

# **TEST REPORT** FROM **RFI GLOBAL SERVICES LTD**

Test of: Enfora Inc. Enfora Enabler IIIGBGA (GSM0408)

To: FCC Part 22: 2007, FCC Part 24: 2007, RSS-132 Issue 2 September 2005, RSS-133 Issue 4 February 2008 & RSS-Gen Issue 2 June 2007

> **Test Report Serial No:** RFI/RPTE2/RP49741D05A

**Supersedes Test Report Serial No:** RFI/RPTE1/RP49741D05A

This Test Report Is Issued Under The Authority Of Steve Flooks, Service Leader Radio Performance Group:	pp Brian Watson
Checked By: Brian Watson	Report Copy No: PDF01
Issue Date: 31 March 2008	Test Dates: 14 February to 22 February 2008

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Test of:	Enfora Inc.
	Enfora Enabler IIIGBGA (GSM0408)
To:	FCC Part 22: 2007, FCC Part 24: 2007,
	RSS-132 Issue 2 September 2005, RSS-133 Issue 4 February 2008
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# **1. Client Information**

Company Name:	Enfora Inc.
Address:	251 Renner Parkway Richardson Texas 75080 USA
Contact Name:	Mr R Holden

# 2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

### 2.1. Identification of Equipment Under Test (EUT)

Description:	GSM/GPRS BGA Module
Brand Name:	Enfora
Model Name or Number:	GSM0408 Enabler IIIGBGA
Serial Number:	None Stated
IMEI Number:	001036000150428
Hardware Version:	1
Software Version:	1.1.1
FCC ID Number:	MIVGSM0408
Country of Manufacture:	USA / China
Date of Receipt:	14 February 2008

# 2.2. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Switching Mode Power Supply	
Brand Name:	None Stated	
Model Name or Number:	SMP-2000A	
Serial Number:	None stated	
Cable Length and Type:	2m Twin Core	
Connected to Port:	SDK Power	

Description:	SDK Development Board
Brand Name:	Enfora
Model Name or Number:	SDK0408
Serial Number:	None stated
Cable Length and Type:	Not applicable
Connected to Port:	Not applicable

# 2.3. Description of EUT

The EUT is a GSM/GPRS module.

## 2.4. Modifications Incorporated in EUT

During the course of testing the EUT was not modified.

### 2.5. Additional Information Related to Testing

Power Supply Requirement:	Nominal 110 V, 60 Hz AC Mains Supply (supplying 5 V into SDK, SDK converts to 3.6 to deliver to module)	
Intended Operating Environment:	Within GSM coverage	
Equipment Category:	GSM/GPRS	
Type of Unit:	Modular Transceiver	
Modulation Type:	GMSK	
Channel Spacing:	200 kHz	
Antenna Type:	External	
Antenna Gain:	850 band 1.1dBi 1900 band -1.31dBi	
Antenna Connection:	Balls on Module	

#### FCC Part 22 and RSS-132

Transmit Frequency Range:	824.2 MHz to 848.8 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	128	824.2
	Middle	190	836.6
	Тор	251	848.8
Receive Frequency Range:	869.2 MHz to 893.8 MHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	128	869.2
	Middle	190	881.4
	Тор	251	893.8
Maximum Power Output (ERP):	33.1 dBm		

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## Additional Information Related to Testing (continued)

#### FCC Part 24 and RSS-133

Transmit Frequency Range:	1850.2 MHz to 1909.8 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	512	1850.2
	Middle	660	1879.8
	Тор	810	1909.8
Receive Frequency Range:	1930.2 MHz to 1989.8 MHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	512	1930.2
	Middle	660	1959.8
	Тор	810	1989.8
Maximum Power Output (EIRP):	32.7 dBm		

## 2.6. Port Identification

Port	Description	Type / Length	Applicability
1.	RS232 x 2	RS232	No
2.	Antenna	SMA	No
3.	DC Input	2-Core	Yes

# 3. Test Specification, Methods and Procedures

Reference:	FCC Part 22: 2007 Subpart H (Cellular Radiotelephone Service)	
Title:	Code of Federal Regulations, Part 22 (47CFR22) Personal Communication Services.	
Reference:	FCC Part 24: 2007 Subpart E (Broadband PCS)	
Title:	Code of Federal Regulations, Part 24 (47CFR24) Personal Communication Services.	
Reference:	RSS-Gen Issue 2 June 2007	
Title:	General Requirements and Information for the Certification of Radiocommunication Equipment	
Reference:	RSS-132 Issue 2 September 2005	
Title:	Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz	
Reference:	RSS-133 Issue 4 February 2008	
Title:	2 GHz Personal Communications Services	

# 3.1. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2003

Land Mobile Communications Equipment, Measurements and performance Standards

ANSI C63.2 (1987)

Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2003)

Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)

Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)

Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)

Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

# 3.2. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures Section above. Appendix 1 contains a list of the test equipment used.

# 4. Deviations from the Test Specification

There were no deviations from the test speciation.

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# 5. Operation of the EUT during Testing

# 5.1. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated.

- GSM 850 Allocated and Idle Mode.
- GSM 1900 Allocated and Idle Mode.
- (GSM and GPRS)

Initially tested in all operating modes to establish the worst case (which was GSM Mode), all tests were then performed in this mode.

## 5.2. Configuration and Peripherals

The EUT was tested in the following configuration unless otherwise stated:

- Powered via the supplied switching mode power supply with a radio link to a GSM tester established.
- The module was built onto a development board for test purposes.

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# 6. Summary of Test Results

### FCC Part 22 and RSS-132 (GSM 850 band)

Range of Measurements	FCC Part Reference	IC RSS Reference	Port Type	Compliancy Status
Receiver/Idle AC Conducted Spurious Emissions (150 kHz to 30 MHz)	15.107	RSS-Gen 7.2.2	AC Mains Input	Complied
Receiver/Idle Radiated Spurious Emissions	15.109	RSS-Gen 6.0	Antenna	Complied
Transmitter Carrier Output Power	2.1046(a)	RSS-132 4.4	Antenna Terminals	Complied
Transmitter Frequency Stability (Temperature Variation)	22.355	RSS-132 4.3	Antenna Terminals	Complied
Transmitter Frequency Stability (Voltage Variation)	22.355	RSS-132 4.3	Antenna Terminals	Complied
Transmitter Occupied Bandwidth	2.1049	RSS-Gen 4.6.1	Antenna Terminals	Complied
Transmitter Out of Band Conducted Emissions	2.1051/22.917	RSS-132 4.5	Antenna Terminals	Complied
Transmitter Band Edge Conducted Emissions	2.1051/22.917	RSS-132 4.5	Antenna Terminals	Complied
Transmitter Out of Band Radiated Emissions	2.1053/22.917	RSS-132 4.5	Antenna	Complied
Transmitter Band Edge Radiated Emissions	2.1053/22.917	RSS-132 4.5	Antenna	Complied

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#### Summary of Test Results (continued)

#### FCC Part 24 and RSS-133 (GSM 1900 band)

Range of Measurements	FCC Part Reference	IC RSS Reference	Port Type	Compliancy Status
Receiver/Idle AC Conducted Spurious Emissions (150 kHz to 30 MHz)	15.107	RSS-Gen 7.2.2	AC Mains Input	Complied
Receiver Radiated Spurious Emissions	15.109	RSS-133 6.6	Antenna	Complied
Transmitter Carrier Output Power	2.1046(a)	RSS-133 4.1 & 6.4	Antenna Terminals	Complied
Transmitter Frequency Stability (Temperature Variation)	24.235	RSS-133 6.3	Antenna Terminals	Complied
Transmitter Frequency Stability (Voltage Variation)	24.235	RSS-133 6.3	Antenna Terminals	Complied
Transmitter Occupied Bandwidth	24.238	RSS-Gen 4.6.1	Antenna Terminals	Complied
Transmitter Out of Band Conducted Emissions	2.1051/24.238	RSS-133 4.2 & 6.5	Antenna Terminals	Complied
Transmitter Band Edge Conducted Emissions	2.1051/24.238	RSS-133 4.2 & 6.5	Antenna Terminals	Complied
Transmitter Out of Band Radiated Emissions	2.1053/24.238	RSS-133 4.2 & 6.5	Antenna	Complied
Transmitter Band Edge Radiated Emissions	2.1053/22.917	RSS-133 4.2 & 6.5	Antenna	Complied

### 6.1. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ.

FCC Site Registration Number: 90895

IC Site Registration Number: 3485

# 7. Measurements, Examinations and Derived Results

### 7.1. General Comments

This Section contains test results only.

