

TEST REPORT

Report Number. : 14888706-E1V2

- Applicant : ENERGOUS CORPORATION 3590 NORTH FIRST STREET, SUITE 210, SAN JOSE, CA 95134, U.S.A.
 - Model : VN55, VN55-E
 - Brand : ENERGOUS
 - FCC ID : 2ADNG-VN55
 - IC : 23686-VN55
- EUT Description : WIRELESS CHARGER
- Test Standard(s) : FCC 47 CFR PART 15 C ISED RSS-247 ISSUE 3 ISED RSS-GEN ISSUE 5 + A1 + A2

Date Of Issue: 2023-10-17

Prepared by: UL VERIFICATION SERVICES INC. 47173 Benicia Street Fremont, CA 94538 U.S.A. TEL: (510) 319-4000 FAX: (510) 661-0888



REPORT REVISION HISTORY

Rev.	lssue Date	Revisions	Revised By
V1	2023-08-14	Initial Issue	
V2	2023-10-17	Corrected FCC standard wording and revised Section 6.5 C2PC description. Added additional model number. Added Section model number difference description. Revised RSS 247 to Issue 3.	Tina Chu

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1. ATTESTATION OF TEST RESULTS

- COMPANY NAME: ENERGOUS CORPORATION 3590 NORTH FIRST STREET, SUITE 210, SAN JOSE, CA 95134, U.S.A.
- **EUT DESCRIPTION:** WIRELESS CHARGER

MODEL: VN55, VN55-E (TESTED MODEL NUMBER)

- BRAND: ENERGOUS
- SERIAL NUMBER: D003778 (CONDUCTED/RADIATED)

SAMPLE RECEIPT DATE: 2023-07-13

DATE TESTED: 2023-07-13 to 2023-07-28

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC 47 CFR Part 15 C	Complies
ISED RSS-247 Issue 3	Complies
ISED RSS-GEN Issue 5 + A1 + A2	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document.

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2. TEST RESULTS SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

Below is a list of the data provided by the customer:

- 1) Antenna gain and type (see section 6.3)
- 2) Cable Loss (see section 6.3)

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment	See Comment	Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 11.6.
FCC §15.247 (a) (1)(i)	RSS-GEN 6.7	20dB BW/99% OBW	Complies	ANSI C63.10 Sections 6.9.2 and 6.9.3
15.247 (a)(1)	RSS-247 (5.1) (b)	Hopping Frequency Separation	Complies	None.
15.247 (a)(1)(i)	RSS-247 (5.1) (c) Number of Hopping Channels Complies		Complies	None.
15.247 (a)(1)(i)	7 (a)(1)(i) RSS-247 (5.1) (c) Average Time of Occupancy Comp		Complies	None.
15.247 (b)(2)	RSS-247 (5.4) (a)	Output Power	Complies	None.
See Comment	See Comment	Average Power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (d)	RSS-247 (5.5)	Conducted Spurious Emissions	Complies	None.
15.209, 15.205	RSS-GEN 8.9, 8.10	EN 8.9, Radiated Emissions C		None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Not performed	Antenna changed only, no impacted on the AC powerline test.

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3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC 47 CFR Part 2, FCC 47 CFR Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 + A1 + A2, and RSS-247 Issue 3.

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, Certificate Number 0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
\boxtimes	Building 1: 47173 Benicia Street Fremont, CA 94538, U.S.A			
	Building 2: 47266 Benicia Street Fremont, CA 94538, U.S.A	US0104	2324A	550739
\boxtimes	Building 4: 47658 Kato Rd Fremont, CA 94538, U.S.A			

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5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U _{Lab}
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
Power Spectral Density	2.47 dB
RF Power Measurement Direct Method Using Power Meter	1.3 dB (PK) / 0.45 dB (AV)
Unwanted Emissions, Conducted	1.94 dB
Worst Case Conducted Disturbance, 9kHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9kHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB
Time Domain Measurements	3.39%
Temperature	0.57°C
Humidity	3.39%
DC Supply Voltages	0.57%

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

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5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided: Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB - 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided: Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss. 36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a stand-alone wireless charger with BLE and Zigbee 802.15.4 that is mounted on a ceiling. The wireless charger transmits power via a frequency hopping signal between 907MHz to 920MHz and a DTS Zigbee 802.15.4 signal between 2402MHz and 2480MHz, and charges multiple receivers at a time.

This report documents test results of the 900MHz FHSS radio portion of the wireless charger.

6.2. DESCRIPTION OF MODEL NUMBER DIFFERENCE

Model number: VN55: Original filing for EUT with internal antenna. Model number: VN55-E: Class II permissive change filing for EUT with external antenna. Tested model number: VN55-E.

6.3. MAXIMUM OUTPUT POWER

Refer to original test report 14262501-E1V2 for max output power.

6.4. DESCRIPTION OF AVAILABLE ANTENNAS AND CABLE LOSS

The antenna(s) gain and type, cable loss as provided by the manufacturer' are as follows:

The WPT radio utilizes one External Omni Dipole antenna, with a maximum gain of 5dBi .

Cable loss: 0.4 dB

6.5. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

This class II permissive change is to add a new external antenna type and the highest gain to support SISO for all technologies and additional range on the 900MHz radio from 917.2MHz-918.8MHz to 907MHz-920MHz via firmware changed.

6.6. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was nrf5x_redux.6.0.1.7_2155_sdk_17

The test utility software used during testing was nrf5x_redux.6.0.1.7_2155_sdk_17

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6.7. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

The EUT is a ceiling mounted device, and it has one USB type C port for power only. The fundamental of the antenna was investigated in three orthogonal orientations X,Y(upright), it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

WPT band and BLE(beaconing mode) or WPT band and 2.4G Zigbee transmit simultaneously, investigation has been performed when WPT band, BLE and 2.4G Zigbee transmit simultaneously as worst case, result of 30MHz to 18GHz radiated emissions was recorded in this report.

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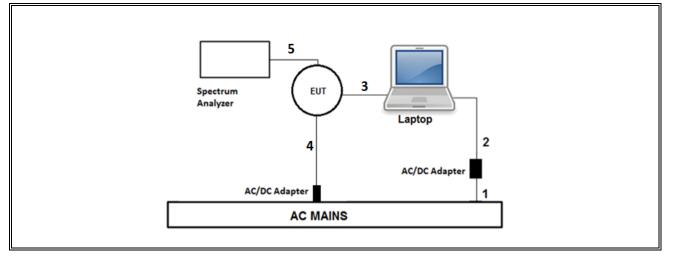
6.8. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT							
Description Ma		Manufacturer	Model	Serial Number		FCC ID/ DoC	
	Laptop	Dell	Precision 5520	FK7QI	HM2	DoC	
Laptop /	AC/DC adapter	Dell	HA130PM130	CN-0V363H-CH2 A0		DoC	
	C Switching Adapter	CUI Inc.	HDP- QB05010U	-		DoC	
		I/O	CABLES (RF C	ONDUCTED TEST)		
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks	
1	AC	1	AC	Un-shielded	1	AC Mains to AC/DC Adapter	
2	DC	1	DC	Un-shielded	1.5	AC/DC Adapter to Laptop	
3	USB to UART	1	USB A	Un-shielded	1.5	Laptop to EUT	
4	USB	1	USB Type C	Shielded	1	EUT to AC/DC adapter	
5	Antenna	1	SMA	Un-shielded	0.3	To spectrum analyzer	
		1/	O CABLES (RF I	RADIATED TEST)			
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks	
1	USB	1	USB Type C	Shielded	1		

TEST SETUP-RF CONDUCTED TEST

The EUT was powered by AC/DC adapter via USB cable. Test software exercised the EUT.

SETUP DIAGRAMS



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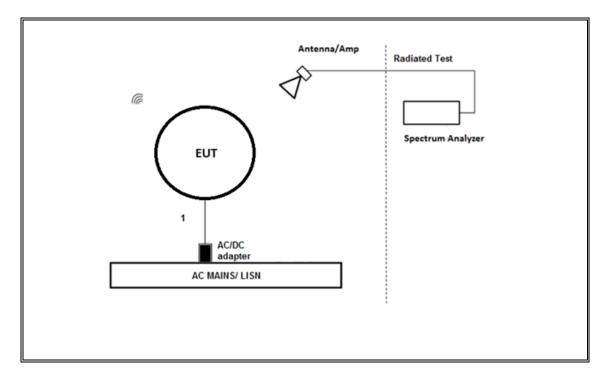
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TEST SETUP- RADIATED TEST / AC LINE CONDUCTED TEST

The EUT was powered by AC/DC adapter via USB cable. Test software exercised the EUT. Laptop was removed after test setup.

SETUP DIAGRAM



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7. MEASUREMENT METHODS

On Time and Duty Cycle: ANSI C63.10-2013 Section 11.6

Occupied BW (20dB): ANSI C63.10-2013 Section 6.9.2

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Carrier Frequency Separation: ANSI C63.10-2013 Section 7.8.2

Number of Hopping Frequencies: ANSI C63.10-2013 Section 7.8.3

Time of Occupancy (Dwell Time): ANSI C63.10-2013 Section 7.8.4

Peak Output Power: ANSI C63.10-2013 Section 7.8.5

Conducted Spurious Emissions: ANSI C63.10-2013 Section 7.8.8

Conducted Band-Edge: ANSI C63.10-2013 Section 6.10.4

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

Radiated Spurious Emissions 30-1000MHz: ANSI C63.10-2013 Section 6.3 and 6.5

Radiated Spurious Emissions above 1GHz: ANSI C63.10-2013 Section 6.3 and 6.6

Radiated Band-edge: ANSI C63.10-2013 Section 6.10.5

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8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST								
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal			
Antenna, Broadband Hybrid, 30MHz to 3000MHz	Sunol Sciences Corp.	JB3	174374	2024-04-30	2023-04-05			
Amplifier, 10KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310N	29654	2024-07-31	2023-07-13			
Thermometer	Control Company	14-650-118	160656	2024-04-30	2023-04-24			
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	191429	2024-02-29	2023-02-15			
Antenna, Horn 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	206806	2023-10-07	2022-10-07			
RF Filter Box, 1-18GHz	FREMONT	SAC-L1	171013	2023-10-31	2021-10-31			
Thermometer - Digital	Control Company	14-650-118	175731	2024-02-29	2023-02-08			
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	191429	2024-02-29	2023-02-15			
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	199659	2023-12-06	2022-12-06			
Rf Amplifier, 18-26.5GHz, 60dB gain	AMPLICAL	AMP18G26.5-60	234683	2024-03-29	2023-02-18			
Spectrum Analyzer, PSA, 3Hz to 26.5GHz	Keysight Technologies Inc	E4440A	125178	2024-02-29	2023-02-06			
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	90757	2024-02-29	2023-02-03			
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	90419	2024-02-29	2023-02-03			
Filter, BRF 915GHz 1.5GHz Max!	Micro-Tronics	BRC50722	156483	2024-07-31	2024-07-14			
Filter, Highpass 1.2GHz	Micro-Tronics	HPM50108	152043	2023-10-20	2022-10-20			
	UL TES	ST SOFTWARE LIST						
Radiated Software	UL	UL EMC		Rev 9.5, Jan	03, 2020			

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

<u>LIMITS</u>

None; for reporting purposes only.

