Annex A

WLAN 802.11b/g/n Test Result

Model No.: APEX0374

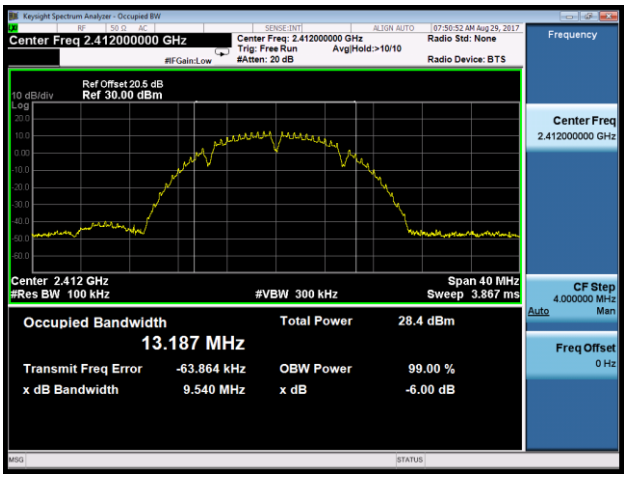
1. 6dB Bandwidth Measurement Test Result

Product	ACCESS POINT	Temperature	27°C
Test Engineer	Kevin Ker	Relative Humidity	65%
Test Site	SR2	Test Date	2017/08/29
Test Item	6dB Bandwidth		

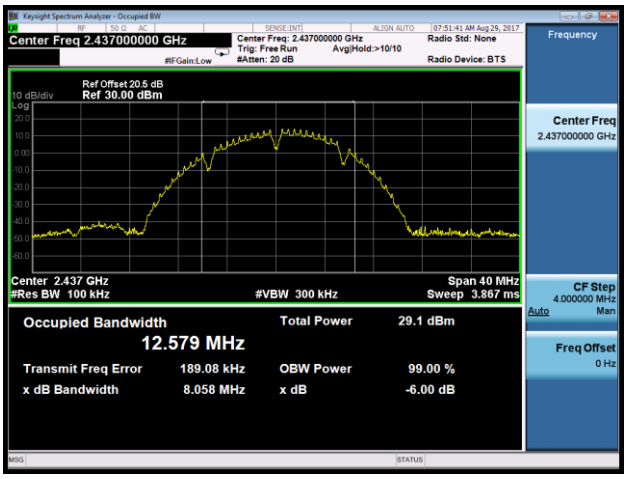
Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Ant 0 / Ant 0 + 1						
802.11b	1Mbps	01	2412	9.54	≥ 0.5	Pass
802.11b	1Mbps	06	2437	8.06	≥ 0.5	Pass
802.11b	1Mbps	11	2462	7.56	≥ 0.5	Pass
802.11g	6Mbps	01	2412	15.72	≥ 0.5	Pass
802.11g	6Mbps	06	2437	15.78	≥ 0.5	Pass
802.11g	6Mbps	11	2462	15.76	≥ 0.5	Pass
802.11n-HT20	MCS0	01	2412	15.92	≥ 0.5	Pass
802.11n-HT20	MCS0	06	2437	17.14	≥ 0.5	Pass
802.11n-HT20	MCS0	11	2462	17.17	≥ 0.5	Pass
802.11n-HT40	MCS0	03	2422	35.64	≥ 0.5	Pass
802.11n-HT40	MCS0	06	2437	35.11	≥ 0.5	Pass
802.11n-HT40	MCS0	09	2452	35.10	≥ 0.5	Pass

802.11b 6dB Bandwidth - Ant 0 / Ant 0 + 1

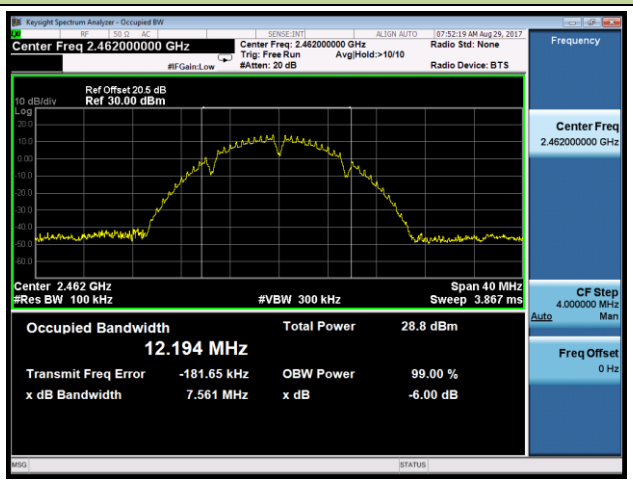
Channel 01 (2412MHz)



Channel 06 (2437MHz)

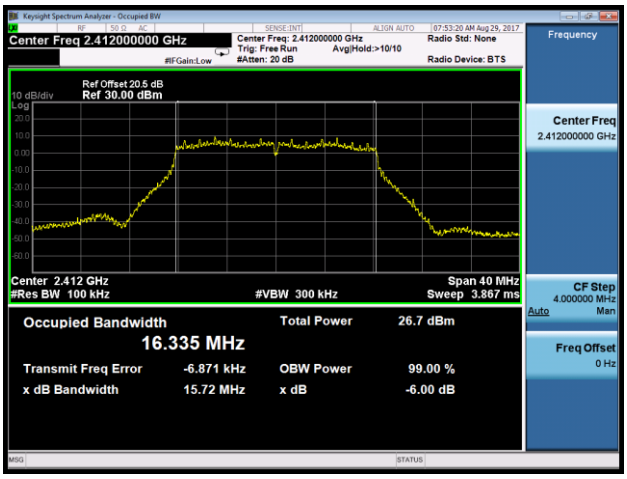


Channel 11 (2462MHz)

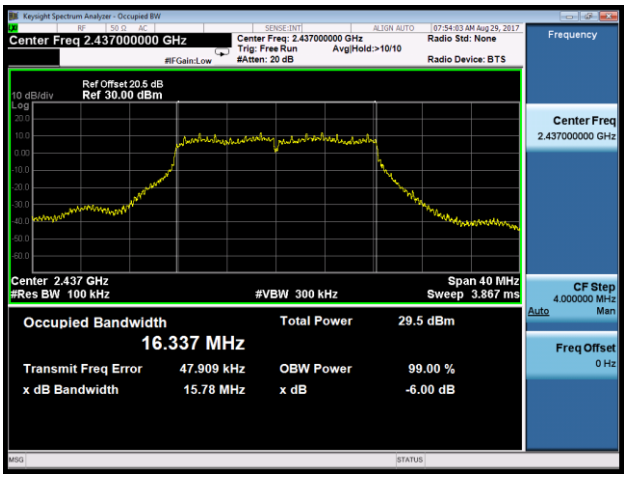


802.11g 6dB Bandwidth - Ant 0 / Ant 0 + 1

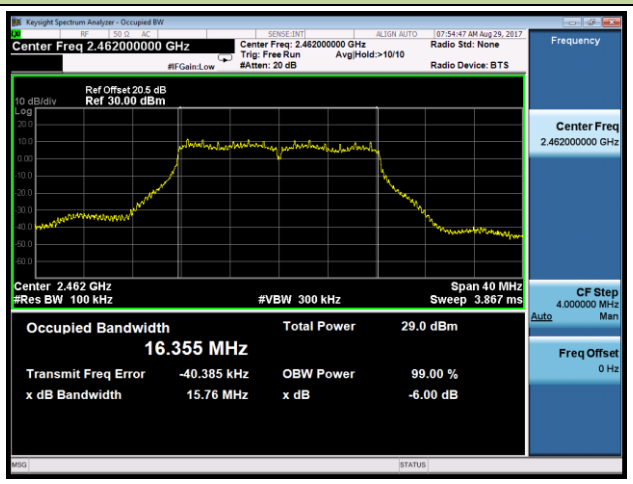
Channel 01 (2412MHz)



Channel 06 (2437MHz)

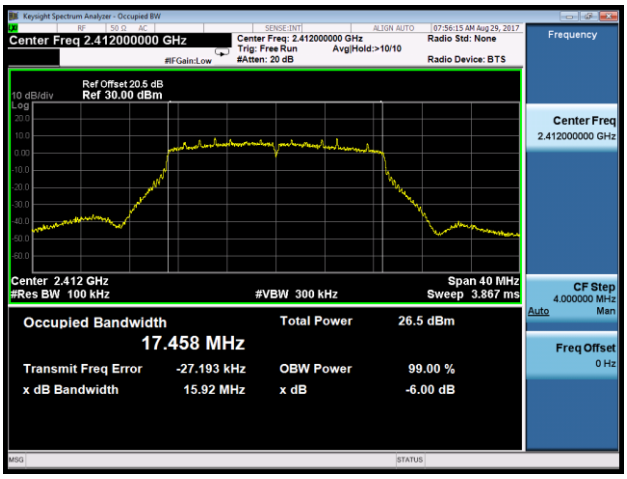


Channel 11 (2462MHz)

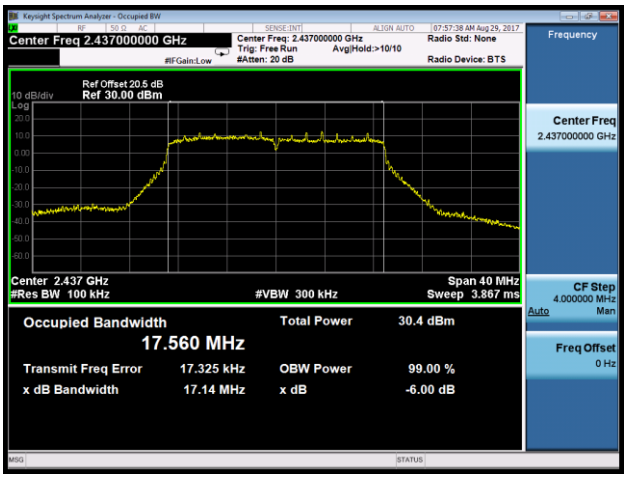


802.11n-HT20 6dB Bandwidth - Ant 0 / Ant 0 + 1

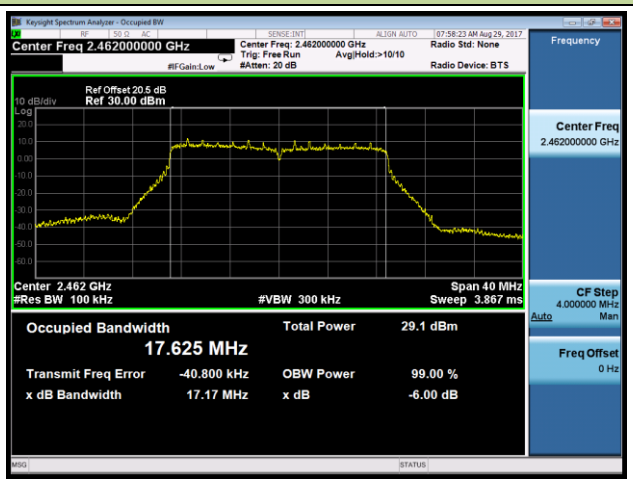
Channel 01 (2412MHz)



Channel 06 (2437MHz)

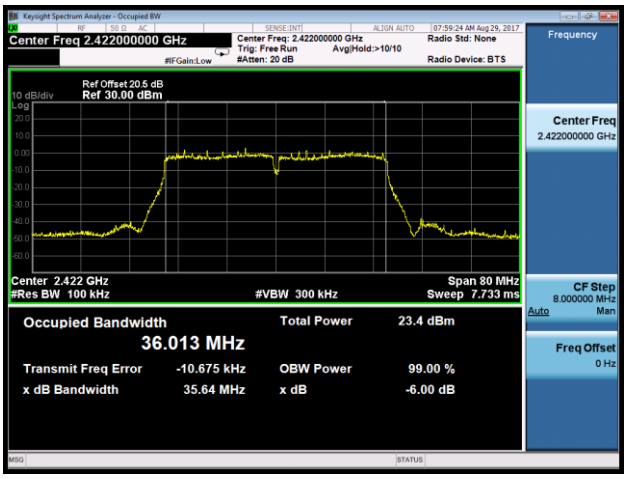


Channel 11 (2462MHz)

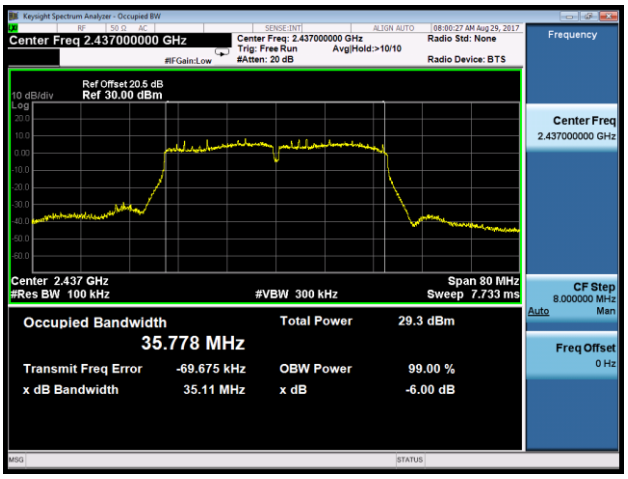


802.11n-HT40 6dB Bandwidth - Ant 0 / Ant 0 + 1

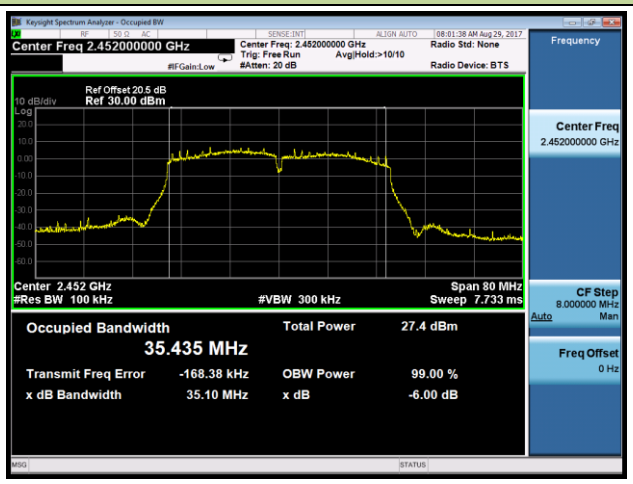
Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)



2. Output Power Measurement Test Result

Power output test was verified over all data rates of each mode shown as below table, and then choose the maximum power output (gray marker) for final test of each channel.