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 8 for details of measurement uncertainties.

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## 7.2. Test Results - FCC Part 22 and RSS-132 (GSM 850 band)

#### 7.2.1. Receiver/Idle Mode AC Conducted Spurious Emissions

7.2.2. Tests were performed using the test methods detailed in ANSI C63.4 Section 7

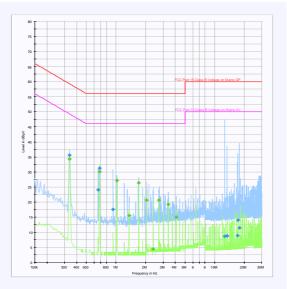
#### **Quasi-Peak Detector Measurements on Live and Neutral Lines**

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.338000	Live	35.6	59.3	23.7	Complied
0.658000	Live	24.2	56.0	31.8	Complied
0.678000	Live	31.3	56.0	24.7	Complied
0.930000	Neutral	17.6	56.0	38.4	Complied
12.622000	Neutral	8.6	60.0	51.4	Complied
13.318000	Live	8.8	60.0	51.2	Complied
13.354000	Live	8.8	60.0	51.2	Complied
17.138000	Live	9.0	60.0	51.0	Complied
17.290000	Neutral	14.1	60.0	45.9	Complied
17.938000	Neutral	11.5	60.0	48.5	Complied

### Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.338000	Live	34.3	49.3	15.0	Complied
0.678000	Live	30.1	46.0	15.9	Complied
1.018000	Live	27.1	46.0	18.9	Complied
1.358000	Live	15.5	46.0	30.5	Complied
1.694000	Live	26.4	46.0	19.6	Complied
2.034000	Live	20.7	46.0	25.3	Complied
2.374000	Neutral	4.5	46.0	41.5	Complied
2.714000	Live	20.6	46.0	25.4	Complied
3.390000	Live	19.2	46.0	26.8	Complied
4.070000	Live	15.0	46.0	31.0	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.

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### 7.2.3. Receiver/Idle Mode Radiated Spurious Emissions

7.2.3.1. Tests were performed using the test methods detailed in ANSI C63.4 Section 8

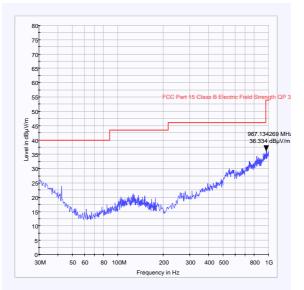
#### Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
967.134	Vertical	36.3	54.0	15.7	Complied

#### Note(s):

1. 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.

#### **Receiver/Idle Mode Radiated Spurious Emissions (continued)**



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

#### 7.2.4. Receiver/Idle Mode Radiated Spurious Emissions

#### Electric Field Strength Measurements (Frequency Range: 1 to 5 GHz)

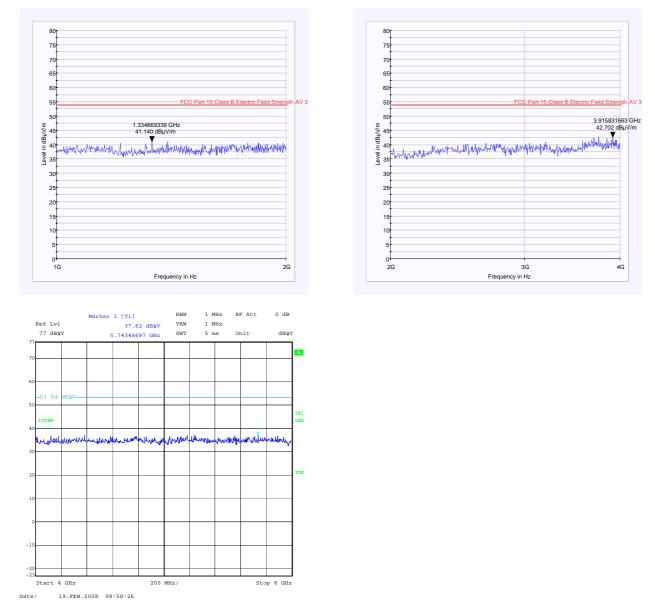
#### **Highest Peak Level**

Frequency (GHz)	Antenna Polarity	Detector Level (dBµV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBµV/m)	Margin (dB)	Result
3.9158	Vertical	48.8	-6.1	42.7	54.0	11.3	Complied

#### Note(s):

- 1. 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.
- 2. 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.

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### 7.2.5. Transmitter Carrier Output Power

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Part 2

Channel	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
Bottom	824.2	31.6	1.1	32.7	30.6	38.4	5.7	Complied
Middle	836.6	31.4	1.1	32.5	30.4	38.4	5.9	Complied
Тор	848.8	31.2	1.1	32.3	30.2	38.4	6.1	Complied

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#### 7.2.6. Transmitter Frequency Stability (Temperature Variation)

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Part 2

# Bottom Channel (824.2 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	824.199987	-13	-0.016	2.5	2.484	Complied
-20	824.199983	-17	-0.021	2.5	2.479	Complied
-10	824.199980	-20	-0.024	2.5	2.476	Complied
0	824.199981	-19	-0.023	2.5	2.477	Complied
10	824.199982	-18	-0.022	2.5	2.478	Complied
20	824.199982	-18	-0.022	2.5	2.478	Complied
30	824.199981	-19	-0.023	2.5	2.477	Complied
40	824.199983	-17	-0.021	2.5	2.479	Complied
50	824.199978	-22	-0.027	2.5	2.473	Complied

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### Transmitter Frequency Stability (Temperature Variation) (continued)

#### Top Channel (848.8 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	848.800015	15	0.018	2.5	2.518	Complied
-20	848.800018	18	0.021	2.5	2.521	Complied
-10	848.799991	-9	-0.011	2.5	2.489	Complied
0	848.799987	-13	-0.015	2.5	2.485	Complied
10	848.799991	-9	-0.011	2.5	2.489	Complied
20	848.799982	-18	-0.021	2.5	2.479	Complied
30	848.799980	-20	-0.024	2.5	2.476	Complied
40	848.799986	-14	-0.016	2.5	2.484	Complied
50	848.799988	-12	-0.014	2.5	2.486	Complied

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### 7.2.7. Transmitter Frequency Stability (Voltage Variation)

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Part 2

#### Bottom Channel (824.2 MHz)

Supply Voltage (V)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
93.5	824.199982	-18	-0.022	2.5	2.478	Complied
126.5	824.199982	-18	-0.022	2.5	2.478	Complied

# Top Channel (848.8 MHz)

Supply Voltage (V)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
93.5	848.799982	-18	-0.021	2.5	2.479	Complied
126.5	848.799982	-18	-0.021	2.5	2.479	Complied

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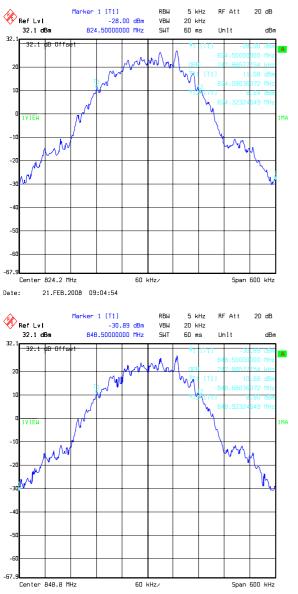
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#### 7.2.8. Transmitter Occupied Bandwidth

