

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT**

OF

Fingerprint Access Controller

Model No.: eNBioAccess-T1 RF

FCC ID: XX2-T1RF

Trademark: NITGEN

Report No.:ES181203028E1

Issue Date: December 28, 2018

Prepared for
UNION COMMUNITY CO.,LTD.
Hyundai Topics Bldg. Bangi 2-dong, Songpa-gu, Seoul, Korea

Prepared by
EMTEK (SHENZHEN) CO., LTD.
**Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen,
Guangdong, China.**

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VERIFICATION OF COMPLIANCE

Applicant:	UNION COMMUNITY CO.,LTD. Hyundai Topics Bldg. Bangi 2-dong, Songpa-gu, Seoul, Korea
Manufacturer:	Union Community Co.,Ltd. Hyundai Topics Bldg. Bangi 2-dong, Songpa-gu, Seoul, Korea
Product Description:	Fingerprint Access Controller
Model Number:	eNBioAccess-T1 RF
Trademark:	NITGEN

We hereby certify that:

The above equipment was tested by EMTEK (SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.209(2018).

The test results of this report relate only to the tested sample identified in this report.

Date of Test : December 03, 2018 to December 25, 2018

Prepared by :



Yaping Shen/Editor

Reviewer :



Joe Xia/Supervisor

Approved & Authorized Signer :



Lisa Wang/Manager

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	ES181203028E1

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1. General Information

1.1 Product Description

Characteristics	Description
Product Name	Fingerprint Access Controller
Model number	eNBioAccess-T1 RF
Power Supply for Test	AC 120V/60Hz for adapter
Adapter Information	MODEL: DSA-42PFB-12 1 120350 INPUT: 100-240V~50/60Hz 1.2A OUTPUT: DC12V, 3.5A
Modulation	ASK
Operating Frequency Range	125KHz
Number of Channels	1 channel
Antenna Type	Internal antenna

Note: for a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

1.2 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$
Maximum Peak Output Power Test	$\pm 1.0\text{dB}$
Conducted Emissions Test	$\pm 2.0\text{dB}$
Radiated Emission Test	$\pm 2.0\text{dB}$
Power Density	$\pm 2.0\text{dB}$
Occupied Bandwidth Test	$\pm 1.0\text{dB}$
Band Edge Test	$\pm 3\text{dB}$
All emission, radiated	$\pm 3\text{dB}$
Antenna Port Emission	$\pm 3\text{dB}$
Temperature	$\pm 0.5^{\circ}\text{C}$
Humidity	$\pm 3\%$

Measurement Uncertainty for a level of Confidence of 95%

1.3 Test Facility

Site Description

EMC Lab. : Accredited by CNAS, 2016.10.24
The certificate is valid until 2022.10.28
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2005)
The Certificate Registration Number is L2291.

Accredited by TUV Rheinland Shenzhen 2016.5.19
The Laboratory has been assessed according to the requirements ISO/IEC 17025.

Accredited by FCC, August 03, 2017
Designation Number: CN1204
Test Firm Registration Number: 882943

Accredited by Industry Canada, November 24, 2015
The Certificate Registration Number is 4480A.

Accredited by A2LA, July 31, 2017
The Certificate Number is 4321.01.

Name of Firm : EMTEK (SHENZHEN) CO., LTD.
Site Location : Bldg 69, Majialong Industry Zone,
Nanshan District, Shenzhen, Guangdong, China

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 6.3 of ANSI C63.10-2013.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

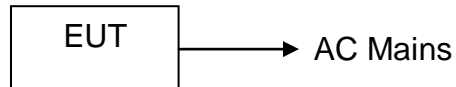


Table 2-1 Equipment Used in Tested System

Item	Equipment	Brand	Model No.	FCC ID	Series No.	Note
1	Fingerprint Access Controller	NITGEN	eNBioAccess-T1 RF	XX2-T1RF	N/A	<i>EUT</i>
2	Switching Adapter	DVE	DSA-42PFB-12 1 120350	N/A	N/A	<i>Support EUT</i>

Note:

- (1) Unless otherwise denoted as EUT in 『Remark』 column, device(s) used in tested system is a support equipment.
- (2) Three orthogonal panels X, Y, Z of EUT are tested. And the test results of the worst test panel(Y) were recorded.

3. Summary of Test Results

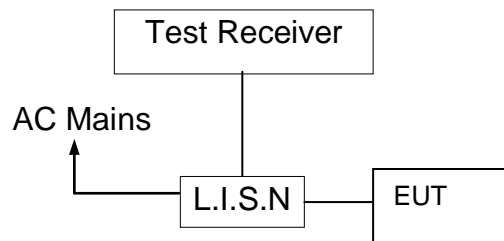
FCC Rules	Description Of Test	Result
§15.207	AC Power Conducted Emission	Compliant*
§15.209	Radiated Emission	Compliant*
§15.203	Antenna Application	Compliant*
Note: Compliant*: All the test data was the same to the another report NO.: ES181203029E1 since their products are the same. The differences between them are the Applicant, Manufacturer, FCC ID, Trade Mark, Product Name and model number.		

4. Conducted Emissions Test

4.1 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

4.2 Test SET-UP (Block Diagram of Configuration)



4.3 Measurement Equipment Used

Conducted Emission Test Site						
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	Last Cal.	Due date
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	9kHz~3GHz	05/16/2018	05/15/2019
Artificial Network	Schwarzbeck	8126D	8126D-211	9KHz-300MHz	05/16/2018	05/15/2019
RF Switching Unit	CDS	RSU-M2	38401	9KHz-300MHz	05/16/2018	05/15/2019
Coaxial Cable	CDS	79254	46107086	9kHz~3GHz	05/16/2018	05/15/2019

4.4 Conducted Emission Limit

Conducted Emission

Frequency(MHz)

0.15-0.5

0.5-5.0

5.0-30.0

Quasi-peak

66-56

56

60

Average

56-46

46

50

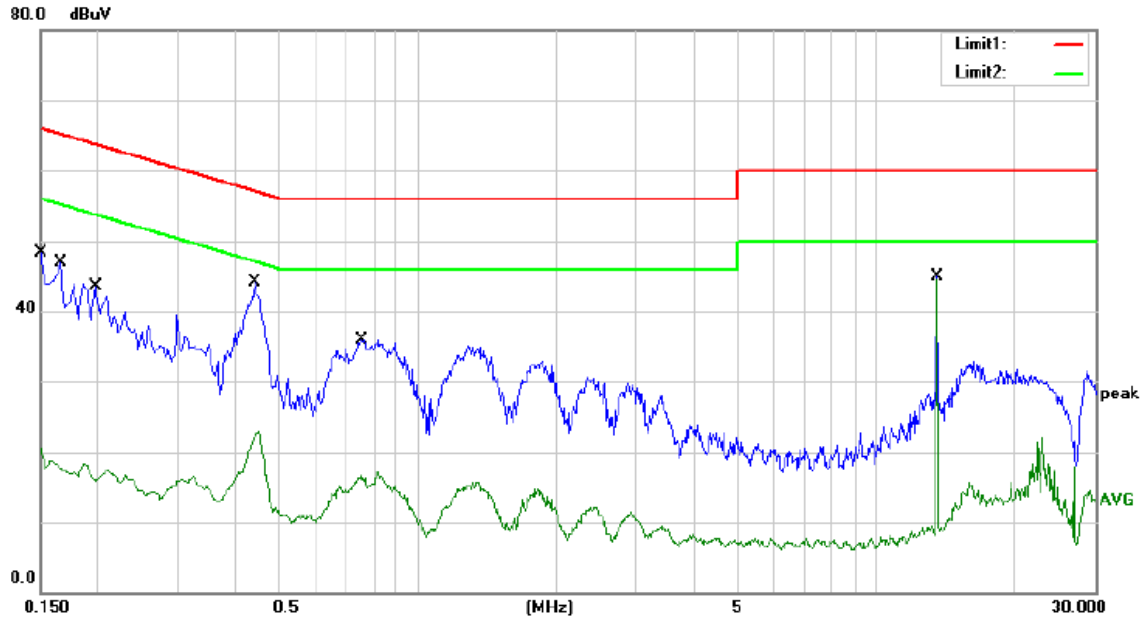
Note: 1. The lower limit shall apply at the transition frequencies

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.5 Measurement Result

Pass.

