RF Exposure Report

Report No.:	SABCKS-WTW-P21061072
FCC ID:	2AWHPR201
Test Model:	UTR-201
Received Date:	June 29, 2021
Test Date:	July 30, 2021
Issued Date:	Aug. 20, 2021
Applicant:	Space Exploration Technologies Corp.
Address:	1 Rocket Rd., Hawthorne, CA 90250 USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
SABCKS-WTW-P21061072	Original release.	Aug. 20, 2021

1 Certificate of Conformity

Product: Starlink Router

Brand: SPACEX,

Test Model: UTR-201

Sample Status: ENGINEERING SAMPLE

Applicant: Space Exploration Technologies Corp.

Test Date: July 30, 2021

Standards: FCC Part 2 (Section 2.1091)
KDB 447498 D01 General RF Exposure Guidance v06

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Vivian Huang , **Date:** Aug. 20, 2021

Vivian Huang / Specialist

Approved by : , **Date:** Aug. 20, 2021

Clark Lin / Technical Manager

2 RF Exposure

2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	…	…	f/1500	30
1500-100,000	…	…	1.0	30

f = Frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

$Pd = (Pout*G) / (4*pi*r^2)$

where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 23cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Antenna NO.	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length (mm)
1	1.4	2.4~2.4835GHz	PCB	None	NA
	2.3	5.15~5.85GHz			
2	2.3	2.4~2.4835GHz	PCB	None	NA
	3.6	5.15~5.85GHz			

Note: The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2.5 Calculation Result of Maximum Conducted Power

Operation Mode	Evaluation Frequency (MHz)	Max. Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WLAN (2.4GHz)	2412~2462	882.202	4.87	23	0.40729	1
WLAN (U-NII-1)	5180~5240	744.049	5.98	23	0.44354	1
WLAN (U-NII-2A)	5260~5320	233.326	5.98	23	0.13909	1
WLAN (U-NII-2C)	5500~5720	238.065	5.98	23	0.14192	1
WLAN (U-NII-3)	5745~5825	726.102	5.98	23	0.43284	1

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. 2.4GHz: The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 4.87 dBi
3. 5GHz: The directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.98 dBi

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + WLAN 5GHz = 0.40729 / 1 + 0.44354 / 1 = 0.85083

Therefore the maximum calculations of above situations are less than the "1" limit.

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