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# Test report

## FCC Part15B ICES-003 Arris DCX860 EPR2

Date of issue: August 22, 2016

Applicant:

ARRIS GROUP INC

Product:

Set-Top Box

Model:

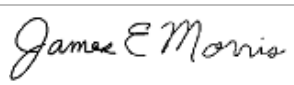
DCX860

Specifications:

- FCC 47 CFR Part 15, Subpart B – DoC
- ICES-003 Issue 6, June 2016

Lab and test locations

| | |
|---|---|
| Company name | Nemko USA, Inc. |
| Address | 2210 Faraday Ave, Suite 150 |
| City | Carlsbad |
| Province | California |
| Postal code | 92008 |
| Country | USA |
| Telephone | +1 760 444 3500 |
| Website | www.nemko.com |
| Site number | FCC: US5058; IC: 2040B |

| | |
|---|---|
| Tested by | Feng You, Sr. Wireless Engineer |
| Reviewed by | James Morris, EMC and Wireless Divisions Manager |
| Review date | August 30, 2016 |
| Reviewer signature |  |

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko USA's ISO/IEC 17025 accreditation.

Copyright notification

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# Section 8 Report summary

## 8.1 Test specifications

| | |
|---|---|
| FCC 47 CFR Part 15, Subpart B – DoC | Title 47: Telecommunication; PART 15—RADIO FREQUENCY DEVICES |
| ICES-003 Issue 6 June 2016 | Information Technology Equipment (Including Digital Apparatus) — Limits and Methods of Measurement |

## 8.2 Exclusions

None.

## 8.3 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

*See "Summary of test results" for full details.*

## 8.4 Test report revision history

***Table 8.4-1:*** *Test report revision history*

| Revision # | Details of changes made to test report |
|---|---|
| 1 | Original report issued |

Notes: None

# Section 9 Summary of test results

## 9.1 North America test results

***Table 9.1-1:*** *FCC 47 CFR Part 15, Subpart B results*

| Test description | Verdict |
|---|---|
| Radiated disturbance | Pass |
| Conducted disturbance at mains port | Pass |

Notes: [1] Product classification B

***Table 9.1-2:*** *ICES-003 results*

| Test description | Verdict |
|---|---|
| Radiated disturbance | Pass |
| Conducted disturbance at mains port | Pass |

Notes: [1] Product classification B

# Section 10 Equipment under test (EUT) details

## 10.1 Applicant

| | |
|---|---|
| Company name | Arris Group Inc. |
| Address | 6450 Sequence Drive |
| City | San Diego |
| Province/State | CA |
| Postal/Zip code | 92121 |
| Country | USA |

## 10.2 Manufacturer

| | |
|---|---|
| Company name | Arris Group Inc. |
| Address | 6450 Sequence Drive |
| City | San Diego |
| Province/State | CA |
| Postal/Zip code | 92121 |
| Country | USA |

## 10.3 Sample information

| | |
|---|---|
| Receipt date | August 18, 2016 |
| Nemko sample ID number | #1 |

## 10.4 EUT information

| | |
|---|---|
| Product name | Set-Top Box |
| Model | DCX860 |
| Serial number | M11632TH0117 |
| Part number | 599339-001-00 |
| Power requirements | 12V DC / 12W |
| Description/theory of operation | Cable TV Set-Top Box |
| Operational frequencies | Highest clock = 1503MHz<br>RF-QAM = 849MHz, MoCA = 1175MHz |
| Software details | PKG_MTC_6105_DCX860_STRT_0101_SIGNED.bin |

## 10.5 EUT exercise and monitoring details

Normal operation. Receive signal from RF-QAM or MoCA generators, plays on TV.

## 10.6 EUT setup details

***Table 10.6-1:*** *EUT sub assemblies*

| Description | Brand name | Model/Part number | Serial number | Rev. |
|---|---|---|---|---|
| Set-Top Box | Arris | DCX860 | M11632TH0117 | EPR2 |
| AC Adapter | Asian Power Devices | WA-12M12FU | N/A | N/A |
| AC Adapter | NetBit | NBS12E120110VU | N/A | N/A |

***Table 10.6-2:*** *EUT interface ports*

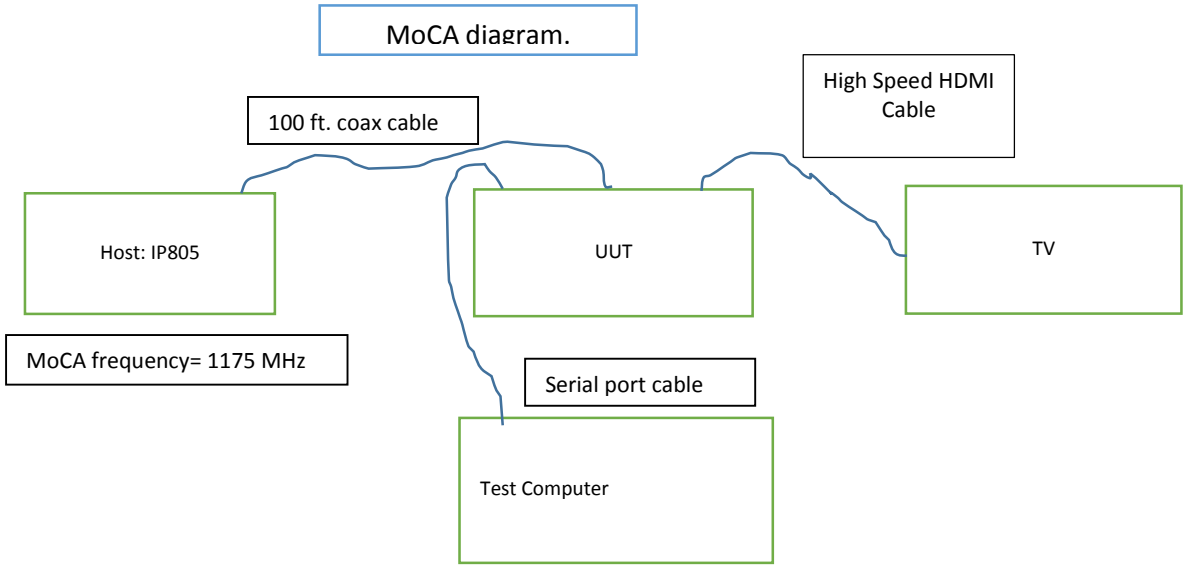
| Description | Qty. |
|---|---|
| Cable IN (F) | 1 |
| Digital Audio Out (Optical) | 1 |
| HDMI Out | 1 |
| USB 2.0 | 1 |
| USB 3.0 | 1 |
| RJ45 | 1 |
| Serial | 1 |
| DC Input | 1 |

***Table 10.6-3:*** *Support equipment*

| Description | Brand name | Model/Part number | Serial number | Rev. |
|---|---|---|---|---|
| TV | LG | 10LG30 | 804AMUA0S790 | N/A |
| QAM & VSB RF Signal Generator | Tektronix | RTX 130B | B010180 | N/A |
| Mouse | Microsoft | Serial Mouse 55305 | 106841 | N/A |
| Set-top Box as MOCA Signal generator | Arris | IP805-M | M11524TJ6695 | N/A |
| AC Adapter for IP805-M | Delta | ADP-15AR | GOID41V05LC | N/A |

***Table 10.6-4:*** *Inter-connection cables*

| Cable description | From | To | Length (m) |
|---|---|---|---|
| F Connector Video Cable | EUT | RF Signal Generator | 30.5 |
| 2.5mm to RCA AV Cable | EUT | TV | 3 |
| HDMI Cable | EUT | TV | 2.4 |
| USB Load Cable | EUT | Terminated | 0.6 |
| USB 3.0 Cable Load | EUT | Terminated | 1.8 |
| RJ45 Cable Load | EUT | Terminated | 1.2 |



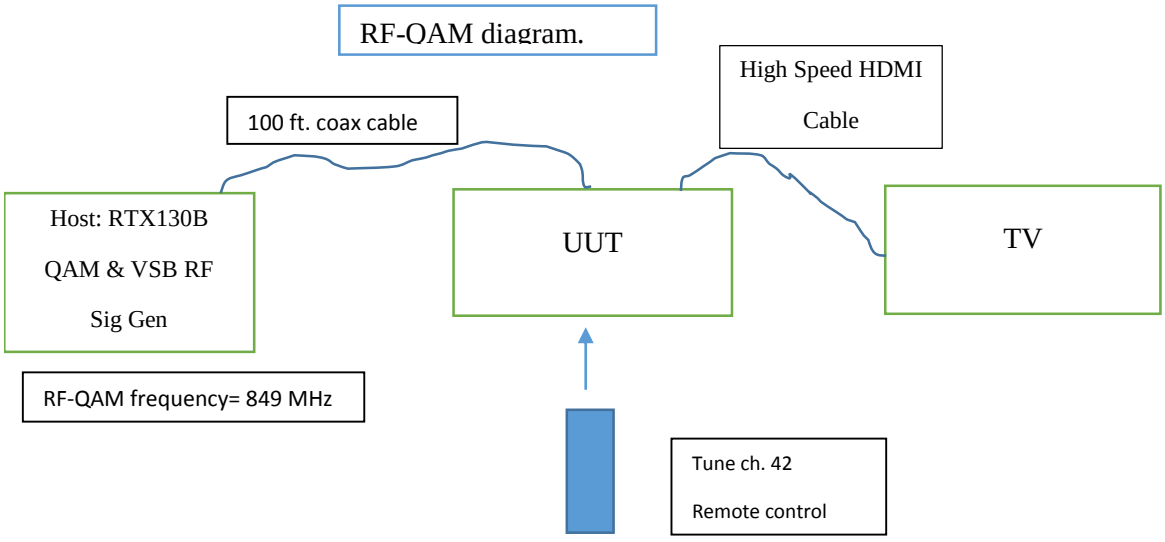




***Figure 10.6-1:*** *Setup diagram*

# Section 11 Engineering considerations

## 11.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

## 11.2 Technical judgment

None

## 11.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

# Section 12 Test conditions

## 12.1 Atmospheric conditions

| | |
|---|---|
| Temperature | 15–30 °C |
| Relative humidity | 20–75 % |
| Air pressure | 86–106 kPa |

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

## 12.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

120V 60Hz

# Section 13 Measurement uncertainty

## 13.1 Uncertainty of measurement

Nemko USA Inc. has calculated measurement uncertainty and is documented in EMC/MUC/001 “Uncertainty in EMC measurements.” Measurement uncertainty was calculated using the methods described in CISPR 16-4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC measurements; as well as described in UKAS LAB34: The expression of Uncertainty in EMC Testing. Measurement uncertainty calculations assume a coverage factor of K=2 with 95% certainty.

