



# FCC ID Co-Location Test Report

## For

**Applicant Name:** Pella Corporation  
**Address:** 102, Main St Pella, Iowa, 50219, US.  
**EUT Name:** Bridge  
**Brand Name:** N/A  
**Model Number:** 20AT0000 V15

## Issued By

**Company Name:** BTF Testing Lab (Shenzhen) Co., Ltd.  
**Address:** F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China  
**Report Number:** BTF240326R00201  
**Test Standards:** 47 CFR Part 15 Subpart C  
RSS-210 Issue 10 April 2020  
**Test Conclusion:** Pass  
**Test Date:** 2024-03-14 to 2024-03-25  
**Date of Issue:** 2024-03-26

Prepared By:

Gavin Cui

Gavin Cui / Project Engineer

Date:

2024-03-26

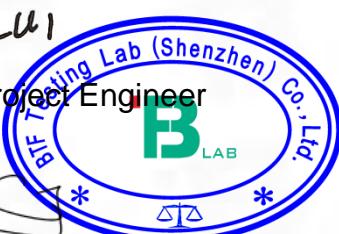
Approved By:

Ryan.CJ

Ryan.CJ / EMC Manager

Date:

2024-03-26



*Note: All the test results in this report only related to the testing samples. Which can be duplicated completely for the legal use with approval of applicant; it shall not be reproduced except in full without the written approval of BTF Testing Lab (Shenzhen) Co., Ltd., All the objections should be raised within thirty days from the date of issue. To validate the report, you can contact us.*



Test Report Number: BTF240326R00201

Revision History		
Version	Issue Date	Revisions Content
R_V0	2024-03-26	Original

*Note: Once the revision has been made, then previous versions reports are invalid.*

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## 1 Introduction

### 1.1 Identification of Testing Laboratory

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130

### 1.2 Identification of the Responsible Testing Location

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130
FCC Registration Number:	518915
Designation Number:	CN1330

### 1.3 Announcement

- (1) The test report reference to the report template version v0.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.
- (5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

## 2 Product Information

### 2.1 Application Information

Company Name:	Pella Corporation
Address:	102, Main St Pella, Iowa, 50219, US.

### 2.2 Manufacturer Information

Company Name:	GADGEON SMART SYSTEMS PRIVATE LIMITED
Address:	BLOCK 9, SCK01 640, 641, SMART CITY, ERNAKULAM, Kerala. 682042. India

### 2.3 Factory Information

Company Name:	GADGEON SMART SYSTEMS PRIVATE LIMITED
Address:	BLOCK 9, SCK01 640, 641, SMART CITY, ERNAKULAM, Kerala. 682042. India

### 2.4 General Description of Equipment under Test (EUT)

EUT Name:	Bridge
Test Model Number:	20AT0000 V15
Hardware Version:	REV15 ( Main Board) & REV2.6 ( Daughter Board)
Software Version:	REV_G & UB20RevB
Power Adaptor:	PHIHONG PSA05A-050QL6-H Input: 100-240V~0.2A 50-60Hz 12-16VA OUTPUT:5V--1A
Description:	Bridge is the wireless communication hub that connects the Pella Insynctive Products to status indicator or a compatible security or home automation system.

### 2.5 Technical Information

For BLE:	
Modulation Type:	GFSK
Modulation Technology:	Hopping
Transfer Rate:	1Mbps, 2Mbps
Operating Frequency:	2402~2480MHz
Number of Channel:	40
Antenna Type:	On board ceramic chip antenna with 1.86dBi of gain
Note:	
The antenna gain provided by the applicant, and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.	

For SDR:	
Modulation Type:	OOK
Center Frequency Intentional radiator:	433.92MHz
Number of Channel:	1
Antenna Type:	Monopole Copper-Clad antenna

### 3 Summary of Test Results

#### 3.1 Test Standards

The tests were performed according to following standards:

**47 CFR Part 15.231:** Periodic operation in the band 40.66–40.70 MHz and above 70 MHz

**RSS-210 Issue 10 April 2020:** Licence-Exempt Radio Apparatus: Category I Equipment

#### 3.2 Uncertainty of Test

Item	Measurement Uncertainty
AC Power Conducted Emission	0.94 dB
Radiated Emissions (30M - 1GHz)	±4.12dB
Radiated Emissions (above 1GHz)	1-6GHz: ±3.94dB 6-18GHz: ±4.16dB

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 4 Test Configuration

### 4.1 Test Equipment List

Conducted emissions on AC mains					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00953	/	/
Coaxial Switcher	SCHWARZBECK	CX210	CX210	/	/
V-LISN	SCHWARZBECK	NSLK 8127	01073	2023-11-16	2024-11-15
LISN	AFJ	LS16/110VAC	16010020076	2023-11-26	2024-11-15
EMI Receiver	ROHDE&SCHWABERZ	ESCI3	101422	2023-11-15	2024-11-14
EZ_EMC	Frad	EMC-CON 3A1.1+	/	/	/

Radiated emissions (Below 1GHz) Radiated emissions (Above 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	/	/
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	/	/
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	/	/
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	/	/
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	/	/
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2023-11-13	2024-11-12
EMI TEST RECEIVER	ROHDE&SCHWABERZ	ESCI7	101032	2023-11-16	2024-11-15
SIGNAL ANALYZER	ROHDE&SCHWABERZ	FSQ40	100010	2023-11-16	2024-11-15
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplifier	SCHWARZBECK	BBV9718D	00008	/	/
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2023-11-13	2024-11-12

## 4.2 Test Auxiliary Equipment

The EUT was tested as an independent device.

## 4.3 Channel List

For BLE:

Channel	Freq. (MHz)						
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

For OOK:

Channel	Freq. (MHz)
0	433.92

## 4.4 Test Mode Applicability and Tested Channel Detail

No.	Test Modes
TM1	BLE_1Mbps_CH0 TX+433.92MHz TX
TM2	BLE_1Mbps_CH19 TX+433.92MHz TX
TM3	BLE_1Mbps_CH39 TX+433.92MHz TX
TM4	BLE_2Mbps_CH1 TX+433.92MHz TX
TM5	BLE_2Mbps_CH19 TX+433.92MHz TX
TM6	BLE_2Mbps_CH38 TX+433.92MHz TX

#### 4.5 Summary of Test Result

Item	Standard	Requirement	Test Mode	Result
AC Power Conducted Emission	47 CFR Part 15.231 RSS-210 Issue 10	47 CFR 15.207(a) RSS-Gen Issue 5, 8.8	TM1 TM2 TM3 TM4 TM5 TM6	Pass
Radiated Emissions	47 CFR Part 15.231 RSS-210 Issue 10	47 CFR 15.209, 15.205 47 CFR 15.231(b) RSS-Gen Issue 5, 8.9	TM1 TM2 TM3 TM4 TM5 TM6	Pass

**Conformity Assessment Condition:**

1. The test results (PASS / FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty".

**Disclaimer**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

## 5 Emission Test Results (EMI)

### 5.1 Conducted Emission at AC power line

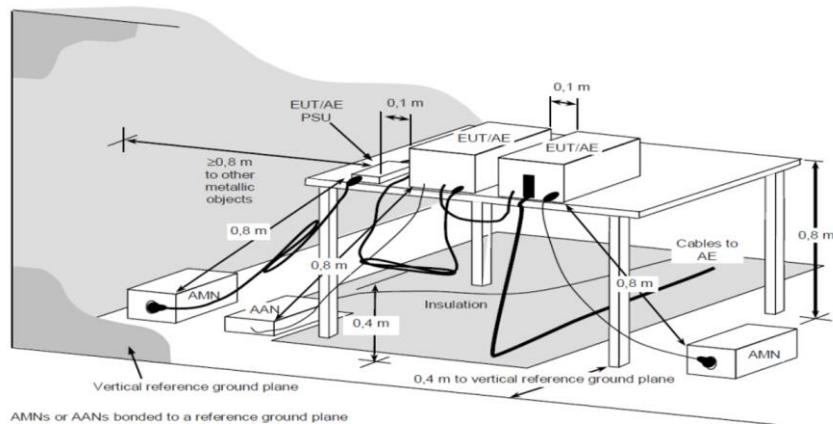
Test Requirement:	47 CFR 15.207(a) RSS-Gen Issue 5, 8.8		
Test Method:	Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices		
Test Limit:	Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	0.15-0.5	Quasi-peak 66 to 56*	Average 56 to 46*
	0.5-5	56	46
	5-30	60	50

\*Decreases with the logarithm of the frequency.

#### 5.1.1 E.U.T. Operation:

Operating Environment:			
Temperature:	24.3 °C		
Humidity:	52 %		
Atmospheric Pressure:	1010 mbar		

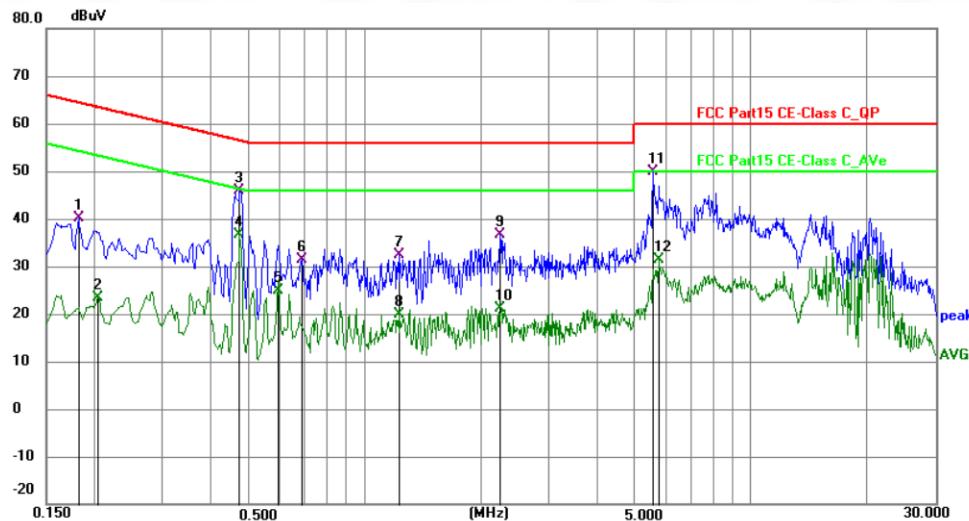
#### 5.1.2 Test Setup Diagram:



### 5.1.3 Test Data:

Worst case data:

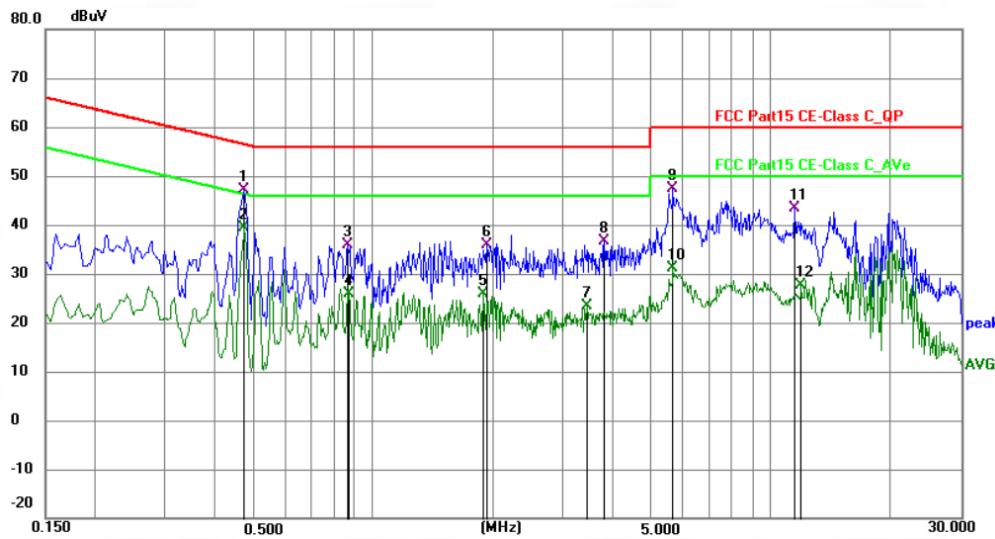
TM1 / Line: Line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1814	29.53	10.52	40.05	64.42	-24.37	QP	P
2	0.2040	12.75	10.56	23.31	53.45	-30.14	AVG	P
3	0.4740	35.23	10.57	45.80	56.44	-10.64	QP	P
4 *	0.4740	26.01	10.57	36.58	46.44	-9.86	AVG	P
5	0.5980	14.31	10.63	24.94	46.00	-21.06	AVG	P
6	0.6854	20.83	10.67	31.50	56.00	-24.50	QP	P
7	1.2342	21.78	10.66	32.44	56.00	-23.56	QP	P
8	1.2342	9.11	10.66	19.77	46.00	-26.23	AVG	P
9	2.2425	25.92	10.68	36.60	56.00	-19.40	QP	P
10	2.2559	10.57	10.67	21.24	46.00	-24.76	AVG	P
11	5.5815	39.16	10.75	49.91	60.00	-10.09	QP	P
12	5.7525	20.65	10.76	31.41	50.00	-18.59	AVG	P

Remark:

1. All readings are Quasi - Peak and Average values;
2. Factor = Insertion Loss + Cable Loss;
3. Level =Reading + Factor;
4. Margin= Level – Limit.

**TM1 / Line: Neutral**


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.4740	36.57	10.57	47.14	56.44	-9.30	QP	P
2 *	0.4740	28.91	10.57	39.48	46.44	-6.96	AVG	P
3	0.8655	25.24	10.68	35.92	56.00	-20.08	QP	P
4	0.8700	15.32	10.68	26.00	46.00	-20.00	AVG	P
5	1.8960	15.27	10.68	25.95	46.00	-20.05	AVG	P
6	1.9365	25.26	10.68	35.94	56.00	-20.06	QP	P
7	3.4485	12.80	10.63	23.43	46.00	-22.57	AVG	P
8	3.8083	25.96	10.66	36.62	56.00	-19.38	QP	P
9	5.6805	36.68	10.76	47.44	60.00	-12.56	QP	P
10	5.6805	20.34	10.76	31.10	50.00	-18.90	AVG	P
11	11.4672	32.58	10.84	43.42	60.00	-16.58	QP	P
12	11.8950	16.81	10.83	27.64	50.00	-22.36	AVG	P

**Remark:**

1. All readings are Quasi - Peak and Average values;
2. Factor = Insertion Loss + Cable Loss;
3. Level =Reading + Factor;
4. Margin= Level – Limit.

## 5.2 Radiated Emissions (below 1GHz)

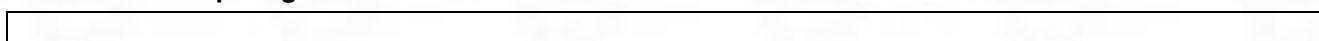
Test Requirement:	47 CFR 15.247(d), 15.209, 15.205 47 CFR 15.231(b) RSS-Gen Issue 5, 8.9																										
Test Method:	ANSI C63.10-2013 section 6.6.4																										
	<b>For 15.209:</b> <table border="1"> <thead> <tr> <th>Frequency (MHz)</th> <th>Field strength (microvolts/meter)</th> <th>Measurement distance (meters)</th> </tr> </thead> <tbody> <tr> <td>0.009–0.490</td> <td>2400/F(kHz)</td> <td>300</td> </tr> <tr> <td>0.490–1.705</td> <td>24000/F(kHz)</td> <td>30</td> </tr> <tr> <td>1.705–30.0</td> <td>30</td> <td>30</td> </tr> <tr> <td>30–88</td> <td>100 **</td> <td>3</td> </tr> <tr> <td>88–216</td> <td>150 **</td> <td>3</td> </tr> <tr> <td>216–960</td> <td>200 **</td> <td>3</td> </tr> <tr> <td>Above 960</td> <td>500</td> <td>3</td> </tr> </tbody> </table>			Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	0.009–0.490	2400/F(kHz)	300	0.490–1.705	24000/F(kHz)	30	1.705–30.0	30	30	30–88	100 **	3	88–216	150 **	3	216–960	200 **	3	Above 960	500	3
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)																									
0.009–0.490	2400/F(kHz)	300																									
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1.705–30.0	30	30																									
30–88	100 **	3																									
88–216	150 **	3																									
216–960	200 **	3																									
Above 960	500	3																									
	<p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p> <p>In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p>																										
Test Limit:	<b>For 15.231(b):</b> <p>In addition to the provisions of § 15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:</p> <table border="1"> <thead> <tr> <th>Fundamental frequency (MHz)</th> <th>Field strength of fundamental (microvolts/meter)</th> <th>Field strength of spurious emissions (microvolts/meter)</th> </tr> </thead> <tbody> <tr> <td>40.66–40.70</td> <td>2,250</td> <td>225</td> </tr> <tr> <td>70–130</td> <td>1,250</td> <td>125</td> </tr> <tr> <td>130–174</td> <td><sup>1</sup> 1,250 to 3,750</td> <td><sup>1</sup> 125 to 375</td> </tr> <tr> <td>174–260</td> <td>3,750</td> <td>375</td> </tr> <tr> <td>260–470</td> <td><sup>1</sup> 3,750 to 12,500</td> <td><sup>1</sup> 375 to 1,250</td> </tr> <tr> <td>Above 470</td> <td>12,500</td> <td>1,250</td> </tr> </tbody> </table> <p><sup>1</sup> Linear interpolations.</p> <p>(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.</p> <p>(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on</p>			Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)	40.66–40.70	2,250	225	70–130	1,250	125	130–174	<sup>1</sup> 1,250 to 3,750	<sup>1</sup> 125 to 375	174–260	3,750	375	260–470	<sup>1</sup> 3,750 to 12,500	<sup>1</sup> 375 to 1,250	Above 470	12,500	1,250			
Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)																									
40.66–40.70	2,250	225																									
70–130	1,250	125																									
130–174	<sup>1</sup> 1,250 to 3,750	<sup>1</sup> 125 to 375																									
174–260	3,750	375																									
260–470	<sup>1</sup> 3,750 to 12,500	<sup>1</sup> 375 to 1,250																									
Above 470	12,500	1,250																									

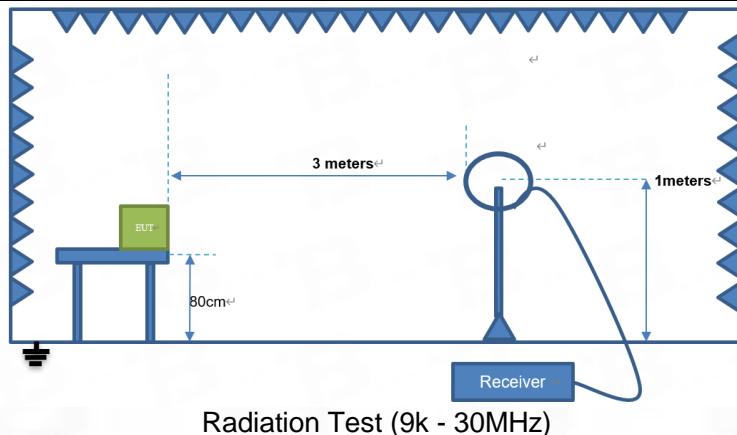
	<p>the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in § 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of § 15.205 shall be demonstrated using the measurement instrumentation specified in that section.</p> <p>(3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in § 15.209, whichever limit permits a higher field strength.</p> <p>For RSS-GEN:</p> <p>Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.</p>																						
	<p><b>Table 5 – General field strength limits at frequencies above 30 MHz</b></p> <table border="1"> <thead> <tr> <th data-bbox="473 893 695 923">Frequency (MHz)</th><th data-bbox="838 893 1060 923">Field strength (<math>\mu</math>V/m at 3 m)</th></tr> </thead> <tbody> <tr> <td data-bbox="473 938 695 968">30 – 88</td><td data-bbox="838 938 1060 968">100</td></tr> <tr> <td data-bbox="473 983 695 1012">88 – 216</td><td data-bbox="838 983 1060 1012">150</td></tr> <tr> <td data-bbox="473 1028 695 1057">216 – 960</td><td data-bbox="838 1028 1060 1057">200</td></tr> <tr> <td data-bbox="473 1073 695 1102">Above 960</td><td data-bbox="838 1073 1060 1102">500</td></tr> </tbody> </table> <p><b>Table 6 – General field strength limits at frequencies below 30 MHz</b></p> <table border="1"> <thead> <tr> <th data-bbox="473 1170 568 1199">Frequency</th><th data-bbox="663 1170 981 1199">Magnetic field strength (H-Field) (<math>\mu</math>A/m)</th><th data-bbox="1124 1170 1314 1199">Measurement distance (m)</th></tr> </thead> <tbody> <tr> <td data-bbox="473 1215 568 1244">9 - 490 kHz Note 1</td><td data-bbox="663 1215 981 1244">6.37/F (F in kHz)</td><td data-bbox="1124 1215 1314 1244">300</td></tr> <tr> <td data-bbox="473 1260 568 1289">490 - 1705 kHz</td><td data-bbox="663 1260 981 1289">63.7/F (F in kHz)</td><td data-bbox="1124 1260 1314 1289">30</td></tr> <tr> <td data-bbox="473 1304 568 1334">1.705 - 30 MHz</td><td data-bbox="663 1304 981 1334">0.08</td><td data-bbox="1124 1304 1314 1334">30</td></tr> </tbody> </table> <p><b>Note 1:</b> The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.</p>	Frequency (MHz)	Field strength ( $\mu$ V/m at 3 m)	30 – 88	100	88 – 216	150	216 – 960	200	Above 960	500	Frequency	Magnetic field strength (H-Field) ( $\mu$ A/m)	Measurement distance (m)	9 - 490 kHz Note 1	6.37/F (F in kHz)	300	490 - 1705 kHz	63.7/F (F in kHz)	30	1.705 - 30 MHz	0.08	30
Frequency (MHz)	Field strength ( $\mu$ V/m at 3 m)																						
30 – 88	100																						
88 – 216	150																						
216 – 960	200																						
Above 960	500																						
Frequency	Magnetic field strength (H-Field) ( $\mu$ A/m)	Measurement distance (m)																					
9 - 490 kHz Note 1	6.37/F (F in kHz)	300																					
490 - 1705 kHz	63.7/F (F in kHz)	30																					
1.705 - 30 MHz	0.08	30																					
Procedure:	ANSI C63.10-2013 section 6.6.4																						

