



FCC AND ISCED CERTIFICATION TEST REPORT

Applicant	:	Harman International Industries, Inc.
Address of Applicant	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Manufacturer	:	Harman International Industries, Inc.
Address of Manufacturer	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Equipment under Test	:	Multi-Channel Soundbar with wireless subwoofer
Model No.	:	BAR 1300XMK2 SURROUND
FCC ID	:	APIBAR1300SUR2
IC	:	6132A-BAR1300SUR2
Test Standard(s)	:	FCC Rules and Regulations Part 15 Subpart E, RSS-247 Issue 3 August 2023, ANSI C63.10:2013, 789033 D02 General U-NII Test Procedures New Rules v02r01, 662911 D01 Multiple Transmitter Output v02r01, RSS-Gen Issue 5 April 2018
Report No.	:	DDT-RE24111520-1E23
Issue Date	:	2025/03/14
Issue By	:	Guangdong Dongdian Testing Service Co., Ltd. Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808

REPORT

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Test Report Declare

Applicant	:	Harman International Industries, Inc.
Address of Applicant	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES
Equipment under Test	:	Multi-Channel Soundbar with wireless subwoofer
Model No.	:	BAR 1300XMK2 SURROUND
Manufacturer	:	Harman International Industries, Inc.
Address of Manufacturer	:	8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES

Test Standard Used:

FCC Rules and Regulations Part 15 Subpart E,
RSS-247 Issue 3 August 2023,
ANSI C63.10:2013,
789033 D02 General U-NII Test Procedures New Rules v02r01,
662911 D01 Multiple Transmitter Output v02r01,
RSS-Gen Issue 5 April 2018

We Declare:

The equipment described above is tested by Guangdong Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Guangdong Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

Report No.:	DDT-RE24111520-1E23		
Date of Receipt:	2024/11/26	Date of Test:	2024/11/26 - 2025/03/14

Created: Bobo Chen	Reviewed: Ella Gong	Approved: Damon Hu
<i>Bobo Chen</i>	<i>Ella Gong</i>	<i>Damon Hu</i>
2025/03/14	2025/03/14	2025/03/14

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Guangdong Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	2025/03/14	

1. Summary of Test Results

No.	Test Parameter	Clause No.	Condition	Result
1	6/26db Bandwidth and 99% Bandwidth	FCC 15.407 (e), RSS-247 Clause 6.2, RSS-GEN Clause 6.7	/	Pass
2	Output Power	FCC 15.407 (a) ; RSS-247 Clause 6.2	/	Pass
3	Power Spectral Density	FCC 15.407 (a) ; RSS-247 Clause 6.2	/	Pass
4	Frequency Stability Measurement	FCC 15.407 (g); RSS-247 Clause 6.2; RSS-GEN Clause 8.11	/	Pass
5	Radiated Emission	FCC 15.407 (b); FCC 15.209; FCC 15.205; RSS-247 Clause 6.2; RSS-GEN Clause 8.9	/	Pass
6	Band Edge Compliance	FCC 15.407 (b); FCC 15.209; FCC 15.205; RSS-247 Clause 6.2; RSS-GEN Clause 8.10	/	Pass
7	Dynamic Frequency Selection	FCC 15.407 (h); RSS-247 Clause 6.8	/	Pass
8	Antenna Requirement	FCC Part 15: 15.203, RSS-Gen Issue 5 clause 6.8	/	Pass
9	Power Line Conducted Emissions	FCC Part 15: 15.207(a), RSS-Gen Issue 5 clause 8.8	/	Pass
Note: N/A is an abbreviation for Not Applicable, and means this item is not applicable for this device or no need to test according to standard.				

2. General Test Information

2.1. Description of EUT

EUT Name	: Multi-Channel Soundbar with wireless subwoofer
Model Number	: BAR 1300XMK2 SURROUND
EUT Function Description	: Please reference user manual of this device
Power Supply	: DC 5V/3.0A, DC 9V/1.6A, DC 12V/1.25V, DC 15V/1.0A, DC 20V/0.75A from external AC Adapter (Type-c port charging) DC 7.2V 4722mAh Polymer Li-ion built-in battery
Antenna Type	: FPC
Max Antenna Gain(dBi)	: 1.84

Note: This EUT support Bluetooth BR/EDR/LE, 5 GHz Wireless, this report only for 5 GHz Wireless.

Radio Technology	: IEEE 802.11a/ax
Operation frequency	: U-NII-1: 5180 MHz to 5240 MHz U-NII-2A: 5260 MHz to 5320 MHz U-NII-2C: 5500 MHz to 5720 MHz U-NII-3: 5745 MHz to 5825 MHz
Modulation	: IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax: OFDMA (64QAM, 16QAM, QPSK, BPSK)

Channel information							
IEEE 802.11a							
IEEE 802.11ax (HE20)							
UNII-1							
CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)	CH	Frequency (MHz)
36	5180	40	5200	44	5220	48	5240
UNII-2A							
52	5260	56	5280	60	5300	64	5320
UNII-2C							
100	5500	112	5560	124	5620	136	5680
104	5520	116	5580	128	5640	140	5700
108	5540	120	5600	132	5660	144	5720
UNII-3							
149	5745	157	5785	161	5805	165	5825
153	5765	/	/	/	/	/	/
Note: Band 5600-5650MHz will be disabled when shipped to Canada.							

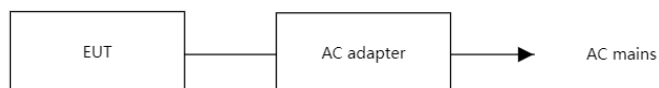
Note: The above EUT information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications or User's Manual. The above Antenna information is declared by manufacturer and for more detailed features description please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

“☑” means to be chosen or applicable; “☐” means don't to be chosen or not applicable; This note applies to entire report.

2.2. Accessories of EUT

Accessories	Manufacturer	Model number	Description
AC cable	Harman	N/A	Length: 150cm
HDMI cable	Harman	N/A	Length: 120cm, with two magnetic rings
Remote control	Harman	N/A	N/A

2.3. Block diagram of EUT configuration for test



2.4. Decision of final test mode

According pre-test, the worst test modes were reported as below:

Test software: main.exe

The test software was used to control EUT work in Continuous Tx mode, and select test channel, wireless mode as below table.

The pathloss of external cable: 2 dB (According to the manufacturer's claims)

Tested mode, Tx Power Setting, Data rate, Channel, and Frequency				
Tested mode	Tx Power Setting	Data rate (Mbps) (see Note)	Test Channel	Frequency (MHz)
	ANT1			
IEEE 802.11a	Default	6	LCH: CH36	5180
	Default	6	MCH: CH40	5200
	Default	6	HCH: CH48	5240
	Default	6	LCH: CH52	5260
	Default	6	MCH: CH56	5280
	Default	6	HCH: CH64	5320
	Default	6	LCH: CH100	5500
	Default	6	MCH: CH116	5580
	Default	6	HCH: CH140	5700
	Default	6	Straddle: CH144	5720
	Default	6	LCH: CH149	5745
	Default	6	MCH: CH157	5785
	Default	6	HCH: CH165	5825
IEEE 802.11ax HE20	Default	MCS 0	LCH: CH36	5180
	Default	MCS 0	MCH: CH40	5200
	Default	MCS 0	HCH: CH48	5240
	Default	MCS 0	LCH: CH52	5260
	Default	MCS 0	MCH: CH56	5280
	Default	MCS 0	HCH: CH64	5320

Default	MCS 0	LCH: CH100	5500
Default	MCS 0	MCH: CH116	5580
180	MCS 0	HCH: CH140	5700
Default	MCS 0	Straddle: CH144	5720
Default	MCS 0	LCH: CH149	5745
Default	MCS 0	MCH: CH157	5785
Default	MCS 0	HCH: CH165	5825
Note: According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.			

2.5. Deviations of test standard

No deviation.

2.6. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	+15°C to +35 °C
Humidity range:	20% to 75%
Pressure range:	86 kPa to106 kPa

Note: The specific temperature and humidity information of each test item refers to the temperature and humidity record in the corresponding test data.

2.7. Test laboratory

Guangdong Dongdian Testing Service Co., Ltd.

Add.: Unit 2, Building 1, No. 17, Zongbu 2nd Road, Songshan Lake Park, Dongguan, Guangdong, China, 523808.

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: ddt@dgddt.com.

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20240, G-20118

2.8. Measurement uncertainty

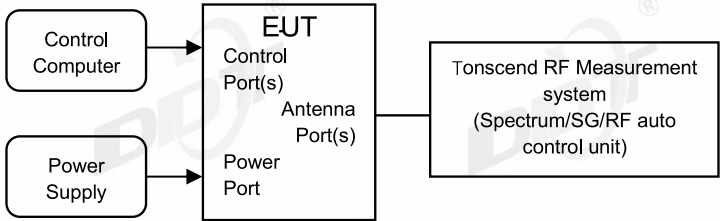
Test Item	Uncertainty
Bandwidth	1.1%
Peak Output Power (Conducted) (Spectrum analyzer)	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$); 1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Peak Output Power (Conducted) (Power Sensor)	0.74 dB
Power Spectral Density	0.74 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$); 1.38 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$)
Frequencies Stability	6.7×10^{-8} (Antenna couple method) 5.5×10^{-8} (Conducted method)
Conducted spurious emissions	0.86 dB ($10 \text{ MHz} \leq f < 3.6 \text{ GHz}$); 1.40 dB ($3.6 \text{ GHz} \leq f < 8 \text{ GHz}$) 1.66 dB ($8 \text{ GHz} \leq f < 26.5 \text{ GHz}$)
Uncertainty for radio frequency (RBW < 20 kHz)	3×10^{-8}
Temperature	0.4 °C
Humidity	2 %
Uncertainty for Radiation Emission test (9 kHz – 30 MHz)	3.44 dB
Uncertainty for Radiation Emission test (30 MHz - 1 GHz)	4.70 dB (Antenna Polarize: V) 4.84 dB (Antenna Polarize: H)
Uncertainty for Radiation Emission test (1 GHz - 40 GHz)	4.10 dB (1 - 6 GHz) 4.40 dB (6 GHz - 18 GHz) 3.54 dB (18 GHz - 26 GHz) 4.30 dB (26 GHz - 40 GHz)
Uncertainty for Power line conduction emission test	3.34dB (150KHz-30MHz) 3.72dB (9KHz-150KHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3. Equipment Used During Conductive Test

Equipment	Manufacturer	Model No.	Serial Number	Due Date
☒ RF Connected Test (RF Measurement System 1#)				
SIGNAL ANALYZER	R&S	FSQ26	101272	2025/03/31
Wideband Radio Communication Tester	R&S	CMW500	120259	2025/07/08
MXG Vector Signal Generator	KEYSIGHT	N5182B	MY59100192	2025/03/31
MXG Vector Signal Generator	Agilent	N5182A	MY19060405	2025/03/31
RF Control Unit	Tonsend	JS0806-2	158060010	2025/03/31
TEMP&HUMI Programmable Chamber	ZHIXIANG	ZXGDJS-150L	ZX170110-A	2025/04/22
Test Software	Tonscend	JS1120-3	Ver.3.2.22	N/A

4. 26dB Bandwidth

4.1. Block diagram of test setup



4.2. Limits

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
26 dB Bandwidth	---	5150 - 5250
	---	5250 - 5350
	---	For FCC: 5470 - 5725 For IC: 5470 - 5600 5650 - 5725

4.3. Test procedure

Connect EUT's antenna output to spectrum analyzer by RF cable.

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	approximately 1% of the emission bandwidth.
VBW	> RBW
Trace	Max hold
Sweep	Auto couple

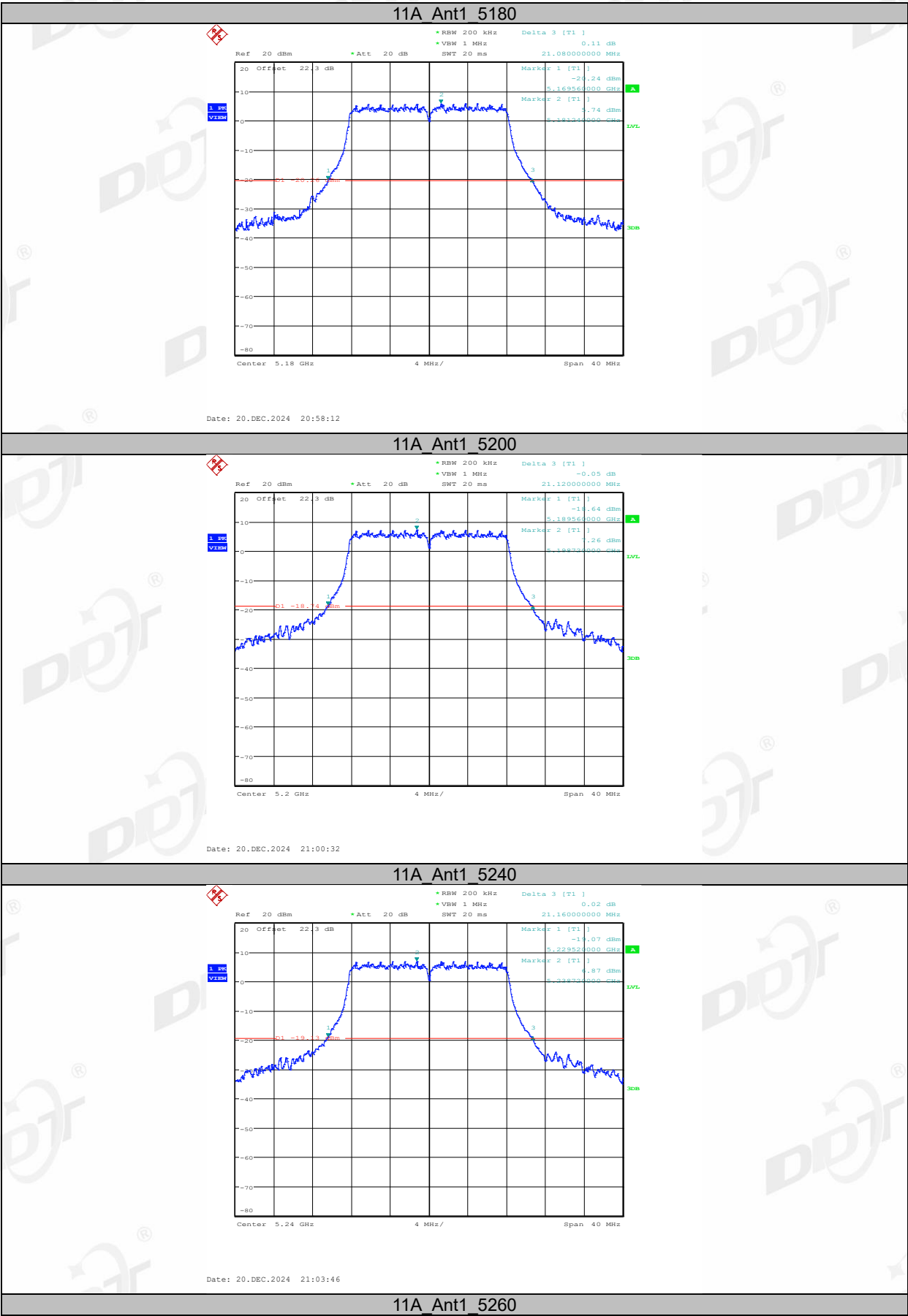
Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.

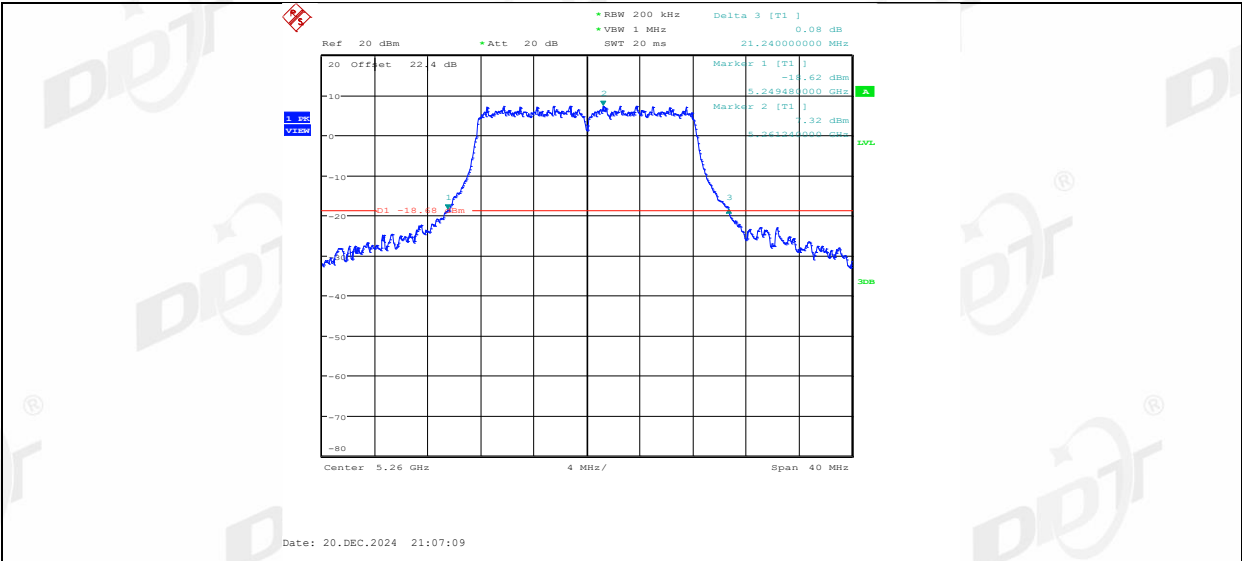
4.4. Test result

Test Engineer:	Zora Zhang	Test Site:	RF Measurement System 1#
Ambient Condition:	23.5℃,45.6%RH	Test Date:	2024.11.30-2025.02.11
Test Power Supply:	Battery	Sample Number:	S24111520-011

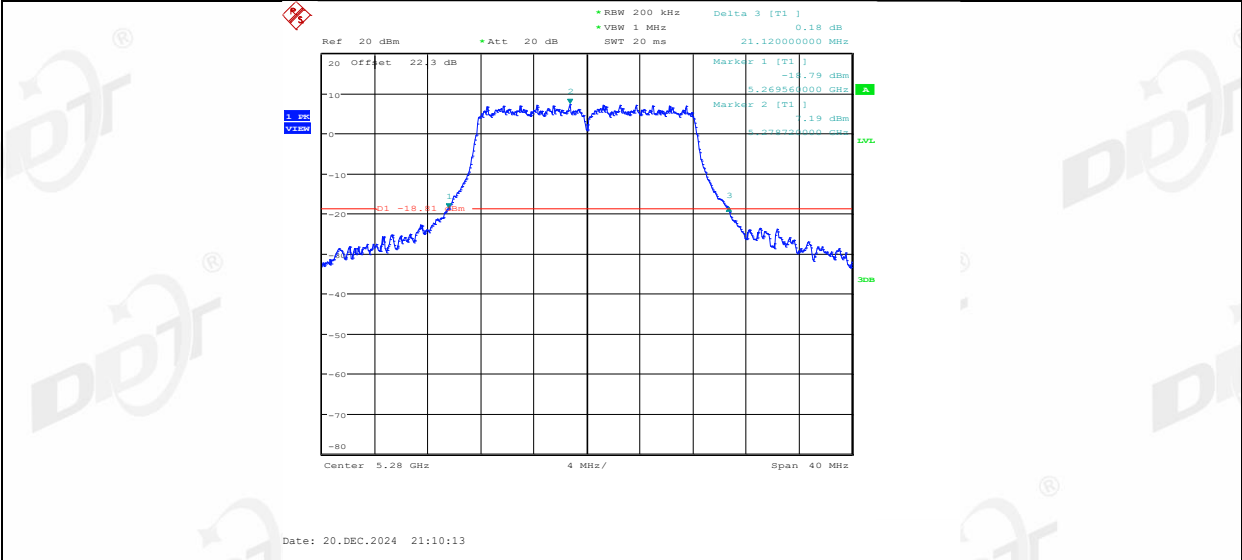
Test Mode	Antenna	Frequency[MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	21.08	5169.56	5190.64	---	---
		5200	21.12	5189.56	5210.68	---	---
		5240	21.16	5229.52	5250.68	---	---
		5260	21.24	5249.48	5270.72	---	---
		5280	21.12	5269.56	5290.68	---	---
		5320	21.24	5309.48	5330.72	---	---
		5500	20.80	5489.68	5510.48	---	---
		5580	20.88	5569.64	5590.52	---	---
		5700	20.96	5689.64	5710.60	---	---
		5720	21.68	5709.04	5730.72	---	---
		5720 UNII-2C	15.96	5709.04	5725	---	---
		5720 UNII-3	5.72	5725	5730.72	---	---
		5745	20.92	5734.68	5755.60	---	---
		5785	20.88	5774.64	5795.52	---	---
		5825	20.84	5814.64	5835.48	---	---
11AX20SISO	Ant1	5180	23.12	5168.28	5191.40	---	---
		5200	23.16	5188.24	5211.40	---	---
		5240	23.08	5228.28	5251.36	---	---
		5260	23.12	5248.28	5271.40	---	---
		5280	23.08	5268.28	5291.36	---	---
		5320	23.08	5308.24	5331.32	---	---
		5500	22.56	5488.76	5511.32	---	---
		5580	22.56	5568.76	5591.32	---	---
		5700	23.12	5688.24	5711.36	---	---
		5720	23.68	5707.76	5731.44	---	---
		5720 UNII-2C	17.24	5707.76	5725	---	---
		5720 UNII-3	6.44	5725	5731.44	---	---
		5745	23.12	5733.28	5756.40	---	---
		5785	22.56	5773.80	5796.36	---	---
		5825	23.00	5813.36	5836.36	---	---

