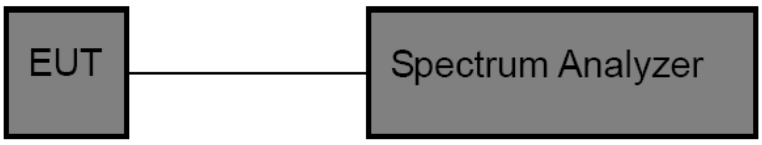
3.4. Band Edge and Spurious Emissions (Conducted)

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d) / RSS-247 5.5
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Test Configuration



Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
   RBW = 100 kHz, VBW ≥ RBW, scan up through 10th harmonic.
   Sweep = auto, Detector function = peak, Trace = max hold.
4. Measure and record the results in the test report.

Test Mode

Please refer to the clause 2.4.

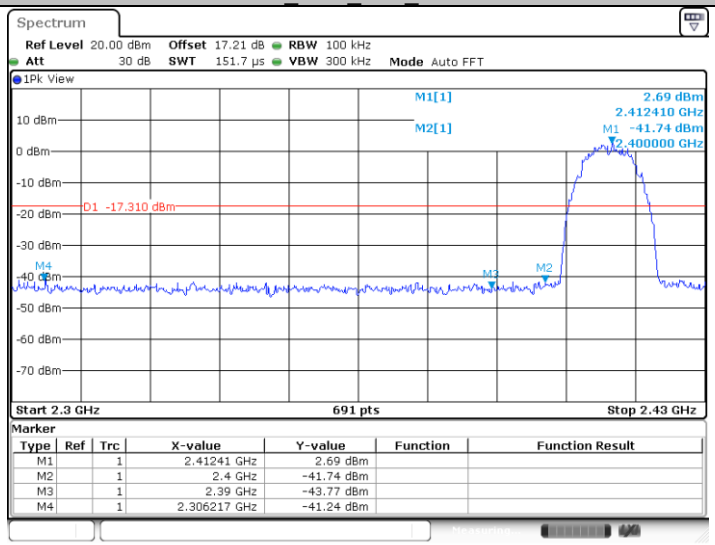
Test Result

Band edge measurements

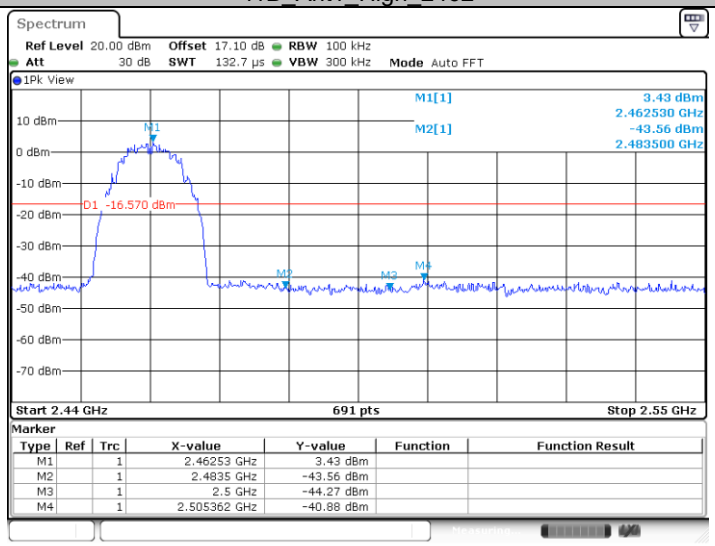
Test Mode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	2.69	-41.24	≤-17.31	PASS
		High	2462	3.43	-40.88	≤-16.57	PASS
11G	Ant1	Low	2412	-1.37	-40.56	≤-21.37	PASS
		High	2462	-2.33	-40.47	≤-22.33	PASS
11N20SISO	Ant1	Low	2412	-4.17	-41.18	≤-24.17	PASS
		High	2462	-5.29	-40.80	≤-25.29	PASS
11N40SISO	Ant1	Low	2422	-5.32	-41.15	≤-25.32	PASS
		High	2452	-6.44	-40.70	≤-26.44	PASS

Test Graphs:

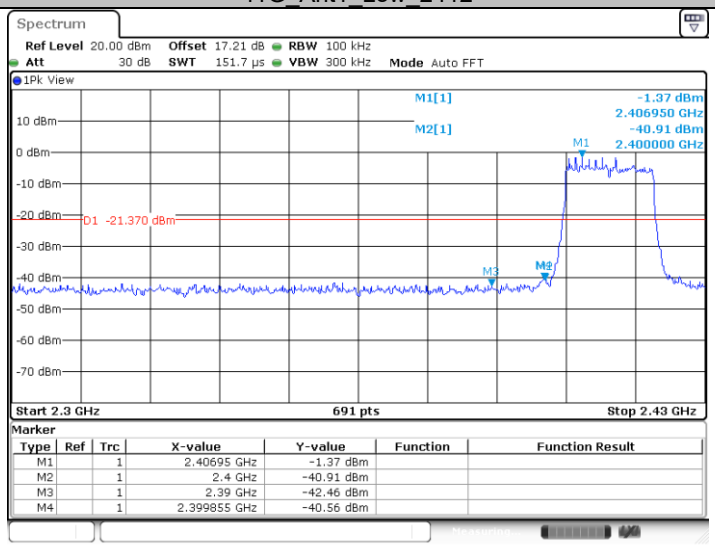
11B_Ant1_Low_2412



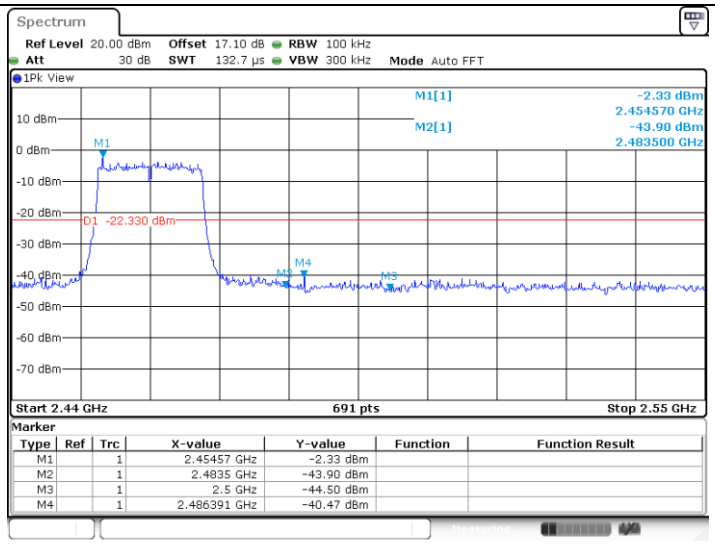
11B_Ant1_High_2462



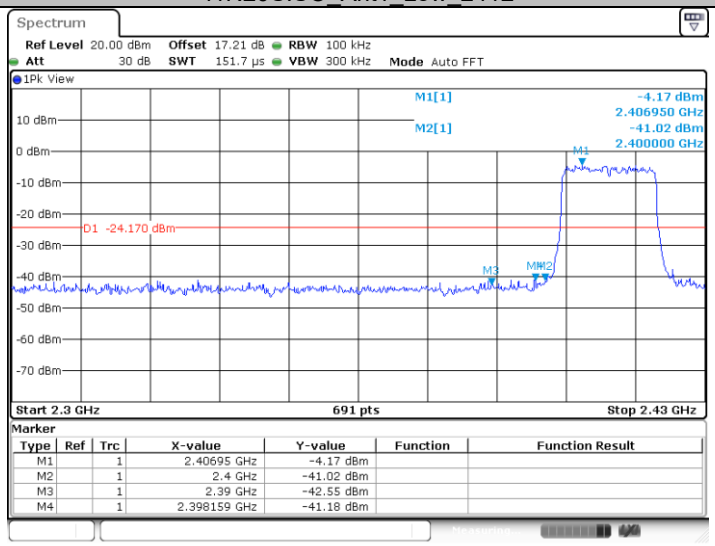
11G_Ant1_Low_2412



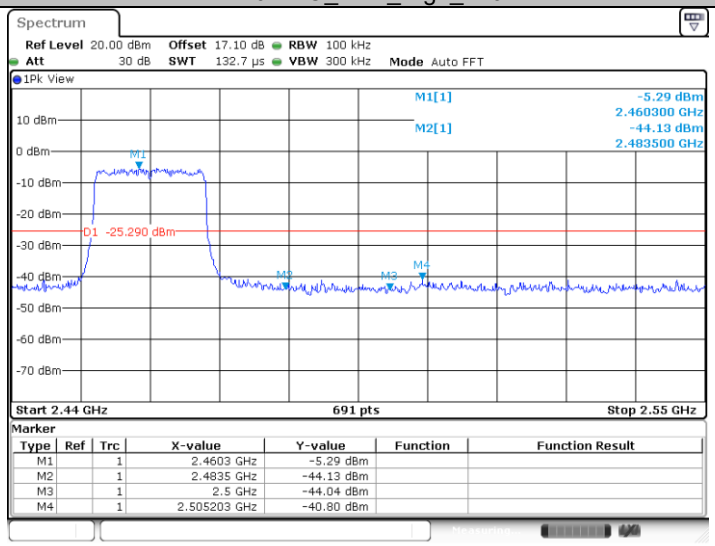
11G_Ant1_High_2462



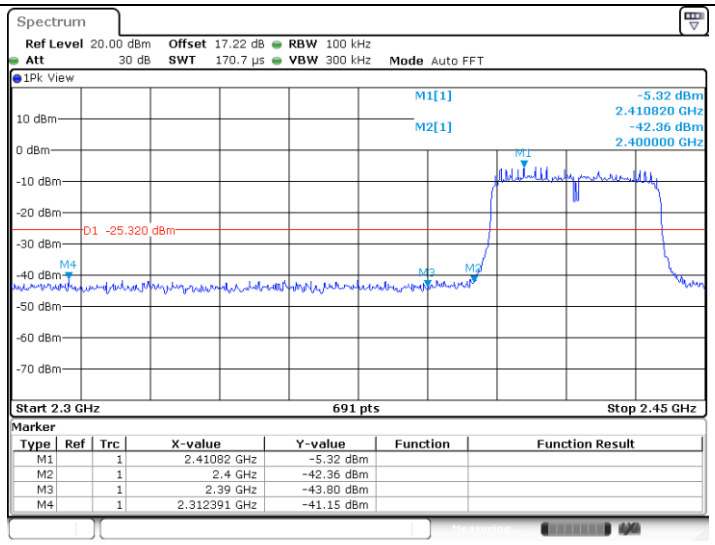
11N20SISO_Ant1_Low_2412



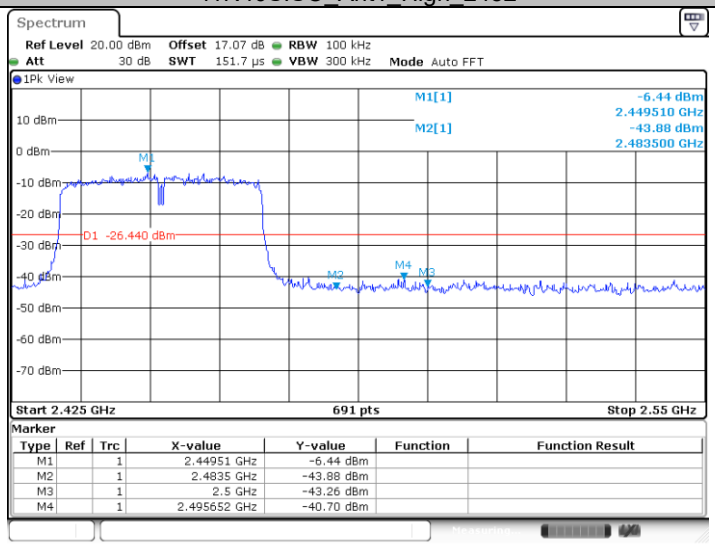
11N20SISO_Ant1_High_2462



11N40SISO_Ant1_Low_2422



11N40SISO_Ant1_High_2452

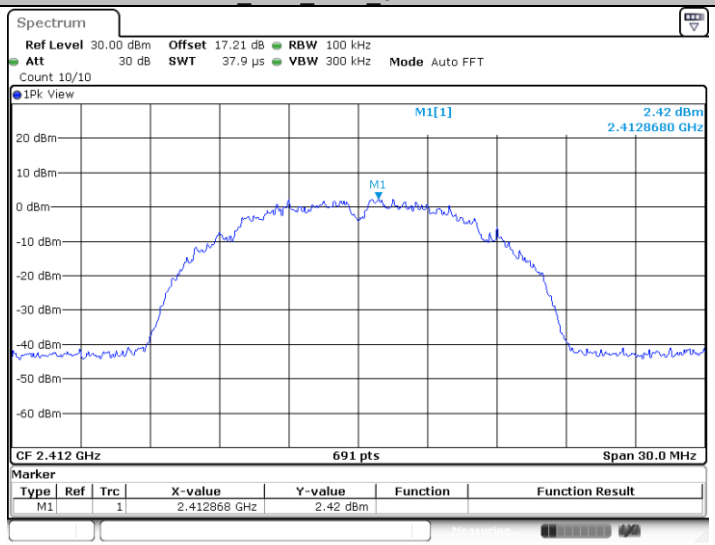


Conducted Spurious Emission

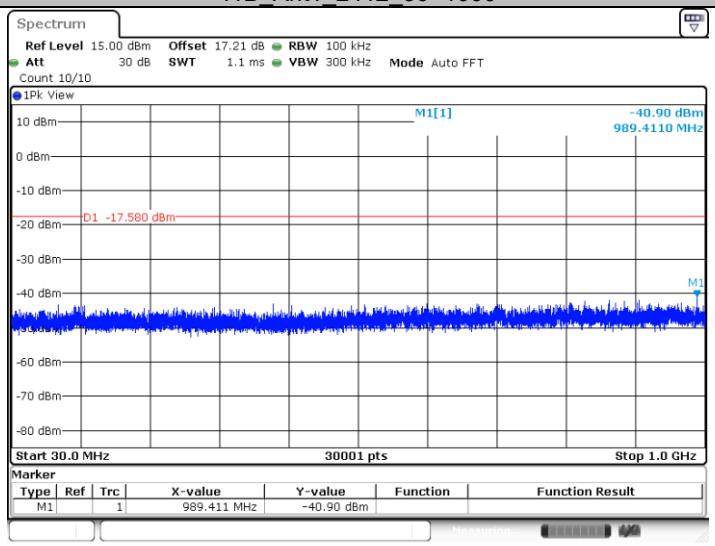
Test Mode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	2.42	2.42	---	PASS
			30~1000	2.42	-40.90	≤-17.58	PASS
			1000~26500	2.42	-45.09	≤-17.58	PASS
		2437	Reference	3.05	3.05	---	PASS
			30~1000	3.05	-42.17	≤-16.95	PASS
			1000~26500	3.05	-45.50	≤-16.95	PASS
		2462	Reference	3.51	3.51	---	PASS
			30~1000	3.51	-42.04	≤-16.49	PASS
			1000~26500	3.51	-44.76	≤-16.49	PASS
11G	Ant1	2412	Reference	-2.24	-2.24	---	PASS
			30~1000	-2.24	-42.25	≤-22.24	PASS
			1000~26500	-2.24	-45.22	≤-22.24	PASS
		2437	Reference	-1.78	-1.78	---	PASS
			30~1000	-1.78	-41.81	≤-21.78	PASS
			1000~26500	-1.78	-45.11	≤-21.78	PASS
		2462	Reference	-2.28	-2.28	---	PASS
			30~1000	-2.28	-41.83	≤-22.28	PASS
			1000~26500	-2.28	-44.39	≤-22.28	PASS
11N20SISO	Ant1	2412	Reference	-1.62	-1.62	---	PASS
			30~1000	-1.62	-41.81	≤-21.62	PASS
			1000~26500	-1.62	-44.81	≤-21.62	PASS
		2437	Reference	-3.21	-3.21	---	PASS
			30~1000	-3.21	-42.02	≤-23.21	PASS
			1000~26500	-3.21	-44.72	≤-23.21	PASS
		2462	Reference	-2.98	-2.98	---	PASS
			30~1000	-2.98	-41.56	≤-22.98	PASS
			1000~26500	-2.98	-44.35	≤-22.98	PASS
11N40SISO	Ant1	2422	Reference	-5.98	-5.98	---	PASS
			30~1000	-5.98	-41.92	≤-25.98	PASS
			1000~26500	-5.98	-44.78	≤-25.98	PASS
		2437	Reference	-6.09	-6.09	---	PASS
			30~1000	-6.09	-41.75	≤-26.09	PASS
			1000~26500	-6.09	-45.53	≤-26.09	PASS
		2452	Reference	-7.16	-7.16	---	PASS
			30~1000	-7.16	-42.27	≤-27.16	PASS
			1000~26500	-7.16	-45.16	≤-27.16	PASS

