



Test report No:
NIE: 64195RRF.007

Partial Test Report

Reference Standard:
USA FCC Part 22
CANADA RSS-132

(*) Identification of item tested	Telematics Control Unit for trucks with TPMS support, GSM, BLE, LF Transmitter and GNSS receiver
(*) Trademark	LDL Technology
(*) Model and /or type reference	19239
Other identification of the product	HW version: 319-158-2090 SW version: 414069191013 FCC ID: T4519239 IC: 6450A-19239 Cell module FCC ID: RI7ME910C1WW Cell module IC: 5131A-ME910C1WW IMEI TAC: 35308109
(*) Features	Bluetooth LE, RF 434, GSM/LTE, GNSS receiver
Applicant	LDL TECHNOLOGY Parc Technologique du Canal, 3 rue Giotto, 31520, Ramonville-Saint-Agne, FRANCE
Test method requested, standard	USA FCC Part 22 (10-1-19 Edition). CANADA RSS-132 Issue 3, Jan. 2013. 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	2020-09-28
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.

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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.

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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 19239 is a system that aims to offer telematic services and the device acts like gateway, receiving and transmitting data.

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
64195C/028	Telematics Control Unit	19239	9d99E039	2020-06-01
64195C/020	Harness	--	--	2020-03-25
64195C/013	Metallic mounting bracket	--	--	2020-03-25

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

Test sample description

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾		
		Power and data (RS232) test cable	1	☒	☐	☐	
				☐	☐	☐	
				☐	☐	☐	
				☐	☐	☐	
				☐	☐	☐	
Supplementary information to the ports..... :							
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☐ AC:		☐	☐	☐	☐	☐
	☐ AC:		☐	☐	☐	☐	☐
	☒ DC: nominal 12V/24V (according to vehicle battery)						
	☒ DC: tolerated range: 8 to 32V						
Rated Power	12W						
Clock frequencies.....	8MHz, 32 MHz, 32.768 KHz, 16 MHz						
Other parameters							
Software version	414069191013						
Hardware version	319-158-2090						
Dimensions in cm (W x H x D)	18 x 6.5 x 13						
Mounting position	☐	Table top equipment					
	☐	Wall/Ceiling mounted equipment					
	☐	Floor standing equipment					
	☐	Hand-held equipment					
	☒	Other: attached to provided bracket, mounted on vehicle					

Modules/parts.....:	Module/parts of test item	Type	Manufacturer
	TCU 1.2 4G Autolocation	EUT	LDL Technology
	TCU 1.2 Bracket	Metallic mounting bracket	LDL Technology
Accessories (not part of the test item)	Description	Type	Manufacturer
Documents as provided by the applicant.....:	Description	File name	Issue date

⁽³⁾ Only for Medical Equipment

Identification of the client

LDL TECHNOLOGY

Parc Technologique du Canal, 3 rue Giotto, 31520, Ramonville-Saint-Agne, FRANCE

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2020-06-08
Date (finish)	2020-06-08

Document history

Report number	Date	Description
64195RRF.007	2020-09-28	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: Nicolás Salguero.

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. Horn Antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2019/11	2022/11
4. Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2020/04	2023/04
5. RF Pre-amplifier, 40 dB ,1-18 GHz BONN ELEKTRONIK BLMA 0118-1M	2020/05	2021/05
6. EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2019/10	2021/10
7. Signal and Spectrum Analyzer 10 Hz - 40 GHz ROHDE AND SCHWARZ FSV40	2019/09	2021/09
8. DC Power Supply, 30V/5A KEYSIGHT TECHNOLOGIES U8002A	N.A.	N.A.
9. Digital multimeter FLUKE 175	2019/10	2020/10
10. Wideband Radio Communication Tester ROHDE AND SCHWARZ CMW500	2020/04	2021/04

Testing verdicts

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

Summary

FCC PART 22 / RSS-132 PARAGRAPH		
Requirement – Test case	Verdict	Remark
FCC 22.913 / RSS-132 5.4: RF output power	N/M	(1)
FCC 2.1047 / RSS-132 5.2: Modulation characteristics	N/M	(1)
FCC 22.355 / RSS-132 5.3: Frequency stability	N/M	(1)
FCC 2.1049: Occupied Bandwidth	N/M	(1)
FCC 22.917 / RSS-132 5.5: Spurious emissions at antenna terminals	N/M	(1)
FCC 22.917 / RSS-132 5.5: Radiated emissions	P	
<u>Supplementary information and remarks:</u>		
(1) Test not requested. Radiated emissions test only requested.		

Appendix A: Test results for FCC 22 / RSS-132

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TEST CONDITIONS

POWER SUPPLY (V):

Vn: 12 Vdc

Type of Power Supply: DC External (car battery).

