



# **FCC TEST REPORT**

**FCC ID: 2ABNA-TRM121**

On Behalf of

**Guangzhou Geoelectron Science & Technology Company  
Limited**

**Wireless Data Transceiver Module**

**Model No.: TRM121**

Prepared for : Guangzhou Geoelectron Science & Technology Company Limited  
Address : No.704, 7/F, Building C, No.7, Cai Pin Road, Science City, Luogang  
District, Guangzhou, China

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.  
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### TEST REPORT DECLARATION

Applicant : Guangzhou Geoelectron Science & Technology Company Limited  
 Address : No.704, 7/F, Building C, No.7, Cai Pin Road, Science City, Luogang District, Guangzhou, China  
 Manufacturer : Guangzhou Geoelectron Science & Technology Company Limited  
 Address : No.704, 7/F, Building C, No.7, Cai Pin Road, Science City, Luogang District, Guangzhou, China  
 EUT Description : Wireless Data Transceiver Module  
 (A) Model No. : TRM121  
 (B) Trademark : Geoelectron

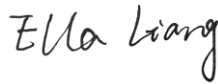
Measurement Standard Used:


**FCC Rules and Regulations Part 15 Subpart C Section 15.247  
ANSI C63.10:2013**

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Ella Liang   
 Project Engineer

Approved by (name + signature).....: Simple Guan   
 Project Manager

Date of issue.....: July 10, 2019

**Revision History**

Revision	Issue Date	Revisions	Revised By
V0	July 10, 2019	Initial released Issue	Simple Guan

## 1. SUMMARY OF STANDARDS AND RESULTS

### 1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Item	Standards Paragraph	Result
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1) ANSI C63.10 :2013	P
Bandwidth	FCC Part 15: 15.247(a)(1) ANSI C63.10 :2013	P
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) ANSI C63.10 :2013	P
Number Of Hopping Channel	FCC Part 15: 15.247 (a)(1)(i) ANSI C63.10 :2013	P
Dwell Time	FCC Part 15: 15.247 (a)(1)(i) ANSI C63.10 :2013	P
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Band Edge Compliance	FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.10 :2013	P
Antenna requirement	FCC Part 15: 15.203	P
Note:	1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable.	

## 2. GENERAL INFORMATION

### 2.1. Description of Device (EUT)

Description : Wireless Data Transceiver Module  
Trademark : Geoelectron  
Model Number : TRM121  
DIFF. : N/A  
Test Voltage : DC 3.3V

#### UHF

Operation frequency : 902.4MHz -928MHz  
Conducted Power : 1W(30dBm), 0.5W(27dBm)  
Modulation : GMSK  
Antenna Type : External Antenna, Maximum Gain is 3dBi.  
Software version : V1.0  
Hardware version : TRM121\_V1.0

*Note: All Conducted Power have been tested, and recorded the worst case 1W(30dBm) results in this report.*

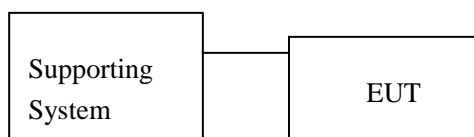
## 2.2. Accessories of Device (EUT)

Accessories1 : /  
 Manufacturer : /  
 Model : /  
 Ratings : /

## 2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1.	Notebook	ACER	ZQT	N/A	DOC
2	DC Battery	/	/	/	/

## 2.4. Block Diagram of connection between EUT and simulators



## 2.5. Test Mode Description

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
GMSK	Low	903.0
	Middle	915.0
	High	927.6

### Channel List:

903	903.6	904.2	904.8	905.4	905.7
906.3	906.6	906.9	908.1	908.7	909.6
909.9	910.2	910.8	911.1	911.7	912.3
914.4	915	915.6	916.2	916.5	916.9
917.2	917.6	918	918.3	918.9	919.2
919.8	920.4	920.7	921.3	921.6	922.2
922.5	922.8	923.1	923.4	923.7	924.6
924.9	925.2	925.5	925.8	926.1	926.4
927	927.6	--	--	--	--



## 2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35°C	27°C
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

## 2.7. Test Facility

Shenzhen Alpha Product Testing Co., Ltd

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,  
Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission

Registration Number: 293961

July 15, 2019 Certificated by IC

Registration Number: CN0085

## 2.8. Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.16dB(Polarize: H)
	4.13dB(Polarize: V)
Uncertainty for radio frequency	$5.4 \times 10^{-8}$
Uncertainty for conducted RF Power	0.37dB
Uncertainty for temperature	0.2°C
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

## 2.9. Test Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2018.09.21	1Year
Spectrum analyzer	ROHDE&SCHWARZ	FSU	1166.1660.26	2018.09.21	1Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2018.09.11	1Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-102082-Wa	2018.09.21	1Year
Receiver	R&S	ESCI	101165	2018.09.21	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2018.04.13	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2018.04.13	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2018.09.26	2Year
Cable	Resenberger	N/A	No.1	2018.09.21	1Year
Cable	Resenberger	N/A	No.2	2018.09.21	1Year
Cable	Resenberger	N/A	No.3	2018.09.21	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2018.09.21	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2018.09.21	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2018.09.21	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2018.09.21	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2018.09.21	1 Year
Horn Antenna	A-INFOMW	LB-180100-KF	J211020657	2018.09.21	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2018.09.21	1 Year
Power Meter	Agilent	E9300A	MY41496625	2018.09.21	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000-40-880	100631	2018.9.11	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2018.09.11	1 Year

### 3. MAXIMUM PEAK OUTPUT POWER

#### 3.1.Limit

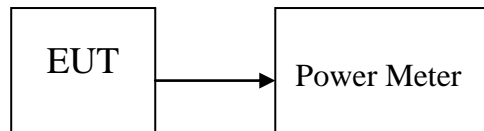
Please refer section15.247.

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

#### 3.2.Test Procedure

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the peak power detection.

#### 3.3.Test Setup



#### 3.4.Test Result

Mode	Freq (MHz)	PK Output Power (dBm)	Limit (dBm)	Result
GMSK	903.0	28.880	30	Pass
	915.0	29.205	30	Pass
	927.6	28.980	30	Pass
Conclusion: PASS				

Mode	Freq (MHz)	PK Output Power (dBm)	Limit (dBm)	Result
GMSK	903.0	26.15	30	Pass
	915.0	26.87	30	Pass
	927.6	26.21	30	Pass
Conclusion: PASS				

## 4. BANDWIDTH

### 4.1.Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

### 4.2.Test Procedure

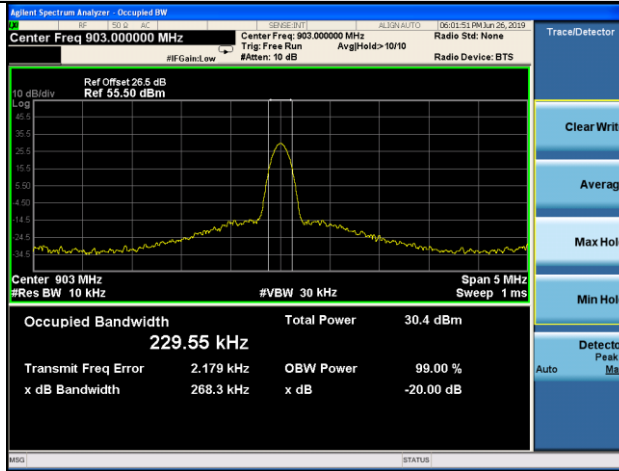
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 10kHz RBW and 30kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

