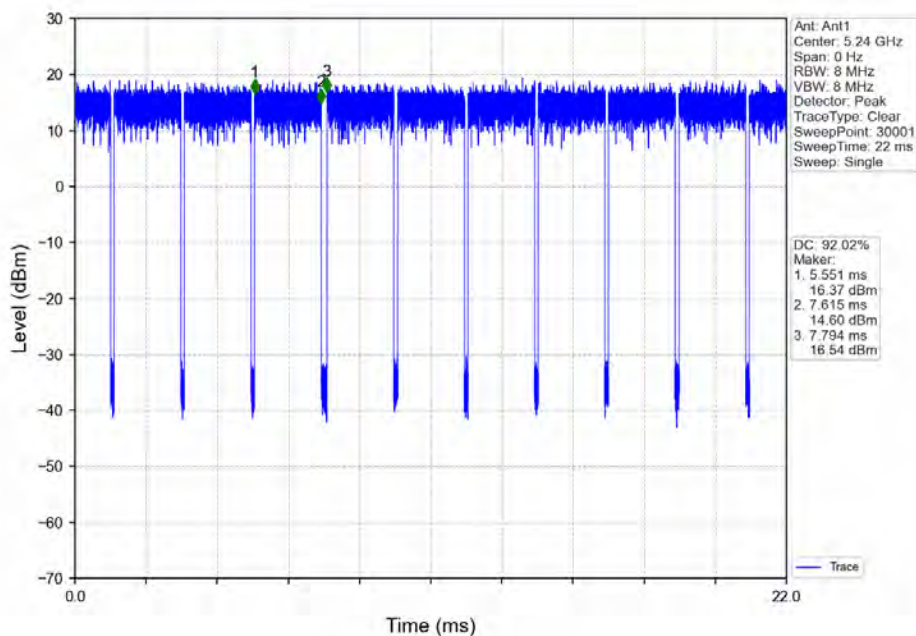
**Test Report No.: W7L-P21090018RF03**

802.11ac (VHT40)	SISO	5190	0.952	1.130	84.25	0.74	6.51
		5230	0.952	1.103	86.31	0.64	4.44
		5755	0.952	1.130	84.25	0.74	5.75
		5795	0.952	1.244	76.53	1.16	13.47
802.11ac (VHT80)	SISO	5210	0.465	0.598	77.76	1.09	5.02
		5775	0.464	0.633	73.30	1.35	8.14

