5.6. Power line conducted emissions

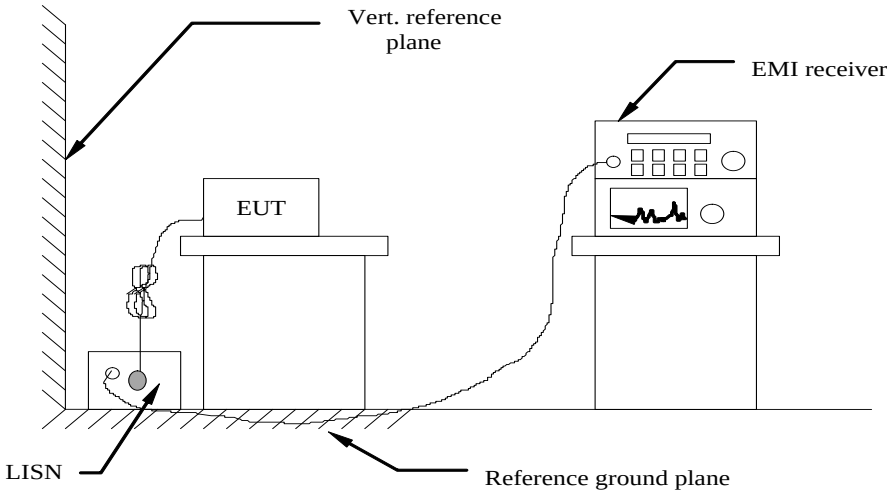
5.6.1 Standard Applicable

According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreasing linearly with the logarithm of the frequency

5.6.2 Block Diagram of Test Setup

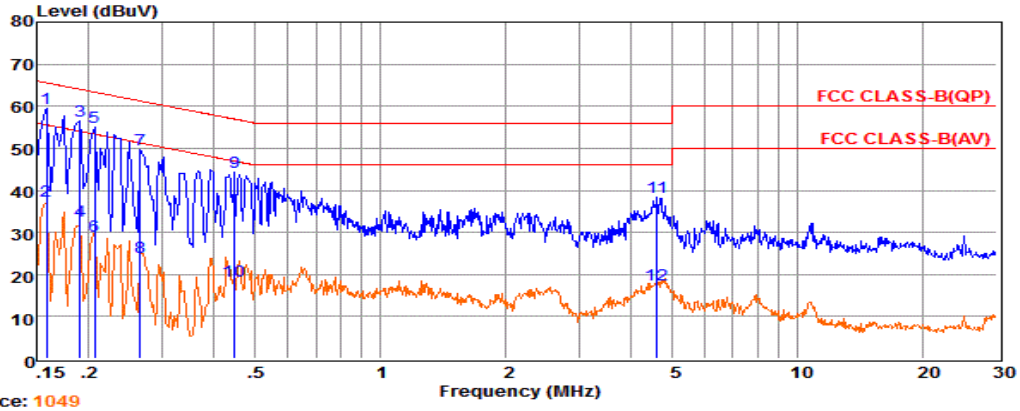


5.6.3 Test Results

PASS.

The test data please refer to following page.

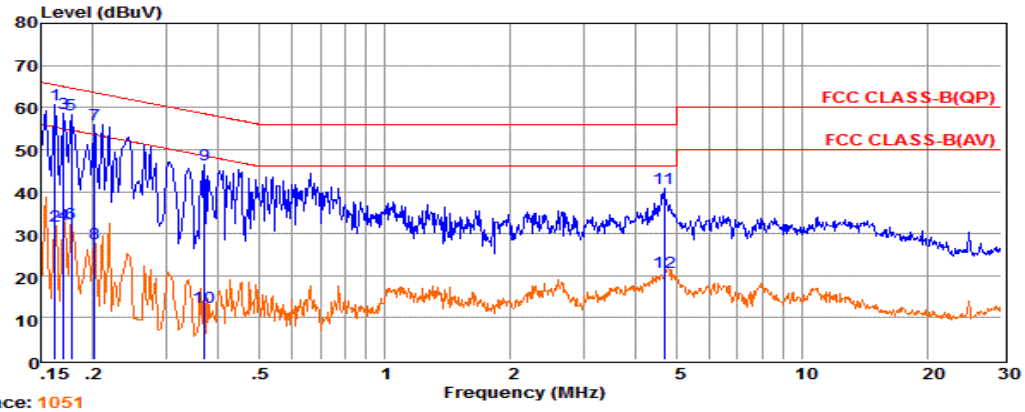
AC Conducted Emission of power by adapter @ AC 120V/60Hz @ IEEE 802.11a (worst case)



Trace: 1049
Power Rating: AC 120V/60Hz
Pol: NEUTRAL

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.16	39.76	9.68	0.02	10.00	59.46	65.56	-6.10	QP
2	0.16	17.81	9.68	0.02	10.00	37.51	55.55	-18.04	Average
3	0.19	36.93	9.61	0.02	10.00	56.56	64.02	-7.46	QP
4	0.19	12.98	9.61	0.02	10.00	32.61	54.02	-21.41	Average
5	0.21	35.25	9.59	0.03	10.00	54.87	63.36	-8.49	QP
6	0.21	9.60	9.59	0.03	10.00	29.22	53.36	-24.14	Average
7	0.27	29.91	9.60	0.03	10.00	49.54	61.25	-11.71	QP
8	0.27	4.56	9.60	0.03	10.00	24.19	51.24	-27.05	Average
9	0.45	24.62	9.62	0.04	10.00	44.28	56.93	-12.65	QP
10	0.45	-1.27	9.62	0.04	10.00	18.39	46.93	-28.54	Average
11	4.60	18.62	9.66	0.06	10.00	38.34	56.00	-17.66	QP
12	4.60	-2.20	9.66	0.06	10.00	17.52	46.00	-28.48	Average

Remarks: 1. Measured = Reading +Cable Loss +Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

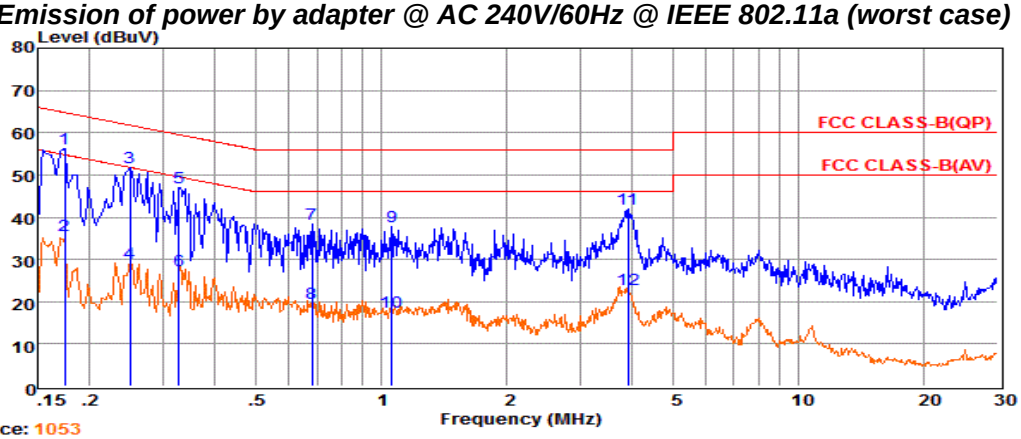


Trace: 1051
Power Rating: AC 120V/60Hz
Pol: LINE

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.16	40.97	9.59	0.02	10.00	60.58	65.34	-4.76	QP
2	0.16	12.08	9.59	0.02	10.00	31.69	55.33	-23.64	Average
3	0.17	39.03	9.60	0.02	10.00	58.65	64.94	-6.29	QP
4	0.17	12.55	9.60	0.02	10.00	32.17	54.94	-22.77	Average
5	0.18	38.78	9.61	0.02	10.00	58.41	64.59	-6.18	QP
6	0.18	12.93	9.61	0.02	10.00	32.56	54.59	-22.03	Average
7	0.20	36.37	9.63	0.02	10.00	56.02	63.54	-7.52	QP
8	0.20	7.93	9.63	0.02	10.00	27.58	53.53	-25.95	Average
9	0.37	26.87	9.62	0.03	10.00	46.52	58.52	-12.00	QP
10	0.37	-7.10	9.62	0.03	10.00	12.55	48.52	-35.97	Average
11	4.67	20.97	9.65	0.06	10.00	40.68	56.00	-15.32	QP
12	4.67	1.16	9.65	0.06	10.00	20.87	46.00	-25.13	Average

