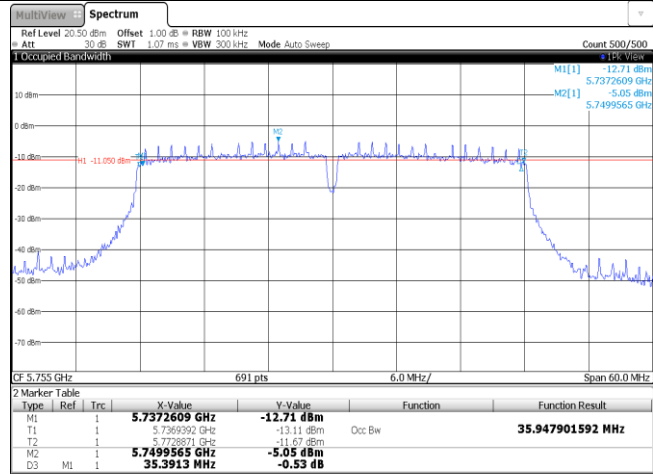


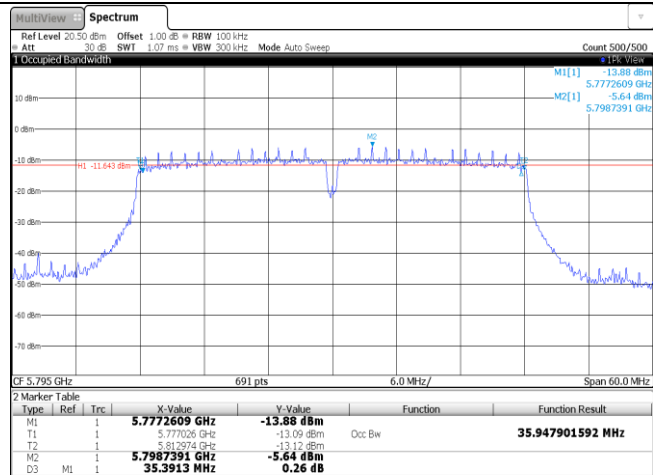
**802.11n (HT40) Antenna 1**

CH<sub>L</sub>



Date: 15 Jul 2019 13:45:52

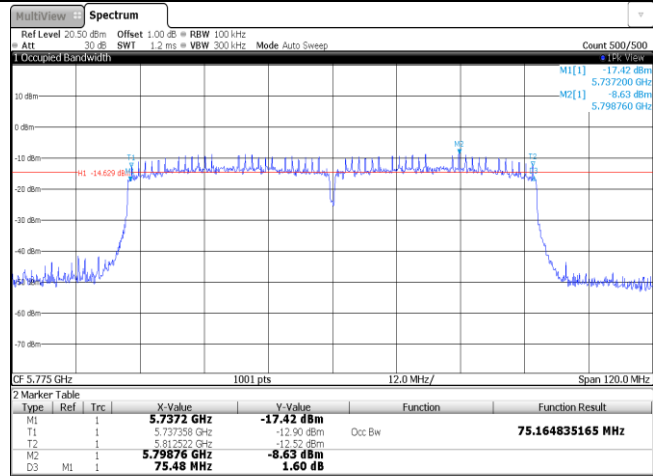
CH<sub>H</sub>



Date: 15 Jul 2019 13:49:46

**802.11ac (HT80) Antenna 1**

CH<sub>M</sub>



Date: 15 Jul 2019 14:08:20

### 5.7. Band edge

#### LIMIT

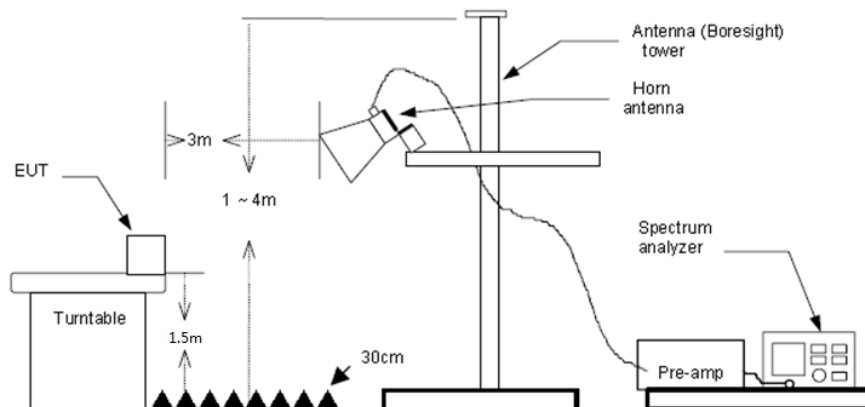
FCC CFR Title 47 Part 15 Subpart E Section 15.407(b)

