



Test mode: IEEE 802.11n HT40 MHz (Antenna 1)

Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2422	36397	>500	PASS
Mid	2437	36374		PASS
High	2452	35726		PASS

Test mode: IEEE 802.11n HT40 MHz (Combine with antenna 1 and antenna 2)

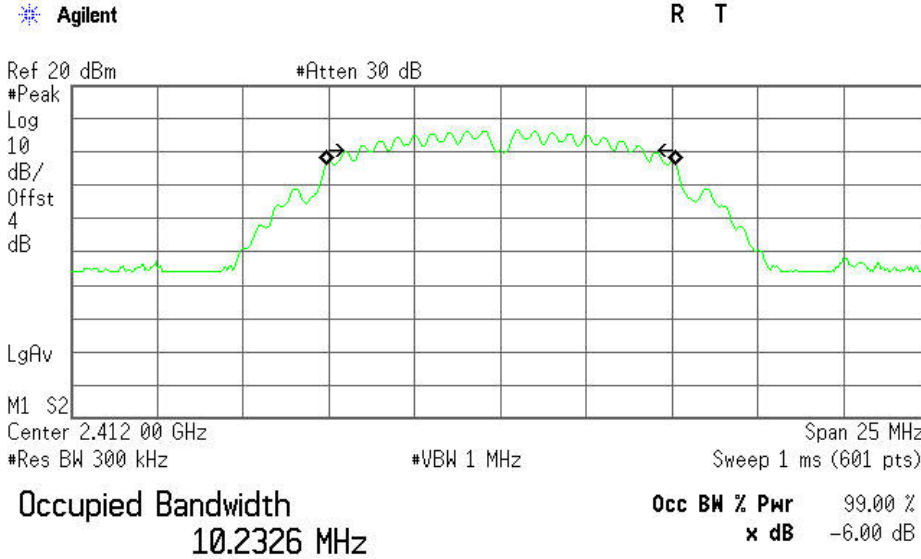
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Low	2422	36046	>500	PASS
Mid	2437	36392		PASS
High	2452	36490		PASS



Test Plot

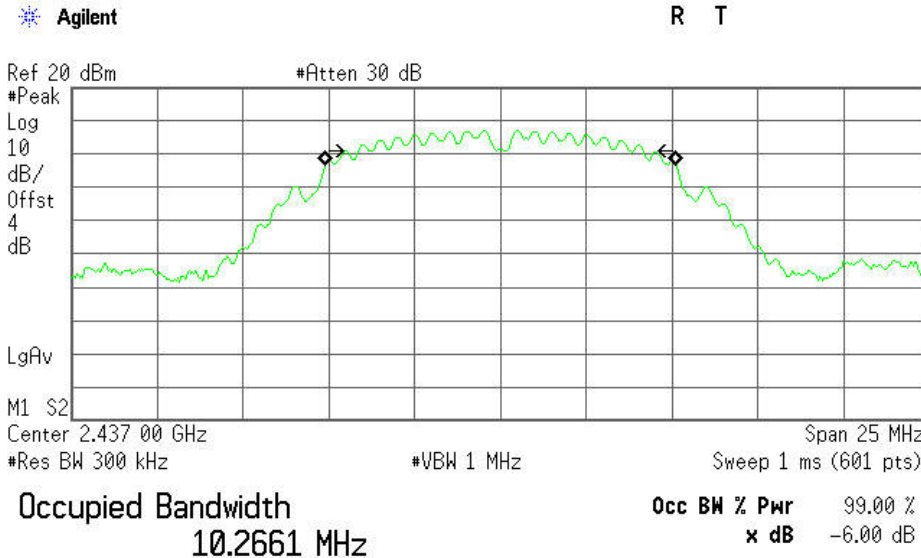
IEEE 802.11b (Antenna 1)mode

6dB Bandwidth (CH Low)



Transmit Freq Error 13.671 kHz
x dB Bandwidth 8.259 MHz

6dB Bandwidth (CH Mid)



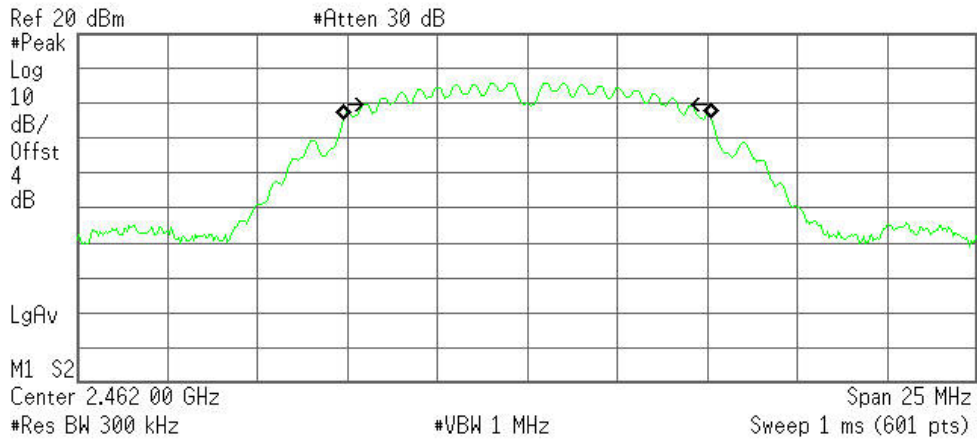
Transmit Freq Error 10.202 kHz
x dB Bandwidth 8.265 MHz



6dB Bandwidth (CH High)

Agilent

R T



Occupied Bandwidth 10.2634 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

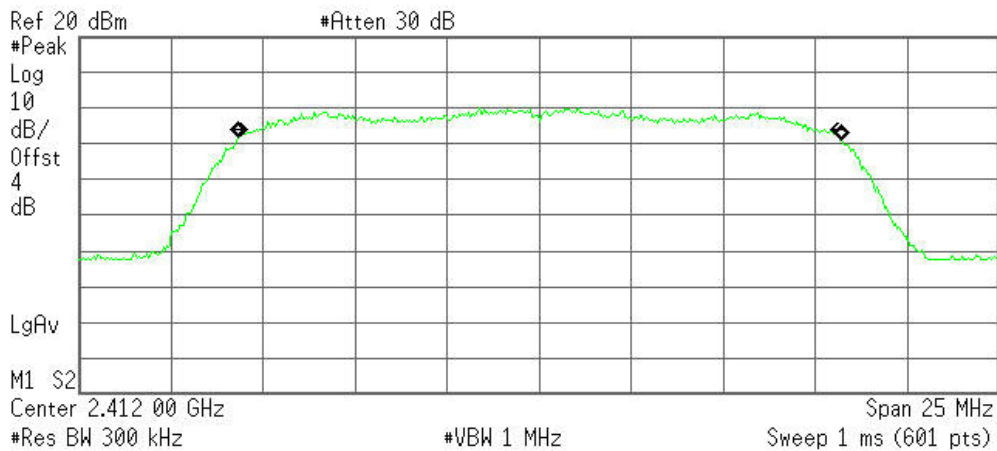
Transmit Freq Error -1.597 kHz
x dB Bandwidth 8.265 MHz

IEEE 802.11g (Antenna 1) mode

6dB Bandwidth (CH Low)

Agilent

R T



Occupied Bandwidth 16.3654 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

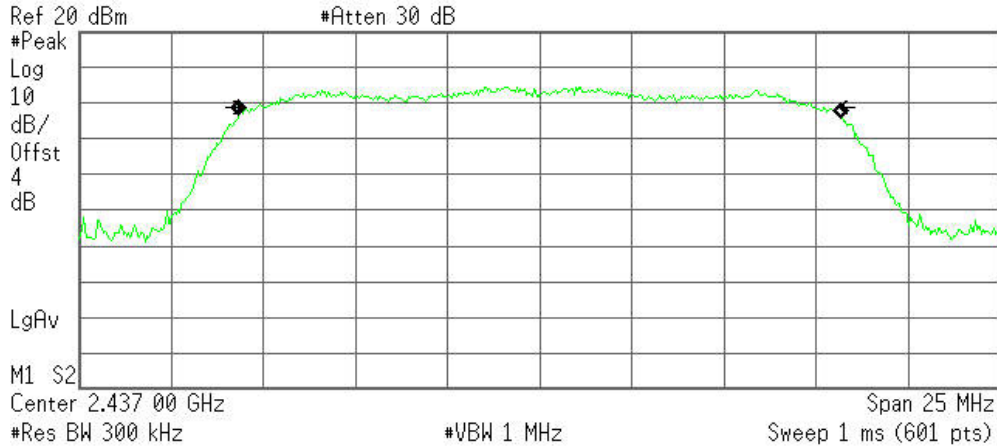
Transmit Freq Error 13.522 kHz
x dB Bandwidth 15.025 MHz



6dB Bandwidth (CH Mid)

Agilent

R T



Occupied Bandwidth
16.3441 MHz

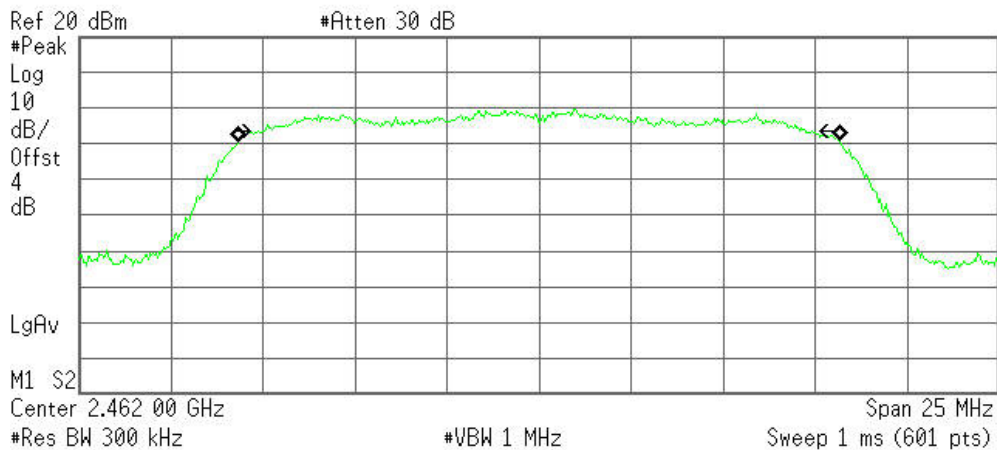
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 12.492 kHz
x dB Bandwidth 15.399 MHz

6dB Bandwidth (CH High)

