EMC TEST REPORT

Report Number: 102011503ATL-001
Project Number: G102011503

Report Issue Date: May 6, 2015

Product Designation:
Model tested: Wireless Professional

Manufacturer Declared Equivalent Product Designations:
Model not tested: SP8.0, SP6.0, Fit5.0 and Wireless USA

Standards: CFR47 FCC Part 15 Subpart C:2015 Section 15.205, 15.209, 15.215, 15.249
CFR47 FCC Part 15 Subpart B:2015 Section 15.109
Industry Canada RSS-210 Issue 8 December 2010, Annex A2.9
Industry Canada RSS-GEN Issue 4 November 2014

Tested by:
Intertek Testing Services NA, Inc.
1950 Evergreen Blvd, Suite 100
Duluth, GA 30096 USA

Client:
DJO LLC
1430 Decision Street
Vista, CA 92081
USA

Report prepared by
Mary Sampson/Senior Project Engineer

Report reviewed by
Krishna Vemuri/Senior Staff Engineer

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 Frequency Radiated Emissions (47CFR Part 15 Subpart C: 2015 Section 15.249 RSS-210 Issue 8 Dec 2010 Annex A2.9)	Pass
--	AC Mains Conducted Emissions (Battery Powered Device)	N/A
7	Transmitter Spurious Radiated Emissions (47CFR Part 15 Subpart C: 2015 Section 15.249, 15.209, 15.205 RSS-210 Issue 8 Dec 2010 Annex A2.9)	Pass
8	Duty Cycle (47CFR Part 15 Subpart A: 2015 Section 15.35(c) RSS-GEN Issue 4: Nov 2014 Section 6.10)	Pass
9	20 dB Bandwidth (47CFR Part 15 Subpart C: 2015 Section 15.215 RSS-GEN Issue 4:Nov 2014 Section 6.6)	Pass
10	Bandedge (Band Edge (47CFR FCC Part 15 Subpart C: 2015 Section 15.215(c), 15.249(d); RSS-210 Issue 8: Dec 2010 Annex A2.9)	Pass
11	Digital Parts Emissions (47CFR Part 15 Subpart B: 2015 Section 15.109 RSS-GEN Issue 4:Nov 2014 Section 6.6	Pass
12	RF Exposure(47CFR Part 2 Subpart J:2015 Section 2.1091; RSS-102 Issue 4 Mar 2010 Section 2.5.1)	Pass
13	Revision History	

3 Client Information

This EUT was tested at the request of:

Client: DJO LLC
1430 Decision Street
Vista, CA 92081
USA
Contact: Mark Stavro
Telephone: (760) 734-3551
Fax: (760) 734-5694
Email: mark.stavro@djoglobal.com

4 Description of Equipment Under Test

Manufacturer: DJO LLC
1430 Decision Street
Vista, CA 92081
USA

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Wireless Professional Remote Controller	DJO	00300	YNP000712

Receive Date:	10/15/2014
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)

The Wireless Professional Remote Controller is a muscle stimulator which uses wireless communication to control up to four muscle stimulators. The Wireless Pro can be used by a healthy person for the purposes of pain relief, muscle conditioning, muscle warmup and muscle recovery.

Per the client, the Compex Wireless Professional Remote Controller, SP8.0, SP6.0, Fit5.0 and Wireless USA all use the same radio board and transmitter protocol, the only difference is the color and firmware.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
3.7 Vdc	1500 mAh Max Charging = 1.5 A	N/A	N/A

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Continuous transmission
2	Idle

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	Firmware version: 0209x1DC5F303

5 System Setup and Method

Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
None					

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None			

5.1 Method:

Configuration as required by CFR47 FCC Part 15 Subpart C:2015 Sections 15.205, 15.209, 15.215, 15.249, Industry Canada RSS-210 Issue 8 December 2010, Annex A2.9, Industry Canada RSS-GEN Issue 4 November 2014, and ANSI C63.10-2013.

5.2 EUT Block Diagram:

6 Fundamental Frequency Radiated Emissions

6.1 Method

Tests are performed in accordance with 47CFR Part 15 Subpart C:2015 Section 15.249, RSS-210 Issue 8 Annex A2.9, and ANSI C63.10:2013.

TEST SITE: 10m Semi-Anechoic Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

Measurement Uncertainty

For radiated emissions, U_{lab} (3.9 dB at 3m and 3.6 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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

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

To convert from dBμV to μV or mV the following was used:

UF = $10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
UF = $10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
200162;	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	03/02/2015	03/02/2016
211872;	Barometer, Temperature, and Humidity sensor - Network based. Also marked as iServer MicroServer.	Omega	iBTHX-W	0240116	11/07/2014	11/07/2015
213061;	Antenna, Horn, <18 GHz	EMCO	3115	9208-3919	07/22/2014	07/22/2015
MP1;	Cable MP1, 18 GHz, N, 394 inches	Megaphase	G919-NKNK-310	MP1	11/14/2014	11/14/2015
MP3;	Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/08/2014	05/08/2015
MP-HF-2;	Cable, 3-meters, 1-18GHz	Megaphase	EM18-N1N1-119	12090601002	08/26/2014	08/26/2015

Software Utilized:

Name	Manufacturer	Version
None (Spectrum Analyzer Firmware)		

6.3 Results:

FCC Part 15 Section 15.249

Fundamental Frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

IC RSS-210 Section A2.9

Fundamental Frequency (MHz)	Field strength (millivolts/meter)	
	Fundamental	Harmonics
902-928 MHz	50	0.5
2400-2483.5 MHz	50	0.5
5725-5875 MHz	50	0.5

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

The sample tested was found to Comply.

6.4 Setup Photographs:

Setup photographs can be found in Test Setup Photos exhibit.

6.5 Plots/Data:

Client: DJO
Model Number: Compex Wireless Controller
Project Number: G102011503
Tested By: MTS
Date: 03/31/2015
Frequency Range (MHz): Fundamental
Input power: Battery

Receiver: R&S ESU40
Antenna: EMCO 3115
Cables: MP1+MP3+MP-HF-2
Preamp:
Limit: FCC15 Class B-3m
Test Distance (m): 3
Modifications for compliance (y/n): n

Notes:

A	B	C	D	E	F	G	H	I	J	K
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Duty Cycle Factor dB**	**Net dB(uV/m)**	**3m Limit dB(uV/m)**	**Margin dB**	**Detector/ Bandwidth**
X-axis, low channel										
H	2403.000	47.7	28.3	4.1	0.0	0.0	80.1	114.0	-33.9	PK/1MHz
H	2403.000	47.7	28.3	4.1	0.0	16.5	63.6	94.0	-30.4	AVG/1MHz
V	2403.000	38.1	28.3	4.1	0.0	0.0	70.5	114.0	-43.5	PK/1MHz
V	2403.000	38.1	28.3	4.1	0.0	16.5	54.0	94.0	-40.0	AVG/1MHz
X-Axis, mid channel										
H	2440.000	44.7	28.3	4.2	0.0	0.0	77.2	114.0	-36.8	PK/1MHz
H	2440.000	44.7	28.3	4.2	0.0	16.5	60.7	94.0	-33.3	AVG/1MHz
V	2440.000	39.5	28.3	4.2	0.0	0.0	72.0	114.0	-42.0	PK/1MHz
V	2440.000	39.5	28.3	4.2	0.0	16.5	55.5	94.0	-38.5	AVG/1MHz
X-Axis , high channel										
H	2475.000	43.2	28.3	4.2	0.0	0.0	75.7	114.0	-38.3	PK/1MHz
H	2475.000	43.2	28.3	4.2	0.0	16.5	59.2	94.0	-34.8	AVG/1MHz
V	2475.000	32.8	28.3	4.2	0.0	0.0	65.2	114.0	-48.8	PK/1MHz
V	2475.000	32.8	28.3	4.2	0.0	16.5	48.7	94.0	-45.3	AVG/1MHz
Y-Axis, low channel										
H	2403.000	40.2	28.3	4.1	0.0	0.0	72.6	114.0	-41.4	PK/1MHz
H	2403.000	40.2	28.3	4.1	0.0	16.5	56.1	94.0	-37.9	AVG/1MHz
V	2403.000	43.4	28.3	4.1	0.0	0.0	75.8	114.0	-38.2	PK/1MHz
V	2403.000	43.4	28.3	4.1	0.0	16.5	59.3	94.0	-34.7	AVG/1MHz
Y-Axis, mid channel										
H	2440.000	42.9	28.3	4.2	0.0	0.0	75.4	114.0	-38.6	PK/1MHz
H	2440.000	42.9	28.3	4.2	0.0	16.5	58.9	94.0	-35.1	AVG/1MHz
V	2440.000	40.6	28.3	4.2	0.0	0.0	73.1	114.0	-40.9	PK/1MHz
V	2440.000	40.6	28.3	4.2	0.0	16.5	56.6	94.0	-37.4	AVG/1MHz
Y-Axis, high channel										
H	2475.000	38.9	28.3	4.2	0.0	0.0	71.4	114.0	-42.6	PK/1MHz
H	2475.000	38.9	28.3	4.2	0.0	16.5	54.9	94.0	-39.1	AVG/1MHz
V	2475.000	38.4	28.3	4.2	0.0	0.0	70.8	114.0	-43.2	PK/1MHz
V	2475.000	38.4	28.3	4.2	0.0	16.5	54.3	94.0	-39.7	AVG/1MHz
Z-Axis, low channel										
H	2403.000	42.5	28.3	4.1	0.0	0.0	74.9	114.0	-39.1	PK/1MHz
H	2403.000	42.5	28.3	4.1	0.0	16.5	58.4	94.0	-35.6	AVG/1MHz
V	2403.000	41.6	28.3	4.1	0.0	0.0	74.0	114.0	-40.0	PK/1MHz
V	2403.000	41.6	28.3	4.1	0.0	16.5	57.5	94.0	-36.5	AVG/1MHz
Z-Axis, mid channel										
H	2440.000	38.4	28.3	4.2	0.0	0.0	70.9	114.0	-43.1	PK/1MHz
H	2440.000	38.4	28.3	4.2	0.0	16.5	54.4	94.0	-39.6	AVG/1MHz
V	2440.000	41.4	28.3	4.2	0.0	0.0	73.9	114.0	-40.1	PK/1MHz
V	2440.000	41.4	28.3	4.2	0.0	16.5	57.4	94.0	-36.6	AVG/1MHz
Z-Axis, high channel										
H	2475.000	37.4	28.3	4.2	0.0	0.0	69.9	114.0	-44.1	PK/1MHz
H	2475.000	37.4	28.3	4.2	0.0	16.5	53.4	94.0	-40.6	AVG/1MHz
V	2475.000	39.2	28.3	4.2	0.0	0.0	71.6	114.0	-42.4	PK/1MHz
V	2475.000	39.2	28.3	4.2	0.0	16.5	55.1	94.0	-38.9	AVG/1MHz
Calculations		G=C+D+E-F		I=G-H						

EUT was placed in the X. Y and Z orthoganal axes.
Note: PK indicates peak detection. AVG indicates the peak reading corrected by the duty cycle.

Test Personnel:	Mary Sampson MTS	Test Date:	03/31/2015
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	47CFR Part 15 Subpart C: 2015 Section 15.249, RSS-210 Issue 8: 2010 Annex A2.9	Limit Applied:	See section 6.3
Input Voltage:	Battery		
Pretest Verification w/ Ambient Signals or BB Source:	**BB Source**	Ambient Temperature:	24 ºC
		Relative Humidity:	34.4 %
		Atmospheric Pressure:	981.7 mbars

Deviations, Additions, or Exclusions: None

7 Transmitter Spurious Radiated Emissions

7.1 Method

Tests are performed in accordance with 47CFR Part 15 Subpart C: 2015 Section 15.249, 15.209, and 15.205, RSS-210 Issue 8 Annex A2.9, and ANSI C63.10:2013.

TEST SITE: 10m Semi-Anechoic Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

Measurement Uncertainty

For radiated emissions, U_{lab} (3.9 dB at 3m and 3.6 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 Calculations

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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

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

To convert from dBμV to μV or mV the following was used:

UF = $10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
UF = $10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
213061;	Antenna, Horn, <18 GHz	EMCO	3115	9208-3919	07/22/2014	07/22/2015
MP3;	Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/08/2014	05/08/2015
MP-HF-;2	Cable, 3-meters, 1-18GHz	Megaphase	EM18-N1N1-119	12090601002	08/26/2014	08/26/2015
ST-5;	7m Cable, 0.01-18GHz	Storm Products Co.	A81-0303-275.6	121-07-002	08/14/2014	08/14/2015
200108;	Preamplifier, 20 MHz to 18 GHz, 40 dB	A.H. Systems	PAM-0118	199	12/03/2014	12/03/2015
200162;	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	03/02/2015	03/02/2016
213023;	Antenna, Horn, 18-40 GHz	EMCO	3116	9310-2222	10/09/2014	10/09/2015
200080;	Preamplifier, 18-40GHz, 29 dB Gain	Miteq	JS41800400-30-5P-S	818197	08/27/2014	08/27/2015
E404;	Cable E404, 40 GHz, 2.9, 2m	Megaphase	TM40 K1K1 80	E404	08/27/2014	08/27/2015
211386;	Antenna, BiLog, 20-2000MHz					
200082;	Preamplifier, 20MHz to 2GHz, 30 dB	A.H. Systems	PAM-0202	203	10/02/2014	10/02/2015
E210;	RF Coax Cable	Megaphase	TM18-N1N1-120	14065201-003	05/08/2014	05/08/2015
E209;	RF Coax Cable	Megaphase	TM18-N1N1-120	14065201-003	05/08/2014	05/08/2015
TT6;	RF Coax Cable. Rated 9KHz to 2 GHz.	Andrews	Cable TT-6	TT6	06/18/2014	06/18/2015
TW2 211411;	Cable TW2	Andrews	Cable TW2	TW2	05/08/2014	05/08/2015
015762;	EMI Receiver, Preselector section	Hewlett Packard	85460A	3330A00158	04/09/2014	04/09/2015
211505;	EMI Receiver	Hewlett Packard	8546A	3650A00362	04/09/2014	04/09/2015

Software Utilized:

Name	Manufacturer	Version
None (Spectrum Analyzer Firmware)Tile	Quantum Change	3.4.K.22

7.3 Results:

FCC 15.249

Fundamental Frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

FCC 15.209

Fundamental Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permItted under other sections of this part, e.g., §§ 15.231 and 15.241.