Un-restricted band emissions above 1GHz			
Operating Band	Frequency	EIRP Limit	Value
5150-5250MHz	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
5250-5350MHz	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
5470-5725MHz	Above 1GHz	-27dBm/MHz(68.2dBuV/m)@3m	Peak
5725-5850 MHz	1GHz-5.65GHz	-27 dBm/MHz(68.2dBuV/m)@3m	Peak
	5.65GHz-5.7GHz	-27*dBm/MHz to 10dBm/MHz (68.2* dBuV/m to 105.6dBuV/m)	Peak
	5.7GHz-5.72GHz	10*dBm/MHz to 15.6dBm/MHz (105.6*dBuV/m to 110.8dBuV/m)	Peak
	5.72GHz-5.725GHz	15.6*dBm/MHz to 27dBm/MHz (110.8dBuV/m to* 122.2dBuV/m)	Peak
	5.85GHz-5.855GHz	27dBm/MHz to 15.6*dBm/MHz (122.2dBuV/m to110.8* dBuV/m)	Peak
	5.855GHz-5.875GHz	15.6dBm/MHz to 10*dBm/MHz (110.8dBuV/m to 105.6* dBuV/m)	Peak
	5.875GHz-5.925GHz	10dBm/MHz to -27*dBm/MHz (105.6dBuV/m to 68.2* dBuV/m)	Peak
	Above 5.925GHz	-27 dBm/MHz(68.2dBuV/m)@3m	Peak

\* Increase/Decreases with the linearly of the frequency.

For emission above 1GHz and in restricted band, according to FCC KDB 789033 D02 General UNII Test Procedure, all emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.  $E[dBuV/m] = EIRP[dBm] + 95.2$ , for  $d = 3$  meters.

#### TEST CONFIGURATION



**TEST PROCEDURE**

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:  
RBW=1MHz, VBW=3MHz PEAK detector for Peak value.  
RBW=1MHz, VBW=3MHz RMS detector for Average value.

**TEST MODE:**

Please refer to the clause 3.3

**TEST RESULTS**

**Passed**       **Not Applicable**

Band: I									
Worst mode: 802.11ac(HT20)					Test channel: CH <sub>L</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
5149.67	18.54	31.70	9.79	0.00	60.03	68.20	-8.17	Horizontal	Peak
5249.35	19.34	31.40	9.91	0.00	60.65	68.20	-7.55	Horizontal	Peak
5149.67	19.48	31.70	9.79	0.00	60.97	68.20	-7.23	Vertical	Peak
5249.35	18.09	31.40	9.91	0.00	59.40	68.20	-8.80	Vertical	Peak
5149.67	7.95	31.70	9.79	0.00	49.44	54.00	-4.56	Horizontal	Average
5249.35	7.18	31.40	9.91	0.00	48.49	54.00	-5.51	Horizontal	Average
5149.67	8.76	31.70	9.79	0.00	50.25	54.00	-3.75	Vertical	Average
5249.35	8.64	31.40	9.91	0.00	49.95	54.00	-4.05	Vertical	Average

Band: I									
Worst mode: 802.11ac(HT20)					Test channel: CH <sub>H</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
5149.67	20.38	31.70	9.79	0.00	61.87	68.20	-6.33	Horizontal	Peak
5249.35	19.33	31.40	9.91	0.00	60.64	68.20	-7.56	Horizontal	Peak
5149.67	19.27	31.70	9.79	0.00	60.76	68.20	-7.44	Vertical	Peak
5249.35	20.65	31.40	9.91	0.00	61.96	68.20	-6.24	Vertical	Peak
5149.67	7.37	31.70	9.79	0.00	48.86	54.00	-5.14	Horizontal	Average
5249.35	6.53	31.40	9.91	0.00	47.84	54.00	-6.16	Horizontal	Average
5149.67	7.18	31.70	9.79	0.00	48.67	54.00	-5.33	Vertical	Average
5249.35	7.38	31.40	9.91	0.00	48.69	54.00	-5.31	Vertical	Average

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Test 802.11a, 802.11n, 802.11ac mode, all modulations have been tested, only worst case is reported

Band: IV									
Worst mode: 802.11ac(HT20)					Test channel: CH <sub>L</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
5725.49	12.68	31.73	10.47	0.00	54.88	68.20	-13.32	Horizontal	Peak
5850.00	12.79	32.20	10.61	0.00	55.60	68.20	-12.60	Horizontal	Peak
5725.49	12.76	31.73	10.47	0.00	54.96	68.20	-13.24	Vertical	Peak
5850.00	14.69	32.20	10.61	0.00	57.50	68.20	-10.70	Vertical	Peak
5725.49	6.98	31.73	10.47	0.00	49.18	54.00	-4.82	Horizontal	Average
5850.00	7.46	32.20	10.61	0.00	50.27	54.00	-3.73	Horizontal	Average
5725.49	4.43	31.73	10.47	0.00	46.63	54.00	-7.37	Vertical	Average
5850.00	4.71	32.20	10.61	0.00	47.52	54.00	-6.48	Vertical	Average

Band: IV									
Worst mode: 802.11ac(HT20)					Test channel: CH <sub>H</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
5725.49	12.65	31.73	10.47	0.00	54.85	68.20	-13.35	Horizontal	Peak
5850.00	13.95	32.20	10.61	0.00	56.76	68.20	-11.44	Horizontal	Peak
5725.49	9.60	31.73	10.47	0.00	51.80	68.20	-16.40	Vertical	Peak
5850.00	11.86	32.20	10.61	0.00	54.67	68.20	-13.53	Vertical	Peak
5725.49	5.73	31.73	10.47	0.00	47.93	54.00	-6.07	Horizontal	Average
5850.00	7.36	32.20	10.61	0.00	50.17	54.00	-3.83	Horizontal	Average
5725.49	6.97	31.73	10.47	0.00	49.17	54.00	-4.83	Vertical	Average
5850.00	6.15	32.20	10.61	0.00	48.96	54.00	-5.04	Vertical	Average

