# TEST REPORT
# FROM
# RFI GLOBAL SERVICES LTD

Test of: Enfora L.P
GSM3408 Cradle

To: FCC Part 15.107 & 15.109

**Test Report Serial No:**
RFI/EMCE1/RP72183JD10A

| | |
|---|---|
| **This Test Report Is Issued Under The Authority Of Andrew Brown, Operations Manager:** | |
| **Tested By: Giles Aldridge** | **Checked By: Claire Ashman** |
| **Report Copy No: PDF01** | |
| **Issue Date: 12 October 2006** | **Test Dates: 28 September 2006 to 02 October 2006** |

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## 1. Client Information

| | |
|---|---|
| **Company Name:** | Enfora L.P |
| **Address:** | 661 E 18th Street<br>Plano<br>TX 75074<br>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:** | Cradle |
| **Brand Name:** | Enfora |
| **Model Name or Number:** | GSM 3408 |
| **Serial Number:** | 3408390600001 |
| **IMtEI Number:** | 01106900050015 |
| **FCC ID:** | Not Stated |
| **Country of Manufacture:** | China |
| **Date of Receipt:** | 28 September 2006 |

| | |
|---|---|
| **Description:** | Power Supply |
| **Brand Name:** | Globtek |
| **Model Name or Number:** | GT-41052-1305 |
| **Unique Type Identification:** | WR9QA2600EJ1-N-KIT |
| **Serial Number:** | None Stated |
| **FCC ID:** | Not Stated |
| **Country of Manufacture:** | China |
| **Date of Receipt:** | 28 September 2006 |

## 2.2. Description of EUT

The equipment under test is a GSM Mobile Station cradle which enables the user to make and receive calls via a PDA.

## 2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

## 2.4. Additional Information Related to Testing

| | |
|---|---|
| **Equipment Category:** | GSM 850/GSM 1900 |
| **Type of Unit:** | Base Station (Fixed Use) and Portable (Standalone battery powered device) |
| **Weight:** | Not stated |
| **Dimensions:** | Not stated |
| **Power Supply Requirement:** | |
| **DC Supply (Volts)** | 5.1 V |
| **AC Supply (Volts)** | Nominal 115 V 60 Hz AC Mains supply |
| **Internal Battery Supply (Volts)** | 3.7 V |
| **Intended Operating Environment:** | Within GSM Coverage |
| **Cycle Time:** | Less than 2.5 sec |

## 2.5. Port Identification

| Port | Description | Type | Applicable |
|---|---|---|---|
| 1 | Enclosure | - | Y |
| 2 | DC Cable | 2.0m Multicore Screened | Y |

## 2.6. Support Equipment

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

| | |
|---|---|
| **Description:** | PDA |
| **Brand Name:** | PHT Logpad |
| **Model Name or Number:** | Logpad |
| **Serial Number:** | PN20UCW5V40Y |
| **Cable Length and Type:** | Direct Connection to cradle |
| **Connected to Port:** | Cradle Connector |

# 3. Test Specification, Methods and Procedures

## 3.1. Test Specification

| | |
|---|---|
| **Reference:** | FCC Part 15: 2001 Class B |
| **Title:** | Code of Federal Regulations, Part 15 (47CFR15)<br>Radio Frequency Devices: Digital Devices. |
| **Comments:** | A description of the test facility used for this test is on file with, and has been accepted by, the Federal Communications Commission as required by Section 2.948 of Federal Rules. |
| **Purpose of Test:** | To determine whether the equipment complies with the requirements of the specification to achieve the relevant approval. |

## 3.2. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI C63.2 (1996)
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 (2004)
Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (2005)
Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1-1 (2004)
Title: Specification for radio disturbance and immunity measuring apparatus and methods. Part 1. Radio disturbance and immunity measuring apparatus – Measuring Apparatus.

CISPR 16-1-4 (2005)
Title: Specification for radio disturbance and immunity measuring apparatus and methods. Part 1. Radio disturbance and immunity measuring apparatus – Radiated Disturbances.

## 3.3. 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 specification.

# 5. Operation of the EUT during Testing

## 5.1. Operating Modes

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

GSM 850 and GSM 1900 Idle mode.

The reason for choosing this configuration was that it has been defined by the customer as being typical of normal use and likely to be a worst case with regard to EMC.

## 5.2. Configuration and Peripherals

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

The EUT was powered from an AC mains supply, connected to the GSM test network, but in idle mode.

Please refer to Appendix 2 for a schematic drawing of the test configuration, drawing number DRG/72183JD10/001

# 6. Summary of Test Results

| Range of Measurements | Specification Reference | Port Type | Compliancy Status |
|---|---|---|---|
| Conducted Emissions | FCC Part 15 Class B | AC Mains Input | Complied |
| Radiated Emissions Electric Field Strength, 30 MHz to 10000 MHz | FCC Part 15 Class B | Enclosure | 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.

# 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.

## 7.2. Test Results

### 7.2.1. AC Mains Conducted Emissions - Quasi Peak Detector Measurements on Live and Neutral Lines – GSM 850 Idle Mode

7.2.1.1. Plots of the initial scans can be found in Appendix 3.

7.2.1.2. The following table lists frequencies at which emissions were measured using a quasi peak detector:

**Test Summary:**

| | |
|---|---|
| **Port:** | AC Mains Input |
| **Basic Standard:** | FCC Part 15 Class B |

**Environmental Conditions:**

| | |
|---|---|
| **Temperature Variation (°C):** | 22 |
| **Relative Humidity Variation (%):** | 54 |
| **Atmospheric Pressure Variation (mb):** | 996 |

**Results:**

| Frequency (MHz) | Line | Quasi Peak Level (dBμV) | Limit (dBμV) | Margin (dB) | Note(s) | Result |
|---|---|---|---|---|---|---|
| 0.166 | Neutral | 35.1 | 65.2 | 30.1 | - | Complied |
| 0.174 | Live | 29.8 | 64.8 | 35.0 | - | Complied |
| 0.194 | Neutral | 31.2 | 63.9 | 32.7 | - | Complied |
| 0.222 | Live | 27.9 | 62.7 | 34.8 | - | Complied |
| 0.470 | Live | 20.5 | 56.5 | 36.0 | - | Complied |
| 2.202 | Live | 16.1 | 56.0 | 39.9 | - | Complied |

## 7.2.2. AC Mains Conducted Emissions - Average Detector Measurements on Live and Neutral Lines GSM 850 Idle Mode

7.2.2.1. Following the initial scans and quasi peak measurements, further measurements were made at the relevant frequencies using an average detector. The measured levels were as follows:

**Test Summary:**

| | |
|---|---|
| **Port:** | AC Mains Input |
| **Basic Standard:** | FCC Part 15 Class B |

**Environmental Conditions:**

| | |
|---|---|
| **Temperature Variation (°C):** | 22 |
| **Relative Humidity Variation (%):** | 54 |
| **Atmospheric Pressure Variation (mb):** | 996 |

**Results:**

| Frequency (MHz) | Line | Average Level (dBμV) | Limit (dBμV) | Margin (dB) | Note(s) | Result |
|---|---|---|---|---|---|---|
| 0.166 | Neutral | 24.9 | 55.2 | 30.6 | - | Complied |
| 0.174 | Live | 20.1 | 54.8 | 34.7 | - | Complied |
| 0.194 | Neutral | 22.4 | 53.9 | 31.5 | - | Complied |
| 0.222 | Live | 18.1 | 52.7 | 34.6 | - | Complied |
| 0.470 | Live | 11.1 | 46.5 | 35.4 | - | Complied |
| 2.202 | Live | 6.2 | 46.0 | 39.8 | - | Complied |

## 7.2.3. AC Mains Conducted Emissions - Quasi Peak Detector Measurements on Live and Neutral Lines - GSM 1900 Idle Mode

7.2.3.1. Plots of the initial scans can be found in Appendix 3.

7.2.3.2. The following table lists frequencies at which emissions were measured using a quasi peak detector:

**Test Summary:**

| | |
|---|---|
| **Port:** | AC Mains Input |
| **Basic Standard:** | FCC Part 15 Class B |

**Environmental Conditions:**

| | |
|---|---|
| **Temperature Variation (°C):** | 22 |
| **Relative Humidity Variation (%):** | 54 |
| **Atmospheric Pressure Variation (mb):** | 996 |

**Results:**

| Frequency (MHz) | Line | Quasi Peak Level (dBμV) | Limit (dBμV) | Margin (dB) | Note(s) | Result |
|---|---|---|---|---|---|---|
| 0.158 | Neutral | 31.0 | 65.6 | 34.6 | - | Complied |
| 0.190 | Neutral | 27.0 | 64.0 | 37.0 | - | Complied |
| 0.234 | Neutral | 21.7 | 62.3 | 40.6 | - | Complied |
| 0.274 | Neutral | 19.4 | 61.0 | 41.6 | - | Complied |
| 0.370 | Live | 16.6 | 58.5 | 41.9 | - | Complied |
| 8.018 | Neutral | 12.4 | 60.0 | 47.6 | - | Complied |

## 7.2.4. AC Mains Conducted Emissions - Average Detector Measurements on Live and Neutral Lines GSM 1900 Idle Mode

7.2.4.1. Following the initial scans and quasi peak measurements, further measurements were made at the relevant frequencies using an average detector. The measured levels were as follows:

### Test Summary:

| | |
|---|---|
| **Port:** | AC Mains Input |
| **Basic Standard:** | FCC Part 15 Class B |

### Environmental Conditions:

| | |
|---|---|
| **Temperature Variation (°C):** | 22 |
| **Relative Humidity Variation (%):** | 54 |
| **Atmospheric Pressure Variation (mb):** | 996 |

### Results:

| Frequency (MHz) | Line | Average Level (dBμV) | Limit (dBμV) | Margin (dB) | Note(s) | Result |
|---|---|---|---|---|---|---|
| 0.158 | Neutral | 21.3 | 55.6 | 32.3 | - | Complied |
| 0.190 | Neutral | 17.1 | 54.0 | 36.9 | - | Complied |
| 0.234 | Neutral | 10.9 | 52.3 | 41.4 | - | Complied |
| 0.274 | Neutral | 10.1 | 51.0 | 40.9 | - | Complied |
| 0.370 | Live | 7.1 | 48.5 | 41.4 | - | Complied |
| 8.018 | Neutral | 4.3 | 50.0 | 45.7 | - | Complied |

## 7.2.5. Radiated Emissions - Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz) GSM 850 Idle

7.2.5.1. Plots of the initial scans can be found in Appendix 3.

7.2.5.2. The following table lists frequencies at which emissions were measured using a quasi peak detector, at a test measurement distance of 3 metres:

### Test Summary:

| | |
|---|---|
| **Port:** | Enclosure |
| **Basic Standard:** | FCC Part 15 Class B |

### Environmental Conditions:

| | |
|---|---|
| **Temperature Variation (°C):** | 20 |
| **Relative Humidity Variation (%):** | 70 |
| **Atmospheric Pressure Variation (mb):** | 996 |

### Results:

| Frequency (MHz) | Antenna Polarity | Quasi Peak Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Note(s) | Result |
|---|---|---|---|---|---|---|
| 48.200 | Vertical | 22.3 | 40.0 | 17.7 | - | Complied |
| 93.770 | Vertical | 31.1 | 40.5 | 12.4 | - | Complied |
| 131.807 | Vertical | 25.1 | 43.5 | 18.4 | - | Complied |
| 156.541 | Vertical | 14.4 | 43.5 | 29.1 | - | Complied |
| 497.898 | Vertical | 31.9 | 46.0 | 14.1 | - | Complied |
| 569.891 | Horizontal | 26.6 | 46.0 | 19.4 | - | Complied |
| 893.800 | Vertical | 30.7 | 46.0 | 15.3 | - | Complied |

## 7.2.6. Radiated Emissions - Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz) GSM 1900 Idle

7.2.6.1. Plots of the initial scans can be found in Appendix 3.

7.2.6.2. The following table lists frequencies at which emissions were measured using a quasi peak detector, at a test measurement distance of 3 metres:

### Test Summary:

| | |
|---|---|
| **Port:** | Enclosure |
| **Basic Standard:** | FCC Part 15 Class B |

### Environmental Conditions:

| | |
|---|---|
| **Temperature Variation (°C):** | 20 |
| **Relative Humidity Variation (%):** | 70 |
| **Atmospheric Pressure Variation (mb):** | 996 |

### Results:

| Frequency (MHz) | Antenna Polarity | Quasi Peak Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Note(s) | Result |
|---|---|---|---|---|---|---|
| 49.202 | Vertical | 19.7 | 40.0 | 20.3 | - | Complied |
| 111.819 | Vertical | 15.7 | 43.5 | 22.8 | - | Complied |
| 136.581 | Vertical | 13.2 | 43.5 | 30.3 | - | Complied |
| 144.362 | Vertical | 12.8 | 43.5 | 30.7 | - | Complied |
| 476.028 | Vertical | 21.1 | 46.0 | 24.9 | - | Complied |
| 552.979 | Vertical | 29.8 | 46.0 | 16.2 | - | Complied |

## 7.2.7. Electric Field Strength Measurements – GSM 850 Idle Mode

7.2.7.1. The client has stated that the highest clock frequency for the EUT was 1900 MHz. Therefore tests were performed up to 10 GHz.

