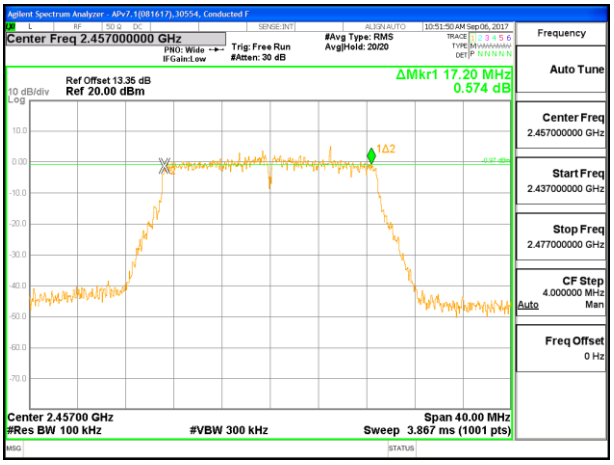
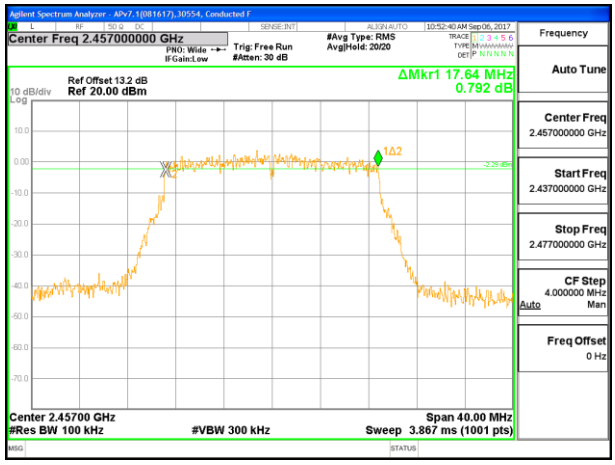
HIGH CHANNEL 10

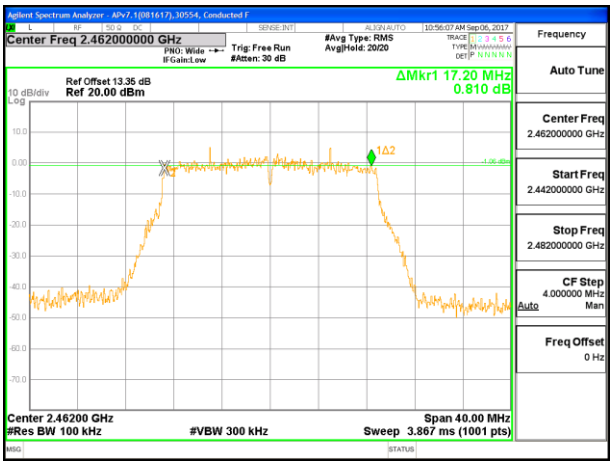


HIGH CHANNEL 10 Antenna A

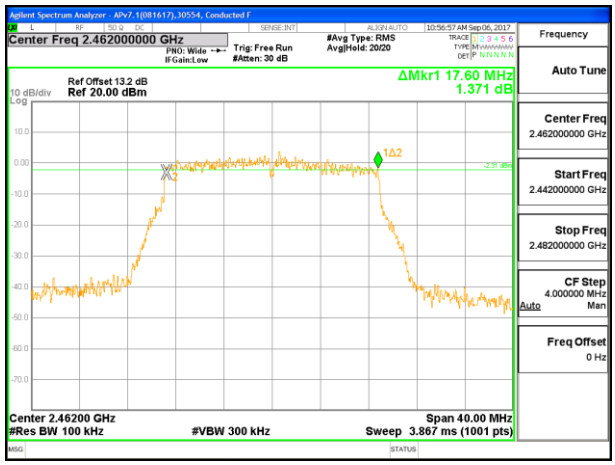


HIGH CHANNEL 10 Antenna B

HIGH CHANNEL 11

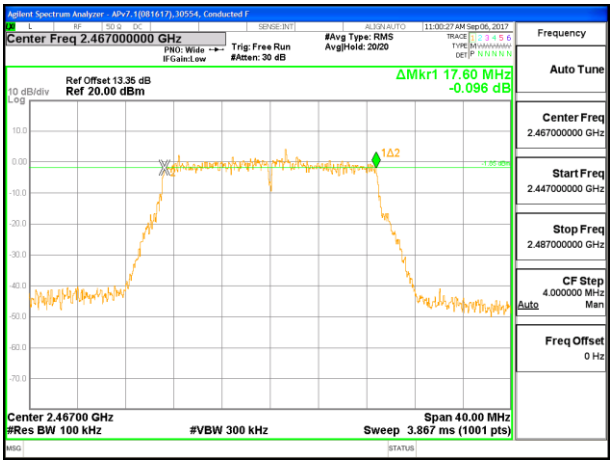


HIGH CHANNEL 11 Antenna A

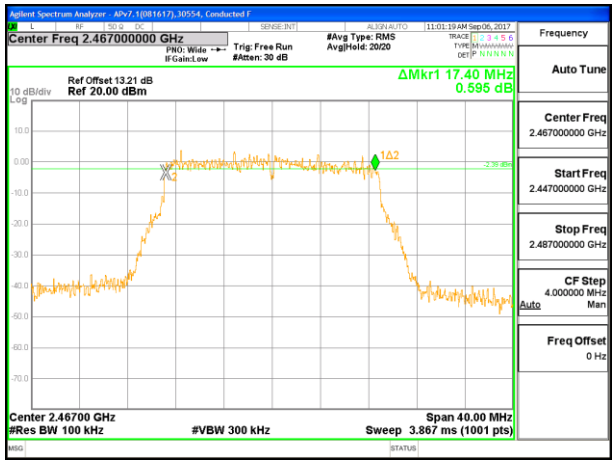


HIGH CHANNEL 11 Antenna B

HIGH CHANNEL 12



HIGH CHANNEL 12 Antenna A



HIGH CHANNEL 12 Antenna B

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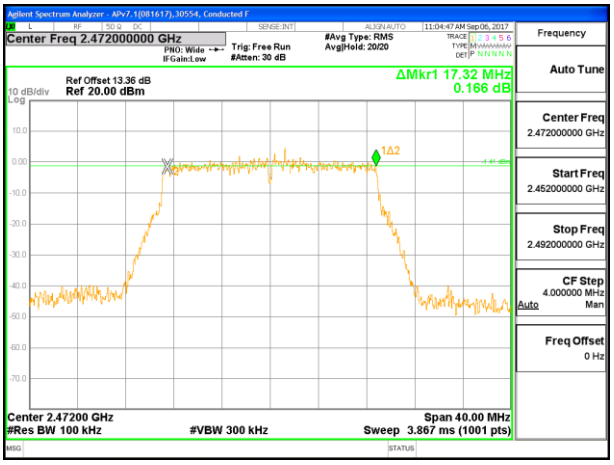
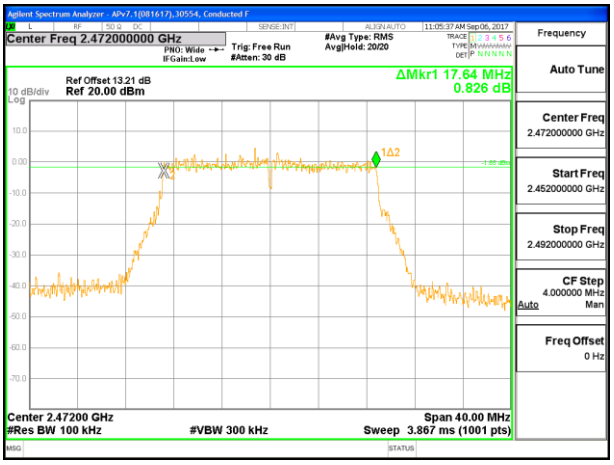
HIGH CHANNEL 13



HIGH CHANNEL 13 Antenna A



HIGH CHANNEL 13 Antenna B

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9.4. OUTPUT POWER

ID:	30554	Date:	09/08/2017

LIMITS

FCC §15.247

IC RSS-247 (5.4) (d)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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DIRECTIONAL ANTENNA GAIN

For 1 TX:
There is only one transmitter output therefore the directional gain is equal to the antenna gain.

For 2 TX:

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Ant A Gain (dBi)	Ant B Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
3.80	3.80	3.80

The TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Band (GHz)	Antenna A Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
2.4	3.80	3.01	6.81

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RESULTS

9.4.1. 802.11b MODE

1TX Antenna A

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	3.80	30.00	30	36	30.00
Low 2	2417	3.80	30.00	30	36	30.00
Low 3	2422	3.80	30.00	30	36	30.00
Mid 6	2437	3.80	30.00	30	36	30.00
High 9	2452	3.80	30.00	30	36	30.00
High 10	2457	3.80	30.00	30	36	30.00
High 11	2462	3.80	30.00	30	36	30.00
High 12	2467	3.80	30.00	30	36	30.00
High 13	2472	3.80	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	**Included in Calculations of Corr'd Power**

Results

Channel	Frequency (MHz)	Ant A Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	22.18	22.18	30.00	-7.82
Low 2	2417	23.16	23.16	30.00	-6.84
Low 3	2422	26.19	26.19	30.00	-3.81
Mid 6	2437	26.20	26.20	30.00	-3.80
High 9	2452	26.17	26.17	30.00	-3.83
High 10	2457	24.19	24.19	30.00	-5.81
High 11	2462	23.17	23.17	30.00	-6.83
High 12	2467	17.25	17.25	30.00	-12.75
High 13	2472	15.16	15.16	30.00	-14.84

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1TX Antenna B

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	3.80	30.00	30	36	30.00
Low 2	2417	3.80	30.00	30	36	30.00
Low 3	2422	3.80	30.00	30	36	30.00
Mid 6	2437	3.80	30.00	30	36	30.00
High 9	2452	3.80	30.00	30	36	30.00
High 10	2457	3.80	30.00	30	36	30.00
High 11	2462	3.80	30.00	30	36	30.00
High 12	2467	3.80	30.00	30	36	30.00
High 13	2472	3.80	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	**Included in Calculations of Corr'd Power**