For Ant 0 / Ant 0 + 1 port of Omni Antenna (ANT-2x2-2005):

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate/ MCS	Average Power (dBm)
802.11b	20	6	2437	1Mbps	21.47
				5.5Mbps	21.13
				11Mbps	20.89
802.11g	20	6	2437	6Mbps	21.89
				24Mbps	21.45
				54Mbps	21.04
802.11n	20	6	2437	MCS0	22.03
				MCS3	21.56
				MCS7	21.23
802.11n	40	6	2437	MCS0	17.54
				MCS3	17.33
				MCS7	17.04

Product	ACCESS POINT	Temperature	27°C
Test Engineer	Kevin Ker	Relative Humidity	65%
Test Site	SR2	Test Date	2017/08/29
Antenna Type	Omni Antenna (ANT-2x2-2005)	Test Item	Output Power

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Total Average Power (dBm)	Limit (dBm)	Result
Ant 0 + 1 (CDD Mode)								
11b	1Mbps	1	2412	22.47	22.19	25.34	≤ 30.00	Pass
11b	1Mbps	6	2437	21.47	22.07	24.79	≤ 30.00	Pass
11b	1Mbps	11	2462	21.41	22.16	24.81	≤ 30.00	Pass
11g	6Mbps	1	2412	19.17	19.28	22.24	≤ 30.00	Pass
11g	6Mbps	6	2437	21.89	22.15	25.03	≤ 30.00	Pass
11g	6Mbps	11	2462	21.73	22.03	24.89	≤ 30.00	Pass
11n-HT20	MCS0	1	2412	18.38	18.65	21.53	≤ 30.00	Pass
11n-HT20	MCS0	2	2417	21.71	21.75	24.74	≤ 30.00	Pass
11n-HT20	MCS0	6	2437	22.03	22.39	25.22	≤ 30.00	Pass
11n-HT20	MCS0	11	2462	21.92	22.17	25.06	≤ 30.00	Pass
11n-HT40	MCS0	3	2422	15.57	15.62	18.61	≤ 30.00	Pass
11n-HT40	MCS0	6	2437	17.54	18.09	20.83	≤ 30.00	Pass
11n-HT40	MCS0	9	2452	16.62	16.89	19.77	≤ 30.00	Pass
Ant 0 + 1 (Beam-Forming Mode)								
11n-HT20	MCS0	1	2412	18.38	18.65	21.53	≤ 30.00	Pass
11n-HT20	MCS0	2	2417	21.71	21.75	24.74	≤ 30.00	Pass
11n-HT20	MCS0	6	2437	22.03	22.39	25.22	≤ 30.00	Pass
11n-HT20	MCS0	11	2462	21.92	22.17	25.06	≤ 30.00	Pass
11n-HT40	MCS0	3	2422	15.57	15.62	18.61	≤ 30.00	Pass
11n-HT40	MCS0	6	2437	17.54	18.09	20.83	≤ 30.00	Pass
11n-HT40	MCS0	9	2452	16.62	16.89	19.77	≤ 30.00	Pass

Note: Total Average Power (dBm) = $10*\log\{10^{(\text{Ant 0 Average Power }/10)}+10^{(\text{Ant 1 Average Power }/10)}\}$ (dBm).

Product	ACCESS POINT	Temperature	27°C
Test Engineer	Kevin Ker	Relative Humidity	65%
Test Site	SR2	Test Date	2017/08/29
Antenna Type	Directional Antenna (ANT-2x2-2314)	Test Item	Output Power

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Total Average Power (dBm)	Limit (dBm)	Result
Ant 0 + 1 (CDD Mode)								
11b	1Mbps	1	2412	18.94	18.84	21.90	≤ 22.00	Pass
11b	1Mbps	6	2437	18.37	19.05	21.73	≤ 22.00	Pass
11b	1Mbps	11	2462	18.33	19.22	21.81	≤ 22.00	Pass
11g	6Mbps	1	2412	16.11	16.46	19.30	≤ 22.00	Pass
11g	6Mbps	6	2437	18.70	18.98	21.85	≤ 22.00	Pass
11g	6Mbps	11	2462	16.69	17.14	19.93	≤ 22.00	Pass
11n-HT20	MCS0	1	2412	15.28	15.59	18.45	≤ 22.00	Pass
11n-HT20	MCS0	2	2417	17.14	17.27	20.22	≤ 22.00	Pass
11n-HT20	MCS0	6	2437	18.29	18.72	21.52	≤ 22.00	Pass
11n-HT20	MCS0	10	2457	17.36	17.47	20.43	≤ 22.00	Pass
11n-HT20	MCS0	11	2462	14.86	15.36	18.13	≤ 22.00	Pass
11n-HT40	MCS0	3	2422	12.56	12.42	15.50	≤ 22.00	Pass
11n-HT40	MCS0	6	2437	14.69	14.93	17.82	≤ 22.00	Pass
11n-HT40	MCS0	9	2452	13.12	13.44	16.29	≤ 22.00	Pass
Ant 0 + 1 (Beam-Forming Mode)								
11n-HT20	MCS0	1	2412	15.28	15.59	18.45	≤ 22.00	Pass
11n-HT20	MCS0	2	2417	17.14	17.27	20.22	≤ 22.00	Pass
11n-HT20	MCS0	6	2437	18.29	18.72	21.52	≤ 22.00	Pass
11n-HT20	MCS0	10	2457	17.36	17.47	20.43	≤ 22.00	Pass
11n-HT20	MCS0	11	2462	14.86	15.36	18.13	≤ 22.00	Pass
11n-HT40	MCS0	3	2422	12.56	12.42	15.50	≤ 22.00	Pass
11n-HT40	MCS0	6	2437	14.69	14.93	17.82	≤ 22.00	Pass
11n-HT40	MCS0	9	2452	13.12	13.44	16.29	≤ 22.00	Pass

Note 1: Total Average Power (dBm) = $10*\log\{10^{(\text{Ant 0 Average Power /10})}+10^{(\text{Ant 1 Average Power /10})}\}$ (dBm).

Note 2: Limit (dBm) = 30 dBm – (14 dBi – 6 dBi) = 22 dBm.

3. Power Spectral Density Measurement Test Result

Product	ACCESS POINT	Temperature	27°C
Test Engineer	Kevin Ker	Relative Humidity	65%
Test Site	SR2	Test Date	2017/08/30
Antenna Type	Omni Antenna (ANT-2x2-2005)	Test Item	Power Spectral Density

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 AVGPSD (dBm / 10kHz)	Ant 1 AVGPSD (dBm / 10kHz)	Duty Cycle (%)	Constant Factor	Total AVGPSD (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
Ant 0 + 1 (CDD Mode)										
11b	1Mbps	1	2412	-3.73	-4.49	99.19	-5.23	-6.28	≤ 8.00	Pass
11b	1Mbps	6	2437	-4.88	-4.14	99.19	-5.23	-6.68	≤ 8.00	Pass
11b	1Mbps	11	2462	-5.03	-4.39	99.19	-5.23	-6.88	≤ 8.00	Pass
11g	6Mbps	1	2412	-9.98	-9.56	96.19	-5.23	-11.81	≤ 8.00	Pass
11g	6Mbps	6	2437	-7.75	-6.19	96.19	-5.23	-8.95	≤ 8.00	Pass
11g	6Mbps	11	2462	-7.91	-7.09	96.19	-5.23	-9.53	≤ 8.00	Pass
11n-HT20	MCS0	1	2412	-12.17	-11.10	98.00	-5.23	-13.73	≤ 8.00	Pass
11n-HT20	MCS0	6	2437	-8.21	-8.08	98.00	-5.23	-10.28	≤ 8.00	Pass
11n-HT20	MCS0	11	2462	-7.84	-7.69	98.00	-5.23	-9.90	≤ 8.00	Pass
11n-HT40	MCS0	3	2422	-16.83	-17.04	96.23	-5.23	-18.99	≤ 8.00	Pass
11n-HT40	MCS0	6	2437	-11.60	-11.57	96.23	-5.23	-13.64	≤ 8.00	Pass
11n-HT40	MCS0	9	2452	-12.30	-13.97	96.23	-5.23	-15.11	≤ 8.00	Pass
Ant 0 + 1 (Beam-Forming Mode)										
11n-HT20	MCS0	1	2412	-12.17	-11.10	98.00	-5.23	-13.73	≤ 8.00	Pass
11n-HT20	MCS0	6	2437	-8.21	-8.08	98.00	-5.23	-10.28	≤ 8.00	Pass
11n-HT20	MCS0	11	2462	-7.84	-7.69	98.00	-5.23	-9.90	≤ 8.00	Pass
11n-HT40	MCS0	3	2422	-16.83	-17.04	96.23	-5.23	-18.99	≤ 8.00	Pass
11n-HT40	MCS0	6	2437	-11.60	-11.57	96.23	-5.23	-13.64	≤ 8.00	Pass
11n-HT40	MCS0	9	2452	-12.30	-13.97	96.23	-5.23	-15.11	≤ 8.00	Pass

Note: The total AVGPSD = $10*\log\{10^{(\text{Ant 0 AVGPSD}/10)}+10^{(\text{Ant 1 AVGPSD}/10)}\}$ + 10*log(1/Duty cycle) + Constant Factor.

Product	ACCESS POINT	Temperature	27°C
Test Engineer	Kevin Ker	Relative Humidity	65%
Test Site	SR2	Test Date	2017/08/30
Antenna Type	Directional Antenna (ANT-2x2-2314)	Test Item	Power Spectral Density

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 AVGPSD (dBm / 10kHz)	Ant 1 AVGPSD (dBm / 10kHz)	Duty Cycle (%)	Constant Factor	Total AVGPSD (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
Ant 0 + 1 (CDD Mode)										
11b	1Mbps	1	2412	-7.23	-7.80	99.19	-5.23	-9.69	≤ 0.00	Pass
11b	1Mbps	6	2437	-7.82	-6.95	99.19	-5.23	-9.55	≤ 0.00	Pass
11b	1Mbps	11	2462	-7.84	-6.69	99.19	-5.23	-9.41	≤ 0.00	Pass
11g	6Mbps	1	2412	-12.10	-12.10	96.19	-5.23	-14.15	≤ 0.00	Pass
11g	6Mbps	6	2437	-11.53	-10.48	96.19	-5.23	-13.02	≤ 0.00	Pass
11g	6Mbps	11	2462	-13.59	-12.53	96.19	-5.23	-15.08	≤ 0.00	Pass
11n-HT20	MCS0	1	2412	-14.81	-13.97	98.00	-5.23	-16.50	≤ 0.00	Pass
11n-HT20	MCS0	6	2437	-11.55	-11.25	98.00	-5.23	-13.53	≤ 0.00	Pass
11n-HT20	MCS0	11	2462	-15.51	-14.53	98.00	-5.23	-17.12	≤ 0.00	Pass
11n-HT40	MCS0	3	2422	-19.96	-20.66	96.23	-5.23	-22.35	≤ 0.00	Pass
11n-HT40	MCS0	6	2437	-13.47	-13.59	96.23	-5.23	-15.58	≤ 0.00	Pass
11n-HT40	MCS0	9	2452	-20.14	-18.40	96.23	-5.23	-21.24	≤ 0.00	Pass
Ant 0 + 1 (Beam-Forming Mode)										
11n-HT20	MCS0	1	2412	-14.81	-13.97	98.00	-5.23	-16.50	≤ 0.00	Pass
11n-HT20	MCS0	6	2437	-11.55	-11.25	98.00	-5.23	-13.53	≤ 0.00	Pass
11n-HT20	MCS0	11	2462	-15.51	-14.53	98.00	-5.23	-17.12	≤ 0.00	Pass
11n-HT40	MCS0	3	2422	-19.96	-20.66	96.23	-5.23	-22.35	≤ 0.00	Pass
11n-HT40	MCS0	6	2437	-13.47	-13.59	96.23	-5.23	-15.58	≤ 0.00	Pass
11n-HT40	MCS0	9	2452	-20.14	-18.40	96.23	-5.23	-21.24	≤ 0.00	Pass

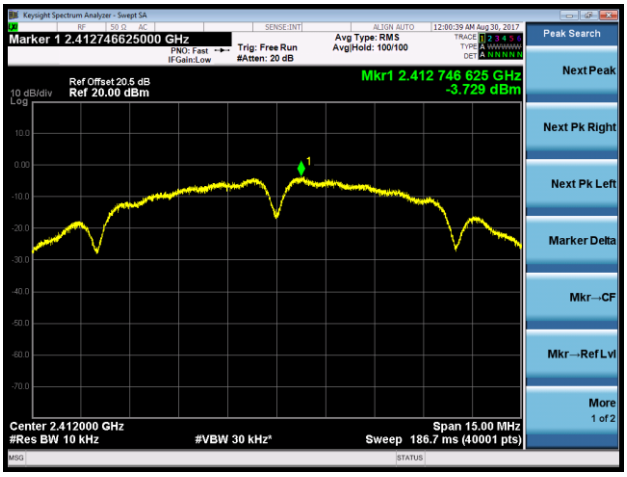
Note 1: The total AVGPSD = $10*\log\{10^{(\text{Ant 0 AVGPSD}/10)}+10^{(\text{Ant 1 AVGPSD}/10)}\}$ + 10*log(1/Duty cycle) + Constant Factor.

