

Mode: IEEE 802.11g ANT1
 Highest Frequency (2462MHz)
 Environment:21.5℃/65%RH/101.0kPa
 Tested By:Zhang Zishan

Date: 2023-05-20
 Voltage:DC 12V

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18430.525	52.28	34.60	-17.68	83.54	48.94	100	154	Horizontal
2	19133.475	52.10	35.18	-16.92	83.54	48.36	200	92	Horizontal
3	20033.2	50.94	34.44	-16.50	83.54	49.10	200	29	Horizontal
4	21260.6	49.58	33.74	-15.84	83.54	49.80	200	297	Horizontal
5	23347.35	50.63	35.71	-14.92	83.54	47.83	100	29	Horizontal
6	25107.7	47.00	33.10	-13.90	83.54	50.44	100	346	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18468.35	51.89	34.29	-17.60	83.54	49.25	100	125	Vertical
2	20146.675	51.06	34.34	-16.72	83.54	49.20	200	16	Vertical
3	21256.35	49.39	33.34	-16.05	83.54	50.20	200	344	Vertical
4	23348.2	50.10	35.22	-14.88	83.54	48.32	200	46	Vertical
5	25039.275	46.82	32.85	-13.97	83.54	50.69	200	344	Vertical
6	25946.225	47.52	33.13	-14.39	83.54	50.41	100	297	Vertical

Note: The pre measurement result margin is greater than 20dB, and final measurement is not required

----- The following blanks -----

Mode: IEEE 802.11g ANT2
 Lowest Frequency (2412MHz)
 Environment:21.5℃/65%RH/101.0kPa
 Tested By:Zhang Zishan

Date: 2023-05-20
 Voltage:DC 12V

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18660.025	51.63	34.25	-17.38	83.54	49.29	100	234	Horizontal
2	20120.325	51.60	35.07	-16.53	83.54	48.47	200	346	Horizontal
3	22754.9	48.79	34.01	-14.78	83.54	49.53	200	0	Horizontal
4	23347.775	50.16	35.24	-14.92	83.54	48.30	100	329	Horizontal
5	24457.025	47.11	32.87	-14.24	83.54	50.67	100	123	Horizontal
6	26020.6	47.64	33.21	-14.43	83.54	50.33	100	219	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18498.525	51.56	34.02	-17.54	83.54	49.52	200	312	Vertical
2	20621.825	50.85	34.32	-16.53	83.54	49.22	100	218	Vertical
3	21489.25	49.53	33.68	-15.85	83.54	49.86	100	204	Vertical
4	23348.2	51.03	36.15	-14.88	83.54	47.39	200	46	Vertical
5	24652.1	47.53	33.45	-14.08	83.54	50.09	100	46	Vertical
6	25625.35	47.11	33.00	-14.11	83.54	50.54	200	188	Vertical

Note: The pre measurement result margin is greater than 20dB, and final measurement is not required

----- The following blanks -----

Mode: IEEE 802.11g ANT2
Middle Frequency (2437MHz)
Environment: 21.5°C/65%RH/101.0kPa
Tested By: Zhang Zishan

Date: 2023-05-20
Voltage: DC 12V

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18970.275	52.41	35.42	-16.99	83.54	48.12	200	61	Horizontal
2	19613.725	52.16	35.36	-16.80	83.54	48.18	200	187	Horizontal
3	21202.375	50.15	34.26	-15.89	83.54	49.28	200	172	Horizontal
4	23347.775	49.65	34.73	-14.92	83.54	48.81	200	30	Horizontal
5	24760.475	47.07	33.09	-13.98	83.54	50.45	100	155	Horizontal
6	25171.025	46.72	32.78	-13.94	83.54	50.76	200	282	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18964.75	52.17	35.10	-17.07	83.54	48.44	200	283	Vertical
2	19783.725	51.95	35.05	-16.90	83.54	48.49	200	251	Vertical
3	21052.35	50.99	34.86	-16.13	83.54	48.68	200	172	Vertical
4	23064.3	49.17	34.42	-14.75	83.54	49.12	100	204	Vertical
5	23347.775	50.19	35.31	-14.88	83.54	48.23	200	32	Vertical
6	25066.9	47.08	33.08	-14.00	83.54	50.46	200	189	Vertical

Note: The pre measurement result margin is greater than 20dB, and final measurement is not required

----- The following blanks -----

Mode: IEEE 802.11g ANT2
Highest Frequency (2462MHz)
Environment:21.5℃/65%RH/101.0kPa
Tested By:Zhang Zishan

Date: 2023-05-20
Voltage:DC 12V

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18969.85	53.52	36.53	-16.99	83.54	47.01	100	57	Horizontal
2	21074.875	50.84	34.85	-15.99	83.54	48.69	100	281	Horizontal
3	22728.125	47.93	33.12	-14.81	83.54	50.42	200	154	Horizontal
4	23347.35	50.85	35.93	-14.92	83.54	47.61	200	27	Horizontal
5	24358.425	47.08	32.82	-14.26	83.54	50.72	100	10	Horizontal
6	25120.45	47.05	33.14	-13.91	83.54	50.40	200	281	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18913.75	52.17	35.07	-17.10	83.54	48.47	100	16	Vertical
2	19688.525	51.94	34.98	-16.96	83.54	48.56	100	345	Vertical
3	21039.175	50.66	34.52	-16.14	83.54	49.02	200	16	Vertical
4	23347.35	50.24	35.36	-14.88	83.54	48.18	200	32	Vertical
5	24063.05	47.06	32.52	-14.54	83.54	51.02	100	359	Vertical
6	25006.55	46.68	32.73	-13.95	83.54	50.81	200	32	Vertical

Note: The pre measurement result margin is greater than 20dB, and final measurement is not required

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6. 6dB BANDWIDTH

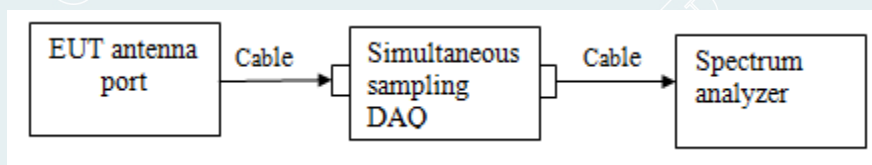
6.1 LIMITS

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.2 TEST PROCEDURES

- 1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer.
- 2) Set resolution bandwidth (RBW) = 100kHz. Set the video bandwidth (VBW) $\geq 3 \times$ RBW. Detector = Peak. Trace mode = max hold. Sweep = auto couple. Allow the trace to stabilize, record 6dB bandwidth value.
- 3) Repeat above procedures until all frequencies measured were complete.