Results

Channel	Frequency (MHz)	Ant B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	22.21	22.21	30.00	-7.79
Low 2	2417	22.41	22.41	30.00	-7.59
Low 3	2422	26.19	26.19	30.00	-3.81
Mid 6	2437	26.17	26.17	30.00	-3.83
High 9	2452	26.20	26.20	30.00	-3.80
High 10	2457	24.34	24.34	30.00	-5.66
High 11	2462	23.21	23.21	30.00	-6.79
High 12	2467	17.30	17.30	30.00	-12.70
High 13	2472	15.17	15.17	30.00	-14.83

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9.4.2. 802.11n HT20 SISO MODE

1TX Antenna A

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	3.80	30.00	30	36	30.00
Low 2	2417	3.80	30.00	30	36	30.00
Low 3	2422	3.80	30.00	30	36	30.00
Mid 6	2437	3.80	30.00	30	36	30.00
High 9	2452	3.80	30.00	30	36	30.00
High 10	2457	3.80	30.00	30	36	30.00
High 11	2462	3.80	30.00	30	36	30.00
High 12	2467	3.80	30.00	30	36	30.00
High 13	2472	3.80	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	**Included in Calculations of Corr'd Power**

Results

Channel	Frequency (MHz)	Ant A Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	22.18	22.18	30.00	-7.82
Low 2	2417	23.16	23.16	30.00	-6.84
Low 3	2422	25.19	25.19	30.00	-4.81
Mid 6	2437	25.20	25.20	30.00	-4.80
High 9	2452	25.27	25.27	30.00	-4.73
High 10	2457	24.19	24.19	30.00	-5.81
High 11	2462	23.17	23.17	30.00	-6.83
High 12	2467	17.25	17.25	30.00	-12.75
High 13	2472	15.16	15.16	30.00	-14.84

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1TX Antenna B

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	3.80	30.00	30	36	30.00
Low 2	2417	3.80	30.00	30	36	30.00
Low 3	2422	3.80	30.00	30	36	30.00
Mid 6	2437	3.80	30.00	30	36	30.00
High 9	2452	3.80	30.00	30	36	30.00
High 10	2457	3.80	30.00	30	36	30.00
High 11	2462	3.80	30.00	30	36	30.00
High 12	2467	3.80	30.00	30	36	30.00
High 13	2472	3.80	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	**Included in Calculations of Corr'd Power**

Results

Channel	Frequency (MHz)	Ant B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	17.17	17.17	30.00	-12.83
Low 2	2417	20.78	20.78	30.00	-9.22
Low 3	2422	22.33	22.33	30.00	-7.67
Mid 6	2437	25.31	25.31	30.00	-4.69
High 9	2452	21.79	21.79	30.00	-8.21
High 10	2457	21.28	21.28	30.00	-8.72
High 11	2462	17.77	17.77	30.00	-12.23
High 12	2467	14.41	14.41	30.00	-15.59
High 13	2472	5.79	5.79	30.00	-24.21

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9.4.3. 802.11n HT20 MIMO MODE

2TX Antenna A + Antenna B CDD MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	3.80	30.00	36	30.00
Low 2	2417	3.80	30.00	36	30.00
Low 3	2422	3.80	30.00	36	30.00
Mid 6	2437	3.80	30.00	36	30.00
High 9	2452	3.80	30.00	36	30.00
High 10	2457	3.80	30.00	36	30.00
High 11	2462	3.80	30.00	36	30.00
High 12	2467	3.80	30.00	36	30.00
High 13	2472	3.80	30.00	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power

Results

Channel	Frequency (MHz)	Ant A Meas Power (dBm)	Ant B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low 1	2412	19.53	19.69	22.62	30.00	-7.38
Low 2	2417	22.51	22.72	25.63	30.00	-4.37
Low 3	2422	24.11	24.26	27.20	30.00	-2.80
Low 4	2427	25.40	25.46	28.44	30.00	-1.56
Mid 6	2437	26.15	26.21	29.19	30.00	-0.81
High 9	2452	24.56	24.60	27.59	30.00	-2.41
High 10	2457	23.56	23.49	26.54	30.00	-3.46
High 11	2462	19.53	19.67	22.61	30.00	-7.39
High 12	2467	16.46	16.66	19.57	30.00	-10.43

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9.5. AVERAGE POWER

ID:	30554	Date:	09/08/2017

LIMITS

None; for reporting purposes only

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

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9.5.1. 802.11b MODE

1TX Antenna A

Channel	Frequency (MHz)	Average Power 1TX Antenna A (dBm)
Low 1	2412	18.73
Low 2	2417	19.71
Low 3	2422	22.78
Mid 6	2437	22.82
High 9	2452	22.84
High 10	2457	20.74
High 11	2462	19.72
High 12	2467	13.80
High 13	2472	11.71

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1TX Antenna B

Channel	Frequency (MHz)	Average Power 1TX Antenna B (dBm)
Low 1	2412	18.76
Low 2	2417	19.86
Low 3	2422	22.78
Mid 6	2437	22.87
High 9	2452	22.75
High 10	2457	20.89
High 11	2462	19.76
High 12	2467	13.85
High 13	2472	11.72

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9.5.2. 802.11n HT20 SISO MODE

1TX Antenna A

Channel	Frequency (MHz)	Average Power 1TX Antenna A MODE (dBm)
Low 1	2412	13.78
Low 2	2417	17.17
Low 3	2422	18.87
Mid 6	2437	21.76
High 9	2452	18.35
High 10	2457	17.79
High 11	2462	14.40
High 12	2467	10.89
High 13	2472	2.32

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1TX Antenna B

Channel	Frequency (MHz)	Average Power 1TX Antenna B (dBm)
Low 1	2412	13.73
Low 2	2417	17.33
Low 3	2422	18.88
Mid 6	2437	21.86
High 9	2452	18.34
High 10	2457	17.83
High 11	2462	14.32
High 12	2467	10.96
High 13	2472	2.34

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9.5.3. 802.11n HT20 MIMO MODE

2TX Antenna A + Antenna B CDD MODE

Channel	Frequency (MHz)	Ant A Power (dBm)	Ant B Power (dBm)	Total Power (dBm)
Low 1	2412	12.76	12.92	15.85
Low 2	2417	15.74	15.95	18.86
Low 3	2422	17.34	17.49	20.43
Low 4	2427	18.78	18.82	21.81
Mid 6	2437	19.38	19.44	22.42
High 9	2452	17.79	17.83	20.82
High 10	2457	16.79	16.72	19.77
High 11	2462	12.76	12.90	15.84
High 12	2467	9.69	9.89	12.80
High 13	2472	0.78	0.94	3.87

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9.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 (5.2) (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

UAT 1 Antenna Gain (dBi)	LAT 3 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
3.80	3.80	6.81

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9.6.1. 802.11b MODE

1TX Antenna A

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency (MHz)	Antenna Meas (dBm)	Total Corr'd PSD (dBm/3KHz)	Limit (dBm)	Margin (dB)
Low 1	2412	-3.75	-3.75	8.0	-11.8
Low 2	2417	-2.56	-2.56	8.0	-10.6
Low 3	2422	0.49	0.49	8.0	-7.5
Mid 6	2437	1.36	1.36	8.0	-6.6
High 9	2452	0.92	0.92	8.0	-7.1
High 10	2457	-2.62	-2.62	8.0	-10.6
High 11	2462	-3.68	-3.68	8.0	-11.7
High 12	2467	-8.10	-8.10	8.0	-16.1
High 13	2472	-11.15	-11.15	8.0	-19.2

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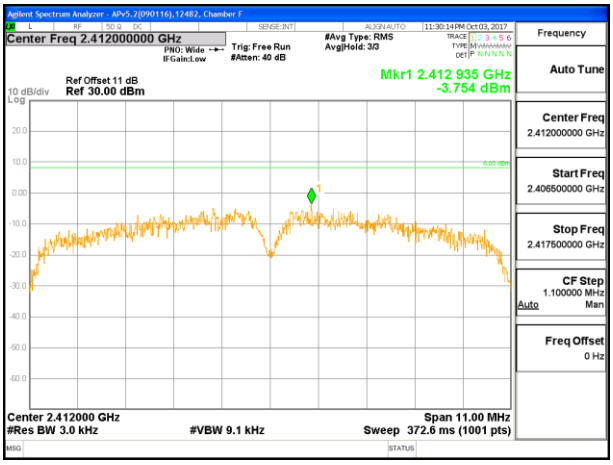
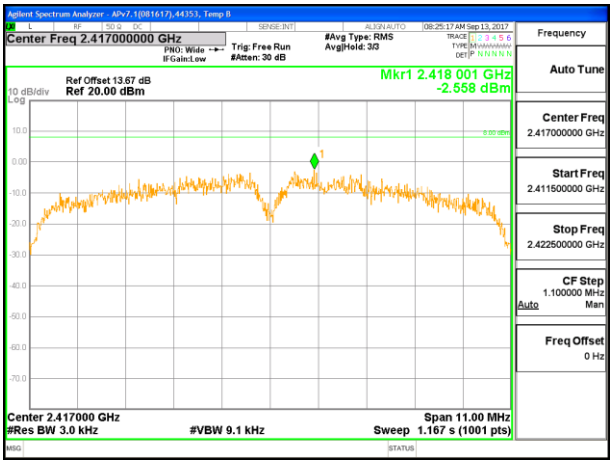
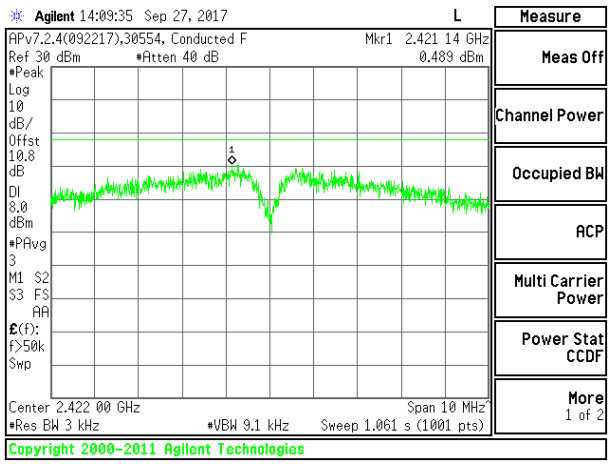