Remarks: 1. Measured = Reading +Cable Loss +Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

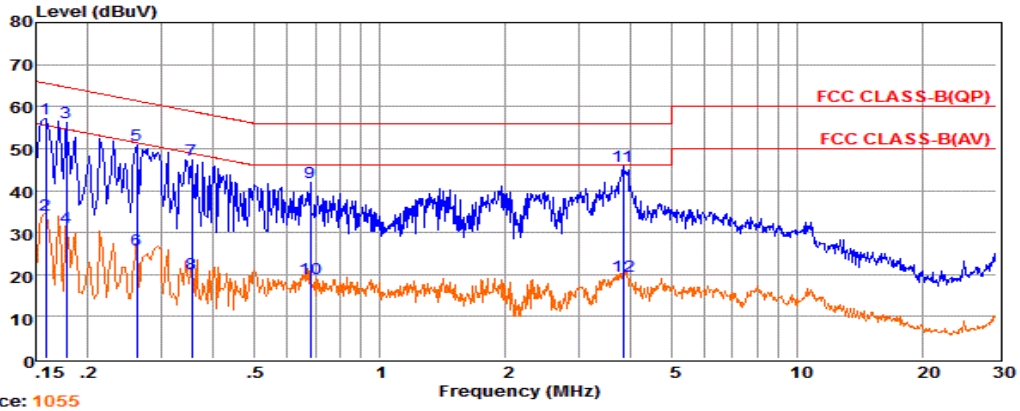
AC Conducted Emission of power by adapter @ AC 240V/60Hz @ IEEE 802.11a (worst case)



Trace: 1053
Power Rating: AC 240V/60Hz
Pol: LINE

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.17	36.66	9.60	0.02	10.00	56.28	64.77	-8.49	QP
2	0.17	15.92	9.60	0.02	10.00	35.54	54.76	-19.22	Average
3	0.25	31.96	9.63	0.03	10.00	51.62	61.78	-10.16	QP
4	0.25	9.49	9.63	0.03	10.00	29.15	51.77	-22.62	Average
5	0.33	27.43	9.62	0.03	10.00	47.08	59.53	-12.45	QP
6	0.33	7.75	9.62	0.03	10.00	27.40	49.53	-22.13	Average
7	0.68	18.58	9.64	0.04	10.00	38.26	56.00	-17.74	QP
8	0.68	-0.10	9.64	0.04	10.00	19.58	46.00	-26.42	Average
9	1.06	18.05	9.63	0.05	10.00	37.73	56.00	-18.27	QP
10	1.06	-2.01	9.63	0.05	10.00	17.67	46.00	-28.33	Average
11	3.90	22.12	9.65	0.06	10.00	41.83	56.00	-14.17	QP
12	3.90	3.31	9.65	0.06	10.00	23.02	46.00	-22.98	Average

Remarks: 1. Measured = Reading +Cable Loss +Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.



Trace: 1055
Power Rating: AC 240V/60Hz
Pol: NEUTRAL

	Freq	Reading	LISNFac	CabLos	Aux2Fac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB	dB	dB	dBuV	dBuV	dB
1	0.16	37.54	9.68	0.02	10.00	57.24	65.56	-8.32	QP
2	0.16	14.54	9.68	0.02	10.00	34.24	55.55	-21.31	Average
3	0.18	36.45	9.64	0.02	10.00	56.11	64.59	-8.48	QP
4	0.18	11.64	9.63	0.02	10.00	31.29	54.59	-23.30	Average
5	0.26	31.15	9.60	0.03	10.00	50.78	61.38	-10.60	QP
6	0.26	6.34	9.60	0.03	10.00	25.97	51.38	-25.41	Average
7	0.35	27.63	9.61	0.03	10.00	47.27	58.87	-11.60	QP
8	0.35	0.68	9.61	0.03	10.00	20.32	48.87	-28.55	Average
9	0.68	22.29	9.63	0.04	10.00	41.96	56.00	-14.04	QP
10	0.68	-0.52	9.63	0.04	10.00	19.15	46.00	-26.85	Average
11	3.82	26.11	9.65	0.06	10.00	45.82	56.00	-10.18	QP
12	3.82	-0.23	9.65	0.06	10.00	19.48	46.00	-26.52	Average

Remarks: 1. Measured = Reading +Cable Loss +Aux2 Fac.
2. The emission levels that are 20dB below the official limit are not reported.

****Note: Pre-scan all modes and recorded the worst case results in this report (IEEE 802.11a).*

5.7 Undesirable Emissions Measurement

5.7.1 LIMIT

According to ξ15.407 (b) Undesirable emission limits. Except as shown in paragraph (b) (7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(a) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(b) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(c) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(d) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.

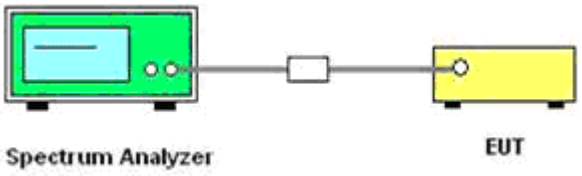
(e) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(f) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

(g) The provisions of §15.205 apply to intentional radiators operating under this section.

(h) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

5.7.2 TEST CONFIGURATION



5.7.3 TEST PROCEDURE

1. The power was monitored at the coupler port with a Spectrum Analyzer. The power level was set to the maximum level.
2. Set the RBW = 1MHz.
3. Set the VBW ≥ 3MHz
4. Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
5. Manually set sweep time ≥ 10 × (number of points in sweep) × (total on/off period of the transmitted signal).
6. Set detector = power averaging (rms).
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.

5. 7.4 Test Results

For Antenna Chain 0

IEEE 802.11a							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
5650.000	-53.901	2.000	-51.901	Peak	-27.000	-24.901	PASS
5700.000	-50.137	2.000	-48.137	Peak	10.000	-58.137	PASS
5720.000	-45.057	2.000	-43.057	Peak	15.600	-58.657	PASS
5725.000	-39.050	2.000	-37.050	Peak	27.000	-64.05	PASS
5850.000	-40.122	2.000	-38.122	Peak	27.000	-65.122	PASS
5855.000	-44.918	2.000	-42.918	Peak	15.600	-58.518	PASS
5875.000	-46.298	2.000	-44.298	Peak	10.000	-54.298	PASS
5925.000	-50.593	2.000	-48.593	Peak	-27.000	-21.593	PASS

IEEE 802.11n HT20							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
5650.000	-52.057	2.000	-50.057	Peak	-27.000	-23.057	PASS
5700.000	-49.432	2.000	-47.432	Peak	10.000	-57.432	PASS
5720.000	-45.959	2.000	-43.959	Peak	15.600	-59.559	PASS
5725.000	-37.643	2.000	-35.643	Peak	27.000	-62.643	PASS
5850.000	-40.379	2.000	-38.379	Peak	27.000	-65.379	PASS
5855.000	-47.392	2.000	-45.392	Peak	15.600	-60.992	PASS
5875.000	-47.016	2.000	-45.016	Peak	10.000	-55.016	PASS
5925.000	-52.292	2.000	-50.292	Peak	-27.000	-23.292	PASS

