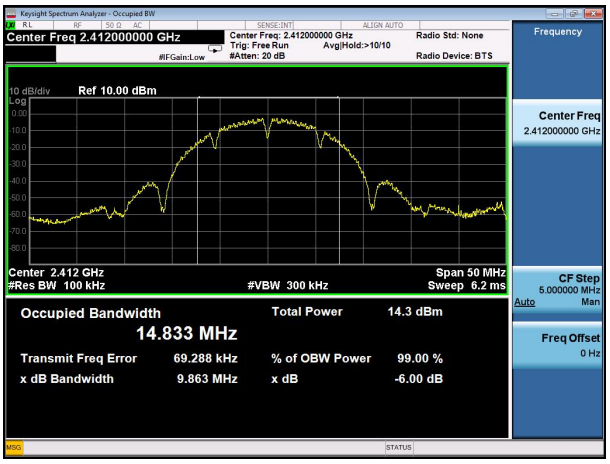
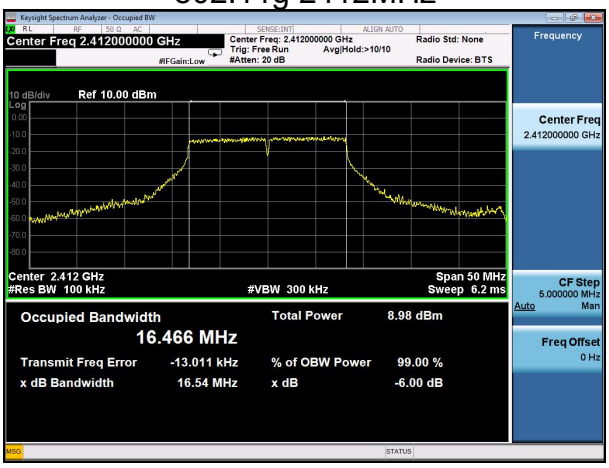
Test plot as follows:
6dB bandwith

802.11b 2412MHz

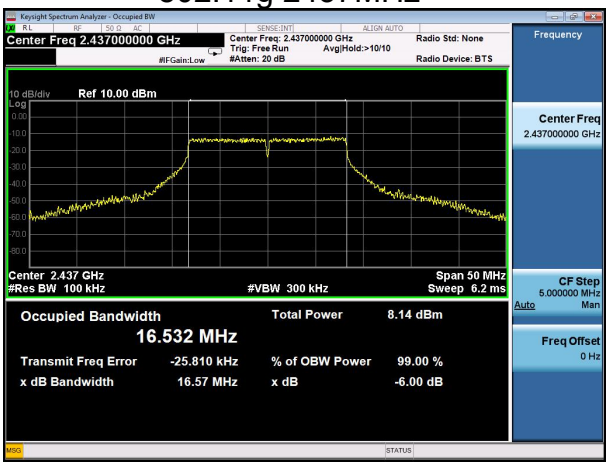


802.11g 2412MHz

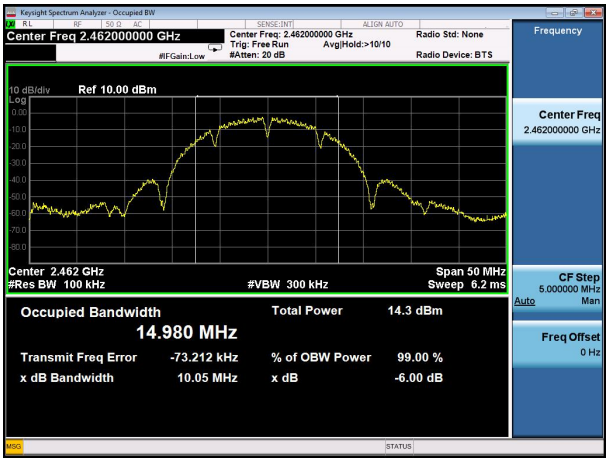


802.11b 2437MHz

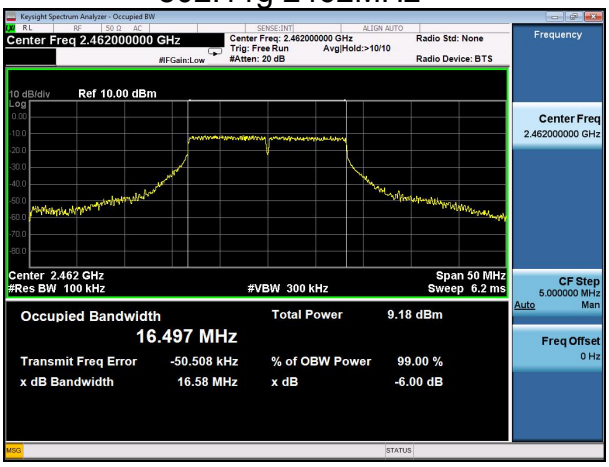
802.11g 2437MHz



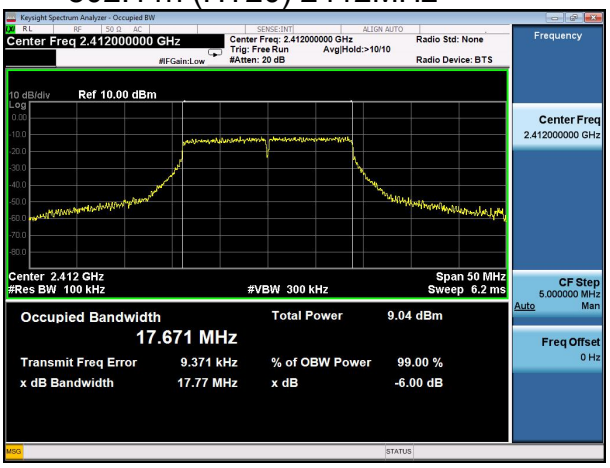
802.11b 2462MHz



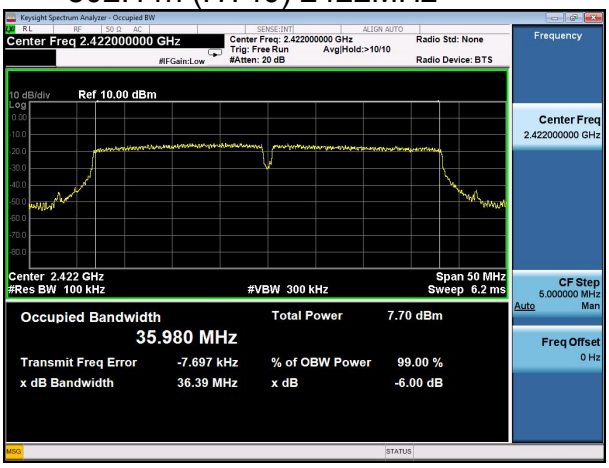
802.11g 2462MHz



802.11n (HT20) 2412MHz



802.11n (HT40) 2422MHz

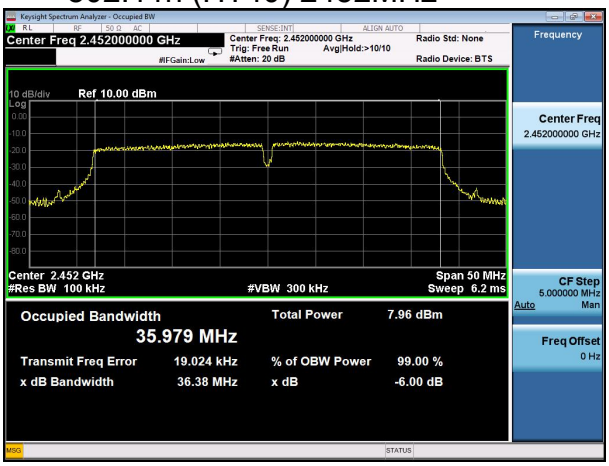


802.11n (HT20) 2437MHz

802.11n (HT40) 2437MHz

802.11n(HT20) 2462MHz

802.11n (HT40) 2452MHz



7. OUTPUT POWER TEST

7.1. Limits

For systems using digital modulation in the 2400~2483.5MHz, The out put Power shall not exceed 1W (30dBm)

7.2. Test setup

1. The Transmitter output (antenna port) was connected to the power meter.
2. Turn on the EUT and power meter and then record the power value.
3. Repeat above procedures on all channels needed to be tested.

