

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)	3.7	5180.0128	5180	0.0128	2.4719
		V max (V)	4.07	5180.0175	5180	0.0175	3.3829
		V min (V)	3.33	5180.0054	5180	0.0054	1.0510
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)	3.7	T (°C)	-20	5180.0071	5180	0.0071	1.3783
		T (°C)	-10	5180.0089	5180	0.0089	1.7202
		T (°C)	0	5180.0025	5180	0.0025	0.4808
		T (°C)	10	5180.0134	5180	0.0134	2.5959
		T (°C)	20	5180.0093	5180	0.0093	1.7984
		T (°C)	30	5180.0001	5180	0.0001	0.0265
		T (°C)	40	5180.0009	5180	0.0009	0.1648
		T (°C)	50	5180.0071	5180	0.0071	1.3660
		T (°C)	60	5180.0058	5180	0.0058	1.1261
		T (°C)	70	5180.0016	5180	0.0016	0.3058
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)	3.7	5200.0135	5200	0.0135	2.5953
		V max (V)	4.07	5200.0110	5200	0.0110	2.1133
		V min (V)	3.33	5200.0071	5200	0.0071	1.3580
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)	3.7	T (°C)	-20	5200.01078	5200	0.01078	2.0723
		T (°C)	-10	5200.00463	5200	0.00463	0.8909
		T (°C)	0	5200.00717	5200	0.00717	1.3793
		T (°C)	10	5200.00934	5200	0.00934	1.7961
		T (°C)	20	5200.00352	5200	0.00352	0.6766
		T (°C)	30	5200.00867	5200	0.00867	1.6676
		T (°C)	40	5200.01094	5200	0.01094	2.1039
		T (°C)	50	5200.01041	5200	0.01041	2.0025
		T (°C)	60	5200.01178	5200	0.01178	2.2646
		T (°C)	70	5200.00483	5200	0.00483	0.9298
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)	3.7	5240.0022	5240	0.0022	0.4250
		V max (V)	4.07	5240.0127	5240	0.0127	2.4178
		V min (V)	3.33	5240.0066	5240	0.0066	1.2634
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)	3.7	T (°C)	-20	5240.0045	5240	0.0045	0.8648
		T (°C)	-10	5240.0125	5240	0.0125	2.3905
		T (°C)	0	5240.0028	5240	0.0028	0.5298
		T (°C)	10	5240.0089	5240	0.0089	1.6926
		T (°C)	20	5240.0022	5240	0.0022	0.4137
		T (°C)	30	5240.0128	5240	0.0128	2.4433
		T (°C)	40	5240.0024	5240	0.0024	0.4615
		T (°C)	50	5240.0107	5240	0.0107	2.0425
		T (°C)	60	5240.0002	5240	0.0002	0.0396
		T (°C)	70	5240.0085	5240	0.0085	1.6251
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)	3.7	5745.00015	5745	0.00015	0.0256
		V max (V)	4.07	5745.01120	5745	0.01120	1.9500
		V min (V)	3.33	5745.00791	5745	0.00791	1.3774
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