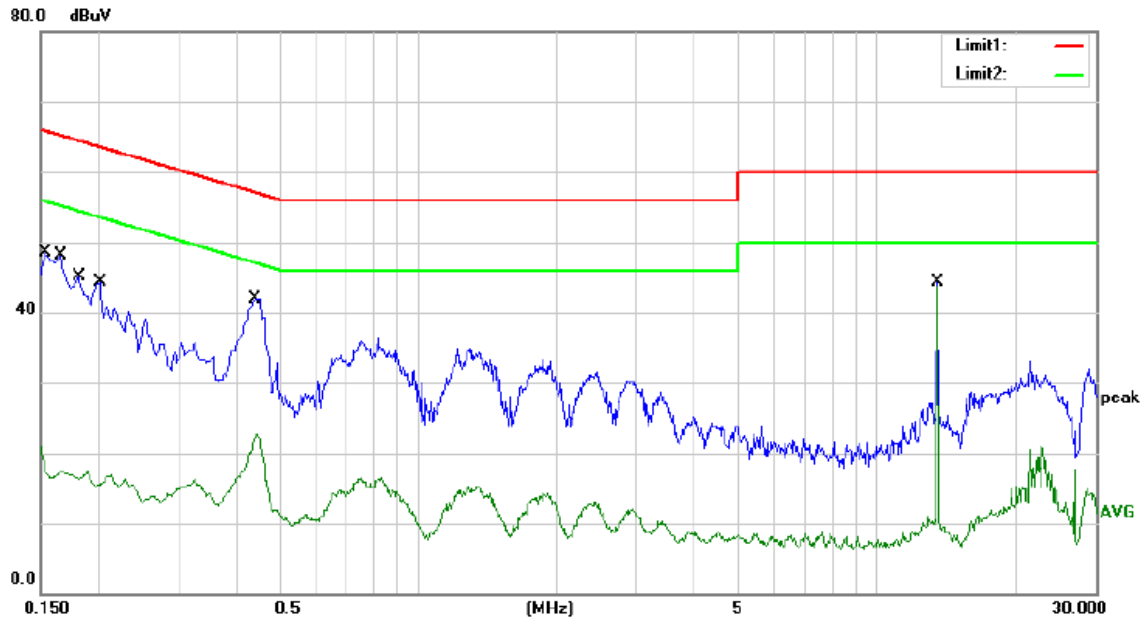
Please refer to the following.



Site site #1 Phase: **L1** Temperature: 25
 Limit: (CE)FCC PART 15C_QP Power: AC 120V/60Hz Humidity: 55 %
 Mode: TX
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	38.52	9.78	48.30	66.00	-17.70	QP	
2		0.1500	10.72	9.78	20.50	56.00	-35.50	AVG	
3		0.1660	37.05	9.78	46.83	65.16	-18.33	QP	
4		0.1660	8.82	9.78	18.60	55.16	-36.56	AVG	
5		0.1980	33.66	9.79	43.45	63.69	-20.24	QP	
6		0.1980	7.78	9.79	17.57	53.69	-36.12	AVG	
7		0.4420	34.34	9.83	44.17	57.02	-12.85	QP	
8		0.4420	13.11	9.83	22.94	47.02	-24.08	AVG	
9		0.7540	26.16	9.84	36.00	56.00	-20.00	QP	
10		0.7540	7.34	9.84	17.18	46.00	-28.82	AVG	
11		13.5620	34.78	10.07	44.85	60.00	-15.15	QP	
12	*	13.5620	34.41	10.07	44.48	50.00	-5.52	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Yaping Shen

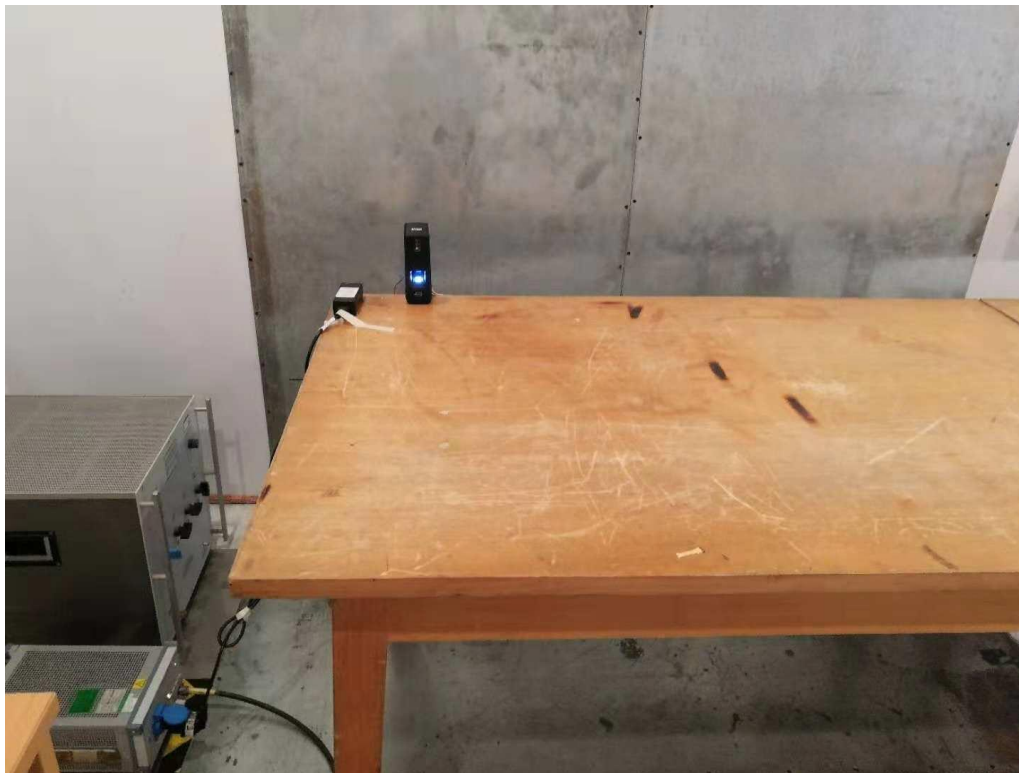


Site site #1 Phase: **N** Temperature: 25
 Limit: (CE)FCC PART 15C_QP Power: AC 120V/60Hz Humidity: 55 %
 Mode: TX
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1540	38.71	9.78	48.49	65.78	-17.29	QP	
2		0.1540	11.18	9.78	20.96	55.78	-34.82	AVG	
3		0.1660	38.23	9.78	48.01	65.16	-17.15	QP	
4		0.1660	7.50	9.78	17.28	55.16	-37.88	AVG	
5		0.1820	35.23	9.79	45.02	64.39	-19.37	QP	
6		0.1820	7.69	9.79	17.48	54.39	-36.91	AVG	
7		0.2020	34.47	9.79	44.26	63.53	-19.27	QP	
8		0.2020	7.01	9.79	16.80	53.53	-36.73	AVG	
9		0.4420	32.11	9.83	41.94	57.02	-15.08	QP	
10		0.4420	12.88	9.83	22.71	47.02	-24.31	AVG	
11		13.5620	34.32	10.07	44.39	60.00	-15.61	QP	
12	*	13.5620	33.73	10.07	43.80	50.00	-6.20	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Yaping Shen

