Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

FCC PART 15 SUBPART C TEST REPORT

FCC PART 15.250

Report Reference No.....:	**GTS20190703006-1-2**
FCC ID..... :	**2AS75-EM-UWBTG100**
Compiled by (position+printed name+signature)..:	File administrators Jimmy Wang
Supervised by (position+printed name+signature)..:	Test Engineer Aaron Tan
Approved by (position+printed name+signature)..:	Manager Jason Hu
Date of issue.....:	July 11, 2019
Representative Laboratory Name .:	**Shenzhen Global Test Service Co., Ltd.**
Address.....:	No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong
Applicant's name.....:	**Techbloom (Beijing) Information Technology Co., Ltd.**
Address .....:	Room 301, Buliding 6, No. 2, Ronghua South Road, Beijing ETDZ, Beijing, China
Test specification .....:	
Standard .....:	**FCC Part 15.250**
TRF Originator.....:	Shenzhen Global Test Service Co.,Ltd.
Master TRF.....:	Dated 2014-12

Shenzhen Global Test Service Co.,Ltd. All rights reserved.
This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Global Test Service Co.,Ltd. is acknowledged as copyright owner and source of the material. Shenzhen Global Test Service Co.,Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description .....:	UWB Location Label Module
Trade Mark .....:	N/A
Manufacturer .....:	Techbloom (Beijing) Information Technology Co., Ltd.
Model/Type reference.....:	EM-UWBTG100
Listed Models .....:	N/A
Modulation Type .....:	Pulse Modulation, Frequency Hopping
Operation Frequency.....:	From 6240MHz to 6739.2MHz
Rating .....:	DC 3.3V from host device
Result.....:	**PASS**

TEST REPORT

Test Report No. :	GTS20190703006-1-2	July 11, 2019 Date of issue

Equipment under Test	:	UWB Location Label Module
Model /Type	:	EM-UWBTG100
Listed Models	:	N/A
Applicant	:	**Techbloom (Beijing) Information Technology Co., Ltd.**
Address	:	Room 301, Buliding 6, No. 2, Ronghua South Road, Beijing ETDZ, Beijing, China
Manufacturer	:	**Techbloom (Beijing) Information Technology Co., Ltd.**
Address	:	Room 301, Buliding 6, No. 2, Ronghua South Road, Beijing ETDZ, Beijing, China

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1 TEST STANDARDS 4

2 SUMMARY 5

2.1 General Remarks 5
2.2 Product Description 5
2.3 Equipment Under Test 5
2.4 Short description of the Equipment under Test (EUT) 5
2.5 EUT operation mode 6
2.6 Block Diagram of Test Setup 6
2.7 Special Accessories 6
2.8 Related Submittal(s) / Grant (s) 6
2.9 Modifications 6

3 TEST ENVIRONMENT 7

3.1 Address of the test laboratory 7
3.2 Test Facility 7
3.3 Environmental conditions 7
3.4 Summary of measurement results 8
3.5 Statement of the measurement uncertainty 8
3.6 Equipments Used during the Test 8

4 TEST CONDITIONS AND RESULTS 10

4.1 AC Power Conducted Emission 10
4.2 Radiated Emission 11
4.3 Peak Power 16
4.4 Frequency Stability 18
4.5 -10dB Bandwidth 19
4.6 Antenna Requirement 20

5 TEST SETUP PHOTOS OF THE EUT 21

6 PHOTOS OF THE EUT 22

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.250: Operation of wideband systems within the band 5925-7250 MHz.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices

2 SUMMARY

2.1 General Remarks

Date of receipt of test sample	:	June 24, 2019
Testing commenced on	:	June 25, 2019
Testing concluded on	:	July 10, 2019

2.2 Product Description

Product Name:	UWB Location Label Module
Model/Type reference:	EM-UWBTG100
Power supply:	DC 3.3V from host device
Operation frequency band:	6240MHz to 6739.2MHz
Center frequency:	6489.6MHZ
Modulation:	Pulse Modulation, Frequency Hopping
Channel number:	1
Antenna type:	PCB antenna
Antenna gain:	2dBi

2.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	○	120V / 60Hz
		○	12 V DC	○	24 V DC
		●	Other (specified in blank below)		

DC 3.30V from host device

2.4 Short description of the Equipment under Test (EUT)

This is a UWB Location Label Module.

For more details, refer to the user's manual of the EUT.

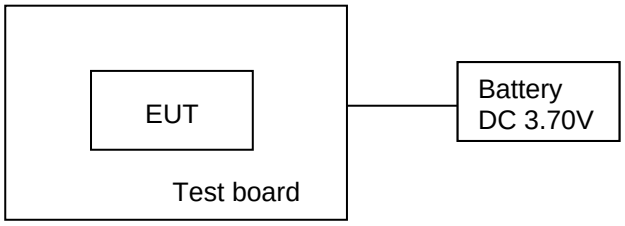
2.5 EUT operation mode

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing .There is on channel provided to the EUT and was selected to test.

Operation Frequency:

Channel	Frequency (MHz)
05	6489.6

2.6 Block Diagram of Test Setup



2.7 Special Accessories

Manufacturer	Description	Model	Serial Number	Certificate
/	/	/	/	/

2.8 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID:2AS75-EM-UWBTG100** filing to comply with Section 15.250 of the FCC Part 15, Subpart C Rules.

2.9 Modifications

No modifications were implemented to meet testing criteria.