# Section 14 Terms and definitions

## 14.1 Product classifications definitions

### 14.1.7 Title 47: Telecommunication – Part 15-Radio Frequency devices, Subpart A – General

**Class A digital device.** A digital device that is marketed for use in a commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home.

**Class B digital device**. A digital device that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public.

Note: The responsible party may also qualify a device intended to be marketed in a commercial, business or industrial environment as a Class B device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B digital device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B digital device, regardless of its intended use.

### 14.1.8 ICES-003 2.2

ICES-003 prescribes two Classes of limits of radio noise for ITE: Class A limits for non-residential operation and Class B limits for residential operation, as set out in Section 5.

Only ITE intended strictly for non-residential use in commercial, industrial or business environments, and whose design or other characteristics strongly preclude the possibility of its use in a residential environment, shall be permitted to comply with the Class A limits.

All ITE that cannot meet the definition for Class A operation shall comply with the Class B limits.

Note: The ITE shall comply with both the conducted and the radiated emissions limits for power lines, within the same Class, with no intermixing.

### 14.1.9 EN 55011, AS/NZS CISPR 11, CISPR 11, and ICES-001

Group number

**Group 1**

group 1 contains all equipment in the scope of this standard which is not classified as group 2 equipment.

**Group 2**

group 2 contains all ISM RF equipment in which radio-frequency energy in the frequency range 9 kHz to 400 GHz is intentionally generated and used or only used, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material or inspection/analysis purposes.

**Class A equipment**

… is equipment suitable for use in all establishments other than domestic and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

**Warning:** Class A equipment is intended for use in an industrial environment. In the documentation for the user, a statement shall be included drawing attention to the fact that there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

**Class B equipment**

… is equipment suitable for use in domestic establishments and in establishments directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

## 7.1 Product classifications definitions, continued

### 14.1.10 EN 61000-3-2

For the purpose of harmonic current limitation, equipment is classified as follows:

**Class A:**

- Balanced three-phase equipment;
- Household appliances excluding equipment identified as Class D;
- Tools excluding portable tools;
- Dimmers for incandescent lamps;
- Audio equipment.

Equipment not specified in one of the three other classes shall be considered as Class A equipment.

**Class B:**

- Portable tools;
- Arc welding equipment, which is not professional equipment.

**Class C:**

- Lighting equipment.

**Class D:**

Equipment having a specified power according to 6.2.2 less than or equal to 600 W, of the following types:

- Personal computers and personal computer monitors;
- Television receivers.

## 14.2 General definitions

### 14.2.7 Title 47: Telecommunication – Part 15-Radio Frequency devices, Subpart A – General

*Digital device.* (Previously defined as a computing device). An unintentional radiator (device or system) that generates and uses timing signals or pulses at a rate in excess of 9,000 pulses (cycles) per second and uses digital techniques; inclusive of telephone equipment that uses digital techniques or any device or system that generates and uses radio frequency energy for the purpose of performing data processing functions, such as electronic computations, operations, transformations, recording, filing, sorting, storage, retrieval, or transfer. A radio frequency device that is specifically subject to an emanation requirement in any other FCC Rule part or an intentional radiator subject to subpart C of this part that contains a digital device is not subject to the standards for digital devices, provided the digital device is used only to enable operation of the radio frequency device and the digital device does not control additional functions or capabilities.

Note: Computer terminals and peripherals that are intended to be connected to a computer are digital devices.

### 14.2.8 ICES-003 2.1

ITE is defined as devices or systems that use digital techniques for purposes such as data processing and computation. ITE is any unintentional radiator (device or system) that generates and/or uses timing signals or pulses having a rate of at least 9 kHz and employs digital techniques for purposes such as computation, display, data processing and storage, and control. An ITE device used to create an ITE system shall comply with the requirements of ICES-003 prior to its integration into the final system if offered for sale, imported or marketed individually.

ITE is designated as Category II Equipment,1 meaning that no technical acceptability certificate (TAC) or equipment certification is required. ITE subject to ICES-003 is approved through the method of a "supplier's declaration of conformity (SDoC)" by the manufacturer, importer or distributor of ITE, which shall ensure that compliance with all technical requirements prescribed by ICES-003 has been demonstrated and that the results have been compiled into a test report. The test report shall clearly state which test method was used to determine compliance. The methods of measurement are set out in the standards incorporated by reference in ICES-003, and are specified in Section 3.

### 14.2.9 EN 55011, AS/NZS CISPR 11, CISPR 11, and ICES-001

**industrial, scientific and medical (ISM) applications (of radio frequency energy)**
operation of equipment or appliances designed to generate and use locally radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunications [ITU Radio Regulations Volume 1: 2004 – Articles, Definition 1.15]

***NOTE 1*** Typical applications are the production of physical, biological, or chemical effects such as heating, ionisation of gases, mechanical vibrations, hair removal, acceleration of charged particles.

***NOTE 2*** The abbreviation ISM RF is used throughout this standard for such equipment or appliances.

**ISM equipment and appliances**
equipment or appliances designed to generate and/or use locally radio-frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunications and information technology and other applications covered by other CISPR publications

### 14.2.10 EN 61000-3-3

**Voltage fluctuation:** Series of changes of r.m.s voltage evaluated as a single value for each successive half-period between zero-crossings of the source voltage.

**Flicker:** Impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time.

**Short-term flicker indicator, *P*st:** The flicker severity evaluated over a short period (in minutes); *P*st = 1 is the conventional threshold of irritability.

**Long-term flicker indicator, *P*lt:** The flicker severity evaluated over a long period (a few hours) using successive *P*st values

# Section 15 Testing data

## 15.1 Radiated disturbance

### 15.1.7 References

CISPR 11: 2009 + A1: 2010 and ANSI C63.4-2014

### 15.1.8 Test summary

| | | | |
|---|---|---|---|
| Verdict | Pass | | |
| Test date | August 18, 2016 | Temperature | 24 °C |
| Test engineer | Feng You | Air pressure | 1001 mbar |
| Test location | San Diego | Relative humidity | 64 % |

### 15.1.9 Notes

None.

### 15.1.10 Setup details

| | |
|---|---|
| EUT setup configuration | Table top |
| Test facility | 10 m Semi anechoic chamber |
| Measuring distance | 3 m |
| Antenna height variation | 1–4 m |
| Turn table position | 0–360° |
| Measurement details | A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement. |

Receiver/spectrum analyzer settings for frequencies below 1 GHz:

| | |
|---|---|
| Resolution bandwidth | 120 kHz |
| Video bandwidth | 300 kHz |
| Detector mode | – Peak (Preview measurement)<br>– Quasi-peak (Final measurement) |
| Trace mode | Max Hold |
| Measurement time | – 100 ms (Peak preview measurement)<br>– 1000 ms (Quasi-peak final measurement) |

Receiver/spectrum analyzer settings for frequencies above 1 GHz:

| | |
|---|---|
| Resolution bandwidth | 1 MHz |
| Video bandwidth | 3 MHz |
| Detector mode | Peak (Preview measurement)<br>Peak and CAverage (Final measurement) |
| Trace mode | Max Hold |
| Measurement time | – 100 ms (Peak preview measurement)<br>– 1000 ms (Peak and CAverage final measurement) |

### 15.1.4 Setup details, continued

***Table 15.1-1:*** *Radiated disturbance equipment list*

| Equipment | Manufacturer | Model no. | Asset no. | Cal cycle | Next cal. |
|---|---|---|---|---|---|
| Antenna, DRWG | EMCO | 3115 | 2505 | Annually | 01-Feb-2017 |
| Antenna, Bilog | Schaffner | CBL 6111D | 22926 | Annually | 02-Oct-2016 |
| EMI Test Receiver | Rohde & Schwarz | ESU 40 | 100064 | Annually | 28-Apr-2017 |

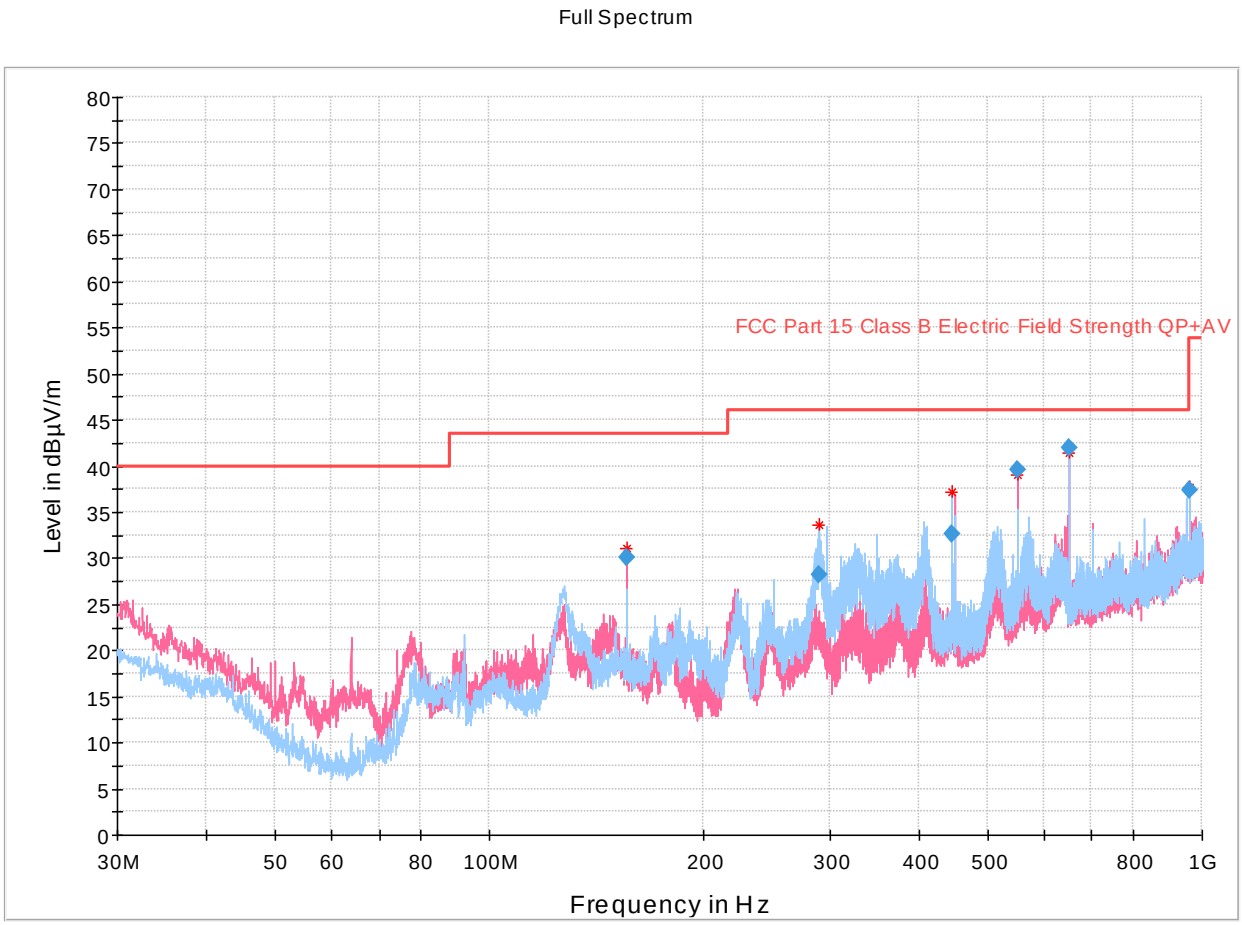
Notes: None

***Table 15.1-2:*** *Radiated disturbance test software details*

| Manufacturer of Software | Details |
|---|---|
| Rohde & Schwarz | EMC32 Version 10.00.00 |

Notes: None

### 15.1.5 Test data – RF-QAM, Asian Power Devices AC Adapter




The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators.