Agilent

R T



Occupied Bandwidth
16.3082 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

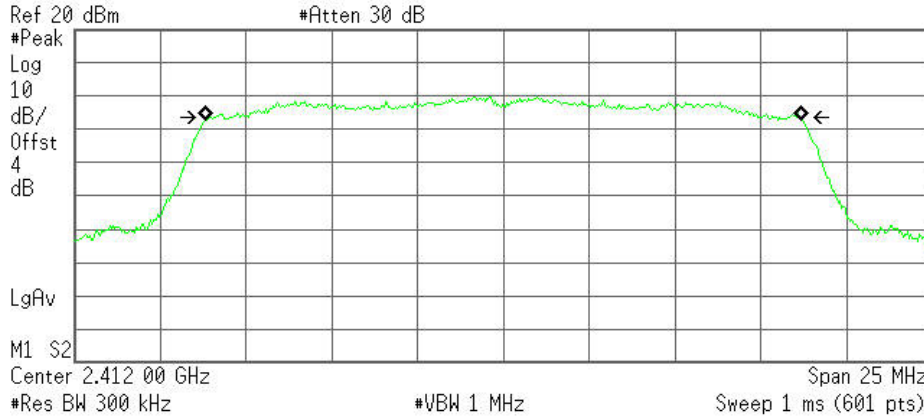
Transmit Freq Error -3.416 kHz
x dB Bandwidth 14.656 MHz



IEEE 802.11n HT20 MHz (Antenna 1)mode
6dB Bandwidth (CH Low)

Agilent

R L



Occupied Bandwidth
17.3257 MHz

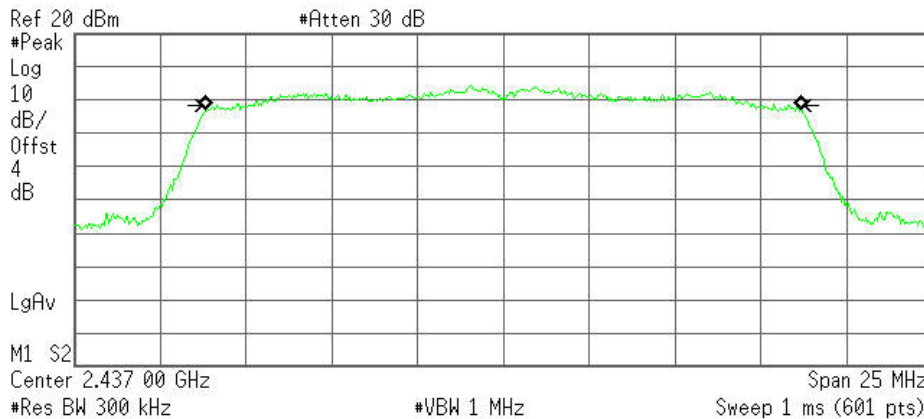
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error 5.526 kHz
x dB Bandwidth 17.176 MHz

6dB Bandwidth (CH Mid)

Agilent

R T



Occupied Bandwidth
17.3216 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

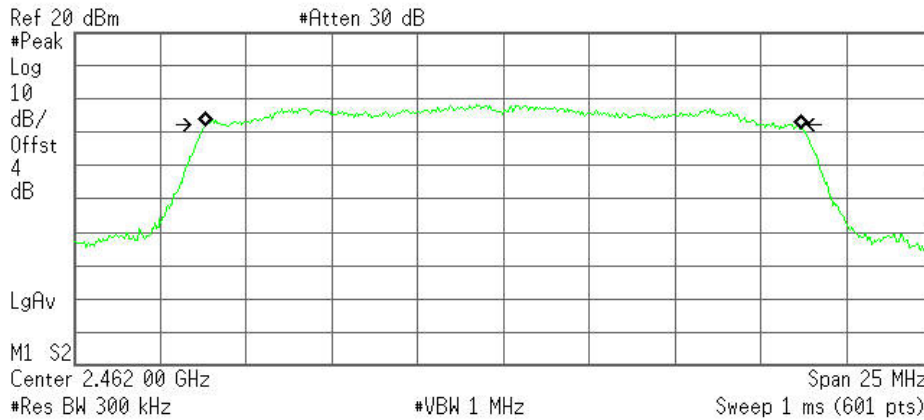
Transmit Freq Error 6.077 kHz
x dB Bandwidth 16.672 MHz



6dB Bandwidth (CH High)

Agilent

R T



Occupied Bandwidth
17.3233 MHz

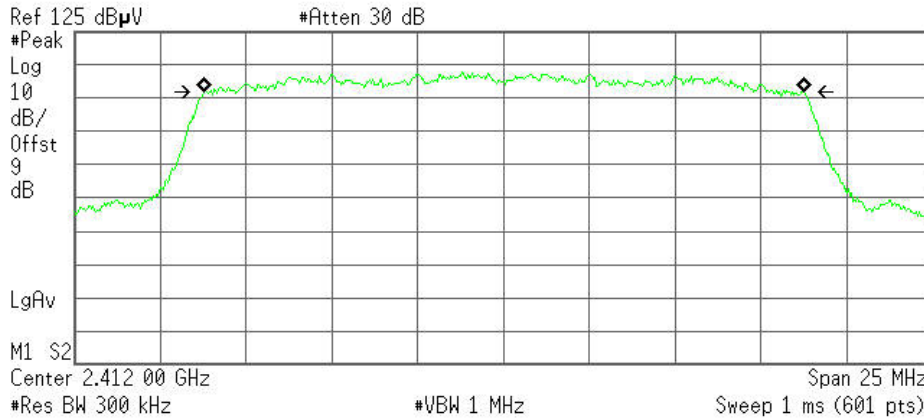
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -6.300 kHz
x dB Bandwidth 17.069 MHz

IEEE 802.11n HT20 MHz (Combine with antenna 1 and antenna 2)mode 6dB Bandwidth (CH Low)

Agilent

R T



Occupied Bandwidth
17.4475 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

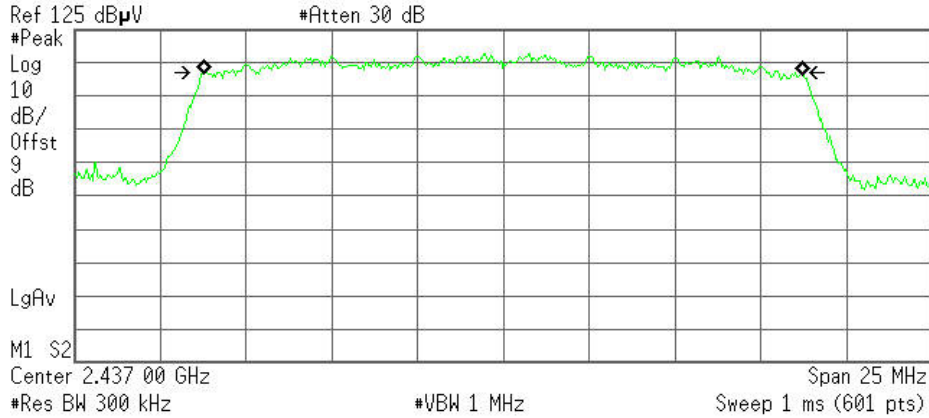
Transmit Freq Error 16.176 kHz
x dB Bandwidth 17.456 MHz



6dB Bandwidth (CH Mid)

Agilent

R T



Occupied Bandwidth
17.4502 MHz

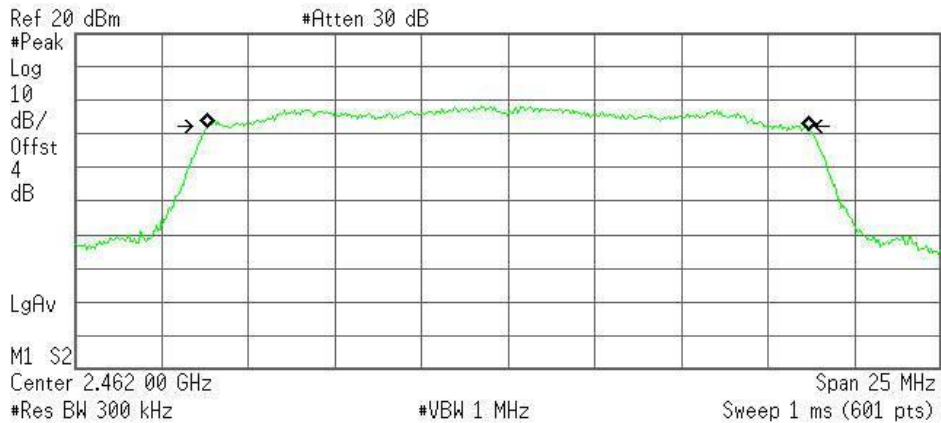
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -4.005 kHz
x dB Bandwidth 17.233 MHz

6dB Bandwidth (CH High)

Agilent

R T



Occupied Bandwidth
17.3222 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

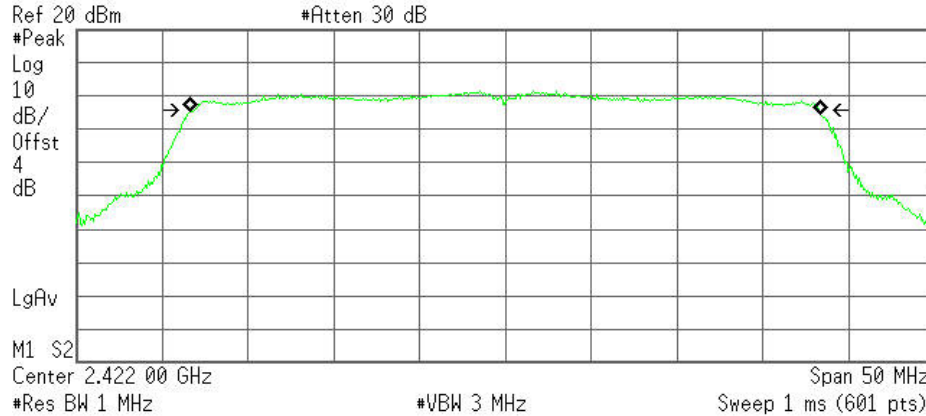
Transmit Freq Error -6.300 kHz
x dB Bandwidth 17.109 MHz