IC RSS-210 Section A2.9

Fundamental Frequency (MHz)	Field strength (millivolts/meter)	
	Fundamental	Harmonics
902-928 MHz	50	0.5
2400-2483.5 MHz	50	0.5
5725-5875 MHz	50	0.5

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

IC RSS-Gen Section 8.3

Fundamental Frequency (MHz)	Field strength (μV/m at 3 metres)
30–88	100
88–216	150
216–960	200
Above 960	500*

(*)Unless otherwise specified, for all frequencies greater than 1 GHz, the radiated emission limits for licence-exempt radio apparatus stated in applicable RSSs (including RSS-Gen) are based on measurements using a linear average detector function having a minimum resolution bandwidth of 1 MHz. If an average limit is specified for the EUT, then the peak emission shall also be measured with instrumentation properly adjusted for such factors as pulse desensitization to ensure the peak emission is less than 20 dB above the average limit.

Testing was performed with EUT in X, Y, and Z axis from 30 MHz to 25 GHz. Hand scan was performed from 18 to 25 GHz, no significant emissions were detected.

The sample tested was found to Comply.

7.4 Setup Photographs:

Setup photographs can be found in Test Setup Photos exhibit.

7.5 Plots/Data:

Client: DJO Global
Model Number: Remote Controller REF 6522040
Project Number: Q500558693
Tested By: LEM
Date: 11/6/14
Frequency Range (MHz): 30-1000
Input power: Battery

Receiver: HP 8546A
Antenna: Chase 2622
Cables: E-205+E-209+TT-6+TW2
Preamp: ZKL-2 200069
Test Distance (m):
Limit: CISPR Class A-10m

Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Net dB(uV/m)**	**10m Limit dB(uV/m)**	**Margin dB**	**Detectors / Bandwidths Det/RBW/VBW**
H	32.480	34.6	16.5	0.9	31.6	20.3	40.0	-19.7	120KHz
H	36.232	34.3	13.6	0.9	31.6	17.3	40.0	-22.7	120KHz
H	39.944	34.0	12.0	1.0	31.6	15.4	40.0	-24.6	120KHz
H	112.072	31.2	11.4	2.0	31.4	13.2	40.0	-26.8	120KHz
V	36.217	34.3	15.4	0.9	31.6	19.0	40.0	-21.0	120KHz
V	40.000	34.2	13.6	1.0	31.6	17.2	40.0	-22.8	120KHz
Calculations		G=C+D+E-F		I=G-H					

Client: DJO
Model Number: Compex Wireless Controller
Project Number: G102011503
Tested By: MTS
Date: 04/07/2015
Frequency Range (MHz): 1000-18000
Input power: Battery

Receiver: R&S ESU40
Antenna: EMCO 3115
Cables: ST-5+MP3+MP-HF-2
Preamp: PAM-0118
Limit: FCC15 Class B-3m
Test Distance (m): 3
Modifications for compliance (y/n): n

Notes: Continuous transmission, low channel

A	B	C	D	E	F	G	H	I	J	K
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Duty Cycle Factor dB**	**Net dB(uV/m)**	**3m Limit dB(uV/m)**	**Margin dB**	**Detector/ Bandwidth**
X-Axis										
V	4806.000	45.2	32.8	3.5	39.5	0.0	42.0	74.0	-32.0	PK/1MHz
V	4806.000	45.2	32.8	3.5	39.5	16.5	25.5	54.0	-28.5	AVG/1MHz
H	4806.000	47.1	32.8	3.5	39.5	0.0	43.9	74.0	-30.1	PK/1MHz
H	4806.000	47.1	32.8	3.5	39.5	16.5	27.4	54.0	-26.6	AVG/1MHz
V	7209.000	44.5	35.8	4.7	38.9	0.0	46.0	74.0	-28.0	PK/1MHz
V	7209.000	44.5	35.8	4.7	38.9	16.5	29.5	54.0	-24.5	AVG/1MHz
H	7209.000	44.6	35.8	4.7	38.9	0.0	46.1	74.0	-27.9	PK/1MHz
H	7209.000	44.6	35.8	4.7	38.9	16.5	29.6	54.0	-24.4	AVG/1MHz
V	9612.000	43.0	37.6	5.4	37.1	0.0	49.0	74.0	-25.0	PK/1MHz
V	9612.000	43.0	37.6	5.4	37.1	16.5	32.5	54.0	-21.5	AVG/1MHz
H	9612.000	42.8	37.6	5.4	37.1	16.5	32.2	74.0	-41.8	PK/1MHz
H	9612.000	42.8	37.6	5.4	37.1	16.5	32.2	54.0	-21.8	AVG/1MHz
Y-Axis										
V	4806.000	46.3	32.8	3.5	39.5	0.0	43.1	74.0	-30.9	PK/1MHz
V	4806.000	46.3	32.8	3.5	39.5	16.5	26.6	54.0	-27.4	AVG/1MHz
H	4806.000	46.5	32.8	3.5	39.5	0.0	43.3	74.0	-30.7	PK/1MHz
H	4806.000	46.5	32.8	3.5	39.5	16.5	26.8	54.0	-27.2	AVG/1MHz
V	7209.000	44.6	35.8	4.7	38.9	0.0	46.1	74.0	-27.9	PK/1MHz
V	7209.000	44.6	35.8	4.7	38.9	16.5	29.6	54.0	-24.4	AVG/1MHz
H	7209.000	44.9	35.8	4.7	38.9	0.0	46.4	74.0	-27.6	PK/1MHz
H	7209.000	44.9	35.8	4.7	38.9	16.5	29.9	54.0	-24.1	AVG/1MHz
V	9612.000	42.8	37.6	5.4	37.1	0.0	48.8	74.0	-25.2	PK/1MHz
V	9612.000	42.8	37.6	5.4	37.1	16.5	32.3	54.0	-21.7	AVG/1MHz
H	9612.000	42.6	37.6	5.4	37.1	0.0	48.5	74.0	-25.5	PK/1MHz
H	9612.000	42.6	37.6	5.4	37.1	16.5	32.0	54.0	-22.0	AVG/1MHz
Z-Axis										
V	4806.000	45.5	32.8	3.5	39.5	0.0	42.3	74.0	-31.7	PK/1MHz
V	4806.000	45.5	32.8	3.5	39.5	16.5	25.8	54.0	-28.2	AVG/1MHz
H	4806.000	45.4	32.8	3.5	39.5	0.0	42.2	74.0	-31.8	PK/1MHz
H	4806.000	45.4	32.8	3.5	39.5	16.5	25.7	54.0	-28.3	AVG/1MHz
V	7209.000	44.8	35.8	4.7	38.9	0.0	46.4	74.0	-27.6	PK/1MHz
V	7209.000	44.8	35.8	4.7	38.9	16.5	29.9	54.0	-24.1	AVG/1MHz
H	7209.000	45.1	35.8	4.7	38.9	0.0	46.7	74.0	-27.3	PK/1MHz
H	7209.000	45.1	35.8	4.7	38.9	16.5	30.2	54.0	-23.8	AVG/1MHz
V	9612.000	43.6	37.6	5.4	37.1	0.0	49.6	74.0	-24.4	PK/1MHz
V	9612.000	43.6	37.6	5.4	37.1	16.5	33.1	54.0	-20.9	AVG/1MHz
H	9612.000	43.3	37.6	5.4	37.1	0.0	49.2	74.0	-24.8	PK/1MHz
H	9612.000	43.3	37.6	5.4	37.1	16.5	32.7	54.0	-21.3	AVG/1MHz
Calculations		G=C+D+E-F		I=G-H						