Note 2: PSD Limit (dBm/3kHz) = 8 dBm/3kHz – (14 dBi – 6 dBi) = 0 dBm/3kHz.

Product	ACCESS POINT	Temperature	27°C
Test Engineer	Kevin Ker	Relative Humidity	65%
Antenna Type	Omni Antenna (ANT-2x2-2005)		

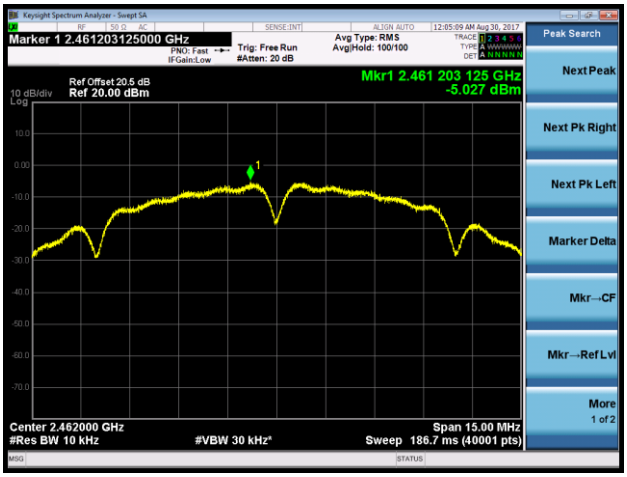
802.11b AVGPSD - Ant 0 / Ant 0 + 1(CDD Mode)

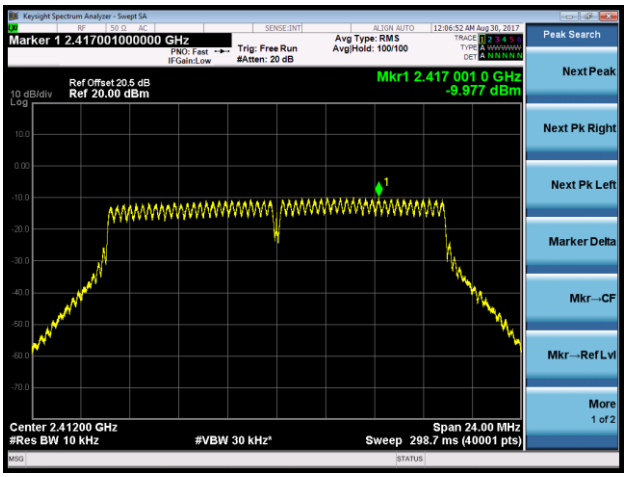
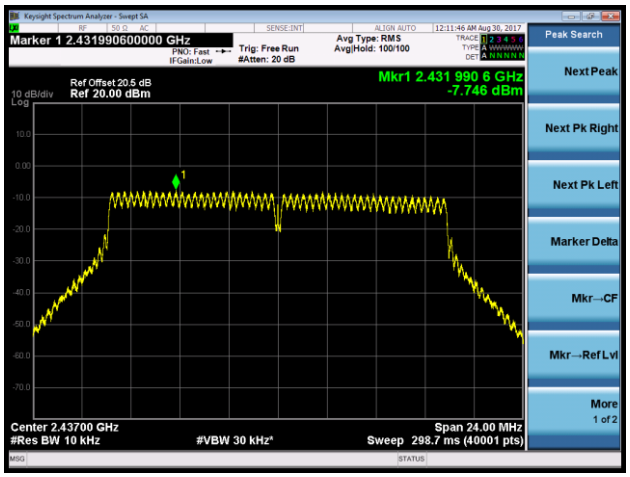
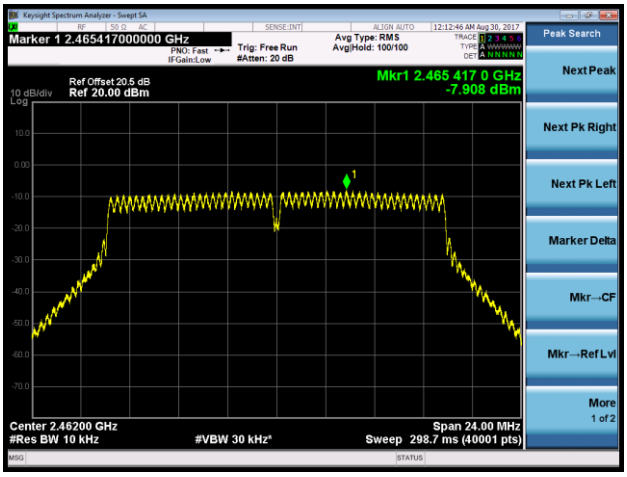
Channel 01 (2412MHz)



Channel 06 (2437MHz)

Channel 11 (2462MHz)