**IEEE 802.11n HT40 MHz (Combine with antenna 1 and antenna 2) mode
6dB Bandwidth (CH Low)**

Agilent

R T



Occupied Bandwidth
36.6987 MHz

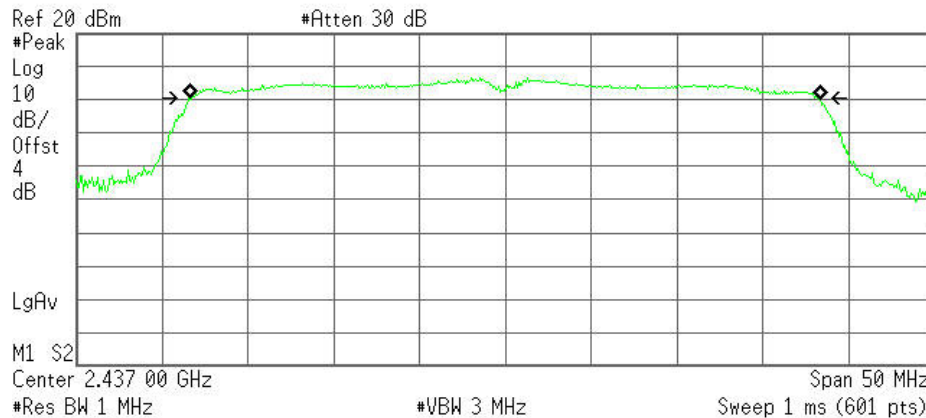
Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -6.531 kHz
x dB Bandwidth 36.397 MHz

6dB Bandwidth (CH Mid)

Agilent

R T



Occupied Bandwidth
36.6927 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

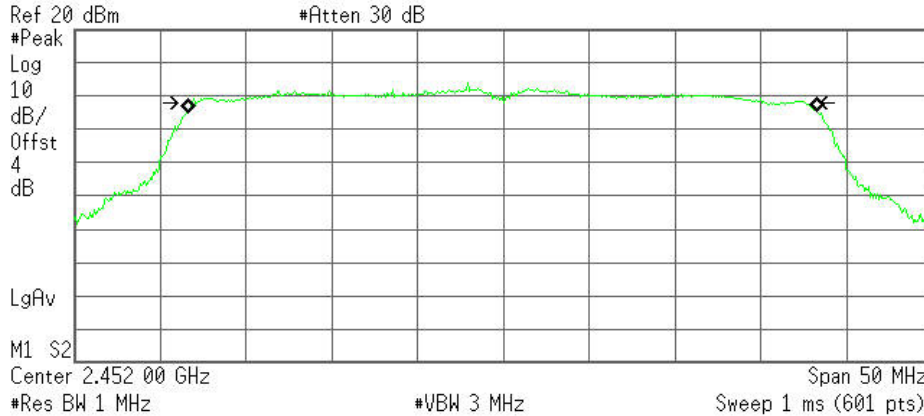
Transmit Freq Error -25.258 kHz
x dB Bandwidth 36.374 MHz



6dB Bandwidth (CH High)

Agilent

R T



Occupied Bandwidth 36.6055 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

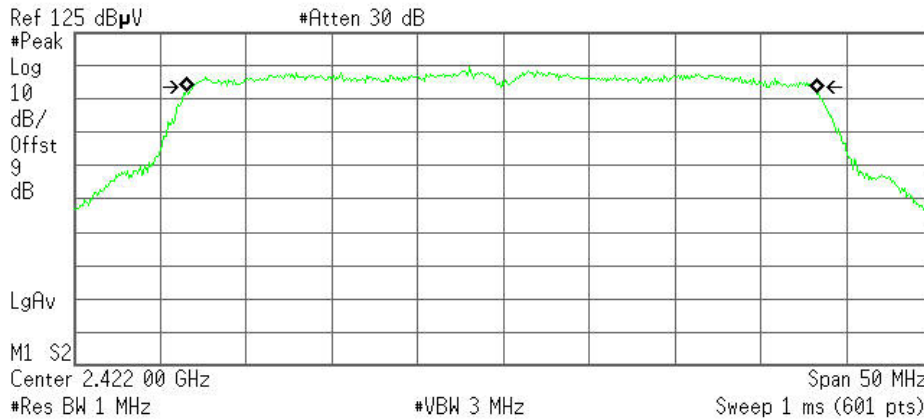
Transmit Freq Error -38.681 kHz
x dB Bandwidth 35.726 MHz

IEEE 802.11n HT40 MHz (Antenna 1) mode

6dB Bandwidth (CH Low)

Agilent

R T



Occupied Bandwidth 36.6039 MHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

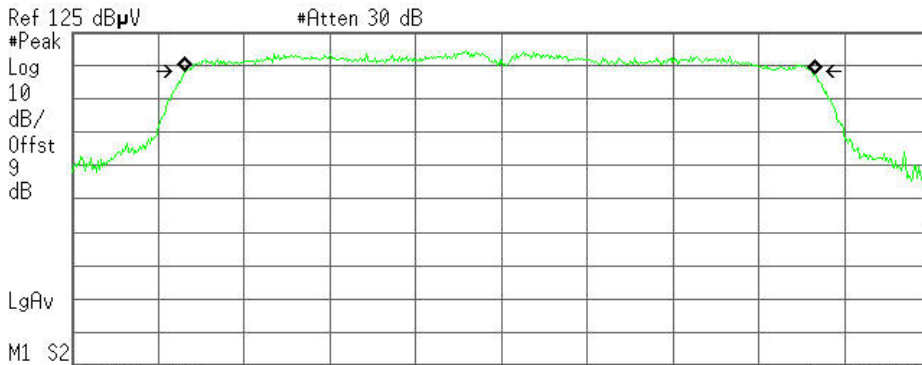
Transmit Freq Error -86.579 kHz
x dB Bandwidth 36.046 MHz



6dB Bandwidth (CH Mid)

Agilent

R T



Ref 125 dBμV #Atten 30 dB
 Center 2.437 00 GHz Span 50 MHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 1 ms (601 pts)

Occupied Bandwidth
 36.6275 MHz

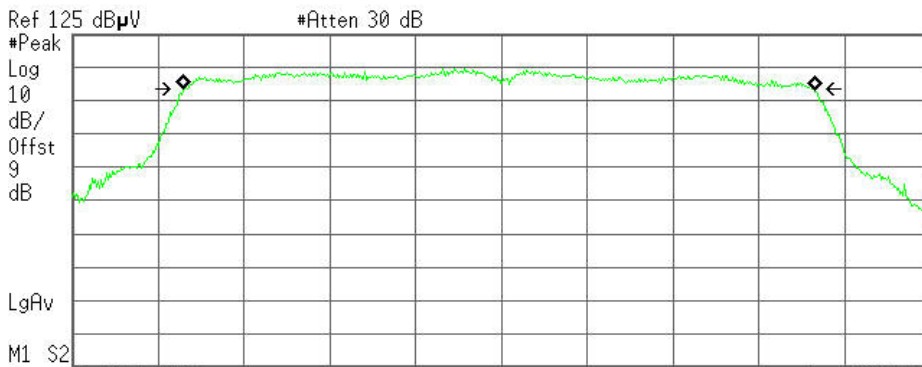
Occ BW % Pwr 99.00 %
 x dB -6.00 dB

Transmit Freq Error -96.509 kHz
 x dB Bandwidth 36.392 MHz

6dB Bandwidth (CH High)

Agilent

R T



Ref 125 dBμV #Atten 30 dB
 Center 2.452 00 GHz Span 50 MHz
 #Res BW 1 MHz #VBW 3 MHz Sweep 1 ms (601 pts)

Occupied Bandwidth
 36.6982 MHz

Occ BW % Pwr 99.00 %
 x dB -6.00 dB

Transmit Freq Error -118.307 kHz
 x dB Bandwidth 36.490 MHz



7.4. PEAK OUTPUT POWER

7.4.1. LIMITS

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

7.4.2. TEST INSTRUMENTS

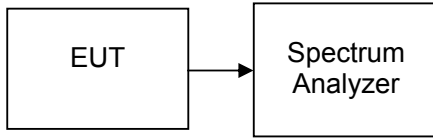
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US44300399	03/19/2012	03/19/2013

7.4.3. TEST PROCEDURES (please refer to measurement standard)

1. This procedure provides an integrated measurement alternative when the maximum available RBW < EBW.
2. Set the RBW = 1 MHz.
3. Set the VBW = 3 MHz.
4. Set the span to a value that is 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the spectrum analyzer's integrated band power measurement function with band limits set equal to the EBW band edges (for some analyzers, this may require a manual override to ensure use of peak detector). If the spectrum analyzer does not have a band power function, sum the spectrum levels (in linear power units) at 1 MHz intervals extending across the EBW of the spectrum.



7.4.4. TEST SETUP



7.4.5. TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b (Antenna 1)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	16.61	0.04581	1	PASS
Mid	2437	17.69	0.05875		PASS
High	2462	16.72	0.04699		PASS

Test mode: IEEE 802.11g (Antenna 1)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	11.58	0.01439	1	PASS
Mid	2437	15.55	0.03589		PASS
High	2462	11.54	0.01426		PASS

Test mode: IEEE 802.11n HT20 MHz (Antenna 1)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	10.61	0.01151	1	PASS
Mid	2437	15.65	0.03673		PASS
High	2462	10.67	0.01167		PASS

Test mode: IEEE 802.11n HT20 MHz (Combine with antenna 1 and antenna 2)

Channel	Frequency (MHz)	Output Power (dBm)		Output Power Total(dBm)	Output Power (W)	Limit (W)	Result
		Chain 0	Chain 1				
Low	2412	10.65	10.66	13.67	0.02326	1	PASS
Mid	2437	15.69	15.66	18.69	0.07388		PASS
High	2462	9.55	10.51	13.07	0.02026		PASS



Test mode: IEEE 802.11n HT40 MHz (Antenna 1)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	9.79	0.00953	1	PASS
Mid	2437	14.68	0.02938		PASS
High	2452	9.76	0.00946		PASS

Test mode: IEEE 802.11n HT40 MHz (Combine with antenna 1 and antenna 2)

Channel	Frequency (MHz)	Output Power (dBm)		Output Power Total(dBm)	Output Power (W)	Limit (W)	Result
		Chain 0	Chain 1				
Low	2422	8.59	9.74	12.21	0.01665	1	PASS
Mid	2437	13.94	14.70	17.35	0.05429		PASS
High	2452	8.57	9.71	12.19	0.01655		PASS

Note : Combine Power Calculation :