Test Graphs

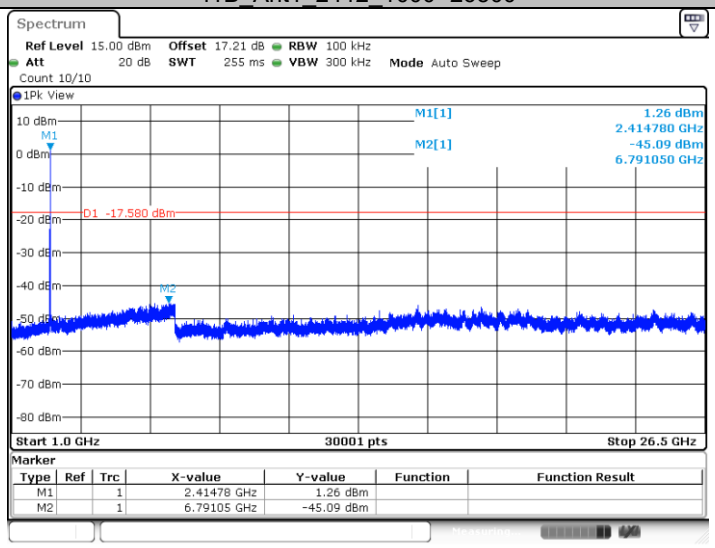
11B_Ant1_2412_0~Reference



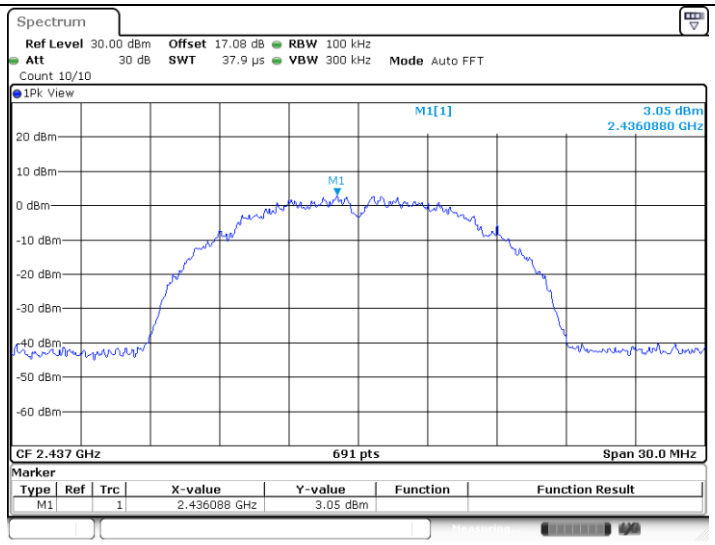
11B_Ant1_2412_30~1000



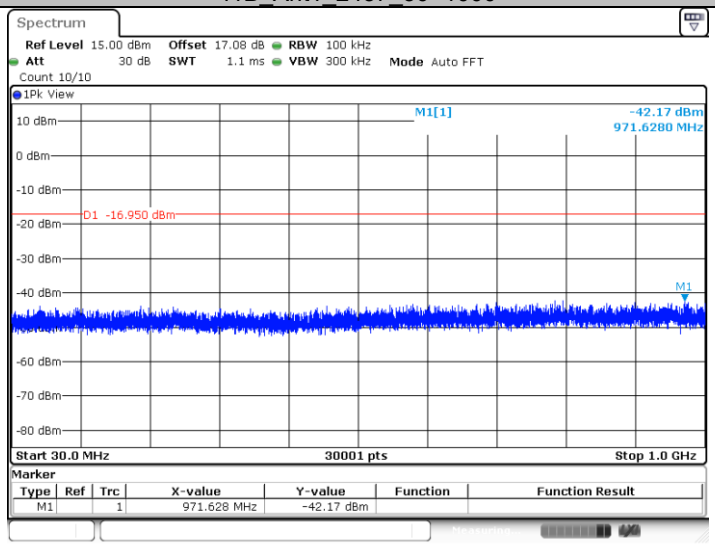
11B_Ant1_2412_1000~26500



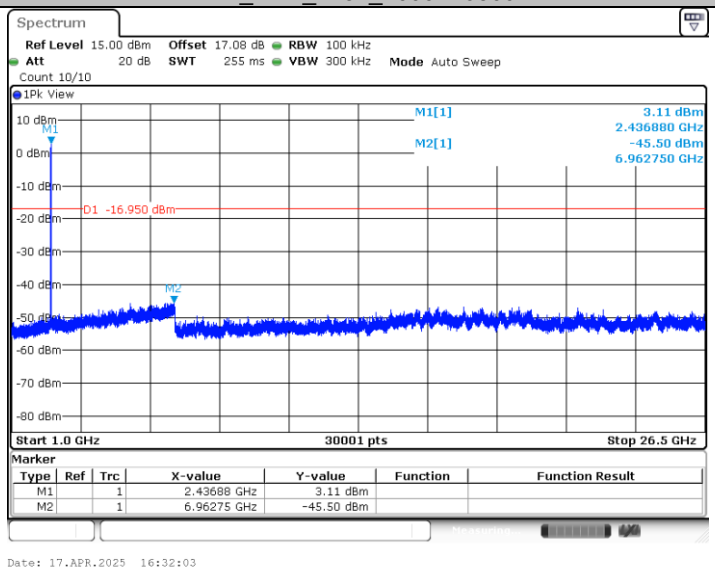
11B_Ant1_2437_0~Reference



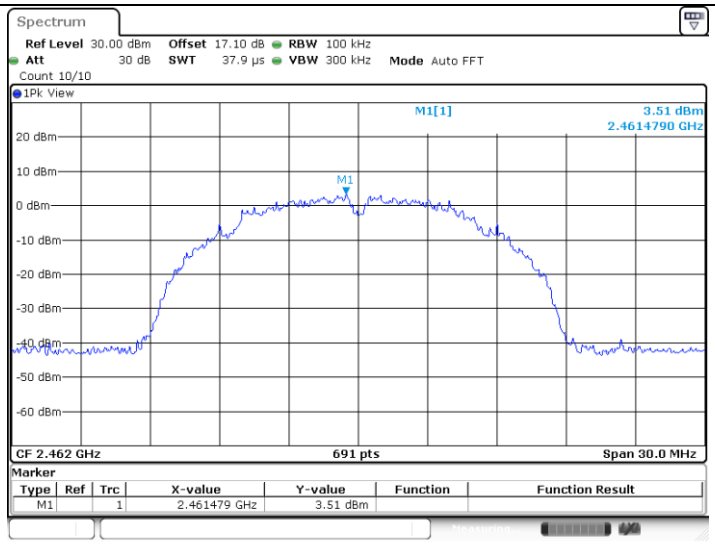
11B_Ant1_2437_30~1000



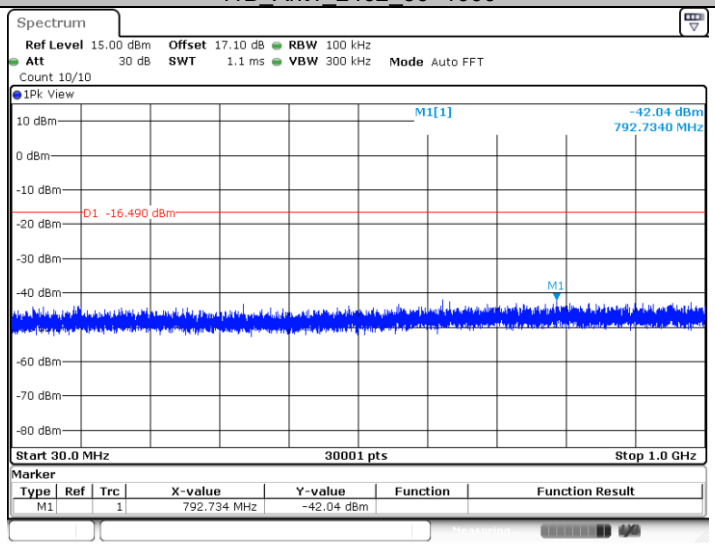
11B_Ant1_2437_1000~26500



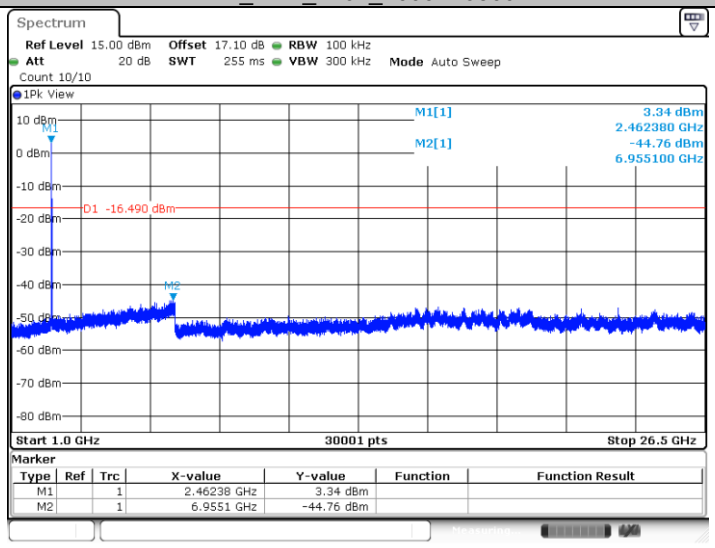
11B_Ant1_2462_0~Reference



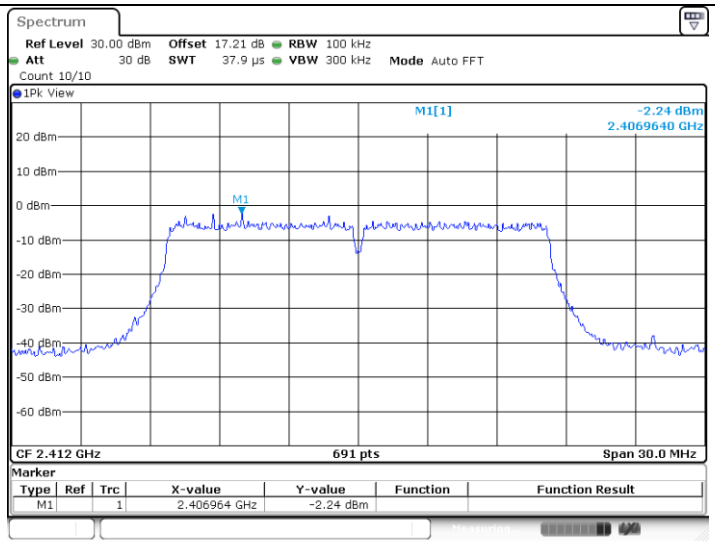
11B_Ant1_2462_30~1000



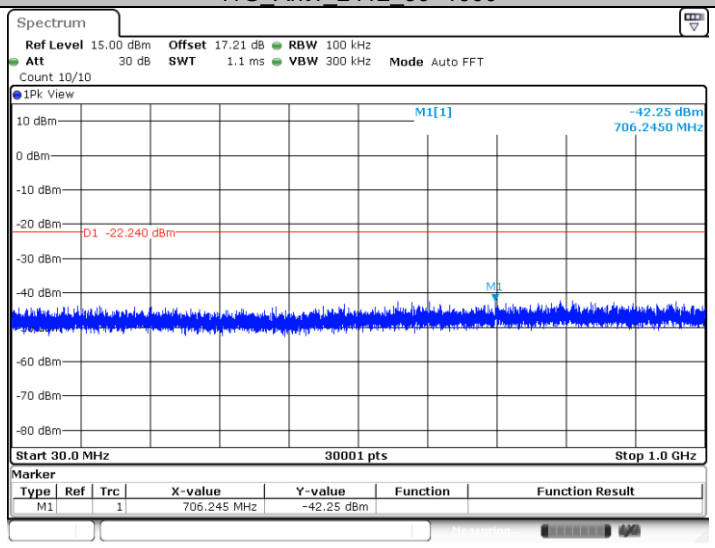
11B_Ant1_2462_1000~26500



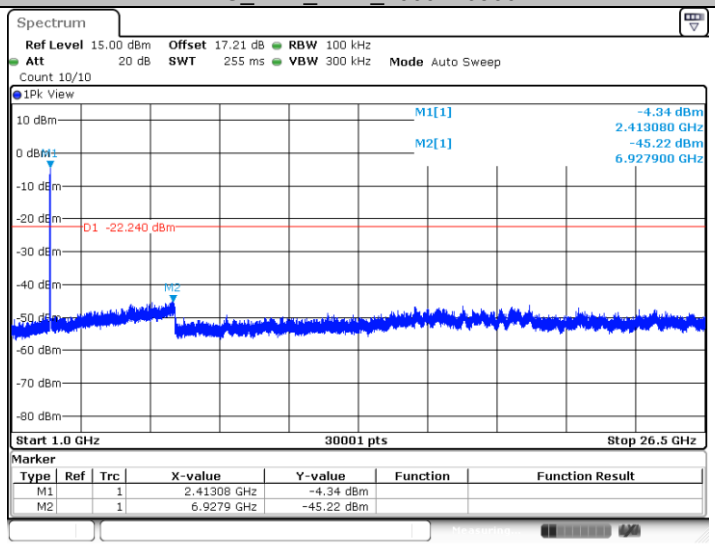
11G_Ant1_2412_0~Reference



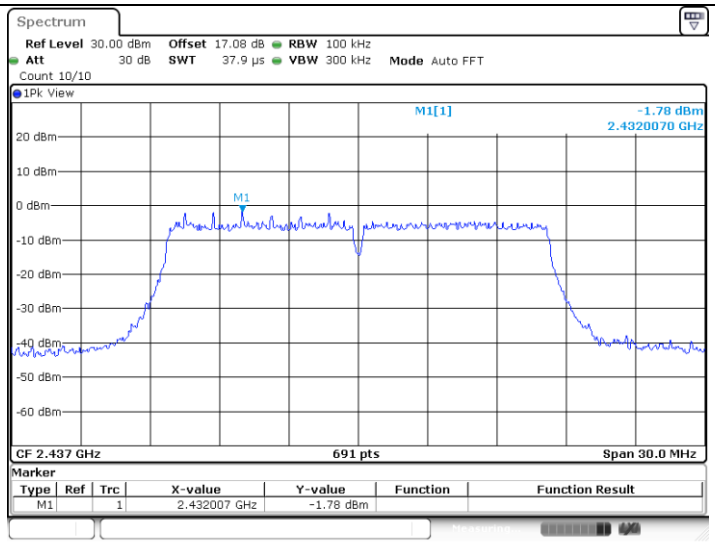
11G_Ant1_2412_30~1000



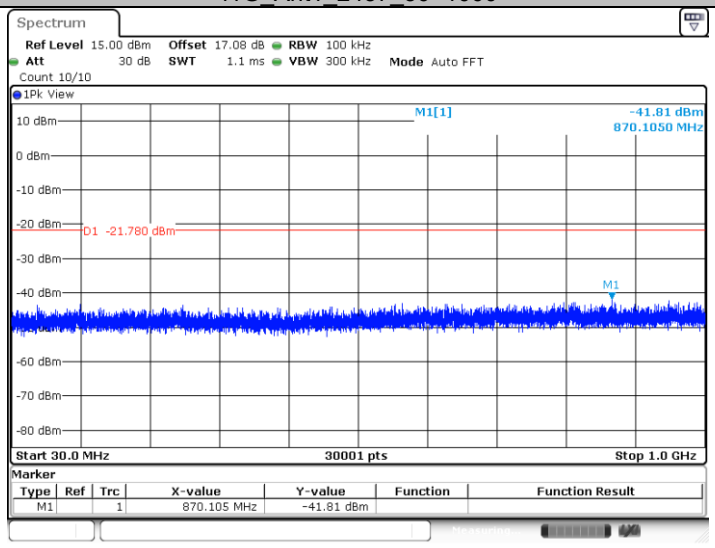
11G_Ant1_2412_1000~26500



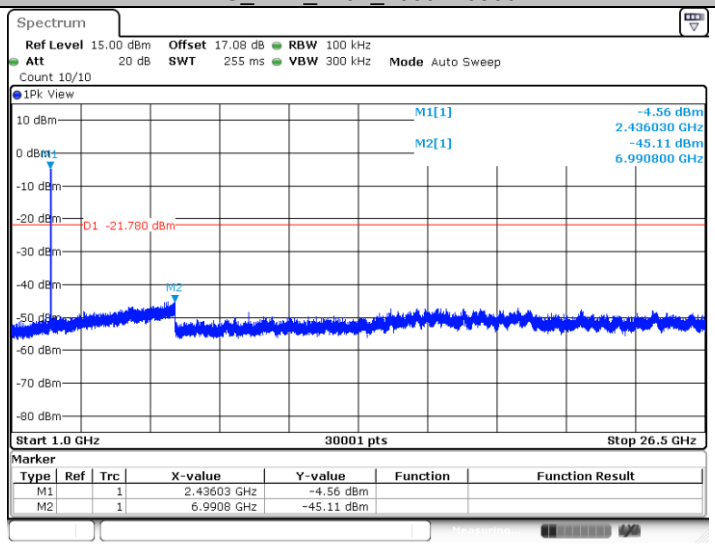
11G_Ant1_2437_0~Reference



11G_Ant1_2437_30~1000



11G_Ant1_2437_1000~26500



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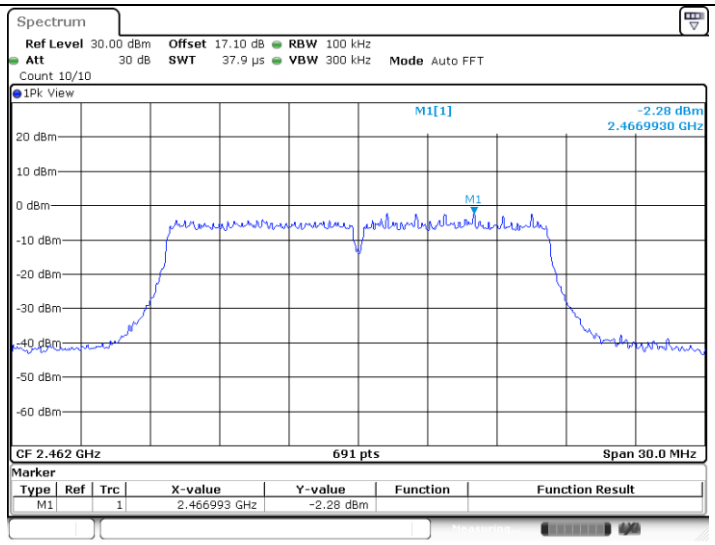