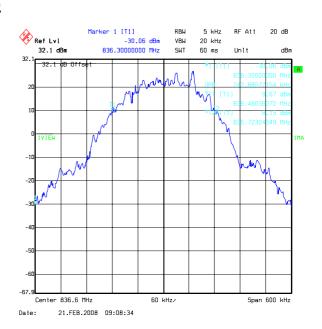
The 99% occupied bandwidth was measured using the channel bandwidth function of the R&S spectrum analyser referencing FCC CFR Part 2

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	824.2	242.886
Middle	836.6	242.886
Тор	848.8	242.886

### Transmitter Occupied Bandwidth (continued)



21.FEB.2008 09:10:40 Date:



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### 7.2.9. Transmitter Out of Band Conducted Emissions

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Part 2

#### **Bottom Channel**

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2472.6	-32.1	-13.0	19.1	Complied
3296.8	-35.3	-13.0	22.3	Complied

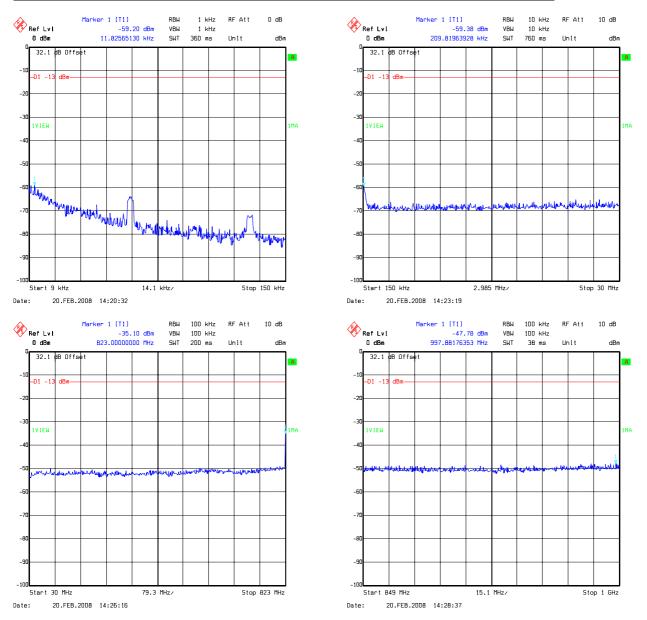
#### Middle Channel

Frequency	Peak Emission Level	Limit	Margin	Result
(MHz)	(dBm)	(dBm)	(dB)	
2509.8	-30.9	-13.0	17.9	Complied

#### Top Channel

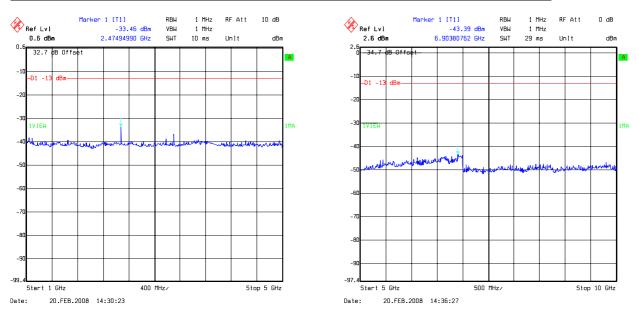
Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
850.0	-33.6	-13.0	20.6	Complied
2546.4	-31.1	-13.0	18.1	Complied
3395.2	-36.7	-13.0	23.7	Complied

### Transmitter Out of Band Conducted Emissions (continued) - Bottom Channel



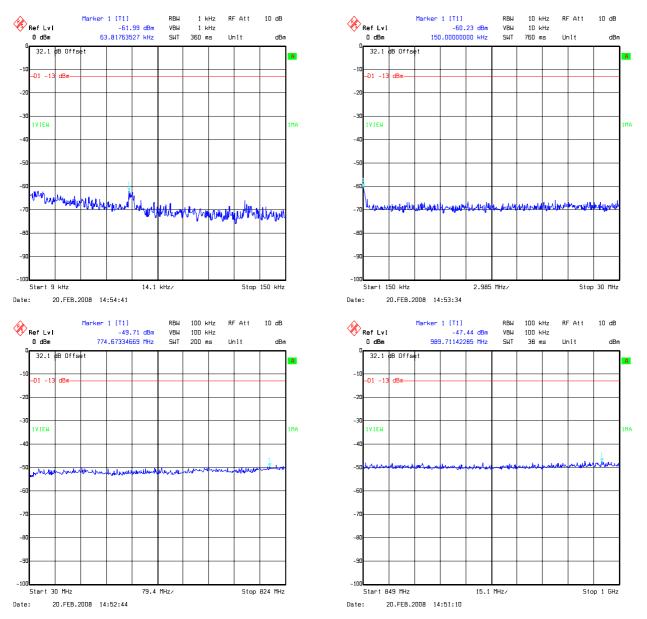
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

### Transmitter Out of Band Conducted Emissions (continued) - Bottom Channel



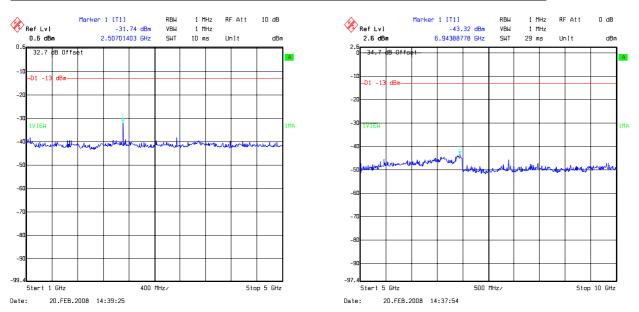
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

## Transmitter Out of Band Conducted Emissions (continued) – Middle Channel



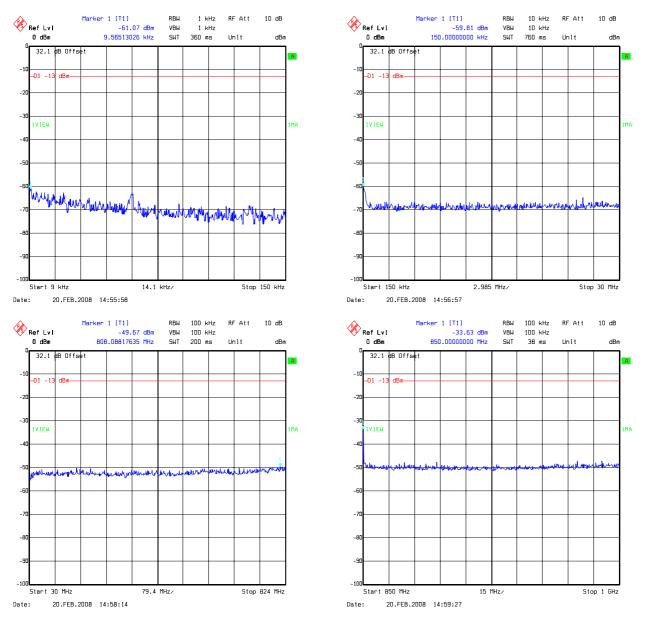
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

### Transmitter Out of Band Conducted Emissions (continued) - Middle Channel



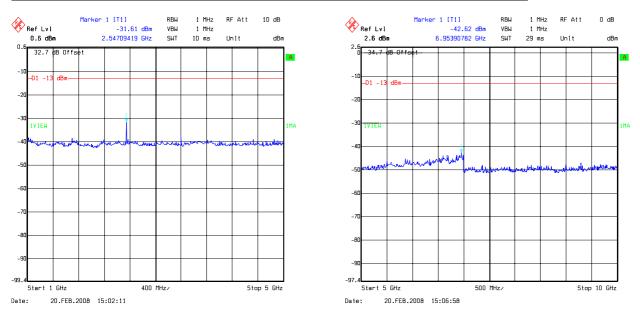
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

## Transmitter Out of Band Conducted Emissions (continued) - Top Channel



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

### Transmitter Out of Band Conducted Emissions (continued) - Top Channel



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

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# Test of:Enfora Inc.<br/>Enfora Enabler IIIGBGA (GSM0408)To:FCC Part 22: 2007, FCC Part 24: 2007,<br/>RSS-132 Issue 2 September 2005, RSS-133 Issue 4 February 2008<br/>& RSS-Gen Issue 2 June 2007

