

802.11n(HT20)

U-NII 2C



CH100



CH116

CH140

802.11n(HT40)

U-NII 1



U-NII 2A



CH38



CH54



CH46

CH62

802.11n(HT40)

U-NII 2C



CH102



CH118

CH134

802.11ac(HT20)

U-NII 1



U-NII 2A



CH36



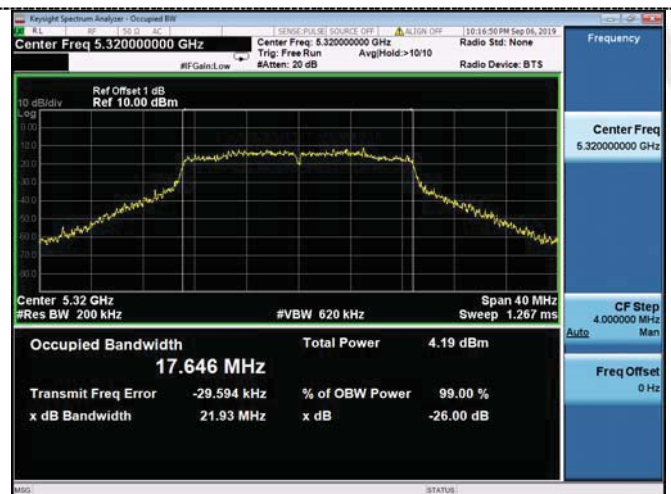
CH52



CH40



CH60



CH48

CH64

802.11ac(HT20)

U-NII 2C



CH100



CH116

CH140

802.11ac(HT40)

U-NII 1



U-NII 2A



CH38



CH54



CH46

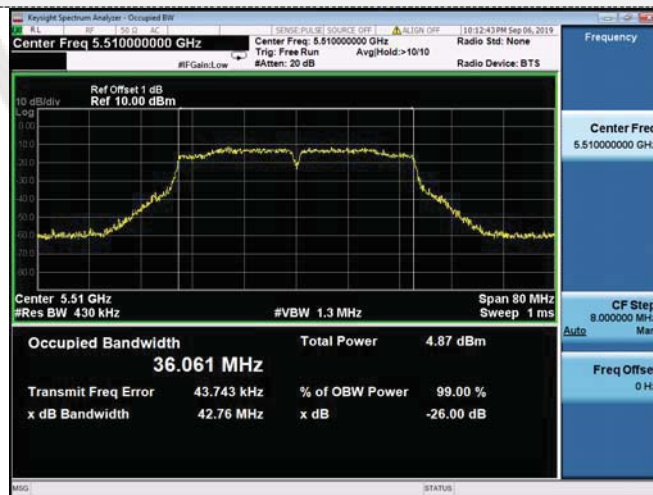


CH62



802.11ac(HT40)

U-NII 2C



CH102

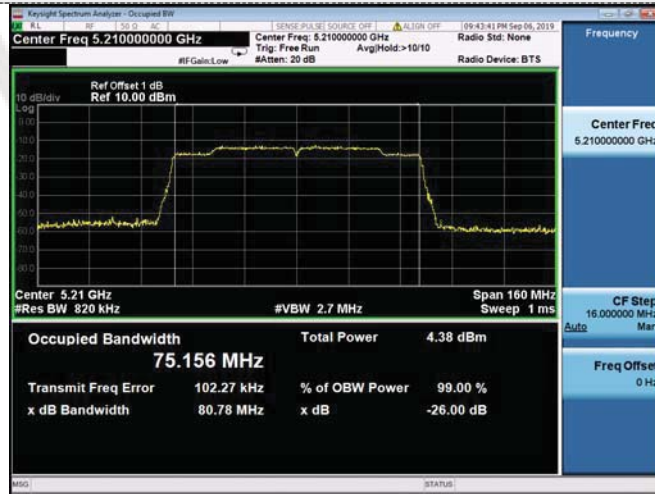


CH118

CH134

802.11ac(HT80)

U-NII 1



CH42

U-NII 2A



CH58

802.11ac(HT80)

U-NII 2C



CH106



CH122

3.6. Minimum Emission Bandwidth (6dBm Bandwidth)

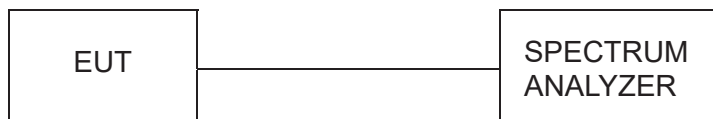
Limit

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth 3 x RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Test Configuration



