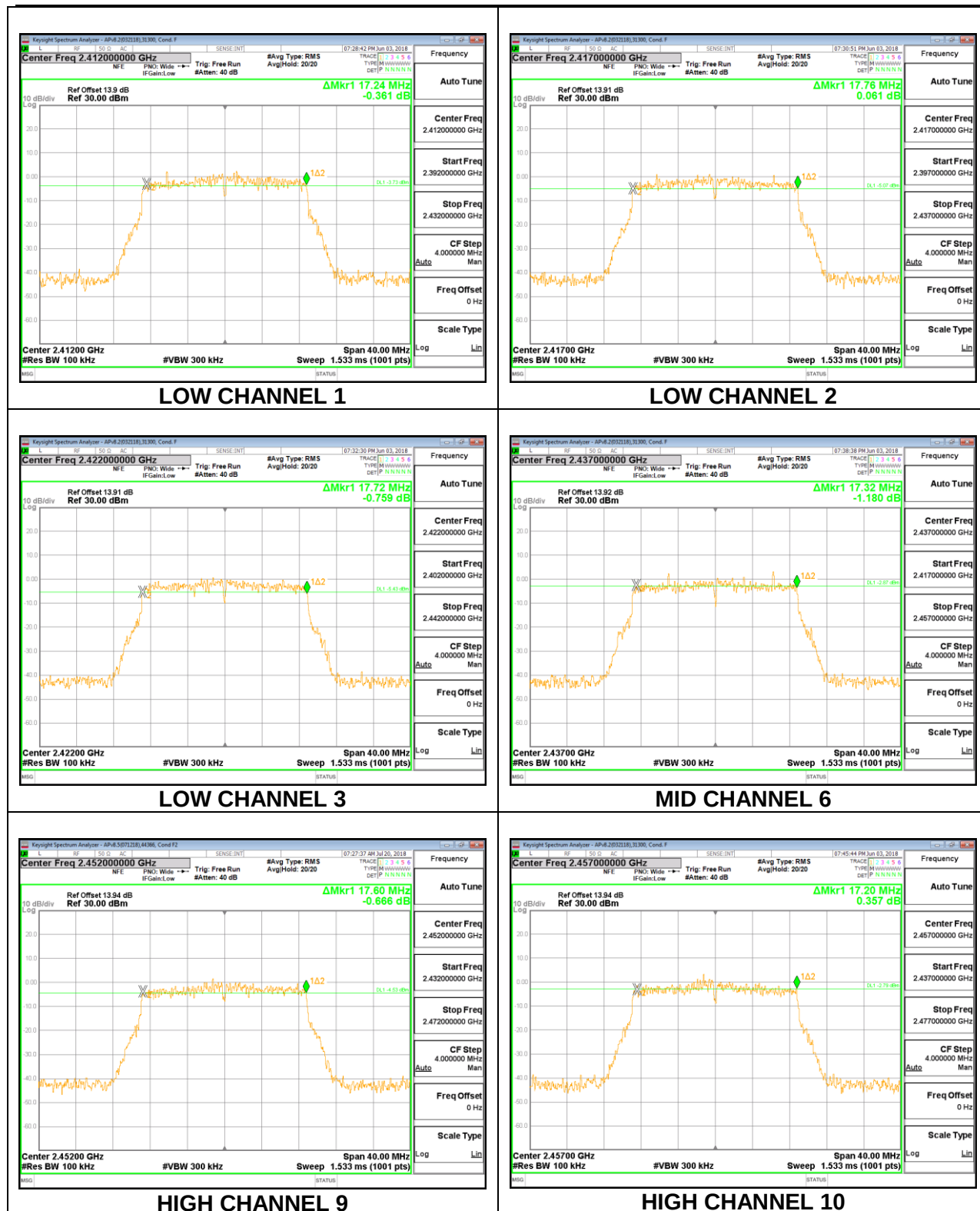
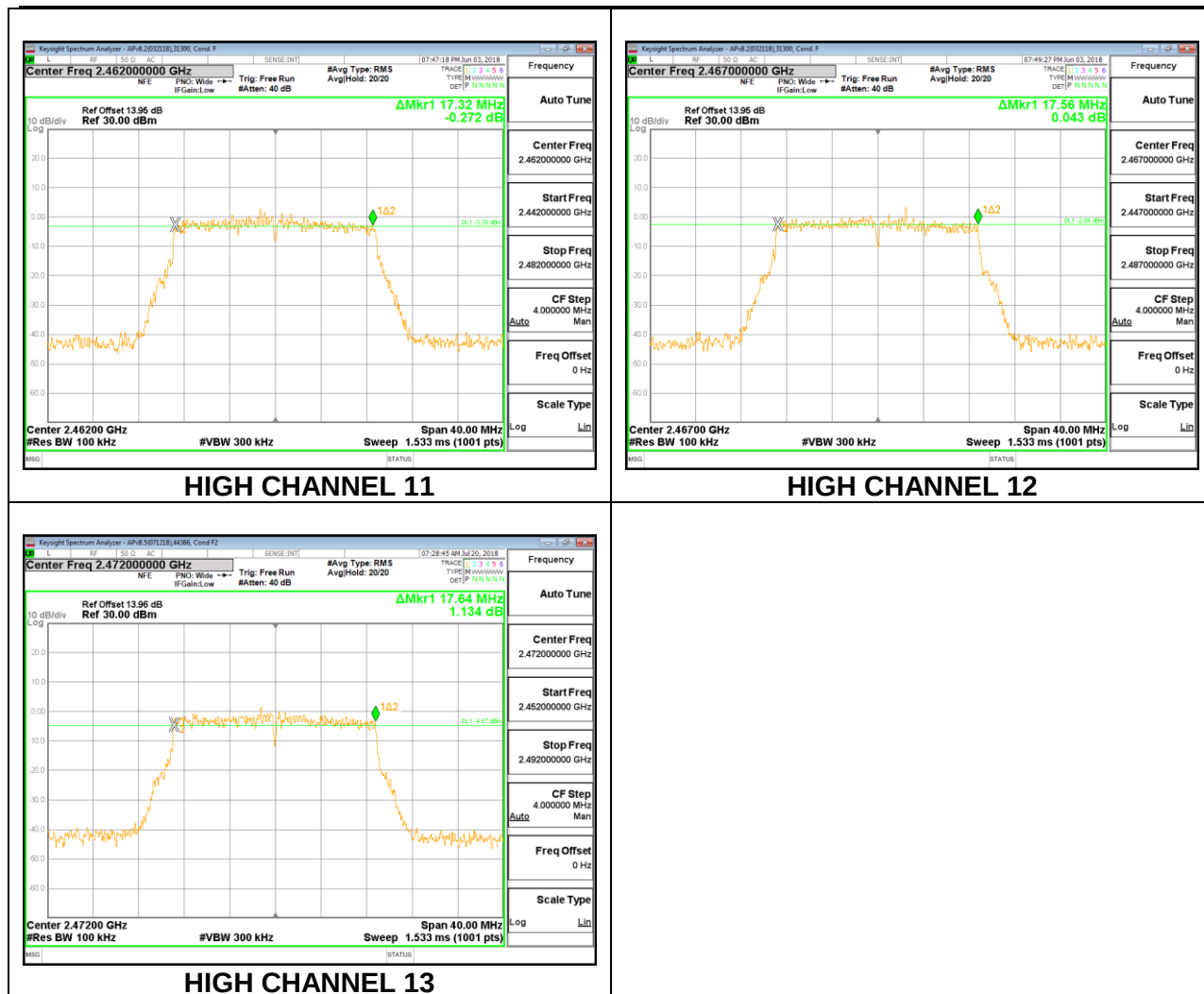


