

Mode: IEEE 802.11n HT40
Lowest Frequency (2422MHz)
Environment: 24.8°C/62%RH
Tested By: Zhao yaru

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Voltage: DC 12V
Date: 2024-09-29

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2382.8000	55.18	52.21	-2.97	74.00	21.79	100	334	Horizontal
2	3141.0000	59.89	46.89	-13.00	74.00	27.11	100	129	Horizontal
3	5769.0000	56.46	51.84	-4.62	74.00	22.16	200	209	Horizontal
4	6750.0000	49.02	48.57	-0.45	74.00	25.43	200	173	Horizontal
5	7311.0000	46.24	47.70	1.46	74.00	26.30	200	160	Horizontal
6	9945.0000	40.02	48.90	8.88	74.00	25.10	200	160	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2383.2480	-2.97	42.16	39.19	54.00	14.81	112	319.1	Horizontal
2	5772.0060	-4.62	46.00	41.38	54.00	12.62	200	199.9	Horizontal
3	6750.0000	-0.45	47.49	47.04	54.00	6.96	200	175.5	Horizontal
4	9907.8650	8.88	28.21	37.09	54.00	16.91	198	141.7	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	2383.0000	56.18	53.22	-2.96	74.00	20.78	200	293	Vertical
2	2497.4000	48.68	48.25	-0.43	74.00	25.75	200	360	Vertical
3	2902.0000	48.49	47.23	-1.26	74.00	26.77	200	345	Vertical
4	5731.5000	54.68	49.97	-4.71	74.00	24.03	100	222	Vertical
5	6750.0000	46.19	45.94	-0.25	74.00	28.06	100	222	Vertical
6	9909.0000	40.28	48.90	8.62	74.00	25.10	200	209	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2383.1030	-2.96	42.94	39.98	54.00	14.02	200	323	Vertical
2	2499.8220	-0.43	37.10	36.67	54.00	17.33	200	336.7	Vertical
3	5722.0445	-4.71	40.99	36.28	54.00	17.72	174	222.9	Vertical
4	9897.2450	8.62	28.25	36.87	54.00	17.13	200	212.5	Vertical

Mode: IEEE 802.11n HT40
Middle Frequency (2437 MHz)
Environment: 24.8°C/62%RH
Tested By: Zhao yaru

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Voltage: DC 12V
Date: 2024-09-29

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1970.6000	47.04	43.16	-3.88	74.00	30.84	200	340	Horizontal
2	2500.6000	47.65	47.25	-0.40	74.00	26.75	100	302	Horizontal
3	3157.5000	60.59	47.57	-13.02	74.00	26.43	100	126	Horizontal
4	5685.0000	56.27	51.10	-5.17	74.00	22.90	200	216	Horizontal
5	7263.0000	46.56	47.86	1.30	74.00	26.14	200	152	Horizontal
6	9307.5000	40.19	47.52	7.33	74.00	26.48	100	163	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	5696.7650	-5.17	46.44	41.27	54.00	12.73	200	207.3	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	1924.4000	48.76	44.88	-3.88	74.00	29.12	200	171	Vertical
2	2530.4000	49.70	48.06	-1.64	74.00	25.94	200	328	Vertical
3	2917.4000	48.10	46.85	-1.25	74.00	27.15	100	326	Vertical
4	5706.0000	54.19	49.17	-5.02	74.00	24.83	200	149	Vertical
5	7942.5000	41.20	44.79	3.59	74.00	29.21	100	178	Vertical
6	13629.0000	34.06	46.90	12.84	74.00	27.10	100	60	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2517.8030	-1.64	37.54	35.90	54.00	18.10	178	337.3	Vertical
2	5720.2030	-5.02	44.15	39.13	54.00	14.87	200	151.7	Vertical

Mode: IEEE 802.11n HT40
Highest Frequency (2452MHz)
Environment: 24.8°C/62%RH
Tested By: Zhao yaru

Voltage: DC 12V
Date: 2024-09-29

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2497.2000	48.37	47.98	-0.39	74.00	26.02	100	316	Horizontal
2	3150.0000	60.52	47.53	-12.99	74.00	26.47	100	124	Horizontal
3	5724.0000	57.12	52.07	-5.05	74.00	21.93	200	201	Horizontal
4	6750.0000	48.44	47.99	-0.45	74.00	26.01	200	170	Horizontal
5	7299.0000	46.91	48.28	1.37	74.00	25.72	200	153	Horizontal
6	9811.5000	39.89	48.83	8.94	74.00	25.17	200	138	Horizontal
7	2495.6000	38.35	37.93	-0.42	54.00	16.07	100	300	Horizontal
8	3157.5000	52.58	39.56	-13.02	54.00	14.44	100	124	Horizontal
9	5725.5000	47.96	42.92	-5.04	54.00	11.08	200	201	Horizontal
10	6750.0000	41.93	41.48	-0.45	54.00	12.52	200	170	Horizontal
11	7311.0000	36.47	37.93	1.46	54.00	16.07	200	153	Horizontal
12	9904.5000	30.75	39.27	8.52	54.00	14.73	200	138	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	2496.4000	50.59	50.14	-0.45	74.00	23.86	200	359	Vertical
2	2931.8000	47.90	46.65	-1.25	74.00	27.35	200	328	Vertical
3	5700.0000	55.39	50.30	-5.09	74.00	23.70	200	146	Vertical
4	6750.0000	46.74	46.49	-0.25	74.00	27.51	100	232	Vertical
5	9937.5000	39.38	48.15	8.77	74.00	25.85	200	213	Vertical
6	11817.0000	37.23	48.32	11.09	74.00	25.68	200	340	Vertical
7	2497.0000	40.70	40.26	-0.44	54.00	13.74	200	345	Vertical
8	2932.0000	42.36	41.11	-1.25	54.00	12.89	200	328	Vertical
9	5722.5000	43.92	39.10	-4.82	54.00	14.90	200	146	Vertical
10	6750.0000	39.12	38.87	-0.25	54.00	15.13	100	232	Vertical
11	9670.5000	30.56	38.68	8.12	54.00	15.32	100	171	Vertical
12	11748.0000	26.19	37.74	11.55	54.00	16.26	200	259	Vertical

18GHz-26.5GHz:

All models were pretested and only the worst modes and channels were recorded in this report. (IEEE 802.11n HT40 2452MHz).

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Environment: 26.5°C/57%RH/101.0kPa

Tested By: Zhao yaru

Voltage: DC 12V

Date: 2024-10-02

Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level for 1m [dBμV/m]	Level for 3m [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18680	49.93	33.84	24.3	-16.09	74	49.70	100	138	Horizontal
2	20249.95	50.7	35.22	25.68	-15.48	74	48.32	200	159	Horizontal
3	21470.55	48.12	33.24	23.7	-14.88	74	50.30	100	239	Horizontal
4	22818.225	47.05	32.64	23.1	-14.41	74	50.90	100	218	Horizontal
5	23629.975	45.64	31.63	22.09	-14.01	74	51.91	100	300	Horizontal
6	24599.825	45.21	31.58	22.04	-13.63	74	51.96	200	117	Horizontal

Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level for 1m [dBμV/m]	Level for 3m [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18971.125	49.1	33.31	23.77	-15.79	74	50.23	100	298	Vertical
2	20249.95	50.16	35.08	25.54	-15.08	74	48.46	200	139	Vertical
3	21503.7	47.97	33.5	23.96	-14.47	74	50.04	100	19	Vertical
4	22873.475	46.73	33.05	23.51	-13.68	74	50.49	100	19	Vertical
5	24670.375	45.57	32.64	23.1	-12.93	74	50.90	100	199	Vertical
6	25298.95	45.23	32.21	22.67	-13.02	74	51.33	200	319	Vertical

Remark:

- 1 Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2 Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4 Above 18G test distance is 1m, so the Level for 3m= Level for 1m + 20*log(1/3)

6. 6DB BANDWIDTH

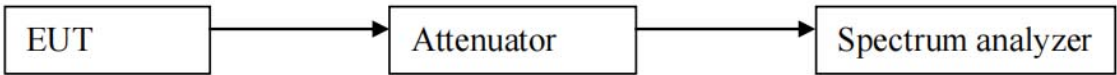
6.1 LIMITS

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) ≥ 3 x 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

