DEKRA Testing and Certification, S.A.U.
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DEKRA

ENAC ENSAYOS Nº 51/LE147

Test report No:
NIE: 64009REM.001

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 6 (January 2016, Updated April 2019)

(*) Identification of item tested	Pressure and Temperature measurement sensor
(*) Trademark	Intuitu Sensor
(*) Model and /or type reference	Intuitu Sensor 9Bar V001
Other identification of the product	HW Version: SNS_08 B8 SW Version: 1.0.0 FCC ID: QCE-S09001 IC: 25968-S09001
(*) Features	BLE, 433MHz RF transmitter, 125kHz LF receiver
Manufacturer	NOKIAN TYRES PLC Pirkkalaistie 7, 37101 Nokia, FINLAND
Test method requested, standard	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 (Updated 04-2019)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López Martín EMC Consumer & RF Lab. Manager RAFAEL LÓPEZ MARTÍN 2020.08.25 12:03:36 +02'00'
Date of issue	2020-08-25
Report template No	FDT08_22 (*) "Data provided by the client"

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Competences and guarantees

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DEKRA Testing and Certification is a FCC recognized accredited testing laboratory with appropriate scope of accreditation that include testing performed in this test report, FCC designation number ES0004.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification has a calibration and maintenance program for its measurement equipment.

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Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification internal document PODT000.

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").

2. The sample consists of a tire pressure and temperature sensor with BLE interface to mobile application.

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples under test have been selected by: The client.

Sample S/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
64009/006	Pressure and temperature measurement sensor	Intuitu Sensor 9Bar V001	---	2020-03-20

Test sample description

Ports..... :	Port name and description		Cable					
			Specified length [m]	Attached during test	Shielded			
	N/A			☐	☐			
				☐	☐			
				☐	☐			
				☐	☐			
Supplementary information to the ports..... :	Not provided data							
Rated power supply ..... :	Voltage and Frequency		Reference poles					
			L1	L2	L3	N	PE	
	☐	AC:	☐	☐	☐	☐	☐	
	☒	DC: 3Vdc. CR2032 Internal battery.						
Rated Power ..... :	Not provided data							
Clock frequencies ..... :	32kHz, 32MHz, 64MHz, 26MHz, 8MHz							
Other parameters..... :	Not provided data							
Software version ..... :	1.0.0							
Hardware version..... :	SNS_08 B8							
Dimensions in mm (W x H x D)... :	49mm x 49mm x 17mm							
Mounting position..... :	☐	Table top equipment						
	☐	Wall/Ceiling mounted equipment						
	☐	Floor standing equipment						
	☐	Hand-held equipment						
	☒	Other: Tyre mount						

Modules/parts .....:	Module/parts of test item	Type	Manufacturer
	Intuitu test sample#1 (E0:A3:D6:1B:05:59)		Nokian Tyres
	Intuitu test sample#2 (D4:85:BF:55:98:FD)		Nokian Tyres
	Intuitu test sample#3(E8:6E:21:0C:2D:DA)		Nokian Tyres
	Intuitu test sample#7(EE:F4:40:CA:EF:6B)		Nokian Tyres
Accessories (not part of the test item).....:	Description	Type	Manufacturer
	UART to USB dongle		DLP Design Inc.
	Mini USB cable		
	Power cable		
	Android Phone with nRF Connect	Huawei Y6	Huawei
Documents as provided by the applicant.....:	Description	File name	Issue date
	N/A		

Identification of the client

NOKIAN TYRES PLC
Pirkkalaistue 7. 37101 Nokia, Finland.

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2020-04-15
Date (finish)	2020-04-15

Document history

Report number	Date	Description
64009REM.001	2020-08-25	First release

List of equipment used during the test

Control Number	Description	Model	Manufacturer	Next Calibration
3258	SONDA DE TEMPERATURA Y HUMEDAD RELATIVA	HUMIDIPROBE	PICO TECHNOLOGY	2021-04-22
4575	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	TR-702W	T&D	2021-04-22
7763	HORN ANTENNA 1-18GHz	BBHA 9120D	SCHWARZBECK MESS-ELEKTRONIK	2022-11-15
7769	PREAMPLIFIER 30dB 500MHz-18GHz	BBV 9718 C	SCHWARZBECK	2021-01-09
7817	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2021-10-29
7826	ULTRALOG ANTENNA 30MHz-6GHz	HL562E_UPG	ROHDE AND SCHWARZ	2022-10-15
8130	SEMIANECHOIC ABSORBER LINED CHAMBER	P29419	ALBATROSS	---
8134	SHIELDED ROOM	P29419	ALBATROSS PROJECTS GMBH	---

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The test have been performed by the technical personnel: Lorena Oviedo.