8.3.2. 802.11n HT20 MODE

1TX Antenna 2 MODE

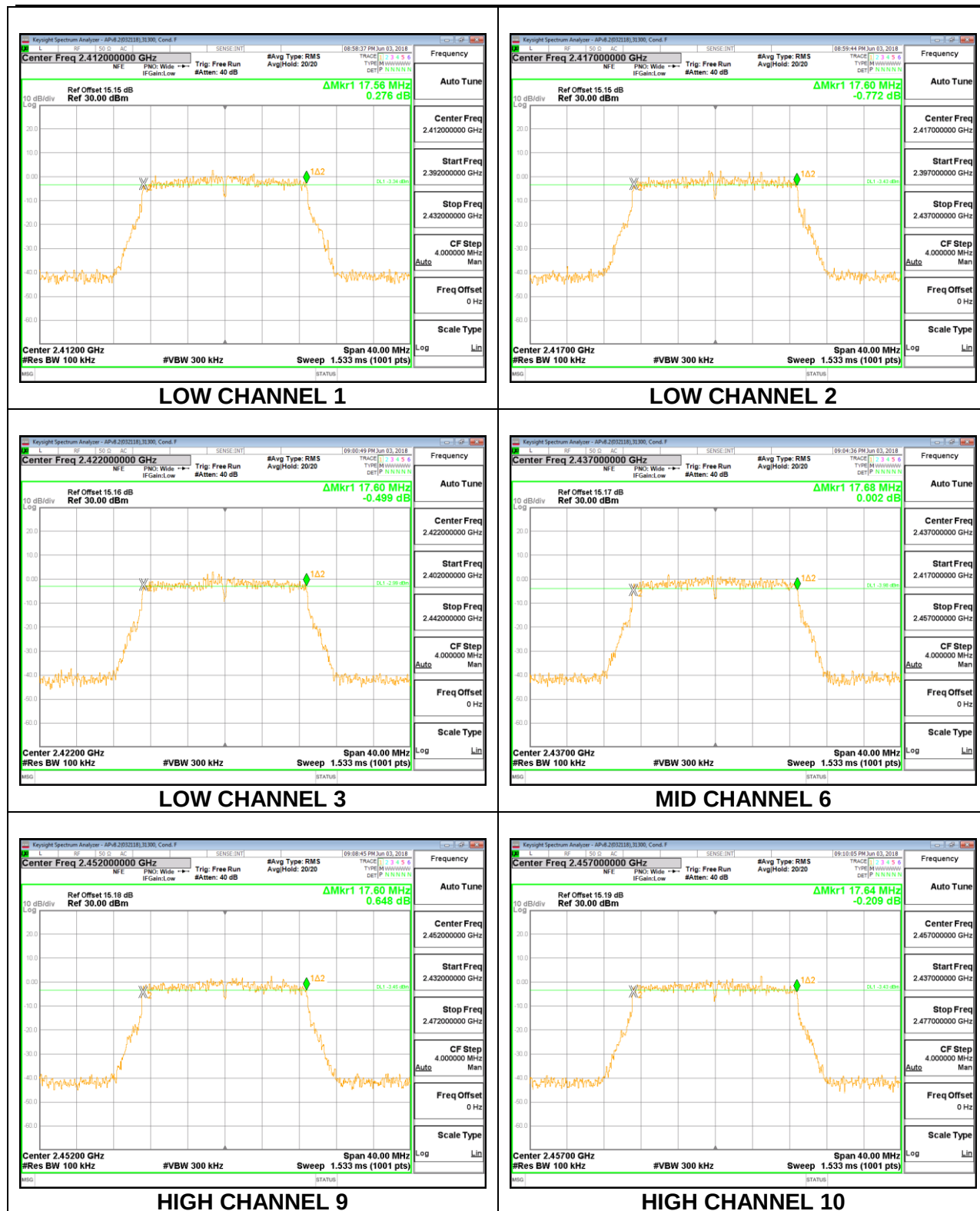
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	17.2400	0.5
Low 2	2417	17.7600	0.5
Low 3	2422	17.7200	0.5
Mid 6	2437	17.3200	0.5
High 9	2452	17.6000	0.5
High 10	2457	17.2000	0.5
High 11	2462	17.3200	0.5
High 12	2467	17.5600	0.5
High 13	2472	17.6400	0.5

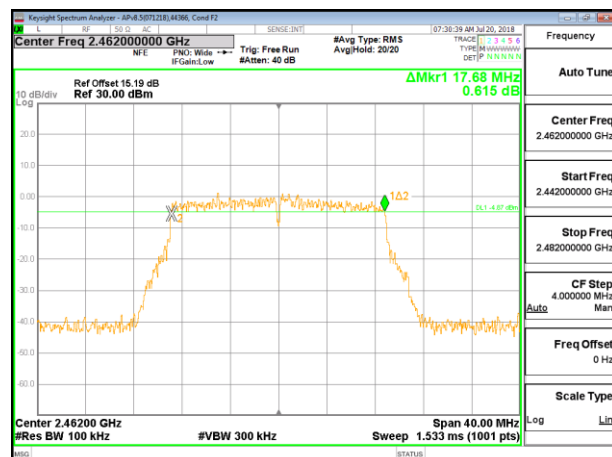




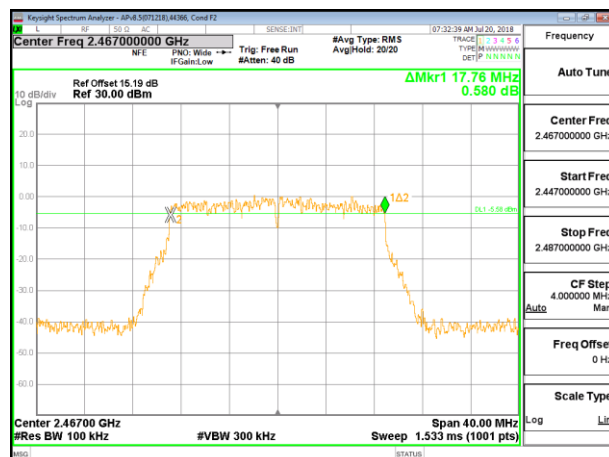
1TX Antenna 5 MODE

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	17.5600	0.5
Low 2	2417	17.6000	0.5
Low 3	2422	17.6000	0.5
Mid 6	2437	17.6800	0.5
High 9	2452	17.6000	0.5
High 10	2457	17.6400	0.5
High 11	2462	17.6800	0.5
High 12	2467	17.7600	0.5
High 13	2472	17.6800	0.5

