

Radiation Hazard Analysis for Myriota-Enabled Terminals

I. Introduction

This analysis demonstrates compliance with applicable radiation limits for Myriota-enabled terminals (“METs”).¹ The calculations performed in this analysis comply with the methods described in Federal Communications Commission Office of Engineering & Technology Bulletin, Number 65 (Edition 97-01) (“OET Bulletin 65”) and demonstrate compliance with the Maximum Permissible Exposure (“MPE”) limits set forth in Section 1.1310 of the Commission's rules.

II. Myriota-Enabled Terminal Description and Operating Parameters

The METs fulfill the criteria for mobile devices set forth in Section 2.1091(b) of the Commission's rules, as the devices can be readily relocated and are generally operated a minimum distance of 20 centimeters from the human body. The installation and operating manuals for the METs will specify a minimum 20-centimeter separation distance between any person, including the user, and the earth station antenna while operating the device.

Section 1.1310 of the Commission's rules and OET Bulletin 65 specify radiation limits for two different scenarios: (i) occupational/controlled exposures and (ii) general population/uncontrolled exposures.

- i. The limits for occupational/controlled exposure apply when persons are exposed as a consequence of their employment, provided those persons are fully aware of the potential for exposure and can exercise control over their exposure.
- ii. General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

The METs will be deployed in a wide variety of commercial and industrial applications. As such, the analysis below reflects the more restrictive general population/uncontrolled exposure limits to demonstrate compliance in all potential deployment environments and scenarios. The applicable MPE limits for general population/uncontrolled exposure for METs are shown in Table 1.

¹ Myriota received an equipment authorization for identical equipment which includes a Part 25 MPE report. See Myriota Pty. Ltd., *Equipment Authorization MPE Part 25 Report*, FCC ID 2ATKL-SL2-1 (granted Oct. 7, 2019), available at https://apps.fcc.gov/oetcf/tcb/reports/Tcb731GrantForm.cfm?mode=COPY&RequestTimeout=500&tcb_c ode=&application_id=SJBdaxcNO%2BP91Soj8FwvFw%3D%3D&fcc_id=2ATKL-SL2-1 (“*Equipment Authorization*”).

Table 1: MPE limits for general population/uncontrolled exposure for METs.

Frequency Range (MHz)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² , or S (minutes)
300-1500	0.267	30

Under Section 2.1091 of the Commission’s rules, mobile devices intended for use in general population or uncontrolled environments, are permitted to use “source-based” time-averaging based on the duty-cycle of a device.² The maximum duty cycle of a MET is 5% over any fifteen-minute period. The maximum duty cycle over the averaging time of thirty minutes specified in Table 1 is also 5%, and the radiation hazard analysis below accounts for this maximum duty cycle value.

III. Analysis

The exposure power density is derived from equation (3) in OET Bulletin 65 which predicts RF field strength and power density levels around a radiating antenna and is used to make a “worst case” prediction:

$$S = \frac{P \times G}{4\pi \times R^2}$$

where: S = power density; P = power input to the antenna; G = power gain of the antenna in the direction of interest relative to an isotropic radiator; R = distance to center of radiation of the antenna.

Table 2: Parameters for Determining Power Density Levels for METs.

Parameter	Value	Units
Power input to antenna	1000	mW
Power gain	3.16	unitless
distance to center	20	cm

For evaluation of compliance with the time-averaged power density requirement over thirty minutes (see Table 1), the maximum power density level was multiplied by the maximum duty cycle of 5%.

$$S = (0.05) \times \frac{1000\text{mW} \times 3.16}{4\pi \times (20\text{cm})^2}$$

² See 47 C.F.R. § 2.1091(d)(2).

As shown, a MET operates with a maximum power density of 0.0315 mW/cm² over the applicable averaging time, and therefore does not exceed the MPE limit of 0.267 mW/cm² averaged over a thirty-minute period.

IV. Conclusion

As demonstrated in the analysis above, operation of the METs will not result in exposure levels exceeding the applicable radiation hazard limits.