

FCC RADIO TEST REPORT

FCC ID: 2ARZ2PIONA1925A

Product: Panoramic Camera

Trade Mark: Labpano

Model No.: PIONA1925/A

Family Model: PIONA1925/B, PIONA1925/C,
PIONA1925/D, PIONA1925/E

Report No.: S19112901716004

Issue Date: 13 Mar. 2020

Prepared for

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TEST RESULT CERTIFICATION

Applicant's name : Shenzhen Pisoftware Technology Co., Ltd.

Address : Room 1221, 12F, Shenzhen Newspaper Group and Periodicals Building,
Qinghu Community, Longhua Street, Longhua District, Shenzhen, China

Manufacturer's Name : Shenzhen Pisoftware Technology Co., Ltd.

Address : Room 1221, 12F, Shenzhen Newspaper Group and Periodicals Building,
Qinghu Community, Longhua Street, Longhua District, Shenzhen, China

Product description

Product name..... : Panoramic Camera

Model and/or type reference : PIONA1925/A

Family Model..... : PIONA1925/B, PIONA1925/C, PIONA1925/D, PIONA1925/E

Standards : FCC Part15.407

Test procedure..... ANSI C63.10-2013 and KDB 789033 D02 General UNII Test
Procedures New Rules v02r01

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

FCC KDB 662911 D02 MIMO With Cross Polarized Antenna V01

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements/ the Industry Canada requirements.. And it is applicable only to the tested sample identified in the report.

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Date of Test.....

Date (s) of performance of tests..... 18 Dec. 2019 ~ 11 Mar, 2020

Date of Issue..... 13 Mar, 2020

Test Result..... **Pass**

Testing Engineer : Jerry Xie
(Jerry Xie)

Technical Manager : Jason Chen
(Jason Chen)

Authorized Signatory : Sam. Chen
(Sam Chen)

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Revision History

[illegible]

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.207	AC Power Line Conducted Emissions	PASS	
15.209(a), 15.407 (b)(1) 15.407 (b)(2) 15.407 (b)(3) 15.407 (b)(4) 15.407 (b)(6)	Spurious Radiated Emissions	PASS	
15.407 (a)	26 dB and 99% Emission Bandwidth	PASS	
15.407(e)	Minimum 6 dB bandwidth	PASS	
15.407 (a)	Maximum Conducted Output Power	PASS	
15.407 (b)(1) 15.407 (b)(2) 15.407 (b)(3) 15.407 (b)(4)	Band Edge	PASS	
15.407 (a)	Power Spectral Density	PASS	
15.407(b)	Spurious Emissions at Antenna Terminals	PASS	
15.407(g)	Frequency Stability Measurement	PASS	
15.407(h)	Dynamic Frequency Selection(DFS)	N/A	
15.203	Antenna Requirement	PASS	

NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report
- (2) This device operates with a duty cycle greater than 99%

1.1 FACILITIES AND ACCREDITATIONS

FACILITIES

All measurement facilities used to collect the measurement data are located at
1/F, Building E, Fenda Science Park Sanwei, Xixiang, Bao'an District
Shenzhen, Guangdong, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

CNAS-Lab. : The Laboratory has been assessed and proved to be in compliance with
CNAS-CL01:2006 (identical to ISO/IEC 17025:2005)
The Certificate Registration Number is L5516.

IC-Registration The Certificate Registration Number is 9270A.
CAB identifier:CN0074

FCC- Accredited Test Firm Registration Number: 463705.
Designation Number: CN1184

A2LA-Lab. The Certificate Registration Number is 4298.01
This laboratory is accredited in accordance with the recognized
International Standard ISO/IEC 17025:2005 General requirements for the
competence of testing and calibration laboratories.
This accreditation demonstrates technical competence for a defined
scope and the operation of a laboratory quality management system
(refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Name of Firm : Shenzhen NTEK Testing Technology Co., Ltd.

Site Location : 1/F, Building E, Fenda Science Park Sanwei, Xixiang, Bao'an District
Shenzhen, Guangdong, China

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 2.80\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(30MHz~1GHz)	$\pm 2.64\text{dB}$
5	All emissions, radiated(1GHz~6GHz)	$\pm 2.40\text{dB}$
6	All emissions, radiated(> 6GHz)	$\pm 2.52\text{dB}$
7	Temperature	$\pm 0.5^{\circ}\text{C}$
8	Humidity	$\pm 2\%$

1. GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

Equipment	Panoramic Camera	
Trade Mark	Labpano	
Model Name	PIONA1925/A	
Family Model	PIONA1925/B, PIONA1925/C, PIONA1925/D, PIONA1925/E	
Model Difference	All models are the same circuit and RF module, except different model for different market purposes.	
FCC ID	2ARZ2PIONA1925A	
Product Description	Mode Supported	☒ 802.11a ☒ 802.11n(HT20) ☒ 802.11n(HT40) ☒ 802.11ac(HT20) ☒ 802.11ac(HT40) ☒ 802.11ac(HT80)
	Data Rate	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20/HT40):MCS0-MCS15; 802.11ac(VHT20): NSS1, MCS0-MCS8 802.11ac(VHT40/VHT80):NSS1, MCS0-MCS9
	Modulation	OFDM with BPSK/QPSK/16QAM/64QAM
	Operating Frequency Range	☒ U-NII-1: 5180 MHz ~5240MHz ☐ U-NII-2A: 5260MHz~5320MHz ☐ U-NII-2C: 5500MHz~5700MHz ☒ U-NII-3: 5745 MHz ~5825 MHz
	Function:	☐ Outdoor AP ☐ Indoor AP ☐ Fixed P2P ☒ Client
	Support TPC	☐ YES ☒ NO
	Antenna Type	Antenna 1: FPCB Print Antenna Antenna 2: FPCB Print Antenna
	Antenna Gain	Antenna 1: 0.96dBi Antenna 2: 0.96dBi
	Smart system	☒ SISO for 802.11a ☒ MIMO for 802.11n/ac
	Based on the application, features, or specification exhibited in User's Manual, More details of EUT technical specification, please refer to the User's Manual.	
Ratings	DC 3.8V from Battery or DC 5V from Adapter	
Adapter	☒ Adapter supply: Model:A824A-120150U-EU1 Input: 100-240V~50/60Hz 0.5A Output: 5V---3A/9V---2A/12V---1.5A	
Battery	DC 3.8V/3400mAh	
Connecting I/O Port(s)	Please refer to the User's Manual	

HW Version	N/A
SW Version	N/A

Note:

- For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- Frequency and Channel list:

Band	20MHz		40MHz		80MHz	
	Channel	Frequency	Channel	Frequency	Channel	Frequency
U-NII-1	36	5180 MHz	38	5190 MHz	42	5210 MHz
	40	5200 MHz	46	5230 MHz	-	-
	44	5220 MHz				
	48	5240 MHz				
U-NII-2A	52	5260 MHz	54	5270 MHz	58	5290 MHz
	56	5280 MHz	62	5310 MHz		
	60	5300 MHz				
	64	5320 MHz				
U-NII-2C	100	5500 MHz	102	5510 MHz	106	5530 MHz
	104	5520 MHz	110	5550 MHz	122	5610 MHz
	108	5540 MHz	118	5590 MHz		
	112	5560 MHz	126	5630 MHz		
	116	5580 MHz	134	5670 MHz		
	120	5600 MHz				
	124	5620 MHz				
	128	5640 MHz				
	132	5660 MHz				
	140	5700 MHz				
U-NII-3	149	5745 MHz	151	5755 MHz	155	5775 MHz
	153	5765 MHz	159	5795 MHz		
	157	5785 MHz				
	161	5805 MHz				
	165	5825 MHz				

The module for 5G WIFI has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1TX, 1RX
802.11n/ac	1TX/2TX, 1RX/2RX

For 5GHz mode, Antenna 1,2 are transmitting, each with the same directional gain.

For MIMO mode, Directional gain= $[10\log(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$ dBi =3.97 dBi in 5GHz
the 802.11n(20/40) ac(20/40/80) 5GHz has MIMO mode.

Note: G1 means antenna gain for ANT 1 in dBi.

G2 means antenna gain for ANT 2 in dBi.

N_{ANT} means the number of Antennas.

1.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Normal Link Mode
Mode 2	802.11a / n/ ac 20 CH36/ CH40/ CH 48 802.11a /n/ ac 20 CH149/ CH157/ CH 165
Mode 3	802.11n/ ac40 CH38/ CH 46 802.11n/ ac40 CH 151 / CH 159
Mode 4	802.11 ac80 CH 42/CH 155

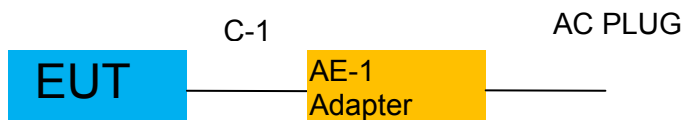
For Radiated Emission	
Final Test Mode	Description
Mode 1	Normal Link Mode
Mode 2	802.11a / n/ ac 20 CH36/ CH40/ CH 48 802.11a /n/ ac 20 CH149/ CH157/ CH 165
Mode 3	802.11n/ ac40 CH38/ CH 46 802.11n/ ac40 CH 151 / CH 159
Mode 4	802.11 ac80 CH 42/CH 155

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

1.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

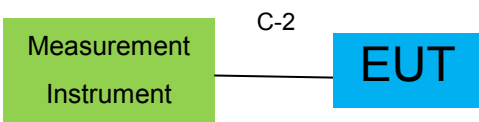
For AC Conducted Emission Mode



For Radiated Test Cases



For Conducted Test Cases



Note: 1. The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

1.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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

Item	Equipment	Brand	Model/Type No.	Series No.	Note
AE-1	Adapter	N/A	A824A-120150U-EU1	N/A	Peripherals

Item	Cable Type	Shielded Type	Ferrite Core	Length	Note
C-1	USB Cable	NO	NO	1.0m	
C-2	RF Cable	YES	NO	0.1m	

Note:

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

1.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation& Conducted Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2019.05.13	2020.05.12	1 year
2	Spectrum Analyzer	Agilent	N9020A	MY49100060	2019.08.28	2020.08.27	1 year
3	Spectrum Analyzer	R&S	FSV40	101417	2019.08.28	2020.08.27	1 year
4	Test Receiver	R&S	ESPI7	101318	2019.05.13	2020.05.12	1 year
5	Bilog Antenna	TESEQ	CBL6111D	31216	2019.04.15	2020.04.14	1 year
6	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2018.05.19	2020.05.18	2 year
7	Horn Antenna	EM	EM-AH-10180	2011071402	2019.04.15	2020.04.14	1 year
8	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	803	2019.12.11	2020.12.10	1 year
9	Amplifier	EMC	EMC051835SE	980246	2019.08.06	2020.08.05	1 year
10	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	055	2019.12.11	2020.12.10	1 year
11	Power Meter	DARE	RPR3006W	15100041SN084	2019.08.06	2020.08.05	1 year
12	Test Cable (9KHz-30MHz)	N/A	R-01	N/A	2017.04.21	2020.04.20	3 year
13	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2017.04.21	2020.04.20	3 year
14	High Test Cable(1G-40GHz)	N/A	R-03	N/A	2017.04.21	2020.04.20	3 year
15	High Test Cable(1G-40GHz)	N/A	R-04	N/A	2017.04.21	2020.04.20	3 year
16	Filter	TRILTHIC	2400MHz	29	2017.04.19	2020.04.18	3 year
17	temporary antenna connector (Note)	NTS	R001	N/A	N/A	N/A	N/A
18	MXG Vector Signal Generator	Agilent	N5182A	MY47070317	2019.03.28	2020.03.27	1 year

Note:

We will use the temporary antenna connector (soldered on the PCB board) When conducted test
And this temporary antenna connector is listed within the instrument list

AC Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2019.05.13	2020.05.12	1 year
2	LISN	R&S	ENV216	101313	2019.04.15	2020.04.14	1 year
3	LISN	SCHWARZBECK	NNLK 8129	8129245	2019.05.13	2020.05.12	1 year
4	50Ω Coaxial Switch	ANRITSU CORP	MP59B	6200983704	2018.05.19	2020.05.18	2 year
5	Test Cable (9KHz-30MHz)	N/A	C01	N/A	2017.04.21	2020.04.20	3 year
6	Test Cable (9KHz-30MHz)	N/A	C02	N/A	2017.04.21	2020.04.20	3 year
7	Test Cable (9KHz-30MHz)	N/A	C03	N/A	2017.04.21	2020.04.20	3 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable& Aux Equipment which is scheduled for calibration every 3 years.

2. EMC EMISSION TEST

2.1 CONDUCTED EMISSION MEASUREMENT

2.1.1 APPLICABLE STANDARD

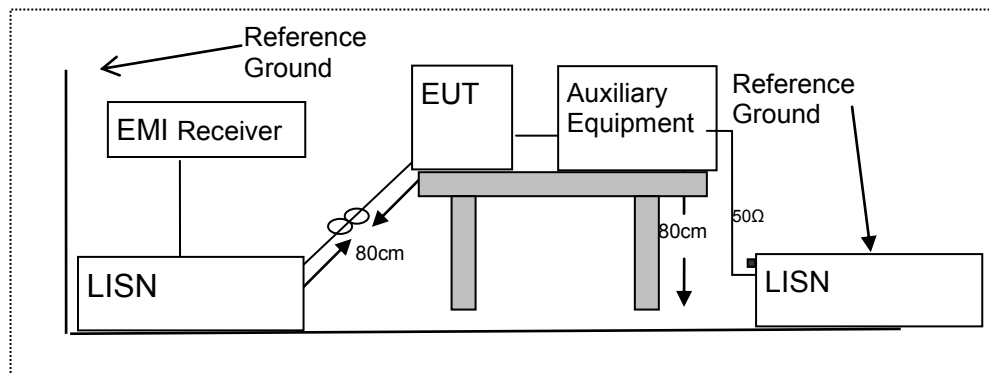
According to FCC Part 15.207(a)

2.1.2 CONFORMANCE LIMIT

Frequency(MHz)	Conducted Emission Limit	
	Quasi-peak	Average
0.15-0.5	66-56*	56-46*
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. *Decreases with the logarithm of the frequency
2. The lower limit shall apply at the transition frequencies
3. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

2.1.3 TEST CONFIGURATION



2.1.4 TEST PROCEDURE

According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

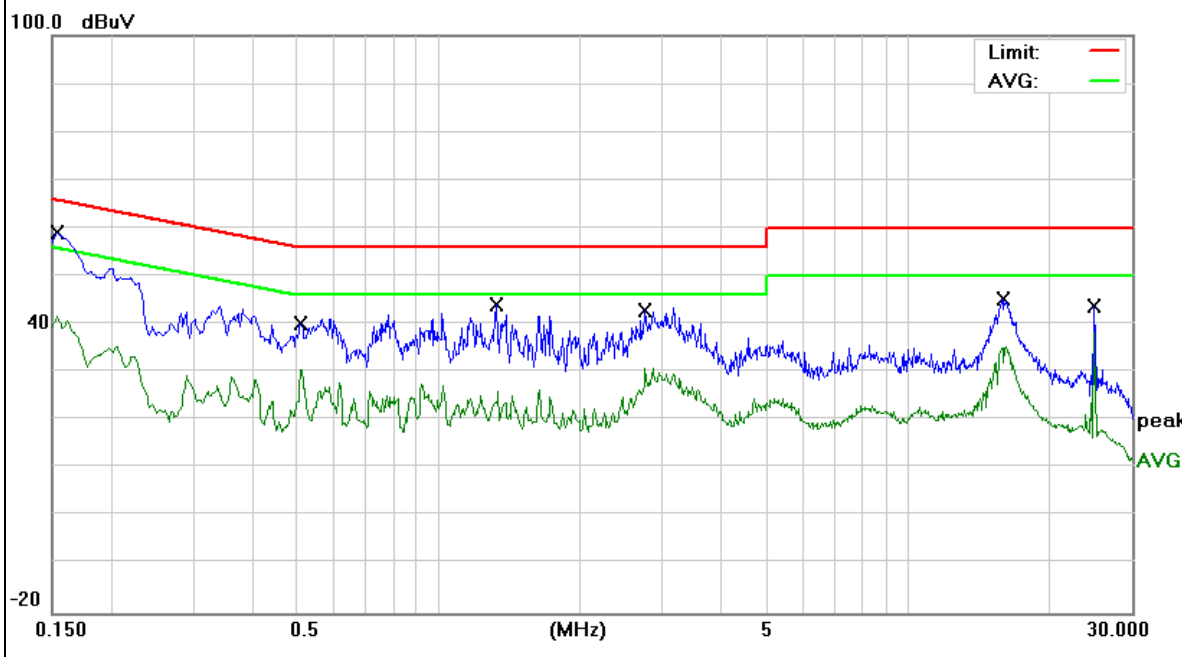
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room.
2. The EUT was placed on a table which is 0.8m above ground plane.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
4. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40cm long.
5. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
6. LISN at least 80 cm from nearest part of EUT chassis.
7. The frequency range from 150KHz to 30MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth(IF bandwidth=9KHz) with Maximum Hold Mode
9. For the actual test configuration, please refer to the related Item –EUT Test Photos.

EUT :	Panoramic Camera	Model Name. :	PIONA1925/A
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V from Adapter AC 120V/60Hz	Test Mode :	Mode 1(5.2G)

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1539	49.32	9.75	59.07	65.78	-6.71	QP
0.1539	31.76	9.75	41.51	55.78	-14.27	AVG
0.5100	30.35	9.74	40.09	56.00	-15.91	QP
0.5100	20.89	9.74	30.63	46.00	-15.37	AVG
1.3300	34.37	9.75	44.12	56.00	-11.88	QP
1.3300	16.18	9.75	25.93	46.00	-20.07	AVG
2.7620	33.01	9.82	42.83	56.00	-13.17	QP
2.7620	21.17	9.82	30.99	46.00	-15.01	AVG
15.9618	35.02	10.12	45.14	60.00	-14.86	QP
15.9618	25.08	10.12	35.20	50.00	-14.80	AVG
25.0259	32.91	10.72	43.63	60.00	-16.37	QP
25.0259	27.61	10.72	38.33	50.00	-11.67	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

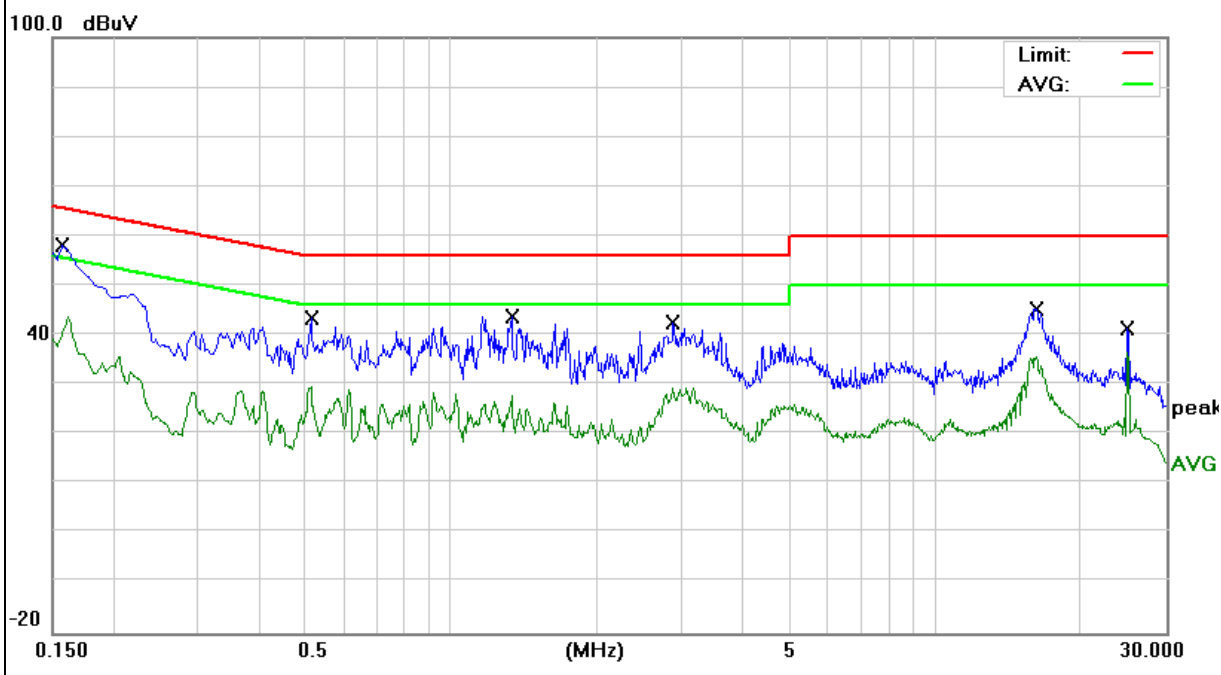


EUT :	Panoramic Camera	Model Name. :	PIONA1925/A
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V from Adapter AC 120V/60Hz	Test Mode :	Mode 1(5.2G)

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1580	48.42	9.74	58.16	65.56	-7.40	QP
0.1580	34.01	9.74	43.75	55.56	-11.81	AVG
0.5140	33.78	9.75	43.53	56.00	-12.47	QP
0.5140	19.98	9.75	29.73	46.00	-16.27	AVG
1.3340	34.12	9.76	43.88	56.00	-12.12	QP
1.3340	17.99	9.76	27.75	46.00	-18.25	AVG
2.8699	32.59	9.86	42.45	56.00	-13.55	QP
2.8699	19.45	9.86	29.31	46.00	-16.69	AVG
16.1858	35.24	10.11	45.35	60.00	-14.65	QP
16.1858	25.66	10.11	35.77	50.00	-14.23	AVG
24.9377	30.74	10.65	41.39	60.00	-18.61	QP
24.9377	26.02	10.65	36.67	50.00	-13.33	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

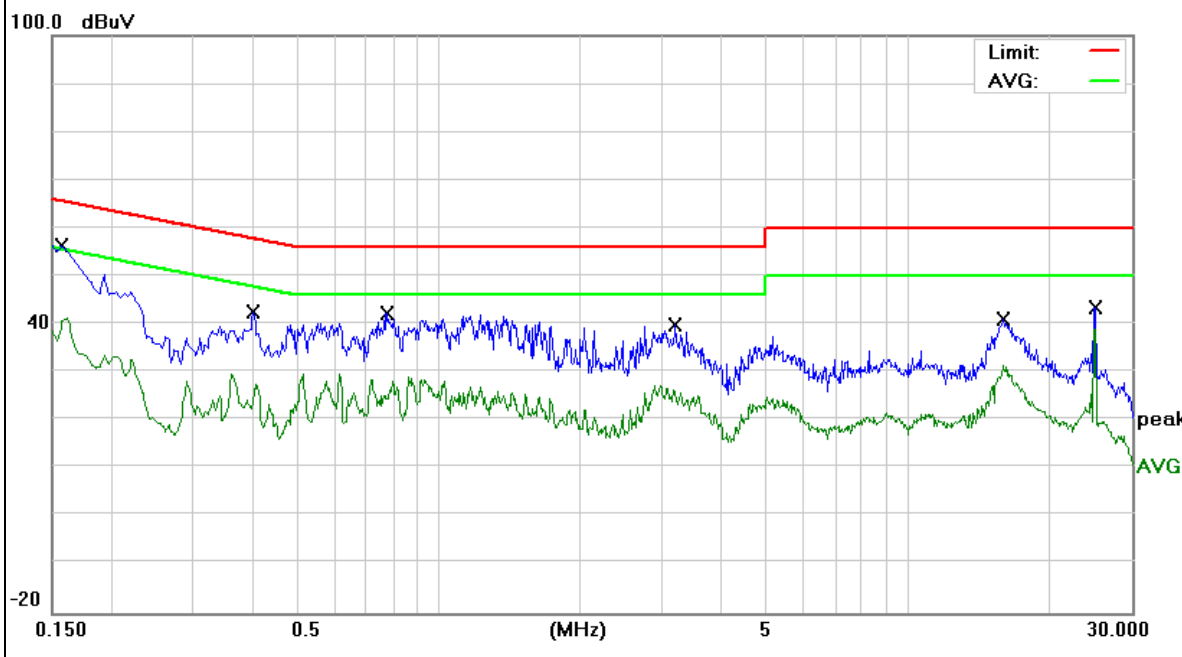


EUT :	Panoramic Camera	Model Name. :	PIONA1925/A
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V from Adapter AC 120V/60Hz	Test Mode :	Mode 1(5.8G)

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1580	46.54	9.75	56.29	65.56	-9.27	QP
0.1580	36.58	9.75	46.33	55.56	-9.23	AVG
0.4020	32.82	9.74	42.56	57.81	-15.25	QP
0.4020	24.28	9.74	34.02	47.81	-13.79	AVG
0.7780	32.39	9.74	42.13	56.00	-13.87	QP
0.7780	23.95	9.74	33.69	46.00	-12.31	AVG
3.1979	30.10	9.83	39.93	56.00	-16.07	QP
3.1979	19.53	9.83	29.36	46.00	-16.64	AVG
16.0178	30.87	10.12	40.99	60.00	-19.01	QP
16.0178	20.23	10.12	30.35	50.00	-19.65	AVG
25.0620	32.76	10.72	43.48	60.00	-16.52	QP
25.0620	22.93	10.72	33.65	50.00	-16.35	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

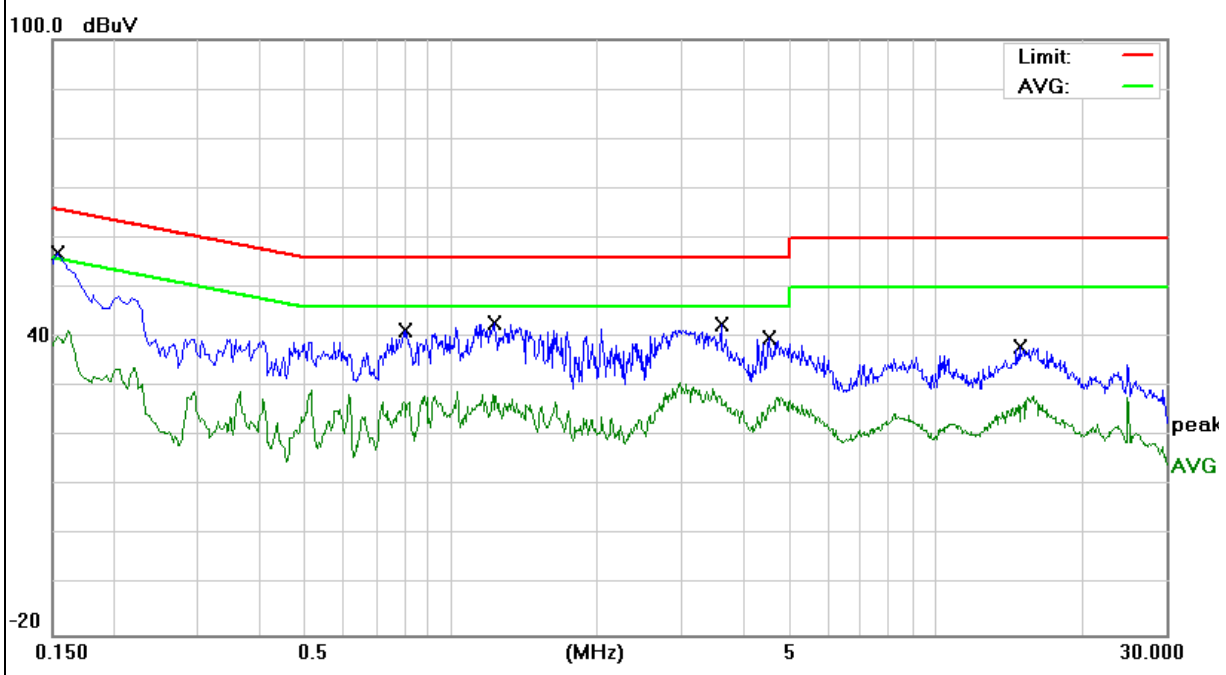


EUT :	Panoramic Camera	Model Name. :	PIONA1925/A
Temperature :	26 °C	Relative Humidity :	56%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V from Adapter AC 120V/60Hz	Test Mode :	Mode 1(5.8G)

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1539	47.16	9.74	56.90	65.78	-8.88	QP
0.1539	36.95	9.74	46.69	55.78	-9.09	AVG
0.8020	31.47	9.75	41.22	56.00	-14.78	QP
0.8020	22.61	9.75	32.36	46.00	-13.64	AVG
1.2257	33.04	9.75	42.79	56.00	-13.21	QP
1.2257	25.58	9.75	35.33	46.00	-10.67	AVG
3.6139	32.50	9.90	42.40	56.00	-13.60	QP
3.6139	26.12	9.90	36.02	46.00	-9.98	AVG
4.5377	29.99	9.94	39.93	56.00	-16.07	QP
4.5377	19.64	9.94	29.58	46.00	-16.42	AVG
14.9859	28.07	10.09	38.16	60.00	-21.84	QP
14.9859	20.16	10.09	30.25	50.00	-19.75	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



2.2 RADIATED EMISSION MEASUREMENT

2.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(d) and 15.209

2.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407(b)(7): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

According to FCC Part 15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

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

Restricted Frequency(MHz)	Field Strength ($\mu\text{V}/\text{m}$)	Field Strength ($\text{dB}\mu\text{V}/\text{m}$)	Measurement Distance
0.009~0.490	2400/F(KHz)	20 log ($\mu\text{V}/\text{m}$)	300
0.490~1.705	24000/F(KHz)	20 log ($\mu\text{V}/\text{m}$)	30
1.705~30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B ($\text{dB}\mu\text{V}/\text{m}$) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Remark : 1. Emission level in $\text{dB}\mu\text{V}/\text{m}=20 \log (\mu\text{V}/\text{m})$

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

3. For Frequency 9kHz~30MHz:

Distance extrapolation factor = $40 \log (\text{Specific distance}/ \text{test distance})(\text{dB})$;

Limit line=Specific limits($\text{dB}\mu\text{V}$) + distance extrapolation factor.

For Frequency above 30MHz:

Distance extrapolation factor = $20 \log (\text{Specific distance}/ \text{test distance})(\text{dB})$;

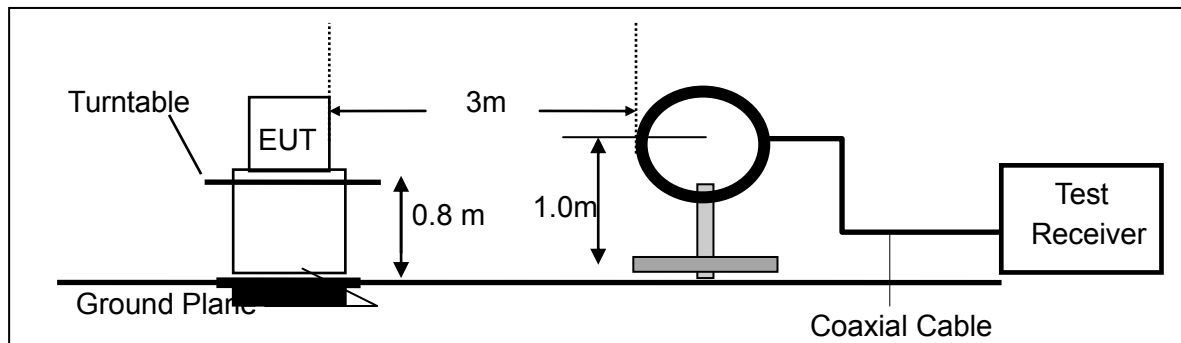
Limit line=Specific limits($\text{dB}\mu\text{V}$) + distance extrapolation factor.

