

EMC TEST DATA REPORT

Report Number: 100858090BOX-004

Project Number: G100858090

Report Issue Date: 09/18/2012

Product Designation: CASE PDM, Model: UST500

Standards: CFR47 FCC Part 15 Subpart C 15.231:2012
IC RSS-210 Issue 8 December 2010 Annex 1
IC RSS-Gen Issue 3 December 2010+Notice DRS 2012-DRS0126
CFR47 FCC Part 15 Subpart B:2012
IC ICES-003 Issue 5 August 2012

Tested by:
Intertek Testing Services NA, Inc.
70 Codman Hill Road
Boxborough, MA 01719

Client:
Insulet Corporation
9 Oak Park Drive
Bedford, MA 01730

Report prepared by Reviewer



Nicholas Abbondante / Transmitter Staff
Engineer

Report reviewed by



Vathana Ven / Senior Project Engineer

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1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining 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.

2 Test Summary

Section	Test full name	Result
3	Client Information	
4	Description of Equipment Under Test	
5	System Setup and Method	
6	Fundamental Field Strength and Transmitter Radiated Emissions (CFR47 FCC Part 15 Subpart C:2012 15.209 and 15.231; IC RSS-210 Issue 8 December 2010 Annex 1)	Pass
7	Digital Device Radiated Emissions (CISPR11 ed5.1 (2010-05); CFR47 FCC Part 15 Subpart B:2012; IC ICES-003 Issue 5 August 2012)	Pass
8	Revision History	

3 Client Information

This EUT was tested at the request of:

Company: Insulet Corporation
9 Oak Park Drive
Bedford, MA 01730

Contact: Mr. Mohsen Moghaddami

Telephone: (781) 457-4737

Fax: (781) 457-5011

Email: mmoghaddami@insulet.com

4 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
OmniPod Personal Diabetes Manager	Insulet Corporation	UST500	130009745 (transmit)
OmniPod Personal Diabetes Manager	Insulet Corporation	UST500	130009743 (idle/receive)

Receive Date:	09/12/2012
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)

The EUT is a Personal diabetes manager with blood glucose meter and 433.878 MHz radio to communicate with an insulin pump. It utilizes an integral antenna.

This report covers partial testing of the PDM with a new Blood Glucose Daughter Card replacing the previous one. It does not include occupied bandwidth, 5 second shut off time, duty cycle, or receiver measurements.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
3.0 VDC (AAA Battery)	750mA	N/A	N/A

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	For transmitter testing, the sample was programmed to transmit with a 100% duty cycle.
2	For receive/idle mode testing, the sample was idle and was programmed to not go into sleep mode.

5 System Setup and Method

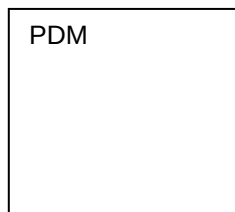
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
	None				

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
POD	Insulet	L40008	0000077
POD	Insulet	L40013	0000501
POD	Insulet	L40008	0000068

5.1 Method:

Configuration as required by ANSI C63.4:2009.

5.2 EUT Block Diagram:



6 Fundamental Field Strength and Transmitter Radiated Emissions

6.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C, IC RSS-210, IC RSS-Gen, and ANSI C63.4:2009.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

Measurement Uncertainty

For radiated emissions, U_{lab} (3.5 dB at 3m and 3.5 dB at 10m below 1 GHz, and 4.2 dB at 3m above 1 GHz) $< U_{CISPR}$ (5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V
 AF = 7.4 dB/m
 CF = 1.6 dB
 AG = 29.0 dB
 FS = 32 dB μ V/m

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where UF = Net Reading in } \mu\text{V}$$

NF = Net Reading in dB μ V

Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$

$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

6.2 Test Equipment Used:

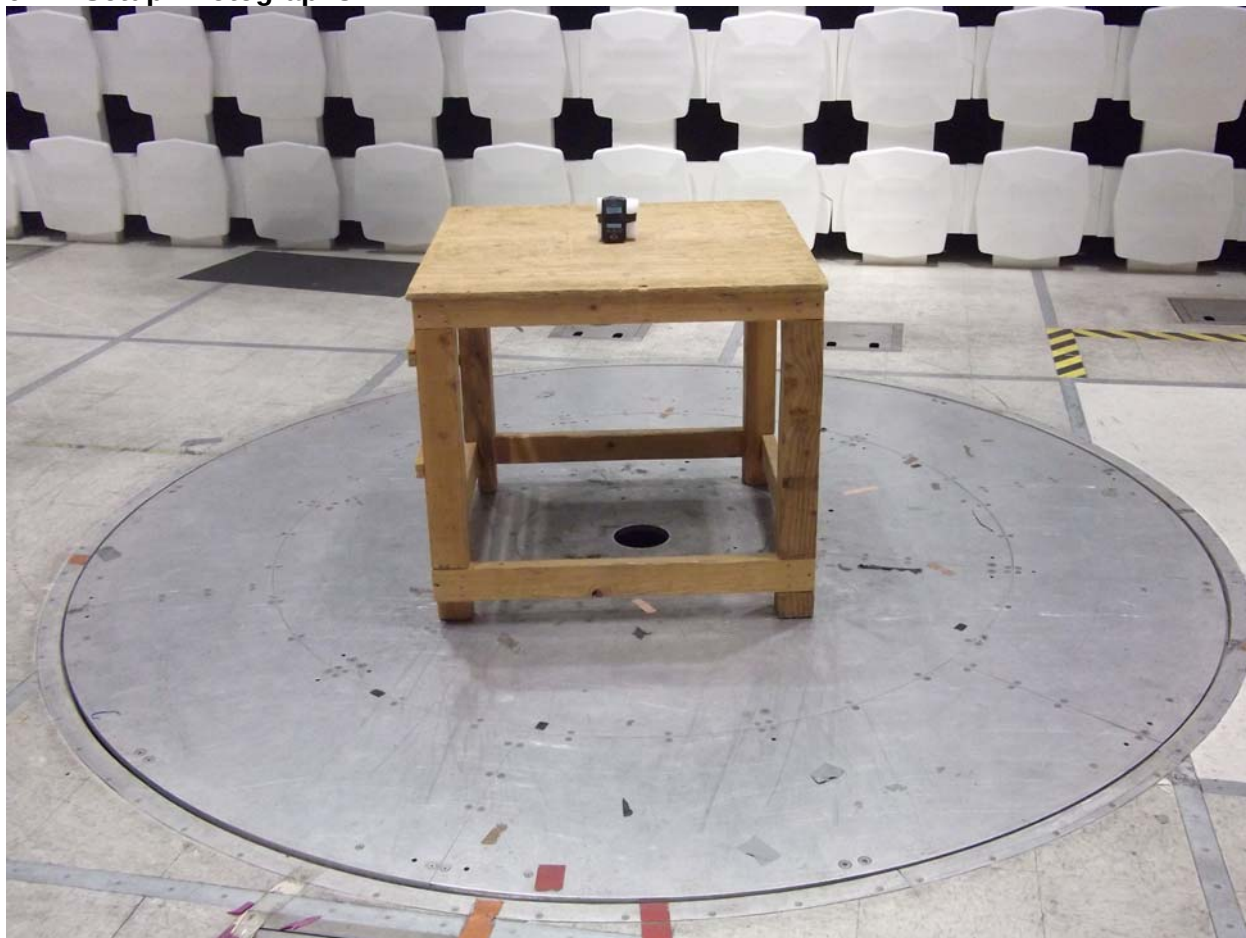
Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV003'	Weather Station	Davis Instruments	7400	PE80529A39 A	08/17/2011	09/17/2012
145128'	EMI Receiver 40 GHz (20 Hz - 40 GHz)	Rohde & Schwarz	ESI	8392831001	08/23/2011	09/23/2012
145034'	BiLog Antenna (30 MHz to 1GHz)	Schaffner Chase EMC	CBL6111C	2564	02/07/2012	02/07/2013
145003'	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/04/2011	10/04/2012
145-410'	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	09/04/2011	10/04/2012
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	09/04/2011	10/04/2012
HORN2'	HORN ANTENNA	EMCO	3115	9602-4675	10/24/2011	10/24/2012
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	12/16/2011	12/16/2012

Software Utilized:

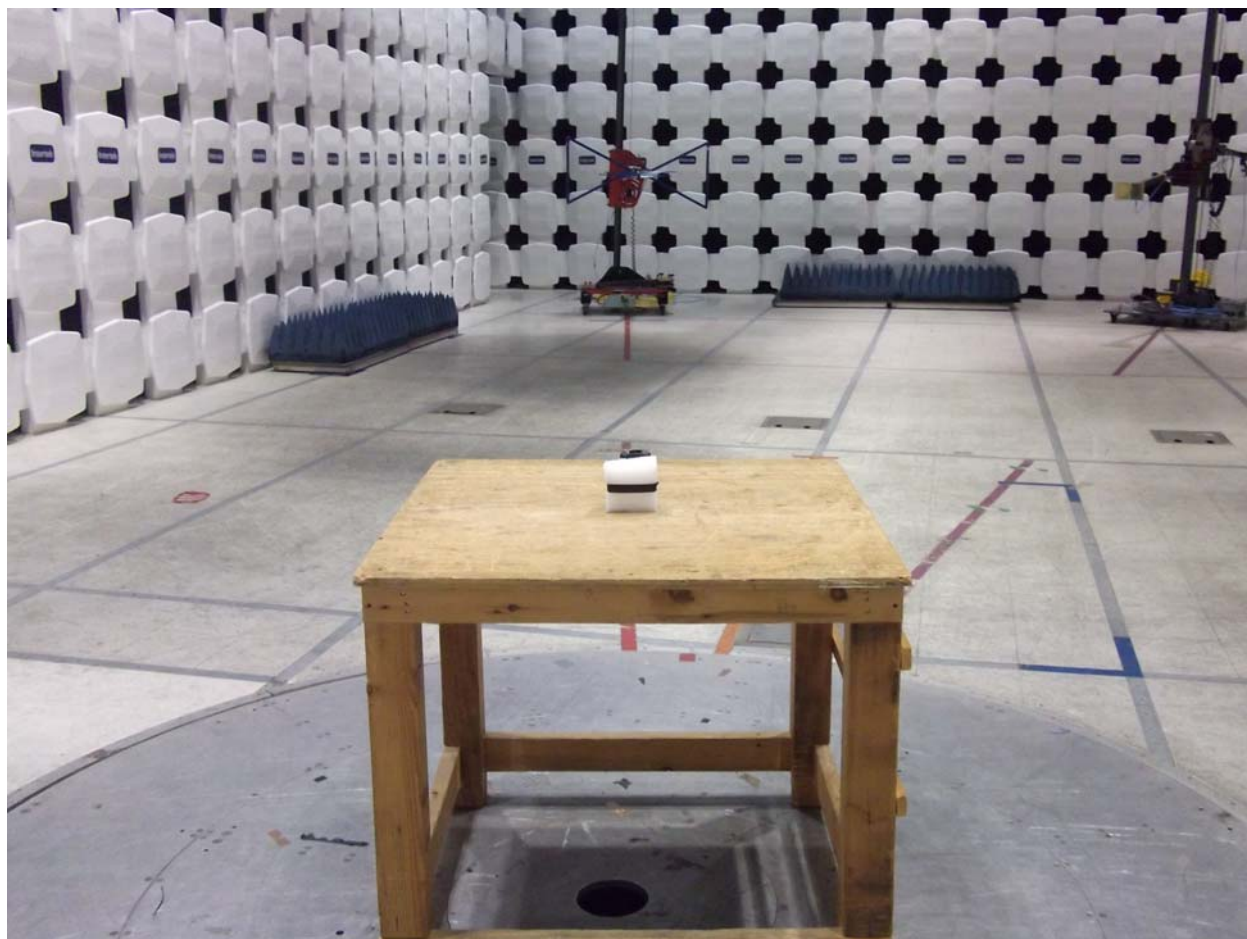
Name	Manufacturer	Version
C5 Emissions	TESEQ	5.26.46.46

