9. MPE ESTIMATION

9.1.Limit for General Population/ Uncontrolled Exposures

Frequency	**Power density (mW/cm2)**	**Averaging time(minutes)**
300MHz----1.5GHz	F/1500	30
1.5GHz---100GHz	1.0	30

Note: F= Frequency in MHz

9.2.Estimation Result

5180-5240MHz Band:

EUT: CaptionCall Wireless Router 2		
M/N: CR2		
Test date: 2016-12-02	Pressure: 103.1±1.0 kpa	Humidity: 52.3±3.0%
Tested by: Lynn	Test site: RF site	Temperature:22.7±0.6 ℃

Test Mode	Frequency（MHz）	Peak Output Power (dBm)	Peak Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (Linear)	MPE
11a	5180	14.48	28.05	5	3.16	0.0177
	5200	14.45	27.86	5	3.16	0.0175
	5240	14.18	26.18	5	3.16	0.0165
11n HT20	5180	14.19	26.24	5	3.16	0.0165
	5200	14.21	26.36	5	3.16	0.0166
	5240	14.22	26.42	5	3.16	0.0166
11n HT40	5190	13.47	22.23	5	3.16	0.0140
	5230	14.52	28.31	5	3.16	0.0178
11ac VHT20	5180	14.57	28.64	5	3.16	0.0180
	5200	14.59	28.77	5	3.16	0.0181
	5240	14.65	29.17	5	3.16	0.0184
11ac VHT40	5190	13.05	20.18	5	3.16	0.0127
	5230	14.51	28.25	5	3.16	0.0178
11ac VHT80	5210	13.25	21.13	5	3.16	0.0133

$$MPE=\frac{PG}{4\pi R^2} \quad (R=20\ cm)$$

5745-5825MHz Band:

EUT: CaptionCall Wireless Router 2		
M/N: CR2		
Test date: 2016-12-05	Pressure: 102.7±1.0 kpa	Humidity: 53.6±3.0%
Tested by: Lynn	Test site: RF site	Temperature:23.2±0.6 ℃

Test Mode	Frequency（MHz）	Peak Output Power (dBm)	Peak Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (Linear)	MPE
11a	5745	14.68	29.38	5	3.16	0.0185
	5785	14.46	27.93	5	3.16	0.0176
	5825	14.50	28.18	5	3.16	0.0177
11n HT20	5745	14.51	28.25	5	3.16	0.0178
	5785	14.59	28.77	5	3.16	0.0181
	5825	14.30	26.92	5	3.16	0.0169
11n HT40	5755	14.46	27.93	5	3.16	0.0176
	5795	14.26	26.67	5	3.16	0.0168
11ac VHT20	5745	14.35	27.23	5	3.16	0.0171
	5785	14.56	28.58	5	3.16	0.0180
	5825	14.22	26.42	5	3.16	0.0166
11ac VHT40	5755	14.46	27.93	5	3.16	0.0176
	5795	14.23	26.49	5	3.16	0.0167
11ac VHT80	5775	14.62	28.97	5	3.16	0.0182

$$MPE=\frac{PG}{4\pi R^2} \quad (R=20\ cm)$$

10. FREQUENCY STABILITY MEASUREMENT

10.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	N9030A	MY51380221	Oct.15,16	1 Year
2.	Amplifier	Agilent	8449B	3008A02495	Apr.24,16	1 Year
3.	Horn Antenna	ETC	MCTD 1209	DRH15F03007	Apr.11,16	1 Year
4.	HF Cable	Hubersuhner	Sucoflex104	274094/4	Apr.24,16	1 Year

10.2. Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emissions is maintained within the band of operation under all conditions of normal operation as specified in the user's manual or ±20ppm

10.3. Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer. EUT have transmitted absence of modulation signal and fixed channelise. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 106 ppm and the limit is less than ±20ppm The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
2. Extreme temperature rule is -30°C~50°C.

