

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 :	AC120V/60Hz
Test Mode:	TX (5.1G) Mode 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	5180.02	5180	0.02	3.86
		V max (V)	138.00	5180.0197	5180	0.0197	3.80
		V min (V)	102.00	5180.0114	5180	0.0114	2.20
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

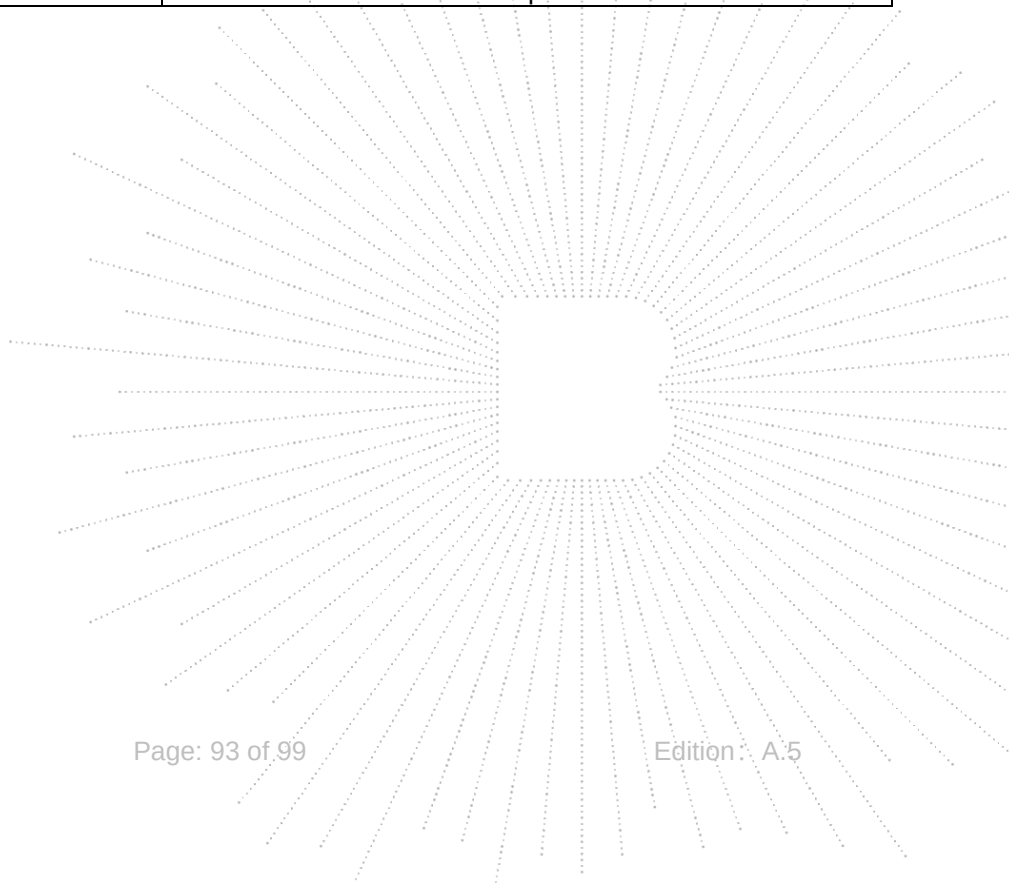
TEST CONDITIONS				Reference Frequency: 5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5180.0199	5180	0.0199	3.84
		T (°C)	-10	5180.0187	5180	0.0187	3.61
		T (°C)	0	5180.0149	5180	0.0149	2.88
		T (°C)	10	5180.0179	5180	0.0179	3.46
		T (°C)	20	5180.0126	5180	0.0126	2.43
		T (°C)	30	5180.0115	5180	0.0115	2.22
		T (°C)	40	5180.0146	5180	0.0146	2.82
		T (°C)	50	5180.0117	5180	0.0117	2.26
		T (°C)	60	5180.0181	5180	0.0181	3.49
		T (°C)	70	5180.0134	5180	0.0134	2.59
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	5200.02	5200	0.02	3.85
		V max (V)	138.00	5200.0164	5200	0.0164	3.15
		V min (V)	102.00	5200.019	5200	0.019	3.65
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)	120	T (°C)	-20	5200.0166	5200	0.0166	3.19
		T (°C)	-10	5200.0127	5200	0.0127	2.44
		T (°C)	0	5200.0136	5200	0.0136	2.62
		T (°C)	10	5200.0167	5200	0.0167	3.21
		T (°C)	20	5200.0112	5200	0.0112	2.15
		T (°C)	30	5200.0122	5200	0.0122	2.35
		T (°C)	40	5200.0183	5200	0.0183	3.52
		T (°C)	50	5200.015	5200	0.015	2.88
		T (°C)	60	5200.0149	5200	0.0149	2.87
		T (°C)	70	5200.0159	5200	0.0159	3.06
Limits				5150-5250 MHz			
Result				Complies			

