



# TEST REPORT

**Test Report No. : UL-RPT-RP10655468JD01A V2.0**

**Manufacturer** : Cambium Networks Ltd  
**Model No.** : PMP 450i / PTP 450i  
**FCC ID** : QWP-50450I  
**Test Standard(s)** : FCC Parts 15.207, 15.209 & 15.247

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2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 supersedes all previous versions.

**Date of Issue:** 20 May 2015

**Checked by:**

Steven White  
Project Lead, Radio Laboratory

**Issued by :**

pp

John Newell  
Quality Manager,  
UL VS LTD



This laboratory is accredited by UKAS.  
The tests reported herein have been  
performed in accordance with its terms  
of accreditation.

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**Table of Contents**

|                                                                    |            |
|--------------------------------------------------------------------|------------|
| <b>1. Customer Information.....</b>                                | <b>4</b>   |
| <b>2. Summary of Testing.....</b>                                  | <b>5</b>   |
| 2.1. General Information                                           | 5          |
| 2.2. Summary of Test Results                                       | 5          |
| 2.3. Methods and Procedures                                        | 6          |
| 2.4. Deviations from the Test Specification                        | 6          |
| <b>3. Equipment Under Test (EUT) .....</b>                         | <b>7</b>   |
| 3.1. Identification of Equipment Under Test (EUT)                  | 7          |
| 3.2. Description of EUT                                            | 7          |
| 3.3. Modifications Incorporated in the EUT                         | 7          |
| 3.4. Additional Information Related to Testing                     | 8          |
| 3.5. Support Equipment                                             | 9          |
| 3.6. Antenna                                                       | 10         |
| <b>4. Operation and Monitoring of the EUT during Testing .....</b> | <b>11</b>  |
| 4.1. Operating Modes                                               | 11         |
| 4.2. Configuration and Peripherals                                 | 11         |
| <b>5. Measurements, Examinations and Derived Results.....</b>      | <b>13</b>  |
| 5.1. General Comments                                              | 13         |
| 5.2. Test Results                                                  | 14         |
| 5.2.1. Transmitter AC Conducted Spurious Emissions                 | 14         |
| 5.2.2. Minimum 6 dB Bandwidth                                      | 22         |
| 5.2.3. Power Spectral Density                                      | 29         |
| 5.2.4. Maximum Conducted Output Power                              | 36         |
| 5.2.5. Band Edge Conducted Emissions                               | 44         |
| 5.2.6. Transmitter Radiated Emissions                              | 78         |
| <b>6. Measurement Uncertainty .....</b>                            | <b>106</b> |
| <b>7. Report Revision History .....</b>                            | <b>107</b> |
| <b>Appendix 1. Conducted Test Setup Photograph .....</b>           | <b>108</b> |

**1. Customer Information**

|                      |                                                                                                  |
|----------------------|--------------------------------------------------------------------------------------------------|
| <b>Company Name:</b> | Cambium Networks Ltd                                                                             |
| <b>Address:</b>      | Unit B2/3, Linhay Business Park<br>Eastern Road<br>Ashburton<br>Devon TQ13 7UP<br>United Kingdom |

## **2. Summary of Testing**

### **2.1. General Information**

|                                 |                                                                                                                                       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Specification Reference:</b> | 47CFR15.247                                                                                                                           |
| <b>Specification Title:</b>     | Code of Federal Regulations Volume 47 (Telecommunications):<br>Part 15 Subpart C (Intentional Radiators) - Section 15.247             |
| <b>Specification Reference:</b> | 47CFR15.207 and 47CFR15.209                                                                                                           |
| <b>Specification Title:</b>     | Code of Federal Regulations Volume 47 (Telecommunications):<br>Part 15 Subpart C (Intentional Radiators) – Sections 15.207 and 15.209 |
| <b>Site Registration:</b>       | 209735                                                                                                                                |
| <b>Location of Testing:</b>     | UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park,<br>Basingstoke, Hampshire, RG24 8AH, United Kingdom                    |
| <b>Test Dates:</b>              | 23 February 2015 to 10 March 2015                                                                                                     |

### **2.2. Summary of Test Results**

| <b>FCC Reference (47CFR)</b>                                                                                                                                                                                                 | <b>Measurement</b>                        | <b>Result</b>                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------|
| Part 15.207                                                                                                                                                                                                                  | Transmitter AC Conducted Emissions        |    |
| Part 15.247(a)(2)                                                                                                                                                                                                            | Transmitter Minimum 6 dB Bandwidth        |    |
| Part 15.247(e)                                                                                                                                                                                                               | Transmitter Power Spectral Density        |  |
| 15.247(b)(3), 15.147(b)(4)<br>& Part 15.247(c)(1)(ii)                                                                                                                                                                        | Transmitter Conducted Output Power        |  |
| Part 15.247(d)/15.209(a)                                                                                                                                                                                                     | Transmitter Band Edge Conducted Emissions |  |
| Part 15.247(d)/15.209(a)                                                                                                                                                                                                     | Transmitter Radiated Emissions            |  |
| <b>Key to Results</b><br> = Complied  = Did not comply |                                           |                                                                                       |

### **2.3. Methods and Procedures**

|                   |                                                                                                                                                                     |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Reference:</b> | ANSI C63.4-2009                                                                                                                                                     |
| <b>Title:</b>     | 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 |
| <b>Reference:</b> | ANSI C63.4-2014                                                                                                                                                     |
| <b>Title:</b>     | 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 |
| <b>Reference:</b> | ANSI C63.10-2009                                                                                                                                                    |
| <b>Title:</b>     | American National Standard for Testing Unlicensed Wireless Devices                                                                                                  |
| <b>Reference:</b> | ANSI C63.10-2013                                                                                                                                                    |
| <b>Title:</b>     | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices                                                                      |
| <b>Reference:</b> | FCC KDB 558074 D01 v03r02 June 5, 2014                                                                                                                              |
| <b>Title:</b>     | Guidance for Performing Compliance Measurements on Digital Transmission System (DTS) devices operating Under §15.247                                                |
| <b>Reference:</b> | FCC KDB 662911 D01 Multiple Transmitter Output v02r01 October 31, 2013                                                                                              |
| <b>Title:</b>     | Emissions Testing of Transmitters with Multiple Outputs in the Same Band                                                                                            |
| <b>Reference:</b> | FCC KDB 662911 D02 v01, October 25 2011                                                                                                                             |
| <b>Title:</b>     | MIMO with Cross-Polarized Antennas                                                                                                                                  |
| <b>Reference:</b> | FCC KDB 174176 D01 Line Conducted FAQ v01, 03/06/2015                                                                                                               |
| <b>Title:</b>     | AC power line conducted emissions, frequently asked questions                                                                                                       |

### **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.

### **3. Equipment Under Test (EUT)**

#### **3.1. Identification of Equipment Under Test (EUT)**

|                              |                                                                        |
|------------------------------|------------------------------------------------------------------------|
| <b>Brand Name:</b>           | Cambium Networks Ltd                                                   |
| <b>Model Name or Number:</b> | PMP 450i / PTP 450i                                                    |
| <b>Hardware Version:</b>     | ODU: P2 (Mod)<br>Power Injector : Rev 02<br>Power Over Ethernet: Rev B |
| <b>Software Version:</b>     | B135-PXP455-PRODTEST-2015FEB27                                         |
| <b>Serial Number:</b>        | F50980BB0073                                                           |
| <b>FCC ID:</b>               | QWP-50450I                                                             |

|                              |                                                 |
|------------------------------|-------------------------------------------------|
| <b>Description:</b>          | PoE Power supply                                |
| <b>Brand Name:</b>           | LEADER ELECTRONICS INC.                         |
| <b>Model Name or Number:</b> | NU60-R550111-I3 (Cambium Part No. N000065L001B) |
| <b>Serial Number:</b>        | 13000019581409000667                            |

|                              |                  |
|------------------------------|------------------|
| <b>Description:</b>          | PoE Power supply |
| <b>Brand Name:</b>           | Cambium Networks |
| <b>Model Name or Number:</b> | E100109B G       |
| <b>Part Number:</b>          | C000065L002B     |
| <b>Serial Number:</b>        | 1451008904       |

#### **3.2. Description of EUT**

The Equipment Under Test was a point to point transceiver operating in the 5725 MHz to 5850 MHz band. The EUT is available in two configurations:

1. Connectorised with two external antenna ports.
2. Integrated with directional and sectorised flat plate antenna options.

Power is provided by a PoE supply.

#### **3.3. Modifications Incorporated in the EUT**

No modifications were applied to the EUT during testing.

**3.4. Additional Information Related to Testing**

|                                        |                                |                                            |                                       |                                                     |                                        |                                    |
|----------------------------------------|--------------------------------|--------------------------------------------|---------------------------------------|-----------------------------------------------------|----------------------------------------|------------------------------------|
| <b>Technology Tested:</b>              |                                | Digital Transmission System                |                                       |                                                     |                                        |                                    |
| <b>Type of Unit:</b>                   |                                | Microwave fixed radio link transceiver     |                                       |                                                     |                                        |                                    |
| <b>Modes/Modulation:</b>               |                                | QPSK, 16QAM, 64QAM, 256QAM                 |                                       |                                                     |                                        |                                    |
| <b>Intended Operating Environment:</b> |                                | Residential, Commercial and Light Industry |                                       |                                                     |                                        |                                    |
| <b>Data rates:</b>                     |                                | 32.4, 64.6, 97.1 & 129.5 Mbp/s             |                                       |                                                     |                                        |                                    |
| <b>Power Supply Requirement(s):</b>    |                                | Nominal                                    |                                       | PoE supply input 120 VAC 60 Hz<br>PoE output 48 VDC |                                        |                                    |
| <b>Maximum Conducted Output Power:</b> |                                | 27.6 dBm                                   |                                       |                                                     |                                        |                                    |
| <b>Frequency Range:</b>                |                                | 5725 MHz to 5850 MHz                       |                                       |                                                     |                                        |                                    |
| <b>Channels Tested:</b>                | <b>Channel Bandwidth (MHz)</b> | <b>Bottom Channel Frequency (MHz)</b>      | <b>Lowest Full Pwr. Channel (MHz)</b> | <b>Middle Channel Frequency (MHz)</b>               | <b>Highest Full Pwr. Channel (MHz)</b> | <b>Top Channel Frequency (MHz)</b> |
|                                        | 5                              | 5730                                       | 5730                                  | 5788                                                | 5845                                   | 5845                               |
|                                        | 10                             | 5730                                       | 5733                                  | 5788                                                | 5842                                   | 5845                               |
|                                        | 20                             | 5735                                       | 5740                                  | 5788                                                | 5833                                   | 5840                               |
|                                        | 40                             | 5747                                       | 5750                                  | 5788                                                | 5821                                   | 5828                               |

**Note(s):**

The EUT is unable to operate at full power and remain compliant on some lower and higher channels. Power has been reduced on lower and higher channels in some configurations. 'Lowest Full Pwr. Channel' and 'Highest Full Pwr. Channel' in the table above show the lowest and highest channel frequencies that the EUT can operate at full power and remain compliant. All channel frequencies between the 'Lowest Full Pwr. Channel' and 'Highest Full Pwr. Channel' can operate at full power. Power settings used for testing are shown in Section 4.2 of this test report.

**3.5. Support Equipment**

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

|                              |                 |
|------------------------------|-----------------|
| <b>Description:</b>          | Laptop PC       |
| <b>Brand Name:</b>           | HP              |
| <b>Model Name or Number:</b> | EliteBook 8530W |
| <b>Serial Number:</b>        | 2CE00223BK      |

|                              |               |
|------------------------------|---------------|
| <b>Description:</b>          | Ethernet Hub  |
| <b>Brand Name:</b>           | Netgear       |
| <b>Model Name or Number:</b> | GS605         |
| <b>Serial Number:</b>        | 2N21223M02078 |

### 3.6. Antenna

The table below lists the antennas that the manufacturer intends to use with this product when operating in the 5725-5850 MHz band:

| Type                              | Stated Gain (dBi) | Manufacturer | Antenna Name     | Used for Testing | Note |
|-----------------------------------|-------------------|--------------|------------------|------------------|------|
| Dual polarised plate (Integrated) | 23.0              | MARS         | MA-WA56-DP23     | -                | 1, 3 |
| Dual polarised plate (Integrated) | 17.0              | Cambium      | 5093HH           | -                | 1, 3 |
| Dual polarised plate (External)   | 28.5              | MARS         | MA-WA56-DP28N    | X                | 2    |
| 4 ft Parabolic Dual Polarised     | 35.3              | Andrews      | PX4F-52-N7A/A    | X                | 2, 4 |
| 6 ft Parabolic Dual Polarised     | 38.1              | Andrews      | PX6F-52-N7A/A    | -                | 4    |
| 60° Sectorised (External)         | 17.0              | Laird        | ANT, AP Sector   | -                | 1    |
| 90° Sectorised (External)         | 17.0              | Laird        | ANT, AP Sector   | X                | 2    |
| 90° Sectorised (External)         | 17.0              | Proprietary  | Part No. A005189 | -                | 1    |
| 90° Sectorised (Integrated)       | 16.0              | MARS         | MA-WD56-DP16PCMW | -                | 1, 3 |
| Omnidirectional                   | 13.0              | KP           | KPPA-5.7-DPOMA   | X                | 2    |

X = This antenna was used for testing purposes

#### **Note(s):**

1. This antenna has the same gain or less gain and is of the same type as the antenna that was tested. Therefore it was not tested.
2. Used in conjunction with two, 0.5 metre length RF cables (Radiall R284C0351033 N type male – N type male) having an individual insertion loss of 0.9 dB across the EUT operating band.
3. Integral antenna. No external RF cables.
4. The 4 ft parabolic antenna (Andrews PX4F-52-N7A/A) has equivalent in/out of band characteristics to the 6 ft parabolic antenna (PX6F-52-N7A/A). The 4 foot antenna was used for testing in lieu of the 6 foot antenna because of the similarity between the two antennas. Antenna gain compensation was applied to the test results. Compensation was applied to obtain the reported values for the 6 foot parabolic antenna.

## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

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

- The unit operates in transceiver mode only as a TDD device in its normal mode of operation. There is no dedicated receive only mode.
- For test purposes only, the EUT was continuously transmitting at maximum power with 100% duty cycle in test mode on the required channels using the supported modulation types.

### **4.2. Configuration and Peripherals**

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

- A laptop PC with Cambium Networks test application 'Regulatory RF Control V1.0' was used to configure the EUT via the PoE power supply and Ethernet cables.
- The EUT was powered throughout testing via the PoE power supply.
- The EUT was operating at maximum allowable output power for the configuration being tested unless otherwise stated.
- No receiver or idle mode tests were performed as the EUT constantly transmits and receives. It does not have a dedicated receive or idle mode.

**Power settings used during testing**

'LCF' in the tables below indicates the power setting on the lower channels. 'HCF' indicates the power setting on the higher channels. Where the tables are marked as 'Mid Ch' the maximum power setting was used for all channels from the Lowest Full Power Channel to the Highest Full Power Channel including the centre channel. Channel frequencies are shown in Section 3.4 of this report.

**Point-to-Point Antennas**

The table below shows the EUT power settings that were used during testing for each channel bandwidth and modulation type when the EUT was operated as a point-to-point device.

| Ch. BW | QPSK |        |     | 16QAM |        |     | 64QAM |        |     | 256QAM |        |     |
|--------|------|--------|-----|-------|--------|-----|-------|--------|-----|--------|--------|-----|
|        | LCF  | Mid Ch | HCF | LCF   | Mid Ch | HCF | LCF   | Mid Ch | HCF | LCF    | Mid Ch | HCF |
| 5      | 28   | 28     | 28  | 26    | 26     | 26  | 25    | 25     | 25  | 24     | 24     | 24  |
| 10     | 26   | 28     | 27  | 26    | 26     | 26  | 25    | 25     | 25  | 24     | 24     | 24  |
| 20     | 27   | 28     | 27  | 26    | 26     | 26  | 25    | 25     | 25  | 24     | 24     | 24  |
| 40     | 28   | 28     | 27  | 26    | 26     | 26  | 25    | 25     | 25  | 24     | 24     | 24  |

The tables below show the EUT power settings that were used during testing when the EUT was operated with the sectorised and omnidirectional antennas.

**Sectorised Antenna**

| Ch. BW | QPSK  |        |       | 16QAM |        |       | 64QAM |        |       | 256QAM |        |       |
|--------|-------|--------|-------|-------|--------|-------|-------|--------|-------|--------|--------|-------|
|        | LCF   | Mid Ch | HCF   | LCF   | Mid Ch | HCF   | LCF   | Mid Ch | HCF   | LCF    | Mid Ch | HCF   |
| 5      | 20.75 | 20.75  | 20.75 | 20.75 | 20.75  | 20.75 | 20.75 | 20.75  | 20.75 | 20.75  | 20.75  | 20.75 |
| 10     | 20.75 | 20.75  | 20.75 | 20.75 | 20.75  | 20.75 | 20.75 | 20.75  | 20.75 | 20.75  | 20.75  | 20.75 |
| 20     | 20.75 | 20.75  | 20.75 | 20.75 | 20.75  | 20.75 | 20.75 | 20.75  | 20.75 | 20.75  | 20.75  | 20.75 |
| 40     | 20.75 | 20.75  | 20.75 | 20.75 | 20.75  | 20.75 | 20.75 | 20.75  | 20.75 | 20.75  | 20.75  | 20.75 |

**Omnidirectional Antenna**

| Ch. BW | QPSK |        |      | 16QAM |        |      | 64QAM |        |      | 256QAM |        |     |
|--------|------|--------|------|-------|--------|------|-------|--------|------|--------|--------|-----|
|        | LCF  | Mid Ch | HCF  | LCF   | Mid Ch | HCF  | LCF   | Mid Ch | HCF  | LCF    | Mid Ch | HCF |
| 5      | 24.5 | 24.5   | 24.5 | 24.5  | 24.5   | 24.5 | 24.5  | 24.5   | 24.5 | 24     | 24     | 24  |
| 10     | 24.5 | 24.5   | 24.5 | 24.5  | 24.5   | 24.5 | 24.5  | 24.5   | 24.5 | 24     | 24     | 24  |
| 20     | 24.5 | 24.5   | 24.5 | 24.5  | 24.5   | 24.5 | 24.5  | 24.5   | 24.5 | 24     | 24     | 24  |
| 40     | 24.5 | 24.5   | 24.5 | 24.5  | 24.5   | 24.5 | 24.5  | 24.5   | 24.5 | 24     | 24     | 24  |

## **5. Measurements, Examinations and Derived Results**

### **5.1. General Comments**

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 6. Measurement Uncertainty* for details.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

## **5.2. Test Results**

### **5.2.1. Transmitter AC Conducted Spurious Emissions**

#### **Test Summary:**

|                                   |             |                   |               |
|-----------------------------------|-------------|-------------------|---------------|
| <b>Test Engineer:</b>             | Ian Watch   | <b>Test Date:</b> | 07 March 2015 |
| <b>Test Sample Serial Number:</b> | F5098BB0073 |                   |               |

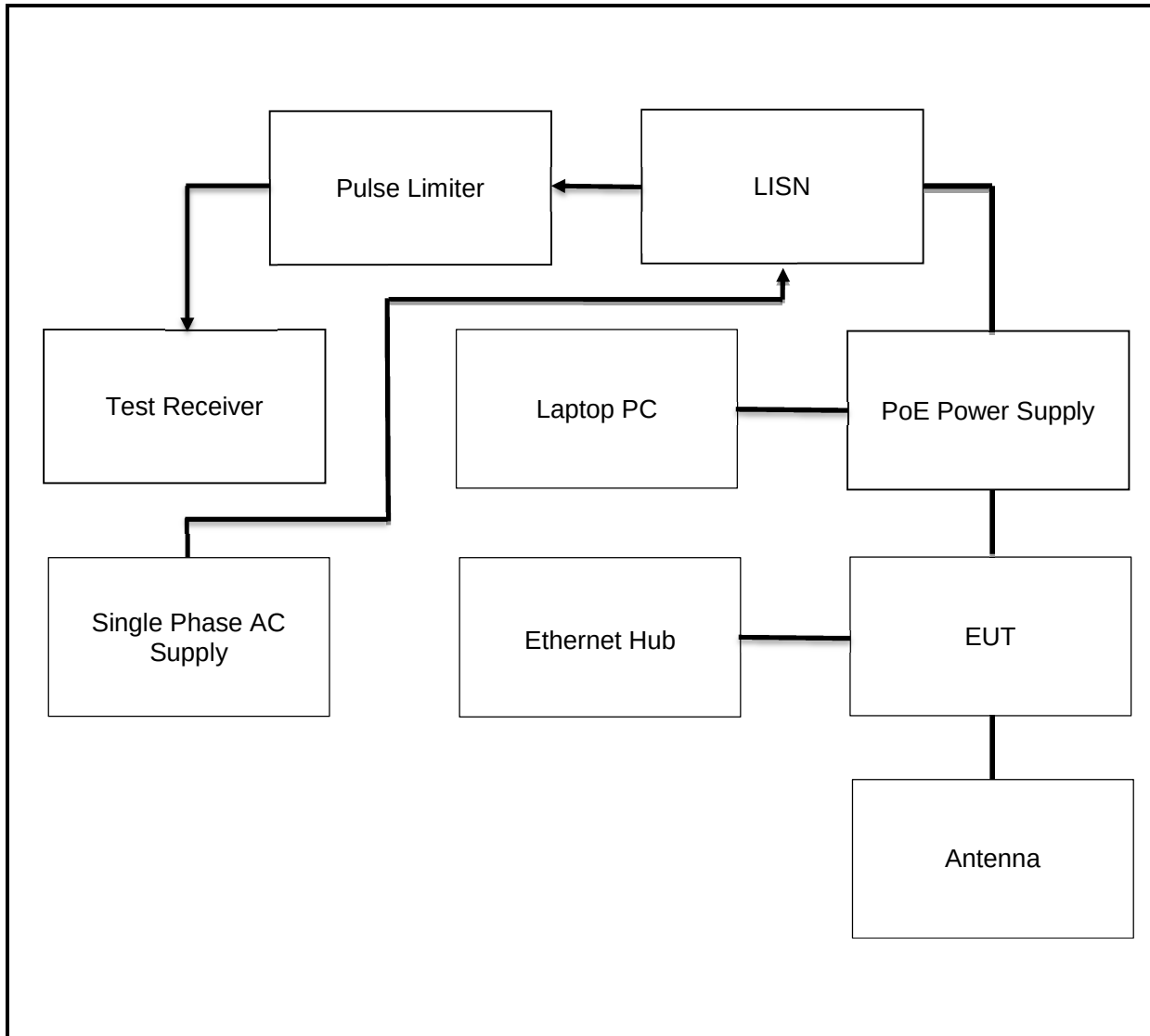
|                          |                                                                                                      |
|--------------------------|------------------------------------------------------------------------------------------------------|
| <b>FCC Reference:</b>    | Part 15.207                                                                                          |
| <b>Test Method Used:</b> | ANSI C63.10-2013 Section 6.2 referencing ANSI C63.4-2014 in accordance with published KDB 174176 D01 |

#### **Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 24 |
| <b>Relative Humidity (%):</b> | 31 |

#### **Note(s):**

1. The manufacturer stated that two different PoE power supplies can be used with this product. AC conducted spurious emissions tests were performed on each power supply.
2. The input to the PoE power supply was connected to a 120 VAC 60 Hz single phase supply via a LISN during the testing. The output of the PoE power supply was connected to the input of the EUT via an Ethernet cable.
3. The EUT was transmitting at maximum power during the test. A laptop PC was connected to the EUT via Ethernet. The unused Ethernet port on the EUT was terminated into an Ethernet hub.
4. The earth bonding point on the EUT was connected to the metal structure of the test chamber during testing.
5. The six highest level emissions in each mode were recorded in the tables below.

