

# **EMC TEST REPORT**

(Partial COMPLIANCE)

Report Number: 102837160BOX-001b Project Number: G102837160

Report Issue Date: 02/06/2017

 Model(s) Tested:
 WhoopStrap 2.0/830-000004 (USB charger)

 Model(s) Partially Tested:
 None

 Model(s) Not Tested but declared equivalent by the client:
 None

Standards: CFR47 FCC Part 15 Subpart C (15.247): 10/2016 RSS-247 Issue 1: 05/2015 CFR47 FCC Part 15 Subpart B: 10/2016 ICES 003: 01/2016 updated 06/2016

Tested by: Intertek Testing Services NA, Inc. 70 Codman Hill Road Boxborough, MA 01719 USA Client: Whoop Inc. 1325 Boylston Street Suite 401 Boston, MA 02215 USA

Report prepared by

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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. Intertek does not make any claims of compliance for samples or variants which were not tested.

## 2 Test Summary

Section	Test full name	Result
3	Client Information	
4	Description of Equipment Under Test and Variant Models	
5	System Setup and Method	
6	Output Power and Human RF Exposure (CFR47 FCC Part 15 Subpart C (15.247): 10/2016 RSS-247 Issue 1: 05/2015 RSS-102 Issue 5: 03/2015)	Pass
7	Band Edge Compliance (CFR47 FCC Part 15 Subpart C (15.247): 10/2016 RSS-247 Issue 1: 05/2015)	Pass
8	Radiated Emissions from Digital parts and Receiver (CFR47 FCC Part 15 (15.109): 10/2016 ICES 003: 01/2016 and updated 06/2016)	Pass
9	AC Mains Conducted Emissions (FCC Part 15 Subpart B: 10/2016 ICES 003: 01/2016 and updated 06/2016, FCC Part 15 Subpart C:2016)	Pass
10		

10 Revision History

Note: Limited testing was performed for permissive change as different wall charger was used with the WhoopStrap 2.0. The WhoopStrap 2.0 was tested and certified (Report # 102743203BOX-001).

## 3 Client Information

#### This EUT was tested at the request of:

Client:	Whoop Inc. 1325 Boylston Street Suite 401 Boston, MA 02215 USA
Contact:	Michael Costa
Telephone:	(617) 670-1074 x153
Fax:	None
Email:	costa@whoop.com

## 4 Description of Equipment Under Test and Variant Models

Manufacturer:	Whoop Inc. 1325 Boylston Street Suite 401
	Boston, MA 02215
	USA

Equipment Under Test				
Description Manufacturer Model Number Serial Number				
Wrist worn strap Whoop Inc.		WhoopStrap 2.0	20D125 6	
Dual USB Wall Charger	Whoop Inc.	830-000004	TM16500012	

Receive Date:	10/11/2016, 12/08/2016	Test Date:	12/21/2016 – 02/06/2017
Received Condition:	Good	Test Complete Date:	02/06/2017
Туре:	Production		

Description of Equipment Under Test (provided by client) The EUT is a Dual USB Wall Charger uses with wrist worn strap that measures strain and recovery

Equipment Under Test Power Configuration				
Rated Voltage Rated Current Rated Frequency Number of Phases				
120VAC	2.1A	50/60Hz	1	

## Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Transmit mode with Frequency hopping enabled.
2	Transmit mode with Frequency hopping disabled. Transmitting in single channel.
3	Receive mode

## Software used by the EUT:

No.	Descriptions of EUT Exercising
1	None

Radio/Receiver Characteristics			
Frequency Band(s)	2402 – 2480 MHz		
Modulation Type(s)	GFSK, pi/4-DQPSK, 8DPSK		
Maximum Output Power	0.000272 W		
Test Channels	CH0 – 2402 MHz, CH 39 – 2441 MHz, CH 78 – 2480 MHz		
Occupied Bandwidth	Not performed		
Frequency Hopper: Number of Hopping Channels	79		
Frequency Hopper: Channel Occupancy			
Time	Not performed		
MIMO Information (# of Transmit and			
Receive antenna ports)	1 – Integral antenna		
Equipment Type	Bluetooth		
ETSI LBT/Adaptivity	N/A		
ETSI Adaptivity Type	N/A		
ETSI Temperature Category (I, II, III)	N/A		
ETSI Receiver Category (1, 2, 3)	N/A		
Antenna Type and Gain	Integral (Gain 0.5 dBi)		

## Variant Models:

The following variant models were not tested as part of this evaluation, but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

None

## 5 System Setup and Method

	Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination	
1	USB cable	1	None	None	AC mains	

Support Equipment					
Description Manufacturer Model Number Serial Number					
Laptop	HP	T60M283.00	N/L		

## 5.1 Method:

Configuration as required by FCC CFR47 Part 15 Subpart C (15.247): 10/2016, RSS-247 Issue 1: 05/2015 FCC CDR47 Part 15 Subpart B: 10/2016. ICES 003: 01/2016 updated 06/2016 and ANSI C63.10: 2013.

# 5.2 EUT Block Diagram:



## 6 Output Power

## 6.1 Method

Tests are performed in accordance with CFR47 FCC Part 15 Subpart C (15.247), RSS-247 Issue 1 May 2016 and ANSI C 63.10.

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 Styrofoam table 80 cm high is used for table-top equipment.

## Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6 Db	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	- dB

As shown in the table above our radiated emissions  $U_{lab}$  is less than the corresponding  $U_{CISPR}$  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 $dB\mu V/m$
	RA = Receiver Amplitude (including preamplifier) in $dB\mu V$
	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 $\mu$ 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 $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

 $\label{eq:result} \begin{array}{l} {\sf RA} = 52.0 \ d{\sf B}\mu{\sf V} \\ {\sf AF} = \ 7.4 \ d{\sf B}/{\sf m} \\ {\sf CF} = \ 1.6 \ d{\sf B} \\ {\sf AG} = 29.0 \ d{\sf B} \\ {\sf FS} = 32 \ d{\sf B}\mu{\sf V}/{\sf m} \end{array}$ 

To convert from  $dB\mu V$  to  $\mu V$  or mV the following was used:

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

## Example:

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

## 6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
				PE80529A61		
DAV004'	Weather Station	Davis Instruments	7400	A	05/02/2016	05/02/2017
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/10/2016	03/10/2017
ETS001'	1-18GHz DRG Horn Antenna	ETS-Lindgren	3117	00143259	02/10/2016	02/10/2017
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	05/27/2016	05/27/2017
			3m Track B			
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	cables	multiple	07/30/2016	07/30/2017

#### Software Utilized:

Name	Manufacturer	Version			
EMI Boxborough.xls	Intertek	08/27/2010			

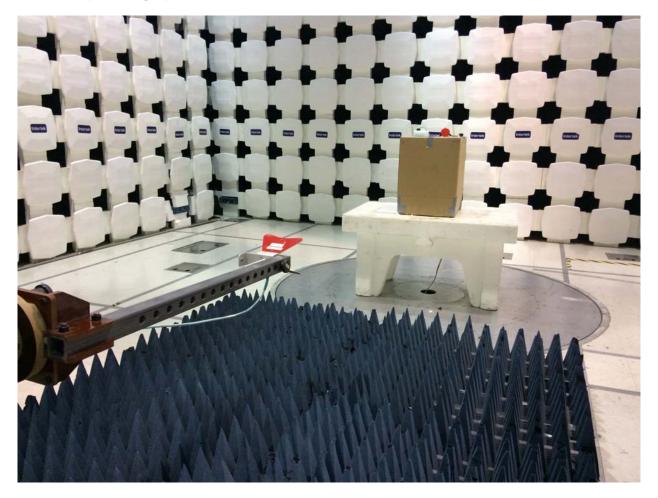
Note: Your Laptop may use a different version of Excel. Record the version you actually used!

## 6.3 Results:

The sample tested was found to Comply.

Output power was measured to determine the Class of permissive change.

## 6.4 Setup Photographs:

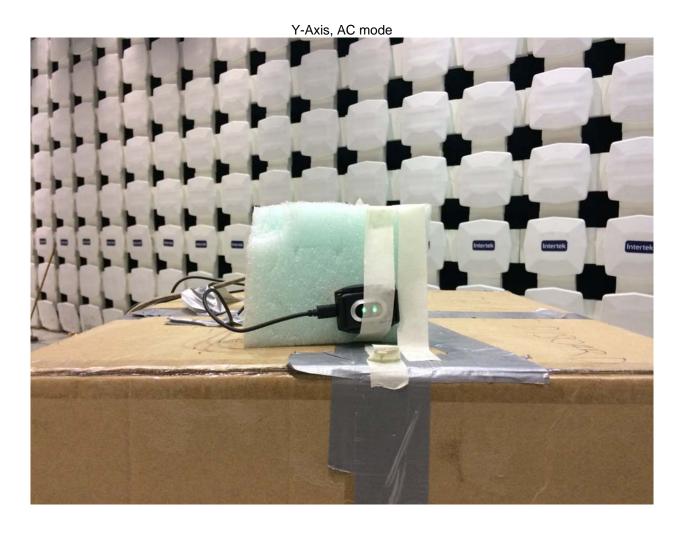


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# Intertek Report Number: 102837160BOX-001b Issued: 02/06/2017 X-Axis, AC mode Issued: 02/06/2017

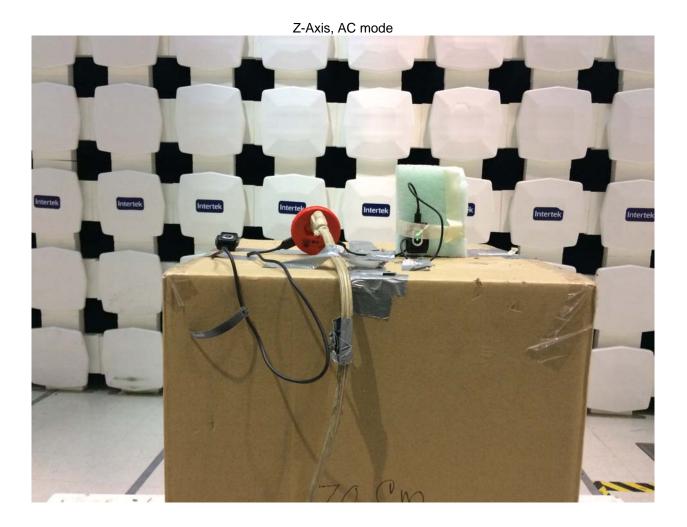
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# Intertek

Report Number: 102837160BOX-001b



IC

Harmonic?