4.5. Test graphs

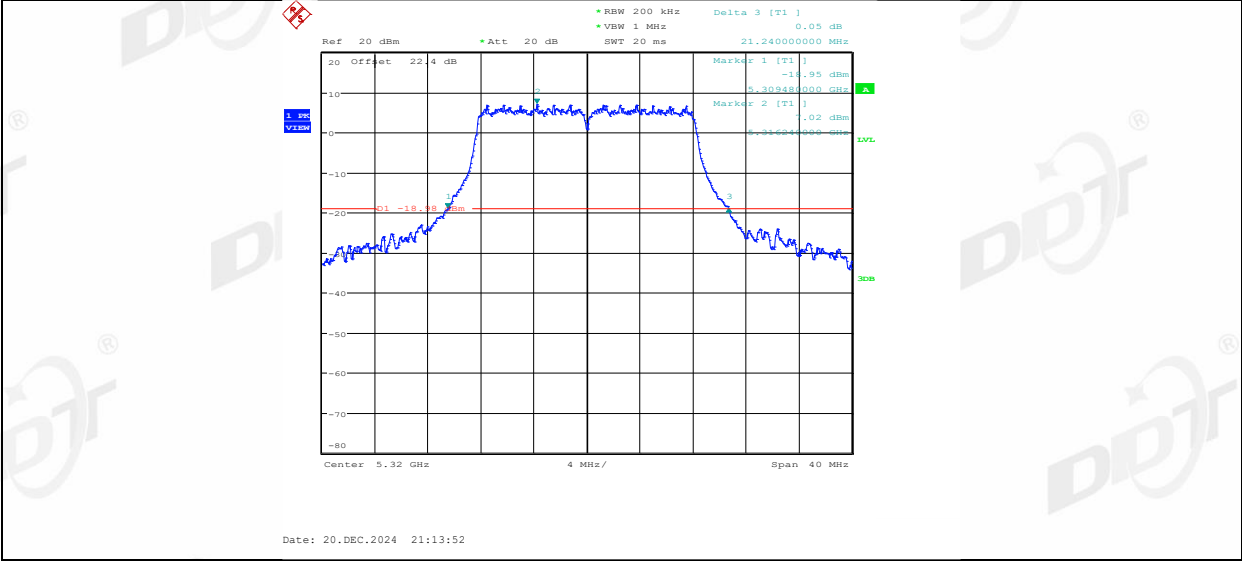




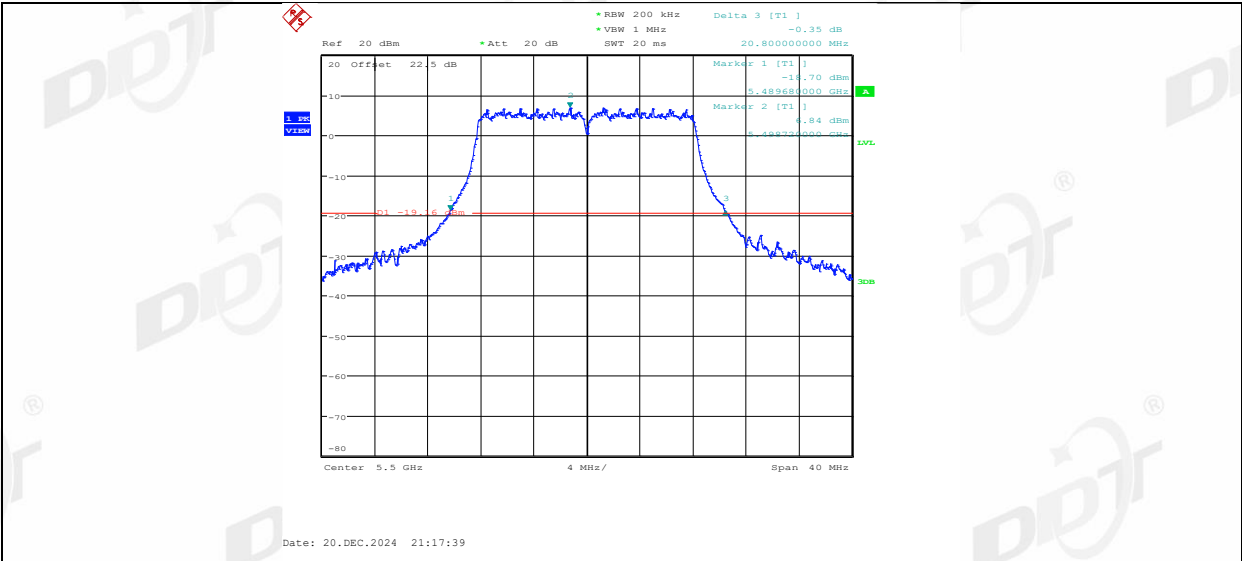
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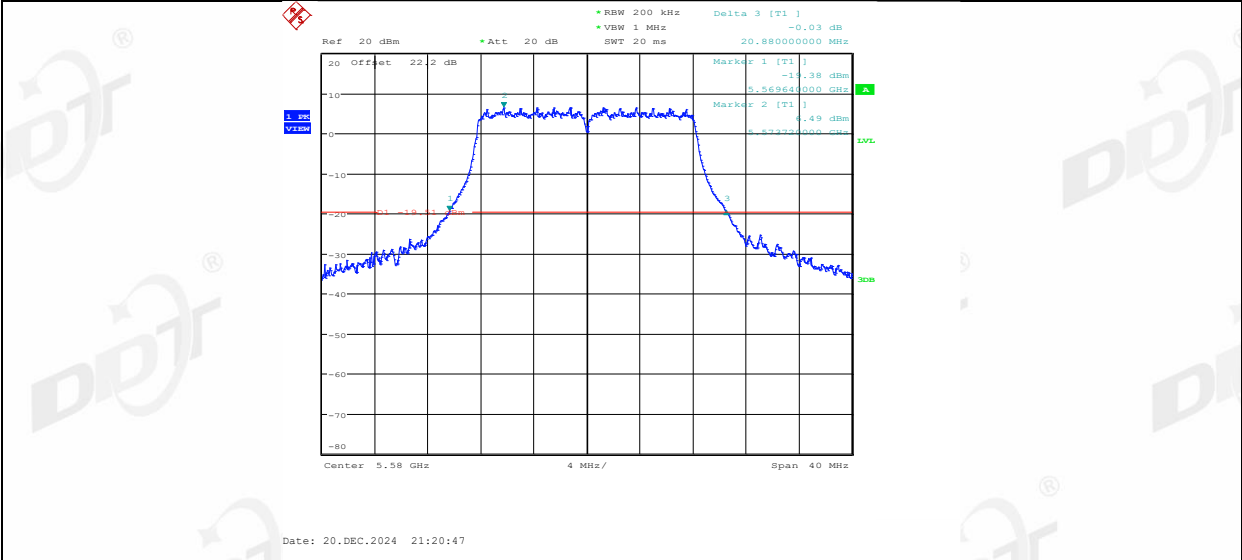
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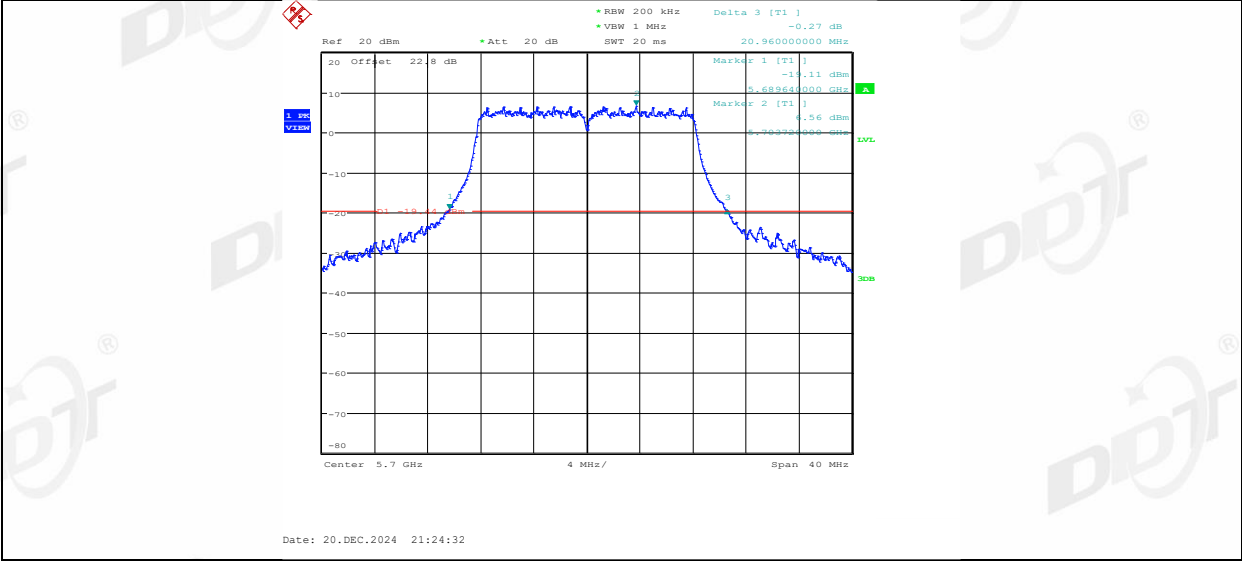
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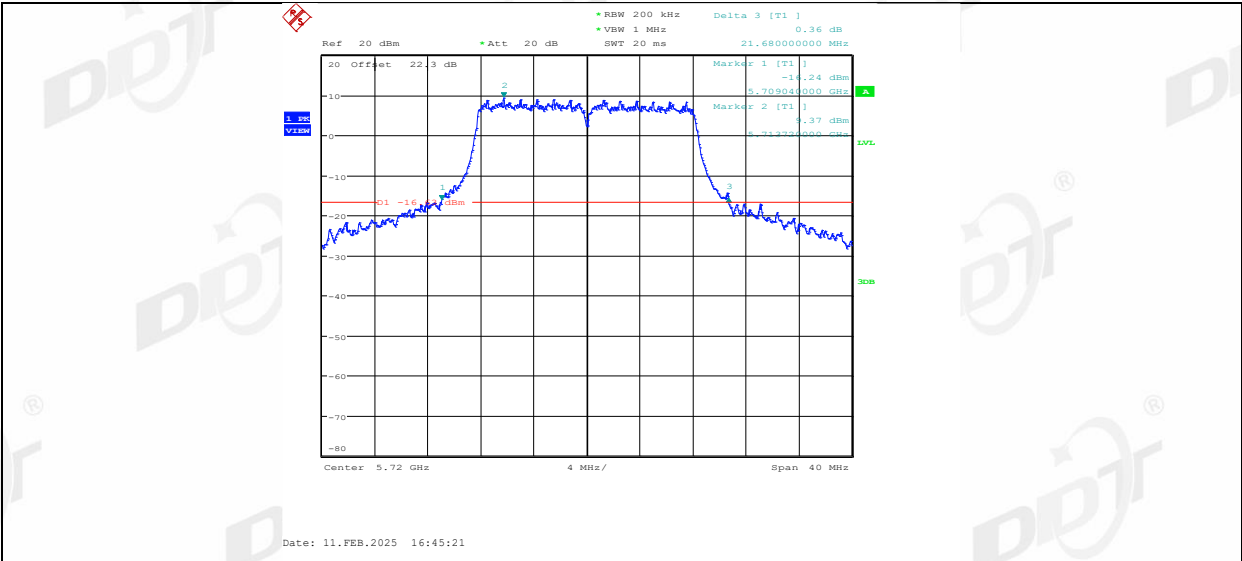
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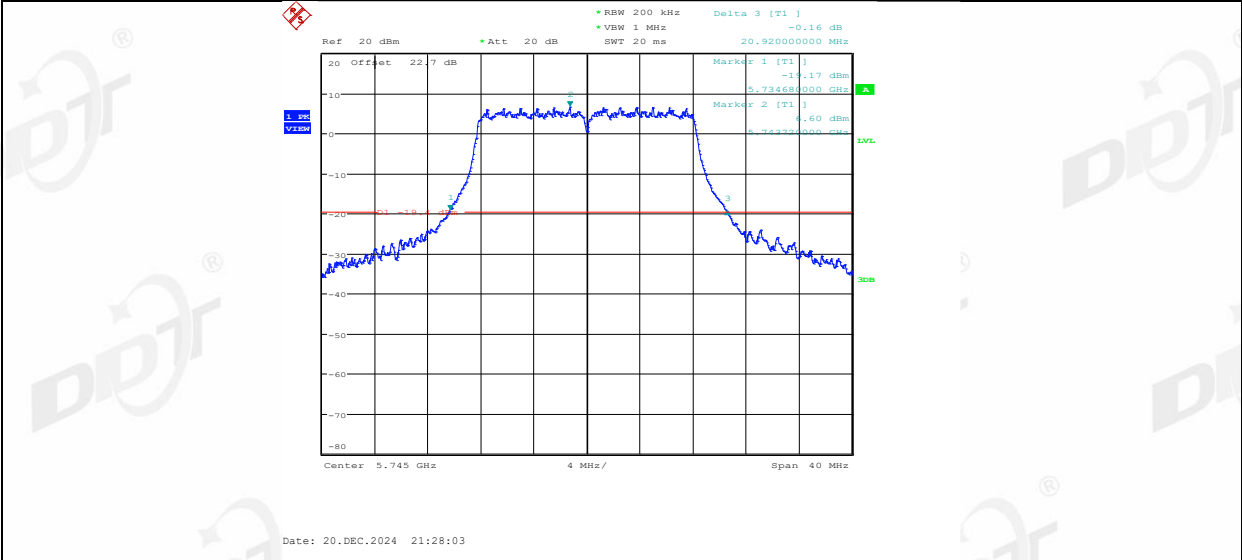
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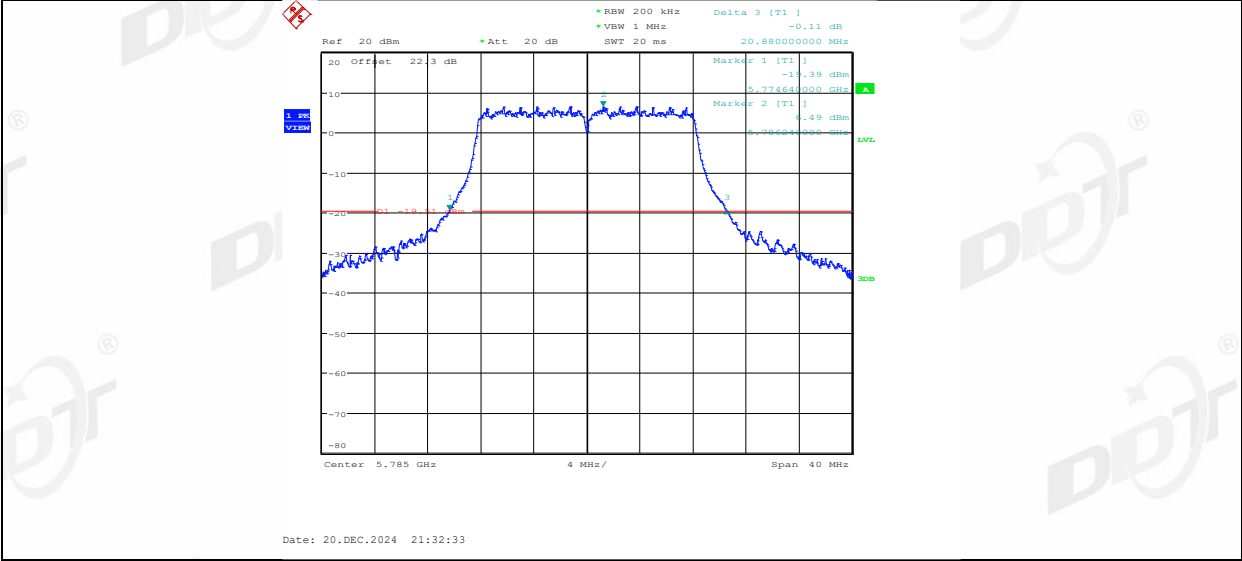
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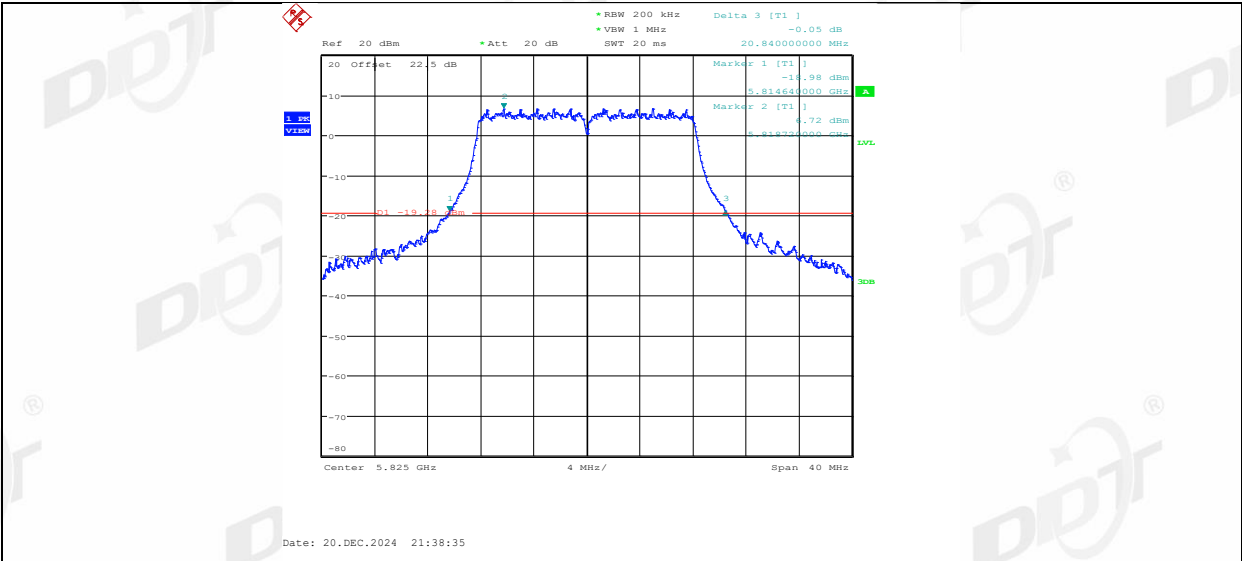
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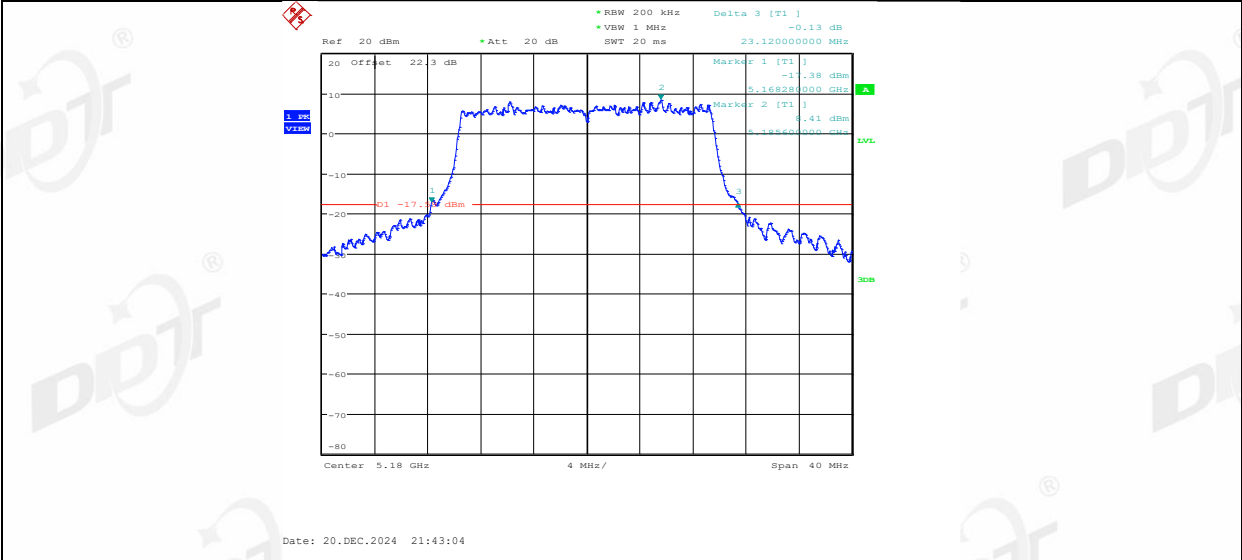
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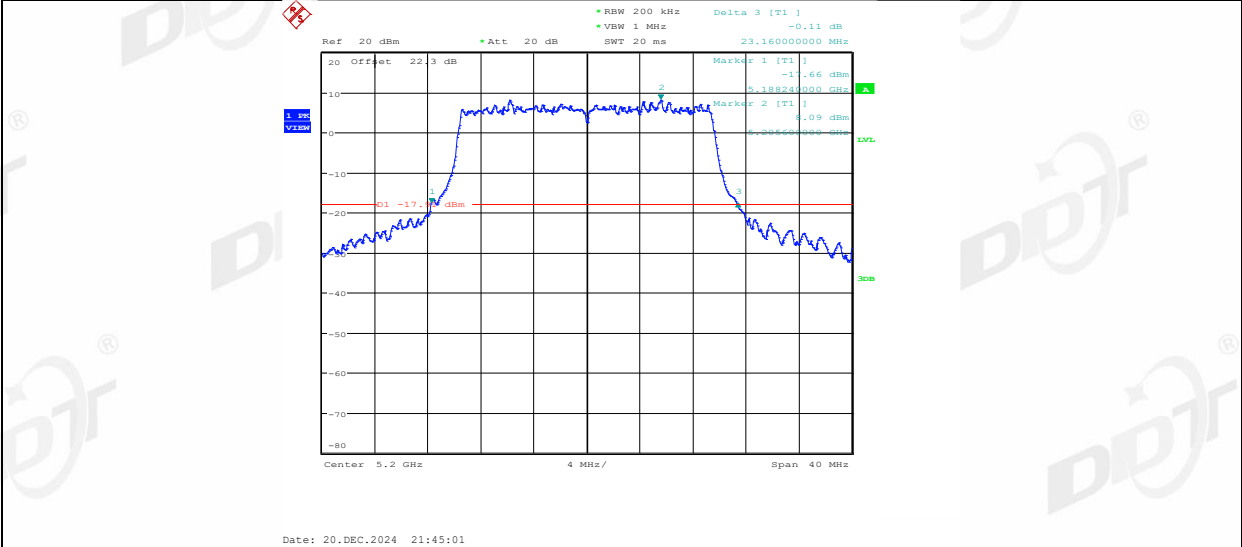
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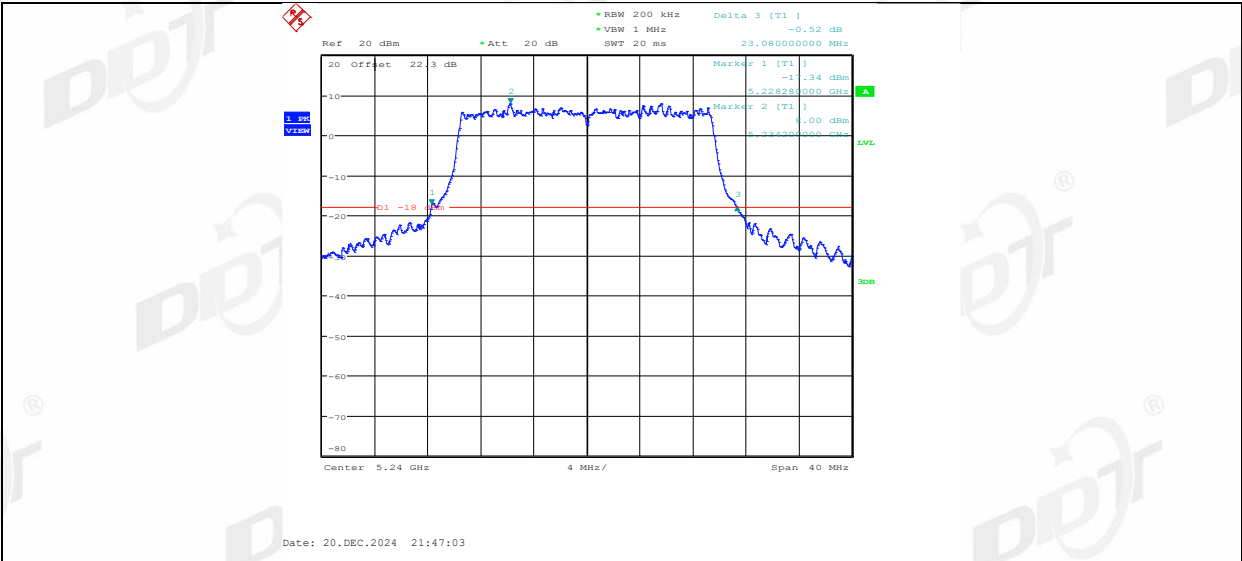
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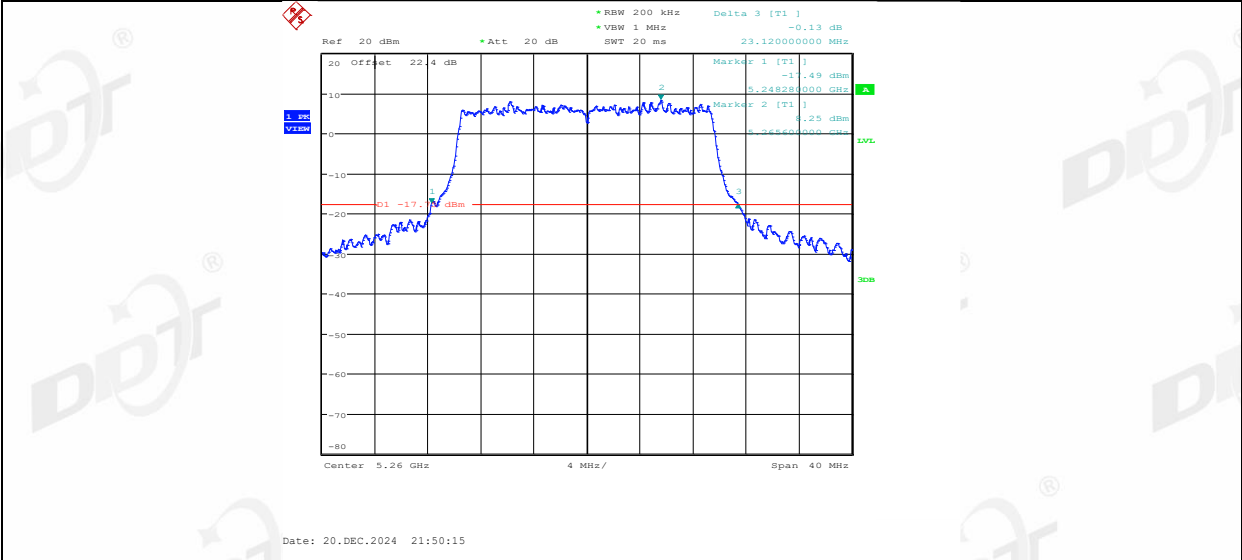
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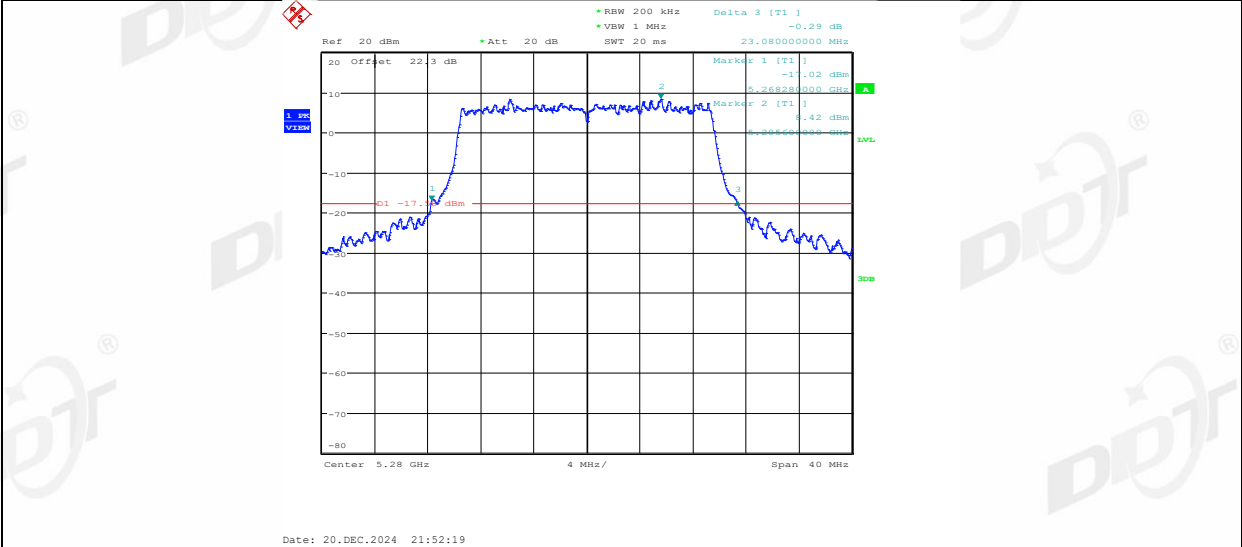
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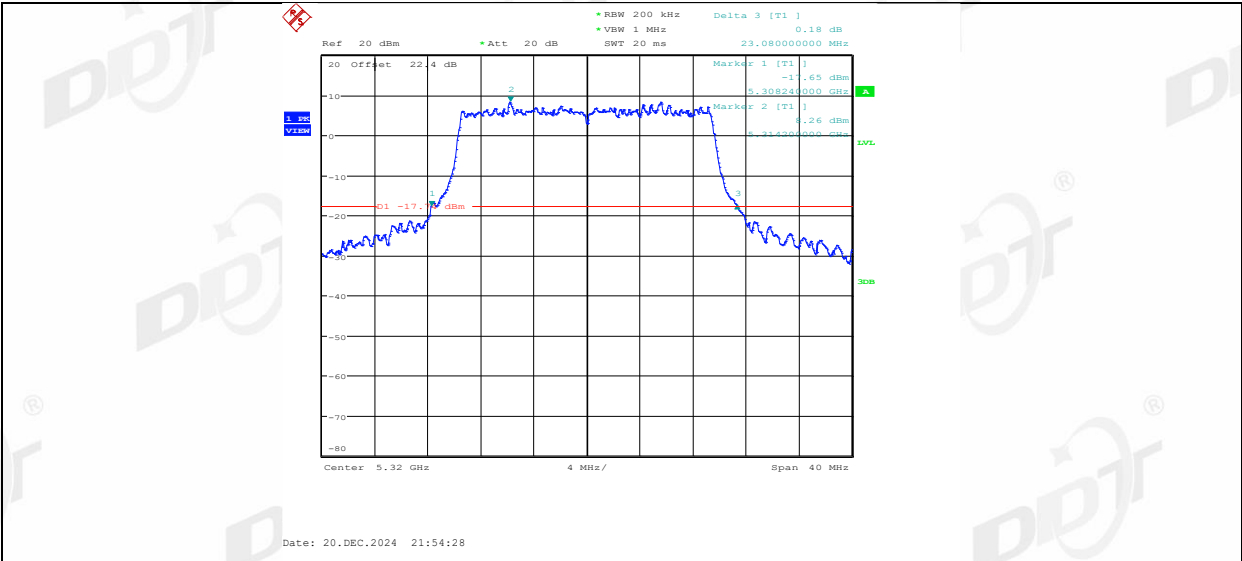
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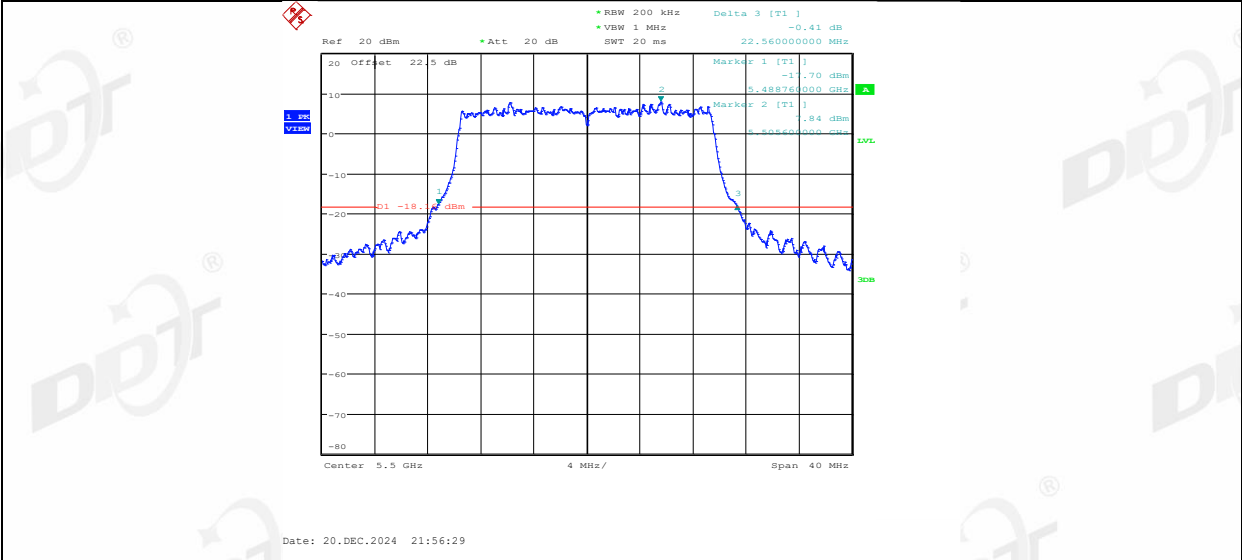
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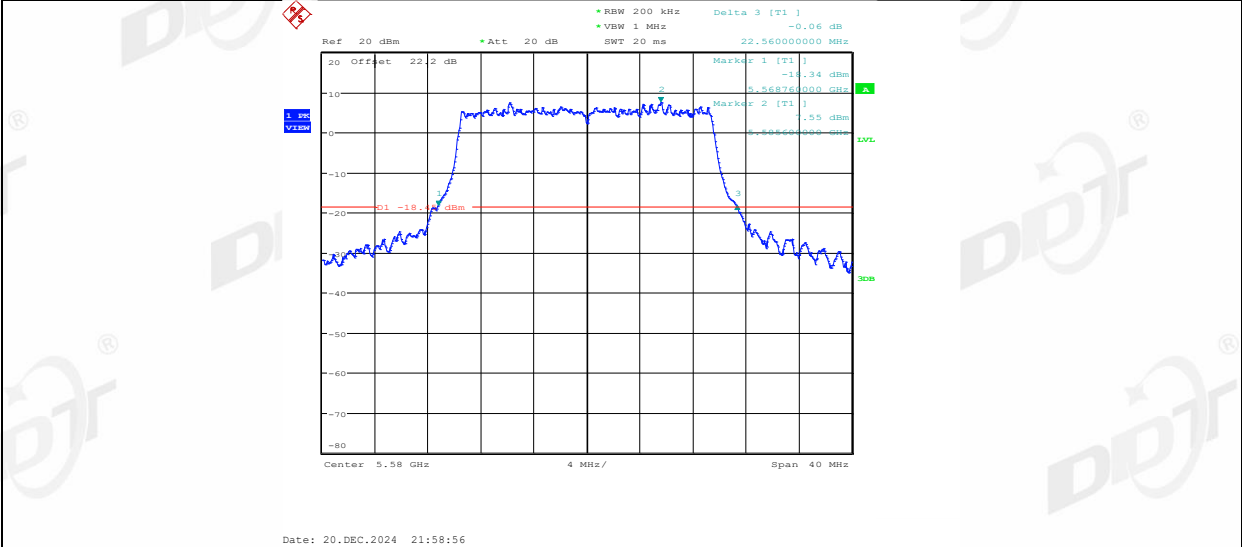
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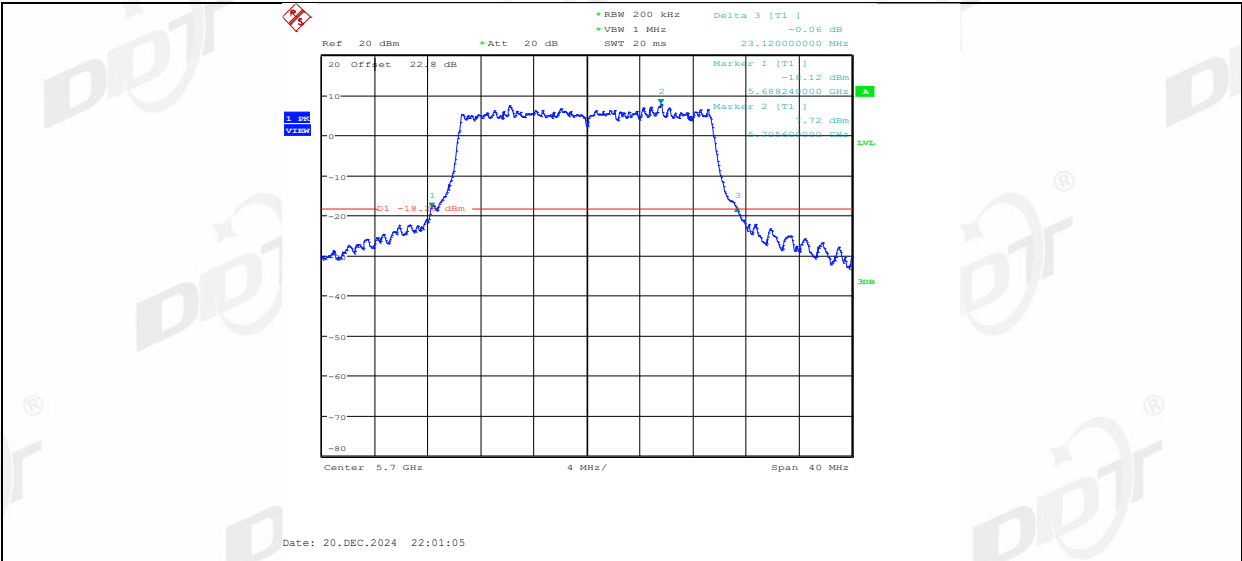
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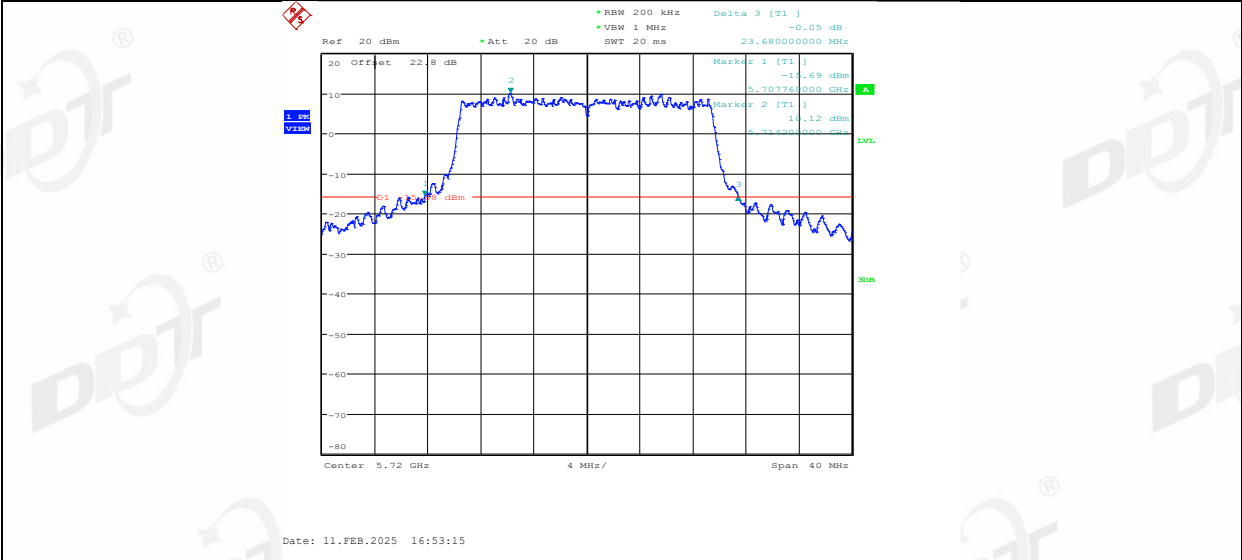
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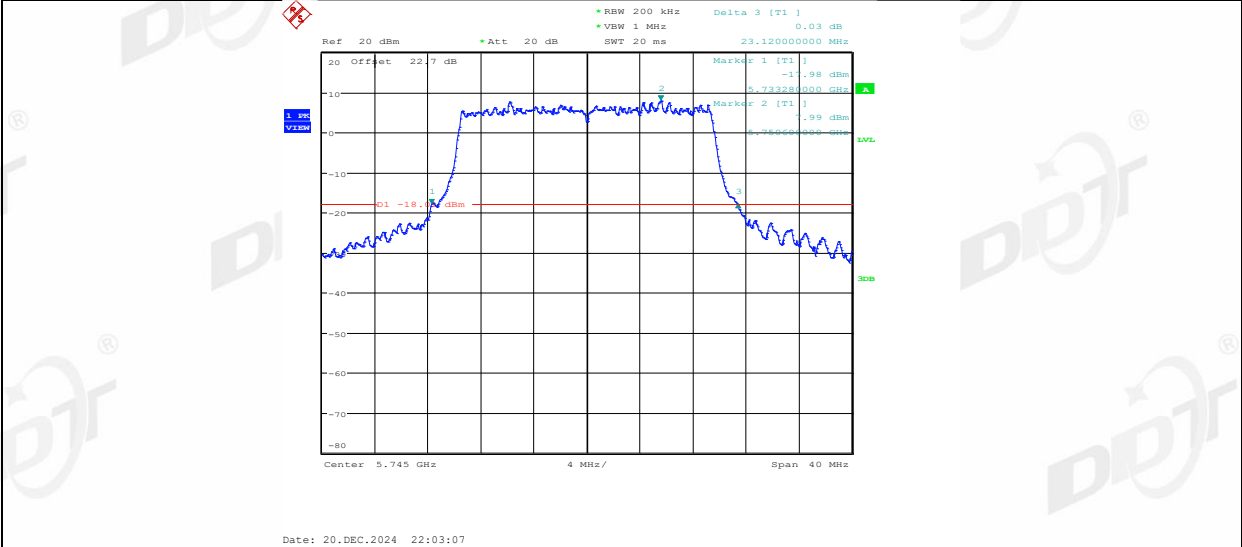
11AX20SISO_Ant1_5700



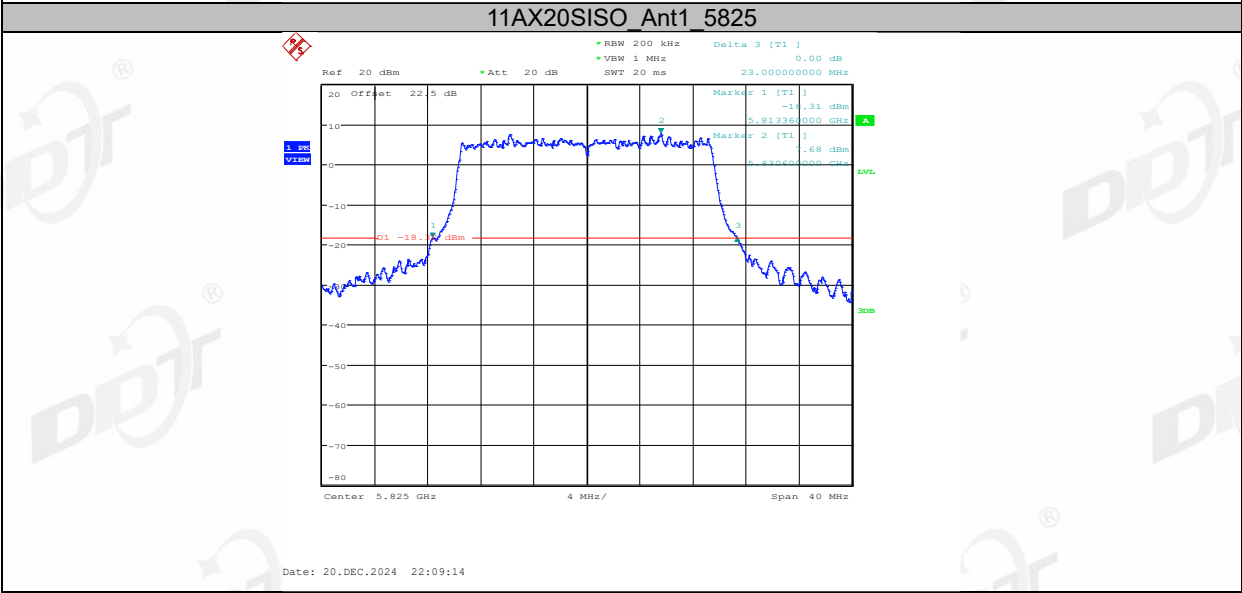
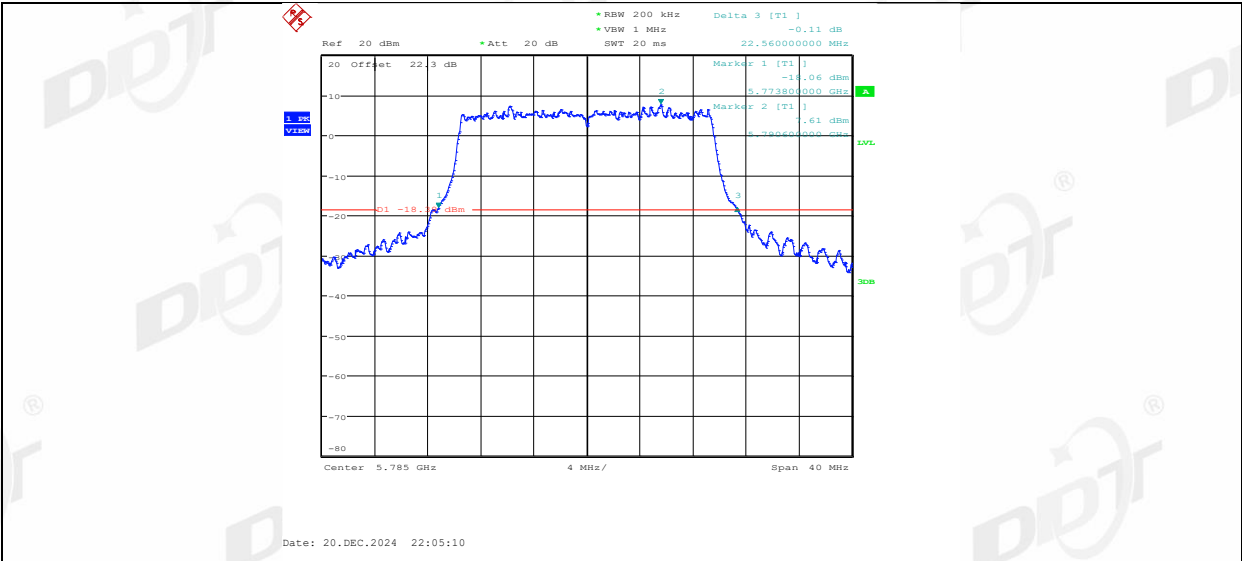
11AX20SISO_Ant1_5720



11AX20SISO_Ant1_5745

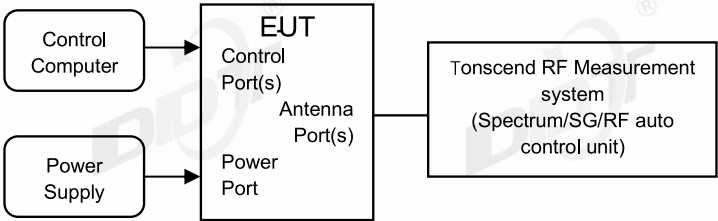


11AX20SISO_Ant1_5785



5. 6dB Bandwidth

5.1. Block diagram of test setup



5.2. Limits

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
6 dB Bandwidth	Minimum 500 kHz	5725 - 5850

5.3. Test procedure

Connect EUT's antenna output to spectrum analyzer by RF cable.