#### 7.2.10. Transmitter Conducted Emissions at Band Edges

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Parts 2 and 22.917

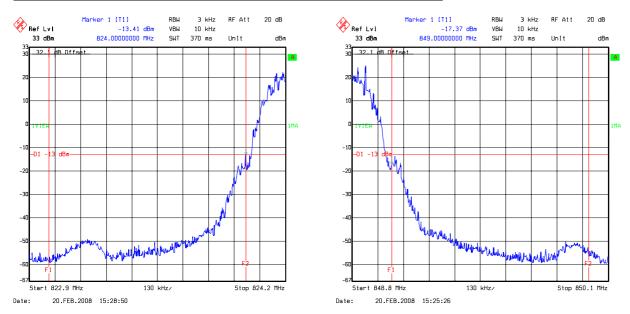
#### **Bottom Band Edge**

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-13.4	-13.0	0.4	Complied

## Top Band Edge

Frequency	Peak Emission Level	Limit	Margin	Result
(MHz)	(dBm)	(dBm)	(dB)	
849	-17.4	-13.0	4.4	Complied

#### Transmitter Conducted Emissions at Band Edges (continued)



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# Test of:Enfora Inc.<br/>Enfora Enabler IIIGBGA (GSM0408)To:FCC Part 22: 2007, FCC Part 24: 2007,<br/>RSS-132 Issue 2 September 2005, RSS-133 Issue 4 February 2008<br/>& RSS-Gen Issue 2 June 2007

### 7.2.11. Transmitter Out of Band Radiated Emissions

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Part 2

#### **Bottom Channel**

Frequency	Peak Emission	Limit	Margin	Result
(MHz)	Level (dBm)	(dBm)	(dB)	
1648.4	-28.8	-13.0	15.8	Complied

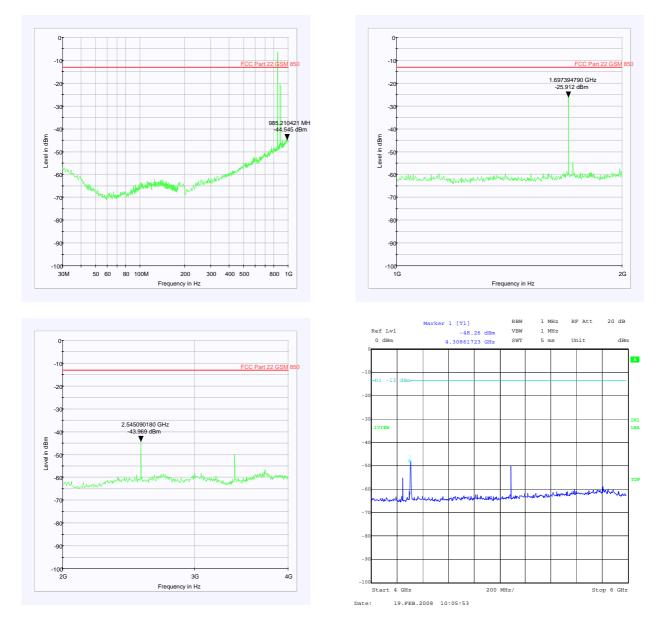
#### **Middle Channel**

Frequency	Peak Emission	Limit	Margin	Result
(MHz)	Level (dBm)	(dBm)	(dB)	
1673.2	-30.3	-13.0	17.3	Complied

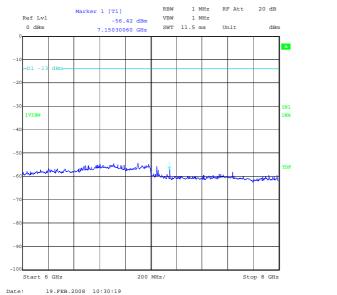
#### Top Channel

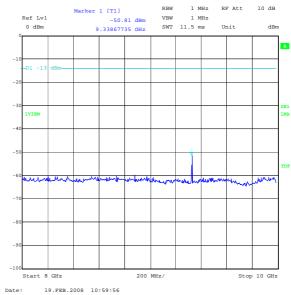
Frequency	Peak Emission	Limit	Margin	Result
(MHz)	Level (dBm)	(dBm)	(dB)	
1697.6	-27.4	-13.0	14.4	Complied

## Transmitter Out of Band Radiated Emissions (continued)



## Transmitter Out of Band Radiated Emissions (continued)





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## 7.2.12. Transmitter Radiated Emissions at Band Edges

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Parts 2 and 24.238

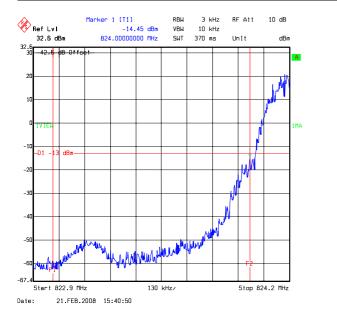
### Bottom Band Edge

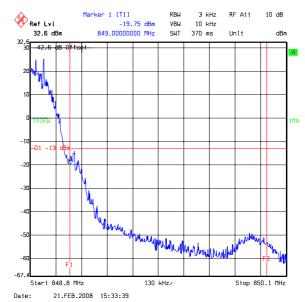
Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
824	-14.5	-13.0	1.5	Complied

### Top Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
849	-19.7	-13.0	6.3	Complied

## Transmitter Out of Band Radiated Emissions (continued)





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## 7.3. Test Results - FCC Part 24 and RSS-133 (GSM 1900 band)

### 7.3.1. Receiver/Idle Mode AC Conducted Spurious Emissions

Tests were performed using the test methods detailed in ANSI C63.4 Section 7

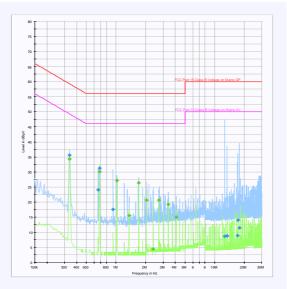
### **Quasi-Peak Detector Measurements on Live and Neutral Lines**

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.338000	Live	35.6	59.3	23.7	Complied
0.658000	Live	24.2	56.0	31.8	Complied
0.678000	Live	31.3	56.0	24.7	Complied
0.930000	Neutral	17.6	56.0	38.4	Complied
12.622000	Neutral	8.6	60.0	51.4	Complied
13.318000	Live	8.8	60.0	51.2	Complied
13.354000	Live	8.8	60.0	51.2	Complied
17.138000	Live	9.0	60.0	51.0	Complied
17.290000	Neutral	14.1	60.0	45.9	Complied
17.938000	Neutral	11.5	60.0	48.5	Complied

### Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.338000	Live	34.3	49.3	15.0	Complied
0.678000	Live	30.1	46.0	15.9	Complied
1.018000	Live	27.1	46.0	18.9	Complied
1.358000	Live	15.5	46.0	30.5	Complied
1.694000	Live	26.4	46.0	19.6	Complied
2.034000	Live	20.7	46.0	25.3	Complied
2.374000	Neutral	4.5	46.0	41.5	Complied
2.714000	Live	20.6	46.0	25.4	Complied
3.390000	Live	19.2	46.0	26.8	Complied
4.070000	Live	15.0	46.0	31.0	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.