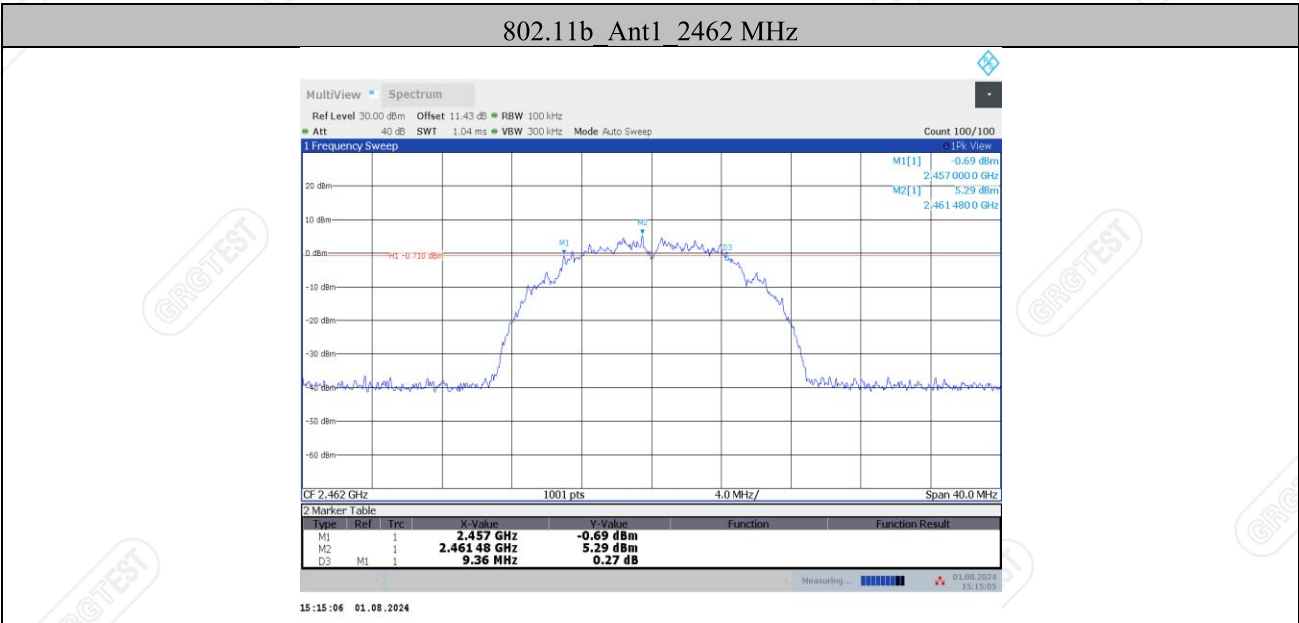
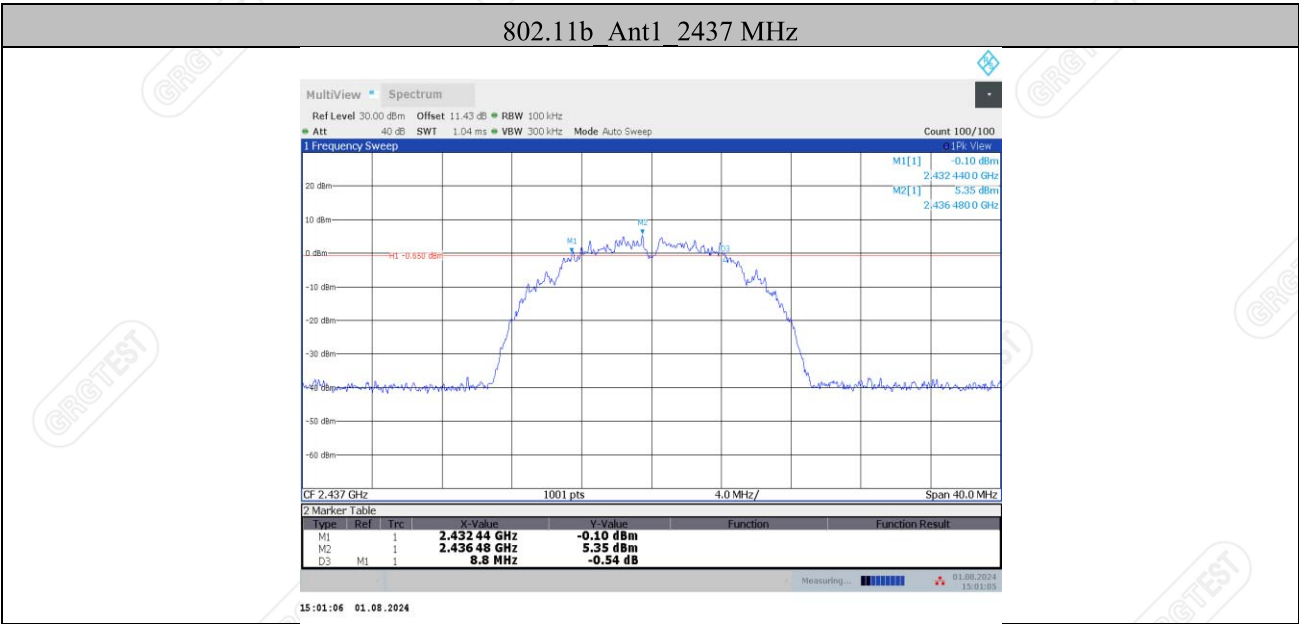


6.4 TEST RESULTS

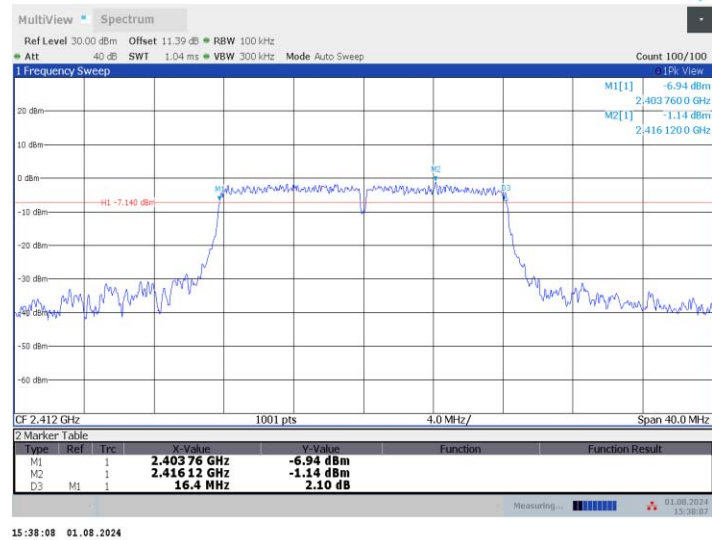
Environment: 25.6°C/65%RH/101.0kPa
Tested By:Zhu rongting

Voltage: DC 12V
Date: 2024-09-26

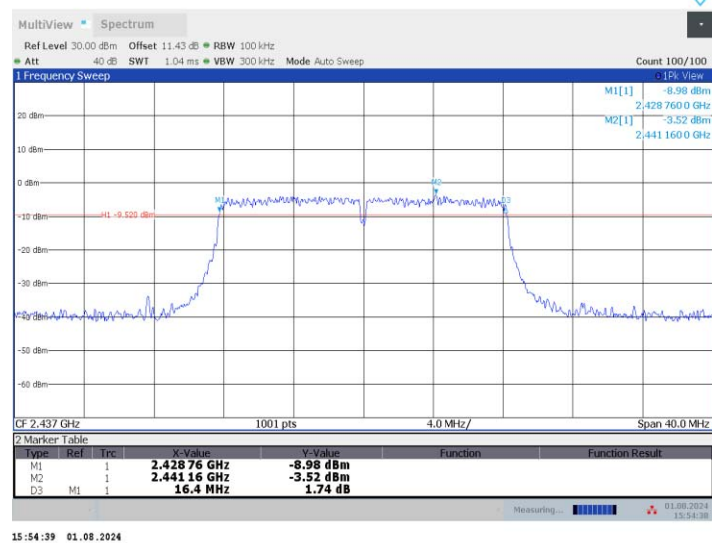
Test Mode	Antenna	Frequency[MHz]	DTS BW [MHz]	Limit[MHz]	Verdict
802.11b	Ant1	2412	8.08	≥0.5	PASS
		2437	8.08	≥0.5	PASS
		2462	8.08	≥0.5	PASS
802.11g	Ant1	2412	15.08	≥0.5	PASS
		2437	15.04	≥0.5	PASS
		2462	15.04	≥0.5	PASS
802.11n HT20	Ant1	2412	15.04	≥0.5	PASS
		2437	15.04	≥0.5	PASS
		2462	15.08	≥0.5	PASS
802.11n HT40	Ant1	2422	33.84	≥0.5	PASS
		2437	33.84	≥0.5	PASS
		2452	33.84	≥0.5	PASS

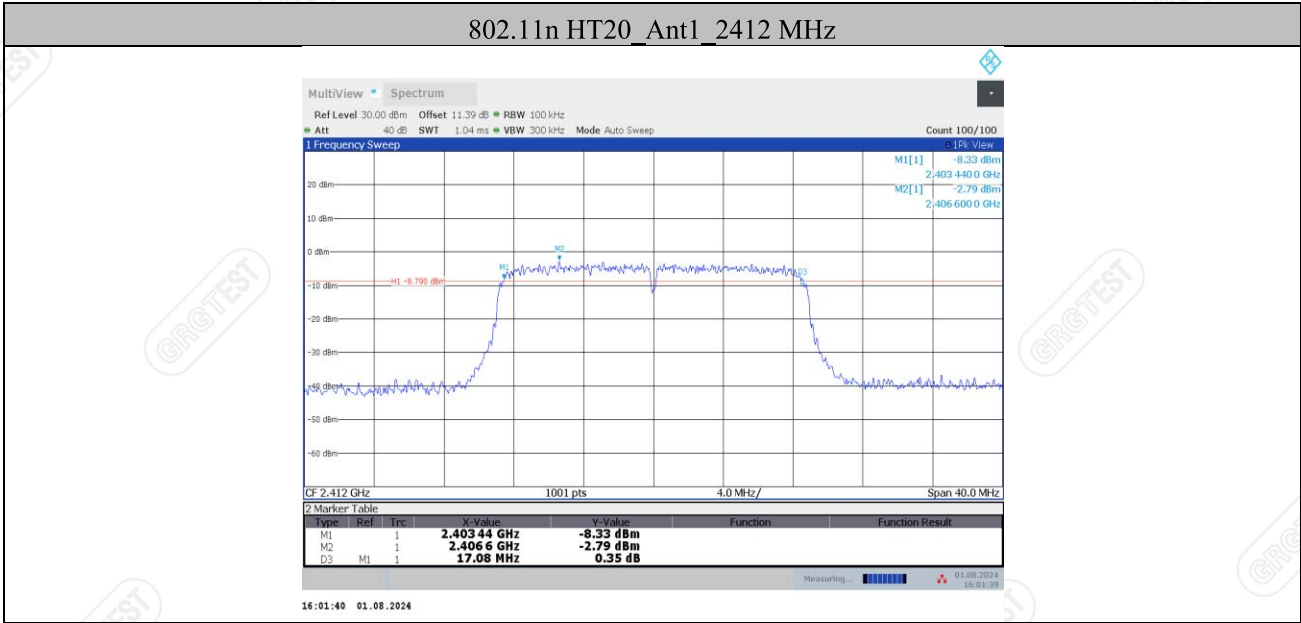
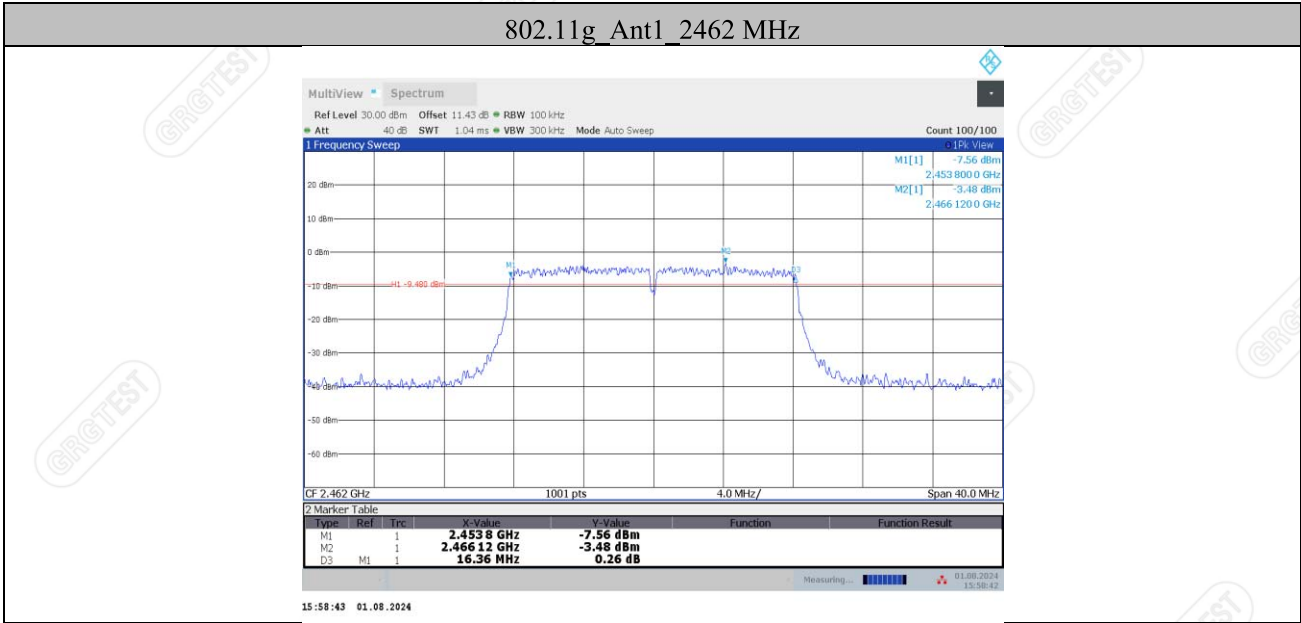