#### Test Data: Radiated Emissions

Intertek

Company	: Whoop Inc						Antenn	a & Cables:	HF	Bands: N. I	_F, HF, SHF	
		ap 2.0/830-0	00004 (USB	charger)				ETS001 02				
		TM16500012					Cable(s):	145-416 1-18 G	Hz 09-17-17.txt			
Engineers	: Vathana V	en			Location:	10M	Barometer:	DAV004		Filter:	NONE	
Project #:	: G1028371	60	Date(s):	02/06/17								
		15 Subpart C					Temp/Humi	dity/Pressure:	20c	15%	1009mB	
		145-128) 03-	10-2017		istance (m):							
PreAmp		ad2 (V ar N))	N		istance (m):		C 60H-	Freque	nov Donaou	Fraguana	ice Chour	
		ed? (Y or N): ading (dBuV/		-	/Frequency: B1/m) + Cal		C 60Hz			Frequenc Eactor (dB)	ies Shown	
Peak:		Peak: QP Av									W/VBW	
	Ant.			Antenna	Cable	Pre-amp	Distance	EIRP	EIRP			
Detector	Pol.	Frequency	Reading	Factor	Loss	Factor	Factor	Net	Limit	Margin	Bandwidth	
Туре	(V/H)	MHz	dB(uV)	dB(1/m)	dB	dB	dB	dBm	dBm	dB		FCC
						Channel 0,						
	1	Obtained by		1	1	1						
PK	V	2402.000	48.97	32.29	3.67	0.00	0.00	-10.29	30.00	-40.29	5/10 MHz	
PK	H Noto: EIRR	2402.000 Obtained by	53.60	32.29	3.67	0.00	0.00 dictopoo	-5.66	30.00	-35.66	5/10 MHz	
PK	V	2402.000	48.33	32.29	3.67	0.00	0.00	-10.93	30.00	-40.93	1/3 MHz	
PK	H	2402.000	50.10	32.29	3.67	0.00	0.00	-9.16	30.00	-40.35	1/3 MHz	
						Channel 0, 0				30.10		1
	Note: EIRP	Obtained by							3m - 95.22	= dBm EIRF	>	
PK	V	2402.000	46.80	32.29	3.67	0.00	0.00	-12.46	30.00	-42.46	5/10 MHz	1
PK	Н	2402.000	52.44	32.29	3.67	0.00	0.00	-6.82	30.00	-36.82	5/10 MHz	
		Obtained by			1					1		
PK	V	2402.000	46.00	32.29	3.67	0.00	0.00	-13.26	30.00	-43.26	1/3 MHz	
PK	Н	2402.000	52.03	32.29	3.67	0.00	0.00	-7.23	30.00	-37.23	1/3 MHz	
	Note: FIDD	Obtained by				Channel 0,			2		<b>`</b>	
PK	V	Obtained by 2402.000	49.90	32.29	3.67	0.00	0.00	(авиу/п)@ -9.36	30.00	-39.36	5/10 MHz	
PK	н	2402.000	49.00	32.29	3.67	0.00	0.00	-10.26	30.00	-40.26	5/10 MHz	
		Obtained by										
PK	V	2402.000	48.80	32.29	3.67	0.00	0.00	-10.46	30.00	-40.46	1/3 MHz	
PK	Н	2402.000	47.55	32.29	3.67	0.00	0.00	-11.71	30.00	-41.71	1/3 MHz	
						Channel 39,						
		Obtained by										
PK	V	2441.000	46.00	32.26	3.73	0.00	0.00	-13.23	30.00	-43.23	5/10 MHz	
PK	H	2441.000	51.37	32.26	3.73	0.00	0.00	-7.86	30.00	-37.86	5/10 MHz	
PK		Obtained by	/ applying th	e path loss	correction to	or a 3m test			3m - 95 22 :	= abm Fike		
FN		2441 000	45.00					1		1		
PK	V H	2441.000	45.00	32.26	3.73	0.00	0.00	-14.23	30.00	-44.23	1/3 MHz	
PK	H	2441.000 2441.000	50.97	32.26 32.26	3.73 3.73	0.00	0.00	-14.23 -8.26		1		
PK	Н		50.97 N	32.26 32.26 ote: RF Out	3.73 3.73 put Power, 0	0.00 0.00 Channel 39,	0.00 0.00 GFSK, Y-a:	-14.23 -8.26 xis	30.00 30.00	-44.23 -38.26	1/3 MHz 1/3 MHz	
PK PK	Н	2441.000	50.97 N	32.26 32.26 ote: RF Out	3.73 3.73 put Power, 0	0.00 0.00 Channel 39,	0.00 0.00 GFSK, Y-a:	-14.23 -8.26 xis	30.00 30.00	-44.23 -38.26	1/3 MHz 1/3 MHz	
	H Note: EIRP	2441.000 Obtained by	50.97 No applying th	32.26 32.26 ote: RF Out e path loss	3.73 3.73 out Power, 0 correction fe	0.00 0.00 Channel 39, or a 3m test	0.00 0.00 GFSK, Y-a: distance, E	-14.23 -8.26 xis (dBuV/m)@	30.00 30.00 3m - 95.22	-44.23 -38.26 = dBm EIRF	1/3 MHz 1/3 MHz	
PK	H Note: EIRP V H	2441.000 Obtained by 2441.000	50.97 No applying th 48.80 50.45	32.26 32.26 ote: RF Out e path loss 32.26 32.26	3.73 3.73 out Power, ( correction fe 3.73 3.73	0.00 0.00 Channel 39, or a 3m test 0.00 0.00	0.00 0.00 GFSK, Y-a: distance, E 0.00 0.00	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78	30.00 30.00 3m - 95.22 30.00 30.00	-44.23 -38.26 = dBm EIRF -40.43 -38.78	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz	
PK PK PK	H Note: EIRP V H Note: EIRP V	2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000	50.97 No applying th 48.80 50.45 applying th 48.60	32.26 32.26 ote: RF Out e path loss 32.26 32.26 e path loss 32.26	3.73 3.73 put Power, ( correction fo 3.73 3.73 3.73 correction fo 3.73	0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00	0.00 0.00 GFSK, Y-a: distance, E 0.00 0.00 distance, E 0.00	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -10.63	30.00 30.00 3m - 95.22 = 30.00 30.00 3m - 95.22 = 30.00	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz	
PK PK	H Note: EIRP V H Note: EIRP	2441.000 Obtained by 2441.000 2441.000 Obtained by	50.97 N applying th 48.80 50.45 applying th 48.60 49.79	32.26 32.26 ote: RF Out e path loss 32.26 32.26 e path loss 32.26 32.26 32.26	3.73 3.73 out Power, ( 3.73 3.73 3.73 correction fr 3.73 3.73 3.73	0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 0.00	0.00 0.00 GFSK, Y-a: distance, E 0.00 0.00 distance, E 0.00 0.00	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -10.63 -9.44	30.00 30.00 3m - 95.22 30.00 30.00 3m - 95.22	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz	
PK PK PK	H Note: EIRP V H Note: EIRP V H	2441.000 Obtained by 2441.000 Obtained by 2441.000 2441.000 2441.000	50.97 N/ 4applying th 48.80 50.45 7 applying th 48.60 49.79 N	32.26 32.26 ote: RF Out e path loss 32.26 32.26 e path loss 32.26 32.26 32.26 32.26 ote: RF Out	3.73 3.73 but Power, ( correction for 3.73 3.73 correction for 3.73 3.73 3.73 3.73 but Power, (	0.00 0.00 Channel 39, or a 3m test 0.00 0 a 3m test 0.00 0.00 0.00 Channel 39,	0.00 0.00 GFSK, Y-a: distance, E 0.00 distance, E 0.00 0.00 GFSK, Z-a:	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -10.63 -9.44 xis	30.00 30.00 3m - 95.22 : 30.00 30.00 3m - 95.22 : 30.00 30.00	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz	
РК РК РК РК	H Note: EIRP V H Note: EIRP V H	2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000 2441.000 Obtained by	50.97 N/ 4applying th 48.80 50.45 (applying th 48.60 49.79 N/ (applying th	32.26 32.26 ote: RF Out e path loss 32.26 32.26 e path loss 32.26 32.26 32.26 ote: RF Out e path loss	3.73 3.73 but Power, ( correction for 3.73 3.73 correction for 3.73 3.73 3.73 but Power, ( correction for	0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 0.00 Channel 39, or a 3m test	0.00 0.00 GFSK, Y-a: distance, E 0.00 distance, E 0.00 0.00 GFSK, Z-a: distance, E	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -10.63 -9.44 xis (dBuV/m)@	30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz	
РК РК РК РК РК	H Note: EIRP V H Note: EIRP V H Note: EIRP V	2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000	50.97 Ni (applying th 48.80 50.45 (applying th 48.60 49.79 Ni (applying th 47.90	32.26 32.26 ote: RF Out e path loss 32.26 32.26 e path loss 32.26 32.26 32.26 ote: RF Out e path loss 32.26	3.73 3.73 but Power, ( correction for 3.73 3.73 correction for 3.73 3.73 but Power, ( correction for 3.73	0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 Channel 39, or a 3m test 0.00	0.00 0.00 GFSK, Y-a: distance, E 0.00 distance, E 0.00 GFSK, Z-a: distance, E 0.00	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -10.63 -9.44 xis (dBuV/m)@ -11.33	30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -41.33	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz	
РК РК РК РК	H Note: EIRP V Note: EIRP V H Note: EIRP V H	2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000	50.97 Ni (applying th 48.80 50.45 (applying th 48.60 49.79 Ni (applying th 47.90 45.88	32.26 32.26 ote: RF Outple path loss 32.26 32.26 32.26 32.26 32.26 ote: RF Outple path loss 32.26 32.26 32.26 32.26	3.73           3.73           3.73           pout Power, 0           correction for           3.73           3.73           correction for           3.73           3.73           3.73           a.73	0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 0.00 Channel 39, or a 3m test 0.00	0.00 0.00 GFSK, Y-a: distance, E 0.00 distance, E 0.00 GFSK, Z-a: distance, E 0.00 0.00	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -10.63 -9.44 xis (dBuV/m)@ (dBuV/m)@ -11.33 -13.35	30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -41.33 -43.35	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 5/10 MHz	
РК РК РК РК РК	H Note: EIRP V Note: EIRP V H Note: EIRP V H	2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000	50.97 No 4 applying th 48.80 50.45 7 applying th 48.60 49.79 No 49.79 No 49.79 No 45.88 7 applying th	32.26 32.26 ote: RF Out e path loss 32.26 32.26 32.26 32.26 32.26 ote: RF Out e path loss 32.26 32.26 ote: RF Out e path loss 32.26 ote: RF Out	3.73 3.73 but Power, ( correction for 3.73 3.73 correction for 3.73 3.73 but Power, ( correction for 3.73 but Power, ( correction for 3.73 but Power, ( correction	0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 0.00 Channel 39, or a 3m test 0.00	0.00 0.00 GFSK, Y-a: distance, E 0.00 0.00 distance, E 0.00 GFSK, Z-a: distance, E 0.00 0.00 distance, E	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -10.63 -9.44 xis (dBuV/m)@ -11.33 -13.35 (dBuV/m)@	30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -41.33 -43.35 = dBm EIRF	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 5/10 MHz	