### 5.2.1 E.U.T. Operation:

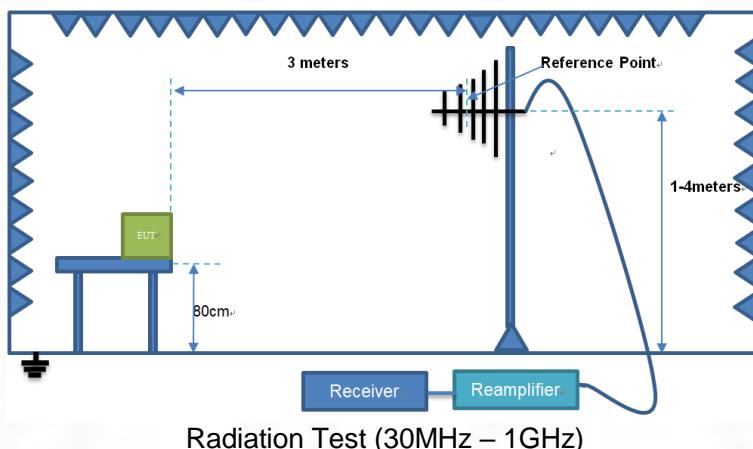
Operating Environment:		
Temperature:	25.7 °C	
Humidity:	48.1 %	
Atmospheric Pressure:	1010 mbar	

### 5.2.2 Test Setup Diagram:





Radiation Test (9kHz - 30MHz)

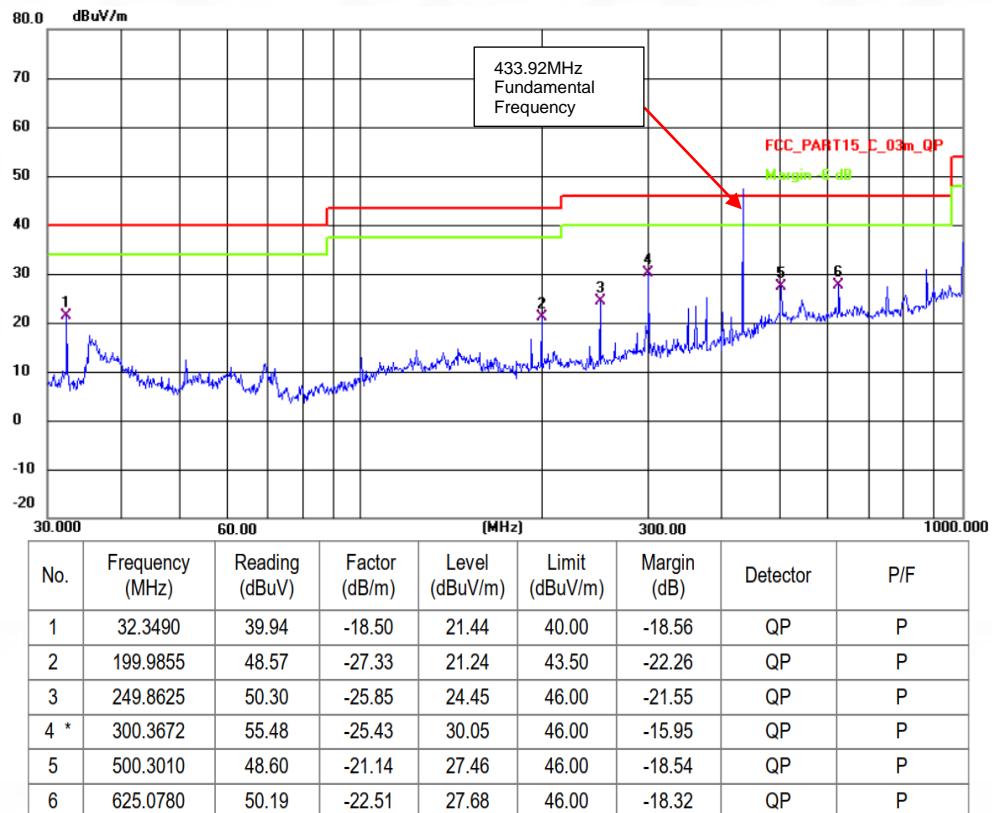


Radiation Test (30MHz - 1GHz)

### 5.2.3 Test Data:

Worst case data:

TM1 / Polarization: Horizontal



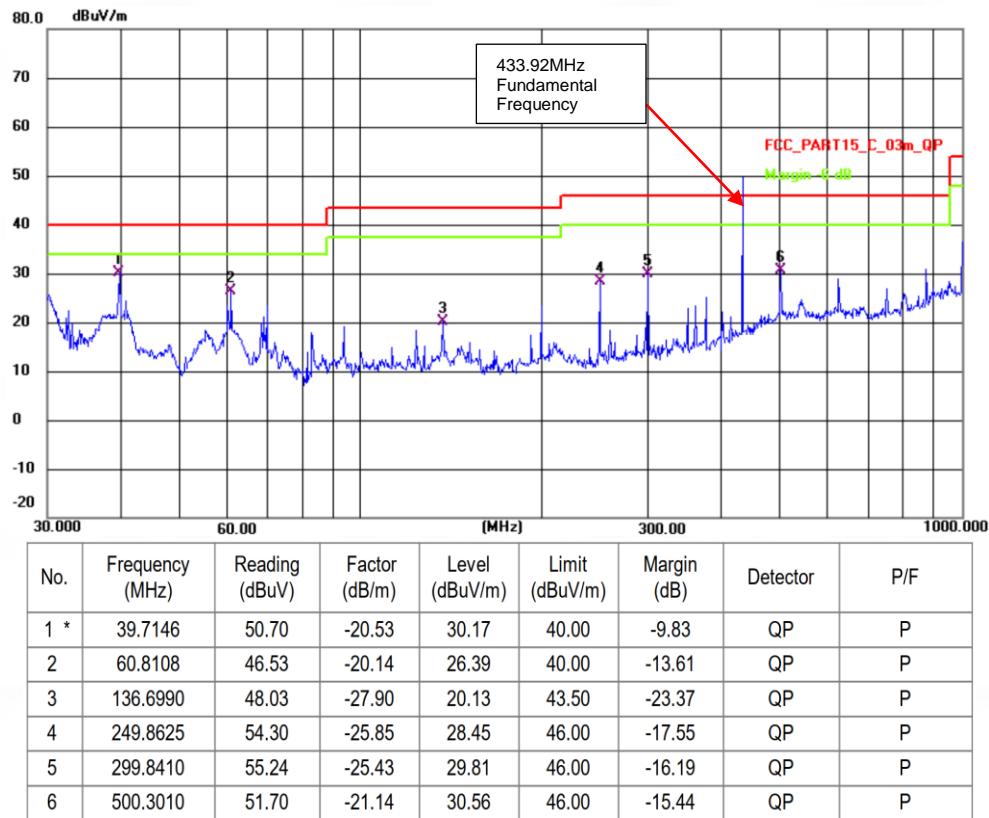
Note:

Factor = Antenna factor + Cable loss;

Level = Reading + Factor;

Limit = Limit stated in standard;

Margin = Level - Limit.

**TM1 / Polarization: Vertical**

**Note:**

Factor = Antenna factor + Cable loss;

Level = Reading + Factor;

Limit = Limit stated in standard;

Margin = Level - Limit.

