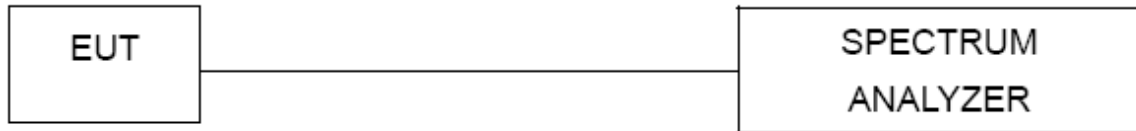


## 13. Frequency Stability Measurement

### 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  $\pm 20$  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  $\pm 20$  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:	DC 12V
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	5180.0069	5180	0.0069	1.3320
		V max (V)	13.80	5180.0132	5180	0.0132	2.5483
		V min (V)	10.20	5180.0006	5180	0.0006	0.1158
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	5180.0044	5180	0.0044	0.8494
		T (°C)	-10	5180.0001	5180	0.0001	0.0193
		T (°C)	0	5180.0077	5180	0.0077	1.4865
		T (°C)	10	5180.0129	5180	0.0129	2.4903
		T (°C)	20	5180.0069	5180	0.0069	1.3320
		T (°C)	30	5180.0013	5180	0.0013	0.2510
		T (°C)	40	5180.0050	5180	0.0050	0.9653
		T (°C)	50	5180.0026	5180	0.0026	0.5019
		T (°C)	60	5180.0013	5180	0.0013	0.2510
		T (°C)	70	5180.0093	5180	0.0093	1.7954
Limits				5150-5250 MHz			
Result				Complies			

