



Compliance Testing, LLC

Previously Flom Test Lab

EMI, EMC, RF Testing Experts Since 1963

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Test Report

Prepared for: Etherstack

Model: SFFR6UH2

Description: Small Form Factor Repeater

Serial Number: 17050005

FCC ID: 2ADAKSFFR6UH2

To

FCC Part 1.1310

Date of Issue: April 11, 2019

On the behalf of the applicant:

Etherstack Inc.
1115 Broadway
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Attention of:

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Greg Corbin
Project Test Engineer

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Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	September 21, 2017	Greg Corbin	Original Document
2.0	December 17, 2017	Greg Corbin	Updated model and EUT description, updated antenna gain
3.0	June 8, 2018	Greg Corbin	Updated FCC ID and revised MPE calculation with higher output power
4.0	October 15, 2018	Greg Corbin	Revised MPE calculation due to higher gain antenna provided by manufacturer
5.0	October 22, 2018	Greg Corbin	Updated RF exposure calculations using the lowest frequency and highest measured output power.
6.0	January 7, 2019	Greg Corbin	Updated Table 1, Frequency Allocation
7.0	April 8, 2019	Greg Corbin	Updated MPE calculations to reflect rated power including tune-up tolerances

ILAC / A2LA

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated January 2009)

The tests results contained within this test report all fall within our scope of accreditation, unless below

Please refer to <http://www.compliancetesting.com/labscope.html> for current scope of accreditation.

Testing Certificate Number: **2152.01**



FCC Site Reg. #349717

IC Site Reg. #2044A-2

Non-accredited tests contained in this report:

N/A

EUT Description
Model: SFFR-6

Description: Small Form Factor Repeater

Firmware: 2.04.000

Software: N/A

Serial Number: 17060005

Additional Information:

The EUT is a UHF small form factor repeater operating from 450 - 520 MHz per Table 1 below.

The EUT is AC or DC powered, with 2 battery packs for battery power.

A 7.15 dBi gain 5/8 wave collinear omnidirectional antenna was specified by the manufacturer.

Worst case RF exposure calculations were calculated using the highest gain antenna and the highest output power which is the rated output power listed on the grant plus tune-up tolerances of +/- 0.29 dB.

Table 1 Frequency Allocation

Frequency Range (440 - 512 MHz)						
Rule Part	Frequency Range (MHz)	Sub-Bands (MHz)			Extended Frequency	
FCC Part 90 Narrowband	440 - 512	450 – 512	N/A	N/A	440 – 450	512 - 520
FCC Part 90 Wideband	440 - 512	470 - 512	N/A	N/A	440 – 450	512 - 520
FCC Part 22	454 - 460	454 - 455	456 - 460	N/A	N/A	N/A
FCC Part 74	450 - 456	450 - 454	455 - 456	N/A	N/A	N/A
FCC Part 80	454 - 470	454 - 455	456 - 460	462.7375 - 470	N/A	N/A
RSS 119	450 - 470	450 - 470	N/A	N/A	N/A	N/A



MPE Evaluation

This is a portable device used in **Uncontrolled** Exposure environment.

**Limits Uncontrolled Exposure
47 CFR 1.1310
Table 1, (B)**

0.3-1.234 MHz:	Limit [mW/cm ²] = 100
1.34-30 MHz:	Limit [mW/cm ²] = (180/f ²)
30-300 MHz:	Limit [mW/cm ²] = 0.2
300-1500 MHz:	Limit [mW/cm ²] = f/1500
1500-100,000 MHz	Limit [mW/cm ²] = 1.0

Test Data

Test Frequency, MHz	440
Power, Conducted, mW (P)	29936
Antenna Gain Isotropic	7.15 dBi
Antenna Gain Numeric (G)	5.19
Antenna Type	5/8 wave collinear omnidirectional
Distance (R)	20 cm

$S = \frac{P * G}{4\pi r^2}$
Power Density (S) mw/cm ²
30.91 mw/cm ²

Power Density (S) = 30.91mw/cm ²
Limit =(from above table) = 0.293

The power density at 30.91 mw/cm² is over the 0.293 mw/cm² limit.

The Minimum Safe Distance was calculated on the next page



Minimum Safe Distance Evaluation

This is a mobile device used in **Uncontrolled** Exposure environment.

**Limits Uncontrolled Exposure
47 CFR 1.1310
Table 1, (B)**

0.3-1.234 MHz:	Limit [mW/cm ²] = 100
1.34-30 MHz:	Limit [mW/cm ²] = (180/f ²)
30-300 MHz:	Limit [mW/cm ²] = 0.2
300-1500 MHz:	Limit [mW/cm ²] = f/1500
1500-100,000 MHz	Limit [mW/cm ²] = 1.0

Test Data

Test Frequency, MHz	440
Power, Conducted, mW (P)	29936
Antenna Gain Isotropic	7.15 dBi
Antenna Gain Numeric (G)	5.19
Antenna Type	5/8 wave collinear omnidirectional
Limit (L)	0.293

$R = \sqrt{(PG/4\pi L)}$			
Distance (R) cm	Power mW (P)	Numeric Gain (G)	Limit (L)
205.5 cm	29936	5.19	0.293

The minimum safe distance is 205.5 cm for a 7.15 dBi gain antenna.

END OF TEST REPORT