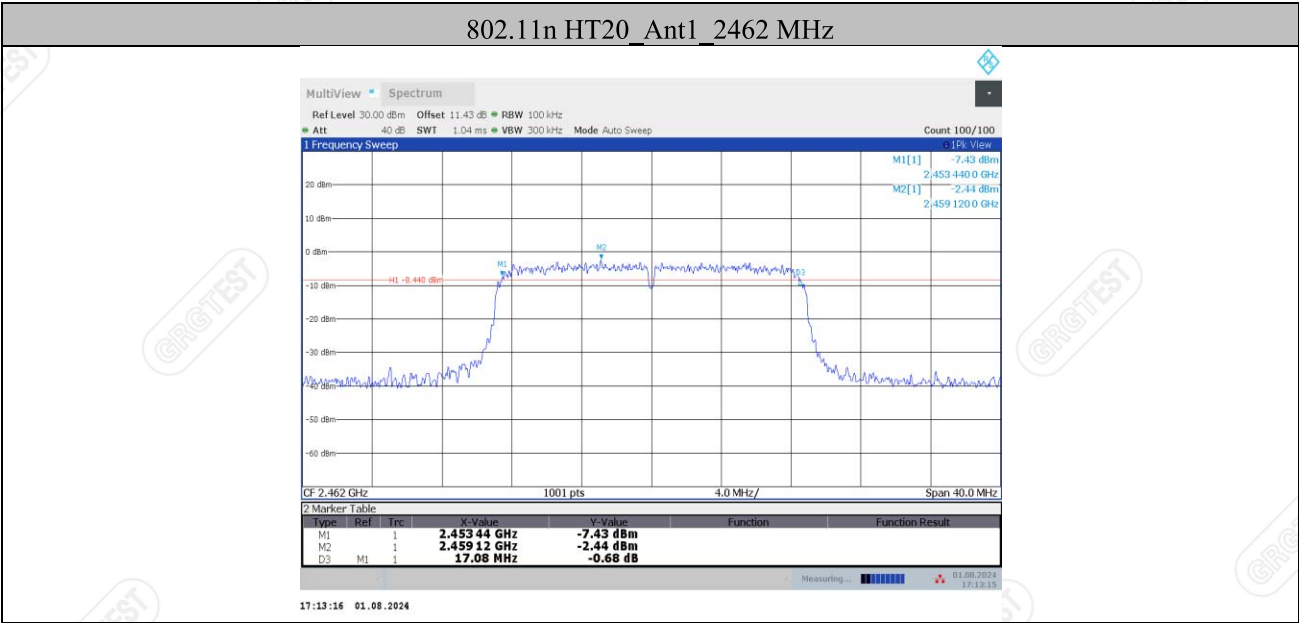
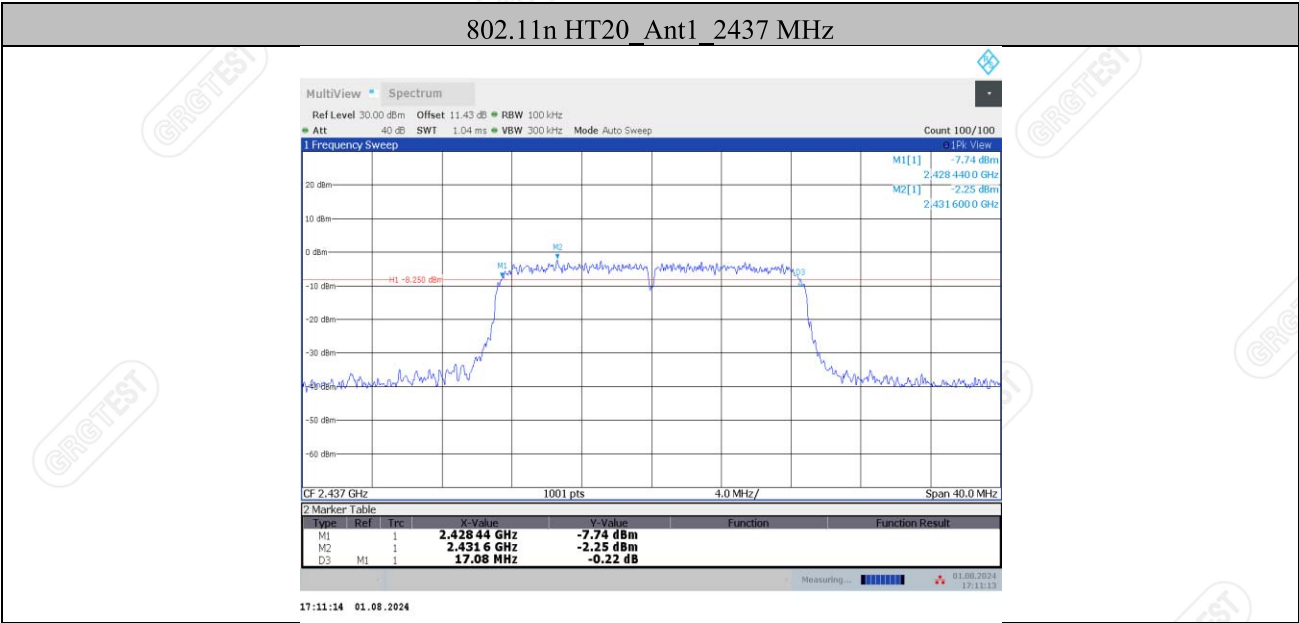
802.11g_Ant1_2412 MHz

