8.SPURIOUS RF CONDUCTED EMISSIONS

8.1CONFORMANCE LIMIT

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

8.2MEASURING INSTRUMENTS

The Measuring equipment is listed in the section 6.3 of this test report.

8.3TEST SETUP

Please refer to Section 6.1 of this test report.

8.4TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

8.5TEST RESULTS

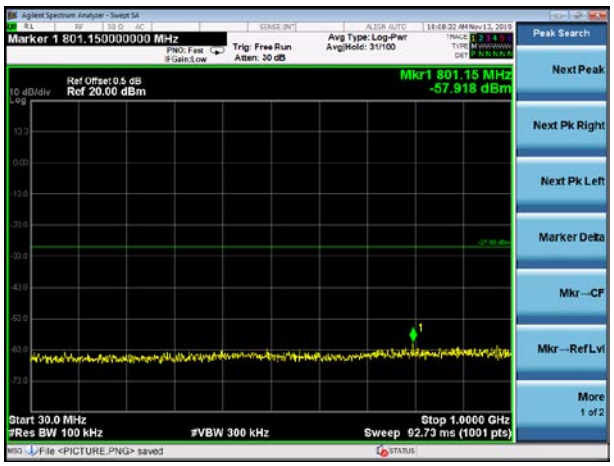
Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A ,only shown Antenna A Plot.

