

FCC SAR Exclusion Report



Product name : Treon Gateway 2 1211
Variant : --
Applicant : Testilabs Oy
FCC ID : 2AR86W12
contains XPYNINAB30; XPYUBX20VA01;
XPYLILYW1
IC : N/A
contains 8595A-NINAB30;
8595A-UBX20VA01; 8595A-LILYW1

Test report No. : P000319246 008 V1.0

Laboratory information

Accreditation

Kiwa Nederland B.V. complies with the accreditation criteria for test laboratories as laid down in ISO/IEC 17025:2017. The accreditation covers the quality system of the laboratory as well as the specific activities as described in the authorized annex bearing the accreditation number L248 and is granted by the Dutch Council For Accreditation (RvA: Raad voor Accreditatie).

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The Industry Canada company number for Kiwa Nederland B.V. is: 4173A. The CABID is NL0001.

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Documentation

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Testing Location

Test Site	Kiwa Nederland B.V.
Test Site location	Wilmersdorf 50 7327 AC Apeldoorn The Netherlands Tel. +31 88998 3393
Test Site FCC	NL0001
CABID	NL0001

Revision History

Version	Date	Remarks	By
v0.50	12-06-2024	First draft	GG
v1.00	14-06-2024	Final release	AWM

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1 General Description

1.1 Applicant

Client name:	Testilabs Oy
Address:	Uusikatu 24 F 61
Zip code:	90100 Oulu, FINLAND
Telephone:	+358505507331
E-mail:	certification@treon.fi
Contact name:	Janne Julkunen

1.2 Manufacturer

Manufacturer name:	Treon Oy
Address:	Visiokatu 3
Zip code	33720, Tampere FINLAND
Telephone:	+358505507331
E-mail:	certification@treon.fi
Contact name:	Janne Julkunen

1.3 Tested Equipment Under Test (EUT)

Product name:	Treon Gateway 2 1211
Brand name:	Treon
Model or type	Model 1211, variant WP
FCC ID:	AR86W12
IC:	N/A
Product description:	Wireless IoT Gateway
Variant model(s):	Model 1211, Variant BT
Batch and/or serial No.	--
Software version:	V7
Hardware version:	B5.1
Date of receipt	09-10-2023
Tests started:	09-10-2023
Testing ended:	26-10-2023

1.4 Applicable standards

47 CFR § 1.1307 (b)(1)(i)(A)

1.5 Conclusions

The sample of the product showed **NO NON-COMPLIANCES** to the specifications stated in paragraph 1.4 of this report.

The results of the test as stated in this report, are exclusively applicable to the product items as identified in this report. Kiwa Nederland B.V. accepts no responsibility for any properties of product items in this test report, which are not supported by the tests as specified in paragraph 1.4 "*Applicable standards*".

Assessment is performed by:

Name : dr. ir. G. Geers

Review of assessment methods and report by:

Name : ing. M.H.Khan

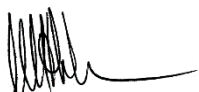
The above conclusions have been verified by the following signatory:

Date : 14-06-2024

Name : ing. M.H. Khan

Function : Test Engineer

Signature :

A handwritten signature in black ink, consisting of a series of vertical, wavy lines followed by a horizontal stroke.

2 SAR exclusion Evaluation

2.1 Transmitter specifications

The maximum output powers are taken from the manufacturer's specification.
Assumed antenna gain is 1 (numerical)

Transmitter BLE

Variable (unit)	Value	Symbol
Conducted time-averaged output power (mW)	5.01	P
Time-averaged output power ERP (mW)	6.31	P_{ERP}
Operating frequency range (MHz)	2440	f
Separation distance (cm)	20	d
Separation distance (m)	0.2	R

Transmitter WiFi

Variable (unit)	Value	Symbol
Conducted time-averaged output power (mW)	42.66	P
Time-averaged output power ERP (mW)	53.70	P_{ERP}
Operating frequency range (MHz)	2442	f
Separation distance (cm)	20	d
Separation distance (m)	0.2	R

Transmitter Wirepass

Variable (unit)	Value	Symbol
Conducted time-averaged output power (mW)	5.01	P
Time-averaged output power ERP (mW)	6.31	P_{ERP}
Operating frequency range (MHz)	2440	f
Separation distance (cm)	20	d
Separation distance (m)	0.2	R

Transmitter LTE Band 2

Variable (unit)	Value	Symbol
Conducted time-averaged output power (mW)	426	P
Time-averaged output power ERP (mW)	537	P_{ERP}
Operating frequency range (MHz)	1880	f
Separation distance (cm)	20	d
Separation distance (m)	0.2	R

Transmitter LTE Band 4

Variable (unit)	Value	Symbol
Conducted time-averaged output power (mW)	426	P
Time-averaged output power ERP (mW)	537	P_{ERP}
Operating frequency range (MHz)	1710.7	f
Separation distance (cm)	20	d
Separation distance (m)	0.2	R

Transmitter LTE Band 5

Variable (unit)	Value	Symbol
Conducted time-averaged output power (mW)	426	P
Time-averaged output power ERP (mW)	537	P _{ERP}
Operating frequency range (MHz)	836.5	f
Separation distance (cm)	20	d
Separation distance (m)	0.2	R

2.2 Evaluation calculations

Transmitter BLE

Transmitter BLE is evaluated according to method B of KDB 447498 D04 v01

Method B:

$$P_{th}(mW) = \begin{cases} ERP_{20cm} \left(\frac{d}{20cm} \right)^x & d \leq 20 \text{ cm} \\ ERP_{20cm} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where:

$$x = -\log_{10} \left(\frac{60}{ERP_{20cm} * \sqrt{f}} \right)$$

$$ERP_{20cm}(mW) = \begin{cases} 2040 * f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6.0 \text{ GHz} \end{cases}$$

Filling in the values of d (cm) and f (GHz) as reported in clause 2.1 in the equations above gives the result:

P_{th} = 3060 mW

P or P_{ERP} = 6.31 mW which is less than the calculated P_{th} so the EUT complies with the SAR based exemption requirement.