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

7.3. Test result

Test Channe	Frequency	Maximum Conducted Output Power（(AV)）(dBm)	Maximum Conducted Output Power（AV）(dBm)	Total power	LIMIT
	(MHz)	ANT1	ANT2	dBm	dBm
TX 802.11b Mode					
CH01	2412	9.24	9.15	-	30
CH06	2437	9.56	9.27	-	30
CH11	2462	9.55	9.42	-	30
TX 802.11g Mode					
CH01	2412	8.52	8.41	-	30
CH06	2437	8.67	8.38	-	30
CH11	2462	8.62	8.39	-	30
TX 802.11n(20) Mode					
CH01	2412	6.48	6.62	9.56	30
CH06	2437	6.64	6.54	9.60	30
CH11	2462	6.37	6.52	9.46	30
TX 802.11n(40) Mode					
CH03	2422	6.65	6.27	9.47	30
CH06	2437	6.84	6.35	9.61	30
CH09	2452	6.72	6.38	9.56	30

Note:802.11b ,802.11g mode the ANT1 and ANT2 can not TX and RX at the same time

802.11n(20),802.11n(40) mode the ANT1 and ANT2 can TX and RX at the same time

Directional gain=GANT +10log(N)dbi =2+10log2=5.01dbi

For power test the duty cycle is 100% in continous transmitting mode.

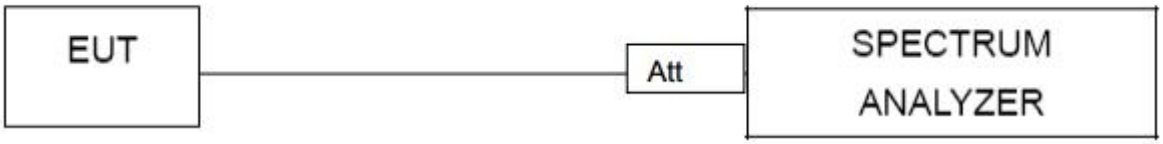
8. DUTY CYCLE

8.1. Test Procedure

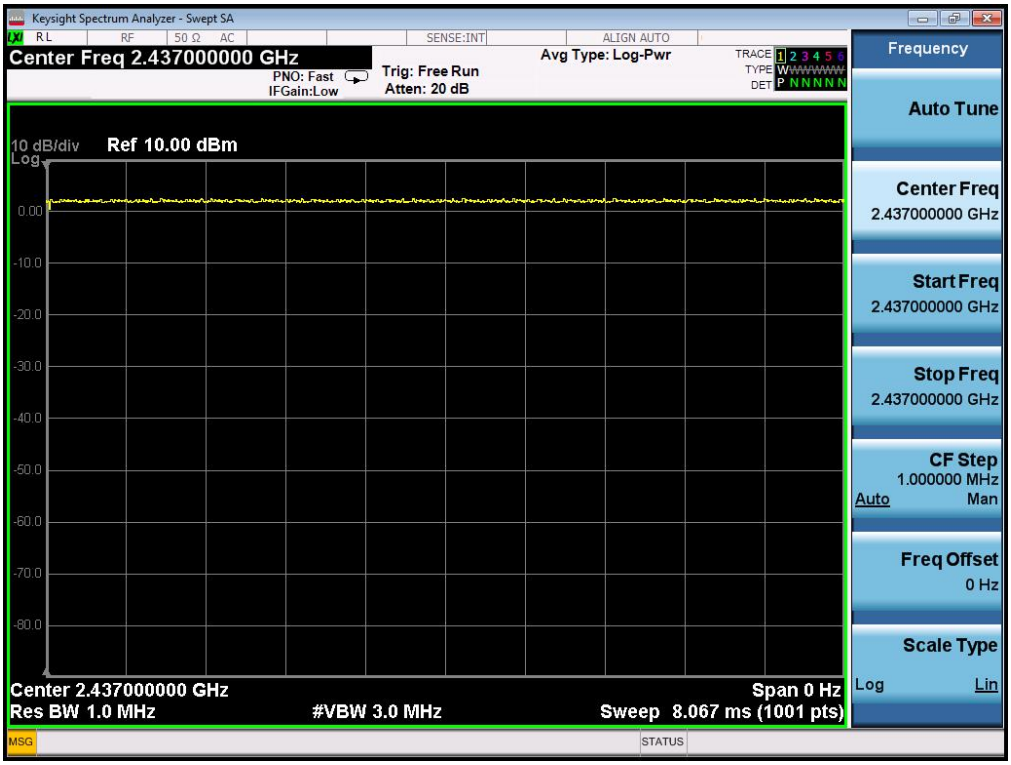
The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ⩾ OBW if possible; otherwise, set RBW to the largest available value. Set VBW ⩾ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ⩽ 16.7 microseconds.)

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
The path loss was compensated to the results for each measurement.
Set to the maximum power setting and enable the EUT transmit continuously.
The EUT was operating in controlled its channel.
Use the following spectrum analyzer settings:
Span = Zero Span
RBW = 1MHz
VBW =3MHz
Number of points in Sweep >100
Detector function = peak
Trace = Clear write Measure T_{total} and T_{on}
Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor=10*log(1/Duty Cycle)