The subscripts 'n', 'min' and 'max' indicate voltage test conditions (nominal, minimum and maximum respectively).

ANTENNA:

LOW Bands	GAIN	ANTENNA TYPE
LTE Band 5	+3.5 dBi	Internal (SMD)

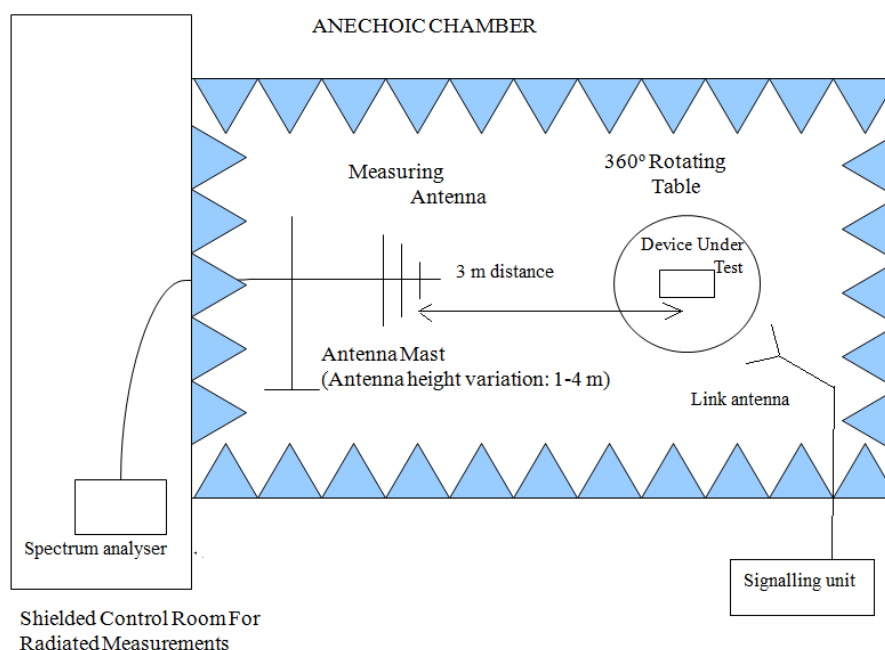
TEST FREQUENCIES:

LTE. QPSK AND 16QAM MODULATION (BAND 5)

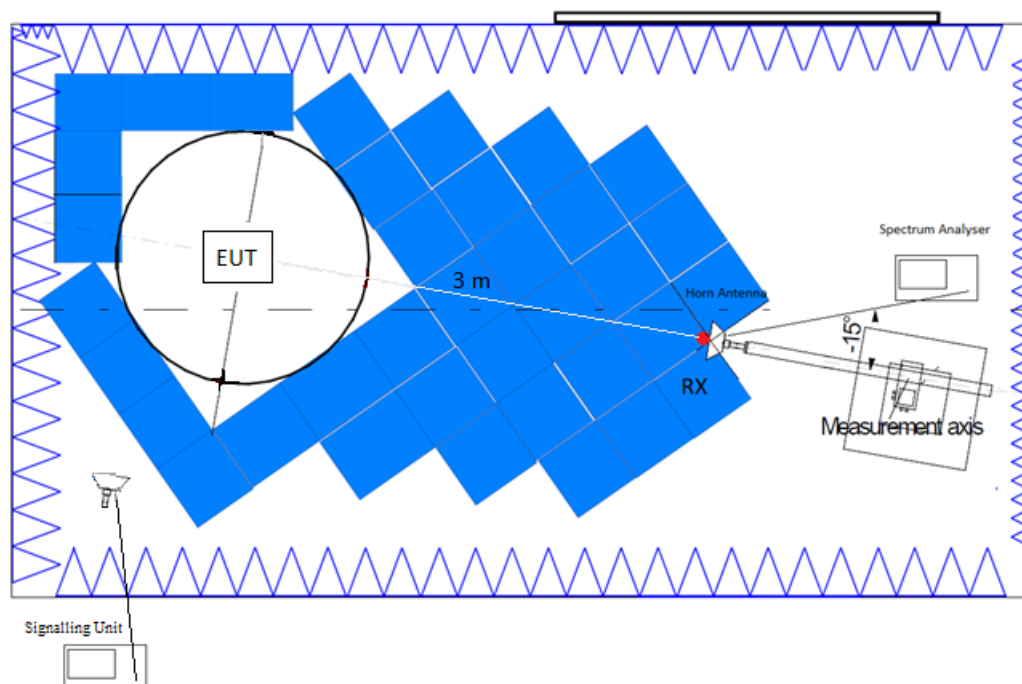
	Channel (Frequency, MHz)			
	BW = 1.4 MHz	BW = 3 MHz	BW=5 MHz	BW=10 MHz
Lowest	20407 (824.70)	20415 (825.50)	20425 (826.50)	20450 (829.00)
Middle	20525 (836.50)	20525 (836.50)	20525 (836.50)	20525 (836.50)
Highest	20643 (848.30)	20635 (847.50)	20625 (846.50)	20600 (844.00)

TEST SETUP:

Radiated measurements below 1 GHz.