РК РК РК РК РК РК	H Note: EIRP V Note: EIRP V H Note: EIRP V Note: EIRP	2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000 Obtained by 2441.000 2441.000 2441.000	50.97 Ni (applying th 48.80 50.45 (applying th 48.60 49.79 Ni (applying th 47.90 45.88	32.26 32.26 ote: RF Outple path loss 32.26 32.26 32.26 32.26 32.26 ote: RF Outple path loss 32.26 32.26 32.26 32.26	3.73           3.73           3.73           pout Power, 0           correction for           3.73           3.73           correction for           3.73           3.73           3.73           a.73	0.00 0.00 Channel 39, or a 3m test 0.00 or a 3m test 0.00 Channel 39, or a 3m test 0.00 0.00 chan el 39, or a 3m test	0.00 0.00 GFSK, Y-a: distance, E 0.00 distance, E 0.00 GFSK, Z-a: distance, E 0.00 0.00	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -10.63 -9.44 xis (dBuV/m)@ (dBuV/m)@ -11.33 -13.35	30.00 30.00 30.00 30.00 30.00 3m - 95.22 30.00 30.00 3m - 95.22 30.00 30.00 30.00 30.00 3m - 95.22	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -41.33 -43.35	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 5/10 MHz	
РК РК РК РК РК РК	H Note: EIRP H Note: EIRP V H Note: EIRP V H Note: EIRP V	2441.000 Obtained by 2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000 Obtained by 2441.000	50.97 N/ 48.80 50.45 48.60 49.79 N/ 48.60 49.79 N/ 47.90 47.90 47.90 47.00 44.00	32.26 32.26 ote: RF Out e path loss 32.26 e path loss 32.26 a32.26 ote: RF Out e path loss 32.26 a32.26 a32.26 a32.26 a32.26 a32.26 a32.26 a32.26 a32.26 a32.26 a32.26	3.73 3.73 3.73 3.73 3.73 correction fe 3.73 3.73 correction fe 3.73 3.73 out Power, correction fe 3.73 3.73 3.73 3.73 3.73 3.73 3.73	0.00 0.00 Channel 39, or a 3m test 0.00 or a 3m test 0.00 Channel 39, or a 3m test 0.00 channel 30, or a 3m test 0.00 or a 3m test 0.00	0.00 0.00 GFSK, Y-a: distance, E 0.00 distance, E 0.00 0.00 GFSK, Z-a: distance, E 0.00 0.00 distance, E 0.00	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -10.63 -9.44 xis (dBuV/m)@ -11.33 -13.35 (dBuV/m)@ -12.23 -15.23	30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00 30.00	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -43.35 = dBm EIRF -42.23	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 5/10 MHz	
РК РК РК РК РК РК РК	H Note: EIRP H Note: EIRP V H Note: EIRP V H Note: EIRP Note: EIRP	2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000	50.97 N (applying th 48.80 50.45 applying th 48.60 49.79 N (applying th 47.90 45.88 (applying th 47.00 45.88 (applying th 47.00 N (applying th (applying th) (applying th) (applyin	32.26 32.26 ote: RF Out e path loss 32.26 a2.26 a2.26 a2.26 32.26 a2.26 a2.26 ote: RF Out a2.26 a2.26 a2.26 a2.26 a2.26 a2.26 a2.26 a2.26 a2.26 be: RF Out e path loss a2.26 a2.26 be: RF Out e path loss	3.73 3.73 but Power, 6 correction fr 3.73 3.73 correction fr 3.73 3.73 but Power, 6 correction fr 3.73 3.73 correction fr 3.73 3.73 2.73 2.73 2.73 2.73 2.73 2.73	0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 0.00 Channel 39, or a 3m test 0.00 0.00 0.00 0.00 or a 3m test 0.00 or a 3m test or a	0.00 0.00 GFSK, Y-a: distance, E 0.00 0.00 distance, E 0.00 GFSK, Z-a: distance, E 0.00 distance, E 0.00 distance, K 0.00 distance, E 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -11.63 -9.44 xis (dBuV/m)@ -11.33 -13.35 (dBuV/m)@ -15.23 xis (dBuV/m)@	30.00 30	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -41.33 -43.35 = dBm EIRF -42.23 -45.23 = dBm EIRF	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz	
РК РК РК РК РК РК РК РК	H Note: EIRP V H Note: EIRP V H Note: EIRP V H Note: EIRP V V H Note: EIRP V V	2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000 Obtained by 2441.000	50.97 N (applying th 48.80 50.45 (applying th 48.60 49.79 N (applying th 47.90 45.88 applying th 47.00 44.00 Ni (applying th 47.00 44.84	32.26 32.26 ote: RF Out e path loss 32.26 e path loss 32.26 ote: RF Out e path loss 32.26 ote: RF Out a2.26 a2.26 a2.26 a2.26 a2.26 a2.26 a2.26 a2.26 ce path loss 32.26 a2.26 ce path loss 32.26 ce path loss 32.26 a2.26 ce path loss 32.26 ce path loss 32.23	3.73 3.73 but Power, 0 correction fr 3.73 3.73 correction fr 3.73 but Power, 0 correction fr 3.73 3.73 but Power, 0 correction fr 3.73 3.73 3.73 correction fr 3.73 3.73 3.73 3.73 3.73 3.73 3.73 3.7	0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 Channel 39, or a 3m test 0.00 or a 3m test 0.00 or a 3m test 0.00 or a 3m test 0.00 0.00 or a 3m test 0.00 0.00 or a 3m test 0.00 0.	0.00 0.00 GFSK, Y-a: distance, E 0.00 distance, E 0.00 GFSK, Z-a: distance, E 0.00 distance, E 0.00 distance, K-a: distance, K-a: distance, E 0.00 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 distance, E 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 distance, E 0.00 0.00 distance, E 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 0.00 0.00 distance, E 0.00 0.00 0.00 distance, E 0.00 0.0	-14.23 -8.26 xis (dBUV/m)@ -10.43 -8.78 (dBUV/m)@ -10.63 -9.44 xis (dBUV/m)@ -11.33 -13.35 (dBUV/m)@ -12.23 -15.23 xis (dBUV/m)@ -10.37	30.00 30	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -41.33 -43.35 = dBm EIRF -42.23 -45.23 = dBm EIRF -40.37	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz	
РК РК РК РК РК РК РК	H Note: EIRP V H Note: EIRP V H Note: EIRP V H Note: EIRP V H Note: EIRP V H	2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 2441.000 2441.000 2441.000 2441.000 2441.000	50.97 N (applying th 48.80 50.45 (applying th 48.60 49.79 N (applying th 47.90 45.88 (applying th 47.90 44.00 N (applying th 47.00 44.00 N (applying th 47.90 44.84 50.97 N	32.26 32.26 ote: RF Out e path loss 32.26 e path loss 32.26 e path loss 32.26 ote: RF Out e path loss 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.23	3.73 3.73 0ut Power, 0 correction for 3.73 3.73 correction for 3.73 3.73 0ut Power, 0 correction for 3.73 3.73 3.73 3.73 3.73 3.73 3.73 3.7	0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 Channel 39, or 0.00 Channel 39, or 0.00 0.00 Channel 39, or 0.00 0.0	0.00 0.00 GFSK, Y-a: distance, E 0.00 0.00 distance, E 0.00 GFSK, Z-a: distance, E 0.00 0.0	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -10.63 -9.44 xis (dBuV/m)@ -11.33 -13.35 (dBuV/m)@ -12.23 -15.23 xis (dBuV/m)@ -10.37 -75.24	30.00 30	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -41.33 -43.35 = dBm EIRF -42.23 -45.23 = dBm EIRF -40.37 -38.24	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 1/3 MHz 1/3 MHz 1/3 MHz	
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РК РК РК РК РК РК РК РК РК	H           Note: EIRP           V           H           V           H	2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 2441.000 2441.000 Dotained by 2441.000 Obtained by 2441.000 Obtained by 2440.000 Obtained by 2480.000	50.97 N (applying th 48.80 50.45 (applying th 48.60 49.79 N (applying th 47.90 45.88 applying th 47.00 45.88 (applying th 47.00 N (applying th 48.40 50.97 (applying th 48.40 (applying th (applying th) (applying th) (	32.26 32.26 ote: RF Out e path loss 32.26 e path loss 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 32.26 ce: RF Out e path loss 32.26 32.26 32.23 32.23 32.23	3.73 3.73 but Power, 6 correction fr 3.73 3.73 correction fr 3.73 3.73 but Power, 6 correction fr 3.73 3.73 correction fr 3.73 3.73 3.73 3.73 3.73 correction fr 3.73 3.73 3.78 3.78 3.78 3.78 3.78 3.78	0.00 0.00 Channel 39, or a 3m test 0.00 or a 3m test 0.00 0.00 Channel 39, or a 3m test 0.00 0.00 0.00 0.00 0.00 or a 3m test 0.00 0.00 or a 3m test 0.00 Channel 78, or a 3m test 0.00 0.0	0.00 0.00 GFSK, Y-a: distance, E 0.00 distance, E 0.00 GFSK, Z-a: distance, E 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 0.00 distance, E 0.00	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -10.63 -9.44 xis (dBuV/m)@ -11.33 -15.23 xis (dBuV/m)@ -15.23 xis (dBuV/m)@ -10.63 -8.24 (dBuV/m)@ -11.03 -8.24 (dBuV/m)@ -11.01	30.00 30	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -41.33 -43.35 = dBm EIRF -42.23 -45.23 = dBm EIRF -40.37 -38.24 = dBm EIRF -40.037 -38.24 = dBm EIRF -41.01	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz 1/3 MHz	
