

8 6dB&99% Bandwidth Measurement

Test Requirement : FCC CFR47 Part 15 Section 15.247, RSS-GEN §6.7& RSS-247 §5.2

Test Method : ANSI C63.10:2013

Test Limit 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.

8.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

8.2 Test Result

Test CH	-6dB Occupy Bandwidth (MHz)					Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)	Limit(KHz)	
Lowest	9.04	15.74	16.84	36.00	>500	Pass
Middle	9.04	16.09	16.86	35.63		
Highest	8.61	16.10	17.01	35.59		

Test CH	99% Occupy Bandwidth (MHz)					Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)	Limit(KHz)	
Lowest	11.989	17.552	17.777	36.831	/	Pass
Middle	11.952	18.010	17.993	36.460		
Highest	12.060	18.012	18.054	36.366		

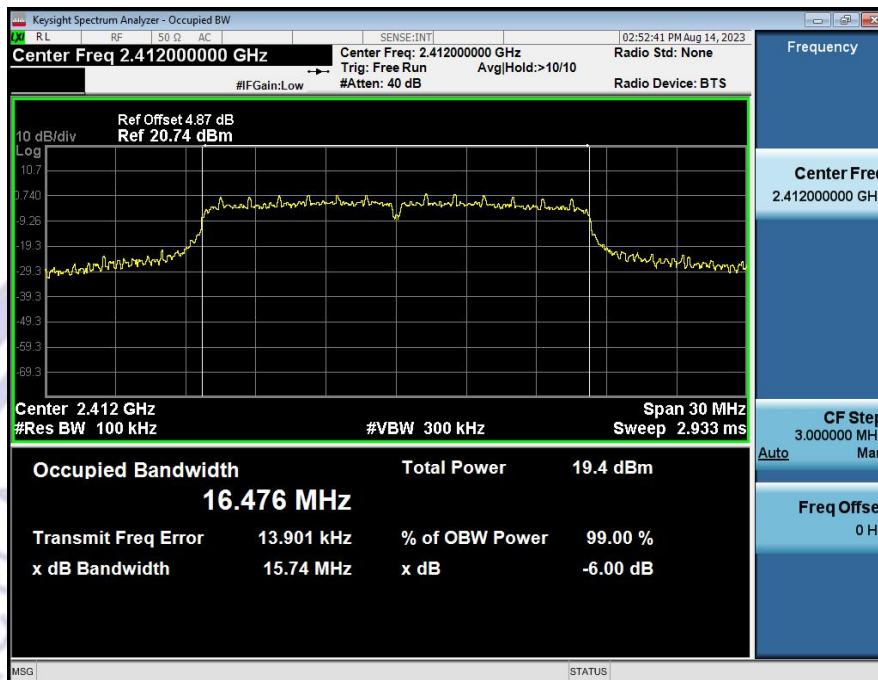
-6dB Occupancy Bandwidth
802.11b Low Channel



