

8. EQUIVALENT ISOTROPIC RADIATED POWER TEST

8.1.Limit

Use the test method described in FCC Part 15.407(h) (1):

Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

8.2.Test Procedure

Use the test method described in ANSI C63.10 Annex G :

(1) Connected the EUT's antenna port to the Spectrum Analyzer by suitable attenuator ,set the Spectrum Analyzer as below:

Span: Zero

RBW:100KHz

VBW:100KHz

Read out the duty cycle(X) of the transmitter and record as X

(2) The channel power measure function of spectrum Analyzer was used to measure out average output power of transmitter.

(3) Calculated e.i.r.p according to the formula: Read + Cable loss + Atten loss + Antenna Gain + $10\log(1/x)$

(4) Repeated test at the lowest, the middle, and the highest frequency of the stated frequency range.

8.3. Test Results

U-NII-1 Band:

EUT: Room Booking Panel		
M/N: IAD-18010A		
Test date: 2023-01-11	Pressure: 102.5±1.0 kpa	Humidity: 53.6±3.0%
Tested by: Carl	Test site: RF site	Temperature: 22.4±0.6 °C

Test Mode	Frequency (MHz)	EIRP (dBm)	Limit (dBm)
11a	5180	14.51	N/A
	5200	14.2	
	5240	14.55	
11n HT20	5180	14.16	N/A
	5200	14	
	5240	14.17	
11n HT40	5190	13.92	N/A
	5230	13.9	
11ac VHT20	5180	13.97	N/A
	5200	13.99	
	5240	14.16	
11ac VHT40	5190	13.94	N/A
	5230	13.92	
11ac VHT80	5210	13.4	N/A
Conclusion: PASS			

9. SPECTRAL DENSITY TEST

9.1. Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.07,22	1 Year
2.	RF Cable	Mini-Circuits	CBL-1M-SMSM+	No.7	Oct.10,22	1 Year

9.2. Limit

Band 5150-5250 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.

9.3. Test Procedure

For the Band 5.15-5.25GHz:

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:

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

So use the test method described in KDB789033 clause E

- 1) Set the RBW=100kHz and VBW ≥ 3 RBW
- 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.

9.4. Test Results

U-NII-1 Band:

EUT: Room Booking Panel		
M/N: IAD-18010A		
Test date: 2023-01-12	Pressure: 102.5±1.0 kpa	Humidity: 53.6±3.0%
Tested by: Carl	Test site: RF site	Temperature: 22.4±0.6 °C

Test Mode	Frequency (MHz)	Power Spectral density (dBm/MHz)	Limit (dBm/MHz)
11a	5180	1.695	11
	5200	1.482	
	5240	1.578	
11n HT20	5180	0.915	11
	5200	0.885	
	5240	1.213	
11n HT40	5190	-2.114	11
	5230	-1.879	
11ac VHT20	5180	0.960	11
	5200	1.134	
	5240	1.065	
11ac VHT40	5190	-2.164	11
	5230	-2.028	
11ac VHT80	5210	-5.743	11