Note: PK indicates peak detection. AVG indicates the peak reading corrected by the duty cycle.

Client: DJO
Model Number: Compex Wireless Controller
Project Number: G102011503
Tested By: MTS
Date: 04/07/2015
Frequency Range (MHz): 1000-18000
Input power: Battery

Receiver: R&S ESU40
Antenna: EMCO 3115
Cables: ST-5+MP3+MP-HF-2
Preamp: PAM-0118
Limit: FCC15 Class B-3m
Test Distance (m): 3
Modifications for compliance (y/n): n

Notes: Continuous transmission, mid channel

A	B	C	D	E	F	G	H	I	J	K
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Duty Cycle Factor dB**	**Net dB(uV/m)**	**3m Limit dB(uV/m)**	**Margin dB**	**Detector/ Bandwidth**
X-Axis										
V	4880.000	44.9	32.8	3.5	39.5	0.0	41.6	74.0	-32.4	PK/1MHz
V	4880.000	44.9	32.8	3.5	39.5	16.5	25.1	54.0	-28.9	AVG/1MHz
H	4880.000	44.7	32.8	3.5	39.5	0.0	41.4	74.0	-32.6	PK/1MHz
H	4880.000	44.7	32.8	3.5	39.5	16.5	24.9	54.0	-29.1	AVG/1MHz
V	7320.000	44.0	36.2	4.7	38.9	0.0	45.9	74.0	-28.1	PK/1MHz
V	7320.000	44.0	36.2	4.7	38.9	16.5	29.4	54.0	-24.6	AVG/1MHz
H	7320.000	44.0	36.3	4.7	38.9	0.0	46.0	74.0	-28.0	PK/1MHz
H	7320.000	44.0	36.3	4.7	38.9	16.5	29.5	54.0	-24.5	AVG/1MHz
V	9760.000	39.7	37.6	5.4	37.1	0.0	45.6	74.0	-28.4	PK/1MHz
V	9760.000	39.7	37.6	5.4	37.1	16.5	29.1	54.0	-24.9	AVG/1MHz
H	9760.000	40.0	37.6	5.4	37.1	16.5	29.4	74.0	-44.6	PK/1MHz
H	9760.000	40.0	37.6	5.4	37.1	16.5	29.4	54.0	-24.6	AVG/1MHz
Y-Axis										
V	4880.000	45.1	32.8	3.5	39.5	0.0	41.9	74.0	-32.1	PK/1MHz
V	4880.000	45.1	32.8	3.5	39.5	16.5	25.4	54.0	-28.6	AVG/1MHz
H	4880.000	45.1	32.8	3.5	39.5	0.0	41.8	74.0	-32.2	PK/1MHz
H	4880.000	45.1	32.8	3.5	39.5	16.5	25.3	54.0	-28.7	AVG/1MHz
V	7320.000	44.1	36.2	4.7	38.9	0.0	46.0	74.0	-28.0	PK/1MHz
V	7320.000	44.1	36.2	4.7	38.9	16.5	29.5	54.0	-24.5	AVG/1MHz
H	7320.000	44.7	36.3	4.7	38.9	0.0	46.7	74.0	-27.3	PK/1MHz
H	7320.000	44.7	36.3	4.7	38.9	16.5	30.2	54.0	-23.8	AVG/1MHz
V	9760.000	40.4	37.6	5.4	37.1	0.0	46.3	74.0	-27.8	PK/1MHz
V	9760.000	40.4	37.6	5.4	37.1	16.5	29.8	54.0	-24.3	AVG/1MHz
H	9760.000	40.4	37.6	5.4	37.1	0.0	46.3	74.0	-27.8	PK/1MHz
H	9760.000	40.4	37.6	5.4	37.1	16.5	29.8	54.0	-24.2	AVG/1MHz
Z-Axis										
V	4880.000	45.8	32.8	3.5	39.5	0.0	42.5	74.0	-31.5	PK/1MHz
V	4880.000	45.8	32.8	3.5	39.5	16.5	26.0	54.0	-28.0	AVG/1MHz
H	4880.000	45.3	32.8	3.5	39.5	0.0	42.1	74.0	-31.9	PK/1MHz
H	4880.000	45.3	32.8	3.5	39.5	16.5	25.6	54.0	-28.4	AVG/1MHz
V	7320.000	44.6	36.2	4.7	38.9	0.0	46.6	74.0	-27.4	PK/1MHz
V	7320.000	44.6	36.2	4.7	38.9	16.5	30.1	54.0	-23.9	AVG/1MHz
H	7320.000	44.5	36.3	4.7	38.9	0.0	46.5	74.0	-27.5	PK/1MHz
H	7320.000	44.5	36.3	4.7	38.9	16.5	30.0	54.0	-24.0	AVG/1MHz
V	9760.000	40.2	37.6	5.4	37.1	0.0	46.1	74.0	-27.9	PK/1MHz
V	9760.000	40.2	37.6	5.4	37.1	16.5	29.6	54.0	-24.4	AVG/1MHz
H	9760.000	39.9	37.6	5.4	37.1	0.0	45.7	74.0	-28.3	PK/1MHz
H	9760.000	39.9	37.6	5.4	37.1	16.5	29.2	54.0	-24.8	AVG/1MHz
Calculations		G=C+D+E-F		I=G-H						

Note: PK indicates peak detection. AVG indicates the peak reading corrected by the duty cycle.

