



## RF Exposure Report

MC990D

Equipment:	MC990D USB Broadband Modem
Trade Name:	Ovation MC990D
Model No:	MC990D
FCC ID:	NBZNRM-MC990D
Filing Type:	Original Certification
Applicant:	Novatel Wireless Technologies Ltd. Suite 200, 6715 8 <sup>th</sup> St N.E. Calgary, Alberta, Canada T2E-7H7

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## REVISION HISTORY

<b>Rev.</b>	<b>Date</b>	<b>Brief Description of Change</b>	<b>Originator</b>	<b>Approved by</b>
1	25-04-07	Initial Revision	JT	PCTEST Inc.
2	15-05-08	Release 1	JT	PCTEST Inc

## 1.0 Introduction

This report has been issued to show compliance of the Novatel Wireless MC990D to the FCC Maximum Permissible Exposure limits as specified in CFR 47 §2.1091. The MC990D is a USB form factor broadband modem that operates in the Cellular and PCS frequency bands. The need for an MPE calculation is based upon a configuration that utilizes a USB extender cable and clip assembly that allows for the MC990D modem to be affixed to the display of a notebook computer via the clip.

This configuration is defined as a Mobile configuration as per the FCC Rules, and the user documentation that is available to consumers indicates that the modem must not be used closer than 20 cm to the head or body to ensure safe operation of the MC990D.

### 1.1. FCC Definitions

As per OET Bulletin 65, three (3) categories of transmitters are defined, these are:

a) **Fixed Installation** – Defined as a fixed location for the transmitter and its antenna that is physically secured at a permanent location and cannot easily be moved. Typical user distance to the transmitting antenna is  $\geq 2$  meters.

b) **Mobile Installation** – A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

c) **Portable Installation** - A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

The FCC categorizes the use of any device based upon the users awareness and ability to exercise control over exposure. The definitions of exposure categories are as follows:

a) **Occupational/Controlled Exposure** – Applicable to situations where the end users are exposed to RF energy during routine daily workplace conditions and are fully aware of said exposure.

b) **General Population/Uncontrolled Exposure** – Applicable to situations where the end users do not have an awareness of the potential exposure to RF energy or have no control of said exposure.

For purposes of this investigation, the MC990D is evaluated using the exposure limits for General Population/Uncontrolled Exposure.

## **1.2. MPE Calculation Formula**

Per FCC §1.1310, the Power Density limit for General Population/Uncontrolled Exposure is  $1\text{mW}/\text{cm}^2$ . As aforementioned, the end users of the MC990D are explicitly instructed not to use the device closer than 20 cm in order to adhere to the FCC exposure rules.

The calculation is made using the Friis transmission equation:

$$S = \text{EIRP}/4\pi R^2$$

Where:

S = Power Density

EIRP – Effective Isotropic Radiated Power

R = 20 cm distance

## **1.3. EUT Information**

Equipment Under Test: Novatel Wireless MC990D

Hardware Revision:

Firmware/Software Revision:

Serial Number:

## **1.4. Measurement Data/MPE Figures**

The MC990D is capable of transmitting in the Cellular and PCS frequency bands and features GPRS/EDGE and WCDMA modulation schemes. For purposes of this report, MPE figures for each band and mode of transmission is presented. All measurements taken are worst case per band investigated.

Case One: GSM 850

Maximum ERP (mW)	Calculated RF Exposure D = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
1099	0.2187	1.00

Case Two: PCS 1900

Maximum EIRP (mW)	Calculated RF Exposure D = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
1445	0.2876	1.00

Case Three: WCDMA Band II

Maximum EIRP (mW)	Calculated RF Exposure D = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
329	0.065	1.00

**2.0 Conclusion**

As presented in the previous section, the MC990D modem complies with all requirements for Maximum Permissible Exposure per CFR 47 §2.1093.