2.2.3 MEASURING INSTRUMENTS

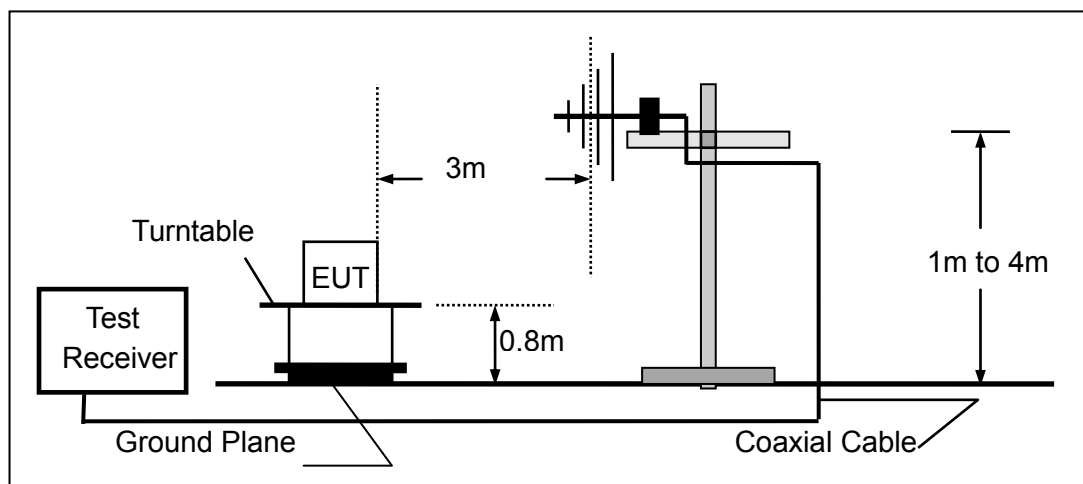
The Measuring equipment is listed in the section 6.3 of this test report.

2.2.4 TEST CONFIGURATION

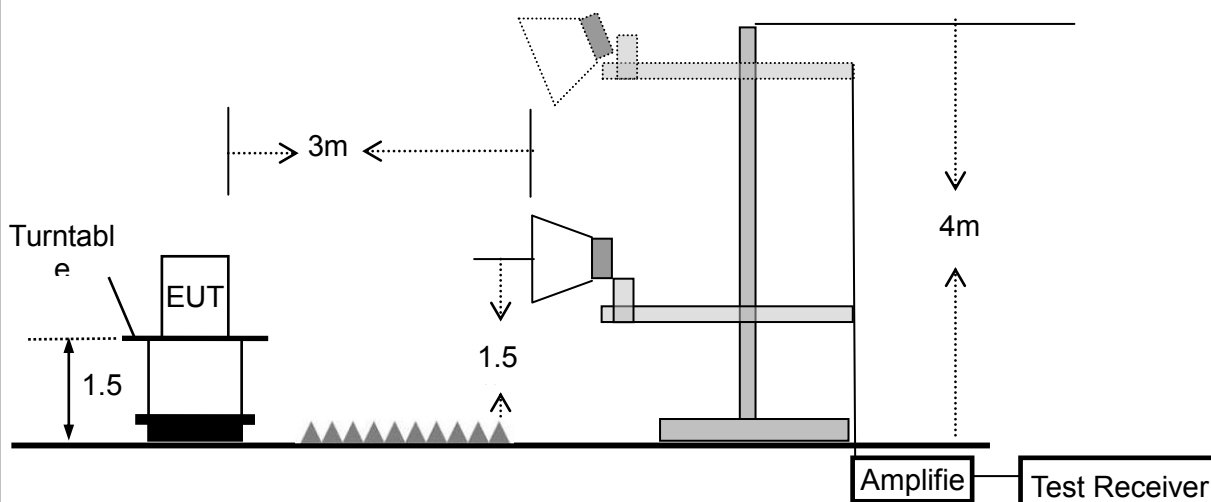
(a) For radiated emissions below 30MHz



(b) For radiated emissions from 30MHz to 1000MHz



(c) For radiated emissions above 1000MHz



2.2.5 TEST PROCEDURE

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205.

It must be performed with the highest gain of each type of antenna proposed for use with the EUT.

Use the following spectrum analyzer settings:

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

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

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

Note:

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

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

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

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

2.2.6 TEST RESULTS (9KHZ – 30 MHZ)

EUT :	Panoramic Camera	Model Name :	PIONA1925/A
Temperature :	26 °C	Relative Humidity :	54%
Pressure:	1010 hPa	Test Voltage :	DC 3.8V
Test Mode :	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	N/A
--	--	--	--	N/A

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

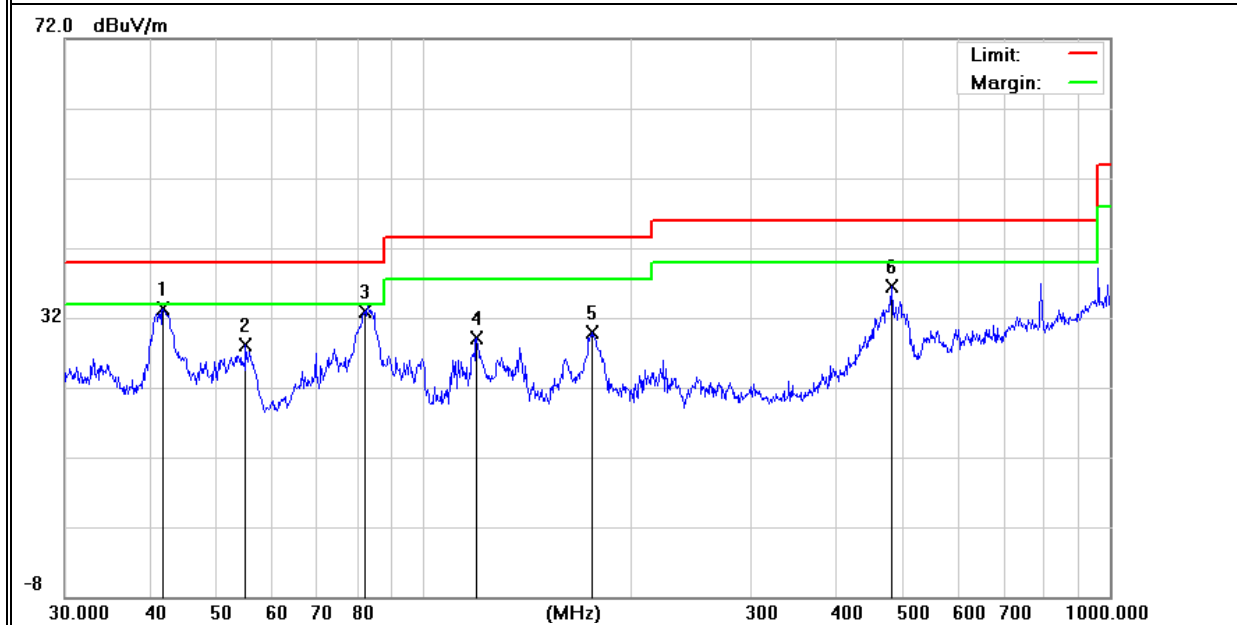
2.2.7 TEST RESULTS (30MHZ – 1GHZ)

EUT :	Panoramic Camera	Model Name :	PIONA1925/A
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC 3.8V
Test Mode :	TX(5.2G)- 802.11a (High CH)		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	41.7129	20.53	12.82	33.35	40.00	-6.65	QP
V	55.0274	21.22	6.80	28.02	40.00	-11.98	QP
V	82.0706	24.61	8.29	32.90	40.00	-7.10	QP
V	119.4360	16.79	12.32	29.11	43.50	-14.39	QP
V	176.2686	20.27	9.73	30.00	43.50	-13.50	QP
V	480.5276	17.06	19.45	36.51	46.00	-9.49	QP

Remark:

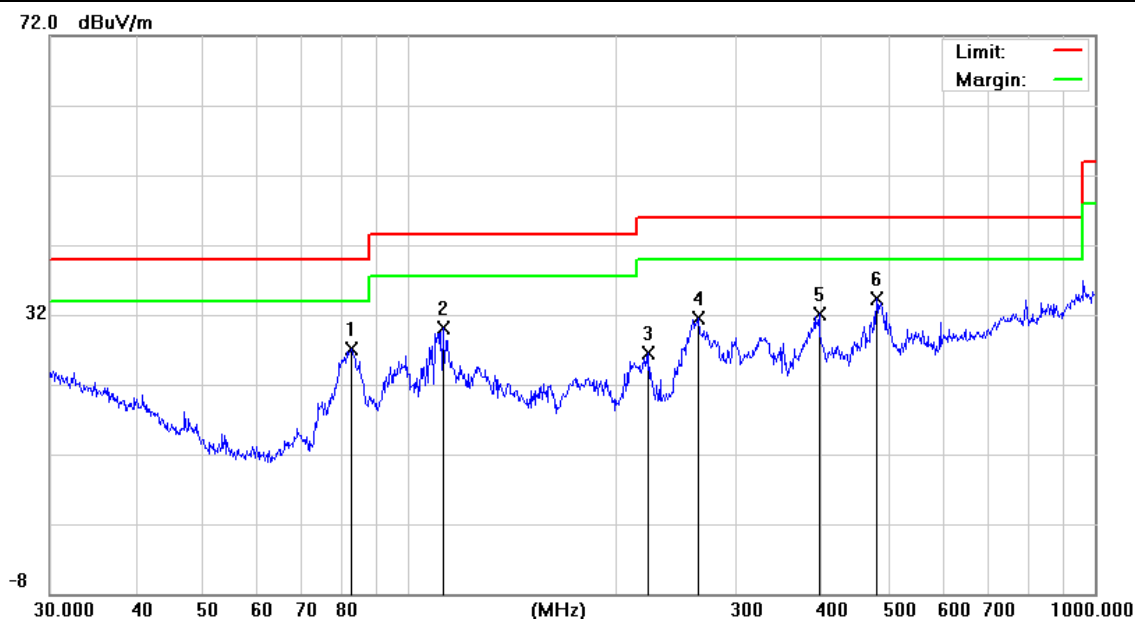
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	82.6482	18.66	8.40	27.06	40.00	-12.94	QP
H	112.1305	18.13	11.88	30.01	43.50	-13.49	QP
H	223.7333	15.83	10.74	26.57	46.00	-19.43	QP
H	264.7457	17.49	14.06	31.55	46.00	-14.45	QP
H	396.2415	14.55	17.65	32.20	46.00	-13.80	QP
H	480.5276	14.78	19.45	34.23	46.00	-11.77	QP

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit

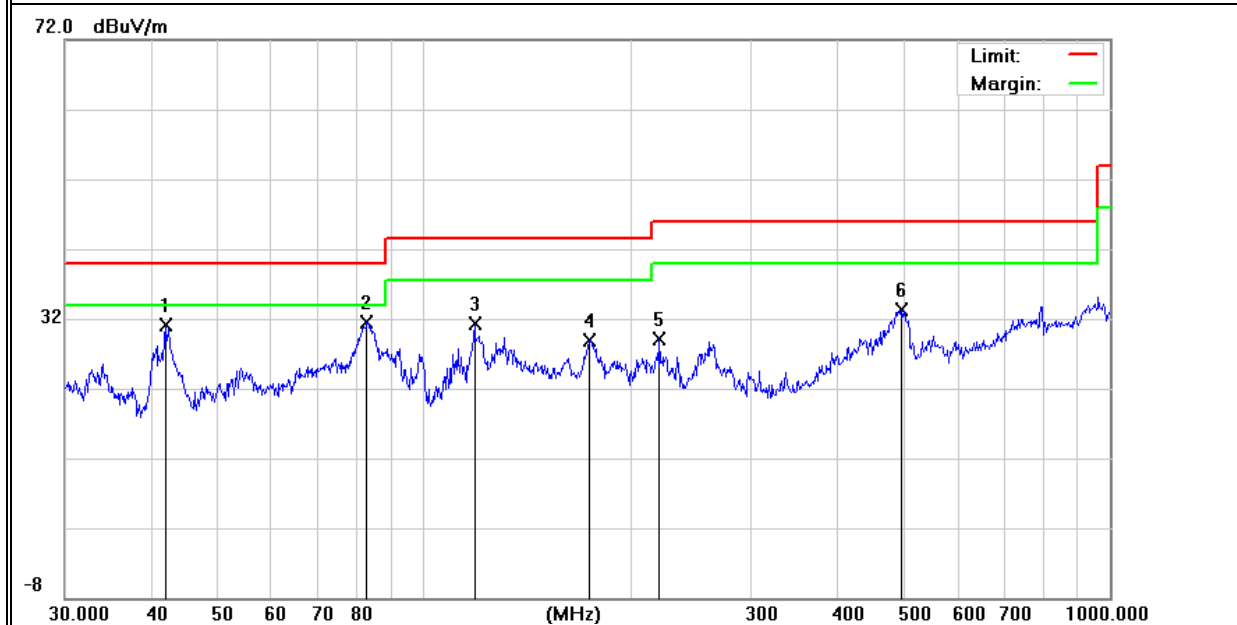


EUT :	Panoramic Camera	Model Name :	PIONA1925/A
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	DC 3.8V
Test Mode :	TX(5.8G) - 802.11a (High CH)		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	42.0065	18.46	12.62	31.08	40.00	-8.92	QP
V	82.6482	23.14	8.40	31.54	40.00	-8.46	QP
V	118.6012	18.96	12.34	31.30	43.50	-12.20	QP
V	174.4241	19.17	9.83	29.00	43.50	-14.50	QP
V	220.6168	18.34	10.79	29.13	46.00	-16.87	QP
V	495.9343	13.40	19.97	33.37	46.00	-12.63	QP

Remark:

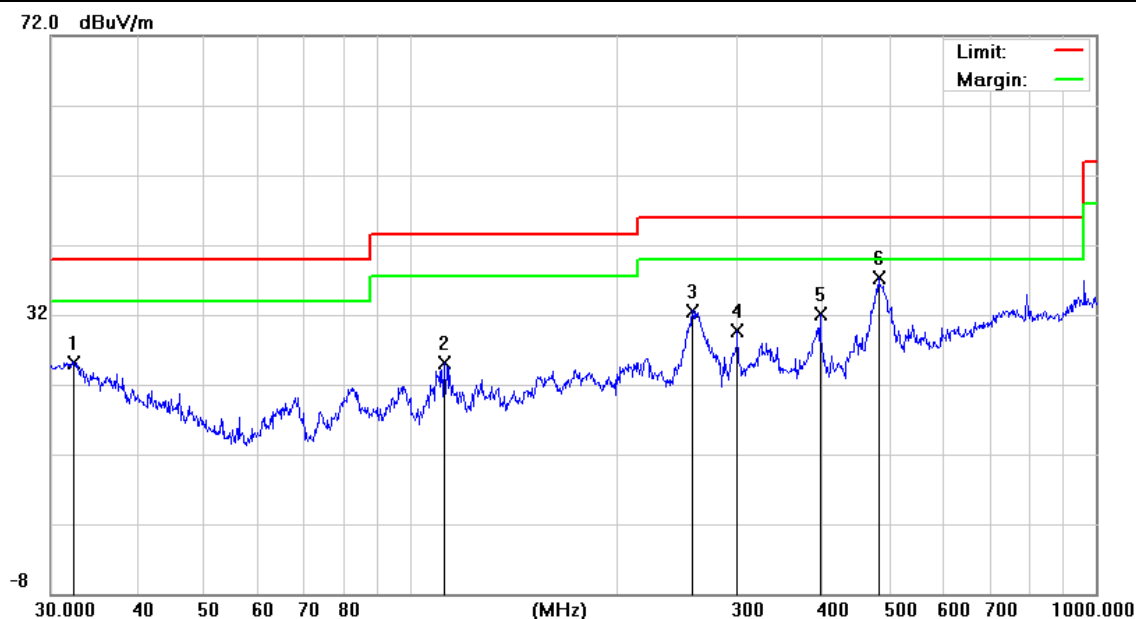
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	32.4059	7.46	17.62	25.08	40.00	-14.92	QP
H	112.5241	13.10	11.95	25.05	43.50	-18.45	QP
H	258.3263	17.98	14.62	32.60	46.00	-13.40	QP
H	300.3672	15.00	14.62	29.62	46.00	-16.38	QP
H	396.2412	14.55	17.65	32.20	46.00	-13.80	QP
H	482.2155	17.84	19.48	37.32	46.00	-8.68	QP

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit



2.2.8 TEST RESULTS (1GHz-18GHz)

EUT :	Panoramic Camera	Model Name. :	PIONA1925/A
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.8V
Test Mode :	TX(5.2G) - 802.11n20 _5180~5240MHz		

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5180 MHz)-Above 1G									
Vertical	5150.00	56.10	5.94	35.40	44.00	53.44	74.00	-20.56	Pk
Vertical	10360.75	51.45	8.46	39.75	44.50	55.16	68.20	-13.04	Pk
Vertical	15540.35	57.60	10.12	38.80	44.10	62.42	74.00	-11.58	Pk
Horizontal	5150.00	56.26	5.94	35.18	44.00	53.38	74.00	-20.62	Pk
Horizontal	10360.00	52.07	8.46	38.71	44.50	54.74	68.20	-13.46	Pk
Horizontal	15540.17	56.73	10.12	38.38	44.10	61.13	74.00	-12.87	Pk
middle Channel (5200 MHz)-Above 1G									
Vertical	10400.72	53.44	8.47	37.88	44.51	55.28	68.20	-12.92	Pk
Vertical	15600.05	57.66	10.12	38.80	44.10	62.48	74.00	-11.52	Pk
Horizontal	10400.46	51.54	8.47	38.64	44.50	54.15	68.20	-14.05	Pk
Horizontal	15600.97	58.59	10.12	38.38	44.10	62.99	74.00	-11.01	Pk
High Channel (5240 MHz)-Above 1G									
Vertical	5350.00	59.35	7.10	37.24	43.50	60.19	74.00	-13.81	Pk
Vertical	10480.73	52.06	8.46	37.68	44.50	53.70	68.20	-14.50	Pk
Vertical	15720.06	54.22	10.12	38.80	44.10	59.04	74.00	-14.96	Pk
Horizontal	5350.00	57.89	7.10	37.24	43.50	58.73	74.00	-15.27	Pk
Horizontal	10480.37	53.75	8.46	38.57	44.50	56.28	68.20	-11.92	Pk
Horizontal	15720.19	56.21	10.12	38.38	44.10	60.61	74.00	-13.39	Pk

Note:"802.11n20(5G)" mode is the worst mode. PK value is lower than the Average value limit, So average didn't record.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

EUT :	Panoramic Camera	Model Name. :	PIONA1925/A
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.8V
Test Mode :	TX (5.8G) -- 802.11n20 _5745~5825MHz		

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5745 MHz)-Above 1G									
Vertical	5122.23	62.99	5.94	35.40	44.00	60.33	74.00	-13.67	Pk
Vertical	11490.26	51.95	8.46	39.75	44.50	55.66	68.20	-12.54	Pk
Vertical	17235.40	50.32	10.12	38.80	44.10	55.14	68.20	-13.06	Pk
Horizontal	5166.24	60.52	5.94	35.18	44.00	57.64	68.20	-10.56	Pk
Horizontal	11490.03	58.98	8.46	38.71	44.50	61.65	74.00	-12.35	Pk
Horizontal	17235.24	55.18	10.12	38.38	44.10	59.58	68.20	-8.62	Pk
middle Channel (5785 MHz)-Above 1G									
Vertical	5433.07	56.21	6.48	36.35	44.05	54.99	74.00	-19.01	Pk
Vertical	11570.28	54.19	8.47	37.88	44.51	56.03	74.00	-17.97	Pk
Vertical	17355.01	51.80	10.12	38.8	44.10	56.62	68.20	-11.58	Pk
Horizontal	4866.07	60.38	6.48	36.37	44.05	59.18	74.00	-14.82	Pk
Horizontal	11570.47	58.18	8.47	38.64	44.50	60.79	74.00	-13.21	Pk
Horizontal	17355.38	65.28	10.12	38.38	44.10	69.68	74.00	-4.32	Pk
High Channel (5825 MHz)-Above 1G									
Vertical	5244.38	59.64	7.10	37.24	43.50	60.48	68.20	-7.72	Pk
Vertical	11652.17	64.95	8.46	37.68	44.50	66.59	74.00	-7.41	Pk
Vertical	17473.02	59.95	10.12	38.8	44.10	64.77	68.20	-3.43	Pk
Horizontal	5285.26	57.69	7.10	37.24	43.50	58.53	74.00	-15.47	Pk
Horizontal	11652.13	59.42	8.46	38.57	44.50	61.95	74.00	-12.05	Pk
Horizontal	17474.25	58.09	10.12	38.38	44.10	62.49	68.20	-5.71	Pk

Note:"802.11n20(5G)" mode is the worst mode. PK value is lower than the Average value limit, So average didn't record.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

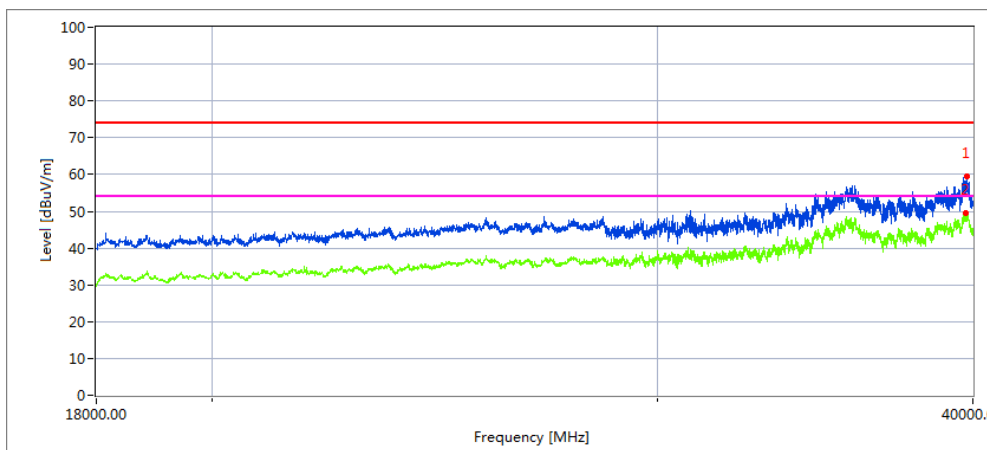
2.2.9 TEST RESULTS (18GHz-40GHz)

EUT :	Panoramic Camera	Model Name. :	PIONA1925/A
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.8V
Test Mode :	TX (5.2G)-802.11a 5180MHz~5240MHz; TX (5.8G)-802.11a 5745MHz~5825MHz		

All the modulation modes have been tested, and the worst result was report as below:

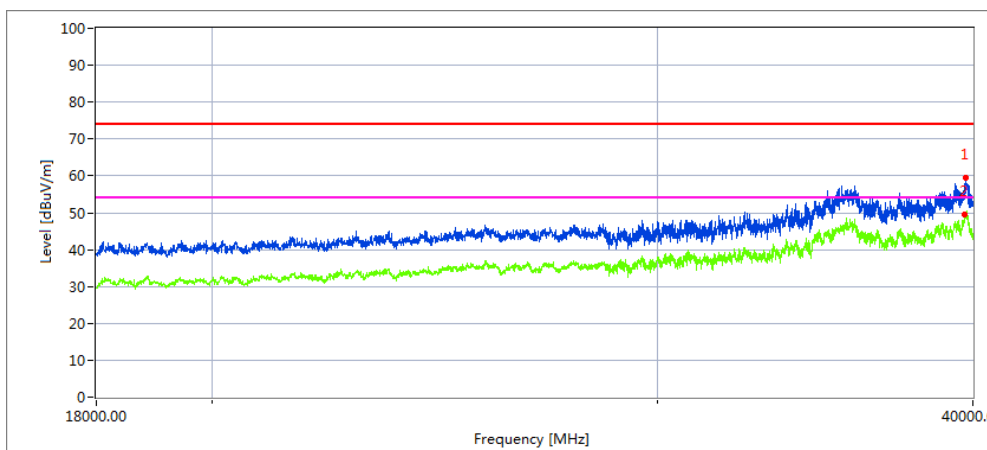
Low Channel (5180 MHz)-Above 1G

Horizontal



Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin dB	Detector Type
(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
39769.62	38.56	20.09	44.07	43.48	59.24	68.2	8.96	Peak

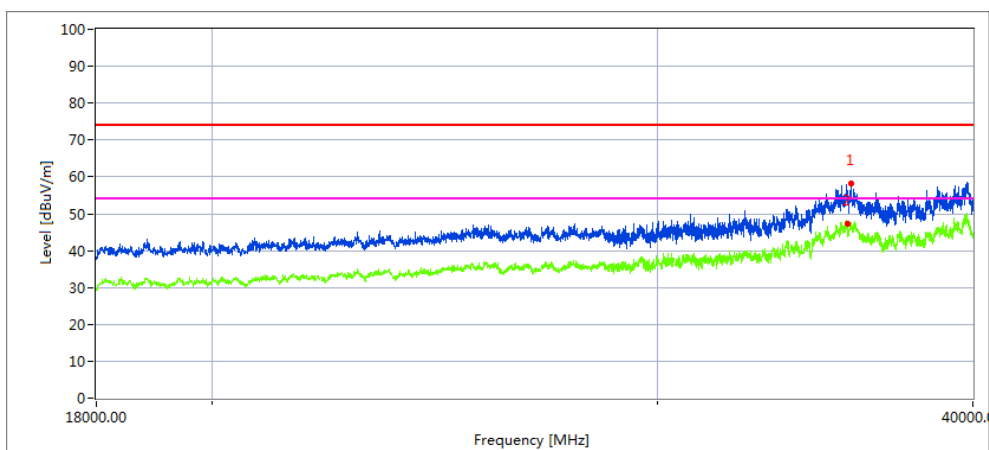
Vertical



Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin dB	Detector Type
(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
39769.576	35.41	20.09	44.07	43.48	56.09	68.2	12.11	Peak

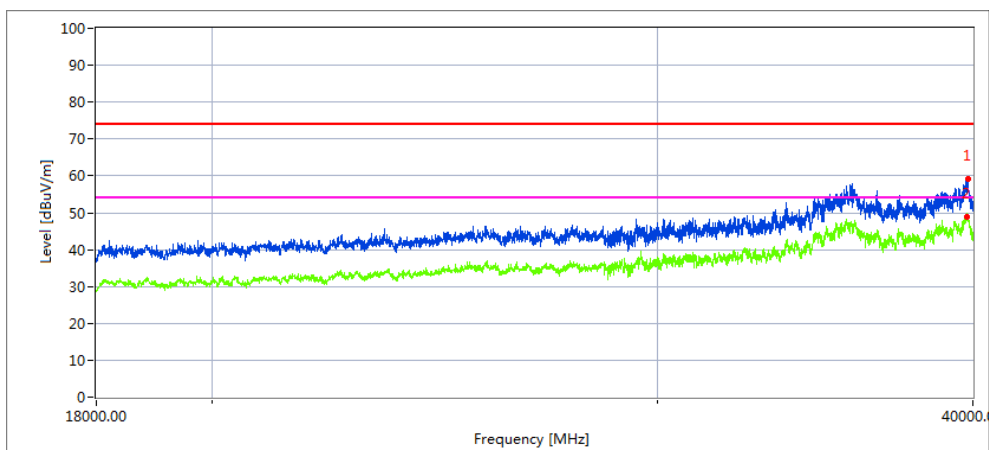
High Channel (5240 MHz)-Above 1G

Horizontal



Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin dB	Detector Type
(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
35628.31	40.46	19.11	42.73	44.61	57.69	68.2	10.51	Peak

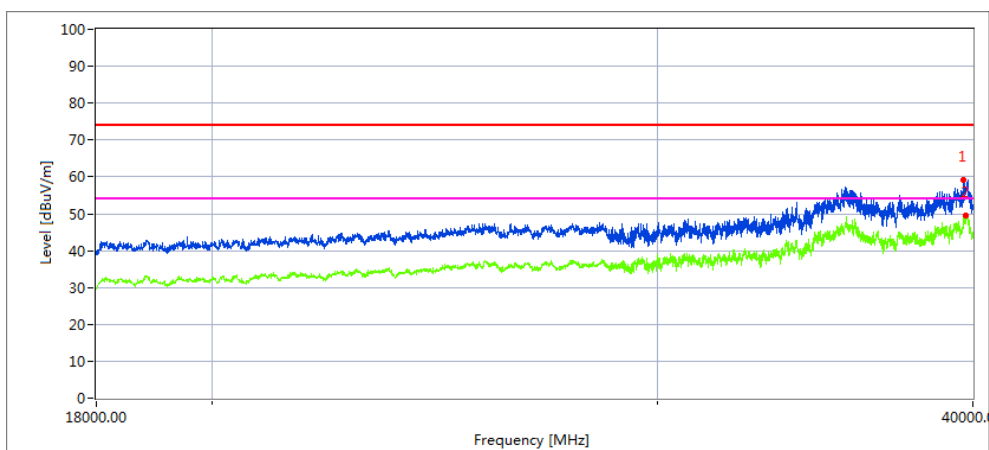
Vertical



Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin dB	Detector Type
(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
39769.17	36.35	20.09	44.07	43.48	57.03	68.2	11.17	Peak

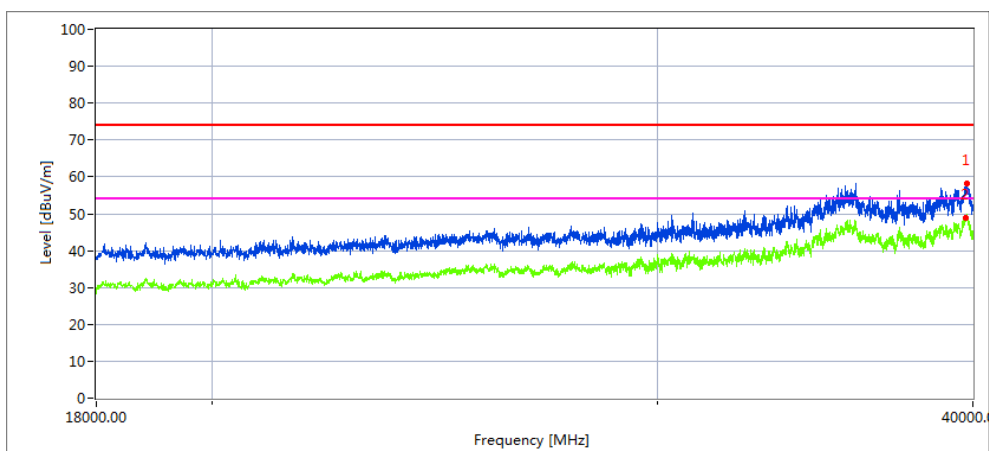
Low Channel (5745 MHz)-Above 1G

Horizontal



Frequency	Meter Reading	Cable loss	Antenna Factor	Preamplifier	Emission Level	Limits	Margin	Detector
(MHz)	(dBuV)	(dB)	dB/m	Factor	(dBuV/m)	(dBuV/m)	(dB)	Type
39670.51	38.24	20.09	44.16	43.48	59.01	68.2	9.19	Peak

