FCC PART 15.407
TEST REPORT

On Behalf of

Guangdong ximico digital technology Co.,LTD

Room 409, 4th Floor, E1-1 Building, High-tech Development Zone, Heyuan City

FCC ID: 2BF3M-Z42

Model: Z42, H1, H2, H3, H5, H6, X1, X3, X4, X6, X8, X9, Y1, Y2, Y3, Z1, Z2, Z3, Z41, Z6, Z8, XY01, XY02, XY03, XY04, XY05, XY06, XY07, XY08, XY09, XY10, SY01, SY02, SY03, SY04, SY05, SY06, SY07, SY08, SY09, SY10

April 16, 2024

This Report Concerns:	**Equipment Type:**
☒ Original Report	Projector

Test Engineer:	LBi Li / LBi Li
Report Number:	**QCT24CR-1350E-04**
Test Date:	March 18 ~ April 15, 2024
Reviewed By:	Gordon Tan/ Gordon Tan
Approved By:	Kendy Wang / Kendy Wang
Prepared By:	**Shenzhen QC Testing Laboratory Co., Ltd.** East of 1/F., Building E, Xinghong Science Park, No.111, Shuiku Road, Fenghuanggang, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China **Tel: 0755-23008269** **Fax: 0755-23726780**

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Table of Contents

1. GENERAL INFORMATION 5

1.1 Product Description for Equipment under Test (EUT) 5
1.2 System Test Configuration 6
1.3 Test Facility 7
1.4 Measurement Uncertainty 7

2. SUMMARY OF TEST RESULTS 8

3. LIST OF TEST AND MEASUREMENT INSTRUMENTS 9

3.1 Conducted Emission Test 9
3.2 Radiated Emission Test 9
3.3 RF Conducted test 10

4. ANTENNA REQUIREMENT 11

5. CONDUCTED EMISSIONS 12

5.1 Applicable Standard 12
5.2 Limit 12
5.3 Test setup 12
5.4 EMI Test Receiver Setup 12
5.5 Test procedure 12
5.6 Test Data 12

6. BANDWIDTH 15

6.1 Applicable Standard 15
6.2 Limit 15
6.3 Test setup 15
6.4 Test Procedure 15
6.5 Test Data 15

7. CONDUCTED TRANSMITTER OUTPUT POWER 35

7.1 Applicable Standard 35
7.2 Limit 35
7.3 Test setup 35
7.4 Test Procedure 35
7.5 Test Data 35

8. POWER SPECTRAL DENSITY 37

8.1 Applicable St`andard 37
8.2 Limit 37
8.3 Test setup 37
8.4 Test Procedure 37
8.5 Test Data 37

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9. BAND EDGE 48
9.1 Applicable Standard 48
9.2 Limit 48
9.3 EMI Test Receiver Setup 48
9.4 Test setup 48
9.5 Test Procedure 48
9.6 Test Data 49
10. RADIATED EMISSION METHOD 51
10.1 Applicable Standard 51
10.2 Limit 51
10.3 Test setup 51
10.4 EMI Test Receiver Setup 52
10.5 Test procedure 52
10.6 Test Data 53

Address: East of 1/F., Building E, Xinghong Science Park, No.111, Shuiku Road, Fenghuanggang, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China
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Revision History of This Test Report

Report Number	Description	Issued Date
QCT24CR-1350E-04	Initial Issue	2024-4-16

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1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Description	Projector
Model No.	Z42, H1, H2, H3, H5, H6, X1, X3, X4, X6, X8, X9, Y1, Y2, Y3, Z1, Z2, Z3, Z41, Z6, Z8, XY01, XY02, XY03, XY04, XY05, XY06, XY07, XY08, XY09, XY10, SY01, SY02, SY03, SY04, SY05, SY06, SY07, SY08, SY09, SY10
Tested Model	Z42
Sample(s) Status	Engineer sample
Operation Frequency:	U-NII-1: 5180MHz~5240MHz
Channel numbers:	IEEE 802.11a/n/ac/ax 20MHz: 4 IEEE 802.11/n/ac/ax 40MHz: 2
Modulation type:	802.11a/n/ac/: OFDM; 802.11ax: OFDMA (802.11ax mode only support Full RU)
Antenna Type:	FPC Antenna
Antenna gain*1:	2.21dBi
Power supply:	100-240V~, 50/60Hz, 1.6A, 90W
Trade Mark:	N/A
Applicant	Guangdong ximico digital technology Co.,LTD
Address	Room 409, 4th Floor, E1-1 Building, High-tech Development Zone, Heyuan City
Manufacturer	Guangdong ximico digital technology Co.,LTD
Address	Room 409, 4th Floor, E1-1 Building, High-tech Development Zone, Heyuan City
Sample No.	Y24C1350E01LY

Note: *1This information provided by Manufacturer, SZ QC Lab is not responsible for the accuracy of this information.

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1.2 System Test Configuration

1.2.1 Channel List

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5180~5240MHz **(U-NII-1)**	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz
	42	5210 MHz		
For 20 MHz Bandwidth, use channel 36, 40, 44, 48. For 40 MHz Bandwidth, use channel 38, 46.				

Note: In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

For 802.11a/n20/ac20/ax20 channel 36, 40, 48 were tested;
For 802.11n40/ac40/ax40 channel 38, 46 were tested.

1.2.2 EUT Exercise Software

" SecureCRT " software was used to test. The software and power level was provided by the applicant.

Mode	Data Rate (Mbps)	Power Level
802.11 a	6	11
802.11 n20/n40/ac20/ac40/ax20/ax40	MCS0	11

1.2.3 Support Equipment

Manufacturer	Description	Model	Serial Number
/	/	/	/

1.2.4 Test mode

Transmitting mode: Keep the EUT in continuously transmitting.

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1.3 Test Facility

Test Firm : Shenzhen QC Testing Laboratory Co., Ltd.

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19. The testing quality system of our laboratory meets with ISO/IEC-17025 requirements. This approval result is accepted by MRA of APLAC.

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

CNAS – Registration No.: L8464

The EMC Laboratory has been accredited by CNAS, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

A2LA Certificate Number: 6759.01

The EMC Laboratory has been accredited by A2LA, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

FCC Registration Number: 561109

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission.

IC Registration Number: 29628

CAB identifier: CN0141

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada.

1.4 Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	±1.42 x10^{-4}%
RF output power, conducted	±1.06dB
Power Spectral Density, conducted	±1.06dB
Unwanted Emissions, conducted	±2.51dB
AC Power Line Conducted Emission	±1.80dB
Radiated Spurious Emission test (9kHz-30MHz)	±2.66dB
Radiated Spurious Emission test (30MHz-1000MHz)	±4.04dB
Radiated Spurious Emission test (1000MHz-18000MHz)	±4.70 dB
Radiated Spurious Emission test (18GHz-40GHz)	±4.80dB
Temperature	±0.8℃
Humidity	±3.2%
DC and low frequency voltages	±0.1%
Time	±5%
Duty cycle	±5%

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

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2. Summary of Test Results

Test Item	Section	Result
Antenna Requirement	FCC part 15.203	Pass
AC Power Line Conducted Emission	FCC part 15.207	Pass
Bandwidth	FCC part 15.407(a)	Pass
Conducted Transmitter Output Power	FCC part 15.407(a)(1)	Pass
Power Spectral Density	FCC part 15.407(a)(1)	Pass
Band Edge	FCC part 15.407(b)(1)	Pass
Undesirable Emission& Restricted Bands	FCC part 15.407(b)(1), 15.205/15.209	Pass

Note: 1. Pass: The EUT complies with the essential requirements in the standard,

2. Test according to ANSI C63.10:2013,

3. The Frequency Stability item is declared by the manufacturer,

4. All indications of Pass/Fail in this report are opinions expressed by Shenzhen QC Testing Laboratory Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.

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3. List of Test and Measurement Instruments

3.1 Conducted Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	EMI Test Receiver	R&S	ESIB 7	2277573376	2024.03.14	2025.03.13
2	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	101820	2023.08.21	2024.08.20
3	Artificial Mains Network	SCHWARZBECK	NSLK8126	8126200	2024.03.14	2025.03.13
4	PULSE LIMITER	R&S	ESH3-Z2	100058	2024.03.14	2025.03.13
Conducted Emission Measurement Software: TS						

3.2 Radiated Emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	Spectrum Analyzer	ROHDE&SCHWARZ	FSV 40	101458	2024.03.14	2025.03.13
2.	Loop Antenna	EMCO	6502	2133	2022.07.23	2024.07.22
3.	Logarithmic compound broadband Antenna	SCKWARZBECK	VULB9168	VULB9168-1-588	2023.04.01	2025.03.31
4.	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB 7	2277573376	2024.03.14	2025.03.13
5.	EMI Test Receiver	R&S	ESPI	101131	2024.03.14	2025.03.13
6.	Horn Antenna	SCHWARZBECK	BBHA9120D	02069	2023.04.01	2025.03.31
7.	Horn Antenna	COM-MW	ZLB7-18-40G -950	12221225	2023.01.12	2025.01.09
8.	Amplifier	R&S	BBV9721	9721-031	2024.03.14	2025.03.13
9.	Amplifier	HPX	BP-01G-18G	210902	2024.03.14	2025.03.13
10.	Pre-amplifier	COM-MW	DLAN-18000 -40000-02	10229104	2024.03.14	2025.03.13
11.	966 Chamber	ZhongYu Electron	9*6*6	/	2022.07.25	2025.07.24
Radiated Emission Measurement Software: EZ_EMC						

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3.3 RF Conducted test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	Wideband Radio Communication Tester	Rohde & Schwarz	CW500	151583	2024.03.14	2025.03.13
2.	Spectrum Analyzer	ROHDE& SCHWARZ	FSV 40	101458	2024.03.14	2025.03.13
3.	Signal Generator	Agilent	N5182A	MY50141563	2024.03.14	2025.03.13
4.	RF Automatic Test System	MW	MW100-RFCB/ MW100-PSB	MW2007004	2024.03.14	2025.03.13
RF Conducted Measurement Software: MTS 8310						

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4. Antenna requirement

Standard requirement: FCC Part15 C Section 15.203

15.203 requirement:
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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna: The Ant is FPC Antenna, the best case gain of the antenna is 2.21dBi, reference to the Internal photo for details.

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5. Conducted Emissions

5.1 Applicable Standard

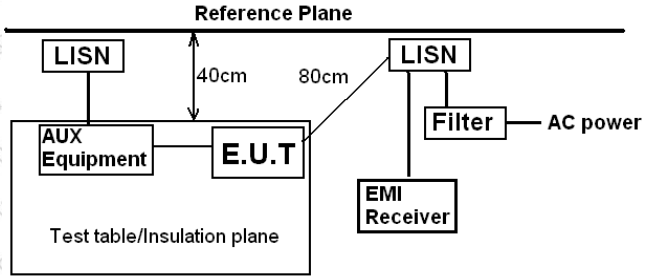
FCC Part15 C Section 15.207

5.2 Limit

Frequency range (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

Note *: The level decreases linearly with the logarithm of the frequency.

5.3 Test setup



Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

5.4 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.
RBW=9 kHz, VBW=30 kHz, Sweep time=auto

5.5 Test procedure

1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

5.6 Test Data

Temperature	25.4 ℃	Humidity	62%
ATM Pressure	101.1kPa	Antenna Gain	2.21dBi
Test by	LBi Li	Test result	PASS

Test Voltage: AC 120V/60Hz

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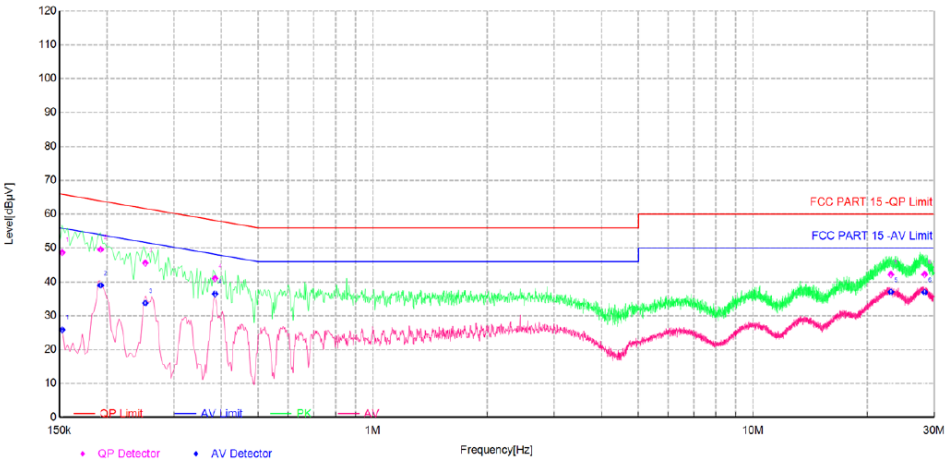
Measurement data:

Pre-scan all test modes, found worst case at 802.11a mode 5180MHz, and so only show the test result of 802.11a mode 5180MHz

Line:



Final Data List										
NO.	Freq. [MHz]	Factor[dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Phase	Verdict
1	0.1525	10.02	48.71	65.86	17.15	25.88	55.86	29.98	L	PASS
2	0.1925	10.23	49.59	63.93	14.34	38.96	53.93	14.97	L	PASS
3	0.2525	10.40	45.61	61.67	16.06	33.74	51.67	17.93	L	PASS
4	0.3850	10.10	41.07	58.17	17.10	36.49	48.17	11.68	L	PASS
5	23.0780	10.42	42.22	60.00	17.78	37.00	50.00	13.00	L	PASS
6	28.3070	10.55	42.24	60.00	17.76	36.91	50.00	13.09	L	PASS

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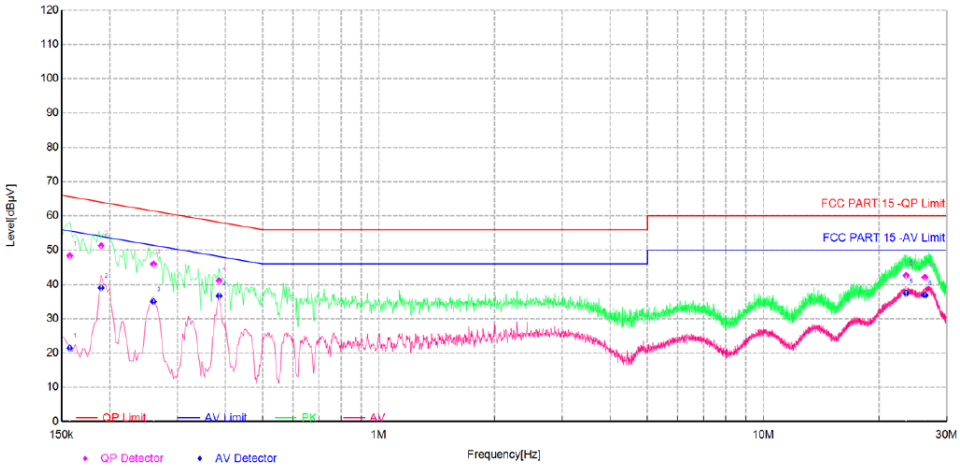
Neutral:



Final Data List										
NO.	Freq. [MHz]	Factor[dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Phase	Verdict
1	0.1575	10.04	48.38	65.59	17.21	21.43	55.59	34.16	N	PASS
2	0.1900	10.25	51.32	64.04	12.72	39.01	54.04	15.03	N	PASS
3	0.2600	10.41	45.98	61.43	15.45	35.00	51.43	16.43	N	PASS
4	0.3850	10.41	41.11	58.17	17.06	36.69	48.17	11.48	N	PASS
5	23.5100	10.46	42.63	60.00	17.37	37.38	50.00	12.62	N	PASS
6	26.3000	10.49	42.12	60.00	17.88	36.85	50.00	13.15	N	PASS

Notes:

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

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6. Bandwidth

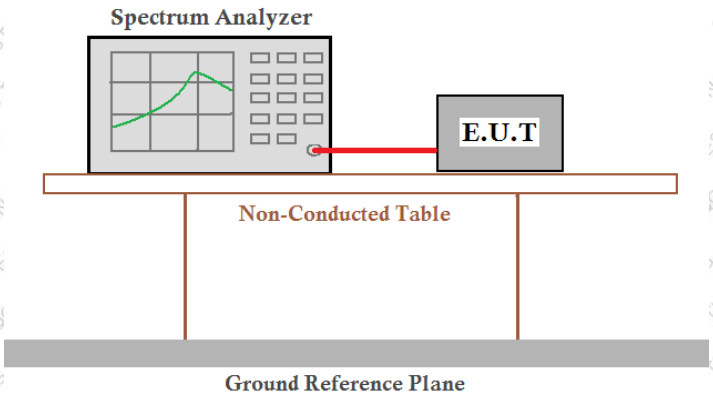
6.1 Applicable Standard

FCC Part15 E Section 15.407

6.2 Limit

N/A

6.3 Test setup



6.4 Test Procedure

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

6.5 Test Data

Temperature	23.5 ℃	Humidity	48%
ATM Pressure	101.1kPa	Antenna Gain	2.21dBi
Test by	LBi Li	Test result	PASS

Please refer to following table and plots.

