

TEST REPORT FROM RFI GLOBAL SERVICES LTD



Test of: Mini-MT (GSM2428)

FCC ID: MIVGSM2428

IC Certification Number: 4160A-GSM2428

To: FCC Part 15.107 and 15.109: 2010 Subpart B & RSS-Gen Issue 3 December 2010

Test Report Serial No:
RFI-RPT-RP78940JD10A

This Test Report Is Issued Under The Authority Of Chris Guy, Head of Global Approvals:	
Checked By:	Ian Watch
Signature:	
Date of Issue:	23 March 2011

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1. Customer Information





Company Name:	Enfora Inc.Enfora Inc
Address:	251 Renner Parkway Richardson Texas 75080 United States

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 15 Subpart B (Unintentional Radiators) - Sections 15.107 and 15.109
Specification Reference:	RSS-Gen Issue 3 December 2010
Specification Title:	General Requirements and Information for the Certification of Radio Apparatus
Site Registration:	FCC: 209735; Industry Canada: 3245B-2
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	16 March 2011 to 17 March 2011

2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 15.107	RSS-Gen 7.2.4	Receiver/Idle Mode AC Conducted Emissions	
Part 15.109	RSS-Gen 4.10/6.1	Receiver/Idle Mode Radiated Spurious Emissions	
Key to Results			
 = Complied  = Did not comply			

2.3. Methods and Procedures

Reference:	ANSI C63.4 (2009)
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

2.4. 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)
Serial Number:	Not stated
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 GSM/GPRS/GPS Mobile tracker that supports GSM850 and PCS1900 bands.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Tested Technology:	GSM850/PCS1900		
Power Supply Requirement:	Nominal	3.7V	
Type of Unit:	Transceiver		
Receive Frequency Range:	869 to 894 MHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	128	869.2
	Middle	190	881.6
	Top	251	893.8
Receive Frequency Range:	1850 to 1990 MHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	512	1930.2
	Middle	660	1959.8
	Top	810	1989.8

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Receive/Idle Mode.

4.2. Configuration and Peripherals

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

- Receive/Idle mode with AC charger for port termination. Test SIM inserted behind the battery and scanning across all bands while testing.

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. Receiver/Idle Mode AC Conducted Spurious Emissions****Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	17 March 2011
Test Sample Serial No / IMEI:	Not stated		