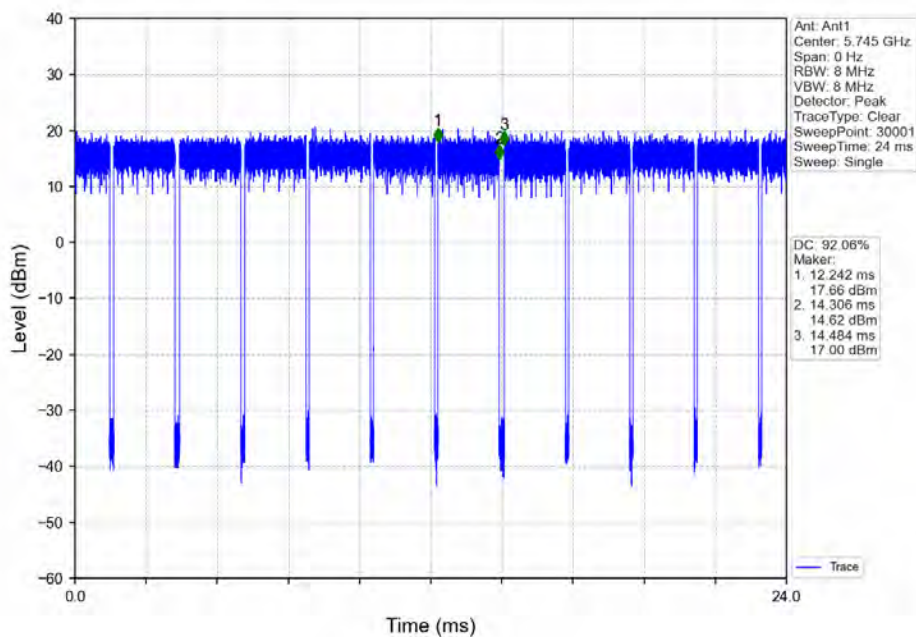
TEST GRAPH



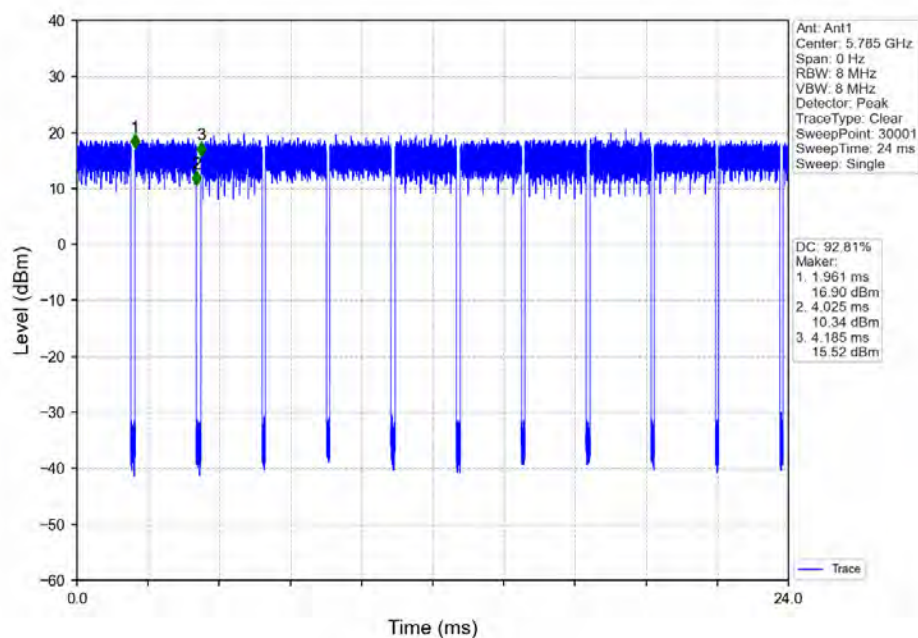
802.11a_HCH_5240MHz_Ant1_NTNV



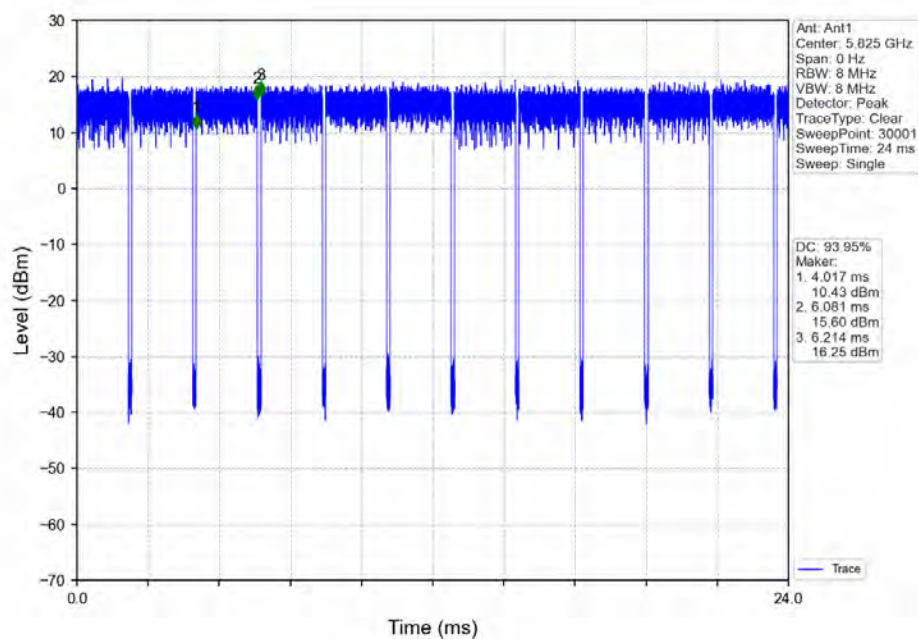
802.11a_LCH_5745MHz_Ant1_NTNV



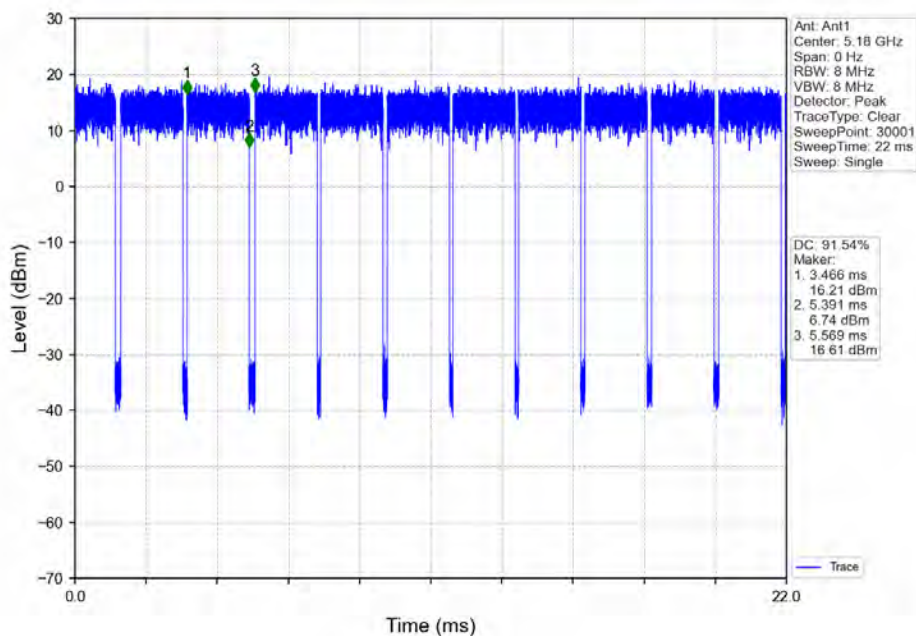
802.11a_MCH_5785MHz_Ant1_NTNV



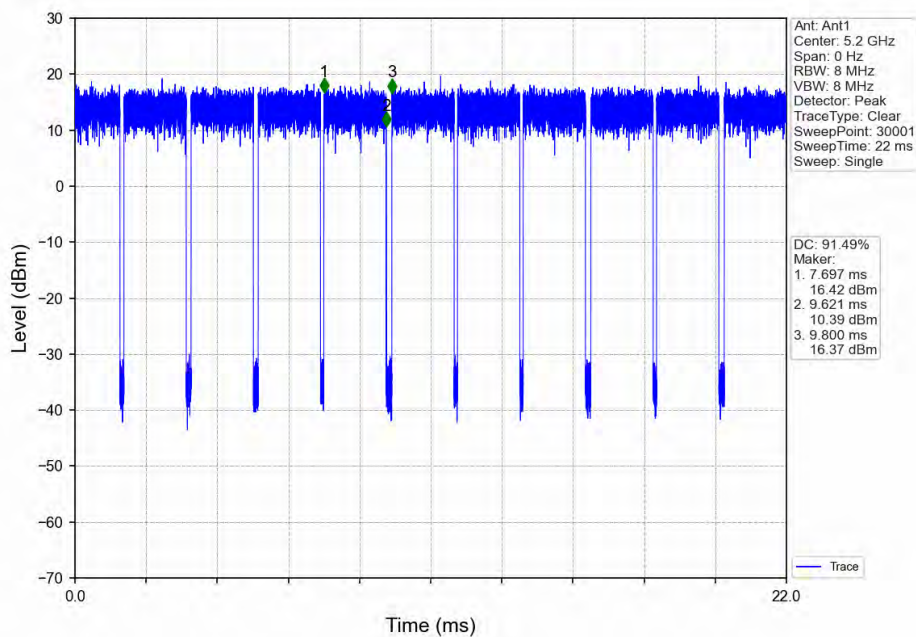
802.11a_HCH_5825MHz_Ant1_NTNV



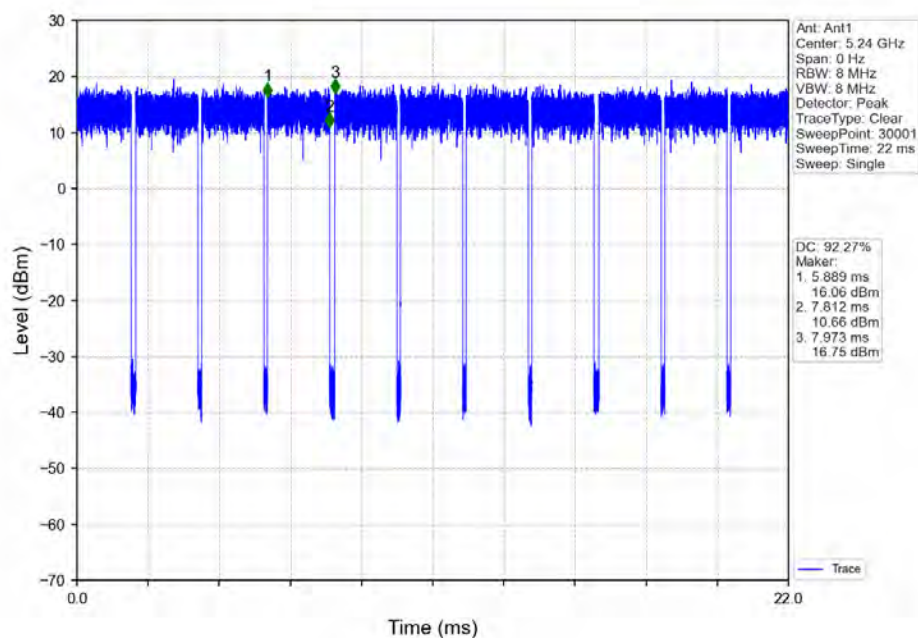
802.11n(HT20)_LCH_5180MHz_Ant1_NTNV



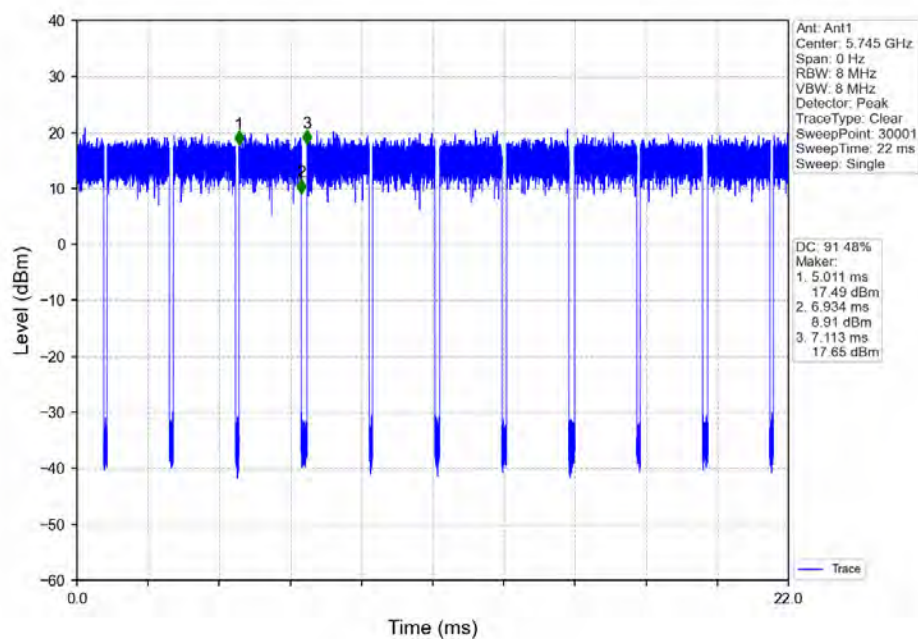
802.11n(HT20)_MCH_5200MHz_Ant1_NTNV



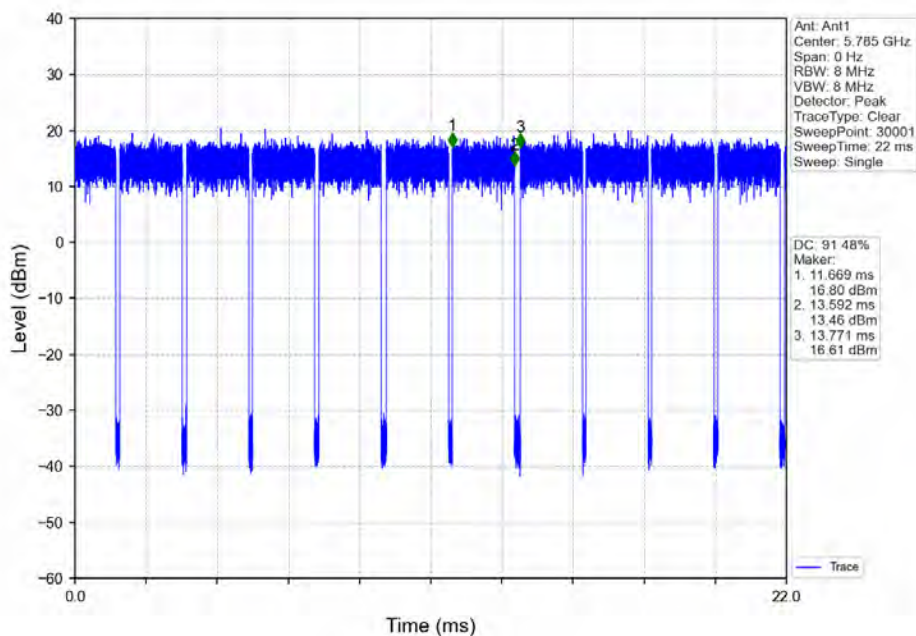
802.11n(HT20)_HCH_5240MHz_Ant1_NTNV



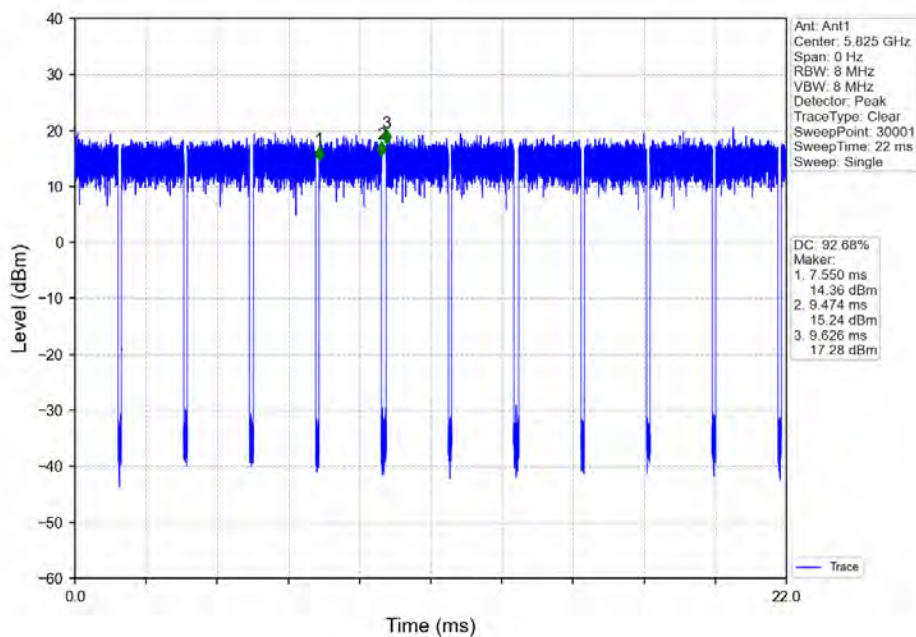
802.11n(HT20)_LCH_5745MHz_Ant1_NTNV



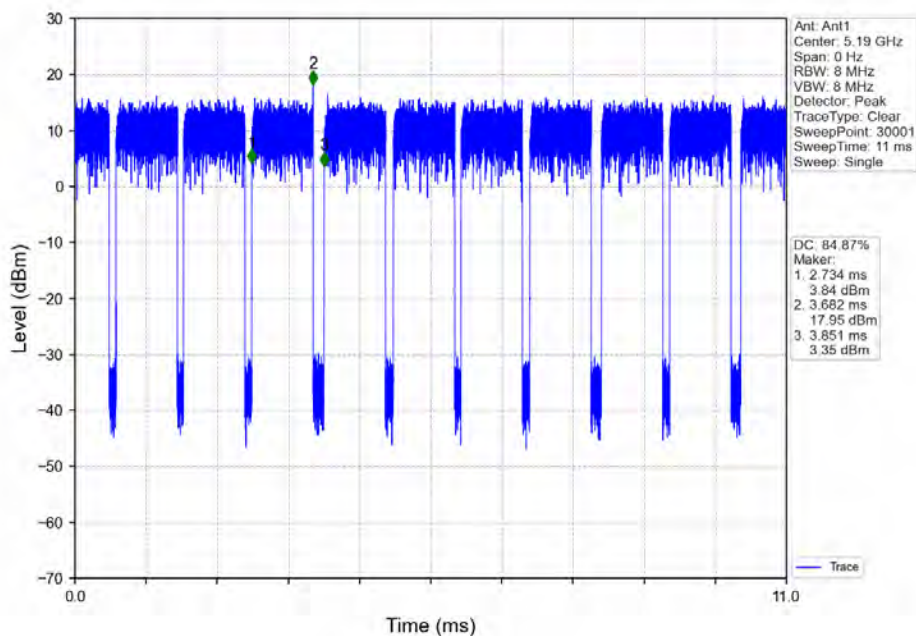
802.11n(HT20)_MCH_5785MHz_Ant1_NTNV



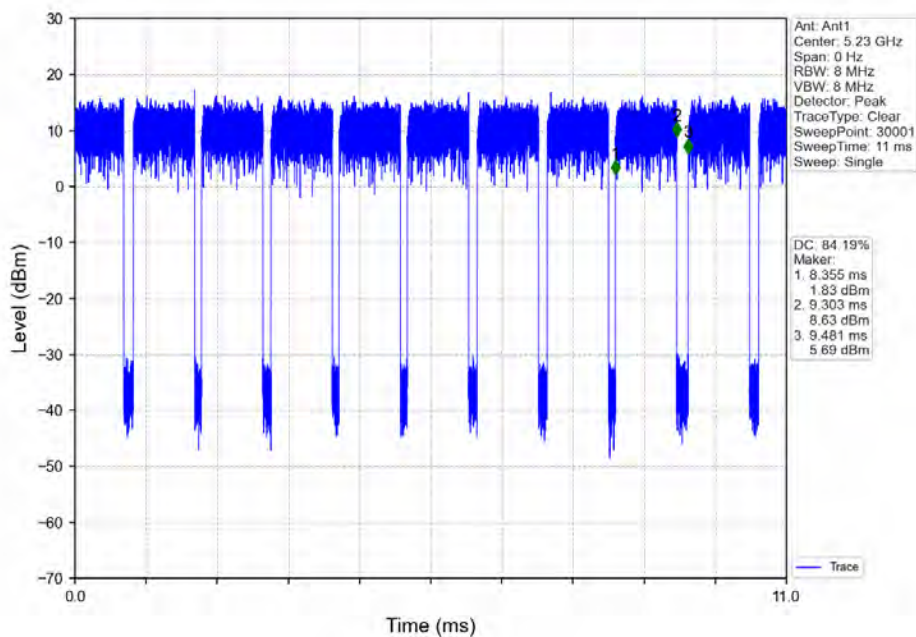
802.11n(HT20)_HCH_5825MHz_Ant1_NTNV



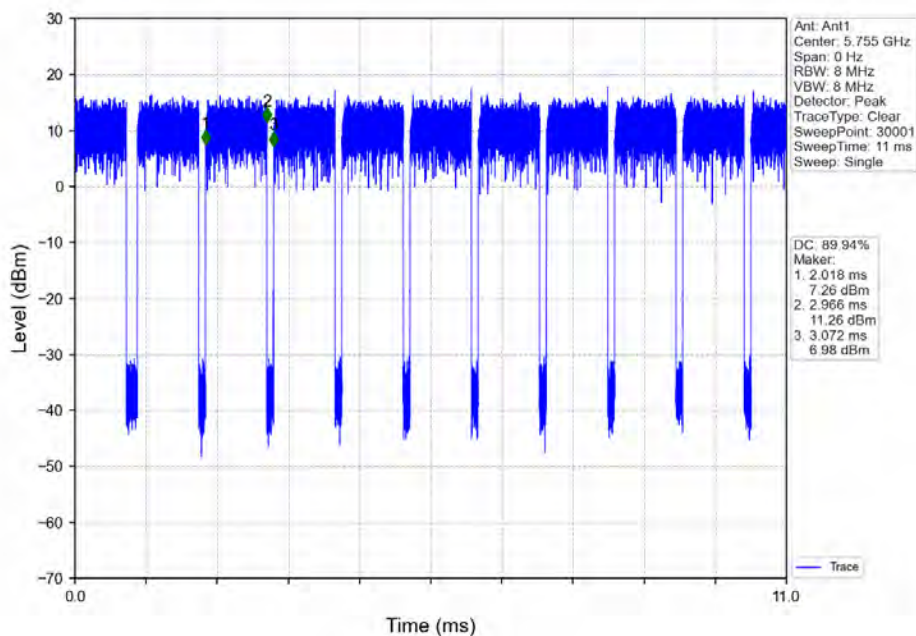
802.11n(HT40)_LCH_5190MHz_Ant1_NTNV



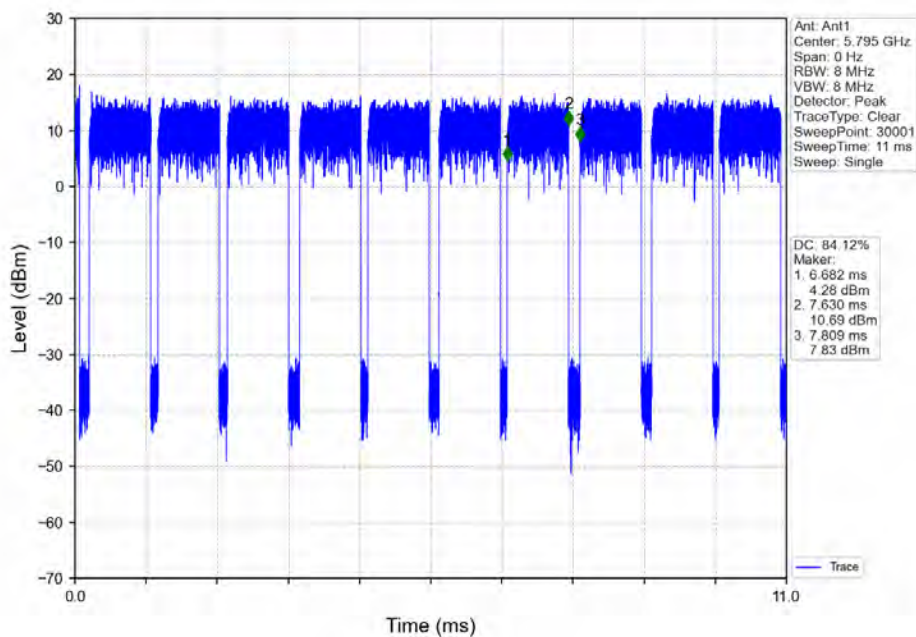
802.11n(HT40)_HCH_5230MHz_Ant1_NTNV



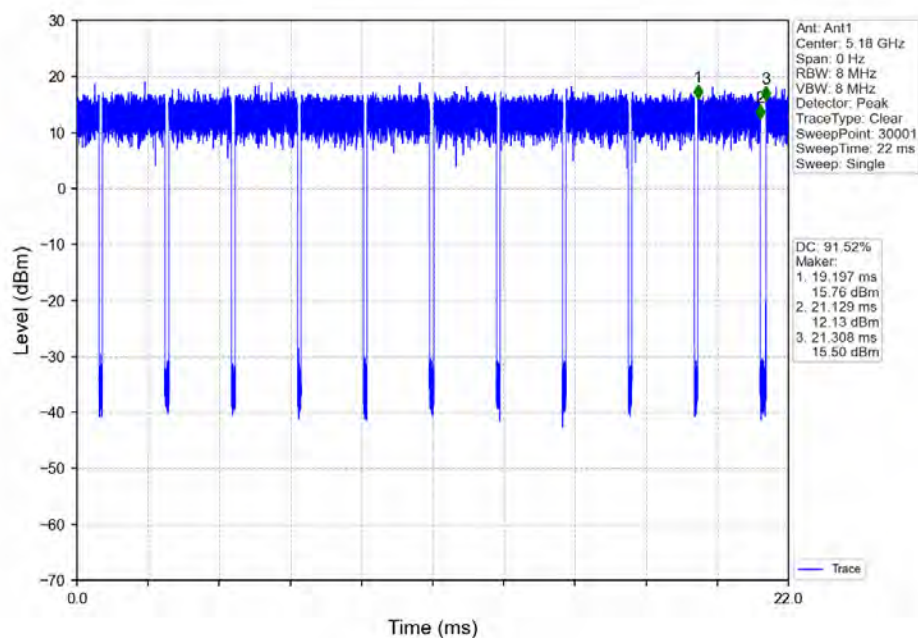
802.11n(HT40)_LCH_5755MHz_Ant1_NTNV



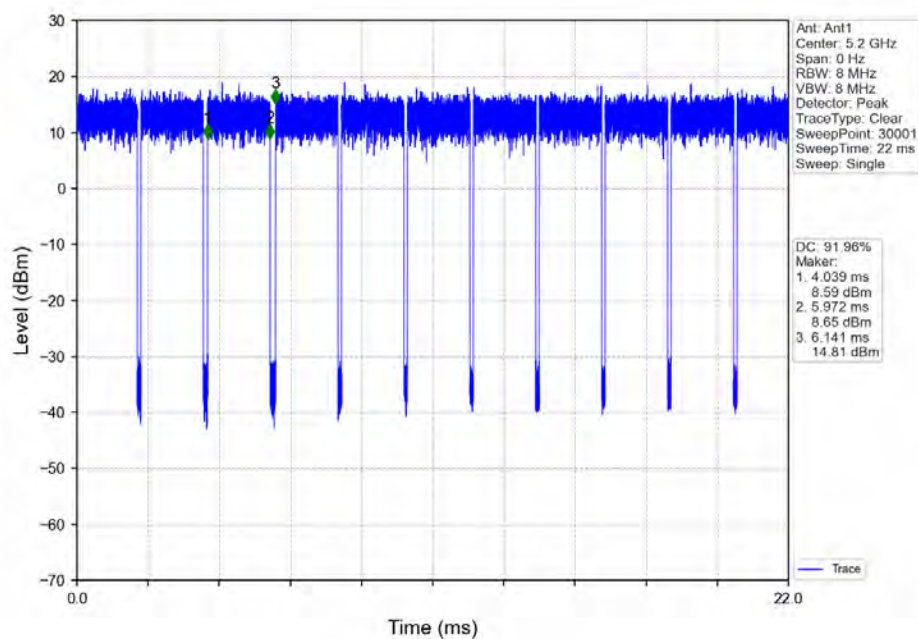
802.11n(HT40)_HCH_5795MHz_Ant1_NTNV



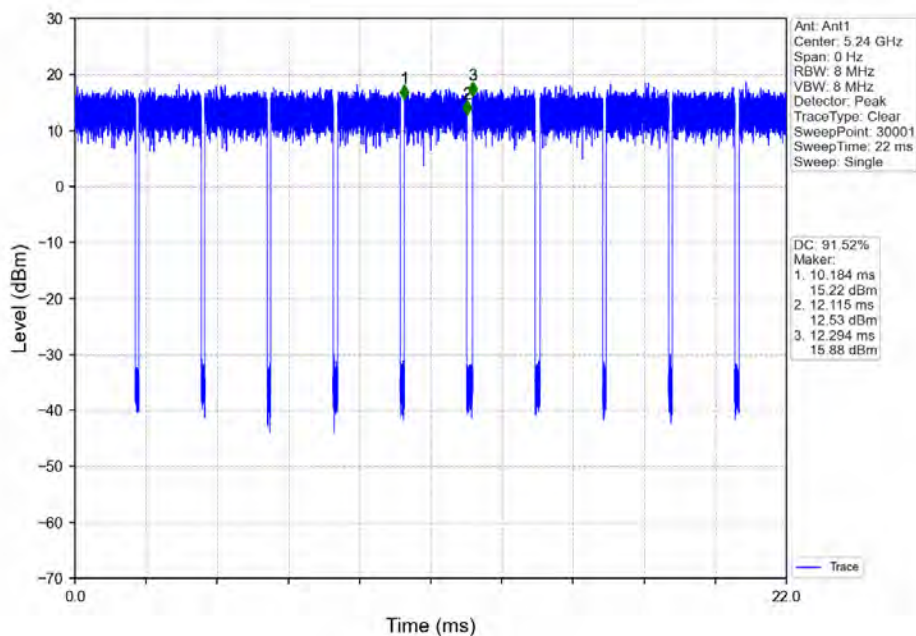
802.11ac(VHT20)_LCH_5180MHz_Ant1_NTNV



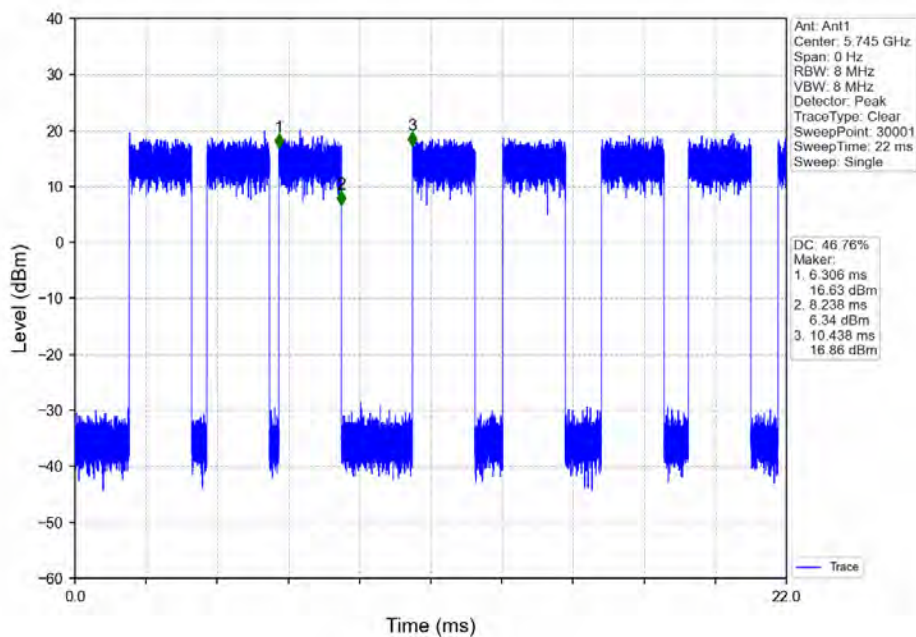
802.11ac(VHT20)_MCH_5200MHz_Ant1_NTNV



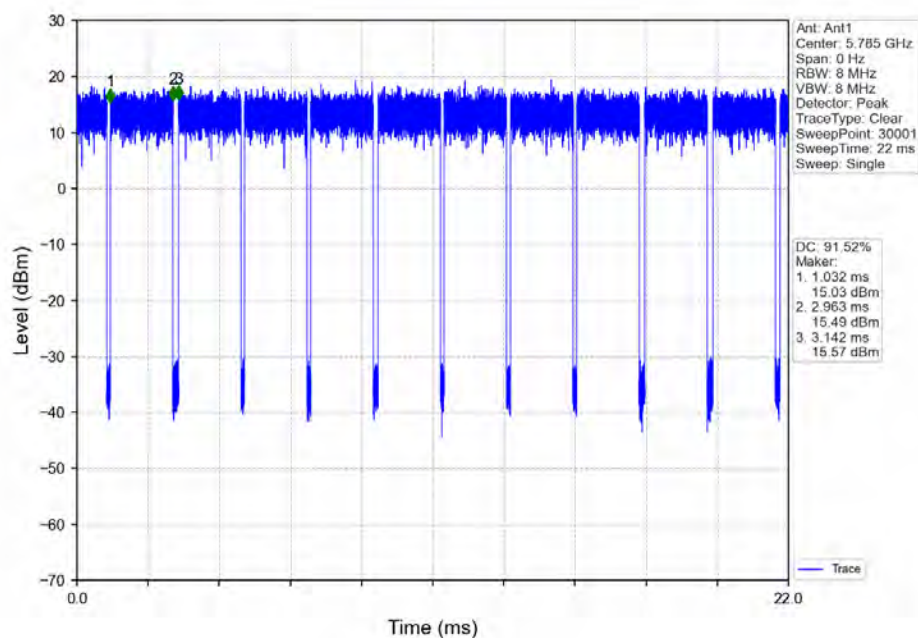
802.11ac(VHT20)_HCH_5240MHz_Ant1_NTNV



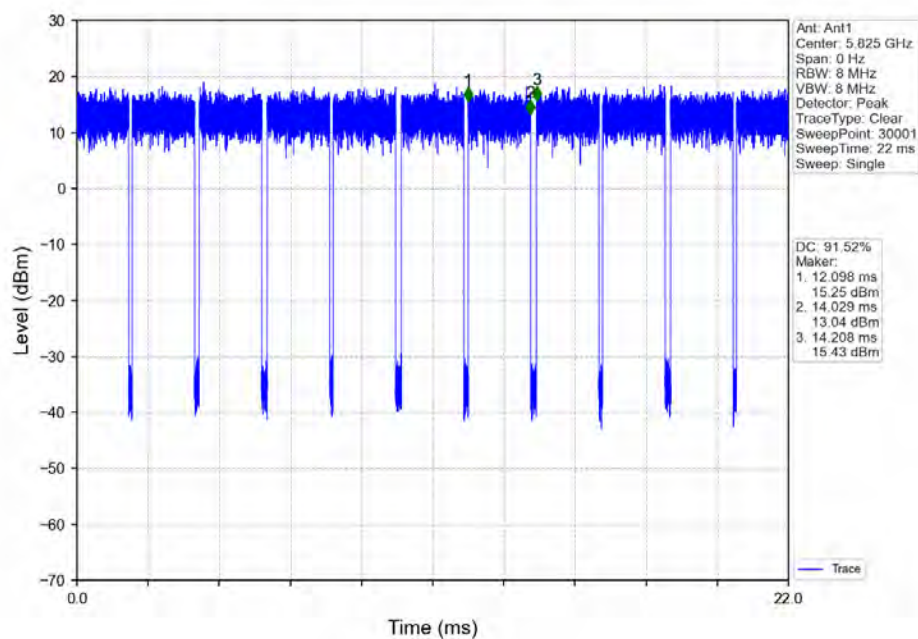
802.11ac(VHT20)_LCH_5745MHz_Ant1_NTNV