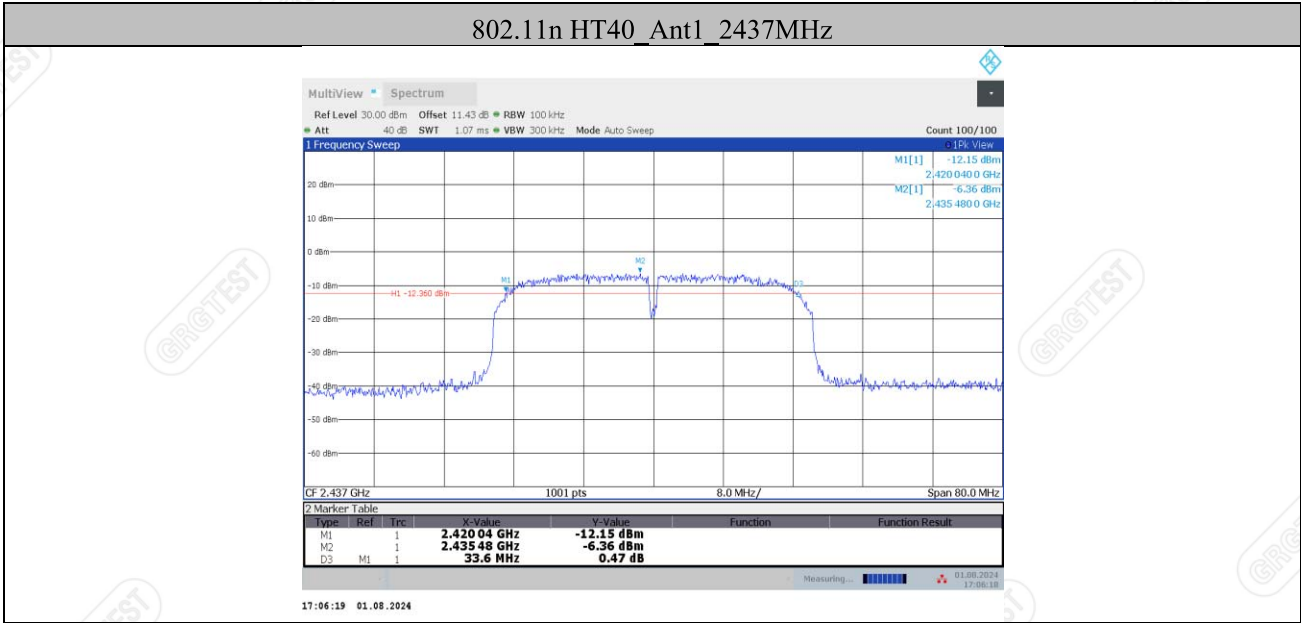
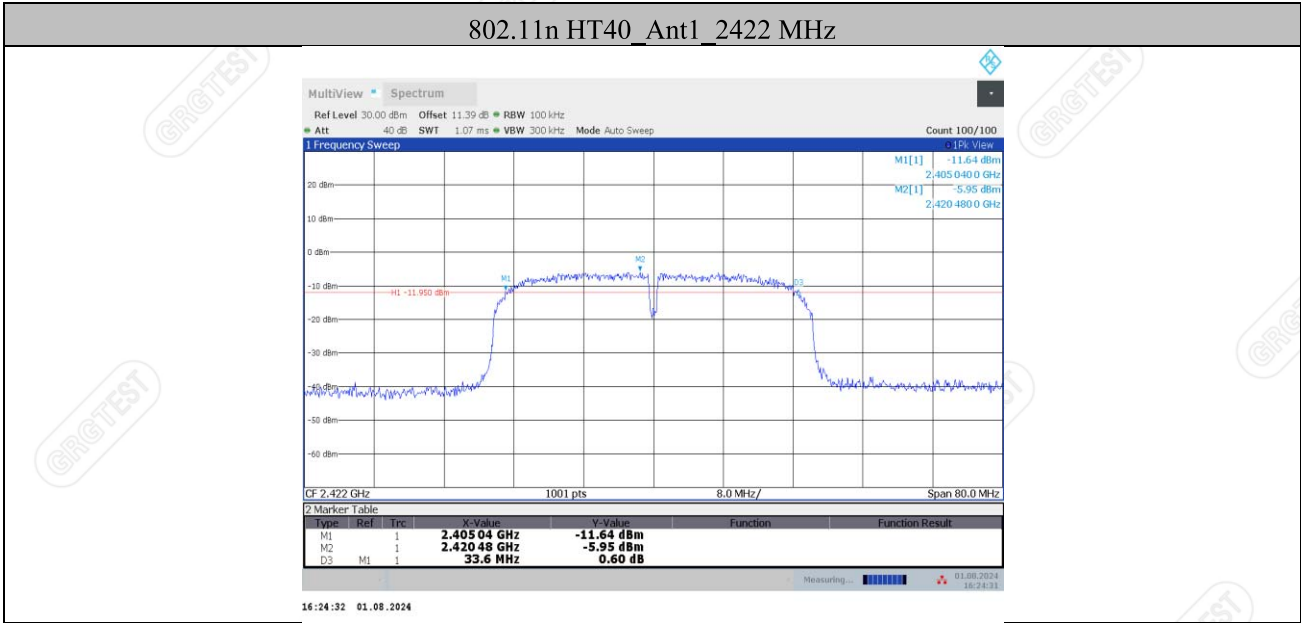


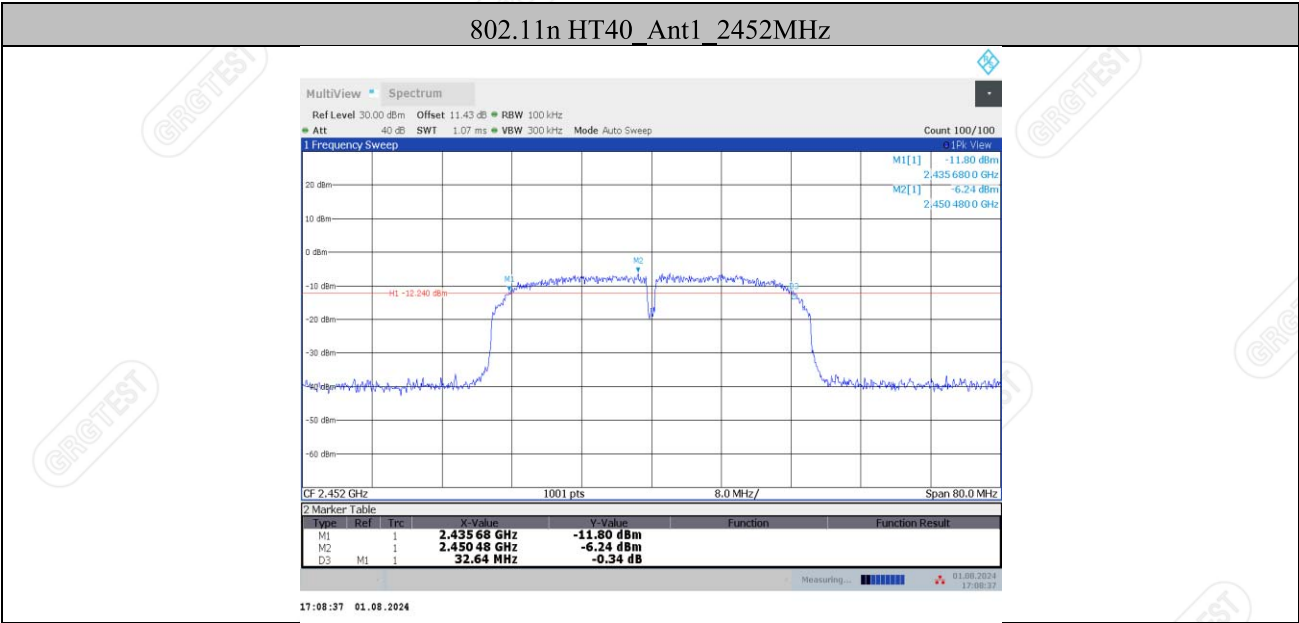
802.11g_Ant1_2437 MHz











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7. MAXIMUM PEAK OUTPUT POWER

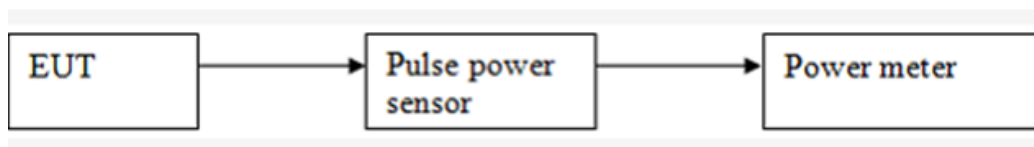
7.1 LIMITS

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



7.4 TEST RESULT

Environment: 25.6°C/65%RH/101.0kPa

Tested By:Zhu rongting

Voltage: DC 12V

Date: 2024-09-26

802.11b Mode:

Channel No.	Frequency (MHz)	Maximum output Power (dBm)	Peak / AVG	Limit	Result
1	2412	10.62	Peak	30dBm	Pass
6	2437	11.31			Pass
11	2462	11.68			Pass

802.11g Mode:

Channel No.	Frequency (MHz)	Maximum output Power (dBm)	Peak / AVG	Limit	Result
1	2412	12.73	Peak	30dBm	Pass
6	2437	13.13			Pass
11	2462	13.53			Pass

802.11n HT20 Mode:

Channel No.	Frequency (MHz)	Maximum output Power (dBm)	Peak / AVG	Limit	Result
1	2412	14.06	Peak	30dBm	Pass
6	2437	14.38			Pass
11	2462	14.88			Pass

802.11n HT40 Mode:

Channel No.	Frequency (MHz)	Maximum output Power (dBm)	Peak / AVG	Limit	Result
3	2422	15.17	Peak	30dBm	Pass
6	2437	15.32			Pass
9	2452	15.44			Pass

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8. POWER SPECTRAL DENSITY

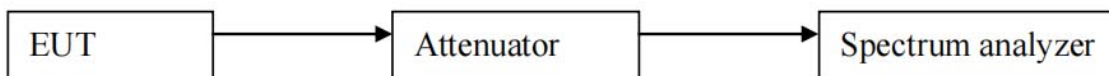
8.1 LIMITS

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 = average
 - 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

