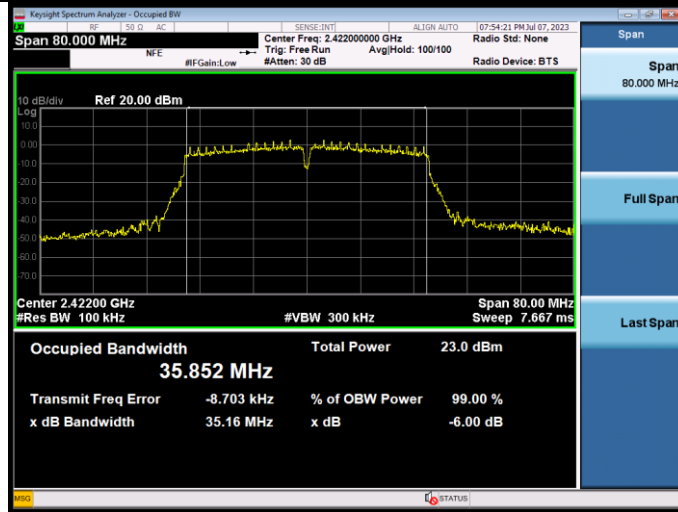
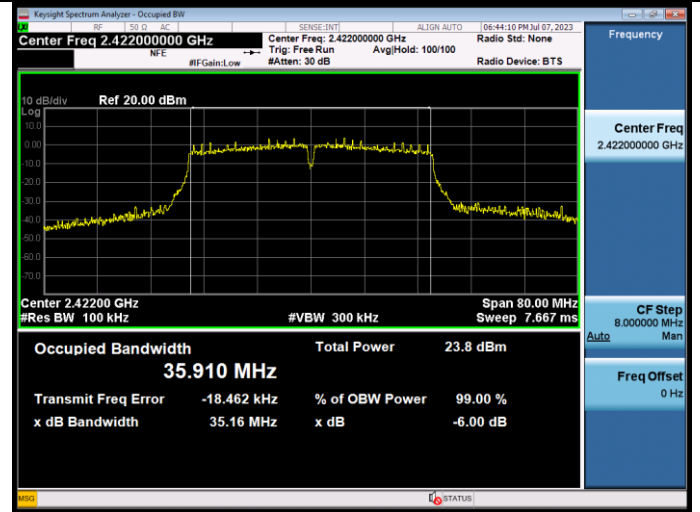
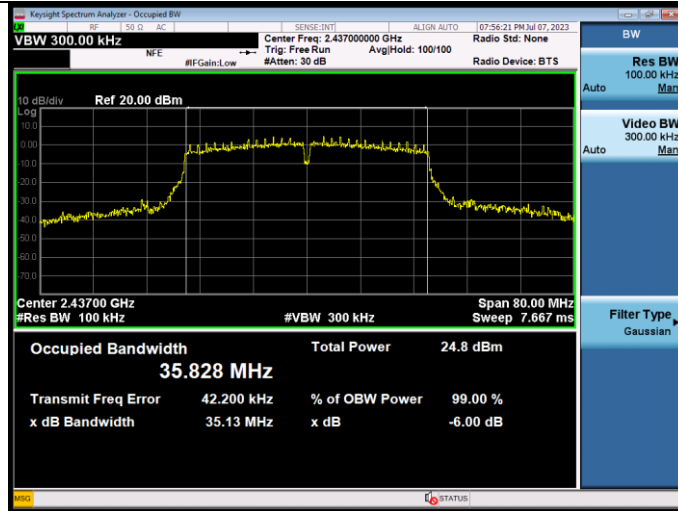


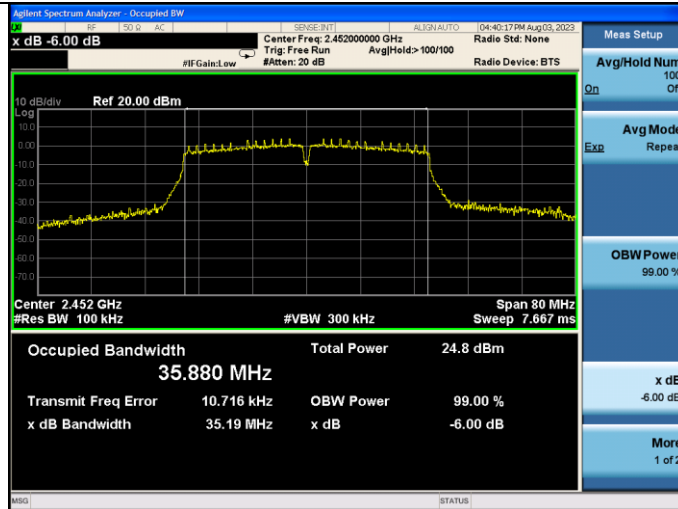
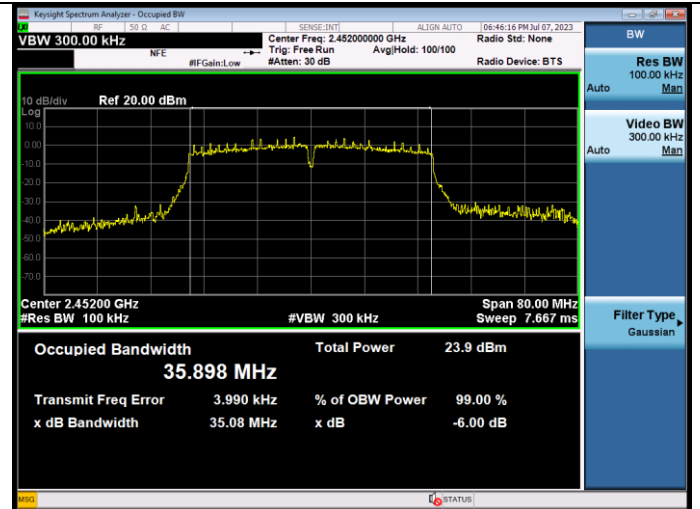
ANT A:

Test Mode: IEEE 802.11n HT40
Test CH3: 2422MHz


ANT B:

Test Mode: IEEE 802.11n HT40
Test CH3: 2422MHz


Test CH6: 2437MHz

Test CH6: 2437MHz

Test CH9: 2452MHz

Test CH9: 2452MHz


8. OUTPUT POWER TEST

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.01,23	1 Year
2.	Power meter	Anritsu	ML2487A	6K00003262	Jun.26,23	1 Year
3.	Power sensor	Anritsu	MA2491A	0332516	Jun.26,23	1 Year
4.	RF Cable	HUBER+SUHNER	SUCOFLE X-106	505238/6	Apr.02,23	1 Year

8.2. Limit (FCC Part 15C 15.247 b(3))

For systems using digital modulation in the 2400—2483.5MHz, The Peak output Power shall not exceed 1W(30dBm), As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level.