## 7.3.2. Receiver/Idle Mode Radiated Spurious Emissions

Tests were performed using the test methods detailed in ANSI C63.4 Section 8

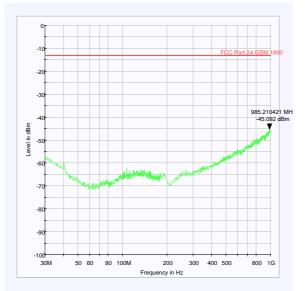
#### Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
967.134	Vertical	36.3	54.0	15.7	Complied

## Note(s):

1. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver recorded was recorded

## **Receiver/Idle Mode Radiated Spurious Emissions (continued)**



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

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## 7.3.3. Receiver/Idle Mode Radiated Spurious Emissions

#### Electric Field Strength Measurements (Frequency Range: 1 to 10 GHz)

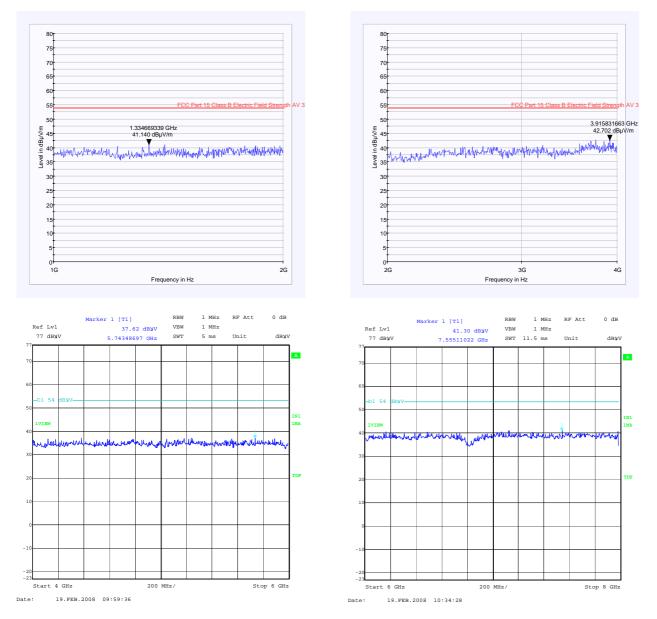
#### **Highest Peak Level**

Frequency (GHz)	Antenna Polarity	Detector Level (dBµV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBµV/m)	Margin (dB)	Result
9.9759	Vertical	40.8	3.6	44.4	54.0	9.6	Complied

### Note(s):

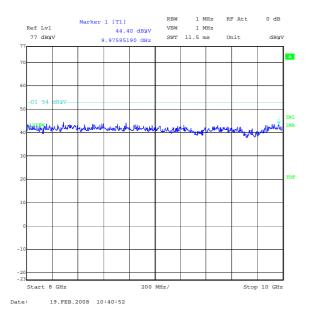
- 1. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver recorded was recorded.
- 2. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.

## Idle Mode Radiated Spurious Emissions (continued)



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

## Idle Mode Radiated Spurious Emissions (continued)



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

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## 7.3.4. Transmitter Carrier Output Power

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Part 2

Channel	Frequency (MHz)	Conducted RF O/P Power (dBm)	Stated Antenna Gain (dBi)	EIRP (dBm)	EIRP Limit (dBm)	Margin (dB)	Result
Bottom	1850.2	29.6	-1.31	28.3	33.0	4.7	Complied
Middle	1879.8	29.3	-1.31	28.0	33.0	5.0	Complied
Тор	1909.8	29.5	-1.31	28.2	33.0	4.8	Complied

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## 7.3.5. Transmitter Frequency Stability (Temperature Variation)

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Part 2

## Bottom Channel (1850.2 MHz)

Temperature (ºC)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
-30	33	1850.200033	1850.0	0.200033	Complied
-20	30	1850.200030	1850.0	0.200030	Complied
-10	-21	1850.199979	1850.0	0.199979	Complied
0	-21	1850.199979	1850.0	0.199979	Complied
10	-16	1850.199984	1850.0	0.199984	Complied
20	-21	1850.199979	1850.0	0.199979	Complied
30	-25	1850.199975	1850.0	0.199975	Complied
40	-32	1850.199968	1850.0	0.199968	Complied
50	-32	1850.199968	1850.0	0.199968	Complied

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## Transmitter Frequency Stability (Temperature Variation) (continued)

### Top Channel (1909.8 MHz)

Temperature (ºC)	Frequency Error (Hz)	Measured Frequency (MHz)	Upper Band Edge Limit (MHz)	Margin (MHz)	Result
-30	39	1909.800039	1910.0	0.199961	Complied
-20	26	1909.800026	1910.0	0.199974	Complied
-10	24	1909.800024	1910.0	0.199976	Complied
0	-14	1909.799986	1910.0	0.200014	Complied
10	-9	1909.799991	1910.0	0.200009	Complied
20	-19	1909.799981	1910.0	0.200019	Complied
30	-27	1909.799973	1910.0	0.200027	Complied
40	-28	1909.799972	1910.0	0.200028	Complied
50	-23	1909.799977	1910.0	0.200023	Complied

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## 7.3.6. Transmitter Frequency Stability (Voltage Variation)

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Part 2

### Bottom Channel (1850.2 MHz)

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
93.5	-29	1850.199971	1850	0.199971	Complied
126.5	-20	1850.199980	1850	0.199980	Complied

## Top Channel (1909.8 MHz)

Supply Voltage (V)	Frequency Error (Hz)	Measured Frequency (MHz)	Lower Band Edge Limit (MHz)	Margin (MHz)	Result
93.5	-17	1909.799983	1910	0.200017	Complied
126.5	-17	1909.799983	1910	0.200017	Complied

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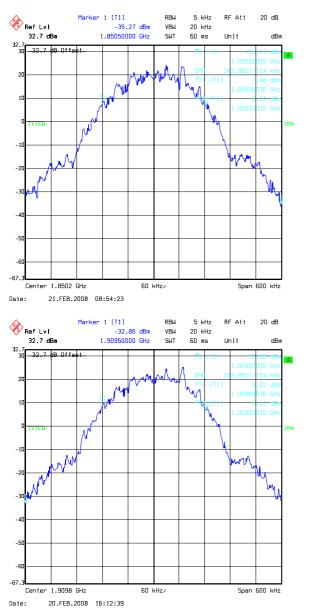
## Test of:Enfora Inc.<br/>Enfora Enabler IIIGBGA (GSM0408)To:FCC Part 22: 2007, FCC Part 24: 2007,<br/>RSS-132 Issue 2 September 2005, RSS-133 Issue 4 February 2008<br/>& RSS-Gen Issue 2 June 2007

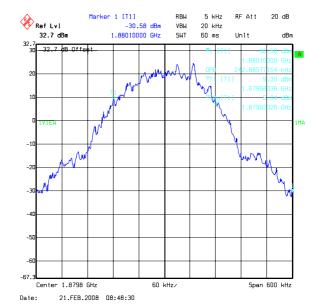
## 7.3.7. Transmitter Occupied Bandwidth

The 99% occupied bandwidth was measured using the channel bandwidth function of the R&S spectrum analyser referencing FCC CFR Part 2

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
Bottom	1850.2	242.886
Middle	1879.8	242.886
Тор	1909.8	242.886

## Transmitter Occupied Bandwidth (continued)





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## 7.3.8. Transmitter Out of Band Conducted Emissions

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Parts 2 and 24.238

### **Bottom Channel**

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1847.0	-24.7	-13.0	11.7	Complied
3700.4	-32.3	-13.0	19.3	Complied

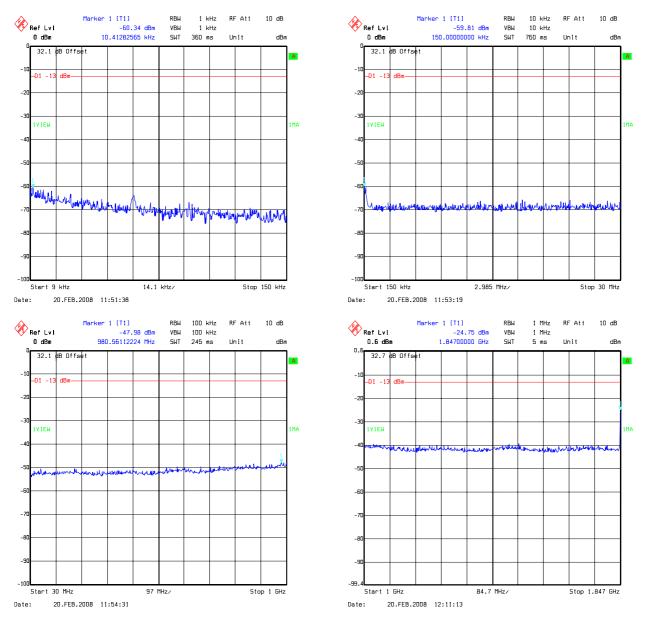
#### Middle Channel

Frequency	Peak Emission Level	Limit	Margin	Result
(MHz)	(dBm)	(dBm)	(dB)	
3759.6	-32.9	-13.0	19.9	Complied