PROCEDURE

ANSI C63.10, Section 11.6 : Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time	Period	Duty Cycle	Duty	Duty Cycle	1/T
	В		x	Cycle	Correction Factor	Minimum VBW
	(msec)	(msec)	(linear)	(%)	(dB)	(kHz)
WPT	90.40	90.40	1.000	100.00	0.00	0.010

Test Engineer CH 27342

L RF	50 Ω DC		SENSE:IN		04:16:08 PM Jul 13, 2023	- Energy and
		PNO: Fast G	Trig: Free Rur #Atten: 40 dB	Avg Type: Voltage	TRACE 1 2 3 4 5 6 TYPE WWWWWW DET N N N N N N	4
0 dB/div Ref 30.0	00 dBm				ΔMkr3 90.40 ms 0.00 dB	Auto Tun
					3∆2	Center Fre
10.0						915.100000 MH
0.00						
20.0						Start Fre
30.0						915.100000 MH
40.0						
50.0						Stop Fre 915.100000 MH
60.0						510.100000 1111
Center 915.100000 Res BW 8 MHz	MHz	#VBV	V 50 MHz	Sweep	Span 0 Hz 100.0 ms (1001 pts)	CF Ste 8.000000 MH Auto Ma
MODE TRC SCL $\Delta 2 \ 1 \ t \ (\Delta)$	X 90.4	0 ms (Δ)	Y 0.00 dB	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	Auto Ma
F 1 t $\Delta 2 1 t (\Delta)$	4.40	0 ms 0 ms (Δ)	19.24 dBm 0.00 dB			Freq Offse
	50.4	0 m3 (Δ)	0.00 00		E	он
						Scale Typ
						Log Li

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9.2. 20 dB AND 99% BANDWIDTH

<u>LIMITS</u>

FCC §15.247 (a) (1)(i)

(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequencies and the average time of not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

RSS-247 (5.1)

(c) For FHSS in the band 902-928 MHz: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10-second period. The maximum 20 dB bandwidth of the hopping channel shall be 500 kHz.

TEST PROCEDURE

The RBW is set to 10kHz. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

Note: Because the measured signal is CW or CW-like adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

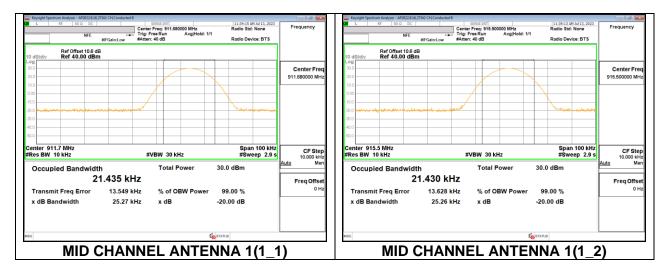
RESULTS

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Region Code	Channel	Frequency	20dB Bandwidth Antenna 1	99% Bandwidth Antenna 1
Code	Channel	Frequency (MHz)	(kHz)	(kHz)
	Low	907	25.27	21.433
1_1	Middle	911.68	25.27	21.435
	High	916.18	25.25	21.431
	Low	910.82	25.25	21.426
1_2	Middle	915.5	25.26	21.43
	High	920	25.28	21.433
	Low	907	25.26	21.428
2_1	Middle	911.004	25.26	21.432
	High	914.854	25.28	21.422
	Low	912.146	25.24	21.431
2_2	Middle	916.15	25.26	21.434
	High	920	25.27	21.433
	Low	907	25.25	21.417
3_1	Middle	910.016	25.27	21.429
	High	912.916	25.28	21.439
	Low	914.084	25.29	21.424
3_2	Middle	917.1	25.27	21.433
	High	920	25.29	21.436
	Low	907	25.25	21.428
4_1	Middle	908.976	25.31	21.44
	High	910.876	25.26	21.426
	Low	916.124	25.26	21.426
4_2	Middle	918.1	25.24	21.431
	High	920	25.26	21.438
	Low	907	25.27	21.425
5_1	Middle	907.988	25.28	21.431
	High	908.938	25.26	21.425
	Low	918.062	25.28	21.431
5_2	Middle	919.05	25.26	21.431
	High	920	25.27	21.431
	Low	907	25.27	21.426
6_1	Middle	907.832	25.25	21.424
	High	908.632	25.26	21.423
	Low	918.368	25.26	21.426
6_2	Middle	919.2	25.26	21.433
	High	920	25.28	21.426

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9.3. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

RSS-247 (5.1) (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 10 kHz and the VBW is set to 30 kHz. The sweep time is coupled.

<u>RESULTS</u>

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Region Code	Channel	Frequency	Hopping Freq Sepration Antenna 1
	Loui	(MHz) 907	(kHz) 180
4 4	Low		
1_1	Middle	911.68	180
	High	916.18	180
4.0	Low	910.82	180
1_2	Middle	915.5	180
	High	920	180
0.4	Low	907	154
2_1	Middle	911.004	154
	High	914.854	154
	Low	912.146	154
2_2	Middle	916.15	154
	High	920	154
	Low	907	116
3_1	Middle	910.016	116
	High	912.916	116
	Low	914.084	116
3_2	Middle	917.1	116
	High	920	116
	Low	907	76
4_1	Middle	908.976	76
	High	910.876	76
	Low	916.124	76
4_2	Middle	918.1	76
	High	920	76
	Low	907	38
5_1	Middle	907.988	38
	High	908.938	38
5_2	Low	918.062	38
	Middle	919.05	38
	High	920	38
6_1	Low	907	32
	Middle	907.832	32
	High	908.632	32
	Low	918.368	32
6_2	Middle	919.2	32
0_2	High	920	32

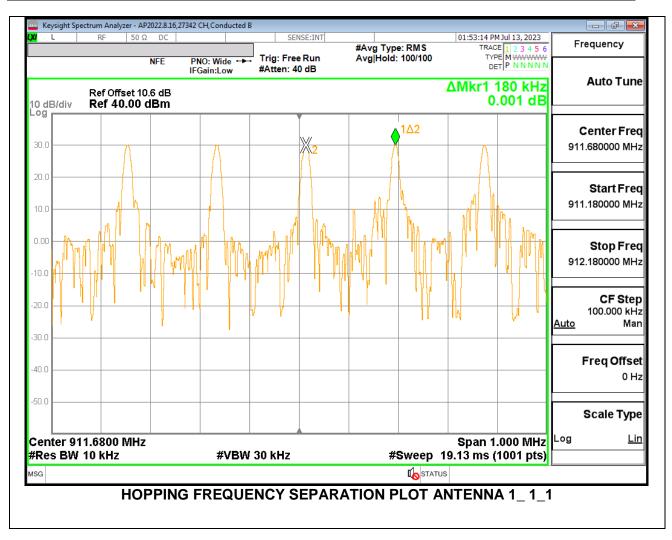
DATE: 2023-10-17 IC: 23686-VN55

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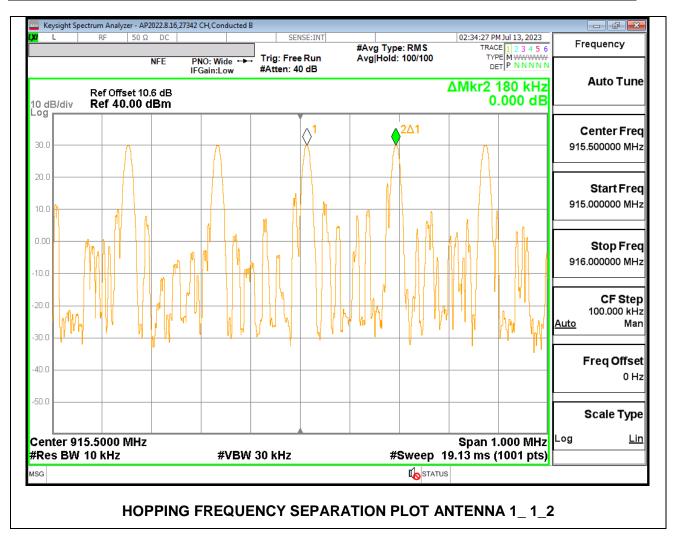
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9.4. NUMBER OF HOPPING CHANNELS

LIMITS

FCC §15.247 (a) (1) (i)

(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequencies and the average time of occupancy. The system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

RSS-247 (5.1)

(c) For FHSS in the band 902-928 MHz: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 10-second period. The maximum 20 dB bandwidth of the hopping channel shall be 500 kHz.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW (set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.) is set to 10 kHz and the VBW is set to > RBW. The analyzer is set to Max Hold.