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Summary

Emission Test		
Requirement – Test case	**Verdict**	**Remark**
Radiated emission. Electromagnetic field measure (30 MHz – 1000 MHz)	P	---
Radiated emission. Electromagnetic field measure (1 GHz – 12.75 GHz)	P	---
Radiated emission. Electromagnetic field measure (12.75 GHz – 26 GHz)	N/A	(1)
Continuous conducted emission (150 KHz – 30 MHz)	N/A	(2)
Supplymentary information and remarks: (1) Range: f>12.75 GHz. Test not required due 5th harmonics of the maximum internal frequency is below 12.75Ghz (2) Test not required, equipment powered by internal battery		

Appendix A: Test results

Appendix A Content

DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. The operation modes used by the samples to which the present report refers, are shown in the following table:

OPERATION MODE	DESCRIPTION
OM#01	EUT ON. Bluetooth OFF. 433MHz RF transmitter and 125kHz LF receiver disabled. Power supply: 3Vdc (Internal battery)

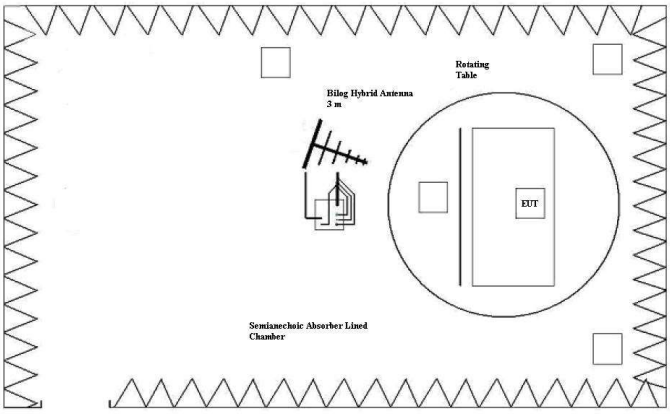
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Secs. 15.109; ICES-003 (January 2016, updated April 2019)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Secs. 15.109; ICES-003 (January 2016, updated April 2019)

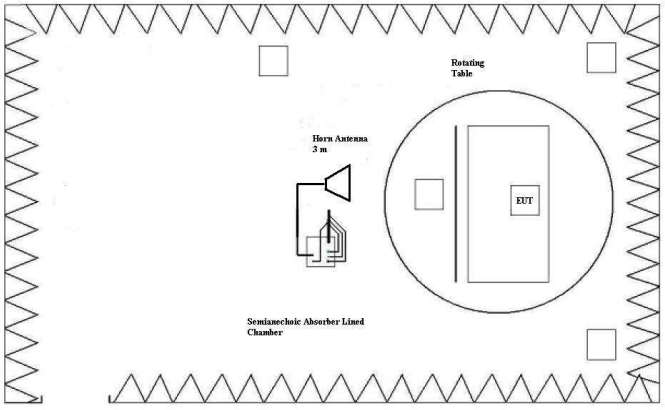
Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 6 (Updated 04-2019)

Frequency of emission (MHz)	Field strength (microvolt/meter)
30-88	100
88-216	150
216-960	200
Above 960	500