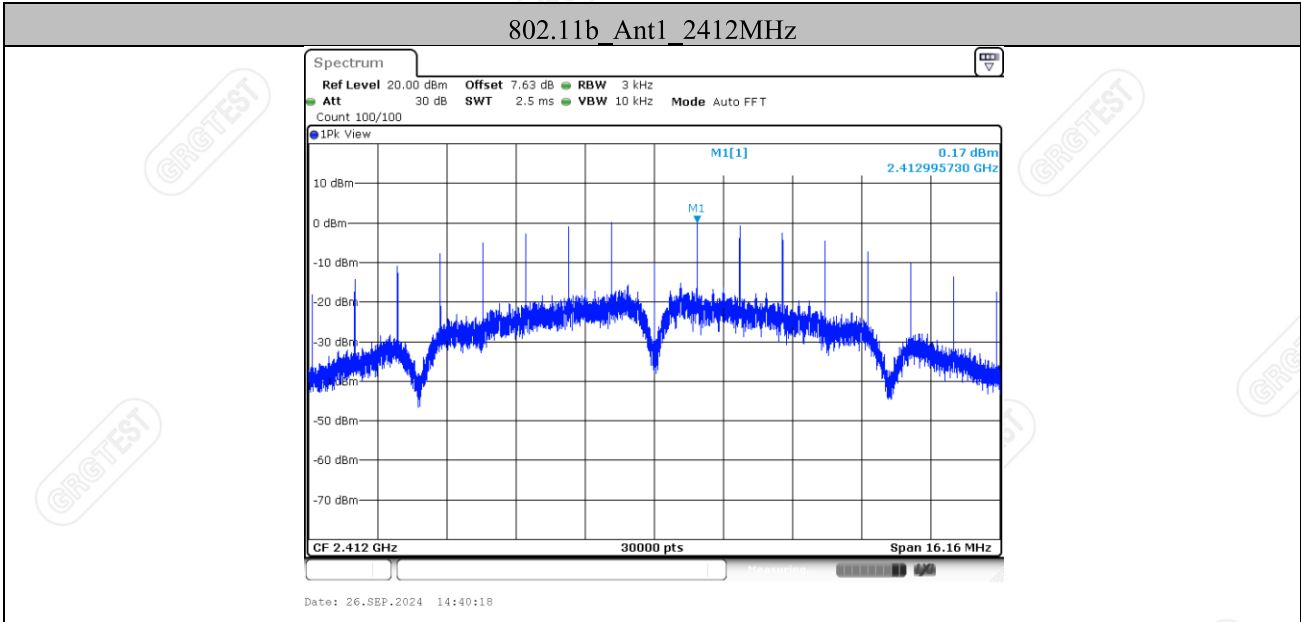


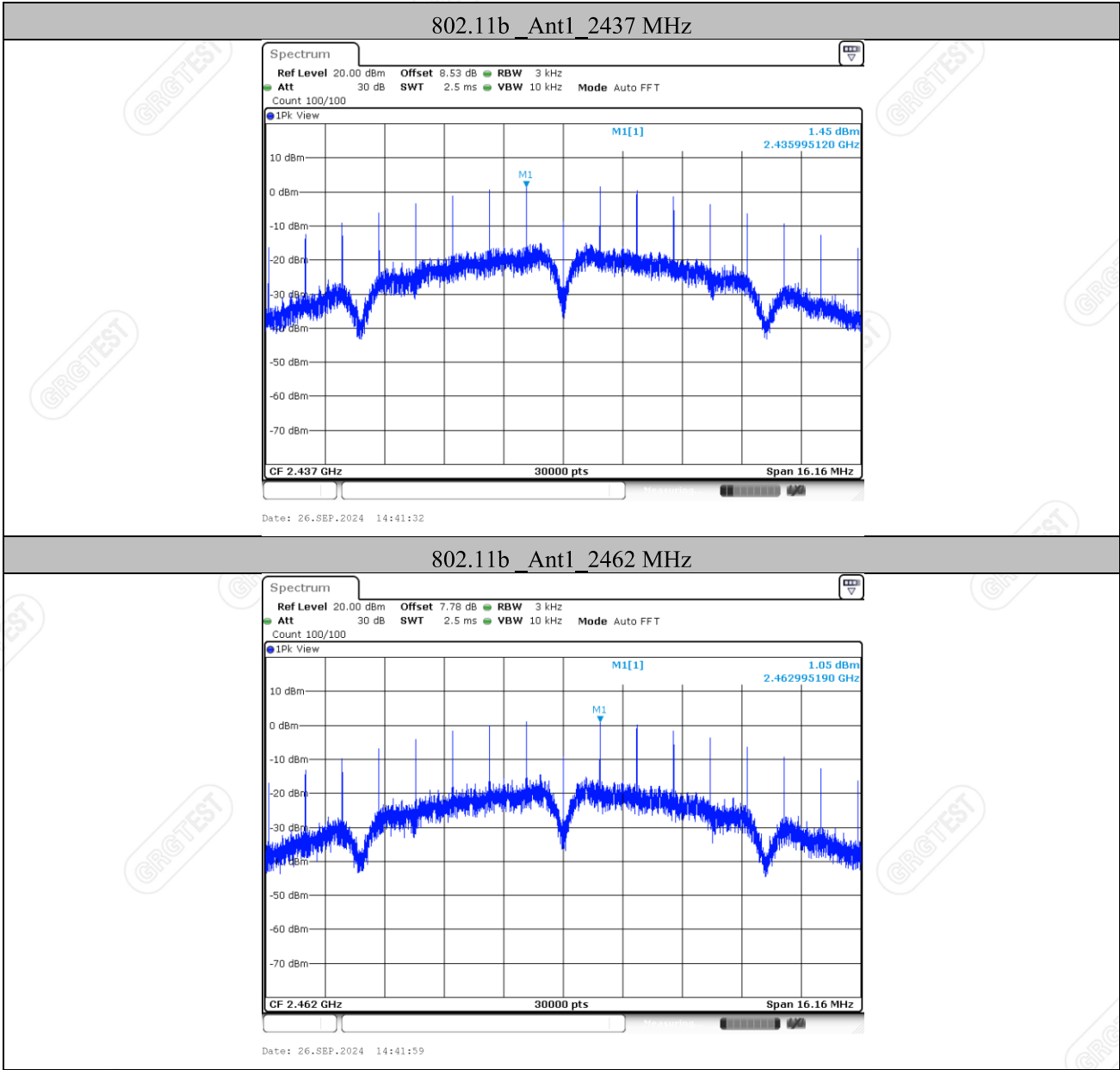
8.4 TEST RESULTS

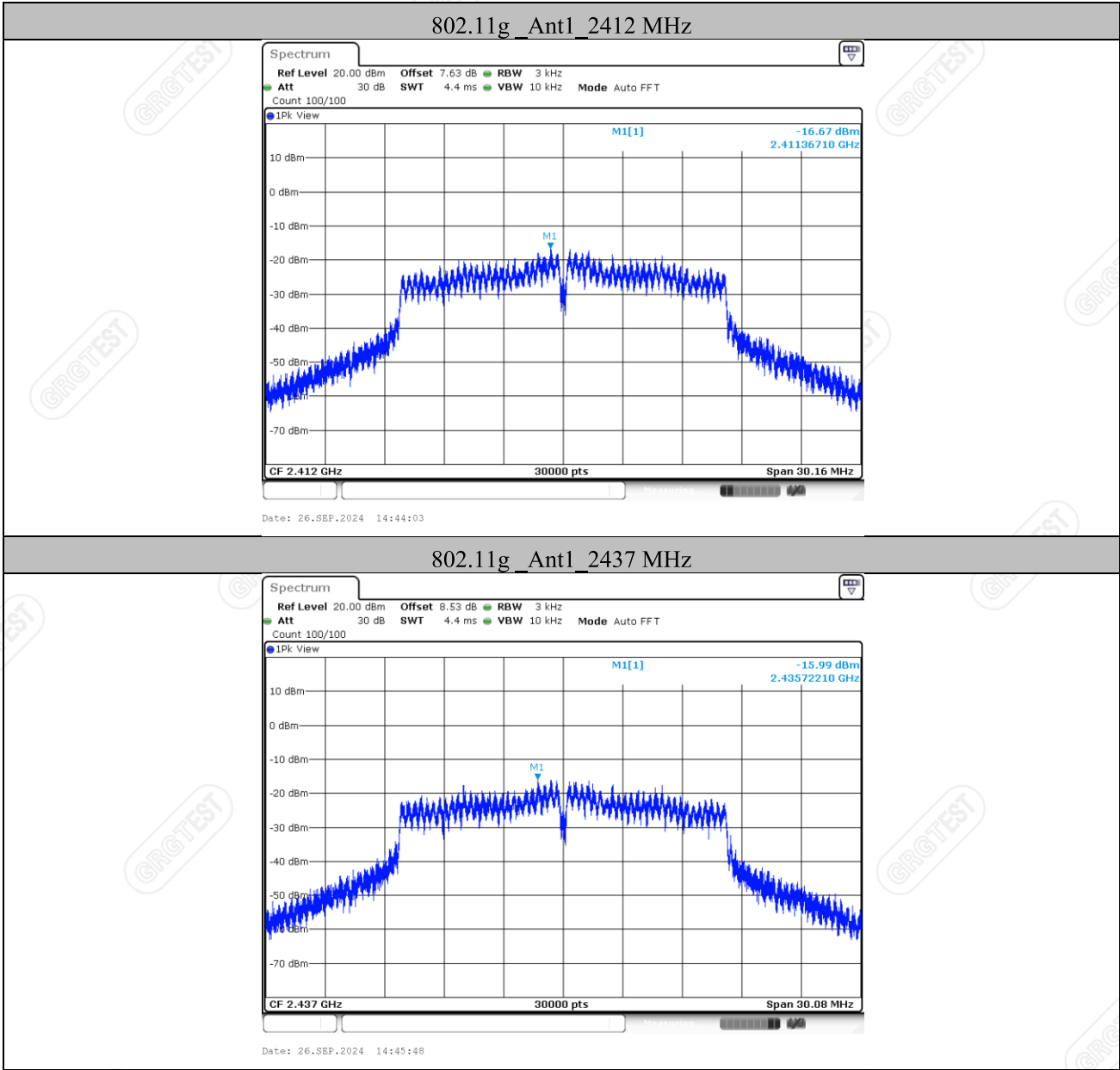
Environment: 25.6°C/65%RH/101.0kPa
Tested By:Zhu rongting