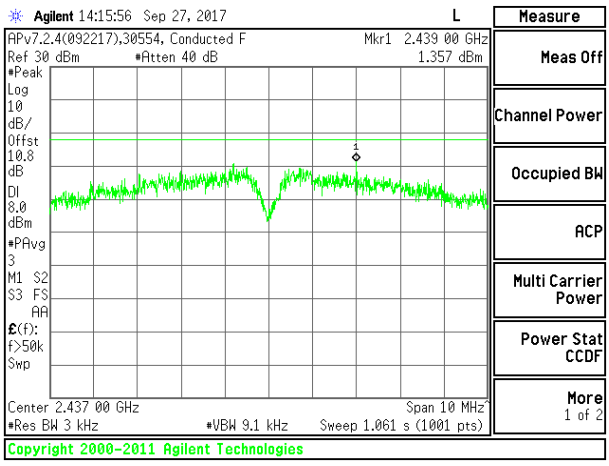
LOW CHANNEL 1



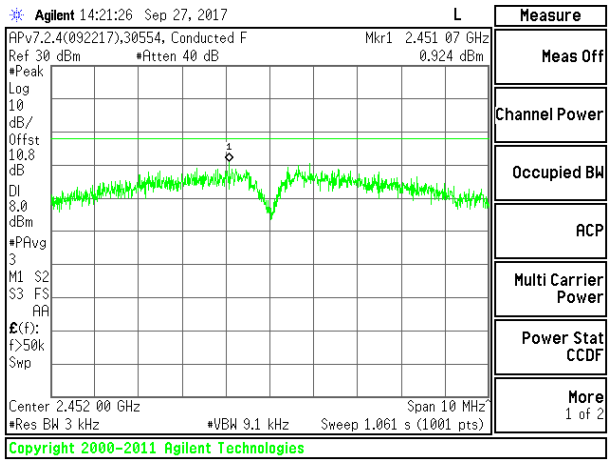
LOW CHANNEL 2



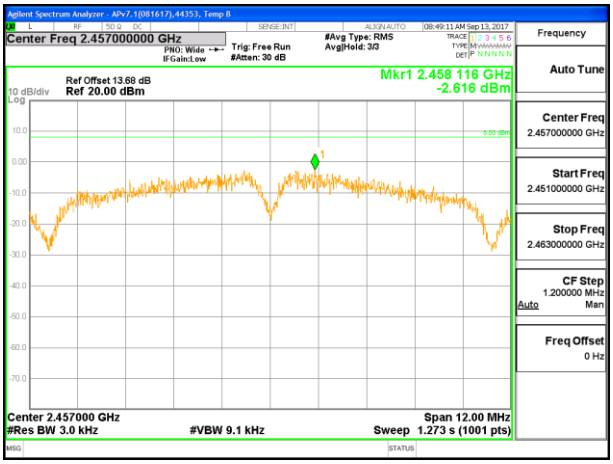
LOW CHANNEL 3



MID CHANNEL 6



HIGH CHANNEL 9



HIGH CHANNEL 10

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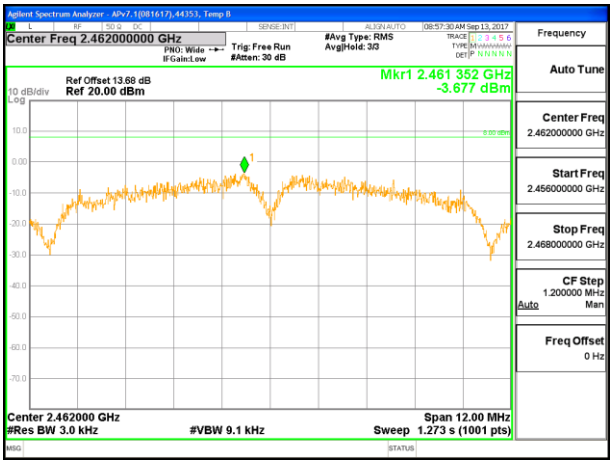
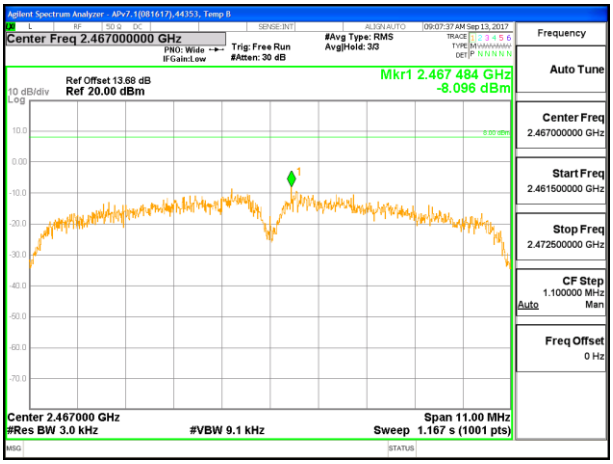
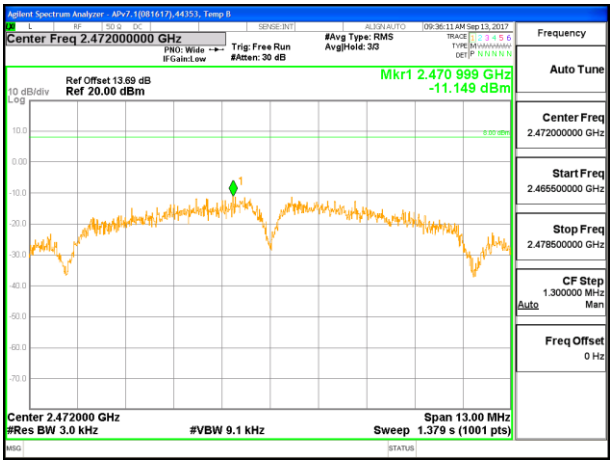


HIGH CHANNEL 11



HIGH CHANNEL 12



HIGH CHANNEL 13

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1TX Antenna B

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency (MHz)	Ant B Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low 1	2412	-4.28	-4.28	8.0	-12.3
Low 2	2417	-2.76	-2.76	8.0	-10.8
Low 3	2422	-0.04	-0.04	8.0	-8.0
Mid 6	2437	0.24	0.24	8.0	-7.8
High 9	2452	0.76	0.76	8.0	-7.2
High 10	2457	-1.98	-1.98	8.0	-10.0
High 11	2462	-2.62	-2.62	8.0	-10.6
High 12	2467	-9.24	-9.24	8.0	-17.2
High 13	2472	-11.54	-11.54	8.0	-19.5

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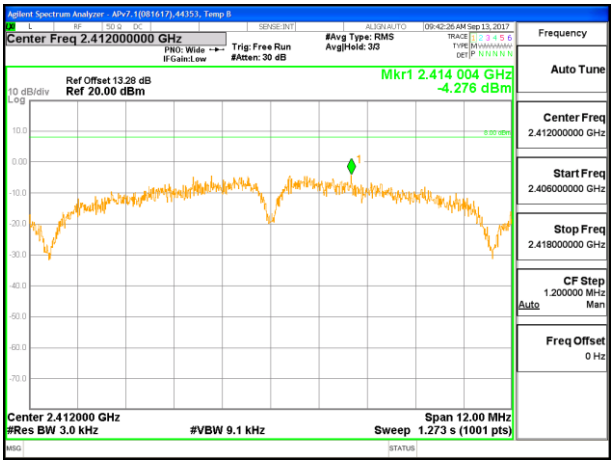

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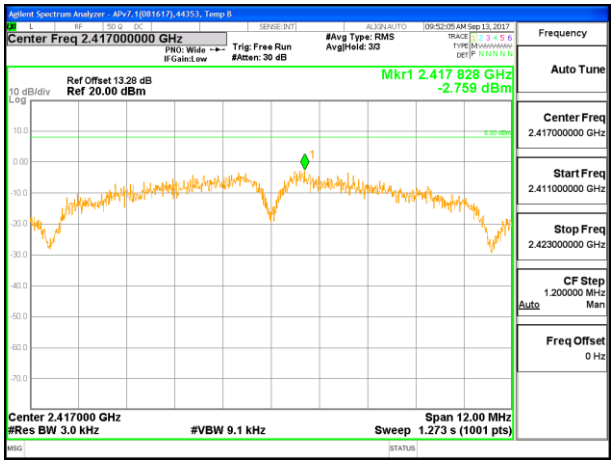

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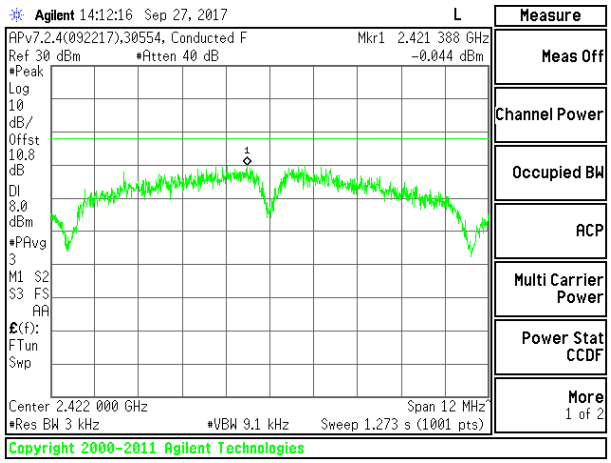
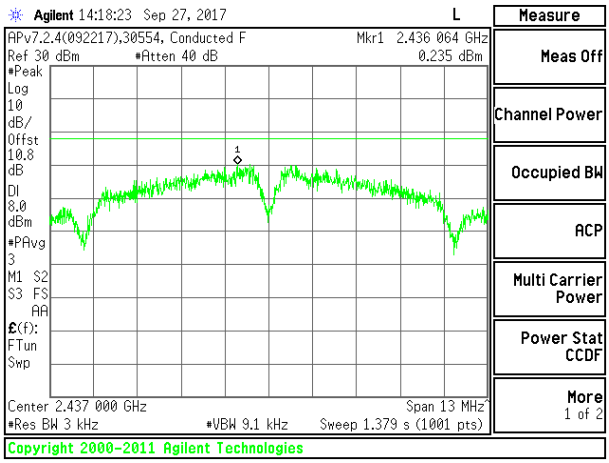
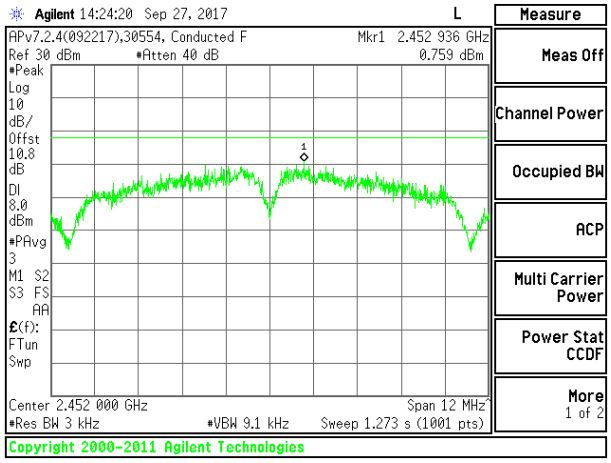


