CFR 47 FCC PART 15 SUBPART E

TEST REPORT

For

Azuga Safetycam

MODEL NUMBER: Gen-2 D107

FCC ID: 2AS3V-D107-1

REPORT NUMBER: E04A23030703F00202

ISSUE DATE: Sept. 09, 2023

Prepared for

Azuga Inc.

42840 Christy St. #205, Fremont, CA 94538

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	Sept. 09, 2023	Initial Issue	Win

Summary of Test Results			
Test Item	**Clause**	**Limit/Requirement**	**Result**
ON TIME AND DUTY CYCLE	ANSI C63.10-2013, Clause 12.2	None; for reporting purposes only.	Pass
6dB AND 26dB EMISSION BANDWIDTH AND 99% OCCUPIED BANDWIDTH	KDB 789033 D02 v02r01 Section C.1	FCC Part 15.407 (a)(2)(5),	Pass
CONDUCTED OUTPUT POWER	KDB 789033 D02 v02r01 Section E.3.a (Method PM)	FCC 15.407 (a)	Pass
POWER SPECTRAL DENSITY	KDB 789033 D02 v02r01 Section F	FCC 15.407 (a)	Pass
AC Power Line Conducted Emission	ANSI C63.10-2013, Clause 6.2.	FCC 15.207	N/A (NOTE 1, 2)
Radiated Emissions and Band Edge Measurement	KDB 789033 D02 v02r01 Section G.3, G.4, G.5, and G.6	FCC 15.407 (b) FCC 15.209 FCC 15.205	Pass
FREQUENCY STABILITY		FCC 15.407 (g)	Pass
Antenna Requirement	N/A	FCC 47 CFR Part 15.203/ 15.407(a)(1) (2),	Pass

Note:
1. N/A: In this whole report not applicable.
2. This test is only applicable for devices which can be charged or powered by AC power cable.

*The measurement result for the sample received is <Pass> according to <CFR 47 FCC PART 15 SUBPART E > when <Accuracy Method> decision rule is applied.

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	Azuga Inc.
Address:	42840 Christy St. #205, Fremont, CA 94538

Manufacturer Information

Company Name:	SHENZHEN AONI ELECTRONIC CO.,LTD
Address:	No.5 Bldg, Honghui Industrial park, 2nd liuxian Road, Xin'an street, Bao'an District, Shenzhen

EUT Information

EUT Name:	Azuga Safetycam
Model:	Gen-2 D107
Series Model:	N/A
Brand:	Azuga SafetyCam™
Sample Received Date:	March 27, 2023
Sample Status:	Normal
Sample ID:	A23030703 001
Date of Tested:	March 27, 2023 to Sept. 09, 2023

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 FCC PART 15 SUBPART E	**Pass**

Prepared By:

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Project Engineer

Checked By:

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Approved By:

Shawn Wen

Laboratory Supervisor

2. TEST METHODOLOGY

All tests were performed in accordance with the standard CFR 47 FCC PART 15 SUBPART E

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 6947.01)** Guangdong Global Testing Technology Co., Ltd. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1343)** Guangdong Global Testing Technology Co., Ltd. has been recognized to perform compliance testing on equipment subject to Supplier's Declaration of Conformity (SDoC) and Certification rules **ISED (Company No.: 30714)** Guangdong Global Testing Technology Co., Ltd. has been registered and fully described in a report filed with ISED. The Company Number is 30714 and the test lab Conformity Assessment Body Identifier (CABID) is CN0148.

Note: All tests measurement facilities use to collect the measurement data are located at Room 101-105, 203-210, Building 1, No.2, Keji 8 Road, Songshan Lake Park, Dongguan city, Guangdong, People’s Republic of China, 523808

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Description	Limit	Uncertainties
Carrier Frequencies	±1.0E-05	±2.2E-10
Occupied Channel Bandwidth	-	±1.71 %
Power	±1.5 dB	±1.15 dB
Power Density	±1.5 dB	±1.21 dB
Transmitter unwanted emissions outside the 5 GHz RLAN bands		
30 MHz to 1 GHz	±3 dB	±0.80 dB
1 GHz to 26GHz	±3 dB	±2.42 dB
Transmitter unwanted emissions inside the 5 GHz RLAN bands		
5 150 MHz to 5 350 MHz and 5 470 MHz to 5 725 MHz	±3 dB	±1.69 dB
Receiver Spurious emission		
30 MHz to 1 GHz	±3 dB	±0.80 dB
1 GHz to 26GHz	±3 dB	±2.42 dB

Test Item	Uncertainty
Radiation Emission	4.62 dB (30 MHz ~ 1 GHz)
	3.50 dB (1 GHz ~ 18 GHz)
	4.24 dB (18 GHz ~ 26 GHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.	

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name		Azuga Safetycam
Model		Gen-2 D107
Series Model		N/A
Hardware Version		N/A
Software Version		N/A
Ratings		DC 5V, 2A
Power Supply	DC	13V

Frequency Band:	5150 MHz to 5250 MHz (U-NII-1)
Frequency Range:	5180 MHz to 5240 MH
Support Standards:	IEEE 802.11a/n/ac
Type of Modulation:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)
Channel Spacing:	IEEE 802.11a/n-HT20/ac-VHT20: 20 MHz IEEE 802.11n-HT40/ac-VHT40: 40 MHz IEEE 802.11ac-VHT80: 80 MHz
Data Rate:	IEEE 802.11a: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS15 IEEE 802.11n-HT40: Up to MCS15 IEEE 802.11ac-VHT20: Up to MCS8 IEEE 802.11ac-VHT40: Up to MCS9 IEEE 802.11ac-VHT80: Up to MCS9
Number of Channels:	5150 MHz to 5250 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40)/ac-VHT40 1 for IEEE 802.11acVHT80 5725 MHz to 5850 MHz: 5 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40/ac-VHT40 1 for IEEE 802.11ac-VHT80
Maximum conducted output power: (U-NII-1)	10.89 dBm
Antenna Type:	FPC Antenna
Antenna Gain:	1.74dBi
Normal Test Voltage:	13 Vdc

‘

5.1. CHANNEL LIST

UNII-1 (For Bandwidth=20MHz)		UNII-1 (For Bandwidth=40MHz)		UNII-1 (For Bandwidth=80MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				

5.2. MAXIMUM AVERAGE EIRP

UNII-1 BAND

IEEE Std. 802.11	Frequency (MHz)	Maximum Average Conducted Power (dBm)
a	5150 ~ 5250	10.89
n HT20		10.42
n HT40		10.47
ac VHT20		9.33
ac VHT40		8.83
ac VHT80		6.64

5.3. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter	
Test Software	Secure CRT 1.7.6

UNII-1

Mode	Rate	Channel	Soft set value
			ANT 1
11a	6M	36	17
		40	17
		48	17
11n HT20	MCS0	36	17
		40	17
		48	17
11n HT40	MCS0	38	17
		46	17
11ac VHT20	MCS0	36	17
		40	17
		48	17
11ac VHT40	MCS0	38	17
		46	17
11ac VHT80	MCS0	42	17

THE WORSE CASE CONFIGURATIONS

The EUT was tested in the following configuration(s):

Controlled in test mode using a software application on the EUT supplied by customer. The application was used to enable a continuous transmission and to select the mode, test channels, bandwidth, data rates as required.

Test channels referring to section 5.4.

Maximum power setting referring to section 5.6.

Worst case Data Rates declared by the customer:

802.11a 20 mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0
802.11ac VHT20 mode: MCS0
802.11ac VHT40 mode: MCS0
802.11ac VHT80 mode: MCS0

802.11ac VHT20 and VHT40 mode are different from 802.11nHT20 and HT40 only in control messages, so for these 4 modes, only 802.11n HT20 and 802.11n HT40 worst case power modes radiated emission test data are recorded in the report .

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna No.	Frequency Band	Antenna Type	Max Antenna Gain (dBi)
1	5150-5250	FPC	1.74

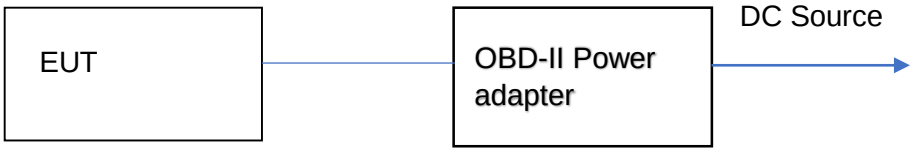
IEE Std. 802.11	Transmit and Receive Mode	Description
802.11a	☒1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
802.11n HT20	☒1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
802.11n HT40	☒1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
802.11ac VHT20	☒1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
802.11ac VHT40	☒1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
802.11ac VHT80	☒1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
Note: 1. WLAN 2.4G & WLAN 5G can’t transmit simultaneously. (declared by client)		

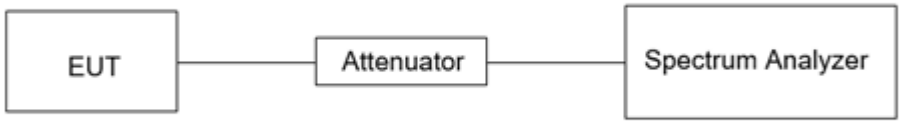
5.5. SUPPORT UNITS FOR SYSTEM TEST

The EUT has been tested as an independent unit

Equipment	Manufacturer	Model No.
OBD-II Power adapter	AONI	A2-OPK-HTVP-007A
PC	Lenovo	T14

5.6. SETUP DIAGRAM





6. MEASURING EQUIPMENT AND SOFTWARE USED

Test Equipment of Conducted RF					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
Spectrum Analyzer	Rohde & Schwarz	FSV40	102257	2022/10/08	2023/10/07
EXG Analog Signal Generator	KEYSIGHT	N5173B	MY61253075	2022/10/08	2023/10/07
Vector Signal Generator	Rohde & Schwarz	SMM100A	101899	2023/03/16	2024/03/15
RF Control box	MWRF-test	MW100-RFCB	MW220926GTG	2022/10/08	2023/10/07
Wideband Radio Communication Tester	Rohde & Schwarz	CMW270	102792	2023/03/16	2024/03/15
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	103235	2022/10/08	2023/10/07
temperature humidity chamber	Espec	SH-241	SH-241-2014	2022/10/08	2023/10/07
RF Test Software	MWRF-test	MTS8310E (Ver. V2/0)	N/A	N/A	N/A

Test Equipment of Radiated emissions below 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
3m Semi-anechoic Chamber	ETS	9m*6m*6m	Q2146	2022/08/30	2025/08/29
EMI Test Receiver	Rohde & Schwarz	ESCI3	101409	2022/10/08	2023/10/07
Pre-Amplifier	HzEMC	HPA-9K0130	HYPA21001	2022/10/29	2023/10/28
Biconilog Antenna	Schwarzbeck	VULB 9168	01315	2022/10/10	2025/10/09
Biconilog Antenna	ETS	3142E	00243646	2022/03/23	2025/03/22
Loop Antenna	ETS	6502	243668	2022/03/30	2025/03/29
Test Software	Farad	EZ-EMC (Ver.FA-03A2 RE)	N/A	N/A	N/A

Test Equipment of Radiated emissions above 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
3m Semi-anechoic Chamber	ETS	9m*6m*6m	Q2149	2022/08/30	2025/08/29
Spectrum Analyzer	Rohde & Schwarz	FSV40	101413	2022/10/08	2023/10/07
Pre-Amplifier	A-INFO	HPA-1G1850	HYPA21003	2022/10/29	2023/10/28
Horn antenna	A-INFO	3117	246069	2022/03/11	2023/03/10
Pre-Amplifier	ZKJC	HPA-184057	HYPA21004	2022/10/29	2023/10/28
Horn antenna	ZKJC	3116C	246265	2022/03/29	2023/03/28

Test Software	Farad	EZ-EMC (Ver.FA-03A2 RE+)	N/A	N/A	N/A

7. ANTENNA PORT TEST RESULTS

7.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.B.

The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ EBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T, where T is defined in II.B.1.a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

TEST ENVIRONMENT

Temperature	24℃	Relative Humidity	55%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix

7.2. 6DB AND 26DB EMISSION BANDWIDTH AND 99% OCCUPIED BANDWIDTH

LIMITS

CFR 47 FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
26 dB Emission Bandwidth	For reporting purposes only.	5150 ~ 5250
26 dB Emission Bandwidth	For reporting purposes only.	5250 ~ 5350
26 dB Emission Bandwidth	For reporting purposes only.	5470 ~ 5725
6 dB Emission Bandwidth	The minimum 6 dB emission bandwidth shall be 500 kHz.	5725 ~ 5850
99 % Occupied Bandwidth	For reporting purposes only.	5150 ~ 5825

TEST PROCEDURE

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.C1. for 26 dB Emission Bandwidth; section II.C2. for 6 dB Emission Bandwidth; section II.D. for 99 % Occupied Bandwidth.
Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	For 6 dB Emission Bandwidth: RBW=100 kHz For 26 dB Emission bandwidth: approximately 1 % of the EBW. For 99 % Occupied Bandwidth: approximately 1 % ~ 5 % of the OBW.
VBW	For 6 dB Bandwidth: ≥ 3*RBW For 26 dB Bandwidth: >3*RBW For 99 % Bandwidth: >3*RBW
Trace	Max hold
Sweep	Auto couple

a) Use the 99 % power bandwidth function of the instrument, allow the trace to stabilize and report the measured bandwidth.
b) Allow the trace to stabilize and 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 6/26 dB relative to the maximum level measured in the fundamental emission.

Calculation for 99 % Bandwidth of UNII-2C and UNII-3 Straddle Channel:

For Example: Fundamental Frequency: 5720 MHz

99 % OBW: 21.00 MHz

Turning Frequency: 5725 MHz

99 % Bandwidth of UNII-2C Band Portion = (5725-(5720-(21.00/2)) = 15.50 MHz

99 % Bandwidth of UNII-3 Band Portion = (5720+(21.00/2)-5725) = 5.50 MHz

Calculation for 26 dB Bandwidth of UNII-2C Straddle Channel:

For Example: Fundamental frequency: 5720 MHz

26 dB BW: 20.00 MHz

FL: 5710.16 MHz

FH: 5730.16 MHz

Turning Frequency: 5725 MHz

26 dB Bandwidth of UNII-2C Band Portion = 5725-5710.16=14.84 MHz

Calculation for 6dB Bandwidth of UNII-3 Straddle Channel:

For Example: Fundamental frequency: 5720 MHz

6 dB BW: 16.44 MHz

FL: 5711.76 MHz

FH: 5728.2 MHz

Turning Frequency: 5725 MHz

6 dB Bandwidth of UNII-3 band Portion = 5728.2-5725=3.2 MHz

TEST ENVIRONMENT

Temperature	24℃	Relative Humidity	55%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix

7.3. CONDUCTED OUTPUT POWER

LIMITS

CFR 47 FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	☐ Outdoor Access Point: 1 W (30 dBm) ☐ Indoor Access Point: 1 W (30 dBm) ☐ Fixed Point-To-Point Access Points: 1 W (30 dBm) ☒ Client Devices: 250 mW (24 dBm)	5150 ~ 5250
	Shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.	5250 ~ 5350 5470 ~ 5725
	Shall not exceed 1 Watt (30 dBm).	5725 ~ 5850

Note:
The above limits are based upon the maximum antenna gain does not exceed 6 dBi.
If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.E.

Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep):
(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(ii) Set RBW = 1 MHz.
(iii) Set VBW ≥ 3 MHz.
(iv) Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
(v) Sweep time = auto.
(vi) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
(vii) If transmit duty cycle < 98 %, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 %, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run.”
(viii) Trace average at least 100 traces in power averaging (rms) mode.
(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

Method PM (Measurement using an RF average power meter):
(i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:
a. The EUT is configured to transmit continuously or to transmit with a constant duty cycle.

b. At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
c. The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
(ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in II.B.
(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
(iv) Adjust the measurement in dBm by adding 10 log (1/x) where x is the duty cycle (e.g., 10 log (1/0.25) if the duty cycle is 25 %).

Method PM-G (Measurement using a gated RF average power meter):
Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

Straddle channel power was measured using spectrum analyzer.

TEST ENVIRONMENT

Temperature	24℃	Relative Humidity	55%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix

7.4. POWER SPECTRAL DENSITY

LIMITS

CFR 47 FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	☐ Outdoor Access Point: 17 dBm/MHz ☐ Indoor Access Point: 17 dBm/MHz ☐ Fixed Point-To-Point Access Points: 17 dBm/MHz ☒ Client Devices: 11 dBm/MHz	5150 ~ 5250
	11 dBm/MHz	5250 ~ 5350 5470 ~ 5725
	30 dBm/500kHz	5725 ~ 5850

Note:
The above limits are based upon the maximum antenna gain does not exceed 6 dBi.
If transmitting antennas of directional gain greater than 6 dBi are used, maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.F.

Connect the EUT to the spectrum analyser and use the following settings:

For U-NII-1, U-NII-2A and U-NII-2C band:

Center Frequency	The center frequency of the channel under test
Detector	RMS
RBW	1 MHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

For U-NII-3:

Center Frequency	The center frequency of the channel under test
Detector	RMS
RBW	500 kHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

Allow trace to fully stabilize and Use the peak search function on the instrument to find the peak of the spectrum and record its value.

Add 10 log (1/x), where x is the duty cycle, to the peak of the spectrum, the result is the Maximum PSD over 1 MHz / 500 kHz reference bandwidth.

TEST ENVIRONMENT

Temperature	24℃	Relative Humidity	55%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix

7.5. FREQUENCY STABILITY

LIMITS

The frequency of the carrier signal shall be maintained within band of operation.

TEST PROCEDURE

1. The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -10 °C ~ 50 °C (declared by customer).

2. The temperature was incremented by 10 °C intervals and the unit allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.

3. The primary supply voltage is varied from 85 % to 115 % of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Connect the EUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	10 kHz
VBW	≥3 × RBW
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

4. While maintaining a constant temperature inside the environmental chamber, turn the EUT on and record the operating frequency at startup, and at 2 minutes, 5minutes, and 10 minutes after the EUT is energized.

5. Allow the trace to stabilize, find the peak value of the power envelope and record the frequency, then calculated the frequency drift.

TEST ENVIRONMENT

	Normal Test Conditions	Extreme Test Conditions
Relative Humidity	20 % - 75 %	/
Atmospheric Pressure	100 kPa ~102 kPa	/
Temperature	T_N (Normal Temperature): 25.1 °C	T_L (Low Temperature): -10 °C
		T_H (High Temperature): 50 °C
Supply Voltage	V_N (Normal Voltage): DC 13 V	V_L (Low Voltage): DC 11.05 V
		V_H (High Voltage): DC 14.95 V

TEST ENVIRONMENT

Temperature	24℃	Relative Humidity	55%
Atmosphere Pressure	101kPa		

TEST RESULTS

Please refer to section "Test Data" - Appendix

8. RADIATED TEST RESULTS

LIMITS

Refer to CFR 47 FCC §15.205, §15.209 and §15.407 (b).

Radiation Disturbance Test Limit for FCC (Class B) (9 kHz ~ 1 GHz)

Emissions radiated outside of the specified frequency bands above 30 MHz			
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m	
		Quasi-Peak	
30 - 88	100	40	
88 - 216	150	43.5	
216 - 960	200	46	
Above 960	500	54	
Above 1000	500	Peak	Average
		74	54

FCC Emissions radiated outside of the specified frequency bands below 30 MHz		
Frequency (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

FCC Restricted bands of operation refer to FCC §15.205 (a):

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]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	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	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			

Note: [1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2]Above 38.6c

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1GHz)		
Frequency Range (MHz)	EIRP Limit	Field Strength Limit (dBuV/m) at 3 m
5150~5250 MHz	PK: -27 (dBm/MHz)	PK:68.2(dBμV/m)
5250~5350 MHz		
5470~5725 MHz		
5725~5850 MHz	PK: -27 (dBm/MHz) *1 PK: 10 (dBm/MHz) *2 PK: 15.6 (dBm/MHz) *3 PK: 27 (dBm/MHz) *4	PK: 68.2(dBμV/m) *1 PK: 105.2 (dBμV/m) *2 PK: 110.8(dBμV/m) *3 PK: 122.2 (dBμV/m) *4
Note: *1 beyond 75 MHz or more above of the band edge. *2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. *3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. *4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.		

TEST PROCEDURE

Below 30 MHz

The setting of the spectrum analyser

RBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
VBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
Sweep	Auto

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.4.

2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1 m height antenna tower.

5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

6. For measurement below 1 GHz, 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 and average detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak and average detector and reported.

7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KDB 414788.

8. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω. For example, the measurement frequency X KHz resulted in a level of Y dBuV/m, which is equivalent to Y-51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

Below 1 GHz and above 30 MHz

The setting of the spectrum analyser

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.5.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement below 1 GHz, 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 emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

Above 1 GHz

The setting of the spectrum analyser

RBW	1 MHz
VBW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.G.3 ~ II.G.6.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

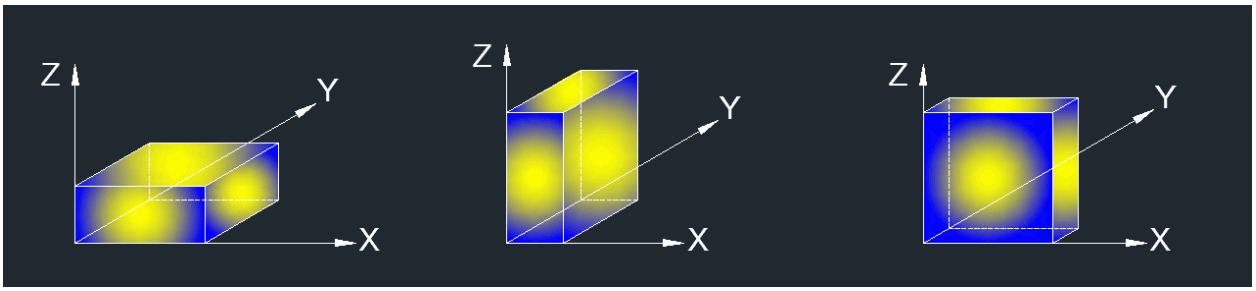
3. The EUT was placed on a turntable with 1.5 m above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1 GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

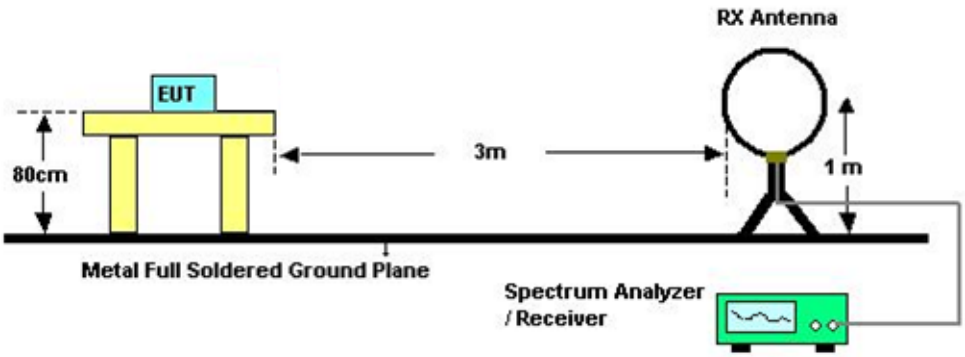
6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 7.1.ON TIME AND DUTY CYCLE.

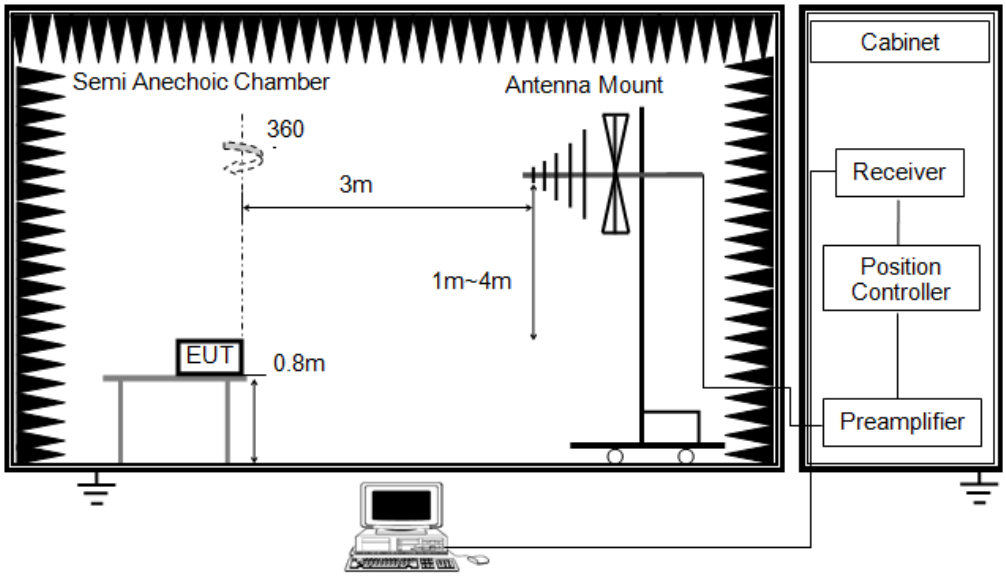
X axis, Y axis, Z axis positions:

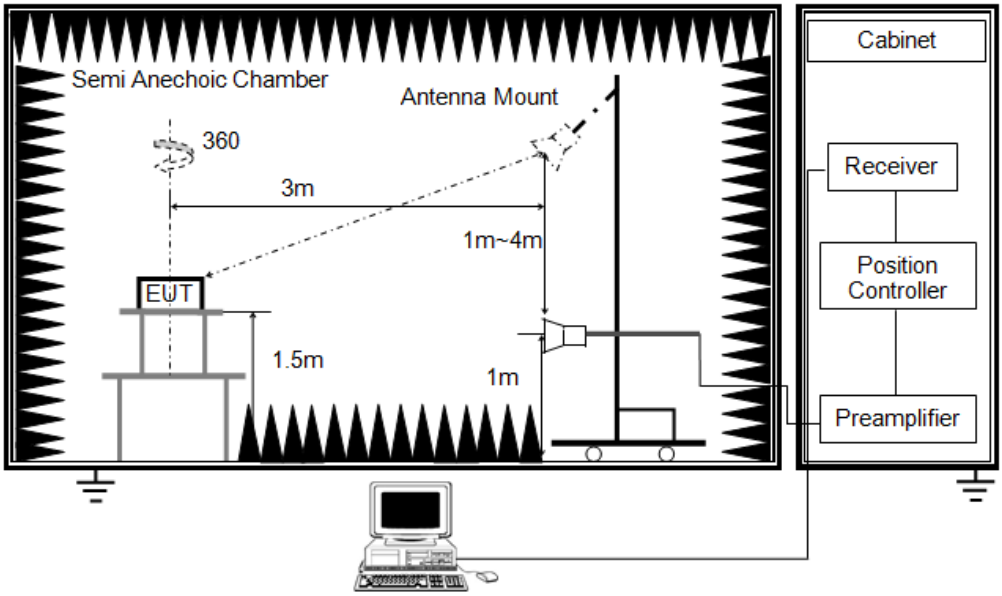


Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

TEST SETUP


RX Antenna
EUT
80cm
3m
1 m
Metal Full Soldered Ground Plane
Spectrum Analyzer
/ Receiver


Semi Anechoic Chamber
Antenna Mount
360
3m
1m~4m
EUT
0.8m
Cabinet
Receiver
Position
Controller
Preamplifier


Semi Anechoic Chamber
Antenna Mount
360
3m
1m~4m
EUT
1.5m
1m
Cabinet
Receiver
Position
Controller
Preamplifier

TEST ENVIRONMENT

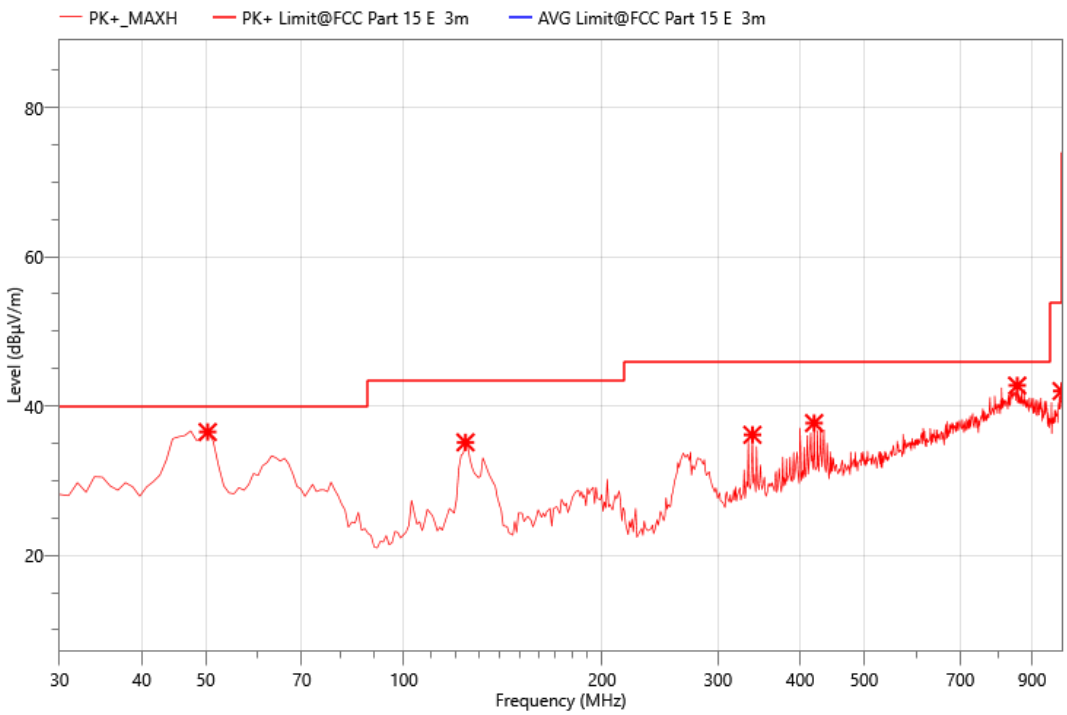
Temperature	24℃	Relative Humidity	55%
Atmosphere Pressure	101kPa		

TEST RESULTS

Radiated Spurious Emission :

The worst result as bellow:

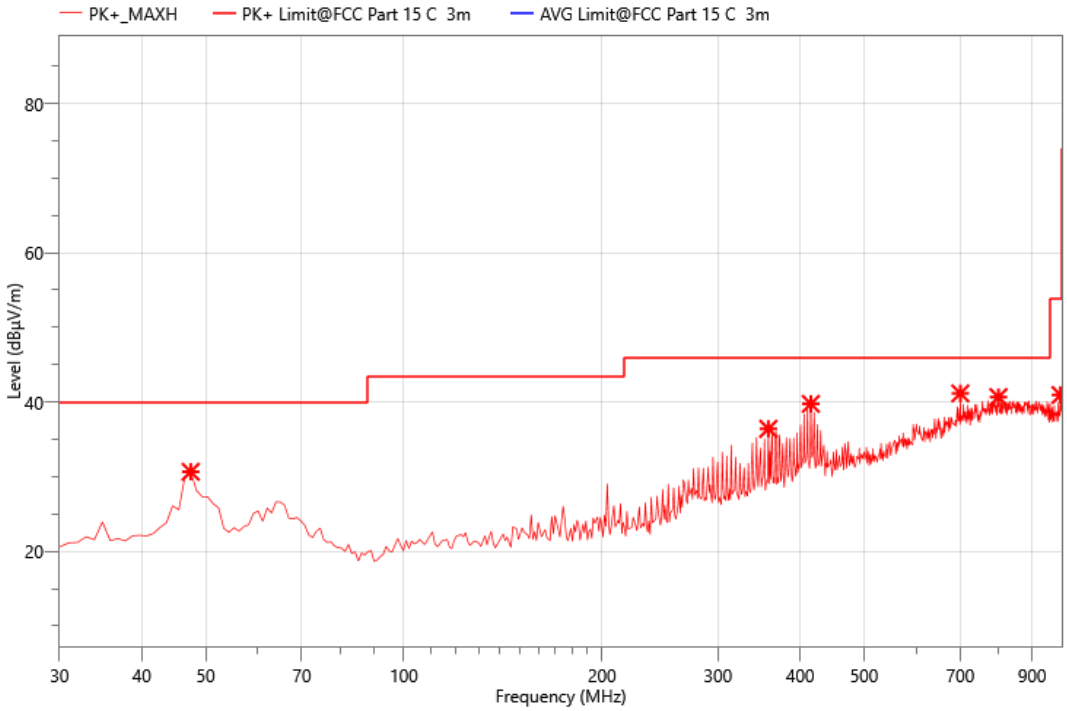
Mode:	5.1G a 5180
Power:	DC 5V
TE:	Vier
Date	2023/9/4
T/A/P	24.3□/54%/101Kpa



Critical_Freqs

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	50.370	40.11	36.52	40.00	3.48	PK+	V	-3.59
2	124.090	40.89	35.14	43.50	8.36	PK+	V	-5.75
3	338.460	35.56	36.15	46.00	9.85	PK+	V	0.59
4	419.940	34.27	37.72	46.00	8.28	PK+	V	3.45
5	854.500	29.70	42.75	46.00	3.25	PK+	V	13.05
6	998.060	30.20	42.01	53.90	11.89	PK+	V	11.81

Mode:	5.1G a 5180
Power:	DC 5V
TE:	Vier
Date	2023/9/4
T/A/P	24.3□/54%/101Kpa



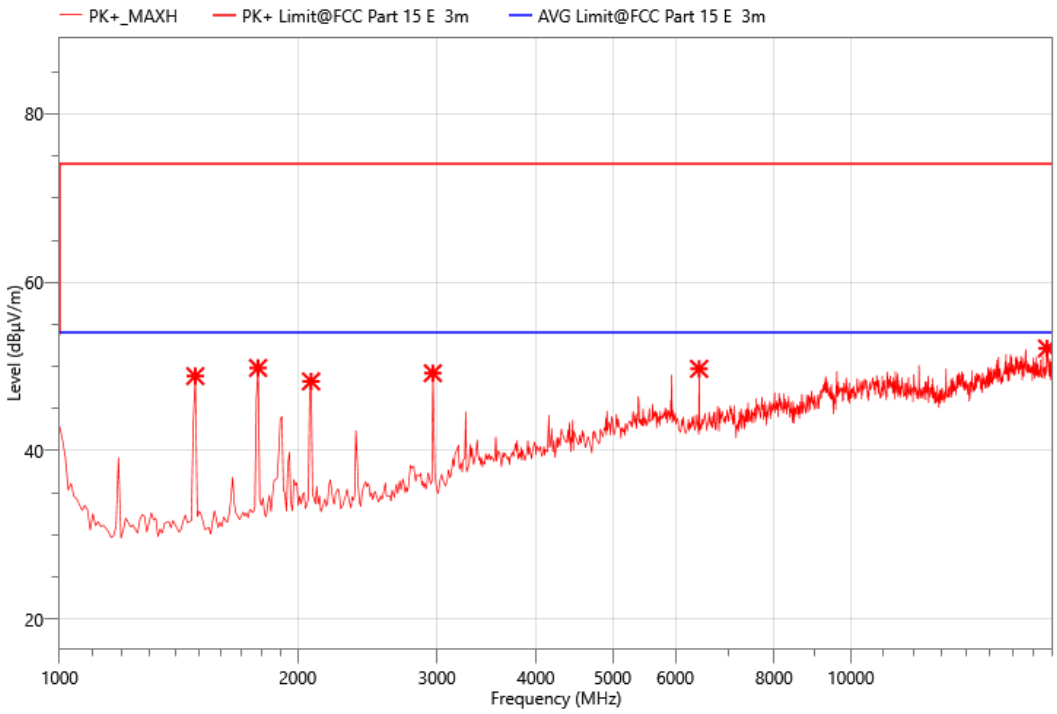
Critical_Freqs

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	47.460	34.67	30.66	40.00	9.34	PK+	H	-4.01
2	357.860	35.18	36.41	46.00	9.59	PK+	H	1.23
3	415.090	36.44	39.76	46.00	6.24	PK+	H	3.32
4	700.270	31.15	41.16	46.00	4.84	PK+	H	10.01
5	800.180	27.80	40.67	46.00	5.33	PK+	H	12.87
6	994.180	29.18	40.94	53.90	12.96	PK+	H	11.76

Note: 1. Result Level = Read Level+ Antenna Factor+ Cable Loss- Amp. Factor

Above 1000MHz~10th Harmonics:

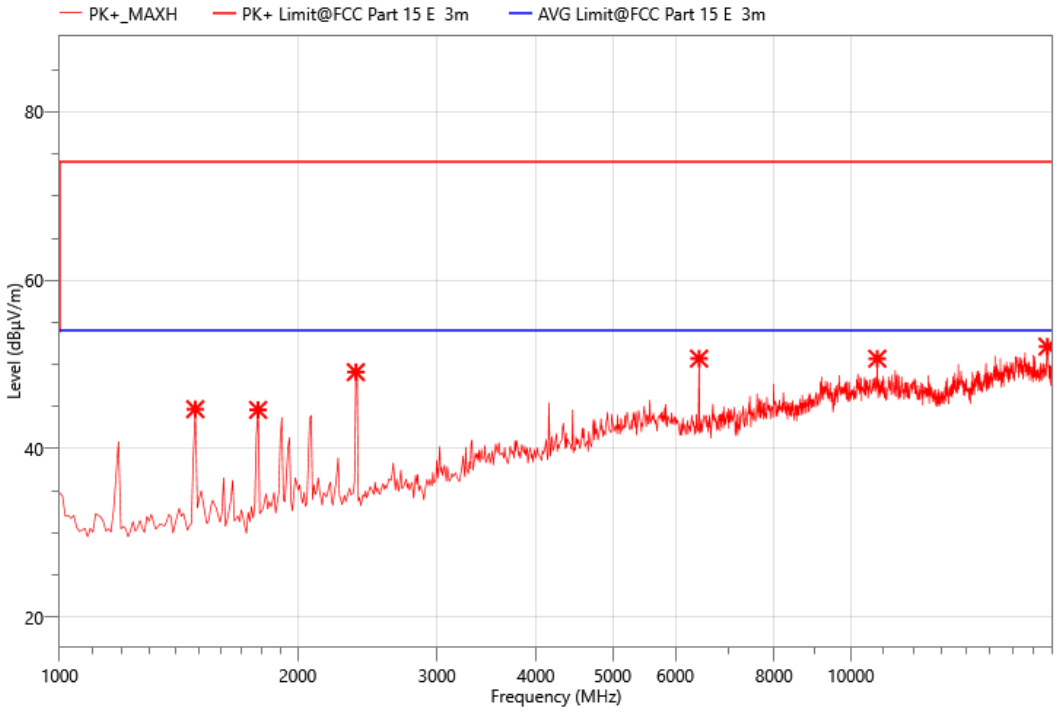
Mode:	5.1G a 5180
Power:	DC 5V
TE:	Vier
Date	2023/9/4
T/A/P	24.3□/54%/101Kpa



Critical_Freqs

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	1484.500	74.74	48.86	74.00	25.14	PK+	H	-25.88
2	1782.000	73.73	49.83	74.00	24.17	PK+	H	-23.9
3	2079.500	70.19	48.23	74.00	25.77	PK+	H	-21.96
4	2963.500	67.00	49.21	74.00	24.79	PK+	H	-17.79
5	6431.500	54.57	49.72	74.00	24.28	PK+	H	-4.85
6	17702.500	47.56	52.15	74.00	21.85	PK+	H	4.59

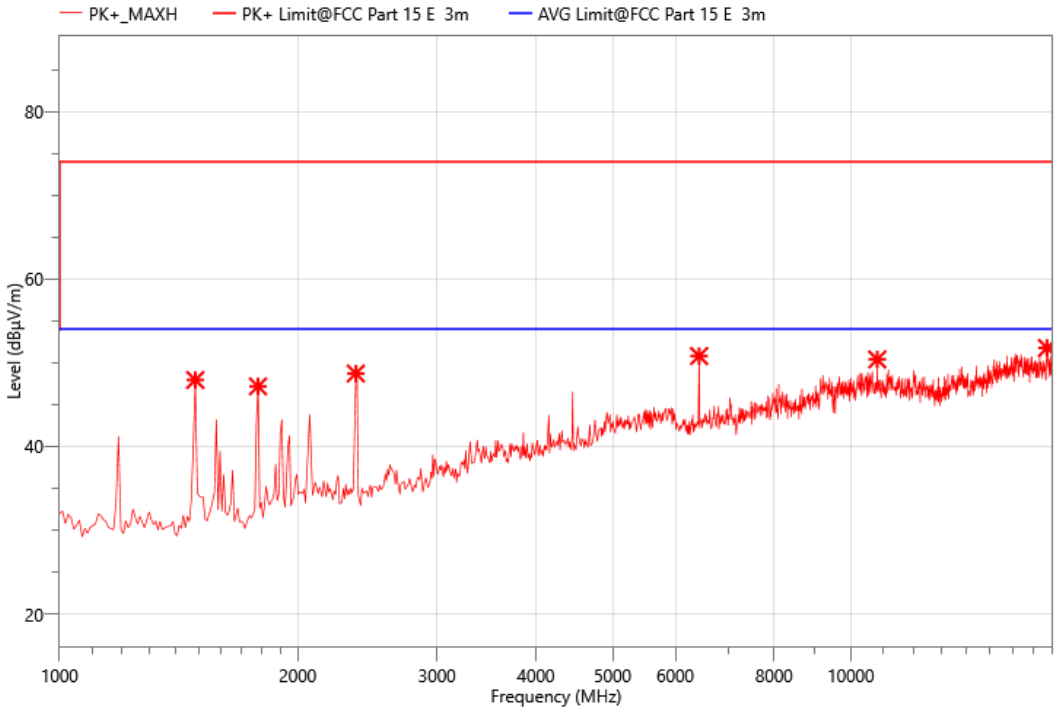
Mode:	5.1G a 5180
Power:	DC 5V
TE:	Vier
Date	2023/9/4
T/A/P	24.3□/54%/101Kpa



Critical_Freqs

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	1484.500	70.57	44.69	74.00	29.31	PK+	V	-25.88
2	1782.000	68.51	44.61	74.00	29.39	PK+	V	-23.9
3	2368.500	69.82	49.09	74.00	24.91	PK+	V	-20.73
4	6431.500	55.55	50.70	74.00	23.30	PK+	V	-4.85
5	10800.500	51.02	50.69	74.00	23.31	PK+	V	-0.33
6	17728.000	46.95	52.13	74.00	21.87	PK+	V	5.18