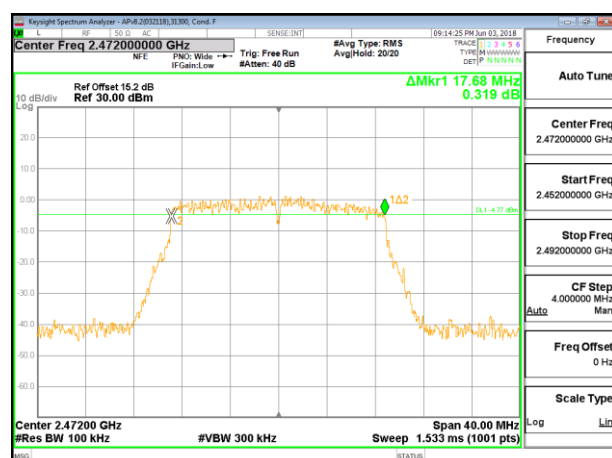




HIGH CHANNEL 11



HIGH CHANNEL 12

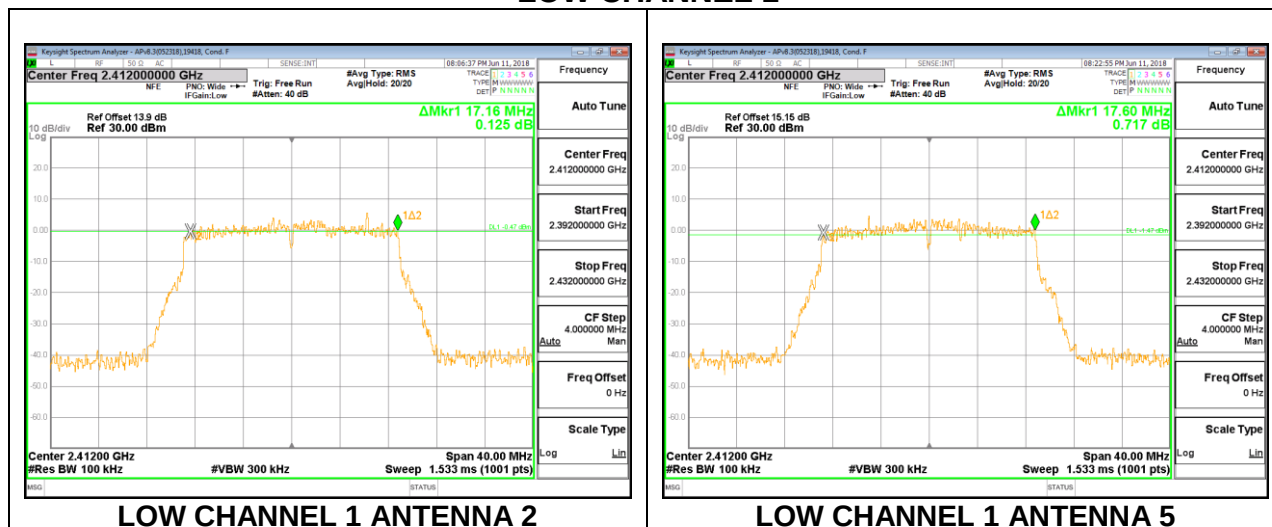


HIGH CHANNEL 13

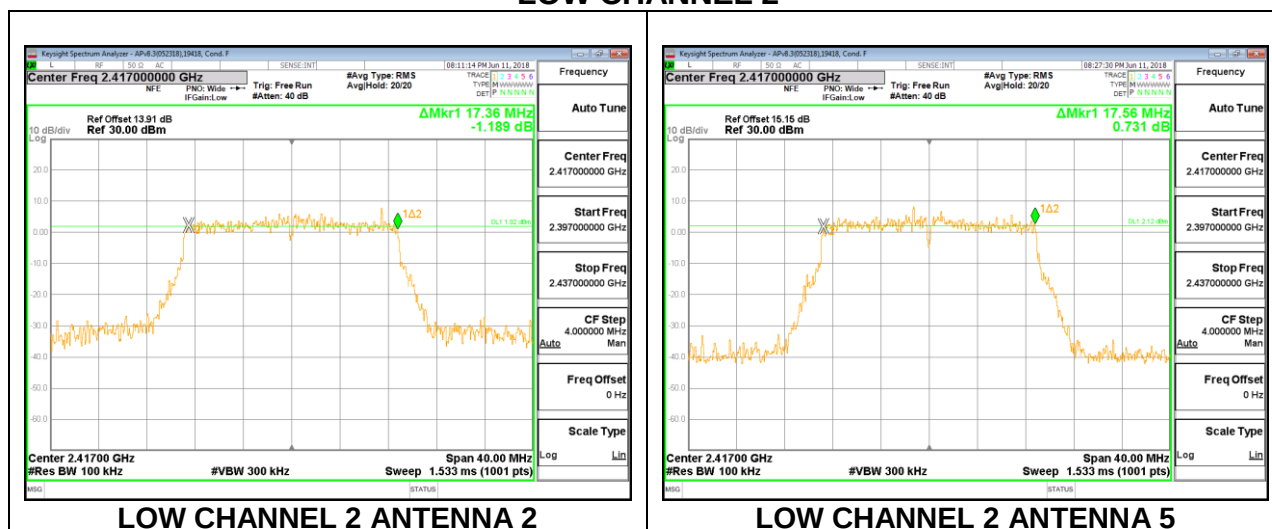
8.3.3. 2TX Antenna 2 + Antenna 5 CDD MODE

Channel	Frequency (MHz)	6 dB BW ANT 2 (MHz)	6 dB BW ANT 5 (MHz)	Minimum Limit (MHz)
Low 1	2412	17.1600	17.6000	0.5
Low 2	2417	17.3600	17.5600	0.5
Low 3	2422	17.6400	17.5600	0.5
Low 4	2427	17.6400	17.6000	0.5
Mid 6	2437	17.5600	17.6000	0.5
High 8	2447	17.3600	17.6000	0.5
High 9	2452	17.3200	17.2000	0.5
High 10	2457	17.5600	17.6400	0.5
High 11	2462	17.6000	17.7200	0.5
High 12	2467	17.6000	17.6000	0.5
High 13	2472	17.6000	17.6000	0.5

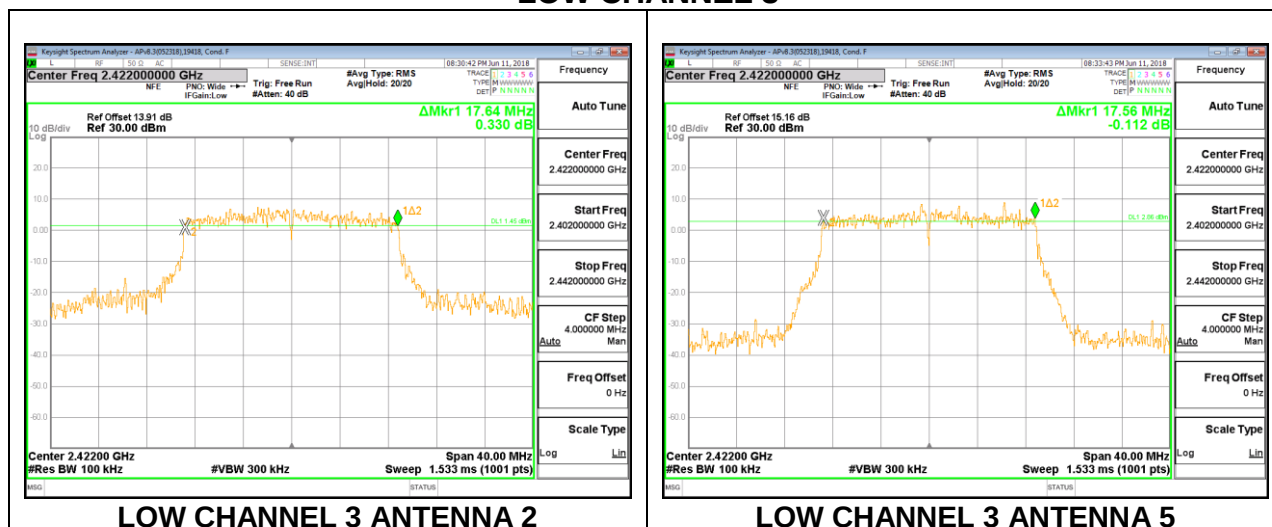
LOW CHANNEL 1



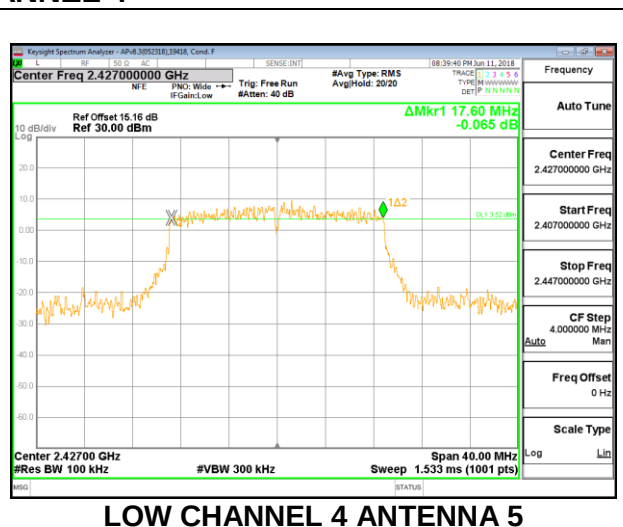
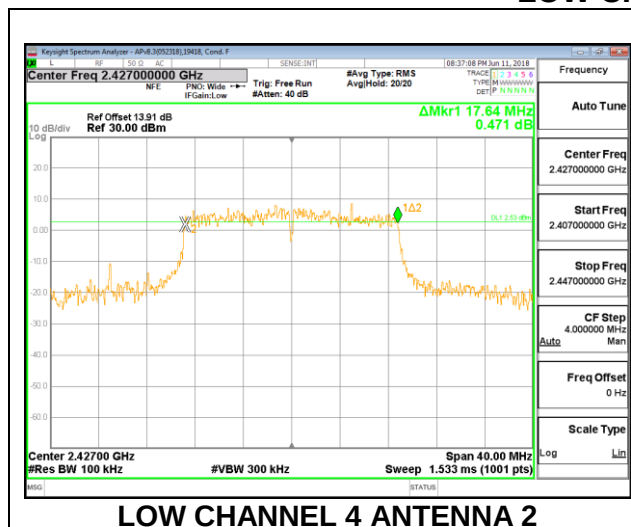
LOW CHANNEL 2