### 4.3.Test Result

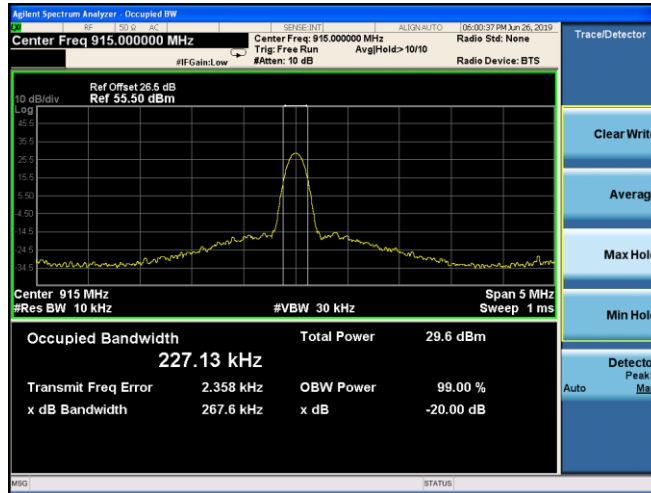
Mode	Freq (MHz)	20dB Bandwidth (MHz)	Conclusion
GMSK	903.0	0.2683	PASS
	915.0	0.2676	PASS
	927.6	0.2690	PASS

Original Test data For 20dB bandwidth

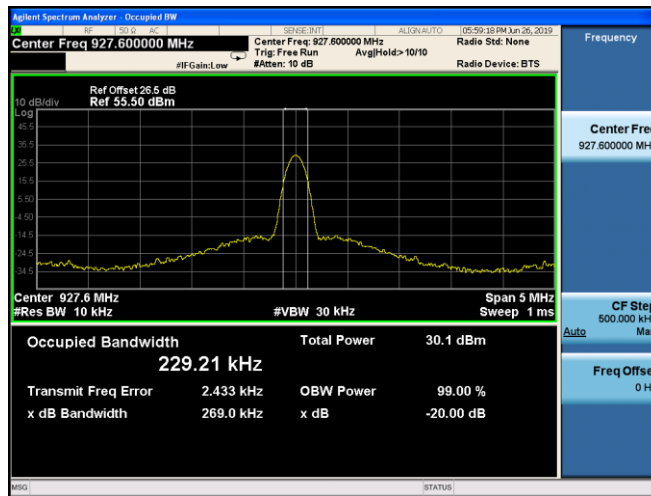
GMSK



Lowest channel



Middle channel



Highest channel

## 5. CARRIER FREQUENCY SEPARATION

### 5.1.Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

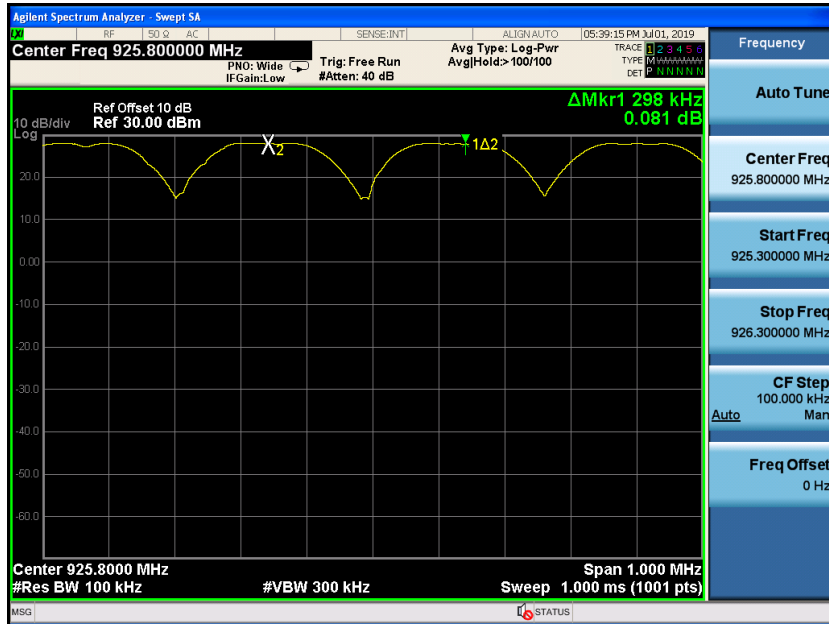
### 5.2.Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The carrier frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW.

### 5.3.Test Result

Mode/Channel	Channel separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Conclusion
GMSK	0.298	0.2690	0.2690	PASS

Original test data for channel separation



GMSK

## 6. NUMBER OF HOPPING CHANNEL

### 6.1.Limit

Frequency hopping systems in the 902-928 MHz band shall use at least 25 channels

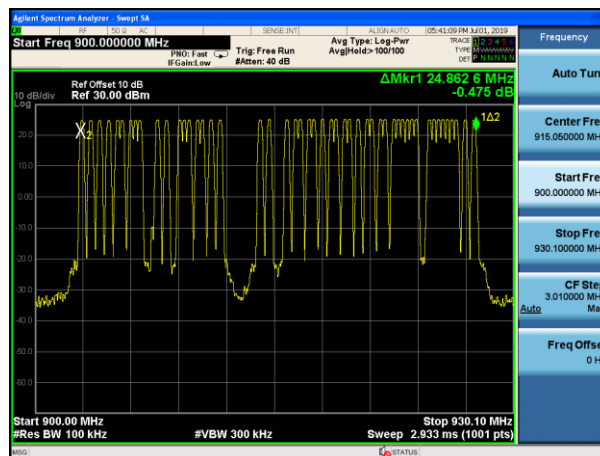
### 6.2.Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The number of hopping channel was measured by spectrum analyzer with 100kHz RBW and 300KHz VBW.

### 6.3.Test Result

Mode	Number of hopping channel	Limit	Conclusion
GMSK	50	>25	PASS

Original test data for hopping channel number



GMSK



## 7. DWELL TIME

### 7.1. Test limit

Please refer section 15.247

If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

### 7.2. Test Procedure

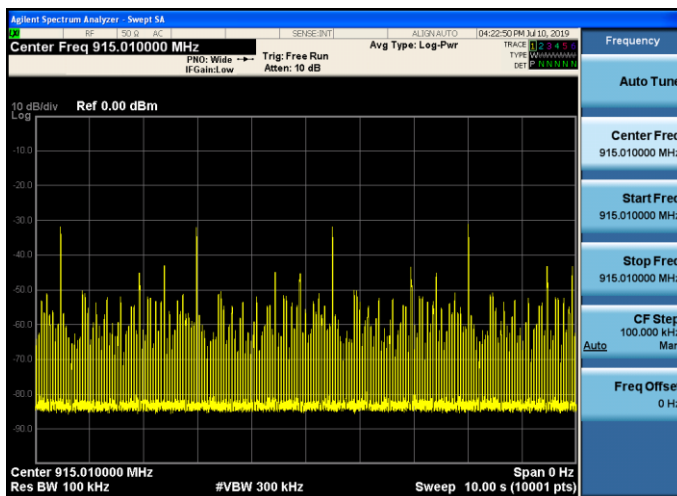
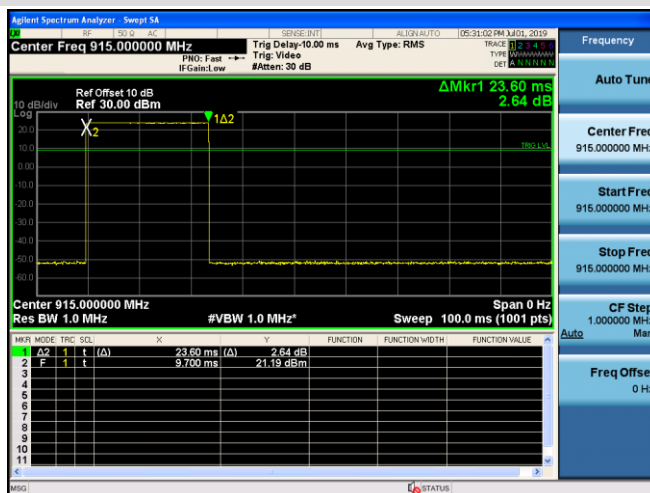
- 7.2.1. Place the EUT on the table and set it in transmitting mode.
- 7.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 7.2.3. Set center frequency of spectrum analyzer = operating frequency.
- 7.2.4. Set the spectrum analyzer as RBW=1MHz, VBW=1MHz, Span = 0Hz, Sweep = auto.
- 7.2.5. Repeat above procedures until all frequency measured were complete.