РК РК РК РК РК РК РК РК РК	H Note: EIRP V H Note: EIRP V H Note: EIRP V H Note: EIRP V H Note: EIRP	2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 2441.000 2441.000 Obtained by 2441.000 2441.000 2441.000 2441.000 2441.000 Obtained by 2480.000 Obtained by 2480.000 Obtained by	50.97 N: (applying th 48.80 50.45 (applying th 48.60 49.79 N: (applying th 47.90 45.88 applying th 47.00 44.00 N: (applying th 48.84 50.97 (applying th 50.97 (applying th) 50.97 (applying th) 50.97 (applying th) 50.95 (applying th) (applying th) (app	32.26 32.26 ote: RF Out, e path loss 32.26 e path loss 32.26 ote: RF Out, e path loss 32.26 ote: RF Out, e path loss 32.26 32.26 a2.26 a2.26 ce path loss 32.26 a2.26 ce path loss 32.26 a2.26 a2.26 ce path loss 32.26 a2.23 a2.23	3.73 3.73 but Power, 0 correction fr 3.73 3.73 correction fr 3.73 but Power, 0 correction fr 3.73 3.73 but Power, 0 correction fr 3.73 3.73 3.73 3.73 correction fr 3.73 3.73 3.73 3.73 but Power, 0 correction fr 3.78 3.78 3.78 3.78 3.78 3.78 3.78	0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 0.00 0.00 or a 3m test 0.00 0.	0.00 0.00 GFSK, Y-a: distance, E 0.00 distance, E 0.00 GFSK, Z-a: distance, E 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 0.00 distance, E 0.00	-14.23 -8.26 xis (dBUV/m)@ -10.43 -8.78 (dBUV/m)@ -11.63 -9.44 xis (dBUV/m)@ -11.33 -13.35 (dBUV/m)@ -12.23 -15.23 xis (dBUV/m)@ -10.37 -8.24 (dBUV/m)@ -11.01 -8.76	30.00 30	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -41.33 -43.35 = dBm EIRF -42.23 -45.23 = dBm EIRF -40.37 -38.24 = dBm EIRF	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz	
РК РК РК РК РК РК РК РК РК	H Note: EIRP V H Note: EIRP V H H Note: EIRP V H H Note: EIRP V H Note: EIRP V H Note: EIRP	2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 2441.000 2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000 2441.000 2441.000 Obtained by 2480.000 Obtained by 2480.000	50.97 N: (applying th 48.80 50.45 (applying th 48.60 49.79 N: (applying th 47.90 45.88 (applying th 47.90 45.88 (applying th 47.90 45.00 N: (applying th 48.84 50.97 N: (applying th 48.84 50.97 (applying th 48.84 50.97 (applying th 48.84 50.97 (applying th 48.84 50.97 (applying th 48.85 N: (applying th 48.85 N: (applying th 48.84 (applying th 48.85 (applying th (applying th	32.26 32.26 ote: RF Out; e path loss 32.26 e path loss 32.26 ote: RF Out; e path loss 32.26 ote: RF Out; e path loss 32.26 32.26 ote: RF Out; e path loss 32.26 32.26 ote: RF Out; e path loss 32.26 32.26 se path loss 32.26 32.26 se path loss 32.23 32.23 ote: RF Out; e path loss 32.23 se path loss 3	3.73 3.73 0ut Power, 0 correction fe 3.73 3.73 correction fe 3.73 0ut Power, 0 correction fe 3.73 3.73 0ut Power, 0 correction fe 3.73 3.73 3.73 0ut Power, 0 correction fe 3.78 3.78 0ut Power, 0 correction fe 3.78 0.78 0ut Power, 0 correction fe 3.78 0.78 0.78 0.78 0.78 0.78 0.78 0.78 0	0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 0.00 Ochannel 78, or a 3m test 0.00 0	0.00 0.00 GFSK, Y-a: distance, E 0.00 distance, E 0.00 GFSK, Z-a: distance, E 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 GFSK, X-a: distance, E 0.00 0.00 GFSK, Y-a: 0.00 0.00 GFSK, Y-a: 0.00	-14.23 -8.26 xis (dBUV/m)@ -10.43 -8.78 (dBUV/m)@ -10.63 -9.44 xis (dBUV/m)@ -11.33 -13.35 (dBUV/m)@ -12.23 -15.23 xis (dBUV/m)@ -10.37 -8.24 (dBUV/m)@ -10.37 -8.24 (dBUV/m)@ -8.76 xis	30.00 30	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -41.33 -43.35 = dBm EIRF -42.23 -45.23 = dBm EIRF -40.37 -38.24 = dBm EIRF -40.37 -38.24 = dBm EIRF -40.137 -38.76	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz	
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РК РК РК РК РК РК РК РК РК РК РК РК	H           Note: EIRP           V           H           Note: EIRP           H           Note: EIRP           H           Note: EIRP           Note: EIRP           H           Note: EIRP	2441.000 Obtained by 2441.000 2441.000 2441.000 2441.000 2441.000 2441.000 2441.000 2441.000 2441.000 2441.000 2441.000 2441.000 2441.000 2441.000 2441.000 2440.000 2480.000 2480.000 2480.000 Obtained by 2480.000 Obtain	50.97 N: (applying th 48.80 50.45 (applying th 48.60 49.79 N: (applying th 47.00 44.00 N: (applying th 47.00 44.00 N: (applying th 48.84 50.97 (applying th 48.84 50.97 (applying th 48.84 50.97 N: (applying th 48.80 N: (applying th 48.20 50.45 N: (applying th 48.20 50.45 N: (applying th 48.20 50.45 N: (applying th 48.20 50.45 N: (applying th 48.20 N: (applying th 48.20 N: (applying th 48.20 N: (applying th 48.20 N: (applying th 48.20 N: (applying th 48.20 N: (applying th 48.20 N: (applying th 48.20 N: (applying th 48.20 N: (applying th 49.20 N: (applying th 49.20 N: (applying th 49.20 N: (applying th 49.20 N: (applying th 49.20 N: (applying th 49.20 (applying th 49.20 (applying th 49.20 (applying th 49.20 (applying th 49.20 N: (applying th 49.20 N: (applying th 49.20 N: (applying th 49.20 (applying th 49.20 N: (applying th 49.20 N: (applying th 49.20 N: (applying th 49.20 (applying th 49.20 (applying th 49.20 (applying th 49.20 (applying th 49.20 (applying th 49.20 (applying th 47.94 N: (applying th 47.94 N: (applying th 47.94 N: (applying th (applying	32.26           32.26           32.26           ote: RF Out;           e path loss           32.26           az.26           e path loss           32.26           ote: RF Out;           e path loss           32.26           ote: RF Out;           e path loss           32.26           ote: RF Out;           e path loss           32.26           32.26           32.26           32.26           32.26           ote: RF Out;           e path loss           32.23           ote: RF Out;           e path loss	3.73 3.73 0ut Power, 0 correction fr 3.73 3.73 correction fa 3.73 0ut Power, 0 correction fa 3.73 correction fa 3.73 correction fa 3.73 3.73 correction fa 3.73 3.73 correction fa 3.78 3.78 3.78 0ut Power, 0 correction fa 3.78 3.78 3.78 0ut Power, 0 correction fa 3.78 3.78 3.78 0ut Power, 0 correction fa 3.78 3.78 0ut Power, 0 correction fa 3.78 0ut Power, 0 correction fa 3.78 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.00 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 Channel 39, or a 3m test 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 0.	0.00 0.00 GFSK, Y-a: distance, E 0.00 0.00 distance, E 0.00 GFSK, Z-a: distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 0.00 distance, E 0.00 0.00 0.00 0.00 GFSK, Y-a: distance, E 0.00	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -10.63 -9.44 xis (dBuV/m)@ -11.33 -13.35 (dBuV/m)@ -12.23 -15.23 xis (dBuV/m)@ -10.37 -8.24 (dBuV/m)@ -11.037 -8.24 (dBuV/m)@ -13.21 -10.75 xis (dBuV/m)@ -13.21 -10.75 xis (dBuV/m)@ -13.21 -10.75 xis (dBuV/m)@ -13.21 -11.27 xis (dBuV/m)@	30.00 30	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -41.33 -43.35 = dBm EIRF -42.23 -45.23 = dBm EIRF -40.37 -38.24 = dBm EIRF -40.37 -38.76 = dBm EIRF -43.21 -4	1/3 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 1/3 MHz 1/3 MHz 1/3 MHz 1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz 5/10 MHz	
РК РК РК РК РК РК РК РК РК РК РК РК РК Р	H           Note: EIRP           V           H	2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 Obtained by 2441.000 2441.000 Obtained by 2441.000 2441.000 2441.000 Obtained by 2440.000 Obtained by 2480.000 Obtained by 248	50.97 N (applying th 48.80 50.45 (applying th 48.60 49.79 N (applying th 47.90 45.88 (applying th 47.90 44.00 N (applying th 48.20 50.97 (applying th 48.20 50.97 (applying th 48.20 50.97 (applying th 48.20 50.97 (applying th 48.20 50.97 (applying th 48.20 50.97 N (applying th 48.40 N (applying th 48.40 N (applying th 48.40 N (applying th 48.40 N (applying th 48.40 N (applying th 48.40 N (applying th 48.40 N (applying th 48.40 N (applying th 44.00 A7.00 N (applying th 44.00 A7.00 N (applying th 44.00 (applying th 44.00 (applying th 44.00 (applying th 44.00 (applying th 44.00 (applying th 44.00 (applying th 49.50 (applying th 49.50 (applying th 49.50 (applying th 49.50 (applying th 49.50 (applying th 49.50 (applying th 49.50 (applying th (applying th (a	32.26           32.23           32.23	3.73 3.73 0ut Power, 0 correction fr 3.73 3.73 0ut Power, 0 correction fr 3.73 3.73 0ut Power, 0 correction fr 3.73 3.73 0ut Power, 0 correction fr 3.78 3.78 3.78 3.78 3.78 3.78 3.78 3.78	0.00 0.00 Channel 39, or a 3m test 0.00 or a 3m test 0.00 or a 3m test 0.00 Channel 39, or a 3m test 0.00 0.00 or a 3m test 0.00 0.00 or a 3m test 0.00 0.00 Channel 78, or a 3m test 0.00	0.00 0.00 GFSK, Y-a: distance, E 0.00 0.00 distance, E 0.00 GFSK, Z-a: distance, E 0.00 distance, E 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 distance, E 0.00 0.00 GFSK, X-a: distance, E 0.00 0.00 GFSK, Y-a: distance, E 0.00 0.0	-14.23 -8.26 xis (dBuV/m)@ -10.43 -8.78 (dBuV/m)@ -11.43 -9.44 -10.63 -9.44 -11.33 -9.44 -13.35 (dBuV/m)@ -12.23 -15.23 xis (dBuV/m)@ -15.23 xis (dBuV/m)@ -11.01 -8.76 xis (dBuV/m)@ -11.01 -8.76 xis (dBuV/m)@ -11.27 xis (dBuV/m)@ -14.31 -11.27 xis	30.00 30	-44.23 -38.26 = dBm EIRF -40.43 -38.78 = dBm EIRF -40.63 -39.44 = dBm EIRF -41.33 -43.35 = dBm EIRF -42.23 -45.23 = dBm EIRF -40.37 -38.24 = dBm EIRF -40.37 -38.24 = dBm EIRF -43.21 -40.37 = dBm EIRF -43.21 -40.75 = dBm EIRF -43.21 -40.75	1/3 MHz 1/3 MHz 5/10 MHz 5/10 MHz 1/3 MHz 1/3 MHz 1/3 MHz 1/3 MHz 1/3 MHz 1/3 MHz 5/10 MHz	

