

U-NII-3 Band IEEE 802.11a



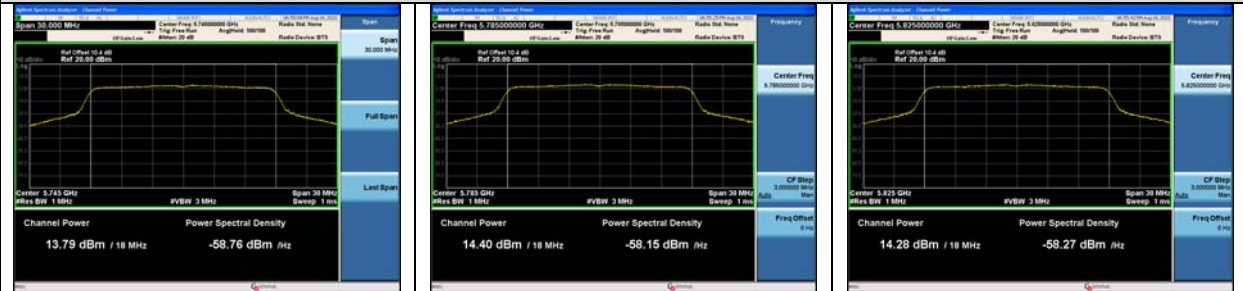
IEEE 802.11n HT20



IEEE 802.11n HT40



IEEE 802.11ac VHT20



IEEE 802.11ac VHT40



IEEE 802.11ac VHT80



7. POWER SPECTRAL DENSITY TEST

7.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.06,22	1 Year
2.	RF Cable	Mini-Circuits	CBL-1M-SMSM+	No.7	Oct.11,21	1 Year
3.	Attenuator	Agilent	8491B	MY39269201	Oct.09,21	1 Year

7.2. Limit

Band 5150-5250 MHz:

The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

Band 5250-5350 MHz:

The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

Band 5470-5725 MHz:

The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

Band 5725-5850 MHz:

The power spectral density shall not exceed 30 dBm in any 500 KHz band.

7.3. Test Procedure

Use the test method described in ANSI C63.10 clause 12.5:

For the Band 5.15-5.35GHz; 5.47-5.725 GHz:

The transmitter output was connected to a spectrum analyzer. Power density was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW; Detector: RMS mode.

For the band 5.725-5.85 GHz:

test method described in KDB789033 clause E

- 1) Set the RBW=100kHz and VBW =300kHz
- 2) Number of points in sweep ≥ 2 Span / RBW.(This ensures that bin-to-bin spacing is \leq RBW/2, so that narrowband signals are not lost between frequency bins.)
- 3) Sweep time = auto
- 4) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- 5) Use the “peak search” function of spectrum analyzer find the max value, then add $10\log(500\text{kHz}/\text{RBW})$ to the measured result.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

7.4. Test Results

EUT: Digital Media Player		
M/N: YY1301B1		
Test date: 2022-08-18~19	Pressure: 102.5±1.0 kpa	Humidity: 53.6±3.0%
Tested by: Winter	Test site: RF site	Temperature: 22.4±0.6°C

U-NII-1 Band:

Test Mode	Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
11a	5180	1.789	11
	5200	2.237	
	5240	2.120	
11n HT20	5180	1.616	11
	5200	1.766	
	5240	1.674	
11n HT40	5190	-1.182	11
	5230	-1.066	
11ac VHT20	5180	1.626	11
	5200	1.785	
	5240	1.731	
11ac VHT40	5190	-1.171	11
	5230	-1.110	
11ac VHT80	5210	-5.958	11
Conclusion:Pass			

U-NII-2A Band:

Test Mode	Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
11a	5260	2.259	11
	5300	2.644	
	5320	2.648	
11n HT20	5260	2.067	11
	5300	2.543	
	5320	2.267	
11n HT40	5270	-0.840	11
	5310	-0.907	
11ac VHT20	5260	1.992	11
	5300	2.173	
	5320	2.095	
11ac VHT40	5270	-0.810	11
	5310	-0.889	
11ac VHT80	5290	-5.338	11
Conclusion:Pass			