FCC Part:	15.107
Test Method Used:	As detailed in ANSI C63.4 Section 7

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	21

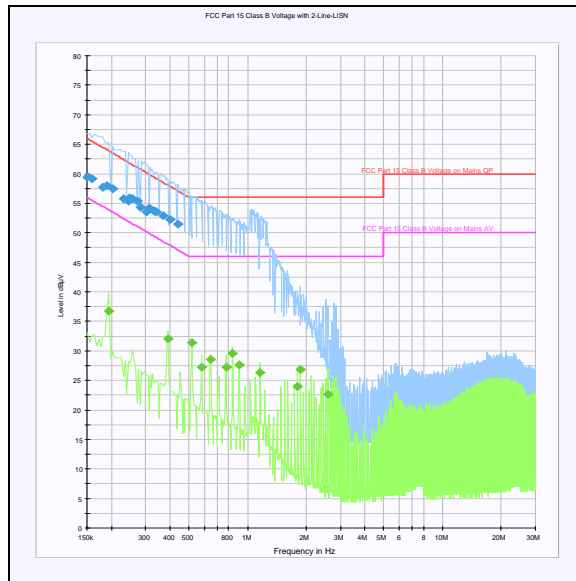
Results: Quasi Peak

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.150000	Neutral	59.4	66.0	6.6	Complied
0.159000	Neutral	59.2	65.5	6.3	Complied
0.181500	Live	57.7	64.4	6.7	Complied
0.190500	Neutral	57.9	64.0	6.1	Complied
0.204000	Neutral	57.5	63.4	5.9	Complied
0.231000	Live	55.8	62.4	6.6	Complied
0.244500	Live	55.4	61.9	6.5	Complied
0.249000	Neutral	55.9	61.8	5.9	Complied
0.258000	Neutral	55.7	61.5	5.8	Complied
0.271500	Neutral	55.3	61.1	5.8	Complied
0.280500	Live	54.4	60.8	6.4	Complied
0.303000	Live	53.6	60.2	6.6	Complied
0.312000	Neutral	54.1	59.9	5.8	Complied
0.330000	Neutral	53.7	59.5	5.8	Complied
0.339000	Neutral	53.5	59.2	5.7	Complied
0.370500	Neutral	52.8	58.5	5.7	Complied
0.397500	Neutral	52.3	57.9	5.6	Complied
0.438000	Neutral	51.4	57.1	5.7	Complied

Results: Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.195000	Neutral	36.7	53.8	17.1	Complied
0.388500	Neutral	32.0	48.1	16.1	Complied
0.514500	Neutral	31.4	46.0	14.6	Complied
0.582000	Neutral	27.3	46.0	18.7	Complied
0.645000	Neutral	28.5	46.0	17.5	Complied
0.775500	Neutral	27.2	46.0	18.8	Complied
0.838500	Neutral	29.6	46.0	16.4	Complied
0.901500	Neutral	27.6	46.0	18.4	Complied
1.158000	Neutral	26.3	46.0	19.7	Complied
1.806000	Neutral	24.0	46.0	22.0	Complied
1.869000	Neutral	26.8	46.0	19.2	Complied
2.580000	Neutral	22.7	46.0	23.3	Complied

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

5.2.2. Receiver/Idle Mode Radiated Spurious Emissions**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	16 March 2011
Test Sample Serial No / IMEI:	Not stated		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	28

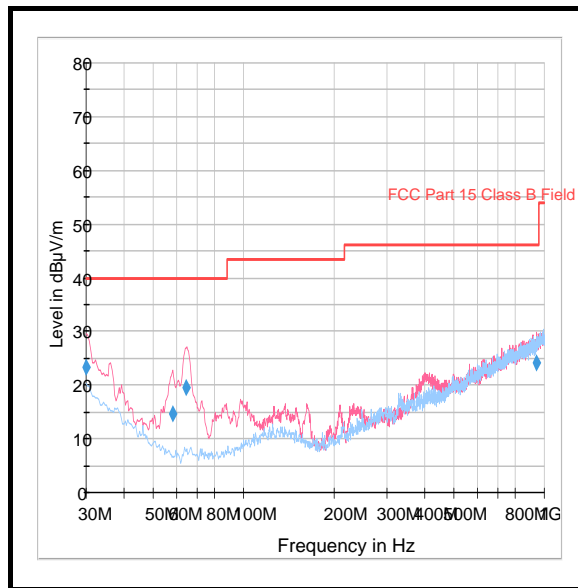
Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
30.008	Vertical	23.3	40.0	16.7	Complied
58.109	Vertical	14.5	40.0	25.5	Complied
64.452	Vertical	19.6	40.0	20.4	Complied

Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
3. Measurements below 1GHz 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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Receiver/Idle Mode Radiated Spurious Emissions (continued)**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	16 March 2011
Test Sample Serial No / IMEI:	Not stated		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	1 GHz to 10 GHz