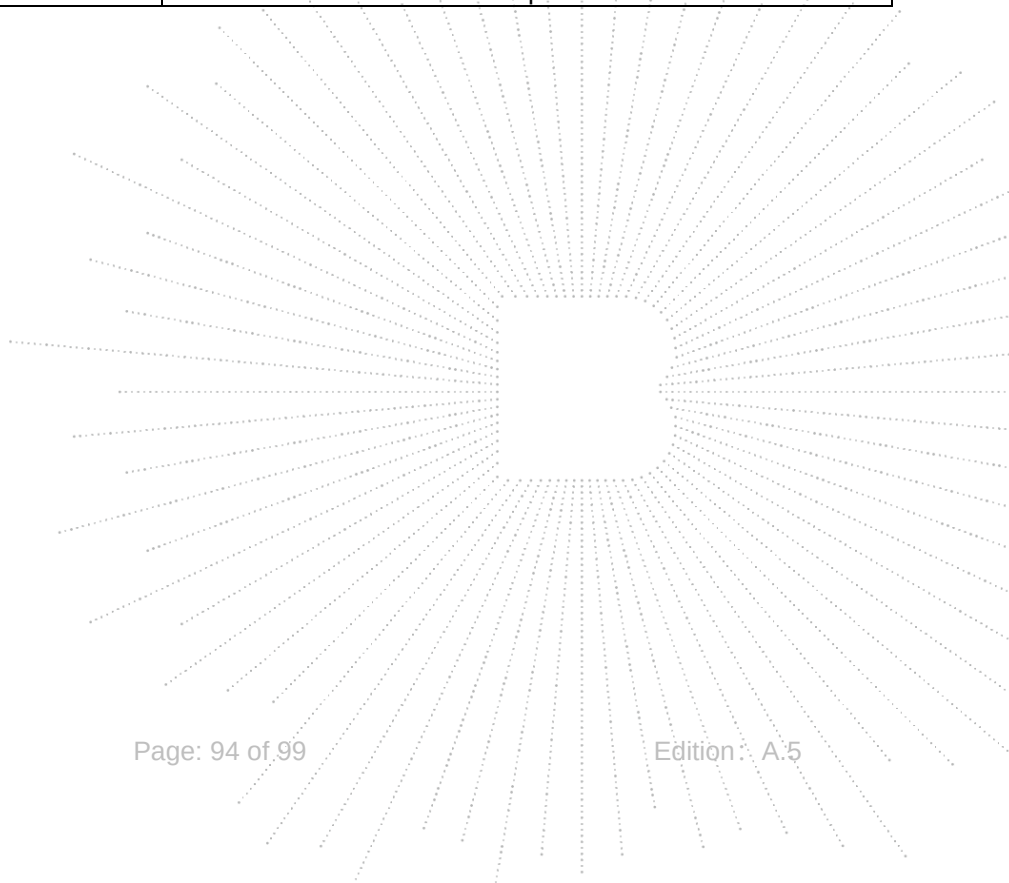


Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5240.04	5240	0.04	7.63
		V max (V)	138.00	5240.0353	5240	0.0353	6.74
		V min (V)	102.00	5240.0354	5240	0.0354	6.76
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)	120	T (°C)	-20	5240.0369	5240	0.0369	7.04
		T (°C)	-10	5240.0384	5240	0.0384	7.33
		T (°C)	0	5240.0359	5240	0.0359	6.85
		T (°C)	10	5240.0359	5240	0.0359	6.85
		T (°C)	20	5240.0312	5240	0.0312	5.95
		T (°C)	30	5240.0385	5240	0.0385	7.35
		T (°C)	40	5240.0327	5240	0.0327	6.24
		T (°C)	50	5240.0397	5240	0.0397	7.58
		T (°C)	60	5240.0352	5240	0.0352	6.72
		T (°C)	70	5240.0323	5240	0.0323	6.16
Limits				5150-5250 MHz			
Result				Complies			



Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage :	AC120V/60Hz
Test Mode:	TX (5.8G) Mode Frequency U-NII-3 (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	5745.02	5745	0.02	3.48
		V max (V)	138.00	5745.032	5745	0.032	5.57
		V min (V)	102.00	5745.0325	5745	0.0325	5.66
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