***Figure 15.1-1:*** *Radiated disturbance spectral plot (30 to 1000 MHz)*

***Table 15.1-3:*** *Radiated disturbance (Quasi-Peak) results*

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|
| 155.849000 | 30.05 | 43.50 | 13.45 | 1000.0 | 120.000 | 105.2 | V | 295.0 |
| 289.763500 | 28.22 | 46.00 | 17.78 | 1000.0 | 120.000 | 158.4 | H | 70.0 |
| 445.459500 | 32.65 | 46.00 | 13.35 | 1000.0 | 120.000 | 126.6 | H | 261.0 |
| 550.017000 | 39.61 | 46.00 | 6.39 | 1000.0 | 120.000 | 103.9 | V | 245.0 |
| 649.984000 | 41.98 | 46.00 | 4.02 | 1000.0 | 120.000 | 123.6 | H | 162.0 |
| 958.347000 | 37.45 | 46.00 | 8.55 | 1000.0 | 120.000 | 111.3 | V | 119.0 |

15.1.5 Test data, continued

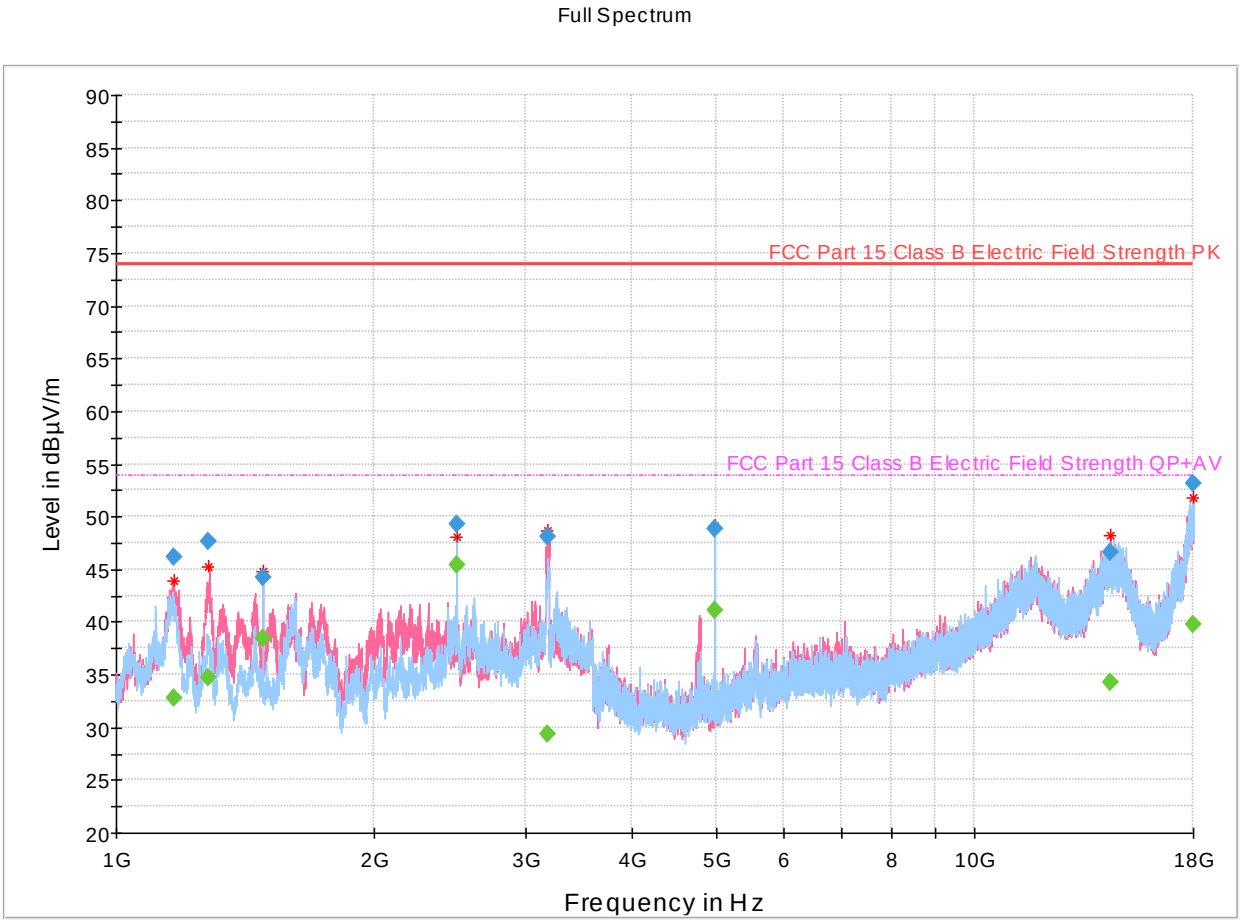
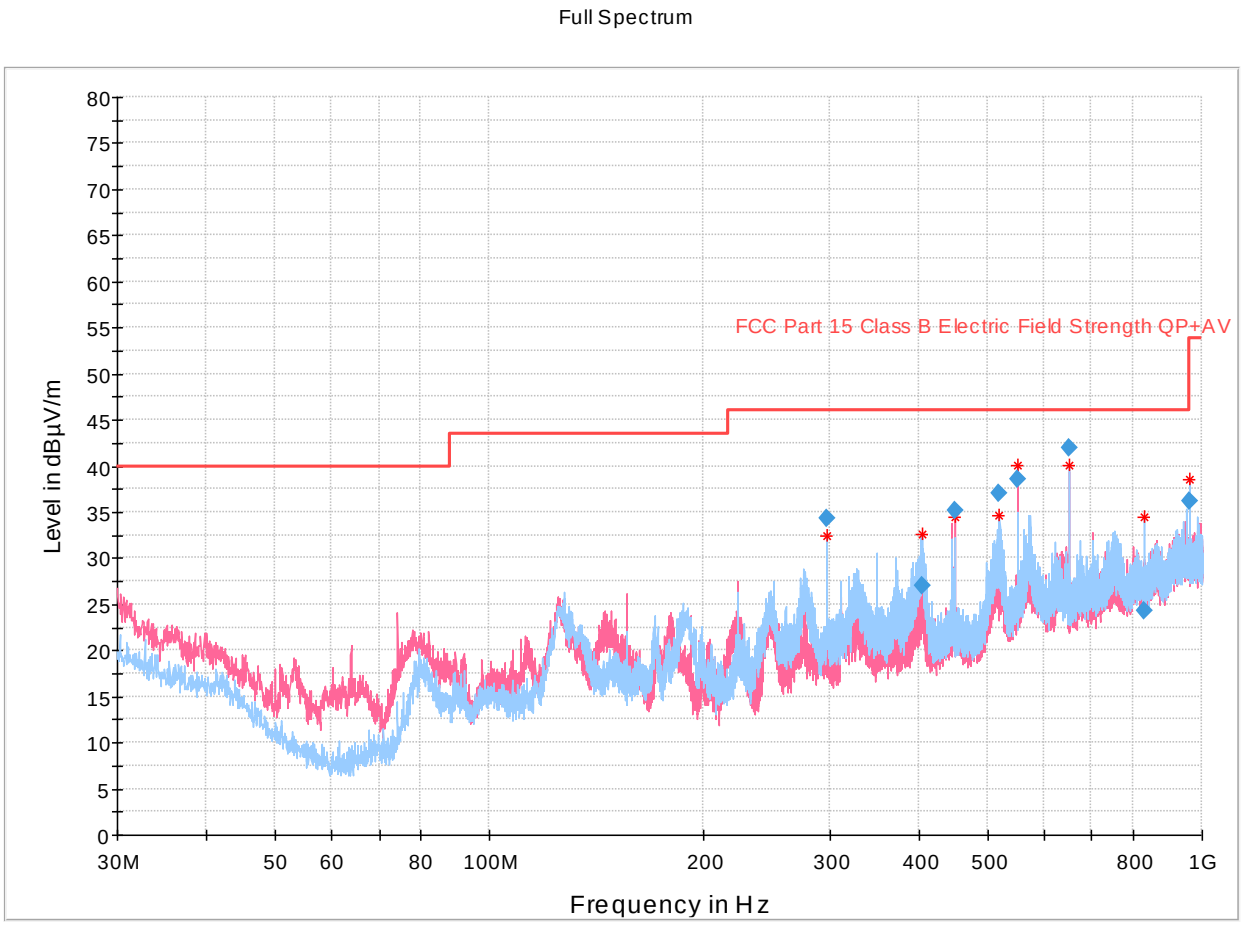