U-NII-2C Band:

Test Mode	Frequency (MHz)	Power Spectral Density (dBm/MHz)	Limit (dBm/MHz)
11a	5500	2.422	11
	5580	2.802	
	5720	3.454	
11n HT20	5500	1.308	11
	5580	2.309	
	5720	3.093	
11n HT40	5510	-1.019	11
	5550	-0.914	
	5710	-0.319	
11ac VHT20	5500	1.998	11
	5580	2.365	
	5720	3.062	
11ac VHT40	5510	-0.930	11
	5550	-0.983	
	5710	-0.349	
11ac VHT80	5530	-5.658	11
	5690	-4.810	
Conclusion:Pass			

U-NII-3 Band:

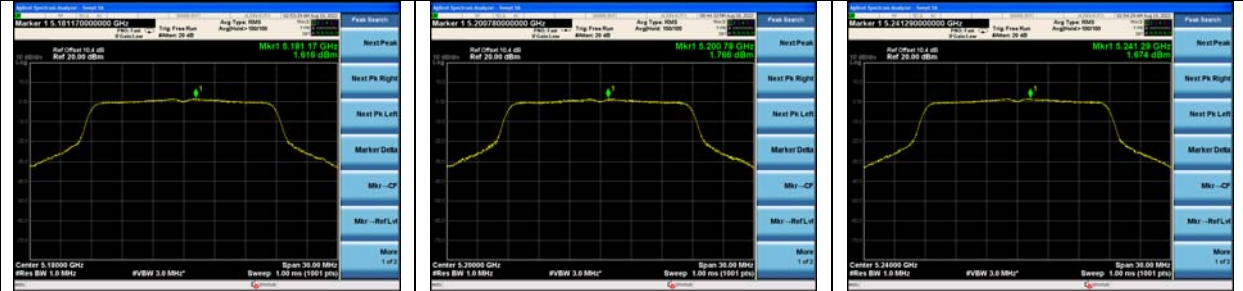
Test Mode	Frequency (MHz)	Power Spectral Density (dBm/500KHz)	Limit (dBm/500KHz)
11a	5745	1.6907	30
	5785	2.2487	
	5825	2.6837	
11n HT20	5745	1.3477	30
	5785	1.7657	
	5825	1.7127	
11n HT40	5755	-1.9643	30
	5795	-1.3233	
11ac VHT20	5745	1.4077	30
	5785	1.9867	
	5825	1.6767	
11ac VHT40	5755	-1.7883	30
	5795	-1.2163	
11ac VHT80	5775	-8.4123	30
Conclusion:Pass			

Note; The result = Reading + 10 log(500kHz/100kHz).