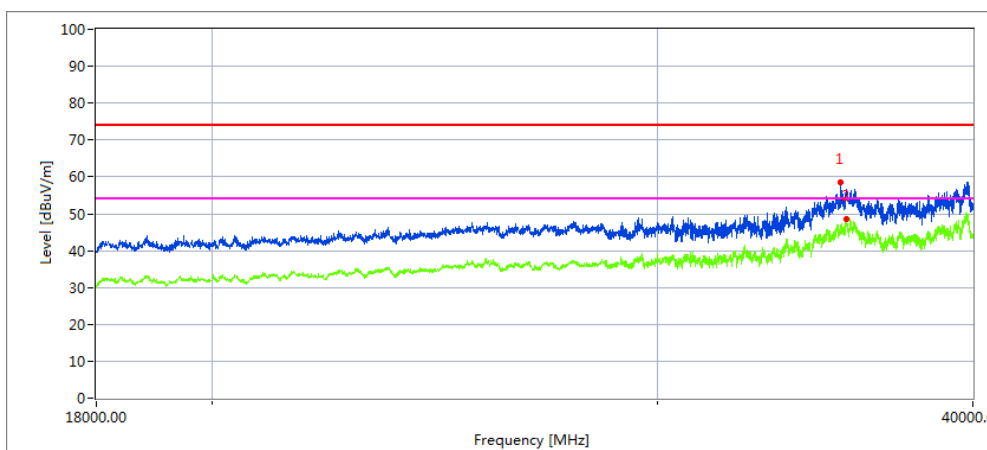
Vertical



Frequency	Meter Reading	Cable loss	Antenna Factor	Preamplifier	Emission Level	Limits	Margin	Detector
(MHz)	(dBuV)	(dB)	dB/m	Factor	(dBuV/m)	(dBuV/m)	(dB)	Type
39731.35	37.19	20.06	44.07	43.21	58.11	68.2	10.09	Peak

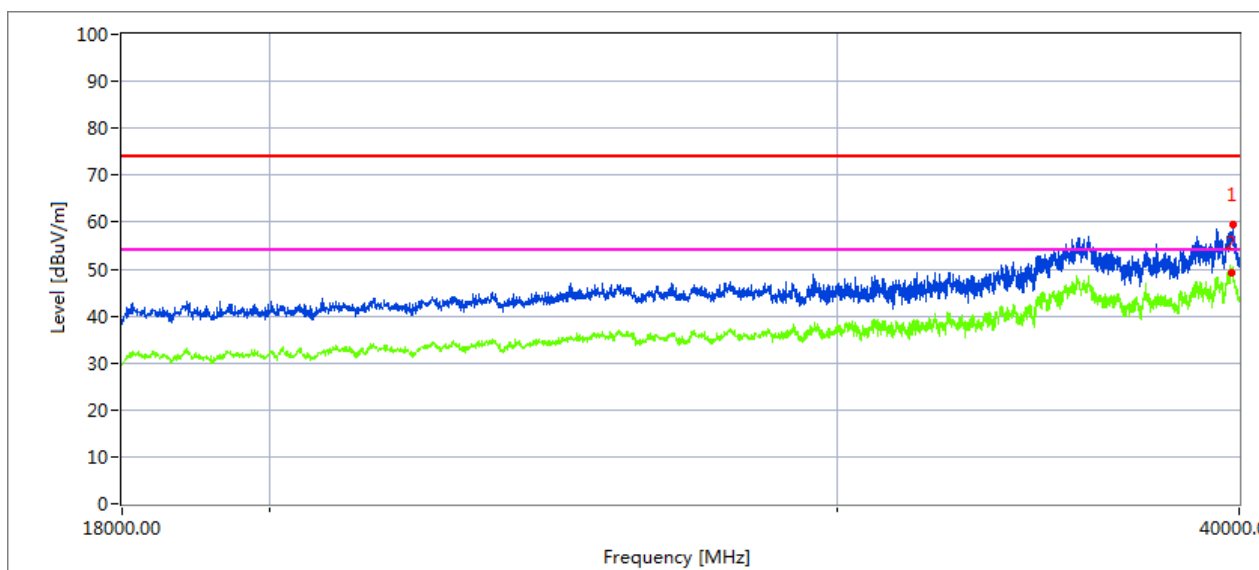
High Channel (5825 MHz)-Above 1G

Horizontal



Frequency	Meter Reading	Cable loss	Antenna Factor	Preamplifier	Emission Level	Limits	Margin	Detector
(MHz)	(dBuV)	(dB)	dB/m	Factor (dB)	(dBuV/m)	(dBuV/m)	dB	Type
35629.24	39.81	19.11	42.63	43.48	58.07	68.2	10.13	Peak

Vertical



Frequency	Meter Reading	Cable loss	Antenna Factor	Preamplifier	Emission Level	Limits	Margin	Detector
(MHz)	(dBuV)	(dB)	dB/m	Factor (dB)	(dBuV/m)	(dBuV/m)	dB	Type
39821.55	36.92	20.1	44.1	43.22	57.9	68.2	10.3	Peak

3. POWER SPECTRAL DENSITY TEST

3.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(a)

For the band 5.15-5.25 GHz,

- (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
- (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
- (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
- (iv) For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

For the band 5.725-5.85 GHz

- (3) For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.2 TEST PROCEDURE

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

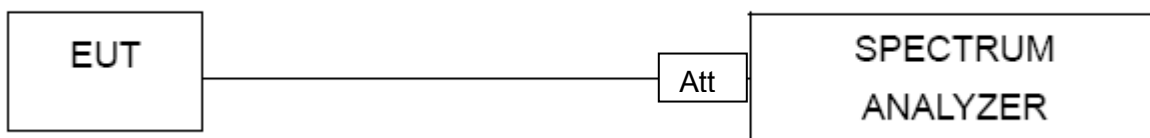
- a) Set $RBW \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $VBW \geq 3$ RBW.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/RBW)$ to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10\log(1\text{MHz}/RBW)$ to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

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

3.3 DEVIATION FROM STANDARD

No deviation.

3.4 TEST SETUP



3.5 EUT OPERATION CONDITIONS

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

3.6 TEST RESULTS

EUT :	Panoramic Camera	Model Name :	PIONA1925/A
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1015 hPa	Test Voltage :	DC 3.8V
Test Mode :	TX Frequency Band 1 (5150-5250MHz), Band 3 (5725-5850MHz)		

Note: Band1 For 802.11n/ac 5GHz has MIMO mode. Directional gain=3.97dbi

3.97dbi<6.0dbi so power density limit= 11 dBm

Band3 For 802.11n/ac 5GHz has MIMO mode. Directional gain=3.97dbi

3.97dbi<6.0dbi so power density limit= 30 dBm

Test data reference attachment.

4. 26DB & 99% EMISSION BANDWIDTH

4.1 APPLIED PROCEDURES / LIMIT

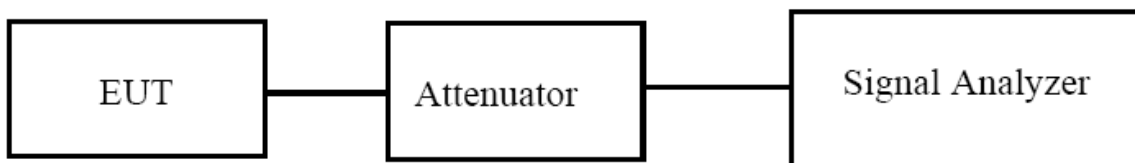
The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band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

4.2 TEST PROCEDURE

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum 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%.

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.



4.3 EUT OPERATION CONDITIONS

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

4.4 TEST RESULTS

EUT :	Panoramic Camera	Model Name :	PIONA1925/A
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 3.8V
Test Mode :	TX Frequency Band 1 (5150-5250MHz), Band 3(5725-5850MHz)		

Test data reference attachment.

5. MINIMUM 6 DB BANDWIDTH

5.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(e)

(e) Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

5.2 TEST PROCEDURE

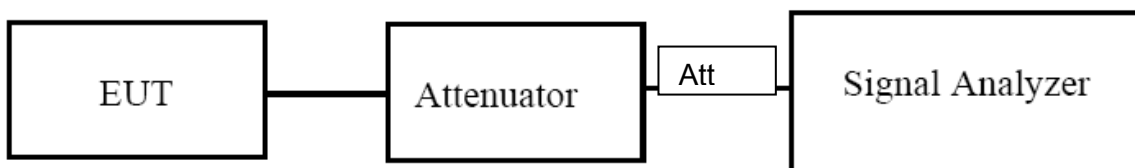
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) 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.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

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

5.6 TEST RESULTS

EUT :	Panoramic Camera	Model Name :	PIONA1925/A
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 3.8V
Test Mode :	TX (5G) Mode Frequency Band 3 (5725-5850MHz)		

Test data reference attachment.

6. MAXIMUM CONDUCTED OUTPUT POWER

6.1 PPLIED PROCEDURES / LIMIT

The maximum conducted output power should not exceed:

Frequency Band(MHz)	Limit
5150~5250	250mW
5250~5350	250mW
5470~5725	250mW
5725~5850	1W

The maximum e.i.r.p should not exceed:

Frequency Band(MHz)	Limit
5150~5250	200mW or 10dBm +10logB whichever is less
5725~5850	N/A

Note: Where "B" is the 99% emission bandwidth in MHz

6.2 TEST PROCEDURE

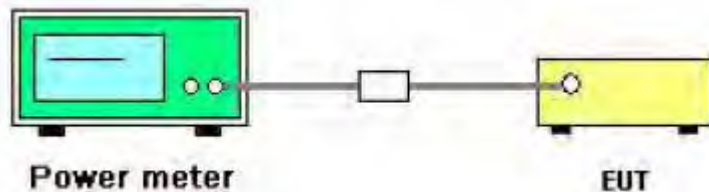
· Method PM is Measurement using an RF average power meter. The procedure for this method is as follows:

- a) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:
 - 1) The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.
 - 2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
 - 3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
- b) If the transmitter does not transmit continuously, measure the duty cycle D of the transmitter output signal as described in 12.2.
- c) Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.
- d) Adjust the measurement in dBm by adding $[10 \log (1 / D)]$, where D is the duty cycle {e.g., $[10 \log (1 / 0.25)]$, if the duty cycle is 25%}.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

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

6.2 TEST RESULTS

EUT :	Panoramic Camera	Model Name :	PIONA1925/A
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 3.8V
Test Mode :	TX (5G) Mode Frequency Band 1 (5150-5250MHz), Band 3 (5725-5850MHz)		

Note: Band1&Band2A&Band2C For 802.11n/ac 5GHz has MIMO mode. Directional gain=3.97dbi
 3.97bi<6.0dbi so power limit= 24 dBm
 Band3 For 802.11n/ac 5GHz has MIMO mode. Directional gain=3.97dbi
 3.97bi <6.0dbi so power limit= 30 dBm

Test data reference attachment.

7. OUT OF BAND EMISSIONS

7.1 APPLICABLE STANDARD

According to FCC §15.407(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: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

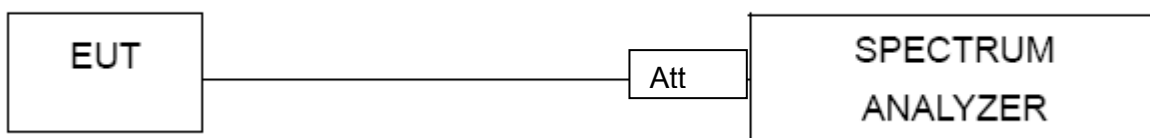
7.2 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

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

7.6 TEST RESULTS

EUT :	Panoramic Camera	Model Name :	PIONA1925/A
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1012 hPa	Test Voltage :	DC 3.8V

Test data reference attachment.

8. Frequency Stability Measurement

8.1 LIMIT

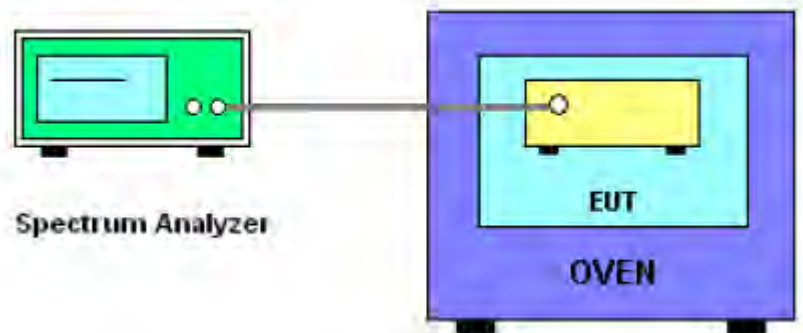
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

8.2 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and the limit is less than ± 20 ppm (IEEE 802.11n specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is $-30^\circ\text{C} \sim 80^\circ\text{C}$.

8.3 TEST SETUP LAYOUT



8.4 EUT OPERATION DURING TEST

1. The EUT was programmed to be in continuously un-modulation transmitting mode.
2. The module has two antennas, and the worst data is Antenna 1, only shown Antenna 1 Plot.

8.5 TEST RESULTS

EUT :	Panoramic Camera	Model Name. :	PIONA1925/A
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.8V
Test Mode :	TX Frequency Band I (5150-5250MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.80	5179.9577	5180	-0.0423	-8.1593
		V max (V)	4.37	5179.9709	5180	-0.0291	-5.6178
		V min (V)	3.23	5179.9981	5180	-0.0019	-0.3758
Limits				Within 5150-5250MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	19	T (°C)	-30	5179.9427	5180	-0.0573	-11.062
		T (°C)	-20	5180.0255	5180	0.0255	4.929
		T (°C)	-10	5179.9784	5180	-0.0216	-4.164
		T (°C)	0	5180.0350	5180	0.0350	6.764
		T (°C)	10	5180.0434	5180	0.0434	8.382
		T (°C)	20	5180.0214	5180	0.0214	4.135
		T (°C)	30	5179.9640	5180	-0.0360	-6.942
		T (°C)	40	5180.0428	5180	0.0428	8.267
		T (°C)	50	5179.9700	5180	-0.0300	-5.792
		T (°C)	60	5180.0437	5180	0.0437	8.433
		T (°C)	70	5180.0003	5180	0.0003	0.060
		T (°C)	80	5179.9576	5180	-0.0424	-8.191
Limits				Within 5150-5250MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.80	5199.9759	5200	-0.0241	-4.625
		V max (V)	4.37	5199.9547	5200	-0.0453	-8.715
		V min (V)	3.23	5199.9481	5200	-0.0519	-9.983
Limits				Within 5150-5250MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	19	T (°C)	-30	5200.0268	5200	0.0268	5.154
		T (°C)	-20	5199.9774	5200	-0.0226	-4.337
		T (°C)	-10	5199.9491	5200	-0.0509	-9.798
		T (°C)	0	5200.0426	5200	0.0426	8.189
		T (°C)	10	5200.0187	5200	0.0187	3.595
		T (°C)	20	5200.0318	5200	0.0318	6.120
		T (°C)	30	5199.9895	5200	-0.0105	-2.014
		T (°C)	40	5200.0355	5200	0.0355	6.828
		T (°C)	50	5199.9966	5200	-0.0034	-0.658
		T (°C)	60	5199.9661	5200	-0.0339	-6.519
		T (°C)	70	5200.0230	5200	0.0230	4.418
		T (°C)	80	5199.9882	5200	-0.0118	-2.272
Limits				Within 5150-5250MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.80	5239.9891	5240	-0.0109	-2.076
		V max (V)	4.37	5240.0276	5240	0.0276	5.267
		V min (V)	3.23	5239.9895	5240	-0.0105	-2.008
Limits				Within 5150-5250MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	19	T (°C)	-30	5239.96672	5240	-0.0333	-6.350
		T (°C)	-20	5240.0381	5240	0.0381	7.270
		T (°C)	-10	5239.9767	5240	-0.0233	-4.442
		T (°C)	0	5240.0278	5240	0.0278	5.313
		T (°C)	10	5239.9807	5240	-0.0193	-3.677
		T (°C)	20	5240.0185	5240	0.0185	3.538
		T (°C)	30	5239.9548	5240	-0.0452	-8.621
		T (°C)	40	5239.9871	5240	-0.0129	-2.471
		T (°C)	50	5239.9561	5240	-0.0439	-8.385
		T (°C)	60	5239.9603	5240	-0.0397	-7.583
		T (°C)	70	5239.9621	5240	-0.0379	-7.224
		T (°C)	80	5239.9530	5240	-0.0470	-8.963
Limits				Within 5150-5250MHz			
Result				Complies			

EUT :	Panoramic Camera	Model Name. :	PIONA1925/A
Temperature :	25 °C	Relative Humidity :	56%
Pressure :	1012 hPa	Test Voltage :	DC 3.8V
Test Mode :	TX Frequency(5745-5850MHz)		

TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.80	5744.9630	5745	-0.0370	-6.439
		V max (V)	4.37	5744.9956	5745	-0.0044	-0.774
		V min (V)	3.23	5744.9851	5745	-0.0149	-2.598
Limits				Within 5745-5850MHz			
Result				Complies			

Voltage vs. Frequency Stability

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	19	T (°C)	-30	5745.0255	5745	0.0255	4.432
		T (°C)	-20	5744.9628	5745	-0.0372	-6.476
		T (°C)	-10	5745.0447	5745	0.0447	7.787
		T (°C)	0	5744.9521	5745	-0.0479	-8.331
		T (°C)	10	5745.0354	5745	0.0354	6.158
		T (°C)	20	5744.9754	5745	-0.0246	-4.282
		T (°C)	30	5744.9464	5745	-0.0536	-9.326
		T (°C)	40	5744.9823	5745	-0.0177	-3.088
		T (°C)	50	5745.0170	5745	0.0170	2.955
		T (°C)	60	5744.9850	5745	-0.0150	-2.613
		T (°C)	70	5744.9825	5745	-0.0175	-3.052
		T (°C)	80	5745.0357	5745	0.0357	6.222
Limits				Within 5745-5850MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.80	5784.9680	5785	-0.0320	-5.524
		V max (V)	4.37	5784.9717	5785	-0.0283	-4.887
		V min (V)	3.23	5784.9701	5785	-0.0299	-5.169
Limits				Within 5745-5850MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	19	T (°C)	-30	5784.9859	5785	-0.0141	-2.429
		T (°C)	-20	5784.9744	5785	-0.0256	-4.433
		T (°C)	-10	5785.0020	5785	0.0020	0.353
		T (°C)	0	5785.0128	5785	0.0128	2.206
		T (°C)	10	5784.9747	5785	-0.0253	-4.377
		T (°C)	20	5784.9954	5785	-0.0046	-0.790
		T (°C)	30	5784.9969	5785	-0.0031	-0.534
		T (°C)	40	5785.0373	5785	0.0373	6.447
		T (°C)	50	5784.9805	5785	-0.0195	-3.378
		T (°C)	60	5784.9770	5785	-0.0230	-3.969
		T (°C)	70	5785.0491	5785	0.0491	8.492
		T (°C)	80	5784.9854	5785	-0.0146	-2.531
Limits				Within 5745-5850MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.80	5824.9831	5825	-0.0169	-2.903
		V max (V)	4.37	5824.9741	5825	-0.0259	-4.443
		V min (V)	3.23	5824.9989	5825	-0.0011	-0.186
Limits				Within 5745-5850MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	19	T (°C)	-30	5824.9975	5825	-0.0025	-0.429
		T (°C)	-20	5824.9773	5825	-0.0227	-3.902
		T (°C)	-10	5825.0018	5825	0.0018	0.306
		T (°C)	0	5824.9864	5825	-0.0136	-2.335
		T (°C)	10	5825.0299	5825	0.0299	5.133
		T (°C)	20	5824.9845	5825	-0.0155	-2.655
		T (°C)	30	5824.9840	5825	-0.0160	-2.752
		T (°C)	40	5824.9693	5825	-0.0307	-5.278
		T (°C)	50	5824.9806	5825	-0.0194	-3.327
		T (°C)	60	5825.0278	5825	0.0278	4.779
		T (°C)	70	5824.9804	5825	-0.0196	-3.367
		T (°C)	80	5824.9700	5825	-0.0300	-5.157
Limits				Within 5745-5850MHz			
Result				Complies			

9. ANTENNA REQUIREMENT

9.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

9.2 EUT ANTENNA

The EUT antenna is permanent attached FPCB antenna(antenna gain: 0.96dBi (Antenna1); 0.96 dBi (Antenna2)). It comply with the standard requirement.

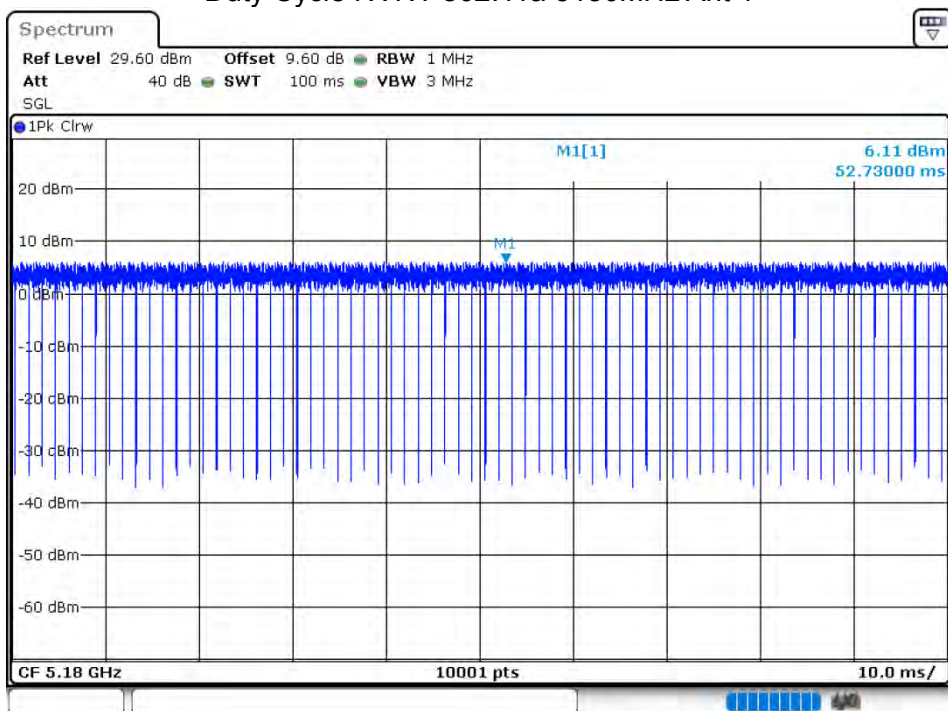
10. TEST RESULTS

10.1 DUTY CYCLE

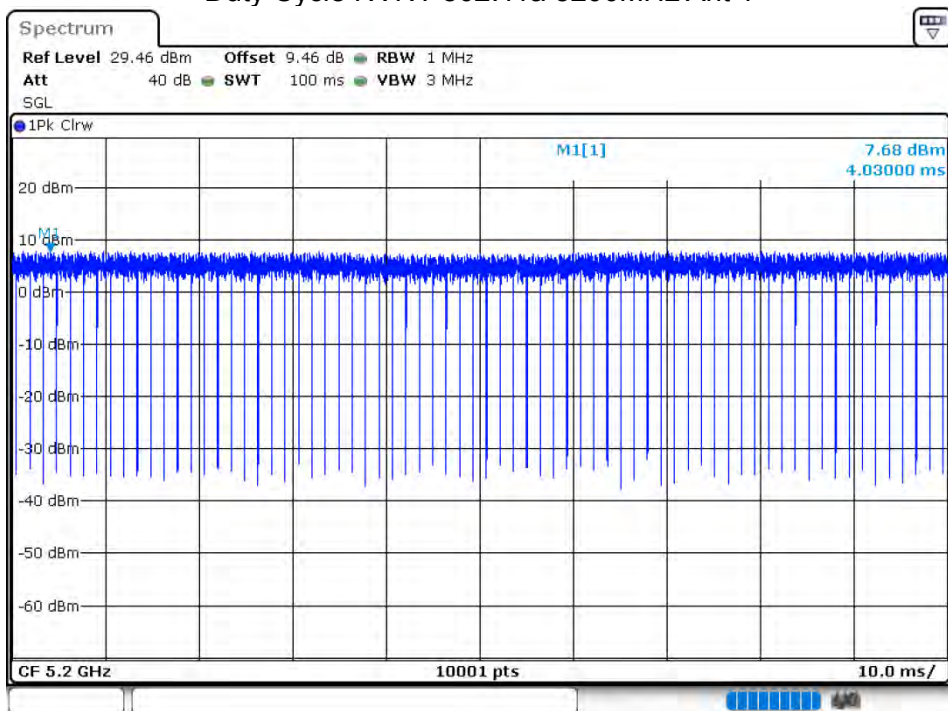
5.2G:

Antenna	Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
Ant 1	NVNT	802.11a	5180	100	0
Ant 1	NVNT	802.11a	5200	100	0
Ant 1	NVNT	802.11a	5240	100	0
Ant 2	NVNT	802.11a	5180	100	0
Ant 2	NVNT	802.11a	5200	100	0
Ant 2	NVNT	802.11a	5240	100	0
Ant 1	NVNT	802.11ac20	5180	100	0
Ant 1	NVNT	802.11ac20	5200	100	0
Ant 1	NVNT	802.11ac20	5240	100	0
Ant 2	NVNT	802.11ac20	5180	100	0
Ant 2	NVNT	802.11ac20	5200	100	0
Ant 2	NVNT	802.11ac20	5240	100	0
Ant 1	NVNT	802.11ac40	5190	100	0
Ant 1	NVNT	802.11ac40	5230	99.93	0
Ant 2	NVNT	802.11ac40	5190	100	0
Ant 2	NVNT	802.11ac40	5230	99.97	0
Ant 1	NVNT	802.11ac80	5210	100	0
Ant 2	NVNT	802.11ac80	5210	100	0
Ant 1	NVNT	802.11n(HT20)	5180	100	0
Ant 1	NVNT	802.11n(HT20)	5200	100	0
Ant 1	NVNT	802.11n(HT20)	5240	100	0
Ant 2	NVNT	802.11n(HT20)	5180	100	0
Ant 2	NVNT	802.11n(HT20)	5200	100	0
Ant 2	NVNT	802.11n(HT20)	5240	100	0
Ant 1	NVNT	802.11n(HT40)	5190	100	0
Ant 1	NVNT	802.11n(HT40)	5230	100	0
Ant 2	NVNT	802.11n(HT40)	5190	100	0
Ant 2	NVNT	802.11n(HT40)	5230	100	0

