MOTOROLA

ACCREDITED
TESTING CERT # 2518.01

DECLARATION OF COMPLIANCE: MPE ASSESSMENT

Enterprise Mobility Solution (EMS)
EME Test Laboratory
8000 West Sunrise Blvd
Fort Lauderdale, FL. 33322

Date of Report: 06/07/2010
Report Revision: Rev. A
Report ID: SR8404 & SR8253_MPE rpt_VM2500_Rev A_100607

Responsible Engineer:	Stephen C. Whalen (Principal Staff EME Test Engineer)
Report Author:	Stephen C. Whalen (Principal Staff EME Test Engineer)
Date(s) Tested:	06/07/2010
Manufacturer/Location:	Motorola, Israel - South
Date submitted for test:	05/25/2010
DUT Description:	WiMAX and WiFi data modem for vehicular application
Test TX mode(s):	NA - MPE calculation
Max. Power output:	1.12W (WiMAX) & 0.16W (WLAN b/g) U.S. 0.5W (WiMAX) & 0.056W (WLAN b/g) EU
TX Frequency Bands:	2495-2690 MHz for WiMAX: 2412-2437 MHz for WLAN b/g
Signaling type:	OFDM
Model(s) Tested	F7400A
Model(s) Certified:	F7400A
Serial Number(s):	NA - MPE calculation
Classification:	General Population/Uncontrolled

Photo not available

Regulatory Identifications

FCC ID AZ492FT7041 – Rule Part(s) 15 & 27

MPE results outside of identified Rule Part(s) identified above are not applicable for FCC compliance demonstration.

IC ID 109U-92FT7041

Approved Accessories:
Antenna(s):
Vehicular collinear two dipole array antenna, gain 5.0dBi for frequency range 2500-2700MHz
Vehicular Dual helical monopole, antenna gain 5.0dBi for frequency range 2400-2500MHz
Vehicular whip monopole antenna, gain 5.0dBi for frequency range 2400-2500MHz

Final RF Exposure Results:
Highest calculated power density = 0.63mW/cm²

The results are compliant to the FCC General population/Uncontrolled exposure limits of 0.59-0.61mW/cm^2 for the frequency ranges of 880.2-914.8MHz, and 1.00mW/cm^2 for frequency range 1710.2-1784.8MHz, per 47 CFR §1.1310 titled "Radio frequency radiation exposure limits".
The results are compliant to the ICNIRP General population/Uncontrolled exposure limits of 0.44-0.46mW/cm^2 for the frequency range of 880.2-914.8MHz, and 0.86-0.89mW/cm^2 for frequency range 1710.2-1784.8MHz per ICNIRP (1998) Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300GHz), and IEEE C95.1-2005.

Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with the national and international reference standards and guidelines listed in sections 2.0 and 4.0 of this report. This report shall not be reproduced without written approval from an officially designated representative of the Motorola EME Laboratory.

I attest to the accuracy of the data and assume full responsibility for the completeness of these measurements.
This reporting format is consistent with the suggested guidelines of the TIA TSB-159 April 2006
The results and statements contained in this report pertain only to the device(s) evaluated herein.

Signature on file – Deanna Zakharia
Deanna Zakharia
EMS EME Lab Senior Resource Manager,
Laboratory Director,

Approval Date: 06/07/2010

Certification Date: 06/07/2010

Certification No.: L1100609

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REVISION HISTORY

Date	Revision	Comments
05/11/2010	O	Original release
06/07/2010	A	This report supersedes SR8253 due to increased WiMAX duty cycle.

1.0 Product and System Description

The VM2500 is a WiMAX and WLAN data modem for public safety vehicular applications. The WiMAX modem implements the 802.16 physical layer which supports two modulation formats - OFDM with QPSK and 16QAM. The maximum duty cycle for the WiMAX modem is 46%. The WLAN-radio modem implements Direct Sequence 802.11a/b/g physical layer which supports seven modulation formats - OFDM with BPSK, DBPSK QPSK, DQPSK, CCK, 16QAM, and 64QAM. The maximum duty cycle for the WLAN 802.11 b/g is 100%. Both the WiMAX and WLAN can transmit simultaneously.

This modem is capable of operating in the 2495-2690MHz WiMAX band and 2412-2437MHz WLAN b/g band. The U.S. rated conducted powers are 0.891W and 0.126W and the maximum conducted output powers are 1.12W and 0.16W respectively. The EU rated conducted powers are 0.398W and 0.044W and the maximum conducted output powers are 0.5W and 0.056W respectively.

2.0 Evaluation methods

MPE numerical assessment which is used to evaluate the RF exposure of this device is based on a maximum antenna gain of 5.0dBi for both WiMAX and WLAN bands.

According to OET Bulletin 65 Edition 97-01 Section 2, calculations can be made to predict RF field strength and power density levels around typical RF sources. For example, in the case of a single radiating antenna, a prediction for power density in the far-field of the antenna can be made by use of the general Equations (1) or (2) below. These equations are generally accurate in the far-field of an antenna but will over-predict power density in the near field, where they could be used for making a "worst case" or conservative prediction.

$$S = P\,G / 4\,\pi\,r^2 = EIRP / 4\,\pi\,r^2 \qquad (1)$$

Where: S = power density (mW/cm^2)
P = Power input into antenna (mW)
G = numeric gain of antenna (dBi).
r = distance to centre of radiation (cm)
EIRP = Effective (isotropic) radiated power

Or

$$S = \frac{P_t G_t}{4\pi d^2 L} F = \frac{c P_m G_t}{4\pi d^2 L} F \qquad (2)$$

Equation (2) accounts for the maximum duty cycle of the signal, and the factor, F, to provide a worst-case prediction of power density per FCC OET Bulletin 65, Edition 97-01 1997.

Where: S = power density (mW/cm^2)
P_t = Total output power (W) = maximum output power, P_m, scaled by the maximum duty cycle of the signal, c.
G_t = power gain of the antenna in the direction of interest relative to an isotropic radiator (dBi).
L = cable loss (dB)
d = distance from the antenna (cm)
F = 2.56

3.0 MPE Analysis

Tx Frequency (MHz)	Env./ User Category	MPE Spec Limit (mW/cm^2)		Duty Cycle (%)	Max Power (W)	Antenna #	Ant Gain (dBi)	Cable Loss, L (dB)	Dist. d (cm)	MPE Calc. (mW/cm^2)
		FCC	ICNIRP							
WiMAX										
2495	Uncontrolled	1.00	1.00	46%	1.12	NA	5.0	2.4	20	0.48
WLAN b/g										
2437	Uncontrolled	1.00	1.00	100%	0.16	NA	5.0	2.4	20	0.15

Direct summation of the two results to include simultaneous transmission;
0.48 mW/cm² + 0.15 mW/cm² = 0.63 mW/cm²

4.0 Conclusion:

The MPE results per the assessment above are compliant to the FCC General population/Uncontrolled RF exposure limits per 47 CFR §1.1310 titled “Radio frequency radiation exposure limits”.

The MPE results are also compliant to the ICNIRP General population/Uncontrolled exposure limits, per ICNIRP (1998) Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300GHz) and IEEE C95.1-2005.