### Top Channel

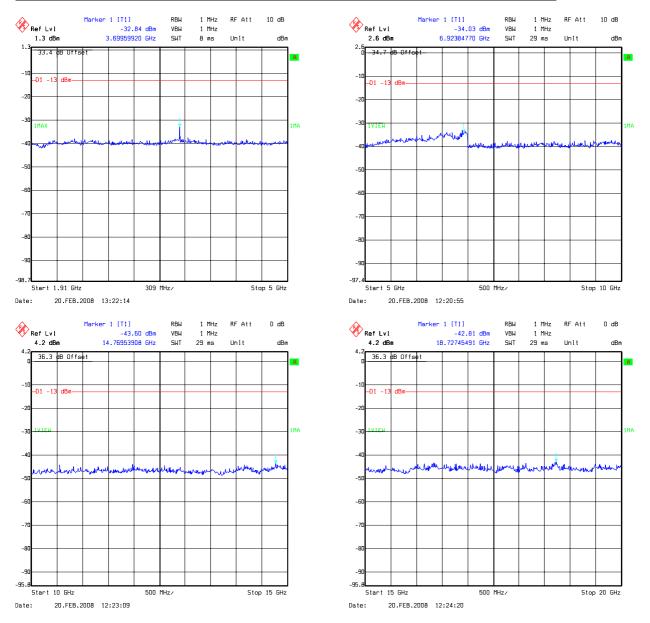
Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1913.0	-14.8	-13.0	1.8	Complied
3819.6	-35.6	-13.0	22.6	Complied

## Transmitter Out of Band Conducted Emissions (continued) - Bottom Channel



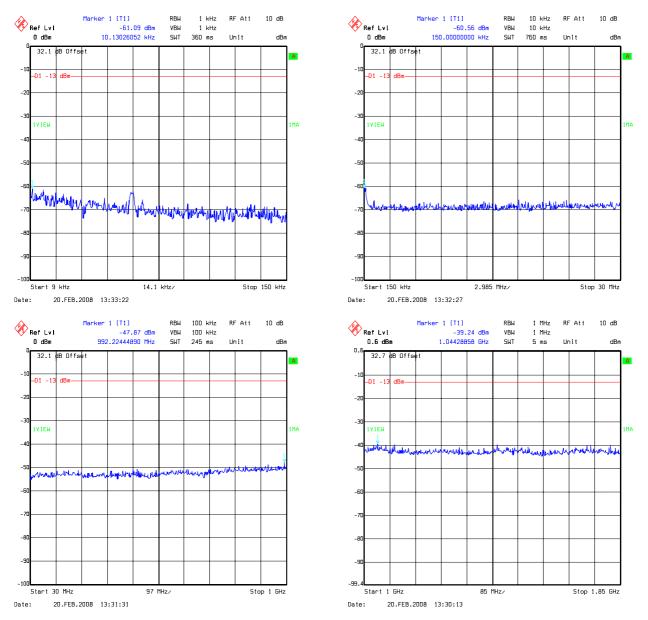
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

## Transmitter Out of Band Conducted Emissions (continued) - Bottom Channel



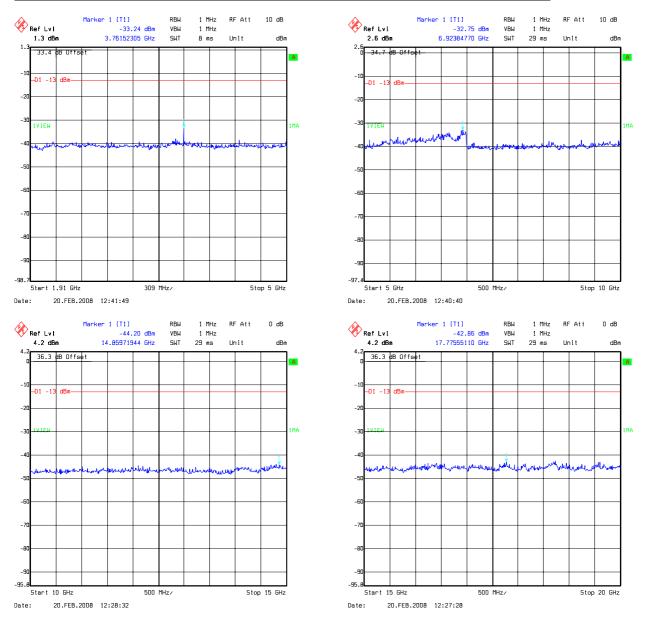
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

## Transmitter Out of Band Conducted Emissions (continued) – Middle Channel



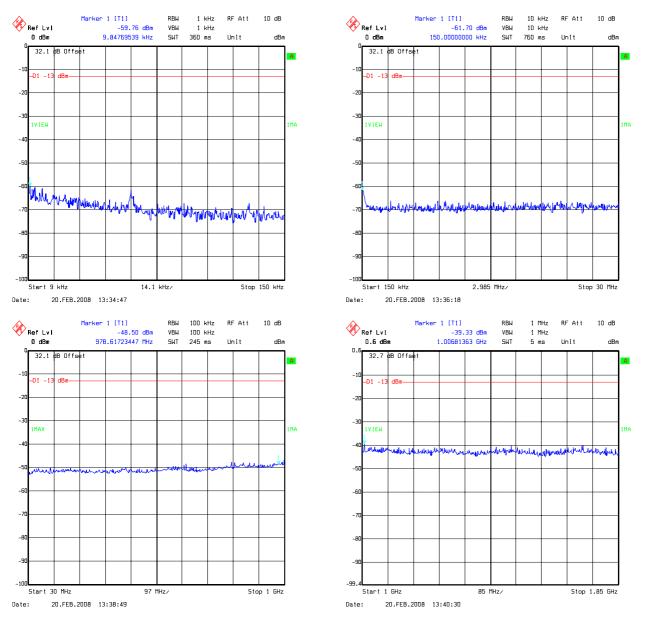
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

## Transmitter Out of Band Conducted Emissions (continued) – Middle Channel



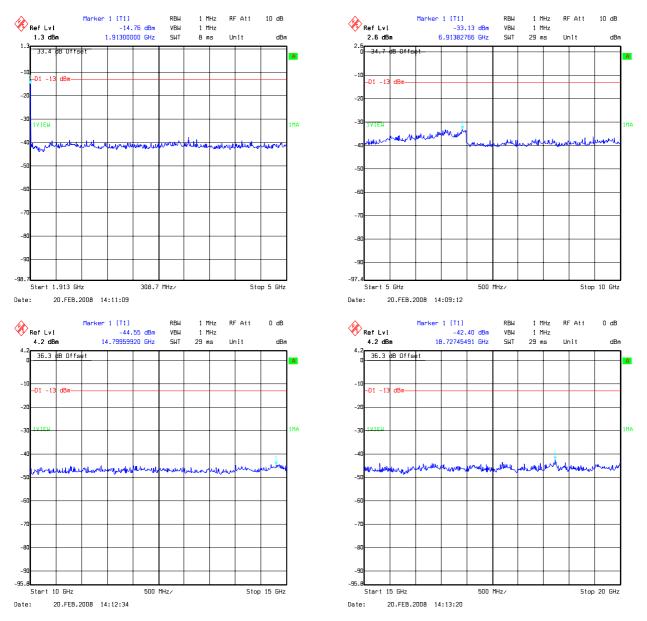
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

## Transmitter Out of Band Conducted Emissions (continued) - Top Channel



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

## Transmitter Out of Band Conducted Emissions (continued) - Top Channel



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

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### Transmitter Out of Band Conducted Emissions (continued)