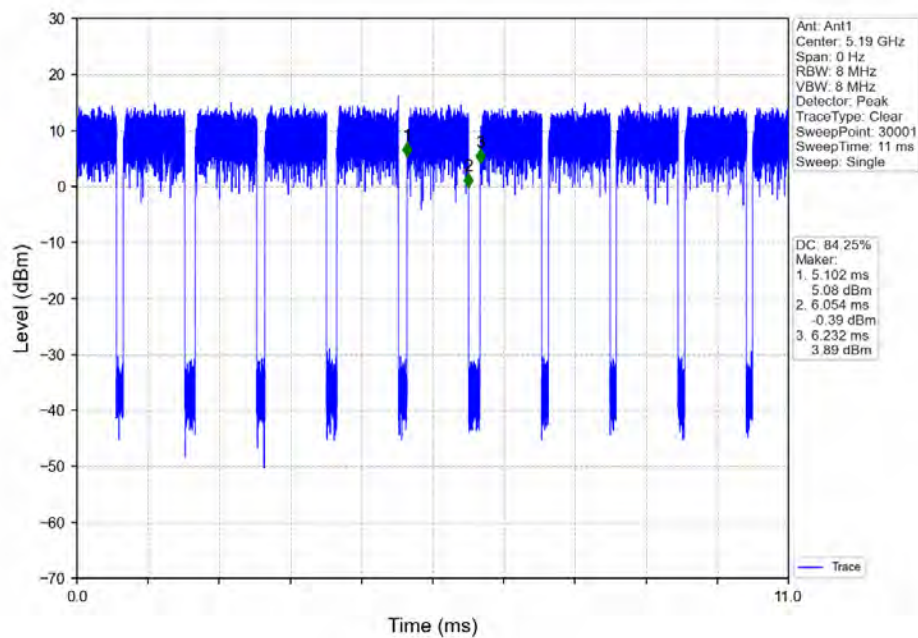
802.11ac(VHT20)_MCH_5785MHz_Ant1_NTNV



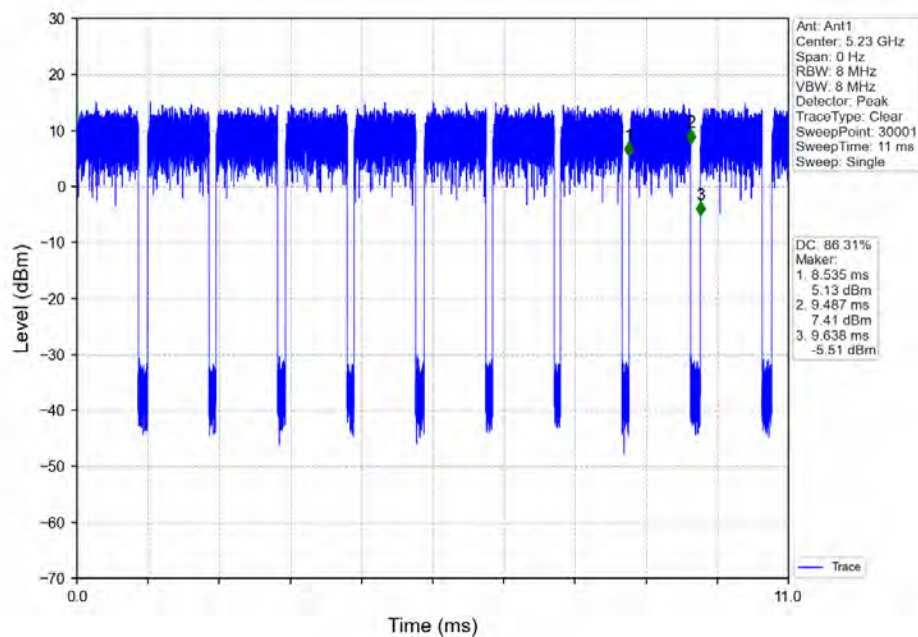
802.11ac(VHT20)_HCH_5825MHz_Ant1_NTNV



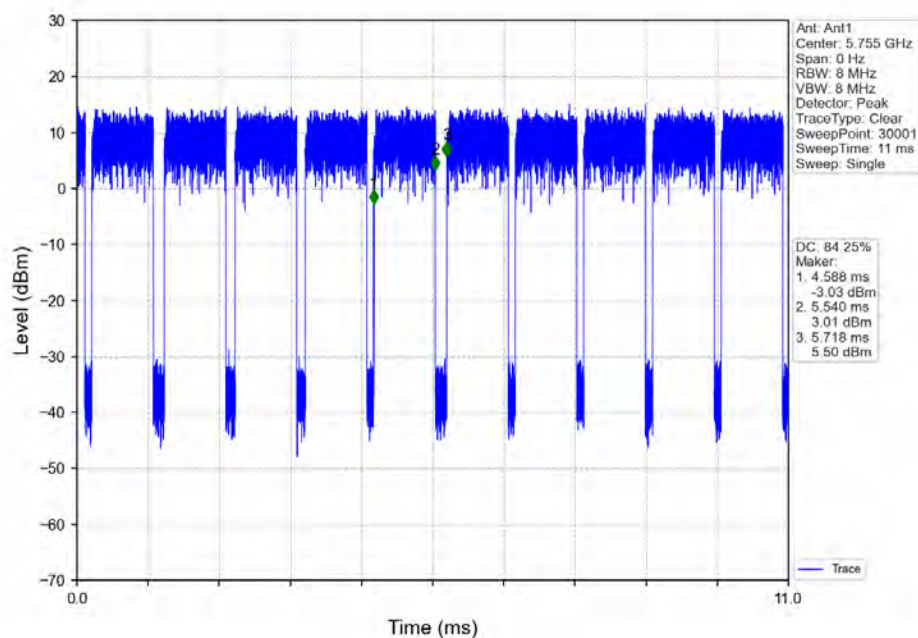
802.11ac(VHT40)_LCH_5190MHz_Ant1_NTNV



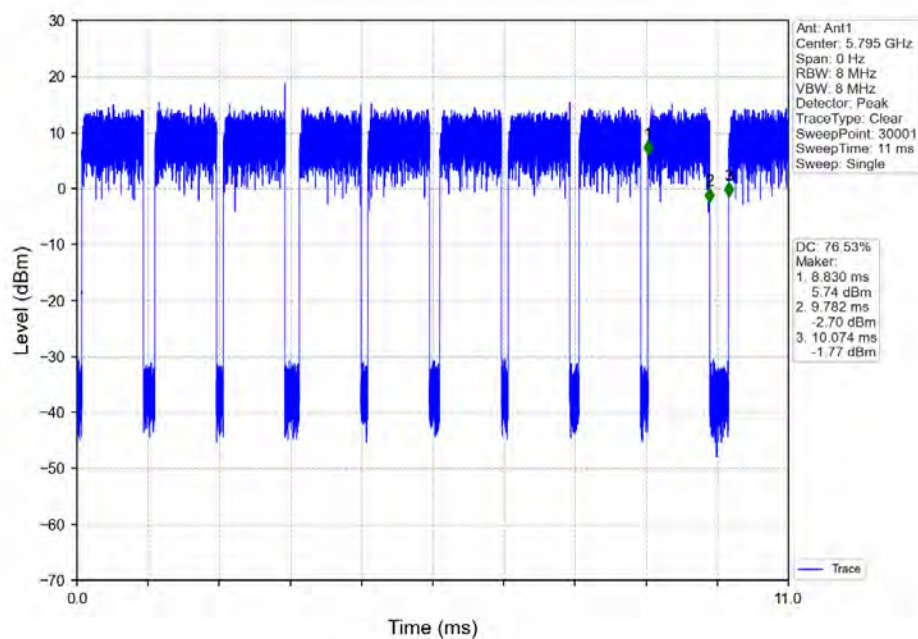
802.11ac(VHT40)_HCH_5230MHz_Ant1_NTNV



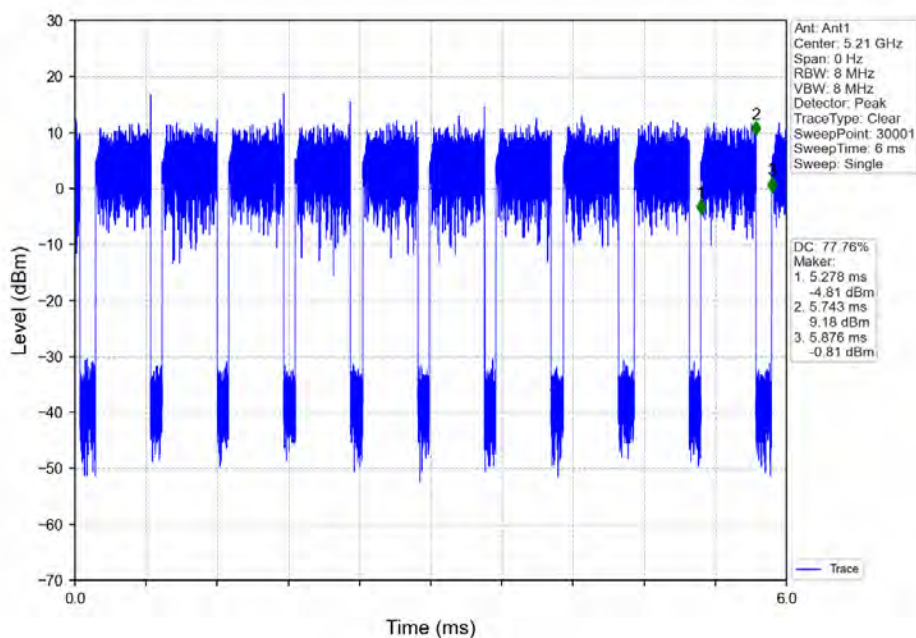
802.11ac(VHT40)_LCH_5755MHz_Ant1_NTNV



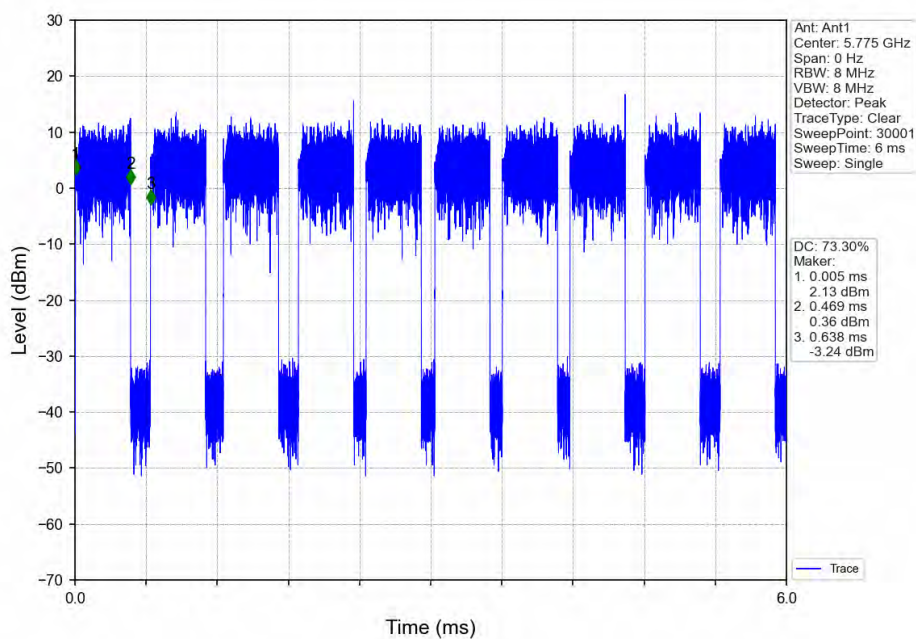
802.11ac(VHT40)_HCH_5795MHz_Ant1_NTNV



802.11ac(VHT80)_MCH_5210MHz_Ant1_NTNV



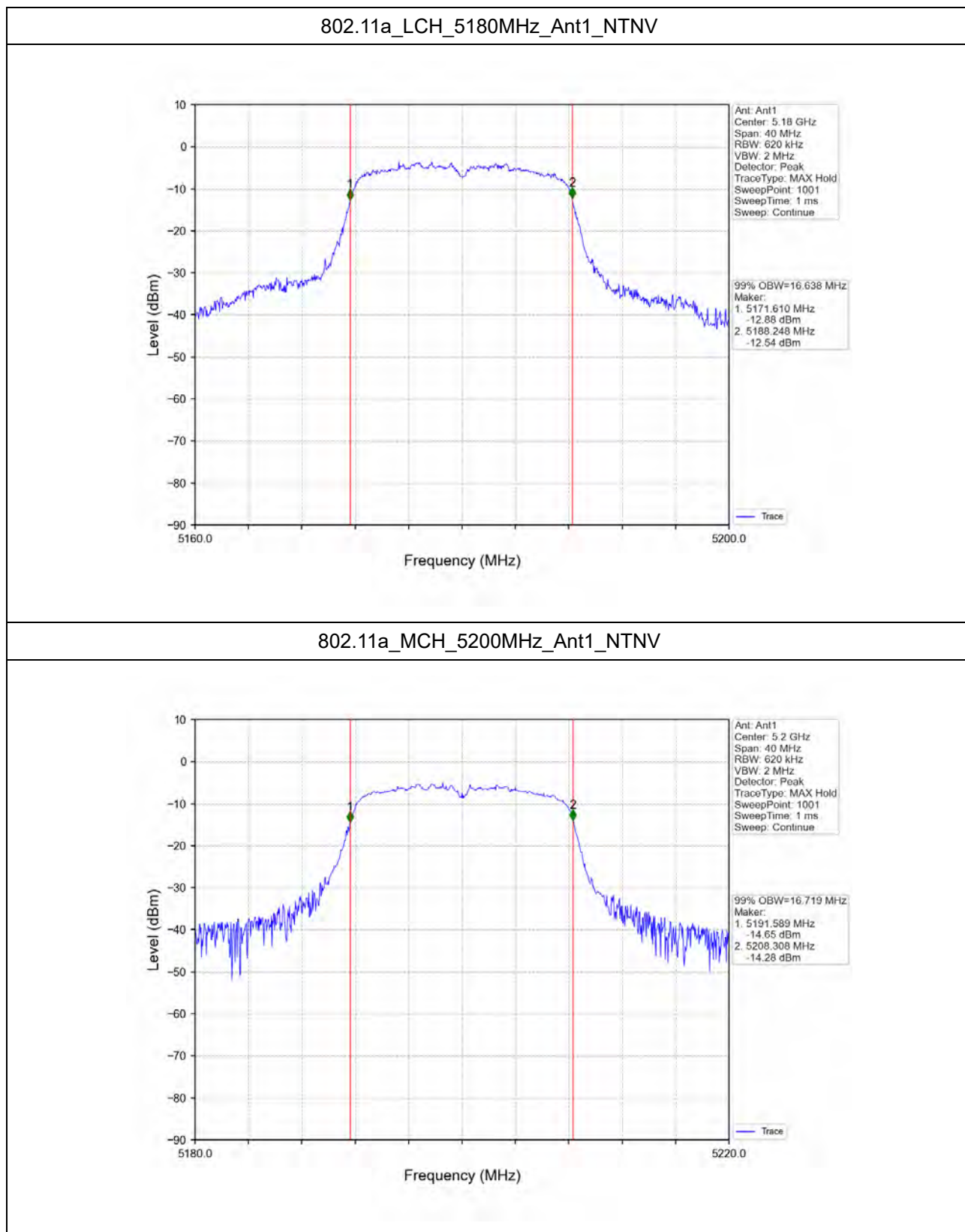
802.11ac(VHT80)_MCH_5775MHz_Ant1_NTNV



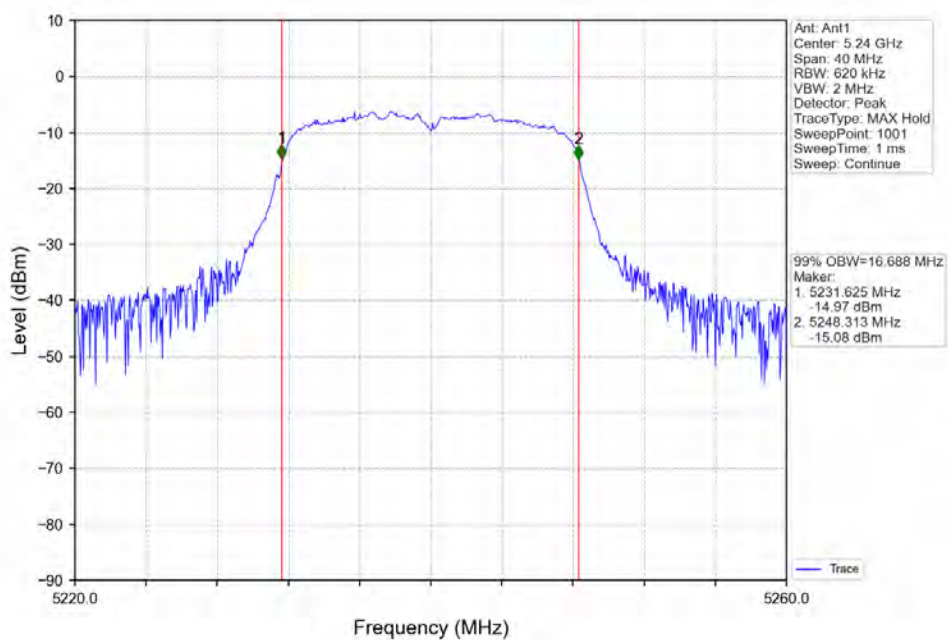
OBW_Bandwidth TEST RESULT

Mode	TX Type	Frequency (MHz)	Ant	99% Occupied Bandwidth (MHz)	Verdict
				Result	
802.11a	SISO	5180	1	16.638	Pass
		5200	1	16.719	Pass
		5240	1	16.688	Pass
		5745	1	17.715	Pass
		5785	1	17.001	Pass
		5825	1	16.916	Pass
802.11n (HT20)	SISO	5180	1	17.630	Pass
		5200	1	17.591	Pass
		5240	1	17.651	Pass
		5745	1	17.820	Pass
		5785	1	17.800	Pass
		5825	1	17.705	Pass
802.11n (HT40)	SISO	5190	1	36.342	Pass
		5230	1	36.322	Pass
		5755	1	37.314	Pass
		5795	1	36.642	Pass
802.11ac (VHT20)	SISO	5180	1	17.643	Pass
		5200	1	17.695	Pass
		5240	1	17.663	Pass
		5745	1	17.726	Pass
		5785	1	17.706	Pass
		5825	1	17.674	Pass
802.11ac (VHT40)	SISO	5190	1	36.249	Pass
		5230	1	36.204	Pass
		5755	1	36.169	Pass
		5795	1	36.183	Pass
802.11ac (VHT80)	SISO	5210	1	75.405	Pass
		5775	1	75.351	Pass