RESULTS

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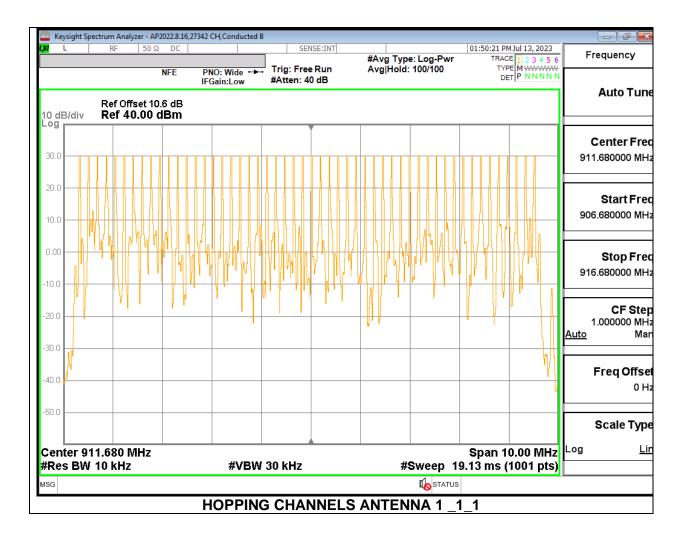
$\begin{array}{c c c} \mbox{Channel} & \ \hline \mbox{Antenna 1} \\ \hline \mbox{Antenna 1} \\ \hline \mbox{52} \\ \mbox{1_1} & \ \mbox{52} \\ \$
$\begin{array}{c cccccc} & 52 \\ & $
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$\begin{array}{c c} & 52 \\ 52 \\ 52 \\ 1_2 & 52 \\ 52 \\ 2_1 & 52 \\ 52 \\ 2_2 & 52 \\ 52 \\ 2_2 & 52 \\ 52 \\ 3_1 & 52 \\ 52 \\ 3_1 & 52 \\ 52 \\ 3_2 & 52 \\ 52 \\ 3_2 & 52 \\ 52 \\ 4_1 & 52 \\ 52 \\ 4_2 & 52 \\ 52 \\ 4_2 & 52 \\ 52 \\ 52 \\ 52 \\ 52 \\ 52 \\ 52 \\ 5$
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$\begin{array}{c c} & 52 \\ & 52 \\ & 52 \\ & 52 \\ 2_2 & 52 \\ & 52 \\ 2_2 & 52 \\ & 52 \\ 3_1 & 52 \\ & 52 \\ 3_1 & 52 \\ & 52 \\ 3_2 & 52 \\ & 52 \\ & 52 \\ 4_1 & 52 \\ & 52 \\ & 52 \\ 4_1 & 52 \\ $
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5_2 52
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6_1 52
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52
6_2 52
52

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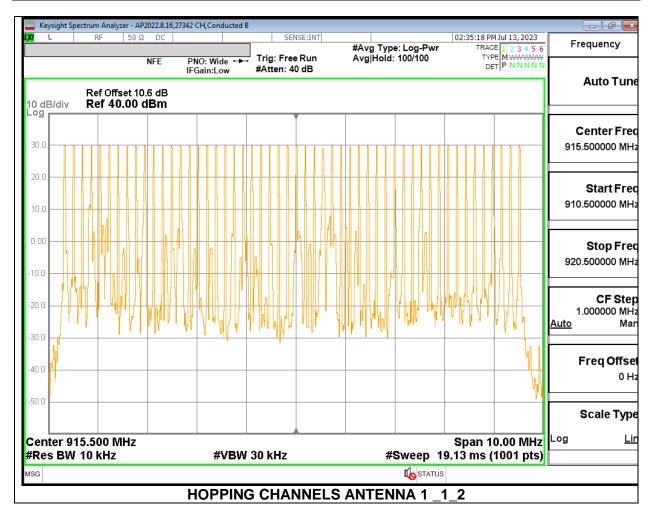


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FAX:(510) 661-0888



9.5. AVERAGE TIME OF OCCUPANCY

<u>LIMITS</u>

FCC §15.247 (a) (1) (i)

(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period;

RSS-247 (5.1)

(c) For FHSS in the band 902-928 MHz: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping channels and the average time of occupancy on any channel shall not be greater than 0.4 seconds within a 20-second period.

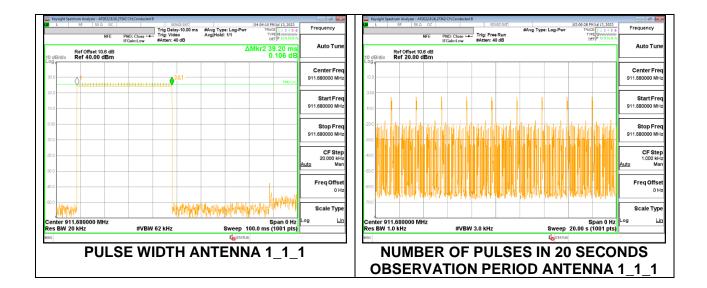
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 20 second scan, to enable resolution of each occurrence.

RESULTS

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Region Code	Pulse Width (msec)	Number of Pulses in 20 seconds	Average Time of Occupancy in 20 seconds (sec) Antenna 1	Limit (sec)	Margin (sec)
1_1	39.2	9	0.3528	0.4	-0.0472
1_2	39.3	10	0.3930	0.4	-0.0070
2_1	39.3	10	0.3930	0.4	-0.0070
2_2	39.3	10	0.3930	0.4	-0.0070
3_1	39.3	10	0.3930	0.4	-0.0070
3_2	39.2	10	0.3920	0.4	-0.0080
4_1	39.3	10	0.3930	0.4	-0.0070
4_2	39.2	9	0.3528	0.4	-0.0472
5_1	39.2	9	0.3528	0.4	-0.0472
5_2	39.3	10	0.3930	0.4	-0.0070
6_1	39.3	10	0.3930	0.4	-0.0070
6_2	39.3	10	0.3930	0.4	-0.0070



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9.6. OUTPUT POWER

LIMITS

15.247 (b) (2)

(2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels as permitted under paragraph (a)(1)(i) of this section.

RSS-247 (5.4)

(a)For FHSS operating in the band 902-928 MHz, the maximum peak conducted output power shall not exceed 1.0 W, and the e.i.r.p. shall not exceed 4 W if the hopset uses 50 or more hopping channels.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband power sensor. Peak output power was read directly from power meter.

RESULTS

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REPORT NO: 14888706-E1V2 FCC ID: 2ADNG-VN55

Application	Channel	Frequency	Output Power (dBm)	Peak	Total Peak power (dBm)	Limit (dBm)
		(MHz)	Ant1	Ant2	Ant1+ Ant2	(
	Low	917.2	27.49	26.25	29.92	30
Original	Middle	918	27.51	26.37	29.99	30
	High	918.8	26.92	26.85	29.90	30
Tested By:	CH 27342					
Date:	2023-07-13					
Region Code	Channel	Frequency	Output Power Peak	Limit	Margin	
	1	(MHz)	(dBm)	(dBm)	(dB)	
	Low	907	29.83	30	-0.17	
1_1	Middle	911.68	29.84	30	-0.16	
	High	916.18	29.86	30	-0.14	
1.0	Low	910.82	29.92	30	-0.08	
1_2	Middle	915.5	29.92	30	-0.08	
	High	920 907	29.88 29.89	30	-0.12	
2_1	Low Middle			30	-0.11	
۲_۲	High	911.004 914.854	29.89 29.88	30 30	-0.11 -0.12	
		914.834	29.89	30	-0.12	
2_2	Low Middle	916.15	29.89	30	-0.11	
2_2	High	920	29.88	30	-0.12	
	Low	920	29.86	30	-0.12	
3_1	Middle	910.016	29.87	30	-0.14	
0_1	High	912.916	29.88	30	-0.13	
	Low	914.084	29.87	30	-0.13	
3_2	Middle	917.1	29.86	30	-0.14	
	High	920	29.86	30	-0.14	
	Low	907	29.87	30	-0.13	
4_1	Middle	908.976	29.9	30	-0.10	
_	High	910.876	29.88	30	-0.12	
	Low	916.124	29.89	30	-0.11	
4_2	Middle	918.1	29.89	30	-0.11	
	High	920	29.88	30	-0.12	
	Low	907	29.9	30	-0.10	
5_1	Middle	907.988	29.9	30	-0.10	
	High	908.938	29.9	30	-0.10	
	Low	918.062	29.89	30	-0.11	
5_2	Middle	919.05	29.9	30	-0.10	
	High	920	29.91	30	-0.09	
	Low	907	29.97	30	-0.03	
6_1	Middle	907.832	29.95	30	-0.05	
	High	908.632	29.95	30	-0.05	
	Low	918.368	29.93	30	-0.07	
6_2	Middle	919.2	29.93	30	-0.07	
	High	920	29.92	30	-0.08	

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9.7. AVERAGE POWER

<u>LIMITS</u>

None; for reporting purposes only

TEST PROCEDURE

The transmitter output is connected to a power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband power sensor. Gated average output power was read directly from power meter.

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REPORT NO: 14888706-E1V2 FCC ID: 2ADNG-VN55

RESULTS

Application	Channel	Frequency (MHz)			Total avg power (dBm)
			Ant1	Ant2	Ant1+ Ant2
	Low	917.2	27.44	26.16	29.86
Original	Middle	918	27.46	26.25	29.91
	High	918.8	26.85	26.29	29.59

Tested By:	CH 27342	
Date:	2023-07-13	

Region Code	Channel	Frequency (MHz)	Output Power Avg (dBm)
	Low	907	29.78
1_1	Middle	911.68	29.78
	High	916.18	29.79
	Low	910.82	29.85
1_2	Middle	915.5	29.84
	High	920	29.82
	Low	907	29.83
2_1	Middle	911.004	29.84
	High	914.854	29.82
	Low	912.146	29.83
2_2	Middle	916.15	29.82
	High	920	29.83
	Low	907	29.81
3_1	Middle	910.016	29.82
	High	912.916	29.83
	Low	914.084	29.82
3_2	Middle	917.1	29.81
	High	920	29.82
	Low	907	29.83
4_1	Middle	908.976	29.85
	High	910.876	29.84
	Low	916.124	29.84
4_2	Middle	918.1	29.84
	High	920	29.83
	Low	907	29.85
5_1	Middle	907.988	29.85
	High	908.938	29.85
5_2	Low	918.062	29.84
	Middle	919.05	29.84
	High	920	29.85
	Low	907	29.91
6_1	Middle	907.832	29.9
	High	908.632	29.9
	Low	918.368	29.88
6_2	Middle	919.2	29.88
	High	920	29.87

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9.8. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

RSS-247 (5.5)

Limit = -20 dBc

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The bandedges at 902MHz and 928MHz are investigated with the transmitter set to the normal hopping mode.