6.3 Results:

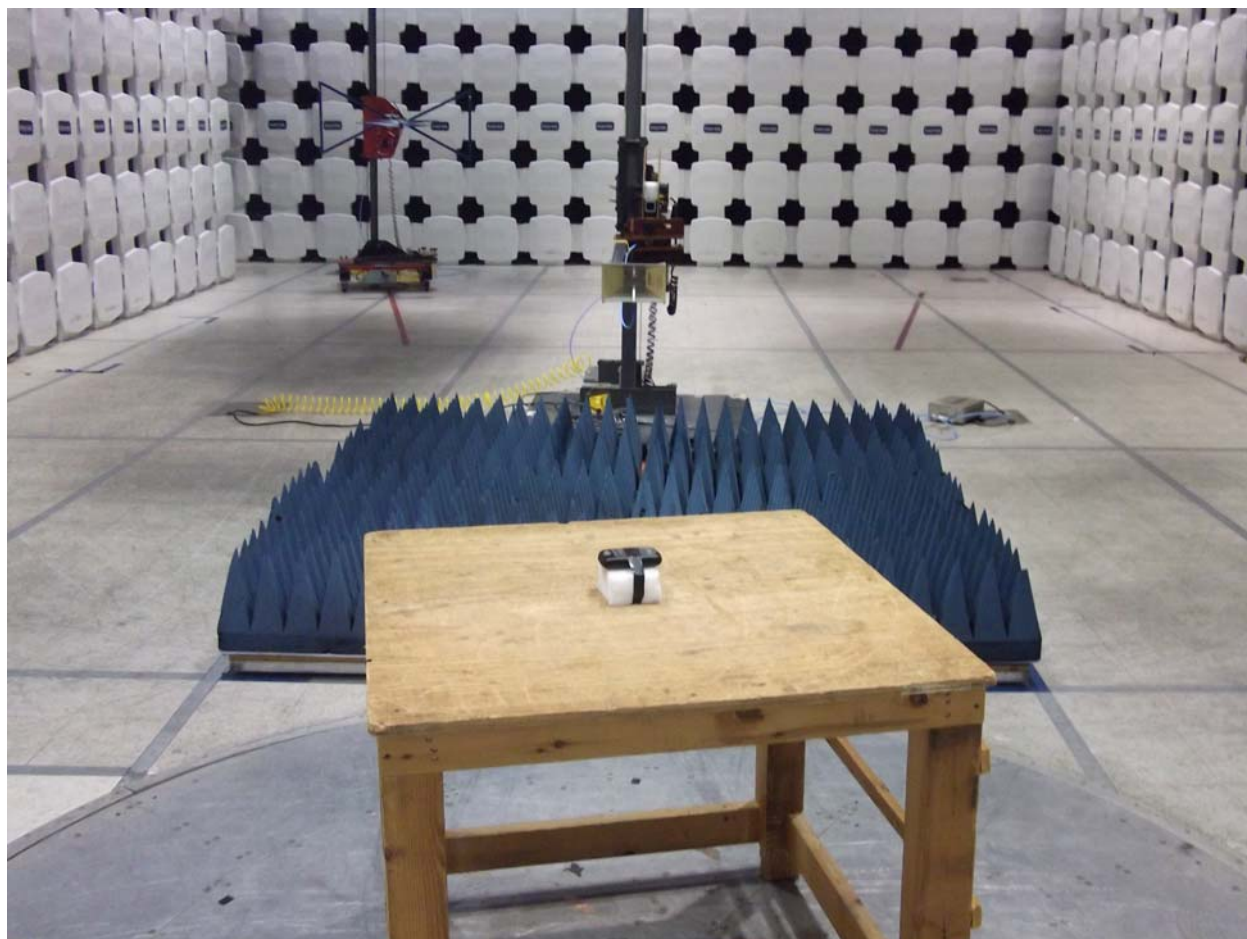
The sample tested was found to Comply. The fundamental field strength must not exceed 70.37 dB μ V/m average and 90.37 dB μ V/m peak, or 70.37 dB μ V/m quasi-peak at a distance of 10 meters. Spurious emissions must not exceed 50.37 dB μ V/m average and 70.37 dB μ V/m peak, or 50.37 dB μ V/m quasi-peak, except in the restricted bands of 15.205 and IC RSS-Gen where the emissions must meet the general limits of 15.209 and IC RSS-Gen. In no case is the limit required to be lower than the general limits.

6.4 Setup Photographs:

Radiated Emissions, 30-1000 MHz



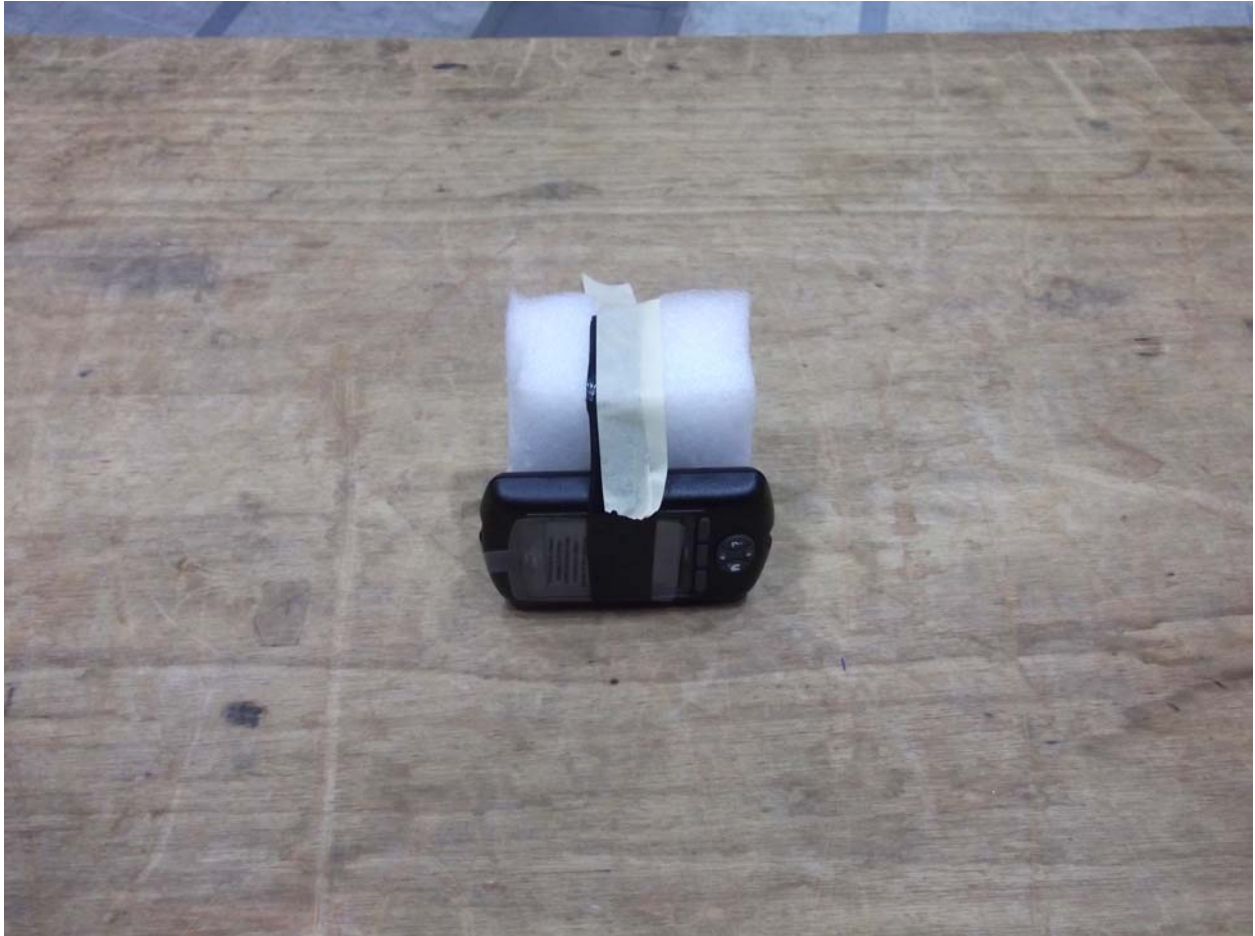
Radiated Emissions, 30-1000 MHz



Radiated Emissions, 1-5 GHz



Orthogonal #1



Orthogonal #2



Orthogonal #3

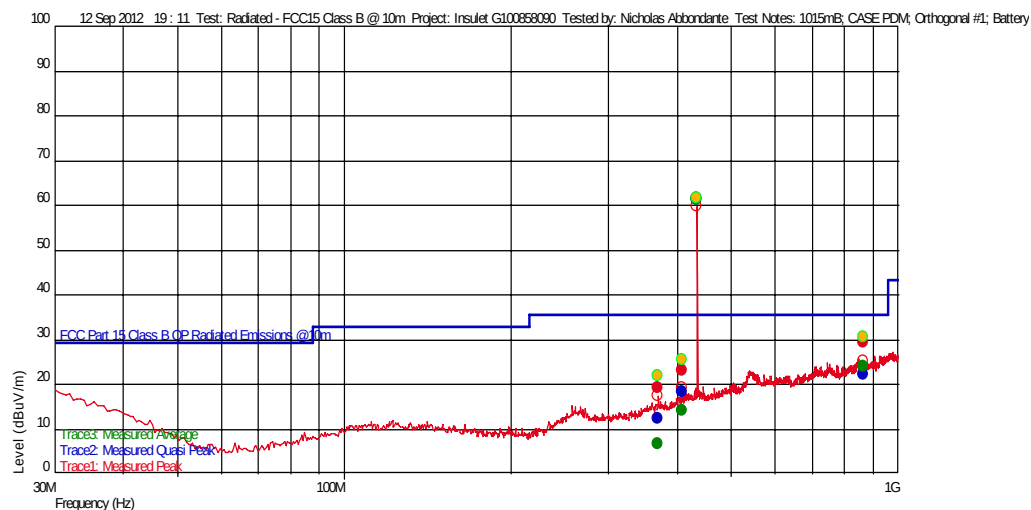
6.5 Plots/Data:

Test Information

Test Details
 Test: Radiated - FCC15 Class B @ 10m
 Project: Insulet G100858090
 Test Notes: 1015mB; CASE PDM; Orthogonal #1; Battery
 Temperature: 24c
 Humidity: 44%
 Tested by: Nicholas Abbondante
 Test Started: 12 Sep 2012 19 : 11

Additional Information

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable

- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace1: Measured Peak

Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
369.116032174 M	19.35	15.08 2	- 23.920	70.37	-51.02		288	1.97	120 k	
407.887374405 M	22.99	16.35 8	- 23.905	70.37	-47.38	--	1	2.27	120 k	
864.96472986 M	29.32	22.79 9	- 22.917	70.37	-41.05		103	4.00	120 k	
433.879558747 M	61.51	17.10 0	- 23.920	90.37	-28.86	--	45	2.31	120 k	

Trace2: Measured Quasi Peak

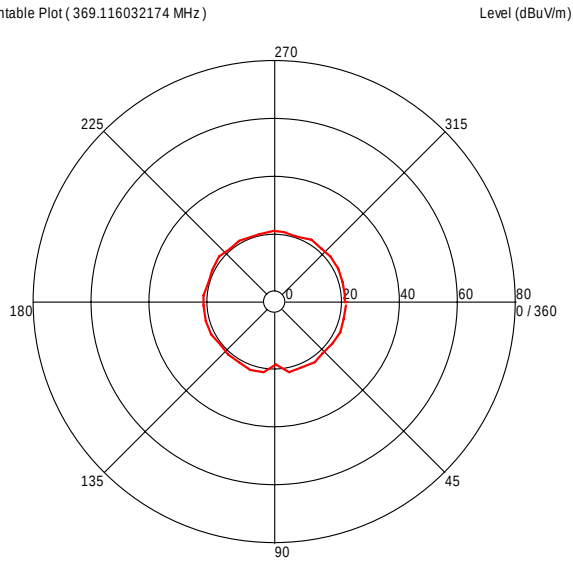
Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
369.116032174 M	12.25	15.08 2	- 23.920	35.54	-23.29		288	1.97	120 k	
407.887374405 M	18.25	16.35 8	- 23.905	35.54	-17.29	--	1	2.27	120 k	
864.96472986 M	22.38	22.79 9	- 22.917	35.54	-13.16		103	4.00	120 k	
433.879558747 M	61.21	17.10 0	- 23.920	70.37	-9.16	--	45	2.31	120 k	

Trace3: Measured Average

Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
369.116032174 M	6.72	15.08 2	- 23.920	50.37	-43.65		288	1.97	120 k	
407.887374405 M	14.15	16.35 8	- 23.905	50.37	-36.22	--	1	2.27	120 k	
864.96472986 M	24.05	22.79 9	- 22.917	50.37	-26.32		103	4.00	120 k	
433.879558747 M	61.36	17.10 0	- 23.920	70.37	-9.01	--	45	2.31	120 k	

