



Test report No:
NIE: 64587RRF.003

Partial Test report

REFERENCE STANDARD:
USA FCC Part 27
CANADA RSS-139

(*) Identification of item tested	Treon Gateway inside IP protected enclosure
(*) Trademark	TREON
(*) Model and /or type reference	Treon Gateway in protective enclosure, Model 1131
Other identification of the product	HW Version: 0001 SW Version: 5.8.0 FCC ID: 2AR86GW11 IC: 24716-GW11
(*) Features	GSM/NB-IOT/Cat M1, WLAN 2.4GHz b/g/n, Wirepas Mesh (BLE)
Applicant	TREON OY Visiokatu 3, 33720 Tampere, Finland
Test method requested, standard	USA FCC Part 27 (10-1-19 Edition). CANADA RSS-139 Issue 3, July. 2015. ANSI C63.26-2015. KDB 971168 D01 Power Meas License Digital Systems v03r01, April. 2018.
Approved by (name / position & signature)	José Carlos Luque RF Lab. Supervisor
Date of issue	2020-08-12
Report template No	FDT08_22 (*) "Data provided by the client"

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Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

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DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification S.A.U. 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 of the model Treon Gateway in protective enclosure, Model 1131 includes a Treon Gateway (Model 1111) which is placed inside a plastic IP67 enclosure to protect the gateway in challenging installation environments. Treon Gateway is a certified wireless gateway for Wirepas Mesh sensor networks. Through the Treon Gateway sensor data can be routed to backend systems via ethernet, WiFi or cellular data connection.

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

Usage of samples

Samples undergoing test have been selected by: The client.

- Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
64587/002	Treon Gateway inside IP protected enclosure	Treon Gateway in protective enclosure, Model 1131	3019d076	2020/05/19

Sample S/01 has undergone the following test(s): All radiated tests indicated in Appendix A.

Test sample description

Ports..... :	Port name and description	Cable				
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	
	RJ45	<100	☐	☐	☐	
			☐	☐	☐	
Supplementary information to the	--					
Rated power supply	Voltage and Frequency		Reference poles			
			L1	L2	L3	N PE
	☒	AC: 100-240V 50/60Hz	☐	☐	☐	☐
	☐	DC:				
Rated Power	--					
Clock frequencies..... :	1000MHz					
Other parameters	--					
Software version	5.8.0					
Hardware version	0001					
Dimensions in cm (W x H x D)	18 x 13 x 8,1					
Mounting position	☐	Table top equipment				
	☒	Wall/Ceiling mounted equipment				
	☐	Floor standing equipment				
	☐	Hand-held equipment				
	☐	Other:				

Modules/parts.....:	Module/parts of test item	Type	Manufacturer
	IRM-30-5ST	AC-DC Single output Encapsulated power supply	Mean Well
Accessories (not part of the test item)	Description	Type	Manufacturer
	--		
Documents as provided by the applicant.....:	Description	File name	Issue date
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⁽³⁾ Only for Medical Equipment

Identification of the client

TREON OY
VISIOKATU 3, 33720 TAMPERE, FINLAND

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2020-06-24
Date (finish)	2020-06-25

Document history

Report number	Date	Description
64587RRF.003	2020-08-12	First release

Environmental conditions

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

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % 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 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: José Gabriel Pendón and Miguel Angel Torres.

Used instrumentation:

Radiated Measurements

	Last Calibration	Due Calibration
1. Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N.A.	N.A.
2. Shielded room ETS LINDGREN S101	N.A.	N.A.
3. Biconical/Log Antenna ETS LINDGREN 3142E	2020/04	2023/04
4. RF pre-amplifier 10 MHz-6 GHz Bonn Elektronik BLNA 0160-01N	2020/02	2021/02
5. EMI Test Receiver ROHDE AND SCHWARZ ESR7	2019/10	2021/10
6. Broadband Horn antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2019/11	2022/11
7. RF pre-amplifier 1-18 GHz Bonn Elektronik BLMA 0118-1M	2020/05	2021/05
8. Signal and Spectrum Analyzer ROHDE AND SCHWARZ FSV 40	2019/09	2021/09
9. Wideband Radio Communication tester ROHDE & SCHWARZ CMW500	2020/04	2021/04
10. AC power supply ELGAR CS-AC35(351SL)	2019/09	2022/09
11. Digital Multimeter FLUKE 175	2020/06	2021/06

Testing verdicts

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

Summary

FCC PART 27 / IC RSS-139 PARAGRAPH		
Requirement – Test case	Verdict	Remark
Clause 27.50 / RSS-139 Clause 6.5: RF output power	N/M	
Clause 2.1047 / RSS-139 Clause 6.2: Modulation characteristics	N/M	
Clause 27.54 / RSS-139 Clause 6.4: Frequency stability	N/M	
Clause 2.1049: Occupied Bandwidth	N/M	
Clause 27.53 / RSS-139 Clause 6.6: Spurious emissions at antenna terminals	N/M	
Clause 27.53 / RSS-139 Clause 6.6: Radiated emissions	P	(1)
<u>Supplementary information and remarks:</u>		
(1) Only test requested.		