The low frequency, which started from 9KHz~30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

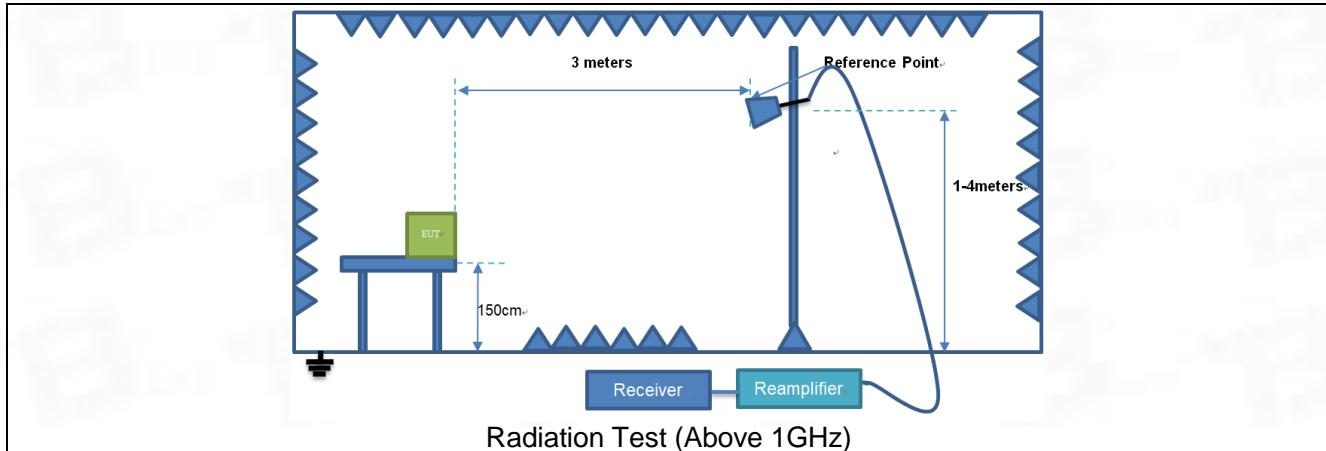
### 5.3 Radiated Emissions (above 1GHz)

Test Requirement:	47 CFR15.209, 15.205 47 CFR 15.231(b) RSS-Gen Issue 5, 8.9																							
Test Method:	ANSI C63.10-2013 section 6.6.4																							
	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)																					
	0.009–0.490	2400/F(kHz)	300																					
	0.490–1.705	24000/F(kHz)	30																					
	1.705–30.0	30	30																					
	30–88	100 **	3																					
	88–216	150 **	3																					
	216–960	200 **	3																					
	Above 960	500	3																					
Test Limit:	<p>** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.</p> <p>In the emission table above, the tighter limit applies at the band edges. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p> <p>For 15.231(b):</p> <p>In addition to the provisions of § 15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:</p> <table border="1"> <thead> <tr> <th>Fundamental frequency (MHz)</th><th>Field strength of fundamental (microvolts/meter)</th><th>Field strength of spurious emissions (microvolts/meter)</th></tr> </thead> <tbody> <tr> <td>40.66–40.70</td><td>2,250</td><td>225</td></tr> <tr> <td>70–130</td><td>1,250</td><td>125</td></tr> <tr> <td>130–174</td><td><sup>1</sup> 1,250 to 3,750</td><td><sup>1</sup> 125 to 375</td></tr> <tr> <td>174–260</td><td>3,750</td><td>375</td></tr> <tr> <td>260–470</td><td><sup>1</sup> 3,750 to 12,500</td><td><sup>1</sup> 375 to 1,250</td></tr> <tr> <td>Above 470</td><td>12,500</td><td>1,250</td></tr> </tbody> </table> <p><sup>1</sup> Linear interpolations.</p> <p>(1) The above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.</p> <p>(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on</p>			Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)	40.66–40.70	2,250	225	70–130	1,250	125	130–174	<sup>1</sup> 1,250 to 3,750	<sup>1</sup> 125 to 375	174–260	3,750	375	260–470	<sup>1</sup> 3,750 to 12,500	<sup>1</sup> 375 to 1,250	Above 470	12,500	1,250
Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)																						
40.66–40.70	2,250	225																						
70–130	1,250	125																						
130–174	<sup>1</sup> 1,250 to 3,750	<sup>1</sup> 125 to 375																						
174–260	3,750	375																						
260–470	<sup>1</sup> 3,750 to 12,500	<sup>1</sup> 375 to 1,250																						
Above 470	12,500	1,250																						

	<p>the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in § 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of § 15.205 shall be demonstrated using the measurement instrumentation specified in that section.</p> <p>(3) The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in § 15.209, whichever limit permits a higher field strength.</p> <p>For RSS-GEN:</p> <p>Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.</p>																						
	<p><b>Table 5 – General field strength limits at frequencies above 30 MHz</b></p> <table border="1"> <thead> <tr> <th data-bbox="466 893 711 923">Frequency (MHz)</th><th data-bbox="711 893 1049 923">Field strength (<math>\mu</math>V/m at 3 m)</th></tr> </thead> <tbody> <tr> <td data-bbox="466 934 711 963">30 – 88</td><td data-bbox="711 934 1049 963">100</td></tr> <tr> <td data-bbox="466 974 711 1003">88 – 216</td><td data-bbox="711 974 1049 1003">150</td></tr> <tr> <td data-bbox="466 1015 711 1044">216 – 960</td><td data-bbox="711 1015 1049 1044">200</td></tr> <tr> <td data-bbox="466 1055 711 1084">Above 960</td><td data-bbox="711 1055 1049 1084">500</td></tr> </tbody> </table> <p><b>Table 6 – General field strength limits at frequencies below 30 MHz</b></p> <table border="1"> <thead> <tr> <th data-bbox="466 1163 568 1192">Frequency</th><th data-bbox="568 1163 981 1192">Magnetic field strength (H-Field) (<math>\mu</math>A/m)</th><th data-bbox="981 1163 1400 1192">Measurement distance (m)</th></tr> </thead> <tbody> <tr> <td data-bbox="466 1203 568 1233">9 - 490 kHz Note 1</td><td data-bbox="568 1203 981 1233">6.37/F (F in kHz)</td><td data-bbox="981 1203 1400 1233">300</td></tr> <tr> <td data-bbox="466 1244 568 1273">490 - 1705 kHz</td><td data-bbox="568 1244 981 1273">63.7/F (F in kHz)</td><td data-bbox="981 1244 1400 1273">30</td></tr> <tr> <td data-bbox="466 1284 568 1313">1.705 - 30 MHz</td><td data-bbox="568 1284 981 1313">0.08</td><td data-bbox="981 1284 1400 1313">30</td></tr> </tbody> </table> <p><b>Note 1:</b> The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.</p>	Frequency (MHz)	Field strength ( $\mu$ V/m at 3 m)	30 – 88	100	88 – 216	150	216 – 960	200	Above 960	500	Frequency	Magnetic field strength (H-Field) ( $\mu$ A/m)	Measurement distance (m)	9 - 490 kHz Note 1	6.37/F (F in kHz)	300	490 - 1705 kHz	63.7/F (F in kHz)	30	1.705 - 30 MHz	0.08	30
Frequency (MHz)	Field strength ( $\mu$ V/m at 3 m)																						
30 – 88	100																						
88 – 216	150																						
216 – 960	200																						
Above 960	500																						
Frequency	Magnetic field strength (H-Field) ( $\mu$ A/m)	Measurement distance (m)																					
9 - 490 kHz Note 1	6.37/F (F in kHz)	300																					
490 - 1705 kHz	63.7/F (F in kHz)	30																					
1.705 - 30 MHz	0.08	30																					
Procedure:	ANSI C63.10-2013 section 6.6.4																						

### 5.3.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.7 °C
Humidity:	48.1 %
Atmospheric Pressure:	1010 mbar

**5.3.2 Test Setup Diagram:**

**5.3.3 Test Data:**
**TM1: BLE\_1Mbps\_CH0 TX+433.92MHz TX**

Fundamental Frequency	Polarization	Reading Freq. (MHz)	Receiver Reading Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Verdict
2402MHz + 433.92MHz	Horizontal	2390	73.42	-30.19	43.23	74	30.77	Peak	Pass
	Horizontal	2390	50.02	-30.19	19.83	54	34.17	Average	Pass
	Horizontal	2400	76.86	-30.48	46.38	74	27.62	Peak	Pass
	Horizontal	2400	51.41	-30.48	20.93	54	33.07	Average	Pass
	Horizontal	4804	79.19	-27.70	51.49	74	22.51	Peak	Pass
	Horizontal	4804	53.33	-27.70	25.63	54	28.37	Average	Pass
	Vertical	2390	72.88	-29.46	43.42	74	30.58	Peak	Pass
	Vertical	2390	50.39	-29.46	20.93	54	33.07	Average	Pass
	Vertical	2400	74.17	-30.40	43.77	74	30.23	Peak	Pass
	Vertical	2400	50.80	-30.40	20.4	54	33.6	Average	Pass
	Vertical	4804	77.38	-27.87	49.51	74	24.49	Peak	Pass
	Vertical	4804	53.33	-27.87	25.46	54	28.54	Average	Pass

**TM2: BLE\_1Mbps\_CH19 TX+433.92MHz TX**

Fundamental Frequency	Polarization	Reading Freq. (MHz)	Receiver Reading Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Verdict
2440MHz + 433.92MHz	Horizontal	4880	78.43	-27.73	50.70	74	23.30	Peak	Pass
	Horizontal	4880	56.04	-27.73	28.31	54	25.69	Average	Pass
	Vertical	4880	77.36	-27.69	49.67	74	24.33	Peak	Pass
	Vertical	4880	56.43	-27.69	28.74	54	25.26	Average	Pass

**TM3: BLE\_1Mbps\_CH39 TX+433.92MHz TX**

Fundamental Frequency	Polarization	Reading Freq. (MHz)	Receiver Reading Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Verdict
2480MHz + 433.92MHz	Horizontal	2483.5	74.94	-30.39	44.55	74	29.45	Peak	Pass
	Horizontal	2483.5	52.13	-30.39	21.74	54	32.26	Average	Pass
	Horizontal	4960	73.09	-27.49	45.60	74	28.40	Peak	Pass
	Horizontal	4960	50.70	-27.49	23.21	54	30.79	Average	Pass
	Vertical	2483.5	73.73	-29.84	43.89	74	30.11	Peak	Pass
	Vertical	2483.5	52.64	-29.84	22.8	54	31.20	Average	Pass
	Vertical	4960	71.39	-26.76	44.63	74	29.37	Peak	Pass
	Vertical	4960	52.81	-26.76	26.05	54	27.95	Average	Pass

**TM4: BLE\_2Mbps\_CH1 TX+433.92MHz TX**

Fundamental Frequency	Polarization	Reading Freq. (MHz)	Receiver Reading Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Verdict
2404MHz + 433.92MHz	Horizontal	2390	73.37	-30.19	43.18	74	30.82	Peak	Pass
	Horizontal	2390	50.44	-30.48	20.25	54	33.75	Average	Pass
	Horizontal	2400	73.41	-30.48	42.93	74	31.07	Peak	Pass
	Horizontal	2400	50.93	-30.48	20.45	54	33.55	Average	Pass
	Horizontal	4808	75.39	-27.32	48.07	74	25.93	Peak	Pass
	Horizontal	4808	51.46	-27.32	24.14	54	29.86	Average	Pass
	Vertical	2390	72.18	-29.46	42.72	74	31.28	Peak	Pass
	Vertical	2390	51.03	-29.46	21.57	54	32.43	Average	Pass
	Vertical	2400	74.09	-30.40	43.69	74	30.31	Peak	Pass
	Vertical	2400	50.37	-30.40	19.97	54	34.03	Average	Pass
	Vertical	4808	72.76	-27.55	45.21	74	28.79	Peak	Pass
	Vertical	4808	49.96	-27.55	22.41	54	31.59	Average	Pass