Azimuth Plots

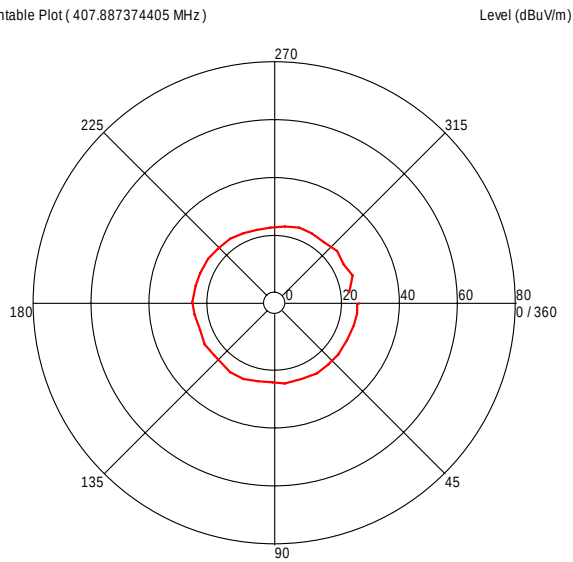
Turntable Plot (369.116032174 MHz)



All Polarities

Azimuth (Degrees)

Turntable Plot (407.887374405 MHz)

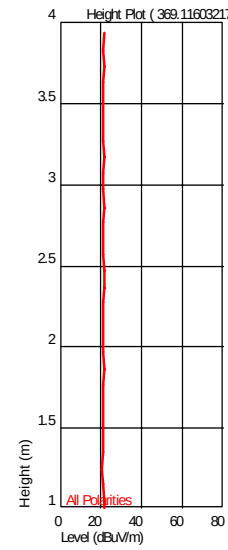


All Polarities

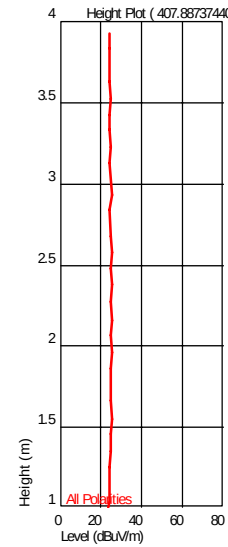
Azimuth (Degrees)

Turntable Plots

Height Plot (369.116032174 MHz)

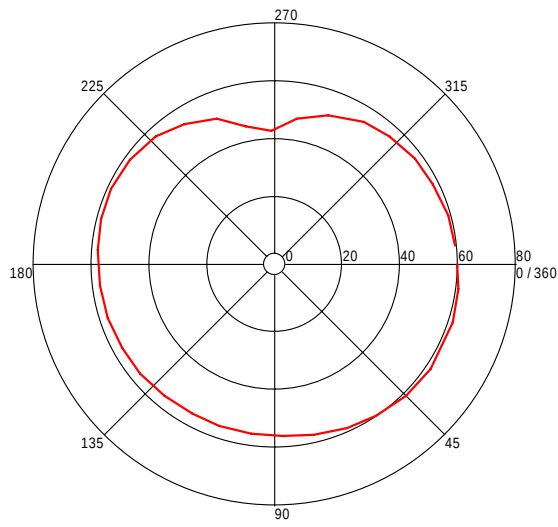


Height Plot (407.887374405 MHz)



Turntable Plot (433.879558747 MHz)

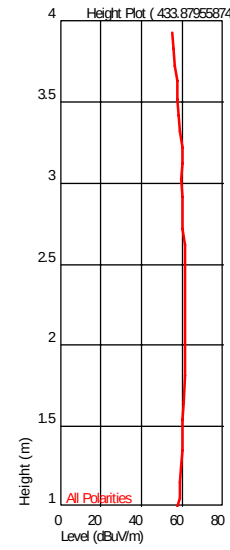
Level (dBuV/m)



All Polarities

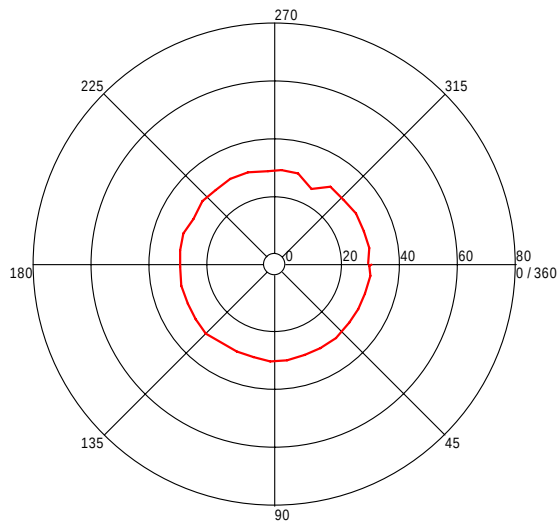
Azimuth (Degrees)

Height Plot (433.879558747 MHz)



Turntable Plot (864.96472986 MHz)

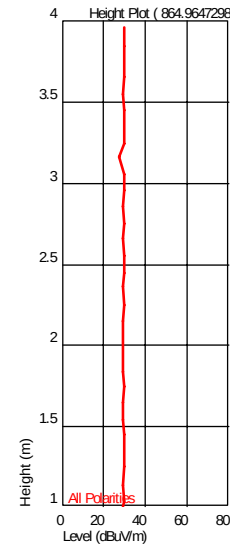
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (864.96472986 MHz)

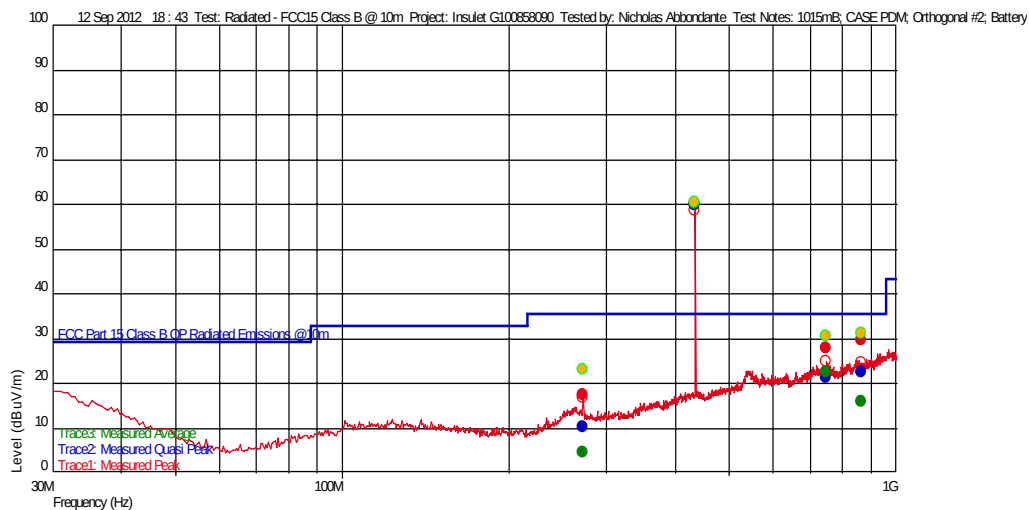


Test Information

Test Details
 Test: Radiated - FCC15 Class B @ 10m
 Project: Insulet G100858090
 Test Notes: 1015mB; CASE PDM; Orthogonal #2; Battery
 Temperature: 24c
 Humidity: 44%
 Tested by: Nicholas Abbondante
 Test Started: 12 Sep 2012 18 : 43

Additional Information

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable
- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace1: Measured Peak

Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
272.597795591 M	17.33	13.19 6	- 24.110	70.37	-53.04		279	1.25	120 k	
749.574348743 M	28.06	22.47 4	- 23.410	70.37	-42.31	--	59	1.34	120 k	
864.588377042 M	29.74	22.79 2	- 22.920	70.37	-40.63	--	267	3.51	120 k	
433.871542715 M	60.15	17.10 0	- 23.920	90.37	-30.22	--	51	2.26	120 k	

Trace2: Measured Quasi Peak

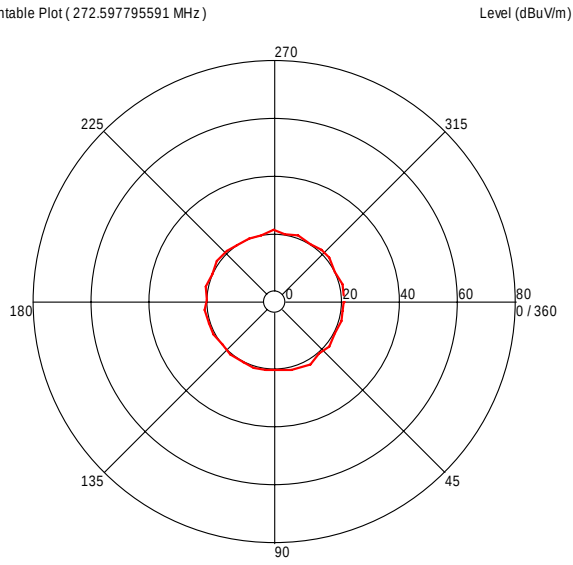
Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
272.597795591 M	10.17	13.19 6	- 24.110	35.54	-25.37		279	1.25	120 k	
749.574348743 M	21.45	22.47 4	- 23.410	35.54	-14.09	--	59	1.34	120 k	
864.588377042 M	22.48	22.79 2	- 22.920	35.54	-13.06	--	267	3.51	120 k	
433.871542715 M	59.97	17.10 0	- 23.920	70.37	-10.40	--	51	2.26	120 k	

Trace3: Measured Average

Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
272.597795591 M	4.65	13.19 6	- 24.110	50.37	-45.72		279	1.25	120 k	
864.588377042 M	15.90	22.79 2	- 22.920	50.37	-34.47	--	267	3.51	120 k	
749.574348743 M	22.68	22.47 4	- 23.410	50.37	-27.69	--	59	1.34	120 k	
433.871542715 M	60.13	17.10 0	- 23.920	70.37	-10.21	--	51	2.26	120 k	

Azimuth Plots

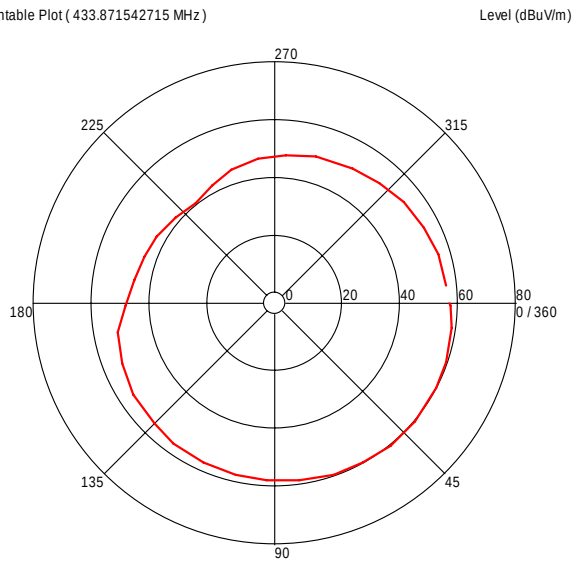
Turntable Plot (272.597795591 MHz)



All Polarities

Azimuth (Degrees)

Turntable Plot (433.871542715 MHz)

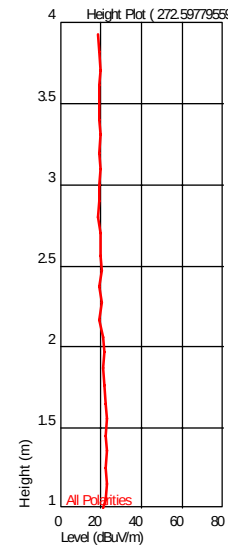


All Polarities

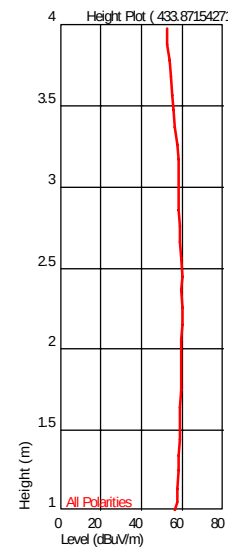
Azimuth (Degrees)

Turntable Plots

Height Plot (272.597795591 MHz)

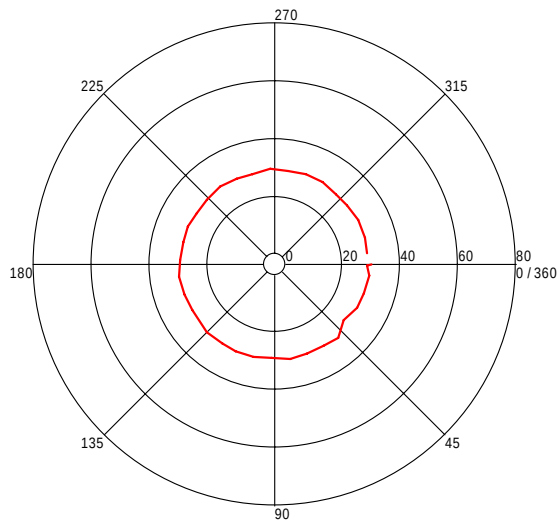


Height Plot (433.871542715 MHz)