Non-Specific Radio Report Shell Rev. August 2015 Company: Whoop Inc. Model: WhoopStrap 2.0/830-000004 (USB charger)

## Intertek

Harmonic?

Radiated Emissions Company: Whoop Inc. Antenna & Cables: HF Bands: N. LF. HF. SHF Model #: WhoopStrap 2.0/830-000004 (USB charger) Antenna: ETS001 02-10-17.txt ETS001 02-10-17.txt Serial #: 20D125 6/TM16500012 (USB charger) Cable(s): 145-416 1-18 GHz 09-15-17.txt NONE. Engineers: Vathana Ven Location: 10M Barometer: DAV004 Filter: NONE Project #: G102837160 Date(s): 02/06/17 Standard: FCC Part 15 Subpart C 15.247 1009mB Temp/Humidity/Pressure: 20c 15% Receiver: R&S ESI (145-128) 03-10-2017 Limit Distance (m): 3 Test Distance (m): 3 PreAmp: None PreAmp Used? (Y or N): 120VAC 60Hz Ν Voltage/Frequency: Frequency Range: Frequencies Shown Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB) Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW Ant. Antenna Cable Pre-amp Distance EIRP EIRP Reading Margin Detecto Pol Frequency Factor Loss Factor Factor Net I imit Bandwidth dB<u>(1/m)</u> Type (V/H) MHz dB(uV) dB dB dB dBm dBm dB FCC IC Note: RF Output Power, Channel 0, Pi/4-DQPSK, X-axis Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP ΡK 2402.000 V 46.60 32.29 3.67 0.00 0.00 -12.66 30.00 -42.66 5/10 MHz PK н 2402 000 48 20 32 29 3 67 0.00 0.00 -11 06 30.00 -41 06 5/10 MHz Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP P۴ 2402.000 45.40 32.29 3.67 0.00 0.00 -13.86 30.00 -43.86 1/3 MHz ΡK н 2402.000 38.00 32.29 3.67 0.00 0.00 -21.26 30.00 -51.26 1/3 MHz Note: RF Output Power, Channel 0, Pi/4-DQPSK, Y-axis Note: EIRP Obtained by applying the path loss correction for a 3m test distance. E(dBuV/m)@3m - 95.22 dBm EIRE PK 2402 000 44 10 32 29 3 67 0.00 -15 16 -45 16 5/10 MHz V 0.00 30.00 ΡK 2402.000 46.50 32.29 3.67 0.00 -12.76 30.00 -42.76 н 0.00 5/10 MHz Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 dBm EIRF PK V 2402.000 30.00 -45.36 1/3 MHz 43.90 32.29 3.67 0.00 0.00 -15.36 PK 1/3 MHz н 2402.000 46.00 32.29 3.67 0.00 0.00 -13.26 30.00 -43.26 Note: RF Output Power, Channel 0, Pi/4-DQPSK, Z-axis Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP PK V 2402.000 48.00 32.29 3.67 0.00 0.00 -11.26 30.00 -41.26 5/10 MHz PK Н 2402.000 43.90 3.67 0.00 0.00 -15.36 30.00 -45.36 5/10 MHz 32.29 Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRF PK V 2402.000 47.50 32.29 3.67 0.00 0.00 -11.76 30.00 -41.76 1/3 MHz PK н 2402 000 45 00 32 29 3 67 0.00 0.00 -14 26 30.00 -44 26 1/3 MHz Note: RF Output Power, Channel 39, Pi/4-DQPSK, X-axis Note: EIRF Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 dBm EIRF P۴ 2441.000 30.00 5/10 MHz 41.00 32.26 3.73 0.00 0.00 -18.23 -48.23 PK н 2441.000 45.90 32.26 0.00 0.00 -13.33 30.00 5/10 MHz 3.73 -43.33 Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP 2441.000 40.56 -48.67 PK V -18.67 1/3 MHz 32.26 3.73 0.00 0.00 30.00 PK Н 2441.000 44.50 32.26 3.73 0.00 0.00 -14.73 30.00 -44.73 1/3 MHz Note: RF Output Power, Channel 39, Pi/4-DQPSK Y-axis Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 dBm EIRF PK V 2441.000 43.70 32.26 3.73 0.00 0.00 -15.53 30.00 -45.53 5/10 MHz PK н 2441 000 45.00 32.26 373 0.00 0.00 -14 23 30.00 -44 23 5/10 MHz Note: EIRF Obtained by applying the path loss correction for a 3m test distance, dBuV/m)@3m - 95.22 dBm EIRF ΡK V 2441.000 43.00 32.26 3.73 0.00 0.00 -16.23 30.00 -46.23 1/3 MHz ΡK 2441.000 44.80 н 32.26 3.73 0.00 0.00 -14.43 30.00 -44.43 1/3 MHz Note: RF Output Power, Channel 39, Pi/4-DQPSK, Z-axis Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRF PK 2441.000 45.00 V 32.26 3.73 0.00 0.00 -14.23 30.00 -44.23 5/10 MHz PK н 2441.000 43.00 32.26 3.73 0.00 0.00 -16.23 30.00 -46.23 5/10 MHz Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 Note: EIRF dBm EIRF 2441.000 1/3 MHz PK V 44.30 32.26 3.73 0.00 0.00 -14.93 30.00 -44.93 PK н 2441.000 42.30 32.26 0.00 -16.93 30.00 -46.93 1/3 MHz 3.73 0.00 Note: RF Output Power, Channel 78, Pi/4-DQPSK, X-axis Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP P۴ V 2480.000 44.20 32.23 3.78 0.00 0.00 -15.01 30.00 -45.01 5/10 MHz PK н 2480.000 45.60 32.23 3.78 0.00 0.00 30.00 5/10 MHz -13.61 -43.61 Note: EIRP Obtained by applying the path loss correction for a 3m test distance. E(dBuV/m)@3m - 95,22 = dBm EIRf PK V 2480.000 43.30 32.23 3.78 0.00 0.00 -15.9130.00 -45.91 1/3 MHz PK Н 2480.000 47.98 32.23 3.78 0.00 0.00 -11.23 30.00 -41.23 1/3 MHz Note: RF Output Power, Chan el 78, Pi/4-DQPSK, Y-axis Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP PK 2480.000 30.00 -45.72 5/10 MHz V 43.49 32.23 3.78 0.00 0.00 -15.72 PK 32.23 -17.31 -47.31 5/10 MHz н 2480.000 41.90 3.78 0.00 0.00 30.00 Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRF PK V 2480.000 42.28 1/3 MHz 32.23 3.78 0.00 0.00 -16.93 30.00 -46.93 PK н 2480.000 40.60 32.23 3.78 0.00 0.00 -18.61 30.00 -48.61 1/3 MHz Note: RF Output Power, Channel 78, Pi/4-DQPSK, Z-axis Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRF 5/10 MHz PK 2480.000 47.90 32.23 3.78 0.00 0.00 -11.31 30.00 -41.31 V PK н 2480.000 45.70 32.23 3.78 0.00 0.00 -13.51 30.00 -43.51 5/10 MHz E(dBuV/m)@3m - 95.22 Note: EIRP Obtained by applying the path loss correction a 3m test distance, dBm EIRF P۴ V 2480.000 46.90 32.23 3.78 0.00 0.00 -12.31 30.00 -42.31 1/3 MHz ΡK н 2480.000 44.00 32.23 3.78 0.00 0.00 -15.21 30.00 1/3 MHz -45.21

#### Radiated Emissions

					Radiated I	Emissions					
Model #:		ap 2.0/830-0					Antenna:		2-10-17.txt	ETS001 02	LF, HF, SHF 2-10-17.txt
	20D125 6/ Vathana Ve	TM16500012 en	(USB char	ger)	Location:	10M	Barometer:		Hz 09-15-17.txt	Filter:	NONE
-	G1028371	60 5 Subpart C		02/06/17			Temp/Humi(	lity/Pressure:	19c	13%	1008mB
		145-128) 03-		Limit Di	istance (m):	3	rempiriume	ity/i iessuie.	100	1070	TOUGHIE
PreAmp:		10.07 N			istance (m):		0.001	_		_	
ł		ed? (Y or N): ading (dBuV/		-	/Frequency: B1/m) + Cat		C 60Hz 3) - Preamp	-		: Frequenc Factor (dB)	ies Shown
Peak:		Peak: QP Av		RMS: RM	S; NF = Nois						W/VBW
	Ant.	_		Antenna		Pre-amp	Distance	EIRP	EIRP		
Detector Type	Pol. (V/H)	Frequency MHz	Reading dB(uV)	Factor dB(1/m)	Loss dB	Factor dB	Factor dB	Net dBm	Limit dBm	Margin dB	Bandwidth
21 -			N	ote: RF Out	put Power, C	Channel 0, 8	DPSK, X-a	cis			
DK	Note: EIRP	Obtained by		1	1	1				1	5/10 MHz
PK PK	H	2402.000 2402.000	49.34 50.50	32.29 32.29	3.67 3.67	0.00	0.00	-9.92 -8.76	30.00 30.00	-39.92 -38.76	5/10 MHz
	Note: EIRP	Obtained by									
PK	V	2402.000	48.00	32.29	3.67	0.00	0.00	-11.26	30.00	-40.06	1/3 MHz
PK	Н	2402.000	49.40	32.29 ote: RE Out	3.67 put Power, 0	0.00 Channel 0.8	0.00 DPSK Y-av	-9.86	30.00	-39.86	1/3 MHz
	Note: EIRP	Obtained by							3m - 95.22	= dBm EIRF	<b>.</b>
PK	V	2402.000	49.65	32.29	3.67	0.00	0.00	-9.61	30.00	-39.61	5/10 MHz
PK	H Noto: EIRR	2402.000 Obtained by	53.00	32.29	3.67	0.00	0.00	-6.26	30.00	-36.26	5/10 MHz
PK	V	2402.000	47.42	32.29	3.67	0.00	0.00	-11.84	30.00	-41.84	1/3 MHz
PK	Н	2402.000	48.90	32.29	3.67	0.00	0.00	-10.36	30.00	-40.36	1/3 MHz
		Obtain a d bu			put Power, (				0 05 00		
PK	Note: EIRP	Obtained by 2402.000	53.38	32.29	3.67	0.00	0.00	(dBuV/m)@ -5.88	3m - 95.22 30.00	-35.88	5/10 MHz
PK	H	2402.000	49.90	32.29	3.67	0.00	0.00	-9.36	30.00	-39.36	5/10 MHz
	1	Obtained by		r -							-
PK PK	V H	2402.000 2402.000	51.50 46.00	32.29 32.29	3.67 3.67	0.00	0.00	-7.76 -13.26	30.00 30.00	-37.76 -37.89	1/3 MHz 1/3 MHz
		2402.000			out Power, C				00.00	07.00	1/0 10112
		Obtained by									
PK PK	V H	2441.000 2441.000	49.90 48.50	32.26 32.26	3.73 3.73	0.00	0.00	-9.33 -10.73	30.00 30.00	-39.33 -40.73	5/10 MHz 5/10 MHz
FK		Obtained by									
PK	V	2441.000	47.80	32.26	3.73	0.00	0.00	-11.43	30.00	-41.43	1/3 MHz
PK	Н	2441.000	48.00	32.26	3.73	0.00	0.00	-11.23	30.00	-41.23	1/3 MHz
	Note: EIRP	Obtained by			out Power, C correction for				3m - 95.22 :	= dBm EIRF	<u></u>
PK	V	2441.000	48.84	32.26	3.73	0.00	0.00	-10.39	30.00	-40.39	5/10 MHz
PK	H	2441.000	52.10	32.26	3.73	0.00	0.00	-7.13	30.00	-37.13	5/10 MHz
PK	Note: EIRP	Obtained by 2441.000	46.77	e path loss 32.26	3.73	0.00	distance, E 0.00	(dBuV/m)@ -12.46	3m - 95.22 30.00	= dBm EIRF -42.46	1/3 MHz
PK	н	2441.000	51.90	32.26	3.73	0.00	0.00	-7.33	30.00	-37.33	1/3 MHz
					out Power, C						
PK	Note: EIRP	Obtained by 2441.000	applying th 51.90	e path loss 32.26	3.73	0.00	distance, E 0.00	(dBuV/m)@ -7.33	3m - 95.22 30.00	= dBm EIRF -37.33	5/10 MHz
PK	H	2441.000	46.90	32.26	3.73	0.00	0.00	-12.33	30.00	-42.33	5/10 MHz
		Obtained by	applying th	e path loss	correction for	or a 3m test	distance, E	(dBuV/m)@	3m - 95.22	= dBm EIRF	
PK	V	2441.000	49.50	32.26	3.73	0.00	0.00	-9.73	30.00	-39.73	1/3 MHz
PK	Н	2441.000	44.28 No	32.26 te: RF Outp	3.73 out Power, C	0.00 hannel 78. 8	0.00 3DPSK. X-a	-14.95 xis	30.00	-44.95	1/3 MHz
	Note: EIRP	Obtained by							3m - 95.22	= dBm EIRF	2
PK	V	2480.000	48.71	32.23	3.78	0.00	0.00	-10.50	30.00	-40.50	5/10 MHz
PK	H Note: FIRP	2480.000 Obtained by	49.95	32.23	3.78 correction fr	0.00	0.00 distance F	-9.26	30.00	-39.26 – dBm EIRE	5/10 MHz
PK	V	2480.000	47.00	32.23	3.78	0.00	0.00	ава v/m)@ -12.21	30.00	-42.21	1/3 MHz
PK	Н	2480.000	50.90	32.23	3.78	0.00	0.00	-8.31	30.00	-38.31	1/3 MHz
	Note: EIDD	Obtained by			out Power, C				3m - 05 22		
PK	V	2480.000	47.16	32.23	3.78	0.00	0.00	авиv/m)@ -12.05	3m - 95.22 : 30.00	-42.05	5/10 MHz
DK	<u>i</u>	0400.000	40.00	00.00	0.70	0.00	0.00	40.04	00.00	40.04	5/40 MIL