Client: DJO **Receiver:** R&S ESU40
Model Number: Compex Wireless Controller **Antenna:** EMCO 3115
Project Number: G102011503 **Cables:** ST-5+MP3+MP-HF-2
Tested By: MTS **Preamp:** PAM-0118
Date: 04/07/2015 **Limit:** FCC15 Class B-3m
Frequency Range (MHz): 1000-18000 **Test Distance (m):** 3
Input power: Battery **Modifications for compliance (y/n):** n
Notes: Continuous transmission, high channel

A	B	C	D	E	F	G	H	I	J	K
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Duty Cycle Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB	Detector/ Bandwidth
X-Axis										
V	4950.000	44.8	33.0	3.5	39.6	0.0	41.7	74.0	-32.3	PK/1MHz
V	4950.000	44.8	33.0	3.5	39.6	16.5	25.2	54.0	-28.8	AVG/1MHz
H	4950.000	45.3	33.0	3.5	39.6	0.0	42.1	74.0	-31.9	PK/1MHz
H	4950.000	45.3	33.0	3.5	39.6	16.5	25.7	54.0	-28.3	AVG/1MHz
V	7425.000	45.0	36.5	4.7	38.8	0.0	47.4	74.0	-26.6	PK/1MHz
V	7425.000	45.0	36.5	4.7	38.8	16.5	30.9	54.0	-23.1	AVG/1MHz
H	7425.000	44.9	36.5	4.7	38.8	0.0	47.3	74.0	-26.7	PK/1MHz
H	7425.000	44.9	36.5	4.7	38.8	16.5	30.8	54.0	-23.2	AVG/1MHz
V	9900.000	41.1	38.0	5.4	37.0	0.0	47.6	74.0	-26.4	PK/1MHz
V	9900.000	41.1	38.0	5.4	37.0	16.5	31.1	54.0	-22.9	AVG/1MHz
H	9900.000	41.2	38.0	5.4	37.0	16.5	31.1	74.0	-42.9	PK/1MHz
H	9900.000	41.2	38.0	5.4	37.0	16.5	31.1	54.0	-22.9	AVG/1MHz
Y-Axis										
V	4950.000	44.3	33.0	3.5	39.6	0.0	41.2	74.0	-32.8	PK/1MHz
V	4950.000	44.3	33.0	3.5	39.6	16.5	24.7	54.0	-29.3	AVG/1MHz
H	4950.000	44.1	33.0	3.5	39.6	0.0	40.9	74.0	-33.1	PK/1MHz
H	4950.000	44.1	33.0	3.5	39.6	16.5	24.4	54.0	-29.6	AVG/1MHz
V	7425.000	45.4	36.5	4.7	38.8	0.0	47.8	74.0	-26.2	PK/1MHz
V	7425.000	45.4	36.5	4.7	38.8	16.5	31.3	54.0	-22.7	AVG/1MHz
H	7425.000	44.9	36.5	4.7	38.8	0.0	47.2	74.0	-26.8	PK/1MHz
H	7425.000	44.9	36.5	4.7	38.8	16.5	30.7	54.0	-23.3	AVG/1MHz
V	9900.000	41.4	38.0	5.4	37.0	0.0	47.8	74.0	-26.2	PK/1MHz
V	9900.000	41.4	38.0	5.4	37.0	16.5	31.3	54.0	-22.7	AVG/1MHz
H	9900.000	41.5	38.0	5.4	37.0	0.0	48.0	74.0	-26.0	PK/1MHz
H	9900.000	41.5	38.0	5.4	37.0	16.5	31.5	54.0	-22.5	AVG/1MHz
Z-Axis										
V	4950.000	45.1	33.0	3.5	39.6	0.0	42.1	74.0	-31.9	PK/1MHz
V	4950.000	45.1	33.0	3.5	39.6	16.5	25.6	54.0	-28.4	AVG/1MHz
H	4950.000	44.9	33.0	3.5	39.6	0.0	41.7	74.0	-32.3	PK/1MHz
H	4950.000	44.9	33.0	3.5	39.6	16.5	25.2	54.0	-28.8	AVG/1MHz
V	7425.000	45.2	36.5	4.7	38.8	0.0	47.6	74.0	-26.4	PK/1MHz
V	7425.000	45.2	36.5	4.7	38.8	16.5	31.1	54.0	-22.9	AVG/1MHz
H	7425.000	45.6	36.5	4.7	38.8	0.0	48.0	74.0	-26.0	PK/1MHz
H	7425.000	45.6	36.5	4.7	38.8	16.5	31.5	54.0	-22.5	AVG/1MHz
V	9900.000	41.0	38.0	5.4	37.0	0.0	47.5	74.0	-26.6	PK/1MHz
V	9900.000	41.0	38.0	5.4	37.0	16.5	31.0	54.0	-23.1	AVG/1MHz
H	9900.000	41.1	38.0	5.4	37.0	0.0	47.6	74.0	-26.4	PK/1MHz
H	9900.000	41.1	38.0	5.4	37.0	16.5	31.1	54.0	-22.9	AVG/1MHz
Calculations		G=C+D+B-F		I=G-H						

Note: PK indicates peak detection. AVG indicates the peak reading corrected by the duty cycle.

Test Personnel: Larry Miller / Mary Sampson MTS
Supervising/Reviewing Engineer: (Where Applicable)
Product Standard: 47CFR Part 15 Subpart C: 2015 Section 15.249, 15.209, and 15.205, RSS-210 Issue 8: 2010 Annex A2.9, and RSS-Gen Issue 4: 2014 Section 8.3
Input Voltage: 3 Vdc
Pretest Verification w/ Ambient Signals or BB Source: **BB**

Test Date: 11/6/2014 / 04/07/2015
Limit Applied: See section 7.3
Ambient Temperature: Nov: 22 ºC / Apr: 23.9 ºC
Relative Humidity: Nov: 40 % / Apr: 40.5 %
Atmospheric Pressure: Nov: 983 mbars / Feb: 988.5 mbars

Deviations, Additions, or Exclusions: None

8 Duty Cycle

8.1 Method

Tests are performed in accordance with 47CFR Part 15 Subpart A: 2015 Section 15.35(c), RSS-Gen Issue 4:Nov 2014 Section 6.10, and ANSI C63.10:2013.

TEST SITE: EMC Lab

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
T006217;	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014
200162;	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	11/21/2013	11/21/2014

Software Utilized:

Name	Manufacturer	Version
None (Spectrum Analyzer Firmware)		

8.3 Results:

47CFR Part 15 Subpart A: 2015 Section 15.35(c)

Unless otherwise specified, e.g., §§15.255(b), and 15.256(l)(5), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

IC RSS-210 Section 6.10 Pulsed Operation

When the field strength (or envelope power) is not constant or it is in pulses, and an average detector is specified to be used, the value of field strength or power shall be determined by averaging over one complete pulse train, including blanking intervals within the pulse train, as long as the pulse train does not exceed 0.1 second. In cases where the pulse train exceeds 0.1 second, the average value of field strength or output power shall be determined during a 0.1 second interval during which the field strength or power is at its maximum value.

