

4.2 Maximum Conducted Output Power Measurement

4.2.1 Limit of Output Power

FCC

Operation Band	EUT Category		Limit
U-NII-1		Access Point(Mater Device)	1 Watt(30dBm)
		Fixed point-to-point Acess Ponit	1 Watt(30dBm)
	√	Mobile and portable client device	250mW(23.98dBm)
U-NII-2A	√		250mW(23.98dBm) or 11dBm+10 log B
U-NII-2C	√		250mW(23.98dBm) or 11dBm+10 log B
U-NII-3	√		1 W(30dBm)

If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the direction-al gain of the antenna exceeds 6 dBi.

B is the 99% emission bandwidth in megahertz.

4.2.2 Test Procedures

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.
4. Spectrum Analyzer is used as the auxiliary test equipment to conduct the output power measurement.
5. Set span to encompass the entire emission bandwidth (EBW) of the signal. Set sweep trigger to "free run.", RBW = 1 MHz, Set VBW $\geq$ 3MHz, Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$, Sweep time = auto, Detector = power averaging (rms).
6. Video filtering shall be applied to power signal (rms), it shall be set to operate on a linear voltage signal.
7. Trace average at least 100 traces in power averaging (rms) mode.
8. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.

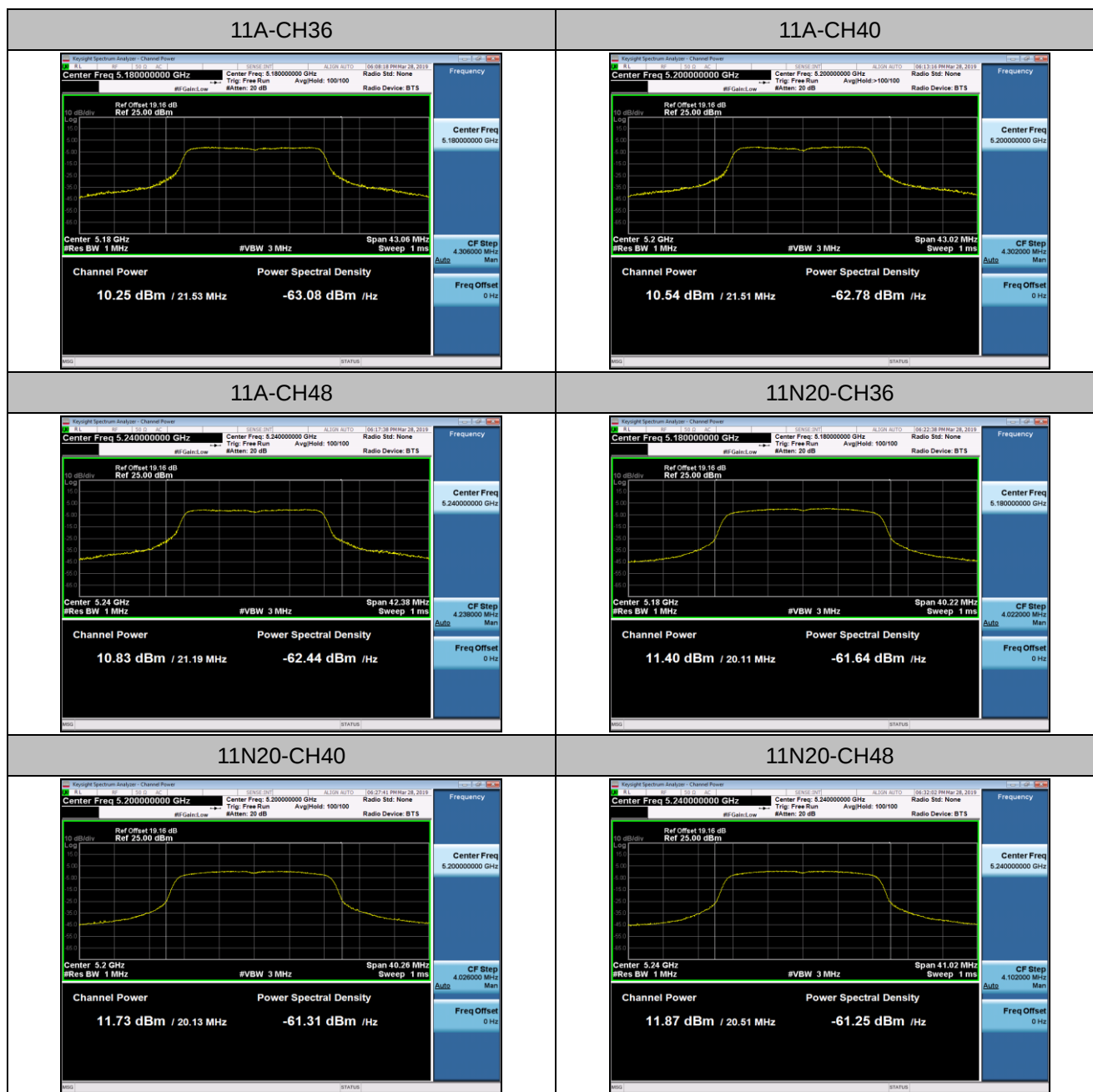
4.2.3 Test Result of Output Power

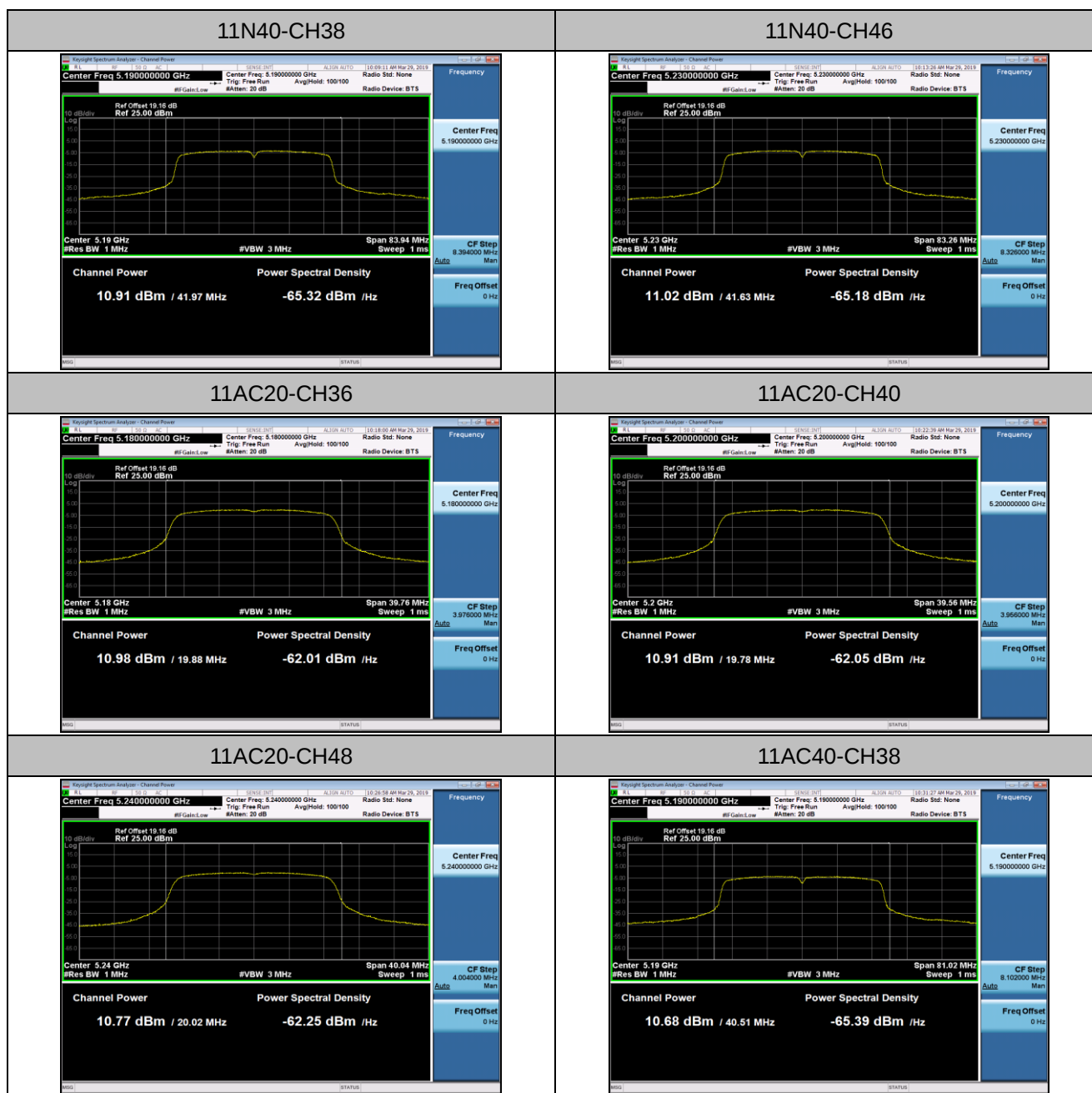
Test Mode	Band	Channel	Meas.Level [dBm]	Av.Power [dBm]	Limit[dBm]	Verdict
11a	U-NII-1	36	10.25	11.95	<=30	PASS
		40	10.54	12.55	<=30	PASS
		48	10.83	13.23	<=30	PASS
11n HT20	U-NII-1	36	11.4	11.62	<=30	PASS
		40	11.73	11.95	<=30	PASS
		48	11.87	12.09	<=30	PASS
11n HT40	U-NII-1	38	10.91	11.56	<=30	PASS
		46	11.02	11.78	<=30	PASS
11ac VHT20	U-NII-1	36	10.98	11.24	<=30	PASS
		40	10.91	11.24	<=30	PASS
		48	10.77	11.01	<=30	PASS
11ac VHT40	U-NII-1	38	10.68	11.44	<=30	PASS
		46	10.72	11.23	<=30	PASS
11ac VHT80	U-NII-1	42	10.46	11.31	<=30	PASS

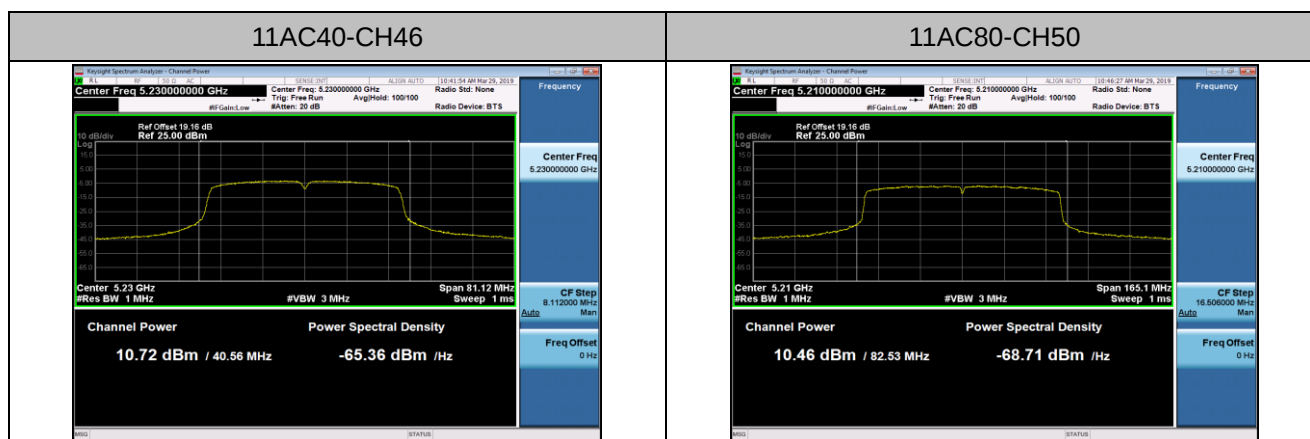
TestMode	Band	Channel	Result[dBm]	Limit[dBm]	Verdict
11a	U-NII-3	149	13.68	<=30	PASS
		157	12.03	<=30	PASS
		165	12.58	<=30	PASS
11n HT20	U-NII-3	149	12.92	<=30	PASS
		157	11.59	<=30	PASS
		165	11.52	<=30	PASS
11n HT40	U-NII-3	151	13.08	<=30	PASS
		159	11.55	<=30	PASS
11ac VHT20	U-NII-3	149	13.15	<=30	PASS
		157	11.80	<=30	PASS
		165	11.84	<=30	PASS
11ac VHT40	U-NII-3	151	13.45	<=30	PASS
		159	12.05	<=30	PASS
11ac VHT80	U-NII-3	155	12.97	<=30	PASS

Note : For U-NII-3 band the Duty Cycle Factor is compensated in the graph.

