



TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Mini MT GSM2428



FCC ID: MIVGSM2428

IC Certification Number: 4160A-GSM2428

To: FCC Parts 22.913 & 24.232: Industry Canada RSS-132 Section 4.4 &
RSS-133 Section 6.4

Test Report Serial No:
RFI-RPT-RP78940JD14A V3.0

Version 3.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of Chris Guy, Head of Global Approvals:	
Checked By:	Ian Watch
Signature:	
Date of Issue:	14 June 2011

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1. Customer Information





Company Name:	Enfora Inc
Address:	251 Renner Parkway Richardson Texas 75080 USA

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR22
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 22 Subpart H (Public Mobile Services)
Specification Reference:	47CFR24
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 24 Subpart E (Personal Communication Services)
Specification Reference:	RSS-132 Issue 2 Sep 2005
Specification Title:	Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz
Specification Reference:	SRSP-503 Issue 7 Sep 2008
Specification Title:	Technical Requirements for Cellular Radiotelephone Systems Operating in the Bands 824 – 849 MHz and 869 – 894 MHz
Specification Reference:	RSS-133 Issue 5 Feb 2009
Specification Title:	2 GHz Personal Communications Services
Specification Reference:	SRSP-510 Issue 5 Feb 2009
Specification Title:	Technical Requirements for Personal Communications Services (PCS) in the Bands 1850-1915 MHz and 1930-1995 MHz
Site Registration:	FCC: 209735; Industry Canada: 3245B-2
Test Date:	04 April 2011

Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 22 & RSS-132			
Part 22.913(a)	RSS-132 4.4 SRSP-503 5.1.3	Transmitter Output Power (ERP)	
Part 2.1046	RSS Gen 4.8	Transmitter Conducted Output Power	Note 1
Part 24 & RSS-133			
Part 24.232	RSS-133 6.4 SRSP-510 5.1.2	Transmitter Output Power (EIRP)	
Part 2.1046	RSS Gen 4.8	Transmitter Conducted Output Power	Note 1
Key to Results			
 = Complied  = Did not comply			

Note 1: The measurement was performed to support SAR tests.

2.2. Methods and Procedures

Reference:	ANSI/TIA-603-C-2004
Title:	Land Mobile Communications Equipment, Measurements and performance Standards

2.3. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Enfora Inc
Model Name or Number:	Mini-MT (GSM2428)
IMEI:	001036000013907
Hardware Version Number:	A
Software Version Number:	1.1.5
FCC ID:	MIVGSM2428
IC Certification Number:	4160A-GSM2428

3.2. Description of EUT

The equipment under test was a GPS mobile tracking device incorporating a quad band GSM/GPRS modem.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Type of Radio Device:	Transceiver		
Mode:	GSM/GPRS		
Modulation Type:	GMSK		
Channel Spacing:	200 kHz		
Power Supply Requirement(s):	Nominal	3.7 V	
Technology Tested:	GSM850		
Maximum Output Power (ERP):	GSM	27.6 dBm	
	GPRS	27.1 dBm	
Transmit Frequency Range:	824 to 849 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	128	824.2
	Middle	190	836.6
	Top	251	848.8
Technology Tested:	PCS1900		
Maximum Output Power (EIRP):	GSM	32.2 dBm	
	GPRS	31.4 dBm	
Transmit Frequency Range:	1850 to 1910 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	512	1850.2
	Middle	660	1879.8
	Top	810	1909.8

3.5. Support Equipment

No support equipment was used to exercise the EUT during testing:

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Constantly transmitting at full power on bottom, middle and top channels as required.
- ERP/EIRP tests were performed with the EUT in GSM single timeslot circuit switched mode or GPRS Multislot Class 10 with the unit transmitting on two timeslots in the uplink.