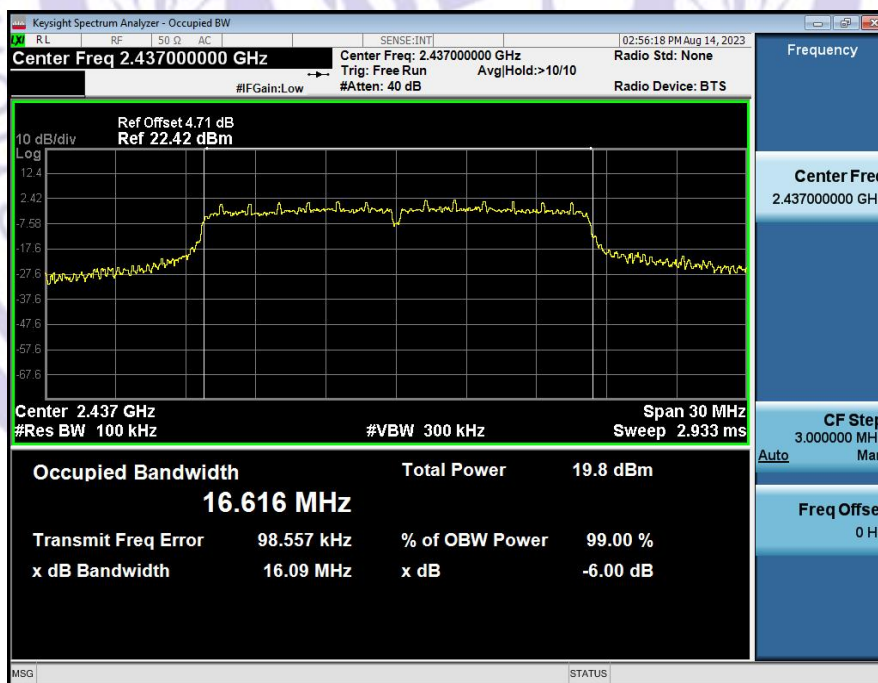
802.11b Middle Channel



802.11b High Channel



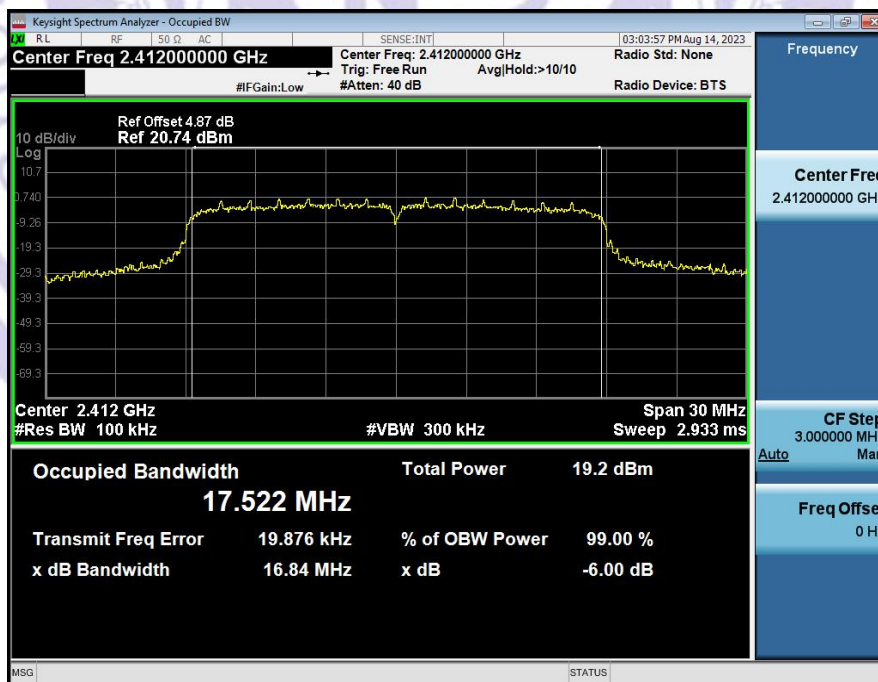
802.11g Low Channel



802.11g Middle Channel



802.11g High Channel



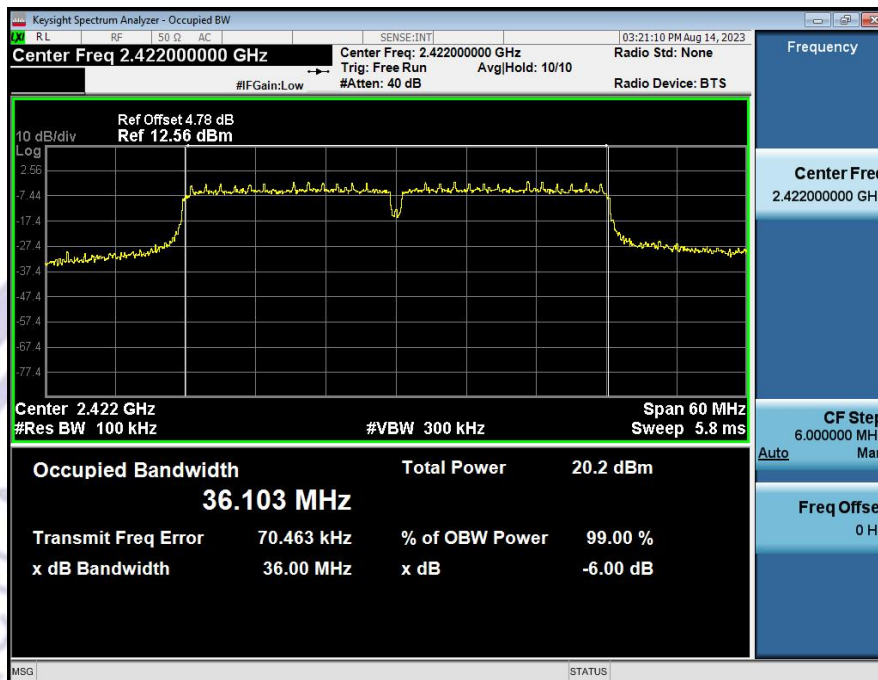
802.11n20 Low Channel



802.11n20 Middle Channel



802.11n20 High Channel



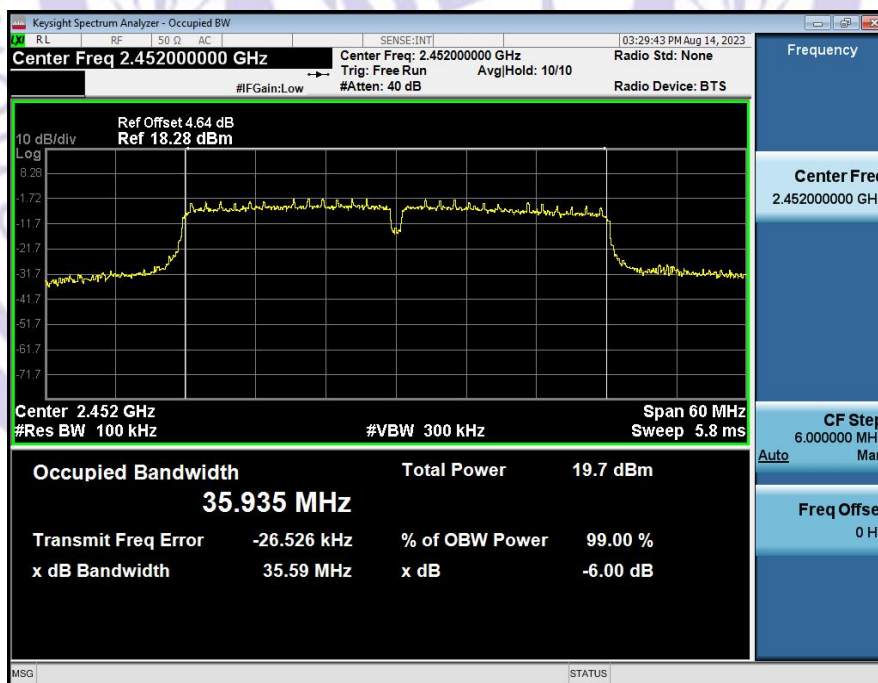
802.11n40 Low Channel



802.11n40 Middle Channel



802.11n40 High Channel



99% Occupancy Bandwidth

802.11b Low Channel