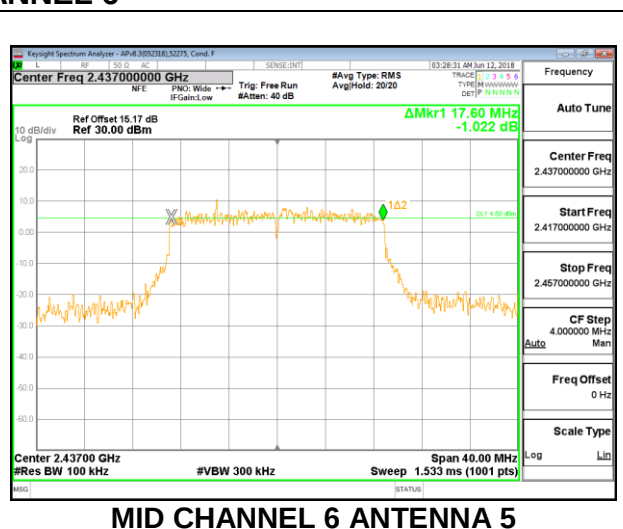
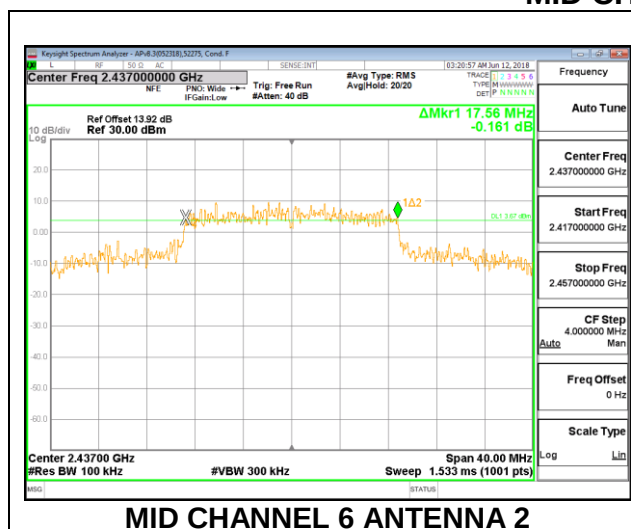
LOW CHANNEL 3



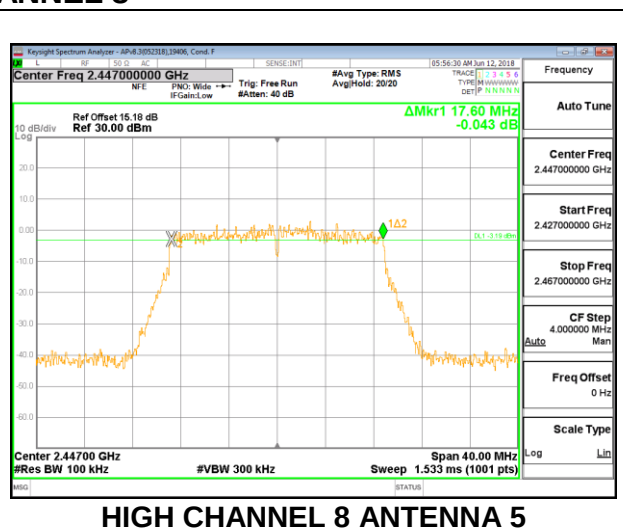
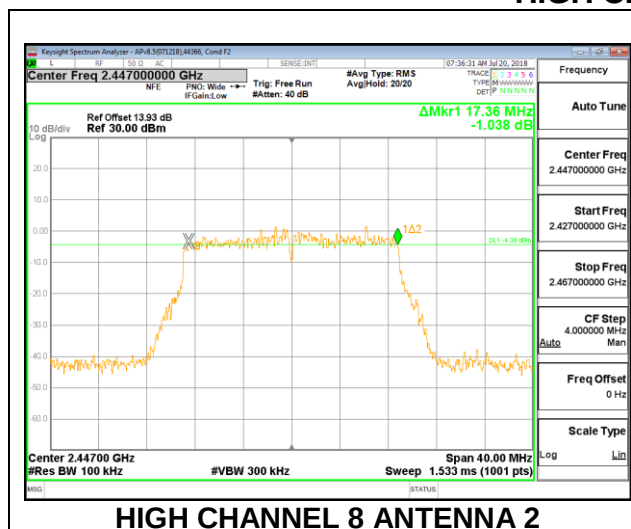
LOW CHANNEL 4



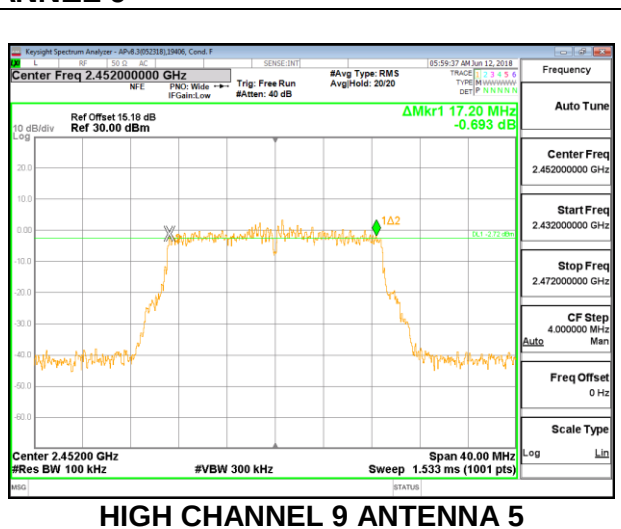
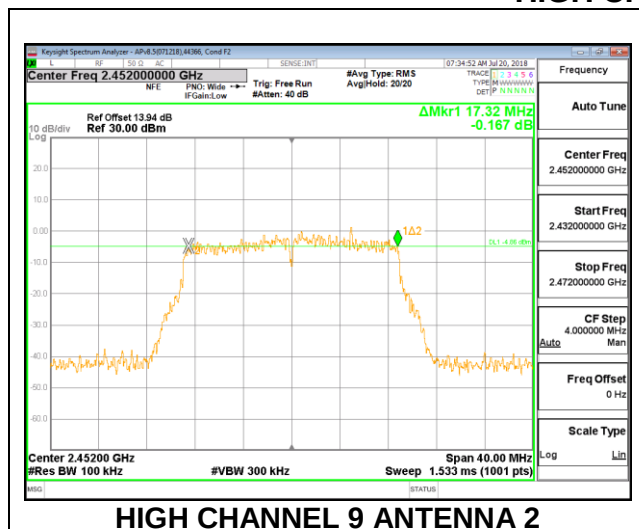
MID CHANNEL 6