**TM5: BLE\_2Mbps\_CH19 TX+433.92MHz TX**

Fundamental Frequency	Polarization	Reading Freq. (MHz)	Receiver Reading Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Verdict
2440MHz + 433.92MHz	Horizontal	4880	73.44	-27.73	45.71	74	28.29	Peak	Pass
	Horizontal	4880	51.11	-27.73	23.38	54	30.62	Average	Pass
	Vertical	4880	73.91	-27.69	46.22	74	27.78	Peak	Pass
	Vertical	4880	50.06	-27.69	22.37	54	31.63	Average	Pass

**TM6: BLE\_2Mbps\_CH38 TX+433.92MHz TX**

Fundamental Frequency	Polarization	Reading Freq. (MHz)	Receiver Reading Level (dBuV)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Verdict
2478MHz + 433.92MHz	Horizontal	2483.5	72.11	-30.39	41.72	74	32.28	Peak	Pass
	Horizontal	2483.5	50.79	-30.39	20.4	54	33.6	Average	Pass
	Horizontal	4956	73.64	-27.49	46.15	74	27.85	Peak	Pass
	Horizontal	4956	51.82	-27.49	24.33	54	29.67	Average	Pass
	Vertical	2483.5	73.03	-29.84	43.19	74	30.81	Peak	Pass
	Vertical	2483.5	50.17	-29.84	20.33	54	33.67	Average	Pass
	Vertical	4956	73.09	-26.18	46.91	74	27.09	Peak	Pass
	Vertical	4956	51.82	-26.18	25.64	54	28.36	Average	Pass

Note: Factor = Antenna factor + Cable loss;

Level= Receiver Reading Level + Factor;

Limit = Limit stated in standard;

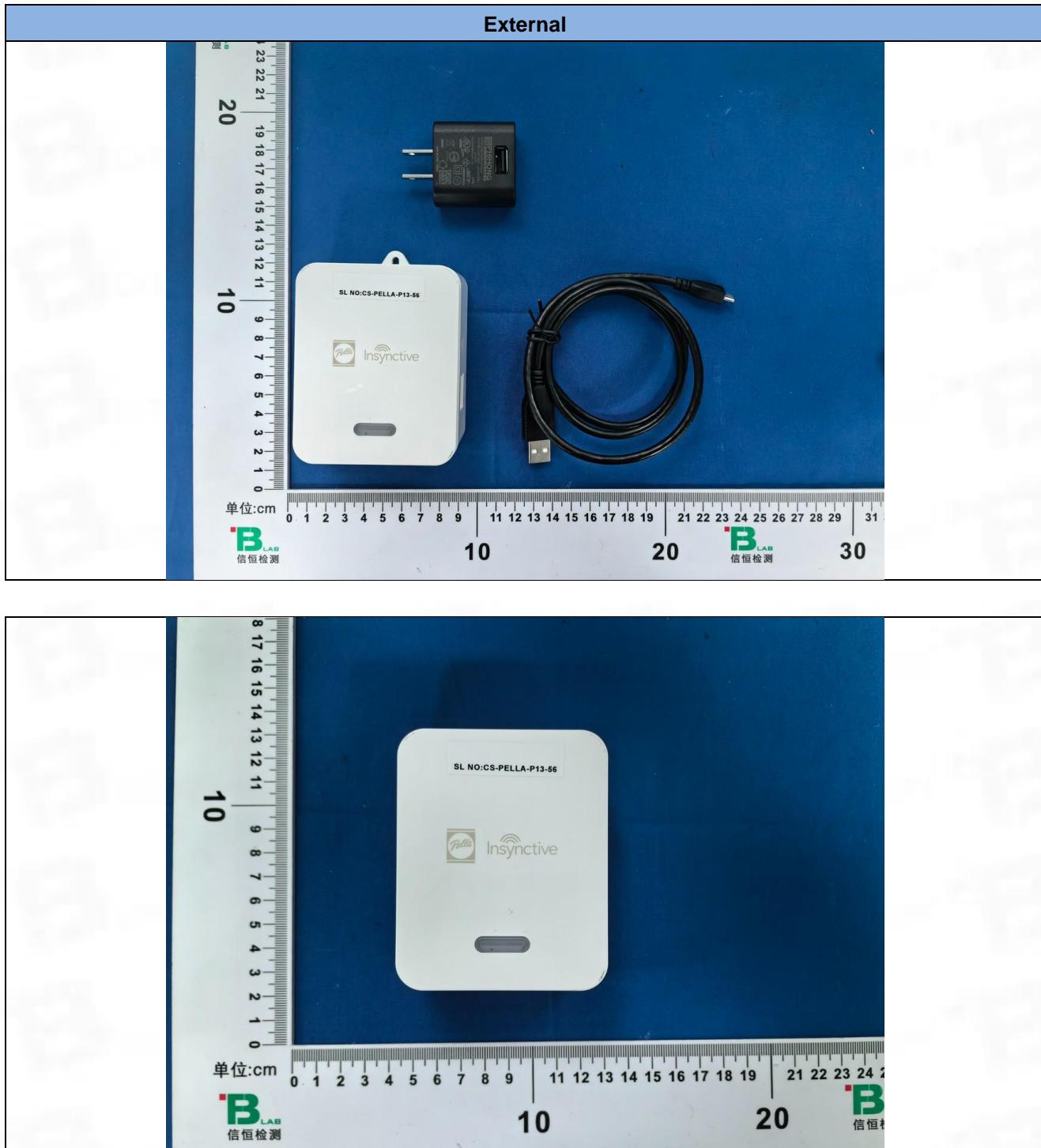
Margin= Level – Limit.