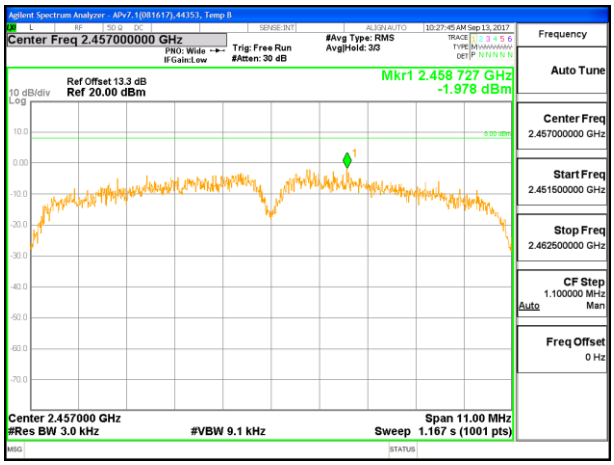
LOW CHANNEL 3



MID CHANNEL 6



HIGH CHANNEL 9



HIGH CHANNEL 10

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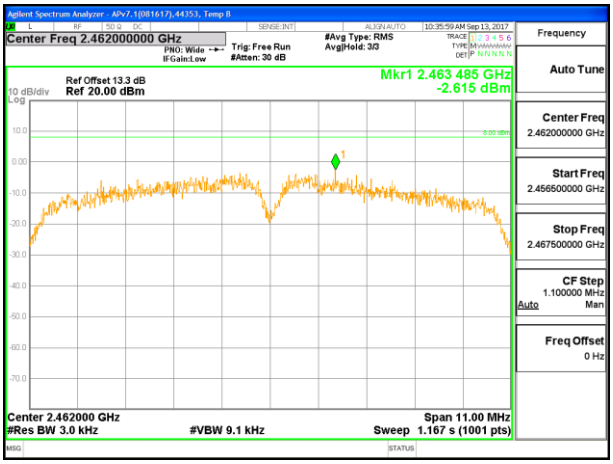

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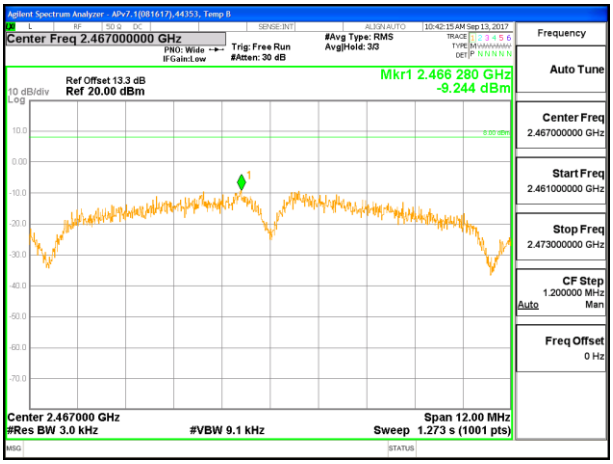
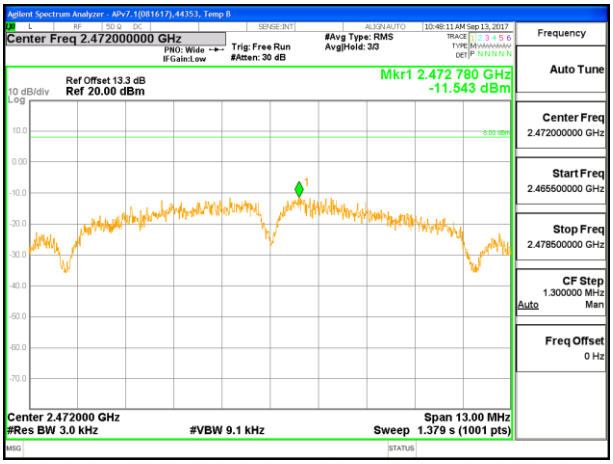


HIGH CHANNEL 12



HIGH CHANNEL 13

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9.6.2. 802.11n HT20 SISO MODE

1TX Antenna A

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency (MHz)	Ant A Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low 1	2412	-10.90	-10.90	8.0	-18.9
Low 2	2417	-8.05	-8.05	8.0	-16.1
Low 3	2422	-5.91	-5.91	8.0	-13.9
Low 4	2427	-5.81	-5.81	8.0	-13.8
Low 5	2432	-3.34	-3.34	8.0	-11.3
Mid 6	2437	-3.62	-3.62	8.0	-11.6
High 7	2442	-3.40	-3.40	8.0	-11.4
High 8	2447	-4.84	-4.84	8.0	-12.8
High 9	2452	-7.47	-7.47	8.0	-15.5
High 10	2457	-7.72	-7.72	8.0	-15.7
High 11	2462	-10.51	-10.51	8.0	-18.5
High 12	2467	-14.06	-14.06	8.0	-22.1
High 13	2472	-23.13	-23.13	8.0	-31.1

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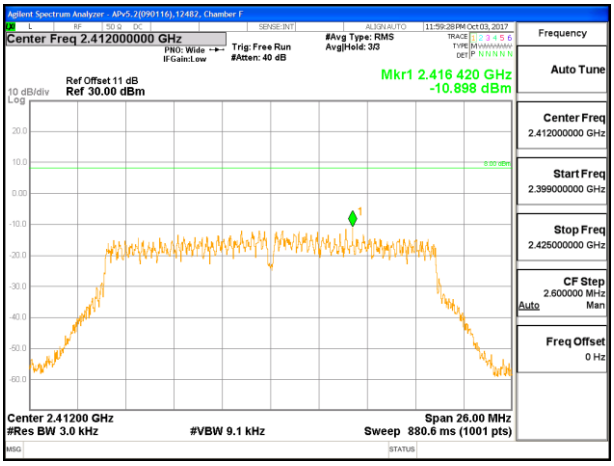

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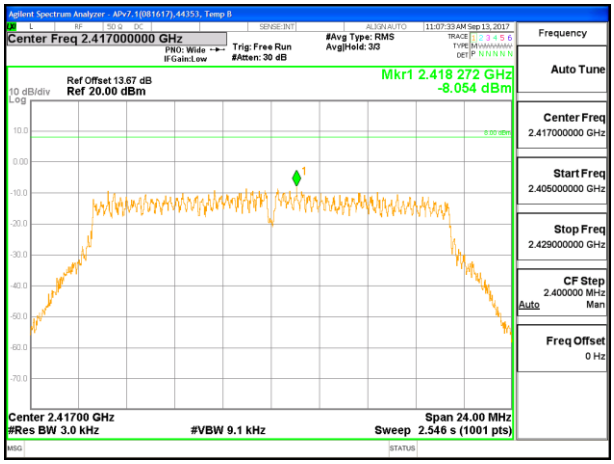

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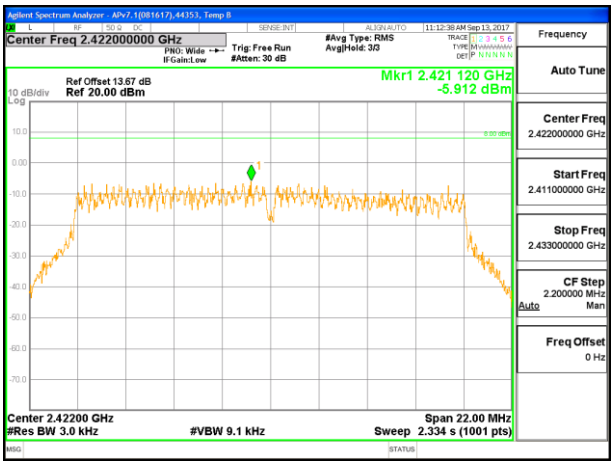

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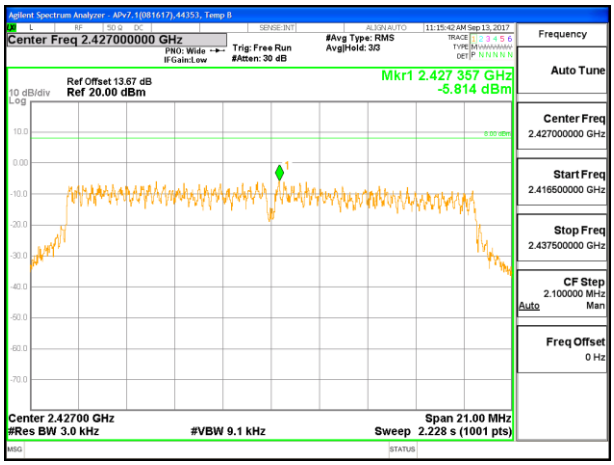