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	For 6 dB Bandwidth: RBW=100 kHz For 26 dB Bandwidth: approximately 1% of the emission bandwidth.
VBW	For 6 dB Bandwidth: VBW=300 kHz For 26 dB Bandwidth: >3 RBW
Trace	Max hold
Sweep	Auto couple

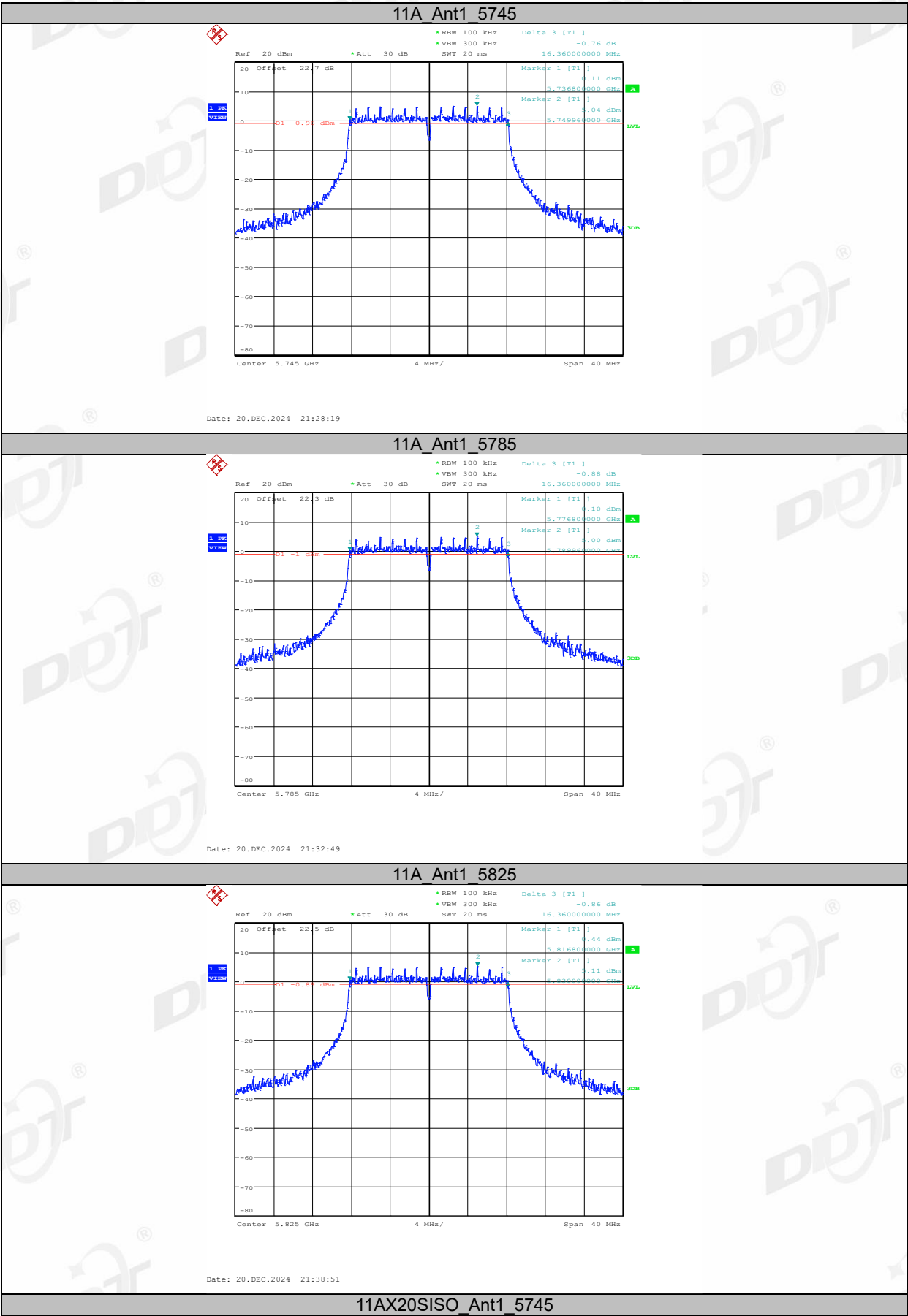
Allow the trace to stabilize, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

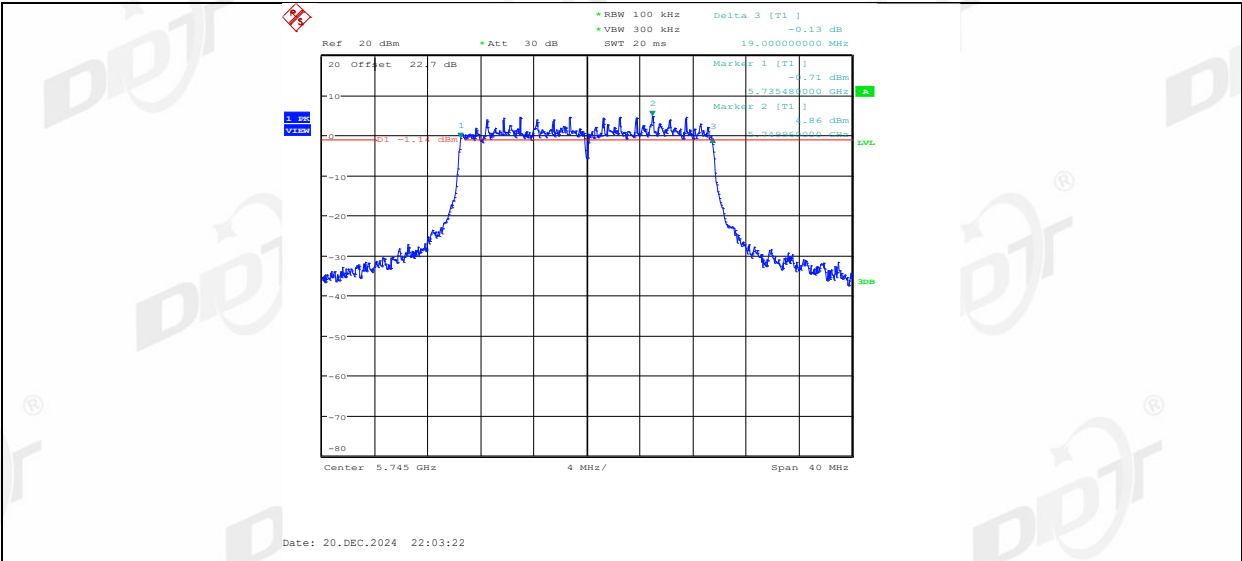
5.4. Test result B4

Test Engineer:	Zora Zhang	Test Site:	RF Measurement System 1#
Ambient Condition:	23.5℃,45.6%RH	Test Date:	2024.11.30-2025.02.11
Test Power Supply:	Battery	Sample Number:	S24111520-011

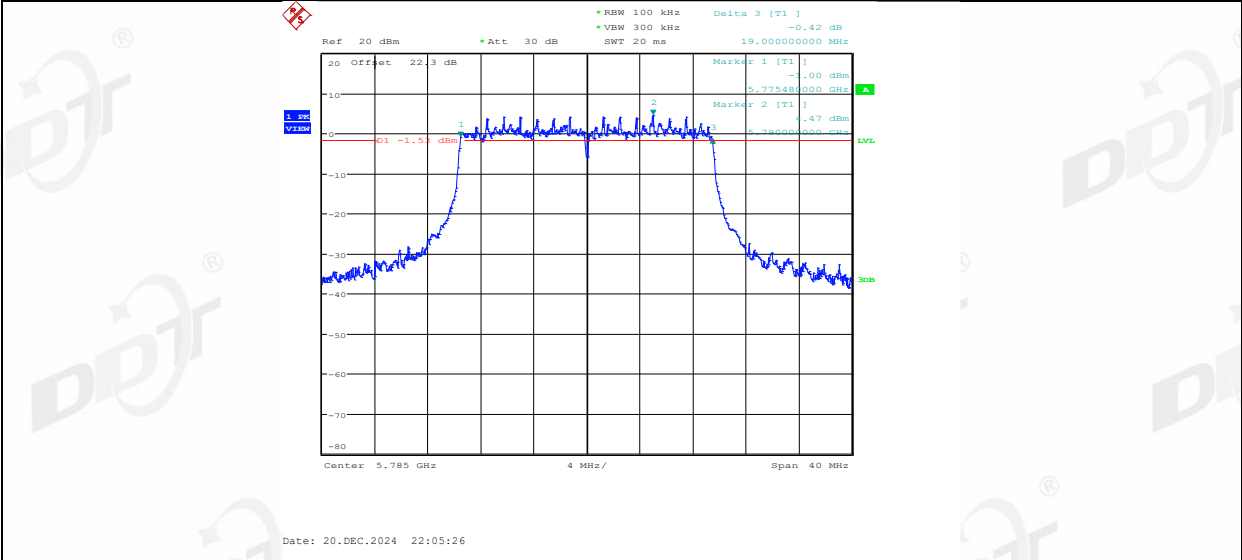
Test Mode	Antenna	Frequency[MHz]	6db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	16.36	5736.80	5753.16	0.5	PASS
		5785	16.36	5776.80	5793.16	0.5	PASS
		5825	16.36	5816.80	5833.16	0.5	PASS
11AX20SISO	Ant1	5745	19.00	5735.48	5754.48	0.5	PASS
		5785	19.00	5775.48	5794.48	0.5	PASS
		5825	19.00	5815.48	5834.48	0.5	PASS

5.5. Test graphs B4

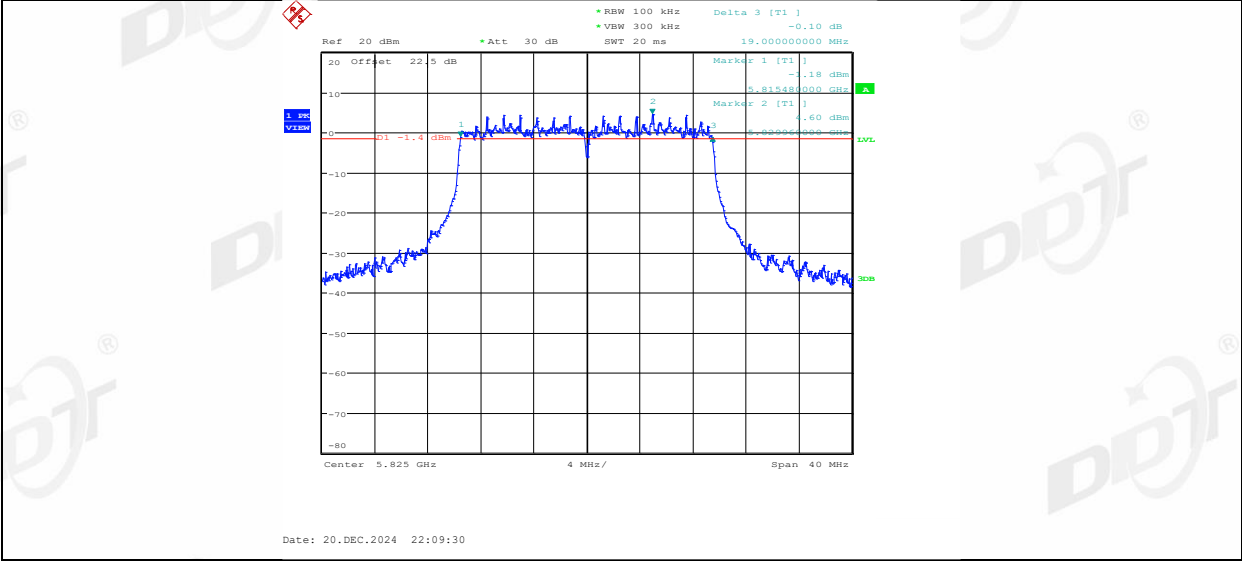




11AX20SISO_Ant1_5785

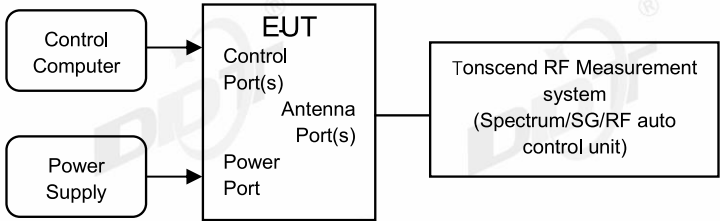


11AX20SISO_Ant1_5825



6. 99% Bandwidth

6.1. Block diagram of test setup



6.2. Limits

Just for Report.

6.3. Test procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	1% to 5% of the OBW
VBW	approximately three times the RBW
Trace	Max hold

Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.

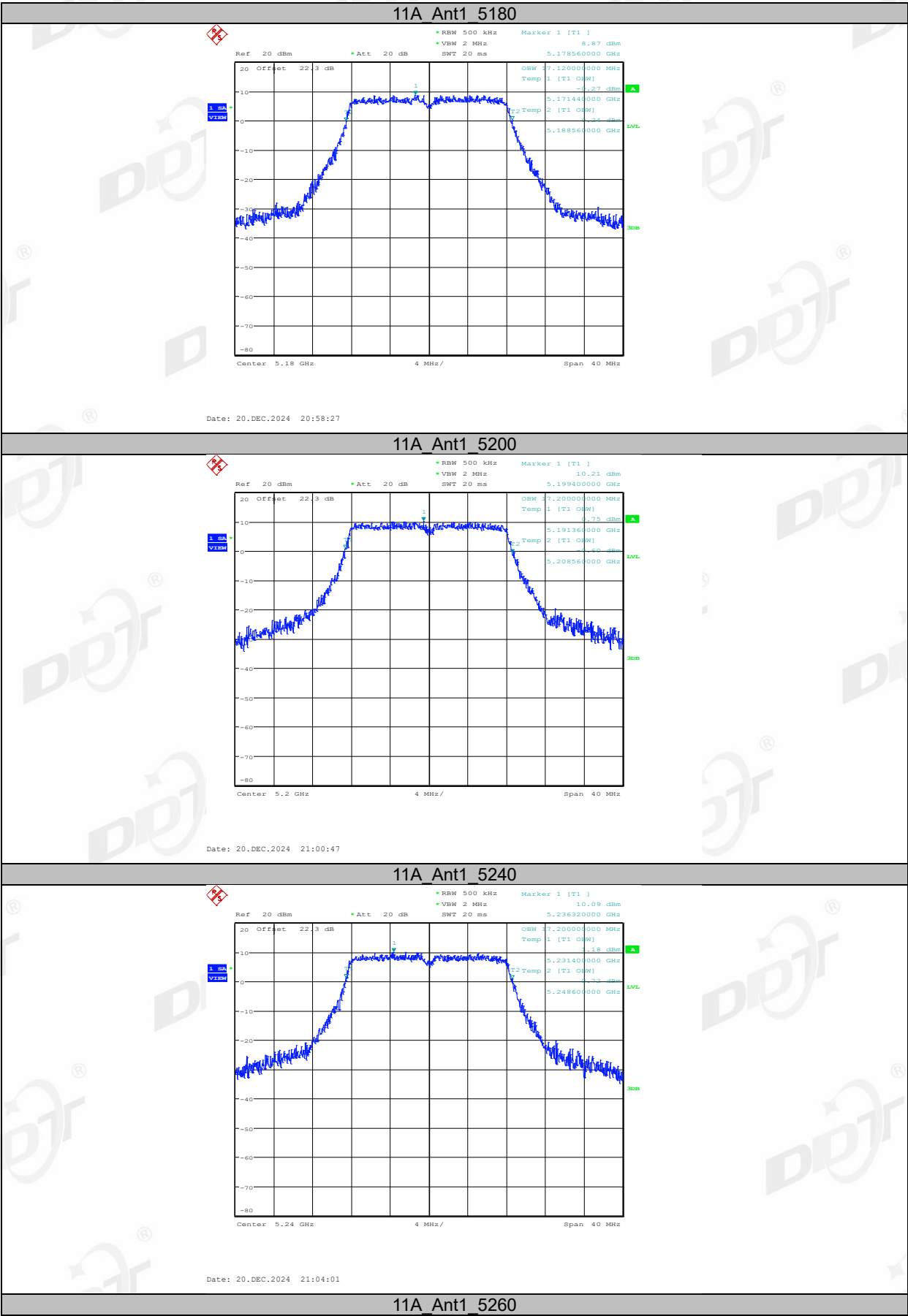
6.4. Test result

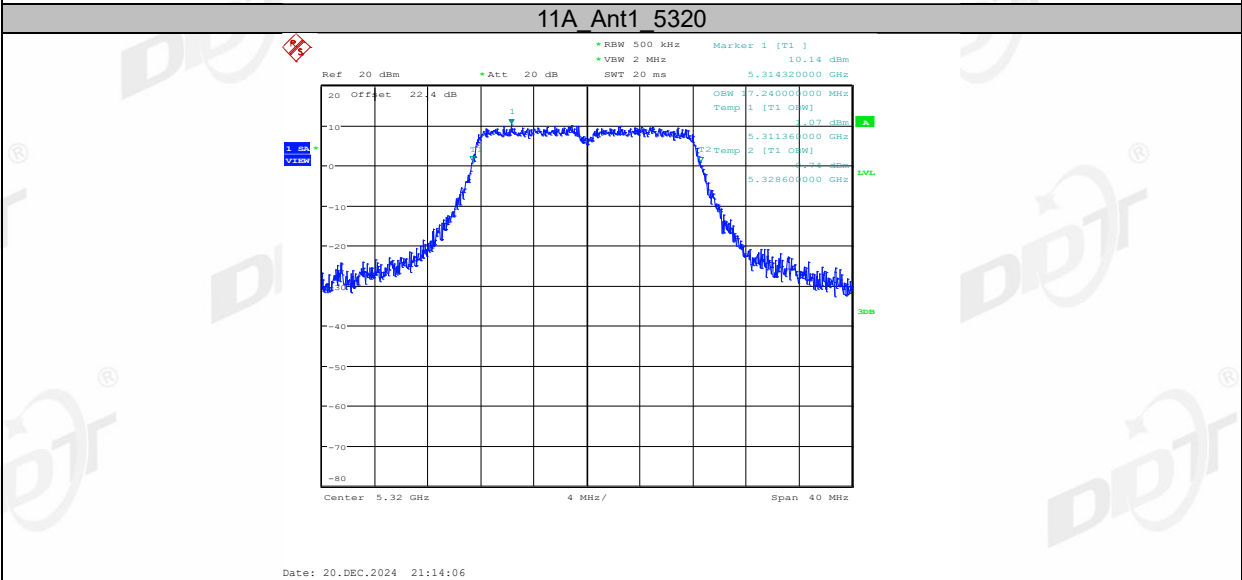
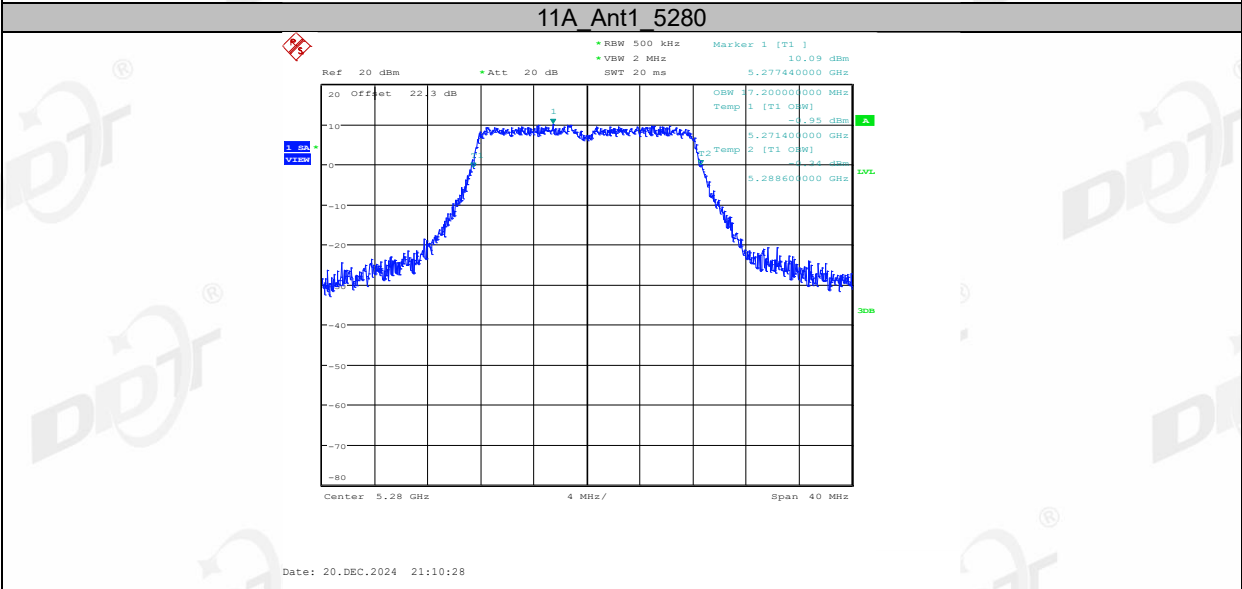
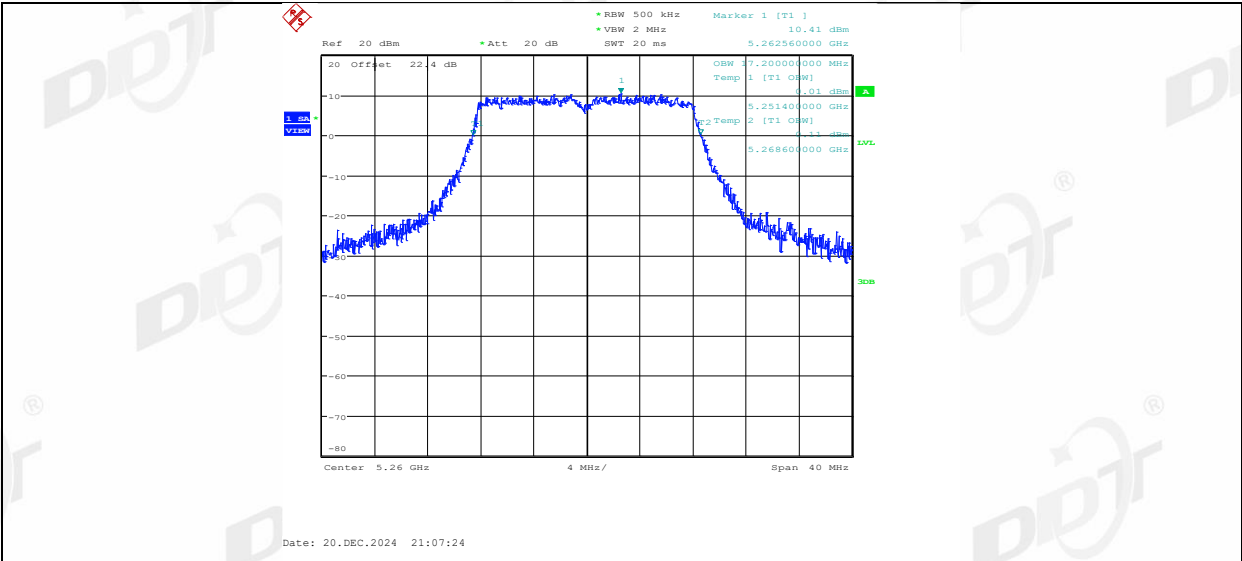
Test Engineer:	Zora Zhang	Test Site:	RF Measurement System 1#
Ambient Condition:	23.5℃,45.6%RH	Test Date:	2024.11.30-2025.02.11
Test Power Supply:	Battery	Sample Number:	S24111520-011

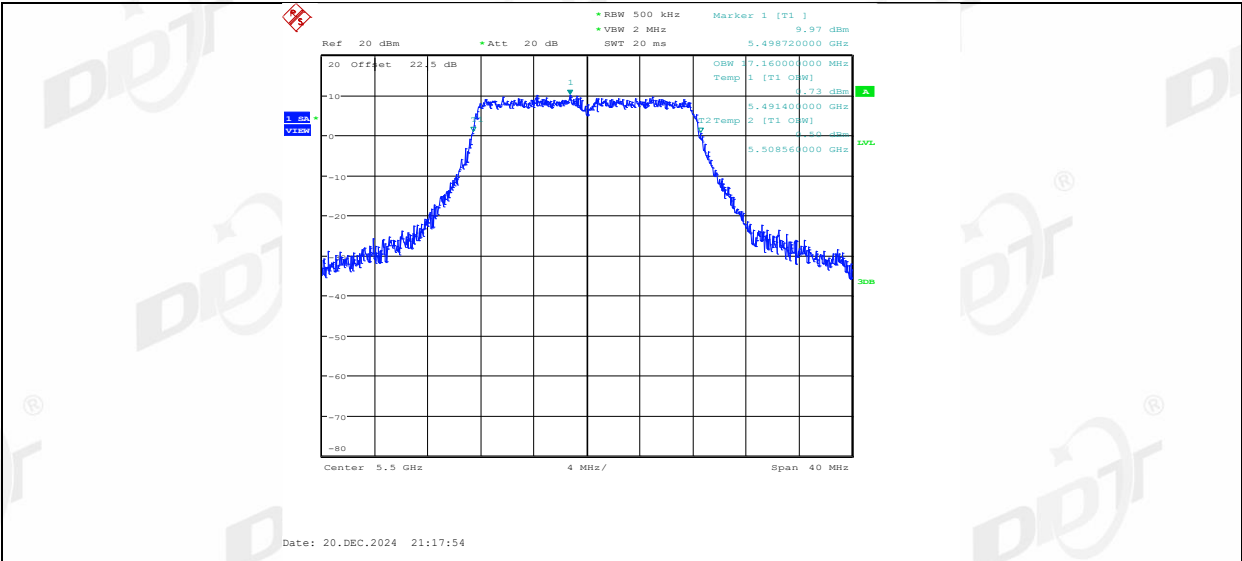
Test Mode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	17.12	5171.440 0	5188.5600	---	---
		5200	17.2	5191.360 0	5208.5600	---	---
		5240	17.2	5231.400 0	5248.6000	---	---
		5260	17.2	5251.400 0	5268.6000	---	---
		5280	17.2	5271.400 0	5288.6000	---	---
		5320	17.24	5311.360 0	5328.6000	---	---
		5500	17.16	5491.400 0	5508.5600	---	---
		5580	17.2	5571.400 0	5588.6000	---	---
		5700	17.2	5691.360 0	5708.5600	---	---
		5720	17.32	5711.280 0	5728.6000	---	---
		5720_UNII-2C	13.72	5711.280 0	5725	---	---
		5720_UNII-3	3.6	5725	5728.6000	---	---
		5745	17.2	5736.440 0	5753.6400	---	---
		5785	17.2	5776.400 0	5793.6000	---	---
		5825	17.16	5816.400 0	5833.5600	---	---
11AX20SI SO	Ant1	5180	19.36	5170.280 0	5189.6400	---	---
		5200	19.36	5190.280 0	5209.6400	---	---
		5240	19.36	5230.280 0	5249.6400	---	---
		5260	19.4	5250.280 0	5269.6800	---	---
		5280	19.4	5270.240 0	5289.6400	---	---
		5320	19.36	5310.280 0	5329.6400	---	---
		5500	19.36	5490.280 0	5509.6400	---	---
		5580	19.4	5570.240 0	5589.6400	---	---
		5700	19.36	5690.280 0	5709.6400	---	---
		5720	19.44	5710.160 0	5729.6000	---	---
		5720_UNII-2C	14.84	5710.160 0	5725	---	---
		5720_UNII-3	4.6	5725	5729.6000	---	---
		5745	19.32	5735.320 0	5754.6400	---	---
		5785	19.36	5775.280 0	5794.6400	---	---
		5825	19.36	5815.280	5834.6400	---	---

				0			
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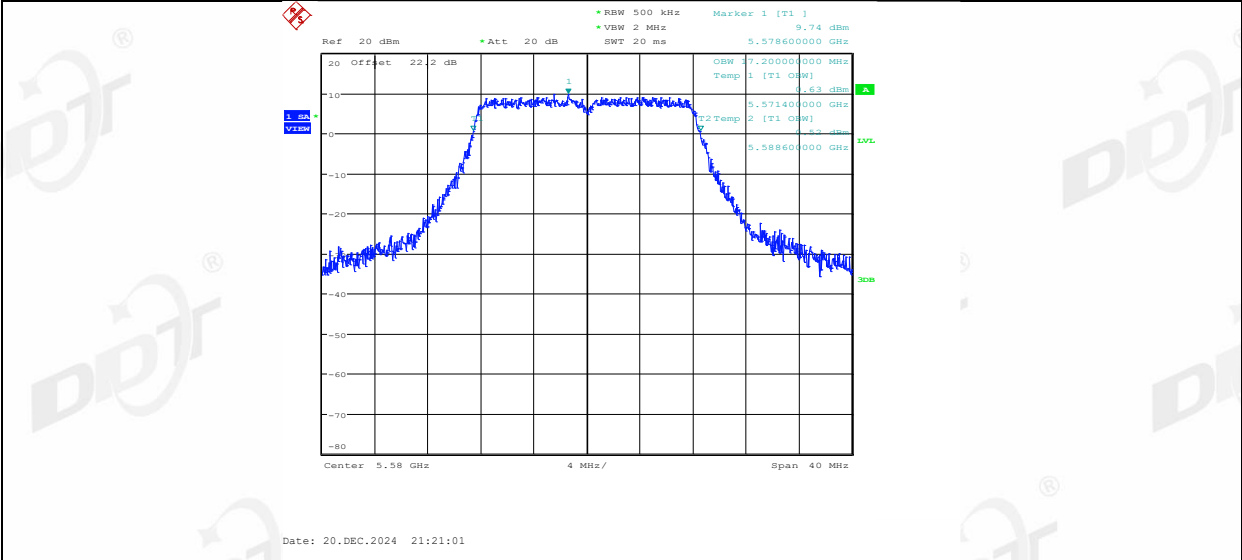
6.5. Test graphs