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Measurement Data:

Mode	Frequency (MHz)	Antenna	-26 dB Bandwidth (MHz)	99% OBW (MHz)	Verdict
802.11a	5180	Ant1	26.145	16.822	Pass
	5200	Ant1	25.311	16.771	Pass
	5240	Ant1	26.052	16.78	Pass
802.11n20	5180	Ant1	27.045	18.01	Pass
	5200	Ant1	26.82	18.007	Pass
	5240	Ant1	26.244	18.025	Pass
802.11n40	5190	Ant1	47.064	36.908	Pass
	5230	Ant1	47.022	36.794	Pass
802.11ac20	5180	Ant1	29.049	18.067	Pass
	5200	Ant1	29.13	18.049	Pass
	5240	Ant1	28.893	18.055	Pass
802.11ac40	5190	Ant1	46.938	36.884	Pass
	5230	Ant1	46.416	36.752	Pass
802.11ax20	5180	Ant1	26.631	19.156	Pass
	5200	Ant1	26.28	19.135	Pass
	5240	Ant1	25.437	19.153	Pass
802.11ax40	5190	Ant1	44.454	38.042	Pass
	5230	Ant1	44.598	38.006	Pass

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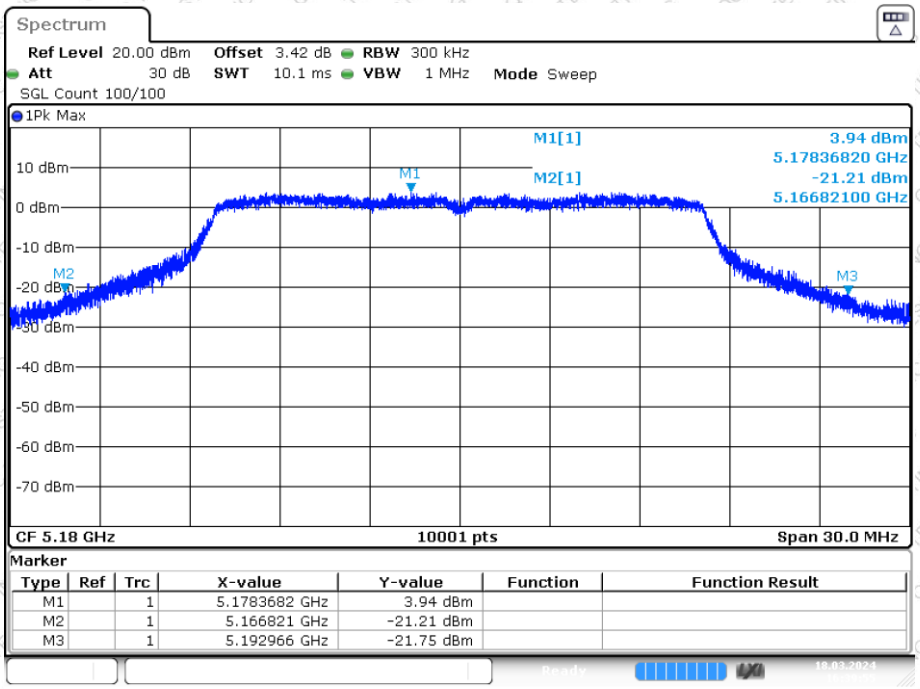
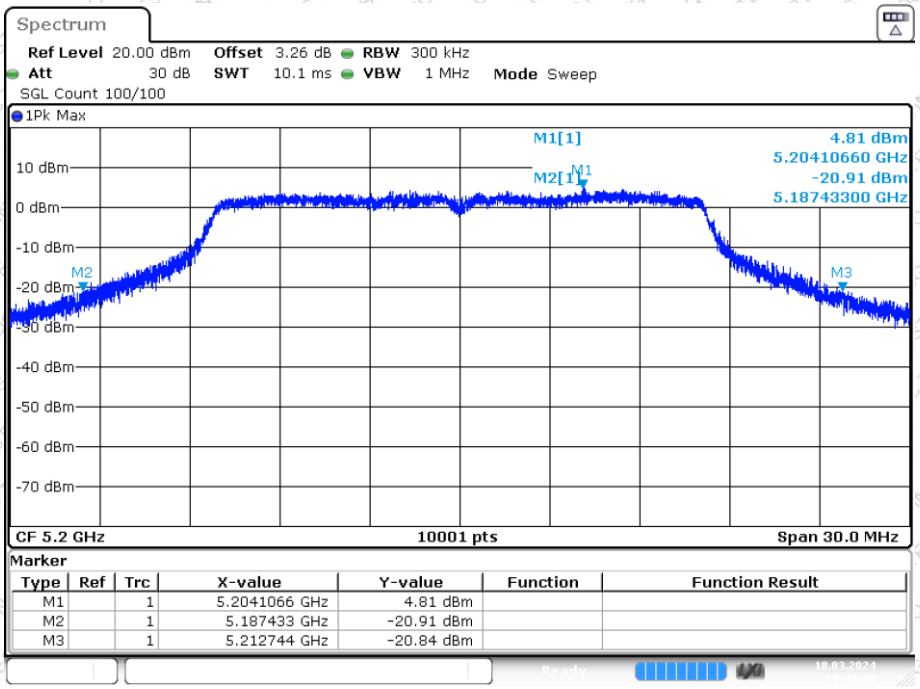
-26dB Bandwidth NVNT a 5180MHz Ant1



Date: 18.MAR.2024 16:39:55

-26dB Bandwidth NVNT a 5200MHz Ant1



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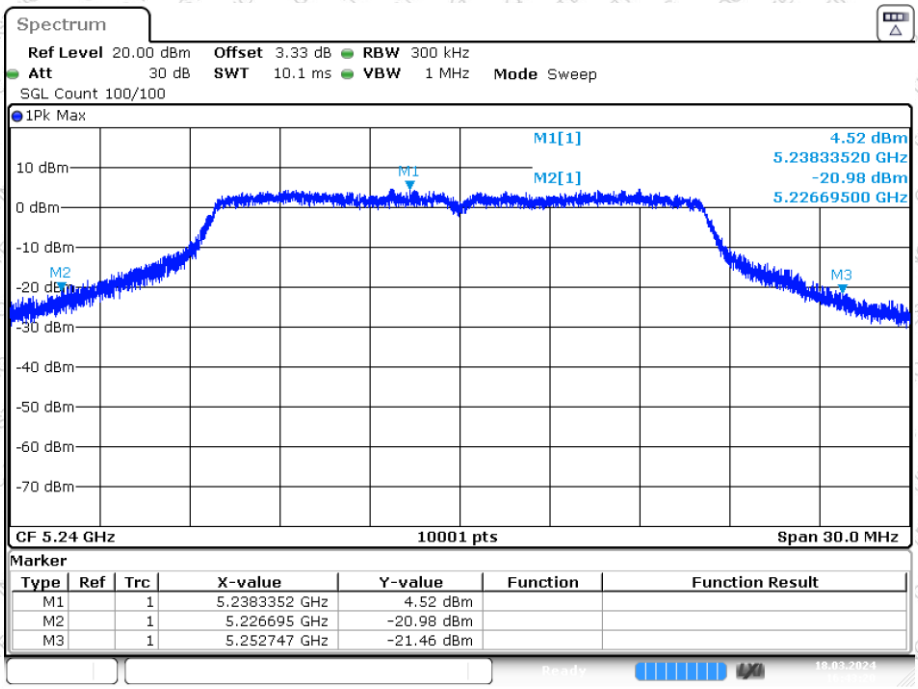
-26dB Bandwidth NVNT a 5240MHz Ant1



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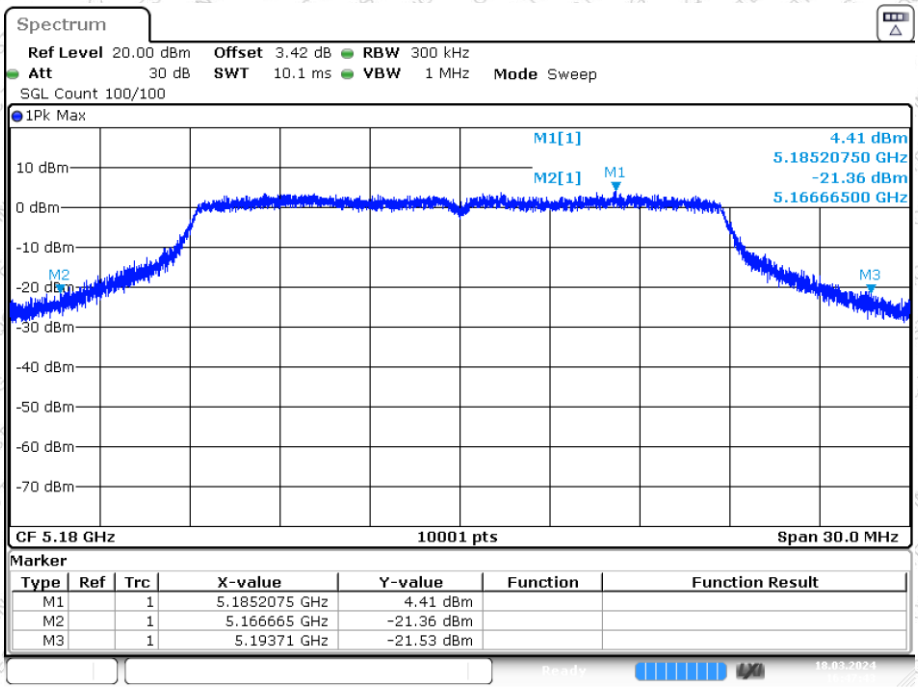
-26dB Bandwidth NVNT n20 5180MHz Ant1



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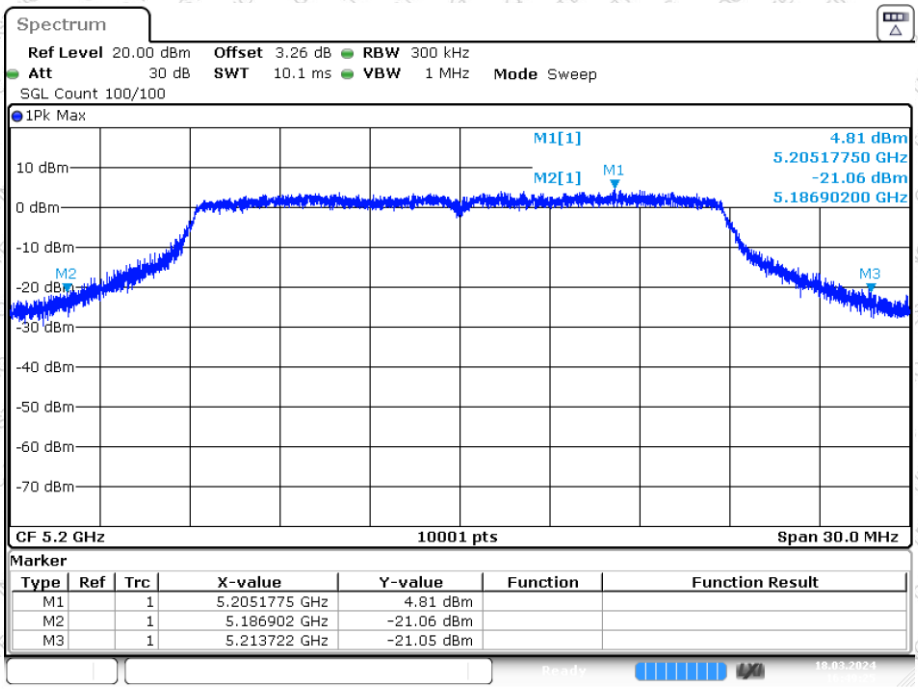
-26dB Bandwidth NVNT n20 5200MHz Ant1

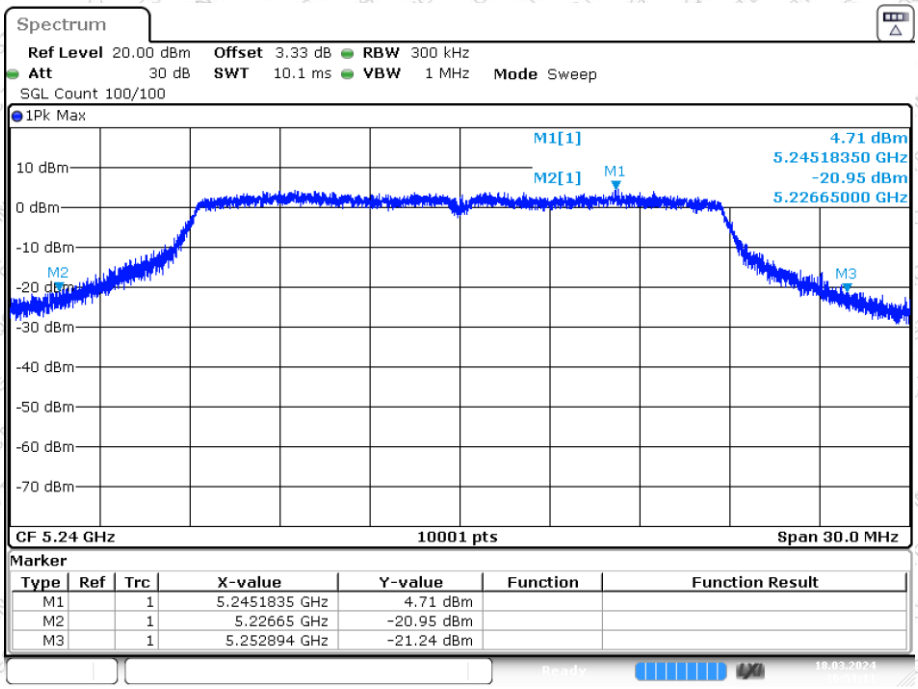


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.2051775 GHz	4.81 dBm		
M2		1	5.186902 GHz	-21.06 dBm		
M3		1	5.213722 GHz	-21.05 dBm		

Date: 18.MAR.2024 16:49:26

-26dB Bandwidth NVNT n20 5240MHz Ant1



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Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.2451835 GHz	4.71 dBm		
M2		1	5.22665 GHz	-20.95 dBm		
M3		1	5.252894 GHz	-21.24 dBm		

Date: 18.MAR.2024 16:51:11

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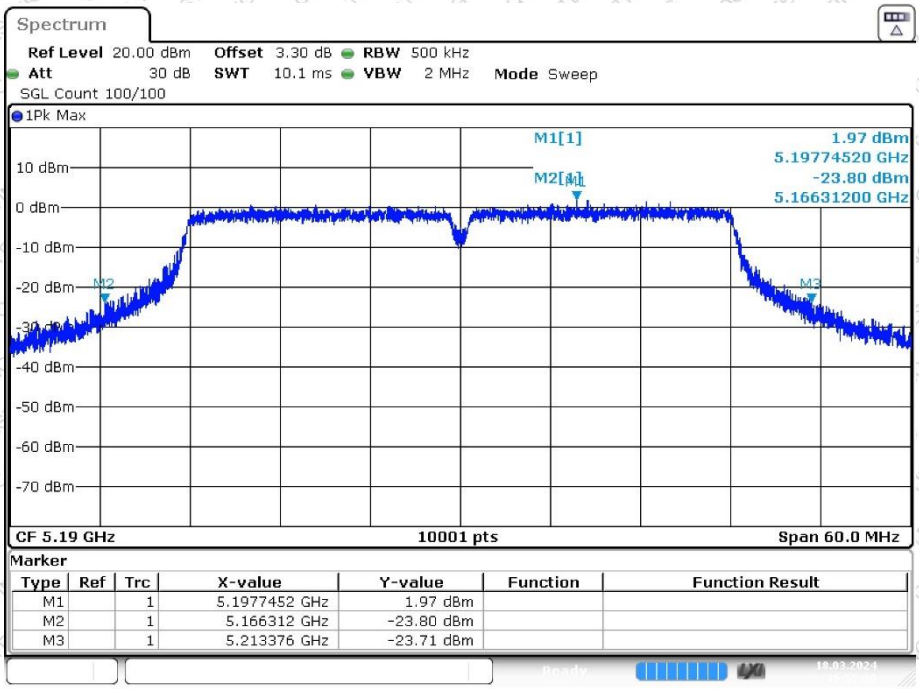
-26dB Bandwidth NVNT n40 5190MHz Ant1



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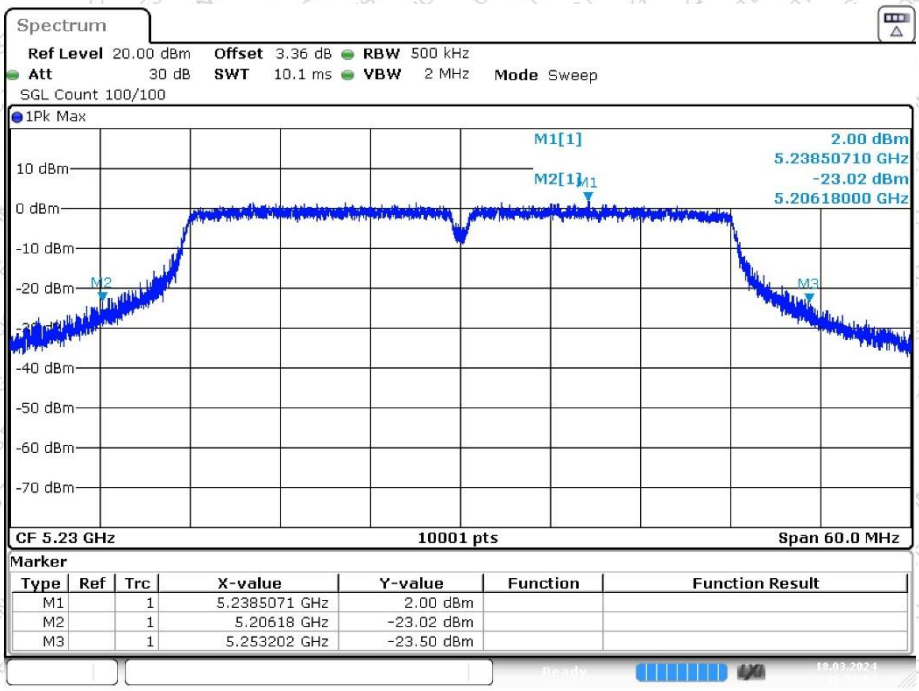
-26dB Bandwidth NVNT n40 5230MHz Ant1



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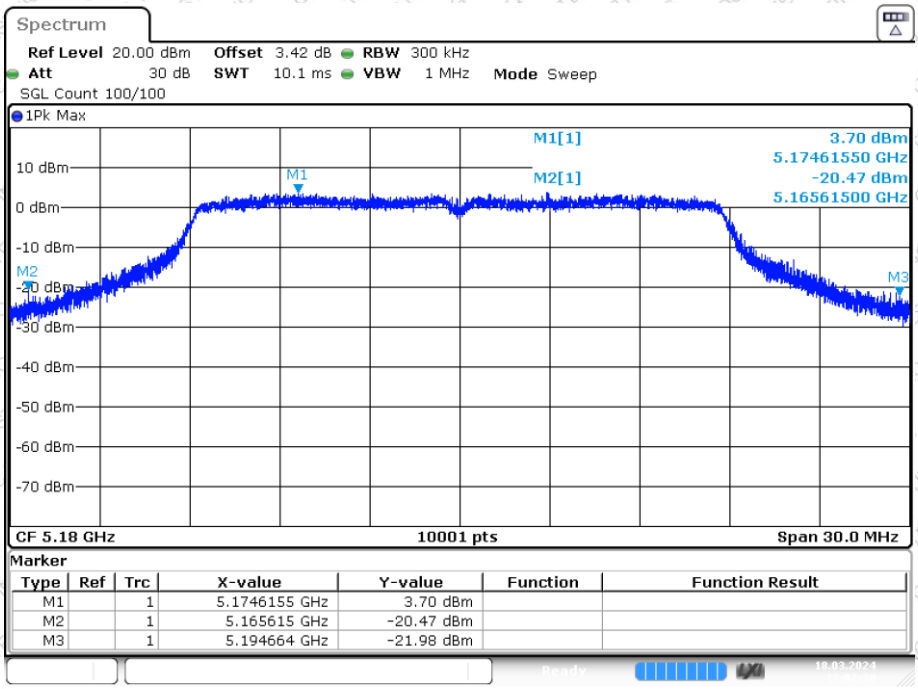
-26dB Bandwidth NVNT ac20 5180MHz Ant1



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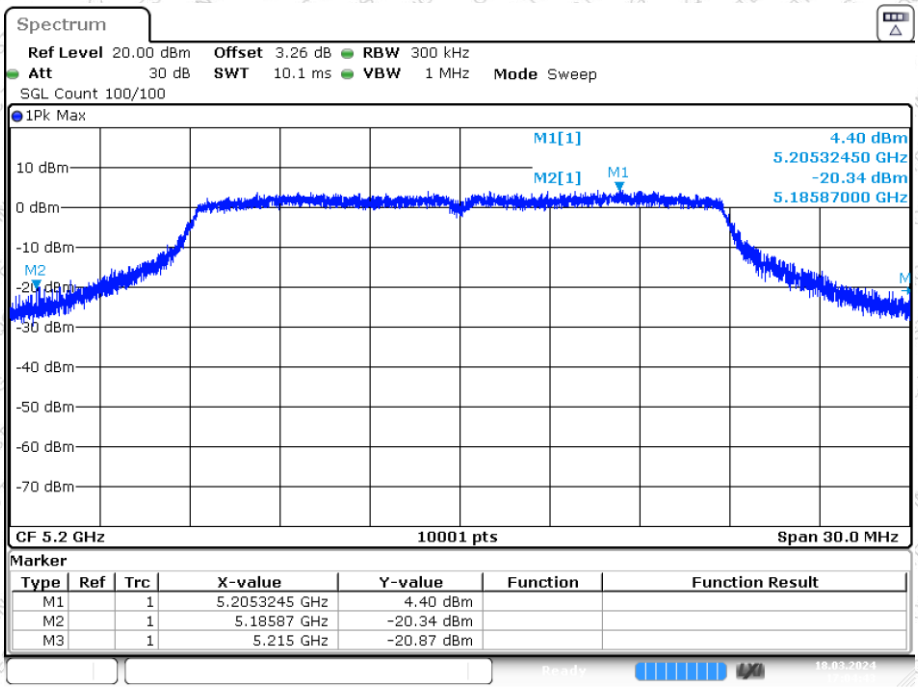
-26dB Bandwidth NVNT ac20 5200MHz Ant1