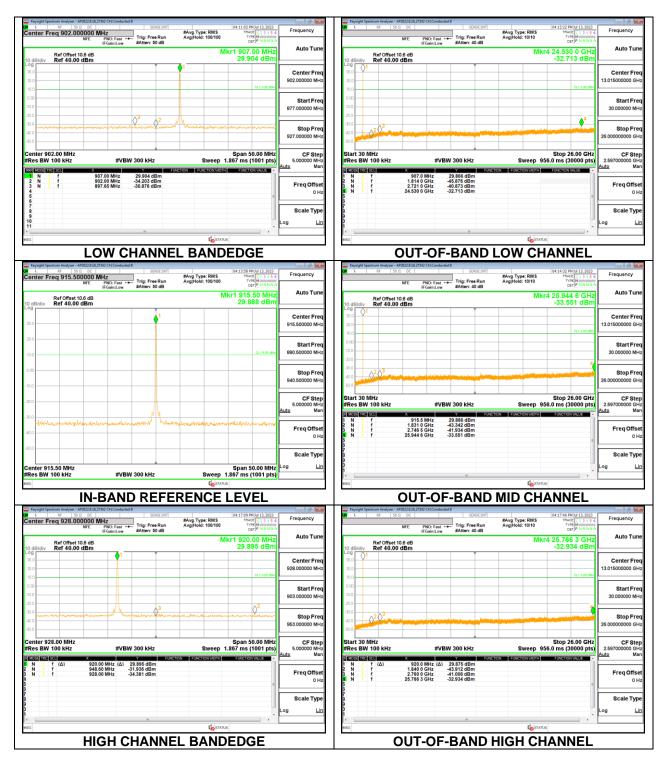
RESULTS

Output power is similar, only selective channel as below are chosen as a representative:

Region Code	Channel Frequency (MHz)	
1_1	Low	907
1_2	Middle	915.5
1_2	High	920
1_2	Hopping	

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SPURIOUS EMISSIONS, NON-HOPPING

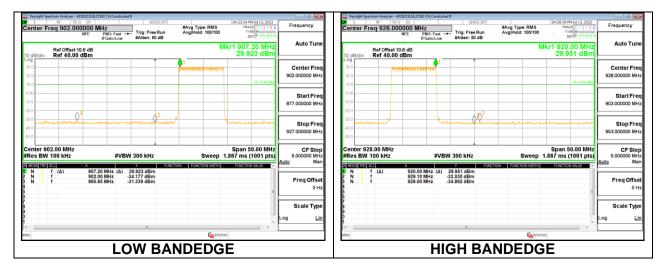


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SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



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10. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak or average (9-90kHz and 110-490kHz).

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements.

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

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For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only. Blue color trace on plots: Parallel orientation. Green color trace on plots: Perpendicular orientation.

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

NOTE: The limits in FCC 47 CFR, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table), using the free space impedance of 377 Ohms. For example the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to Y - 51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

RESULTS

Output power is similar, only selective channel as below are chosen as a representative:

Region Code	Channel	Frequency (MHz)
1_1	Low	907
1_2	Middle	915.5
1_2	High	920

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10.1. TRANSMITTER BELOW 1 GHz

-20 dBc BANDEDGE WITHOUT NOTCH FILTER AND PRE-AMPLIFIER (LOW CHANNEL)

Chamber 04-RDE-L	2023 Jul 20 09:45:38
8	Radiated Emissions - 3 Meters Praject Number: 14888706
V	Client: Energous
	Cliftert: Energous Config: EUT-Support Equipment Mode: WPT_907 Tested by: 20756 CW
6	
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2	
300	1000
Frequenc	
Range (MHz) R8U/UBU Ref/Attn Det Avg Mode Sweep Pts #Swps/Mode Position 1:888-1898 198k(-346)/388k187/18 PEAK - 8nsec(Auto) 8881 MAXH 53 degs 198 cm	Range (MHz) RBW/UBU Ref/Attn Det Avg Mode Sweep Pts #Swps/Mode Position
1:899-1898 188k(-3d6)/389k107/10 PEAK - 8nsec(Auto) 8881 MAXH 53 degs 188 cn	

HORIZONTAL RESULT

Radiated Emissions

Range 1:	Range 1: Horizontal 800 - 1000MHz														
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	174374 ANSI ACF 10 m H UL_	Cbl (dB)	Corrected Reading dB(uVolts/meter)	Azimuth (Degs)	Height (cm)	Polarity						
6	907.025	85.02	Pk	28.2	4.2	117.42	53	100	Н						
7	901.975	26.69	Pk	28	4.3	58.99	53	100	Н						
8	897.625	27.41	Pk	28	4.2	59.61	53	100	Н						
9	928.1	25.17	Pk	28.3	4.3	57.77	53	100	Н						
10	943.075	27.96	Pk	28.6	4.2	60.76	53	100	Н						

Pk - Peak detector

M8 and M10 are not under restricted bands. With 20dBc from M6 117.42 dBuV/m= 97.42 dBuV/m as limit, M8 and M10 are passing.

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VERTICAL RESULT

150	Chamber 04-RDE-L	2023 Jul 20 09:10:48
		Radiated Emissions - 3 Meters Project Number: 14888706
138	3	Project Number: 14888706 Client: Energous Gonfig: EUT+Support Equipment Mpde: WPT_987 Tested by: 20756 CW
		l(onfig: EUI+Support Equipment Mode: WPT 907
126	j	Tested by: 20756 CW
114	1	
102	2	
90]	
78	3	
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66	j	2 1 1 4 5
	week to be the second of the s	m. Mariland da parlan and factor and Querta allo and strand the adverted by the second strategies and the second strategies and
54	And Address And Address Addres	
42	2	
88		1000
	Frequency (
	Range (MHz) R884/VBU Ref/Attn Det Avg Mode Sweep Pts #Swep/Mode Position Range (1) 1:888-1898 1884-(-3x8)/3384187/18 PEAK 81sec(Auto) 8881 MMH 156 degs 93 cn	Hz) RBU/UBU Ref/Attn Det Avg Mode Sweep Pts #Swps/Mode Position
Law	1GHz BE_V.TST bs4419 12 Jan 2022 Rev 9.5 01 May 2023	
	The second reaction is an even were not and at may base	

Radiated Emissions

Range 1	: Vertical 800	- 1000MHz							
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	174374 ANSI ACF 10 m H UL_	Cbl (dB)	Corrected Reading dB(uVolts/meter)	Azimuth (Degs)	Height (cm)	Polarity
1	907.025	97.29	Pk	28.2	4.2	129.69	156	99	V
2	902.2	27.54	Pk	28	4.3	59.84	156	99	V
3	897.65	32.16	Pk	28	4.2	64.36	156	99	V
4	927.8	26.51	Pk	28.3	4.3	59.11	156	99	V
5	943.225	27.67	Pk	28.6	4.2	60.47	156	99	V

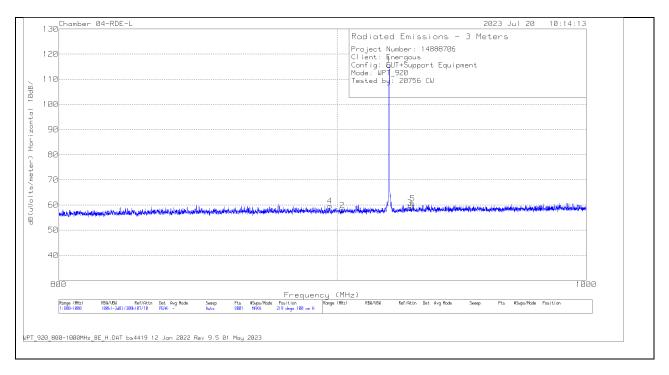
Pk - Peak detector

M3 and M5 are not under restricted bands. With 20dBc from M1 129.69 dBuV/m= 109.69 dBuV/m as limit, M3 and M5 are passing.

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

-20 dBc BANDEDGE WITHOUT NOTCH FILTER AND PRE-AMPLIFIER (HIGH CHANNEL)



HORIZONTAL RESULT

Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	174374 ANSI ACF 10 m H UL_	Cbl (dB)	Corrected Reading dB(uVolts/meter)	Azimuth (Degs)	Height (cm)	Polarity
1	920.025	83.33	Pk	28.1	4.2	115.63	219	100	Н
2	902	25.53	Pk	28	4.3	57.83	219	100	Н
3	928.025	26.28	Pk	28.3	4.3	58.88	219	100	Н
4	897.2	27.34	Pk	28	4.2	59.54	219	100	Н
5	929.2	28	Pk	28.3	4.3	60.6	219	100	Н

Pk - Peak detector

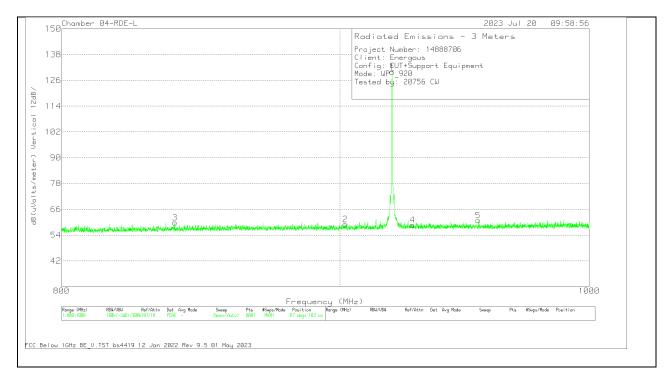
M4 and M5 are not under restricted bands. With 20dBc from M1 115.63 dBuV/m= 95.63 dBuV/m as limit, M4 and M5 are passing.