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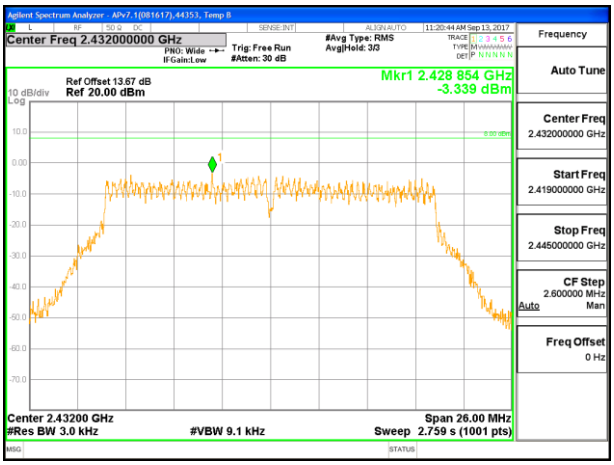
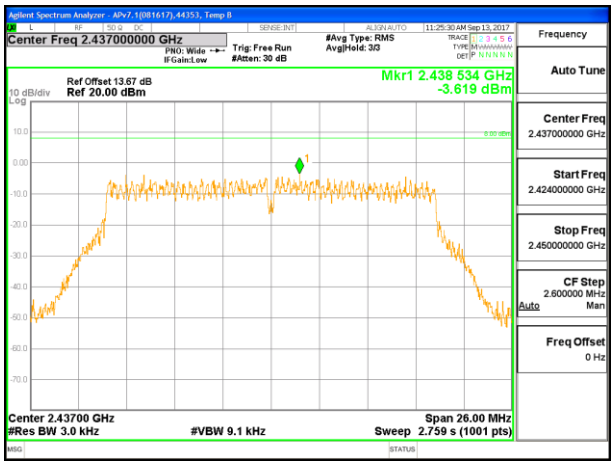


LOW CHANNEL 5



MID CHANNEL 6

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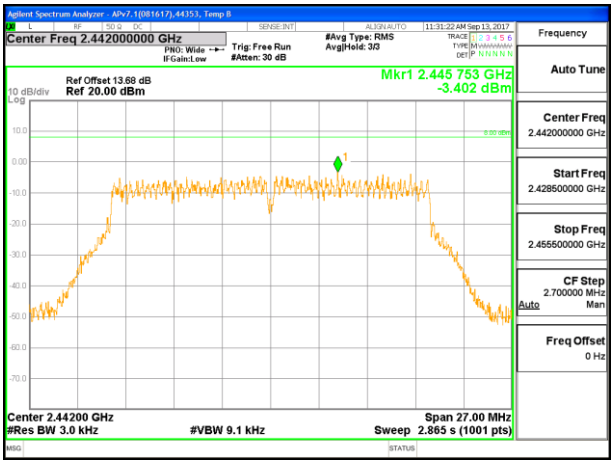
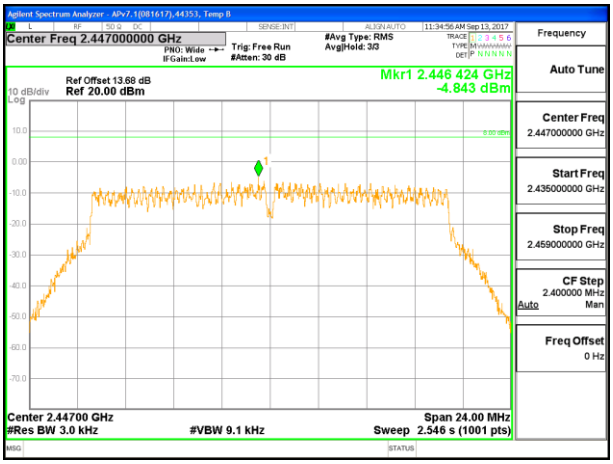


HIGH CHANNEL 7



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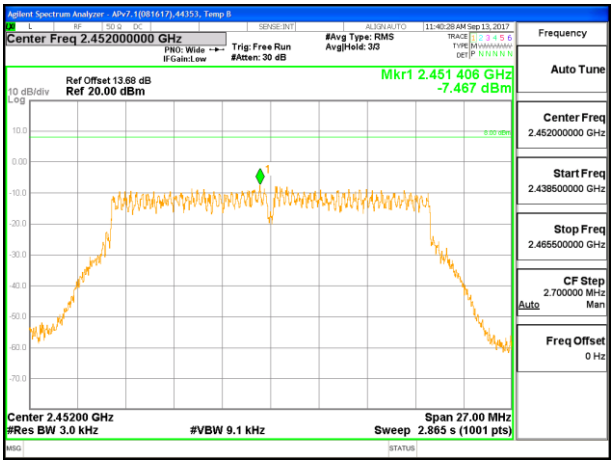
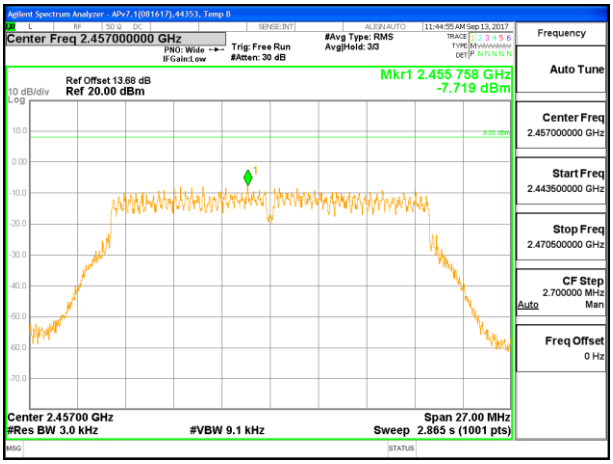


HIGH CHANNEL 9



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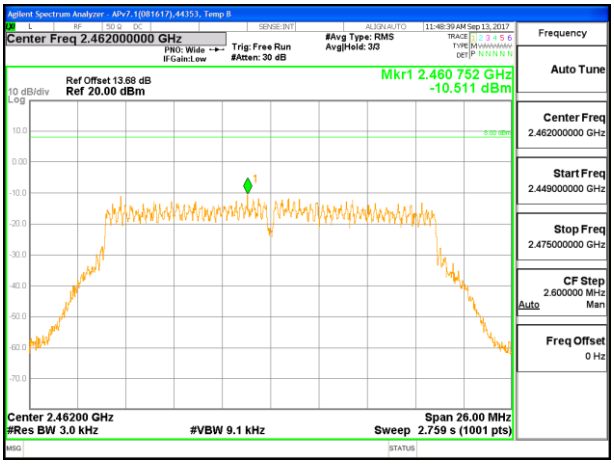

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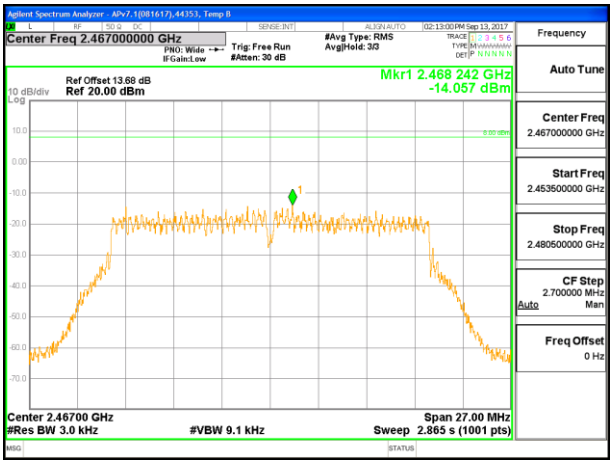

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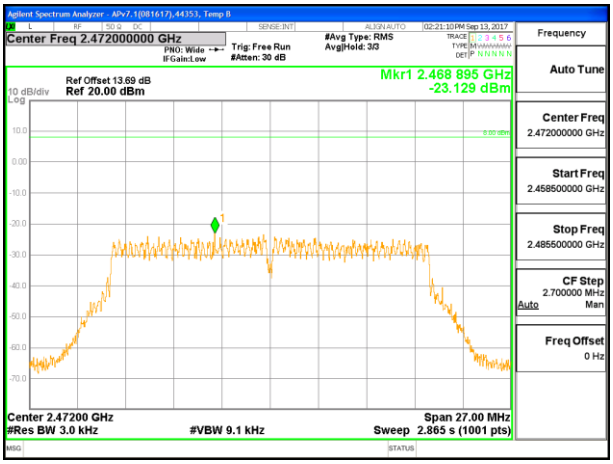

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1TX Antenna B

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency (MHz)	Ant B Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low 1	2412	-11.80	-11.80	8.0	-19.8
Low 2	2417	-7.26	-7.26	8.0	-15.3
Low 3	2422	-5.61	-5.61	8.0	-13.6
Low 4	2427	-5.57	-5.57	8.0	-13.6
Low 5	2432	-2.20	-2.20	8.0	-10.2
Mid 6	2437	-3.99	-3.99	8.0	-12.0
High 7	2442	-3.34	-3.34	8.0	-11.3
High 8	2447	-5.81	-5.81	8.0	-13.8
High 9	2452	-6.84	-6.84	8.0	-14.8
High 10	2457	-7.33	-7.33	8.0	-15.3
High 11	2462	-11.11	-11.11	8.0	-19.1
High 12	2467	-14.03	-14.03	8.0	-22.0
High 13	2472	-22.50	-22.50	8.0	-30.5

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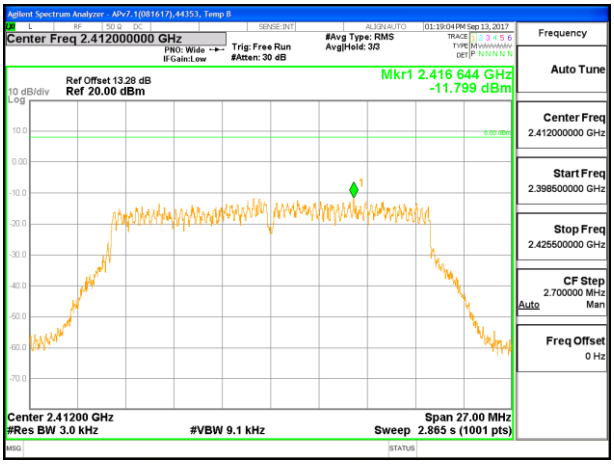
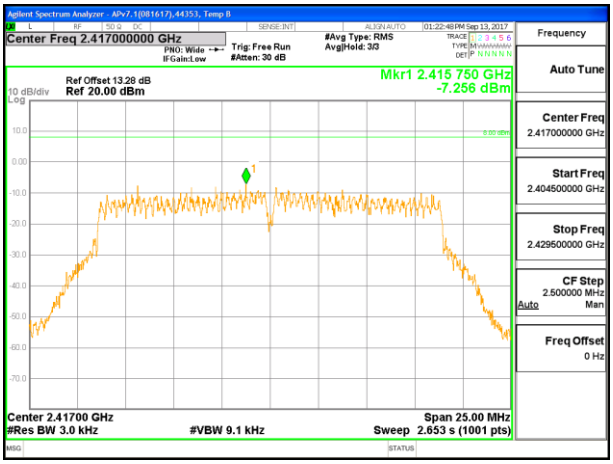