### 7.3. Test Result

PASS.

Mode	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (ms)	Limit (ms)	Conclusion
GMSK	915.0	23.6	94.4	400	PASS

GMSK



915.0 MHz

## 8. RADIATED EMISSIONS

### 8.1.Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

#### 15.205 Restricted frequency band

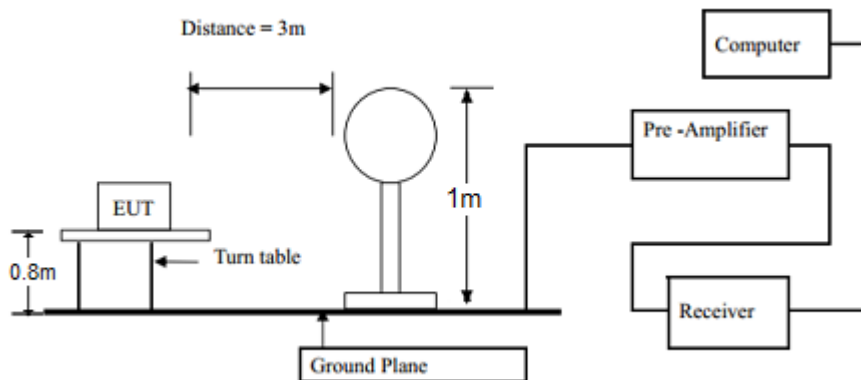
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )

#### 15.209 Limit

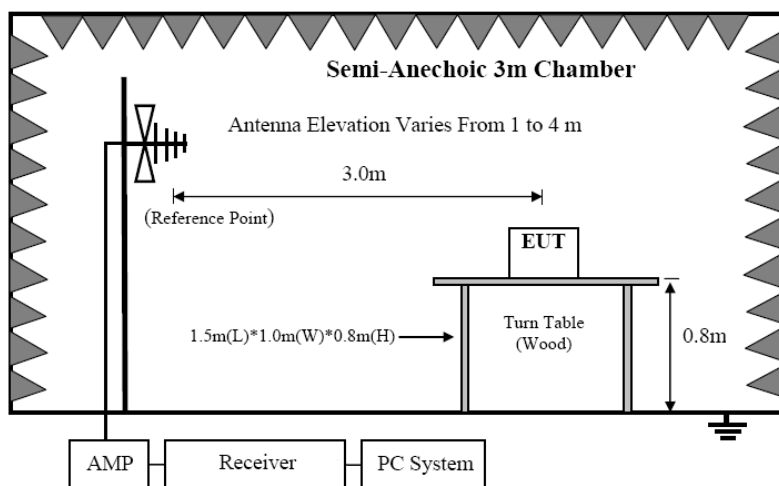
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

## 8.2. Block Diagram of Test setup

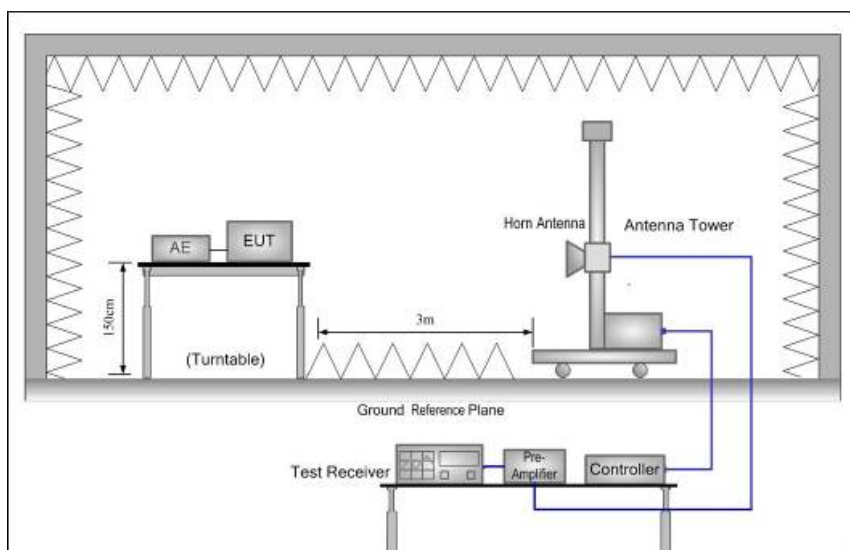
### 8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



### 8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



### 8.2.2 In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

### 8.3. Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency below 1GHz and above 1GHz, The EUT was placed on a rotating 80cm above the ground plane inside a semi-anechoic chamber for below 1GHz and 150cm above the ground plane inside a semi-anechoic chamber for above 1GHz, The table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Setup EUT and simulator as shown in section 1.4 and 6.1
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
  - (a) Change work frequency or channel of device if practicable.
  - (b) Change modulation type of device if practicable.
  - (c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 :2013on Radiated Emission test.
- (6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

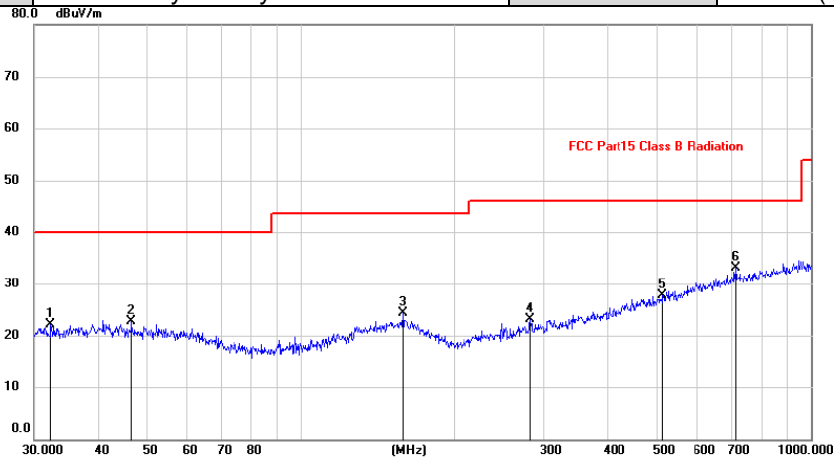
### 8.4. Test Result

We have scanned the 10th harmonic from 9KHz to the EUT's highest frequency.  
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

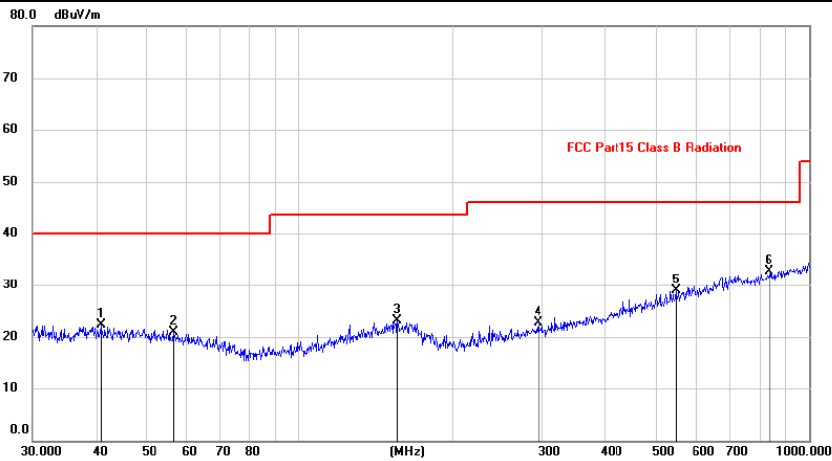
Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