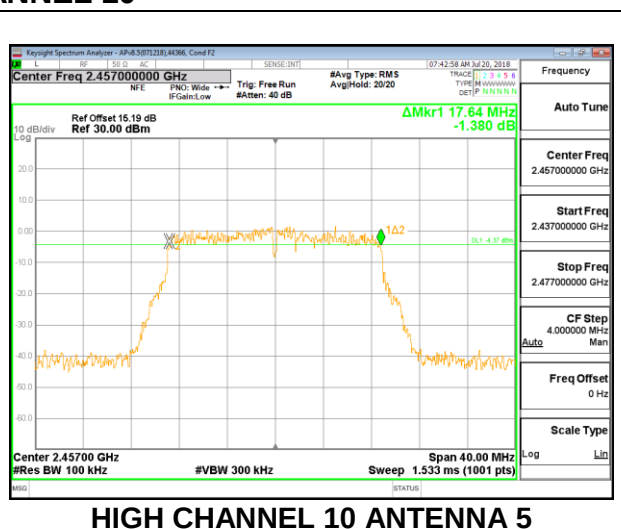
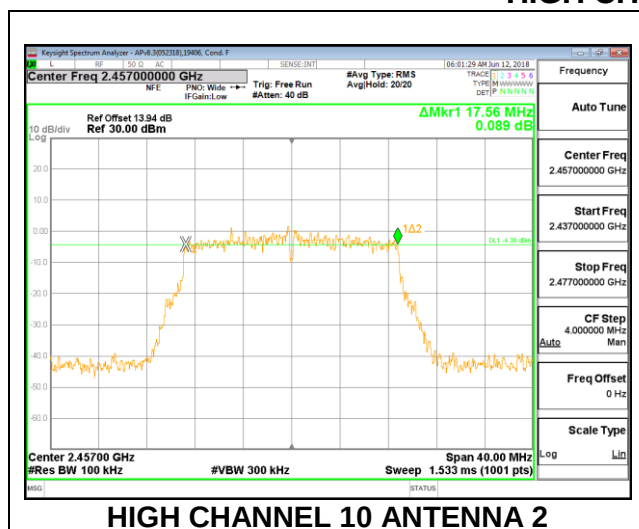
HIGH CHANNEL 8



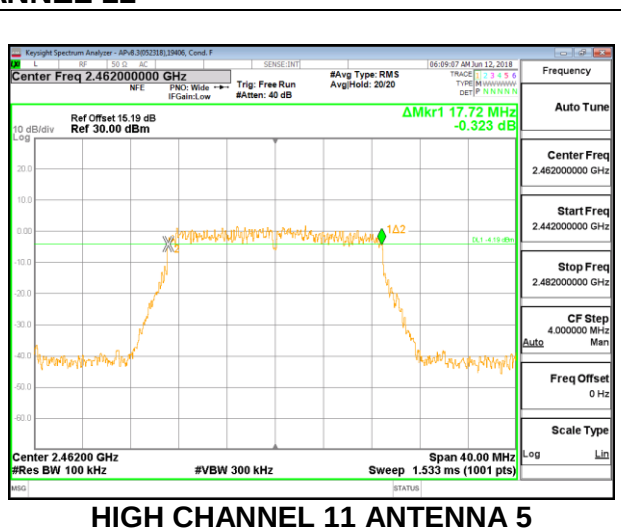
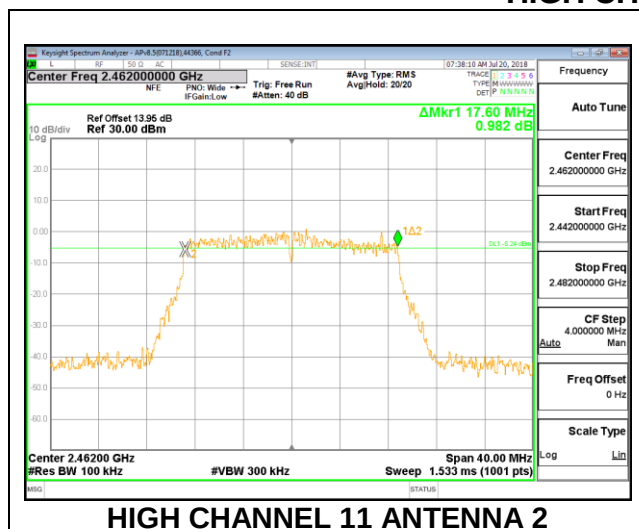
HIGH CHANNEL 9



HIGH CHANNEL 10



HIGH CHANNEL 11



The figure consists of two side-by-side screenshots of the Keysight Spectrum Analyzer software interface. Both screenshots show a power spectrum plot with a peak at 2.467 GHz. The left screenshot is for 'HIGH CHANNEL 12 ANTENNA 2' and the right is for 'HIGH CHANNEL 12 ANTENNA 5'. Both show a power level of 17.60 MHz. The left antenna has a power level of -1.385 dB and the right antenna has a power level of -2.232 dB.

Left Screenshot (HIGH CHANNEL 12 ANTENNA 2):

- Center Freq: 2.467000000 GHz
- Ref Offset: 13.95 dB
- Ref: 30.00 dBm
- ΔMkr1 17.60 MHz
- 1.385 dB
- Center Freq: 2.467000000 GHz
- Start Freq: 2.447000000 GHz
- Stop Freq: 2.487000000 GHz
- CF Step: 4.000000 MHz
- Man
- Auto
- Freq Offset: 0 Hz
- Scale Type: Log
- Center 2.46700 GHz
- #Res BW 100 kHz
- #VBW 300 kHz
- Sweep 1.533 ms (1001 pts)

Right Screenshot (HIGH CHANNEL 12 ANTENNA 5):

- Center Freq: 2.467000000 GHz
- Ref Offset: 15.19 dB
- Ref: 30.00 dBm
- ΔMkr1 17.60 MHz
- 2.232 dB
- Center Freq: 2.467000000 GHz
- Start Freq: 2.447000000 GHz
- Stop Freq: 2.487000000 GHz
- CF Step: 4.000000 MHz
- Man
- Auto
- Freq Offset: 0 Hz
- Scale Type: Log
- Center 2.46700 GHz
- #Res BW 100 kHz
- #VBW 300 kHz
- Sweep 1.533 ms (1001 pts)

Figure 10 displays two plots of the frequency response of the antennas. The left plot shows the response for High Channel 13 Antenna 2, and the right plot shows the response for High Channel 13 Antenna 5. Both plots show a bandpass filter response centered at 2.472 GHz. The left plot has a peak gain of 17.60 dBm, while the right plot has a peak gain of 17.60 dBm - 0.034 dB. Both plots show a 40 MHz span and 300 kHz resolution bandwidth.

8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

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.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power.

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:

Tx chains are uncorrelated for power and correlated for PSD due to the device supporting CDD in all MIMO modes. The directional gains are as follows:

Band (GHz)	ANT 2 Antenna Gain (dBi)	ANT 5 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.4	-2.80	-4.90	-3.72	-0.78

RESULTS

ID:	30554	Date:	7/27/2018
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8.4.1. 802.11b MODE

1TX Antenna 2 MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-2.80	30.00	30	36	30.00
Low 2	2417	-2.80	30.00	30	36	30.00
Mid 6	2437	-2.80	30.00	30	36	30.00
High 11	2462	-2.80	30.00	30	36	30.00
High 12	2467	-2.80	30.00	30	36	30.00
High 13	2472	-2.80	30.00	30	36	30.00

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

Channel	Frequency (MHz)	ANT 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	20.36	20.36	30.00	-9.64
Low 2	2417	21.59	21.59	30.00	-8.41
Mid 6	2437	21.65	21.65	30.00	-8.35
High 11	2462	21.61	21.61	30.00	-8.39
High 12	2467	20.44	20.44	30.00	-9.56
High 13	2472	18.93	18.93	30.00	-11.07

1TX Antenna 5 MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-4.90	30.00	30	36	30.00
Low 2	2417	-4.90	30.00	30	36	30.00
Mid 6	2437	-4.90	30.00	30	36	30.00
High 11	2462	-4.90	30.00	30	36	30.00
High 12	2467	-4.90	30.00	30	36	30.00
High 13	2472	-4.90	30.00	30	36	30.00

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

Channel	Frequency (MHz)	ANT 5 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	20.41	20.41	30.00	-9.59
Low 2	2417	21.80	21.80	30.00	-8.20
Mid 6	2437	21.91	21.91	30.00	-8.09
High 11	2462	21.86	21.86	30.00	-8.14
High 12	2467	20.33	20.33	30.00	-9.67
High 13	2472	18.93	18.93	30.00	-11.07

8.4.2. 802.11n HT20 MODE

1TX Antenna 2 MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-2.80	30.00	30	36	30.00
Low 2	2417	-2.80	30.00	30	36	30.00
Low 3	2422	-2.80	30.00	30	36	30.00
Mid 6	2437	-2.80	30.00	30	36	30.00
High 9	2452	-2.80	30.00	30	36	30.00
High 10	2457	-2.80	30.00	30	36	30.00
High 11	2462	-2.80	30.00	30	36	30.00
High 12	2467	-2.80	30.00	30	36	30.00
High 13	2472	-2.80	30.00	30	36	30.00