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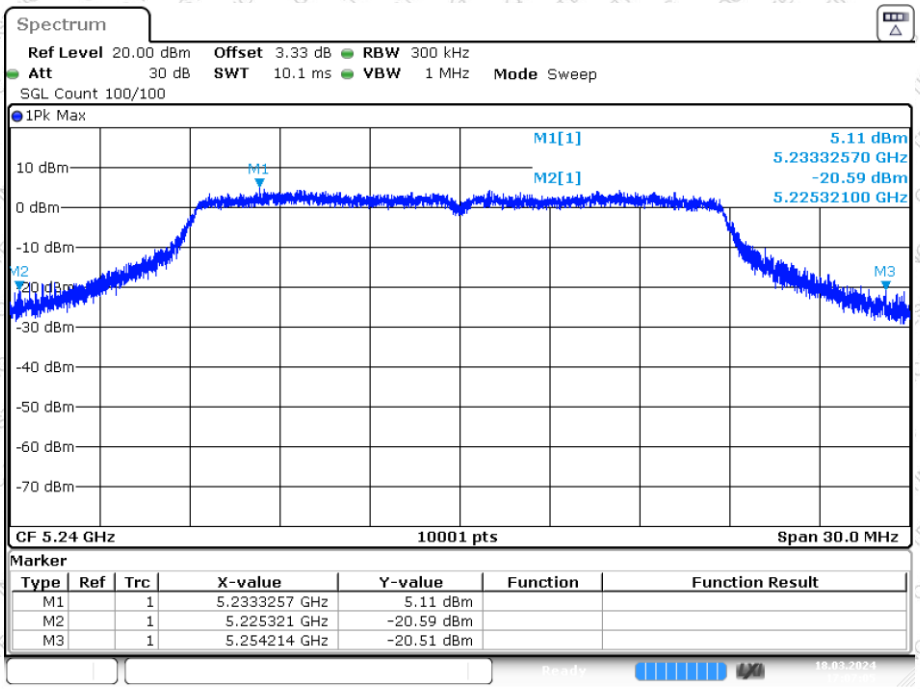
-26dB Bandwidth NVNT ac20 5240MHz Ant1



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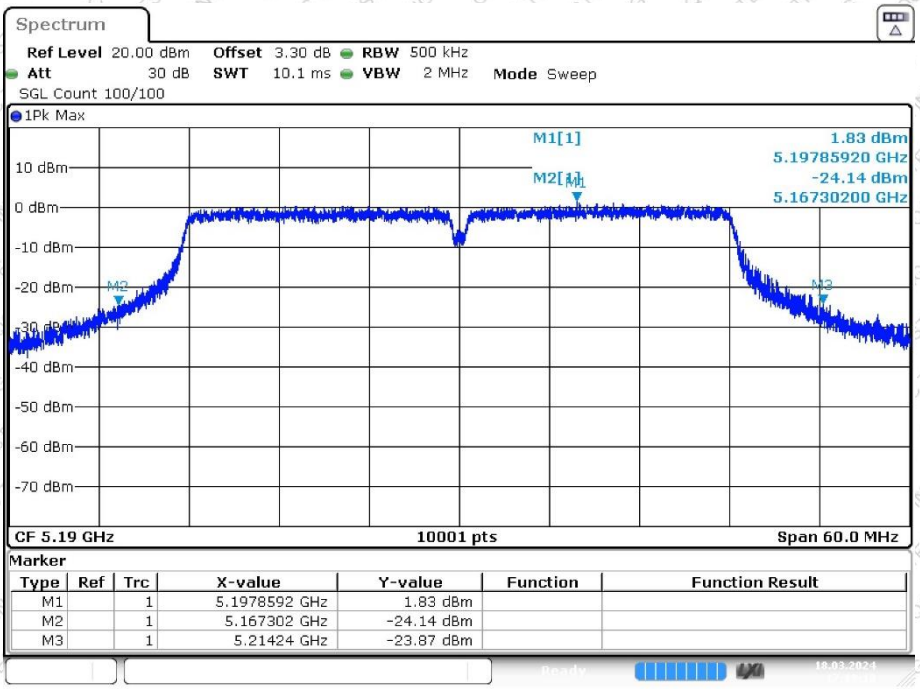
-26dB Bandwidth NVNT ac40 5190MHz Ant1



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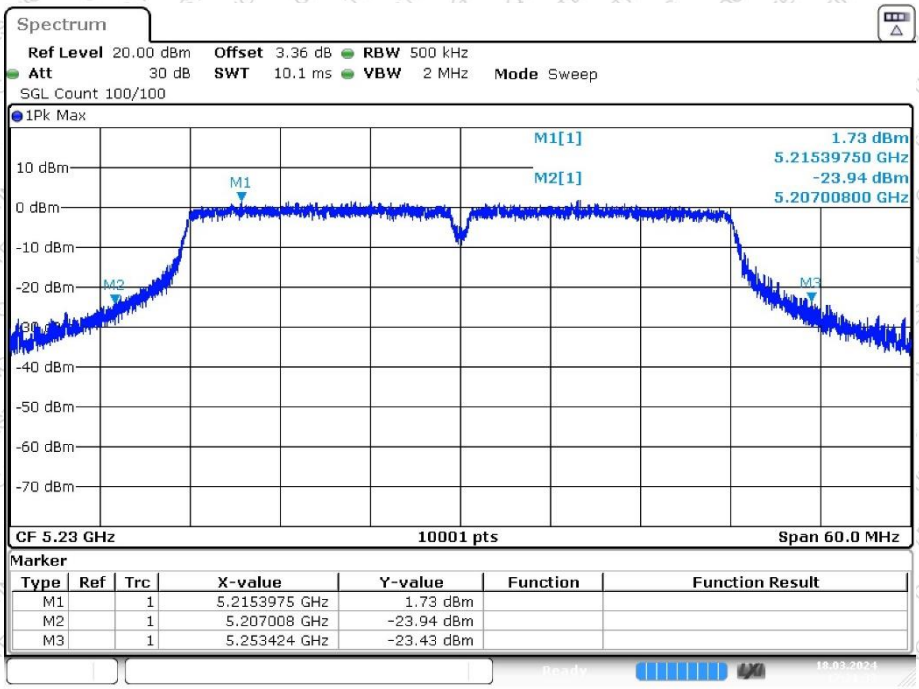
-26dB Bandwidth NVNT ac40 5230MHz Ant1



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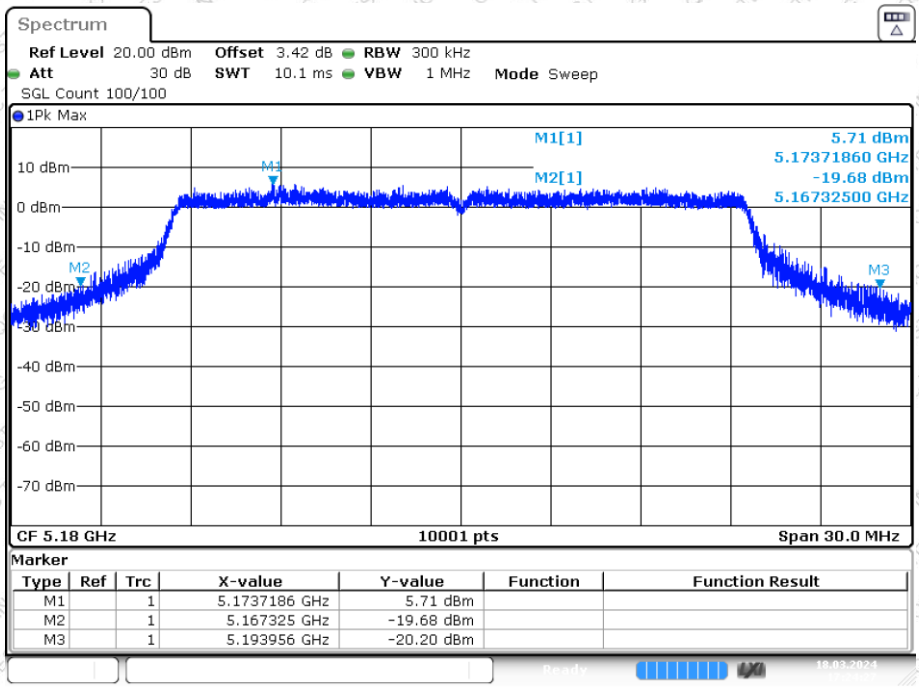
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.2153975 GHz	1.73 dBm		
M2		1	5.207008 GHz	-23.94 dBm		
M3		1	5.253424 GHz	-23.43 dBm		

Date: 18.MAR.2024 17:21:33

-26dB Bandwidth NVNT ax20 5180MHz Ant1



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.1737186 GHz	5.71 dBm		
M2		1	5.167325 GHz	-19.68 dBm		
M3		1	5.193956 GHz	-20.20 dBm		

Date: 18.MAR.2024 17:24:28

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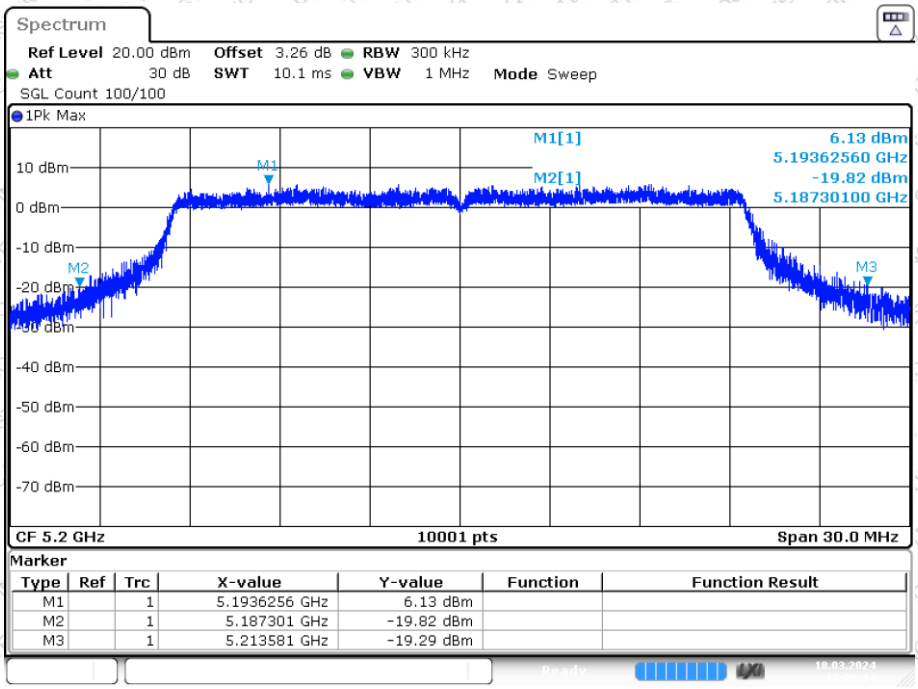
-26dB Bandwidth NVNT ax20 5200MHz Ant1



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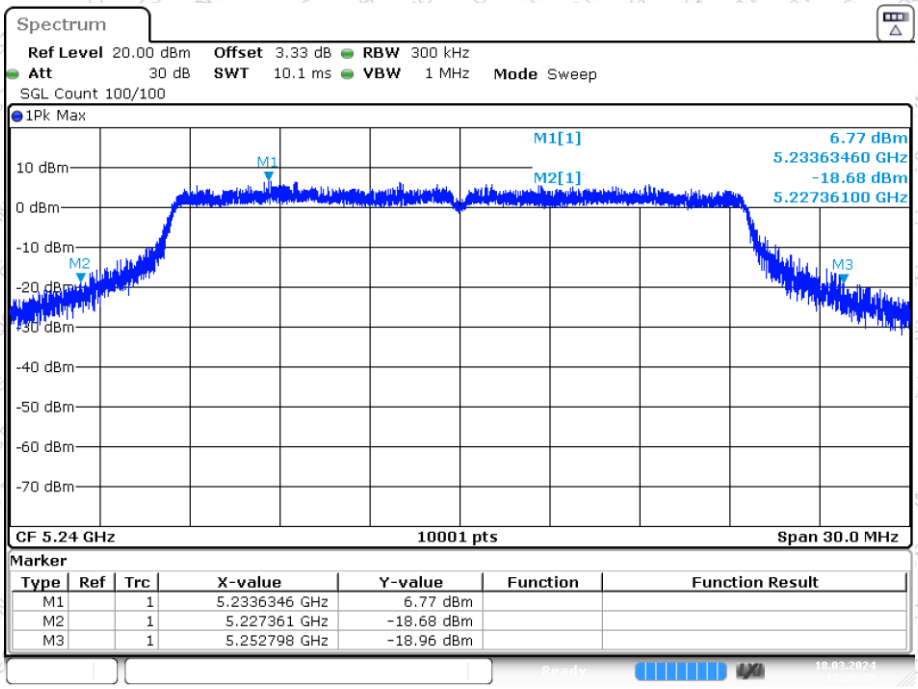
-26dB Bandwidth NVNT ax20 5240MHz Ant1



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Address: East of 1/F., Building E, Xinghong Science Park, No.111, Shuiku Road, Fenghuanggang, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China
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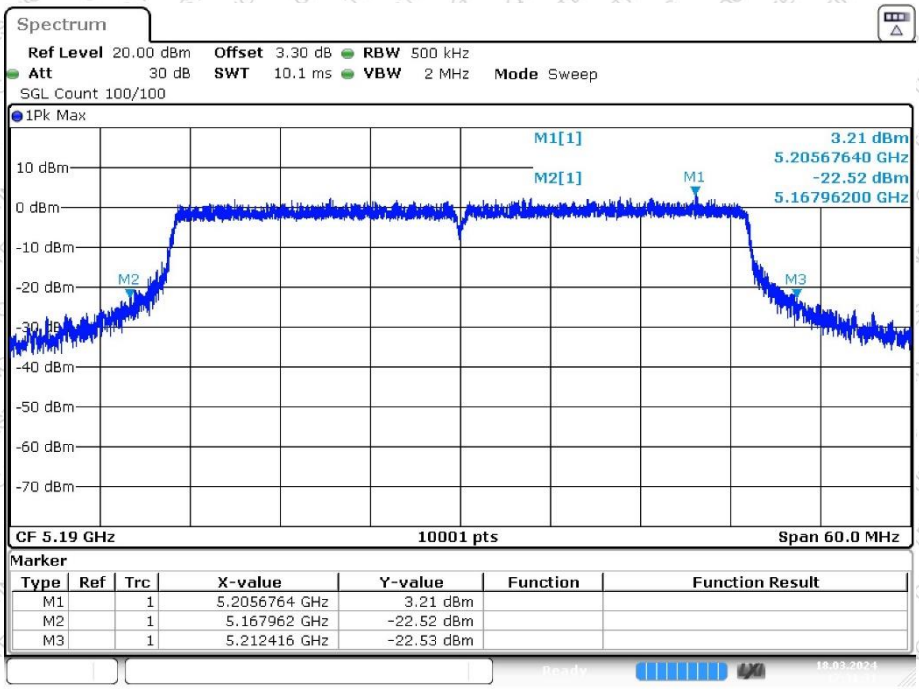
-26dB Bandwidth NVNT ax40 5190MHz Ant1



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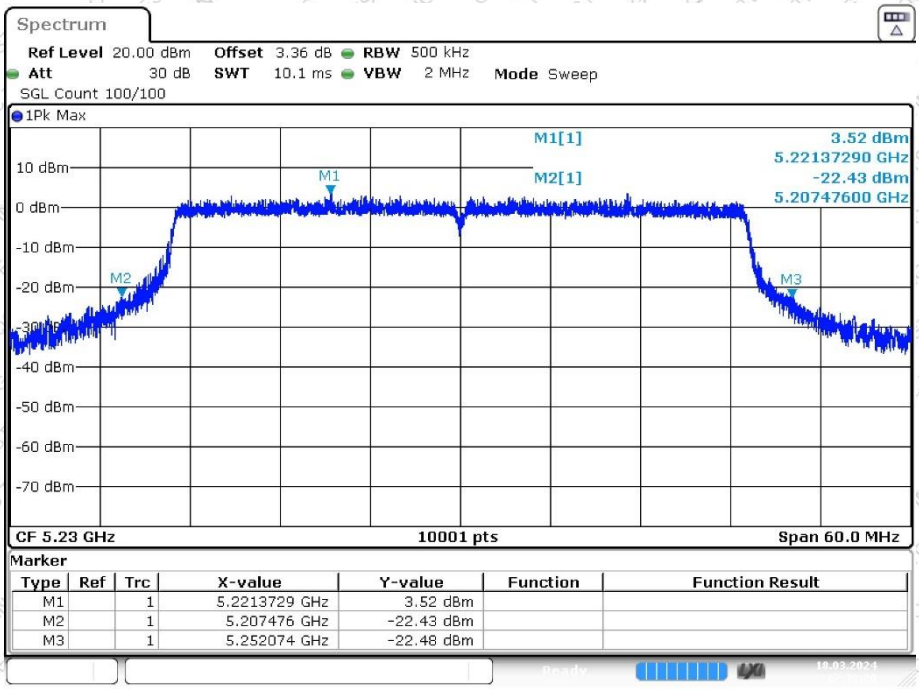

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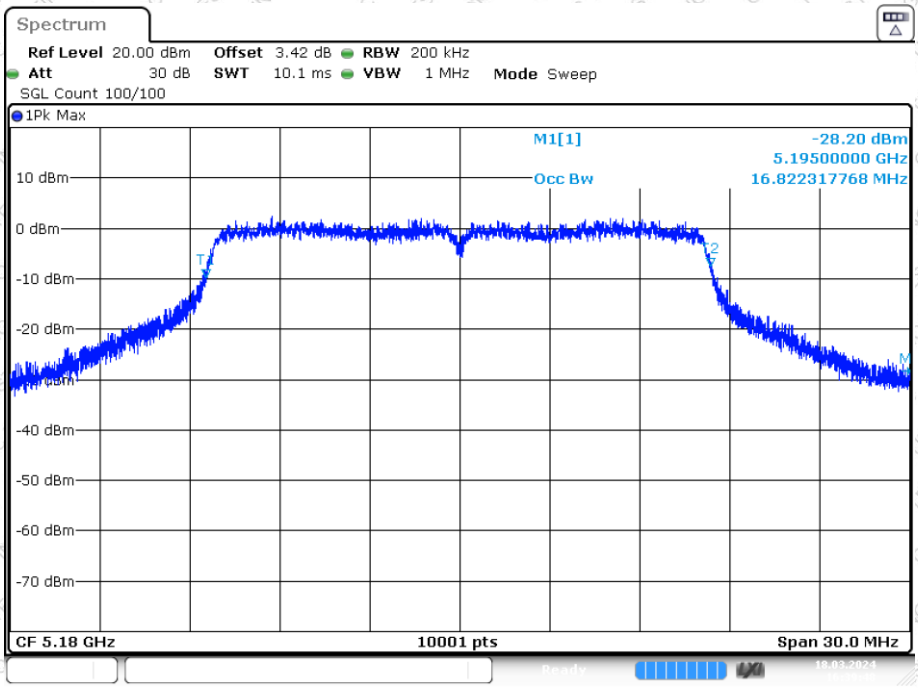
OBW NVNT a 5180MHz Ant1