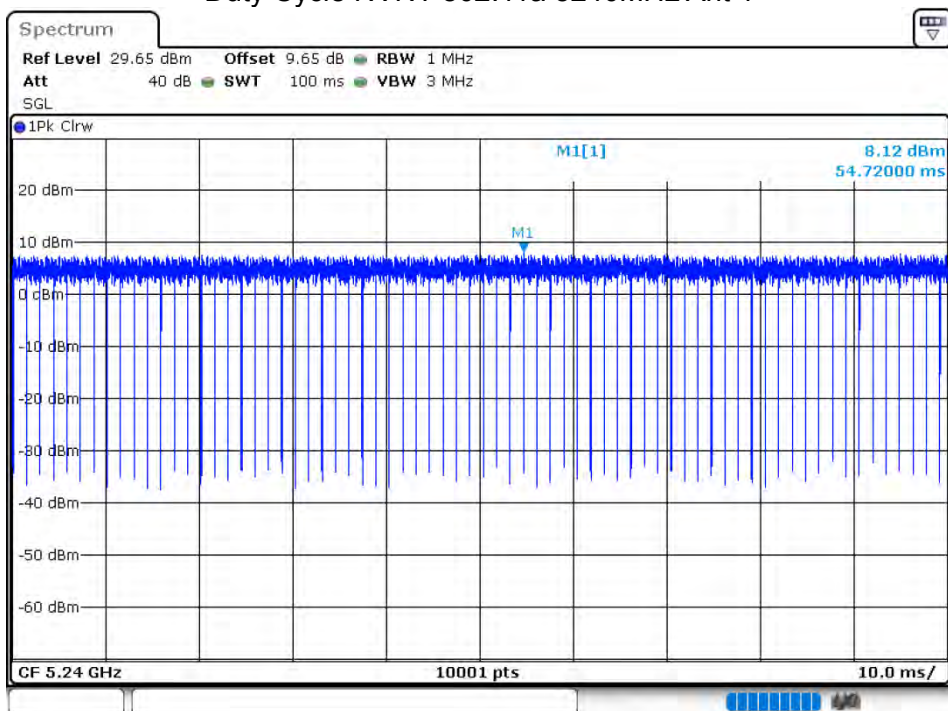
Duty Cycle NVNT 802.11a 5180MHz Ant 1



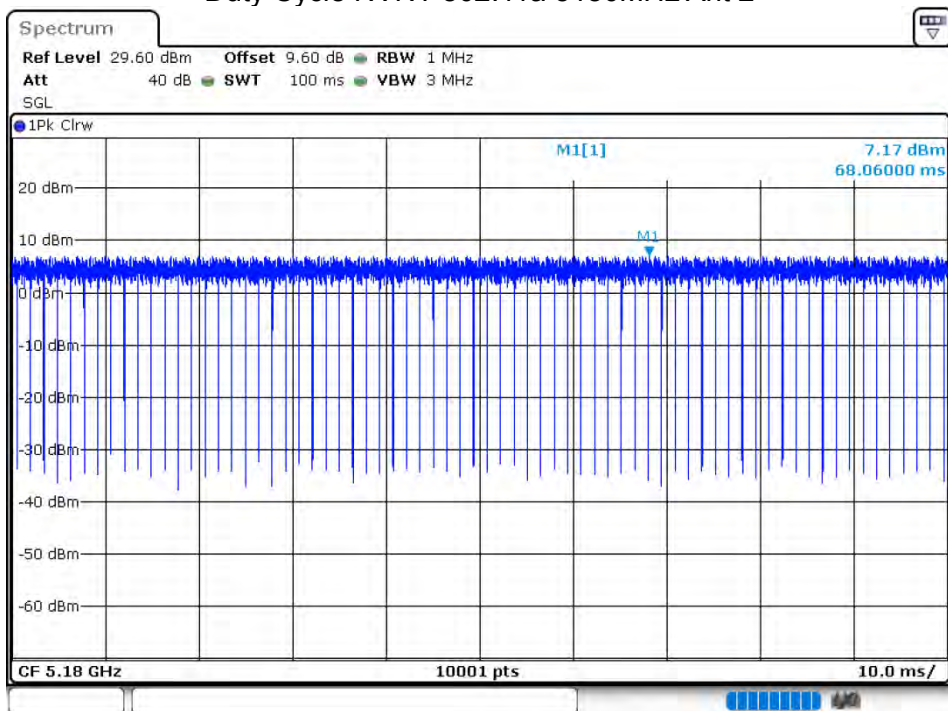
Duty Cycle NVNT 802.11a 5200MHz Ant 1



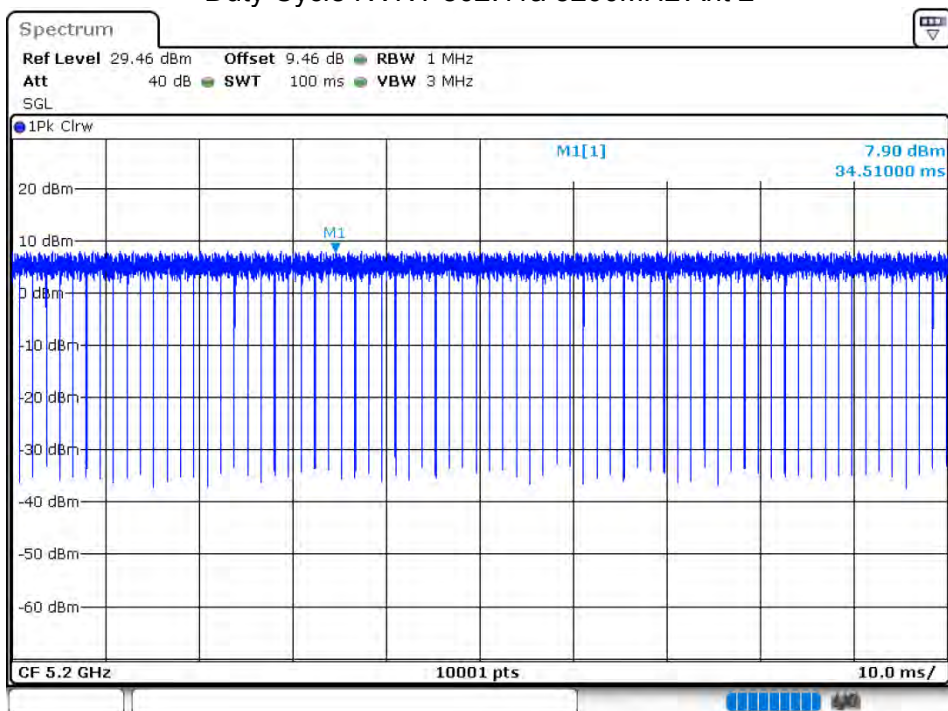
Duty Cycle NVNT 802.11a 5240MHz Ant 1



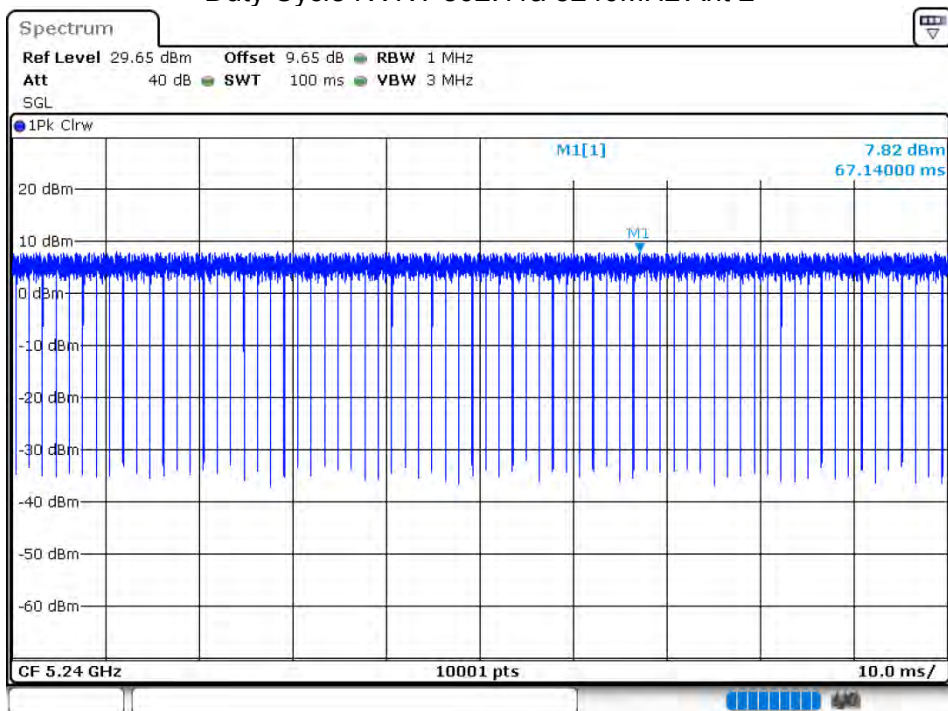
Duty Cycle NVNT 802.11a 5180MHz Ant 2



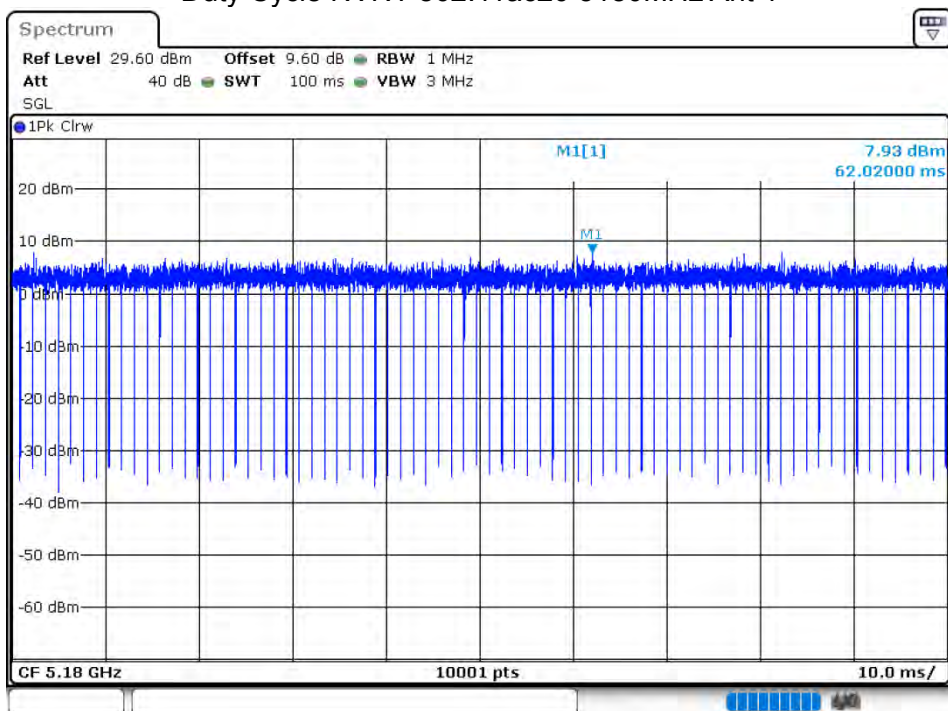
Duty Cycle NVNT 802.11a 5200MHz Ant 2



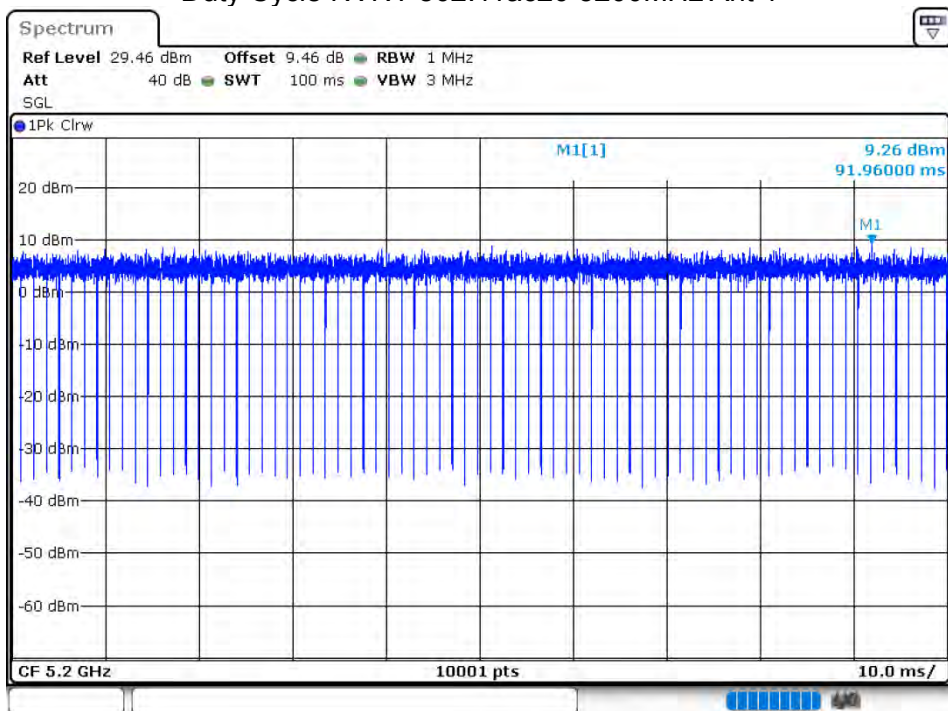
Duty Cycle NVNT 802.11a 5240MHz Ant 2



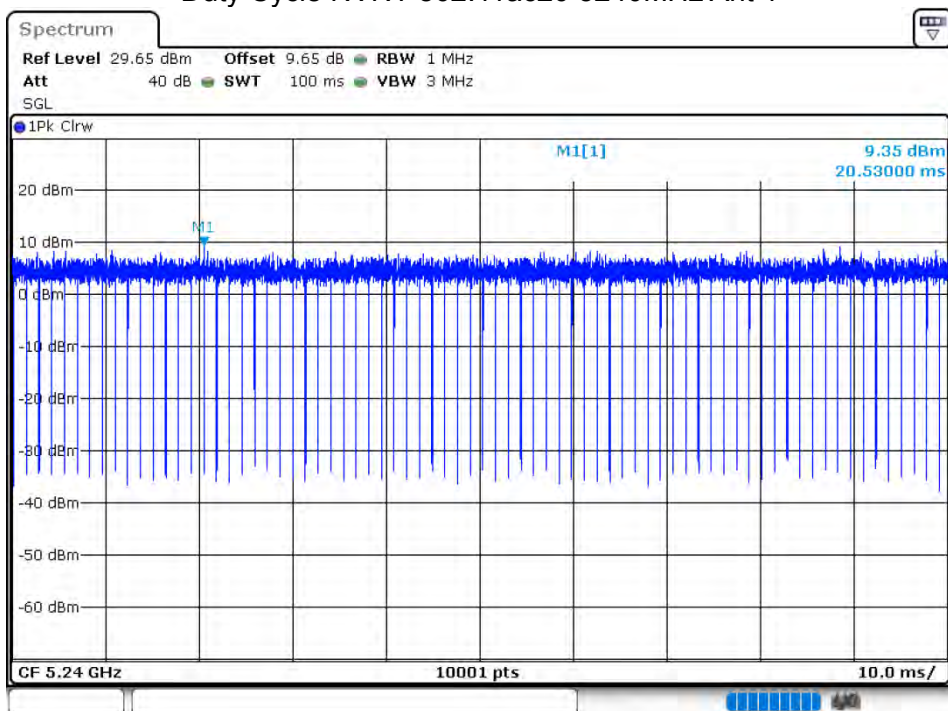
Duty Cycle NVNT 802.11ac20 5180MHz Ant 1



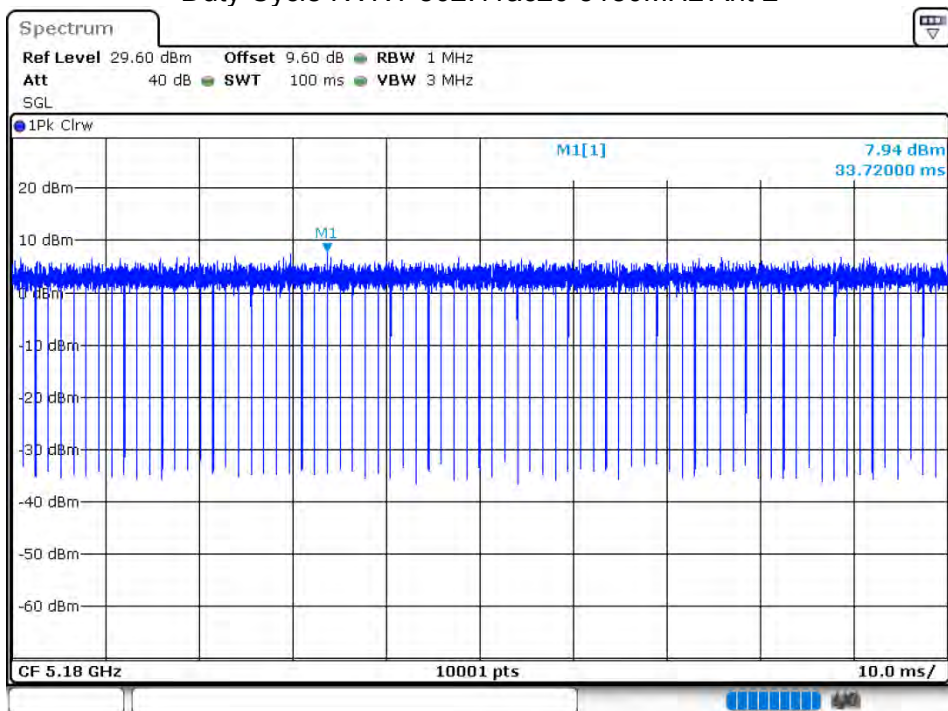
Duty Cycle NVNT 802.11ac20 5200MHz Ant 1



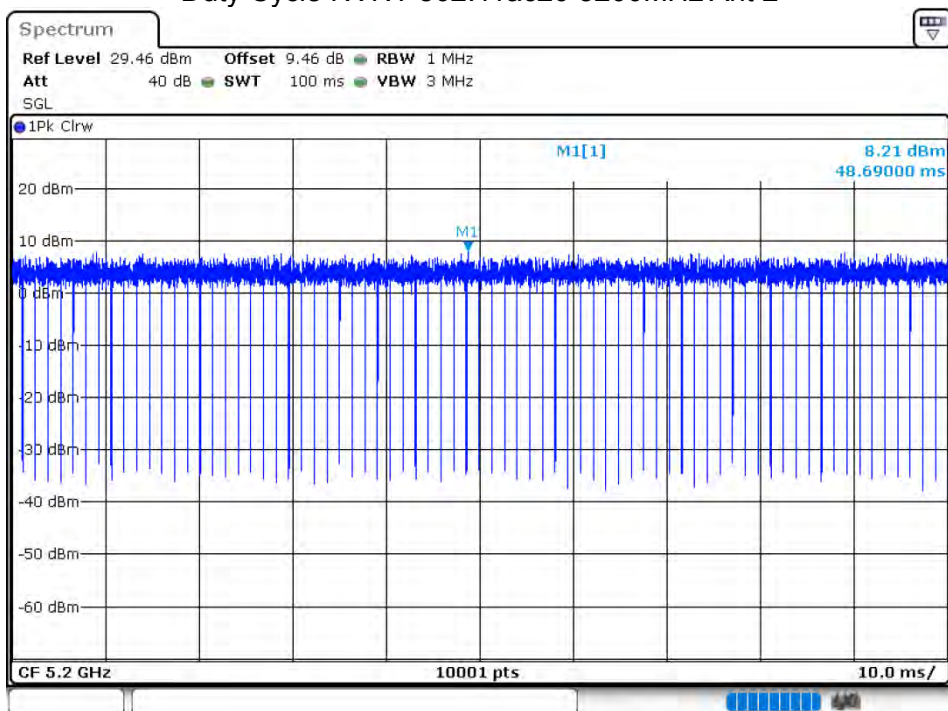
Duty Cycle NVNT 802.11ac20 5240MHz Ant 1



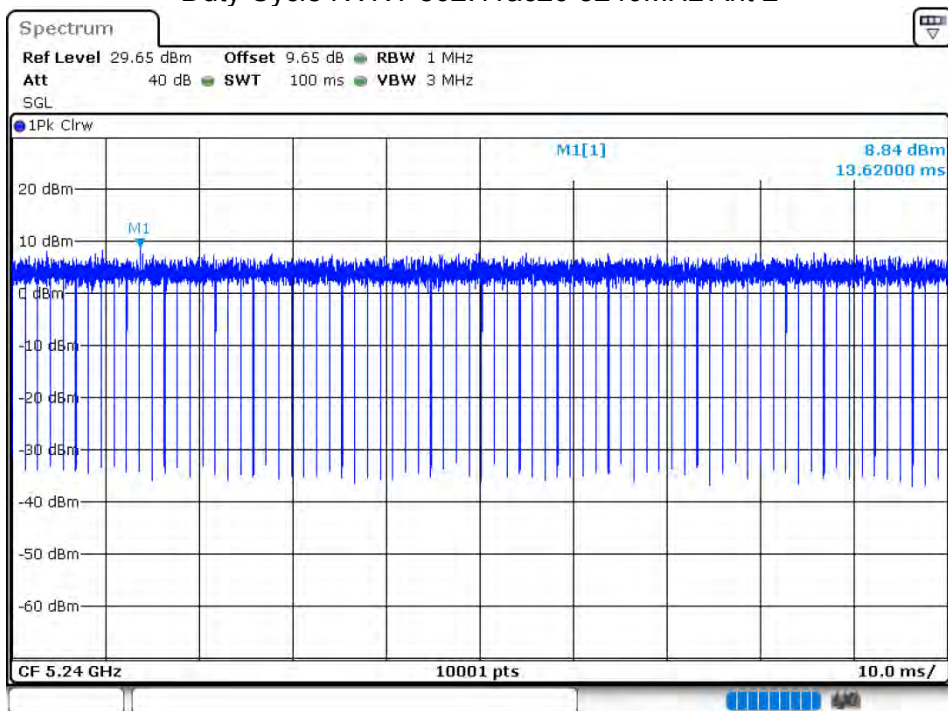
Duty Cycle NVNT 802.11ac20 5180MHz Ant 2



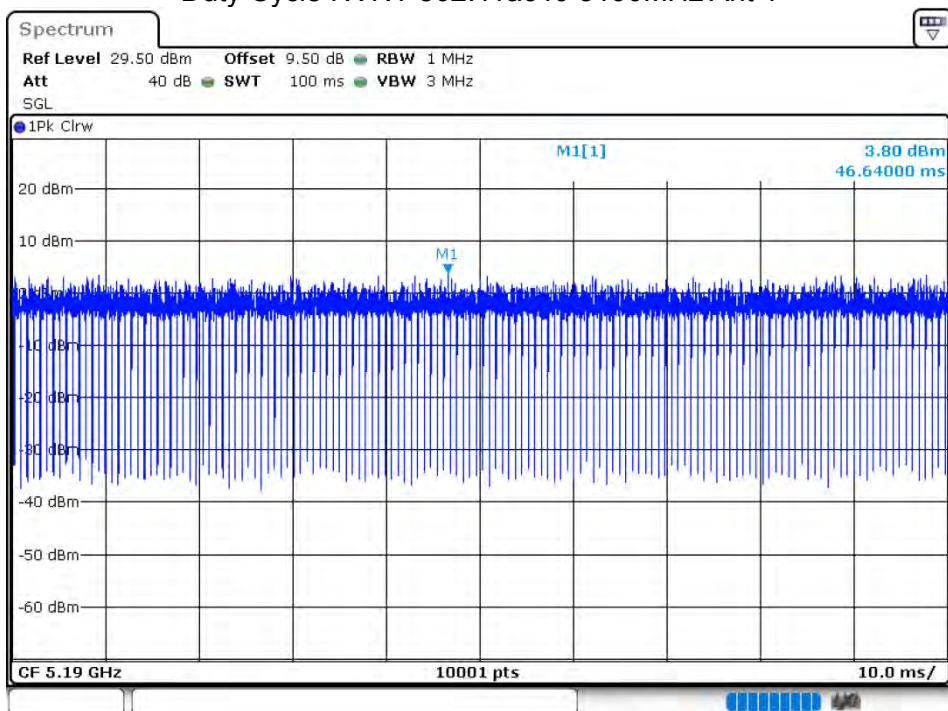
Duty Cycle NVNT 802.11ac20 5200MHz Ant 2



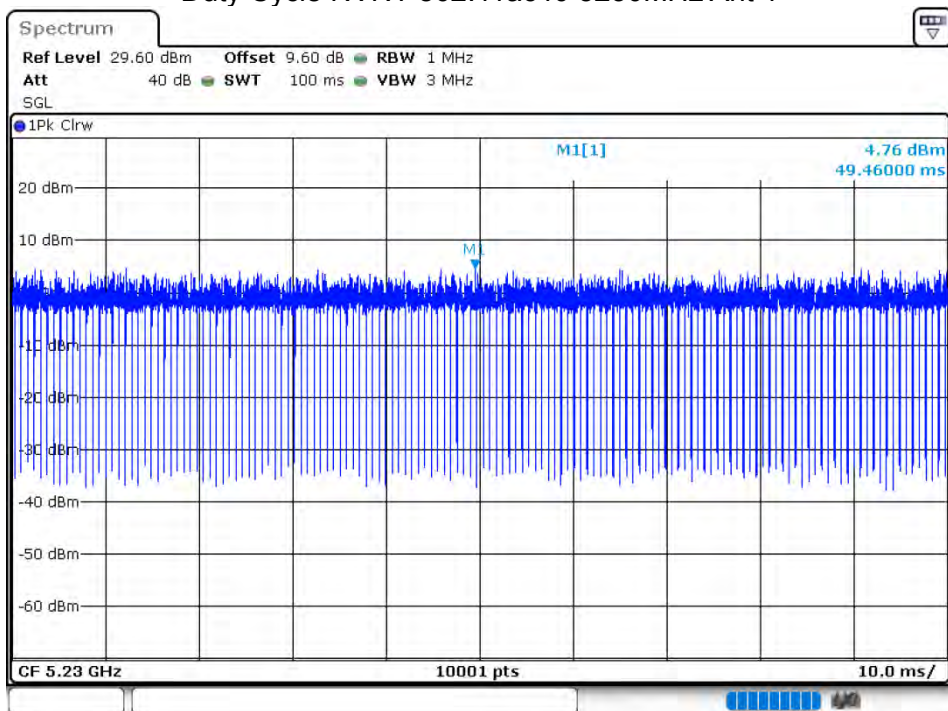
Duty Cycle NVNT 802.11ac20 5240MHz Ant 2



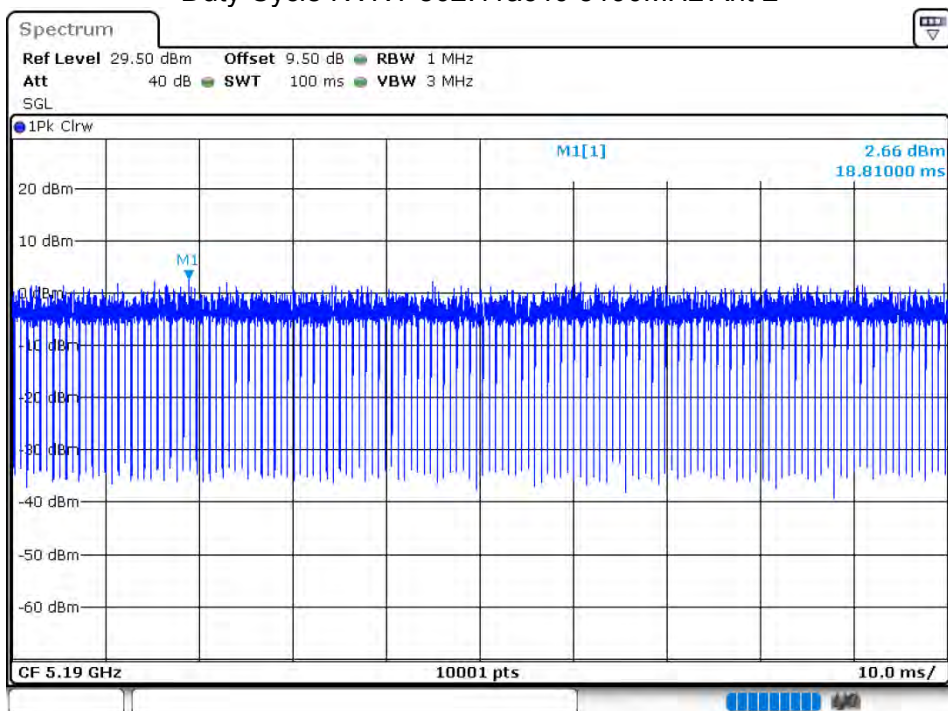
Duty Cycle NVNT 802.11ac40 5190MHz Ant 1



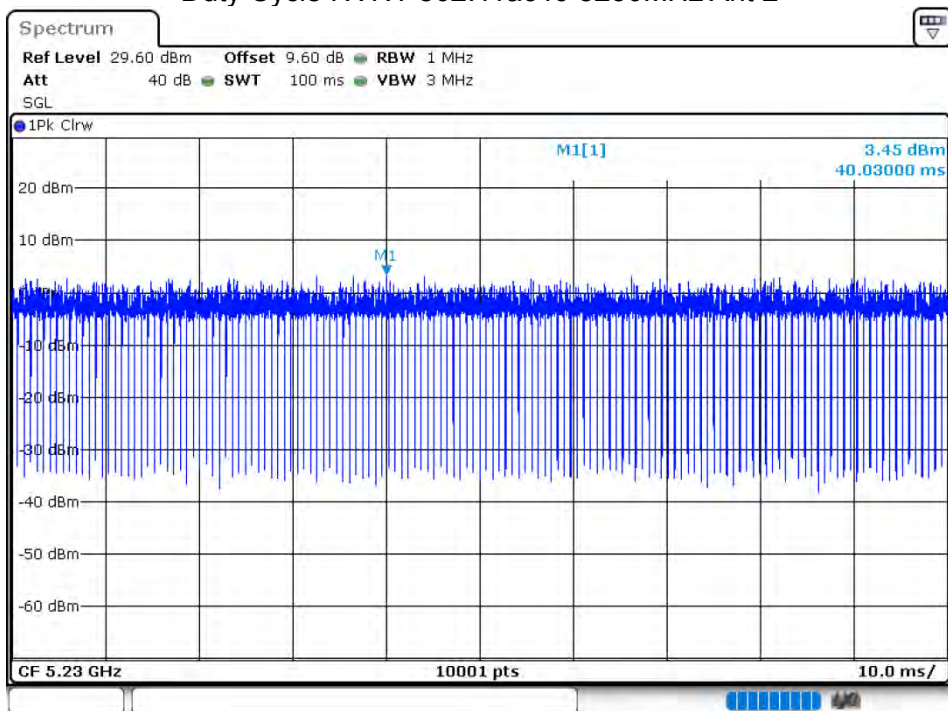
Duty Cycle NVNT 802.11ac40 5230MHz Ant 1



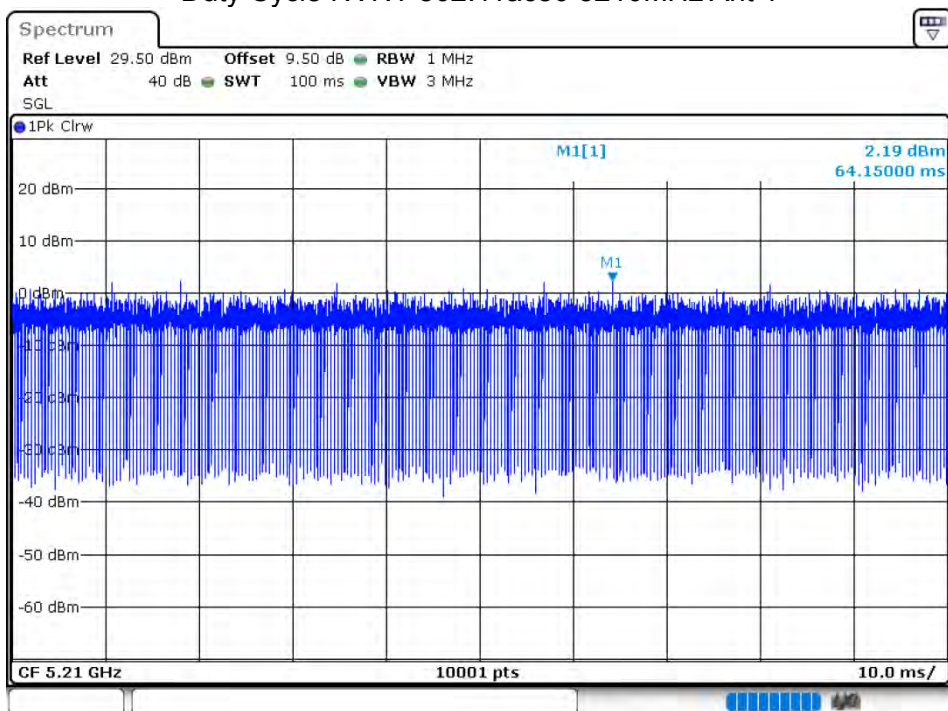
Duty Cycle NVNT 802.11ac40 5190MHz Ant 2



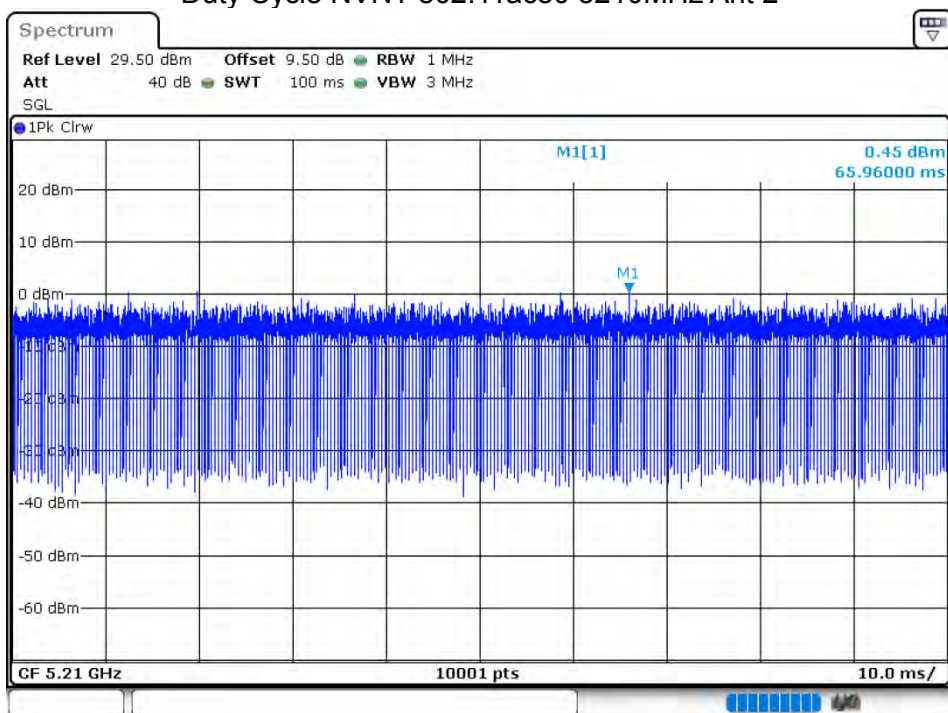
Duty Cycle NVNT 802.11ac40 5230MHz Ant 2