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Test 802.11a, 802.11n, 802.11ac mode, all modulations have been tested, only worst case is reported

Band: I									
Worst mode: 802.11ac(HT40)					Test channel: CH <sub>L</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
5149.67	16.85	31.70	9.79	0.00	58.34	68.20	-9.86	Horizontal	Peak
5349.35	16.72	31.40	10.05	0.00	58.17	68.20	-10.03	Horizontal	Peak
5149.67	17.08	31.70	9.79	0.00	58.57	68.20	-9.63	Vertical	Peak
5349.35	16.56	31.40	10.05	0.00	58.01	68.20	-10.19	Vertical	Peak
5149.67	8.09	31.70	9.79	0.00	49.58	54.00	-4.42	Horizontal	Average
5349.35	8.09	31.40	10.05	0.00	49.54	54.00	-4.46	Horizontal	Average
5149.67	8.79	31.70	9.79	0.00	50.28	54.00	-3.72	Vertical	Average
5349.35	9.93	31.40	10.05	0.00	51.38	54.00	-2.62	Vertical	Average

Band: I									
Worst mode: 802.11ac(HT40)					Test channel: CH <sub>H</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
5149.67	21.95	31.70	9.79	0.00	63.44	68.20	-4.76	Horizontal	Peak
5249.35	19.85	31.40	9.91	0.00	61.16	68.20	-7.04	Horizontal	Peak
5149.67	18.71	31.70	9.79	0.00	60.20	68.20	-8.00	Vertical	Peak
5249.35	18.13	31.40	9.91	0.00	59.44	68.20	-8.76	Vertical	Peak
5149.67	8.33	31.70	9.79	0.00	49.82	54.00	-4.18	Horizontal	Average
5249.35	7.80	31.40	9.91	0.00	49.11	54.00	-4.89	Horizontal	Average
5149.67	7.81	31.70	9.79	0.00	49.30	54.00	-4.70	Vertical	Average
5249.35	7.76	31.40	9.91	0.00	49.07	54.00	-4.93	Vertical	Average

## Remark:

4. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
5. The emission levels of other frequencies are very lower than the limit and not show in test report.
6. Test 802.11a, 802.11n, 802.11ac mode, all modulations have been tested, only worst case is reported

Band: IV									
Worst mode: 802.11ac(HT40)					Test channel: CH <sub>L</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
5725.49	6.68	31.73	10.47	0.00	48.88	68.20	-19.32	Horizontal	Peak
5850.00	6.79	32.20	10.61	0.00	49.60	68.20	-18.60	Horizontal	Peak
5725.49	14.76	31.73	10.47	0.00	56.96	68.20	-11.24	Vertical	Peak
5850.00	16.69	32.20	10.61	0.00	59.50	68.20	-8.70	Vertical	Peak
5725.49	5.98	31.73	10.47	0.00	48.18	54.00	-5.82	Horizontal	Average
5850.00	6.46	32.20	10.61	0.00	49.27	54.00	-4.73	Horizontal	Average
5725.49	4.43	31.73	10.47	0.00	46.63	54.00	-7.37	Vertical	Average
5850.00	4.71	32.20	10.61	0.00	47.52	54.00	-6.48	Vertical	Average

Band: IV									
Worst mode: 802.11ac(HT40)					Test channel: CH <sub>H</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
5725.49	12.65	31.73	10.47	0.00	54.85	68.20	-13.35	Horizontal	Peak
5850.00	13.95	32.20	10.61	0.00	56.76	68.20	-11.44	Horizontal	Peak
5725.49	8.60	31.73	10.47	0.00	50.80	68.20	-17.40	Vertical	Peak
5850.00	10.86	32.20	10.61	0.00	53.67	68.20	-14.53	Vertical	Peak
5725.49	4.73	31.73	10.47	0.00	46.93	54.00	-7.07	Horizontal	Average
5850.00	6.36	32.20	10.61	0.00	49.17	54.00	-4.83	Horizontal	Average
5725.49	6.97	31.73	10.47	0.00	49.17	54.00	-4.83	Vertical	Average
5850.00	6.15	32.20	10.61	0.00	48.96	54.00	-5.04	Vertical	Average

## Remark:

4. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
5. The emission levels of other frequencies are very lower than the limit and not show in test report.
6. Test 802.11a, 802.11n, 802.11ac mode, all modulations have been tested, only worst case is reported