Meas.Level Plot



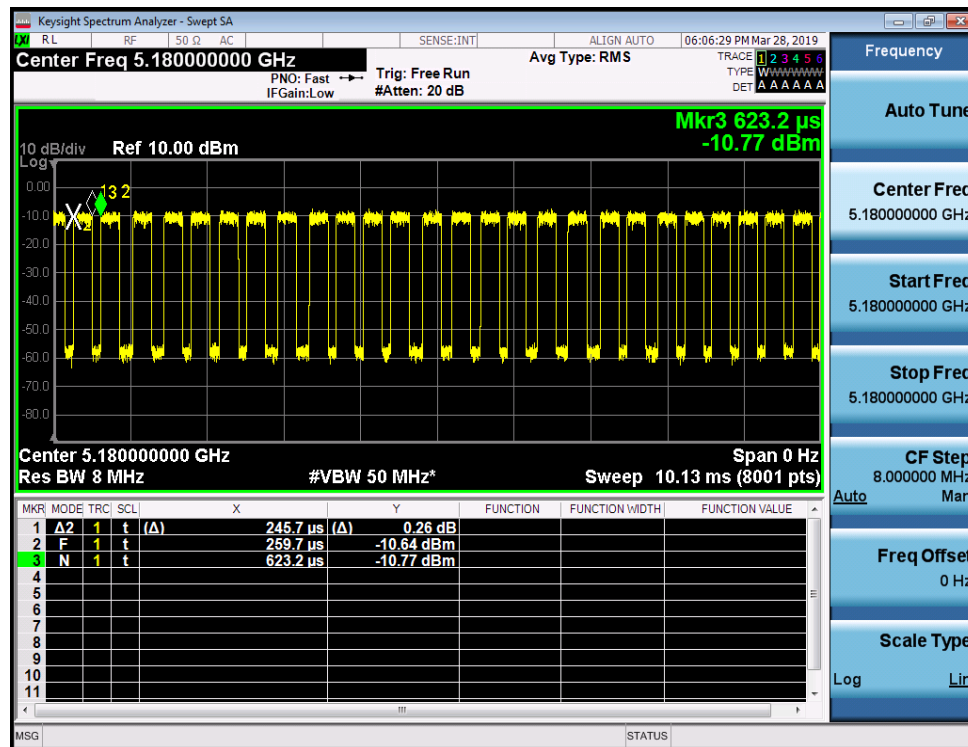




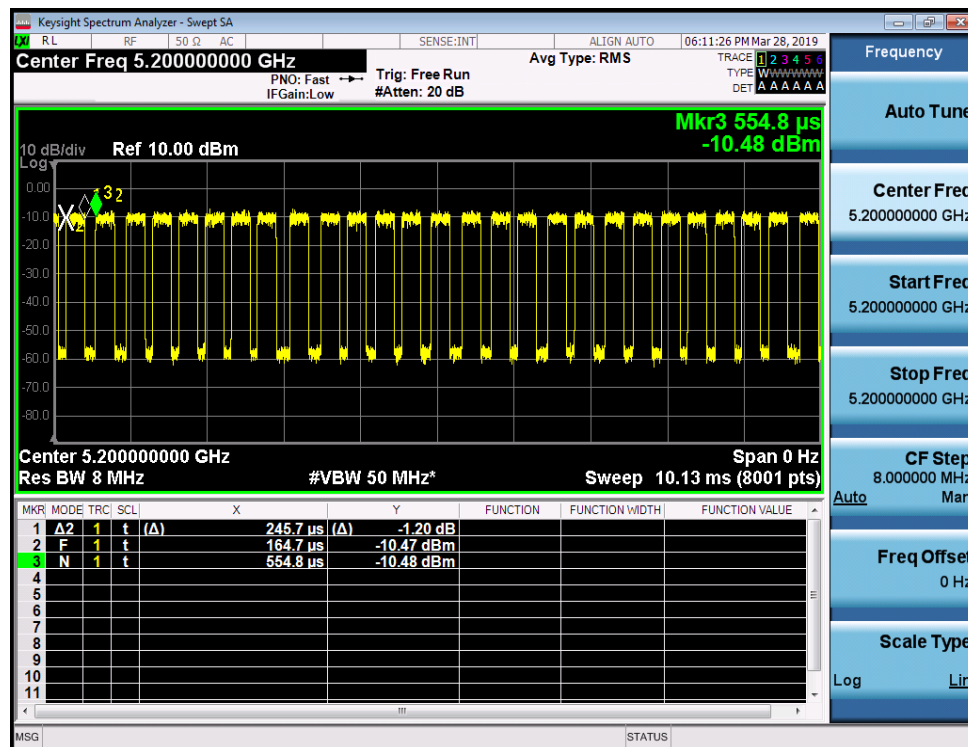
Duty cycle Plot

Graphs

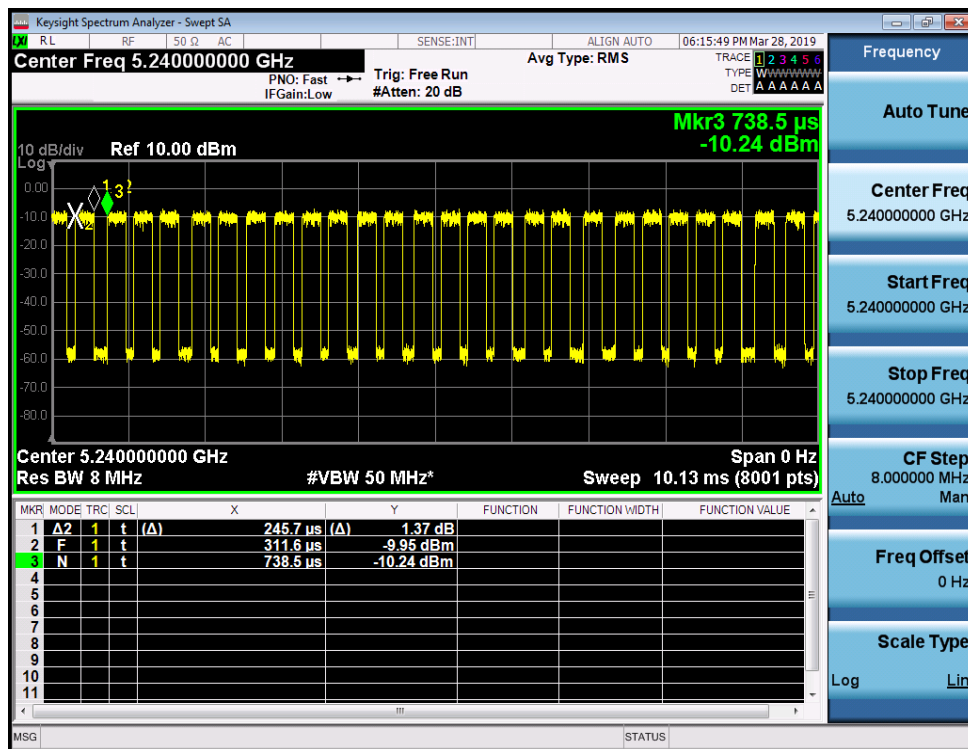
11A/CH36



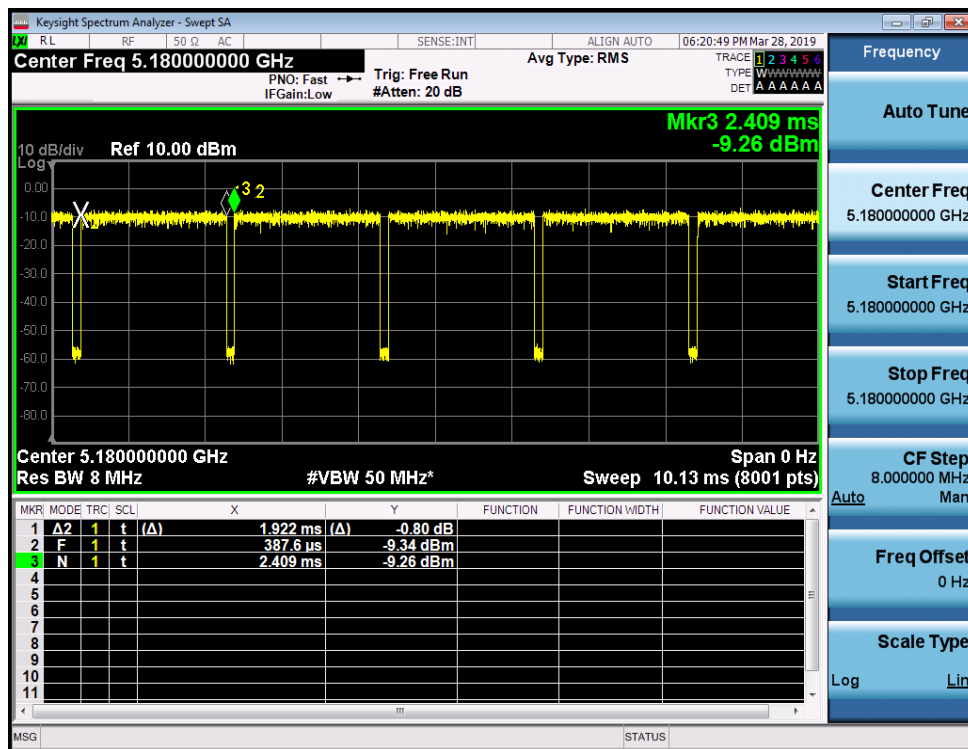
11A/CH40



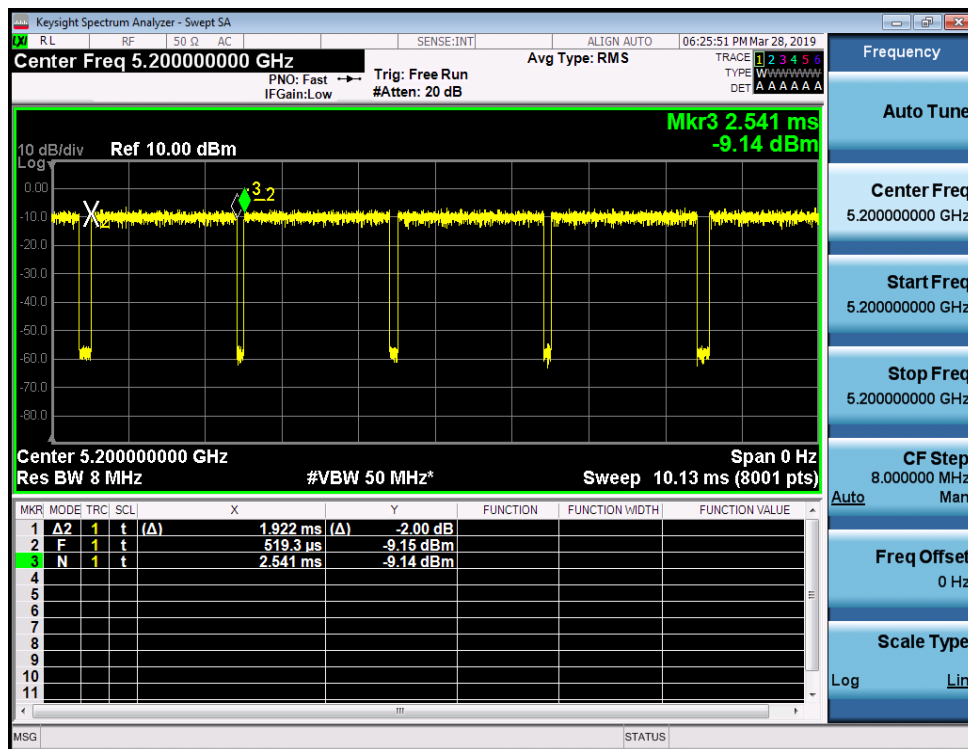
11A/CH48



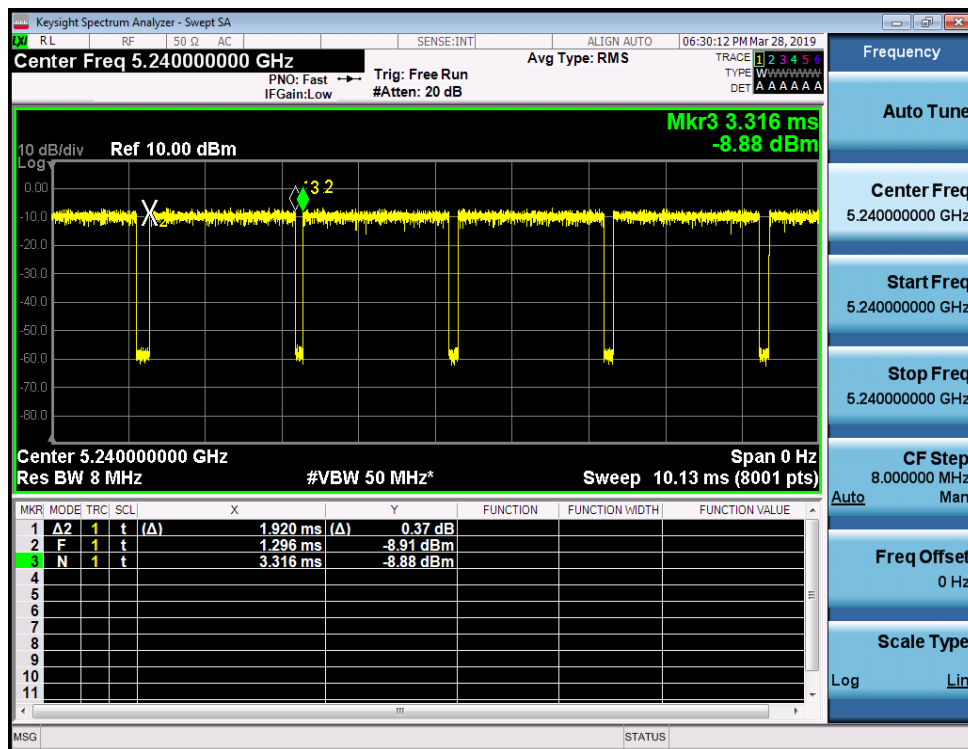
11N20/CH36



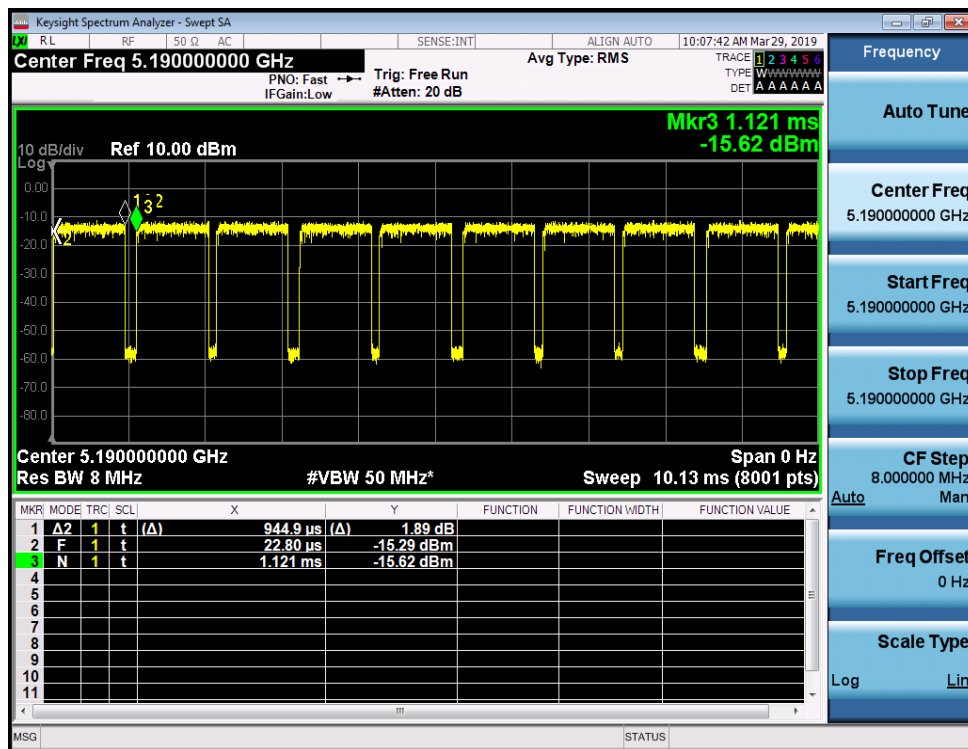