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

VERTICAL RESULT



Radiated Emissions

Range 1	: Vertical 800	- 1000MHz							
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	174374 ANSI ACF 10 m H UL_	Cbl (dB)	Corrected Reading dB(uVolts/meter)	Azimuth (Degs)	Height (cm)	Polarity
1	920.025	97.57	Pk	28.1	4.2	129.87	87	103	V
2	902	26.64	Pk	28	4.3	58.94	87	103	V
3	839.275	28.49	Pk	27.4	3.9	59.79	87	103	V
4	927.975	26.1	Pk	28.3	4.3	58.7	87	103	V
5	954.175	27.99	Pk	28.5	4.3	60.79	87	103	V

Pk - Peak detector

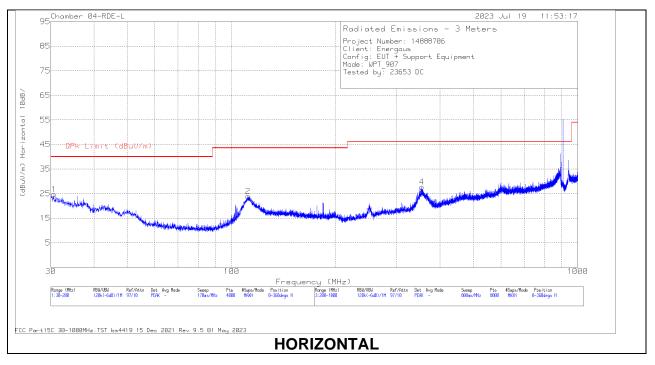
M3 and M5 are not under restricted bands. With 20dBc from M 129.87 dBuV/m= 109.87 dBuV/m as limit, M3 and M5 are passing.

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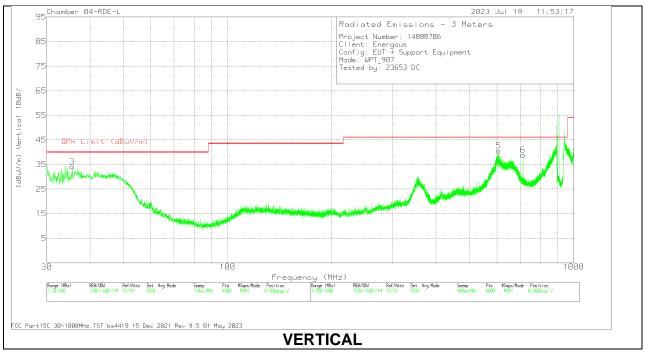
UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

HARMONICS AND SPURIOUS EMISSIONS (WITH NOTCH FILTER)



LOW CHANNEL RESULTS



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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

FAX:(510) 661-0888

RADIATED EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	174374 ANSI ACF 10 m H UL_	Amp/Cbl (dB)	156483 BRF (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	31.111	21.54	Qp	25.8	-31.1	0	16.24	40	-23.76	149	225	Н
2	* 112.349	29.11	Qp	18.8	-30.3	.1	17.71	43.52	-25.81	357	305	Н
3	48.4719	42.6	Qp	14.5	-30.9	.1	26.3	40	-13.7	171	129	V
4	353.949	29	Qp	20.4	-28.8	.2	20.8	46.02	-25.22	190	280	Н
5	604.61	36.21	Qp	24.6	-28.1	.3	33.01	46.02	-13.01	131	163	V
6	684.552	32.03	Qp	25.7	-28	.3	30.03	46.02	-15.99	212	164	V

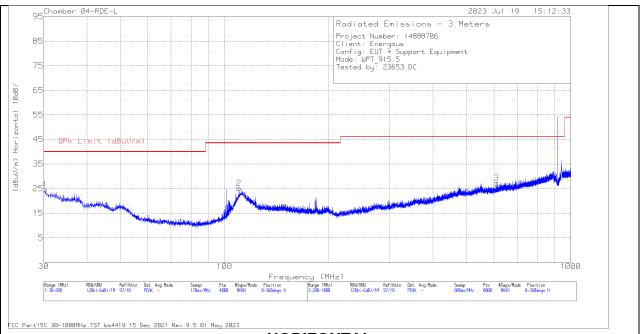
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Qp - Quasi-Peak detector

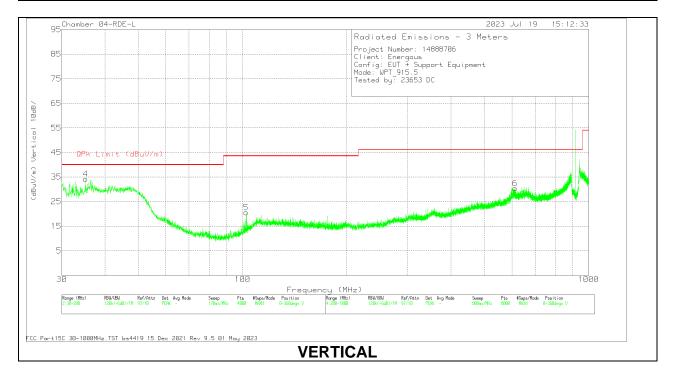
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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

MID CHANNEL RESULTS



HORIZONTAL



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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

FAX:(510) 661-0888

RADIATED EMISSIONS

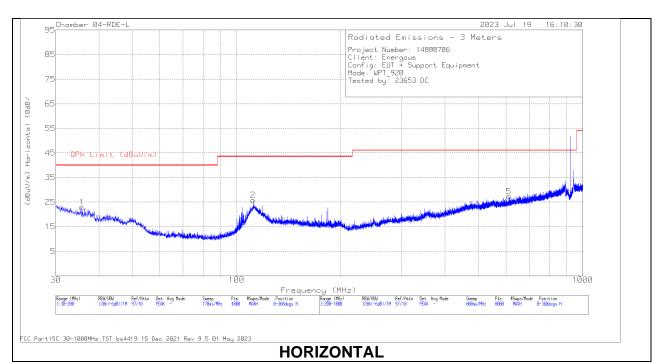
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	174374 ANSI ACF 10 m H UL_	Amp/Cbl (dB)	156483 BRF (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	30.0818	21.75	Qp	26.8	-31.1	0	17.45	40	-22.55	176	338	Н
2	* 112.04	31.33	Qp	18.7	-30.3	.1	19.83	43.52	-23.69	145	261	Н
3	37.4673	33.86	Qp	21.5	-31	0	24.36	40	-15.64	139	158	V
4	100.93	21.26	Qp	16.3	-30.4	.1	7.26	43.52	-36.26	87	223	V
5	* 610.156	21.69	Qp	24.7	-27.9	.3	18.79	46.02	-27.23	264	153	Н
6	* 612.71	26.53	Qp	24.8	-27.9	.3	23.73	46.02	-22.29	136	182	V

 * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Qp - Quasi-Peak detector

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA



HIGH CHANNEL RESULTS

95 Chamber 04-RDE-L 2023 Jul 19 16:10:30 Radiated Emissions - 3 Meters Project Number: 14888706 Client: Energous Config: EUT + Support Equipment Mode: WFT 920 Tested by: 23653 DC 85 75 65 10dB/ 55 Vertical 45 QPk Limit (dBuV/m) (dBuU/m) 35 MANA 25 4 15 30 1 ÅA 1000 Frequency (MHz) solition Range (MHz) Modegs V 4:200-1000 Pts #Sups/Mode Position 4888 MAXH 8-368degs V RBW/UBW Ref/Atta Det Avg Made 128k(-6dB)/1M 97/18 PEAK -RBN/VBN Ref/Attn Det Avg Mode 128k(-6dB)/1M 97/18 PEAK -Sweep Pts #Swps/Mode Position 608ns/Miz 8000 MAXH 8-368degs V Range (MHz) 2:38-288 Sxeep 178xs/MHz FCC Part15C 30-1000MHz.TST bs4419 15 Dec 2021 Rev 9.5 01 May 2023 VERTICAL

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

FAX:(510) 661-0888

RADIATED EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	174374 ANSI ACF 10 m H UL_	Amp/Cbl (dB)	156483 BRF (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	35.6896	22.8	Qp	22.6	-31.1	0	14.3	40	-25.7	165	135	Н
2	* 111.51	30.26	Qp	18.7	-30.3	.1	18.76	43.52	-24.76	132	194	Н
3	35.1122	30.98	Qp	22.9	-31.1	0	22.78	40	-17.22	139	167	V
4	101.992	21.24	Qp	16.6	-30.4	.1	7.54	43.52	-35.98	94	210	V
5	* 611.934	22.06	Qp	24.8	-27.9	.3	19.26	46.02	-26.76	261	154	Н
6	* 611.088	24.82	Qp	24.7	-27.9	.3	21.92	46.02	-24.1	245	139	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

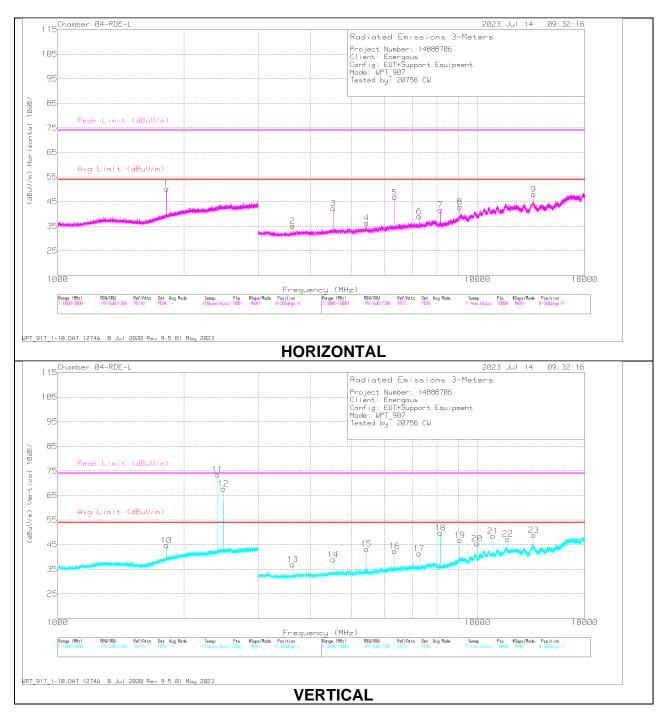
Qp - Quasi-Peak detector

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

10.2. TRANSMITTER ABOVE 1 GHz

HARMONICS AND SPURIOUS EMISSIONS (WITH HPF 204786)