Conclusion: PASS

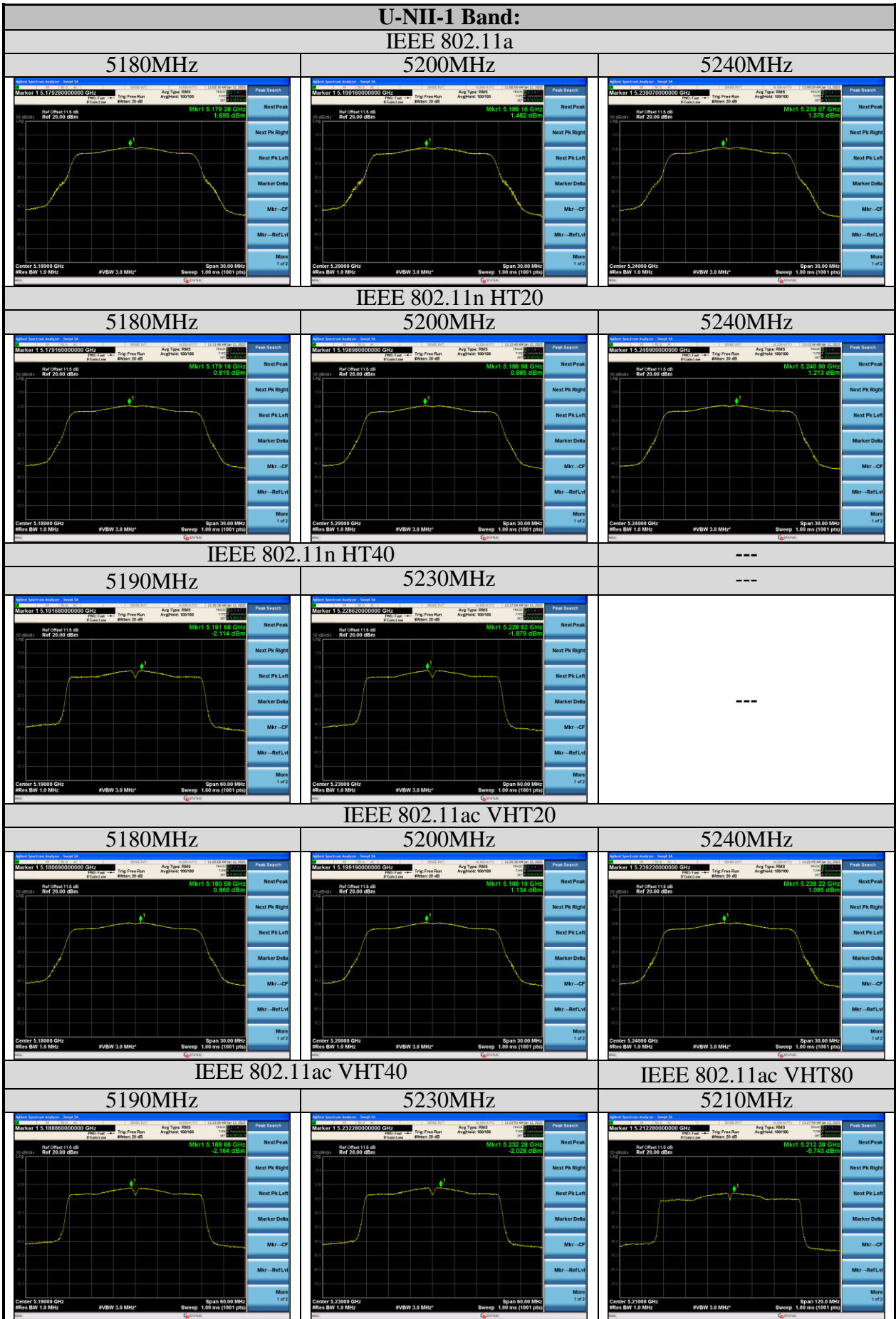
U-NII-3 Band:

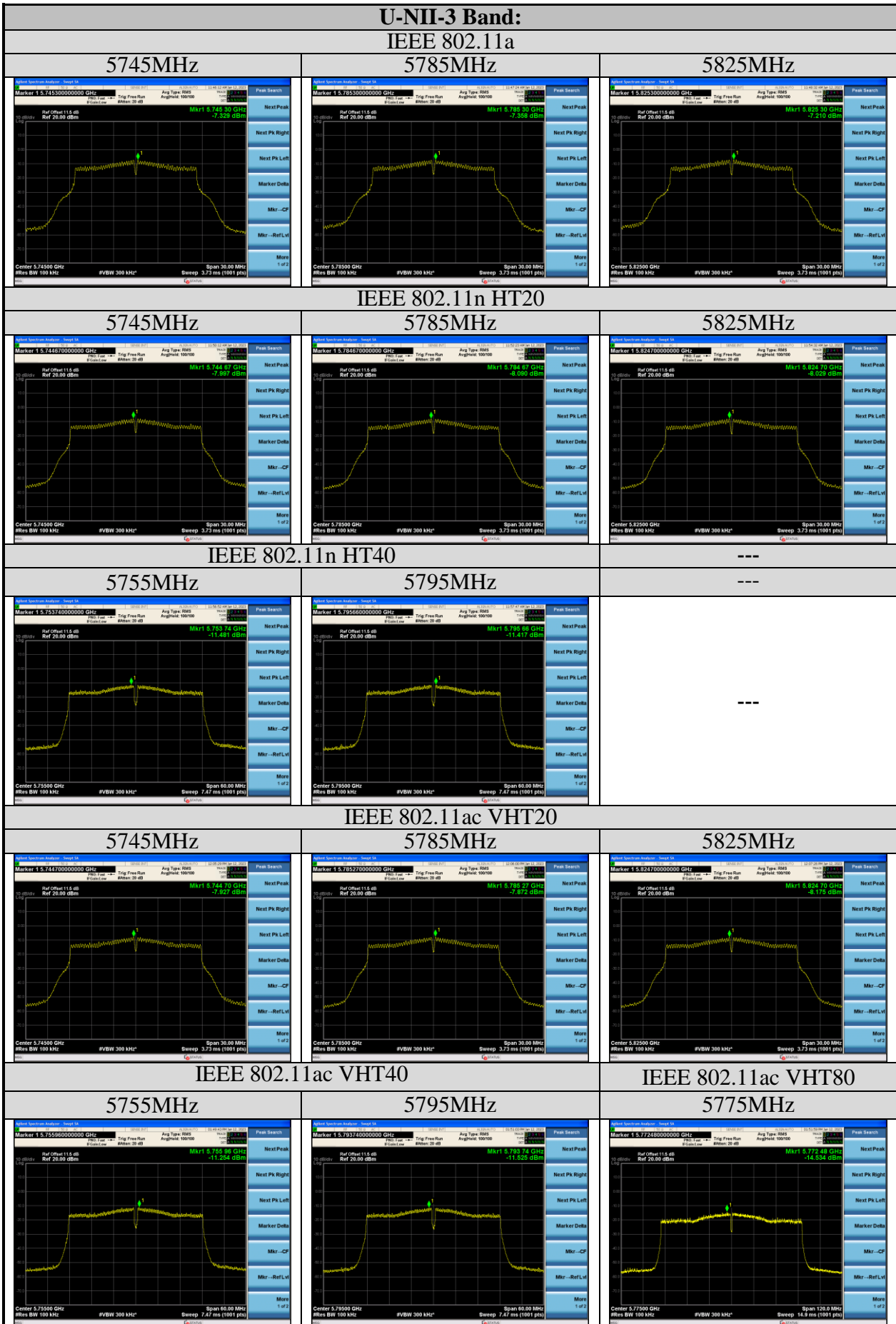
EUT: Room Booking Panel		
M/N: IAD-18010A		
Test date: 2023-01-12	Pressure: 102.5±1.0 kpa	Humidity: 53.6±3.0%
Tested by: Carl	Test site: RF site	Temperature: 22.4±0.6 °C

