

# RF EXPOSURE REPORT

## CERTIFICATE OF CONFORMITY

**FCC Rule Part:** FCC Part 2 (Section 2.1091)

**Report No.:** MFBCKS-WTW-P25030148A

**FCC ID:** 2AWHPR251

**Product:** Starlink Router

**Brand:** SPACEX, *SPACEX*, *X*, STARLINK

**Model No.:** UTR-251

**Received Date:** 2025/2/24

**Test Date:** 2025/3/31

**Issued Date:** 2025/4/2

**Applicant:** Space Exploration Technologies Corp. (SPACEX)

**Address:** 1 Rocket Rd., Hawthorne, CA 90250 USA

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan

**FCC Registration /** 788550 / TW0003

**Designation Number:**

**Approved by:**

*Jeremy Lin*

**Date:**

2025/4/2

Jeremy Lin / Project Engineer

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Prepared by : Vera Huang / Specialist



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## Release Control Record

| Issue No.              | Description      | Date Issued |
|------------------------|------------------|-------------|
| MFBACKS-WTW-P25030148A | Original Release | 2025/4/2    |

## 1 Certificate

**Product:** Starlink Router

**Brand:** SPACEX, *SPACEX*, *X*, STARLINK

**Test Model:** UTR-251

**Sample Status:** Engineering sample

**Applicant:** Space Exploration Technologies Corp. (SPACEX)

**Test Date:** 2025/3/31

**FCC Rule Part:** FCC Part 2 (Section 2.1091)

**Standard:** KDB 447498 D04 Interim General RF Exposure Guidance v01

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 RF characteristics under the conditions specified in this report.

## 2 Applicable RF Exposure Limit

### § 1.1310 Radiofrequency radiation exposure limits.

(a) Specific absorption rate (SAR) shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in § 1.1307(b) of this part within the frequency range of 100 kHz to 6 GHz (inclusive).

(b) The SAR limits for occupational/controlled exposure are 0.4 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 8 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit for occupational/controlled exposure is 20 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 6 minutes to determine compliance with occupational/controlled SAR limits.

(c) The SAR limits for general population/uncontrolled exposure are 0.08 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 1.6 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit is 4 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 30 minutes to determine compliance with general population/uncontrolled SAR limits.

### (e) Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields

#### ➤ Limits for General Population/Uncontrolled Exposure

| Frequency Range (MHz)                                 | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | 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 <sup>2</sup> )*              | <30                    |
| 30-300                                                | 27.5                          | 0.073                         | 0.2                                 | <30                    |
| 300-1,500                                             | ...                           | ...                           | f/1500                              | <30                    |
| 1,500-100,000                                         | ...                           | ...                           | 1.0                                 | <30                    |

f = frequency in MHz. \* = Plane-wave equivalent power density.

#### ➤ Limits for Occupational/Controlled Exposure

| Frequency Range (MHz)                                 | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Average Time (minutes) |
|-------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|------------------------|
| Limits For General Population / Uncontrolled Exposure |                               |                               |                                     |                        |
| 0.3-3.0                                               | 614                           | 1.63                          | *(100)                              | ≤6                     |
| 3.0-30                                                | 1842/f                        | 4.89/f                        | *(900/f <sup>2</sup> )              | <6                     |
| 30-300                                                | 61.4                          | 0.163                         | 1.0                                 | <6                     |
| 300-1,500                                             |                               |                               | f/300                               | <6                     |
| 1,500-100,000                                         |                               |                               | 5                                   | <6                     |

f = frequency in MHz. \* = Plane-wave equivalent power density.

### MPE-based Exemption – §1.1307(b)(3)(i)(B)

- For mobile devices that are not exempt per Table 1 of §1.1307(b)(1)(i)(C) and device at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz. The MPE-based test exemption condition is in terms of ERP, defined as the product of the maximum antenna gain and the delivered maximum time-averaged power.

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

### Fixed RF sources operating in the same time-averaging period – §1.1307(b)(3)(ii)(B)

- Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluated<sub>k</sub> term) should be used to determine exemption for simultaneous transmission according to Formula below,

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

The sum of the ratios of the applicable terms for SAR-based, MPE-based and measured SAR or MPE should be less than 1, to determine simultaneous transmission exposure compliance.

Where:

$a$  = number of fixed, mobile, or portable RF sources claiming exemption using [paragraph \(b\)\(3\)\(i\)\(B\)](#) of this section for  $P_{th}$ , including existing exempt transmitters and those being added.