Band: I									
Worst mode: 802.11ac(HT80)					Test channel: CH <sub>M</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
5149.67	14.54	31.70	9.79	0.00	56.03	68.20	-12.17	Horizontal	Peak
5249.35	14.34	31.40	9.91	0.00	55.65	68.20	-12.55	Horizontal	Peak
5149.67	16.48	31.70	9.79	0.00	57.97	68.20	-10.23	Vertical	Peak
5249.35	14.09	31.40	9.91	0.00	55.40	68.20	-12.80	Vertical	Peak
5149.67	5.95	31.70	9.79	0.00	47.44	54.00	-6.56	Horizontal	Average
5249.35	4.18	31.40	9.91	0.00	45.49	54.00	-8.51	Horizontal	Average
5149.67	5.76	31.70	9.79	0.00	47.25	54.00	-6.75	Vertical	Average
5249.35	5.64	31.40	9.91	0.00	46.95	54.00	-7.05	Vertical	Average

Band: IV									
Worst mode: 802.11ac(HT80)					Test channel: CH <sub>M</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
5718.40	15.30	31.69	10.46	0.00	57.45	68.20	-10.75	Horizontal	Peak
5850.92	16.12	32.20	10.61	0.00	58.93	68.20	-9.27	Horizontal	Peak
5725.49	17.60	31.73	10.47	0.00	59.80	68.20	-8.40	Vertical	Peak
5850.00	16.86	32.20	10.61	0.00	59.67	68.20	-8.53	Vertical	Peak
5725.49	5.73	31.73	10.47	0.00	47.93	54.00	-6.07	Horizontal	Average
5850.00	9.36	32.20	10.61	0.00	52.17	54.00	-1.83	Horizontal	Average
5725.49	5.97	31.73	10.47	0.00	48.17	54.00	-5.83	Vertical	Average
5850.00	9.15	32.20	10.61	0.00	51.96	54.00	-2.04	Vertical	Average

## Remark:

7. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
8. The emission levels of other frequencies are very lower than the limit and not show in test report.
9. Test 802.11a, 802.11n, 802.11ac mode, all modulations have been tested, only worst case is reported



### 5.8. Radiated Spurious Emissions

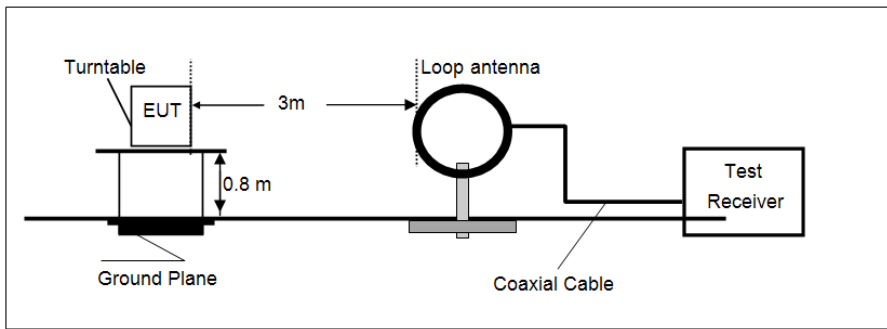
#### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209 and Part 15 Subpart E Section 15.407

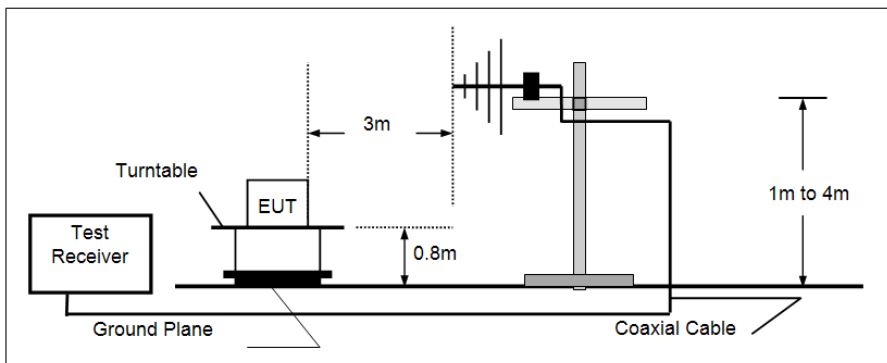
Unwanted emissions below 1GHz and Restricted band emissions above 1GHz		
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

#### TEST CONFIGURATION

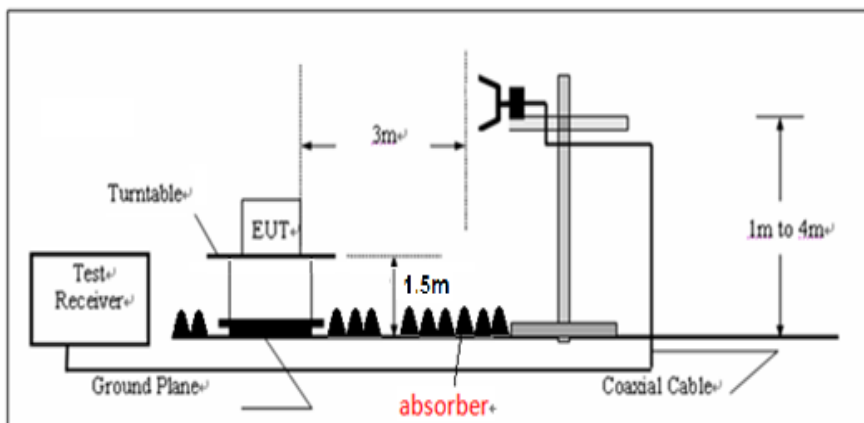
- 9KHz ~30MHz



- 30MHz ~ 1GHz



- Above 1GHz



**TEST PROCEDURE**

1. The EUT was setup and tested according to ANSI C63.10:2013
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Below 1 GHz:  
RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;  
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
  - (3) From 1 GHz to 10<sup>th</sup> harmonic:  
RBW=1MHz, VBW=3MHz Peak detector for Peak value.  
RBW=1MHz, VBW=3MHz RMS detector for Average value.