Turntable Plot (749.574348743 MHz)

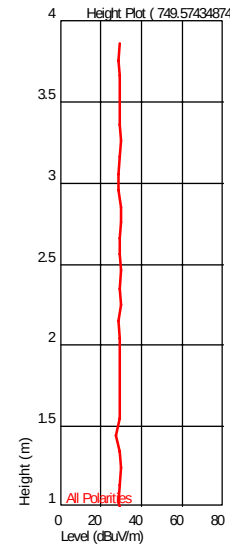
Level (dBuV/m)



All Polarities

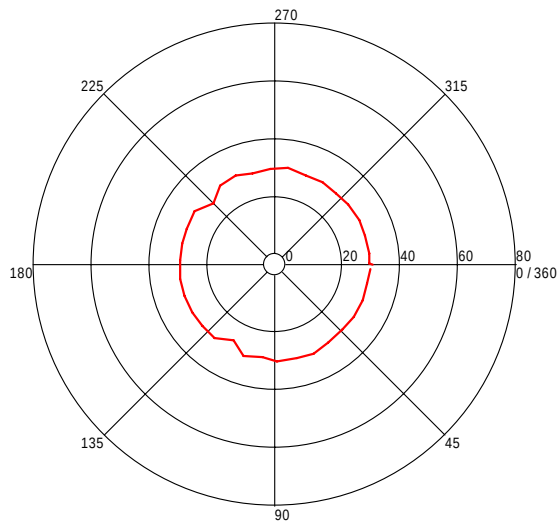
Azimuth (Degrees)

Height Plot (749.574348743 MHz)



Turntable Plot (864.588377042 MHz)

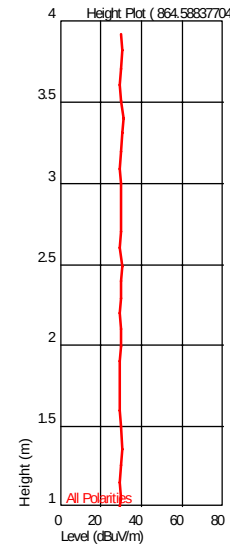
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (864.588377042 MHz)

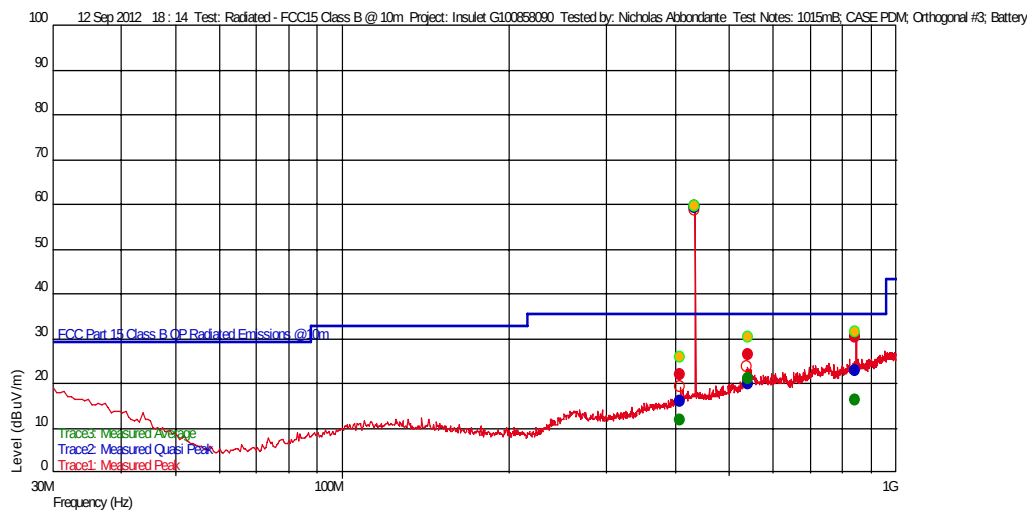


Test Information

Test Details
 Test: Radiated - FCC15 Class B @ 10m
 Project: Insulet G100858090
 Test Notes: 1015mB; CASE PDM; Orthogonal #3; Battery
 Temperature: 24c
 Humidity: 44%
 Tested by: Nicholas Abbondante
 Test Started: 12 Sep 2012 18 : 14

Additional Information

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable
- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace1: Measured Peak

Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
407.912224104 M	21.95	16.358	-	70.37	-48.42	--	214	1.56	120 k	
540.166132126 M	26.42	21.990	-	70.37	-43.95		39	3.66	120 k	
845.752104421 M	30.30	23.370	-	70.37	-40.07	--	125	1.15	120 k	
433.880360351 M	59.52	17.100	-	90.37	-40.85	--	37	1.98	120 k	

Trace2: Measured Quasi Peak

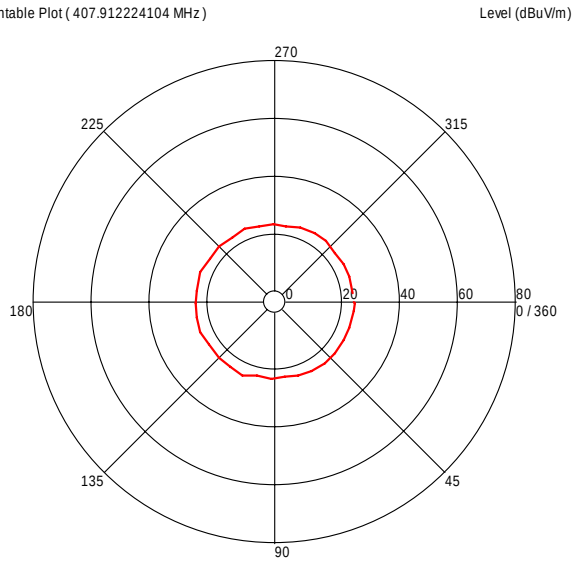
Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
407.912224104 M	16.07	16.358	-	35.54	-19.47	--	214	1.56	120 k	
540.166132126 M	19.83	21.990	-	35.54	-15.71		39	3.66	120 k	
845.752104421 M	22.84	23.370	-	35.54	-12.70	--	125	1.15	120 k	
433.880360351 M	59.26	17.100	-	70.37	-21.11	--	37	1.98	120 k	

Trace3: Measured Average

Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
407.912224104 M	11.70	16.358	-	50.37	-38.67	--	214	1.56	120 k	
845.752104421 M	16.14	23.370	-	50.37	-34.23	--	125	1.15	120 k	
540.166132126 M	21.14	21.990	-	50.37	-29.23		39	3.66	120 k	
433.880360351 M	59.42	17.100	-	70.37	-20.95	--	37	1.98	120 k	

Azimuth Plots

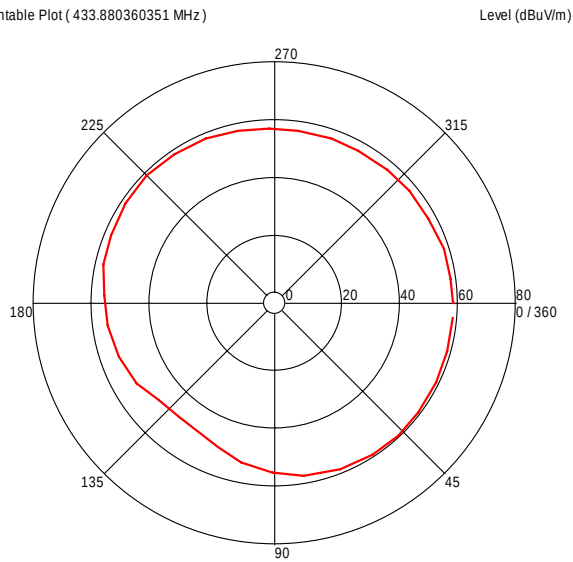
Turntable Plot (407.912224104 MHz)



All Polarities

Azimuth (Degrees)

Turntable Plot (433.880360351 MHz)

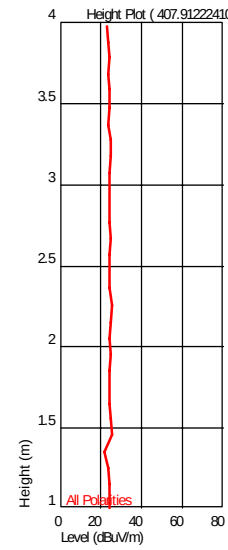


All Polarities

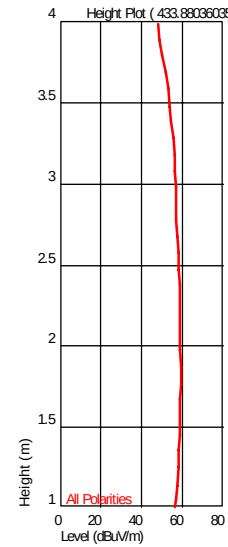
Azimuth (Degrees)

Turntable Plots

Height Plot (407.912224104 MHz)

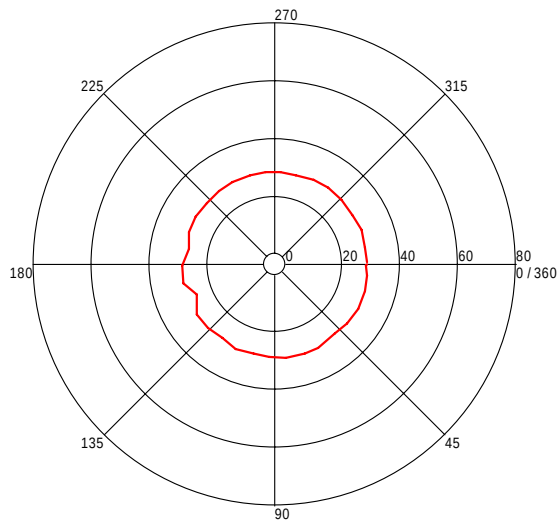


Height Plot (433.880360351 MHz)



Turntable Plot (540.166132126 MHz)

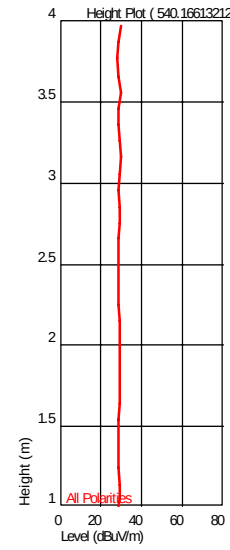
Level (dBuV/m)



All Polarities

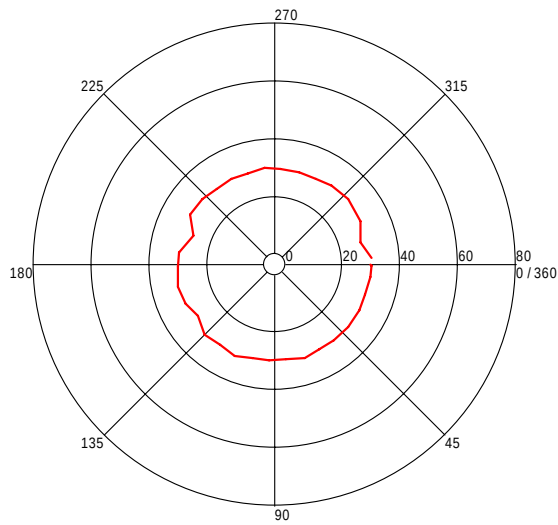
Azimuth (Degrees)

Height Plot (540.166132126 MHz)



Turntable Plot (845.752104421 MHz)

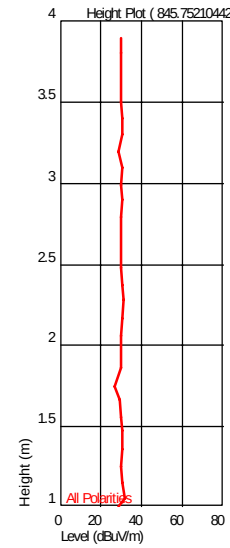
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (845.752104421 MHz)