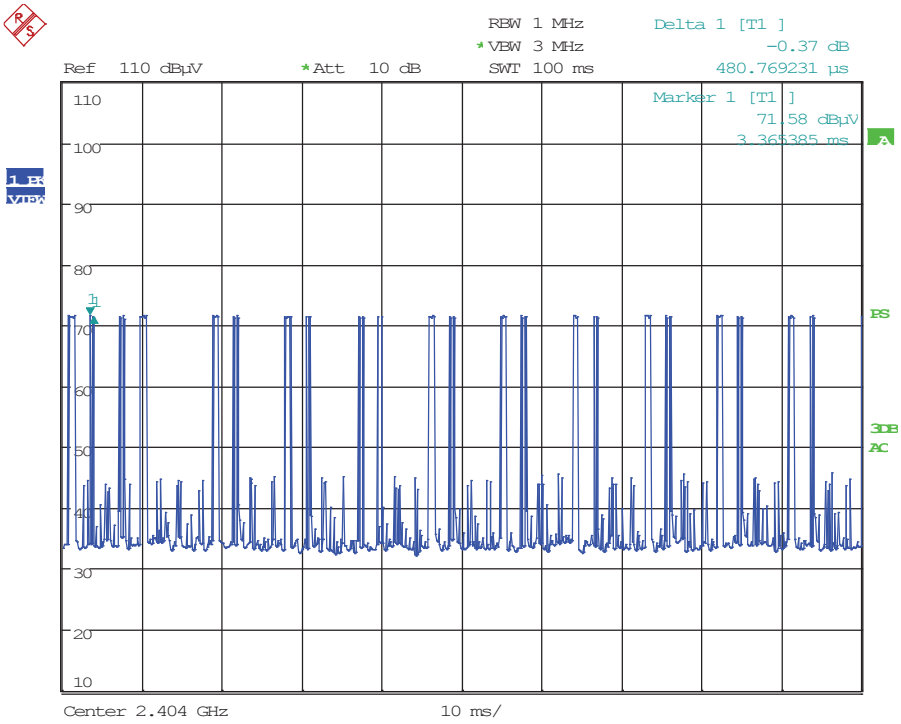
The exact method of calculating the average field strength shall be submitted with the application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

The sample tested was found to Comply.

8.4 Setup Photographs:

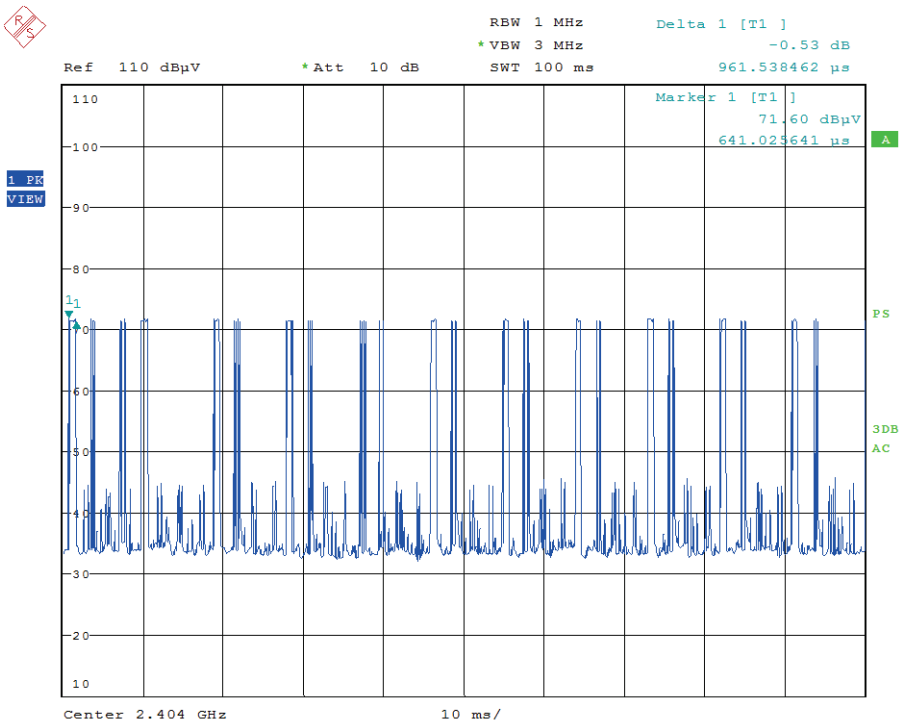
Setup photographs can be found in Test Setup Photos exhibit.

8.5 Plots/Data:



Date: 13.NOV.2014 15:23:31

11 pulses at 480.769231 µs = 5.288461541 ms



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10 pulses at 961.538462 µs = 9.61538462 ms

Duty cycle correction factor
= 11 pulses at 480.769231 µs = 5.288461541 ms + 10 pulses at 961.538462 µs = 9.61538462 ms
= 5.288461541 ms + 9.61538462 ms/100 ms = 0.14903846161 ms
Duty correction factor = 20 log (0.14903846161) = -16.5 dB

Test Personnel:	Mary Sampson MTS	Test Date:	11/13/2014
Supervising/Reviewing Engineer: (Where Applicable)			
	47CFR Part 15 Subpart A:2015 Section 15.35(c), RSS-GEN Issue 4:Nov 2014, Section 6.10, and ANSI	Limit Applied:	See section 8.3
Product Standard:	C63.10:2013		
Input Voltage:	Battery		
		Ambient Temperature:	21.5 ºC
		Relative Humidity:	34 %
		Atmospheric Pressure:	983 mbars

Deviations, Additions, or Exclusions: None

9 20 dB Bandwidth

9.1 Method

Tests are performed in accordance with 47CFR Part 15 Subpart C Section 15.215(c), RSS-GEN Issue 4 Nov 2014 Section 6.6, and ANSI C63.10:2013.

TEST SITE: EMC Lab

The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
T006217;	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014
200162;	EMI Receiver (20Hz-40GHz)	Rohde & Schwarz	ESU 40	100314	11/21/2013	11/21/2014

Software Utilized:

Name	Manufacturer	Version
None (Spectrum Analyzer Firmware)		

9.3 Results:

47CFR Part 15 Subpart C Section 15.215(c)
(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

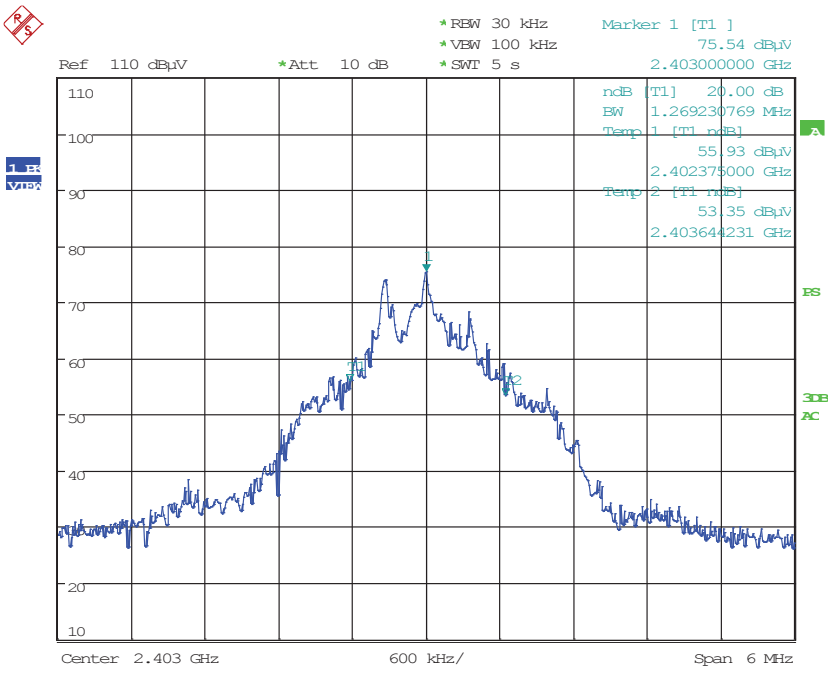
RSS-GEN Issue 4 Nov 2014, Section 6.6
The emission bandwidth (x dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated x dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.
When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

The sample tested was found to Comply.