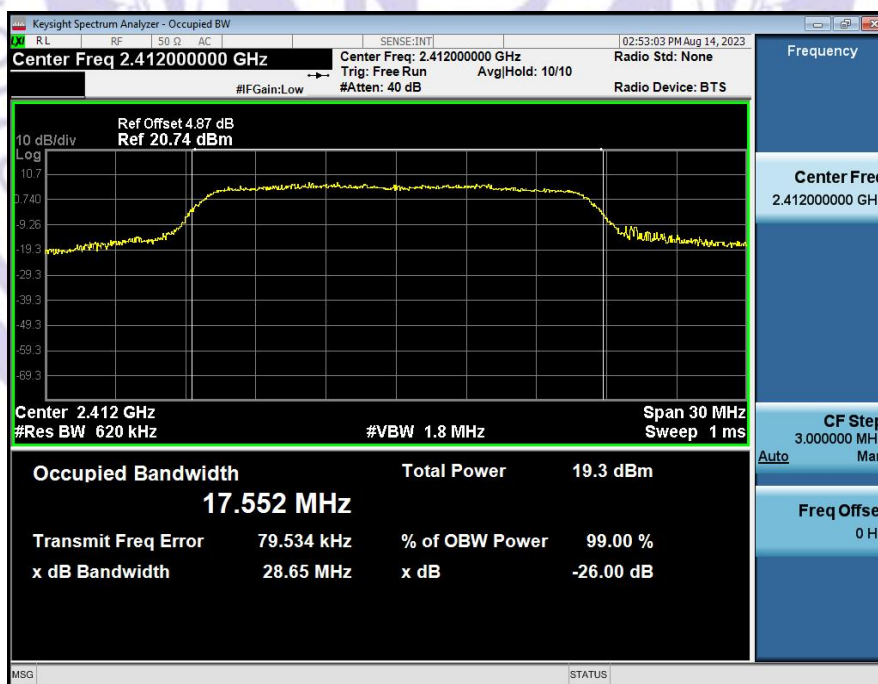
802.11b Middle Channel



802.11b High Channel



802.11g Low Channel



802.11g Middle Channel



802.11g High Channel



802.11n20 Low Channel



802.11n20 Middle Channel



802.11n20 High Channel



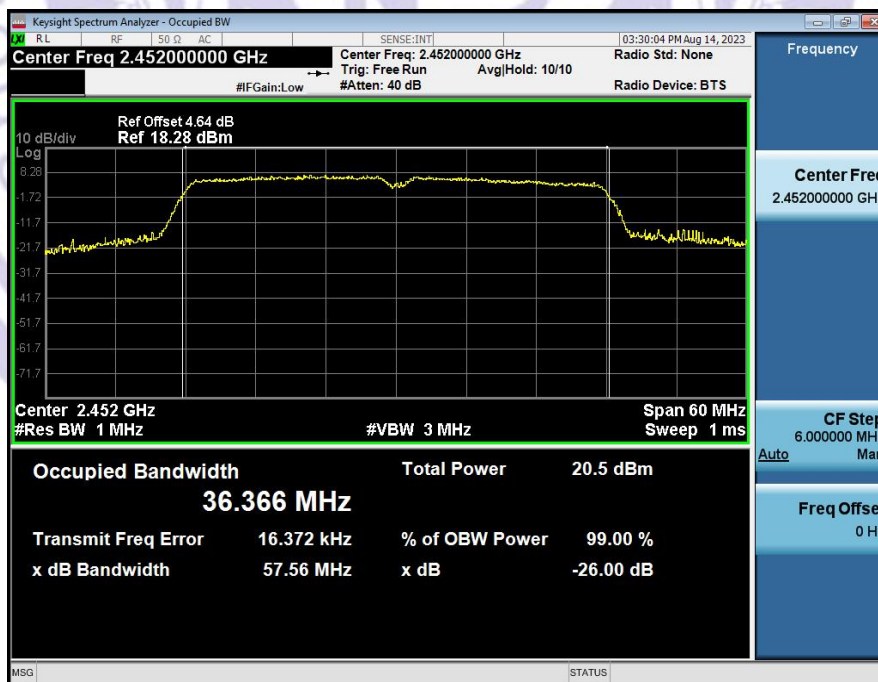
802.11n40 Low Channel



802.11n40 Middle Channel



802.11n40 High Channel



9 Maximum Peak Output Power

Test Requirement : FCC CFR47 Part 15 Section 15.247, RSS-247 § 5.4

Test Method : ANSI C63.10:2013