LOW CHANNEL RESULTS

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

FAX:(510) 661-0888

RADIATED EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206806 ACF (dB) 3mH	AMP/C BL	152043 HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarit y
3	* 4535.095	36.96	PKFH	34	-25.7	0.45	45.71	-	-	74	-28.29	355	103	Н
	* 4535.067	31.76	VA1T	34	-25.7	0.45	40.51	54	-13.49	-	-	355	103	Н
7	* 8163.083	30.61	PKFH	35.7	-19.4	0.43	47.34	-	-	74	-26.66	253	163	Н
	* 8163.118	24.56	VA1T	35.7	-19.4	0.43	41.29	54	-12.71	-	-	253	163	Н
8	* 9070.345	30.7	PKFH	36.1	-18.1	0.41	49.11	-	-	74	-24.89	359	234	Н
	* 9070.105	20.68	VA1T	36.1	-18.1	0.41	39.09	54	-14.91	-	-	359	234	Н
18	* 8163.154	36.26	PKFH	35.7	-19.4	0.43	52.99	-	-	74	-21.01	27	263	V
	* 8163.114	33.61	VA1T	35.7	-19.4	0.43	50.34	54	-3.66	-	-	27	263	V
21	* 10884.075	30.66	PKFH	37.7	-15.9	0.6	53.06	-	-	74	-20.94	28	101	V
	* 10884.167	24.39	VA1T	37.7	-15.9	0.6	46.79	54	-7.21	-	-	28	101	V
22	* 11791.096	31.33	PKFH	38.4	-16.5	1.3	54.53	-	-	74	-19.47	259	287	V
	* 11791.169	23.53	VA1T	38.4	-16.5	1.3	46.73	54	-7.27	-	-	259	287	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

Markers 11 and 12 are BLE fundamental signals.

Markers 1, 5, 9, 10, 11, 12, 16, 20, 23 are under non restricted bands.

Markers 3, 7, 8, 18, 21, 22 are chosen as the worst 6 worst markers.

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

FAX:(510) 661-0888

Spurious Emissions 1GHz – 1.6GHz without a Band Reject Filter, without 1.2 GHz HPF, and without amplifier

	L 2023 Jul 20 11:09:27
5 <mark>Chamber 04-RDE</mark>	Radiated Emissions 3-Meters
15	Project Number: 14888706 Client: Energoux Canfig: EUT-Support Equipment
15	Mode: UPT 907 Tested by: 20756 CU
15	
Peak Limit	(dBuV/m)
5	
.5	
Avg Limit	(dBuU/m)
	and the state of the state of the state and the state of
15	
15	
15	
15	
	Frequency (MHz)
	Frequency (MHz) Ref/Ath bet for Note: Sweet Pis Miner/Note Parition Range (Mt) 98/ABI Ser/Ath bet for Note: Sweet Pis Miner/Note Parition
888	Frequency (MHz) Ref/Ath bet for Note: Sweet Pis Miner/Note Parition Range (Mt) 98/ABI Ser/Ath bet for Note: Sweet Pis Miner/Note Parition

DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206806 ACF (dB) 3mH	Cbl (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1333.795	23.21	PKFH	28.7	6.7	58.61	-	-	74	-15.39	110	235	Н
	* 1334.339	9.81	VA1T	28.7	6.7	45.21	54	-8.79	-	-	110	235	Н

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration Note:

• Test was performed @ 3 meter distance.

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

Rodicted Emissions 3-Meters Project Number: 1488786 Climit: Energous Config: EUFSupport Equipment Mode: UPT 997 Tested by: 20756 CU Peak Limit (dBuU/m) Âvg Limit (dBuU/m)	5 Chamber 04-R	DE-L 2823 Jul 20 11:89:27
Climit: Energous Climit: Energous Mode: UPT 997 Tested by: 2075 CU Peak Limit (dBuU/m) Avg Limit (dBuU/m)	<u> </u>	Radiated Emissions 3-Meters
Mode:: LuFT_997 Tested by: 20756 CU Prodx Limit (dBuU/m) Avg Limit (dBuU/m) Avg Limit (dBuU/m) Bage Mbu Bude by Balance B	5	Client: Energous
Pedk Linit (dBuU/m) Rvg Linit (dBuU/m) Rvg Linit (dBuU/m) Rvg Binit (dBuU/m) Rvg Himit (dBuU/m) Rvg H	_	Mode: UPT 907
Peak Limit (dBuU/m) Avg Limit (dBuU/m) Avg Limit (dBuU/m) Reger (Ho) State of the second sec	5	Tested by: 20756 CW
Avg Limit (dBuU/m)	5	
Avg Limit (dBuU/m)	Peak Lin	nit (dBuV/m)
Avg Limit (dBuU/n) S S	5	
308 Frequency (MHz) 1 Rege (No) 88×680 ke//kton bx kg Rule Seep Pia Regering V	5	
308 Frequency (MHz) 1 Rege (No) 88×680 ke//kton bx kg Rule Seep Pia Regering V	Ava Limi	it (dBuU/m)
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5	
1 1 Beng Ohu 1924-000 bet og hak Saay ha Kapanhak hantur Nage Ohu 1924-000 bet og hak Saay ha Kapanhak hantur 1 1000-100 thrudd 200 bet og hak Saay ha Kapanhak hantur Nage Ohu 100 bet og hak Saay ha Kapanhak hantur 1-1000-100 thrudd 200 bet og hak Saay ha Kapanhak hantur	5	
000 Frequency (MHz) Bage (Mz) 182488 be/rition but ing Rule Samp Pia KaparRule Pastion Region 2 282498 be/rition but ing Rule Samp Pia KaparRule Pastion Piato (2012) 101 101 101 101 101 101 101 101 101 10		
189 Frequency (MHz) Raye Mbi 189/89 Ad/Alto but ng hak Sawy Pa Kaputhak haitan Ngg Mbi 189/88 Ad/Alto but ng hak Jang hak Jang Alto Pautian Maga Mbi 189/89 Ad/Alto but ng hak Sawy Pa Kaputhak haitan Ngg Mbi 180/80 Bi 100/2000 Pautian State Sawa Sawa Mbi 100/2000 Pautian Sawa Sawy Pa Kaputhak haitan Ngg Mbi 100/2000 Pautian Sawa Sawa Sawa Sawa Sawa Sawa Sawa Sa	5	
189 Frequency (MHz) Raye Mbi 189/89 Ad/Alto but ng hak Sawy Pa Kaputhak haitan Ngg Mbi 189/88 Ad/Alto but ng hak Jang hak Jang Alto Pautian Maga Mbi 189/89 Ad/Alto but ng hak Sawy Pa Kaputhak haitan Ngg Mbi 180/80 Bi 100/2000 Pautian State Sawa Sawa Mbi 100/2000 Pautian Sawa Sawy Pa Kaputhak haitan Ngg Mbi 100/2000 Pautian Sawa Sawa Sawa Sawa Sawa Sawa Sawa Sa		
Frequency (MHz) Rege (Mu) NEAN Antino but ng hale Seep Pa Kepundak Paulion Page (Mu) NEAN State State See Pauline State	_	
Frequency (MHz) Rege (Mu) NEAN Antino but ng hale Seep Pa Kepundak Paulion Page (Mu) NEAN State State See Pauline State	5	
Starstan in Gardan son Har - Starstand with mile a Starsy v	5	
K 1-1.60Hz RSE buposs 8 mech otten.15T bs4419 12 Jun 2020 Rev 9.5 01 Moy 2023	000	
3C 1–1.6GHz RSE_bypass_8 mech atten.TST bs4419 12 Jun 2020 Rev 9.5 81 May 2023	000	Frequency (MHz) BV By/Atto But Ava Mode Sweep Pia Kiwa/Mode Position Ranae (Mtz) 989/489 By/Atto Dat Ava Mode Sweep Pia Kiwa/Mode Position
	000	Frequency (MHz) BV By/Atto But Ava Mode Sweep Pia Kiwa/Mode Position Ranae (Mtz) 989/489 By/Atto Dat Ava Mode Sweep Pia Kiwa/Mode Position

<u>DATA</u>

N	Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206806 ACF (dB) 3mH	Cbl (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
	2	* 1288.228	23.12	PKFH	28.8	6.5	58.42	-	-	74	-15.58	317	380	V
		* 1289.6	9.66	VA1T	28.8	6.5	44.96	54	-9.04	-	-	317	380	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

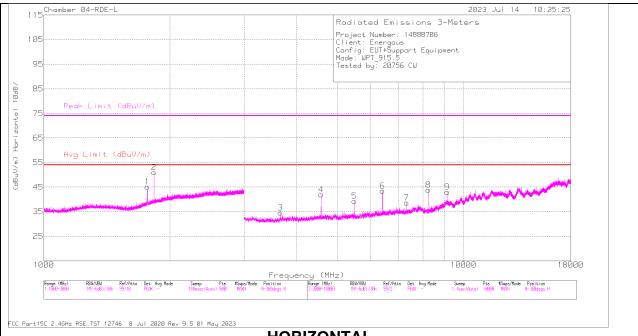
PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration Note:

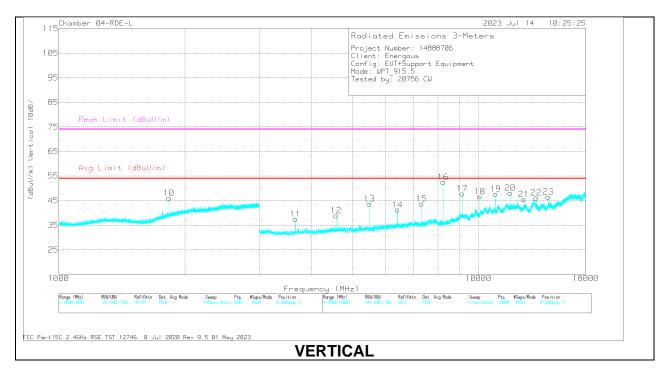
• Test was performed @ 3 meter distance.