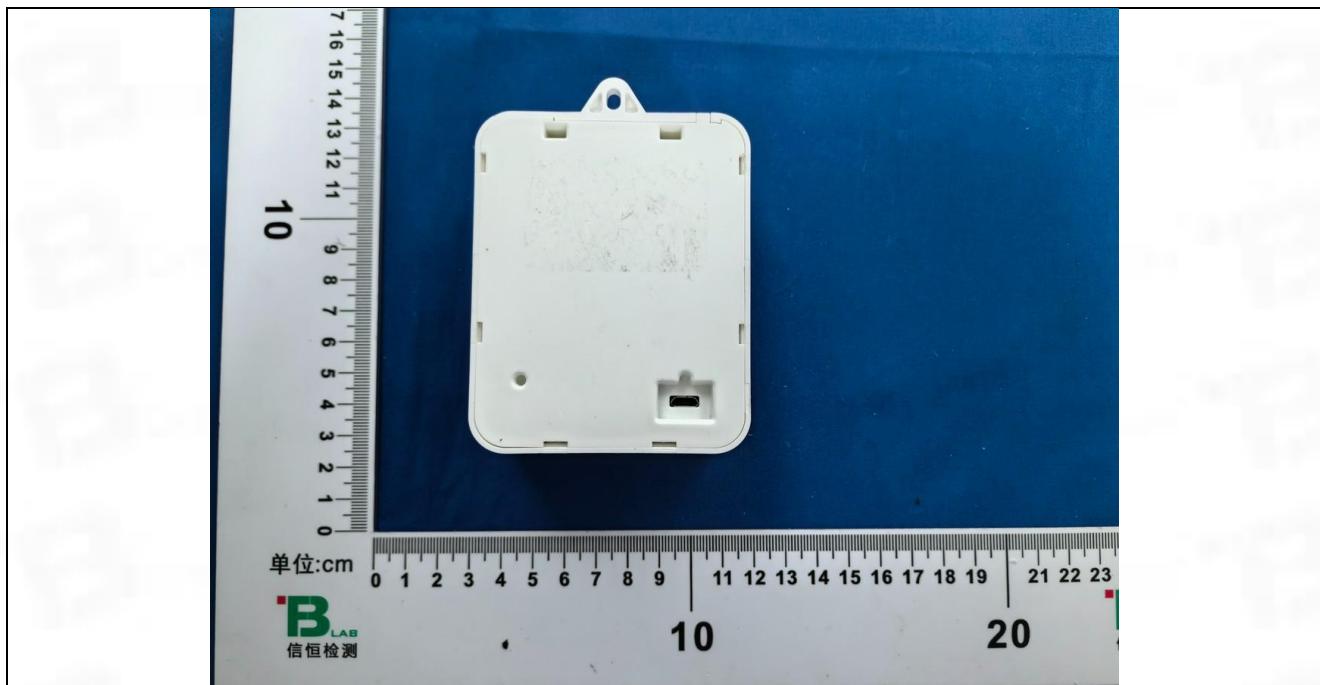
## 6 Test Setup Photos

**Conducted emissions on AC mains****Radiated emissions (Below 1GHz)**

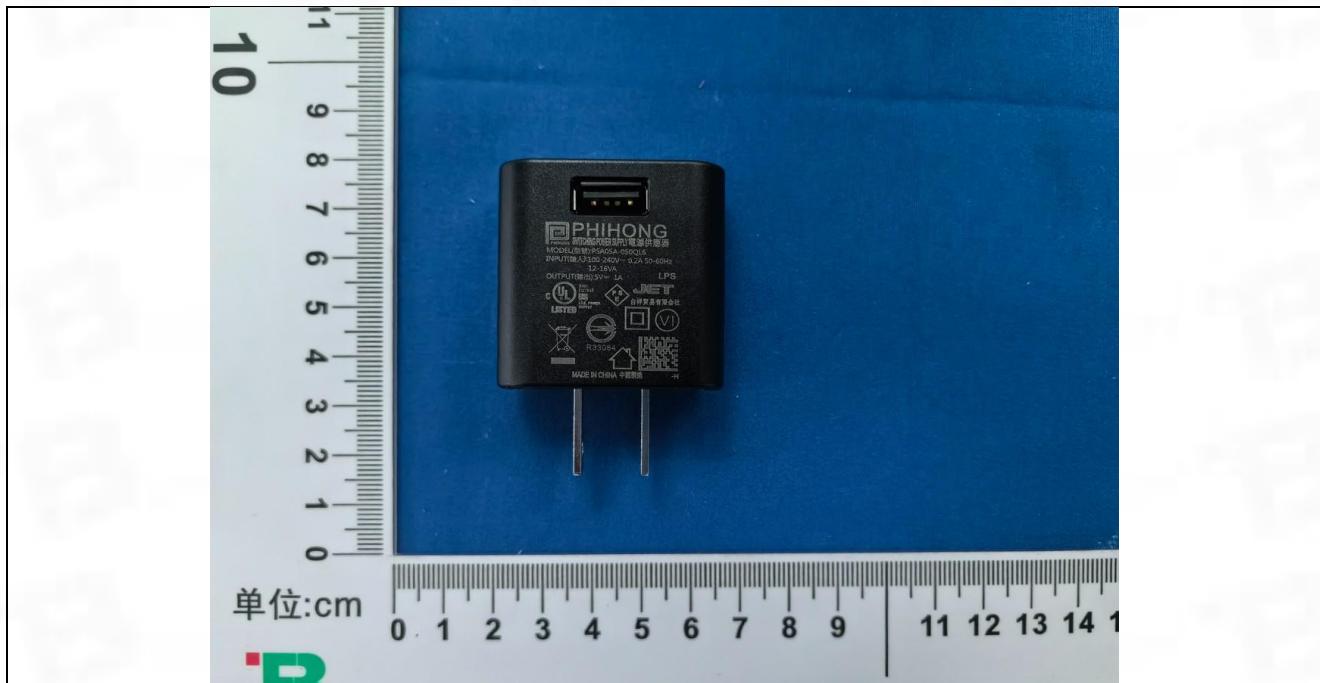
**Radiated emissions (Above 1GHz)**

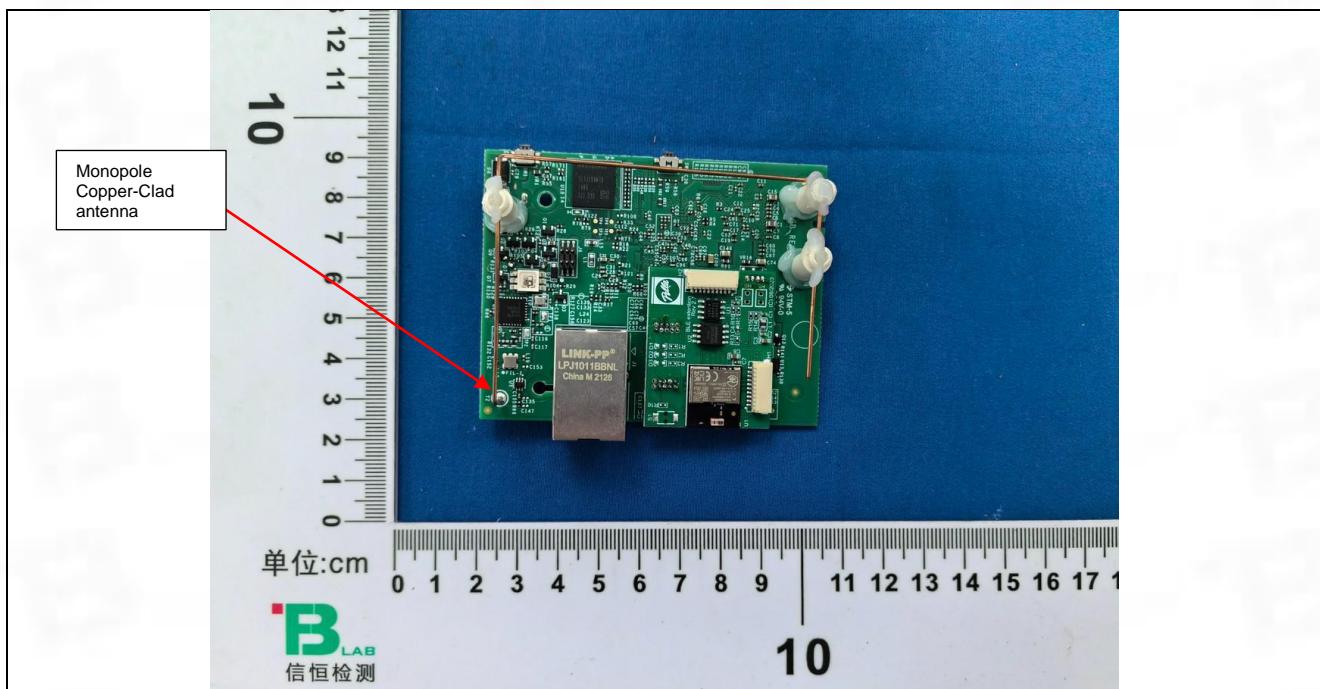
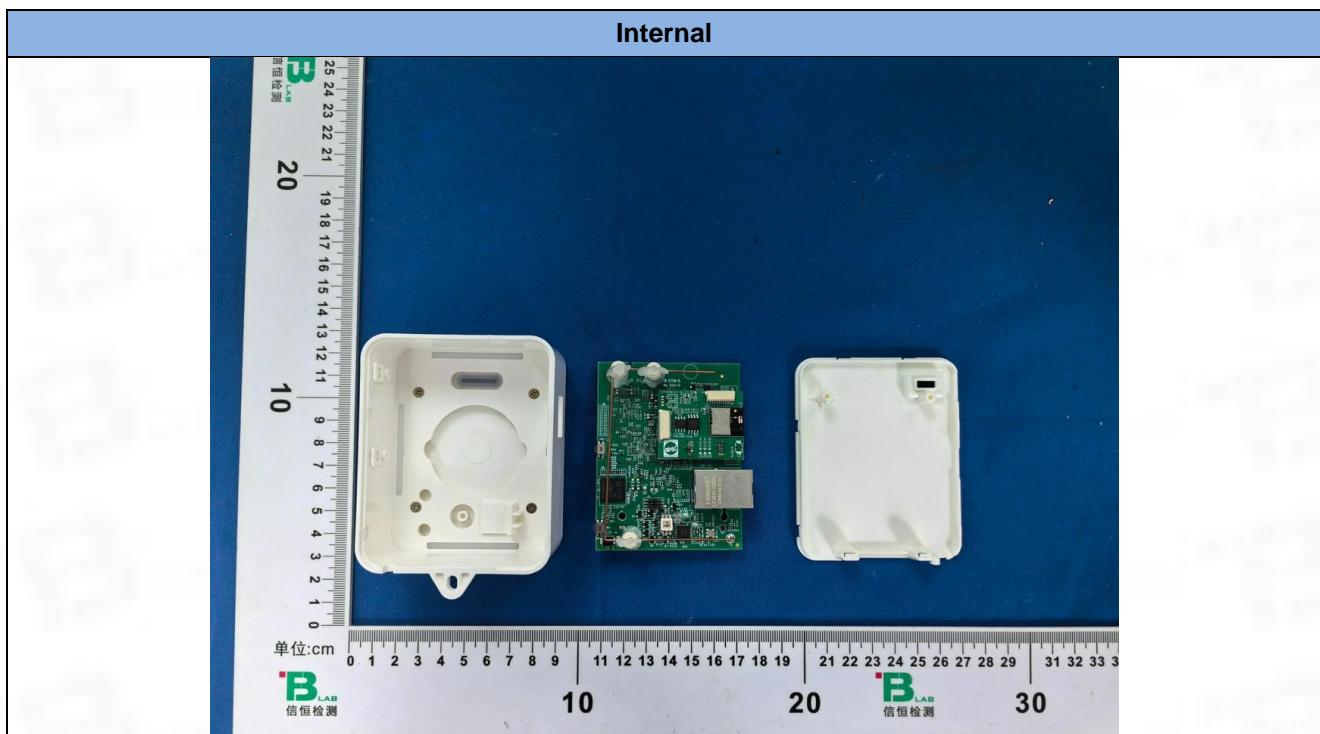
## 7 EUT Constructional Details (EUT Photos)

