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TEST REPORT

Sierra Wireless EWM100 GPRS Modem

tested to the specification

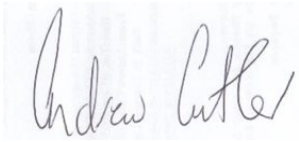
NZS 2772: Part 1: 1999

Radio Frequency Fields
Part 1 – Maximum Exposure Levels
3 kHz to 300 GHz

for

Advanced Metering Services Ltd

This Test Report is issued with the authority of:



Andrew Cutler - General Manager

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1. STATEMENT OF COMPLIANCE

The **Sierra Wireless EWM100 GPRS Modem** complies with NZS 2772: Part 1: 1999 when operated with a safe distance of 20 cm being applied.

2. INTRODUCTION

This report describes the tests and measurements for the purpose of determining compliance with the specification under the following conditions:

The test sample was selected by the client.

This report relates only to the sample tested.

This report contains no corrections or erasures.

Measurement uncertainties with statistical confidence intervals of 95% are shown below test results. Both class A and Class B uncertainties have been accounted for, as well as influence uncertainties where appropriate

3. CLIENT INFORMATION

Company Name	Advanced Metering Services Ltd
Address	357 Madras Street Christchurch Central
City	Christchurch 8013
Country	New Zealand
Contact	Mr Gary Nightingale

4. DESCRIPTION OF TEST SAMPLE

Brand Name	Sierra Wireless
Model Numbers	EWM100
Product	GPRS Modem
Manufacturer	EDMI Ltd
Country of Origin	Singapore
Serial Numbers	IMEI: 357321041774513 IMEI: 357321041858639

5. TEST SETUP

Testing was carried out in accordance with NZS 2772: Part 1: 1999 Radio Frequency Fields, Part 1 – Maximum Exposure Levels - 3 kHz to 300 GHz.

Two modems were tested that were attached to two different meters with one being a standalone meter and the other was a meter in a white metal meter box enclosure.

Testing was carried out in a semi anechoic chamber located at 47 MacKelvie Street, Grey Lynn, Auckland.

The modem was forced to transmit continuously by the client using modem control software via the Vodafone GPRS network.

During the testing no local control of the modem output was possible.

Testing was carried out over a distance of 3 metres using a spectrum analyser operating in peak hold mode with a resolution bandwidth of 10 MHz when attached to a log periodic antenna.

Before each measurement was made the device was manually manipulated to determine the worst case orientation and the measurement antenna was raised and lowered to find the worst case antenna height.

Measurements were made in vertical and horizontal polarisations.

The modem was configured to operate in the 900 MHz GSM band.

The coax attenuation, antenna gain and path loss over the 3 metre distance were then all determined and a radiated transmitter power determined.

Using this power a minimum safe distance was determined in accordance with the limits in the directive.

In addition a broadband probe was placed approximately 20 cm from the boundary of the product to determine the worst case radiated field strength when in close proximity to the device.

The output of the field strength meter attached to this device was recorded directly in V/m.

7 TEST RESULTS

Testing was carried out on Friday June 7th, 2013

The following results were recorded.

Mode	Polarisation	Level (dBuV/m)	Power (W)	Distance (m)	Probe level (V/m)
Meter box	Vertical	128.1	1.94	0.184	> 8.0
	Horizontal	127.9	1.85	0.180	> 8.0
Free standing	Vertical	122.7	0.56	0.099	> 8.0
	Horizontal	126.4	1.31	0.151	> 8.0

The transmitter power was calculated as follows:

Field strength (V/m) = √(30 x Power (watts)) / Distance (metres)

Therefore 128.1 dBuV/m = 2.541 V/m where dBuV = 20 x log (V1/1 uV)

Power = (Field Strength (V/m) x Distance (m))^2 / 30
= (2.541 x 3)^2 / 30
= 1.94 watts

Safe distance is calculated based upon the reference level in Table 6 which is calculated as follows:

The General Public Exposure Level for transmitters operating between 400 MHz – 2 GHz is 1.375 x (f $^{0.5}$)

The device operates between approximately 890 MHz – 910 MHz

Therefore the reference level will be 1.375 x (910 MHz $^{0.5}$) = 41.5 V/m

Using the formula

Field strength (V/m) = √(30 x Power (watts)) / Distance (metres)

Distance = √(30 x Power (watts)) / Reference Field Strength (V/m)

Distance = √(30 x 1.94) / 41.5 (V/m) = 0.184 m or 18.4 cm

8. RESULTS ANALYSIS

The following will apply in accordance with NZS 2772.1 table 11.

This device would not normally be used by the general public but it could be installed in areas that the general public could have access to.

The mean power is greater than 20 mW and it does not have a push to talk function.

The mean power does not exceed 3.5 watts.

It is most likely that this device would be installed at a distance greater than 20 cm from users.

Therefore this device is exempt from any further testing.

However a field measurement has been made in accordance with table 6 of NZS 2772.1.

In the band 400 MHz – 2 GHz a field strength limit of 41 V/m will apply at 900 MHz.

When operated at 1.95 W EIRP, the highest power level recorded, the 41.5 V/m compliance boundary would be located at a distance of 18.6 cm.

It is therefore recommended that a compliance boundary of 20 cm is specified for all of the devices tested.

Result: Complies.

41 V/m = 4,458,886 uW/m2 which as they say is just under the standard level at 20cm. No measurements were taken at a distance but it must be assumed that even at a distance of 10m the readings would be in well in excess of 1,000 uW/m2, the BioInitiative suggested limit.

6. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial No	Asset Ref
Measuring Receiver	R & S	ESIB 40	100171	R-27-1
Log Periodic Antenna	Schwarzbeck	UHALP 9107	-	3702
Coax cable	Sucoflex	104PA	2736/4PA	-
Measurement Probe	Amplifier Research	FP2000	14317	3745
Measuring Receiver	Amplifier Research	FM2000	14417	-

7. PHOTOGRAPHS