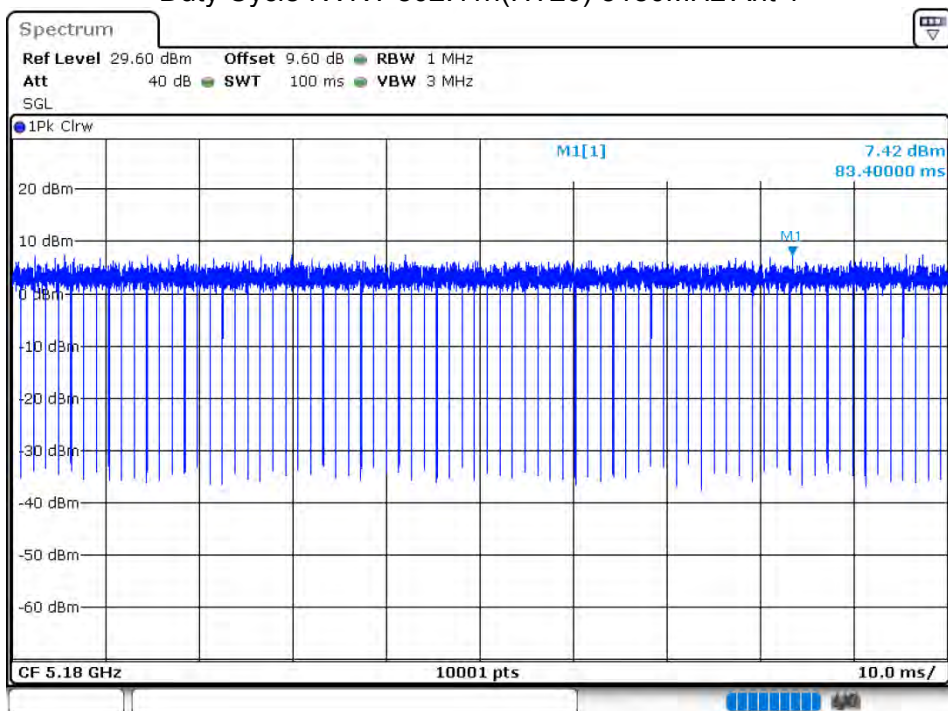
Duty Cycle NVNT 802.11ac80 5210MHz Ant 1



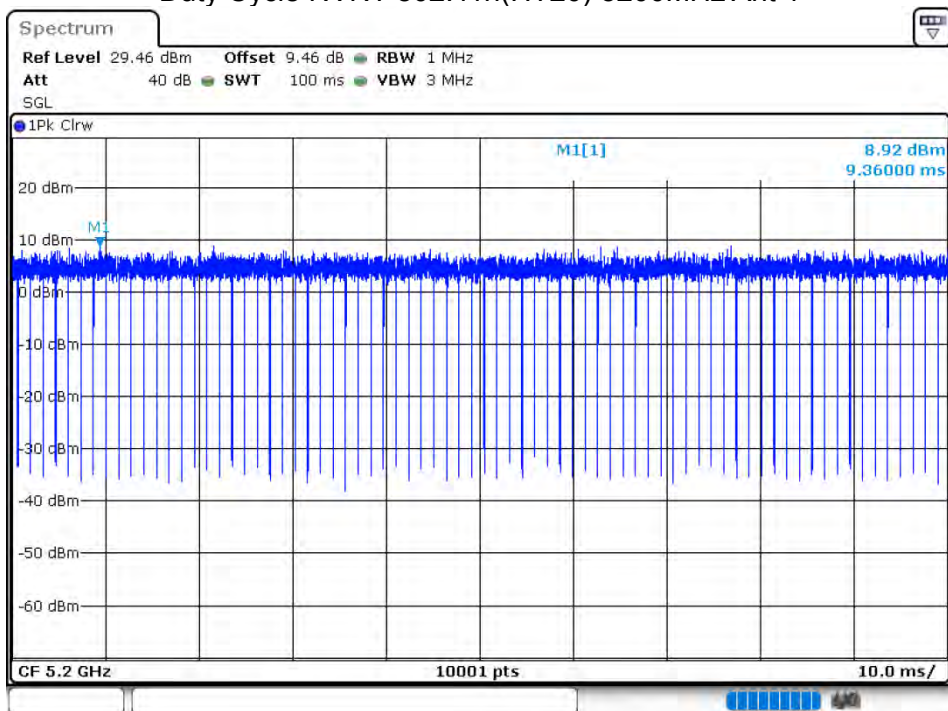
Duty Cycle NVNT 802.11ac80 5210MHz Ant 2



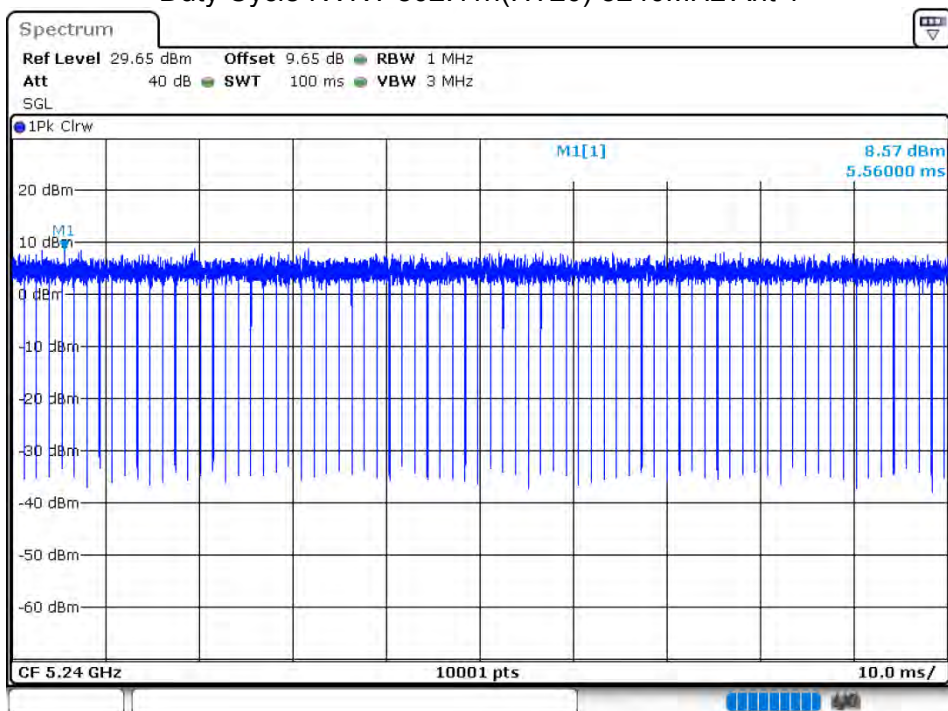
Duty Cycle NVNT 802.11n(HT20) 5180MHz Ant 1



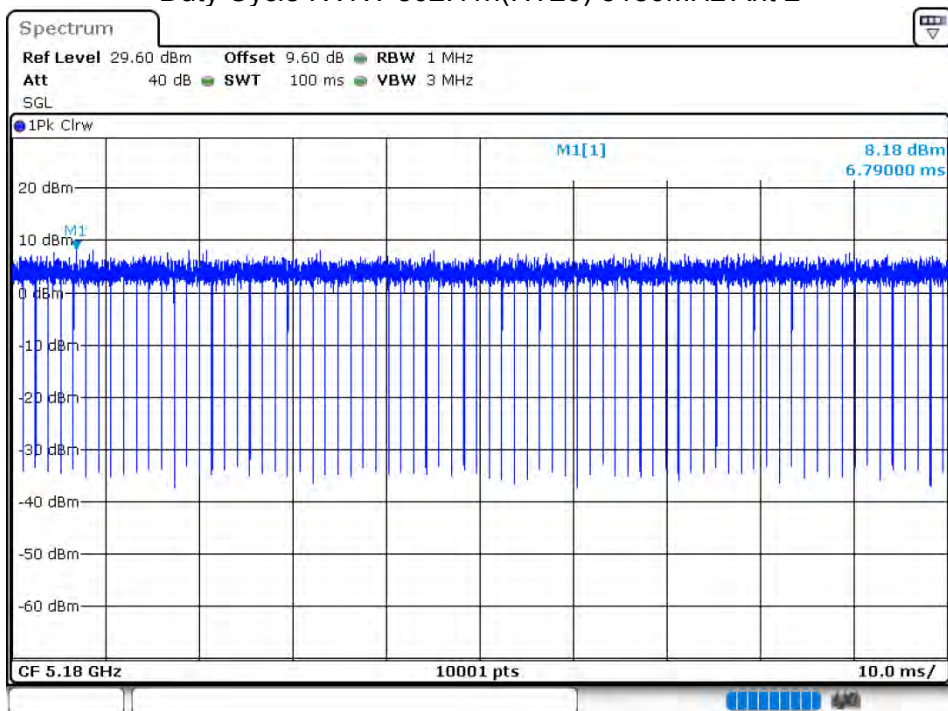
Duty Cycle NVNT 802.11n(HT20) 5200MHz Ant 1



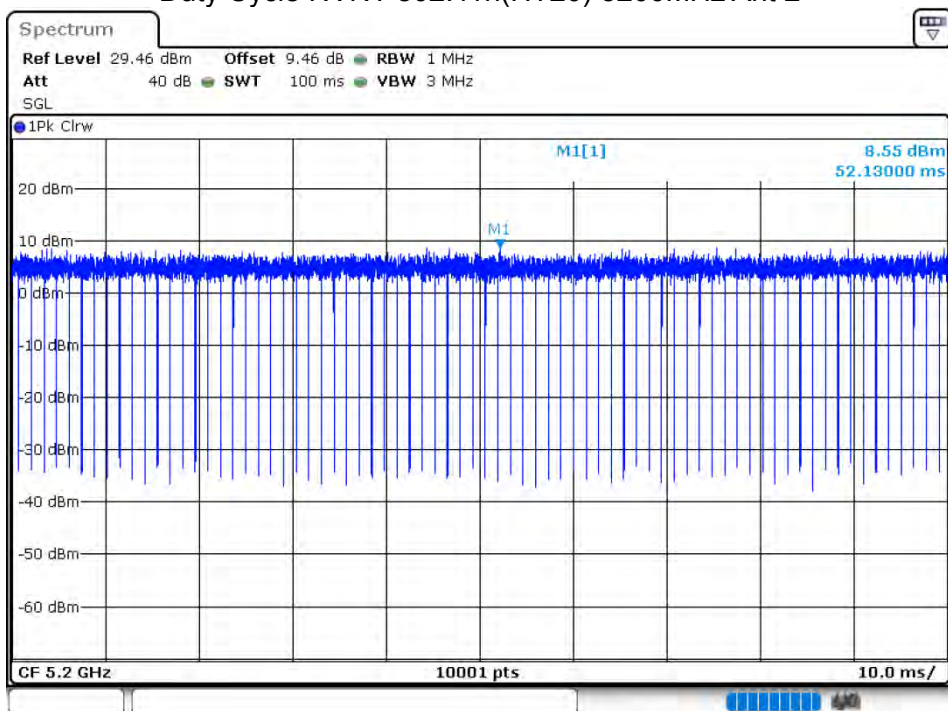
Duty Cycle NVNT 802.11n(HT20) 5240MHz Ant 1



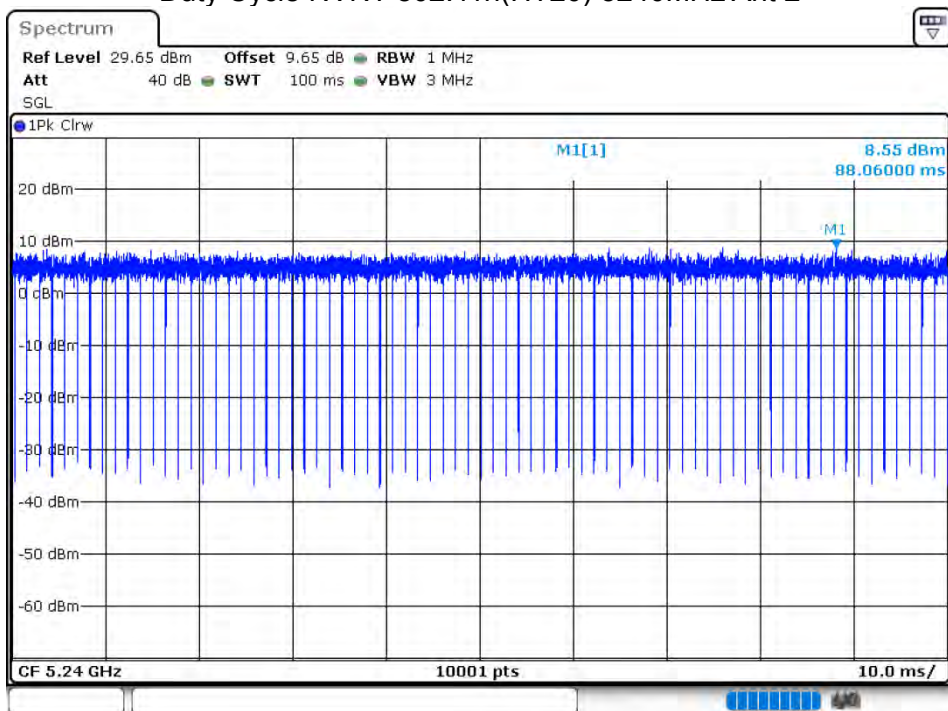
Duty Cycle NVNT 802.11n(HT20) 5180MHz Ant 2



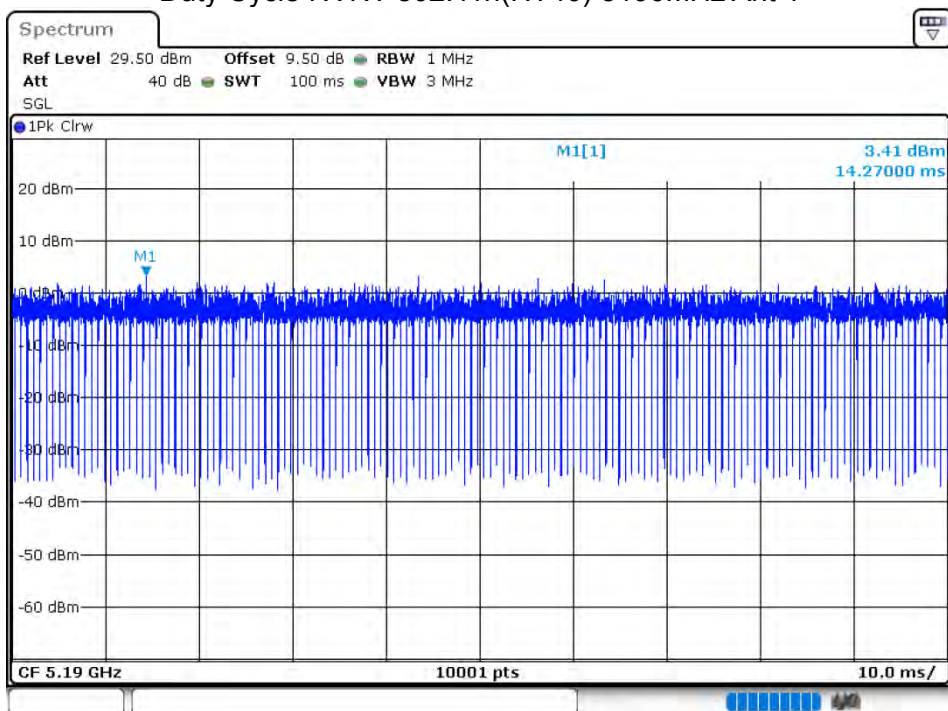
Duty Cycle NVNT 802.11n(HT20) 5200MHz Ant 2



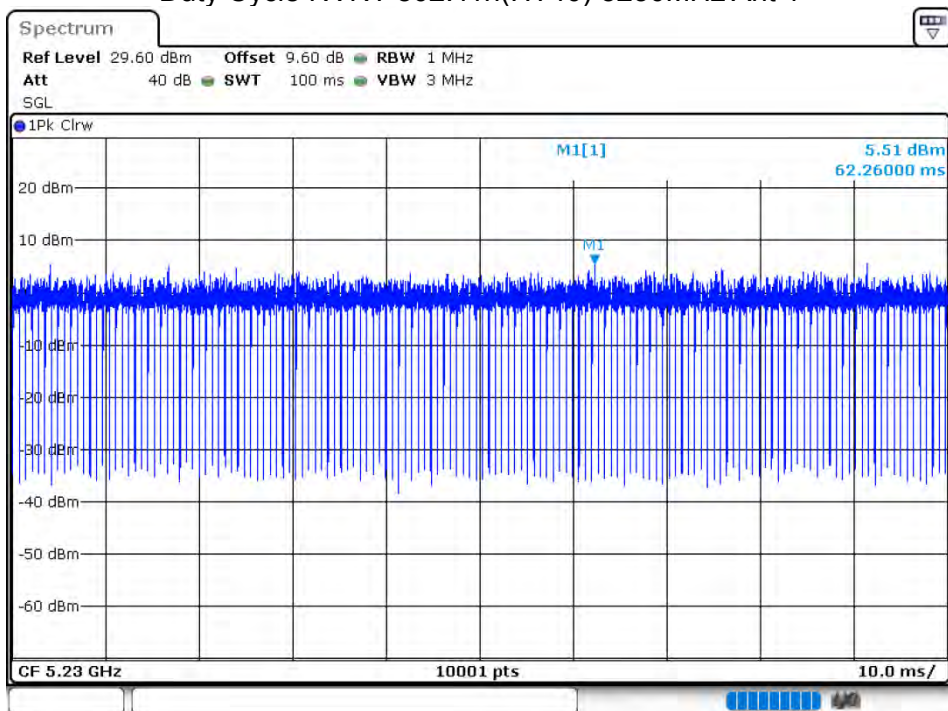
Duty Cycle NVNT 802.11n(HT20) 5240MHz Ant 2



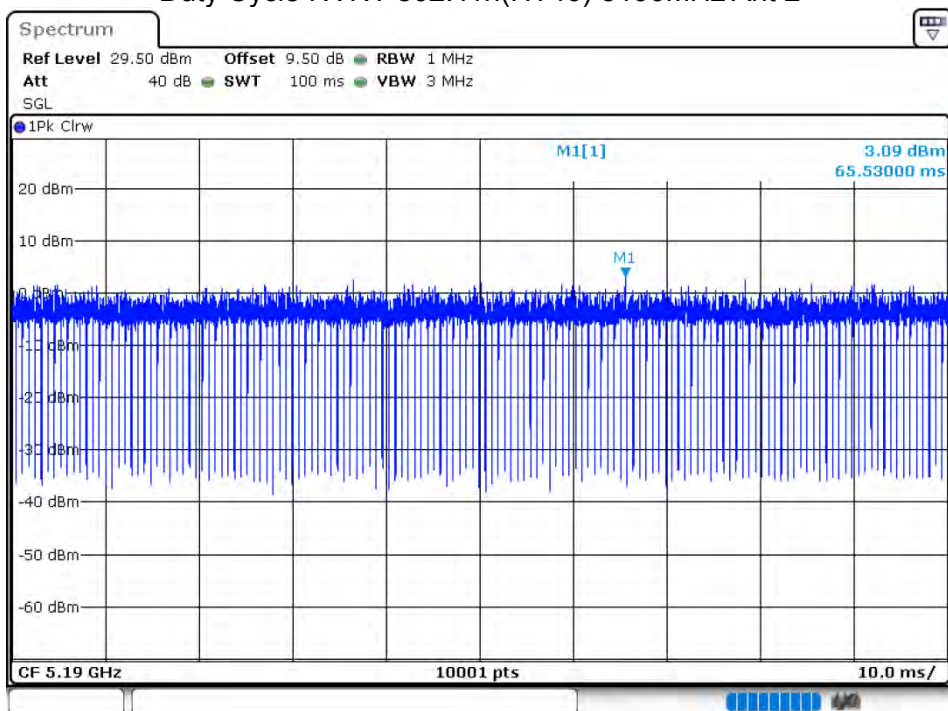
Duty Cycle NVNT 802.11n(HT40) 5190MHz Ant 1



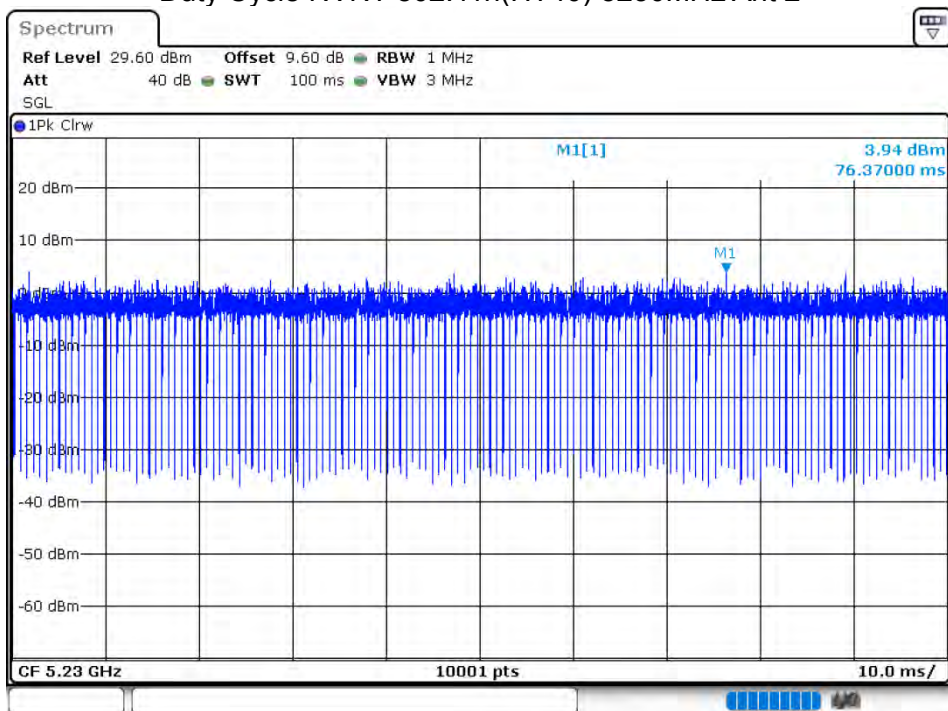
Duty Cycle NVNT 802.11n(HT40) 5230MHz Ant 1



Duty Cycle NVNT 802.11n(HT40) 5190MHz Ant 2



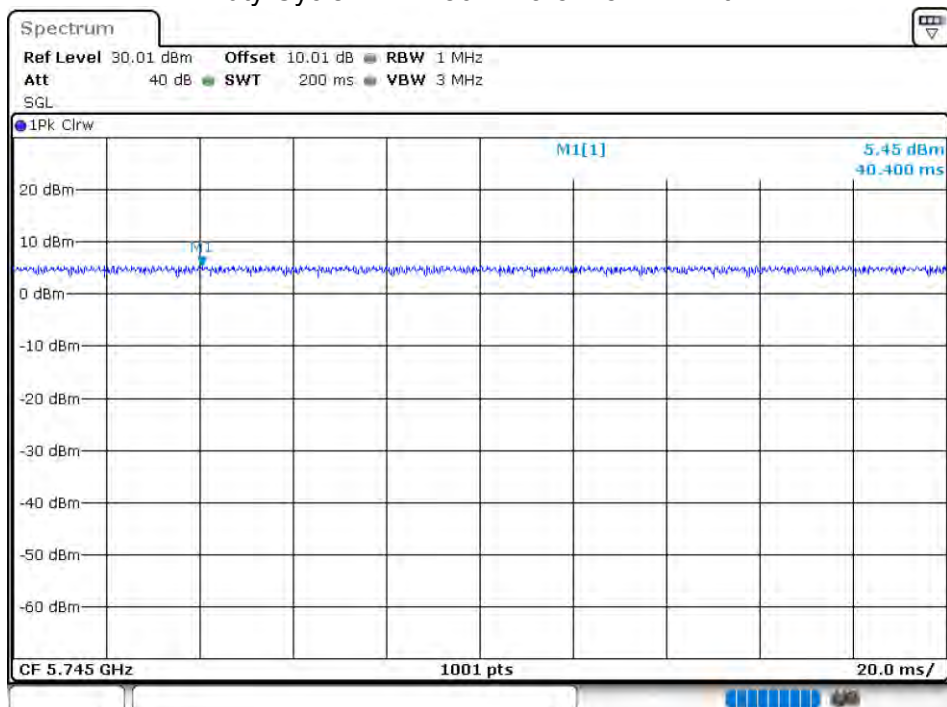
Duty Cycle NVNT 802.11n(HT40) 5230MHz Ant 2



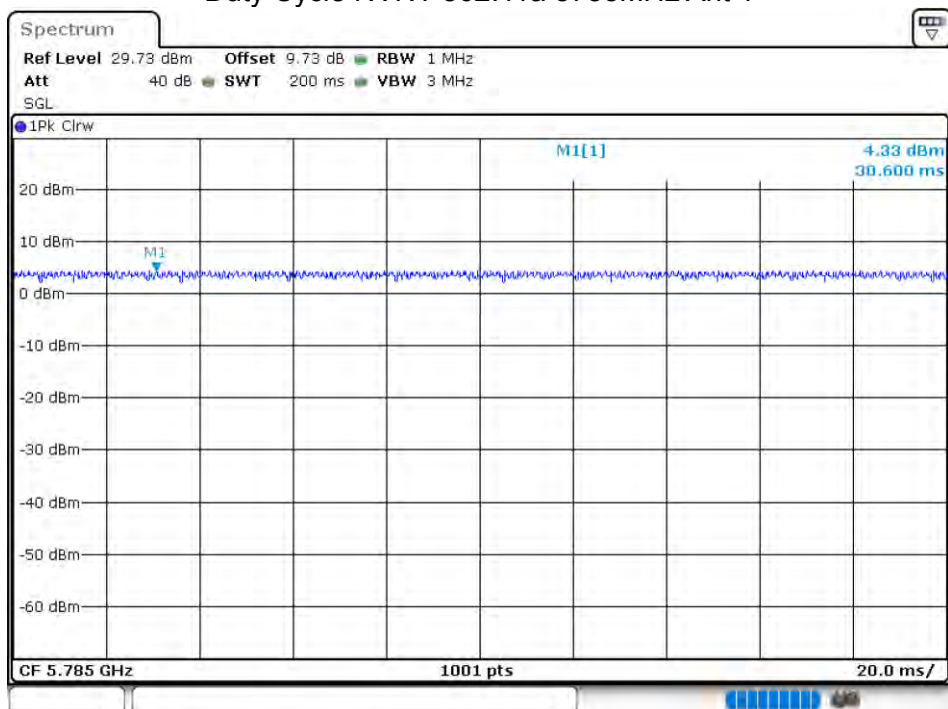
5.8G:

Antenna	Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
Ant 1	NVNT	802.11a	5745	100	0
Ant 1	NVNT	802.11a	5785	100	0
Ant 1	NVNT	802.11a	5825	100	0
Ant 2	NVNT	802.11a	5745	100	0
Ant 2	NVNT	802.11a	5785	100	0
Ant 2	NVNT	802.11a	5825	100	0
Ant 1	NVNT	802.11ac20	5745	100	0
Ant 1	NVNT	802.11ac20	5785	100	0
Ant 1	NVNT	802.11ac20	5825	100	0
Ant 2	NVNT	802.11ac20	5745	100	0
Ant 2	NVNT	802.11ac20	5785	100	0
Ant 2	NVNT	802.11ac20	5825	100	0
Ant 1	NVNT	802.11ac40	5755	100	0
Ant 1	NVNT	802.11ac40	5795	100	0
Ant 2	NVNT	802.11ac40	5755	100	0
Ant 2	NVNT	802.11ac40	5795	100	0
Ant 1	NVNT	802.11ac80	5775	100	0
Ant 2	NVNT	802.11ac80	5775	100	0
Ant 1	NVNT	802.11n(HT20)	5745	100	0
Ant 1	NVNT	802.11n(HT20)	5785	100	0
Ant 1	NVNT	802.11n(HT20)	5825	100	0
Ant 2	NVNT	802.11n(HT20)	5745	100	0
Ant 2	NVNT	802.11n(HT20)	5785	100	0
Ant 2	NVNT	802.11n(HT20)	5825	100	0
Ant 1	NVNT	802.11n(HT40)	5755	100	0
Ant 1	NVNT	802.11n(HT40)	5795	100	0
Ant 2	NVNT	802.11n(HT40)	5755	100	0
Ant 2	NVNT	802.11n(HT40)	5795	100	0