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MID CHANNEL RESULTS



HORIZONTAL



Page 54 of 69

UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

FAX:(510) 661-0888

RADIATED EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206806 ACF (dB) 3mH	AMP/CBL	152043 HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 4577.528	36.27	PKFH	34.1	-25.6	0.61	45.38	-	-	74	-28.62	357	110	Н
	* 4577.556	31.11	VA1T	34.1	-25.6	0.61	40.22	54	-13.78	-	-	357	110	Н
8	* 8239.545	31.59	PKFH	35.7	-20.2	0.54	47.63	-	-	74	-26.37	248	222	Н
	* 8239.627	25.44	VA1T	35.7	-20.2	0.54	41.48	54	-12.52	-	-	248	222	Н
9	* 9155.34	30.57	PKFH	36.1	-18	0.4	49.07	-	-	74	-24.93	354	233	Н
	* 9155.126	21.25	VA1T	36.1	-18	0.4	39.75	54	-14.25	-	-	354	233	Н
16	* 8239.686	38.48	PKFH	35.7	-20.2	0.54	54.52	-	-	74	-19.48	27	270	V
	* 8239.615	35.81	VA1T	35.7	-20.2	0.54	51.85	54	-2.15	-	-	27	270	V
17	* 9154.909	31.81	PKFH	36.1	-18	0.4	50.31	-	-	74	-23.69	265	249	V
	* 9155.133	25.39	VA1T	36.1	-18	0.4	43.89	54	-10.11	-	-	265	249	V
20	* 11901.656	30.77	PKFH	38.5	-16	1.34	54.61	-	-	74	-19.39	11	101	V
	* 11901.661	23.08	VA1T	38.5	-16	1.34	46.92	54	-7.08	-	-	11	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

Markers 1, 2, 5, 6, 10, 13, 14, 18, 21, 22, 23 are under non restricted bands. Markers 4, 8, 9, 16, 17, 20 are chosen as the worst 6 worst markers.

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

FAX:(510) 661-0888

Spurious Emissions 1GHz – 1.6GHz without a Band Reject Filter, without 1.2 GHz HPF, and without amplifier

15 Chamber 04-RDE-L 2823 Ju Rodiated Emissions 3-Meters Project Number: 1488706 Client: Energous 55 75 Peak Limit (d8uV/m) 55	
D Client: Energous Config: EUTSupport Equipment Mode: UPT_915.5 Tested by: 20755 CU Peak Limit (dBuU/m)	
Node: UPT_915.5 Tested by: 20756 CU	
75 Peak Limit (dBull/m)	
5	
55	
Avg Limit (dBuU/m) 55	
and the second	Heronicity and the second
15	
15	
/5	
000	160
Frequency (MHz)	
Range (Mtz) #88//884 Ref/Attn Det Ava Mode Sweep Pts #Swee/Mode Position Range (Mtz) #88//884 Ref/Attn Det Ava Mode Sweep Pts	#Swps/Node Position
Bagar (Mis) BBANDI bar/Mato bat day Kuda Sanay Pia KaparAnda Pasistan Bangar (Mis) BBANDB Bar/Atto bat day Kuda Sanay Pia 1:388-1630 19:5-581/30:37/6 FEBL - Sinanzillata) 981 19:51 1:388-1630 19:5-51/6	#Swps/Mode Position

DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206806 ACF (dB) 3mH	Cbl (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1298.328	21.92	PKFH	28.8	6.6	57.32	-	-	74	-16.68	221	247	Н
	* 1297.56	9.66	VA1T	28.8	6.6	45.06	54	-8.94	-	-	221	247	Н

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration Note:

• Test was performed @ 3 meter distance.

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

Schamber 04-RDE-L	2023 Jul 20 10:51:
35	Radiated Emissions 3-Metens Project Number: 14888706 Climit: Energoux Config: EUI+Support Equipment Mode: UMT 215.5 Tested by: 20756 CW
35	
Peak Limit (dB	BuU/m0
75	
55	
Avg Limit (dBu	uU/m)
wardel als it for the second first here a	عنهم والمربع الملاحظ المحد والمحافظ والمحتول والمحتج وا
15	
35	
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1 0 0 0	
Range (Miz) RBM/JBU RaF/J	Frequency (MHz) //tith bet Ang Made Sweep Pits Kinger/Made Pasition Darger(MHz) 884/0810 Bet/Mith Det Ang Made Sweep Pits Kinger/Made Pasition //tith bet Ang Made Sweep Pits Kinger/Made Pasition Distance U
	21886-1688 INC-680728k 57/8 PEAK Stractouto Sell molt 0-368eg V
15C 1-1.6GHz RSE buposs 0 =	mech atten.TST bs4419 12 Jun 2020 Rev 9.5 01 May 2023

DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206806 ACF (dB) 3mH	Cbl (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 1359.64	22.41	PKFH	28.7	6.7	57.81	-	-	74	-16.19	226	343	V
	* 1361.795	9.74	VA1T	28.7	6.7	45.14	54	-8.86	-	-	226	343	V

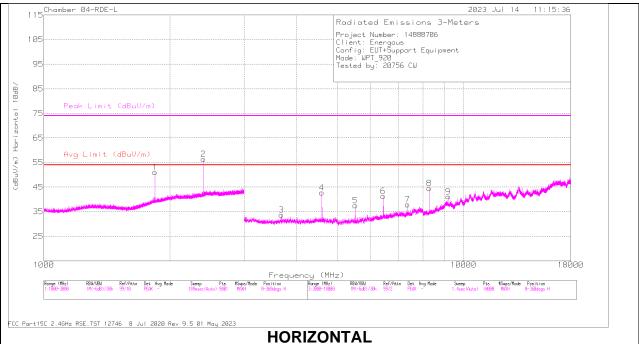
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration Note:

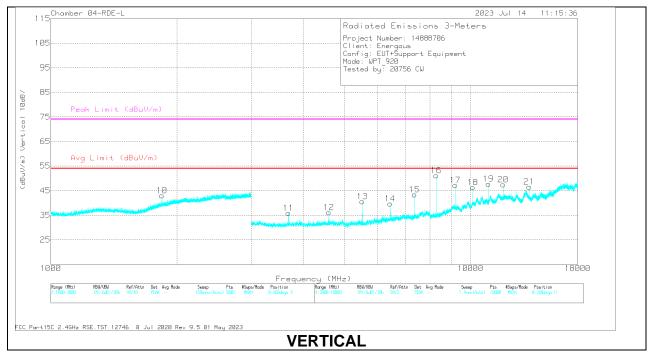
• Test was performed @ 3 meter distance.

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HIGH CHANNEL RESULTS



HORIZONTAL



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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

FAX:(510) 661-0888

RADIATED EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206806 ACF (dB) 3mH	AMP/CBL	152043 HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 4600.02	37.7	PKFH	34.1	-25.7	0.45	46.55		-	74	-27.45	355	295	Н
	* 4600.055	32.82	VA1T	34.1	-25.7	0.45	41.67	54	-12.33	-	-	355	295	H
7	* 7360.162	30.61	PKFH	35.6	-21.1	0.41	45.52	-	-	74	-28.48	317	271	Н
	* 7360.116	20.51	VA1T	35.6	-21.1	0.41	35.42	54	-18.58	-	-	317	271	Н
8	* 8280.141	32.43	PKFH	35.7	-20	0.42	48.55	-	-	74	-25.45	249	165	Н
	* 8280.107	27.58	VA1T	35.7	-20	0.42	43.7	54	-10.3	-	-	249	165	Н
16	* 8280.082	37.52	PKFH	35.7	-20	0.42	53.64	-	-	74	-20.36	27	285	V
	* 8280.126	35.17	VA1T	35.7	-20	0.42	51.29	54	-2.71	-	-	27	285	V
19	* 11040.322	30.96	PKFH	37.8	-16.8	0.62	52.58	-	-	74	-21.42	21	110	V
	* 11040.114	24.53	VA1T	37.8	-16.8	0.62	46.15	54	-7.85	-	-	21	110	V
20	* 11960.082	30.84	PKFH	38.6	-16	1.45	54.89	-	-	74	-19.11	18	108	V
	* 11960.17	23.64	VA1T	38.6	-16	1.45	47.69	54	-6.31		-	18	108	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

Marker 2 is BLE fundamental signal. Markers 1, 5, 6, 10, 13, 14, 18, 21 are under non restricted bands. Markers 4, 7, 8, 16, 19, 20 are chosen as the worst 6 worst markers.

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

FAX:(510) 661-0888

Spurious Emissions 1GHz – 1.6GHz without a Band Reject Filter, without 1.2 GHz HPF, and without amplifier

15 Chamber 04-RDE-L	2823 Jul 20 18:33:46
35	Radiated Emissions 3-Meters Project Number: 14888786 Client: Energous
95	Config: EUI+Support Equipment Mode: UPT 920 Tested by: 20756 CU
85	
75 Peak Limit (dBu	/U/m)
65	
Avg Limit (dBu	J/m)
55	and the second
45	hulk in discenses and the second s
35	
25	
25	
1000	168
Range (MHz) RBM/JBU RaF/A 1:1888-1688 1MC-6dB3/38k 97/8	Frequency (MHz) th bit Ang Koda Sweep Pis Bayes/Node Position Parge OHz) 894/188 947/18th bet Ang Koda Sweep Pis Bayes/Koda Position FDR - StraceCatus 981 1990 Fishesian I

DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206806 ACF (dB) 3mH	Cbl (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1323.456	22.69	PKFH	28.8	6.7	58.19	-	-	74	-15.81	309	220	Н
	* 1324.702	9.79	VA1T	28.8	6.7	45.29	54	-8.71	-	-	309	220	Н

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

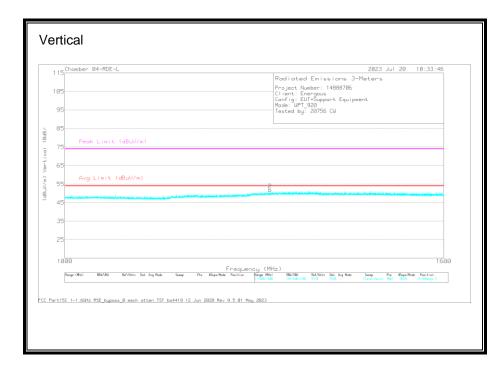
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration Note:

• Test was performed @ 3 meter distance.