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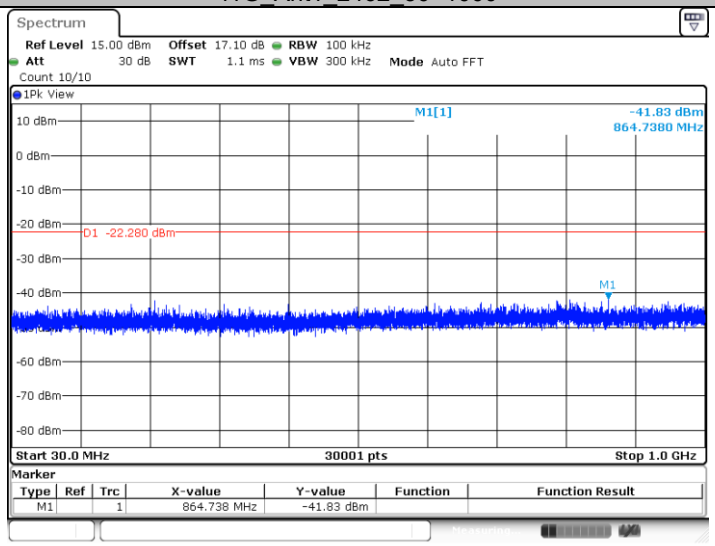
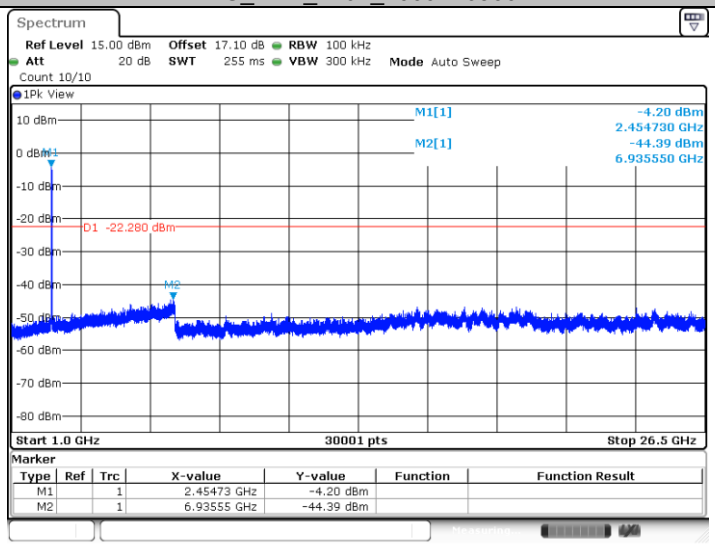
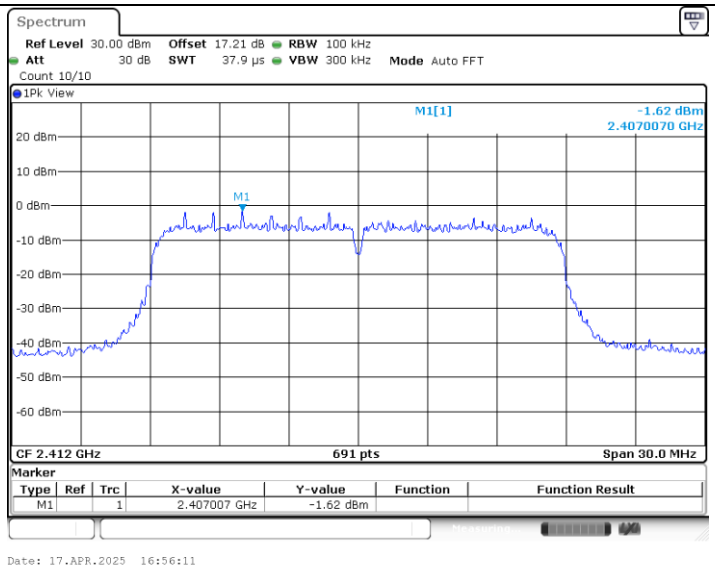


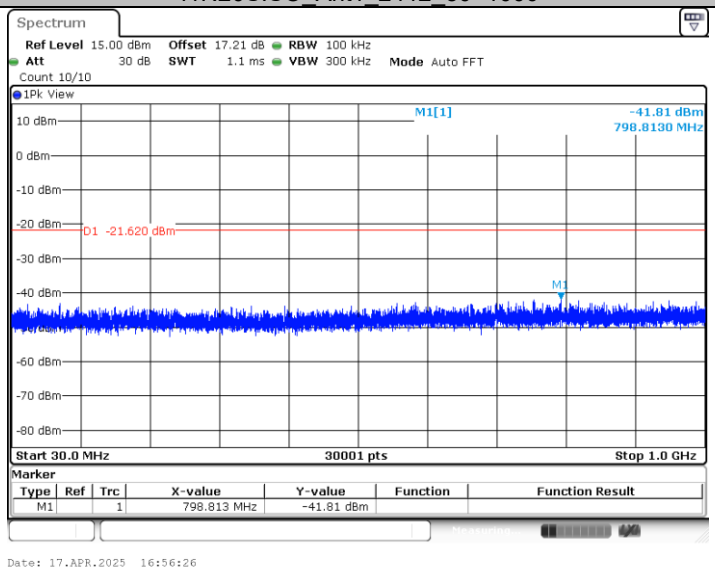
11G_Ant1_2462_1000~26500



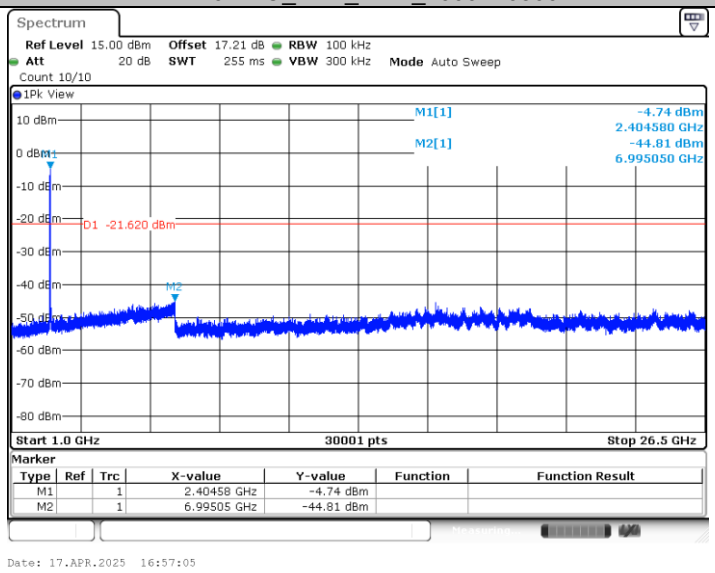
11N20SISO_Ant1_2412_0~Reference



11N20SISO_Ant1_2412_30~1000



11N20SISO_Ant1_2412_1000~26500



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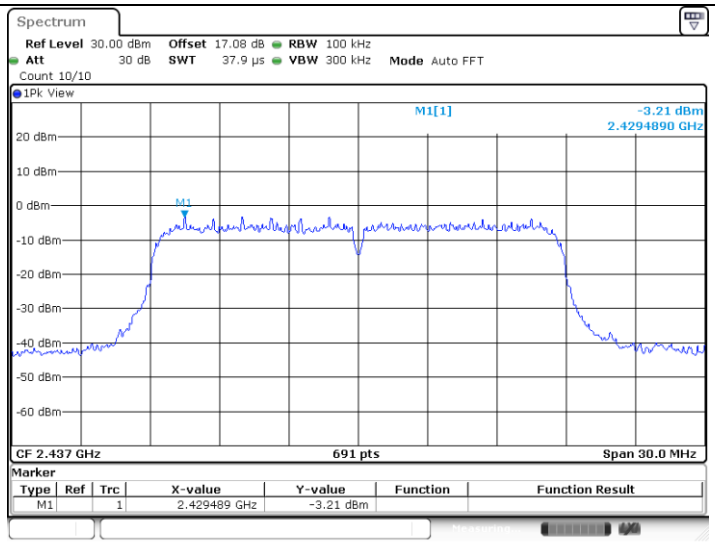

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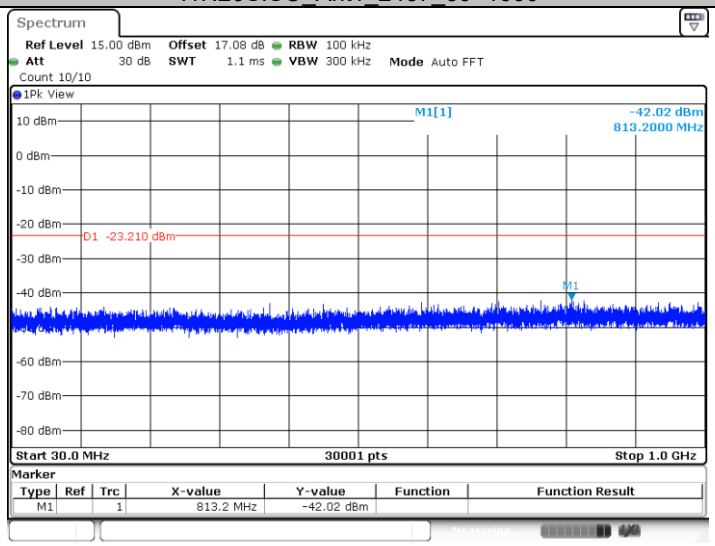
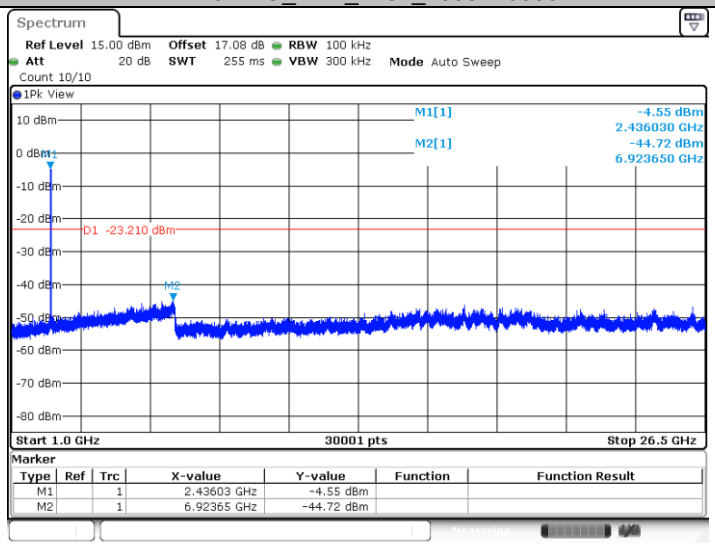


11N20SISO_Ant1_2437_1000~26500



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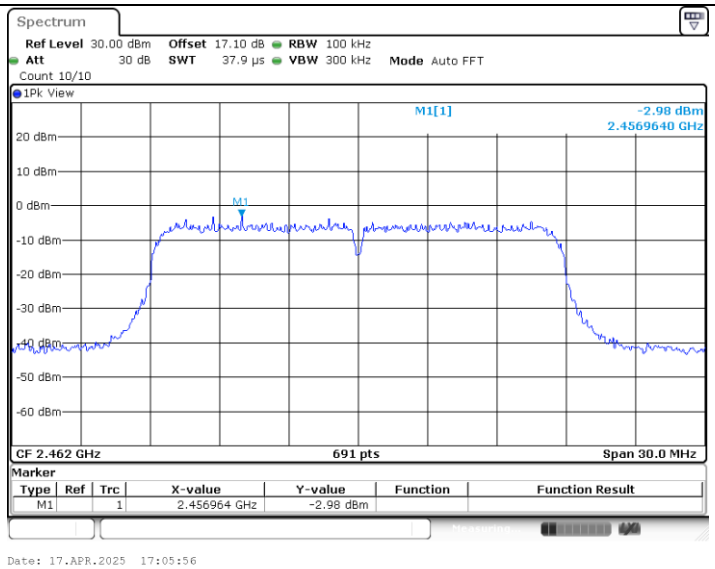
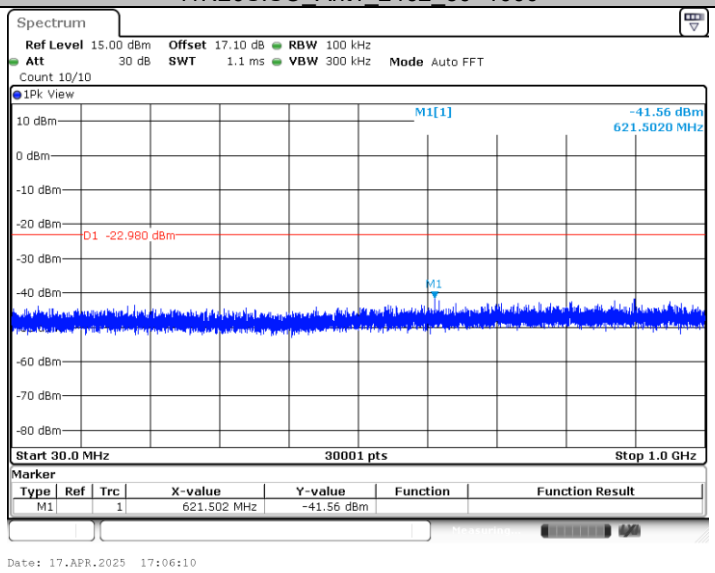
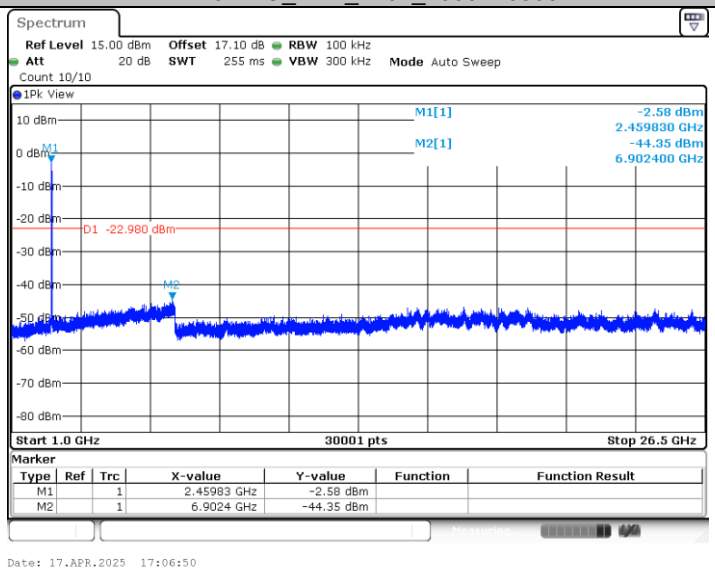