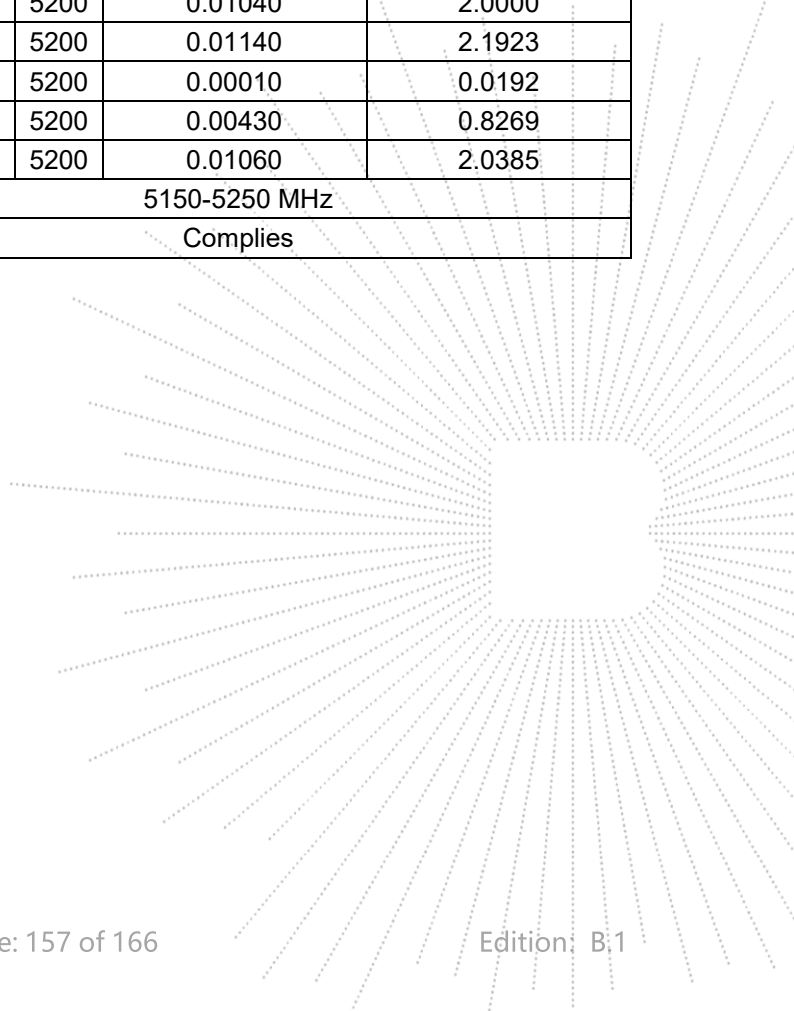


## Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5200.0119	5200	0.0119	2.2885
		V max (V)	13.80	5200.0116	5200	0.0116	2.2308
		V min (V)	10.20	5200.0080	5200	0.0080	1.5385
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)	12	T (°C)	-20	5200.00350	5200	0.00350	0.6731
		T (°C)	-10	5200.01330	5200	0.01330	2.5577
		T (°C)	0	5200.00170	5200	0.00170	0.3269
		T (°C)	10	5200.00600	5200	0.00600	1.1538
		T (°C)	20	5200.00840	5200	0.00840	1.6154
		T (°C)	30	5200.01040	5200	0.01040	2.0000
		T (°C)	40	5200.01140	5200	0.01140	2.1923
		T (°C)	50	5200.00010	5200	0.00010	0.0192
		T (°C)	60	5200.00430	5200	0.00430	0.8269
		T (°C)	70	5200.01060	5200	0.01060	2.0385
Limits				5150-5250 MHz			
Result				Complies			