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

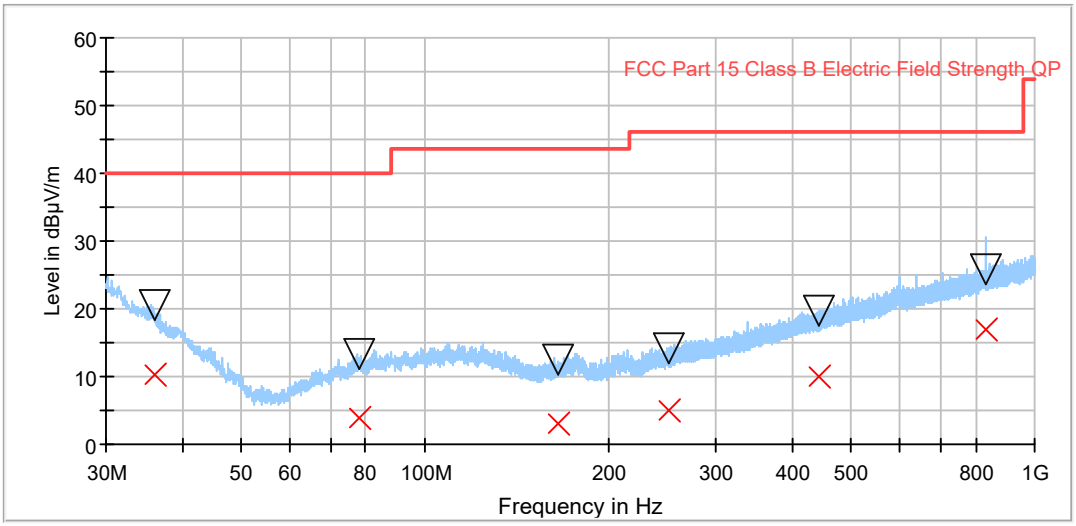
TESTED SAMPLE:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS:	CRmmnnRRPP: CR, Radiated Condition; mm: Sample number; nn: Operation mode; RR: Range; PP: Polarization.

CRmmnnRRPP	Description	Result
CR0101LR	Range: 30 MHz - 1000 MHz.	P
CR0101HR_PH	Range: 1 GHz – 12.75 GHz. Horizontal polarization.	P
CR0101HR_PV	Range: 1 GHz – 12.75 GHz. Vertical polarization.	P

Radiated Emission. CR0101LR

Project:	64009REM.001
Company:	NOKIAN TYRES PLC
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Bluetooth OFF. 433MHz RF transmitter and 125kHz LF receiver disabled. Power supply: 3Vdc (Internal battery)

Full Spectrum



Peak Preview
QuasiPeak
FCC Part 15 Class B Electric Field Strength QP
MaxPeak

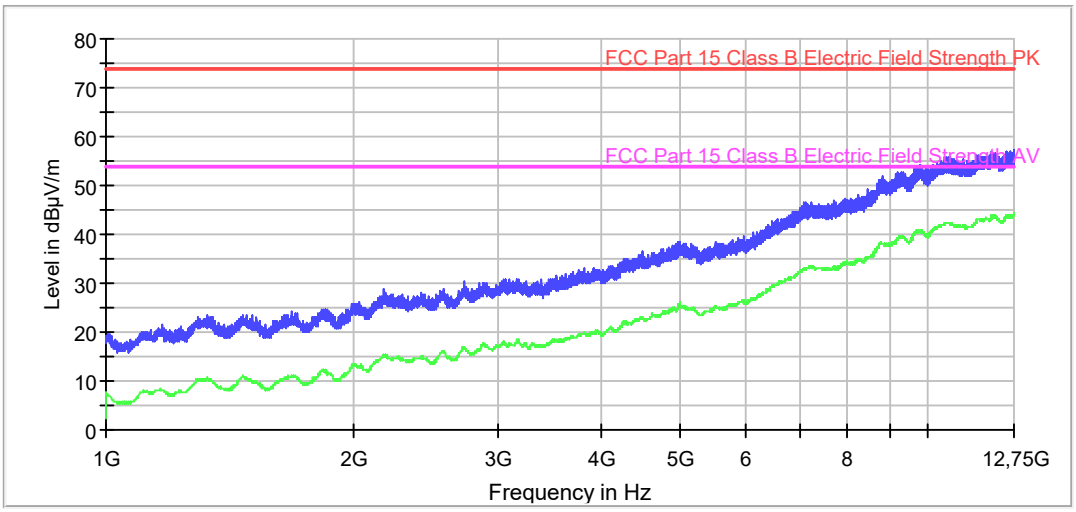
Maximizations

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
36.143000	10.41	20.48	40.00	29.59	195.0	V	35.0
78.159000	3.81	13.44	40.00	36.19	278.0	H	158.0
165.947000	3.04	12.58	43.52	40.48	199.0	V	150.0
250.700000	4.92	14.27	46.00	41.08	172.0	V	331.0
441.568000	10.07	19.82	46.00	35.93	251.0	H	49.0
832.815000	16.85	25.90	46.00	29.15	136.0	V	6.0