802.11g AVGPSD - Ant 0 / Ant 0 + 1(CDD Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11n-HT20 AVGPSD - Ant 0 / Ant 0 + 1(CDD Mode)	
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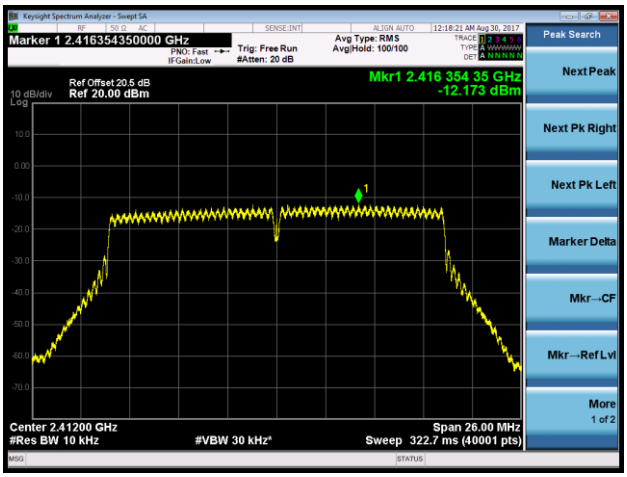
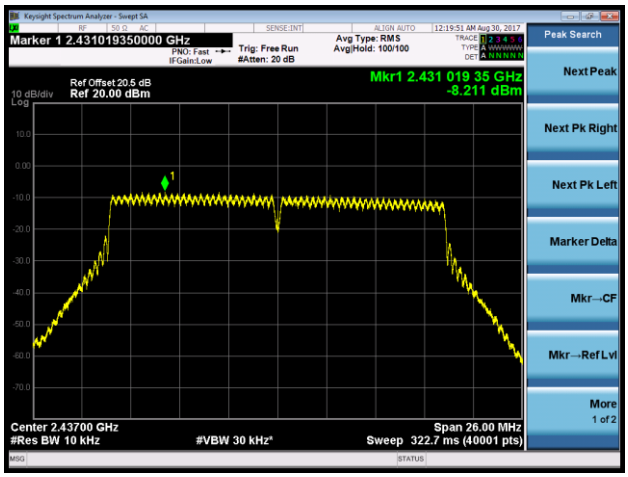
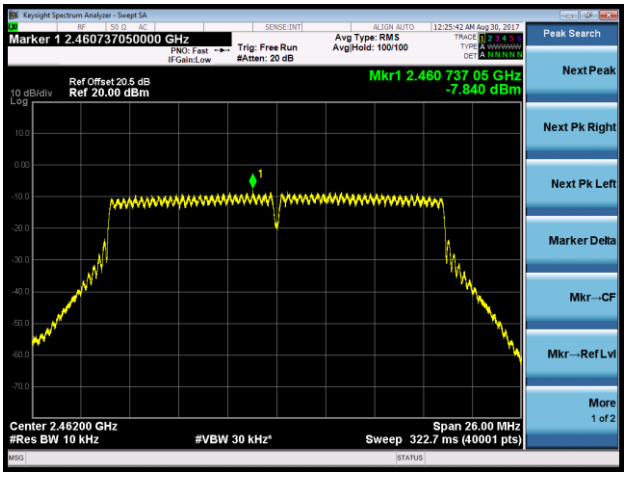
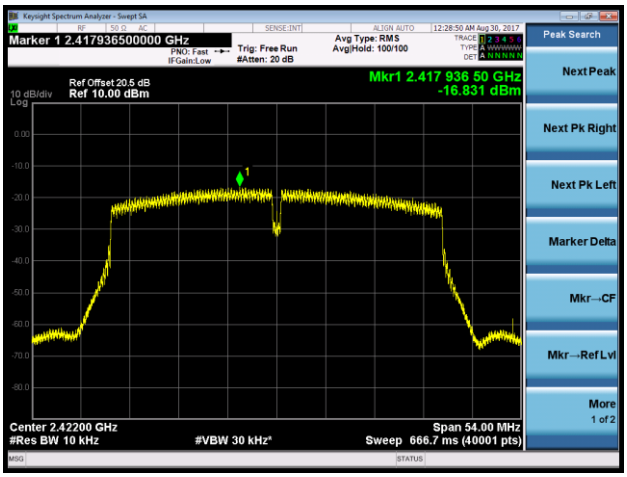
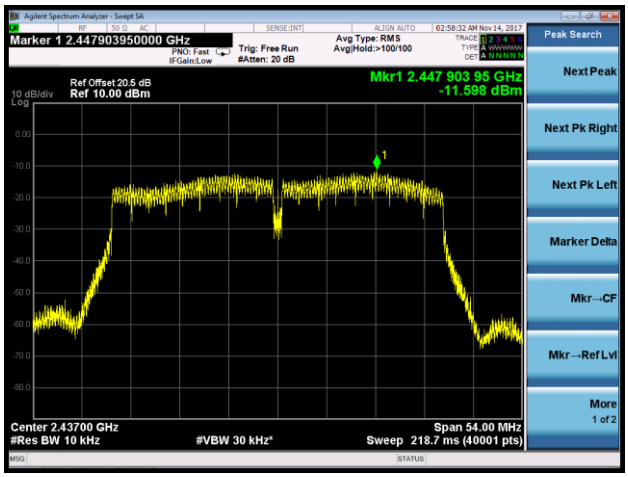
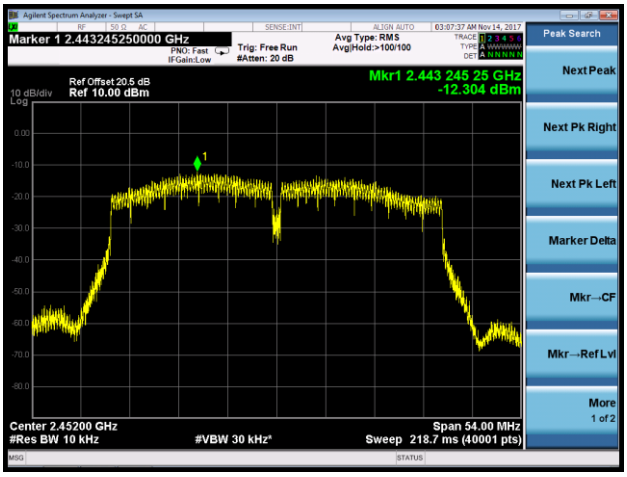
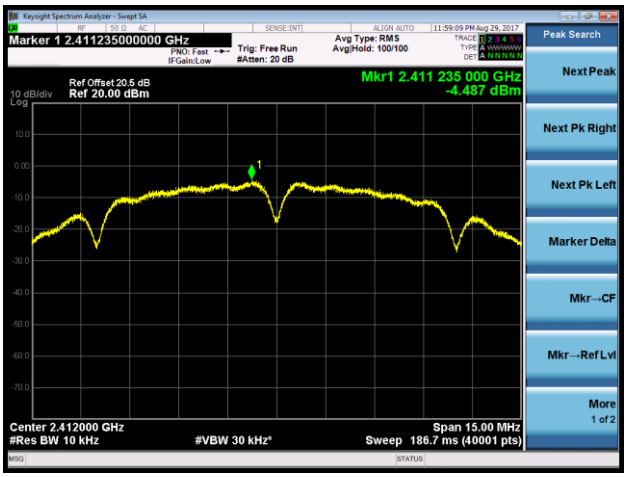
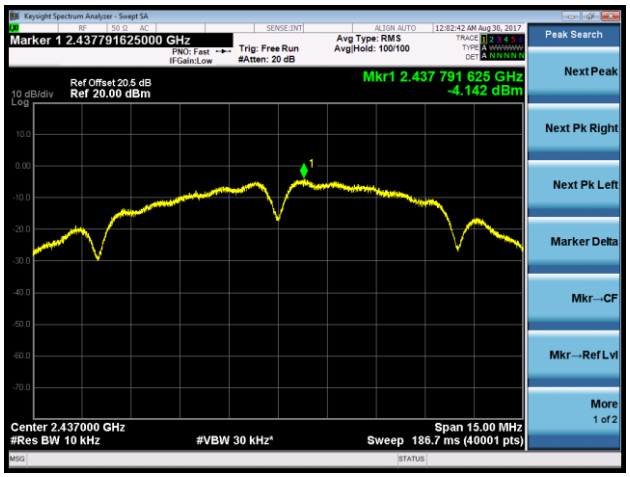
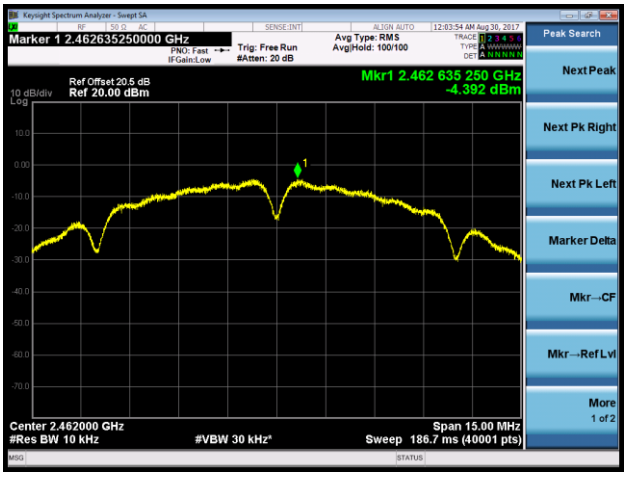
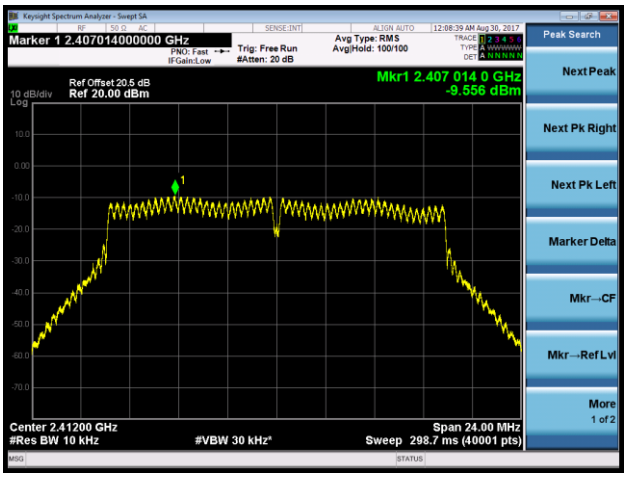
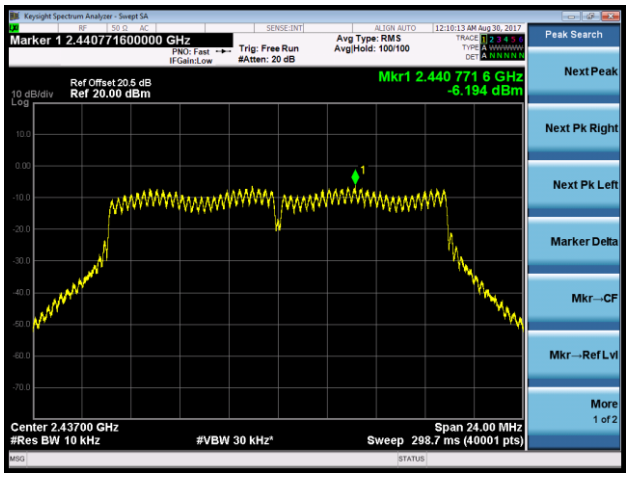
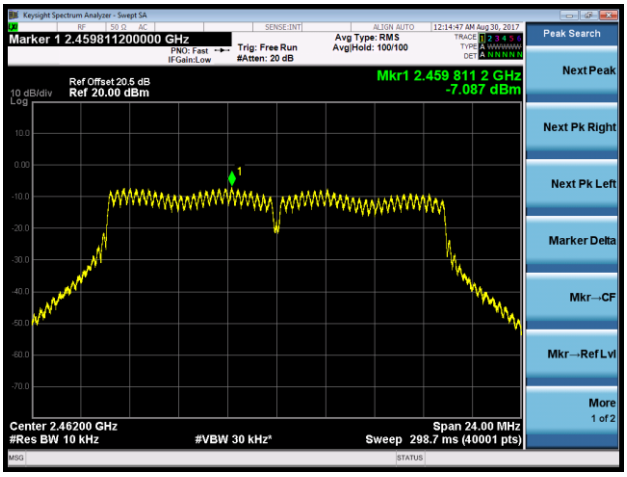
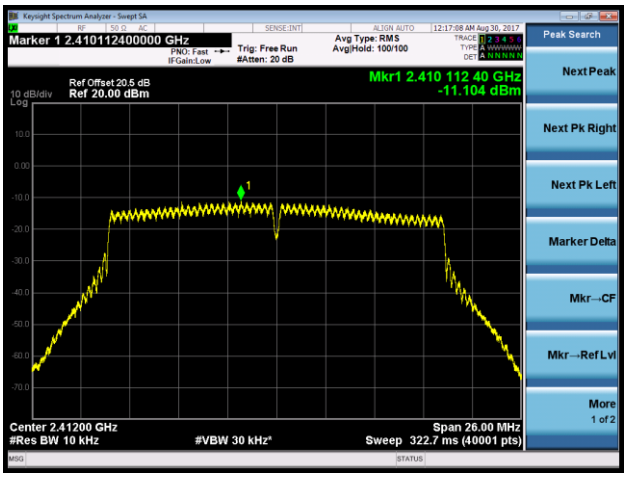
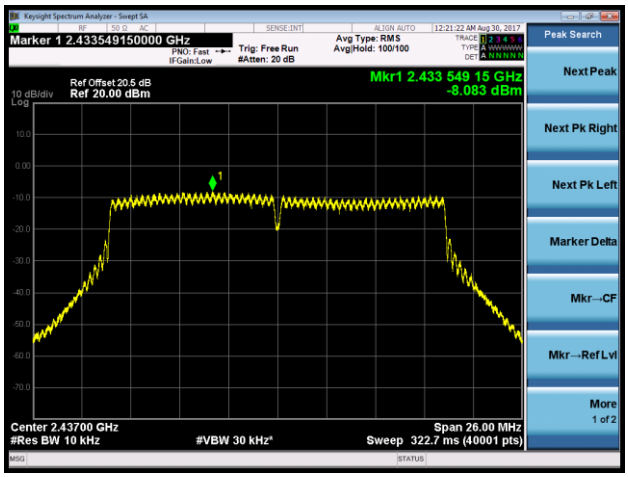
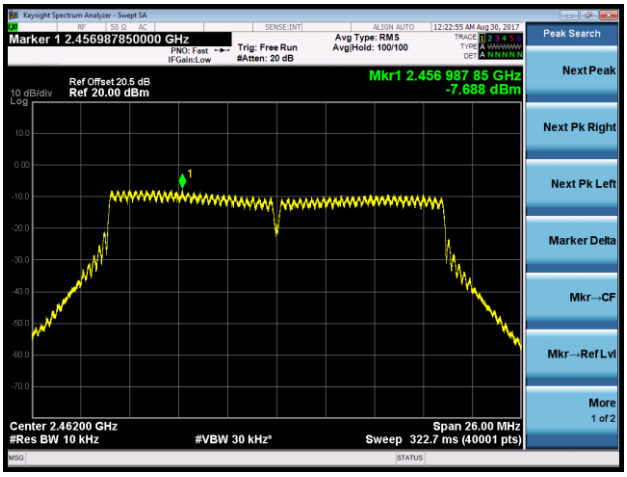
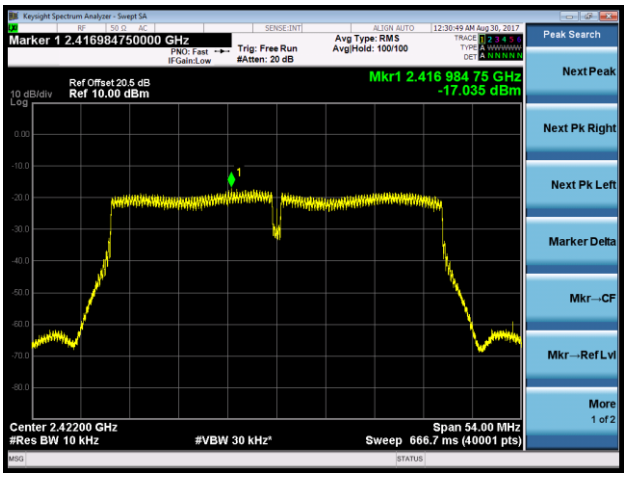
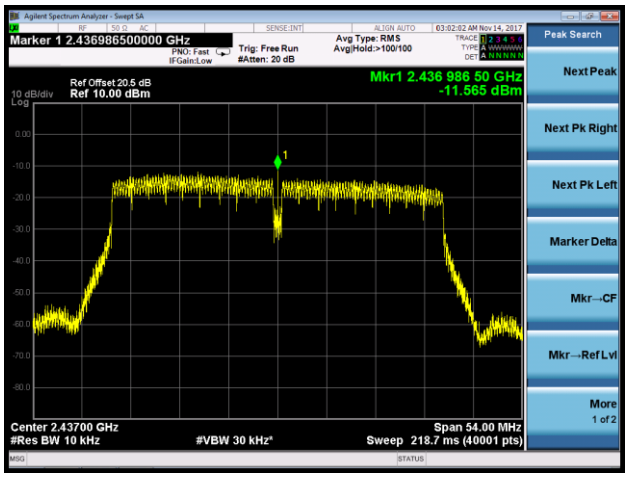
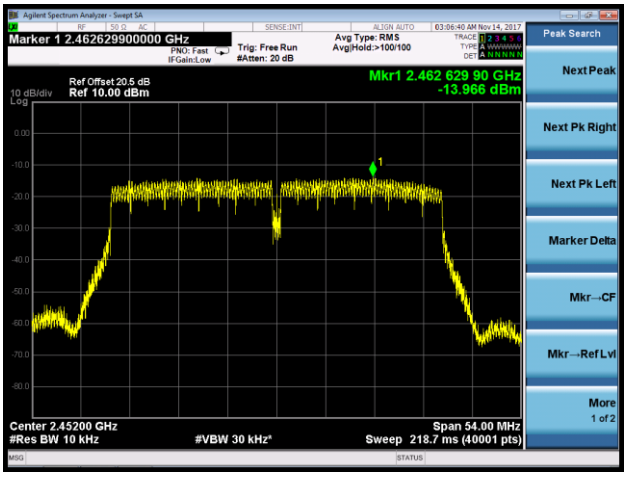
	
Channel 11 (2462MHz)	
	

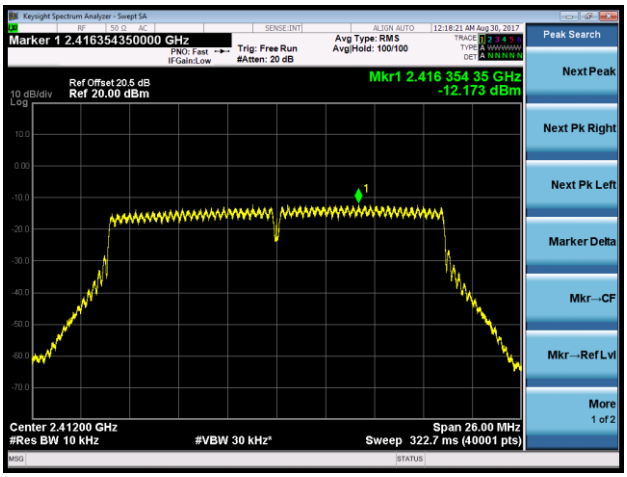
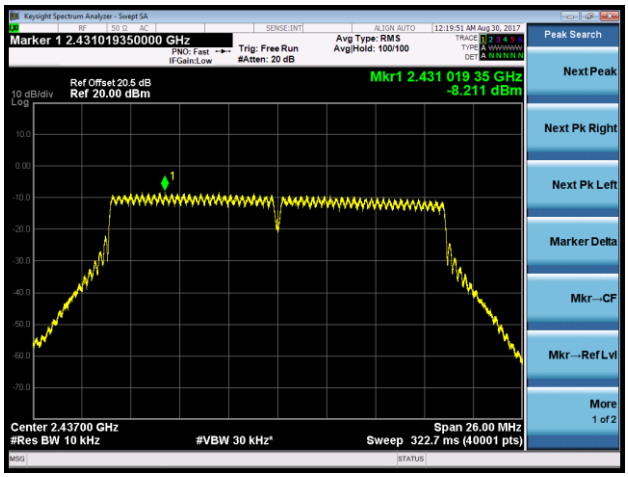
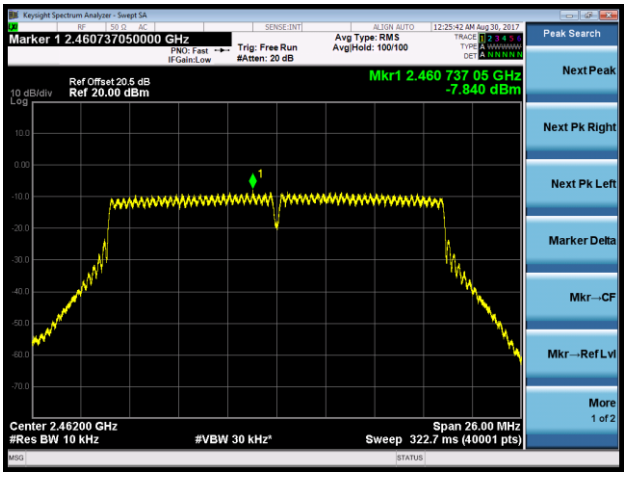
802.11n-HT40 AVGPSD - Ant 0 / Ant 0 + 1(CDD Mode)	
Channel 03 (2422MHz)	**Channel 06 (2437MHz)**
	