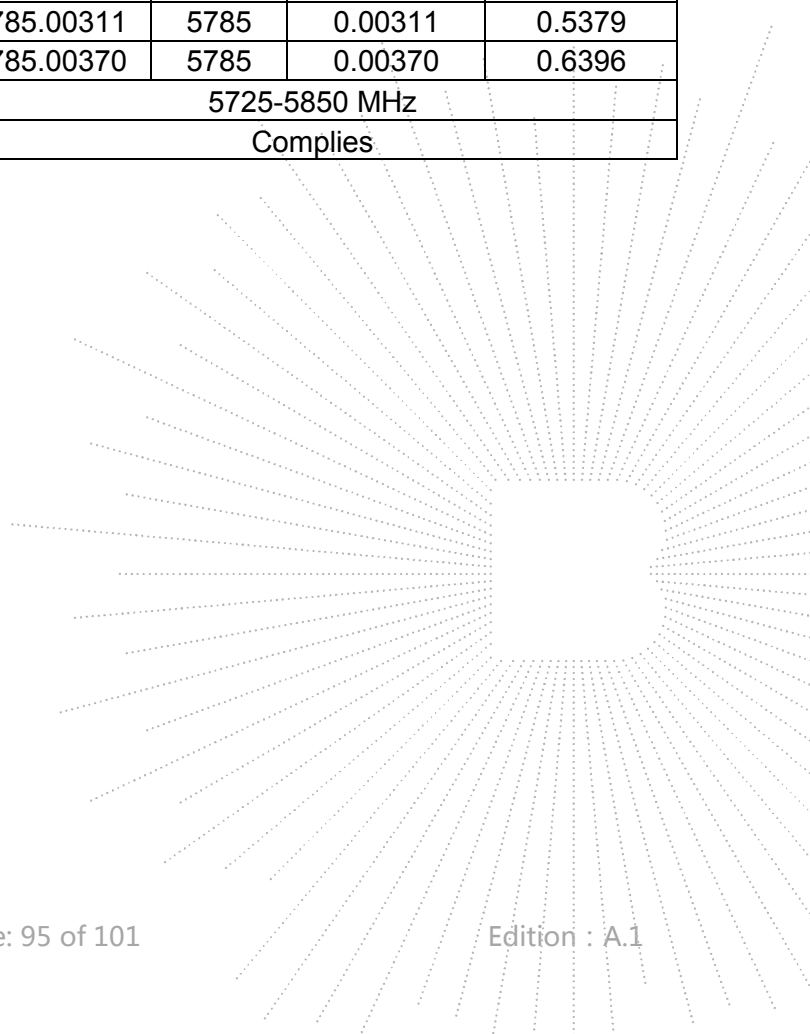
TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.7	T (°C)	-20	5745.01103	5745	0.01103	1.9200
		T (°C)	-10	5745.00960	5745	0.00960	1.6703
		T (°C)	0	5745.00681	5745	0.00681	1.1859
		T (°C)	10	5745.00023	5745	0.00023	0.0396
		T (°C)	20	5745.01271	5745	0.01271	2.2129
		T (°C)	30	5745.00595	5745	0.00595	1.0355
		T (°C)	40	5745.00596	5745	0.00596	1.0380
		T (°C)	50	5745.01188	5745	0.01188	2.0672
		T (°C)	60	5745.01318	5745	0.01318	2.2949
		T (°C)	70	5745.01188	5745	0.01188	2.0674
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)	3.7	5785.00330	5785	0.00330	0.5699
		V max (V)	4.07	5785.00635	5785	0.00635	1.0970
		V min (V)	3.33	5785.00429	5785	0.00429	0.7416
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)	3.7	T (°C)	-20	5785.01040	5785	0.01040	1.7982
		T (°C)	-10	5785.00796	5785	0.00796	1.3760
		T (°C)	0	5785.00098	5785	0.00098	0.1689
		T (°C)	10	5785.00842	5785	0.00842	1.4559
		T (°C)	20	5785.00366	5785	0.00366	0.6326
		T (°C)	30	5785.00563	5785	0.00563	0.9739
		T (°C)	40	5785.00814	5785	0.00814	1.4066
		T (°C)	50	5785.00448	5785	0.00448	0.7739
		T (°C)	60	5785.00311	5785	0.00311	0.5379
		T (°C)	70	5785.00370	5785	0.00370	0.6396
Limits				5725-5850 MHz			
Result				Complies			