-13.26

IC

Intertek

2480.000

2480.000

2480.000

2480.000

2480.000

2480.000

2480.000

ΡK

PK

PK

ΡK

ΡK

ΡK

PK

Н

V

н

V

Н

V

н

48.90

44.55

48.00

48.00

43.90

44.80

42.99

32.23

32.23

32.23

32.23

32.23

32.23

32.23

3.78

3.78

3.78

3.78

3.78

3.78

3.78

Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRF

Note: RF Output Power, Channel 78, 8DPSK, Z-axis Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRF

Note: EIRP Obtained by applying the path loss correction for a 3m test distance, E(dBuV/m)@3m - 95.22 = dBm EIRP

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

0.00

-10.31

-14.66

-11.21

-11.21

-15.31

-14.41

-16.22

30.00

30.00

30.00

30.00

30.00

30.00

30.00

-40.31

-44.66

-41.21

-41.21

-45.31

-44.41

-46.22

5/10 MHz

1/3 MHz

1/3 MHz

5/10 MHz

5/10 MHz

1/3 MHz

1/3 MHz

Issued: 02/06/2017

#### Report Number: 102837160BOX-001b Issued: 02/06/2017 Test Personnel: Vathana Ven Test Date: 02/06/2017 Supervising/Reviewing Engineer: (Where Applicable) N/A FCC Part 15C, 15.247, RSS-247 Product Standard: Limit Applied: Below specified limit Input Voltage: 120VAC/60Hz Ambient Temperature: 19 ⁰C Pretest Verification w/ Ambient Signals or BB Source: Yes Relative Humidity: 13 % Atmospheric Pressure: 1008 mbars

Intertek

Deviations, Additions, or Exclusions: None

## 7 Band Edge Compliance

## 7.1 Method

Tests are performed in accordance with CFR47 FCC Part 15 Subpart C (15.247), RSS-247 Issue 1 May 2016 and ANSI C 63.10.

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 Styrofoam table 80 cm high is used for table-top equipment.

## Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6 dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	- dB

As shown in the table above our radiated emissions  $U_{lab}$  is less than the corresponding  $U_{CISPR}$  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 $dB\mu V/m$
	RA = Receiver Amplitude (including preamplifier) in $dB\mu V$
	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 $\mu$ 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 $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

 $\label{eq:result} \begin{array}{l} {\sf RA} = 52.0 \ d{\sf B}\mu{\sf V} \\ {\sf AF} = \ 7.4 \ d{\sf B}/{\sf m} \\ {\sf CF} = \ 1.6 \ d{\sf B} \\ {\sf AG} = 29.0 \ d{\sf B} \\ {\sf FS} = 32 \ d{\sf B}\mu{\sf V}/{\sf m} \end{array}$ 

To convert from  $dB\mu V$  to  $\mu V$  or mV the following was used:

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

## Example:

$$\label{eq:FS} \begin{split} FS &= RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0 \\ UF &= 10^{(32 \ dB\mu V \ / \ 20)} = 39.8 \ \mu V/m \end{split}$$

## 7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
				PE80529A61		
DAV004'	Weather Station	Davis Instruments	7400	A	05/02/2016	05/02/2017
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/10/2016	03/10/2017
ETS001'	1-18GHz DRG Horn Antenna	ETS-Lindgren	3117	00143259	02/10/2016	02/10/2017
145014'	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	05/27/2016	05/27/2017
			3m Track B			
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	cables	multiple	07/30/2016	07/30/2017

## Software Utilized:

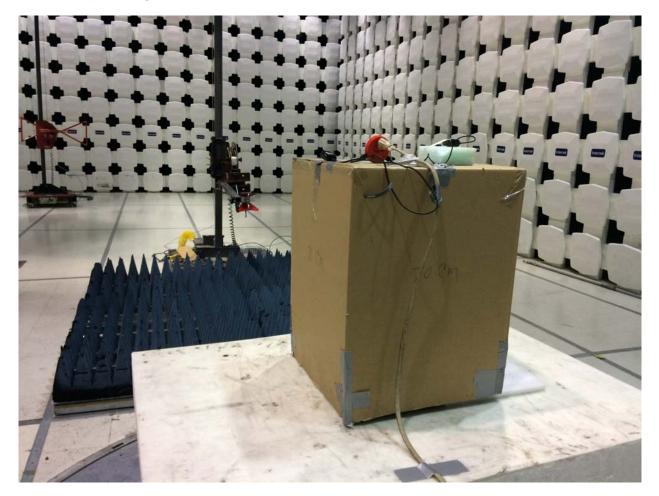
Name	Manufacturer	Version			
EMI Boxborough.xls	Intertek	08/27/2010			

Note: Your Laptop may use a different version of Excel. Record the version you actually used!

## 7.3 Results:

The sample tested was found to Comply.

## 7.4 Setup Photographs:



Intertek

**Special Radiated Emissions** 

## Test Data:

Company: Whoop								a & Cables:	HF	Bands: N, I	LF, HF, SHF	
Model #: WhoopStrap 2.0/830-000004 (USB charger)							Antenna:	ETS001 02	-10-17.txt	ETS001 02	2-10-17.txt	
Serial #:	20D125 6/1	FM16500012	(USB charg	ger)			Cable(s):	145-416 1-18 G	Hz 10-08-17.txt			
Engineers:	Vathana Ve	en			Location:	10M	Barometer:	DAV004		Filter:		
Project #:	G10283716	60	Date(s):	12/21/16								
Standard:	FCC Part 1	5 Subpart C	15.247				Temp/Humic	lity/Pressure:	21c	29%	999 mB	
Receiver:	R&S ESI (1	45-128) 03-	10-2017	Limit Di	stance (m):	3						
PreAmp:	145014 05-	-27-17.txt		Test Di	stance (m):	3						
P	reAmp Use	ed? (Y or N):	Ν	Voltage/	Frequency:	120VA	C 60Hz	Freque	ncy Range:	See fre	quencies	
	Net = Rea	ding (dBuV/r	n) + Antenn	a Factor (dl	31/m) + Cab	le Loss (dB	) - Preamp	Factor (dB)	- Distance F	actor (dB)		
Peak: F	PK Quasi-P	eak: QP Ave	erage: AVG	RMS: RMS	S; NF = Nois	e Floor, RE	= Restricte	d Band; Bar	ndwidth den	oted as RB	W/VBW	
	Ant.			Antenna	Cable	Pre-amp	Distance					1
Detector	Pol.	Frequency	Reading	Factor	Loss	Factor	Factor	Net	Limit	Margin	Bandwidth	
Туре	(V/H)	MHz	dB(uV)	dB(1/m)	dB	dB	dB	dB(uV/m)	dB(uV/m)	dB		FCC
			Note:	_ower Band	Edge Comp	liance, 8DF	SK none ho	opping				1
PK	Н	2390.000	26.70	32.21	3.66	0.00	0.00	62.57	74.00	-11.43	1/3 MHz	RB
AVG	Н	2390.000	16.19	32.21	3.66	0.00	0.00	52.06	54.00	-1.94	1/3 MHz	RB
			Not	e: Lower Ba	nd Edge Co	mpliance, 8	DPSK hopp	ing				1
PK	Н	2390.000	29.00	32.21	3.66	0.00	0.00	64.87	74.00	-9.13	1/3 MHz	RB
AVG	Н	2390.000	16.00	32.21	3.66	0.00	0.00	51.87	54.00	-2.13	1/3 MHz	RB
			Note:	Jpper Band	Edge Comp	oliance, 8DF	SK none ho	opping				1
PK	Н	2483.500	27.59	32.22	3.79	0.00	0.00	63.60	74.00	-10.40	1/3 MHz	RB
AVG	Н	2483.500	15.99	32.22	3.79	0.00	0.00	52.00	54.00	-2.00	1/3 MHz	RB
		-	Not	e: Upper Ba	nd Edge Co	mpliance, 8	DPSK hopp	ing			-	1
PK	Н	2483.500	29.90	32.22	3.79	0.00	0.00	65.91	74.00	-8.09	1/3 MHz	RB

Test Personnel:	Vathana Ven
Supervising/Reviewing Engineer:	
(Where Applicable)	N/A
	FCC Part 15C, 15.247,
Product Standard:	RSS-247
Input Voltage:	120VAC/60Hz
Pretest Verification w/ Ambient Signals or	
BB Source:	Yes

Deviations, Additions, or Exclusions: None

Test Date: 12/21/2016

Limit Applied:	Below specified limit
Ambient Temperature:	21 °C
Relative Humidity:	29 %
Atmospheric Pressure:	999 mbars

## 8 Radiated Emissions from Digital device and Receiver

## 8.1 Method

Tests are performed in accordance with CFR47 FCC Part 15B, ICES-003.