IEEE 802.11ac VHT20							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
5650.000	-54.065	2.000	-52.065	Peak	-27.000	-25.065	PASS
5700.000	-50.831	2.000	-48.831	Peak	10.000	-58.831	PASS
5720.000	-48.579	2.000	-46.579	Peak	15.600	-62.179	PASS
5725.000	-39.928	2.000	-37.928	Peak	27.000	-64.928	PASS
5850.000	-42.484	2.000	-40.484	Peak	27.000	-67.484	PASS
5855.000	-49.585	2.000	-47.585	Peak	15.600	-63.185	PASS
5875.000	-50.277	2.000	-48.277	Peak	10.000	-58.277	PASS
5925.000	-52.411	2.000	-50.411	Peak	-27.000	-23.411	PASS

IEEE 802.11n HT40							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
5650.000	-54.840	2.000	-52.840	Peak	-27.000	-25.840	PASS
5700.000	-51.393	2.000	-49.393	Peak	10.000	-59.393	PASS
5720.000	-44.077	2.000	-42.077	Peak	15.600	-57.677	PASS
5725.000	-40.475	2.000	-38.475	Peak	27.000	-65.475	PASS
5850.000	-48.595	2.000	-46.595	Peak	27.000	-73.595	PASS
5855.000	-49.978	2.000	-47.978	Peak	15.600	-63.578	PASS
5875.000	-50.938	2.000	-48.938	Peak	10.000	-58.938	PASS
5925.000	-54.437	2.000	-52.437	Peak	-27.000	-25.437	PASS

IEEE 802.11ac VHT40							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
5650.000	-54.357	2.000	-52.357	Peak	-27.000	-25.357	PASS
5700.000	-51.978	2.000	-49.978	Peak	10.000	-59.978	PASS
5720.000	-45.410	2.000	-43.410	Peak	15.600	-59.010	PASS
5725.000	-41.986	2.000	-39.986	Peak	27.000	-66.986	PASS
5850.000	-49.529	2.000	-47.529	Peak	27.000	-74.529	PASS
5855.000	-50.611	2.000	-48.611	Peak	15.600	-64.211	PASS
5875.000	-50.967	2.000	-48.967	Peak	10.000	-58.967	PASS
5925.000	-53.600	2.000	-51.600	Peak	-27.000	-24.600	PASS

IEEE 802.11ac VHT80							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
5650.000	-53.216	2.000	-51.216	Peak	-27.000	-24.216	PASS
5700.000	-50.573	2.000	-48.573	Peak	10.000	-58.573	PASS
5720.000	-47.918	2.000	-45.918	Peak	15.600	-61.518	PASS
5725.000	-46.330	2.000	-44.330	Peak	27.000	-71.330	PASS
5850.000	-51.569	2.000	-49.569	Peak	27.000	-76.569	PASS
5855.000	-50.074	2.000	-48.074	Peak	15.600	-63.674	PASS
5875.000	-52.787	2.000	-50.787	Peak	10.000	-60.787	PASS
5925.000	-54.847	2.000	-52.847	Peak	-27.000	-25.847	PASS

For Antenna Chain 1

IEEE 802.11a							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
5650.000	-51.807	2.000	-49.807	Peak	-27.000	-22.807	PASS
5700.000	-48.020	2.000	-46.020	Peak	10.000	-56.020	PASS
5720.000	-46.004	2.000	-44.004	Peak	15.600	-59.604	PASS
5725.000	-41.154	2.000	-39.154	Peak	27.000	-66.154	PASS
5850.000	-47.557	2.000	-45.557	Peak	27.000	-72.557	PASS
5855.000	-47.082	2.000	-45.082	Peak	15.600	-60.682	PASS
5875.000	-49.949	2.000	-47.949	Peak	10.000	-57.949	PASS
5925.000	-52.492	2.000	-50.492	Peak	-27.000	-23.492	PASS

IEEE 802.11n HT20							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
5650.000	-54.423	2.000	-52.423	Peak	-27.000	-25.423	PASS
5700.000	-49.114	2.000	-47.114	Peak	10.000	-57.114	PASS
5720.000	-46.027	2.000	-44.027	Peak	15.600	-59.627	PASS
5725.000	-36.863	2.000	-34.863	Peak	27.000	-61.863	PASS
5850.000	-43.706	2.000	-41.706	Peak	27.000	-68.706	PASS
5855.000	-46.536	2.000	-44.536	Peak	15.600	-60.136	PASS
5875.000	-47.393	2.000	-45.393	Peak	10.000	-55.393	PASS
5925.000	-53.704	2.000	-51.704	Peak	-27.000	-24.704	PASS

IEEE 802.11ac VHT20							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
5650.000	-53.216	2.000	-51.216	Peak	-27.000	-24.216	PASS
5700.000	-48.208	2.000	-46.208	Peak	10.000	-56.208	PASS
5720.000	-46.785	2.000	-44.785	Peak	15.600	-60.385	PASS
5725.000	-42.421	2.000	-40.421	Peak	27.000	-67.421	PASS
5850.000	-46.717	2.000	-44.717	Peak	27.000	-71.717	PASS
5855.000	-48.815	2.000	-46.815	Peak	15.600	-62.415	PASS
5875.000	-49.476	2.000	-47.476	Peak	10.000	-57.476	PASS
5925.000	-53.104	2.000	-51.104	Peak	-27.000	-24.104	PASS

IEEE 802.11n HT40							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
5650.000	-54.569	2.000	-52.569	Peak	-27.000	-25.569	PASS
5700.000	-51.852	2.000	-49.852	Peak	10.000	-59.852	PASS
5720.000	-41.246	2.000	-39.246	Peak	15.600	-54.846	PASS
5725.000	-40.496	2.000	-38.496	Peak	27.000	-65.496	PASS
5850.000	-50.535	2.000	-48.535	Peak	27.000	-75.535	PASS
5855.000	-49.211	2.000	-47.211	Peak	15.600	-62.811	PASS
5875.000	-50.980	2.000	-48.980	Peak	10.000	-58.980	PASS
5925.000	-54.225	2.000	-52.225	Peak	-27.000	-25.225	PASS

IEEE 802.11ac VHT40							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
5650.000	-55.181	2.000	-53.181	Peak	-27.000	-26.181	PASS
5700.000	-50.286	2.000	-48.286	Peak	10.000	-58.286	PASS
5720.000	-44.906	2.000	-42.906	Peak	15.600	-58.506	PASS
5725.000	-43.512	2.000	-41.512	Peak	27.000	-68.512	PASS
5850.000	-49.751	2.000	-47.751	Peak	27.000	-74.751	PASS
5855.000	-49.361	2.000	-47.361	Peak	15.600	-62.961	PASS
5875.000	-51.332	2.000	-49.332	Peak	10.000	-59.332	PASS
5925.000	-53.027	2.000	-51.027	Peak	-27.000	-24.027	PASS

IEEE 802.11ac VHT80							
Frequency (MHz)	Conducted Power (dBm)	Antenna Gain (dBi)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
5650.000	-53.950	2.000	-51.950	Peak	-27.000	-24.950	PASS
5700.000	-52.521	2.000	-50.521	Peak	10.000	-60.521	PASS
5720.000	-48.570	2.000	-46.570	Peak	15.600	-62.170	PASS
5725.000	-48.363	2.000	-46.363	Peak	27.000	-73.363	PASS
5850.000	-50.035	2.000	-48.035	Peak	27.000	-75.035	PASS
5855.000	-51.901	2.000	-49.901	Peak	15.600	-65.501	PASS
5875.000	-50.855	2.000	-48.855	Peak	10.000	-58.855	PASS
5925.000	-54.846	2.000	-52.846	Peak	-27.000	-25.846	PASS