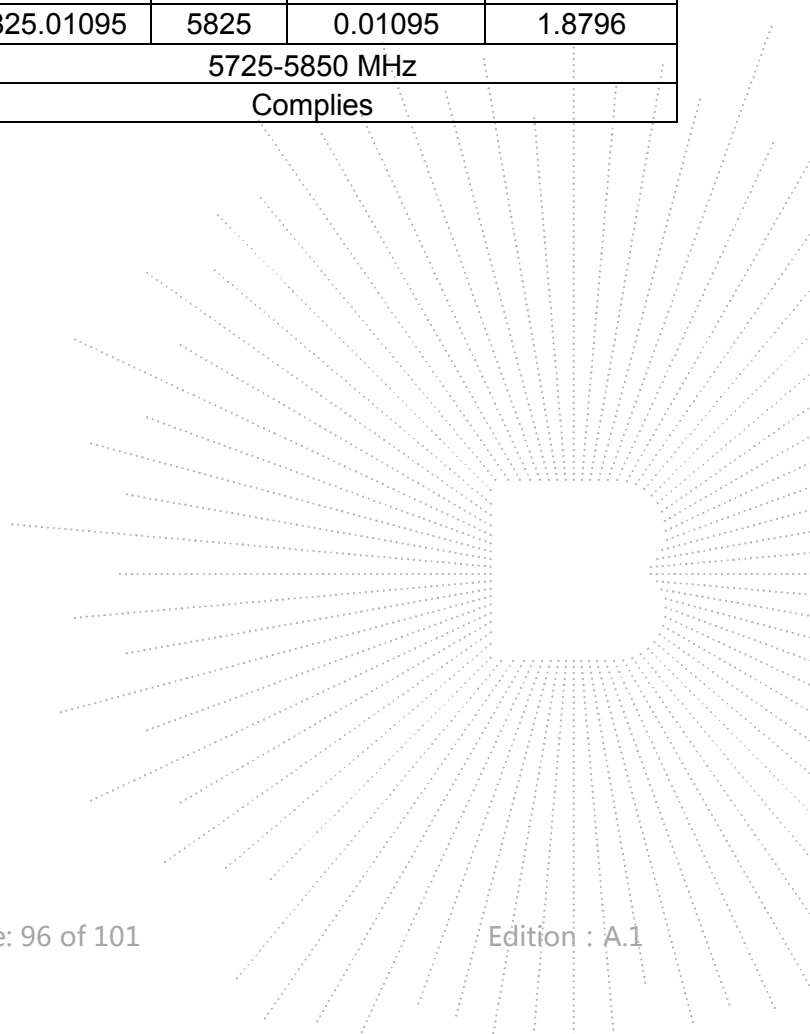


Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.7	5825.00407	5825	0.00407	0.6987
		V max (V)	4.07	5825.00351	5825	0.00351	0.6033
		V min (V)	3.33	5825.00516	5825	0.00516	0.8856
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)	3.7	T (°C)	-20	5825.01055	5825	0.01055	1.8107
		T (°C)	-10	5825.00635	5825	0.00635	1.0895
		T (°C)	0	5825.01286	5825	0.01286	2.2083
		T (°C)	10	5825.00008	5825	0.00008	0.0143
		T (°C)	20	5825.00929	5825	0.00929	1.5946
		T (°C)	30	5825.00529	5825	0.00529	0.9089
		T (°C)	40	5825.00457	5825	0.00457	0.7845
		T (°C)	50	5825.01192	5825	0.01192	2.0468
		T (°C)	60	5825.01307	5825	0.01307	2.2441
		T (°C)	70	5825.01095	5825	0.01095	1.8796
Limits				5725-5850 MHz			
Result				Complies			



