



FCC Test Report

FOR:
Livongo Health, Inc.

Model Number: BG300

Product Description: Blood Glucose Monitor

FCC ID: 2AA92 LV00408

Per
FCC 47 CFR Part 15B

TEST REPORT #: EMC-KORET-003-16001-FCC-15B
DATE: 2016-05-26



FCC: Recognized

A2LA Accredited

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1 Assessment

The following device, as identified in chapter 3 of this test report, was evaluated against the applicable criteria specified FCC Part 15B and No deviations were ascertained during the course of the tests performed.

Company	Description	Model #
Livongo Health, Inc	Blood Glucose Monitor	BG300

Responsible for Testing Laboratory:

Franz Engert

2016-05-26 Compliance (Compliance Services Manager)

Date	Section	Name	Signature
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Responsible for the Report:

James Donnellan

2016-05-26 Compliance (Sr. EMC Engineer)

Date	Section	Name	Signature
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The test results of this test report relate exclusively to the test item specified in Section 3. CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.



2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name	CETECOM Inc.
Department	Compliance
Address	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone	+1 (408) 586 6200
Fax	+1 (408) 586 6299
Compliance Manager	Franz Engert
Project Manager	James Devasia
Test Engineer	James Donnellan

2.2 Identification of the Client

Client Company	Livongo Health, Inc.
Street Address	150 W. Evelyn Ave,
City, State, Zip Code	Mountain View, CA 94041
Country	USA

2.3 Identification of the Manufacturer

Manufacturer Company	Same as Client
Street Address	
City, State, Zip Code	
Country	

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Model Number	BG300
Technical Product Description	Blood Glucose Monitor
Digital Device Class	Class B
FCC ID	2AA92 LV00408
Radio Module Used	Telit HE910NAD
Highest Frequency Generated / Used	1910 MHz
Rated Operating Voltage Range	V min 3.4V, V nom 3.8V, V max 4.2 V
Rated Operating Temperature Range:	5°C to 45°C
Prototype / Production Unit	Prototype
Date of Testing	03/29/2016 - 04/21/2016

3.2 Identification of the Equipment Under Test (EUT)

EUT #	Serial Number	Hardware Version	Software Version	Comments
1	BG3001616000072	SA00412	0.7.0	Radiated Unit.

3.3 Identification of Accessory equipment (AE)

AE #	Type	Serial Number	Manufacturer	Model	Comments
1	Switching Mode Power Supply	N/A	ITE	SKB0501000PU	USB Charger
	USB Shielded High Speed cable	N/A	Kaibo / AWM	E318233 / 2525	USB Cable

3.4 Test Sample Configuration

Setup	Items Used	Comments
1	EUT #1, AE #1, 2	-



4 Subject of Investigation.

The objective of the measurements done by CETECOM Inc. was to evaluate the compliance of the EUT against the relevant Requirements specified in the Code of Federal Regulations Title 47 parts 15B.

4.1 Dates Of Testing

03/29/2016 - 04/21/2016

4.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests apparatus, with 95% confidence interval (in dB delta to result), based on a coverage factor $k=1$.

Radiated measurement

9 kHz to 30MHz	+/- 2.5 dB (Magnetic Loop Antenna)
30 MHz to 1000 MHz	+/- 2.0 dB (Biconilog Antenna)
1 GHz to 40 GHz	+/- 2.3 dB (Horn Antenna)

Conducted measurement

150 kHz to 30 MHz	+/- 0.7 dB (LISN)
RF conducted measurements	+/- 0.5 dB

4.3 Environmental Conditions during Testing

The following environmental conditions were maintained during the course of testing:

- * Ambient Temperature: 20-25oC
- * Relative humidity: 40-60%

Deviating test conditions are indicated at individual test description where applicable.