**Transmitter AC Conducted Spurious Emissions (continued)****Test setup for AC conducted spurious emissions measurements:**

**Transmitter AC Conducted Spurious Emissions (continued)****Results: Live / Quasi Peak / LEADER Power Supply**

| Frequency (MHz) | Line | Level (dBμV) | Limit (dBμV) | Margin (dB) | Result   |
|-----------------|------|--------------|--------------|-------------|----------|
| 0.172           | Live | 54.5         | 64.8         | 10.3        | Complied |
| 0.303           | Live | 52.3         | 60.2         | 7.9         | Complied |
| 0.600           | Live | 41.0         | 56.0         | 15.0        | Complied |
| 0.829           | Live | 41.1         | 56.0         | 14.9        | Complied |
| 1.000           | Live | 45.7         | 56.0         | 10.3        | Complied |
| 1.554           | Live | 39.8         | 56.0         | 16.2        | Complied |

**Results: Live / Average / LEADER Power Supply**

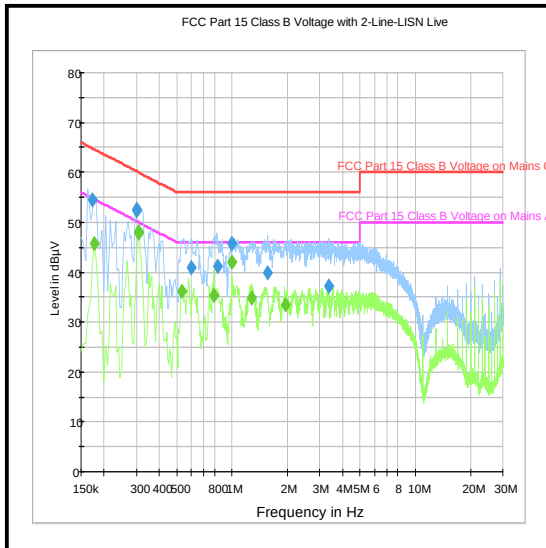
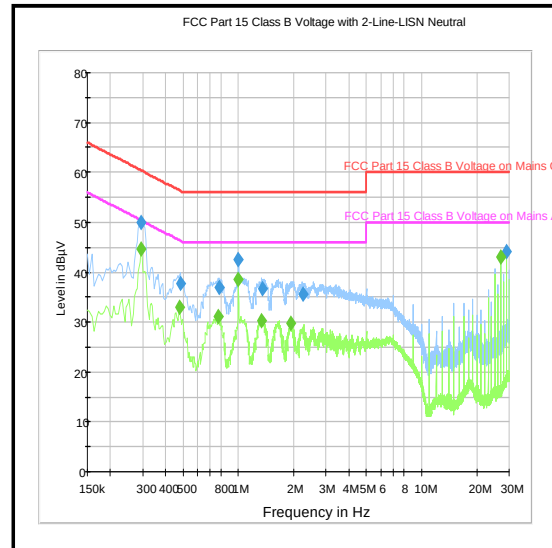
| Frequency (MHz) | Line    | Level (dBμV) | Limit (dBμV) | Margin (dB) | Result   |
|-----------------|---------|--------------|--------------|-------------|----------|
| 0.177           | Average | 45.7         | 54.6         | 8.9         | Complied |
| 0.307           | Average | 48.0         | 50.0         | 2.0         | Complied |
| 0.532           | Average | 36.1         | 46.0         | 9.9         | Complied |
| 0.793           | Average | 35.3         | 46.0         | 10.7        | Complied |
| 1.000           | Average | 41.9         | 46.0         | 4.1         | Complied |
| 1.275           | Average | 34.7         | 46.0         | 11.3        | Complied |

**Transmitter AC Conducted Spurious Emissions (continued)****Results: Neutral / Quasi Peak / LEADER Power Supply**

| Frequency (MHz) | Line    | Level (dBμV) | Limit (dBμV) | Margin (dB) | Result   |
|-----------------|---------|--------------|--------------|-------------|----------|
| 0.294           | Neutral | 49.9         | 60.4         | 10.5        | Complied |
| 0.483           | Neutral | 37.9         | 56.3         | 18.4        | Complied |
| 0.784           | Neutral | 37.0         | 56.0         | 19.0        | Complied |
| 1.000           | Neutral | 42.5         | 56.0         | 13.5        | Complied |
| 1.360           | Neutral | 36.6         | 56.0         | 19.4        | Complied |
| 28.999          | Neutral | 44.1         | 60.0         | 15.9        | Complied |

**Results: Neutral / Average / LEADER Power Supply**

| Frequency (MHz) | Line    | Level (dBμV) | Limit (dBμV) | Margin (dB) | Result   |
|-----------------|---------|--------------|--------------|-------------|----------|
| 0.294           | Neutral | 44.5         | 50.4         | 5.9         | Complied |
| 0.478           | Neutral | 32.9         | 46.4         | 13.5        | Complied |
| 0.780           | Neutral | 31.0         | 46.0         | 15.0        | Complied |
| 1.000           | Neutral | 38.5         | 46.0         | 7.5         | Complied |
| 1.333           | Neutral | 30.3         | 46.0         | 15.7        | Complied |
| 27.001          | Neutral | 43.0         | 50.0         | 7.0         | Complied |

**Transmitter AC Conducted Spurious Emissions (continued)****Results: LEADER Power Supply****Live****Neutral**

**Transmitter AC Conducted Spurious Emissions (continued)****Results: Live / Quasi Peak / Cambium Networks Power Supply**

| Frequency (MHz) | Line | Level (dBμV) | Limit (dBμV) | Margin (dB) | Result   |
|-----------------|------|--------------|--------------|-------------|----------|
| 0.258           | Live | 45.6         | 61.5         | 15.9        | Complied |
| 0.600           | Live | 40.1         | 56.0         | 15.9        | Complied |
| 1.000           | Live | 44.0         | 56.0         | 12.0        | Complied |
| 4.713           | Live | 37.7         | 56.0         | 18.3        | Complied |
| 20.998          | Live | 42.2         | 60.0         | 17.8        | Complied |
| 24.999          | Live | 49.7         | 60.0         | 10.3        | Complied |

**Results: Live / Average / Cambium Networks Power Supply**

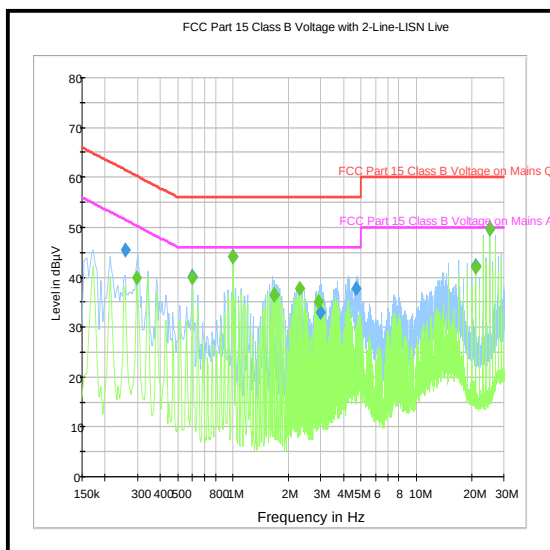
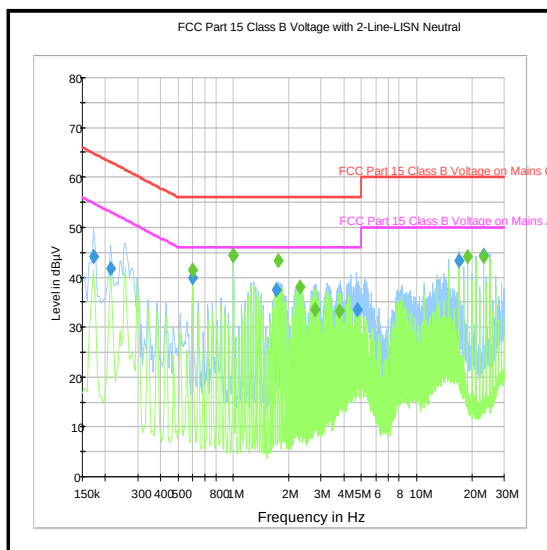
| Frequency (MHz) | Line | Level (dBμV) | Limit (dBμV) | Margin (dB) | Result   |
|-----------------|------|--------------|--------------|-------------|----------|
| 0.600           | Live | 39.8         | 46.0         | 6.2         | Complied |
| 1.000           | Live | 44.0         | 46.0         | 2.0         | Complied |
| 1.671           | Live | 36.3         | 46.0         | 9.7         | Complied |
| 2.314           | Live | 37.6         | 46.0         | 8.4         | Complied |
| 20.998          | Live | 42.0         | 50.0         | 8.0         | Complied |
| 24.999          | Live | 49.6         | 50.0         | 0.4         | Complied |

**Transmitter AC Conducted Spurious Emissions (continued)****Results: Neutral / Quasi Peak / Cambium Networks Power Supply**

| Frequency (MHz) | Line    | Level (dBμV) | Limit (dBμV) | Margin (dB) | Result   |
|-----------------|---------|--------------|--------------|-------------|----------|
| 0.172           | Neutral | 44.0         | 64.8         | 20.8        | Complied |
| 0.600           | Neutral | 39.9         | 56.0         | 16.1        | Complied |
| 1.000           | Neutral | 44.3         | 56.0         | 11.7        | Complied |
| 1.711           | Neutral | 37.5         | 56.0         | 18.5        | Complied |
| 16.998          | Neutral | 43.4         | 60.0         | 16.6        | Complied |
| 23.001          | Neutral | 44.4         | 60.0         | 15.6        | Complied |

**Results: Neutral / Average / Cambium Networks Power Supply**

| Frequency (MHz) | Line    | Level (dBμV) | Limit (dBμV) | Margin (dB) | Result   |
|-----------------|---------|--------------|--------------|-------------|----------|
| 0.600           | Neutral | 41.4         | 46.0         | 4.6         | Complied |
| 1.000           | Neutral | 44.3         | 46.0         | 1.7         | Complied |
| 1.756           | Neutral | 43.3         | 46.0         | 2.7         | Complied |
| 2.314           | Neutral | 38.0         | 46.0         | 8.0         | Complied |
| 19.000          | Neutral | 44.1         | 50.0         | 5.9         | Complied |
| 23.001          | Neutral | 44.2         | 50.0         | 5.8         | Complied |

**Transmitter AC Conducted Spurious Emissions (continued)****Results: Cambium Networks Power Supply****Live****Neutral****Test Equipment Used:**

| Asset No. | Instrument       | Manufacturer    | Type No.   | Serial No. | Date Calibration Due | Cal. Interval (Months) |
|-----------|------------------|-----------------|------------|------------|----------------------|------------------------|
| A067      | LISN             | Rohde & Schwarz | ESH3-Z5    | 890603/002 | 14 Aug 2015          | 12                     |
| A1830     | Pulse Limiter    | Rohde & Schwarz | ESH3-Z2    | 100668     | 02 Mar 2016          | 12                     |
| M1263     | Test Receiver    | Rohde & Schwarz | ESIB7      | 100265     | 14 Oct 2016          | 12                     |
| M1657     | Thermohygrometer | JM Handelspunkt | 30.5015.13 | N/A        | 14 Mar 2015          | 12                     |

**5.2.2. Minimum 6 dB Bandwidth****Test Summary:**

|                                   |              |                   |                  |
|-----------------------------------|--------------|-------------------|------------------|
| <b>Test Engineer:</b>             | Ian Watch    | <b>Test Date:</b> | 26 February 2015 |
| <b>Test Sample Serial Number:</b> | F50980BB0073 |                   |                  |

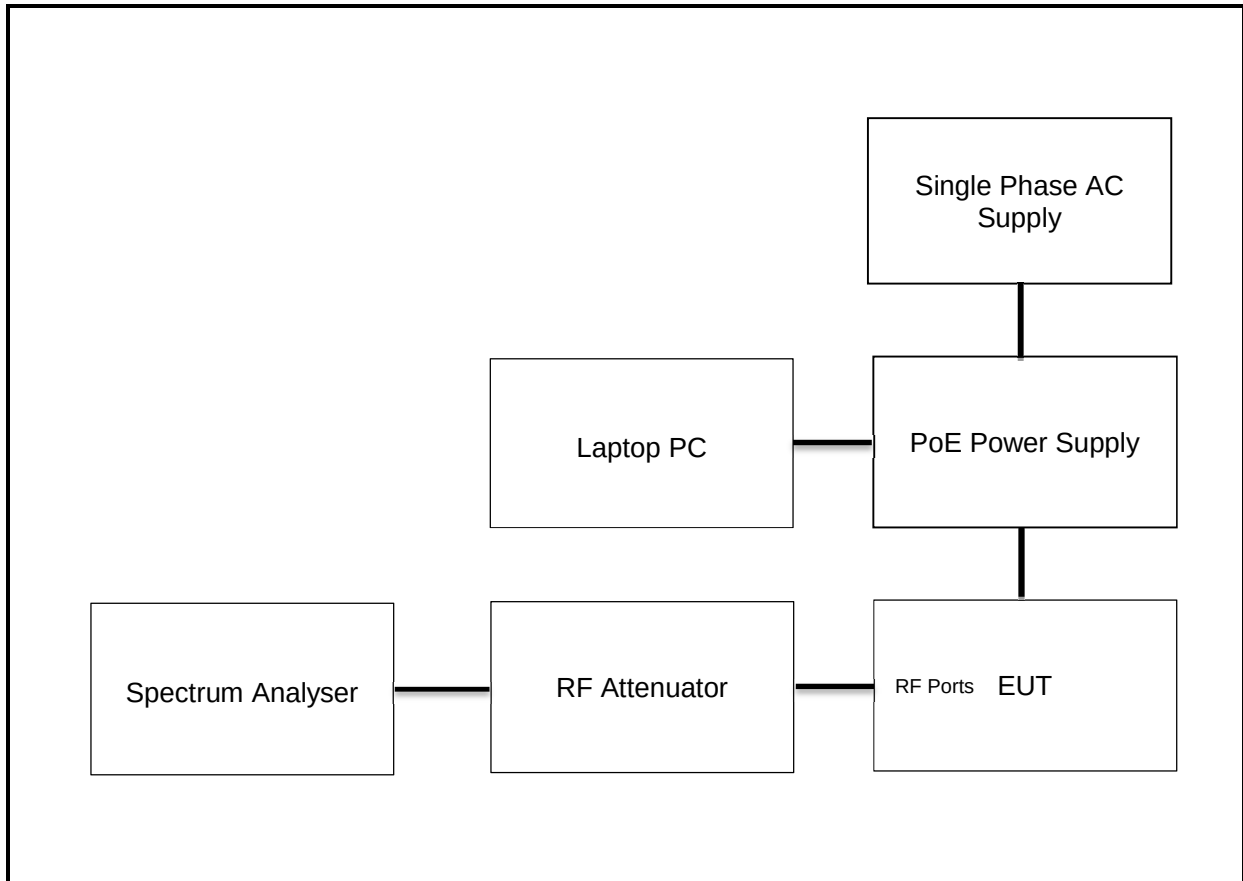
|                          |                                                   |
|--------------------------|---------------------------------------------------|
| <b>FCC Reference:</b>    | Part 15.247(a)(2)                                 |
| <b>Test Method Used:</b> | FCC KDB 558074 Section 8 Option 1 and Notes below |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 22 |
| <b>Relative Humidity (%):</b> | 51 |

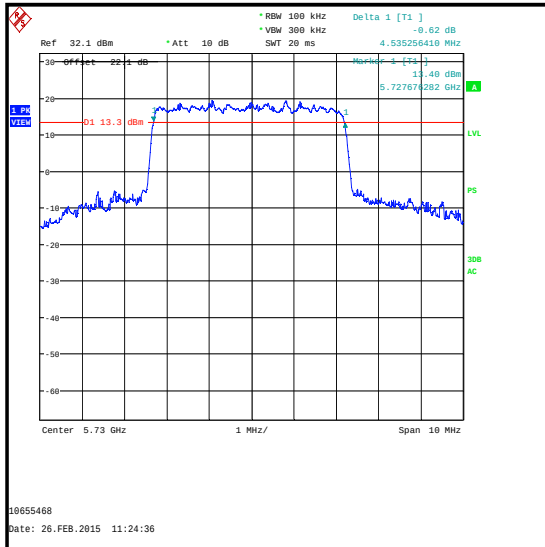
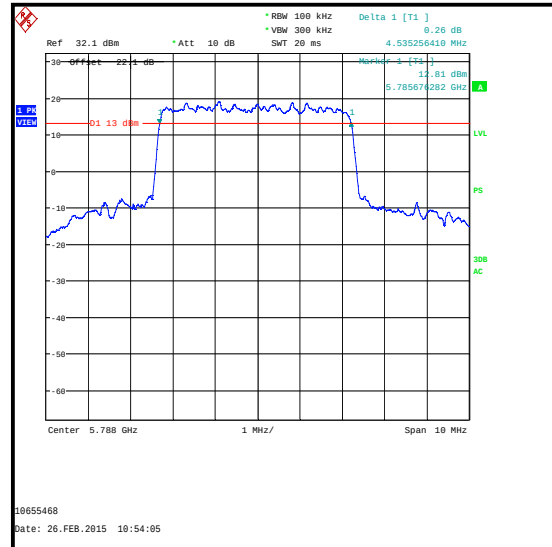
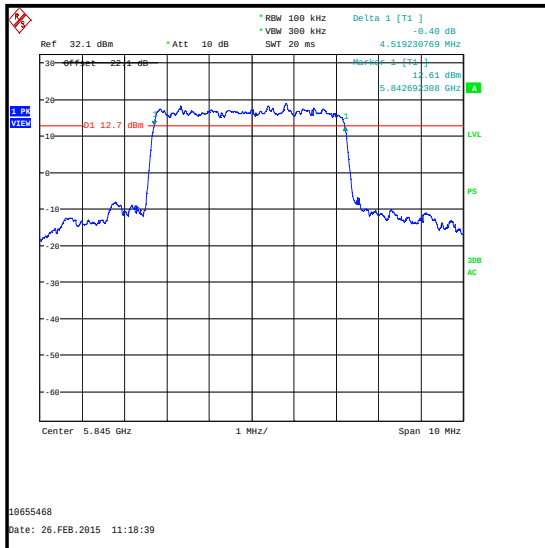
**Note(s):**

1. Minimum 6 dB bandwidth measurements were performed on both RF ports with the EUT transmitting at maximum power with QPSK and 256QAM modulation types. Only 5 MHz channels were tested as this has the narrowest bandwidth and is closest to the minimum 6 dB bandwidth limit of  $\geq 500$  kHz. Bottom, middle and top channels were tested.
2. Spot checks were also performed on 16QAM and 64QAM with a 5 MHz channel and the results were found to be comparable to QPSK and 256QAM. Results for these configurations are archived on the test laboratory IT server and are available for inspection if required.
3. An RF level offset of 22.1 dB was used on the spectrum analyser to compensate for the attenuator and cable loss. A spectrum analyser reference level of 32.1 dB was used, this is the highest reference level the analyser supports for the attenuation and resolution bandwidth used.

**Minimum 6 dB Bandwidth (continued)****Test setup for bandwidth measurements:**

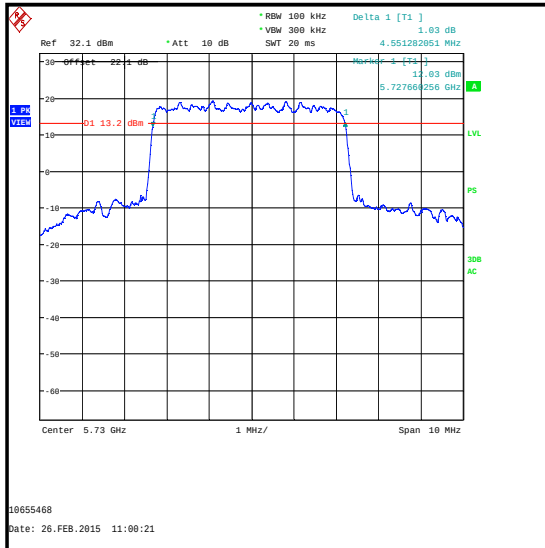
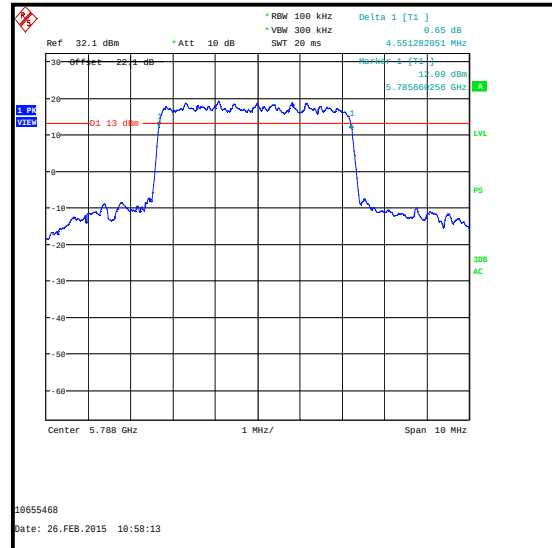
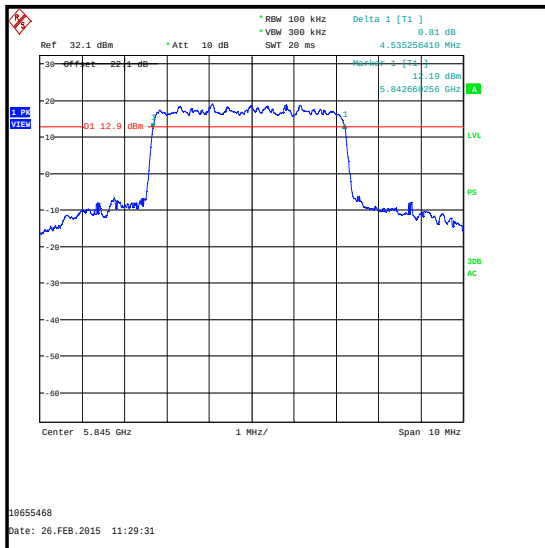
**Minimum 6 dB Bandwidth (continued)****Results: 5 MHz Channel / QPSK / A Port**

| Channel | 6 dB Bandwidth (MHz) | Limit (MHz) | Margin (MHz) | Result   |
|---------|----------------------|-------------|--------------|----------|
| Bottom  | 4.535                | $\geq 0.5$  | 4.035        | Complied |
| Middle  | 4.535                | $\geq 0.5$  | 4.035        | Complied |
| Top     | 4.519                | $\geq 0.5$  | 4.019        | Complied |