Test Limit : Regulation 15.247 (b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. 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.

9.1 Test Procedure

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

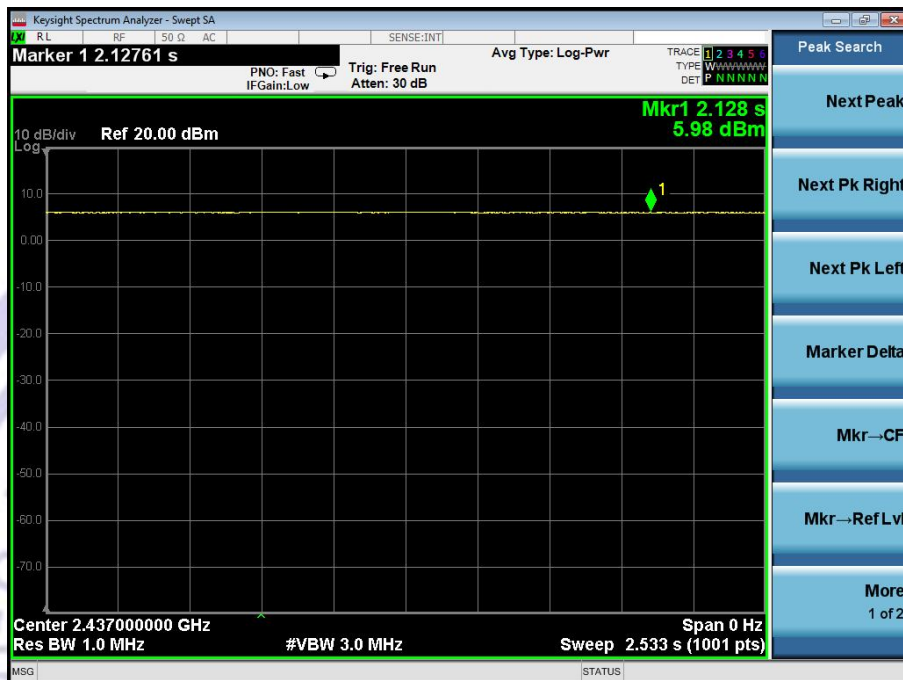
9.2 Test Result

	Maximum Peak Output Power (dBm)				Limit
	802.11b	802.11g	802.11n20	802.11n40	
Low Channel	18.15	17.12	17.07	16.87	1W(30dBm)
Middle Channel	18.39	17.58	17.55	16.71	1W(30dBm)
High Channel	18.98	17.91	17.11	16.47	1W(30dBm)

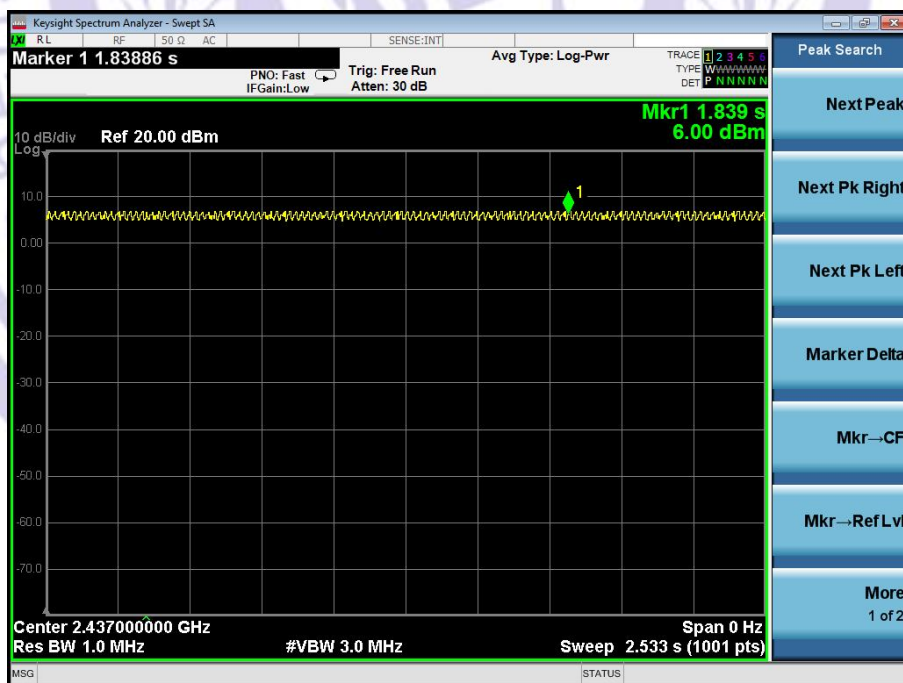
Note:

1. For power test the duty cycle is 100% in continuous transmitting mode;
2. TX means Transmit, RX means Receive.

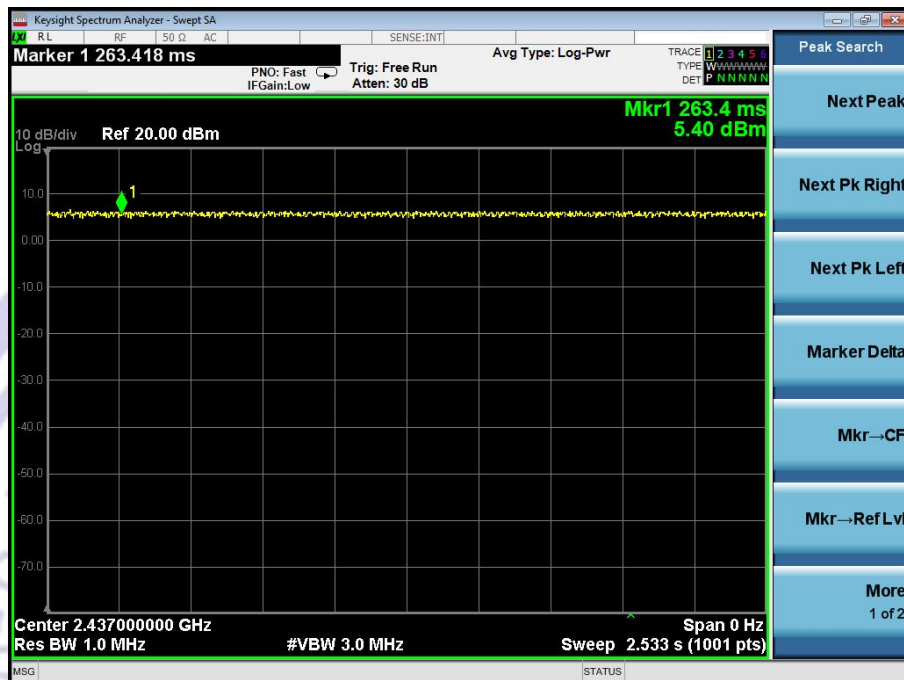
802.11 b



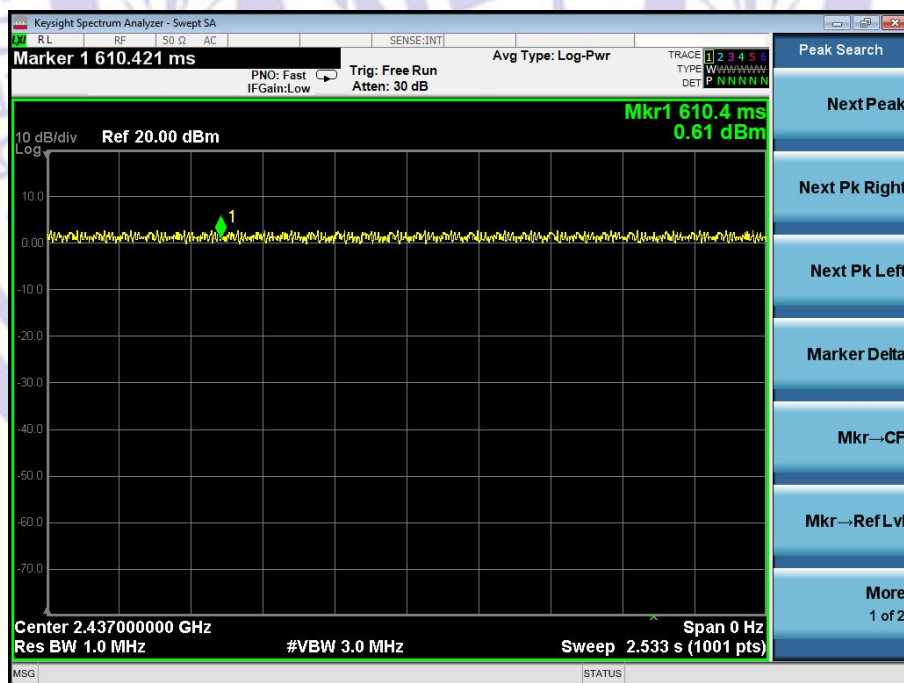
802.11 g



802.11 n20



802.11 n40



10 Power Spectral density

Test Requirement	: FCC CFR47 Part 15 Section 15.247, RSS-247 §5.2
Test Method	: ANSI C63.10:2013
Test Limit	: Regulation 15.247(f) The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

10.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz, Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