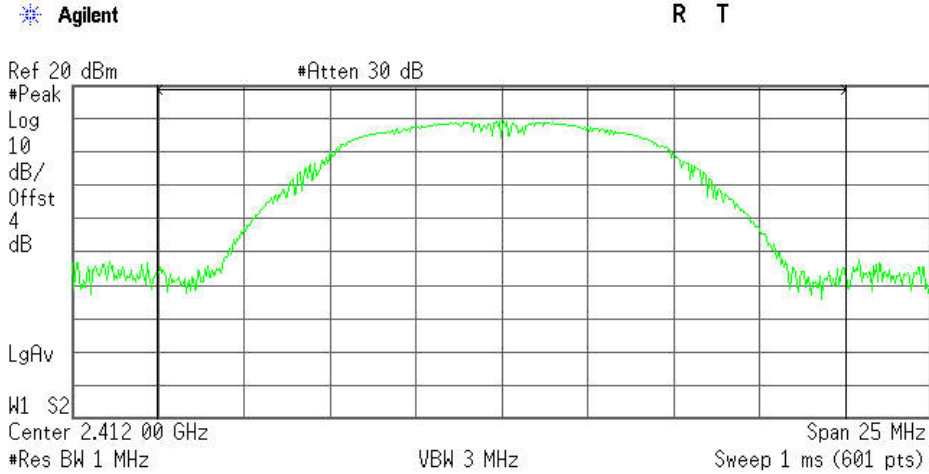
$$\text{Total Power(dBm)} = \lg \left(10^{(\text{chain 0 power}/10)} + 10^{(\text{chain 1 power}/10)} \right) * 10$$



Test Plot

IEEE 802.11b(Antenna 1) mode

Peak power (CH Low)



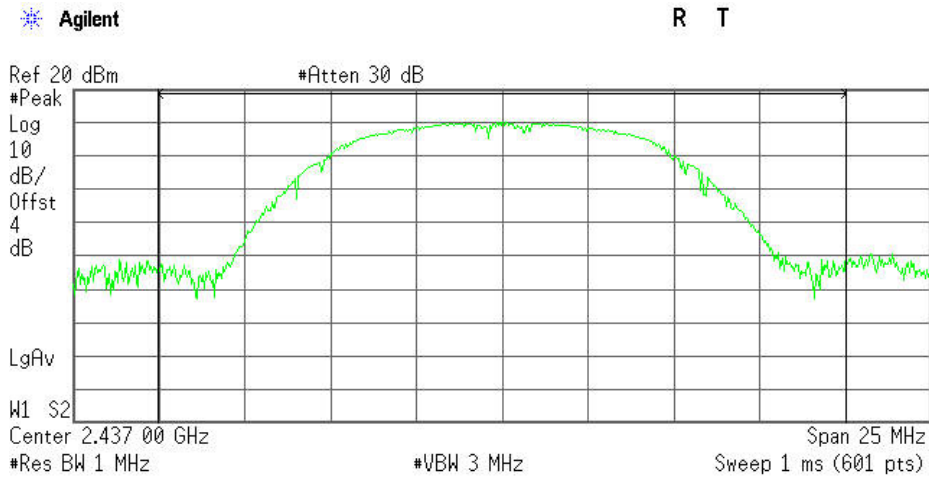
Channel Power

16.61 dBm /20.0000 MHz

Power Spectral Density

-56.40 dBm/Hz

Peak power (CH Mid)



Channel Power

17.69 dBm /20.0000 MHz

Power Spectral Density

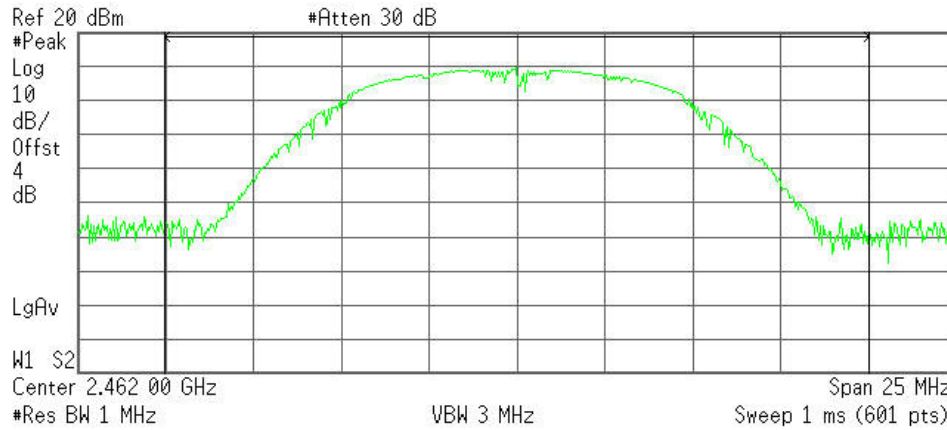
-55.32 dBm/Hz



Peak power (CH High)

Agilent

R T



Channel Power

16.72 dBm /20.0000 MHz

Power Spectral Density

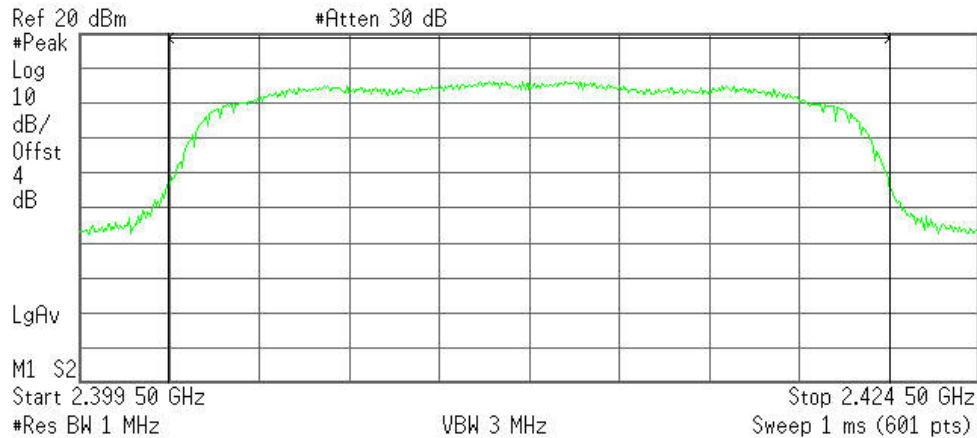
-56.29 dBm/Hz

IEEE 802.11g (Antenna 1)mode

Peak power (CH Low)

Agilent

R T



Channel Power

11.58 dBm /20.0000 MHz

Power Spectral Density

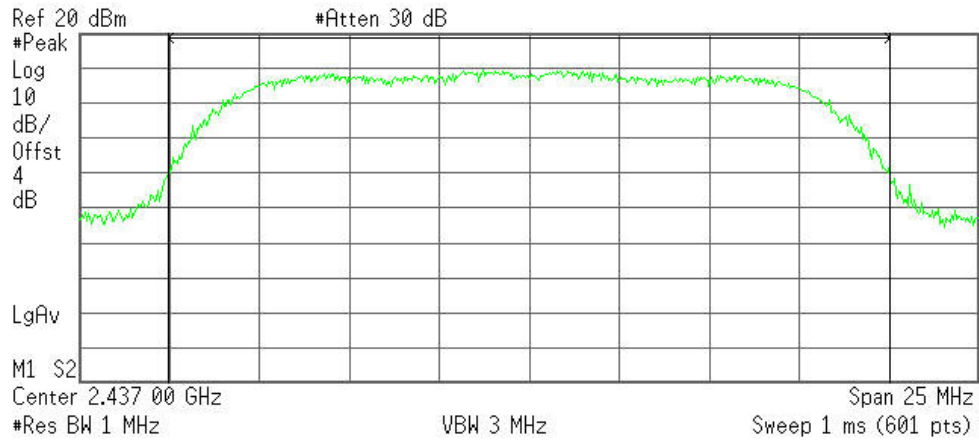
-61.43 dBm/Hz



Peak power (CH Mid)

Agilent

R T



Channel Power

15.55 dBm /20.0000 MHz

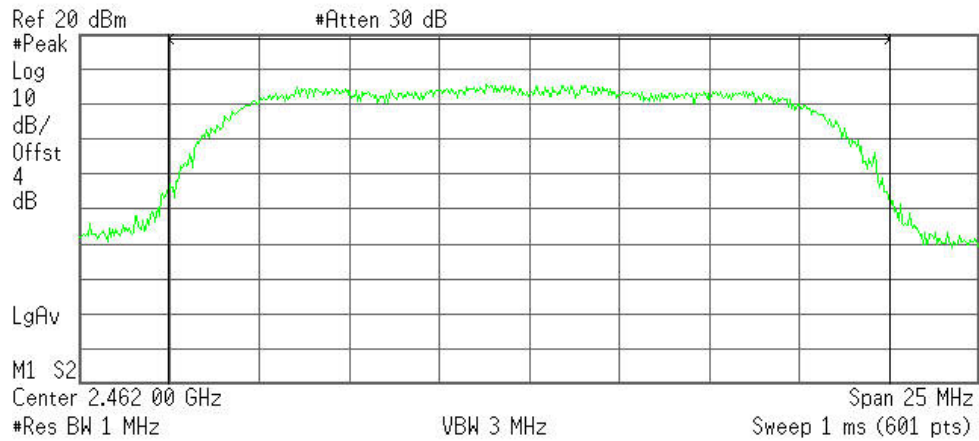
Power Spectral Density

-57.46 dBm/Hz

Peak power (CH High)

Agilent

R T



Channel Power

11.54 dBm /20.0000 MHz

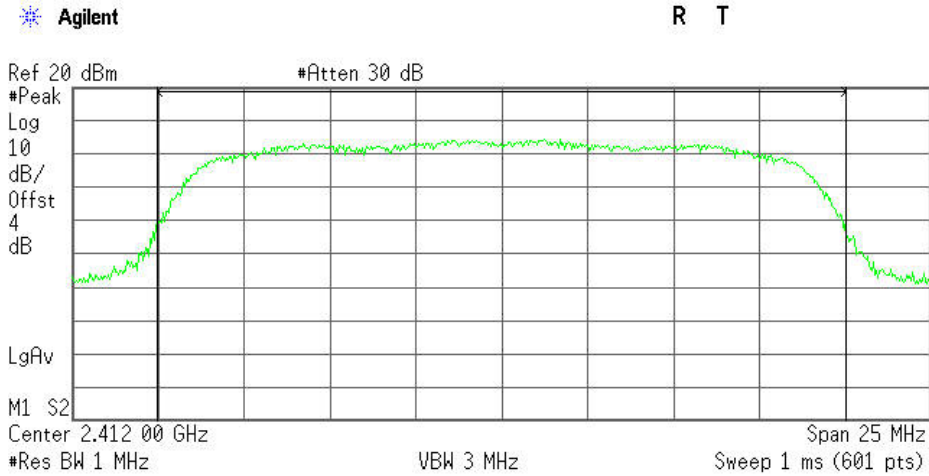
Power Spectral Density

-61.47 dBm/Hz



IEEE 802.11n HT20 MHz (Antenna 1)mode

Peak power (CH Low)