7.2.7.2. Plots of the initial scans can be found in Appendix 4.

7.2.7.3. The following tables list frequencies at which emissions were measured using Peak and Average detector functions:

**Highest Peak Level:**

| Frequency (GHz) | Antenna Polarity | Peak Detector level (dBμV) | Antenna factor (dB) | Cable loss (dB) | Actual Peak Level (dBμV/m) | Peak Limit (dBμV/m) | Peak Margin (dB) | Result |
|---|---|---|---|---|---|---|---|---|
| 1.008 | Vertical | 16.94 | 22.1 | 1.5 | 40.54 | 54.0 | 13.46 | Complied |
| 1.032 | Vertical | 17.21 | 22.1 | 1.5 | 40.81 | 54.0 | 13.19 | Complied |
| 1.095 | Vertical | 16.68 | 20.7 | 1.5 | 37.88 | 54.0 | 16.12 | Complied |
| 1.117 | Vertical | 14.92 | 20.7 | 1.5 | 37.12 | 54.0 | 16.88 | Complied |
| 1.392 | Vertical | 17.10 | 21.1 | 1.7 | 39.90 | 54.0 | 14.10 | Complied |
| 1.787 | Vertical | 17.87 | 21.3 | 1.8 | 40.97 | 54.0 | 13.03 | Complied |
| 1.008 | Horizontal | 17.72 | 22.1 | 1.5 | 41.32 | 54.0 | 12.68 | Complied |
| 1.032 | Horizontal | 18.16 | 22.1 | 1.5 | 41.76 | 54.0 | 12.24 | Complied |
| 1.095 | Horizontal | 16.56 | 20.7 | 1.5 | 38.76 | 54.0 | 15.24 | Complied |
| 1.117 | Horizontal | 15.92 | 20.7 | 1.5 | 38.12 | 54.0 | 15.88 | Complied |
| 1.392 | Horizontal | 16.52 | 21.1 | 1.7 | 39.32 | 54.0 | 14.68 | Complied |
| 1.787 | Horizontal | 18.09 | 21.3 | 1.8 | 41.19 | 54.0 | 12.81 | Complied |

## Electric Field Strength Measurements – GSM 850 Idle Mode (Continued)

### Highest Average Level:

| Frequency (GHz) | Antenna Polarity | Average Detector level (dBμV) | Antenna factor (dB) | Cable loss (dB) | Actual Average Level (dBμV/m) | Average Limit (dBμV/m) | Average Margin (dB) | Result |
|---|---|---|---|---|---|---|---|---|
| 1.008 | Vertical | 5.68 | 22.1 | 1.5 | 29.28 | 54.0 | 24.72 | Complied |
| 1.032 | Vertical | 6.11 | 22.1 | 1.5 | 29.71 | 54.0 | 24.29 | Complied |
| 1.095 | Vertical | 5.52 | 20.7 | 1.5 | 27.72 | 54.0 | 26.28 | Complied |
| 1.117 | Vertical | 5.31 | 20.7 | 1.5 | 27.51 | 54.0 | 26.49 | Complied |
| 1.392 | Vertical | 5.98 | 21.1 | 1.7 | 28.78 | 54.0 | 25.22 | Complied |
| 1.787 | Vertical | 7.06 | 21.3 | 1.8 | 30.16 | 54.0 | 23.84 | Complied |
| 1.008 | Horizontal | 5.98 | 22.1 | 1.5 | 29.58 | 54.0 | 23.84 | Complied |
| 1.032 | Horizontal | 6.31 | 22.1 | 1.5 | 29.91 | 54.0 | 24.09 | Complied |
| 1.095 | Horizontal | 6.49 | 20.7 | 1.5 | 28.69 | 54.0 | 25.31 | Complied |
| 1.117 | Horizontal | 6.29 | 20.7 | 1.5 | 28.49 | 54.0 | 25.51 | Complied |
| 1.392 | Horizontal | 5.68 | 21.1 | 1.7 | 28.48 | 54.0 | 25.52 | Complied |
| 1.787 | Horizontal | 6.80 | 21.3 | 1.8 | 29.90 | 54.0 | 24.10 | Complied |

## 7.2.8. Electric Field Strength Measurements – GSM 1900 Idle Mode

7.2.8.1. The client has stated that the highest clock frequency for the EUT was 1900 MHz. Therefore tests were performed up to 10 GHz.

7.2.8.2. Plots of the initial scans can be found in Appendix 4.

7.2.8.3. The following tables list frequencies at which emissions were measured using Peak and Average detector functions:

**Highest Peak Level:**

| Frequency (GHz) | Antenna Polarity | Peak Detector level (dBμV) | Antenna factor (dB) | Cable loss (dB) | Actual Peak Level (dBμV/m) | Peak Limit (dBμV/m) | Peak Margin (dB) | Result |
|---|---|---|---|---|---|---|---|---|
| 1.009 | Vertical | 15.42 | 22.1 | 1.5 | 39.02 | 54.0 | 14.98 | Complied |
| 1.111 | Vertical | 16.12 | 20.7 | 1.5 | 38.32 | 54.0 | 15.68 | Complied |
| 1.160 | Vertical | 14.82 | 20.6 | 1.5 | 36.92 | 54.0 | 17.08 | Complied |
| 1.196 | Vertical | 20.46 | 20.6 | 1.5 | 42.56 | 54.0 | 11.44 | Complied |
| 1.807 | Vertical | 22.58 | 21.3 | 1.8 | 45.68 | 54.0 | 8.32 | Complied |
| 1.948 | Vertical | 21.04 | 20.8 | 1.9 | 43.74 | 54.0 | 10.26 | Complied |
| 2.391 | Vertical | 18.44 | 21.7 | 2.1 | 42.24 | 54.0 | 11.76 | Complied |
| 1.009 | Horizontal | 17.72 | 22.1 | 1.5 | 41.32 | 54.0 | 12.68 | Complied |
| 1.111 | Horizontal | 18.42 | 20.7 | 1.5 | 40.62 | 54.0 | 13.38 | Complied |
| 1.160 | Horizontal | 17.50 | 20.6 | 1.5 | 39.60 | 54.0 | 14.40 | Complied |
| 1.196 | Horizontal | 19.17 | 20.6 | 1.5 | 41.27 | 54.0 | 12.73 | Complied |
| 1.807 | Horizontal | 22.06 | 21.3 | 1.8 | 45.16 | 54.0 | 8.84 | Complied |
| 1.948 | Horizontal | 21.59 | 20.8 | 1.9 | 44.29 | 54.0 | 9.71 | Complied |
| 2.391 | Horizontal | 17.87 | 21.7 | 2.1 | 41.69 | 54.0 | 12.33 | Complied |

## Electric Field Strength Measurements – GSM 1900 Idle Mode (Continued)

### Highest Average Level:

| Frequency (GHz) | Antenna Polarity | Average Detector level (dBμV) | Antenna factor (dB) | Cable loss (dB) | Actual Average Level (dBμV/m) | Average Limit (dBμV/m) | Average Margin (dB) | Result |
|---|---|---|---|---|---|---|---|---|
| 1.009 | Vertical | 4.73 | 22.1 | 1.5 | 28.33 | 54.0 | 15.67 | Complied |
| 1.111 | Vertical | 5.14 | 20.7 | 1.5 | 27.34 | 54.0 | 16.66 | Complied |
| 1.160 | Vertical | 4.68 | 20.6 | 1.5 | 26.78 | 54.0 | 27.22 | Complied |
| 1.196 | Vertical | 10.24 | 20.6 | 1.5 | 32.34 | 54.0 | 11.66 | Complied |
| 1.807 | Vertical | 17.42 | 21.3 | 1.8 | 40.52 | 54.0 | 13.48 | Complied |
| 1.948 | Vertical | 16.26 | 20.8 | 1.9 | 38.96 | 54.0 | 15.14 | Complied |
| 2.391 | Vertical | 7.32 | 21.7 | 2.1 | 31.12 | 54.0 | 12.78 | Complied |
| 1.009 | Horizontal | 5.68 | 22.1 | 1.5 | 29.28 | 54.0 | 24.72 | Complied |
| 1.111 | Horizontal | 6.12 | 20.7 | 1.5 | 28.32 | 54.0 | 25.68 | Complied |
| 1.160 | Horizontal | 5.98 | 20.6 | 1.5 | 28.08 | 54.0 | 25.92 | Complied |
| 1.196 | Horizontal | 7.80 | 20.6 | 1.5 | 29.90 | 54.0 | 14.10 | Complied |
| 1.807 | Horizontal | 14.82 | 21.3 | 1.8 | 37.92 | 54.0 | 16.08 | Complied |
| 1.948 | Horizontal | 16.43 | 20.8 | 1.9 | 39.13 | 54.0 | 14.87 | Complied |
| 2.391 | Horizontal | 6.54 | 21.7 | 2.1 | 30.34 | 54.0 | 23.66 | 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 |
|---|---|---|---|
| Radiated Emissions | 30 to 1000 MHz | 95% | ± 4.54 dB |
| Radiated Emissions | 1 to 2 GHz | 95% | ± 4.76 dB |
| Radiated Emissions | 2 to 4 GHz | 95% | ± 4.76 dB |
| Radiated Emissions | 4 to 6 GHz | 95% | ± 4.74 dB |
| Radiated Emissions | 6 to 8 GHz | 95% | ± 4.76 dB |
| Radiated Emissions | 8 to 12 GHz | 95% | ± 4.79 dB |
| Conducted Emissions AC (and DC) Lines | 150 kHz to 30 MHz | 95% | ± 3.66 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.

Where it has been necessary to perform measurements using the substitution method, it has not been possible to calculate an uncertainty for this measurement. Due to the complex effects on the emissions levels measured within a screened room with either a signal source or the equipment under test, the calculation of a general measurement uncertainty for this process would be unrepresentative for all possible measured results.

