

## TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Pro Tech Monitoring Inc, MTD (ISM 318 MHz)

Test Report Serial No: RFI-EMC-RP74737JD13A

Version 2.0 supersedes all previous versions

This test report is issued under the authority  
of Scott D'Adamo, Group Service Manager:

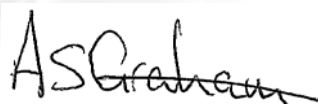


pp

Checked By:

Andy Graham

Signature:



Date of Issue:

02 October 2009

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**1. CUSTOMER DETAILS**

|                      |                          |
|----------------------|--------------------------|
| <b>Company Name:</b> | Pro Tech Monitoring inc. |
|----------------------|--------------------------|



|                 |  |
|-----------------|--|
| <b>Address:</b> | 2549 Success Dr<br>Odessa, Fl<br>33556 |
|-----------------|--|

## 2. SUMMARY OF TESTING

### 2.1. Test Specification



|                   |   |
|-------------------|---|
| <b>Reference:</b> | 47CFR15.107 and 47CFR15.109   |
| <b>Title:</b>     | Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subgroup C (Radio Frequency Devices) – Section 15.107 and Section 15.109 |

### 2.2. Summary of Test Results

| Clause           | Measurement Type                                  | Applicability | Result  |
|------------------|---|---------------|---|
| <b>EMISSIONS</b> |   |               |   |
| 15.107           | Radiated Emissions (Enclosure)                    | Y             |  |
| 15.109           | Conducted Emissions (AC Mains Input/Output Ports) | Y             |  |

**Notes**

1. Not applicable for the selected Test Standard.

**KEY:**  = Complied  = Did not comply

### 2.3. Location of Testing

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire RG24 8AH.

### 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, nor from the requirements defined in the basic standards called up within it.

### 3. EQUIPMENT UNDER TEST (EUT)

#### 3.1. Description of EUT

The equipment under test was a GSM, GPS and ISM tracking device designed for monitoring the location of prisoners. The EUT operated at a frequency of 318 MHz

The full system consisted of the tracking device (MTD) and a base unit. The base unit communicated with the MTD via an ISM band radio and then relayed the data via a landline to a data centre.

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

| ID# | Description               | Brand Name | Model No     | Serial No  | IMEI            |
|-----|---------------------------|------------|--------------|------------|-----------------|
| E1  | Miniature Tracking Device | Pro Tech   | MTD-8000     | 33592701   | 011312001075817 |
| E2  | Base Unit                 | Pro Tech   | MCS 1000     | 50354727   | Not Applicable  |
| E3  | AC Adaptor for Cradle     | CUI Inc    | DSA-0151A-05 | Not Stated | Not Applicable  |

#### 3.3. Port Identification

| Port | Description            | Type                  |
|------|------------------------|-----------------------|
| P1   | Enclosure (MTD)        | -                     |
| P2   | Battery Charger Port   | 3-Pin                 |
| P3   | Enclosure (Base Unit)  | -                     |
| P4   | DC Power Supply Socket | DC Barrel Jack Socket |
| P5   | Phone Line Socket      | US Phone Socket       |

#### 3.4. Operating Modes

| Mode Reference | Definition   |
|----------------|--|
| Receive        | The EUT was synchronised to a GSM test set in the PCS 1900 operating band, but not allocated a channel. The ISM radio was switched to receive mode during testing. |

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

#### GSM Radio characteristics

| GSM Bands supported (Tick as appropriate): | Rated Output Power (dBm) | Transmit Frequency range (MHz) | ARFCN | Transmit Frequency (MHz) | Receive Frequency range (MHz) | ARFCN | Receive Frequency (MHz) |
|--|--------------------------|--------------------------------|-------|--------------------------|-------------------------------|-------|-------------------------|
| ✓ GSM 850                                  | 33                       | 824 – 849                      | 190   | 836.6                    | 869 – 894                     | 190   | 881.6                   |
| ✓ GSM 900                                  | 33                       | 880 -915                       | 63    | 902.6                    | 925 - 960                     | 63    | 947.6                   |
| ✓ DCS 1800                                 | 30                       | 1710 – 1785                    | 700   | 1747.8                   | 1805 – 1880                   | 700   | 1842.8                  |
| ✓ PCS 1900                                 | 30                       | 1850 – 1910                    | 660   | 1879.8                   | 1930 – 1990                   | 660   | 1959.8                  |

|   |                             |
|---|-----------------------------|
| <b>Supported Technologies e.g. Circuit Switched Voice/Data, Packet Switched Data GPRS/ EDGE</b> | Circuit Switched Data/Voice |
|---|-----------------------------|

#### 3.5. Configuration and Peripherals

|                     |  |
|---------------------|--|
| <b>Description:</b> | The MTD was tested whilst being synchronised with a GSM test set. The MTD was placed in its charging port on the base unit. The base unit was powered by an AC/DC adapter with 120V AC, 60Hz source. |
|---------------------|--|

#### 3.6. Modifications

NOTE: No modifications were made to the EUT during the course of testing.