Test Mode	Frequency (MHz)	Power Spectral density (dBm/500KHz)	Limit (dBm/500KHz)
11a	5745	-0.339	30
	5785	-0.395	
	5825	-0.22	
11n HT20	5745	-1.007	30
	5785	-1.1	
	5825	-1.039	
11n HT40	5755	-4.491	30
	5795	-4.427	
11ac VHT20	5745	-0.937	30
	5785	-0.882	
	5825	-1.16	
11ac VHT40	5755	-4.264	30
	5795	-4.535	
11ac VHT80	5775	-7.544	30

Conclusion: PASS

Note: The total result = Reading + 10 log(500kHz/100kHz)





10.FREQUENCY STABILITY MEASUREMENT

10.1.Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Apr.07,22	1 Year
2.	Attenuator	Agilent	8491B	MY39269201	Oct.09,22	1 Year
3.	RF Cable	RF Cable	Mini-Circuits	CBL-1M-SMS M+	No.7	1 Year

10.2.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.

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 $(f_c - f) / f \times 10^{-6}$ ppm. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.
2. Extreme temperature rule is 0°C~50°C.

10.4. Test Result

EUT: Room Booking Panel		
M/N: IAD-18010A		
Test date: 2023-01-12	Pressure: 102.1±1.0 kpa	Humidity: 53.2±3.0%
Tested by: Carl	Test site: RF site	Temperature: 22.3±0.6 °C

Frequency Stability vs. Voltage:

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
AC 120V	25°C	CH36	5179.9970	5180	0.58
		CH38	5189.9955	5190	0.87
		CH40	5199.9950	5200	0.96
		CH42	5209.9950	5210	-0.96
		CH46	5229.9945	5230	-1.05
		CH48	5239.9945	5240	-1.05
		CH149	5744.9940	5745	-1.04
		CH151	5754.9940	5755	-1.04
		CH155	5774.9940	5775	-1.04
		CH157	5784.9940	5785	-1.04
		CH159	5794.9940	5795	-1.04
CH165	5824.9935	5825	-1.12		
AC 120V	0°C	CH36	5179.9965	5180	-0.68
		CH38	5189.9965	5190	-0.67
		CH40	5199.9950	5200	-0.96
		CH42	5209.9950	5210	-0.96
		CH46	5229.9955	5230	-0.86
		CH48	5239.9955	5240	-0.86
		CH149	5744.9940	5745	-1.04
		CH151	5754.9945	5755	-0.96
		CH155	5774.9945	5775	-0.95
		CH157	5784.9945	5785	-0.95
		CH159	5794.9940	5795	-1.04
CH165	5824.9935	5825	-1.12		