For Combined Antenna Chain 0 and Antenna Chain 1

IEEE 802.11n HT20									
Frequency (MHz)	Conducted Power (dBm)			Directional Gain (dB)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
	Antenna 0	Antenna 1	Sum						
5650.000	-52.057	-54.423	-50.071	5.010*	-45.061	Peak	-27.000	-18.061	PASS
5700.000	-49.432	-49.114	-46.260	5.010*	-41.250	Peak	10.000	-51.250	PASS
5720.000	-45.959	-46.027	-42.983	5.010*	-37.973	Peak	15.600	-53.573	PASS
5725.000	-37.643	-36.863	-34.225	5.010*	-29.215	Peak	27.000	-56.215	PASS
5850.000	-40.379	-43.706	-38.721	5.010*	-33.711	Peak	27.000	-60.711	PASS
5855.000	-47.392	-46.536	-43.933	5.010*	-38.923	Peak	15.600	-54.523	PASS
5875.000	-47.016	-47.393	-44.190	5.010*	-39.180	Peak	10.000	-49.180	PASS
5925.000	-52.292	-53.704	-49.931	5.010*	-44.921	Peak	-27.000	-17.921	PASS

IEEE 802.11ac VHT20									
Frequency (MHz)	Conducted Power (dBm)			Directional Gain (dB)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
	Antenna 0	Antenna 1	Sum						
5650.000	-54.065	-53.216	-50.609	5.010*	-45.599	Peak	-27.000	-18.599	PASS
5700.000	-50.831	-48.208	-46.314	5.010*	-41.304	Peak	10.000	-51.304	PASS
5720.000	-48.579	-46.785	-44.580	5.010*	-39.570	Peak	15.600	-55.170	PASS
5725.000	-39.928	-42.421	-37.988	5.010*	-32.978	Peak	27.000	-59.978	PASS
5850.000	-42.484	-46.717	-41.094	5.010*	-36.084	Peak	27.000	-63.084	PASS
5855.000	-49.585	-48.815	-46.173	5.010*	-41.163	Peak	15.600	-56.763	PASS
5875.000	-50.277	-49.476	-46.848	5.010*	-41.838	Peak	10.000	-51.838	PASS
5925.000	-52.411	-53.104	-49.733	5.010*	-44.723	Peak	-27.000	-17.723	PASS

IEEE 802.11n HT40									
Frequency (MHz)	Conducted Power (dBm)			Directional Gain (dB)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
	Antenna 0	Antenna 1	Sum						
5650.000	-54.840	-54.569	-51.692	5.010*	-46.682	Peak	-27.000	-19.682	PASS
5700.000	-51.393	-51.852	-48.606	5.010*	-43.596	Peak	10.000	-53.596	PASS
5720.000	-44.077	-41.246	-39.424	5.010*	-34.414	Peak	15.600	-50.014	PASS
5725.000	-40.475	-40.496	-37.475	5.010*	-32.465	Peak	27.000	-59.465	PASS
5850.000	-48.595	-50.535	-46.447	5.010*	-41.437	Peak	27.000	-68.437	PASS
5855.000	-49.978	-49.211	-46.567	5.010*	-41.557	Peak	15.600	-57.157	PASS
5875.000	-50.938	-50.980	-47.949	5.010*	-42.939	Peak	10.000	-52.939	PASS
5925.000	-54.437	-54.225	-51.319	5.010*	-46.309	Peak	-27.000	-19.309	PASS

IEEE 802.11ac VHT40									
Frequency (MHz)	Conducted Power (dBm)			Directional Gain (dB)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
	Antenna 0	Antenna 1	Sum						
5650.000	-54.357	-55.181	-51.739	5.010*	-46.729	Peak	-27.000	-19.729	PASS
5700.000	-51.978	-50.286	-48.040	5.010*	-43.030	Peak	10.000	-53.030	PASS
5720.000	-45.410	-44.906	-42.140	5.010*	-37.130	Peak	15.600	-52.730	PASS
5725.000	-41.986	-43.512	-39.672	5.010*	-34.662	Peak	27.000	-61.662	PASS
5850.000	-49.529	-49.751	-46.628	5.010*	-41.618	Peak	27.000	-68.618	PASS
5855.000	-50.611	-49.361	-46.931	5.010*	-41.921	Peak	15.600	-57.521	PASS
5875.000	-50.967	-51.332	-48.135	5.010*	-43.125	Peak	10.000	-53.125	PASS
5925.000	-53.600	-53.027	-50.294	5.010*	-45.284	Peak	-27.000	-18.284	PASS

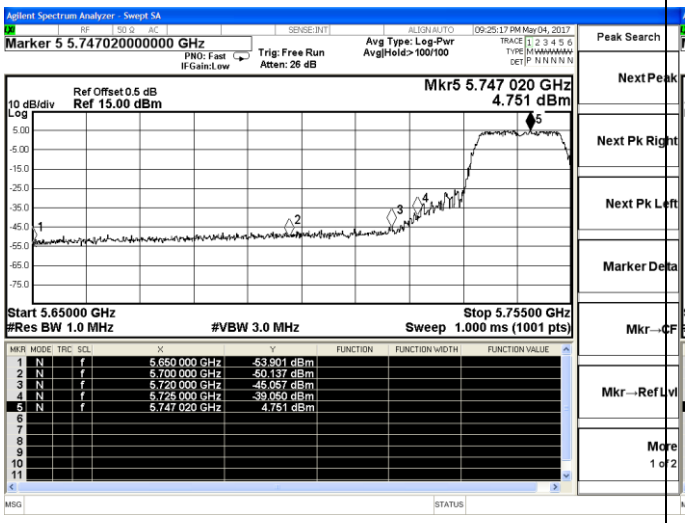
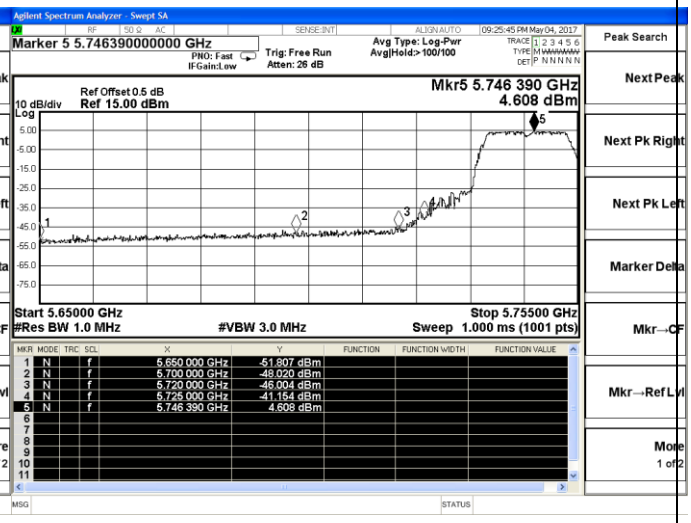
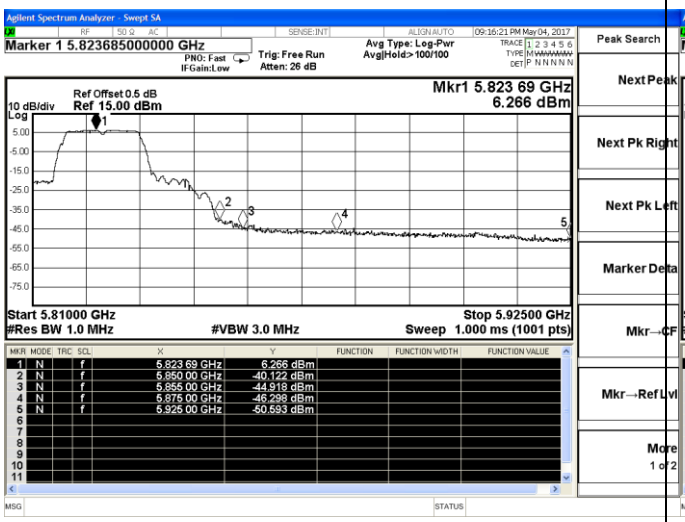
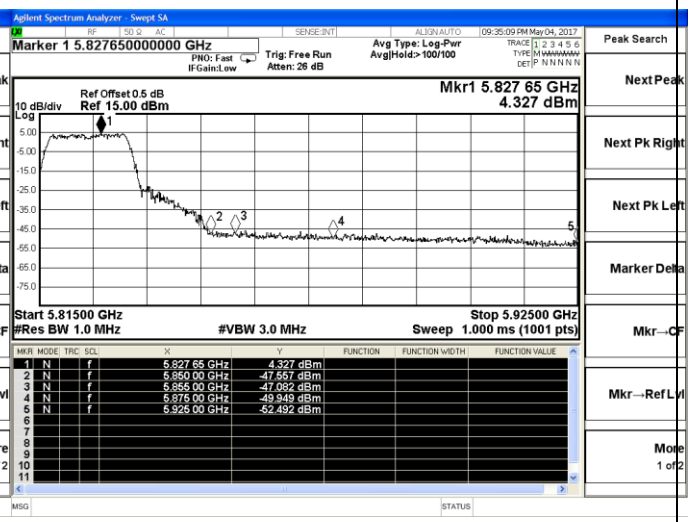
IEEE 802.11ac VHT80									
Frequency (MHz)	Conducted Power (dBm)			Directional Gain (dB)	EIRP (dBm/1MHz)	Detector	Limit (dBm/1MHz)	Over limit dB	Verdict
	Antenna 0	Antenna 1	Sum						
5650.000	-53.216	-53.95	-50.557	5.010*	-45.547	Peak	-27.000	-18.547	PASS
5700.000	-50.573	-52.521	-48.428	5.010*	-43.418	Peak	10.000	-53.418	PASS
5720.000	-47.918	-48.57	-45.221	5.010*	-40.211	Peak	15.600	-55.811	PASS
5725.000	-46.330	-48.363	-44.218	5.010*	-39.208	Peak	27.000	-66.208	PASS
5850.000	-51.569	-50.035	-47.724	5.010*	-42.714	Peak	27.000	-69.714	PASS
5855.000	-50.074	-51.901	-47.882	5.010*	-42.872	Peak	15.600	-58.472	PASS
5875.000	-52.787	-50.855	-48.704	5.010*	-43.694	Peak	10.000	-53.694	PASS
5925.000	-54.847	-54.846	-51.836	5.010*	-46.826	Peak	-27.000	-19.826	PASS