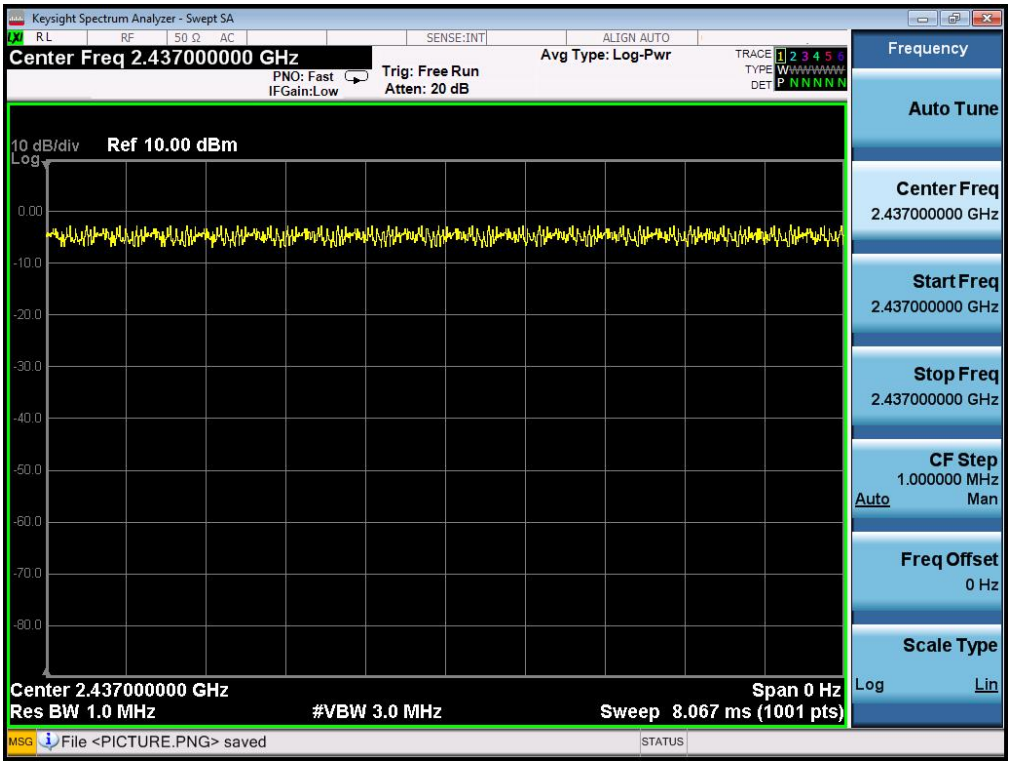
8.2. TEST SETUP



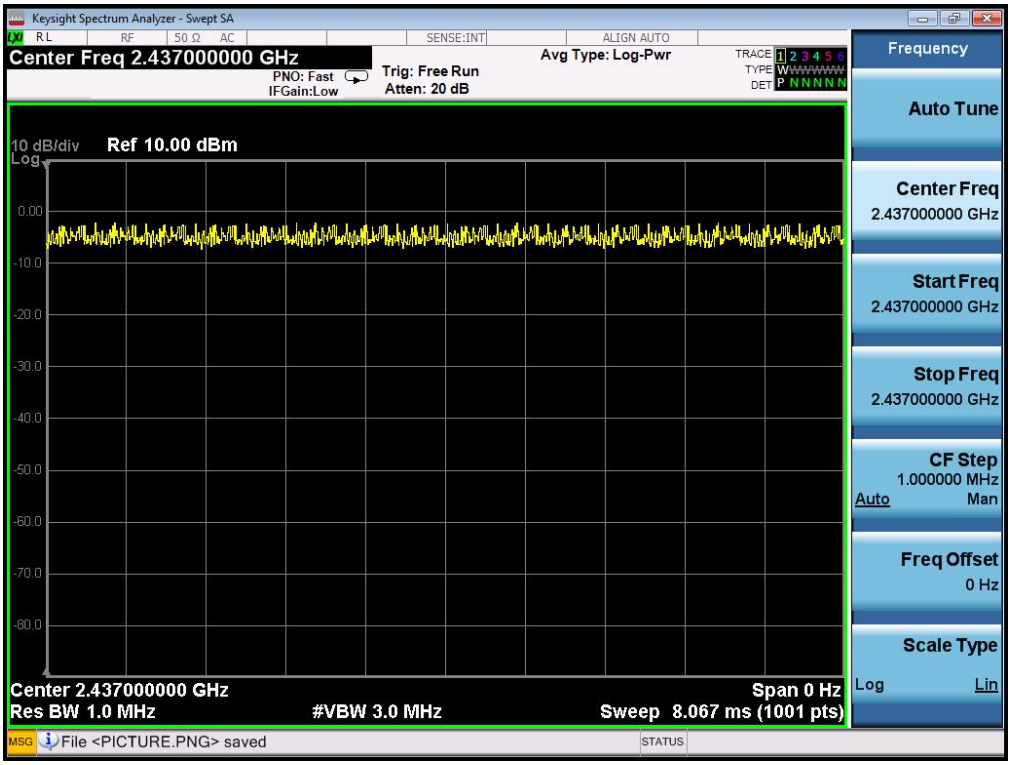
Test plot of Duty Cycle for 802.11b



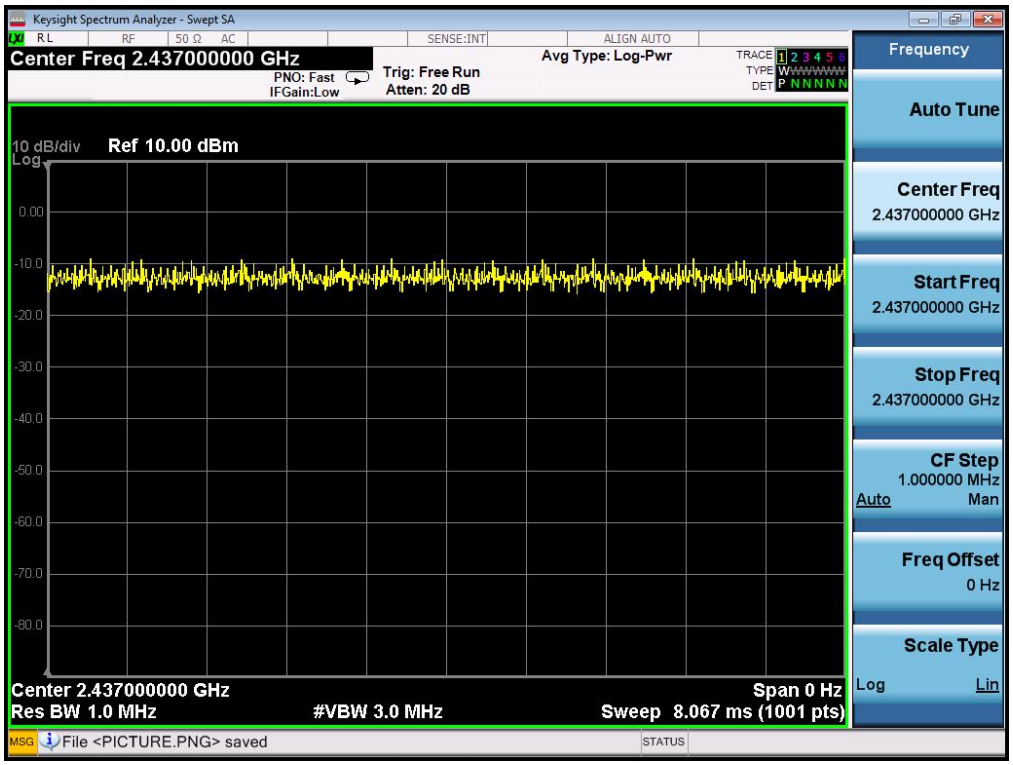
Test plot of Duty Cycle for 802.11g



Test plot of Duty Cycle for 802.11n -HT20



Test plot of Duty Cycle for 802.11n -HT40



9. POWER SPECTRAL DENSITY TEST

9.1. Limits

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.

9.2. Test setup

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

9.3. Test result

Antenna 1

	Channel Frequency (MHz)	Power density (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11b	2412	-20.98	8	Pass
	2437	-22.327	8	Pass
	2462	-21.045	8	Pass
802.11g	2412	-24.195	8	Pass
	2437	-25.427	8	Pass
	2462	-23.958	8	Pass
802.11n (HT20)	2412	-24.218	8	Pass
	2437	-24.627	8	Pass
	2462	-22.945	8	Pass
802.11n (HT40)	2422	-26.279	8	Pass
	2437	-26.828	8	Pass
	2452	-26.689	8	Pass

Antenna 2

	Channel Frequency (MHz)	Power density (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11b	2412	-23.987	8	Pass
	2437	-23.943	8	Pass
	2462	-23.887	8	Pass
802.11g	2412	-27.882	8	Pass
	2437	-27.432	8	Pass
	2462	-27.138	8	Pass
802.11n (HT20)	2412	-27.148	8	Pass
	2437	-27.049	8	Pass
	2462	-26.994	8	Pass
802.11n (HT40)	2422	-24.474	8	Pass
	2437	-24.822	8	Pass
	2452	-24.619	8	Pass