***Figure 15.1-2:*** *Radiated disturbance spectral plot (1 to 18 GHz)*

***Table 15.1-4:*** *Radiated disturbance (Peak and Average) result*

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 1165.6666 | 46.23 | --- | 73.90 | 27.67 | 1000.0 | 1000.000 | 147.4 | V | 214.0 |
| 1165.6666 | --- | 32.81 | 53.90 | 21.09 | 1000.0 | 1000.000 | 147.4 | V | 214.0 |
| 1278.9000 | --- | 34.76 | 53.90 | 19.14 | 1000.0 | 1000.000 | 116.2 | V | 190.0 |
| 1278.9000 | 47.65 | --- | 73.90 | 26.25 | 1000.0 | 1000.000 | 116.2 | V | 190.0 |
| 1485.1000 | --- | 38.38 | 53.90 | 15.52 | 1000.0 | 1000.000 | 137.7 | H | 11.0 |
| 1485.1000 | 44.20 | --- | 73.90 | 29.70 | 1000.0 | 1000.000 | 137.7 | H | 11.0 |
| 2493.7666 | 49.26 | --- | 73.90 | 24.64 | 1000.0 | 1000.000 | 203.2 | H | 79.0 |
| 2493.7666 | --- | 45.43 | 53.90 | 8.47 | 1000.0 | 1000.000 | 203.2 | H | 79.0 |
| 3182.5333 | 48.16 | --- | 73.90 | 25.74 | 1000.0 | 1000.000 | 103.9 | V | 62.0 |
| 3182.5333 | --- | 29.31 | 53.90 | 24.59 | 1000.0 | 1000.000 | 103.9 | V | 62.0 |
| 4988.0666 | --- | 41.03 | 53.90 | 12.87 | 1000.0 | 1000.000 | 99.9 | H | 100.0 |
| 4988.0666 | 48.77 | --- | 73.90 | 25.13 | 1000.0 | 1000.000 | 99.9 | H | 100.0 |
| 14401.500 | --- | 34.23 | 53.90 | 19.67 | 1000.0 | 1000.000 | 220.4 | V | 75.0 |
| 14401.500 | 46.63 | --- | 73.90 | 27.27 | 1000.0 | 1000.000 | 220.4 | V | 75.0 |
| 17994.966 | 53.12 | --- | 73.90 | 20.78 | 1000.0 | 1000.000 | 172.2 | V | 285.0 |
| 17994.966 | --- | 39.78 | 53.90 | 14.12 | 1000.0 | 1000.000 | 172.2 | V | 285.0 |

### 15.1.6 Test data – MoCA, Asian Power Devices AC Adapter




The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators.

***Figure 15.1-3:*** *Radiated disturbance spectral plot (30 to 1000 MHz)*

***Table 15.1-5:*** *Radiated disturbance (Quasi-Peak) results*

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|
| 297.032500 | 34.34 | 46.00 | 11.66 | 1000.0 | 120.000 | 108.1 | H | 262.0 |
| 404.050000 | 27.00 | 46.00 | 19.00 | 1000.0 | 120.000 | 100.0 | H | 186.0 |
| 450.010000 | 35.21 | 46.00 | 10.79 | 1000.0 | 120.000 | 104.5 | V | 263.0 |
| 519.753000 | 37.07 | 46.00 | 8.93 | 1000.0 | 120.000 | 110.0 | H | 14.0 |
| 550.017000 | 38.57 | 46.00 | 7.43 | 1000.0 | 120.000 | 107.2 | V | 238.0 |
| 650.024000 | 41.93 | 46.00 | 4.07 | 1000.0 | 120.000 | 123.4 | H | 170.0 |
| 830.709500 | 24.26 | 46.00 | 21.74 | 1000.0 | 120.000 | 143.7 | H | 254.0 |
| 958.307000 | 36.20 | 46.00 | 9.80 | 1000.0 | 120.000 | 119.4 | V | 96.0 |

15.1.6 Test data, continued

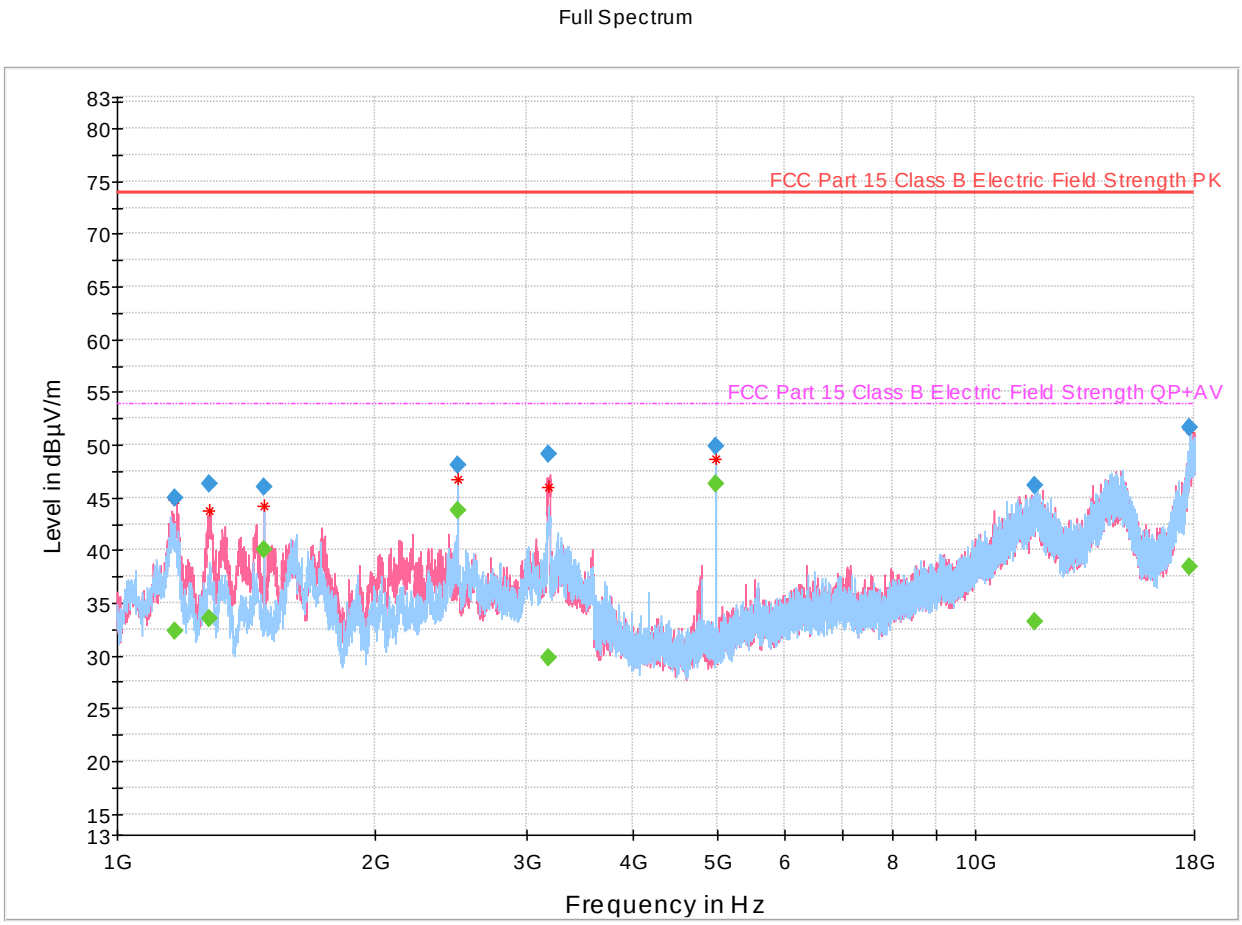
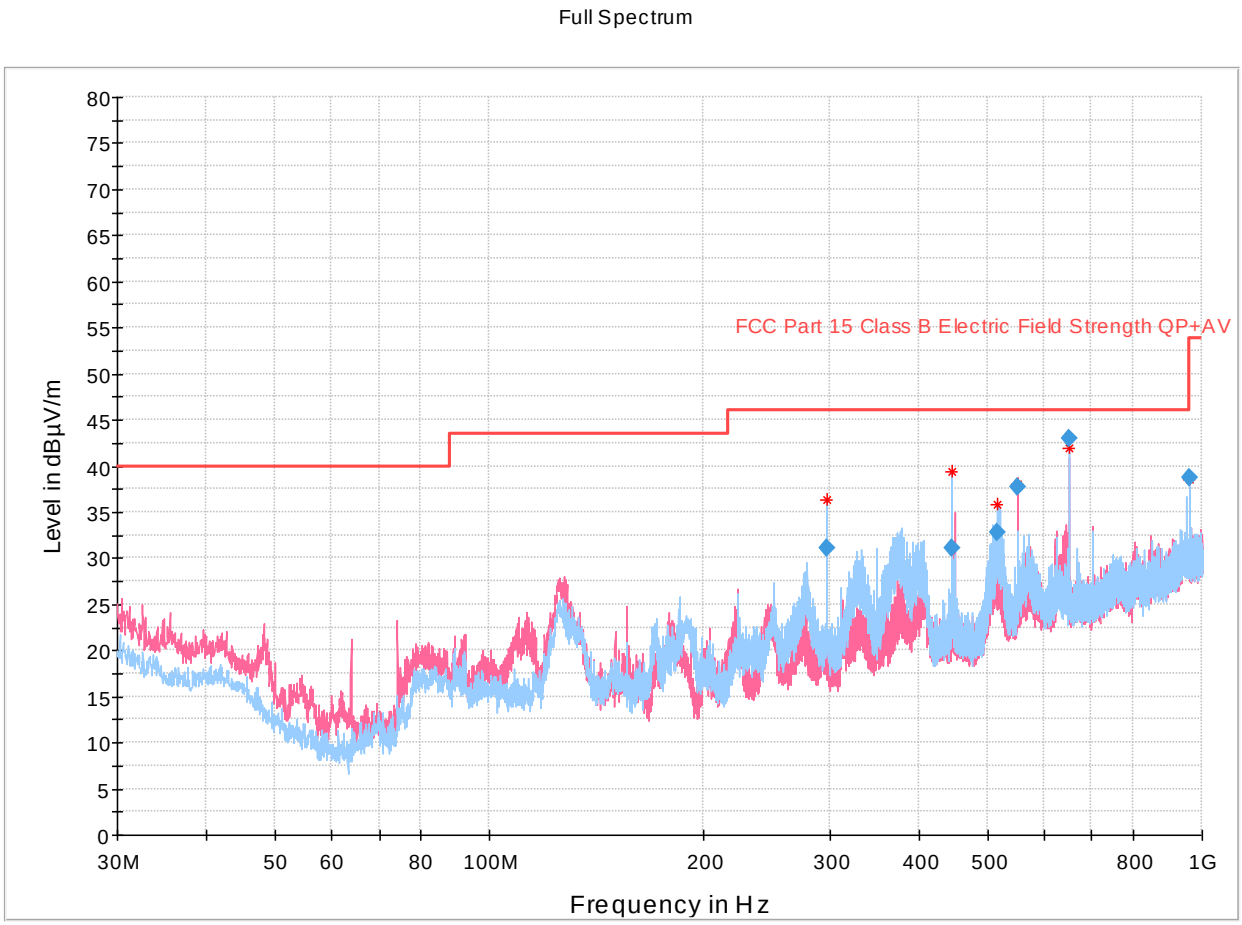