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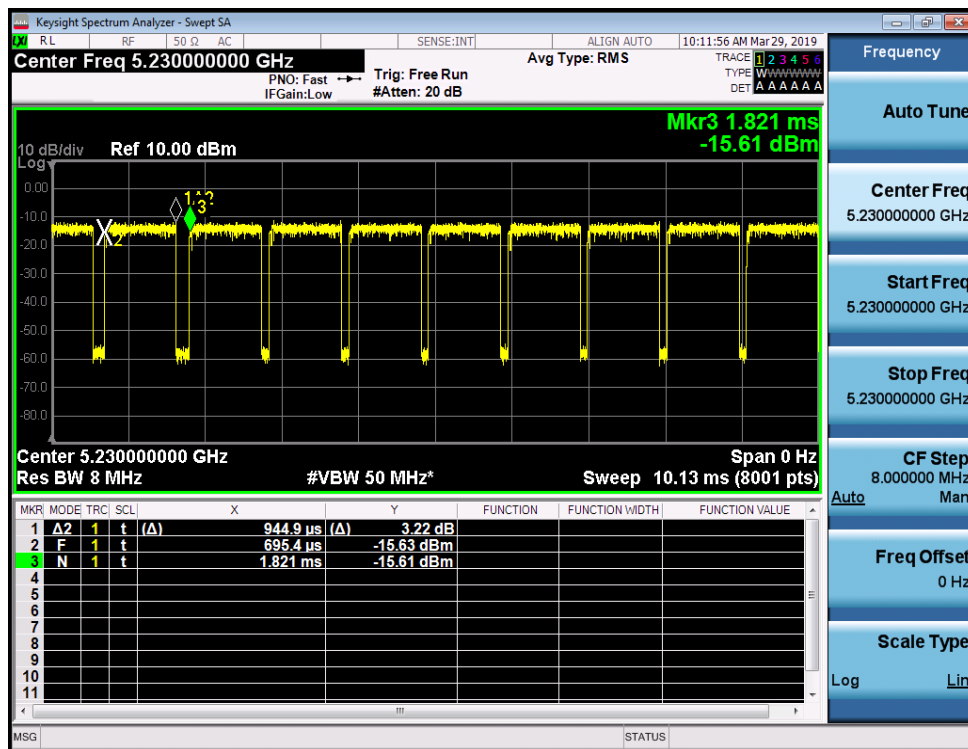
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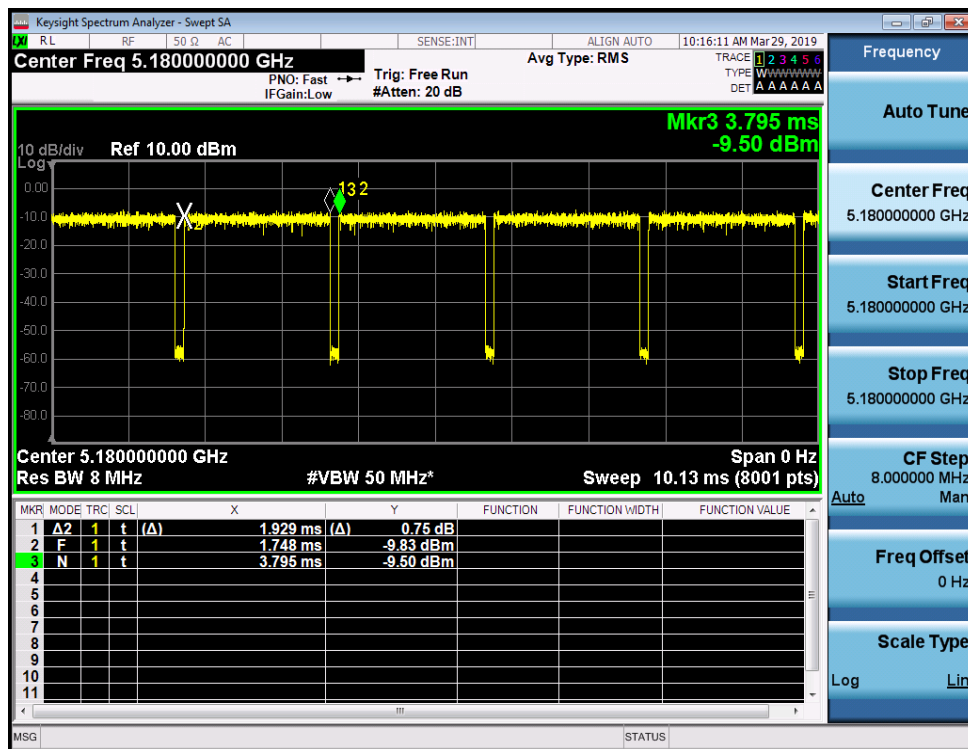
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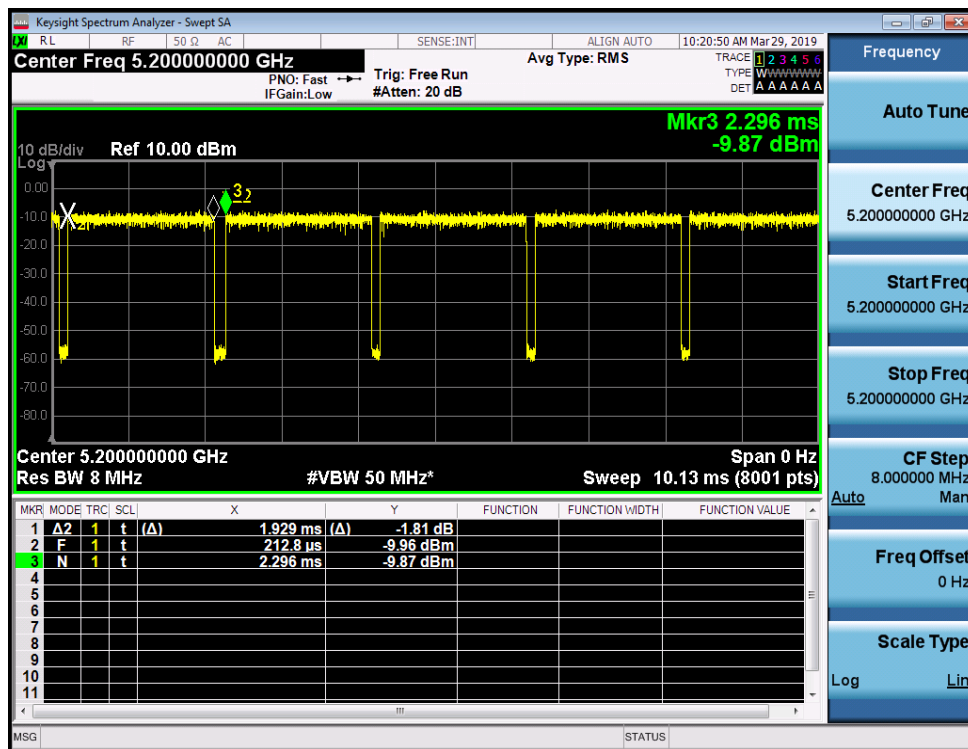
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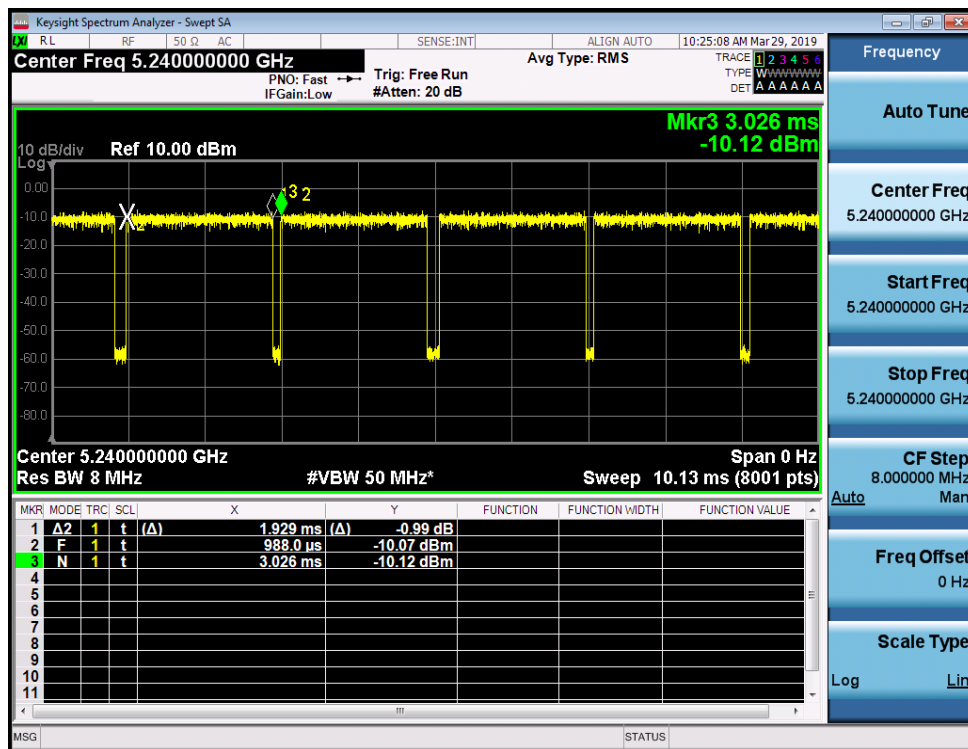