**TEST MODE:**

Please refer to the clause 3.3

**TEST RESULTS**

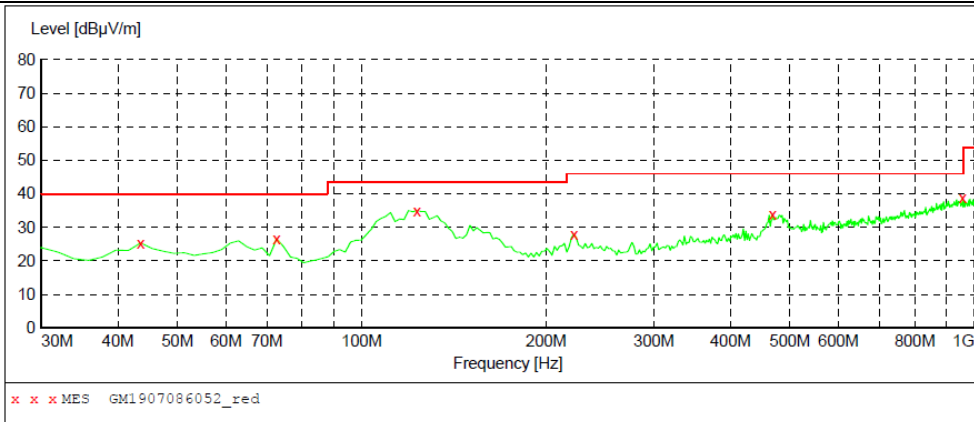
**Passed**       **Not Applicable**

**Measurement data:**

■ **9kHz ~ 30MHz**

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

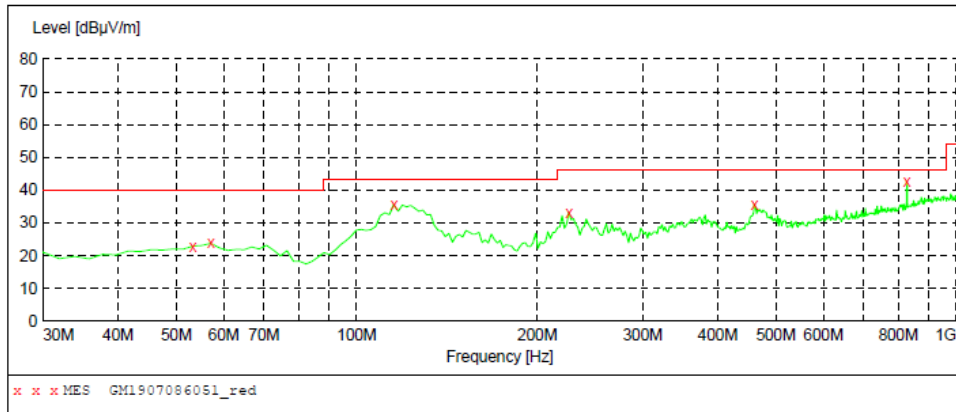
■ **30MHz ~ 1GHz**



**MEASUREMENT RESULT: "GM1907086052\_red"**

7/8/2019 6:02PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
43.580000	25.40	-5.2	40.0	14.6	QP	100.0	316.00	VERTICAL
72.680000	26.60	-10.2	40.0	13.4	QP	100.0	224.00	VERTICAL
123.120000	35.00	-8.9	43.5	8.5	QP	100.0	264.00	VERTICAL
222.060000	28.00	-5.9	46.0	18.0	QP	100.0	345.00	VERTICAL
468.440000	33.80	0.8	46.0	12.2	QP	100.0	248.00	VERTICAL
957.320000	38.80	10.9	46.0	7.2	QP	100.0	33.00	VERTICAL



**MEASUREMENT RESULT: "GM1907086051\_red"**

7/8/2019 6:00PM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
53.280000	22.90	-5.1	40.0	17.1	QP	100.0	74.00	HORIZONTAL
57.160000	23.80	-5.5	40.0	16.2	QP	300.0	257.00	HORIZONTAL
115.360000	35.60	-7.7	43.5	7.9	QP	300.0	137.00	HORIZONTAL
225.940000	33.30	-5.7	46.0	12.7	QP	100.0	245.00	HORIZONTAL
460.680000	35.70	0.7	46.0	10.3	QP	100.0	193.00	HORIZONTAL
827.340000	42.60	8.6	46.0	3.4	QP	100.0	34.00	HORIZONTAL

