FCC SAR Exclusion Report



Product name	: TCU V5.5
Applicant	: The Goodyear Tire & Rubber Company
FCC ID	: 2BEXS-TPH55M
ISED ID	: 32033-TPH55M

Test report No. : P000334442 009 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).

Kiwa Nederland B.V. is designated by the FCC as an Accredited Test Firm for compliance testing of equipment subject to Certification under Parts 15 & 18. The Designation number is: NL0001.

Kiwa Nederland B.V. is a Wireless Device Testing laboratory recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements. The Industry Canada company number for Kiwa Nederland B.V. is: 4173A. The CABID is NL0001.

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Documentation

The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 10 years at Kiwa Nederland B.V.

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	Ву
v0.50	25-10-2024	First draft	МНК
v1.00	11-12-2024	Initial release	МНК



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1 General Description

1.1 Applicant

Client name:	The Goodyear Tire & Rubber Company
Address:	200 Innovation Way, OH 44316 Akron, USA
Telephone:	00352691964033
E-mail:	chris_helsel@goodyear.com
Contact name:	Christopher P. Helsel

1.2 Manufacturer

Manufacturer name:	IOSiX, LLC
Address:	1161 Oak Valley Dr, MI 48108 Ann Arbor, USA
Telephone:	0014158002060
E-mail:	info@iosix.com
Contact name:	Robert Vogt

1.3 Tested Equipment Under Test (EUT)

Product name:	TCU V5.5
Brand name:	Goodyear
FCC ID:	2BEXS-TPH55M
IC:	32033-TPH55M
Product description:	IoT gateway for vehicle and tire remote monitoring
Variant model(s):	
Batch and/or serial No.	
Software version:	
Hardware version:	
Date of receipt	05-04-2024
Tests started:	06-05-2024
Testing ended:	30-10-2024



1.4

Applicable standards

47 CFR § 1.1307 (b)(1)(i)(A)



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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 Netherland 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 : ing. M.H. Khan.

Review of assessment methods and report by:

Name : P. van Wanrooij, BASc

The above conclusions have been verified by the following signatory:

Name : P. van Wanrooij

Function : Test Engineer

:

Signature





2 SAR exclusion Evaluation

2.1 Transmitter specifications

Variable (unit)	Value	Symbol
Conducted time-averaged output power (mW)	-	Р
Time-averaged output power ERP (mW)	LTE B2: 2.39 ¹	PERP
	LTE B5: 16.21 ¹	
	WLAN: 15.58*	
	Bluetooth: 0.63*	
Operating frequency range (MHz)	2: 1850-1910, 1930-1990 MHz	f
	4: 1710-1755, 2110-2155 MHz	
	5: 824-849, 896-894 MHz	
	12: 699-716, 729-746 MHz	
	13: 777-787, 746-756 MHz	
	17: 704-716, 734-756 MHz	
	25: 1850-1915, 1930-1995 MHz	
	26: 824-849, 869-894 MHz	
	66: 1710-1780,2110-2180 MHz	
	WLAN:2412-2462 MHz	
	Bluetooth: 2402-2480 MHz	
Separation distance (cm)	20	d
Separation distance (m)	0.2	R

Notes:

1. Power taken from report P000334442 007

*Power is measured using methods below.

The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02. IRN 402 - RF power (W) - Method 1 – AVGSA (DTS) according to ANSI C63.10.

2.2 Evaluation calculations

LTE Band 2

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

$$P_{th}(mW) = \left\{ \begin{array}{ll} ERP_{20cm} \left(\frac{d}{20cm} \right)^{x} & d \le 20 \ cm \\ ERP_{20cm} & 20 \ cm < d \le 40 \ cm \end{array} \right.$$

Where:

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

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

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} = 2.39mW which is less than the calculated P_{th} so the EUT complies with the SAR based exemption requirement.



LTE Band 5

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

$$P_{th}(mW) = \left\{ \begin{array}{ll} ERP_{20cm} \left(\frac{d}{20cm} \right)^{x} & d \le 20 \ cm \\ ERP_{20cm} & 20 \ cm < d \le 40 \ cm \end{array} \right.$$

Where:

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

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

Filling in the values of d (cm) and f (GHz) as reported in clause 2.1 in the equations above gives the result: $P_{th} = 1681 \text{ mW}$

P or P_{ERP} =16.21 mW which is less than the calculated P_{th} so the EUT complies with the SAR based exemption requirement.

WLAN

WLAN is evaluated according to method B of KDB 447498 D04 v01

$$P_{th}(mW) = \left\{ \begin{array}{ll} ERP_{20cm} \left(\frac{d}{20cm} \right)^{x} & d \le 20 \ cm \\ ERP_{20cm} & 20 \ cm < d \le 40 \ cm \end{array} \right.$$

Where:

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

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

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} = 15.58 mW which is less than the calculated P_{th} so the EUT complies with the SAR based exemption requirement.

Bluetooth

Bluetooth is evaluated according to method B of KDB 447498 D04 v01

$$P_{th}(mW) = \{ \frac{ERP_{20cm}}{ERP_{20cm}} \left(\frac{d}{20cm} \right)^{x} \quad d \le 20 \ cm$$
$$20 \ cm < d \le 40 \ cm$$

Where:

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

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

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} = 0.63 mW which is less than the calculated P_{th} so the EUT complies with the SAR based exemption requirement.



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Assessment for multiple transmitters capable of transmitting simultaneously Transmitters are not capable of transmitting simultaneously.

2.3 Conclusion

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>>