4.6 Conducted Measurement Photos



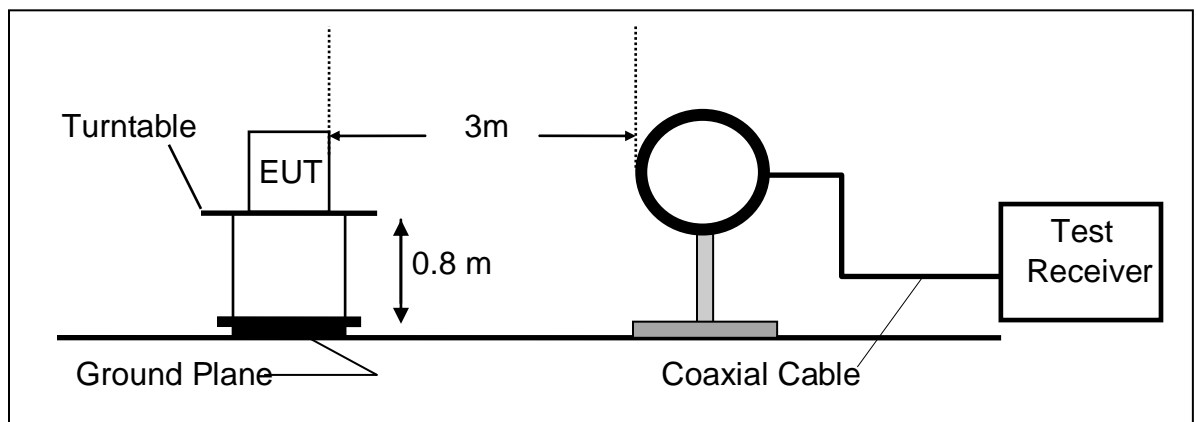
5. Radiated Emission Test

5.1 Measurement Procedure

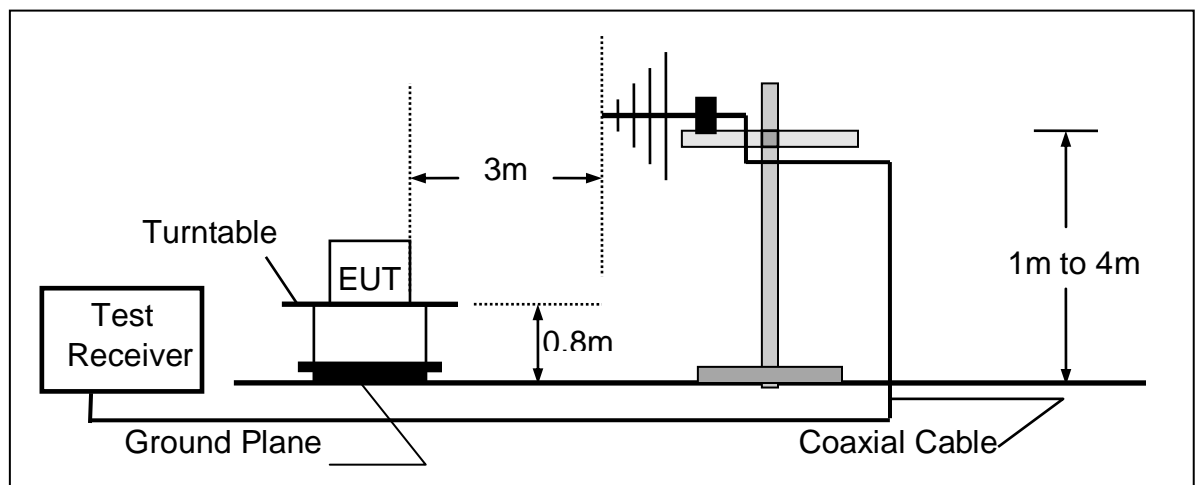
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



5.3 Measurement Equipment Used

Equipment	Serial No.	Manufacturer	Model No.	Cal. Date	Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/16/2018	05/15/2019
Pre-Amplifier	HP	8447D	2944A07999	05/16/2018	05/15/2019
Bilog Antenna	Schwarzbeck	VULB9163	142	05/16/2018	05/15/2019
Loop Antenna	Schwarzbeck	FMZB 1519	012	05/16/2018	05/15/2019
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/16/2018	05/15/2019
Horn Antenna	Schwarzbeck	BBHA9120D	D143	05/16/2018	05/15/2019
Cable	Schwarzbeck	AK9513	ACRX1	05/16/2018	05/15/2019
Cable	Rosenberger	N/A	FP2RX2	05/16/2018	05/15/2019
Cable	Schwarzbeck	AK9513	CRPX1	05/16/2018	05/15/2019
Cable	Schwarzbeck	AK9513	CRRX2	05/16/2018	05/15/2019
Pre-Amplifier	A.H.	PAM-0126	1415261	05/16/2018	05/15/2019

5.4 Radiated Emission Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

FCC Part 15.209				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation Frequency at 3m Measurement Distance	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
0.009 – 0.490	2400 / F(KHz)	300m	10000 * 2400/F(KHz)	20log 2400/F(KHz) + 80
0.490 – 1.705	24000 / F(KHz)	30m	100 * 24000/F(KHz)	20log 24000/F(KHz) + 40
1.705 – 30.00	30	30m	100* 30	20log 30 + 40
30.0 – 88.0	100	3m	100	20log 100
88.0 – 216.0	150	3m	150	20log 150
216.0 – 960.0	200	3m	200	20log 200
Above 960.0	500	3m	500	20log 500

15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 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	(²)

Remark 1. Emission level in dBuV/m=20 log (uV/m)

- :
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
 3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

5.5 Measurement Result

Radiated Emission (Below 30MHz):

