

CALCULATED SAR for UNCONTROLLED, GENERAL POPULATION

$$S = PG/(4\pi R^2)$$

Where S = power density in mw/cm²

P = input power to antenna in mw.

G = power gain of antenna

R = distance from antenna in cm.

For a minimum distance of 3 meters and 1 watt operation with a 10-dB gain antenna, S is:

$$S = 1000(10)/(4\pi(300)^2) = 0.0088 \text{ mw/cm}^2$$

This is within the requirements of 1.0 mw/cm².

There is only one antenna available for use with this system. It is professionally installed and modification or substitution is not an option. The typical gain of the antenna is less than 6 dB and will always be less than 10 dB.

A picture of the antenna is included in the report.

Questions from the FCC

1. Filing is requesting for 1.0 W peak conducted output for this transmitter. There does not appear to be any peak conducted output measurement results in the test report. The RF exposure info is based on 2 W output with antenna gain up to 10 dBi. Maximum allowed output by the rules is 1.0 W peak and output reduction is required when antenna gain is higher than 6 dBi; please clarify.

REPLY

Figure 14 on page 24 of the report shows a plot of the spectrum analyzer screen with antenna conducted emissions measurement. There was a 10dB attenuator and 2dB of cable loss. This equates to a 29.5 dBm output and falls within 0.5 dB of 1 Watt. The unit produces a maximum of 1-Watt output power. The equation shows 1000 mW (1watt) and is correct for the equation. The 10 dB of antenna gain was used to demonstrate how far BELOW the limits the unit is for maximum exposure limits. This unit uses a one-quarter wave spike antenna, mounted inside of an aluminum cylinder approximately 4 inches in diameter and twelve inches long. This gives the antenna a VERY focused beam width, and is mounted to the TOP of a TRAIN ENGINE. The units are required to be professionally installed as mentioned at least three times in the manual and the requirements of 15.203 are met.

2. MPE info indicated there is only one antenna available for this system, which described the typical antenna gain is 6 dBi but not exceeding 10 dBi. It also indicates that a picture of the antenna is included in the report. Please provide specific information on the antenna type and gain. It is not clear according to the photos submitted whether the cylindrical structure next to the transmitter is the antenna. It seems to have radomes on both ends of the cylinder, please clarify.

REPLY

The statement should read LESS THAN 6 dB of gain. Again, this was used for MPE demonstration purposes only. The radio frequency exposure is not what is going to injure someone in the path of this TRAIN. The antenna is a metal cylinder with plastic covers on both ends to keep foreign objects from damaging the spike antenna inside. Refer to the pictures below showing the antenna removed from the cylinder and a picture down the inside of the tube.

ROGERS LABS, INC.
4405 W. 259th Terrace
Louisburg, KS 66053
Phone/Fax: (913) 837-3214

Harmon Industries, Inc.
MODEL: AATC-SSR
Test #: 000614 FCCID#: AJTAATCSSR-24
Test to: FCC Parts 2 and 15c

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3. The MPE info used a separation of 3 meters between the antenna and persons. Please provide installation instructions and requirements to support the 3 meter distance used in the MPE estimation. If applicable, revise the MPE estimations using the correct distance and antenna gain. The applicable antenna installation instructions and operating requirements should be included in the users manual for users and installers to satisfy RF exposure compliance. Please revise and submit the relevant pages of the manual.

Note: Output is Unknown, need peak conducted output results.

REPLY

The length of three meters is applicable due to the fact that a TRAIN ENGINE is taller than nine feet three inches. The antenna is mounted, by professional installers qualified by the railway system, to the TOP of the train engine, in a horizontal fashion, with the beam pointing to the front and rear of the train. The users of the radio are located inside the personnel compartment of the engine. They are protected from exposure due to the location of the antenna, physical separation and steel walls between them and the antenna element. The professional installers are educated on the practices of antenna installation and are not required to energize the antenna while mounting it to the engine.