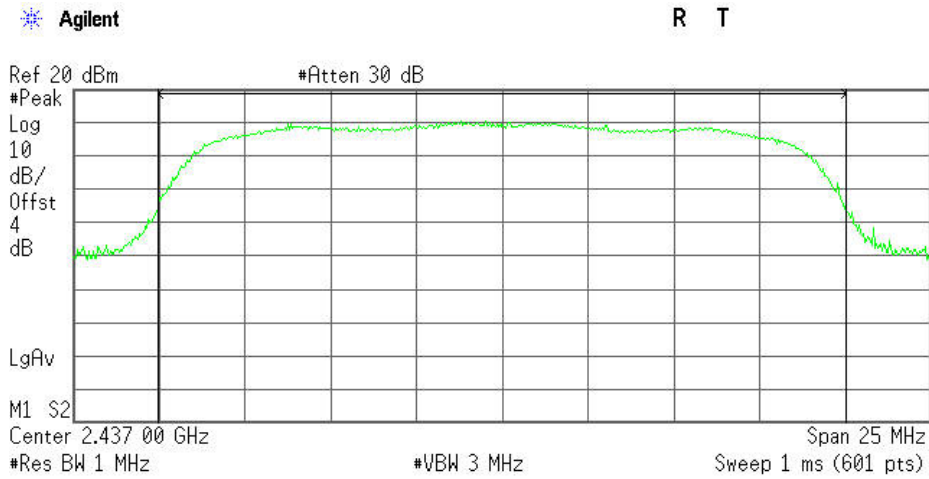
Channel Power

10.61 dBm /20.0000 MHz

Power Spectral Density

-62.40 dBm/Hz

Peak power (CH Mid)



Channel Power

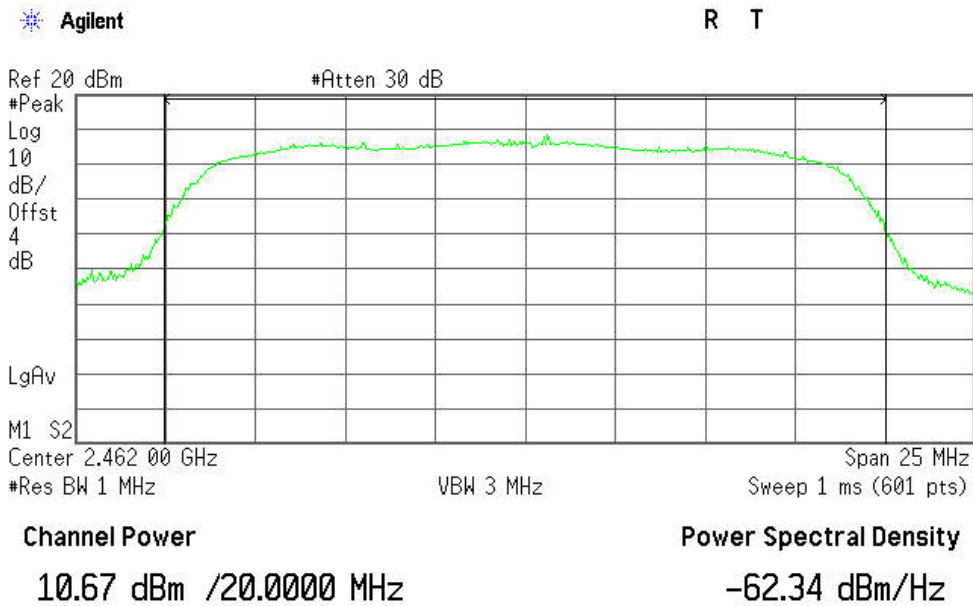
15.65 dBm /20.0000 MHz

Power Spectral Density

-57.36 dBm/Hz

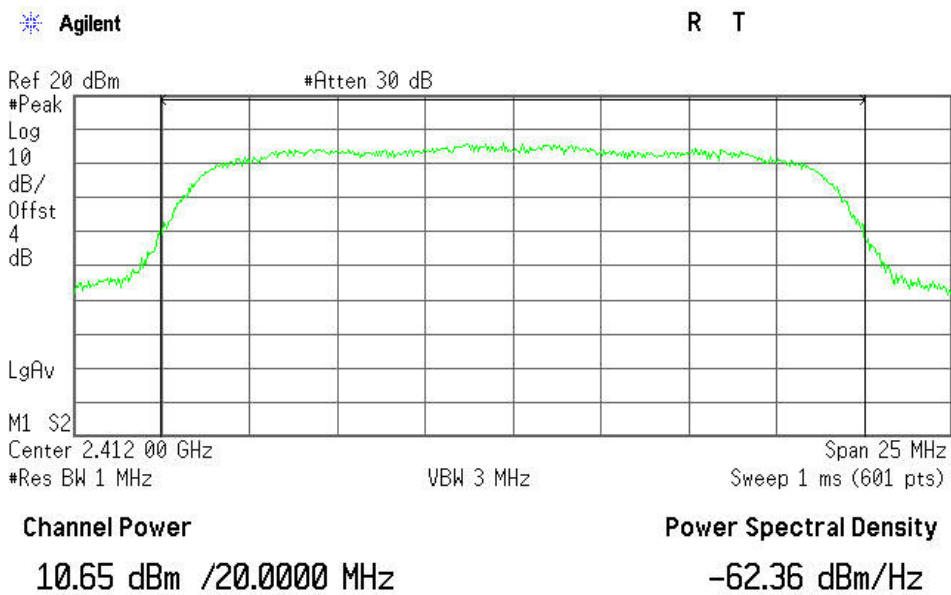


Peak power (CH High)



IEEE 802.11n HT20 MHz (Combine with antenna 1 and antenna 2)mode: Chain 0

Peak power (CH Low)

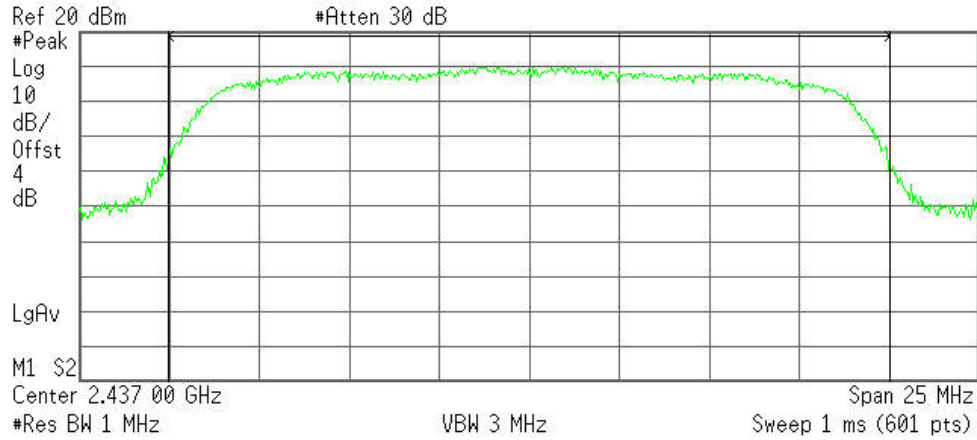




Peak power (CH Mid)

Agilent

R T



Channel Power

15.69 dBm /20.0000 MHz

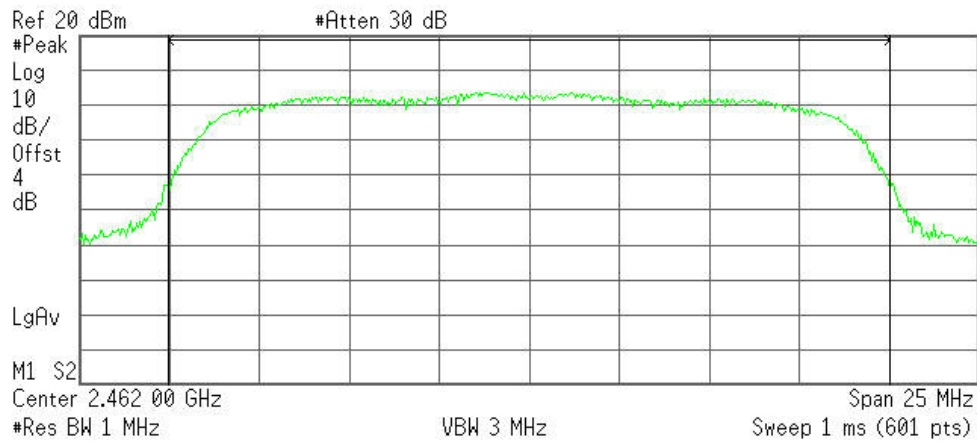
Power Spectral Density

-57.32 dBm/Hz

Peak power (CH High)