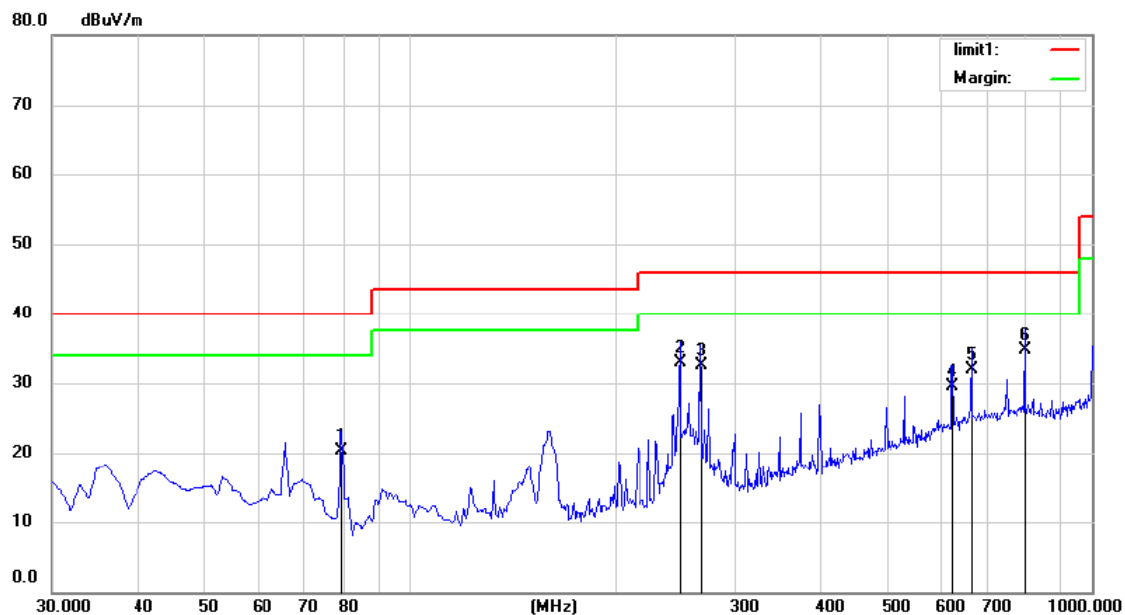
Fundamental

Frequency (MHz)	Ant.Pol (H/V)	Reading@3m (dBuV/m)		Limit@3m (dBuV/m)		Margin (dB)	
		Peak	Average	Peak	Average	Peak	Average
0.125	V	69.53	64.82	125.7	105.7	-56.17	-40.88

Other Emissions:

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)	Note
8.53	V	33.15	69.54	-36.39	QP
12.32	V	31.24	69.54	-38.30	QP
14.56	V	35.45	69.54	-34.09	QP
17.12	V	34.19	69.54	-35.35	QP
21.78	V	36.93	69.54	-32.61	QP
28.44	V	37.43	69.54	-32.11	QP
6.17	H	31.52	69.54	-38.02	QP
11.78	H	32.63	69.54	-36.91	QP
15.22	H	36.71	69.54	-32.83	QP
20.66	H	37.86	69.54	-31.68	QP
25.34	H	34.14	69.54	-35.40	QP
27.21	H	36.27	69.54	-33.27	QP

Radiated Emission (30MHz-1GHz):



Site Chamber #1

Polarization: **Horizontal**

Temperature: 26

Limit: (RE)FCC PART 15 C 3m

Power: AC 120V/60Hz

Humidity: 55 %

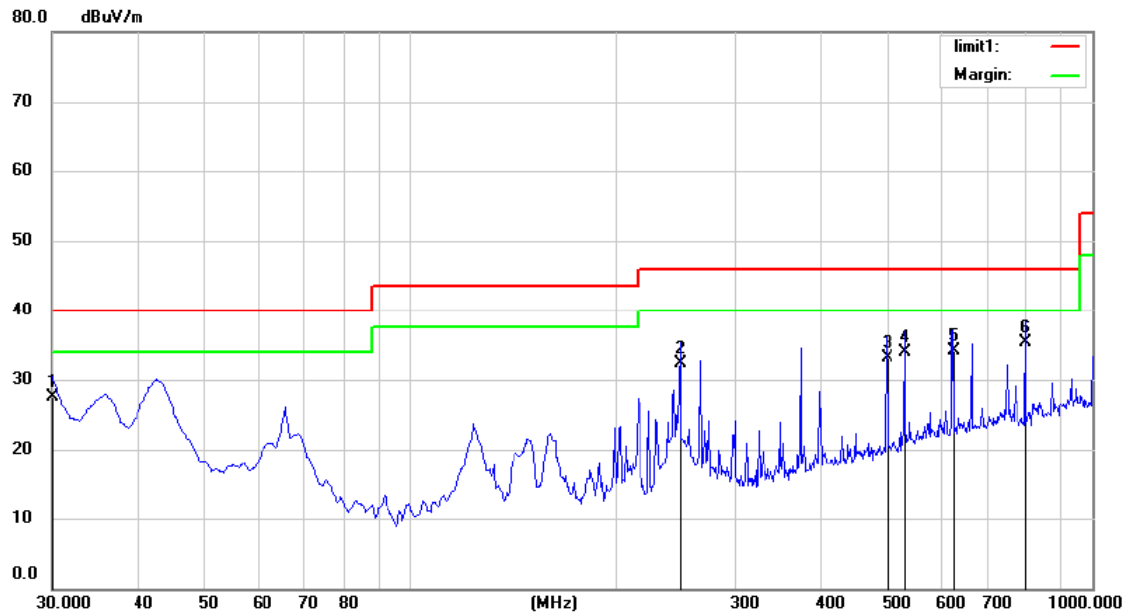
Mode: TX

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		79.4700	41.86	-21.55	20.31	40.00	-19.69	QP		
2		250.1900	48.41	-15.54	32.87	46.00	-13.13	QP		
3		266.6800	47.42	-14.85	32.57	46.00	-13.43	QP		
4		624.6100	35.41	-5.92	29.49	46.00	-16.51	QP		
5		667.2900	36.87	-4.88	31.99	46.00	-14.01	QP		
6	*	800.1800	37.94	-3.29	34.65	46.00	-11.35	QP		