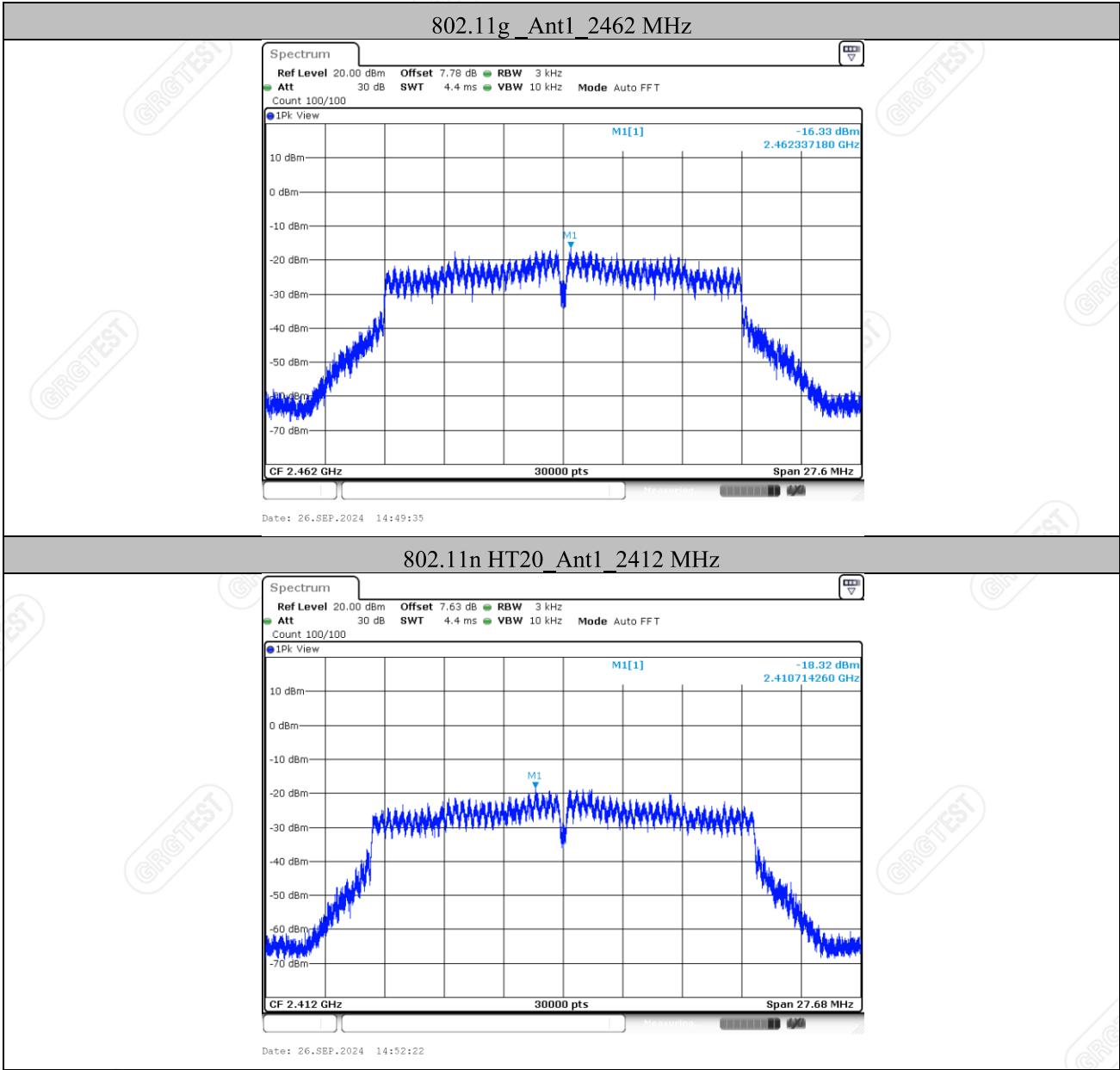
Voltage: DC 12V
Date: 2024-09-26

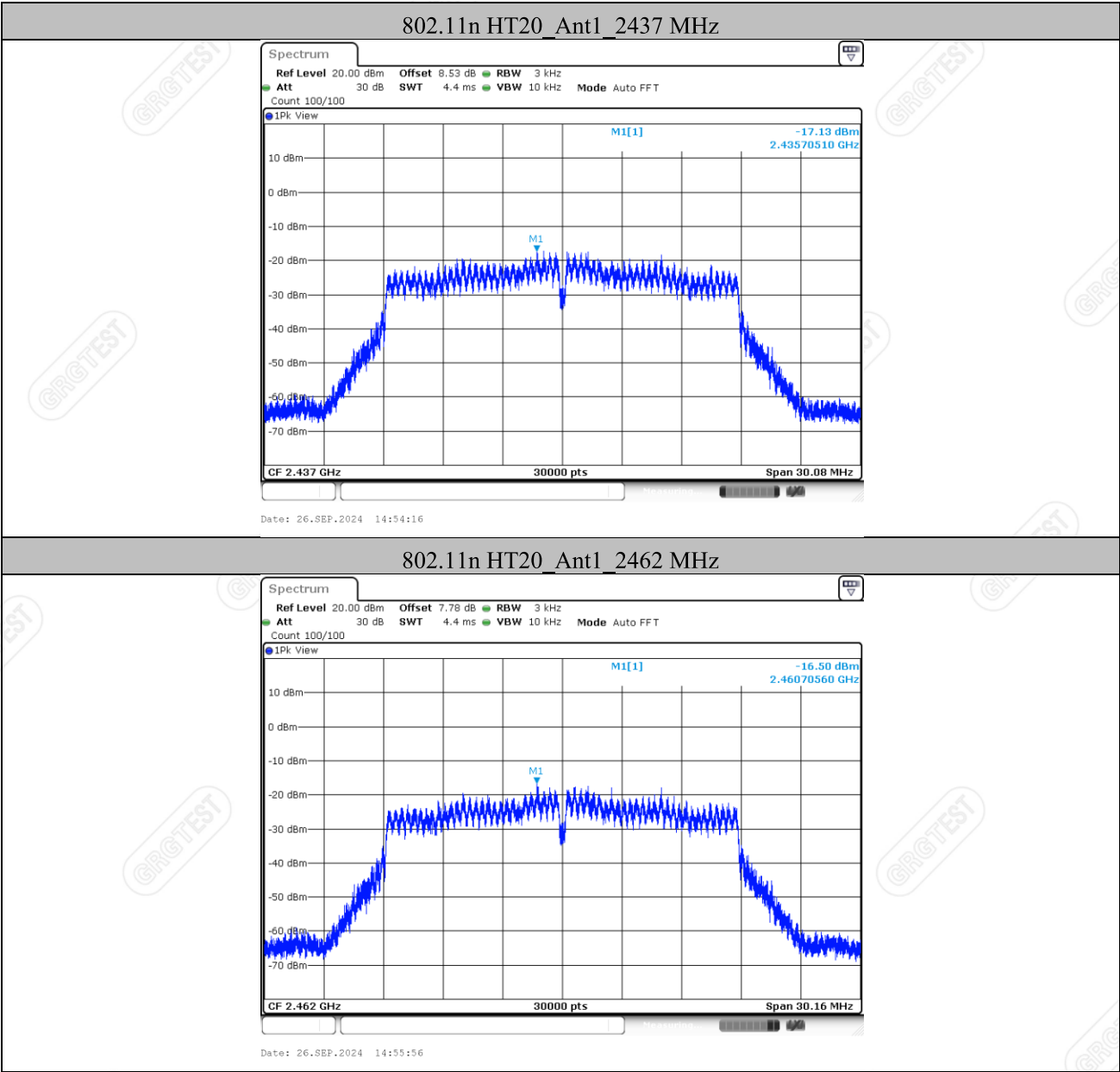
Test Mode	Antenna	Frequency [MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
802.11b	Ant1	2412	0.17	8.00	PASS
		2437	1.45	8.00	PASS
		2462	1.05	8.00	PASS
802.11g	Ant1	2412	-16.67	8.00	PASS
		2437	-15.99	8.00	PASS
		2462	-16.33	8.00	PASS
802.11n HT20	Ant1	2412	-18.32	8.00	PASS
		2437	-17.13	8.00	PASS
		2462	-16.50	8.00	PASS
802.11n HT40	Ant1	2422	-19.17	8.00	PASS
		2437	-18.60	8.00	PASS
		2452	-19.22	8.00	PASS