3 TEST ENVIRONMENT

3.1 Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 165725

Shenzhen Global Test Service Co.,Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

A2LA-Lab Cert. No.: 4758.01

Shenzhen Global Test Service Co.,Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

CNAS-Lab Code: L8169

Shenzhen Global Test Service Co.,Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. Date of Registration: Dec. 11, 2015. Valid time is until Dec. 10, 2024.

3.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4 Summary of measurement results

FCC Requirements		
FCC Part 15.207	AC Power Conducted Emission	N/A
FCC Part 15.250(a)	Frequency Stability	PASS
FCC Part 15.250(b)	−10 dB Bandwidth	PASS
FCC Part 15.250(d)(1)(2)(4)(5)	Radiated emissions	PASS
FCC Part 15.250(d)(3)	Peak Power	PASS
FCC Part 15.203 & 15.250(C)	Antenna Requirement	PASS

3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Global Test Service Co.,Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6 Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.08	2018/09/20	2019/09/19
LISN	R&S	ESH2-Z5	893606/008	2018/09/20	2019/09/19
Bilog Antenna	Schwarzbeck	VULB9163	976	2018/09/20	2019/09/19
EMI Test Receiver	R&S	ESCI7	101102	2018/09/20	2019/09/19
Spectrum Analyzer	Agilent	N9020A	MY48010425	2018/09/20	2019/09/19
Spectrum Analyzer	R&S	FSP40	100019	2018/06/05	2019/06/04
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2018/09/20	2019/09/19
Active Loop Antenna	SCHWARZBECK	FMZB1519	1519-037	2018/09/20	2019/09/19
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	971	2018/09/20	2019/09/19
Amplifier	Schwarzbeck	BBV 9743	#202	2018/09/20	2019/09/19
Amplifier	EMCI	EMC051845B	980355	2018/09/20	2019/09/19
Temperature/Humidity Meter	Gangxing	CTH-608	02	2018/09/20	2019/09/19

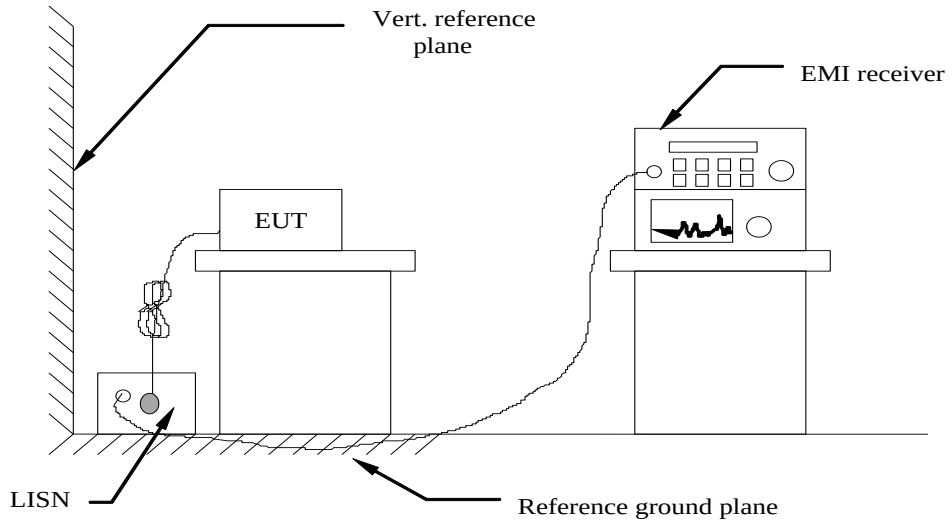
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2018/09/20	2019/09/19
High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2018/09/20	2019/09/19
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2018/09/20	2019/09/19
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2018/09/20	2019/09/19
Data acquisition card	Agilent	U2531A	TW53323507	2018/09/20	2019/09/19
Power Sensor	Agilent	U2021XA	MY5365004	2018/09/20	2019/09/19
EMI Test Software	R&S	ES-K1	V1.7.1	2018/09/20	2019/09/19
EMI Test Software	JS Tonscend	JS32-RE	2.0.1.5	2018/09/20	2019/09/19
EMI Test Software	Audix	E3	2..1.1	2018/09/20	2019/09/19

Note: The Cal.Interval was one year.

4 TEST CONDITIONS AND RESULTS

4.1 AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received DC 12V power from adapter, the adapter received AC120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT.The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

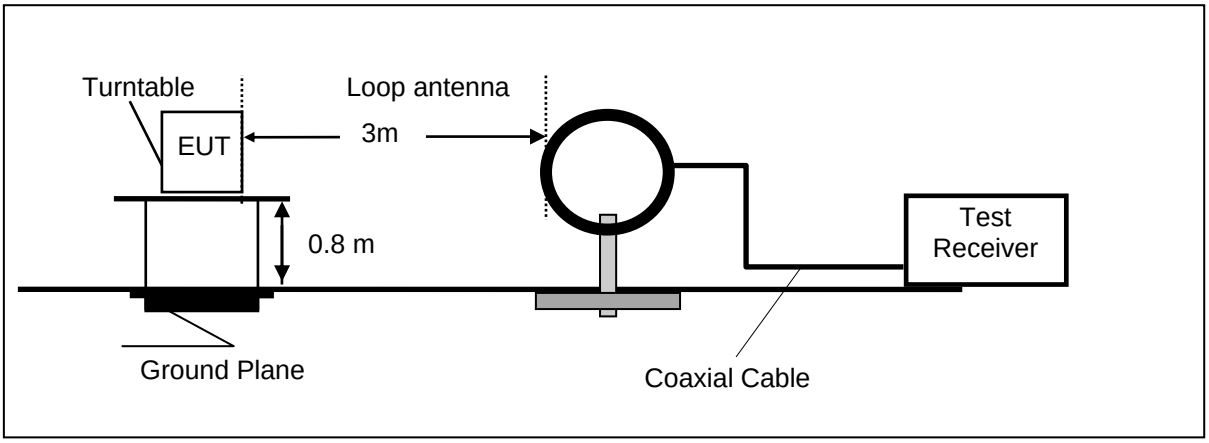
TEST RESULTS

Not applicable to this device, which is a battery powered device.

