

# RF EXPOSURE EVALUATION REPORT

Product Name: iDevices Instant Switch  
Trade Mark: iDevices Instinct  
Model No.: IDEV0022  
HVIN: IDEV0022  
Report Number: 190611023RFC-3  
Test Standards: FCC 47 CFR Part 1 Subpart I  
RSS-102 Issue 5  
FCC ID: 2ABDJ-INSTINCT22  
IC: 11569A-INSTINCT22  
Test Result: PASS  
Date of Issue: June 25, 2019

Prepared for:

**iDevices, LLC**  
**136 Simsbury Rd Building 12, Avon, Connecticut 06001, United States**

Prepared by:

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**  
**16/F, Block A, Building 6, Baoneng Science and Technology Park,**  
**Qingxiang Road No.1, Longhua New District, Shenzhen, China**  
**TEL: +86-755-2823 0888**  
**FAX: +86-755-2823 0886**

Prepared by: 

Henry Lu  
Project Engineer

Reviewed by: 

Kevin Liang  
Assistant Manager

Approved by: 

Billy Li  
Technical Director

Date: June 25, 2019

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China  
Tel: +86-755-28230888 Fax: +86-755-28230886 E-mail: [info@uttlab.com](mailto:info@uttlab.com)

<http://www.uttlab.com>

## Version

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V1.0	June 25, 2019	Original



### **Shenzhen UnionTrust Quality and Technology Co., Ltd.**

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: [info@uttlab.com](mailto:info@uttlab.com)

[Http://www.uttlab.com](http://www.uttlab.com)

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## 1. GENERAL INFORMATION

### 1.1 CLIENT INFORMATION

<b>Applicant:</b>	iDevices, LLC
<b>Address of Applicant:</b>	136 Simsbury Rd Building 12, Avon, Connecticut 06001, United States
<b>Manufacturer:</b>	EWIG INDUSTRIES MACAO COMMERCIAL OFFSHORE LTD
<b>Address of Manufacturer:</b>	1/F, Houtex Industrial Building, E16 Hung To Road, Kwun Tung, Kowloon, Hong Kong

### 1.2 EUT INFORMATION

<b>Product Name:</b>	iDevices Instant Switch	
<b>Model No.:</b>	IDEV0022	
<b>HVIN:</b>	IDEV0022	
<b>Trade Mark:</b>	iDevices Instinct	
<b>DUT Stage:</b>	Identical Prototype	
<b>EUT Supports Function:</b>	2.4 GHz ISM Band:	IEEE 802.11b/g/n
		Bluetooth V4.0
<b>Sample Received Date:</b>	June 11, 2019	
<b>Sample Tested Date:</b>	June 11, 2019 to June 21, 2019	

### 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

For BT_LE	
<b>Frequency Band:</b>	2400 MHz to 2483.5 MHz
<b>Frequency Range:</b>	2402 MHz to 2480 MHz
<b>Bluetooth Version:</b>	Bluetooth LE
<b>Type of Modulation:</b>	GFSK
<b>Number of Channels:</b>	40
<b>Channel Separation:</b>	2 MHz
<b>Antenna Type:</b>	Integral Antenna
<b>Antenna Gain:</b>	4.88 dBi
<b>Maximum Peak Power:</b>	6.71 dBm

For 2.4 GHz ISM Band of Wi-Fi	
<b>Frequency Band:</b>	2400 MHz to 2483.5 MHz
<b>Frequency Range:</b>	2412 MHz to 2462 MHz
<b>Support Standards:</b>	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20
<b>Type of Modulation:</b>	IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK)
	IEEE 802.11g: OFDM(64-QAM, 16-QAM, QPSK, BPSK)
	IEEE 802.11n-HT20: OFDM(64-QAM, 16-QAM, QPSK, BPSK)
<b>Data Rate:</b>	IEEE 802.11b: Up to 11 Mbps
	IEEE 802.11g: Up to 54 Mbps
	IEEE 802.11n-HT20: Up to MCS7
<b>Number of Channels:</b>	IEEE 802.11b: 11
	IEEE 802.11g: 11
	IEEE 802.11n-HT20: 11
<b>Channel Separation:</b>	5 MHz
<b>Antenna Type:</b>	Integral Antenna
<b>Antenna Gain:</b>	4.88 dBi
<b>Maximum Peak Power:</b>	IEEE 802.11b: 18.57 dBm
	IEEE 802.11g: 21.03dBm

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E-mail: info@uttlab.com

[Http://www.uttlab.com](http://www.uttlab.com)

	IEEE 802.11n-HT20: 19.98 dBm
<b>Maximum EIRP:</b>	IEEE 802.11b: 23.45 dBm IEEE 802.11g: 26.03 dBm IEEE 802.11n-HT20: 25.02 dBm

## 1.4 OTHER INFORMATION

Test channels for BT_LE				
Type of Modulation	Tx/Rx Frequency	Test RF Channel Lists		
GFSK	2402 MHz to 2480 MHz	<b>Lowest(L)</b>	<b>Middle(M)</b>	<b>Highest(H)</b>
		Channel 0	Channel 19	Channel 39
		2402 MHz	2440 MHz	2480 MHz

Test channels for 2.4 GHz ISM Band of Wi-Fi				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
		<b>Lowest(L)</b>	<b>Middle(M)</b>	<b>Highest(H)</b>
IEEE 802.11b	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11g	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n-HT20	2412 MHz to 2462 MHz	Channel 1	Channel 6	Channel 11
		2412 MHz	2437 MHz	2462 MHz

## 1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

**FCC 47 CFR Part 1 Subpart I**  
**RSS-102 Issue 5**

All test items have been performed and recorded as per the above standards

## 1.6 DEVIATION FROM STANDARDS

None.