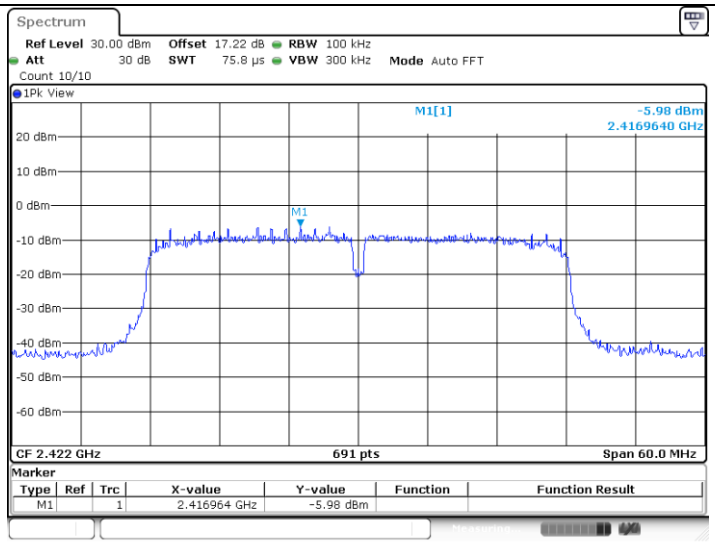
11N20SISO_Ant1_2462_30~1000



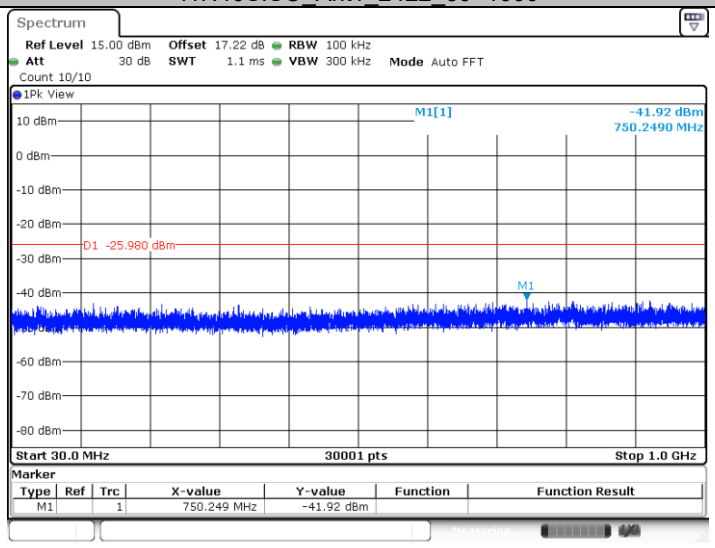
11N20SISO_Ant1_2462_1000~26500



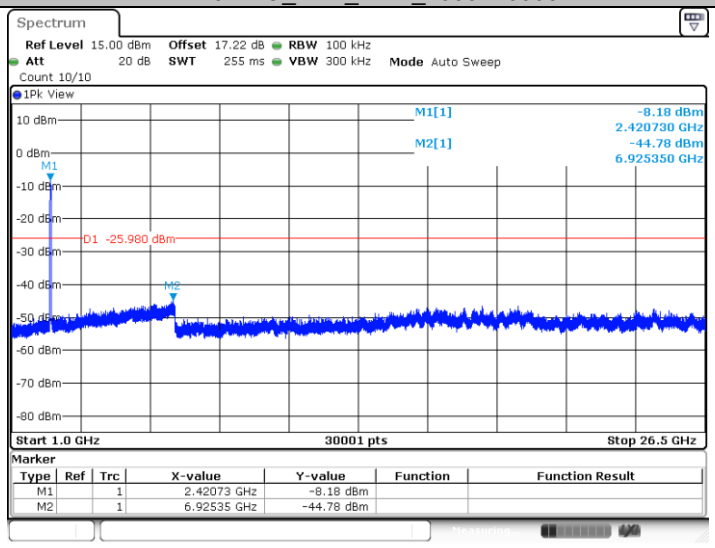
11N40SISO_Ant1_2422_0~Reference



11N40SISO_Ant1_2422_30~1000



11N40SISO_Ant1_2422_1000~26500



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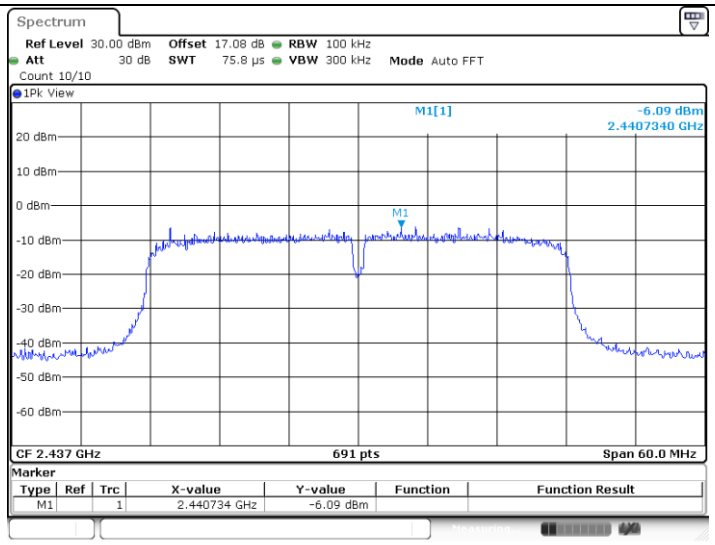
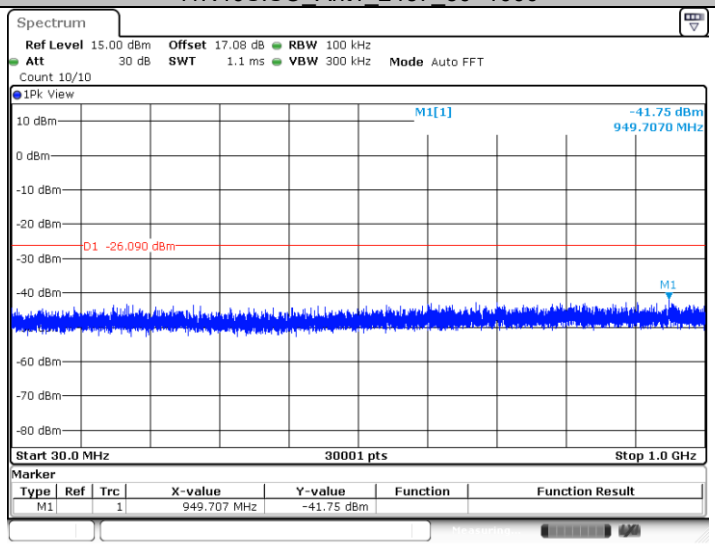
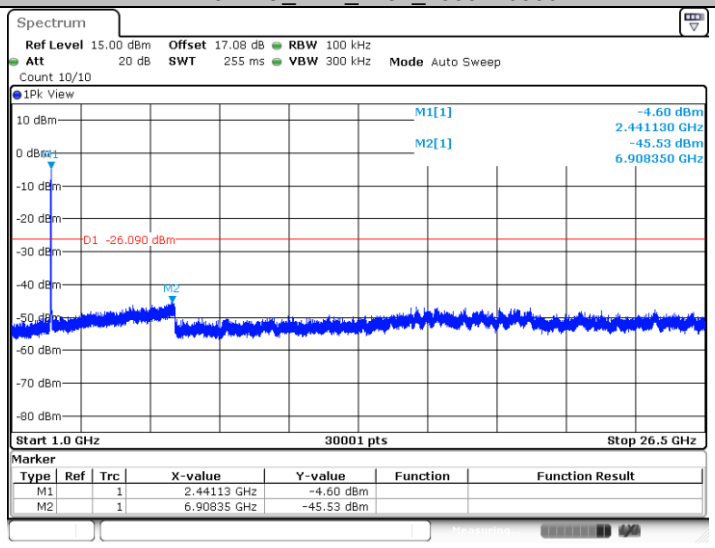


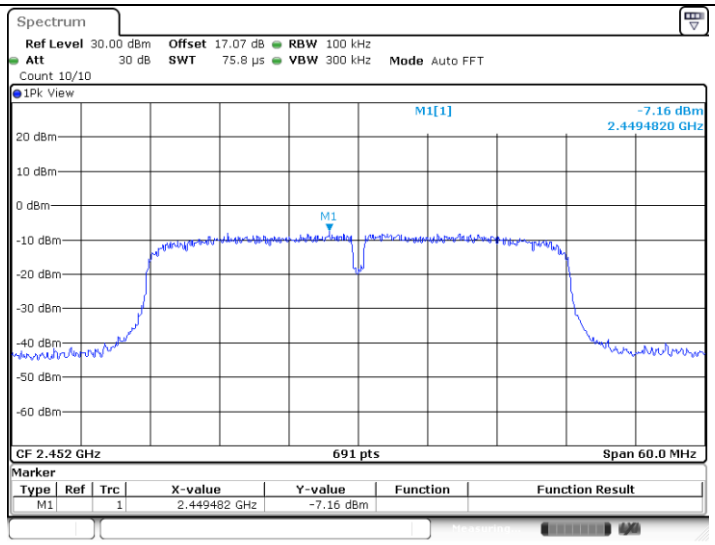
11N40SISO_Ant1_2437_30~1000



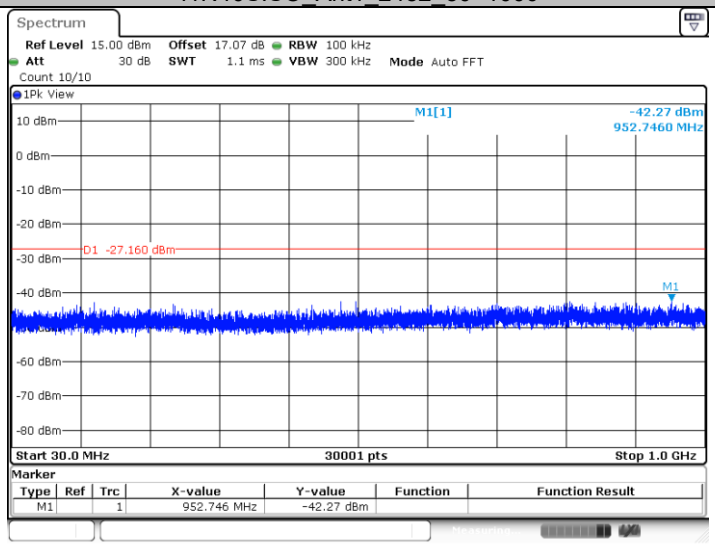
11N40SISO_Ant1_2437_1000~26500



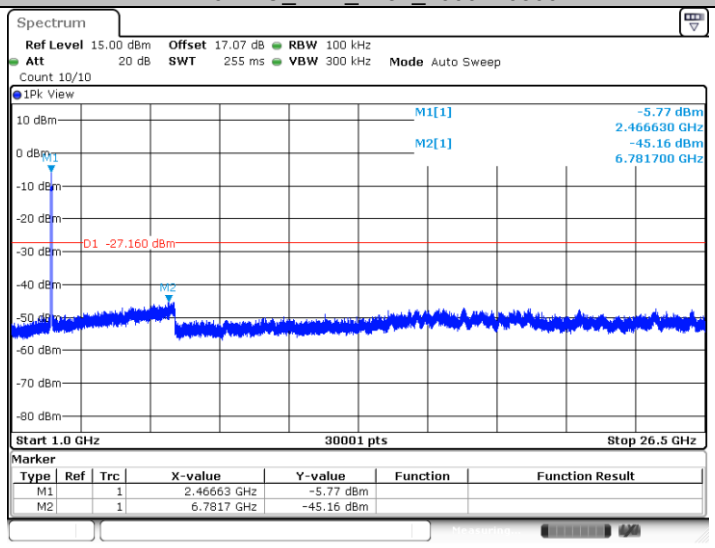
11N40SISO_Ant1_2452_0~Reference



11N40SISO_Ant1_2452_30~1000



11N40SISO_Ant1_2452_1000~26500



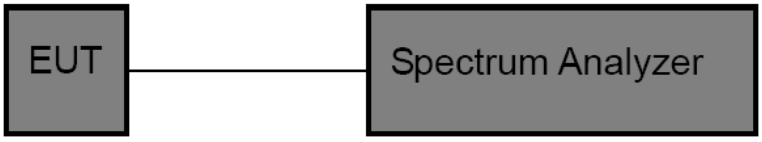
3.5. DTS Bandwidth

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2) / RSS-247 5.2 a

Test Item	Limit	Frequency Range (MHz)
DTS Bandwidth	⩾500 kHz (6dB bandwidth)	2400~2483.5

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. DTS Spectrum Setting:
   (1) Set RBW = 100 kHz.
   (2) Set the video bandwidth (VBW) ≥ 3 RBW.
   (3) Detector = Peak.
   (4) Trace mode = Max hold.
   (5) Sweep = Auto couple.
   OCB Spectrum Setting:
   (1) Set RBW = 1% ~ 5% occupied bandwidth.
   (2) Set the video bandwidth (VBW) ≥ 3 RBW.
   (3) Detector = Peak.
   (4) Trace mode = Max hold.
   (5) Sweep = Auto couple.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

Test Mode

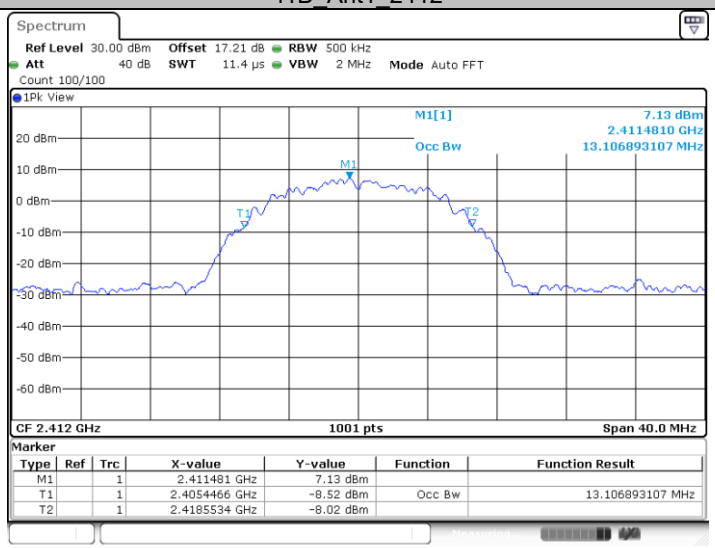
Please refer to the clause 2.4.