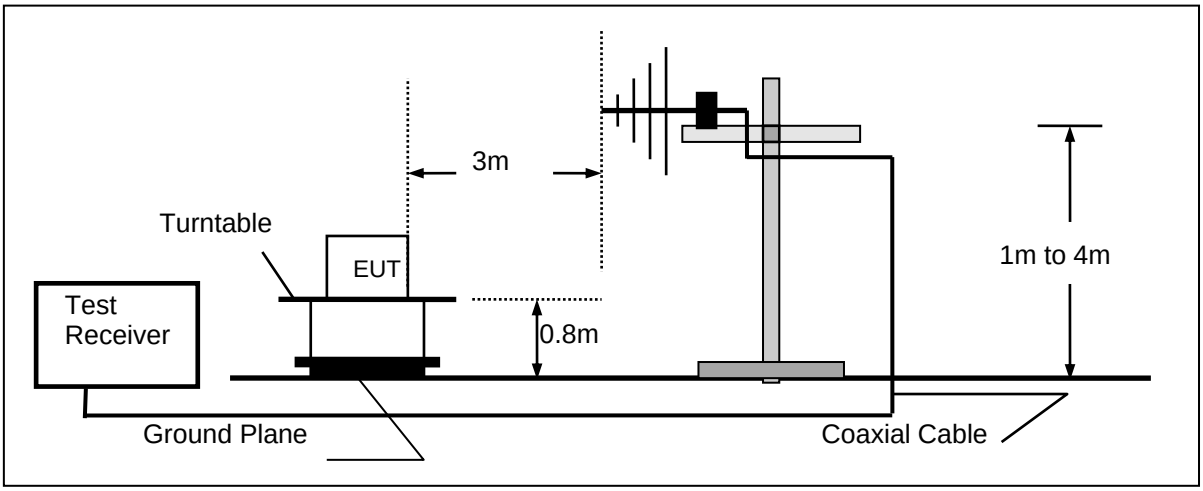
4.2 Radiated Emission

TEST CONFIGURATION

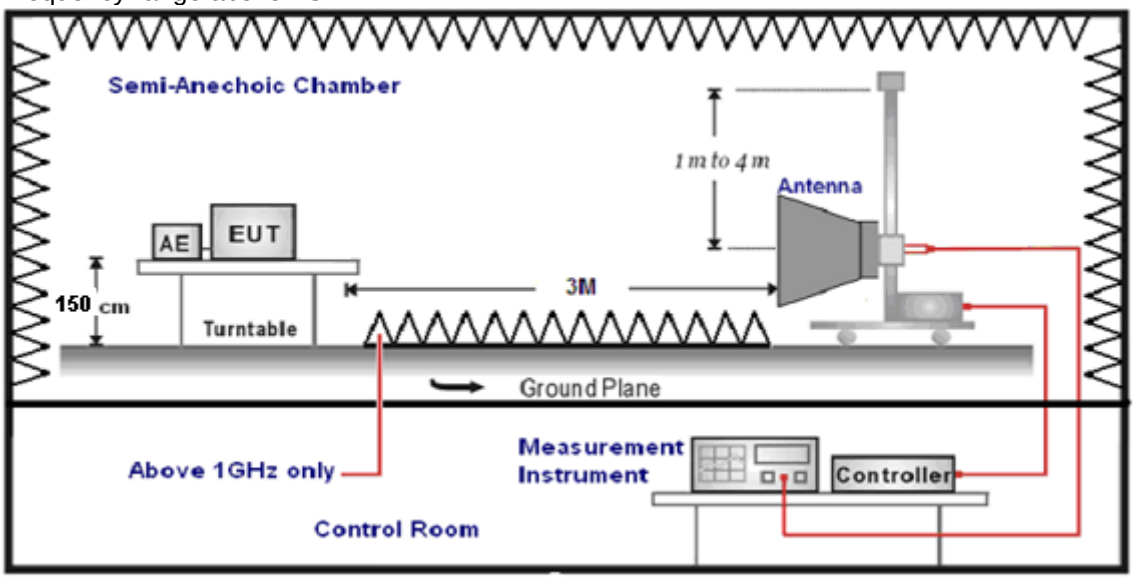
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range above 1GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 40GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
Above 18GHz	Horn Anternna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-960MHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
960MHz-1610MHz	RBW=1MHz/VBW=3MHz,Sweep time=Auto	RMS
1610 MHz -1990 MHz	RBW=1MHz/VBW=3MHz,Sweep time=Auto	RMS
1990 MHz -3100 MHz	RBW=1MHz/VBW=3MHz,Sweep time=Auto	RMS
3100 MHz -5925 MHz	RBW=1MHz/VBW=3MHz,Sweep time=Auto	RMS
5925 MHz -7250 MHz	RBW=1MHz/VBW=3MHz,Sweep time=Auto	RMS
7250 MHz -10600 MHz	RBW=1MHz/VBW=3MHz,Sweep time=Auto	RMS
Above 10600 MHz	RBW=1MHz/VBW=3MHz,Sweep time=Auto	RMS
1164-1240	RBW=1KHz/VBW=3KHz,Sweep time=Auto	RMS
1559-1610	RBW=1KHz/VBW=3KHz,Sweep time=Auto	RMS

RADIATION LIMIT

(1) The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following RMS average limits based on measurements using a 1 MHz resolution bandwidth.