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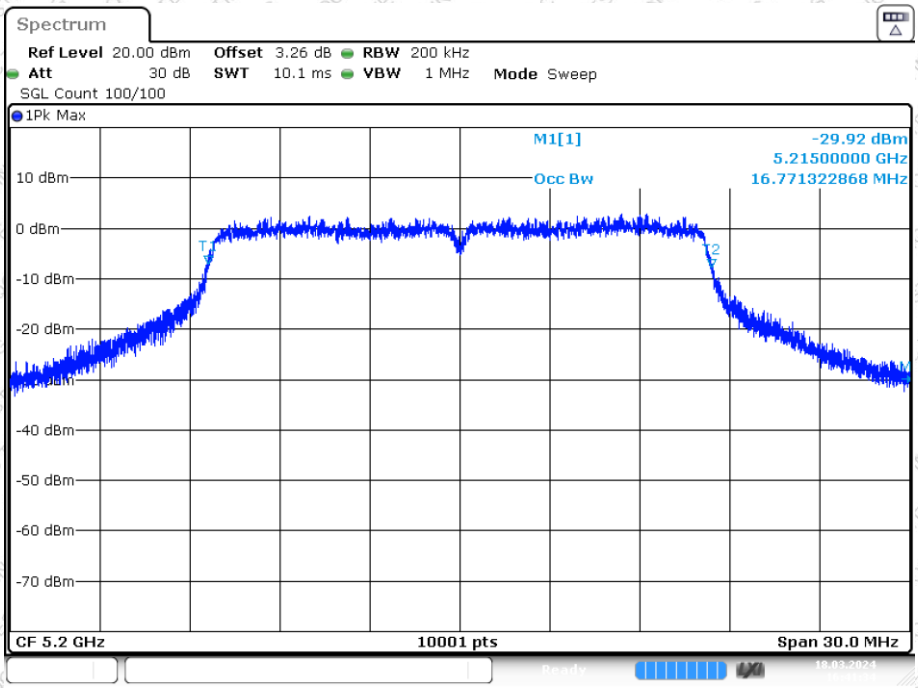
OBW NVNT a 5200MHz Ant1



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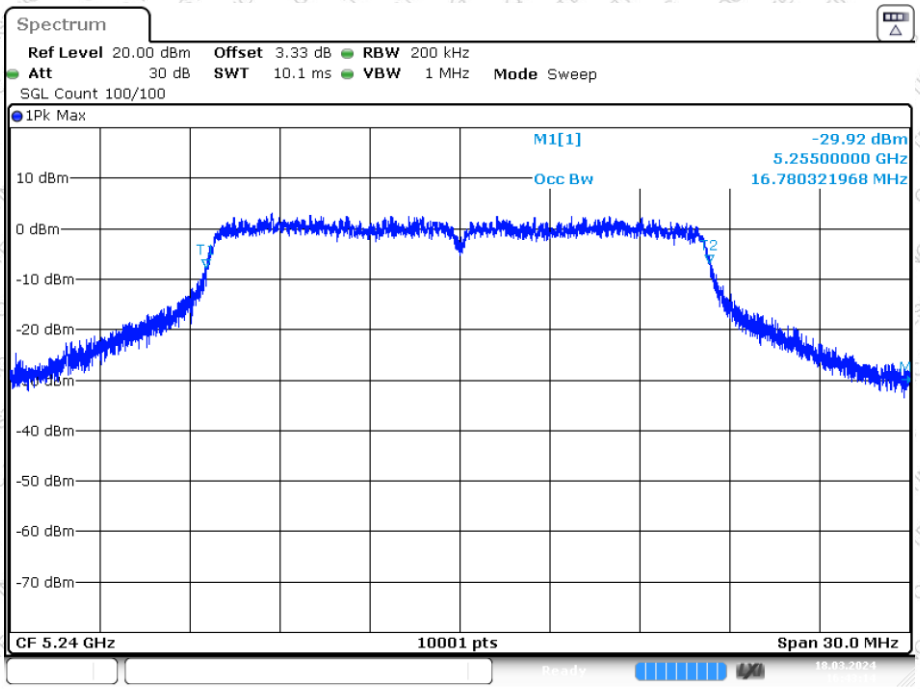
OBW NVNT a 5240MHz Ant1



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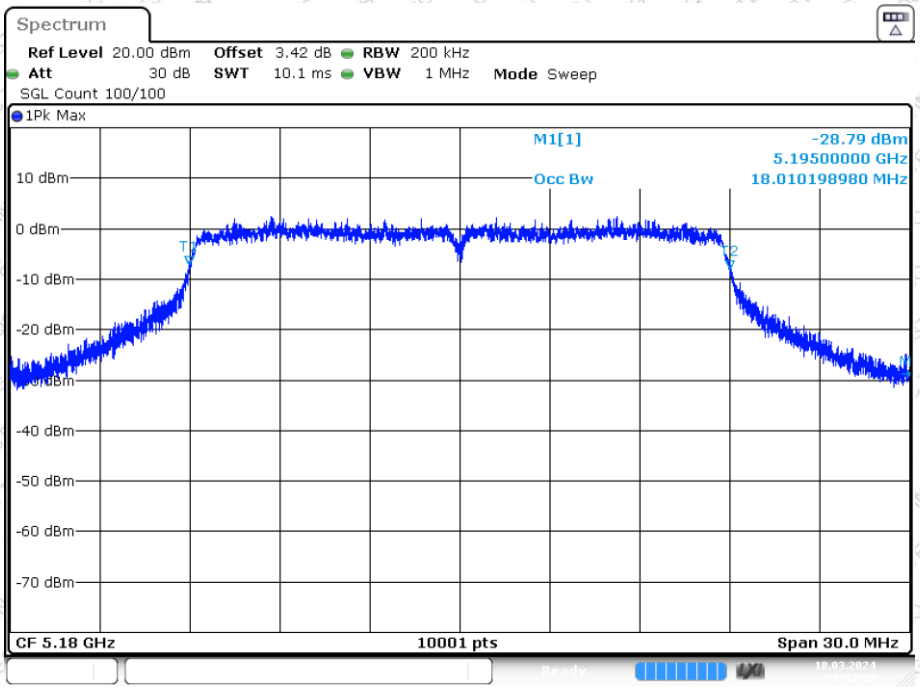
OBW NVNT n20 5180MHz Ant1



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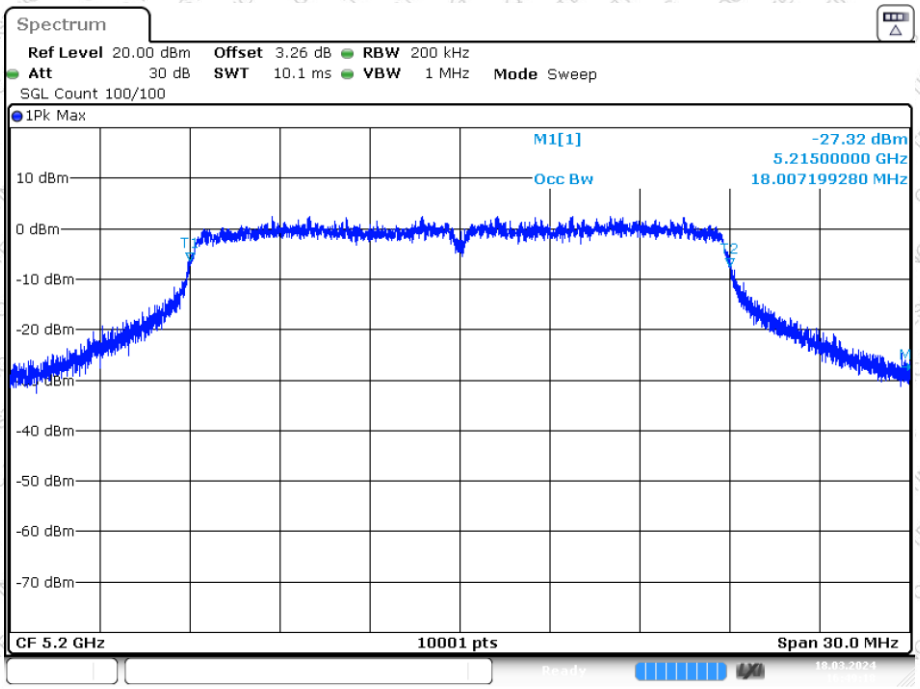
OBW NVNT n20 5200MHz Ant1



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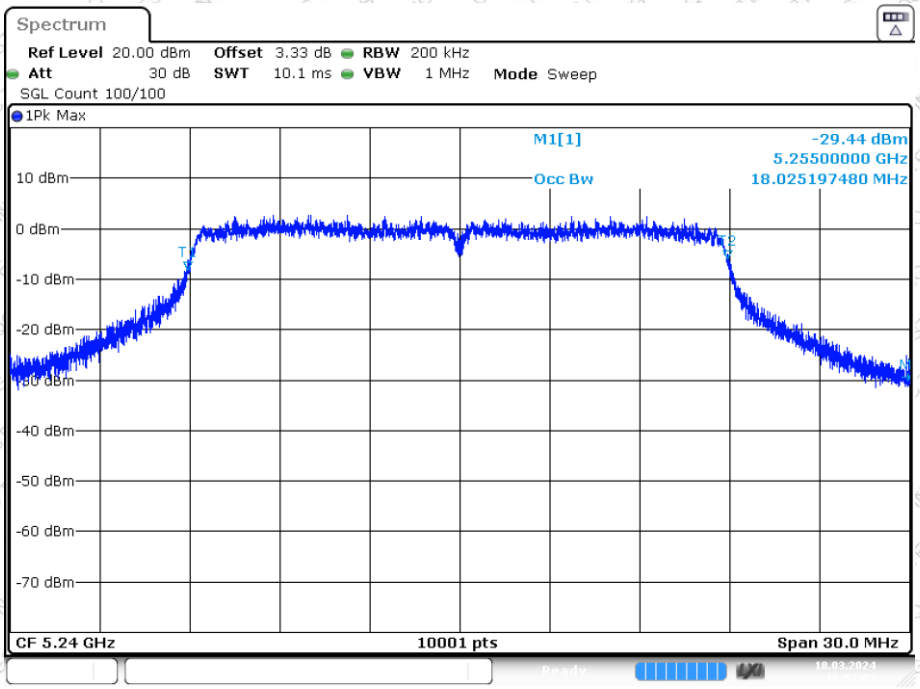

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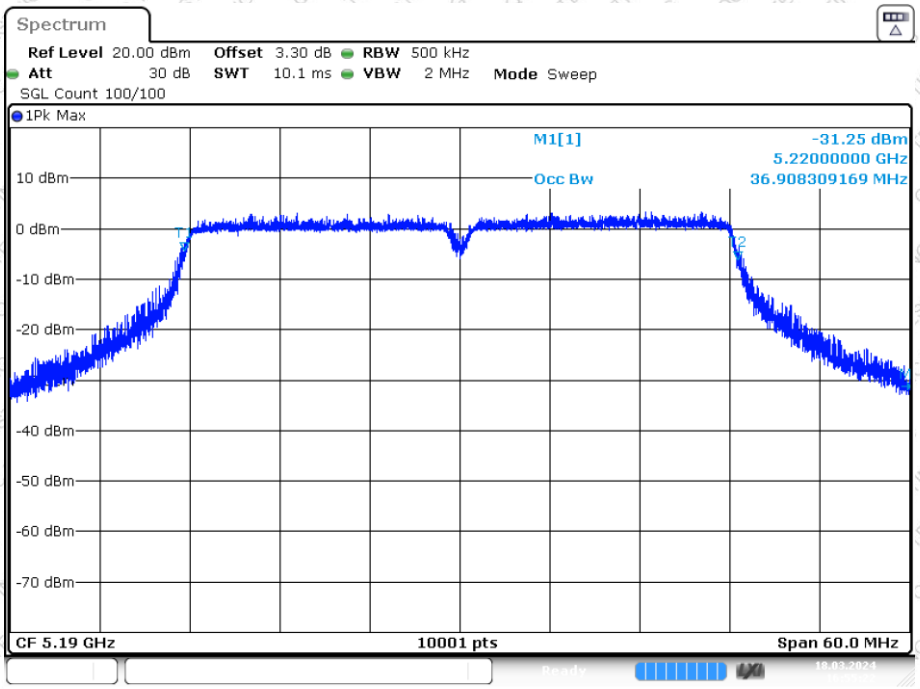
OBW NVNT n40 5190MHz Ant1



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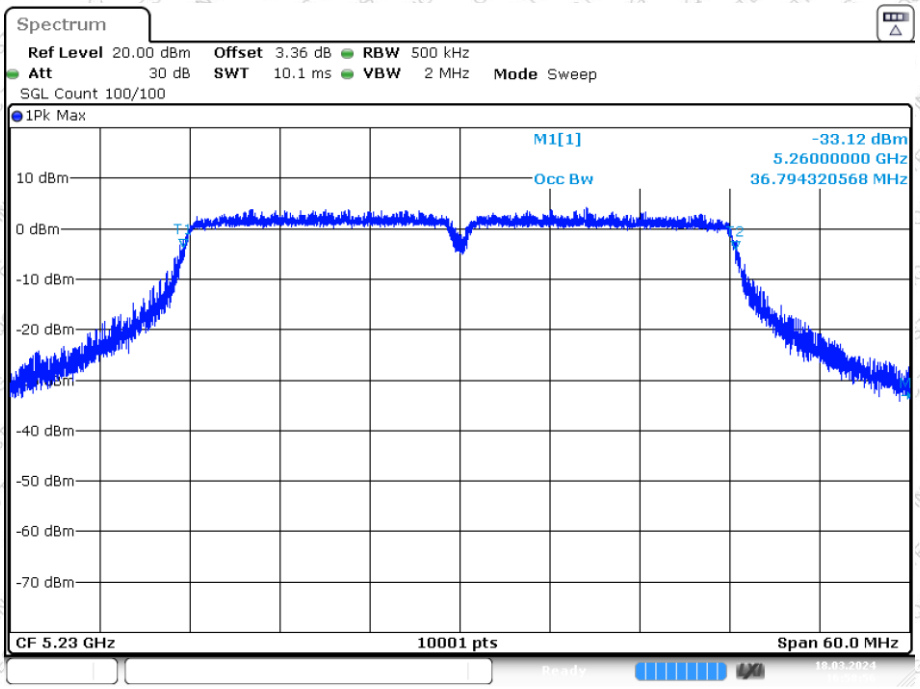
OBW NVNT n40 5230MHz Ant1



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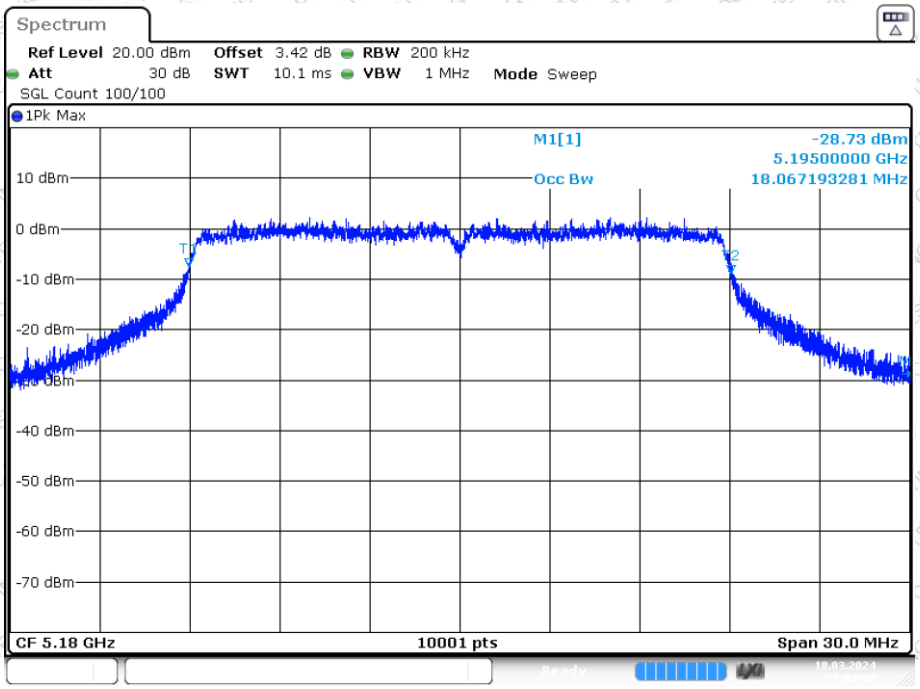
OBW NVNT ac20 5180MHz Ant1



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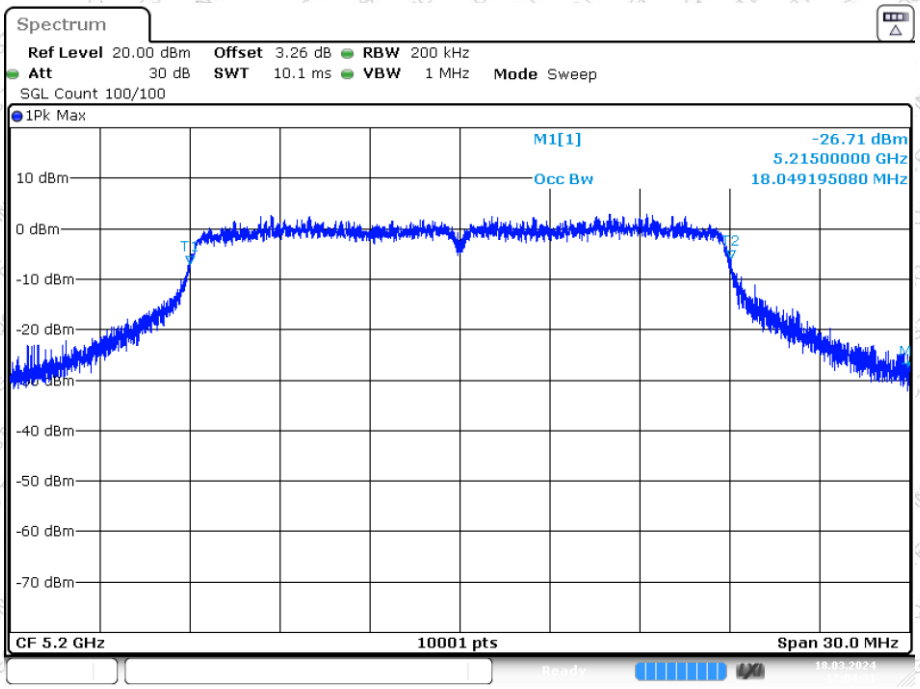