Channel 09 (2452MHz)	
	

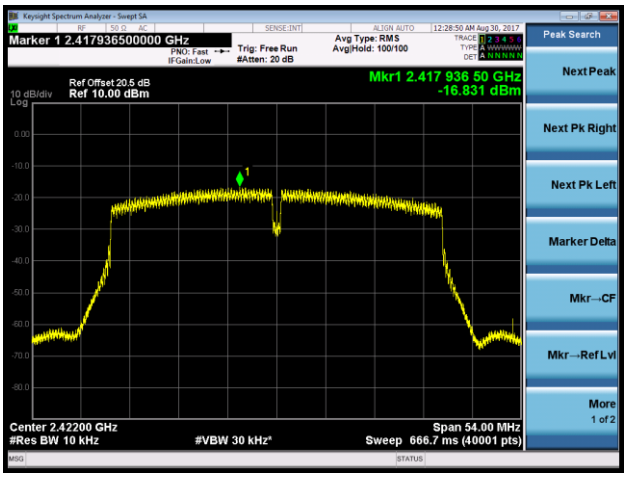
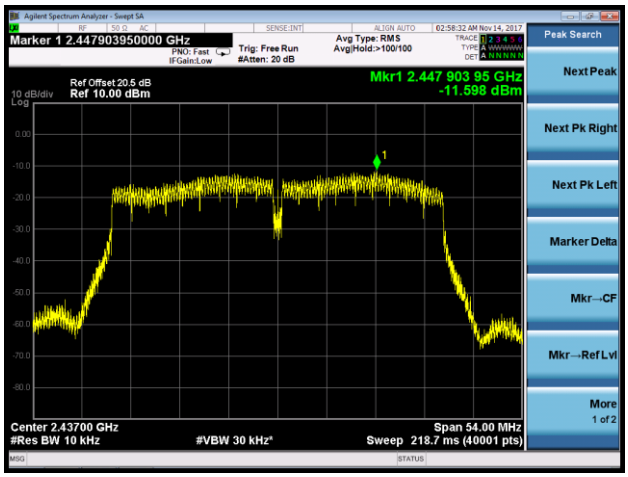
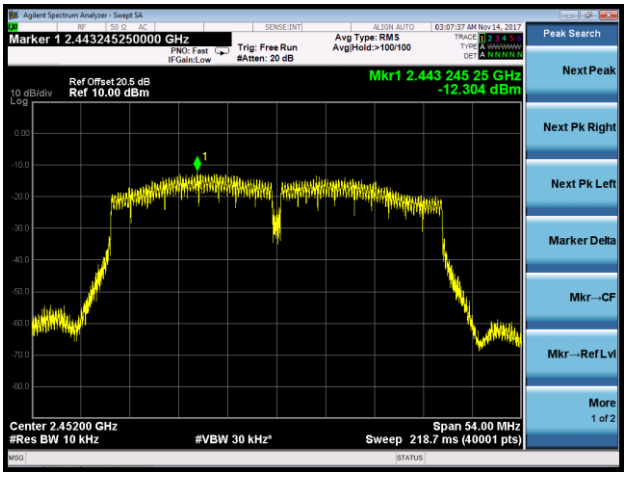
802.11b AVGPSD - Ant 1 / Ant 0 + 1(CDD Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

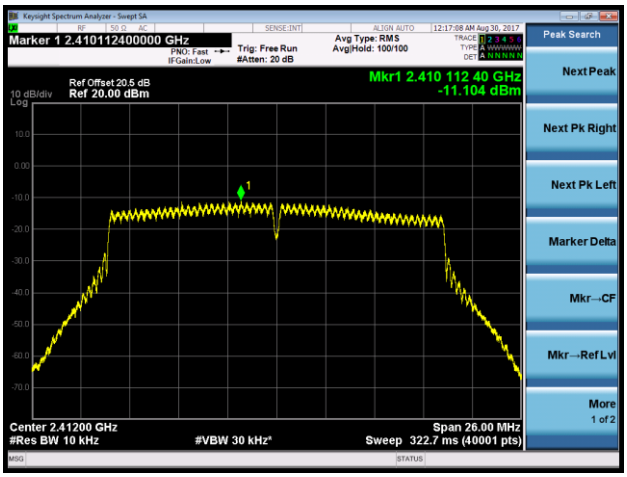
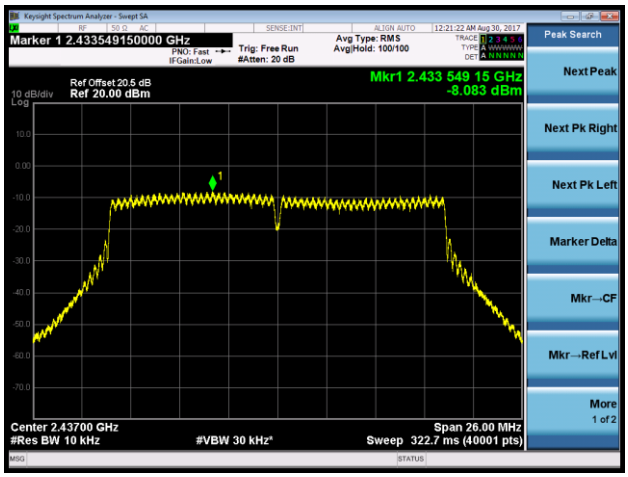
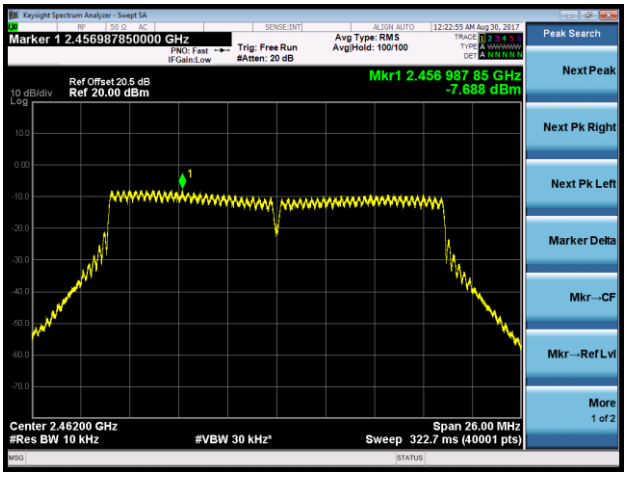
802.11g AVGPSD - Ant 1 / Ant 0 + 1(CDD Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

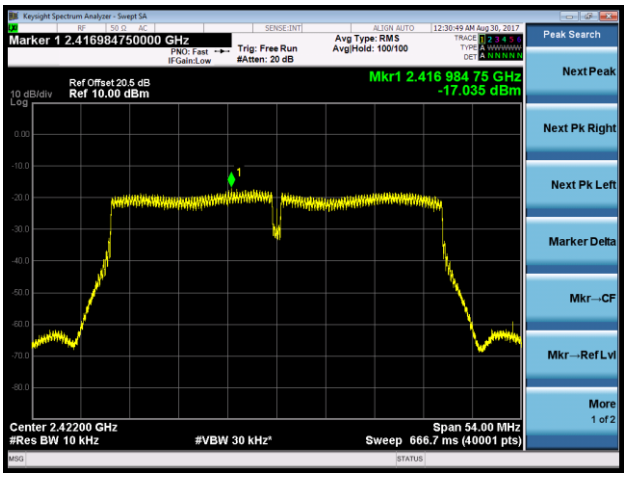
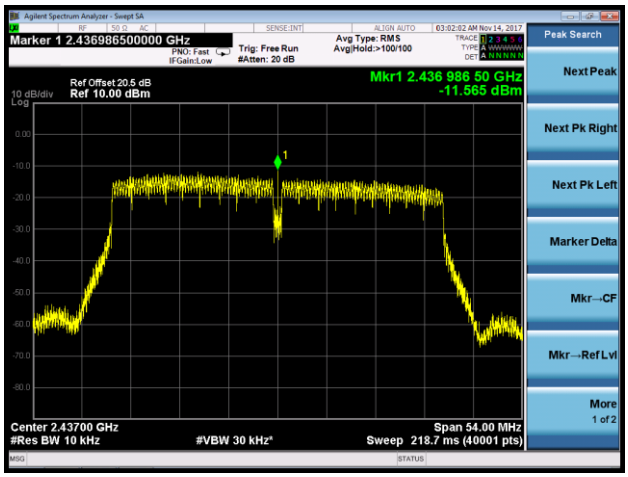
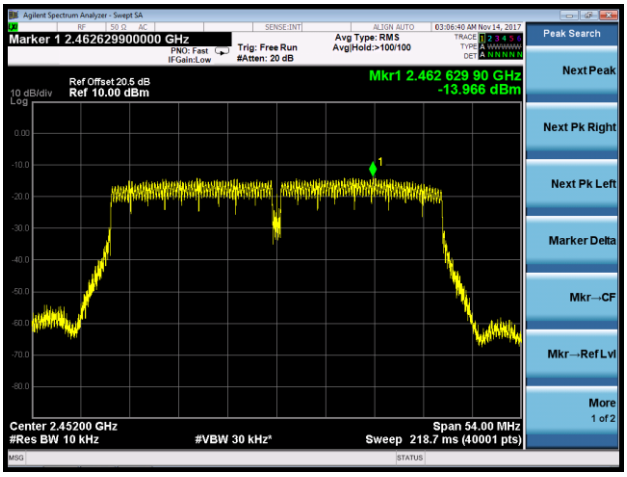
802.11n-HT20 AVGPSD - Ant 1 / Ant 0 + 1(CDD Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11n-HT40 AVGPSD - Ant 1 / Ant 0 + 1(CDD Mode)	
Channel 03 (2422MHz)	**Channel 06 (2437MHz)**
	
Channel 09 (2452MHz)	
	

802.11n-HT20 AVGPSD - Ant 0 / Ant 0 + 1 (Beam-Forming Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11n-HT40 AVGPSD - Ant 0 / Ant 0 + 1 (Beam-Forming Mode)	
Channel 03 (2422MHz)	**Channel 06 (2437MHz)**
	
Channel 09 (2452MHz)	
	

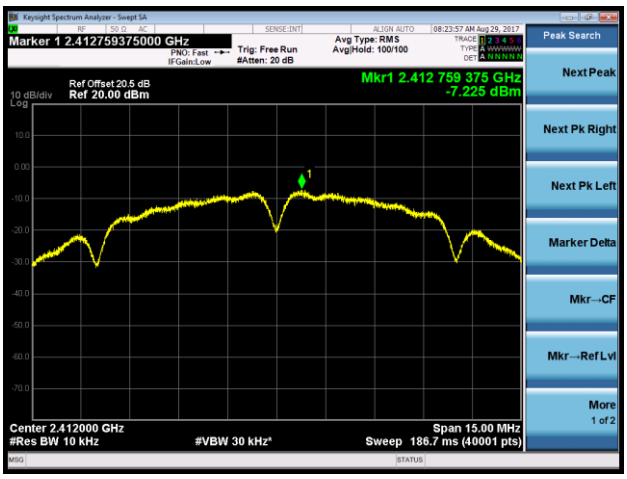
802.11n-HT20 AVGPSD - Ant 1 / Ant 0 + 1 (Beam-Forming Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11n-HT40 AVGPSD - Ant 1 / Ant 0 + 1 (Beam-Forming Mode)	
Channel 03 (2422MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

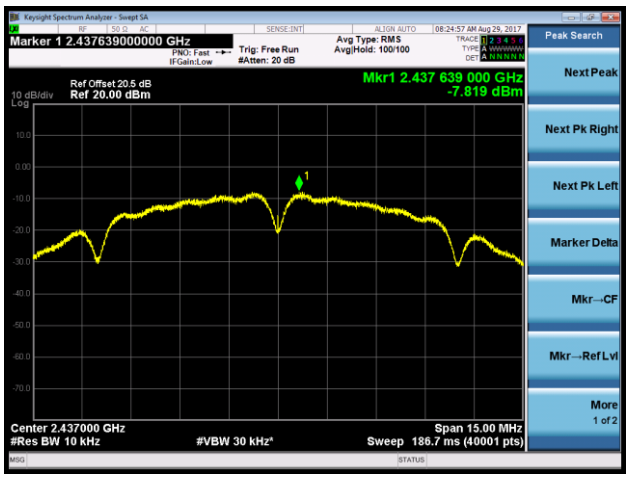
Product	ACCESS POINT	Temperature	27°C
Test Engineer	Kevin Ker	Relative Humidity	65%
Antenna Type	Directional Antenna (ANT-2x2-2314)		

