



Test report No:
NIE: 64587RRF.004

Partial Test report

REFERENCE STANDARD:
USA FCC Part 24
CANADA RSS-133

(*) 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 24 (10-1-19 Edition). CANADA RSS-133 Issue 6, Amendment 1, Jan. 2018. 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.

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

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

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

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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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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.004	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. Broadband Horn antenna 18-40 GHz SCHWARZBECK BBHA 9170	2020/05	2023/05
10. RF Pre-amplifier 30 dB, 18 GHz-40 GHz BONN ELEKTRONIK BLMA 1840-1M	2019/02	2021/02
11. Wideband Radio Communication tester ROHDE & SCHWARZ CMW500	2020/04	2021/04
12. AC power supply ELGAR CS-AC35(351SL)	2019/09	2022/09
13. 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 24 / RSS-133 PARAGRAPH		
Requirement – Test case	Verdict	Remark
Clause 24.232/RSS-133 Clause 6.4: RF output power	N/M	
Clause 2.1047/RSS-133 Clause 6.2: Modulation characteristics	N/M	
Clause 24.235/RSS-133 Clause 6.3: Frequency stability	N/M	
Clause 2.1049: Occupied Bandwidth	N/M	
Clause 24.238/RSS-133 Clause 6.5: Spurious emissions at antenna terminals	N/M	
Clause 24.238/RSS-133 Clause 6.5: Radiated emissions	P	(1)
<u>Supplementary information and remarks:</u>		
(1) Only test requested.		

Appendix A: Test results for FCC PART 24 / RSS-133

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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: +1.15 dBi. Pulse W3544B

TEST FREQUENCIES:

LTE Band 2. QPSK AND 16QAM MODULATIONS:

	Channel (Frequency in MHz)					
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Low	18607 (1850.7)	18615 (1851.5)	18625 (1852.5)	18650 (1855)	18675 (1857.5)	18700 (1860)
Middle	18900 (1880)	18900 (1880)	18900 (1880)	18900 (1880)	18900 (1880)	18900 (1880)
High	19193 (1909.3)	19185 (1908.5)	19175 (1907.5)	19150 (1905)	19125 (1902.5)	19100 (1900)

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 2, QPSK modulation, BW=1.4 MHz, RB=1, Offset=0 as the worst case.

Radiated emissions

SPECIFICATION:

FCC § 24.238. RSS-133 Clause 6.5.

The power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. P in watts.

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 for measurements below 17 GHz and at 1 m distance for measurements above 17 GHz.

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 m.

Measurement Limit:

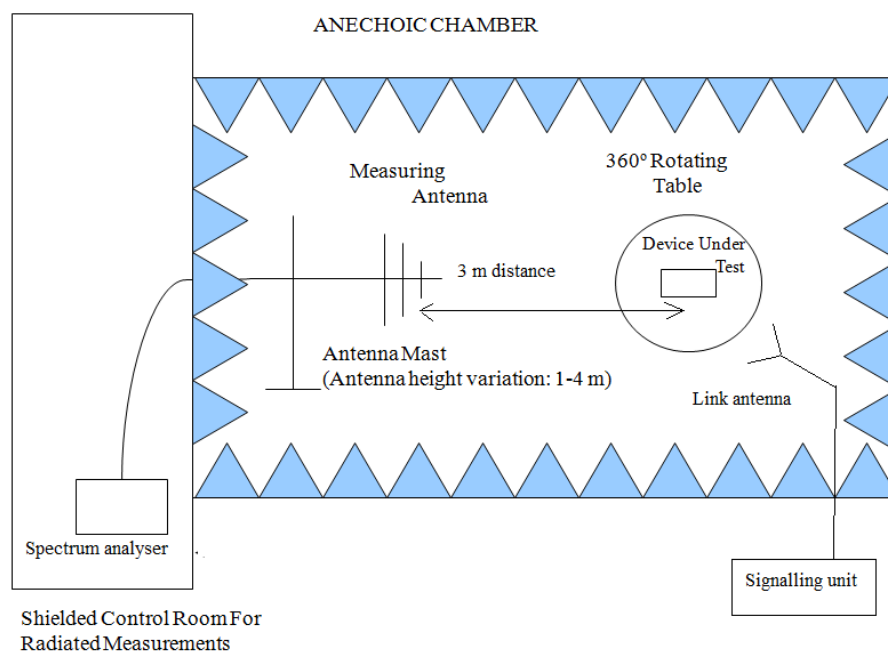
According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. P in watts.