## Appendix 1. Test Equipment Used

| RFI No. | Instrument | Manufacturer | Type No. | Serial No. | Date Last Calibrated | Cal. Interval |
|---|---|---|---|---|---|---|
| A004 | LISN | Rohde & Schwarz | ESH3-Z5 | 890 604/027 | 05 Apr 2006 | 12 |
| A028 | Horn Antenna | Eaton | 91888-2 | 304 | 08 Jun 2006 | 36 |
| A1037 | Bilog Antenna | Chase EMC Ltd | CBL6112B | 2413 | 26 Jan 2006 | 12 |
| A1227 | Pre Amplifier | Agilent | 8449B | 3008A01566 | 30 Aug 2006 | 12 |
| A1360 | Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | A1360-20112003 | 11 May 2006 | 12 |
| A1362 | Horn Antenna | Stoddart Aircraft Radio Co., Inc. | 91889-1 | N/A | 08 Jun 2006 | 12 |
| A253 | Horn Antenna | Flann Microwave | 12240-20 | 128 | 07 July 2004 | 36 |
| A259 | Bilog Antenna | Chase | CBL6111 | 1513 | 03 Mar 2006 | 12 |
| A276 | OATS Positioning Controller | Rohde & Schwarz | HCC | | Not Applicable | 12 |
| A427 | Horn Antenna | Flann | 14240-20 | 150 | 06 Oct 2003 | 36 |
| A429 | Horn Antenna | Flann | 16240-20 | 561 | 06 Oct 2003 | 36 |
| C1071 | 3m Cable | Rosenberger | FA21A1030M5050 | Not Stated | 01 April 2006 | 12 |
| C1116 | Cable | UtiFlex | UFA 210A-1-0360-50x50 | 1409 | 01 April 2006 | 12 |
| C151 | Cable | Rosenberger | UFA210A-1-1181-70x70 | None | 01 April 2006 | 12 |
| C160 | Cables | Rosenberger | UFA210A-1-1181-70x70 | None | 01 April 2006 | 12 |

## Test Equipment Used (Continued)

| RFI No. | Instrument | Manufacturer | Type No. | Serial No. | Date Last Calibrated | Cal. Interval |
|---|---|---|---|---|---|---|
| C348 | Cable | Rosenberger | UFA210A-1-1181-70x70 | 2993 | 01 April 2006 | 12 |
| C363 | BNC Cable | Rosenberger | RG142 | None | 01 April 2006 | 12 |
| C375 | Cable | Rosenberger | RG400 | None | 01 April 2006 | 12 |
| C461 | Cable | Rosenberger | UFA210A-1-1182-704704 | 98H0305 | 01 April 2006 | 12 |
| M023 | ESVP Receiver | Rohde & Schwarz | ESVP | 872 991/027 | 10 Apr 2006 | 12 |
| M024 | Spectrum Monitor | Rohde & Schwarz | EZM | 873 952/006 | Not applicable | 12 |
| M1178 | Thermo-Hygrometer | RS | 212-124 | N/A | 11 Feb 2006 | 12 |
| M1263 | ESIB7 | Rohde & Schwarz | ESIB7 | 100265 | 12 Jan 2006 | 12 |
| M1273 | ESIB 26 EMI Test Receiver | Rhode & Schwarz | ESIB 26 | 100275 | 13 Feb 2006 | 12 |
| M1293 | STAR ESC | Microprossx | 907-1037A | ESC.03.14.02 | 07 Jul 2005 | 12 |

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

# Appendix 2. Measurement Methods

## A2.1. AC Mains Conducted Emissions

A2.1.1. AC mains conducted emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

A2.1.2. The test was performed in a shielded enclosure with the equipment arranged as detailed in the standard on a wooden bench using the floor of the screened enclosure as the ground reference plane and with the EUT powered via a 60 Hz AC mains supply.

A2.1.3. Initial measurements in the form of swept scans covering the entire measurement band were performed in order to identify frequencies on which the EUT was generating interference. In order to minimise the time taken for these swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidths (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

A2.1.4. Following the initial scans, a graph was produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested (at individual frequencies) using the appropriate detector function.

A2.1.5. The test equipment settings for conducted emissions measurements were as follows:

| **Receiver Function** | **Initial Scan** | **Final Measurements** |
|---|---|---|
| Detector Type: | Peak | Quasi-Peak (CISPR)* |
| Mode: | Max Hold | Not applicable |
| Bandwidth: | 10 kHz | 9 kHz |
| Amplitude Range: | 60 dB | 20 dB |
| Measurement Time: | Not applicable | > 1 s |
| Observation Time: | Not applicable | > 15 s |
| Step Size: | Continuous sweep | Not applicable |
| Sweep Time: | Coupled | Not applicable |

* In some instances an Average detector function may also have been used.

## A2.2. Radiated Emissions

A2.2.1. Radiated emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

A2.2.2. Initial measurements covering the entire measurement band in the form of swept scans in a shielded enclosure were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which the EUT should be re-measured in full on the open area test site. In order to minimise the time taken for the swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and for the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

A2.2.3. The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. Following the initial scans, graphs were produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested on the open area test site, at the appropriate distance, using a measuring receivers with a Quasi-Peak detector (below 1000 MHz), where applicable, for measurements above 1000 MHz average and peak detectors were used.

A2.2.4. For the main (final) measurements the EUT was arranged on a non-conducting table on an open area test site, as detailed in the specification.

A2.2.5. All measurements on the open area test site were performed using broadband antennas.

A2.2.6. On the open area test site, at each frequency where a signal was found, the levels were maximised by initially rotating the turntable through 360° and then varying the antenna height between 1 m and 4 m. At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT.

**Radiated Emissions (Continued)**

A2.2.7. The test equipment settings for radiated emissions measurements were as follows:

| Receiver Function | Initial Scan | Final Measurements Below 1GHz | Final Measurements Above 1 GHz |
|---|---|---|---|
| Detector Type: | Peak | Quasi-Peak (CISPR) | Peak/Average |
| Mode: | Max Hold | Not applicable | Not applicable |
| Bandwidth: | 100 kHz | 120 kHz | 1 MHz |
| Amplitude Range: | 60 dB | 20 dB | 20 dB (typical) |
| Measurement Time: | Not applicable | > 1 s | > 1 s |
| Observation Time: | Not applicable | > 15 s | > 15 s |
| Step Size: | Continuous sweep | Not applicable | Not applicable |
| Sweep Time: | Coupled | Not applicable | Not applicable |

## Appendix 3. Test Configuration Drawings

This Appendix contains the following drawings:

| Drawing Reference Number | Title |
|---|---|
| DRG/72183JD10/EMICON | Test configuration for measurement of conducted emissions. |
| DRG/72183JD10/EMIRAD | Test configuration for measurement of radiated emissions. |
| DRG/72183JD10/001 | Schematic diagram of the EUT, support equipment and interconnecting cables used for the test. |

**Test Of:** Enfora L.P
GSM3408 Cradle
**To:** FCC Part 15.107 & 15.109

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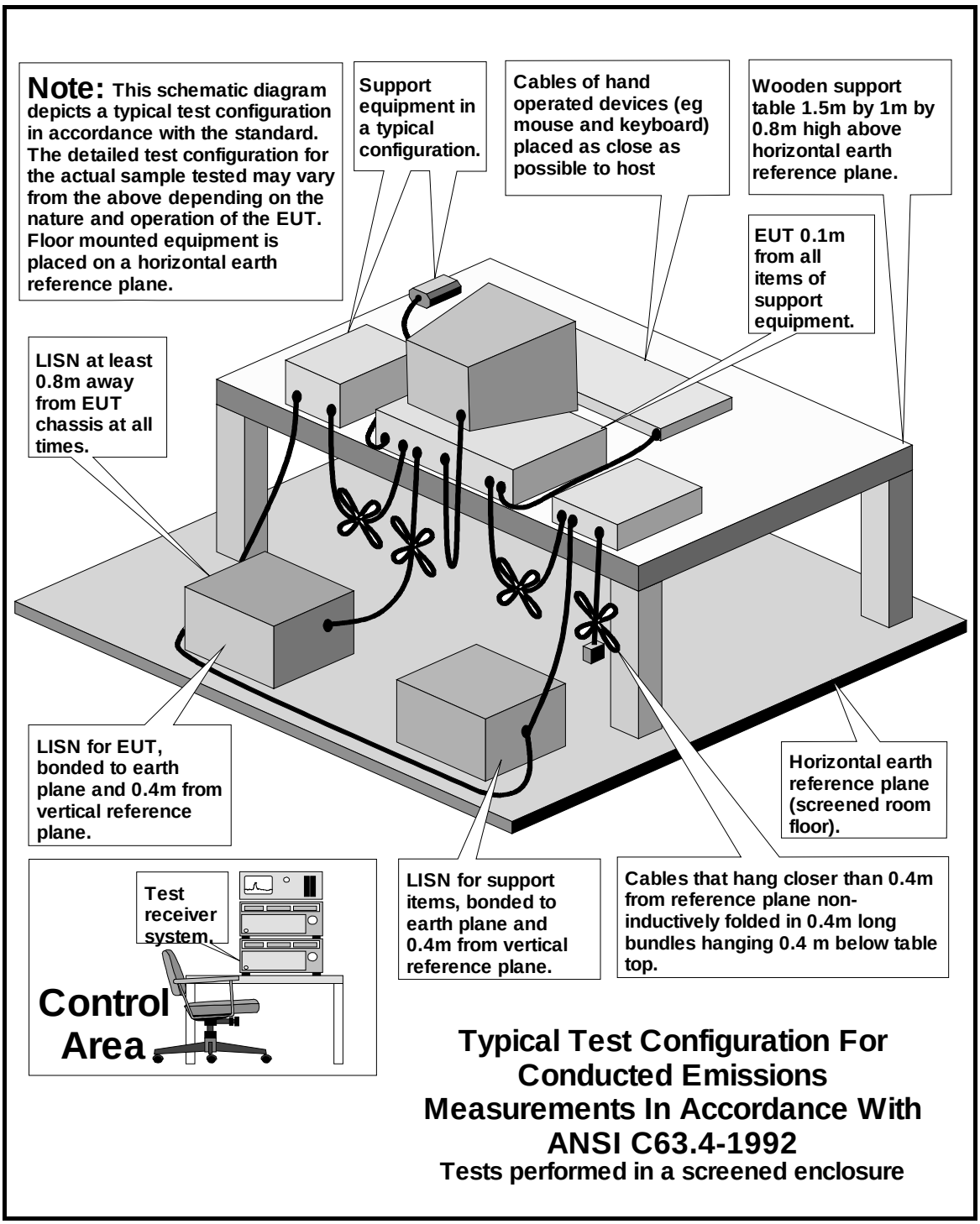
**DRG/72183JD10/EMICON**



**Test Of:** **Enfora L.P**
**GSM3408 Cradle**
**To:** **FCC Part 15.107 & 15.109**

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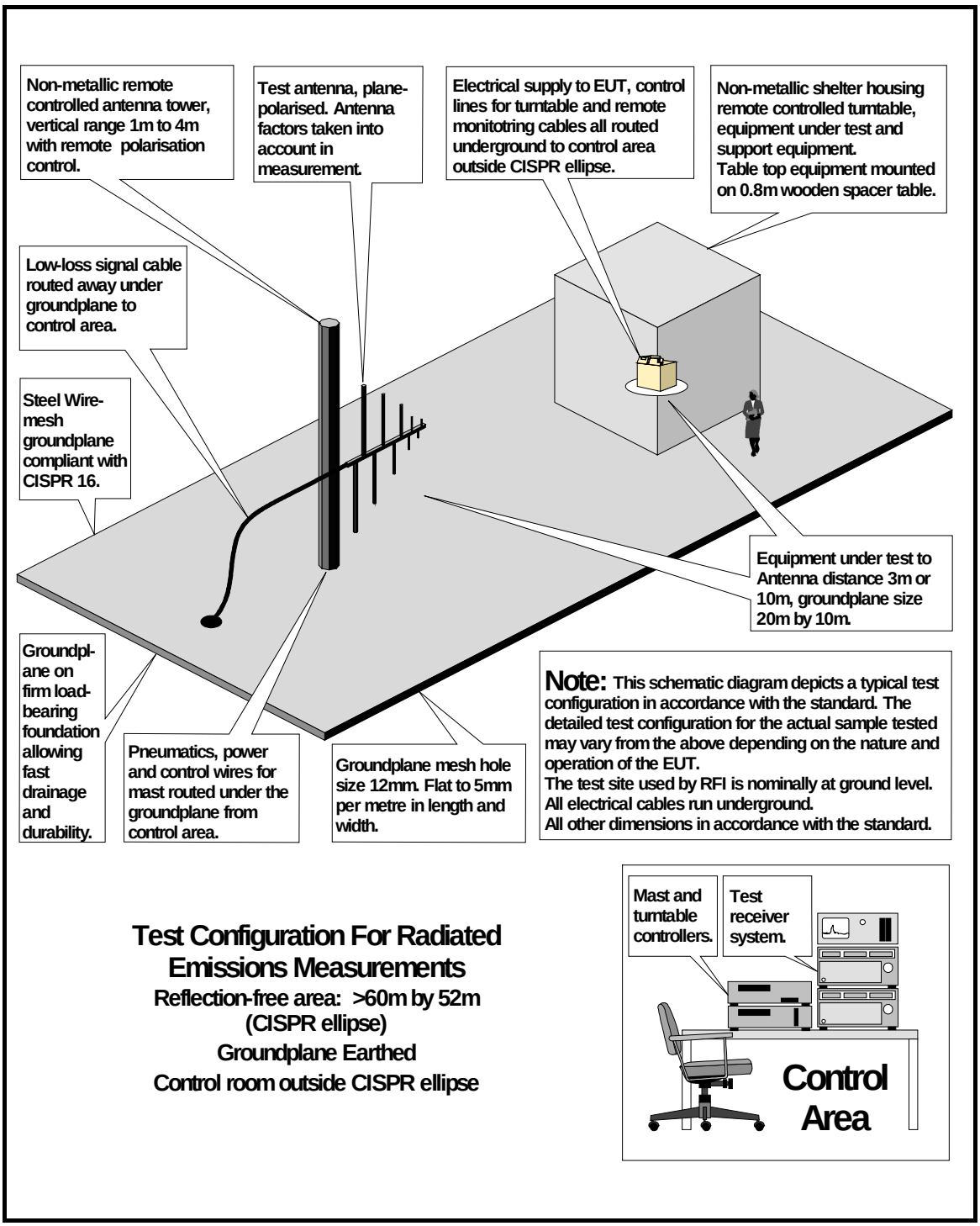
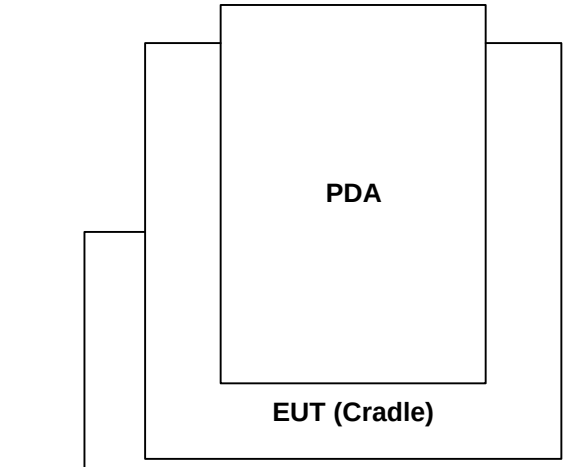
**DRG/72183JD10/EMIRAD**