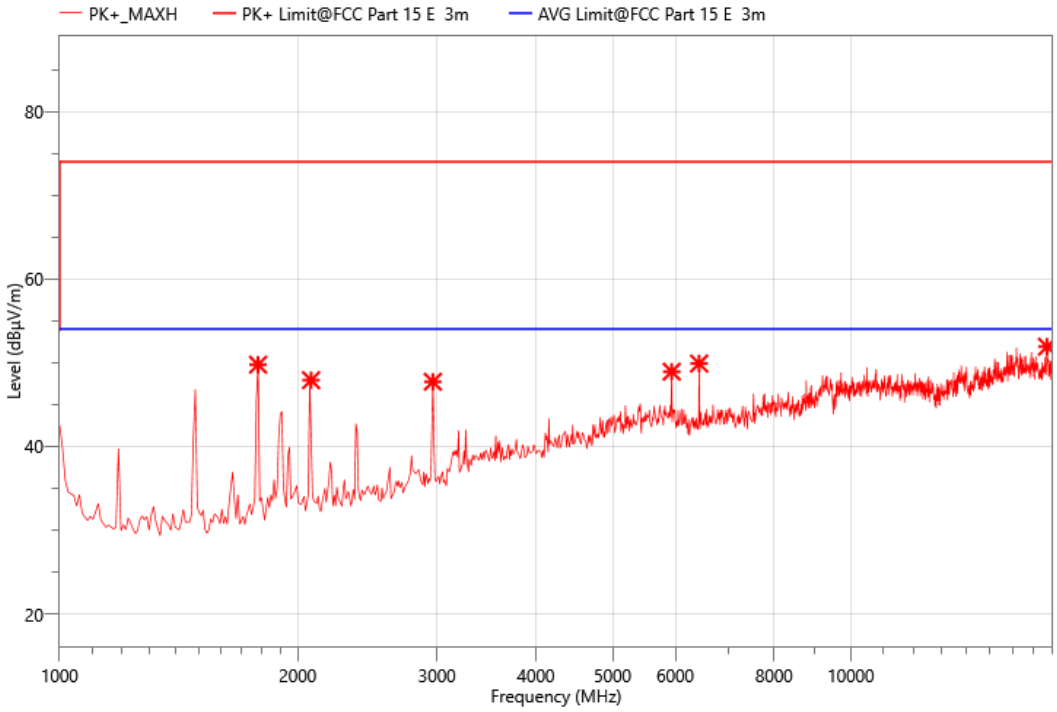
Mode:	5.1G a 5200
Power:	DC 5V
TE:	Vier
Date	2023/9/4
T/A/P	24.3□/54%/101Kpa



Critical_Freqs

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	1484.500	73.83	47.95	74.00	26.05	PK+	V	-25.88
2	1782.000	71.09	47.19	74.00	26.81	PK+	V	-23.9
3	2368.500	69.46	48.73	74.00	25.27	PK+	V	-20.73
4	6431.500	55.66	50.81	74.00	23.19	PK+	V	-4.85
5	10800.500	50.73	50.40	74.00	23.60	PK+	V	-0.33
6	17702.500	47.19	51.78	74.00	22.22	PK+	V	4.59

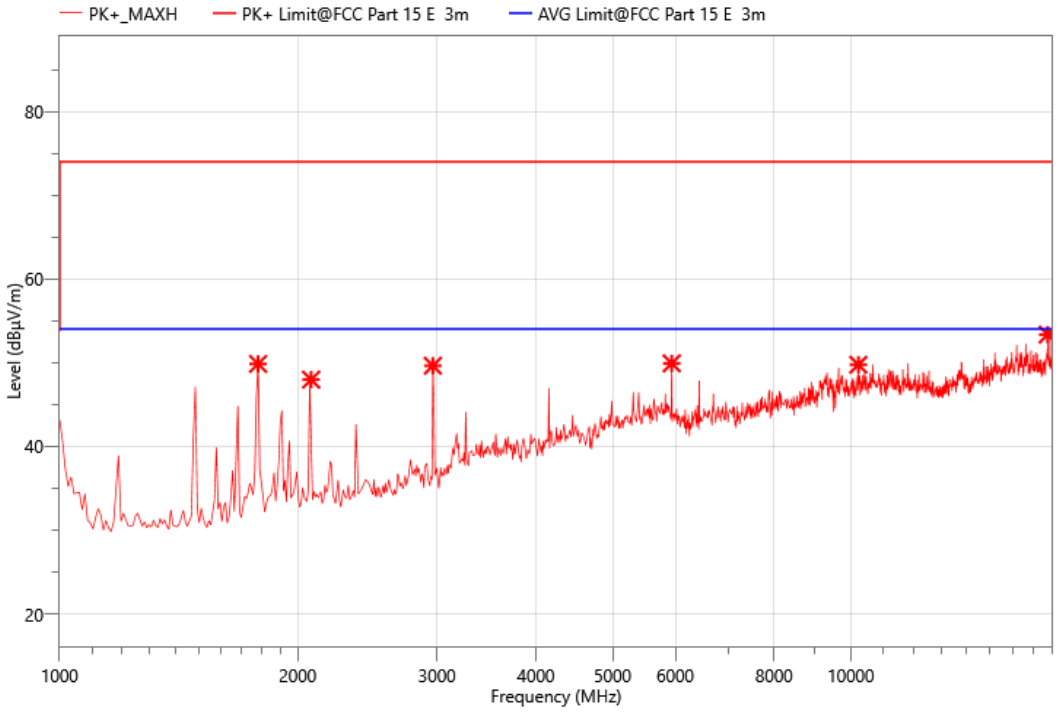
Mode:	5.1G a 5200
Power:	DC 5V
TE:	Vier
Date	2023/9/4
T/A/P	24.3□/54%/101Kpa



Critical_Freqs

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	1782.000	73.68	49.78	74.00	24.22	PK+	H	-23.9
2	2079.500	69.89	47.93	74.00	26.07	PK+	H	-21.96
3	2963.500	65.53	47.74	74.00	26.26	PK+	H	-17.79
4	5938.500	54.08	48.94	74.00	25.06	PK+	H	-5.14
5	6431.500	54.77	49.92	74.00	24.08	PK+	H	-4.85
6	17702.500	47.34	51.93	74.00	22.07	PK+	H	4.59

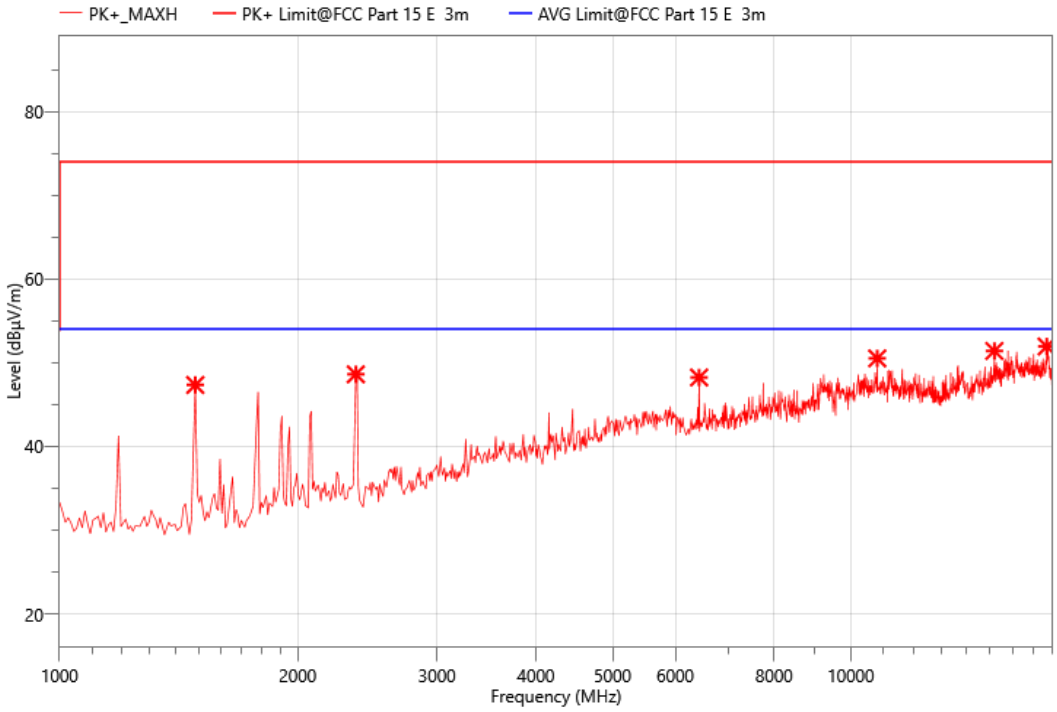
Mode:	5.1G a 5240
Power:	DC 5V
TE:	Vier
Date	2023/9/4
T/A/P	24.3□/54%/101Kpa



Critical_Freqs

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	1782.000	73.77	49.87	74.00	24.13	PK+	H	-23.9
2	2079.500	69.95	47.99	74.00	26.01	PK+	H	-21.96
3	2963.500	67.45	49.66	74.00	24.34	PK+	H	-17.79
4	5938.500	55.08	49.94	74.00	24.06	PK+	H	-5.14
5	10222.500	50.40	49.77	74.00	24.23	PK+	H	-0.63
6	17736.500	48.10	53.38	74.00	20.62	PK+	H	5.28

Mode:	5.1G a 5240
Power:	DC 5V
TE:	Vier
Date	2023/9/4
T/A/P	24.3□/54%/101Kpa



Critical_Freqs

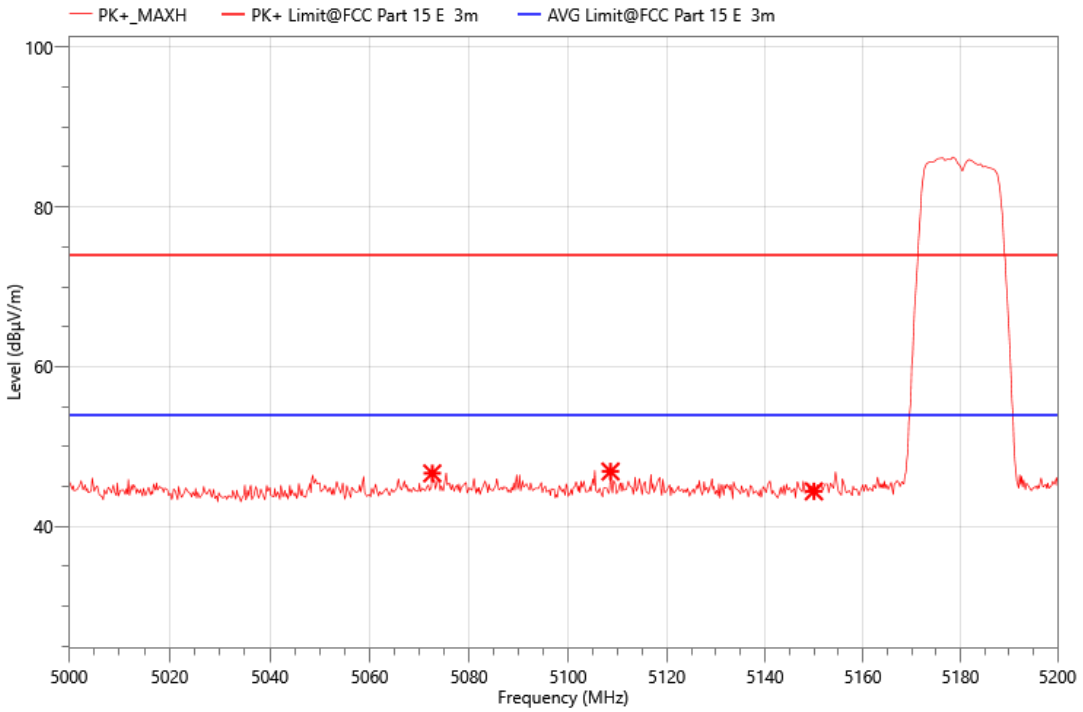
No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	1484.500	73.24	47.36	74.00	26.64	PK+	V	-25.88
2	2368.500	69.36	48.63	74.00	25.37	PK+	V	-20.73
3	6431.500	53.10	48.25	74.00	25.75	PK+	V	-4.85
4	10800.500	50.86	50.53	74.00	23.47	PK+	V	-0.33
5	15186.500	48.72	51.42	74.00	22.58	PK+	V	2.7
6	17685.500	47.35	51.95	74.00	22.05	PK+	V	4.6

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.
(4) Measuring frequencies from 1GHz to 25GHz.

Band edge:

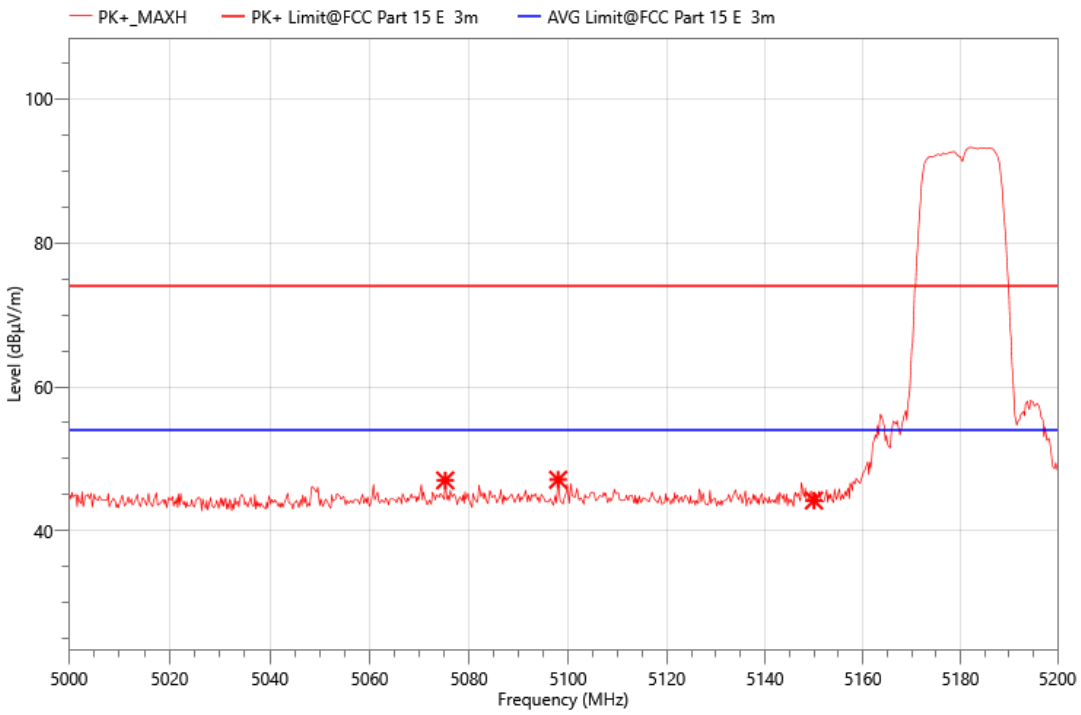
Mode:	5.1G a 5180
Power:	DC 5V
TE:	Vier
Date	2023/9/4
T/A/P	24.3□/54%/101Kpa



Critical_Freqs

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	5072.600	54.90	46.66	74.00	27.34	PK+	H	-8.24
2	5108.600	54.71	46.89	74.00	27.11	PK+	H	-7.82
3	5150.000	52.64	44.41	74.00	29.59	PK+	H	-8.23

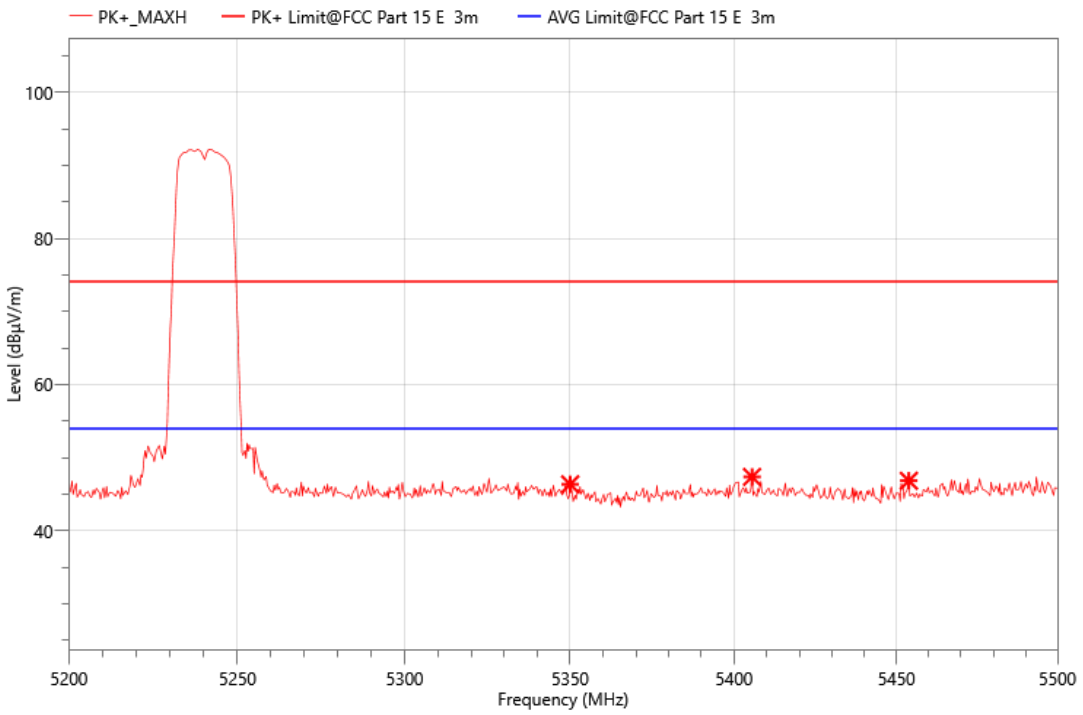
Mode:	5.1G a 5180
Power:	DC 5V
TE:	Vier
Date	2023/9/4
T/A/P	24.3□/54%/101Kpa



Critical_Freqs

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	5075.200	55.21	47.01	74.00	26.99	PK+	V	-8.2
2	5098.000	54.96	47.10	74.00	26.90	PK+	V	-7.86
3	5150.000	52.44	44.21	74.00	29.79	PK+	V	-8.23

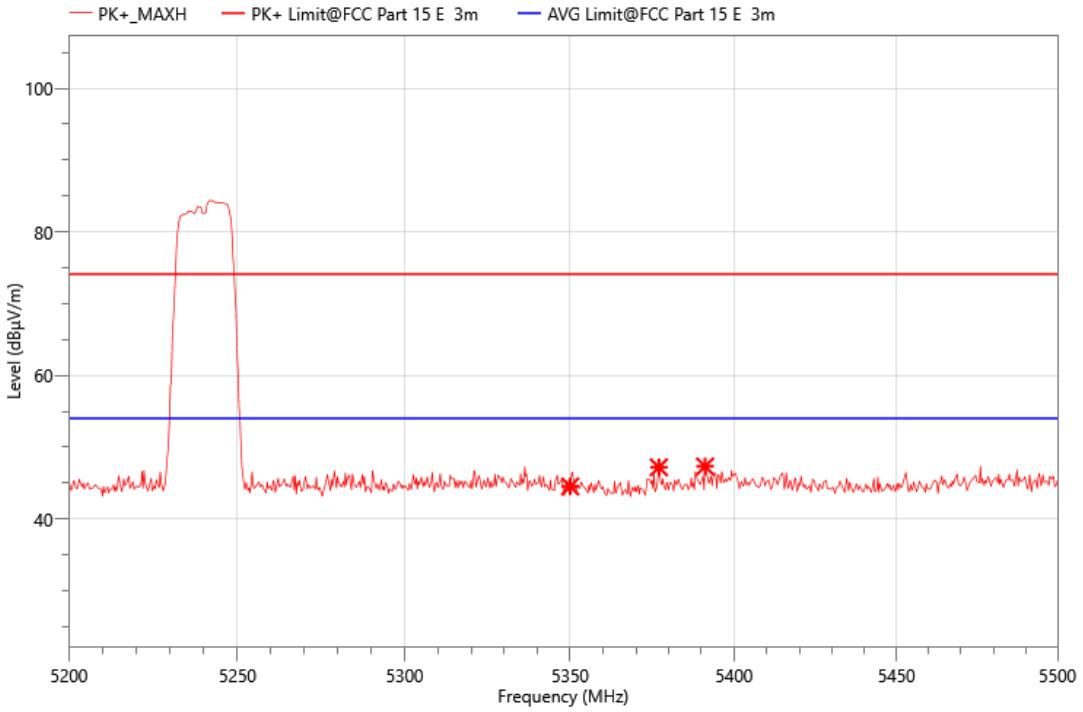
Mode:	5.1G a 5240
Power:	DC 5V
TE:	Vier
Date	2023/9/4
T/A/P	24.3□/54%/101Kpa



Critical_Freqs

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	5350.000	53.86	46.36	74.00	27.64	PK+	V	-7.5
2	5405.500	54.90	47.37	74.00	26.63	PK+	V	-7.53
3	5453.800	54.09	46.84	74.00	27.16	PK+	V	-7.25

Mode:	5.1G a 5240
Power:	DC 5V
TE:	Vier
Date	2023/9/4
T/A/P	24.3□/54%/101Kpa



Critical_Freqs

No.	Freq. (MHz)	Reading (dBµV)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.	Corr. (dB)
1	5350.000	52.02	44.52	74.00	29.48	PK+	H	-7.5
2	5377.000	54.73	47.19	74.00	26.81	PK+	H	-7.54
3	5391.100	54.87	47.32	74.00	26.68	PK+	H	-7.55

9. ANTENNA REQUIREMENT

REQUIREMENT

Standard	Requirement
FCC CRF Part 15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna Sunshine or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