$c$  = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

$P_{th,i}$  = the exemption threshold power ( $P_{th}$ ) according to [paragraph \(b\)\(3\)\(i\)\(B\)](#) of this section for fixed, mobile, or portable RF source  $i$ .

$ERP_{th,j}$  = exemption threshold ERP for fixed, mobile, or portable RF source  $j$ , at a distance of at least  $\lambda/2\pi$  according to the applicable formula of [paragraph \(b\)\(3\)\(i\)\(C\)](#) of this section.

$Exposure Limit_k$  = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source  $k$ , as applicable from [§ 1.1310 of this chapter](#).

$b$  = number of fixed, mobile, or portable RF sources claiming exemption using [paragraph \(b\)\(3\)\(i\)\(C\)](#) of this section for Threshold ERP, including existing exempt transmitters and those being added.

$P_i$  = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source  $i$  at a distance between 0.5 cm and 40 cm (inclusive).

$ERP_j$  = the ERP of fixed, mobile, or portable RF source  $j$ .

$Evaluated_k$  = the maximum reported SAR or MPE of fixed, mobile, or portable RF source  $k$  either in the device or at the transmitter site from an existing evaluation at the location of exposure.

### 3 Test Results

|                           |              |            |           |
|---------------------------|--------------|------------|-----------|
| Environmental Conditions: | 25°C, 60% RH | Tested By: | Wayne Lin |
|---------------------------|--------------|------------|-----------|

This report is issued as a supplementary report to BV CPS report no. MFBCKS-WTW-P25030148. The difference compared with original report is adding 5250 ~ 5320 MHz and 5500 ~ 5720 MHz by software.

Since the 5G B2/B3 power is less than other bands, therefore, the MPE value didn't re-calculate.

#### For Single RF Source

| MPE-based Exemption §1.1307(b)(3)(i)(B) |                        |                    |                    |                  |               |                      |             |
|-----------------------------------------|------------------------|--------------------|--------------------|------------------|---------------|----------------------|-------------|
| Operation Mode                          | Frequency Band (MHz)   | Average Power (mW) | Antenna Gain (dBi) | Maximum ERP (mW) | Distance (cm) | Limit Threshold (mW) | Test Result |
| WLAN 2.4 GHz CDD                        | 2412-2462              | 577.609            | 2.07               | 567.066          | 20            | 3060                 | Pass        |
| WLAN 2.4 GHz BF                         | 2412-2462              | 307.473            | 3.56               | 425.409          | 20            | 3060                 | Pass        |
| WLAN 5 GHz CDD                          | 5180-5320<br>5500-5825 | 831.36             | 3.54               | 1144.957         | 20            | 3060                 | Pass        |
| WLAN 5 GHz BF                           | 5180-5320<br>5500-5825 | 665.978            | 6.52               | 1821.629         | 20            | 3060                 | Pass        |
| WLAN 5.9 GHz CDD                        | 5815-5885              | 628.024            | 3.54               | 864.921          | 20            | 3060                 | Pass        |
| WLAN 5.9 GHz BF                         | 5815-5885              | 314.986            | 6.52               | 861.571          | 20            | 3060                 | Pass        |

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

#### For Multiple RF Sources (Simultaneous Operations)

| Multiple RF Sources (Simultaneous Operations) |                        |                  |                      |       |               |                 |             |
|-----------------------------------------------|------------------------|------------------|----------------------|-------|---------------|-----------------|-------------|
| Exemption Evaluation                          |                        |                  |                      |       | Sum of Ratios | Limit of Ratios | Test Result |
| Operation Mode                                | Frequency Band (MHz)   | Maximum ERP (mW) | Limit Threshold (mW) | Ratio |               |                 |             |
| WLAN 2.4 GHz CDD                              | 2412-2462              | 567.066          | 3060                 | 0.185 | 0.78          | 1               | Pass        |
| WLAN 5 GHz BF                                 | 5180-5320<br>5500-5825 | 1821.629         | 3060                 | 0.595 |               |                 |             |

### 4 Conclusion

Source-base time average power is below Exemption Criteria and/or Routine Evaluation MPE thresholds, therefore the device is compliant FCC RF exposure requirement.

## 5 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

**Lin Kou EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**

Tel: 886-3-6668565

Fax: 886-3-6668323

**Hwa Ya EMC/RF/Safety Lab**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@bureauveritas.com](mailto:service.adt@bureauveritas.com)

**Web Site:** <http://ee.bureauveritas.com.tw>

The address and road map of all our labs can be found in our web site also.

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