10.4.Test Result

EUT: CaptionCall Wireless Router 2		
M/N: CR2		
Test date: 2016-12-08	Pressure: 103.3±1.0 kpa	Humidity: 53.2±3.0%
Tested by: Lynn	Test site: RF site	Temperature:23.6±0.6 ℃

Frequency Stability vs.Voltage:

Test Voltage	Temperature	CH	Max. Reading（MHz）	Target Frequency (MHz)	Result (ppm)	Limit (ppm)
AC 108V	25℃	CH36	5179.9487	5180	-9.90	±20
		CH38	5189.9458	5190	-10.44	±20
		CH40	5199.9456	5200	-10.46	±20
		CH42	5209.9461	5210	-10.35	±20
		CH46	5229.9429	5230	-10.92	±20
		CH48	5239.9469	5240	-10.13	±20
		CH149	5744.9343	5745	-11.44	±20
		CH151	5754.9342	5755	-11.43	±20
		CH155	5774.9378	5775	-10.77	±20
		CH157	5784.9325	5785	-11.67	±20
		CH159	5794.9384	5795	-10.63	±20
		CH165	5824.9337	5825	-11.38	±20
Conclusion: PASS						

Test Voltage	Temperature	CH	Max. Reading（MHz）	Target Frequency (MHz)	Result (ppm)	Limit (ppm)
AC 120V	25℃	CH36	5179.9445	5180	-10.71	±20
		CH38	5189.9460	5190	-10.40	±20
		CH40	5199.9455	5200	-10.48	±20
		CH42	5209.9485	5210	-9.88	±20
		CH46	5229.9440	5230	-10.71	±20
		CH48	5239.9430	5240	-10.88	±20
		CH149	5744.9355	5745	-11.23	±20
		CH151	5754.9390	5755	-10.60	±20
		CH155	5774.9395	5775	-10.48	±20
		CH157	5784.9365	5785	-10.98	±20
		CH159	5794.9390	5795	-10.53	±20
		CH165	5824.9365	5825	-10.90	±20
Conclusion: PASS						

Test Voltage	Temperature	CH	Max. Reading（MHz）	Target Frequency (MHz)	Result (ppm)	Limit (ppm)
AC 132V	25℃	CH36	5179.9443	5180	-10.75	±20
		CH38	5189.9469	5190	-10.23	±20
		CH40	5199.9455	5200	-10.48	±20
		CH42	5209.9497	5210	-9.65	±20
		CH46	5229.9407	5230	-11.34	±20
		CH48	5239.9483	5240	-9.87	±20
		CH149	5744.9317	5745	-11.89	±20
		CH151	5754.9361	5755	-11.10	±20
		CH155	5774.9378	5775	-10.77	±20
		CH157	5784.9320	5785	-11.75	±20
		CH159	5794.9304	5795	-12.01	±20
		CH165	5824.9394	5825	-10.40	±20
Conclusion: PASS						

Frequency Stability vs.Temperature:

Test Voltage	Temperature	CH	Max. Reading （MHz）	Target Frequency (MHz)	Result (ppm)	Limit (ppm)
AC 120V	-5℃	CH36	5179.9459	5180	-10.44	±20
		CH38	5189.9433	5190	-10.92	±20
		CH40	5199.9443	5200	-10.71	±20
		CH42	5209.9406	5210	-11.40	±20
		CH46	5229.9423	5230	-11.03	±20
		CH48	5239.9467	5240	-10.17	±20
		CH149	5744.9395	5745	-10.53	±20
		CH151	5754.9380	5755	-10.77	±20
		CH155	5774.9389	5775	-10.58	±20
		CH157	5784.9328	5785	-11.62	±20
		CH159	5794.9333	5795	-11.51	±20
		CH165	5824.9308	5825	-11.88	±20
Conclusion: PASS						