### Integrated Power Over 1 MHz Strip Band: 1847 to 1848 MHz

2<sup>nd</sup> 1 MHz block immediately outside adjacent frequency block

100 kHz Strip Number	Peak Power (nW/100 kHz)	100 kHz Strip Number	Peak Power (nW/100 kHz)
1	24.0	6	28.8
2	21.9	7	33.1
3	23.4	8	28.8
4	22.4	9	35.5
5	21.9	10	50.1
Total Peak Power:	290.0 nW/MHz		

## Integrated Power Over 1 MHz Strip Band: 1848 to 1849 MHz

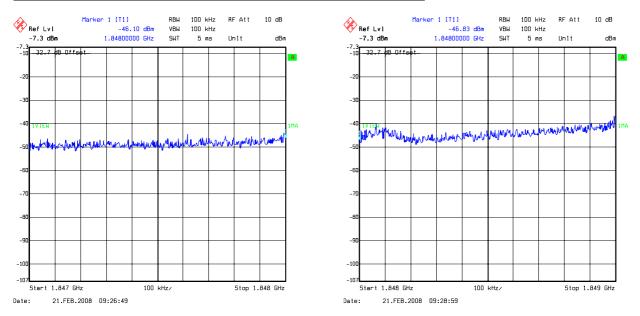
1<sup>st</sup> 1 MHz block immediately outside adjacent frequency block

100 kHz Strip Number	Peak Power (nW/100 kHz)	100 kHz Strip Number	Peak Power (nW/100 kHz)	
1	81.3	6	60.3	
2	61.7	7	87.1	
3	44.7	8	93.3	
4	49.0	9	123.0	
5	66.1	10	257.0	
Total Peak Power:	923.4 nW/MHz			

## Results:

Band (MHz)	Peak Power (nW/MHz)	Peak Power (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)	Status
1847 to 1848	290.0	-35.4	-13.0	22.4	Complied
1848 to 1849	923.4	-30.3	-13.0	17.3	Complied

## Transmitter Out of Band Conducted Emissions (continued)



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### Transmitter Out of Band Conducted Emissions (continued)

## Integrated Power Over 1 MHz Strip Band: 1911 to 1912 MHz

1<sup>st</sup> 1 MHz block immediately outside adjacent frequency block

100 kHz Strip Number	Peak Power (nW/100 kHz)	100 kHz Strip Number	Peak Power (nW/100 kHz)
1	851.1	6	72.4
2	141.3	7	61.7
3	89.1	8	41.7
4	75.9	9	50.1
5	64.6	10	91.2
Total Peak Power:	1539.0 nW/MHz		

## Integrated Power Over 1 MHz Strip Band: 1912 to 1913 MHz

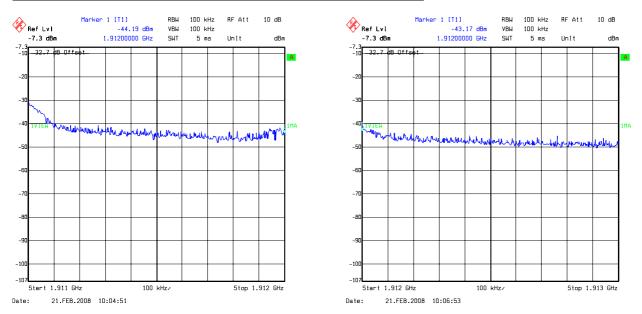
2<sup>nd</sup> 1 MHz block immediately outside adjacent frequency block

100 kHz Strip Number	Peak Power (nW/100 kHz)	100 kHz Strip Number	Peak Power (nW/100 kHz)	
1	87.1	6	28.8	
2	39.8	7	26.9	
3	36.3	8	26.3	
4	30.9	9	21.9	
5	31.6	10	23.4	
Total Peak Power:	353.1 nW/MHz			

#### Results:

Band (MHz)	Peak Power (nW/MHz)	Peak Power (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)	Status
1911 to 1912	1539.0	-28.1	-13.0	15.1	Complied
1912 to 1913	353.1	-34.5	-13.0	21.5	Complied

## Transmitter Out of Band Conducted Emissions (continued)



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# Test of:Enfora Inc.<br/>Enfora Enabler IIIGBGA (GSM0408)To:FCC Part 22: 2007, FCC Part 24: 2007,<br/>RSS-132 Issue 2 September 2005, RSS-133 Issue 4 February 2008<br/>& RSS-Gen Issue 2 June 2007

## 7.3.9. Transmitter Conducted Emissions at Band Edges

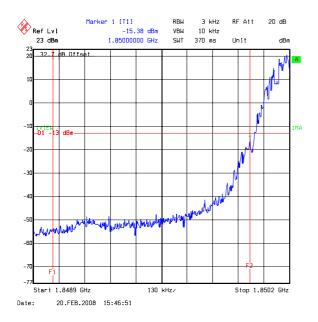
Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Parts 2 and 24.238

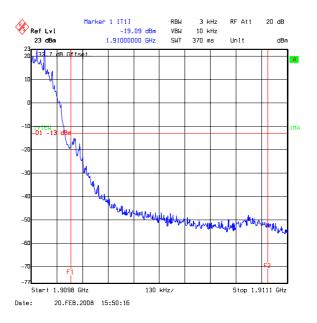
### Bottom Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-15.4	-13.0	2.4	Complied

### Top Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1910	-19.1	-13.0	6.1	Complied





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## 7.3.10. Transmitter Out of Band Radiated Emissions

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Parts 2 and 24.238

### **Bottom Channel**

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
3700.4	-30.2	-13.0	17.2	Complied

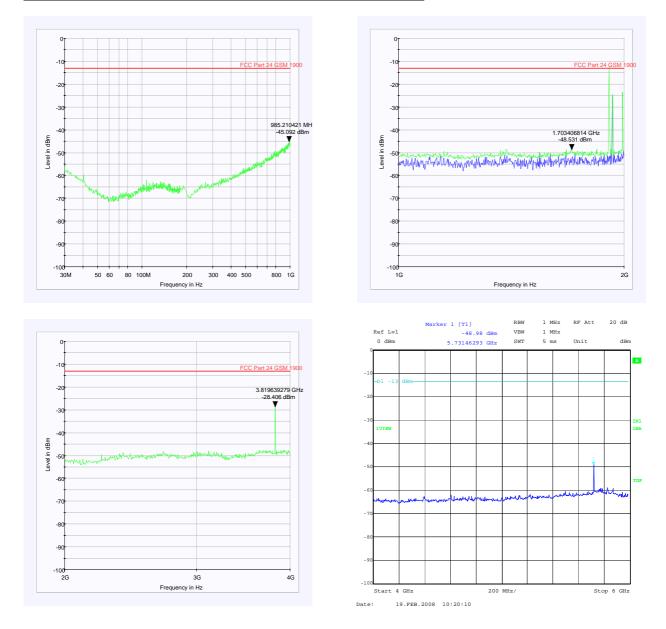
#### **Middle Channel**

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
3759.6	-27.0	-13.0	14.0	Complied

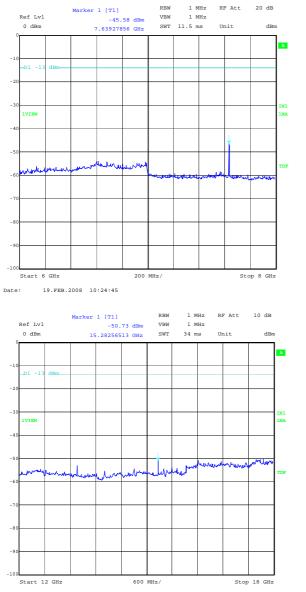
#### Top Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
3819.6	-27.4	-13.0	14.4	Complied

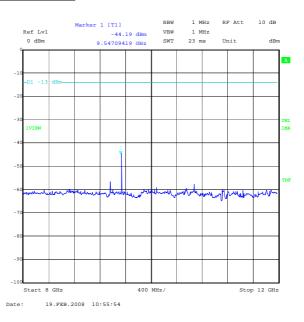
## Transmitter Out of Band Radiated Emissions (continued)