Appendix A: Test results for FCC PART 27 / RSS-139

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TEST CONDITIONS

POWER SUPPLY (V):

V nominal: 110 Vac.

Type of Power Supply: AC voltage.

ANTENNA:

Type of Antenna: Integral.

Maximum Declared Antenna Gain: +1.12 dBi. Pulse W3544B

TEST FREQUENCIES:

LTE Band 4. QPSK AND 16QAM MODULATION:

	Channel (Frequency in MHz)					
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Low	19957 (1710.7)	19965 (1711.5)	19975 (1712.5)	20000 (1715.0)	20025 (1717.5)	20050 (1720.0)
Middle	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)
High	20393 (1754.3)	20385 (1753.5)	20375 (1752.5)	20350 (1750.0)	20325 (1747.5)	20300 (1745.0)

All radiated test have been performed in the worst case of modulation, resource block and channel combination.

A preliminary scan determined the Low channel Band 4, QPSK modulation, BW=1.4 MHz, RB=1, Offset=0 as the worst case.

Radiated emissions

SPECIFICATION:

FCC §2.1053 & §27.53 (h) / RSS-139 Issue 3 Clause 6.6.

FCC §27.53 (h):

(h) Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

RSS-139 Clause 6.6:

i. In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} p$ (watts) dB.

ii. After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} P$ (watts) dB.

LTE Band 4 MEASUREMENT LIMIT:

At P_o transmitting power, the specified minimum attenuation becomes $43 + 10 \log (P_o)$, and the level in dBm relative P_o becomes:

$$P_o \text{ (dBm)} - [43 + 10 \log (P_o \text{ in mwatts}) - 30] = -13 \text{ dBm}$$

METHOD:

The measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to at least the 10th harmonic of the High frequency generated within the equipment.

The EUT was placed on a non-conductive stand at a 3 meter distance from the measuring antenna.

Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum meter reading was recorded.

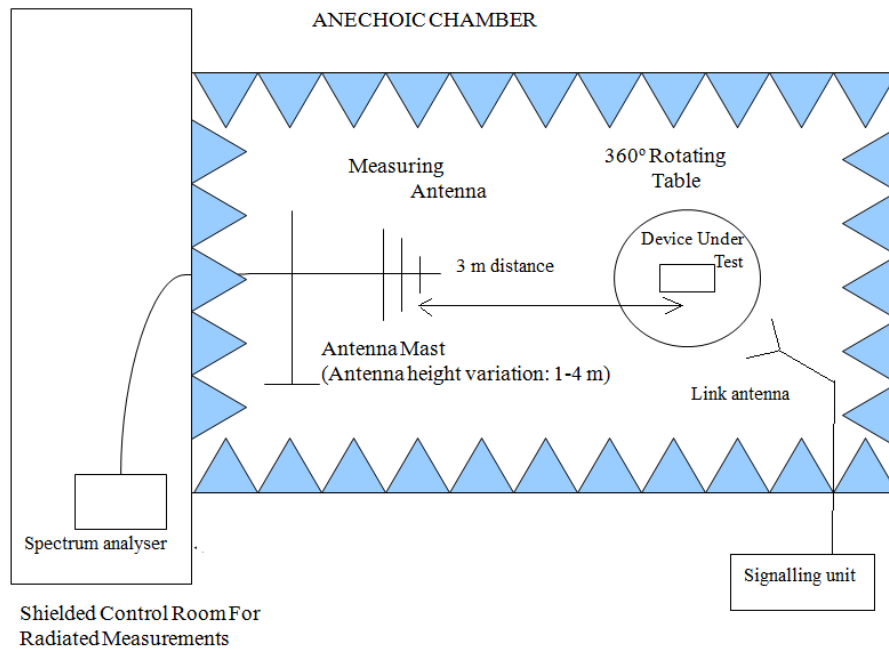
The maximum field strength (dB μ V/m) of each detected emission at less than 20 dB respect to the limit is converted to an equivalent EIRP level (dBm) according to ANSI C63.26 with the formula:

$$\text{EIRP (dBm)} = E(\text{dB}\mu\text{V/m}) + 20 \log (D) - 104.8$$

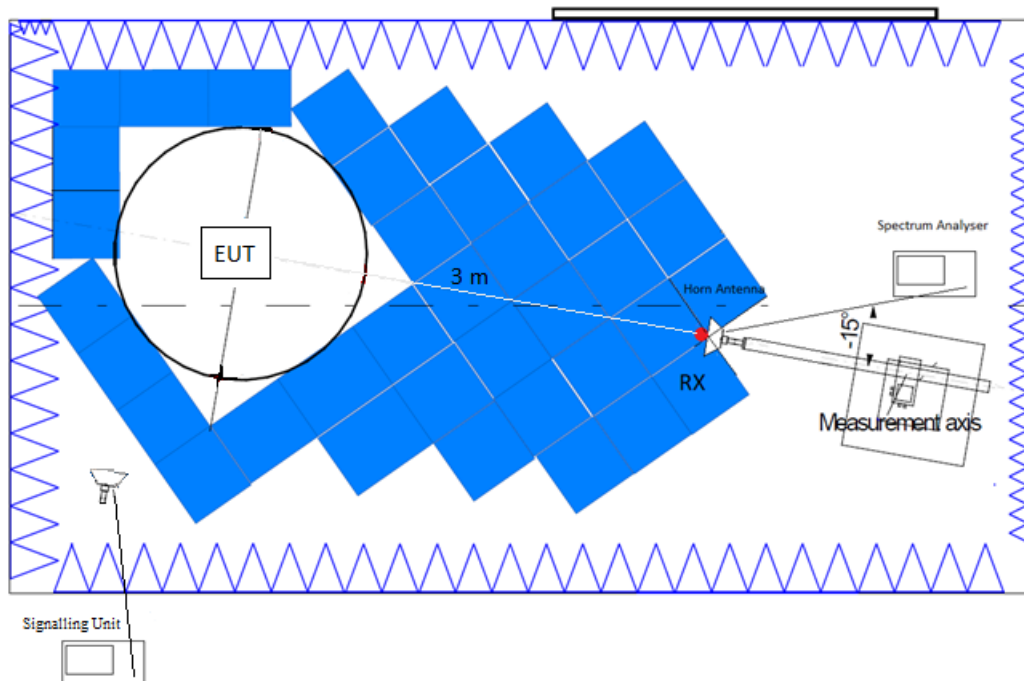
Where D is the measurement distance (in the far field region) in m. $D = 3 \text{ m}$.

TEST SETUP:

Radiated measurements below 1 GHz:



Radiated measurements above 1 GHz:



RESULTS:

A preliminary scan determined the Low channel Band4, QPSK modulation, BW=1.4 MHz, RB=1, Offset=0 as the worst case.

LTE Band 4:

- LOW CHANNEL:

Frequency range 30 MHz - 1 GHz

No spurious frequencies detected at less than 20 dB below the limit.