## 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 Styrofoam table 80 cm high is used for table-top equipment.

## Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6 dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	- dB

As shown in the table above our radiated emissions  $U_{lab}$  is less than the corresponding  $U_{CISPR}$  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 $dB\mu V/m$
	RA = Receiver Amplitude (including preamplifier) in $dB\mu V$
	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 $\mu$ 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 $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

 $\label{eq:RA} \begin{array}{l} = 52.0 \ dB\mu V \\ AF = \ 7.4 \ dB/m \\ CF = \ 1.6 \ dB \\ AG = 29.0 \ dB \\ FS = 32 \ dB\mu V/m \end{array}$ 

To convert from  $dB\mu V$  to  $\mu V$  or mV the following was used:

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

## Example:

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

## 8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
				PE80529A61		
DAV004'	Weather Station	Davis Instruments	7400	A	05/02/2016	05/02/2017
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/10/2016	03/10/2017
			10m Track A			
145-410'	Cables 145-420 145-421 145-422 145-406	Huber + Suhner	Cables	multiple	07/30/2016	07/30/2017
145013	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2944A07027	05/02/2016	05/02/2017
145145'	Broadband Hybrid Antenna 30 MHz - 3 GHz	Sunol Sciences Corp.	JB3	A122313	03/09/2016	03/09/2017

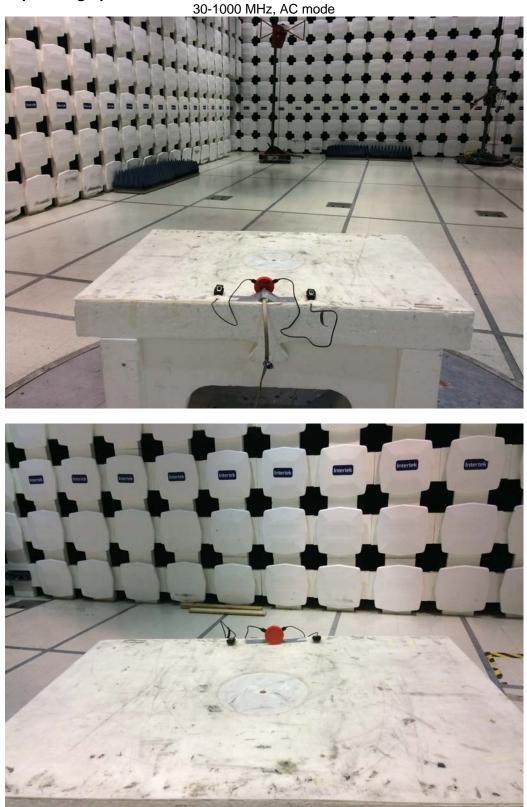
#### Software Utilized:

Name	Manufacturer	Version
Compliance 5	Teseq	5.26.46.46

## 8.3 Results:

The sample tested was found to Comply.

## 8.4 Setup Photographs:



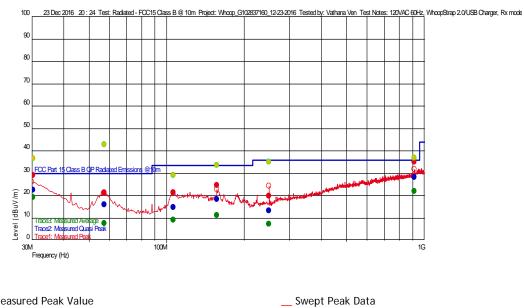
Intertek

Additional Information

#### 8.5 Test Data:

Test Information	
Test Details	User Entry
Test:	Radiated - FCC15 Class B @ 10m
Project:	Whoop_G102837160_12-23-2016
Test Notes:	120VAC 60Hz, WhoopStrap 2.0/USB Charger, Rx mode
Temperature:	19 deg C
Humidity:	21%, 1015mbar
Tested by:	Vathana Ven
Test Started:	23 Dec 2016 20 : 24

Prescan Emission Graph



Measured Peak Value

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

**Emissions Test Data** Trace2: Measured Quasi Peak

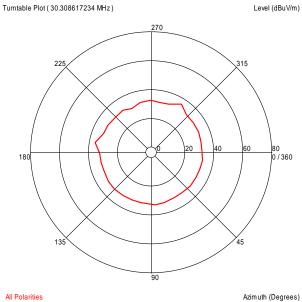
Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dBuV/m)	Hor ( ), Ver (   )	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
250.158116651 M	13.20	17.700	-25.324	36.020	-22.82		349	1.06	120 k	
106.562925661 M	14.90	18.113	-26.729	33.520	-18.62	1	271	1.14	120 k	
156.787374395 M	18.36	18.600	-26.187	33.520	-15.16	i i	17	1.57	120 k	
57.521443028 M	16.06	13.300	-27.298	30.000	-13.94	i	217	1.05	120 k	
916.800000349 M	28.21	29.136	-23.091	36.020	-7.81	i i	0	2.00	120 k	
30.308617234 M	22.41	27.253	-27.767	30.000	-7.59		202	3.62	120 k	

\_

Swept Quasi Peak Data

### Issued: 02/06/2017

#### **Azimuth Plots**

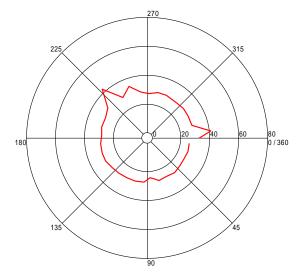


Azimuth (Degrees)

Intertek

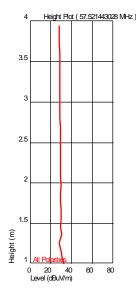
Turntable Plot (57.521443028 MHz)

Level (dBuV/m)



Height Plot ( 30.308617234 MHz ) 4 3.5 3 2.5 2 1.5 Height (m) 0 20 40 Level (dBuV/m) 80 60

**Turntable Plots** 

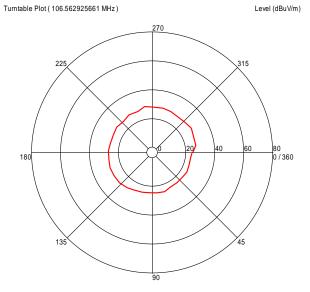


All Polarities

## Issued: 02/06/2017

Height Plot ( 106.562925661 MHz )

4



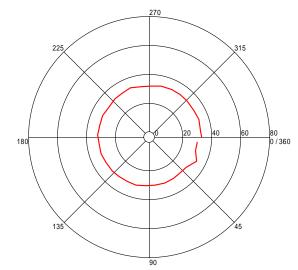
All Polarities

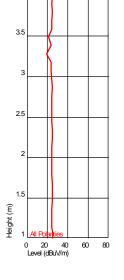
Azimuth (Degrees)

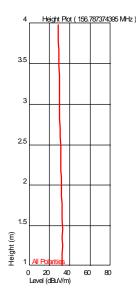
Intertek



Level (dBuV/m)

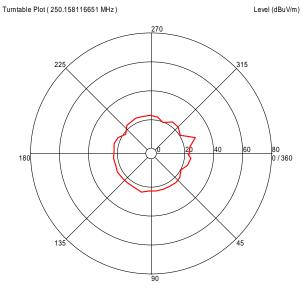






All Polarities

#### Issued: 02/06/2017



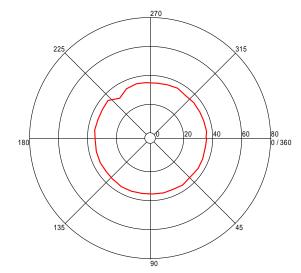
All Polarities

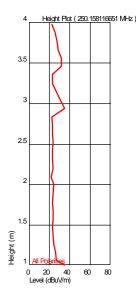
Azimuth (Degrees)

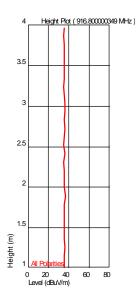
Intertek











All Polarities

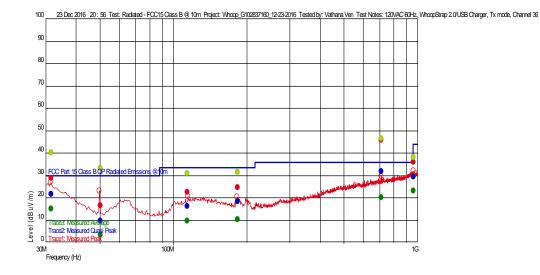
# Intertek

## Report Number: 102837160BOX-001b

## Issued: 02/06/2017

Additional Information

#### Prescan Emission Graph



Measured Peak Value

Measured Quasi Peak Value

Measured Average Value

• Maximum Value of Mast and Turntable

**Emissions Test Data** 

Trace2:	Measured	Quasi	Peal	<
-				

Tracez: Measure	eu Quasi Pe	eak								
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
50.355310922 M	9.77	14.029	-27.382	30.000	-20.23		29	2.80	120 k	
113.985971707 M	16.17	19.397	-26.649	33.520	-17.35		213	2.41	120 k	
183.440280236 M	18.38	17.300	-25.899	33.520	-15.14	1	195	1.15	120 k	
964.29398788 M	29.46	29.814	-22.851	43.980	-14.52		195	1.78	120 k	
31.590180529 M	21.51	26.228	-27.743	30.000	-8.49		197	2.71	120 k	
710.729458475 M	31.88	26.729	-23.843	36.020	-4.14		360	2.88	120 k	

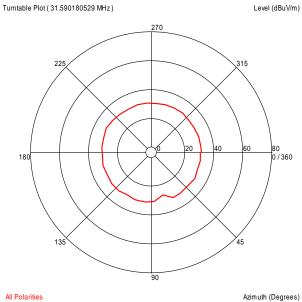
Swept Peak Data

\_\_\_\_ Swept Average Data

Swept Quasi Peak Data

## Issued: 02/06/2017

#### **Azimuth Plots**

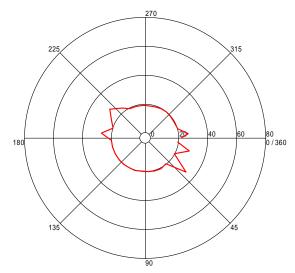


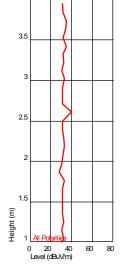
Azimuth (Degrees)

Intertek

Turntable Plot ( 50.355310922 MHz )

Level (dBuV/m)

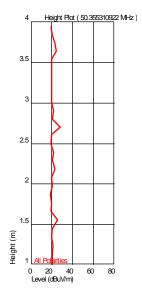




Height Plot ( 31.590180529 MHz )

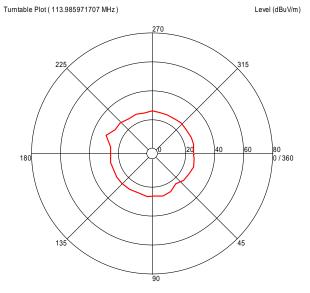
**Turntable Plots** 

4



All Polarities

## Issued: 02/06/2017



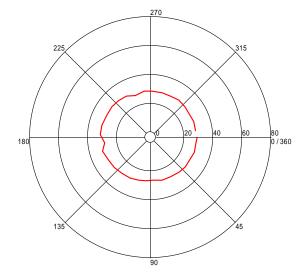
All Polarities

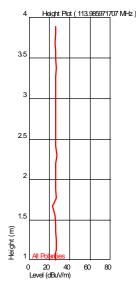
Azimuth (Degrees)