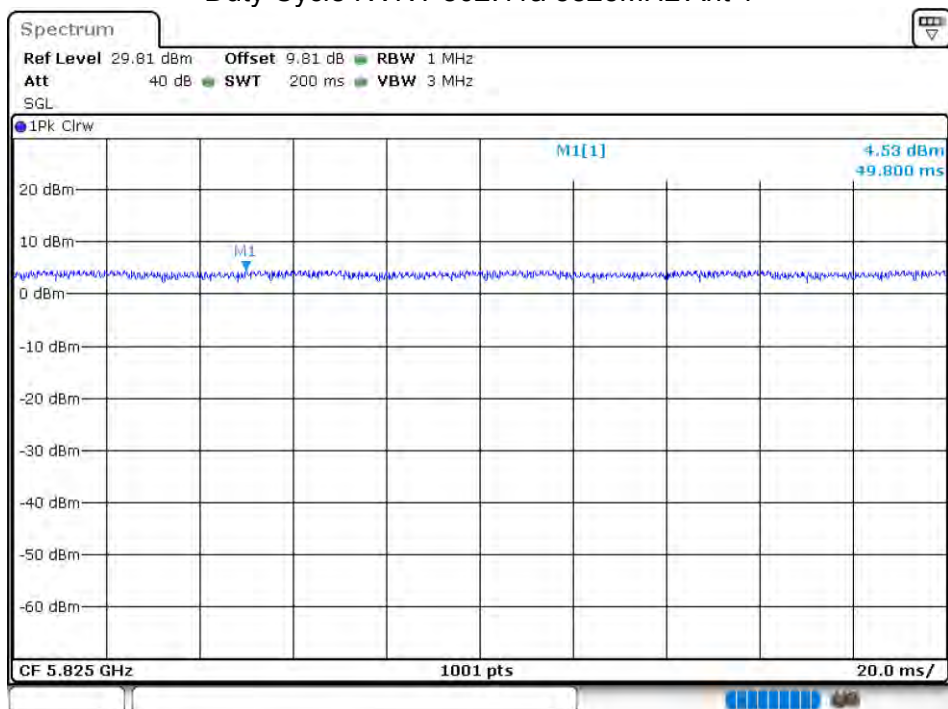
Duty Cycle NVNT 802.11a 5745MHz Ant 1



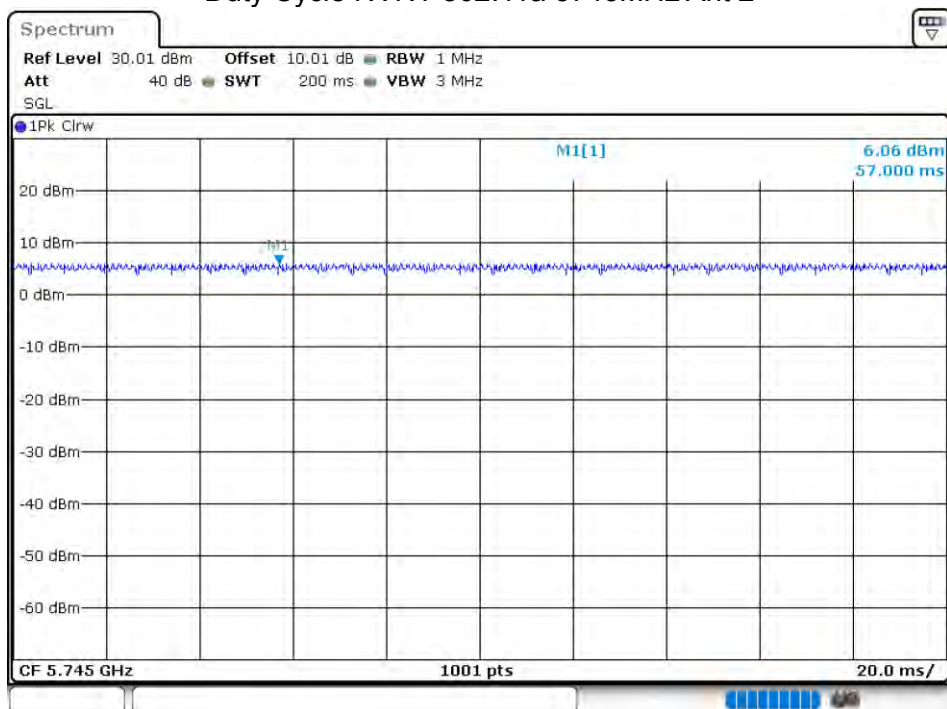
Duty Cycle NVNT 802.11a 5785MHz Ant 1



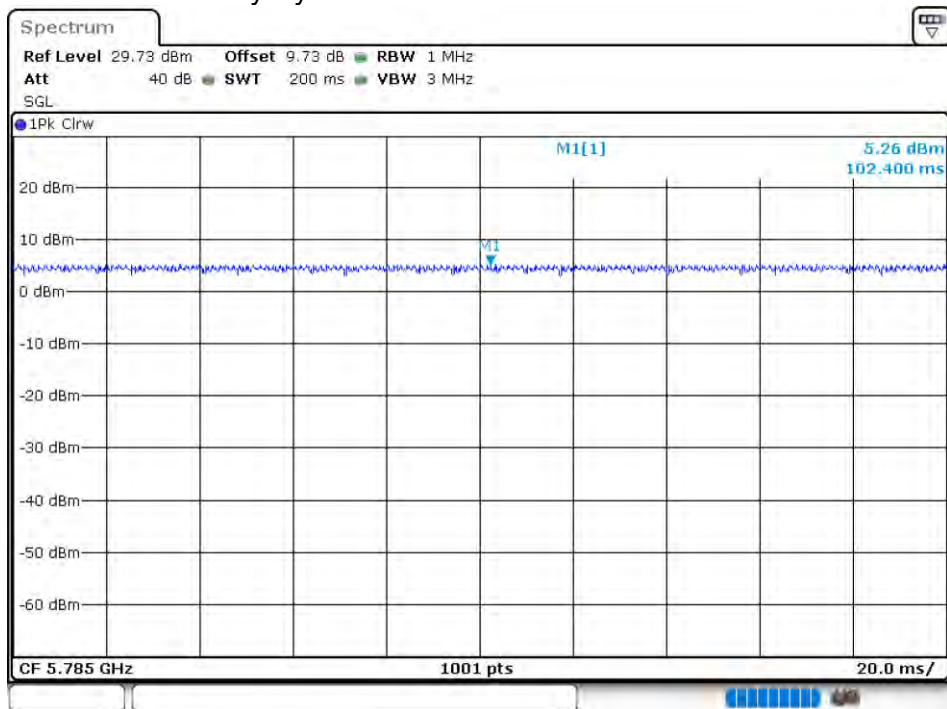
Duty Cycle NVNT 802.11a 5825MHz Ant 1



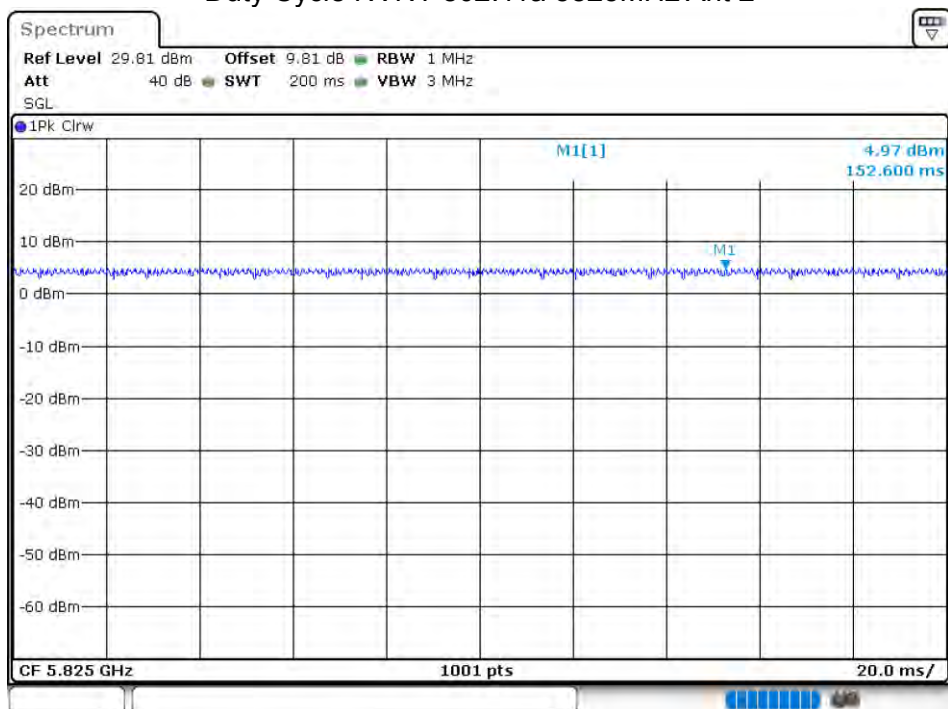
Duty Cycle NVNT 802.11a 5745MHz Ant 2



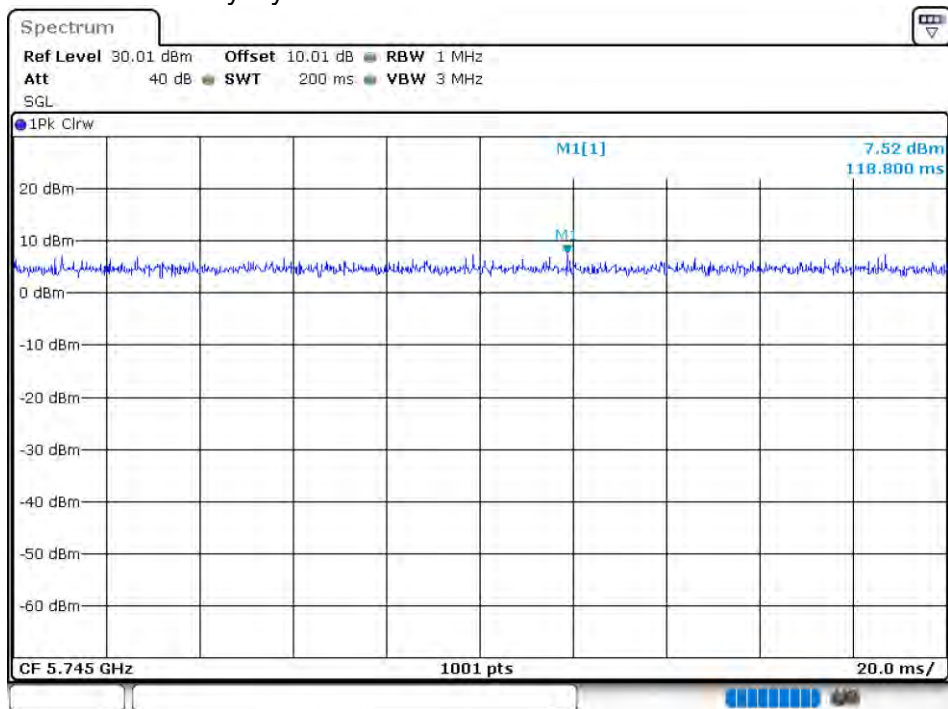
Duty Cycle NVNT 802.11a 5785MHz Ant 2



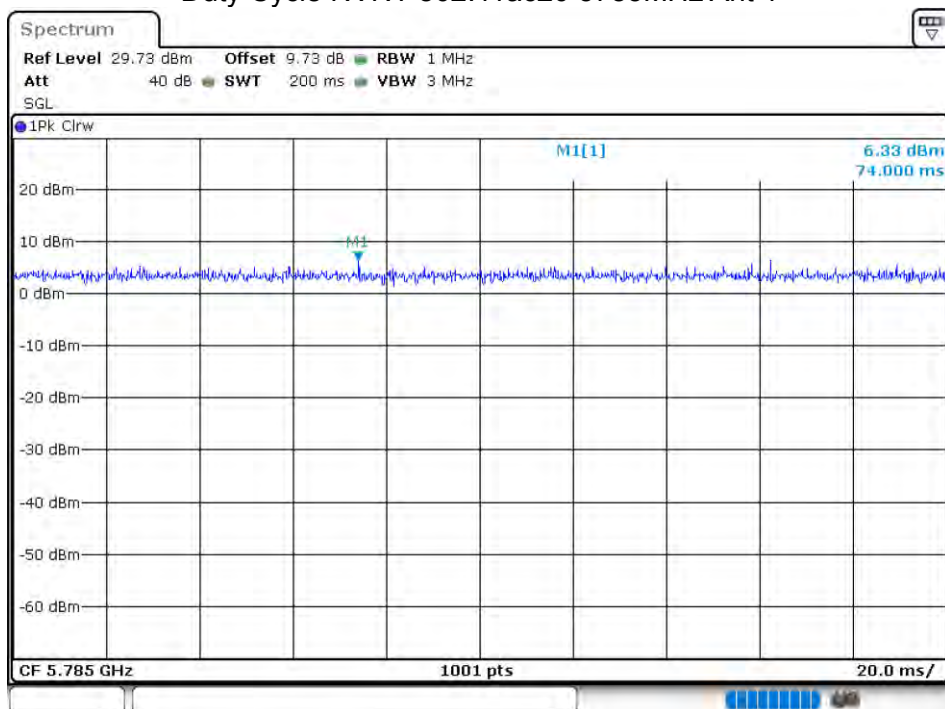
Duty Cycle NVNT 802.11a 5825MHz Ant 2



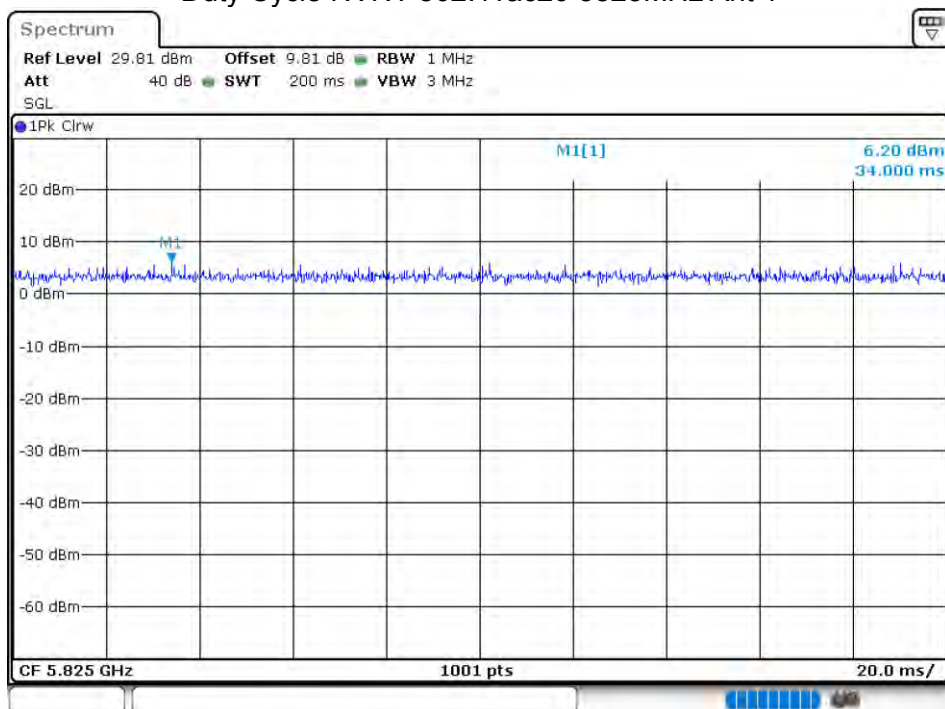
Duty Cycle NVNT 802.11ac20 5745MHz Ant 1



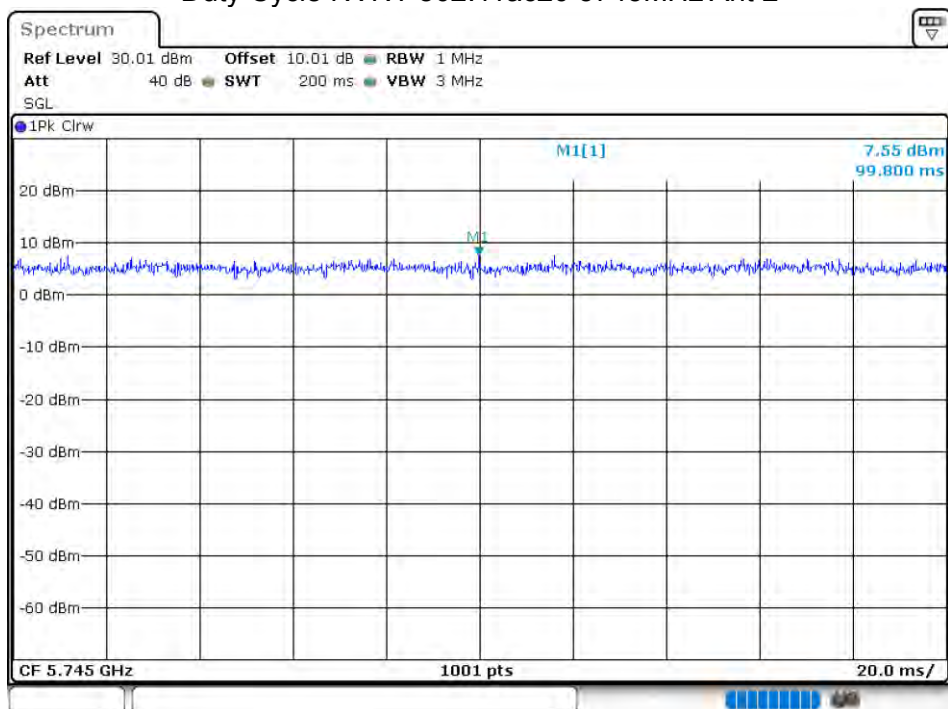
Duty Cycle NVNT 802.11ac20 5785MHz Ant 1



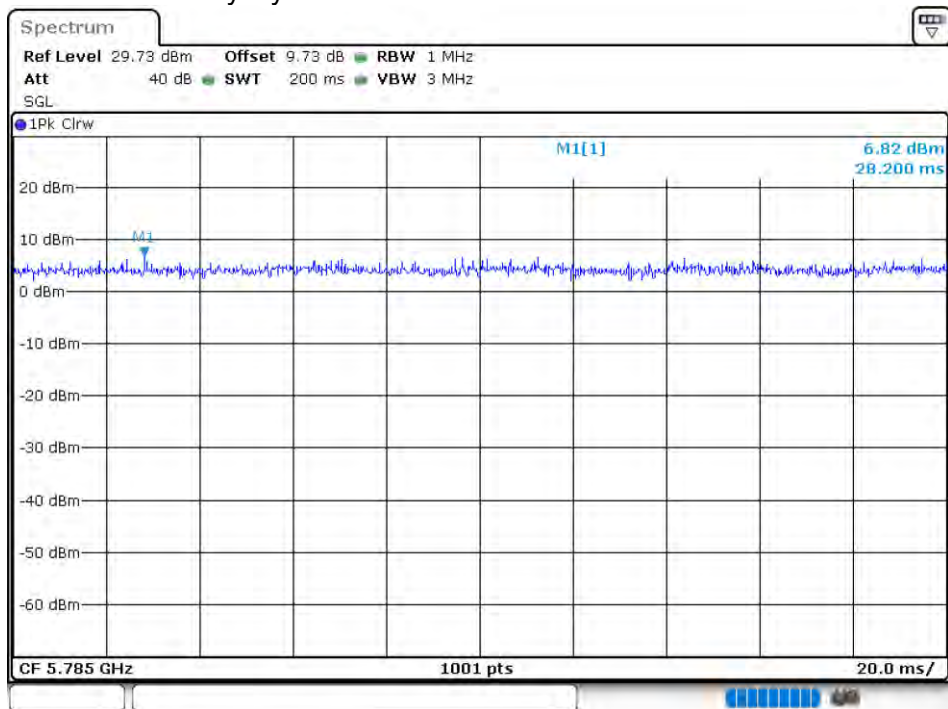
Duty Cycle NVNT 802.11ac20 5825MHz Ant 1



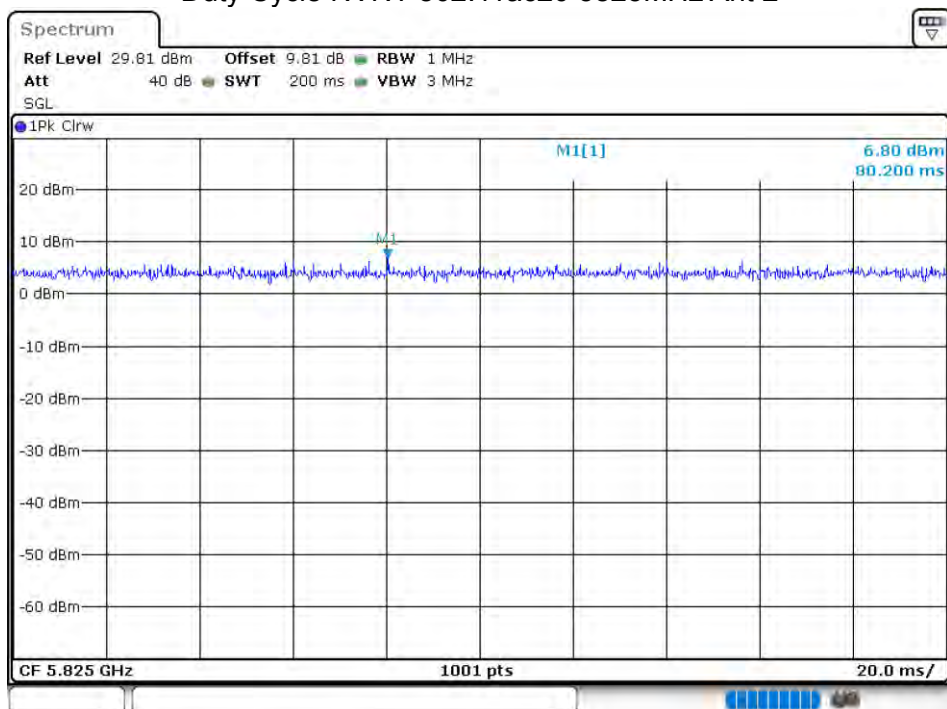
Duty Cycle NVNT 802.11ac20 5745MHz Ant 2



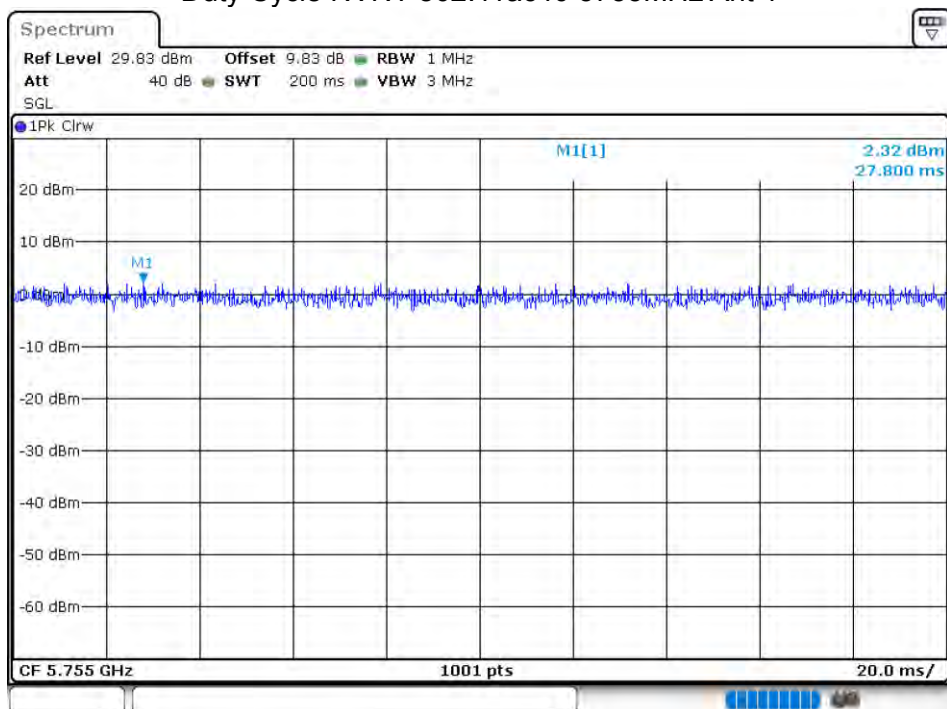
Duty Cycle NVNT 802.11ac20 5785MHz Ant 2



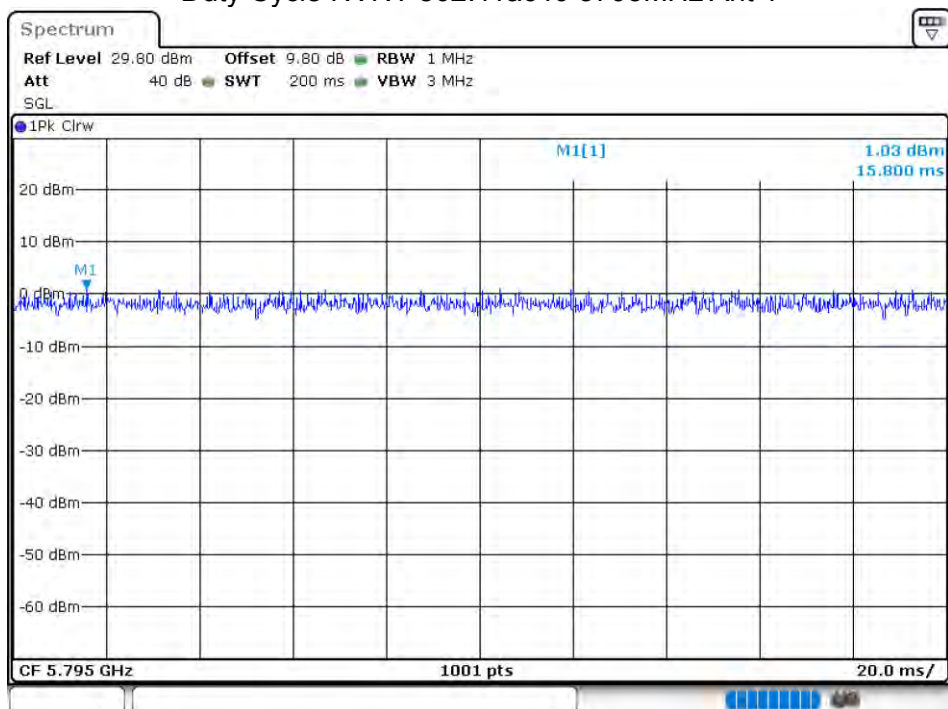
Duty Cycle NVNT 802.11ac20 5825MHz Ant 2



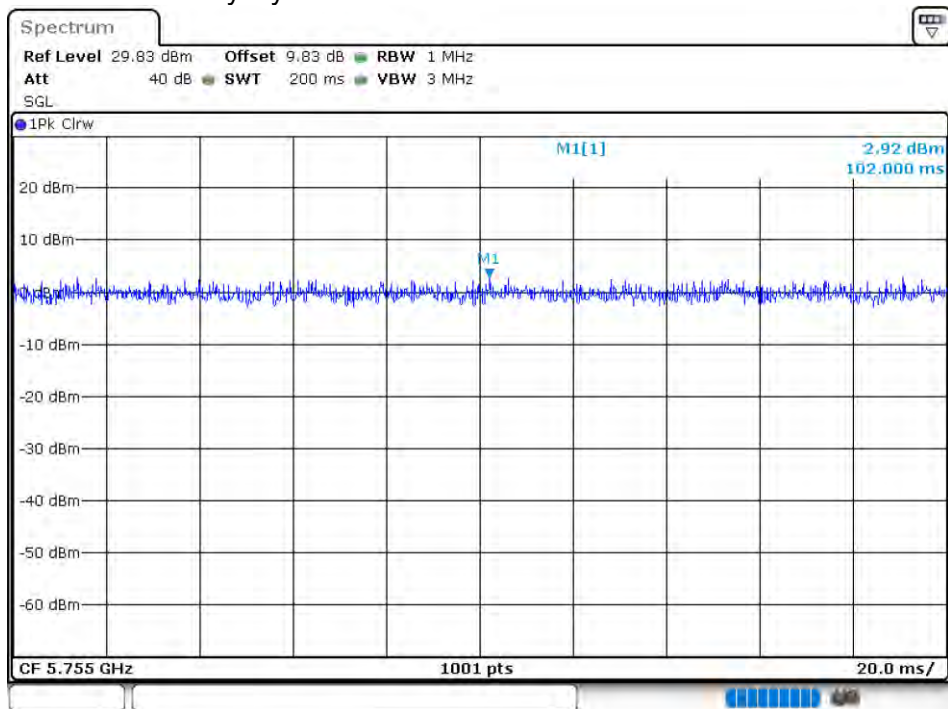
Duty Cycle NVNT 802.11ac40 5755MHz Ant 1



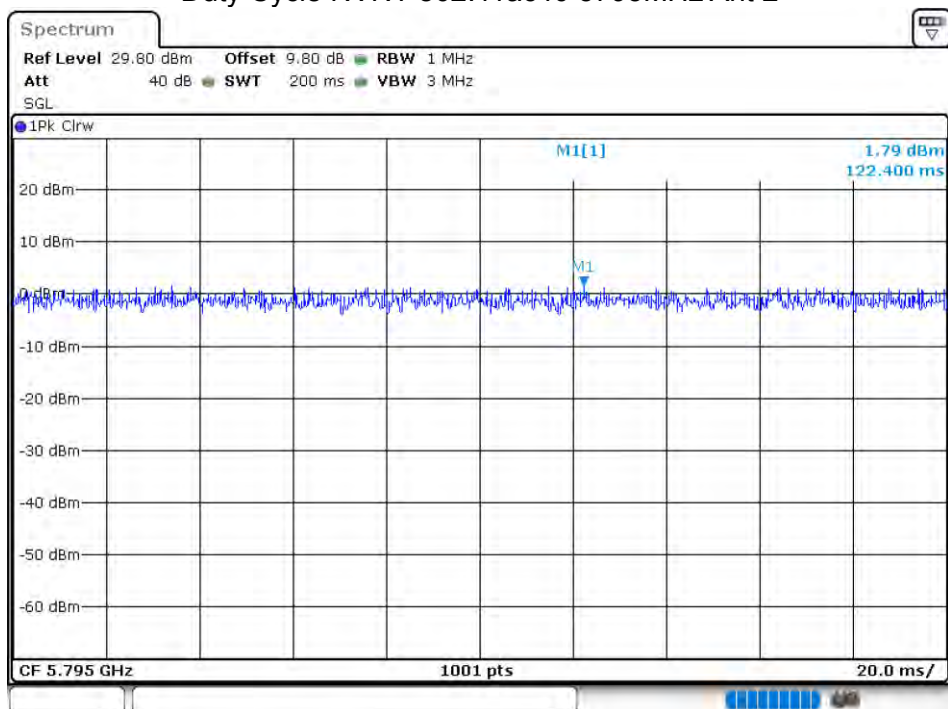
Duty Cycle NVNT 802.11ac40 5795MHz Ant 1



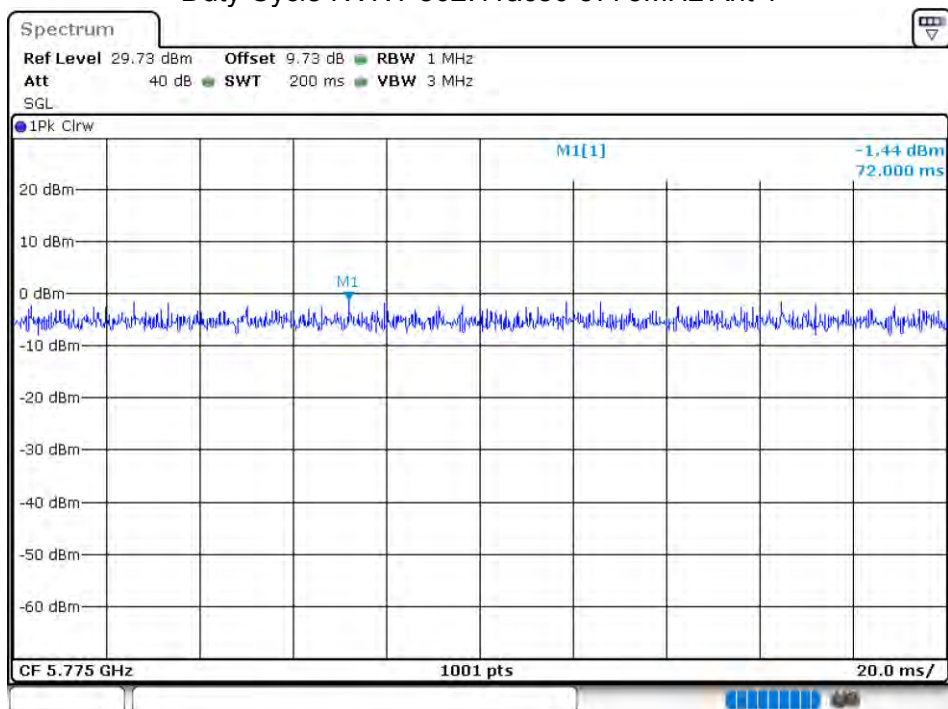
Duty Cycle NVNT 802.11ac40 5755MHz Ant 2



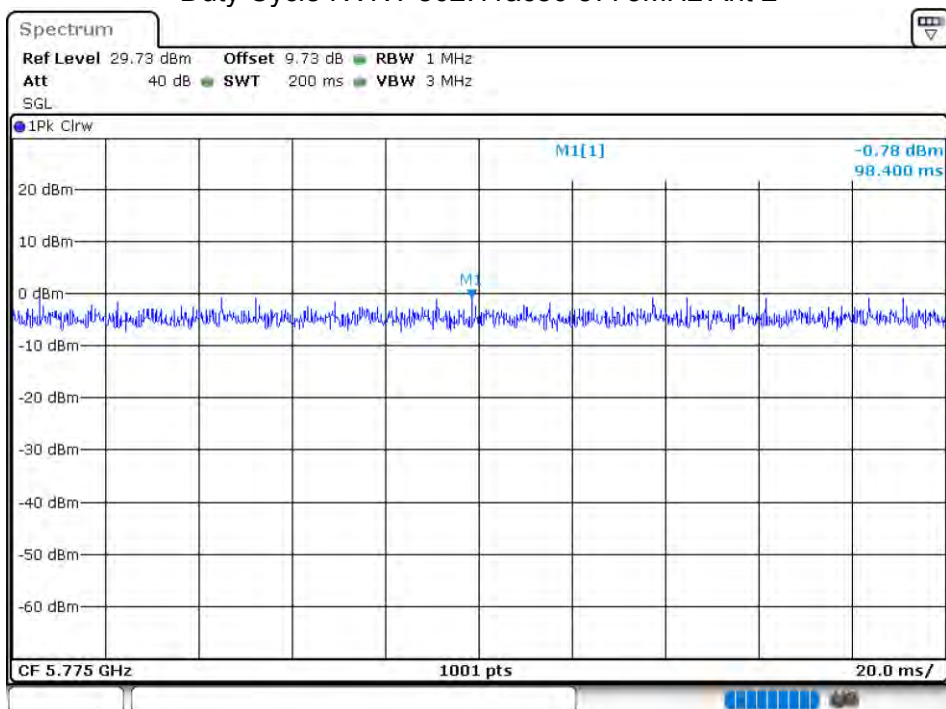
Duty Cycle NVNT 802.11ac40 5795MHz Ant 2