DESCRIPTION

Pass

10. TEST DATA

Duty Cycle

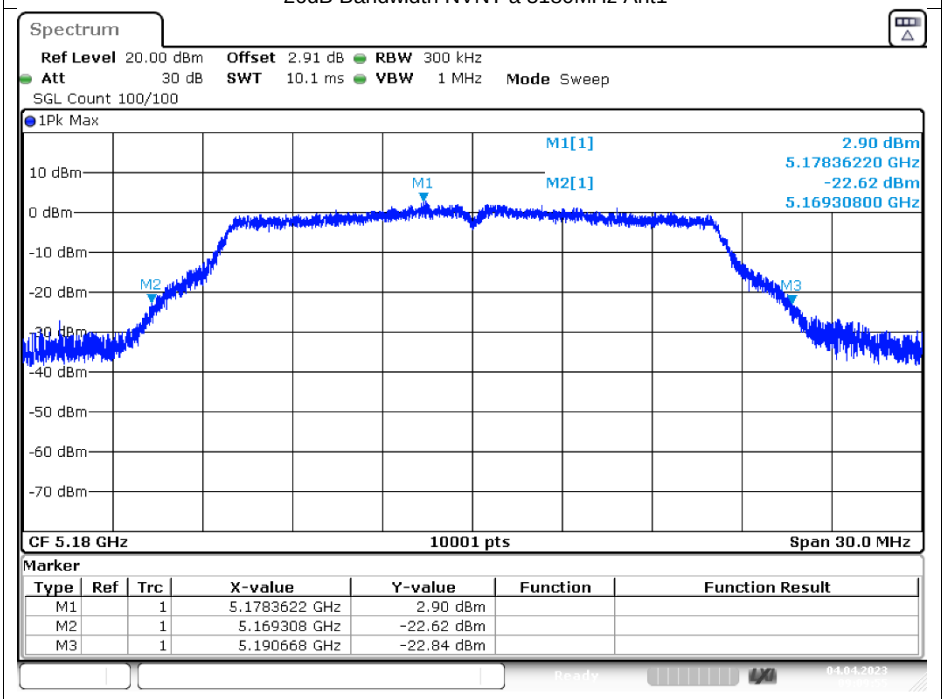
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5180	Ant1	93.46	0.29	0.7
NVNT	a	5200	Ant1	93.46	0.29	0.7
NVNT	a	5240	Ant1	93.46	0.29	0.7
NVNT	n20	5180	Ant1	93.11	0.31	0.75
NVNT	n20	5200	Ant1	93.11	0.31	0.75
NVNT	n20	5240	Ant1	93.05	0.31	0.75
NVNT	n40	5190	Ant1	87.21	0.59	1.5
NVNT	n40	5230	Ant1	87.19	0.6	1.5
NVNT	ac20	5180	Ant1	93.08	0.31	0.74
NVNT	ac20	5200	Ant1	93.08	0.31	0.74
NVNT	ac20	5240	Ant1	93.08	0.31	0.74
NVNT	ac40	5190	Ant1	87.39	0.59	1.49
NVNT	ac40	5230	Ant1	87.27	0.59	1.49
NVNT	ac80	5210	Ant1	77.42	1.11	2.98

-26dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-26 dB Bandwidth (MHz)	Limit -26 dB Bandwidth (MHz)	Verdict
NVNT	a	5180	Ant1	21.36	0.5	Pass
NVNT	a	5200	Ant1	21.45	0.5	Pass
NVNT	a	5240	Ant1	21.477	0.5	Pass
NVNT	n20	5180	Ant1	22.626	0.5	Pass
NVNT	n20	5200	Ant1	21.972	0.5	Pass
NVNT	n20	5240	Ant1	21.651	0.5	Pass
NVNT	n40	5190	Ant1	43.806	0.5	Pass
NVNT	n40	5230	Ant1	43.716	0.5	Pass
NVNT	ac20	5180	Ant1	21.84	0.5	Pass
NVNT	ac20	5200	Ant1	21.717	0.5	Pass
NVNT	ac20	5240	Ant1	21.477	0.5	Pass
NVNT	ac40	5190	Ant1	39.648	0.5	Pass
NVNT	ac40	5230	Ant1	39.594	0.5	Pass
NVNT	ac80	5210	Ant1	79.872	0.5	Pass

Test Graphs

-26dB Bandwidth NVNT a 5180MHz Ant1

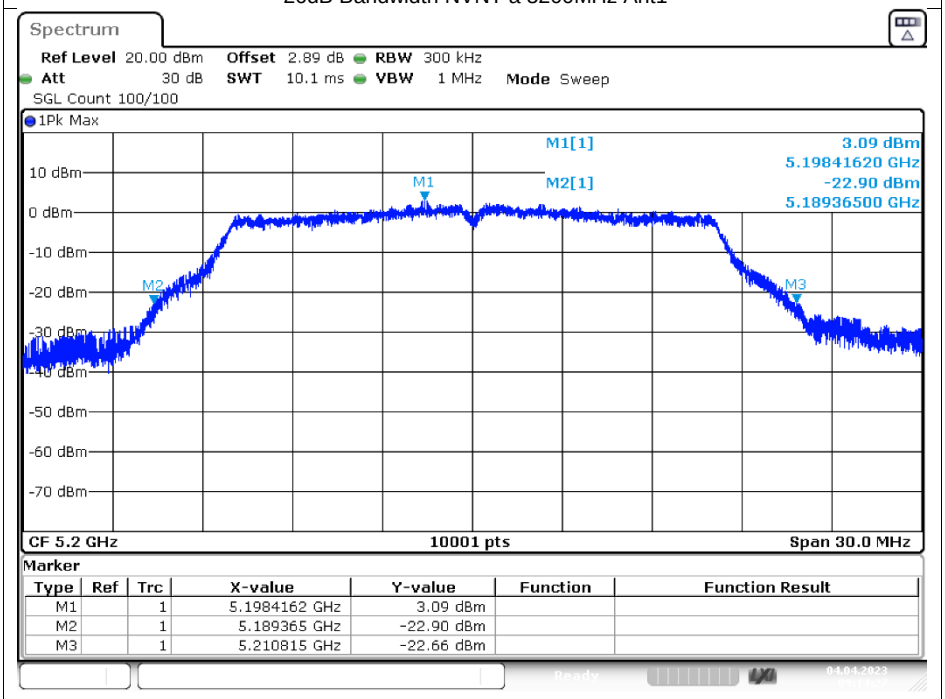


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.1783622 GHz	2.90 dBm		
M2		1	5.169308 GHz	-22.62 dBm		
M3		1	5.190668 GHz	-22.84 dBm		

Date: 4.APR.2023 09:09:55

-26dB Bandwidth NVNT a 5200MHz Ant1

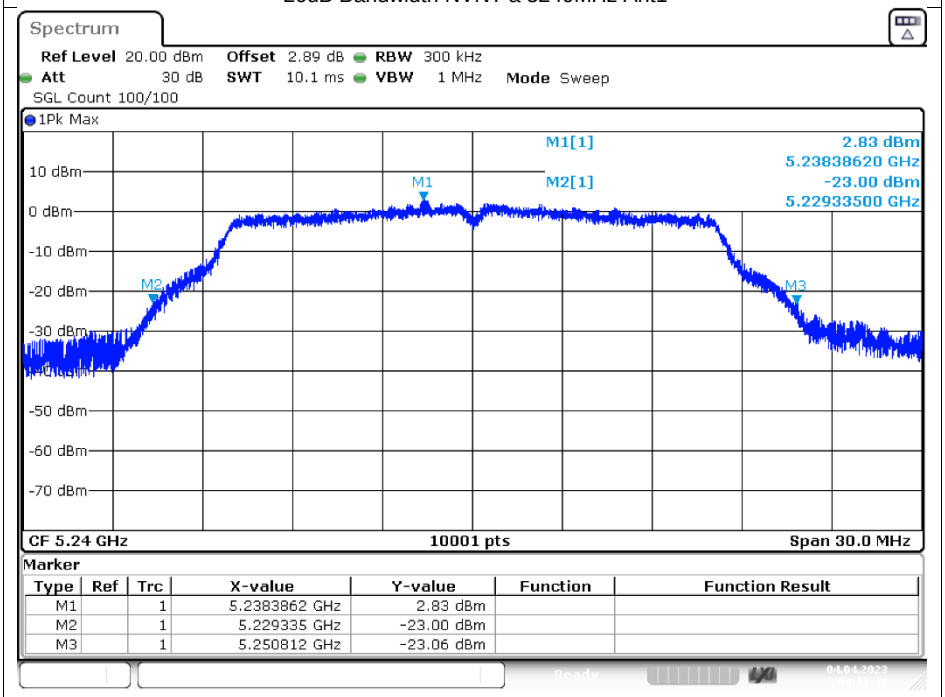


Marker

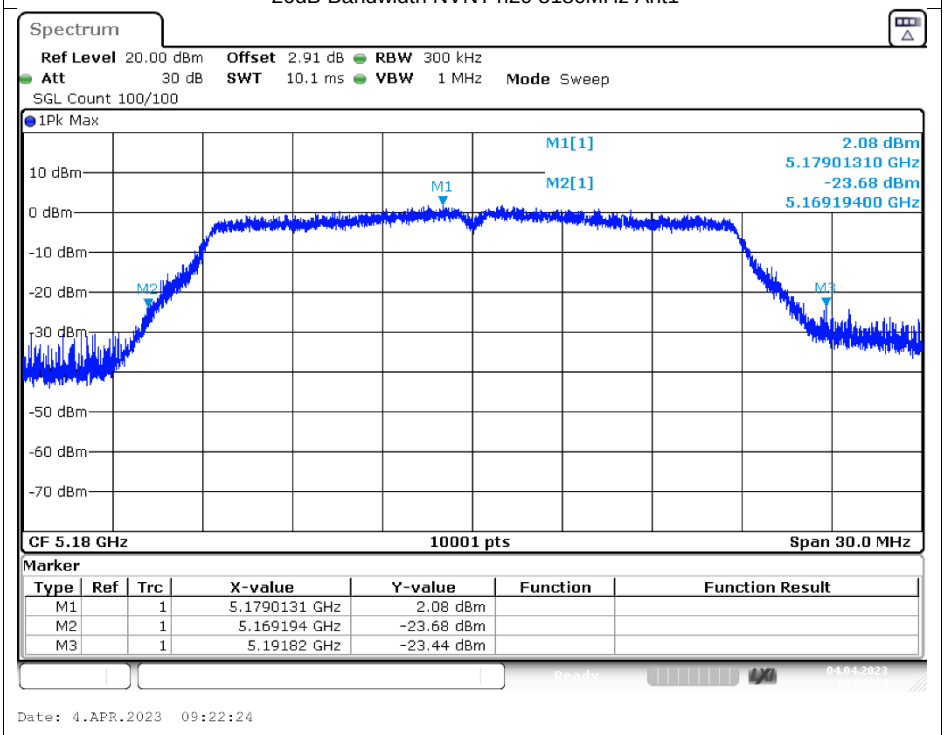
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.1984162 GHz	3.09 dBm		
M2		1	5.189365 GHz	-22.90 dBm		
M3		1	5.210815 GHz	-22.66 dBm		