Remark:

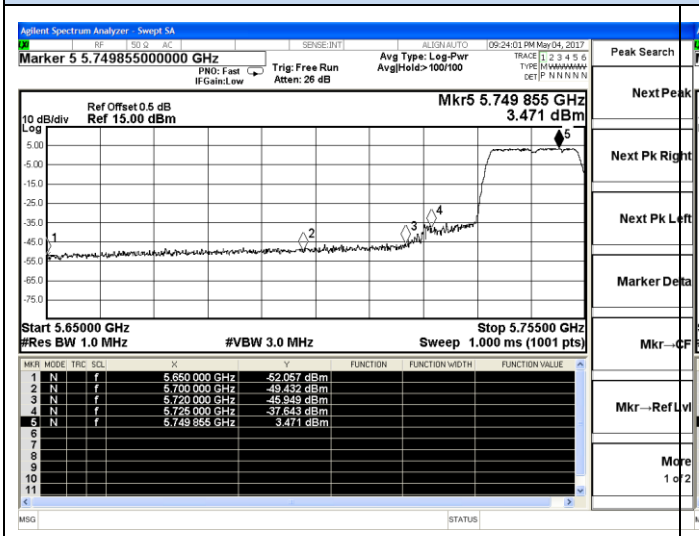
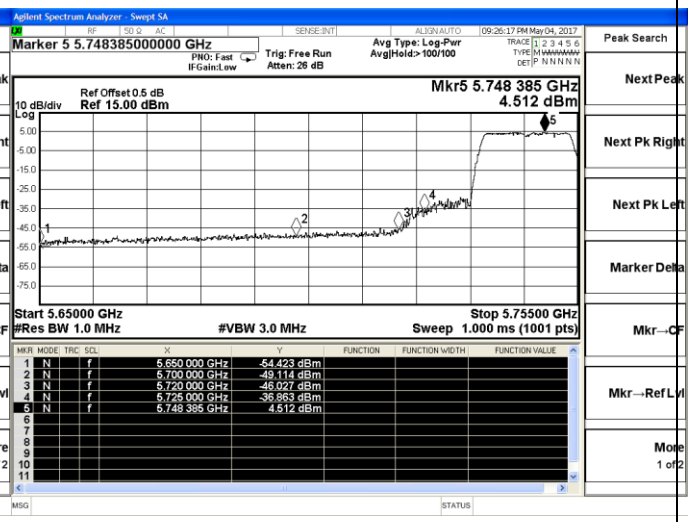
1. *Measured unwanted emission at difference data rate for each mode and recorded worst case for each mode.*
2. *Test results including cable loss;*
3. *Worst case data at 6Mbps at IEEE 802.11a; MCS0 at IEEE 802.11n HT20, IEEE 802.11n HT40, IEEE 802.11a VHT20, IEEE 802.11ac VHT40 and IEEE 802.11ac VHT80;*
4. *For MIMO with CCD technology device, The Directional Gain= Gain of individual transmit antennas (dBi) + Array gain;*
   Array gain = 10 log (N_{ant}), where N_{ant} is the number of transmit antennas.
5. **5.010=2.00+10*log(2).*
6. *E.I.R.P = Conducted power + Directional Gain*
7. *Please refer to following test plots;*

Unwanted emission

IEEE 802.11a

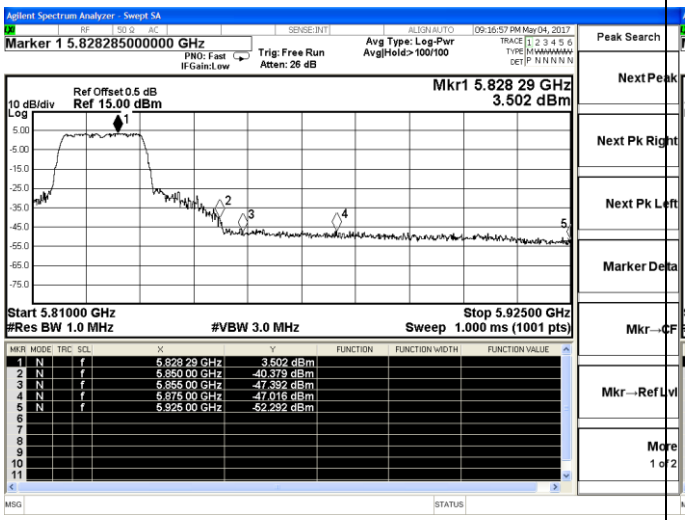
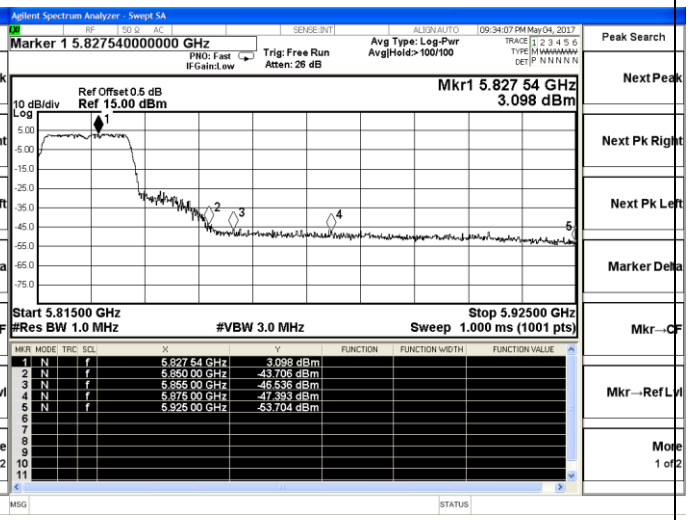
Antenna Chain 0	Antenna Chain 1
	