**Bottom Channel****Middle Channel****Top Channel**

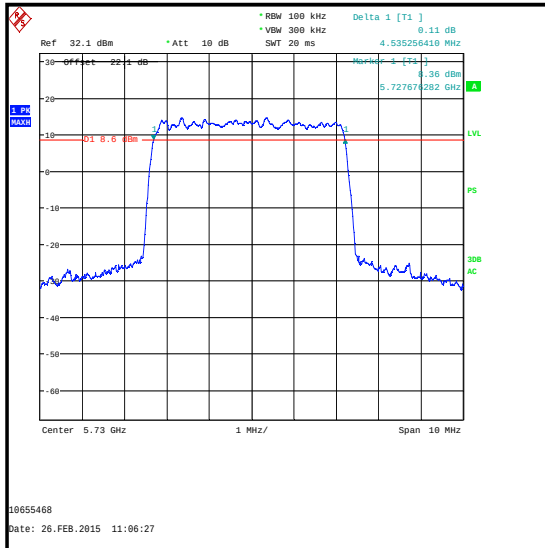
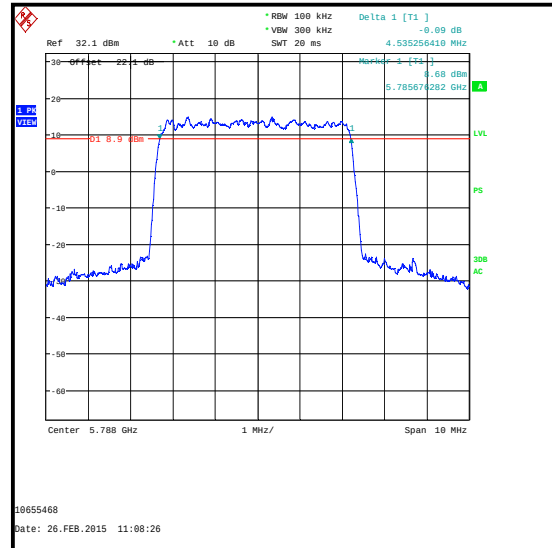
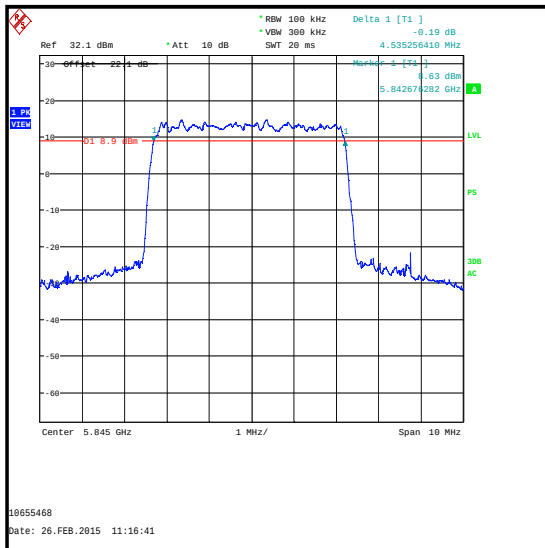
**Minimum 6 dB Bandwidth (continued)****Results: 5 MHz Channel / QPSK / B Port**

| Channel | 6 dB Bandwidth (MHz) | Limit (MHz) | Margin (MHz) | Result   |
|---------|----------------------|-------------|--------------|----------|
| Bottom  | 4.551                | ≥0.5        | 4.051        | Complied |
| Middle  | 4.551                | ≥0.5        | 4.051        | Complied |
| Top     | 4.535                | ≥0.5        | 4.035        | Complied |

**Bottom Channel****Middle Channel****Top Channel**

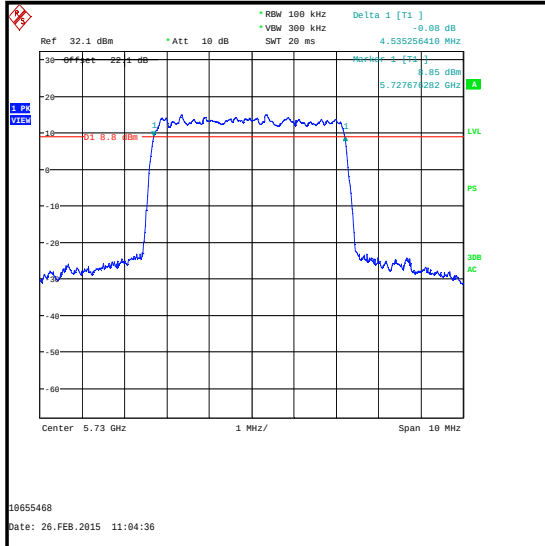
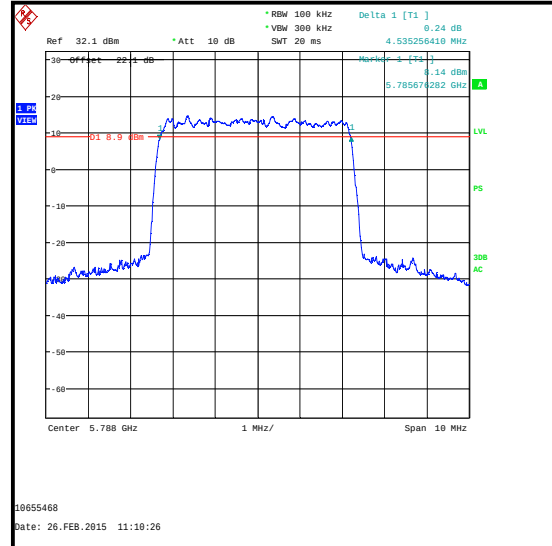
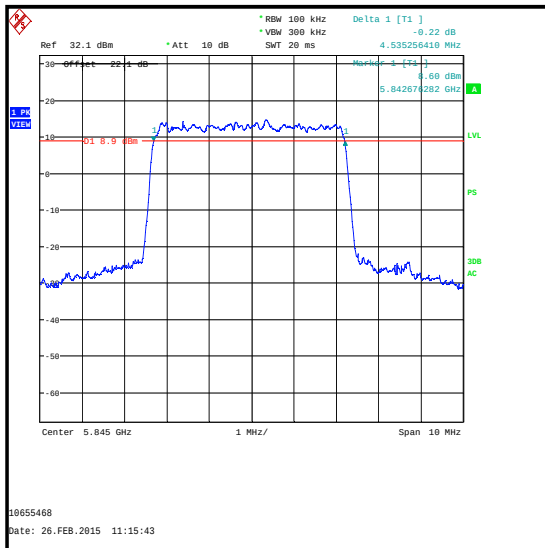
**Minimum 6 dB Bandwidth (continued)****Results: 5 MHz Channel / 256QAM / A Port**

| Channel | 6 dB Bandwidth (MHz) | Limit (MHz) | Margin (MHz) | Result   |
|---------|----------------------|-------------|--------------|----------|
| Bottom  | 4.535                | ≥0.5        | 4.035        | Complied |
| Middle  | 4.535                | ≥0.5        | 4.035        | Complied |
| Top     | 4.535                | ≥0.5        | 4.035        | Complied |

**Bottom Channel****Middle Channel****Top Channel**

**Minimum 6 dB Bandwidth (continued)****Results: 5 MHz Channel / 256QAM / B Port**

| Channel | 6 dB Bandwidth (MHz) | Limit (MHz) | Margin (MHz) | Result   |
|---------|----------------------|-------------|--------------|----------|
| Bottom  | 4.535                | $\geq 0.5$  | 4.035        | Complied |
| Middle  | 4.535                | $\geq 0.5$  | 4.035        | Complied |
| Top     | 4.535                | $\geq 0.5$  | 4.035        | Complied |

**Bottom Channel****Middle Channel****Top Channel**

**Minimum 6 dB Bandwidth (continued)****Test Equipment Used:**

| Asset No. | Instrument       | Manufacturer    | Type No.   | Serial No. | Date Calibration Due  | Cal. Interval (Months) |
|-----------|------------------|-----------------|------------|------------|-----------------------|------------------------|
| A2527     | Attenuator       | AtlanTecRF      | AN18W5-20  | 832828#2   | Calibrated before use | N/A                    |
| M1630     | Test Receiver    | Rohde & Schwarz | ESU40      | 100233     | 13 Mar 2015           | 12                     |
| M1657     | Thermohygrometer | JM Handelspunkt | 30.5015.13 | N/A        | 14 Mar 2015           | 12                     |

**5.2.3. Power Spectral Density****Test Summary:**

|                                   |              |                    |                                  |
|-----------------------------------|--------------|--------------------|----------------------------------|
| <b>Test Engineer:</b>             | Ian Watch    | <b>Test Dates:</b> | 02 March 2015 &<br>03 March 2015 |
| <b>Test Sample Serial Number:</b> | F50980BB0073 |                    |                                  |

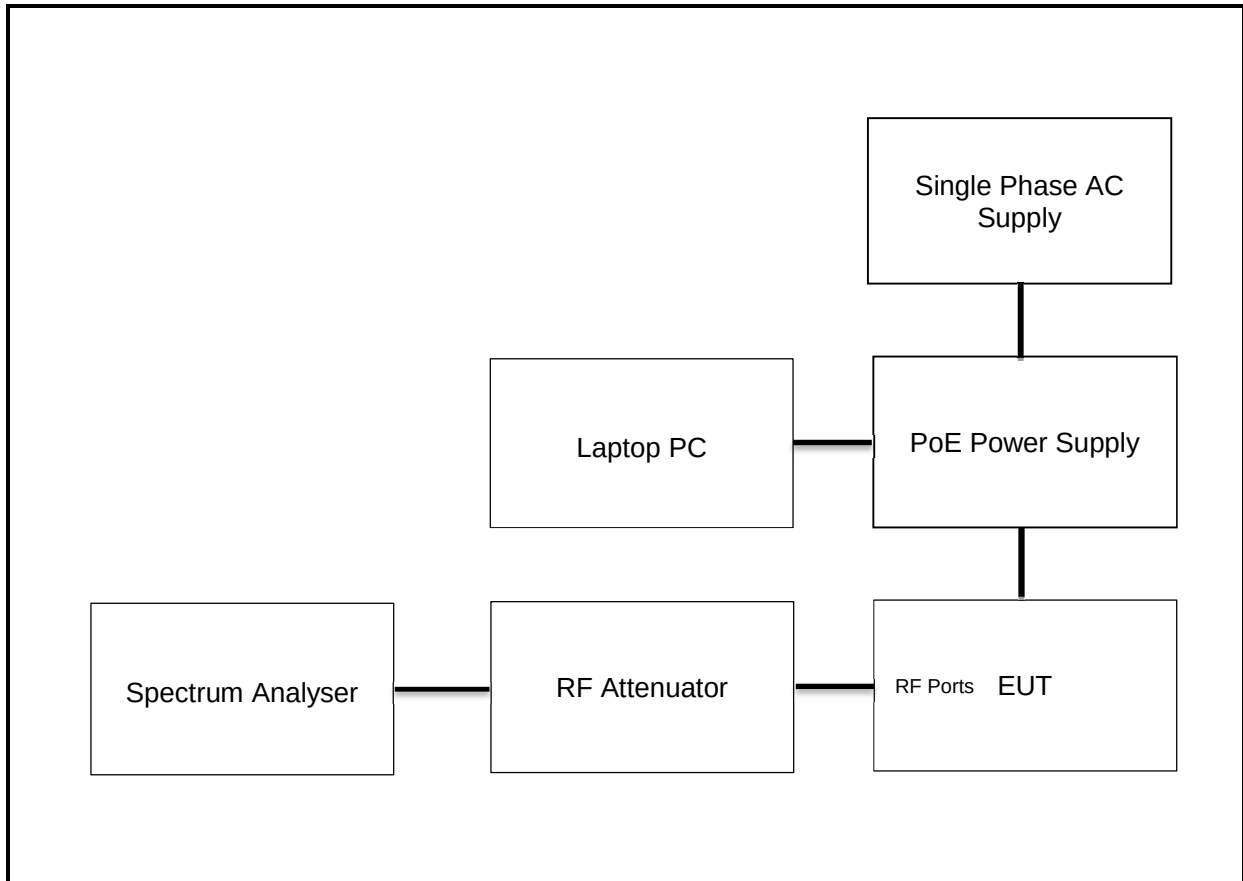
|                          |                                                                                |
|--------------------------|--------------------------------------------------------------------------------|
| <b>FCC Reference:</b>    | Part 15.247(e)                                                                 |
| <b>Test Method Used:</b> | KDB 558074 v03r02 Section 10.3 Method AVGPS-1,<br>KDB 662911 D02 & Notes below |

**Environmental Conditions:**

|                               |          |
|-------------------------------|----------|
| <b>Temperature (°C):</b>      | 22 to 23 |
| <b>Relative Humidity (%):</b> | 31 to 34 |

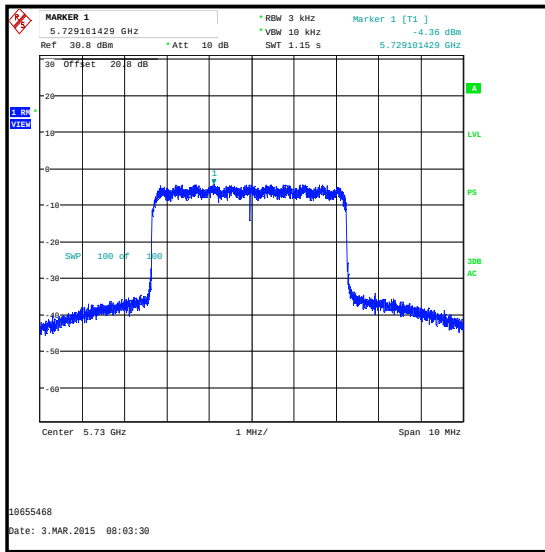
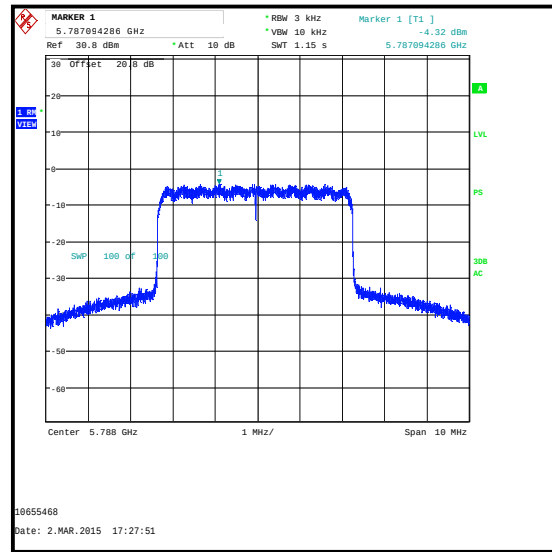
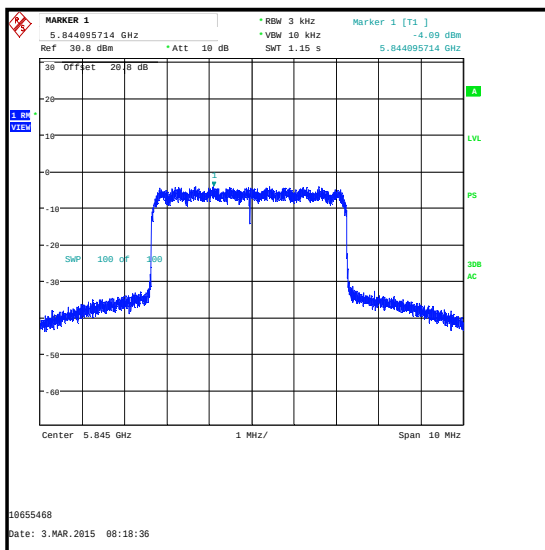
**Note(s):**

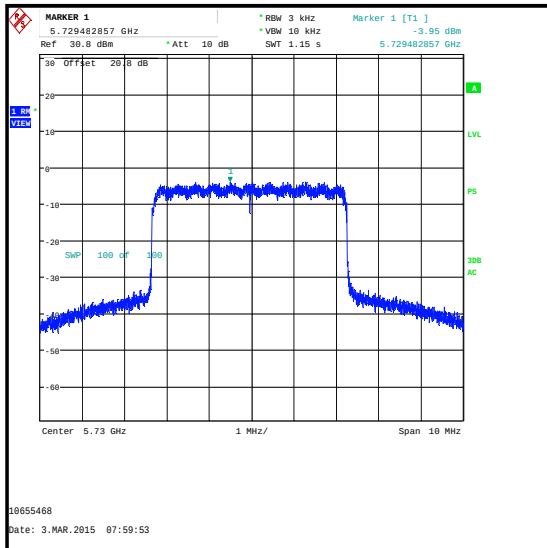
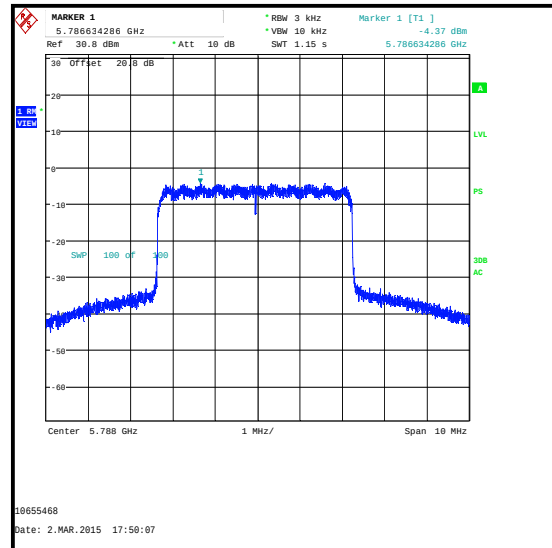
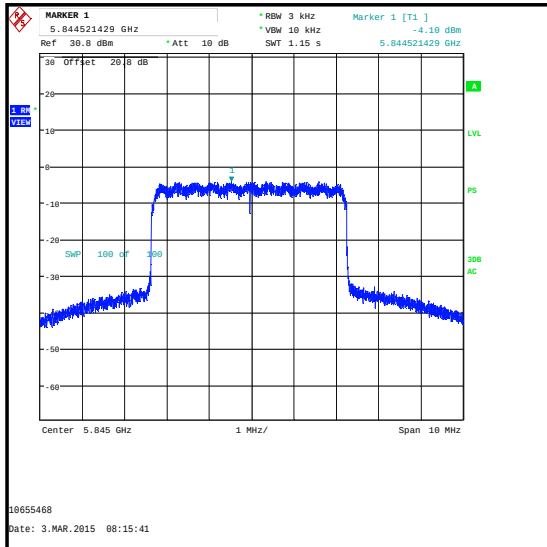
1. Transmitter Power Spectral Density tests were performed using a spectrum analyser in accordance with FCC KDB 558074 Section 10.3 Method AVGPS-1.
2. The EUT was transmitting at 100% duty cycle at the highest power setting for each mode.
3. Tests were performed on 5 MHz channels as these have the highest output power. QPSK and 16QAM were tested. 16QAM operates with a higher power setting than 64QAM and 256QAM and was deemed to be worst case.
4. Measurements were performed on the A and B RF ports. An RMS detector was used. The PSD from both ports was linearly combined and then subtracted from the limit to obtain the margin. An RF attenuator was fitted between the EUT port and spectrum analyser. An RF level offset of 20.8 dB was used on the spectrum analyser to compensate for the attenuator and cable loss. A spectrum analyser reference level of 30.8 dB was used, this is the highest reference level the analyser supports for the attenuation and resolution bandwidth used.
5. Trace averaging was performed over at least 100 traces. This was confirmed by viewing the spectrum analyser screen at the end of each test.

**Power Spectral Density (continued)****Test setup for power spectral density measurements:**

**Power Spectral Density (continued)****Results: 5 MHz Channel / QPSK**

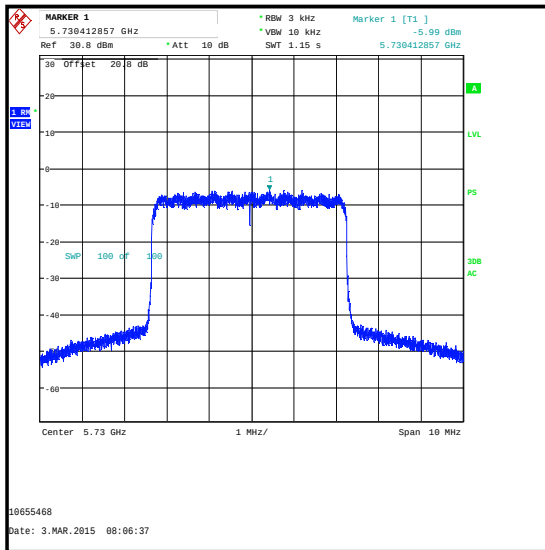
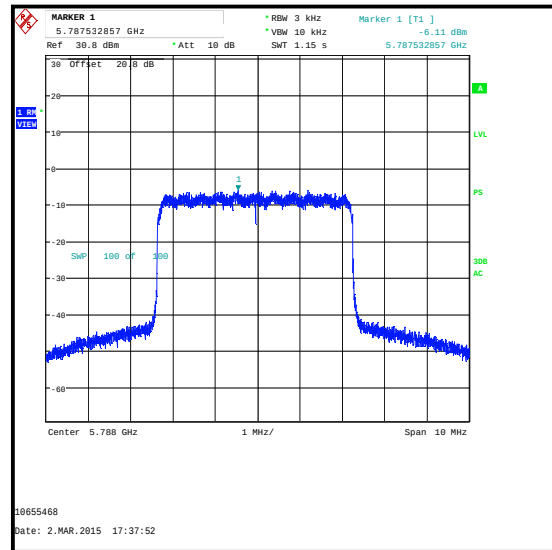
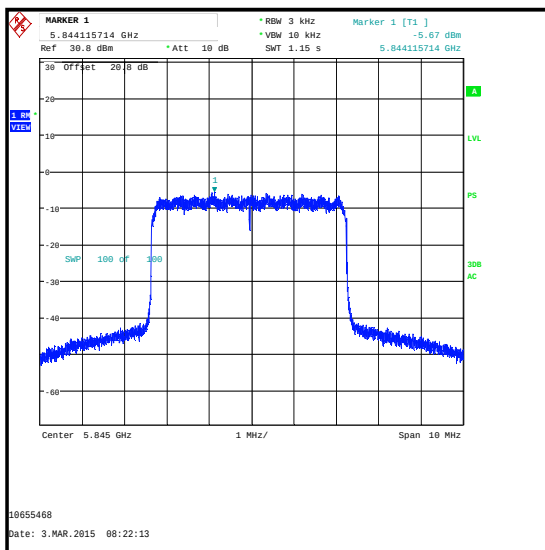
| Channel | PSD at A Port (dBm / 3 kHz) | PSD at B Port (dBm / 3 kHz) | Combined PSD (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Margin (dB) | Result   |
|---------|-----------------------------|-----------------------------|----------------------------|---------------------|-------------|----------|
| Bottom  | -4.4                        | -4.0                        | -1.2                       | 8.0                 | 9.2         | Complied |
| Middle  | -4.3                        | -4.4                        | -1.3                       | 8.0                 | 9.3         | Complied |
| Top     | -4.1                        | -4.1                        | -1.1                       | 8.0                 | 9.1         | Complied |