U-NII-1 Band
IEEE 802.11a



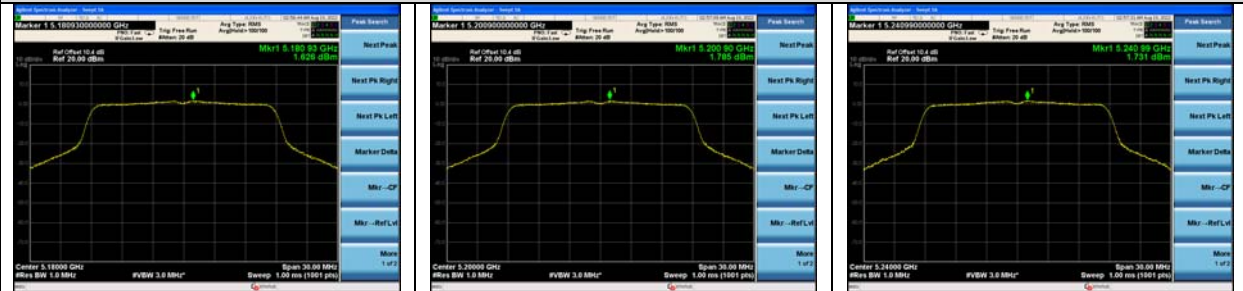
IEEE 802.11n HT20



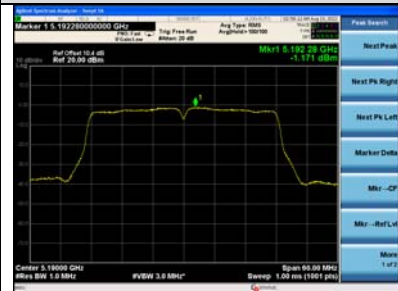
IEEE 802.11n HT40



IEEE 802.11ac VHT20



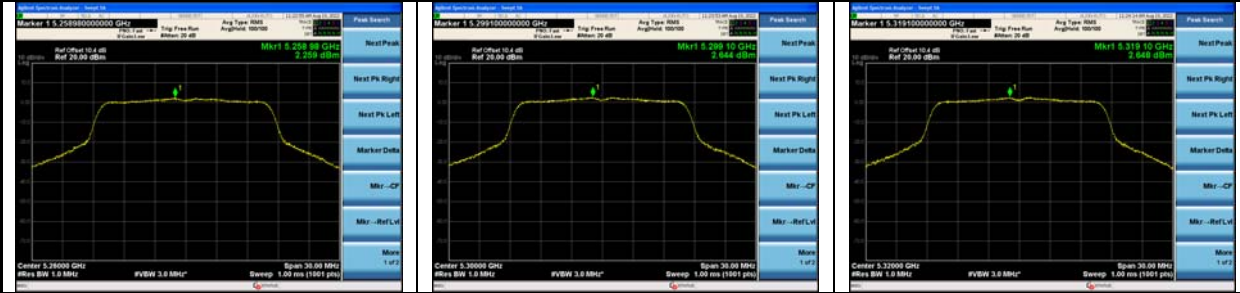
IEEE 802.11ac VHT40



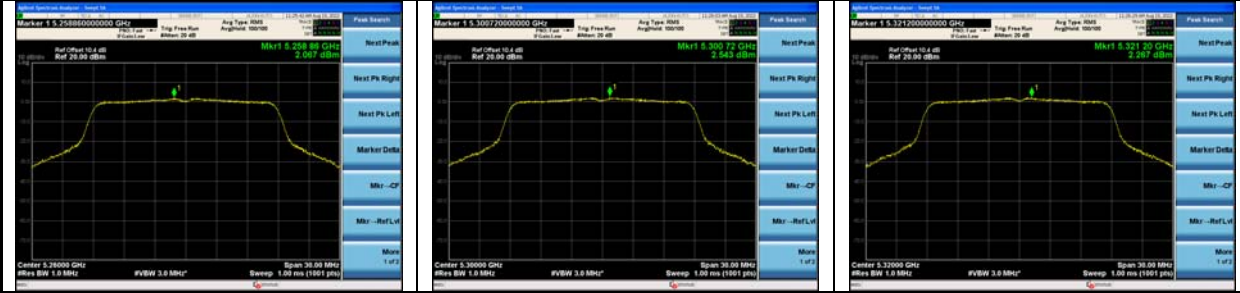
IEEE 802.11ac VHT80



U-NII-2A Band
IEEE 802.11a



IEEE 802.11n HT20



IEEE 802.11n HT40



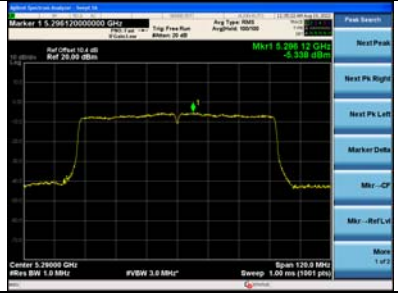
IEEE 802.11ac VHT20



IEEE 802.11ac VHT40



IEEE 802.11ac VHT80



**U-NII-2C Band
IEEE 802.11a**



IEEE 802.11n HT20



IEEE 802.11n HT40



IEEE 802.11ac VHT20



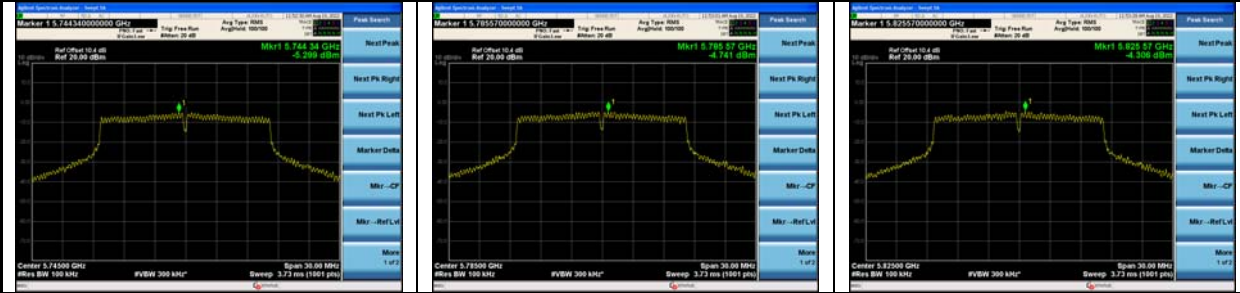
IEEE 802.11ac VHT40



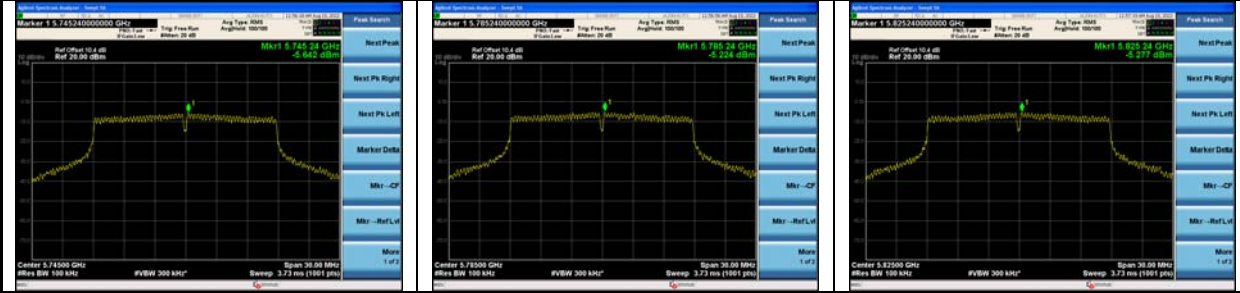
IEEE 802.11ac VHT80



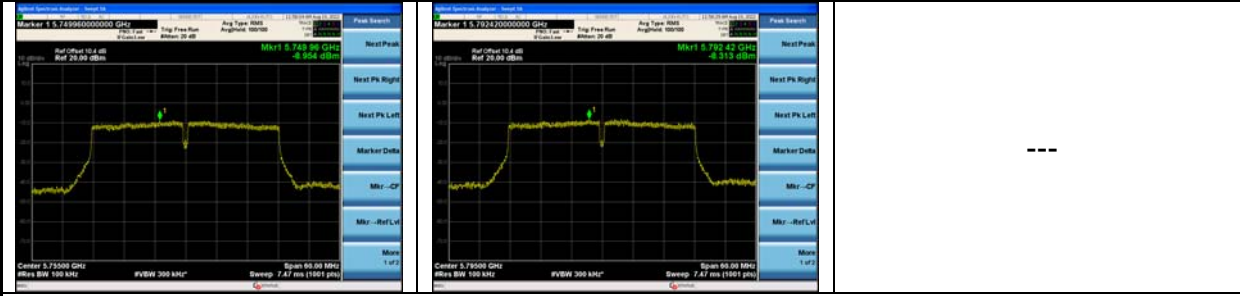
U-NII-3 Band IEEE 802.11a



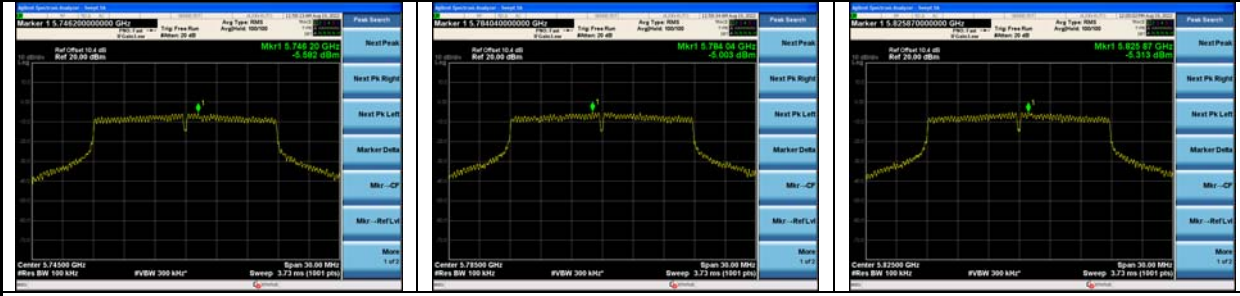
IEEE 802.11n HT20



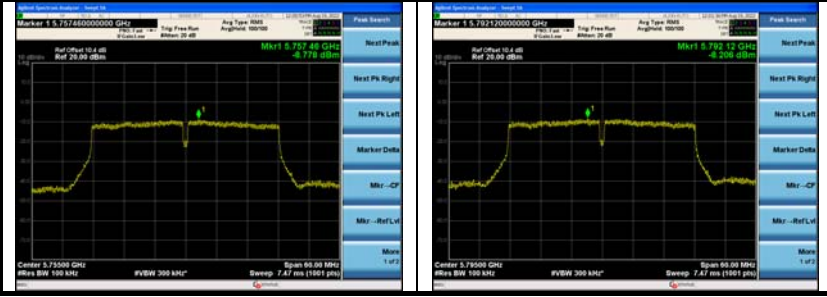