Channel 149 / 5745 MHz – Peak	Channel 149 / 5745 MHz – Peak
	
Channel 165 / 5825 MHz – Peak	Channel 165 / 5825 MHz – Peak

IEEE 802.11n HT20

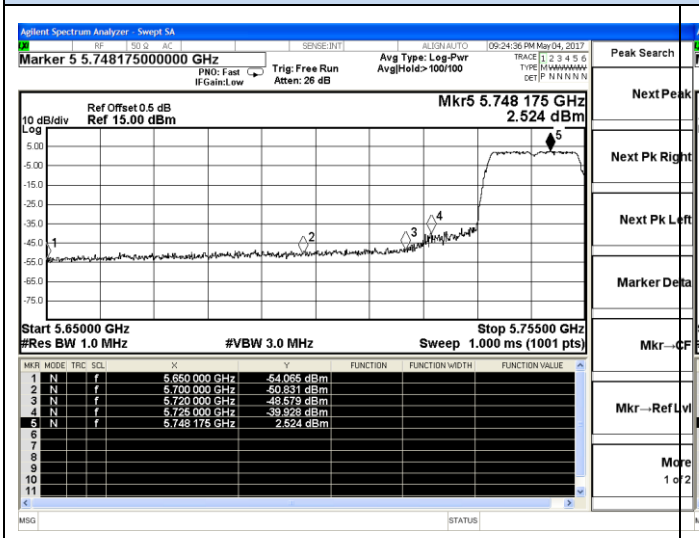
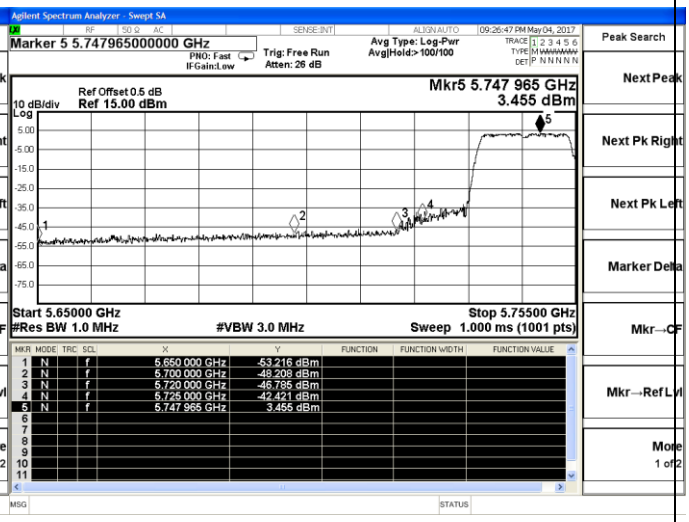
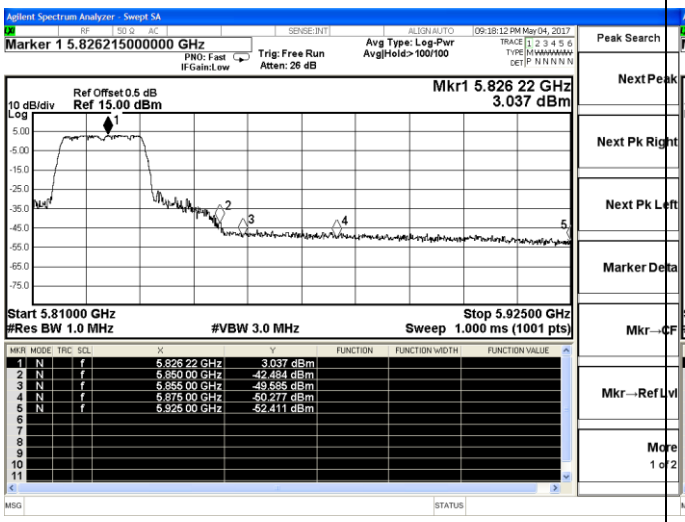
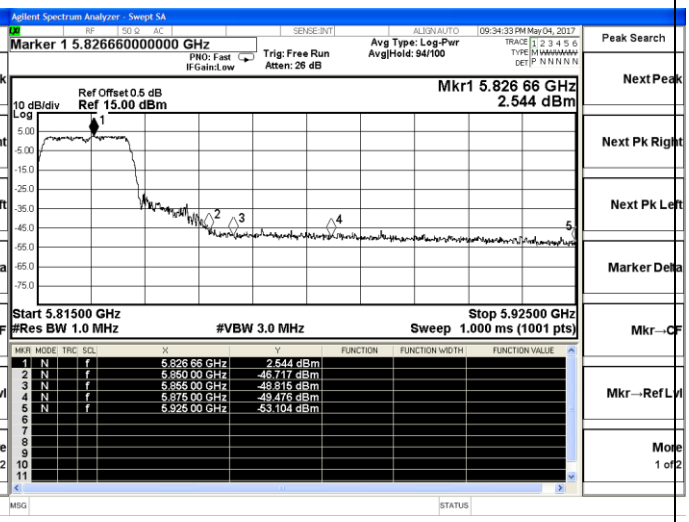
	
Channel 149 / 5745 MHz – Peak	Channel 149 / 5745 MHz – Peak

Unwanted emission

IEEE 802.11n HT20

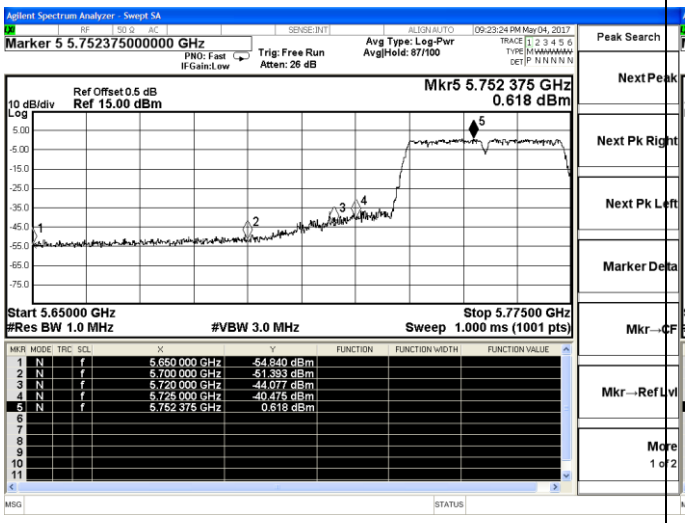
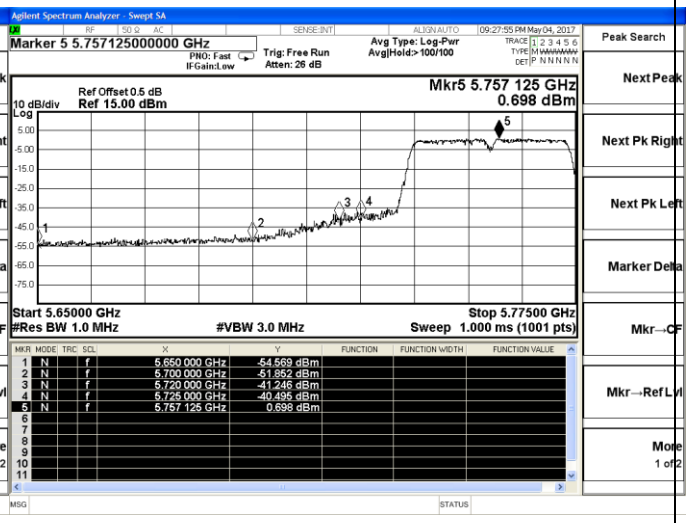
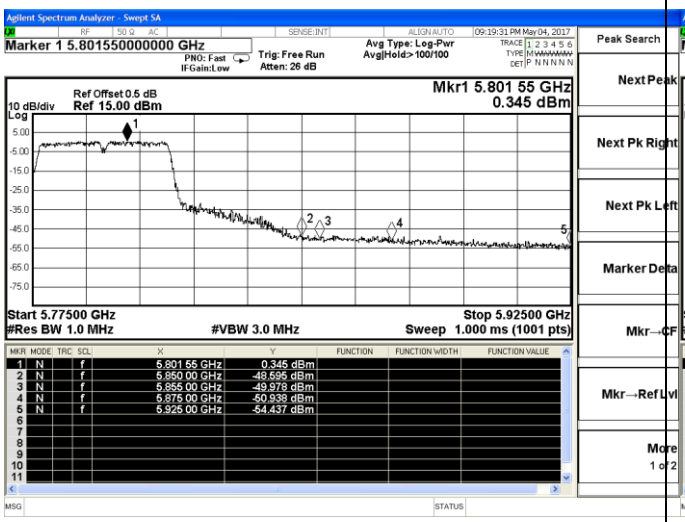
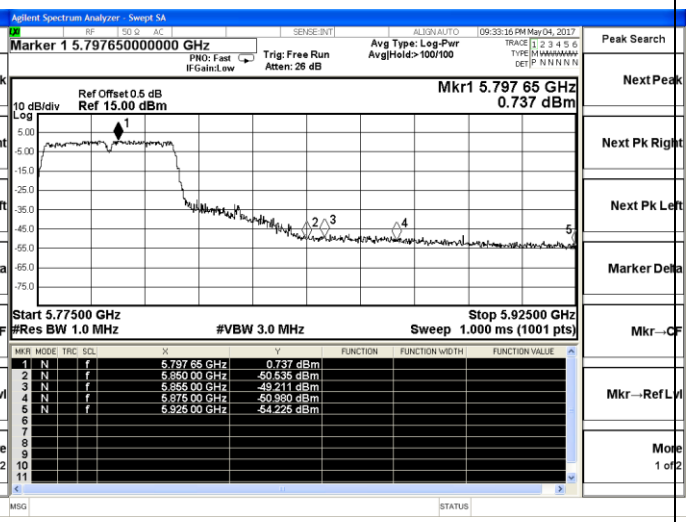
Antenna Chain 0	Antenna Chain 1
	