**Test Configuration For Radiated Emissions Measurements**
**Reflection-free area: >60m by 52m (CISPR ellipse)**
**Groundplane Earthed**
**Control room outside CISPR ellipse**

**DRG/72183JD10/001**

**Configuration of EUT and Local Support Equipment**




**2.0m Multicore Screened**

**110 V 60 Hz AC Supply**

**230V AC 50 Hz**

**Configuration of Remote Support Equipment**

## Appendix 4. Graphical Test Results

This Appendix contains the following graphs:

| Graph Reference Number | Title |
|---|---|
| GPH/72183JD10/001 | Conducted Emissions<br>Pre-Scan (0.15 MHz to 30.0 MHz) – GSM 850 Idle Mode |
| GPH/72183JD10/002 | Conducted Emissions<br>Pre-Scan (0.15 MHz to 30.0 MHz) – GSM 1900 Idle Mode |
| GPH/72183JD10/003 | Radiated Emissions<br>Pre-Scan (30.0 MHz to 1000.0 MHz) – GSM 850 Idle Mode |
| GPH/72183JD10/004 | Radiated Emissions<br>Pre-Scan (30.0 MHz to 1000.0 MHz) – GSM 1900 Idle Mode |
| GPH/72183JD10/005 | Radiated Emissions<br>Pre-Scan (1.0 GHz to 2.0 GHz) – GSM 850 Idle Mode |
| GPH/72183JD10/006 | Radiated Emissions<br>Pre-Scan (1.0 GHz to 2.0 GHz) – GSM 1900 Idle Mode |
| GPH/72183JD10/007 | Radiated Emissions<br>Pre-Scan (2.0 GHz to 4.0 GHz) – GSM 850 Idle Mode |
| GPH/72183JD10/008 | Radiated Emissions<br>Pre-Scan (2.0 GHz to 4.0 GHz) – GSM 1900 Idle Mode |
| GPH/72183JD10/009 | Radiated Emissions<br>Pre-Scan (4.0 GHz to 6.0 GHz) – GSM 850 Idle Mode |
| GPH/72183JD10/010 | Radiated Emissions<br>Pre-Scan (4.0 GHz to 6.0 GHz) – GSM 1900 Idle Mode |
| GPH/72183JD10/011 | Radiated Emissions<br>Pre-Scan (6.0 GHz to 8.0 GHz) – GSM 850 Idle Mode |
| GPH/72183JD10/012 | Radiated Emissions<br>Pre-Scan (6.0 GHz to 8.0 GHz) – GSM 1900 Idle Mode |
| GPH/72183JD10/013 | Radiated Emissions<br>Pre-Scan (8.0 GHz to 10.0 GHz) – GSM 850 Idle Mode |
| GPH/72183JD10/014 | Radiated Emissions<br>Pre-Scan (8.0 GHz to 10.0 GHz) – GSM 1900 Idle Mode |

**Test Of:** Enfora L.P
GSM3408 Cradle
**To:** FCC Part 15.107 & 15.109

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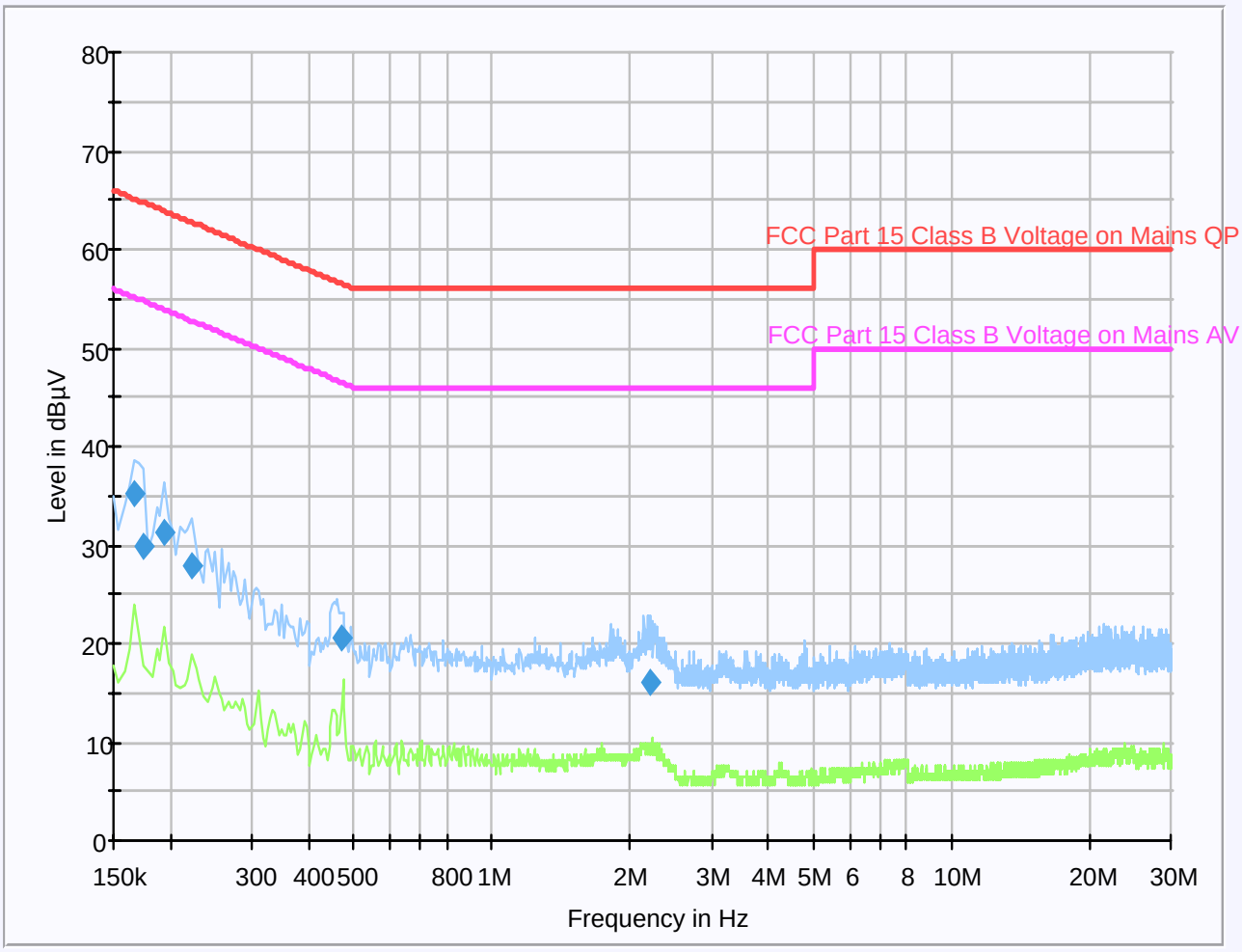
**GPH/72183JD10/001**
**Conducted Emissions Pre-Scan**
**(0.15 MHz to 30.0 MHz) – GSM 850 Idle Mode**



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GSM3408 Cradle
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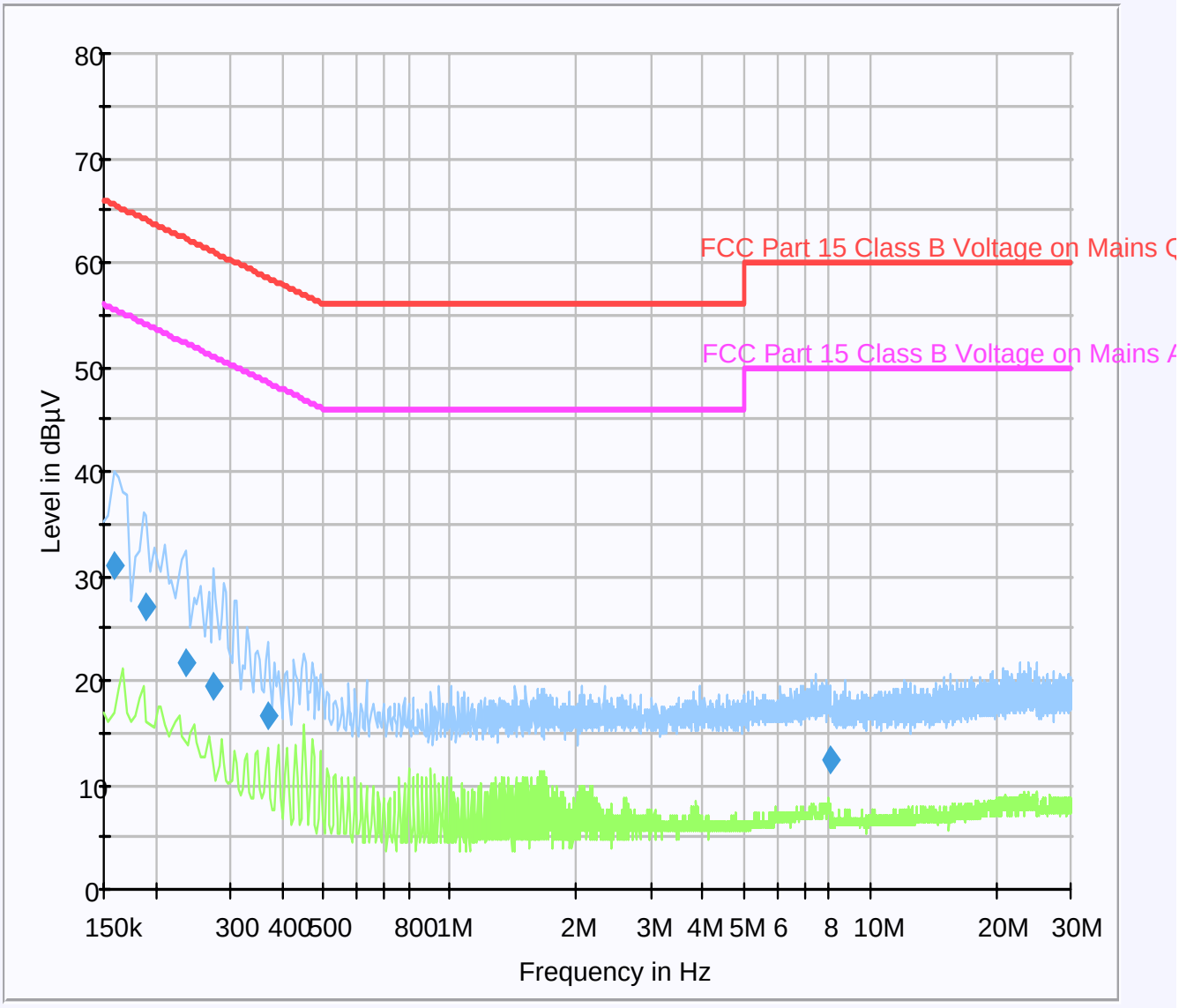
**GPH/72183JD10/002**
**Conducted Emissions Pre-Scan**
**(0.15 MHz to 30.0 MHz) – GSM 1900 Idle Mode**