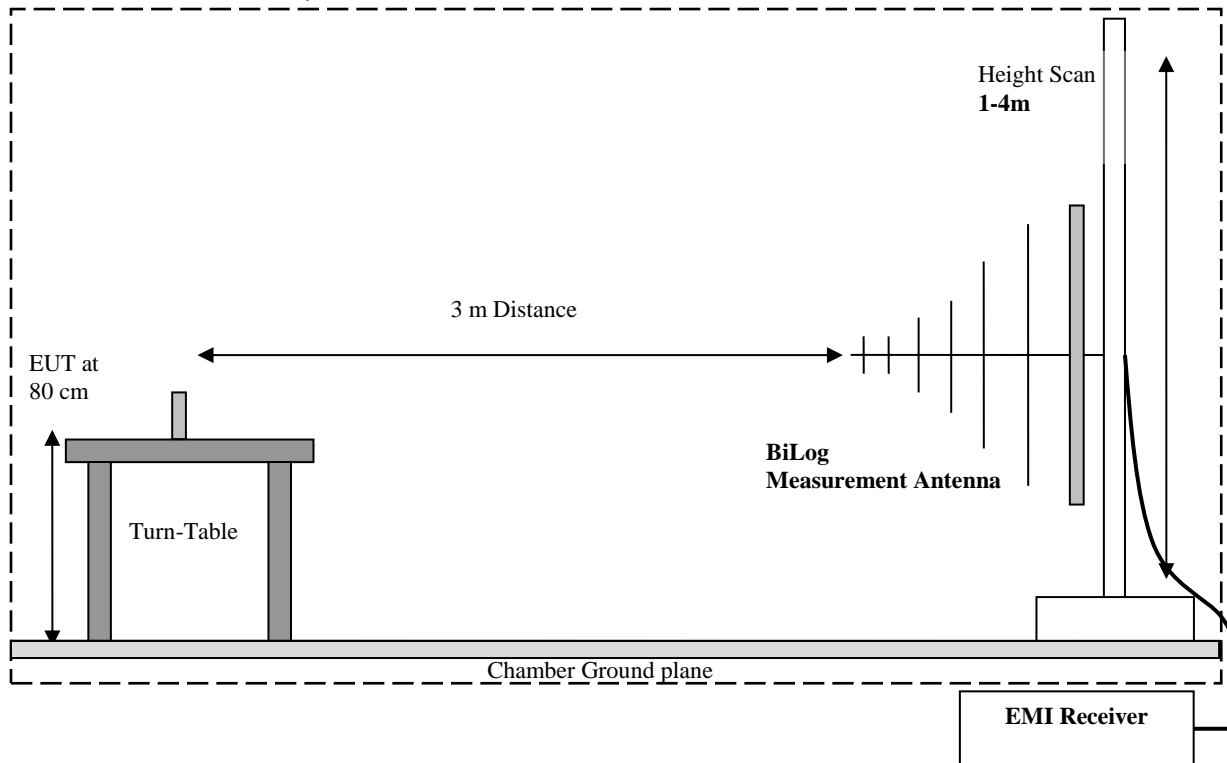
5 Measurements Procedures

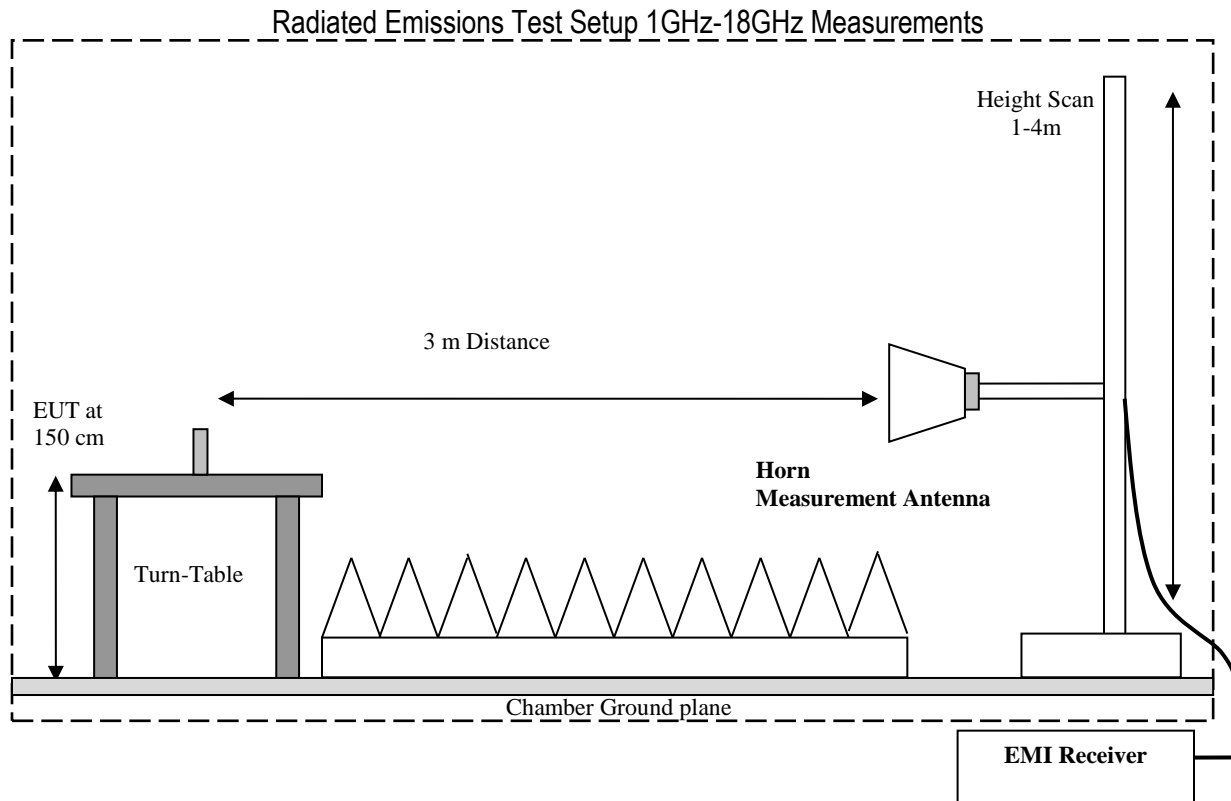
Testing is performed according to the guidelines provided in FCC publication (KDB) 971168 DOI v02r02 - "Measurement Guidance for Certification of Licensed Digital Transmitters" and according to relevant parts of TIA-603C 2004 as detailed below.

5.1 Radiated Measurement

- The exploratory measurement is accomplished by running a matrix of 16 sweeps over the required frequency range with R&S Test-SW EMC32 for 4 positions of the turntable, two orthogonal positions of the EUT and both antenna polarizations. This procedure exceeds the requirement of the above standards to cover the 3 orthogonal axis of the EUT. A max peak detector is utilized during the exploratory measurement. The Test-SW creates an overall maximum trace for all 12 sweeps and saves the settings for each point of this trace. The maximum trace is part of the test report.
- The 10 highest emissions are selected with an automatic algorithm of EMC32 searching for peaks in the noise Door and ensuring that broadband signals are not selected multiple times.
- The maxima are then put through the final measurement and again maximized in a 90deg range of the turntable, fine search in frequency domain and height scan between 1m and 4m.
- The above procedure is repeated for all possible ways of power supply to EUT and for all supported modulations.
- In case there are no emissions above noise Door level only the maximum trace is reported as described above.
- The results are split up into up to 4 frequency ranges due to antenna bandwidth restrictions. A magnetic loop is used from 9 kHz to 30 MHz, a Biconilog antenna is used from 30 MHz to 1 GHz, and two different horn antennas are used to cover frequencies up to 40 GHz.

Radiated Emissions Test Setup 30MHz-1GHz Measurements





5.2 Sample Calculations for Radiated Measurements

Measurements from the spectrum analyzer or receiver are used to calculate the field strength, taking into account the following parameters:

1. Measured reading in dB μ V
2. Cable Loss between the receiving antenna and spectrum analyzer or receiver in dB and
3. Antenna factor in dB/m

$$FS \text{ (dB}\mu\text{V/m)} = \text{Measured Value on SA (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$$

Example:

Frequency (MHz)	Measured SA (dB μ V)	Cable Loss (dB)	Antenna Factor Correction (dB)	Field Strength Result (dB μ V/m)
1000	80.5	3.5	14	98.0

All radiated measurement plots in this report are taken from test software that calculates the field strength based on the above equation.