Frequency in MHz	EIRP in dBm	Radiated (dBμV/m)	Measurement distance(m)
960-1610	−75.3	20	3
1610-1990	−63.3	32	3
1990-3100	−61.3	34	3
3100-5925	−51.3	44	3
5925-7250	−41.3	54	3
7250-10600	−51.3	44	3
Above 10600	−61.3	34	3

Note: EIRP convert to dBμV/m follow the formula EIRP=E_{meas}+20log(d_{meas})-104.7 according to ANSI C63.10-2013.

(2) In addition to the radiated emission limits specified in the table in paragraph (d)(1) of this section, transmitters operating under the provisions of this section shall not exceed the following RMS average limits when measured using a resolution bandwidth of no less than 1 kHz.

Frequency in MHz	EIRP in dBm	Radiated (dBμV/m)	Measurement distance(m)
1164-1240	−85.3	10	3
1559-1610	−85.3	10	3

Note: EIRP convert to dBμV/m follow the formula EIRP=E_{meas}+20log(d_{meas})-104.7 according to ANSI C63.10-2013.

(3) Radiated emissions at or below 960 MHz shall not exceed the emission levels in §15.209.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200

TEST RESULTS

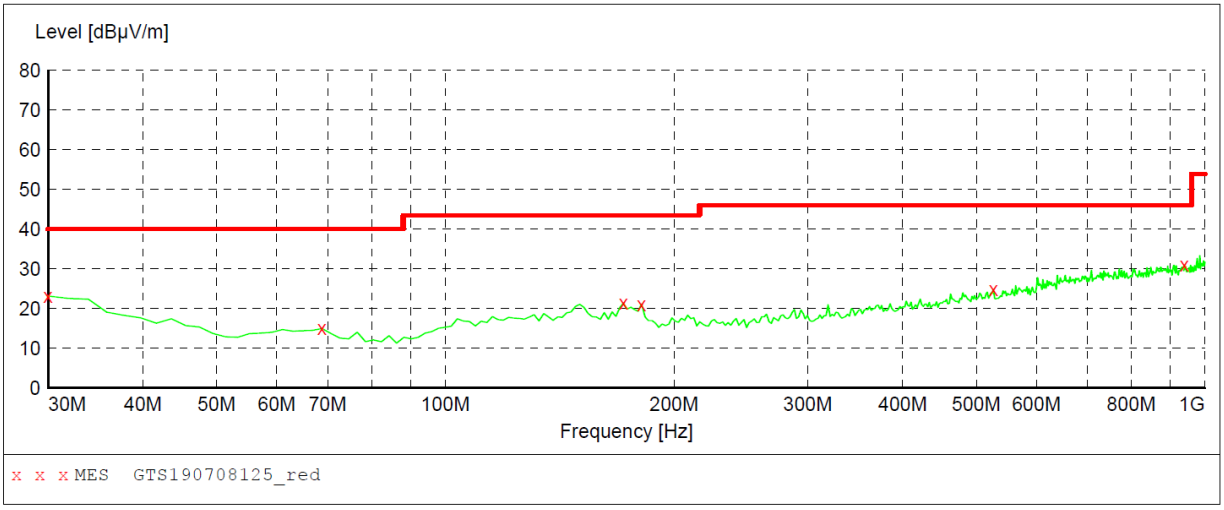
For 30MHz-1GHz

Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description: Field Strength

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	VULB9163



MEASUREMENT RESULT: "GTS190708125_red"

7/8/2019 9:14AM

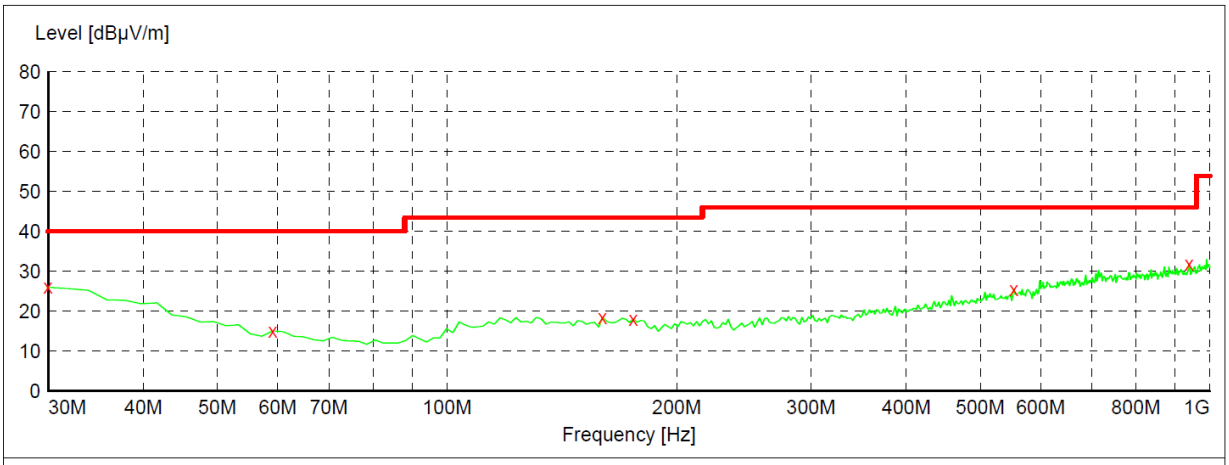
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	23.10	20.8	40.0	16.9	---	0.0	0.00	HORIZONTAL
68.800000	15.00	8.2	40.0	25.0	---	0.0	0.00	HORIZONTAL
171.620000	21.30	13.1	43.5	22.2	---	0.0	0.00	HORIZONTAL
181.320000	21.10	13.0	43.5	22.4	---	0.0	0.00	HORIZONTAL
526.640000	24.80	20.4	46.0	21.2	---	0.0	0.00	HORIZONTAL
939.860000	30.90	26.4	46.0	15.1	---	0.0	0.00	HORIZONTAL