***Figure 15.1-4:*** *Radiated disturbance spectral plot (1 to 18 GHz)*

***Table 15.1-6:*** *Radiated disturbance (Peak and Average) result*

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 1168.0666 | 45.02 | --- | 73.90 | 28.88 | 1000.0 | 1000.000 | 105.6 | V | 200.0 |
| 1168.0666 | --- | 32.27 | 53.90 | 21.63 | 1000.0 | 1000.000 | 105.6 | V | 200.0 |
| 1278.9000 | 46.33 | --- | 73.90 | 27.57 | 1000.0 | 1000.000 | 117.6 | V | 178.0 |
| 1278.9000 | --- | 33.51 | 53.90 | 20.39 | 1000.0 | 1000.000 | 117.6 | V | 178.0 |
| 1485.1000 | --- | 40.08 | 53.90 | 13.82 | 1000.0 | 1000.000 | 140.0 | V | 72.0 |
| 1485.1000 | 46.07 | --- | 73.90 | 27.83 | 1000.0 | 1000.000 | 140.0 | V | 72.0 |
| 2493.9333 | 48.13 | --- | 73.90 | 25.77 | 1000.0 | 1000.000 | 202.5 | H | 82.0 |
| 2493.9333 | --- | 43.79 | 53.90 | 10.11 | 1000.0 | 1000.000 | 202.5 | H | 82.0 |
| 3178.5000 | --- | 29.74 | 53.90 | 24.16 | 1000.0 | 1000.000 | 100.0 | V | 217.0 |
| 3178.5000 | 49.18 | --- | 73.90 | 24.72 | 1000.0 | 1000.000 | 100.0 | V | 217.0 |
| 4987.6666 | 49.89 | --- | 73.90 | 24.01 | 1000.0 | 1000.000 | 103.9 | H | 146.0 |
| 4987.6666 | --- | 46.36 | 53.90 | 7.54 | 1000.0 | 1000.000 | 103.9 | H | 146.0 |
| 11740.633 | 46.11 | --- | 73.90 | 27.79 | 1000.0 | 1000.000 | 267.7 | H | 305.0 |
| 11740.633 | --- | 33.19 | 53.90 | 20.71 | 1000.0 | 1000.000 | 267.7 | H | 305.0 |
| 17778.433 | 51.61 | --- | 73.90 | 22.29 | 1000.0 | 1000.000 | 171.4 | H | 166.0 |
| 17778.433 | --- | 38.43 | 53.90 | 15.47 | 1000.0 | 1000.000 | 171.4 | H | 166.0 |

### 15.1.7 Test data – RF-QAM, NetBit AC Adapter




The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators.

***Figure 15.1-5:*** *Radiated disturbance spectral plot (30 to 1000 MHz)*

***Table 15.1-7:*** *Radiated disturbance (Quasi-Peak) results*

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|
| 296.952500 | 31.11 | 46.00 | 14.89 | 1000.0 | 120.000 | 154.2 | H | 65.0 |
| 445.579500 | 31.03 | 46.00 | 14.97 | 1000.0 | 120.000 | 100.0 | H | 59.0 |
| 516.177500 | 32.76 | 46.00 | 13.24 | 1000.0 | 120.000 | 109.9 | H | 256.0 |
| 550.017000 | 37.64 | 46.00 | 8.36 | 1000.0 | 120.000 | 103.9 | V | 251.0 |
| 650.024000 | 42.92 | 46.00 | 3.08 | 1000.0 | 120.000 | 118.6 | H | 162.0 |
| 958.347000 | 38.69 | 46.00 | 7.31 | 1000.0 | 120.000 | 312.2 | H | 163.0 |

15.1.7 Test data, continued

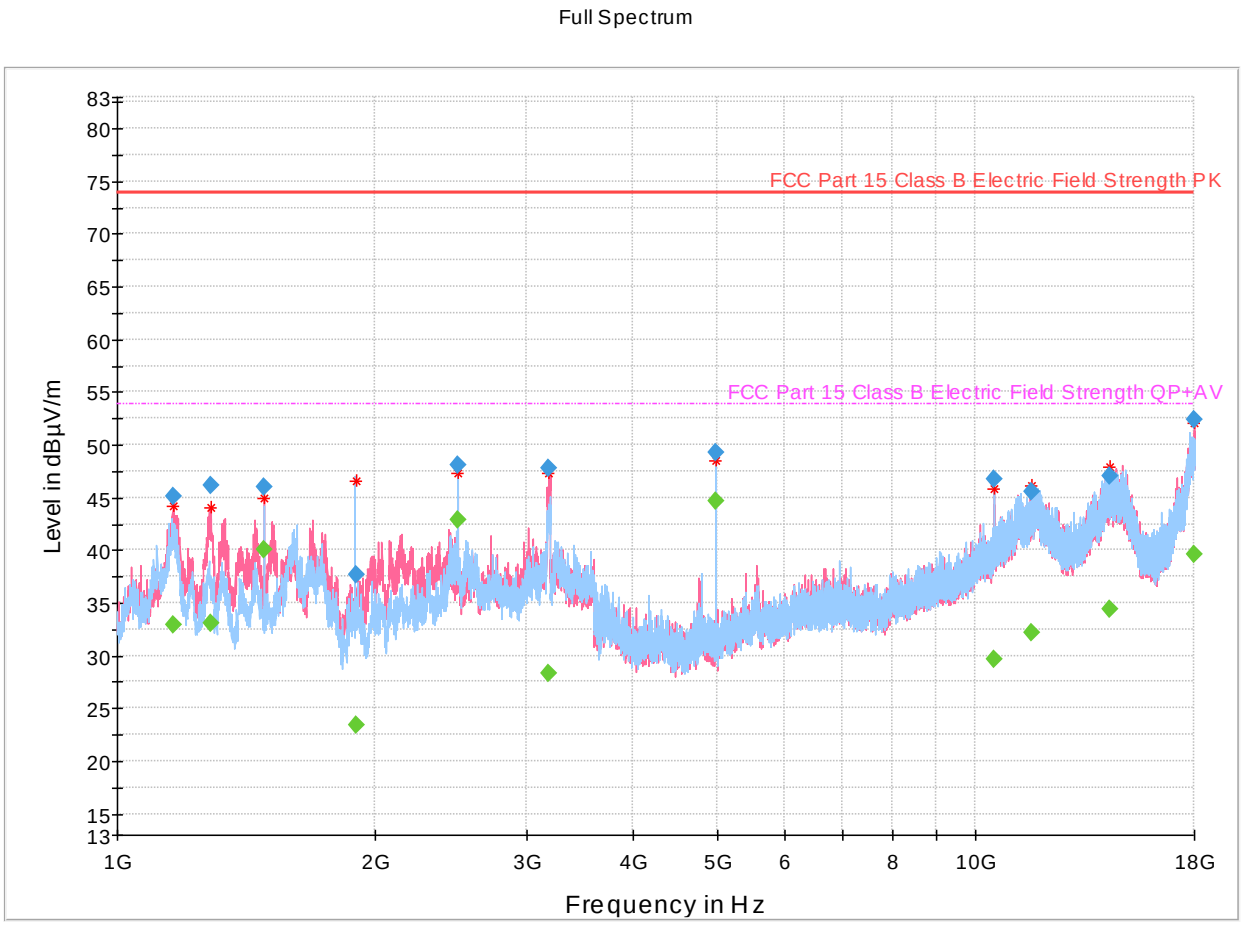
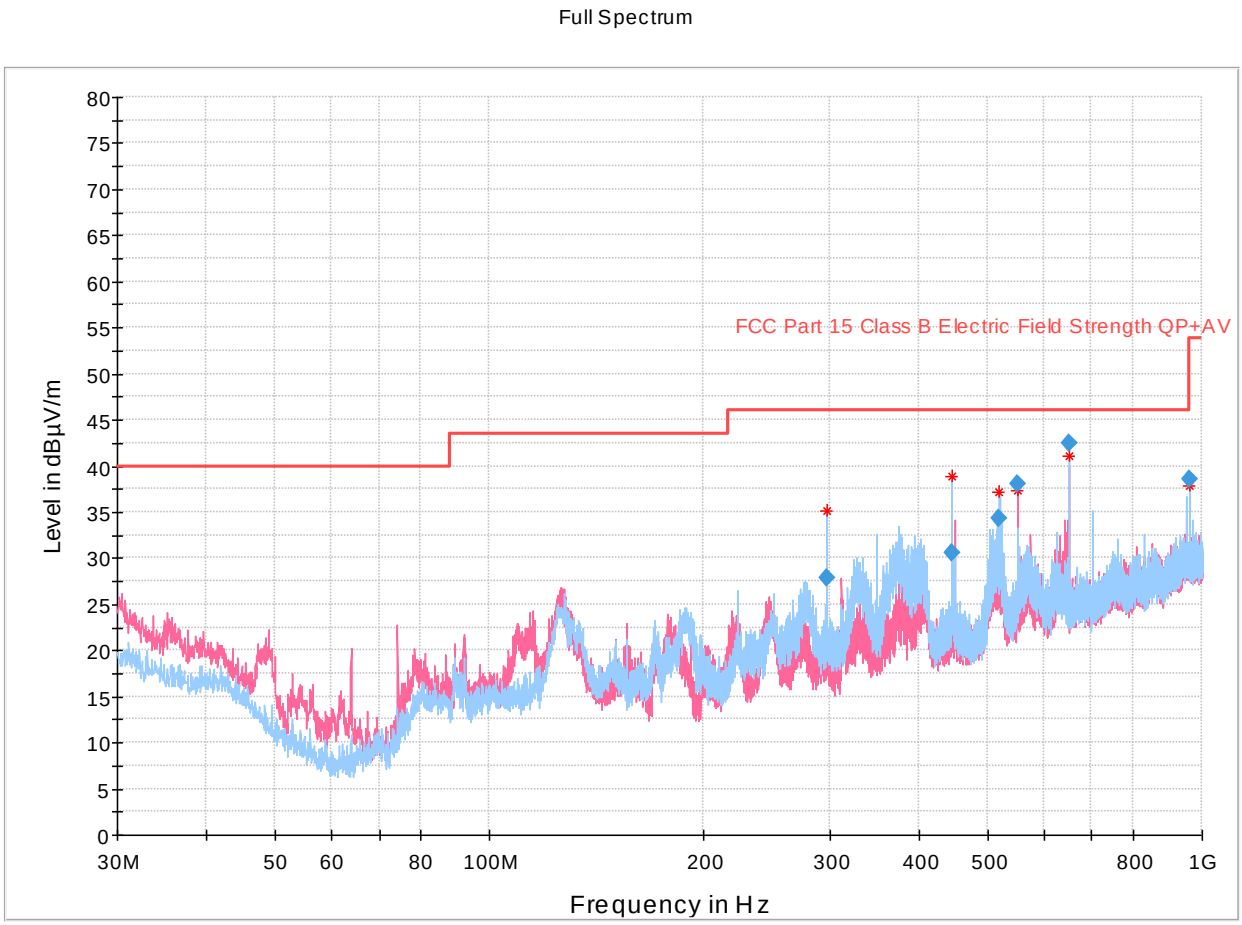