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GSM3408 Cradle
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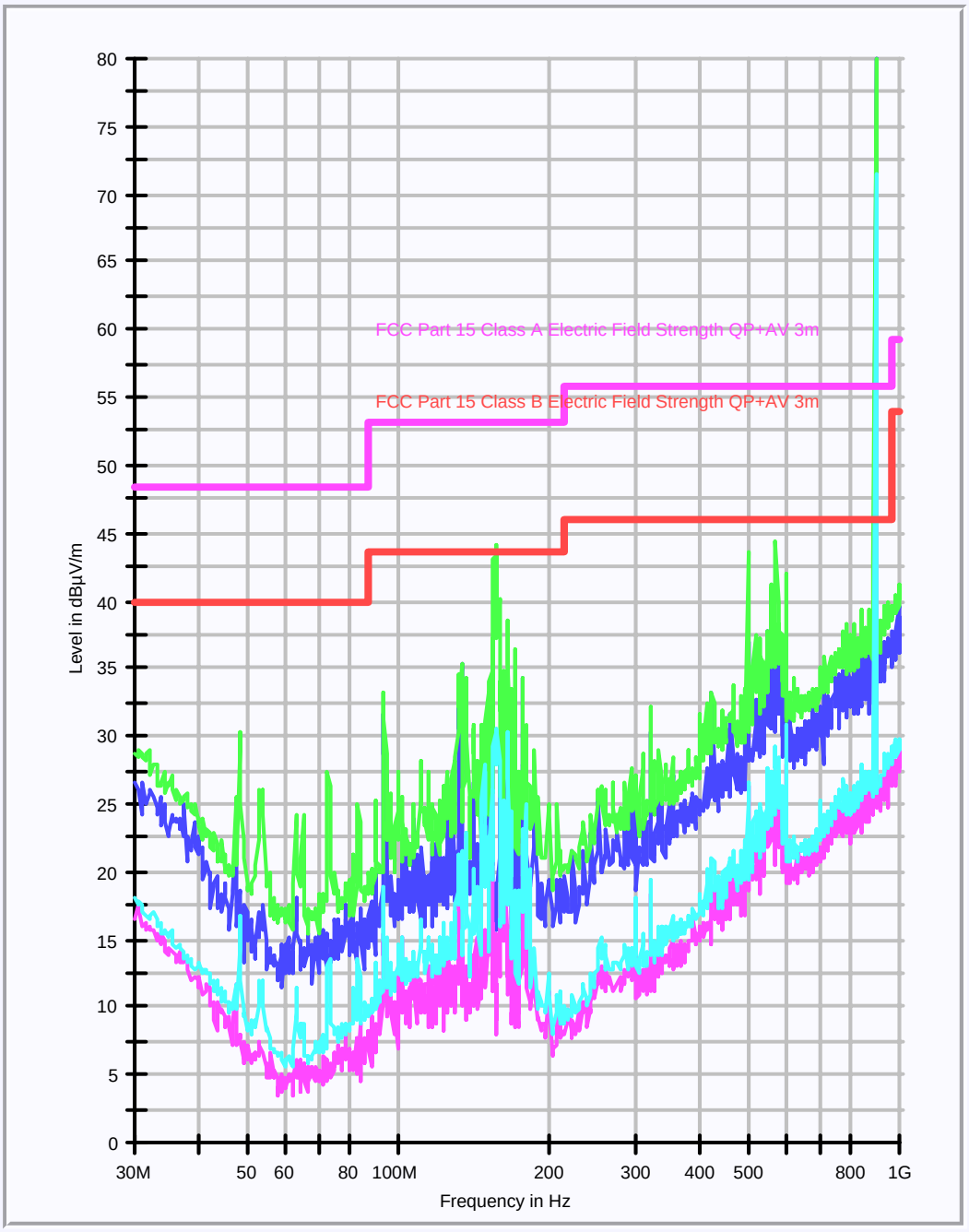
**GPH/72183JD10/003**
**Radiated Emissions Pre-Scan**
**(30.0 MHz to 1000.0 MHz) – GSM 850 Idle Mode**



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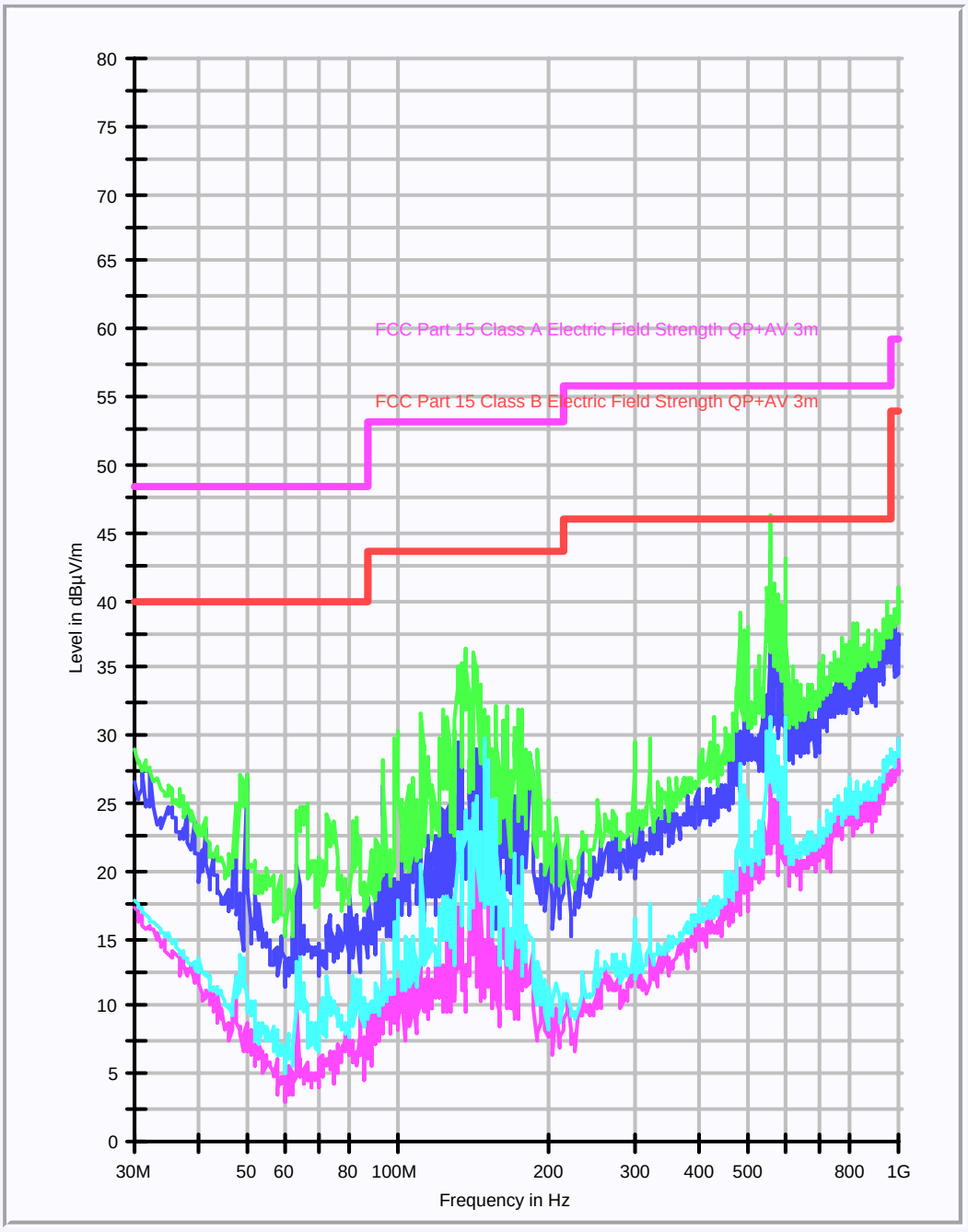
**GPH/72183JD10/004**
**Radiated Emissions Pre-Scan**
**(30.0 MHz to 1000.0 MHz) – GSM 1900 Idle Mode**



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**To:** FCC Part 15.107 & 15.109

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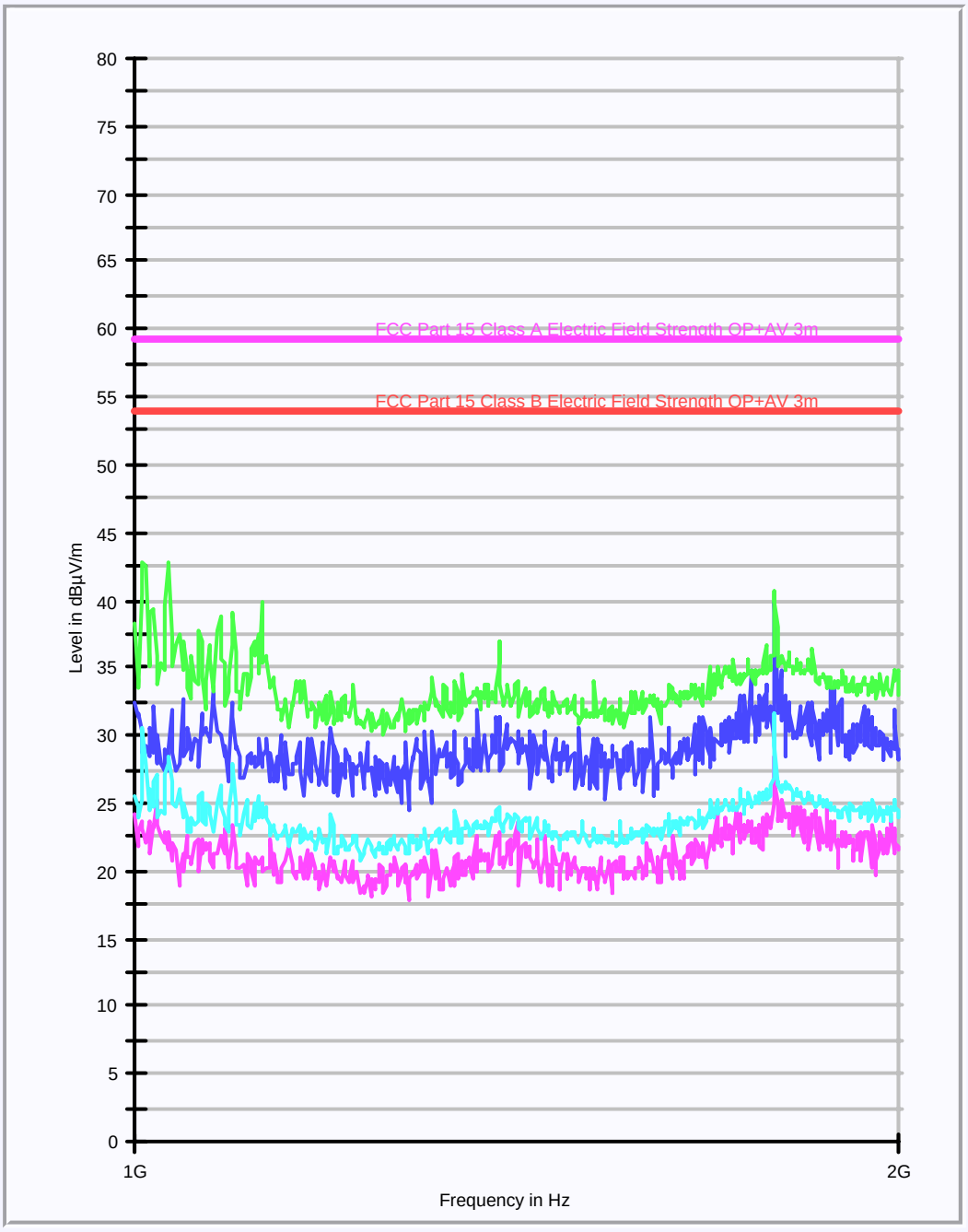
**GPH/72183JD10/005**
**Radiated Emissions Pre-Scan**
**(1.0 GHz to 2.0 GHz) – GSM 850 Idle**