Vertical

SWEEP TABLE: "test (30M-1G)"

Short Description: Field Strength

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	300.0 ms	120 kHz	VULB9163



x x x MES GTS190708126_red

MEASUREMENT RESULT: "GTS190708126_red"

7/8/2019 9:15AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	26.00	20.8	40.0	14.0	---	0.0	0.00	VERTICAL
59.100000	15.10	8.0	40.0	24.9	---	0.0	0.00	VERTICAL
159.980000	18.50	13.6	43.5	25.0	---	0.0	0.00	VERTICAL
175.500000	18.00	12.9	43.5	25.5	---	0.0	0.00	VERTICAL
553.800000	25.40	21.0	46.0	20.6	---	0.0	0.00	VERTICAL
939.860000	31.80	26.4	46.0	14.2	---	0.0	0.00	VERTICAL

Above 960MHz

Frequency(MHz):		6489.6		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1164MHz≤f≤1240MHz & 1559MHz≤f≤1610MHz								
1178.75	1.45	10	8.55	8.76	25.33	3.39	36.03	-7.31
1185.57	2.69	10	7.31	9.99	25.33	3.39	36.03	-7.30
1225.65	3.25	10	6.75	10.25	25.49	3.49	35.99	-7.00
1568.85	2.58	10	7.42	9.26	25.49	3.49	35.67	-6.68
1586.65	3.15	10	6.85	9.29	25.71	3.81	35.65	-6.14
1605.52	1.26	10	8.74	7.38	25.71	3.81	35.64	-6.12
F＞960MHz(except for above frequency range)								
1278.56	11.25	20	8.75	18.02	25.63	3.54	35.94	-6.77
1744.25	13.25	32	18.75	19.59	25.63	3.54	35.51	-6.34
2450.75	10.36	34	23.64	12.19	28.87	4.67	35.37	-1.83
4825.55	9.56	44	34.44	11.91	28.87	4.67	35.89	-2.35
9875.67	14.36	44	29.64	-4.11	38.83	11.09	31.45	18.47
11575.68	10.47	34	23.53	-8.97	38.83	11.09	30.48	19.44

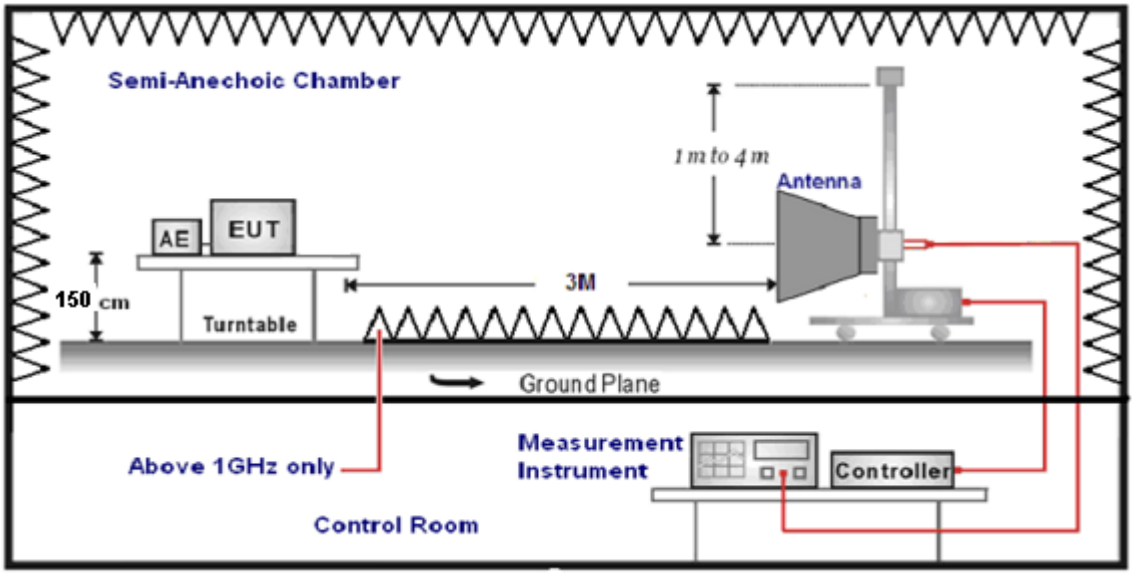
Frequency(MHz):		6489.6		Polarity:			Vertical	
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
1164MHz≤f≤1240MHz & 1559MHz≤f≤1610MHz								
1178.75	2.36	10	7.64	9.67	25.33	3.39	36.03	-7.31
1185.57	2.98	10	7.02	10.28	25.33	3.39	36.03	-7.30
1225.65	4.10	10	5.90	11.10	25.49	3.49	35.99	-7.00
1568.85	3.22	10	6.78	9.90	25.49	3.49	35.67	-6.68
1586.65	4.12	10	5.88	10.26	25.71	3.81	35.65	-6.14
1605.52	2.30	10	7.70	8.42	25.71	3.81	35.64	-6.12
F＞960MHz(except for above frequency range)								
1278.56	12.54	20	7.46	19.31	25.63	3.54	35.94	-6.77
1744.25	13.26	32	18.74	19.60	25.63	3.54	35.51	-6.34
2450.75	11.55	34	22.45	13.38	28.87	4.67	35.37	-1.83
4825.55	10.69	44	33.31	13.04	28.87	4.67	35.89	-2.35
9875.67	13.54	44	30.46	-4.93	38.83	11.09	31.45	18.47
11575.68	11.48	34	22.52	-7.96	38.83	11.09	30.48	19.44

4.3 Peak Power

LIMITS

The peak EIRP limit is 20 log (RBW/50) dBm.