LOW CHANNEL 1



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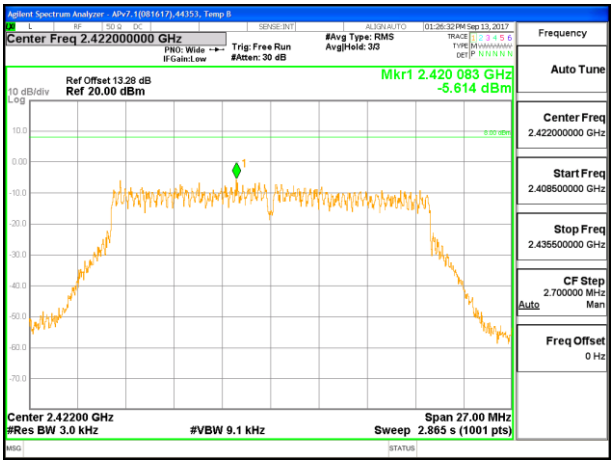

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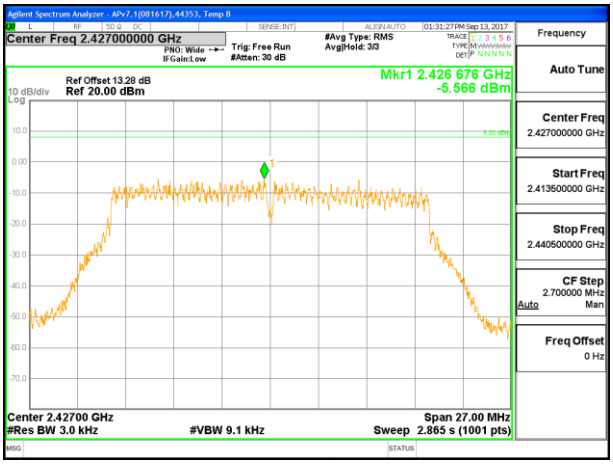

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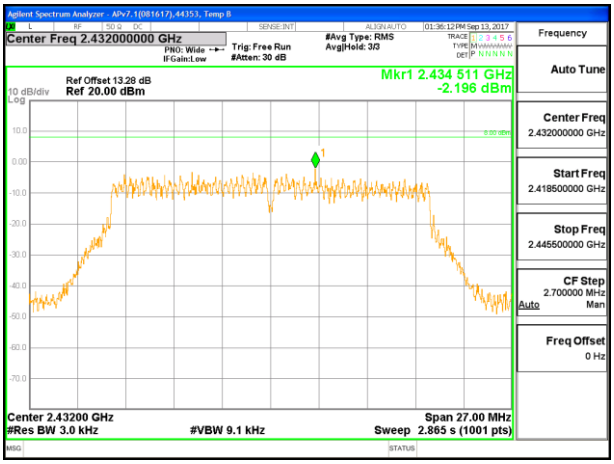
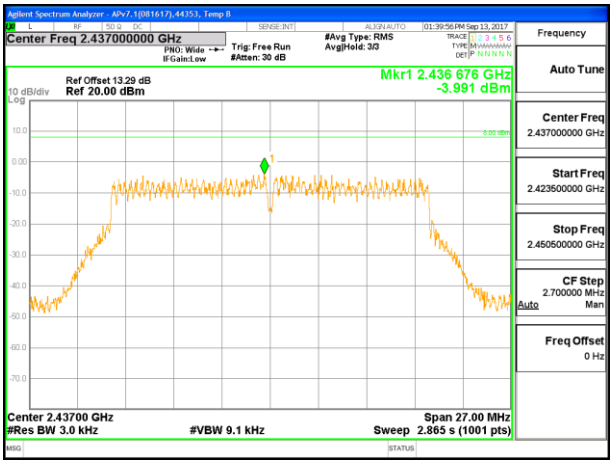


LOW CHANNEL 5



MID CHANNEL 6

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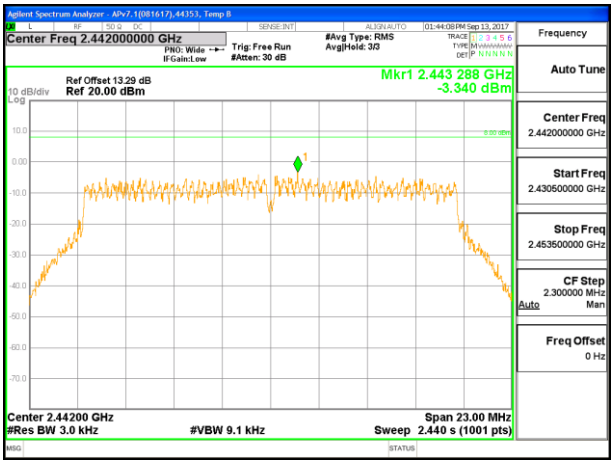
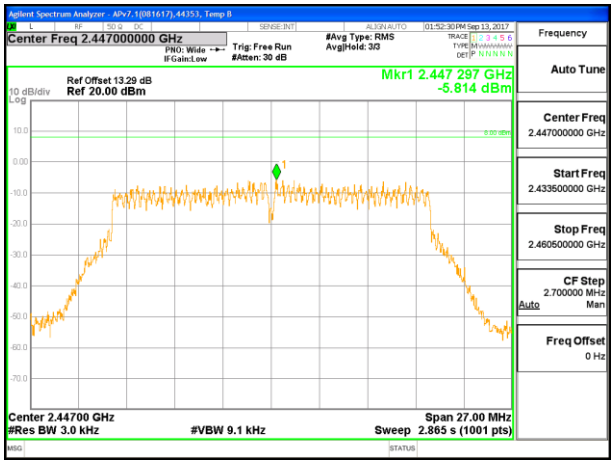
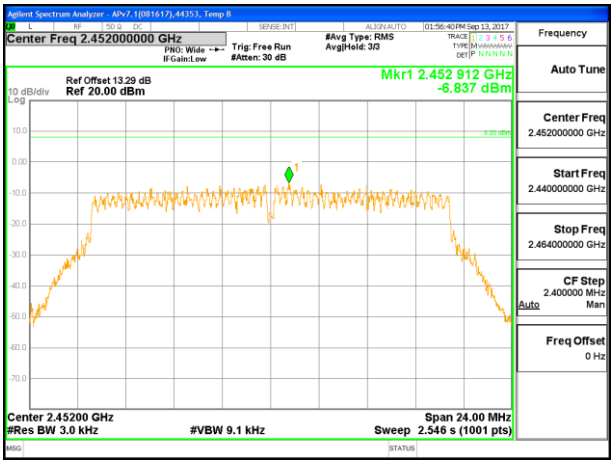


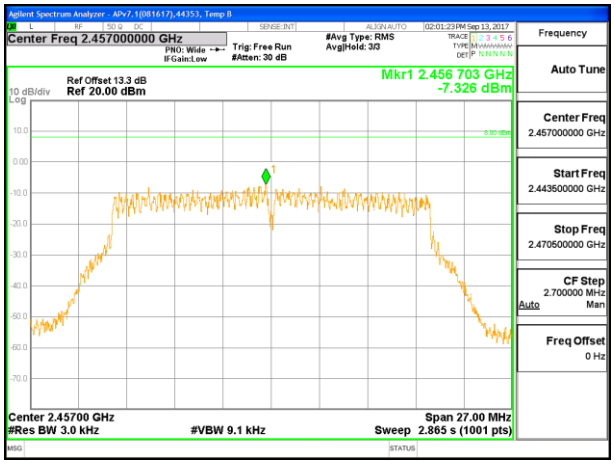
HIGH CHANNEL 7



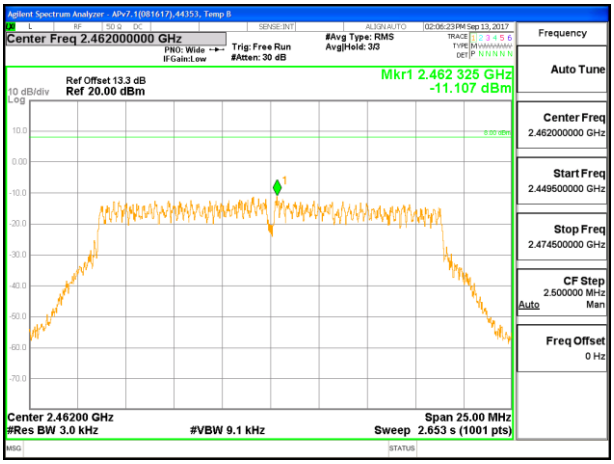
HIGH CHANNEL 8



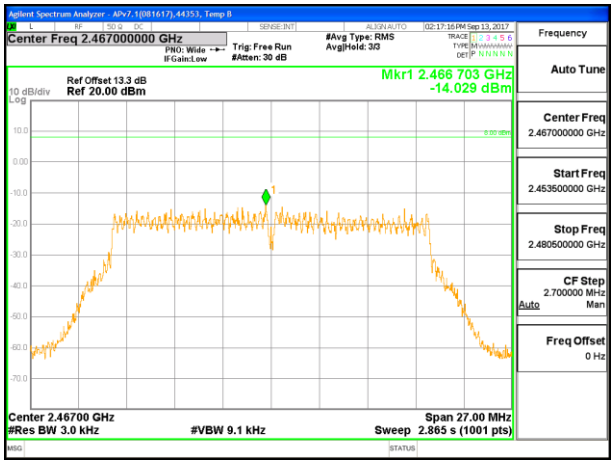
HIGH CHANNEL 9



HIGH CHANNEL 10



HIGH CHANNEL 11



HIGH CHANNEL 12

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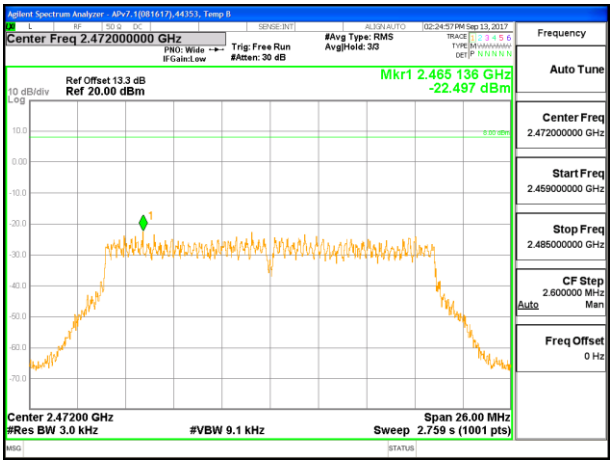