Agilent

R T



Channel Power

9.55 dBm /20.0000 MHz

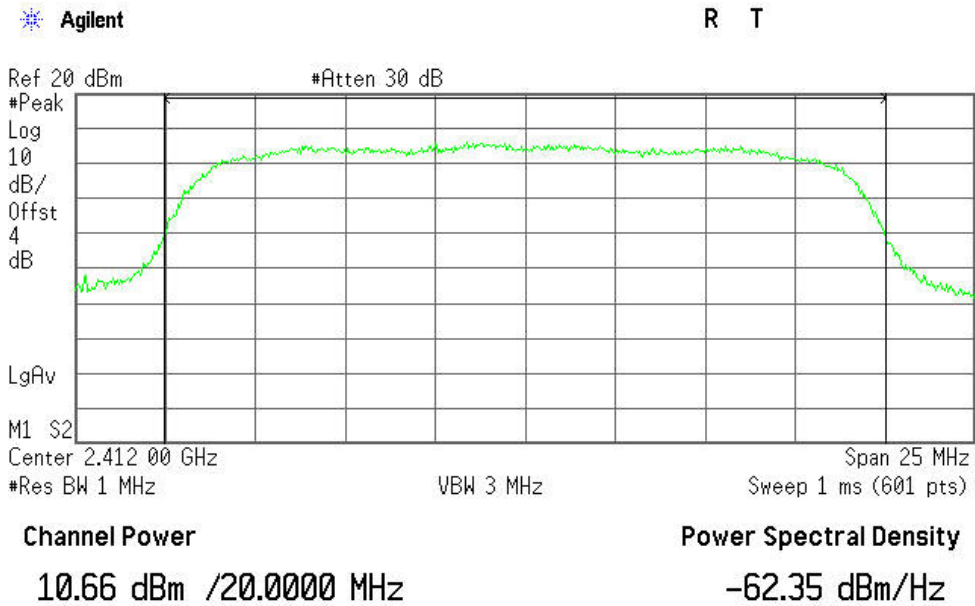
Power Spectral Density

-63.46 dBm/Hz

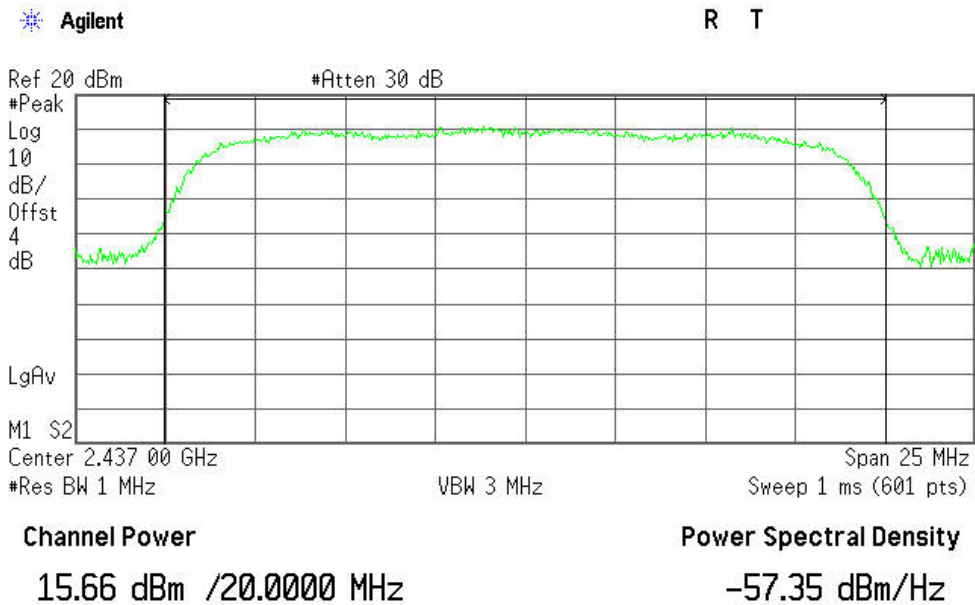


IEEE 802.11n HT20 MHz (Combine with antenna 1 and antenna 2)mode: Chain 1

Peak power (CH Low)



Peak power (CH Mid)

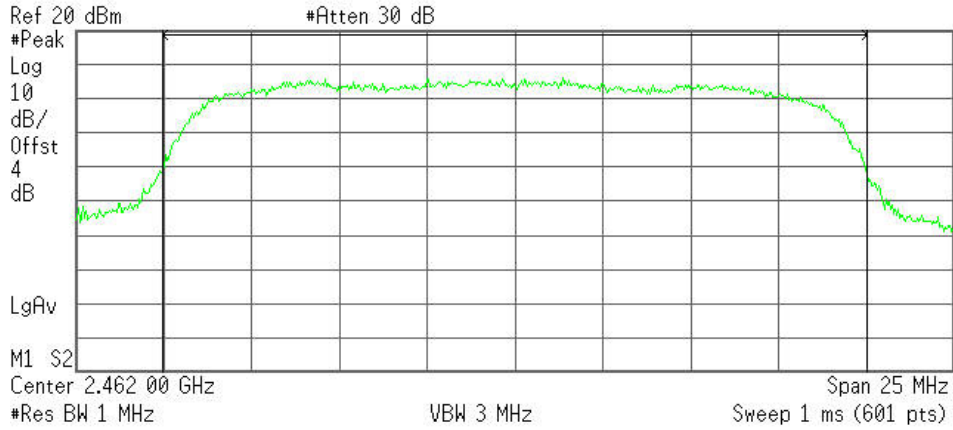




Peak power (CH High)

Agilent

R T



Channel Power

10.51 dBm /20.0000 MHz

Power Spectral Density

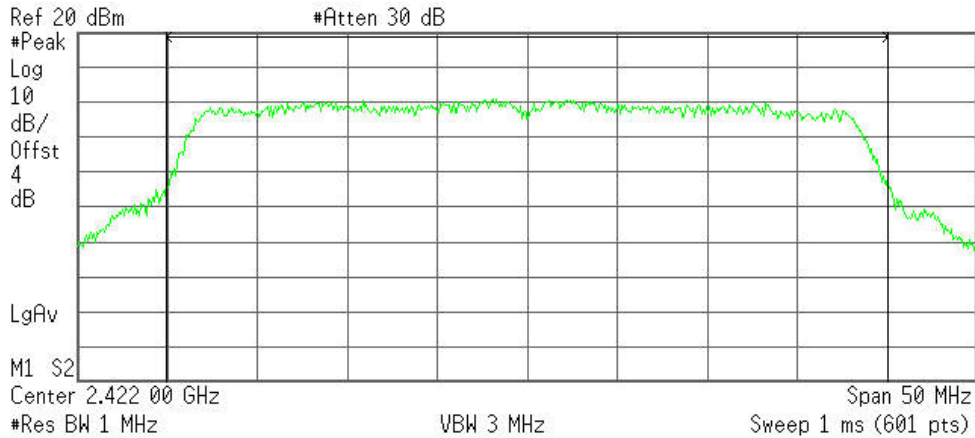
-62.50 dBm/Hz

IEEE 802.11n HT40 MHz (Antenna 1)mode

Peak power (CH Low)

Agilent

R T



Channel Power

9.79 dBm /40.0000 MHz

Power Spectral Density

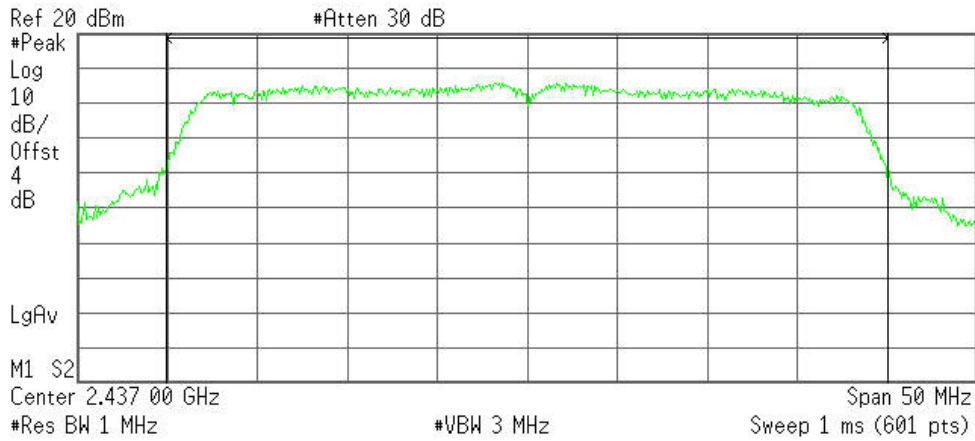
-66.23 dBm/Hz



Peak power (CH Mid)

Agilent

R T



Channel Power

14.68 dBm /40.0000 MHz

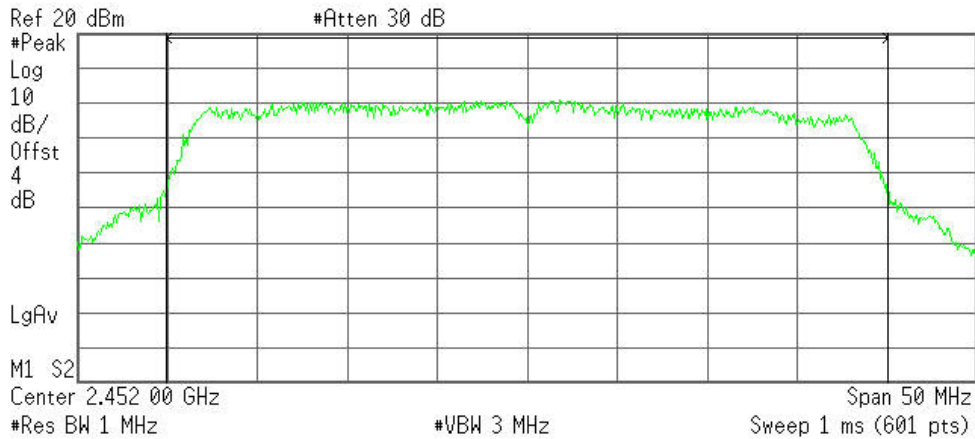
Power Spectral Density

-61.34 dBm/Hz

Peak power (CH High)

Agilent

R T



Channel Power

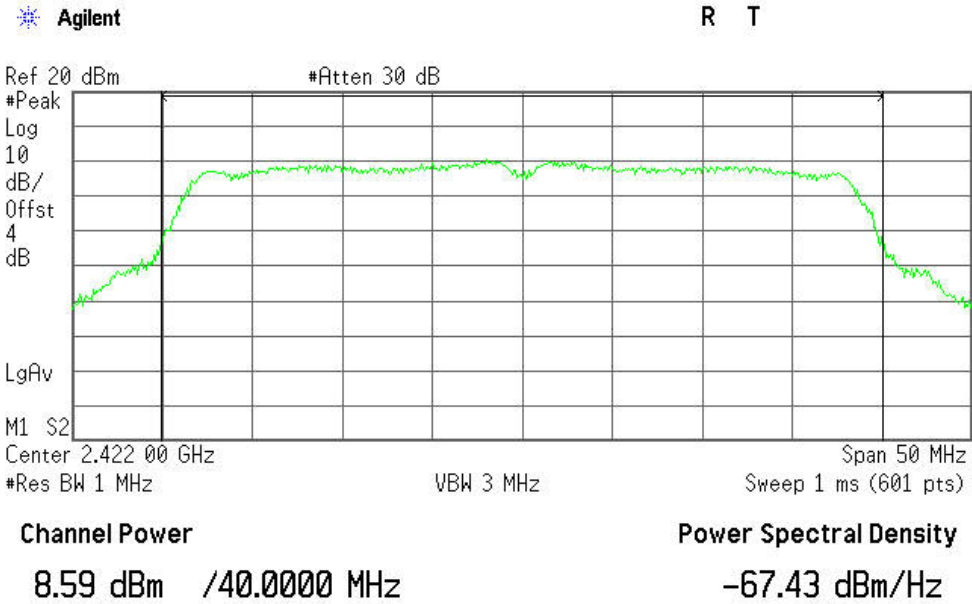
9.76 dBm /40.0000 MHz

Power Spectral Density

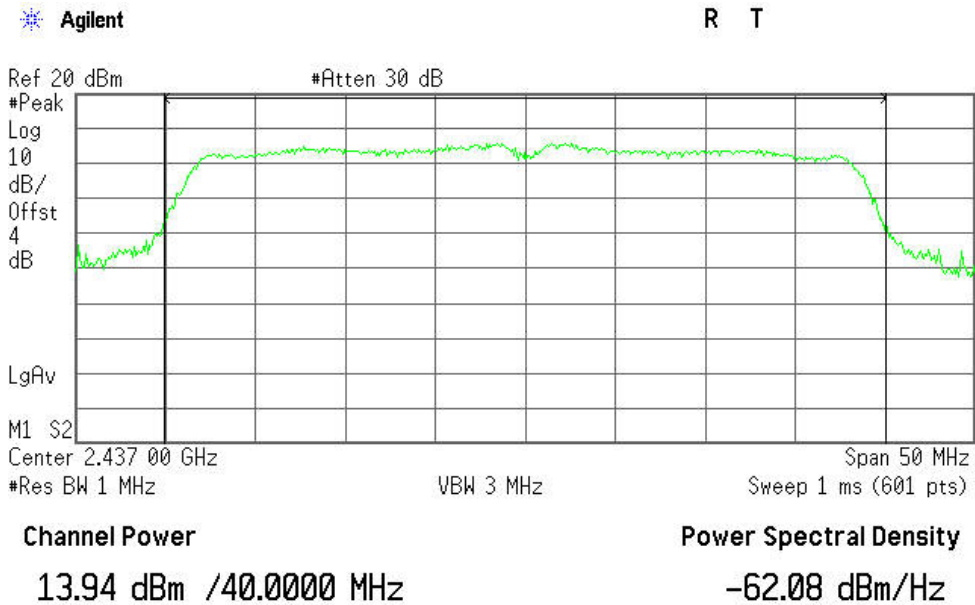
-66.26 dBm/Hz



IEEE 802.11n HT40 MHz (Comine with antenna 1 and antenna 2)mode: Chain 0
Peak power (CH Low)