Test Voltage	Temperature	CH	Max. Reading （MHz）	Target Frequency (MHz)	Result (ppm)	Limit (ppm)
AC 120V	5℃	CH36	5179.9427	5180	-11.06	±20
		CH38	5189.9433	5190	-10.92	±20
		CH40	5199.9421	5200	-11.13	±20
		CH42	5209.9471	5210	-10.15	±20
		CH46	5229.9444	5230	-10.63	±20
		CH48	5239.9358	5240	-12.25	±20
		CH149	5744.9419	5745	-10.11	±20
		CH151	5754.9376	5755	-10.84	±20
		CH155	5774.9375	5775	-10.82	±20
		CH157	5784.9366	5785	-10.96	±20
		CH159	5794.9334	5795	-11.49	±20
		CH165	5824.9364	5825	-10.92	±20
Conclusion: PASS						

Test Voltage	Temperature	CH	Max. Reading（MHz）	Target Frequency (MHz)	Result (ppm)	Limit (ppm)
AC 120V	15℃	CH36	5179.943	5180	-11.00	±20
		CH38	5189.9491	5190	-9.81	±20
		CH40	5199.9408	5200	-11.38	±20
		CH42	5209.9434	5210	-10.86	±20
		CH46	5229.9416	5230	-11.17	±20
		CH48	5239.9348	5240	-12.44	±20
		CH149	5744.9311	5745	-11.99	±20
		CH151	5754.9379	5755	-10.79	±20
		CH155	5774.9321	5775	-11.76	±20
		CH157	5784.9319	5785	-11.77	±20
		CH159	5794.9365	5795	-10.96	±20
		CH165	5824.9356	5825	-11.06	±20
Conclusion: PASS						

Test Voltage	Temperature	CH	Max. Reading（MHz）	Target Frequency (MHz)	Result (ppm)	Limit (ppm)
AC 120V	25℃	CH36	5179.9445	5180	-10.71	±20
		CH38	5189.9460	5190	-10.40	±20
		CH40	5199.9455	5200	-10.48	±20
		CH42	5209.9485	5210	-9.88	±20
		CH46	5229.9440	5230	-10.71	±20
		CH48	5239.9430	5240	-10.88	±20
		CH149	5744.9355	5745	-11.23	±20
		CH151	5754.9390	5755	-10.60	±20
		CH155	5774.9395	5775	-10.48	±20
		CH157	5784.9365	5785	-10.98	±20
		CH159	5794.9390	5795	-10.53	±20
		CH165	5824.9365	5825	-10.90	±20
Conclusion: PASS						

Test Voltage	Temperature	CH	Max. Reading（MHz）	Target Frequency (MHz)	Result (ppm)	Limit (ppm)
AC 120V	35℃	CH36	5179.9468	5180	-10.27	±20
		CH38	5189.9487	5190	-9.88	±20
		CH40	5199.9483	5200	-9.94	±20
		CH42	5209.9484	5210	-9.90	±20
		CH46	5229.9492	5230	-9.71	±20
		CH48	5239.9437	5240	-10.74	±20
		CH149	5744.9301	5745	-12.17	±20
		CH151	5754.9307	5755	-12.04	±20
		CH155	5774.9367	5775	-10.96	±20
		CH157	5784.9342	5785	-11.37	±20
		CH159	5794.9379	5795	-10.72	±20
		CH165	5824.9353	5825	-11.11	±20
Conclusion: PASS						

Test Voltage	Temperature	CH	Max. Reading（MHz）	Target Frequency (MHz)	Result (ppm)	Limit (ppm)
AC 120V	45℃	CH36	5179.9483	5180	-9.98	±20
		CH38	5189.9498	5190	-9.67	±20
		CH40	5199.9466	5200	-10.27	±20
		CH42	5209.9498	5210	-9.64	±20
		CH46	5229.9491	5230	-9.73	±20
		CH48	5239.9411	5240	-11.24	±20
		CH149	5744.9377	5745	-10.84	±20
		CH151	5754.9301	5755	-12.15	±20
		CH155	5774.9333	5775	-11.55	±20
		CH157	5784.9364	5785	-10.99	±20
		CH159	5794.9357	5795	-11.10	±20
		CH165	5824.9361	5825	-10.97	±20
Conclusion: PASS						