



MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*

914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230-3432 • PHONE (410) 354-3300 • FAX (410) 354-3313
33439 WESTERN AVENUE • UNION CITY, CALIFORNIA 94587-3201 • PHONE (510) 489-6300 • FAX (510) 489-6372
3162 BELICK STREET • SANTA CLARA, CA 95054-2401 • PHONE (408) 748-3585 • FAX (510) 489-6372

Electromagnetic Compatibility MPE Calculation

For the

**SRI International
PMX-3.0**

Tested under

**Title 47 of the Code of Federal Regulations (CFR),
Part 15 Subpart C**

MET Report: EMCS80811-MPE_Rev1

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Prepared For:

**SRI International
333 Ravenswood Avenue
BLDG 320-81
Menlo Park, CA 94025-3493**

**Prepared By:
MET Laboratories, Inc.
3162 Belick Street
Santa Clara, CA 95054**

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Shawn McMillen
Manager, Electromagnetic Compatibility Lab



Jennifer Sanchez
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the applicable limits. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Title 47 of the CFR, Part 15, Subpart C under normal use and maintenance.

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.247(b) Peak Power Output and RF Exposure

- Test Purpose:** Co-location of two modules, Ubiquiti Networks, FCC ID: SWX-SR4 (9dBi) and Ubiquiti Networks, FCC ID: SWX-XR5 (6dBi).
- RF Exposure Requirements:** **§1.1307(b)(1) and §1.1307(b)(2):** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.
- RF Radiation Exposure Limit:** **§1.1310:** As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

MPE Calculation - Ubiquiti Networks Modules: 4.9GHz & 5.745-5.825GHz

Equation from page 18 of OET 65, Edition 97-01

$$P_1G_1/4\pi R^2 + P_2G_2/4\pi R^2 = 1 \text{ mW/cm}^2$$
$$1/4\pi R^2(P_1G_1 + P_2G_2) = 1$$
$$\sqrt{1/4\pi(P_1G_1 + P_2G_2)} = R$$

MPE Limit Calculation: EUT's operating frequencies @ **4942.5 - 4985MHz**; highest conducted power = 32.6dBm (peak) therefore, Limit for Uncontrolled exposure: 1 mW/cm² or 10 W/m²

EUT maximum antenna gain = **9 dBi**.

where, S = Power Density (mW/cm²)
P = Power Input to antenna (1819.701 mW)
G = Antenna Gain (7.94numeric)

$$S = (1819.701 * 7.94 / 4 * 3.14 * 20.0^2) = (14454.4 / 5024) = \mathbf{2.877 \text{ mW/cm}^2} \text{ @ 20cm separation}$$
$$R = (1819.701 * 7.94 / 4 * 3.14 * 1.0)^{1/2} = (14454.4 / 12.56)^{1/2} = \mathbf{33.9 \text{ cm}}$$

MPE Limit Calculation: EUT's operating frequencies @ **5745 - 5825MHz**; highest conducted power = 29.98dBm (peak) therefore, Limit for Uncontrolled exposure: 1 mW/cm² or 10 W/m²

EUT maximum antenna gain = **6 dBi**.

where, S = Power Density (mW/cm²)
P = Power Input to antenna (995.4mW)
G = Antenna Gain (3.98numeric)

$$S = (995.4 * 3.98 / 4 * 3.14 * 20.0^2) = (3962.78 / 5024) = \mathbf{0.788 \text{ mW/cm}^2} \text{ @ 20cm separation}$$

MPE Calculation – Co-Location of Ubiquiti Networks Module, FCC ID: SWX-SR4 & Ubiquiti Networks Module, FCC ID: SWX-XR5

Test Requirements: $\sqrt{1/4\pi (P_1G_1 + P_2G_2)} = R$

Test Results:

P_1G_1	P_2G_2	$P_1G_1 + P_2G_2$	$\sqrt{1/4\pi (P_1G_1 + P_2G_2)}$
14454.4	3962.78	18417.18	38.29cm

$$14454.4 + 3962.78 = 18417.18 \Rightarrow \sqrt{18417.18/4 * 3.14} = \mathbf{38.29cm}$$