6.3 TEST SETUP



----- The following blanks -----

6.4 TEST RESULTS

Environment: 25.8°C/62%RH/101.0kPa

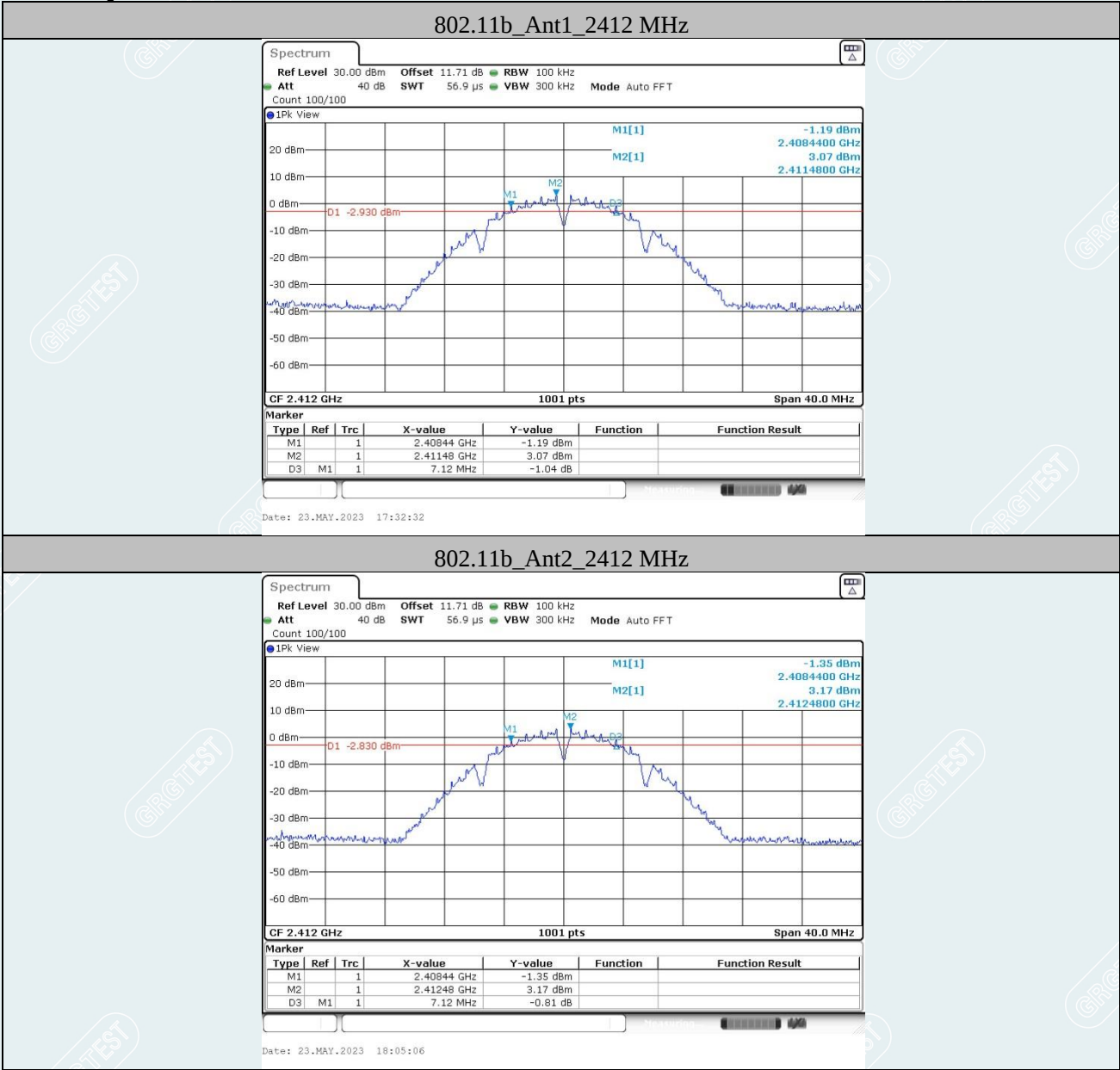
Voltage:DC 12V

Tested By:Qing Tingting

Date: 2023-05-23~2023-05-25

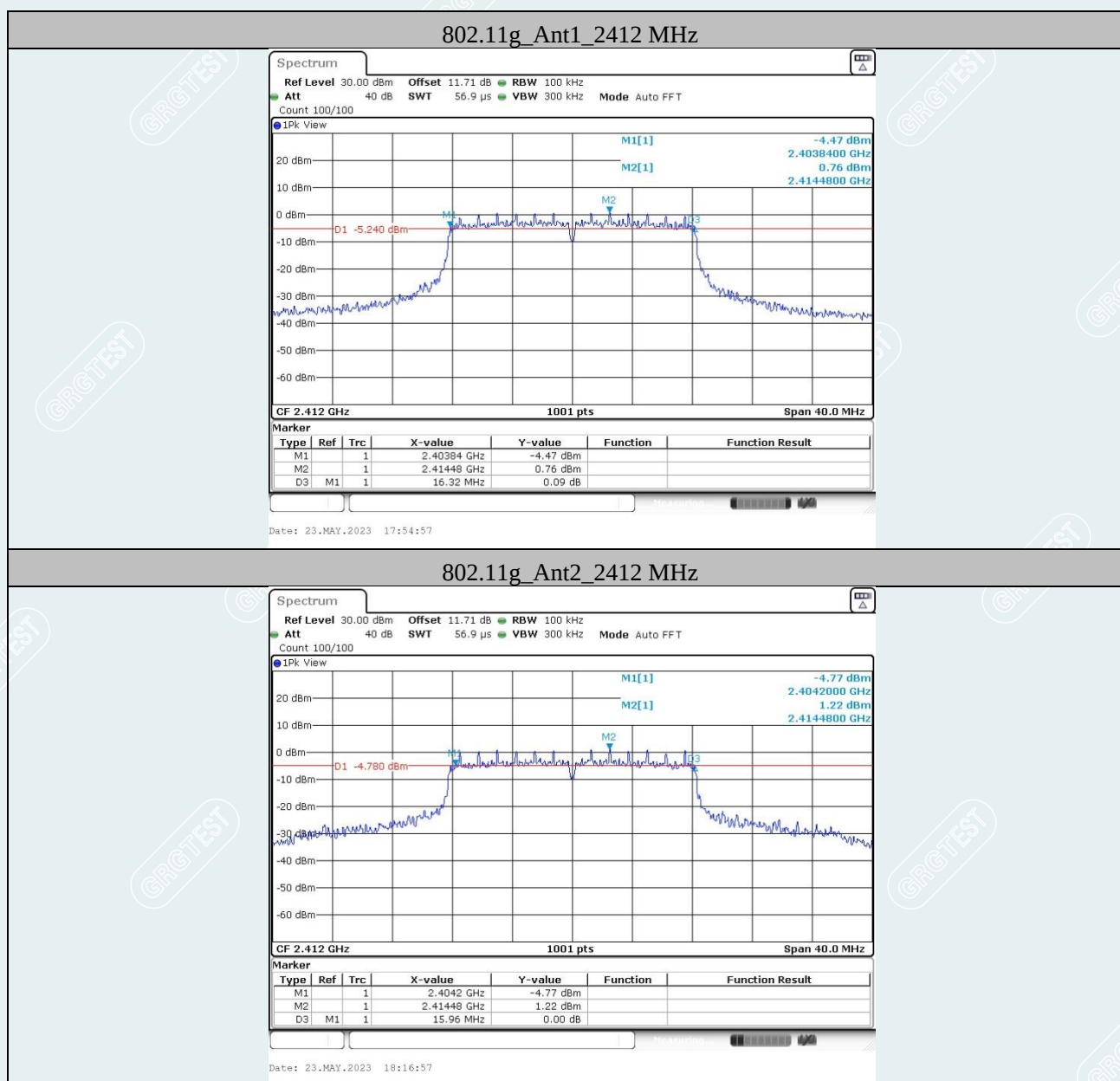
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
802.11b	Ant1	2412	7.12	2408.44	2415.56	≥ 0.5	PASS
	Ant2	2412	7.12	2408.44	2415.56	≥ 0.5	PASS
	Ant1	2437	7.12	2433.44	2440.56	≥ 0.5	PASS
	Ant2	2437	8.08	2432.96	2441.04	≥ 0.5	PASS
	Ant1	2462	7.12	2458.44	2465.56	≥ 0.5	PASS
	Ant2	2462	7.20	2458.36	2465.56	≥ 0.5	PASS
802.11g	Ant1	2412	16.32	2403.84	2420.16	≥ 0.5	PASS
	Ant2	2412	15.96	2404.20	2420.16	≥ 0.5	PASS
	Ant1	2437	16.32	2428.84	2445.16	≥ 0.5	PASS
	Ant2	2437	15.92	2429.24	2445.16	≥ 0.5	PASS
	Ant1	2462	16.32	2453.84	2470.16	≥ 0.5	PASS
	Ant2	2462	16.32	2453.84	2470.16	≥ 0.5	PASS
802.11n HT20	Ant1	2412	17.56	2403.20	2420.76	≥ 0.5	PASS
	Ant2	2412	17.56	2403.20	2420.76	≥ 0.5	PASS
	Ant1	2437	17.52	2428.24	2445.76	≥ 0.5	PASS
	Ant2	2437	17.60	2428.20	2445.80	≥ 0.5	PASS
	Ant1	2462	17.60	2453.20	2470.80	≥ 0.5	PASS
	Ant2	2462	17.60	2453.20	2470.80	≥ 0.5	PASS
802.11n HT40	Ant1	2422	36.40	2403.76	2440.16	≥ 0.5	PASS
	Ant2	2422	36.32	2403.84	2440.16	≥ 0.5	PASS
	Ant1	2437	36.40	2418.76	2455.16	≥ 0.5	PASS
	Ant2	2437	35.92	2419.24	2455.16	≥ 0.5	PASS
	Ant1	2452	36.32	2433.84	2470.16	≥ 0.5	PASS
	Ant2	2452	36.96	2433.84	2470.80	≥ 0.5	PASS
802.11ax HE20	Ant1	2412	19.00	2402.48	2421.48	≥ 0.5	PASS
	Ant2	2412	18.60	2402.68	2421.28	≥ 0.5	PASS
	Ant1	2437	18.72	2427.76	2446.48	≥ 0.5	PASS
	Ant2	2437	18.80	2427.60	2446.40	≥ 0.5	PASS
	Ant1	2462	18.60	2452.80	2471.40	≥ 0.5	PASS
	Ant2	2462	18.52	2452.72	2471.24	≥ 0.5	PASS
802.11ax HE40	Ant1	2422	38.24	2402.88	2441.12	≥ 0.5	PASS
	Ant2	2422	36.96	2404.08	2441.04	≥ 0.5	PASS
	Ant1	2437	38.08	2417.96	2456.04	≥ 0.5	PASS
	Ant2	2437	38.00	2418.04	2456.04	≥ 0.5	PASS
	Ant1	2452	38.16	2432.96	2471.12	≥ 0.5	PASS
	Ant2	2452	36.80	2434.08	2470.88	≥ 0.5	PASS