**Test Of:** Enfora L.P
GSM3408 Cradle
**To:** FCC Part 15.107 & 15.109

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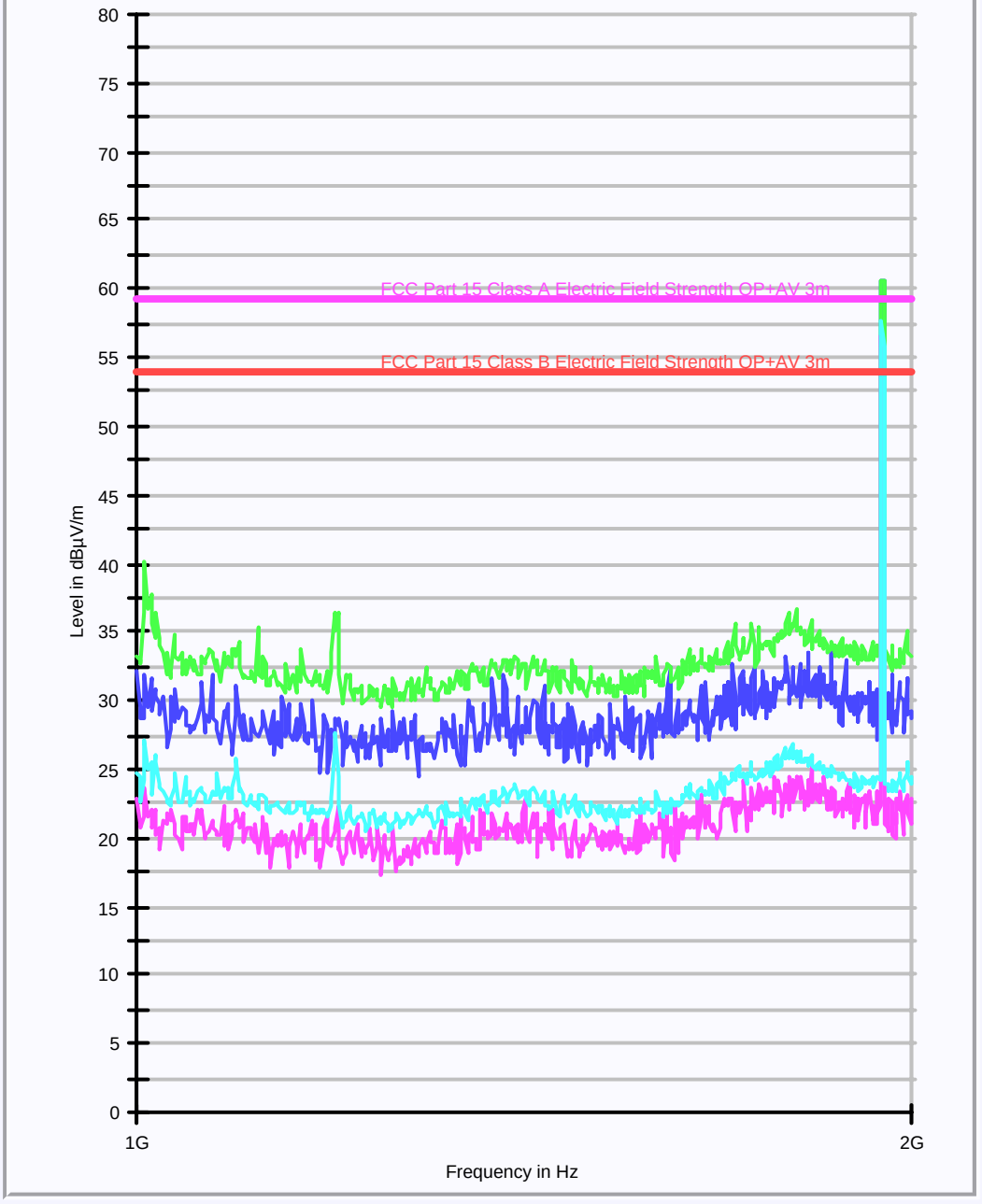
**GPH/72183JD10/006**
**Radiated Emissions Pre-Scan**
**(1.0 GHz to 2.0 GHz) – GSM 1900 Idle**



**Test Of:** Enfora L.P
GSM3408 Cradle
**To:** FCC Part 15.107 & 15.109

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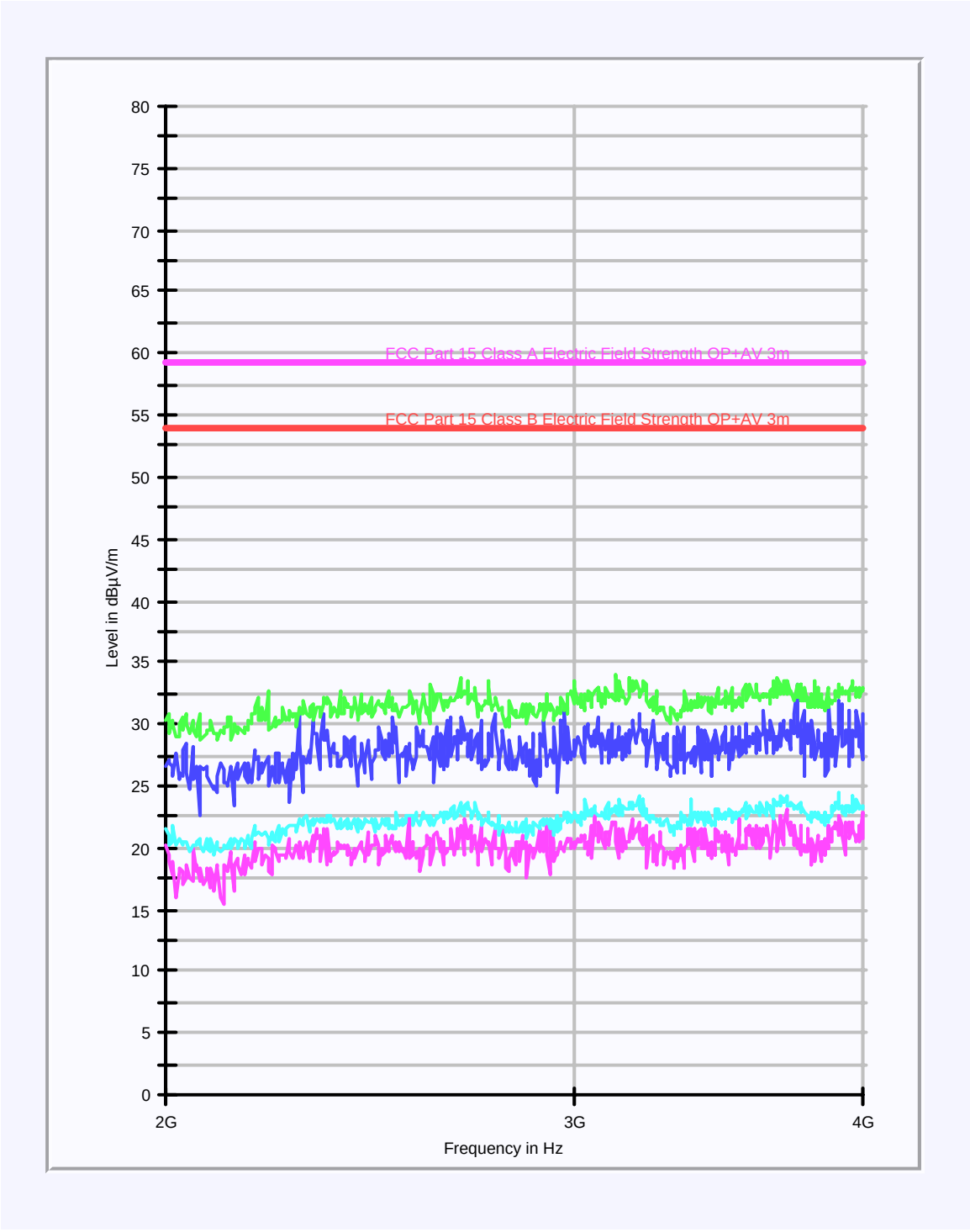
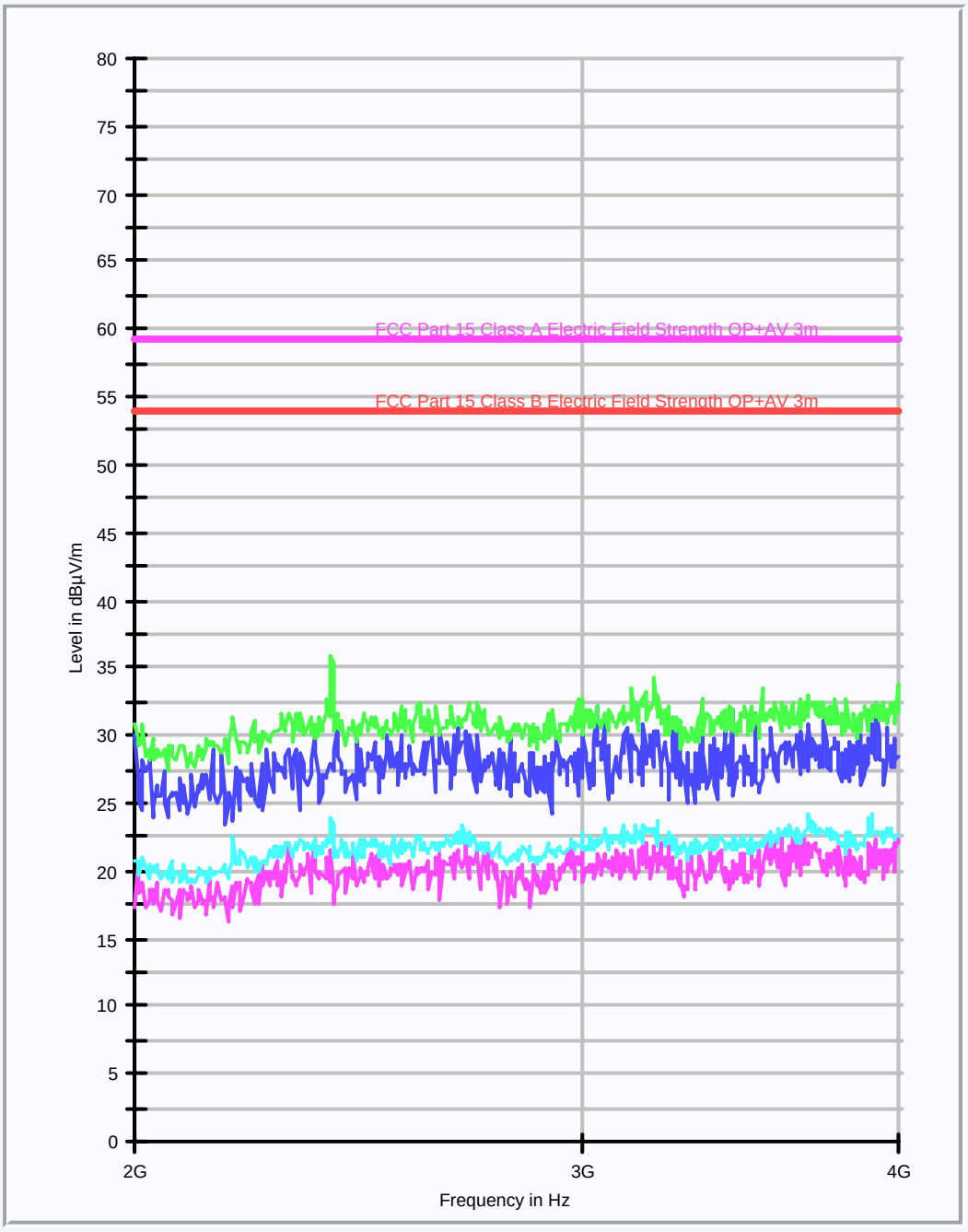
**GPH/72183JD10/007**
**Radiated Emissions Pre-Scan**
**(2.0 GHz to 4.0 GHz) – GSM 850 Idle**