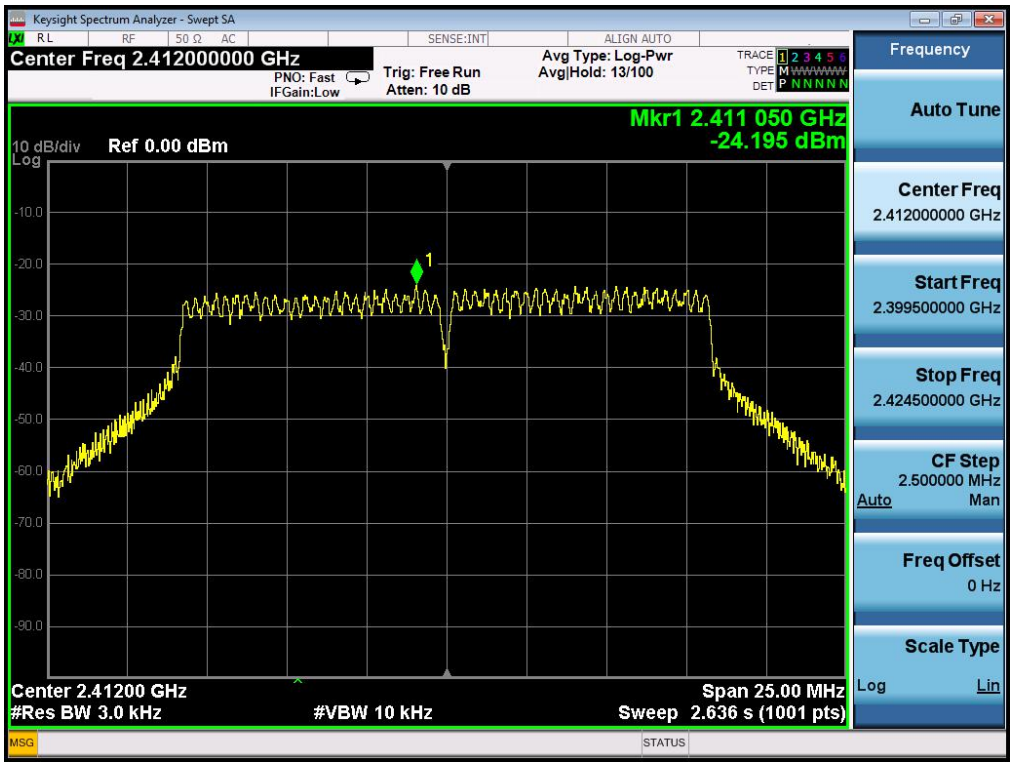
Antenna 1

802.11b 2412MHz

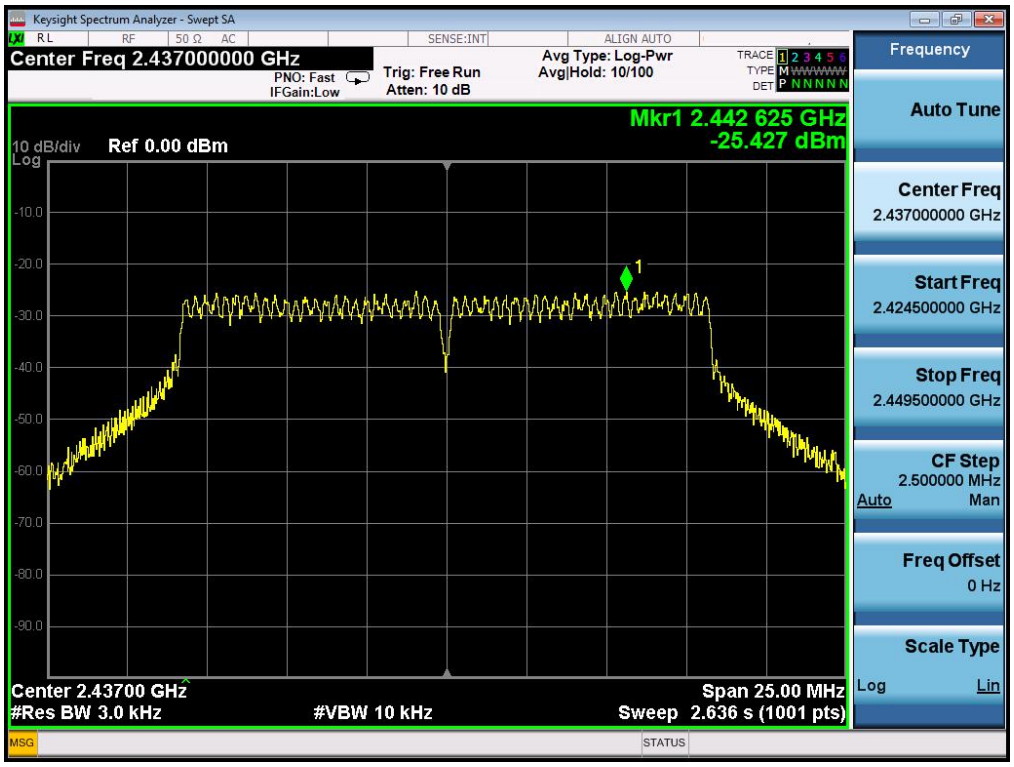
802.11b 2437MHz

802.11b 2462MHz

802.11g 2412MHz

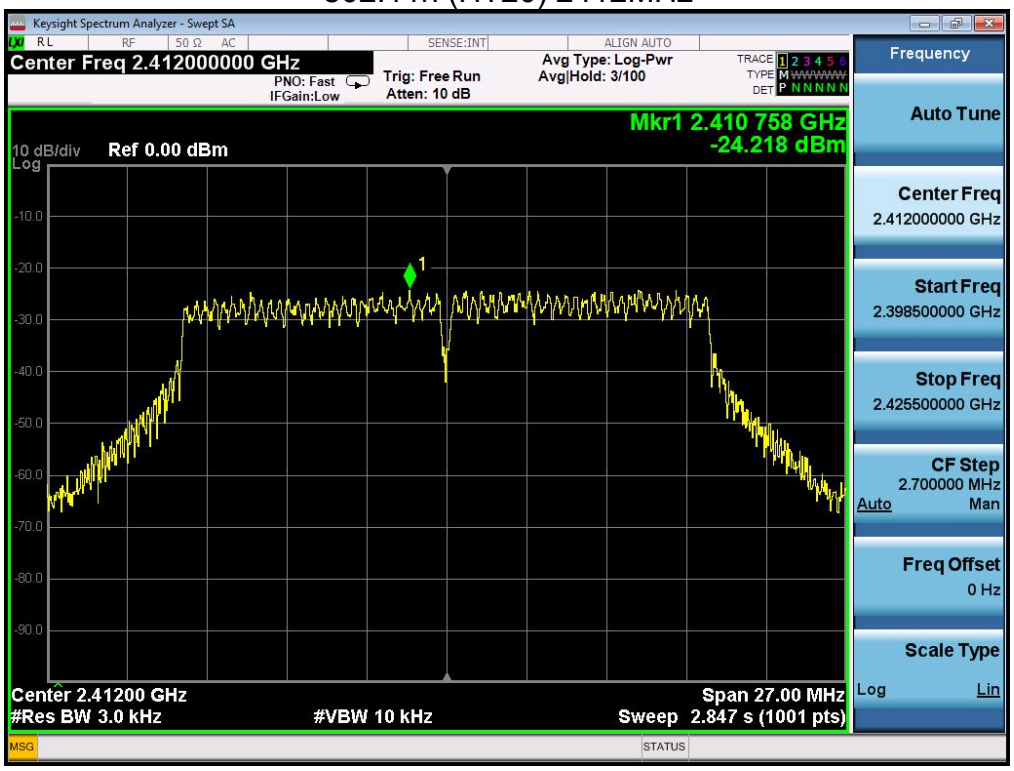


802.11g 2437MHz

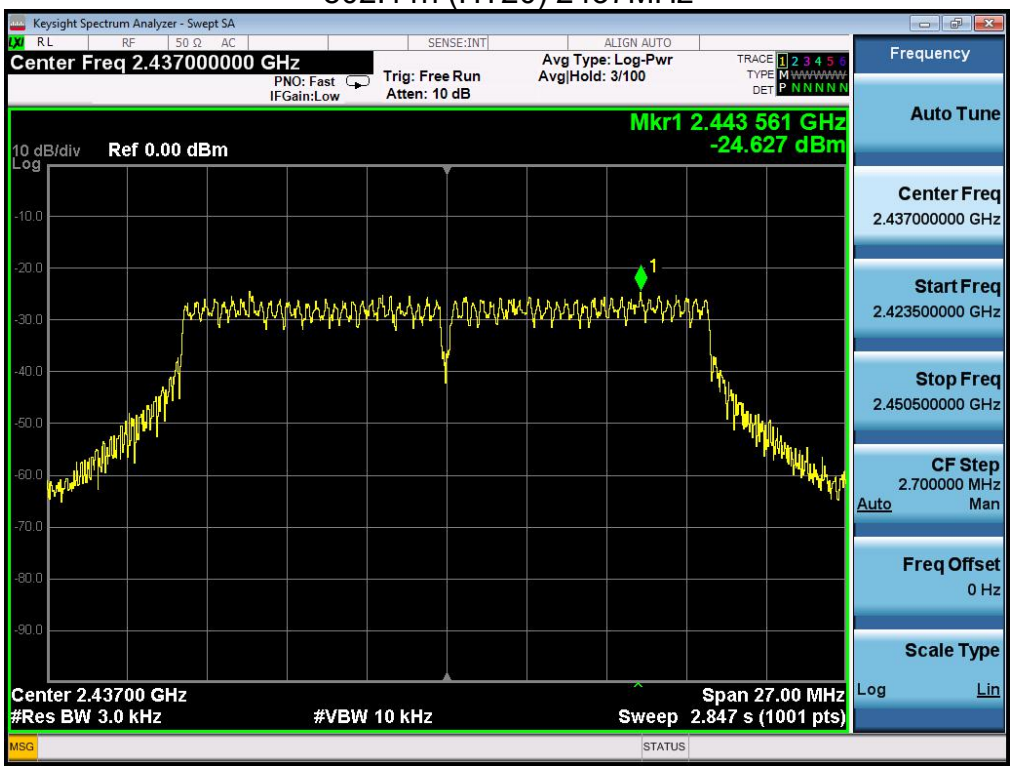


802.11g 2462MHz

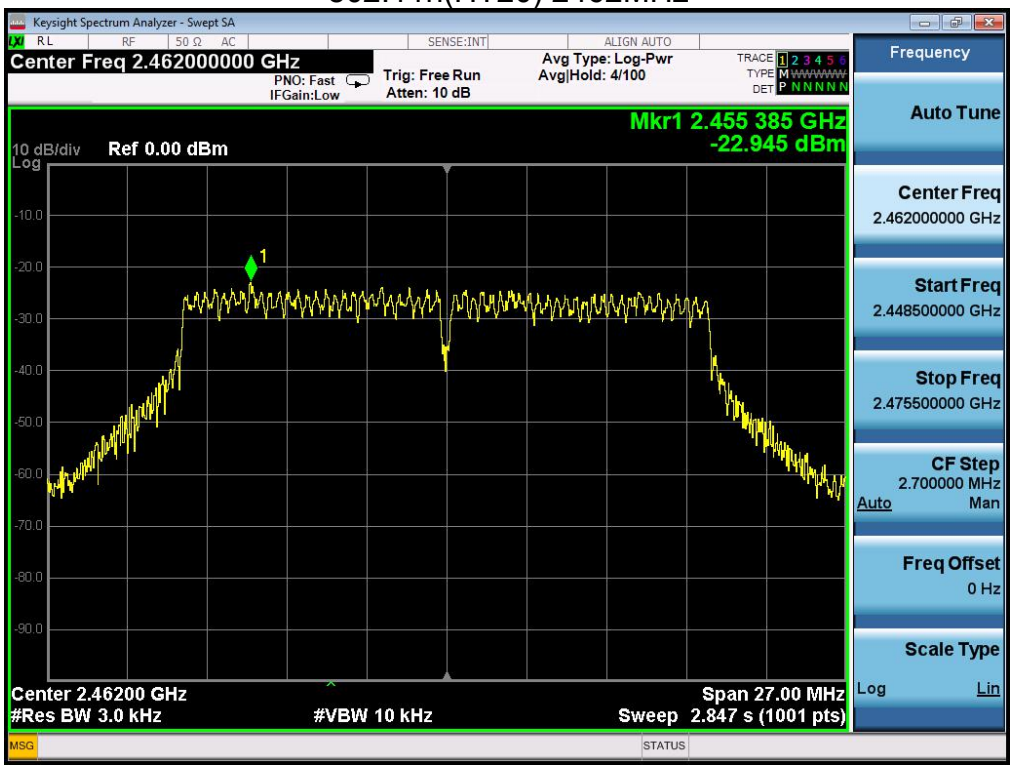
802.11n (HT20) 2412MHz