Radiated measurements above 1 GHz.



Radiated emissions

SPECIFICATION:

FCC §22.917:

RSS-132. Clause 5.5:

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 highest frequency generated within the equipment.

The EUT was placed on a 1 meter high 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 field strength (dBμV/m) is measured and recorded.

The maximum field strength (dBμV/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:

$EIRP (dBm) = E (dBμV/m) + 20\log(D) - 104.8$; where D is the measurement distance (in the far field region) in m. $D = 3 \text{ m}$

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:

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

RESULTS:

LTE Band 5:

QPSK and 16QAM Modulations:

A preliminary scan determined the QPSK modulation, BW=5 MHz, RB Size=1, RB Offset=0 as the worst case. The following tables and plots show the results for the worst case modulation.

- LOW CHANNEL:

Frequency range 30 MHz - 1 GHz

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (MHz)	E.I.R.P (dBm)	Polarization	Detector	Measurement Uncertainty (dB)
820.6710	-30.12	H	RMS	<± 4.99
820.8170	-30.97	H	RMS	<± 4.99
821.0590	-32.55	H	RMS	<± 4.99
821.3020	-27.77	H	RMS	<± 4.99
821.5440	-27.31	H	RMS	<± 4.99
821.7380	-32.10	H	RMS	<± 4.99
822.1750	-23.21	H	RMS	<± 4.99
822.4660	-25.86	H	RMS	<± 4.99
822.7080	-20.12	H	RMS	<± 4.99
822.8540	-14.80	H	RMS	<± 4.99

Frequency range 1 - 10 GHz

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector	Measurement Uncertainty (dB)
1.648767	-31.78	H	Peak	<± 4.98

- MIDDLE CHANNEL:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 10 GHz

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector	Measurement Uncertainty (dB)
1.668633	-30.12	H	Peak	<± 4.98

- HIGH CHANNEL:

Frequency range 30 MHz - 1 GHz

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

Frequency range 1 - 10 GHz

Spurious frequencies at less than 20 dB below the limit:

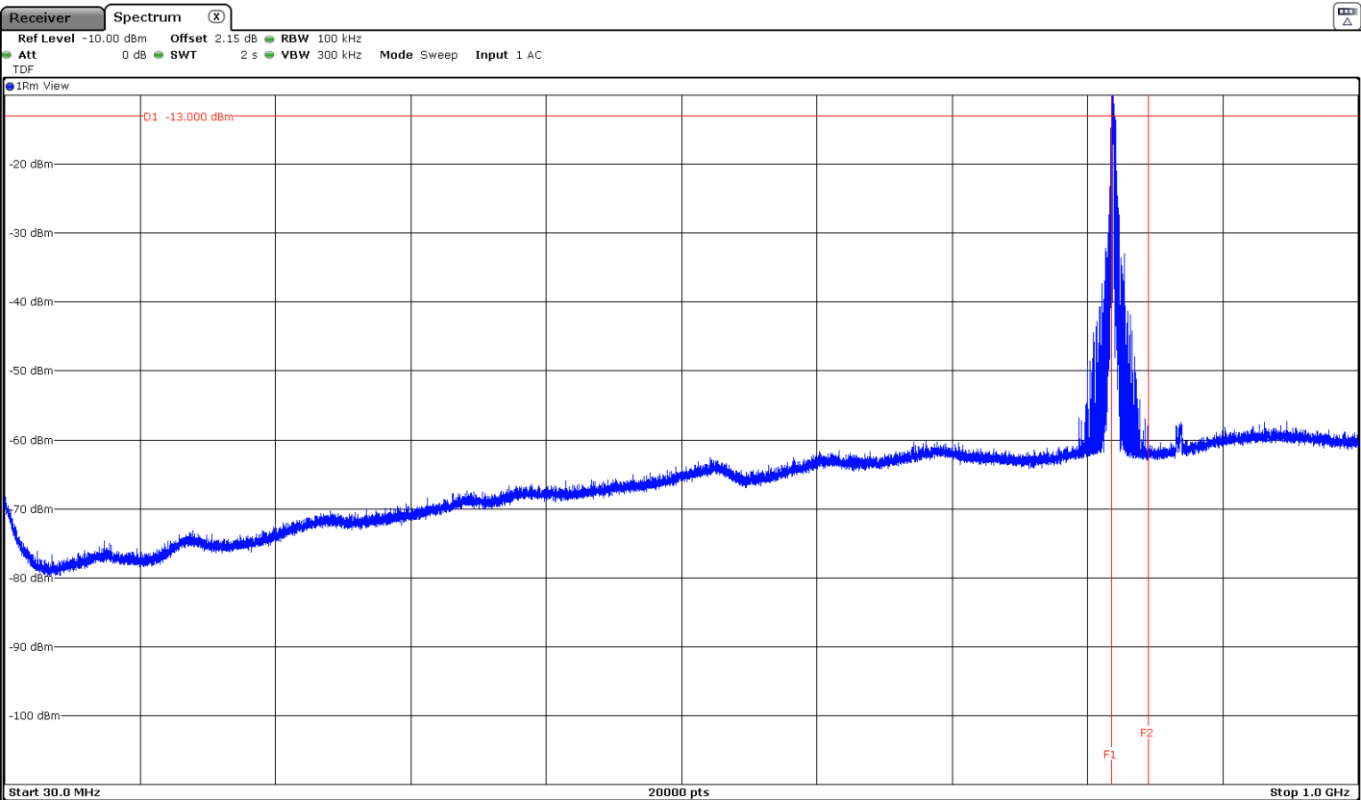
Spurious frequency (GHz)	E.I.R.P (dBm)	Polarization	Detector	Measurement Uncertainty (dB)
1.688767	-30.31	H	Peak	<± 4.98