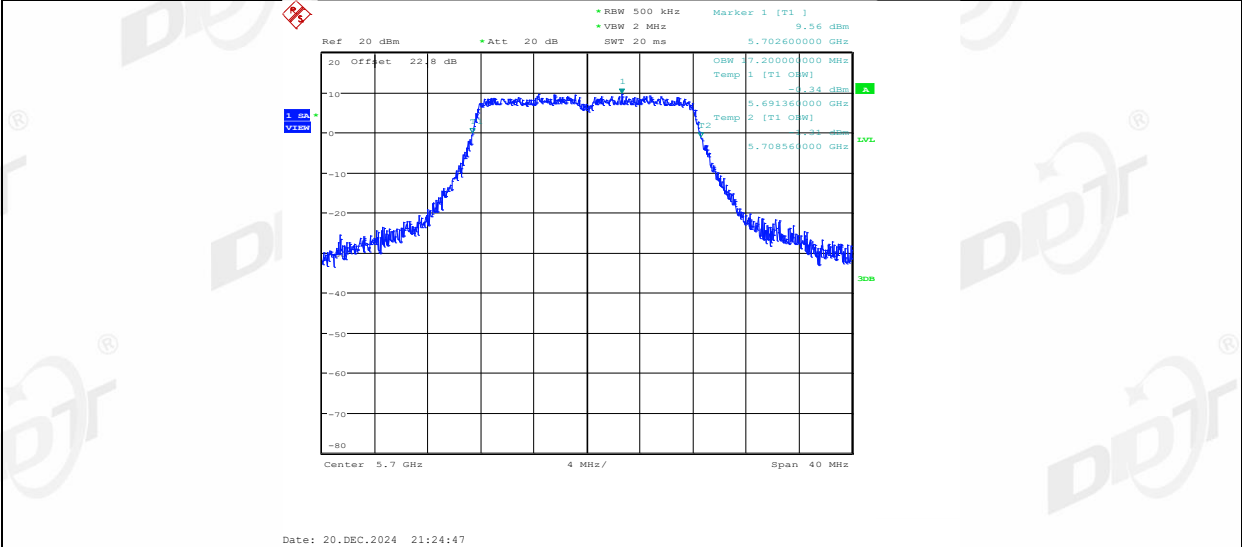




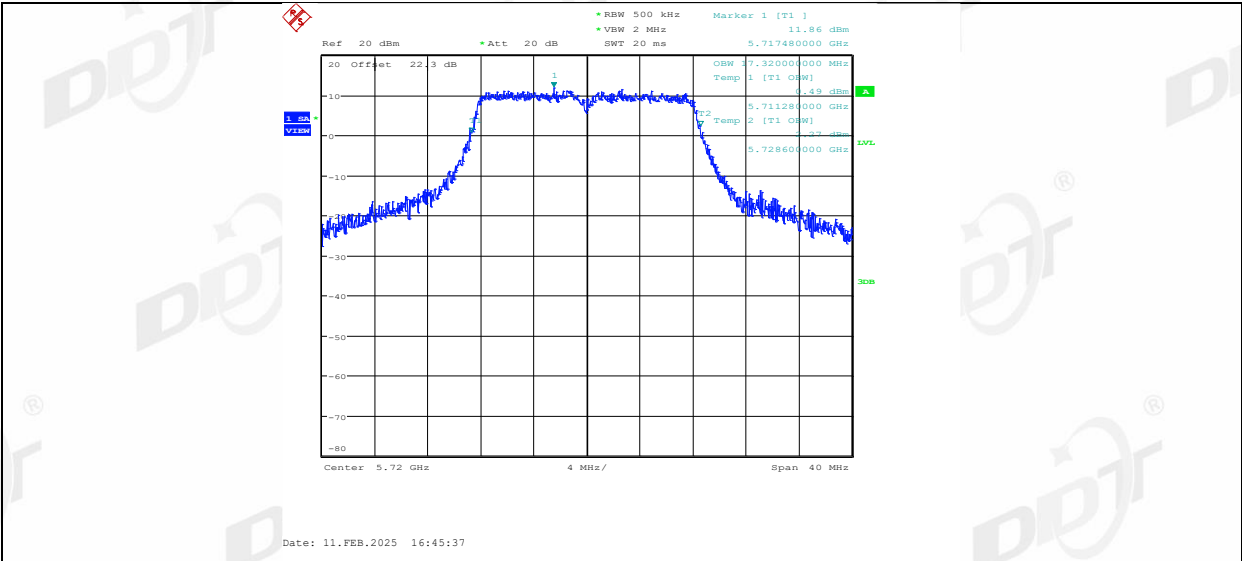
11A_Ant1_5580



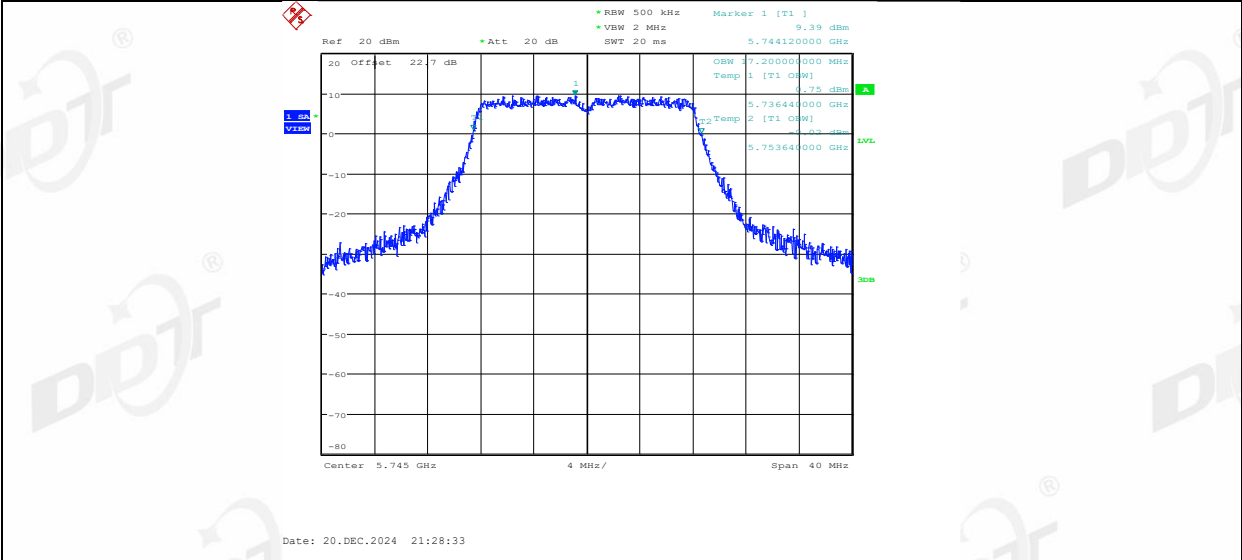
11A_Ant1_5700



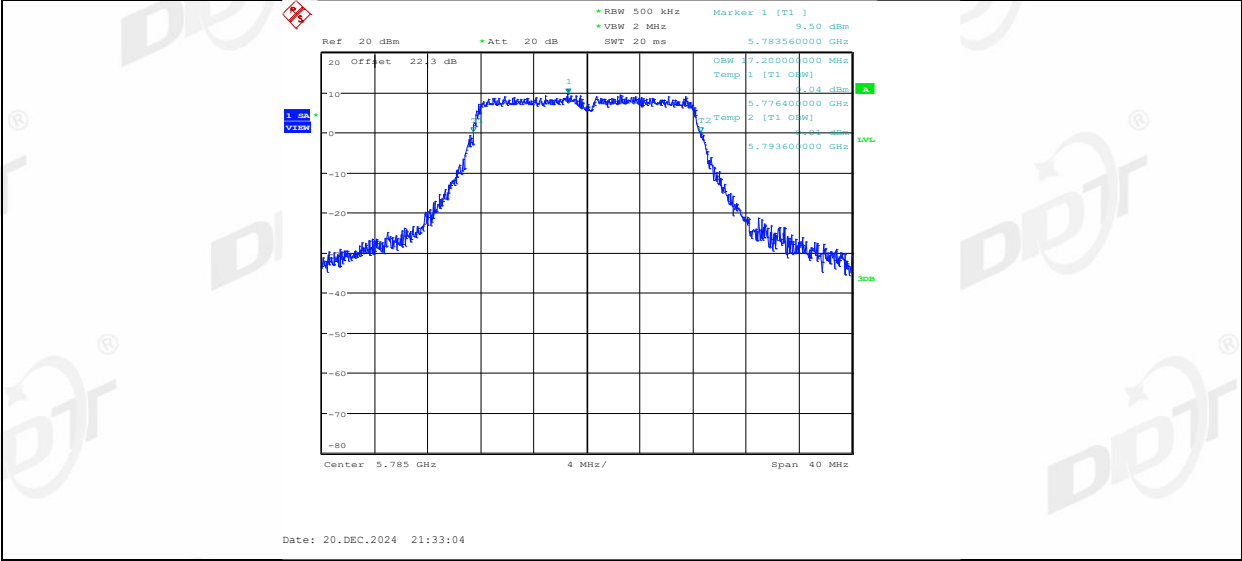
11A_Ant1_5720



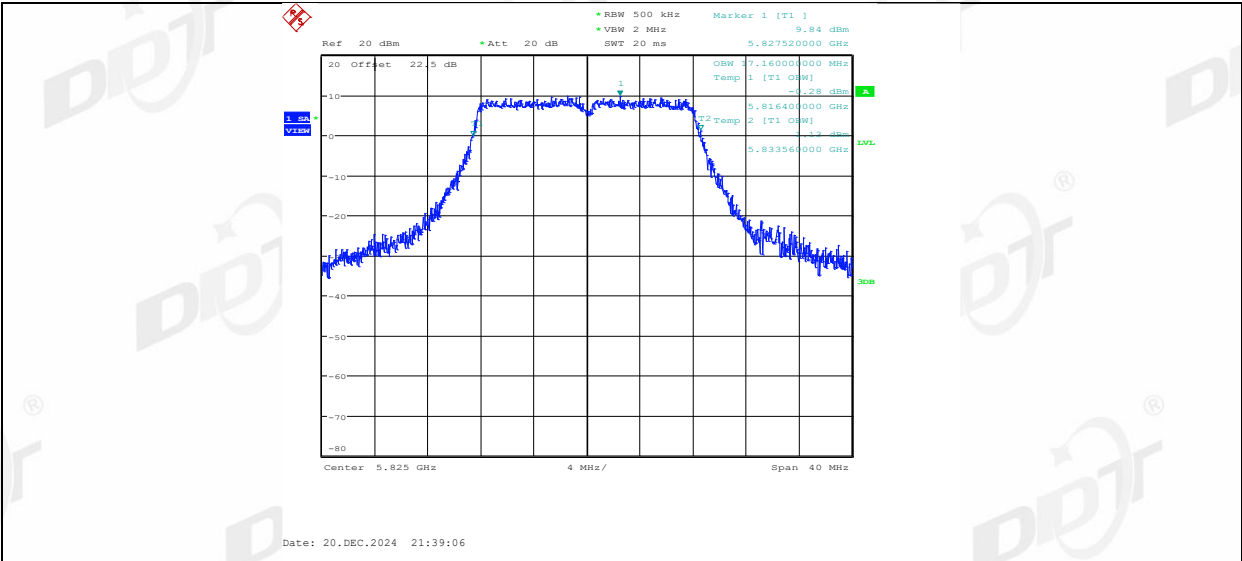
11A_Ant1_5745



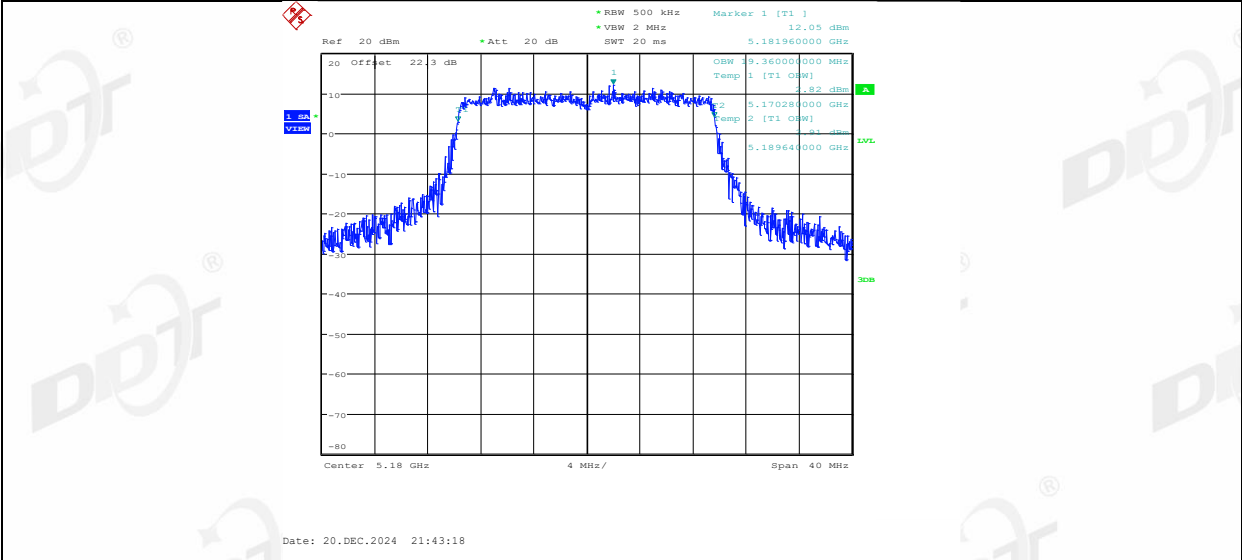
11A_Ant1_5785



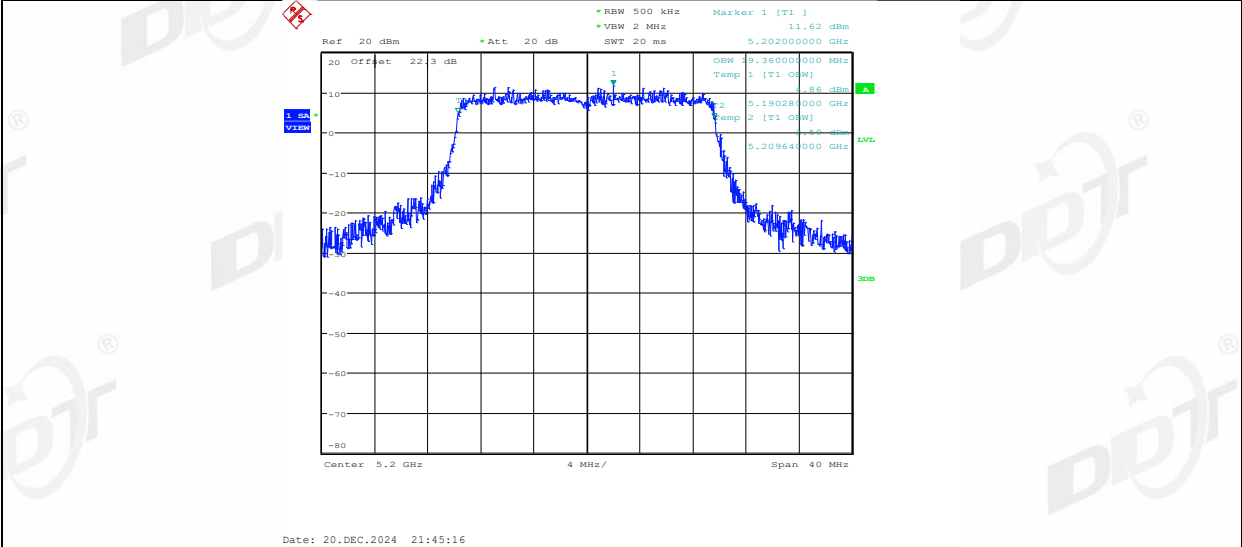
11A_Ant1_5825



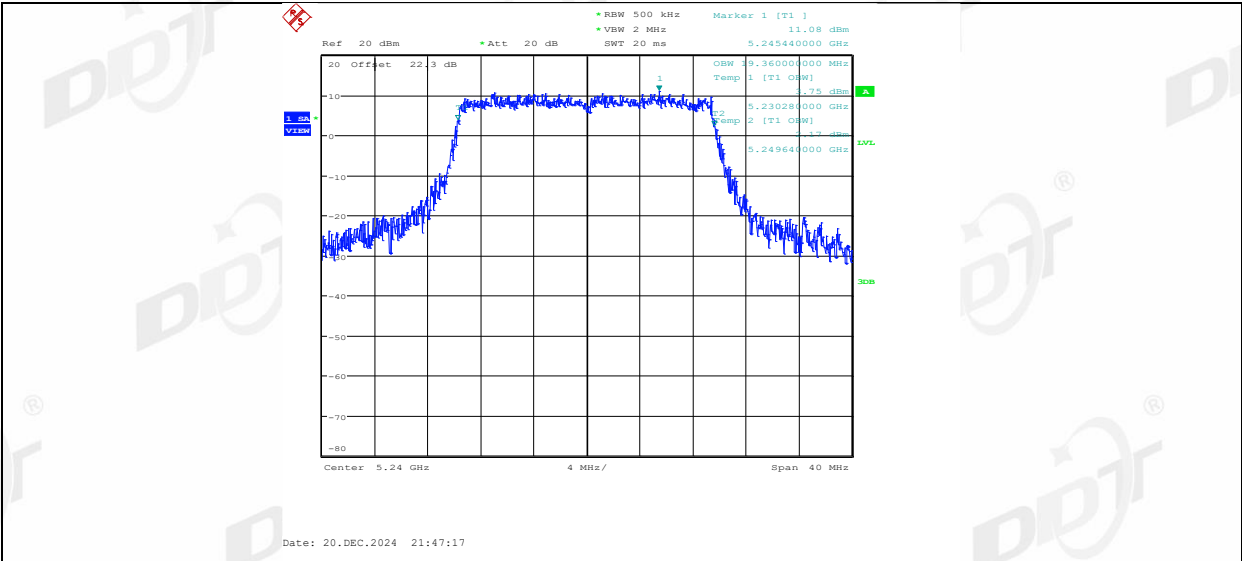
11AX20SISO_Ant1_5180



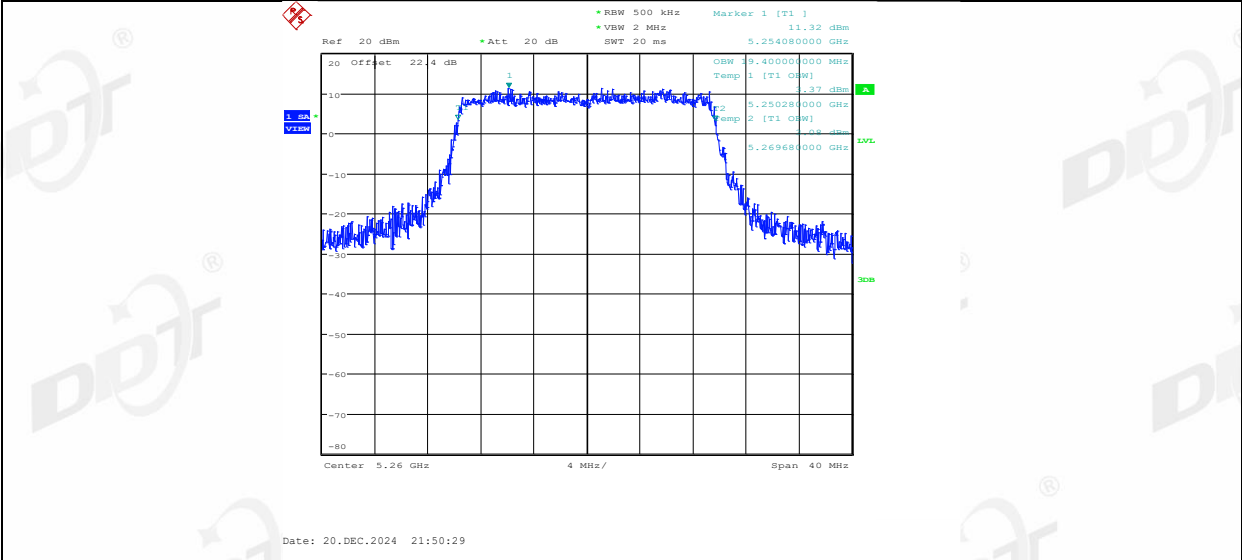
11AX20SISO_Ant1_5200



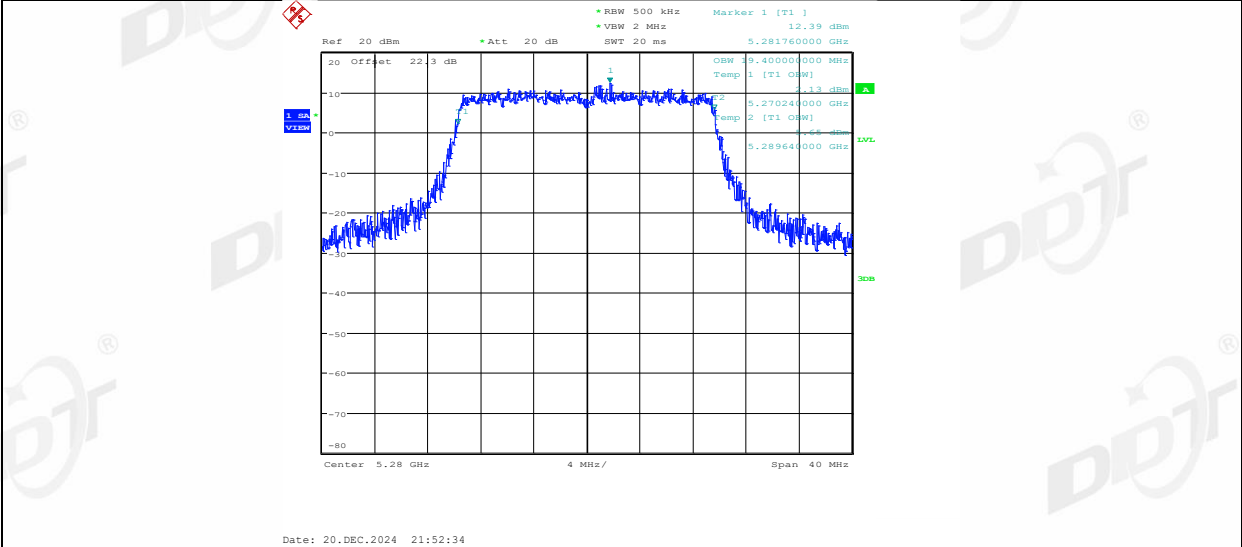
11AX20SISO_Ant1_5240



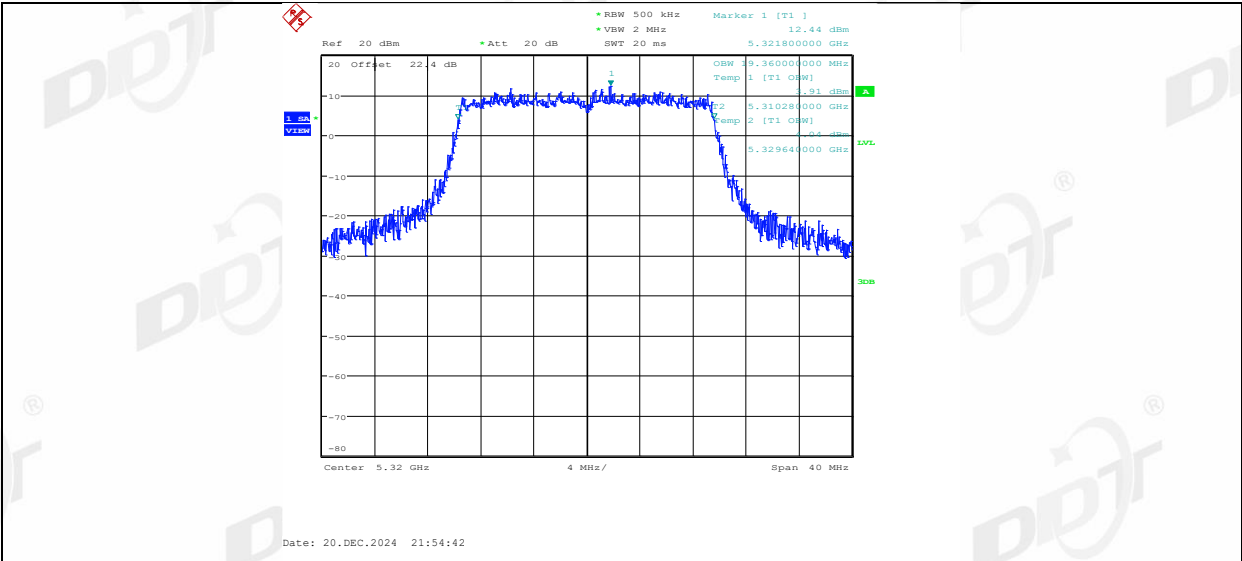
11AX20SISO_Ant1_5260



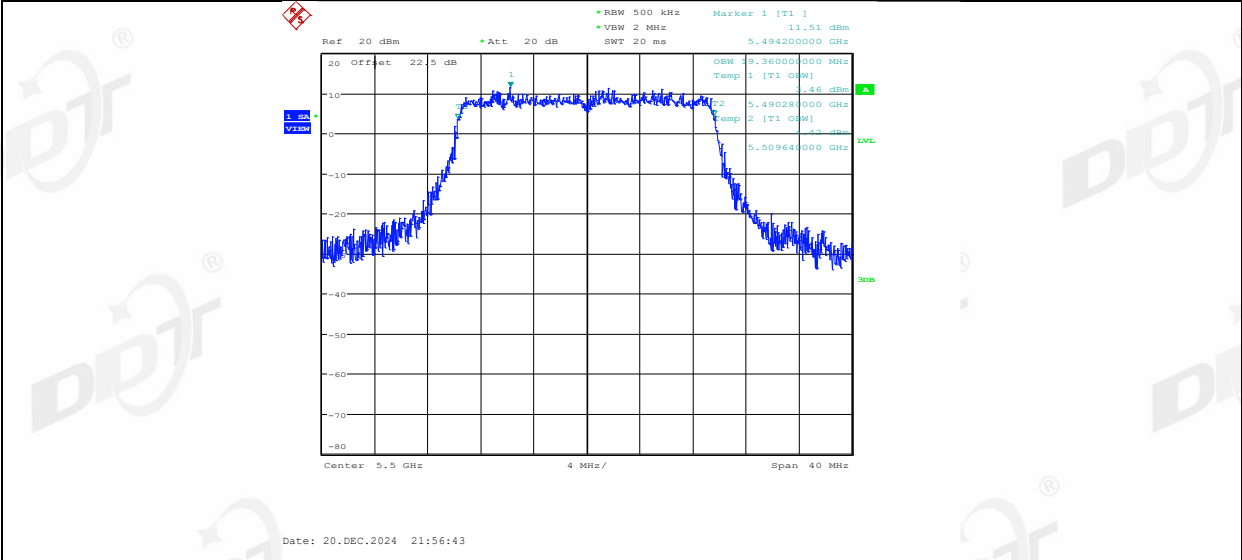
11AX20SISO_Ant1_5280



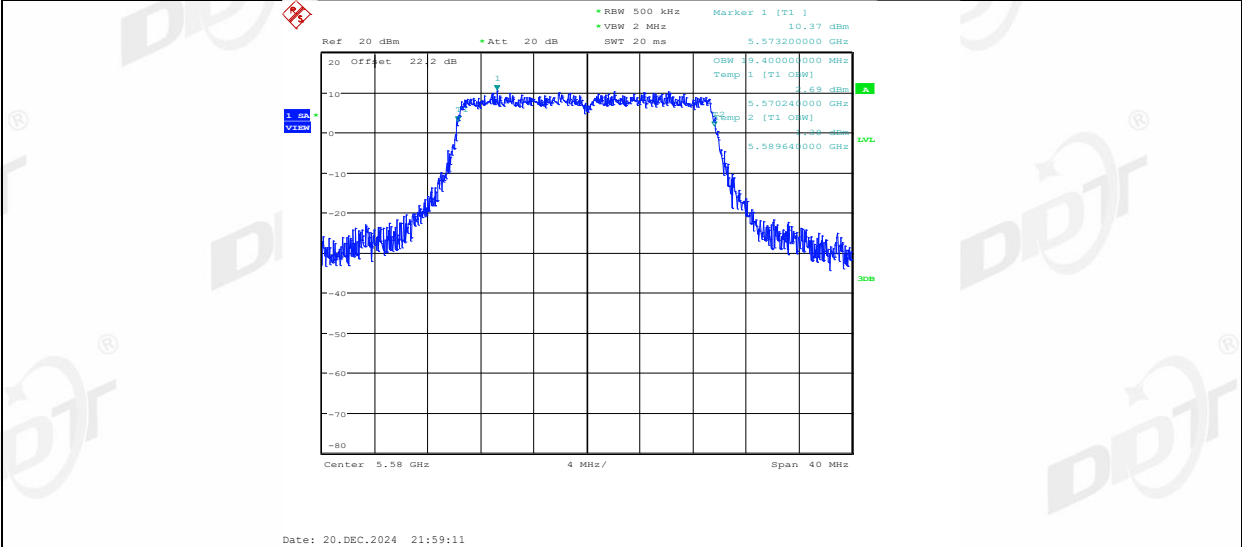
11AX20SISO_Ant1_5320



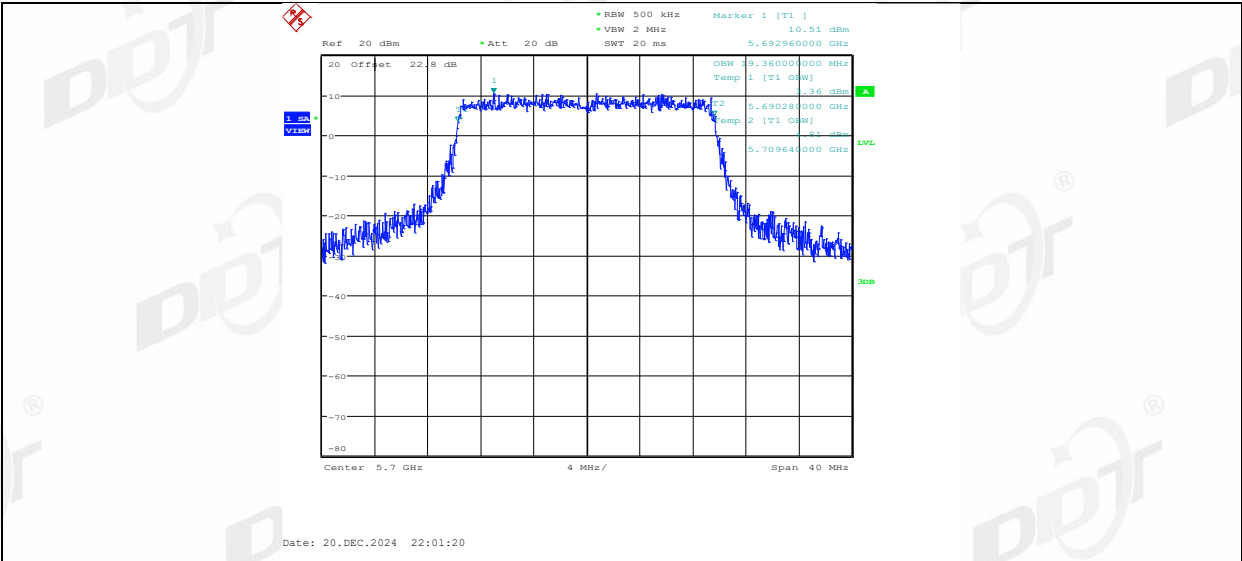
11AX20SISO_Ant1_5500



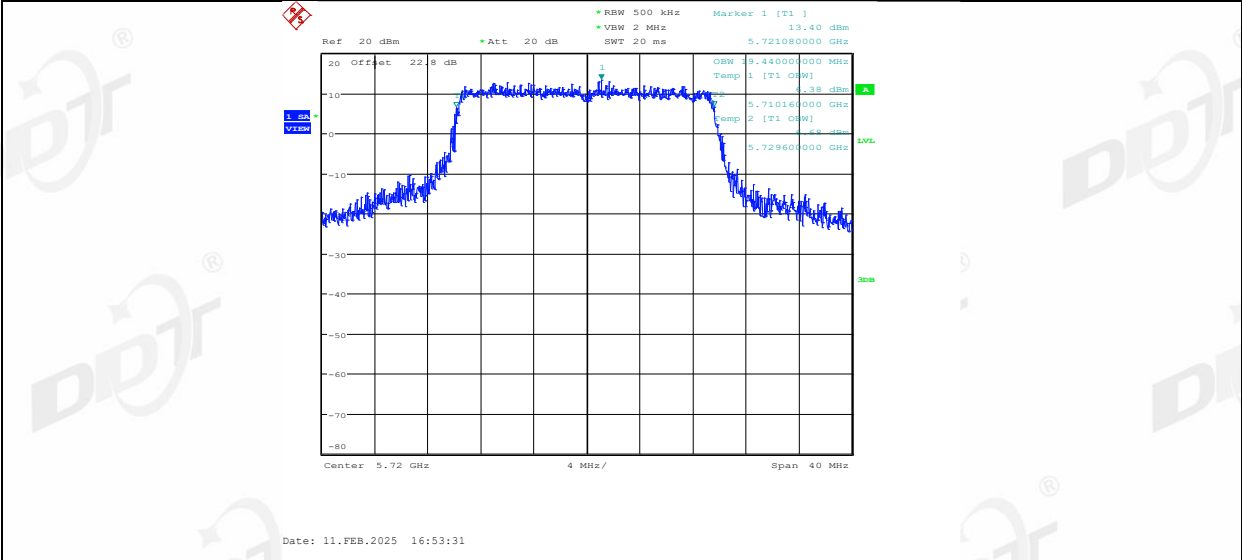
11AX20SISO_Ant1_5580



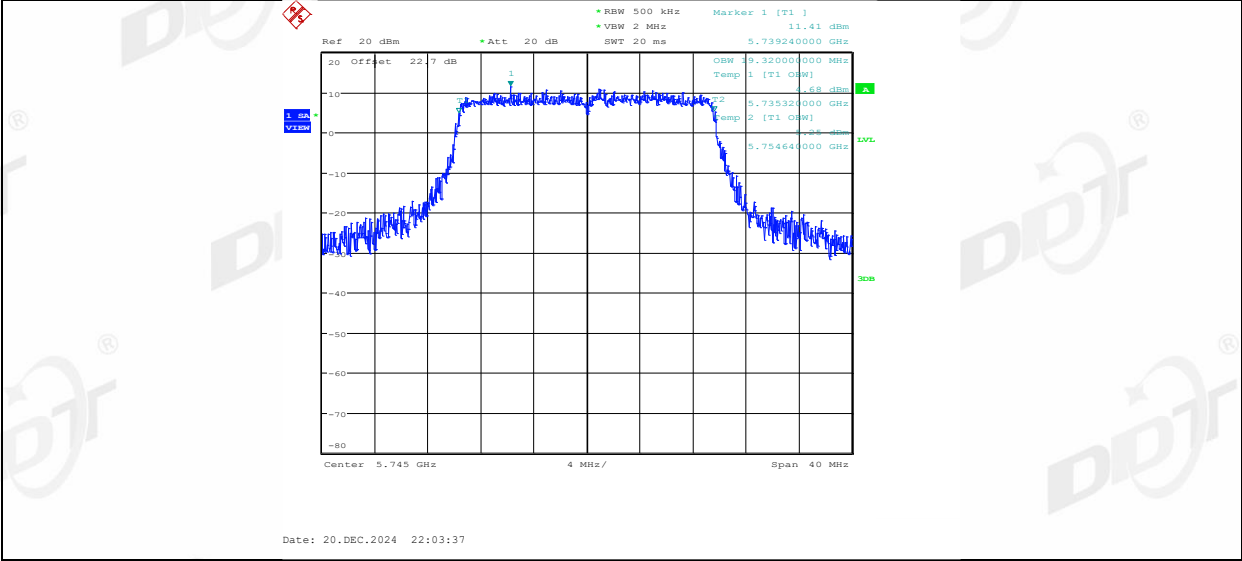
11AX20SISO_Ant1_5700



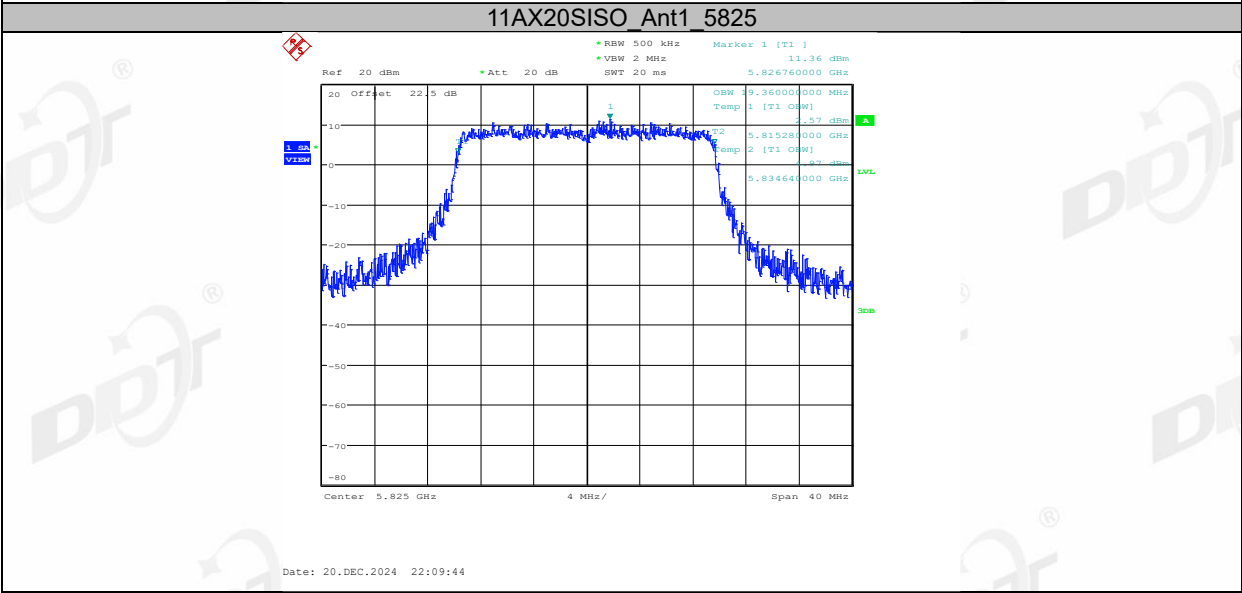
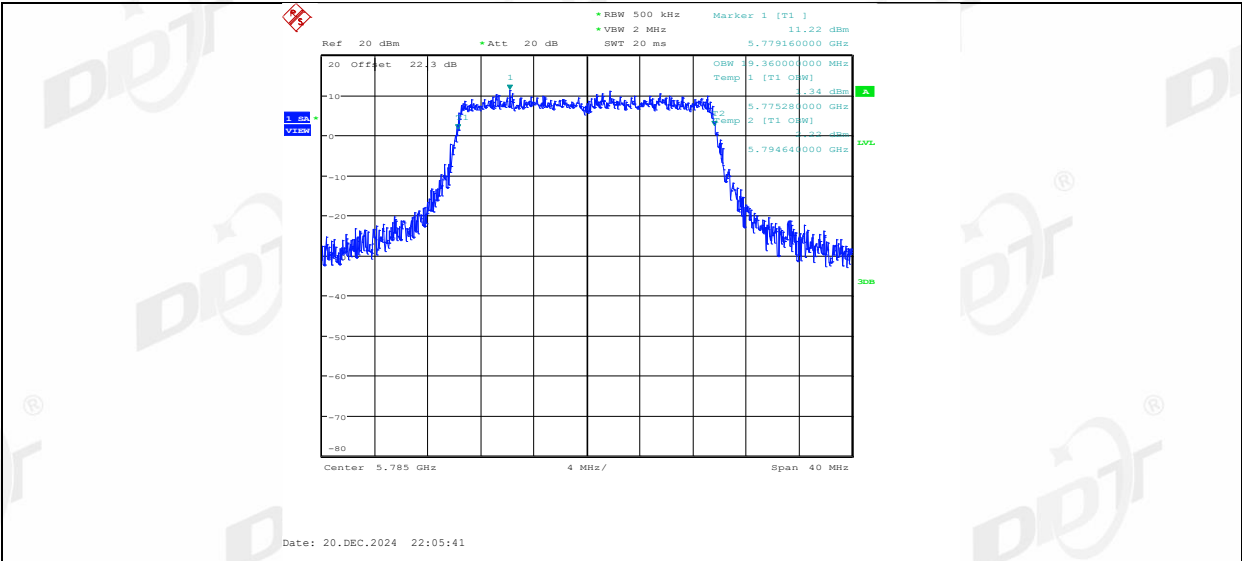
11AX20SISO_Ant1_5720



11AX20SISO_Ant1_5745

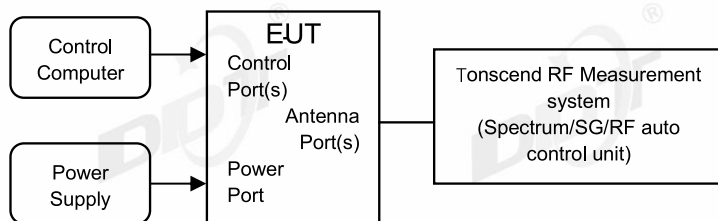


11AX20SISO_Ant1_5785



7. Duty Cycle

7.1. Block diagram of test setup



7.2. Limit

Just for Report.