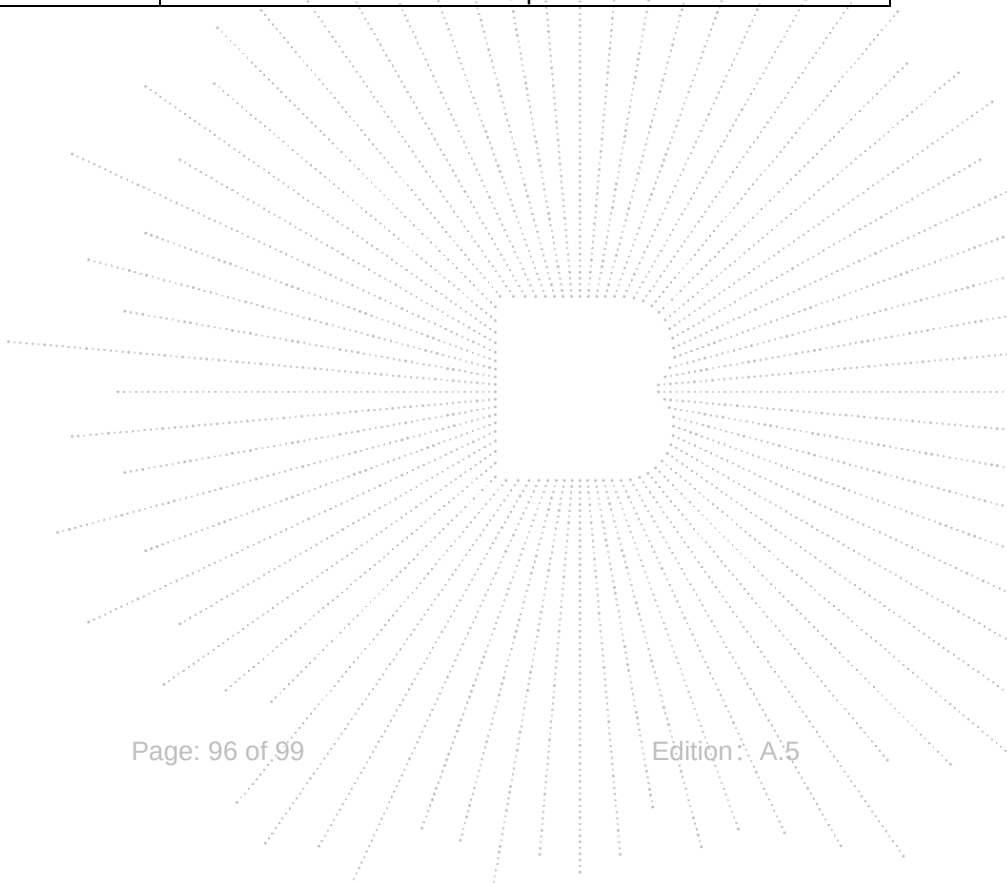
TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5745.036	5745	0.036	6.27
		T (°C)	-10	5745.0353	5745	0.0353	6.14
		T (°C)	0	5745.0396	5745	0.0396	6.89
		T (°C)	10	5745.0382	5745	0.0382	6.65
		T (°C)	20	5745.04	5745	0.04	6.96
		T (°C)	30	5745.0371	5745	0.0371	6.46
		T (°C)	40	5745.0329	5745	0.0329	5.73
		T (°C)	50	5745.0398	5745	0.0398	6.93
		T (°C)	60	5745.0326	5745	0.0326	5.67
		T (°C)	70	5745.0338	5745	0.0338	5.88
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	5785.04	5785	0.04	6.91
		V max (V)	138.00	5785.0319	5785	0.0319	5.51
		V min (V)	102.00	5785.0312	5785	0.0312	5.39
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)	120	T (°C)	-20	5785.0377	5785	0.0377	6.52
		T (°C)	-10	5785.0345	5785	0.0345	5.96
		T (°C)	0	5785.0389	5785	0.0389	6.72
		T (°C)	10	5785.0356	5785	0.0356	6.15
		T (°C)	20	5785.0382	5785	0.0382	6.60
		T (°C)	30	5785.035	5785	0.035	6.05
		T (°C)	40	5785.0339	5785	0.0339	5.86
		T (°C)	50	5785.0386	5785	0.0386	6.67
		T (°C)	60	5785.036	5785	0.036	6.22
		T (°C)	70	5785.0396	5785	0.0396	6.85
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	5825.02	5825	0.02	3.43
		V max (V)	138.00	5825.0153	5825	0.0153	2.63
		V min (V)	102.00	5825.0171	5825	0.0171	2.94
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)	120	T (°C)	-20	5825.0188	5825	0.0188	3.23
		T (°C)	-10	5825.0124	5825	0.0124	2.13
		T (°C)	0	5825.0181	5825	0.0181	3.11
		T (°C)	10	5825.0192	5825	0.0192	3.30
		T (°C)	20	5825.0196	5825	0.0196	3.36
		T (°C)	30	5825.017	5825	0.017	2.92
		T (°C)	40	5825.018	5825	0.018	3.09
		T (°C)	50	5825.0193	5825	0.0193	3.31
		T (°C)	60	5825.0126	5825	0.0126	2.16
		T (°C)	70	5825.0143	5825	0.0143	2.45
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 External antenna. It complies with the standard requirement.

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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