<b>EUT Description</b>	Wireless Data Transceiver Module	<b>Model No.</b>	TRM121
<b>Temperature</b>	24°C	<b>Humidity</b>	56%
<b>Pol</b>	Vertical	<b>Test date</b>	2019/7/10
<b>Test Voltage</b>	DC 3.3V by battery	<b>Test mode</b>	GMSK (915MHz)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		32.2925	8.49	13.61	22.10	40.00	-17.90	peak		
2		46.5030	8.53	14.09	22.62	40.00	-17.38	peak		
3		158.6677	9.30	15.04	24.34	43.50	-19.16	peak		
4		281.9946	9.52	13.63	23.15	46.00	-22.85	peak		
5		511.8352	9.33	18.42	27.75	46.00	-18.25	peak		
6	*	711.6734	11.16	21.89	33.05	46.00	-12.95	peak		

<b>Pol</b>	Horizontal	<b>Test date</b>	2019/7/10
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No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		40.9881	8.04	14.34	22.38	40.00	-17.62	peak		
2		56.7917	7.40	13.44	20.84	40.00	-19.16	peak		
3		155.9101	7.96	15.05	23.01	43.50	-20.49	peak		
4		294.1137	8.78	13.97	22.75	46.00	-23.25	peak		
5		549.0195	9.71	19.17	28.88	46.00	-17.12	peak		
6	*	836.2443	9.40	23.24	32.64	46.00	-13.36	peak		

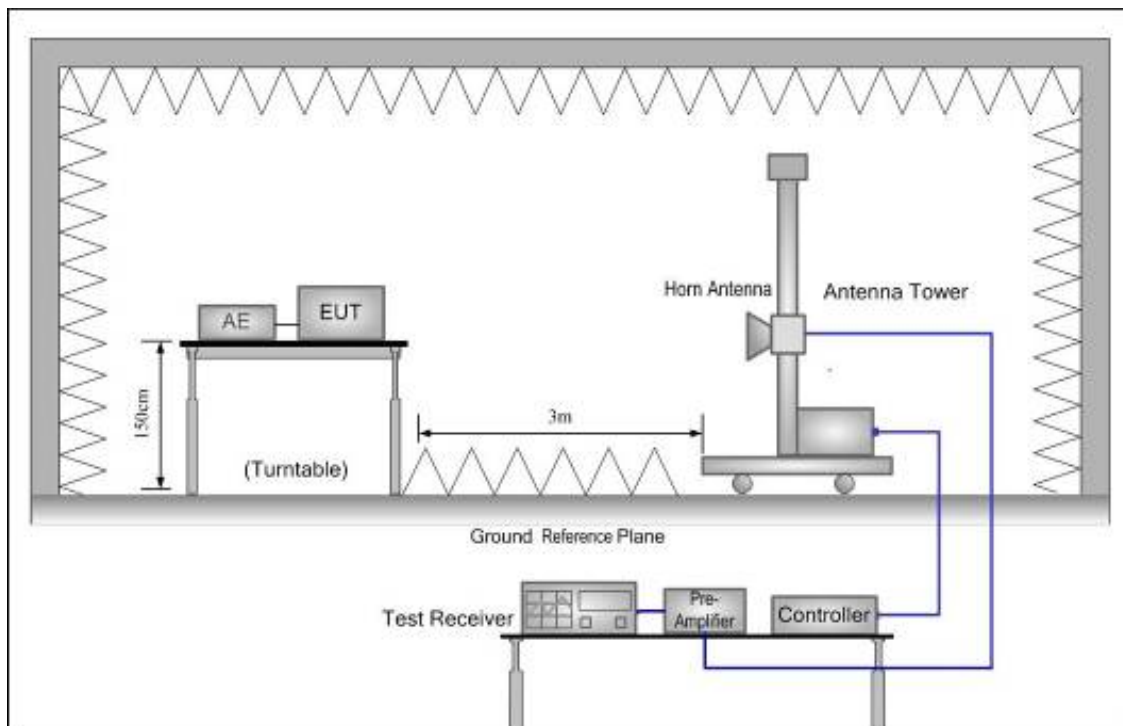
Note: 1. \*:Maximum data; x:Over limit; !:over margin.  
 2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

From 1G-25GHz

Test Mode: GMSK TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1806	46.77	V	33.95	10.18	34.26	56.64	74	17.36	PK
1806	37.31	V	33.95	10.18	34.26	47.18	54	6.82	AV
2709	/	/	/	/	/	/	/	/	/
3612	/	/	/	/	/	/	/	/	/
1806	48.19	H	33.95	10.18	34.26	58.06	74	15.94	PK
1806	37.24	H	33.95	10.18	34.26	47.11	54	6.89	AV
2709	/	/	/	/	/	/	/	/	/
3612	/	/	/	/	/	/	/	/	/
Test Mode: GMSK TX Mid									
1830	45.39	V	33.93	10.2	34.29	55.23	74	18.77	PK
1830	38.11	V	33.93	10.2	34.29	47.95	54	6.05	AV
2745	/	/	/	/	/	/	/	/	/
3660	/	/	/	/	/	/	/	/	/
1830	46.02	H	33.93	10.2	34.29	55.86	74	18.14	PK
1830	38.15	H	33.93	10.2	34.29	47.99	54	6.01	AV
2745	/	/	/	/	/	/	/	/	/
3660	/	/	/	/	/	/	/	/	/
Test Mode: GMSK TX High									
1855.2	45.49	V	33.98	10.22	34.25	55.44	74	18.56	PK
1855.2	35.46	V	33.98	10.22	34.25	45.41	54	8.59	AV
2782.8	/	/	/	/	/	/	/	/	/
3710.4	/	/	/	/	/	/	/	/	/
1855.2	47.09	H	33.98	10.22	34.25	57.04	74	16.96	PK
1855.2	36.64	H	33.98	10.22	34.25	46.59	54	7.41	AV
2782.8	/	/	/	/	/	/	/	/	/
3710.4	/	/	/	/	/	/	/	/	/
Note:									
1, Result = Read level + Antenna factor + cable loss-Amp factor									
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.									

## 9. BAND EDGE COMPLIANCE

### 9.1. Block Diagram of Test Setup



### 9.2. Limit

All the lower and upper band-edges emissions appearing within restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

### 9.3. Test Procedure

All restriction band and non- restriction band have been tested , only worse case is reported.

### 9.4. Test Result

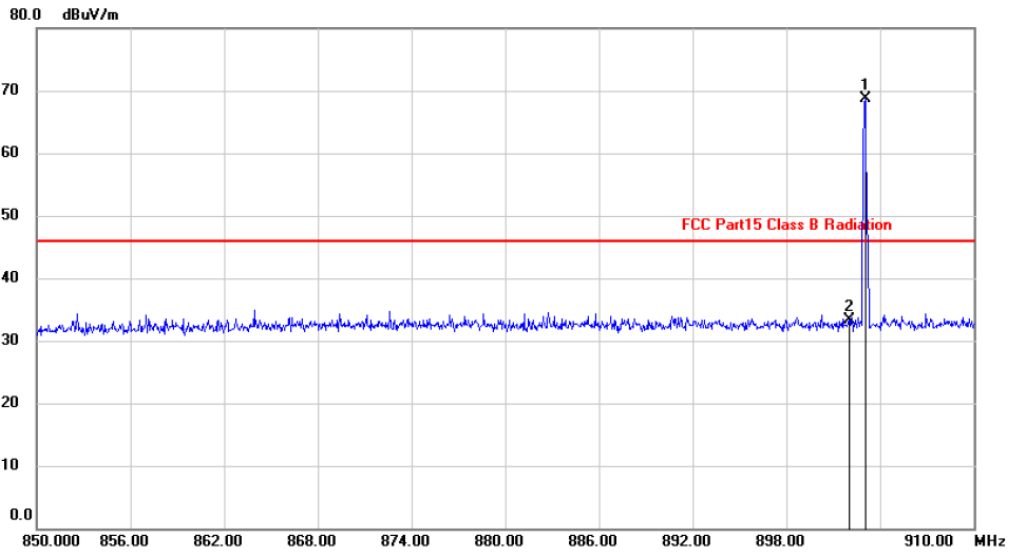
PASS. (See below detailed test data)