AC 120V	50°C	CH36	5179.9960	5180	-0.77
		CH38	5189.9955	5190	-0.87
		CH40	5199.9955	5200	-0.87
		CH42	5209.9955	5210	-0.86
		CH46	5229.9945	5230	-1.05
		CH48	5239.9945	5240	-1.05
		CH149	5744.9940	5745	-1.04
		CH151	5754.9940	5755	-1.04
		CH155	5774.9940	5775	-1.04
		CH157	5784.9940	5785	-1.04
		CH159	5794.9935	5795	-1.12
		CH165	5824.9935	5825	-1.12

Frequency Stability vs. Temperature:

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
AC 96V	25°C	CH36	5179.9970	5180	-0.58
		CH38	5189.9955	5190	-0.87
		CH40	5199.9950	5200	-0.96
		CH42	5209.9945	5210	-1.06
		CH46	5229.9945	5230	-1.05
		CH48	5239.9945	5240	-1.05
		CH149	5744.9940	5745	-1.04
		CH151	5754.9940	5755	-1.04
		CH155	5774.9940	5775	-1.04
		CH157	5784.9940	5785	-1.04
		CH159	5794.9940	5795	-1.04
		CH165	5824.9935	5825	-1.12
AC 96V	0°C	CH36	5179.9965	5180	-0.68
		CH38	5189.9950	5190	-0.96
		CH40	5199.9950	5200	-0.96
		CH42	5209.9950	5210	-0.96
		CH46	5229.9945	5230	-1.05
		CH48	5239.9945	5240	-1.05
		CH149	5744.9940	5745	-1.04
		CH151	5754.9940	5755	-1.04
		CH155	5774.9940	5775	-1.04
		CH157	5784.9940	5785	-1.04
		CH159	5794.9940	5795	-1.04
		CH165	5824.9940	5825	-1.03

AC 97V	50°C	CH36	5179.9965	5180	-0.68
		CH38	5189.9955	5190	-0.87
		CH40	5199.9955	5200	-0.87
		CH42	5209.9955	5210	-0.86
		CH46	5229.9950	5230	-0.96
		CH48	5239.9950	5240	-0.95
		CH149	5744.9940	5745	-1.04
		CH151	5754.9940	5755	-1.04
		CH155	5774.9940	5775	-1.04
		CH157	5784.9935	5785	-1.12
		CH159	5794.9935	5795	-1.12
		CH165	5824.9935	5825	-1.12
AC 138V	25°C	CH36	5179.9960	5180	-0.77
		CH38	5189.9955	5190	-0.87
		CH40	5199.9955	5200	-0.87
		CH42	5209.9945	5210	-1.06
		CH46	5229.9945	5230	-1.05
		CH48	5239.9945	5240	-1.05
		CH149	5744.9945	5745	-0.96
		CH151	5754.9945	5755	-0.96
		CH155	5774.9945	5775	-0.95
		CH157	5784.9945	5785	-0.95
		CH159	5794.9940	5795	-1.04
		CH165	5824.9940	5825	-1.03
AC 138V	0°C	CH36	5179.9970	5180	-0.58
		CH38	5189.9960	5190	-0.77
		CH40	5199.9955	5200	-0.87
		CH42	5209.9955	5210	-0.86
		CH46	5229.9955	5230	-0.86
		CH48	5239.9955	5240	-0.86
		CH149	5744.9940	5745	-1.04
		CH151	5754.9940	5755	-1.04
		CH155	5774.9945	5775	-0.95
		CH157	5784.9940	5785	-1.04
		CH159	5794.9940	5795	-1.04
		CH165	5824.9935	5825	-1.12

AC 138V	50°C	CH36	5179.9965	5180	-0.68
		CH38	5189.9950	5190	-0.96
		CH40	5199.9950	5200	-0.96
		CH42	5209.9945	5210	-1.06
		CH46	5229.9945	5230	-1.05
		CH48	5239.9945	5240	-1.05
		CH149	5744.9950	5745	-0.87
		CH151	5754.9950	5755	-0.87
		CH155	5774.9950	5775	-0.87
		CH157	5784.9950	5785	-0.86
		CH159	5794.9950	5795	-0.86
		CH165	5824.9945	5825	-0.94

11. ANTENNA REQUIREMENT

11.1. 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.

11.2. Antenna Connected Construction

The antennas used for this product are FPC 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-1 Band: 3.5dBi; U-NII-3 Band: 5.1dBi.**

12. DEVIATION TO TEST SPECIFICATIONS

[NONE]

..... **THE END**