

# TEST REPORT

**Applicant:** 8devices

**Address of Applicant:** Antakalnio 17, Vilnius, LT-10312, Lithuania

**Equipment Under Test (EUT)**

Product Name: Broadband Digital Transmission System

Model No.: BLUE bean A, BLUE bean C, RED bean A, RED bean C

**Applicable standards:** EN 62311:2008

**Date of sample receipt:** 28 Mar, 2019

**Date of Test:** 29 Mar, to 26 May, 2019

**Date of report issue:** 27 May, 2019

**Test Result:** PASS\*

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 1999/5/EC are considered.



Laboratory Manager



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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## 2 Version

Version No.	Date	Description
00	27 May, 2019	Original

**Tested by:**

*Mike.ou*

**Date:**

27 May, 2019

**Test Engineer**

**Reviewed by:**

*Wimer Zhang*

**Date:**

27 May, 2019

**Project Engineer**

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## 4 General Information

### 4.1 Client Information

Applicant:	8devices
Address:	Antakalnio 17, Vilnius, LT-10312, Lithuania
Manufacturer/Factory:	8devices
Address:	Antakalnio 17, Vilnius, LT-10312, Lithuania

### 4.2 General Description of E.U.T.

Product Name:	Broadband Digital Transmission System
Model No.:	BLUE bean A,BLUE bean C,RED bean A,RED bean C
Hardware version:	BLUE bean A: 8dev_3201_4, BLUE bean C: 8dev_3200_3, RED bean A: 8dev_3301_3, RED bean C: 8dev_3301_4
Software version:	4.5.20.037
<b>BLE Specification</b>	
Operation Frequency:	2402MHz-2480MHz
Channel number:	40
Channel separation:	2MHz
Modulation	GFSK
Antenna Type:	Ceramic Antenna External antenna
Antenna gain:	Ceramic antenna: 3 dBi External antenna A: 4 dBi External antenna B: 3.2 dBi
<b>Bluetooth Specification</b>	
Operation Frequency:	2402MHz-2480MHz
Channel number:	79
Channel separation:	1MHz
Modulation	GFSK, Pi/4DQPSK, 8DPSK
Antenna Type:	Ceramic Antenna External antenna
Antenna gain:	Ceramic antenna: 3 dBi External antenna A: 4 dBi External antenna B: 3.2 dBi
<b>2.4G Wi-Fi Specification</b>	
Operation Frequency:	2412MHz-2472MHz
Channel number:	13 for 802.11b/802.11g/802.11n(HT20), 11 for 802.11n(HT40)
Channel separation:	5MHz
Modulation technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum (DSSS)
Modulation technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Antenna Type:	Ceramic Antenna External antenna
Antenna gain:	Ceramic antenna: 3 dBi External antenna A: 4 dBi External antenna B: 3.2 dBi

5G Wi-Fi Specification	
Operation Frequency:	5180MHz~5240MHz
Nominal Bandwidth	20MHz, 40MHz, 80MHz
Channel Spacing:	10MHz
Modulation:	OFDM
Antenna Type:	Ceramic Antenna External antenna
Antenna gain:	Ceramic antenna: 3 dBi External antenna A: 4.5 dBi External antenna B: 4.25 dBi

### 4.3 Operating Modes

Operating mode	Detail description
BLE mode	Keep the EUT in continuously transmitting in BLE mode
BT mode	Keep the EUT in continuously transmitting in BT mode
2.4G WIFI mode	Keep the EUT in continuously transmitting in 2.4G WIFI mode
5G WIFI mode	Keep the EUT in continuously transmitting in 5G WIFI mode

### 4.4 Description of Support Units

Manufacturer	Description	Model	S/N	FCC ID/DoC
LENOVO	Laptop	SL510	2847A65	DoC
ULEFONE	Adapter	HJ-0503000K7-EU	N/A	N/A
baofeng	Test suite	Pi3B+SD	N/A	N/A

### 4.5 Laboratory Facility

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

- **FCC - Registration No.: 727551**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <https://portal.a2la.org/scopepdf/4346-01.pdf>

### 4.6 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.  
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,  
Bao'an District, Shenzhen, Guangdong, China  
Tel: +86-755-23118282  
Fax: +86-755-23116366

