

13. Frequency Stability Measurement

13.1 Block Diagram Of Test Setup



13.2 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)..

13.3 Test Procedure

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. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and he limit is less than ± 20 ppm (IEEE 802.11n specification).
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 $-20^\circ\text{C} \sim 70^\circ\text{C}$.

13.4 Test Result

Temperature :	26 °C	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)	120.00	5180.0030	5180	0.0030	0.5720
		V max (V)	138.00	5180.0125	5180	0.0125	2.4155
		V min (V)	102.00	5180.0121	5180	0.0121	2.3360
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)	DC 5V	T (°C)	-20	5180.0018	5180	0.0018	0.3496
		T (°C)	-10	5180.0041	5180	0.0041	0.7921
		T (°C)	0	5180.0108	5180	0.0108	2.0821
		T (°C)	10	5180.0133	5180	0.0133	2.5607
		T (°C)	20	5180.0134	5180	0.0134	2.5787
		T (°C)	30	5180.0047	5180	0.0047	0.9100
		T (°C)	40	5180.0044	5180	0.0044	0.8573
		T (°C)	50	5180.0101	5180	0.0101	1.9564
		T (°C)	60	5180.0083	5180	0.0083	1.5963
		T (°C)	70	5180.0135	5180	0.0135	2.6061
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)	120.00	5200.0033	5200	0.0033	0.6431
		V max (V)	138.00	5200.0113	5200	0.0113	2.1772
		V min (V)	102.00	5200.0120	5200	0.0120	2.3023
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	DC 5V	T (°C)	-20	5200.00140	5200	0.00140	0.2688
		T (°C)	-10	5200.00476	5200	0.00476	0.9152
		T (°C)	0	5200.00169	5200	0.00169	0.3241
		T (°C)	10	5200.00605	5200	0.00605	1.1640
		T (°C)	20	5200.00851	5200	0.00851	1.6359
		T (°C)	30	5200.00559	5200	0.00559	1.0743
		T (°C)	40	5200.00824	5200	0.00824	1.5838
		T (°C)	50	5200.01300	5200	0.01300	2.4994
		T (°C)	60	5200.01210	5200	0.01210	2.3272
		T (°C)	70	5200.00803	5200	0.00803	1.5435
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)	120.00	5240.0104	5240	0.0104	1.9933
		V max (V)	138.00	5240.0133	5240	0.0133	2.5408
		V min (V)	102.00	5240.0129	5240	0.0129	2.4582
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)	DC 5V	T (°C)	-20	5240.0009	5240	0.0009	0.1714
		T (°C)	-10	5240.0046	5240	0.0046	0.8784
		T (°C)	0	5240.0077	5240	0.0077	1.4744
		T (°C)	10	5240.0044	5240	0.0044	0.8432
		T (°C)	20	5240.0035	5240	0.0035	0.6712
		T (°C)	30	5240.0122	5240	0.0122	2.3347
		T (°C)	40	5240.0018	5240	0.0018	0.3487
		T (°C)	50	5240.0044	5240	0.0044	0.8358
		T (°C)	60	5240.0133	5240	0.0133	2.5365
		T (°C)	70	5240.0112	5240	0.0112	2.1341
Limits				5150-5250 MHz			
Result				Complies			

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

Voltage vs. Frequency Stabilit

TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5745.00868	5745	0.00868	1.5102
		V max (V)	138.00	5745.00102	5745	0.00102	0.1776
		V min (V)	102.00	5745.00560	5745	0.00560	0.9752
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)	DC 5V	T (°C)	-20	5745.00727	5745	0.00727	1.2657
		T (°C)	-10	5745.00029	5745	0.00029	0.0507
		T (°C)	0	5745.00994	5745	0.00994	1.7298
		T (°C)	10	5745.00078	5745	0.00078	0.1361
		T (°C)	20	5745.00590	5745	0.00590	1.0265
		T (°C)	30	5745.00821	5745	0.00821	1.4294
		T (°C)	40	5745.00679	5745	0.00679	1.1814
		T (°C)	50	5745.00910	5745	0.00910	1.5846
		T (°C)	60	5745.00064	5745	0.00064	0.1117
		T (°C)	70	5745.00331	5745	0.00331	0.5755
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)	120.00	5785.00200	5785	0.00200	0.3458
		V max (V)	138.00	5785.00920	5785	0.00920	1.5901
		V min (V)	102.00	5785.00397	5785	0.00397	0.6870
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