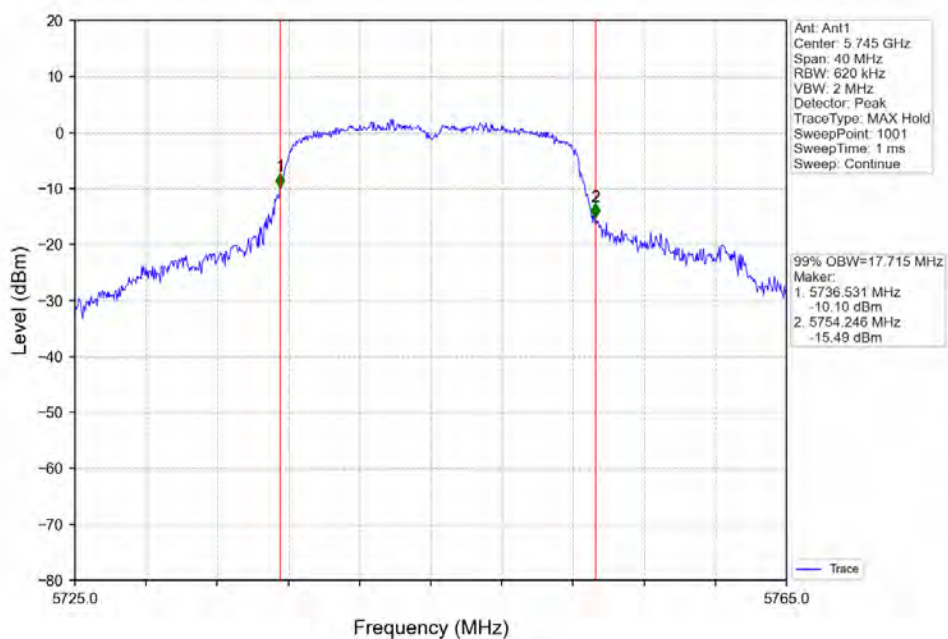
TEST GRAPH



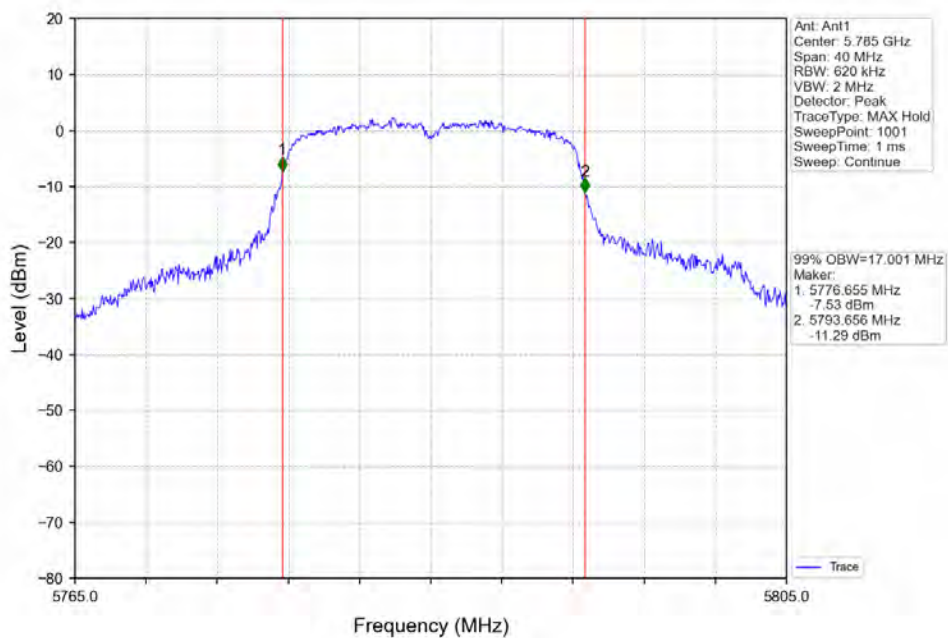
802.11a_HCH_5240MHz_Ant1_NTNV



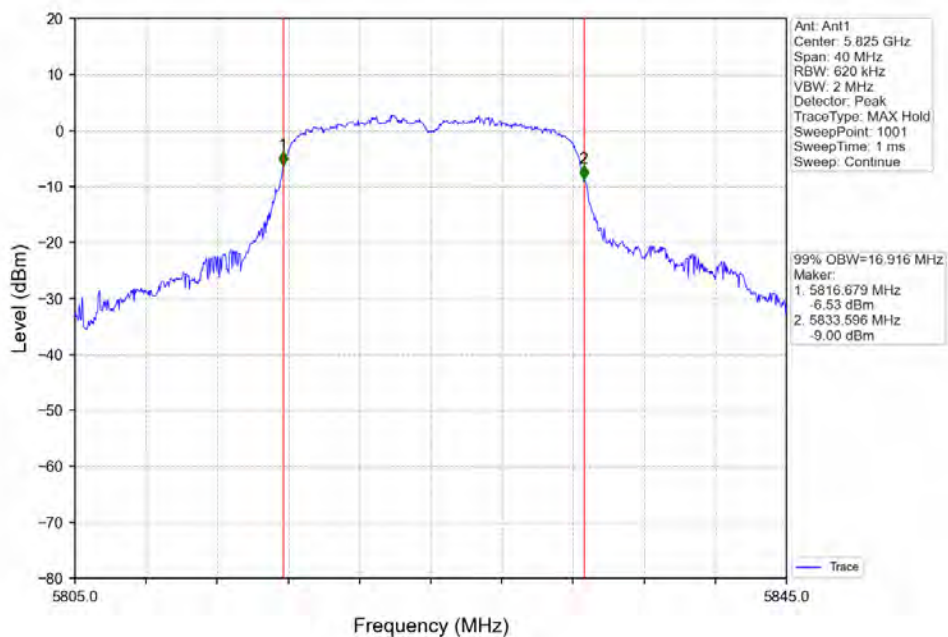
802.11a_LCH_5745MHz_Ant1_NTNV



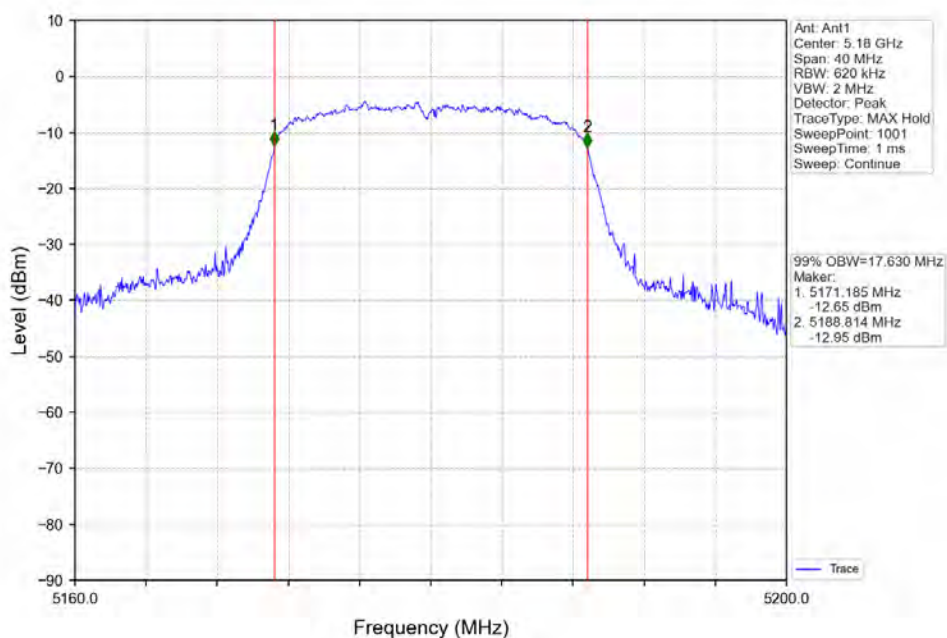
802.11a_MCH_5785MHz_Ant1_NTNV



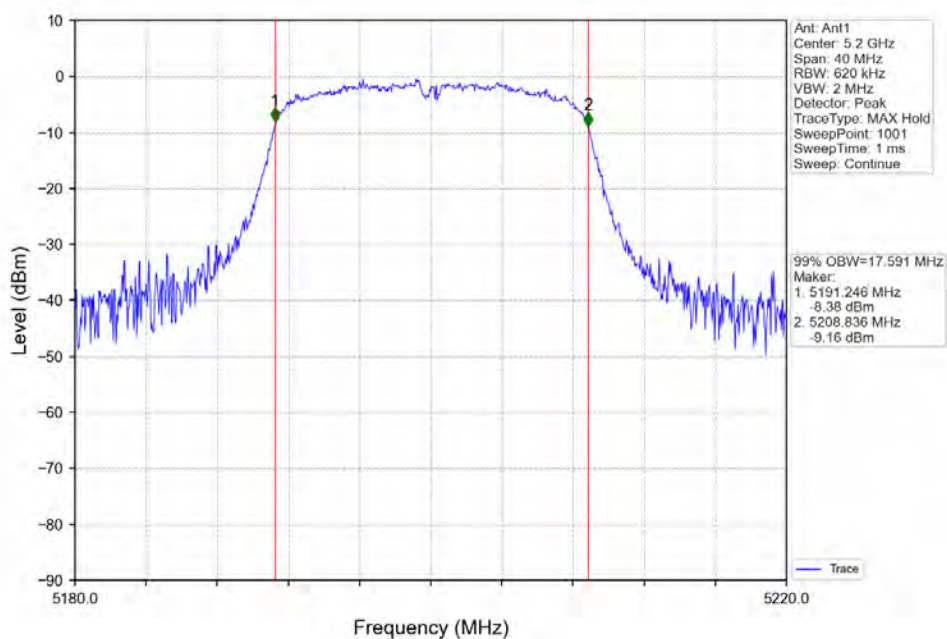
802.11a_HCH_5825MHz_Ant1_NTNV



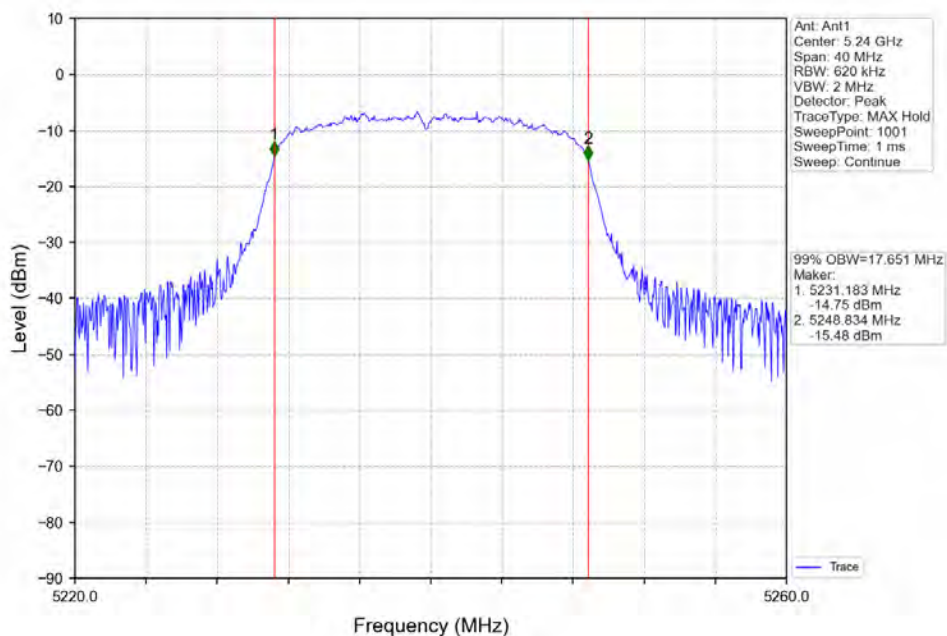
802.11n(HT20)_LCH_5180MHz_Ant1_NTNV



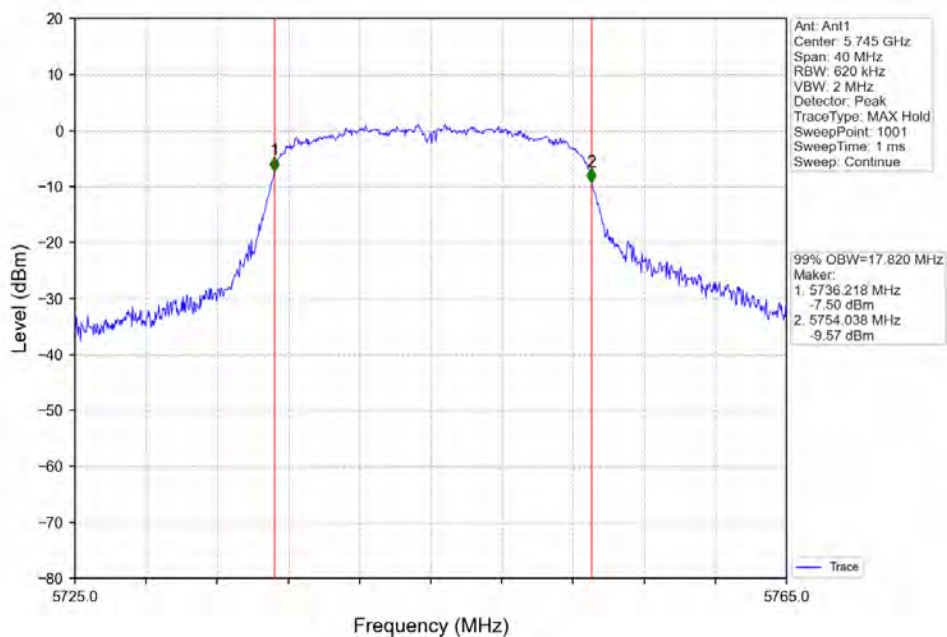
802.11n(HT20)_MCH_5200MHz_Ant1_NTNV



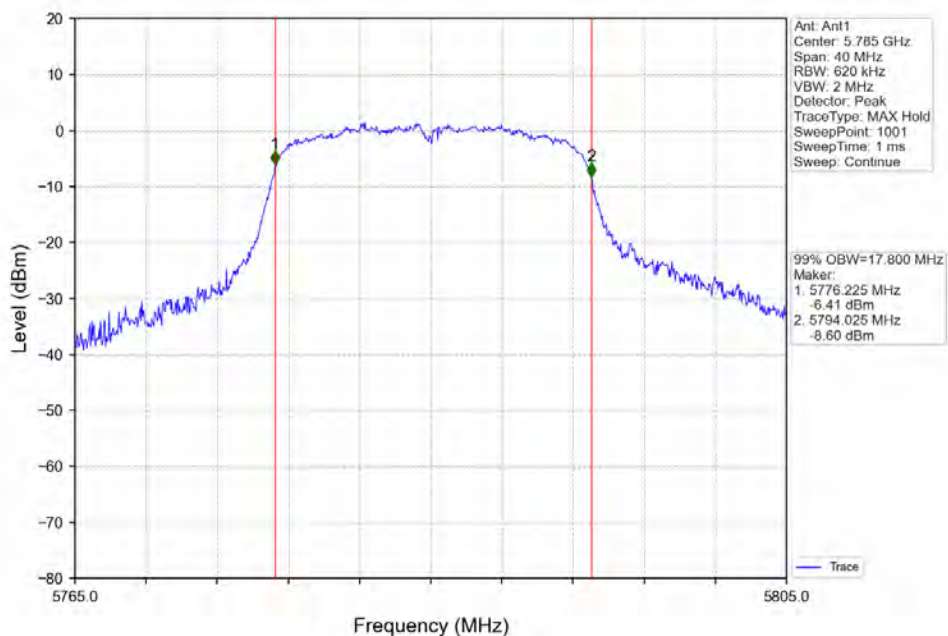
802.11n(HT20)_HCH_5240MHz_Ant1_NTNV



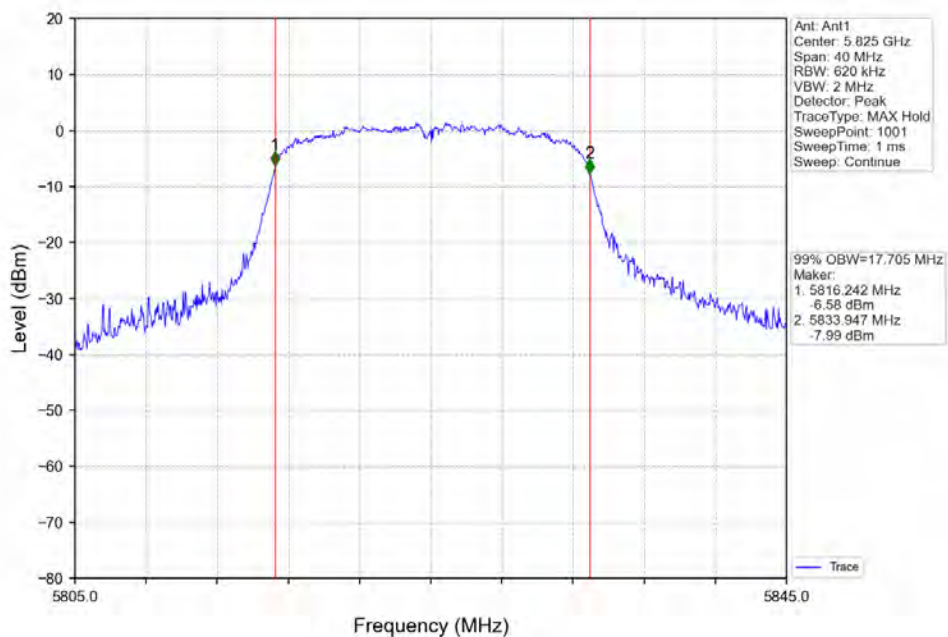
802.11n(HT20)_LCH_5745MHz_Ant1_NTNV



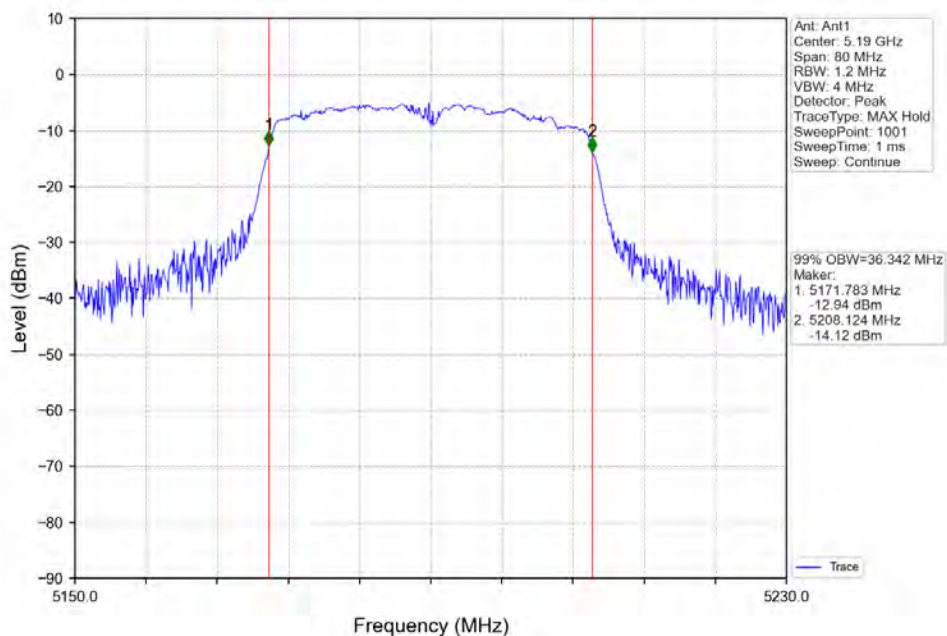
802.11n(HT20)_MCH_5785MHz_Ant1_NTNV



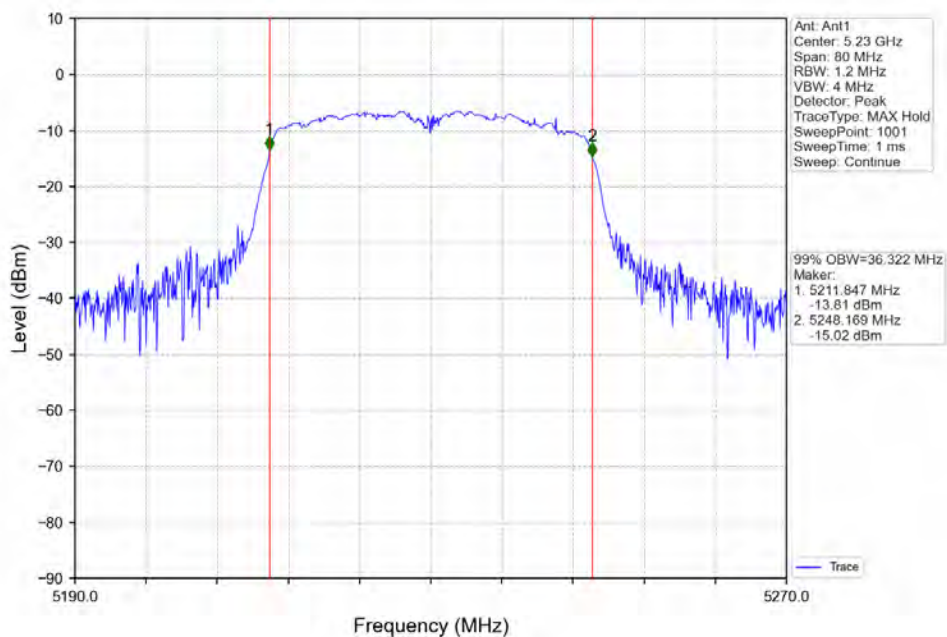
802.11n(HT20)_HCH_5825MHz_Ant1_NTNV



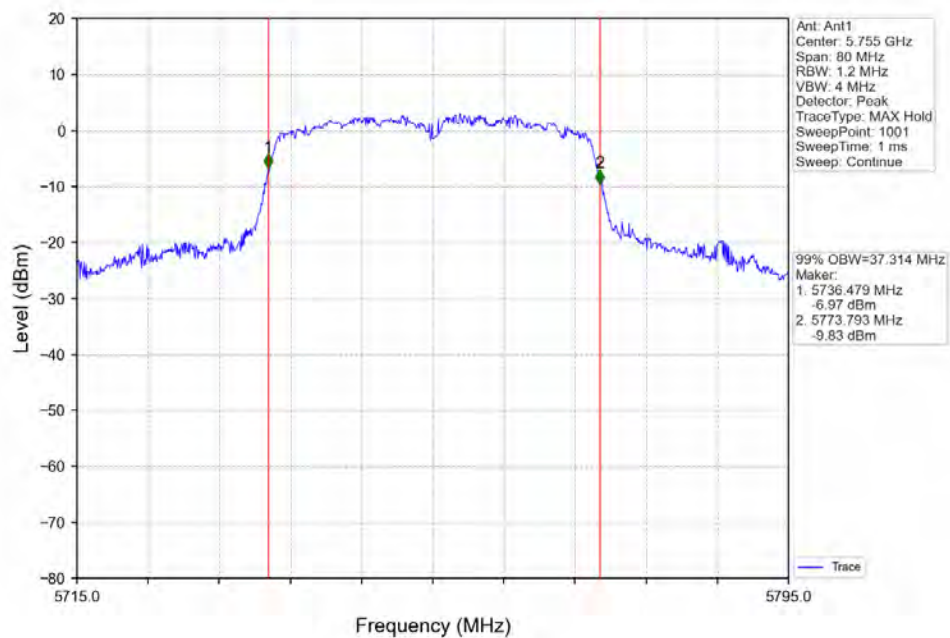
802.11n(HT40)_LCH_5190MHz_Ant1_NTNV



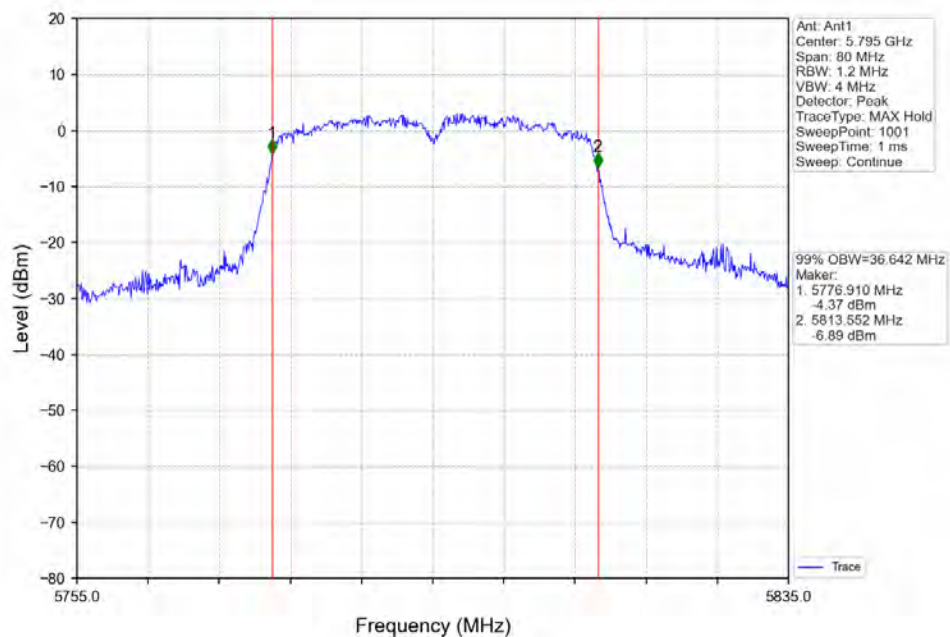
802.11n(HT40)_HCH_5230MHz_Ant1_NTNV



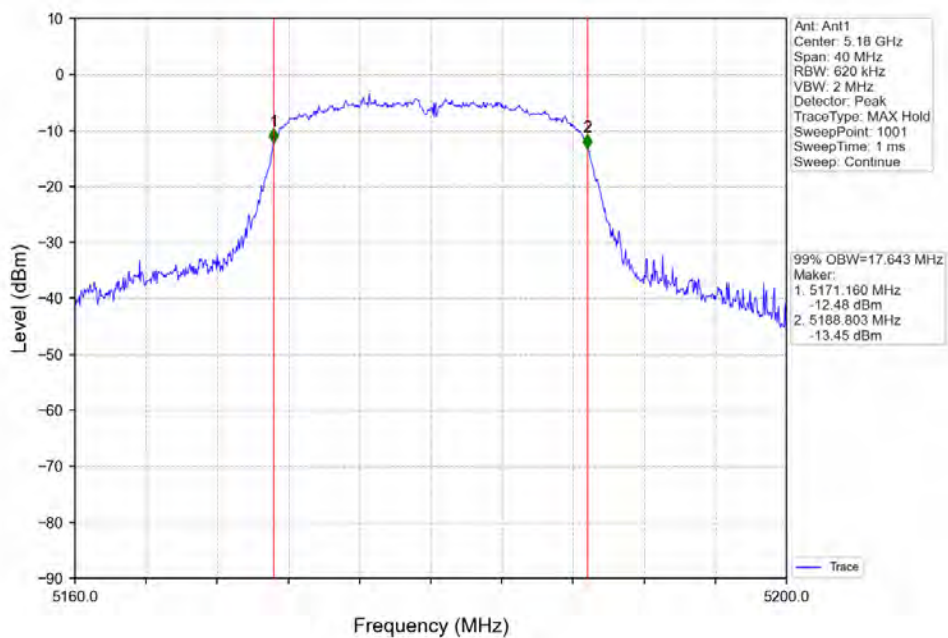
802.11n(HT40)_LCH_5755MHz_Ant1_NTNV



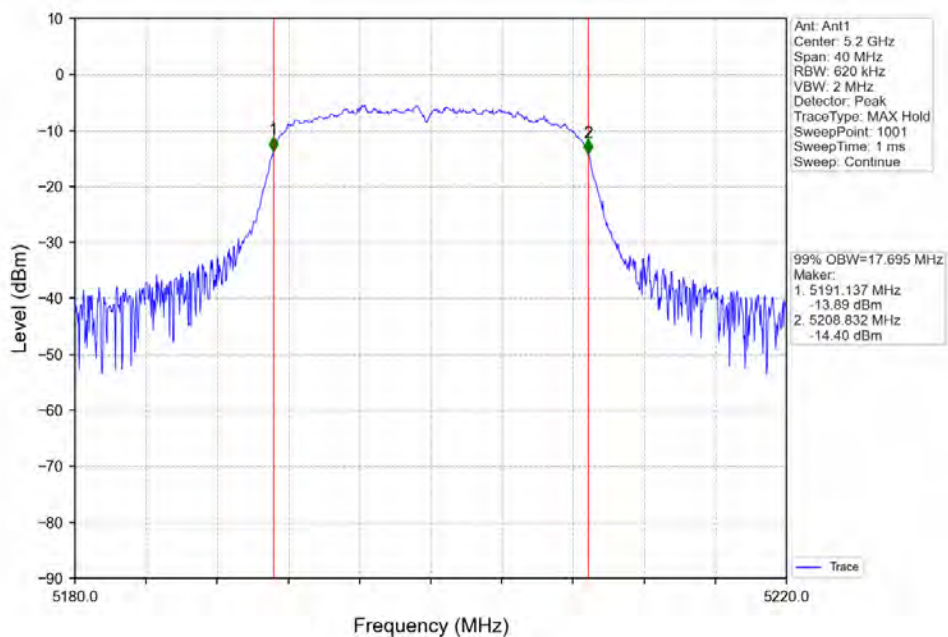
802.11n(HT40)_HCH_5795MHz_Ant1_NTNV



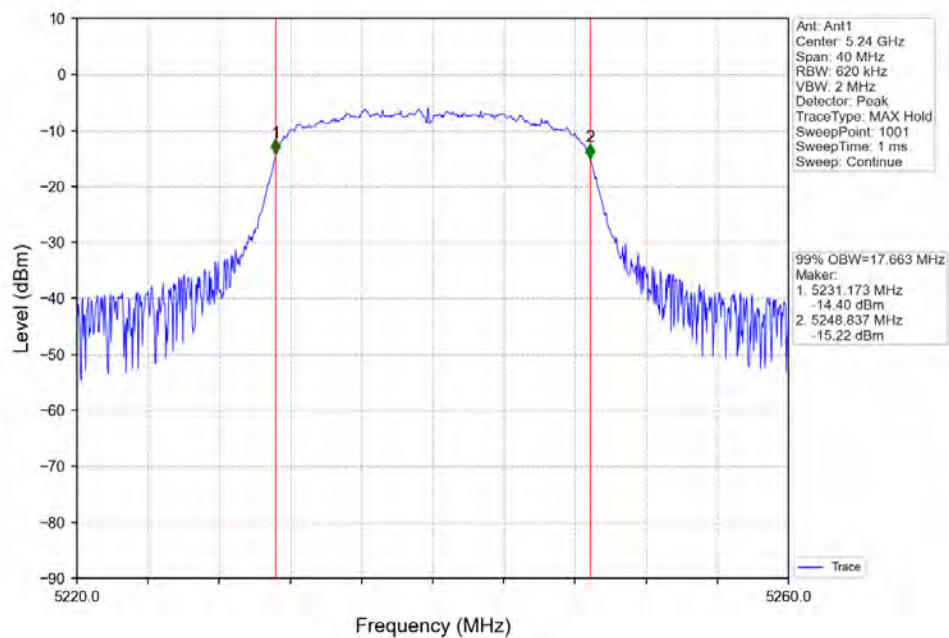
802.11ac(VHT20)_LCH_5180MHz_Ant1_NTNV



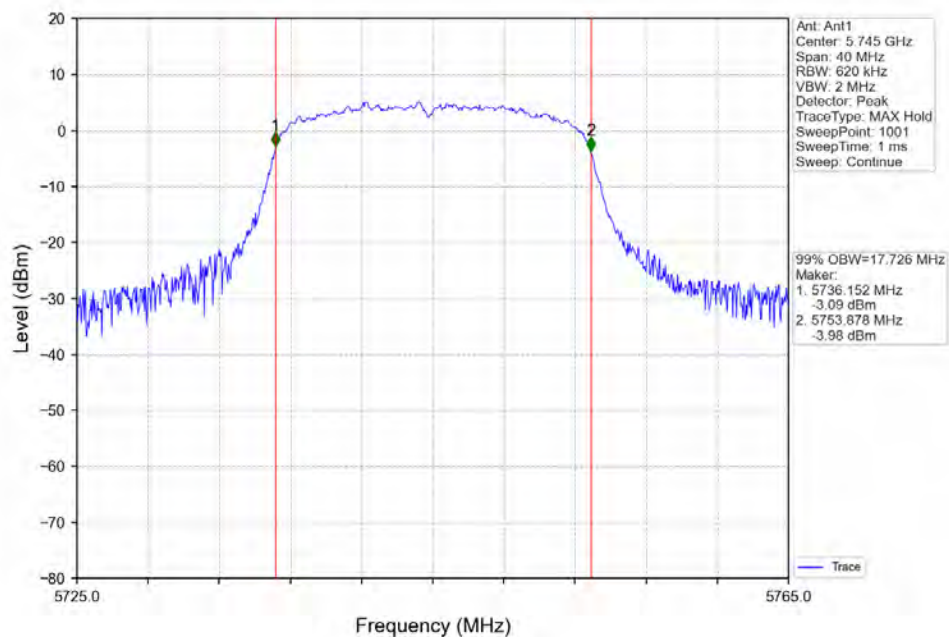
802.11ac(VHT20)_MCH_5200MHz_Ant1_NTNV



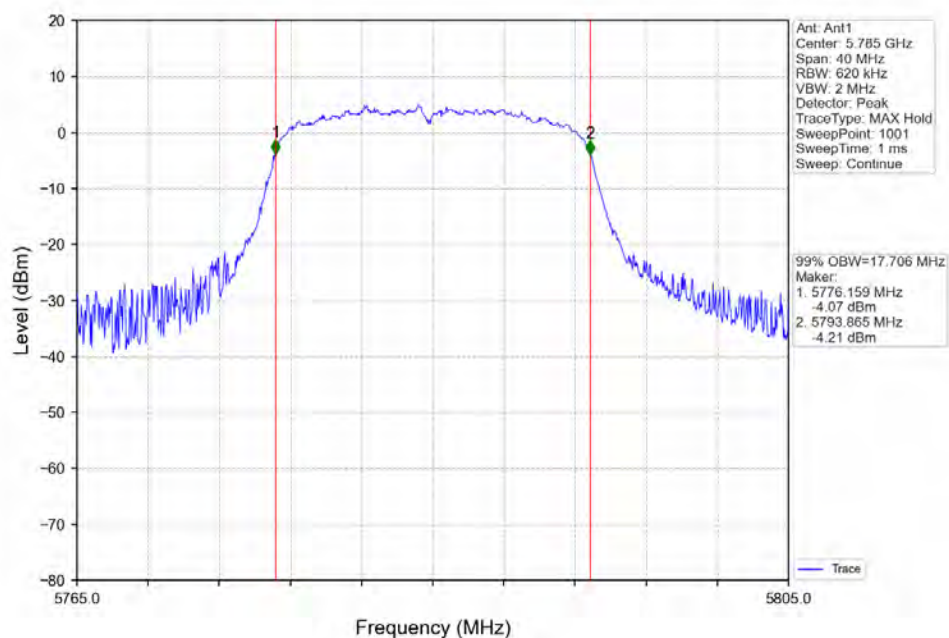
802.11ac(VHT20)_HCH_5240MHz_Ant1_NTNV



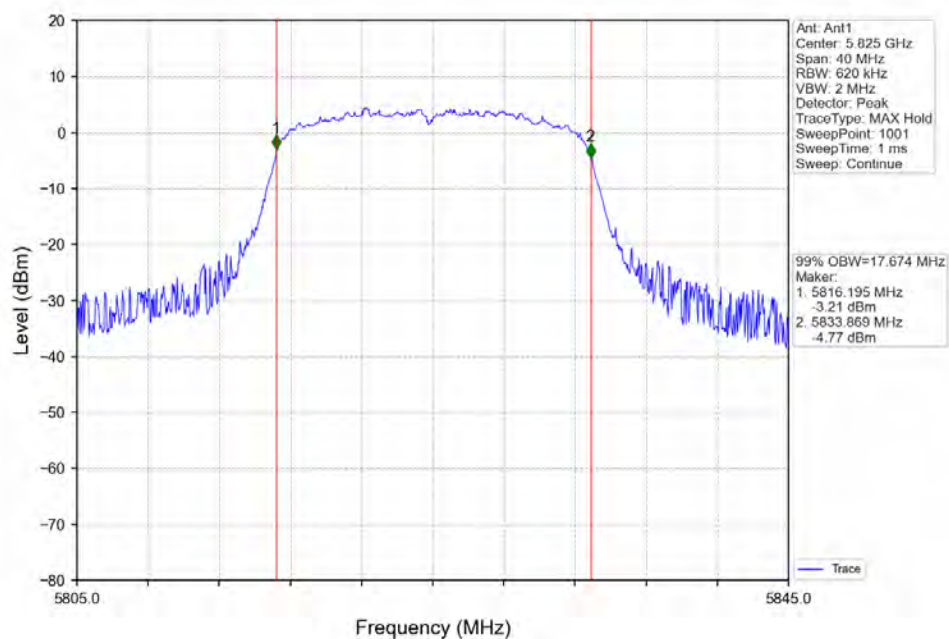
802.11ac(VHT20)_LCH_5745MHz_Ant1_NTNV



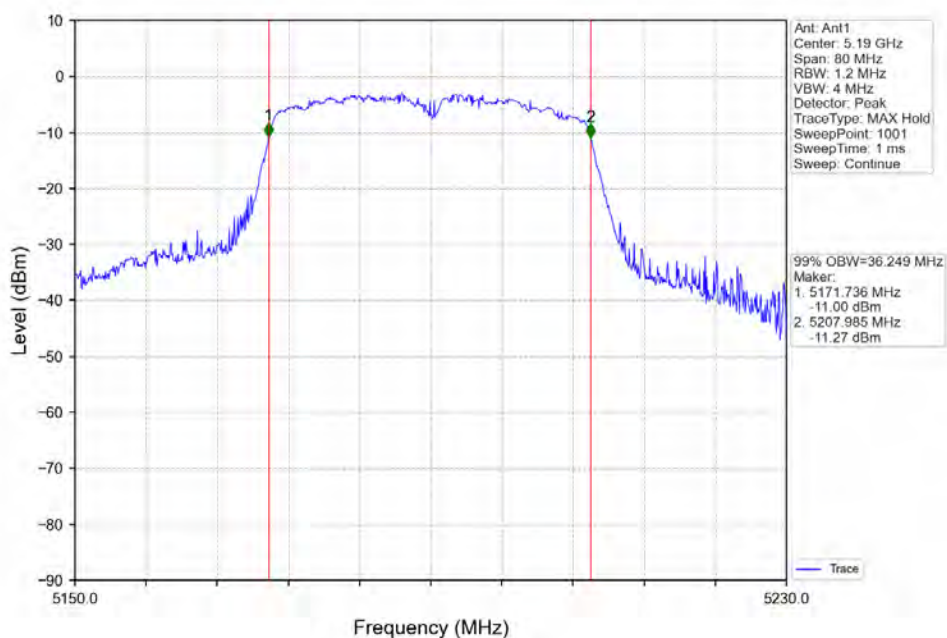
802.11ac(VHT20)_MCH_5785MHz_Ant1_NTNV



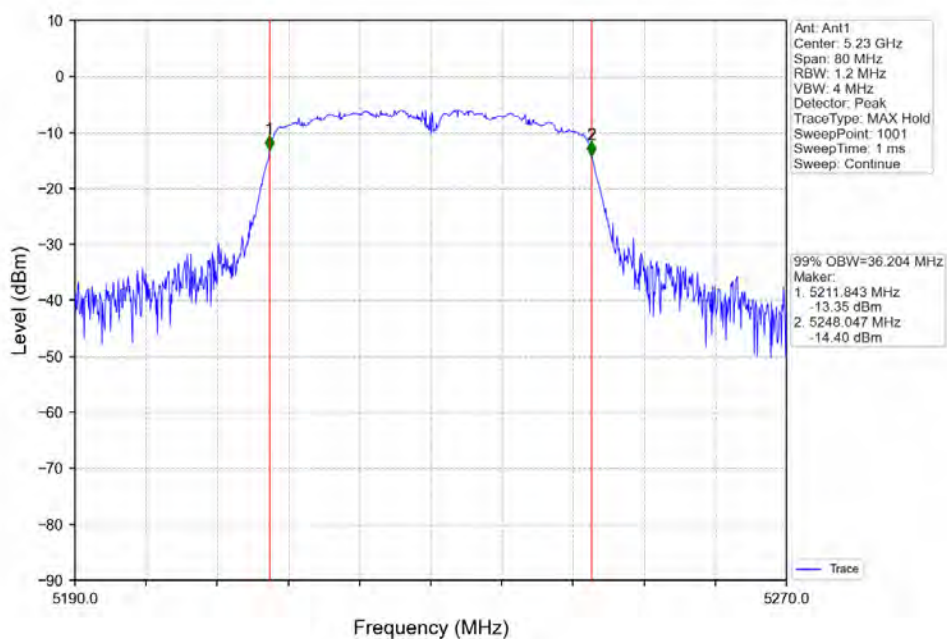
802.11ac(VHT20)_HCH_5825MHz_Ant1_NTNV



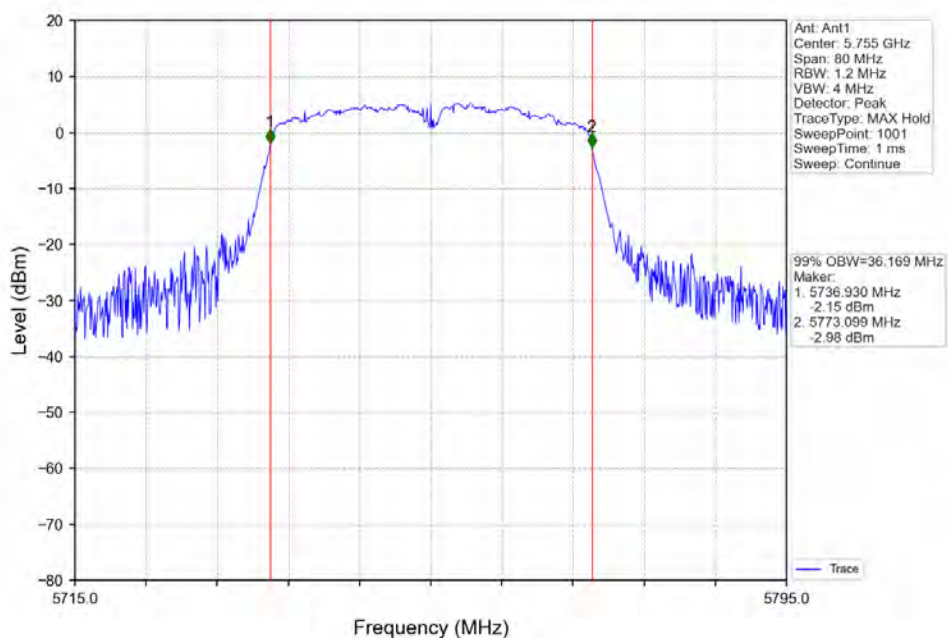
802.11ac(VHT40)_LCH_5190MHz_Ant1_NTNV



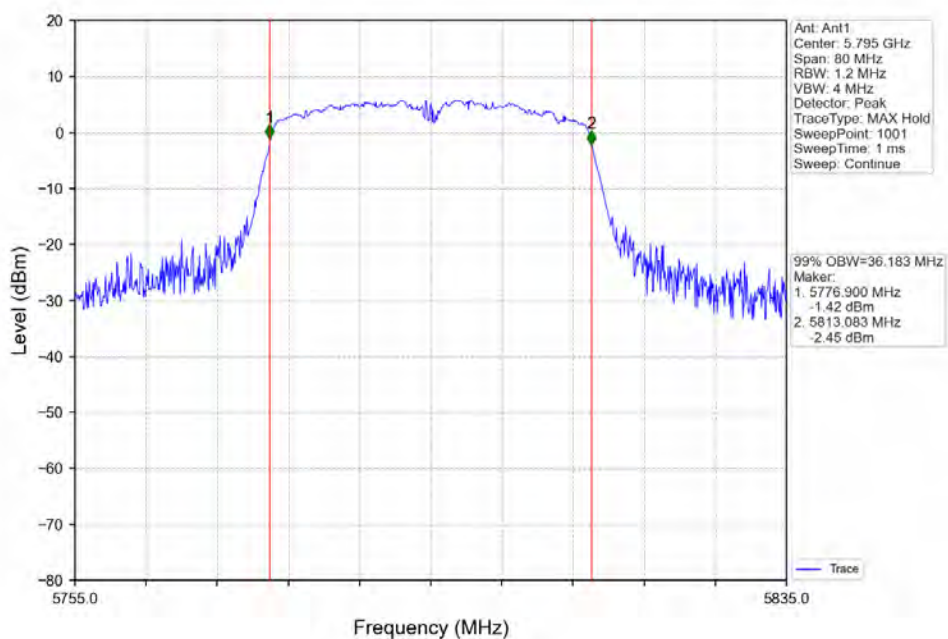
802.11ac(VHT40)_HCH_5230MHz_Ant1_NTNV



802.11ac(VHT40)_LCH_5755MHz_Ant1_NTNV



802.11ac(VHT40)_HCH_5795MHz_Ant1_NTNV

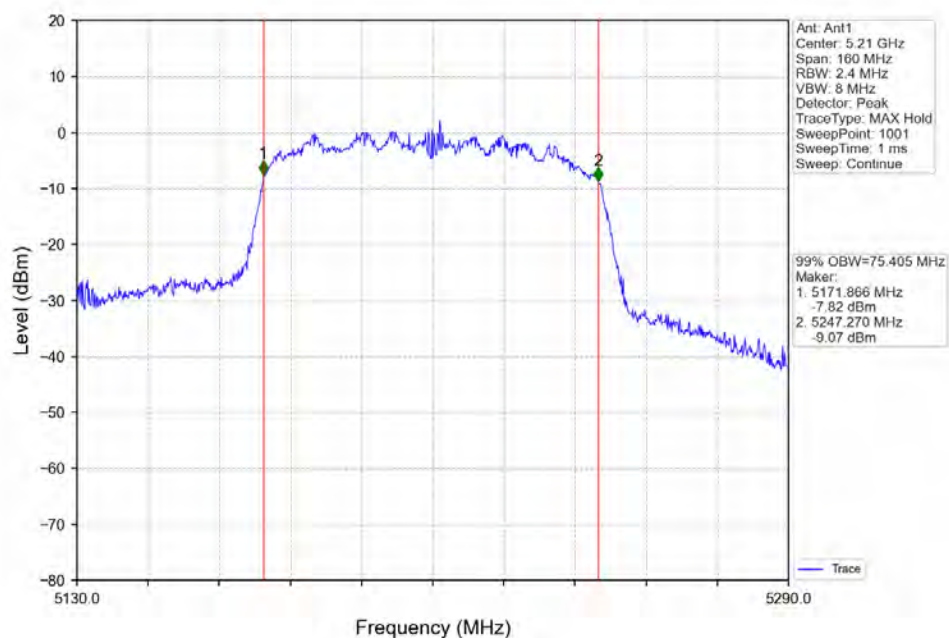




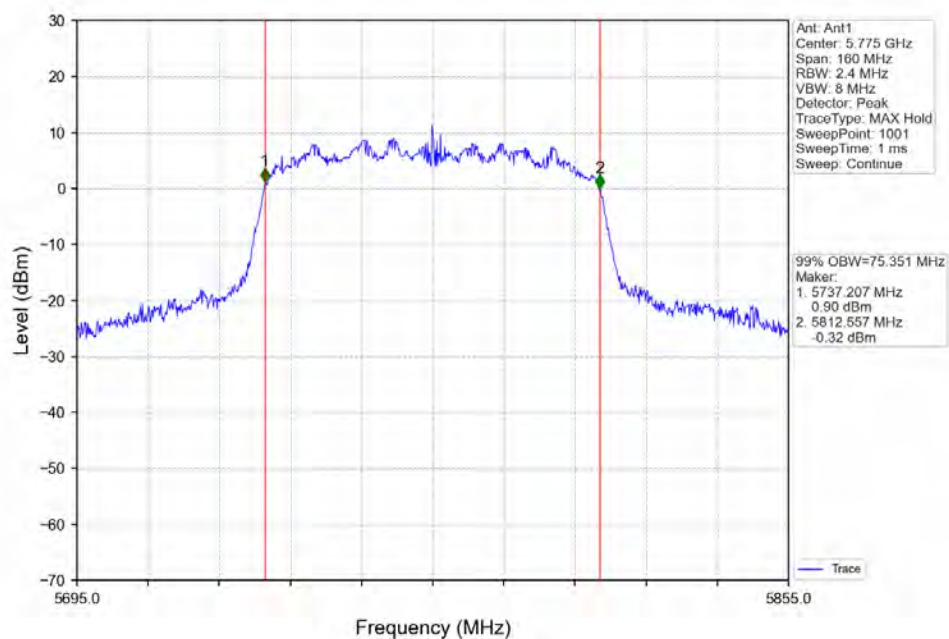
BUREAU
VERITAS

Test Report No.: W7L-P21090018RF03

802.11ac(VHT80)_MCH_5210MHz_Ant1_NTNV



802.11ac(VHT80)_MCH_5775MHz_Ant1_NTNV



6dB BW TEST RESULT

Mode	TX Type	Frequency (MHz)	Ant	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.11a	SISO	5745	1	15.120	≥ 0.5	Pass
		5785	1	15.080	≥ 0.5	Pass
		5825	1	15.080	≥ 0.5	Pass
802.11n (HT20)	SISO	5745	1	15.040	≥ 0.5	Pass
		5785	1	15.120	≥ 0.5	Pass
		5825	1	15.080	≥ 0.5	Pass
802.11n (HT40)	SISO	5755	1	35.040	≥ 0.5	Pass
		5795	1	35.040	≥ 0.5	Pass
802.11ac (VHT20)	SISO	5745	1	15.320	≥ 0.5	Pass
		5785	1	13.880	≥ 0.5	Pass
		5825	1	15.040	≥ 0.5	Pass
802.11ac (VHT40)	SISO	5755	1	35.040	≥ 0.5	Pass
		5795	1	35.040	≥ 0.5	Pass
802.11ac (VHT80)	SISO	5775	1	75.200	≥ 0.5	Pass