Radiated Method:

Test Mode: GMSK-Low

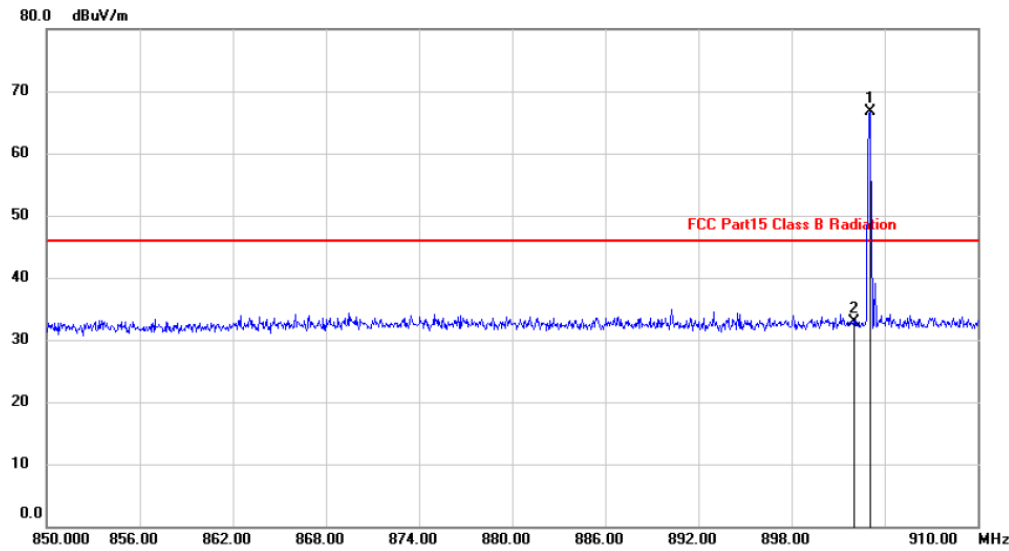
Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	903.0400	44.63	24.08	68.71	46.00	22.71			peak
2		902.0000	9.17	24.07	33.24	46.00	-12.76			peak

hopping-off

Polarization: Horizontal

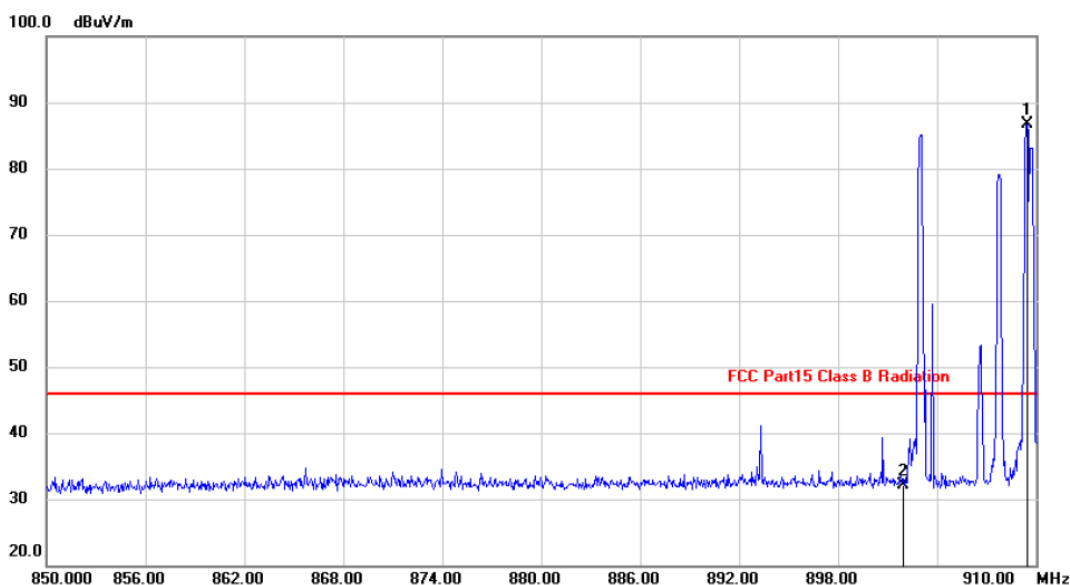


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	903.0400	42.58	24.08	66.66	46.00	20.66			peak
2		902.0000	8.89	24.07	32.96	46.00	-13.04			peak

hopping-off

Test Mode: GMSK-Low

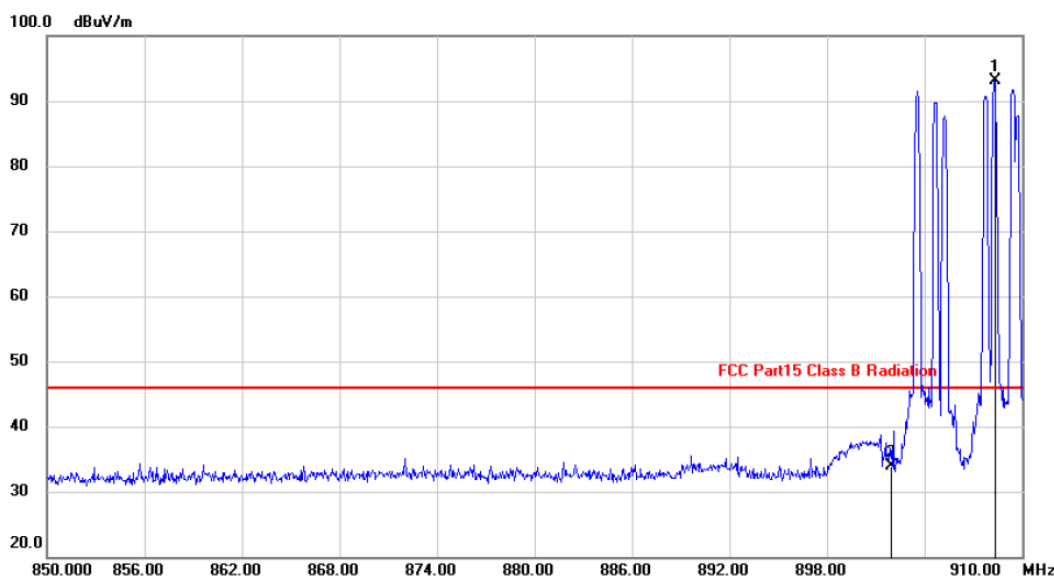
Polarization: Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Antenna Height cm	Table Degree degree	Comment
1	*	909.4600	62.59	24.16	86.75	46.00	40.75			peak
2		902.0000	8.09	24.07	32.16	46.00	-13.84			peak