**3.7. Additional Information Related to Testing**

|   |   |                         |                |
|---|---|-------------------------|----------------|
| Equipment Category:   | GSM Mobile Station <b>and</b> Short Range Device (SRD)  |                         |                |
| FCC ID:   | NC3MTD3318  |                         |                |
| ISM Equipment Group:  | 2   |                         |                |
| Equipment Class:  | B   |                         |                |
| ISM operating frequency   | 318 MHz   |                         |                |
| Type of Group 2 equipment   | Radio Transceiver                                       |                         |                |
| Intended Operating Environment:   | Residential   |                         |                |
| Cycle Time:   | < 1 s   |                         |                |
| Power Supply Requirement(s):  | 3.7 VDC (Li-ion battery)                                |                         |                |
| Weight (Approx):  | < 1 kg (MTD and base unit combined)                     |                         |                |
| Dimensions (Approx):  | 58 x 116 x 88 mm for MTD; 58 x 16 x 82 mm for Base Unit |                         |                |
| Antenna Type  | Integral  |                         |                |
| Echo Cancellation deactivated:  | Not Applicable  |                         |                |
| For products with audio capability, but not fitted with microphone or speakers, stated voltage levels at the output/input port: |   |                         |                |
| Audio Input Value (mV)  | Not Applicable  | Audio Output Value (mV) | Not Applicable |

## 4. SUPPORT EQUIPMENT

### 4.1. Identification of Support Equipment

| Description                 | Manufacturer | Model No      | Serial No               |
|-----------------------------|--------------|---------------|-------------------------|
| Infra-red transceiver       | ACTiSYS      | ACT-IR220LN57 | 001851                  |
| Infra-red transceiver       | ACTiSYS      | ACT-IR220LN57 | 001248                  |
| Laptop (Dell Latitude D600) | Dell         | PP05L         | CN-0X2034-4863-3AG-5302 |

Note: The support equipment shown above was only used for setting up the EUT before testing.

### 4.2. Interconnecting Cables

| Cable Type | Shielded | Length (m) | Ferrite | Connection 1        | Connection 2           |
|------------|----------|------------|---------|---------------------|------------------------|
| Multi-core | N        | 1.2        | N       | IR interface module | Laptop serial port     |
| 2xCore     | N        | 1.8        | N       | AC/DC Adapter       | Base unit power pocket |

## 5. MONITORING PERFORMANCE

### 5.1. Overview

Only emissions tests were performed during which the communication status between the EUT and the GSM test was monitored to ensure the EUT was functioning as intended.

### 5.2. Monitoring EUT Performance During Testing

|  |   |
|--|---|
| For the purposes of testing, the term “ <i>operate as intended</i> ” was defined as:                         | The EUT remained synchronised with the GSM test set whilst the ISM radio was set to receive mode. |
| For the purposes of testing, an “ <i>unintentional response</i> ” was defined as:                            | Not Applicable  |
| Method used to determine whether user control functions and stored data were lost after the EMC exposure:    | Not Applicable  |
| Method used to verify that a communications link was established and maintained (if appropriate):            | The status of the communication link was displayed on the GSM test set.                           |
| Method of assessment of level of performance or degradation of performance during and/or after EMC exposure: | Not Applicable  |

## 6. MEASUREMENT UNCERTAINTY

### 6.1. Overview

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 regarding the uncertainty of approximation.

The measurement uncertainty may need to be taken into account when interpreting the test results included within this test report.

### 6.2. Method of calculation

The methods used to calculate the uncertainties included within this test report 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 United Kingdom Accreditation Service (UKAS) is followed.

## 7. MEASUREMENTS, EXAMINATIONS AND DERIVED RESULTS

### 7.1. General Comments

7.1.1. This section contains the test result sheets for the measurements listed in Section 2.2.  
*Summary of Test Results* (above).

7.1.2. The measurement uncertainties stated in the test result sheets were calculated in accordance with documented best practice and represent a confidence level of 95%. Please refer to Section 6.  
*Measurement Uncertainty* on page 11 for details of our treatment of measurement uncertain

## RADIATED EMISSIONS - TEST RESULTS

This test is covered by the scope of RFI's UKAS Accreditation under ISO/IEC 17025: 2005.

### GENERAL INFORMATION

|                    |                   |                       |                   |
|--------------------|-------------------|-----------------------|-------------------|
| RFI JOB NUMBER:    | 74737JD13         | TEST SITE ID:         | Site 1            |
| EUT:               | MTD (ISM 318 MHz) | TEMPERATURE:          | 23.6 °C to 25 °C  |
| TEST ENGINEER:     | Eric Phiri        | RELATIVE HUMIDITY:    | 27 % to 26 %      |
| DATE OF TEST:      | 30 Mar 2009       | ATMOSPHERIC PRESSURE: | 1013mb to 1014 mb |
| FIELD TYPE:        | Electric Field    | MEASUREMENT DISTANCE: | 3 Metres          |
| UNCERTAINTY (±):   | ±4.68 dB          | EQUIPMENT CLASS:      | Class B           |
| MEASUREMENT UNITS: | dBµV/m            | TEST ENVIRONMENT:     | Test Site         |

### TEST SPECIFICATION DETAILS

The EUT has been configured and tested in accordance with the methods and procedures detailed within the following basic standard:

|            |   |
|------------|---|
| REFERENCE: | 47CFR15.109   |
| TITLE:     | Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart C (Radio Frequency Devices) - Section 15.109 |

### COMMENTS

None

### DEVIATIONS FROM TEST SPECIFICATION

There were no deviations from the test configuration and measurement arrangements defined in the test specification (identified above).