IEEE 802.11n HT40



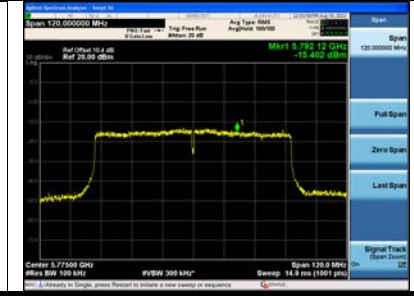
IEEE 802.11ac VHT20



IEEE 802.11ac VHT40



IEEE 802.11ac VHT80



8. FREQUENCY STABILITY MEASUREMENT

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.06,22	1 Year
2.	RF Cable	eastsheep	141-SMA-JJ-1000	NO.1	Jul.01,22	1 Year
3.	Attenuator	Agilent	8491B	MY39269201	Oct.09,21	1 Year

8.2. Limit

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

8.3. Test Procedure

Use the test method described in ANSI C63.10 clause 6.8:

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. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f) / f \times 10^{-6}$ ppm. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.
2. Extreme temperature is 5°C~35°C.

8.4. Test Result

EUT: Digital Media Player		
M/N: YY1301B1		
Test date: 2022-08-15	Pressure: 102.5±1.0 kpa	Humidity: 53.6±3.0%
Tested by: Winter	Test site: RF site	Temperature: 22.4±0.6°C

