



REPORT

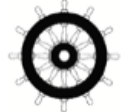
For

Fluid Life Corporation

4371 Savaryn Drive SW
Edmonton, Alberta
T6X 2E8, Canada

Date: 23 December 2020
Report No.: 19882-3E
Revision No.: 0
Project No.: 19882
Model No.: Telematics
FCC ID: 2AYWR-FLTEL1

ONE STOP GLOBAL CERTIFICATION SOLUTIONS





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TABLE OF CONTENTS

TEST REPORT	3
Revision History	4
Description of Radio Module	4
Program details	5
Description of Equipment Under Test and Variant Models	5
Client Equipment Used During Test.....	6
Software and Firmware	6
Input/Output Ports	6
Power Interface	7
EUT Operation Modes	7
EUT Configuration Modes	7
Test Equipment Verified for function	7
Measurement Uncertainty	8
Result Summary	9
Out of band emissions	10
Test setup	11
Measurement Procedure	12
Test Result.....	12
Calculation of Radiated Emission Limits	13
Graphical Representation for Emission - Radiated 30to1000MHz.....	14
Graphical Representation for Emission - Radiated 1 to 9GHz.....	15

TEST REPORT

Radiated Spurious for FCC 47 CFR Part 15 Subpart C

Report Reference No.	19882-3E	
Report Revision History	✓ Rev. 0: 23 December 2020	
Compiled by (+ signature)	Jeremy Lee	
Approved by (+ signature)	David Johanson	
Date of issue	23 December 2020	
Total number of pages	15	
FCC Site Registration No.:		
	721268	
IC Site Registration No.:		
	5970A	
Testing Laboratory		
	LabTest Certification Inc.	
Address		
	Unit 205 – 8291 92st Delta, B.C. V4G 0A4, Canada	
Applicant's name		
	Fluid Life Corporation	
Address		
	4371 Savaryn Drive SW, Edmonton, AB, T6X 2E8 Canada	
Manufacture's Name		
	Same as Applicant	
Address		
	Same as Applicant	
Test specification:		
Standards	<ul style="list-style-type: none"> ➤ FCC 47 CFR Part 22, Subpart H; 2020 ➤ IC RSS-132 Issue 3, January 2013 ➤ IC RSS-139, Issue 3, 2015 ➤ IC RSS-133, Issue 6, 2018 	
Test procedure	<ul style="list-style-type: none"> ➤ ANSI C63.26:2013 ➤ ANSI C63.4:2014 ➤ RSS-Gen, Issue 5, April 2018 ➤ KDB 971168 D01 Power Meas License Digital Systems v03r01 	
Non-standard test method.....	N/A	
Test Report Form(s) Originator	Jeremy Lee	
Master TRF	1036_Rev2 – RF Report Template	
Test item description :		
Trade Mark.....	n/p	

Model/Type reference	Telematics
Serial Number	n/p
FCC ID	2AYWR-FLTEL1
IC ID	-
Possible test case verdicts:	
- test case does not apply to the test object.....	N/A
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement	F (Fail)
Testing:	
Date of receipt of test item	28 Oct. 2020
Date (s) of performance of tests	19 Nov. 2020

Revision History

Revision	Date	Reason For Change	Author(s)
0	23 December 2020	Initial Data	Jeremy Lee

Description of Radio Module

Application for	Cellular
Tx Frequency Range	WCDMA Band 2: 1852.4-1907.6 MHz WCDMA Band 4: 1712.4-1752.6 MHz WCDMA Band 5: 826.4-846.6 MHz
Rx Frequency Range.....	WCDMA Band 2: 1932.4-1987.6 MHz WCDMA Band 4: 2112.4-2152.6 MHz WCDMA Band 5: 871.4-891.6 MHz
Conducted Output Power (in dBm) at Antenna Connector Port on HOST	+19.60dBm at 1Mbps data rate +12.89dBm at MCS7 data rate
Field Strength at 3 meters	99.35 dBuV/m @ 3m, connected to Telus LTE.
Type of Modulation	QPSK
Antenna Type/Gain.....	MA600.A.ABC.007, MA600 Spartan Screw mount 3in1 Combination Antenna WCDMA Band 2: Peak Gain: 3.0dBi, Average Gain: -3.1dBi WCDMA Band 4: Peak Gain: 5.1dBi, Average Gain: -3.1dBi WCDMA Band 5: Peak Gain: 2.1dBi, Average Gain: -4.7dBi
Equipment mobility	Yes, on Vehicle.
Nominal Voltages for:	<input checked="" type="checkbox"/> stand-alone equipment <input type="checkbox"/> combined (or host) equipment