Transmitter WiFi

Transmitter WiFi is evaluated according to method B of KDB 447498 D04 v01

Method B:

$$P_{th}(mW) = \begin{cases} ERP_{20cm} \left(\frac{d}{20cm} \right)^x & d \leq 20 \text{ cm} \\ ERP_{20cm} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where:

$$x = -\log_{10} \left(\frac{60}{ERP_{20cm} * \sqrt{f}} \right)$$

$$ERP_{20cm}(mW) = \begin{cases} 2040 * f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6.0 \text{ GHz} \end{cases}$$

Filling in the values of d (cm) and f (GHz) as reported in clause 2.1 in the equations above gives the result:

P_{th} = 3060 mW

P or P_{ERP} = 53.70 mW which is less than the calculated P_{th} so the EUT complies with the SAR based exemption requirement.

Transmitter Wirepass

Transmitter Wirepass is evaluated according to method B of KDB 447498 D04 v01

Method B:

$$P_{th}(mW) = \begin{cases} ERP_{20cm} \left(\frac{d}{20cm} \right)^x & d \leq 20 \text{ cm} \\ ERP_{20cm} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where:

$$x = -\log_{10} \left(\frac{60}{ERP_{20cm} * \sqrt{f}} \right)$$

$$ERP_{20cm}(mW) = \begin{cases} 2040 * f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6.0 \text{ GHz} \end{cases}$$

Filling in the values of d (cm) and f (GHz) as reported in clause 2.1 in the equations above gives the result:

$P_{th} = 3060 \text{ mW}$

P or $P_{ERP} = 6.31 \text{ mW}$ which is less than the calculated P_{th} so the EUT complies with the SAR based exemption requirement.

Transmitter LTE Band 2

Transmitter LTE Band 2 is evaluated according to method B of KDB 447498 D04 v01

Method B:

$$P_{th}(mW) = \begin{cases} ERP_{20cm} \left(\frac{d}{20cm} \right)^x & d \leq 20 \text{ cm} \\ ERP_{20cm} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where:

$$x = -\log_{10} \left(\frac{60}{ERP_{20cm} * \sqrt{f}} \right)$$

$$ERP_{20cm}(mW) = \begin{cases} 2040 * f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6.0 \text{ GHz} \end{cases}$$

Filling in the values of d (cm) and f (GHz) as reported in clause 2.1 in the equations above gives the result:

$P_{th} = 3060 \text{ mW}$

P or $P_{ERP} = 537 \text{ mW}$ which is less than the calculated P_{th} so the EUT complies with the SAR based exemption requirement.

Transmitter LTE Band 4

Transmitter LTE Band 4 is evaluated according to method B of KDB 447498 D04 v01

Method B:

$$P_{th}(mW) = \begin{cases} ERP_{20cm} \left(\frac{d}{20cm} \right)^x & d \leq 20 \text{ cm} \\ ERP_{20cm} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where:

$$x = -\log_{10} \left(\frac{60}{ERP_{20cm} * \sqrt{f}} \right)$$

$$ERP_{20cm}(mW) = \begin{cases} 2040 * f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6.0 \text{ GHz} \end{cases}$$

Filling in the values of d (cm) and f (GHz) as reported in clause 2.1 in the equations above gives the result:

$P_{th} = 3060 \text{ mW}$

P or $P_{ERP} = 537 \text{ mW}$ which is less than the calculated P_{th} so the EUT complies with the SAR based exemption requirement.

Transmitter LTE Band 5

Transmitter LTE Band 5 is evaluated according to method B of KDB 447498 D04 v01

Method B:

$$P_{th}(mW) = \begin{cases} ERP_{20cm} \left(\frac{d}{20cm} \right)^x & d \leq 20 \text{ cm} \\ ERP_{20cm} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where:

$$x = -\log_{10} \left(\frac{60}{ERP_{20cm} * \sqrt{f}} \right)$$

$$ERP_{20cm}(mW) = \begin{cases} 2040 * f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6.0 \text{ GHz} \end{cases}$$

Filling in the values of d (cm) and f (GHz) as reported in clause 2.1 in the equations above gives the result:

$P_{th} = 1706 \text{ mW}$

P or $P_{ERP} = 537 \text{ mW}$ which is less than the calculated P_{th} so the EUT complies with the SAR based exemption requirement.

Assessment for multiple transmitters capable of transmitting simultaneously

In the case of RF sources operating in the same time averaging period, evaluate if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

$$\frac{P_1}{P_{th1}} + \frac{P_2}{P_{th2}} + \dots + \frac{P_n}{P_{thn}} \leq 1$$

Where P_x is the calculated power and P_{thx} the calculated limit for each transmitter.

Scenario 1 & 2:

BLE + WiFi + LTE B2 ≤ 1

BLE + WiFi + LTE B4 ≤ 1

$$\frac{6.3}{3060} + \frac{53.70}{3060} + \frac{537}{3060} = 0.002059 + 0.01755 + 0.1755 = 0.1951 \leq 1$$

Scenario 3:

BLE + WiFi + LTE B5 ≤ 1

$$\frac{6.3}{3060} + \frac{53.70}{3060} + \frac{537}{1706} = 0.002059 + 0.01755 + 0.3148 = 0.3344 \leq 1$$

2.3 Summary

Since the EUT does not cause exposure in excess of the general population limit (defined in 47 CFR 1.1310 e) (ii)), no additional mitigation actions are required.

<<END OF REPORT>>