HIGH CHANNEL 13

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9.6.3. 802.11n HT20 MIMO MODE

2TX Antenna A + Antenna B CDD MODE

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency (MHz)	Ant A Meas (dBm)	Ant B Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low 1	2412	-10.98	-12.89	-8.82	8.0	-16.8
Low 2	2417	-9.47	-8.69	-6.05	8.0	-14.1
Low 3	2422	-8.24	-8.13	-5.17	8.0	-13.2
Low 4	2427	-6.34	-6.64	-3.48	8.0	-11.5
Low 5	2432	-6.57	-6.06	-3.30	8.0	-11.3
Mid 6	2437	-4.89	-6.53	-2.62	8.0	-10.6
High 7	2442	-6.38	-6.03	-3.19	8.0	-11.2
High 8	2447	-6.25	-6.67	-3.44	8.0	-11.4
High 9	2452	-7.80	-7.48	-4.63	8.0	-12.6
High 10	2457	-8.42	-7.96	-5.17	8.0	-13.2
High 11	2462	-12.52	-12.41	-9.45	8.0	-17.5
High 12	2467	-15.67	-14.38	-11.97	8.0	-20.0
High 13	2472	-25.92	-25.11	-22.49	8.0	-30.5

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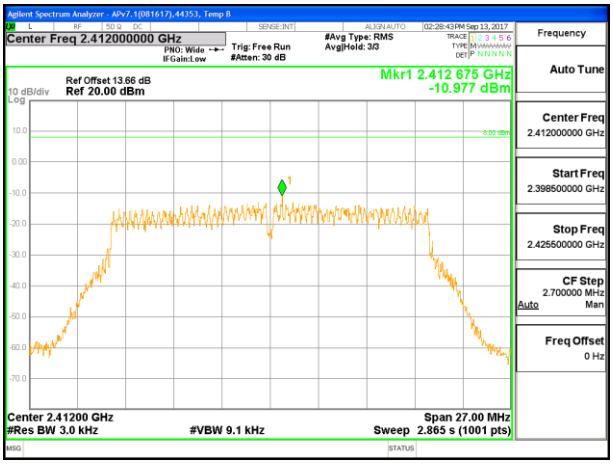
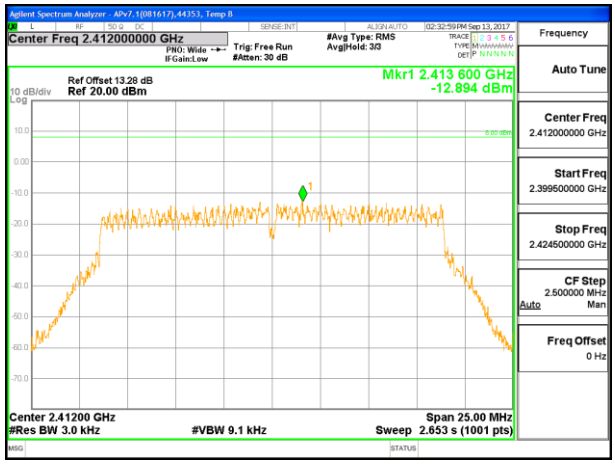
LOW CHANNEL 1

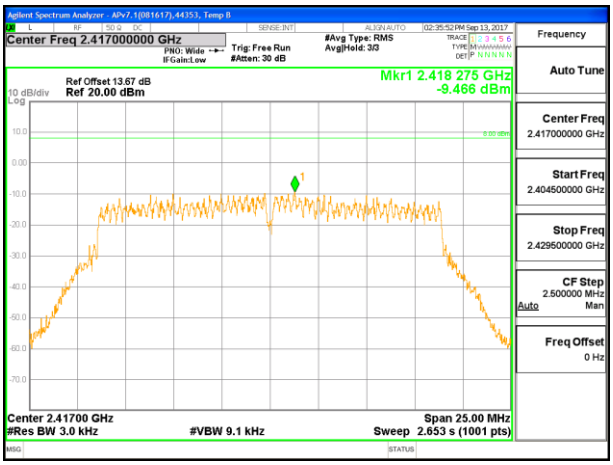


LOW CHANNEL 1 Antenna A

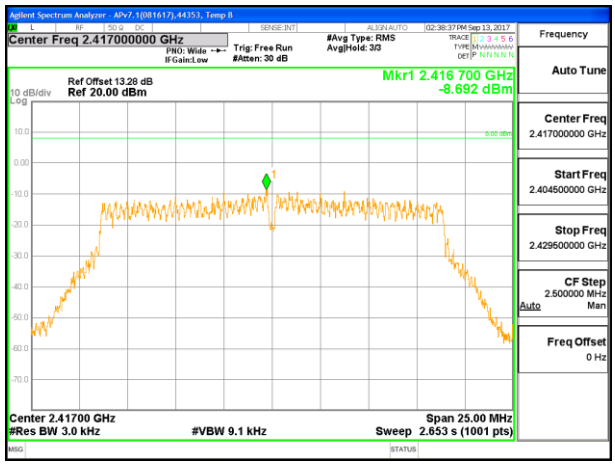


LOW CHANNEL 1 Antenna B

LOW CHANNEL 2

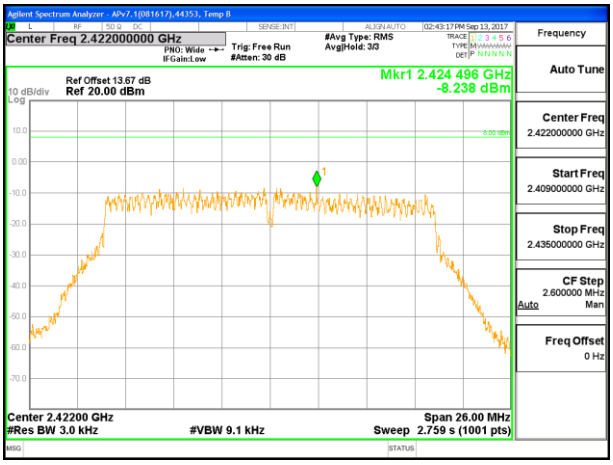


LOW CHANNEL 2 Antenna A

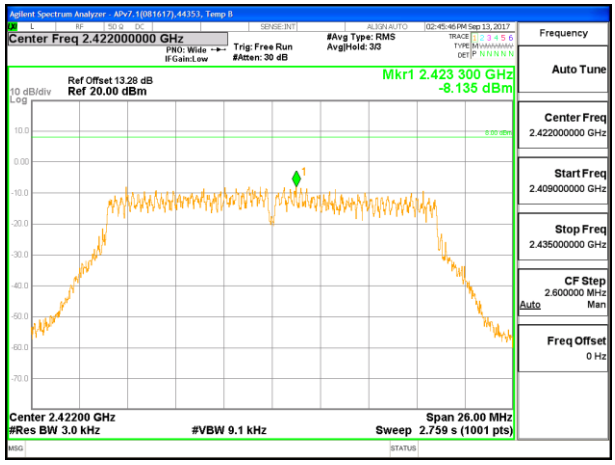


LOW CHANNEL 2 Antenna B

LOW CHANNEL 3



LOW CHANNEL 3 Antenna A



LOW CHANNEL 3 Antenna B

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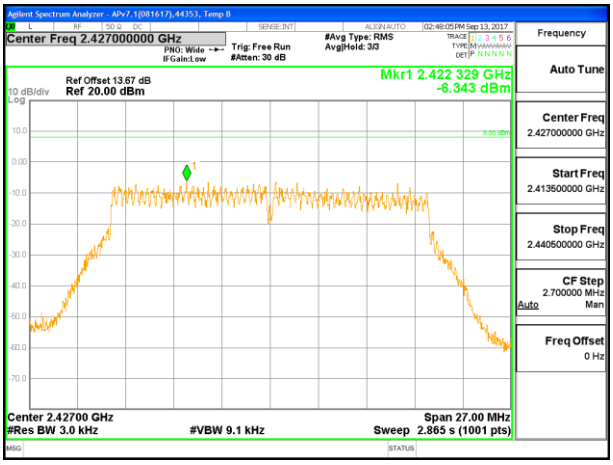
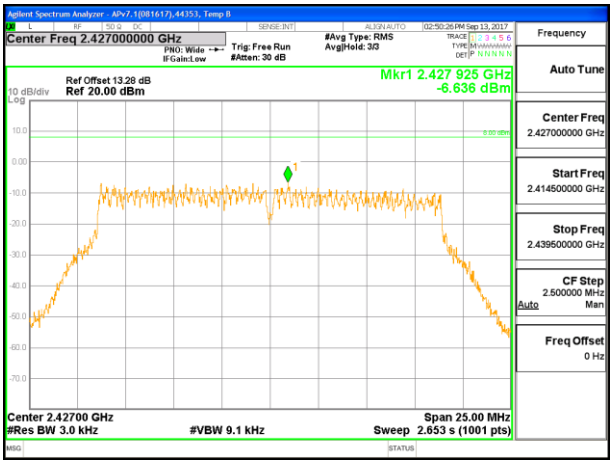
LOW CHANNEL 4