Temperature vs. Frequency Stability				Reference Frequency: 5785MHz			
TEST CONDITIONS				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	DC 5V	T (°C)	-20	5785.00856	5785	0.00856	1.4796
		T (°C)	-10	5785.01004	5785	0.01004	1.7361
		T (°C)	0	5785.00061	5785	0.00061	0.1047
		T (°C)	10	5785.01153	5785	0.01153	1.9937
		T (°C)	20	5785.00400	5785	0.00400	0.6910
		T (°C)	30	5785.01108	5785	0.01108	1.9155
		T (°C)	40	5785.00880	5785	0.00880	1.5204
		T (°C)	50	5785.01184	5785	0.01184	2.0459
		T (°C)	60	5785.00353	5785	0.00353	0.6107
		T (°C)	70	5785.00104	5785	0.00104	0.1789
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)	120.00	5825.00797	5825	0.00797	1.3684
		V max (V)	138.00	5825.00071	5825	0.00071	0.1212
		V min (V)	102.00	5825.00040	5825	0.00040	0.0682
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)	DC 5V	T (°C)	-20	5825.00885	5825	0.00885	1.5198
		T (°C)	-10	5825.00626	5825	0.00626	1.0755
		T (°C)	0	5825.00613	5825	0.00613	1.0532
		T (°C)	10	5825.00723	5825	0.00723	1.2417
		T (°C)	20	5825.00308	5825	0.00308	0.5294
		T (°C)	30	5825.00322	5825	0.00322	0.5534
		T (°C)	40	5825.00979	5825	0.00979	1.6811
		T (°C)	50	5825.01249	5825	0.01249	2.1434
		T (°C)	60	5825.00398	5825	0.00398	0.6828
		T (°C)	70	5825.01032	5825	0.01032	1.7715
Limits				5725-5850 MHz			
Result				Complies			