Channel 165 / 5825 MHz – Peak	Channel 165 / 5825 MHz – Peak

IEEE 802.11ac VHT20

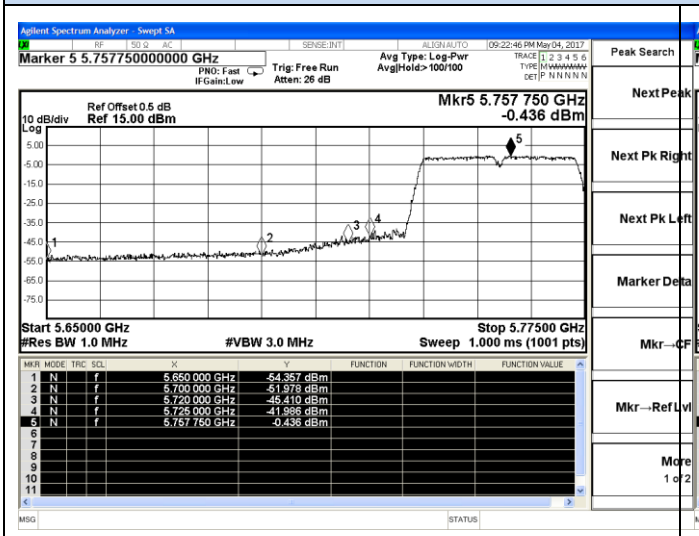
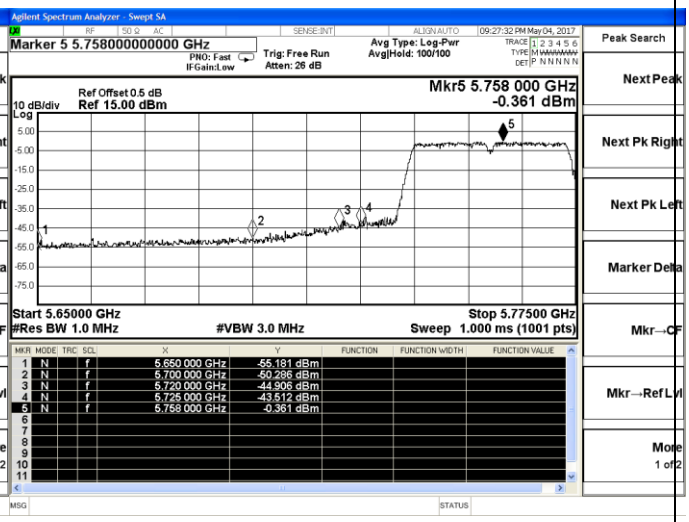
	