Test Results

Type	Bands	Channel	6dB Bandwidth (MHz)	99% Bandwidth (MHz)	Limit (KHz)	Result
802.11a	U-NII 3	149	15.11	--	≥500KHz	Pass
		157	15.13	--		
		165	15.08	--		
802.11n(HT20)	U-NII 3	149	15.33	--		
		157	15.88	--		
		165	13.88	--		
802.11n(HT40)	U-NII 3	151	35.41	--		
		159	32.63	--		
802.11ac(HT20)	U-NII 3	149	15.02	--		
		157	16.52	--		
		165	15.11	--		
802.11ac(HT40)	U-NII 3	151	35.72	--		
		159	33.90	--		
802.11ac(HT80)	U-NII 3	155	75.78	--		

Note:

1. Measured 26dB bandwidth 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 802.11ac VHT20, IEEE 802.11ac VHT40 and IEEE 802.11ac VHT80;
4. Please refer to following test plots;

802.11a



802.11n(HT20)



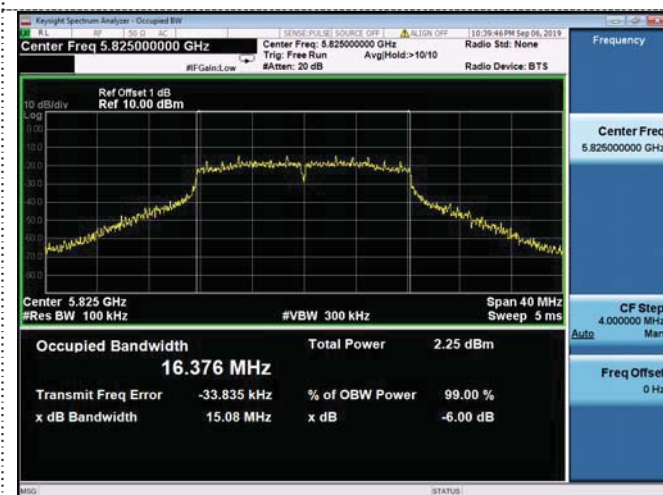
CH149



CH149



CH157



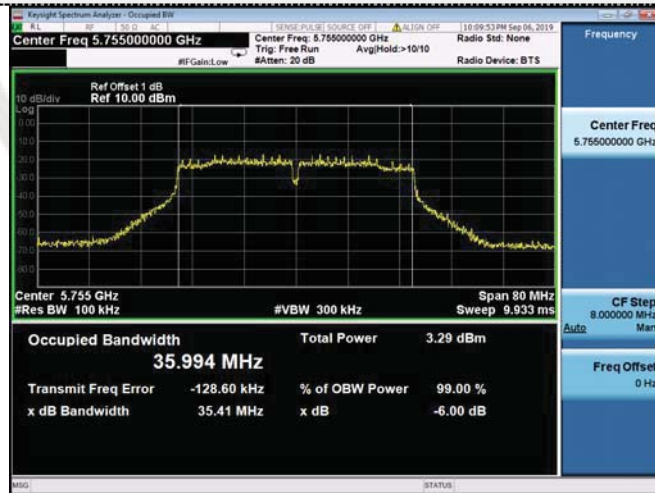
CH157



CH165

CH165

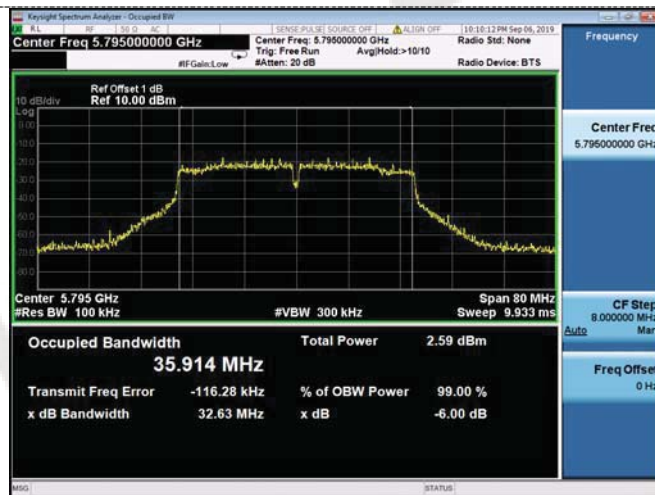
802.11n(HT40)



802.11ac(HT20)