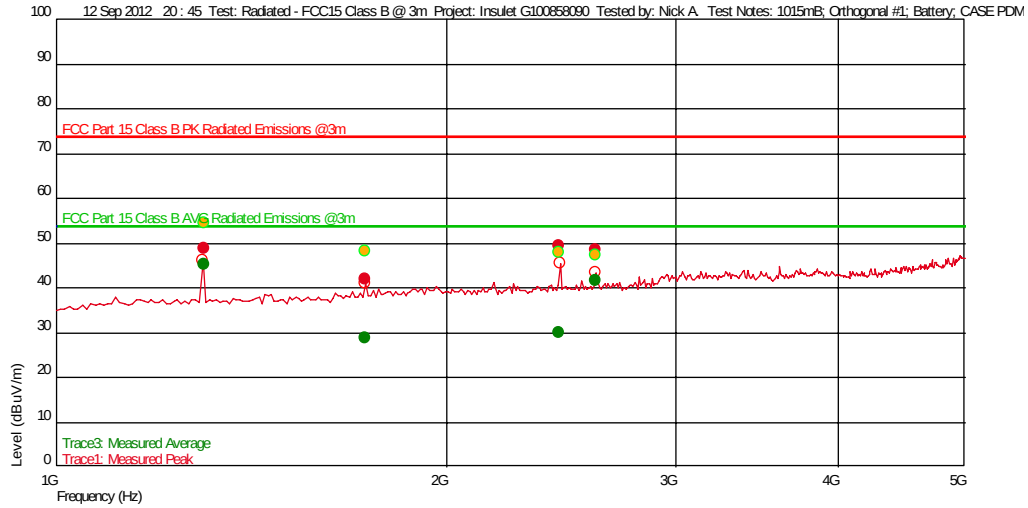


Test Information

Test Details
 Test: Radiated - FCC15 Class B @ 3m
 Project: Insulet G100858090
 Test Notes: 1015mB; Orthogonal #1; Battery; CASE PDM
 Temperature: 24c
 Humidity: 44%
 Tested by: Nick A.
 Test Started: 12 Sep 2012 20:45

Additional Information

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable
- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace1: Measured Peak

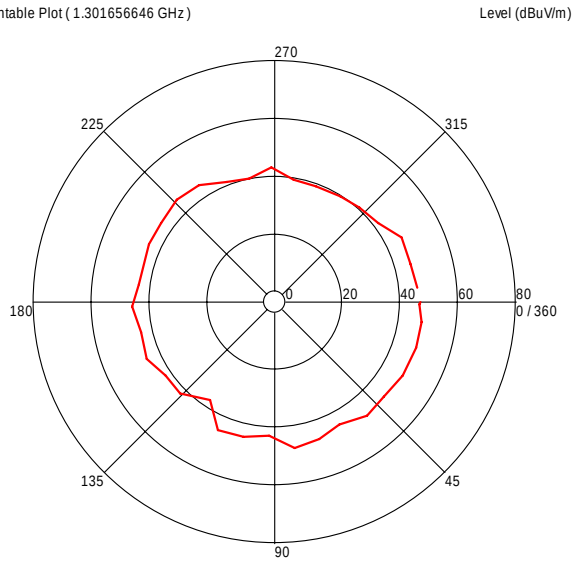
Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
1.731135605 G	42.01	26.83 6	- 28.598	74.000	-31.99		172	1.29	1 M	
2.603353374 G	48.40	28.92 8	- 27.965	74.000	-25.60	--	360	2.60	1 M	
1.301656646 G	48.79	25.68 6	- 29.384	74.000	-25.21	--	18	1.40	1 M	
2.440153641 G	49.46	28.43 1	- 28.226	74.000	-24.54		183	1.65	1 M	

Trace3: Measured Average

Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
1.731135605 G	28.66	26.83 6	- 28.598	54.000	-25.34		172	1.29	1 M	
2.440153641 G	30.06	28.43 1	- 28.226	54.000	-23.94		183	1.65	1 M	
2.603353374 G	41.55	28.92 8	- 27.965	54.000	-12.45	--	360	2.60	1 M	
1.301656646 G	45.24	25.68 6	- 29.384	54.000	-8.76	--	18	1.40	1 M	

Azimuth Plots

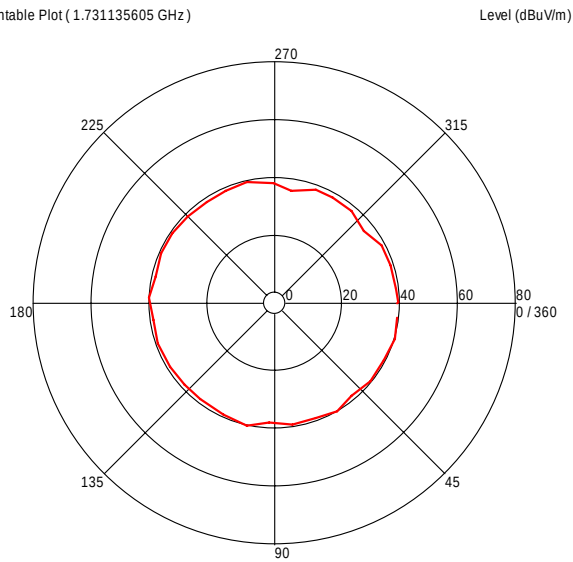
Turntable Plot (1.301656646 GHz)



All Polarities

Azimuth (Degrees)

Turntable Plot (1.731135605 GHz)

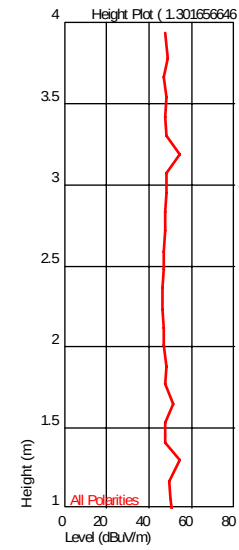


All Polarities

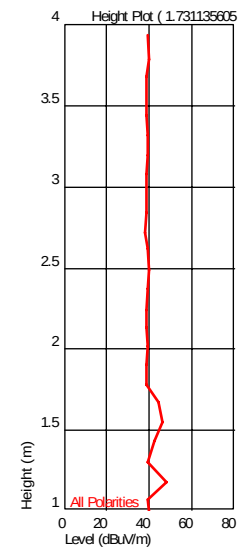
Azimuth (Degrees)

Turntable Plots

Height Plot (1.301656646 GHz)

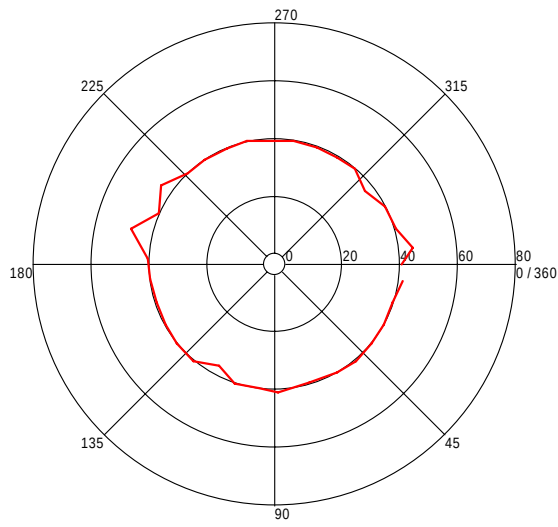


Height Plot (1.731135605 GHz)



Turntable Plot (2.440153641 GHz)

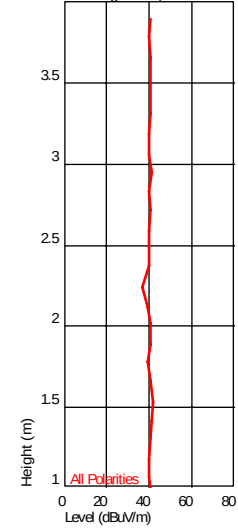
Level (dBuV/m)



All Polarities

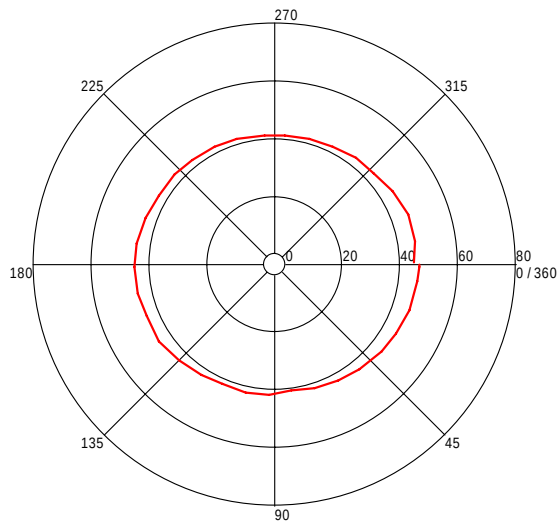
Azimuth (Degrees)

Height Plot (2.440153641 GHz)



Turntable Plot (2.603353374 GHz)

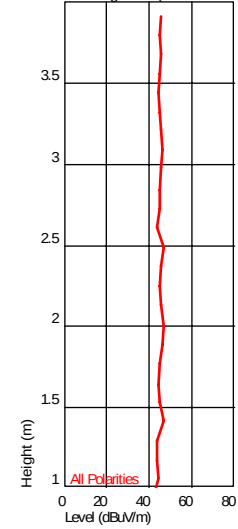
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (2.603353374 GHz)

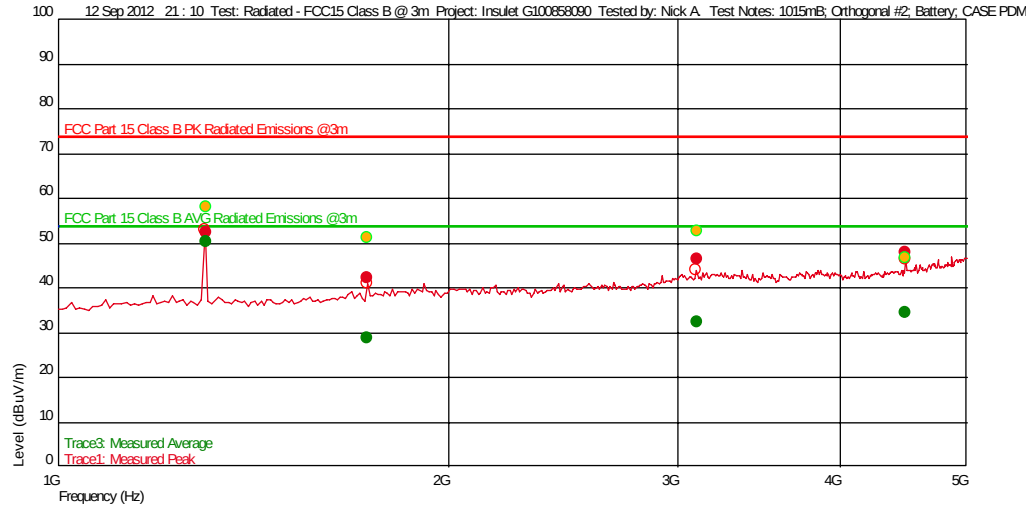


Test Information

Test Details
 Test: Radiated - FCC15 Class B @ 3m
 Project: Insulet G100858090
 Test Notes: 1015mB; Orthogonal #2; Battery; CASE PDM
 Temperature: 24c
 Humidity: 44%
 Tested by: Nick A.
 Test Started: 12 Sep 2012 21:10

Additional Information

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable
- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace1: Measured Peak

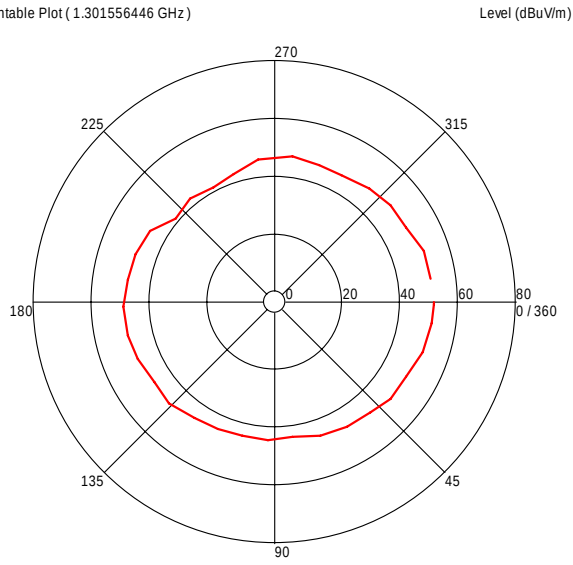
Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
1.730828324 G	42.27	26.83 4	- 28.598	74.000	-31.73		192	1.88	1 M	
3.101436206 G	46.49	30.55 6	- 27.191	74.000	-27.51		241	1.75	1 M	
4.486386106 G	47.87	32.45 4	- 26.516	74.000	-26.13	--	207	1.76	1 M	
1.301556446 G	52.36	25.68 6	- 29.385	74.000	-21.64		8	1.76	1 M	

Trace3: Measured Average

Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
1.730828324 G	28.66	26.83 4	- 28.598	54.000	-25.34		192	1.88	1 M	
3.101436206 G	32.28	30.55 6	- 27.191	54.000	-21.72		241	1.75	1 M	
4.486386106 G	34.35	32.45 4	- 26.516	54.000	-19.65	--	207	1.76	1 M	
1.301556446 G	50.32	25.68 6	- 29.385	54.000	-3.68		8	1.76	1 M	