Peak power (CH Mid)

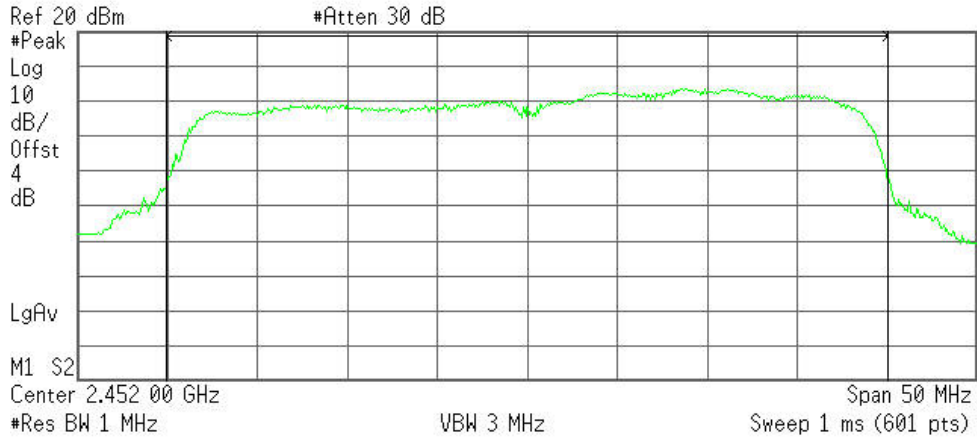




Peak power (CH High)

Agilent

R T



Channel Power

8.57 dBm /40.0000 MHz

Power Spectral Density

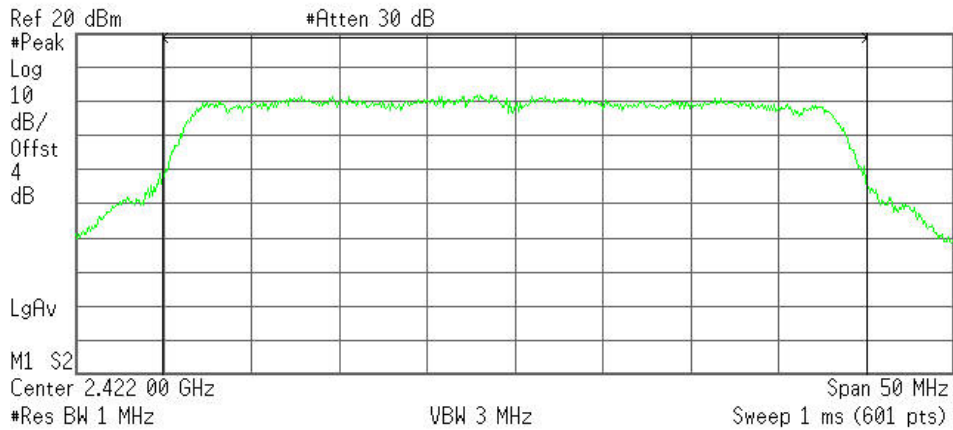
-67.45 dBm/Hz

IEEE 802.11n HT40 MHz (Comine with antenna 1 and antenna 2)mode: Chain 0

Peak power (CH Low)

Agilent

R T



Channel Power

9.74 dBm /40.0000 MHz

Power Spectral Density

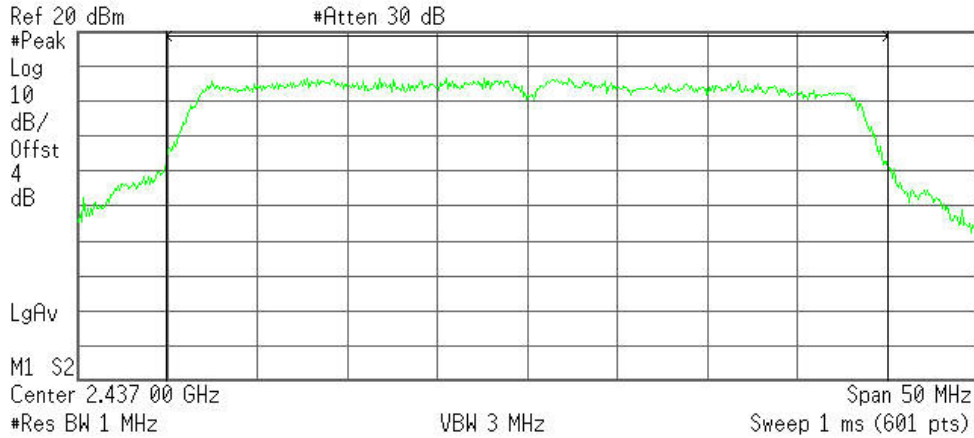
-66.28 dBm/Hz



Peak power (CH Mid)

Agilent

R T



Channel Power

14.70 dBm /40.0000 MHz

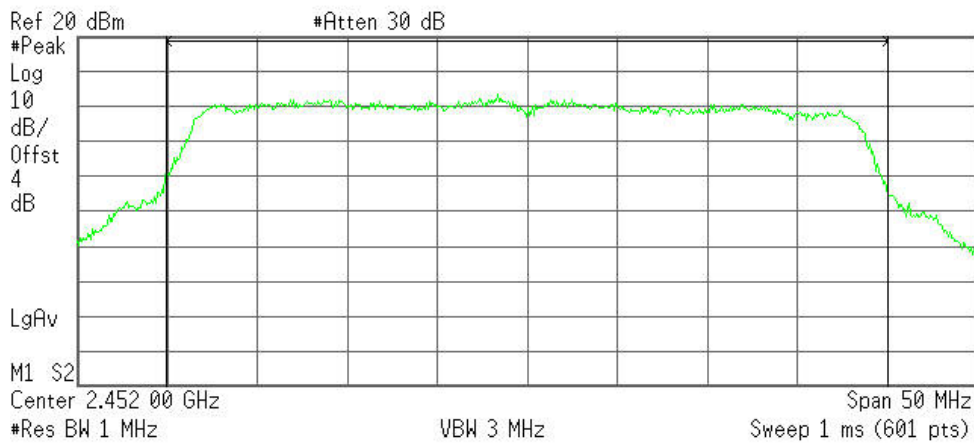
Power Spectral Density

-61.32 dBm/Hz

Peak power (CH High)

Agilent

R T



Channel Power

9.71 dBm /40.0000 MHz

Power Spectral Density

-66.31 dBm/Hz



7.5. BAND EDGES MEASUREMENT

7.5.1. LIMITS

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum 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. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

7.5.2. TEST INSTRUMENTS

Radiated Emission Test Site 966(2)					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	03/19/2012	03/19/2013
ESCI EMI TEST RECEIVER.ESCI	ROHDE&SCHWARZ	ESCI	100783	03/17/2012	03/17/2013
Amplifier	MITEQ	AM-1604-3000	1123808	03/18/2012	03/18/2013
Turn Table	EMCO	2081-1.21	N/A	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
High Noise Amplifier	Agilent	8449B	3008A01838	03/18/2012	03/18/2013
Bilog Antenna	SCHAFFNER	CBL6143	5082	03/17/2012	03/17/2013
Horn Antenna	SCHWARZBECK	BBHA9120	D286	03/17/2012	03/17/2013
Loop Antenna	A. R. A	PLA-1030/B	1029	03/23/2012	03/23/2013
Temp. / Humidity Meter	VICTOR	VC230	N/A	03/19/2012	03/19/2013
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

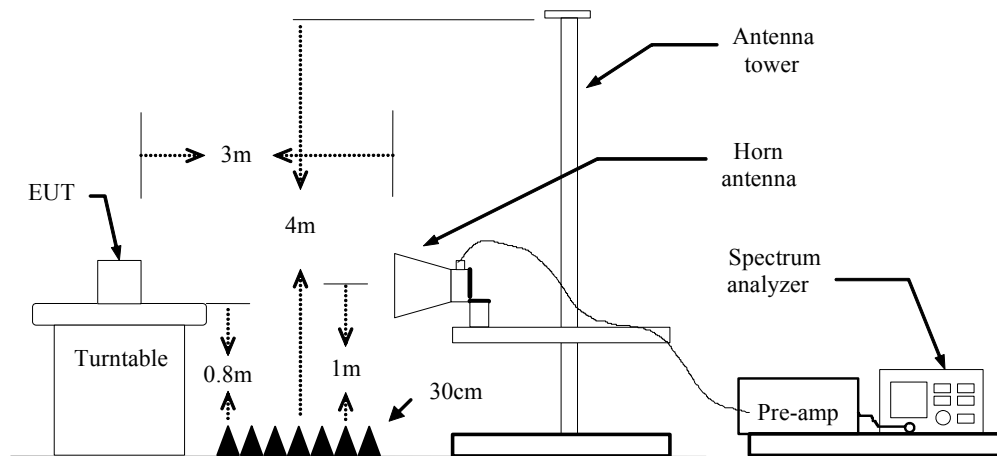
- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The FCC Site Registration number is 101879.
3. N.C.R = No Calibration Required.