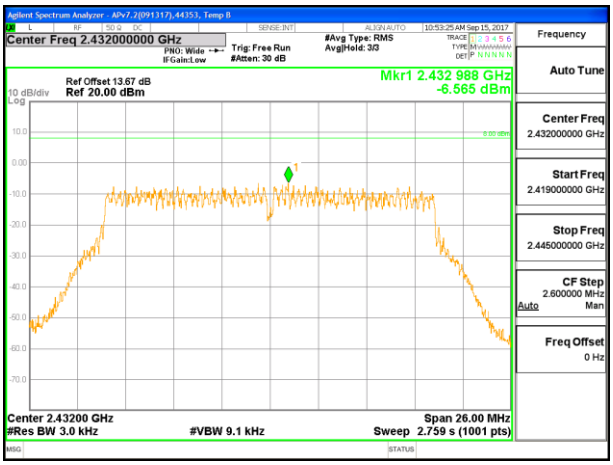


LOW CHANNEL 4 Antenna A



LOW CHANNEL 4 Antenna B

LOW CHANNEL 5



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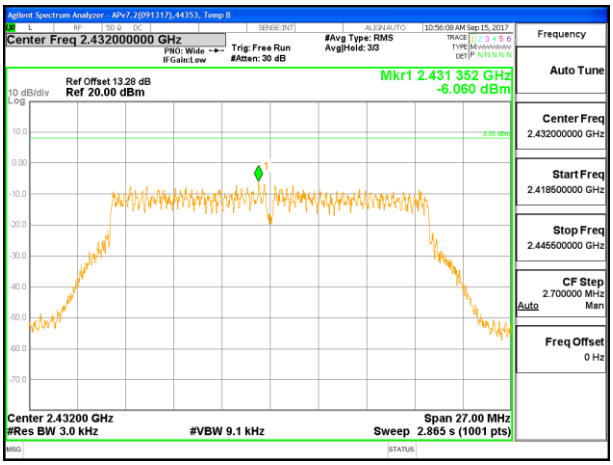
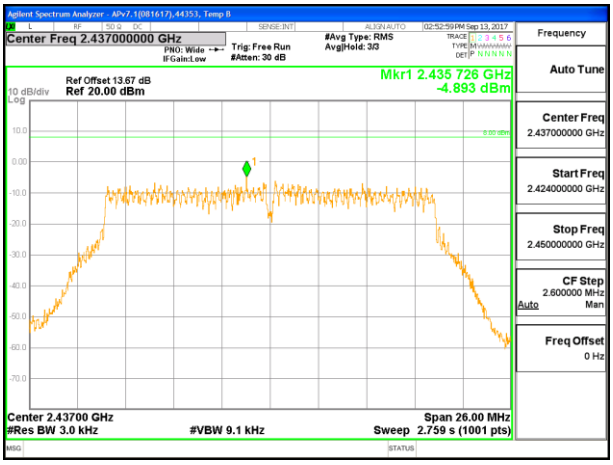
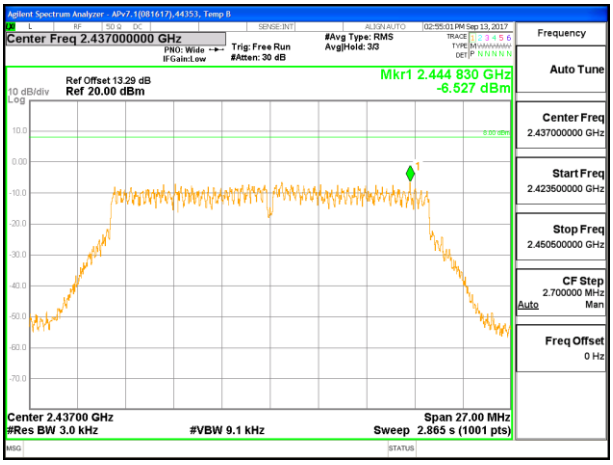


LOW CHANNEL 5 Antenna B

MID CHANNEL 6



MID CHANNEL 6 Antenna A



MID CHANNEL 6 Antenna B

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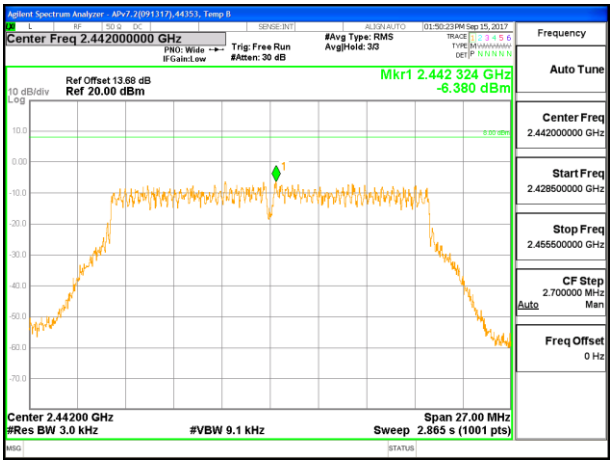
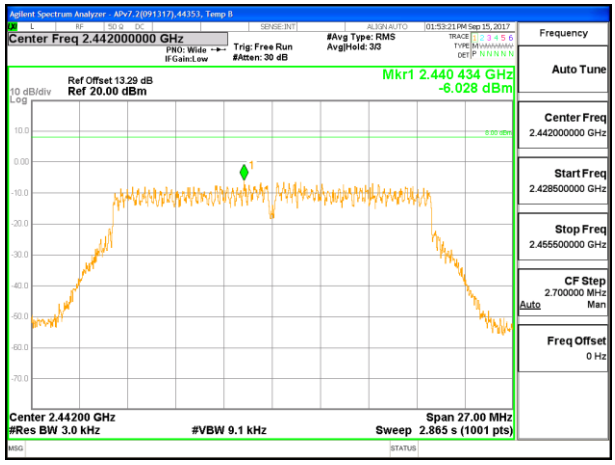
HIGH CHANNEL 7

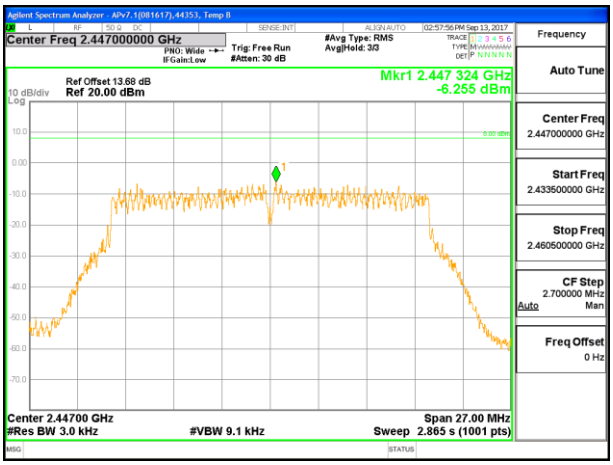


HIGH CHANNEL 7 Antenna A

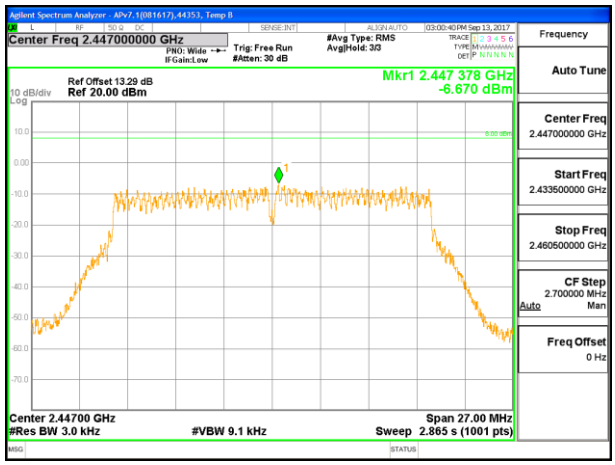


HIGH CHANNEL 7 Antenna B

HIGH CHANNEL 8

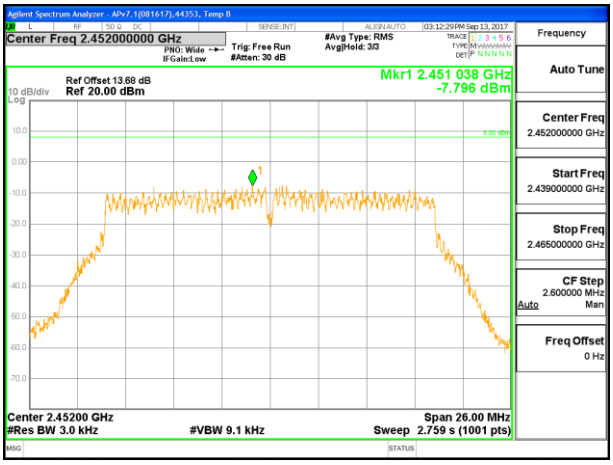


HIGH CHANNEL 8 Antenna A



HIGH CHANNEL 8 Antenna B

HIGH CHANNEL 9



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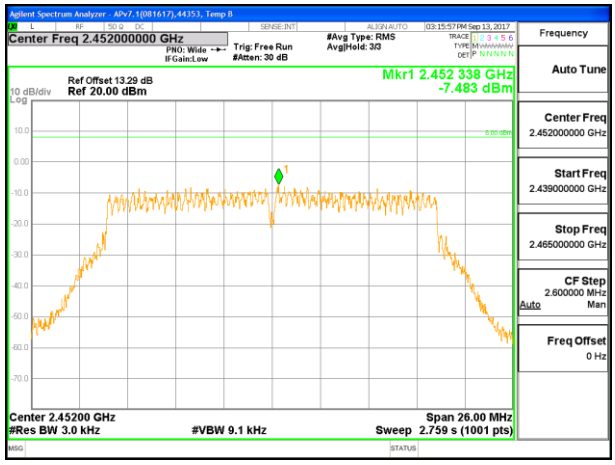

HIGH CHANNEL 9 Antenna B

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