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

Channel	Frequency (MHz)	ANT 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	17.41	17.41	30.00	-12.59
Low 2	2417	19.38	19.38	30.00	-10.62
Low 3	2422	21.40	21.40	30.00	-8.60
Mid 6	2437	21.47	21.47	30.00	-8.53
High 9	2452	21.38	21.38	30.00	-8.62
High 10	2457	19.45	19.45	30.00	-10.55
High 11	2462	17.39	17.39	30.00	-12.61
High 12	2467	15.47	15.47	30.00	-14.53
High 13	2472	7.93	7.93	30.00	-22.07

1TX Antenna 5 MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-4.90	30.00	30	36	30.00
Low 2	2417	-4.90	30.00	30	36	30.00
Low 3	2422	-4.90	30.00	30	36	30.00
Mid 6	2437	-4.90	30.00	30	36	30.00
High 9	2452	-4.90	30.00	30	36	30.00
High 10	2457	-4.90	30.00	30	36	30.00
High 11	2462	-4.90	30.00	30	36	30.00
High 12	2467	-4.90	30.00	30	36	30.00
High 13	2472	-4.90	30.00	30	36	30.00

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

Channel	Frequency (MHz)	ANT 5 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	17.39	17.39	30.00	-12.61
Low 2	2417	19.42	19.42	30.00	-10.58
Low 3	2422	21.37	21.37	30.00	-8.63
Mid 6	2437	21.45	21.45	30.00	-8.55
High 9	2452	21.31	21.31	30.00	-8.69
High 10	2457	19.42	19.42	30.00	-10.58
High 11	2462	17.44	17.44	30.00	-12.56
High 12	2467	15.43	15.43	30.00	-14.57
High 13	2472	7.97	7.97	30.00	-22.03

8.4.3. 2TX Antenna 2 + Antenna 5 CDD MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-3.72	30.00	36	30.00
Low 2	2417	-3.72	30.00	36	30.00
Low 3	2422	-3.72	30.00	36	30.00
Low 4	2427	-3.72	30.00	36	30.00
Mid 6	2437	-3.72	30.00	36	30.00
High 8	2447	-3.72	30.00	36	30.00
High 9	2452	-3.72	30.00	36	30.00
High 10	2457	-3.72	30.00	36	30.00
High 11	2462	-3.72	30.00	36	30.00
High 12	2467	-3.72	30.00	36	30.00
High 13	2472	-3.72	30.00	36	30.00

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

Channel	Frequency (MHz)	ANT 2 Meas Power (dBm)	ANT 5 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low 1	2412	16.44	16.41	19.44	30.00	-10.56
Low 2	2417	18.43	18.39	21.42	30.00	-8.58
Low 3	2422	19.91	19.86	22.90	30.00	-7.10
Low 4	2427	21.41	21.42	24.43	30.00	-5.57
Mid 6	2437	21.44	21.48	24.47	30.00	-5.53
High 8	2447	21.39	21.43	24.42	30.00	-5.58
High 9	2452	19.88	19.92	22.91	30.00	-7.09
High 10	2457	18.43	18.46	21.46	30.00	-8.54
High 11	2462	16.44	16.47	19.47	30.00	-10.53
High 12	2467	14.41	14.39	17.41	30.00	-12.59
High 13	2472	6.95	6.97	9.97	30.00	-20.03

8.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

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

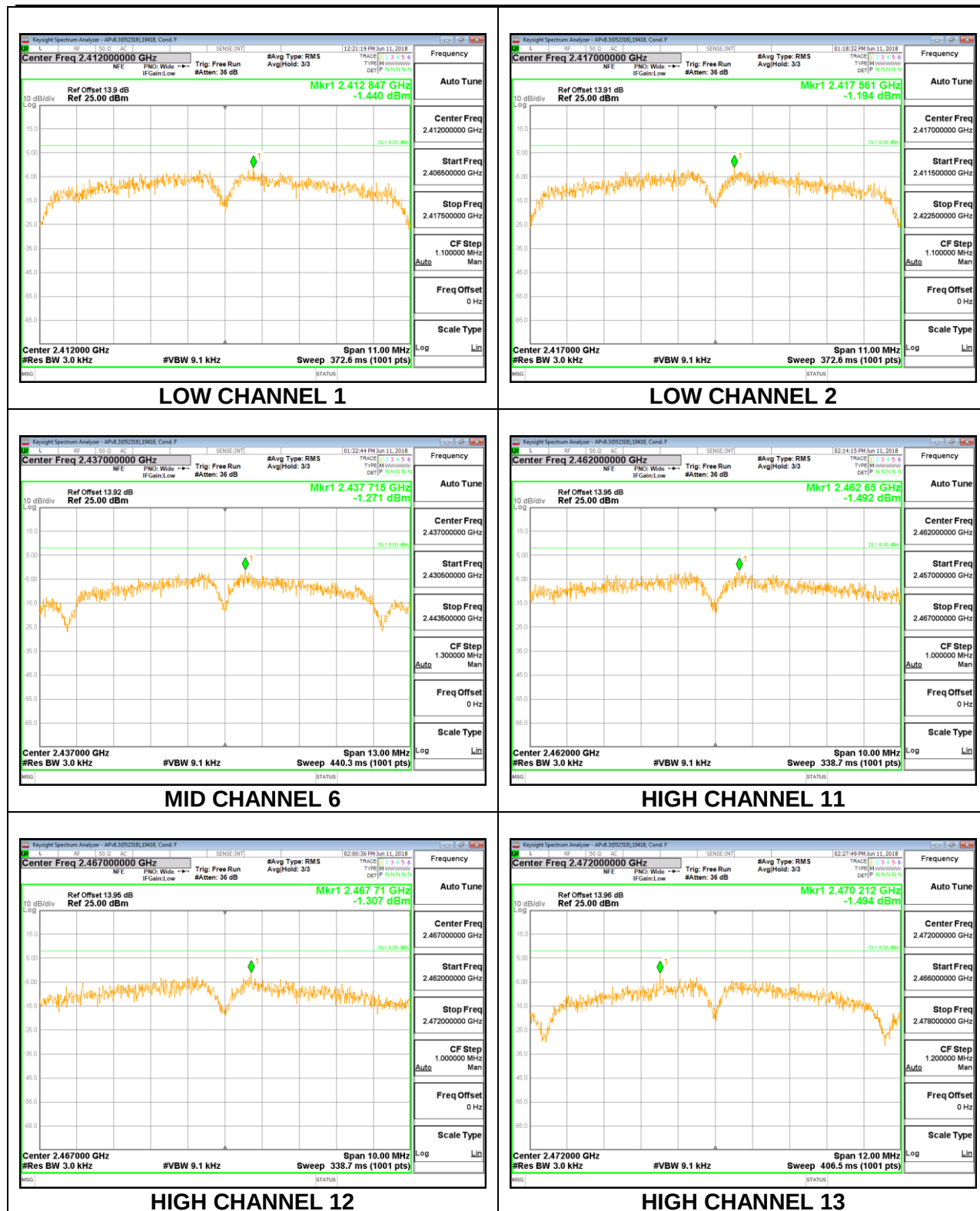
8.5.1. 802.11b MODE

1TX Antenna 2 MODE

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

Channel	Frequency (MHz)	ANT 2 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-1.44	-1.44	8.0	-9.4
Low 2	2417	-1.19	-1.19	8.0	-9.2
Mid 6	2437	-1.27	-1.27	8.0	-9.3
High 11	2462	-1.49	-1.49	8.0	-9.5
High 12	2467	-1.31	-1.31	8.0	-9.3
High 13	2472	-1.49	-1.49	8.0	-9.5



