

TEST REPORT # EMCC-160578AC, 2017-10-23

EQUIPMENT UNDER TEST:

Device: Bitdefender BOX 2 Smart Home Cybersecurity Hub
Serial Number: #4
Application: Wireless Router
FCC ID: 2AMAP-BT11021000EN
IC: 22784-BT11021000C
Manufacturer: SC Bitdefender SRL
Address: 24 Delea Veche St. Offices Building A, floor 7, district 2
024102 Bucharest
Romania
Phone : +40 212 063 470

RELEVANT STANDARD(S) : 47 CFR § 1.1310
RSS-102 Issue 5

MEASUREMENT PROCEDURE:

IEEE C95.1:2005




TEST REPORT PREPARED BY:

Patrick Reusch
EMCCcons DR. RAŠEK GmbH & Co. KG
Boelwiese 8
91320 Ebermannstadt
Germany
Phone: +49 9194 7262-0
Fax: +49 9194 7262-199
E-Mail: p.reusch@emcc.de

TEST PERSONNEL:


Manuel Zenk

**HEAD OF COMMERCIAL
EMC AND RADIO DEPT.:**


Wolfgang Döring

Test of Wireless Router type Bitdefender BOX 2 Smart Home Cybersecurity Hub
to 47 CFR § 1.1310 and RSS-102 Issue 5

CONTENTS**Page**

1	General Information	3
1.1	Purpose	3
1.2	Limits and Reservations	3
1.3	Test Location	3
1.4	Customer	3
1.5	Manufacturer	4
1.6	Dates and Test Location	4
1.7	Ordering Information	4
1.8	Climatic Conditions	4
2	Product Description	5
2.1	Equipment Under Test (EUT)	5
2.2	Exposure Evaluation	6
2.3	Regulation	6
2.4	Calculation	7
2.5	Results	8

Test of Wireless Router type Bitdefender BOX 2 Smart Home Cybersecurity Hub
to 47 CFR § 1.1310 and RSS-102 Issue 5

1 GENERAL INFORMATION

1.1 Purpose

The purpose of this report is to show compliance with the 47 CFR § 1.1310 and RSS-102 Issue 5 requirements for the certification of licence-exempt Intentional Radiator.

1.2 Limits and Reservations

The test results in this report apply only to the particular equipment under test (EUT) as declared in this report. This test report shall not be reproduced except in full without the written permission of EMCCons DR. RAŠEK GmbH & Co. KG.

1.3 Test Location

Test Laboratory: EMCCons DR. RAŠEK GmbH & Co. KG
DAkKS Accreditation No.: D-PL-12067-01-02

Address of Labs I, II, III
and Head Office: EMCCons DR. RAŠEK GmbH & Co. KG
Boelwiese 8
91320 Ebermannstadt
GERMANY

Address of Labs IV and V: EMCCons DR. RAŠEK GmbH & Co. KG
Stoernhofer Berg 15
91364 Unterleinleiter
GERMANY

Laboratory: Test Laboratory IV
The 3 m & 10 m semi-anechoic chamber site has been fully described
in a report submitted to ISED. This 3m/10m alternative test site is approved
by Innovation, Science and Economic Development Canada under file
number 3464C-1.

Phone: +49 9194 7262-0
Fax: +49 9194 7262-199
E-Mail: emc.cons@emcc.de
Web: www.emcc.de

1.4 Customer

Company Name: Borea d.o.o
Street: Mlaka 1b
City: 4275 Begunje
Country: SLOVENIA

Name for contact purposes: Mr Matevz Langus
Phone: +386 599 28590
Fax: none
E-Mail: matevz.langus@borea.si

Test of Wireless Router type Bitdefender BOX 2 Smart Home Cybersecurity Hub
to 47 CFR § 1.1310 and RSS-102 Issue 5

1.5 Manufacturer

Company Name: SC Bitdefender SRL
Street: 24 Delea Veche St. Offices Building A, floor 7, district 2
City: 024102 Bucharest
Country: Romania

1.6 Dates and Test Location

Date of receipt of EUT: 2017-08-11 (#4)
Test Date: see table below
Test Location: Lab IV

1.7 Ordering Information

Purchase Order: 106/2017
Date: 2017-06-12
Vendor Number: none

1.8 Climatic Conditions

Date	Temperature [°C]	Relative Humidity [%]	Air Pressure [hPa]	Lab	Customer attended tests
2017-09-14	22	52	965	IV	Yes, Mr Cadez

Test of Wireless Router type Bitdefender BOX 2 Smart Home Cybersecurity Hub
to 47 CFR § 1.1310 and RSS-102 Issue 5

2 PRODUCT DESCRIPTION

2.1 Equipment Under Test (EUT)

The following data is based on customer's information.