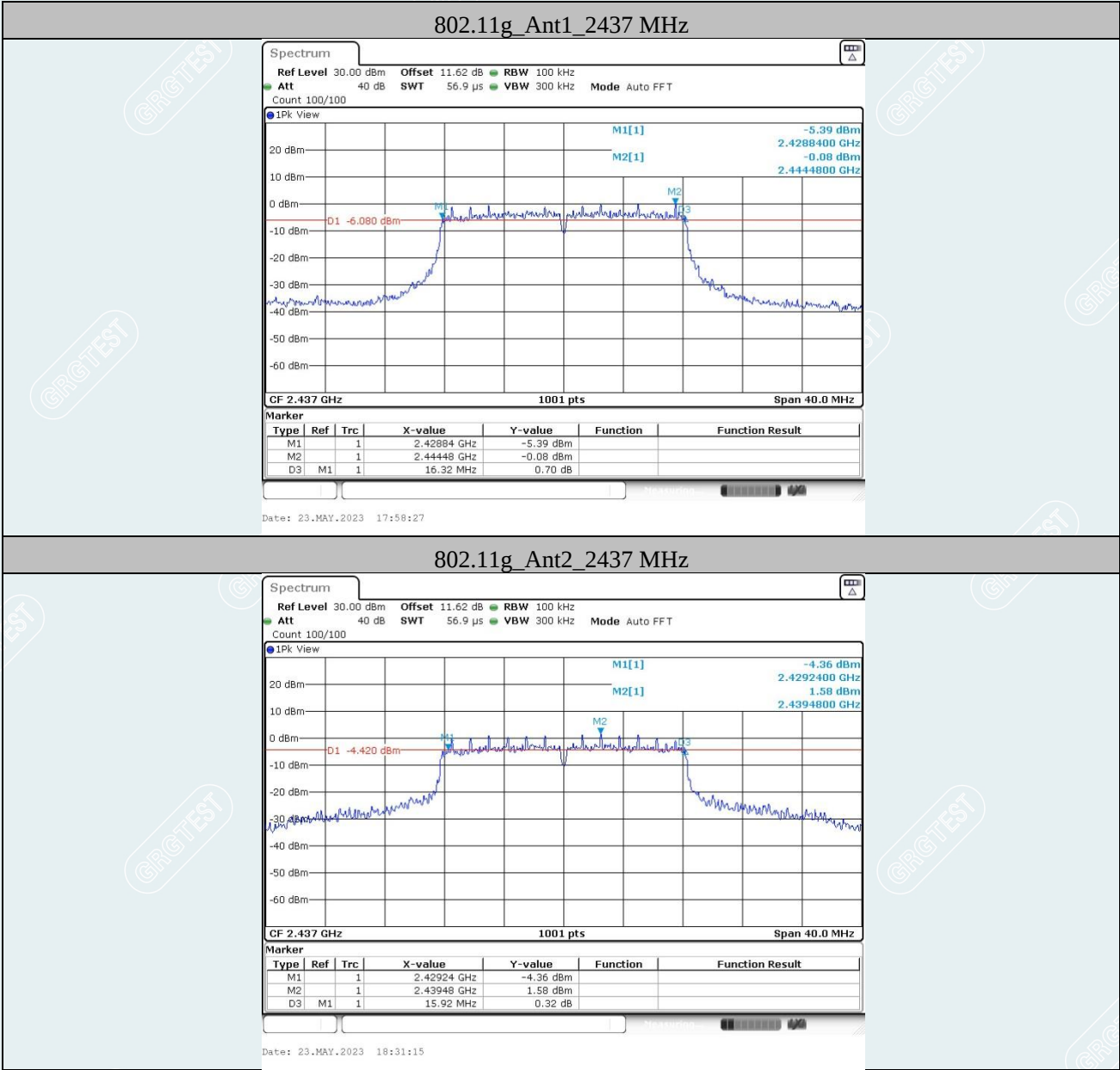
Test Graphs

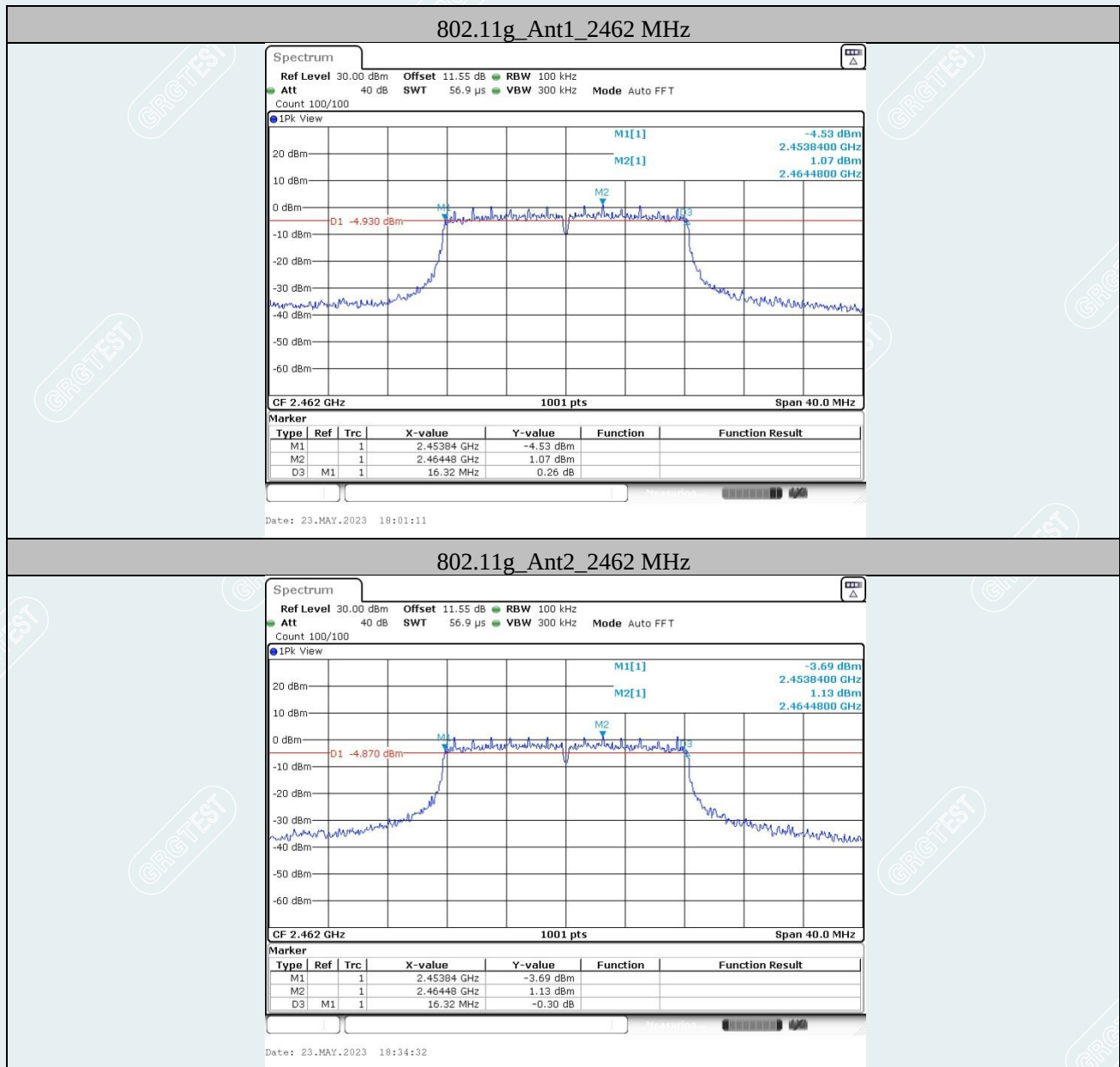




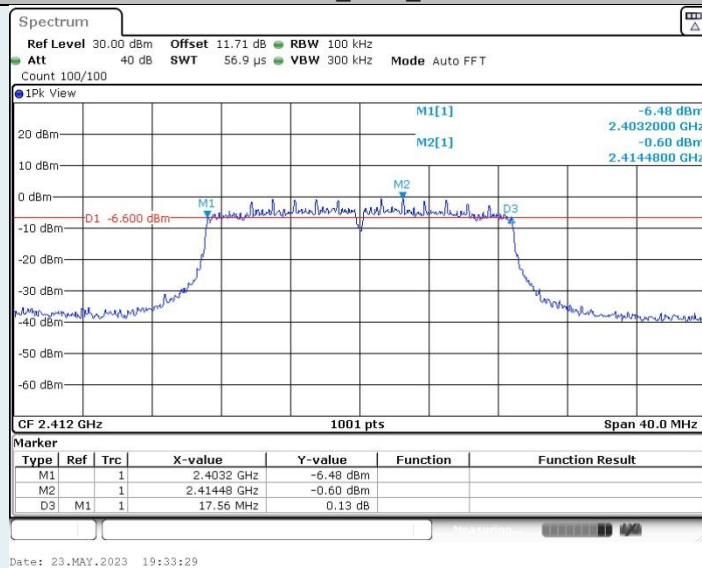




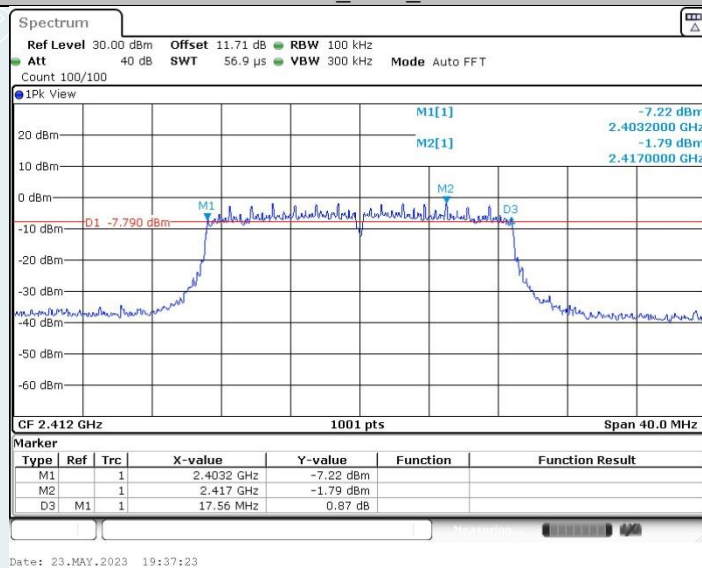


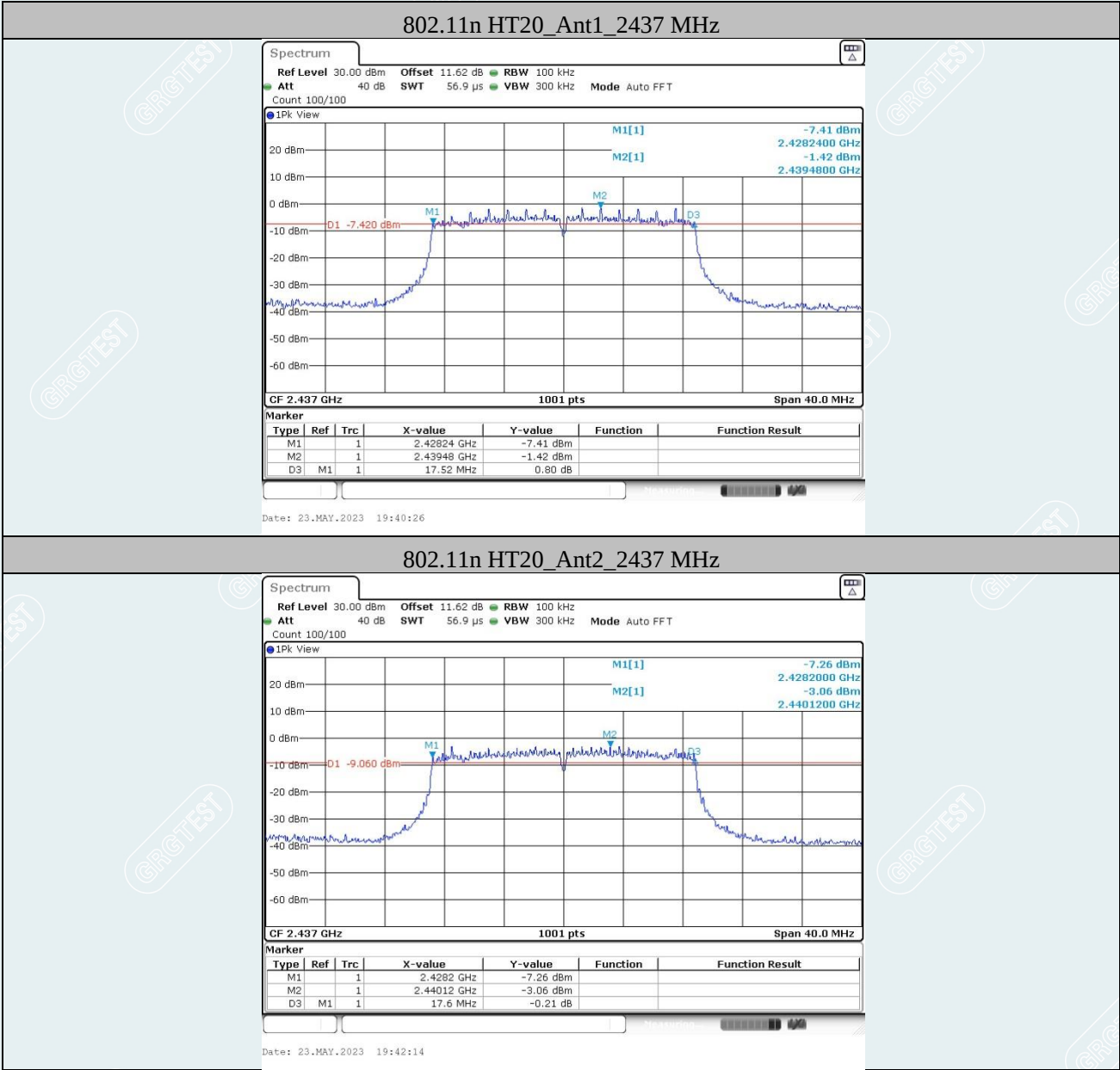


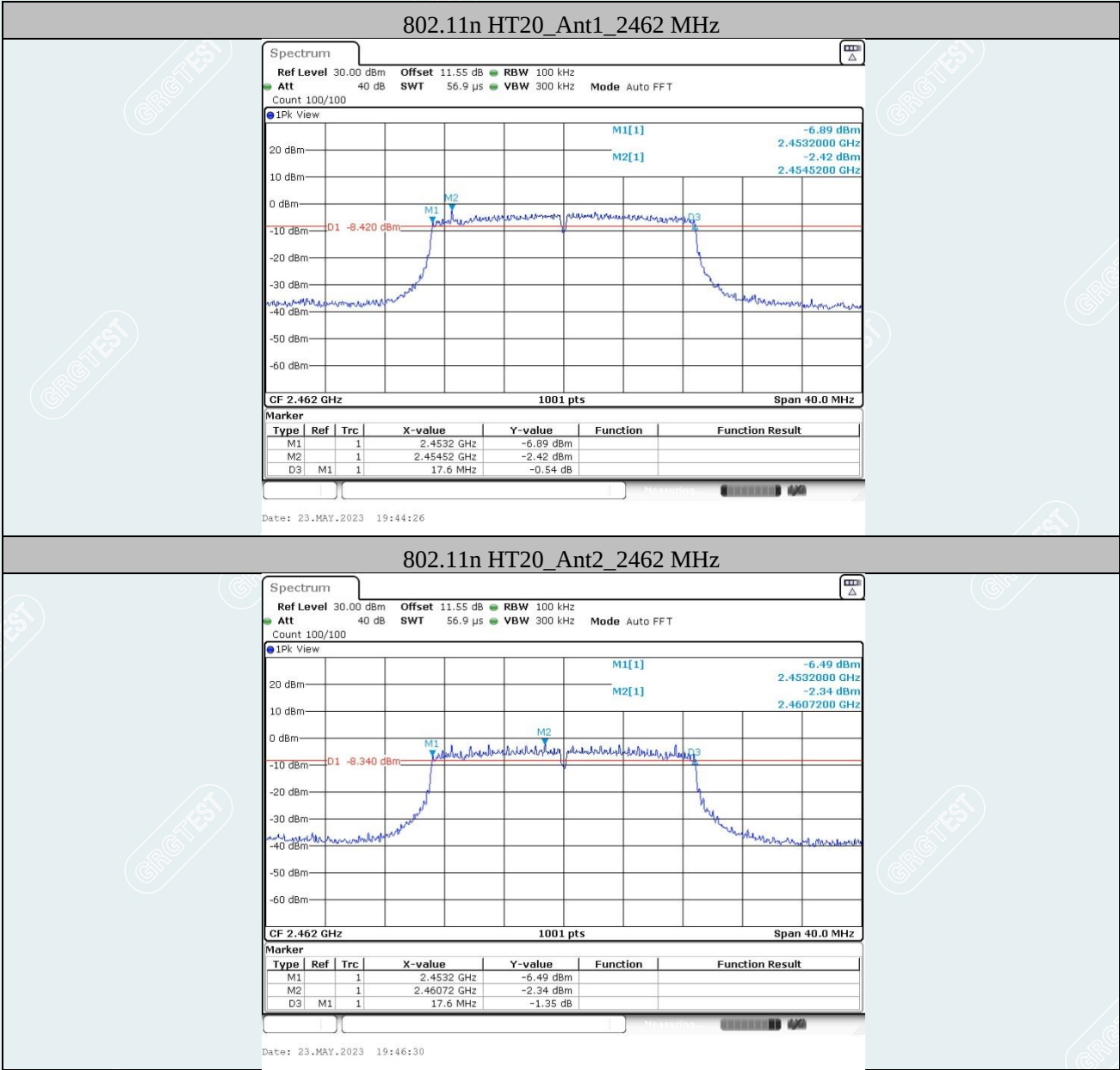
802.11n HT20_Ant1_2412 MHz

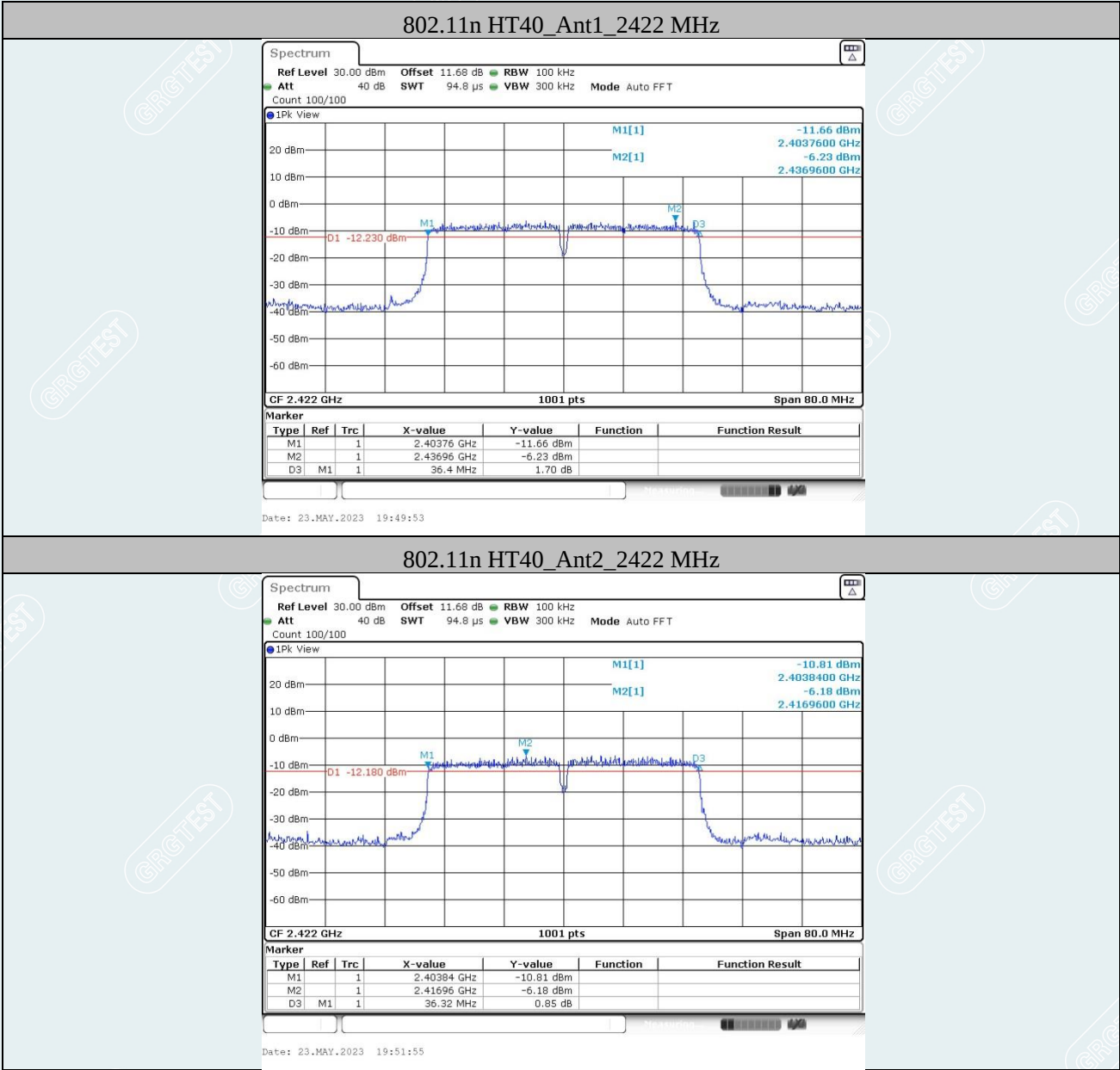


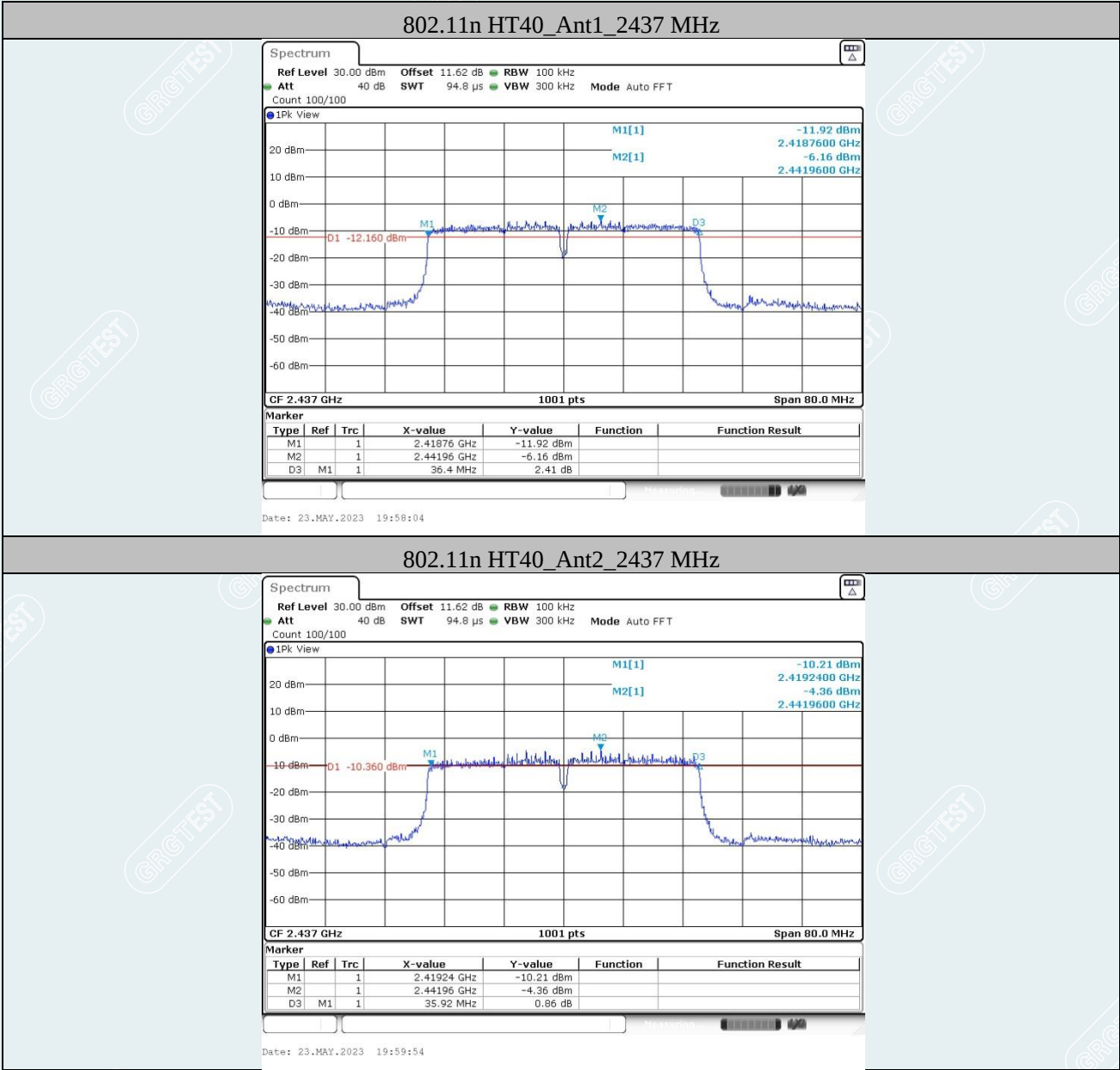
802.11n HT20_Ant2_2412 MHz

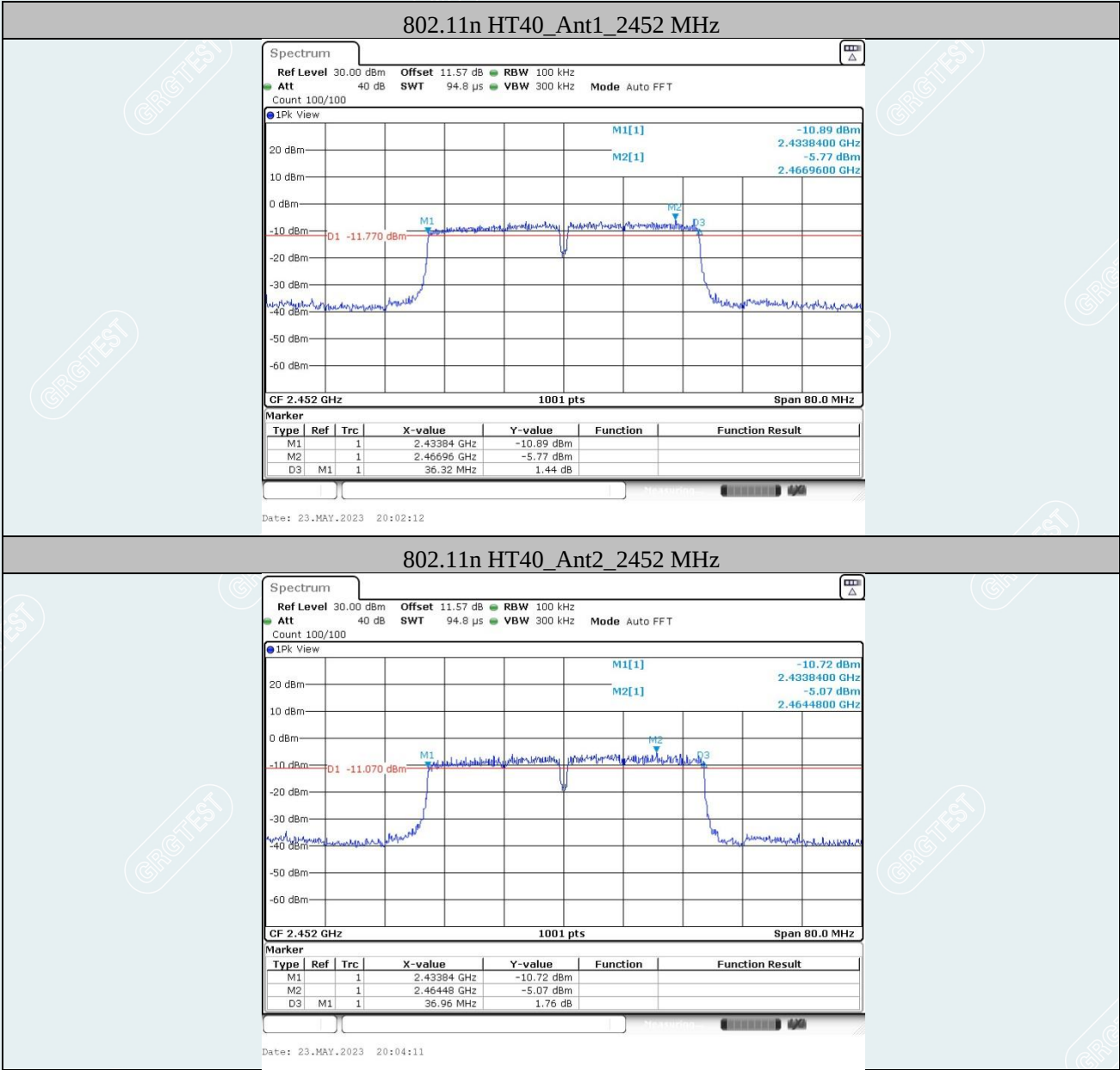


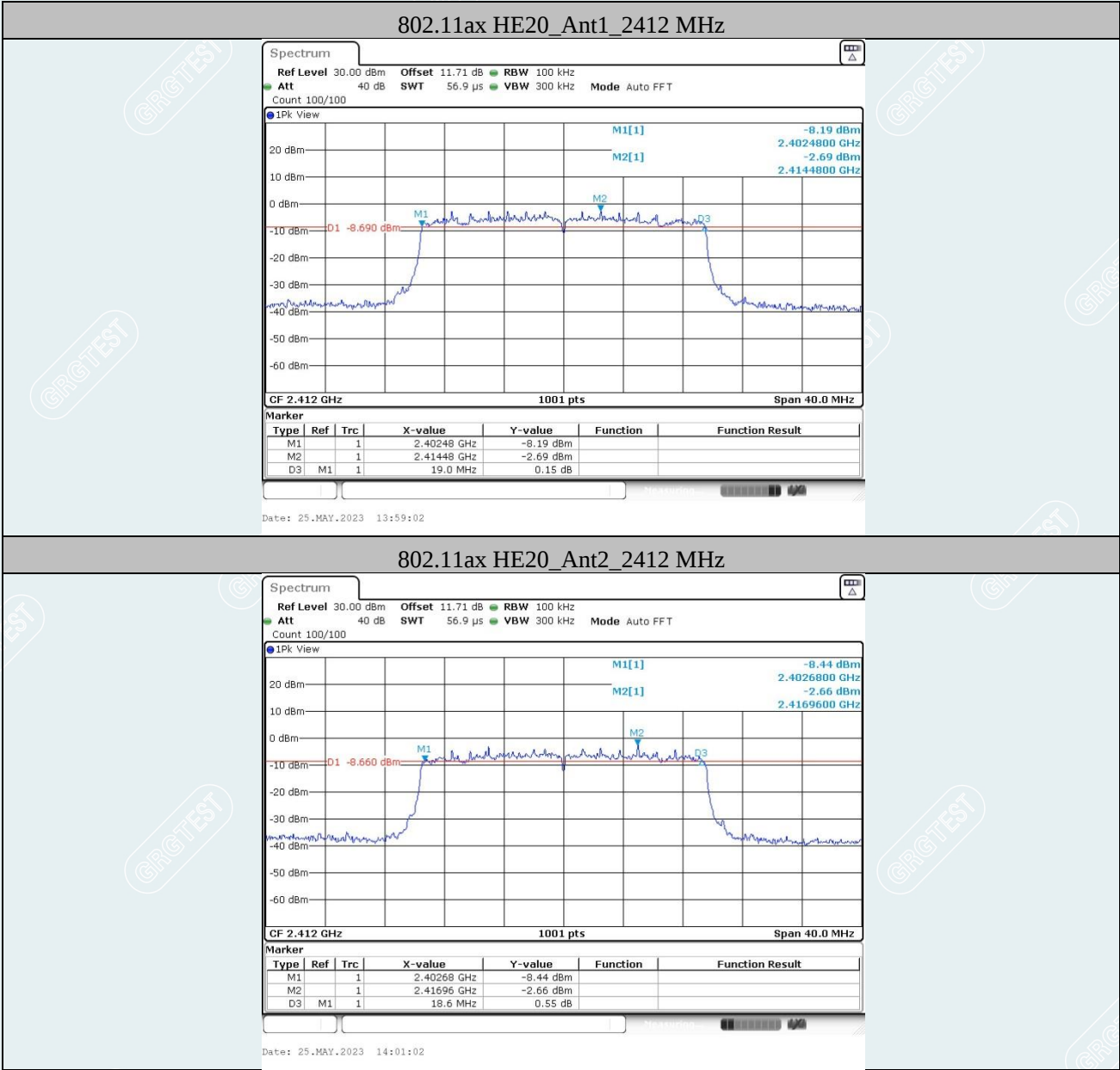


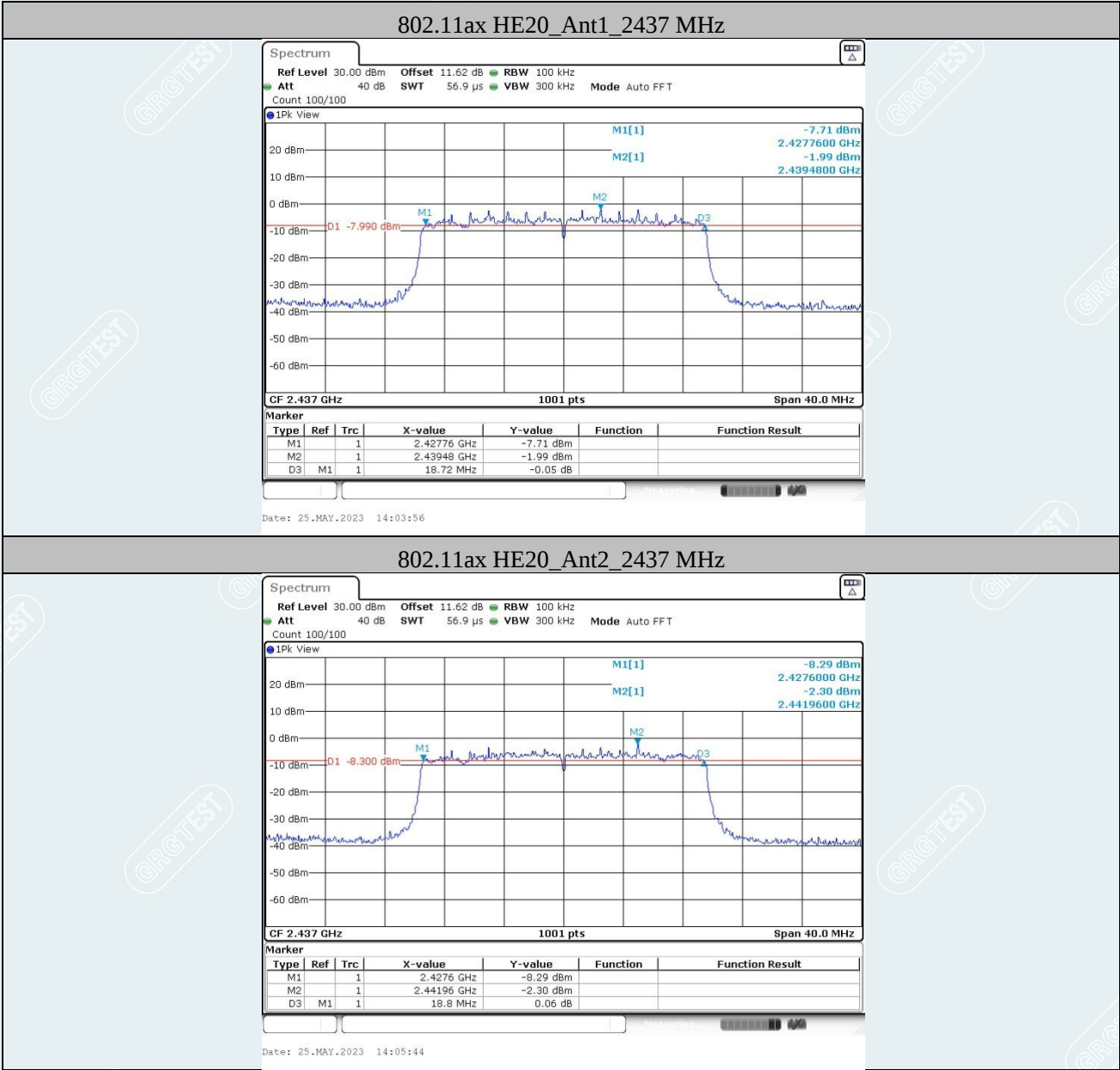


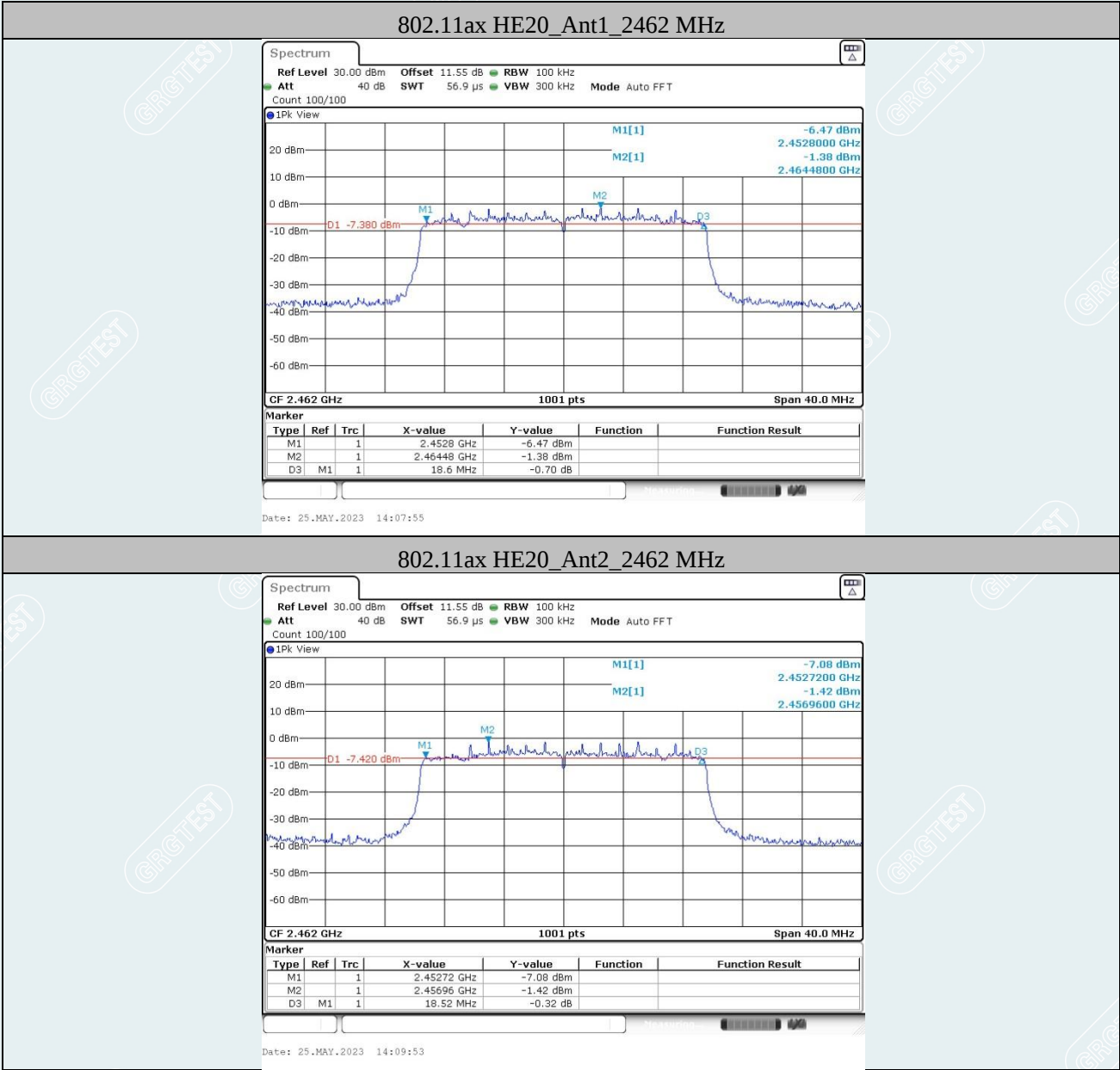


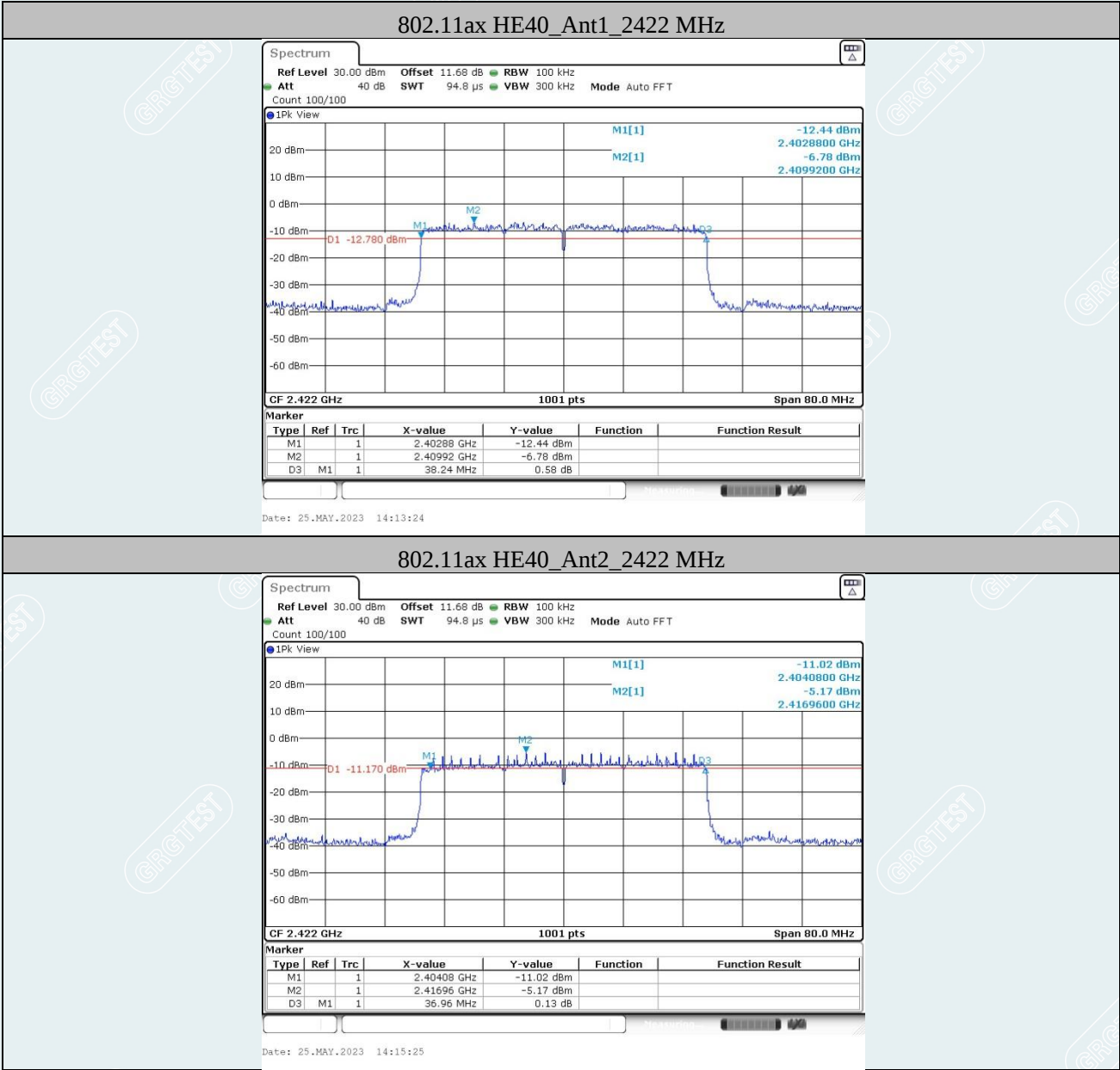


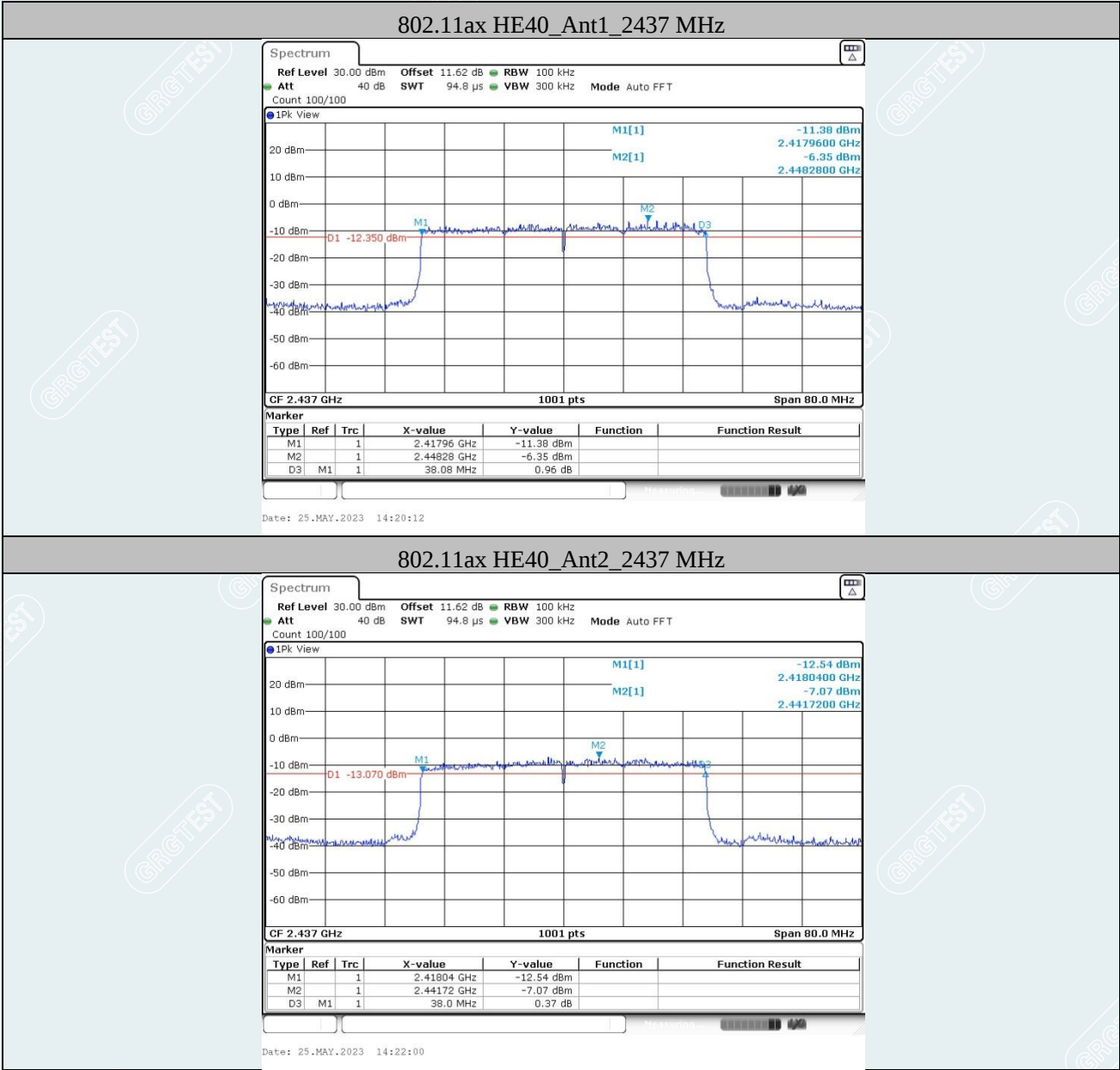


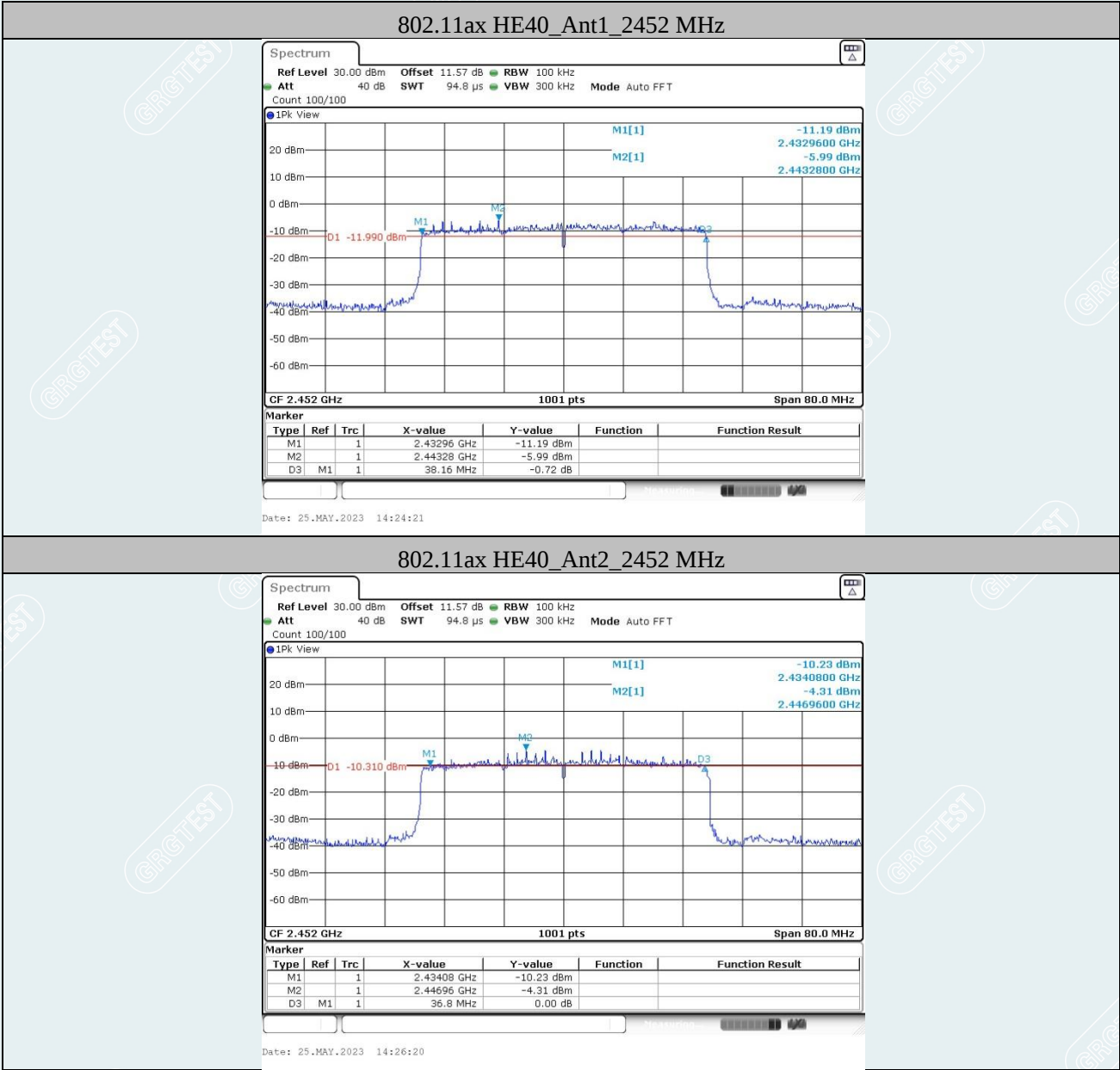












7. MAXIMUM PEAK OUTPUT POWER

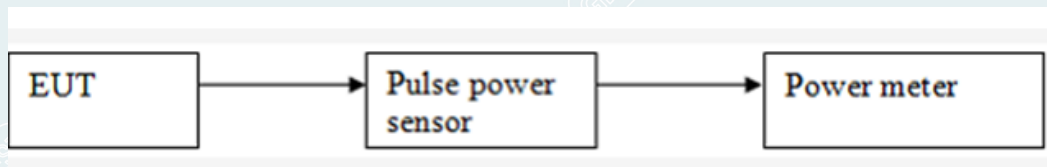
7.1 LIMITS

The maximum Peak output power measurement is 1W

7.2 TEST PROCEDURES