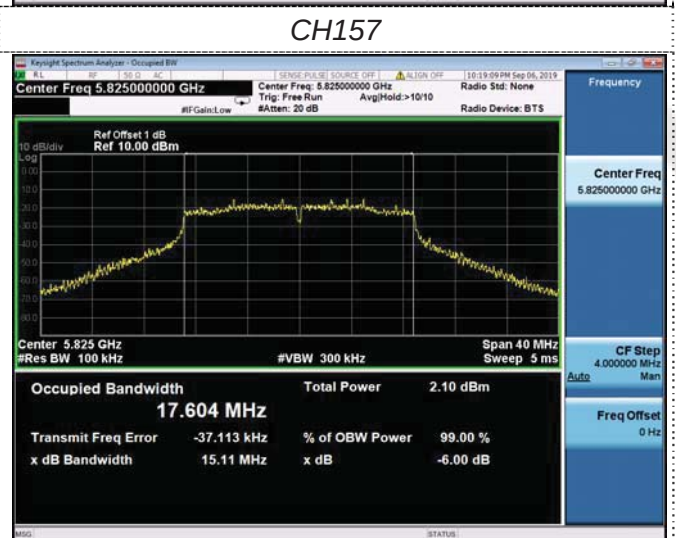
CH151



CH149



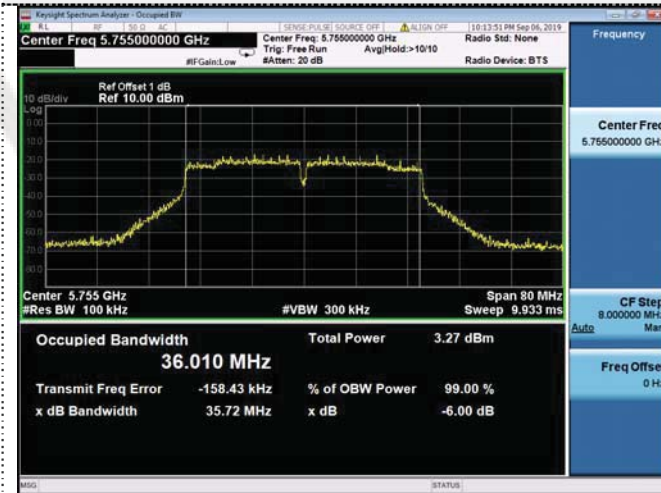
CH159



CH157

CH165

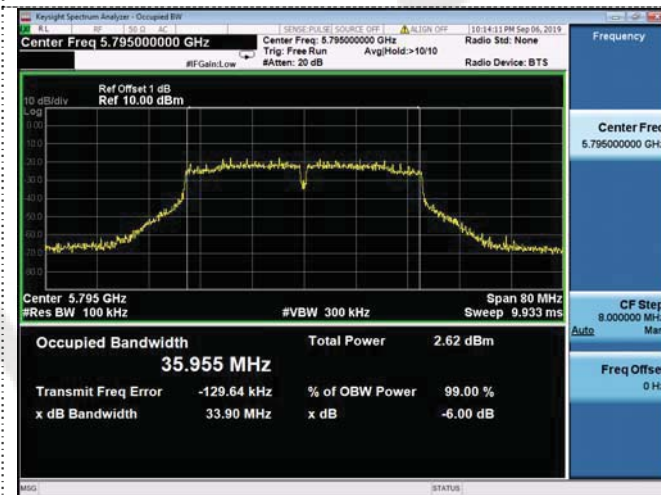
802.11ac(HT40)



802.11ac(HT80)



CH151



CH155

CH159

3.7. Occupied Bandwidth

Limit

≥500 KHz

Test Procedure

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

RBW=1% to 5% of the OBW

VBW=approximately 3 X RBW

Detector=Peak

Trace Mode: Max Hold

Use the 99% power bandwidth function of the instrument to measure the Occupied Bandwidth and recorded.