## 1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

## 1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

## 2. EQUIPMENT LIST

Please refer to the RF test report.

### 3. MPE EVALUATION

#### 3.1 REFERENCE DOCUMENTS FOR EVALUATION

No.	Identity	Document Title
1	FCC 47 CFR Part 1 Subpart I	PROCEDURES IMPLEMENTING THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969
2	RSS-102 Issue 5	Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
3	KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES

#### 3.2 MPE COMPLIANCE REQUIREMENT

##### 3.2.1 Limits

##### 3.2.1.1 FCC 47 CFR Part 1 Subpart I

According to §1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

##### Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

##### Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

**Note:** f = frequency in MHz: \* = Plane-wave equivalents power density.



### 3.2.1.2 RSS-102 Issue 5

According to RSS-102 Issue 5, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

According to RSS-102 Issue 5, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz<sup>6</sup> and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

### 3.2.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

## 3.3 MPE CALCULATION METHOD

### FCC 47 CFR Part 1 Subpart I

$$S = PG/4\pi R^2 = EIRP/4\pi R^2$$

S = power density (in appropriate units, e.g., mw/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

## 3.4 MPE CALCULATION RESULTS

**Note:** For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

### 3.4.1 For WLAN

For Wi-Fi function, operating at 2412MHz to 2462 MHz for IEEE802.11b/g/n and

#### 3.4.1.1 Antenna Type:

Chain 0: Integral Antenna

#### 3.4.1.2 Antenna Gain:

Chain 0: 2412MHz to 2462 MHz: 4.88 dBi

### 3.4.1.3 Results for FCC 47 CFR Part 1 Subpart I

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value
	(MHz)	(dBm)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm <sup>2</sup> )	
IEEE 802.11b IEEE 802.11g IEEE 802.11n- HT20	2412-2462	18	1	4.88	23.88	244.3431	1	0.0486
		21	1	4.88	26.88	487.5285	1	0.0970
		20	1	4.88	25.88	387.2576	1	0.0770

### 3.4.1.4 Results for RSS-102 Issue 5

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit
	(MHz)	(dBm)	(dBm)	(dBi)	(dBm)	(W)	
IEEE 802.11g	2412-2462	18	1	4.88	23.88	0.2443	2.6840
IEEE 802.11b		21	1	4.88	26.88	0.4875	2.6840
IEEE 802.11n- HT20		20	1	4.88	25.88	0.3873	2.6840

## 3.4.2 For BT

For BT\_LE function, operating at 2402MHz to 2480 MHz for GFSK

### 3.4.2.1 Antenna Type:

Chain 0: Integral Antenna

### 3.4.2.2 Antenna Gain:

Chain 0: 2402MHz to 2480 MHz: 4.88 dBi

### 3.4.2.3 Results for FCC 47 CFR Part 1 Subpart I

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	MPE Limit	MPE Value
	(MHz)	(dBm)	(dBm)	(dBi)	(dBm)	(mW)	(mW/cm <sup>2</sup> )	
LE	2402-2480	6	1	4.88	11.88	15.4170	1	0.0031

### 3.4.2.4 Results for RSS-102 Issue 5

Operating Mode	Freq.	Declared maximum conducted average output power	Max. positive tolerance according manufacturer	Antenna Gain	Calculated maximum EIRP	Declared maximum EIRP	Limit
	(MHz)	(dBm)	(dBm)	(dBi)	(dBm)	(W)	
LE	2402-2480	6	1	4.88	11.88	0.0154	2.6764



### 3.4.3 Simultaneous Multi-band Transmission MPE Analysis

#### 3.4.4.1 List of Mode for Simultaneous Multi-band Transmission

No.	Configurations	Support/Not Support
1	2.4G_SISO_WLAN + BT	Support

#### 3.4.4.2 Results for transmit simultaneously

##### FCC 47 CFR Part 1 Subpart I

No.	Configurations	Maximum MPE Value			Limits
		WLAN	BT	Transmit simultaneously	
1	2.4G_SISO_WLAN + BT	0.0970	0.0031	0.1001	1
<b>Note:</b> According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows: $\text{Transmit simultaneously MPE} = \sum \text{of MPE ratios}$ $\text{MPE ratios} = \text{Field strengths or power density} / \text{MPE limit at the test frequency}$					

##### RSS-102 Issue 5

No.	Configurations	Maximum MPE Value			Limits
		WLAN	BT	Transmit simultaneously	
1	2.4G_SISO_WLAN + BT	0.4875	0.0154	0.1874	1
<b>Note:</b> According to KDB 447498 D01 General RF Exposure Guidance v06, At the transmit simultaneously calculation method is as follows: $\text{Transmit simultaneously MPE} = \sum \text{of MPE ratios}$ $\text{MPE ratios} = \text{Field strengths or power density} / \text{MPE limit at the test frequency}$					

## APPENDIX 1 PHOTOS OF TEST SETUP

N/A

## APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal Photos.

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

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