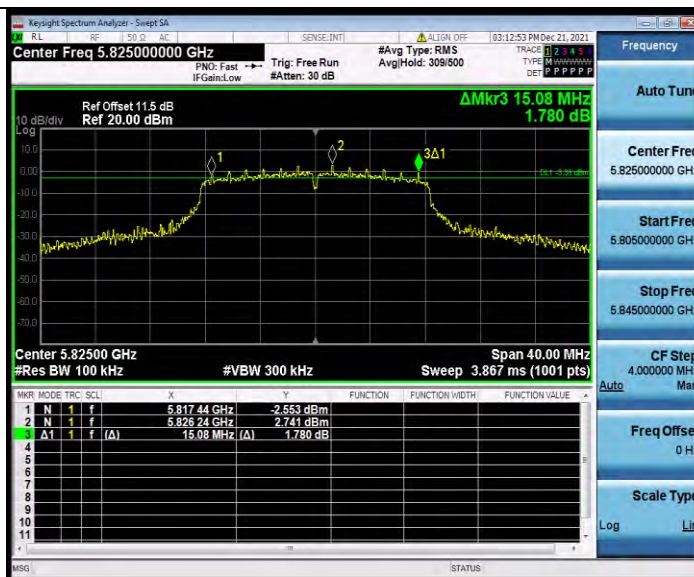
TEST GRAPH





BUREAU
VERITAS

Test Report No.: W7L-P21090018RF03



11A_Ant1_5825

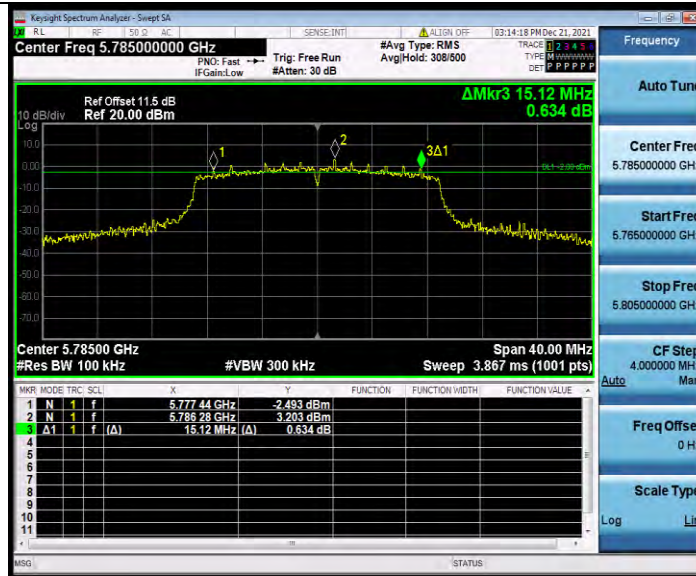


11N20SISO_Ant1_5745

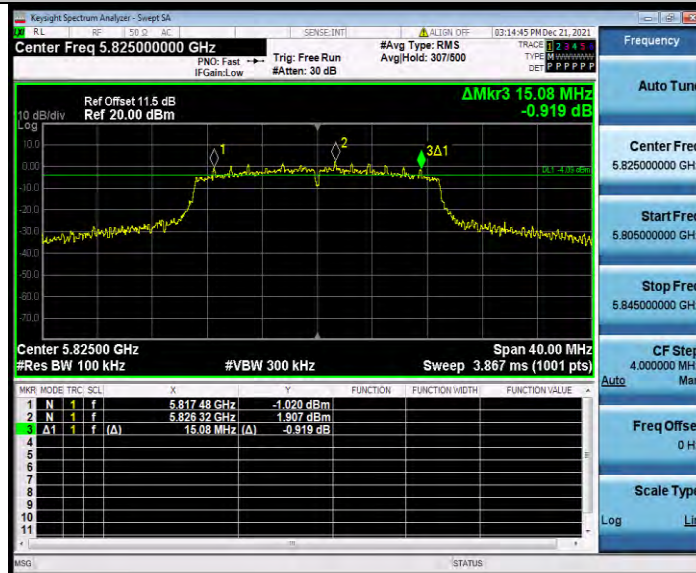


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11N20SISO_Ant1_5785

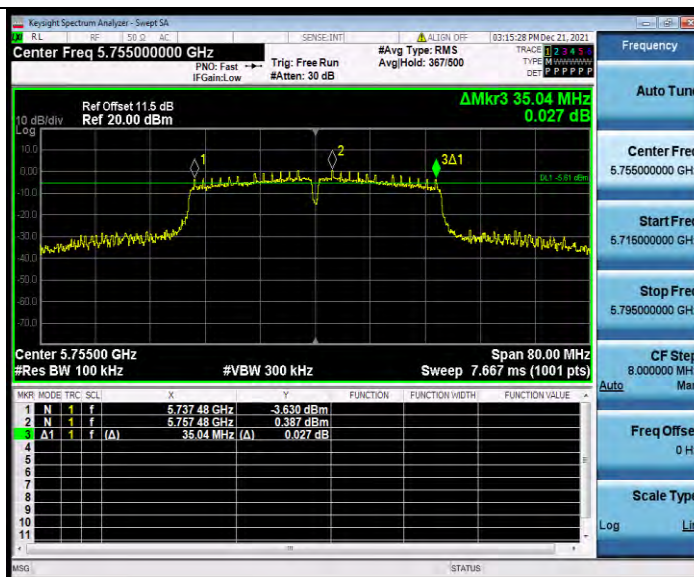


11N20SISO_Ant1_5825

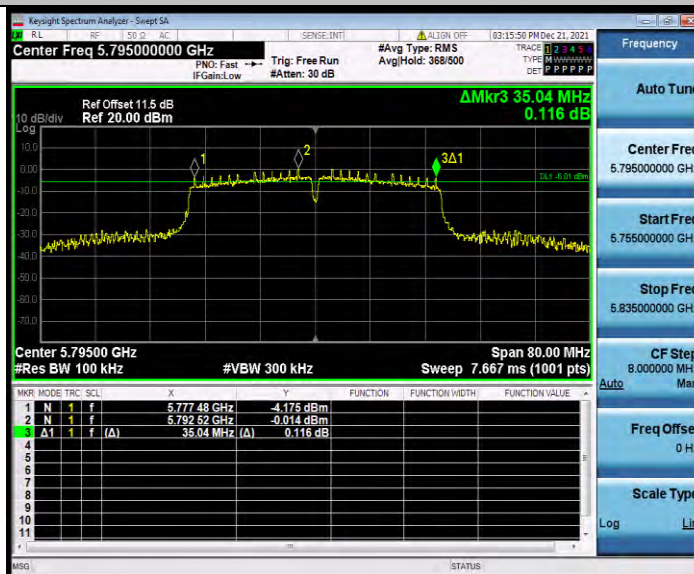


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11N40SISO_Ant1_5755



11N40SISO_Ant1_5795

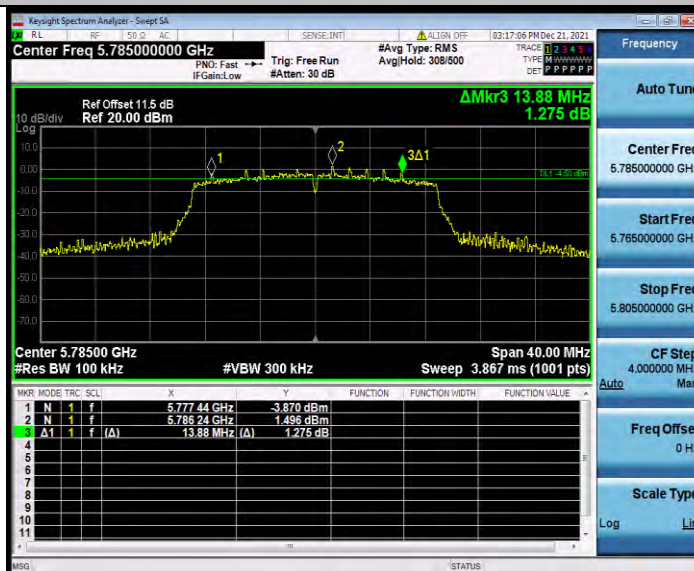


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11AC20SISO_Ant1_5745

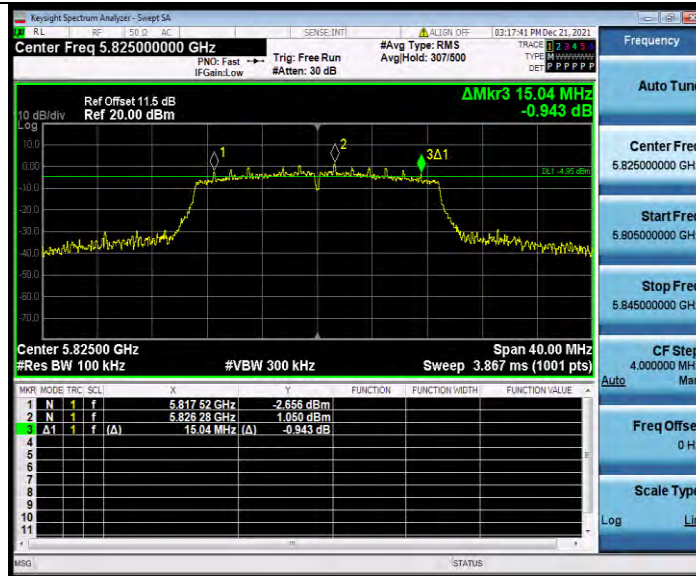


11AC20SISO_Ant1_5785

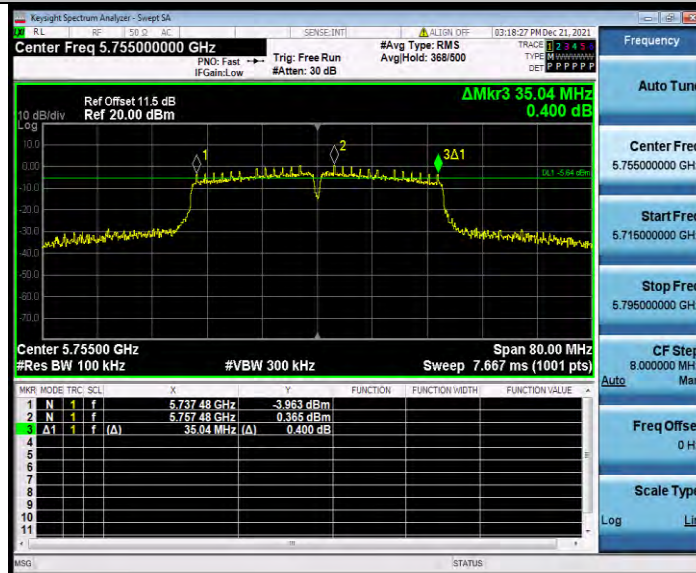


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11AC20SISO_Ant1_5825

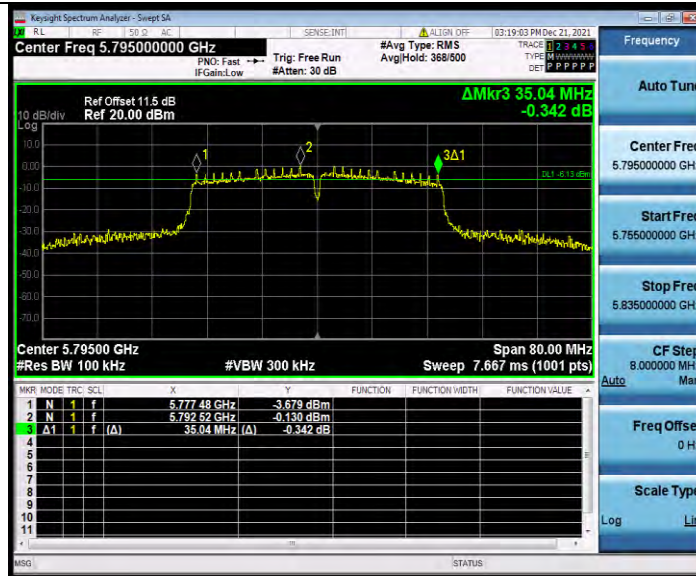


11AC40SISO_Ant1_5755

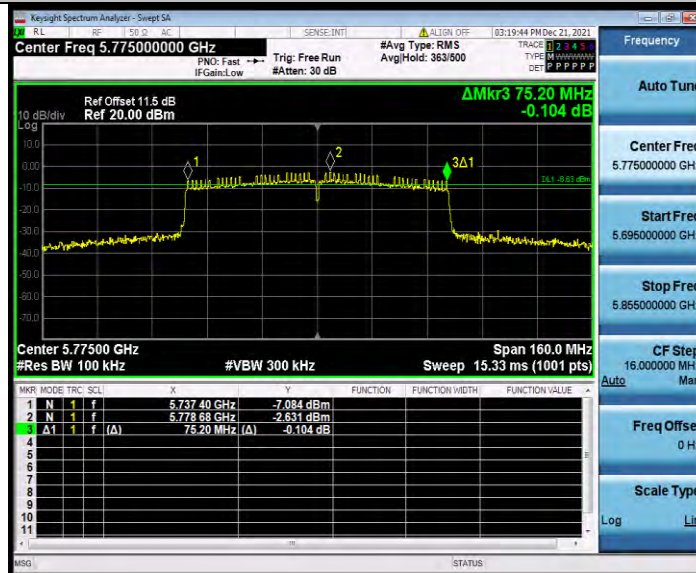


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11AC40SISO_Ant1_5795

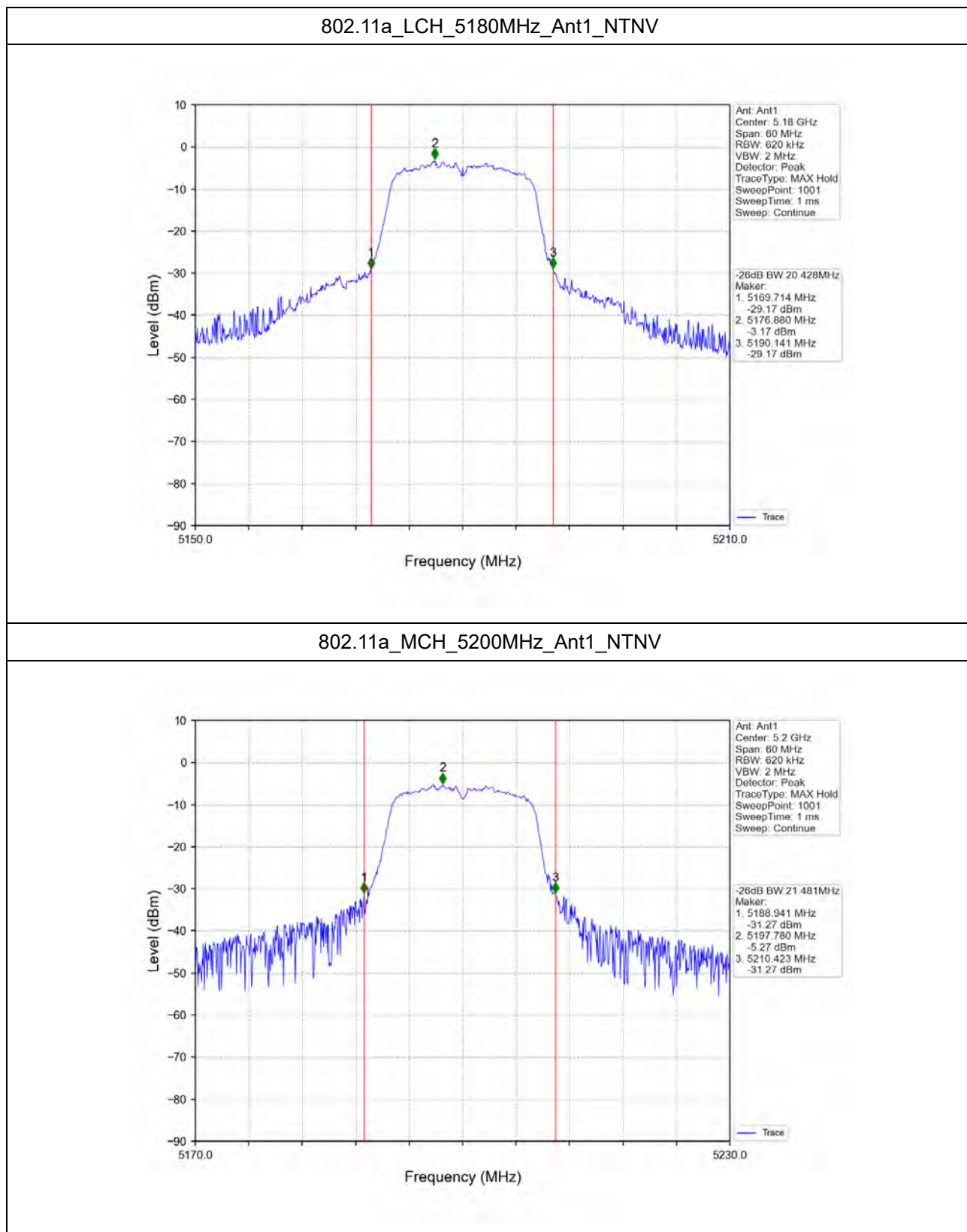


11AC80SISO_Ant1_5775

26dB BW TEST RESULT

Mode	TX Type	Frequency (MHz)	Ant	26dB Bandwidth (MHz)	Verdict
				Result	
802.11a	SISO	5180	1	20.428	Pass
		5200	1	21.481	Pass
		5240	1	21.523	Pass
802.11n (HT20)	SISO	5180	1	21.596	Pass
		5200	1	21.544	Pass
		5240	1	21.568	Pass
802.11n (HT40)	SISO	5190	1	49.698	Pass
		5230	1	48.302	Pass
802.11ac (VHT20)	SISO	5180	1	21.540	Pass
		5200	1	21.526	Pass
		5240	1	22.970	Pass
802.11ac (VHT40)	SISO	5190	1	50.117	Pass
		5230	1	49.430	Pass
802.11ac (VHT80)	SISO	5210	1	83.444	Pass

TEST GRAPH

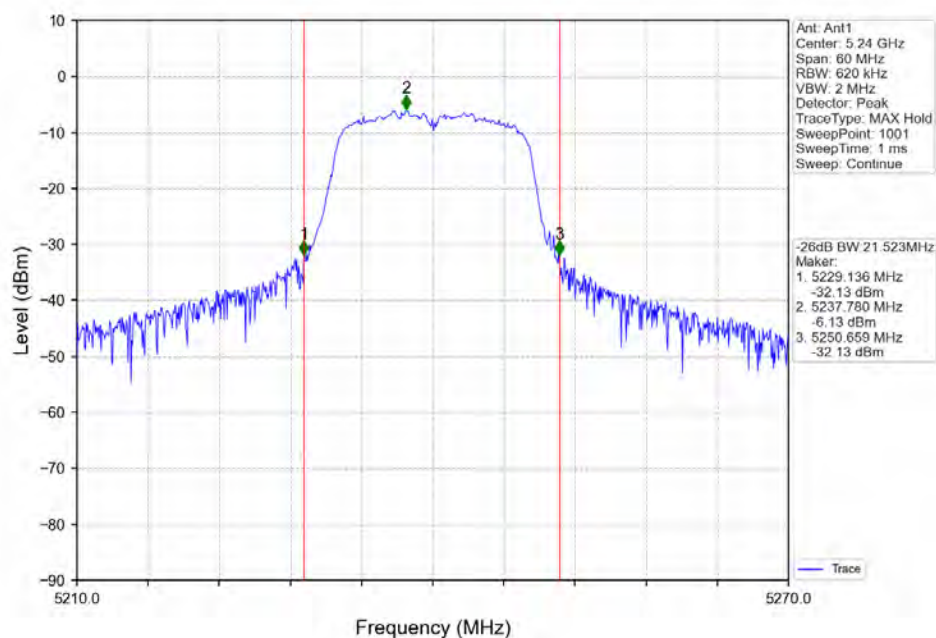




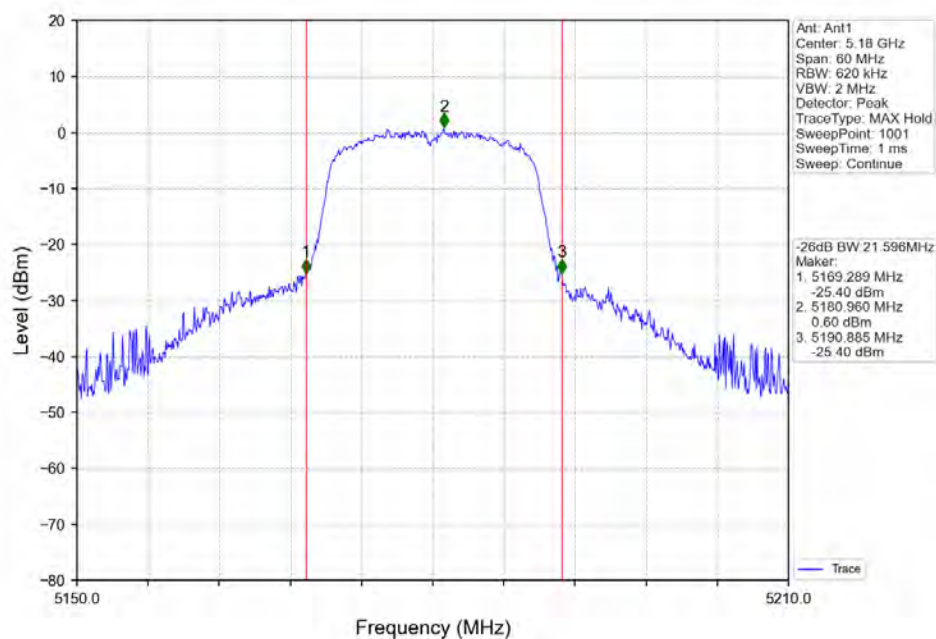
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VERITAS