9.4 Setup Photographs:

Setup photographs can be found in Test Setup Photos exhibit.

9.5 Plots/Data:



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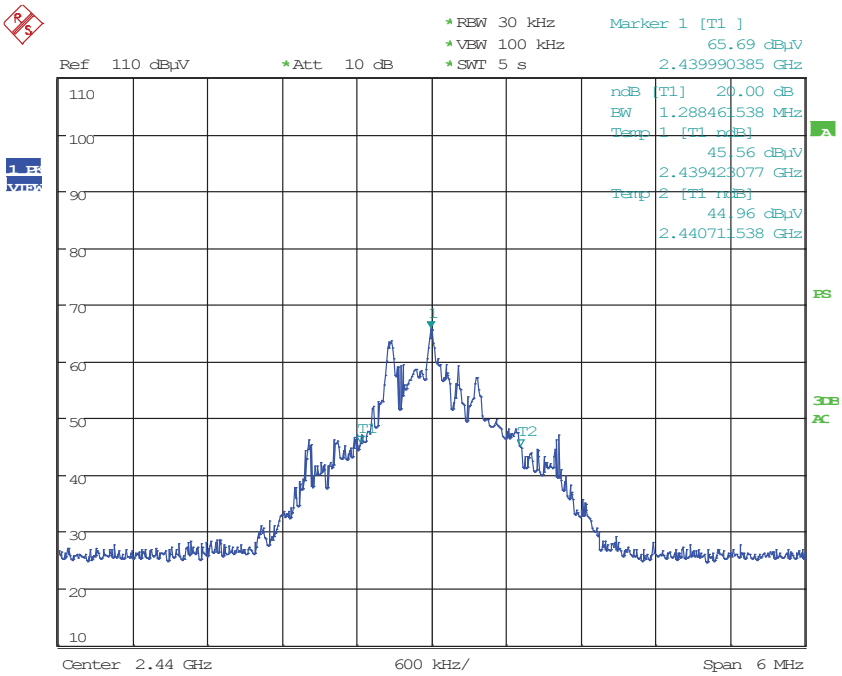

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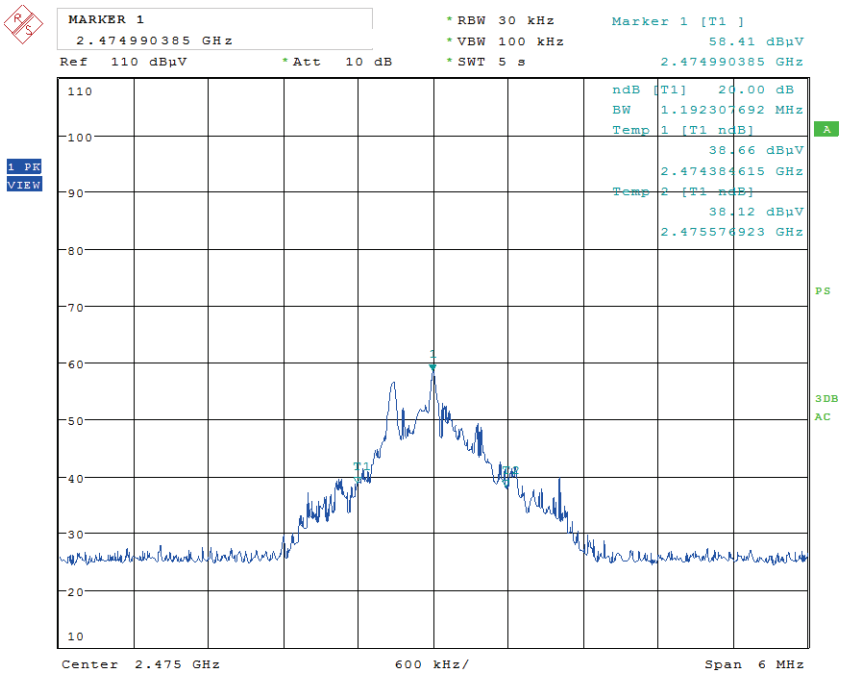

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Test Personnel:	Mary Sampson MTS	Test Date:	11/13/2014
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	47CFR Part 15 Subpart A:2015 Section 15.215(c), RSS-GEN Issue 4:Nov 2014, Section 6.6	Limit Applied:	See section 9.3
Input Voltage:	Battery		
		Ambient Temperature:	21.5 ºC
		Relative Humidity:	34 %
		Atmospheric Pressure:	983 mbars

Deviations, Additions, or Exclusions: None

10 Bandedge

10.1 Method

Tests are performed in accordance with 47CFR Part 15 Subpart C Section 15.215(c), RSS-210 Issue 8 Dec 2010 Section A2.9(b), and ANSI C63.10:2013.

TEST SITE: EMC Lab

The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
211872;	Barometer, Temperature, and Humidity sensor - Network based. Also marked as iServer MicroServer.	Omega	iBTHX-W	0240116	11/07/2014	11/07/2015
031690;	EMC Analyzer	Agilent	E7405A	US40240205	07/31/2014	07/31/2015
213061;	Antenna, Horn, <18 GHz	EMCO	3115	9208-3919	07/22/2014	07/22/2015
MP1;	Cable MP1, 18 GHz, N, 394 inches	Megaphase	G919-NKNK-310	MP1	11/14/2014	11/14/2015
MP3;	Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/08/2014	05/08/2015
MP-HF-1;	Cable, 3-meters, 1-18GHz	Megaphase	EM18-N1N1-119	12090601001	08/26/2014	08/26/2015

Software Utilized:

Name	Manufacturer	Version
None (/Spectrum Analyzer Firmware)		

10.3 Results:

47CFR Part 15 Subpart C Section 15.215(c)

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

R**SS-210 Issue 8 Dec 2010 Section A2.9(b)**

(b) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

The sample tested was found to Comply.

10.4 Setup Photographs:

Setup photographs can be found in Test Setup Photos exhibit.