*:Maximum data x:Over limit l:over margin

Operator: huang

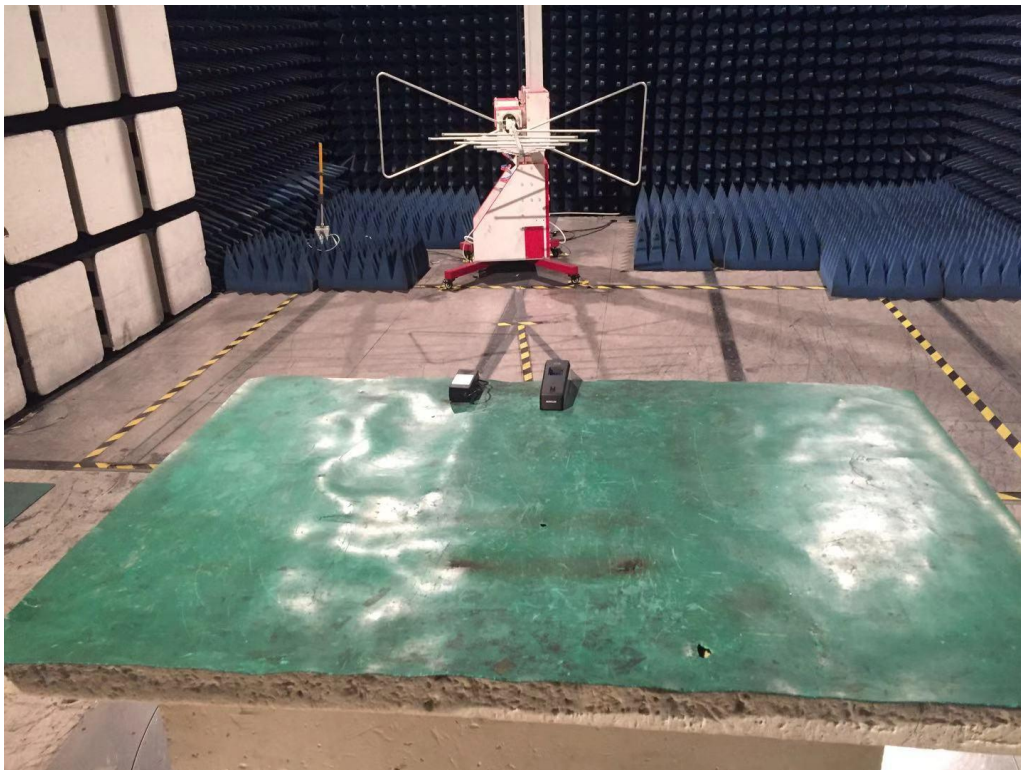
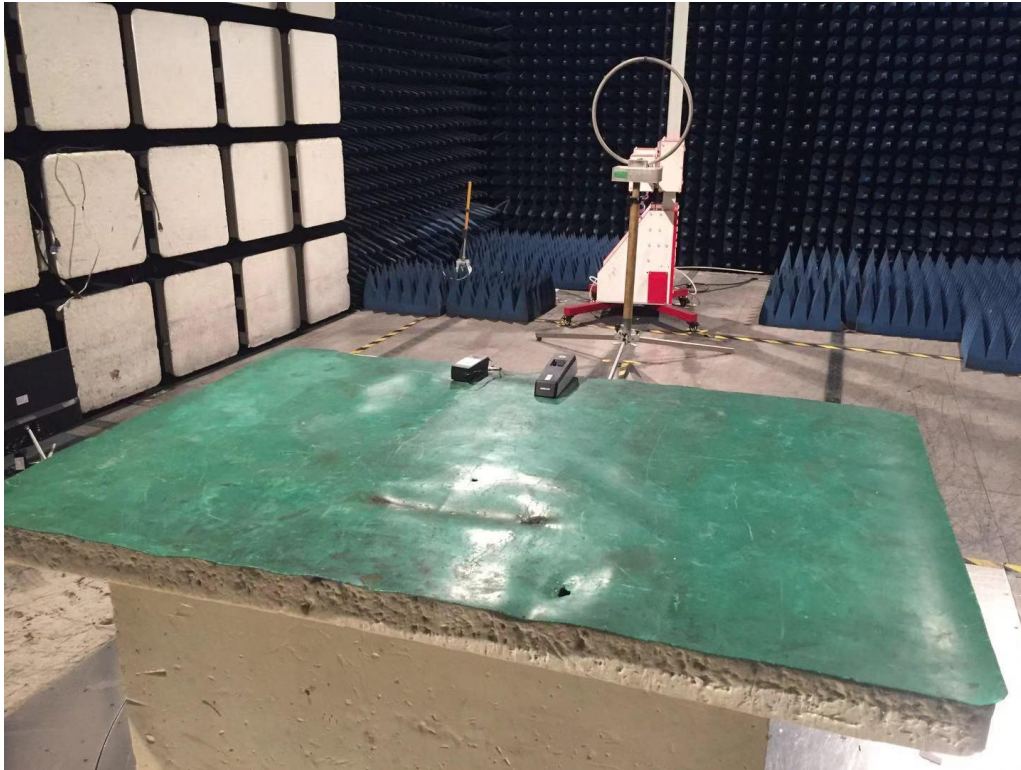


Site: Chamber #1
 Limit: (RE)FCC PART 15 C 3m
 Mode: TX
 Note:

Polarization: **Vertical**
 Power: AC 120V/60Hz
 Temperature: 26
 Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		30.0000	46.35	-18.76	27.59	40.00	-12.41	QP		
2		250.1900	48.53	-16.25	32.28	46.00	-13.72	QP		
3		500.4500	42.80	-9.70	33.10	46.00	-12.90	QP		
4		533.4300	42.66	-8.75	33.91	46.00	-12.09	QP		
5		625.5800	41.16	-7.06	34.10	46.00	-11.90	QP		
6	*	800.1800	39.92	-4.58	35.34	46.00	-10.66	QP		

5.6 Radiated Measurement Photos:



6. ANTENNA REQUIREMENT

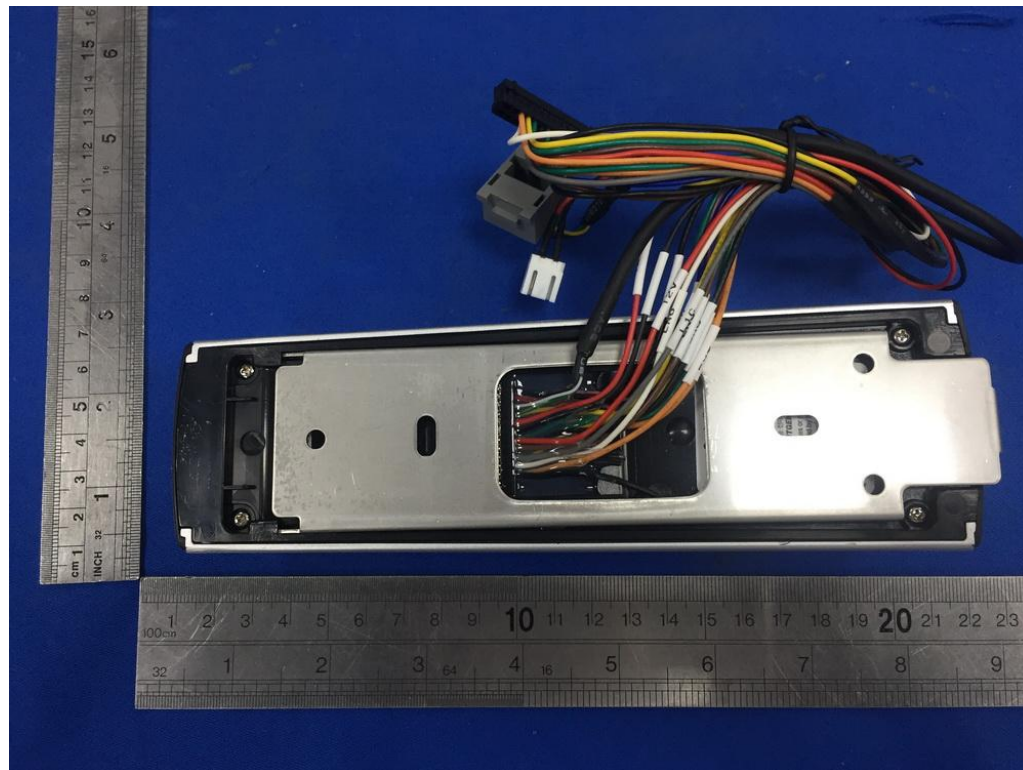
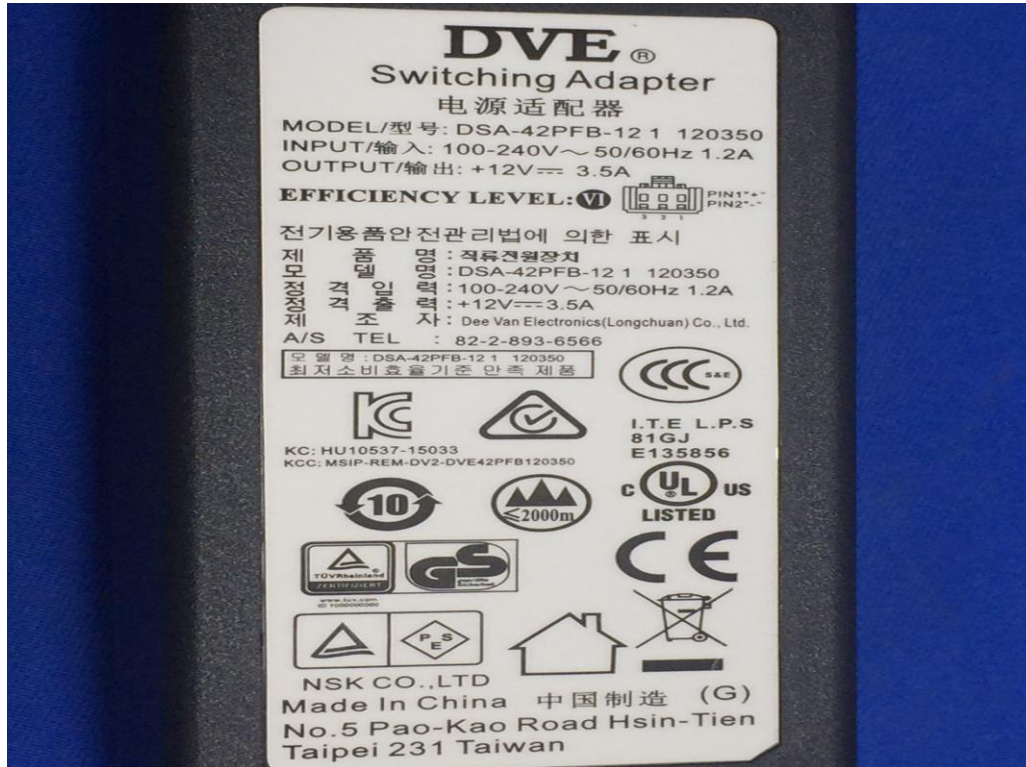
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