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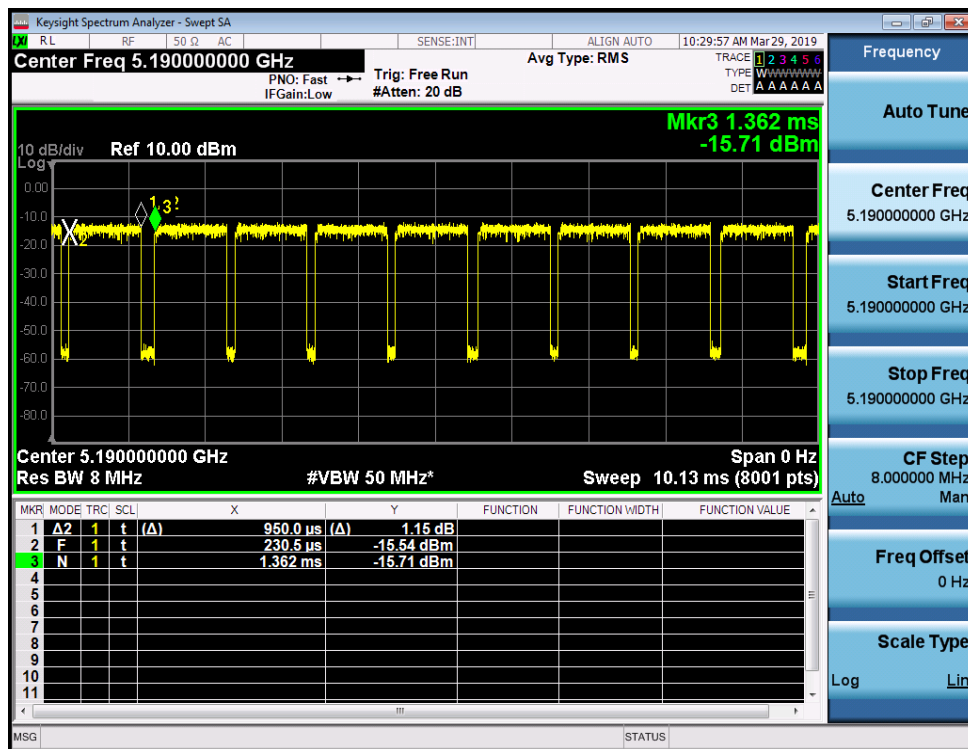
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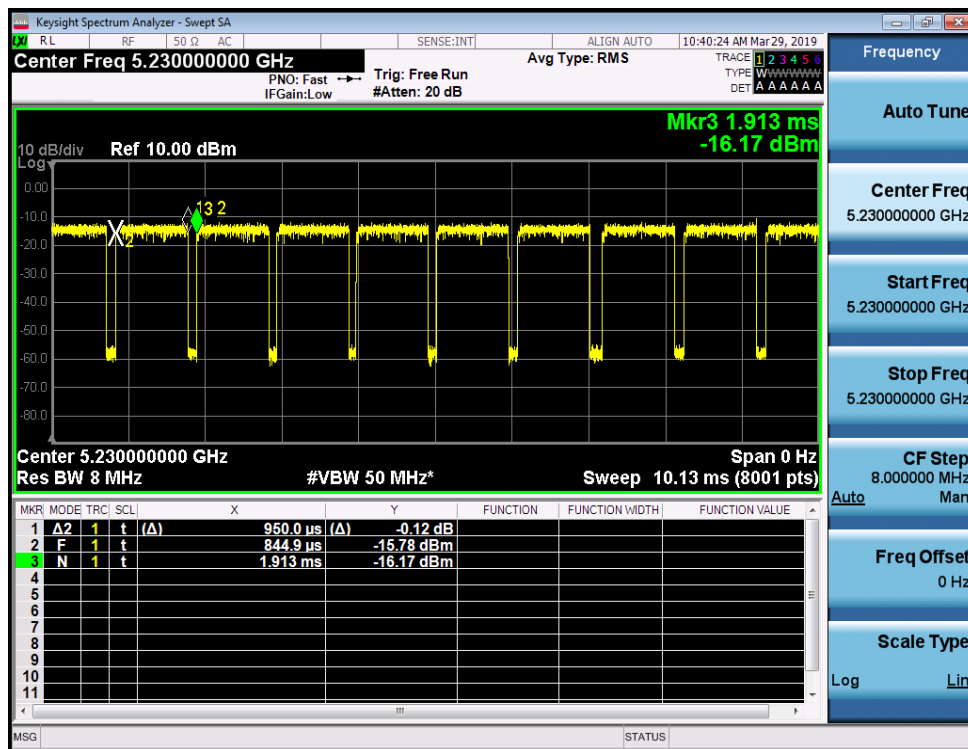
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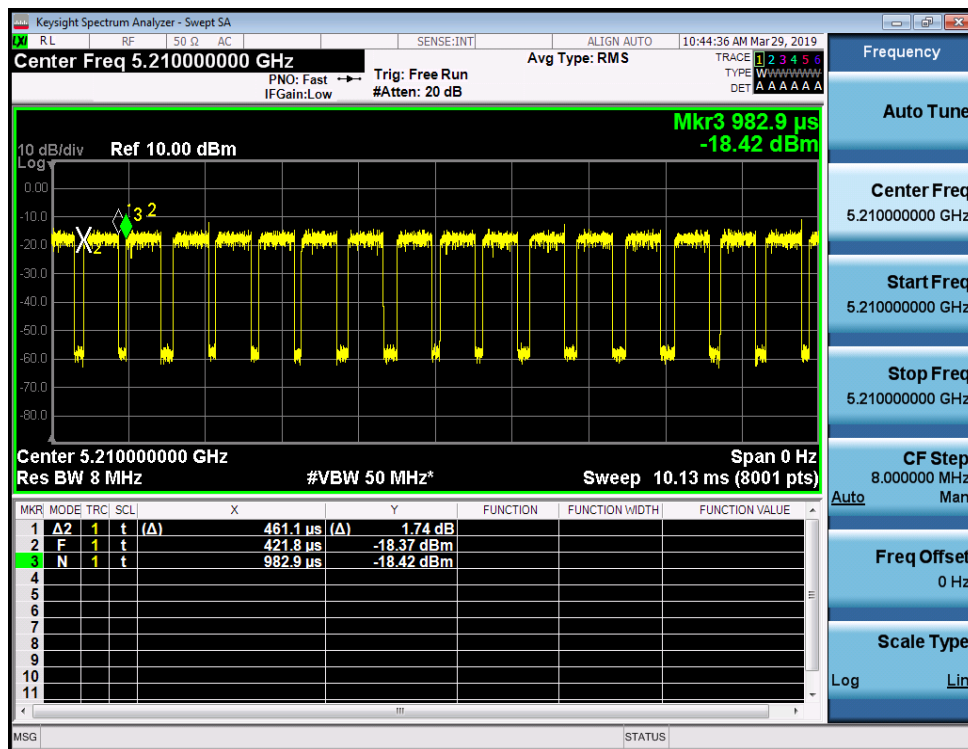
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11AC40/CH46