Frequency Stability vs. Voltage:

Test Voltage	Temperature	CH	Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.15V	25°C	CH36	5179.9605	5180	-7.63
		CH38	5189.9620	5190	-7.32
		CH40	5199.9605	5200	-7.60
		CH42	5209.9640	5210	-6.91
		CH46	5229.9620	5230	-7.27
		CH48	5239.9605	5240	-7.54
		CH52	5259.9635	5260	-6.94
		CH54	5269.9640	5270	-6.83
		CH58	5289.9645	5290	-6.71
		CH60	5299.9630	5300	-6.98
		CH62	5309.9635	5310	-6.87
		CH64	5319.9620	5320	-7.14
		CH100	5499.9500	5500	-9.09
		CH102	5509.9485	5510	-9.35
		CH106	5529.9490	5530	-9.22
		CH110	5549.9490	5550	-9.19
		CH116	5579.9490	5580	-9.14
		CH138	5689.9480	5690	-9.14
		CH142	5709.9475	5710	-9.19
		CH144	5719.9475	5720	-9.18
CH149	5744.9615	5745	-6.70		
CH151	5754.9605	5755	-6.86		
CH155	5774.9610	5775	-6.75		
CH157	5784.9605	5785	-6.83		
CH159	5794.9610	5795	-6.73		
CH165	5824.9600	5825	-6.87		