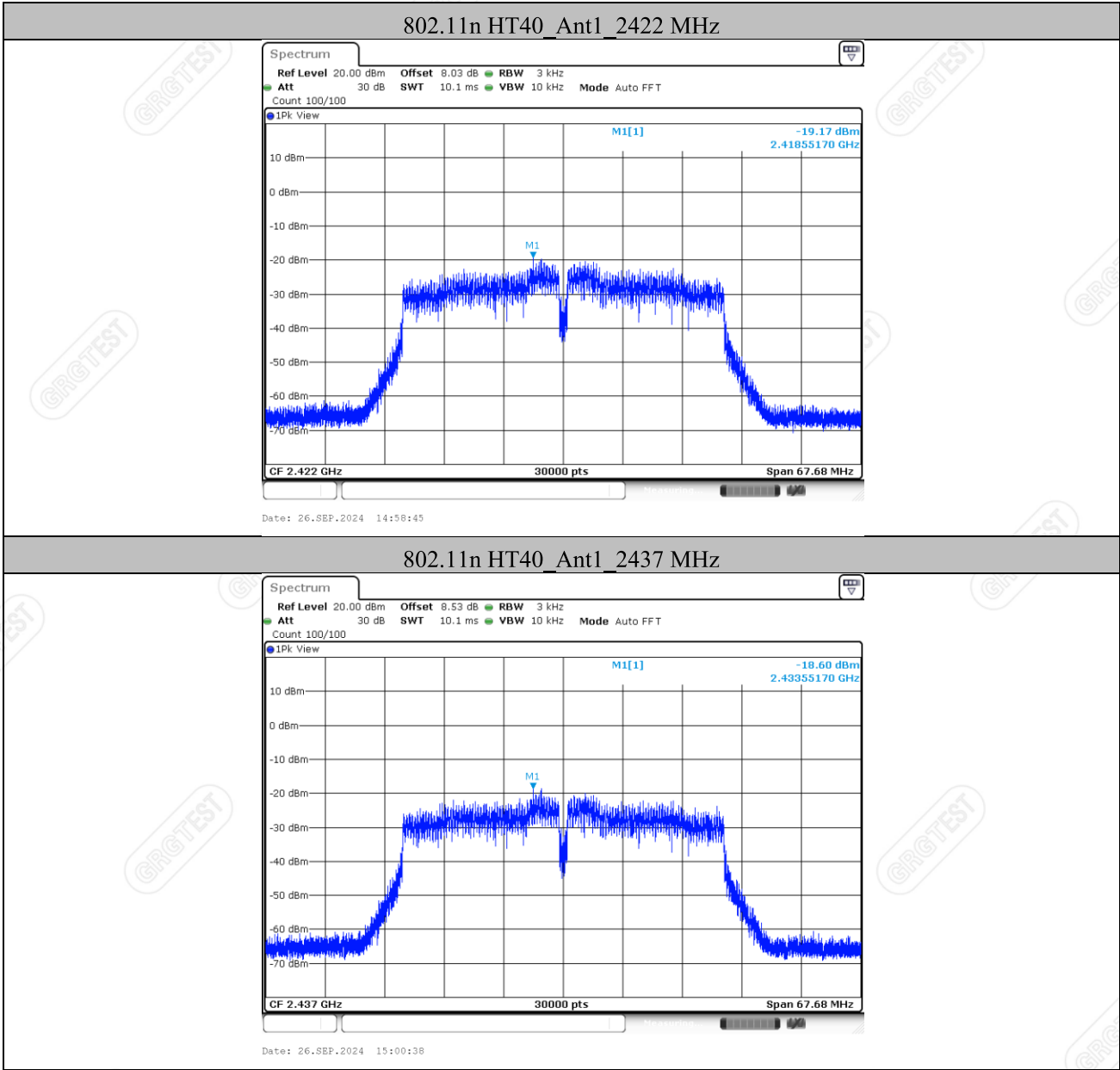


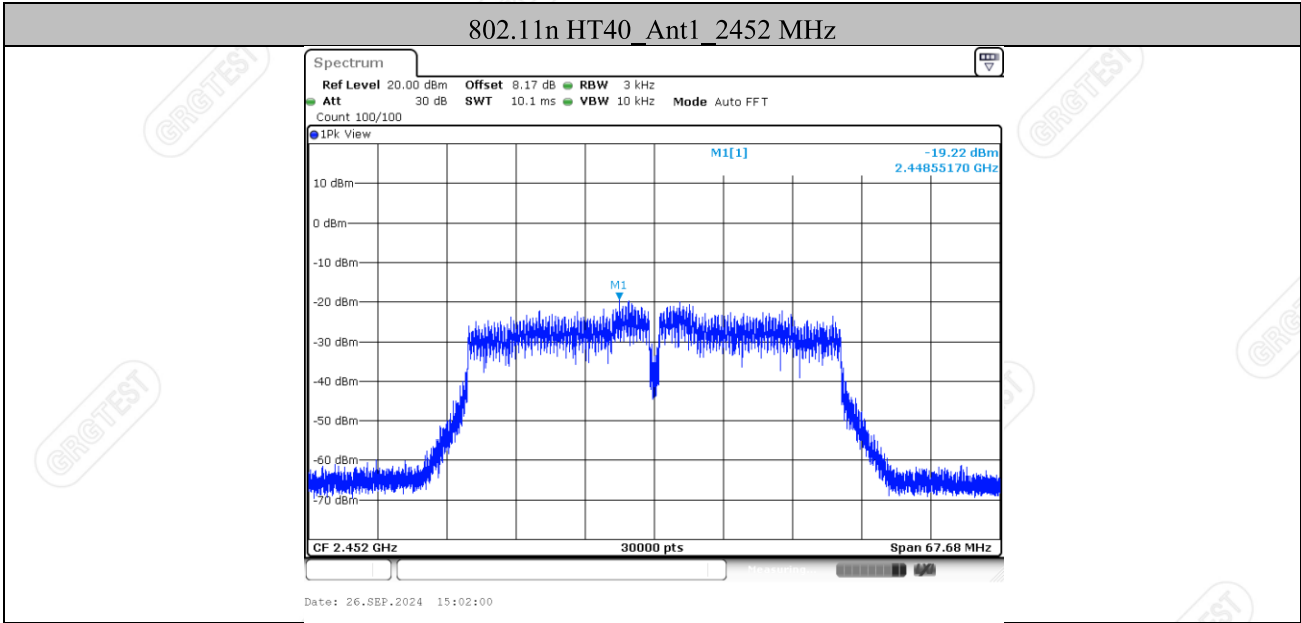












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9. CONDUCTED BAND EDGES AND SPURIOUS EMISSIONS

9.1 LIMITS

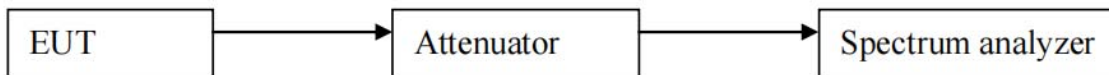
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

9.2 TEST PROCEDURES

Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.

- 1) Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.
- 2) Set the spectrum analyzer: RBW =100KHz; VBW =300KHz, Frequency range = 30MHz to 26.5GHz; Sweep = auto; Detector Function = Peak; Trace = Max hold.
- 3) Measure and record the results in the test report.
- 4) The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