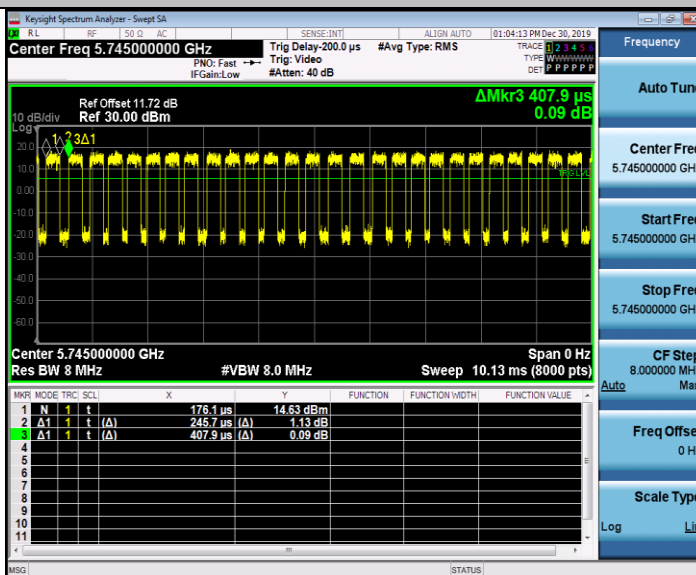


11AC80/CH42

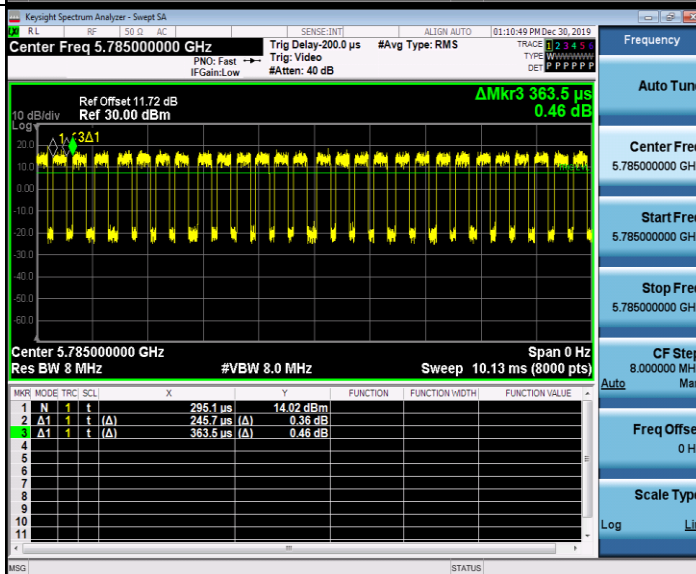


Graphs

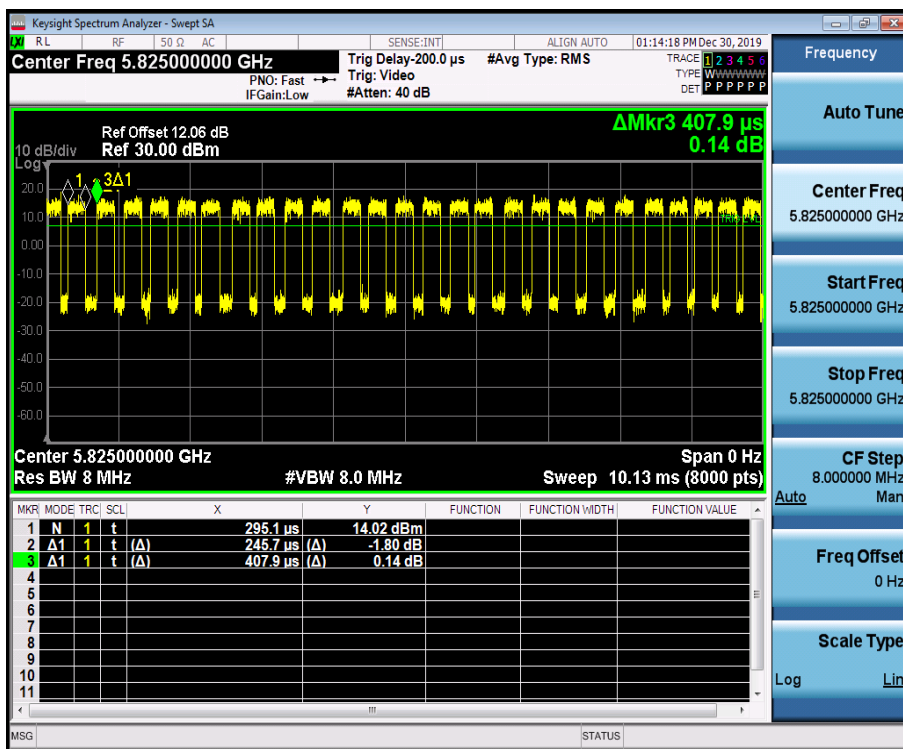
11A/CH149



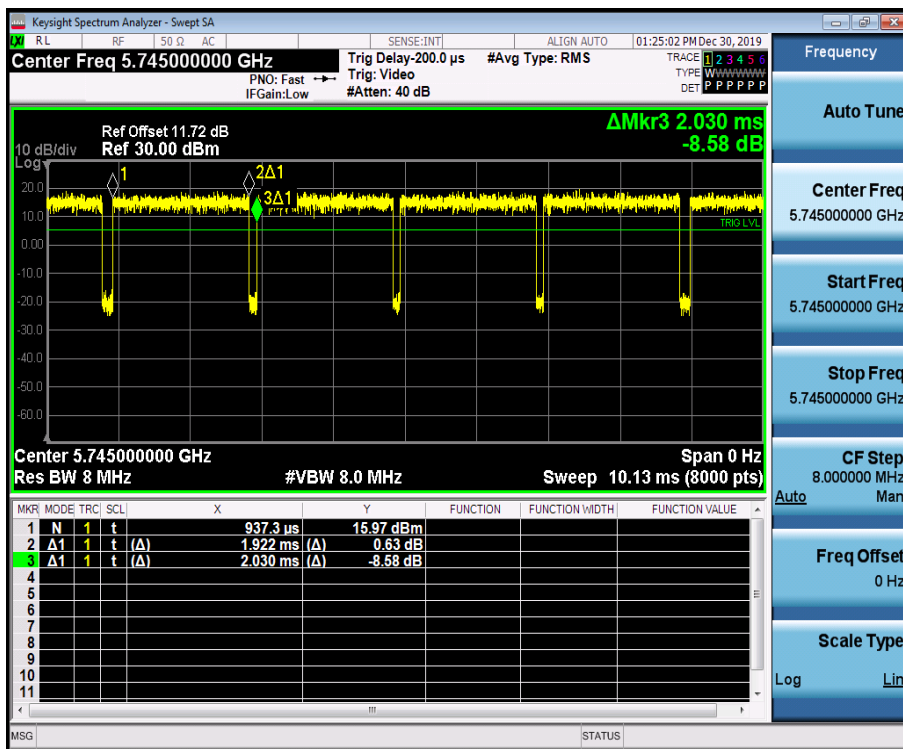
11A/CH157



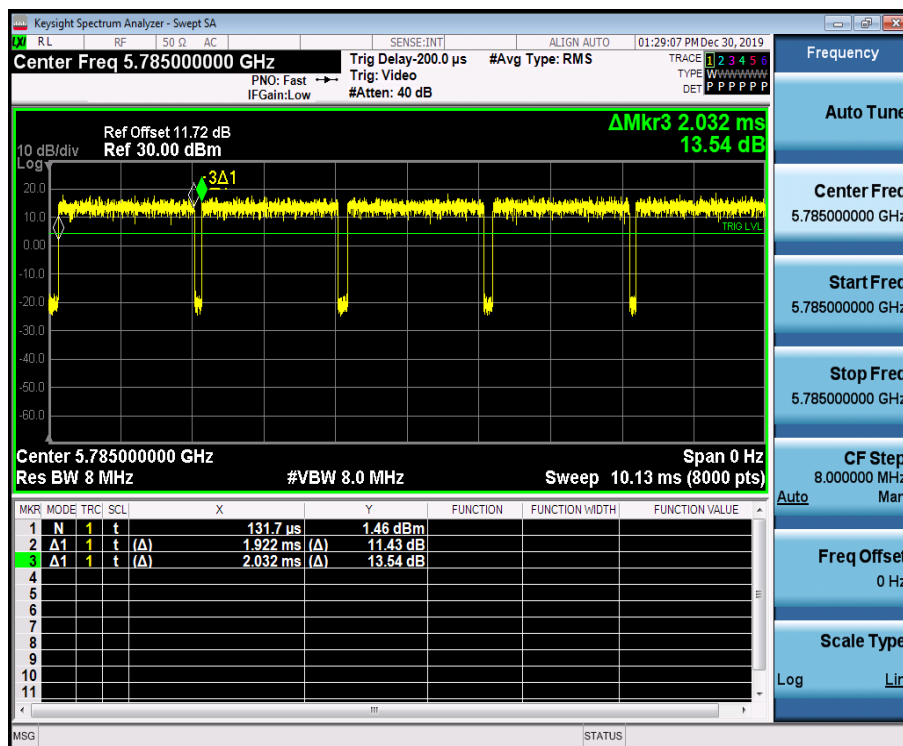
11A/CH165



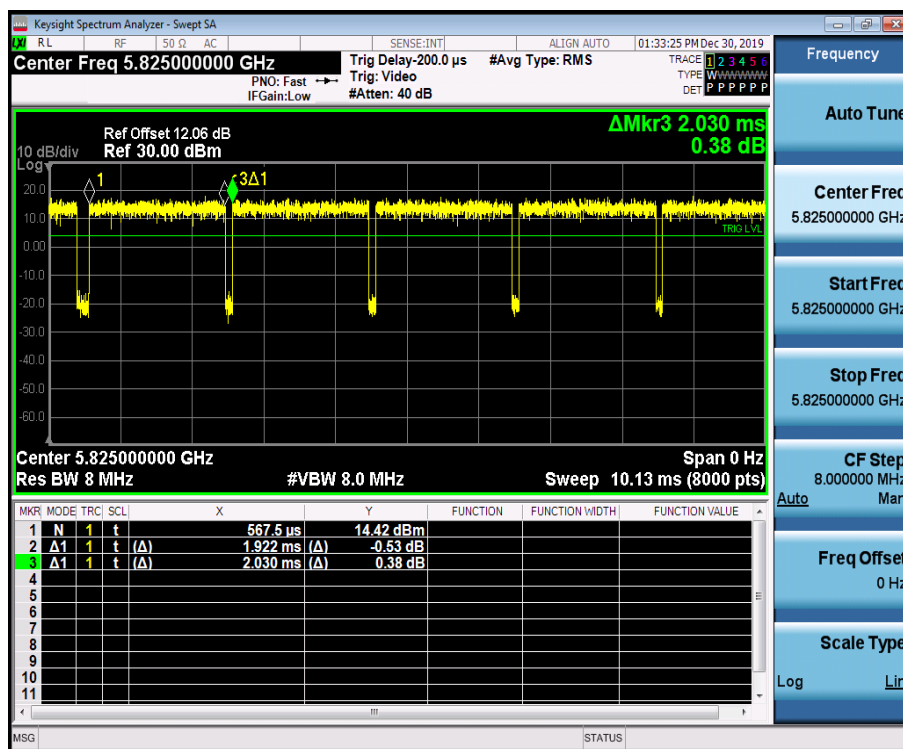
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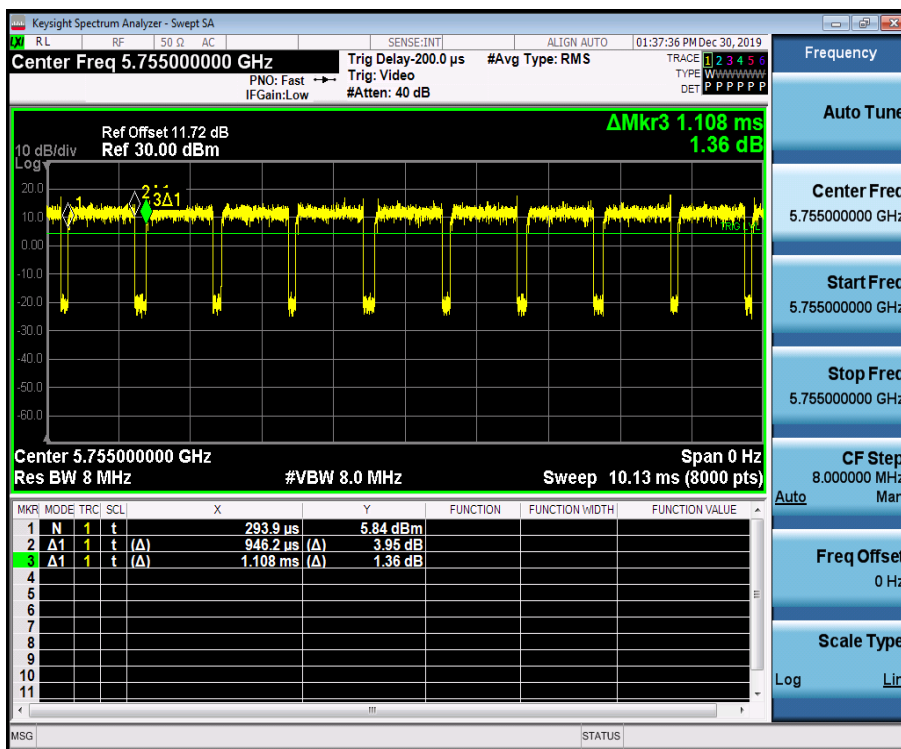
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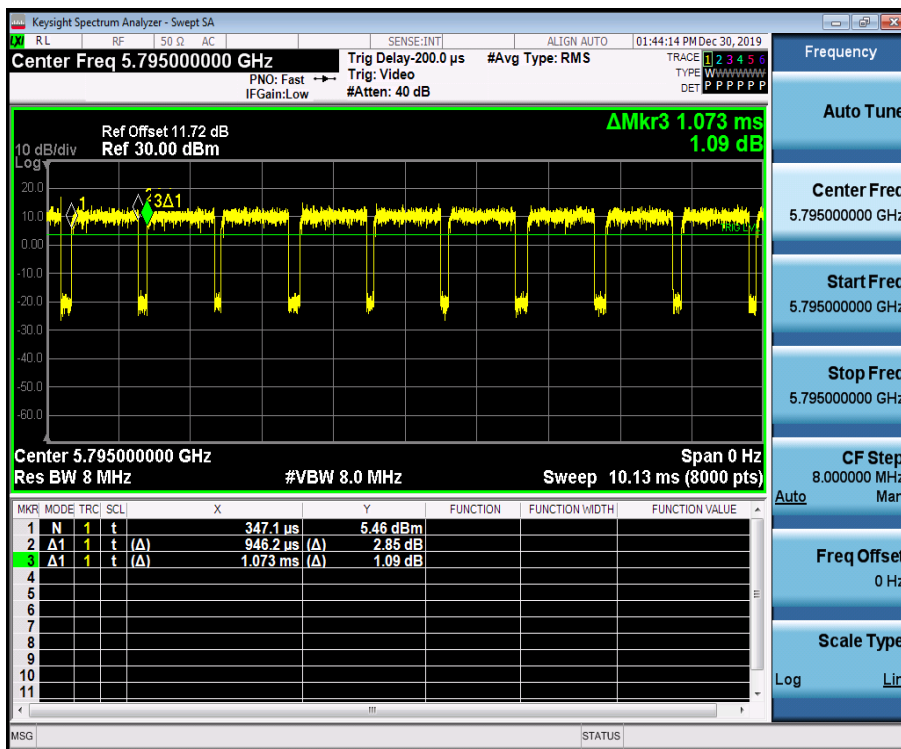