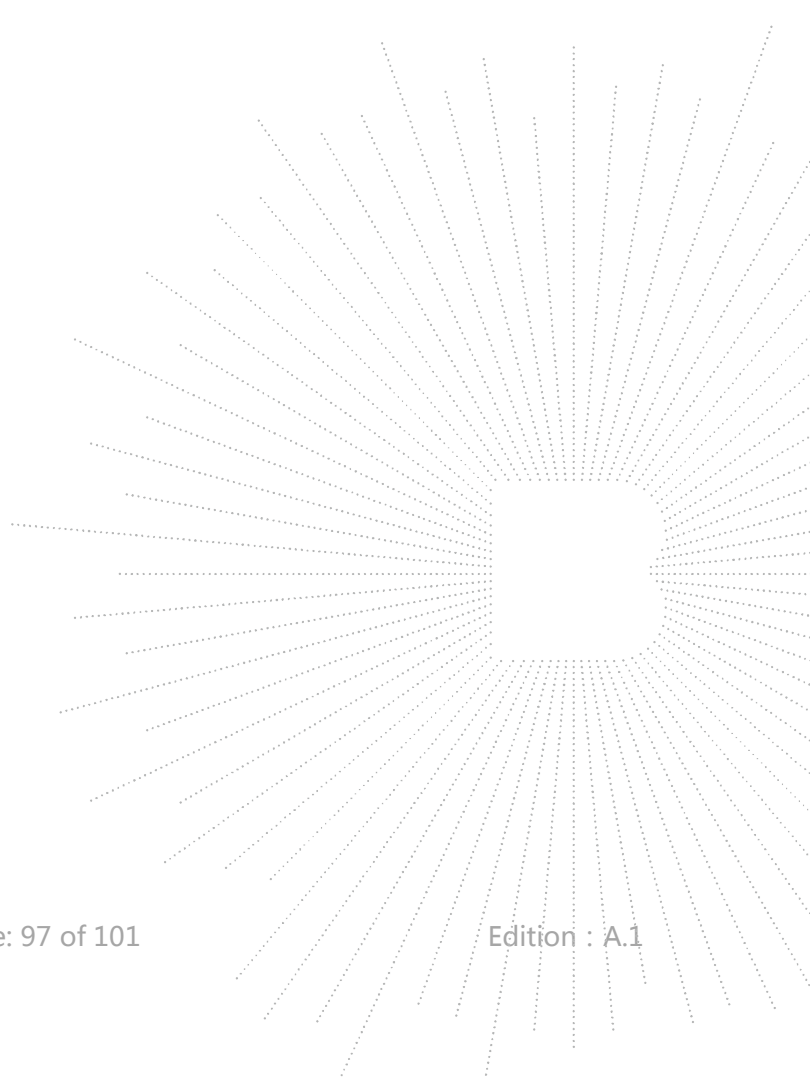
14. ANTENNA REQUIREMENT

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 EUT ANTENNA

The EUT antenna is Internal antenna (antenna gain:0.8dBi). It comply with the standard requirement.