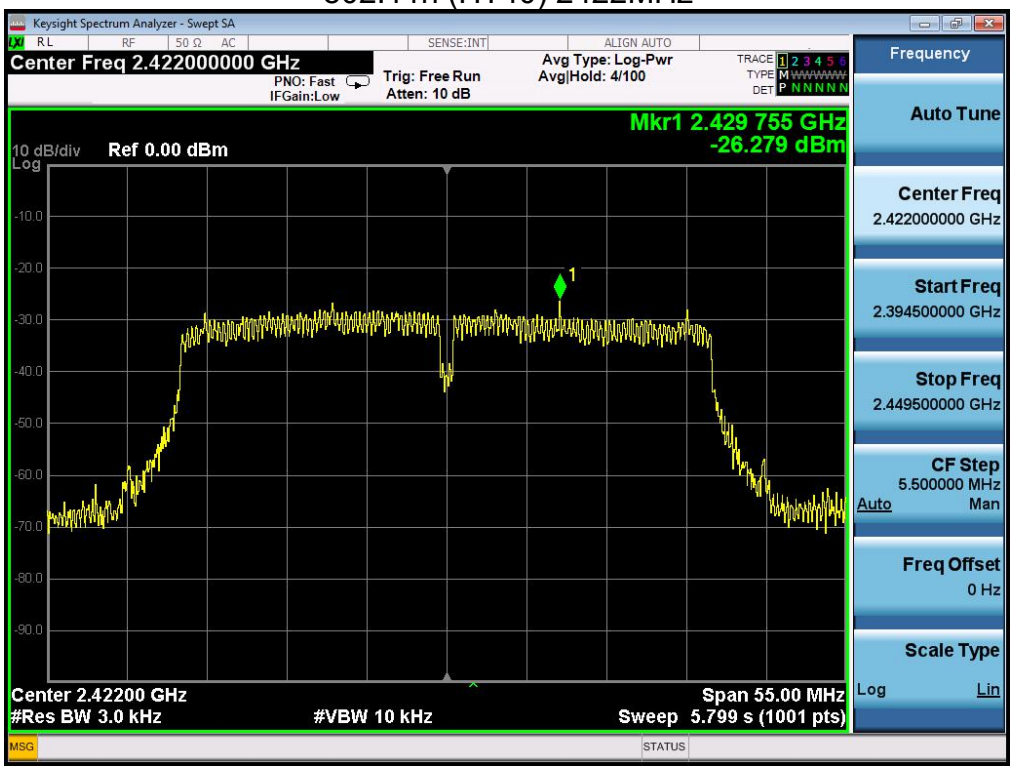
802.11n (HT20) 2437MHz



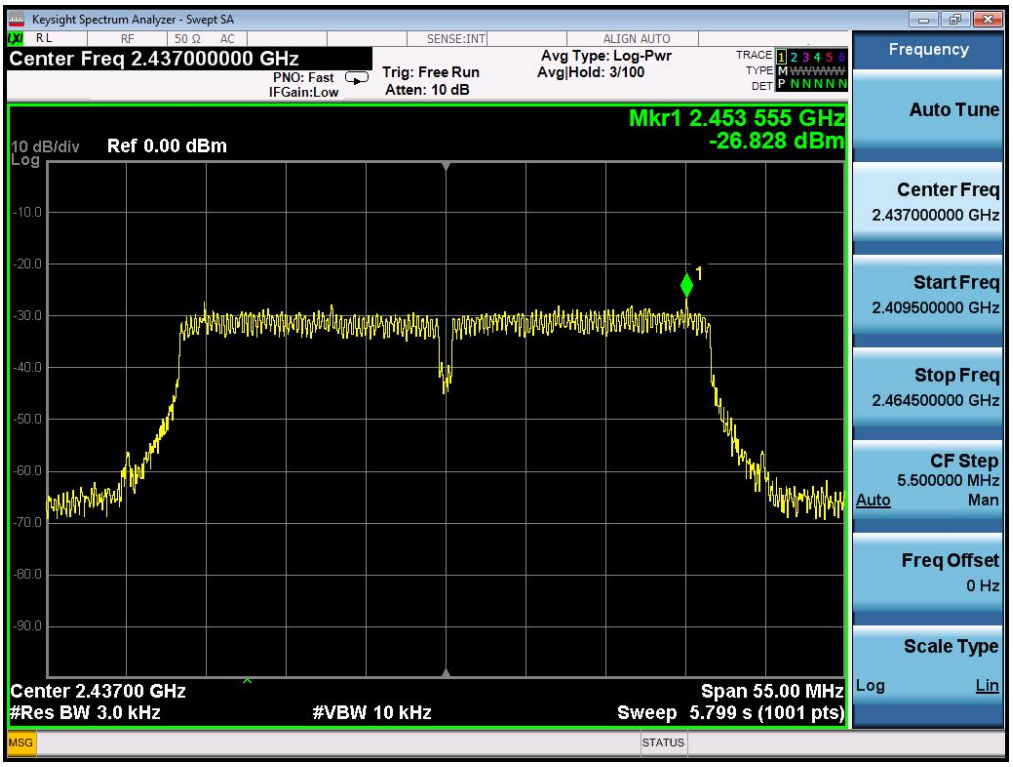
802.11n(HT20) 2462MHz



802.11n (HT40) 2422MHz



802.11n (HT40) 2437MHz



802.11n(HT40) 2452MHz

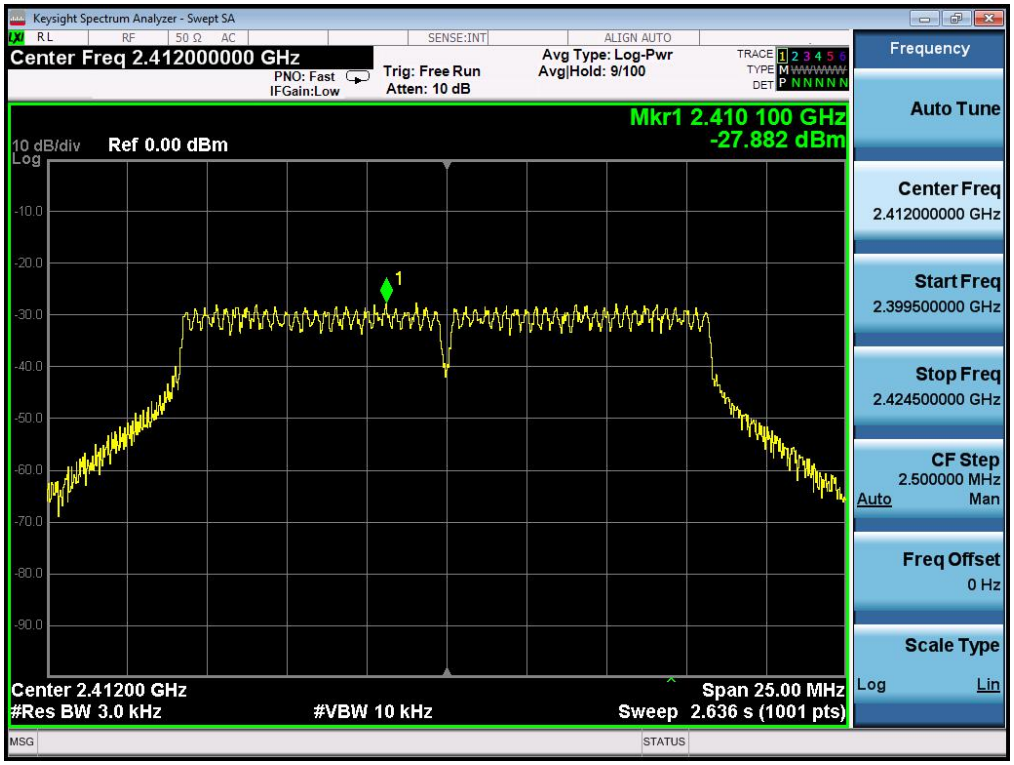
Antenna 2

802.11b 2412MHz

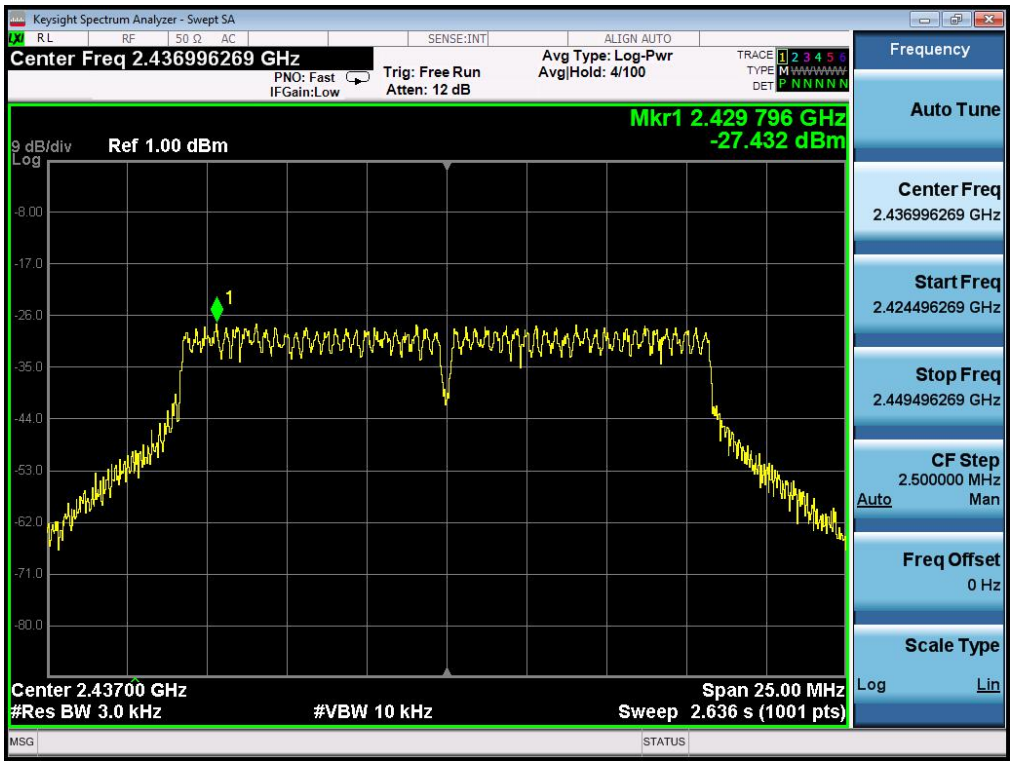
802.11b 2437MHz

802.11b 2462MHz

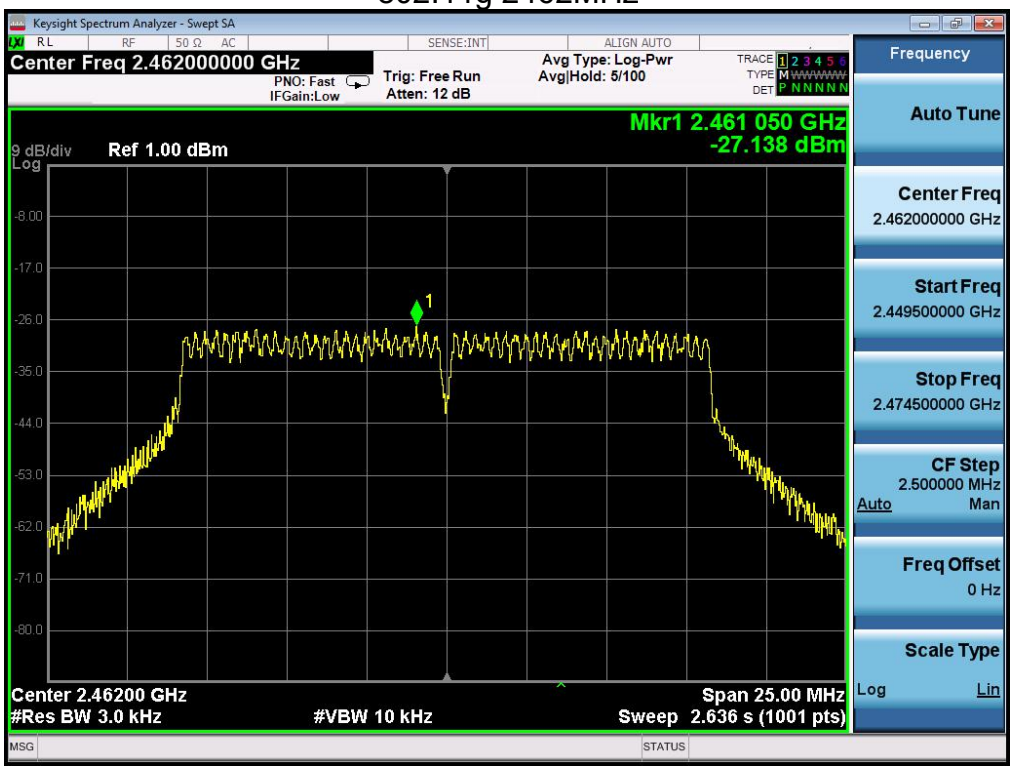