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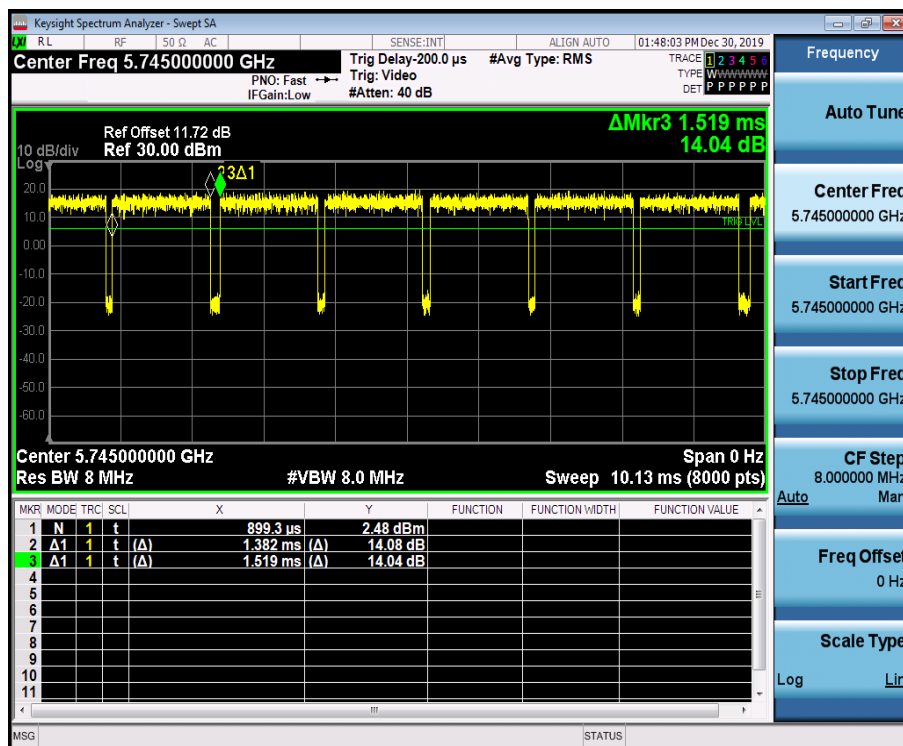
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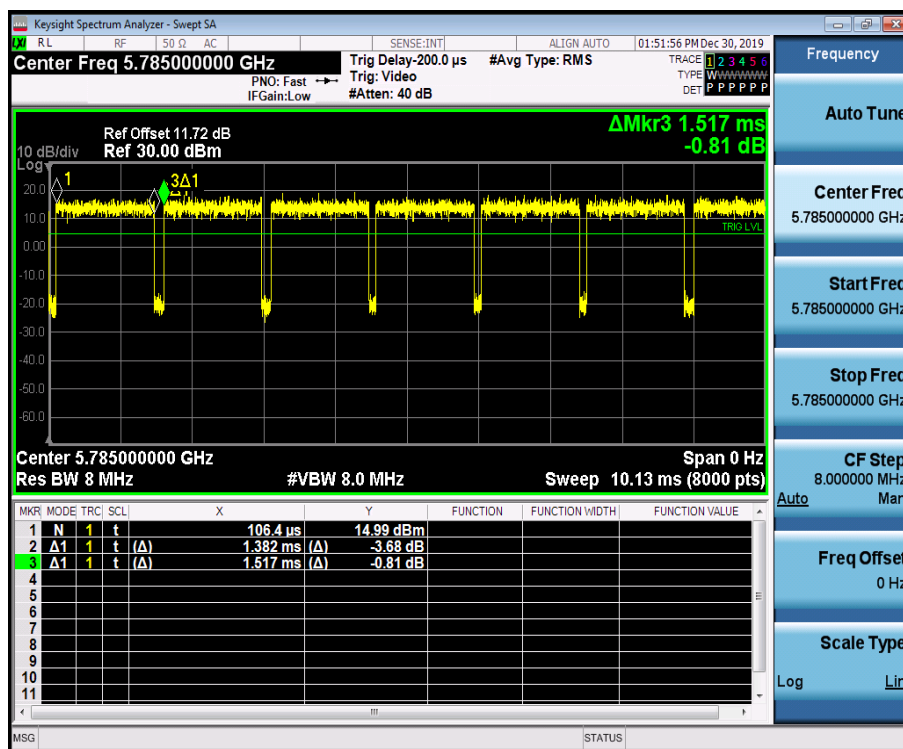
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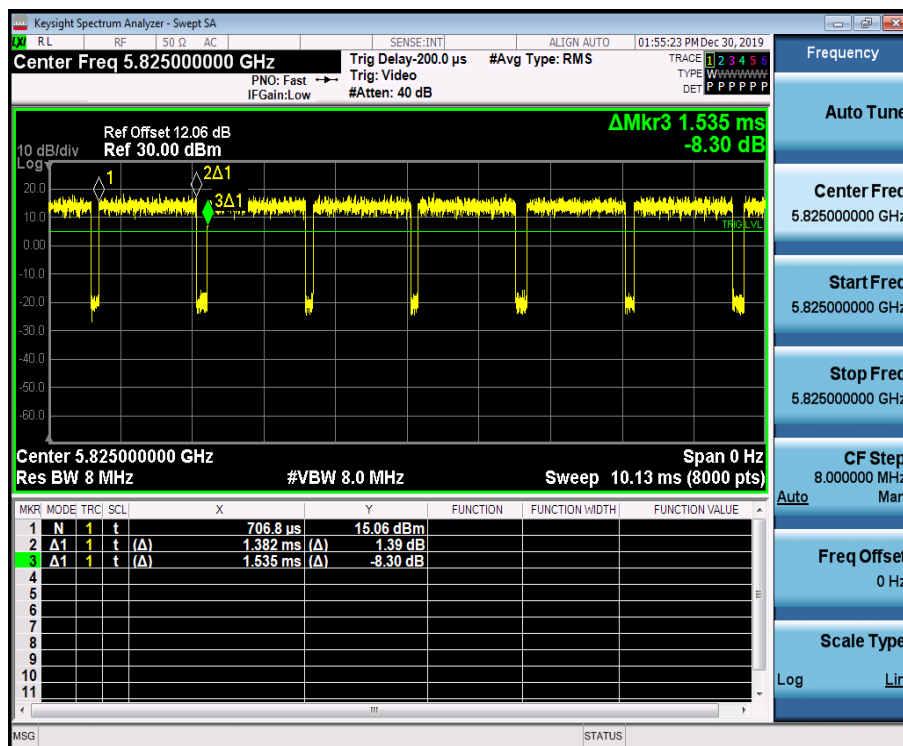
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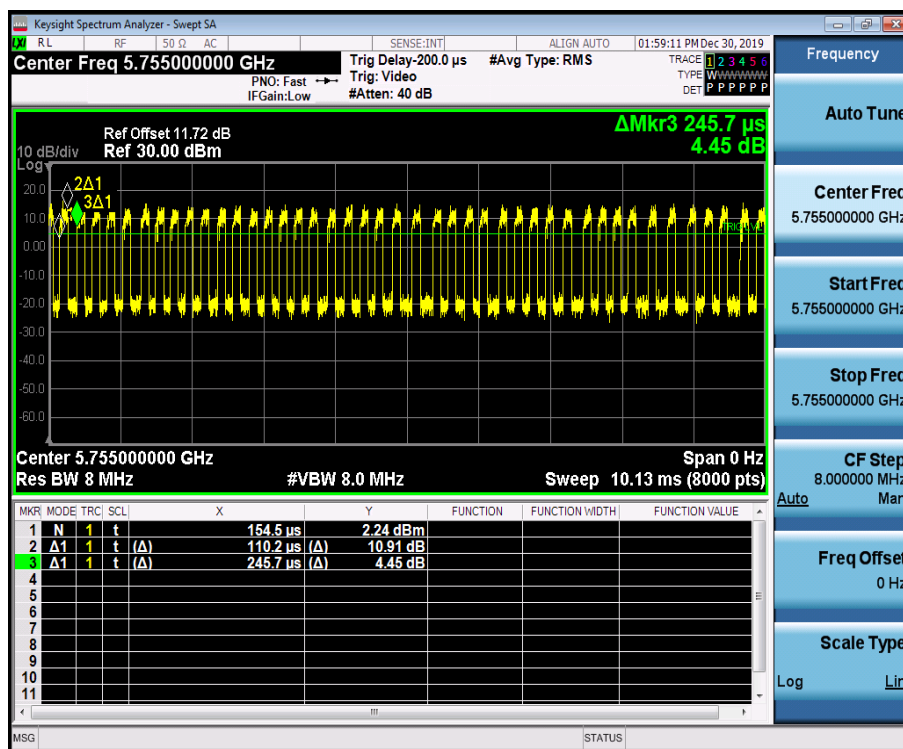
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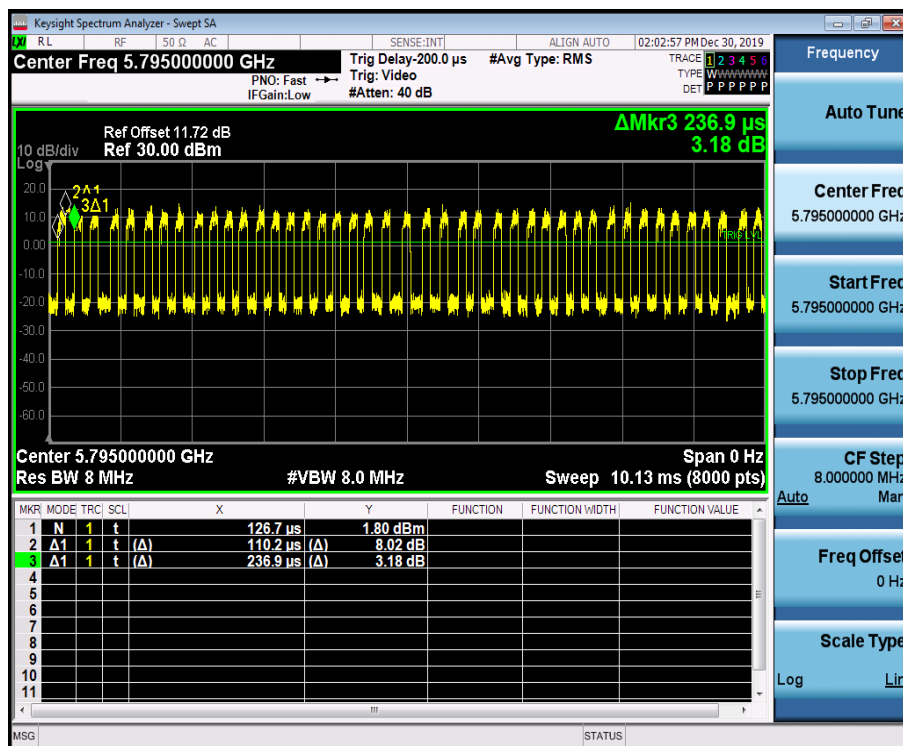
11AC20/CH165