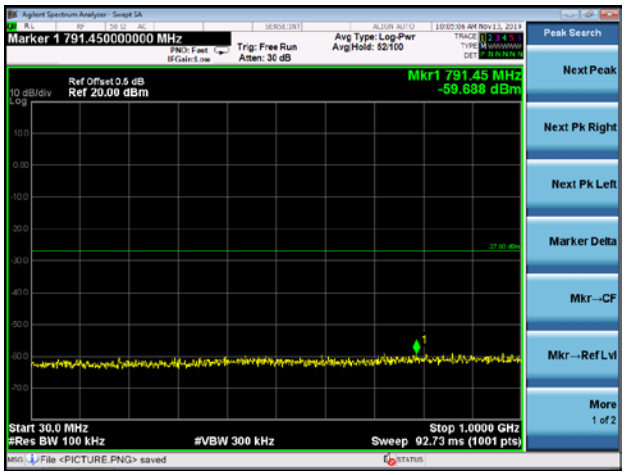
5.2G

Test Plot

802.11a on channel 36



802.11a on channel 40



802.11a on channel 36

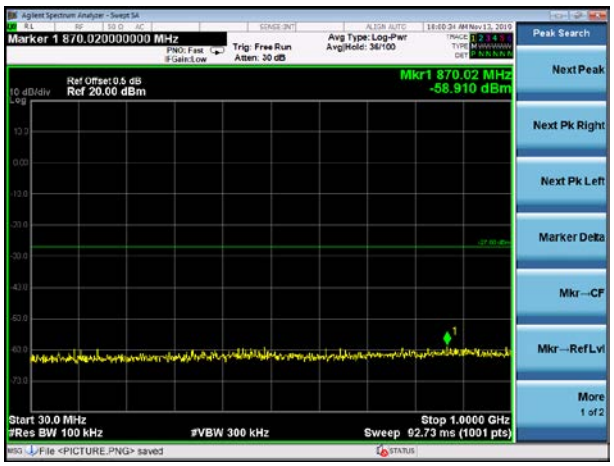
802.11a on channel 40

802.11a on channel 36

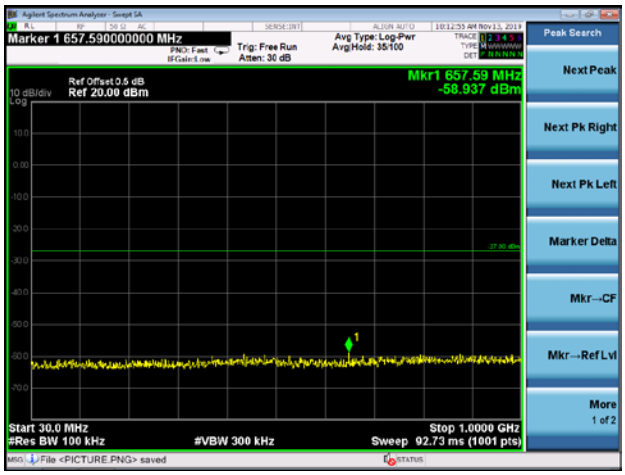
802.11a on channel 40

Test Plot

802.11a on channel 48



802.11n20 on channel 36



802.11a on channel 48

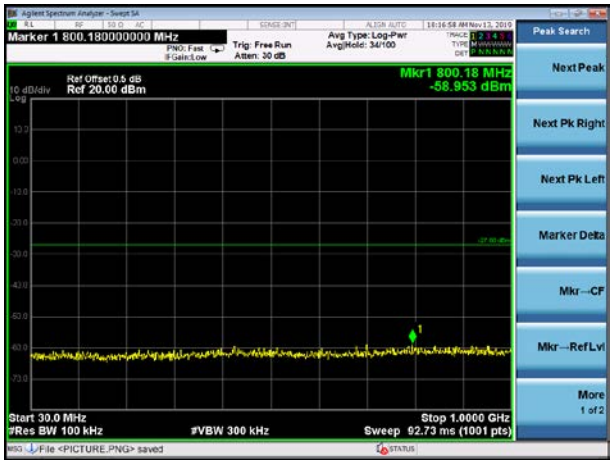
802.11n20 on channel 36

802.11a on channel 48

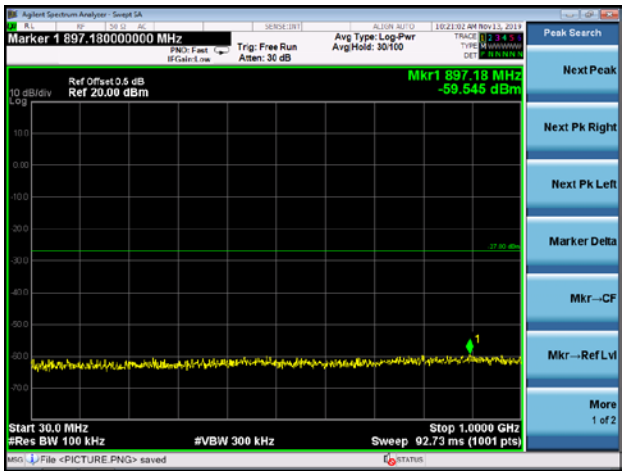
802.11n20 on channel 36

Test Plot

802.11n20 on channel 40



802.11n20 on channel 48



802.11n20 on channel 40

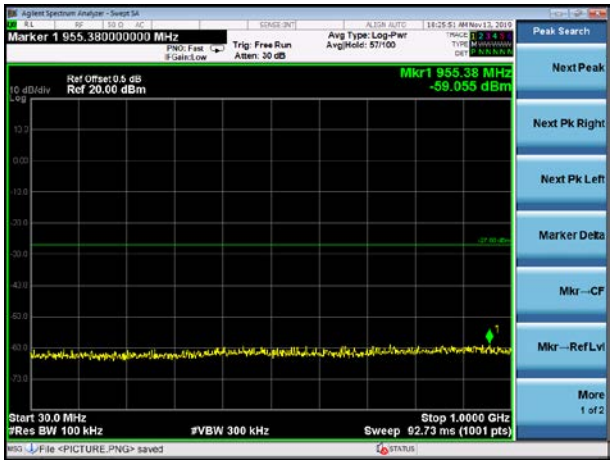
802.11n20 on channel 48

802.11n20 on channel 40

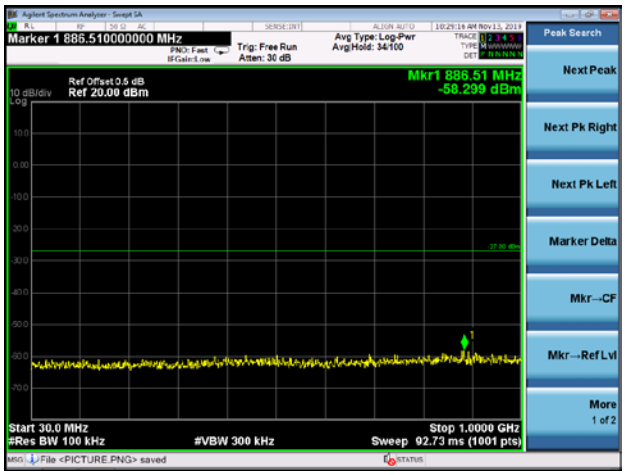
802.11n20 on channel 48

Test Plot

802.11n40 on channel 38



802.11n40 on channel 46



802.11n40 on channel 38

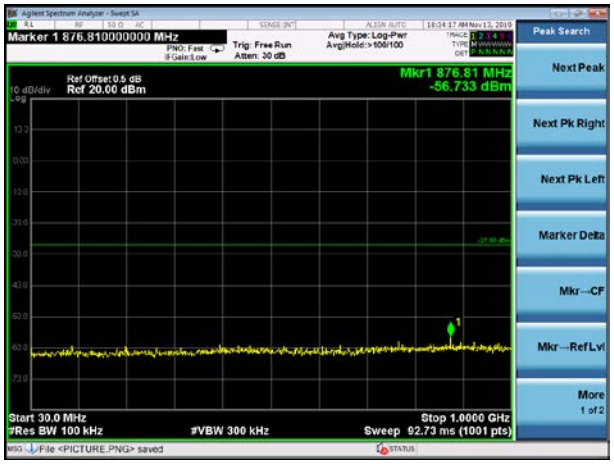
802.11n40 on channel 46

802.11n40 on channel 38

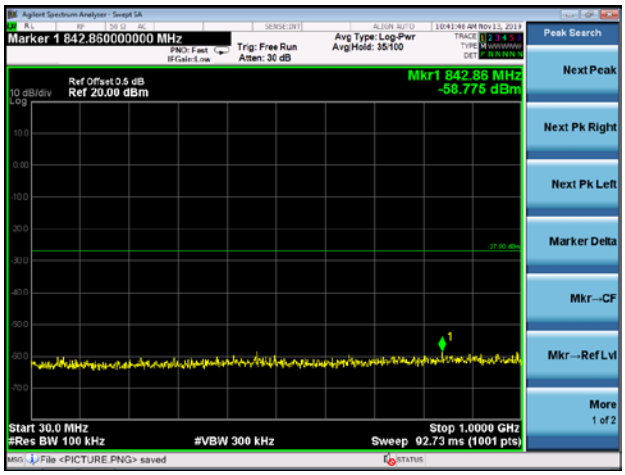
802.11n40 on channel 46

Test Plot

802.11ac20 on channel 36



802.11ac20 on channel 40



802.11ac20 on channel 36

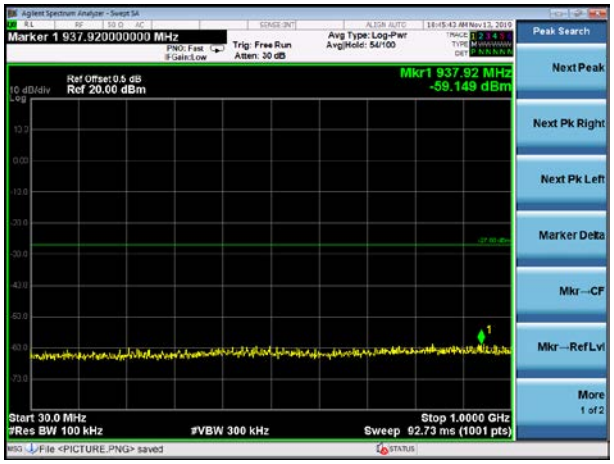
802.11ac20 on channel 40

802.11ac20 on channel 36