Measurement uncertainty (dB): <± 4.99 for $f \geq 30$ MHz up to 1 GHz
<± 4.98 for $f \geq 1$ GHz up to 10 GHz

Verdict: PASS

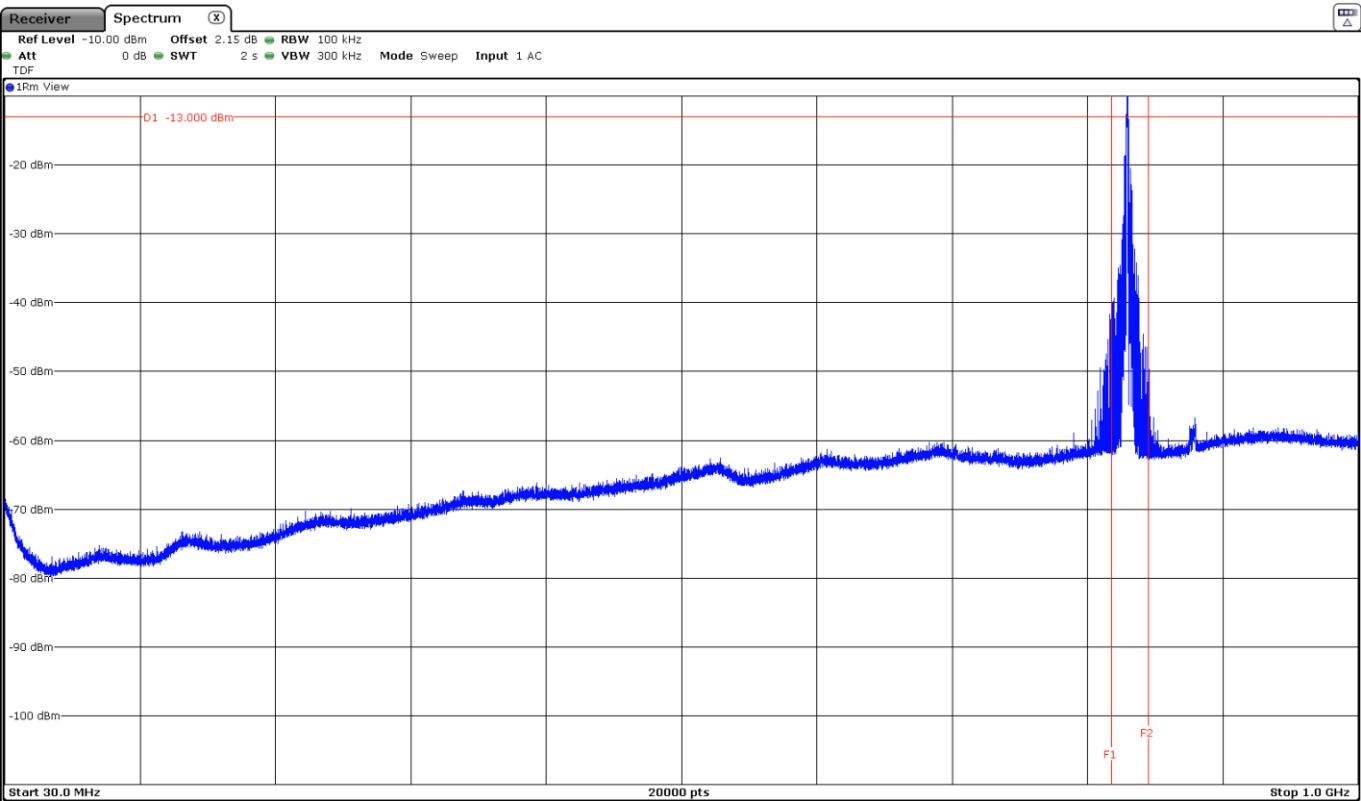
FREQUENCY RANGE 30 MHz - 1 GHz (worst case):