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

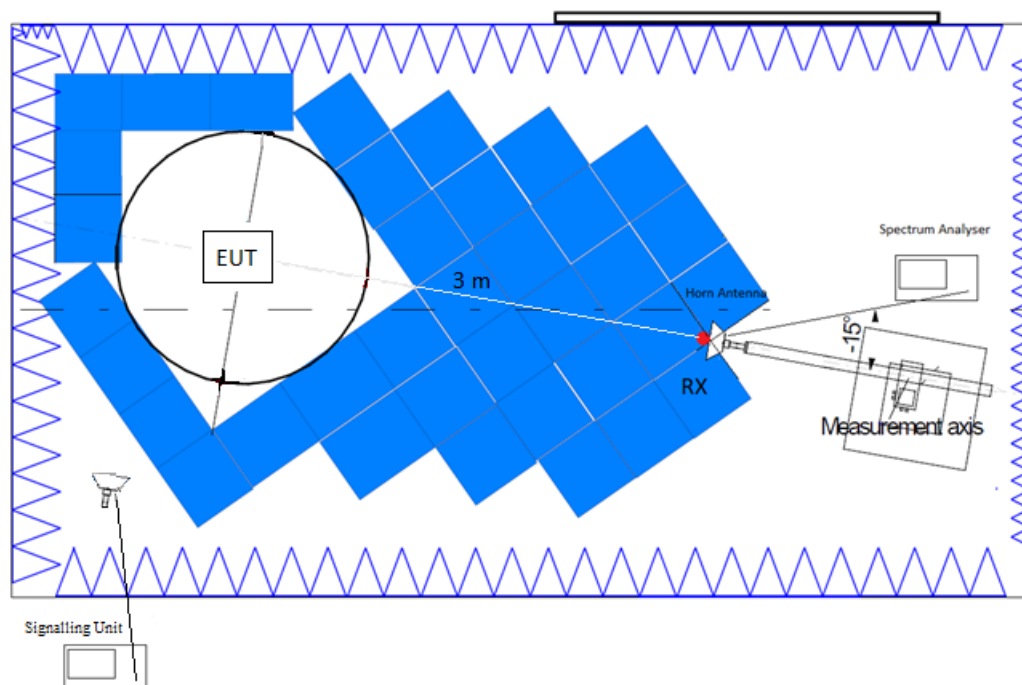
$$P_o \text{ (dBm)} - [43 + 10 \log (P_o \text{ in mwatts}) - 30] = - 13 \text{ dBm}$$

TEST SETUP:

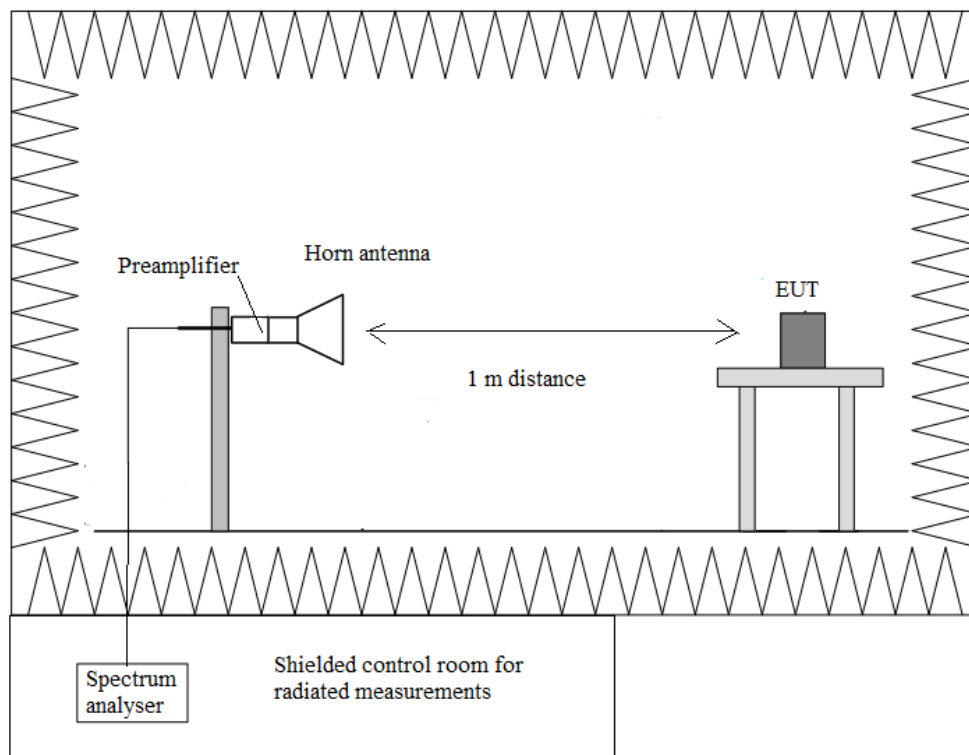
Radiated measurements below 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup $f > 17$ GHz:



RESULTS:

A preliminary scan determined the Low channel Band 2, QPSK modulation, BW=1.4 MHz, RB=1, Offset=0 as the worst case.