Supply Voltage:	<u> </u> 12V <u> </u> DC <u> </u> 1.0 <u> </u> Amps
If DC Power:	<u> </u> Internal Power Supply <u> X </u> External Power Supply or AC/DC adapter <u> </u> Battery

Program details

Testing Facility by procedure:	
<input checked="" type="checkbox"/> All Testing:	LabTest Certification Inc.
Testing location/ address	Unit 3128-20800 Westminster HWY, Richmond, B.C. V6V 2W3 Canada

Summary of testing:	
Tests performed (name of test and test clause): Radiated Field Emissions	Testing location: In SAC, Richmond
<p>The tests indicated in Test Summary were performed on the product constructed as described below. The test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted. Based on the results of our investigation, we have concluded the product tested complies with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. LabTest does not make any claims of compliance for samples or variants which were not tested.</p>	

Description of Equipment Under Test and Variant Models

<p>Description: The EUT is Telematic solution of Fluid Life Corporation. It is including three different Radio in one unit with 3in1 Antenna for communicating with three different Telemetry Device Modes, Direct, Close Mobile Assets and Distant Mobile Assets. It is including pre-certified Modular Radio module for Cellular service. FCC ID: 2AYWR-FLTEL1</p>
<p>Variant Models: The following variant models were not tested as part of this evaluation but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested. None</p>

Client Equipment Used During Test

Use*	Product Type	Manufacturer	Model	Comments
EUT	Telematic	Fluid Life Corp.	Telematic	
EUT	Antenna	Taoglas	MA600.A.ABC.007	3in1 Combination Antenna, GPS, Cellular and WiFi
SIM	Power Supply	DVE	DSA-12PFT-12FUS	Input: 115VAC, 60Hz, 0.5A Output: 12VDC, 1A Max.

Abbreviations:
 EUT - Equipment Under Test,
 SIM - Simulator (Not Subjected to Test)

Software and Firmware

Use*	Description	Version
n/p		

Abbreviations:
 EUT - Equipment Under Test,
 AE - Auxiliary/Associated Equipment, or
 SIM - Simulator (Not Subjected to Test)

Input/Output Ports

Port #	Name	Type*	Cable Max. >3m	Cable Shielded	Comments
1	GPS	TP	N	Y	Connected to Antenna via separated Coaxial cable
2	Cell	TP	N	Y	Connected to Antenna via separated Coaxial cable
3	WiFi	TP	N	Y	Connected to Antenna via separated Coaxial cable
4	Ethernet #1	TP	Y	N	Only one port of ethernet can be connected to Network
5	Ethernet #2	TP	Y	N	Only one port of ethernet can be connected to Network
6	USB	I/O	N	N	Only connecting for maintenance purpose
7	Sensors A	I/O	Y	N	Connecting to Wired Sensor
8	Sensors B	I/O	Y	N	Connecting to Wired Sensor
9	Power	AC/DC	N	N	Connecting to Power Source, For testing, connected to DSA-12PFT-12FUS
10	ModBus	I/O	Y	N	Connecting to ModBus
11	Com	I/O	Y	N	Connecting to Com communication device

12	USB	I/O	N	N	Connecting to USB device
13	CAN/CDL	I/O	Y	N	Connecting to CAN/CDL unit(s)

*Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
 I/O = Signal Input or Output Port (Not Involved in Process Control)
 TP = Telecommunication Ports

Power Interface

Mode #	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
1	115	-	-	AC-60Hz	-	via DSA-12PFT-12FUS

EUT Operation Modes

Mode #	Description
1	Keep operating via Cellular, Ethernet and sensors.