Test Result

Test Mode	Channel Frequency[MHz]	OCB [MHz]	DTS BW [MHz]	Limit[MHz]	Verdict
11B	2412	13.107	9.60	≥0.5	PASS
	2437	13.147	9.32		
	2462	13.027	7.76		
11G	2412	16.743	16.32		
	2437	16.863	16.52		
	2462	16.783	16.56		
11N20SISO	2412	17.542	17.52		
	2437	17.502	16.92		
	2462	17.502	17.40		
11N40SISO	2422	36.284	35.44		
	2437	36.044	34.48		
	2452	36.204	35.04		

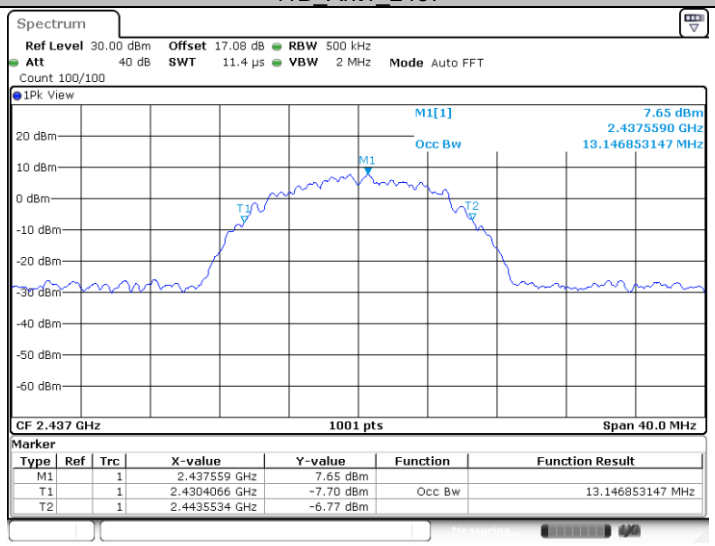
99% Bandwidth:

11B_Ant1_2412



Date: 17.APR.2025 16:25:54

11B_Ant1_2437



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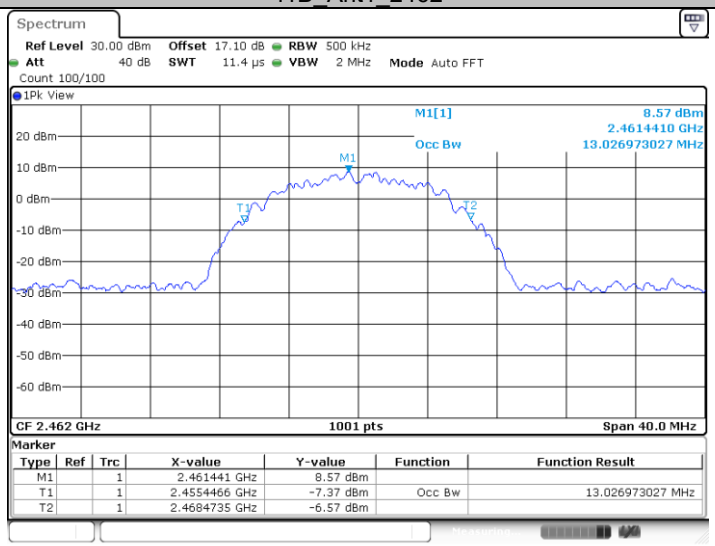
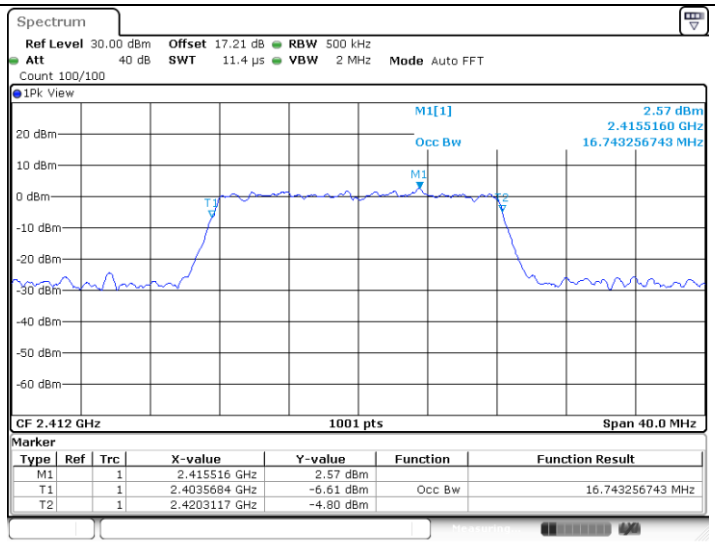
11B_Ant1_2462



Date: 17.APR.2025 16:33:58

11G_Ant1_2412



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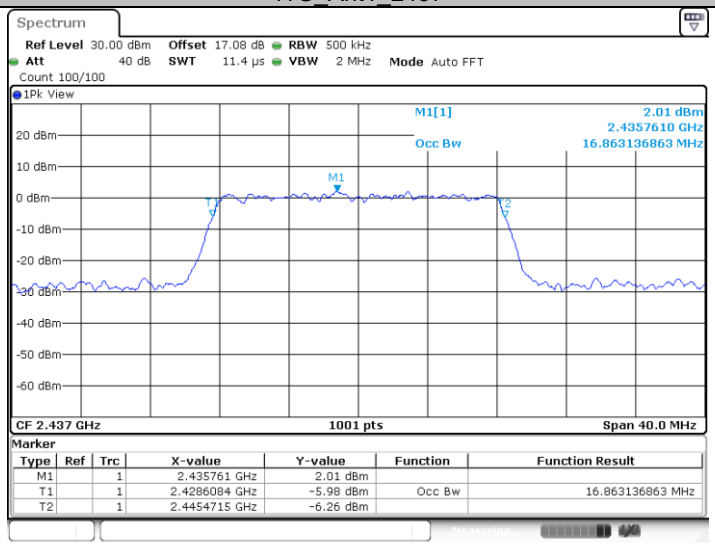

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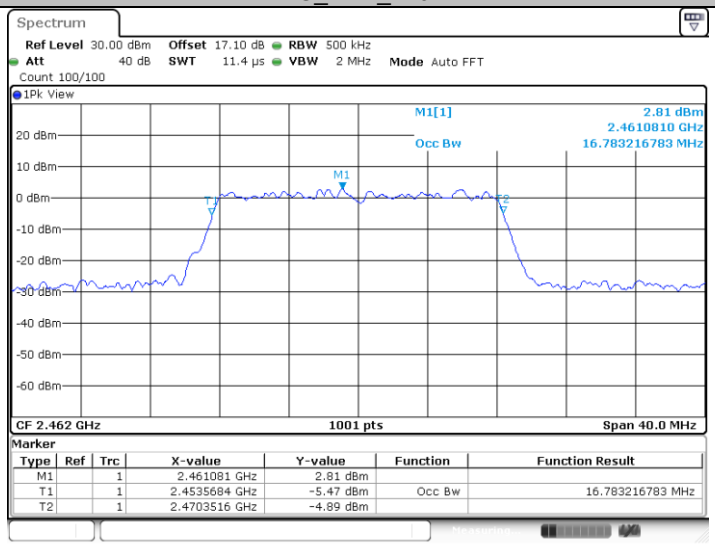
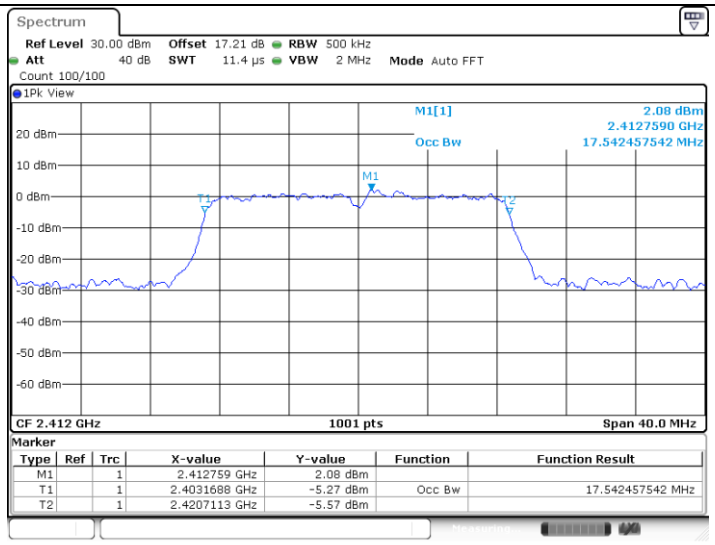


11N20SISO_Ant1_2412



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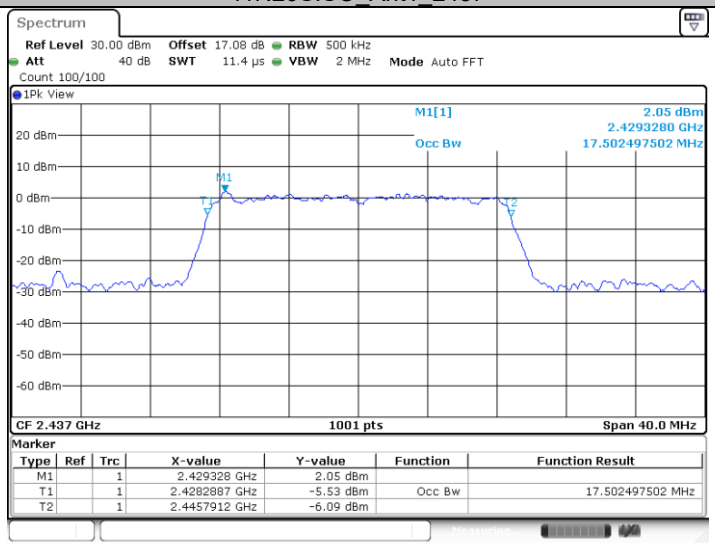
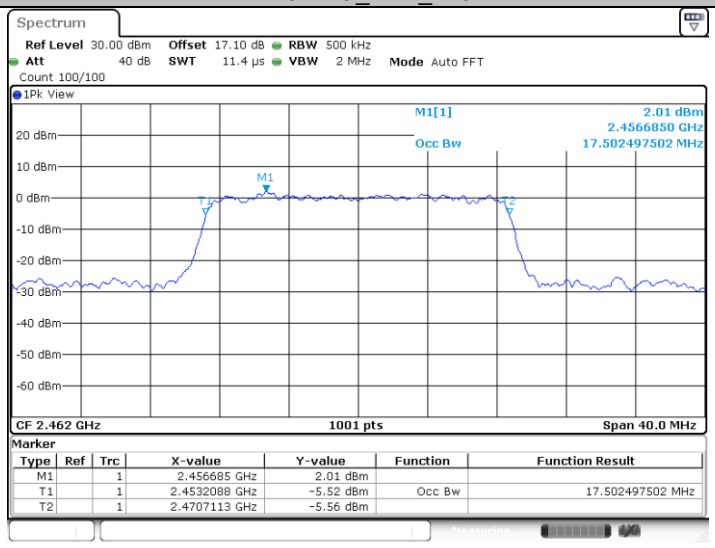


11N20SISO_Ant1_2462



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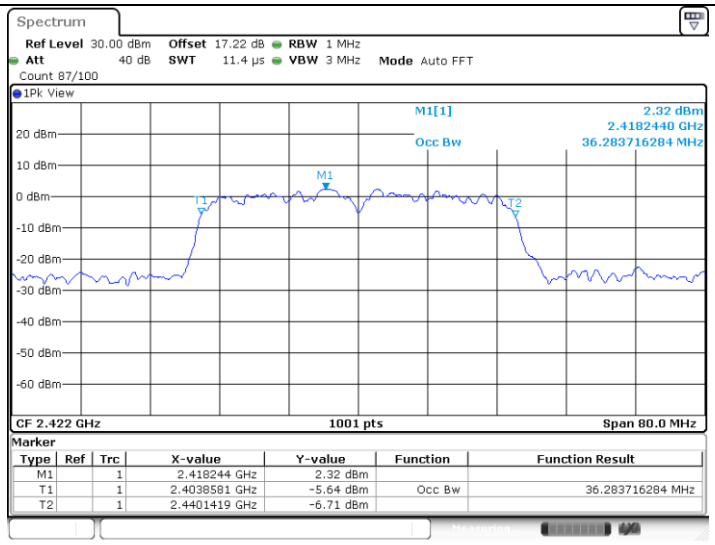

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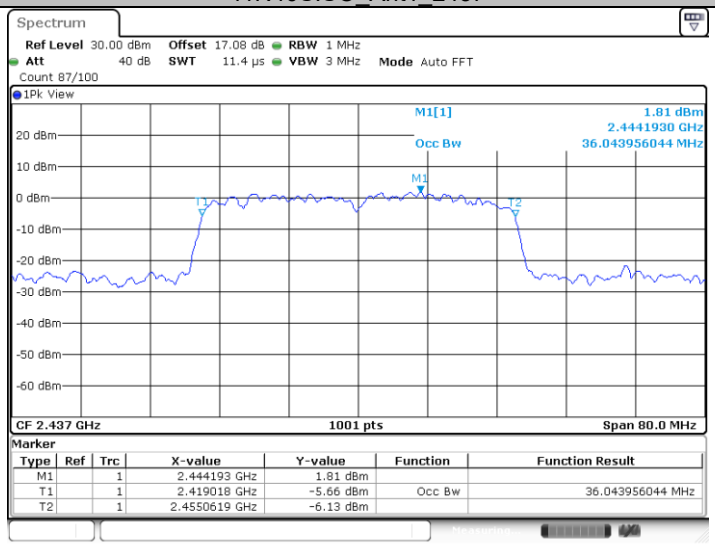

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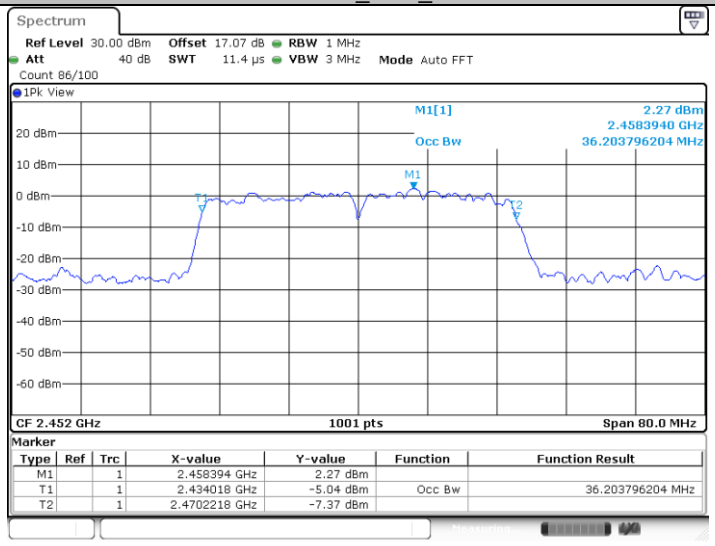
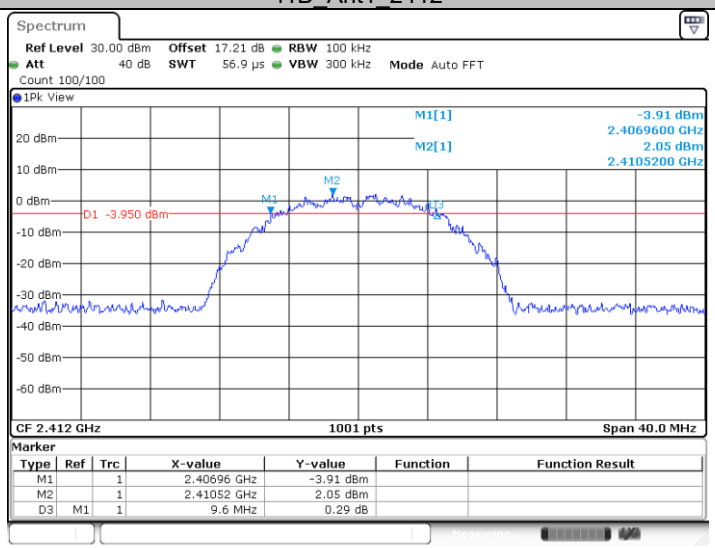


DTS Bandwidth:

11B_Ant1_2412



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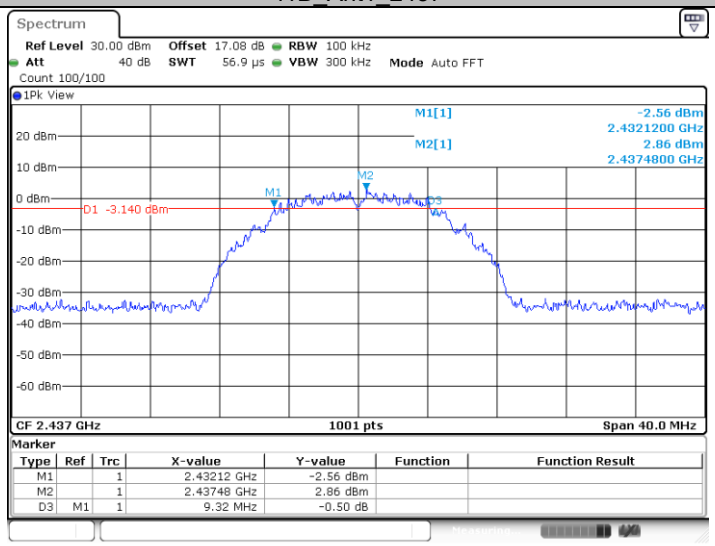

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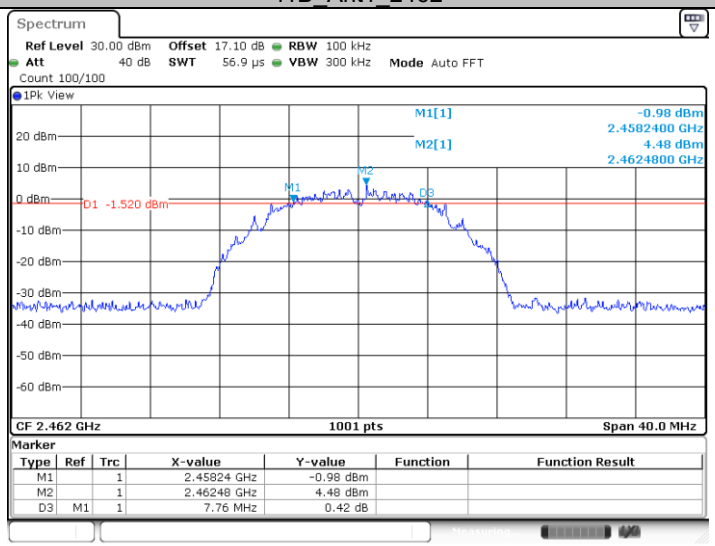