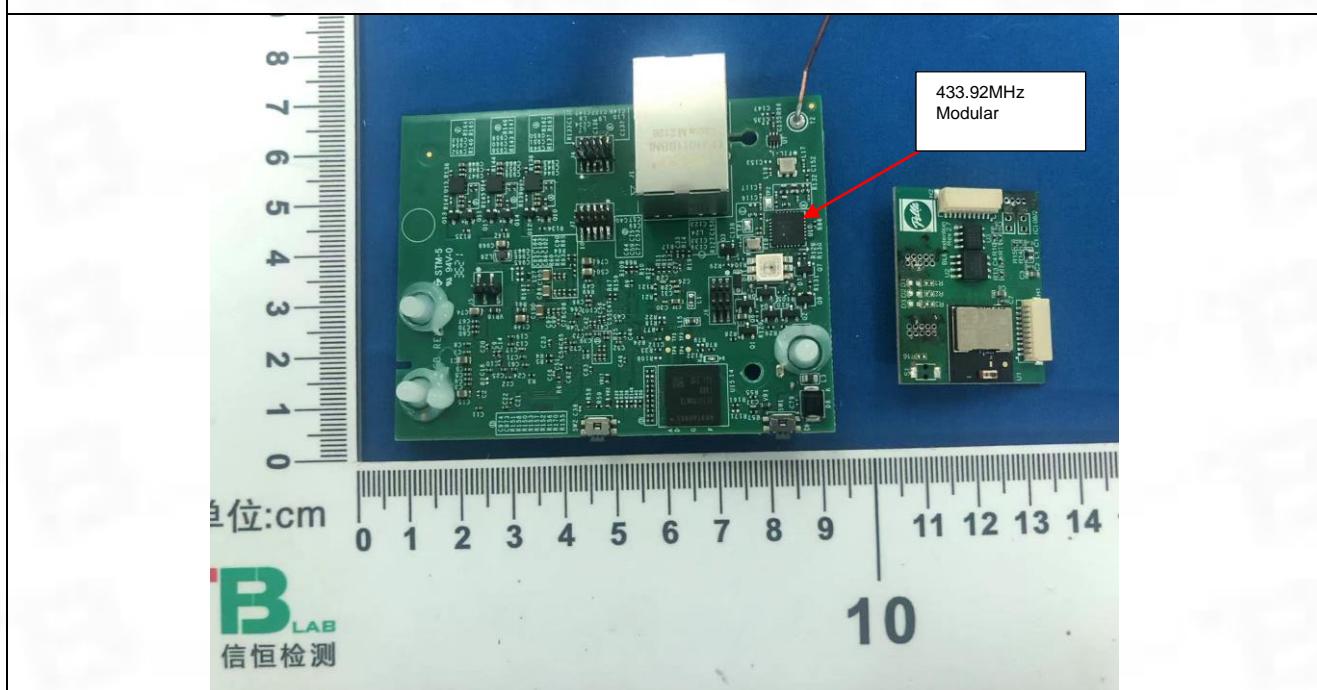
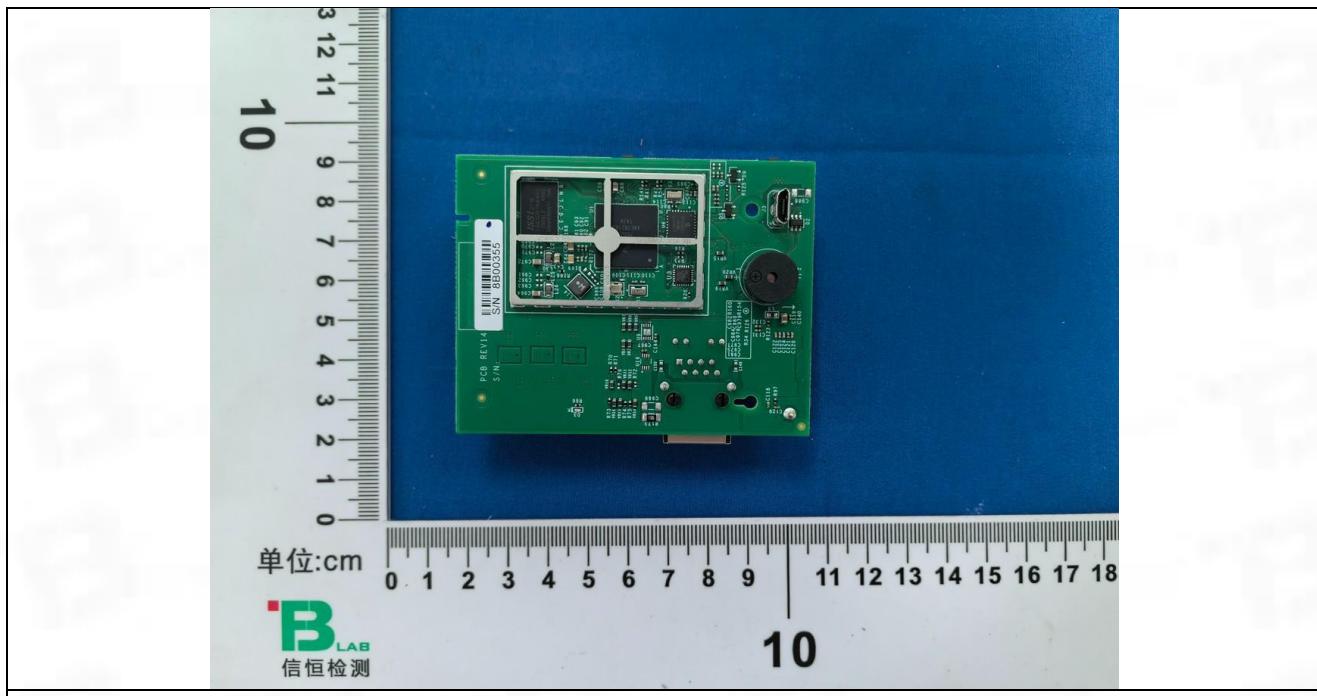