Test Report No.: W7L-P21090018RF03

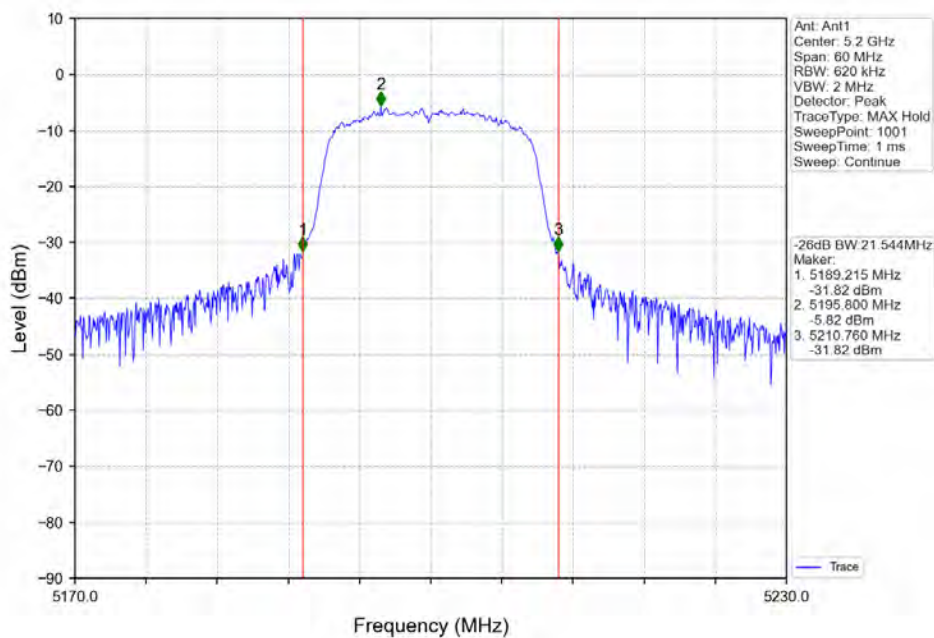
802.11a_HCH_5240MHz_Ant1_NTNV



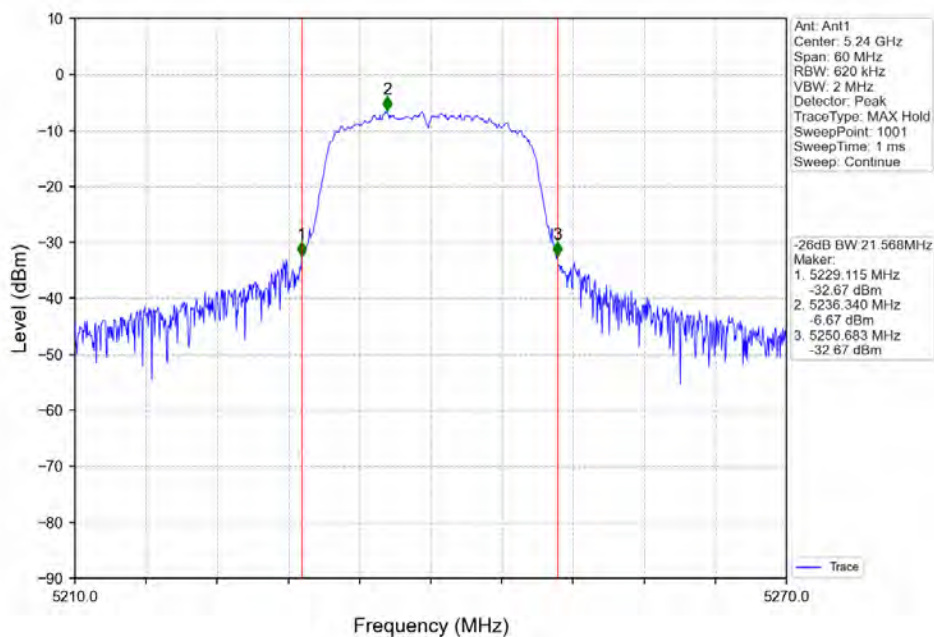
802.11n(HT20)_LCH_5180MHz_Ant1_NTNV



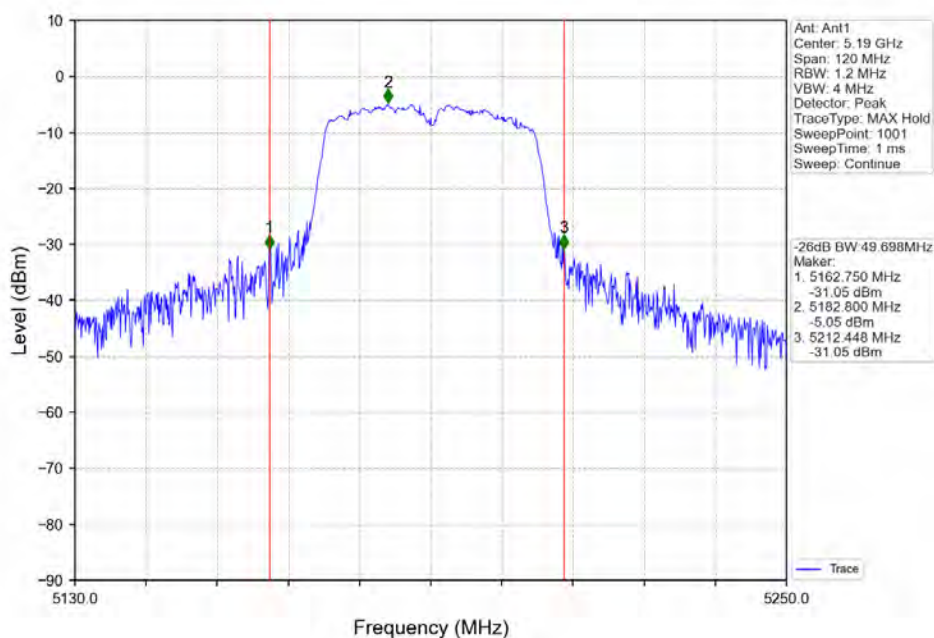
802.11n(HT20)_MCH_5200MHz_Ant1_NTNV



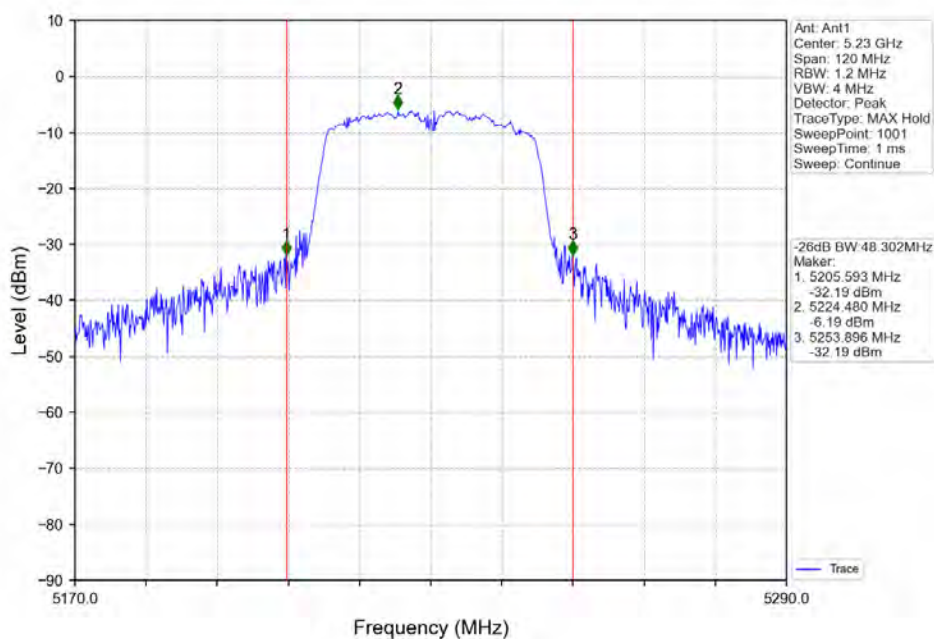
802.11n(HT20)_HCH_5240MHz_Ant1_NTNV



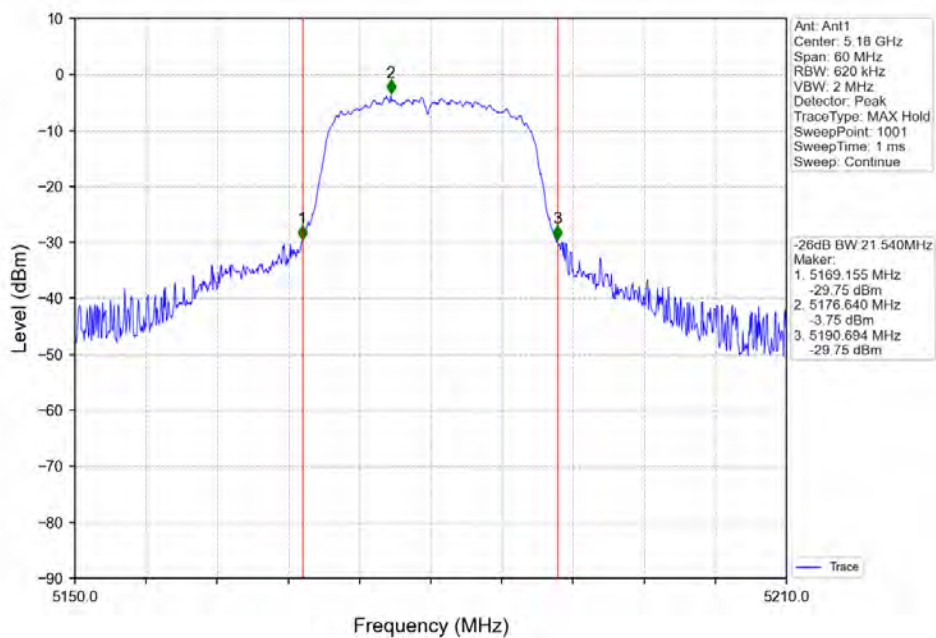
802.11n(HT40)_LCH_5190MHz_Ant1_NTNV



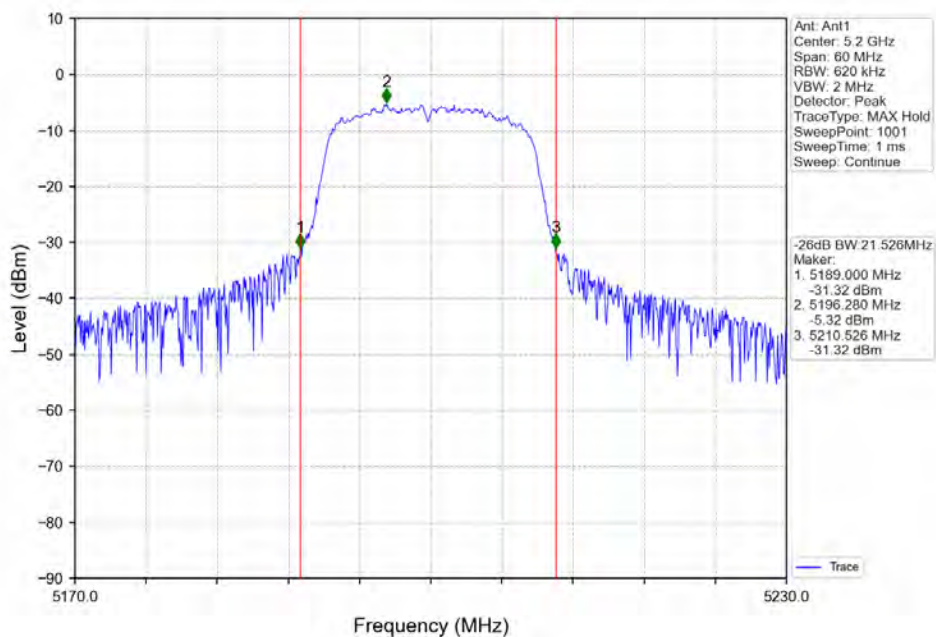
802.11n(HT40)_HCH_5230MHz_Ant1_NTNV



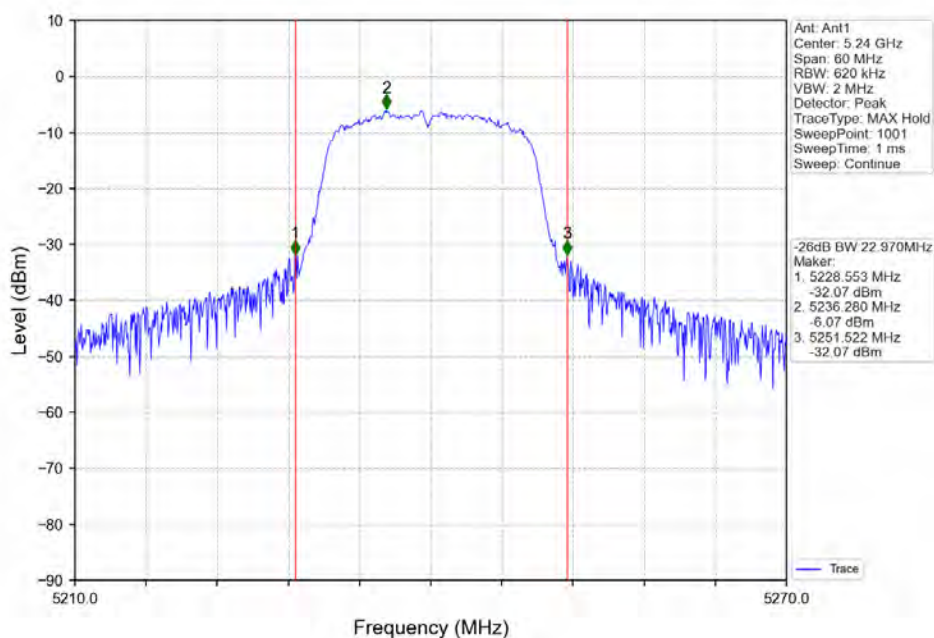
802.11ac(VHT20)_LCH_5180MHz_Ant1_NTNV



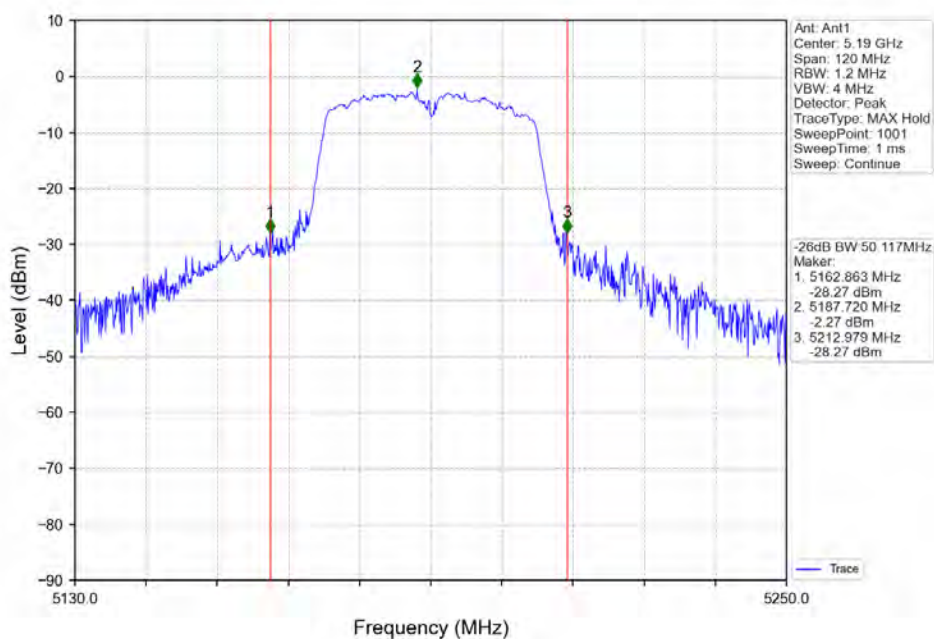
802.11ac(VHT20)_MCH_5200MHz_Ant1_NTNV



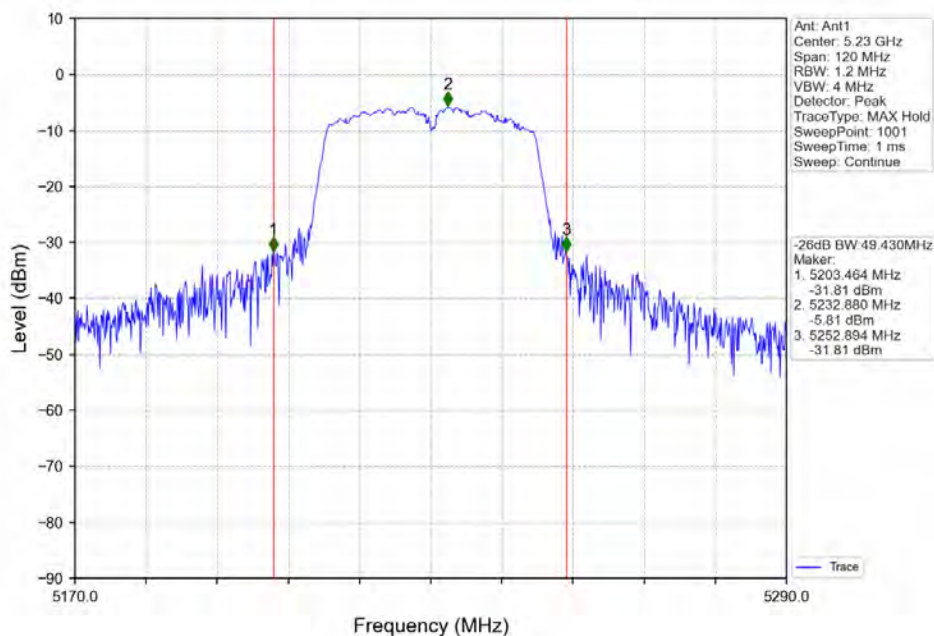
802.11ac(VHT20)_HCH_5240MHz_Ant1_NTNV



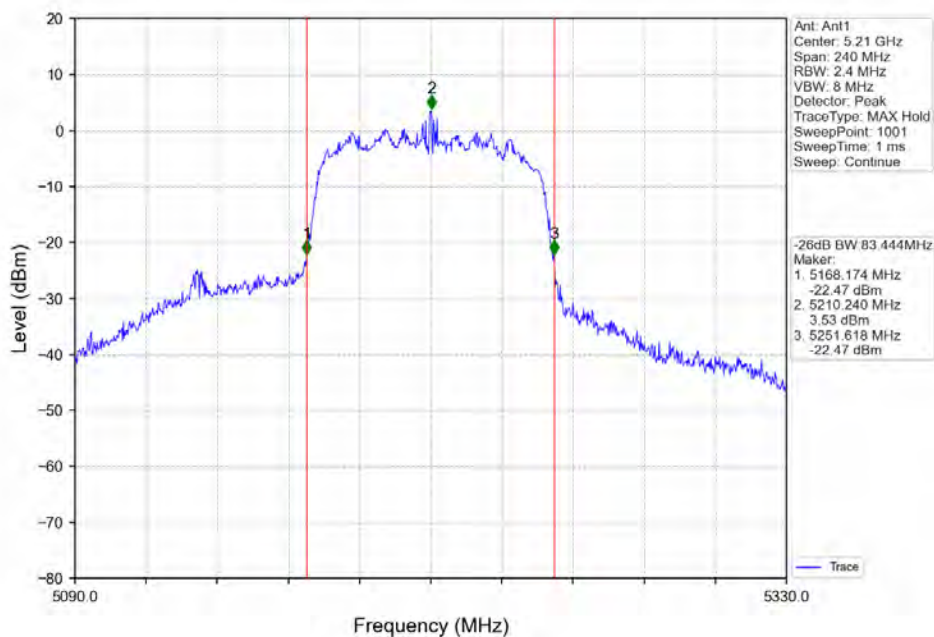
802.11ac(VHT40)_LCH_5190MHz_Ant1_NTNV



802.11ac(VHT40)_HCH_5230MHz_Ant1_NTNV



802.11ac(VHT80)_MCH_5210MHz_Ant1_NTNV



MAXIMUM CONDUCTED OUTPUT POWER

Average_Power TEST RESULT

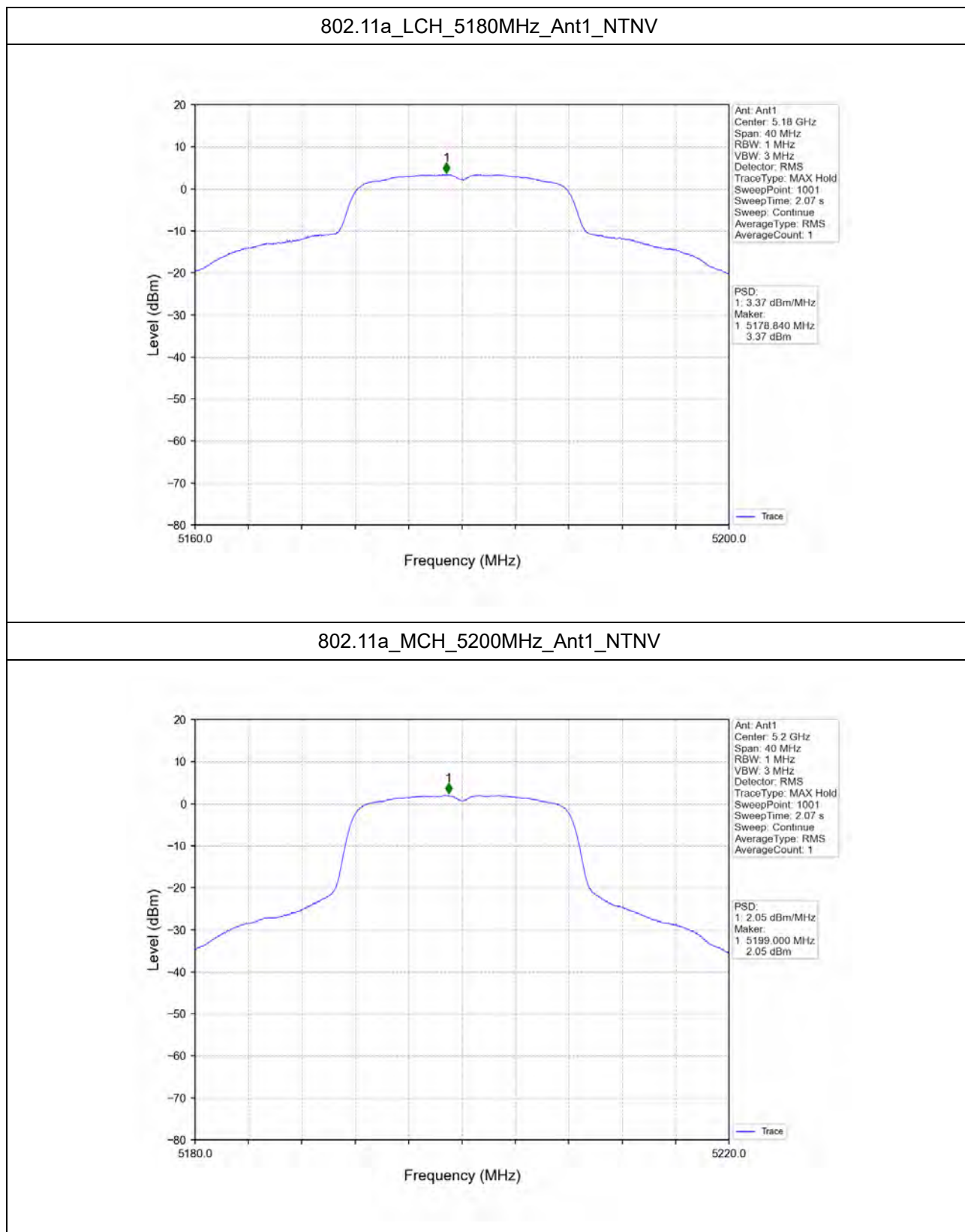
Mode	TX Type	Frequency (MHz)	Maximum Average Conducted Output Power			Verdict
			Ant1(dBm)	Ant1(mw)	Limit(dBm)	
802.11a	SISO	5180	14.20	26.30	<=23.98	Pass
		5200	14.14	25.94	<=23.98	Pass
		5240	14.00	25.12	<=23.98	Pass
		5745	14.32	27.04	<=30	Pass
		5785	14.28	26.79	<=30	Pass
		5825	14.07	25.53	<=30	Pass
802.11n (HT20)	SISO	5180	13.64	23.12	<=23.98	Pass
		5200	13.58	22.80	<=23.98	Pass
		5240	13.46	22.18	<=23.98	Pass
		5745	13.94	24.77	<=30	Pass
		5785	13.47	22.23	<=30	Pass
		5825	13.84	24.21	<=30	Pass
802.11n (HT40)	SISO	5190	10.78	11.97	<=23.98	Pass
		5230	14.08	25.59	<=23.98	Pass
		5755	13.88	24.43	<=30	Pass
		5795	13.80	23.99	<=30	Pass
802.11ac (VHT20)	SISO	5180	12.71	18.66	<=23.98	Pass
		5200	12.55	17.99	<=23.98	Pass
		5240	12.66	18.45	<=23.98	Pass
		5745	13.00	19.95	<=30	Pass
		5785	12.59	18.16	<=30	Pass
		5825	12.50	17.78	<=30	Pass
802.11ac (VHT40)	SISO	5190	12.84	19.23	<=23.98	Pass
		5230	12.76	18.88	<=23.98	Pass
		5755	11.97	15.74	<=30	Pass
		5795	12.24	16.75	<=30	Pass
802.11ac (VHT80)	SISO	5210	9.50	8.91	<=23.98	Pass
		5775	12.79	19.01	<=30	Pass

Maximum Power Spectral Density PSD

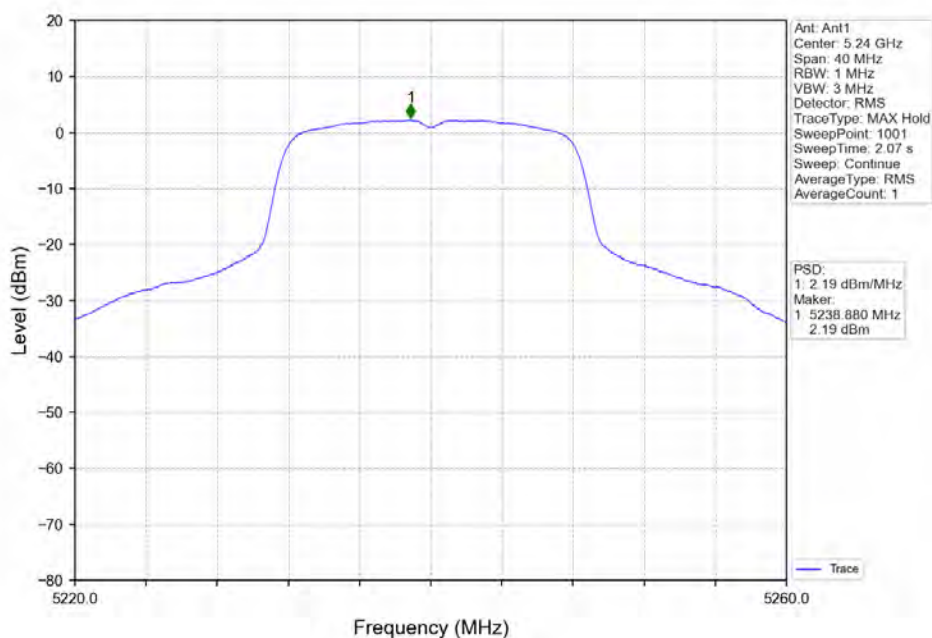
TEST RESULT

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/MHz)		Verdict
			Ant1	Limit	
802.11a	SISO	5180	3.37	<=11	Pass
		5200	2.05	<=11	Pass
		5240	2.19	<=11	Pass
802.11n (HT20)	SISO	5180	1.42	<=11	Pass
		5200	1.42	<=11	Pass
		5240	1.69	<=11	Pass
802.11n (HT40)	SISO	5190	-0.95	<=11	Pass
		5230	-0.87	<=11	Pass
802.11ac (VHT20)	SISO	5180	0.68	<=11	Pass
		5200	0.65	<=11	Pass
		5240	0.98	<=11	Pass
802.11ac (VHT40)	SISO	5190	-2.33	<=11	Pass
		5230	-2.22	<=11	Pass
802.11ac (VHT80)	SISO	5210	-5.37	<=11	Pass