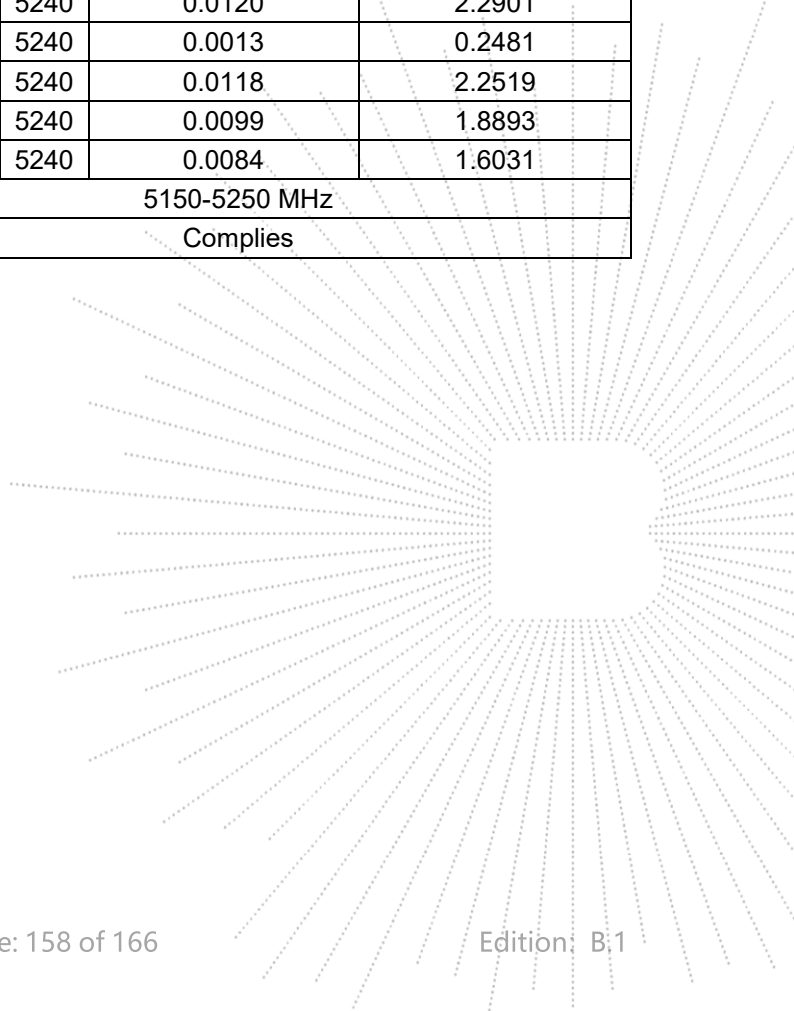


## Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5240.0134	5240	0.0134	2.5573
		V max (V)	13.80	5240.0025	5240	0.0025	0.4771
		V min (V)	10.20	5240.0100	5240	0.0100	1.9084
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	5240.0037	5240	0.0037	0.7061
		T (°C)	-10	5240.0060	5240	0.0060	1.1450
		T (°C)	0	5240.0135	5240	0.0135	2.5763
		T (°C)	10	5240.0122	5240	0.0122	2.3282
		T (°C)	20	5240.0124	5240	0.0124	2.3664
		T (°C)	30	5240.0120	5240	0.0120	2.2901
		T (°C)	40	5240.0013	5240	0.0013	0.2481
		T (°C)	50	5240.0118	5240	0.0118	2.2519
		T (°C)	60	5240.0099	5240	0.0099	1.8893
		T (°C)	70	5240.0084	5240	0.0084	1.6031
Limits				5150-5250 MHz			
Result				Complies			



Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 12V
Test 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	5745.00040	5745	0.00040	0.0696
		V max (V)	13.80	5745.00200	5745	0.00200	0.3481
		V min (V)	10.20	5745.00560	5745	0.00560	0.9748
Limits				5725-5850 MHz			
Result				Complies			

## Temperature vs. Frequency Stability

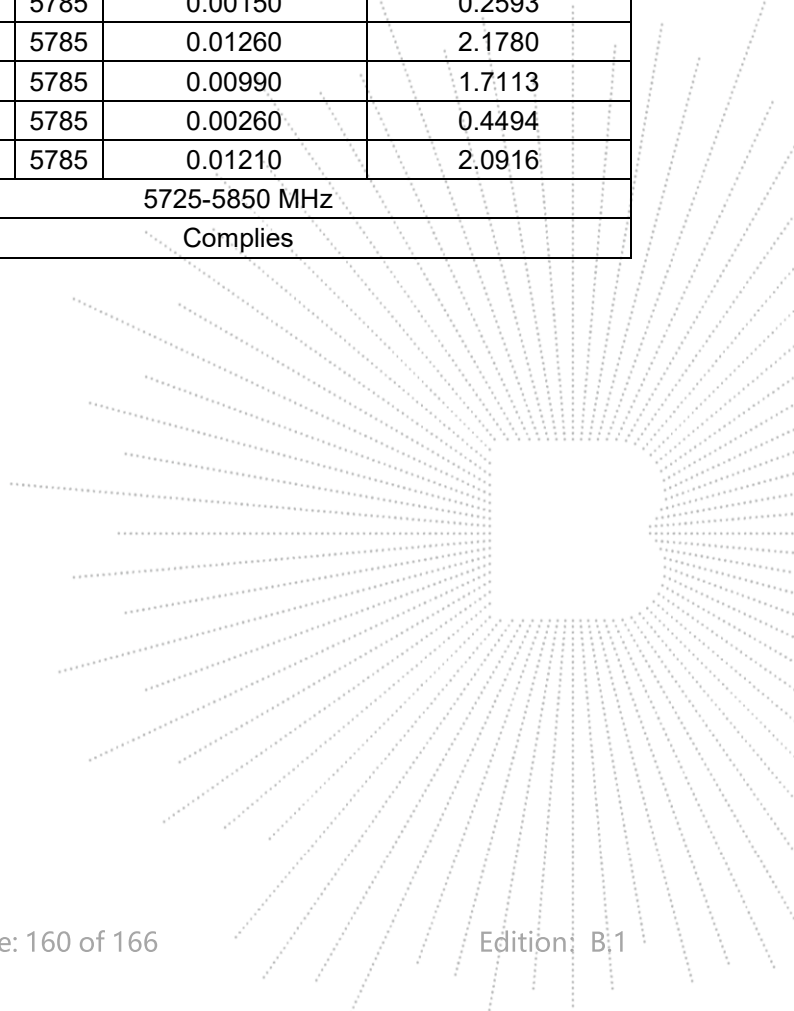
TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5745.01090	5745	0.01090	1.8973
		T (°C)	-10	5745.01250	5745	0.01250	2.1758
		T (°C)	0	5745.01320	5745	0.01320	2.2977
		T (°C)	10	5745.00010	5745	0.00010	0.0174
		T (°C)	20	5745.01320	5745	0.01320	2.2977
		T (°C)	30	5745.00400	5745	0.00400	0.6963
		T (°C)	40	5745.00300	5745	0.00300	0.5222
		T (°C)	50	5745.01230	5745	0.01230	2.1410
		T (°C)	60	5745.00290	5745	0.00290	0.5048
		T (°C)	70	5745.00840	5745	0.00840	1.4621
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)	5.00	5785.00420	5785	0.00420	0.7260
		V max (V)	5.75	5785.00510	5785	0.00510	0.8816
		V min (V)	4.25	5785.01040	5785	0.01040	1.7978
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	5785.00040	5785	0.00040	0.0691
		T (°C)	-10	5785.01350	5785	0.01350	2.3336
		T (°C)	0	5785.01210	5785	0.01210	2.0916
		T (°C)	10	5785.01060	5785	0.01060	1.8323
		T (°C)	20	5785.01350	5785	0.01350	2.3336
		T (°C)	30	5785.00150	5785	0.00150	0.2593
		T (°C)	40	5785.01260	5785	0.01260	2.1780
		T (°C)	50	5785.00990	5785	0.00990	1.7113
		T (°C)	60	5785.00260	5785	0.00260	0.4494
		T (°C)	70	5785.01210	5785	0.01210	2.0916
Limits				5725-5850 MHz			
Result				Complies			