TEST CONFIGURATION



TEST PROCEDURE

1. Set the EUT in Continuous transmitting mode
2. The EUT was placed on a turn table which is 1.5m above ground plane.
3. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
5889.6-7089.6	RBW=1MHz/VBW=3MHz Sweep time=Auto	Peak

TEST RESULTS

Frequency(MHz):		6489.6		Polarity:			HORIZONTAL	
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
6488.75	43.25	61.23	17.98	45.97	28.87	4.67	36.26	-2.72

Frequency(MHz):		6489.6		Polarity:			Vertical	
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
6489.25	44.86	61.23	16.37	47.58	28.87	4.67	36.26	-2.72

Note:

1. EIRP limit =20log(1MHz/50MHz)=-33.97dBm.
2. EIRP limit is convert to dBμV/m follow the formula EIRP=E_{meas}+20log(d_{meas})-104.7 according to ANSI C63.10-2013.

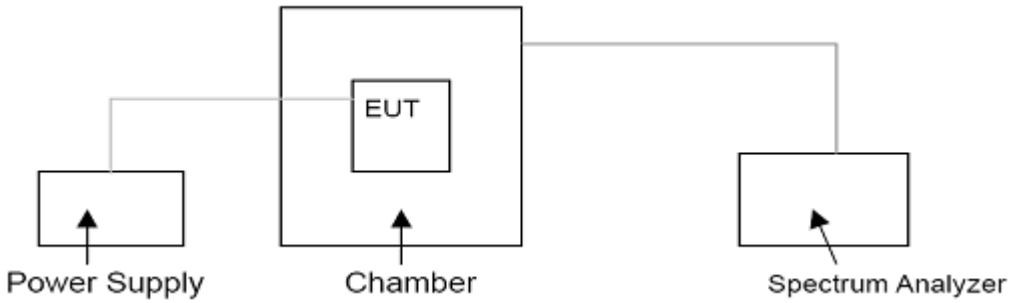
4.4 Frequency Stability

LIMITS

According to FCC 15.250(a)

The −10 dB bandwidth of a device operating under the provisions of this section must be contained within the 5925-7250 MHz band under all conditions of operation including the effects from stepped frequency, frequency hopping or other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage.

TEST CONFIGURATION



TEST PROCEDURE

The EUT was set in the climate chamber and connected to an external DC power supply. The RF output was directly connected to Spectrum Analyzer. The coupling loss of the additional cables was recorded and taken in account for all the measurements. After temperature stabilization (approx. 20 min for each stage), the frequency for the lower, the middle and the highest frequency range was recorded. For Frequency stability Vs. Voltage the EUT was connected to a DC power supply and the voltage was adjusted in the required ranges. The result was recorded.

TEST RESULTS

Voltage (V)	Temperature (℃)	-10dB Band Edges		Limit	Result
		Lower	Upper		
3.70	-30	6139.2	6837.6	Within 5925-7250 MHz	Pass
	-20	6139.3	6837.5		
	-10	6139.5	6837.3		
	0	6139.4	6837.2		
	10	6139.1	6837.4		
	20	6139.2	6837.3		
	30	6139.3	6837.6		
	40	6139.5	6837.7		
	50	6139.6	6837.5		
3.15	25	6139.4	6837.4		
4.26	25	6139.5	6837.3		

4.5 -10dB Bandwidth

Limit

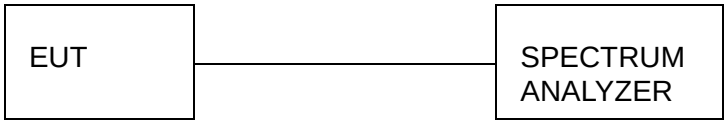
According to FCC 15.250(b)
The −10 dB bandwidth of the fundamental emission shall be at least 50 MHz.

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 1MHz RBW and 3MHz VBW.

The -10dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 10dB.

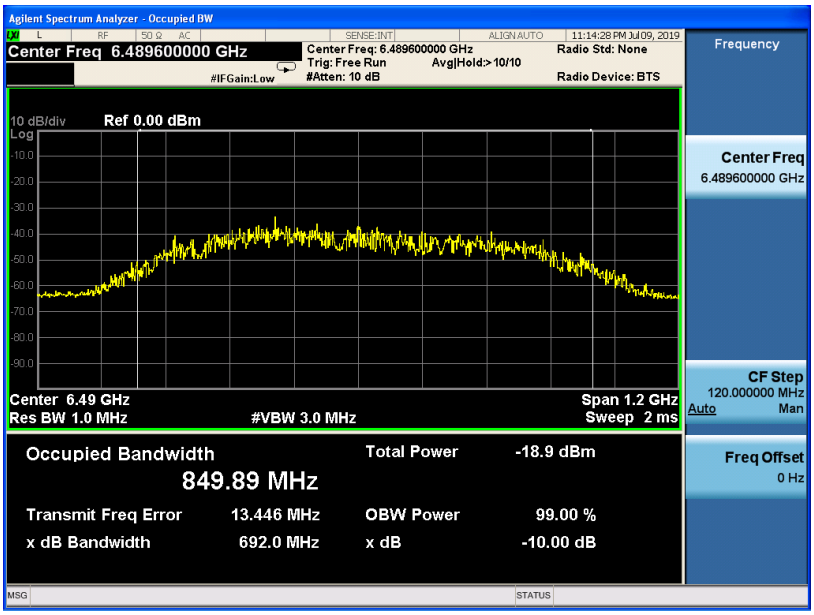
Test Configuration



Test Results

Test frequency (MHz)	10dB bandwidth (MHz)	Limit	Result
6489.6	692.0	⩾50MHz	Pass

Test plot as follows:



4.6 Antenna Requirement

Standard Applicable

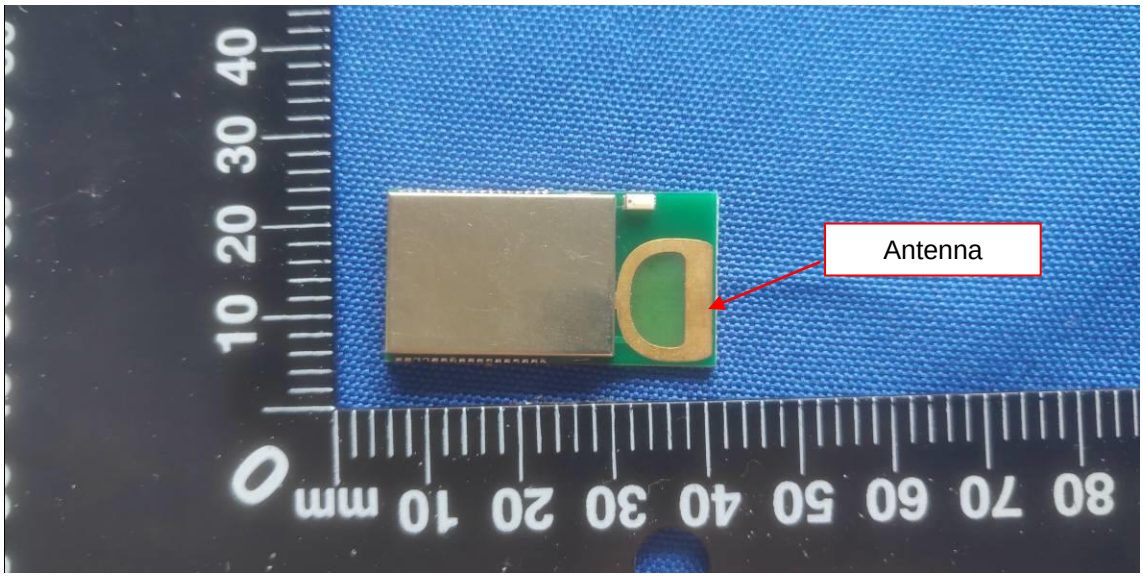
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Refer to statement below for compliance

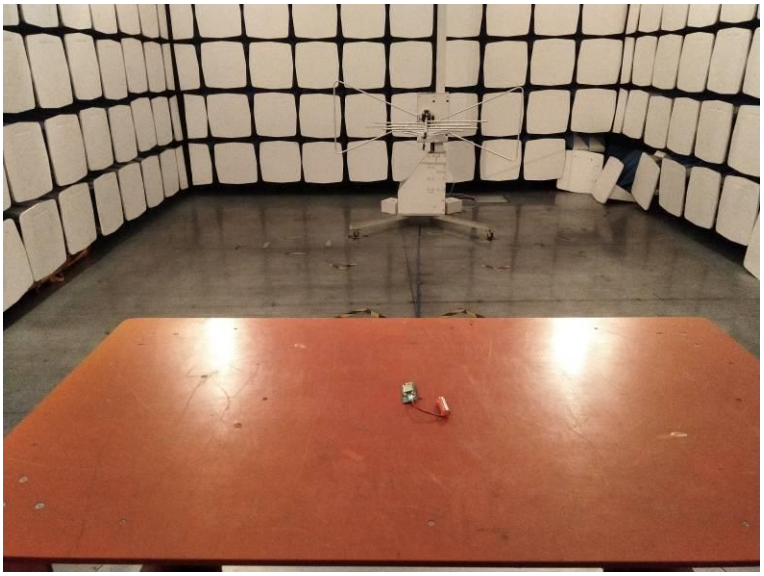
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