- Lowest Channel:



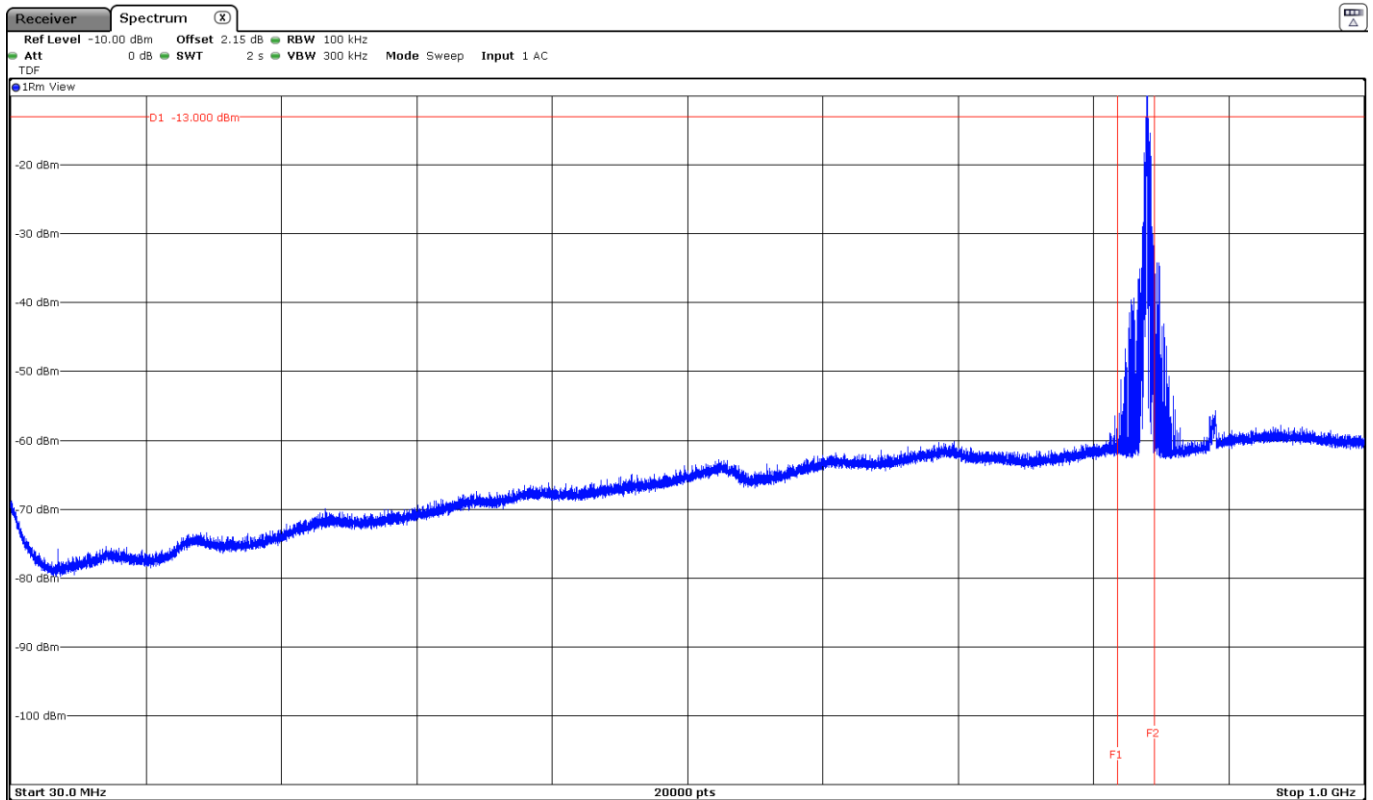
The peak above the limit is the carrier frequency.

- Middle Channel:



The peak above the limit is the carrier frequency.