## 4.7 Test Instruments list

Conducted method:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
Spectrum Analyzer	Agilent	N9020A	MY50510123	11-10-2018	11-09- 2019
Vector Signal Generator	Agilent	N5182A	MY49060014	11-10-2018	11-09- 2019
Signal Generator	R&S	SMR20	1008100050	03-07-2017	03-06-2018
				03-07-2018	03-06-2019
Power Sensor	D.A.R.E	RPR3006W	15I00041SNO12	11-10-2018	11-09- 2019
Power Sensor	D.A.R.E	RPR3006W	15I00041SNO54	11-10-2018	11-09- 2019
Power Sensor	D.A.R.E	RPR3006W	17I00015SNO27	11-10-2018	11-09- 2019
Power Sensor	D.A.R.E	RPR3006W	17I00015SNO28	11-10-2018	11-09- 2019
RF Switch Unit	Ascentest	AT890-RFB	N/A	N/A	N/A
Test Software	MWRFTEST	MTS 8310	Version: 2.0.0.0		

## 5 Technical Requirements Specification in EN 62311

### 5.1 General Description of Applied Standards

EN 62311 Generic standard to demonstrate the compliance of electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (0 Hz–300 GHz) is to demonstrate the compliance of apparatus with the basic restrictions or reference levels on exposure of the general public related to electric, magnetic, electromagnetic fields as well as induced and contact current.

### 5.2 RF Exposure Evaluation

#### 5.2.1 Limit

Reference levels for electric, magnetic and electromagnetic fields  
(0 Hz to 300 GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density $S_{eq}$ (W/m <sup>2</sup> )
0-1 Hz	—	$3,2 \times 10^4$	$4 \times 10^4$	—
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	$4\ 000/f$	$5\ 000/f$	—
0,025-0,8 kHz	$250/f$	$4/f$	$5/f$	—
0,8-3 kHz	$250/f$	5	6,25	—
3-150 kHz	87	5	6,25	—
0,15-1 MHz	87	$0,73/f$	$0,92/f$	—
1-10 MHz	$87/f^{1/2}$	$0,73/f$	$0,92/f$	—
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	$f/200$
2-300 GHz	61	0,16	0,20	10

Notes:

1.  $f$  as indicated in the frequency range column.

#### 5.2.2 Test method

The antenna of the product, under normal use condition is at least 20cm away from the body of the user. Warning statement of the user for keeping 20cm separation distance and the prohibition of operating to a person has been printed on the user manual. So, this product under normal use is located on electromagnetic far field between the human body.

#### Far Field Calculation Formula

$$E = \frac{\sqrt{30PG(\theta, \phi)}}{r}$$

$G$  = antenna gain relative to an isotropic antenna  
 $\theta, \phi$  = elevation and azimuth angles to point of investigation  
 $r$  = distance from observation point to the antenna

**5.2.3 Measurement data(worst case):**

**External antenna A:**

Modulation	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	Antenna Gain (numeric)	E Field Strength (V/m)	E Field Strength Limit (V/m)	Result
<b>Maximum Emissions Level of Bluetooth</b>							
GFSK Mode	7.69	5.86	4	2.51	3.32	61	Pass
Pi/4DQPSK Mode	6.57	4.54	4	2.51	2.92	61	Pass
8DPSK Mode	5.47	3.52	4	2.51	2.30	61	Pass
<b>Maximum Emissions Level of BLE</b>							
GFSK Mode	-1.95	0.64	4	2.51	1.10	61	Pass
<b>Maximum Emissions Level of 2.4G WIFI</b>							
802.11b mode	13.51	22.44	4	2.51	6.50	61	Pass
802.11g mode	12.41	17.42	4	2.51	5.73	61	Pass
802.11n-HT20	12.58	18.11	4	2.51	5.84	61	Pass
802.11n-HT40	11.44	13.93	4	2.51	4.07	61	Pass
<b>Maximum Emissions Level of 5G WIFI</b>							
802.11a	10.68	11.70	4.5	2.82	4.97	61	Pass
802.11n-HT20	9.67	9.27	4.5	2.82	4.43	61	Pass
802.11n-HT40	8.40	6.92	4.5	2.82	4.82	61	Pass
802.11ac20	8.98	7.91	4.5	2.82	4.09	61	Pass
802.11ac40	7.60	5.75	4.5	2.82	3.49	61	Pass
802.11ac80	7.24	5.30	4.5	2.82	3.35	61	Pass

**5.2.4 Conclusion**

Meet the requirements of EN 62311:2008

-----End of report-----