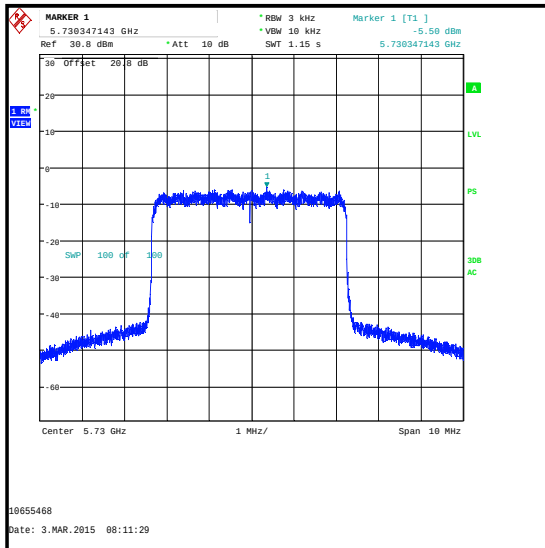
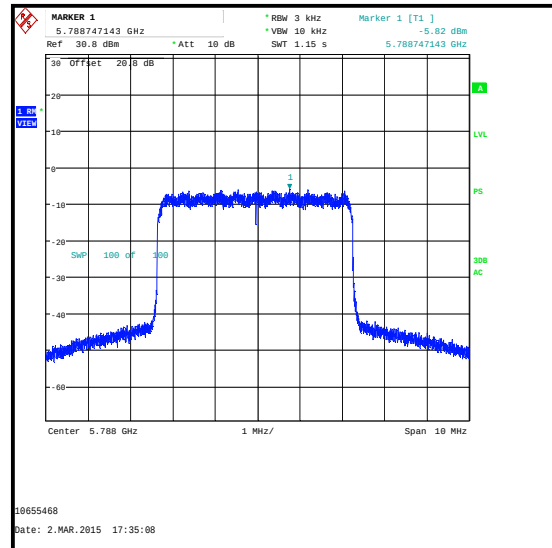
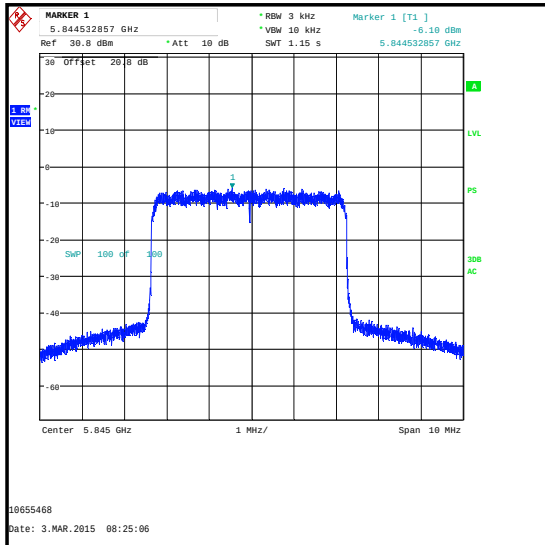
**Results: 5 MHz Channel / QPSK / A Port****Bottom Channel****Middle Channel****Top Channel**

**Power Spectral Density (continued)****Results: 5 MHz Channel / QPSK / B Port****Bottom Channel****Middle Channel****Top Channel**

**Power Spectral Density (continued)****Results: 5 MHz Channel / 16QAM**

| Channel | PSD at A Port (dBm / 3 kHz) | PSD at B Port (dBm / 3 kHz) | Combined PSD (dBm / 3 kHz) | Limit (dBm / 3 kHz) | Margin (dB) | Result   |
|---------|-----------------------------|-----------------------------|----------------------------|---------------------|-------------|----------|
| Bottom  | -6.0                        | -5.5                        | -2.7                       | 8.0                 | 10.7        | Complied |
| Middle  | -6.1                        | -5.8                        | -2.9                       | 8.0                 | 10.9        | Complied |
| Top     | -5.7                        | -6.1                        | -2.9                       | 8.0                 | 10.9        | Complied |

**Results: 5 MHz Channel / 16QAM / A Port****Bottom Channel****Middle Channel****Top Channel**

**Power Spectral Density (continued)****Results: 5 MHz Channel / 16QAM / B Port****Bottom Channel****Middle Channel****Top Channel**

**Power Spectral Density (continued)****Test Equipment Used:**

| Asset No. | Instrument       | Manufacturer    | Type No.   | Serial No. | Date Calibration Due  | Cal. Interval (Months) |
|-----------|------------------|-----------------|------------|------------|-----------------------|------------------------|
| A1393     | Attenuator       | Huber & Suhner  | 6820.17.B  | 757456     | Calibrated Before Use | N/A                    |
| M1886     | Test Receiver    | Rohde & Schwarz | ESU        | 100554     | 09 May 2015           | 12                     |
| M260      | Signal Generator | Rohde & Schwarz | SMP02      | 829076/008 | 24 Apr 2015           | 12                     |
| M1657     | Thermohygrometer | JM Handelspunkt | 30.5015.13 | N/A        | 14 Mar 2015           | 12                     |

**5.2.4. Maximum Conducted Output Power****Test Summary:**

|                                   |              |                   |               |
|-----------------------------------|--------------|-------------------|---------------|
| <b>Test Engineer:</b>             | Ian Watch    | <b>Test Date:</b> | 04 March 2015 |
| <b>Test Sample Serial Number:</b> | F50980BB0073 |                   |               |

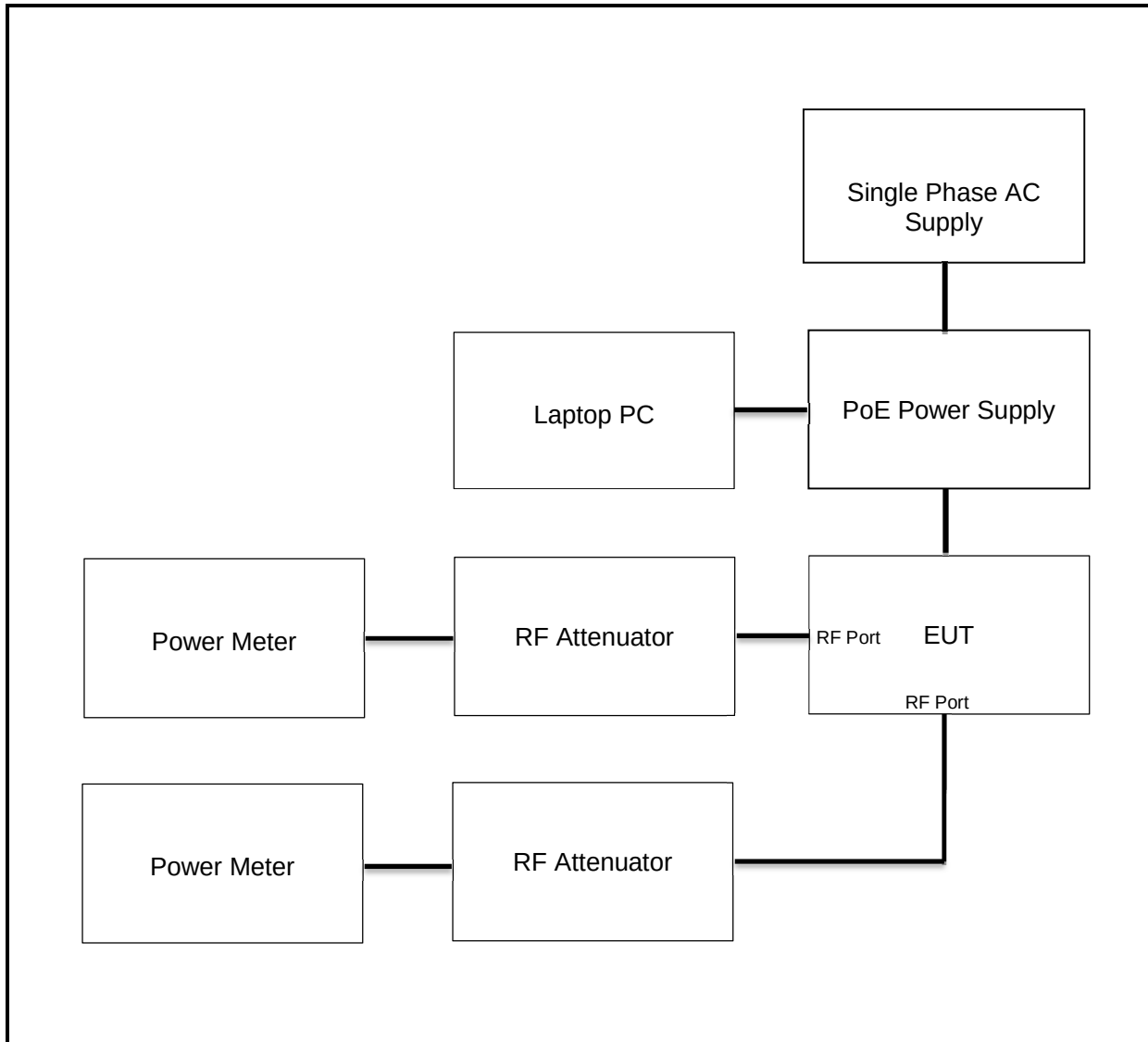
|                          |                                                         |
|--------------------------|---------------------------------------------------------|
| <b>FCC Reference:</b>    | Part 15.247(b)(3), 15.147(b)(4) & Part 15.247(c)(1)(ii) |
| <b>Test Method Used:</b> | KDB 558074 Section 9.2.3.1 & KDB 662911 D02             |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 24 |
| <b>Relative Humidity (%):</b> | 32 |

**Note(s):**

1. Conducted power tests in all bands were performed using wideband average power meters and associated power sensors in accordance with FCC KDB 558074 Section 9.2.3.1 Measurement Procedure AVGPM. RF attenuators were fitted between the EUT and power sensors. The attenuator loss was measured prior to performing the measurements and the loss compensation incorporated into the measurement results.
2. Preliminary tests were made on all supported modulation types to determine worst case (highest power) operation. Highest power was observed in QPSK mode on all channel widths. The EUT is designed to operate with maximum power settings for 16QAM, 64QAM and 256QAM that are lower or the same as QPSK. Only QPSK was tested and recorded in this test report although all other configurations were spot checked and found to be compliant. Test results for other configurations are archived on the UL VS LTD IT server and available for inspection if required.
3. Tests in point-point mode. This mode covers plate antennas and parabolic antennas. Tests were performed with the EUT transmitting at power levels shown for point-to-point configurations shown in Section 4.2 of this test report. No E.I.R.P. limit is specified for point-to point operation as the system can be configured as a fixed link using directional antennas with gains greater than 6 dBi. According to FCC Part 15.247(c)(1)(ii), systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.
4. Tests in sectorised (point-to-multipoint) and omnidirectional modes. Conducted power limits were reduced by 1 dB for each dB that the stated gain of the antenna exceeded 6 dB in accordance with FCC Part 15.247(b)(4), the power settings of the the EUT were reduced accordingly. In addition, 0.9 dB has been subtracted from the stated antenna gains for point-to-multipoint antennas. This is the insertion loss for the shortest length RF cables that can be used to connect the EUT RF ports to the antennas used during testing. Tests were performed with the EUT transmitting at power levels shown for sectorised and omnidirectional antenna configurations shown in Section 4.2 of this test report.
5. The transmitter was continuously transmitting with 100% duty cycle on the required channels during the tests.
6. Power from both ports was measured and combined using the measure-and-sum method stated in FCC KDB 662911 D02.

**Maximum Conducted Output Power (continued)****Test setup for conducted power measurements:**

**Maximum Conducted Output Power (continued)****Results: 5 MHz Channel / QPSK / Directional Antennas / Point-to-Point**

| Channel | Conducted Power A Port (dBm) | Conducted Power B Port (dBm) | Combined Conducted Power (dBm) | Conducted Power Limit (dBm) | Margin (dB) | Result   |
|---------|------------------------------|------------------------------|--------------------------------|-----------------------------|-------------|----------|
| Bottom  | 24.7                         | 24.5                         | 27.6                           | 30.0                        | 2.4         | Complied |
| Middle  | 24.9                         | 24.3                         | 27.6                           | 30.0                        | 2.4         | Complied |
| Top     | 24.4                         | 24.2                         | 27.3                           | 30.0                        | 2.7         | Complied |

**Results: 10 MHz Channel / QPSK / Directional Antennas / Point-to-Point**

| Channel | Conducted Power A Port (dBm) | Conducted Power B Port (dBm) | Combined Conducted Power (dBm) | Conducted Power Limit (dBm) | Margin (dB) | Result   |
|---------|------------------------------|------------------------------|--------------------------------|-----------------------------|-------------|----------|
| Bottom  | 22.4                         | 22.2                         | 25.3                           | 30.0                        | 4.7         | Complied |
| Middle  | 24.8                         | 24.2                         | 27.5                           | 30.0                        | 2.5         | Complied |
| Top     | 23.3                         | 23.0                         | 26.2                           | 30.0                        | 3.8         | Complied |

**Results: 20 MHz Channel / QPSK / Directional Antennas / Point-to-Point**

| Channel | Conducted Power A Port (dBm) | Conducted Power B Port (dBm) | Combined Conducted Power (dBm) | Conducted Power Limit (dBm) | Margin (dB) | Result   |
|---------|------------------------------|------------------------------|--------------------------------|-----------------------------|-------------|----------|
| Bottom  | 23.6                         | 23.1                         | 26.4                           | 30.0                        | 3.6         | Complied |
| Middle  | 24.8                         | 24.2                         | 27.5                           | 30.0                        | 2.5         | Complied |
| Top     | 23.3                         | 22.9                         | 26.1                           | 30.0                        | 3.9         | Complied |

**Results: 40 MHz Channel / QPSK / Directional Antennas / Point-to-Point**

| Channel | Conducted Power A Port (dBm) | Conducted Power B Port (dBm) | Combined Conducted Power (dBm) | Conducted Power Limit (dBm) | Margin (dB) | Result   |
|---------|------------------------------|------------------------------|--------------------------------|-----------------------------|-------------|----------|
| Bottom  | 23.4                         | 23.0                         | 26.2                           | 30.0                        | 3.8         | Complied |
| Middle  | 24.7                         | 24.2                         | 27.5                           | 30.0                        | 2.5         | Complied |
| Top     | 23.3                         | 23.0                         | 26.2                           | 30.0                        | 3.8         | Complied |

**Maximum Conducted Output Power (continued)****Results: 5 MHz Channel / QPSK / 17 dBi Sectorised Antenna**

| Channel | Conducted Power A Port (dBm) | Conducted Power B Port (dBm) | Combined Conducted Power (dBm) | Conducted Power Limit (dBm) | Margin (dB) | Result   |
|---------|------------------------------|------------------------------|--------------------------------|-----------------------------|-------------|----------|
| Bottom  | 16.6                         | 16.5                         | 19.6                           | 19.9                        | 0.3         | Complied |
| Middle  | 16.8                         | 16.3                         | 19.6                           | 19.9                        | 0.3         | Complied |
| Top     | 16.6                         | 16.4                         | 19.5                           | 19.9                        | 0.4         | Complied |

**Results: 5 MHz Channel / QPSK / 17 dBi Sectorised Antenna**

| Channel | Combined Conducted Peak Power (dBm) | Declared Antenna Gain + cable loss (dBi) | EIRP (dBm) | De Facto EIRP Limit (dBm) | Margin (dB) | Result   |
|---------|-------------------------------------|------------------------------------------|------------|---------------------------|-------------|----------|
| Bottom  | 19.6                                | 16.1                                     | 35.7       | 36.0                      | 0.3         | Complied |
| Middle  | 19.6                                | 16.1                                     | 35.7       | 36.0                      | 0.3         | Complied |
| Top     | 19.5                                | 16.1                                     | 35.6       | 36.0                      | 0.4         | Complied |

**Results: 10 MHz Channel / QPSK / 17 dBi Sectorised Antenna**

| Channel | Conducted Power A Port (dBm) | Conducted Power B Port (dBm) | Combined Conducted Power (dBm) | Conducted Power Limit (dBm) | Margin (dB) | Result   |
|---------|------------------------------|------------------------------|--------------------------------|-----------------------------|-------------|----------|
| Bottom  | 16.5                         | 16.4                         | 19.5                           | 19.9                        | 0.4         | Complied |
| Middle  | 16.8                         | 16.2                         | 19.5                           | 19.9                        | 0.4         | Complied |
| Top     | 16.5                         | 16.4                         | 19.5                           | 19.9                        | 0.4         | Complied |

**Results: 10 MHz Channel / QPSK / 17 dBi Sectorised Antenna**

| Channel | Combined Conducted Peak Power (dBm) | Declared Antenna Gain + cable loss (dBi) | EIRP (dBm) | De Facto EIRP Limit (dBm) | Margin (dB) | Result   |
|---------|-------------------------------------|------------------------------------------|------------|---------------------------|-------------|----------|
| Bottom  | 19.5                                | 16.1                                     | 35.6       | 36.0                      | 0.4         | Complied |
| Middle  | 19.5                                | 16.1                                     | 35.6       | 36.0                      | 0.4         | Complied |
| Top     | 19.5                                | 16.1                                     | 35.6       | 36.0                      | 0.4         | Complied |

**Maximum Conducted Output Power (continued)****Results: 20 MHz Channel / QPSK / 17 dBi Sectorised Antenna**

| Channel | Conducted Power A Port (dBm) | Conducted Power B Port (dBm) | Combined Conducted Power (dBm) | Conducted Power Limit (dBm) | Margin (dB) | Result   |
|---------|------------------------------|------------------------------|--------------------------------|-----------------------------|-------------|----------|
| Bottom  | 16.8                         | 16.5                         | 19.6                           | 19.9                        | 0.3         | Complied |
| Middle  | 16.8                         | 16.1                         | 19.5                           | 19.9                        | 0.4         | Complied |
| Top     | 16.6                         | 16.3                         | 19.5                           | 19.9                        | 0.4         | Complied |

**Results: 20 MHz Channel / QPSK / 17 dBi Sectorised Antenna**

| Channel | Combined Conducted Peak Power (dBm) | Declared Antenna Gain + cable loss (dBi) | EIRP (dBm) | De Facto EIRP Limit (dBm) | Margin (dB) | Result   |
|---------|-------------------------------------|------------------------------------------|------------|---------------------------|-------------|----------|
| Bottom  | 19.6                                | 16.1                                     | 35.7       | 36.0                      | 0.3         | Complied |
| Middle  | 19.5                                | 16.1                                     | 35.6       | 36.0                      | 0.4         | Complied |
| Top     | 19.5                                | 16.1                                     | 35.6       | 36.0                      | 0.4         | Complied |

**Results: 40 MHz Channel / QPSK / 17 dBi Sectorised Antenna**

| Channel | Conducted Power A Port (dBm) | Conducted Power B Port (dBm) | Combined Conducted Power (dBm) | Conducted Power Limit (dBm) | Margin (dB) | Result   |
|---------|------------------------------|------------------------------|--------------------------------|-----------------------------|-------------|----------|
| Bottom  | 16.7                         | 16.3                         | 19.5                           | 19.9                        | 0.4         | Complied |
| Middle  | 16.8                         | 16.2                         | 19.5                           | 19.9                        | 0.4         | Complied |
| Top     | 16.6                         | 16.3                         | 19.5                           | 19.9                        | 0.4         | Complied |

**Results: 40 MHz Channel / QPSK / 17 dBi Sectorised Antenna**

| Channel | Combined Conducted Peak Power (dBm) | Declared Antenna Gain + cable loss (dBi) | EIRP (dBm) | De Facto EIRP Limit (dBm) | Margin (dB) | Result   |
|---------|-------------------------------------|------------------------------------------|------------|---------------------------|-------------|----------|
| Bottom  | 19.5                                | 16.1                                     | 35.6       | 36.0                      | 0.4         | Complied |
| Middle  | 19.5                                | 16.1                                     | 35.6       | 36.0                      | 0.4         | Complied |
| Top     | 19.5                                | 16.1                                     | 35.6       | 36.0                      | 0.4         | Complied |

**Maximum Conducted Output Power (continued)****Results: 5 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna**

| Channel | Conducted Power A Port (dBm) | Conducted Power B Port (dBm) | Combined Conducted Power (dBm) | Conducted Power Limit (dBm) | Margin (dB) | Result   |
|---------|------------------------------|------------------------------|--------------------------------|-----------------------------|-------------|----------|
| Bottom  | 20.7                         | 20.4                         | 23.6                           | 23.9                        | 0.3         | Complied |
| Middle  | 20.8                         | 20.2                         | 23.5                           | 23.9                        | 0.4         | Complied |
| Top     | 20.6                         | 20.5                         | 23.6                           | 23.9                        | 0.3         | Complied |

**Results: 5 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna**

| Channel | Combined Conducted Peak Power (dBm) | Declared Antenna Gain + cable loss (dBi) | EIRP (dBm) | De Facto EIRP Limit (dBm) | Margin (dB) | Result   |
|---------|-------------------------------------|------------------------------------------|------------|---------------------------|-------------|----------|
| Bottom  | 23.6                                | 12.1                                     | 35.7       | 36.0                      | 0.3         | Complied |
| Middle  | 23.5                                | 12.1                                     | 35.6       | 36.0                      | 0.4         | Complied |
| Top     | 23.6                                | 12.1                                     | 35.7       | 36.0                      | 0.3         | Complied |

**Results: 10 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna**

| Channel | Conducted Power A Port (dBm) | Conducted Power B Port (dBm) | Combined Conducted Power (dBm) | Conducted Power Limit (dBm) | Margin (dB) | Result   |
|---------|------------------------------|------------------------------|--------------------------------|-----------------------------|-------------|----------|
| Bottom  | 20.7                         | 20.4                         | 23.6                           | 23.9                        | 0.3         | Complied |
| Middle  | 20.8                         | 20.2                         | 23.5                           | 23.9                        | 0.4         | Complied |
| Top     | 20.5                         | 20.4                         | 23.5                           | 23.9                        | 0.4         | Complied |

**Results: 10 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna**

| Channel | Combined Conducted Peak Power (dBm) | Declared Antenna Gain + cable loss (dBi) | EIRP (dBm) | De Facto EIRP Limit (dBm) | Margin (dB) | Result   |
|---------|-------------------------------------|------------------------------------------|------------|---------------------------|-------------|----------|
| Bottom  | 23.6                                | 12.1                                     | 35.7       | 36.0                      | 0.3         | Complied |
| Middle  | 23.5                                | 12.1                                     | 35.6       | 36.0                      | 0.4         | Complied |
| Top     | 23.5                                | 12.1                                     | 35.6       | 36.0                      | 0.4         | Complied |

**Maximum Conducted Output Power (continued)****Results: 20 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna**

| Channel | Conducted Power A Port (dBm) | Conducted Power B Port (dBm) | Combined Conducted Power (dBm) | Conducted Power Limit (dBm) | Margin (dB) | Result   |
|---------|------------------------------|------------------------------|--------------------------------|-----------------------------|-------------|----------|
| Bottom  | 20.7                         | 20.2                         | 23.5                           | 23.9                        | 0.4         | Complied |
| Middle  | 20.9                         | 20.2                         | 23.6                           | 23.9                        | 0.3         | Complied |
| Top     | 20.6                         | 20.5                         | 23.6                           | 23.9                        | 0.3         | Complied |

**Results: 20 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna**

| Channel | Combined Conducted Peak Power (dBm) | Declared Antenna Gain + cable loss (dBi) | EIRP (dBm) | De Facto EIRP Limit (dBm) | Margin (dB) | Result   |
|---------|-------------------------------------|------------------------------------------|------------|---------------------------|-------------|----------|
| Bottom  | 23.5                                | 12.1                                     | 35.6       | 36.0                      | 0.4         | Complied |
| Middle  | 23.6                                | 12.1                                     | 35.7       | 36.0                      | 0.3         | Complied |
| Top     | 23.6                                | 12.1                                     | 35.7       | 36.0                      | 0.3         | Complied |

**Results: 40 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna**

| Channel | Conducted Power A Port (dBm) | Conducted Power B Port (dBm) | Combined Conducted Power (dBm) | Conducted Power Limit (dBm) | Margin (dB) | Result   |
|---------|------------------------------|------------------------------|--------------------------------|-----------------------------|-------------|----------|
| Bottom  | 20.7                         | 20.4                         | 23.6                           | 23.9                        | 0.3         | Complied |
| Middle  | 20.9                         | 20.2                         | 23.6                           | 23.9                        | 0.3         | Complied |
| Top     | 20.7                         | 20.3                         | 23.5                           | 23.9                        | 0.4         | Complied |