**GPH/72183JD10/008**
**Radiated Emissions Pre-Scan**
**(2.0 GHz to 4.0 GHz) – GSM 1900 Idle**



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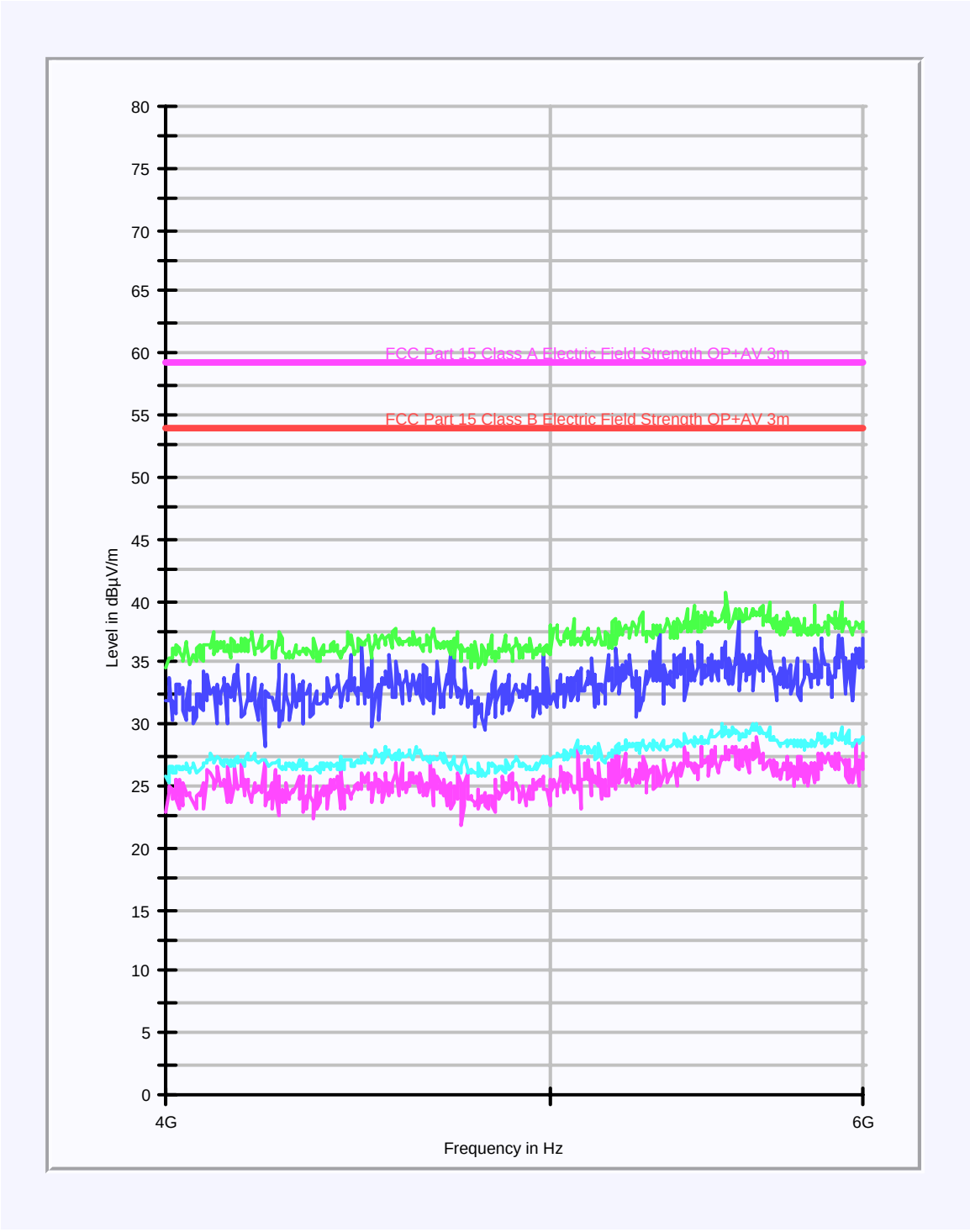
**GPH/72183JD10/009**
**Radiated Emissions Pre-Scan**
**(4.0 MHz to 6.0 GHz) - GSM 850 Idle**



**Test Of:** Enfora L.P
GSM3408 Cradle
**To:** FCC Part 15.107 & 15.109

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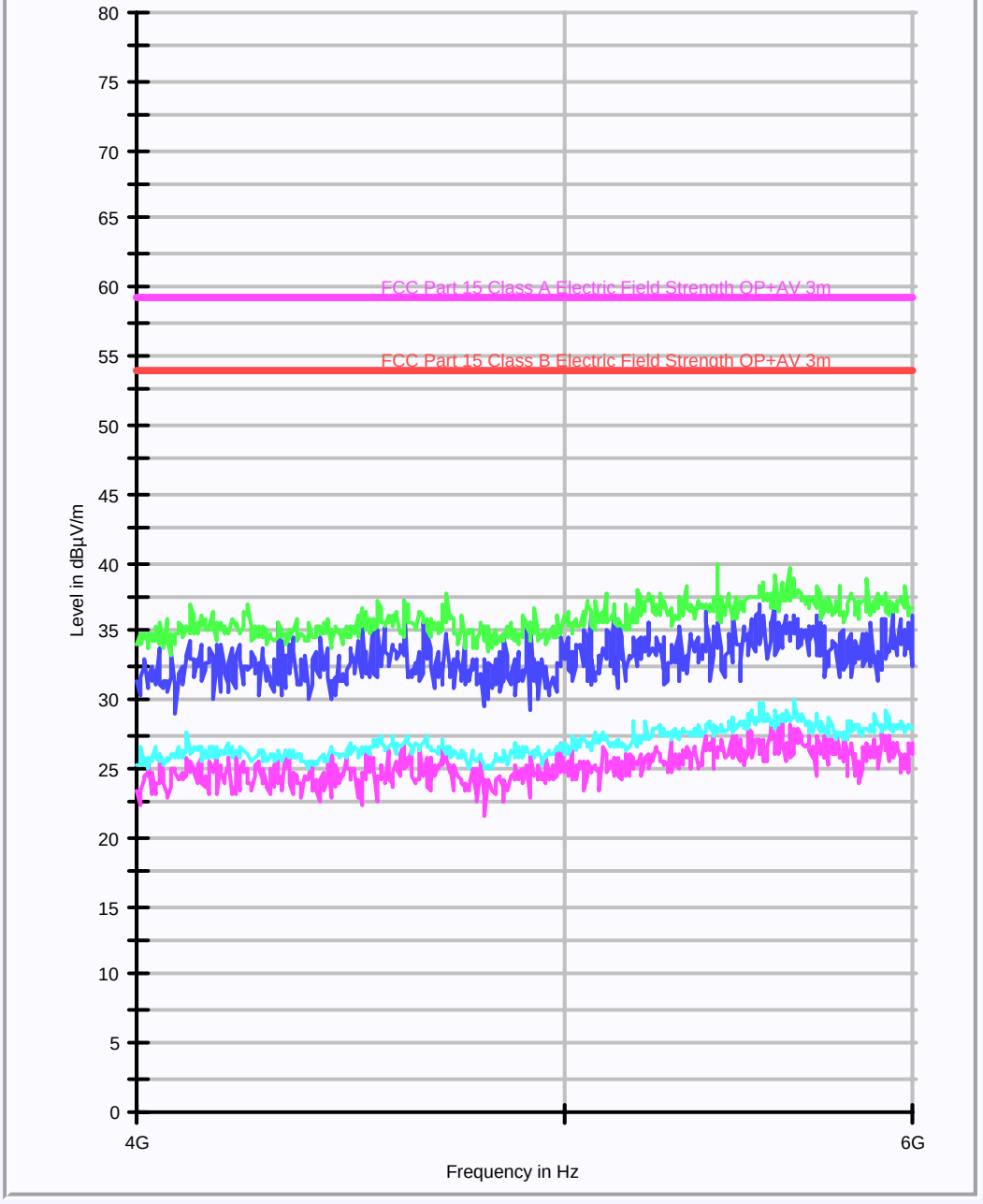
**GPH/72183JD10/010**
**Radiated Emissions Pre-Scan**
**(4.0 MHz to 6.0 GHz) - GSM 1900 Idle**



**Test Of:** Enfora L.P
GSM3408 Cradle
**To:** FCC Part 15.107 & 15.109

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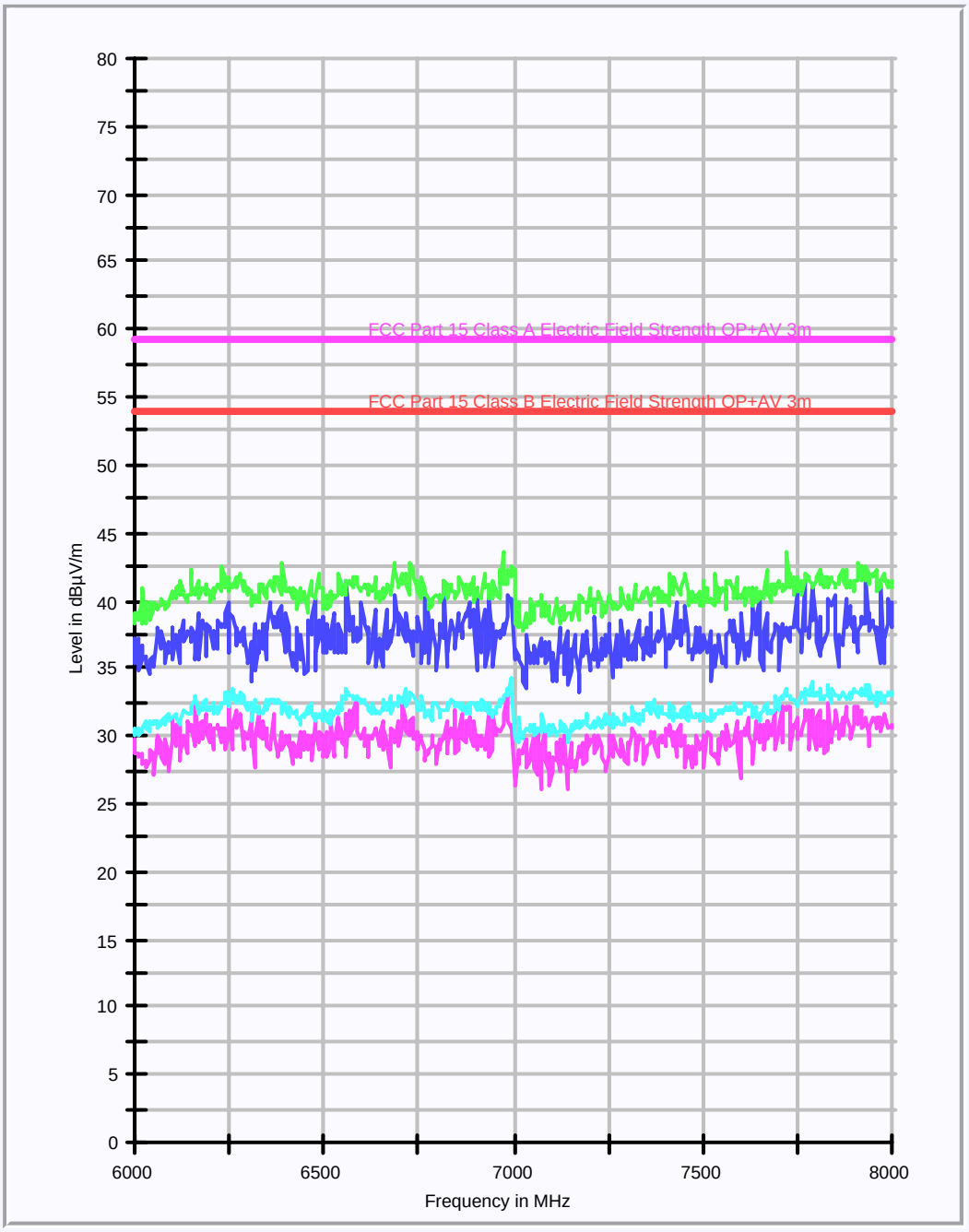
**GPH/72183JD10/011**
**Radiated Emissions Pre-Scan**
**(6.0 GHz to 8.0 GHz) - GSM 850 Idle**