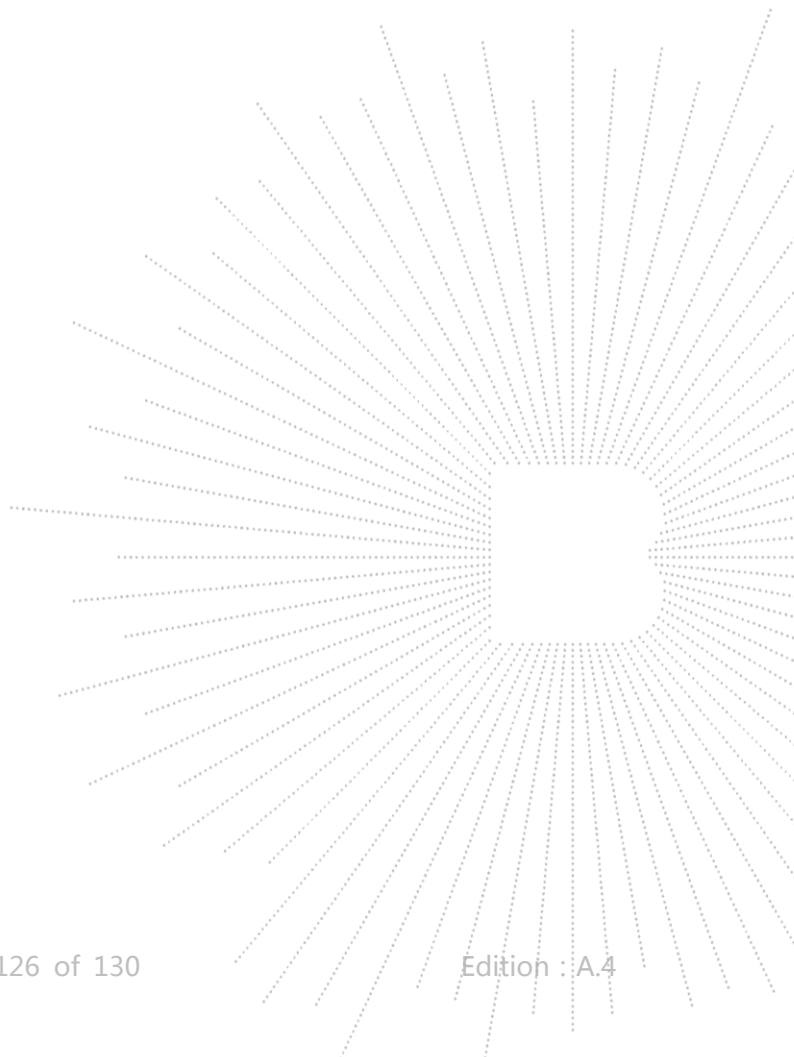
14. Antenna Requirement

14.1 Limit

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.

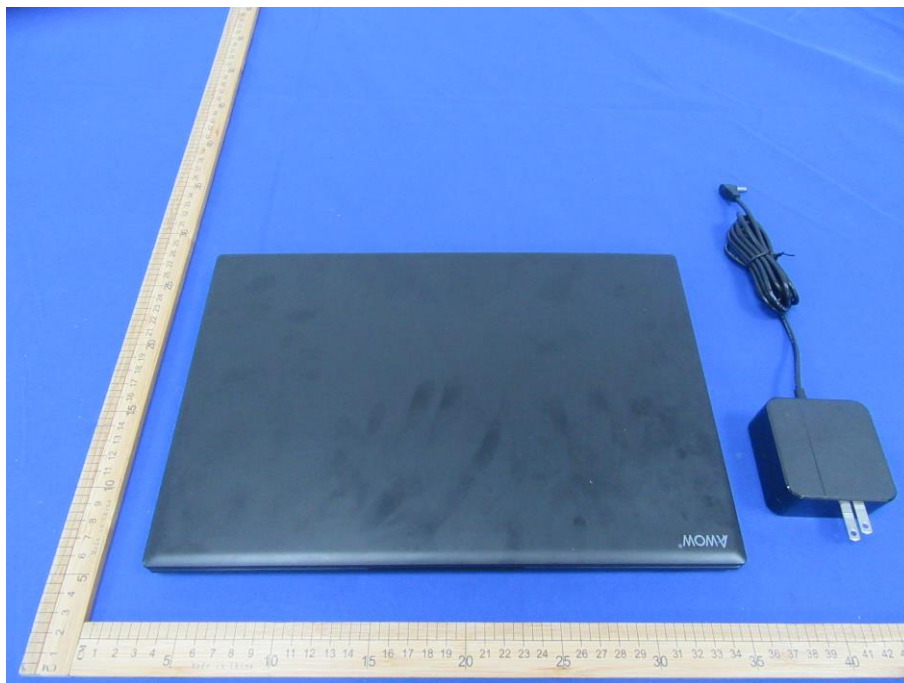
14.2 Test Result

The EUT antenna is FPC antenna. It comply with the standard requirement.



