RF Exposure Exhibit

FCC ID: 2A78V-XB900HP
IC: 21847-XB900HP

FCC Rule Part: 47 CFR Part 2.1093
ISED, RSS-102, 2.5.2

Project Number: 22-0218

Manufacturer: Mirion Technologies
Model: XBEE PROS3B

General Information:

Applicant:	Mirion Technologies
Environment:	General Population/Uncontrolled Exposure
Exposure Conditions:	Portable
Max Antenna Gain:	1.9 dBi (Integral Wire Antenna)
Max Output Power:	298.0 mW

The EUT is a 900 MHz radio module that can be installed in the following Mirion host products:

DMC-2000 iPAM Transmitter Module, Part # WR2-A015
DMC-3000 Transmitter Module, Part # WR3-9000
DMC-3000 Neutron Transmitter Module, Part #'s NOM003430 or NOM004600 (NTx)
DMC-3000 Location Transmitter Module, Part #'s NOM005608 or NOM005632 (LTx)
DMC-3000 enhanced Transmitter Module, Part #'s NOM005044 or NOM005400 (eTx)

When the radio is installed in the host products listed above the radio is used as a portable device.

The purpose of this RF Exposure Exhibit is to show that the radio module's RF exposure levels will meet the threshold requires for portable device when installed in each of the host products cited above.

When the radio is installed in the:

DMC-2000 iPAM Transmitter Module, Part # WR2-A015 host and
DMC-3000 Transmitter Module, Part # WR3-9000 host

the radios separation distance is 10 mm or greater. See Figure 1 and Figure 2 below showing the separation distance.

The following calculation is provided to show that the radio will meet the requirements for portable use when installed in these host devices.

Duty Factor Determination

When the radio is installed in these two host devices the radio is factory programmed to collect data periodically from the Electronic Dosimeter and transmits the accumulated radiation dose and present rate and other status bits. Data is sent over the air at 19.2 kbps with the transmitter active for up to 80 msec duration every 2 seconds. This duration rate is fixed and not end user configurable.

Source-based Time Average Value Determination

The source-based time average value is determine by the **output power (dBm) + antenna gain (dBi) * duty cycle**.

Based on the test report for this radio the max conducted output power is 298.0 mW or 24.7 dBm. The antenna type and gain used is: Integrated Wire ¼ wave monopole, 3.25" (8.26 cm) length, 1.9 dBi Gain. The duty cycle (DC) for the radio using the worst case rate = 80 ms/2000 ms= 0.04 or 4%, DC

The source-based time average value can then be obtained as follows:
24.7 dBm + 1.9 dB= 26.6 dBm = 457.1 mW
457.1 mW * 4%= **18.3 mW**

Per KDB 447498 D01 General RF Exposure Guidance v06, Clause 4.3.1 pg. 12, the Standalone SAR Test Exclusion can be determined based on separation distance. In this case for the two host products cited the separation distance is 10 mm or greater.

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

[(max. power of channel mW (SBTA)) / (min. test separation distance, mm)] * [($\sqrt{f_{GHz}}$)]

Where the result must be ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g SAR

EUT source-based time average value (SBTA) = (output power + antenna gain * duty cycle) = calculation presented above.

SBTA= 18.3 mW

(18.3 mW/10 mm) * ($\sqrt{0.915}$ GHz) = **1.75** < 3.0 for 1-g SAR and < 7.5 for 10-g SAR