802.11b AVGPSD - Ant 0 / Ant 0 + 1(CDD Mode)

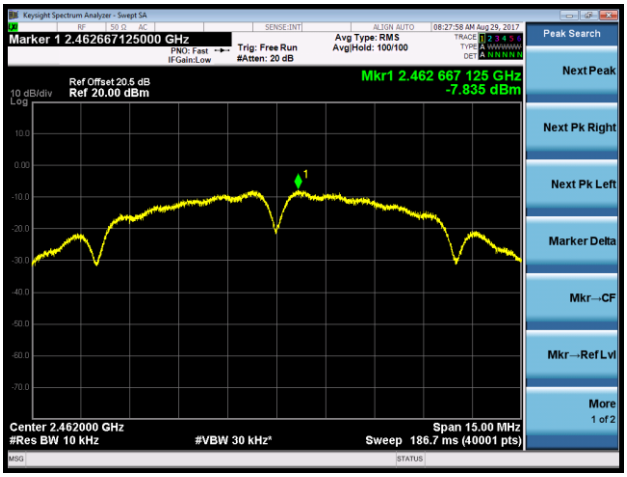
Channel 01 (2412MHz)

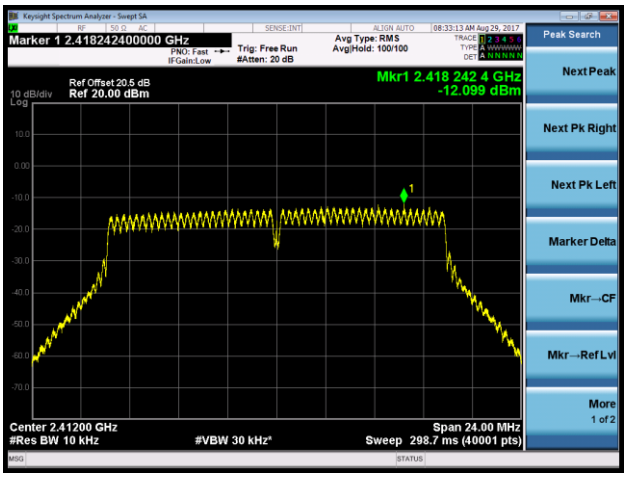
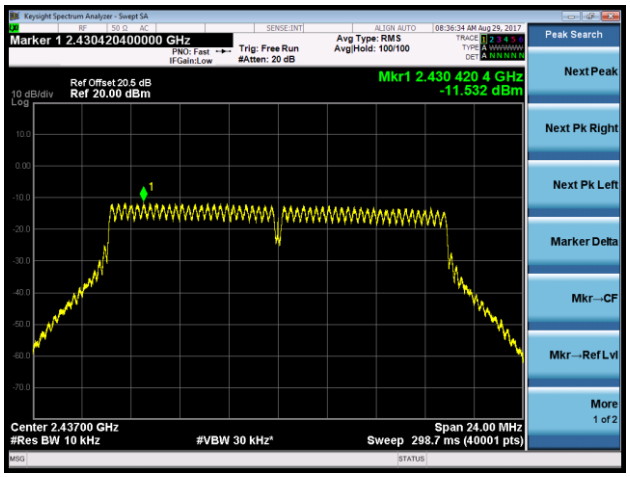
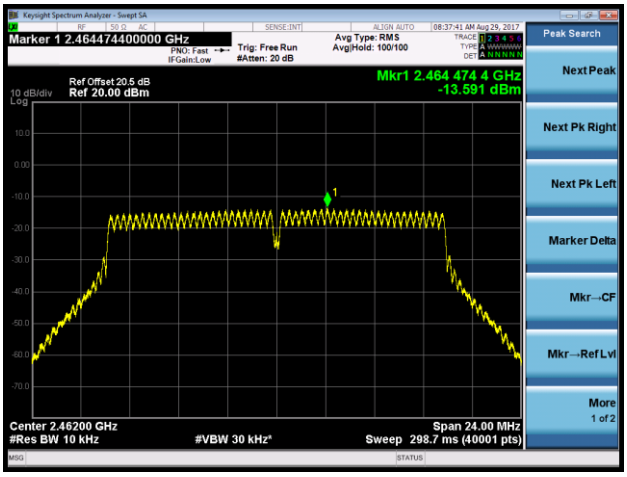


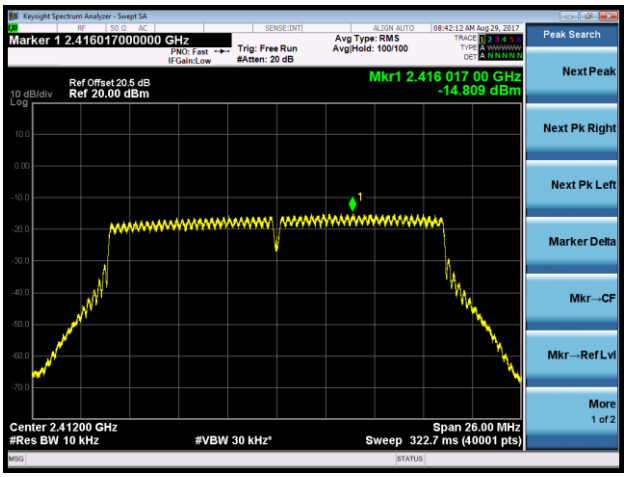
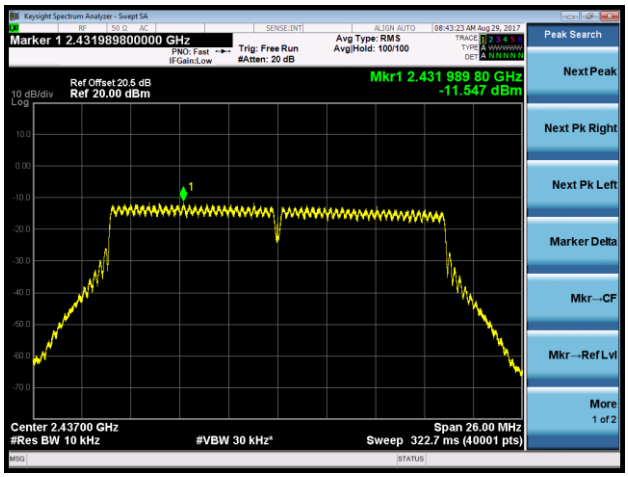
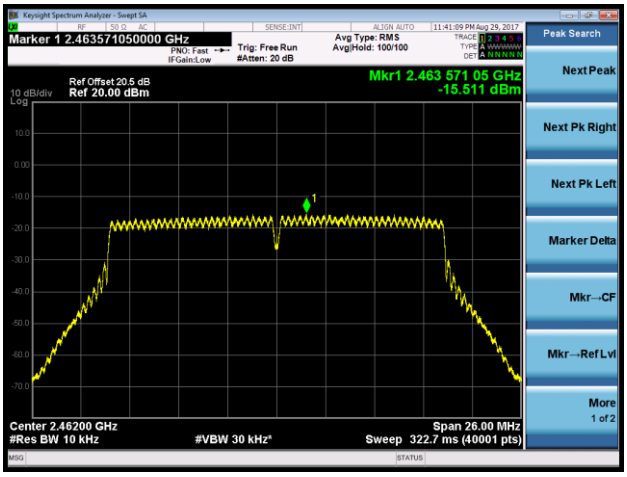
Channel 06 (2437MHz)

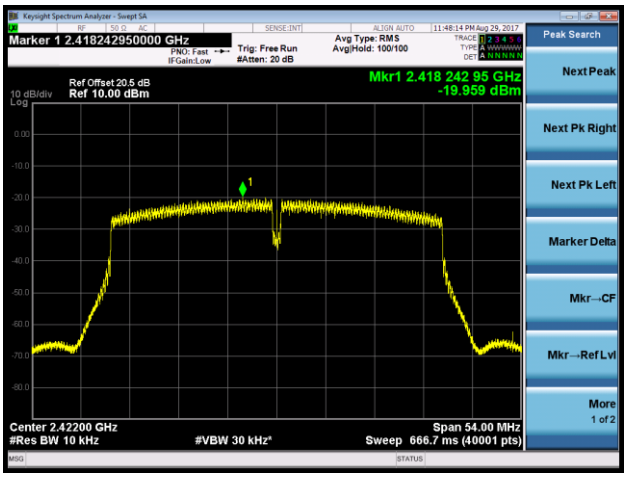
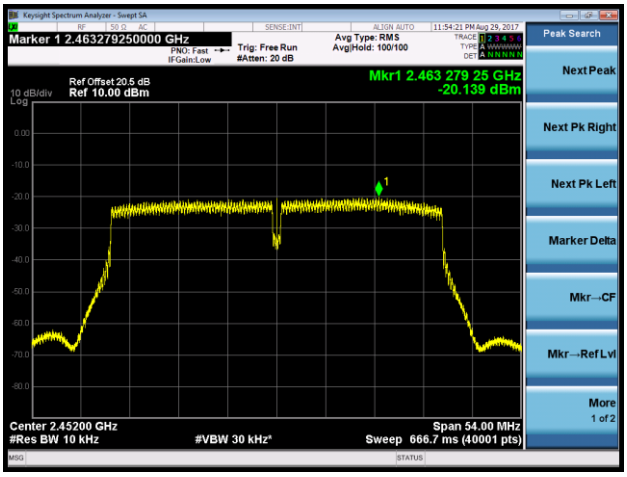


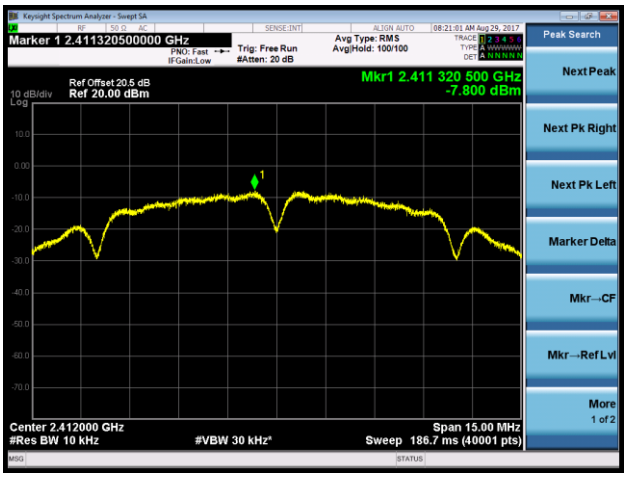
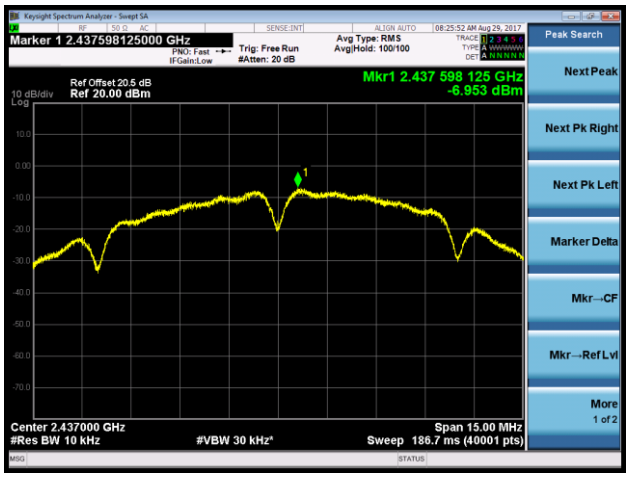
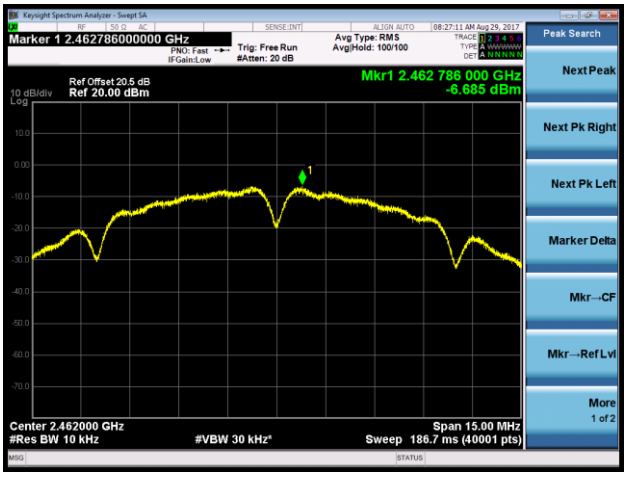
Channel 11 (2462MHz)