Date: 4.APR.2023 09:14:27

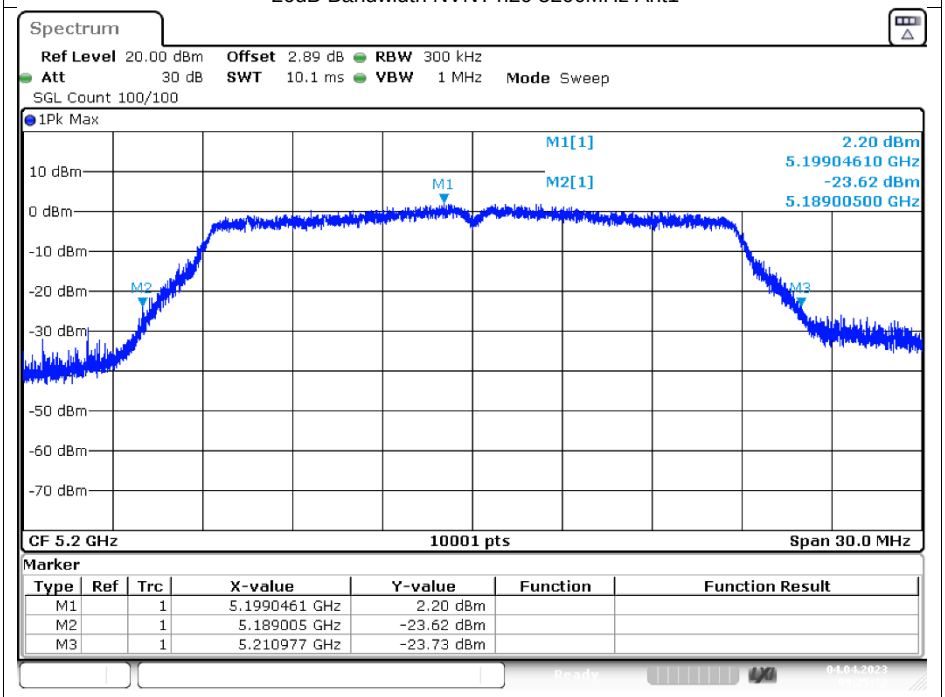
-26dB Bandwidth NVNT a 5240MHz Ant1



-26dB Bandwidth NVNT n20 5180MHz Ant1

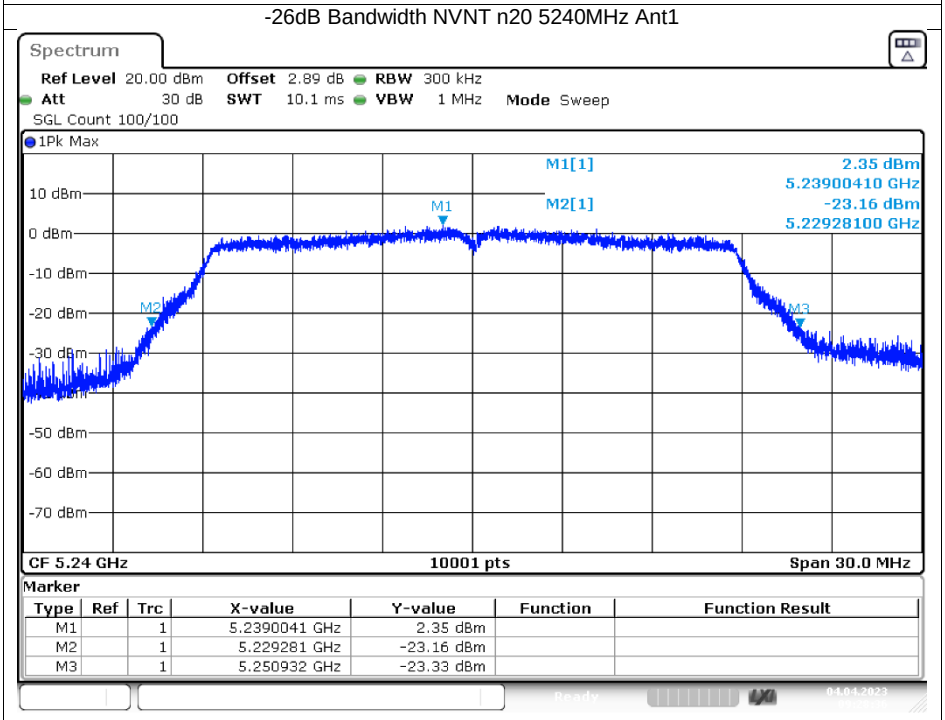


-26dB Bandwidth NVNT n20 5200MHz Ant1



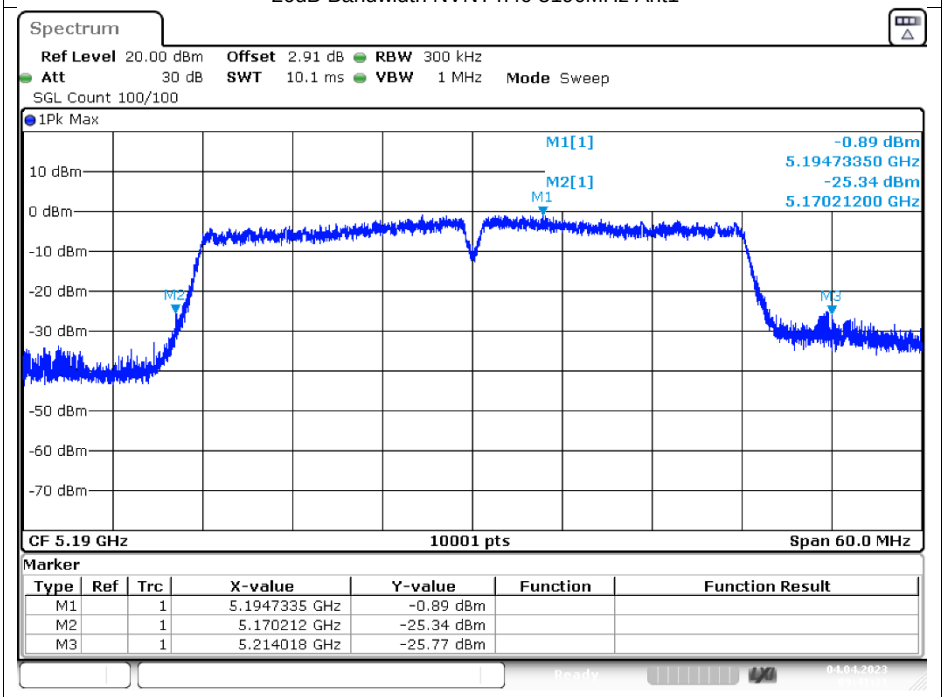
Date: 4.APR.2023 09:25:11

-26dB Bandwidth NVNT n20 5240MHz Ant1



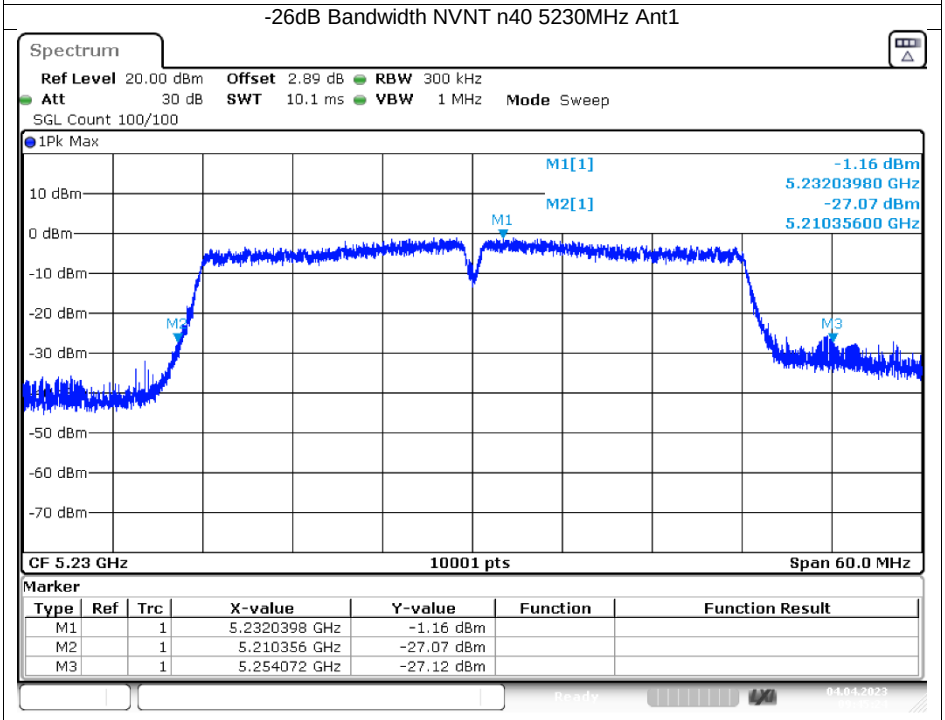
Date: 4.APR.2023 09:28:36

-26dB Bandwidth NVNT n40 5190MHz Ant1



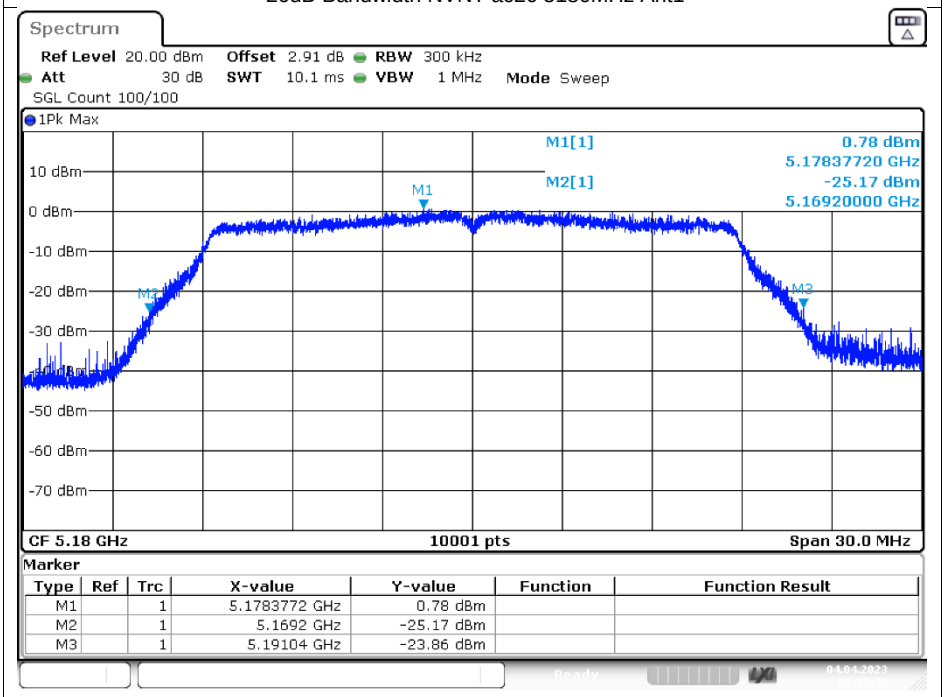
Date: 4.APR.2023 09:41:31

-26dB Bandwidth NVNT n40 5230MHz Ant1



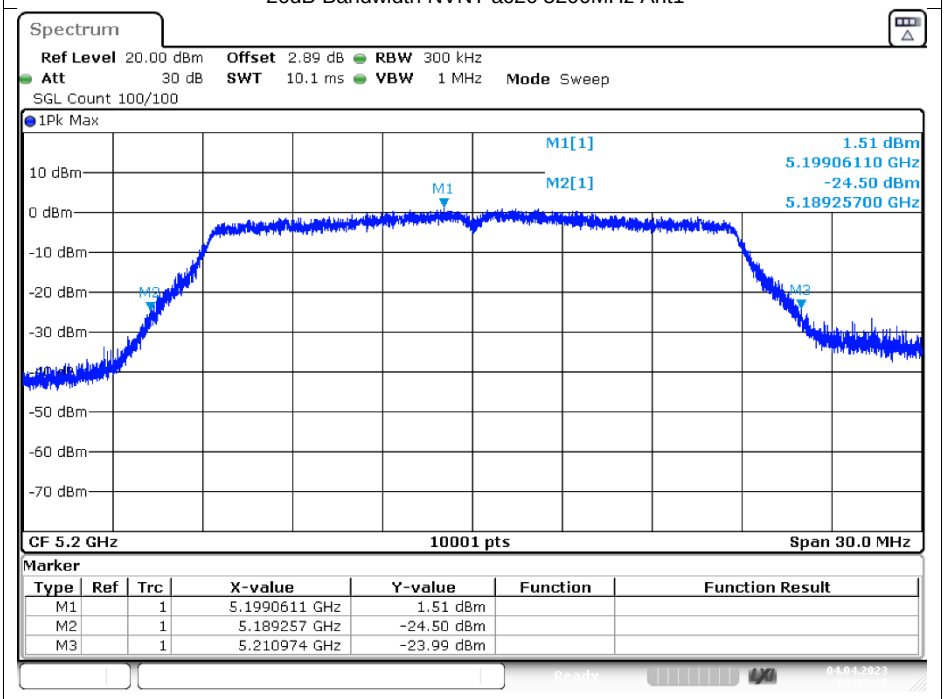
Date: 4.APR.2023 09:45:24

-26dB Bandwidth NVNT ac20 5180MHz Ant1



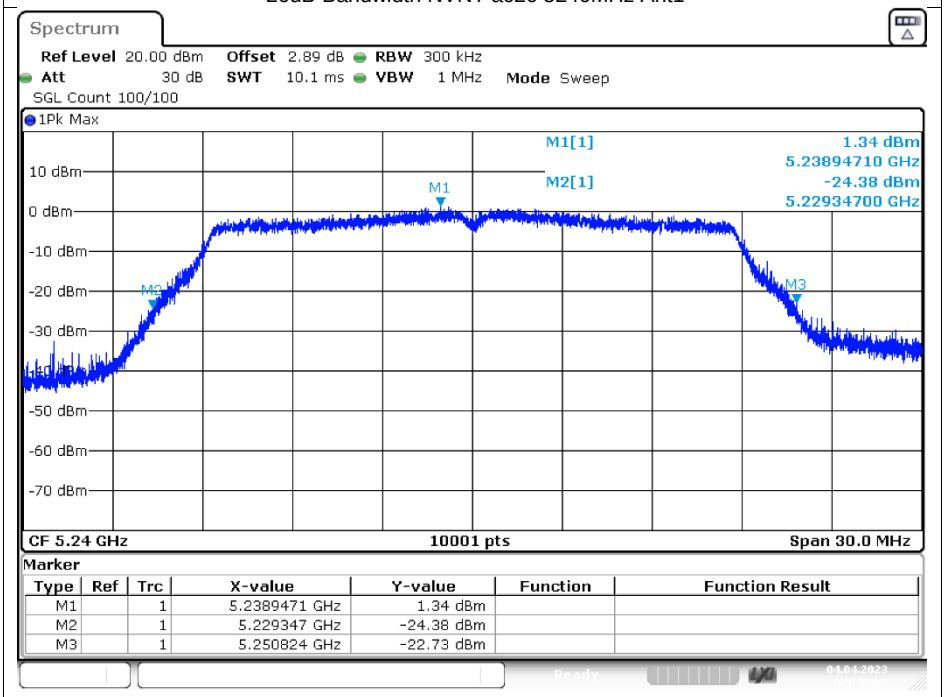
Date: 4.APR.2023 09:32:32

-26dB Bandwidth NVNT ac20 5200MHz Ant1



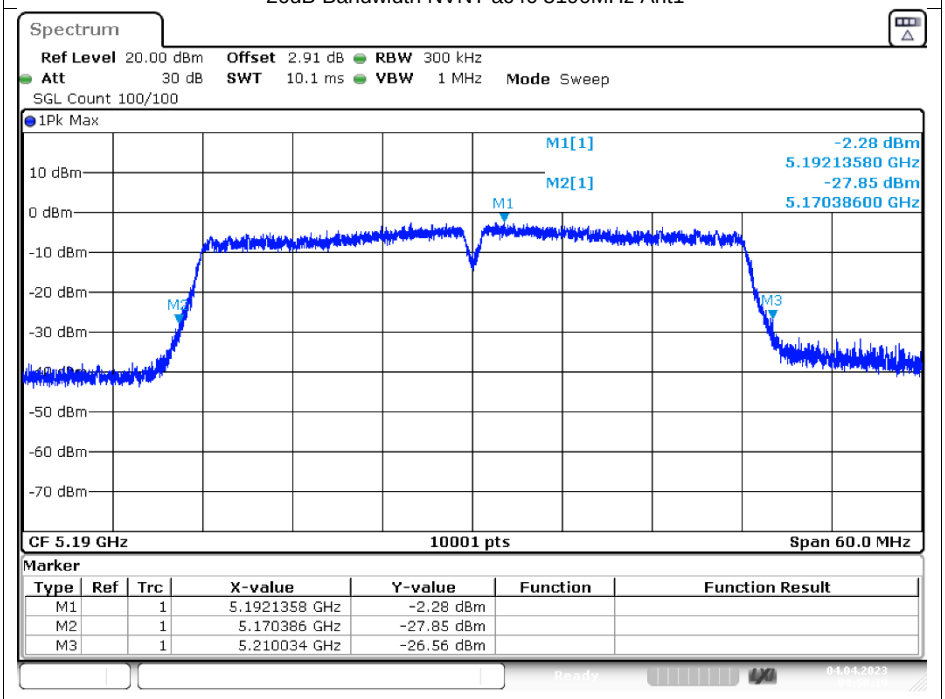
Date: 4.APR.2023 09:35:27

-26dB Bandwidth NVNT ac20 5240MHz Ant1



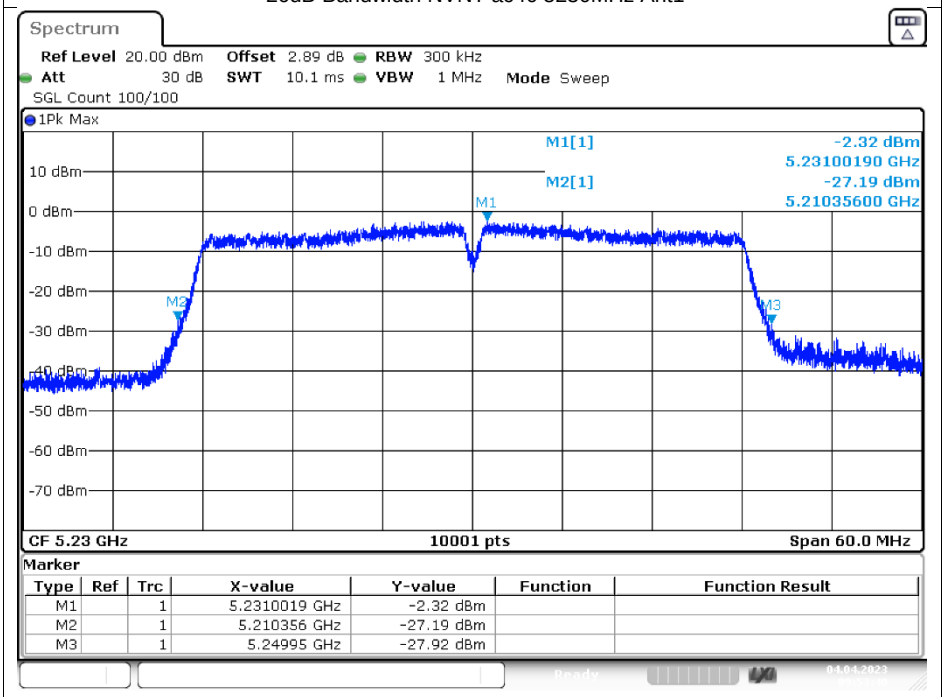
Date: 4.APR.2023 09:38:09

-26dB Bandwidth NVNT ac40 5190MHz Ant1



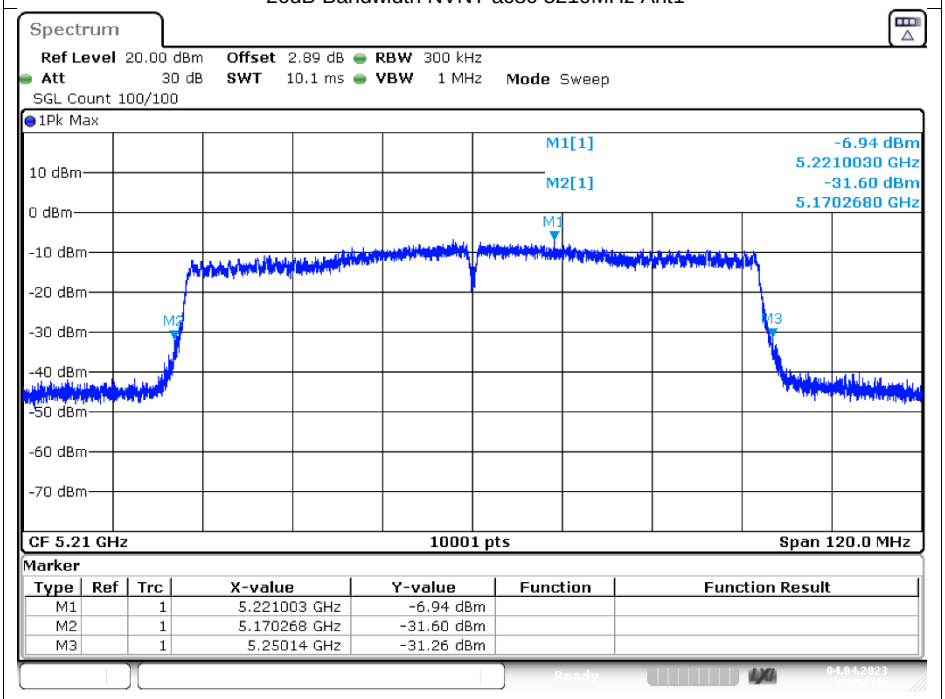
Date: 4.APR.2023 09:50:19

-26dB Bandwidth NVNT ac40 5230MHz Ant1



Date: 4.APR.2023 09:53:39

-26dB Bandwidth NVNT ac80 5210MHz Ant1



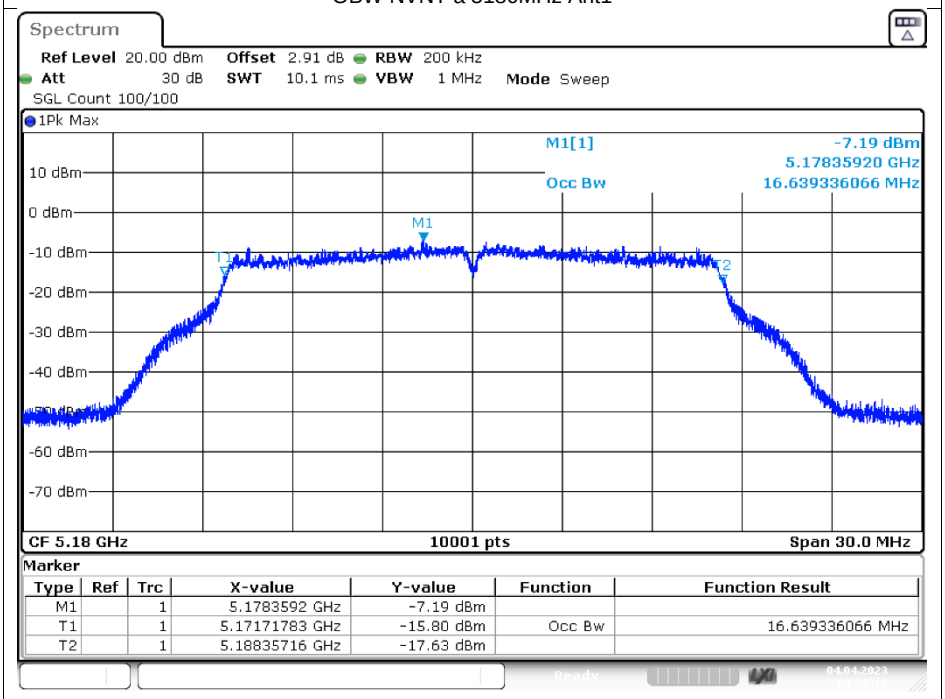
Date: 4.APR.2023 09:57:49

Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	a	5180	Ant1	16.639
NVNT	a	5200	Ant1	16.639
NVNT	a	5240	Ant1	16.63
NVNT	n20	5180	Ant1	17.764
NVNT	n20	5200	Ant1	17.761
NVNT	n20	5240	Ant1	17.767
NVNT	n40	5190	Ant1	36.302
NVNT	n40	5230	Ant1	36.278
NVNT	ac20	5180	Ant1	17.749
NVNT	ac20	5200	Ant1	17.737
NVNT	ac20	5240	Ant1	17.764
NVNT	ac40	5190	Ant1	36.266
NVNT	ac40	5230	Ant1	36.254
NVNT	ac80	5210	Ant1	75.352

Test Graphs

OBW NVNT a 5180MHz Ant1

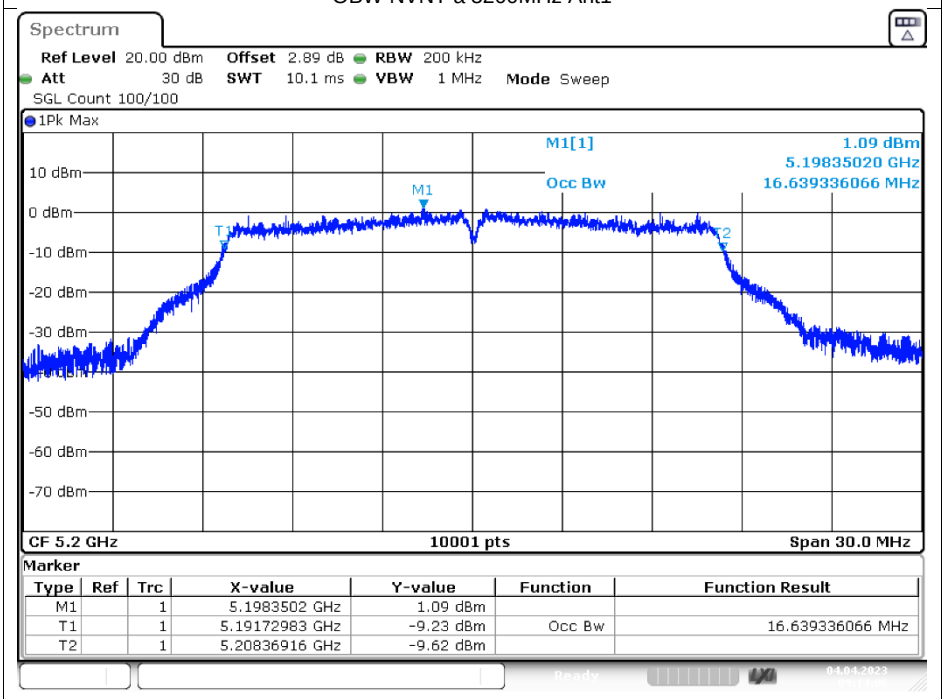


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.1783592 GHz	-7.19 dBm		
T1		1	5.17171783 GHz	-15.80 dBm	Occ Bw	16.639336066 MHz
T2		1	5.18835716 GHz	-17.63 dBm		

Date: 4.APR.2023 09:09:16

OBW NVNT a 5200MHz Ant1

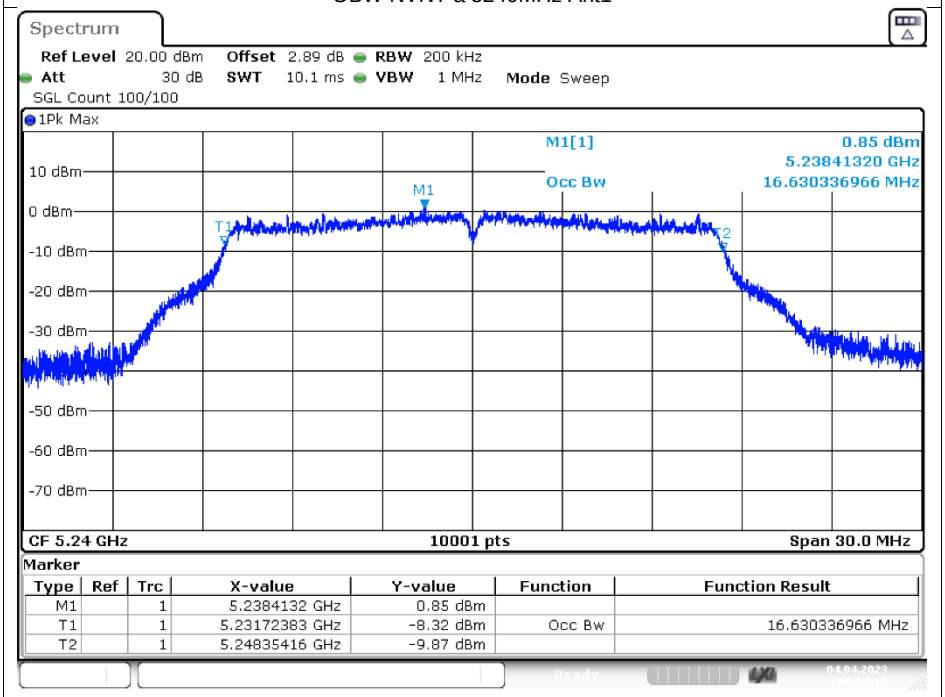


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.1983502 GHz	1.09 dBm		
T1		1	5.19172983 GHz	-9.23 dBm	Occ Bw	16.639336066 MHz
T2		1	5.20836916 GHz	-9.62 dBm		