Calculation Performed by: George Yang

Signature: _____ Date: September 20, 2022

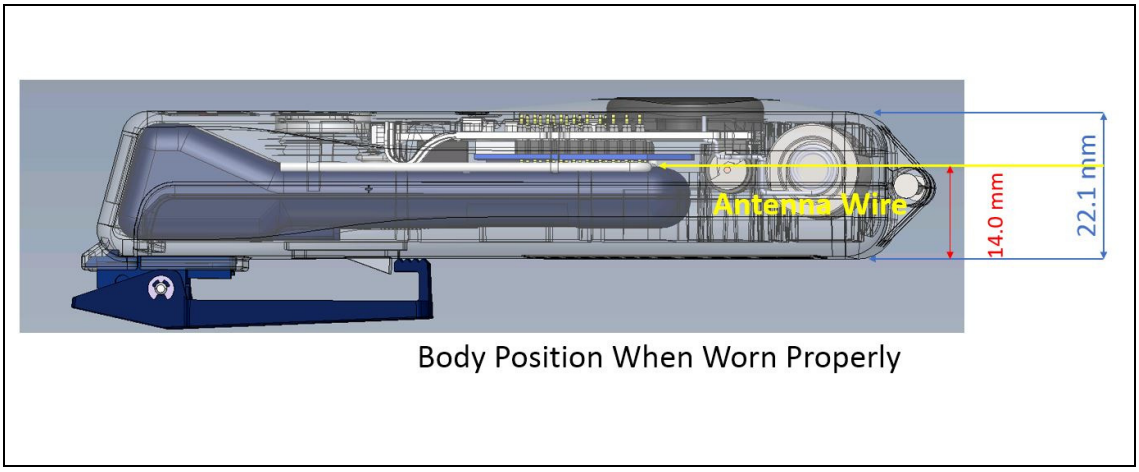

Figure 1. DMC-2000 iPAM Transmitter Module

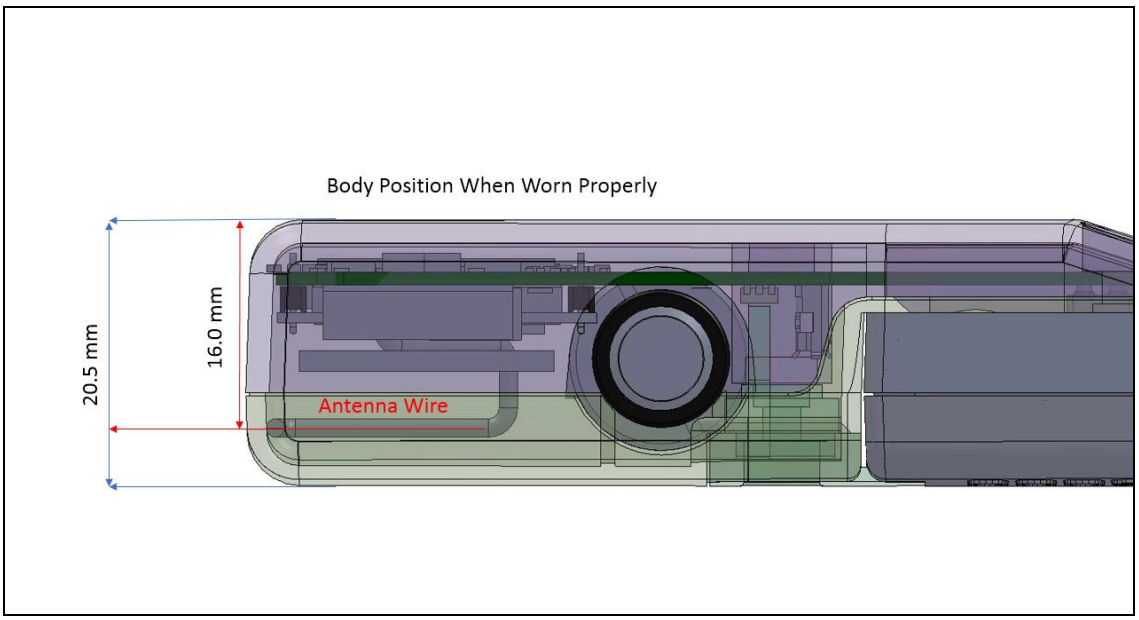

Figure 2. DMC-3000 Transmitter Module

When the radio is installed in the following host products the radios separation distance is 5mm or less. See figure A below showing the separation distance for all three host devices.

DMC-3000 Neutron Transmitter Module, Part #'s NOM003430 or NOM004600 (NTx)
DMC-3000 Location Transmitter Module, Part #'s NOM005608 or NOM005632 (LTx)
DMC-3000 enhanced Transmitter Module, Part #'s NOM005044 or NOM005400 (eTx)

The following calculation is provided to show that the radio will meet the requirements for portable use when installed in these host devices.

Duty Factor Determination

When the radio is installed in these three host devices the radio is factory programmed to collect data periodically from the Electronic Dosimeter and transmits the accumulated radiation dose and present rate and other status bits. Data is sent over the air at 19.2 kbps with the transmitter active for up to 80 msec duration every 4 seconds. This duration rate is fixed and not end user configurable.