Azimuth Plots

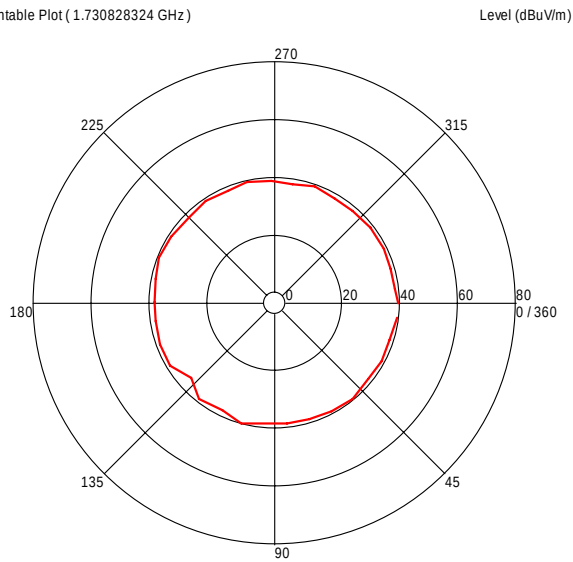
Turntable Plot (1.301556446 GHz)



All Polarities

Azimuth (Degrees)

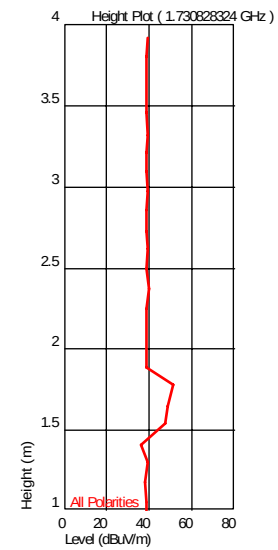
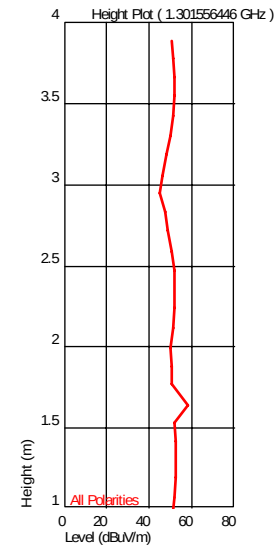
Turntable Plot (1.730828324 GHz)



All Polarities

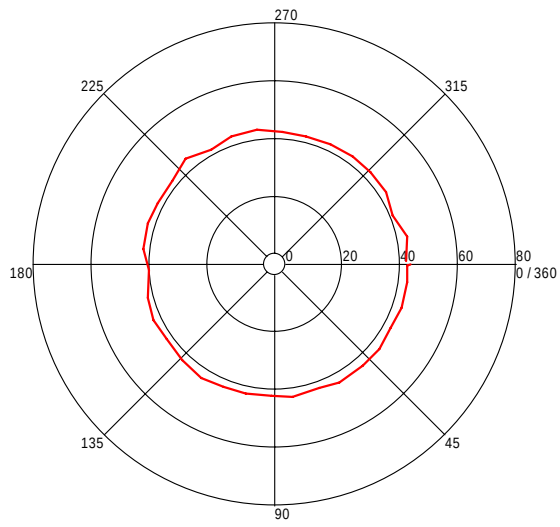
Azimuth (Degrees)

Turntable Plots



Turntable Plot (3.101436206 GHz)

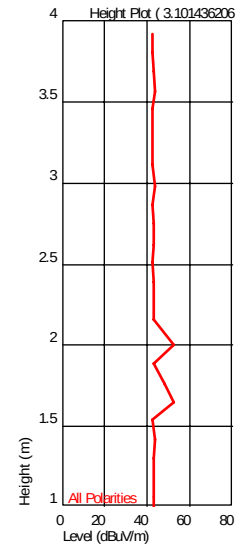
Level (dBuV/m)



All Polarities

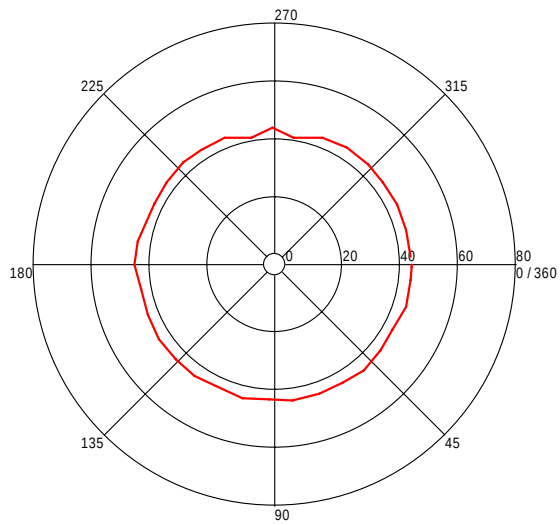
Azimuth (Degrees)

Height Plot (3.101436206 GHz)



Turntable Plot (4.486386106 GHz)

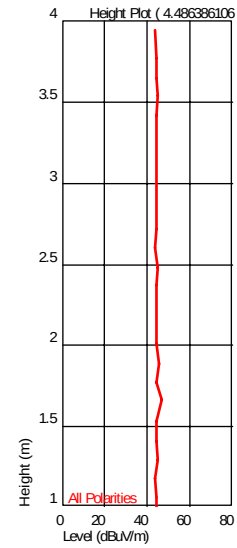
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (4.486386106 GHz)



Test Information

Test Details

Test: Radiated - FCC15 Class B @ 3m
 Project: Insulet G100858090
 Test Notes: 1015mB; Orthogonal #3; Battery; CASE PDM
 Temperature: 24c
 Humidity: 44%
 Tested by: Nick A.
 Test Started: 12 Sep 2012 21:32

User Entry

Radiated - FCC15 Class B @ 3m

Insulet G100858090

1015mB; Orthogonal #3; Battery; CASE PDM

24c

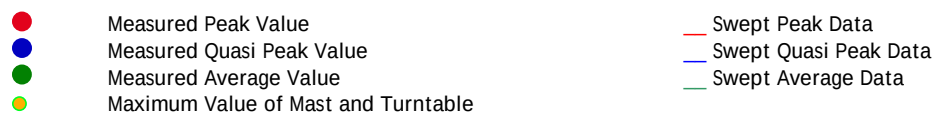
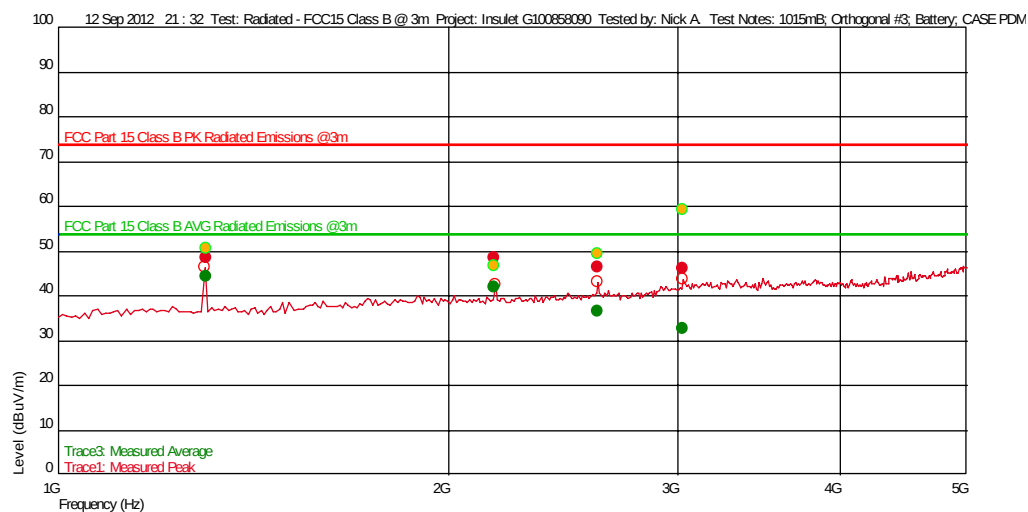
44%

Nick A.

12 Sep 2012 21:32

Additional Information

Prescan Emission Graph



Emissions Test Data

Trace1: Measured Peak

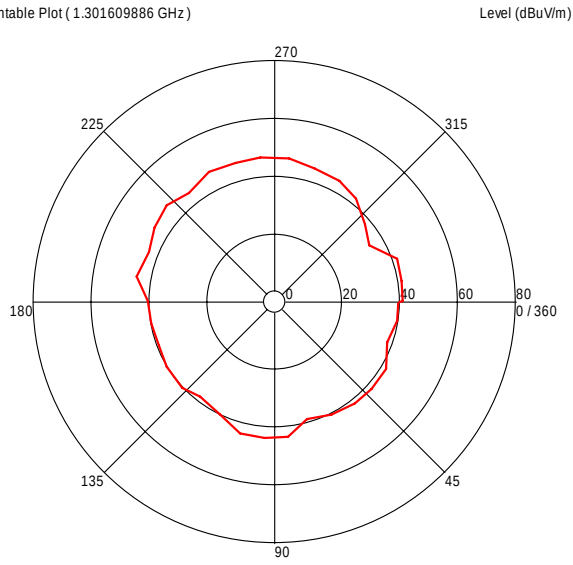
Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
3.024288577 G	46.18	30.30 3	- 27.122	74.000	-27.82		85	3.78	1 M	
2.603333333 G	46.38	28.92 8	- 27.965	74.000	-27.62	--	271	1.77	1 M	
1.301609886 G	48.39	25.68 6	- 29.384	74.000	-25.61		232	1.76	1 M	
2.169398797 G	48.43	27.73 4	- 28.388	74.000	-25.57	--	246	2.85	1 M	

Trace3: Measured Average

Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
3.024288577 G	32.73	30.30 3	- 27.122	54.000	-21.27		85	3.78	1 M	
2.603333333 G	36.54	28.92 8	- 27.965	54.000	-17.46	--	271	1.77	1 M	
2.169398797 G	41.81	27.73 4	- 28.388	54.000	-12.19	--	246	2.85	1 M	
1.301609886 G	44.42	25.68 6	- 29.384	54.000	-9.58		232	1.76	1 M	

Azimuth Plots

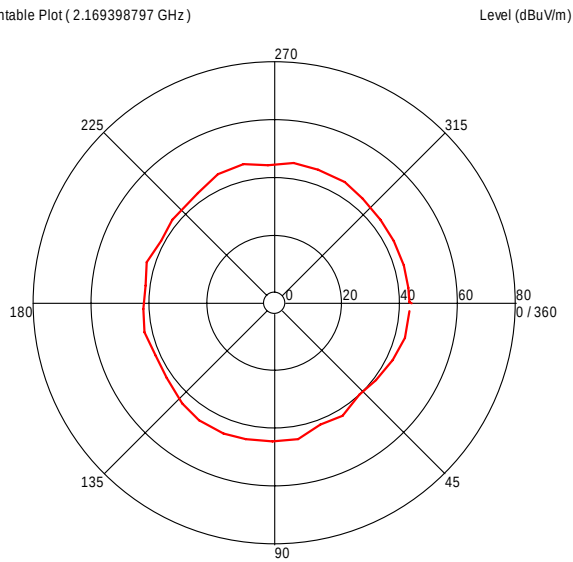
Turntable Plot (1.301609886 GHz)



All Polarities

Azimuth (Degrees)

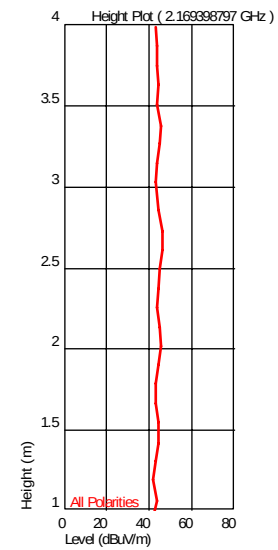
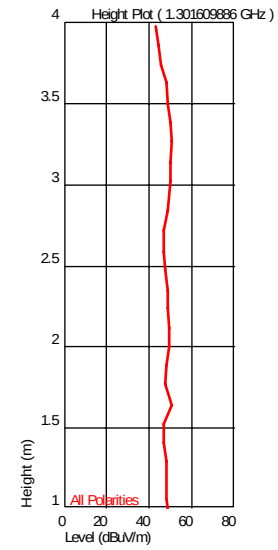
Turntable Plot (2.169398797 GHz)