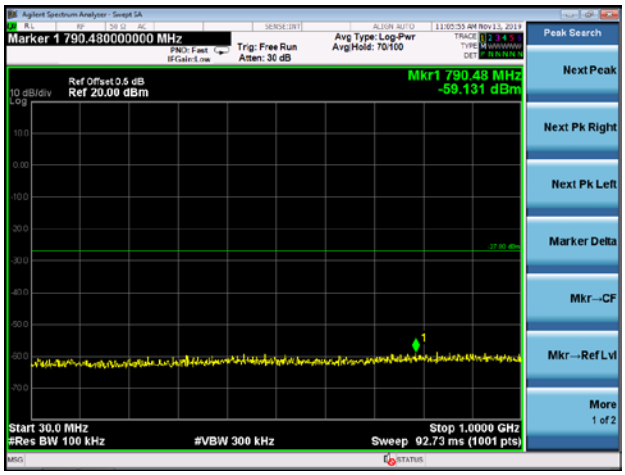
802.11ac20 on channel 40

Test Plot

802.11ac20 on channel 48



802.11ac40 on channel 38



802.11ac20 on channel 48

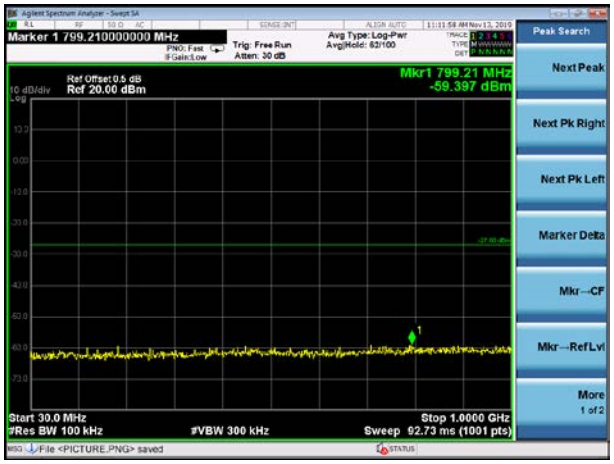
802.11ac40 on channel 38

802.11ac20 on channel 48

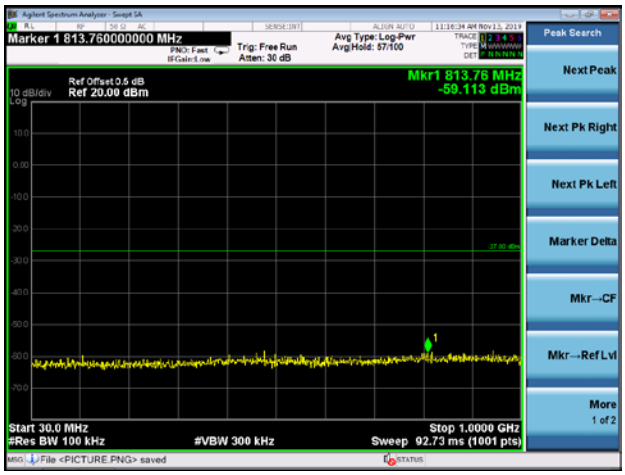
802.11ac40 on channel 38

Test Plot

802.11ac40 on channel 46



802.11ac80 on channel 42



802.11 ac40 on channel 46

802.11 ac80 on channel 42

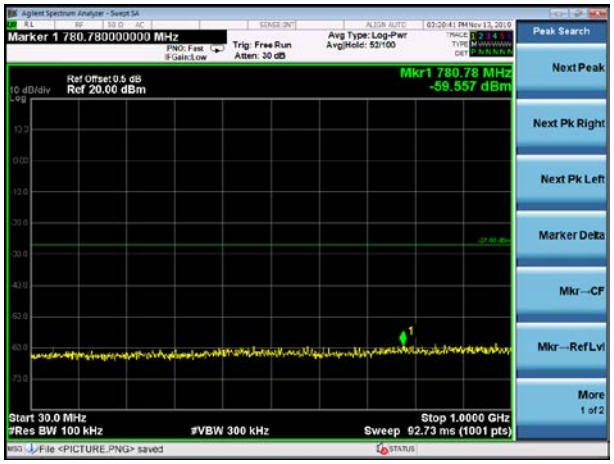
802.11 ac40 on channel 46

802.11 ac80 on channel 42

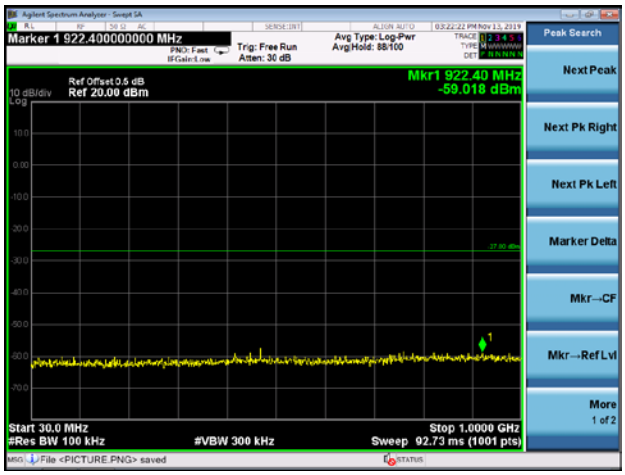
5.8G

Test Plot

802.11a on channel 149



802.11a on channel 157



802.11a on channel 149

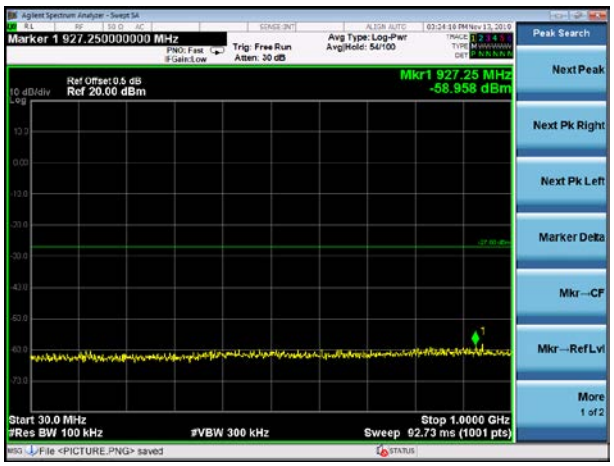
802.11a on channel 157

802.11a on channel 149

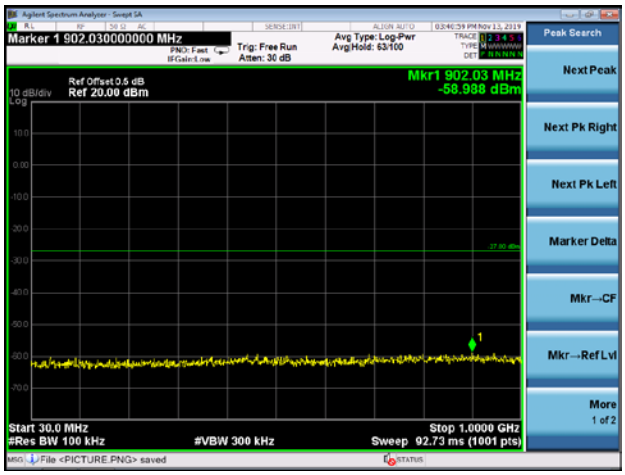
802.11a on channel 157

Test Plot

802.11a on channel 165



802.11n20 on channel 149



802.11a on channel 165

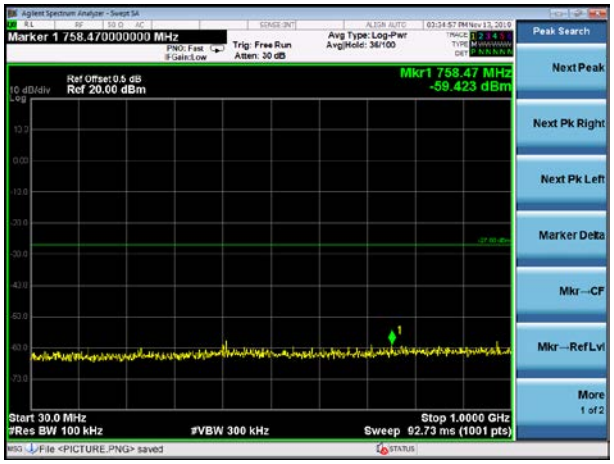
802.11n20 on channel 149

802.11a on channel 165

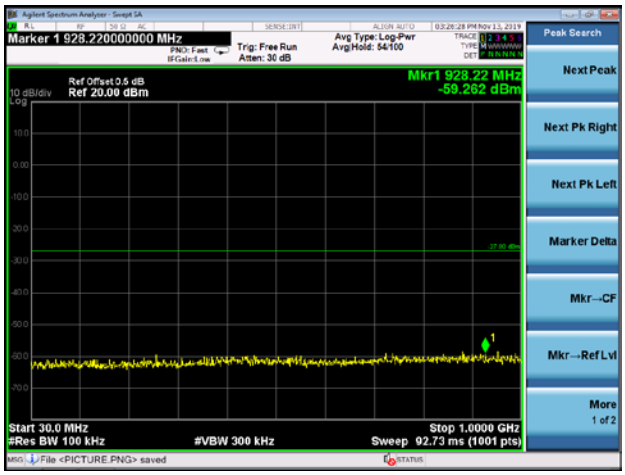
802.11n20 on channel 149

Test Plot

802.11n20 on channel 157



802.11n20 on channel 165



802.11n20 on channel 157

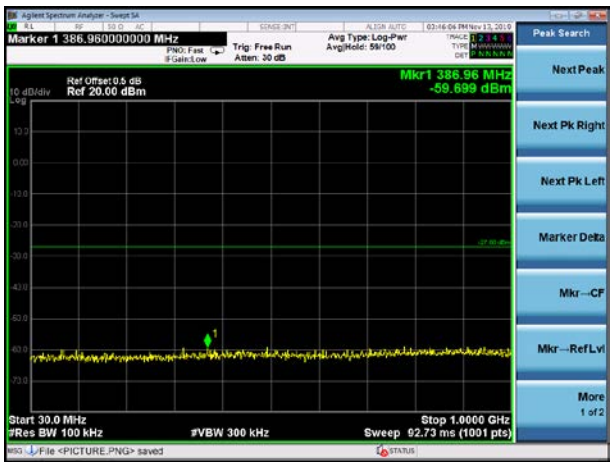