***Figure 15.1-6:*** *Radiated disturbance spectral plot (1 to 18 GHz)*

***Table 15.1-8:*** *Radiated disturbance (Peak and Average) result*

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 1163.3333 | 45.06 | --- | 73.90 | 28.84 | 1000.0 | 1000.000 | 135.3 | V | 107.0 |
| 1163.3333 | --- | 32.87 | 53.90 | 21.03 | 1000.0 | 1000.000 | 135.3 | V | 107.0 |
| 1283.8666 | 46.17 | --- | 73.90 | 27.73 | 1000.0 | 1000.000 | 106.4 | V | 192.0 |
| 1283.8666 | --- | 33.05 | 53.90 | 20.85 | 1000.0 | 1000.000 | 106.4 | V | 192.0 |
| 1485.1000 | --- | 40.04 | 53.90 | 13.86 | 1000.0 | 1000.000 | 147.5 | V | 75.0 |
| 1485.1000 | 45.93 | --- | 73.90 | 27.97 | 1000.0 | 1000.000 | 147.5 | V | 75.0 |
| 1899.2000 | 37.73 | --- | 73.90 | 36.17 | 1000.0 | 1000.000 | 110.1 | H | 174.0 |
| 1899.2000 | --- | 23.45 | 53.90 | 30.45 | 1000.0 | 1000.000 | 110.1 | H | 174.0 |
| 2493.5333 | --- | 42.94 | 53.90 | 10.96 | 1000.0 | 1000.000 | 206.4 | H | 77.0 |
| 2493.5333 | 48.15 | --- | 73.90 | 25.75 | 1000.0 | 1000.000 | 206.4 | H | 77.0 |
| 3180.3000 | 47.78 | --- | 73.90 | 26.12 | 1000.0 | 1000.000 | 103.9 | V | 214.0 |
| 3180.3000 | --- | 28.28 | 53.90 | 25.62 | 1000.0 | 1000.000 | 103.9 | V | 214.0 |
| 4987.8333 | --- | 44.65 | 53.90 | 9.25 | 1000.0 | 1000.000 | 112.9 | H | 116.0 |
| 4987.8333 | 49.23 | --- | 73.90 | 24.67 | 1000.0 | 1000.000 | 112.9 | H | 116.0 |
| 10532.100 | --- | 29.68 | 53.90 | 24.22 | 1000.0 | 1000.000 | 237.9 | H | 58.0 |
| 10532.100 | 46.74 | --- | 73.90 | 27.16 | 1000.0 | 1000.000 | 237.9 | H | 58.0 |
| 11652.833 | --- | 32.12 | 53.90 | 21.78 | 1000.0 | 1000.000 | 136.5 | V | 142.0 |
| 11652.833 | 45.60 | --- | 73.90 | 28.30 | 1000.0 | 1000.000 | 136.5 | V | 142.0 |
| 14336.200 | --- | 34.35 | 53.90 | 19.55 | 1000.0 | 1000.000 | 161.1 | V | 100.0 |
| 14336.200 | 47.00 | --- | 73.90 | 26.90 | 1000.0 | 1000.000 | 161.1 | V | 100.0 |
| 17990.633 | --- | 39.66 | 53.90 | 14.24 | 1000.0 | 1000.000 | 164.3 | V | 176.0 |
| 17990.633 | 52.42 | --- | 73.90 | 21.48 | 1000.0 | 1000.000 | 164.3 | V | 176.0 |

### 15.1.8 Test data – MoCA, NetBit AC Adapter




The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators.

***Figure 15.1-7:*** *Radiated disturbance spectral plot (30 to 1000 MHz)*

***Table 15.1-9:*** *Radiated disturbance (Quasi-Peak) results*

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|
| 296.992500 | 27.90 | 46.00 | 18.10 | 1000.0 | 120.000 | 115.4 | H | 184.0 |
| 445.579500 | 30.51 | 46.00 | 15.49 | 1000.0 | 120.000 | 104.3 | H | 42.0 |
| 519.753000 | 34.23 | 46.00 | 11.77 | 1000.0 | 120.000 | 107.0 | H | 337.0 |
| 550.017000 | 38.00 | 46.00 | 8.00 | 1000.0 | 120.000 | 103.9 | V | 250.0 |
| 650.024000 | 42.41 | 46.00 | 3.59 | 1000.0 | 120.000 | 113.0 | H | 156.0 |
| 958.347000 | 38.55 | 46.00 | 7.45 | 1000.0 | 120.000 | 300.8 | H | 152.0 |

15.1.8 Test data, continued

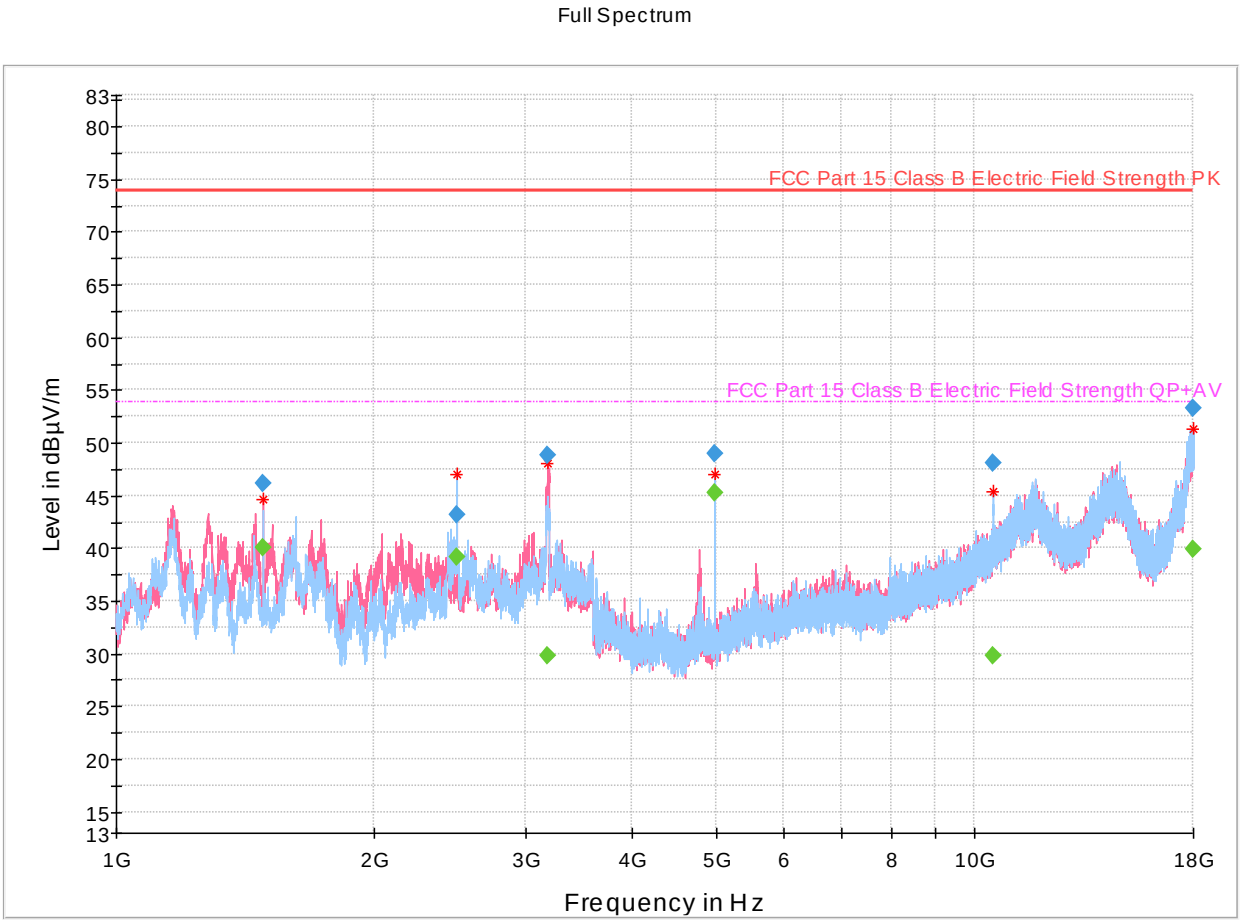



***Figure 15.1-8:*** *Radiated disturbance spectral plot (1 to 18 GHz)*

***Table 15.1-10:*** *Radiated disturbance (Peak and Average) result*

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 1484.8666 | --- | 40.04 | 53.90 | 13.86 | 1000.0 | 1000.000 | 143.1 | V | 75.0 |
| 1484.8666 | 46.07 | --- | 73.90 | 27.83 | 1000.0 | 1000.000 | 143.1 | V | 75.0 |
| 2493.7666 | --- | 39.17 | 53.90 | 14.73 | 1000.0 | 1000.000 | 127.5 | H | 195.0 |
| 2493.7666 | 43.24 | --- | 73.90 | 30.66 | 1000.0 | 1000.000 | 127.5 | H | 195.0 |
| 3188.0000 | --- | 29.80 | 53.90 | 24.10 | 1000.0 | 1000.000 | 100.0 | V | 217.0 |
| 3188.0000 | 48.87 | --- | 73.90 | 25.03 | 1000.0 | 1000.000 | 100.0 | V | 217.0 |
| 4987.6666 | --- | 45.24 | 53.90 | 8.66 | 1000.0 | 1000.000 | 108.4 | H | 114.0 |
| 4987.6666 | 49.02 | --- | 73.90 | 24.88 | 1000.0 | 1000.000 | 108.4 | H | 114.0 |
| 10531.933 | --- | 29.77 | 53.90 | 24.14 | 1000.0 | 1000.000 | 274.8 | H | 246.0 |
| 10531.933 | 48.14 | --- | 73.90 | 25.76 | 1000.0 | 1000.000 | 274.8 | H | 246.0 |
| 17994.100 | --- | 39.89 | 53.90 | 14.01 | 1000.0 | 1000.000 | 189.9 | V | 40.0 |
| 17994.100 | 53.23 | --- | 73.90 | 20.67 | 1000.0 | 1000.000 | 189.9 | V | 40.0 |