### EUT RELATED

|                        |   |
|------------------------|---|
| OPERATING MODE:        | Receive   |
| FUNCTION(S) MONITORED: | The status of the communication link was monitored on the GSM test set. |

### MEASUREMENT RESULTS

| No. | Frequency (MHz) | Polarity        | Detector        | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Graph No. | Result   |
|-----|-----------------|-----------------|-----------------|----------------|----------------|-------------|-----------|----------|
| 1   | 32.196          | Vertical        | Quasi-Peak      | 25.2           | 40.0           | 14.8        | 001       | Complied |
| 2   | 43.710          | Vertical        | Quasi-Peak      | 18.8           | 40.0           | 21.2        | 001       | Complied |
| 3   | 95.983          | Vertical        | Quasi-Peak      | 17.8           | 43.5           | 25.7        | 001       | Complied |
| 4   | 309.644         | Horizontal      | Quasi-Peak      | 24.0           | 46.0           | 22.0        | 001       | Complied |
| 5   | 681.370         | Horizontal      | Quasi-Peak      | 27.0           | 46.0           | 19.0        | 001       | Complied |
| 6   | 941.115         | Horizontal      | Quasi-Peak      | 23.9           | 46.0           | 22.1        | 001       | Complied |
| 7   | 1000 to 4000    | Refer to Note 1 |                 |                |                |             | 002       | Complied |
| 8   | 4000 to 7000    | Refer to Note 1 |                 |                |                |             | 003       | Complied |
| 9   | 7503.287        | Horizontal      | Average (CISPR) | 40.4           | 54.0           | 13.6        | 004       | Complied |
| 10  | 11170.040       | Horizontal      | Average (CISPR) | 45.3           | 54.0           | 8.7         | 005       | Complied |
| 11  | 12493.507       | Horizontal      | Average (CISPR) | 46.2           | 54.0           | 7.8         | 005       | Complied |

**NOTES**

- 1 No emissions were noted above the noise floor of the measurement system. Therefore no further measurements were made.

**TEST EQUIPMENT USED**

| RFI ID | INSTRUMENT DESCRIPTION                | MODEL NUMBER          | CALIBRATION DUE          | INTERVAL |
|--------|---------------------------------------|-----------------------|--------------------------|----------|
| K0001  | Site Reference 4420                   | N/A                   | 13 Aug 2009              | 12       |
| M1379  | Test Receiver                         | ESIB7                 | 14 Aug 2009              | 12       |
| C1116  | UtiFlex                               | ufa 210A-1-0360-50x50 | 20 Apr 2009              | 12       |
| A1516  | Universal Radio Communications Tester | CMU200                | Calibration not required | N/A      |
| C1305  | 3m Cable                              | FA210A1030005050      | 04 Aug 2009              | 12       |
| A1792  | Pre Amplifier                         | PAM-0118              | 28 Nov 2009              | 12       |
| C1306  | 15m Cable                             | FA210A0015005050      | 01 Aug 2009              | 12       |
| C1303  | 8m Cable                              | FA210A1080005050      | 01 Aug 2009              | 12       |
| A259   | Antenna                               | CBL6111               | 25 Jul 2009              | 12       |
| A1817  | Antenna                               | 3115                  | 25 Oct 2009              | 12       |
| C1016  | Cable                                 | None                  | 20 Apr 2009              | 12       |
| C1305  | 3m Cable                              | FA210A1030005050      | 04 Aug 2009              | 12       |
| C1160  | Cable                                 | FA210A1050005050      | 20 Apr 2009              | 12       |

## CONDUCTED EMISSIONS - TEST RESULTS

This test is not covered by the scope of RFI's UKAS Accreditation under ISO/IEC 17025: 2005.

### GENERAL INFORMATION

|                  |                   |                       |                    |
|------------------|-------------------|-----------------------|--------------------|
| RFI JOB NUMBER:  | 74737JD13         | TEST SITE ID:         | Site 1             |
| EUT:             | MTD (ISM 318 MHz) | TEMPERATURE:          | 22 °C to 22.1 °C   |
| TEST ENGINEER:   | Andrew Broad      | RELATIVE HUMIDITY:    | 27 % to 28 %       |
| DATE OF TEST:    | 26 Mar 2009       | ATMOSPHERIC PRESSURE: | 1013 mb to 1013 mb |
| UNCERTAINTY (±): | ±3.99 dB          | EQUIPMENT CLASS:      | Class B            |
| CATEGORY:        | Not applicable    | MEASUREMENT METHOD:   | LISN (AC)          |

### TEST SPECIFICATION DETAILS

The EUT has been configured and tested in accordance with the methods and procedures detailed within the following basic standard:

|            |   |
|------------|---|
| REFERENCE: | 47CFR15.107   |
| TITLE:     | Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart C (Radio Frequency Devices) - Section 15.107 |

### COMMENTS

No comments were noted by the engineer at the time of the test.

### DEVIATIONS FROM TEST SPECIFICATION

There were no deviations from the test configuration and measurement arrangements defined in the test specification (identified above).

### EUT RELATED

|                        |  |
|------------------------|--|
| OPERATING MODE:        | Receive  |
| FUNCTION(S) MONITORED: | The status of the communication link was monitored on the GSM test set |

### MEASUREMENT RESULTS

| No. | Frequency (MHz) | Line | Detector        | Level (dBμV) | Limit (dBμV) | Margin (dB) | Graph No. | Result   |
|-----|-----------------|------|-----------------|--------------|--------------|-------------|-----------|----------|
| 1   | 0.267           | Live | Quasi-Peak      | 50.1         | 61.2         | 11.1        | 006       | Complied |
| 2   | 0.402           | Live | Quasi-Peak      | 47.2         | 57.8         | 10.6        | 006       | Complied |
| 3   | 0.537           | Live | Quasi-Peak      | 43.0         | 56.0         | 13.0        | 006       | Complied |
| 4   | 0.798           | Live | Quasi-Peak      | 44.2         | 56.0         | 11.8        | 006       | Complied |
| 5   | 0.933           | Live | Quasi-Peak      | 44.8         | 56.0         | 11.2        | 006       | Complied |
| 6   | 1.068           | Live | Quasi-Peak      | 41.8         | 56.0         | 14.2        | 006       | Complied |
| 7   | 2.076           | Live | Quasi-Peak      | 45.8         | 56.0         | 10.2        | 006       | Complied |
| 8   | 2.184           | Live | Quasi-Peak      | 43.3         | 56.0         | 12.7        | 006       | Complied |
| 9   | 2.378           | Live | Quasi-Peak      | 42.6         | 56.0         | 13.4        | 006       | Complied |
| 10  | 2.468           | Live | Quasi-Peak      | 39.2         | 56.0         | 16.8        | 006       | Complied |
| 11  | 0.267           | Live | Average (CISPR) | 49.5         | 51.2         | 1.7         | 006       | Complied |
| 12  | 0.402           | Live | Average (CISPR) | 42.0         | 47.8         | 5.8         | 006       | Complied |
| 13  | 0.533           | Live | Average (CISPR) | 41.5         | 46.0         | 4.5         | 006       | Complied |
| 14  | 0.663           | Live | Average (CISPR) | 33.2         | 46.0         | 12.8        | 006       | Complied |

**MEASUREMENT RESULTS**

| No. | Frequency (MHz) | Line | Detector        | Level (dBµV) | Limit (dBµV) | Margin (dB) | Graph No. | Result   |
|-----|-----------------|------|-----------------|--------------|--------------|-------------|-----------|----------|
| 15  | 0.798           | Live | Average (CISPR) | 38.1         | 46.0         | 7.9         | 006       | Complied |
| 16  | 0.933           | Live | Average (CISPR) | 40.6         | 46.0         | 5.4         | 006       | Complied |
| 17  | 1.064           | Live | Average (CISPR) | 38.0         | 46.0         | 8.0         | 006       | Complied |
| 18  | 1.208           | Live | Average (CISPR) | 23.8         | 46.0         | 22.2        | 006       | Complied |
| 19  | 1.460           | Live | Average (CISPR) | 29.2         | 46.0         | 16.8        | 006       | Complied |
| 20  | 1.599           | Live | Average (CISPR) | 31.2         | 46.0         | 14.8        | 006       | Complied |

**NOTES**

N/A During measurement the engineer did not record any specific notes relevant to report.

**TEST EQUIPMENT USED**

| RFI ID | INSTRUMENT DESCRIPTION               | MODEL NUMBER     | CALIBRATION DUE | INTERVAL |
|--------|--------------------------------------|------------------|-----------------|----------|
| K0001  | Site Reference 4420                  | N/A              | 13 Aug 2009     | 12       |
| M1391  | Thermometer/Hygrometer               | BAR629HGU        | 18 Jun 2009     | 12       |
| A1829  | Pulse Limiter                        | ESH3-Z2          | 28 Nov 2009     | 12       |
| A067   | Line Impedance Stabilization Network | ESH3-Z5          | 19 May 2009     | 12       |
| C1262  | Cable                                | FA210A0075008080 | 20 Apr 2009     | 12       |
| C1304  | 3m Cable                             | FA210A1030005050 | 04 Aug 2009     | 12       |
| M1379  | Test Receiver                        | ESIB7            | 14 Aug 2009     | 12       |

## 8. PHOTOGRAPHS OF EUT

This section contains the following photographs:

| Photo Reference Number | Title   |
|------------------------|---|
| PHT\74737JD13\001      | Test Configuration Photograph Radiated Emissions  |
| PHT\74737JD13\002      | Test Configuration Photograph Conducted Emissions |

**PHT\74737JD13\001 – Test Configuration Photograph Radiated Emissions**



**PHT\74737JD13\002 – Test configuration Photograph Conducted Emissions**



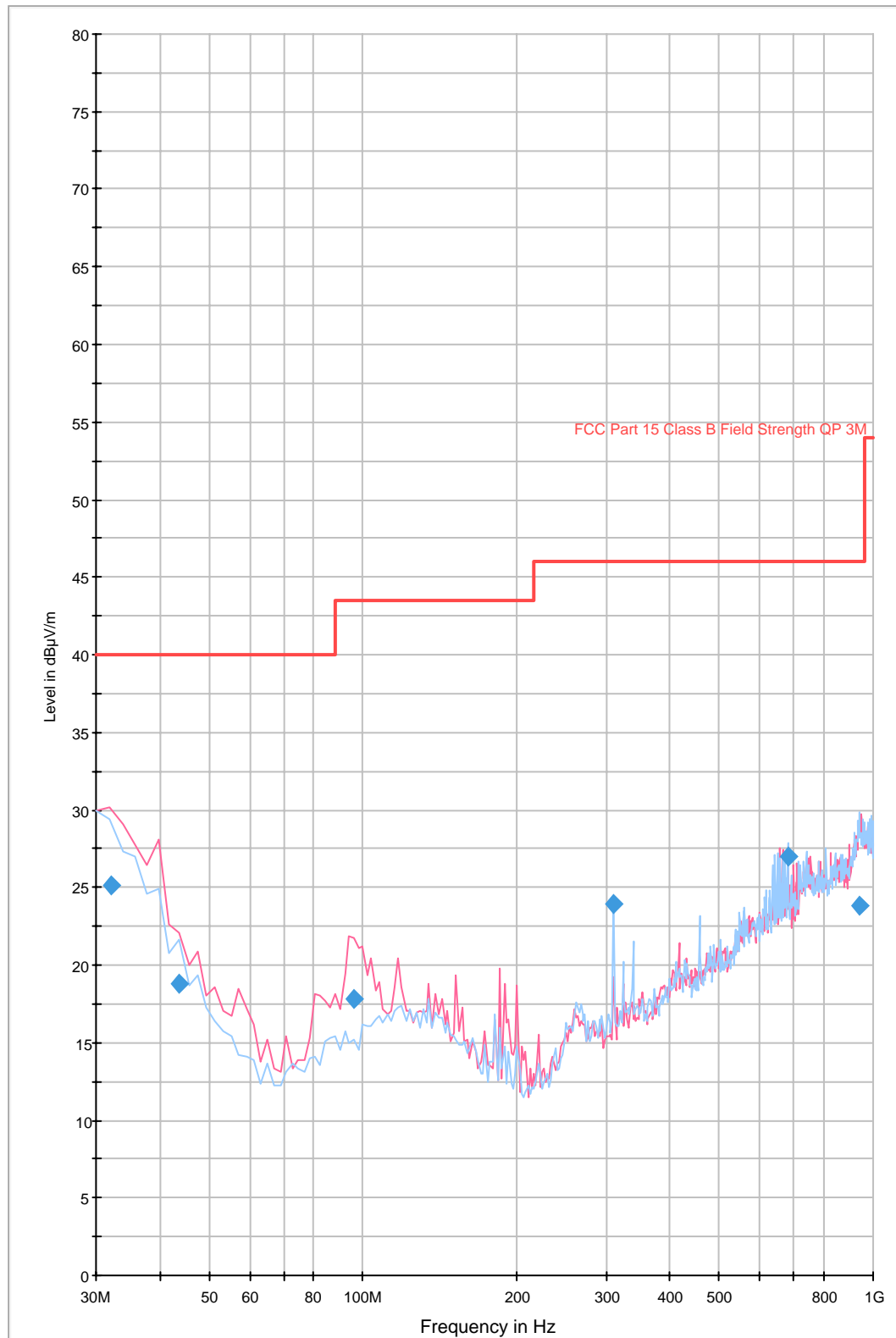
## 9. GRAPHICAL TEST RESULTS

9.1. This section contains the graphical results for the measurements listed in Section 2.2. *Summary of Test Results* (above).

| Graph Number             | Title  |
|--------------------------|--|
| GPH\74737JD13\001 to 005 | Radiated Emissions<br>Pre-Scan (30 MHz to 12750 MHz) |
| GPH\74737JD13\006        | Conducted Emissions<br>Pre-Scan (0.15 MHz to 30 MHz) |

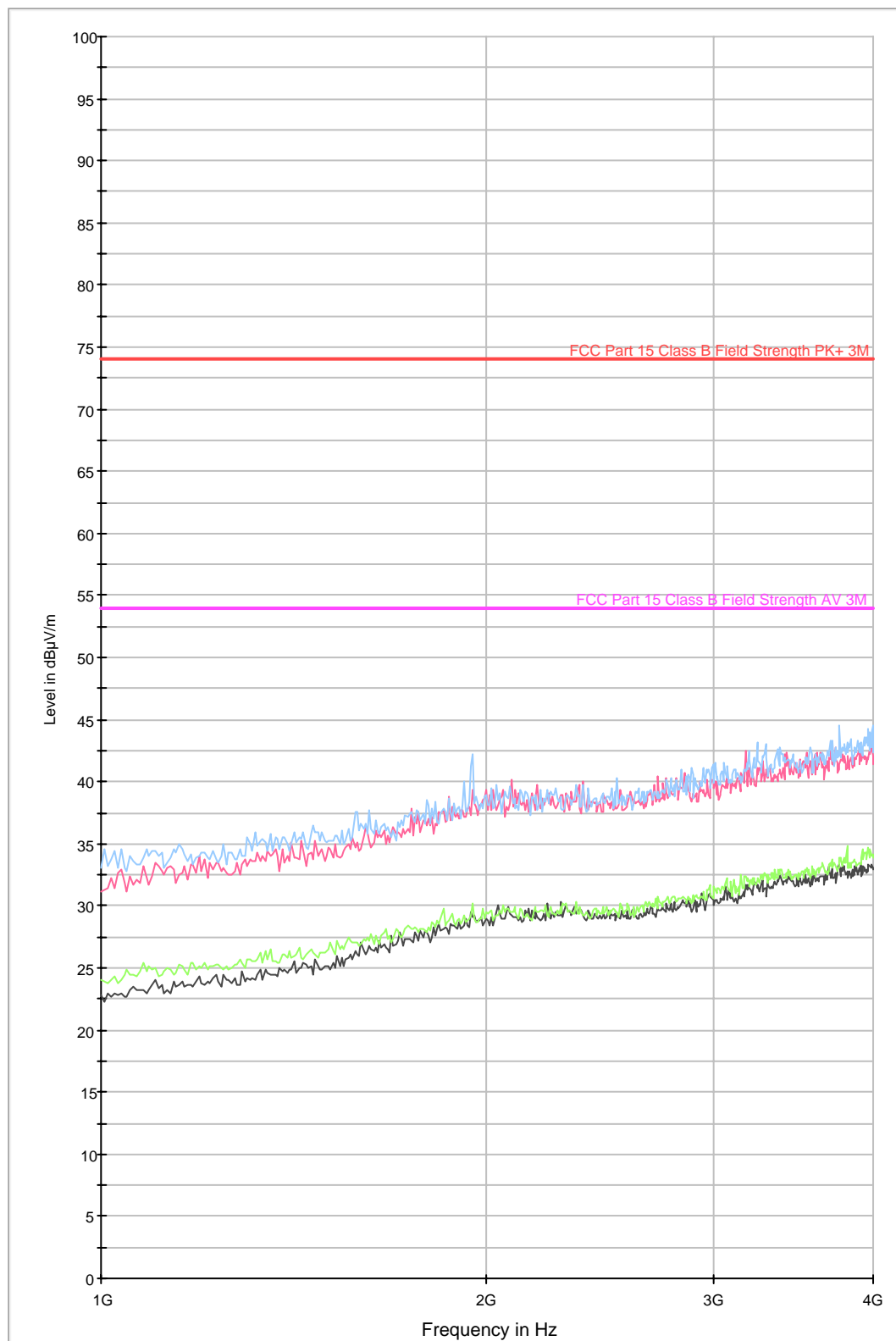
**GPH\74737JD13\001**

FCC Part 15.109 Radiated Emissions Class B 30MHz-1GHz



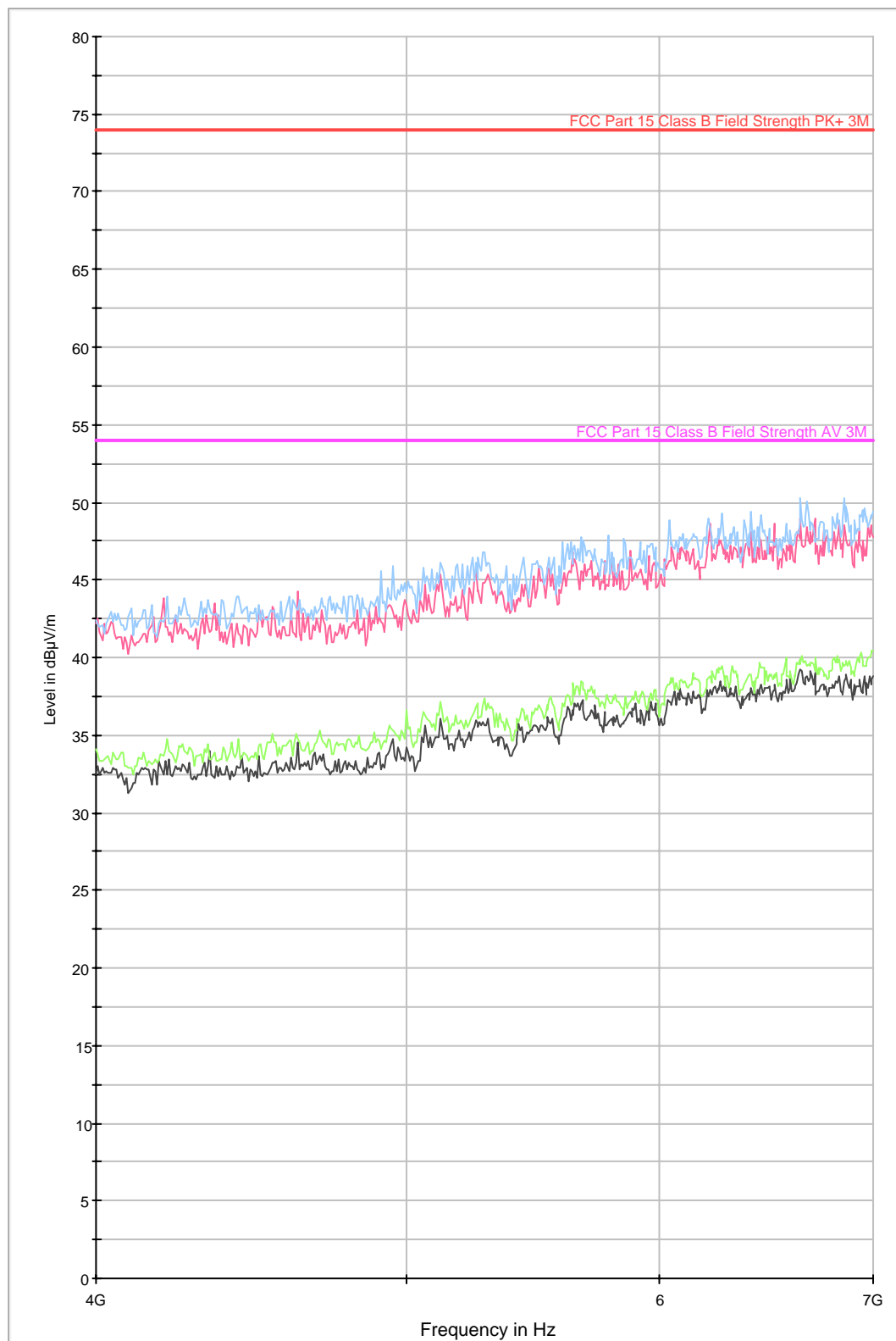
**GPH\74737JD13\002**

FCC Part 15.109 Radiated Emissions Class B 1-4GHz



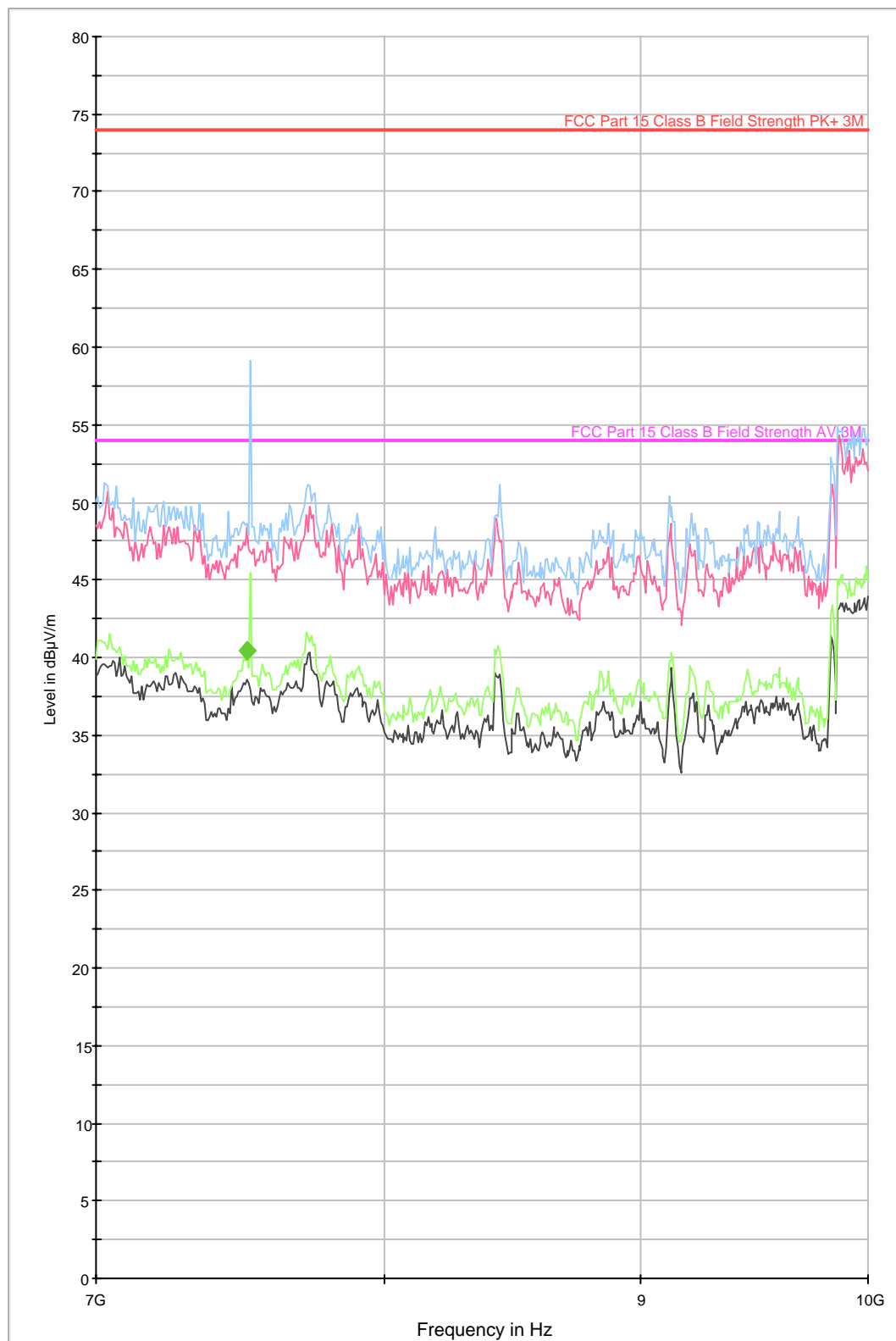
**GPH\74737JD13\003**

FCC Part 15.109 Radiated Emissions Class B 4-7GHz



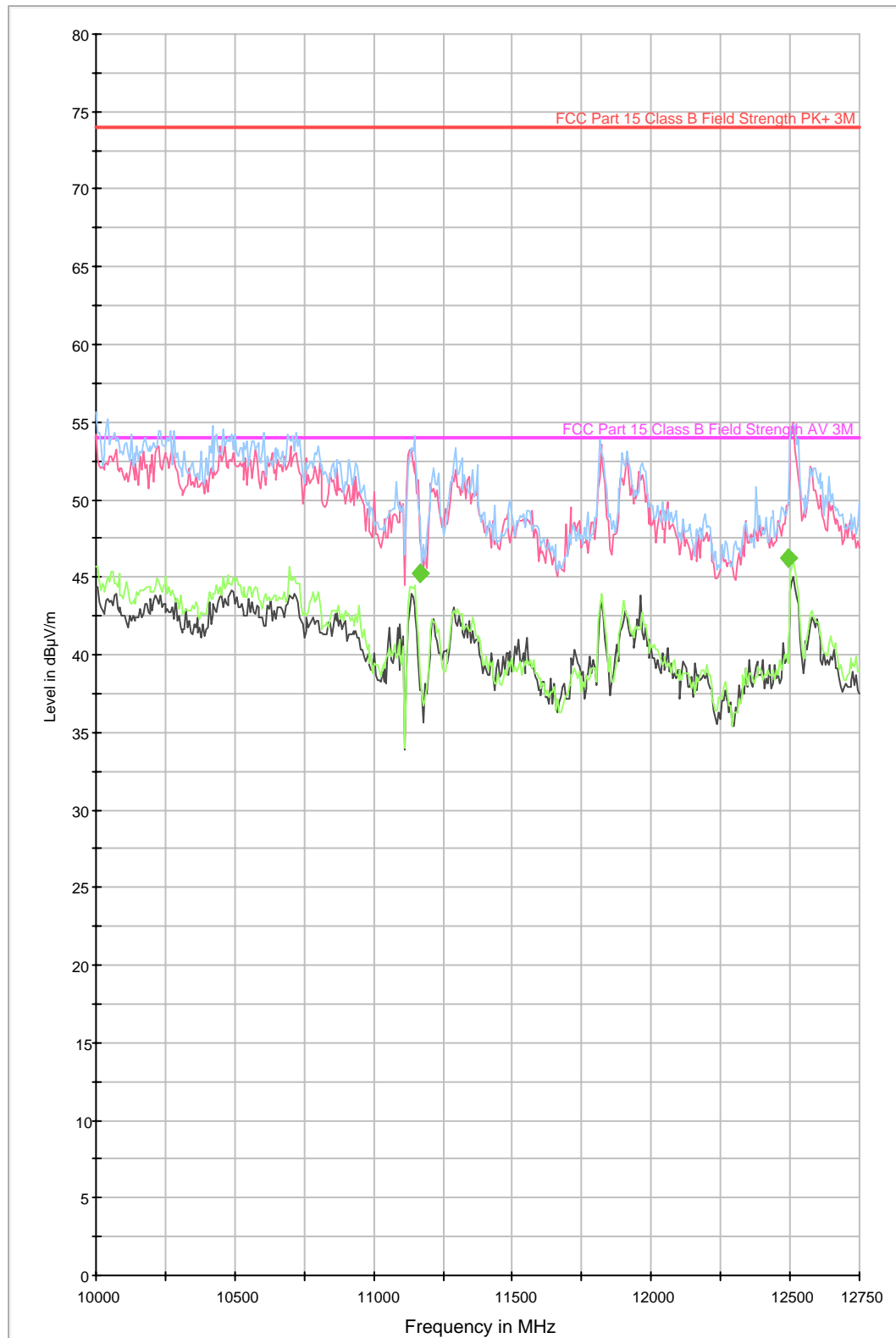