All Polarities

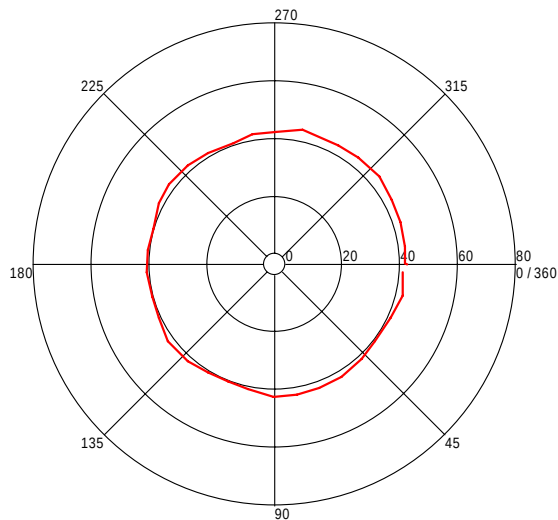
Azimuth (Degrees)

Turntable Plots



Turntable Plot (2.603333333 GHz)

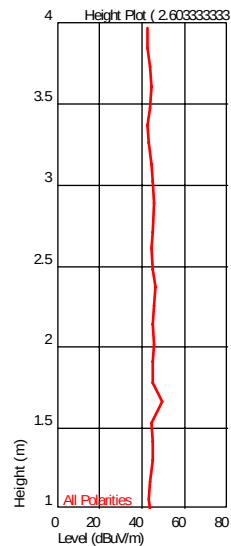
Level (dBuV/m)



All Polarities

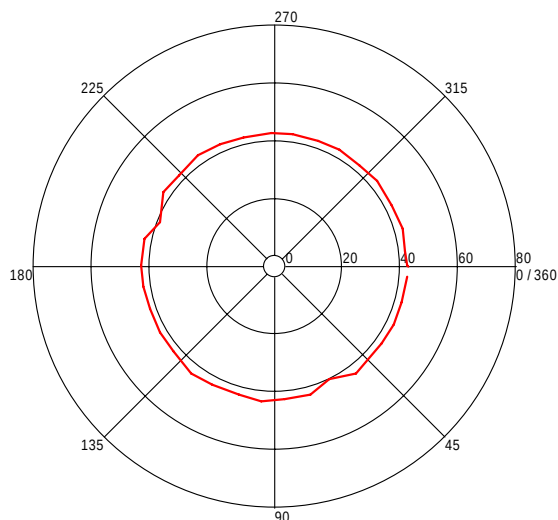
Azimuth (Degrees)

Height Plot (2.603333333 GHz)



Turntable Plot (3.024288577 GHz)

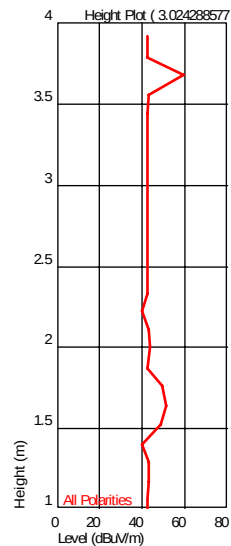
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (3.024288577 GHz)



Test Personnel: Nicholas Abbondante
 Supervising/Reviewing Engineer: N/A
 (Where Applicable) FCC Part 15 Subpart C
 Product Standard: IC RSS-210 Annex 1
 Input Voltage: Fresh Batteries
 Pretest Verification w/ Ambient Signals or BB Source: Ambient

Test Date: 09/12/2012

Test Levels: See tables

Ambient Temperature: 24 °C

Relative Humidity: 44 %

Atmospheric Pressure: 1015 mbars

Deviations, Additions, or Exclusions: None

7 Digital Device Radiated Emissions

7.1 Method

Tests are performed in accordance with FCC Part 15 Subpart B, IC ICES-003, and ANSI C63.4:2009.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

Measurement Uncertainty

For radiated emissions, U_{lab} (3.5 dB at 3m and 3.5 dB at 10m below 1 GHz, and 4.2 dB at 3m above 1 GHz) < U_{CISPR} (5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V
 AF = 7.4 dB/m
 CF = 1.6 dB
 AG = 29.0 dB
 FS = 32 dB μ V/m

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

$$NF = \text{Net Reading in dB}\mu\text{V}$$

Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$

$$UF = 10^{(32 \text{ dB}\mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

7.2 Test Equipment Used:

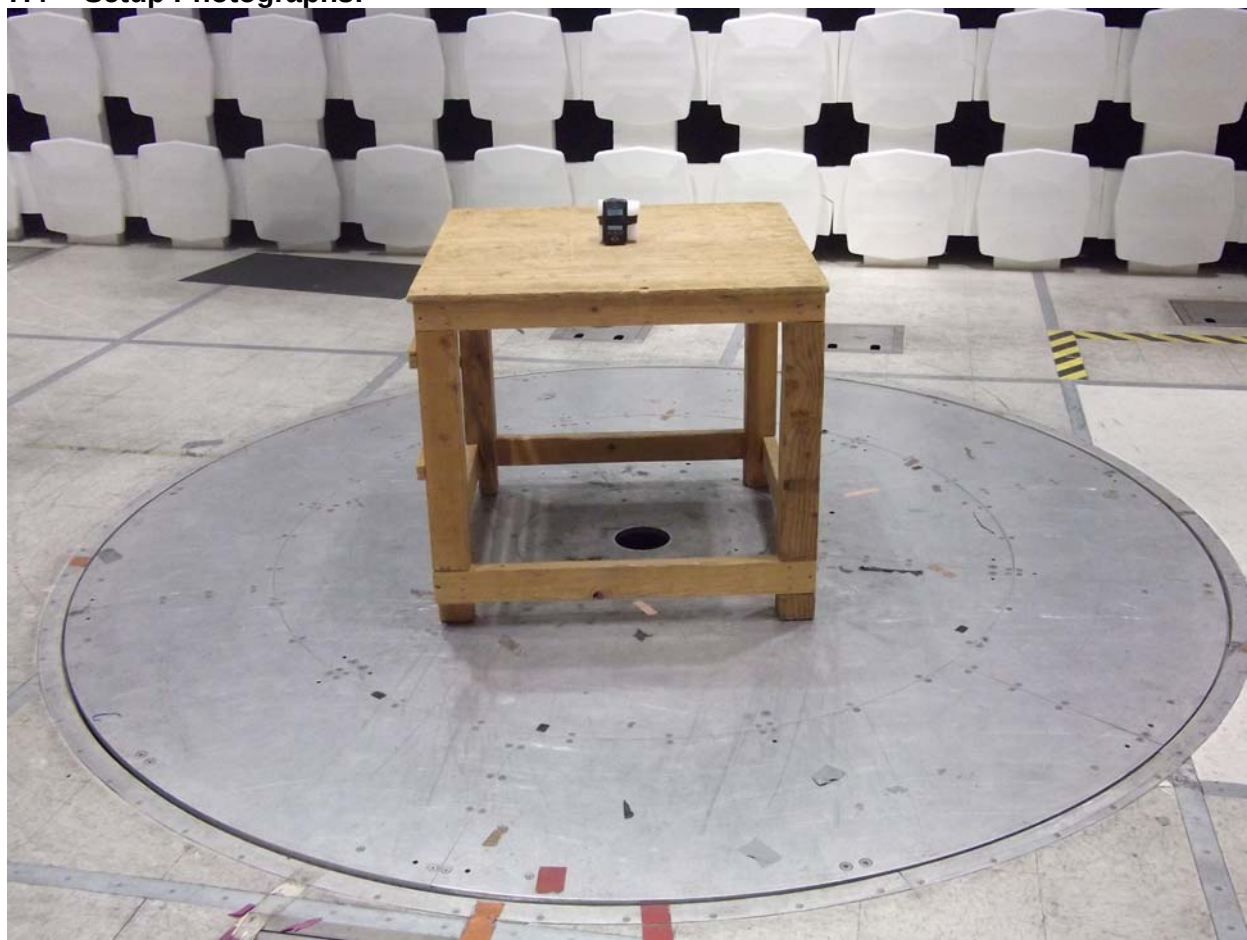
Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
'DAV003	Weather Station	Davis Instruments	7400	PE80529A39 A	08/17/2011	09/17/2012
'145034	BiLog Antenna (30 MHz to 1GHz)	Schaffner Chase EMC	CBL6111C	2564	02/07/2012	02/07/2013
'145128	EMI Receiver 40 GHz (20 Hz - 40 Ghz)	Rohde & Schwarz	ESI	8392831001	08/23/2011	09/23/2012
'145-410	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	09/04/2011	10/04/2012
'145003	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/04/2011	10/04/2012

Software Utilized:

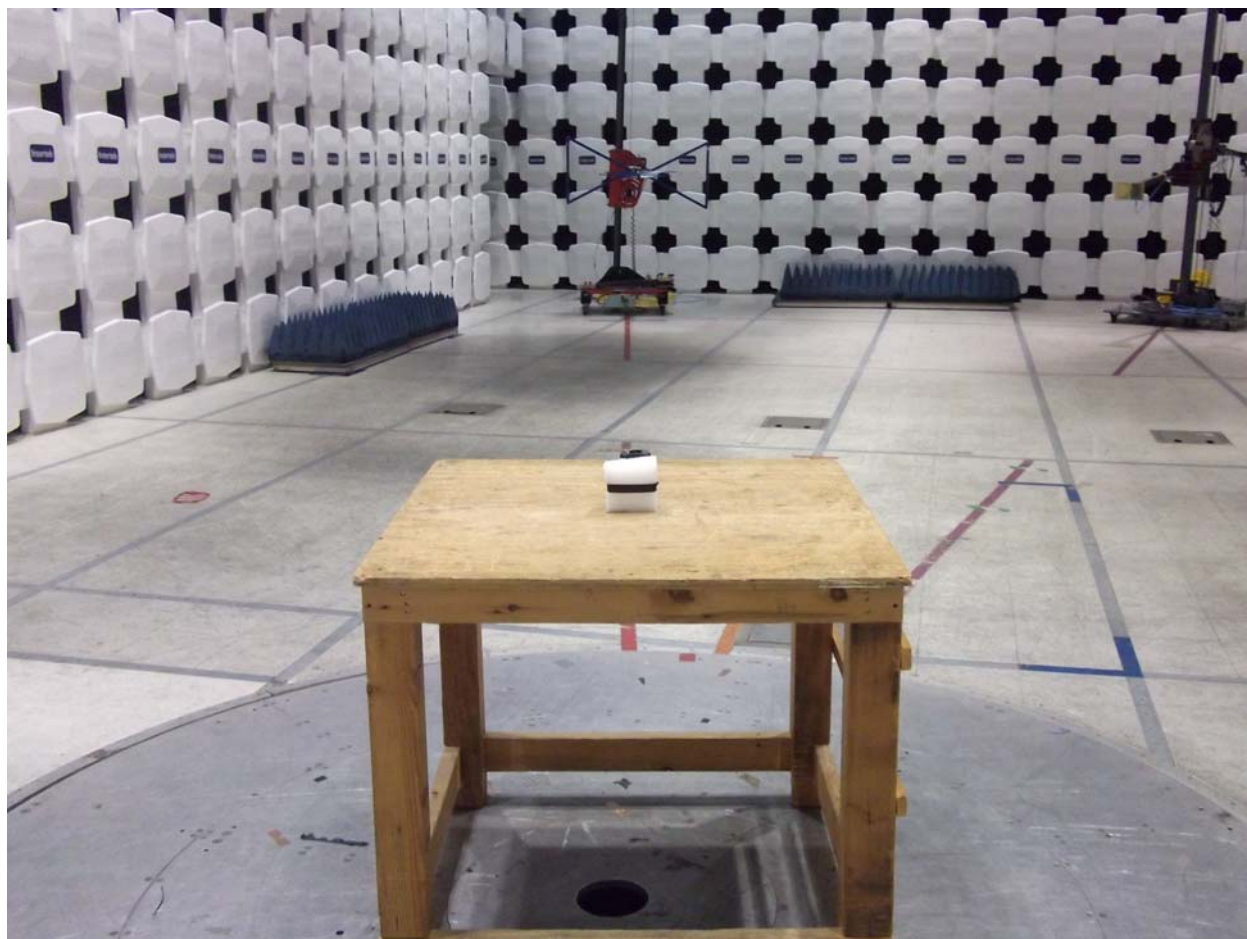
Name	Manufacturer	Version
C5 Emissions	TESEQ	5.26.46.46

7.3 Results:

The sample tested was found to Comply. The Cispr 11 limit is the same as the Cispr 22 limit that is accepted by FCC and Industry Canada.