### 15.1.9 Setup photos

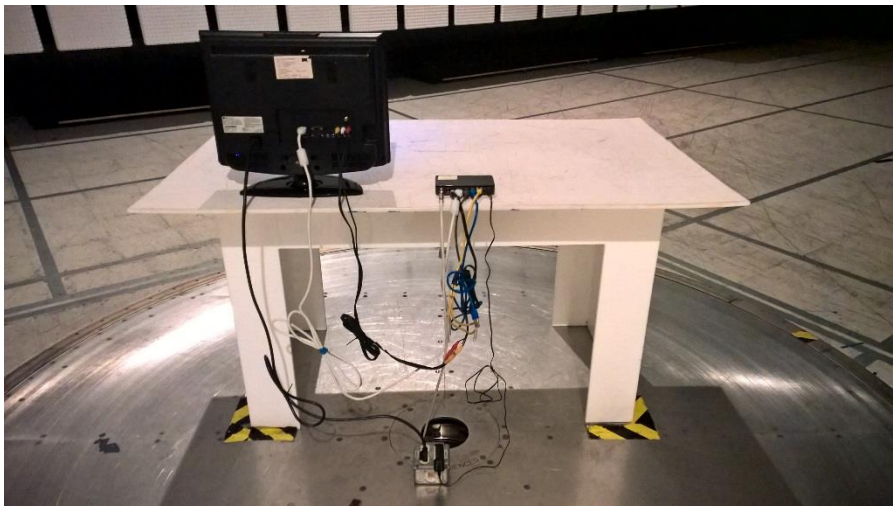


***Figure 15.1-3:*** *Radiated disturbance setup photo*

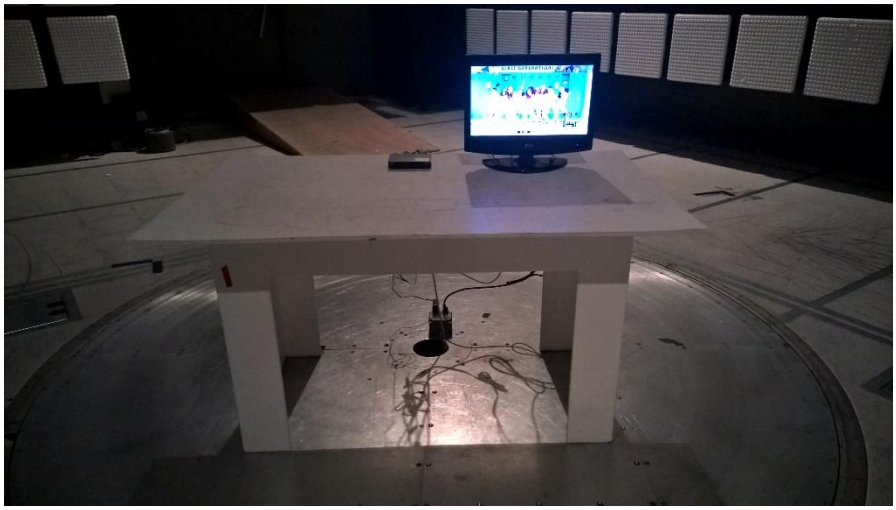


***Figure 15.1-4:*** *Radiated disturbance setup photo*

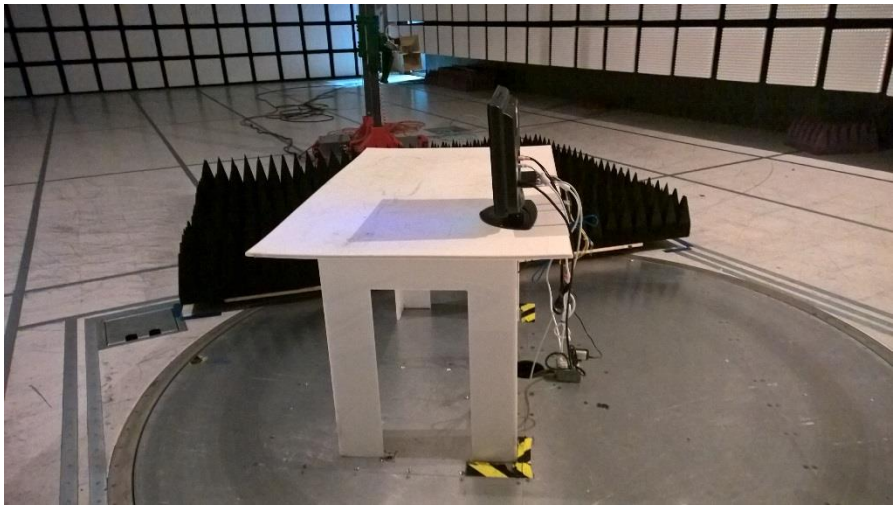


***Figure 15.1-5:*** *Radiated disturbance setup photo above 1GHz*

## 15.2 Conducted disturbance at mains port

### 15.2.7 References

CISPR 11: 2009 + A1: 2010 and ANSI C63.4-2014

### 15.2.8 Test summary

| | | | |
|---|---|---|---|
| Verdict | Pass | | |
| Test date | August 22, 2016 | Temperature | 24 °C |
| Test engineer | Feng You | Air pressure | 1003 mbar |
| Test location | San Diego | Relative humidity | 65 % |

### 15.2.9 Notes

None

### 15.2.10 Setup details

| | |
|---|---|
| Port under test | AC Mains |
| EUT setup configuration | Table top |
| Measurement details | A preview measurement was generated with the receiver in continuous scan mode. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement. |

Receiver settings:

| | |
|---|---|
| Resolution bandwidth | 9 kHz |
| Video bandwidth | 30 kHz |
| Detector mode | – Peak and Average (Preview measurement)<br>– Quasi-peak and CAverage (Final measurement) |
| Trace mode | Max Hold |
| Measurement time | – 100 ms (Peak and Average preview measurement)<br>– 1000 ms (Quasi-peak final measurement)<br>– 160 ms (CAverage final measurement) |

***Table 15.2-1:*** *Conducted disturbance at mains port equipment list*

| Equipment | Manufacturer | Model no. | Asset no. | Cal cycle | Next cal. |
|---|---|---|---|---|---|
| Two Line V-Network | Rohde & Schwarz | ENV216 | 101045 | Annually | 15-Jun-2017 |
| EMI Test Receiver 9kHz to 7GHz | Rohde & Schwarz | ESCI 7 | 100800 | Annually | 17-Mar-2017 |

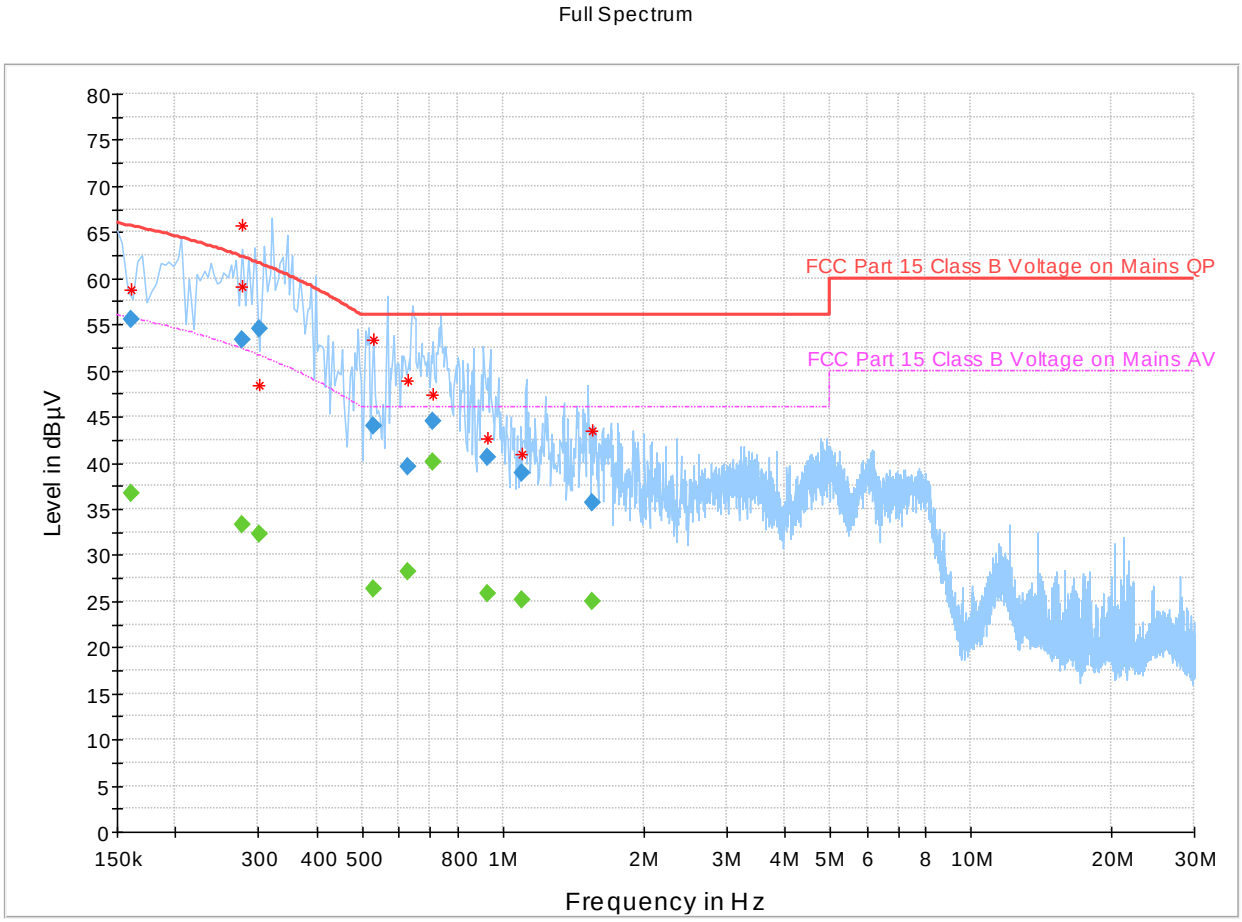
Notes: None

***Table 15.2-2:*** *Conducted disturbance at mains port test software details*

| Manufacturer of Software | Details |
|---|---|
| Rohde & Schwarz | EMC32 Version 10.00.00 |