**Results: 40 MHz Channel / QPSK / 13 dBi Omnidirectional Antenna**

| Channel | Combined Conducted Peak Power (dBm) | Declared Antenna Gain + cable loss (dBi) | EIRP (dBm) | De Facto EIRP Limit (dBm) | Margin (dB) | Result   |
|---------|-------------------------------------|------------------------------------------|------------|---------------------------|-------------|----------|
| Bottom  | 23.6                                | 12.1                                     | 35.7       | 36.0                      | 0.3         | Complied |
| Middle  | 23.6                                | 12.1                                     | 35.7       | 36.0                      | 0.3         | Complied |
| Top     | 23.5                                | 12.1                                     | 35.6       | 36.0                      | 0.4         | Complied |

**Maximum Conducted Output Power (continued)****Test Equipment Used:**

| Asset No. | Instrument       | Manufacturer    | Type No.   | Serial No. | Date Calibration Due  | Cal. Interval (Months) |
|-----------|------------------|-----------------|------------|------------|-----------------------|------------------------|
| M1657     | Thermohygrometer | JM Handelspunkt | 30.5015.13 | N/A        | 14 Mar 2015           | 12                     |
| M1435     | Power Meter      | Hewlett Packard | 437B       | 3125U14631 | 30 Apr 2015           | 12                     |
| M1145     | Power Meter      | Hewlett Packard | 437B       | 3737U26557 | 01 Jul 2015           | 12                     |
| M1175     | Power Sensor     | Hewlett Packard | 8485A      | 2942A10299 | 11 Feb 2016           | 12                     |
| M1592     | Power Sensor     | Hewlett Packard | 8487A      | 3318A02094 | 17 Sep 2015           | 12                     |
| M260      | Signal Generator | Rohde & Schwarz | SMP02      | 829076/008 | 24 Apr 2015           | 12                     |
| A1393     | Attenuator       | Huber & Suhner  | 6820.17.B  | 757456     | Calibrated Before Use | N/A                    |
| A2142     | Attenuator       | AtlanTecRF      | AN18-20    | 081120-23  | Calibrated Before Use | N/A                    |

**5.2.5. Band Edge Conducted Emissions**

|                                   |              |                    |                                                                               |
|-----------------------------------|--------------|--------------------|-------------------------------------------------------------------------------|
| <b>Test Engineer:</b>             | Ian Watch    | <b>Test Dates:</b> | 23 February 2015,<br>24 February 2015,<br>25 February 2015 &<br>03 March 2015 |
| <b>Test Sample Serial Number:</b> | F50980BB0073 |                    |                                                                               |

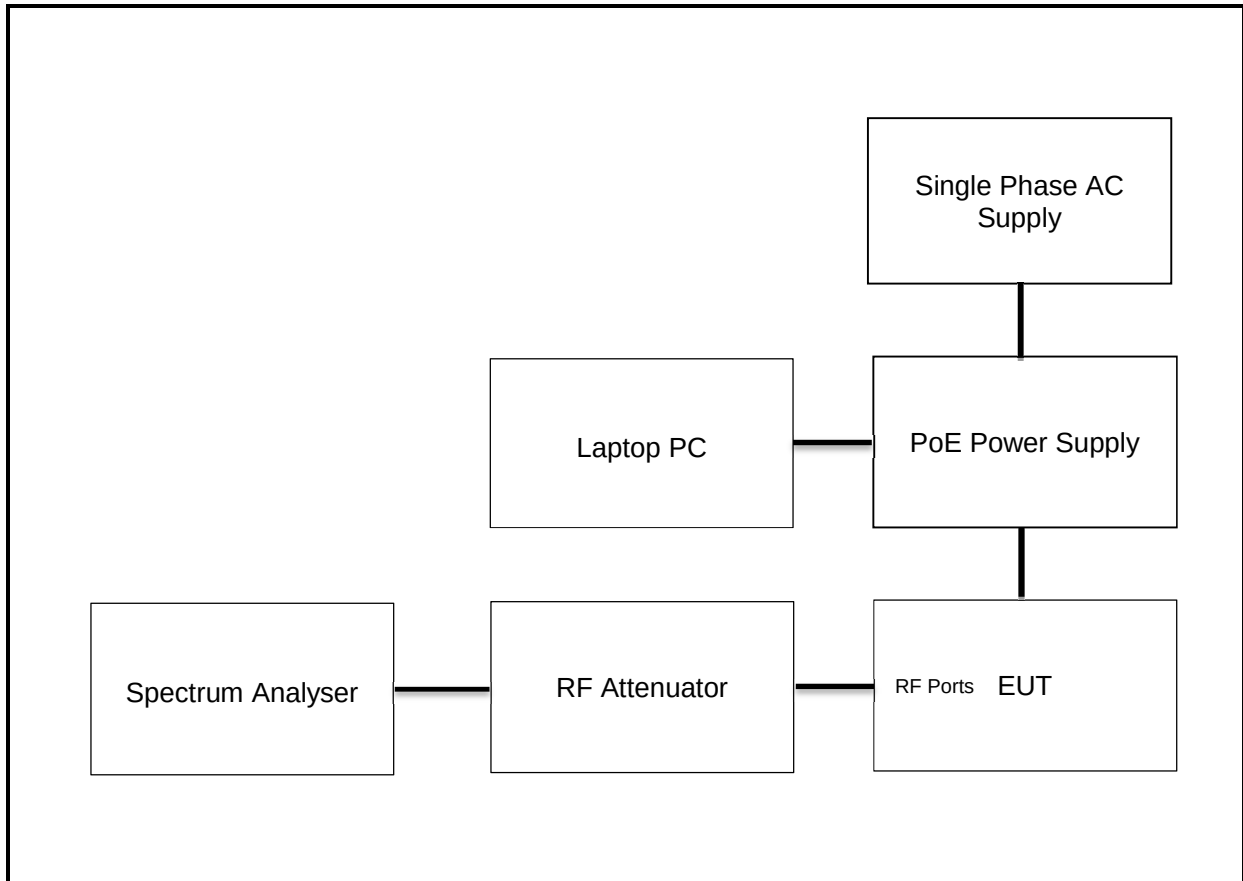
|                          |                                                                                                                |
|--------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>FCC Reference:</b>    | Part 15.247(d)                                                                                                 |
| <b>Test Method Used:</b> | FCC KDB 558074 Sections 11 and 13; FCC KDB 662911 D01 E)3)b;<br>ANSI C63.10-2009 Section 6.9.2 and Notes below |

**Environmental Conditions:**

|                               |          |
|-------------------------------|----------|
| <b>Temperature (°C):</b>      | 22 to 26 |
| <b>Relative Humidity (%):</b> | 29 to 36 |

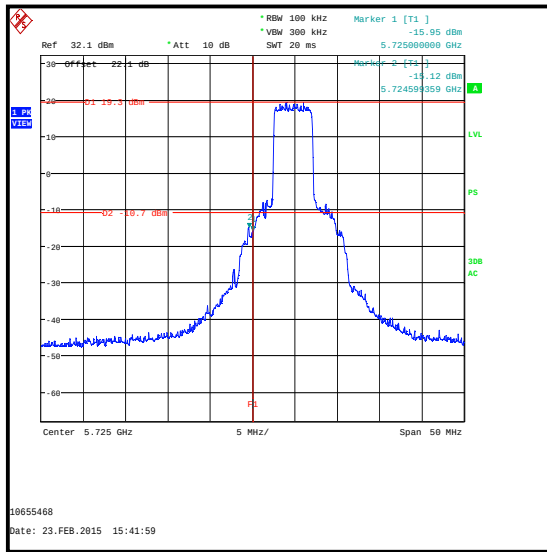
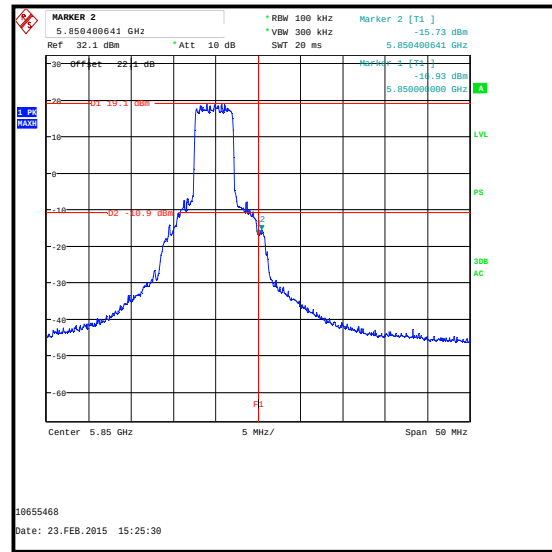
**Note(s):**

1. The EUT was set to transmit on the bottom channel when performing measurements at the lower band edge and the top channel when performing measurements at the upper band edge.
2. An RF cable and 20 dB attenuator connecting the EUT to the spectrum analyser were calibrated before testing commenced. An RF level offset of 22.1 dB was used on the spectrum analyser to compensate for the attenuator and cable loss at both band edges. A spectrum analyser reference level of 32.1 dB was used, this is the highest reference level the analyser supports for the attenuation and resolution bandwidth used. The spectrum analyser centre frequency was adjusted to incorporate bottom and top channels at the upper or lower band edges. Span was adjusted so that it encompassed the DTS bandwidth in order to determine the reference levels for each mode of operation. The spectrum analyser resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold. The EUT was set to transmit at the maximum power (as stated in Section 4.2 of this test report) with 100% duty cycle for all supported channel bandwidths. The spectrum analyser was left to sweep for a sufficient length of time in order to maximise the carrier level and out-of-band emission levels. A marker and corresponding reference level line were placed on the peak of the carrier. Non-restricted bands are adjacent to the lower and upper band edges. As the maximum conducted output power was measured using an average power meter in accordance with FCC KDB 558074 Section 9.2.3.1, an out-of-band limit line was placed 30 dB (FCC KDB 558074 Section 11.1(b)) below the peak level. A marker was placed on the band edge spot frequencies and a second marker placed on the highest emission level in the adjacent non-restricted band of operation (where a higher level emission was present). Marker frequencies and levels were recorded.
3. The manufacturer has reduced power on the highest and lowest channels for some operating modes and channel bandwidths in order to comply with band edge limits. Band edge measurements were also performed with the EUT transmitting at nominal (full) power on the lowest channel and highest channels that operate at full power. These results are held on the test laboratory IT server and available for inspection if required.

**Band Edge Conducted Emissions (continued)****Test setup for conducted band edge measurements:**

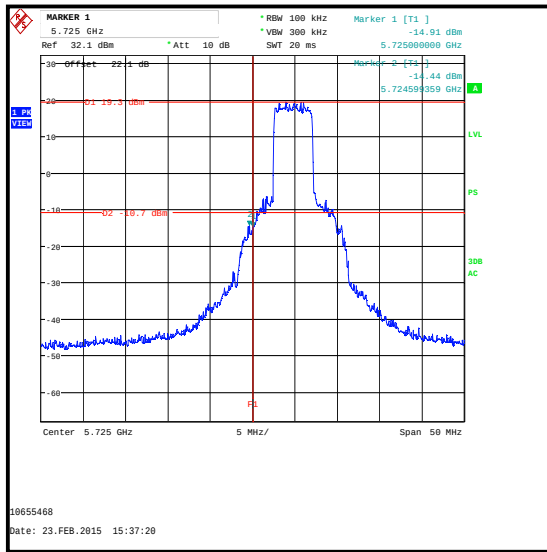
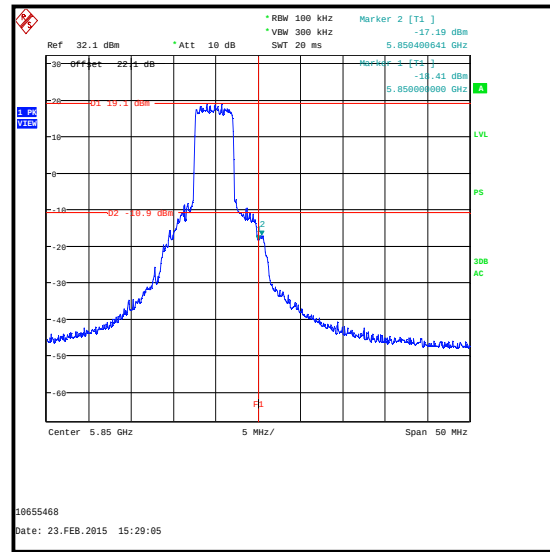
**Band Edge Conducted Emissions (continued)****Results: 5 MHz Channel / QPSK / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5724.599        | -15.1            | -10.7               | 4.4         | Complied |
| 5725            | -15.9            | -10.7               | 5.2         | Complied |
| 5850            | -16.9            | -10.9               | 6.0         | Complied |
| 5850.401        | -15.7            | -10.9               | 4.8         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

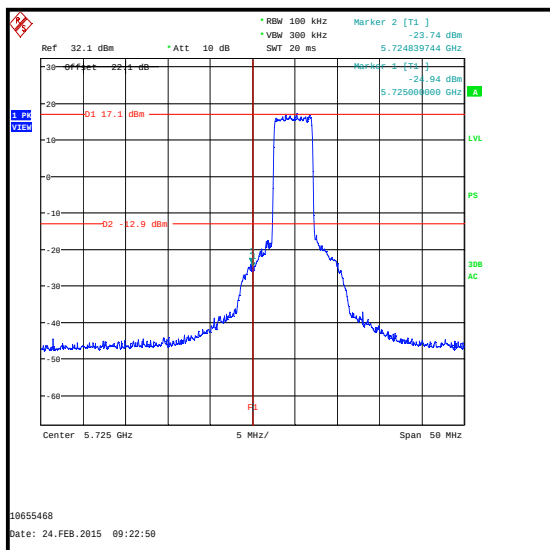
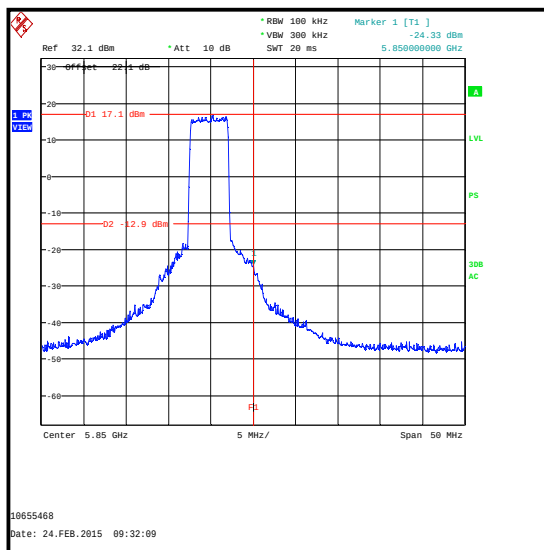
**Band Edge Conducted Emissions (continued)****Results: 5 MHz Channel / QPSK / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5724.599        | -14.4            | -10.7               | 3.7         | Complied |
| 5725            | -14.9            | -10.7               | 4.2         | Complied |
| 5850            | -18.4            | -10.9               | 7.5         | Complied |
| 5850.401        | -17.2            | -10.9               | 6.3         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

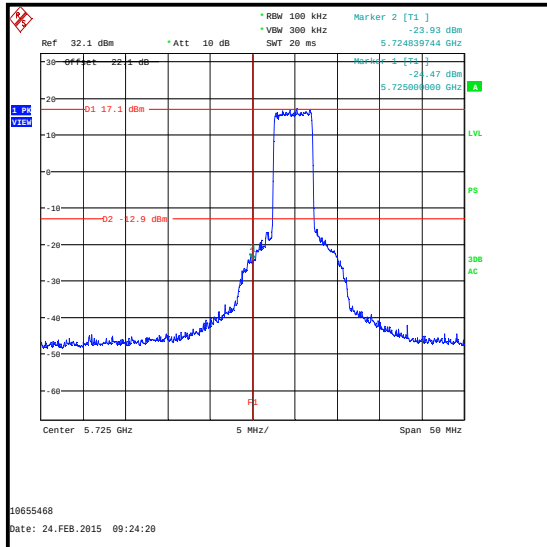
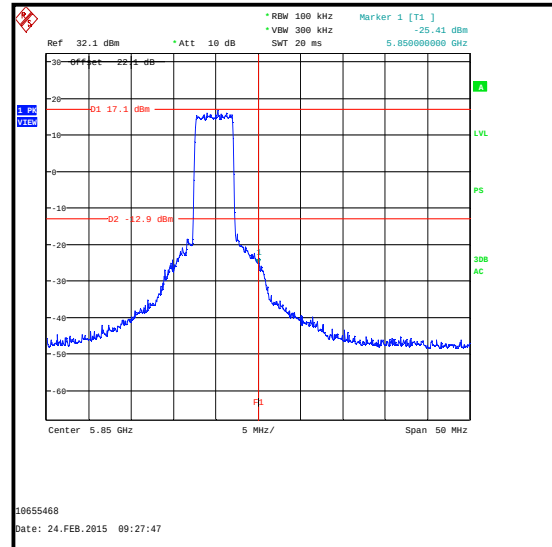
**Band Edge Conducted Emissions (continued)****Results: 5 MHz Channel / 16QAM / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5724.840        | -23.7            | -12.9               | 10.8        | Complied |
| 5725            | -24.9            | -12.9               | 12.0        | Complied |
| 5850            | -24.3            | -12.9               | 11.4        | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

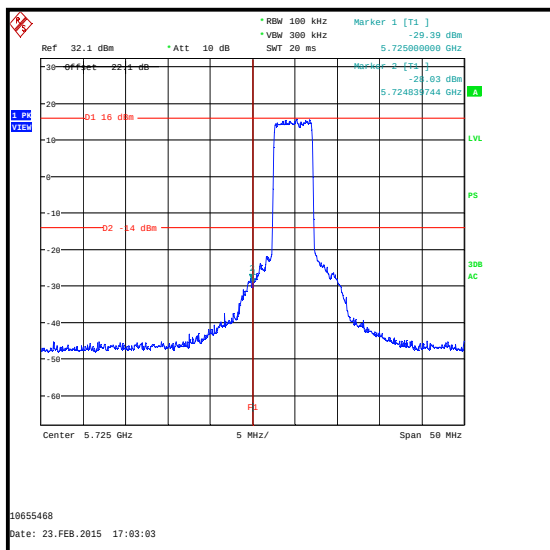
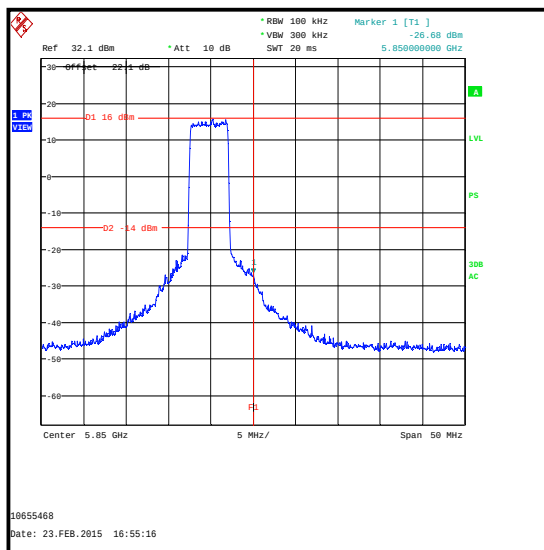
**Band Edge Conducted Emissions (continued)****Results: 5 MHz Channel / 16QAM / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5724.840        | -23.9            | -12.9               | 11.0        | Complied |
| 5725            | -24.5            | -12.9               | 11.6        | Complied |
| 5850            | -25.4            | -12.9               | 12.5        | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

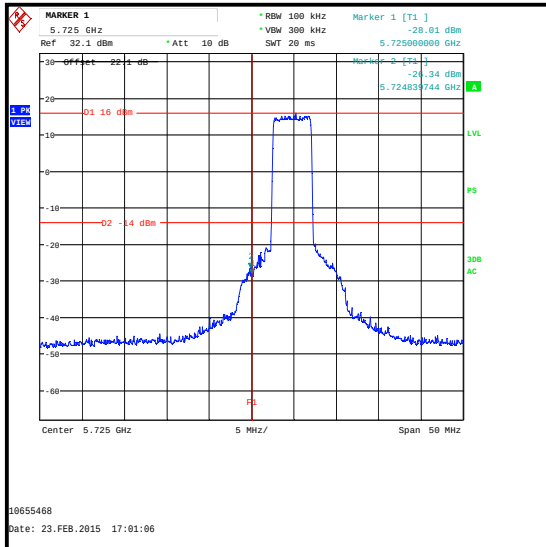
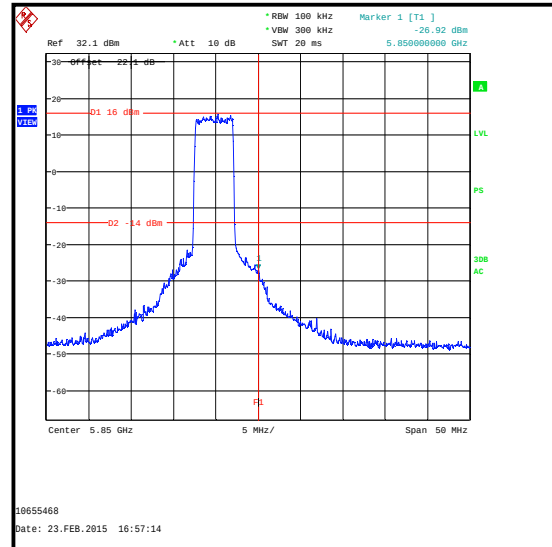
**Band Edge Conducted Emissions (continued)****Results: 5 MHz Channel / 64QAM / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5724.840        | -28.0            | -14.0               | 14.0        | Complied |
| 5725            | -29.4            | -14.0               | 15.4        | Complied |
| 5850            | -26.7            | -14.0               | 12.7        | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

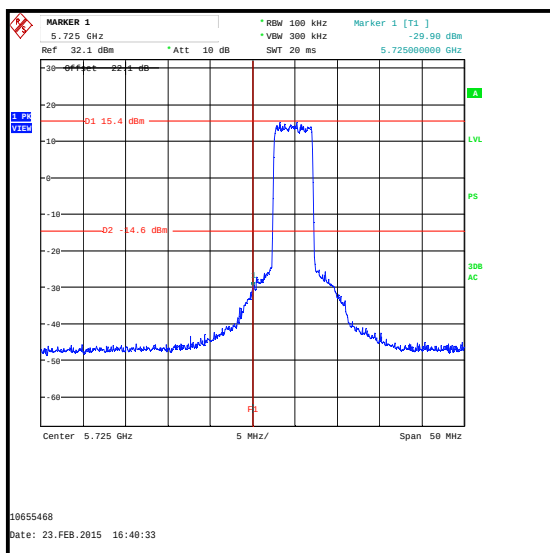
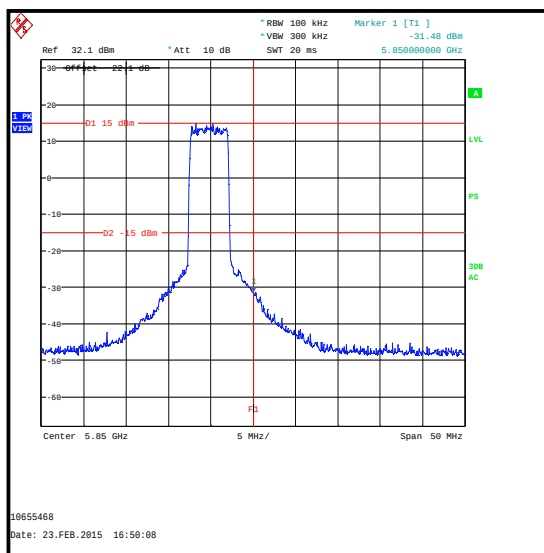
**Band Edge Conducted Emissions (continued)****Results: 5 MHz Channel / 64QAM / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5724.840        | -26.3            | -14.0               | 12.3        | Complied |
| 5725            | -28.0            | -14.0               | 14.0        | Complied |
| 5850            | -26.9            | -14.0               | 12.9        | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