8.3. Test Procedure

- 1, Connected the EUT's antenna port to measure device by 10dB attenuator.
- 2, Use the test method described in ANSI C63.10-2013 clause 11.9.2.2.2 Method AVGSA-1.
 - 1) Set span to at least 1.5 times the OBW.
 - 2) Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
 - 3) Set VBW $\geq [3 \times \text{RBW}]$.
 - 4) Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW} / 2$, so that narrowband signals are not lost between frequency bins.)
 - 5) Sweep time = auto.
 - 6) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
 - 7) If transmit duty cycle < 98%, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at the maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no OFF intervals) or at duty cycle $\geq 98\%$, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run.”
 - 8) Trace average at least 100 traces in power averaging (rms) mode.
 - 9) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

8.4. Test Results

EUT: Wi-Fi Module		
M/N: U9W37		
Test date: 2023-07-04~25	Pressure: 103.1±1.0 kpa	Humidity: 51.5±3.0%
Tested by: Winter	Test site: RF site	Temperature: 22.5±0.6 °C

SISO:

Test Mode	CH	Power Set	Duty factor(dB)	Output Power(dBm)		Limit (dBm)
				ANTA	ANTB	
11b	CH1	23	0	12.41	14.56	30
	CH6	23	0	14.70	14.95	
	CH11	23	0	13.60	14.90	
11g	CH1	23	0.092	14.89	16.91	30
	CH6	23	0.092	16.95	16.80	
	CH11	23	0.092	16.12	17.11	
11n HT20	CH1	23	0.89	15.63	17.61	30
	CH6	23	0.89	17.75	17.54	
	CH11	23	0.89	16.83	17.72	
11n HT40	CH3	23	1.28	17.93	17.57	30
	CH6	23	1.28	18.06	17.95	
	CH9	23	1.28	18.13	17.88	
Conclusion: PASS						

MIMO:

Test Mode	CH	Power Set	Duty factor (dB)	Output Power (dBm)		Total (dbm)	Limit (dBm)
				ANTA	ANTB		
11b	CH1	23	0	12.32	14.25	16.40	30
	CH6	23	0	14.76	14.74	17.76	
	CH11	23	0	13.44	14.69	17.12	
11g	CH1	23	0.092	14.88	16.39	18.71	30
	CH6	23	0.092	16.83	16.49	19.68	
	CH11	23	0.092	16.11	16.88	19.52	
11n HT20	CH1	23	0.89	15.71	17.58	19.76	30
	CH6	23	0.89	17.53	17.64	20.60	
	CH11	23	0.89	16.76	17.81	20.33	
11n HT40	CH3	23	1.28	16.00	17.49	19.82	30
	CH6	23	1.28	17.94	17.53	20.75	
	CH9	23	1.28	17.98	17.68	20.84	
Conclusion: PASS							

Note: 1. Directional Gain= $10 \log[(10^{-0.74/20} + 10^{-2.80/20})^2 / 2]$ dB = 1.3012dB < 6dBi.

Directional Gain= $10 \log[(10^{-0.74/10} + 10^{-2.80/10}) / 2]$ dB = -1.6490dB < 6dBi.

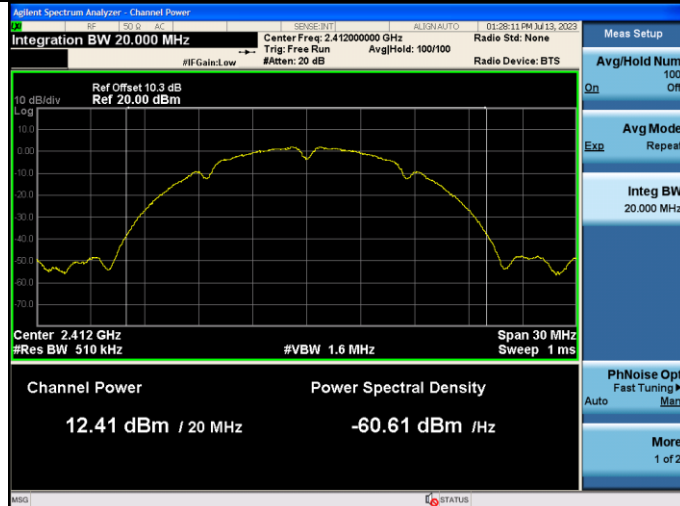
2. U9W37 supports and operates in both correlated MIMO signals and uncorrelated MIMO signals.

SISO:

ANT A:

Test Mode: IEEE 802.11b

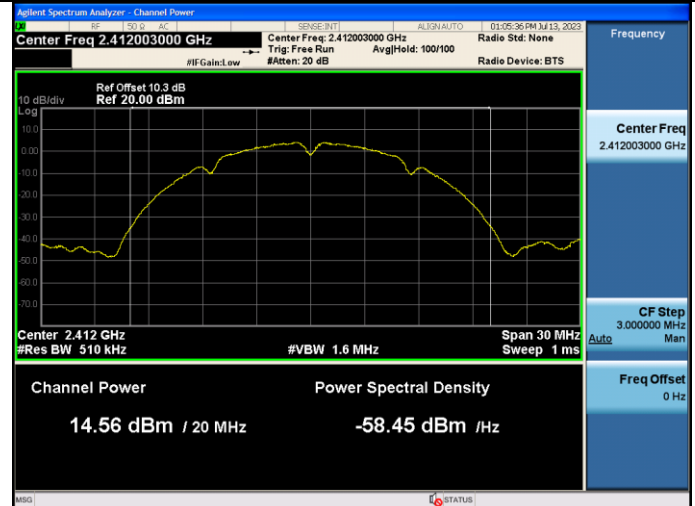
Test CH1: 2412MHz



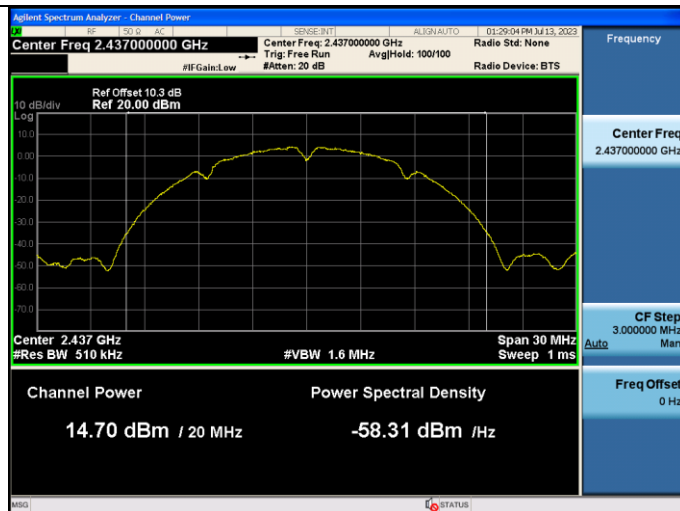
ANT B:

Test Mode: IEEE 802.11b

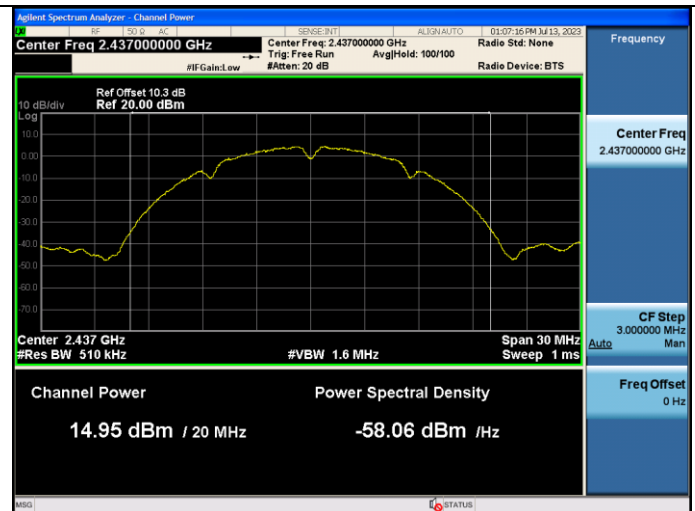
Test CH1: 2412MHz



Test CH6: 2437MHz



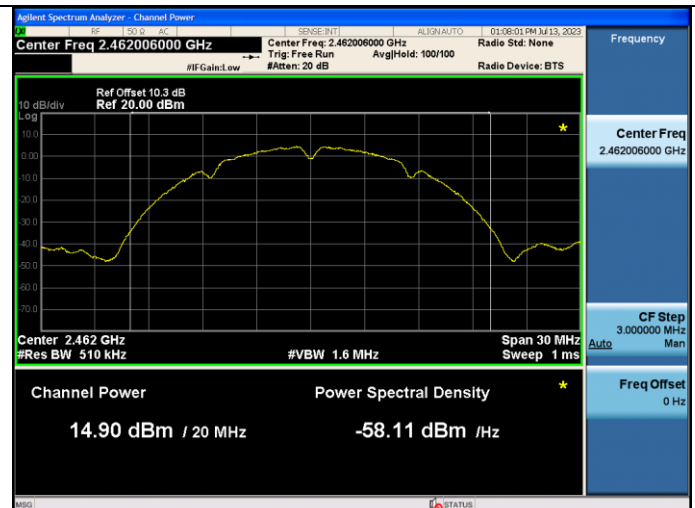
Test CH6: 2437MHz



Test CH11: 2462MHz

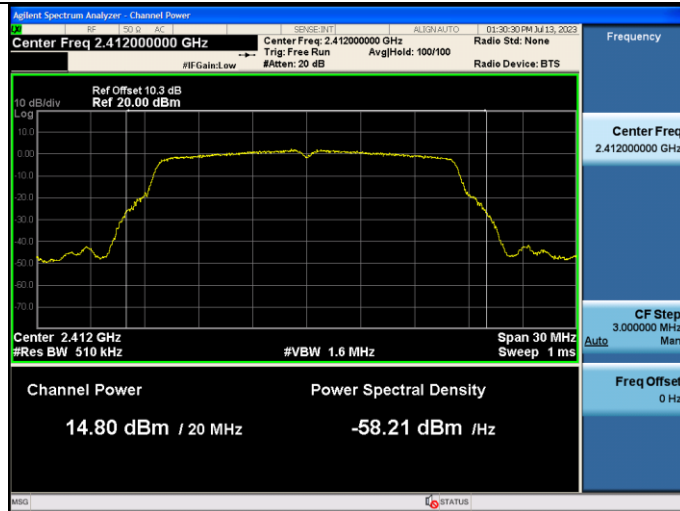


Test CH11: 2462MHz

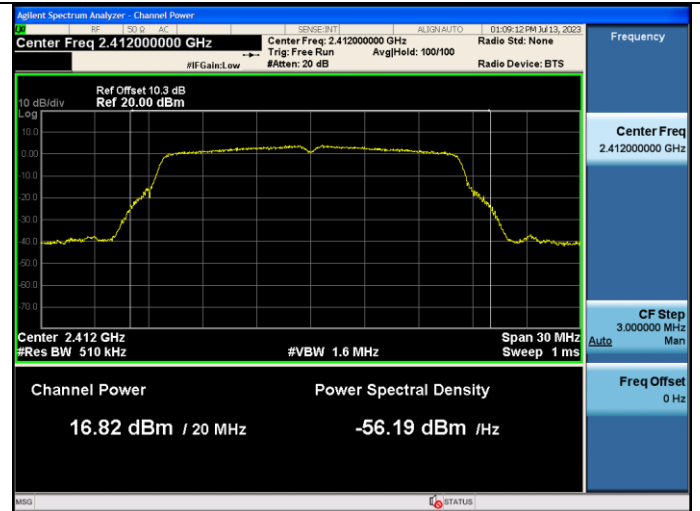
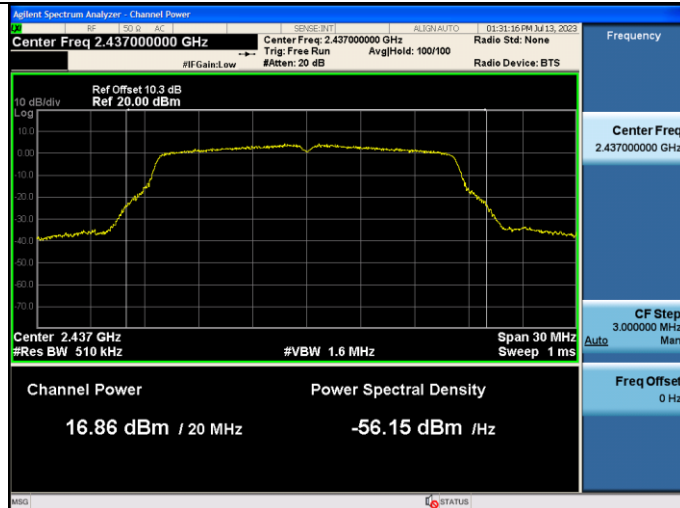
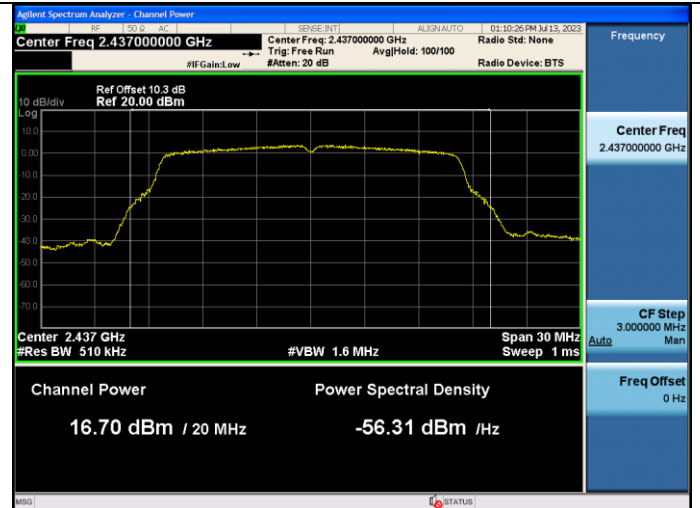


ANT A:

Test Mode: IEEE 802.11g
Test CH1: 2412MHz


ANT B:

Test Mode: IEEE 802.11g
Test CH1: 2412MHz

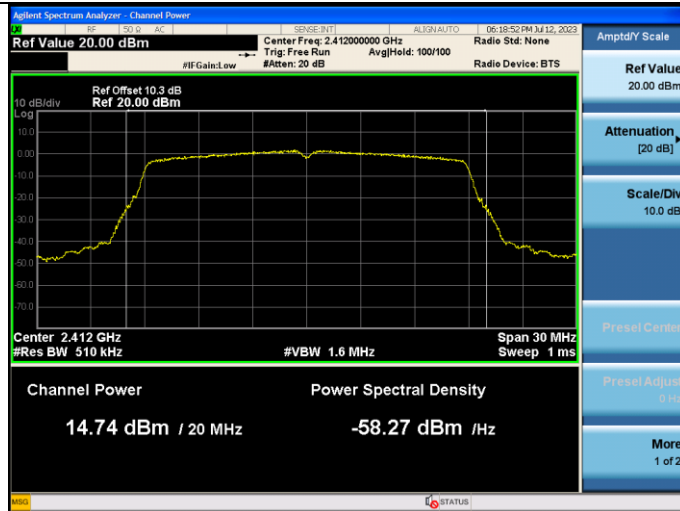

Test CH6: 2437MHz

Test CH6: 2437MHz

Test CH11: 2462MHz

Test CH11: 2462MHz


ANT A:

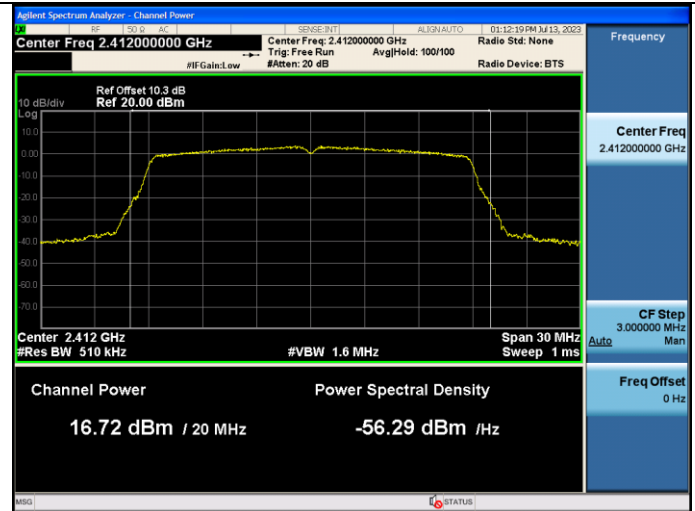
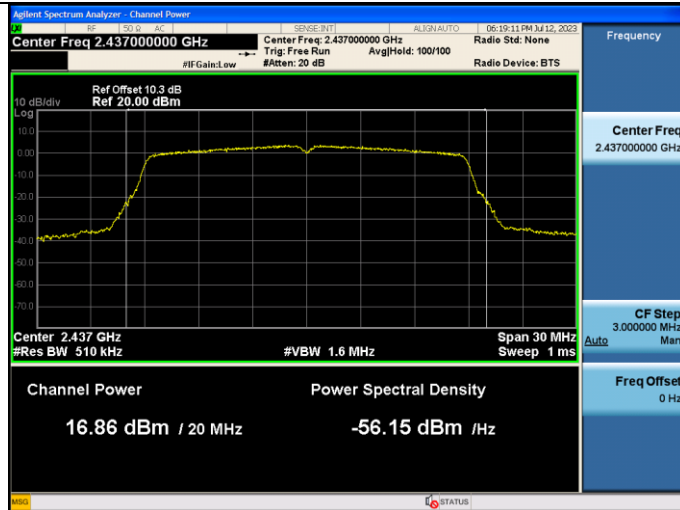
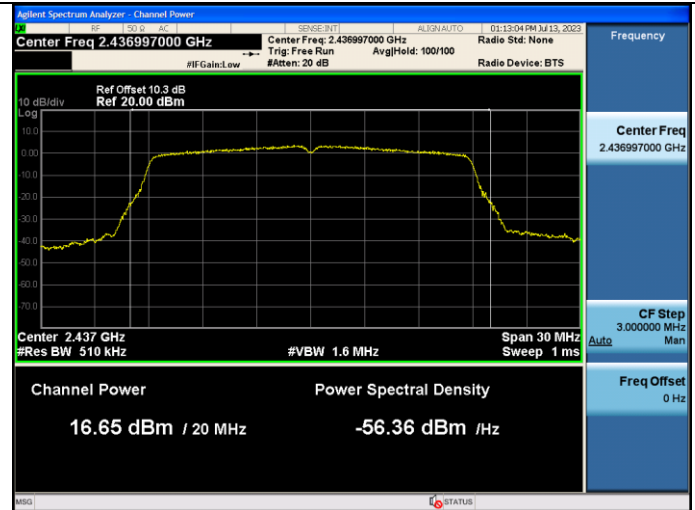
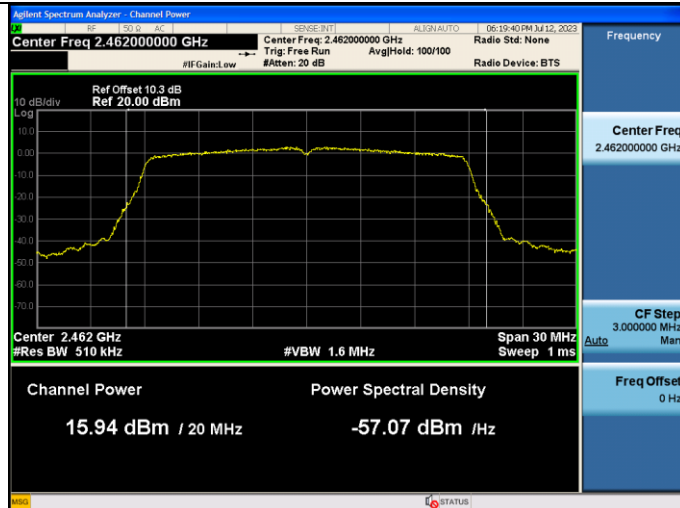
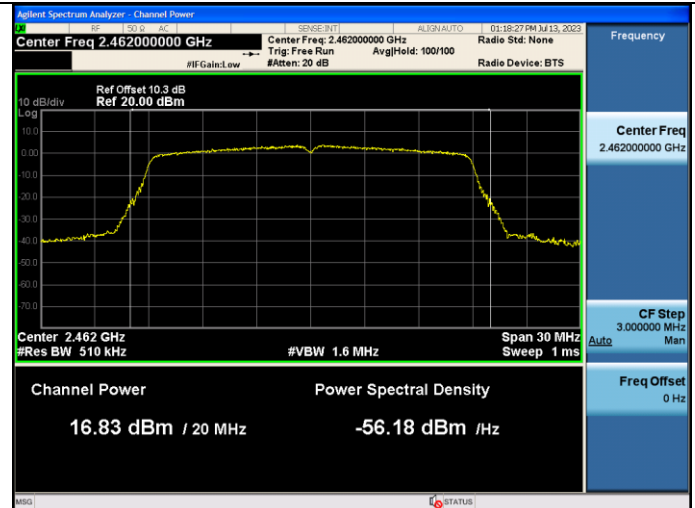
Test Mode: IEEE 802.11n HT20

Test CH1: 2412MHz


ANT B:

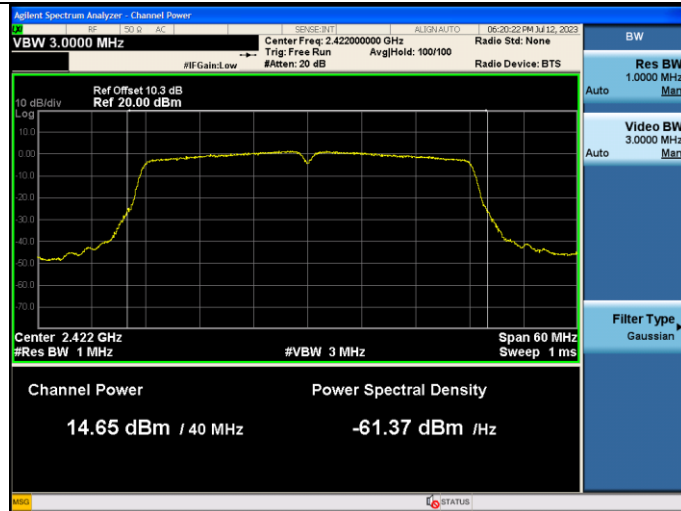
Test Mode: IEEE 802.11n HT20

Test CH1: 2412MHz


Test CH6: 2437MHz

Test CH6: 2437MHz

Test CH11: 2462MHz

Test CH11: 2462MHz


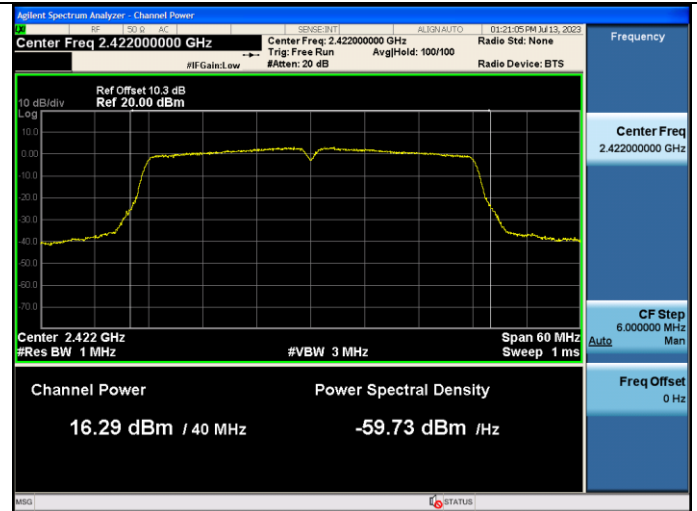
ANT A:

Test Mode: IEEE 802.11n HT40
Test CH3: 2422MHz

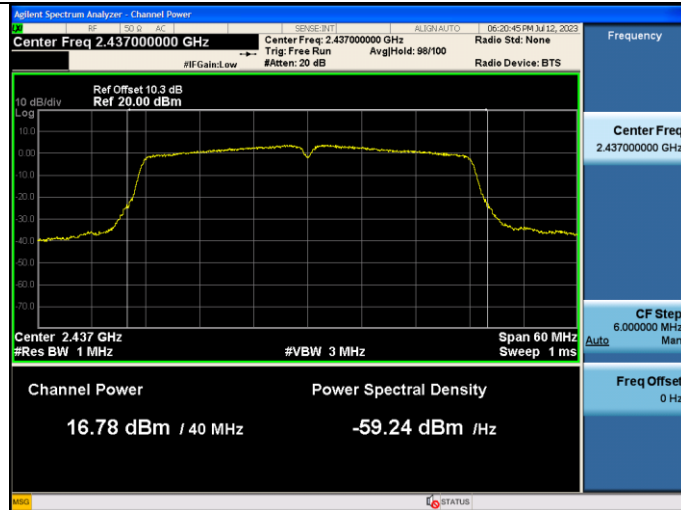


ANTB:

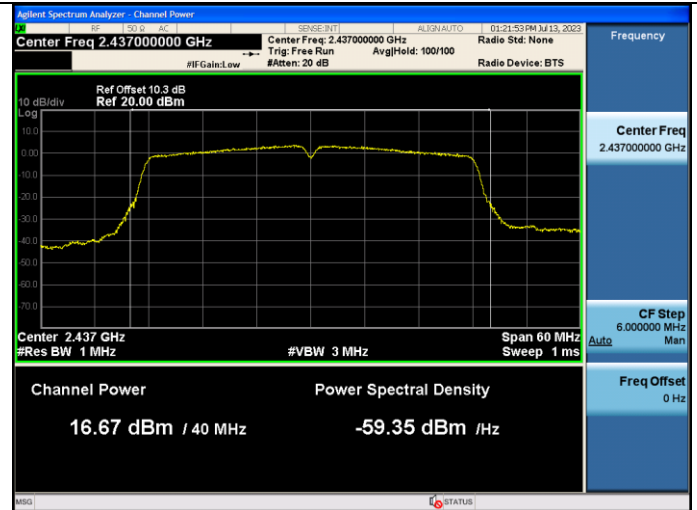
Test Mode: IEEE 802.11n HT40
Test CH3: 2422MHz



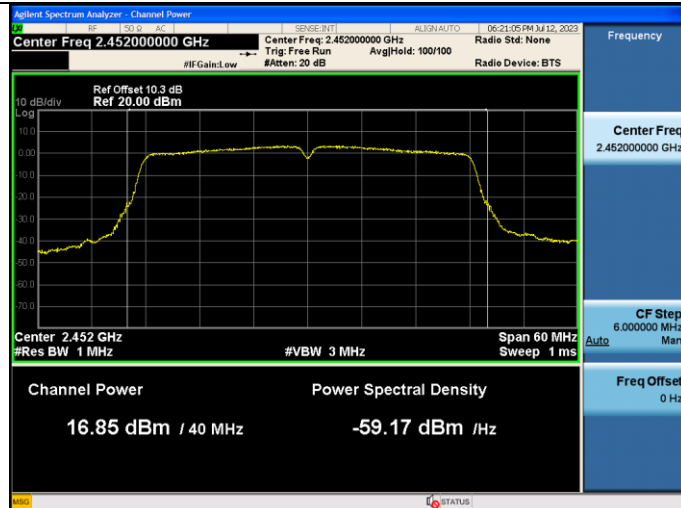
Test CH6: 2437MHz



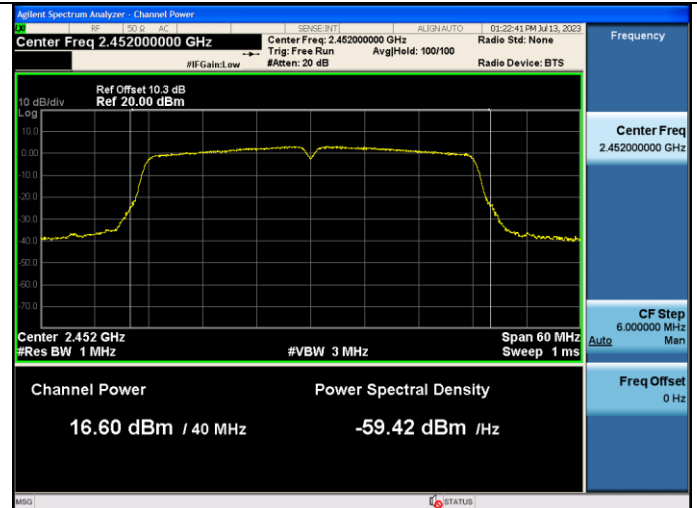
Test CH6: 2437MHz



Test CH9: 2452MHz



Test CH9: 2452MHz



MIMO:

ANT A:

Test Mode: IEEE 802.11b

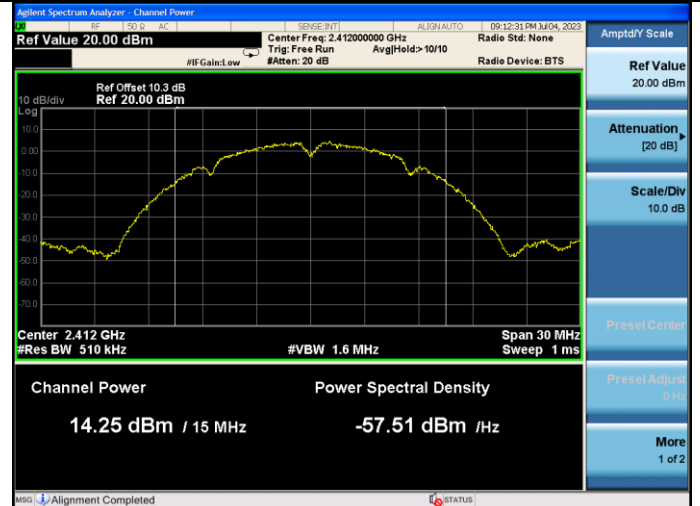
Test CH1: 2412MHz



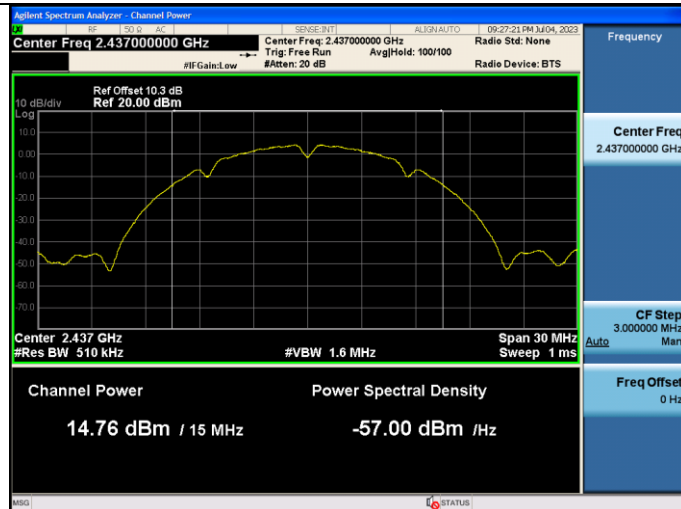
ANT B:

Test Mode: IEEE 802.11b

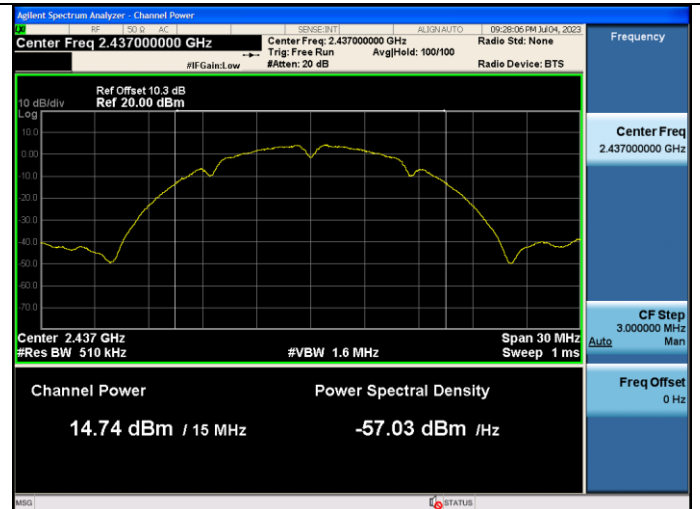
Test CH1: 2412MHz



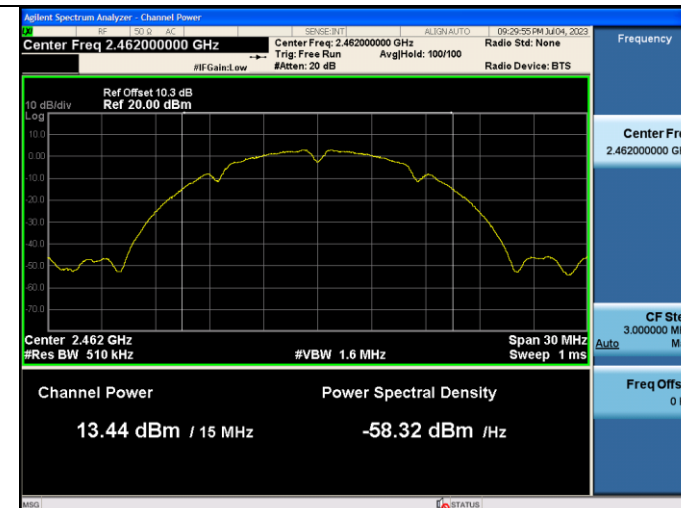
Test CH6: 2437MHz



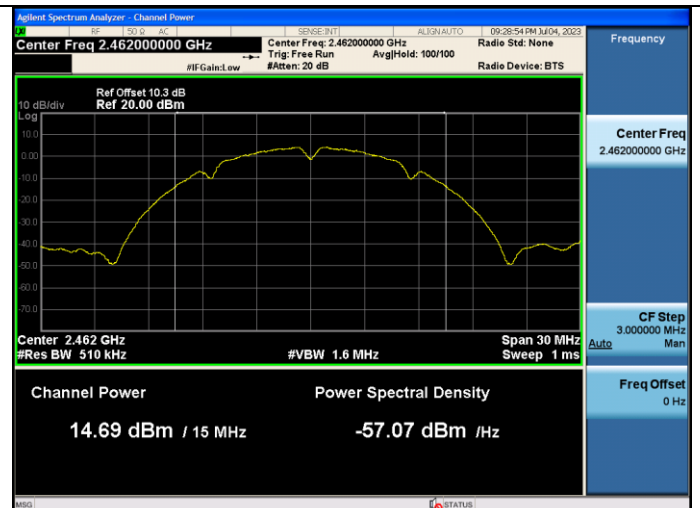
Test CH6: 2437MHz



Test CH11: 2462MHz

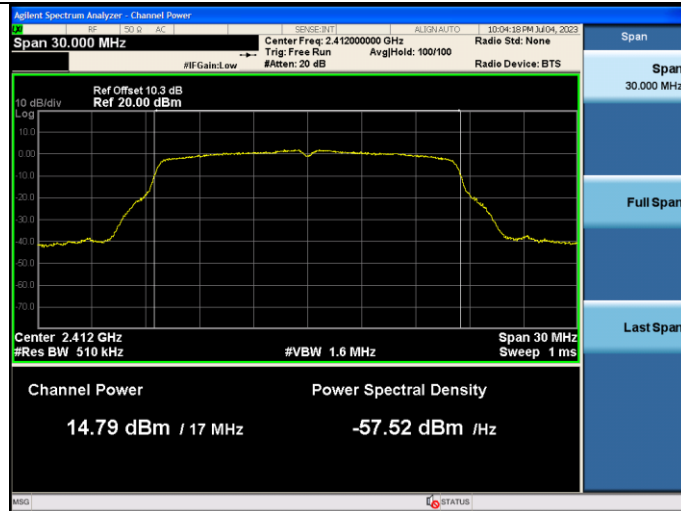


Test CH11: 2462MHz

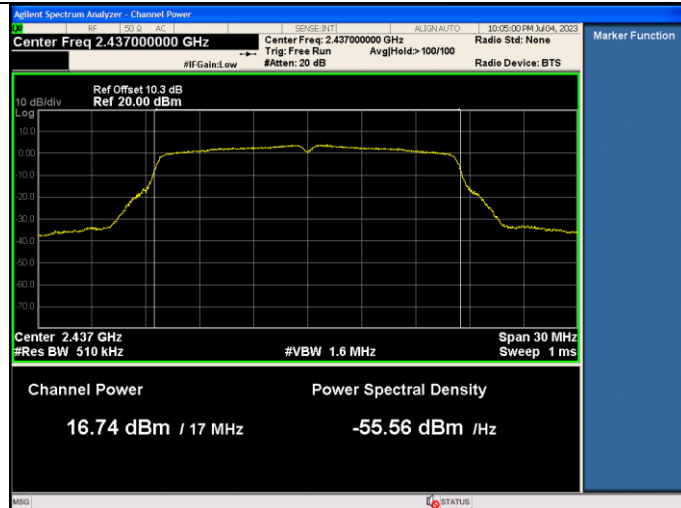
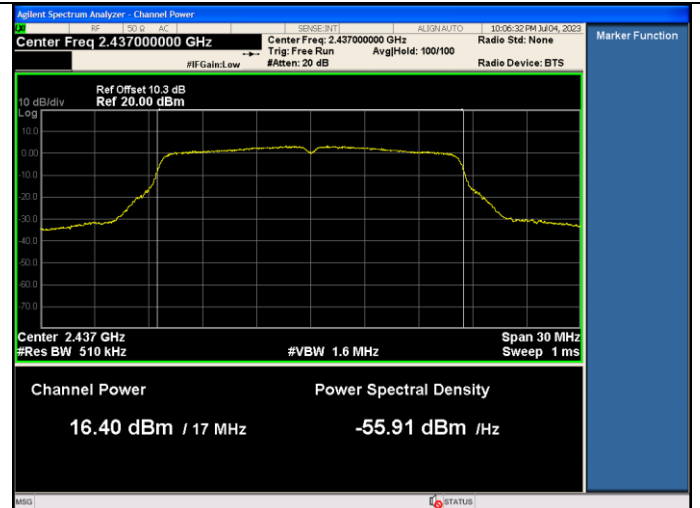


ANT A:

Test Mode: IEEE 802.11g
Test CH1: 2412MHz


ANT B:

Test Mode: IEEE 802.11g
Test CH1: 2412MHz

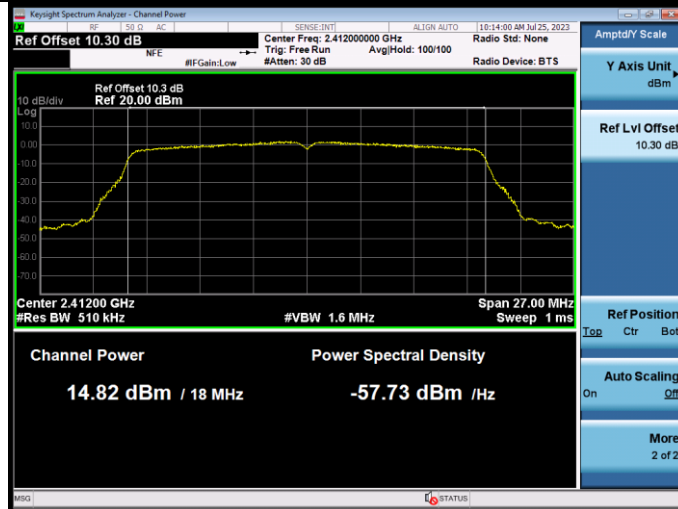

Test CH6: 2437MHz

Test CH6: 2437MHz

Test CH11: 2462MHz

Test CH11: 2462MHz


ANT A:

Test Mode: IEEE 802.11n HT20

Test CH1: 2412MHz

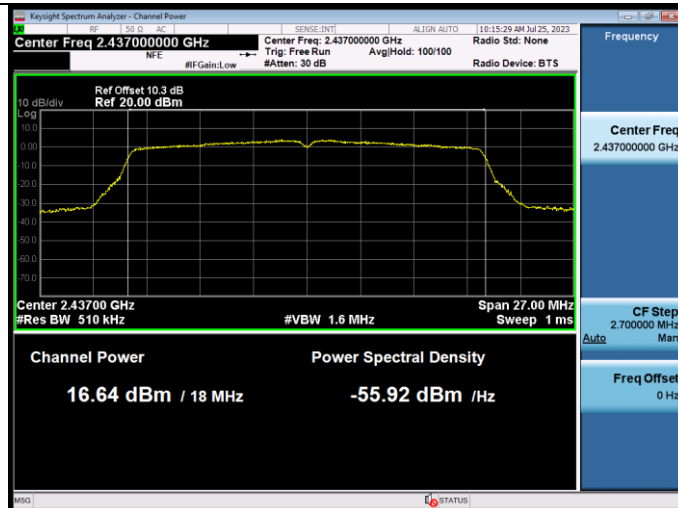

ANT B:

Test Mode: IEEE 802.11n HT20

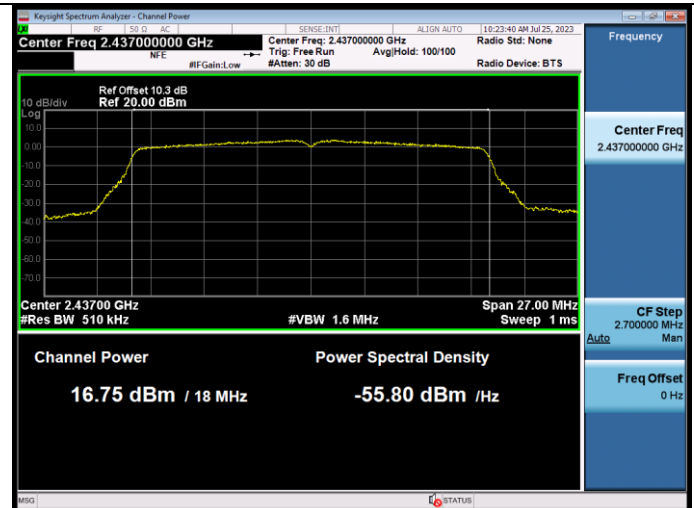
Test CH1: 2412MHz



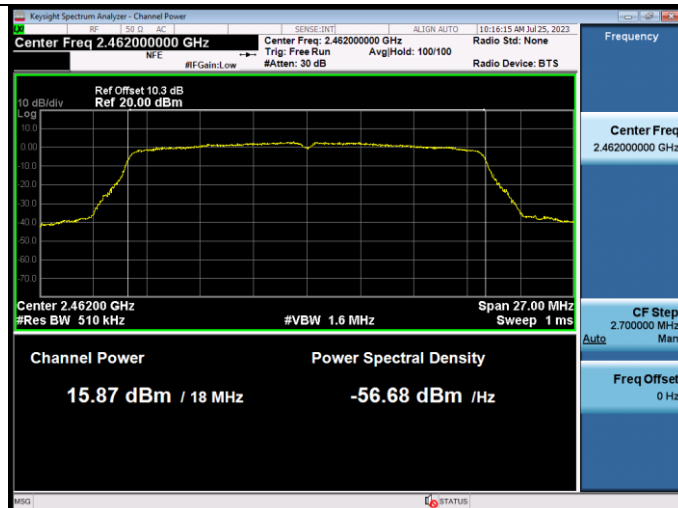
Test CH6: 2437MHz



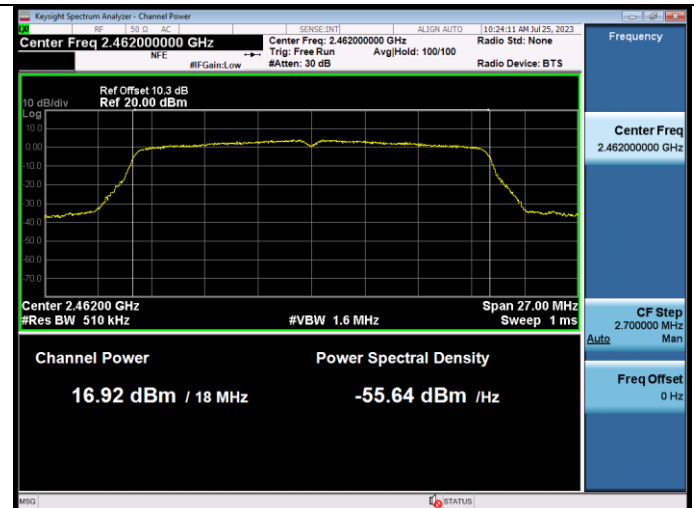
Test CH6: 2437MHz



Test CH11: 2462MHz

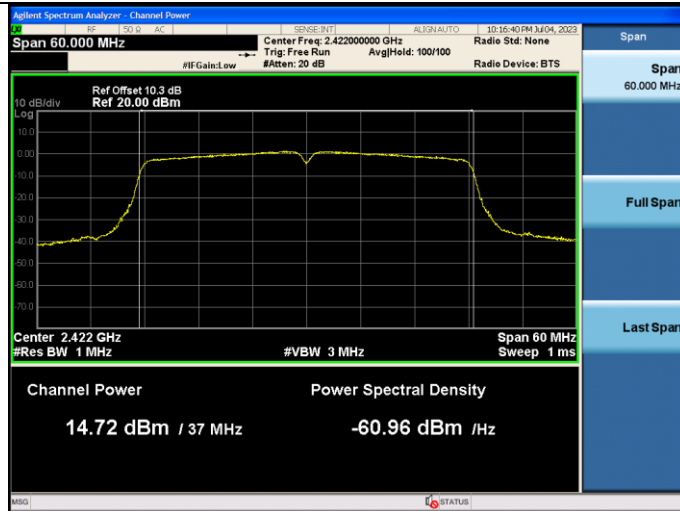


Test CH11: 2462MHz



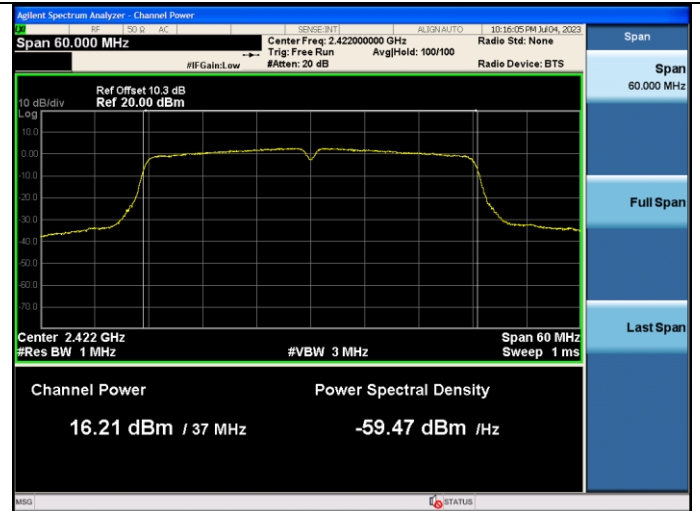
ANT A

Test Mode: IEEE 802.11n HT40
Test CH3: 2422MHz

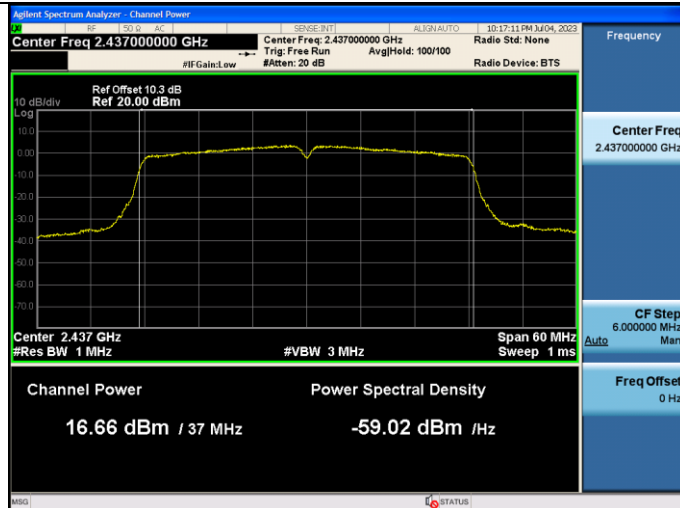


ANT B:

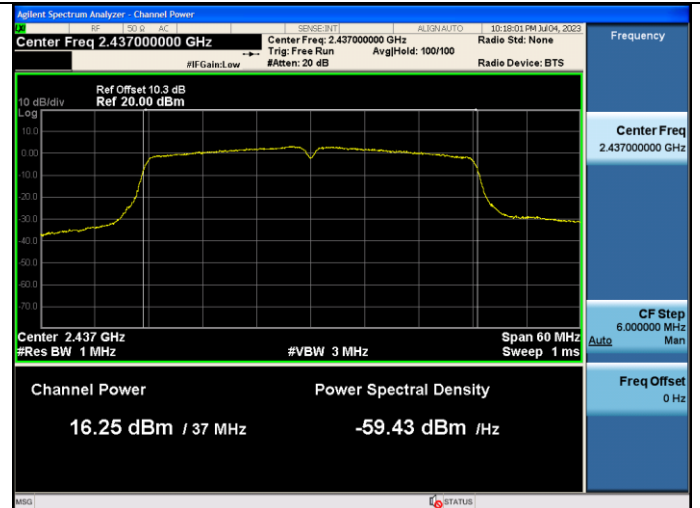
Test Mode: IEEE 802.11n HT40
Test CH3: 2422MHz



Test CH6: 2437MHz



Test CH6: 2437MHz



Test CH9: 2452MHz



Test CH9: 2452MHz



9. POWER SPECTRAL DENSITY TEST

9.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.01,23	1 Year
2.	RF Cable	HUBER+SUHNER	SUCOFLEX-106	505238/6	Apr.02,23	1 Year

9.2. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

9.3. Test Procedure

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 DTS bandwidth.
- Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq [3 \times \text{RBW}]$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.

9.4. Test Results

EUT: Wi-Fi Module		
M/N: U9W37		
Test date: 2023-07-07	Pressure: 103.1±1.0 kpa	Humidity: 51.5±3.0%
Tested by: Winter	Test site: RF site	Temperature: 22.5±0.6 °C

Test Mode	CH	Power Spectral Density (dBm/3KHz)		Total (dBm/3KHz)	Limit (dBm/3KHz)
		ANTA	ANTB		
11b	CH1	-8.453	-6.621	-4.43	8
	CH6	-6.622	-5.970	-3.27	
	CH11	-6.477	-5.155	-2.76	
11g	CH1	-7.865	-6.484	-4.11	8
	CH6	-6.660	-6.407	-3.52	
	CH11	-6.692	-5.603	-3.10	
11n HT20	CH1	-7.637	-5.891	-3.67	8
	CH6	-7.147	-6.023	-3.54	
	CH11	-5.727	-5.800	-2.75	
11n HT40	CH3	-11.506	-9.765	-7.54	8
	CH6	-9.022	-9.723	-6.35	
	CH9	-8.800	-8.679	-5.73	

Conclusion: PASS

Note: 1. Directional Gain= $10 \log[(10^{-0.74/20} + 10^{-2.80/20})^2 / 2]$ dBi= 1.3012dB < 6dBi.

Directional Gain= $10 \log[(10^{-0.74/10} + 10^{-2.80/10}) / 2]$ dBi= -1.6490dB < 6dBi.

2. U9W37 supports and operates in both correlated MIMO signals and uncorrelated MIMO signals.