LTE Band 2:

- LOW CHANNEL:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 17 GHz

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

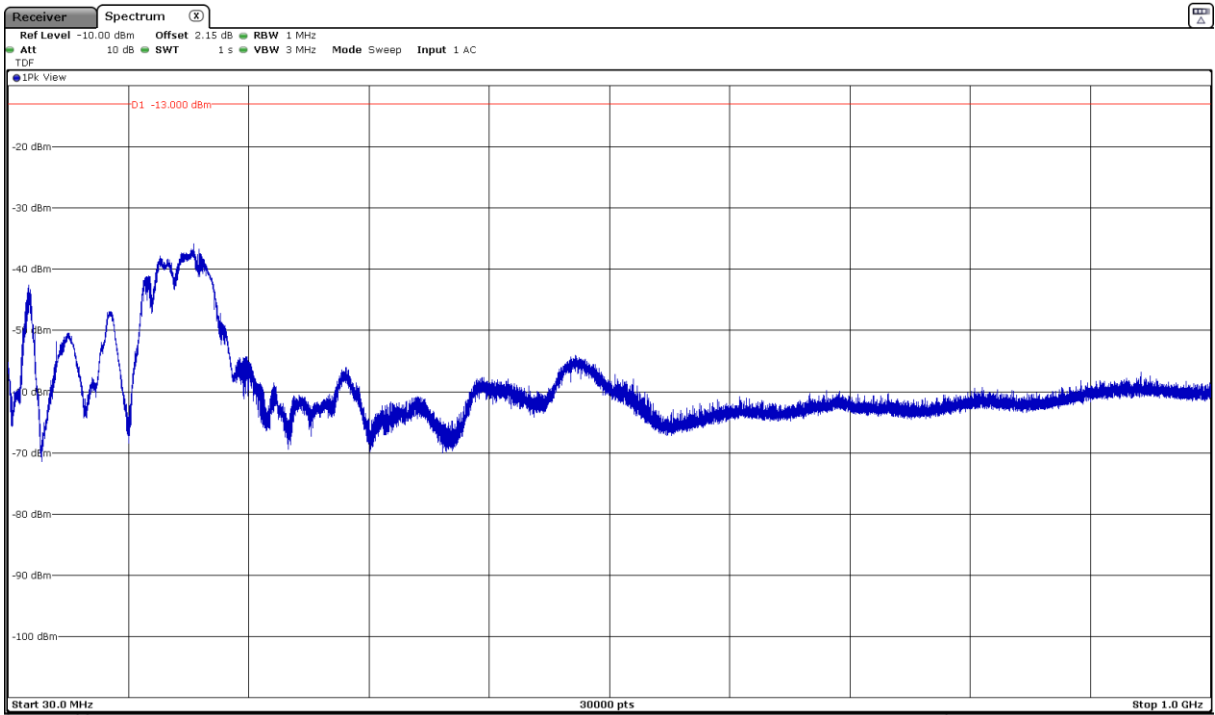
Frequency range 17 - 20 GHz

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

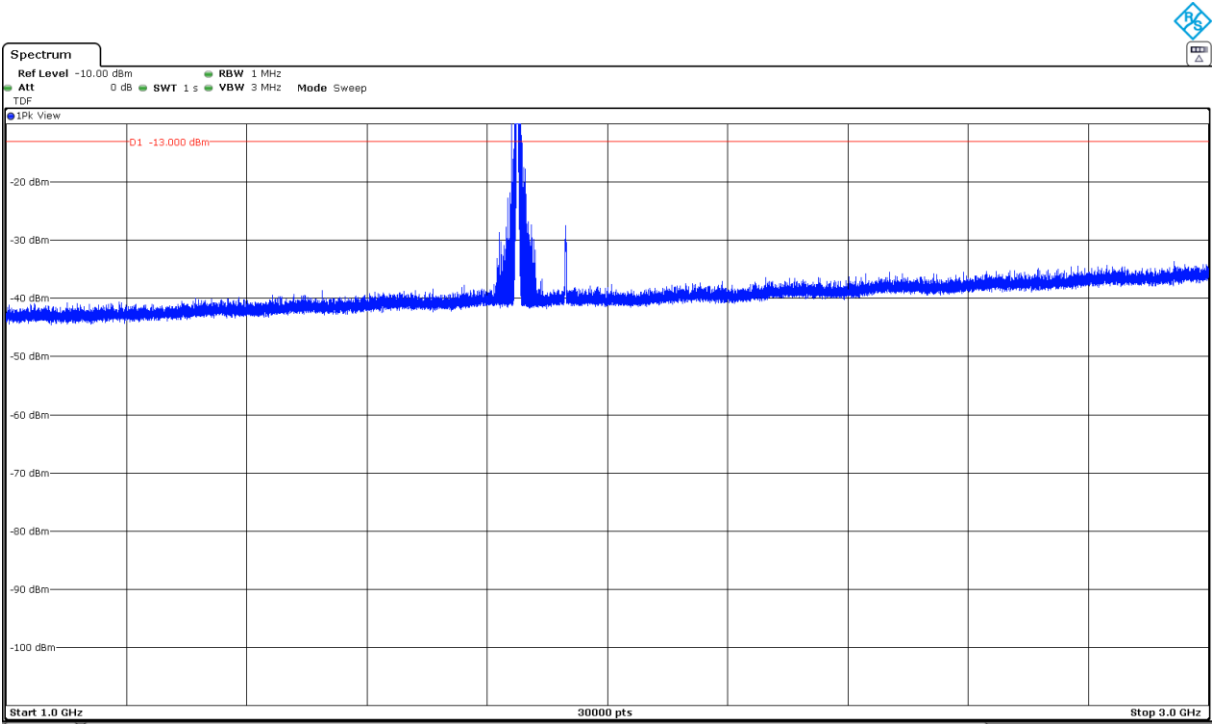
Measurement uncertainty (dB)	<±4.99 for $f < 1\text{GHz}$ <±3.98 for $f \geq 1\text{ GHz up to } 3\text{ GHz}$ <±4.98 for $f \geq 3\text{ GHz up to } 17\text{ GHz}$ <±5.08 for $f \geq 17\text{ GHz up to } 20\text{ GHz}$
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Verdict: PASS