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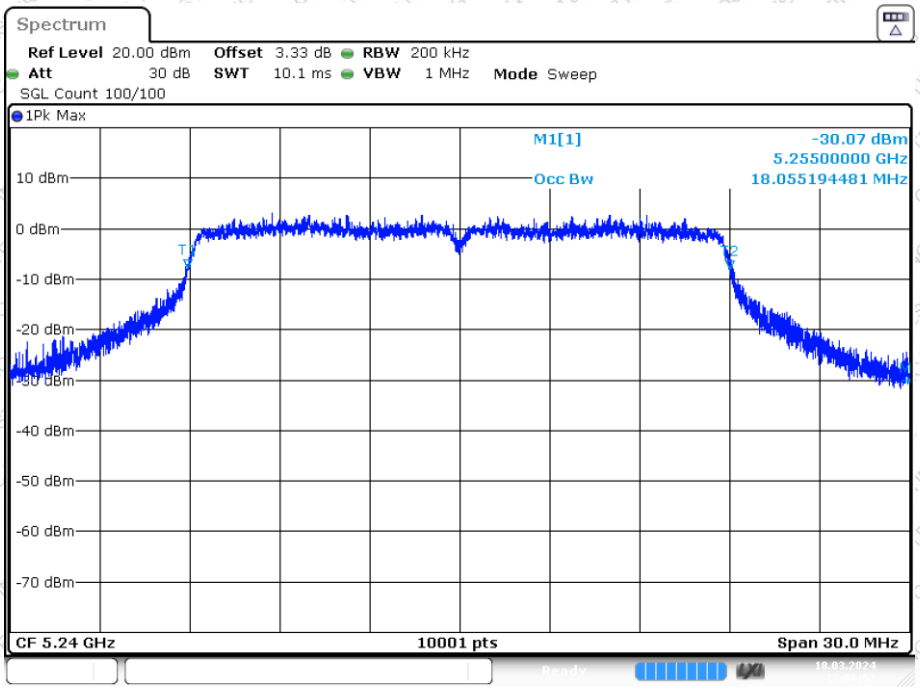
OBW NVNT ac20 5240MHz Ant1



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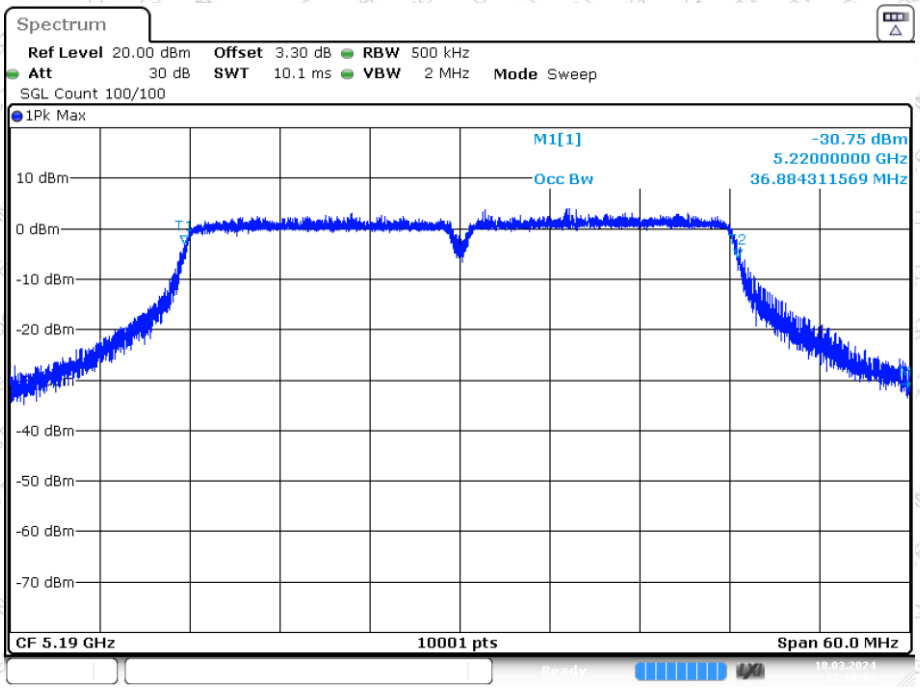

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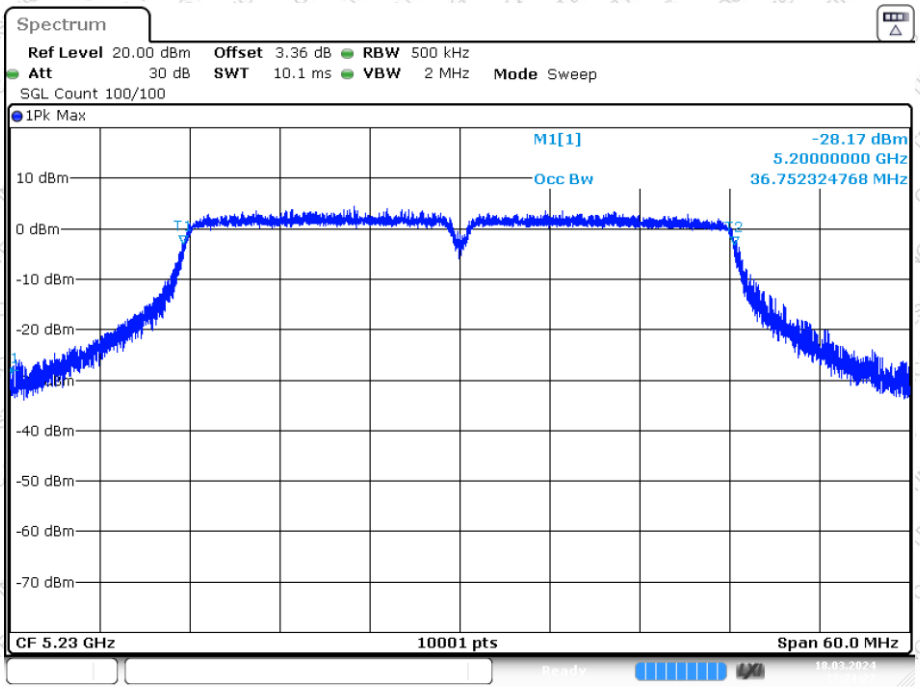
OBW NVNT ac40 5230MHz Ant1



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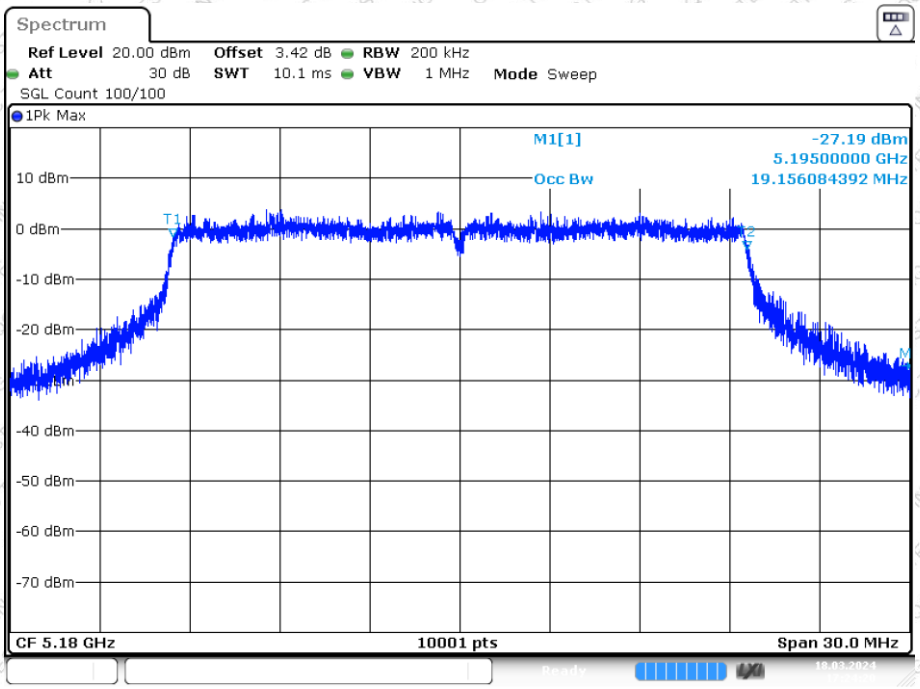
OBW NVNT ax20 5180MHz Ant1



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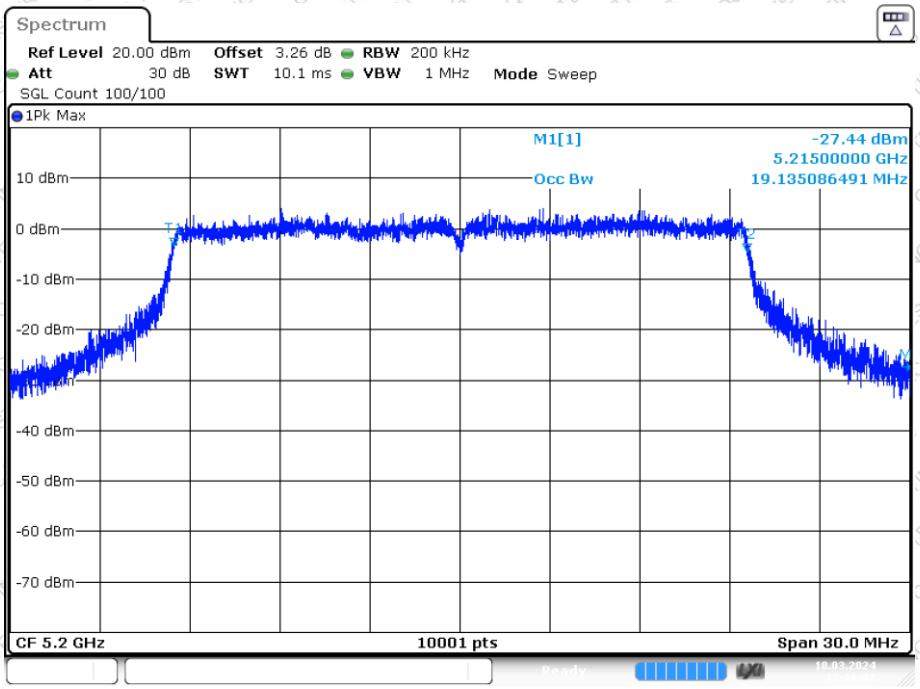
OBW NVNT ax20 5200MHz Ant1



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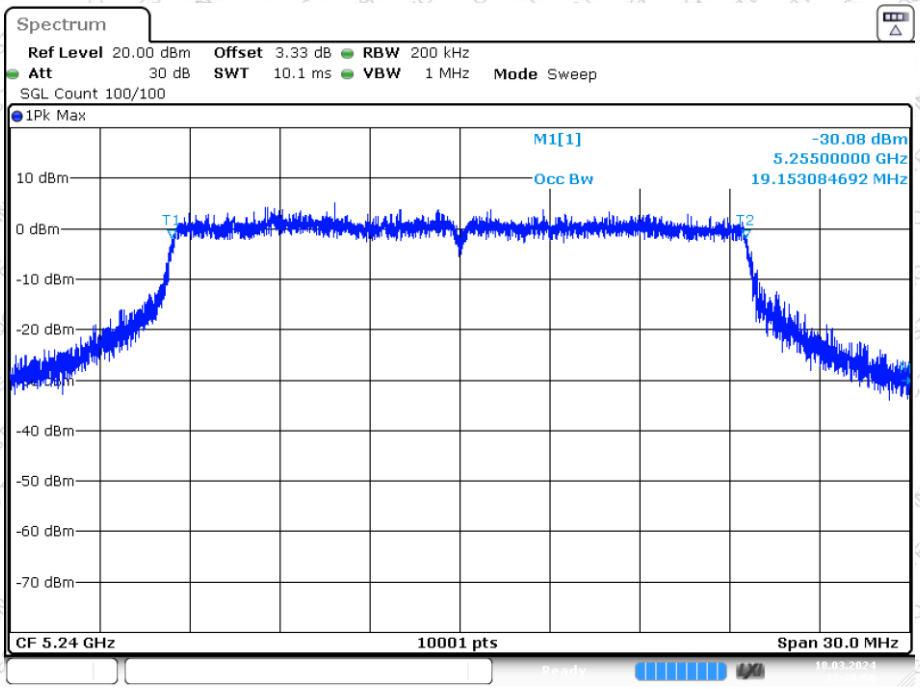

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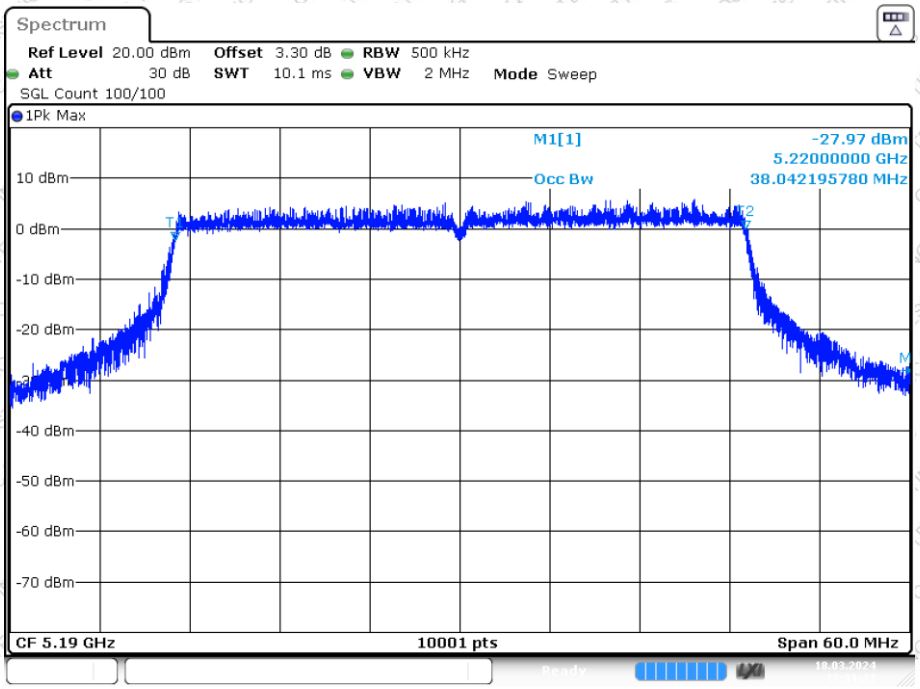
OBW NVNT ax40 5190MHz Ant1



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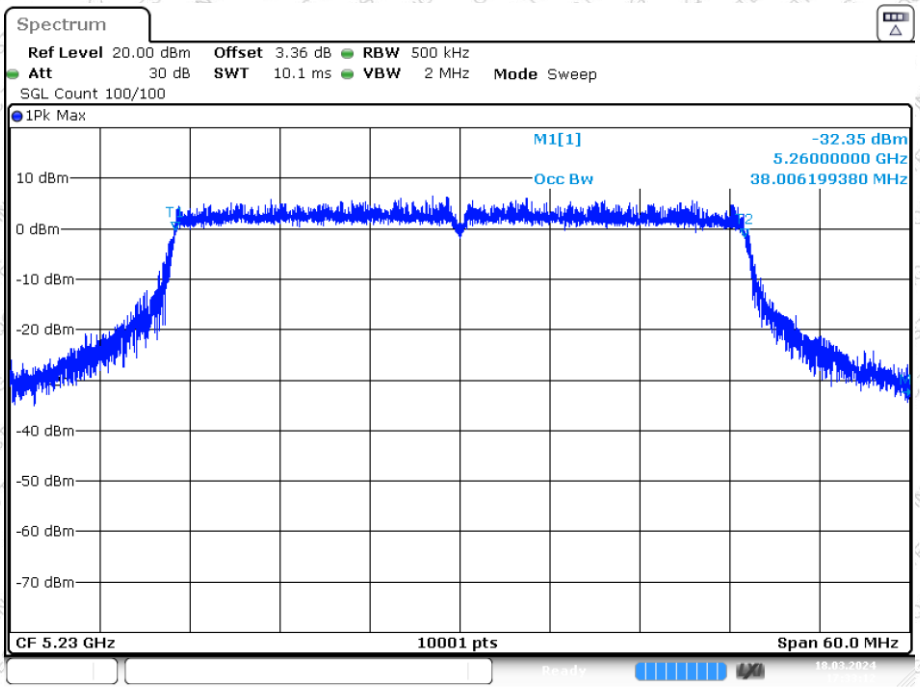
OBW NVNT ax40 5230MHz Ant1



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Address: East of 1/F., Building E, Xinghong Science Park, No.111, Shuiku Road, Fenghuanggang, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China
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7. Conducted Transmitter Output Power

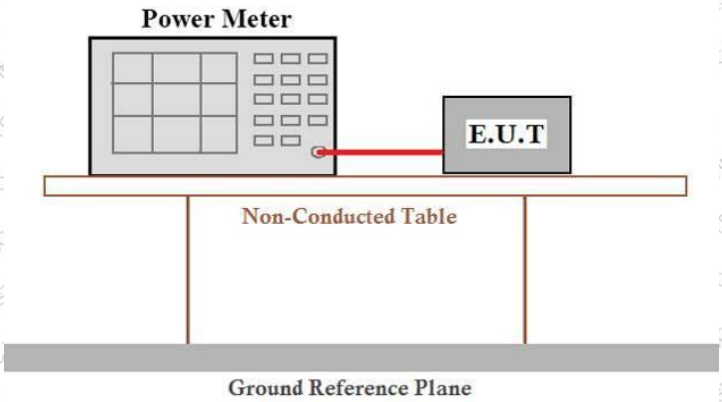
7.1 Applicable Standard

FCC Part15 E Section 15.407

7.2 Limit

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. 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.

7.3 Test setup



7.4 Test Procedure

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 conditions listed below 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 section 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., 10log(1/0.25) if the duty cycle is 25 percent).

7.5 Test Data

Temperature	23.5 ℃	Humidity	48%
ATM Pressure	101.1kPa	Antenna Gain	2.21dBi
Test by	LBi Li	Test result	PASS

Please refer to following table and plots.

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Measurement Data

Mode	Frequency (MHz)	Conducted Power (dBm)	Duty Cycle (%)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
802.11a	5180	12.17	93.72	0.28	12.45	24	Pass
	5200	12.68	94.37	0.25	12.93	24	Pass
	5240	12.8	92.46	0.34	13.14	24	Pass
802.11n20	5180	12.26	93.68	0.28	12.54	24	Pass
	5200	12.61	94.06	0.27	12.88	24	Pass
	5240	12.73	94.65	0.24	12.97	24	Pass
802.11n40	5190	12.26	90.94	0.41	12.67	24	Pass
	5230	12.71	84.03	0.76	13.47	24	Pass
802.11ac20	5180	12.22	94.39	0.25	12.47	24	Pass
	5200	12.86	94.03	0.27	13.13	24	Pass
	5240	12.78	95.37	0.21	12.99	24	Pass
802.11ac40	5190	12.29	90.45	0.44	12.73	24	Pass
	5230	12.97	90.2	0.45	13.42	24	Pass
802.11ax20	5180	12.23	94.06	0.27	12.5	24	Pass
	5200	12.84	83.21	0.8	**13.64**	24	Pass
	5240	12.81	92.58	0.33	13.14	24	Pass
802.11ax40	5190	12.13	84.65	0.72	12.85	24	Pass
	5230	12.77	86.24	0.64	13.41	24	Pass

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8. Power Spectral Density

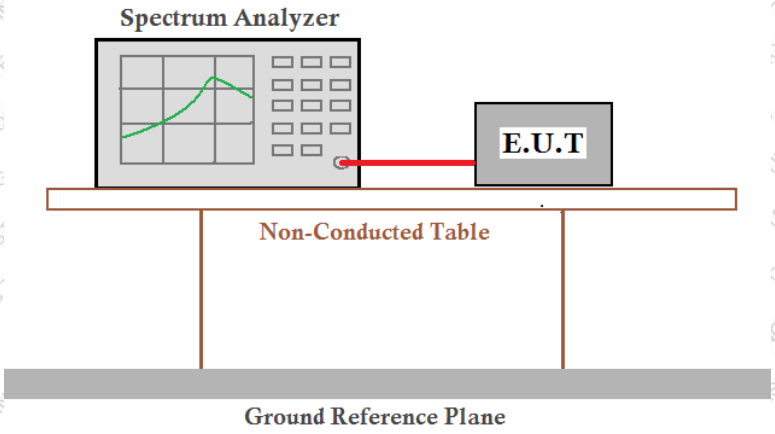
8.1 Applicable St`andard

FCC Part15 E Section 15.407

8.2 Limit

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. 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.