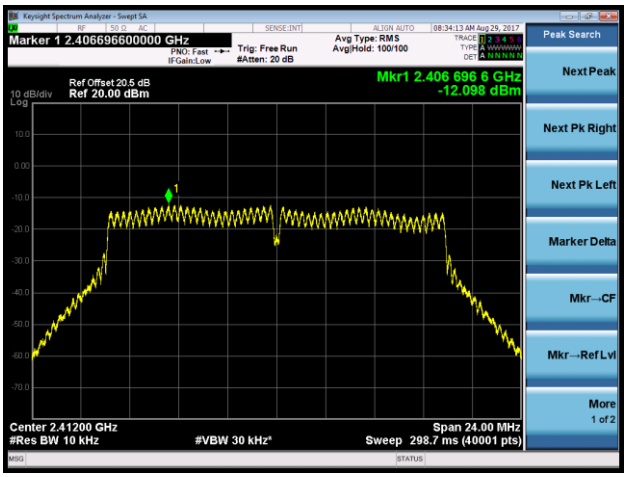
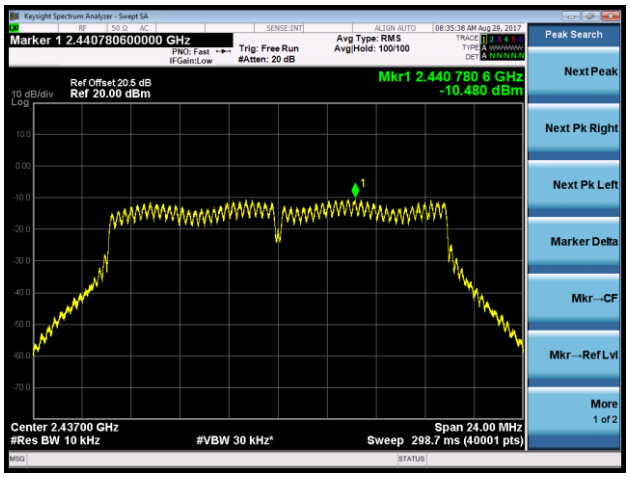
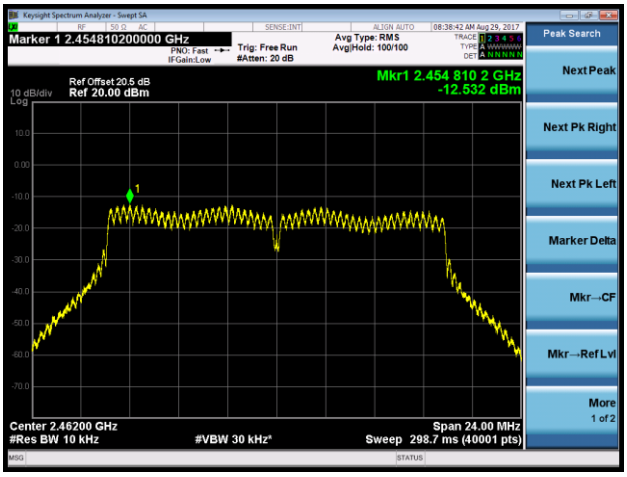


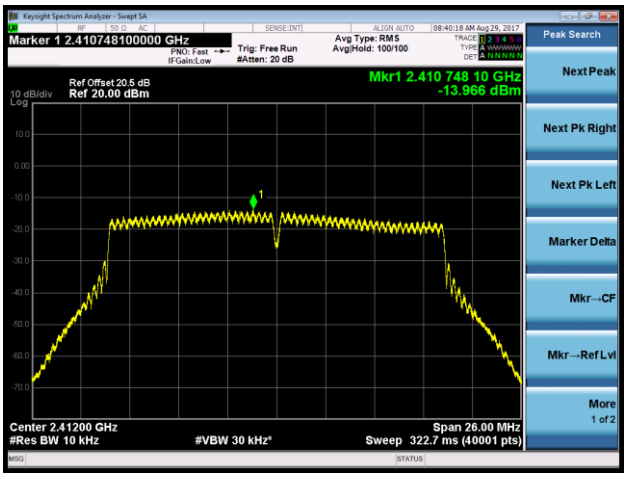
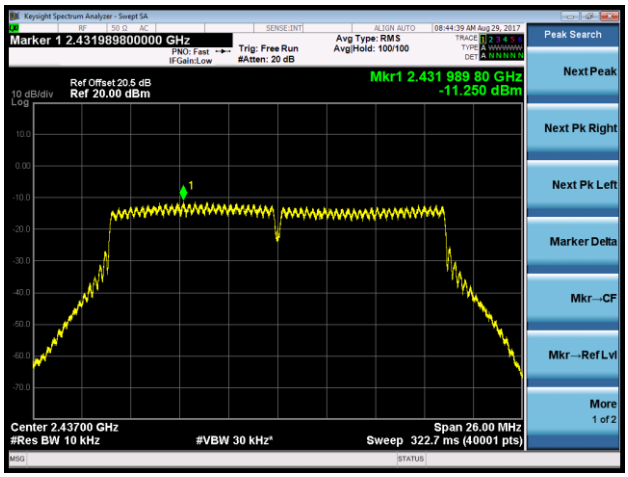
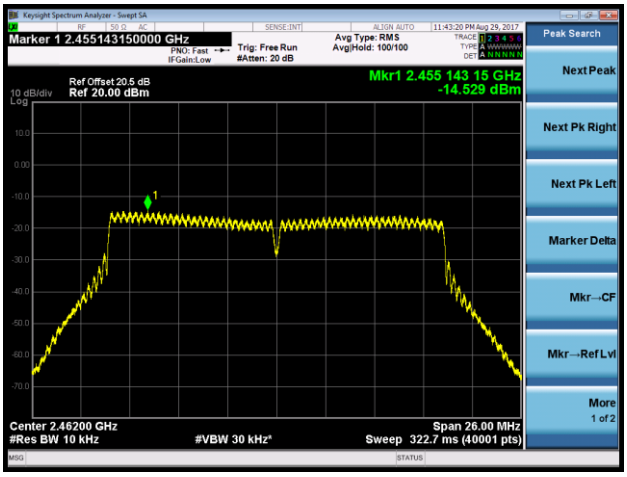
802.11g AVGPSD - Ant 0 / Ant 0 + 1(CDD Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

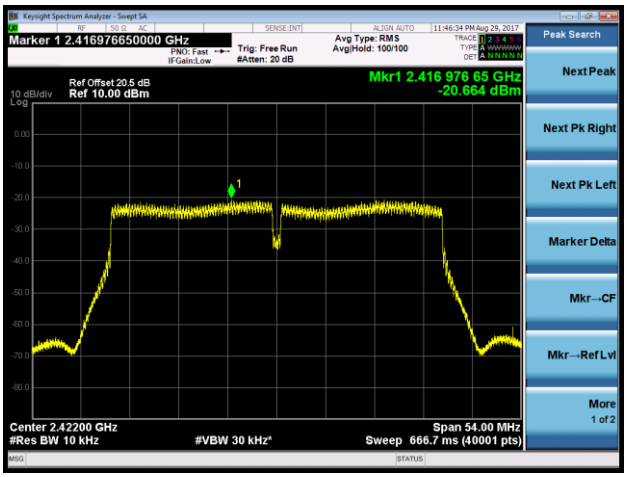
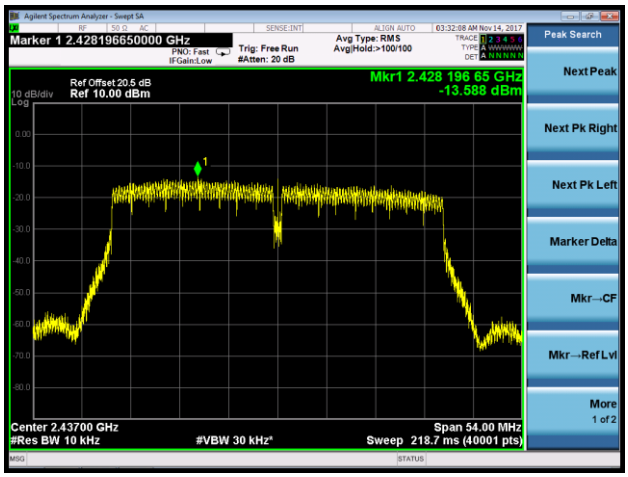
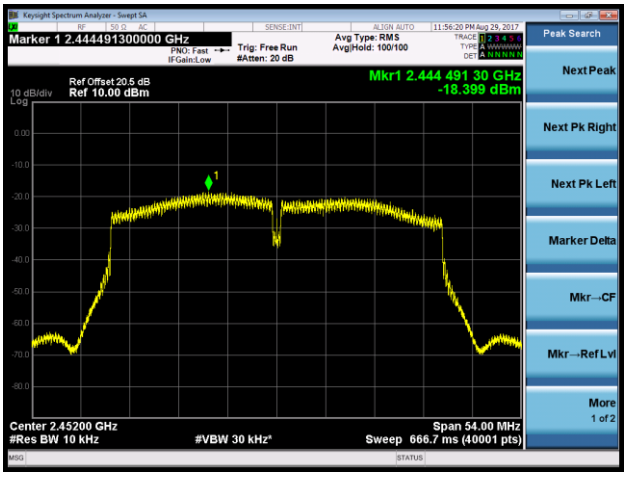
802.11n-HT20 AVGPSD - Ant 0 / Ant 0 + 1(CDD Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

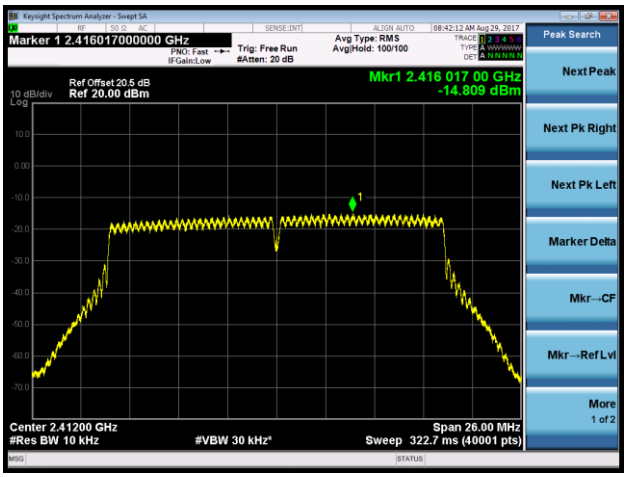
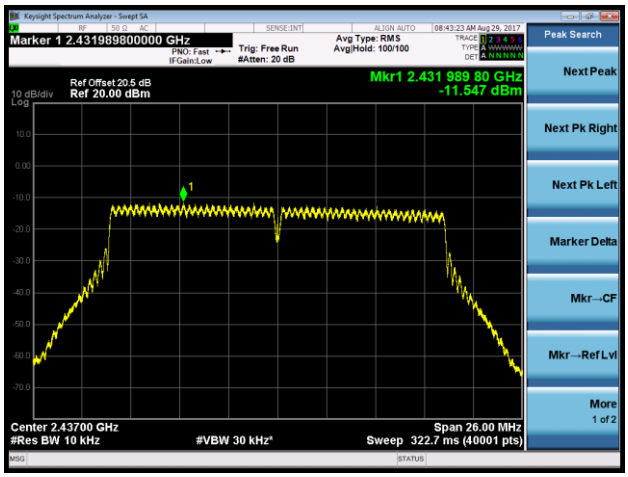
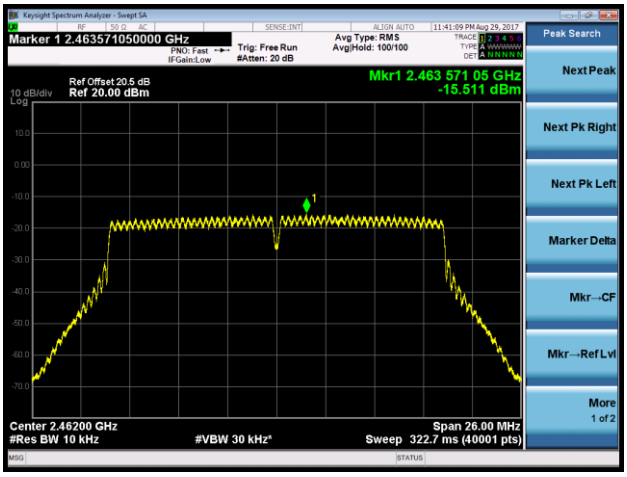
802.11n-HT40 AVGPSD - Ant 0 / Ant 0 + 1(CDD Mode)	
Channel 03 (2422MHz)	**Channel 06 (2437MHz)**
	
Channel 09 (2452MHz)	
	

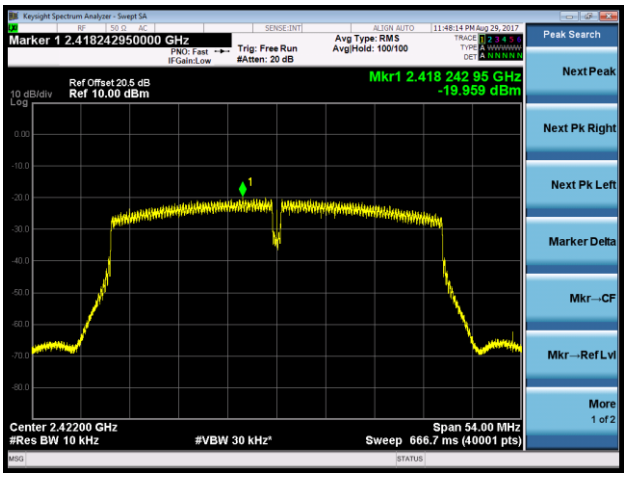
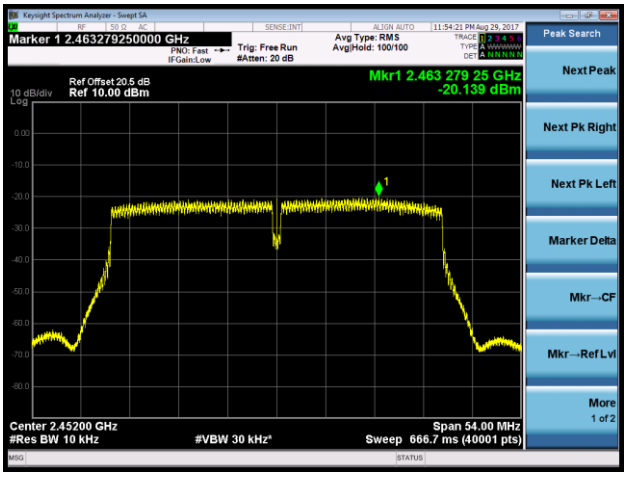
802.11b AVGPSD - Ant 1 / Ant 0 + 1(CDD Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