FREQUENCY RANGE 30 MHz - 1 GHz

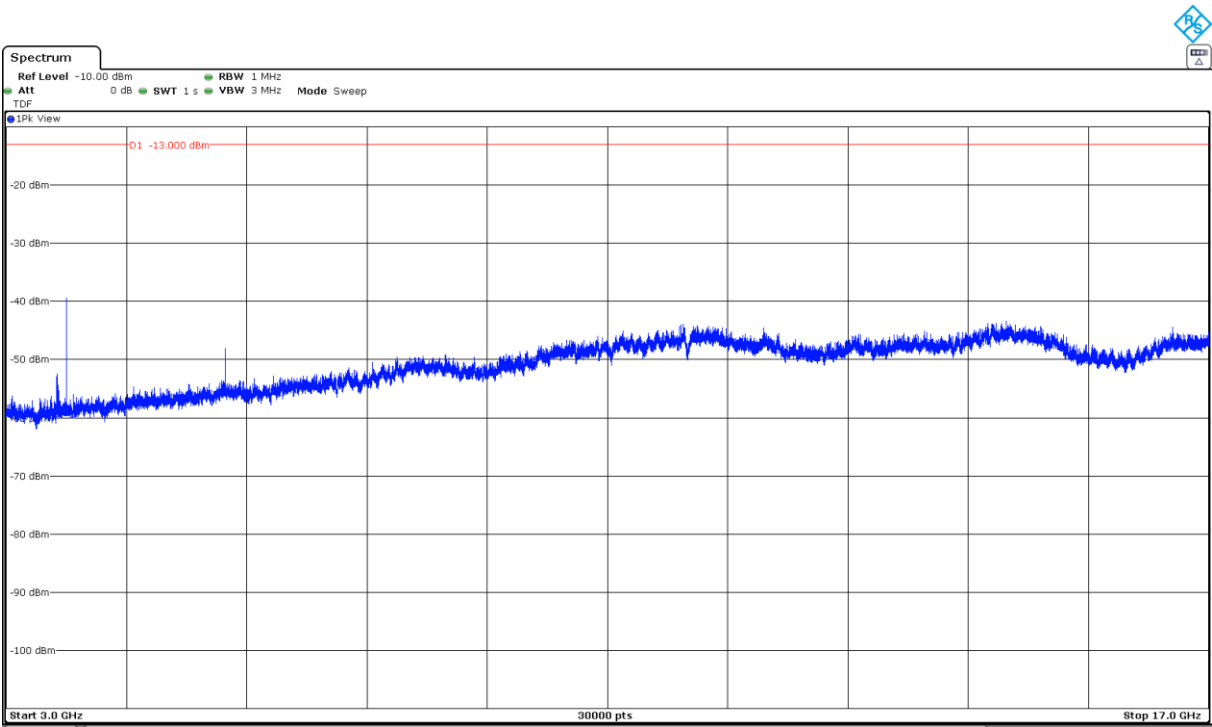


FREQUENCY RANGE 1 - 3 GHz



The peak above the limit is the carrier frequency.
The peak at 1930 MHz corresponds to the downlink signal.

FREQUENCY RANGE 3 - 17 GHz



FREQUENCY RANGE 17 - 20 GHz