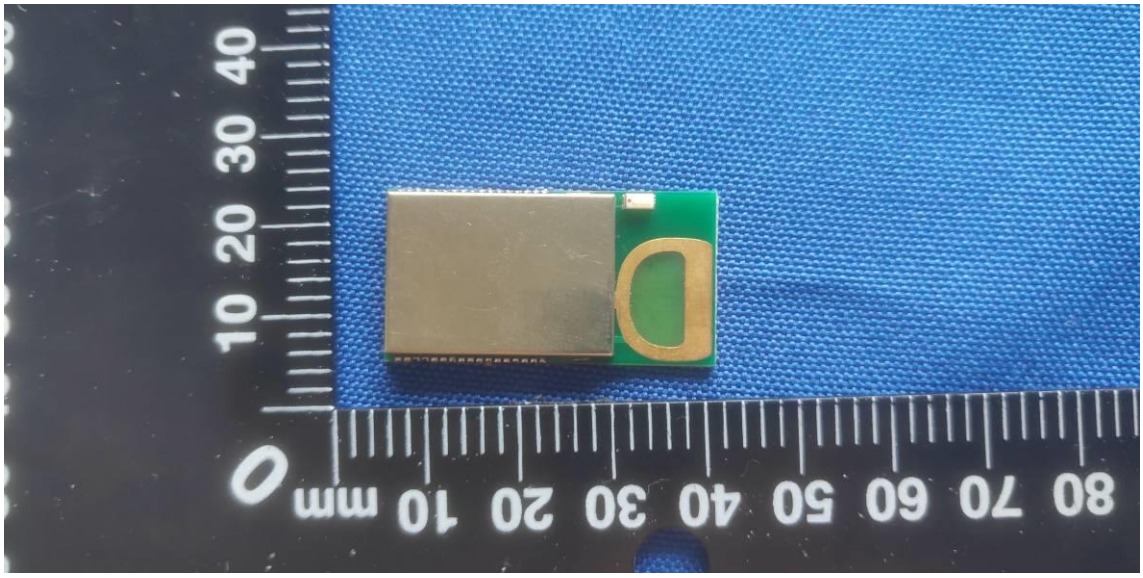
The antenna is integrated on the main PCB and no consideration of replacement.The best case gain of the antenna is 2dBi.

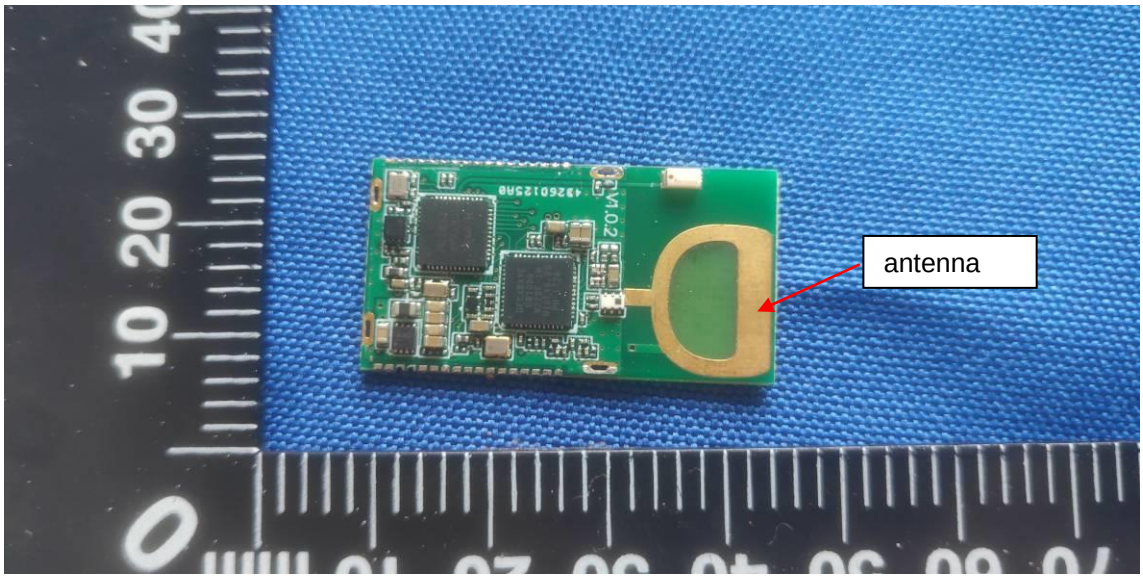


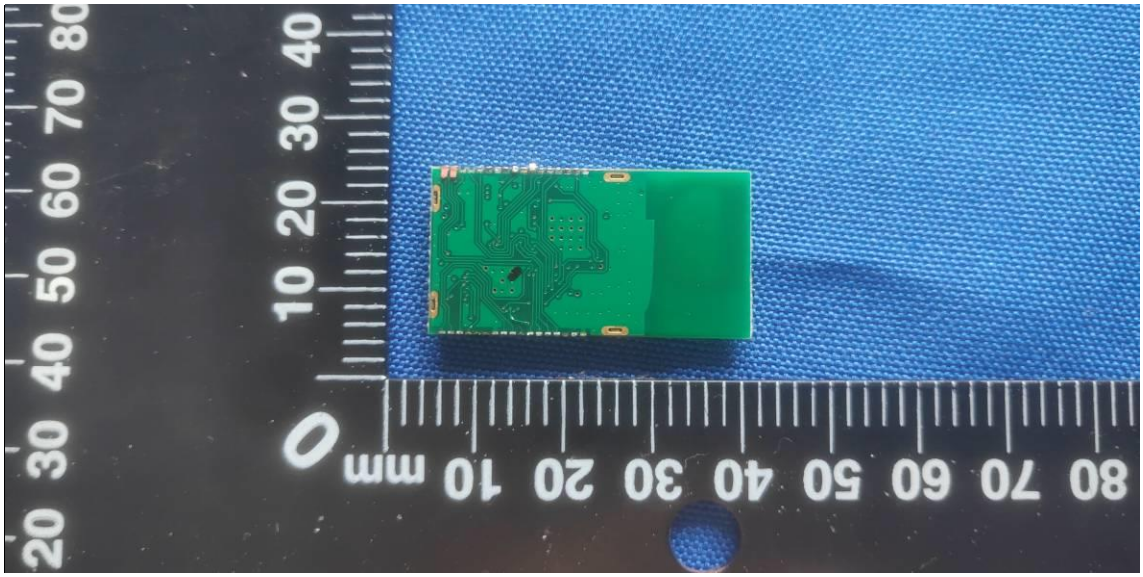
5 Test Setup Photos of the EUT



6 Photos of the EUT







********** End of Report **********