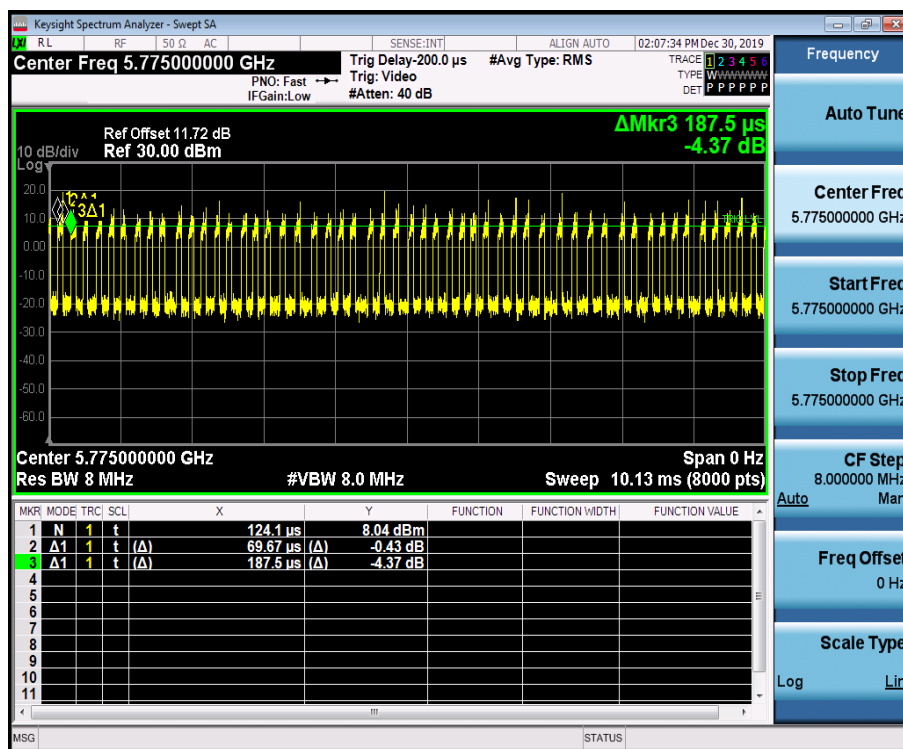
11AC40/CH151



11AC40/CH159



11AC80/CH155



4.3 Power Spectral Density Measurement

4.3.1 Limits of Power Spectral Density

FCC

Operation Band	EUT Category		Limit
U-NII-1		Access Point(Mater Device)	17dBm/MHz
		Fixed point-to-point Access Ponit	
	√	Mobile and portable client device	11dBm/ MHz
U-NII-2A	√		11dBm/ MHz
U-NII-2C	√		11dBm/ MHz
U-NII-3	√		30 dBm/500kHz

If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.3.2 Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
4. Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = RMS, traces 100 sweeps of video averaging(SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
5. Use the cursor on spectrum to peak search the highest level of trace.
6. Record the max. reading and add 10 log(1/duty cycle).
7. Repeat above procedures until all default test channel (low, middle, and high) was complete.

4.3.3 Test Result of Power Spectral Density

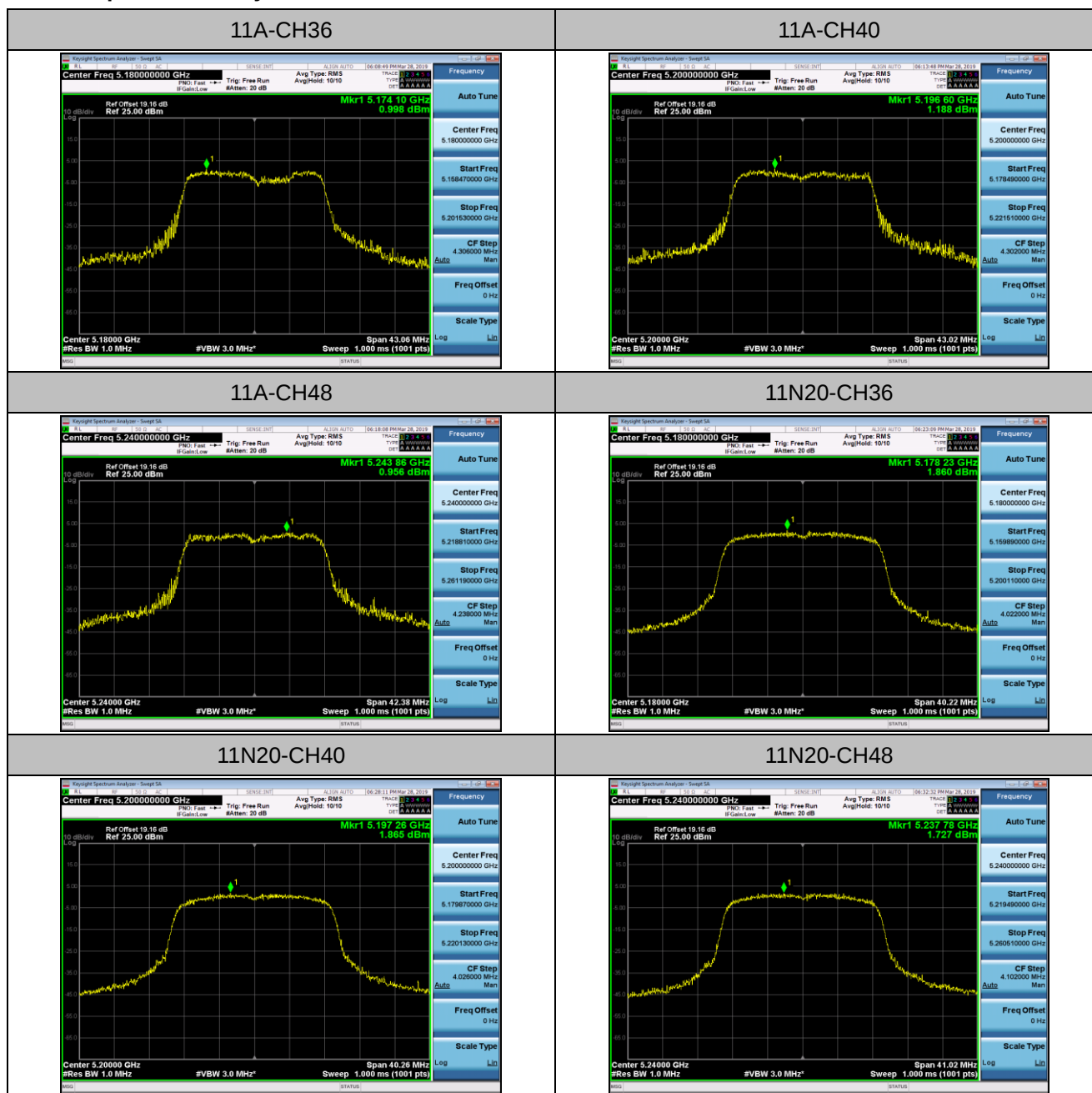
Test Mode	Band	Channel	Meas.Level [dBm]	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
11a	U-NII-1	36	1.00	2.70	17	PASS
		40	1.19	3.20	17	PASS
		48	0.96	3.36	17	PASS
11n HT20	U-NII-1	36	1.86	2.08	17	PASS
		40	1.87	2.09	17	PASS
		48	1.73	1.95	17	PASS
11n HT40	U-NII-1	38	-1.78	-1.13	17	PASS
		46	-2.03	-1.27	17	PASS
11ac VHT20	U-NII-1	36	0.96	1.22	17	PASS
		40	1.10	1.43	17	PASS
		48	0.61	0.85	17	PASS
11ac VHT40	U-NII-1	38	-2.57	-1.81	17	PASS
		46	-2.55	-2.04	17	PASS
11ac VHT80	U-NII-1	42	-5.40	-4.55	17	PASS

TestMode	Band	Channel	Result [dBm/MHz]	Limit[dBm/500KHz]	Verdict
11a	U-NII-3	149	0.97	<=30	PASS
		157	-1.2	<=30	PASS
		165	-0.98	<=30	PASS
11n HT20	U-NII-3	149	-0.69	<=30	PASS
		157	-2.22	<=30	PASS
		165	-2.17	<=30	PASS
11n HT40	U-NII-3	151	-3.69	<=30	PASS
		159	-5.14	<=30	PASS
11ac VHT20	U-NII-3	149	-0.09	<=30	PASS
		157	-1.4	<=30	PASS
		165	-1.46	<=30	PASS
11ac VHT40	U-NII-3	151	-2.19	<=30	PASS
		159	-3.63	<=30	PASS
11ac VHT80	U-NII-3	155	-4.59	<=30	PASS

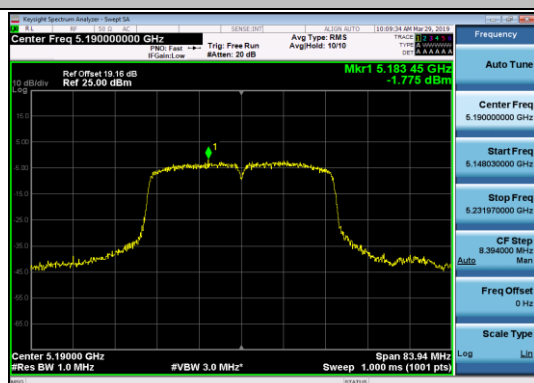
Note : 1.The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.