Test Voltage	Temperature	CH	Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.7V	25°C	CH36	5179.9865	5180	-2.6062
		CH38	5189.9860	5190	-2.6975
		CH40	5199.9865	5200	-2.5962
		CH42	5209.9855	5210	-2.7831
		CH46	5229.9860	5230	-2.6769
		CH48	5239.9860	5240	-2.6718
		CH52	5259.9855	5260	-2.7567
		CH54	5269.9850	5270	-2.8463
		CH58	5289.9850	5290	-2.8355
		CH60	5299.9850	5300	-2.8302
		CH62	5309.9845	5310	-2.9190
		CH64	5319.9845	5320	-2.9135
		CH100	5499.9840	5500	-2.9091
		CH102	5509.9840	5510	-2.9038
		CH106	5529.9845	5530	-2.8029
		CH110	5549.9840	5550	-2.8829
		CH116	5579.9845	5580	-2.7778
		CH138	5689.9825	5690	-3.0756
		CH142	5709.9830	5710	-2.9772
		CH144	5719.9830	5720	-2.9720
CH149	5744.9825	5745	-3.0461		
CH151	5754.9830	5755	-2.9540		
CH155	5774.9830	5775	-2.9437		
CH157	5784.9825	5785	-3.0251		
CH159	5794.9830	5795	-2.9336		
CH165	5824.9825	5825	-3.0043		

Test Voltage	Temperature	CH	Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 4.26V	25°C	CH36	5179.9870	5180	-2.5097
		CH38	5189.9865	5190	-2.6012
		CH40	5199.9870	5200	-2.5000
		CH42	5209.9860	5210	-2.6871
		CH46	5229.9865	5230	-2.5813
		CH48	5239.9865	5240	-2.5763
		CH52	5259.9860	5260	-2.6616
		CH54	5269.9855	5270	-2.7514
		CH58	5289.9855	5290	-2.7410
		CH60	5299.9855	5300	-2.7358
		CH62	5309.9850	5310	-2.8249
		CH64	5319.9850	5320	-2.8195
		CH100	5499.9845	5500	-2.8182
		CH102	5509.9845	5510	-2.8131
		CH106	5529.9850	5530	-2.7125
		CH110	5549.9845	5550	-2.7928
		CH116	5579.9850	5580	-2.6882
		CH138	5689.9830	5690	-2.9877
		CH142	5709.9835	5710	-2.8897
		CH144	5719.9835	5720	-2.8846
CH149	5744.9830	5745	-2.9591		
CH151	5754.9835	5755	-2.8671		
CH155	5774.9835	5775	-2.8571		
CH157	5784.9830	5785	-2.9386		
CH159	5794.9835	5795	-2.8473		
CH165	5824.9830	5825	-2.9185		

Frequency Stability vs. Temperature:

Test Voltage	Temperature	CH	Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.7V	5°C	CH36	5179.9820	5180	-3.4749
		CH38	5189.9815	5190	-3.5645
		CH40	5199.9820	5200	-3.4615
		CH42	5209.9810	5210	-3.6468
		CH46	5229.9815	5230	-3.5373
		CH48	5239.9815	5240	-3.5305
		CH52	5259.9810	5260	-3.6122
		CH54	5269.9805	5270	-3.7002
		CH58	5289.9805	5290	-3.6862
		CH60	5299.9805	5300	-3.6792
		CH62	5309.9800	5310	-3.7665
		CH64	5319.9800	5320	-3.7594
		CH100	5499.9795	5500	-3.7273
		CH102	5509.9795	5510	-3.7205
		CH106	5529.9800	5530	-3.6166
		CH110	5549.9795	5550	-3.6937
		CH116	5579.9800	5580	-3.5842
		CH138	5689.9780	5690	-3.8664
		CH142	5709.9785	5710	-3.7653
		CH144	5719.9785	5720	-3.7587
CH149	5744.9780	5745	-3.8294		
CH151	5754.9785	5755	-3.7359		
CH155	5774.9785	5775	-3.7229		
CH157	5784.9780	5785	-3.8029		
CH159	5794.9785	5795	-3.7101		
CH165	5824.9780	5825	-3.7768		

Test Voltage	Temperature	CH	Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.7V	10°C	CH36	5179.9835	5180	-3.1853
		CH38	5189.9830	5190	-3.2755
		CH40	5199.9835	5200	-3.1731
		CH42	5209.9825	5210	-3.3589
		CH46	5229.9830	5230	-3.2505
		CH48	5239.9830	5240	-3.2443
		CH52	5259.9825	5260	-3.3270
		CH54	5269.9820	5270	-3.4156
		CH58	5289.9820	5290	-3.4026
		CH60	5299.9820	5300	-3.3962
		CH62	5309.9815	5310	-3.4840
		CH64	5319.9815	5320	-3.4774
		CH100	5499.9810	5500	-3.4545
		CH102	5509.9810	5510	-3.4483
		CH106	5529.9815	5530	-3.3454
		CH110	5549.9810	5550	-3.4234
		CH116	5579.9815	5580	-3.3154
		CH138	5689.9795	5690	-3.6028
		CH142	5709.9800	5710	-3.5026
		CH144	5719.9800	5720	-3.4965
CH149	5744.9795	5745	-3.5683		
CH151	5754.9800	5755	-3.4752		
CH155	5774.9800	5775	-3.4632		
CH157	5784.9795	5785	-3.5436		
CH159	5794.9800	5795	-3.4513		
CH165	5824.9795	5825	-3.5193		

Test Voltage	Temperature	CH	Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.7V	15°C	CH36	5179.9850	5180	-2.8958
		CH38	5189.9845	5190	-2.9865
		CH40	5199.9850	5200	-2.8846
		CH42	5209.9840	5210	-3.0710
		CH46	5229.9845	5230	-2.9637
		CH48	5239.9845	5240	-2.9580
		CH52	5259.9840	5260	-3.0418
		CH54	5269.9835	5270	-3.1309
		CH58	5289.9835	5290	-3.1191
		CH60	5299.9835	5300	-3.1132
		CH62	5309.9830	5310	-3.2015
		CH64	5319.9830	5320	-3.1955
		CH100	5499.9825	5500	-3.1818
		CH102	5509.9825	5510	-3.1760
		CH106	5529.9830	5530	-3.0741
		CH110	5549.9825	5550	-3.1532
		CH116	5579.9830	5580	-3.0466
		CH138	5689.9810	5690	-3.3392
		CH142	5709.9815	5710	-3.2399
		CH144	5719.9815	5720	-3.2343
CH149	5744.9810	5745	-3.3072		
CH151	5754.9815	5755	-3.2146		
CH155	5774.9815	5775	-3.2035		
CH157	5784.9810	5785	-3.2844		
CH159	5794.9815	5795	-3.1924		
CH165	5824.9810	5825	-3.2618		