**Remark:**

Transd=Cable lose+ Antenna factor- Pre-amplifier; Margin=Limit -Level

■ Above 1GHz

Band: I									
Worst mode: 802.11ac(HT20)					Test channel: CH <sub>L</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
3151.99	36.99	28.80	7.66	37.44	36.01	68.20	-32.19	Vertical	Peak
4159.93	36.89	29.96	8.91	36.60	39.16	68.20	-29.04	Vertical	Peak
7413.73	31.62	36.27	12.11	33.16	46.84	68.20	-21.36	Vertical	Peak
9562.85	31.53	39.05	13.73	33.89	50.42	68.20	-17.78	Vertical	Peak
1306.41	33.63	26.18	4.84	37.17	27.48	68.20	-40.72	Horizontal	Peak
1958.19	31.34	25.89	6.21	37.56	25.88	68.20	-42.32	Horizontal	Peak
3943.39	31.82	29.70	8.70	36.80	33.42	68.20	-34.78	Horizontal	Peak
6267.19	31.14	33.03	11.00	33.86	41.31	68.20	-26.89	Horizontal	Peak

Band: I									
Worst mode: 802.11ac(HT20)					Test channel: CH <sub>M</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
3151.99	36.99	28.80	7.66	37.44	36.01	68.20	-32.19	Vertical	Peak
4159.93	36.89	29.96	8.91	36.60	39.16	68.20	-29.04	Vertical	Peak
7413.73	31.62	36.27	12.11	33.16	46.84	68.20	-21.36	Vertical	Peak
9562.85	31.53	39.05	13.73	33.89	50.42	68.20	-17.78	Vertical	Peak
1182.94	35.51	26.17	4.62	37.23	29.07	68.20	-39.13	Horizontal	Peak
1791.27	32.08	25.38	5.94	37.40	26.00	68.20	-42.20	Horizontal	Peak
3112.13	32.63	28.80	7.61	37.48	31.56	68.20	-36.64	Horizontal	Peak
6017.06	29.95	32.50	10.70	34.13	39.02	68.20	-29.18	Horizontal	Peak

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Measuring frequencies from 1 GHz to 40GHz.
4. Test 802.11a, 802.11n, 802.11ac mode, all modulations have been tested, only worst case is reported

Band: I									
Worst mode: 802.11ac(HT20)					Test channel: CH <sub>H</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
3151.99	37.99	28.80	7.66	37.44	37.01	68.20	-31.19	Vertical	Peak
4159.93	37.89	29.96	8.91	36.60	40.16	68.20	-28.04	Vertical	Peak
7413.73	32.62	36.27	12.11	33.16	47.84	68.20	-20.36	Vertical	Peak
8996.12	32.22	37.90	13.31	33.03	50.40	68.20	-17.80	Vertical	Peak
3151.99	36.99	28.80	7.66	37.44	36.01	68.20	-32.19	Horizontal	Peak
4159.93	36.89	29.96	8.91	36.60	39.16	68.20	-29.04	Horizontal	Peak
7413.73	31.62	36.27	12.11	33.16	46.84	68.20	-21.36	Horizontal	Peak
9909.80	33.29	39.10	13.59	34.15	51.83	68.20	-16.37	Horizontal	Peak

Band: IV									
Worst mode: 802.11ac(HT20)					Test channel: CH <sub>L</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1593.34	34.15	24.96	5.55	37.18	27.48	68.20	-40.72	Vertical	Peak
2346.10	29.85	27.87	6.68	37.59	26.81	68.20	-41.39	Vertical	Peak
3672.11	33.11	29.30	8.35	37.00	33.76	68.20	-34.44	Vertical	Peak
6315.23	30.75	33.13	11.00	33.81	41.07	68.20	-27.13	Vertical	Peak
1326.51	34.09	26.12	4.88	37.15	27.94	68.20	-40.26	Horizontal	Peak
1923.61	31.82	25.54	6.15	37.53	25.98	68.20	-42.22	Horizontal	Peak
3923.37	31.63	29.70	8.67	36.82	33.18	68.20	-35.02	Horizontal	Peak
7585.53	30.32	36.19	12.67	33.03	46.15	68.20	-22.05	Horizontal	Peak

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Measuring frequencies from 1 GHz to 40GHz.
4. Test 802.11a, 802.11n, 802.11ac mode, all modulations have been tested, only worst case is reported

Band: IV Worst mode: 802.11ac(HT20) Test channel: CH <sub>M</sub>									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1468.70	32.89	25.83	5.20	37.08	26.84	68.20	-41.36	Vertical	Peak
2412.72	32.49	27.55	6.78	37.59	29.23	68.20	-38.97	Vertical	Peak
4321.84	32.42	30.27	9.06	36.45	35.30	68.20	-32.90	Vertical	Peak
7135.98	30.89	35.82	11.86	33.64	44.93	68.20	-23.27	Vertical	Peak
1565.20	33.49	25.21	5.47	37.15	27.02	68.20	-41.18	Horizontal	Peak
2839.61	30.19	28.26	7.39	37.58	28.26	68.20	-39.94	Horizontal	Peak
4524.47	31.51	30.75	9.34	36.24	35.36	68.20	-32.84	Horizontal	Peak
7027.82	31.27	35.38	11.85	33.83	44.67	68.20	-23.53	Horizontal	Peak