802.11g 2412MHz



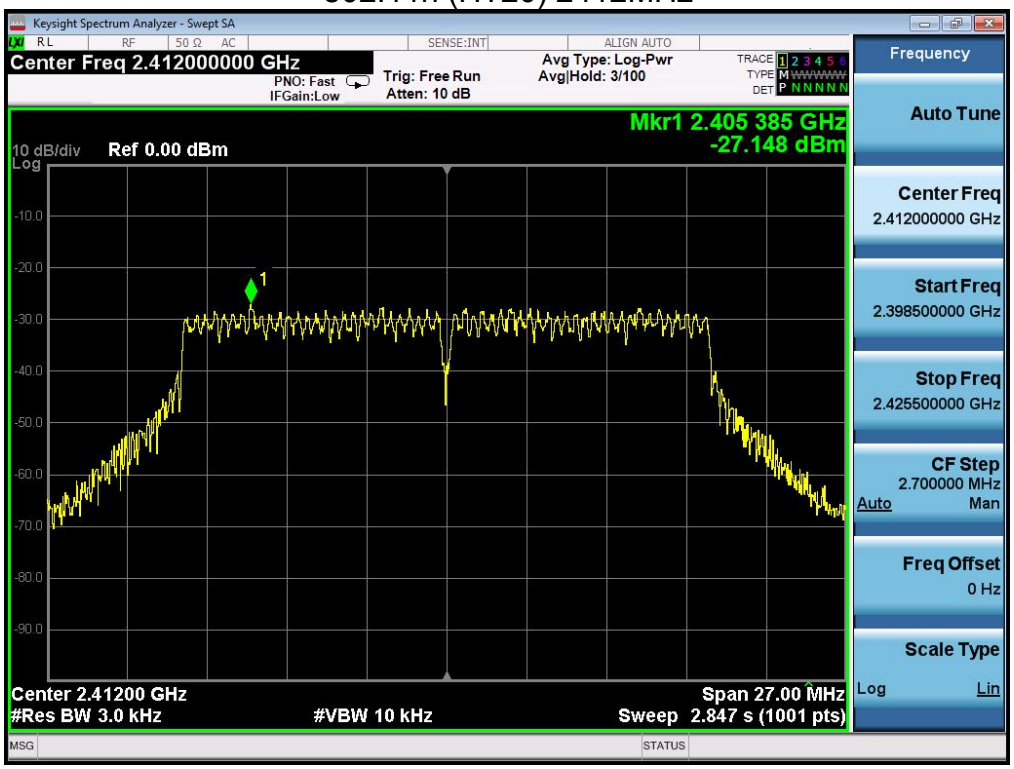
802.11g 2437MHz



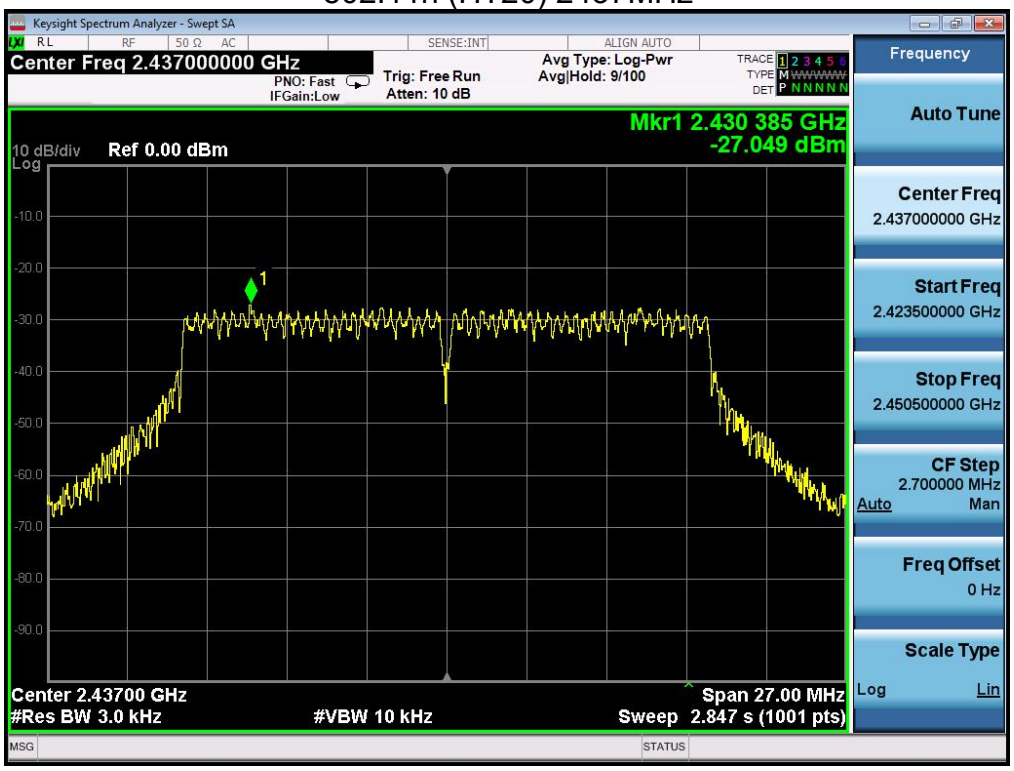
802.11g 2462MHz



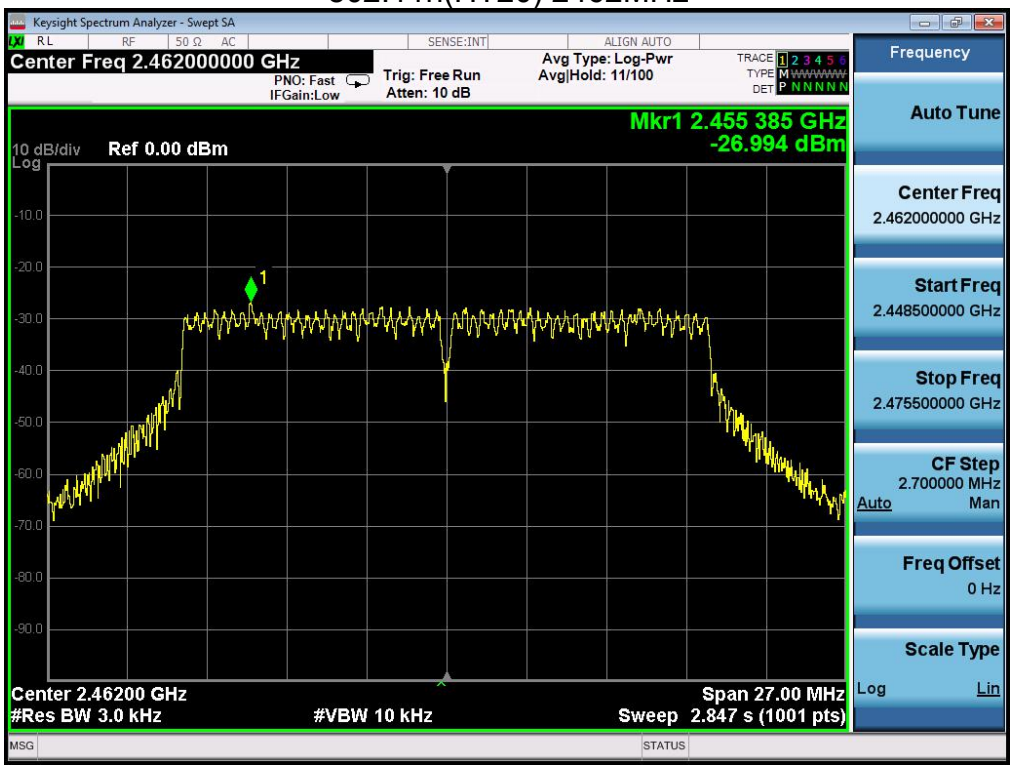
802.11n (HT20) 2412MHz



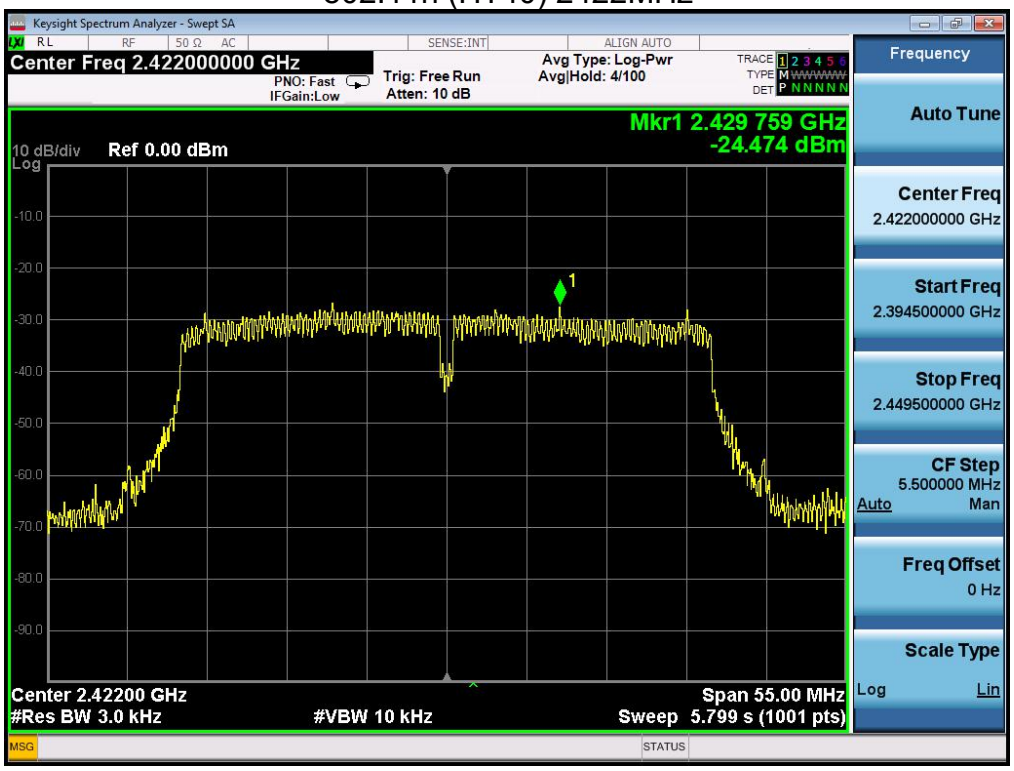
802.11n (HT20) 2437MHz



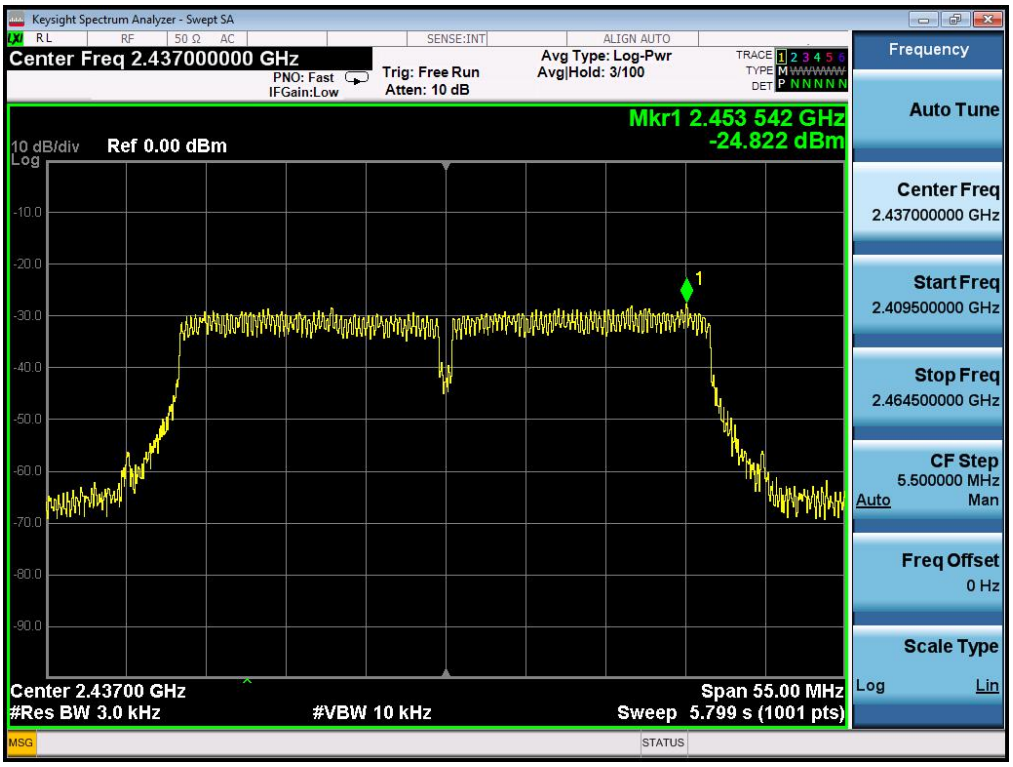
802.11n(HT20) 2462MHz