5.3 AC Conducted Measurement Procedure:

- The EUT and accessories are placed on a non-conducting table 80 cm above the horizontal ground plane and 40 cm from the vertical ground plane.
- Cables that hang closer than 40 cm to the ground plane are gathered into a 30 cm to 40 cm long bundle.
- The power cable of the EUT is connected to the LISN.
- The 6 highest emissions within 20 dB of the limit are noted.

6 Measurement Results Summary

Test Specification	Test Case	Temperature and Voltage Conditions	Mode	Pass	Fail	NA	NP	Result
FCC §15.109	Radiated Emissions	Nominal	RX Mode	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Complies
FCC §15.107	Conducted Emissions	Nominal	RX Mode	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Complies

7 Test Result Data

7.1 Radiated Emissions Measurement

According to CFR 47 Part 15.109

Spectrum Analyzer settings		
Sweep Frequency Range	30 MHz – 1 GHz	1 GHz – 40 GHz
Resolution Bandwidth	120 kHz	1 MHz
Detector (Exploratory Measurements)	Peak	Peak, Average
Detector (Final Measurements)	Quasi-Peak	Peak, Average
Trace Mode	Max Hold	Max Hold
Step Size	40 kHz	800 kHz
Measurement Time (Exploratory Measurements)	2 ms	2 ms
Measurement Time (Final Measurements)	100 ms	100 ms

7.1.1 Limits:

Class A Limits		
Frequency of emission (MHz)	Field Strength @ 10 m (µV/m)	Field Strength @ 3 m (dBµV/m)
30-88	90	49.5
88-216	150	54
216-960	210	56.9
Above 960	300	60

Class B Limits		
Frequency of emission (MHz)	Field Strength @ 3 m (µV/m)	Field Strength @ 3 m (dBµV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Note: For measurements below 1 GHz, the limits above use a quasi-peak detector. For measurements above 1 GHz, the limits above use an average detector.