hopping-on

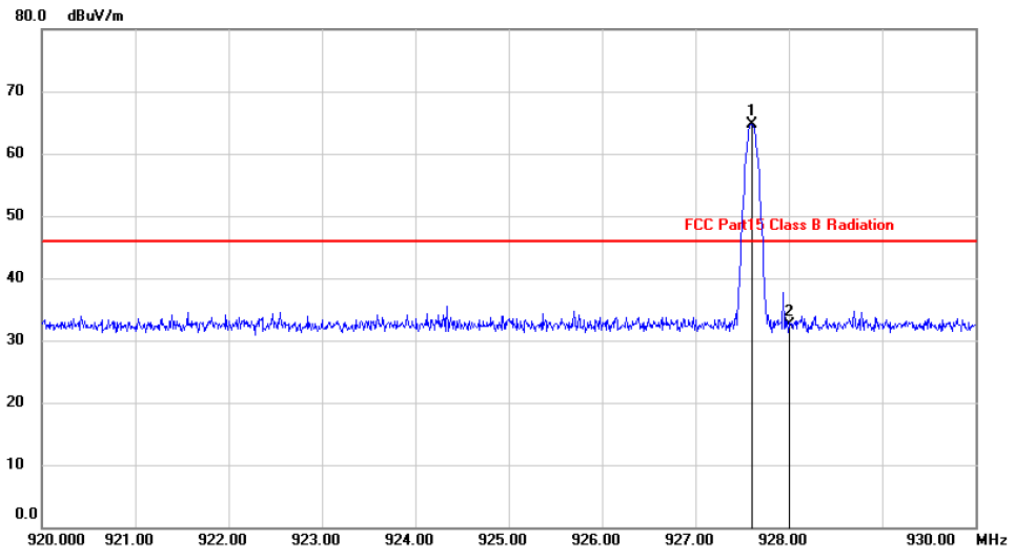
Polarization: Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Antenna Height cm	Table Degree degree	Comment
1	*	908.3200	68.88	24.15	93.03	46.00	47.03			peak
2		902.0000	9.91	24.07	33.98	46.00	-12.02			peak

hopping-on

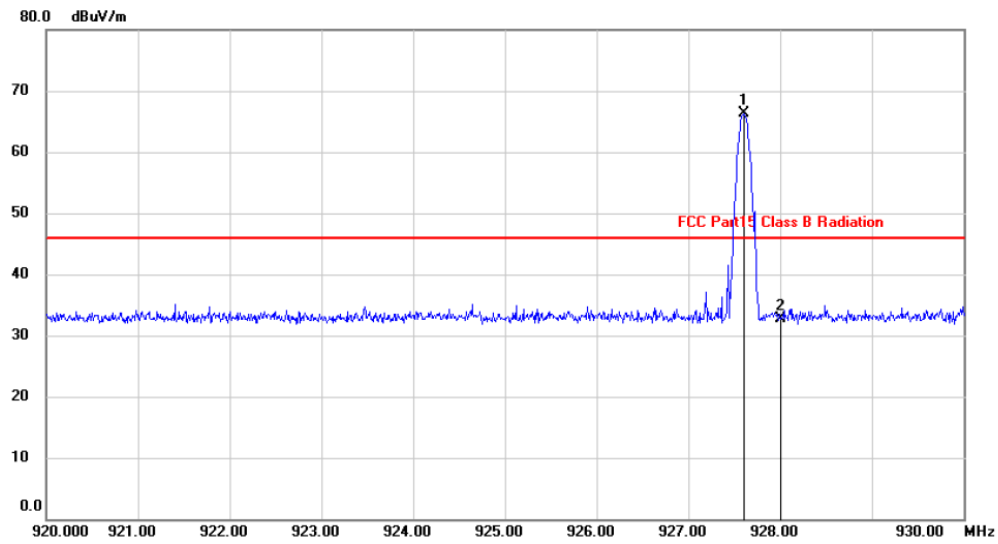
Test Mode: GMSK-High  
 Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	927.6000	40.40	24.39	64.79	46.00	18.79			peak
2		928.0000	8.21	24.39	32.60	46.00	-13.40			peak

hopping-off

Polarization: Horizontal

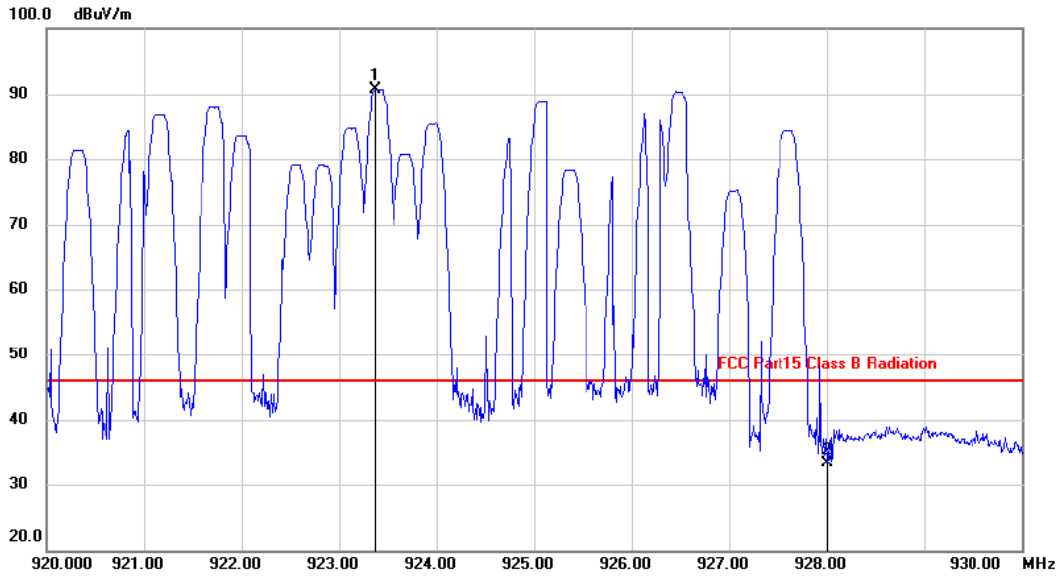


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	927.6000	41.88	24.39	66.27	46.00	20.27			peak
2		928.0000	8.41	24.39	32.80	46.00	-13.20			peak

hopping-off

Test Mode: GMSK-High

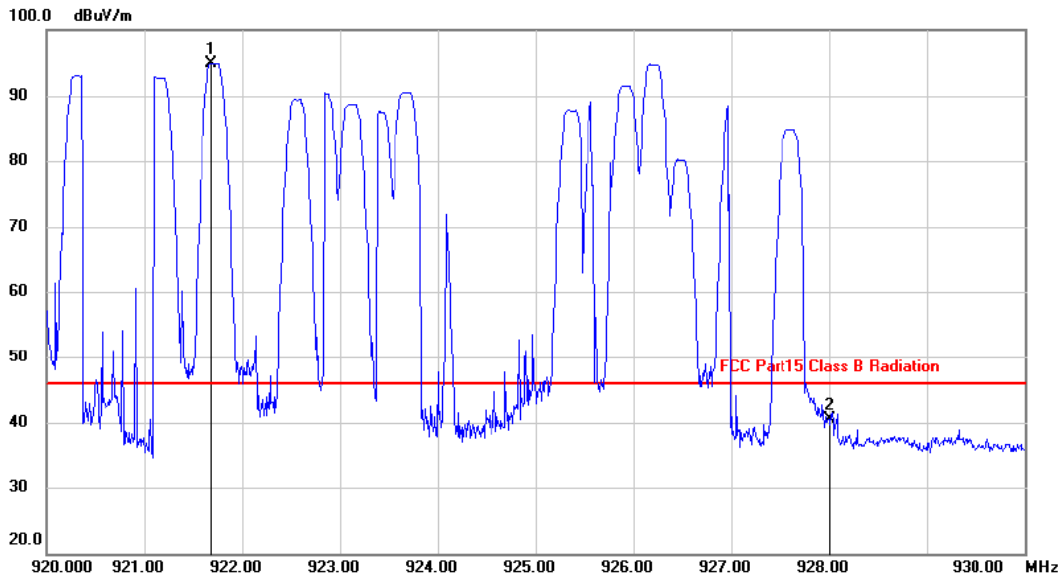
Polarization: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	923.3700	66.32	24.35	90.67	46.00	44.67			peak
2		928.0000	8.95	24.39	33.34	46.00	-12.66			peak