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	28

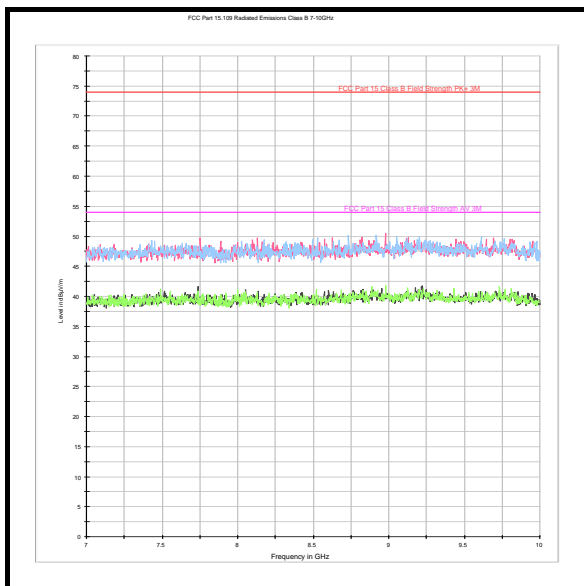
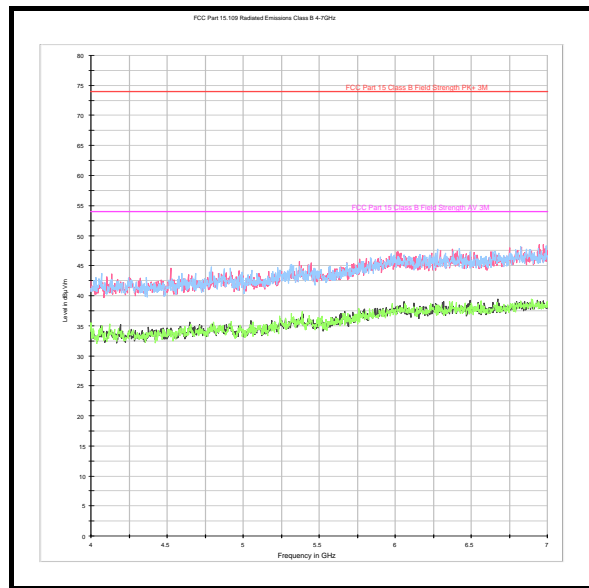
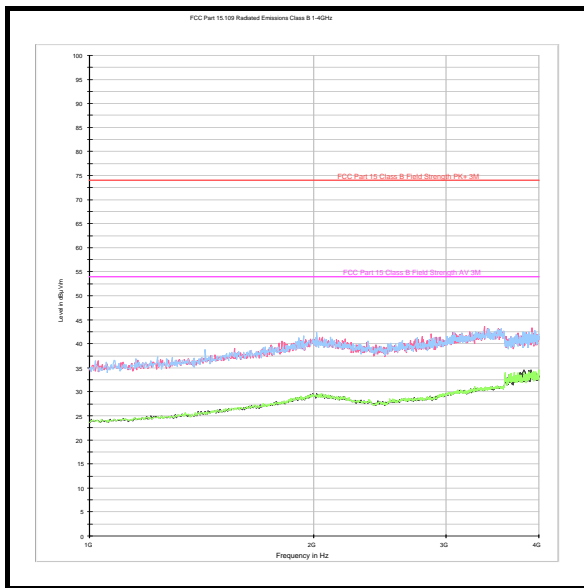
Results:

Frequency (MHz)	Antenna Polarity	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
8950.500	Vertical	50.6	54.0	3.4	Complied

Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. 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.
3. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.

Receiver/Idle Mode Radiated Spurious Emissions (continued)



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

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
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.25 dB
Radiated Spurious Emissions	30 MHz to 10 GHz	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
A1069	LISN	Rohde & Schwarz	ESH3-Z5	837469/012	13 Apr 2011	12
A1817	Antenna	EMCO	3115	00075694	03 Feb 2012	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Mar 2012	12
A1834	Attenuator	Hewlett Packard	8491B	10444	30 Jun 2011	12
A1970	Pre-Amp	RFI	N/A	N/A	22 Mar 2011	12
A553	Antenna	Chase	CBL6111A	1593	16 Mar 2012	12
G0543	Amplifier	Sonoma Instrument	310N	230801	30 Jun 2011	12
K0001	5m Semi-Anechoic Chamber	Rainford EMC	N/A	N/A	25 Apr 2011	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	28 Jun 2011	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.