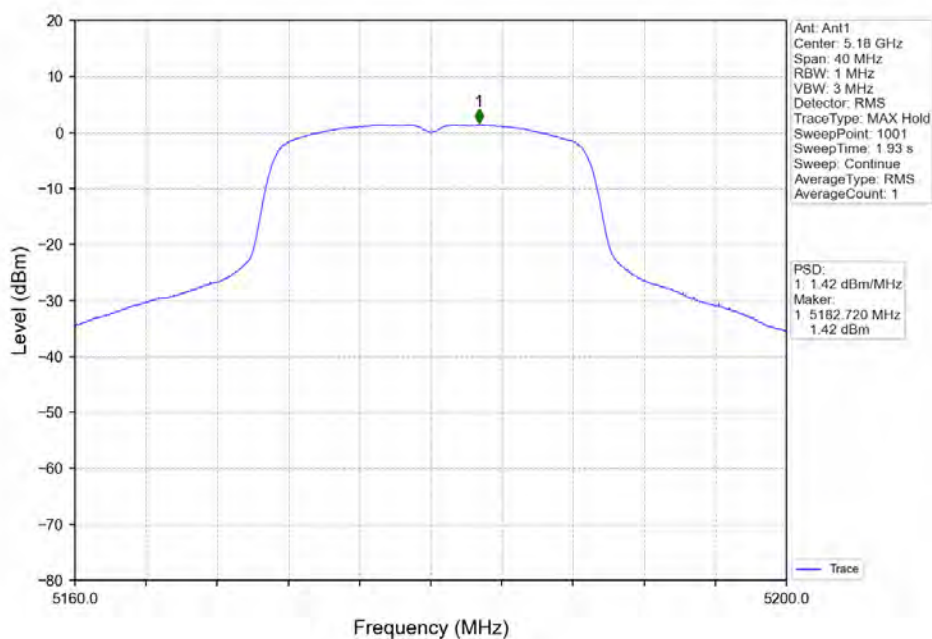
TEST GRAPH



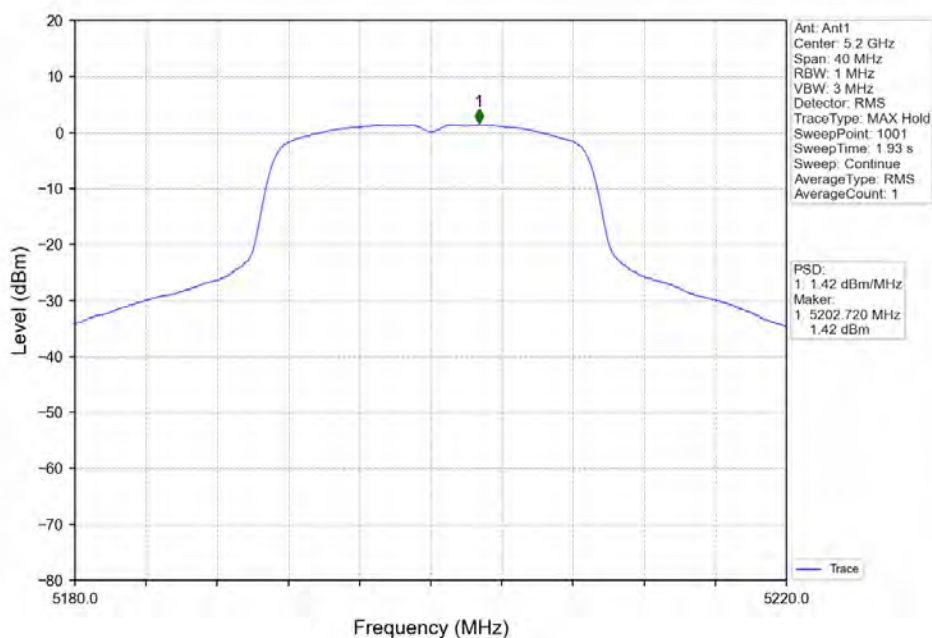
802.11a_HCH_5240MHz_Ant1_NTNV



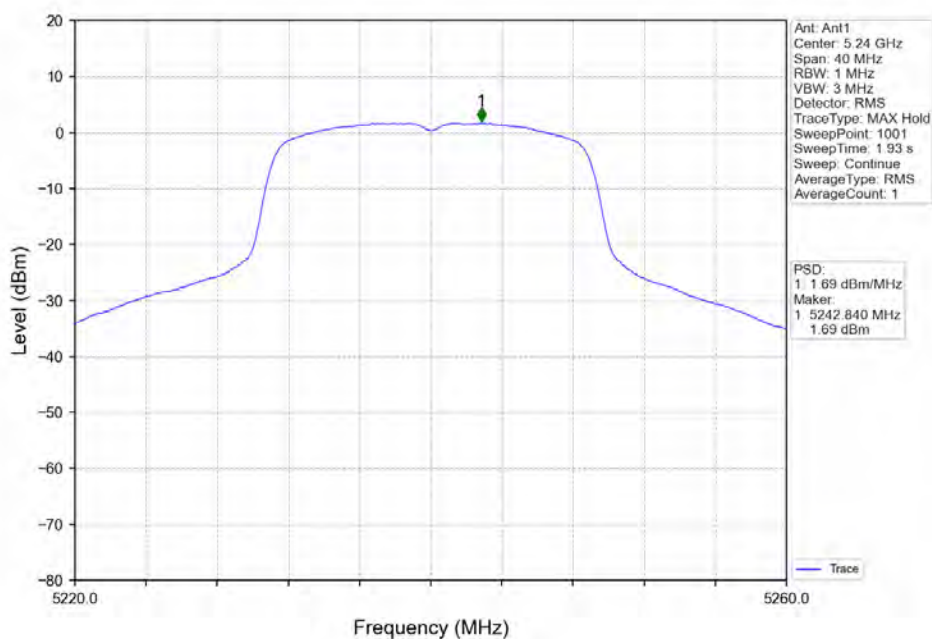
802.11n(HT20)_LCH_5180MHz_Ant1_NTNV



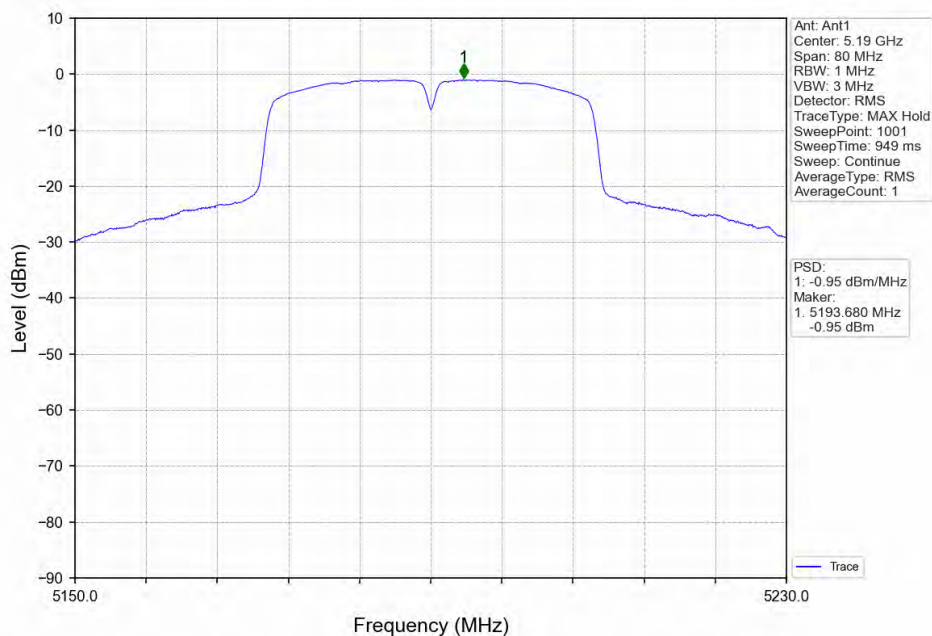
802.11n(HT20)_MCH_5200MHz_Ant1_NTNV



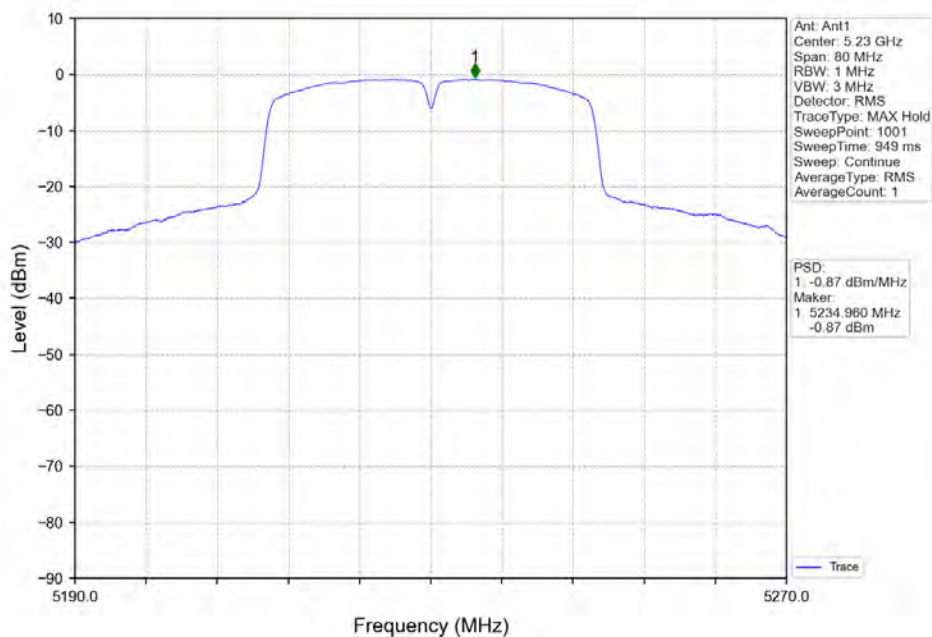
802.11n(HT20)_HCH_5240MHz_Ant1_NTNV



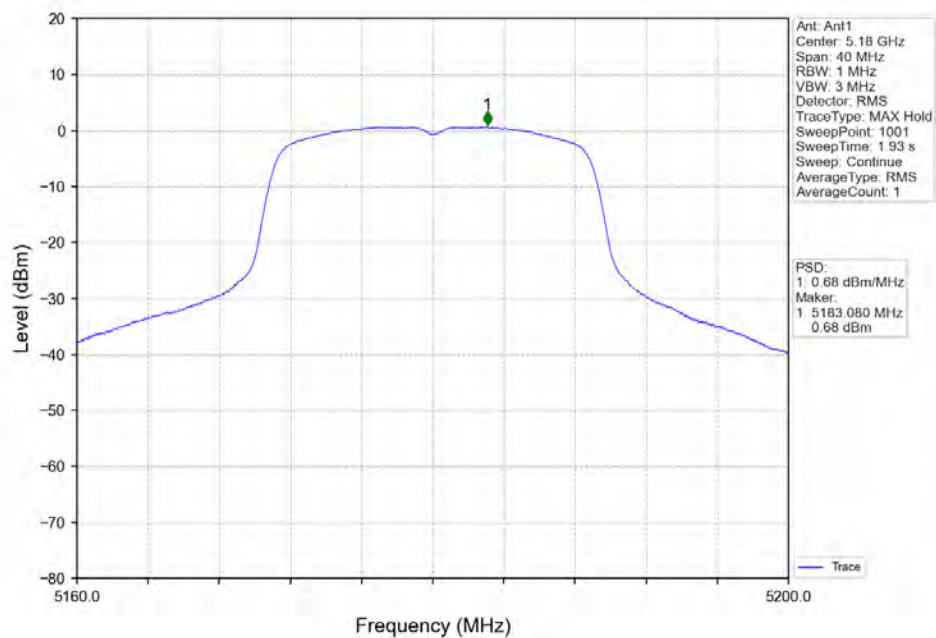
802.11n(HT40)_LCH_5190MHz_Ant1_NTNV



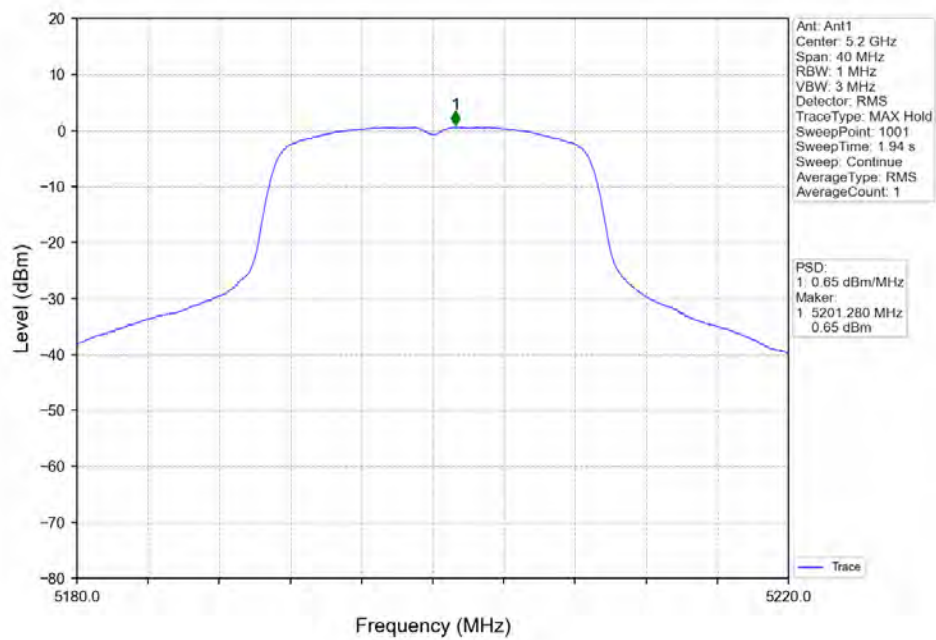
802.11n(HT40)_HCH_5230MHz_Ant1_NTNV



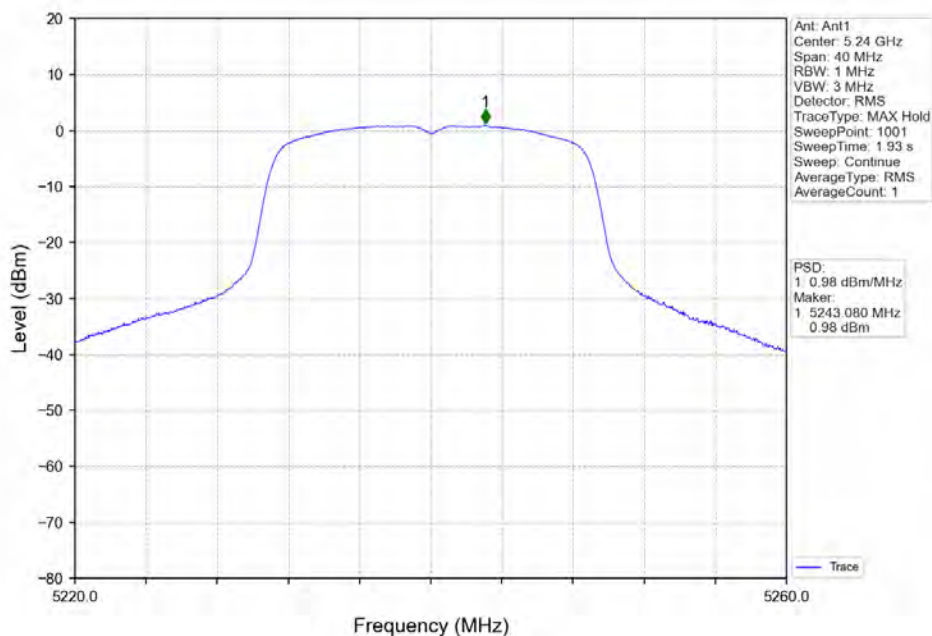
802.11ac(VHT20)_LCH_5180MHz_Ant1_NTNV



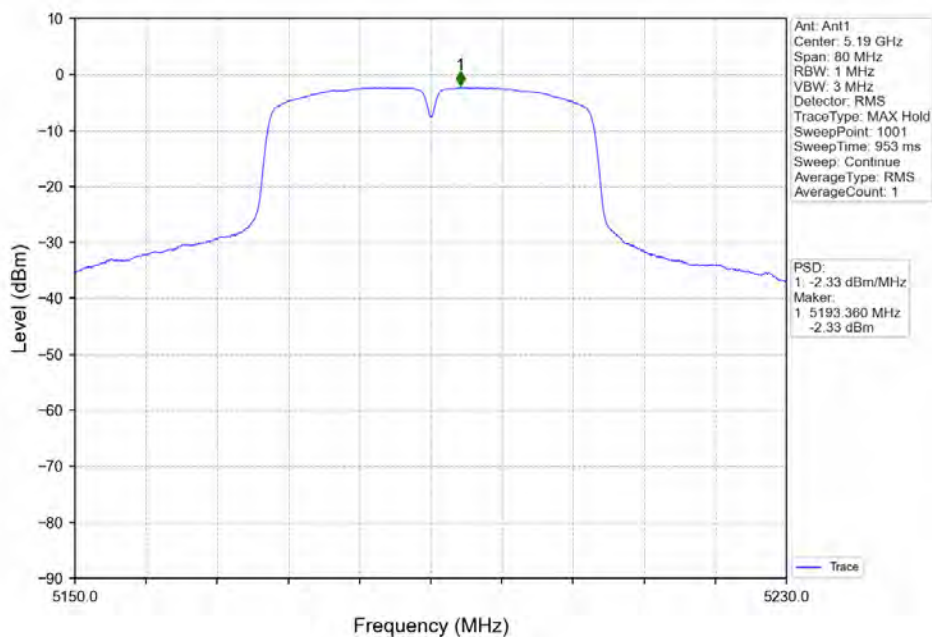
802.11ac(VHT20)_MCH_5200MHz_Ant1_NTNV



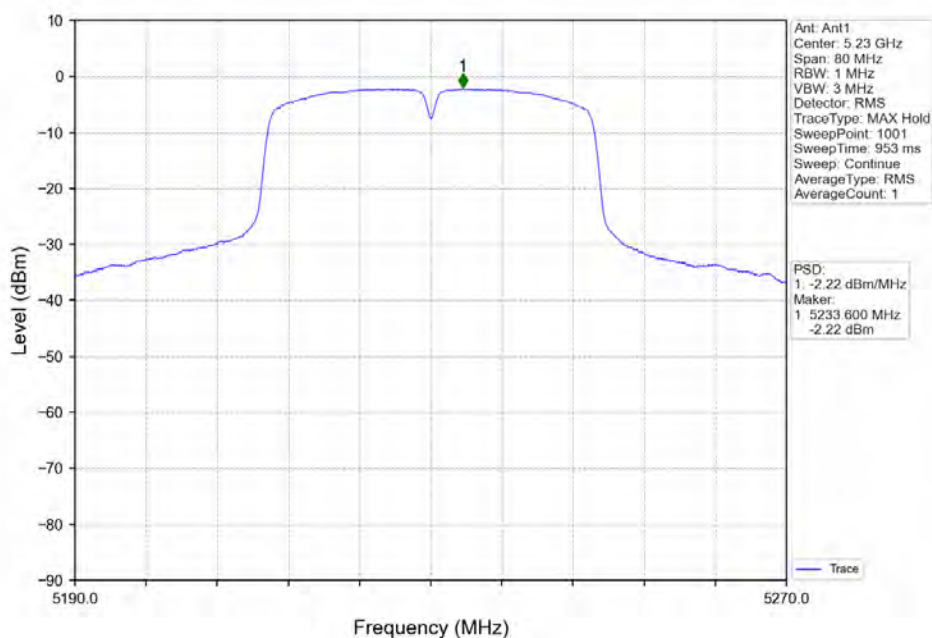
802.11ac(VHT20)_HCH_5240MHz_Ant1_NTNV



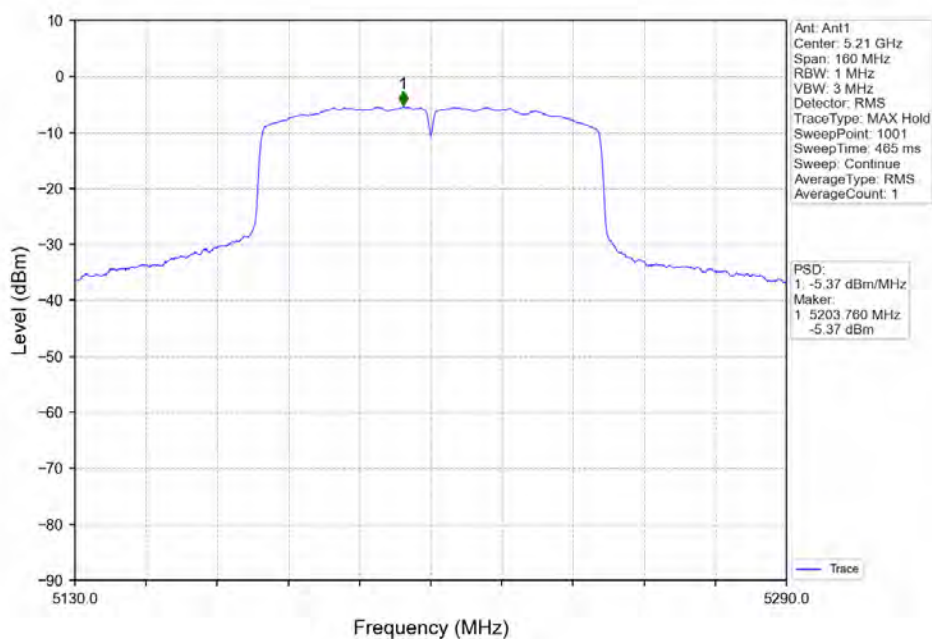
802.11ac(VHT40)_LCH_5190MHz_Ant1_NTNV



802.11ac(VHT40)_HCH_5230MHz_Ant1_NTNV



802.11ac(VHT80)_MCH_5210MHz_Ant1_NTNV

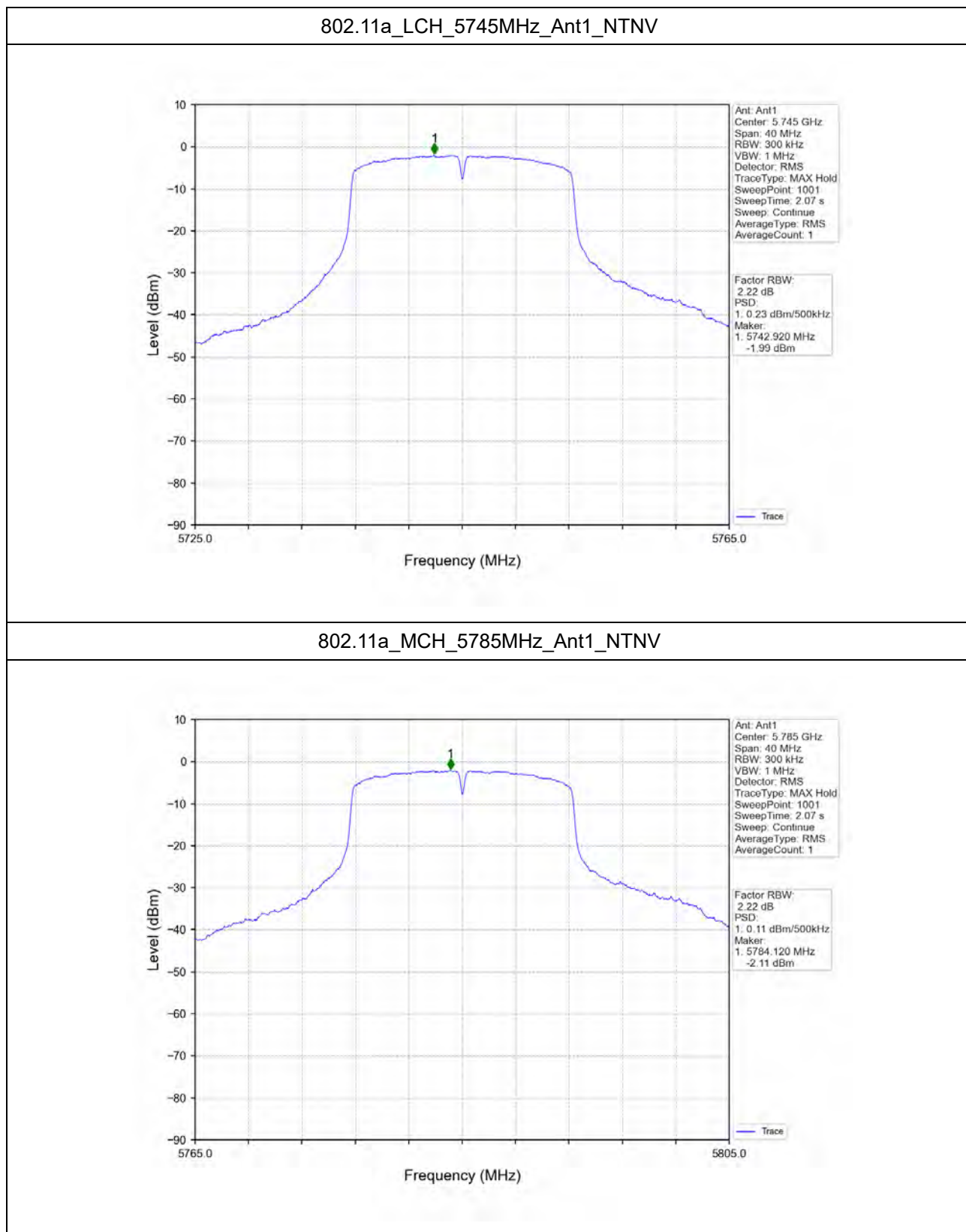


PSD-BAND3

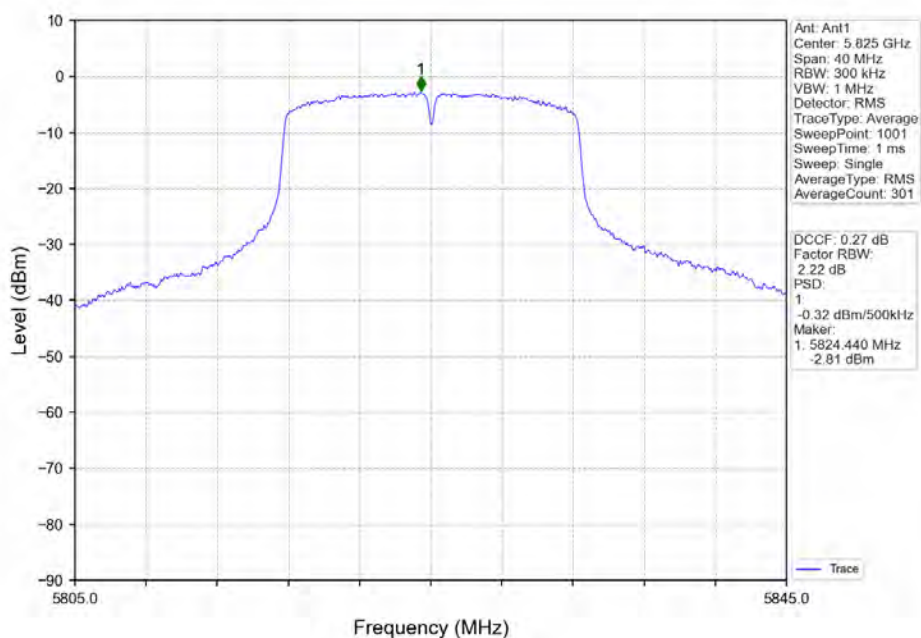
TEST RESULT

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/500kHz)		Verdict
			Ant1	Limit	
802.11a	SISO	5745	0.23	<=30	Pass
		5785	0.11	<=30	Pass
		5825	-0.32	<=30	Pass
802.11n (HT20)	SISO	5745	-0.28	<=30	Pass
		5785	-1.00	<=30	Pass
		5825	-0.89	<=30	Pass
802.11n (HT40)	SISO	5755	-3.90	<=30	Pass
		5795	-3.56	<=30	Pass
802.11ac (VHT20)	SISO	5745	-1.09	<=30	Pass
		5785	-1.93	<=30	Pass
		5825	-2.44	<=30	Pass
802.11ac (VHT40)	SISO	5755	-5.30	<=30	Pass
		5795	-5.15	<=30	Pass
802.11ac (VHT80)	SISO	5775	-7.79	<=30	Pass

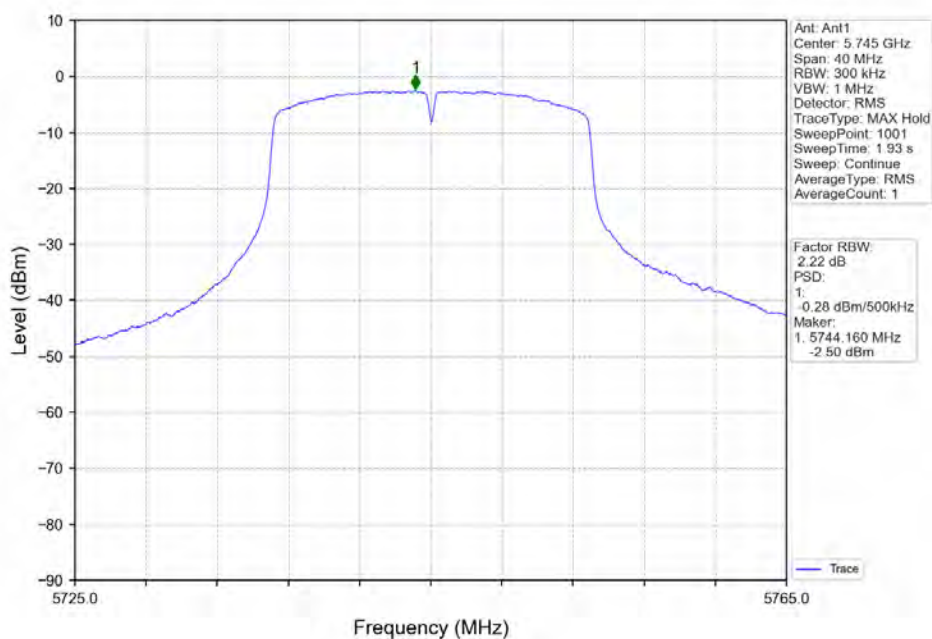
TEST GRAPH



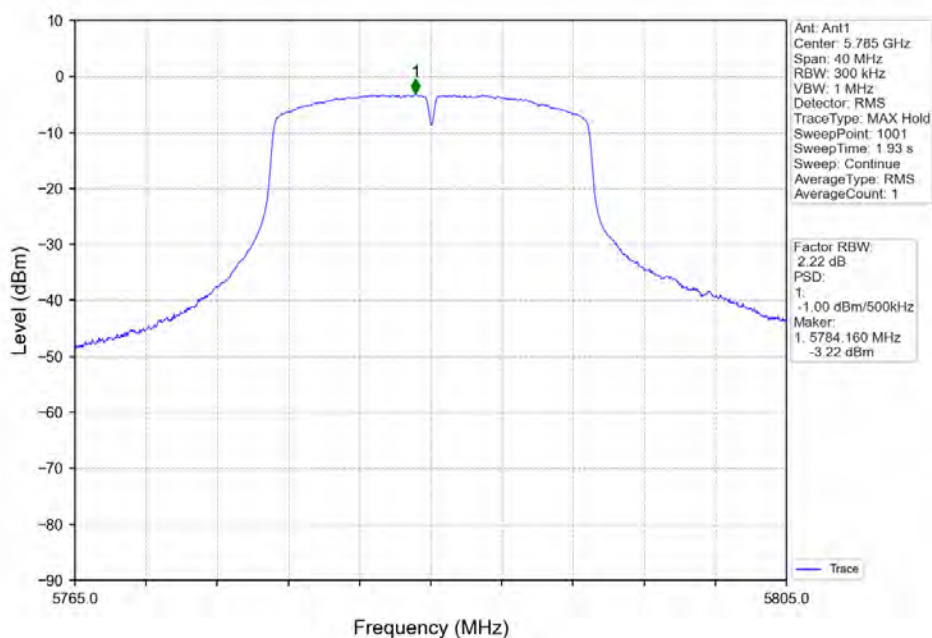
802.11a_HCH_5825MHz_Ant1_NTNV



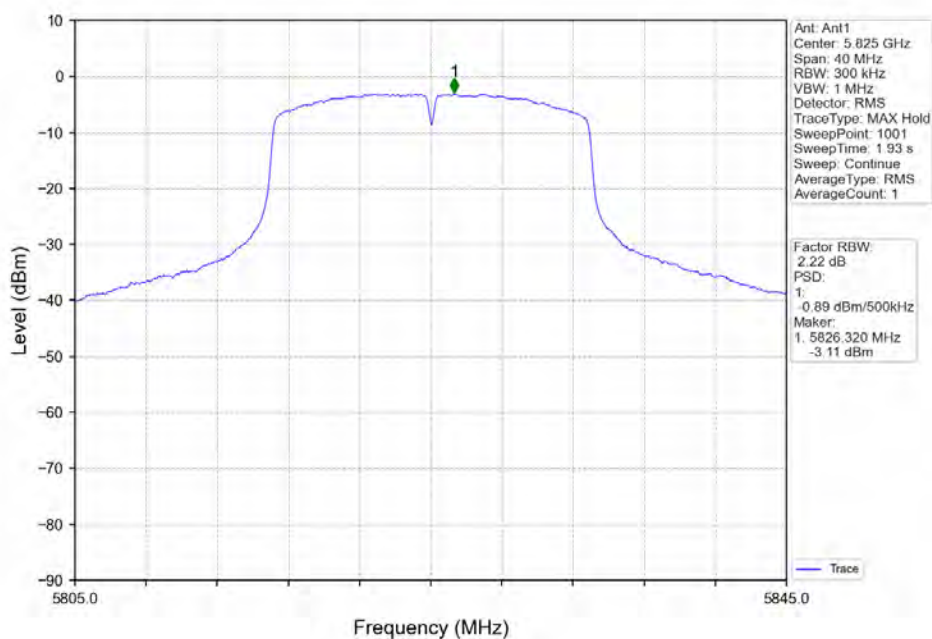
802.11n(HT20)_LCH_5745MHz_Ant1_NTNV



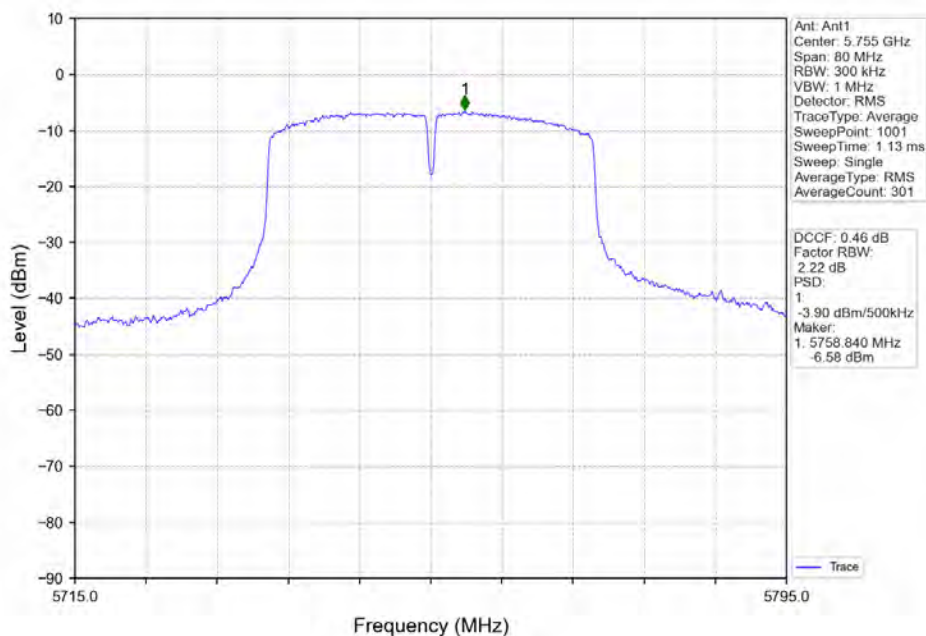
802.11n(HT20)_MCH_5785MHz_Ant1_NTNV



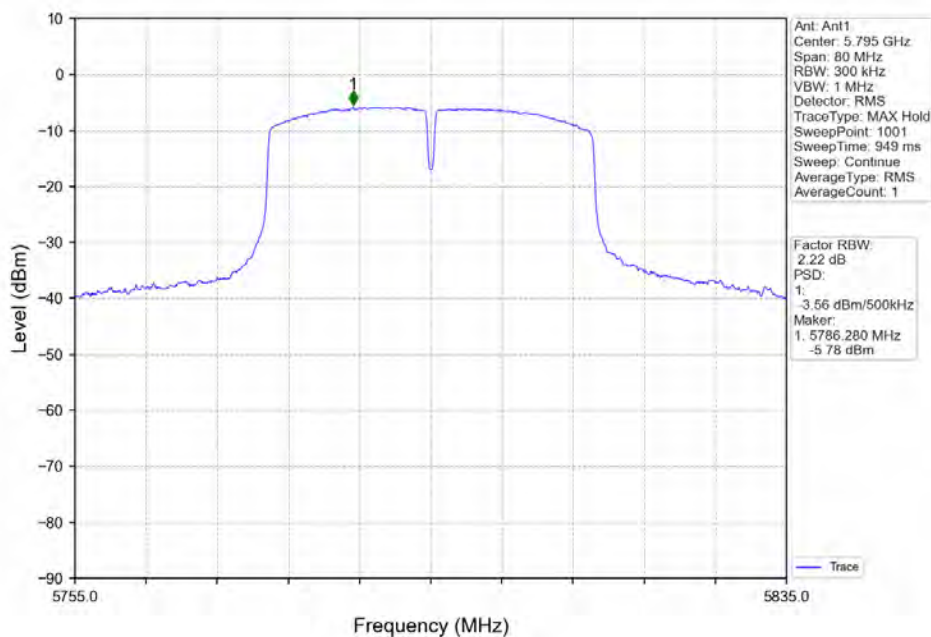
802.11n(HT20)_HCH_5825MHz_Ant1_NTNV



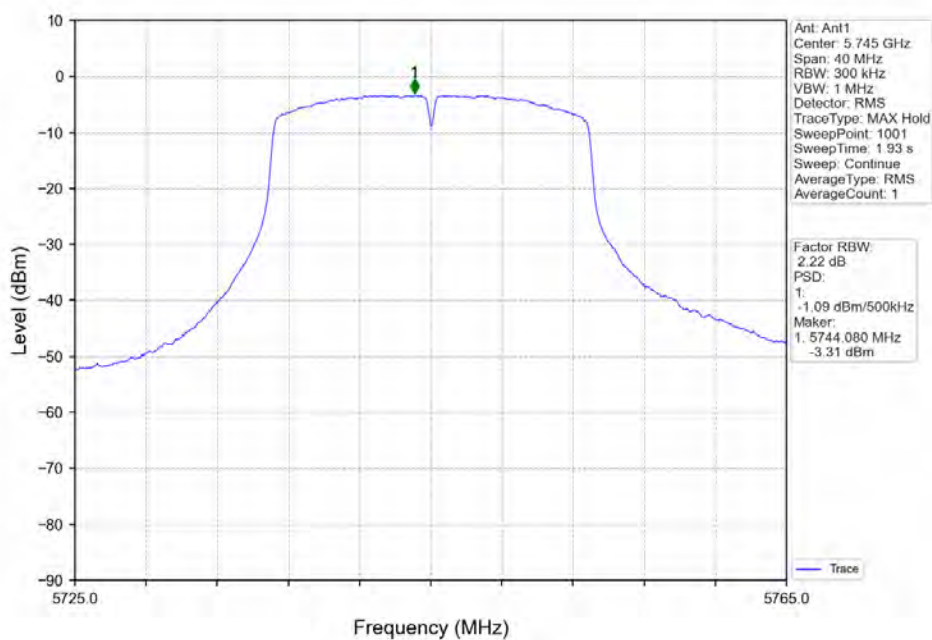
802.11n(HT40)_LCH_5755MHz_Ant1_NTNV



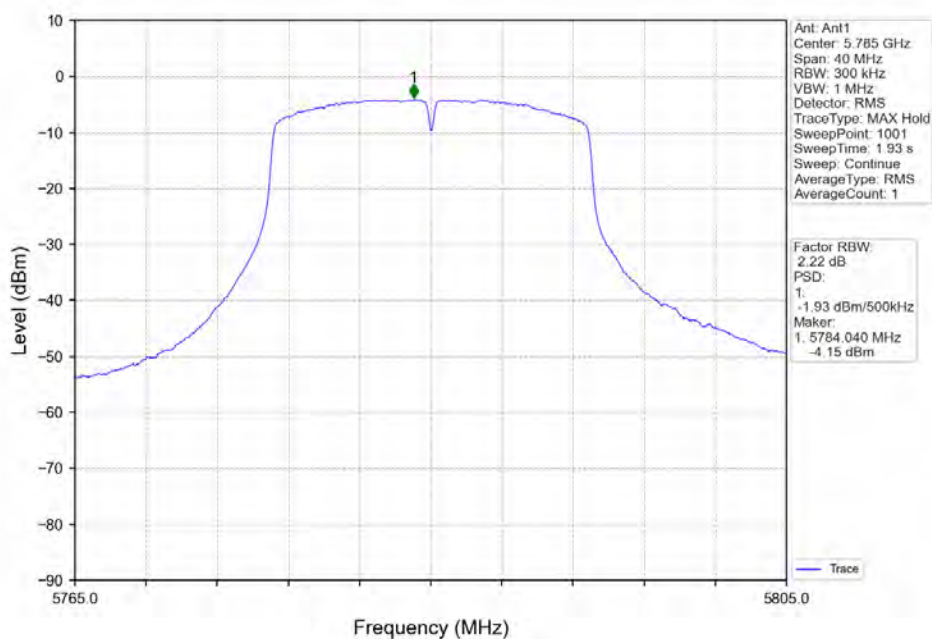
802.11n(HT40)_HCH_5795MHz_Ant1_NTNV



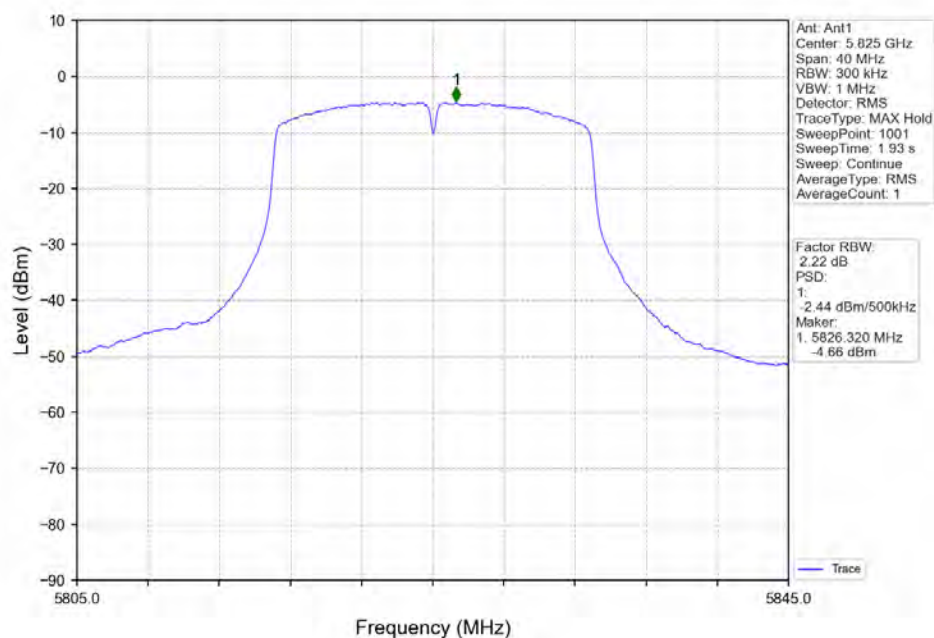
802.11ac(VHT20)_LCH_5745MHz_Ant1_NTNV



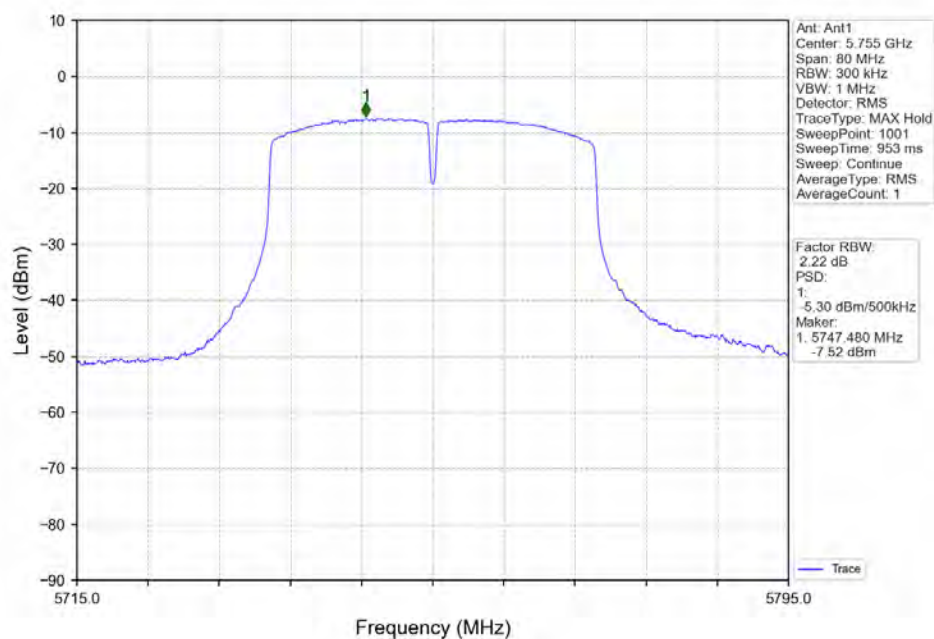
802.11ac(VHT20)_MCH_5785MHz_Ant1_NTNV



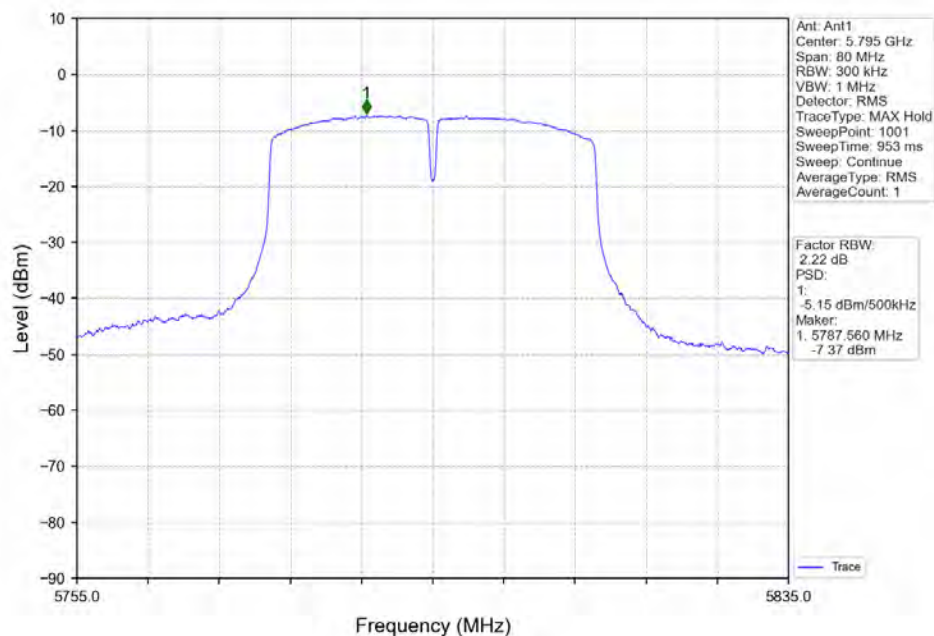
802.11ac(VHT20)_HCH_5825MHz_Ant1_NTNV



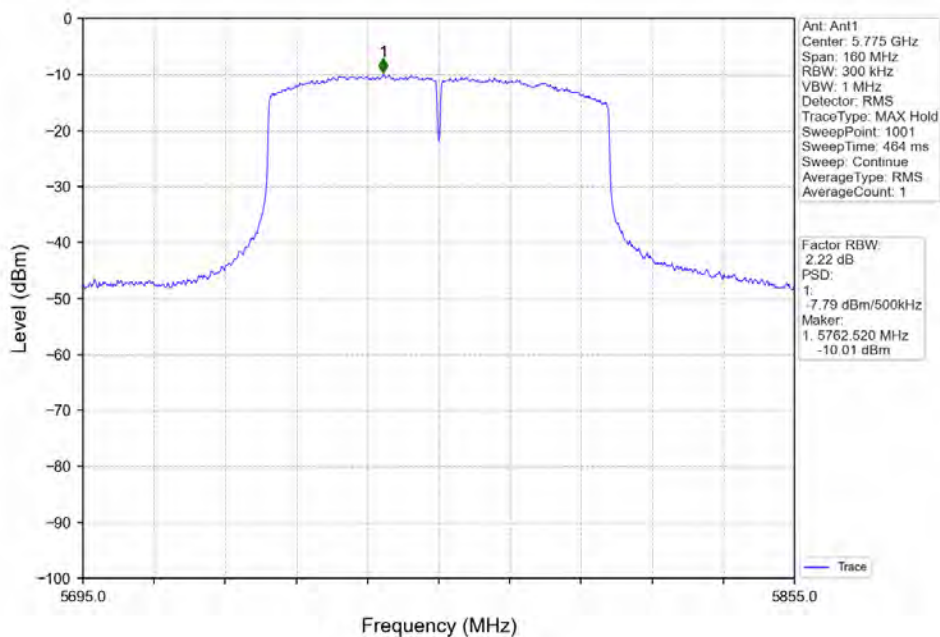
802.11ac(VHT40)_LCH_5755MHz_Ant1_NTNV



802.11ac(VHT40)_HCH_5795MHz_Ant1_NTNV



802.11ac(VHT80)_MCH_5775MHz_Ant1_NTNV





Band edge measurements

TEST RESULT

TestMode	Antenna	ChName	Channel	Result[dBm]	Limit[dBm]	Verdict
11A	Ant1	Low	5180	See graphs	≤ -27	PASS
		High	5240	See graphs	≤ -27	PASS
		Low	5745	See graphs	≤ -27	PASS
		High	5825	See graphs	≤ -27	PASS
11N20SISO	Ant1	Low	5180	See graphs	≤ -27	PASS
		High	5240	See graphs	≤ -27	PASS
		Low	5745	See graphs	≤ -27	PASS
		High	5825	See graphs	≤ -27	PASS
11N40SISO	Ant1	Low	5190	See graphs	≤ -27	PASS
		High	5230	See graphs	≤ -27	PASS
		Low	5755	See graphs	≤ -27	PASS
		High	5795	See graphs	≤ -27	PASS
11AC20SISO	Ant1	Low	5180	See graphs	≤ -27	PASS
		High	5240	See graphs	≤ -27	PASS
		Low	5745	See graphs	≤ -27	PASS
		High	5825	See graphs	≤ -27	PASS
11AC40SISO	Ant1	Low	5190	See graphs	≤ -27	PASS
		High	5230	See graphs	≤ -27	PASS
		Low	5755	See graphs	≤ -27	PASS
		High	5795	See graphs	≤ -27	PASS
11AC80SISO	Ant1	Low	5210	See graphs	≤ -27	PASS
		High	5775	See graphs	≤ -27	PASS