7.3. Test procedure

- (1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator, The cable loss and attenuator loss have been put into spectrum analyzer as amplitude offset.

set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the middle hopping channel.

Resolution BW: 10 MHz.

Video BW: 10 MHz.

Span: Zero span.

Detector: Peak.

Trace Mode: Clear Write.

Sweep: Video Trigger

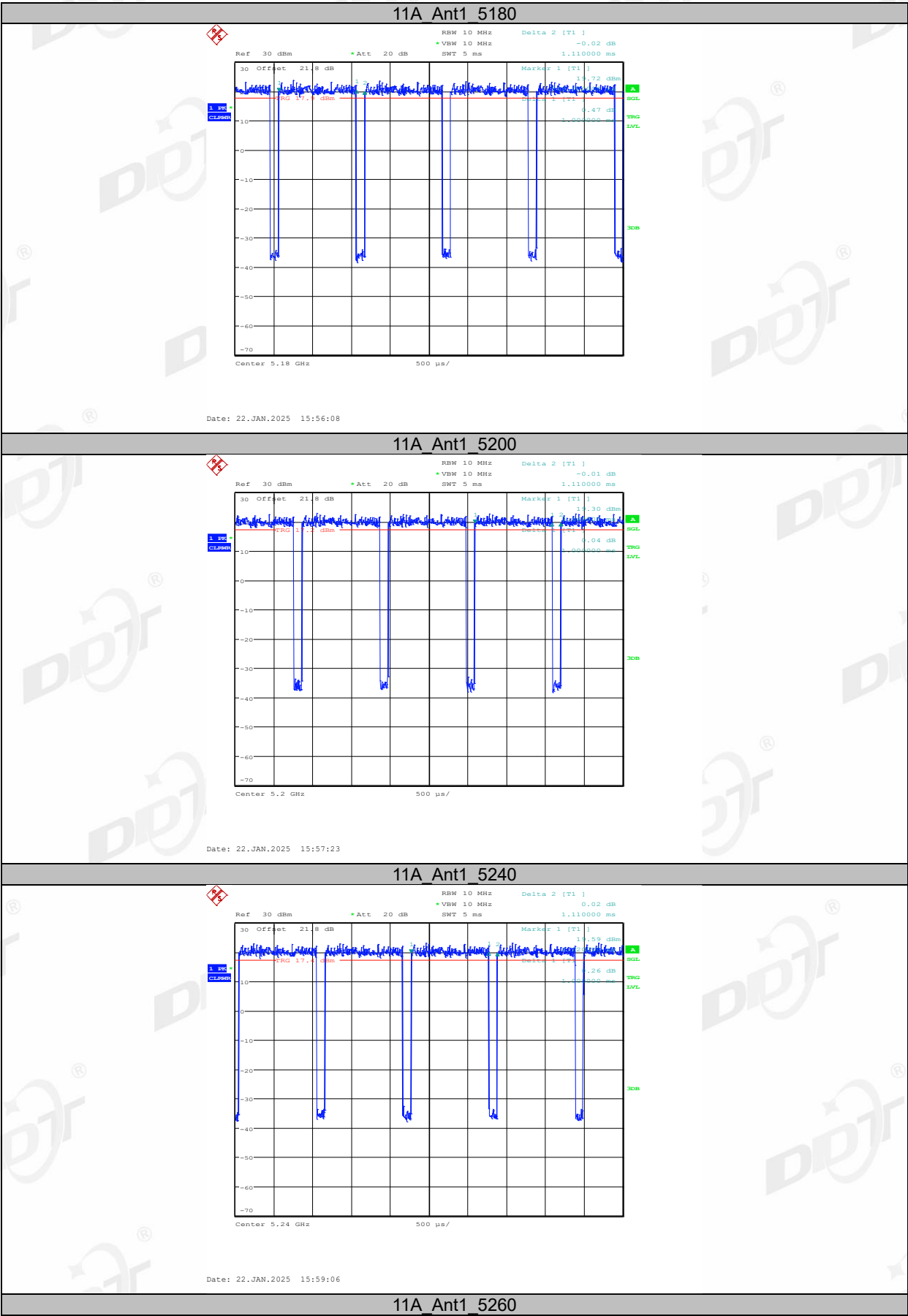
- (2) When the trace is complete, measure the sending time of 1 burst and the duty cycle of 1 burst cycle.
- (3) Calculate dwell time follow below formula:
Duty cycle= Pulse's on time / Burst cycle

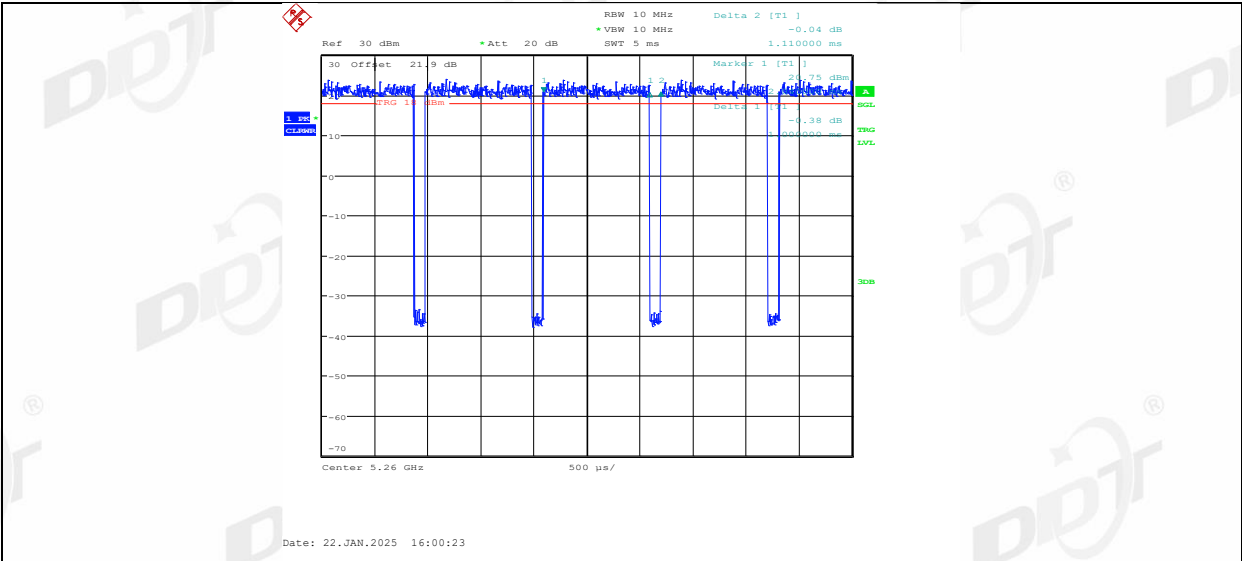
7.4. Test result

Test Engineer:	Zora Zhang	Test Site:	RF Measurement System 1#
Ambient Condition:	23.5℃,45.6%RH	Test Date:	2024.11.30-2025.02.11
Test Power Supply:	Battery	Sample Number:	S24111520-011

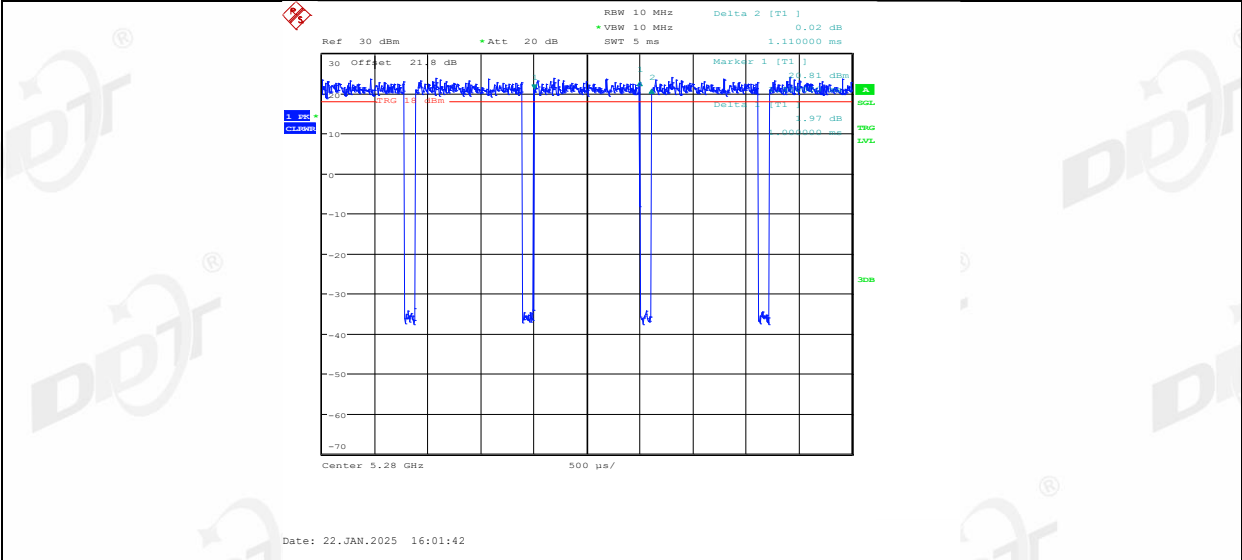
Test Mode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11A	Ant1	5180	1.00	1.11	90.09
		5200	1.00	1.11	90.09
		5240	1.00	1.11	90.09
		5260	1.00	1.11	90.09
		5280	1.00	1.11	90.09
		5320	1.01	1.11	90.99
		5500	1.01	1.11	90.99
		5580	1.01	1.11	90.99
		5700	1.01	1.11	90.99
		5720	1.00	1.11	90.09
		5745	1.01	1.11	90.99
		5785	1.00	1.11	90.09
		5825	1.01	1.11	90.99
11AX20SISO	Ant1	5180	1.00	1.11	90.09
		5200	1.01	1.11	90.99
		5240	1.01	1.11	90.99
		5260	1.00	1.11	90.09
		5280	1.00	1.11	90.09
		5320	1.00	1.11	90.09
		5500	1.01	1.11	90.99
		5580	1.00	1.11	90.09
		5700	1.00	1.11	90.09
		5720	1.00	1.11	90.09
		5745	1.01	1.11	90.99
		5785	1.00	1.11	90.09
		5825	1.01	1.11	90.99