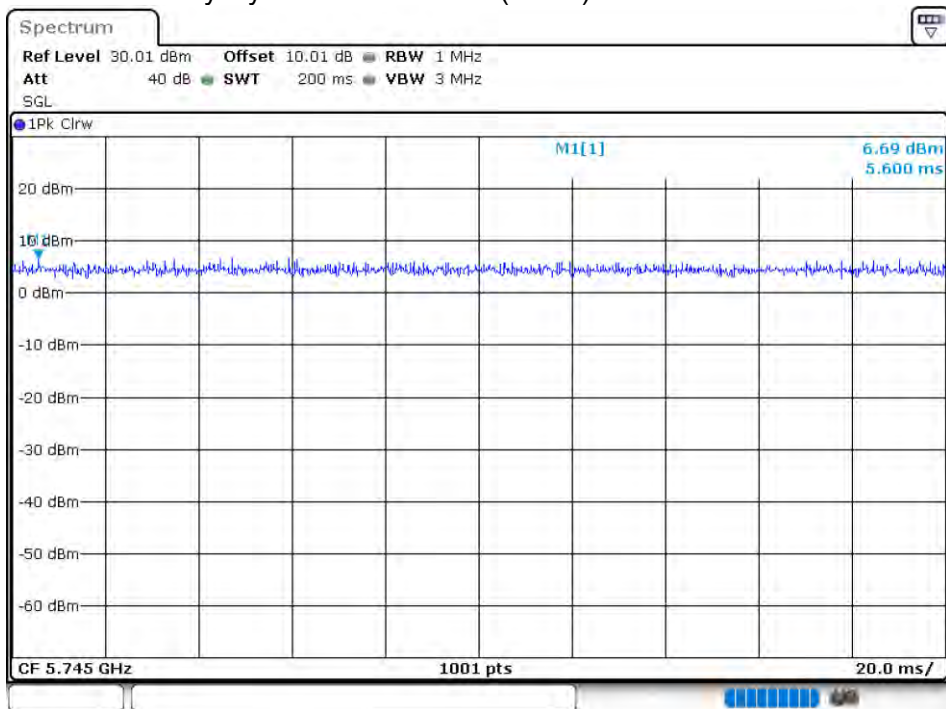
Duty Cycle NVNT 802.11ac80 5775MHz Ant 1



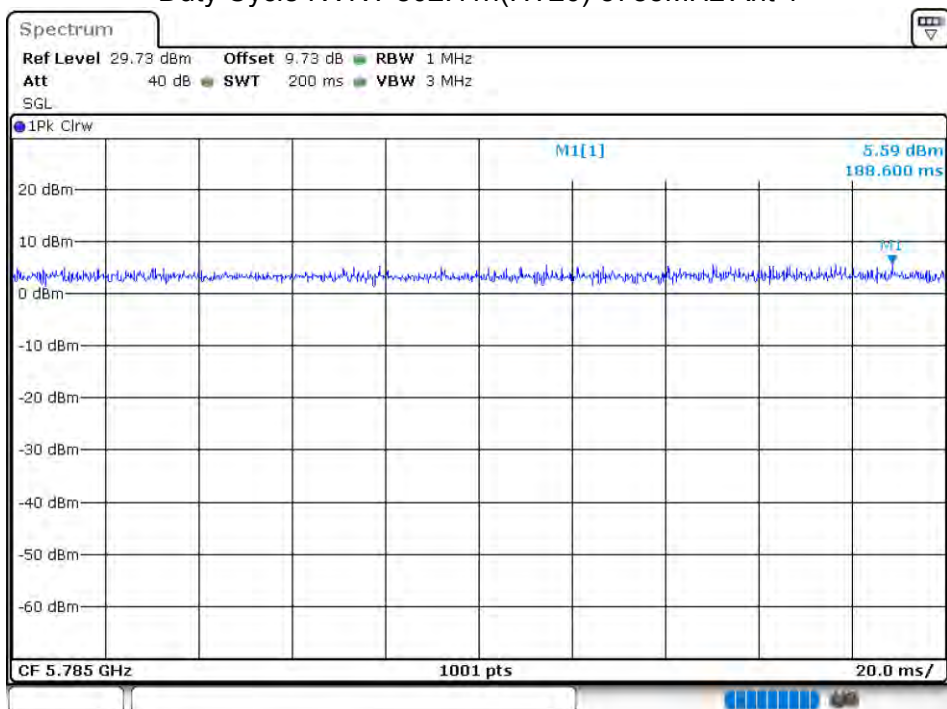
Duty Cycle NVNT 802.11ac80 5775MHz Ant 2



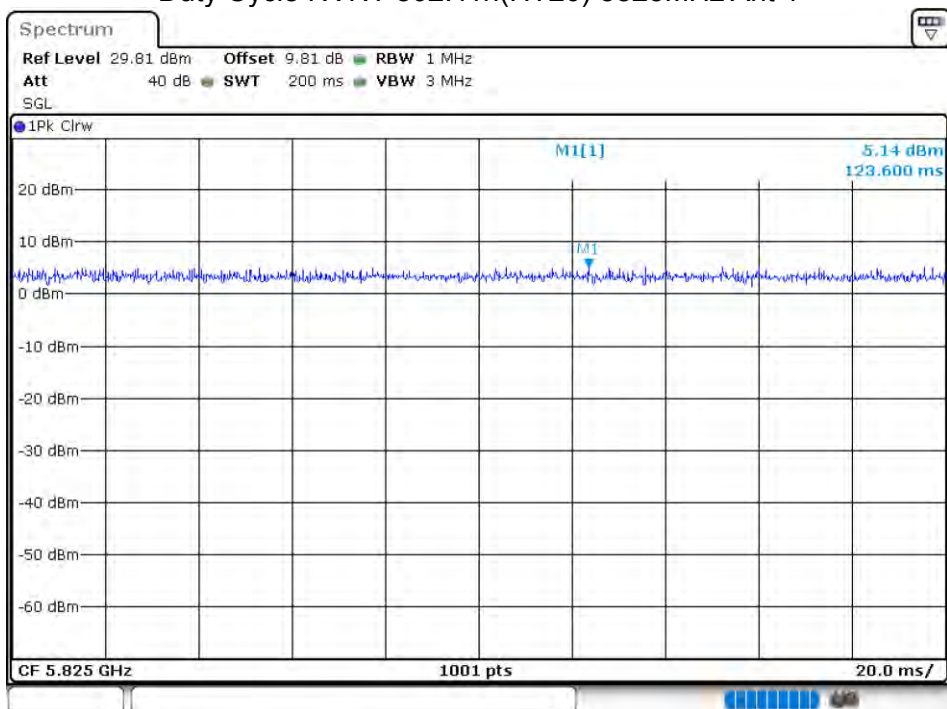
Duty Cycle NVNT 802.11n(HT20) 5745MHz Ant 1



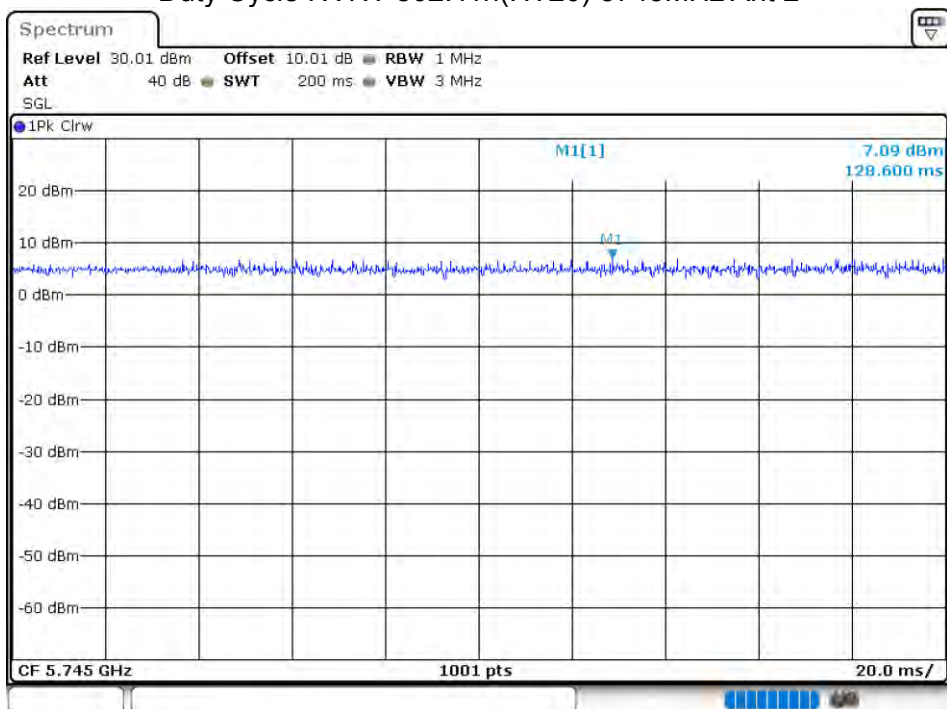
Duty Cycle NVNT 802.11n(HT20) 5785MHz Ant 1



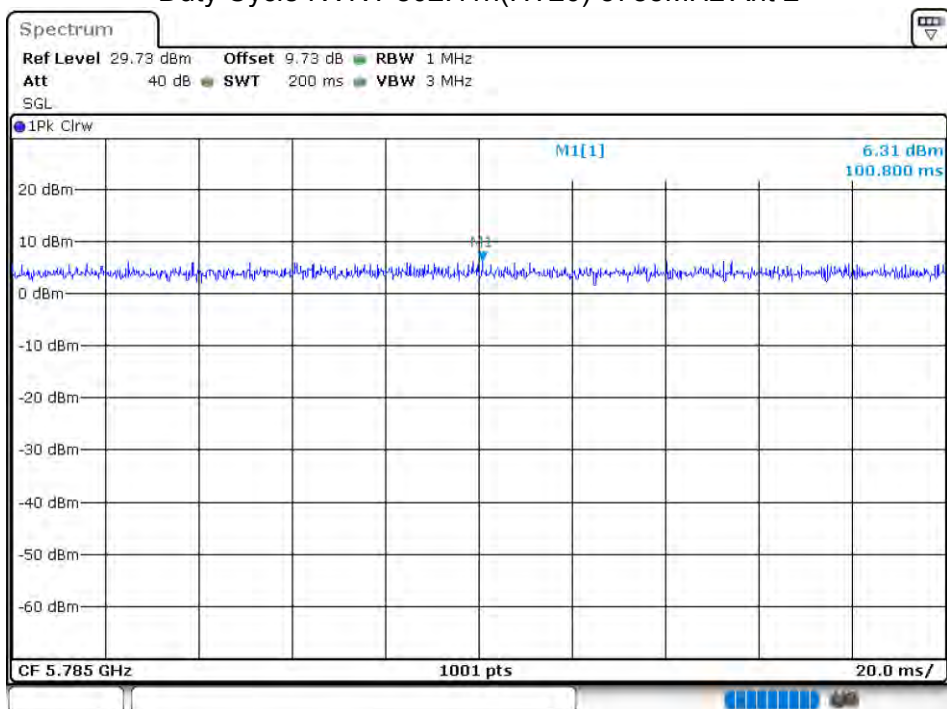
Duty Cycle NVNT 802.11n(HT20) 5825MHz Ant 1



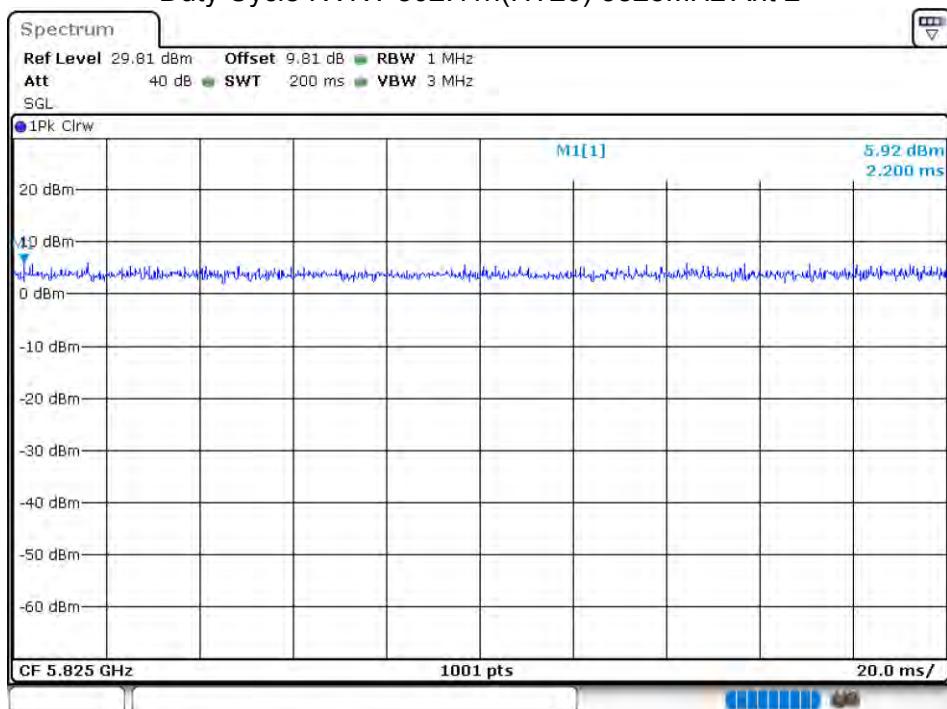
Duty Cycle NVNT 802.11n(HT20) 5745MHz Ant 2



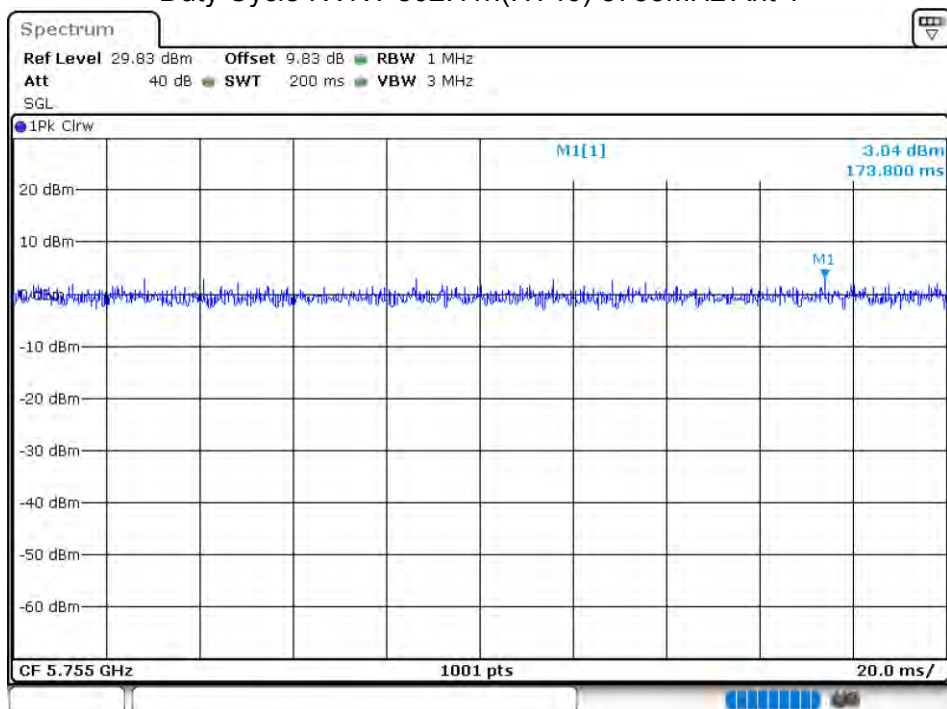
Duty Cycle NVNT 802.11n(HT20) 5785MHz Ant 2



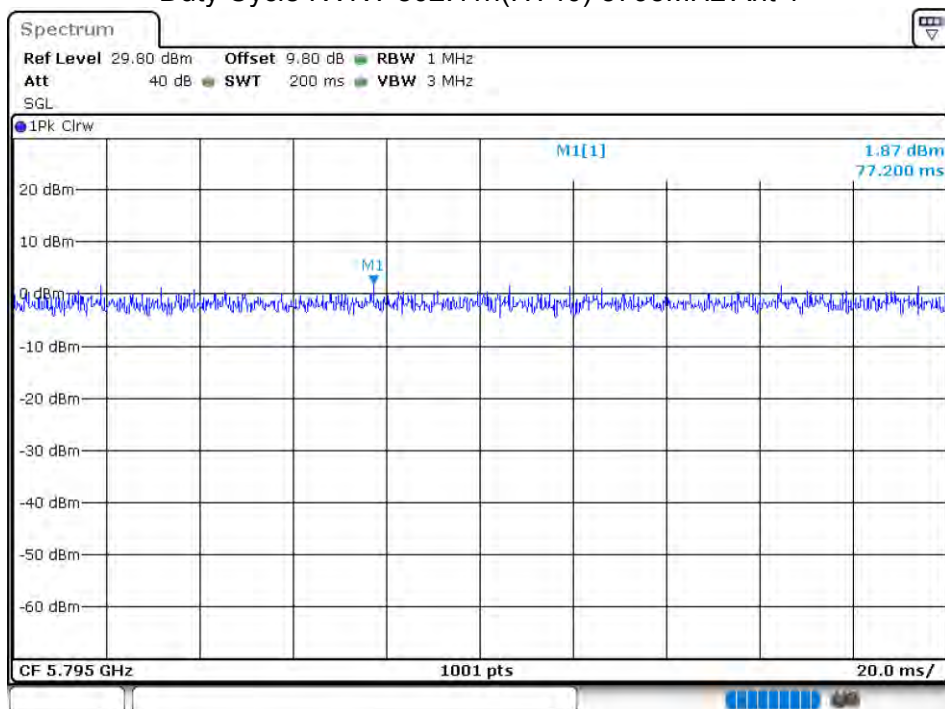
Duty Cycle NVNT 802.11n(HT20) 5825MHz Ant 2



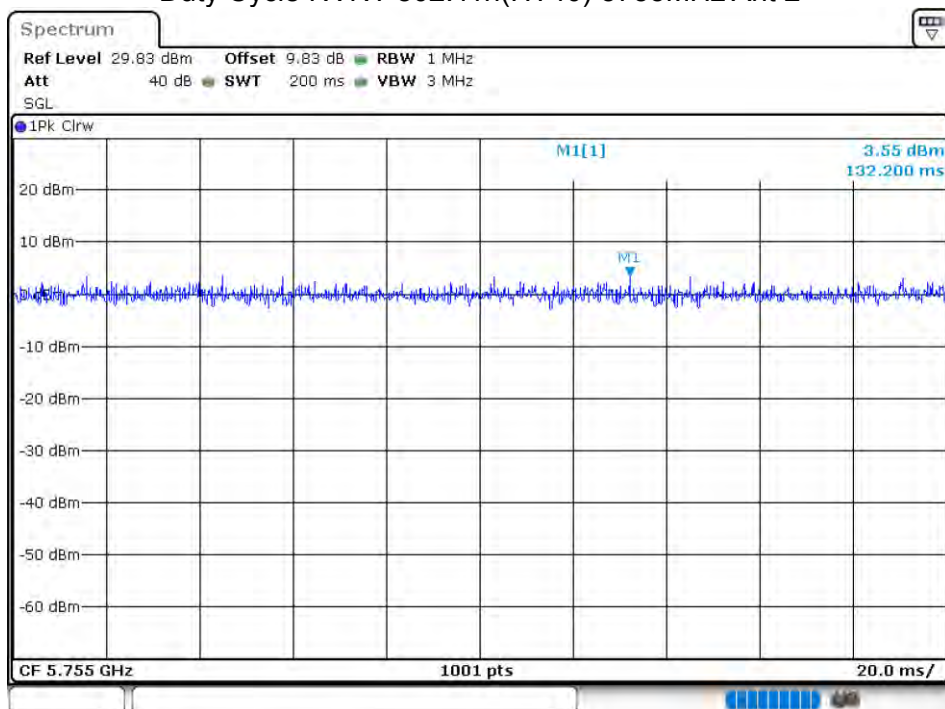
Duty Cycle NVNT 802.11n(HT40) 5755MHz Ant 1



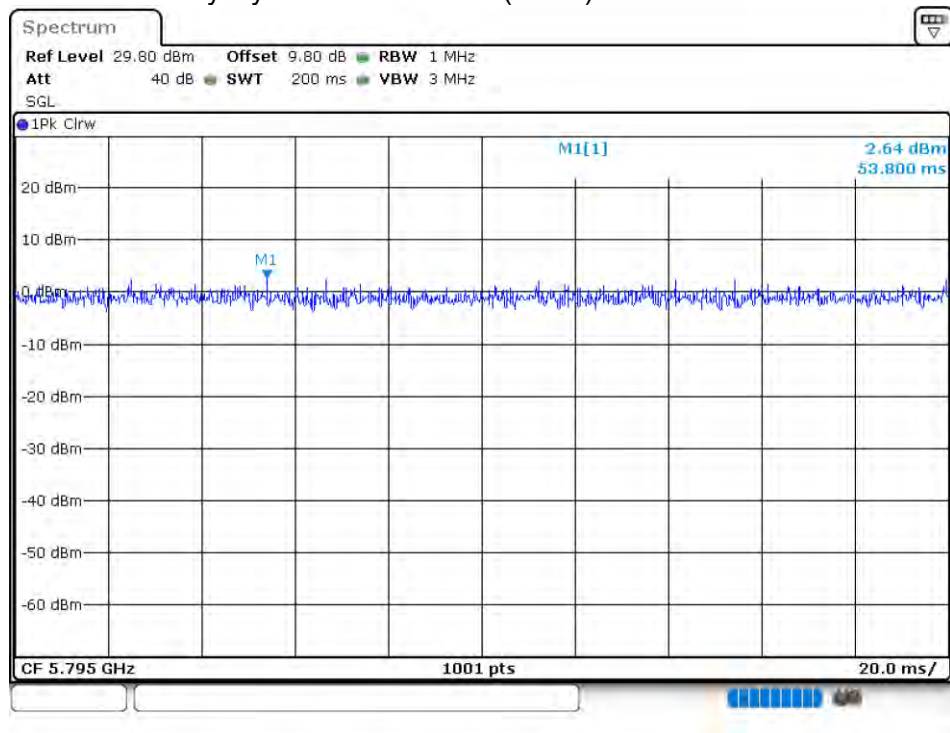
Duty Cycle NVNT 802.11n(HT40) 5795MHz Ant 1



Duty Cycle NVNT 802.11n(HT40) 5755MHz Ant 2



Duty Cycle NVNT 802.11n(HT40) 5795MHz Ant 2



10.2 MAXIMUM CONDUCTED OUTPUT POWER

5.2G:

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	802.11a	5180	Ant 1	10.18	-	24	Pass
NVNT	802.11a	5200	Ant 1	11.96	-	24	Pass
NVNT	802.11a	5240	Ant 1	11.4	-	24	Pass
NVNT	802.11a	5180	Ant 2	11	-	24	Pass
NVNT	802.11a	5200	Ant 2	12.48	-	24	Pass
NVNT	802.11a	5240	Ant 2	11.98	-	24	Pass
NVNT	802.11ac20	5180	Ant 1	10.13	13.03	24	Pass
NVNT	802.11ac20	5180	Ant 2	9.9		24	Pass
NVNT	802.11ac20	5200	Ant 1	11.72	14.54	24	Pass
NVNT	802.11ac20	5200	Ant 2	11.34		24	Pass
NVNT	802.11ac20	5240	Ant 1	11.37	14.17	24	Pass
NVNT	802.11ac20	5240	Ant 2	10.93		24	Pass
NVNT	802.11ac40	5190	Ant 1	11.44	13.86	24	Pass
NVNT	802.11ac40	5190	Ant 2	10.16		24	Pass
NVNT	802.11ac40	5230	Ant 1	12.28	14.56	24	Pass
NVNT	802.11ac40	5230	Ant 2	10.66		24	Pass
NVNT	802.11ac80	5210	Ant 1	11.33	13.70	24	Pass
NVNT	802.11ac80	5210	Ant 2	9.95		24	Pass
NVNT	802.11n(HT20)	5180	Ant 1	10.13	13.58	24	Pass
NVNT	802.11n(HT20)	5180	Ant 2	10.96		24	Pass
NVNT	802.11n(HT20)	5200	Ant 1	11.76	14.90	24	Pass
NVNT	802.11n(HT20)	5200	Ant 2	12.01		24	Pass
NVNT	802.11n(HT20)	5240	Ant 1	11.41	14.66	24	Pass
NVNT	802.11n(HT20)	5240	Ant 2	11.88		24	Pass
NVNT	802.11n(HT40)	5190	Ant 1	10.39	13.26	24	Pass
NVNT	802.11n(HT40)	5190	Ant 2	10.1		24	Pass
NVNT	802.11n(HT40)	5230	Ant 1	12.36	14.60	24	Pass
NVNT	802.11n(HT40)	5230	Ant 2	10.65		24	Pass

5.8G:

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	802.11a	5745	Ant 1	9.18	-	30	Pass
NVNT	802.11a	5785	Ant 1	8.51	-	30	Pass
NVNT	802.11a	5825	Ant 1	8.64	-	30	Pass
NVNT	802.11a	5745	Ant 2	9.85	-	30	Pass
NVNT	802.11a	5785	Ant 2	9.36	-	30	Pass
NVNT	802.11a	5825	Ant 2	8.97	-	30	Pass
NVNT	802.11ac20	5745	Ant 1	9.27	12.64	30	Pass
NVNT	802.11ac20	5745	Ant 2	9.97		30	Pass
NVNT	802.11ac20	5785	Ant 1	8.34	11.80	30	Pass
NVNT	802.11ac20	5785	Ant 2	9.2		30	Pass
NVNT	802.11ac20	5825	Ant 1	8.22	11.58	30	Pass
NVNT	802.11ac20	5825	Ant 2	8.89		30	Pass
NVNT	802.11ac40	5755	Ant 1	9.96	13.23	30	Pass
NVNT	802.11ac40	5755	Ant 2	10.47		30	Pass
NVNT	802.11ac40	5795	Ant 1	8.69	12.04	30	Pass
NVNT	802.11ac40	5795	Ant 2	9.35		30	Pass
NVNT	802.11ac80	5775	Ant 1	8.45	11.89	30	Pass
NVNT	802.11ac80	5775	Ant 2	9.27		30	Pass
NVNT	802.11n(HT20)	5745	Ant 1	9.27	12.45	30	Pass
NVNT	802.11n(HT20)	5745	Ant 2	9.61		30	Pass
NVNT	802.11n(HT20)	5785	Ant 1	8.64	11.84	30	Pass
NVNT	802.11n(HT20)	5785	Ant 2	9.02		30	Pass
NVNT	802.11n(HT20)	5825	Ant 1	8.43	11.56	30	Pass
NVNT	802.11n(HT20)	5825	Ant 2	8.67		30	Pass
NVNT	802.11n(HT40)	5755	Ant 1	9.95	13.19	30	Pass
NVNT	802.11n(HT40)	5755	Ant 2	10.39		30	Pass
NVNT	802.11n(HT40)	5795	Ant 1	8.71	12.09	30	Pass
NVNT	802.11n(HT40)	5795	Ant 2	9.42		30	Pass

10.3 OCCUPIED CHANNEL BANDWIDTH

5.2G:

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)	-26 dB Bandwidth (MHz)	Limit -26 dB Bandwidth (MHz)	Verdict
NVNT	802.11a	5180	Ant 1	16.8623	21.408	N/A	Pass
NVNT	802.11a	5200	Ant 1	17.0543	21.632	N/A	Pass
NVNT	802.11a	5240	Ant 1	16.9223	21.312	N/A	Pass
NVNT	802.11a	5180	Ant 2	17.2303	21.524	N/A	Pass
NVNT	802.11a	5200	Ant 2	17.1263	21.876	N/A	Pass
NVNT	802.11a	5240	Ant 2	16.9983	21.328	N/A	Pass
NVNT	802.11ac20	5180	Ant 1	18.0662	21.512	N/A	Pass
NVNT	802.11ac20	5200	Ant 1	17.9342	21.864	N/A	Pass
NVNT	802.11ac20	5240	Ant 1	18.0622	21.76	N/A	Pass
NVNT	802.11ac20	5180	Ant 2	18.2582	21.512	N/A	Pass
NVNT	802.11ac20	5200	Ant 2	18.0142	21.84	N/A	Pass
NVNT	802.11ac20	5240	Ant 2	18.1902	21.748	N/A	Pass
NVNT	802.11ac40	5190	Ant 1	36.4364	40.072	N/A	Pass
NVNT	802.11ac40	5230	Ant 1	36.2844	40.056	N/A	Pass
NVNT	802.11ac40	5190	Ant 2	36.4124	40.536	N/A	Pass
NVNT	802.11ac40	5230	Ant 2	36.3004	40.344	N/A	Pass
NVNT	802.11ac80	5210	Ant 1	75.3045	81.536	N/A	Pass
NVNT	802.11ac80	5210	Ant 2	75.4325	81.904	N/A	Pass
NVNT	802.11n(HT20)	5180	Ant 1	17.8582	21.688	N/A	Pass
NVNT	802.11n(HT20)	5200	Ant 1	18.0182	21.46	N/A	Pass
NVNT	802.11n(HT20)	5240	Ant 1	18.0542	21.928	N/A	Pass
NVNT	802.11n(HT20)	5180	Ant 2	18.6141	21.708	N/A	Pass
NVNT	802.11n(HT20)	5200	Ant 2	17.8502	21.972	N/A	Pass
NVNT	802.11n(HT20)	5240	Ant 2	17.8222	21.644	N/A	Pass
NVNT	802.11n(HT40)	5190	Ant 1	36.4204	40.44	N/A	Pass
NVNT	802.11n(HT40)	5230	Ant 1	36.2924	40.16	N/A	Pass
NVNT	802.11n(HT40)	5190	Ant 2	36.4364	40.384	N/A	Pass
NVNT	802.11n(HT40)	5230	Ant 2	36.3084	40.088	N/A	Pass

OBW NVNT 802.11a 5180MHz Ant 1



-26 dB BW NVNT 802.11a 5180MHz Ant 1



OBW NVNT 802.11a 5200MHz Ant 1



-26 dB BW NVNT 802.11a 5200MHz Ant 1



OBW NVNT 802.11a 5240MHz Ant 1



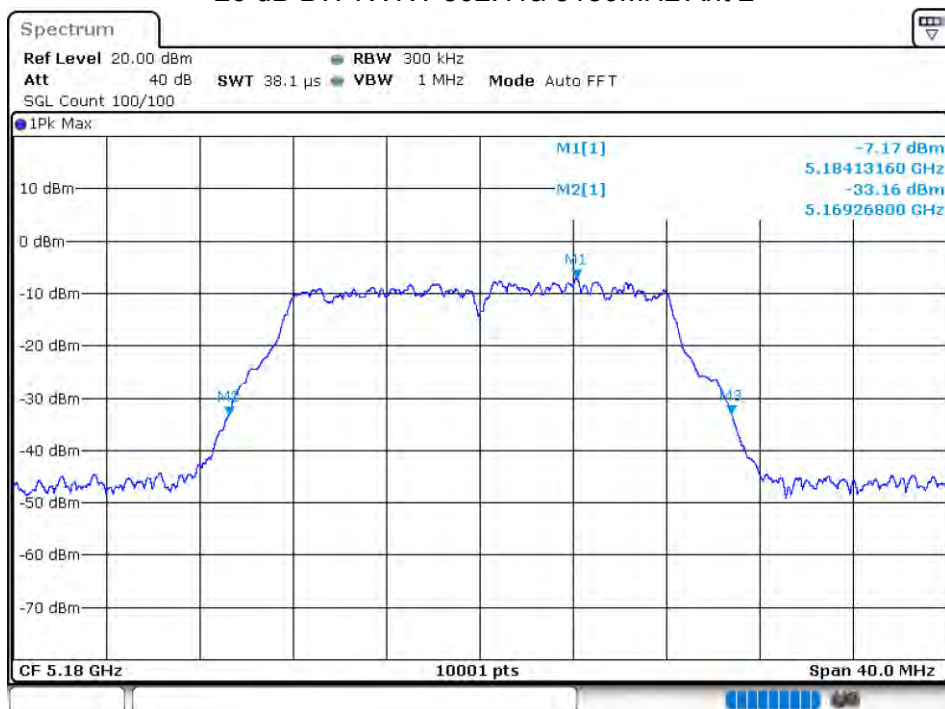
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OBW NVNT 802.11a 5180MHz Ant 2