Trade Name:	Bitdefender BOX 2 Smart Home Cybersecurity Hub
Serial Number:	#4
No. of Variants:	0
Application:	Wireless Router
Hardware Version:	BT11021000
Firmware Version:	2.0.1-22~7246625
FCC ID:	2AMAP-BT11021000EN
IC:	22784-BT11021000C
Radio Standard(s):	IEEE 802.11a/b/g/n/ac
Frequency Range(s):	2400 – 2483.5 MHz 5150 – 5250 MHz 5725 – 5825 MHz
Tested channels:	Refer to test chapters
Modulation:	CCK (2.4 GHz range) OFDM (5 GHz range)
Nominal Bandwidth(s):	20 MHz 40 MHz 80 MHz
Power Supply:	12 V _{DC} via external AC/DC power supply
Ports:	2x Ethernet
Antenna and max. Gain:	2.4 GHz: # 1: 3.5 dBi, type: N2420DGY-T-PK1-G90S4 # 2: 5.0 dBi, type: N2410DSY-T8B-PK1-G80S4 # 3: 4.6 dBi, type: N2410DSMY-T8B-PK1-G80S4 5 GHz: # 1: 4.2 dBi, type: N2420DGY-T-PK1-G90S4 # 2: 4.8 dBi, type: N2410DSY-T8B-PK1-G80S4 # 3: 5.2 dBi, type: N2410DSMY-T8B-PK1-G80S4
Operating Temperature Range:	0 °C – 35 °C
Remarks:	None

Test of Wireless Router type Bitdefender BOX 2 Smart Home Cybersecurity Hub
to 47 CFR § 1.1310 and RSS-102 Issue 5

2.2 Exposure Evaluation

Test Requirement: 47 CFR, § 1.1310
RSS-102 Issue 5
Test Procedure: IEEE C95.1:2005

2.3 Regulation

§ 1.1310:

The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in § 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of § 2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

RSS-102:

2.5.2 Exemption Limits for Routine Evaluation – RF Exposure Evaluation

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 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).

Test of Wireless Router type Bitdefender BOX 2 Smart Home Cybersecurity Hub
to 47 CFR § 1.1310 and RSS-102 Issue 5

2.4 Calculation

2.4.1 MPE based on far-field assumption

Power density calculates as

$$Pd = (P \times G) / (4 \times \pi \times d^2)$$

where

Pd - power density in mW/cm²

P - conducted output power to the antenna in mW

G - antenna gain (linear)

Sample calculation for DTS in 2.4 GHz band:

With a measured max. conducted output power (sum of 3 outputs) of 270.1 mW and an max. antenna gain of 3.16 (5.0 dBi) the resulting power density at a distance of 20 cm will be

$$Pd = (270.1 \times 3.16) / (4 \times \pi \times 20^2) = 0.1698 \text{ [mW/cm}^2\text{]}$$

2.4.2 Limit calculation acc. to RSS-102

For 2.4 G and for 5 G devices the following exemption power limit for RF exposure evaluation applies:

$$Pex = 1.31 \times 10^{-2} f^{0.6834}$$

where:

Pex – power limit for RF Exposure Evaluation

F – frequency in MHz

2.4 GHz band: Pex (2400 MHz) = 2.675 W

5 GHz bands: Pex (5150 MHz) = 4.507 W

Test of Wireless Router type Bitdefender BOX 2 Smart Home Cybersecurity Hub
to 47 CFR § 1.1310 and RSS-102 Issue 5

2.5 Results

2.5.1 MPE Calculation

Operating Mode	Frequency Band [MHz]	Maximum Output Power [mW]	Max. Antenna Gain	Calculated Power Density @ 20 cm distance	Limit of Power Density [mW/cm ²]
802.11b/g/n	2400 – 2483.5	270.1	3.16	0.1698	1
802.11a/n/ac	5150 - 5250 5725 - 5825	102.3	3.31	0.0674	1
2.4G and 5G simultaneous transmission				0.2372	1

2.5.2 Exemption Limits for Routine Evaluation

Operating Mode	Frequency Band [MHz]	Maximum Output Power [mW]	Max. Antenna Gain	Max. Radiated Power [W]	Limit [W]
802.11b/g/n	2410 – 2483.5	270.1	3.16	0.8535	2.675
802.11a/n/ac	5150 - 5250 5725 - 5825	102.3	3.31	0.3386	4.507
2.4G and 5G simultaneous transmission				1.1921	2.675

2.5.3 Summary

Manufacturer: SC Bitdefender SRL
 Device: Bitdefender BOX 2 Smart Home Cybersecurity Hub
 Serial No: #4
 Modification No: 1 - 3
 Tested port: 1 - 3
 Test date: 2017-09-14
 Tested by: M. Zenk

The EUT meets the requirements of this section.