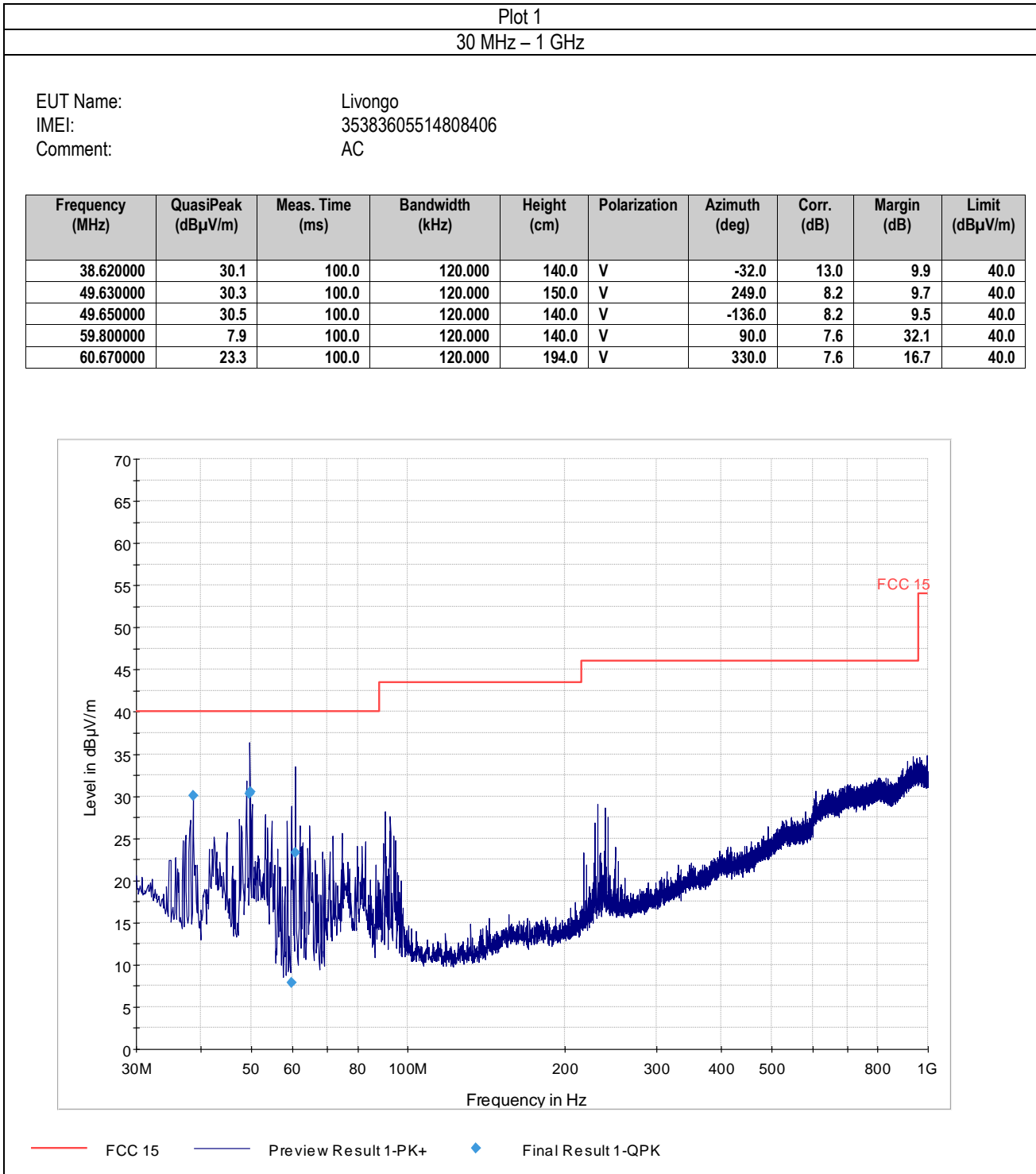


7.1.2 Test Summary

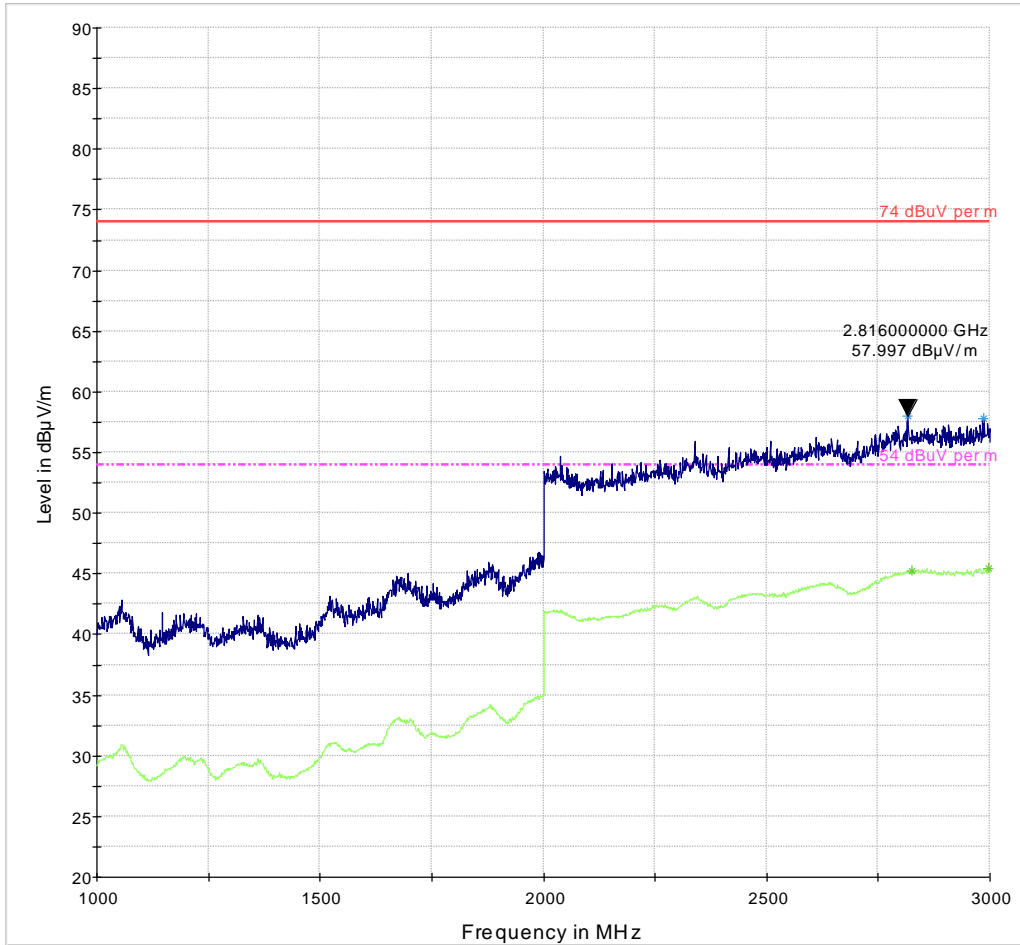
Environmental Conditions	
Ambient Temperature:	23
Relative humidity:	46
Atmospheric Pressure	1011 mbar