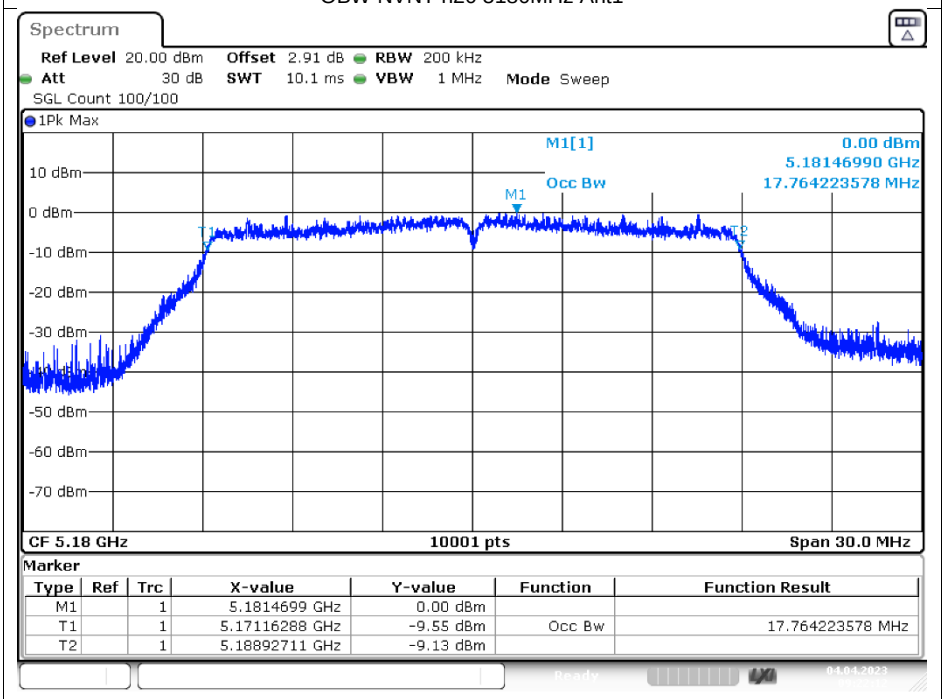
Date: 4.APR.2023 09:14:06

OBW NVNT a 5240MHz Ant1



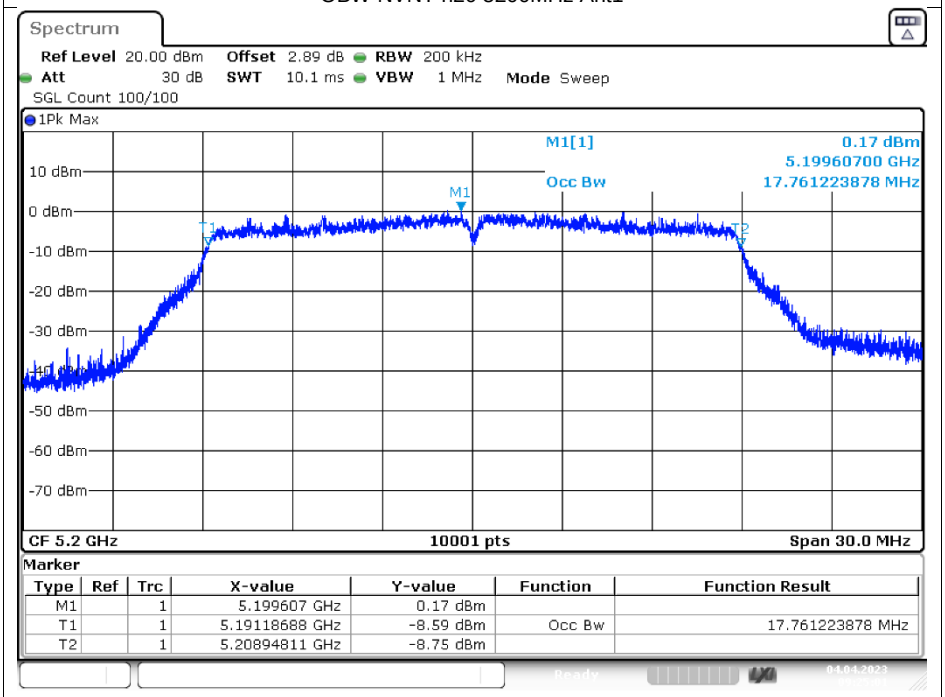
Date: 4.APR.2023 09:17:17

OBW NVNT n20 5180MHz Ant1



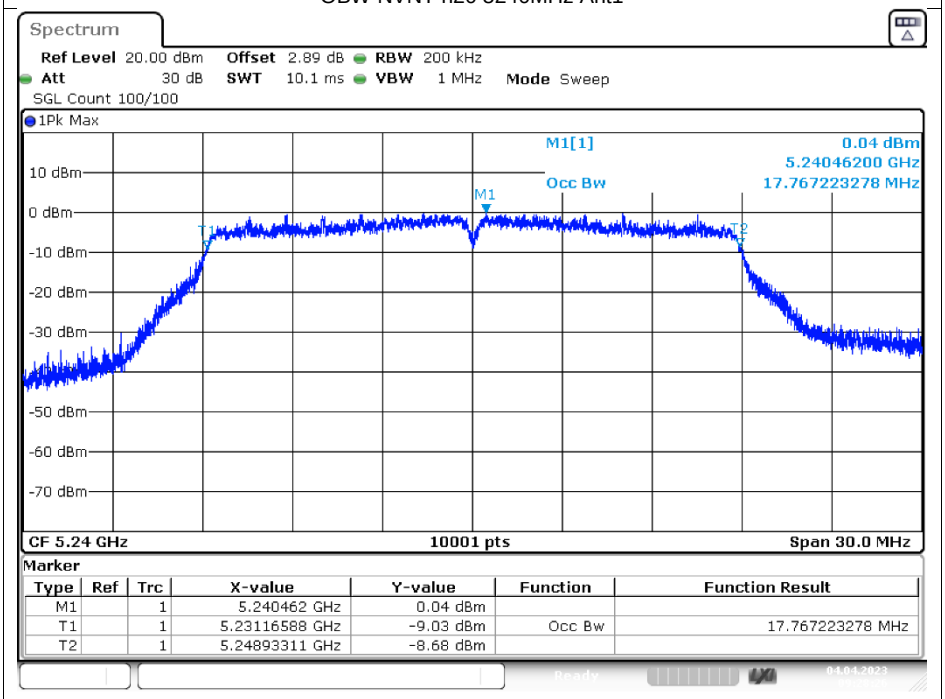
Date: 4.APR.2023 09:22:12

OBW NVNT n20 5200MHz Ant1



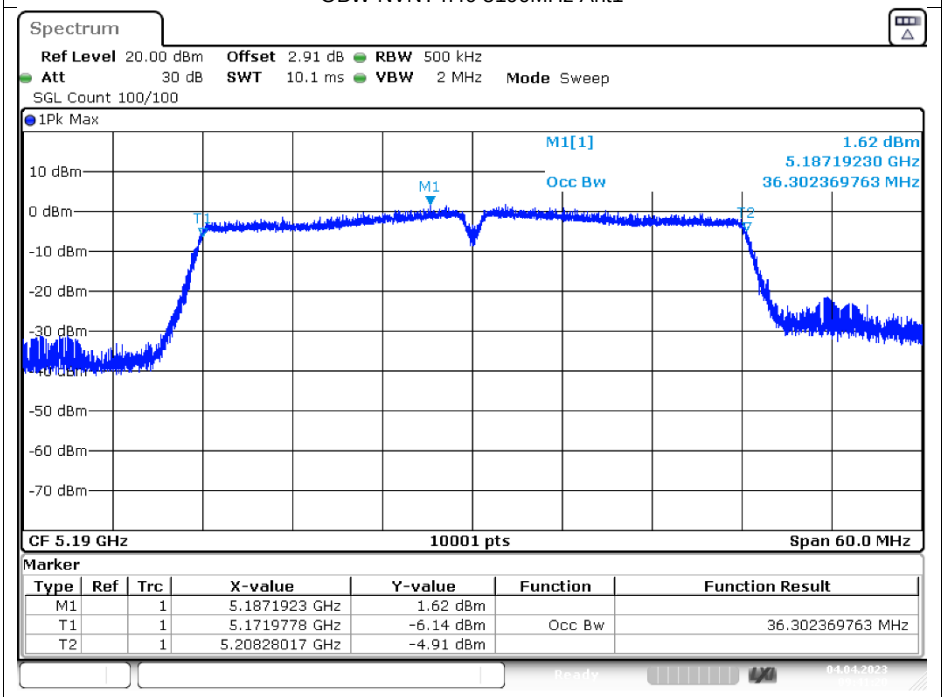
Date: 4.APR.2023 09:25:01

OBW NVNT n20 5240MHz Ant1



Date: 4.APR.2023 09:28:26

OBW NVNT n40 5190MHz Ant1

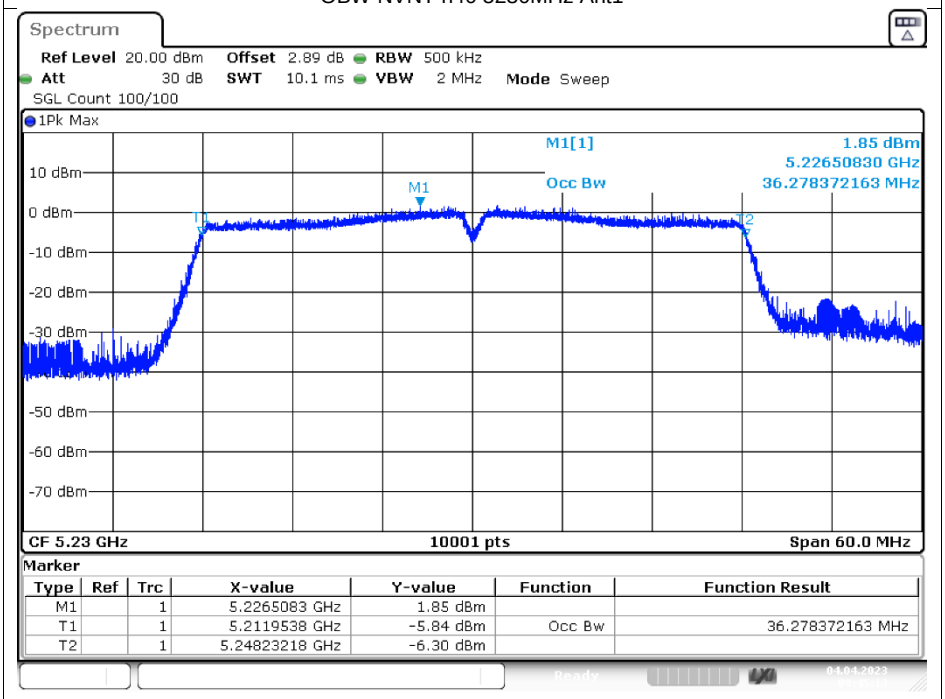


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.1871923 GHz	1.62 dBm		
T1		1	5.1719778 GHz	-6.14 dBm	Occ Bw	36.302369763 MHz
T2		1	5.20828017 GHz	-4.91 dBm		

Date: 4.APR.2023 09:41:20

OBW NVNT n40 5230MHz Ant1

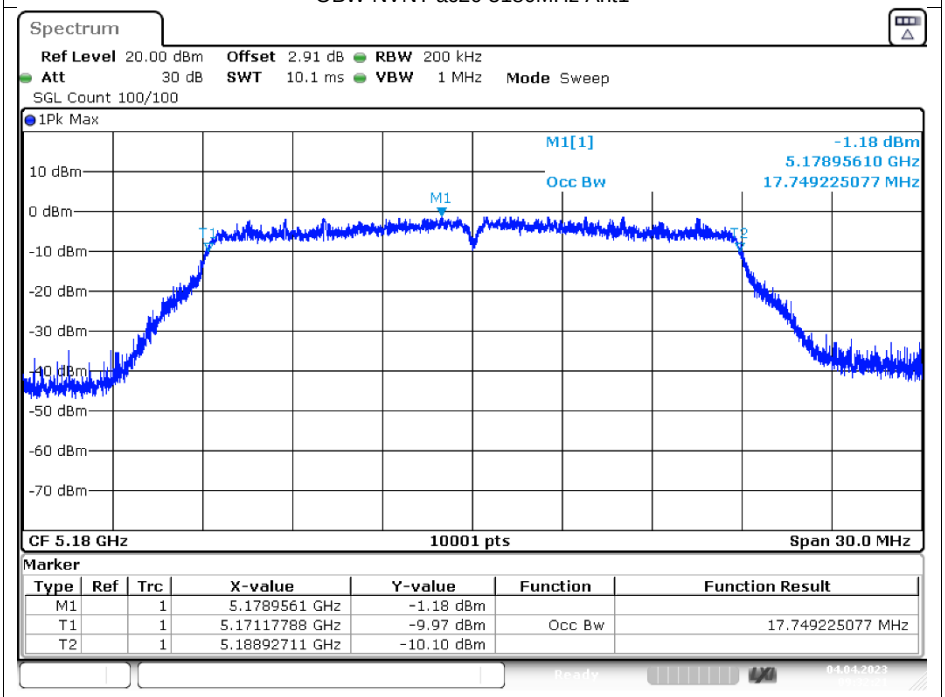


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.2265083 GHz	1.85 dBm		
T1		1	5.2119538 GHz	-5.84 dBm	Occ Bw	36.278372163 MHz
T2		1	5.24823218 GHz	-6.30 dBm		

Date: 4.APR.2023 09:45:14

OBW NVNT ac20 5180MHz Ant1

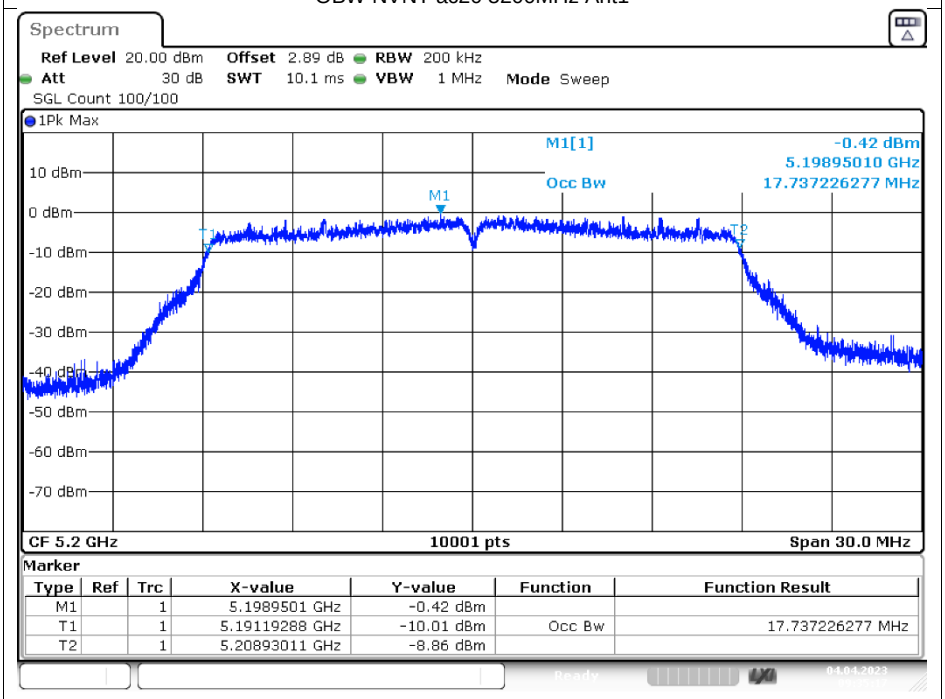


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.1789561 GHz	-1.18 dBm		
T1		1	5.17117788 GHz	-9.97 dBm	Occ Bw	17.749225077 MHz
T2		1	5.18892711 GHz	-10.10 dBm		

Date: 4.APR.2023 09:32:21

OBW NVNT ac20 5200MHz Ant1

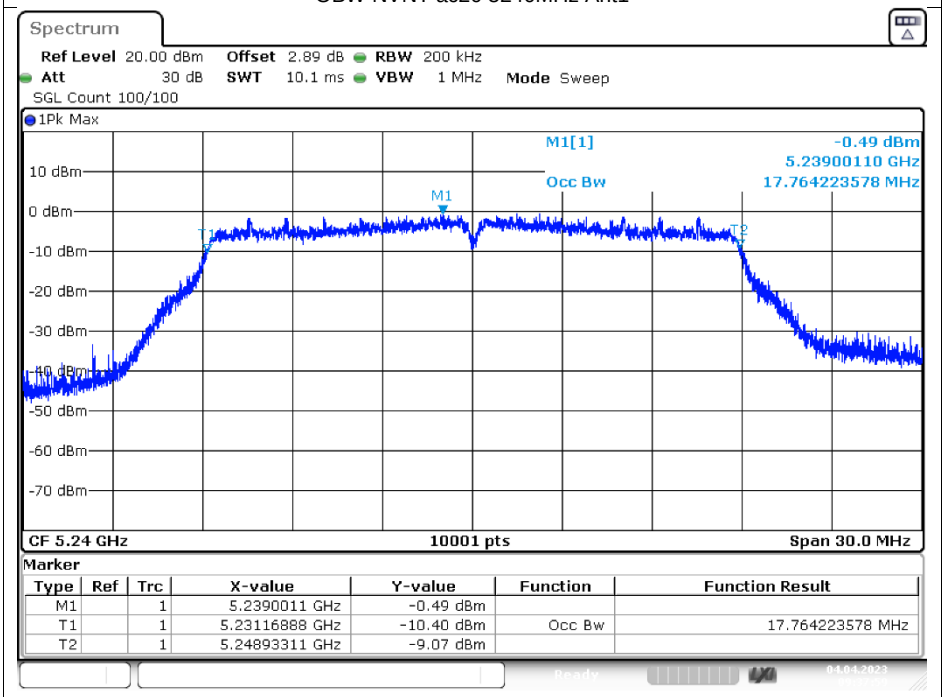


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.1989501 GHz	-0.42 dBm		
T1		1	5.19119288 GHz	-10.01 dBm	Occ Bw	17.737226277 MHz
T2		1	5.20893011 GHz	-8.86 dBm		

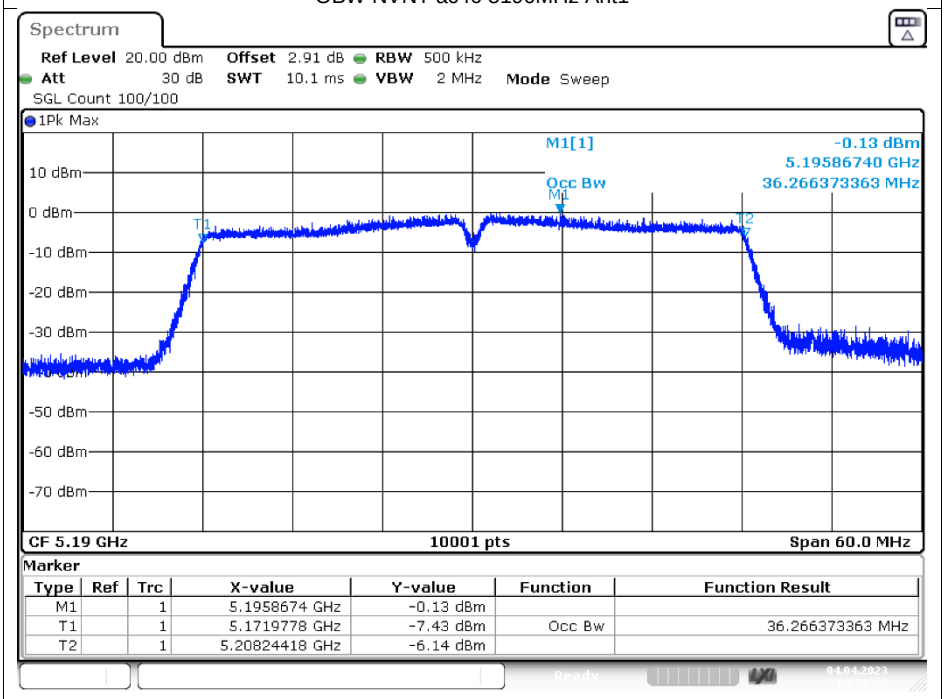
Date: 4.APR.2023 09:35:17

OBW NVNT ac20 5240MHz Ant1



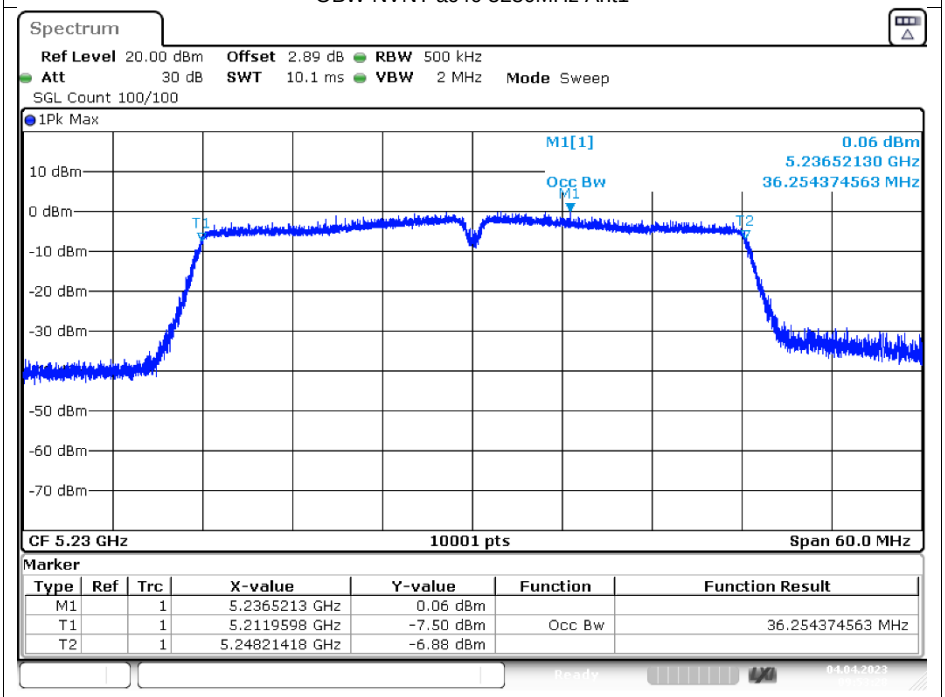
Date: 4.APR.2023 09:37:59

OBW NVNT ac40 5190MHz Ant1



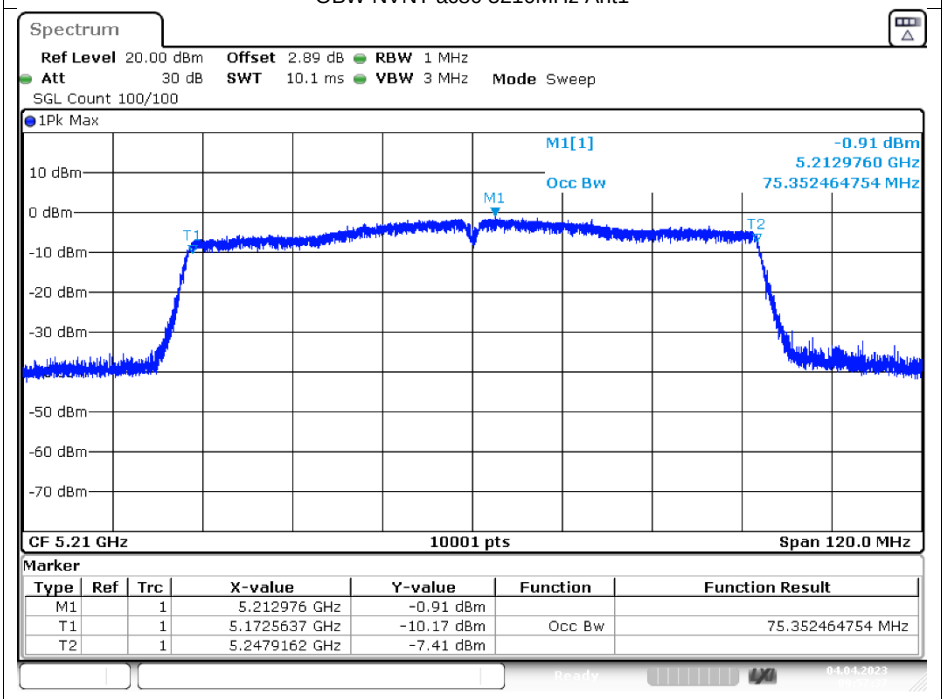
Date: 4.APR.2023 09:50:08

OBW NVNT ac40 5230MHz Ant1



Date: 4.APR.2023 09:53:29

OBW NVNT ac80 5210MHz Ant1



Date: 4.APR.2023 09:57:37

Maximum Conducted Output Power

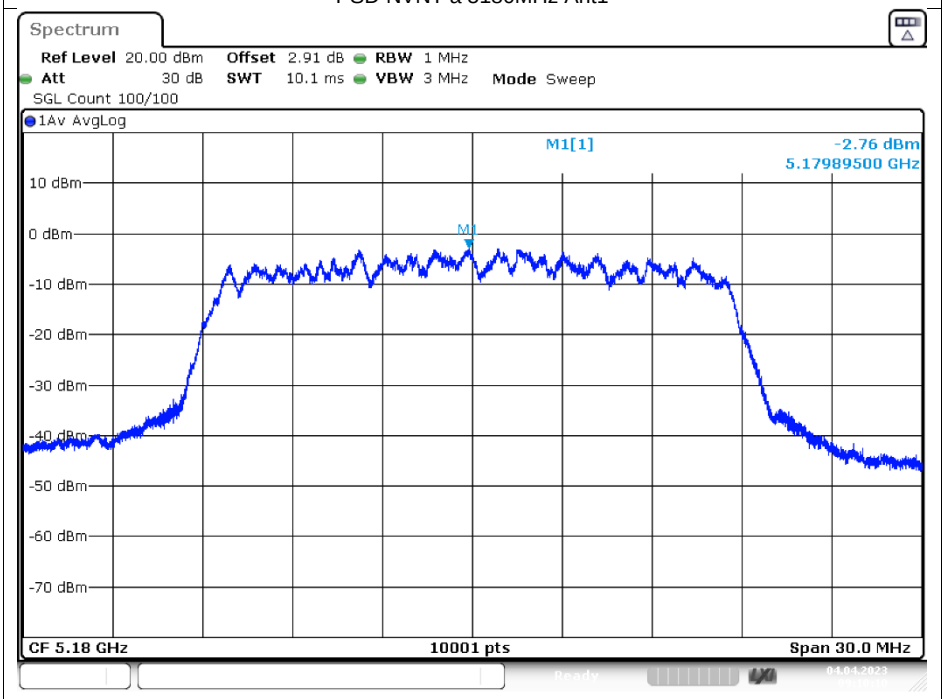
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant1	10.6	0.29	10.89	24	Pass
NVNT	a	5200	Ant1	10.24	0.29	10.53	24	Pass
NVNT	a	5240	Ant1	10.16	0.29	10.45	24	Pass
NVNT	n20	5180	Ant1	10.11	0.31	10.42	24	Pass
NVNT	n20	5200	Ant1	9.71	0.31	10.02	24	Pass
NVNT	n20	5240	Ant1	9.69	0.31	10	24	Pass
NVNT	n40	5190	Ant1	10.47	0	10.47	24	Pass
NVNT	n40	5230	Ant1	9.79	0.6	10.39	24	Pass
NVNT	ac20	5180	Ant1	9.02	0.31	9.33	24	Pass
NVNT	ac20	5200	Ant1	8.84	0.31	9.15	24	Pass
NVNT	ac20	5240	Ant1	8.83	0.31	9.14	24	Pass
NVNT	ac40	5190	Ant1	8.24	0.59	8.83	24	Pass
NVNT	ac40	5230	Ant1	8.18	0.59	8.77	24	Pass
NVNT	ac80	5210	Ant1	5.53	1.11	6.64	24	Pass

Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm)	Duty Factor (dB)	Total PSD (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	Ant1	-2.76	0.29	-2.47	11	Pass
NVNT	a	5200	Ant1	-1.65	0.29	-1.36	11	Pass
NVNT	a	5240	Ant1	-1.96	0.29	-1.67	11	Pass
NVNT	n20	5180	Ant1	-3.16	0.31	-2.85	11	Pass
NVNT	n20	5200	Ant1	-2.7	0.31	-2.39	11	Pass
NVNT	n20	5240	Ant1	-2.91	0.31	-2.6	11	Pass
NVNT	n40	5190	Ant1	-7.51	0	-7.51	11	Pass
NVNT	n40	5230	Ant1	-8.44	0.6	-7.84	11	Pass
NVNT	ac20	5180	Ant1	-3.85	0.31	-3.54	11	Pass
NVNT	ac20	5200	Ant1	-3.3	0.31	-2.99	11	Pass
NVNT	ac20	5240	Ant1	-2.84	0.31	-2.53	11	Pass
NVNT	ac40	5190	Ant1	-9.11	0.59	-8.52	11	Pass
NVNT	ac40	5230	Ant1	-8.84	0.59	-8.25	11	Pass
NVNT	ac80	5210	Ant1	-18.49	1.11	-17.38	11	Pass