10.2 Test Result

	Power Spectral density (dBm/3kHz)				Limit
	802.11b	802.11g	802.11n20	802.11n40	
Low Channel	-14.239	-18.890	-19.723	-19.843	8dBm/3kHz
Middle Channel	-14.080	-19.156	-20.058	-20.834	8dBm/3kHz
High Channel	-14.753	-17.856	-19.249	-20.734	8dBm/3kHz

802.11b Low Channel



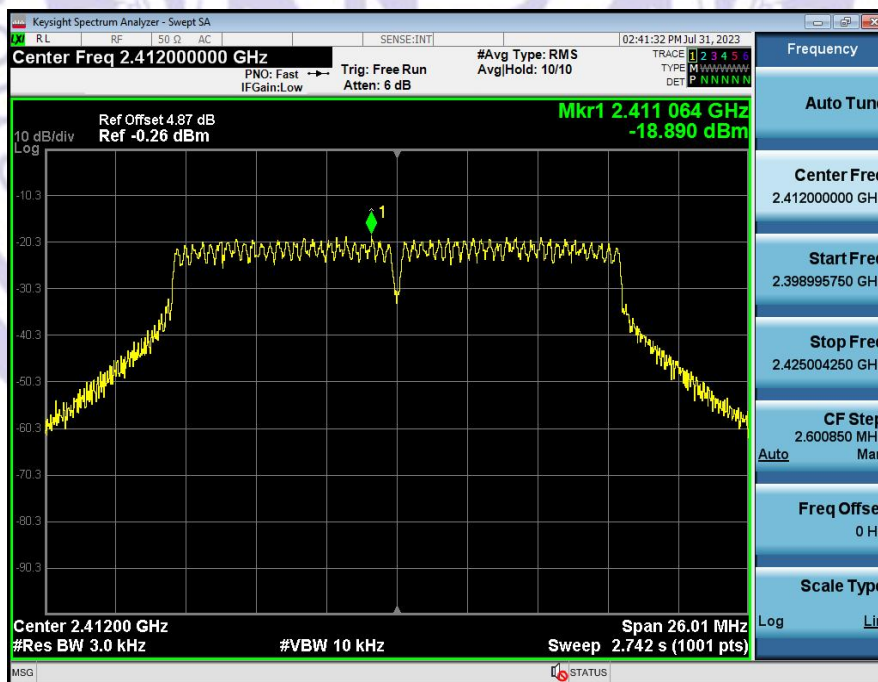
802.11b Middle Channel



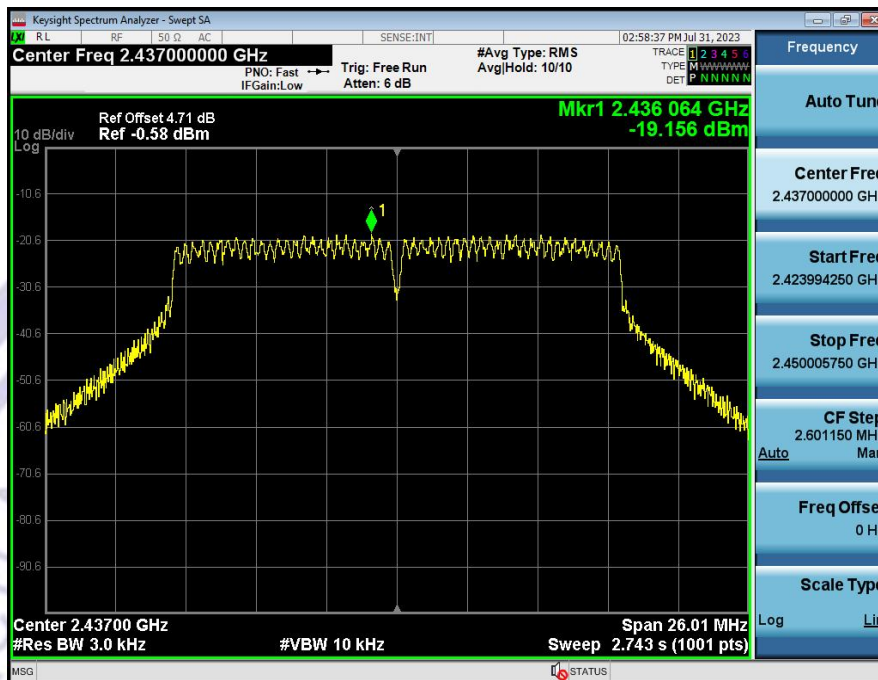
802.11b High Channel



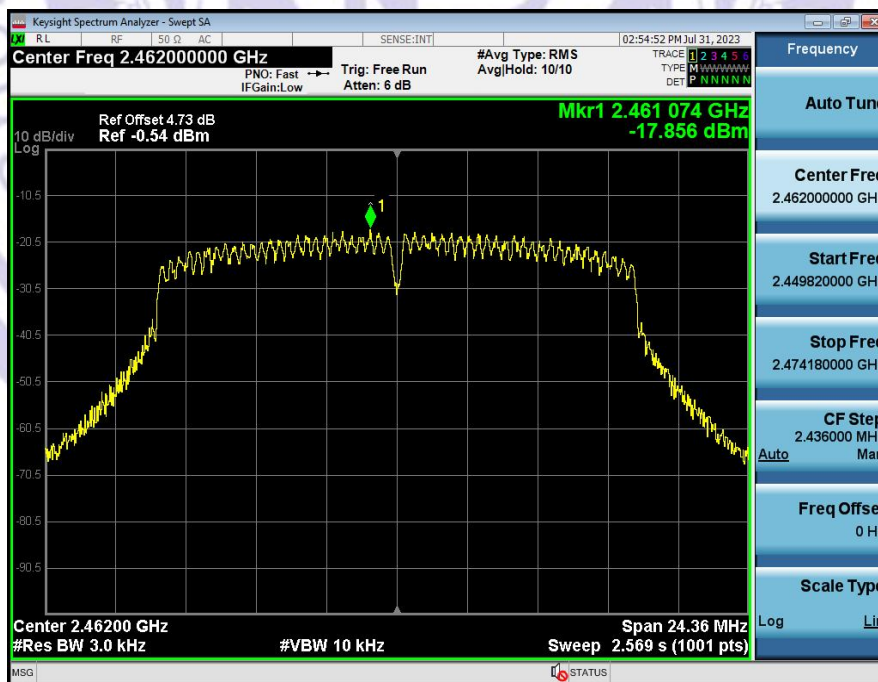