8.3 Test setup



8.4 Test Procedure

i. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”.

ii. Use the peak search function on the instrument to find the peak of the spectrum.

iii. Make the following adjustments to the peak value of the spectrum, if applicable:

iv. a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.

v. b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.

vi. The result is the PSD.

8.5 Test Data

Temperature	23.5 ℃	Humidity	48%
ATM Pressure	101.1kPa	Antenna Gain	2.21dBi
Test by	LBi Li	Test result	PASS

Please refer to following table and plots.

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Mode	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Cycle (%)	Duty Factor (dB)	PSD (dBm/MHz)	Limit (dBm)	Verdict
802.11a	5180	1.77	93.72	0.28	2.05	11	Pass
	5200	2.27	94.37	0.25	2.52	11	Pass
	5240	2.09	92.46	0.34	2.43	11	Pass
802.11n20	5180	1.26	93.68	0.28	1.54	11	Pass
	5200	1.98	94.06	0.27	2.25	11	Pass
	5240	1.98	94.65	0.24	2.22	11	Pass
802.11n40	5190	-1.68	90.94	0.41	-1.27	11	Pass
	5230	-1.11	84.03	0.76	-0.35	11	Pass
802.11ac20	5180	1.46	94.39	0.25	1.71	11	Pass
	5200	1.76	94.03	0.27	2.03	11	Pass
	5240	1.99	95.37	0.21	2.2	11	Pass
802.11ac40	5190	-1.65	90.45	0.44	-1.21	11	Pass
	5230	-1.29	90.2	0.45	-0.84	11	Pass
802.11ax20	5180	1.43	94.06	0.27	1.7	11	Pass
	5200	2.27	83.21	0.8	3.07	11	Pass
	5240	1.98	92.58	0.33	2.31	11	Pass
802.11ax40	5190	-1.8	84.65	0.72	-1.08	11	Pass
	5230	-1.16	86.24	0.64	-0.52	11	Pass

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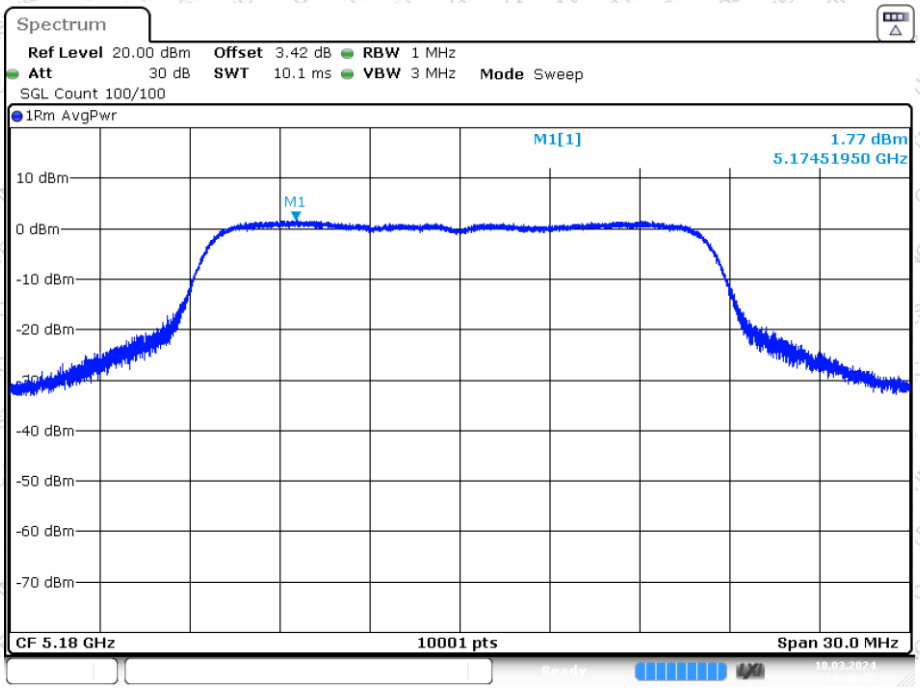
PSD NVNT a 5180MHz Ant1



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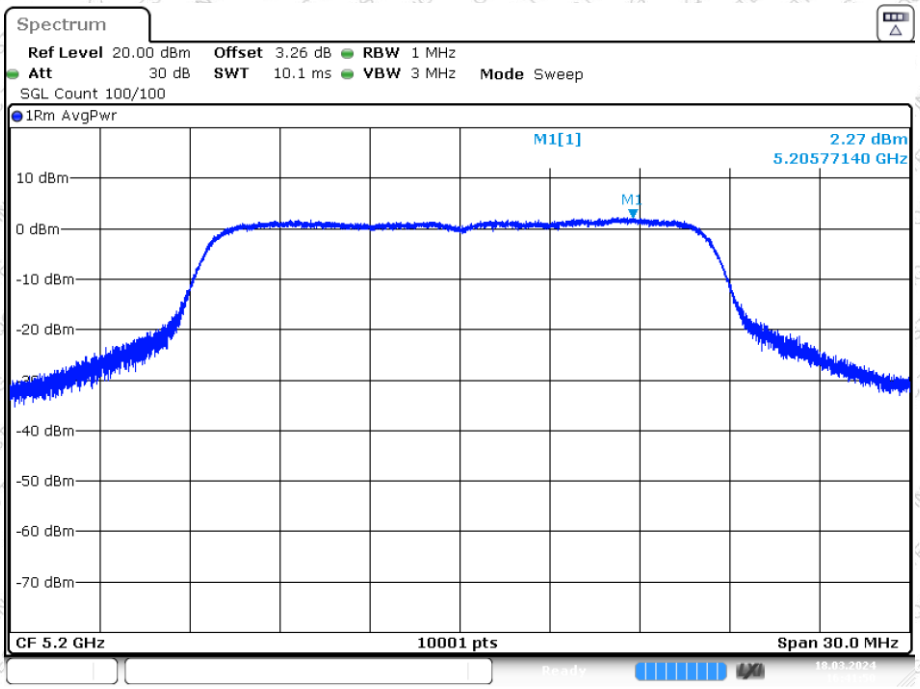

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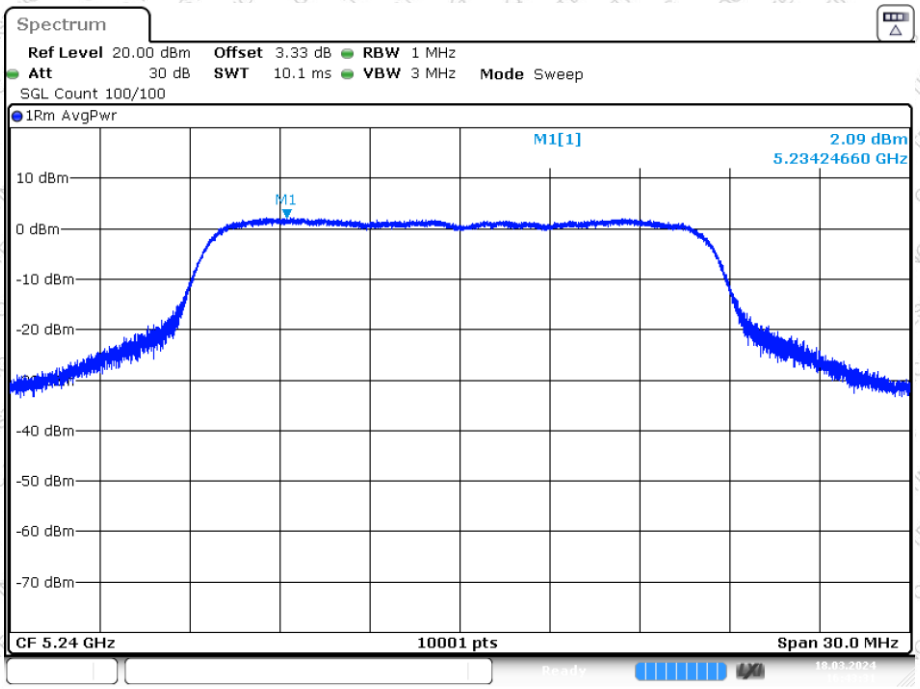
PSD NVNT a 5240MHz Ant1



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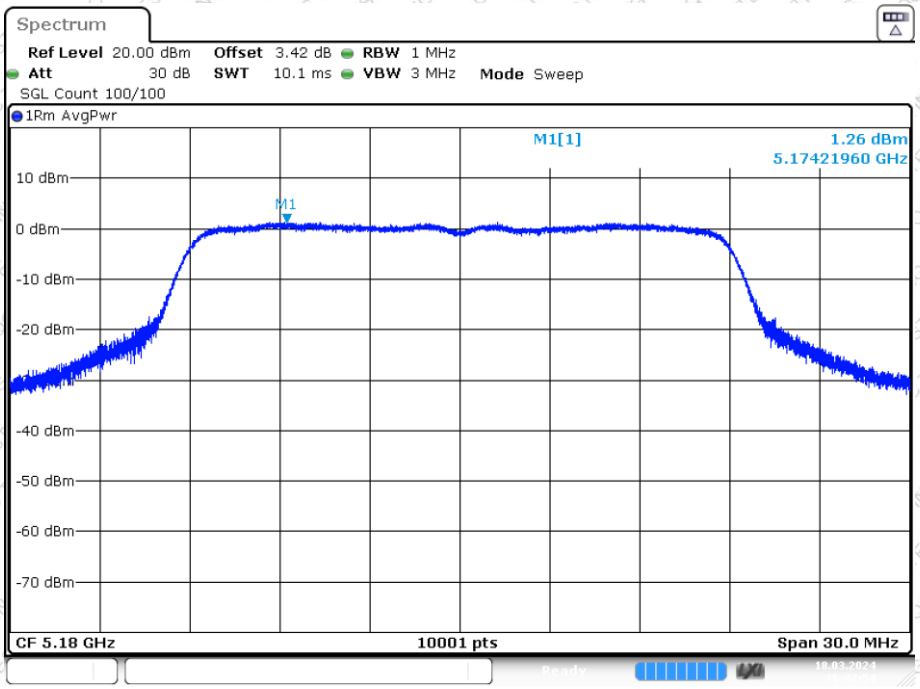

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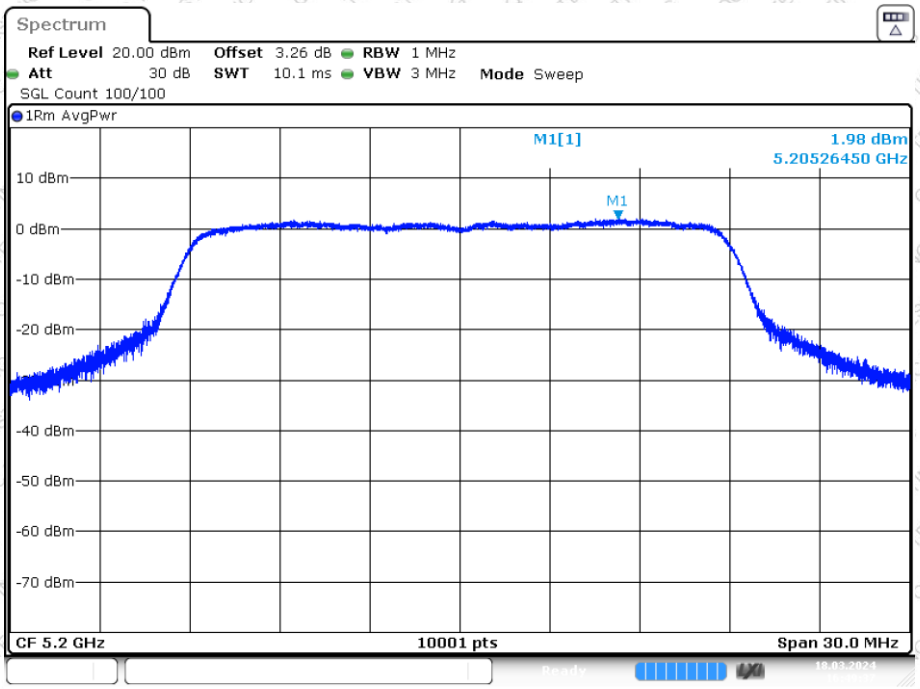
PSD NVNT n20 5200MHz Ant1



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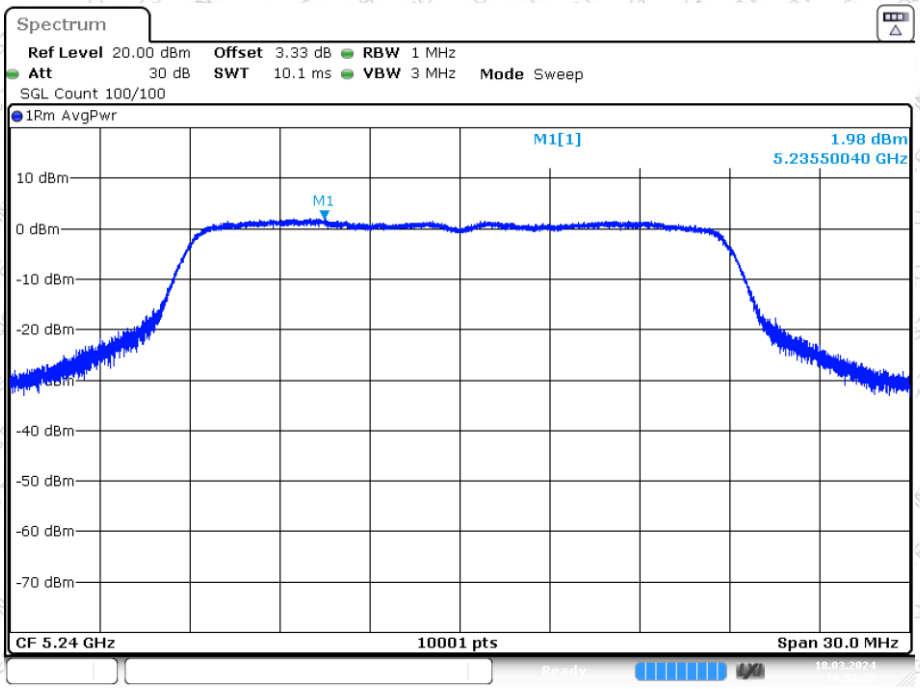

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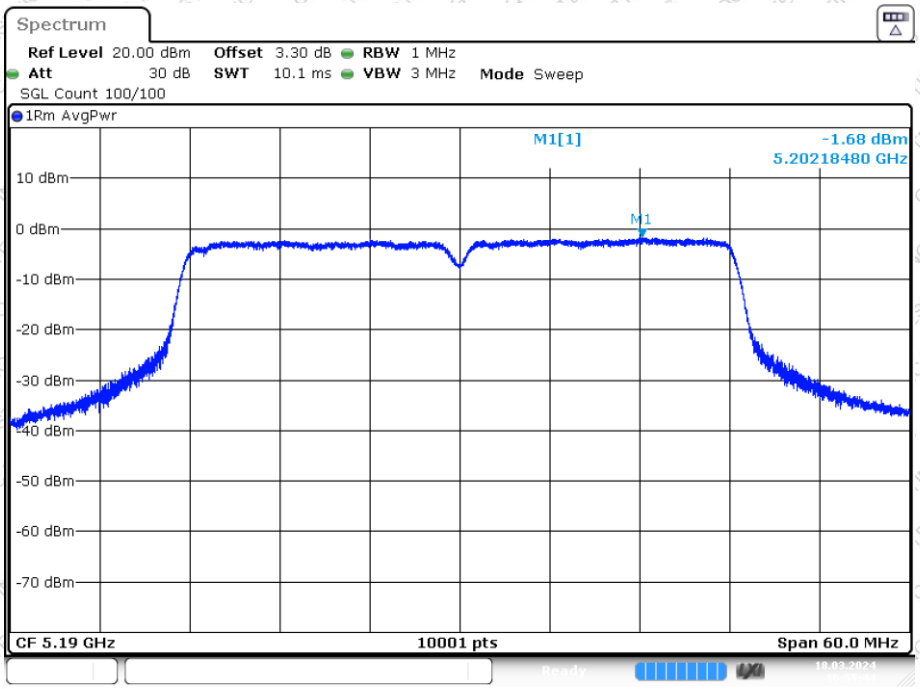
PSD NVNT n40 5190MHz Ant1



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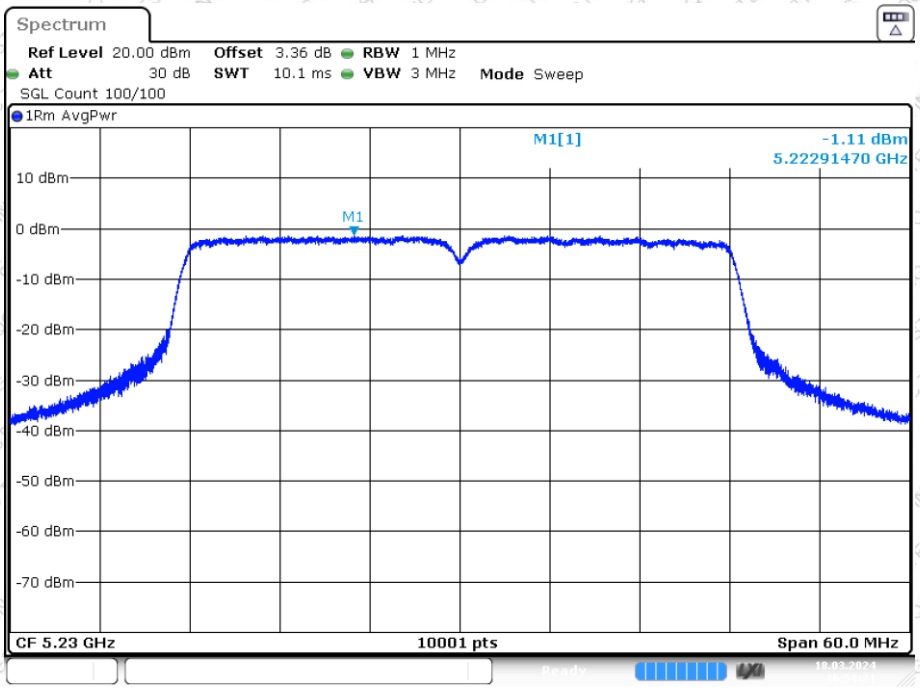