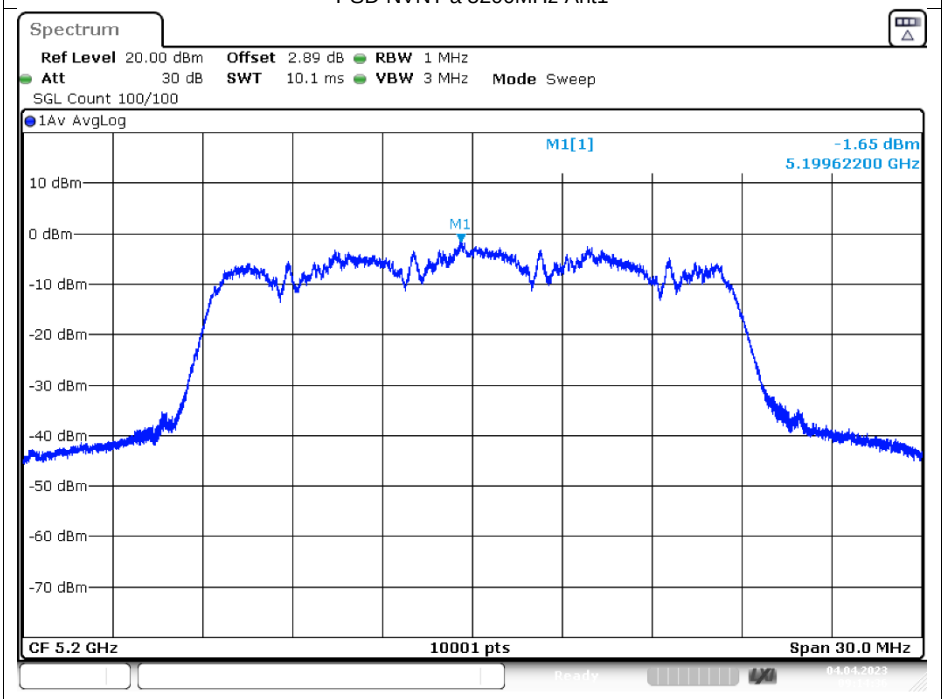
Test Graphs

PSD NVNT a 5180MHz Ant1



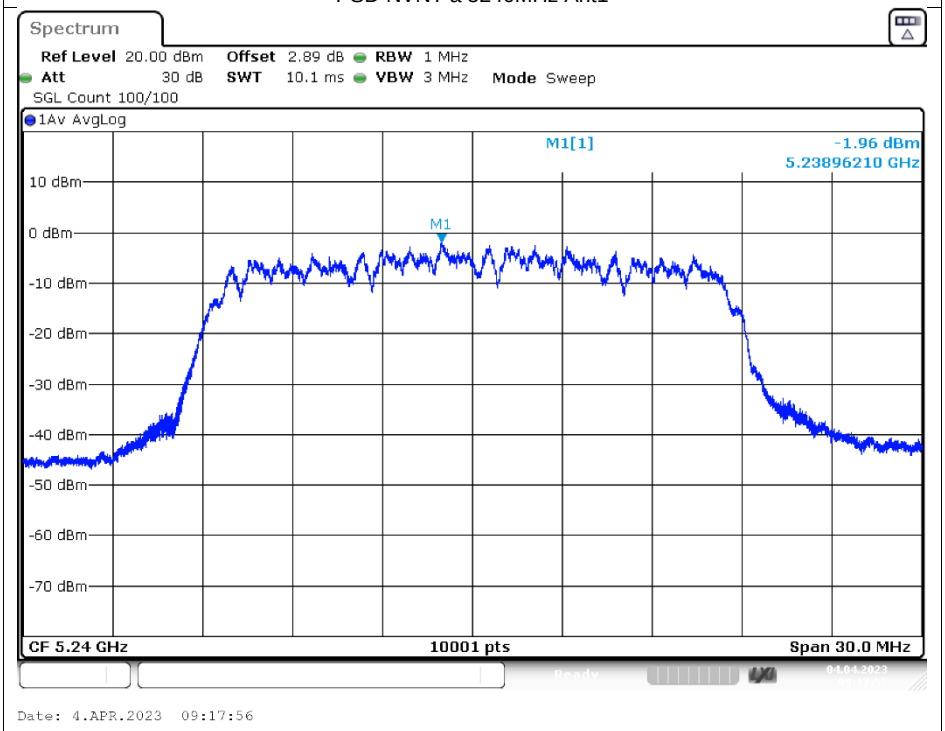
Date: 4.APR.2023 09:10:10

PSD NVNT a 5200MHz Ant1

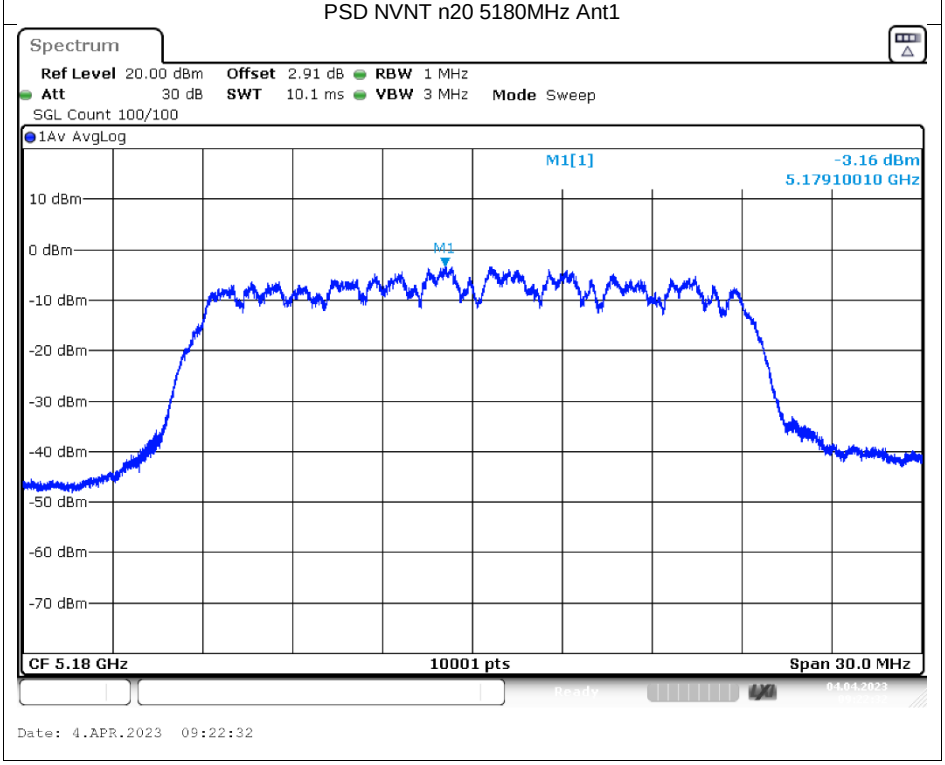


Date: 4.APR.2023 09:14:36

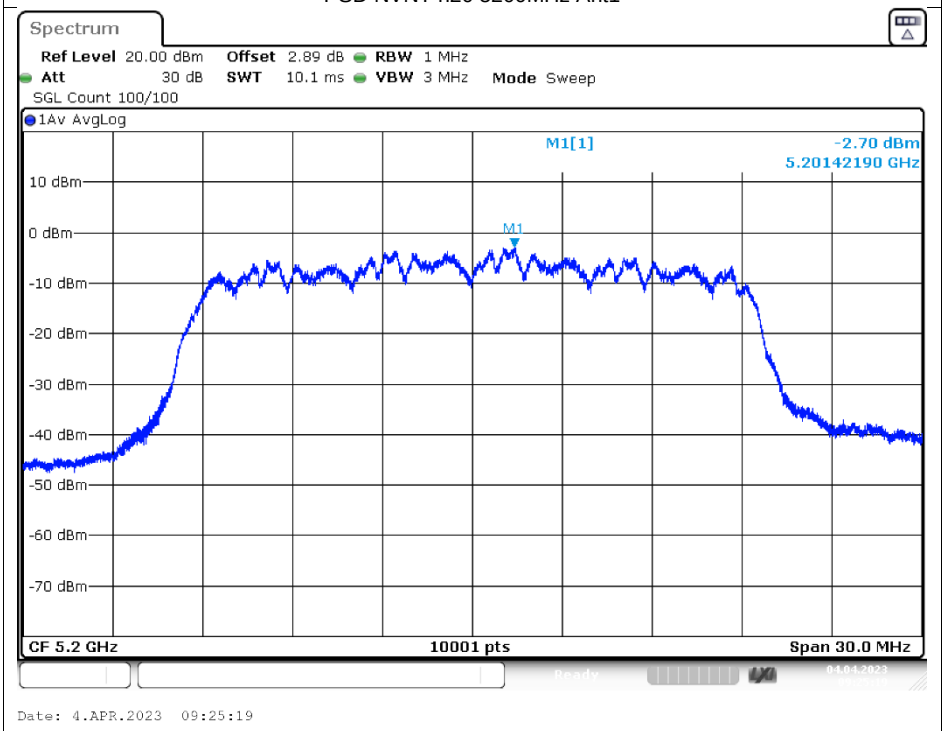
PSD NVNT a 5240MHz Ant1



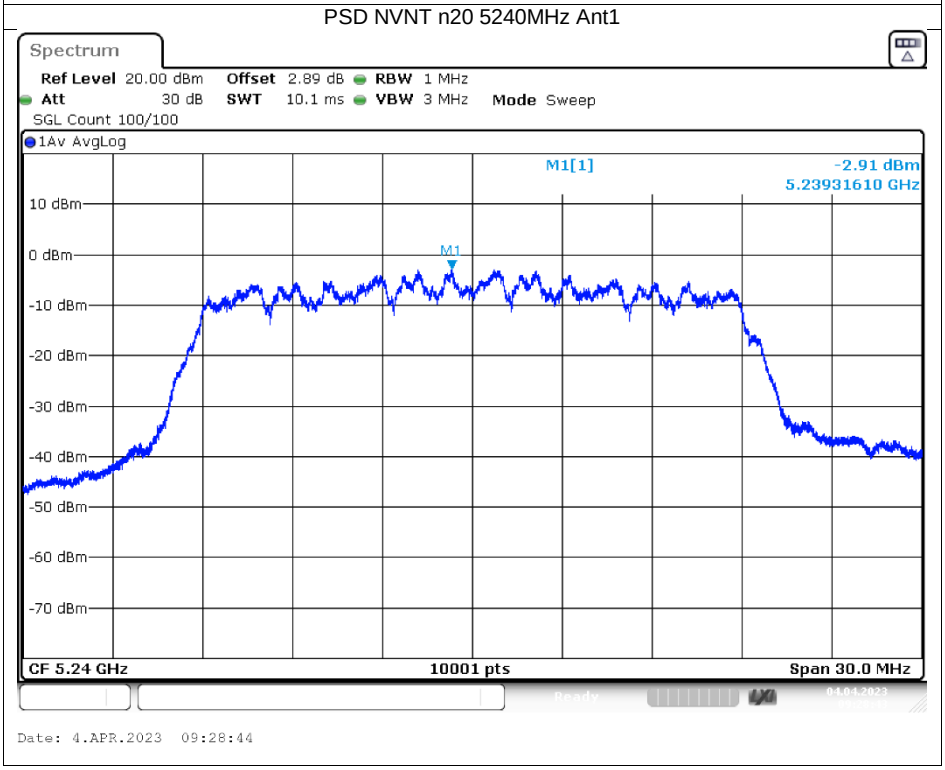
PSD NVNT n20 5180MHz Ant1



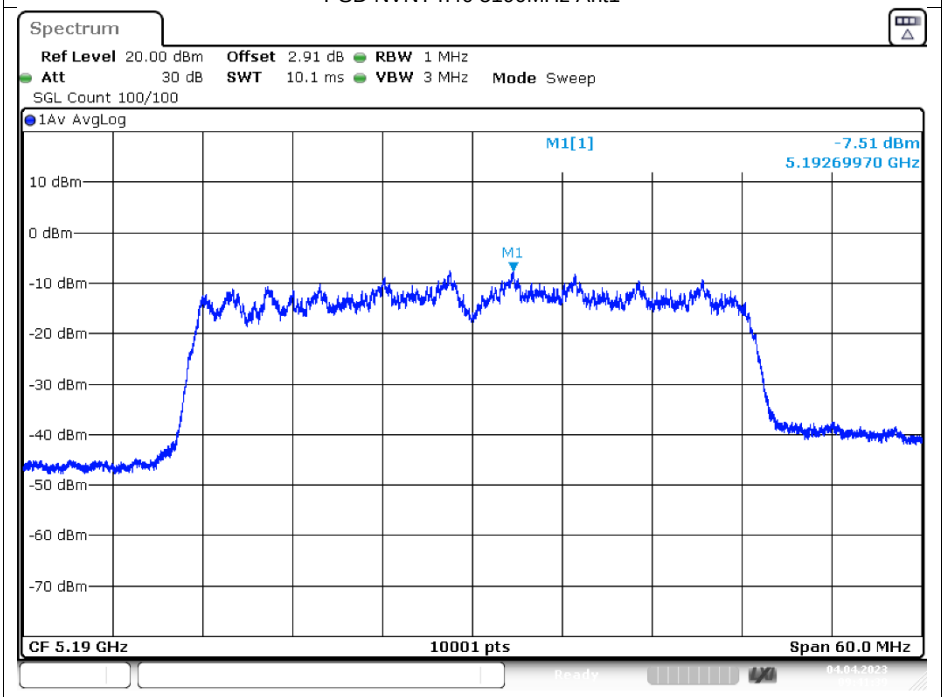
PSD NVNT n20 5200MHz Ant1



PSD NVNT n20 5240MHz Ant1

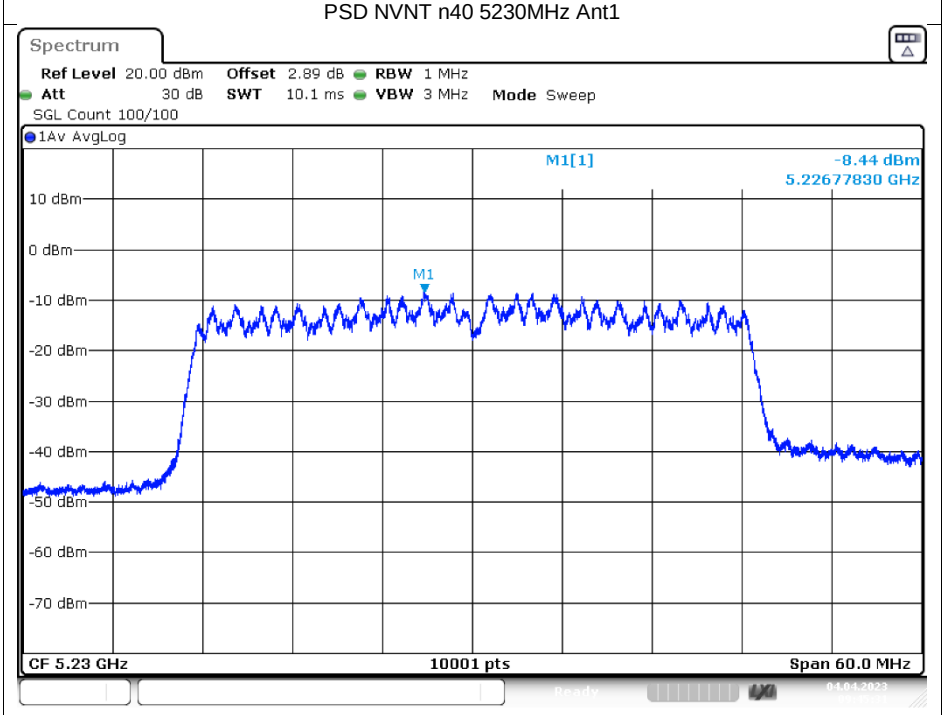


PSD NVNT n40 5190MHz Ant1



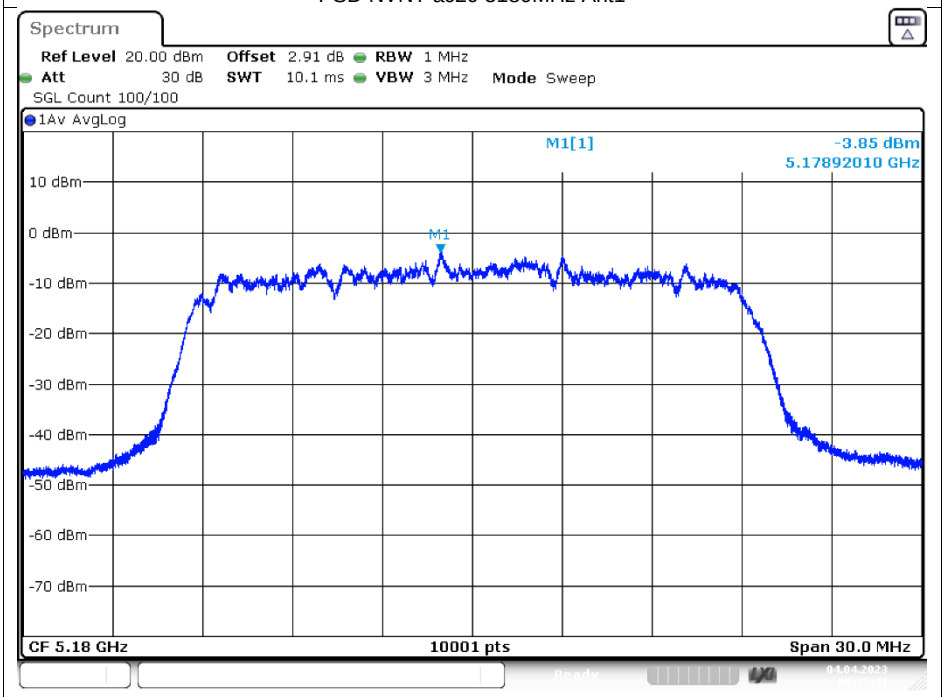
Date: 4.APR.2023 09:41:39

PSD NVNT n40 5230MHz Ant1



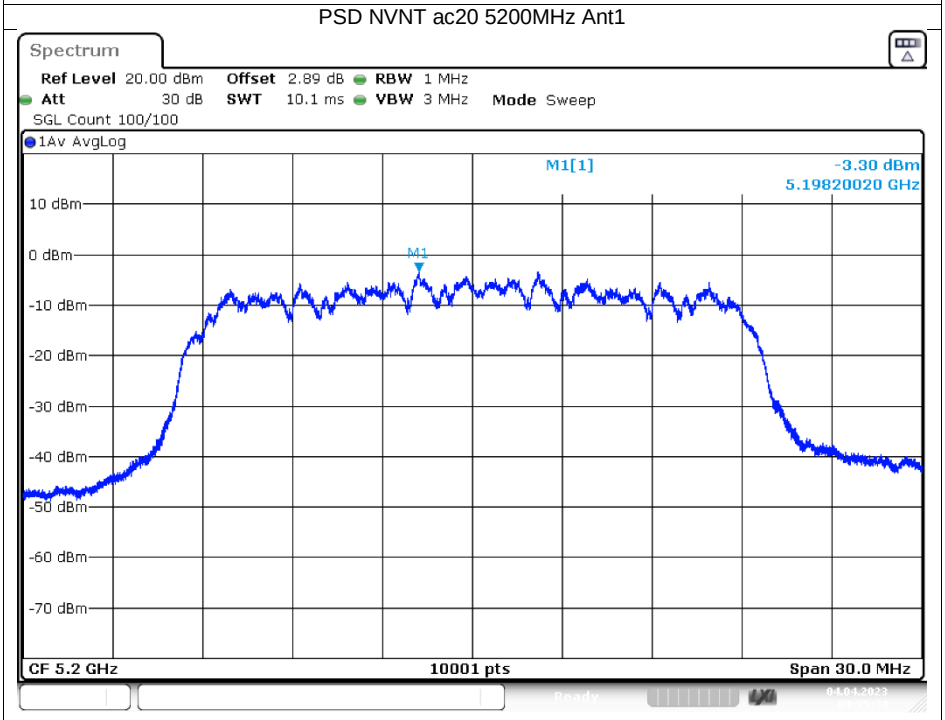
Date: 4.APR.2023 09:45:32

PSD NVNT ac20 5180MHz Ant1



Date: 4.APR.2023 09:32:41

PSD NVNT ac20 5200MHz Ant1



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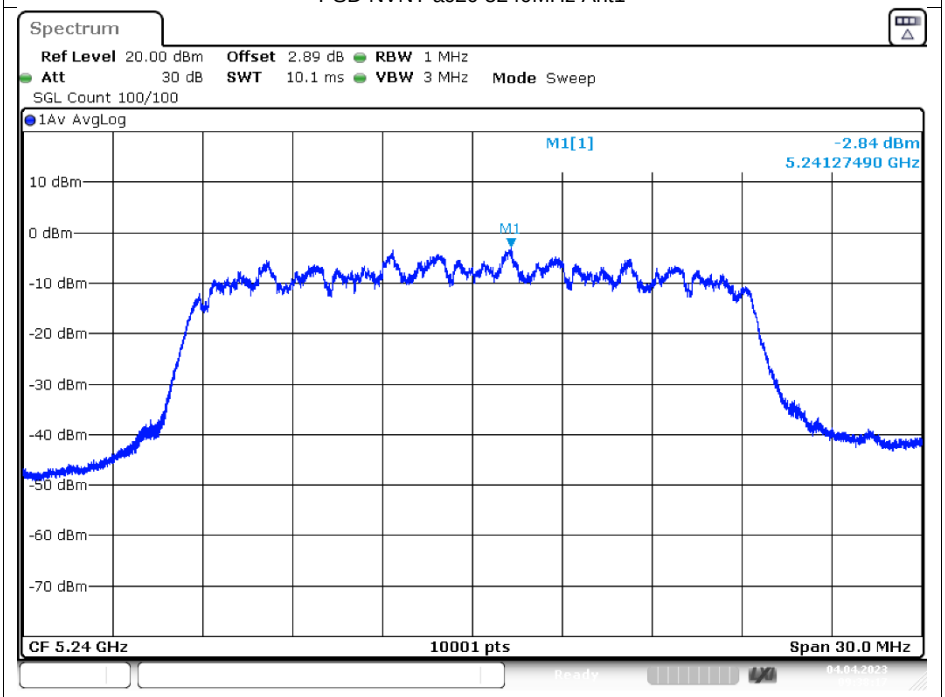
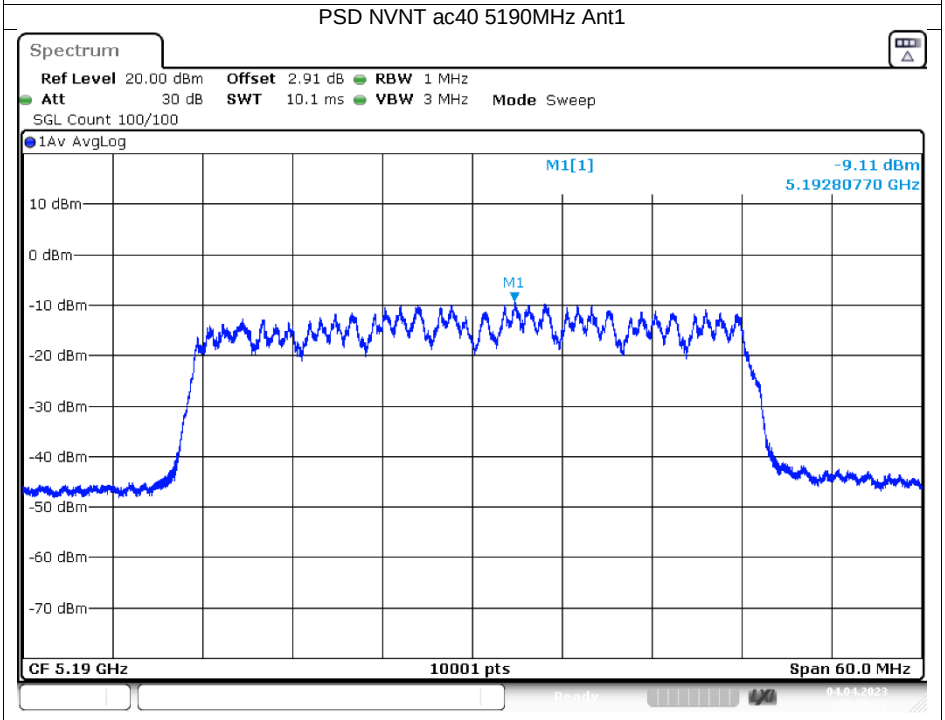
PSD NVNT ac20 5240MHz Ant1



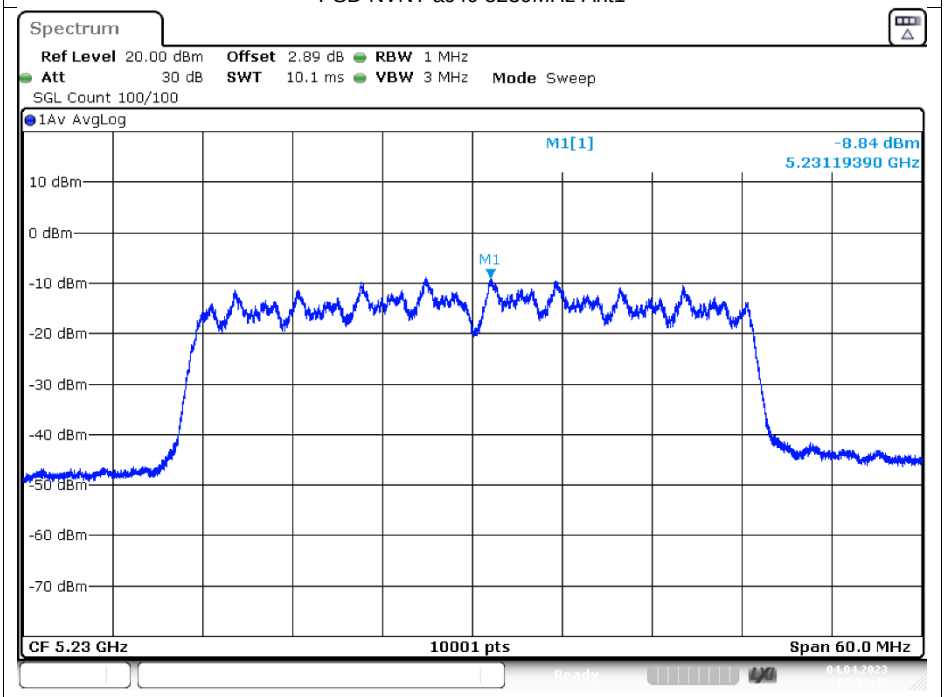
Date: 4.APR.2023 09:38:16

PSD NVNT ac40 5190MHz Ant1



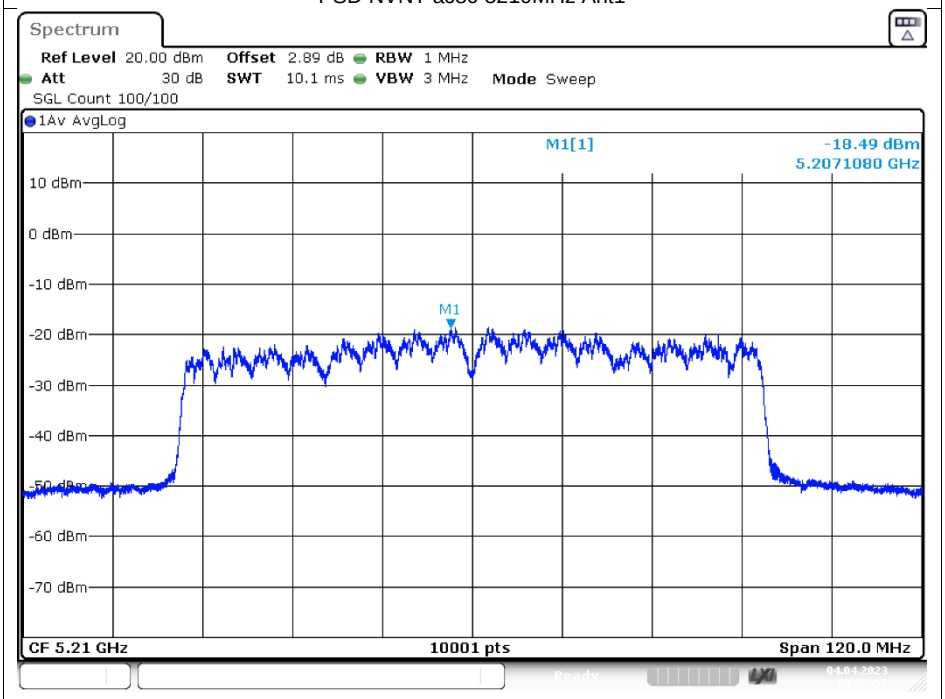
Date: 4.APR.2023 09:50:28

PSD NVNT ac40 5230MHz Ant1



Date: 4.APR.2023 09:53:47

PSD NVNT ac80 5210MHz Ant1



Date: 4.APR.2023 09:57:57

Frequency Stability

Condition	Mode	Time (mins)	Frequency (MHz)	Antenna	Measured Frequency (MHz)	Frequency Error (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
25C 11.05V	a	0	5180	Ant1	5180.02	20000	3.86	25	Pass
25C 13V	a	0	5180	Ant1	5180	0	0	25	Pass
25C14.95V	a	0	5180	Ant1	5180.04	40000	7.72	25	Pass
-10C 13V	a	0	5180	Ant1	5180.02	20000	3.86	25	Pass
0C 13V	a	0	5180	Ant1	5180.02	20000	3.86	25	Pass
10C 13V	a	0	5180	Ant1	5180.04	40000	7.72	25	Pass
30C 13V	a	0	5180	Ant1	5180.04	40000	7.72	25	Pass
40C 13V	a	0	5180	Ant1	5180.02	20000	3.86	25	Pass
50C 13V	a	0	5180	Ant1	5180.02	20000	3.86	25	Pass
25C 11.05V	a	0	5200	Ant1	5200.04	40000	7.69	25	Pass
25C 13V	a	0	5200	Ant1	5200.04	40000	7.69	25	Pass
25C14.95V	a	0	5200	Ant1	5200.04	40000	7.69	25	Pass
-10C 13V	a	0	5200	Ant1	5200.04	40000	7.69	25	Pass
0C 13V	a	0	5200	Ant1	5200.02	20000	3.85	25	Pass
10C 13V	a	0	5200	Ant1	5200.02	20000	3.85	25	Pass
30C 13V	a	0	5200	Ant1	5200.04	40000	7.69	25	Pass
40C 13V	a	0	5200	Ant1	5200.02	20000	3.85	25	Pass
50C 13V	a	0	5200	Ant1	5200.04	40000	7.69	25	Pass
25C 13V	a	0	5240	Ant1	5240.04	40000	7.63	25	Pass
25C14.95V	a	0	5240	Ant1	5240.02	20000	3.82	25	Pass
20C14.95V	a	0	5240	Ant1	5240.02	20000	3.82	25	Pass
-10C 13V	a	0	5240	Ant1	5240.04	40000	7.63	25	Pass
0C 13V	a	0	5240	Ant1	5240.04	40000	7.63	25	Pass
10C 13V	a	0	5240	Ant1	5240.02	20000	3.82	25	Pass
30C 13V	a	0	5240	Ant1	5240	0	0	25	Pass
40C 13V	a	0	5240	Ant1	5240.02	20000	3.82	25	Pass
25C 13V	a	0	5240	Ant1	5240.04	40000	7.63	25	Pass
25C 11.05V	n20	0	5180	Ant1	5180.02	20000	3.86	25	Pass
25C 13V	n20	0	5180	Ant1	5180.02	20000	3.86	25	Pass
25C14.95V	n20	0	5180	Ant1	5180.02	20000	3.86	25	Pass
-10C 13V	n20	0	5180	Ant1	5180	0	0	25	Pass
0C 13V	n20	0	5180	Ant1	5180.04	40000	7.72	25	Pass
10C 13V	n20	0	5180	Ant1	5180.04	40000	7.72	25	Pass
30C 13V	n20	0	5180	Ant1	5180.04	40000	7.72	25	Pass
40C 13V	n20	0	5180	Ant1	5180.04	40000	7.72	25	Pass
50C 13V	n20	0	5180	Ant1	5180.02	20000	3.86	25	Pass
25C 11.05V	n20	0	5200	Ant1	5200.02	20000	3.85	25	Pass
25C 13V	n20	0	5200	Ant1	5200.02	20000	3.85	25	Pass
25C14.95V	n20	0	5200	Ant1	5200.06	60000	11.54	25	Pass
-10C 13V	n20	0	5200	Ant1	5200.02	20000	3.85	25	Pass
0C 13V	n20	0	5200	Ant1	5200.02	20000	3.85	25	Pass
10C 13V	n20	0	5200	Ant1	5200.04	40000	7.69	25	Pass
30C 13V	n20	0	5200	Ant1	5200.04	40000	7.69	25	Pass
40C 13V	n20	0	5200	Ant1	5200.04	40000	7.69	25	Pass
50C 13V	n20	0	5200	Ant1	5200	0	0	25	Pass
25C 11.05V	n20	0	5240	Ant1	5240.02	20000	3.82	25	Pass
25C 13V	n20	0	5240	Ant1	5240.04	40000	7.63	25	Pass
25C14.95V	n20	0	5240	Ant1	5240.02	20000	3.82	25	Pass
-10C 13V	n20	0	5240	Ant1	5240.04	40000	7.63	25	Pass
0C 13V	n20	0	5240	Ant1	5240.04	40000	7.63	25	Pass
10C 13V	n20	0	5240	Ant1	5240.04	40000	7.63	25	Pass
30C 13V	n20	0	5240	Ant1	5240.04	40000	7.63	25	Pass
40C 13V	n20	0	5240	Ant1	5240.04	40000	7.63	25	Pass
50C 13V	n20	0	5240	Ant1	5240.02	20000	3.82	25	Pass
25C 11.05V	n40	0	5190	Ant1	5190.04	40000	7.71	25	Pass
25C 13V	n40	0	5190	Ant1	5190.04	40000	7.71	25	Pass
25C14.95V	n40	0	5190	Ant1	5190.04	40000	7.71	25	Pass
-10C 13V	n40	0	5190	Ant1	5190.04	40000	7.71	25	Pass
0C 13V	n40	0	5190	Ant1	5190.08	80000	15.41	25	Pass
10C 13V	n40	0	5190	Ant1	5190.04	40000	7.71	25	Pass
30C 13V	n40	0	5190	Ant1	5190	0	0	25	Pass
40C 13V	n40	0	5190	Ant1	5190.08	80000	15.41	25	Pass
50C 13V	n40	0	5190	Ant1	5190.08	80000	15.41	25	Pass
25C 11.05V	n40	0	5230	Ant1	5230	0	0	25	Pass
25C 13V	n40	0	5230	Ant1	5230.08	80000	15.3	25	Pass
25C14.95V	n40	0	5230	Ant1	5230.04	40000	7.65	25	Pass
-10C 13V	n40	0	5230	Ant1	5230.04	40000	7.65	25	Pass
0C 13V	n40	0	5230	Ant1	5230	0	0	25	Pass

10C 13V	n40	0	5230	Ant1	5230.04	40000	7.65	25	Pass
30C 13V	n40	0	5230	Ant1	5230	0	0	25	Pass
40C 13V	n40	0	5230	Ant1	5230.04	40000	7.65	25	Pass
50C 13V	n40	0	5230	Ant1	5230.04	40000	7.65	25	Pass
25C 11.05V	ac20	0	5180	Ant1	5180.04	40000	7.72	25	Pass
25C 13V	ac20	0	5180	Ant1	5180.04	40000	7.72	25	Pass
25C14.95V	ac20	0	5180	Ant1	5180.02	20000	3.86	25	Pass
-10C 13V	ac20	0	5180	Ant1	5180.02	20000	3.86	25	Pass
0C 13V	ac20	0	5180	Ant1	5180.04	40000	7.72	25	Pass
10C 13V	ac20	0	5180	Ant1	5180.02	20000	3.86	25	Pass
30C 13V	ac20	0	5180	Ant1	5180.02	20000	3.86	25	Pass
40C 13V	ac20	0	5180	Ant1	5180.04	40000	7.72	25	Pass
50C 13V	ac20	0	5180	Ant1	5180.02	20000	3.86	25	Pass
25C 11.05V	ac20	0	5200	Ant1	5200.02	20000	3.85	25	Pass
25C 13V	ac20	0	5200	Ant1	5200.02	20000	3.85	25	Pass
25C14.95V	ac20	0	5200	Ant1	5200.04	40000	7.69	25	Pass
-10C 13V	ac20	0	5200	Ant1	5200.04	40000	7.69	25	Pass
0C 13V	ac20	0	5200	Ant1	5200.02	20000	3.85	25	Pass
10C 13V	ac20	0	5200	Ant1	5200.02	20000	3.85	25	Pass
30C 13V	ac20	0	5200	Ant1	5200.04	40000	7.69	25	Pass
40C 13V	ac20	0	5200	Ant1	5200.04	40000	7.69	25	Pass
50C 13V	ac20	0	5200	Ant1	5200.04	40000	7.69	25	Pass
25C 11.05V	ac20	0	5240	Ant1	5240.04	40000	7.63	25	Pass
25C 13V	ac20	0	5240	Ant1	5240.04	40000	7.63	25	Pass
25C14.95V	ac20	0	5240	Ant1	5240.04	40000	7.63	25	Pass
-10C 13V	ac20	0	5240	Ant1	5240.04	40000	7.63	25	Pass
0C 13V	ac20	0	5240	Ant1	5240.04	40000	7.63	25	Pass
10C 13V	ac20	0	5240	Ant1	5240.02	20000	3.82	25	Pass
30C 13V	ac20	0	5240	Ant1	5240.04	40000	7.63	25	Pass
40C 13V	ac20	0	5240	Ant1	5240.02	20000	3.82	25	Pass
50C 13V	ac20	0	5240	Ant1	5240.06	60000	11.45	25	Pass
25C 11.05V	ac40	0	5190	Ant1	5190.04	40000	7.71	25	Pass
25C 13V	ac40	0	5190	Ant1	5190.04	40000	7.71	25	Pass
25C14.95V	ac40	0	5190	Ant1	5190.08	80000	15.41	25	Pass
-10C 13V	ac40	0	5190	Ant1	5190.04	40000	7.71	25	Pass
0C 13V	ac40	0	5190	Ant1	5190.08	80000	15.41	25	Pass
10C 13V	ac40	0	5190	Ant1	5190.04	40000	7.71	25	Pass
30C 13V	ac40	0	5190	Ant1	5190.04	40000	7.71	25	Pass
40C 13V	ac40	0	5190	Ant1	5190.08	80000	15.41	25	Pass
50C 13V	ac40	0	5190	Ant1	5190.04	40000	7.71	25	Pass
25C 11.05V	ac40	0	5230	Ant1	5230	0	0	25	Pass
25C 13V	ac40	0	5230	Ant1	5230.04	40000	7.65	25	Pass
25C14.95V	ac40	0	5230	Ant1	5230.04	40000	7.65	25	Pass
-10C 13V	ac40	0	5230	Ant1	5230.04	40000	7.65	25	Pass
0C 13V	ac40	0	5230	Ant1	5230.04	40000	7.65	25	Pass
10C 13V	ac40	0	5230	Ant1	5230	0	0	25	Pass
30C 13V	ac40	0	5230	Ant1	5230	0	0	25	Pass
40C 13V	ac40	0	5230	Ant1	5230.04	40000	7.65	25	Pass
50C 13V	ac40	0	5230	Ant1	5230	0	0	25	Pass
25C 11.05V	ac80	0	5210	Ant1	5210	0	0	25	Pass
25C 13V	ac80	0	5210	Ant1	5210	0	0	25	Pass
25C14.95V	ac80	0	5210	Ant1	5210	0	0	25	Pass
-10C 13V	ac80	0	5210	Ant1	5210.16	160000	16.5	25	Pass
0C 13V	ac80	0	5210	Ant1	5210	0	0	25	Pass
10C 13V	ac80	0	5210	Ant1	5210	0	0	25	Pass
30C 13V	ac80	0	5210	Ant1	5210	0	0	25	Pass
40C 13V	ac80	0	5210	Ant1	5210	0	0	25	Pass
50C 13V	ac80	0	5210	Ant1	5210.08	80000	8.62	25	Pass

APPENDIX: PHOTOGRAPHS OF TEST CONFIGURATION

Please refer to the test report: E04A23030703E00201.

APPENDIX: PHOTOGRAPHS OF THE EUT

Please refer to the test report: E04A23030703E00201.

---END OF REPORT---