9.3 TEST SETUP



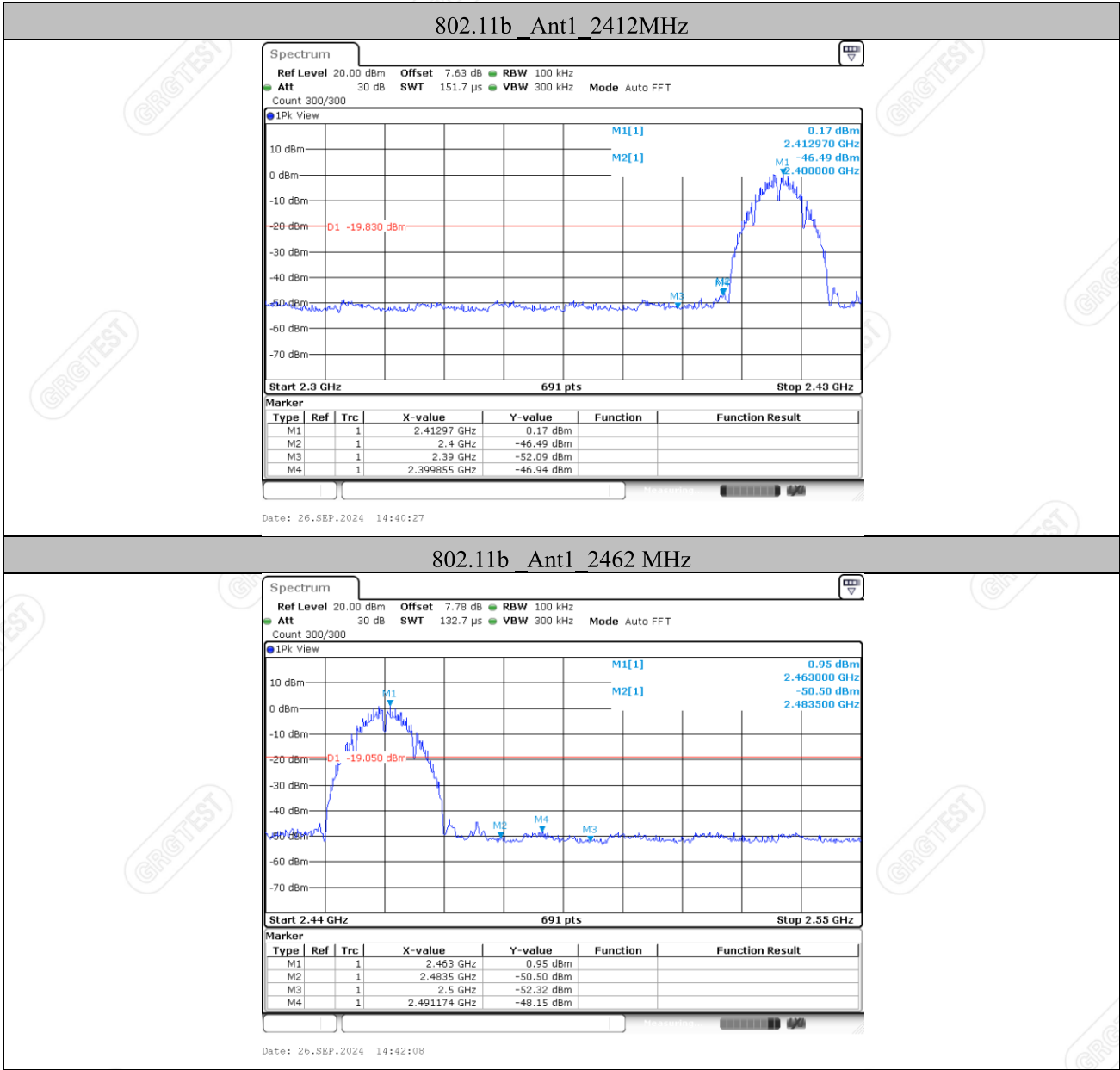
9.4 TEST RESULTS

Environment: 25.6°C/65%RH/101.0kPa
 Tested By:Zhu rongting

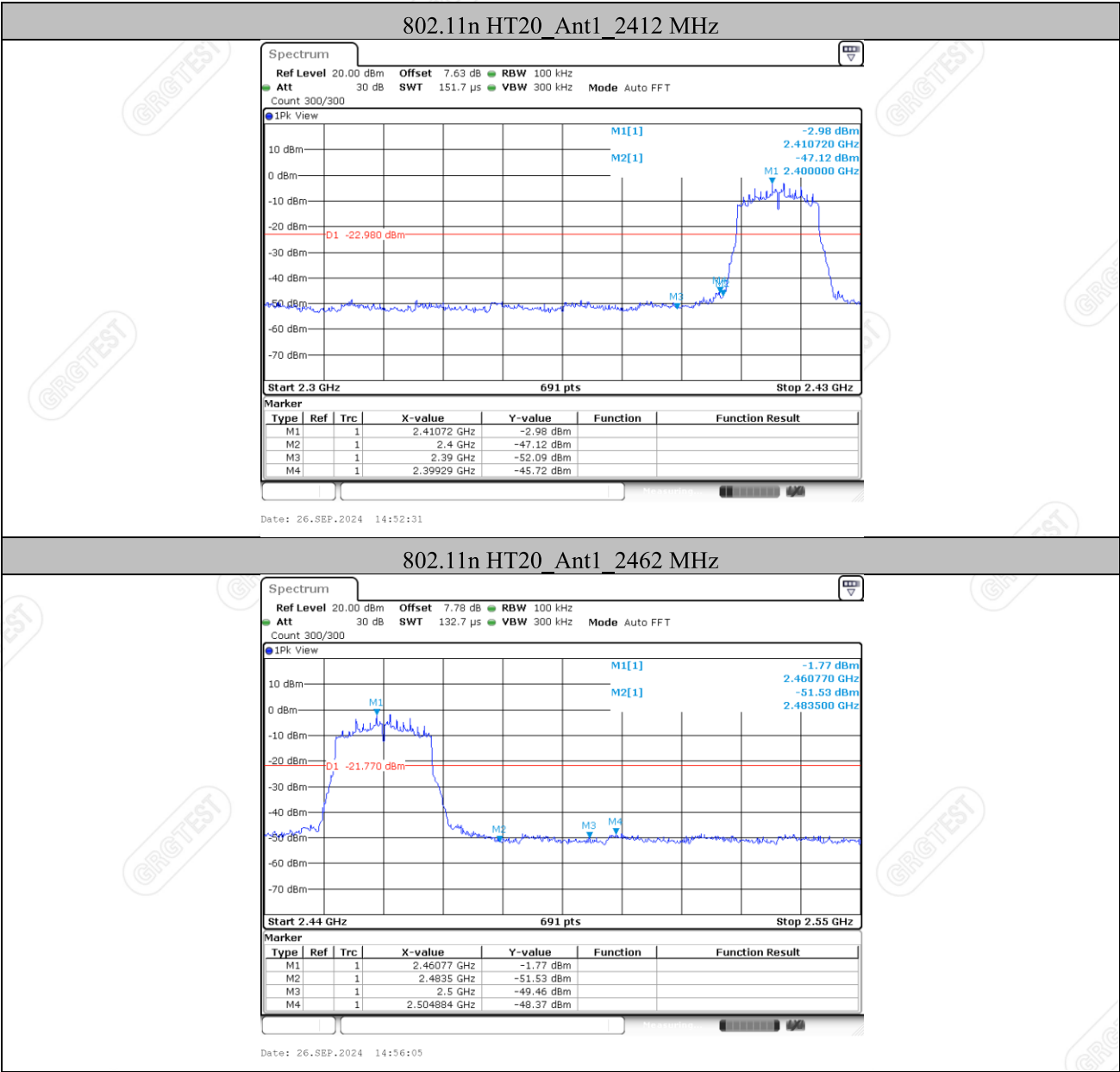
Voltage: DC 12V
 Date: 2024-09-26

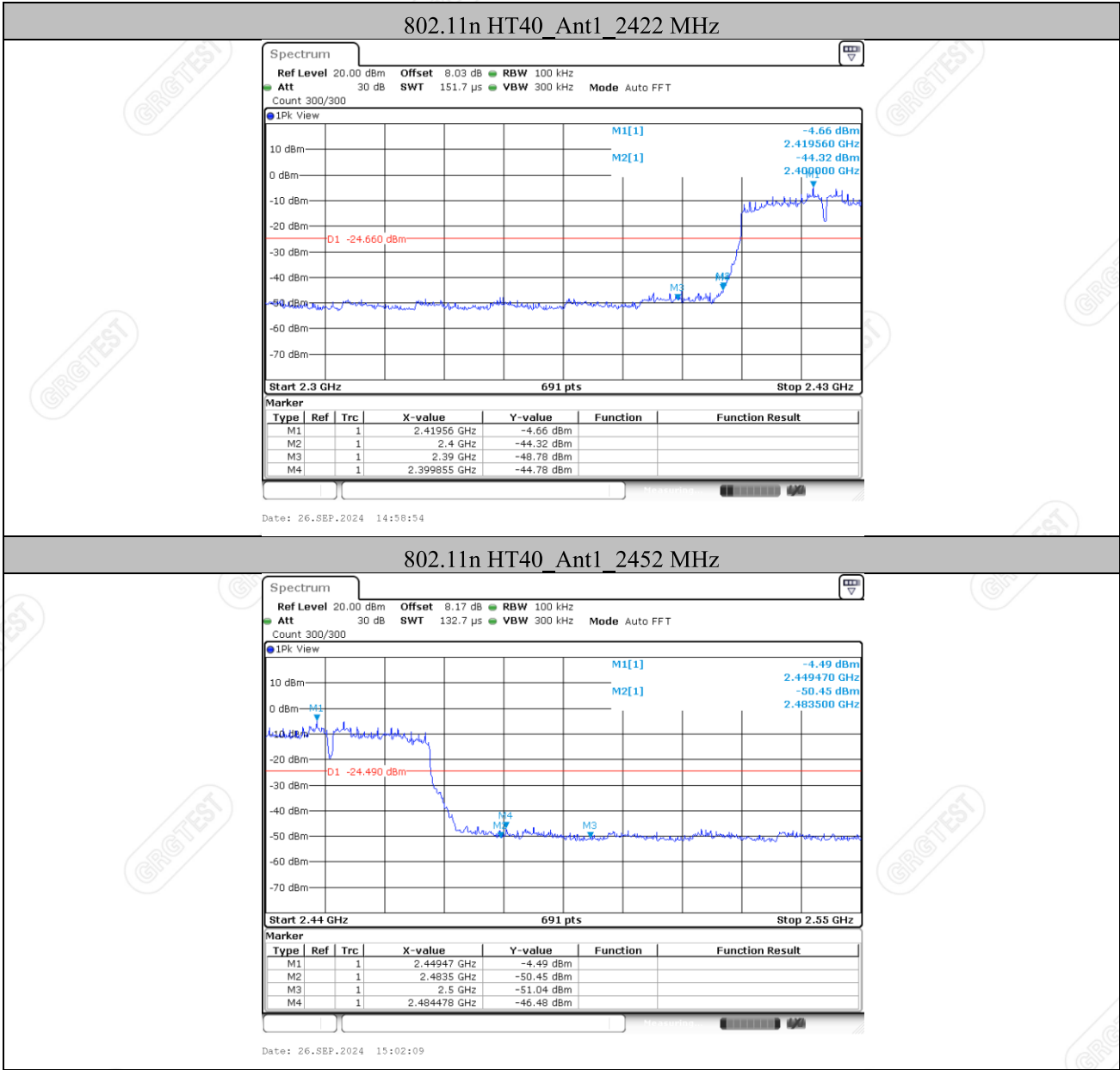
Band edge

Test Mode	Antenna	channel	Frequency [MHz]	Ref Level [dBm]	Result[dBm]	Limit[dBm]	Verdict
802.11b	Ant1	Low	2412	0.17	-46.94	≤-19.83	PASS
		High	2462	0.95	-48.15	≤-19.05	PASS
802.11g	Ant1	Low	2412	-2.03	-34.73	≤-22.03	PASS
		High	2462	-1.42	-47.51	≤-21.42	PASS
802.11n HT20	Ant1	Low	2412	-2.98	-45.72	≤-22.98	PASS
		High	2462	-1.77	-48.37	≤-21.77	PASS
802.11n HT40	Ant1	Low	2422	-4.66	-44.78	≤-24.66	PASS
		High	2452	-4.49	-46.48	≤-24.49	PASS









Conducted Spurious Emission:

Test Mode	Antenna	Frequency [MHz]	Frequency Range [Mhz]	Ref Level [dBm]	Result [dBm]	Limit [dBm]	Verdict
802.11b	Ant1	2412	Reference	0.13	0.13	---	PASS
			30~1000	0.13	-57.36	≤-19.87	PASS
			1000~26500	0.13	-45.34	≤-19.87	PASS
		2437	Reference	1.40	1.40	---	PASS
			30~1000	1.40	-57.94	≤-18.6	PASS
			1000~26500	1.40	-44.53	≤-18.6	PASS
		2462	Reference	1.07	1.07	---	PASS
			30~1000	1.07	-58.87	≤-18.93	PASS
			1000~26500	1.07	-44.39	≤-18.93	PASS
802.11g	Ant1	2412	Reference	-1.86	-1.86	---	PASS
			30~1000	-1.86	-59.35	≤-21.86	PASS
			1000~26500	-1.86	-44.94	≤-21.86	PASS
		2437	Reference	-0.59	-0.59	---	PASS
			30~1000	-0.59	-56.14	≤-20.59	PASS
			1000~26500	-0.59	-44.55	≤-20.59	PASS
		2462	Reference	-0.85	-0.85	---	PASS
			30~1000	-0.85	-59.26	≤-20.85	PASS
			1000~26500	-0.85	-45.22	≤-20.85	PASS
802.11n HT20	Ant1	2412	Reference	-2.73	-2.73	---	PASS
			30~1000	-2.73	-56.1	≤-22.73	PASS
			1000~26500	-2.73	-45.11	≤-22.73	PASS
		2437	Reference	-1.34	-1.34	---	PASS
			30~1000	-1.34	-57.32	≤-21.34	PASS
			1000~26500	-1.34	-44.19	≤-21.34	PASS
		2462	Reference	-1.70	-1.70	---	PASS
			30~1000	-1.70	-55.34	≤-21.7	PASS
			1000~26500	-1.70	-45.08	≤-21.7	PASS
802.11n HT40	Ant1	2422	Reference	-4.78	-4.78	---	PASS
			30~1000	-4.78	-58.85	≤-24.78	PASS
			1000~26500	-4.78	-44.26	≤-24.78	PASS
		2437	Reference	-4.11	-4.11	---	PASS
			30~1000	-4.11	-57.64	≤-24.11	PASS
			1000~26500	-4.11	-44.24	≤-24.11	PASS
		2452	Reference	-4.54	-4.54	---	PASS
			30~1000	-4.54	-58.71	≤-24.54	PASS
			1000~26500	-4.54	-43.55	≤-24.54	PASS

802.11b_Ant1_2412MHz_0~Reference