7.5. Test graphs

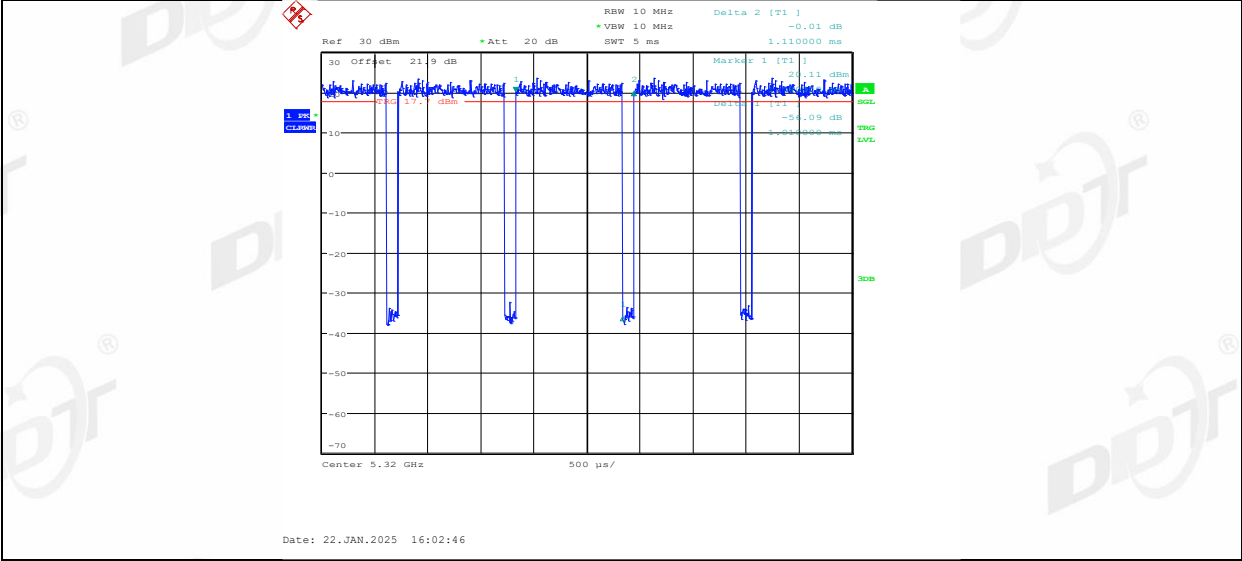




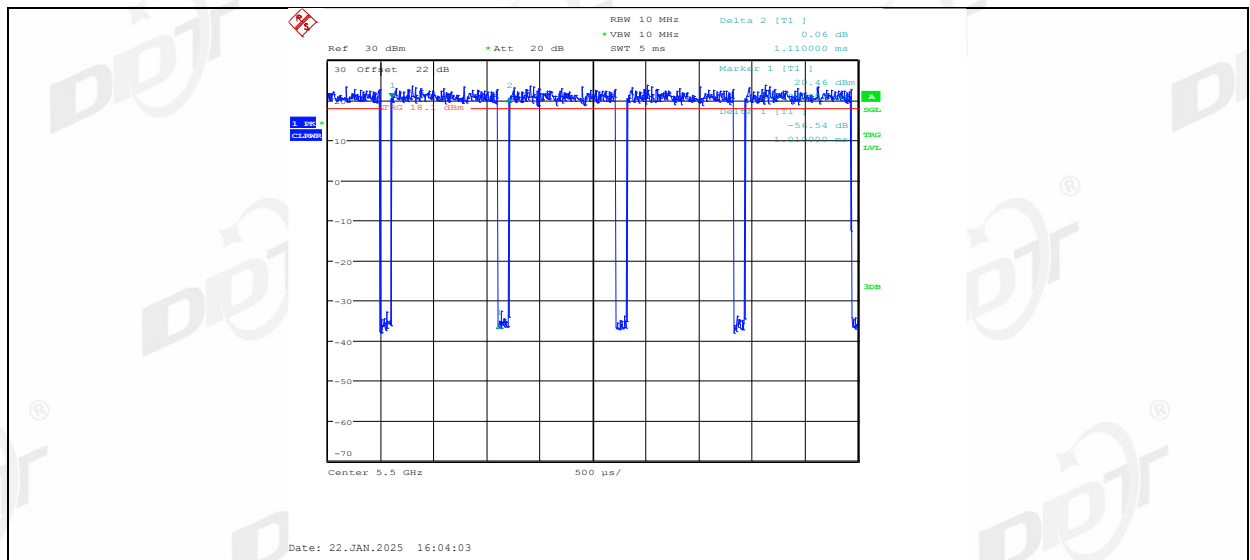
11A_Ant1_5280



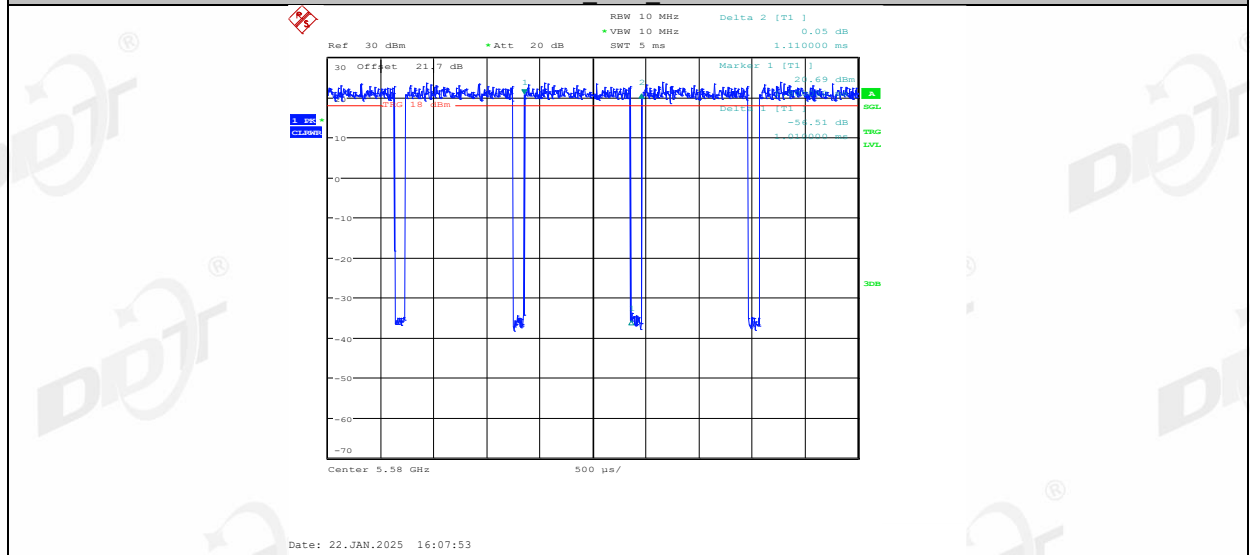
11A_Ant1_5320



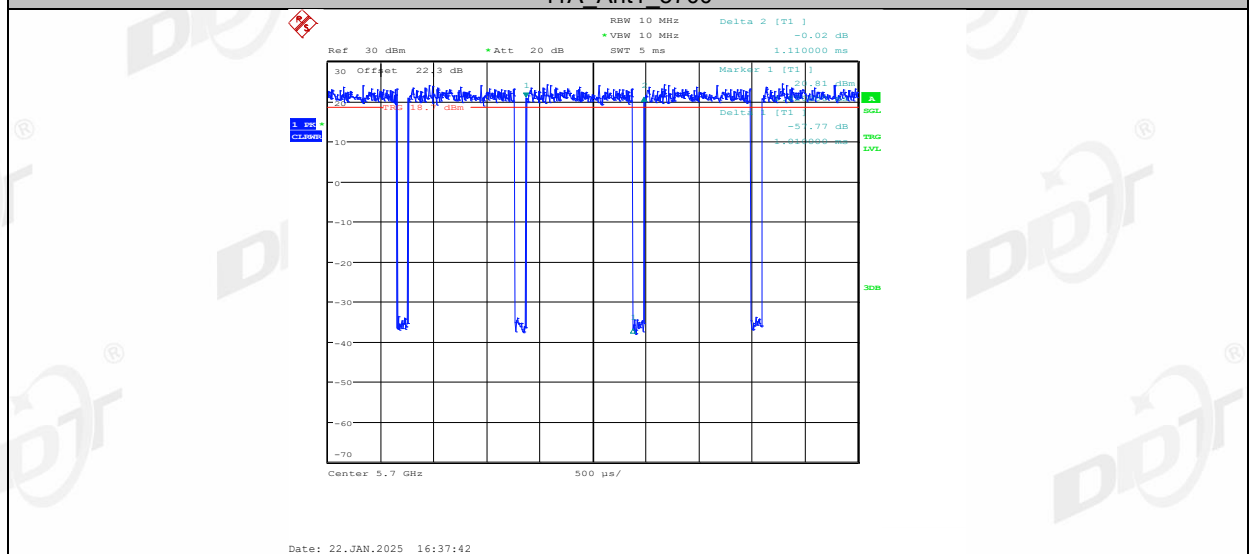
11A_Ant1_5500



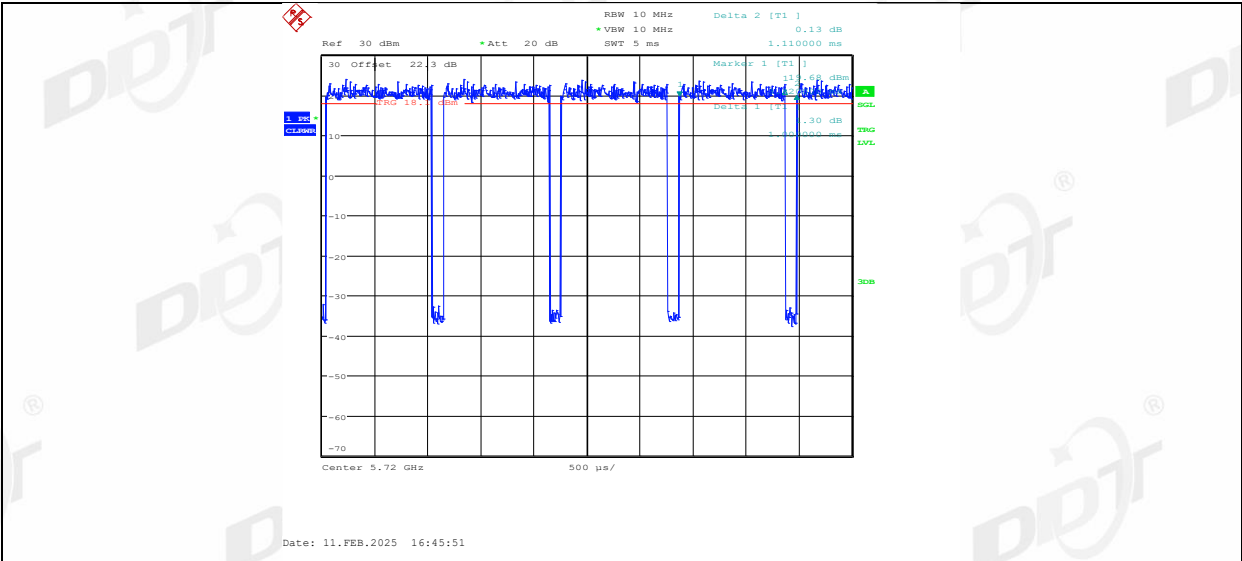
11A_Ant1_5580



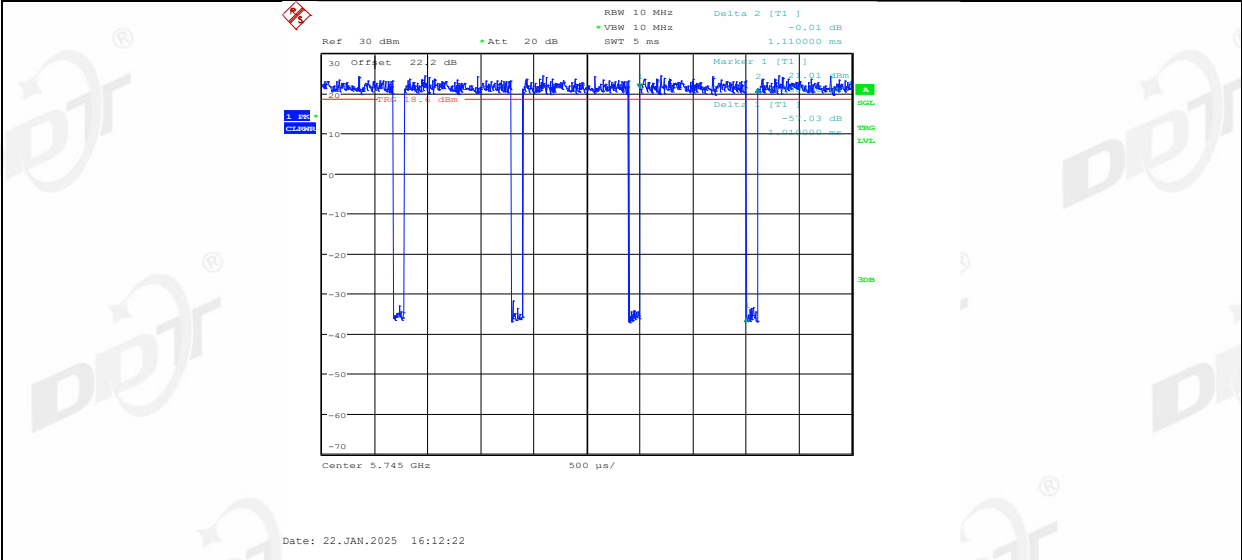
11A_Ant1_5700



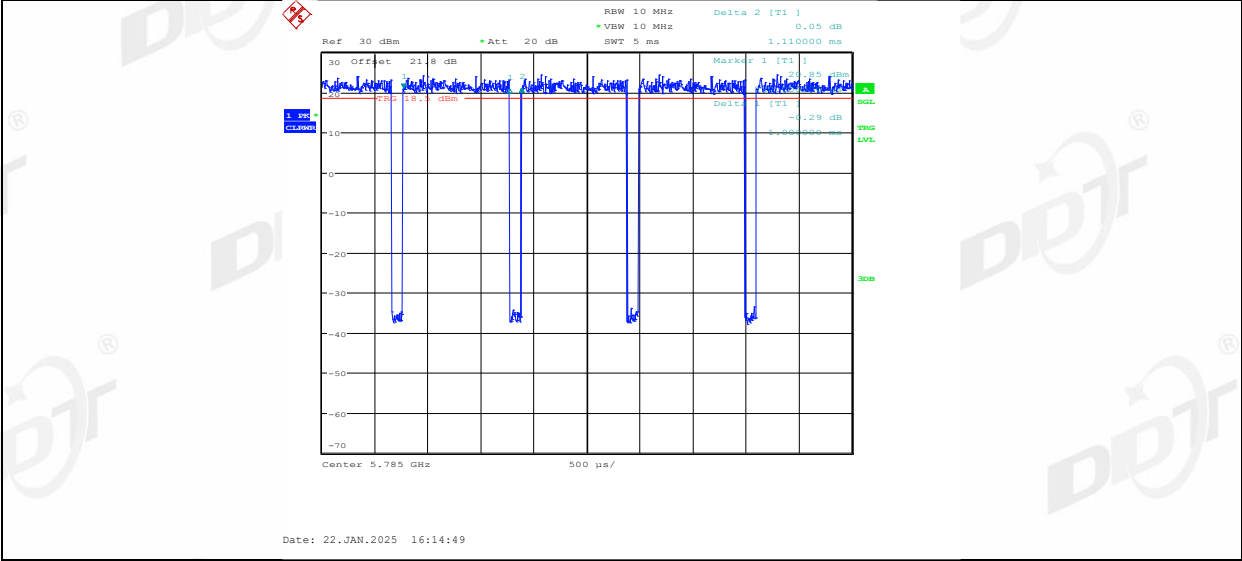
11A Ant1 5720



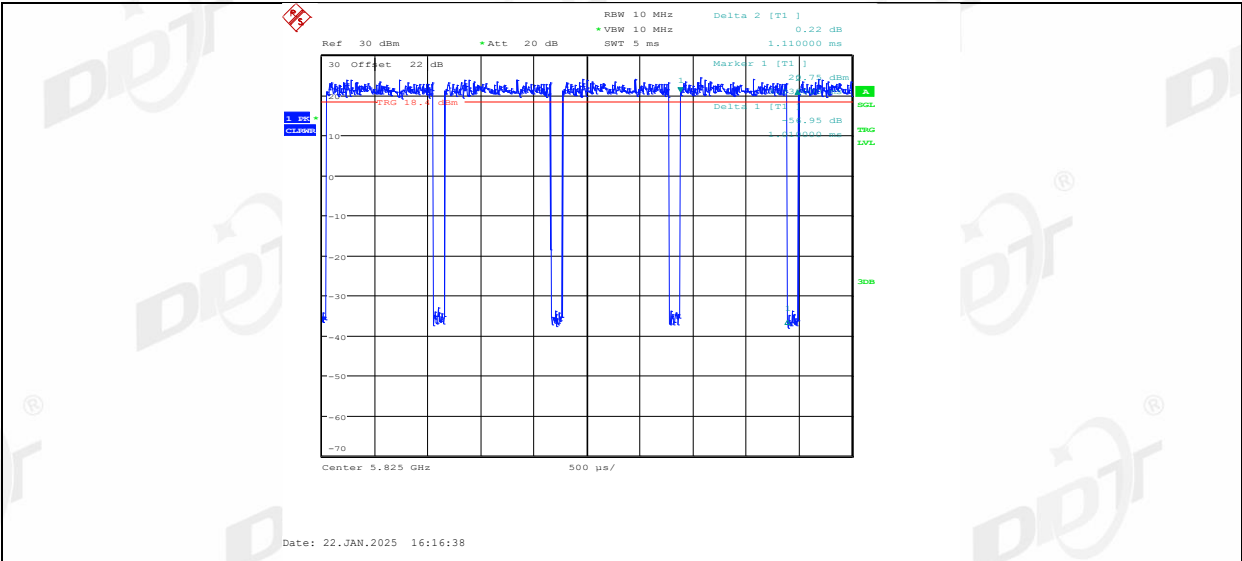
11A_Ant1_5745



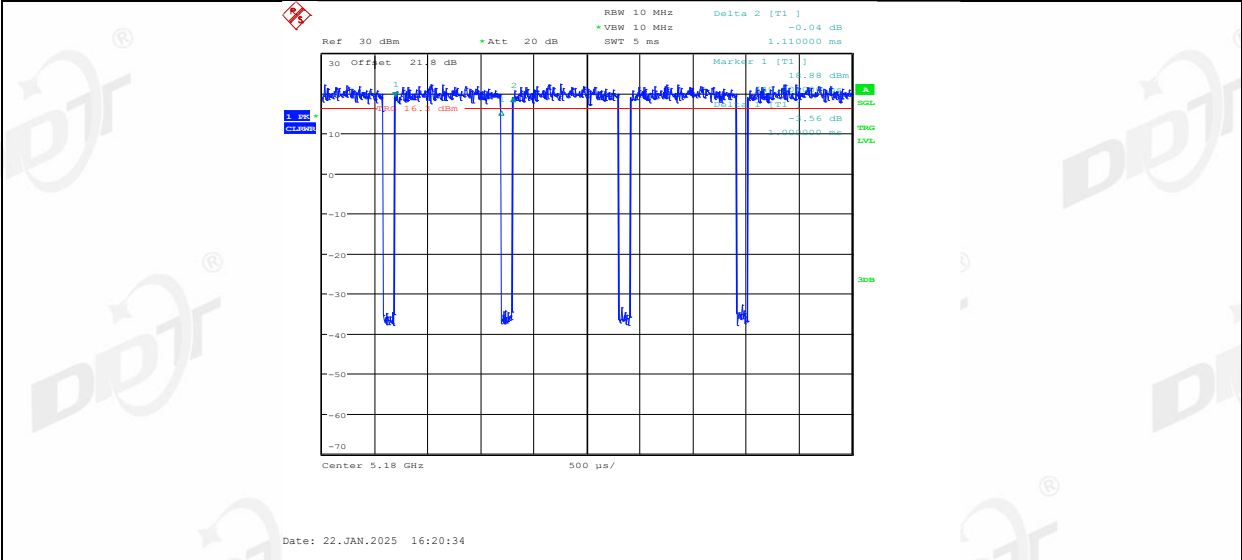
11A_Ant1_5785



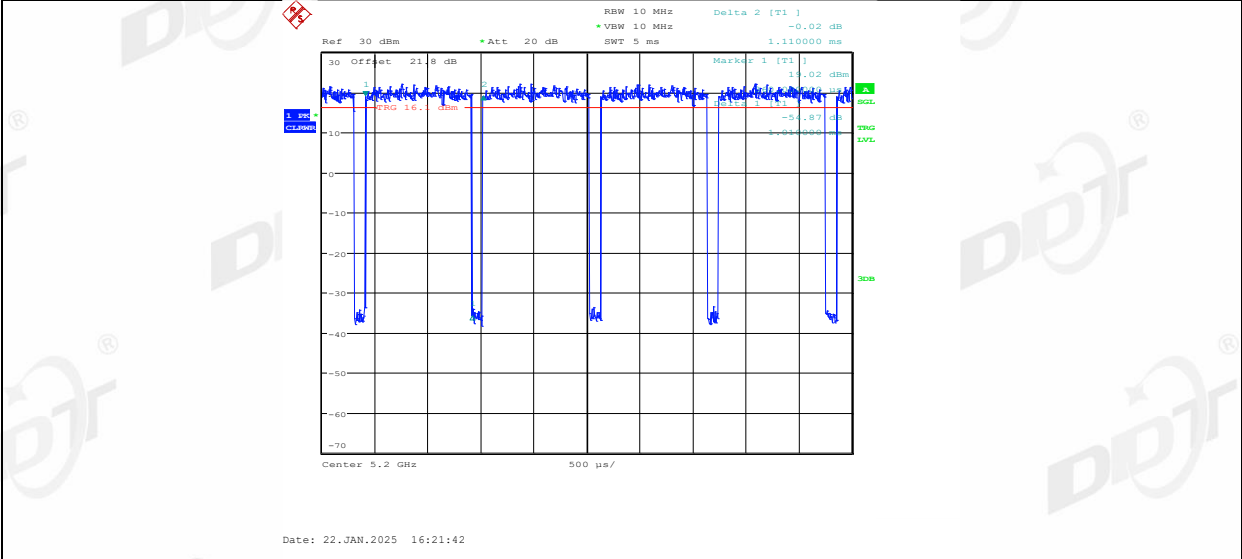
11A_Ant1_5825



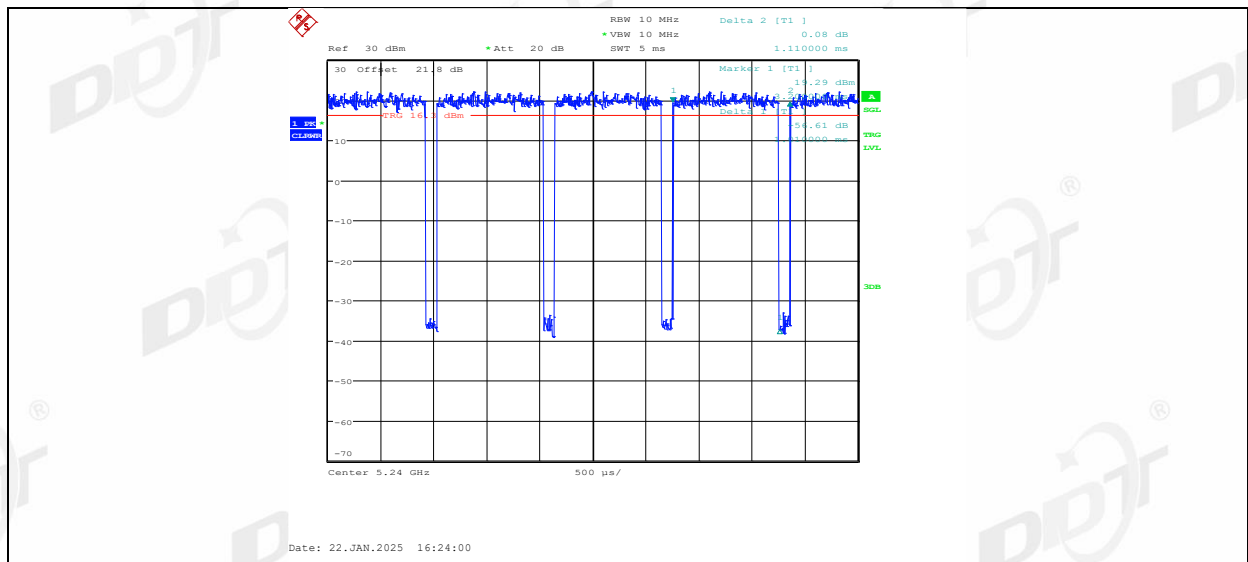
11AX20SISO_Ant1_5180



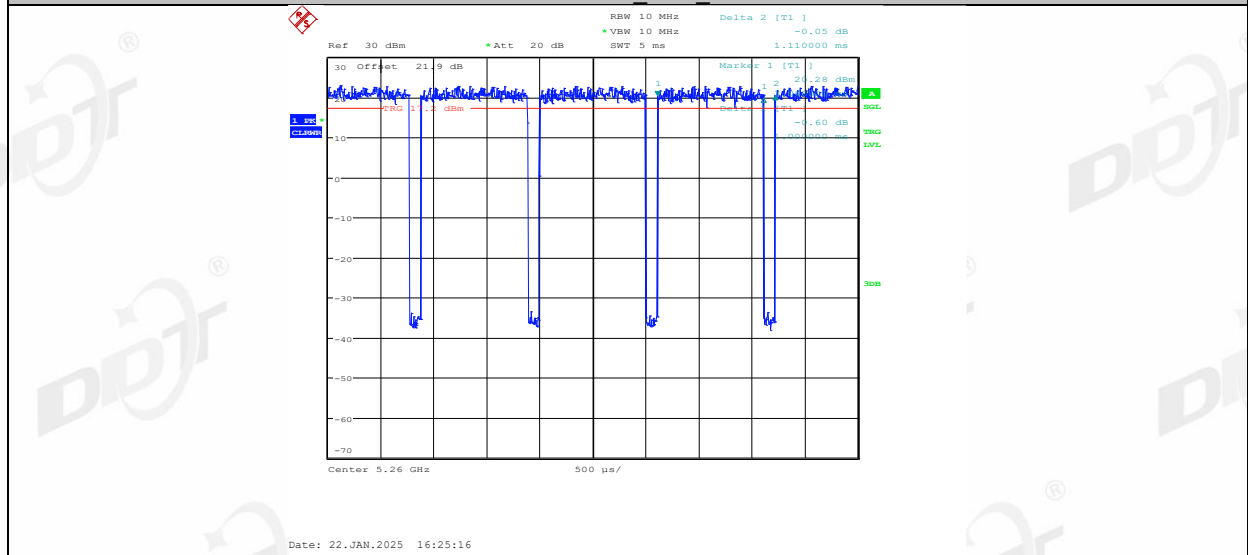
11AX20SISO_Ant1_5200



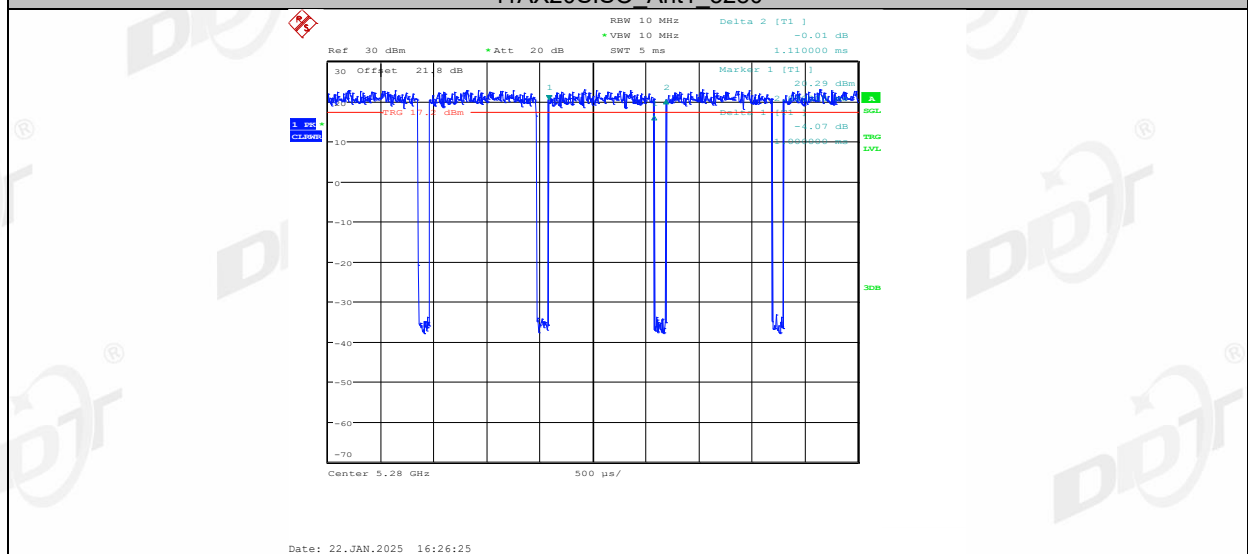
11AX20SISO_Ant1_5240



11AX20SISO_Ant1_5260



11AX20SISO_Ant1_5280



11AX20SISO_Ant1_5320



Ref 30 dBm Att 20 dB RBW 10 MHz VBW 10 MHz SWT 5 ms Delta 2 [T1] 0.07 dB 1.110000 ms

30 Off set 22 dB Marker 1 [T1] 15.96 dBm

1.950 CLASSED -54.62 dB 1.010000 ms

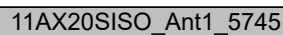
Center 5.5 GHz 500 μs/

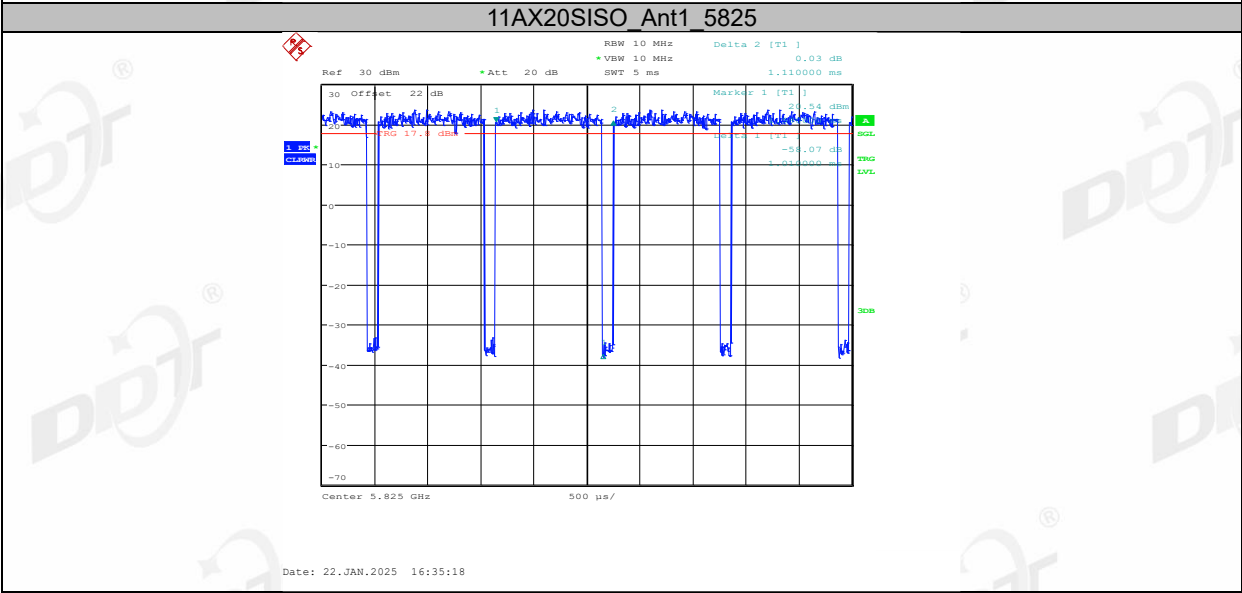
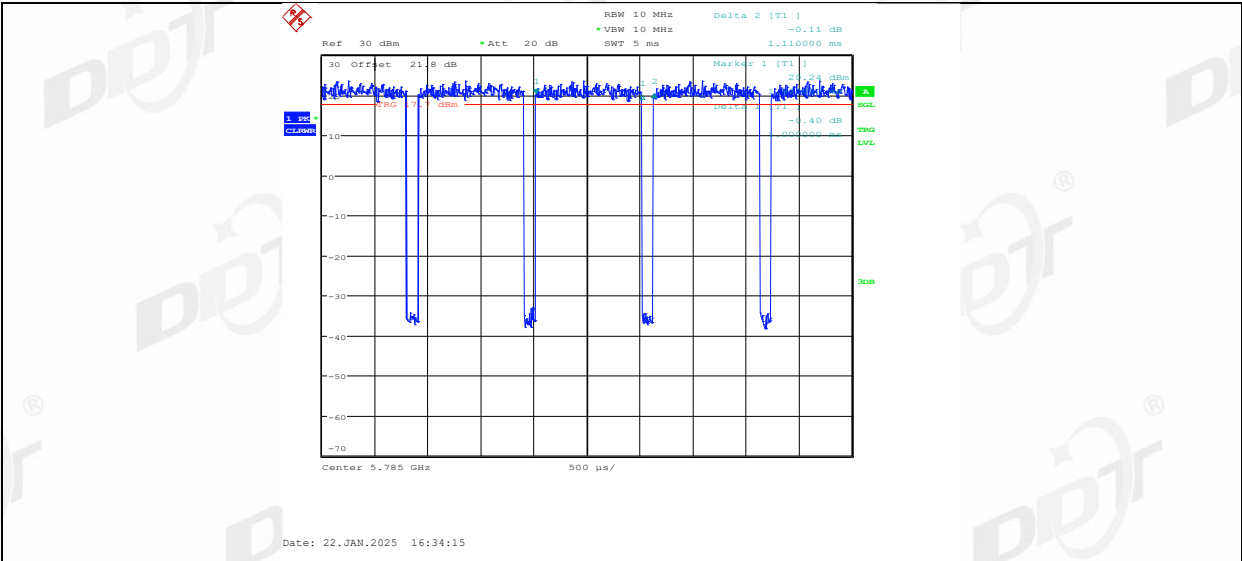
Date: 22.JAN.2025 16:28:41

[illegible]

Date: 22.JAN.2025 16:30:17

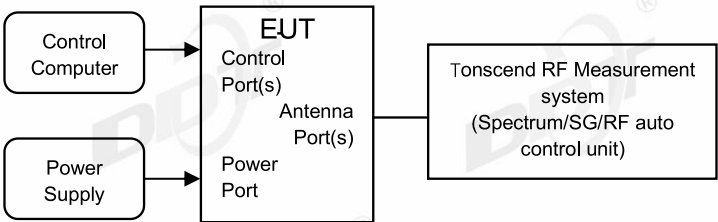
11AX20SISO_Ant1_5700





8. Maximum Output Power

8.1. Block diagram of test setup



8.2. Limits

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Maximum Output Power	For FCC: outdoor access point: 1 W(30 dBm) indoor access point: 1 W(30 dBm) fixed point-to-point access points1 W(30 dBm) client devices: 250 mW (24 dBm)	5150-5250
	For RSS: e.i.r.p. power: not exceed 200 mW (23 dBm) or $10 + 10 \log_{10} B$	
	For FCC: 250 mW (24 dBm) or $11 + 10 \log_{10} B$	
	For RSS: For conducted output power: 250 mW (24 dBm) or $11 + 10 \log_{10} B$	5250-5350
	For RSS: e.i.r.p. power: not exceed 1.0 W (30 dBm) or $17 + 10 \log_{10} B$	
	For FCC: 250 mW (24 dBm) or $11 + 10 \log_{10} B$	
	For RSS: For conducted output power: 250 mW (24 dBm) or $11 + 10 \log_{10} B$	For FCC:5470 - 5725 For IC:5470 - 5600
	For RSS: e.i.r.p. power: not exceed 1.0 W (30 dBm) or $17 + 10 \log_{10} B$	5650 - 5725
1 Watt (30 dBm)		5725-5850
Note: For FCC: B=26 bandwidth; For ISDE: B=99% bandwidth.		

8.3. Test procedure

Connect each EUT's antenna output to power sensor by RF cable and attenuator
Measure the output power of each antenna port by power sensor.

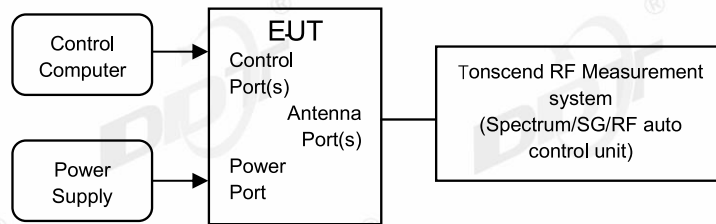
8.4. Test result channel power

Test Engineer:	Zora Zhang	Test Site:	RF Measurement System 1#
Ambient Condition:	23.5℃,45.6%RH	Test Date:	2024.11.30-2025.02.11
Test Power Supply:	Battery	Sample Number:	S24111520-011

Test Mode	Antenna	Freq (MHz)	Channel Power [dBm]	Duty Cycle [%]	DC Factor [dBm]	Conducted Output Power [dBm]	Conducted FCC Limit [dBm]	Conducted RSS Limit [dBm]	EIRP RSS [dBm]	EIRP RSS Limit [dBm]	Verdict
11A	Ant1	5180	17.99	90.09	0.45	18.44	24	---	20.28	22.37	PASS
		5200	18.11	90.09	0.45	18.56	24	---	20.40	22.37	PASS
		5240	18.08	90.09	0.45	18.53	24	---	20.37	22.37	PASS
		5260	19.04	90.09	0.45	19.49	24	23.37	21.33	29.37	PASS
		5280	18.96	90.09	0.45	19.41	24	23.37	21.25	29.37	PASS
		5320	18.44	90.99	0.41	18.85	24	23.37	20.69	29.37	PASS
		5500	18.59	90.99	0.41	19.00	24	23.56	20.84	29.56	PASS
		5580	19.05	90.99	0.41	19.46	24	23.56	21.30	29.56	PASS
		5700	18.78	90.99	0.41	19.19	24	23.56	21.03	29.56	PASS
		5720	18.82	90.09	0.45	19.27	24	23.56	21.11	29.56	PASS
		5745	19.06	90.99	0.41	19.47	30	30	21.31	---	PASS
		5785	19.31	90.09	0.45	19.76	30	30	21.60	---	PASS
11AX20SISO	Ant1	5825	19.37	90.99	0.41	19.78	30	30	21.62	---	PASS
		5180	17.46	90.09	0.45	17.91	24	---	19.75	22.87	PASS
		5200	17.90	90.99	0.41	18.31	24	---	20.15	22.87	PASS
		5240	17.90	90.99	0.41	18.31	24	---	20.15	22.87	PASS
		5260	18.91	90.09	0.45	19.36	24	23.87	21.20	29.87	PASS
		5280	18.82	90.09	0.45	19.27	24	23.87	21.11	29.87	PASS
		5320	18.05	90.09	0.45	18.50	24	23.87	20.34	29.87	PASS
		5500	18.48	90.99	0.41	18.89	24	23.88	20.73	29.88	PASS
		5580	18.70	90.09	0.45	19.15	24	23.88	20.99	29.88	PASS
		5700	17.42	90.09	0.45	17.87	24	23.88	19.71	29.88	PASS
		5720	18.85	90.09	0.45	19.30	24	23.88	21.14	29.88	PASS
		5745	19.01	90.99	0.41	19.42	30	30	21.26	---	PASS
		5785	18.97	90.09	0.45	19.42	30	30	21.26	---	PASS
		5825	19.29	90.99	0.41	19.70	30	30	21.54	---	PASS

9. Power Spectral Density

9.1. Block diagram of test setup



9.2. Limits

FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	For FCC: Other than Mobile and portable:17 dBm/MHz Mobile and portable client devices:11 dBm/MHz	5150-5250
	For RSS eirp: 10 dBm/MHz	
	11 dBm/MHz	5250-5350
	11 dBm/MHz	For FCC: 5470 - 5725 For ISDE: 5470 - 5600 5650 - 5725
	30 dBm/500 kHz	5725-5850

9.3. Test procedure

The transmitter output was connected to a spectrum analyzer. Power density was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW.

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

5150 MHz~5250 MHz, 5250 MHz~5350 MHz, 5470 MHz~5725 MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	1MHz
VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

5725 MHz-5850 MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	500 kHz

VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

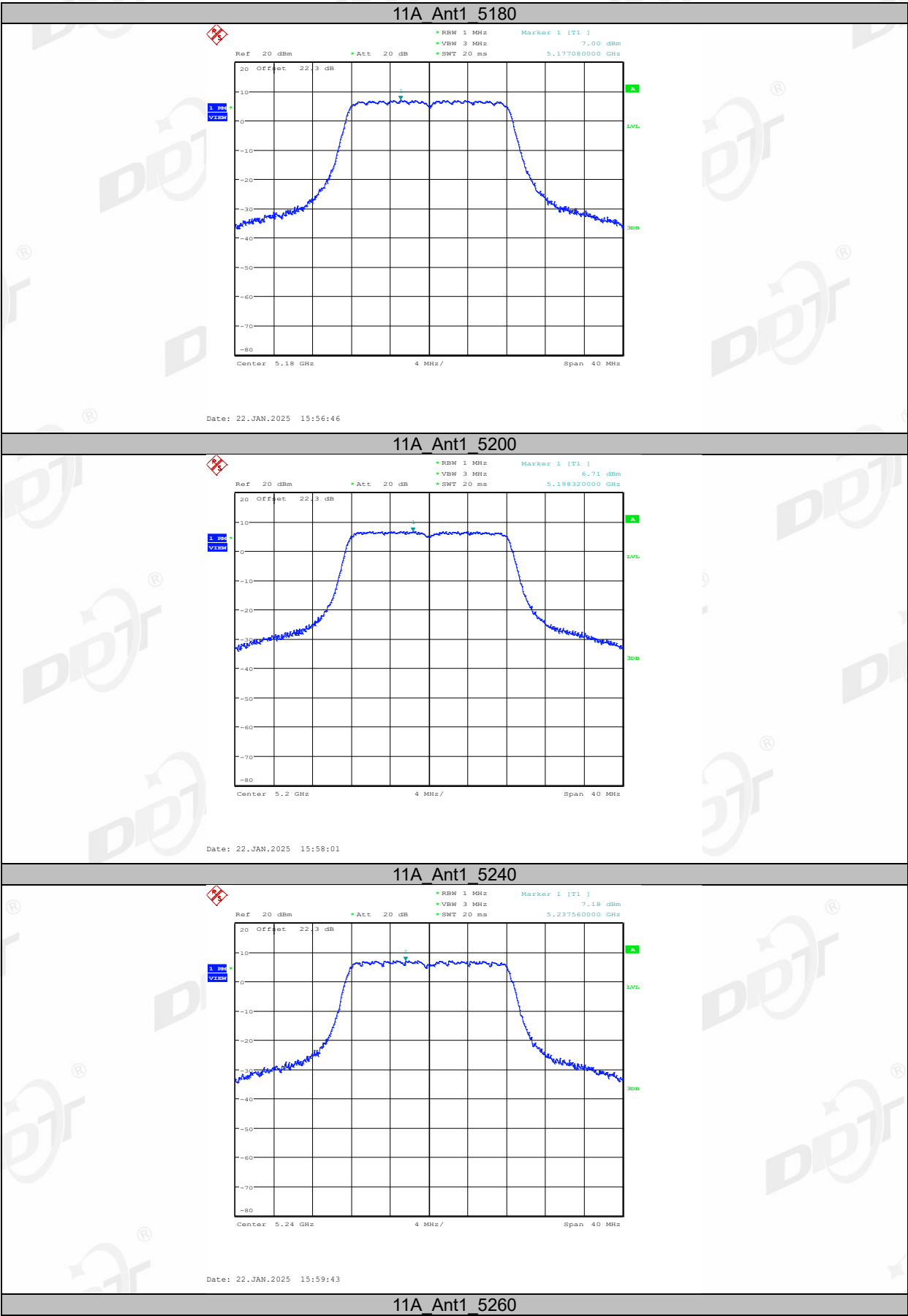
9.4. Test result

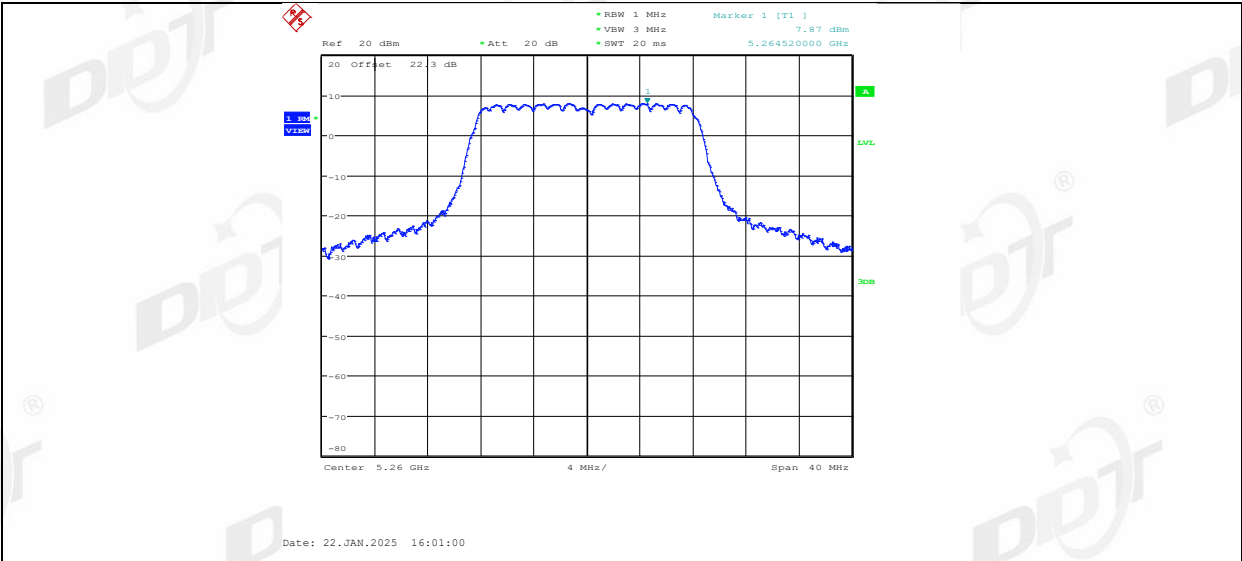
Test Engineer:	Zora Zhang	Test Site:	RF Measurement System 1#
Ambient Condition:	23.5℃,45.6%RH	Test Date:	2024.11.30-2025.02.11
Test Power Supply:	Battery	Sample Number:	S24111520-011

Test Mode	Antenna	Freq (MHz)	Result [dBm/MHz]	Limit [dBm/MHz]	EIRP [dBm/MHz]	RSS EIRP Limit [dBm/MHz]	Verdict
11A	Ant1	5180	7.00	≤11.00	8.84	≤10.00	PASS
		5200	6.71	≤11.00	8.55	≤10.00	PASS
		5240	7.18	≤11.00	9.02	≤10.00	PASS
		5260	7.87	≤11.00	9.71	---	PASS
		5280	8.05	≤11.00	9.89	---	PASS
		5320	7.29	≤11.00	9.13	---	PASS
		5500	7.68	≤11.00	9.52	---	PASS
		5580	7.82	≤11.00	9.66	---	PASS
		5700	7.77	≤11.00	9.61	---	PASS
		5720 UNII-2C	7.54	≤11.00	9.38	---	PASS
		5720 UNII-3	3.67	≤30.00	5.51	---	PASS
		5745	5.52	≤30.00	7.36	---	PASS
		5785	5.48	≤30.00	7.32	---	PASS
11AX20SISO	Ant1	5825	5.23	≤30.00	7.07	---	PASS
		5180	6.04	≤11.00	7.88	≤10.00	PASS
		5200	6.01	≤11.00	7.85	≤10.00	PASS
		5240	6.28	≤11.00	8.12	≤10.00	PASS
		5260	7.25	≤11.00	9.09	---	PASS
		5280	7.38	≤11.00	9.22	---	PASS
		5320	6.53	≤11.00	8.37	---	PASS
		5500	7.17	≤11.00	9.01	---	PASS
		5580	7.02	≤11.00	8.86	---	PASS
		5700	6.13	≤11.00	7.97	---	PASS
		5720 UNII-2C	7.10	≤11.00	8.94	---	PASS
		5720 UNII-3	3.21	≤30.00	5.05	---	PASS
		5745	5.11	≤30.00	6.95	---	PASS
		5785	4.52	≤30.00	6.36	---	PASS
		5825	4.72	≤30.00	6.56	---	PASS

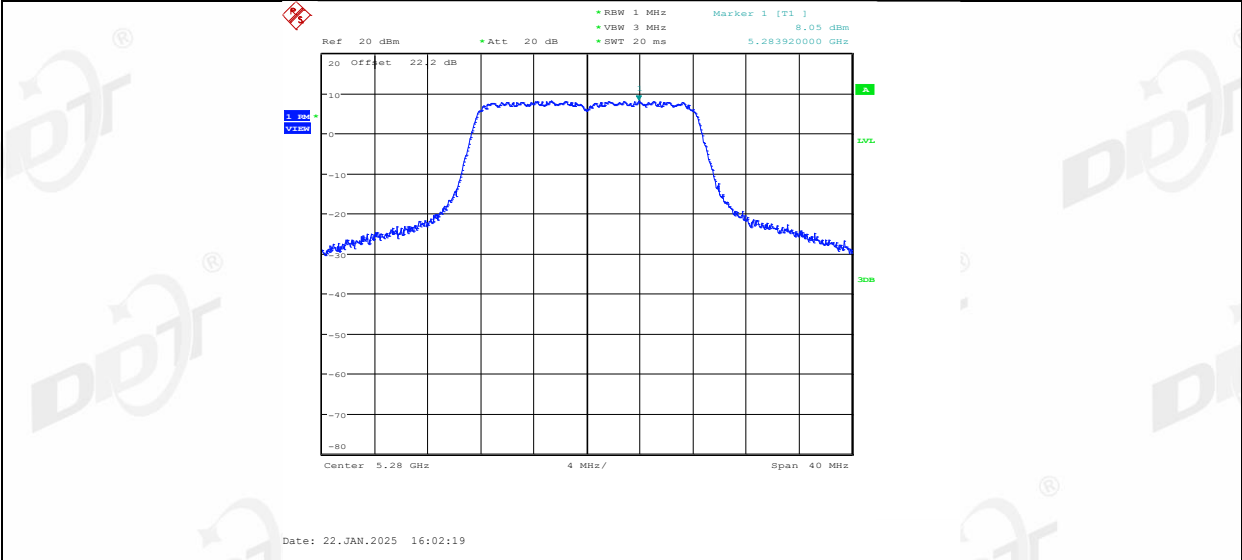
Note: 1.The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.
2.The Duty Cycle Factor is compensated in the graph.