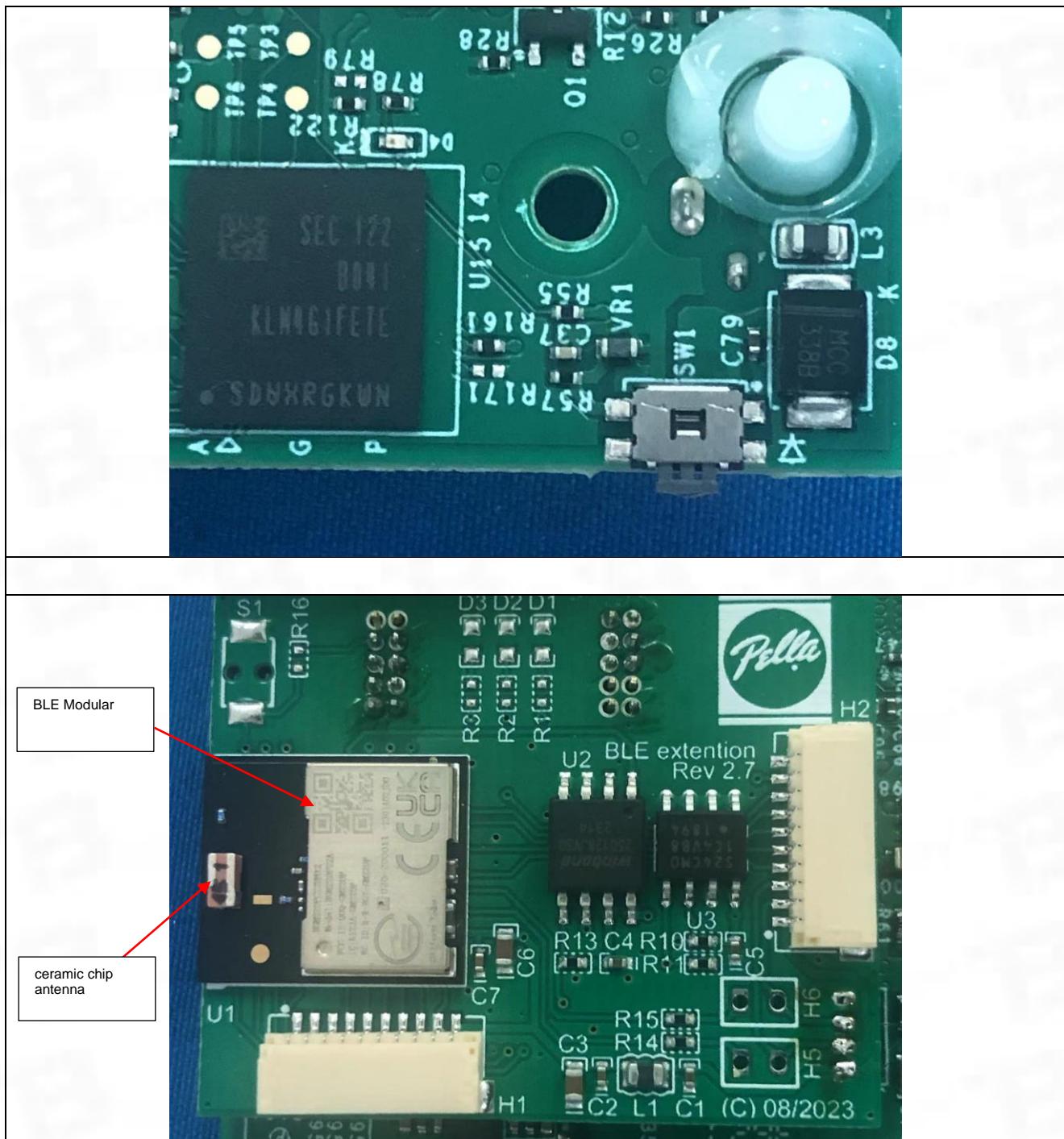


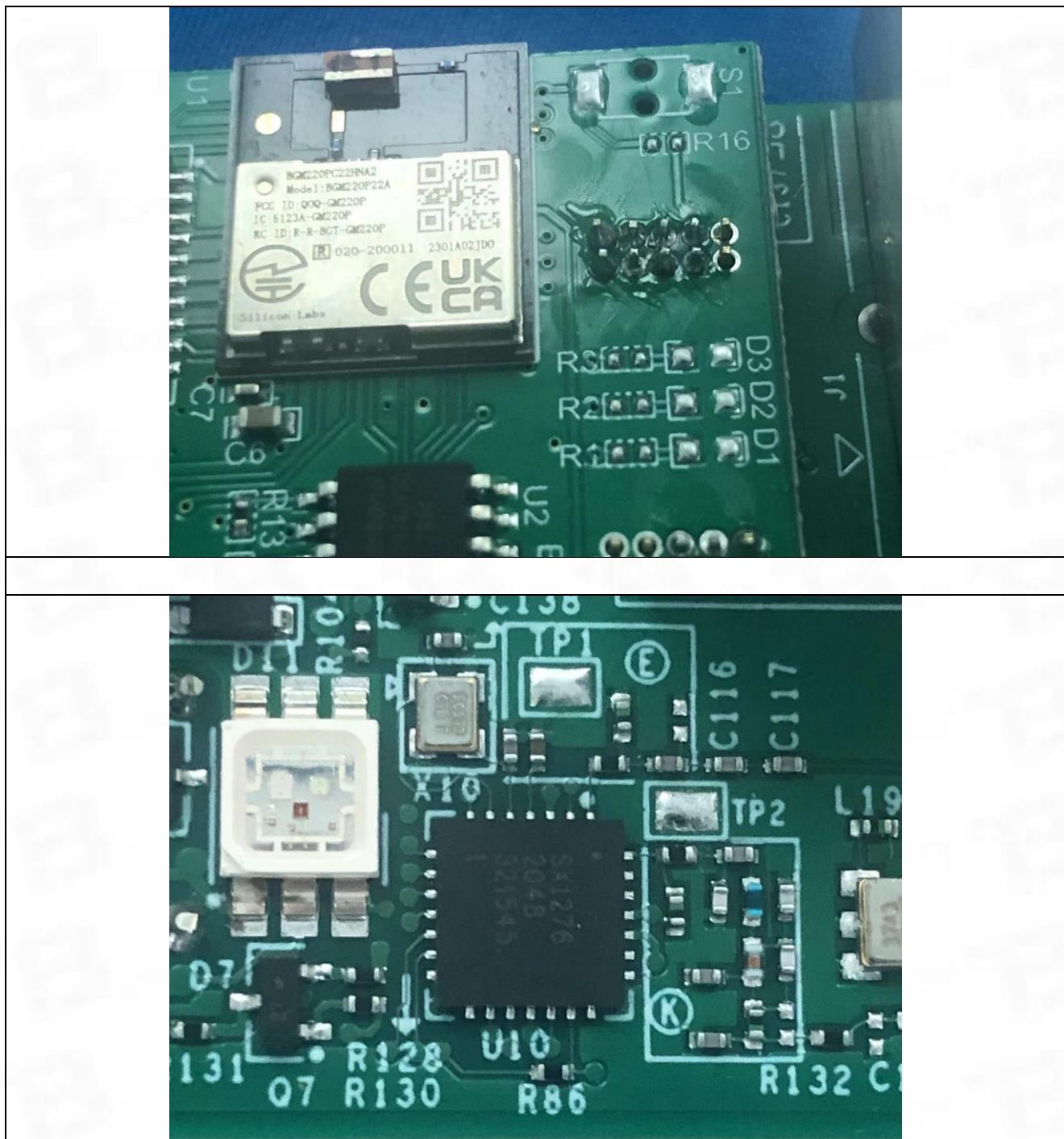


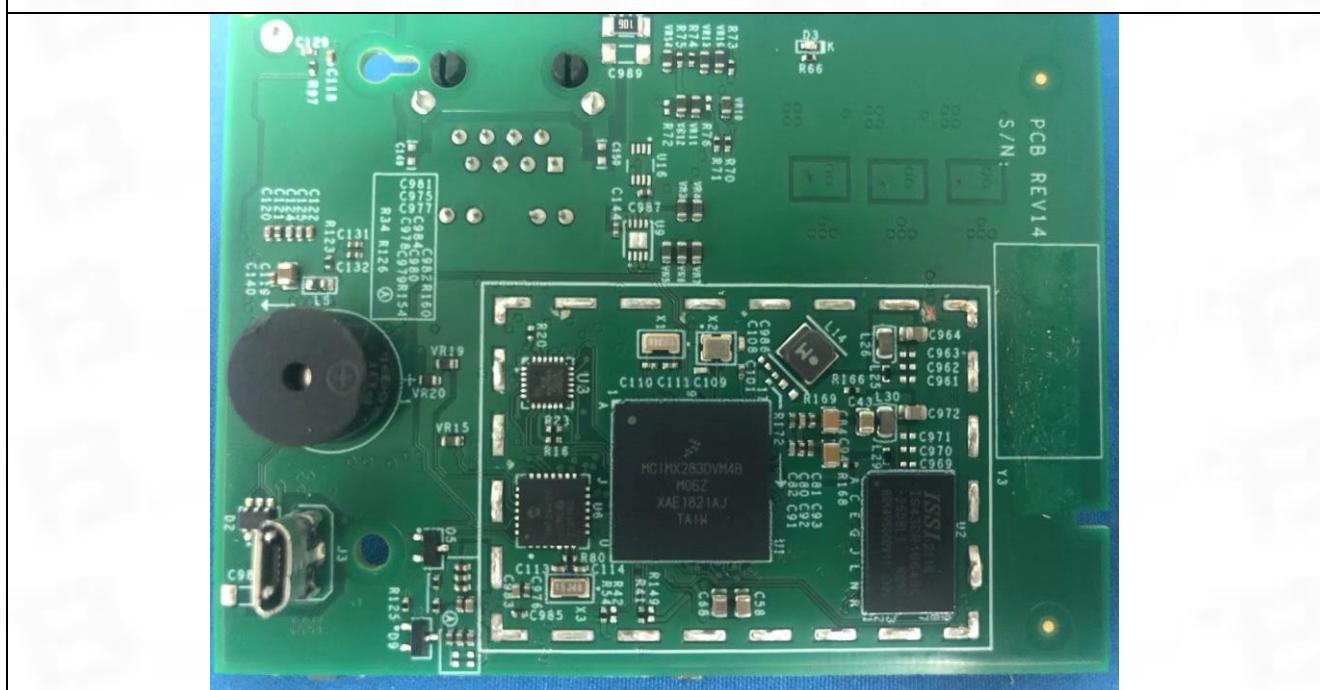
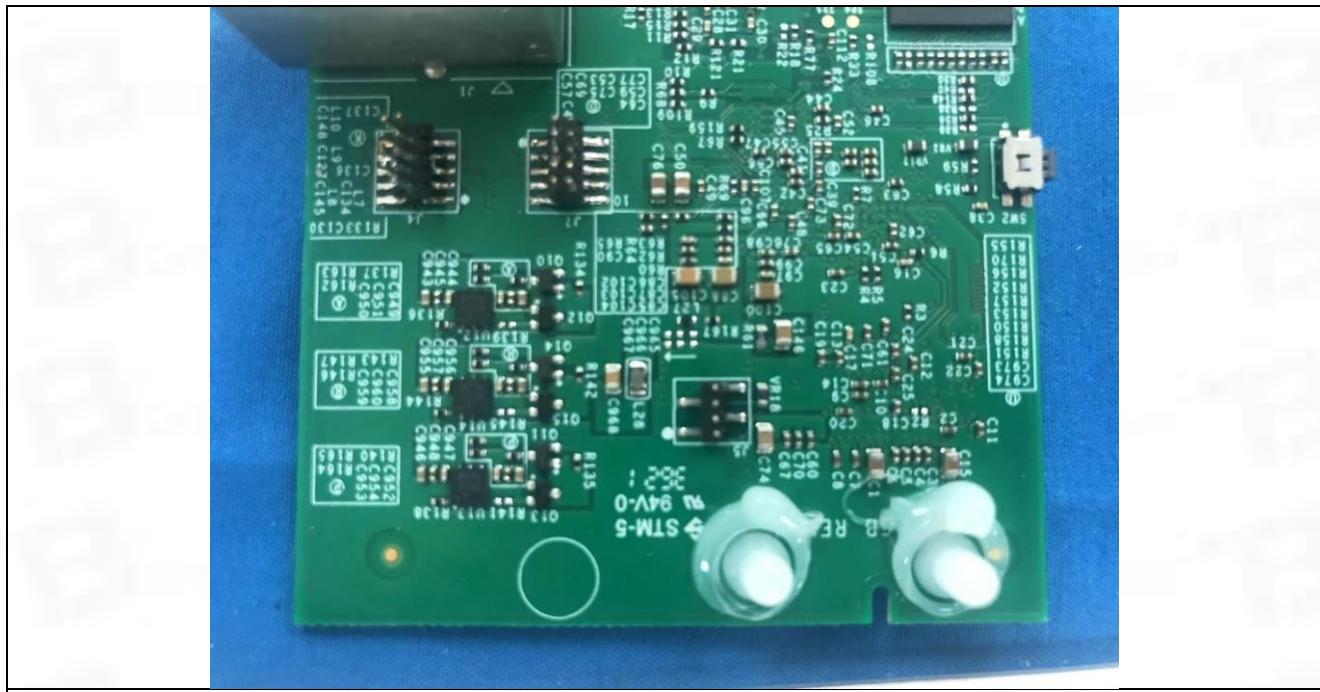


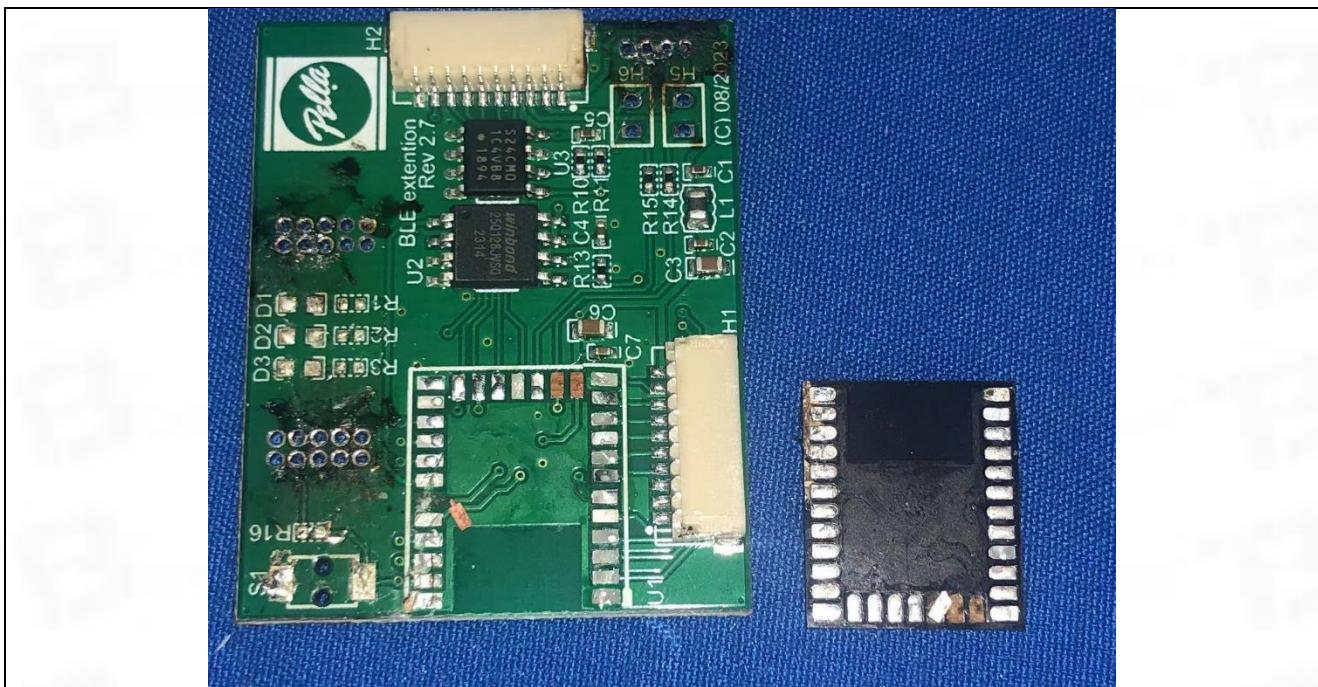














Test Report Number: BTF240326R00201



BTF Testing Lab (Shenzhen) Co., Ltd.

F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street,  
Bao'an District, Shenzhen, China

[www.btf-lab.com](http://www.btf-lab.com)

**-- END OF REPORT --**