2.The Duty Cycle Factor and RBW Factor is compensated in the graph.

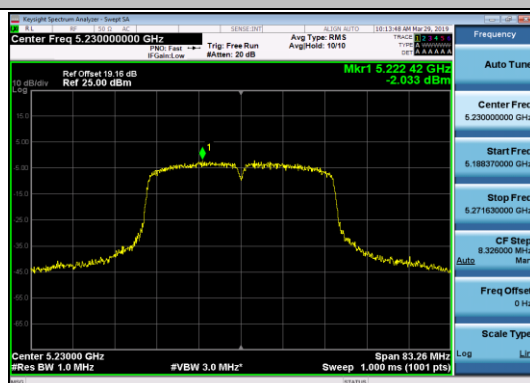
Power Spectral Density Plot



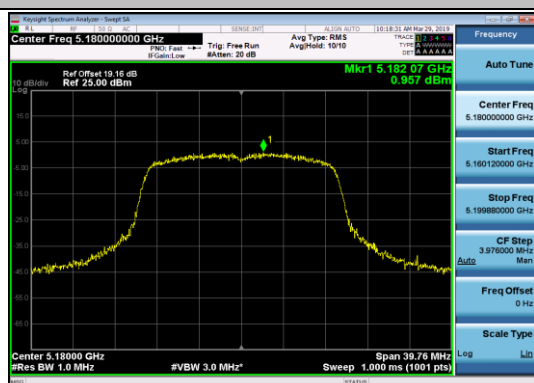
11N40-CH38



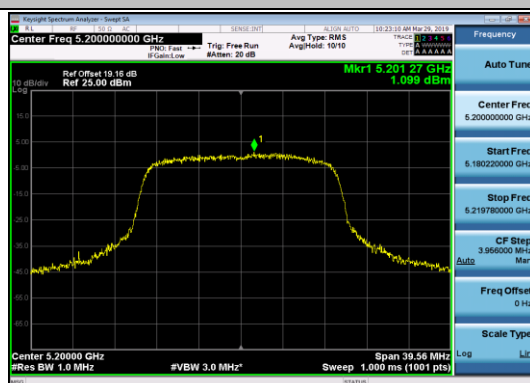
11N40-CH46



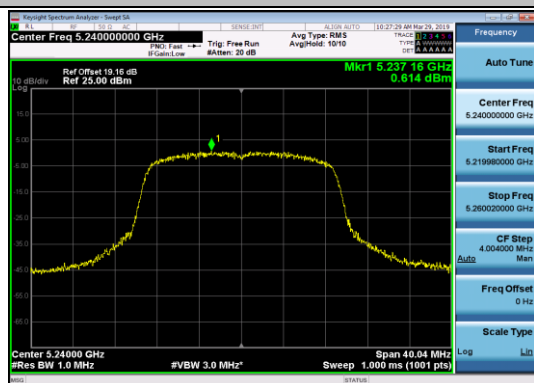
11AC20-CH36



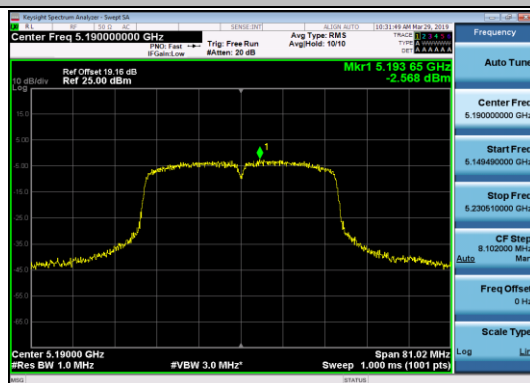
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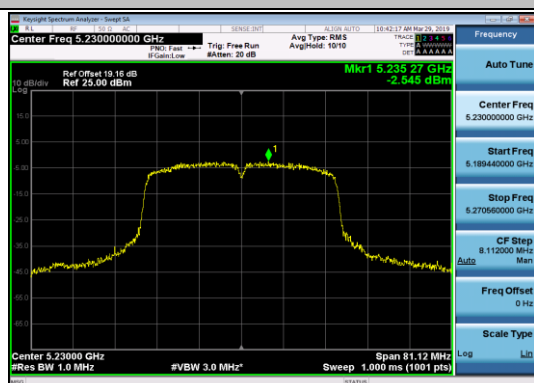
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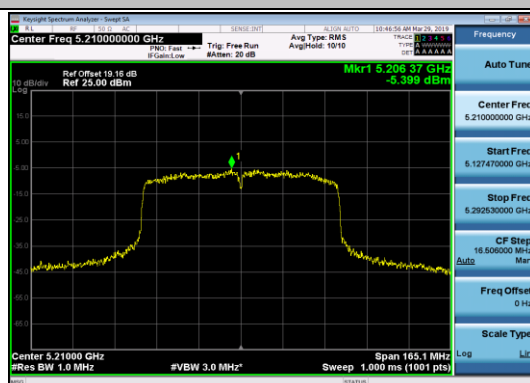
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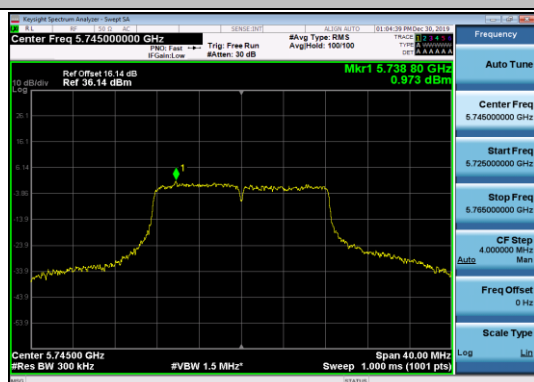
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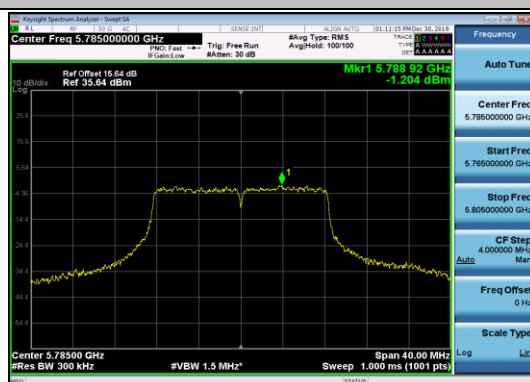
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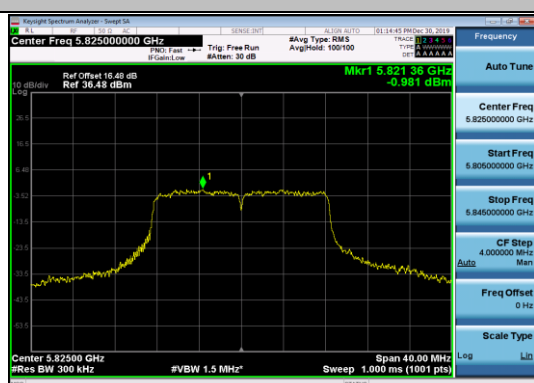
11A-CH149



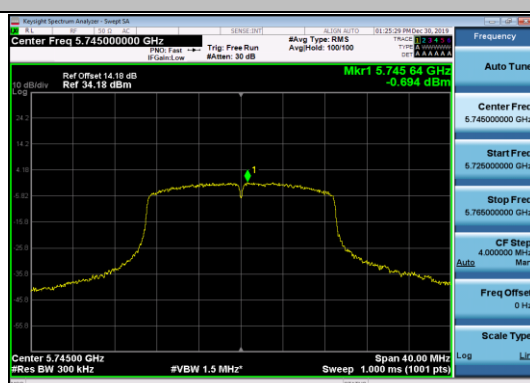
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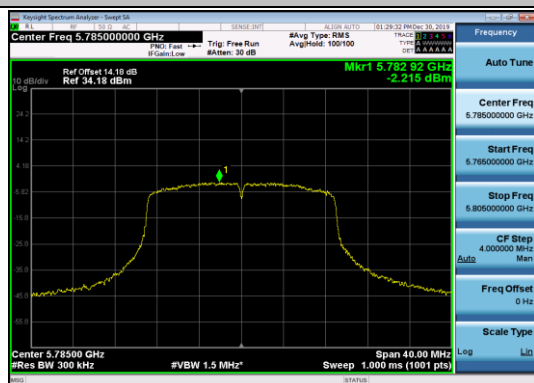
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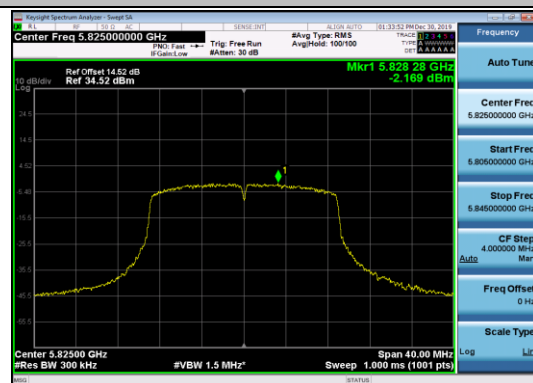
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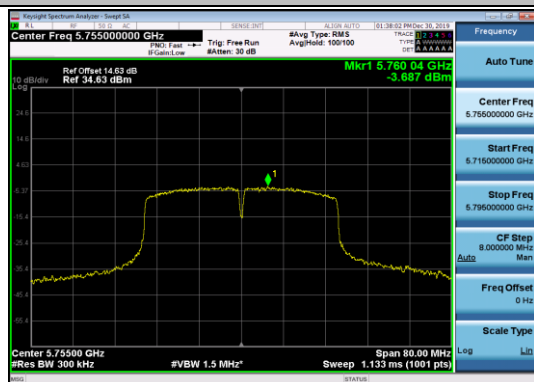
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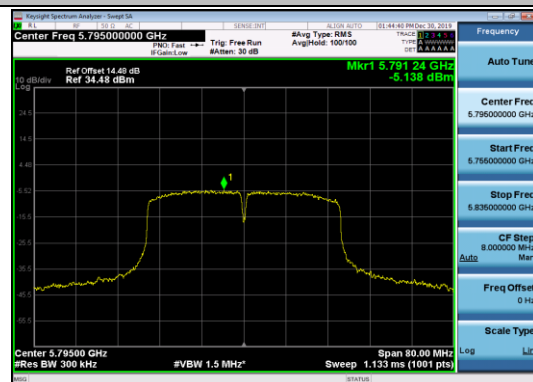
11N20-CH165



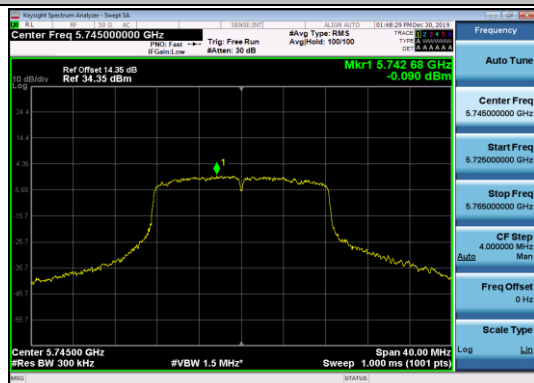
11N40-CH151



11N40-CH159



11AC20-CH149



11AC20-CH157