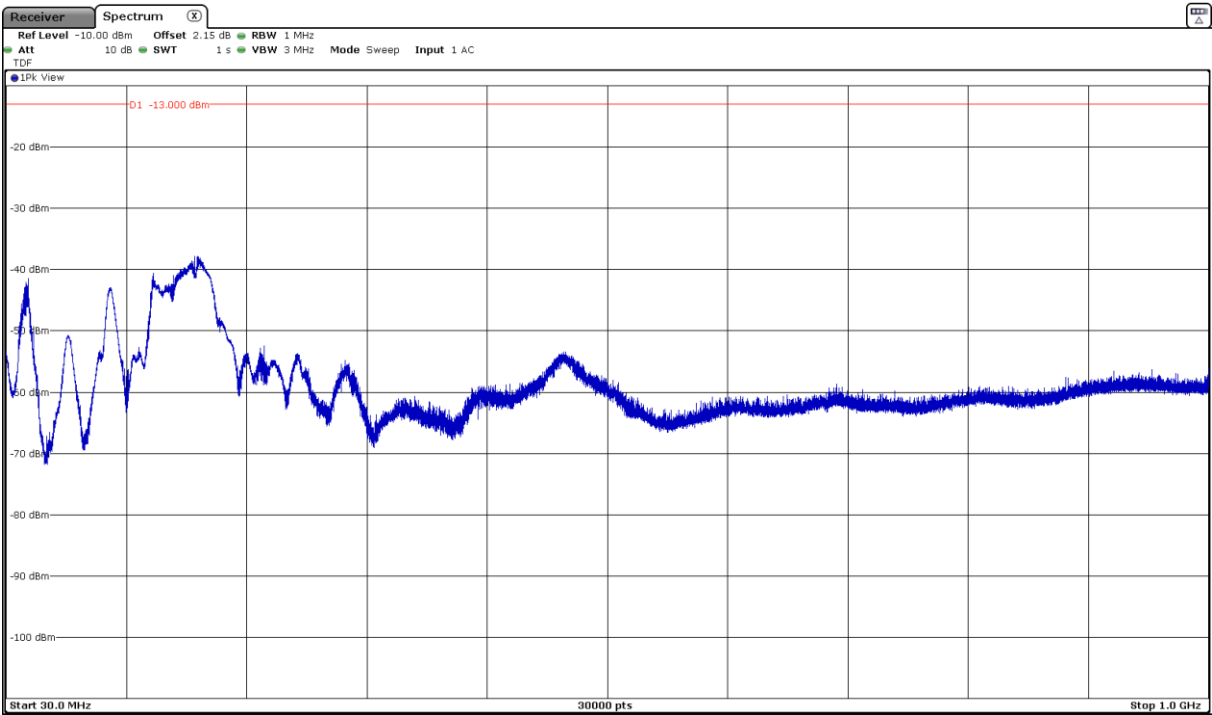
Frequency range 1 - 18 GHz

No spurious frequencies detected at less than 20 dB below the limit.

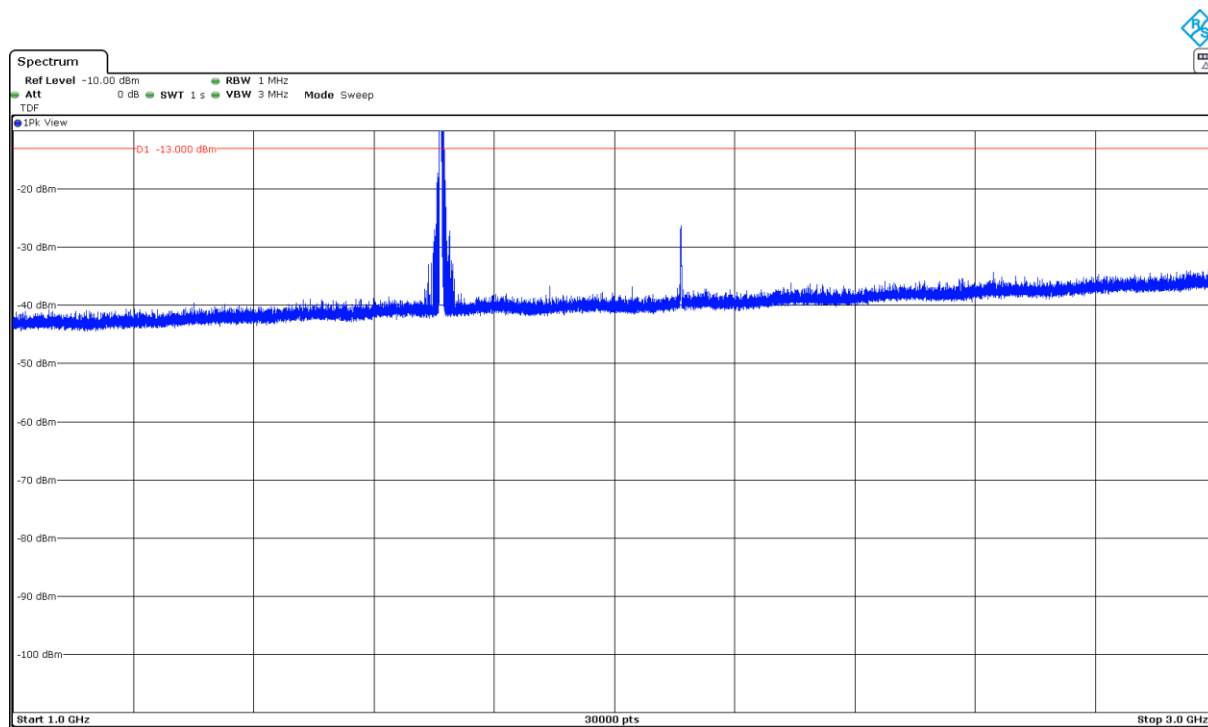
Measurement uncertainty (dB)	<±4.99 for $f < 1\text{GHz}$ <±3.98 for $f \geq 1\text{ GHz up to } 3\text{ GHz}$ <±4.98 for $f \geq 3\text{ GHz up to } 18\text{ GHz}$
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Verdict: PASS

FREQUENCY RANGE 30 MHz - 1 GHz



FREQUENCY RANGE 1 - 3 GHz



The peak above the limit is the carrier frequency.
The peak at 2110 MHz corresponds to the downlink signal.

FREQUENCY RANGE 3 – 18 GHz