802.11g Low Channel



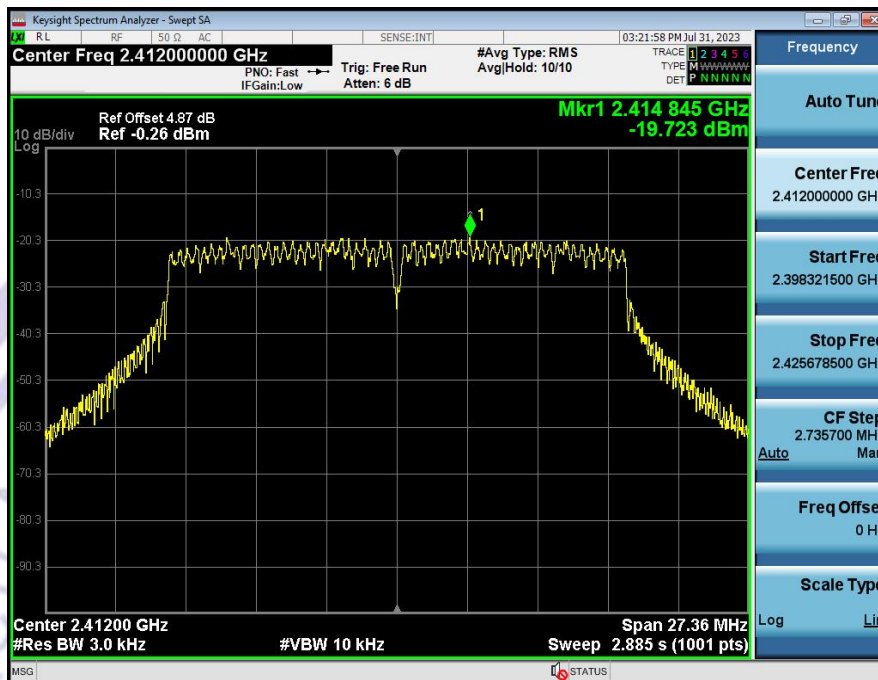
802.11g Middle Channel



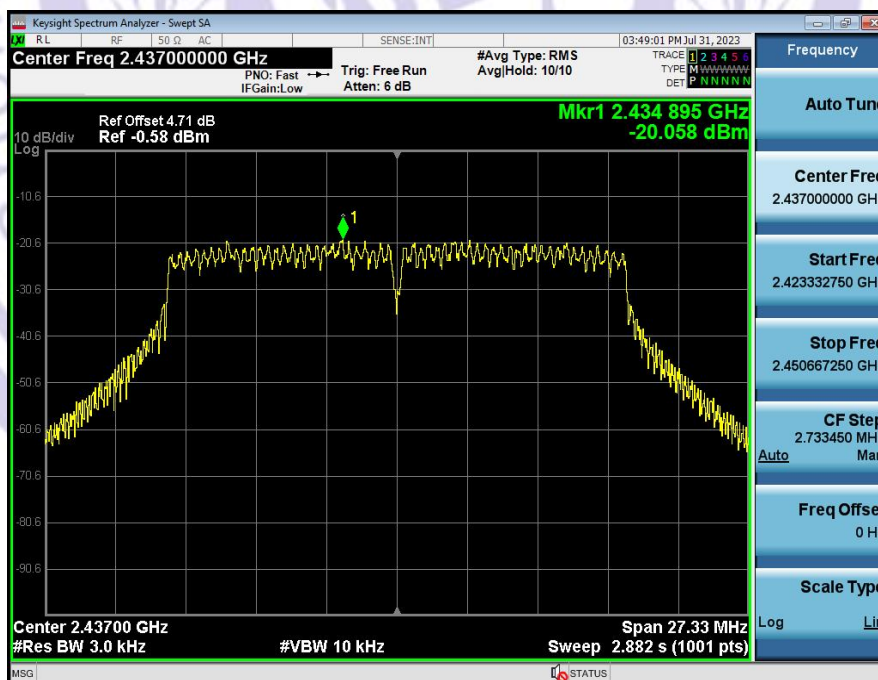
802.11g High Channel



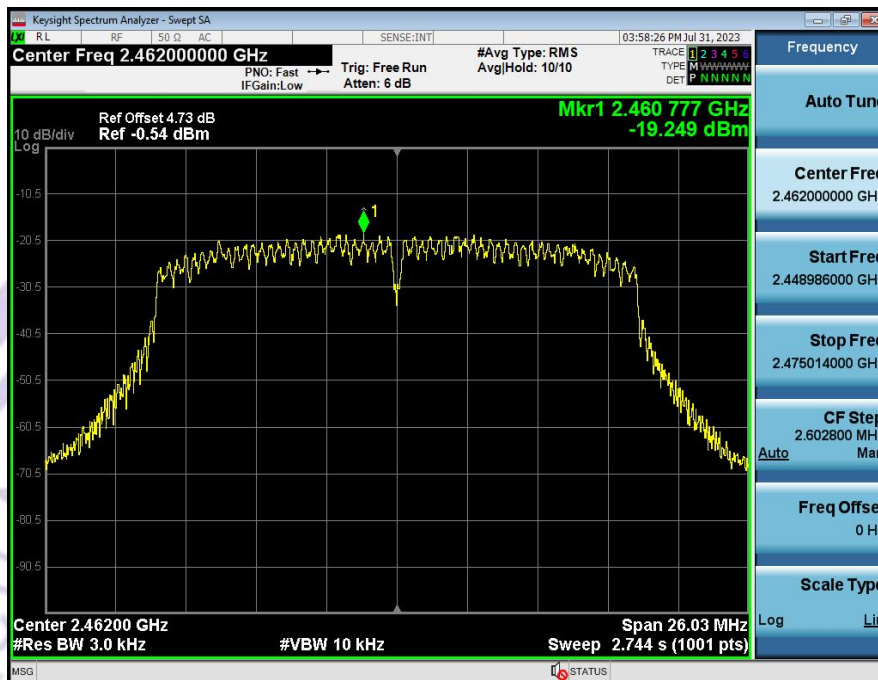
802.11n20 Low Channel



802.11n20 Middle Channel



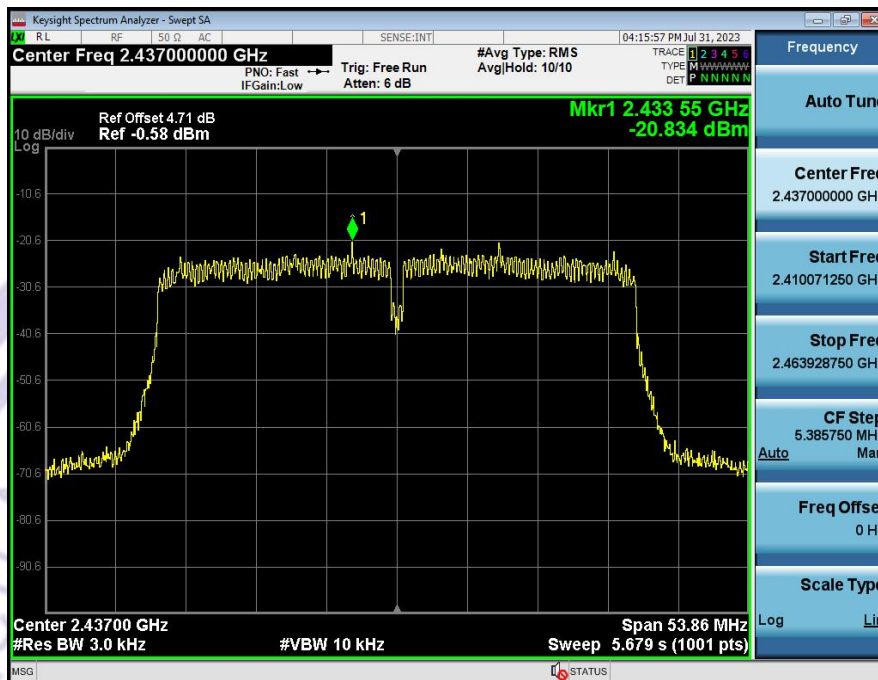
802.11n20 High Channel



802.11n40 Low Channel



802.11n40 Middle Channel



802.11n40 High Channel



11 Antenna Application

11.1 Antenna Requirement

For intentional device, according to FCC 47 CFR 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

According to RSS-GEN section 6.8

The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below).

11.2 Result

The EUT'S antenna, permanent attached antenna, is External antenna. The antenna's gain is 5.42 dBi and meets the requirement.

12 Test Setup and EUT Photos

Reference to the attachment for details.

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