7.4 Setup Photographs:

Radiated Emissions, 30-1000 MHz



Radiated Emissions, 30-1000 MHz

7.5 Plots/Data:

Test Information

Test Details

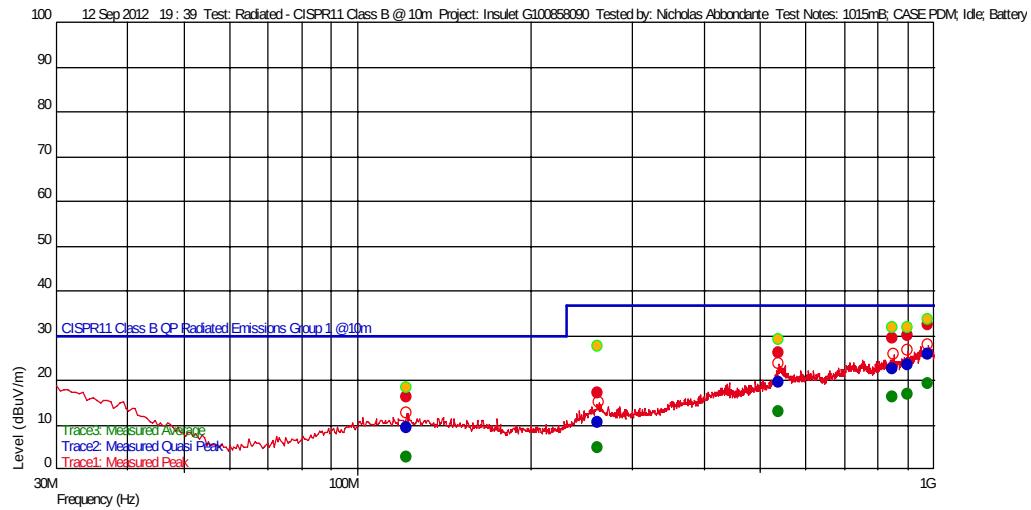
Test: Radiated - CISPR11 Class B @ 10m
Project: Insulet G100858090
Test Notes: 1015mB; CASE PDM; Idle; Battery
Temperature: 24c
Humidity: 44%
Tested by: Nicholas Abbondante
Test Started: 12 Sep 2012 19 : 39

User Entry

Radiated - CISPR11 Class B @ 10m
Insulet G100858090
1015mB; CASE PDM; Idle; Battery
24c
44%
Nicholas Abbondante
12 Sep 2012 19 : 39

Additional Information

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable

- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

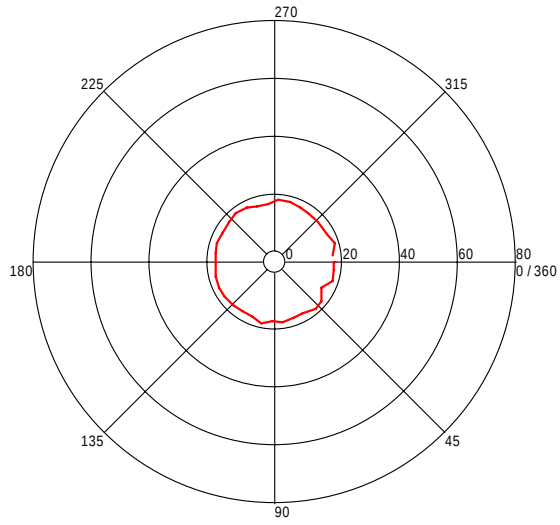
Trace2: Measured Quasi Peak

Frequency(Hz)	Level(dBuV/m)	AF	PA+CL	Limit(dBuV/m)	Margin(dBuV/m)	Hor (--), Ver ()	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
262.007615052 M	10.67	14.10 0	- 24.128	37.000	-26.33	--	82	2.36	120 k	
121.95611183 M	9.35	11.39 6	- 25.071	30.000	-20.65	--	113	3.07	120 k	
538.232063822 M	19.49	21.64 6	- 23.979	37.000	-17.51	--	141	1.35	120 k	
850.603206242 M	22.64	23.15 2	- 23.009	37.000	-14.36	--	48	1.14	120 k	
900.763927409 M	23.37	23.45 4	- 22.691	37.000	-13.63	--	295	4.00	120 k	
978.577955443 M	25.72	24.85 7	- 22.360	37.000	-11.28	--	81	1.55	120 k	

Azimuth Plots

Turntable Plot (121.95611183 MHz)

Level (dBuV/m)

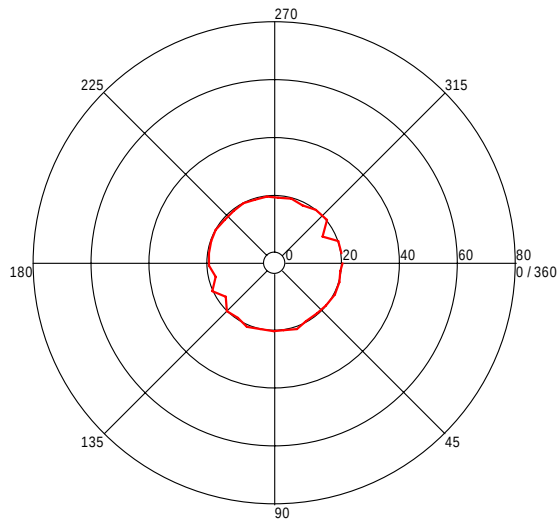


All Polarities

Azimuth (Degrees)

Turntable Plot (262.007615052 MHz)

Level (dBuV/m)

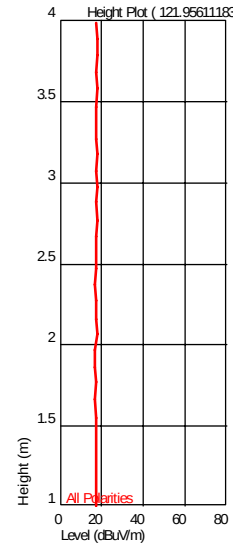


All Polarities

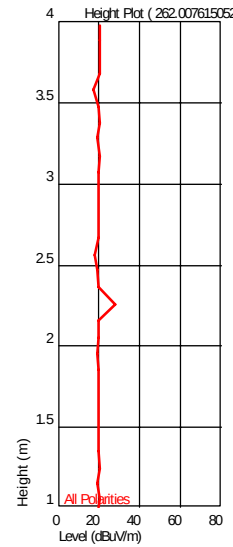
Azimuth (Degrees)

Turntable Plots

Height Plot (121.95611183 MHz)

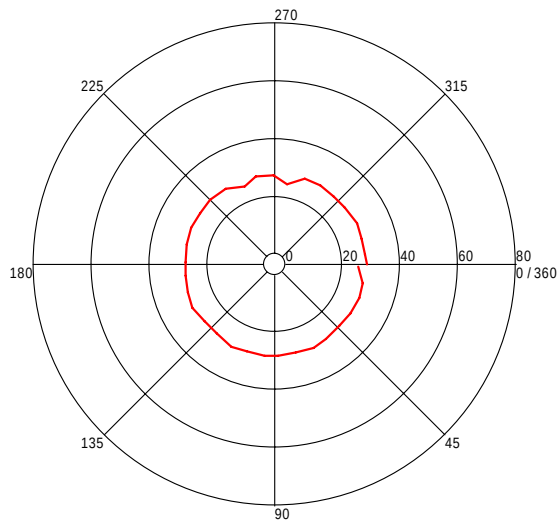


Height Plot (262.007615052 MHz)



Turntable Plot (538.232063822 MHz)

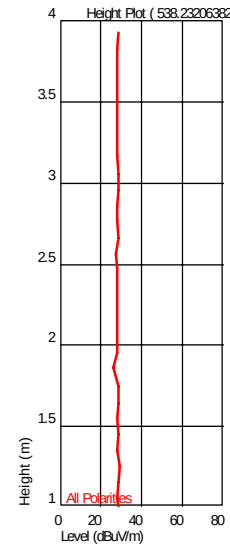
Level (dBuV/m)



All Polarities

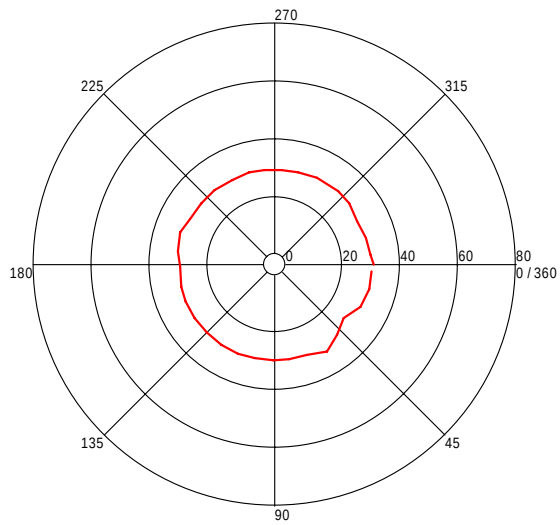
Azimuth (Degrees)

Height Plot (538.232063822 MHz)



Turntable Plot (850.603206242 MHz)

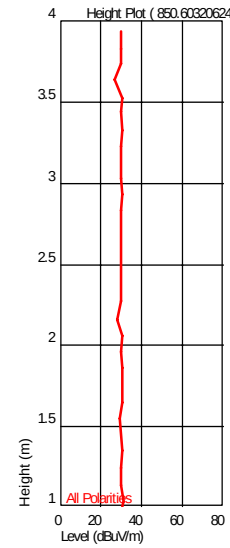
Level (dBuV/m)



All Polarities

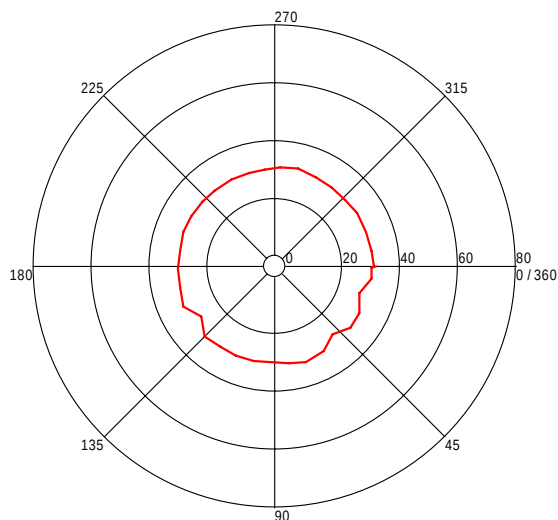
Azimuth (Degrees)

Height Plot (850.603206242 MHz)



Turntable Plot (900.763927409 MHz)

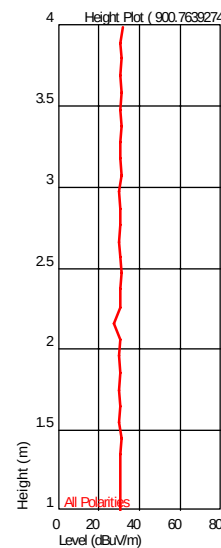
Level (dBuV/m)



All Polarities

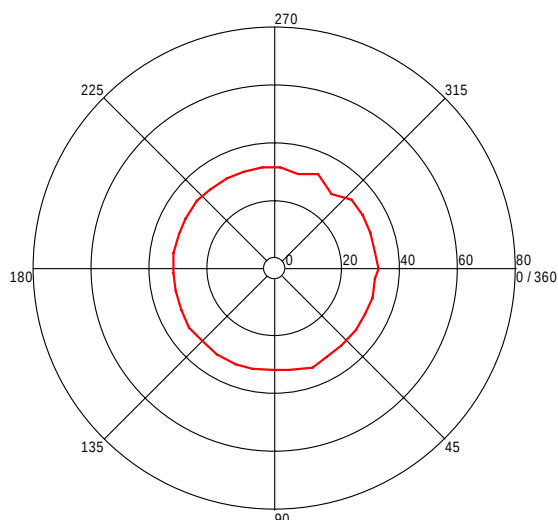
Azimuth (Degrees)

Height Plot (900.763927409 MHz)



Turntable Plot (978.577955443 MHz)

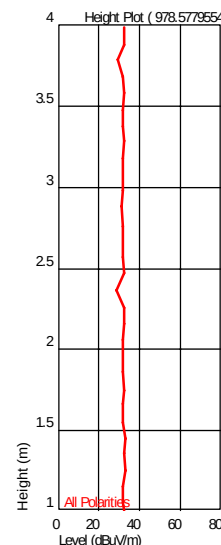
Level (dBuV/m)



All Polarities

Azimuth (Degrees)

Height Plot (978.577955443 MHz)



Test Personnel: Nicholas Abbondante
 Supervising/Reviewing Engineer: N/A
 (Where Applicable) Cispr 11, FCC Part 15
 Product Standard: Subpart B, IC ICES-003
 Input Voltage: Fresh Batteries
 Pretest Verification w/ Ambient Signals or BB Source: Ambient

Test Date: 09/12/2012

Test Levels: See tables

Ambient Temperature: 24 °C

Relative Humidity: 44 %

Atmospheric Pressure: 1015 mbars

Deviations, Additions, or Exclusions: None

8 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	09/18/2012	100858090BOX-004	NNA	JSV	Original Issue