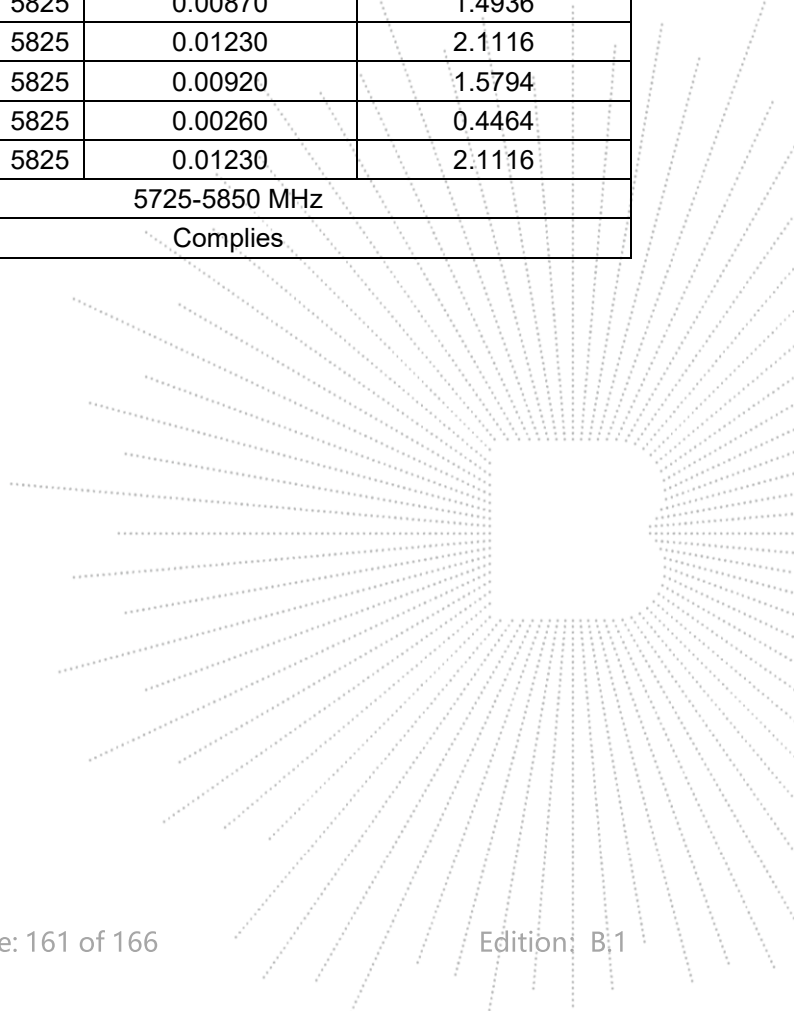


## Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5825.00180	5825	0.00180	0.3090
		V max (V)	13.80	5825.00430	5825	0.00430	0.7382
		V min (V)	10.20	5825.00940	5825	0.00940	1.6137
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	5825.00260	5825	0.00260	0.4464
		T (°C)	-10	5825.00760	5825	0.00760	1.3047
		T (°C)	0	5825.01320	5825	0.01320	2.2661
		T (°C)	10	5825.00910	5825	0.00910	1.5622
		T (°C)	20	5825.00570	5825	0.00570	0.9785
		T (°C)	30	5825.00870	5825	0.00870	1.4936
		T (°C)	40	5825.01230	5825	0.01230	2.1116
		T (°C)	50	5825.00920	5825	0.00920	1.5794
		T (°C)	60	5825.00260	5825	0.00260	0.4464
		T (°C)	70	5825.01230	5825	0.01230	2.1116
Limits				5725-5850 MHz			
Result				Complies			