Notes: None

### 15.2.5 Test data - RF-QAM, Asian Power Devices AC Adapter



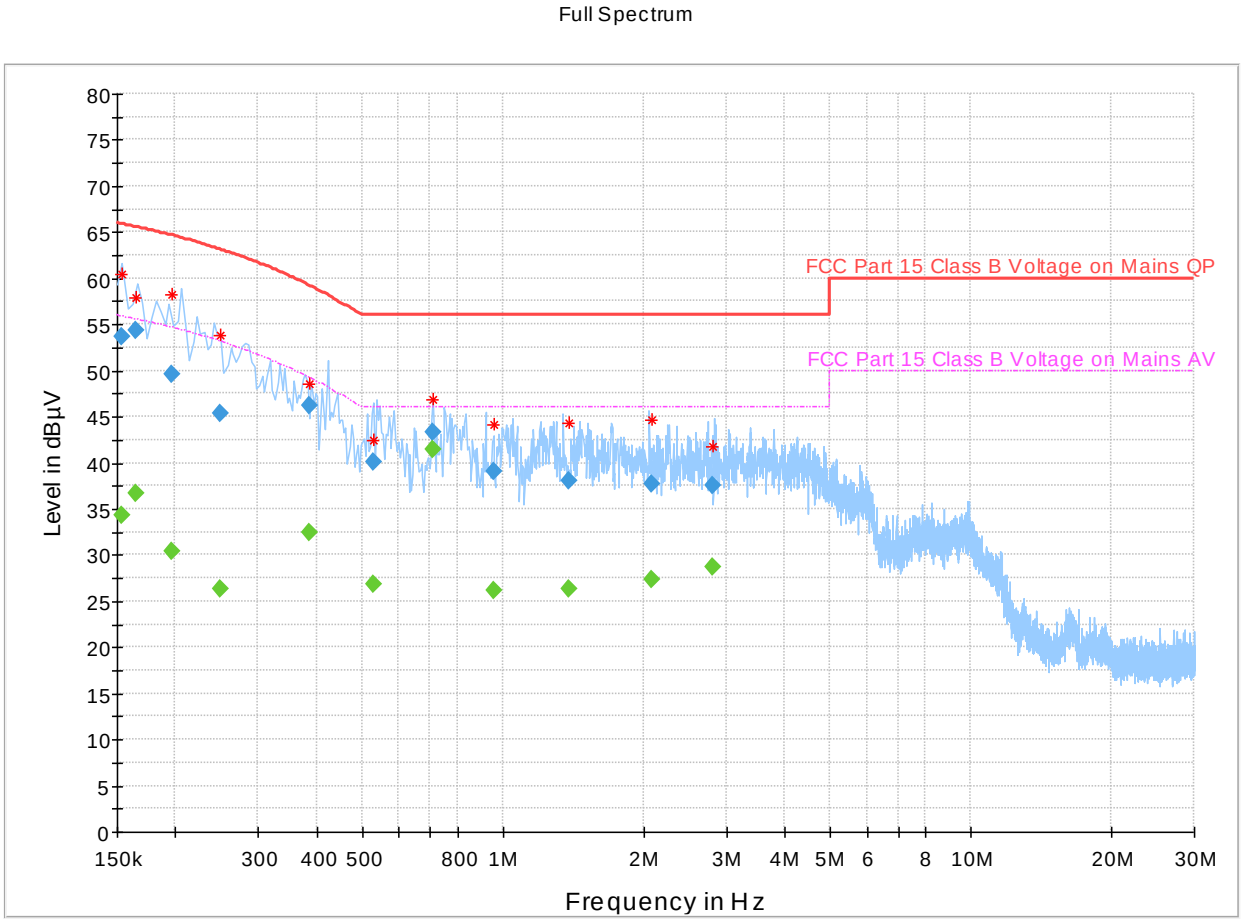

The spectral plot has been corrected with transducer factors. (i.e. cable loss, LISN factors, and attenuators)

***Figure 15.2-1:*** *Conducted disturbance at mains port spectral plot*

***Table 15.2-3:*** *Conducted disturbance at mains port (Quasi-Peak and Average) results*

| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line |
|---|---|---|---|---|---|---|---|
| 0.161000 | --- | 36.65 | 55.69 | 19.03 | 1000.0 | 9.000 | L1 |
| 0.161000 | 55.53 | --- | 65.69 | 10.16 | 1000.0 | 9.000 | L1 |
| 0.277000 | --- | 33.34 | 52.37 | 19.03 | 1000.0 | 9.000 | L1 |
| 0.277000 | 53.31 | --- | 62.37 | 9.06 | 1000.0 | 9.000 | L1 |
| 0.301000 | --- | 32.29 | 51.69 | 19.39 | 1000.0 | 9.000 | N |
| 0.301000 | 54.45 | --- | 61.69 | 7.24 | 1000.0 | 9.000 | N |
| 0.529000 | 44.05 | --- | 56.00 | 11.96 | 1000.0 | 9.000 | L1 |
| 0.529000 | --- | 26.30 | 46.00 | 19.70 | 1000.0 | 9.000 | L1 |
| 0.625000 | 39.58 | --- | 56.00 | 16.42 | 1000.0 | 9.000 | L1 |
| 0.625000 | --- | 28.27 | 46.00 | 17.73 | 1000.0 | 9.000 | L1 |
| 0.709000 | --- | 40.17 | 46.00 | 5.83 | 1000.0 | 9.000 | N |
| 0.709000 | 44.54 | --- | 56.00 | 11.46 | 1000.0 | 9.000 | N |
| 0.929000 | --- | 25.87 | 46.00 | 20.13 | 1000.0 | 9.000 | L1 |
| 0.929000 | 40.63 | --- | 56.00 | 15.37 | 1000.0 | 9.000 | L1 |
| 1.101000 | 38.89 | --- | 56.00 | 17.11 | 1000.0 | 9.000 | L1 |
| 1.101000 | --- | 25.18 | 46.00 | 20.82 | 1000.0 | 9.000 | L1 |
| 1.549000 | 35.70 | --- | 56.00 | 20.30 | 1000.0 | 9.000 | L1 |
| 1.549000 | --- | 25.03 | 46.00 | 20.97 | 1000.0 | 9.000 | L1 |

### 15.2.6 Test data - RF-QAM, NetBit AC Adapter




The spectral plot has been corrected with transducer factors. (i.e. cable loss, LISN factors, and attenuators)

***Figure 15.2-2:*** *Conducted disturbance at mains port spectral plot*

***Table 15.2-4:*** *Conducted disturbance at mains port (Quasi-Peak and Average) results*

| Frequency (MHz) | QuasiPeak (dBµV) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line |
|---|---|---|---|---|---|---|---|
| 0.154000 | --- | 34.24 | 55.89 | 21.65 | 1000.0 | 9.000 | L1 |
| 0.154000 | 53.73 | --- | 65.89 | 12.16 | 1000.0 | 9.000 | L1 |
| 0.165000 | 54.33 | --- | 65.57 | 11.25 | 1000.0 | 9.000 | N |
| 0.165000 | --- | 36.65 | 55.57 | 18.92 | 1000.0 | 9.000 | N |
| 0.197000 | --- | 30.40 | 54.66 | 24.26 | 1000.0 | 9.000 | L1 |
| 0.197000 | 49.54 | --- | 64.66 | 15.12 | 1000.0 | 9.000 | L1 |
| 0.249000 | --- | 26.40 | 53.17 | 26.77 | 1000.0 | 9.000 | N |
| 0.249000 | 45.29 | --- | 63.17 | 17.88 | 1000.0 | 9.000 | N |
| 0.385000 | 46.18 | --- | 59.29 | 13.11 | 1000.0 | 9.000 | L1 |
| 0.385000 | --- | 32.36 | 49.29 | 16.92 | 1000.0 | 9.000 | L1 |
| 0.529000 | --- | 26.86 | 46.00 | 19.14 | 1000.0 | 9.000 | L1 |
| 0.529000 | 40.13 | --- | 56.00 | 15.87 | 1000.0 | 9.000 | L1 |
| 0.709000 | --- | 41.47 | 46.00 | 4.53 | 1000.0 | 9.000 | L1 |
| 0.709000 | 43.37 | --- | 56.00 | 12.63 | 1000.0 | 9.000 | L1 |
| 0.957000 | 39.12 | --- | 56.00 | 16.88 | 1000.0 | 9.000 | L1 |
| 0.957000 | --- | 26.19 | 46.00 | 19.81 | 1000.0 | 9.000 | L1 |
| 1.381000 | --- | 26.36 | 46.00 | 19.64 | 1000.0 | 9.000 | L1 |
| 1.381000 | 38.08 | --- | 56.00 | 17.92 | 1000.0 | 9.000 | L1 |
| 2.081000 | --- | 27.41 | 46.00 | 18.59 | 1000.0 | 9.000 | L1 |
| 2.081000 | 37.74 | --- | 56.00 | 18.26 | 1000.0 | 9.000 | L1 |
| 2.817000 | 37.55 | --- | 56.00 | 18.45 | 1000.0 | 9.000 | L1 |
| 2.817000 | --- | 28.65 | 46.00 | 17.35 | 1000.0 | 9.000 | L1 |

### 15.2.7 Setup photos

***Figure 15.2-3:*** *Conducted disturbance at mains port setup photo*

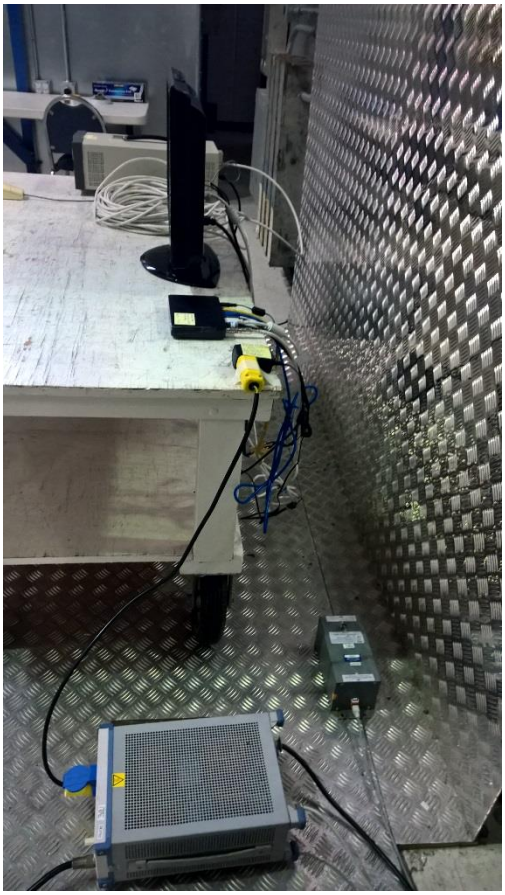


***Figure 15.2-4:*** *Conducted disturbance at mains port setup photo*

# Section 16 EUT photos

## 16.1 External photos


***Figure 16.1-1:*** *Front view photo*


***Figure 16.1-2:*** *Rear view photo*


***Figure 16.1-3:*** *Side view photo*


***Figure 16.1-4:*** *Top view photo*


***Figure 16.1-5:*** *Bottom view photo*


***Figure 16.1-6:*** *APD AC Adapter view photo*


***Figure 16.1-7:*** *NetBit AC Adapter view photo*