9.5. Test graphs

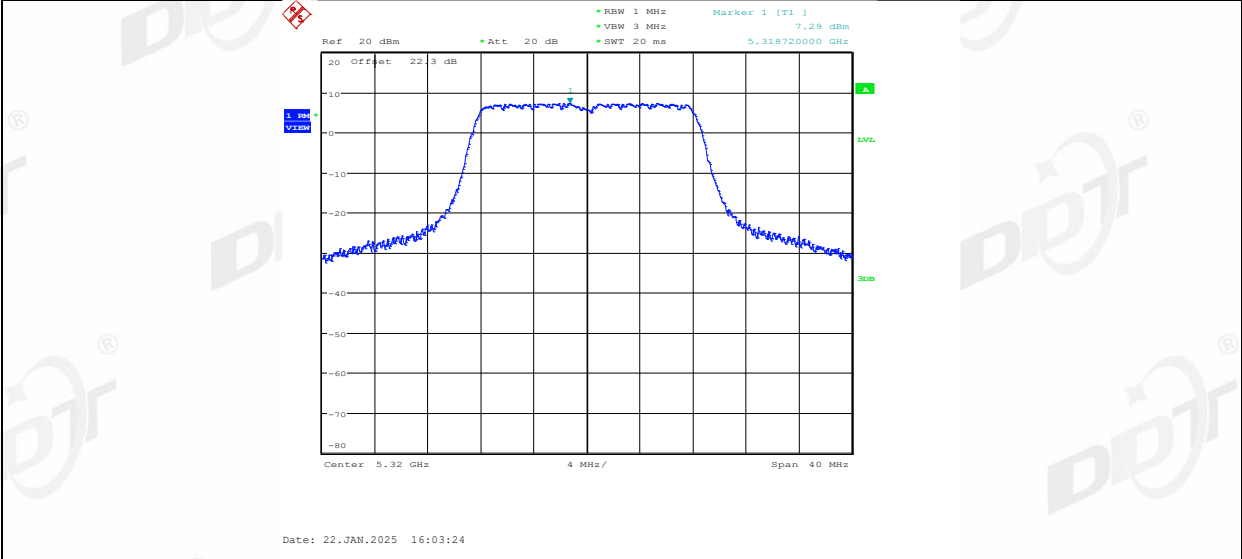




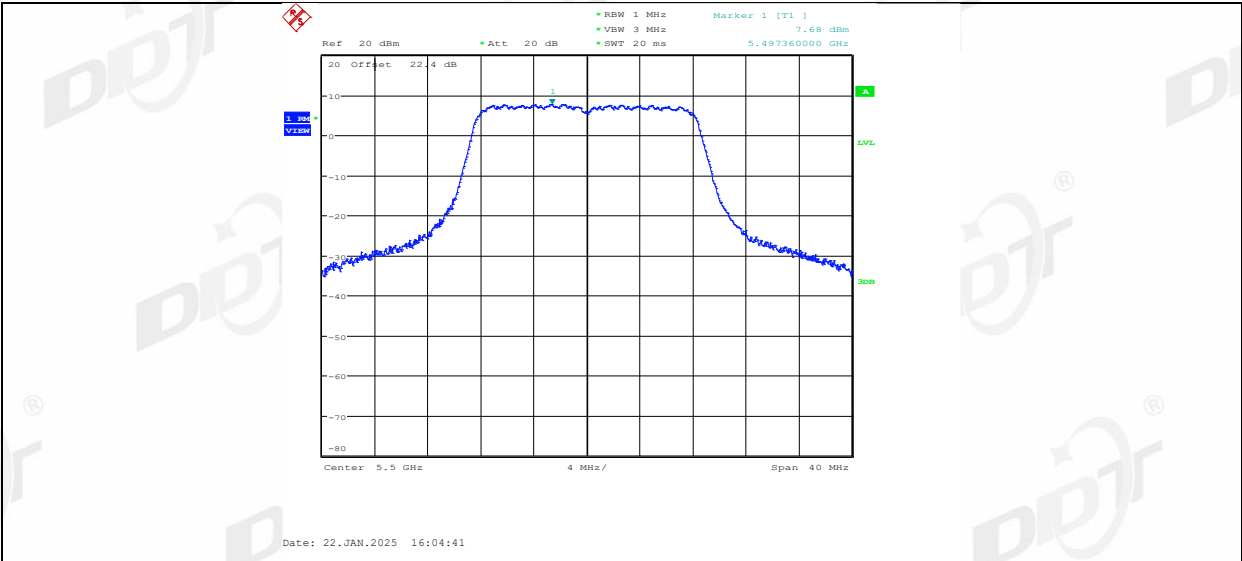
11A_Ant1_5280



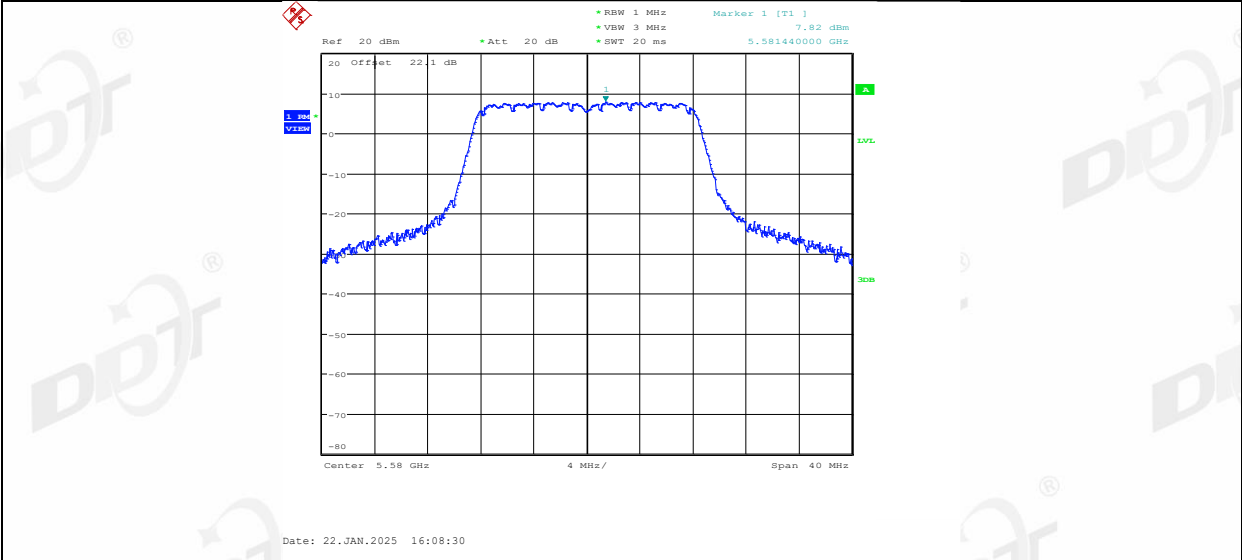
11A_Ant1_5320



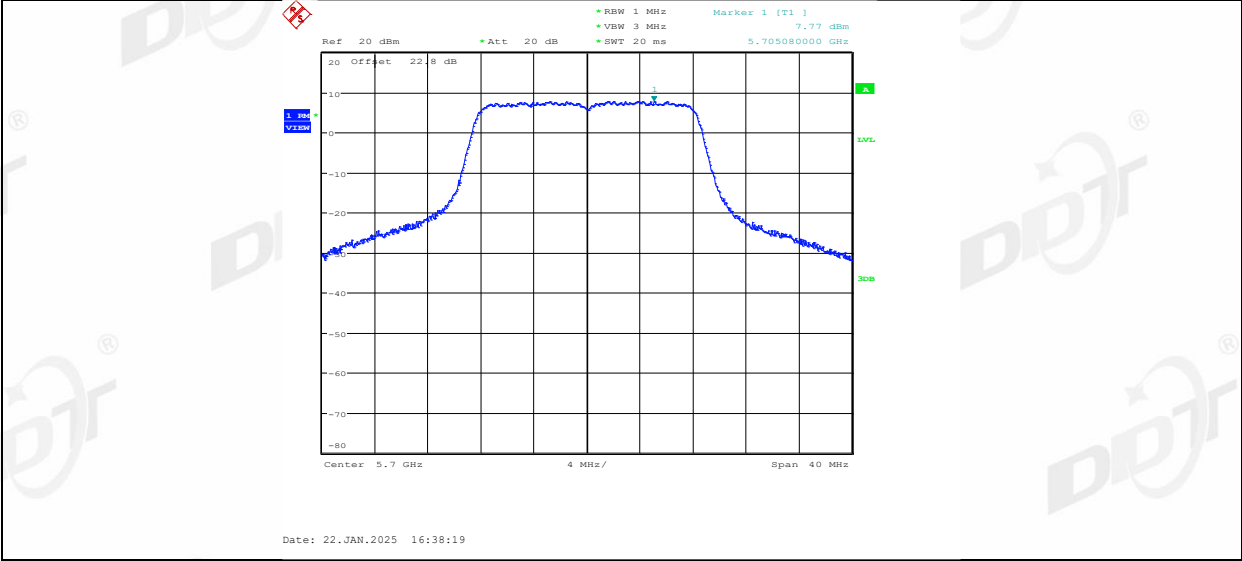
11A_Ant1_5500



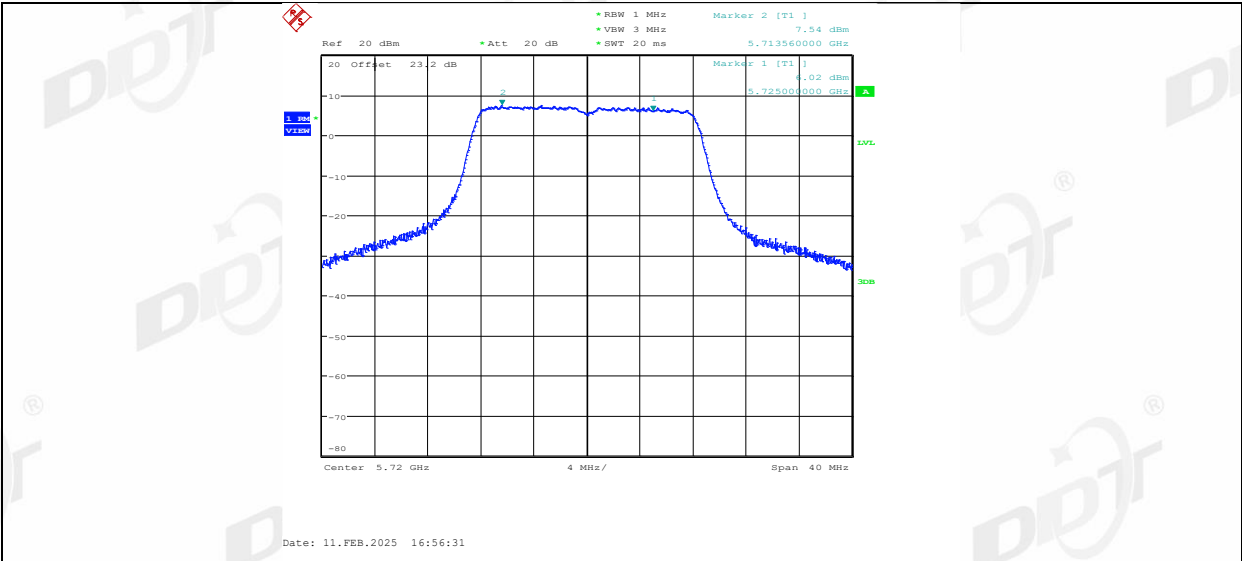
11A_Ant1_5580



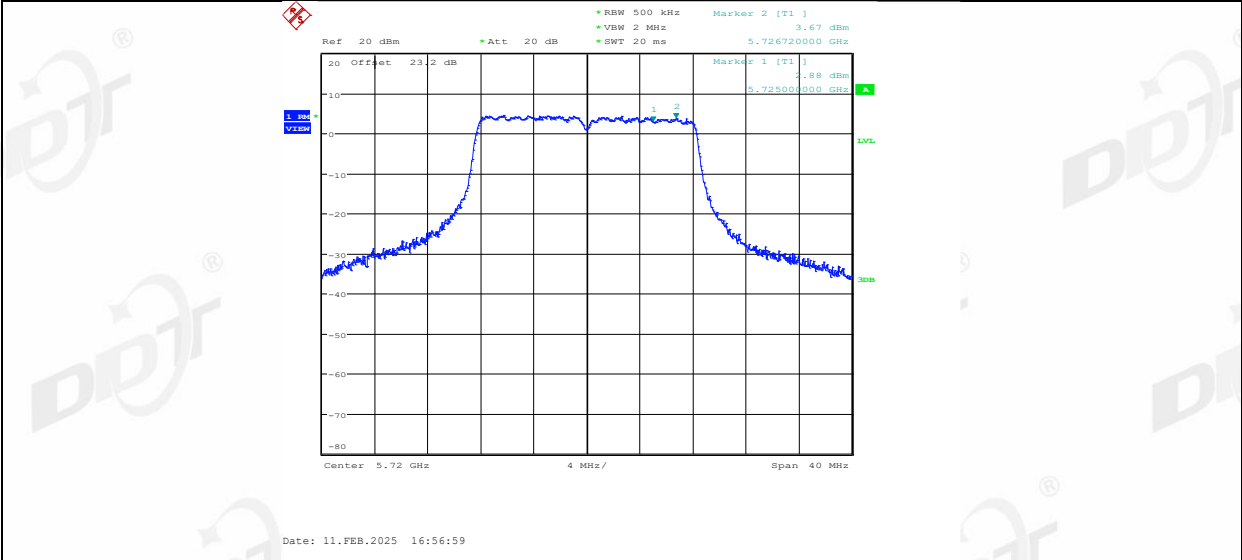
11A_Ant1_5700



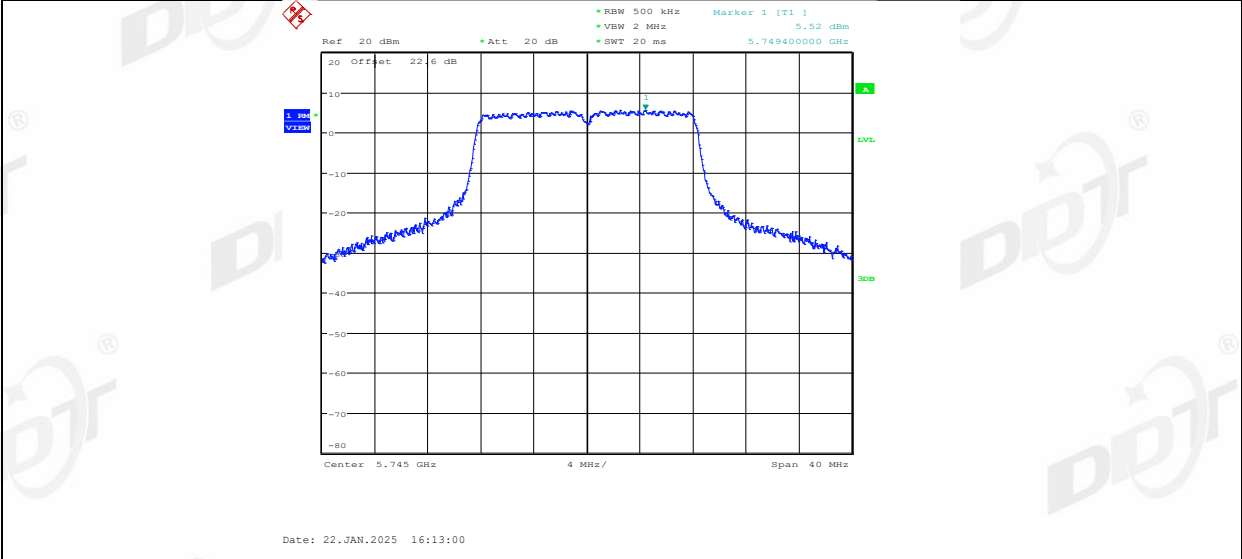
11A_Ant1_5720_UNII-2C



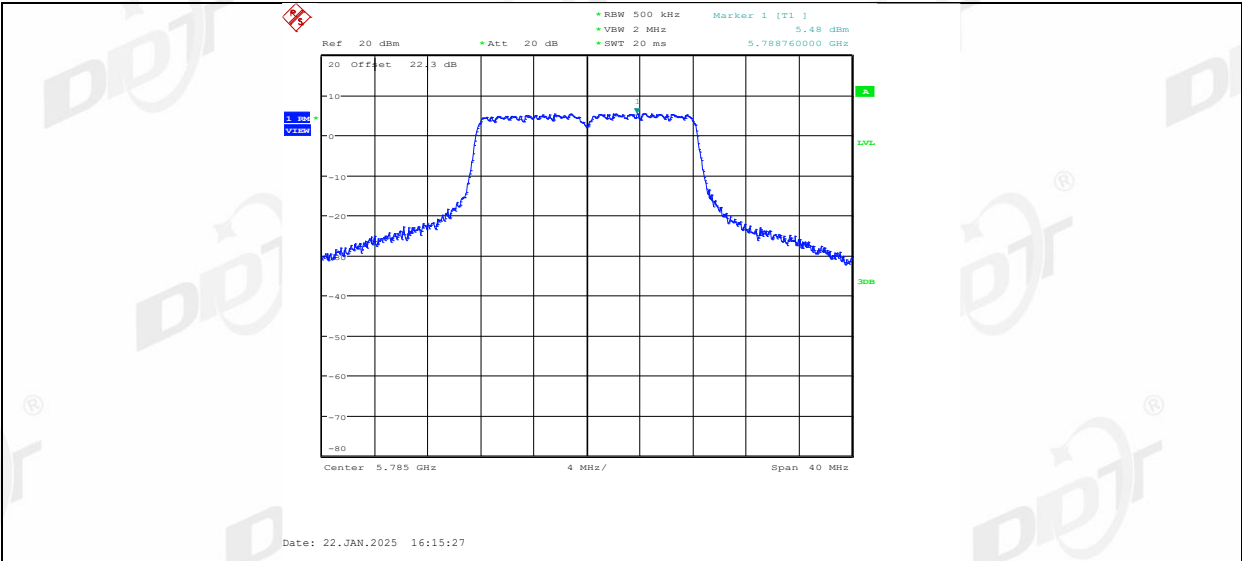
11A Ant1 5720 UNII-3



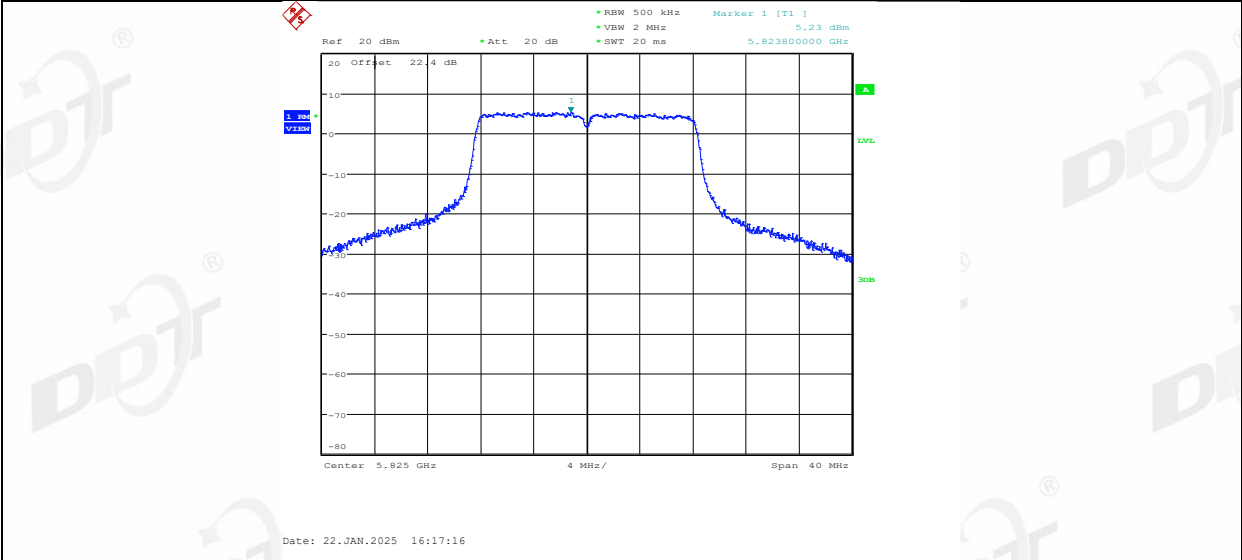
11A Ant1 5745



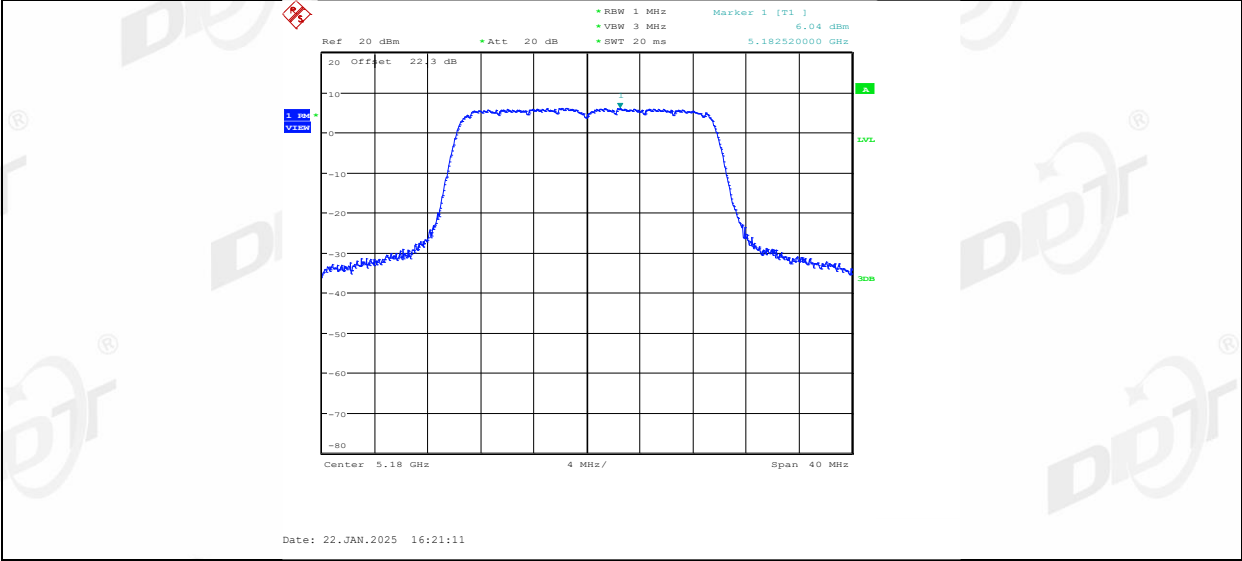
11A Ant1 5785



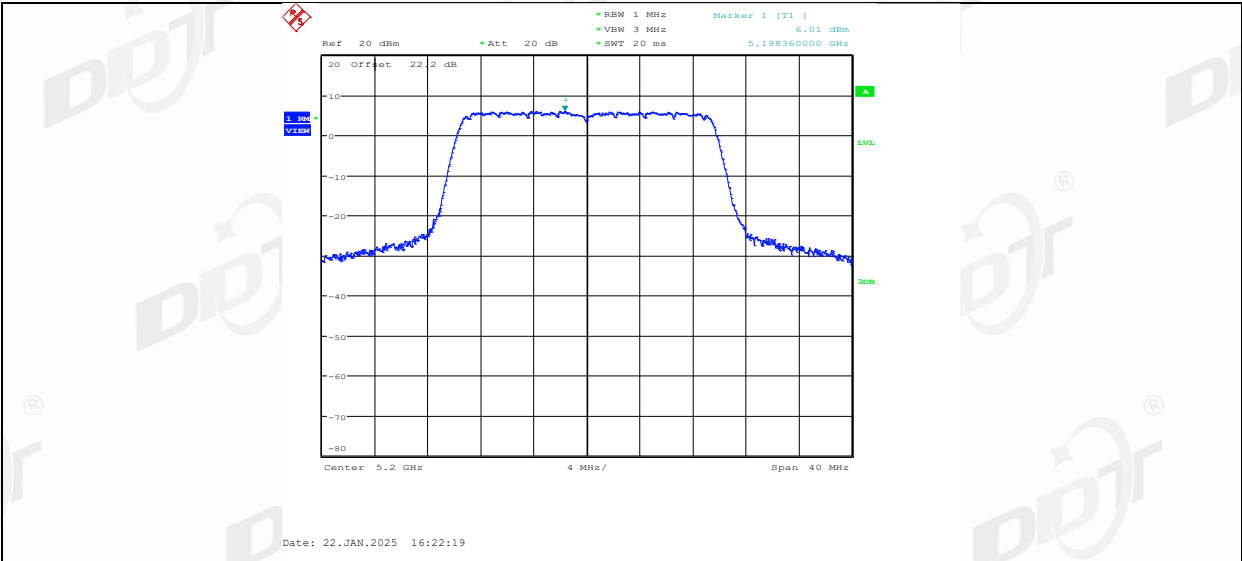
11A_Ant1_5825



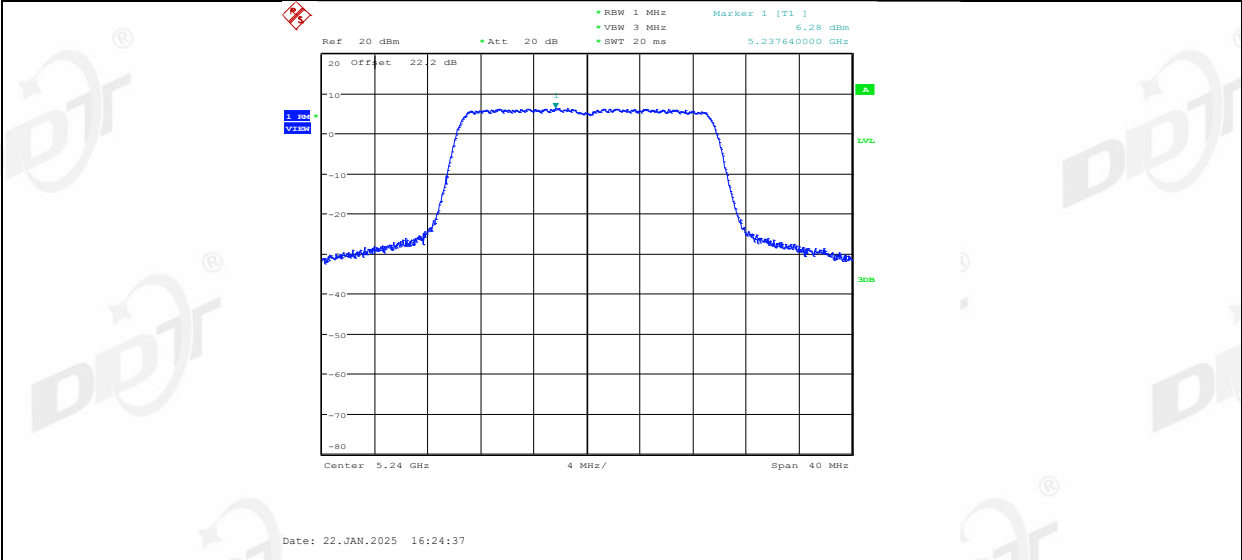
11AX20SISO_Ant1_5180



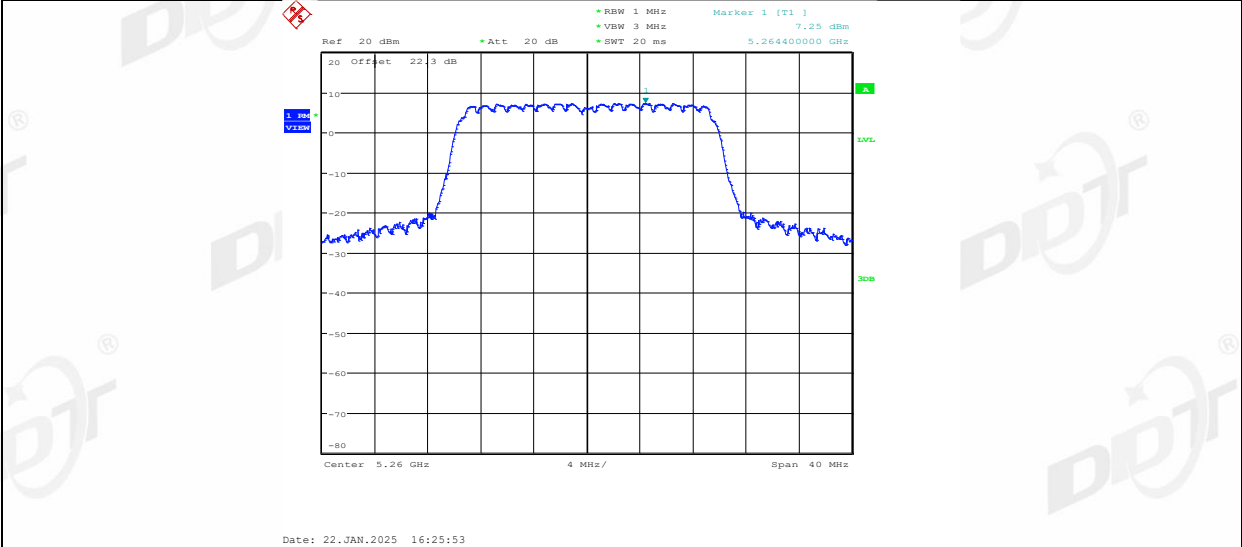
11AX20SISO_Ant1_5200



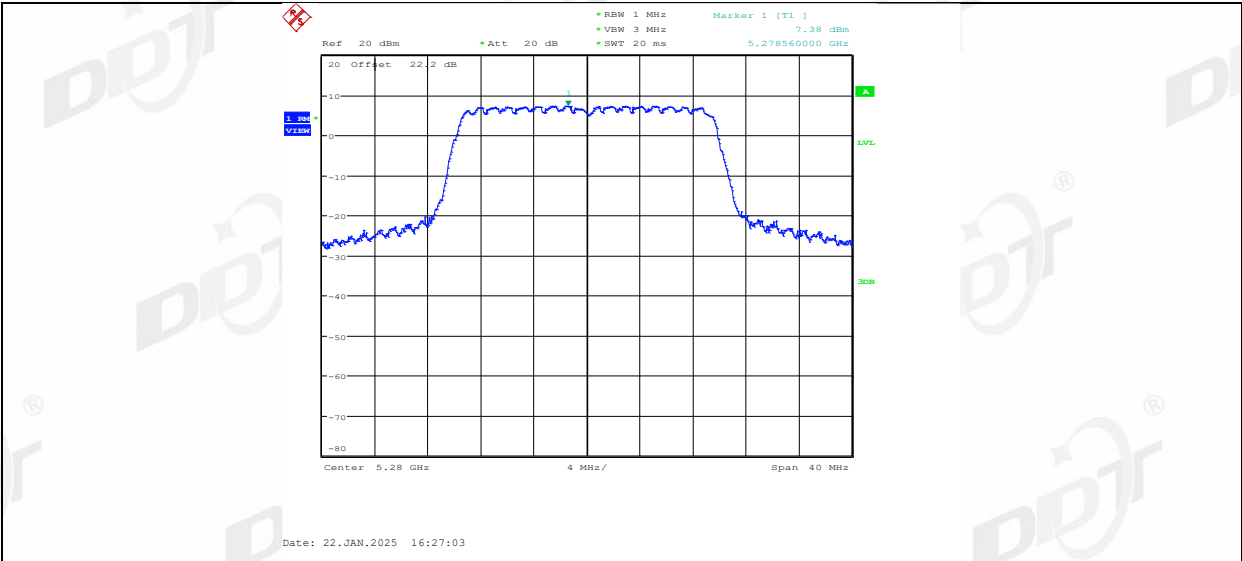
11AX20SISO_Ant1_5240



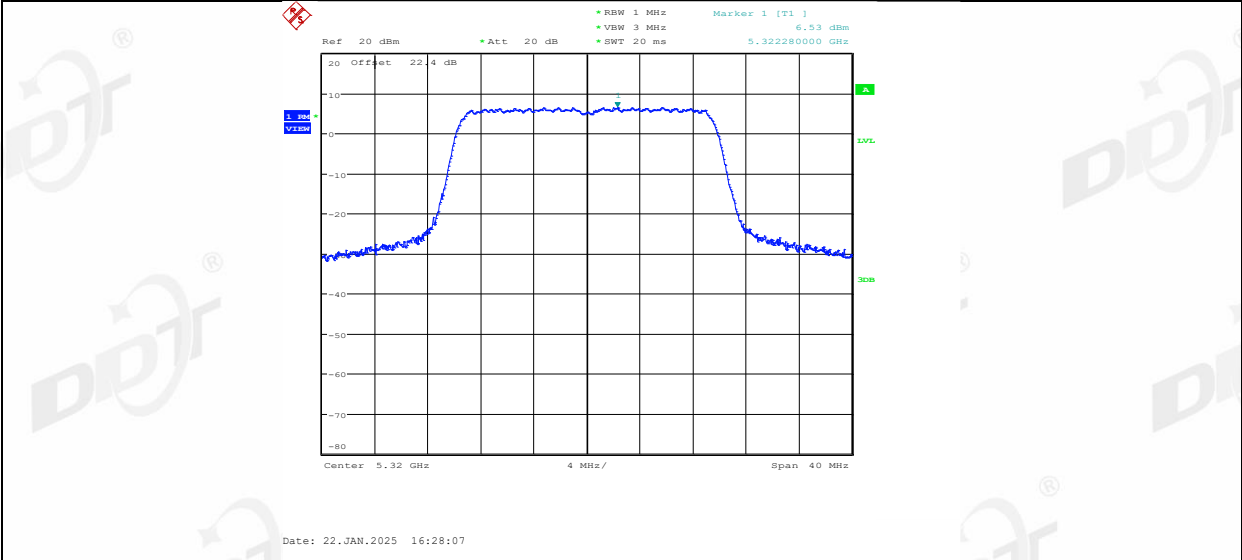
11AX20SISO_Ant1_5260



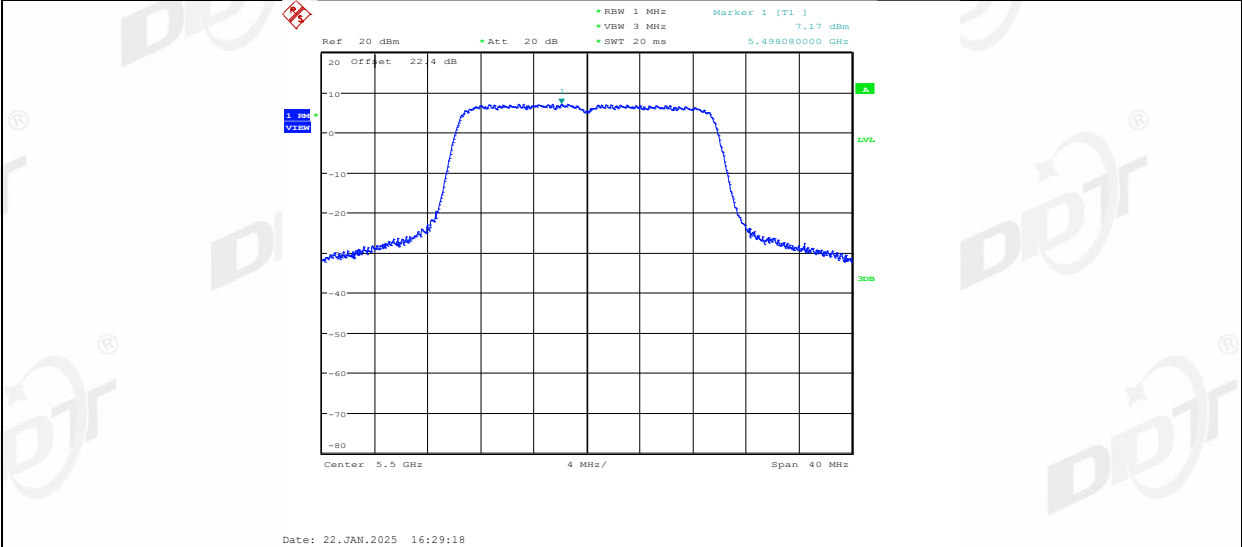
11AX20SISO_Ant1_5280



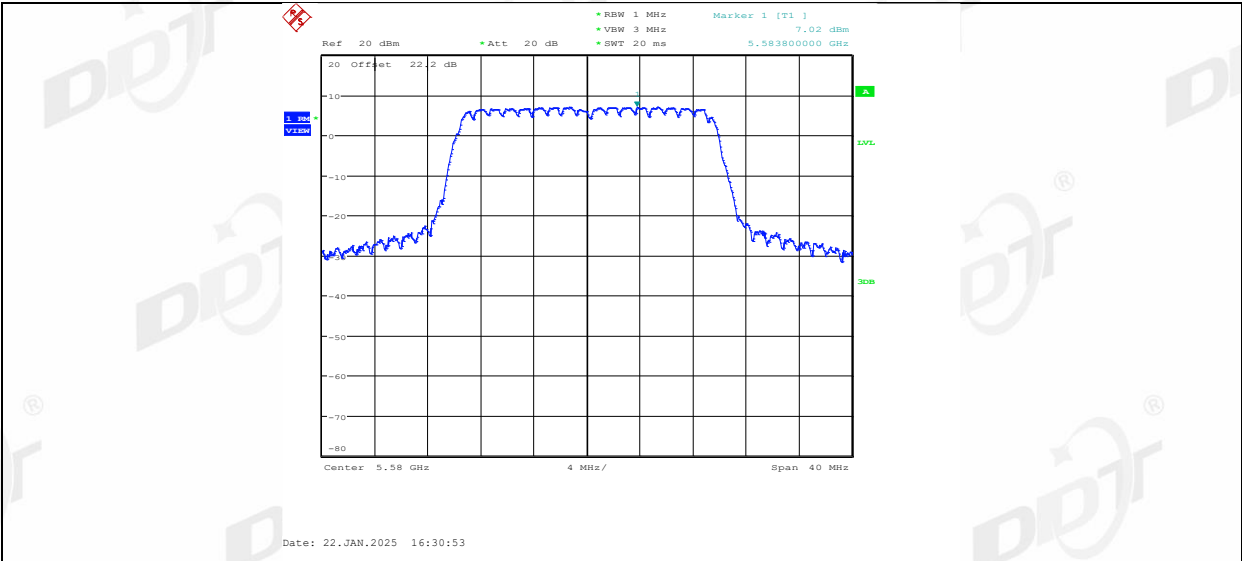
11AX20SISO_Ant1_5320



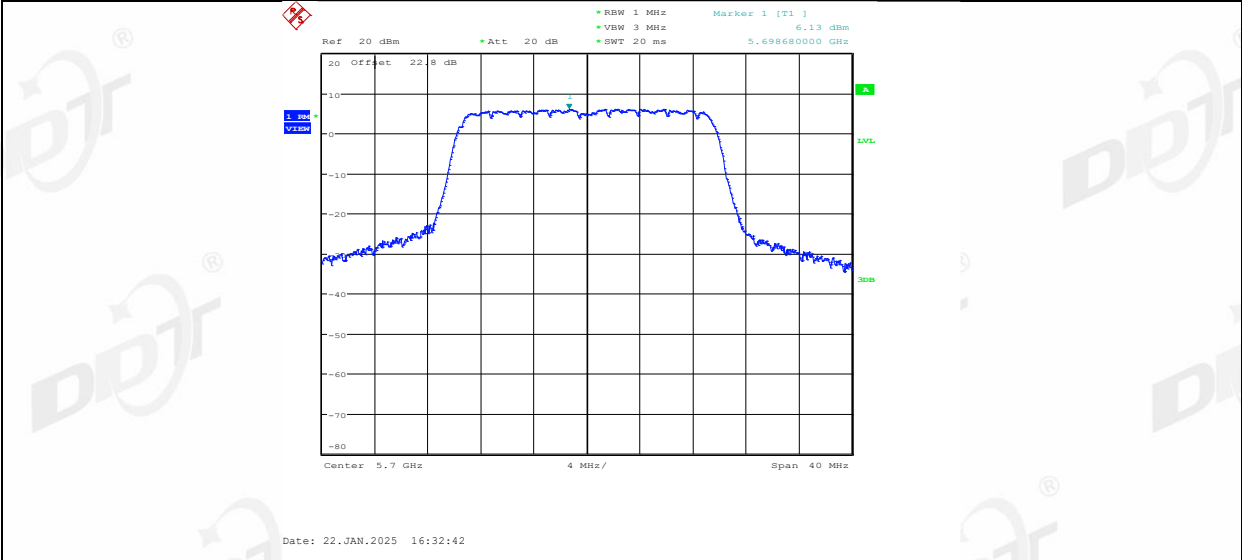
11AX20SISO_Ant1_5500



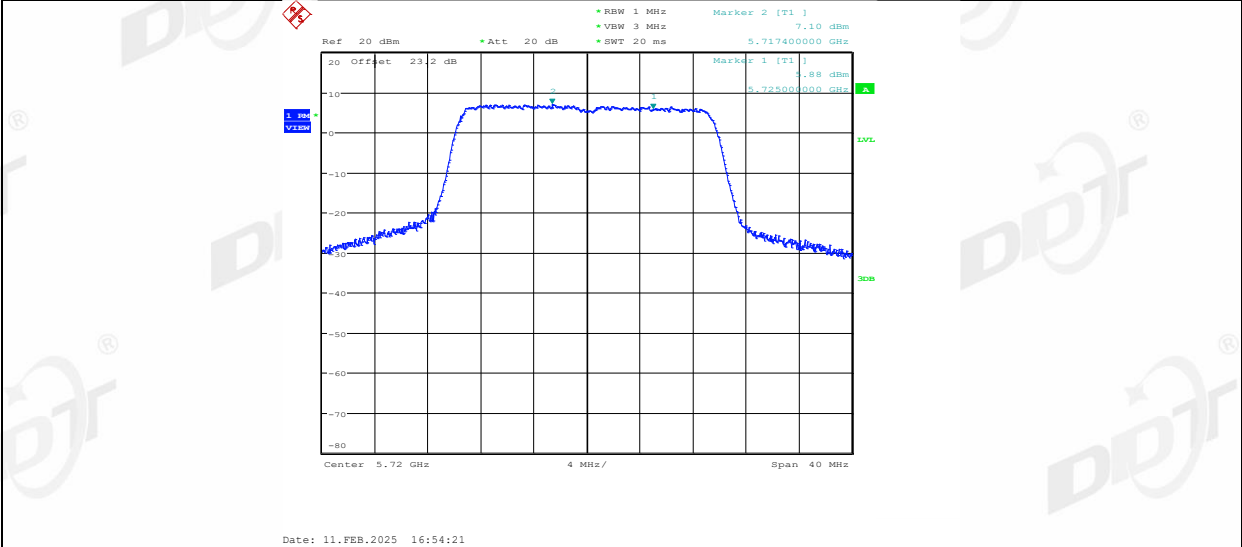
11AX20SISO_Ant1_5580



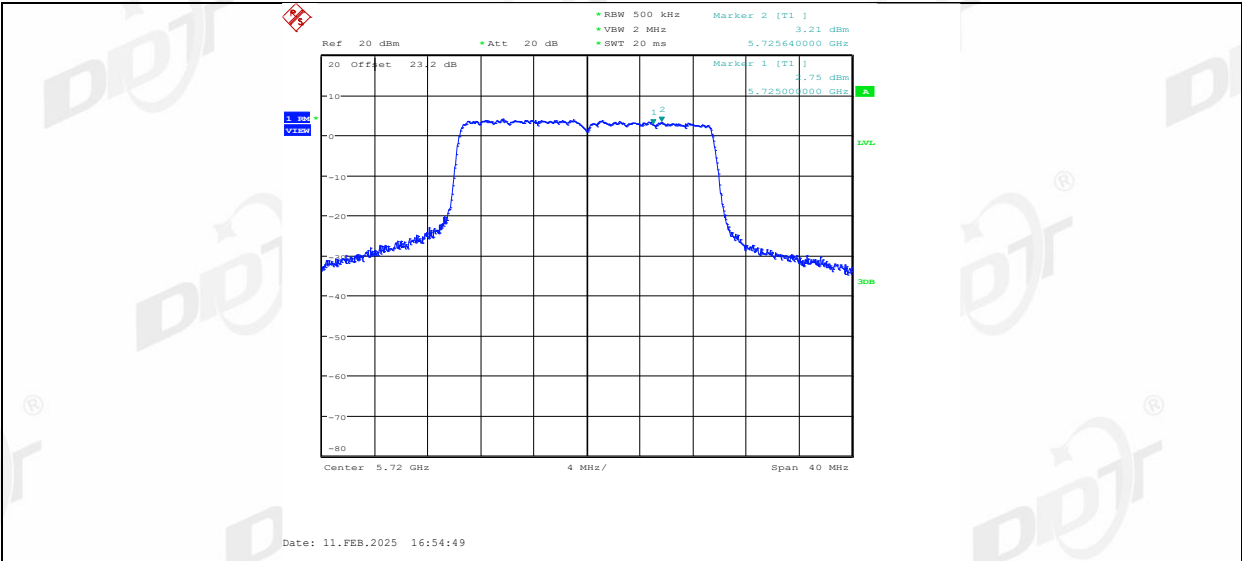
11AX20SISO_Ant1_5700



11AX20SISO_Ant1_5720_UNII-2C



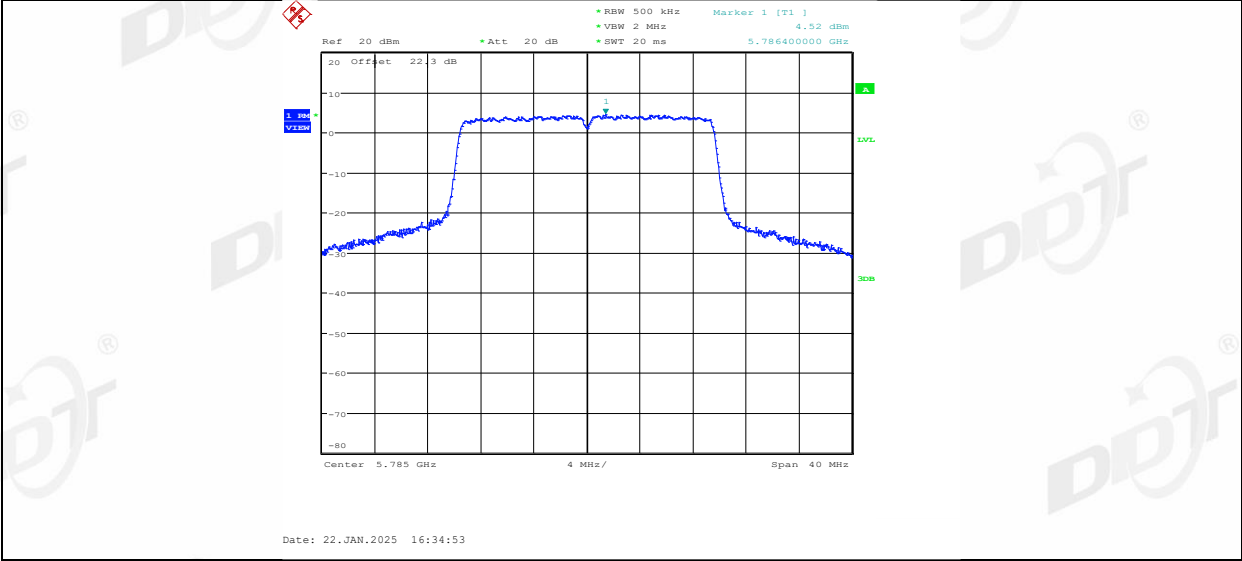
11AX20SISO_Ant1_5720_UNII-3



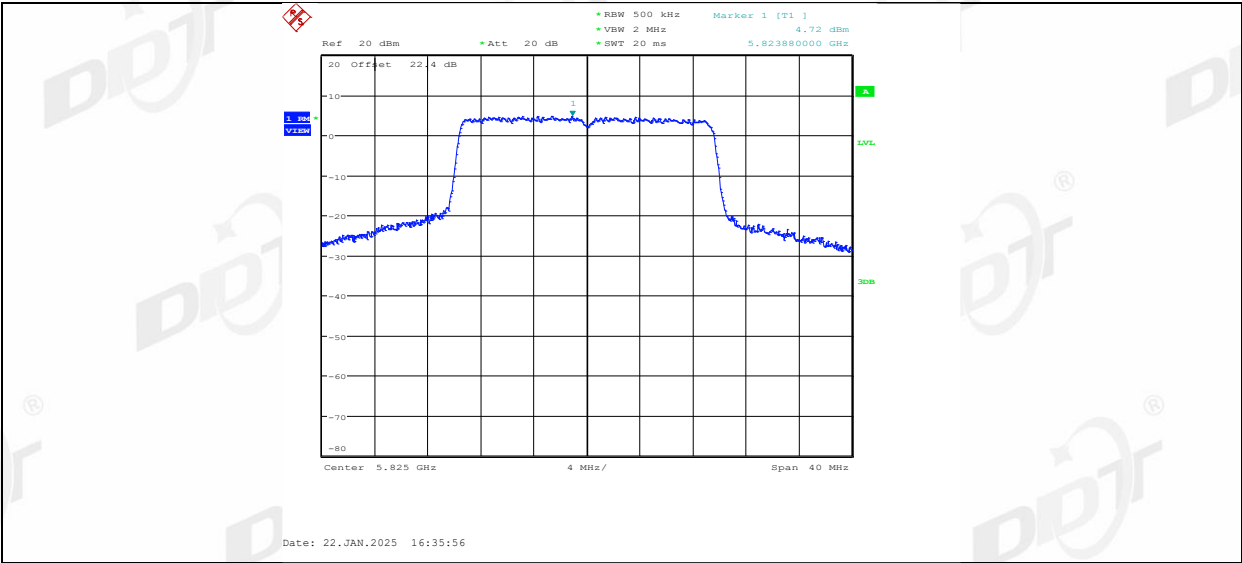
11AX20SISO_Ant1_5745



11AX20SISO_Ant1_5785



11AX20SISO_Ant1_5825



10. Frequency Stability Measurement

10.1. Limit of Frequency Stability

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

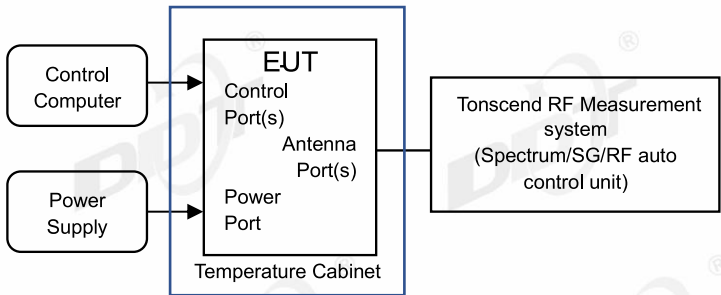
10.2. Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

10.3. Test procedures

- (1) To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
- (2) The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10 dB lower than the measured peak value.
- (3) The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

10.4. Test setup



10.5. Test result

Test Engineer:	Zora Zhang	Test Site:	RF Measurement System 1#
Ambient Condition:	23.5℃,45.6%RH	Test Date:	2024.11.30-2025.02.11
Test Power Supply:	Battery	Sample Number:	S24111520-011

Voltage								
Test Mode	Antenna	Frequency[MHz]	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11A	Ant1	5180	NV	NT	-20000.00	-3.861004	20	PASS
			LV	NT	-20000.00	-3.861004	20	PASS
			HV	NT	-20000.00	-3.861004	20	PASS
		5200	NV	NT	-20000.00	-3.846154	20	PASS
			LV	NT	-40000.00	-7.692308	20	PASS
			HV	NT	-20000.00	-3.846154	20	PASS
		5240	NV	NT	-40000.00	-7.633588	20	PASS
			LV	NT	-20000.00	-3.816794	20	PASS
			HV	NT	-40000.00	-7.633588	20	PASS
		5260	NV	NT	-40000.00	-7.604563	20	PASS
			LV	NT	-20000.00	-3.802281	20	PASS
			HV	NT	-40000.00	-7.604563	20	PASS
		5280	NV	NT	-40000.00	-7.575758	20	PASS
			LV	NT	-20000.00	-3.787879	20	PASS
			HV	NT	-20000.00	-3.787879	20	PASS
		5320	NV	NT	-20000.00	-3.759398	20	PASS
			LV	NT	-20000.00	-3.759398	20	PASS
			HV	NT	-40000.00	-7.518797	20	PASS
		5500	NV	NT	-40000.00	-7.272727	20	PASS
			LV	NT	-20000.00	-3.636364	20	PASS
			HV	NT	-20000.00	-3.636364	20	PASS
		5580	NV	NT	-40000.00	-7.168459	20	PASS
			LV	NT	-40000.00	-7.168459	20	PASS
			HV	NT	-40000.00	-7.168459	20	PASS
		5700	NV	NT	-20000.00	-3.508772	20	PASS
			LV	NT	-20000.00	-3.508772	20	PASS
			HV	NT	-40000.00	-7.017544	20	PASS
		5720	NV	NT	-20000.00	-3.496503	20	PASS
			LV	NT	0.00	0.000000	20	PASS
			HV	NT	0.00	0.000000	20	PASS
		5745	NV	NT	-20000.00	-3.481288	20	PASS
			LV	NT	-20000.00	-3.481288	20	PASS
			HV	NT	-40000.00	-6.962576	20	PASS
		5785	NV	NT	-40000.00	-6.914434	20	PASS
			LV	NT	-20000.00	-3.457217	20	PASS
			HV	NT	-20000.00	-3.457217	20	PASS
		5825	NV	NT	-20000.00	-3.433476	20	PASS
			LV	NT	-40000.00	-6.866953	20	PASS
			HV	NT	-40000.00	-6.866953	20	PASS
11AX20S ISO	Ant1	5785	NV	NT	-20000.00	-3.457217	20	PASS
			LV	NT	-20000.00	-3.457217	20	PASS
			HV	NT	-20000.00	-3.457217	20	PASS

Temperature								
Test Mode	Antenna	Frequency[MHz]	Voltage [Vdc]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11A	Ant1	5180	NV	-30	-20000.00	-3.861004	20	PASS
			NV	-20	-20000.00	-3.861004	20	PASS
			NV	-10	-20000.00	-3.861004	20	PASS
			NV	0	-20000.00	-3.861004	20	PASS
			NV	10	-20000.00	-3.861004	20	PASS
			NV	20	-20000.00	-3.861004	20	PASS
			NV	30	-20000.00	-3.861004	20	PASS
			NV	40	-20000.00	-3.861004	20	PASS
			NV	40	-20000.00	-3.861004	20	PASS

			NV	50	-20000.00	-3.861004	20	PASS
			NV	-30	-40000.00	-7.692308	20	PASS
			NV	-20	-40000.00	-7.692308	20	PASS
			NV	-10	-40000.00	-7.692308	20	PASS
			NV	0	-40000.00	-7.692308	20	PASS
			NV	10	-40000.00	-7.692308	20	PASS
			NV	20	-40000.00	-7.692308	20	PASS
			NV	30	-40000.00	-7.692308	20	PASS
			NV	40	-40000.00	-7.692308	20	PASS
			NV	50	-40000.00	-7.692308	20	PASS
		5240	NV	-30	-40000.00	-7.633588	20	PASS
			NV	-20	-40000.00	-7.633588	20	PASS
			NV	-10	-20000.00	-3.816794	20	PASS
			NV	0	-40000.00	-7.633588	20	PASS
			NV	10	-20000.00	-3.816794	20	PASS
			NV	20	-40000.00	-7.633588	20	PASS
			NV	30	-40000.00	-7.633588	20	PASS
			NV	40	-40000.00	-7.633588	20	PASS
			NV	50	-40000.00	-7.633588	20	PASS
		5260	NV	-30	-40000.00	-7.604563	20	PASS
			NV	-20	-20000.00	-3.802281	20	PASS
			NV	-10	-40000.00	-7.604563	20	PASS
			NV	0	-40000.00	-7.604563	20	PASS
			NV	10	-20000.00	-3.802281	20	PASS
			NV	20	-20000.00	-3.802281	20	PASS
			NV	30	-40000.00	-7.604563	20	PASS
			NV	40	-40000.00	-7.604563	20	PASS
			NV	50	-40000.00	-7.604563	20	PASS
		5280	NV	-30	-20000.00	-3.787879	20	PASS
			NV	-20	-20000.00	-3.787879	20	PASS
			NV	-10	-40000.00	-7.575758	20	PASS
			NV	0	-20000.00	-3.787879	20	PASS
			NV	10	-20000.00	-3.787879	20	PASS
			NV	20	-20000.00	-3.787879	20	PASS
			NV	30	-40000.00	-7.575758	20	PASS
			NV	40	-40000.00	-7.575758	20	PASS
			NV	50	-40000.00	-7.575758	20	PASS
		5320	NV	-30	-20000.00	-3.759398	20	PASS
			NV	-20	-40000.00	-7.518797	20	PASS
			NV	-10	-20000.00	-3.759398	20	PASS
			NV	0	-40000.00	-7.518797	20	PASS
			NV	10	-20000.00	-3.759398	20	PASS
			NV	20	-40000.00	-7.518797	20	PASS
			NV	30	-20000.00	-3.759398	20	PASS
			NV	40	-40000.00	-7.518797	20	PASS
			NV	50	-40000.00	-7.518797	20	PASS
		5500	NV	-30	-20000.00	-3.636364	20	PASS
			NV	-20	-40000.00	-7.272727	20	PASS
			NV	-10	-40000.00	-7.272727	20	PASS
			NV	0	-40000.00	-7.272727	20	PASS
			NV	10	-40000.00	-7.272727	20	PASS
			NV	20	-40000.00	-7.272727	20	PASS
			NV	30	-40000.00	-7.272727	20	PASS
			NV	40	-40000.00	-7.272727	20	PASS
			NV	50	-40000.00	-7.272727	20	PASS
		5580	NV	-30	-20000.00	-3.584229	20	PASS
			NV	-20	-40000.00	-7.168459	20	PASS
			NV	-10	-20000.00	-3.584229	20	PASS
			NV	0	-40000.00	-7.168459	20	PASS
			NV	10	-40000.00	-7.168459	20	PASS
			NV	20	-40000.00	-7.168459	20	PASS
			NV	30	-40000.00	-7.168459	20	PASS
			NV	40	-40000.00	-7.168459	20	PASS
			NV	50	-20000.00	-3.584229	20	PASS

		5700	NV	-30	-40000.00	-7.017544	20	PASS
			NV	-20	-40000.00	-7.017544	20	PASS
			NV	-10	-40000.00	-7.017544	20	PASS
			NV	0	-40000.00	-7.017544	20	PASS
			NV	10	-40000.00	-7.017544	20	PASS
			NV	20	-40000.00	-7.017544	20	PASS
			NV	30	-20000.00	-3.508772	20	PASS
			NV	40	-40000.00	-7.017544	20	PASS
		5720	NV	50	-40000.00	-7.017544	20	PASS
			NV	-30	-20000.00	-3.496503	20	PASS
			NV	-20	0.00	0.000000	20	PASS
			NV	-10	-20000.00	-3.496503	20	PASS