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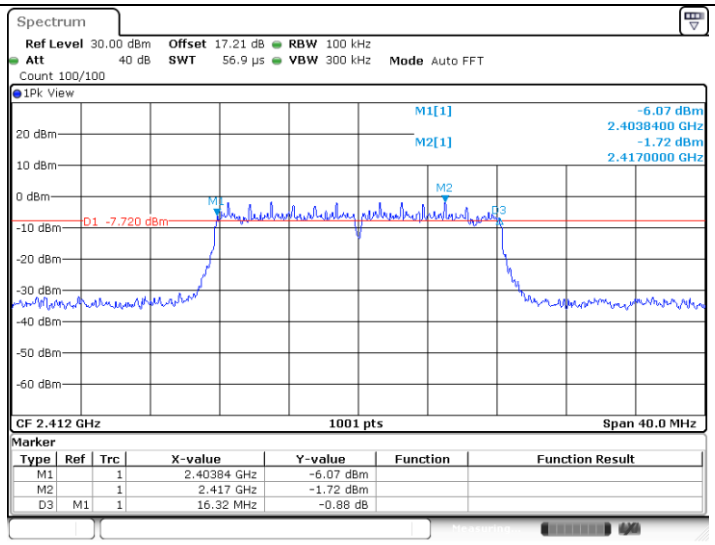

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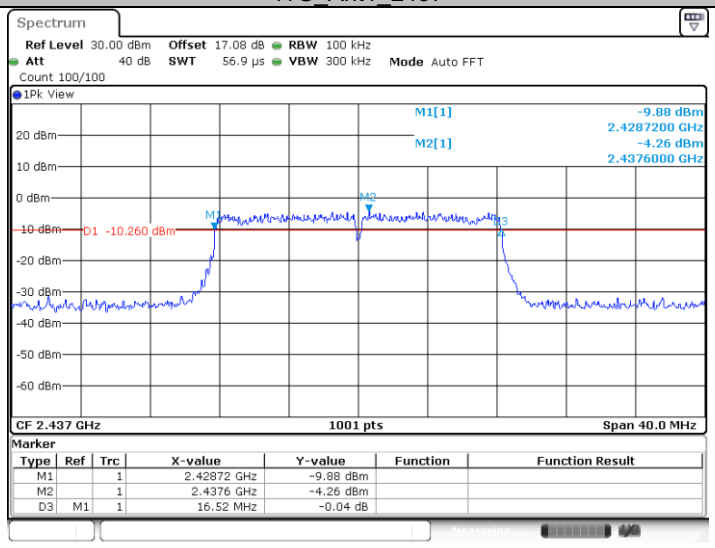

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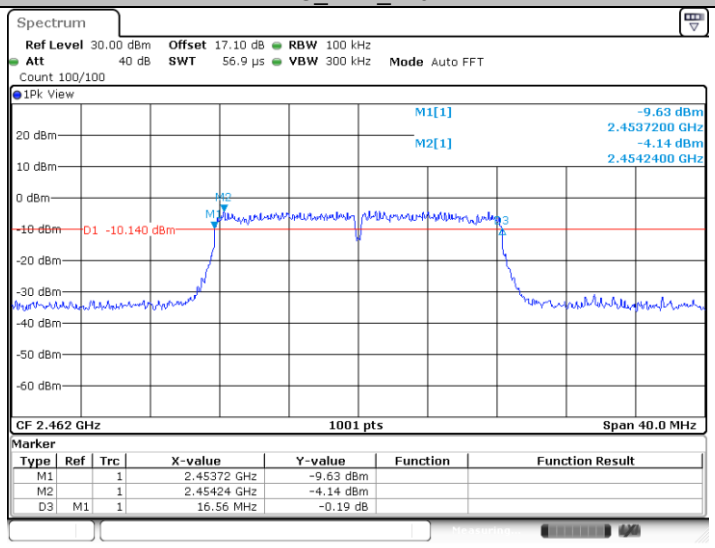

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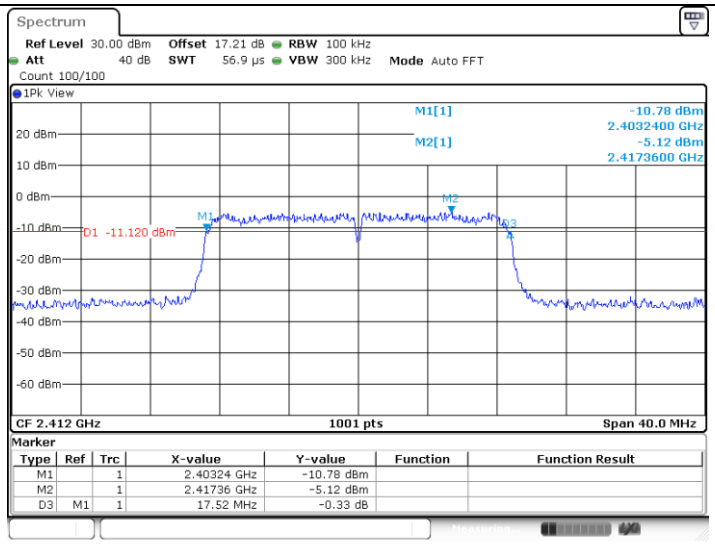

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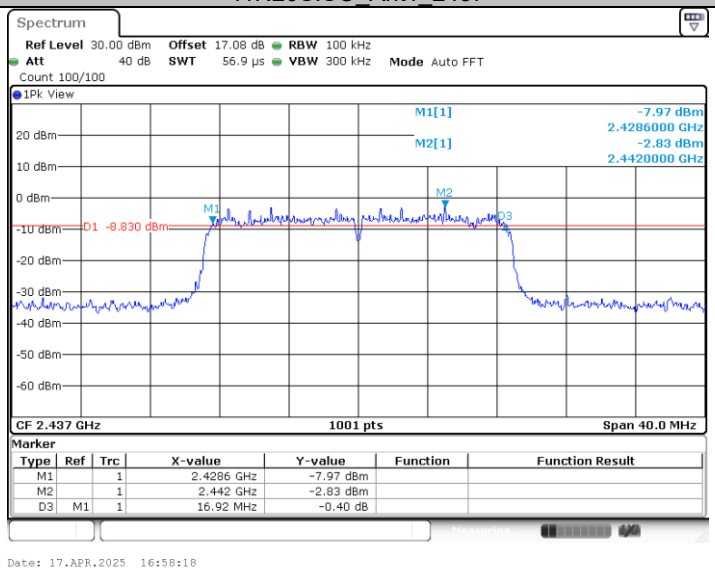

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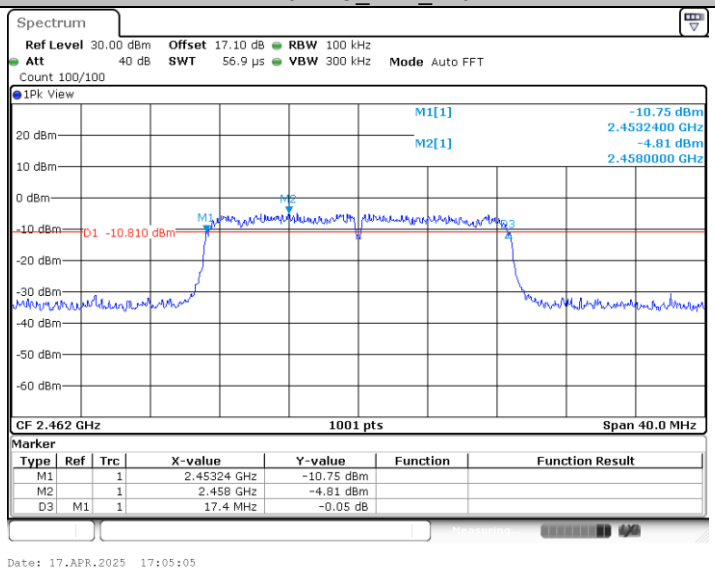

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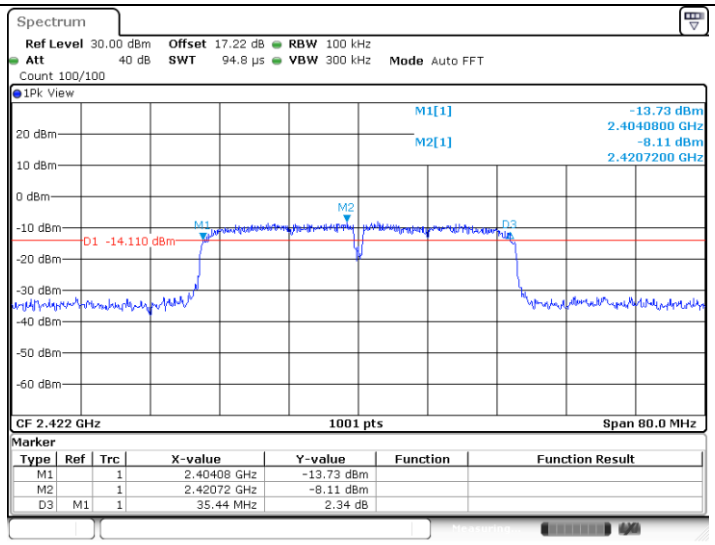

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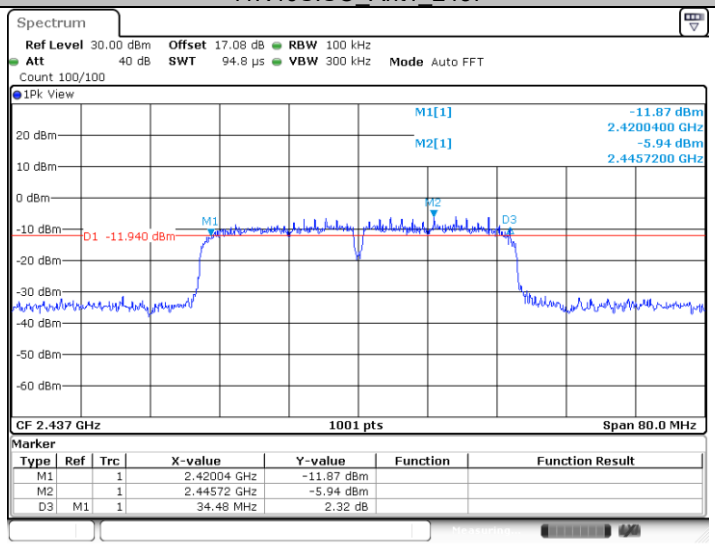

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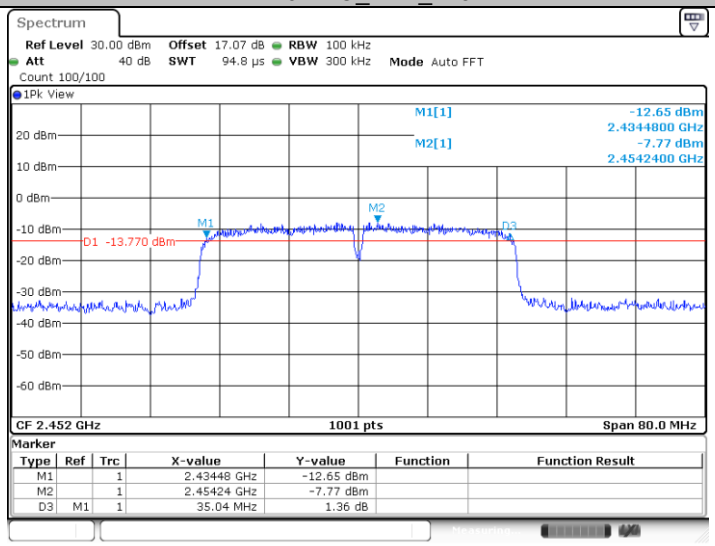


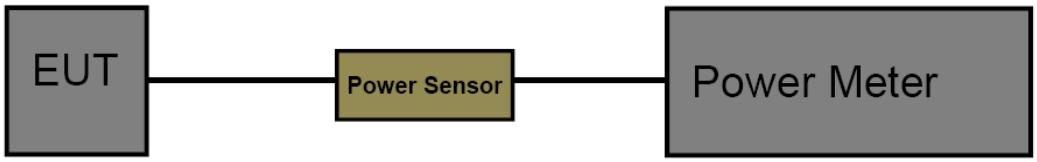
3.6. Peak Output Power

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3) / RSS-247 5.4 d

Section	Test Item	Limit	Frequency Range (MHz)
FCC CFR 47 Part15.247 (b)(3)	Maximum Conducted Output Power	1 Watt or 30dBm	2400~2483.5
ISED RSS-247 5.4 d	Maximum Conducted Output Power	1 Watt or 30dBm	2400~2483.5
	EIRP	4 Watt or 36dBm	2400~2483.5

Test Configuration



Test Procedure

1. The maximum conducted output power may be measured using a broadband RF power meter.
2. Power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor.
3. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.
4. Record the measurement data.

Test Mode

Please refer to the clause 2.4.

Test Result

Test Mode	Frequency [MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
11B	2412	17.53	≤30.00	21.69	≤36.00	PASS
	2437	17.66	≤30.00	21.82	≤36.00	PASS
	2462	17.83	≤30.00	21.99	≤36.00	PASS
11G	2412	16.85	≤30.00	21.01	≤36.00	PASS
	2437	16.84	≤30.00	21.00	≤36.00	PASS
	2462	17.12	≤30.00	21.28	≤36.00	PASS
11N20SISO	2412	16.52	≤30.00	20.68	≤36.00	PASS
	2437	16.37	≤30.00	20.53	≤36.00	PASS
	2462	16.44	≤30.00	20.60	≤36.00	PASS
11N40SISO	2422	16.18	≤30.00	20.34	≤36.00	PASS
	2437	16.23	≤30.00	20.39	≤36.00	PASS
	2452	16.05	≤30.00	20.21	≤36.00	PASS

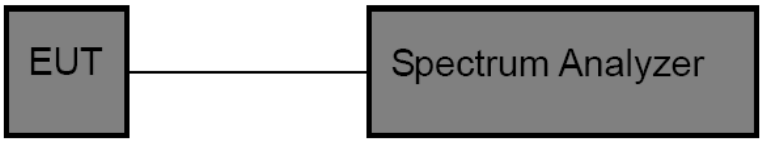
3.7. Power Spectral Density

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e) / RSS-247 5.2 b

Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	8 dBm (in any 3 kHz)	2400~2483.5

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.
3. Spectrum Setting:

Set analyzer center frequency to DTS channel center frequency.
Set span to at least 1.5 times the OBW.
Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
Set VBW ≥ [3 × RBW].
Detector = power averaging (rms) or sample detector (when rms not available).
Ensure that the number of measurement points in the sweep ≥ [2 × span / RBW].
Sweep time = auto couple.
Employ trace averaging (rms) mode over a minimum of 100 traces.
Use the peak marker function to determine the maximum amplitude level.
If the measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

Test Mode

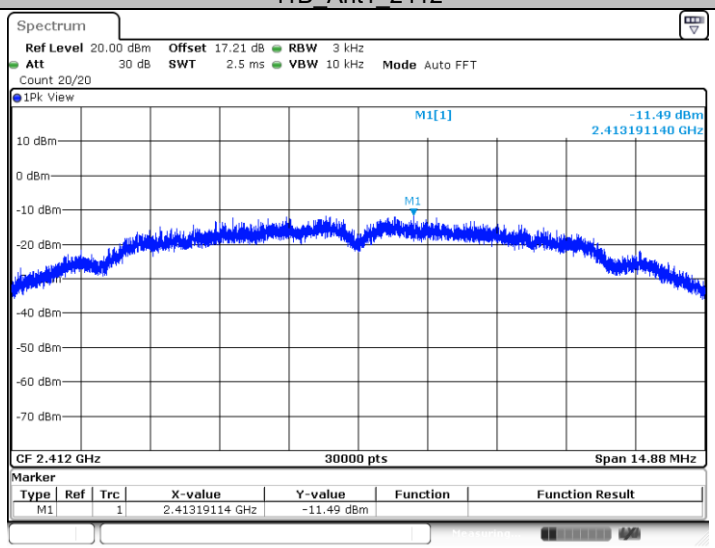
Please refer to the clause 2.4.

