

# Global EMC Inc. Labs

## MPE Evaluation

As per

**Industry Canada Safety Code 6**

**&**

**FCC Part 15 Subpart C: 2010 15.247i**

**FCC Part 1, Section 1.1310 Table 1 (B)**

On the

**ZPU-M400 / 9756A-M400**



Ashwani Malhotra  
Global EMC Inc.  
180 Brodie Dr. Unit 2  
Richmond Hill, ON L4B 3K8  
Canada  
Ph: (905) 883-3919

Testing produced for

 **Endrelia**


See Appendix A for full customer & EUT details.

 **Industry  
Canada**  
LAB REGISTRATION #6844A-1




  
FCC REGISTRATION  
#612361

  
**ACCREDITED**  
TESTING LABORATORY  
CERTIFICATE #2555.01

Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

## Table of Contents

Table of Contents .....	2
Report Scope .....	3
Summary .....	4
Test Results Summary .....	5
Justifications, Descriptions, or Deviations.....	6
Applicable Standards, Specifications and Methods.....	7
Sample calculation(s).....	8
Document Revision Status.....	8
Definitions and Acronyms .....	9
Testing Facility .....	10
Calibrations and Accreditations .....	10
Testing Environmental Conditions and Dates .....	11
Detailed Test Results Section .....	12
Maximum Permissible Exposure .....	13
Appendix A – EUT Summary.....	14
Appendix B – EUT and Test Setup Photographs.....	15

Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

## Report Scope

This report addresses the EMC verification testing and test results of the M400 Bluetooth module, herein referred to as EUT (Equipment Under Test) performed at Global EMC Labs.

The EUT was evaluated for compliance against the following standards:


IC Safety Code 6 & FCC Part 1, Section 1.1310 Table 1 (B)

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

The results contained in this report relate only to the item(s) tested.

This report does not imply product endorsement by A2LA or any other accreditation agency, any government, or Global EMC Inc.


Opinions/interpretations expressed in this report, if any, are outside the scope of Global EMC Inc accreditation. Any opinions expressed do not necessarily reflect the opinions of Global EMC Inc, unless otherwise stated.

Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

## Summary

The results contained in this report relate only to the item(s) tested.

EUT FCC Certification #, FCC ID:	ZPU-M400
EUT Industry Canada Certification #, IC:	9756A-M400
EUT Passed all tests performed.	Yes (see test results summary)
Tests conducted by	Ashwani Malhotra


Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

## Test Results Summary

Standard/Method	Description	Class/Limit	Result
FCC 15.247(i) IC Safety code 6	Maximum Permissible Exposure	> 2.50 cm separation.	Pass See justification and calculations
<b>Overall Result</b>			<b>PASS</b>

All tests were performed by Ashwani Malhotra


If the product as tested or otherwise complies with the specification, the EUT is deemed to comply with the requirement and is deemed a 'PASS' grade. If not 'FAIL' grade will be issued. Note that 'PASS' / 'FAIL' grade is independent of any measurement uncertainties. A 'PASS' / 'FAIL' grade within measurement uncertainty is marked with a '\*'.

Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

### ***Justifications, Descriptions, or Deviations***


The following justifications for tests not performed or deviations from the above listed specifications apply:

For maximum permissible exposure, this device operates at less than 1 Watt at 2402 – 2480.0 MHz and is operated at greater than 2.50 cm from the body. No testing is required, however worst case calculated exposure compliance follows later in this report.

Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

## ***Applicable Standards, Specifications and Methods***

ANSI C63.4:2003	- Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10:2009	- American national standard for testing unlicensed wireless devices
CFR 47 FCC 15	- Code of Federal Regulations – Radio Frequency Devices
CISPR 22:1997	- Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
ICES-003:2004	- Digital Apparatus - Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard
ISO 17025:2005	- General Requirements for the competence of testing and calibration laboratories
RSS 210:2010	- Issue 7: Spectrum Management and Telecommunications Policy. Radio Standards Specification Low Power Licence-Exempt Radiocommunication Devices

Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

### ***Sample calculation(s)***

Margin = limit – (received signal + antenna factor + cable loss – pre-amp gain)

Margin = 50.5dBuV/m – (50dBuV + 10dB + 2.5dB – 20dB)


Margin = 8.5 dB

### ***Document Revision Status***

Revision 1 - August 24<sup>th</sup>, 2011. Initial report release.

Revision 2 - August 29<sup>th</sup>, 2011. Updated model name from m400 to M400 in compliance with the RSS Gen and FCC requirements.



Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

## Definitions and Acronyms

The following definitions and acronyms are applicable in this report.  
See also ANSI C63.14.