			NV	0	-20000.00	-3.496503	20	PASS
			NV	10	-20000.00	-3.496503	20	PASS
			NV	20	0.00	0.000000	20	PASS
			NV	30	-20000.00	-3.496503	20	PASS
		5745	NV	40	-20000.00	-3.496503	20	PASS
			NV	50	-20000.00	-3.496503	20	PASS
			NV	-30	-20000.00	-3.481288	20	PASS
			NV	-20	-20000.00	-3.481288	20	PASS
			NV	-10	-40000.00	-6.962576	20	PASS
			NV	0	-20000.00	-3.481288	20	PASS
			NV	10	-40000.00	-6.962576	20	PASS
			NV	20	-20000.00	-3.481288	20	PASS
		5785	NV	30	-40000.00	-6.962576	20	PASS
			NV	40	-40000.00	-6.962576	20	PASS
			NV	50	-40000.00	-6.962576	20	PASS
			NV	-30	-40000.00	-6.914434	20	PASS
			NV	-20	-40000.00	-6.914434	20	PASS
			NV	-10	-20000.00	-3.457217	20	PASS
			NV	0	-40000.00	-6.914434	20	PASS
			NV	10	-40000.00	-6.914434	20	PASS
		5825	NV	20	-40000.00	-6.914434	20	PASS
			NV	30	-40000.00	-6.914434	20	PASS
			NV	40	-20000.00	-3.457217	20	PASS
			NV	50	-40000.00	-6.914434	20	PASS
			NV	-30	-40000.00	-6.866953	20	PASS
			NV	-20	-40000.00	-6.866953	20	PASS
			NV	-10	-20000.00	-3.433476	20	PASS
			NV	0	-40000.00	-6.866953	20	PASS
11AX20S ISO	Ant1	5785	NV	10	-40000.00	-6.866953	20	PASS
			NV	20	-40000.00	-6.866953	20	PASS
			NV	30	-40000.00	-6.866953	20	PASS
			NV	40	-40000.00	-6.866953	20	PASS
			NV	50	-40000.00	-6.866953	20	PASS
			NV	-30	-20000.00	-3.457217	20	PASS
			NV	-20	-20000.00	-3.457217	20	PASS
			NV	-10	-20000.00	-3.457217	20	PASS
			NV	0	-20000.00	-3.457217	20	PASS
			NV	10	-20000.00	-3.457217	20	PASS
			NV	20	-20000.00	-3.457217	20	PASS
			NV	30	-20000.00	-3.457217	20	PASS
			NV	40	-20000.00	-3.457217	20	PASS
			NV	50	-20000.00	-3.457217	20	PASS

11. Dynamic Frequency Selection

11.1. Applicability of DFS requirements

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	☐ Master	☒ Client Without Radar Detection	☐ Client with Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	☐ Master Device or Client with Radar Detection	☒ Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	☐ Master Device or Client with Radar Detection	☒ Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required

Note: Frequencies selected for statistical performance check should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.

11.2. Limit

(1) DFS Detection Thresholds

Table 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP $\geq$ 200 milliwatt	-64 dBm
EIRP $<$ 200 milliwatt and power spectral density $<$ 10 dBm/MHz	-62 dBm
EIRP $<$ 200 milliwatt that do not meet the power spectral density requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.

Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

(2) DFS Response Requirements

Table 4: DFS Response Requirement Values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required facilitating a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

11.3. Parameters of radar test waveforms

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Table 5 Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A	Roundup $\left\{ \left(\frac{1}{360} \right) \cdot \left(\frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$	60%	30
		Test B			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests. Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A					

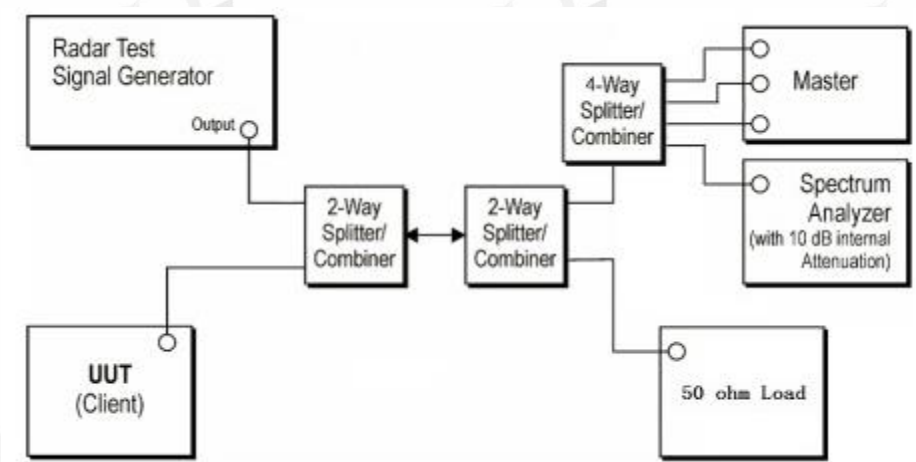
A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B. Test aggregate is average of the percentage of successful detections of short pulse radar types 1-4

11.4. Calibration of radar waveform

Radar Waveform Calibration Procedure:

- (1) A 50 ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to place of the master
- (2) The interference Radar Detection Threshold Level is $-62\text{dBm} + 1.84\text{dBi} = -60.16\text{dBm}$ that had been taken into account the output power range and antenna gain.
- (3) The following equipment setup was used to calibrate the conducted radar waveform. A vector signal generator was utilized to establish the test signal level for radar type 0. During this process there were no transmissions by either the master or client device. The spectrum analyzer was switched to the zero spans (time domain) at the frequency of the radar waveform generator. Peak detection was used. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3 MHz.
- (4) The vector signal generator amplitude was set so that the power level measured at the spectrum analyzer was $-62\text{dBm} + 1.84\text{dBi} = -60.16\text{dBm}$. Capture the spectrum analyzer plots on short pulse radar waveform.

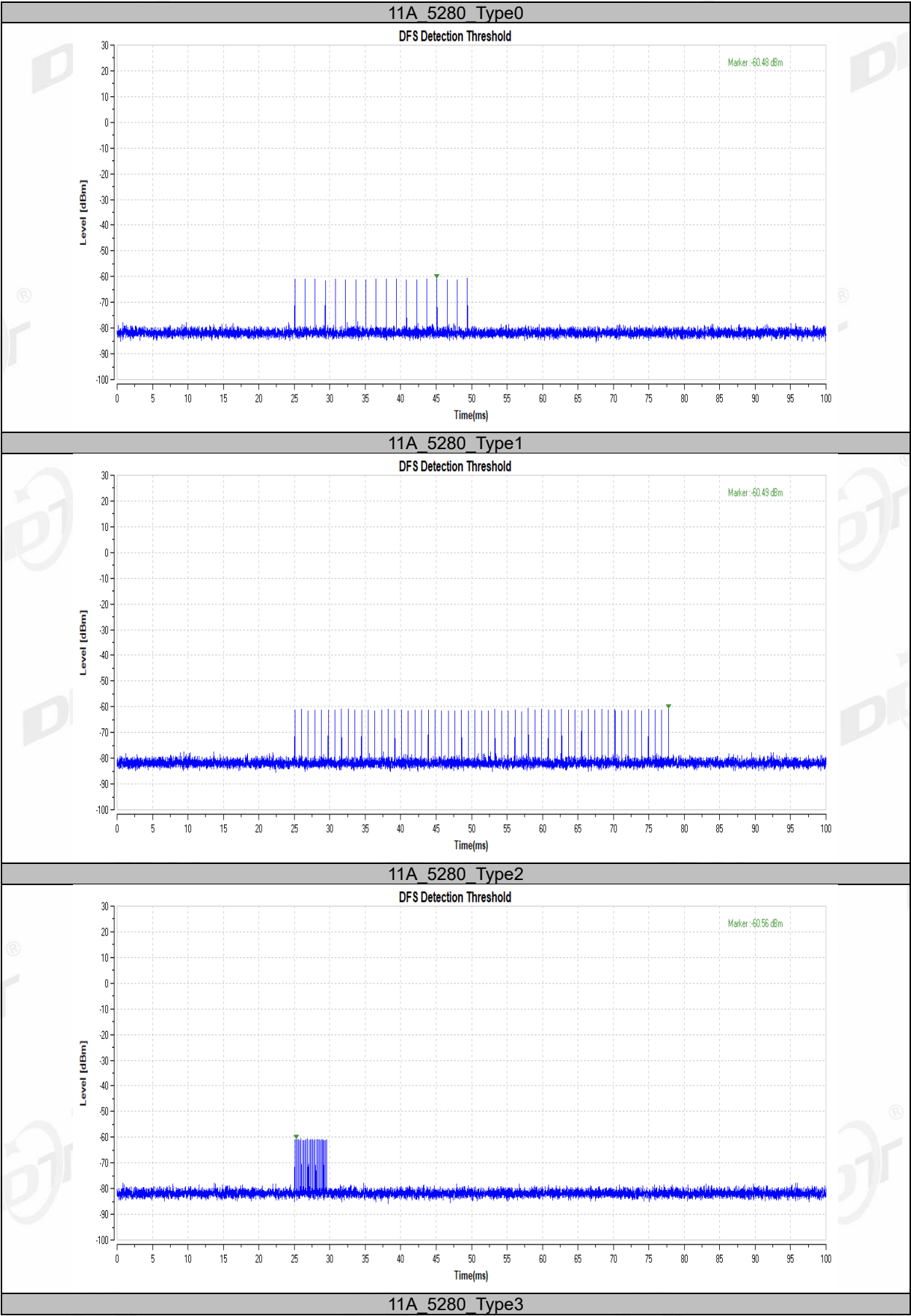
Conducted Calibration Setup:

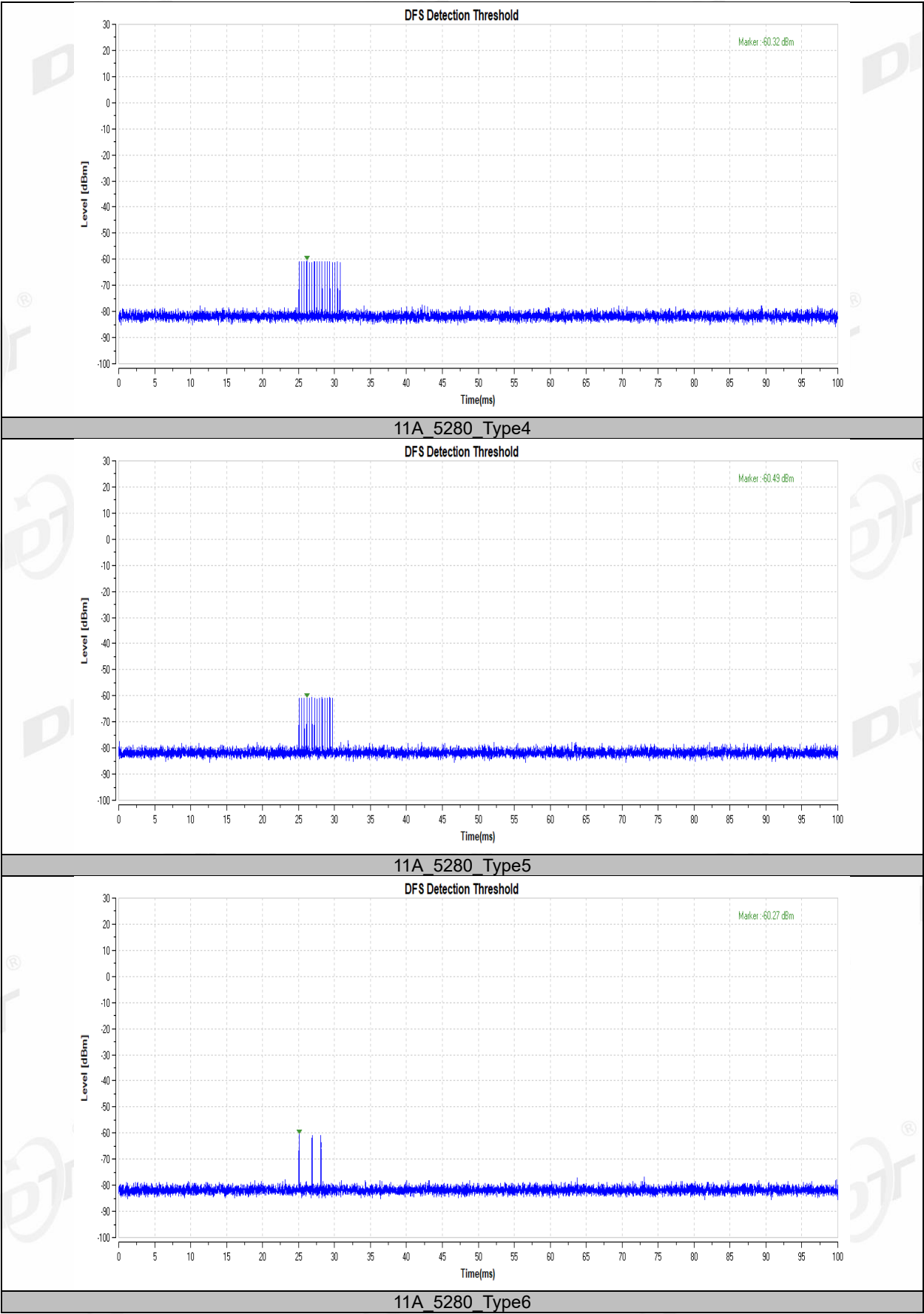


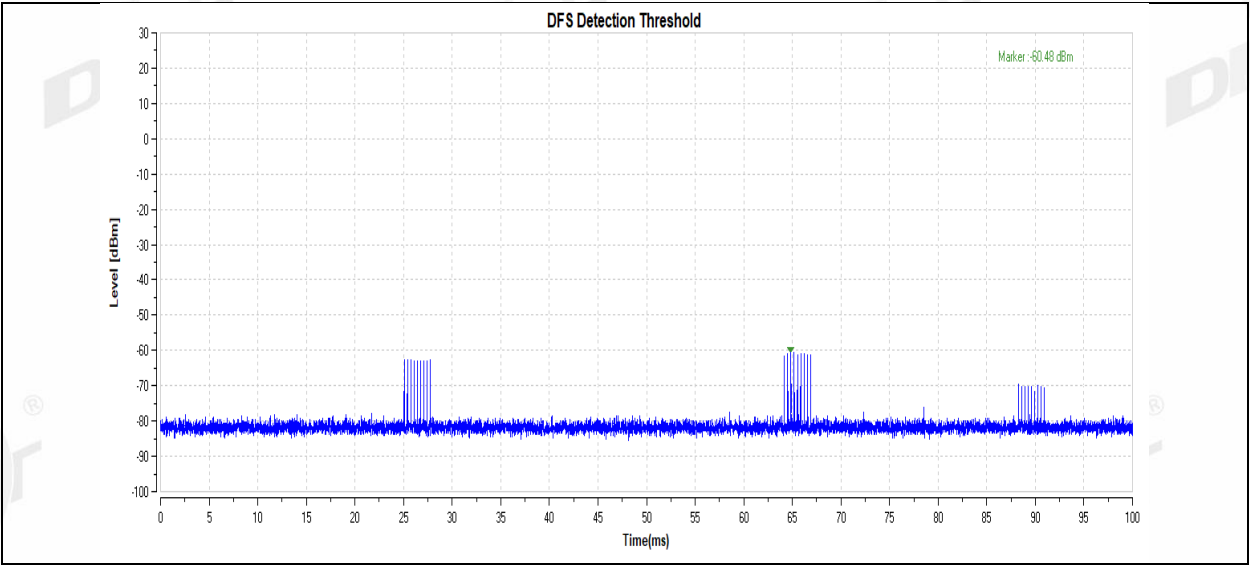
Note: 1. Use the software "Web" to set the frequency channel.
2. EUT is not support TPC and not with Radar detection.

Radar Waveform Calibration Result:

Test Mode	Frequency [MHz]	Radar Type	Result	Limit[dbm]	Verdict
11A	5280	Type0	-60.48	-60.16	PASS
		Type1	-60.49	-60.16	PASS
		Type2	-60.56	-60.16	PASS
		Type3	-60.32	-60.16	PASS
		Type4	-60.49	-60.16	PASS
		Type5	-60.27	-60.16	PASS
		Type6	-60.48	-60.16	PASS







11.5. Channel closing transmission time, channel move time and non-occupancy period

Block diagram of test setup Test Procedure:

- (1) The radar pulse generator is setup to provide a pulse at frequency that the master and client are operating. A type 0 radar pulse with a 1us pulse width and a 1428us PRI is used for the testing.
- (2) The vector signal generator is adjusted to provide the radar burst (18 pulses) at the level of approximately -61dBm at the antenna port of the master device.
- (3) A trigger is provided from the pulse generator to the DFS monitoring system in order to capture the traffic and the occurrence of the radar pulse.
- (4) EUT will associate with the master at channel. The file "iperf.exe" specified by the FCC is streamed from the PC 2 through the master and the client device to the PC 1 and played in full motion video using Test Software in order to properly load the network for the entire period of the test.
- (5) When radar burst with a level equal to the DFS Detection Threshold +1dB is generated on the operating channel of the U-NII device. At time T0 the radar waveform generator sends a burst of pulse of the radar waveform at Detection Threshold +1dB.
- (6) Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). One 15 seconds plot is reported for the Short Pulse Radar Type 0. The plot for the Short Pulse Radar Types start at the end of the radar burst. The Channel Move Time will be calculated based on the zoom in 600ms plot of the Short Pulse Radar Type.
- (7) Measurement of the aggregate duration of the Channel Closed Transmission Time method. With the
- (8) spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by: $Dwell (0.3ms) = S (12000ms) / B (4000)$; where Dwell is the dwell time per spectrum analyzer sampling bin, S is sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by: $C (ms) = N \times Dwell (0.3ms)$; where C is the Closing Time, N is the number of spectrum analyzer sampling bins (intermittent control signals) showing a U-NII transmission and Dwell is the dwell time per bin.

Measurement the EUT for more than 30 minutes following the channel move time to verify that no transmission or beacons occur on this channel.

11.6. Test setup

Setup for Client with injection at the Master