EUT Configuration Modes

Mode #	Description
1	EUT on test table and connected to Antenna, Laptop, 2nd Telematic and Term.

Test Equipment Verified for function

Model #	Description	Checked Function	Results
N9038A	EMI Receiver	Frequency and Amplitude	In Tolerance
SAS-540	Antenna, 30 to 300MHz	Checked structure	Normal – no damage.
VUSLP9111B	Antenna, 300 to 1,000MHz	Checked structure	Normal – no damage.
JB1	Antenna, 30 to 2000MHz	Checked structure	Normal – no damage.
SAS-571	Antenna, 1 to 18GHz	Checked structure	Normal – no damage.
SAS-572	Antenna, 18 to 25GHz	Checked structure	Normal – no damage.
8449B	Pre-Amplifier	Gain	In Tolerance
LIN-120C	LISN	Checked Insertion Losses	In Tolerance
AL-130	Antenna, 9kHz to 30MHz	Checked structure	Normal – no damage.

Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests:

Parameter	Uncertainty
Radio Frequency	± 0.2 ppm
RF Power, Conducted	± 1 dB
Radiated Emission, 30 to 250MHz	± 4.37 dB
Radiated Emission, 250 to 1000MHz	± 4.29 dB
Radiated Emission, 1 to 6GHz	± 5.02 dB
Radiated Emission, 6 to 18GHz	± 5.02 dB

Uncertainty figures are valid to a confidence level of 95%.

Result Summary

The Compliance Status is a judgment based on the direct measurements and calculated highest emissions to appropriate standard limits. Measurement uncertainty values, provided on calibration certificates, were not be used in the judgment of the final status of compliance.

47 CFR FCC Part 22 and IC RSS-132			
Test Type	Regulation	Measurement Method	Result
FCC Part 22 & RSS-132			
Out of band emissions	FCC 22.917(d) & RSS-132	ANSI C63.26 & KDB 971168 D01 Power Meas License Digital Systems v03r01	P

Out of band emissions

Governing Doc	FCC 22.917 & RSS-132	Room Temperature (°C)	21.2		
Basic Standard	ANSI C63.26, Sub-clause 5.5.4 KDB 971168 D01 Power Meas License Digital Systems v03r01, Sub-clause 6.2	Relative Humidity (%)	40.2		
Test Location	Richmond	Barometric Pressure (kPa)	100.1		
Test Engineer	Jeremy Lee	Date	19 Nov. 2020		
EUT Voltage	<input type="checkbox"/> DC <input checked="" type="checkbox"/> 115VAC @ 60Hz				
Test Equipment Used	Manufacturer	Model	Identifier	Calibration	Calibration due
Spectrum Analyzer	Keysight	N9038A	702	27-May-2020	27-May-2021
Horn Antenna	A.H Systems	SAS-571	227C	12-Aug-2020	12-Aug-2022
Horn Antenna	A.H Systems	SAS-572	227D	11-Dec-2018	11-Dec-2021
Broadband Antenna	Sunol	JB1	371	24-Sep-2020	24-Sep-2022
LPDA Antenna	Schwarzbeck Mess	VUSLP9111B	996	26-Mar-2019	26-Mar-2021
BiCon Antenna	A.H Systems	SAS-540	1115	29-Apr-2019	29-Apr-2021
RF Preamplifier	Agilent	8449B	273	IHC ¹	IHC ¹
RF Cable	MRO	n/a	n/a	IHC ¹	IHC ¹
RF Cable	MRO Elec.	SMA-SMA-12FT	n/a	IHC ¹	IHC ¹
AC Power Source	California Instrument	5001i	059	IHC ²	IHC ²
Used Software	<input checked="" type="checkbox"/> Tile! 7 v7.3.0.6				
Used Template	_FCC_RadEmi_30-1000MHz_Spur_20201008 _FCC_RadEmi_1-18GHz_Spur_20200824 _FCC_RadEmi_18-26.5GHz_Spur_20200810				