7.5.3. TEST PROCEDURES (please refer to measurement standard)

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are

7.5.4. TEST SETUP





7.5.5. TEST RESULTS

Test Plot

IEEE 802.11b (Antenna 1)mode

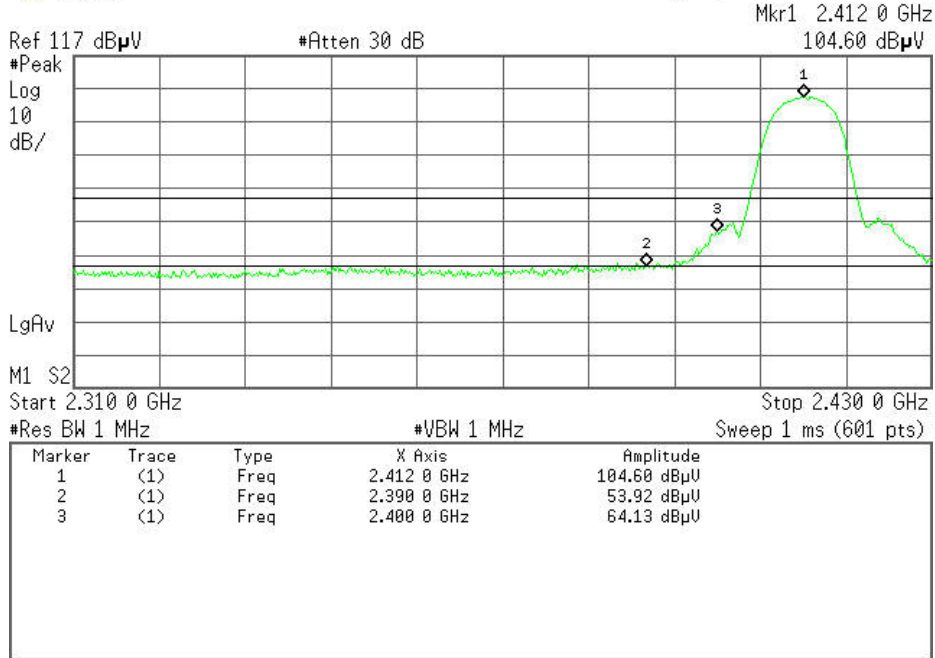
Band Edges (CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent

R T

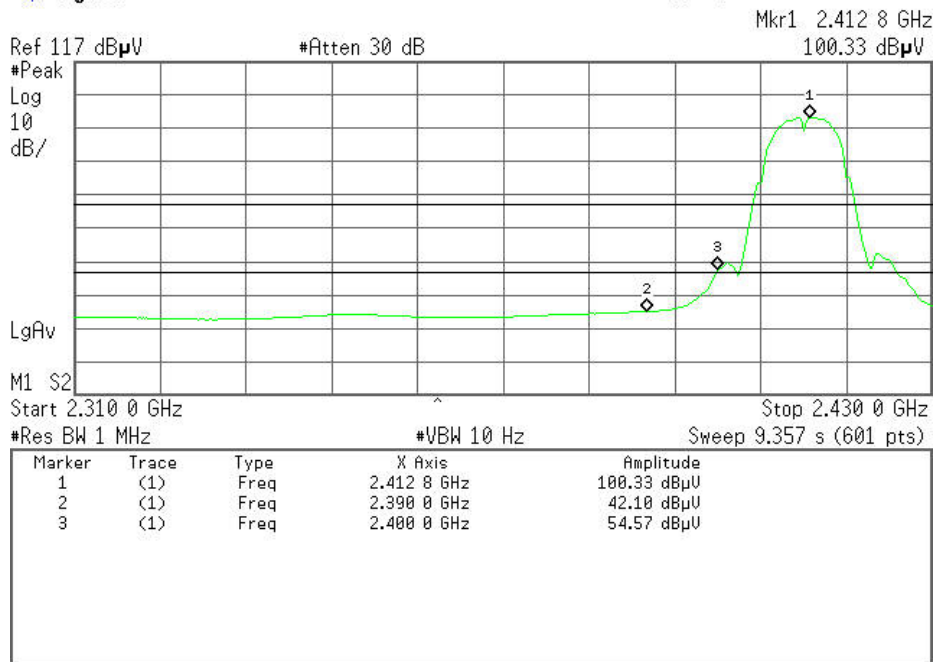


Detector mode: Average

Polarity: Vertical

Agilent

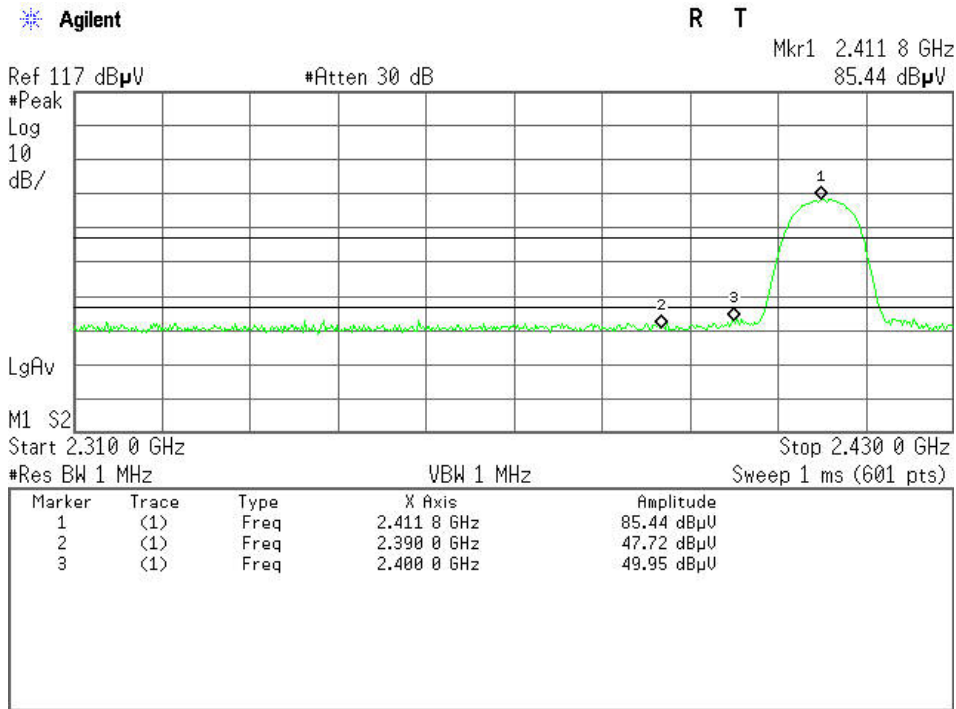
R T





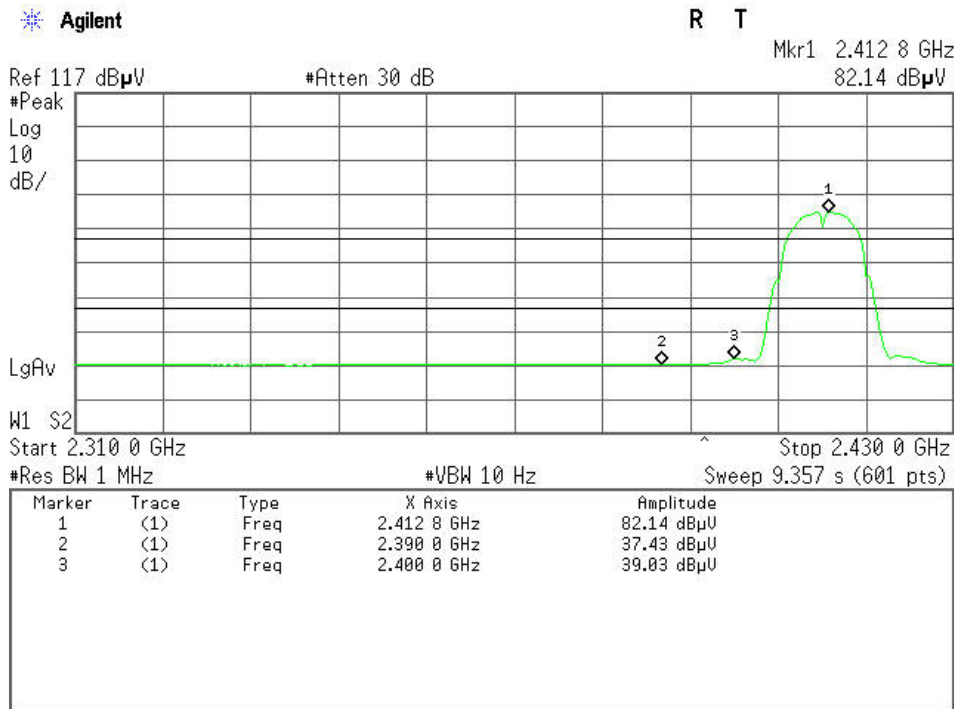
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal





Band Edges (CH High)

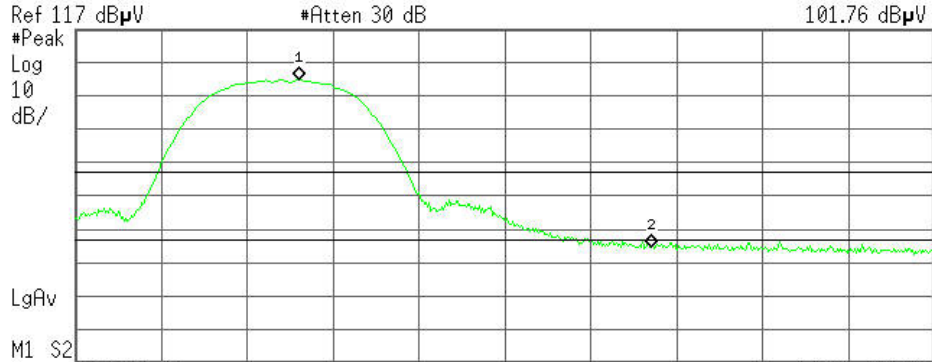
Detector mode: Peak

Polarity: Vertical

Agilent

R T

Mkr1 2.463 00 GHz
101.76 dBμV



M1 S2
 Start 2.450 00 GHz Stop 2.500 00 GHz
 #Res BW 1 MHz VBW 1 MHz Sweep 1 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.463 00 GHz	101.76 dBμV
2	(1)	Freq	2.483 50 GHz	51.46 dBμV

Detector mode: Average

Polarity: Vertical

Agilent

R T

Mkr1 2.461 25 GHz
98.62 dBμV



M1 S2
 Start 2.450 00 GHz Stop 2.500 00 GHz
 #Res BW 1 MHz #VBW 10 Hz Sweep 3.899 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.461 25 GHz	98.62 dBμV
2	(1)	Freq	2.483 50 GHz	41.05 dBμV