hopping-on

Polarization: Horizontal



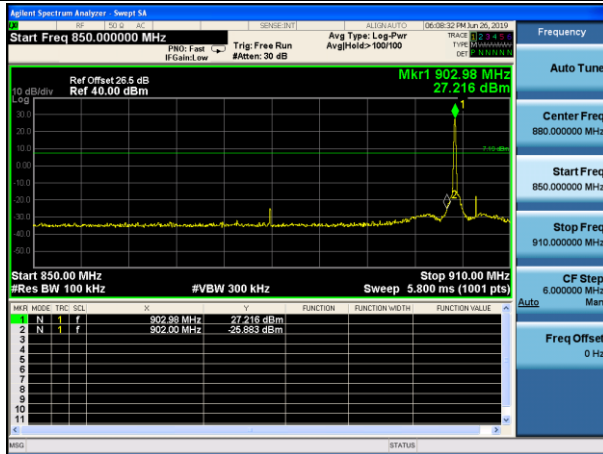
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	921.6800	70.56	24.34	94.90	46.00	48.90			peak
2		928.0000	16.04	24.39	40.43	46.00	-5.57			peak

hopping-on

Conducted Method

**GMSK Mode:**

**Lowest channel**

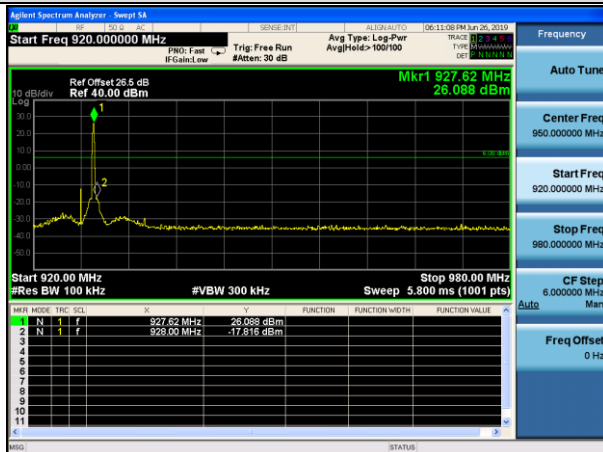


No-hopping mode

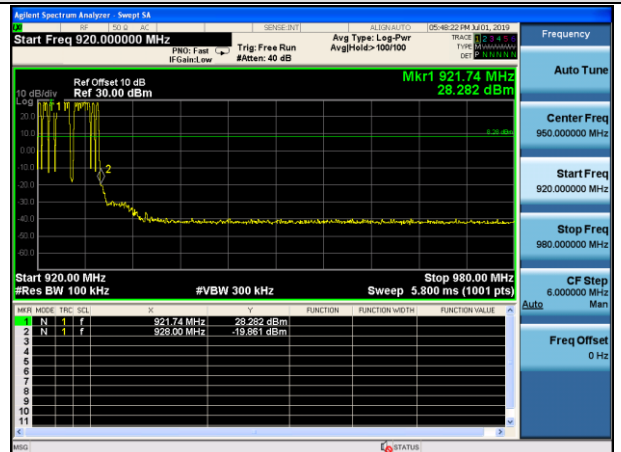


Hopping mode

**Highest channel**



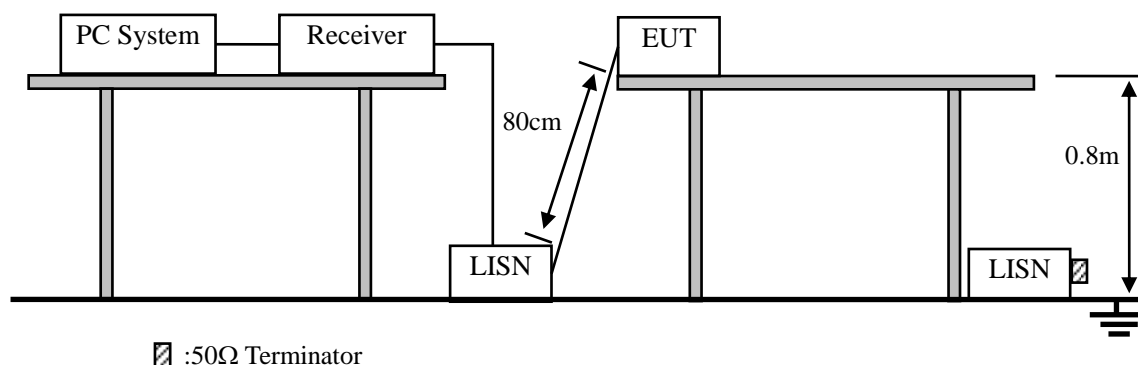
No-hopping mode



Hopping mode

## 10. POWER LINE CONDUCTED EMISSIONS

### 10.1. Block Diagram of Test Setup



### 10.2. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB( $\mu$ V)	Average Level dB( $\mu$ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. \* Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

### 10.3. Test Procedure

- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and simulator as shown in 10.1
- (3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 :2013on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10KHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

### 10.4. Test Result

Not applicable for equipment operated with DC power.

## **11. ANTENNA REQUIREMENTS**

### **11.1. Limit**

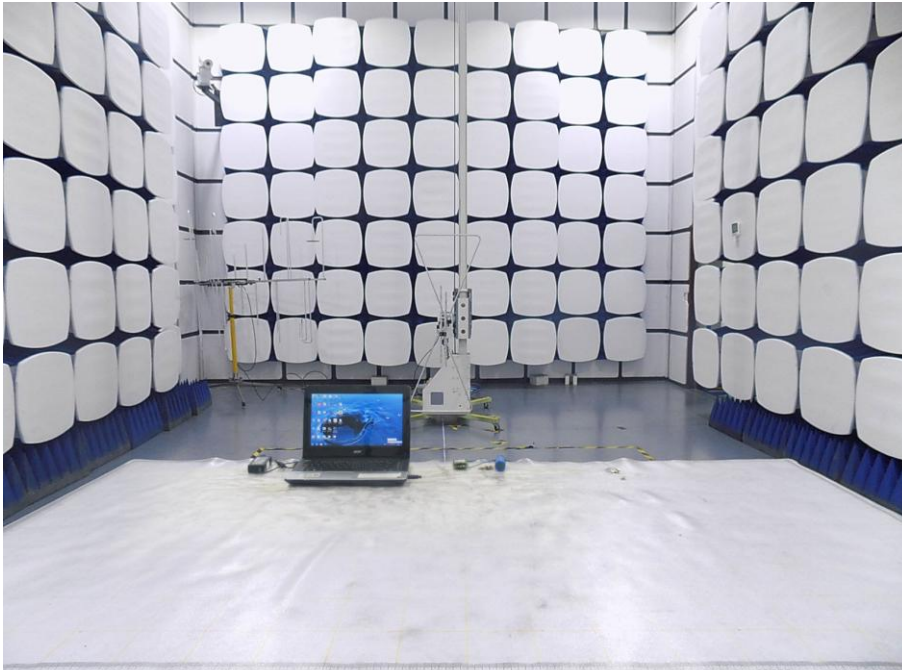
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **11.2. Result**

The EUT antenna is External Antenna. It complies with the standard requirement.