Note1) In House Calibration Ref. # 6
 Note2) In House Calibration Ref. # 7

Detector:	<input checked="" type="checkbox"/> Peak	<input checked="" type="checkbox"/> Quasi-Peak	<input checked="" type="checkbox"/> AVG(over 1GHz)
RBW/VBW:	<input checked="" type="checkbox"/> 120/300kHz	<input checked="" type="checkbox"/> 1/3MHz	
Type of Facility:	<input checked="" type="checkbox"/> SAC	<input checked="" type="checkbox"/> FSOATS	<input type="checkbox"/> <i>in-situ</i>
Distance:	<input checked="" type="checkbox"/> 3meter	<input type="checkbox"/> 10meter	<input type="checkbox"/> 1meter
Arrangement of EUT:	<input checked="" type="checkbox"/> Table-top only	<input type="checkbox"/> Floor-standing only	<input type="checkbox"/> Rack Mounted

The unit was tested for the worst case during the prescan. Test report presents the data of the worst case from the final testing. The EUT was found to **MEET** the Radiated Emissions requirements of Title 47 CFR, FCC Part 22.917 and Canada RSS-132 for a DTS transmitter. The frequencies with significant RF signal strength were recorded and plotted as shown in the Data Charts and Graphs.

Frequency (MHz)	Ant Pol	Peak (dBuV/m)	Limit(dBuV/m)	Margin (dB)
1956.66	V	53.26	82.26	29.00
Compliant <input checked="" type="checkbox"/>		Non-Compliant <input type="checkbox"/>		Not Applicable <input type="checkbox"/>

Test setup

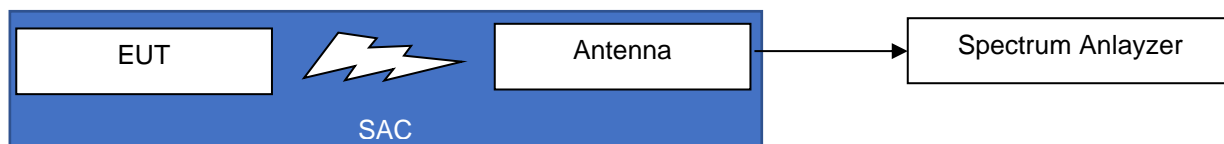
Description of test set-up:

The test setup was assembled in accordance with KDB 971168 D01 Power Meas License Digital Systems v03r01 & ANSI C63.26. The EUT was placed on an 150cm high non-conductive pedestal, centered on a flush mounted 1.2-meter diameter turntable inside a 3-meter Semi-Anechoic Chamber. The EUT was operated in continuous transmitting with proper modulation.

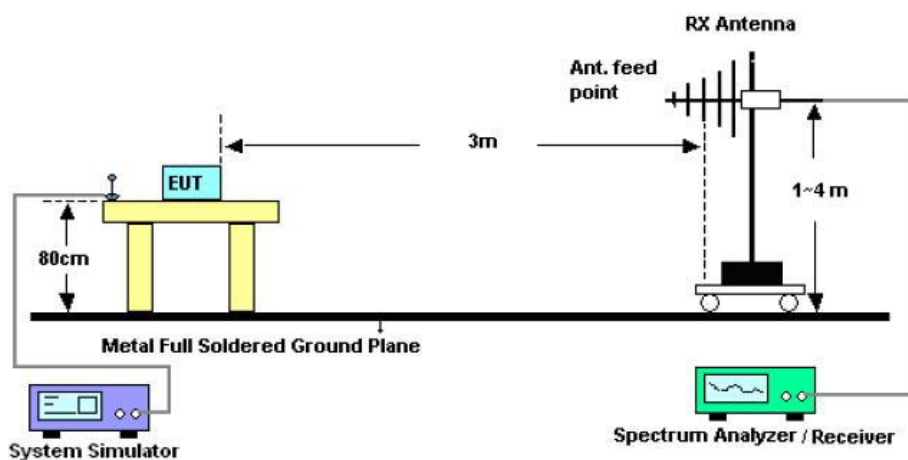
The unit has the capability to operate on Telus network. The applicable limits apply at a 3-meter distance. The calculations to determine these limits are detailed in the following pages.