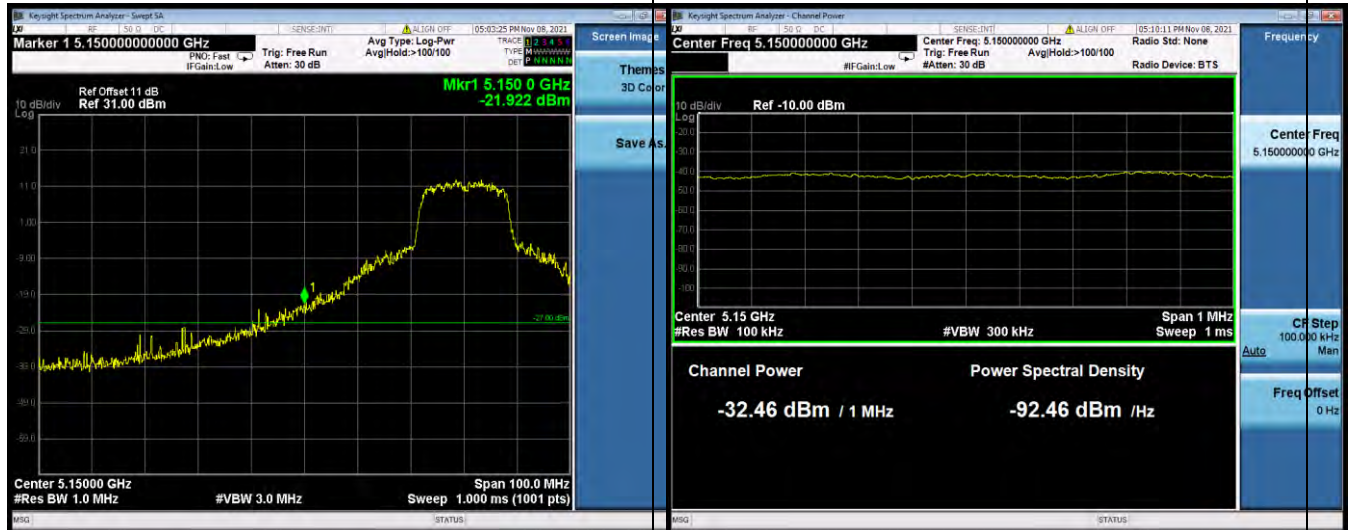


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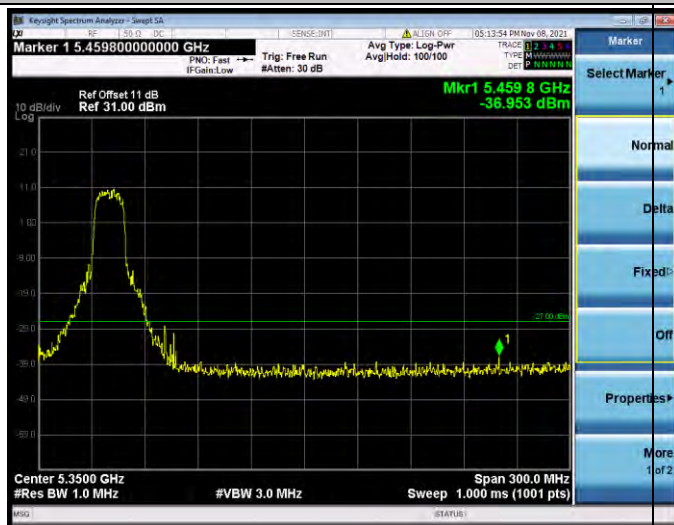
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TEST GRAPHS

11A_Ant1_Low_5180



11A_Ant1_High_5240

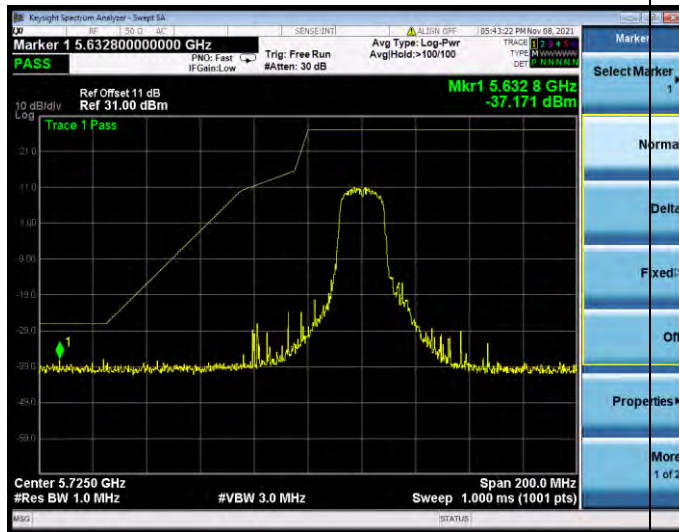


11A_Ant1_Low_5745

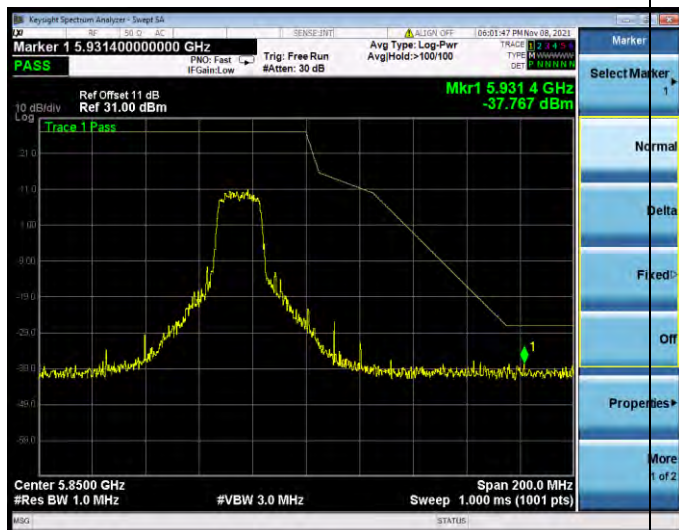


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11A_Ant1_High_5825





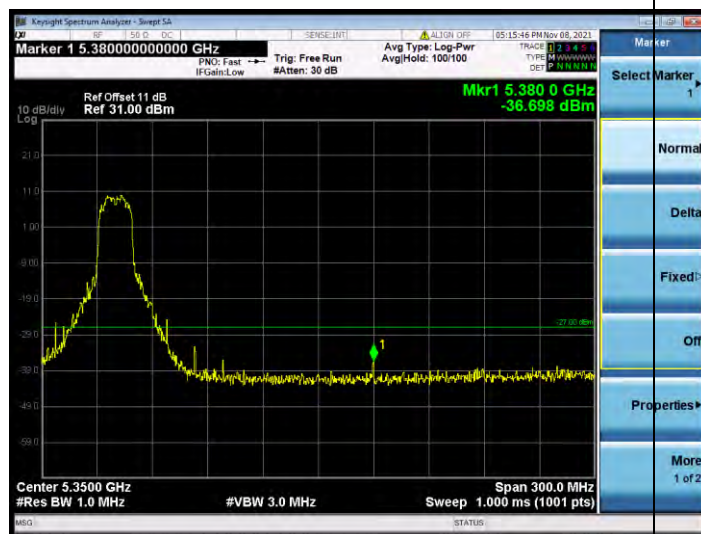
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Test Report No.: W7L-P21090018RF03

11AN20_Ant1_Low_5180



11AN20_Ant1_High_5240

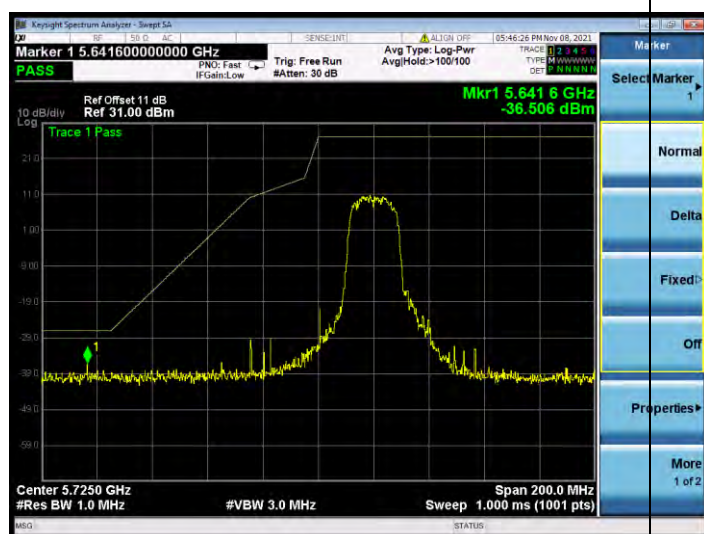


11AN20_Ant1_Low_5745

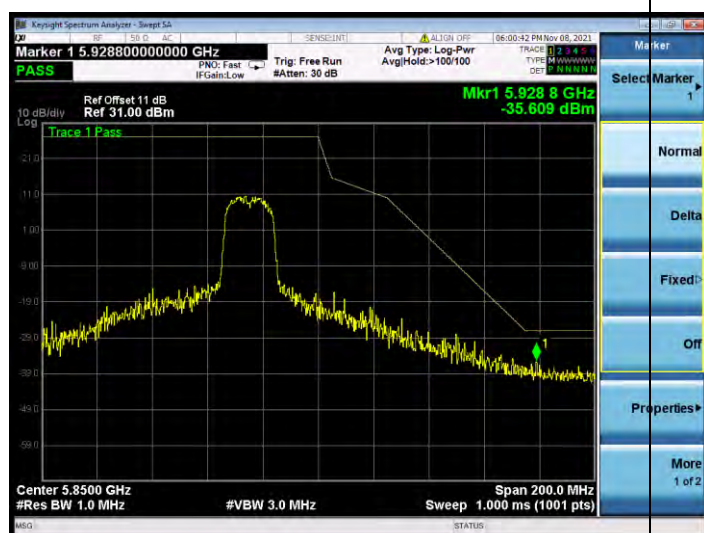


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VERITAS

Test Report No.: W7L-P21090018RF03



11AN20_Ant1_High_5825





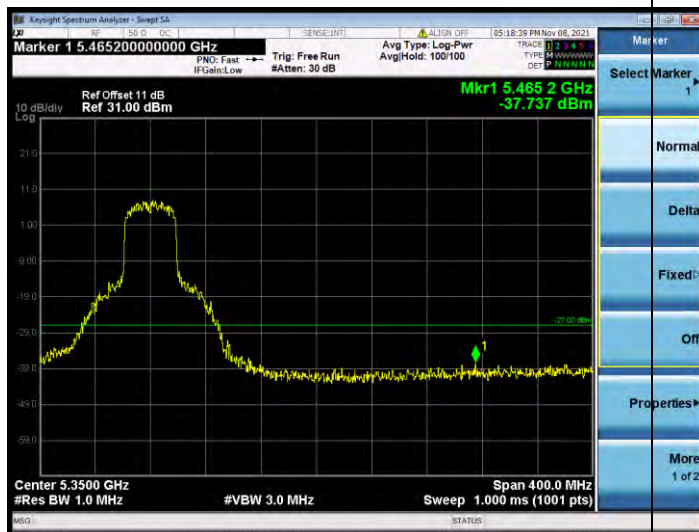
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VERITAS

Test Report No.: W7L-P21090018RF03

11AN40_Ant1_Low_5190



11AN40_Ant1_High_5230

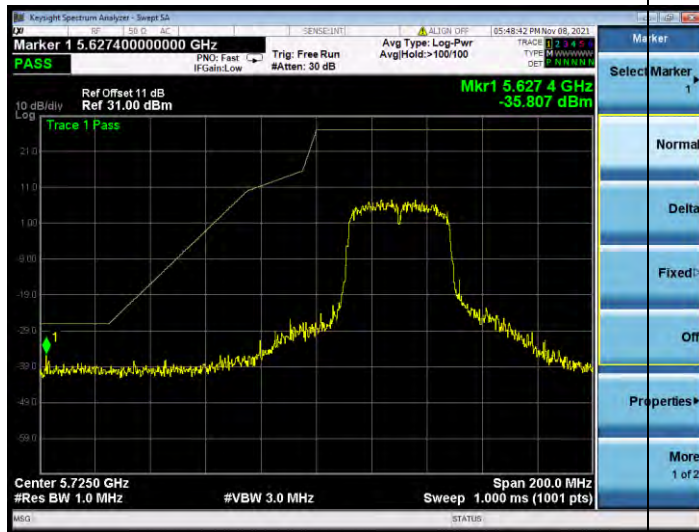


11AN40_Ant1_Low_5755

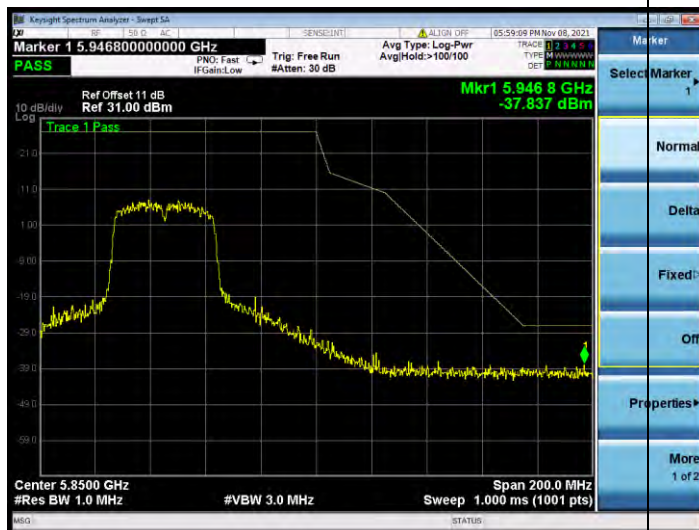


BUREAU
VERITAS

Test Report No.: W7L-P21090018RF03



11AN40_Ant1_High_5795





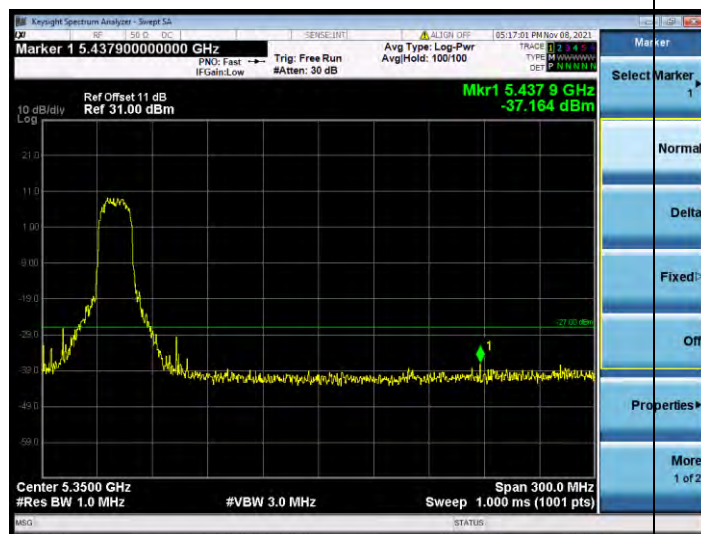
BUREAU
VERITAS

Test Report No.: W7L-P21090018RF03

11AC20_Ant1_Low_5180



11AC20_Ant1_High_5240

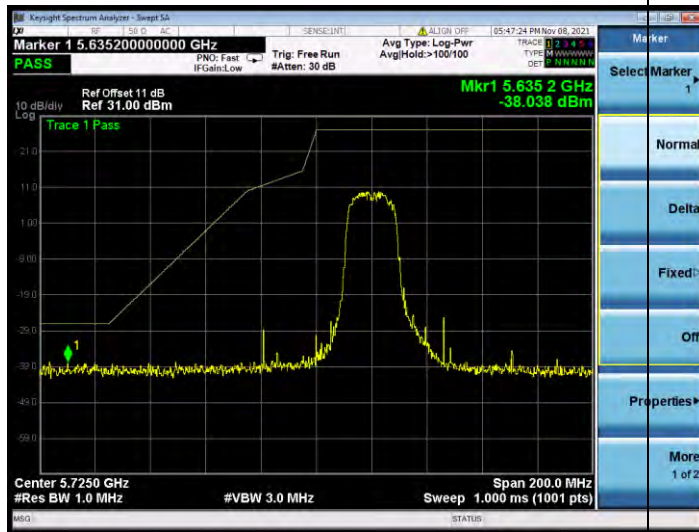


11AC20_Ant1_Low_5745

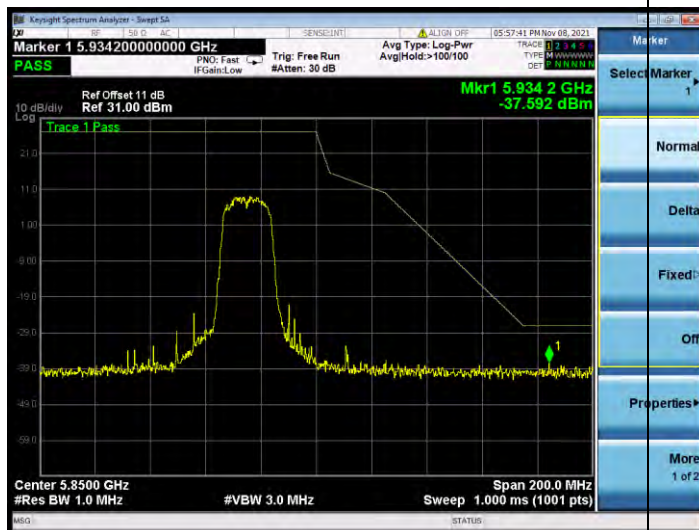


BUREAU
VERITAS

Test Report No.: W7L-P21090018RF03



11AC20_Ant1_High_5825





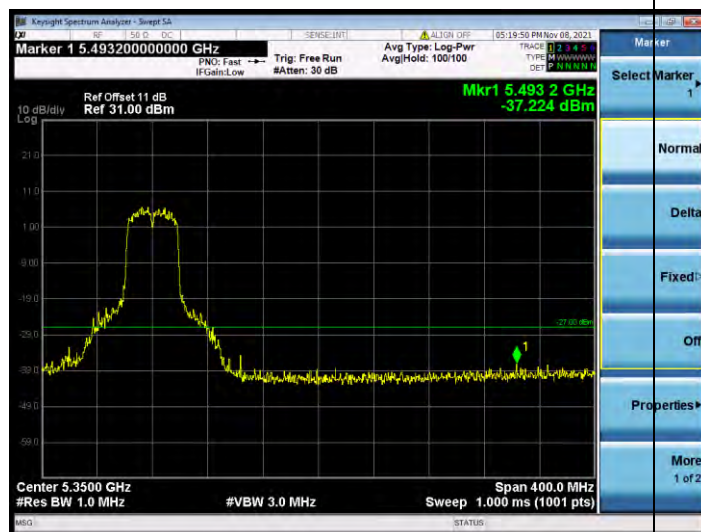
BUREAU
VERITAS

Test Report No.: W7L-P21090018RF03

11AC40_Ant1_Low_5190



11AC40_Ant1_High_5230

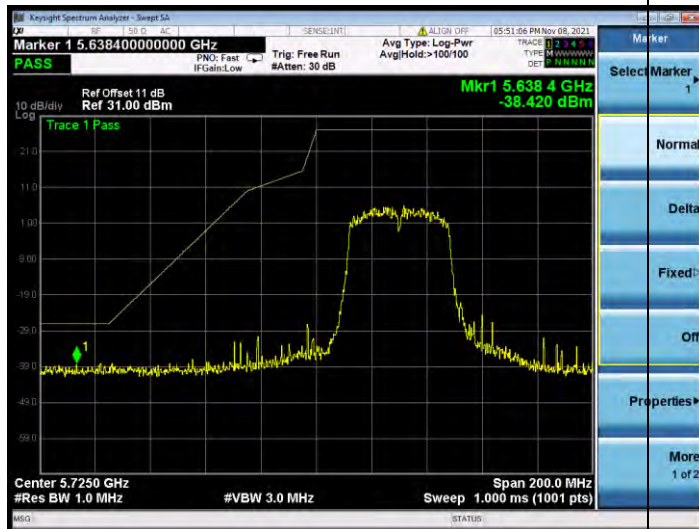


11AC40_Ant1_Low_5755

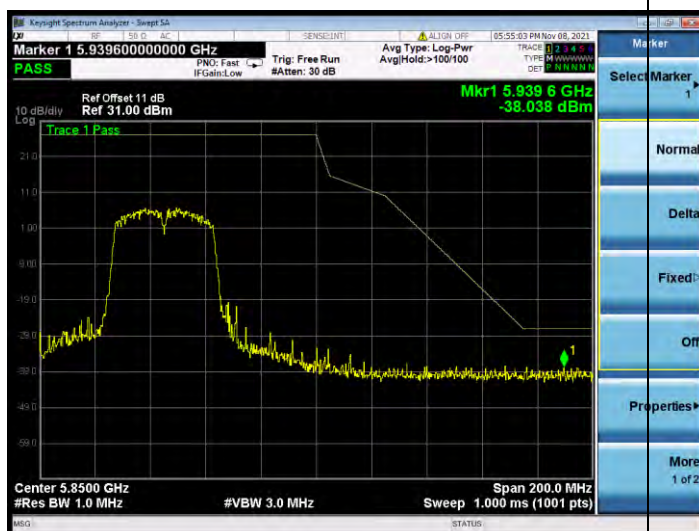


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VERITAS

Test Report No.: W7L-P21090018RF03



11AC40_Ant1_High_5795





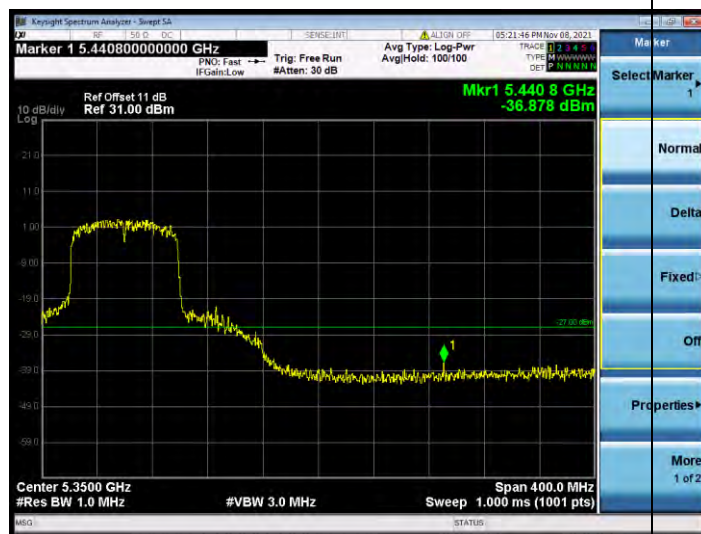
BUREAU
VERITAS

Test Report No.: W7L-P21090018RF03

11AC80_Ant1_Low_5210



11AC80_Ant1_Low_5210

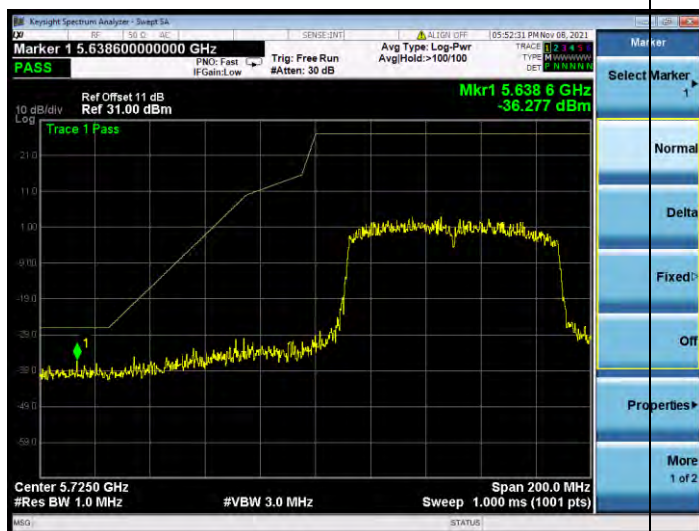


11AC80_Ant1_High_5775

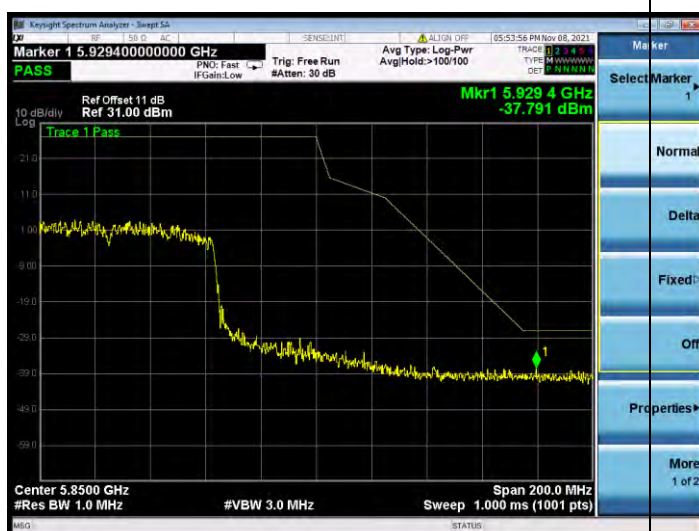


BUREAU
VERITAS

Test Report No.: W7L-P21090018RF03



11AC80_Ant1_High_5775



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