-26 dB BW NVNT 802.11a 5180MHz Ant 2



OBW NVNT 802.11a 5200MHz Ant 2



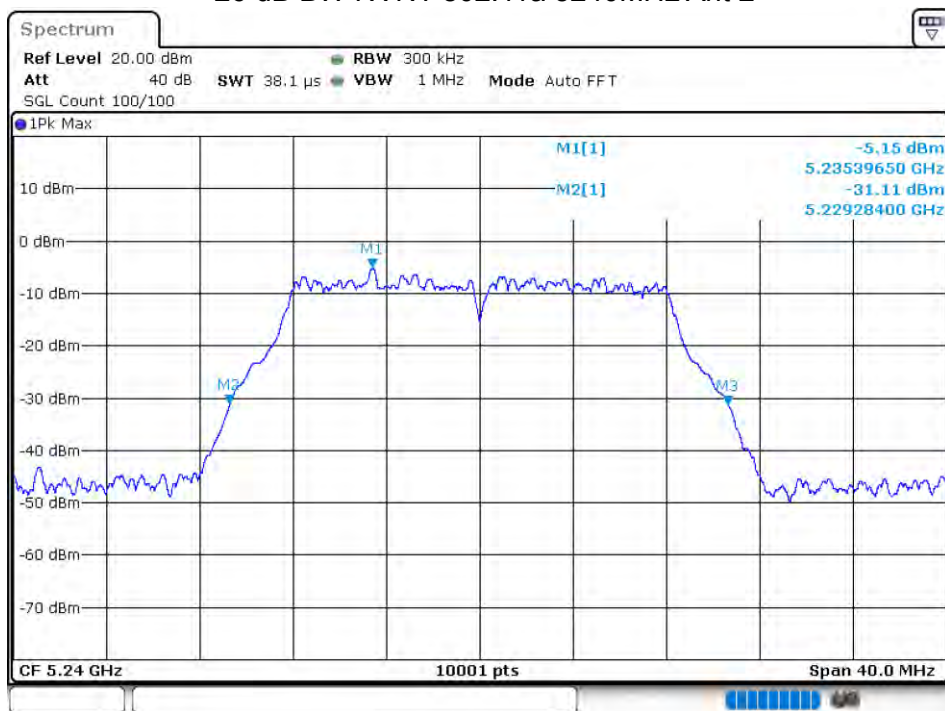
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OBW NVNT 802.11a 5240MHz Ant 2



-26 dB BW NVNT 802.11a 5240MHz Ant 2



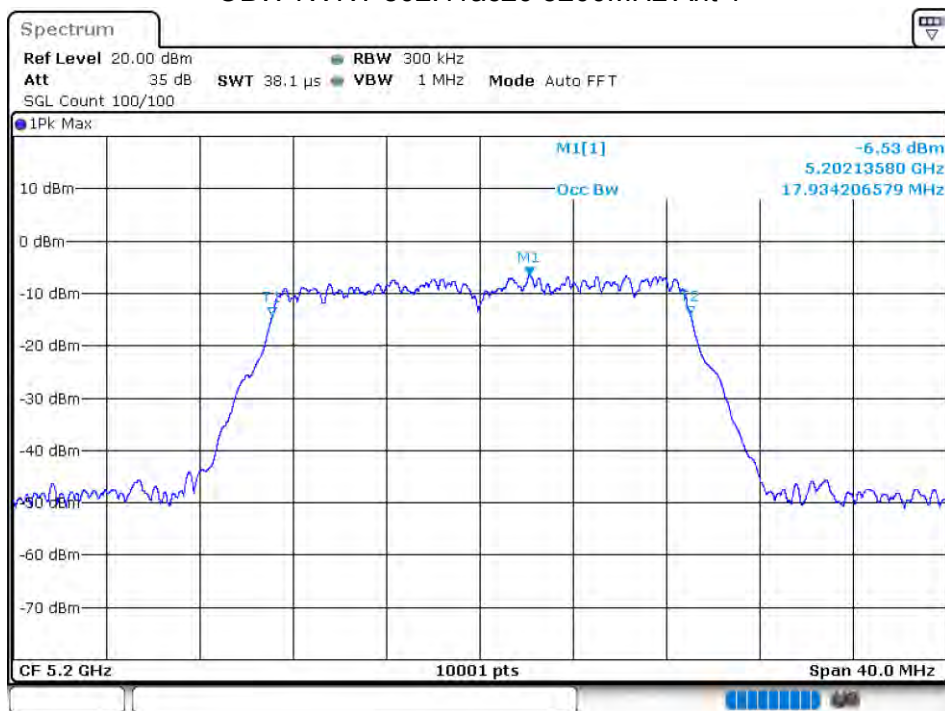
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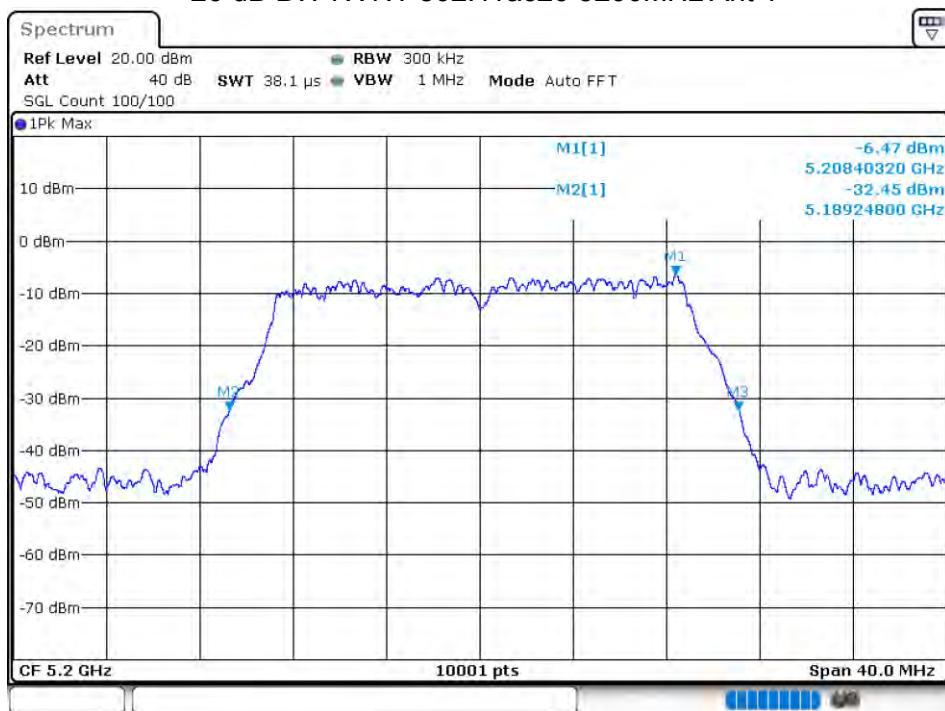
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OBW NVNT 802.11ac20 5200MHz Ant 1



-26 dB BW NVNT 802.11ac20 5200MHz Ant 1



OBW NVNT 802.11ac20 5240MHz Ant 1



-26 dB BW NVNT 802.11ac20 5240MHz Ant 1



OBW NVNT 802.11ac20 5180MHz Ant 2



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OBW NVNT 802.11ac20 5200MHz Ant 2



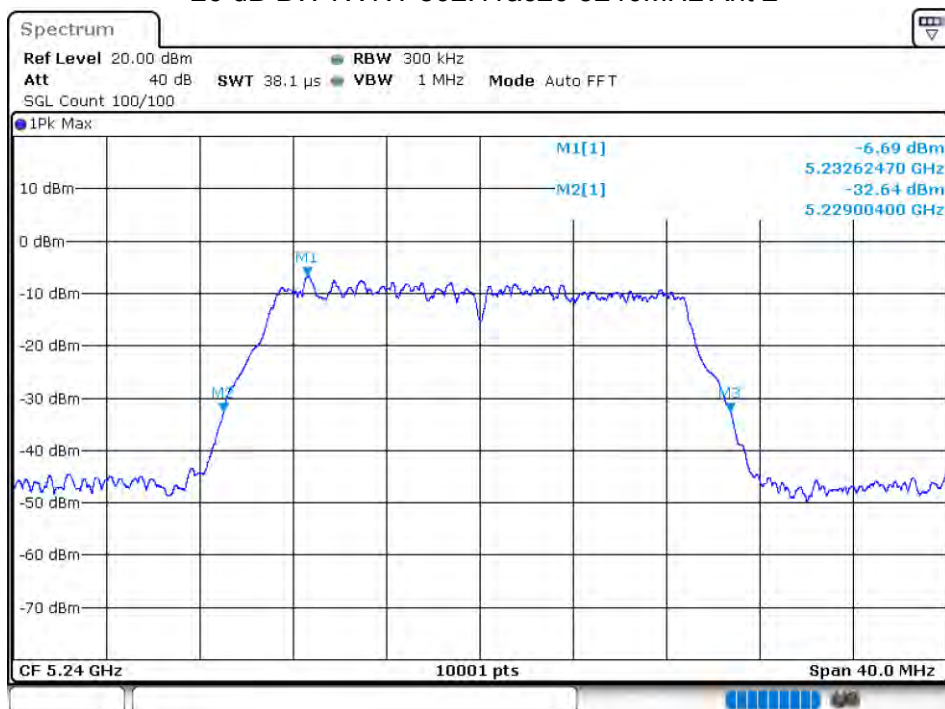
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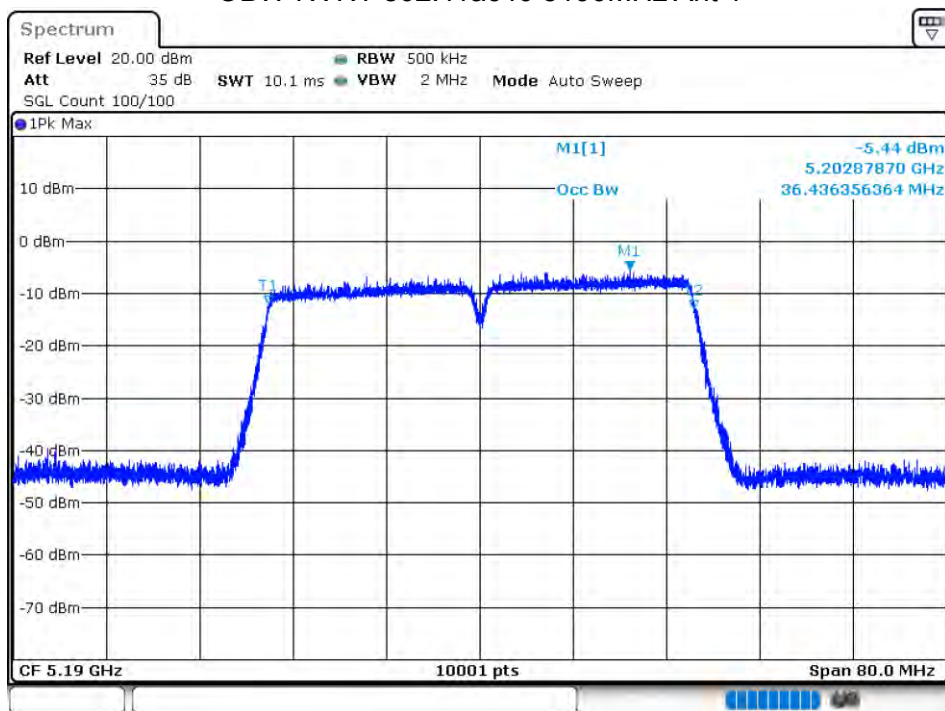
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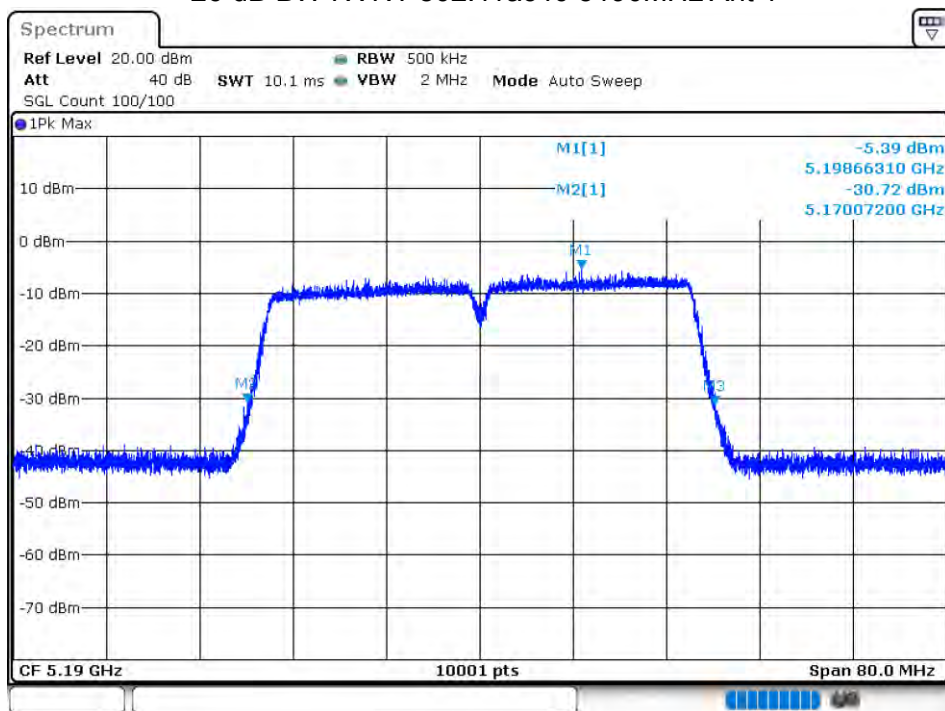
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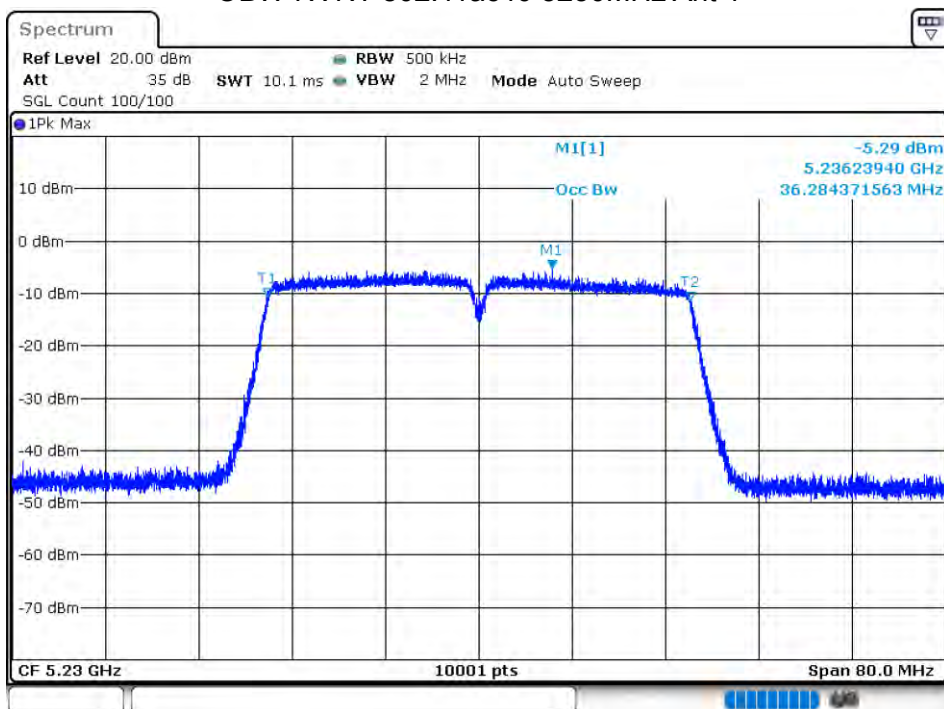
OBW NVNT 802.11ac40 5190MHz Ant 1



-26 dB BW NVNT 802.11ac40 5190MHz Ant 1



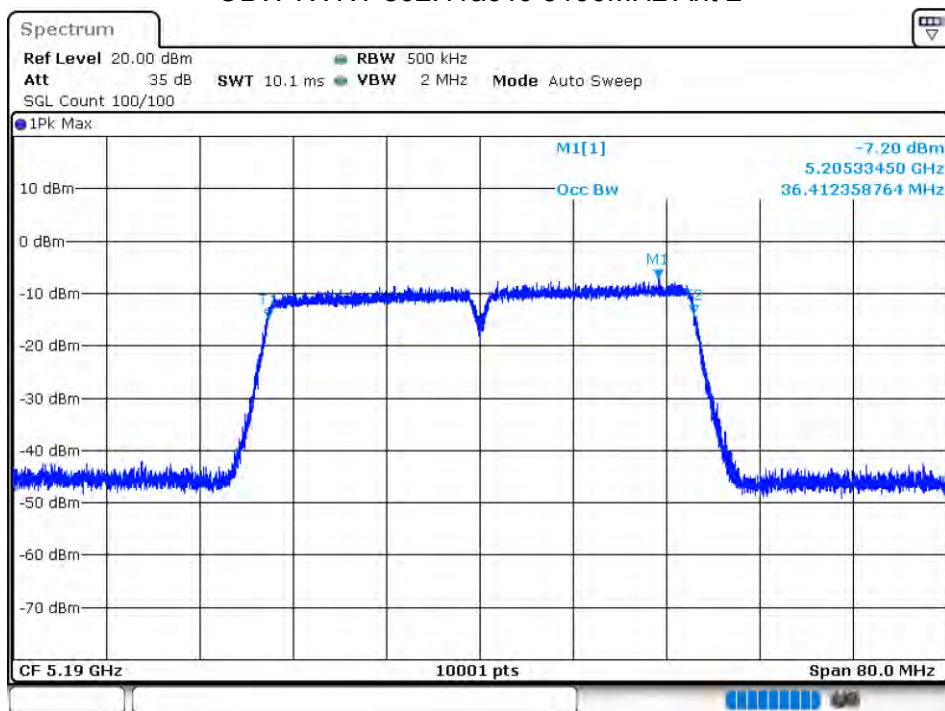
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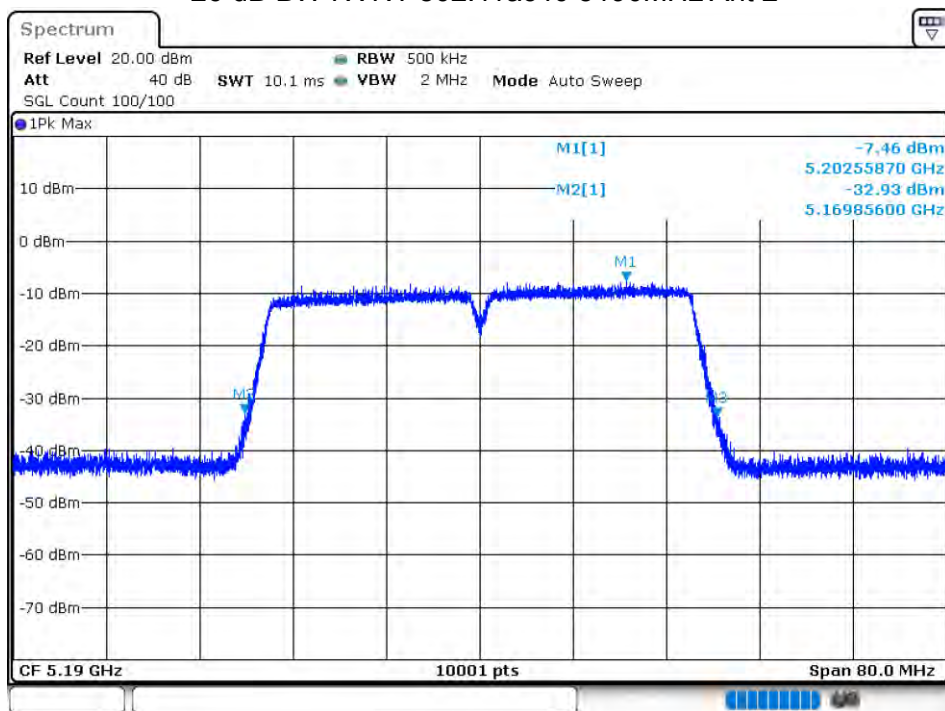
-26 dB BW NVNT 802.11ac40 5230MHz Ant 1



OBW NVNT 802.11ac40 5190MHz Ant 2



-26 dB BW NVNT 802.11ac40 5190MHz Ant 2



OBW NVNT 802.11ac40 5230MHz Ant 2



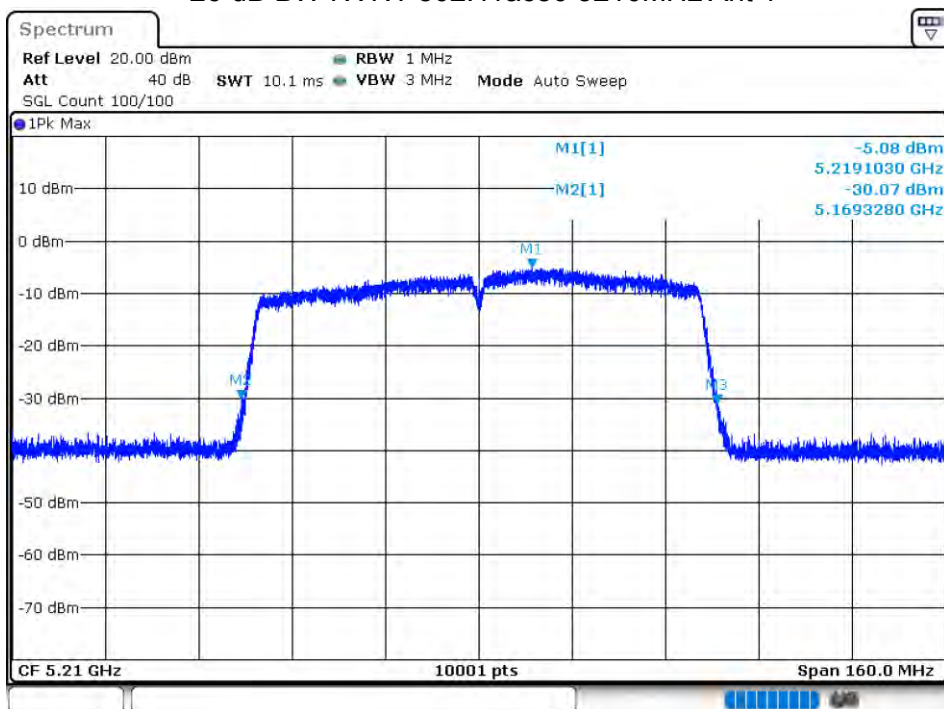
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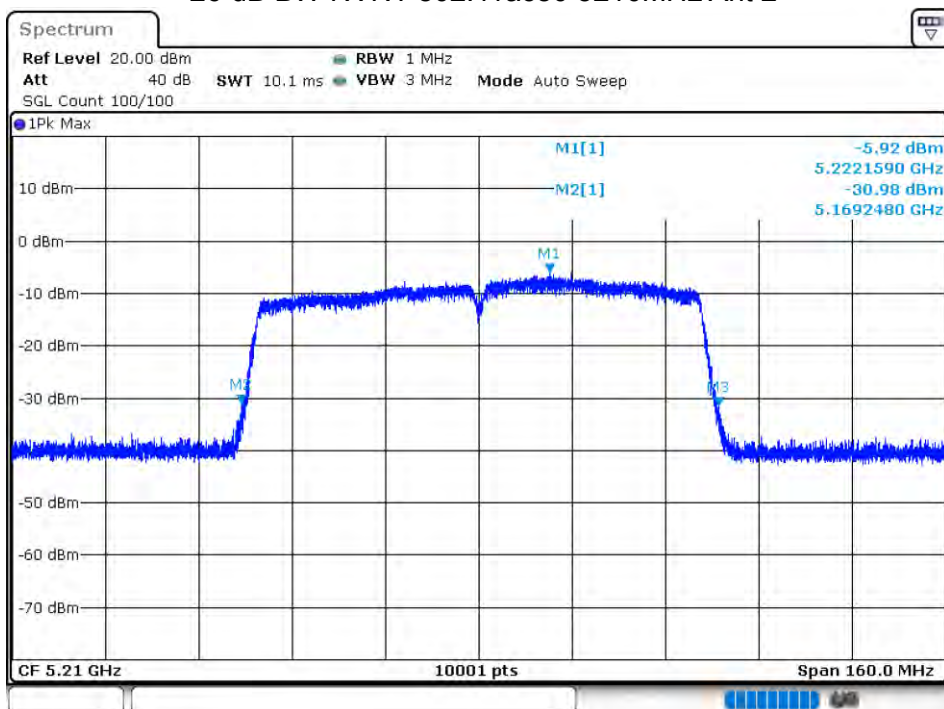
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OBW NVNT 802.11ac80 5210MHz Ant 2



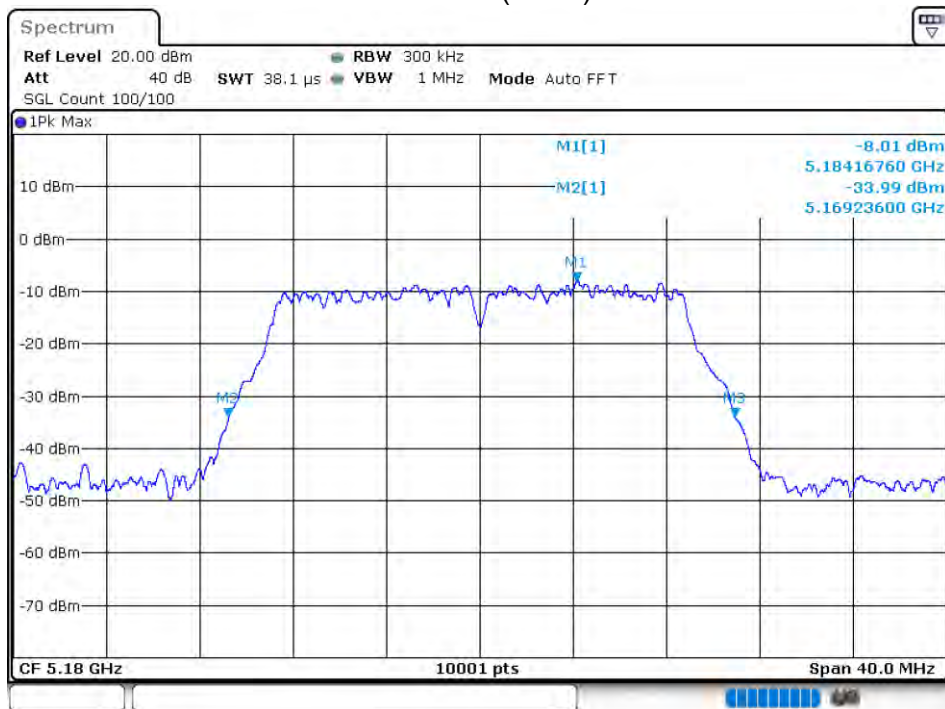
-26 dB BW NVNT 802.11ac80 5210MHz Ant 2



OBW NVNT 802.11n(HT20) 5180MHz Ant 1



-26 dB BW NVNT 802.11n(HT20) 5180MHz Ant 1



OBW NVNT 802.11n(HT20) 5200MHz Ant 1



-26 dB BW NVNT 802.11n(HT20) 5200MHz Ant 1



OBW NVNT 802.11n(HT20) 5240MHz Ant 1



-26 dB BW NVNT 802.11n(HT20) 5240MHz Ant 1



OBW NVNT 802.11n(HT20) 5180MHz Ant 2



-26 dB BW NVNT 802.11n(HT20) 5180MHz Ant 2



OBW NVNT 802.11n(HT20) 5200MHz Ant 2



-26 dB BW NVNT 802.11n(HT20) 5200MHz Ant 2



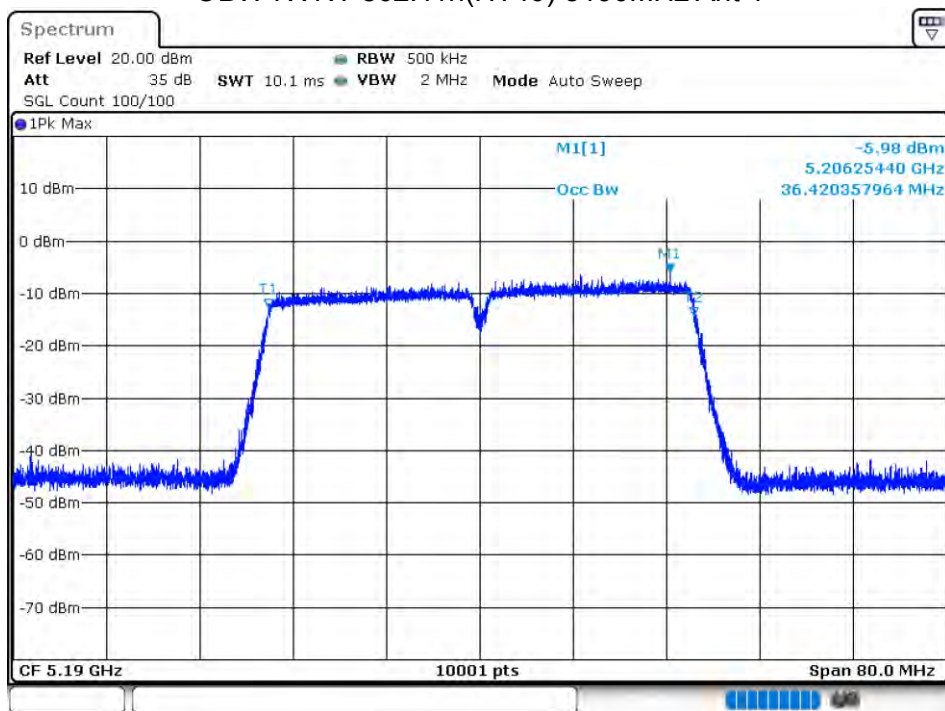
OBW NVNT 802.11n(HT20) 5240MHz Ant 2



-26 dB BW NVNT 802.11n(HT20) 5240MHz Ant 2



OBW NVNT 802.11n(HT40) 5190MHz Ant 1



-26 dB BW NVNT 802.11n(HT40) 5190MHz Ant 1