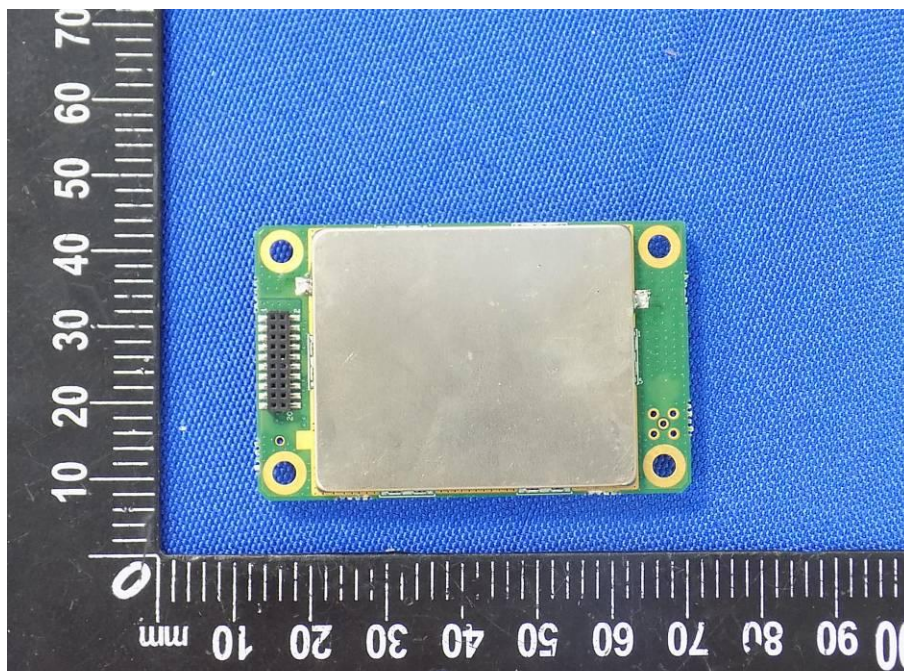
## 12. TEST SETUP PHOTO

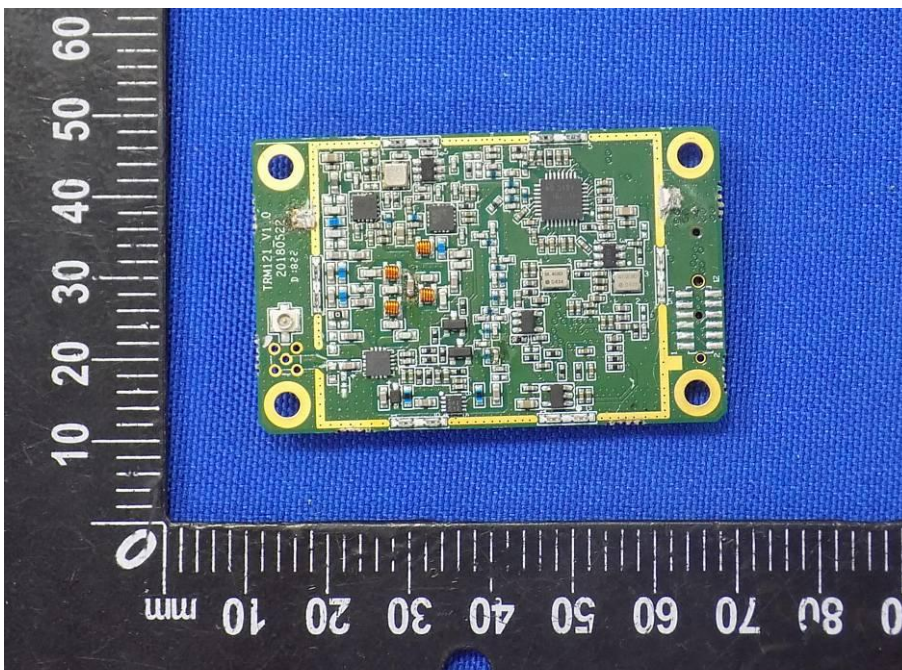
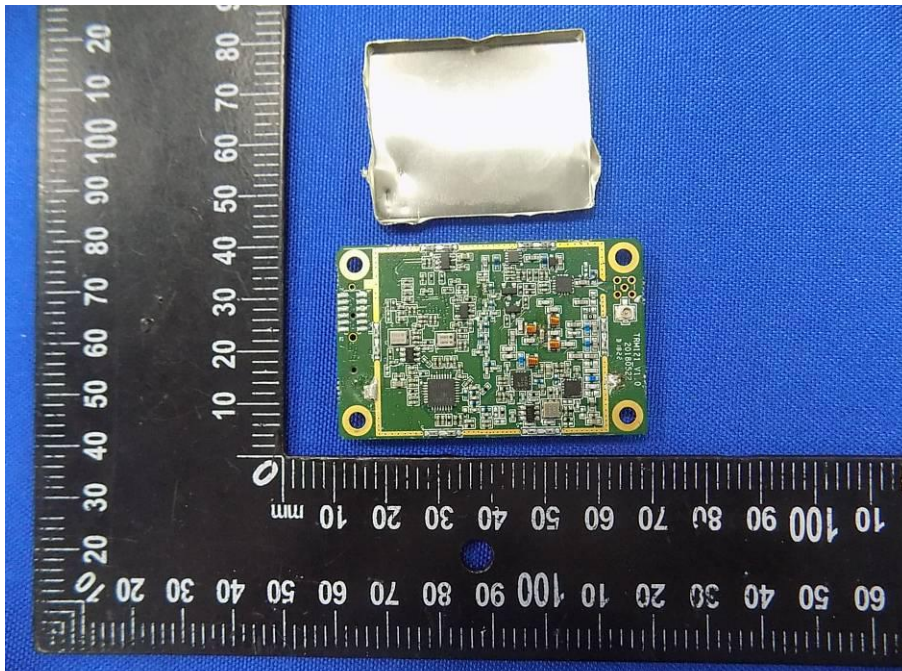
### 12.1. Photos of Radiated emission

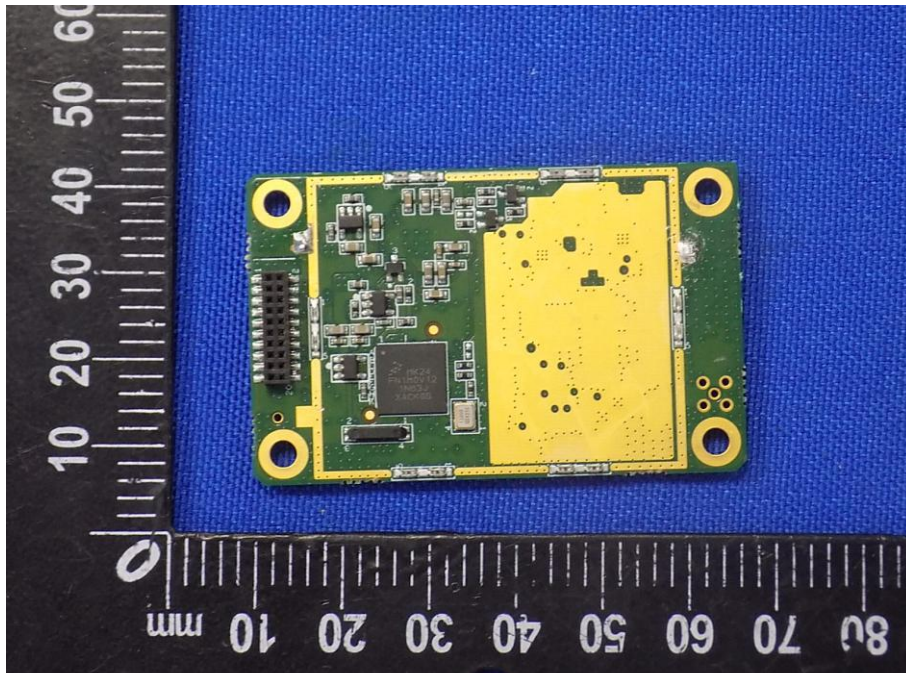




### 13. PHOTOS OF EUT







-----THE END OF REPORT-----