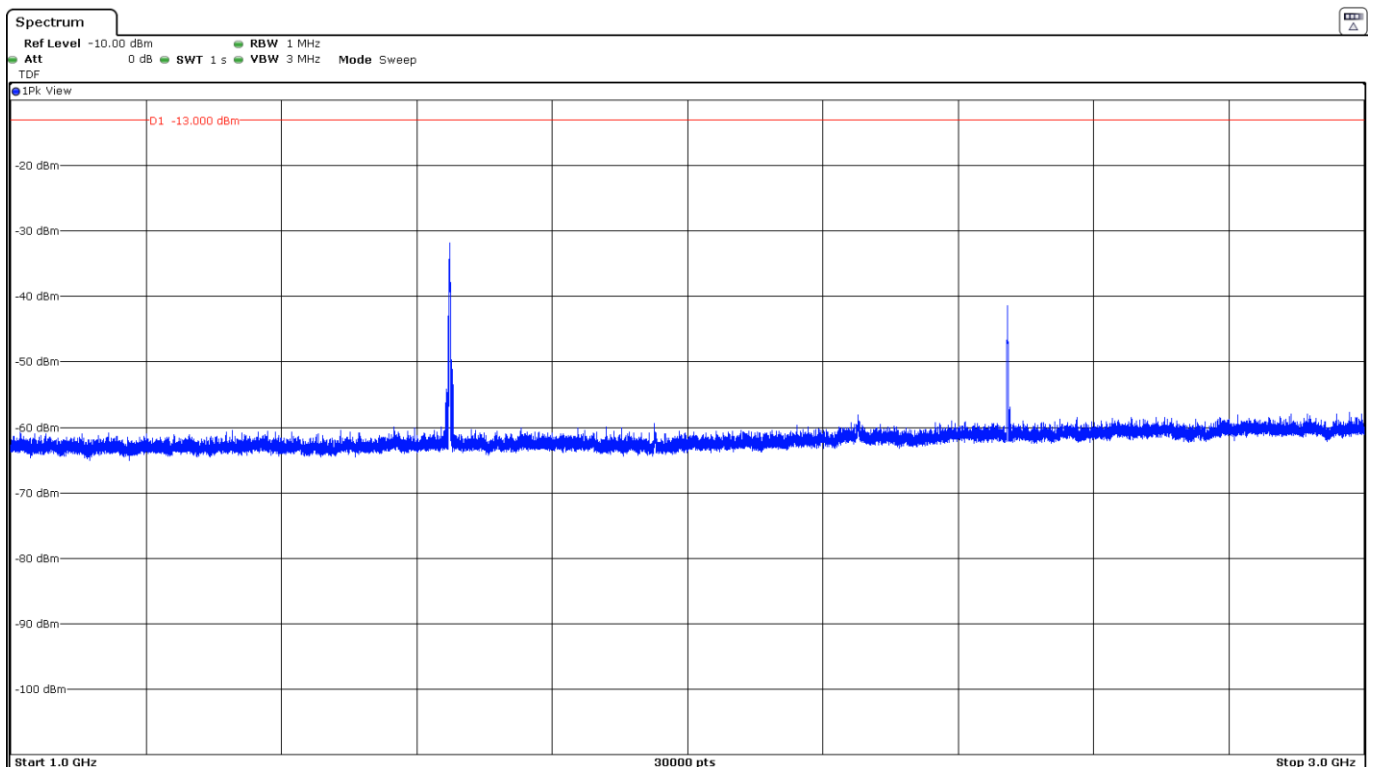
- Highest Channel:

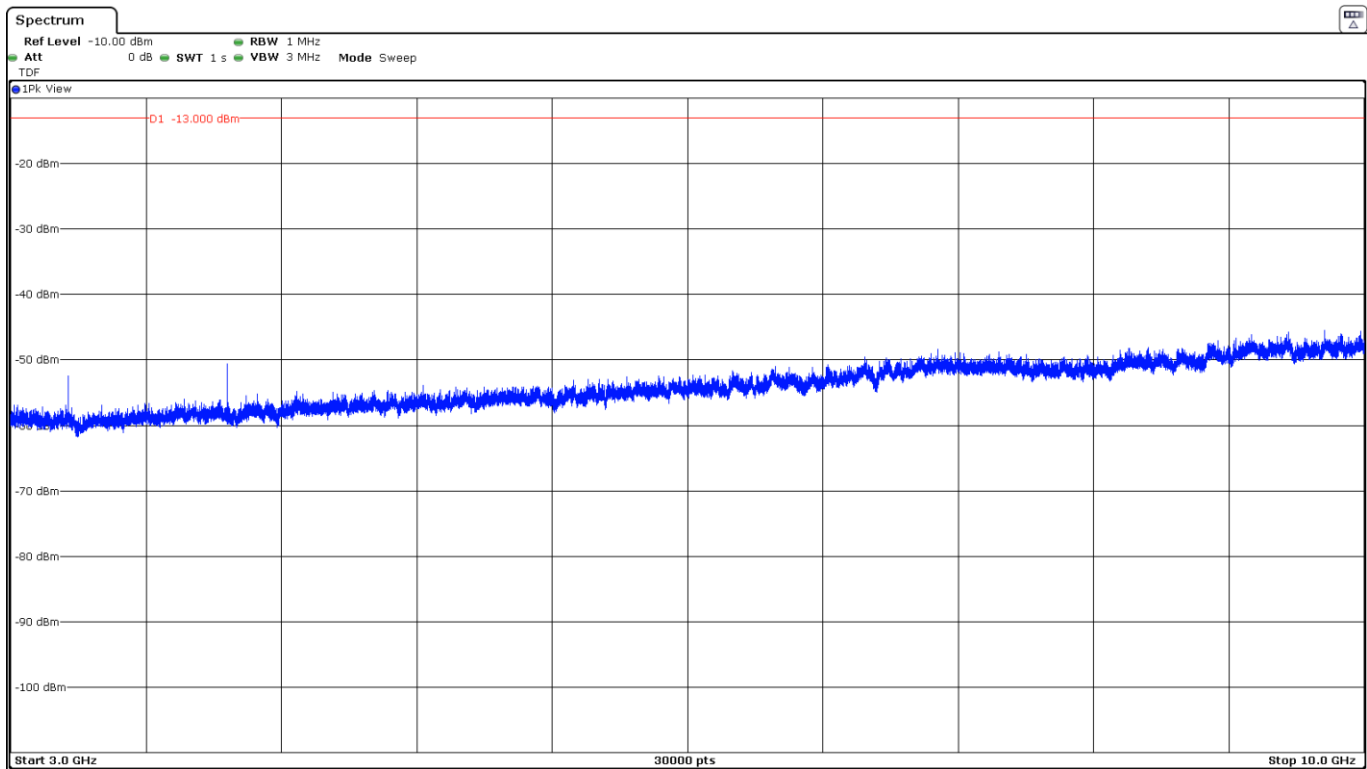


The peak above the limit is the carrier frequency.

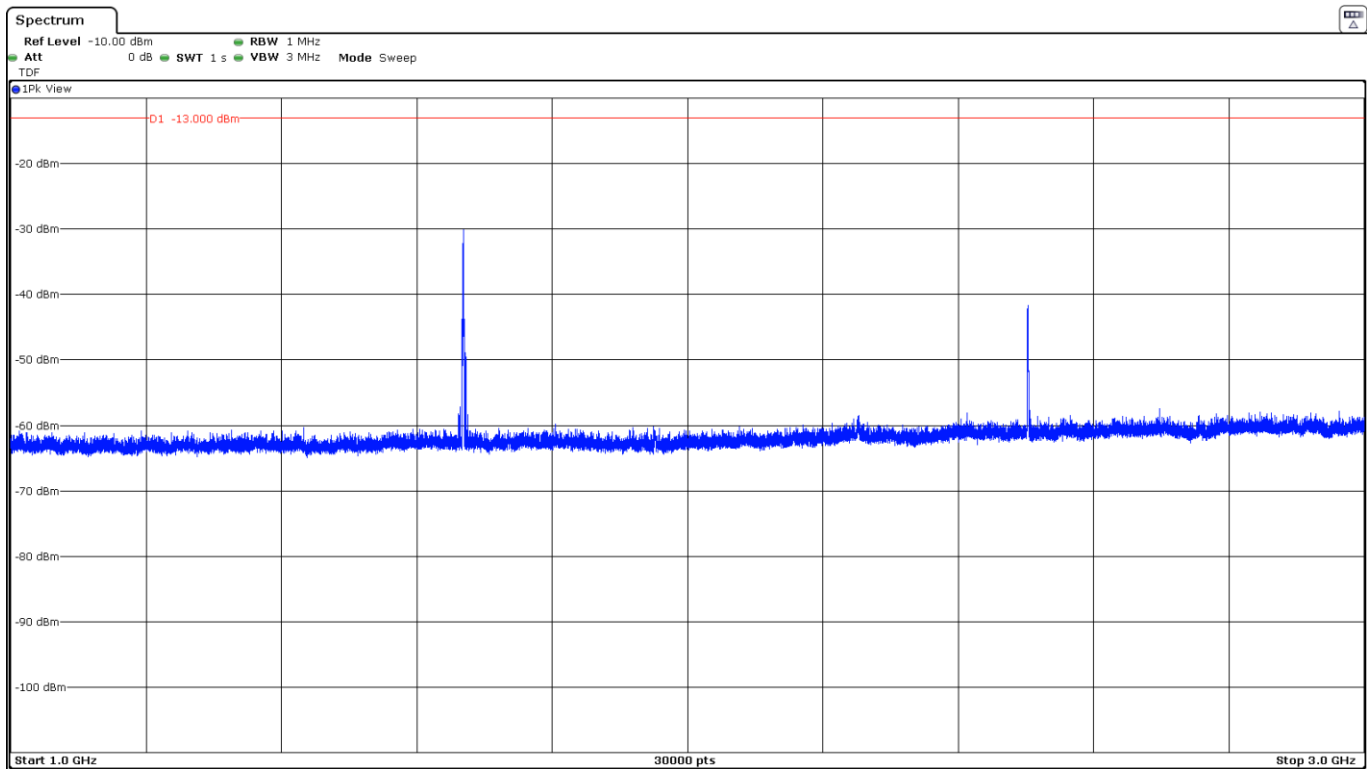
FREQUENCY RANGE 1 - 10 GHz (worst case):