Test Result

Test Mode	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	2412	-11.49	≤8.00	PASS
	2437	-11.30	≤8.00	PASS
	2462	-10.87	≤8.00	PASS
11G	2412	-15.21	≤8.00	PASS
	2437	-15.75	≤8.00	PASS
	2462	-15.40	≤8.00	PASS
11N20SISO	2412	-15.05	≤8.00	PASS
	2437	-16.22	≤8.00	PASS
	2462	-15.05	≤8.00	PASS
11N40SISO	2422	-18.42	≤8.00	PASS
	2437	-18.56	≤8.00	PASS
	2452	-18.25	≤8.00	PASS

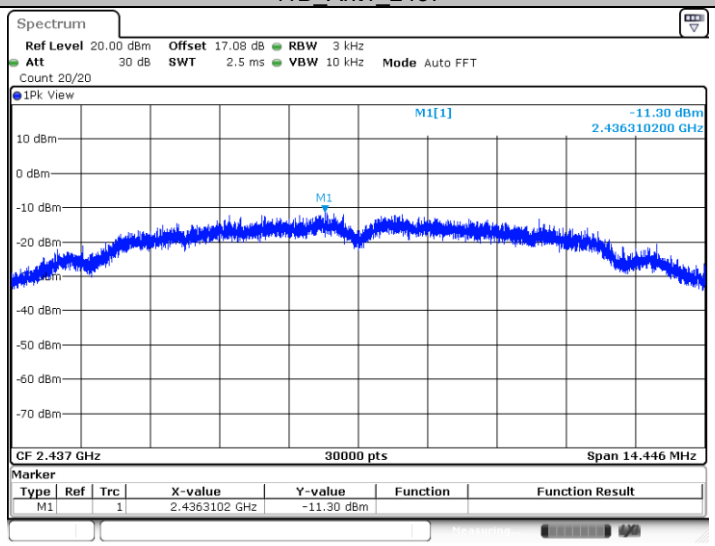
Test Graphs

11B_Ant1_2412



Date: 17.APR.2025 16:26:15

11B_Ant1_2437



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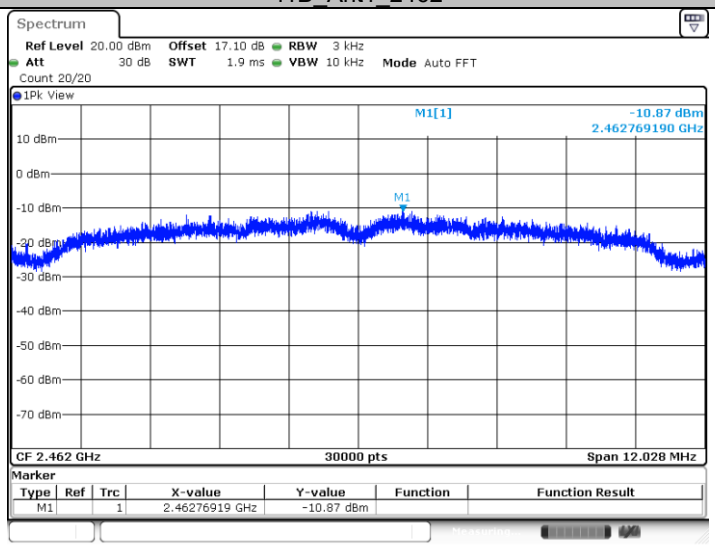
11B_Ant1_2462



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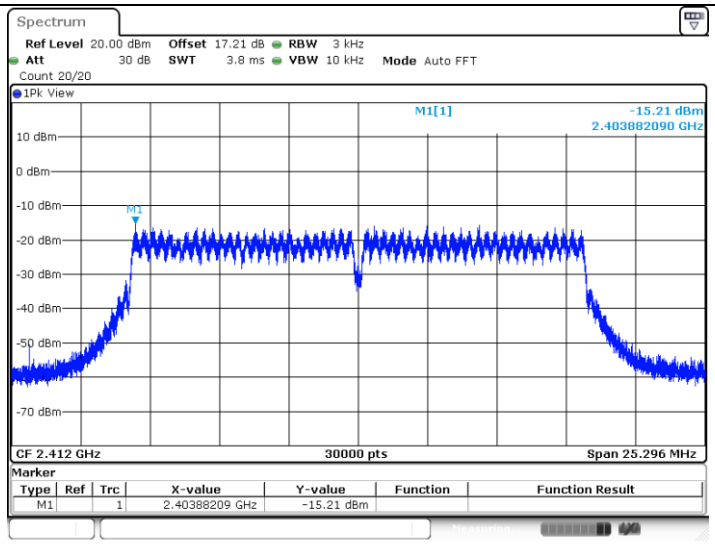

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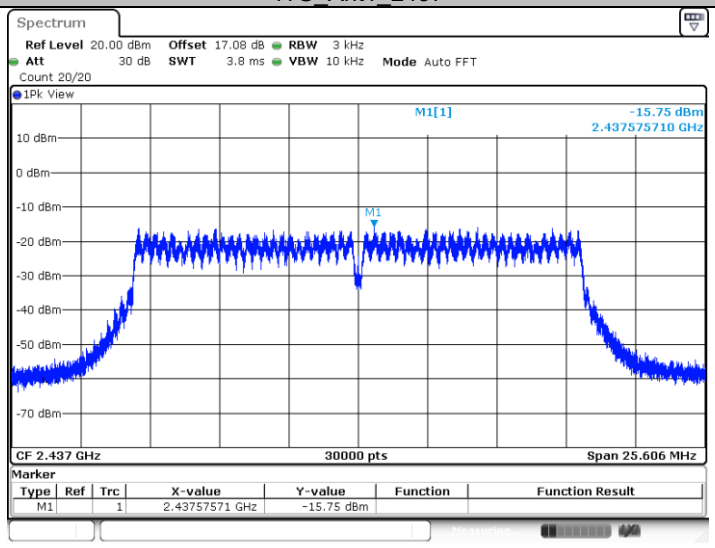
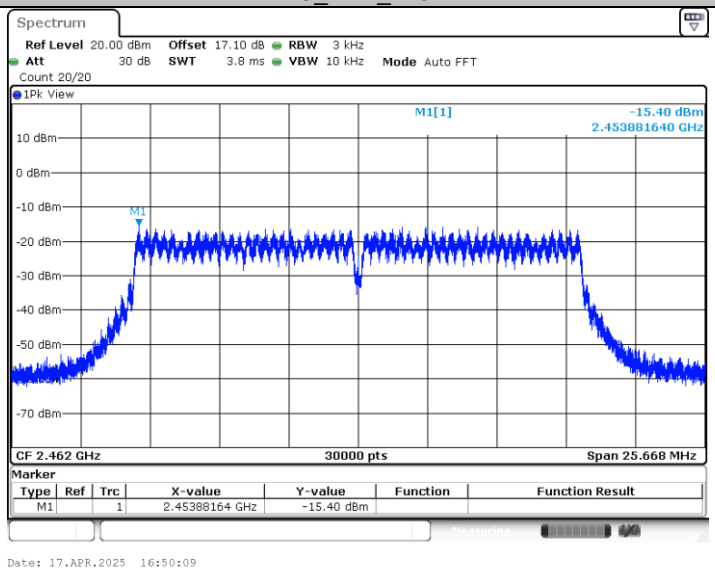


11G_Ant1_2462



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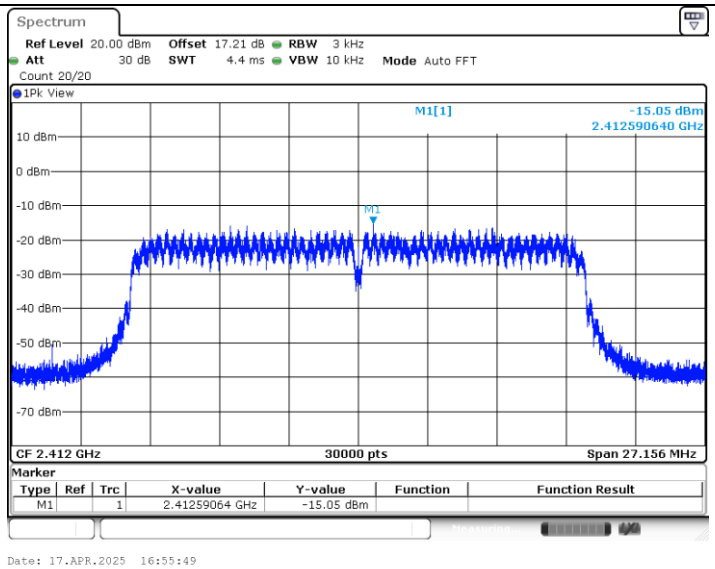

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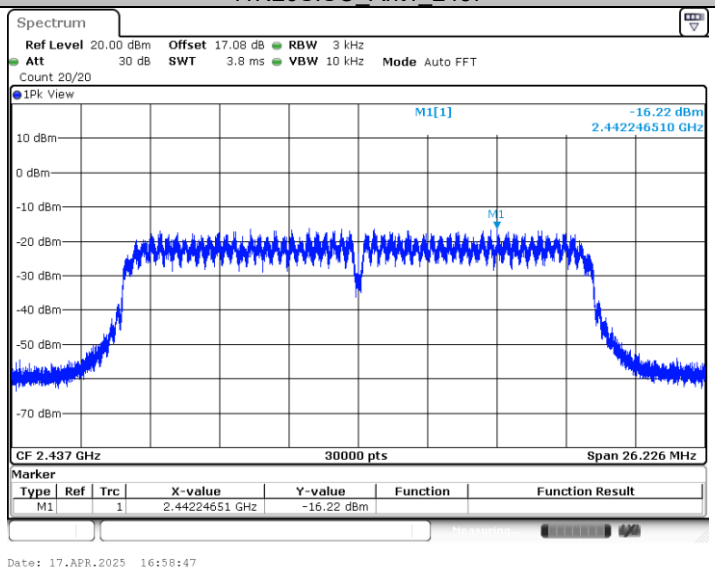

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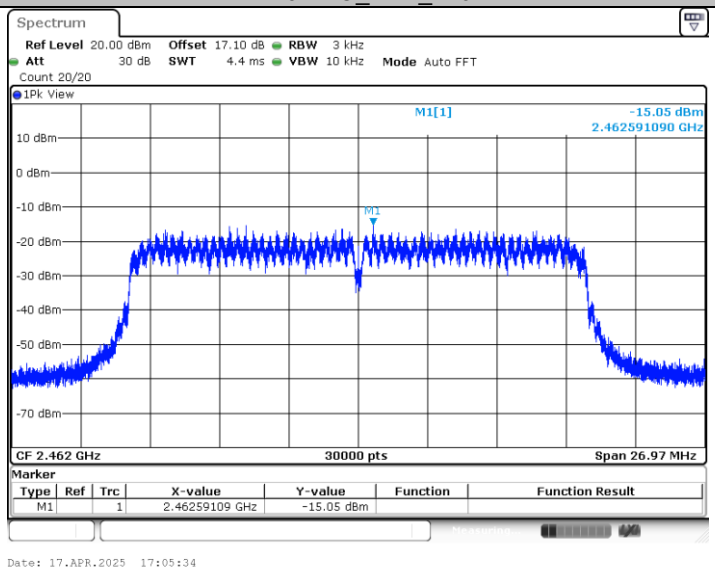
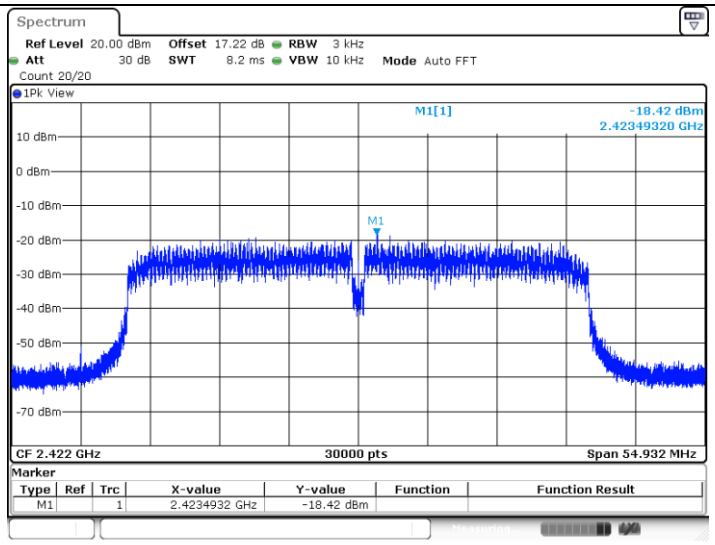
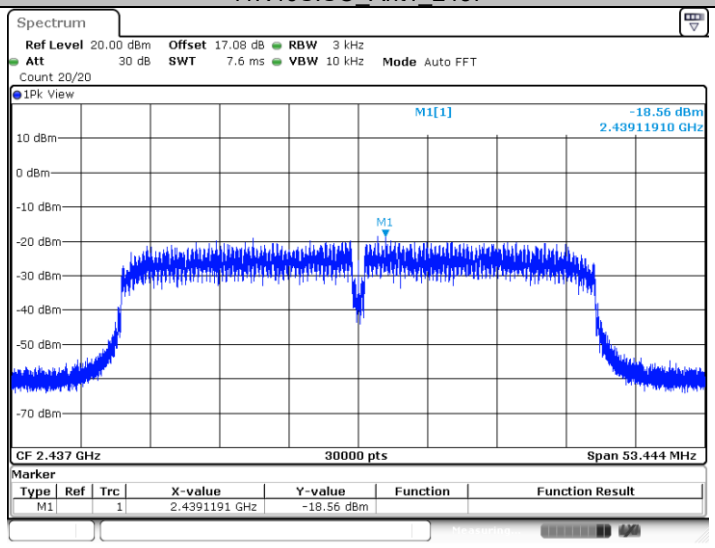


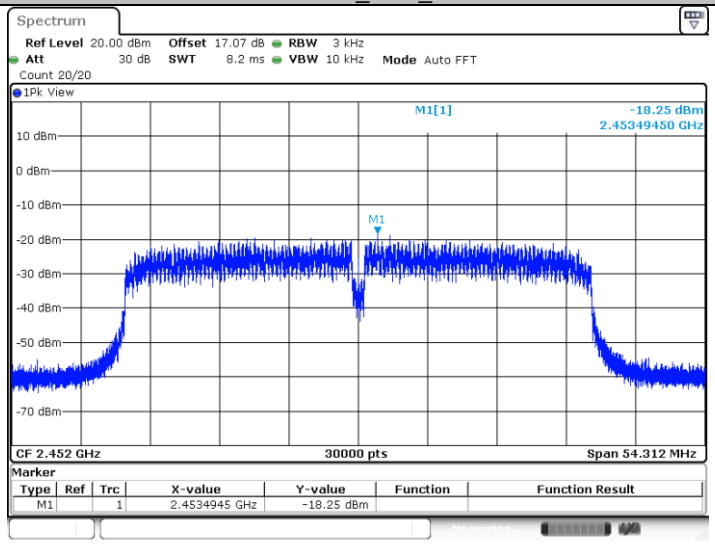
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452

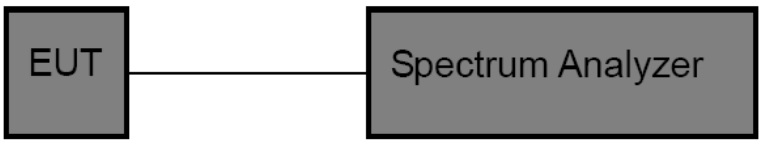


3.8. Duty Cycle

Limit

None, for report purposes only.

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.
3. Spectrum Setting:

Set analyzer center frequency to test channel center frequency.
Set the span to 0Hz.
Set the RBW to 10MHz.
Set the VBW to 10MHz.
Detector: Peak.
Sweep time: Auto.
Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

Test Mode

Please refer to the clause 2.4.