**AE** – Auxillary Equipment.

**BW** – Bandwidth. Unless otherwise stated, this refers to the 6 dB bandwidth.

**EMC** – Electro-Magnetic Compatibility

**EMI** – Electro-Magnetic Immunity


**EUT** – Equipment Under Test

**ITE** – Information Technology Equipment with a primary function(s) of entry, storage, display, retrieval, transmission, processing, switching, or control, of data.

**LISN** – Line impedance stabilization network

**NCR** – No Calibration Required

**RF** – Radio Frequency


Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

## Testing Facility

Testing for EMC on the EUT was carried out at Global EMC labs in Toronto, Ontario, Canada. The testing lab consists of a 3m semi-anechoic chamber calibrated to be able to allow measurements on an EUT with a maximum width or length of up to 2m and height up to 3m. The chamber is equipped with a turn table that is capable of testing devices up to 3300lb in weight. This facility is capable of testing products that are rated for 120 Vac and 240Vac single phase, or 208 Vac 3 phase input. DC capability is also available. The chamber is equipped with an antenna mast that controls polarization and height from the control room adjoining the shielded chamber. Radiated emissions measurements are performed using a Bilog, and Horn antenna where applicable. Conducted emissions, unless otherwise stated, are performed using a LISN.

### ***Calibrations and Accreditations***


The measurement site used is registered with Federal Communications Commission (FCC) and Industry Canada (IC). This site is calibrated for Normalized Site Attenuation (NSA) using test procedures outlined in ANSI C63.4 “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz”. The semi-anechoic chamber is lined with ferrite tiles and absorption cones to minimize any undesired reflections. All measuring equipment is calibrated on an annual or bi-annual basis as listed for each respective test.

Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	


### ***Testing Environmental Conditions and Dates***

Following were the environmental conditions in the facility during time of testing –

Date	Test	Init.	Temperature (°C)	Humidity (%)	Pressure (kPa)
August 1-5, 2011	All	AM	23.3-25.1°C	37-42%	101.1 -101.5 kPa

Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

## Detailed Test Results Section

Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

## ***Maximum Permissible Exposure***

### **Purpose**

The purpose of this test is to ensure that the RF energy intentionally transmitted, in terms of power density emitted from the EUT at a stated operating distance does not exceed the limits listed below as defined in the applicable test standard, as calculated based upon readings obtained during testing. This helps protect human exposure to excessive RF fields.

### **Limit(s) and Method**

The limits, as defined in FCC 15.247(i) and FCC 1.1310 Table 1 (B) limits for general public exposure was applied. The limit for the frequency range of 1.5 GHz to 100 GHz was applied. This is a limit of 1.0 mW/cm<sup>2</sup>. The distance used for calculations was 20cm, as this is the minimum distance an operator will be from the EUT during normal operation, as stated by the manufacturer.

### **Results**

The EUT passed the requirements. The worst case calculated power density was 0.0014mW/cm<sup>2</sup>; this is significantly under the 1.0 mW/cm<sup>2</sup> requirement.

### **Calculations**

The maximum conducted output power as measured = 6.9dbm.

$$P_d = (P_t * G) / (4 * \pi * R^2)$$


Where  $P_t$  = 6.6 dbm or 4.57 mW as per Peak power conducted output

Where  $G$  = -3dBi, or numerically 0.5

Where  $R$  = 2.50 cm

$$P_d = (4.57 \times 0.5) / (4 \times \pi \times 2.50 \text{ cm}^2)$$

$$P_d = 0.029 \text{ mW/cm}^2$$


Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

## Appendix A – EUT Summary

### General EUT Description

Client	
Organization	Endrelia / 2276427 Ontario Inc
Contact	Amandeep Singh
EUT Details	
EUT Model number	M400
Equipment Category	Wireless module for establishing a 2.4 GHz Bluetooth connection between EUT and a mobile phone.
Basic EUT Functionality	M400 unit connects using a Bluetooth connection to a mobile phone and transmit audio to a preselected number that is dialed from the mobile phone.
Input Voltage and Frequency	Battery operated
Connectors available on EUT	None.
Peripherals Required for Test	None.
Release type	Final
Intentional Radiator Frequency	2402 – 2480.0 MHz for Bluetooth protocol.

Note the EUT is considered to have been received the date of the commencement of the first test, unless otherwise stated. For a close-up picture of the EUT, see ‘Appendix B – EUT & Test Setup Photographs’.

Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	

## Appendix B – EUT and Test Setup Photographs


Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	



Figure 1 – Radiated emission setup




Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	



Figure 2 – Power line conducted emissions


Client	Endrelia / 2276427 Ontario Inc	
Product	ZPU-M400 / 9756A-M400	
Standard(s)	RSS 210 Issue 8:2010 / FCC Part 15 Subpart C 15:2010	



Figure 3 – Conducted power emissions

Note: These photos are for information purposes only. Also refer to PDF files that are separate from this test report.