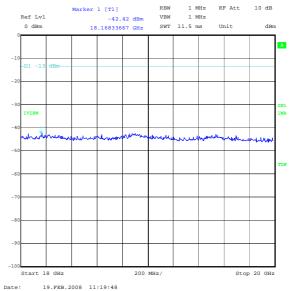


## Transmitter Out of Band Radiated Emissions (continued)



Date: 19.FEB.2008 11:06:59





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### Transmitter Out of Band Conducted Emissions (continued)

### Integrated Power Over 1 MHz Strip Band: 1911 to 1912 MHz

1<sup>st</sup> 1 MHz block immediately outside adjacent frequency block

100 kHz Strip Number	Peak Power (nW/100 kHz)	100 kHz Strip Number	Peak Power (nW/100 kHz)
1	977.2	6	87.1
2	186.2	7	67.6
3	138.0	8	53.7
4	109.6	9	57.5
5	64.6	10	125.9
Total Peak Power:	1867.5 nW/MHz		

## Integrated Power Over 1 MHz Strip Band: 1912 to 1913 MHz

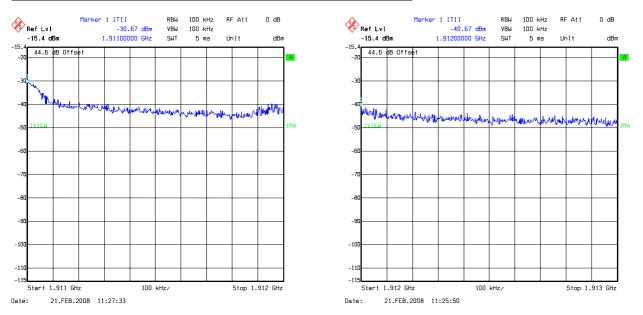
2<sup>nd</sup> 1 MHz block immediately outside adjacent frequency block

100 kHz Strip Number	Peak Power (nW/100 kHz)	100 kHz Strip Number	Peak Power (nW/100 kHz)
1	87.1	6	33.1
2	53.7	7	32.4
3	39.8	8	28.8
4	34.7	9	31.6
5	31.6	10	25.1
Total Peak Power:	398.0 nW/MHz		

### **Results:**

Band (MHz)	Peak Power (nW/MHz)	Peak Power (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)	Status
1911 to 1912	1867.5	-27.3	-13.0	14.3	Complied
1912 to 1913	398.0	-34.0	-13.0	21.0	Complied

## Transmitter Out of Band Radiated Emissions (continued)



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## 7.3.11. Transmitter Radiated Emissions at Band Edges

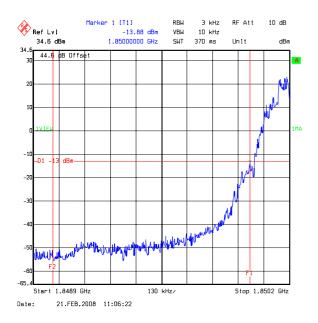
Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Parts 2 and 24.238

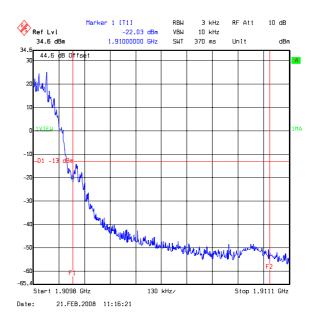
### Bottom Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-13.9	-13.0	0.9	Complied

### Top Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1910	-22.0	-13.0	9.0	Complied





## 8. 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	+/- 3.72 dB
Carrier Output Power	Not applicable	95	+/- 0.46 dB
Conducted Emissions	9 kHz to 10 GHz	95	+/- 1.2 dB
Conducted Emissions Antenna Port	30 MHz to 10 GHz	95	+/- 1.2 dB
Frequency Stability	Not applicable	95	+/- 20 Hz
Occupied Bandwidth	824 to 849 MHz	95	+/- 0.12 %
Radiated Spurious Emissions	30 MHz to 1000 MHz	95	+/- 5.26 dB
Radiated Spurious Emissions	1 GHz 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.

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## Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A028	Antenna	Eaton	91888-2	304	08 Jun 2006	36
A031	Antenna	Eaton	91889-2	557	08 Jun 2006	36
A088	Variable Transformer	Zenith	Y20-HM	9029	Calibrated before use	-
A090	Attenuator	Narda	743-60	01057	Calibrated before use	-
A1141	Directional Coupler	Hewlett Packerd	11691D	1212A02494	Calibrated before use	-
A1398	Attenuator	Weinschel Associates	WA46- 20	A129	Calibrated before use	-
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1829	Pulse Limiter	Rhode & Schwarz	ESH3- Z2	100671	16 Jan 2008	12
A253	Antenna	Flann Microwave	12240- 20	128	17 Nov 2006	36
A254	Antenna	Flann Microwave	14240- 20	139	17 Nov 2006	36
A255	Antenna	Flann Microwave	16240- 20	519	17 Nov 2006	36
A256	Antenna	Flann Microwave	18240- 20	400	17 Nov 2006	36
A436	Antenna	Flann	20240- 20	330	24 Apr 2006	36
A553	Antenna	Chase	CBL611 1A	1593	14 Feb 2008	12
E0511	VTM 7004	Votsch Industrietechnik	VTM 7004	58566087700 010	Calibrated before use	-
M023	Test Receiver	Rohde & Schwarz	ESVP	872 991/027	24 Apr 2007	12
M1093	Communications Test Set	Willtek	4202S	0513018	Calibration not required	-
M1140	Radio Communications Analyser	Anritsu	MT8820 A	6K0000647	Calibration not required	-

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## Test Equipment Used (continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986/022	29 Nov 2007	12
M1249	Thermometer	Fluke	5211	88800049	20 Sep 2007	12
M1251	Digital Multimeter	Fluke	175	89170179	21 Dec 2007	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	18 July 2007	12
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	26 Feb 2008	12
M1379	Test Receiver	Rohde and Schwarz	ESIB7	100330	02 Aug 2007	12
S201	Open Area Test Site	RFI	1	-	25 May 2007	12
S202	Site 2	RFI	2	S202- 15011990	28 Jan 2008	12

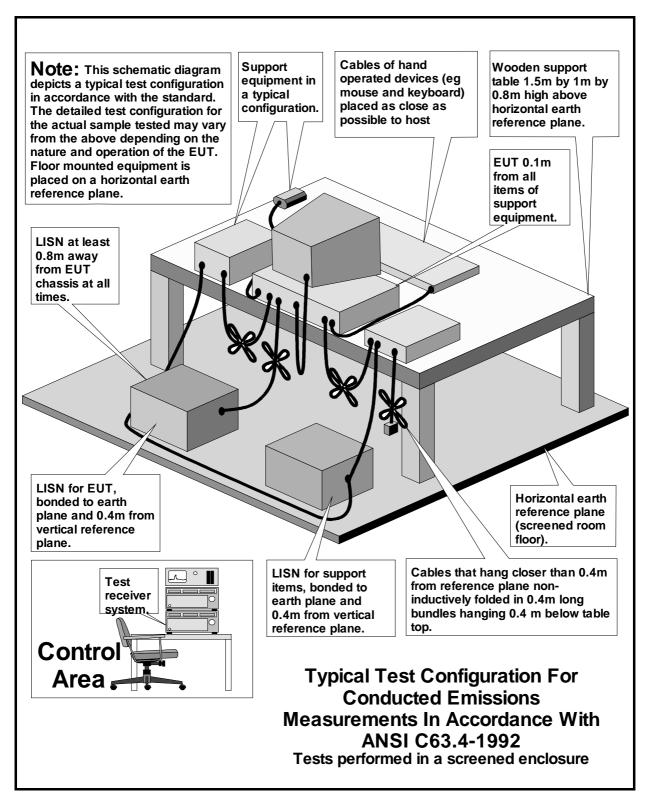
**NB** In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

## **Appendix 2. Test Configuration Drawings**

This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\49741JD05\EMICON	Test configuration for measurement of conducted emissions.
DRG\49741JD05\EMIRAD	Test configuration for measurement of radiated emissions.

#### DRG\49741JD05\EMICON



### DRG\49741JD05\EMIRAD