Test Results						
Plots:	EUT setup	EUT Mode	Scan Frequency	Power Supply	Comment	Result
1	1	RX Mode	30 MHz – 1GHz	AC Charger	Final Measurement	Pass
2	1	RX Mode	1GHz – 3 GHz	AC Charger	Final Measurement	Pass
3	1	RX Mode	3GHz – 18 GHz	AC Charger	Final Measurement	Pass

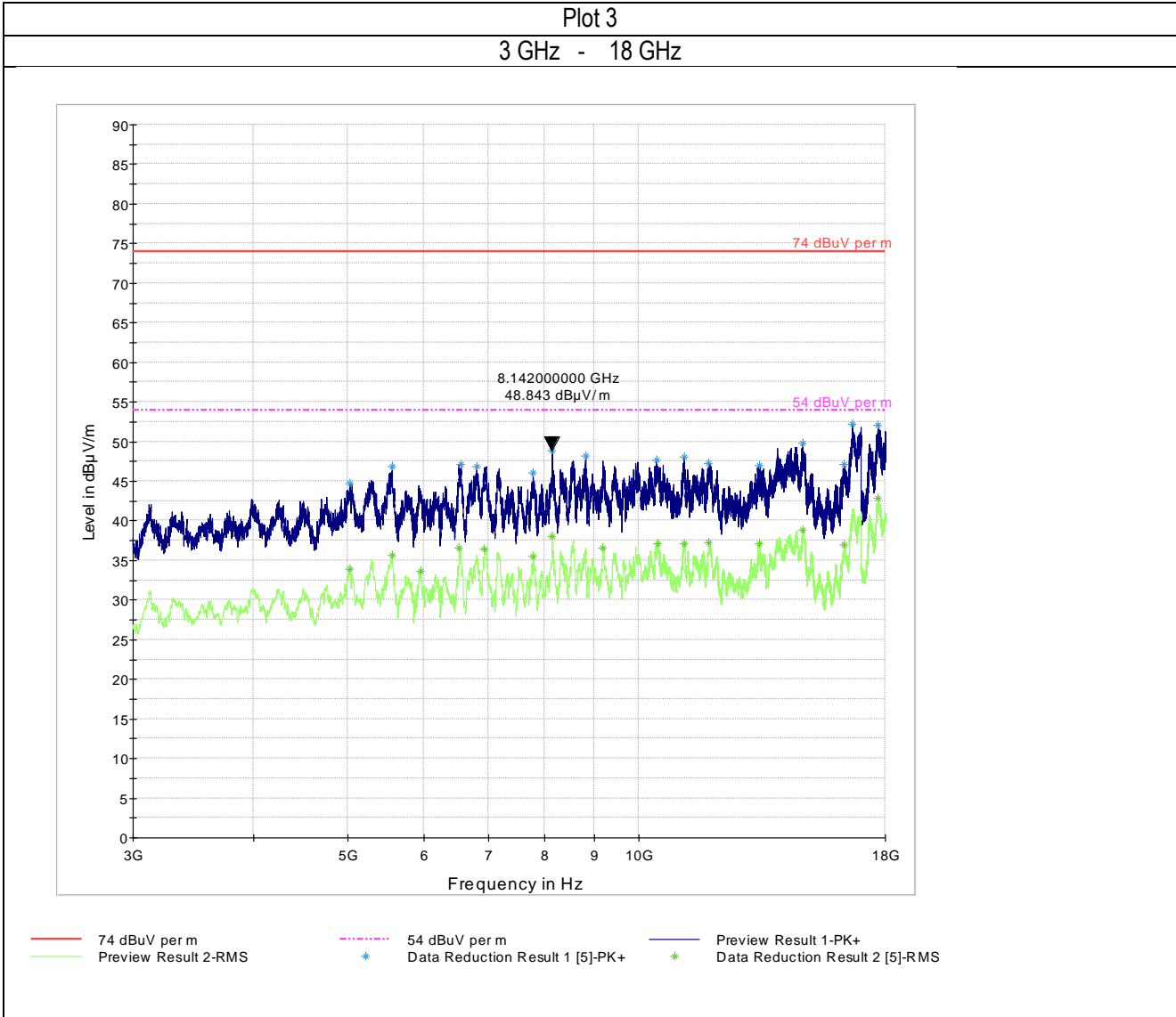
7.1.3 Radiated Measurement Plots



Plot 2
1 GHz – 3GHz



74 dBµV per m
Preview Result 2-RMS
54 dBµV per m
Data Reduction Result 1 [4]-PK+
Preview Result 1-PK+
Data Reduction Result 2 [4]-RMS





7.2 AC line Conducted Emissions Measurement

According to CFR 47 Part 15.107

Spectrum Analyzer Settings			
Frequency Range	30MHz – 1 GHz	1 – 1.58 GHz	1.58 – 9 GHz
Resolution Bandwidth	100 kHz	1 MHz	1 MHz
Video Bandwidth	100 kHz	1 MHz	1 MHz
Detector	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto

7.2.1 Limits:

Class A Limits		
Frequency of emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	79	66
0.5-30	73	60

Class B Limits		
Frequency of emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency

7.2.2 Test Summary:

Environmental Conditions	
Ambient Temperature:	23° C
Relative Humidity:	40%
Atmospheric Pressure:	1015 mbar

Test Results							
Plot #	EUT Set-Up #	EUT operating mode	Detector (Peak / AVG / QP)	Line Under Test	Power Supply Input	Comments	Result
1	1	RX Mode	Peak & AVG	Line & Neutral	120V AC	Final measurement	Pass