Test Configuration

EUT		SPECTRUM ANALYZER

Test Results

Type	Bands	Channel	99% Bandwidth (MHz)	Limit (KHz)	Result
802.11a	U-NII 3	149	16.568	≥500KHz	Pass
		157	16.510		
		165	16.512		
802.11n(HT20)	U-NII 3	149	17.765		
		157	17.819		
		165	17.841		
802.11n(HT40)	U-NII 3	151	36.343		
		159	36.399		
802.11ac(HT20)	U-NII 3	149	17.745		
		157	17.774		
		165	17.740		
802.11ac(HT40)	U-NII 3	151	36.460		
		159	36.443		
802.11ac(HT80)	U-NII 3	155	75.755		

802.11a



802.11n(HT20)



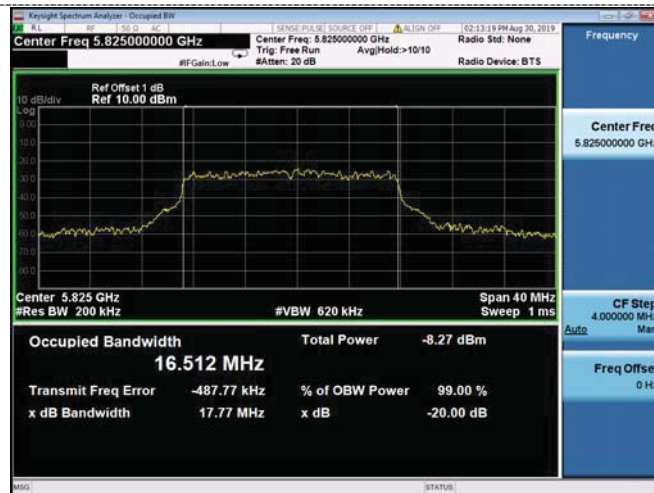
CH149



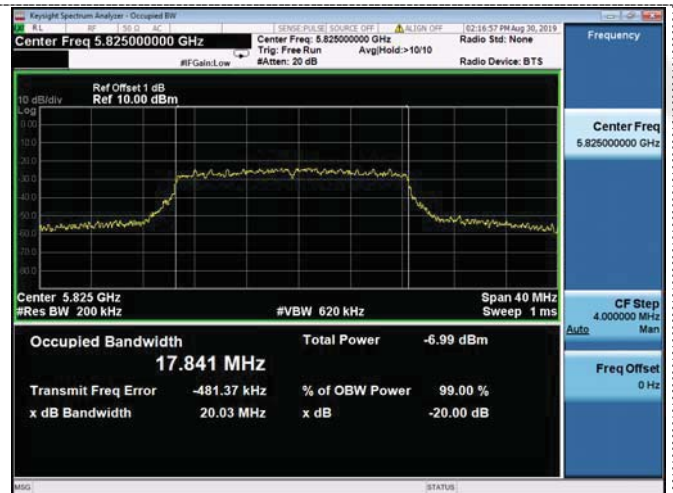
CH149



CH157



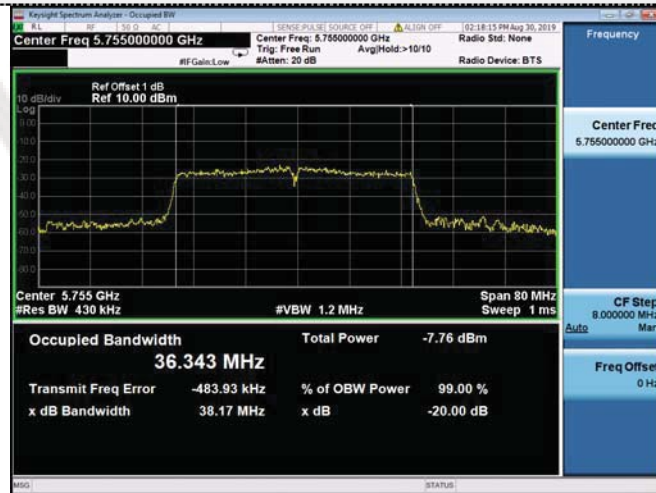
CH157



CH165

CH165

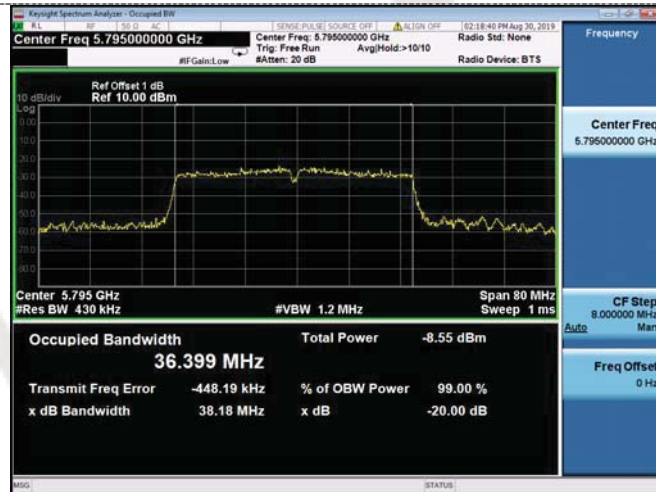
802.11n(HT40)