Radiated Emission. CR0101HR_PH

Project:	64009REM.001
Company:	NOKIAN TYRES PLC
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Bluetooth OFF. 433MHz RF transmitter and 125kHz LF receiver disabled. Power supply: 3Vdc (Internal battery). Horizontal polarization

RE FCC Part 15 ClassB 1-12,75 GHz



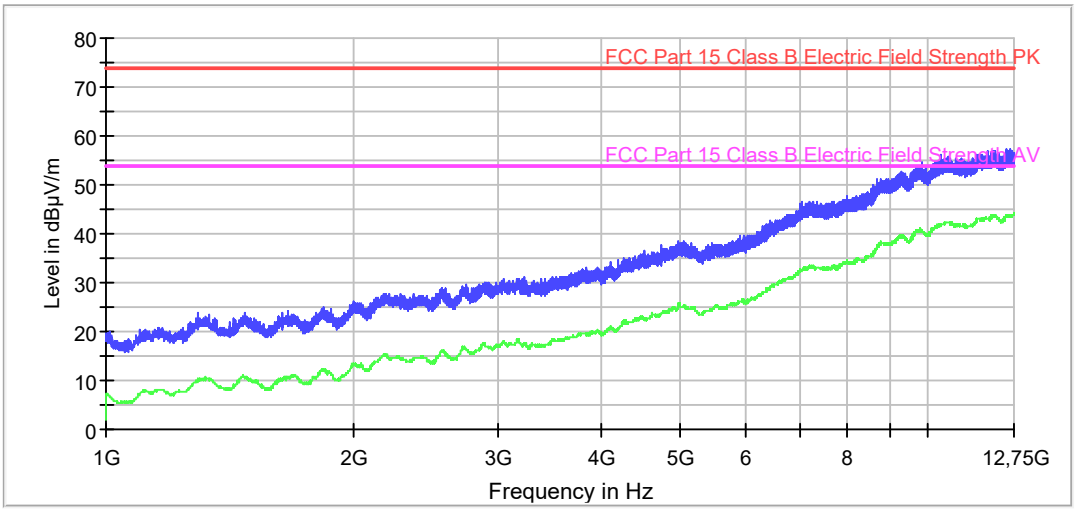
Subrange Maxima

Frequency (MHz)	PK+_CLRWR (dBµV/m)	AVG_CLRWR (dBµV/m)
2158.400000	27.4	14.6
3042.400000	31.0	17.9
4491.200000	36.4	22.8
5534.400000	38.5	25.1
6861.200000	44.5	31.1
7949.600000	47.2	34.2
9213.200000	52.6	39.1
10392.000000	54.9	41.9
11546.000000	56.3	43.1
12734.000000	57.2	43.9

Radiated Emission. CR0101HR_PV

Project:	64009REM.001
Company:	NOKIAN TYRES PLC
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Bluetooth OFF. 433MHz RF transmitter and 125kHz LF receiver disabled. Power supply: 3Vdc (Internal battery). Vertical polarization

RE FCC Part 15 ClassB 1-12,75 GHz



Average Scan
FCC Part 15 Class B Electric Field Strength PK
Peak Scan
FCC Part 15 Class B Electric Field Strength AV

Subrange Maxima

Frequency (MHz)	PK+_CLRWR (dBµV/m)	AVG_CLRWR (dBµV/m)
2163.600000	27.3	14.5
3228.800000	31.0	17.4
4522.800000	35.8	22.4
4976.800000	38.5	25.4
6846.000000	44.0	31.1
7972.000000	47.7	34.3
9220.800000	51.8	39.2
10350.800000	54.8	41.7
11491.600000	56.3	42.8
12454.400000	57.2	43.5