The EUT with ANT was placed on a 0.8 m for under 1GHz and 1.5m for over 1GHz non-conducting table above a Turn table in SAC.

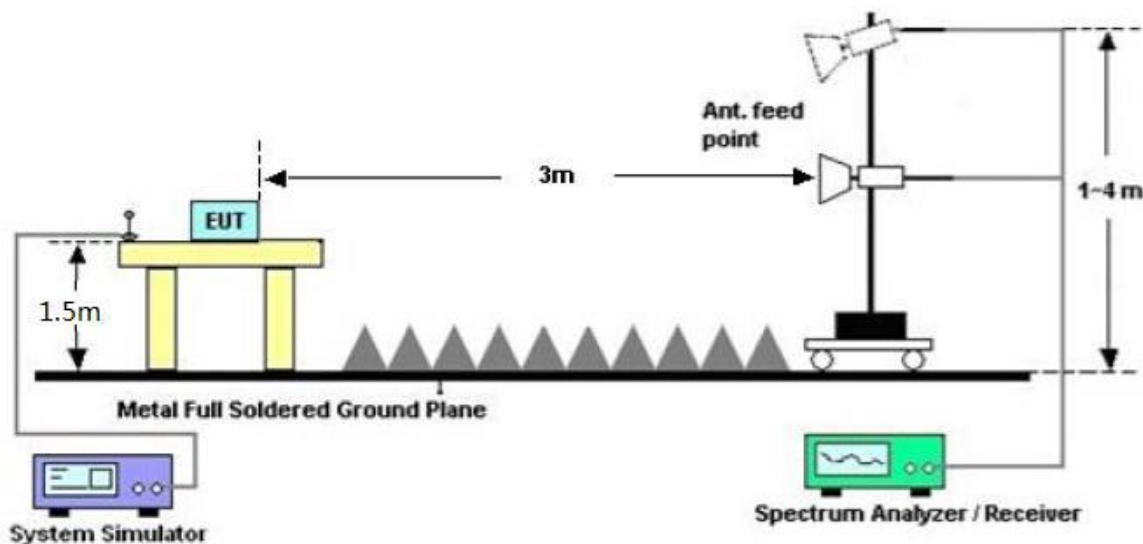
The EUT was set to **Operation Mode #1 with configuration Mode #1 & power interface #1.**



- Tested with JB-1 under 1GHz as followed by ANSI C63.04



- Tested with SAS-571 & SAS-572 over 1GHz as followed by ANSI C63.04



Measurement Procedure

Test procedure is based on the FCC15.31(a)(3) - Other intentional and unintentional radiators are to be measured for compliance using the following procedure excluding sections 4.1.5.2, 5.7, 9 and 14: ANSI C63.4-2014: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see § 15.38). This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51.

This test measures the radiating levels from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices. Testing was performed in accordance with the test standard(s) referenced in the test summary section of this report. The Equipment Under Test (EUT) was configured based upon the requirements of the applicable test standard. Initially, the primary emission frequencies are identified by positioning a broadband receive antenna three meter from the EUT. A scan was made with an EMC Analyzer, controlled by EMC Test Software, Tile7, from 30 to 9000 MHz with the receiver in the peak mode. The receiver IF bandwidth was 120 kHz/1MHz and scan step was about 25 kHz/250kHz. To ensure that the maximum emission at each discrete frequency of interest is observed, the receive antenna is varied in height from one to four meters and rotated to produce horizontal and vertical polarities while the turntable is rotated to determine the worst emitting configuration. Measurements were then made using CISPR quasi peak when the peak readings were within 10dB of the limit line. The numerical results are included herein to demonstrate compliance.

Test Result

$E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$.

Calculation of Radiated Emission Limits

Out of band emissions.