1TX Antenna 5 MODE

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

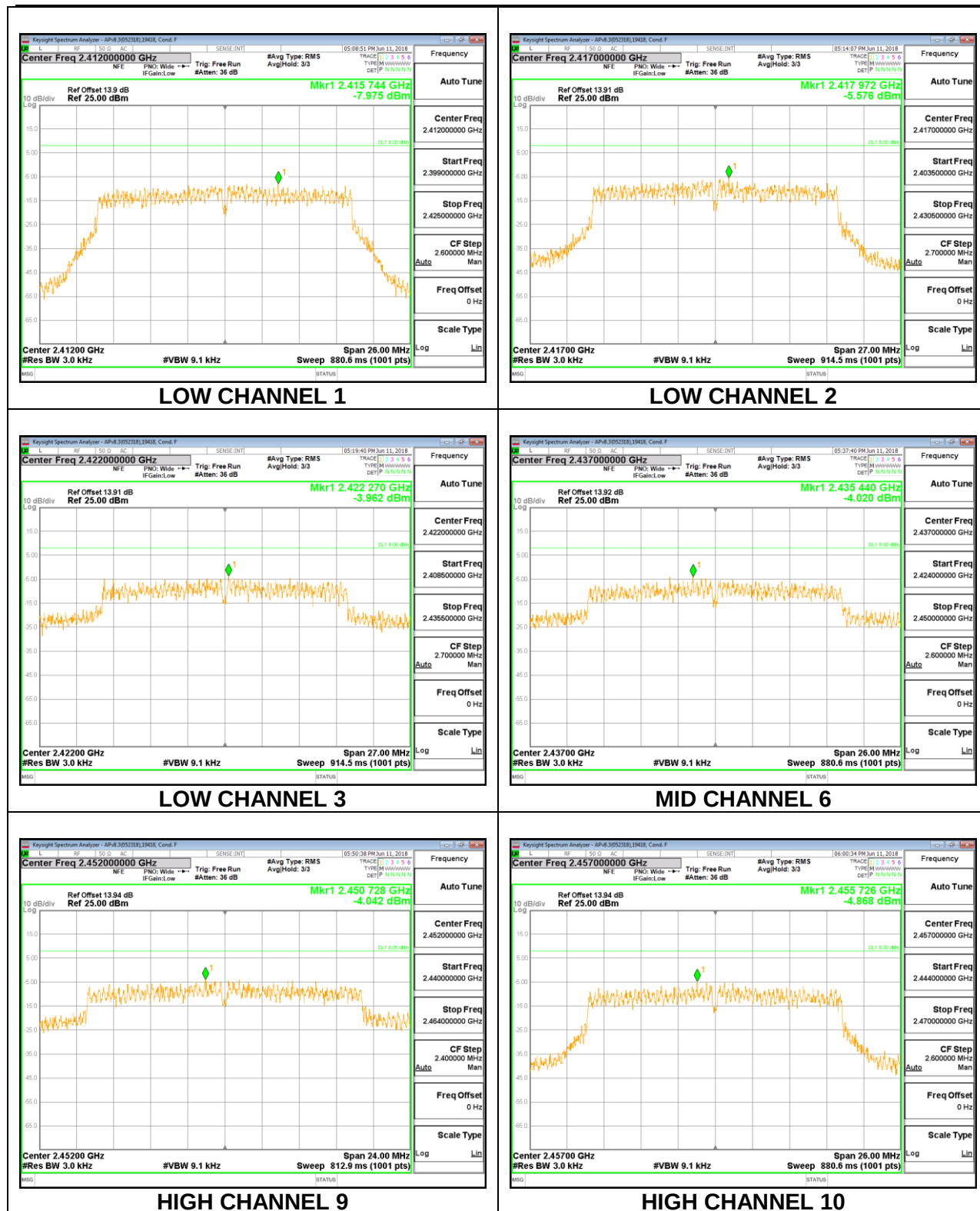
Channel	Frequency (MHz)	ANT 5 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-2.84	-2.84	8.0	-10.8
Low 2	2417	-1.24	-1.24	8.0	-9.2
Mid 6	2437	-1.26	-1.26	8.0	-9.3
High 11	2462	-1.08	-1.08	8.0	-9.1
High 12	2467	-0.93	-0.93	8.0	-8.9
High 13	2472	-3.16	-3.16	8.0	-11.2

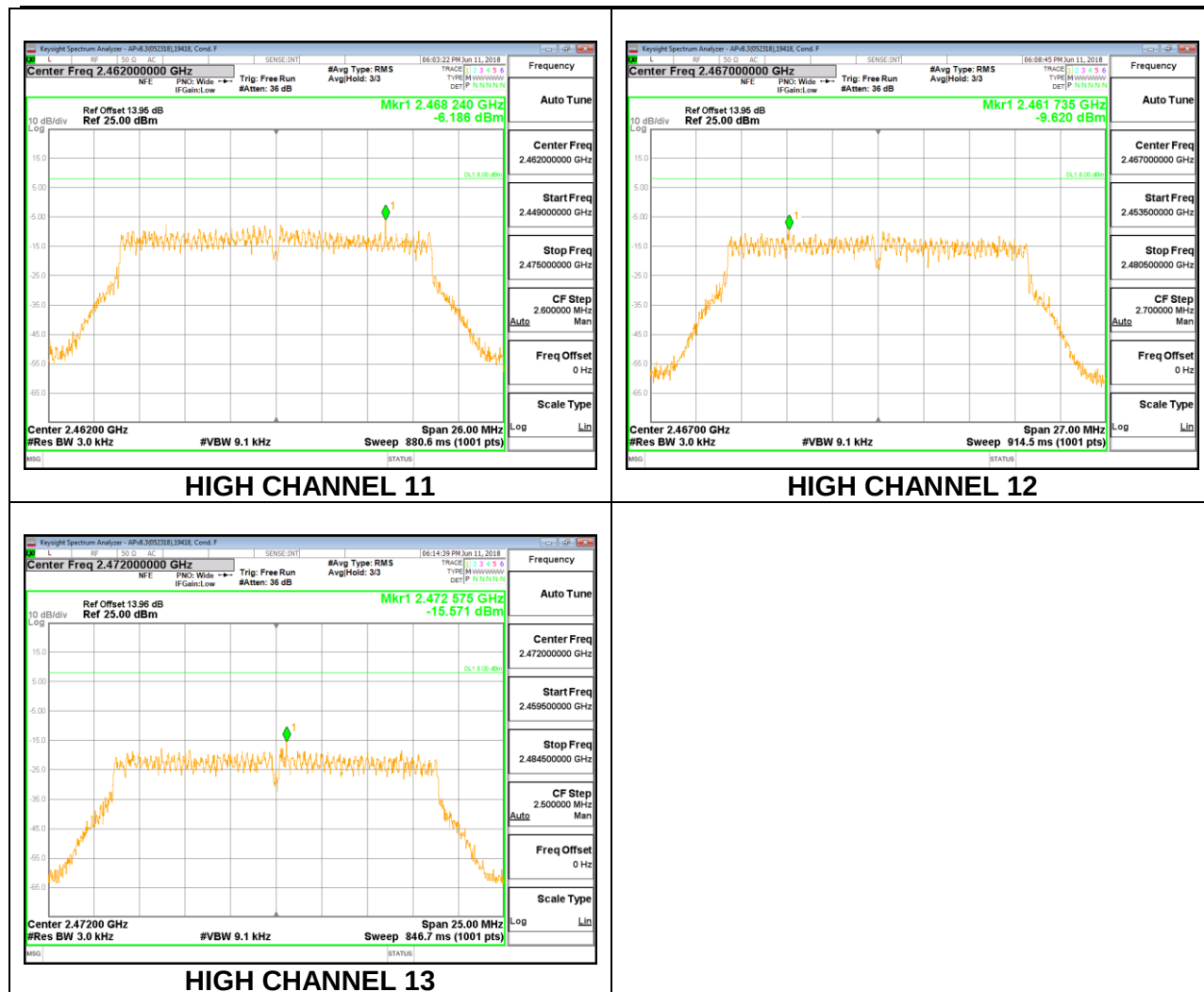


8.5.2. 802.11n HT20 MODE

1TX Antenna 2 MODE

Duty Cycle CF (dB)		0.00	Included in Calculations of Corr'd PSD		
PSD Results					
Channel	Frequency (MHz)	ANT 2 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-7.98	-7.98	8.0	-16.0
Low 2	2417	-5.58	-5.58	8.0	-13.6
Low 3	2422	-3.96	-3.96	8.0	-12.0
Mid 6	2437	-4.02	-4.02	8.0	-12.0
High 9	2452	-4.04	-4.04	8.0	-12.0
High 10	2457	-4.87	-4.87	8.0	-12.9
High 11	2462	-6.19	-6.19	8.0	-14.2
High 12	2467	-9.62	-9.62	8.0	-17.6
High 13	2472	-15.57	-15.57	8.0	-23.6