Test Voltage	Temperature	CH	Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.7V	25°C	CH36	5179.9865	5180	-2.6062
		CH38	5189.9860	5190	-2.6975
		CH40	5199.9865	5200	-2.5962
		CH42	5209.9855	5210	-2.7831
		CH46	5229.9860	5230	-2.6769
		CH48	5239.9860	5240	-2.6718
		CH52	5259.9855	5260	-2.7567
		CH54	5269.9850	5270	-2.8463
		CH58	5289.9850	5290	-2.8355
		CH60	5299.9850	5300	-2.8302
		CH62	5309.9845	5310	-2.9190
		CH64	5319.9845	5320	-2.9135
		CH100	5499.9840	5500	-2.9091
		CH102	5509.9840	5510	-2.9038
		CH106	5529.9845	5530	-2.8029
		CH110	5549.9840	5550	-2.8829
		CH116	5579.9845	5580	-2.7778
		CH138	5689.9825	5690	-3.0756
		CH142	5709.9830	5710	-2.9772
		CH144	5719.9830	5720	-2.9720
CH149	5744.9825	5745	-3.0461		
CH151	5754.9830	5755	-2.9540		
CH155	5774.9830	5775	-2.9437		
CH157	5784.9825	5785	-3.0251		
CH159	5794.9830	5795	-2.9336		
CH165	5824.9825	5825	-3.0043		

Test Voltage	Temperature	CH	Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.7V	30°C	CH36	5179.9880	5180	-2.3166
		CH38	5189.9875	5190	-2.4085
		CH40	5199.9880	5200	-2.3077
		CH42	5209.9870	5210	-2.4952
		CH46	5229.9875	5230	-2.3901
		CH48	5239.9875	5240	-2.3855
		CH52	5259.9870	5260	-2.4715
		CH54	5269.9865	5270	-2.5617
		CH58	5289.9865	5290	-2.5520
		CH60	5299.9865	5300	-2.5472
		CH62	5309.9860	5310	-2.6365
		CH64	5319.9860	5320	-2.6316
		CH100	5499.9855	5500	-2.6364
		CH102	5509.9855	5510	-2.6316
		CH106	5529.9860	5530	-2.5316
		CH110	5549.9855	5550	-2.6126
		CH116	5579.9860	5580	-2.5090
		CH138	5689.9840	5690	-2.8120
		CH142	5709.9845	5710	-2.7145
		CH144	5719.9845	5720	-2.7098
CH149	5744.9840	5745	-2.7850		
CH151	5754.9845	5755	-2.6933		
CH155	5774.9845	5775	-2.6840		
CH157	5784.9840	5785	-2.7658		
CH159	5794.9845	5795	-2.6747		
CH165	5824.9840	5825	-2.7468		

Test Voltage	Temperature	CH	Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.7V	35°C	CH36	5179.9895	5180	-2.0270
		CH38	5189.9890	5190	-2.1195
		CH40	5199.9895	5200	-2.0192
		CH42	5209.9885	5210	-2.2073
		CH46	5229.9890	5230	-2.1033
		CH48	5239.9890	5240	-2.0992
		CH52	5259.9885	5260	-2.1863
		CH54	5269.9880	5270	-2.2770
		CH58	5289.9880	5290	-2.2684
		CH60	5299.9880	5300	-2.2642
		CH62	5309.9875	5310	-2.3540
		CH64	5319.9875	5320	-2.3496
		CH100	5499.9870	5500	-2.3636
		CH102	5509.9870	5510	-2.3593
		CH106	5529.9875	5530	-2.2604
		CH110	5549.9870	5550	-2.3423
		CH116	5579.9875	5580	-2.2401
		CH138	5689.9855	5690	-2.5483
		CH142	5709.9860	5710	-2.4518
		CH144	5719.9860	5720	-2.4476
CH149	5744.9855	5745	-2.5239		
CH151	5754.9860	5755	-2.4327		
CH155	5774.9860	5775	-2.4242		
CH157	5784.9855	5785	-2.5065		
CH159	5794.9860	5795	-2.4159		
CH165	5824.9855	5825	-2.4893		

9. ANTENNA REQUIREMENT

9.1. 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. 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.

9.2. Antenna Connected Construction

The antennas used for this product are Internal PIFA Antenna that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is U-NII Band 1: 0.3dBi & U-NII Band 2A: -0.7dBi & U-NII Band 2C: 0.9dBi & U-NII Band 3: 2.1dBi.

10. DEVIATION TO TEST SPECIFICATIONS

[NONE]

..... THE END