802.11ac(HT20)



CH151



CH149



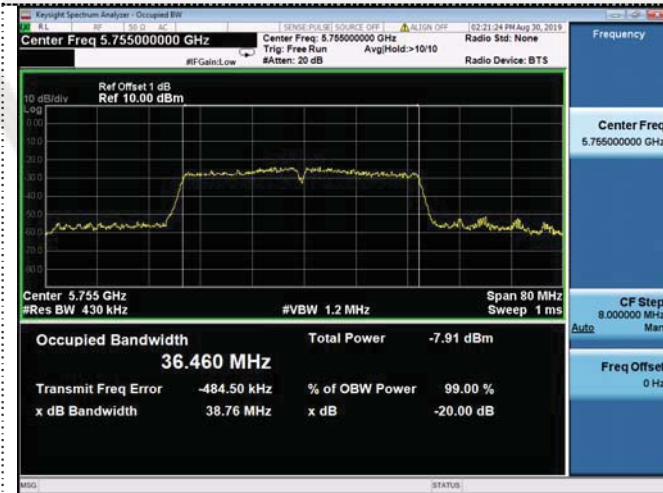
CH159



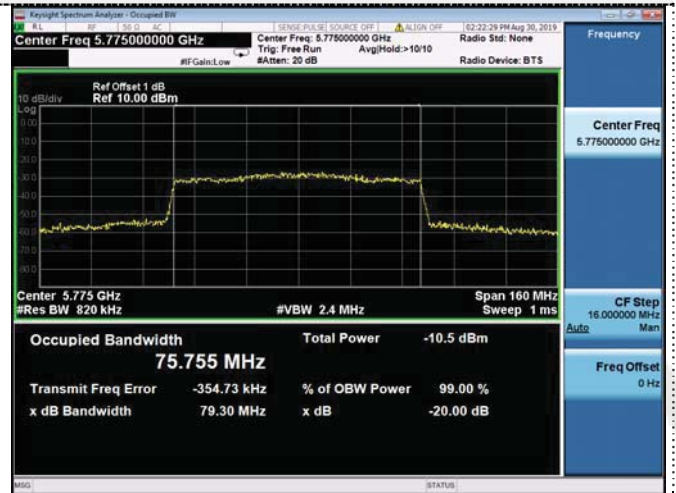
CH157

CH165

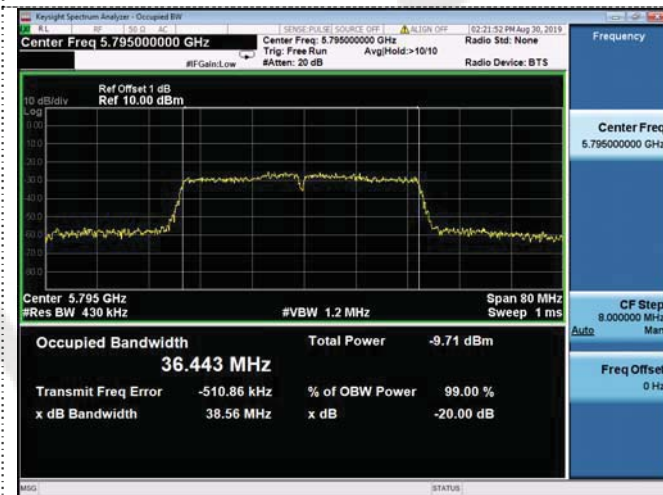
802.11ac(HT40)



802.11ac(HT80)



CH151



CH155

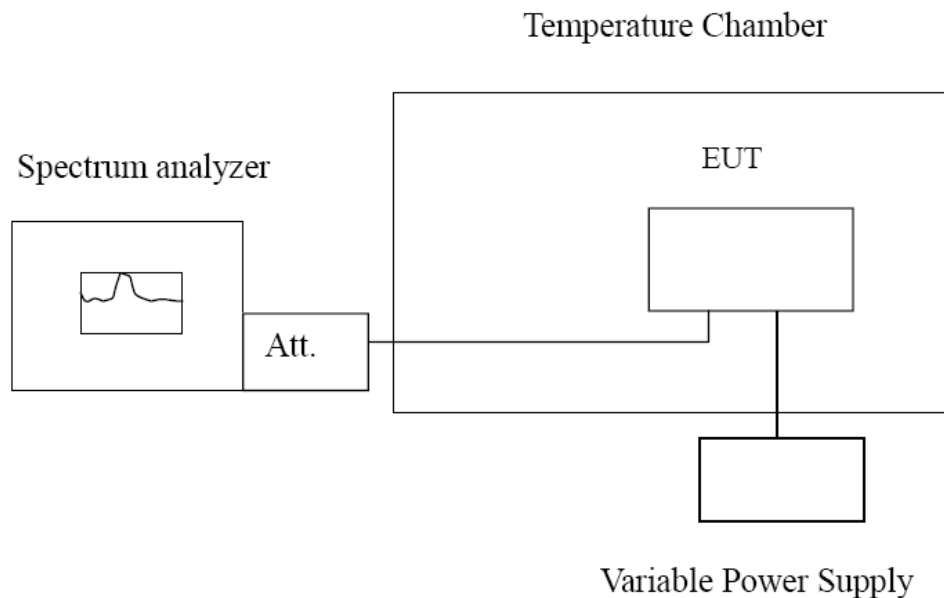
CH159

3.8. Frequency Stability

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 users manual.

TEST CONFIGURATION



TEST PROCEDURE

Frequency Stability under Temperature Variations:

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

Frequency Stability under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

Record worst case as below:

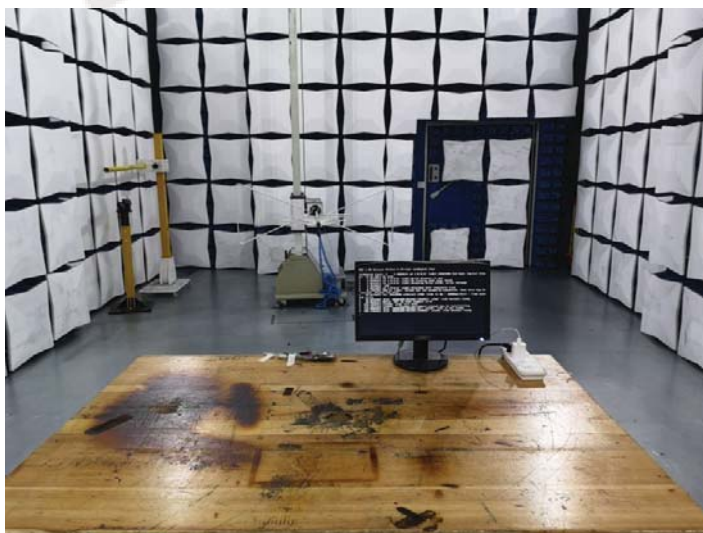
Reference Frequency: 802.11ac channel=36 frequency=5180MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
5.00	-30	456	0.088	Within the band of operation	Pass
	-20	667	0.129		
	-10	794	0.153		
	0	832	0.161		
	10	837	0.162		
	20	657	0.127		
	30	528	0.102		
	40	568	0.110		
	50	501	0.097		
5.75	25	906	0.175		
4.25	25	456	0.088		

Reference Frequency: 802.11ac channel=52 frequency=5260MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
5.00	-30	560	0.106	Within the band of operation	Pass
	-20	670	0.127		
	-10	550	0.105		
	0	542	0.103		
	10	533	0.101		
	20	919	0.175		
	30	593	0.113		
	40	452	0.086		
	50	513	0.098		
5.75	25	943	0.179		
4.25	25	426	0.081		

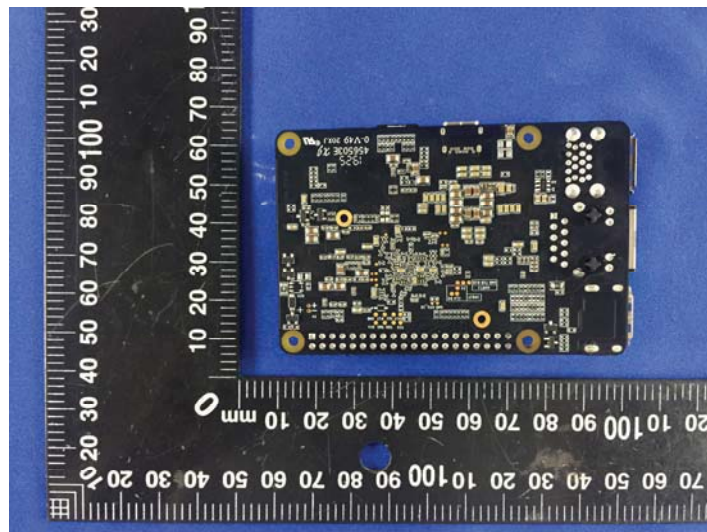
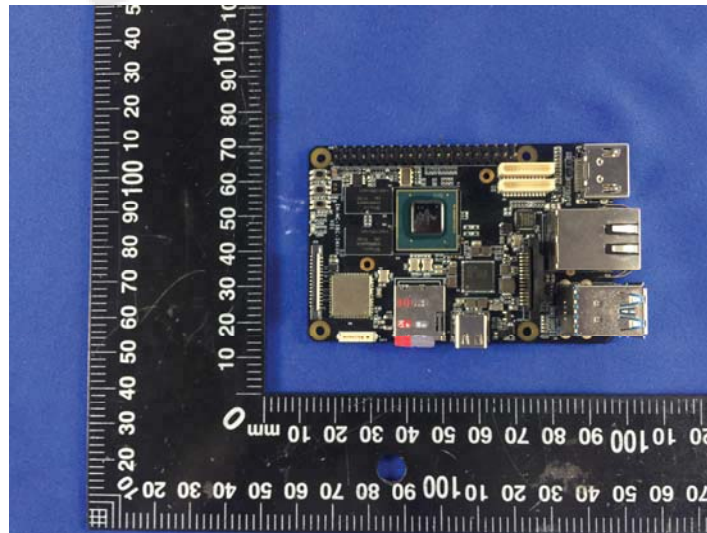
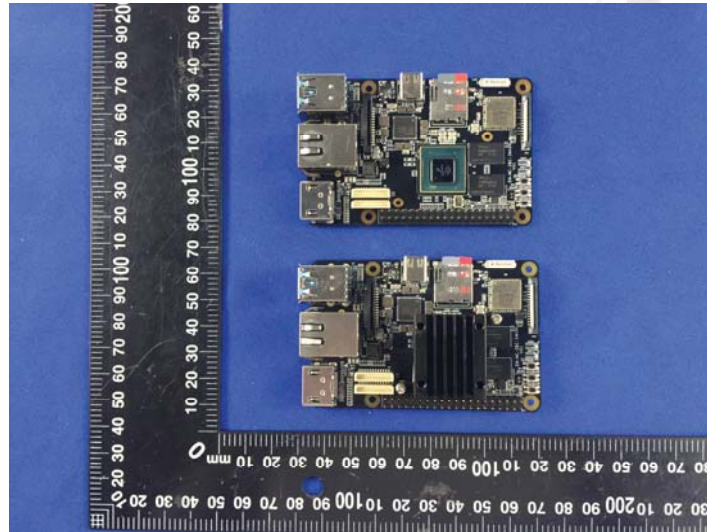
Reference Frequency: 802.11ac channel=100 frequency=5500MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
5.00	-30	695	0.126	Within the band of operation	Pass
	-20	980	0.178		
	-10	861	0.157		
	0	537	0.098		
	10	612	0.111		
	20	458	0.083		
	30	748	0.136		
	40	440	0.080		
	50	792	0.144		
5.75	25	728	0.132		
4.25	25	766	0.139		

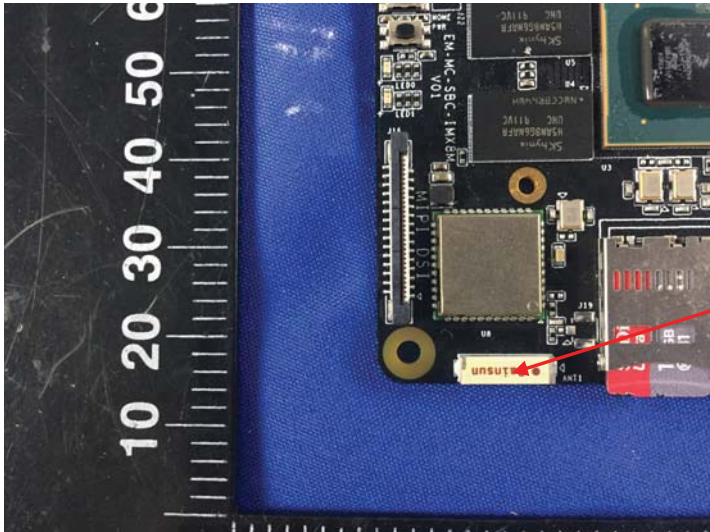
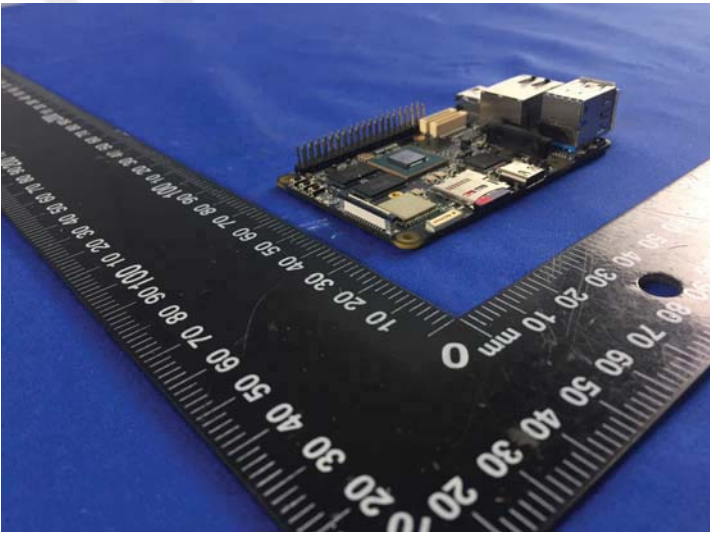
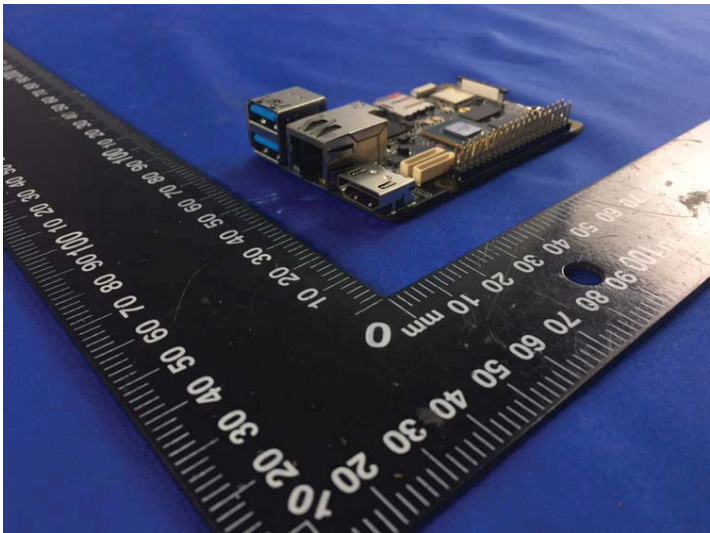
Reference Frequency: 802.11ac channel=149 frequency=5745MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
5.00	-30	698	0.013	Within the band of operation	Pass
	-20	610	0.011		
	-10	766	0.014		
	0	832	0.015		
	10	723	0.013		
	20	711	0.013		
	30	816	0.015		
	40	995	0.018		
	50	656	0.012		
5.75	25	680	0.012	Within the band of operation	Pass
4.25	25	937	0.017		

4. Test Setup Photos of the EUT

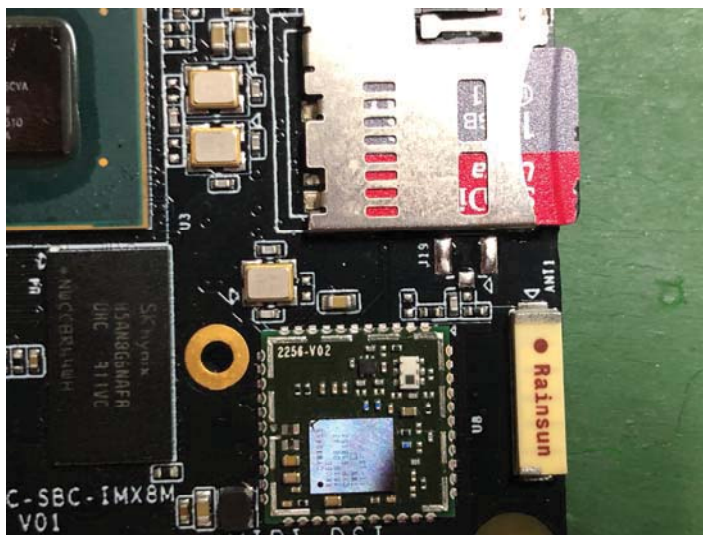


5. Photos of the EUT





antenna



***** End of Report *****