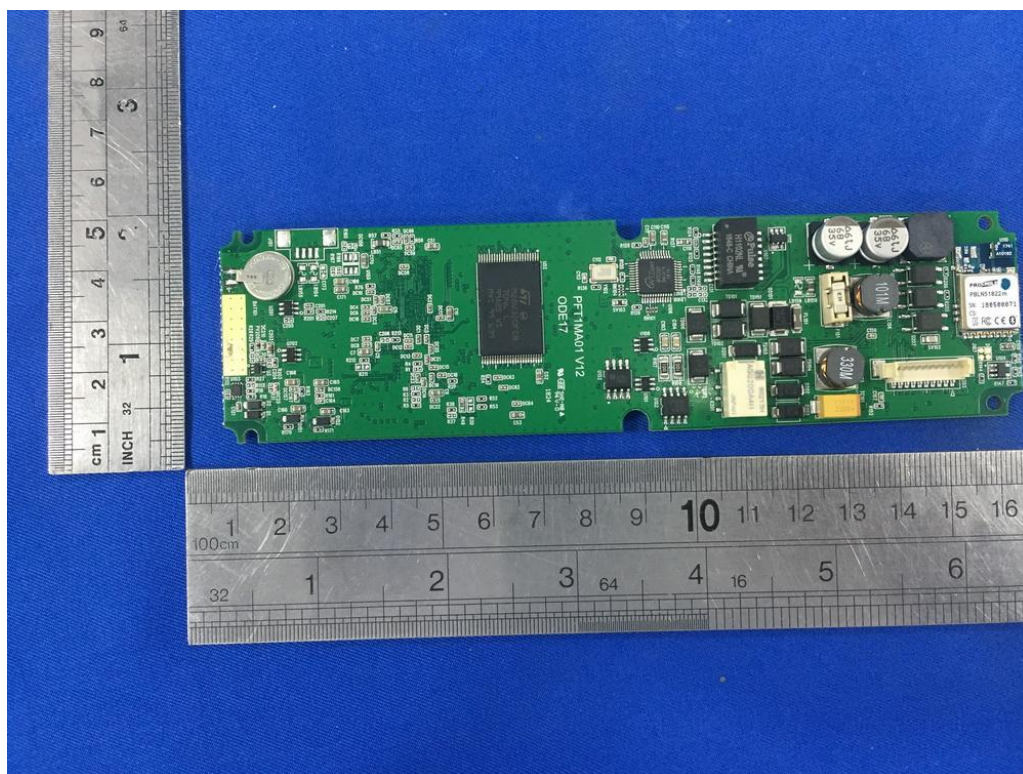
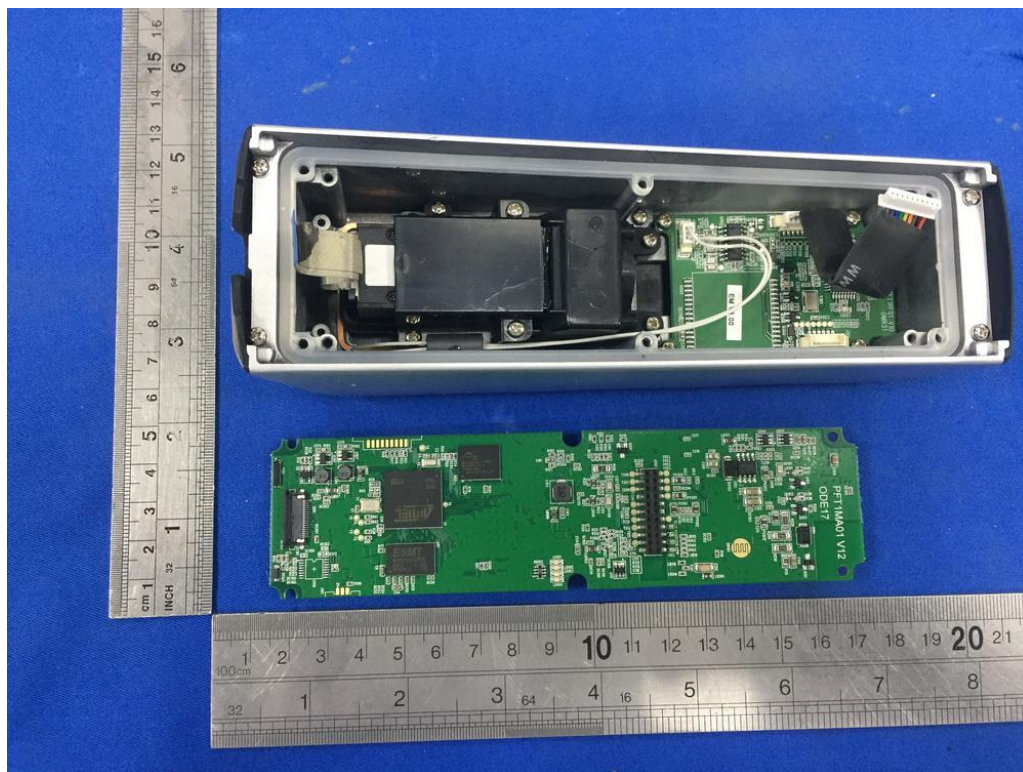
6.1 Result