Band: IV Worst mode: 802.11ac(HT20) Test channel: CH <sub>H</sub>									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1472.44	32.52	25.83	5.21	37.08	26.48	68.20	-41.72	Vertical	Peak
2364.08	30.22	27.78	6.71	37.59	27.12	68.20	-41.08	Vertical	Peak
4501.49	31.76	30.70	9.30	36.29	35.47	68.20	-32.73	Vertical	Peak
7489.60	30.81	36.12	12.36	33.04	46.25	68.20	-21.95	Vertical	Peak
1392.25	33.35	25.92	4.99	37.12	27.14	68.20	-41.06	Horizontal	Peak
3018.50	31.79	28.64	7.50	37.56	30.37	68.20	-37.83	Horizontal	Peak
5546.36	31.29	31.85	10.23	34.39	38.98	68.20	-29.22	Horizontal	Peak
8398.59	31.34	36.60	12.85	32.94	47.85	68.20	-20.35	Horizontal	Peak

**Remark:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Measuring frequencies from 1 GHz to 40GHz.
4. Test 802.11a, 802.11n, 802.11ac mode, all modulations have been tested, only worst case is reported

Band: I									
Worst mode: 802.11ac(HT40)					Test channel: CH <sub>L</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1773.13	32.81	25.35	5.91	37.38	26.69	68.20	-41.51	Vertical	Peak
7027.82	29.74	35.38	11.85	33.83	43.14	68.20	-25.06	Vertical	Peak
9538.54	30.63	39.05	13.72	33.87	49.53	68.20	-18.67	Vertical	Peak
11226.25	28.62	40.30	13.48	35.32	47.08	68.20	-21.12	Vertical	Peak
1805.01	32.29	25.39	5.97	37.41	26.24	68.20	-41.96	Horizontal	Peak
4234.72	30.73	30.07	8.97	36.53	33.24	68.20	-34.96	Horizontal	Peak
6511.12	28.49	34.02	11.20	33.63	40.08	68.20	-28.12	Horizontal	Peak
8814.77	30.43	37.71	13.12	32.99	48.27	68.20	-19.93	Horizontal	Peak

Band: I									
Worst mode: 802.11ac(HT40)					Test channel: CH <sub>H</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1814.22	32.53	25.39	5.98	37.42	26.48	68.20	-41.72	Vertical	Peak
4034.78	31.44	29.77	8.81	36.73	33.29	68.20	-34.91	Vertical	Peak
5022.19	29.05	31.59	9.69	35.34	34.99	68.20	-33.21	Vertical	Peak
10534.09	29.65	39.98	13.59	36.69	46.53	68.20	-21.67	Vertical	Peak
1904.12	31.24	25.34	6.12	37.51	25.19	68.20	-43.01	Horizontal	Peak
3135.99	33.05	28.80	7.64	37.45	32.04	68.20	-36.16	Horizontal	Peak
4946.07	30.70	31.45	9.63	35.47	36.31	68.20	-31.89	Horizontal	Peak
6511.12	28.49	34.02	11.20	33.63	40.08	68.20	-28.12	Horizontal	Peak

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Measuring frequencies from 1 GHz to 40GHz.
4. Test 802.11a, 802.11n, 802.11ac mode, all modulations have been tested, only worst case is reported

Band: IV		Worst mode: 802.11ac(HT40)					Test channel: CH <sub>L</sub>			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value	
1786.72	32.75	25.37	5.93	37.39	26.66	68.20	-41.54	Vertical	Peak	
3049.39	33.51	28.70	7.54	37.53	32.22	68.20	-35.98	Vertical	Peak	
4629.32	30.95	30.99	9.47	36.05	35.36	68.20	-32.84	Vertical	Peak	
6283.16	28.52	33.07	11.00	33.84	38.75	68.20	-29.45	Vertical	Peak	
1786.72	31.96	25.37	5.93	37.39	25.87	68.20	-42.33	Horizontal	Peak	
4433.26	30.43	30.57	9.18	36.35	33.83	68.20	-34.37	Horizontal	Peak	
5164.81	30.87	31.64	9.80	35.05	37.26	68.20	-30.94	Horizontal	Peak	
7820.82	28.71	36.23	13.16	33.05	45.05	68.20	-23.15	Horizontal	Peak	

Band: IV		Worst mode: 802.11ac(HT40)					Test channel: CH <sub>H</sub>			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value	
1502.73	32.24	25.77	5.29	37.07	26.23	68.20	-41.97	Vertical	Peak	
3096.33	32.84	28.79	7.60	37.49	31.74	68.20	-36.46	Vertical	Peak	
4736.60	29.05	31.35	9.51	35.85	34.06	68.20	-34.14	Vertical	Peak	
6594.52	29.33	34.19	11.35	33.67	41.20	68.20	-27.00	Vertical	Peak	
1973.20	30.23	26.04	6.23	37.58	24.92	68.20	-43.28	Horizontal	Peak	
4107.32	31.68	29.91	8.87	36.65	33.81	68.20	-34.39	Horizontal	Peak	
5047.83	29.08	31.69	9.71	35.28	35.20	68.20	-33.00	Horizontal	Peak	
7470.56	29.02	36.16	12.30	33.07	44.41	68.20	-23.79	Horizontal	Peak	

## Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Measuring frequencies from 1 GHz to 40GHz.
4. Test 802.11a, 802.11n, 802.11ac mode, all modulations have been tested, only worst case is reported



Band: I									
Worst mode: 802.11ac(HT80)					Test channel: CH <sub>M</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1728.56	-0.56	25.26	5.82	0.00	30.52	68.20	-37.68	Vertical	Peak
3534.54	-3.40	29.10	8.17	0.00	33.87	68.20	-34.33	Vertical	Peak
8377.24	-4.75	36.55	12.84	0.00	44.64	68.20	-23.56	Vertical	Peak
10944.09	-6.14	40.53	13.57	0.00	47.96	68.20	-20.24	Vertical	Peak
1626.12	-2.03	24.98	5.62	0.00	28.57	68.20	-39.63	Horizontal	Peak
3766.79	-4.47	29.50	8.46	0.00	33.49	68.20	-34.71	Horizontal	Peak
7376.08	-2.90	36.30	12.04	0.00	45.44	68.20	-22.76	Horizontal	Peak
10971.98	-6.74	40.49	13.57	0.00	47.32	68.20	-20.88	Horizontal	Peak

Band: IV									
Worst mode: 802.11ac(HT80)					Test channel: CH <sub>M</sub>				
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Test value
1993.40	-3.81	26.24	6.26	0.00	28.69	68.20	-39.51	Vertical	Peak
3795.66	-3.66	29.59	8.50	0.00	34.43	68.20	-33.77	Vertical	Peak
6696.01	-3.58	34.20	11.48	0.00	42.10	68.20	-26.10	Vertical	Peak
9322.50	-7.58	39.15	13.62	0.00	45.19	68.20	-23.01	Vertical	Peak
1764.12	-3.21	25.33	5.89	0.00	28.01	68.20	-40.19	Horizontal	Peak
2898.03	-4.97	28.49	7.42	0.00	30.94	68.20	-37.26	Horizontal	Peak
6868.65	-3.83	34.48	11.69	0.00	42.34	68.20	-25.86	Horizontal	Peak
10669.02	-6.24	39.92	13.59	0.00	47.27	68.20	-20.93	Horizontal	Peak

## Remark:

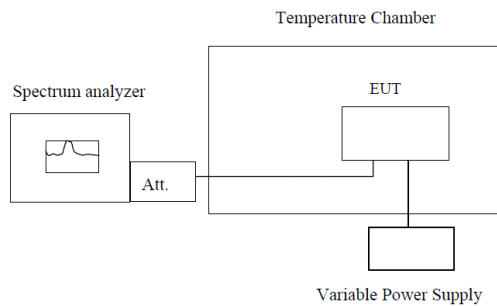
1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. Measuring frequencies from 1 GHz to 40GHz.
4. Test 802.11a, 802.11n, 802.11ac mode, all modulations have been tested, only worst case is reported

## 5.9. Frequency stability

### LIMIT

Within Operation Band

### TEST CONFIGURATION



Note : Measurement setup for testing on Antenna connector

### TEST PROCEDURE

1. The equipment under test was connected to an external power supply.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to -20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

### TEST MODE:

Transmitting with unmodulation

### TEST RESULTS

Passed       Not Applicable

**Voltage VS Frequency stability**

Band: I			Test Frequency: 5180.00MHz	
Temperature (°C)	Voltage (V)	Frequency Deviation (Hz)	Frequency Deviation (ppm)	Result
25	DC 4.5	-16000.00	-3.08880	Pass
25	DC 5.0	-14000.00	-2.70270	Pass
25	DC 5.5	-16000.00	-3.08880	Pass

Band: IV			Test Frequency: 5745.00MHz	
Temperature (°C)	Voltage (V)	Frequency Deviation (Hz)	Frequency Deviation (ppm)	Result
25	DC 4.5	-15000.00	-2.61097	Pass
25	DC 5.0	-15000.00	-2.61097	Pass
25	DC 5.5	-15000.00	-2.61097	Pass

**Temperature VS Frequency stability**

Band: I			Test Frequency: 5180.00MHz	
Voltage (V)	Temperature (°C)	Frequency Deviation (Hz)	Frequency Deviation (ppm)	Result
DC 5.0	-20	-16000.00	-3.08880	Pass
	-10	-16000.00	-3.08880	Pass
	0	-16000.00	-3.08880	Pass
	10	-16000.00	-3.08880	Pass
	20	-16000.00	-3.08880	Pass
	30	-16000.00	-3.08880	Pass
	40	-16000.00	-3.08880	Pass
	50	-15000.00	-2.89575	Pass

Band: IV			Test Frequency: 5745.00MHz	
Voltage (V)	Temperature (°C)	Frequency Deviation (Hz)	Frequency Deviation (ppm)	Result
DC 5.0	-20	-15000.00	-2.61097	Pass
	-10	-15000.00	-2.61097	Pass
	0	-15000.00	-2.61097	Pass
	10	-15000.00	-2.61097	Pass
	20	-15000.00	-2.61097	Pass
	30	-15000.00	-2.61097	Pass
	40	-15000.00	-2.61097	Pass
	50	-15000.00	-2.61097	Pass