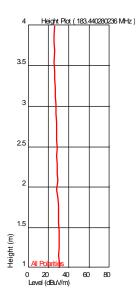
Intertek





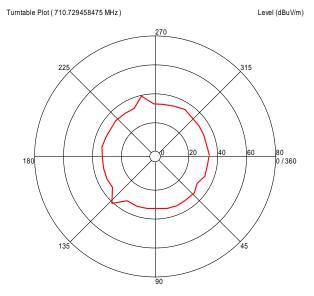






All Polarities

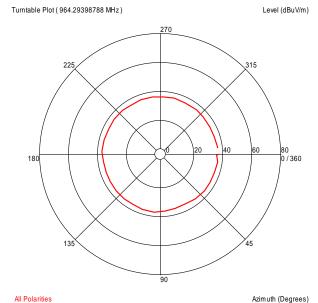
#### Issued: 02/06/2017

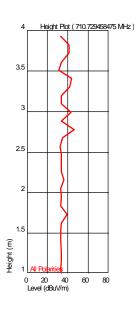


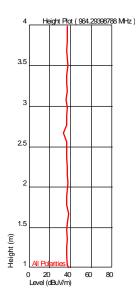
All Polarities

Azimuth (Degrees)

Intertek







	Vathana Ven	Test Date:	12/23/2016
Supervising/Reviewing Engineer:			
(Where Applicable)	N/A		
	FCC Part 15B, 15.247, ICES-		
Product Standard:	003, RSS-247	Limit Applied:	Class B
Input Voltage:	120VAC/60Hz		
Pretest Verification w/		Ambient Temperature:	19 °C
Ambient Signals or			
BB Source:	Yes	Relative Humidity:	21 %
		Atmospheric Pressure:	1015 mbars

Deviations, Additions, or Exclusions: None

## 9 AC Mains Conducted Emissions

## 9.1 Method

Tests are performed in accordance with FCC Part 15 Subpart B and ICES 003, FCC Part 15 Subpart C.

## 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.

## Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
AC Line Conducted Emissions	150 kHz - 30 MHz	2.8dB	3.4dB
Telco Port Emissions	150 kHz - 30 MHz	3.2dB	5.0dB

As shown in the table above our conducted emissions  $U_{lab}$  is less than the corresponding  $U_{CISPR}$ 

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 following is how net line-conducted readings were determined:

$$\begin{split} NF &= RF + LF + CF + AF \\ Where \quad NF &= Net \ Reading \ in \ dB\mu V \\ RF &= Reading \ from \ receiver \ in \ dB\mu V \\ LF &= LISN \ or \ ISN \ Correction \ Factor \ in \ dB \\ CF &= Cable \ Correction \ Factor \ in \ dB \\ AF &= Attenuator \ Loss \ Factor \ in \ dB \end{split}$$

To convert from  $dB\mu V$  to  $\mu V$  or mV the following was used:

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

## Example:

 $\label{eq:NF} \begin{array}{l} \mathsf{NF} = \mathsf{RF} + \mathsf{LF} + \mathsf{CF} + \mathsf{AF} = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \ dB\mu V \\ \mathsf{UF} = 10^{(49.1 \ dB\mu V \,/ \, 20)} = 285.1 \ \mu V/m \end{array}$ 

Alternately, when C5 Software is used, the "Level" includes all losses and gains and is compared directly in the "Margin" column to the "Limit". "TF" is the Transducer Factor; in this case LISN or ISN loss.

## 9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV001'	Weather Station	Davis Instruments	7400	PE80519A61	11/28/2016	11/28/2017
		ESCI				
			1166.5950K0			
ROS002'	9kHz to 3GHz EMI Test Receiver	Rohde & Schwartz	3	100067	07/29/2016	07/29/2017
CBLBNC				CBLBCN2012		
2012-4'	50 Ohm Coaxial Cable	Pomona	RG58C/U	-4	03/21/2016	03/21/2017
LISN31'	LISN - CISPR16 Compliant 9kHz-30MHz	Com-Power	LI-215A	191957	03/14/2016	03/14/2017
DS23A'	Attenuator, 20dB	Mini Circuits	20dB, 50 ohm	DS23A	10/21/2016	10/21/2017

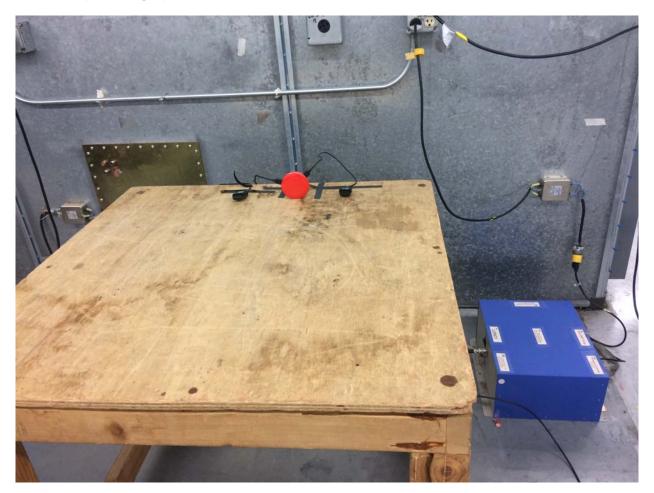
#### Software Utilized:

Name	Manufacturer	Version	
Compliance5	Teseq	5.26.46.46	

## 9.3 Results:

The sample tested was found to Comply.

## 9.4 Setup Photographs:



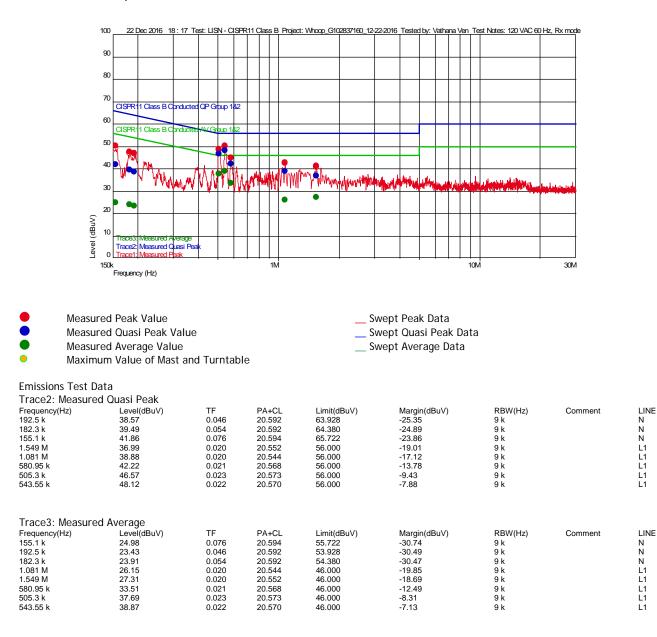
## 9.5 Plots/Data:

## Operating @ 120VAC 60Hz Rx Mode

Test Information
Test Details
Test:
Project:
Test Notes:
Temperature:
Humidity:
Tested by:
Test Started:

User Entry LISN – FCC Part 15B Class B Whoop\_G102837160\_12-22-2016 120 VAC 60 Hz, Rx mode 23 deg C 18%, 1004 mB Vathana Ven 22 Dec 2016 18 : 17 Additional Information

#### Prescan Emission Graph



Limits for the FCC and CISPR 11 are the same.

## Operating @ 120VAC 60Hz Tx Mode

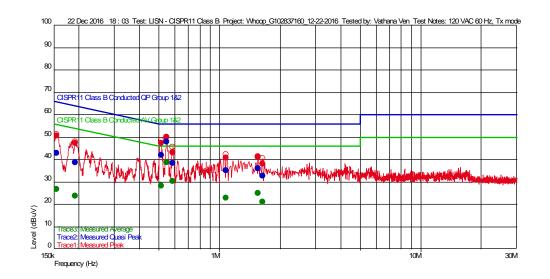
Intertek

Test Information Test Details Test: Project: Test Notes: Temperature: Humidity: Tested by: Test Started:

User Entry LISN – FCC Part 15B Class B Whoop\_G102837160\_12-22-2016 120 VAC 60 Hz, Tx mode 23 deg C 18%, 1004 mB Vathana Ven 22 Dec 2016 18 : 03

#### Additional Information

#### Prescan Emission Graph



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

#### Emissions Test Data

Trace2: Me	easured	Quasi	Peak
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Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
192.5 k	38.70	0.046	20.592	63.928	-25.22	9 k		N
1.639 M	32.75	0.020	20.554	56.000	-23.25	9 k		L1
155.1 k	42.81	0.076	20.594	65.722	-22.91	9 k		L1
1.081 M	34.94	0.020	20.544	56.000	-21.06	9 k		L1
1.558 M	35.90	0.020	20.553	56.000	-20.10	9 k		L1
585.2 k	38.24	0.020	20.568	56.000	-17.76	9 k		L1
513.8 k	41.99	0.023	20.572	56.000	-14.01	9 k		N
545.25 k	47.84	0.022	20.570	56.000	-8.16	9 k		L1

Swept Peak Data

\_\_\_\_ Swept Average Data

Swept Quasi Peak Data

Trace3: Measure	ed Average							
Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
192.5 k	23.63	0.046	20.592	53.928	-30.30	9 k		N
155.1 k	26.63	0.076	20.594	55.722	-29.09	9 k		L1
1.639 M	21.19	0.020	20.554	46.000	-24.81	9 k		L1
1.081 M	22.74	0.020	20.544	46.000	-23.26	9 k		L1
1.558 M	25.07	0.020	20.553	46.000	-20.93	9 k		L1
513.8 k	28.13	0.023	20.572	46.000	-17.87	9 k		N
585.2 k	30.33	0.020	20.568	46.000	-15.67	9 k		L1
545.25 k	38.75	0.022	20.570	46.000	-7.25	9 k		L1

Limits for the FCC and CISPR 11 are the same.

		Intertek	
Report Number: 102	2837160BOX-001b		Issued: 02/06/2017
Test Personnel:	Vathana Ven	Test Date:	12/22/2016
Supervising/Reviewing Engineer:			
(Where Applicable)	N/A FCC Part15 Subpart B		
Product Standard: Input Voltage:	ICES 003 120VAC 60Hz	Limit Applied:	Class B
Pretest Verification w/		- Ambient Temperature:	22.00
Ambient Signals or			
BB Source:	BB Source	Relative Humidity:	18 %
		Atmospheric Pressure:	1004 mbars

Deviations, Additions, or Exclusions: None

## 10 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	12/23/2016	102837160BOX-001	VEVV5V	MFM 💆	Original Issue
1	01/31/2017	102837160BOX-001a	VFV	MFM M	Corrected typo on page 3, 5, 36
2	02/06/2017	102837160BOX-001b	VFV	MFM M	Re-measured and added output power