



MPE Calculations

Control4 Model: C4-DSC-EN
Cisco Model: SCH-VDS-E

FCC ID: R33C4DSC
IC ID: 7848A-C4DSC

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1.0 SCOPE:

This Report Demonstrates Evaluation and Compliance to the following standards:

- 1. Code of Federal Regulations Title 47, Volume 1, Section 1.1310.**
- 2. Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) - RSS-102 Issue 3**

2.0 REVISION LEVEL:

DATE	COMMENTS	REVISION
10/10/08	Created.	1.0
08/16/10	Added RSS-102 references	2.0

3.0 REFERENCE DOCUMENTS:

- (A) Limits for Maximum Permissible Exposure (MPE). Code of Federal Regulations Title 47, Volume 1, Section 1.1310.**
- (B) Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields. OET Bulletin 67 Edition 97-01.**
- (C) Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) - RSS-102 Issue 3**

4.0 CALCULATIONS:

The C4-DSC-EN contains an 802.11 b/g/n Transceiver. The worst case emissions were with the C4-DSC-EN transmitting on 802.11 n mode. Below is the MPE calculation for this Transceiver.

802.11 n Transceiver

The following worst case emissions was calculated by using Method 1 below

Method 1: Based on a PPt (Peak Power Total) measurement of the total power into the antenna and the worst case antenna gain.

Effective/Equivalent Isotropic Radiated Power [EIRP] dBm = Total power into the antenna [dBm] + antenna gain [dBi]

To convert the values from dBm to mW

$$\text{mW} = 10^{\text{dBm}/10}$$

Total power into the antenna (dBm) = 23.11

Antenna gain (dBi) = 1.41

EIRP (dBm) = 24.52

EIRP (mW) = 283.14 worst case while in the Wi-Fi “n” mode

Method 2: Based on the radiated field strength measurement at 3 meters [at a calibrated OATS site, maximizing the antenna polarity and height]

After obtaining the EIRP, the Power density is calculated and compared against the FCC and IC limits.

S_{FCC} = Power density in mW/cm^2 for FCC

$$S_{\text{FCC}} = \text{EIRP}/4\pi \cdot R^2$$

EIRP = Equivalent isotropically radiated power 283.14 mW

R = Distance to the center of radiation of the antenna 20 cm

$$S_{\text{FCC}} = 0.056 \text{ mW}/\text{cm}^2$$

$$S_{\text{FCC}} \text{ Limit} = 1.0 \text{ mW}/\text{cm}^2$$

S_{IC} = Power density in W/m^2 for IC

$$S_{\text{IC}} = \text{EIRP}/4\pi \cdot R^2$$

EIRP = Equivalent isotropically radiated power in watts 0.28314 W

R = Distance to the center of radiation of the antenna 0.2 m

$$S_{\text{IC}} = 0.563 \text{ W}/\text{m}^2$$

$$S_{\text{IC}} \text{ Limit} = 10 \text{ W}/\text{m}^2 \text{ for IC}$$

5.0 CONCLUSION:

- 1. Based upon the limits for Maximum Permissible Exposure (MPE) given in Table 1 of reference document (A) as $1\text{mW}/\text{cm}^2$, this device falls under the required limits.**
- 2. Based upon the limits given in section 4.2 of the reference document (C) as $10\text{W}/\text{m}^2$, this device falls under the required limits.**