Channel 149 / 5745 MHz – Peak	Channel 149 / 5745 MHz – Peak
	
Channel 165 / 5825 MHz – Peak	Channel 165 / 5825 MHz – Peak

Unwanted emission

IEEE 802.11n HT40

Antenna Chain 0	Antenna Chain 1
	
Channel 151 / 5755 MHz – Peak	Channel 151 / 5755 MHz – Peak
	
Channel 159 / 5795 MHz – Peak	Channel 159 / 5795 MHz – Peak

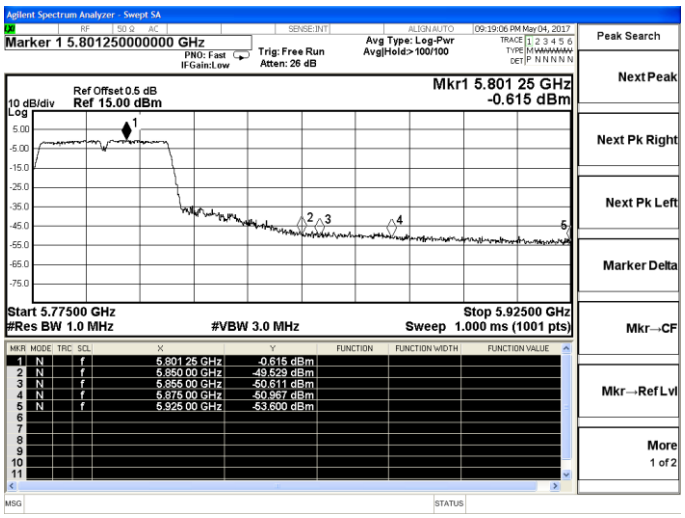
IEEE 802.11ac VHT40

	
Channel 151 / 5755 MHz – Peak	Channel 151 / 5755 MHz – Peak

Unwanted emission

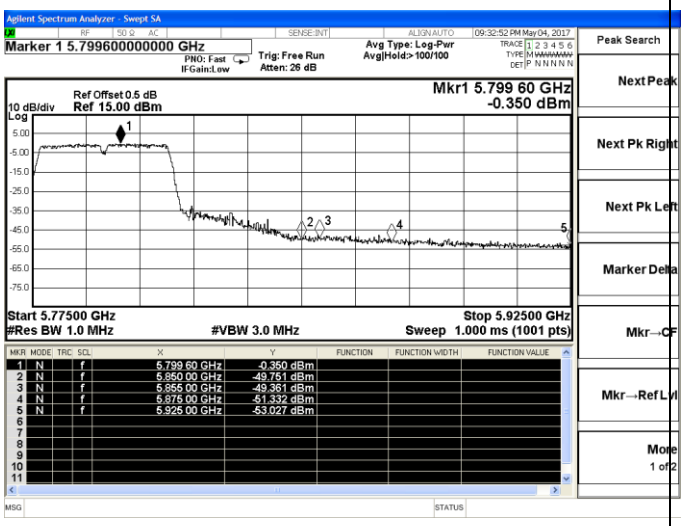
IEEE 802.11ac VHT40

Antenna Chain 0



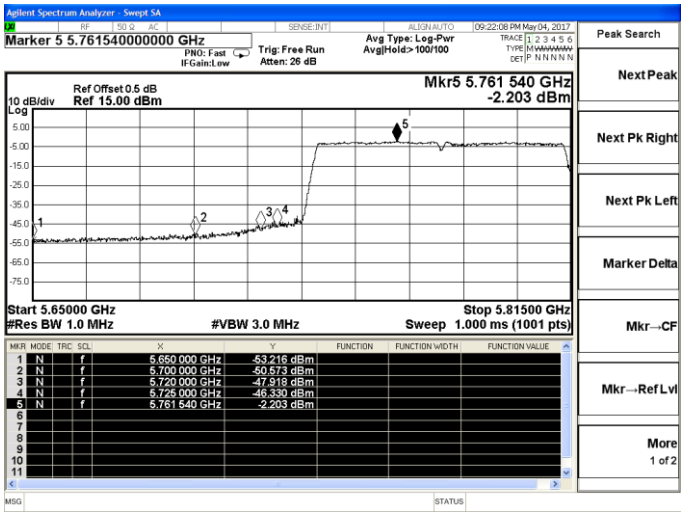
Channel 159 / 5795 MHz – Peak

Antenna Chain 1

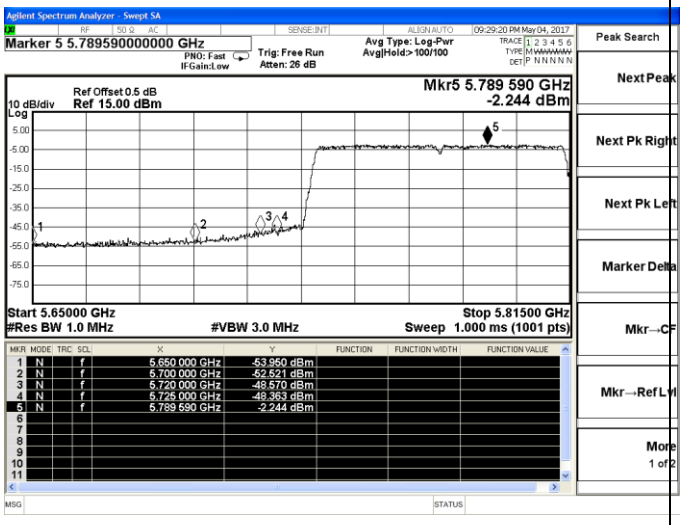


Channel 159 / 5795 MHz – Peak

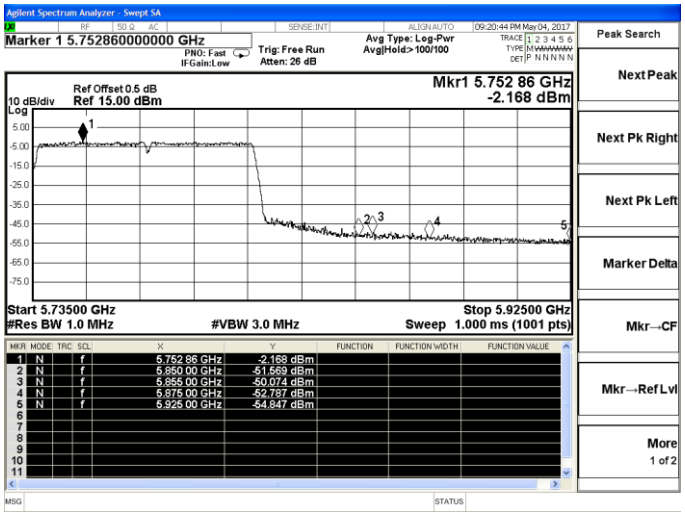
IEEE 802.11ac VHT80



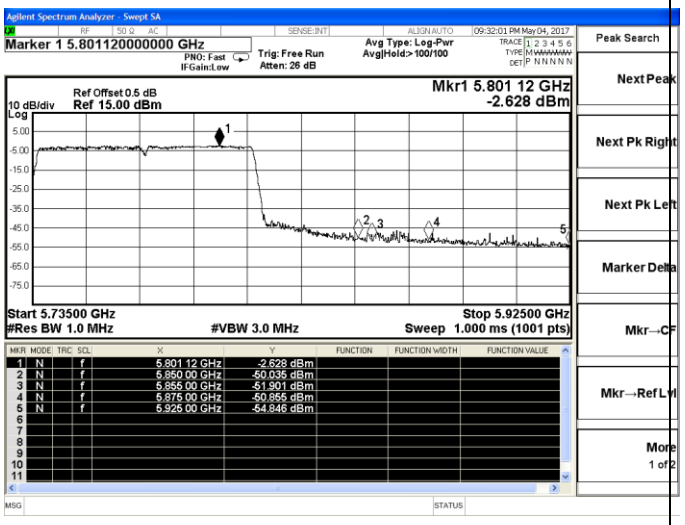
Channel 155 / 5775 MHz – Peak



Channel 155 / 5775 MHz – Peak



Channel 155 / 5775 MHz – Peak



Channel 155 / 5775 MHz – Peak

5.8. Antenna Requirements

5.8.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.8.2. Antenna Connector Construction

The directional gains of antenna used for transmitting is 2.0dBi which is a PIFA antenna and no consideration of replacement. Please see EUT photo for details.

5.8.3. Results: Compliance.

6. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Cal Date	Due Date
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	June 18, 2016	June 17, 2017
Signal analyzer	Agilent	E4448A(External mixers to 40GHz)	US44300469	9kHz~40GHz	July 16, 2016	July 15, 2017
Signal analyzer	Agilent	N9020A	MY50510140	9kHz~26.5GHz	October 27, 2017	October 27, 2017
LISN	MESS Tec	NNB-2/16Z	99079	9KHz-30MHz	June 18, 2016	June 17, 2017
LISN (Support Unit)	EMCO	3819/2NM	9703-1839	9KHz-30MHz	June 18, 2016	June 17, 2017
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9KHz-30MHz	June 18, 2016	June 17, 2017
ISN	SCHAFFNER	ISN ST08	21653	9KHz-30MHz	June 18, 2016	June 17, 2017
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30M-18GHz 3m	June 18, 2016	June 17, 2017
Amplifier	SCHAFFNER	COA9231A	18667	9kHz-2GHzz	June 18, 2016	June 17, 2017
Amplifier	Agilent	8449B	3008A02120	1GHz-26.5GHz	July 16, 2016	July 15, 2017
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5GHz-40GHz	July 16, 2016	July 15, 2017
Loop Antenna	R&S	HFH2-Z2	860004/001	9k-30MHz	June 18, 2016	June 17, 2017
By-log Antenna	SCHWARZBEC	VULB9163	9163-470	30MHz-1GHz	June 10, 2016	June 09, 2017
Horn Antenna	EMCO	3115	6741	1GHz-18GHz	June 10, 2016	June 09, 2017
Horn Antenna	SCHWARZBEC	BBHA9170	BBHA9170154	15GHz-40GHz	June 10, 2016	June 09, 2017
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz-1GHz	June 18, 2016	June 17, 2017
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz-40GHz	June 18, 2016	June 17, 2017
Power Meter	Anritsu	ML2495A	1204011	N/A	June 18, 2016	June 17, 2017
Power Sensor	Anritsu	MA2411B	1126166	N/A	June 18, 2016	June 17, 2017
AC Power Source	HPC	HPA-500E	HPA-9100024	AC 0~300V	June 18, 2016	June 17, 2017
DC power source	GW	GPC-6030D	C671845	DC 1V-60V	June 18, 2016	June 17, 2017
Temp. and Humidify Chamber	Giant Force	GTH-225-20-S	MAB0103-00	N/A	June 18, 2016	June 17, 2017
RF CABLE-1m	JYE Bao	RG142	CB034-1m	20MHz-7GHz	June 18, 2016	June 17, 2017
RF CABLE-2m	JYE Bao	RG142	CB)35-2m	20MHz-1GHz	June 18, 2016	June 17, 2017
EMC Test	Audix	E3	N/A	N/A	N/A	N/A
Note: All equipment through GRGT EST calibration						

7. TEST SETUP PHOTOGRAPHS OF EUT

Please refer to separated files for Test Setup Photos of the EUT.

8. EXTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

9. INTERIOR PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

----------THE END OF REPORT----------