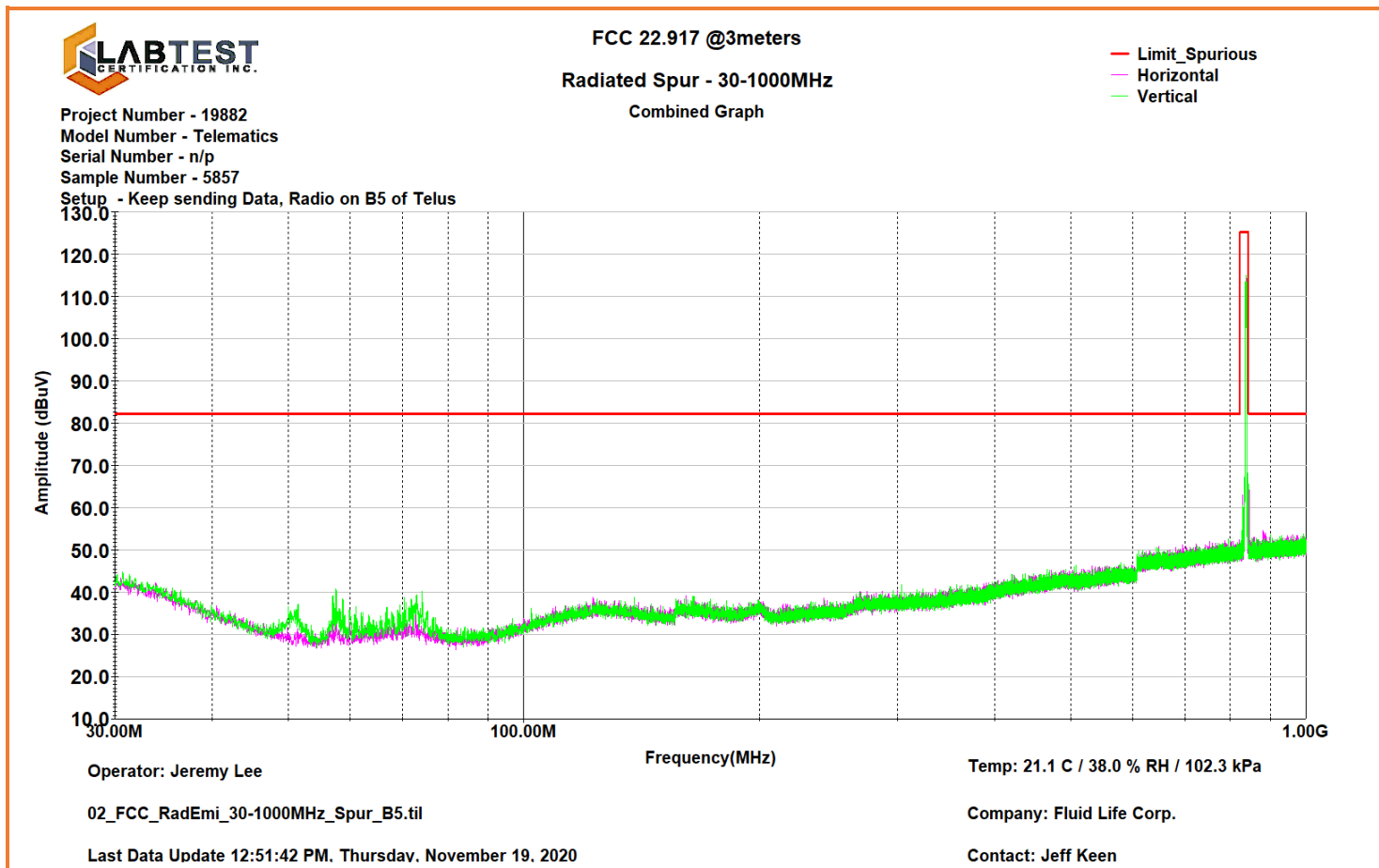
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Out of Band emissions = -13dBm