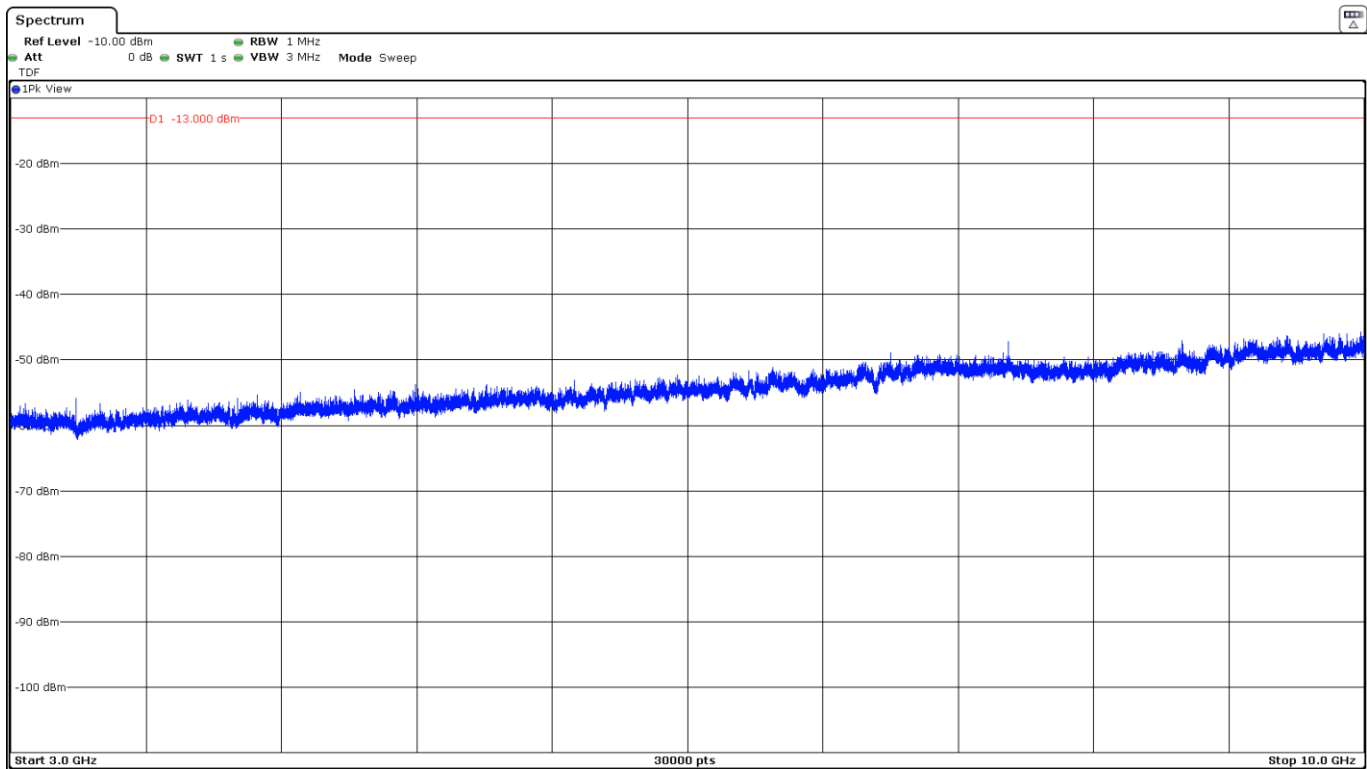
- Lowest Channel:





- Middle Channel:





- Highest Channel:

