

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Audio Partnership Plc, Stream Magic 6

To: 47CFR15.107, 47CFR15.109 and RSS-GEN Issue 3 December 2010

Test Report Serial No: RFI-EMC-RP82868JD01A V4.0

Version 4.0 supersedes all previous versions

| | | |
|---|--|--|
| This Test Report is Issued Under the Authority of John Newell, Group Quality Manager: | |  |
| Checked By: | Gareth Bragg | |
| Signature: |  | |
| Date of Issue: | 11 April 2012 | |

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1. CUSTOMER DETAILS



| | |
|----------------------|---|
| Company Name: | Audio Partnership PLC |
| Address: | Gallery Court, Hankey Place, London, SE1 4BB United Kingdom |



2. SUMMARY OF TESTING

2.1. Test Specification

| | |
|---------------------------|---|
| Reference: | 47CFR15.107 and 47CFR15.109 |
| Title: | Code of Federal Regulations Volume 47 (Telecommunications) 2010: Part 15 Subpart B (Radio Frequency Devices) – Section 15.107 and 15.109. |
| Reference: | RSS-GEN Issue 3 December 2010 |
| Title: | General Requirements and Information for the Certification of Radio Apparatus |
| Site Registration: | FCC: 209735 Industry Canada: 3245B-2 |

2.2. Summary of Test Results

| FCC Reference | IC Reference | Measurement Type | Applicability | Result |
|------------------|-----------------------------|---|---------------|---|
| EMISSIONS | | | | |
| 15.109 | RSS-Gen 4.10 RSS-Gen 6.1 | Radiated Emissions (Enclosure) | Y |  |
| 15.107 | RSS-GEN 7.2.4 | Conducted Emissions (AC Mains Input / Output Ports) | Y |  |

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 EUT was a WiFi enabled network music player capable of streaming audio from local devices

3.2. Identification of Equipment under Test (EUT)

| ID# | Description | Brand Name | Model No | Serial No |
|-----|----------------|-----------------|----------------|-------------|
| 1 | Network Player | Cambridge Audio | Stream Magic 6 | None Stated |

3.3. Port Identification

| Port | Description | Type |
|------|--------------------------|-------------|
| 1 | Enclosure | - |
| 2 | AC Mains Input | IEC |
| 3 | USB x 3 | USB |
| 4 | Ethernet | RJ45 |
| 5 | Toslink | Optical |
| 6 | SPDIF Digital Input | RCA |
| 7 | SPDIF Digital Output | RCA |
| 8 | Balanced Audio Out x 2 | XLR |
| 9 | Unbalanced Audio Out x 2 | RCA |
| 10 | IR Emitter In | 3.5 mm Jack |
| 11 | Control Bus | RCA |

3.4. Operating Modes

| Mode Reference | Definition |
|------------------------|---|
| USB Flash Drive Stream | The EUT was streaming audio from a USB flash drive plugged into the EUT |
| Optical stream | The EUT was streaming audio from a support CD player via an optical connection |
| USB Stream | The EUT was streaming audio from a support notebook PC via a USB connection |
| Ethernet Stream | The EUT was streaming audio from a support notebook PC via an Ethernet connection |
| Standby | The EUT was in a standby state awaiting activation |

NOTE: The audio track was a "no noise" test file, it was played on a continuous loop and was not cached

3.5. Modifications

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

3.6. Additional Information Related to Testing

| | |
|--|-------------------|
| Equipment Category: | Network Player |
| Intended Operating Environment: | Residential |
| Cycle Time: | < 1 s |
| Power Supply Requirement(s): | 110 VAC |
| Weight: | 4 kg |
| Dimensions: | 80 x 430 x 300 mm |
| Hardware Version Number: | None stated |
| Software Version Number: | None Stated |
| Highest Internally Generated Operating Frequency: | 2.4 GHz |
| FCC ID Number: | YKB651N001 |
| Industry Canada Certification Number: | 9095A-651N01 |

4. SUPPORT EQUIPMENT

4.1. Identification of Support Equipment

| Description | Manufacturer | Model No | Serial No |
|----------------------------|-----------------|--------------|--------------------|
| Loudspeaker x 2 | Cambridge Audio | Pro NFM10 | WT NFM10-B08010284 |
| Integrated Audio Amplifier | Cambridge Audio | Azur 550A-S | None Stated |
| USB Flash Drive | LG | Mirror 1Gb | None Stated |
| Notebook PC | Lenovo | 4151 | EB17420700 |
| CD Player | Cambridge Audio | Sonata CD30 | Not Stated |
| Ethernet Router | BT | Business Hub | 220711028393 |

4.2. Interconnecting Cables

| Cable Type | Shielded | Length (m) | Ferrite | Connection 1 | Connection 2 |
|------------|----------|------------|---------|--------------|----------------------------|
| Ethernet | N | 5 | N | EUT | Ethernet Router |
| USB | Y | 2 | Y | EUT | Notebook PC |
| Optical | N | 10 | N | CD Player | EUT |
| RCA | Y | 1 | N | EUT | Integrated Audio Amplifier |
| Ethernet | N | 5 | N | Notebook PC | EUT |

5. MONITORING PERFORMANCE

5.1. Overview

Only emissions tests were performed; therefore performance criteria were not applicable.

5.2. Monitoring EUT Performance during Testing

| | |
|---|--|
| For the purposes of testing, the term “<i>operate as intended</i>” was defined as: | The EUT continued to stream the “no noise” test file. The file was played on a continuous loop and was not cached. |
| 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 indicated by the continuous streaming of the test file |
| 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%. Where only confidence level is given, it has been demonstrated that the relevant items of test equipment used meet the specified requirements in the standard with at least this level of confidence.

7.1.3. Please refer to Section 6. *Measurement Uncertainty* on page 11 for details of our treatment of measurement uncertainty.

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: | 82868JD01 | TEST SITE ID: | Site 1 |
| EUT: | Stream Magic 6 | TEMPERATURE: | 26 °C to 28 °C |
| TEST ENGINEER: | Graeme Morris | RELATIVE HUMIDITY: | 32 % to 34 % |
| DATE OF TEST: | 01 Sep 2011 | ATMOSPHERIC PRESSURE: | 1002 mb to 1002 mb |
| FIELD TYPE: | Electric Field | MEASUREMENT DISTANCE: | 3 Metres |
| UNCERTAINTY: | ±3.99 dB | EQUIPMENT CLASS: | Class B |
| MEASUREMENT UNITS: | dB μ V/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: | ANSI C63.4: 2009 |
| TITLE: | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |

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: | USB Flash Drive Stream |
| FUNCTION(S) MONITORED: | Not Applicable |

MEASUREMENT RESULTS

| No. | Frequency (MHz) | Polarity | Detector | Level (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | Graph No. | Result |
|-----|-----------------|------------|------------|----------------------|----------------------|-------------|------------|----------|
| 1 | 58.729 | Vertical | Quasi-Peak | 27.5 | 40.0 | 12.5 | 001 | Complied |
| 2 | 106.711 | Vertical | Quasi-Peak | 36.4 | 43.5 | 7.1 | 001 | Complied |
| 3 | 119.991 | Vertical | Quasi-Peak | 35.3 | 43.5 | 8.2 | 001 | Complied |
| 4 | 144.001 | Vertical | Quasi-Peak | 34.9 | 43.5 | 8.6 | 001 | Complied |
| 5 | 368.636 | Horizontal | Quasi-Peak | 33.7 | 46.0 | 12.3 | 001 | Complied |
| 6 | 455.995 | Horizontal | Quasi-Peak | 23.0 | 46.0 | 23.0 | 001 | Complied |
| 7 | 479.986 | Horizontal | Quasi-Peak | 35.6 | 46.0 | 10.4 | 001 | Complied |
| 8 | 1000 to 4000 | | | Refer to Note 2 | | | 002 | Complied |
| 9 | 4000 to 12750 | | | Refer to Note 3 | | | 003 to 005 | Complied |

NOTES

- 1 Pre-scans were completed in the following modes of operation; USB Flash Drive Stream, Optical Stream, USB Stream, Ethernet Stream and Standby. From these pre-scans, the worst case was determined to be USB Flash Drive Stream and final measurements were completed in this mode only
- 2 The emission observed at 2.4 GHz was an intentional transmission from the EUT; therefore no further measurements were made
- 3 No emissions were noted above the noise floor of the measurement system; therefore no further measurements were made
- 4 Measurements below 1 GHz were performed in a semi-anechoic chamber at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
- 5 Pre-scans and final measurements above 1 GHz were performed in a semi-anechoic chamber at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

TEST EQUIPMENT USED

| RFI ID | INSTRUMENT DESCRIPTION | MODEL NUMBER | CALIBRATION DUE | INTERVAL |
|--------|---|------------------|-----------------|----------|
| M1273 | 20 Hz - 26.6 GHz EMI Test Receiver, Rohde & Schwarz | ESIB 26 | 04 Feb 2012 | 12 |
| A1834 | 3dB N-Type Attenuator | 8491B | 26 Jul 2012 | 12 |
| A1970 | 1-18GHz Pre-Amp | N/A | 30 Sep 2011 | 06 |
| A1817 | 1-18GHz Horn Antenna | 3115 | 03 Feb 2012 | 12 |
| A553 | Bi-log Antenna | CBL6111A | 26 Mar 2012 | 12 |
| C1407 | 15 metre RF cable | 262-0941-15M0 | 15 Apr 2012 | 12 |
| C1302 | 3m Rosenberger Cable | FA210A1030005050 | 31 Mar 2012 | 12 |

CONDUCTED 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: | 82868JD01 | TEST SITE ID: | Site 8 |
| EUT: | Stream Magic 6 | TEMPERATURE: | 25 °C to 25 °C |
| TEST ENGINEER: | Eric Phiri | RELATIVE HUMIDITY: | 26 % to 26 % |
| DATE OF TEST: | 15 Sep 2011 | ATMOSPHERIC PRESSURE: | 1003 mb to 1002 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: | ANSI C63.4: 2009 |
| TITLE: | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |

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: | Ethernet Stream |
| FUNCTION(S) MONITORED: | Not Applicable |

MEASUREMENT RESULTS

| No. | Frequency (MHz) | Line | Detector | Level (dBµV) | Limit (dBµV) | Margin (dB) | Graph No. | Result |
|-----|-----------------|---------|-----------------|--------------|--------------|-------------|-----------|----------|
| 1 | 0.186 | Neutral | Quasi-Peak | 43.7 | 64.2 | 20.5 | 006 | Complied |
| 2 | 0.249 | Neutral | Quasi-Peak | 35.8 | 61.8 | 26.0 | 006 | Complied |
| 3 | 0.600 | Neutral | Quasi-Peak | 36.9 | 56.0 | 19.1 | 006 | Complied |
| 4 | 3.332 | Neutral | Quasi-Peak | 28.8 | 56.0 | 27.2 | 006 | Complied |
| 5 | 7.661 | Neutral | Quasi-Peak | 33.5 | 60.0 | 26.5 | 006 | Complied |
| 6 | 11.531 | Neutral | Quasi-Peak | 42.6 | 60.0 | 17.4 | 006 | Complied |
| 7 | 18.245 | Neutral | Quasi-Peak | 45.5 | 60.0 | 14.5 | 006 | Complied |
| 8 | 0.191 | Neutral | Average (CISPR) | 30.1 | 54.0 | 23.9 | 006 | Complied |
| 9 | 0.254 | Neutral | Average (CISPR) | 24.5 | 51.6 | 27.1 | 006 | Complied |
| 10 | 0.596 | Neutral | Average (CISPR) | 24.7 | 46.0 | 21.3 | 006 | Complied |
| 11 | 3.530 | Neutral | Average (CISPR) | 17.5 | 46.0 | 28.5 | 006 | Complied |
| 12 | 7.463 | Neutral | Average (CISPR) | 21.6 | 50.0 | 28.4 | 006 | Complied |
| 13 | 11.711 | Neutral | Average (CISPR) | 33.3 | 50.0 | 16.7 | 006 | Complied |
| 14 | 18.245 | Neutral | Average (CISPR) | 42.3 | 50.0 | 7.7 | 006 | Complied |
| 15 | 0.186 | Live 1 | Quasi-Peak | 45.9 | 64.2 | 18.3 | 007 | Complied |
| 16 | 0.249 | Live 1 | Quasi-Peak | 37.5 | 61.8 | 24.3 | 007 | Complied |

MEASUREMENT RESULTS

| No. | Frequency (MHz) | Line | Detector | Level (dB μ V) | Limit (dB μ V) | Margin (dB) | Graph No. | Result |
|-----|-----------------|--------|-----------------|--------------------|--------------------|-------------|-----------|----------|
| 17 | 0.600 | Live 1 | Quasi-Peak | 36.4 | 56.0 | 19.6 | 007 | Complied |
| 18 | 3.530 | Live 1 | Quasi-Peak | 29.5 | 56.0 | 26.5 | 007 | Complied |
| 19 | 11.184 | Live 1 | Quasi-Peak | 44.8 | 60.0 | 15.2 | 007 | Complied |
| 20 | 18.056 | Live 1 | Quasi-Peak | 39.1 | 60.0 | 20.9 | 007 | Complied |
| 21 | 0.195 | Live 1 | Average (CISPR) | 30.4 | 53.8 | 23.4 | 007 | Complied |
| 22 | 0.254 | Live 1 | Average (CISPR) | 24.0 | 51.6 | 27.6 | 007 | Complied |
| 23 | 0.596 | Live 1 | Average (CISPR) | 24.0 | 46.0 | 22.0 | 007 | Complied |
| 24 | 3.593 | Live 1 | Average (CISPR) | 16.9 | 46.0 | 29.1 | 007 | Complied |
| 25 | 11.468 | Live 1 | Average (CISPR) | 32.9 | 50.0 | 17.1 | 007 | Complied |
| 26 | 17.754 | Live 1 | Average (CISPR) | 29.6 | 50.0 | 20.4 | 007 | Complied |

NOTES

- 1 Pre-scans were completed in the following modes of operation; USB Flash Drive Stream, Optical Stream, USB Stream, Ethernet Stream and Standby. From these pre-scans, the worst case was determined to be Ethernet Stream and final measurements were completed in this mode only

TEST EQUIPMENT USED

| RFI ID | INSTRUMENT DESCRIPTION | MODEL NUMBER | CALIBRATION DUE | INTERVAL |
|--------|---|------------------|------------------------------|----------|
| K0008 | Conducted AC Emissions / RF immunity Laboratory | N/A | Calibration not required | N/A |
| M1263 | EMI Test Receiver | ESIB7 | 13 Jul 2012 | 12 |
| A1830 | N-Type Pulse Limiter | ESH3-Z2 | 05 Mar 2012 | 12 |
| A067 | Line Impedance Stabilization Network | ESH3-Z5 | 02 Jun 2012 | 12 |
| C454 | 3m Flexy Cable | RG142XX-001-RFIB | Calibrated as part of system | N/A |

8. PHOTOGRAPHS OF EUT

This section contains the following photographs:

| Photo Reference Number | Title |
|------------------------|---|
| PHT\82868JD01\001 | Test Configuration Photograph - Conducted Emissions 001 |
| PHT\82868JD01\002 | Test Configuration Photograph - Conducted Emissions 002 |
| PHT\82868JD01\003 | Test Configuration Photograph - Conducted Emissions 003 |
| PHT\82868JD01\004 | Test Configuration Photograph - Radiated Emissions |

PHT\82868JD01\001 - Test Configuration Photograph - Conducted Emissions 001



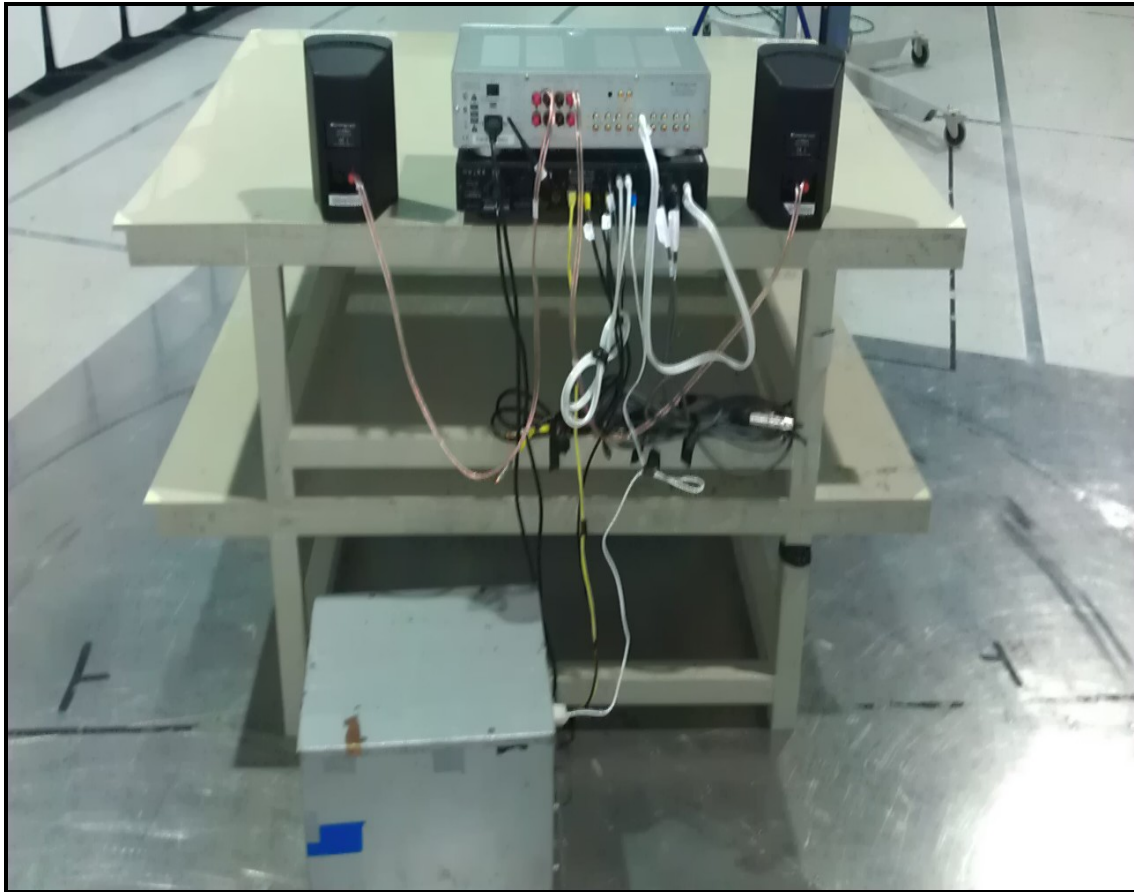
PHT\82868JD01\002 - Test Configuration Photograph - Conducted Emissions 002



PHT\82868JD01\003 - Test Configuration Photograph - Conducted Emissions 003



PHT\82868JD01\004 - Test Configuration Photograph - Radiated Emissions



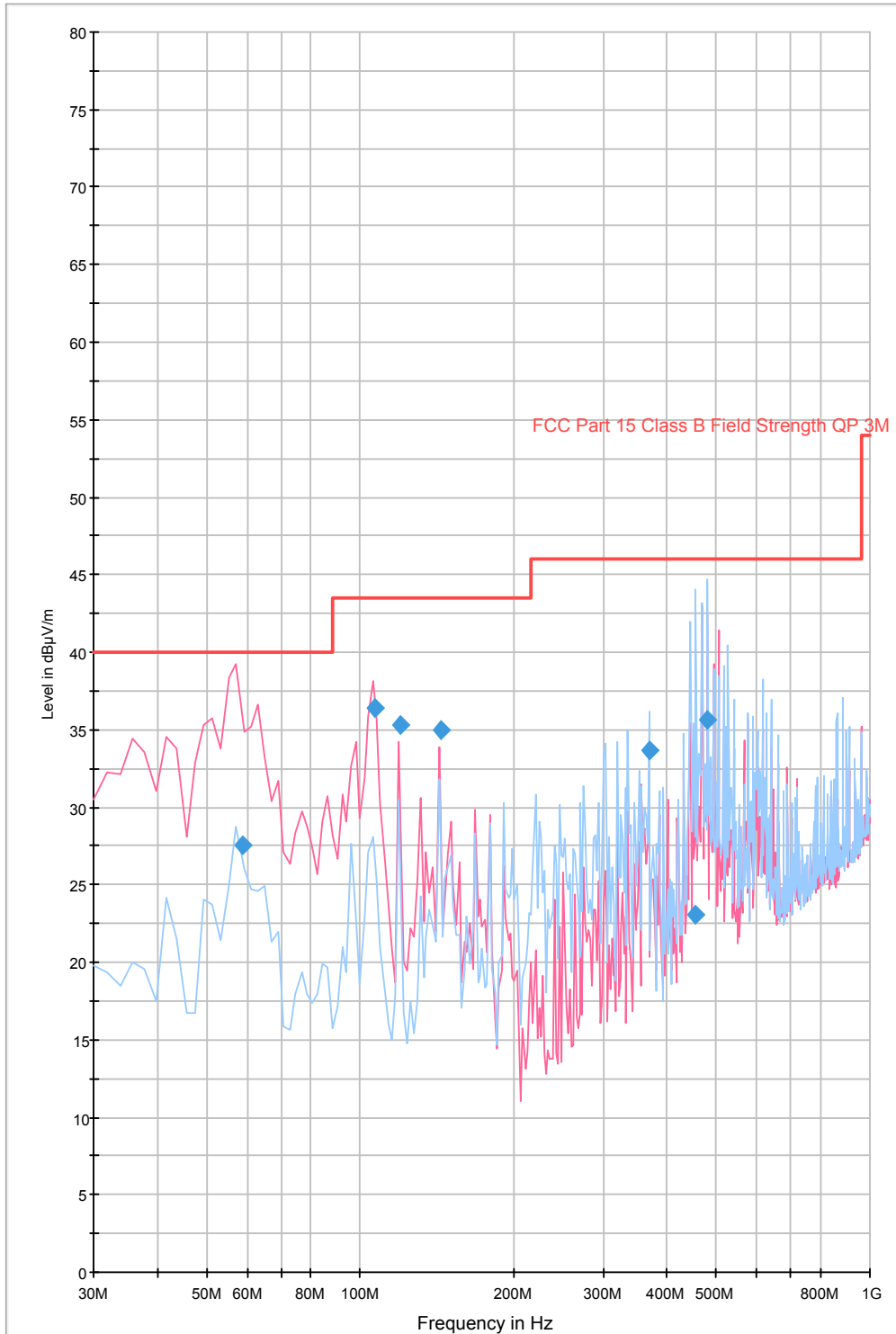
9. GRAPHICAL TEST RESULTS

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

| Graph Reference Number | Title |
|--------------------------|--|
| GPH\82868JD01\001 to 005 | Radiated Emissions - USB Flash Drive Stream Pre-Scans (30 MHz to 12.75 GHz) |
| GPH\82868JD01\006 | Conducted Emissions - Neutral Pre-Scan (150 kHz to 30 MHz) |
| GPH\82868JD01\007 | Conducted Emissions - Live Pre-Scan (150 kHz to 30 MHz) |

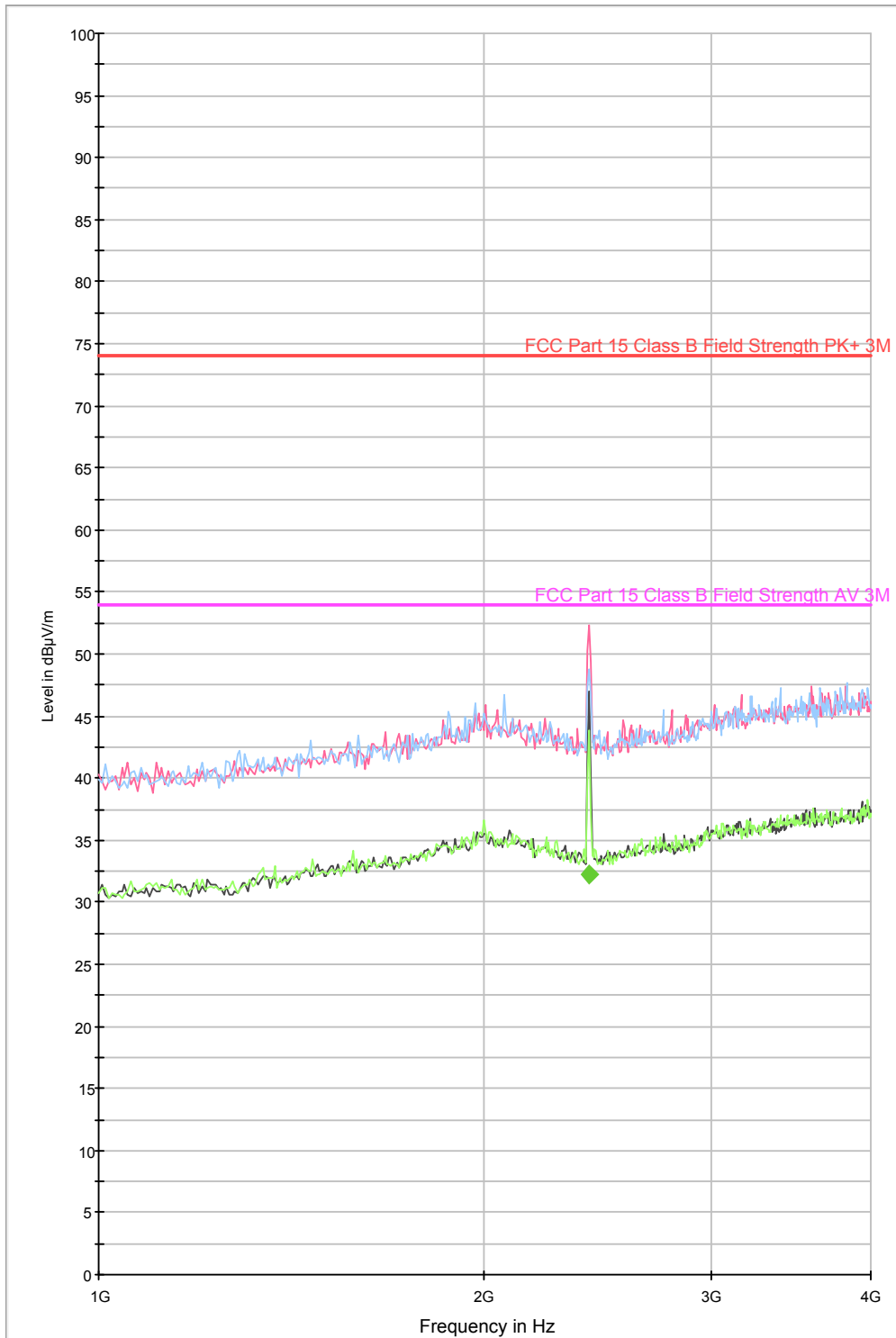
GPH\82868JD01\001

FCC Part 15.109 Radiated Emissions Class B 30MHz-1GHz 3m



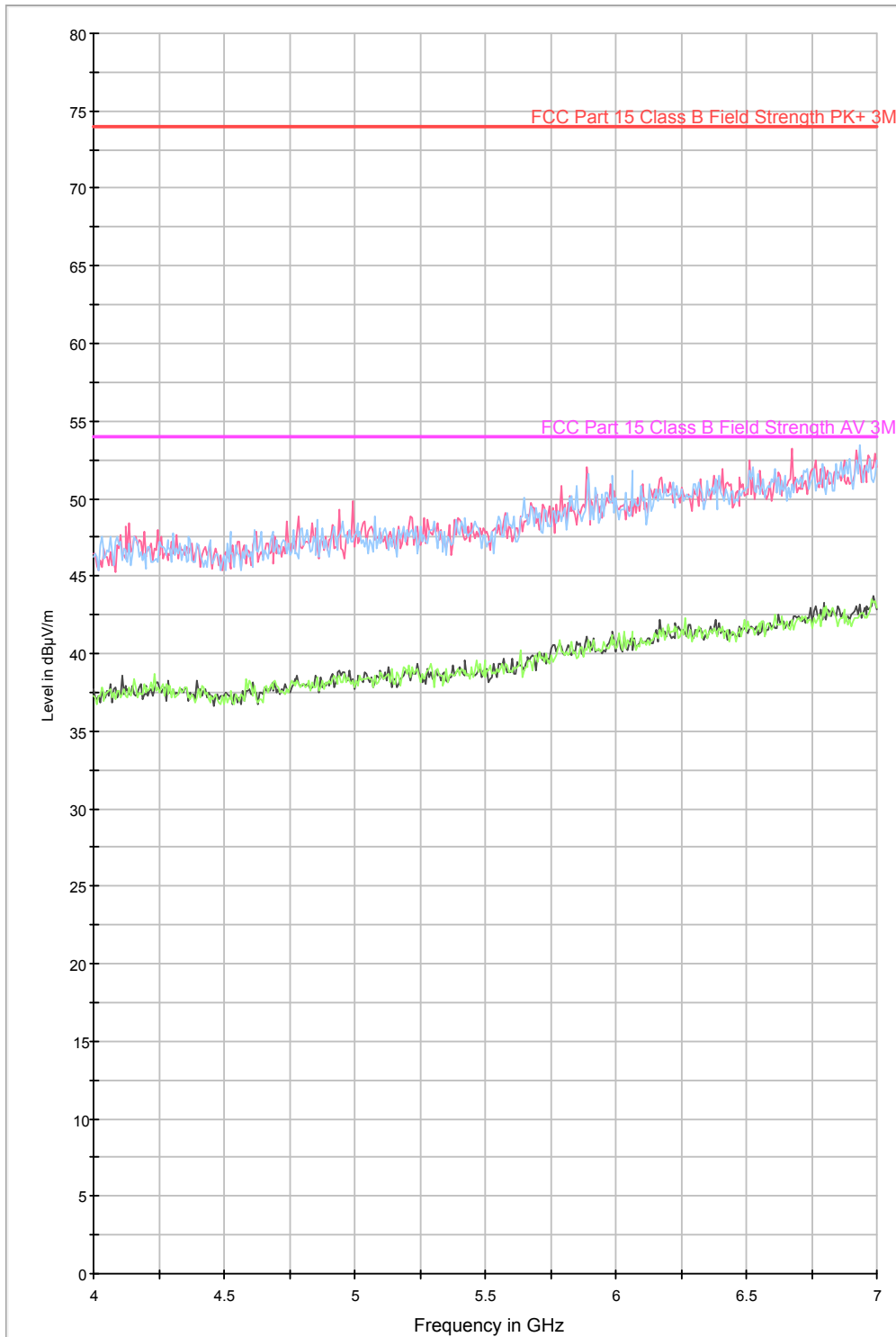
GPH\82868JD01\002

FCC Part 15.109 Radiated Emissions Class B 1-4GHz



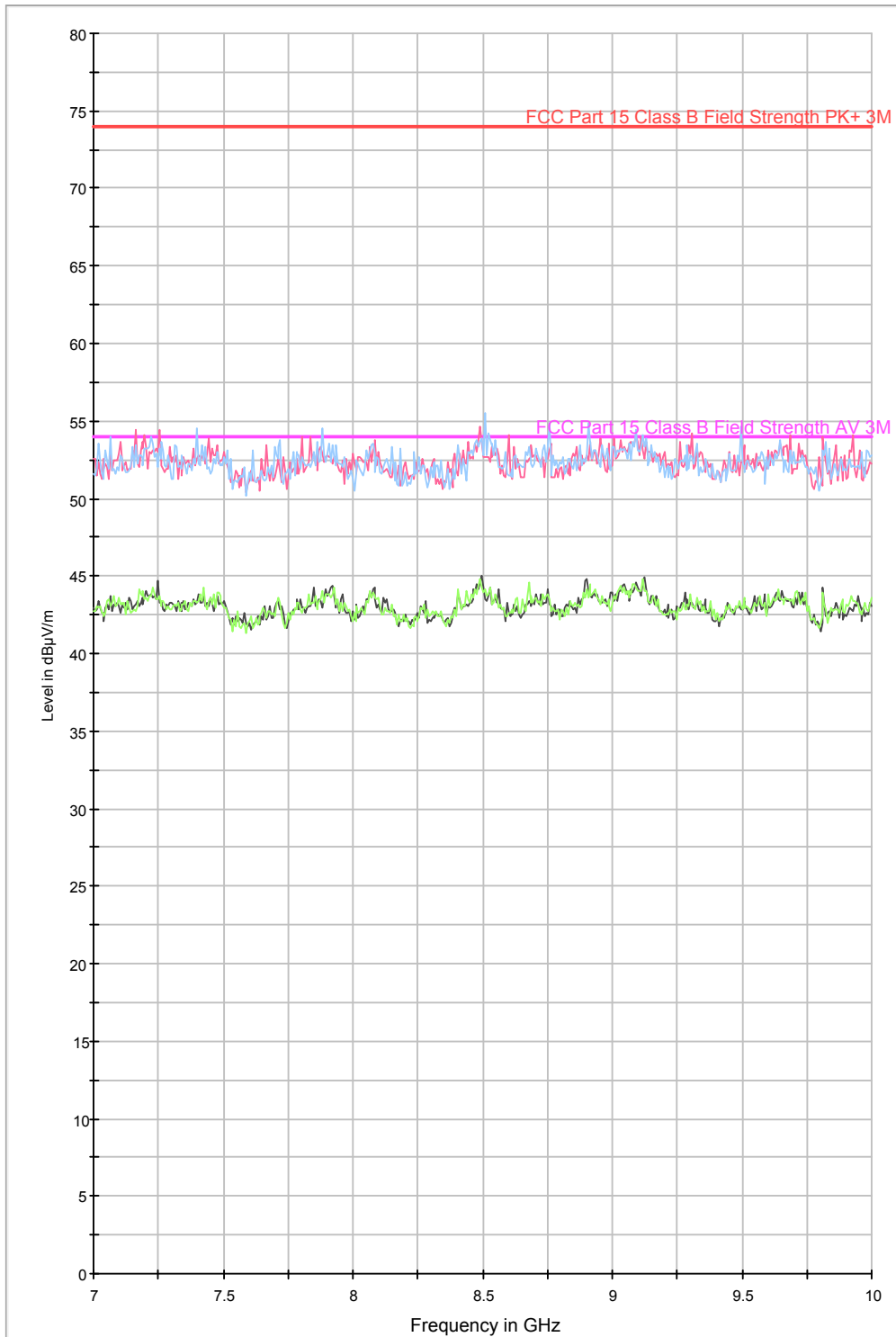
GPH\82868JD01\003

FCC Part 15.109 Radiated Emissions Class B 4-7GHz



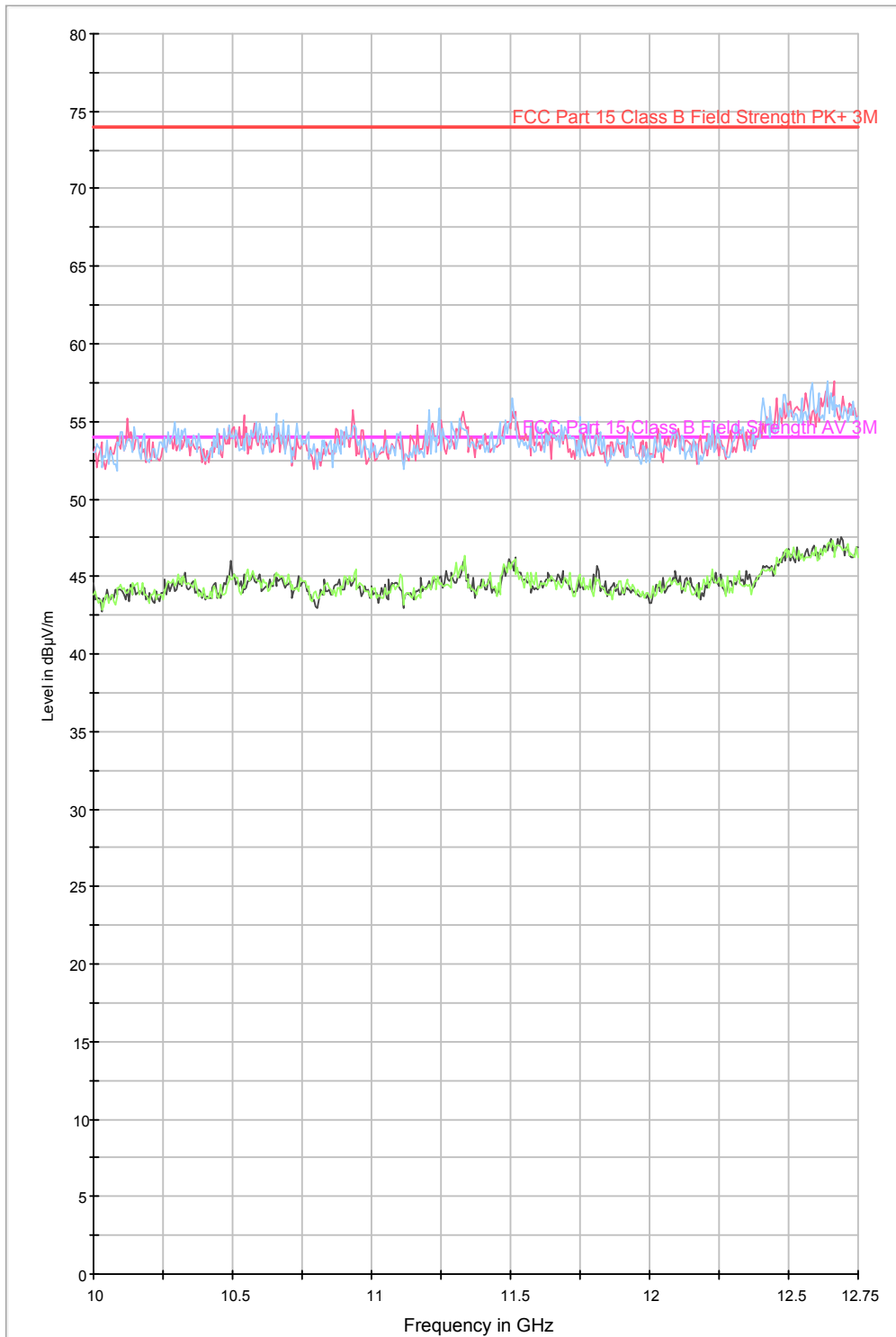
GPH\82868JD01\004

FCC Part 15.109 Radiated Emissions Class B 7-10GHz

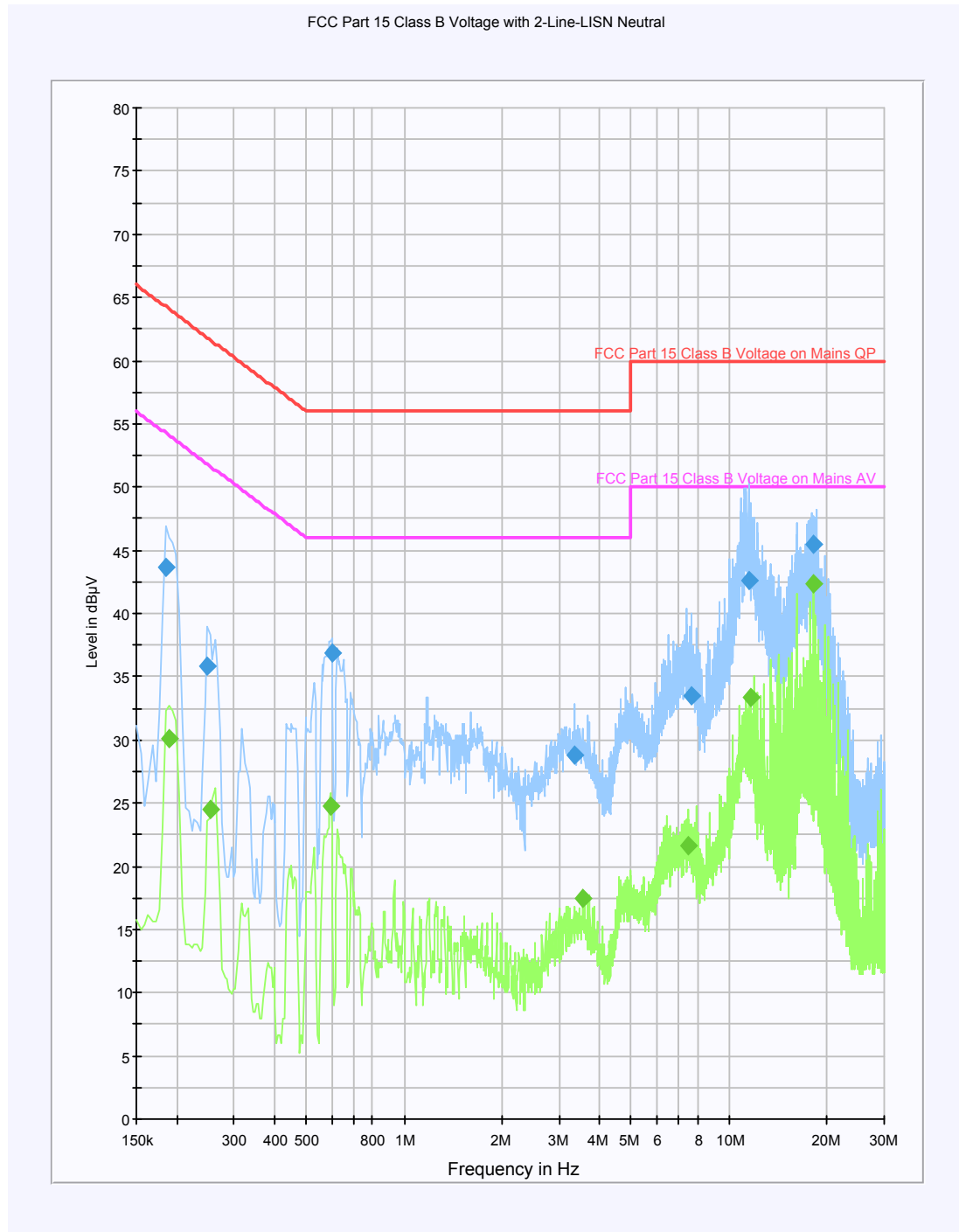


GPH\82868JD01\005

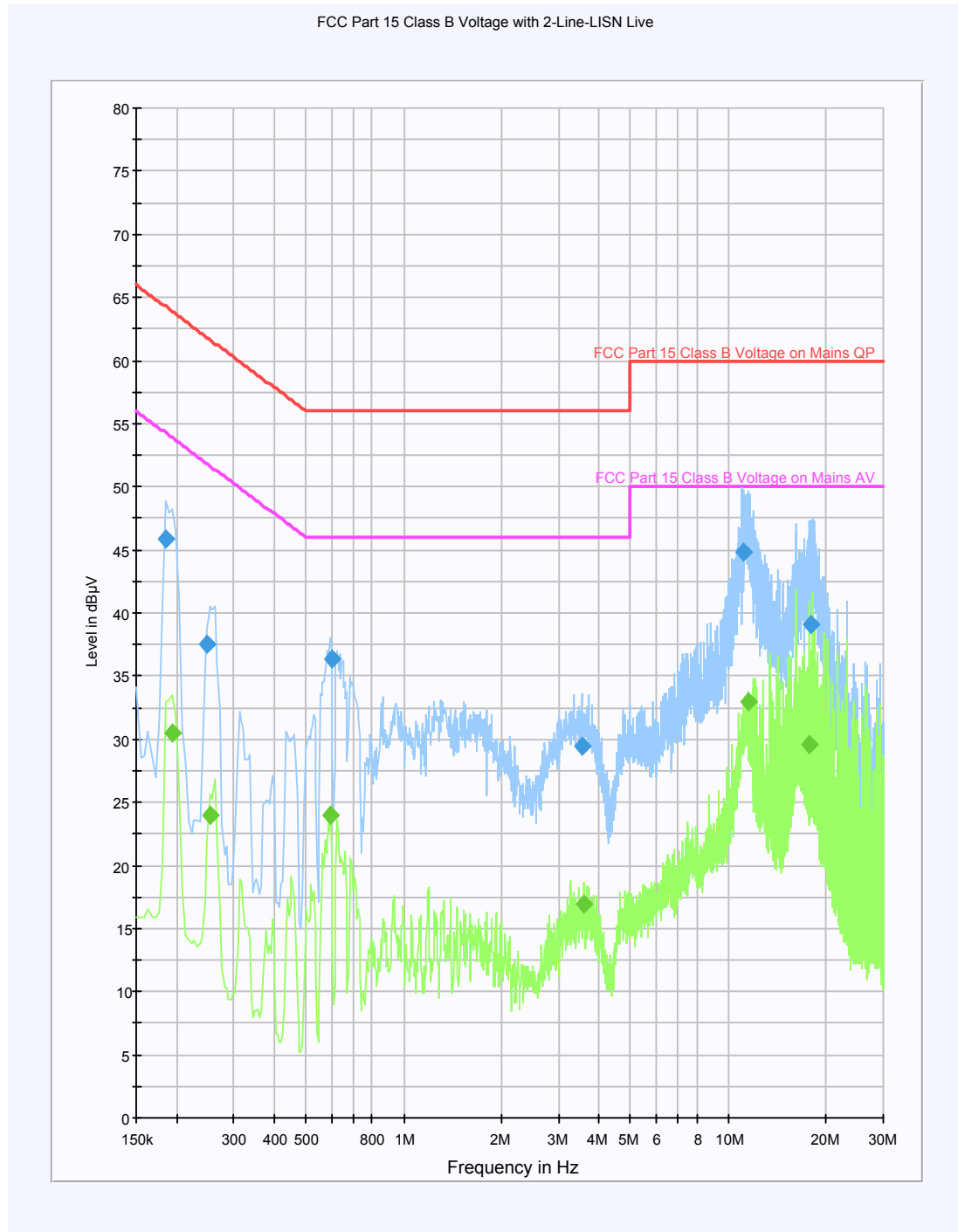
FCC Part 15.109 Radiated Emissions Class B 10-12.75GHz



GPH\82868JD01\006



GPH\82868JD01\007



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\82868JD01\001 | Schematic diagram of the EUT, support equipment and interconnecting cables used for the test |

DRG\82868JD01\001 - Schematic diagram of the EUT, support equipment and interconnecting cables used for the test