- 1) RF output of EUT was connected to the broadband peak RF power meter by RF cable and 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) Measure the conducted output power and record the results in the test report.

7.3 TEST SETUP



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7.4 TEST RESULT

Environment: 25.8°C/62%RH/101.0kPa

Tested By:Qing Tingting

Voltage:DC 12V

Date: 2023-05-23

Test Mode	Channel No.	Frequency (MHz)	Measured Channel Power (dBm)			Peak / AVG	Limit (dBm)	Result
			antenna 1	antenna 2	total			
802.11b	1	2412	15.12	15.72	/	Peak	30.00	Pass
	6	2437	15.36	15.06	/			Pass
	11	2462	15.75	15.27	/			Pass
802.11g	1	2412	18.26	19.35	/	Peak	30.00	Pass
	6	2437	19.29	18.96	/			Pass
	11	2462	20.22	19.30	/			Pass
802.11n HT20	1	2412	17.45	17.72	20.60	Peak	30.00	Pass
	6	2437	18.22	17.83	21.04			Pass
	11	2462	18.95	17.67	21.37			Pass
802.11n HT40	3	2422	17.89	17.55	20.73	Peak	30.00	Pass
	6	2437	18.23	17.73	21.00			Pass
	9	2452	18.47	17.57	21.05			Pass
802.11ax HE20	1	2412	17.61	18.49	21.08	Peak	30.00	Pass
	6	2437	18.68	18.57	21.64			Pass
	11	2462	19.43	18.23	21.88			Pass
802.11ax HE40	3	2422	18.06	18.41	21.25	Peak	30.00	Pass
	6	2437	18.54	18.31	21.44			Pass
	9	2452	18.94	17.94	21.48			Pass

Note:

- According KDB 662911 the antenna gain is equal and the number of antennas is less than 4, Array gain=0, and power does not need to be counted as rollback.

8. POWER SPECTRAL DENSITY

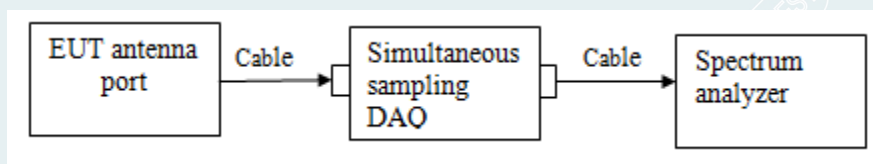
8.1 LIMITS

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

8.2 TEST PROCEDURES

- 1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer.
- 2) Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- 3) The following procedure shall be used if maximum peak conducted output power was used to determine compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:
 - a) Set analyzer center frequency to DTS channel center frequency.
 - b) Set the span to 1.5 times the DTS bandwidth.
 - c) Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
 - d) Set the VBW $\geq [3 \times \text{RBW}]$.
 - e) Detector = peak
 - f) Sweep time = auto couple.
 - g) Trace mode = max hold.
 - h) Allow trace to fully stabilize.
 - i) Use the peak marker function to determine the maximum amplitude level within the RBW.
 - j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.
- 4) Repeat above procedures until all frequencies measured were complete.

8.3 TEST SETUP



8.4 TEST RESULTS

Environment: 25.8°C/62%RH/101.0kPa

Voltage:DC 12V

Tested By:Qing Tingting

Date: 2023-05-23~2023-05-25

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
802.11b	Ant1	2412	-10.21	≤8.00	PASS
	Ant2	2412	-10.67	≤8.00	PASS
	Ant1	2437	-10.96	≤8.00	PASS
	Ant2	2437	-11.15	≤8.00	PASS
	Ant1	2462	-10.33	≤8.00	PASS
	Ant2	2462	-10.92	≤8.00	PASS
802.11g	Ant1	2412	-13.56	≤8.00	PASS
	Ant2	2412	-14.45	≤8.00	PASS
	Ant1	2437	-13.13	≤8.00	PASS
	Ant2	2437	-13.95	≤8.00	PASS
	Ant1	2462	-13.53	≤8.00	PASS
	Ant2	2462	-12.31	≤8.00	PASS
802.11n HT20	Ant1	2412	-14.80	≤7.83	PASS
	Ant2	2412	-16.16	≤7.83	PASS
	total	2412	-12.42	≤7.83	PASS
	Ant1	2437	-15.69	≤7.83	PASS
	Ant2	2437	-16.21	≤7.83	PASS
	total	2437	-12.93	≤7.83	PASS
	Ant1	2462	-14.69	≤7.83	PASS
	Ant2	2462	-15.77	≤7.83	PASS
	total	2462	-12.19	≤7.83	PASS
802.11n HT40	Ant1	2422	-17.55	≤7.83	PASS
	Ant2	2422	-19.38	≤7.83	PASS
	total	2422	-15.36	≤7.83	PASS
	Ant1	2437	-18.24	≤7.83	PASS
	Ant2	2437	-19.37	≤7.83	PASS
	total	2437	-15.76	≤7.83	PASS
	Ant1	2452	-17.43	≤7.83	PASS
	Ant2	2452	-18.94	≤7.83	PASS
	total	2452	-15.11	≤7.83	PASS

TestMode	Antenna	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
802.11ax HE20	Ant1	2412	-16.21	≤ 7.83	PASS
	Ant2	2412	-16.71	≤ 7.83	PASS