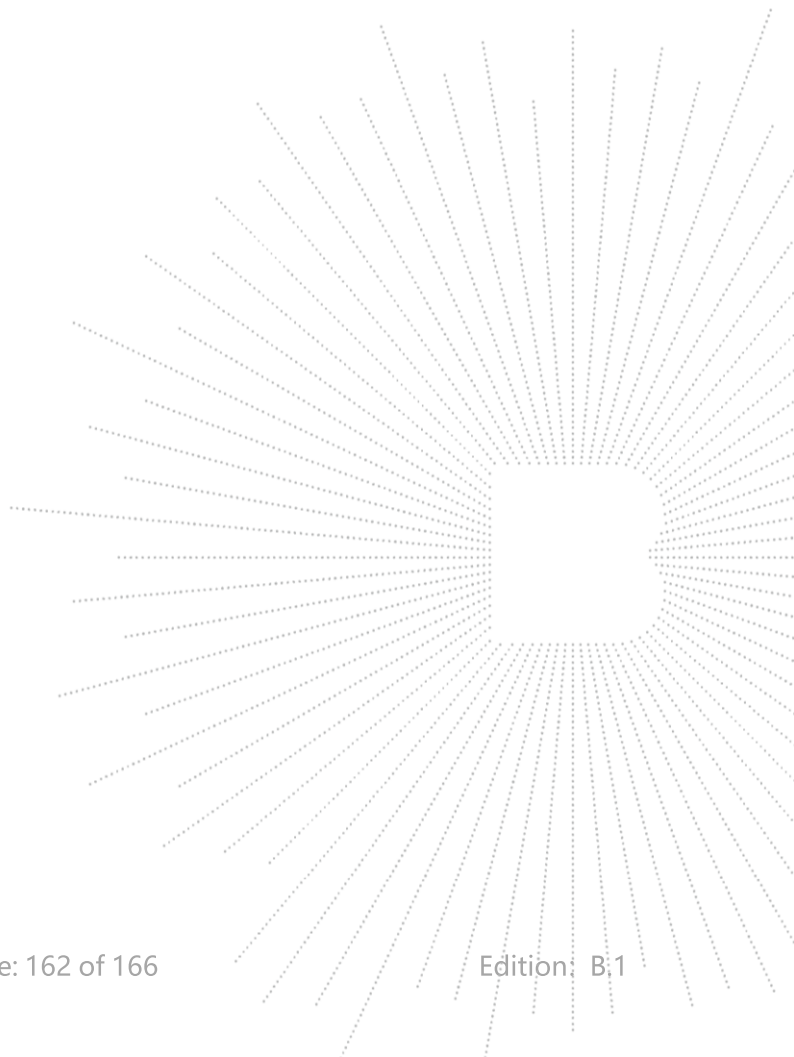
## 14. Antenna Requirement

### 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 Internal antenna, Antenna A: 5.24 dBi; Antenna A: 5.24 dBi). It comply with the standard requirement.





### 15. EUT Photographs

EUT Photo 1



EUT Photo 2



## 16. EUT Test Setup Photographs

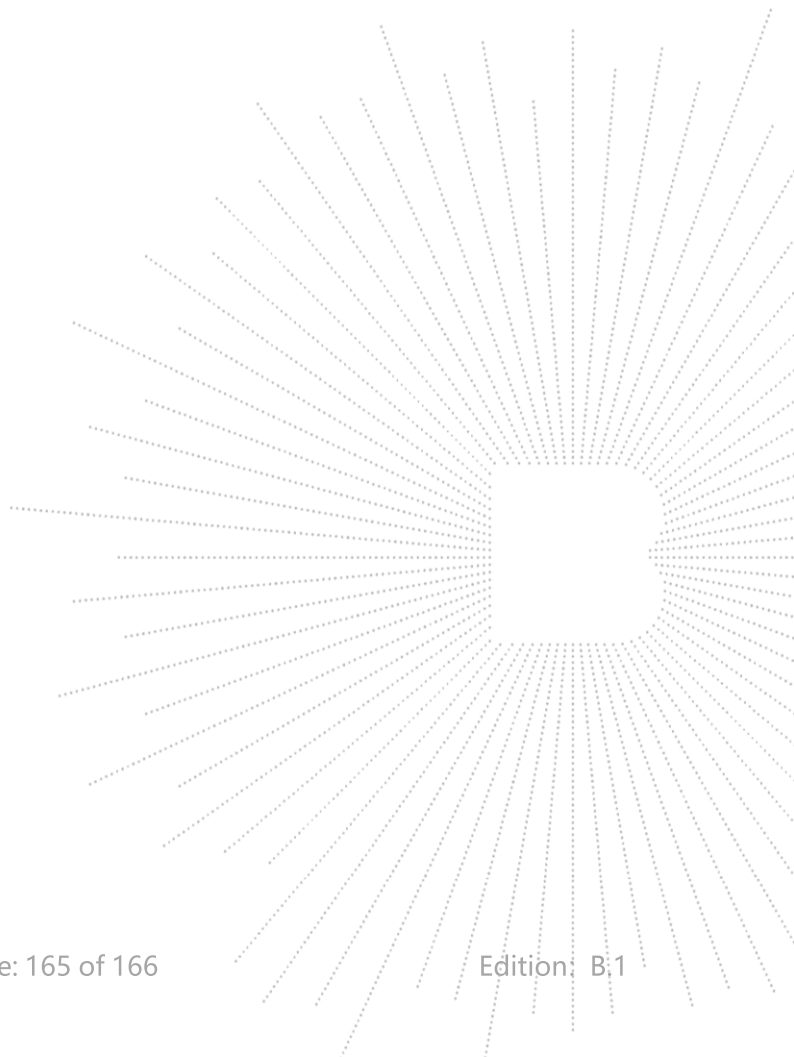
### Conducted Measurement Photo



### 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 the "special seal for inspection and testing".
4. The test report is invalid without the signature of the approver.
5. The test process and test result is only related to the Unit Under Test.
6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.
7. The quality system of our laboratory is in accordance with ISO/IEC17025.
8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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