Source-based Time Average Value Determination

The source-based time average value is determine by the **output power (dBm) + antenna gain (dBi) * duty cycle**.

Based on the test report for this radio the max conducted output power is 298.0 mW or 24.7 dBm. The antenna type and gain used is: Integrated Wire ¼ wave monopole, 3.25" (8.26 cm) length, 1.9 dBi Gain. The duty cycle (DC) for the radio using the worst case rate = 80 ms/4000 ms= 0.02 or 2%, DC

The source-based time average value can then be obtained as follows:
24.7 dBm + 1.9 dB= 26.6 dBm = 457.1 mW
457.1 mW * 2%= **9.14 mW**

Per KDB 447498 D01 General RF Exposure Guidance v06, Clause 4.3.1 pg. 12, the Standalone SAR Test Exclusion can be determined based on separation distance. In this case for the two host products cited the separation distance is 10 mm or greater.

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

[(max. power of channel mW (SBTA)) / (min. test separation distance, mm)] * [($\sqrt{f_{GHz}}$)]

Where the result must be ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g SAR

EUT source-based time average value (SBTA) = (output power + antenna gain * duty cycle) = calculation presented above.

SBTA= 9.14 mW

(9.14 mW/5 mm) * ($\sqrt{0.915}$ GHz) = **1.75** < 3.0 for 1-g SAR and < 7.5 for 10-g SAR

Calculation Performed by: George Yang

Signature: _____ Date: September 20, 2022

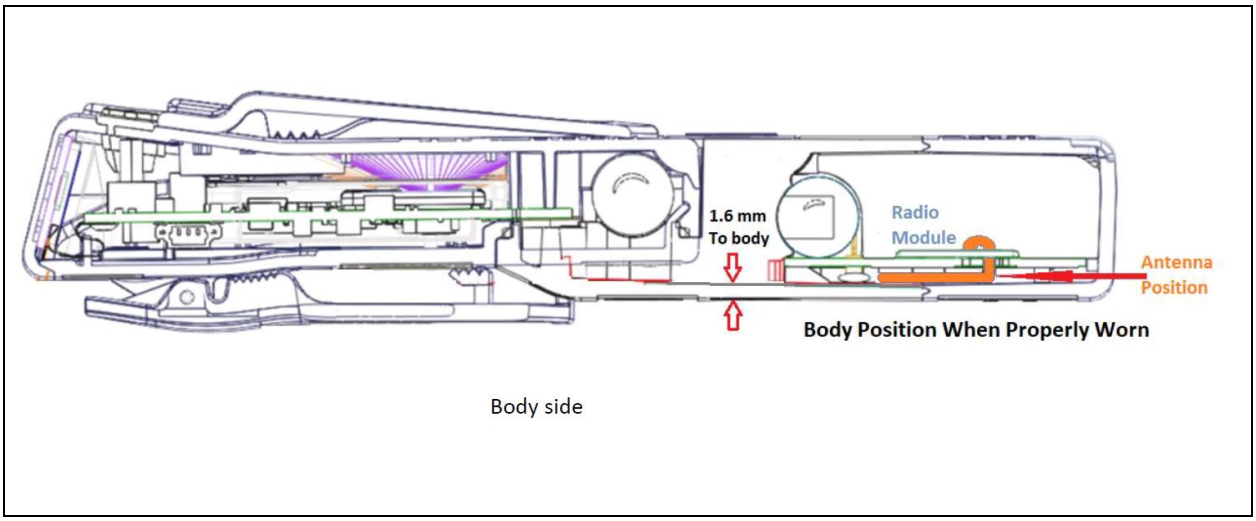

Figure 3. DMC-3000 Transmitter Module, NTx, LTx, eTx

Note: For separation distance less than 5 mm, the value used will be 5 mm.

RSS-102, 2.5.2 Compliance:

At or above 300 MHz and below 6 GHz and the source based time averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ in Watts (adjusted for tune-up tolerance where applicable), where f = frequency in MHz.

For 902-928MHz band

$1.31 * 10^{-2} * 915^{0.6834} =$ 1.39 W

EUT max EIRP = 24.7 dBm + 1.9 dBi = 26.6 dBm = 0.457 Watts << 1.39 Watts

Calculation Performed by: George Yang

Signature: _____ Date: September 20, 2022

END REPORT