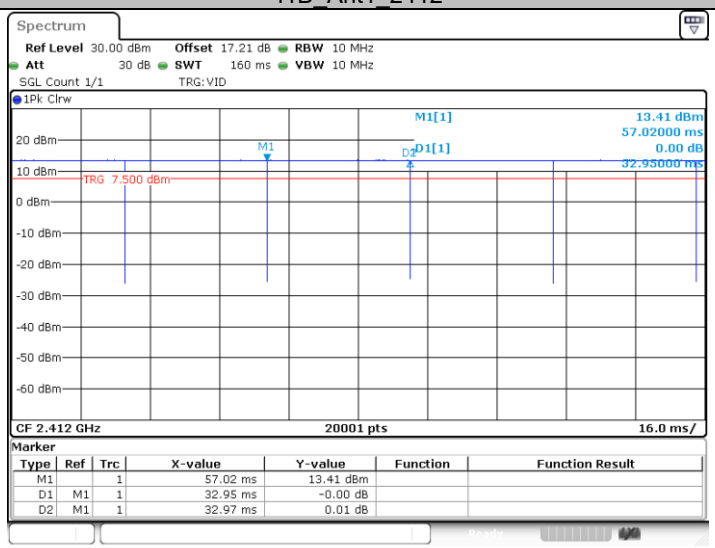
Test Result

Test Mode	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle (%)	1/T Minimum VBW (kHz)	Final Setting for VBW (kHz)
11B	2412	32.95	32.97	99.94	/	0.01
	2437	32.95	32.97	99.94	/	0.01
	2462	32.95	32.97	99.94	/	0.01
11G	2412	5.48	5.51	99.46	/	0.01
	2437	5.49	5.51	99.64	/	0.01
	2462	5.48	5.51	99.46	/	0.01
11N20SISO	2412	5.08	5.10	99.61	/	0.01
	2437	5.08	5.11	99.41	/	0.01
	2462	5.08	5.11	99.41	/	0.01
11N40SISO	2422	2.47	2.52	98.02	/	0.01
	2437	2.46	2.49	98.80	/	0.01
	2452	2.46	2.49	98.80	/	0.01

Note: Duty Cycle>98%, Final Setting for VBW=10Hz.

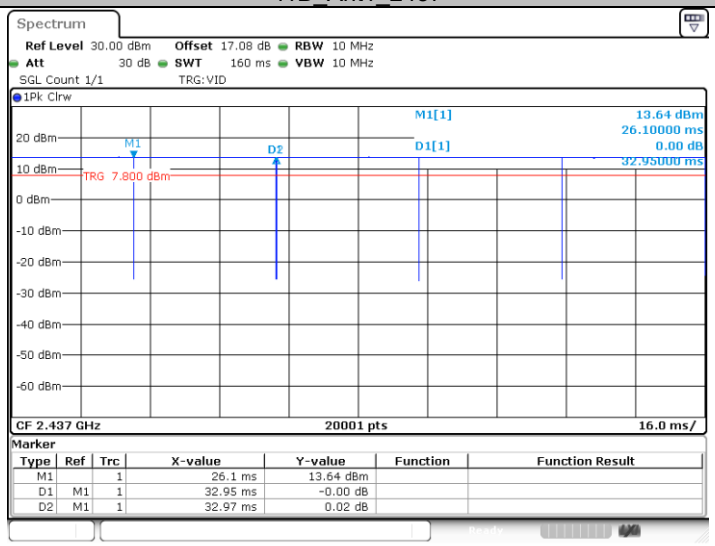
Test Graphs:

11B_Ant1_2412



Date: 17.APR.2025 16:25:36

11B_Ant1_2437



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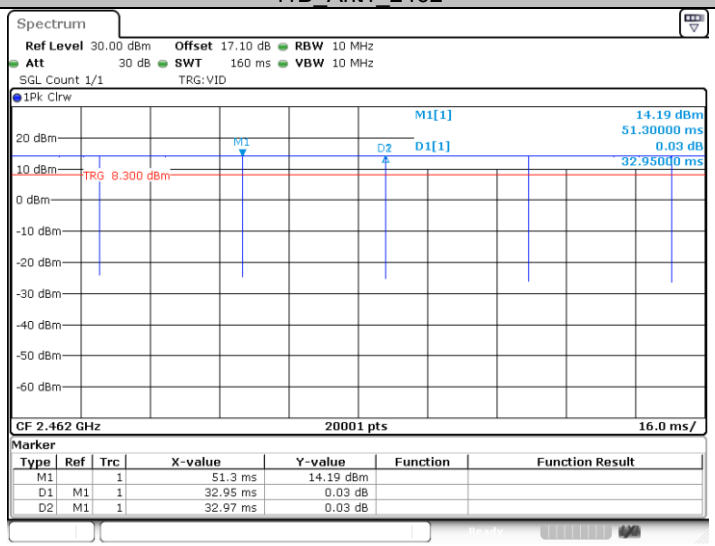
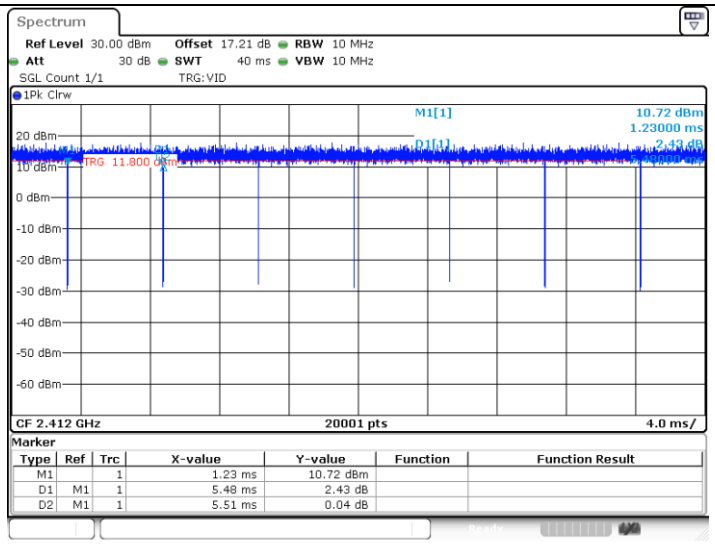
11B_Ant1_2462



Date: 17.APR.2025 16:33:40

11G_Ant1_2412



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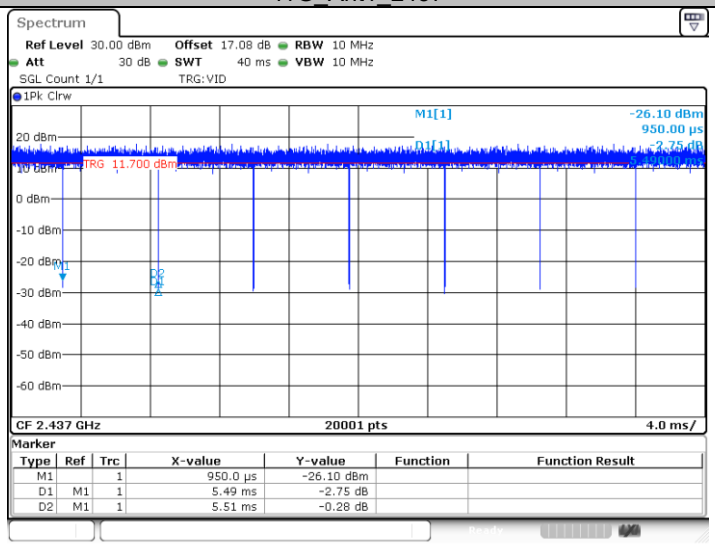

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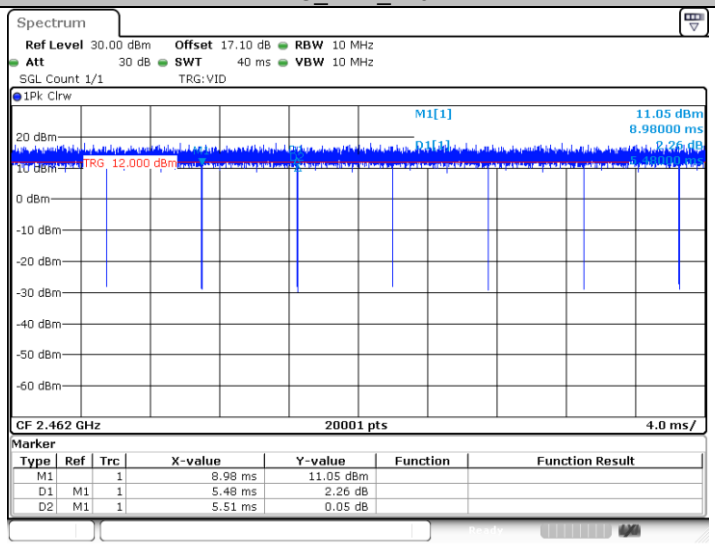

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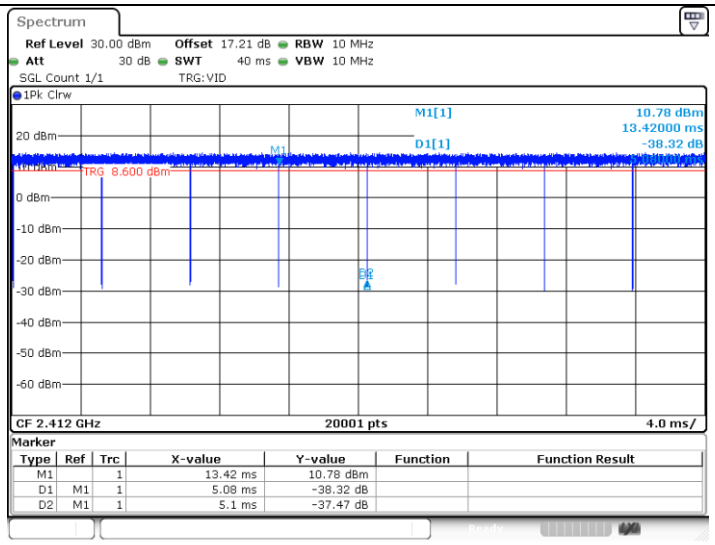

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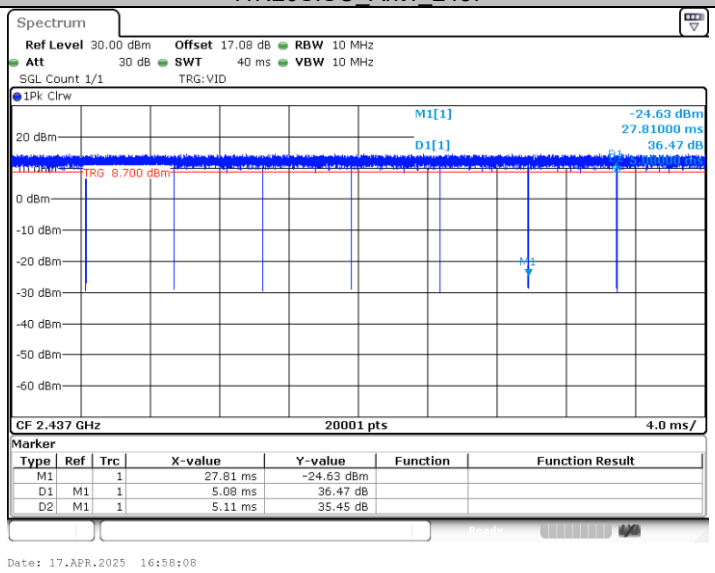

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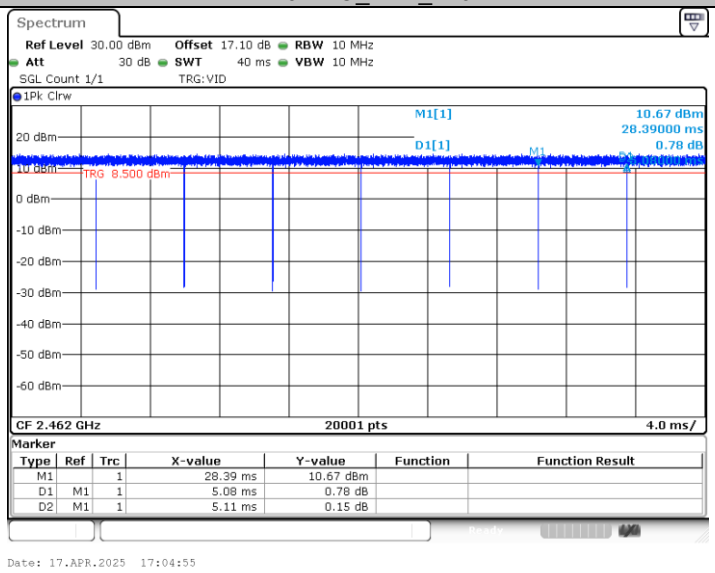

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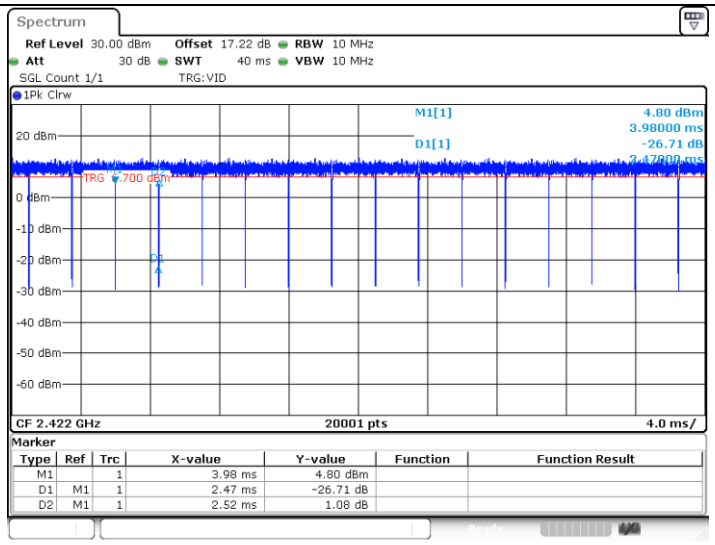
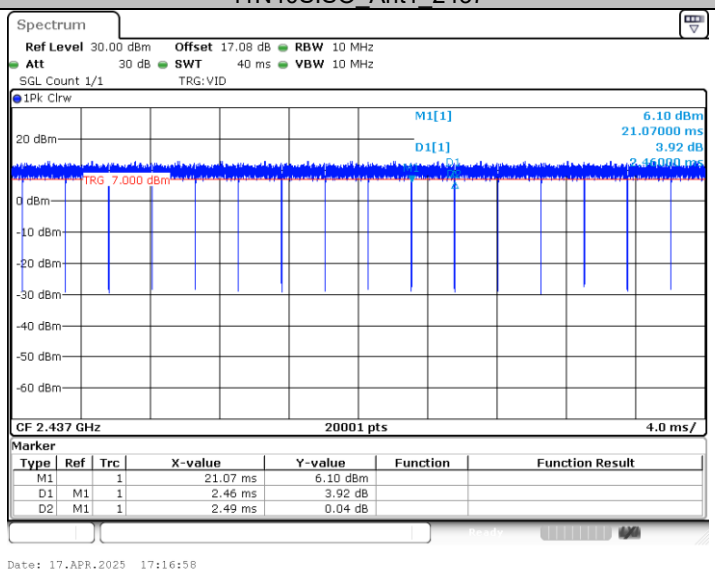
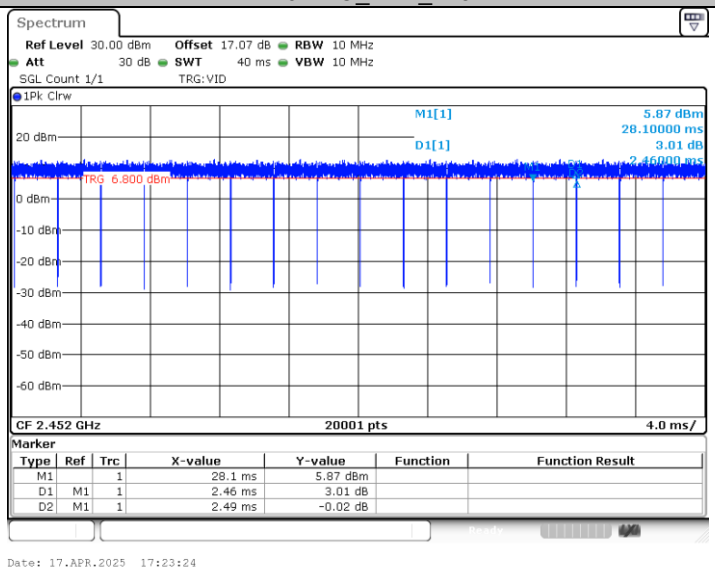


11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



3.9. Antenna Requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C Section 15.203
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of 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.
FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i)
(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

Test Result

The directional gain of the antenna is less than 6dBi, please refer to the EUT internal photographs antenna photo.

RSS-Gen Issue 5 Section 6.8
The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power(e.i.r.p.) limits specified in the applicable standard (RSS) for licence-exempt apparatus.

Result

PASS.
The EUT has 1 antenna: a PCB Antenna for 2.4G WIFI.
Note: ☒Antenna use a permanently attached antenna which is not replaceable.
☐Not using a standard antenna jack or electrical connector for antenna replacement.
☐The antenna has to be professionally installed (please provide method of installation).
Which in accordance to RSS-Gen 6.8, please refer to the internal photos.

**********THE END OF REPORT**********