	total	2412	-13.44	≤ 7.83	PASS
	Ant1	2437	-16.72	≤ 7.83	PASS
	Ant2	2437	-17.65	≤ 7.83	PASS
	total	2437	-14.15	≤ 7.83	PASS
	Ant1	2462	-16.03	≤ 7.83	PASS
	Ant2	2462	-17.03	≤ 7.83	PASS
	total	2462	-13.49	≤ 7.83	PASS
802.11ax HE40	Ant1	2422	-18.88	≤ 7.83	PASS
	Ant2	2422	-19.02	≤ 7.83	PASS
	total	2422	-15.94	≤ 7.83	PASS
	Ant1	2437	-19.29	≤ 7.83	PASS
	Ant2	2437	-18.10	≤ 7.83	PASS
	total	2437	-15.64	≤ 7.83	PASS
	Ant1	2452	-18.52	≤ 7.83	PASS
	Ant2	2452	-18.16	≤ 7.83	PASS
	total	2452	-15.33	≤ 7.83	PASS

Note:

1. This EUT supports MIMO 2X2, any transmit signals are correlated with each other, According KDB 662911 the Directional gain $= 3.16 + 10 \log(2)$ dBi, that is Directional gain (dBi) = 6.17 dBi.
2. Antenna gain is greater than 6, HT20, HT40, HE20, HE40 mode Power Spectral Density Limit $= 8 - (6.17 - 6) = 7.83$ dBm

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Test Graphs