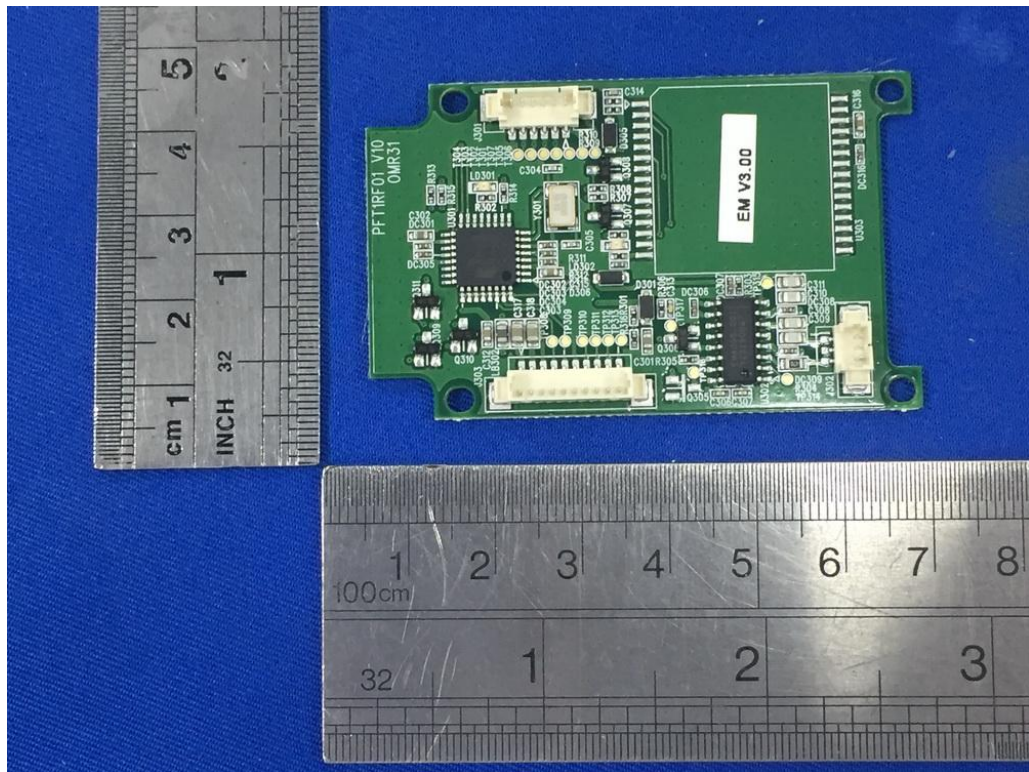
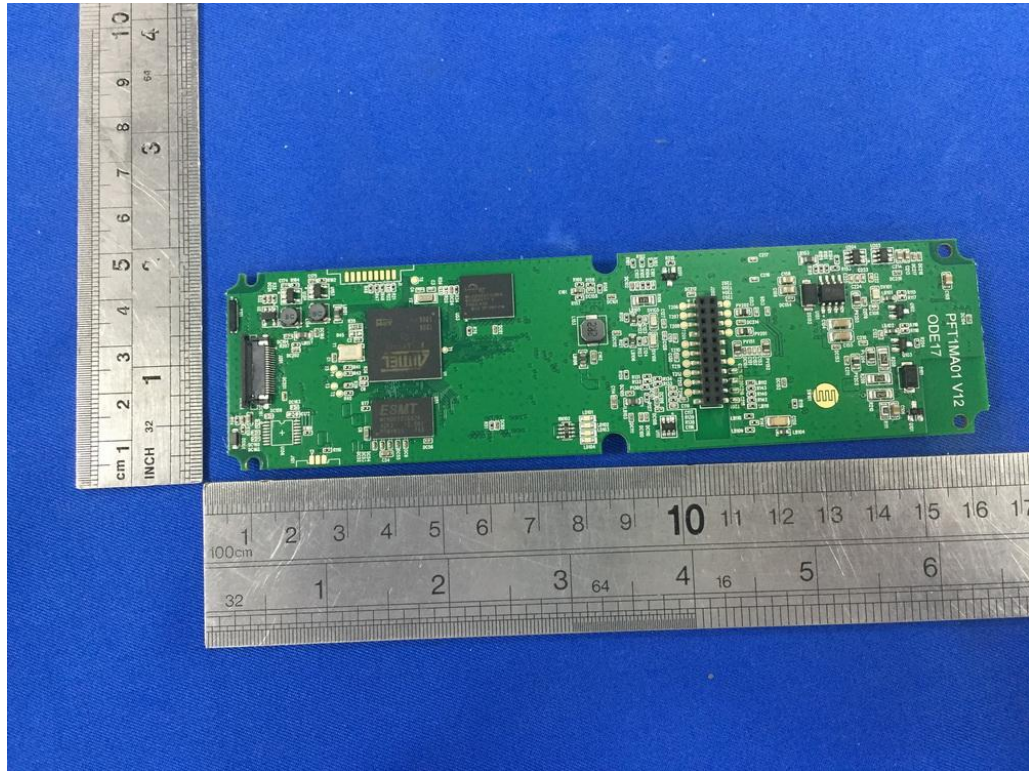
The antenna is permanently attached on PCB, no consideration of replacement. Please refer to internal Photos for details.

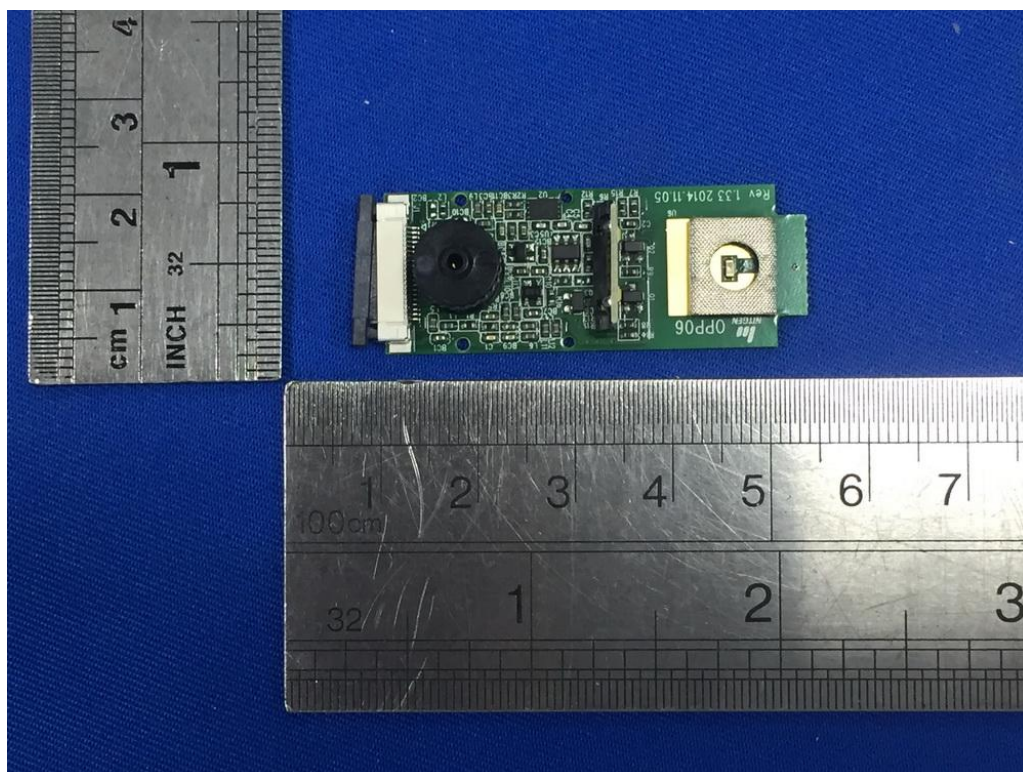
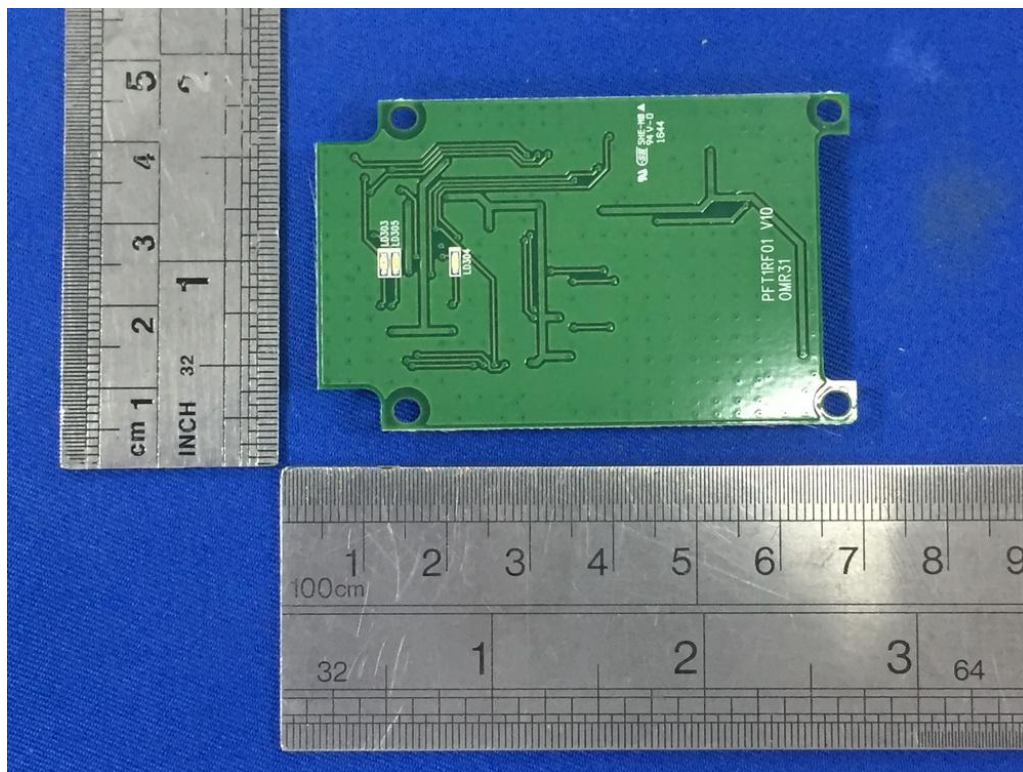
APPENDIX I (Photos of EUT)