10.5 Plots/Data:

Client: DJO
Model Number: Compex Wireless Controller
Project Number: G102011503
Tested By: MTS
Date: 02/27/2015
Frequency Range (MHz): Bandedge
Input power: Battery

Receiver: R&S ESU40
Antenna: EMCO 3115
Cables: MP1+MP3+MP-HF-2
Preamp:
Limit: FCC15 Class B-3m
Test Distance (m): 3
Modifications for compliance (y/n): n

Notes:

A	B	C	D	E	F	G	H	I	J	K
Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Duty Cycle Factor dB	Net dB(uV/m)	3m Limit dB(uV/m)	Margin dB	Detector/ Bandwidth
Low channel										
H	2390.000	35.4	27.9	4.1	0.0	0.0	67.4	74.0	-6.6	PK/1MHz
H	2390.000	35.4	27.9	4.1	0.0	16.5	50.9	54.0	-3.1	AVG/1MHz
High channel										
H	2483.500	35.2	28.3	4.2	0.0	0.0	67.7	74.0	-6.3	PK/1MHz
H	2483.500	35.2	28.3	4.2	0.0	16.5	51.2	54.0	-2.8	AVG/1MHz

EUT was placed in the X, Y and Z orthoganal axes.
Note: PK indicates peak detection. AVG indicates the peak reading corrected by the duty cycle.

Test Personnel:	Mary Sampson MTS	Test Date:	02/27/2015
Supervising/Reviewing Engineer: (Where Applicable)			
	47CFR Part 15 Subpart C Section 15.215(c), RSS-210 Issue 8 Dec 2010 Section	Limit Applied:	See section 10.3
Product Standard:	A2.9(b)		
Input Voltage:	Battery		
		Ambient Temperature:	22.6 ºC
Pretest Verification w/ Artifact:	**BB source**	Relative Humidity:	25.9 %
		Atmospheric Pressure:	992.7 mbars

Deviations, Additions, or Exclusions: None

11 Digital Parts Emissions

11.1 Method

Tests are performed in accordance with 47CFR Part 15 Subpart C: 2015 Section 15.109, RSS-Gen Issue 4 Nov 2014 Section 7.1.2, and ANSI C63.4:2014.

TEST SITE: 10m Semi-Anechoic Chamber

10 Meter Semi-Anechoic Chamber The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096. It is a 10 meter semi-anechoic chamber manufactured by Panashield. Embedded in the floor is a 3 meter diameter turntable.

Measurement Uncertainty

For radiated emissions, U_{lab} (3.9 dB at 3m and 3.6 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 Calculations

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 dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
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 dBμV 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 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

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

To convert from dBμV to μV or mV the following was used:

UF = $10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
UF = $10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

11.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
211386;	Antenna, BiLog, 20-2000MHz	Chase	CBL6112B	2622	12/18/2014	12/18/2015
200082;	Preamplifier, 20MHz to 2GHz, 30 dB	A.H. Systems	PAM-0202	203	10/02/2014	10/02/2015
E210;	RF Coax Cable	Megaphase	TM18-N1N1-120	14065201-003	05/08/2014	05/08/2015
E209;	RF Coax Cable	Megaphase	TM18-N1N1-120	14065201-003	05/08/2014	05/08/2015
TT6;	RF Coax Cable. Rated 9KHz to 2 GHz.	Andrews	Cable TT-6	TT6	06/18/2014	06/18/2015
TW2 211411;	Cable TW2	Andrews	Cable TW2	TW2	05/08/2014	05/08/2015
015762;	EMI Receiver, Preselector section	Hewlett Packard	85460A	3330A00158	04/09/2014	04/09/2015
211505;	EMI Receiver	Hewlett Packard	8546A	3650A00362	04/09/2014	04/09/2015
T006217	THDX	Oregon Scientific	BA888	NSN	12/11/2013	12/11/2014

Software Utilized:

Name	Manufacturer	Version
Tile	Quantum Change	3.4.K.22

11.3 Results:

47CFR Part 15 Subpart C: 2015 Section 15.109

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (microvolts/meter)
30–88	100
88–216	150
216–960	200
Above 960	500

RSS-Gen Issue 4 Nov 2014 Section 7.1.2

Frequency (MHz)	Field Strength (μv/m at 3 metres)*
30–88	100
88–216	150
216–960	200
Above 960	500
* Measurements for compliance with limits in the above table may be performed at distances other than 3 metres, in accordance with Section 6.5.	

The sample tested was found to Comply.

11.4 Setup Photographs:

Setup photographs can be found in Test Setup Photos exhibit.

11.5 Plots/Data:

Client: DJO Global
Model Number: Remote Controller REF 6522040
Project Number: Q500558693
Tested By: LEM
Date: 11/6/14
Frequency Range (MHz): 30-1000
Input power: Battery

Receiver: HP 8546A
Antenna: Chase 2622
Cables: E-205+E-209+TT-6+TW2
Preamp: ZKL-2 200069
Test Distance (m):
Limit: CISPR Class A-10m

IDLE Mode
Modifications for compliance (y/n): n

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Net dB(uV/m)**	**10m Limit dB(uV/m)**	**Margin dB**	**Detectors / Bandwidths Det/RBW/VBW**
V	31.899	34.3	17.7	0.9	31.6	21.2	40.0	-18.8	120KHz
V	39.919	33.8	13.6	1.0	31.6	16.8	40.0	-23.2	120KHz
V	108.472	31.0	11.9	2.0	31.4	13.5	40.0	-26.5	120KHz
V	88.141	30.7	8.8	1.8	31.5	9.9	40.0	-30.1	120KHz
H	32.418	34.4	16.5	0.9	31.6	20.2	40.0	-19.8	120KHz
H	36.112	34.0	13.7	0.9	31.6	17.0	40.0	-23.0	120KHz
Calculations		G=C+D+E-F		I=G-H					

Test Personnel: Larry Miller
Test Date: 11/6/2014
Supervising/Reviewing Engineer: (Where Applicable)
Product Standard: 47CFR Part 15 Subpart C: 2015 Section 15.109, RSS-Gen Issue 4 Nov 2014 Section 7.1.2
Limit Applied: See section 7.3
Input Voltage: Battery
Pretest Verification w/ Ambient Signals or BB Source: **BB Source**
Ambient Temperature: 22ºC
Relative Humidity: 40 %
Atmospheric Pressure: 983 mbars

Deviations, Additions, or Exclusions: None

12 RF Exposure

SAR test exclusion threshold formula according to FCC KDB 447898 D01 v05r02 is

$P^*\sqrt{f}/d < 3$

where
P is *max. power of channel, including tune-up tolerance, mW*
f is operating frequency in GHz
d is *min. test separation distance, mm*

The maximum measured radiated power is 0.03 mW (-15.13 dBm). The antenna gain, G is 1.0 dBi. Therefore, the conducted power (P) is 0.03 mW.

At 5mm distance the condition for SAR exclusion threshold is

$0.03 \times \sqrt{02.403} \div 5 = 0.02$ which is less than 3.

Therefore, SAR testing is not required as the SAR Test Exclusion Threshold condition is satisfied.

Therefore, SAR testing is not required as the SAR Test Exclusion Threshold condition is satisfied.

SAR Exemption limit according to IC RSS-102 Issue 5, at 5 mm separation distance = 4 mW
Routine evaluation is not required since the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time averaged output power is below the exemption limit.

13 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	05/06/2015	102011503ATL-001	MTS MTS	KV	Original Issue