802.11n20 on channel 165

802.11n20 on channel 157

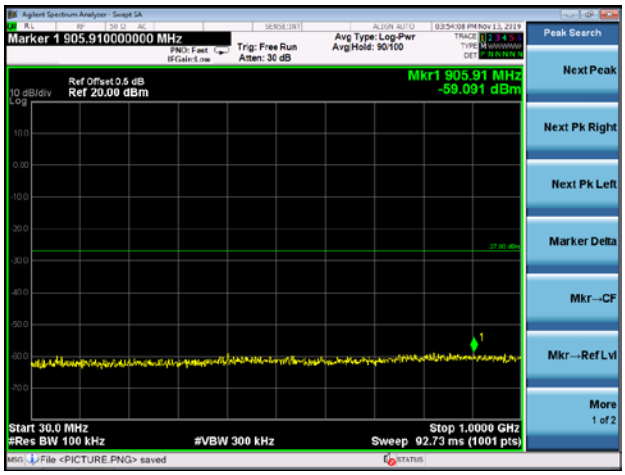
802.11n20 on channel 165

Test Plot

802.11n40 on channel 151



802.11n40 on channel 159



802.11n40 on channel 151

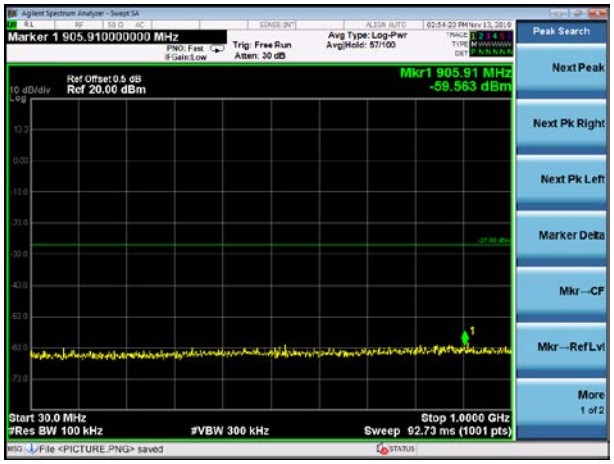
802.11n40 on channel 159

802.11n40 on channel 151

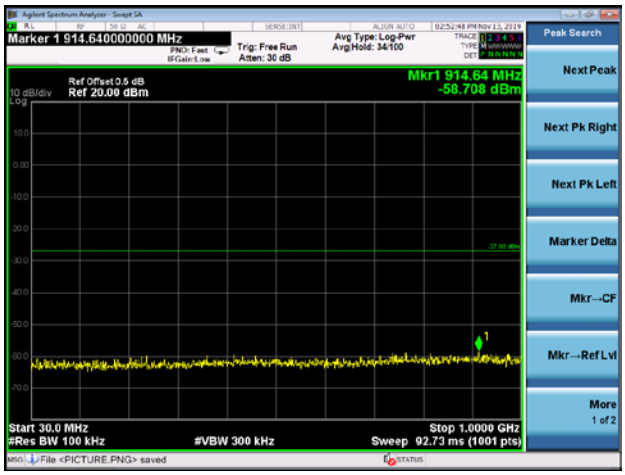
802.11n40 on channel 159

Test Plot

802.11ac20 on channel 149



802.11ac20 on channel 157



802.11ac20 on channel 149

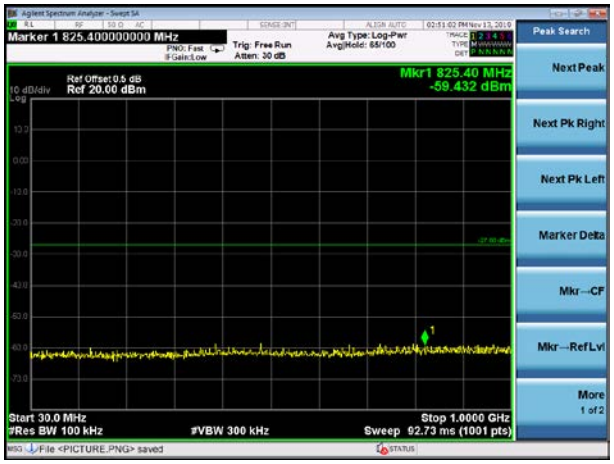
802.11ac20 on channel 157

802.11ac20 on channel 149

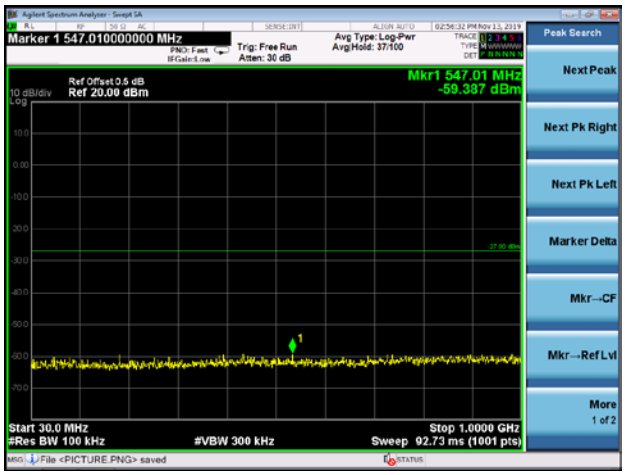
802.11ac20 on channel 157

Test Plot

802.11ac20 on channel 165



802.11ac40 on channel 151



802.11ac20 on channel 165

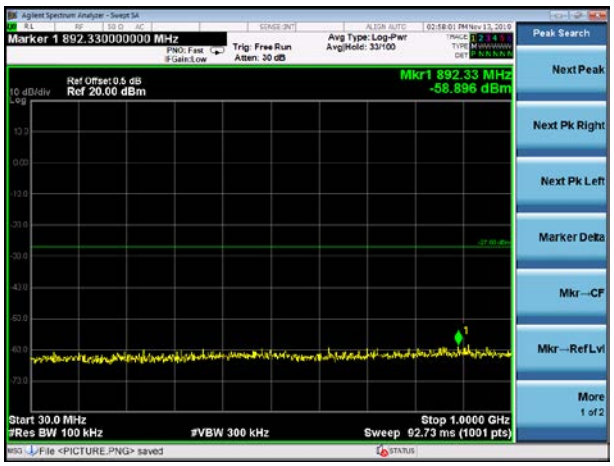
802.11ac40 on channel 151

802.11ac20 on channel 165

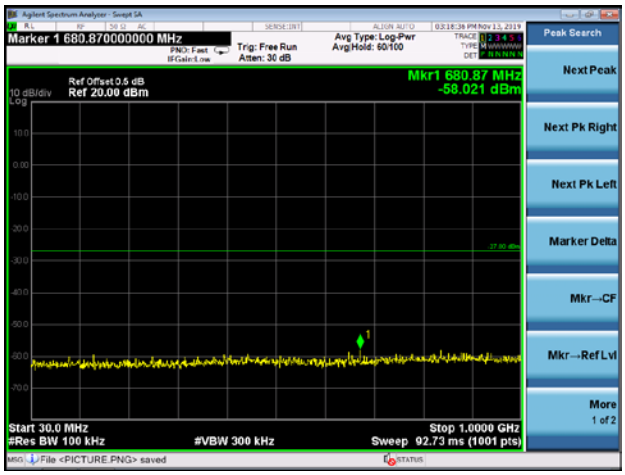
802.11ac40 on channel 151

Test Plot

802.11ac40 on channel 159



802.11ac80 on channel 155



802.11 ac40 on channel 159

802.11 ac80 on channel 155

802.11 ac40 on channel 159

802.11 ac80 on channel 155

9. Frequency Stability Measurement

9.1 LIMIT

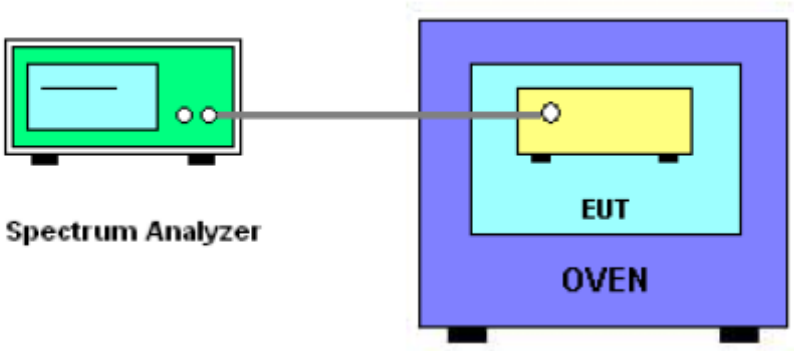