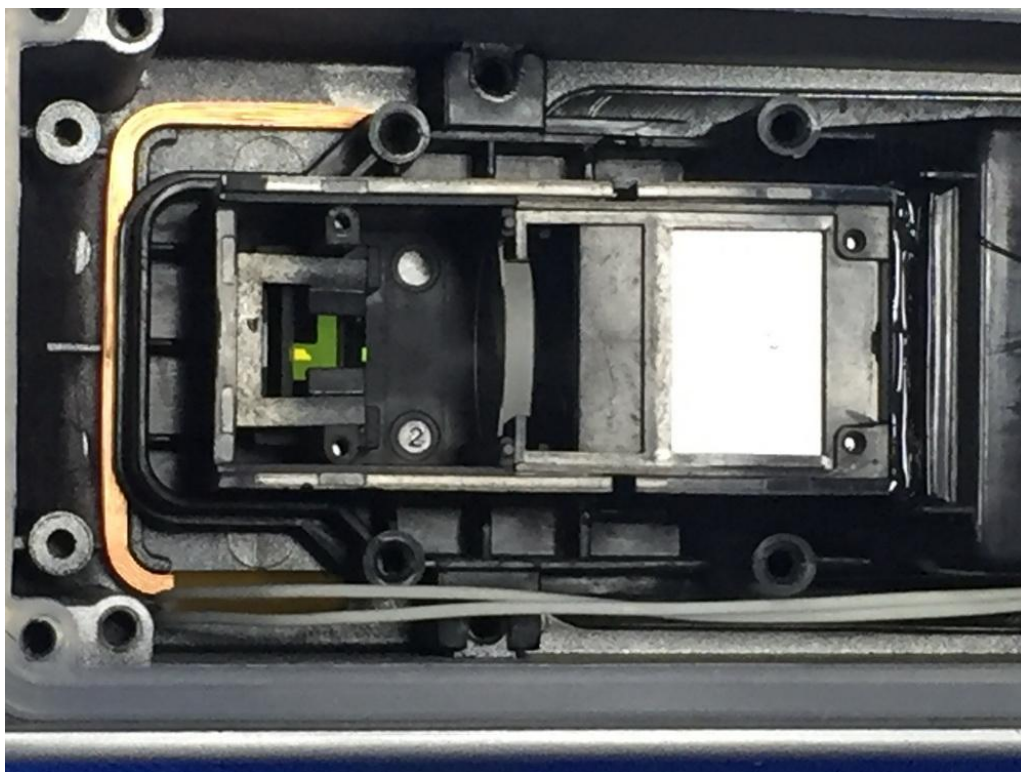
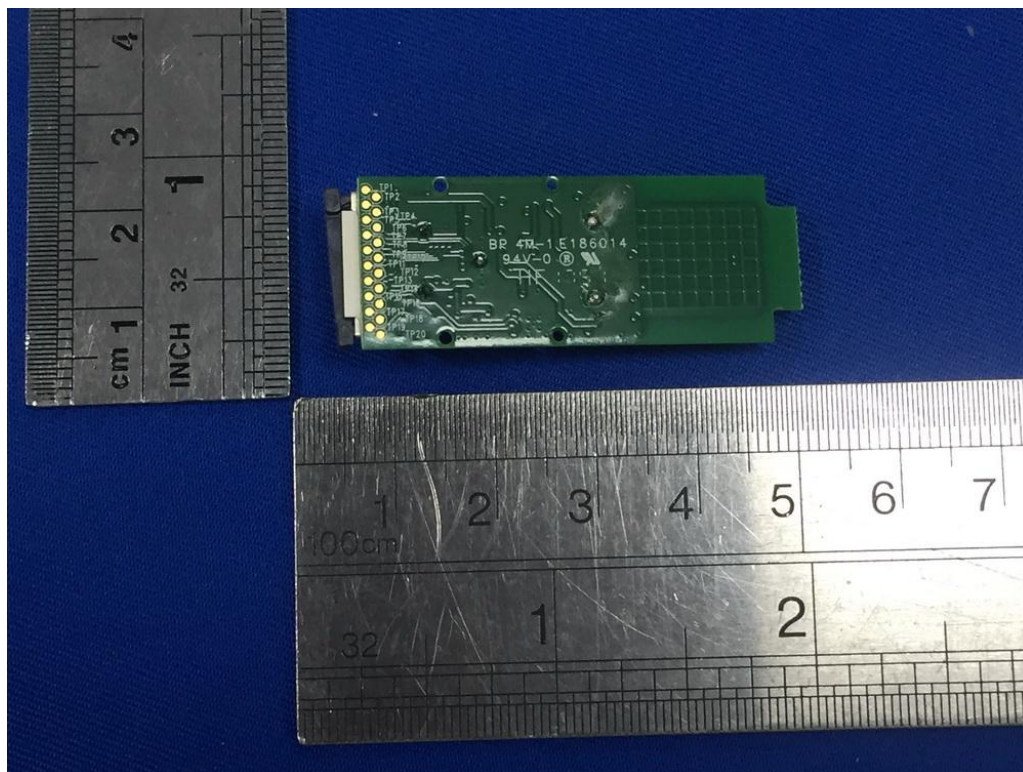












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