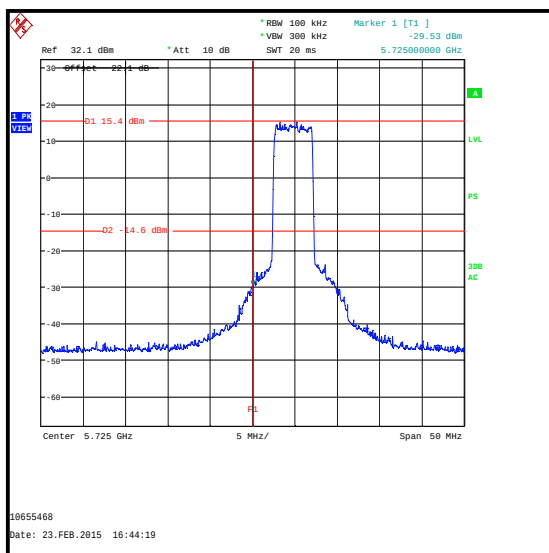
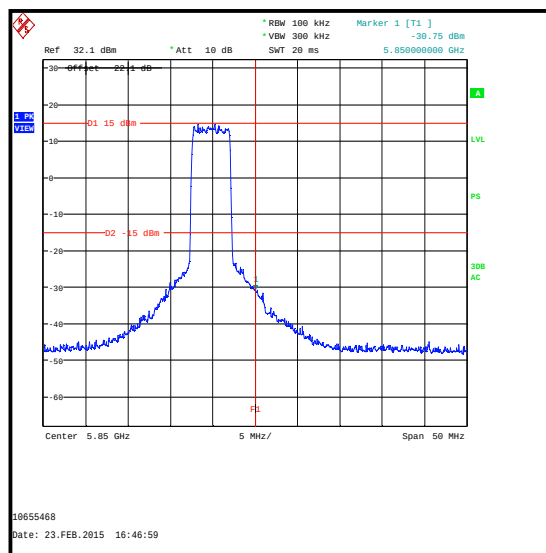
**Band Edge Conducted Emissions (continued)****Results: 5 MHz Channel / 256QAM / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -29.9            | -14.6               | 15.3        | Complied |
| 5850            | -31.5            | -15.0               | 16.5        | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

**Band Edge Conducted Emissions (continued)****Results: 5 MHz Channel / 256QAM / B Port**

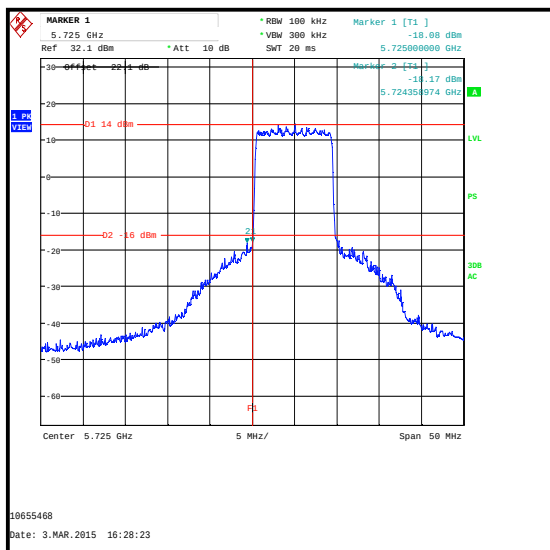
| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -29.5            | -14.6               | 14.9        | Complied |
| 5850            | -30.7            | -15.0               | 15.7        | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

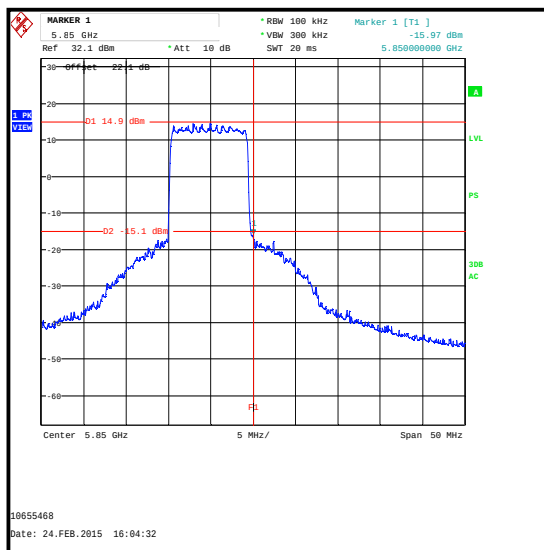
### **Band Edge Conducted Emissions (continued)**

### Results: 10 MHz Channel / QPSK / A Port

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5724.359        | -18.2            | -16.0               | 2.2         | Complied |
| 5725            | -18.1            | -16.0               | 2.1         | Complied |
| 5850            | -16.0            | -15.1               | 0.9         | Complied |



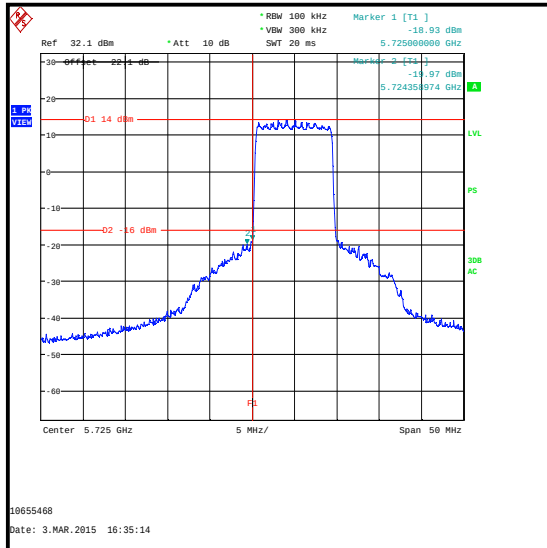
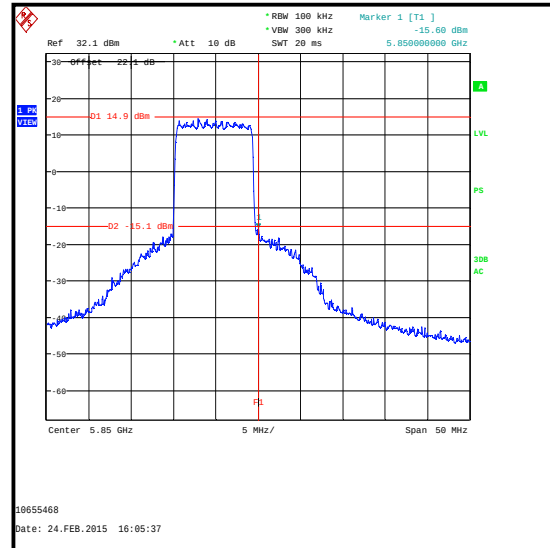
### Lower Band Edge Peak Measurement



### Upper Band Edge Peak Measurement

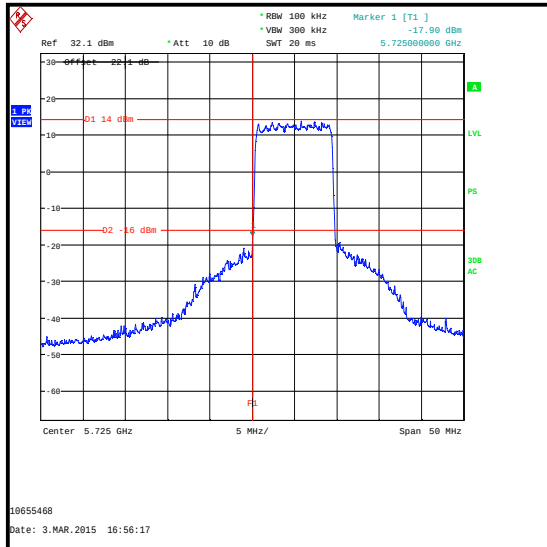
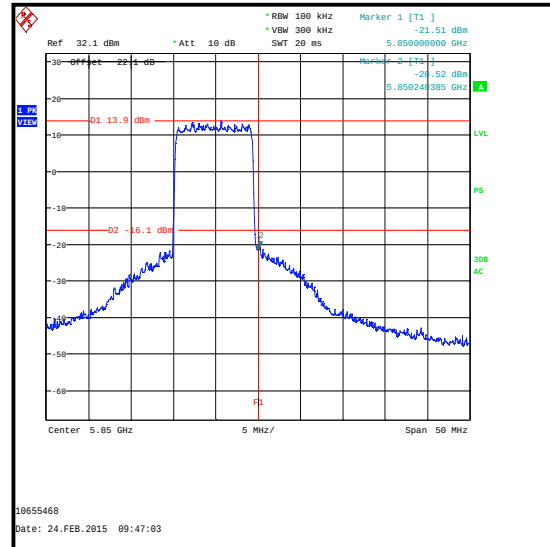
**Band Edge Conducted Emissions (continued)****Results: 10 MHz Channel / QPSK / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5724.359        | -20.0            | -16.0               | 4.0         | Complied |
| 5725            | -18.9            | -16.0               | 2.9         | Complied |
| 5850            | -15.6            | -15.1               | 0.5         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

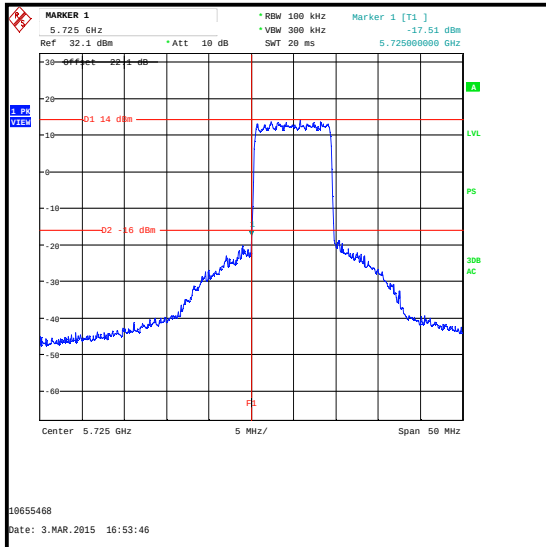
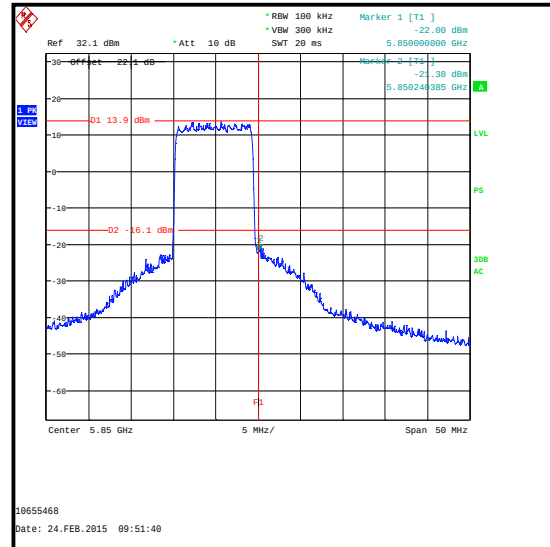
**Band Edge Conducted Emissions (continued)****Results: 10 MHz Channel / 16QAM / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -17.9            | -16.0               | 1.9         | Complied |
| 5850            | -21.5            | -16.1               | 5.4         | Complied |
| 5850.240        | -20.5            | -16.1               | 4.4         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

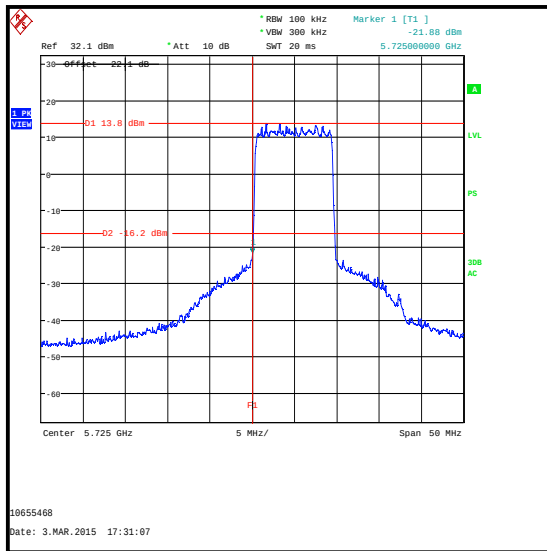
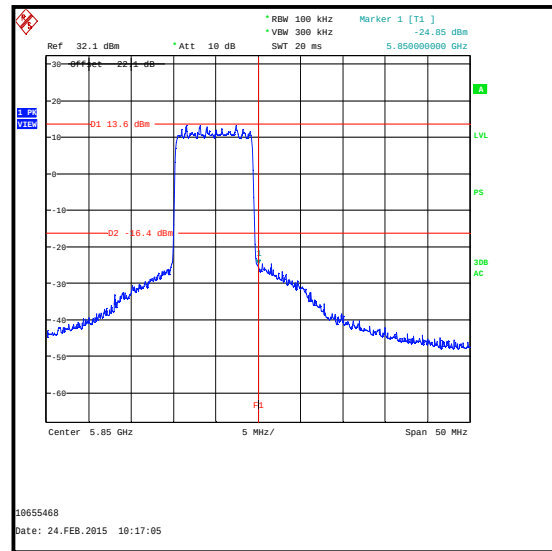
**Band Edge Conducted Emissions (continued)****Results: 10 MHz Channel / 16QAM / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -17.5            | -16.0               | 1.5         | Complied |
| 5850            | -22.0            | -16.1               | 5.9         | Complied |
| 5850.240        | -21.4            | -16.1               | 5.3         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

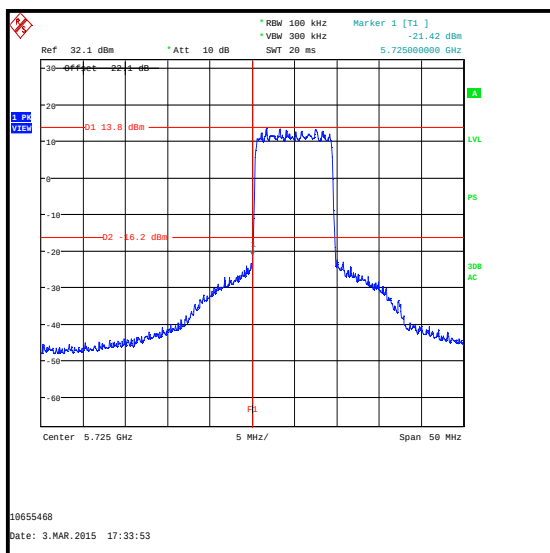
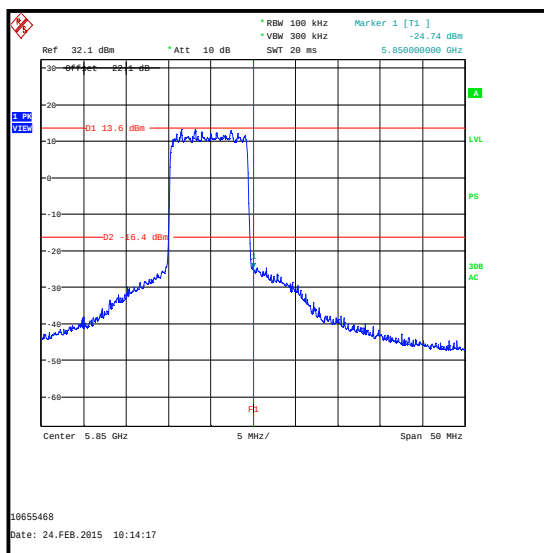
**Band Edge Conducted Emissions (continued)****Results: 10 MHz Channel / 64QAM / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -21.9            | -16.2               | 5.7         | Complied |
| 5850            | -24.8            | -16.4               | 8.4         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

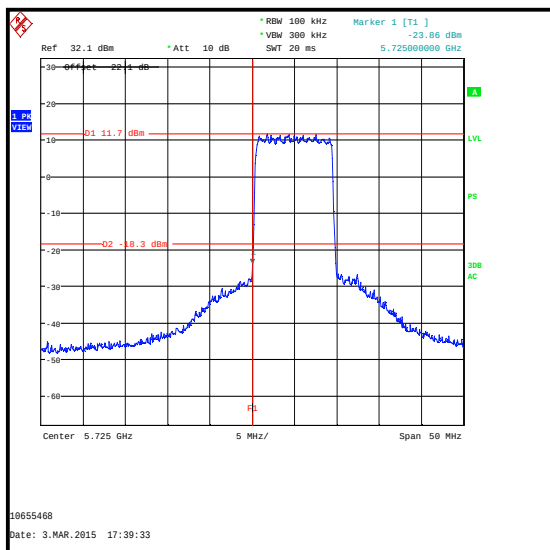
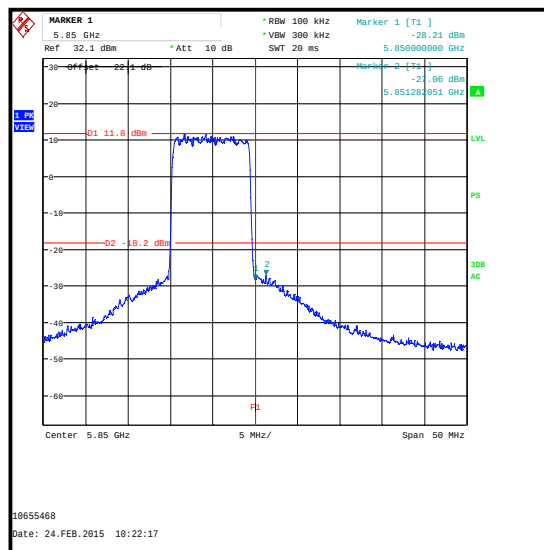
**Band Edge Conducted Emissions (continued)****Results: 10 MHz Channel / 64QAM / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -21.4            | -16.2               | 5.2         | Complied |
| 5850            | -24.7            | -16.4               | 8.3         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

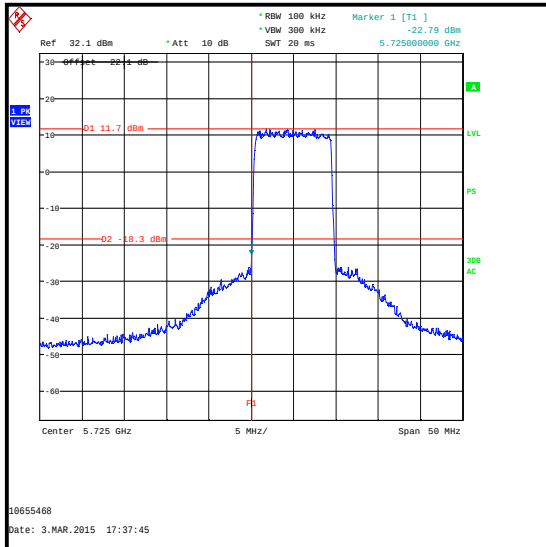
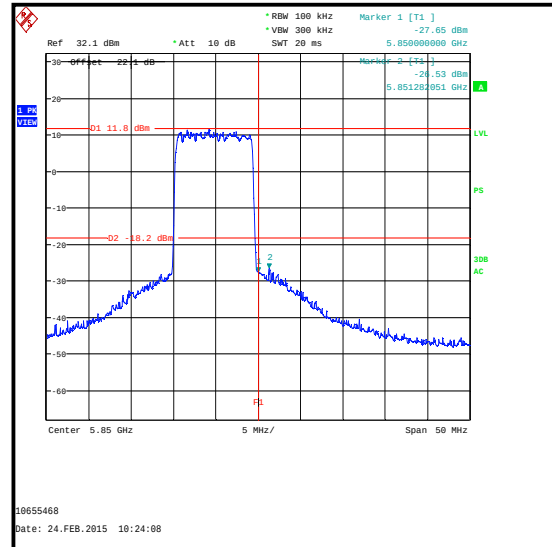
**Band Edge Conducted Emissions (continued)****Results: 10 MHz Channel / 256QAM / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -23.9            | -18.3               | 5.6         | Complied |
| 5850            | -28.2            | -18.2               | 10.0        | Complied |
| 5851.282        | -27.1            | -18.2               | 8.9         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

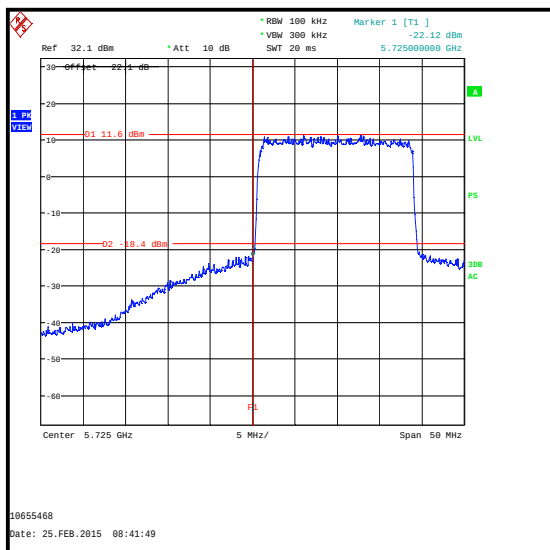
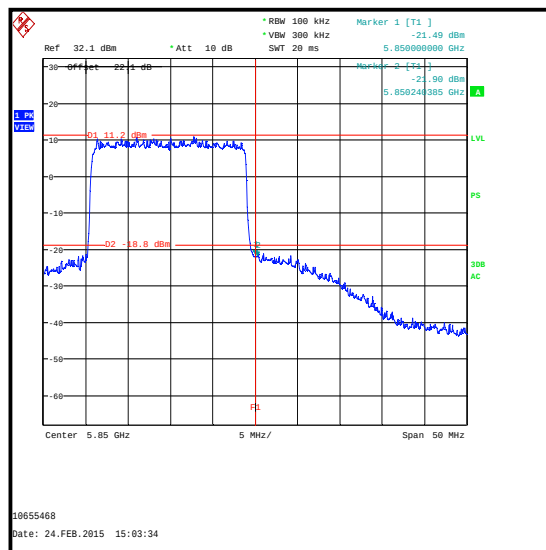
**Band Edge Conducted Emissions (continued)****Results: 10 MHz Channel / 256QAM / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -22.8            | -18.3               | 4.5         | Complied |
| 5850            | -27.6            | -18.2               | 9.4         | Complied |
| 5851.282        | -26.5            | -18.2               | 8.3         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

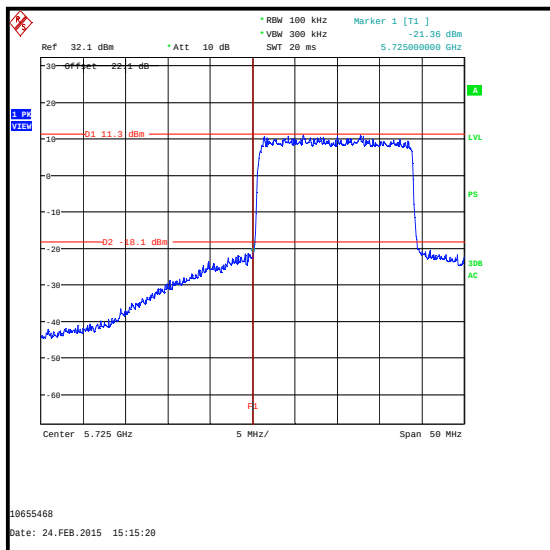
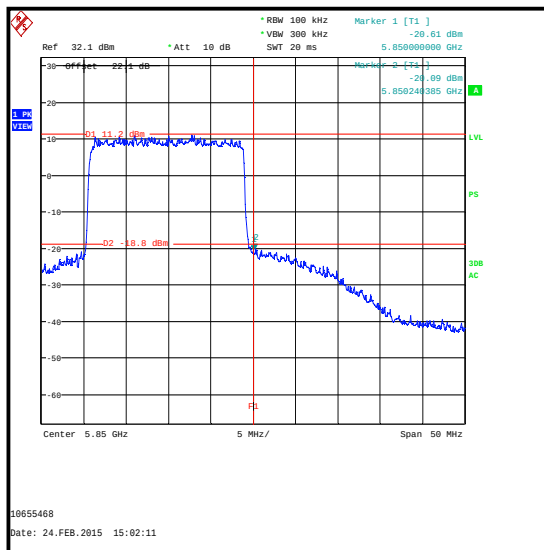
**Band Edge Conducted Emissions (continued)****Results: 20 MHz Channel / QPSK / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -22.1            | -18.4               | 3.7         | Complied |
| 5850            | -21.5            | -18.8               | 2.7         | Complied |
| 5850.240        | -21.9            | -18.8               | 3.1         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