802.11n (HT40) 2422MHz



802.11n (HT40) 2437MHz



802.11n(HT40) 2452MHz

10. ANTENNA REQUIREMENTS

10.1. Limits

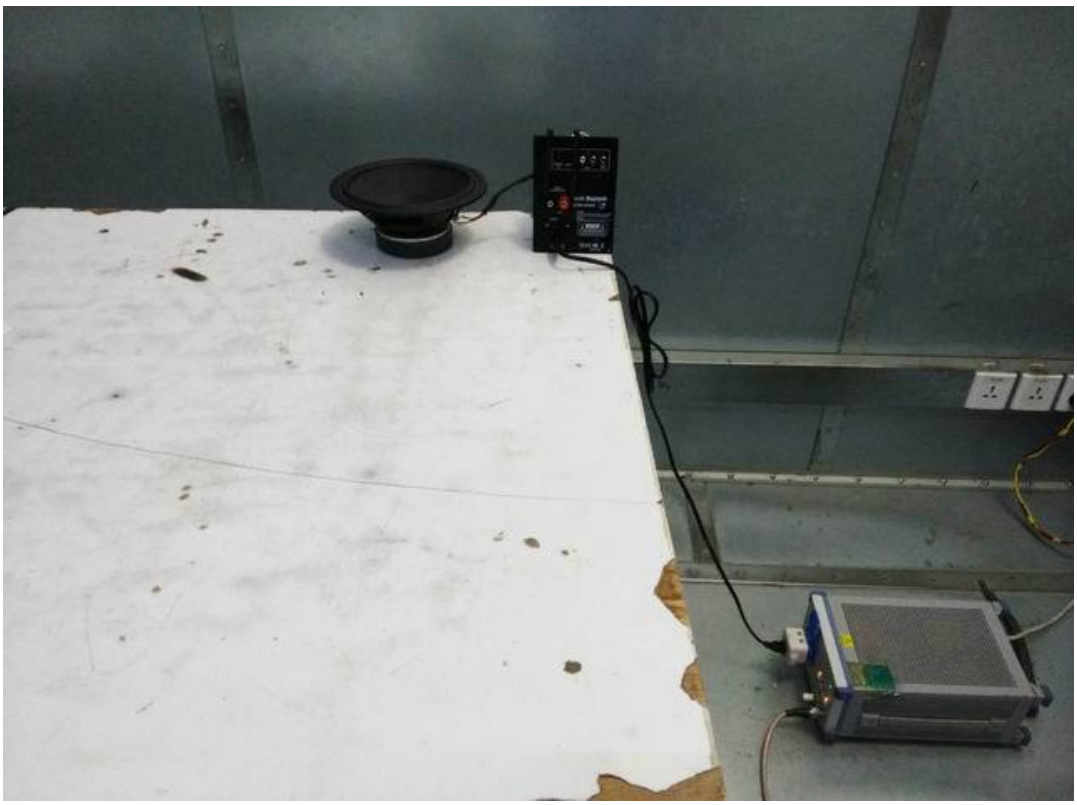
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional 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.

10.2. Result

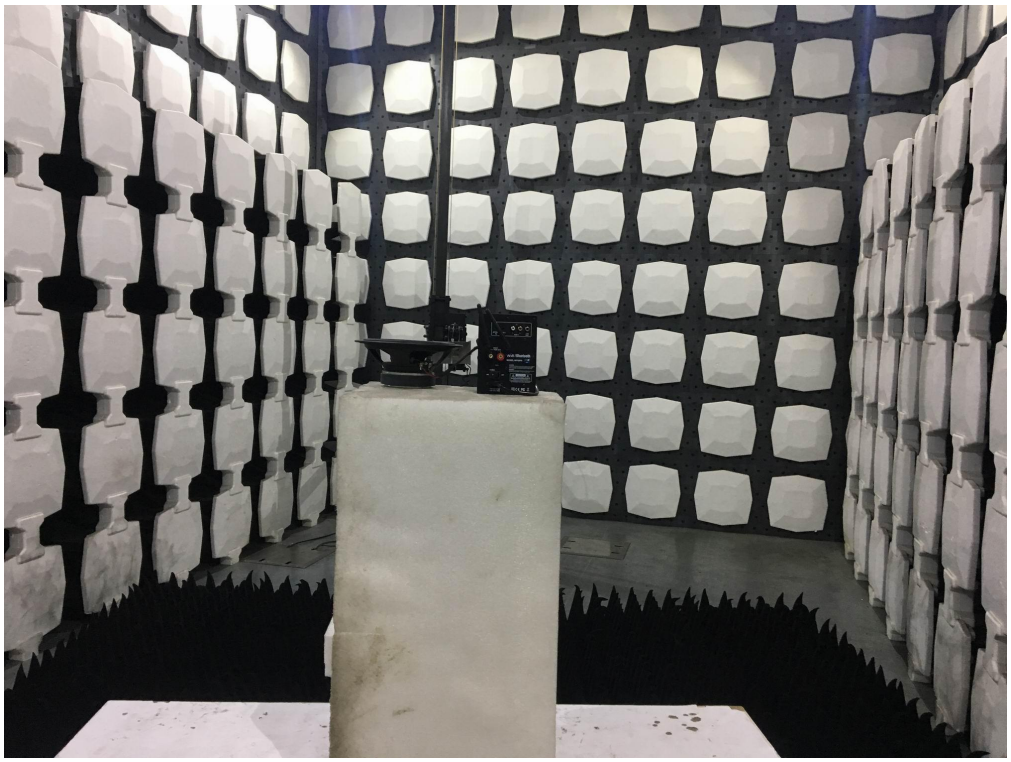
The antennas used for this product is external antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the external antenna is SMA female type and is not permanently fixed, can be removed, the maximum peak gain of the transmit antenna is 2.0dBi.

11. PHOTOGRAPHS OF TEST SET-UP

Conducted Emission



Radiated Emission Test



12. PHOTOGRAPHS OF THE EUT

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