15. EUT Photographs

EUT Photo 1



EUT Photo 2

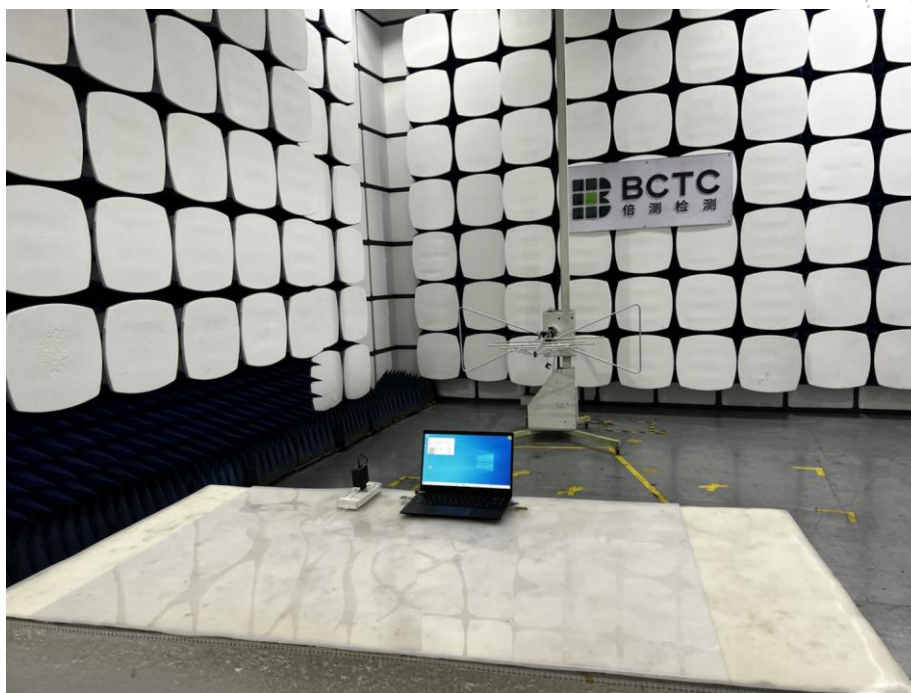


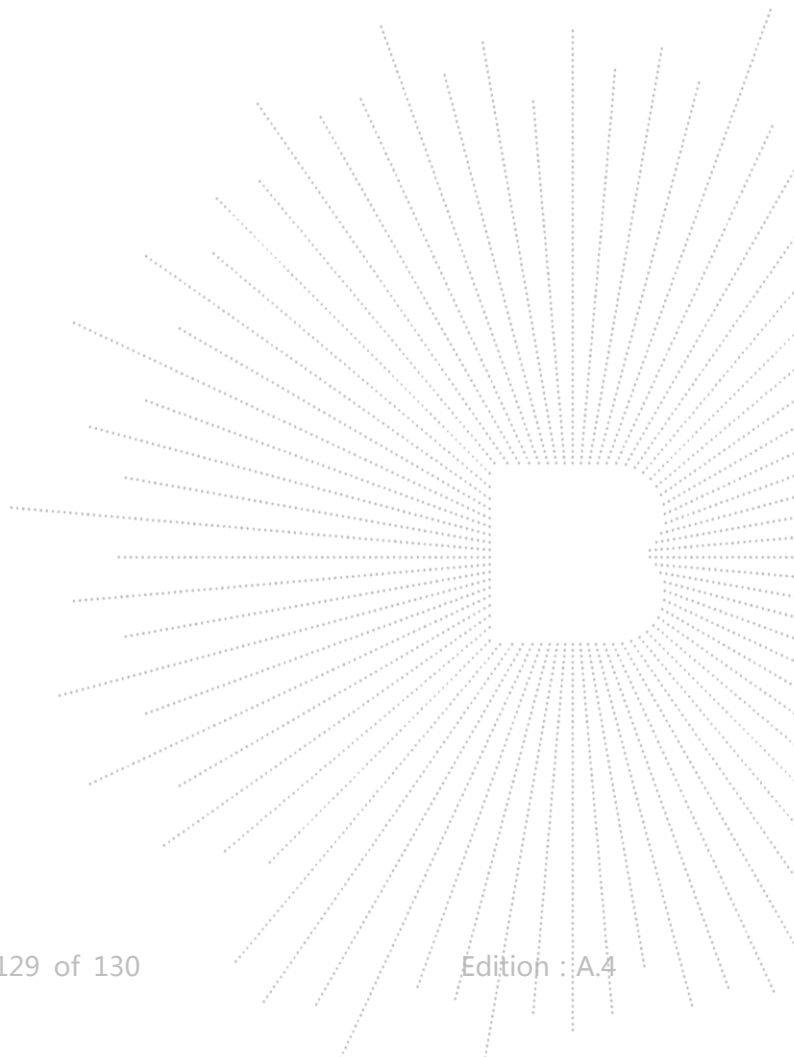
16. EUT Test Setup Photographs

Conducted Measurement Photos



Radiated Measurement Photos





STATEMENT

- 1.The equipment lists are traceable to the national reference standards.
- 2.The test report can not be partially copied unless prior written approval is issued from our lab.
- 3.The test report is invalid without stamp of laboratory.
- 4.The test report is invalid without signature of person(s) testing and authorizing.
- 5.The test process and test result is only related to the Unit Under Test.
- 6.The quality system of our laboratory is in accordance with ISO/IEC17025.
- 7.If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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