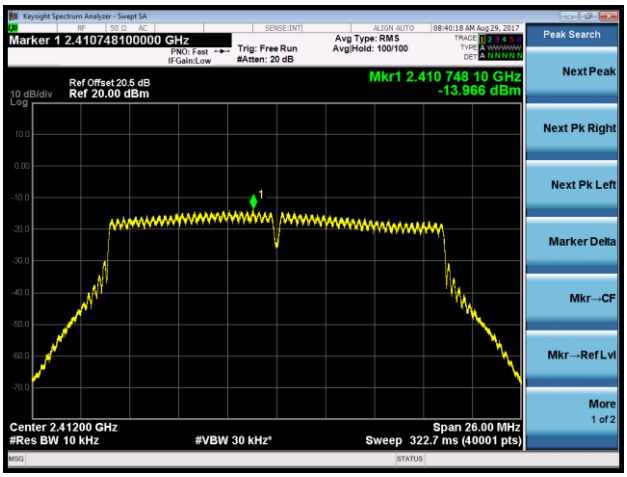
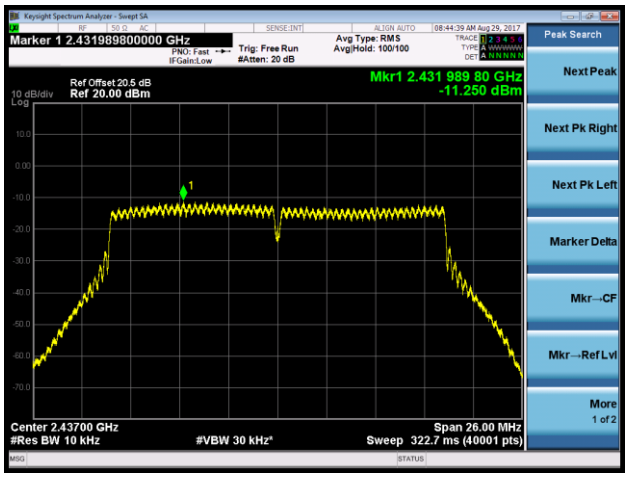
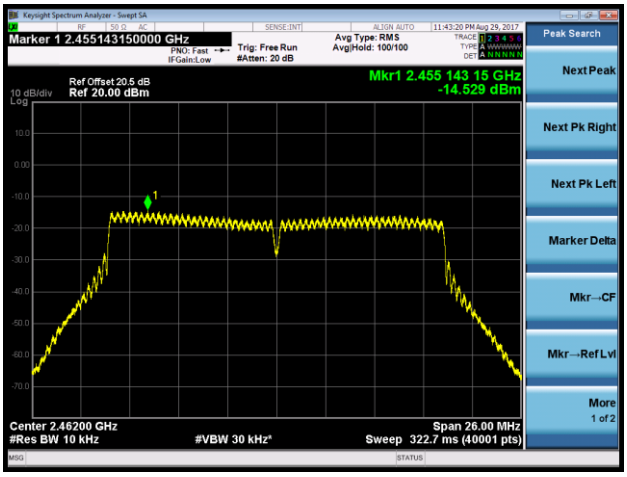
802.11g AVGPSD - Ant 1 / Ant 0 + 1(CDD Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

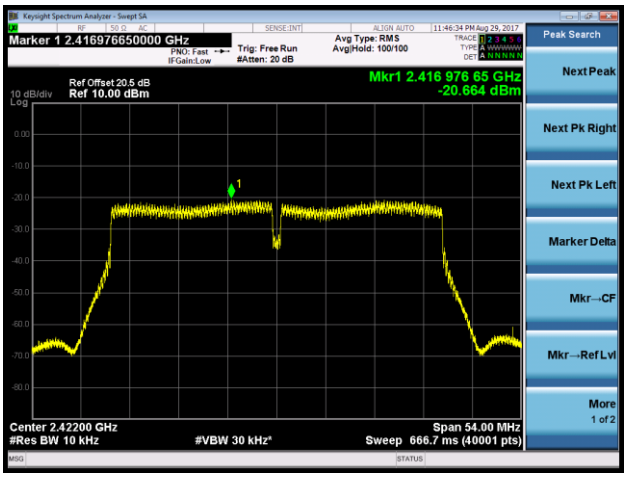
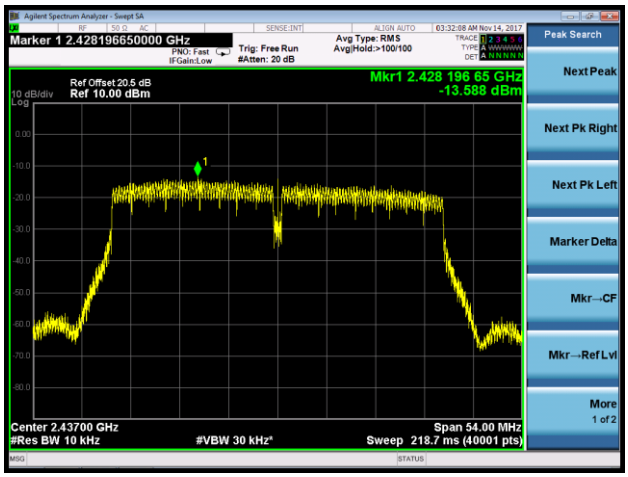
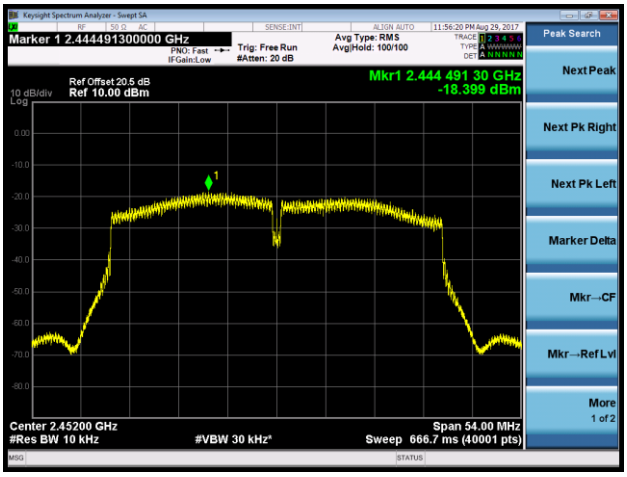
802.11n-HT20 AVGPSD - Ant 1 / Ant 0 + 1(CDD Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11n-HT40 AVGPSD - Ant 1 / Ant 0 + 1(CDD Mode)	
Channel 03 (2422MHz)	**Channel 06 (2437MHz)**
	
Channel 09 (2452MHz)	
	

802.11n-HT20 AVGPSD - Ant 0 / Ant 0 + 1 (Beam-Forming Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11n-HT40 AVGPSD - Ant 0 / Ant 0 + 1 (Beam-Forming Mode)	
Channel 03 (2422MHz)	**Channel 06 (2437MHz)**
	
Channel 09 (2452MHz)	
	

802.11n-HT20 AVGPSD - Ant 1 / Ant 0 + 1 (Beam-Forming Mode)	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

802.11n-HT40 AVGPSD - Ant 1 / Ant 0 + 1 (Beam-Forming Mode)	
Channel 03 (2422MHz)	**Channel 06 (2437MHz)**
	
Channel 09 (2452MHz)	
	

4. Conducted Band Edge and Out-of-Band Emissions Test Result

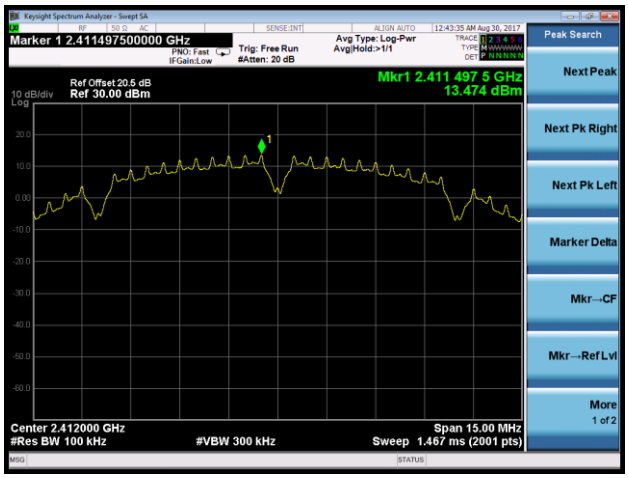
Product	ACCESS POINT	Temperature	27°C
Test Engineer	Kevin Ker	Relative Humidity	65%
Test Site	SR2	Test Date	2017/08/30
Test Item	Conducted Band Edge and Out-of-Band Emissions		

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	Limit (dBc)	Result
Ant 0 / Ant 0 + 1					
802.11b	1Mbps	01	2412	30	Pass
802.11b	1Mbps	06	2437	30	Pass
802.11b	1Mbps	11	2462	30	Pass
802.11g	6Mbps	01	2412	30	Pass
802.11g	6Mbps	06	2437	30	Pass
802.11g	6Mbps	11	2462	30	Pass
802.11n-HT20	MCS0	01	2412	30	Pass
802.11n-HT20	MCS0	06	2437	30	Pass
802.11n-HT20	MCS0	11	2462	30	Pass
802.11n-HT40	MCS0	03	2422	30	Pass
802.11n-HT40	MCS0	06	2437	30	Pass
802.11n-HT40	MCS0	09	2452	30	Pass

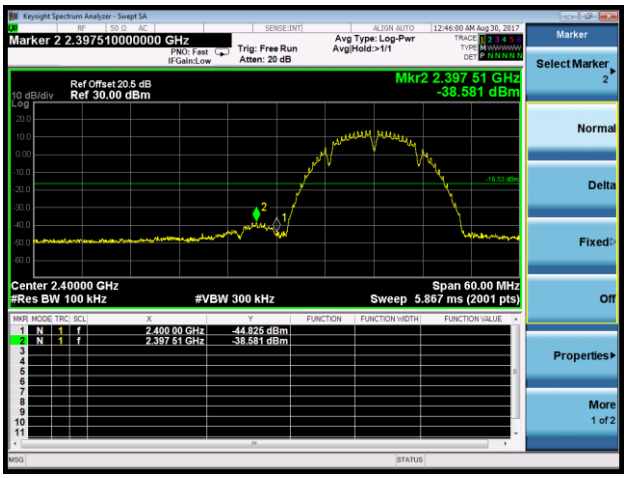
802.11b Out-of-Band Emissions - Ant 0 / Ant 0 + 1

Channel 01 (2412MHz)

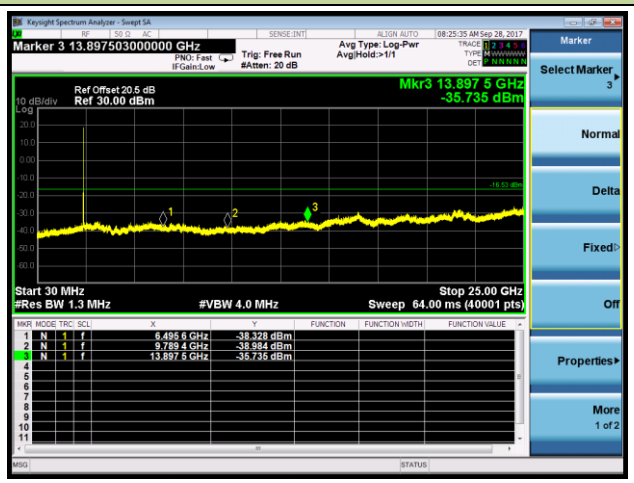
100kHz PSD reference Level



Low Band Edge



Spurious Emission

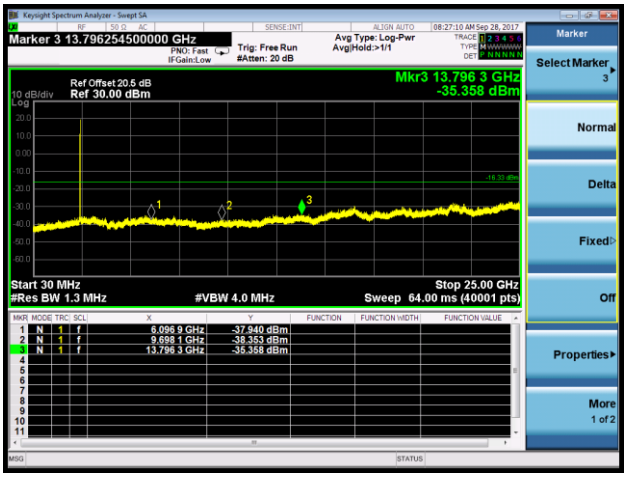


Note: The Value of the Display Line is -16.53dBm

Channel 06 (2437MHz)

100kHz PSD reference Level

Spurious Emission



Note: The Value of the Display Line is -16.33dBm