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206806 ACF (dB) 3mH	Cbl (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 1289.962	22.4	PKFH	28.8	6.5	57.7	-	-	74	-16.3	54	113	V
	* 1290.478	9.65	VA1T	28.8	6.5	44.95	54	-9.05	-	-	54	113	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak

VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration Note:

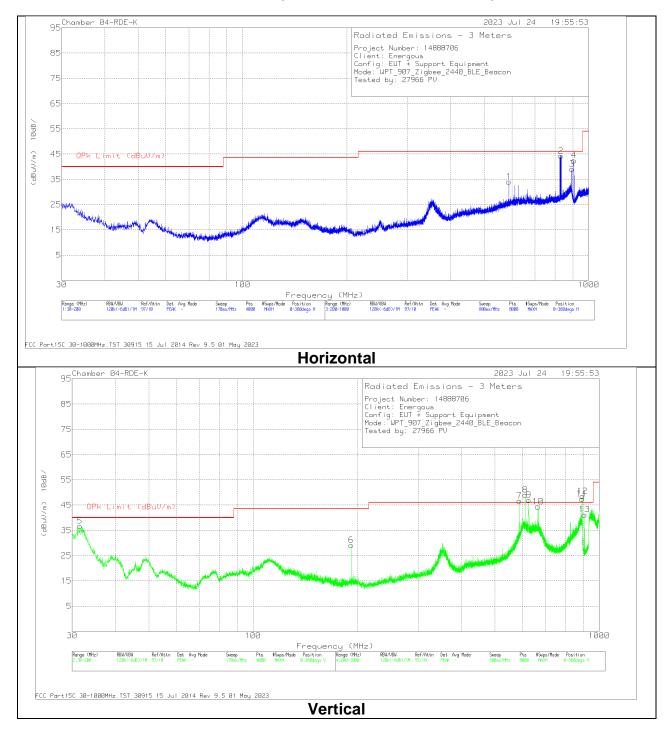
• Test was performed @ 3 meter distance.

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

10.3. WORST CASE COLACATION BELOW 1G

SPURIOUS EMISSIONS 30 MHz-1000MHz (WORST-CASE CONFIGURATION)



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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

FAX:(510) 661-0888

Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	232075 ACF (dB) 10m H	Amp/Cbl (dB)	156483 BRF	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	587.95	38.3	Pk	24.2	-28.4	0.1	34.2	46.02	-11.82	0-360	299	Н
2	831.797	20.13	Qp	27.4	-27.3	0.5	20.73	46.02	-25.29	188	393	Н
5	31.5826	35.13	Qp	25.4	-31.4	0.0	29.13	40	-10.87	119	113	V
6	192.052	41.67	Pk	17.5	-30	0.1	29.27	43.52	-14.25	0-360	100	V
7	587.943	47.19	Qp	24.2	-28.4	0.1	43.09	46.02	-2.93	227	104	V
8	* 611.945	48.42	Qp	24.7	-28.3	0.4	45.22	46.02	-0.8	87	192	V
9	625.956	40.98	Qp	25.1	-28.3	0.3	38.08	46.02	-7.94	48	202	V
10	665.939	41.7	Qp	25.5	-27.9	0.4	39.7	46.02	-6.32	9	132	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

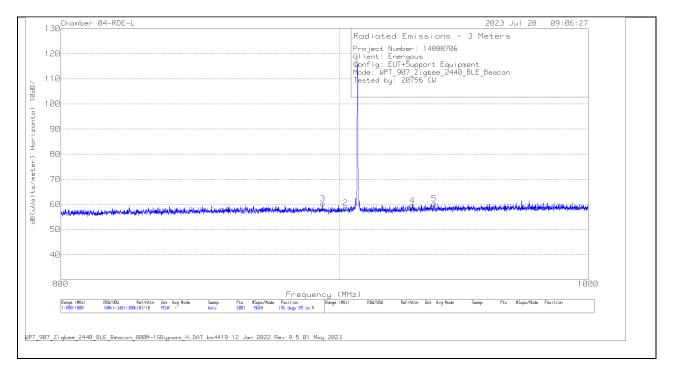
NOTE: Markers 4 and 13 are the WPT fundamental. Markers 11 and 12 are the BRF band-edge and weren't maximized.

Marker 3 please refer to zoom result as below Marker 3 (-20 dBc BANDEDGE WITHOUT NOTCH FILTER AND PRE-AMPLIFIER (LOW CHANNEL)

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

-20 dBc BANDEDGE WITHOUT NOTCH FILTER AND PRE-AMPLIFIER (LOW CHANNEL)



HORIZONTAL RESULT

Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	174374 ANSI ACF 10 m H UL_	Gain/Loss (dB)	Corrected Reading dB(uVolts/meter)	Azimuth (Degs)	Height (cm)	Polarity
1	907	83.5	Pk	28.2	4.3	116	196	99	Н
2	902.325	26.24	Pk	28	4.3	58.54	196	99	Н
3	893.75	28.23	Pk	27.9	4.2	60.33	196	99	Н
4	928.275	26.93	Pk	28.3	4.3	59.53	196	99	Н
5	936.95	27.6	Pk	28.5	4.2	60.3	196	99	Н

Pk - Peak detector

M3 and M5 are not under restricted bands. With 20dBc from M1 116 dBuV/m= 96 dBuV/m as limit, M3 and M5 are passing.

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

VERTICAL RESULT

2023 Jul 28 - 08:57:08
Radiated Emissions - 3 Meters Project Number: 14888706
Client: Energous
Client: Energous Gonfig: EUI+Support Equipment Mode: WPT 997 Zigbee 2440_BLE_Beacon Tested by: 20756 CW
l μ l
ne Henry
1899
(MHz)
(MHz) RBW/UBW Ref/Attn Det Avg Mode Sweep Pts #Swps/Mode Position
•

Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	174374 ANSI ACF 10 m H UL_	Gain/Loss (dB)	Corrected Reading dB(uVolts/meter)	Azimuth (Degs)	Height (cm)	Polarity
1	907	97.57	Pk	28.2	4.3	130.07	174	104	V
2	901.75	28.15	Pk	28	4.3	60.45	174	104	V
3	897.625	32.39	Pk	28	4.2	64.59	174	104	V
4	928.15	27.39	Pk	28.3	4.3	59.99	174	104	V
5	933.5	28.68	Pk	28.4	4.2	61.28	174	104	V

Pk - Peak detector

M3 and M5 are not under restricted bands. With 20dBc from M1 130.07 dBuV/m= 110.07dBuV/m as limit, M3 and M5 are passing.

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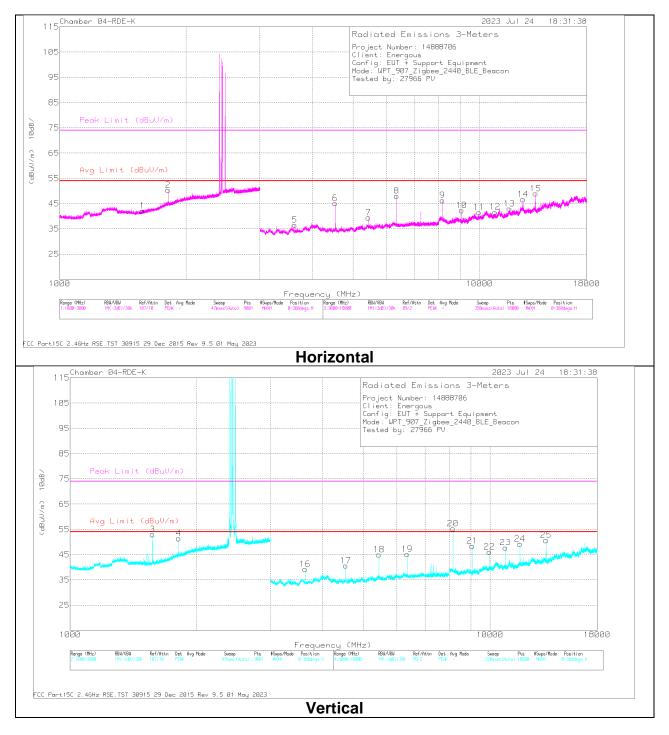
UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

FAX:(510) 661-0888

10.4. WORST CASE COLOCATION ABOVE 1G

SPURIOUS EMISSIONS Above 1GHz (COLOCATION WORST-CASE CONFIGURATION)



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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000

FAX:(510) 661-0888

Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	223083 ACF (dB) 3mH	Cbl/Amp (dB)	152043 HPF	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1579.144	37.29	PK2	27.9	-12.8	0.68	53.07	-	-	74	-20.93	309	272	Н
	* 1577.067	25.31	MAv1	27.9	-12.7	0.67	41.18	54	-12.82	-	-	309	272	Н
8	* 8163.204	53.59	PK2	35.9	-36.9	0.43	53.02	-	-	74	-20.98	235	104	Н
	* 8163.111	46.65	MAv1	35.9	-36.9	0.43	46.08	54	-7.92	-	-	235	104	Н
13	* 11790.772	47.66	PK2	38.3	-33.9	1.3	53.36	-	-	74	-20.64	225	277	Н
	* 11790.969	36.32	MAv1	38.3	-33.9	1.3	42.02	54	-11.98	-	-	225	277	Н
3	* 1572.897	41.75	PK2	27.9	-12.7	0.67	57.62	-	-	74	-16.38	19	119	V
	* 1573.019	28.22	MAv1	27.9	-12.7	0.66	44.08	54	-9.92	-	-	19	119	V
20	* 8162.967	57.44	PK2	35.9	-36.9	0.43	56.87	-	-	74	-17.13	325	101	V
	* 8163.052	53.59	MAv1	35.9	-36.9	0.43	53.02	54	-0.98	-	-	325	101	V
24	* 11791.271	50.39	PK2	38.3	-33.9	1.3	56.09	-	-	74	-17.91	320	105	V
	* 11791.185	43.01	MAv1	38.3	-33.9	1.3	48.71	54	-5.29	-	-	320	105	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band PK2 - KDB558074 Method: Maximum Peak MAv1 - KDB558074 Option 1 Maximum RMS Average

Markers 2, 4,11, 15, 19, 22, 25 are under non restricted bands. Markers 1, 8, 13, 3, 20, 24 are chosen as the worst 6 worst markers.

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UL VERIFICATION SERVICES INC. 47173 Benicia Street, Fremont, CA 94538, USA

TEL:(510) 319-4000