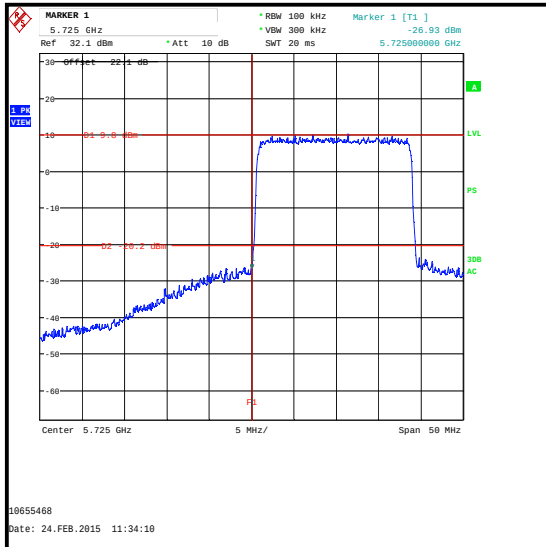
**Band Edge Conducted Emissions (continued)****Results: 20 MHz Channel / QPSK / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -21.4            | -18.1               | 3.3         | Complied |
| 5850            | -20.6            | -18.8               | 1.8         | Complied |
| 5850.240        | -20.1            | -18.8               | 1.3         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

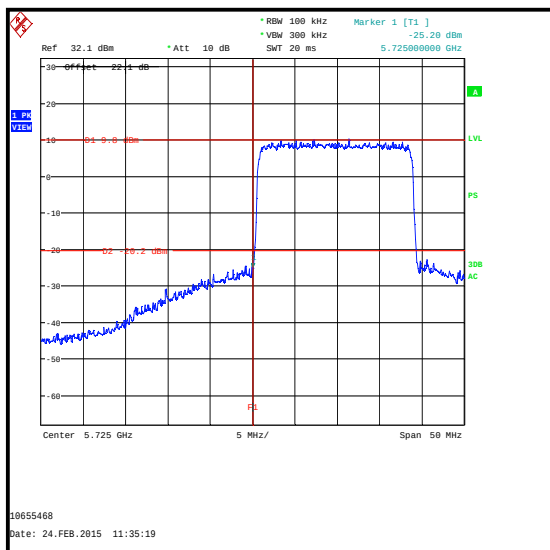
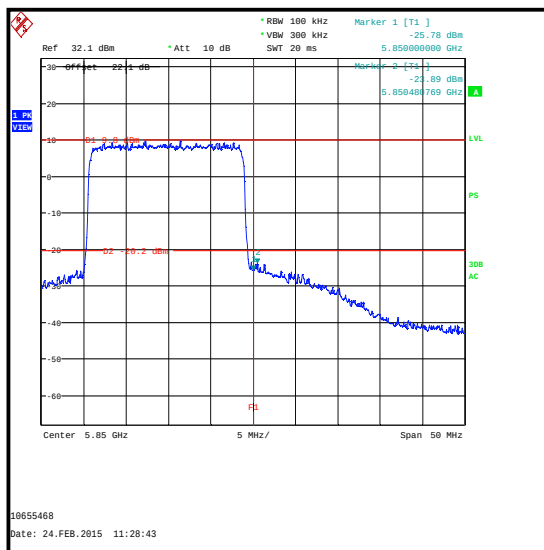
**Band Edge Conducted Emissions (continued)****Results: 20 MHz Channel / 16QAM / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -26.9            | -20.2               | 6.7         | Complied |
| 5850            | -26.5            | -20.2               | 6.3         | Complied |
| 5850.481        | -24.7            | -20.2               | 4.5         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

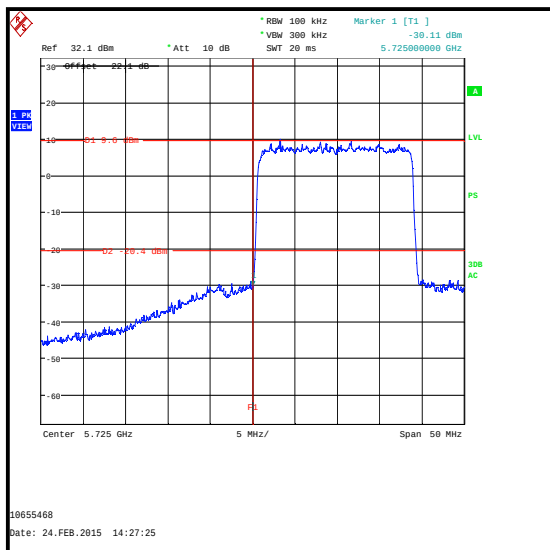
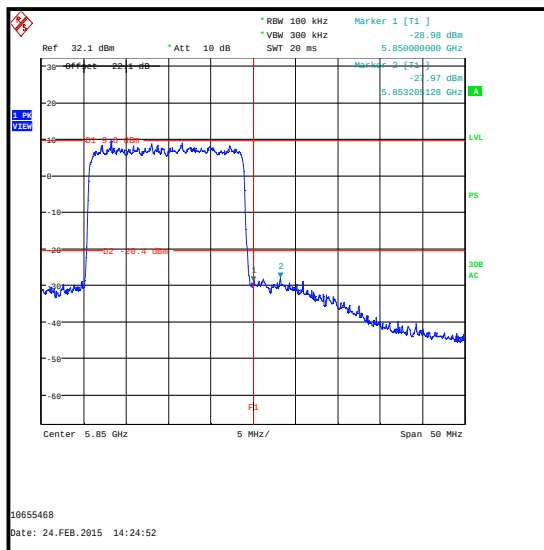
**Band Edge Conducted Emissions (continued)****Results: 20 MHz Channel / 16QAM / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -25.2            | -20.2               | 5.0         | Complied |
| 5850            | -25.8            | -20.2               | 5.6         | Complied |
| 5850.481        | -23.9            | -20.2               | 3.7         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

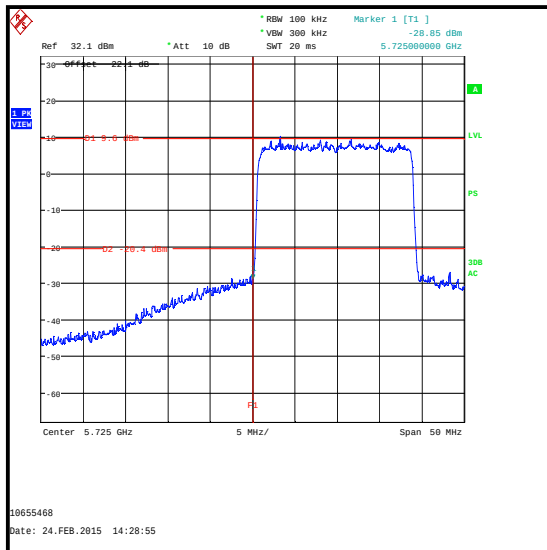
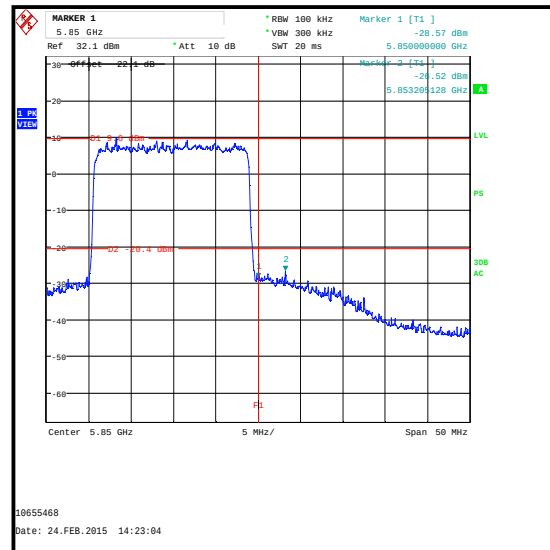
**Band Edge Conducted Emissions (continued)****Results: 20 MHz Channel / 64QAM / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -30.1            | -20.4               | 9.7         | Complied |
| 5850            | -29.0            | -20.4               | 8.6         | Complied |
| 5853.205        | -28.0            | -20.4               | 7.6         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

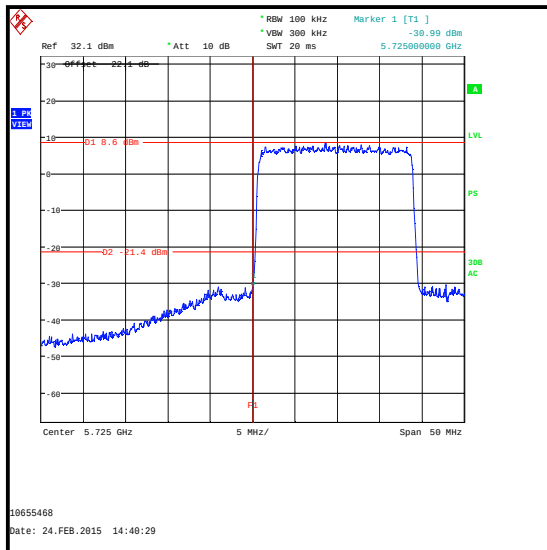
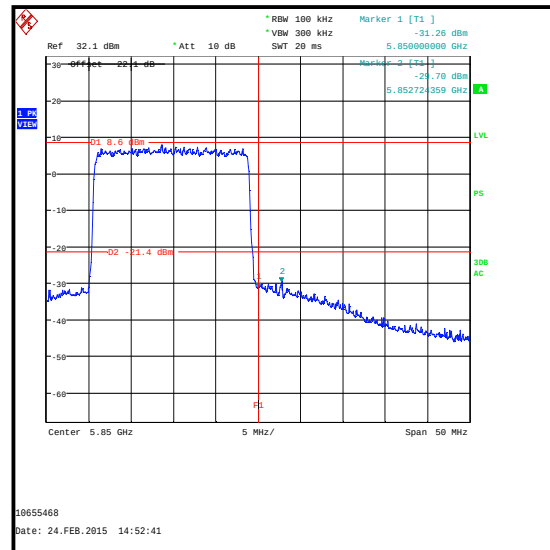
**Band Edge Conducted Emissions (continued)****Results: 20 MHz Channel / 64QAM / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -28.8            | -20.4               | 8.4         | Complied |
| 5850            | -28.6            | -20.4               | 8.2         | Complied |
| 5853.205        | -26.5            | -20.4               | 6.1         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

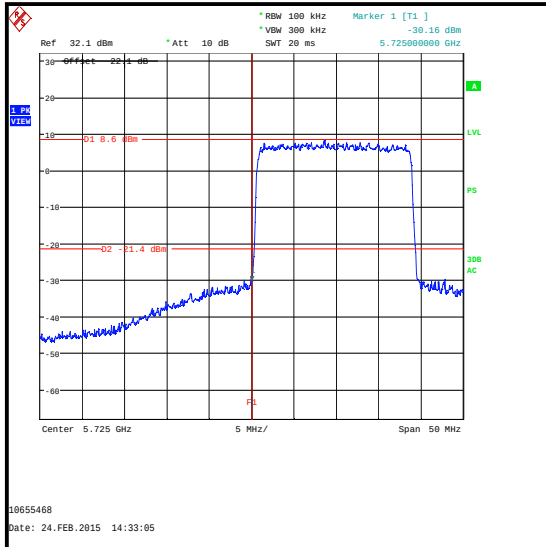
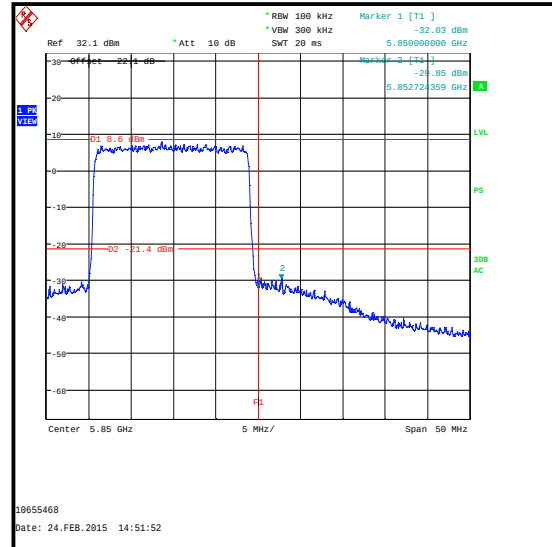
**Band Edge Conducted Emissions (continued)****Results: 20 MHz Channel / 256QAM / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -31.0            | -21.4               | 9.6         | Complied |
| 5850            | -31.3            | -21.4               | 9.9         | Complied |
| 5852.724        | -29.7            | -21.4               | 8.3         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

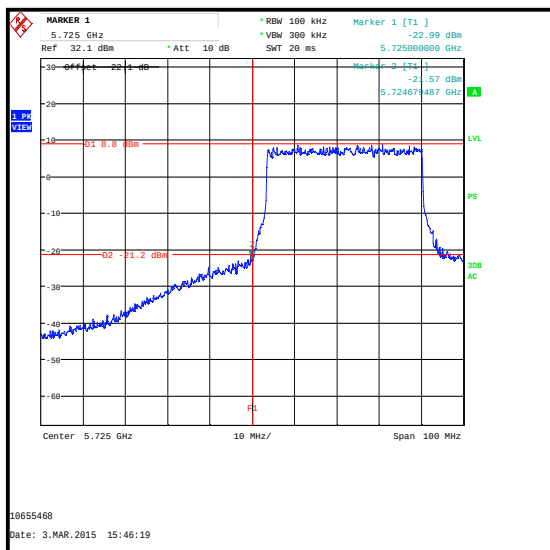
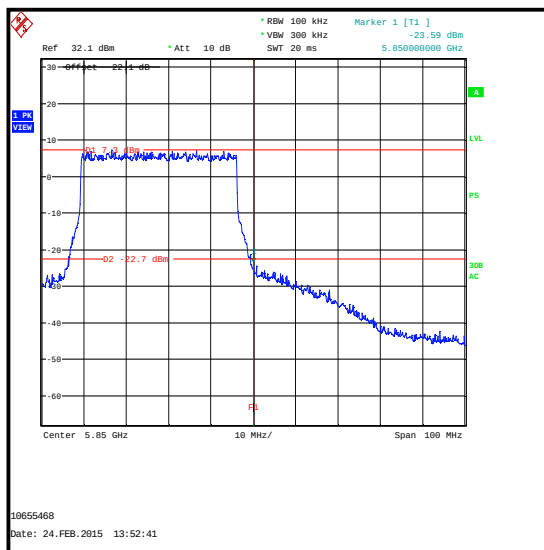
**Band Edge Conducted Emissions (continued)****Results: 20 MHz Channel / 256QAM / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -30.2            | -21.4               | 8.8         | Complied |
| 5850            | -32.0            | -21.4               | 10.6        | Complied |
| 5852.724        | -29.8            | -21.4               | 8.4         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

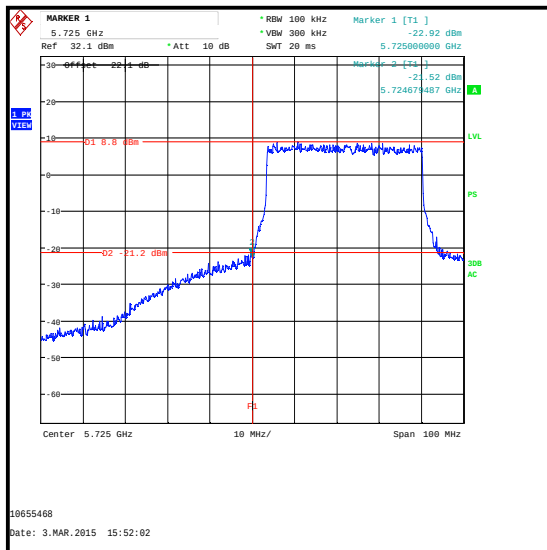
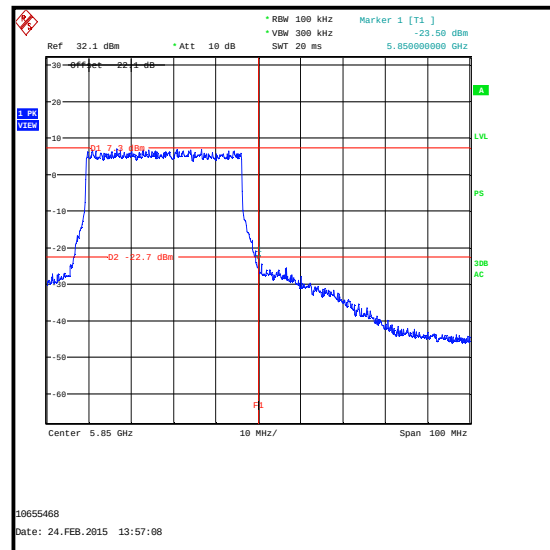
**Band Edge Conducted Emissions (continued)****Results: 40 MHz Channel / QPSK / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5724.679        | -21.6            | -21.2               | 0.4         | Complied |
| 5725            | -23.0            | -21.2               | 1.8         | Complied |
| 5850            | -23.6            | -22.7               | 0.9         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

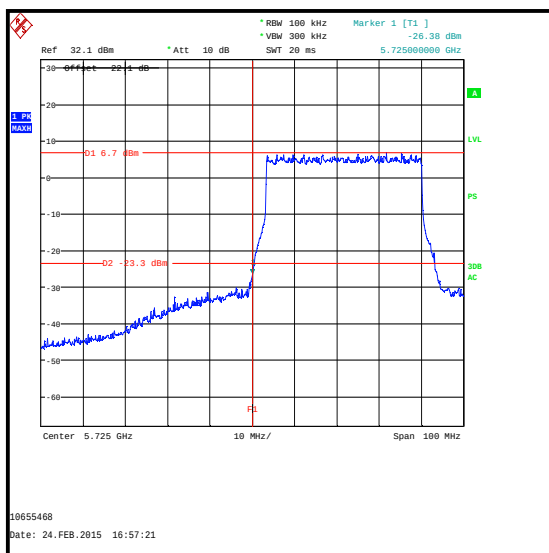
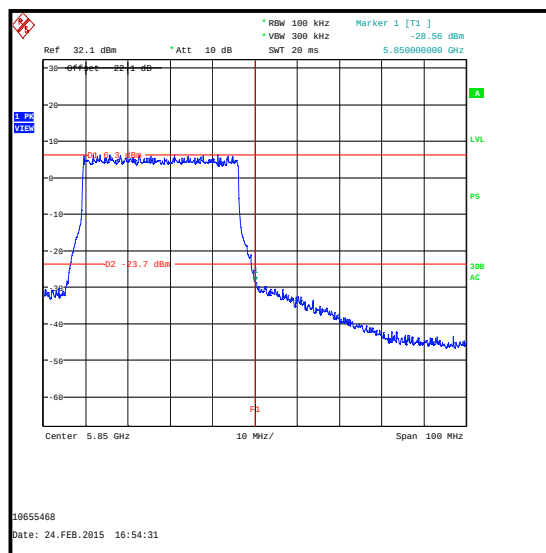
**Band Edge Conducted Emissions (continued)****Results: 40 MHz Channel / QPSK / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5724.679        | -21.5            | -21.2               | 0.3         | Complied |
| 5725            | -22.9            | -21.2               | 1.7         | Complied |
| 5850            | -23.5            | -22.7               | 0.8         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

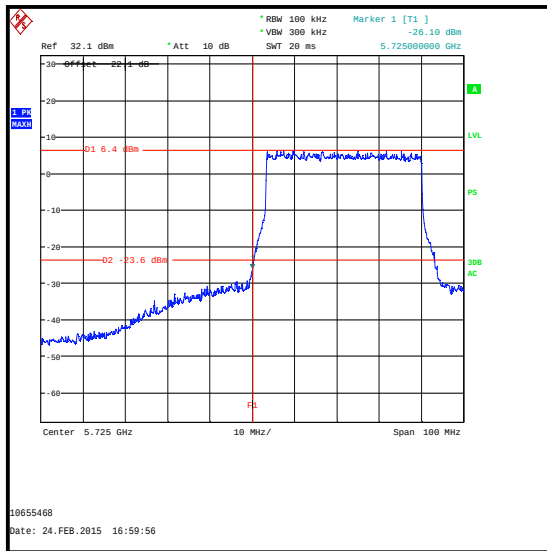
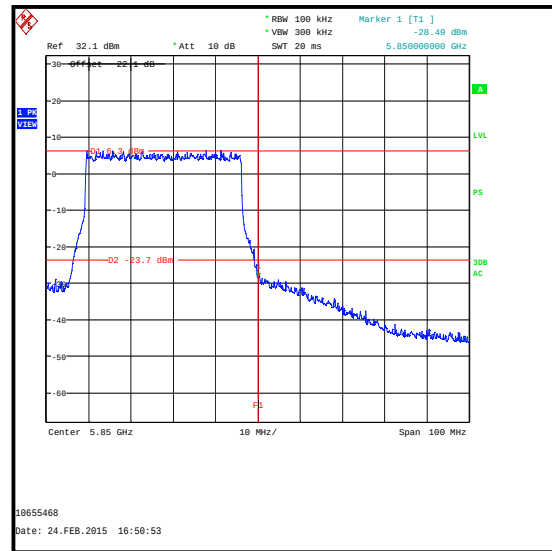
**Band Edge Conducted Emissions (continued)****Results: 40 MHz Channel / 16QAM / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -26.4            | -23.3               | 3.1         | Complied |
| 5850            | -28.6            | -23.7               | 4.9         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

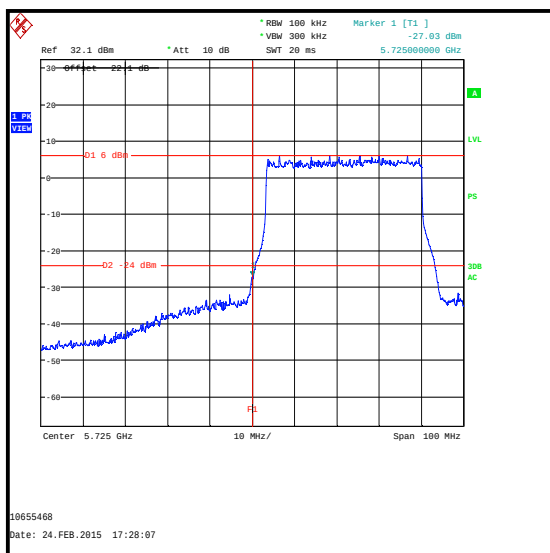
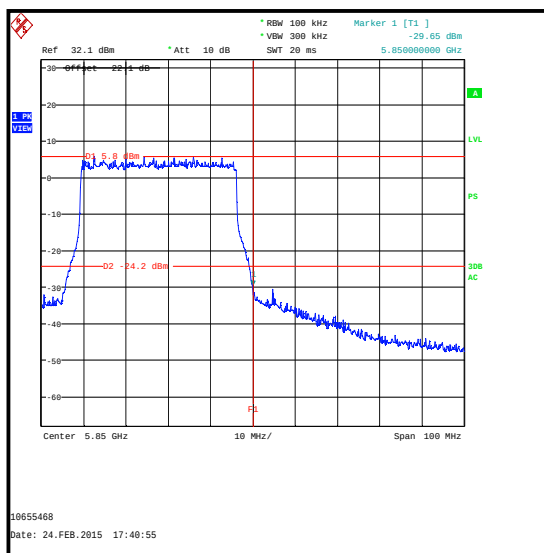
**Band Edge Conducted Emissions (continued)****Results: 40 MHz Channel / 16QAM / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -26.1            | -23.6               | 2.5         | Complied |
| 5850            | -28.5            | -23.7               | 4.8         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