**Test Of:** Enfora L.P
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**To:** FCC Part 15.107 & 15.109

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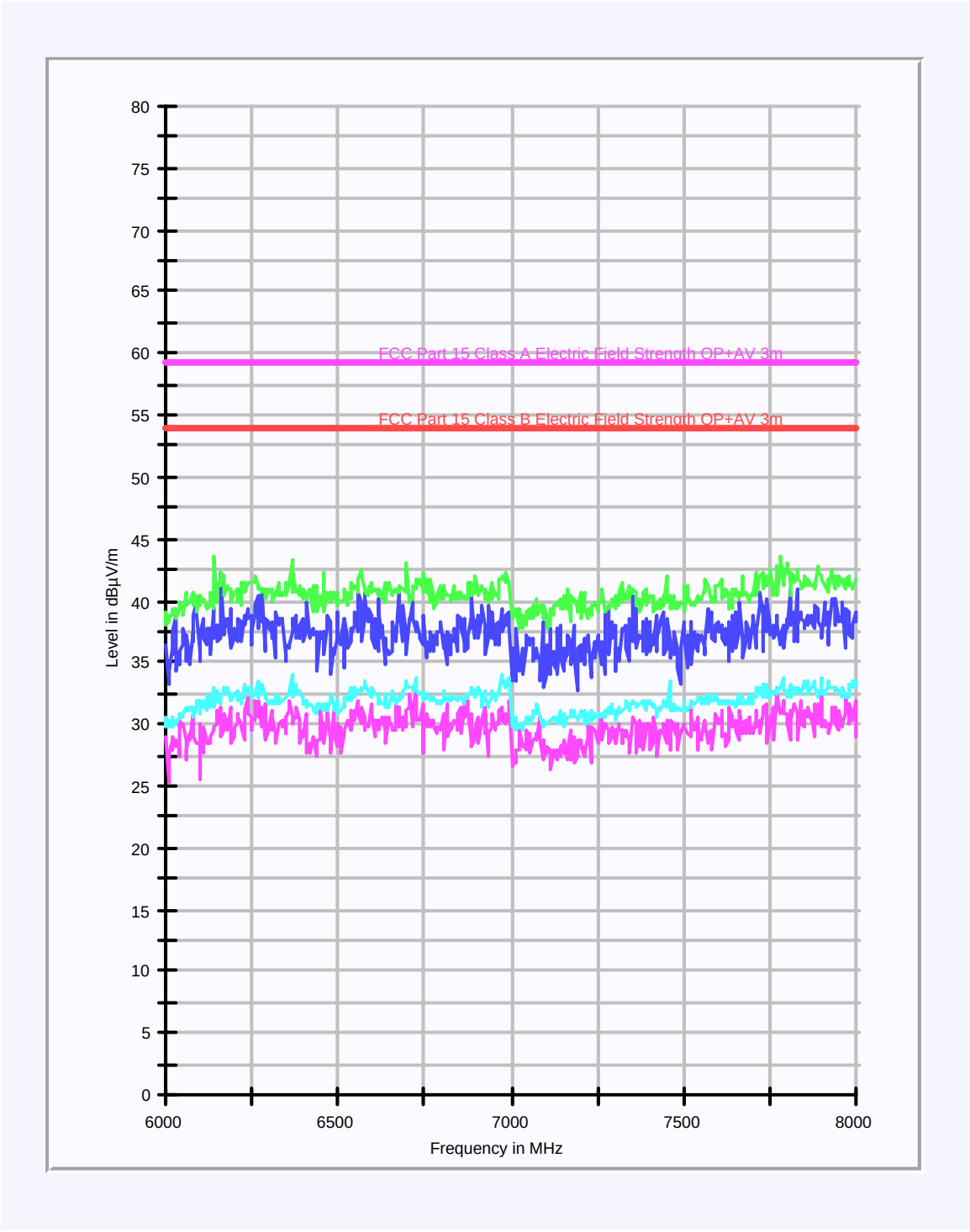
**GPH/72183JD10/012**
**Radiated Emissions Pre-Scan**
**(6.0 GHz to 8.0 GHz) - GSM 1900 Idle**



**Test Of:** Enfora L.P
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**To:** FCC Part 15.107 & 15.109

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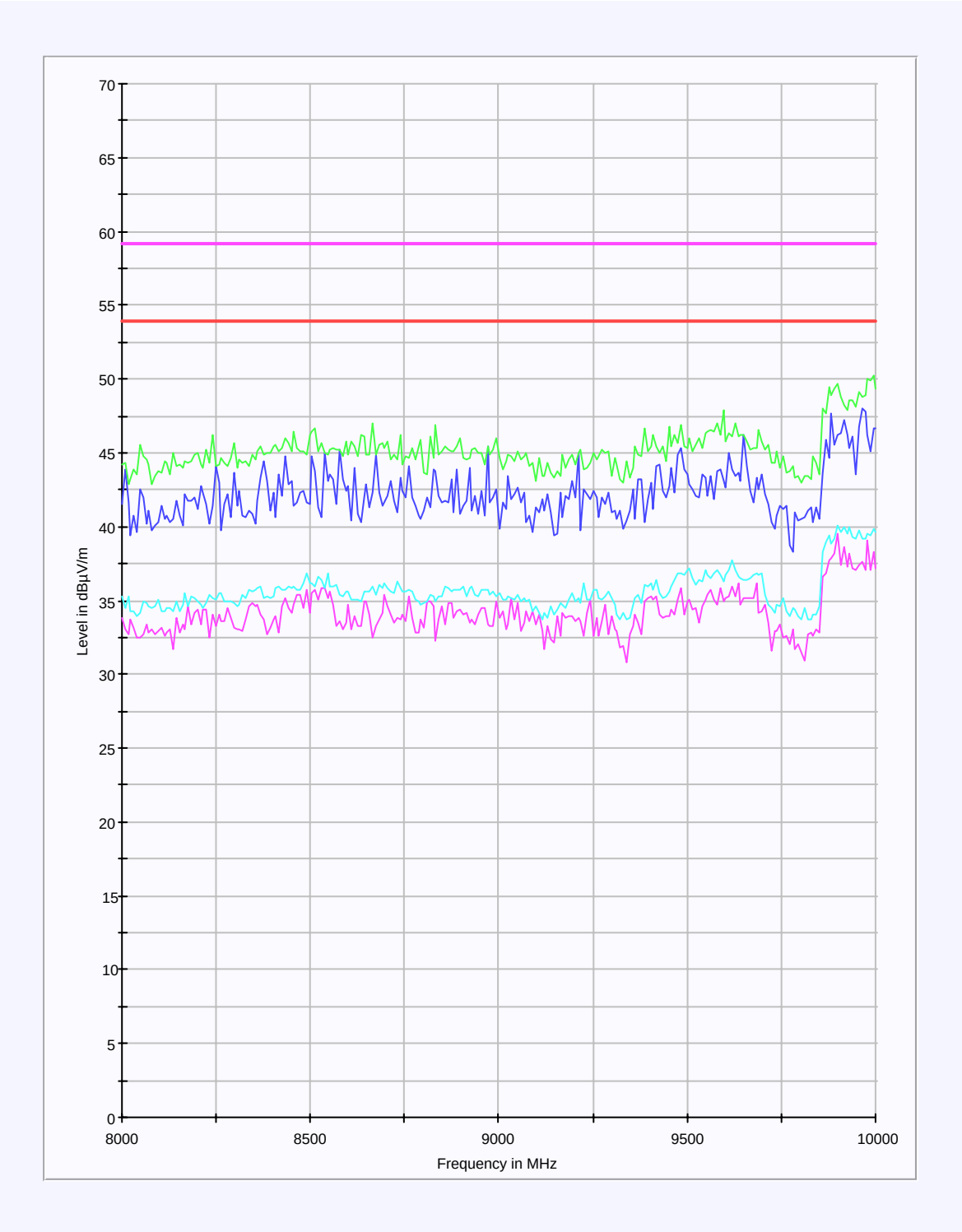
**GPH/72183JD10/013**
**Radiated Emissions Pre-Scan**
**(8.0 GHz to 10.0 GHz) - GSM 850 Idle**



**Test Of:** Enfora L.P
GSM3408 Cradle
**To:** FCC Part 15.107 & 15.109

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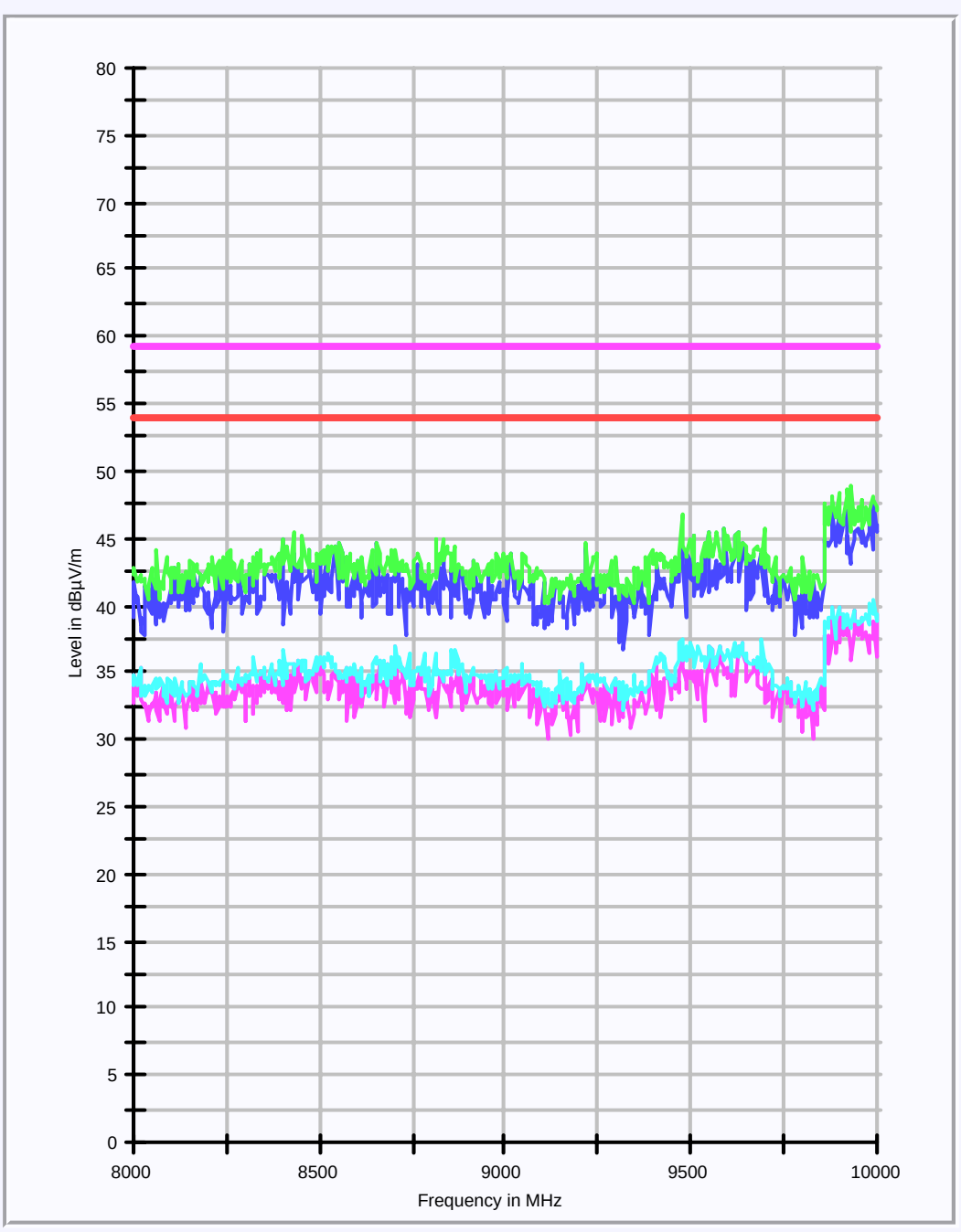
**GPH/72183JD10/014**
**Radiated Emissions Pre-Scan**
**(8.0 GHz to 10.0 GHz) - GSM 1900 Idle**



## Appendix 5. Photographs of EUT

This appendix contains the following photographs:

| Photo Reference Number | Title |
|---|---|
| PHT/72183/001 | Conducted Emissions 1 |
| PHT/72183/002 | Conducted Emissions 2 |
| PHT/72183/003 | Radiated Emissions 1 |
| PHT/72183/004 | Radiated Emissions 2 |

**Test Of:** Enfora L.P
GSM3408 Cradle
**To:** FCC Part 15.107 & 15.109

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**PHT/72183/001: Conducted Emissions 1**

**PHT/72183/002: Conducted Emissions 2**

**Test Of:** **Enfora L.P**
**GSM3408 Cradle**
**To:** **FCC Part 15.107 & 15.109**

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**PHT/72183/003: Radiated Emissions 1**

**Test Of:** **Enfora L.P**
**GSM3408 Cradle**
**To:** **FCC Part 15.107 & 15.109**

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**PHT/72183/004: Radiated Emissions 2**

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