7.2.3 Conducted Measurement Plots

Plot 1
30 MHz – 1 GHz

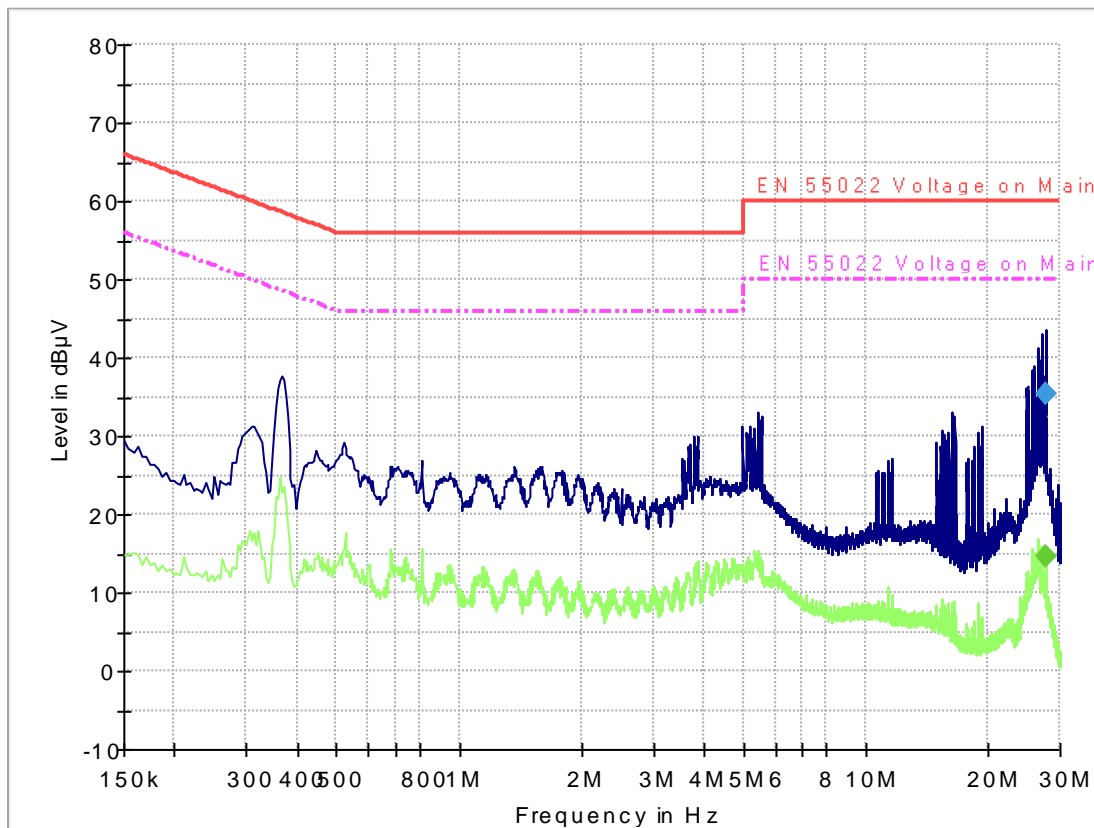
EUT Name: Livongo
IMEI: 35383605514808406
Comment: AC

Final Results

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
27.614000	35.4	500.0	9.000	GND	N	0.6	24.6	60.0	

Disclaimer: Any measurement data within 2dB from the limit line is conditional PASS/FAIL due to measurement uncertainty considerations.

CISPR 22 Mains Conducted FCC_LISN



- EN 55022 Voltage on Mains QP
- EN 55022 Voltage on Mains AV
- Preview Result 1-PK+
- Preview Result 2-AVG
- ◆ Final Result 1-QPK
- ◆ Final Result 2-AVG



8 Test Setup Photos

Setup photos are included in supporting file name: "EMC-KORET-16001-003-FCC-15B-Setup-Photos.pdf"

9 Test Equipment and ancillaries used for tests

Item Name	Equipment Type	Manufacturer	Model	Serial #	Calibration Cycle	Last Calibration Date
Antenna Biconilog 3142E	Biconlog Antenna	EMCO	3142E	166067	3 years	6/14/2014
Antenna Horn 3115 SN 35111	Horn Antenna	EMCO	3115	35111	3 years	7/24/2015
LISN FCC-LISN-50-25-2-08	LISN	FCC	FCC-LISN-50-25-2-08	8014	2 Years	3/26/2015
Digital Barometer	Compact Digital Barometer	Control Company	35519-055	911195 47	2 Years	4/7/2015
Digital Radio Comm. Tester CMU 200 #1	Digital Radio Comm. Tester	R&S	CMU 200 #1	101821	2 Years	7/4/2015
Spectrum Analyzer FSU26 #2	Spectrum Analyzer	R&S	FSU26	200065	3 years	7/4/2015
Thermometer Humidity TM320	Thermometer Humidity	Dickson	TM320	528006 3	1 Year	7/29/2015

Equipment used meets the measurement uncertainty requirements as required per applicable standards for 95% confidence levels.
 Calibration due dates, unless defined specifically, falls on the last day of the month.
 Items indicated "N/A" for cal status either do not specifically require calibration or is internally characterized before use.



10 Revision History

Date	Report Number	Changes to Report	Report prepared by
2016-05-26	EMC-KORET-16001-003-FCC-15B	Initial Version	James Donnellan