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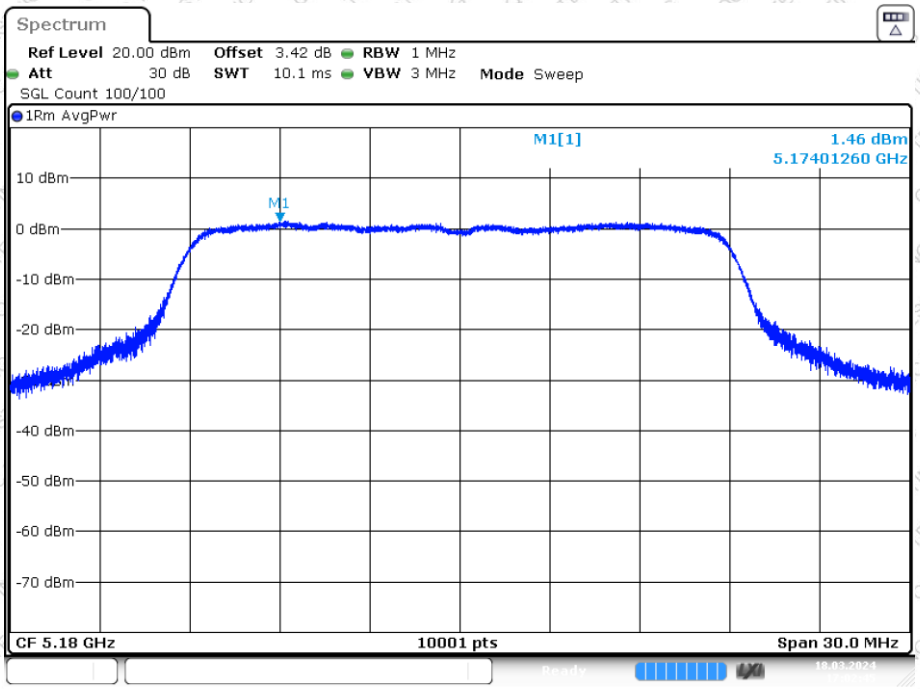
PSD NVNT ac20 5180MHz Ant1



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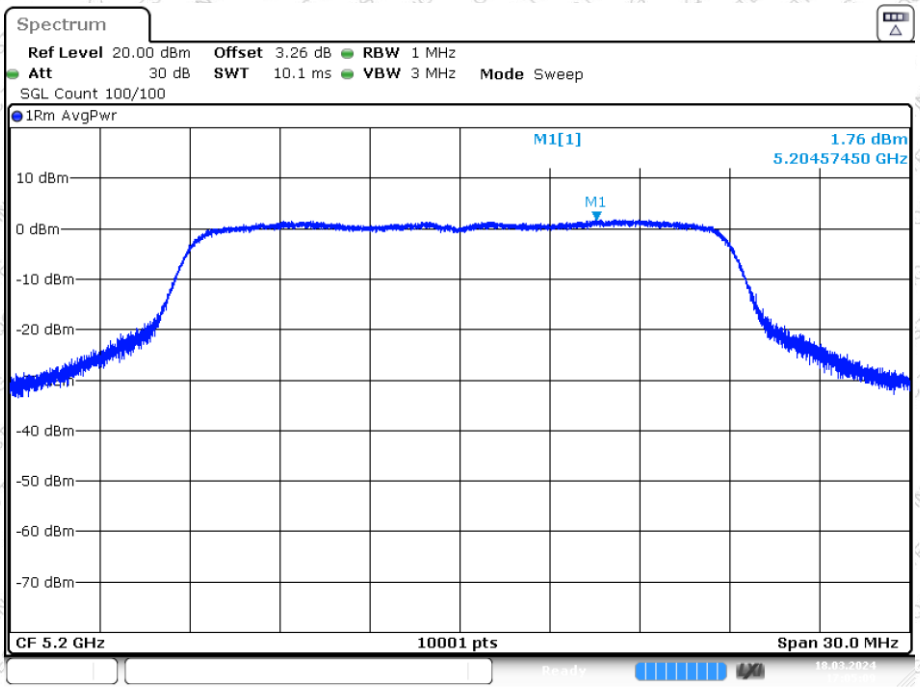

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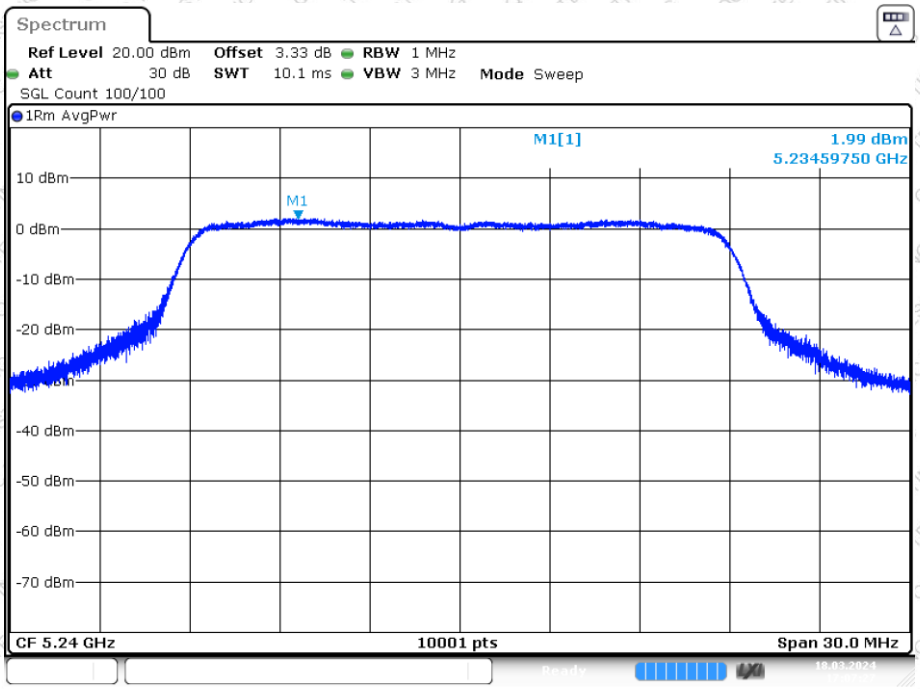
PSD NVNT ac20 5240MHz Ant1



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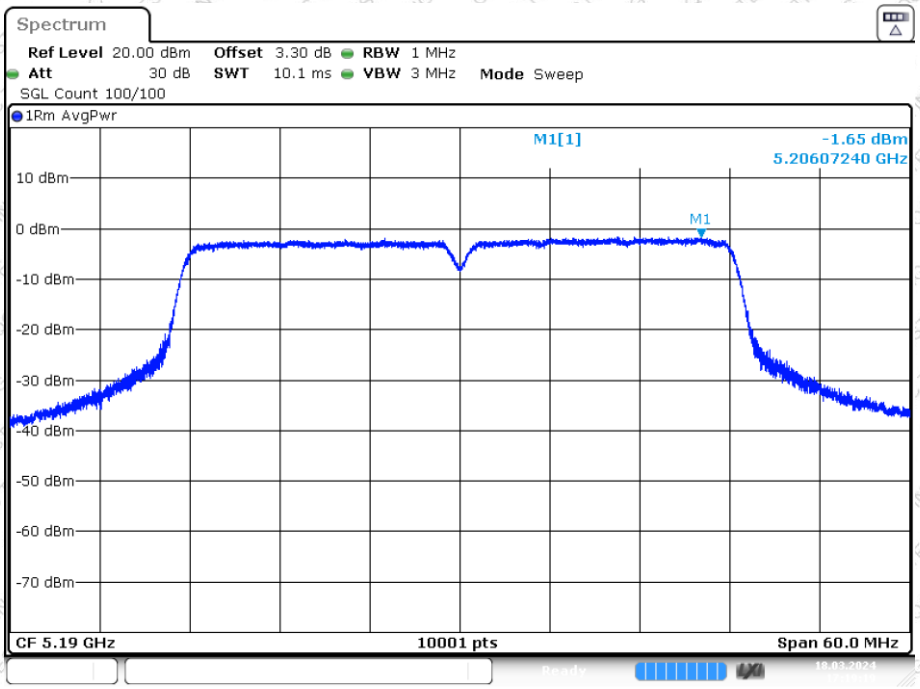

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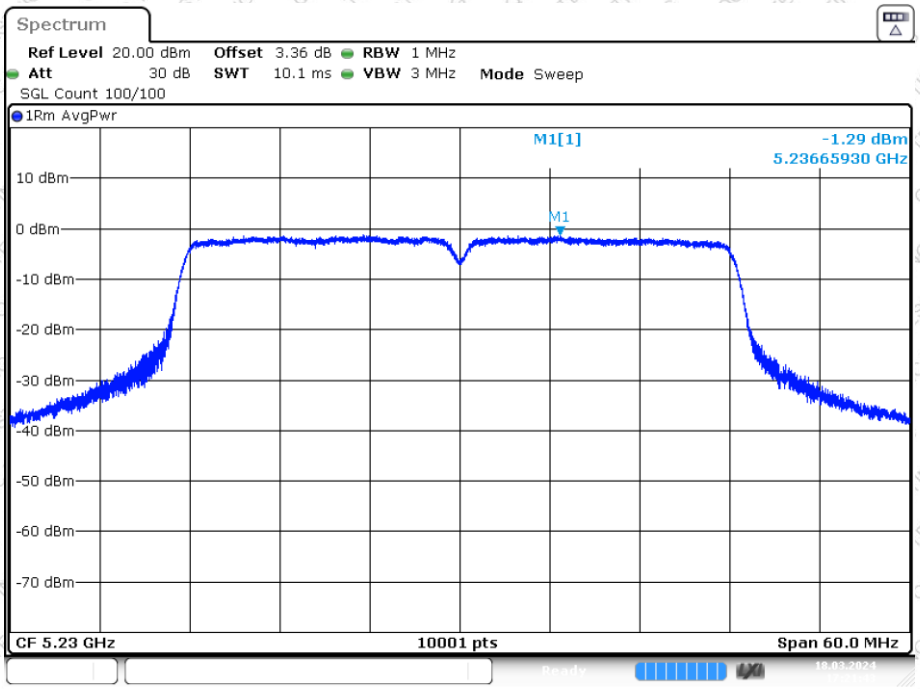
PSD NVNT ac40 5230MHz Ant1



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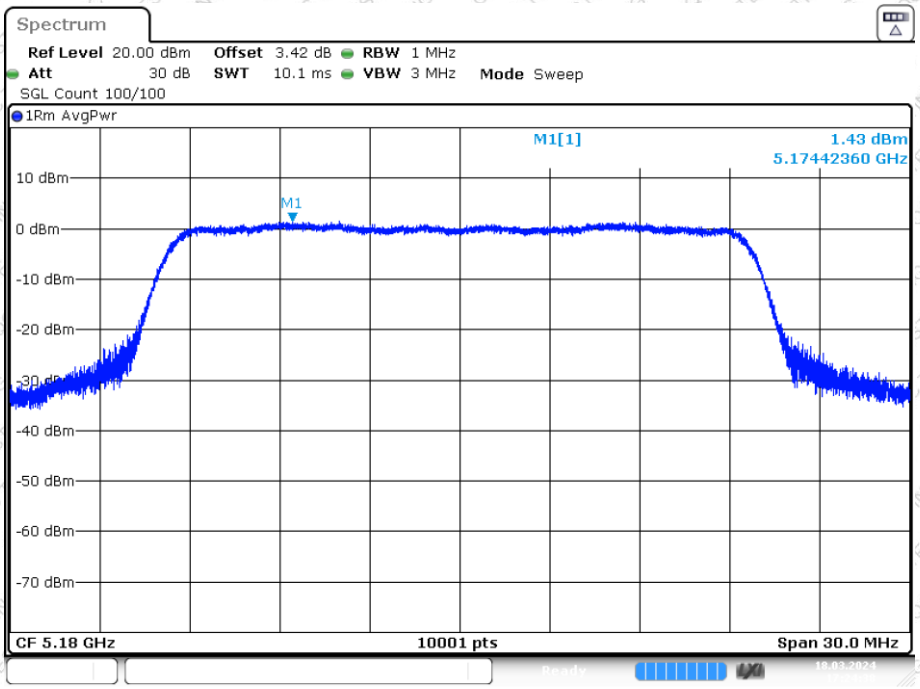

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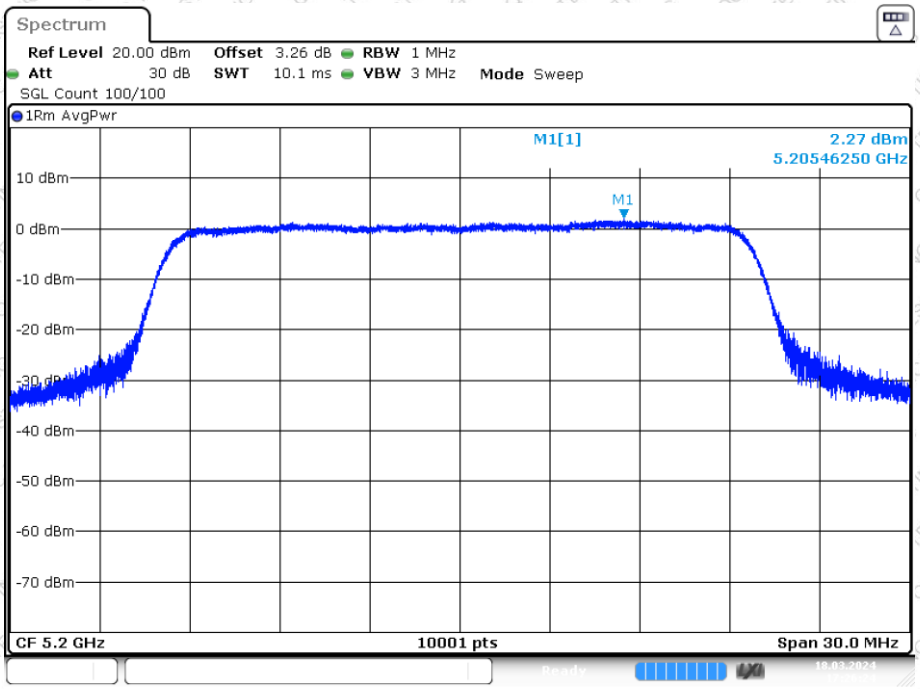
PSD NVNT ax20 5200MHz Ant1



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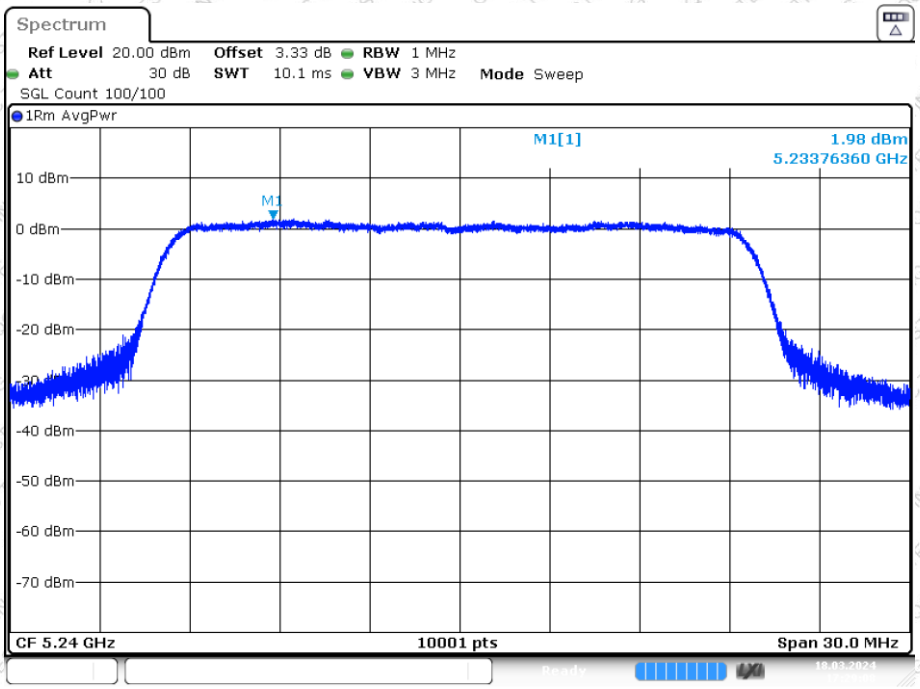

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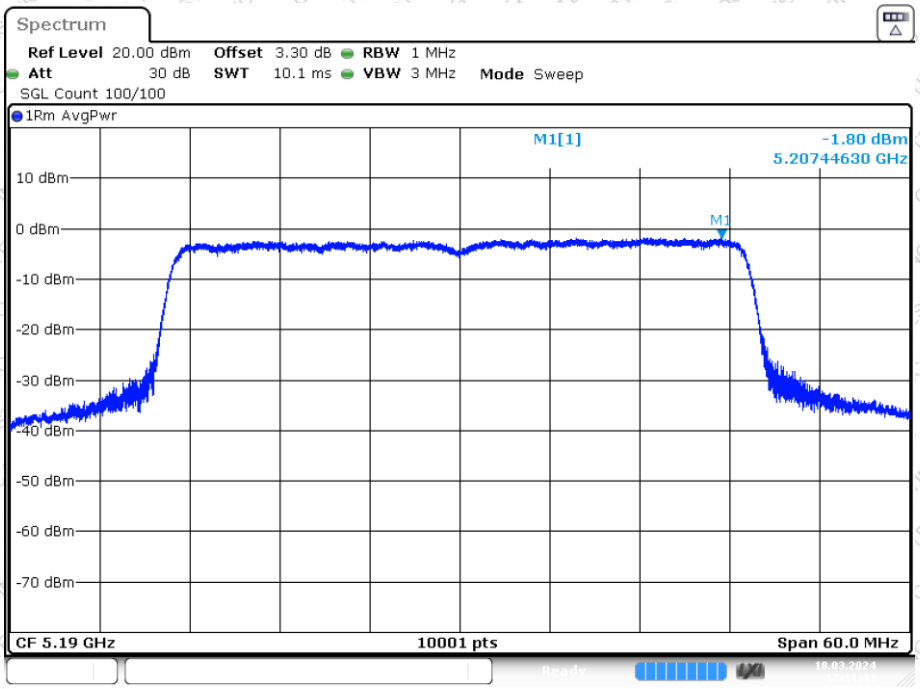
PSD NVNT ax40 5190MHz Ant1



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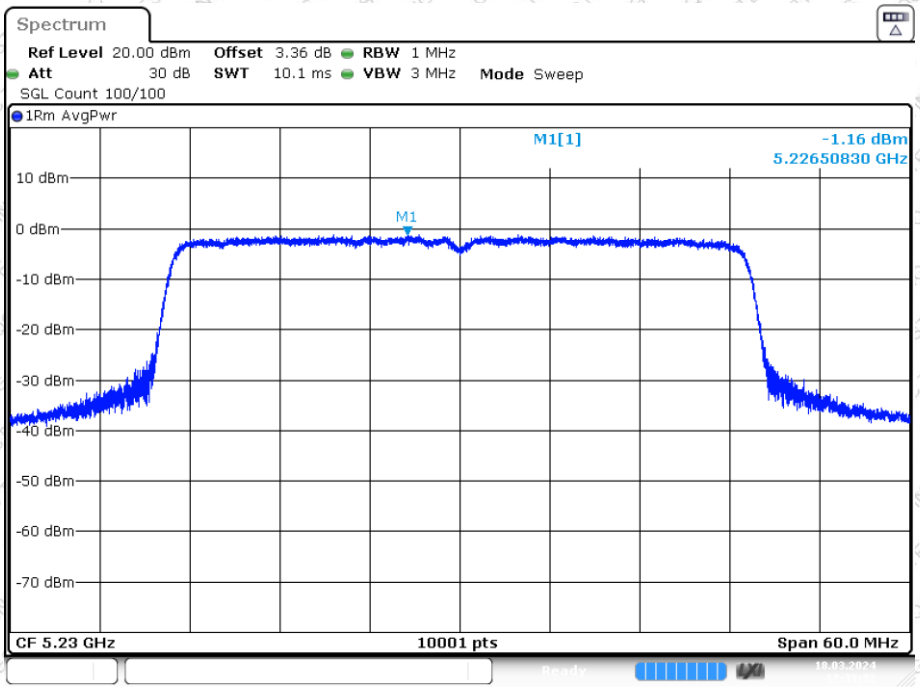
PSD NVNT ax40 5230MHz Ant1



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9. Band Edge

9.1 Applicable Standard

FCC Part15 E Section 15.407 and 5.205

9.2 Limit

Undesirable emission 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 EIRP 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 EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

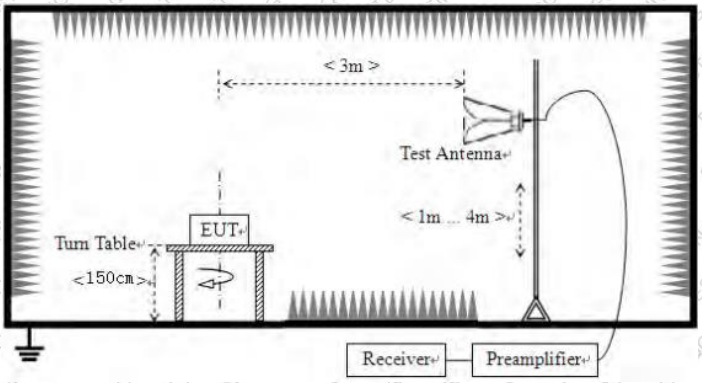
(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.

9.3 EMI Test Receiver Setup

Frequency	RBW	VBW	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	10 Hz Note 1	/	Average
1MHz	1MHz	＞1/T Note 2	/	Average

Note 1: when duty cycle is no less than 98%
Note 2: when duty cycle is less than 98%

9.4 Test setup



9.5 Test Procedure

a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

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f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

9.6 Test Data

Temperature	26 ℃	Humidity	54%
ATM Pressure	101.1kPa	Antenna Gain	2.21dBi
Test by	LBi Li	Test result	PASS

Test Voltage: AC 120V/60Hz

According to KDB 789033 D02 v02r01 section G) 1) (d), for For measurements above 1000 MHz @ 3m distance, the limit of field strength is computed as follows:
E[dBuV/m] = EIRP[dBm] + 95.2;
For example, if EIRP = -27dBm
E[dBuV/m] = -27 + 95.2 = 68.2dBuV/m.

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Frequency (MHz)	Read Level (dBμV)	polarization	Factor (dB/m)	Level (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)	Detector
a Low Channel							
5150	53.17	H	-3.31	49.86	68.2	18.34	peak
5150	50.55	V	-3.35	47.2	68.2	21	peak
a High Channel							
5350	45.45	H	-2.82	42.63	68.2	25.57	peak
5350	45.3	V	-2.78	42.52	68.2	25.68	peak
n20 Low Channel							
5150	53.85	H	-3.31	50.54	68.2	17.66	peak
5150	54.4	V	-3.35	51.05	68.2	17.15	peak
n20 High Channel							
5350	44.91	H	-2.82	42.09	68.2	26.11	peak
5350	44.62	V	-2.78	41.84	68.2	26.36	peak
n40 Low Channel							
5150	56.93	H	-3.31	53.62	68.2	14.58	peak
5150	54.65	V	-3.35	51.3	68.2	16.9	peak
n40 High Channel							
5350	45.48	H	-2.82	42.66	68.2	25.54	peak
5350	45.41	V	-2.78	42.63	68.2	25.57	peak
ac20 Low Channel							
5150	52.63	H	-3.31	49.32	68.2	18.88	peak
5150	52.27	V	-3.35	48.92	68.2	19.28	peak
ac20 High Channel							
5350	45.22	H	-2.82	42.4	68.2	25.8	peak
5350	45.16	V	-2.78	42.38	68.2	25.82	peak
ac40 Low Channel							
5150	55.65	H	-3.31	52.34	68.2	15.86	peak
5150	55.83	V	-3.35	52.48	68.2	15.72	peak
ac40 High Channel							
5350	46.56	H	-2.82	43.74	68.2	24.46	peak
5350	44.39	V	-2.78	41.61	68.2	26.59	peak
ax20 Low Channel							
5150	53.59	H	-3.31	50.28	68.2	17.92	peak
5150	55.37	V	-3.35	52.02	68.2	16.18	peak
ax20 High Channel							
5350	45.44	H	-2.82	42.62	68.2	25.58	peak
5350	45.95	V	-2.78	43.17	68.2	25.03	peak
ax40 Low Channel							
5150	59.35	H	-3.31	56.04	68.2	12.16	peak
5150	44.44	H	-3.31	41.13	54	12.87	AVG
5150	44.48	V	-3.35	41.13	68.2	27.07	peak
ax40 High Channel							
5350	45.34	H	-2.82	42.52	68.2	25.68	peak
5350	45.69	V	-2.78	42.91	68.2	25.29	peak

Remarks:

1. Level =Receiver Read level + Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.

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10. Radiated Emission Method

10.1 Applicable Standard

FCC Part15 C Section 15.209 and 15.205

10.2 Limit

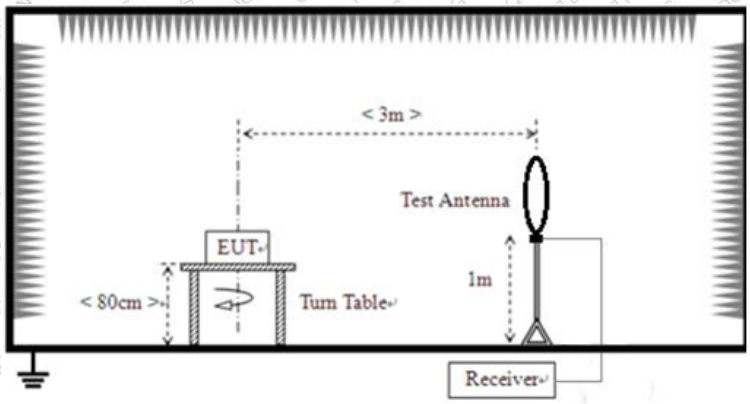
Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	QP	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	30m
1.705MHz-30MHz	30	QP	30m

Frequency	Field Strengths Limits (μV/m at 3 m)	Field Strengths Limits (dBμV/m at 3 m)	Remark
30 – 88	100	40.0	Quasi-peak
88 – 216	150	43.5	Quasi-peak
216 – 960	200	46.0	Quasi-peak
Above 960	500	54.0	Quasi-peak
Above 1GHz	/	54.0	Peak
		74.0	Average

Note: dBμV/m =20log(μV/m)

10.3 Test setup

For radiated emissions from 9kHz to 30MHz



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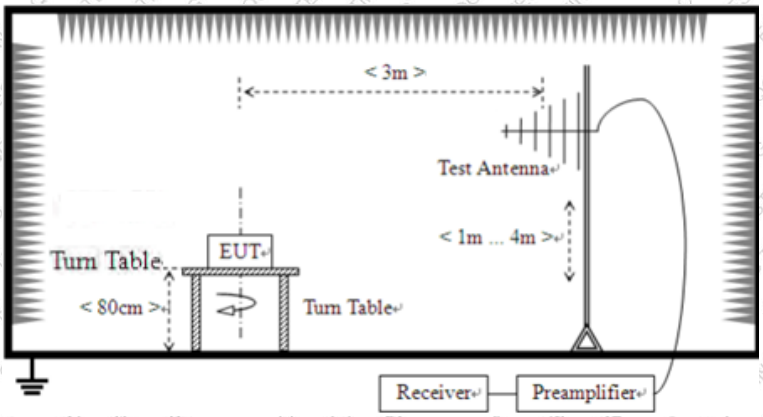
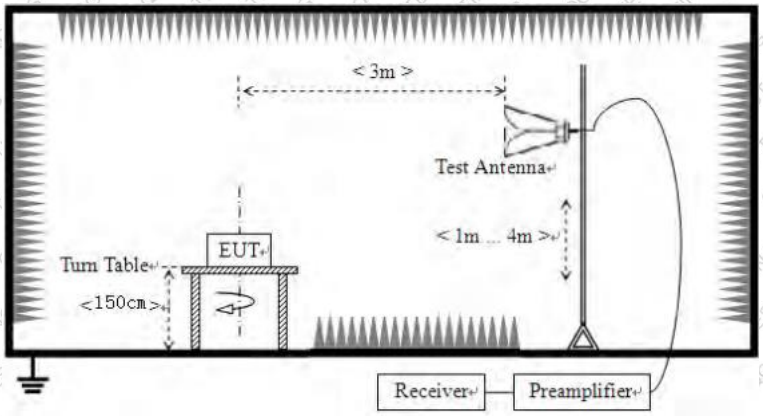
For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



10.4 EMI Test Receiver Setup

Frequency	RBW	VBW	IF B/W	Measurement
9KHz-150KHz	200Hz	600Hz	/	QP
150KHz-30MHz	9KHz	30KHz	/	QP
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	10 Hz Note 1	/	Average
1MHz	1MHz	＞1/T Note 2	/	Average

Note 1: when duty cycle is no less than 98%
Note 2: when duty cycle is less than 98%
Remark: For the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission test in these three bands are based on measurements employing an average detector.

10.5 Test procedure

- The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

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- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

10.6 Test Data

Temperature	25-26 ℃	Humidity	49-54%
ATM Pressure	101.1kPa	Antenna Gain	2.21dBi
Test by	LBi Li	Test result	PASS

Test Voltage: AC 120V/60Hz

Remarks:

1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.
2. The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

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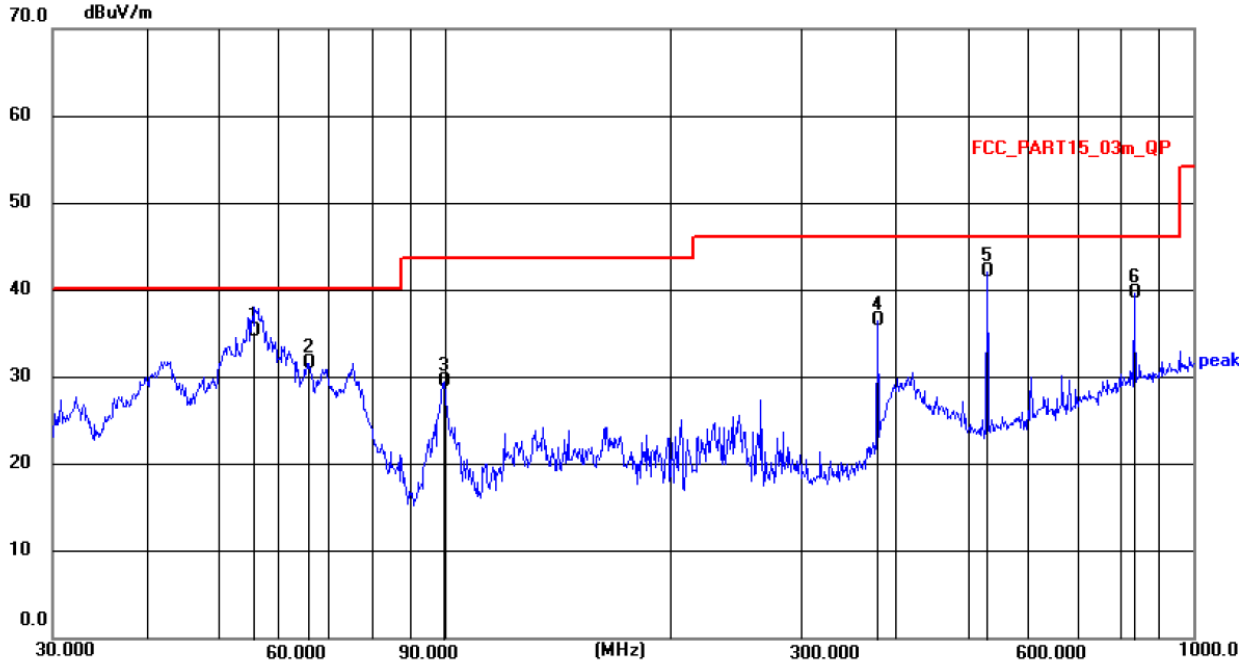
Below 1GHz

Pre-scan all test modes, found worst case at 802.11a mode 5180MHz, and so only show the test result of 802.11a mode 5180MHz

Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	55.8046	21.33	13.95	35.28	40.00	4.72	QP
2	65.5726	18.98	12.62	31.60	40.00	8.40	QP
3	99.8777	18.17	11.29	29.46	43.50	14.04	QP
4	378.5842	19.56	16.89	36.45	46.00	9.55	QP
5 *	530.1013	21.95	20.08	42.03	46.00	3.97	QP
6	833.3170	14.50	25.22	39.72	46.00	6.28	QP

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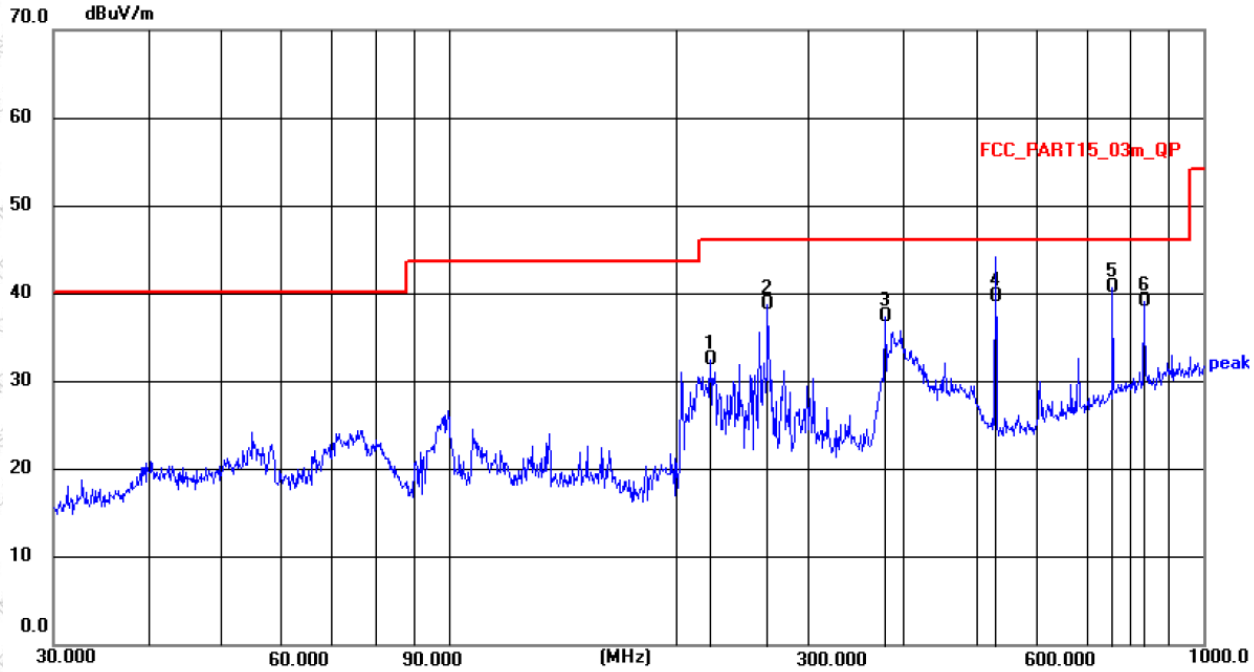
Vertical:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	222.1697	19.99	12.44	32.43	46.00	13.57	QP
2	264.7456	24.92	13.76	38.68	46.00	7.32	QP
3	378.5842	20.27	17.11	37.38	46.00	8.62	QP
4	530.1013	19.17	20.40	39.57	46.00	6.43	QP
5 *	758.0407	16.88	23.84	40.72	46.00	5.28	QP
6	833.3170	13.95	25.15	39.10	46.00	6.90	QP

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Above 1GHz

Frequency (MHz)	Read Level (dBµV)	polarization	Factor (dB/m)	Level (dBµV/m)	Limit Line (dBµV/m)	Margin (dB)	Detector
a Low Channel							
10360	38.46	H	7.13	45.59	68.2	22.61	peak
10360	37.72	V	6.99	44.71	68.2	23.49	peak
a Middle Channel							
10400	39.52	H	7.25	46.77	68.2	21.43	peak
10400	37.02	V	7.11	44.13	68.2	24.07	peak
a High Channel							
10480	36.43	H	7.48	43.91	68.2	24.29	peak
10480	36.72	V	7.34	44.06	68.2	24.14	peak
n20 Low Channel							
10360	37.96	H	7.13	45.09	68.2	23.11	peak
10360	35.22	V	6.99	42.21	68.2	25.99	peak
n20 Middle Channel							
10400	37.02	H	7.25	44.27	68.2	23.93	peak
10400	38.52	V	7.11	45.63	68.2	22.57	peak
n20 High Channel							
10480	37.93	H	7.48	45.41	68.2	22.79	peak
10480	37.72	V	7.34	45.06	68.2	23.14	peak
n40 Low Channel							
10380	37.76	H	7.19	44.95	68.2	23.25	peak
10380	36.79	V	7.06	43.85	68.2	24.35	peak
n40 High Channel							
10460	37.48	H	7.43	44.91	68.2	23.29	peak
10460	36.28	V	7.28	43.56	68.2	24.64	peak
ac20 Low Channel							
10360	36.46	H	7.13	43.59	68.2	24.61	peak
10360	35.72	V	6.99	42.71	68.2	25.49	peak
ac20 Middle Channel							
10400	38.52	H	7.25	45.77	68.2	22.43	peak
10400	36.05	V	7.11	43.16	68.2	25.04	peak
ac20 High Channel							
10480	35.93	H	7.48	43.41	68.2	24.79	peak
10480	36.72	V	7.34	44.06	68.2	24.14	peak
ac40 Low Channel							
10380	34.76	H	7.19	41.95	68.2	26.25	peak
10380	37.79	V	7.06	44.85	68.2	23.35	peak
ac40 High Channel							
10460	35.98	H	7.43	43.41	68.2	24.79	peak
10460	36.78	V	7.28	44.06	68.2	24.14	peak
ax20 Low Channel							
10360	36.96	H	7.13	44.09	68.2	24.11	peak
10360	36.22	V	6.99	43.21	68.2	24.99	peak
ax20 Middle Channel							
10400	35.52	H	7.25	42.77	68.2	25.43	peak
10400	37.52	V	7.11	44.63	68.2	23.57	peak

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ax20 High Channel							
10480	35.93	H	7.48	43.41	68.2	24.79	peak
10480	33.32	V	7.34	40.66	68.2	27.54	peak
ax40 Low Channel							
10380	36.26	H	7.19	43.45	68.2	24.75	peak
10380	36.79	V	7.06	43.85	68.2	24.35	peak
ax40 High Channel							
10460	35.98	H	7.43	43.41	68.2	24.79	peak
10460	36.78	V	7.28	44.06	68.2	24.14	peak

Remarks:

3. Level =Receiver Read level + Factor
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

---------- THE END OF TEST REPORT ----------

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