**GPH\74737JD13\004**

FCC Part 15.109 Radiated Emissions Class B 7-10GHz



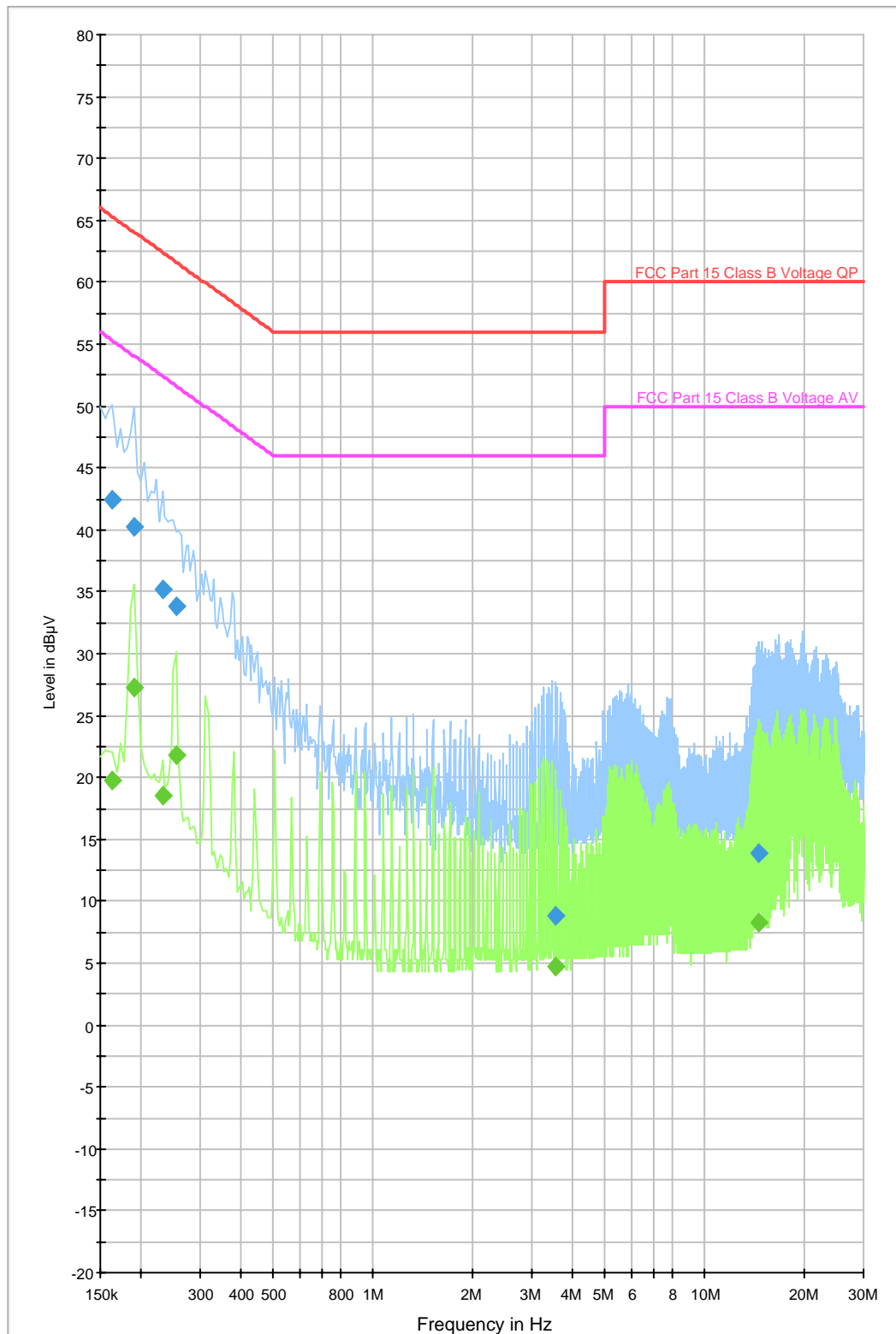
**GPH\74737JD13\005**

FCC Part 15.109 Radiated Emissions Class B 10-12.75GHz



**GPH74737JD13\006**

FCC Part 15.107 Conducted Emissions Class B



## 10. TEST CONFIGURATION DRAWING

10.1. This section contains the Test Configuration Drawings for the measurements listed in Section 7: Measurements, Examinations and Derived Results.

| Test Configuration Reference Number | Title  |
|-------------------------------------|--|
| DRG\74737JD13\001                   | Schematic diagram of the EUT, support equipment and interconnecting cables used for the test |

**DRG\74737JD13\001 - Schematic diagram of the EUT, support equipment and interconnecting cables used for the test**