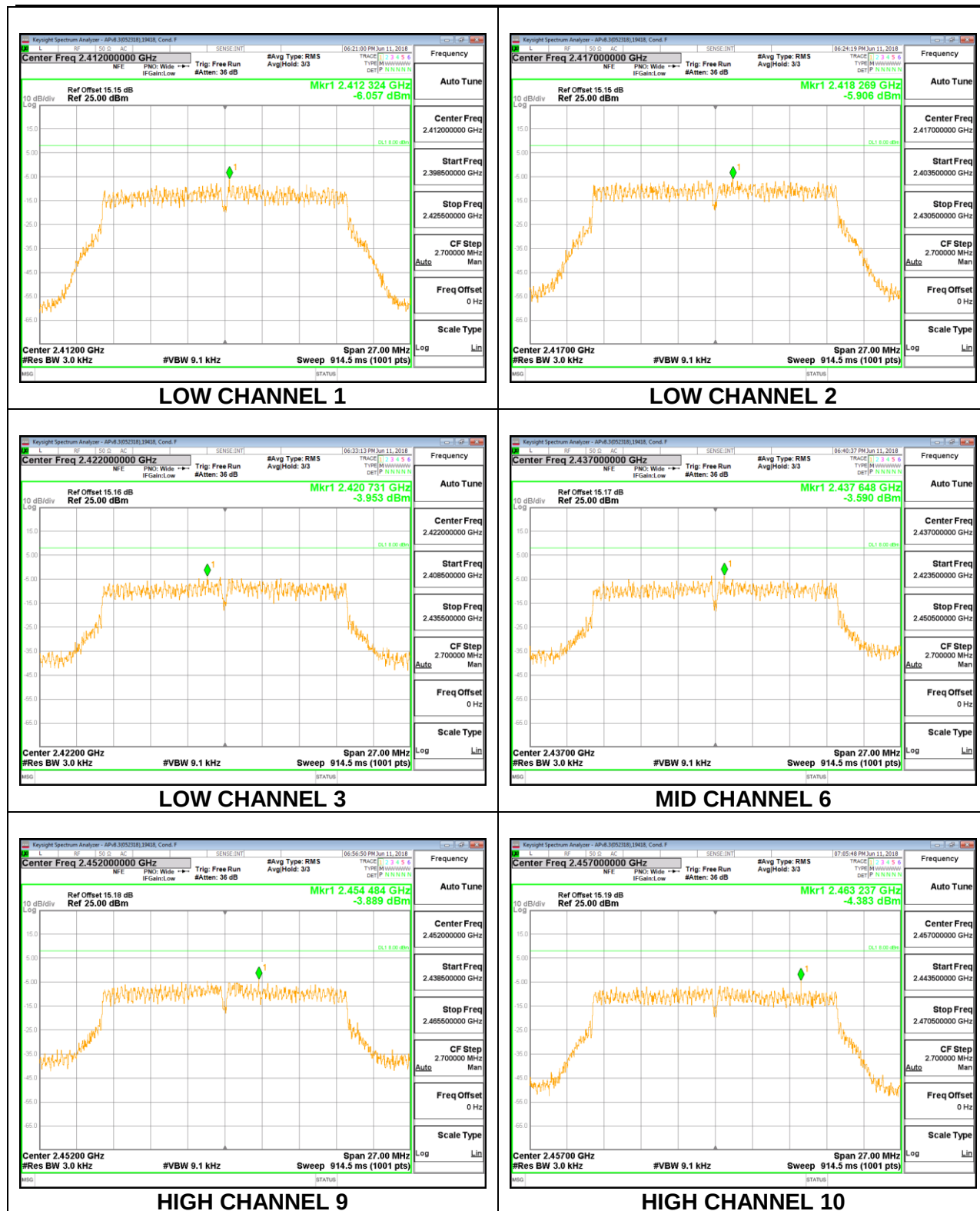


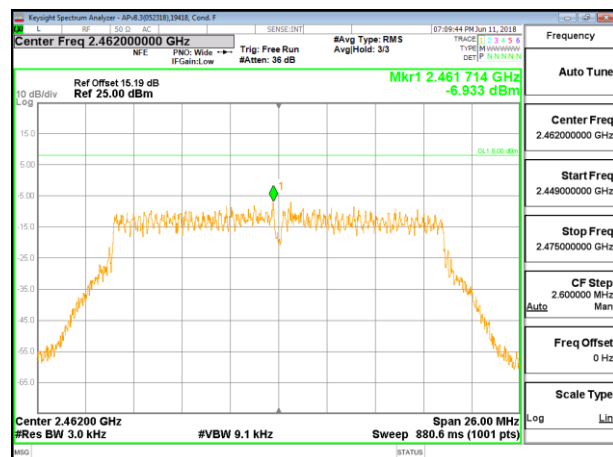
1TX Antenna 5 MODE

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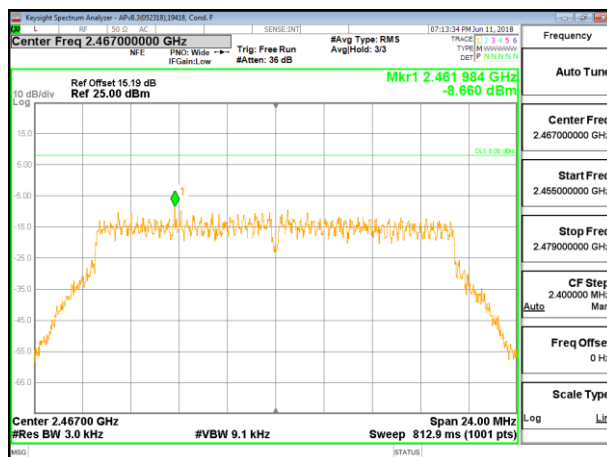
PSD Results

Channel	Frequency (MHz)	ANT 5 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-6.06	-6.06	8.0	-14.1
Low 2	2417	-5.91	-5.91	8.0	-13.9
Low 3	2422	-3.95	-3.95	8.0	-12.0
Mid 6	2437	-3.59	-3.59	8.0	-11.6
High 9	2452	-3.89	-3.89	8.0	-11.9
High 10	2457	-4.38	-4.38	8.0	-12.4
High 11	2462	-6.93	-6.93	8.0	-14.9
High 12	2467	-8.66	-8.66	8.0	-16.7
High 13	2472	-16.25	-16.25	8.0	-24.3

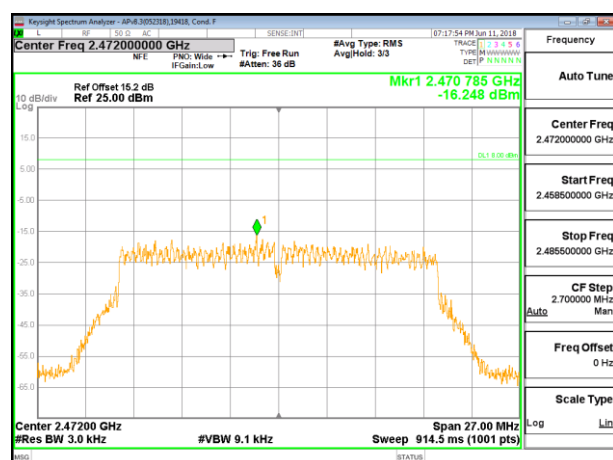




HIGH CHANNEL 11



HIGH CHANNEL 12



HIGH CHANNEL 13