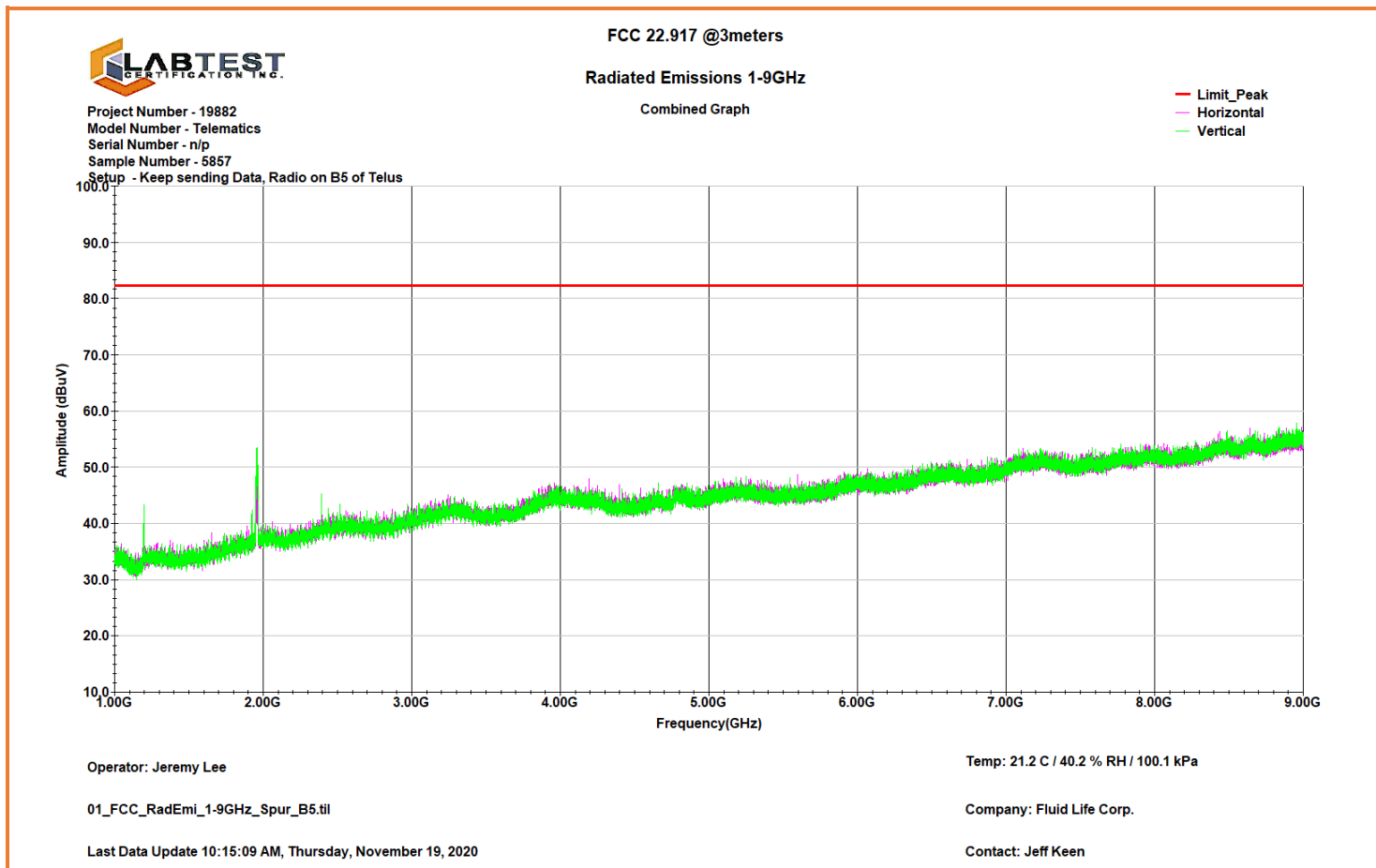
Conversion of field strength (dBm to dB μ V/m at 3 meters):

$$\begin{aligned} E \text{ (dB}\mu\text{V/m)} &= \text{EIRP (dBm)} - 20\log(D) + 104.8; \text{ where } D \text{ is the measurement distance (in the far field region) in m.} \\ &= -13(\text{dBm}) - 20\log(3) + 104.8 \\ &= 82.26 \text{ dBuV/m} \end{aligned}$$

Graphical Representation for Emission - Radiated 30to1000MHz



Graphical Representation for Emission - Radiated 1 to 9GHz



END REPORT