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

9.2 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10_6 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C~70°C.

9.3 TEST SETUP LAYOUT



9.4 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously un-modulation transmitting mode.

9.5 TEST RESULTS

Temperature :	26 ℃	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX Frequency U-NII-1 (5180-5240MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5180.0523	5180	0.0523	10.0965
		V max (V)	13.80	5180.0326	5180	0.0326	6.2934
		V min (V)	10.20	5180.0247	5180	0.0247	4.7683
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5180.0055	5180	0.0055	1.0618
		T (°C)	-10	5180.0106	5180	0.0106	2.0463
		T (°C)	0	5180.0324	5180	0.0324	6.2548
		T (°C)	10	5180.0387	5180	0.0387	7.4710
		T (°C)	20	5180.0293	5180	0.0293	5.6564
		T (°C)	30	5180.0215	5180	0.0215	4.1506
		T (°C)	40	5180.0127	5180	0.0127	2.4517
		T (°C)	50	5180.0095	5180	0.0095	1.8340
		T (°C)	60	5180.0417	5180	0.0417	8.0502
		T (°C)	70	5180.0694	5180	0.0694	13.3977
Limits				5150-5250 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5200.0256	5200	0.0256	4.9231
		V max (V)	13.80	5200.0424	5200	0.0424	8.1538
		V min (V)	10.20	5200.0699	5200	0.0699	13.4423
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5200.0636	5200	0.0636	12.2308
		T (°C)	-10	5200.0523	5200	0.0523	10.0577
		T (°C)	0	5200.0436	5200	0.0436	8.3846
		T (°C)	10	5200.0923	5200	0.0923	17.7500
		T (°C)	20	5200.0637	5200	0.0637	12.2500
		T (°C)	30	5200.0123	5200	0.0123	2.3654
		T (°C)	40	5200.0736	5200	0.0736	14.1538
		T (°C)	50	5200.0414	5200	0.0414	7.9615
		T (°C)	60	5200.0326	5200	0.0326	6.2692
		T (°C)	70	5200.0423	5200	0.0423	8.1346
Limits				5150-5250 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5240.0133	5240	0.0133	2.5382
		V max (V)	13.80	5240.0416	5240	0.0416	7.9389
		V min (V)	10.20	5240.0097	5240	0.0097	1.8511
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5240.0097	5240	0.0097	1.8511
		T (°C)	-10	5240.0034	5240	0.0034	0.6489
		T (°C)	0	5240.0147	5240	0.0147	2.8053
		T (°C)	10	5240.0854	5240	0.0854	16.2977
		T (°C)	20	5240.0113	5240	0.0113	2.1565
		T (°C)	30	5240.0127	5240	0.0127	2.4237
		T (°C)	40	5240.0064	5240	0.0064	1.2214
		T (°C)	50	5240.0076	5240	0.0076	1.4504
		T (°C)	60	5240.0053	5240	0.0053	1.0115
		T (°C)	70	5240.0106	5240	0.0106	2.0229
Limits				5150-5250 MHz			
Result				Complies			

Temperature :	26 ℃	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	AC 120V/60Hz
Hzst Mode :	TX Frequency(5745-5825MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5745.00591	5745	0.00591	1.0284
		V max (V)	13.80	5745.01030	5745	0.01030	1.7920
		V min (V)	10.20	5745.00063	5745	0.00063	0.1089
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5745.00192	5745	0.00192	0.3344
		T (°C)	-10	5745.01282	5745	0.01282	2.2321
		T (°C)	0	5745.01259	5745	0.01259	2.1920
		T (°C)	10	5745.01039	5745	0.01039	1.8078
		T (°C)	20	5745.00340	5745	0.00340	0.5924
		T (°C)	30	5745.00003	5745	0.00003	0.0049
		T (°C)	40	5745.00987	5745	0.00987	1.7177
		T (°C)	50	5745.00064	5745	0.00064	0.1114
		T (°C)	60	5745.00352	5745	0.00352	0.6119
		T (°C)	70	5745.00478	5745	0.00478	0.8314
Limits				5725-5850 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5785.01037	5785	0.01037	1.7931
		V max (V)	13.80	5785.00508	5785	0.00508	0.8781
		V min (V)	10.20	5785.00435	5785	0.00435	0.7513
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5785.00280	5785	0.00280	0.4842
		T (°C)	-10	5785.01324	5785	0.01324	2.2890
		T (°C)	0	5785.01110	5785	0.01110	1.9195
		T (°C)	10	5785.01329	5785	0.01329	2.2967
		T (°C)	20	5785.00171	5785	0.00171	0.2957
		T (°C)	30	5785.01230	5785	0.01230	2.1269
		T (°C)	40	5785.01290	5785	0.01290	2.2304
		T (°C)	50	5785.01187	5785	0.01187	2.0523
		T (°C)	60	5785.00418	5785	0.00418	0.7228
		T (°C)	70	5785.01048	5785	0.01048	1.8113
Limits				5725-5850 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5825.00117	5825	0.00117	0.2000
		V max (V)	13.80	5825.00659	5825	0.00659	1.1307
		V min (V)	10.20	5825.00388	5825	0.00388	0.6662
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5825.00491	5825	0.00491	0.8433
		T (°C)	-10	5825.01194	5825	0.01194	2.0500
		T (°C)	0	5825.00899	5825	0.00899	1.5430
		T (°C)	10	5825.00577	5825	0.00577	0.9907
		T (°C)	20	5825.01060	5825	0.01060	1.8206
		T (°C)	30	5825.00745	5825	0.00745	1.2781
		T (°C)	40	5825.00936	5825	0.00936	1.6074
		T (°C)	50	5825.00274	5825	0.00274	0.4703
		T (°C)	60	5825.00206	5825	0.00206	0.3536
		T (°C)	70	5825.00241	5825	0.00241	0.4138
Limits				5725-5850 MHz			
Result				Complies			

10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

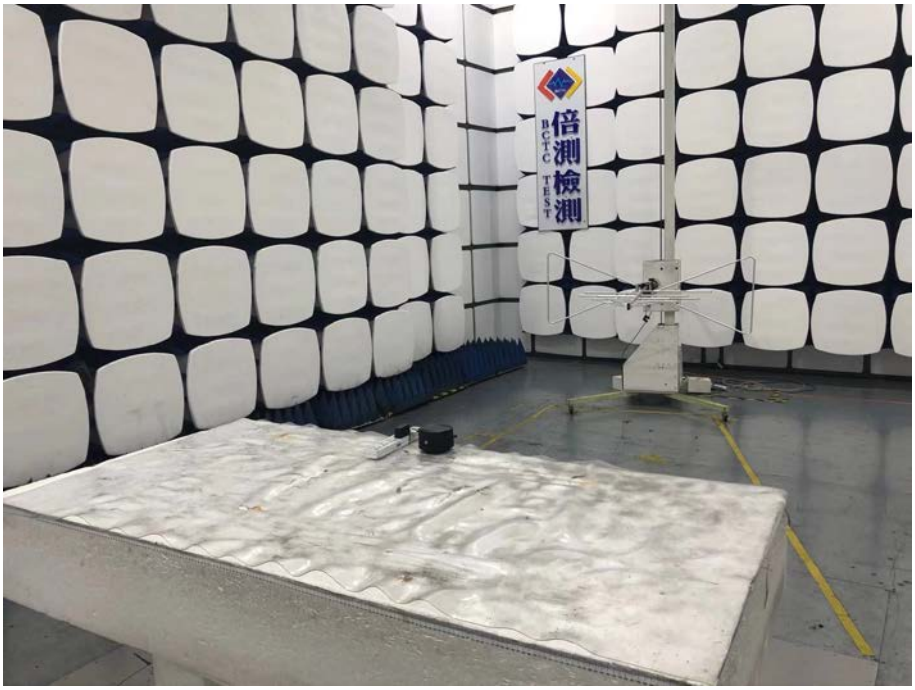
10.2 EUT ANTENNA

The EUT antenna is Internal antenna (antenna gain (A): 3dBi; antenna gain (B) : 3dBi). It comply with the standard requirement.