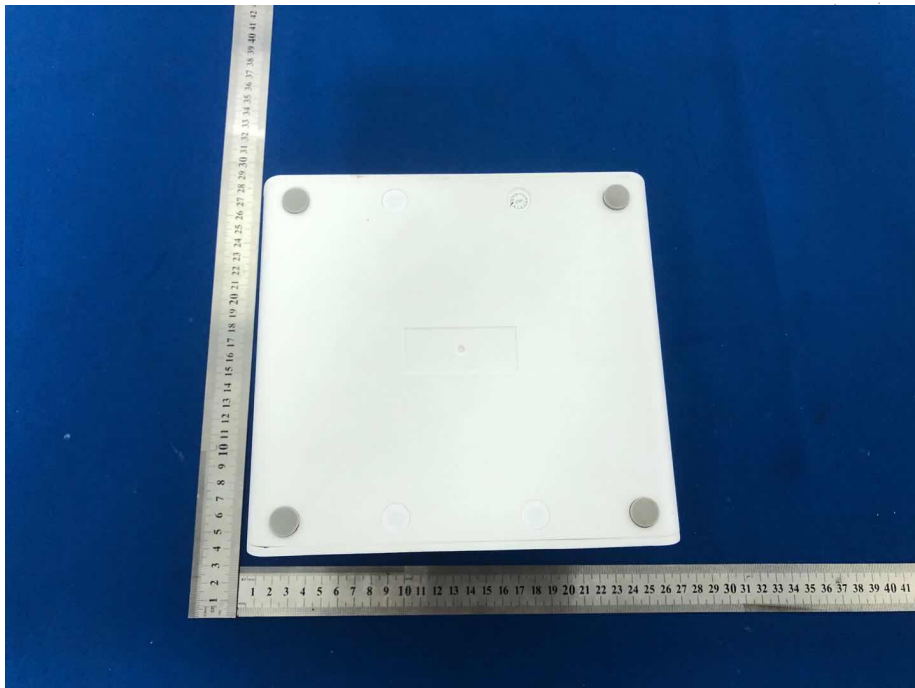


15. EUT PHOTOGRAPHS

EUT Photo 1

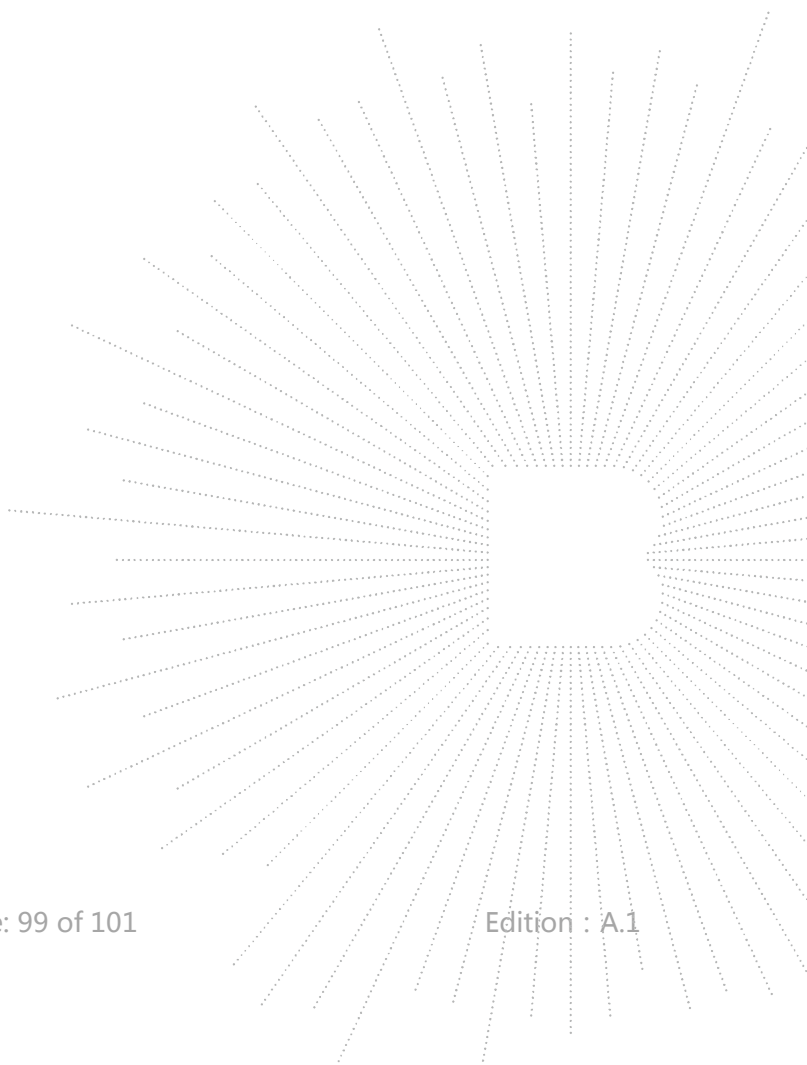


EUT Photo 2

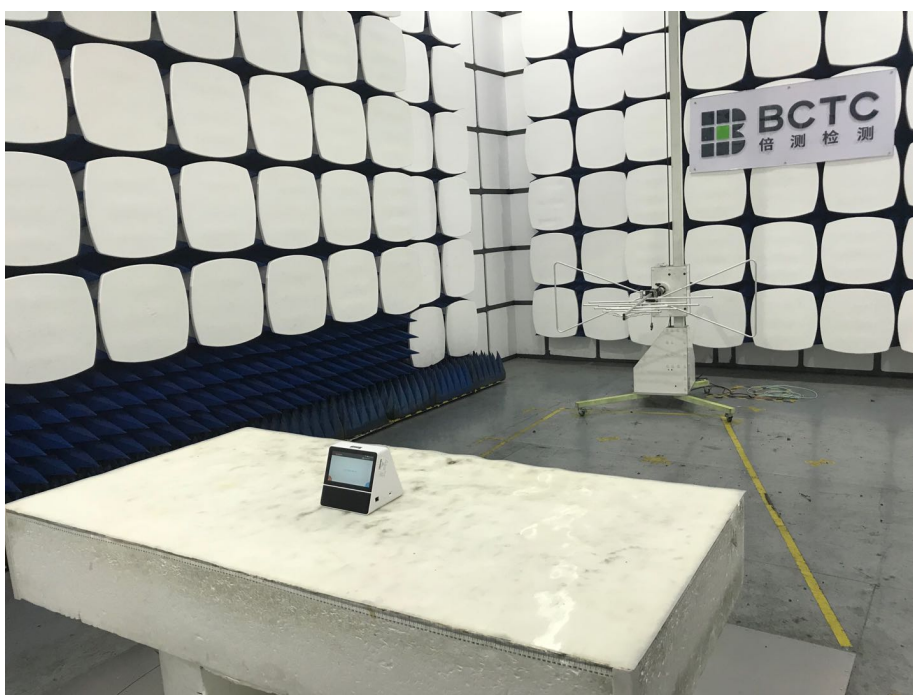


16. EUT TEST SETUP PHOTOGRAPHS

Conducted emissions



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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