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- Connected to a GSM/GPRS system simulator, operating in transceiver mode.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

5.2. Test Results**5.2.1. Transmitter Output Power (ERP)****Test Summary:**

Test Engineer:	Nick Steele	Test Date:	04 April 2011
Test Sample IMEI:	001036000013907		

FCC Part:	22.913(a)
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.17.2

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	21

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Antenna Polarity	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
Bottom	824.2	Horizontal	27.6	38.45	10.85	Complied
Middle	836.6	Horizontal	25.6	38.45	12.85	Complied
Top	848.8	Horizontal	26.4	38.45	12.05	Complied

Results: GPRS

Channel	Frequency (MHz)	Antenna Polarity	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
Bottom	824.2	Horizontal	27.1	38.45	11.35	Complied
Middle	836.6	Horizontal	25.2	38.45	13.25	Complied
Top	848.8	Horizontal	25.9	38.45	12.55	Complied

Note(s):

- SRSP-503 states the limit as an EIRP value of 11.5 Watts (40.6 dBm) which equates to an ERP limit of 7 Watts (38.45 dBm).
- Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

5.2.2. Transmitter Conducted Output Power**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	04 April 2010
Test Sample IMEI:	001036000013907		

FCC Part:	2.1046
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.1 referencing FCC CFR Part 2.1046(a)

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	21

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Average ERP(dBm)	Antenna Gain (dBd)	Calculated Average Conducted Power (dBm)
Bottom	824.2	27.4	-7.25	34.65
Middle	836.6	25.4	-7.05	32.45
Top	848.8	26.2	-5.05	31.25

Results: GPRS

Channel	Frequency (MHz)	Average ERP(dBm)	Antenna Gain (dBd)	Calculated Average Conducted Power (dBm)
Bottom	824.2	26.9	-7.25	34.15
Middle	836.6	25.0	-7.05	32.05
Top	848.8	25.7	-5.05	30.75

Note(s):

1. Conducted power calculations were performed to support SAR testing.
2. The negative antenna gain was added to the ERP value to obtain the average conducted power.

5.2.3. Transmitter Output Power (EIRP)**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	04 April 2011
Test Sample IMEI:	001036000013907		

FCC Part:	24.232
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.17.2

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	21

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	1850.2	Horizontal	32.2	33.0	0.8	Complied
Middle	1879.8	Horizontal	28.9	33.0	4.1	Complied
Top	1909.8	Horizontal	30.7	33.0	2.3	Complied

Results: GPRS

Channel	Frequency (MHz)	Antenna Polarity	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	1850.2	Horizontal	31.4	33.0	2.6	Complied
Middle	1879.8	Horizontal	28.5	33.0	4.5	Complied
Top	1909.8	Horizontal	30.2	33.0	2.8	Complied

Note(s):

- Final measurements above 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

5.2.4. Transmitter Conducted Output Power**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	04 April 2010
Test Sample IMEI:	001036000013907		

FCC Part:	2.1046
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.1 referencing FCC CFR Part 2.1046(a)

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	21

Results: GSM Circuit Switched

Channel	Frequency (MHz)	Average EIRP(dBm)	Antenna Gain (dBi)	Calculated Average Conducted Power (dBm)
Bottom	1850.2	32.0	-1.04	33.04
Middle	1879.8	28.7	-1.85	30.55
Top	1909.8	30.5	-1.95	32.45

Results: GPRS

Channel	Frequency (MHz)	Average EIRP(dBm)	Antenna Gain (dBi)	Calculated Average Conducted Power (dBm)
Bottom	1850.2	31.2	-1.04	32.24
Middle	1879.8	28.3	-1.85	30.15
Top	1909.8	30.0	-1.95	31.95

Note(s):

1. Conducted power calculations were performed to support SAR testing.
2. The negative antenna gain was added to the EIRP value to obtain the average conducted power.

6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Effective Radiated Power (ERP)	824 to 849 MHz	95%	±2.94 dB
Effective Isotropic Radiated Power (EIRP)	1850 to 1910 MHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	06 Jun 2011	12
A1817	Antenna	EMCO	3115	00075694	03 Feb 2012	12
A1970	Pre Amplifier	RFI	1 - 18 GHz	N/A	30 June 2011	12
A1999	Attenuator	Huber & Suhner	6820.17.B	07101	18 Mar 2012	12
A553	Antenna	Chase	CBL6111A	1593	26 Mar 2012	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	25 Apr 2011	12
L1021	Comms Test Set	Rohde & Schwarz	CMU 200	111379	11 Jan 2012	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	04 Feb 2012	12

NB In accordance with UKAS requirements all the measurement equipment is on a calibration schedule.