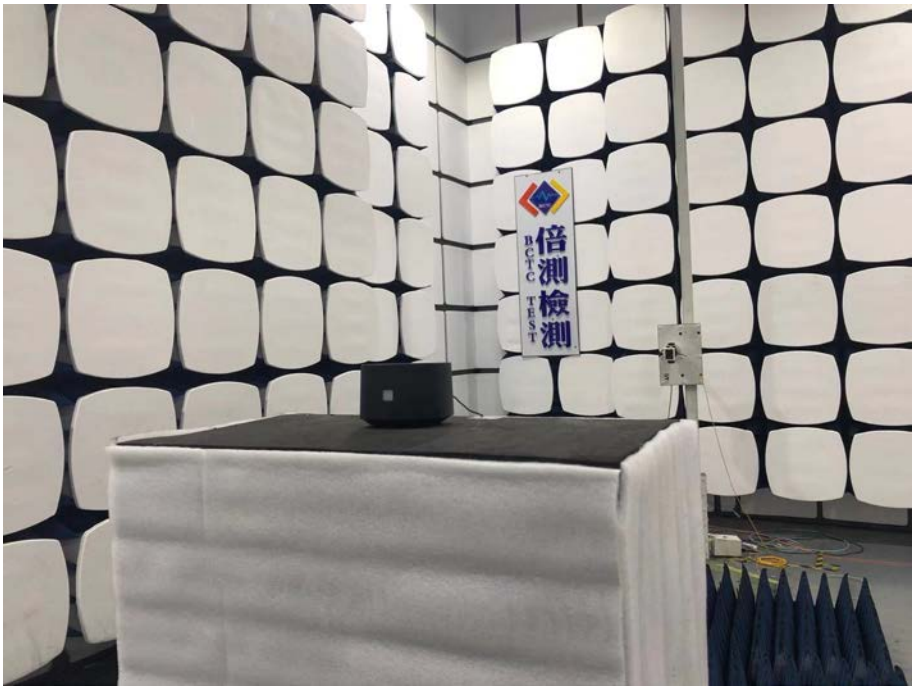
11. EUT TEST PHOTO

Conducted Measurement Photos

Radiated Measurement Photos



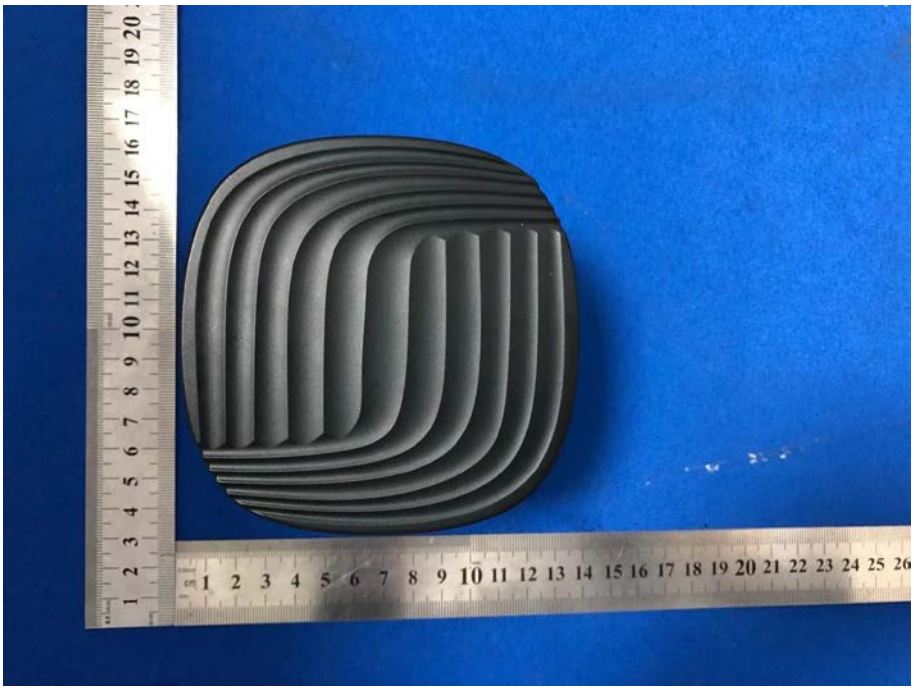
倍测检测
BCTC TEST


倍测检测
BCTC TEST

12. EUT PHOTO

Power Supply
Model: RA004-1201000US
Input : 100-240V~50/60Hz
0.35A Max
Output: 12V⎓1A
LISTED
E493209

SWITCH MODE POWER SUPPLY
Model:LPL-U012120100ZH
Input:100-240V~50/60Hz 0.35A Max
Output:12V 1A
LISTED
LPS
MADE IN CHINA BY DOKOCOM



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