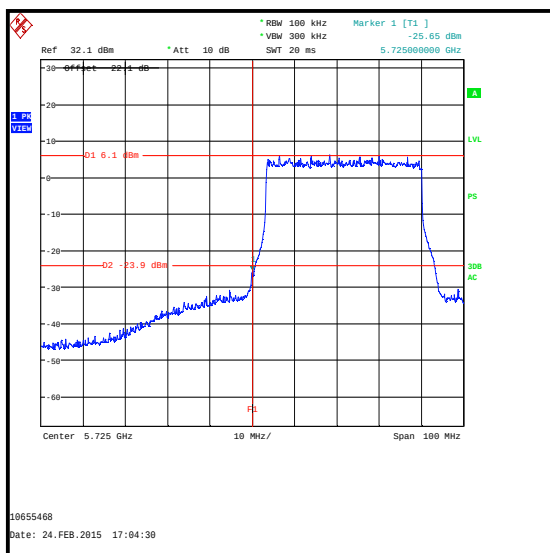
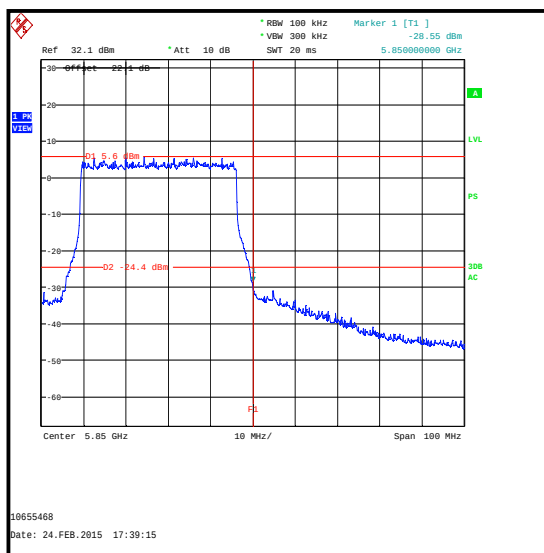
**Band Edge Conducted Emissions (continued)****Results: 40 MHz Channel / 64QAM / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -27.0            | -24.0               | 3.0         | Complied |
| 5850            | -29.6            | -24.2               | 5.4         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

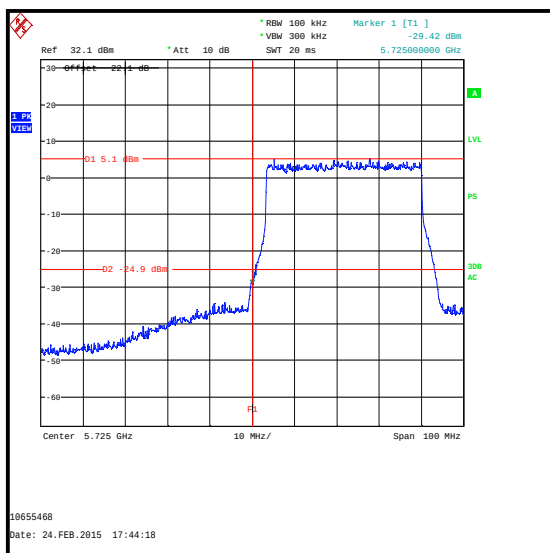
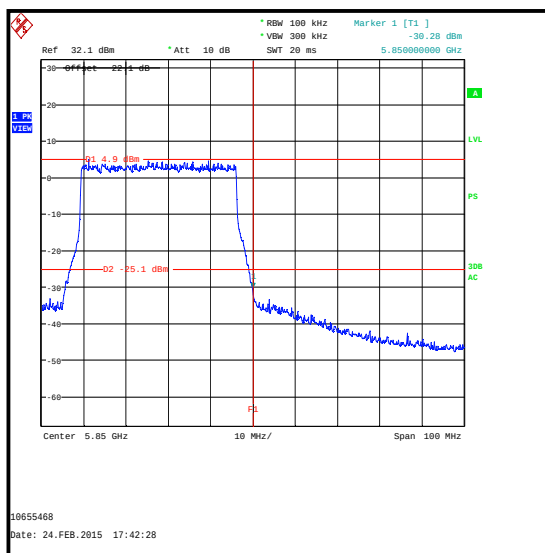
**Band Edge Conducted Emissions (continued)****Results: 40 MHz Channel / 64QAM / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -25.6            | -23.9               | 1.7         | Complied |
| 5850            | -28.5            | -24.4               | 4.1         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

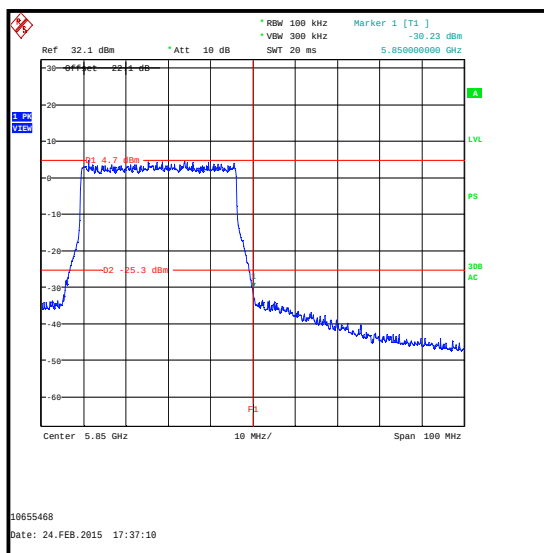
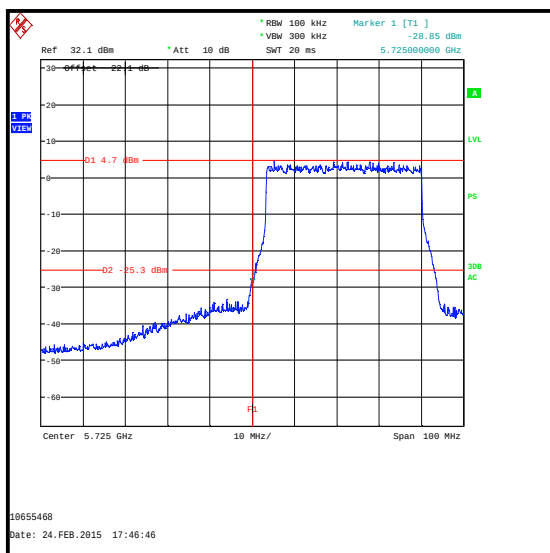
**Band Edge Conducted Emissions (continued)****Results: 40 MHz Channel / 256QAM / A Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -29.4            | -24.9               | 4.5         | Complied |
| 5850            | -30.3            | -25.1               | 5.2         | Complied |

**Lower Band Edge Peak Measurement****Upper Band Edge Peak Measurement**

**Band Edge Conducted Emissions (continued)****Results: 40 MHz Channel / 256QAM / B Port**

| Frequency (MHz) | Peak Level (dBm) | -30 dBc Limit (dBm) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|-------------|----------|
| 5725            | -28.8            | -25.3               | 3.5         | Complied |
| 5850            | -30.2            | -25.3               | 4.9         | Complied |

**Test Equipment Used:**

| Asset No. | Instrument       | Manufacturer    | Type No.   | Serial No. | Date Calibration Due  | Cal. Interval (Months) |
|-----------|------------------|-----------------|------------|------------|-----------------------|------------------------|
| A1393     | Attenuator       | Huber & Suhner  | 6820.17.B  | 757456     | Calibrated Before Use | N/A                    |
| M1886     | Test Receiver    | Rohde & Schwarz | ESU26      | 100554     | 09 May 2015           | 12                     |
| M260      | Signal Generator | Rohde & Schwarz | SMP02      | 829076/008 | 24 Apr 2015           | 12                     |
| M1657     | Thermohygrometer | JM Handelpunkt  | 30.5015.13 | N/A        | 14 Mar 2015           | 12                     |

**5.2.6. Transmitter Radiated Emissions****Test Summary:**

|                                   |              |                   |               |
|-----------------------------------|--------------|-------------------|---------------|
| <b>Test Engineer:</b>             | David Doyle  | <b>Test Date:</b> | 09 March 2015 |
| <b>Test Sample Serial Number:</b> | F50980BB0073 |                   |               |

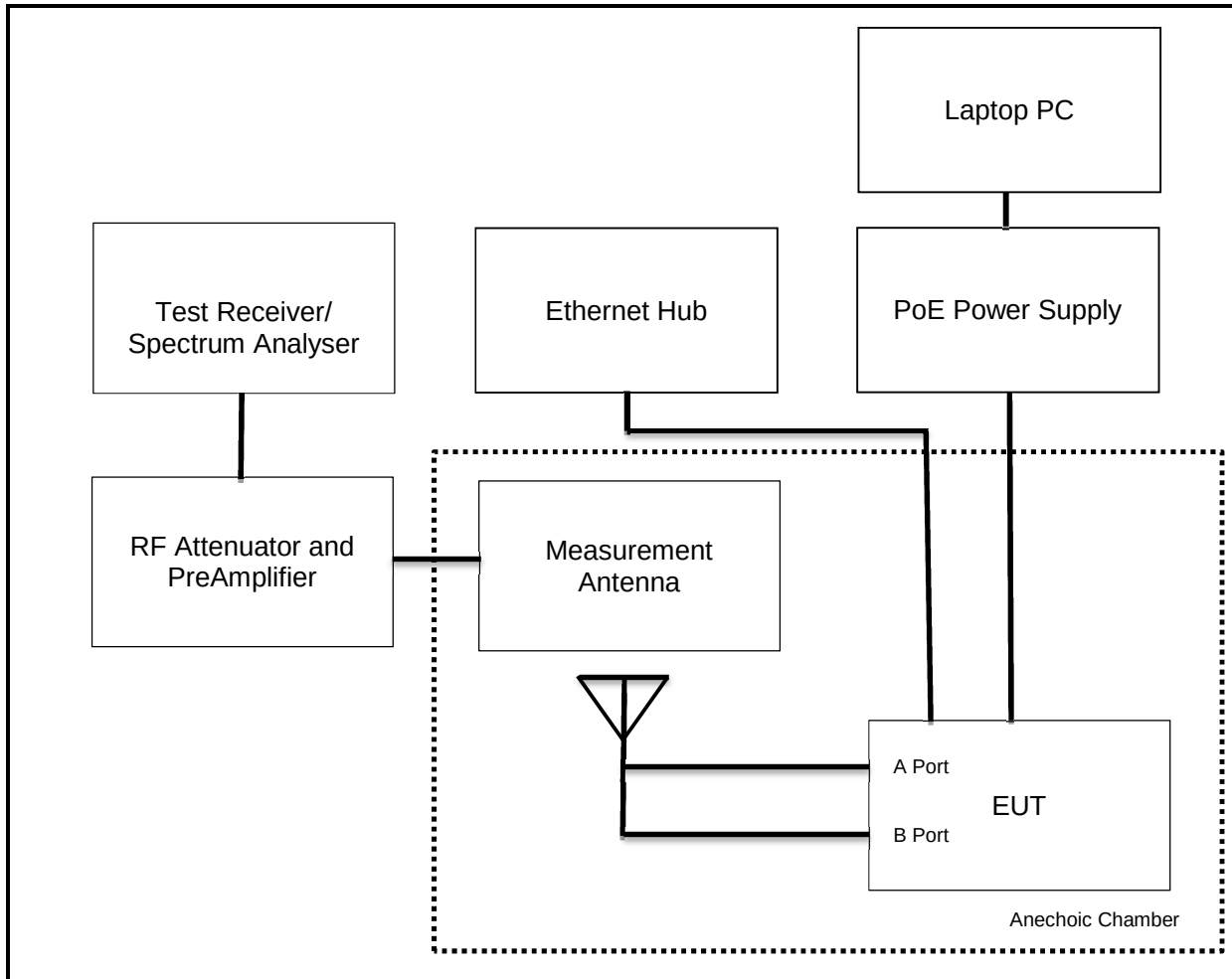
|                          |                                                                                                      |
|--------------------------|------------------------------------------------------------------------------------------------------|
| <b>FCC Reference:</b>    | Parts 15.247(d) & 15.209(a)                                                                          |
| <b>Test Method Used:</b> | FCC KDB 558074 Section 11 and 12 / ANSI C63.10-2009 Sections 6.3 and 6.5 referencing ANSI C63.4-2009 |
| <b>Frequency Range</b>   | 30 MHz to 1000 MHz                                                                                   |

**Environmental Conditions:**

|                               |    |
|-------------------------------|----|
| <b>Temperature (°C):</b>      | 21 |
| <b>Relative Humidity (%):</b> | 34 |

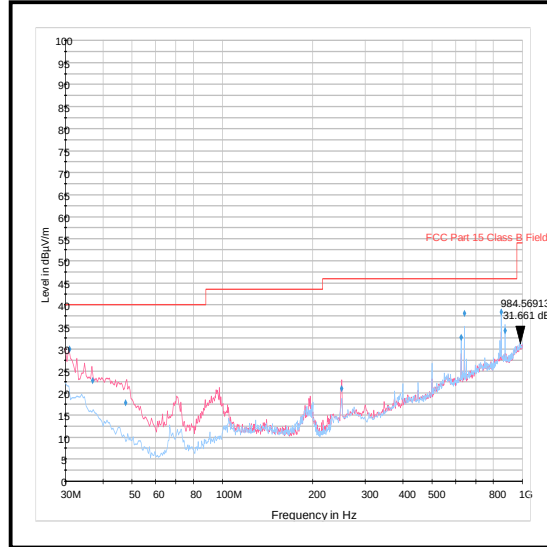
**Note(s):**

1. All emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor. Therefore the highest level of noise floor has been recorded in the tables below.
2. The final measured value, for the given emission, in the tables below incorporates the calibrated antenna factor and cable loss
3. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the middle channel only.
4. Measurements for the 6' parabolic antenna were performed using a 4' parabolic antenna and the difference in gain was incorporated into the measurement as an RF level offset.
5. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The centre point of the EUT system was placed at a height of 0.8 metres above the test chamber floor in the centre of the chamber turntable. The EUT was placed as close to 0.8 metres as the antenna bracket and RF cables allowed. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

**Transmitter Radiated Emissions (continued)****Test setup for radiated measurements:**

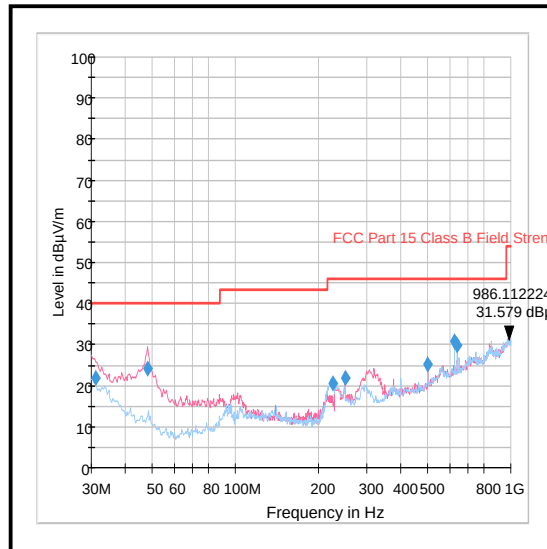
**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / Plate Antenna**

| Frequency (MHz) | Antenna Polarity | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|----------------------|----------------------|-------------|----------|
| 984.569         | Horizontal       | 31.7                 | 54.0                 | 22.3        | Complied |



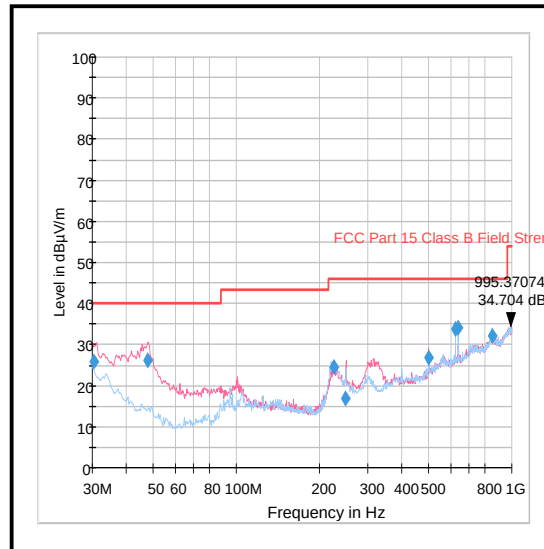
**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 4' Parabolic Antenna**

| Frequency (MHz) | Antenna Polarity | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|----------------------|----------------------|-------------|----------|
| 986.112         | Horizontal       | 31.6                 | 54.0                 | 22.4        | Complied |



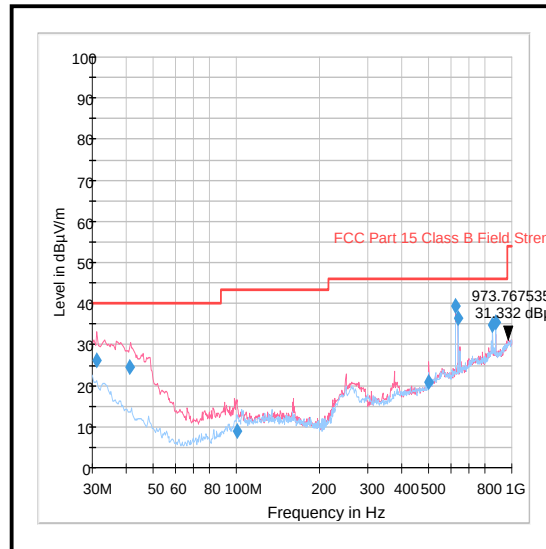
**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 6' Parabolic Antenna**

| Frequency (MHz) | Antenna Polarity | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|----------------------|----------------------|-------------|----------|
| 995.371         | Horizontal       | 34.7                 | 54.0                 | 19.3        | Complied |



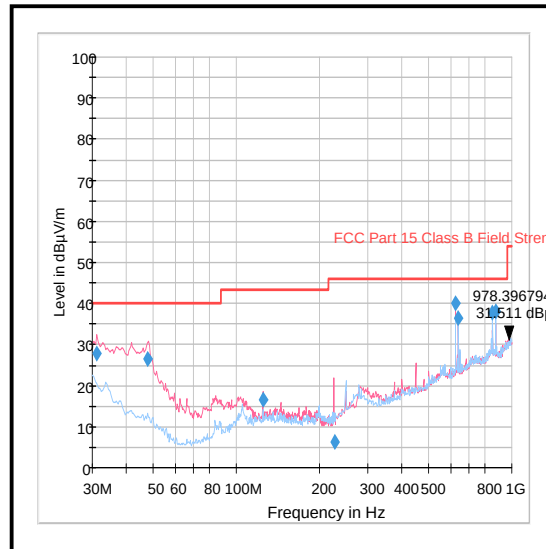
**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 60° Sectorised Antenna**

| Frequency (MHz) | Antenna Polarity | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|----------------------|----------------------|-------------|----------|
| 973.768         | Horizontal       | 31.3                 | 54.0                 | 22.7        | Complied |



**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / Omnidirectional Antenna**

| Frequency (MHz) | Antenna Polarity | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|----------------------|----------------------|-------------|----------|
| 978.397         | Horizontal       | 31.5                 | 54.0                 | 22.5        | Complied |

**Test Equipment Used:**

| Asset No. | Instrument       | Manufacturer    | Type No.   | Serial No.  | Date Calibration Due | Cal. Interval (Months) |
|-----------|------------------|-----------------|------------|-------------|----------------------|------------------------|
| M1624     | Thermohygrometer | JM Handelspunkt | 30.5015.10 | 0           | 07 Jan 2016          | 12                     |
| K0001     | 5m RSE Chamber   | Rainford EMC    | N/A        | N/A         | 26 Mar 2015          | 12                     |
| M1379     | Test Receiver    | Rohde & Schwarz | ESIB7      | 100330      | 08 Dec 2015          | 12                     |
| A490      | Antenna          | Chase           | CBL6111A   | 1590        | 29 Apr 2015          | 12                     |
| G0543     | Amplifier        | Sonoma          | 310N       | 230801      | 05 Jun 2015          | 3                      |
| A1834     | Attenuator       | Hewlett Packard | 8491B      | 10444       | 05 Mar 2016          | 12                     |
| A2131     | Low Pass Filter  | AtlanTecRF      | AFL-02000  | JFB1004-002 | 25 Apr 2015          | 12                     |

**Transmitter Radiated Emissions (continued)****Test Summary:**

|                                   |              |                    |                                                    |
|-----------------------------------|--------------|--------------------|----------------------------------------------------|
| <b>Test Engineer:</b>             | David Doyle  | <b>Test Dates:</b> | 05 March 2015,<br>06 March 2015 &<br>10 March 2015 |
| <b>Test Sample Serial Number:</b> | F50980BB0073 |                    |                                                    |

|                          |                                                                                                      |
|--------------------------|------------------------------------------------------------------------------------------------------|
| <b>FCC Reference:</b>    | Parts 15.247(d) & 15.209(a)                                                                          |
| <b>Test Method Used:</b> | FCC KDB 558074 Section 11 and 12 / ANSI C63.10-2009 Sections 6.3 and 6.5 referencing ANSI C63.4-2009 |
| <b>Frequency Range</b>   | 1 GHz to 40 GHz                                                                                      |

**Environmental Conditions:**

|                               |          |
|-------------------------------|----------|
| <b>Temperature (°C):</b>      | 21 to 22 |
| <b>Relative Humidity (%):</b> | 33 to 36 |

**Note(s):**

1. Radiated spurious emissions testing was performed with the EUT transmitting at maximum power on a 5 MHz channel with QPSK modulation. This configuration produced the highest emission levels and was therefore deemed to be worst case. The EUT was transmitting at 100% duty cycle.
2. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss
3. The reference levels for emissions in non-restricted bands was established by following KDB 558074 D01 Section 11.2 procedure.
4. Appropriate RF filters and attenuators were used during pre-scans and final measurements. Insertion losses were entered on the spectrum analyser as RF levels offsets.
5. Measurements for the 6' parabolic antenna were performed using a 4' parabolic antenna and the difference in gain was incorporated into the measurement as an RF level offset.
6. \*-30 dBc limit applies in non-restricted bands as the conducted output power and spectral density test were performed using an average detector.
7. Emissions in restricted bands; Where peak-detected amplitude was shown to comply with average limits, an average measurement was not performed.
8. Pre-scans above 1 GHz were performed in a fully anechoic chamber (UL Asset Number K0002) at a distance of 3 metres. The centre point of the EUT antenna was placed at a height of 0.8 metres above the test chamber floor in the centre of the chamber turntable. The EUT was placed as close to 0.8 metres as the antenna bracket and RF cables allowed. All measurement antennas were placed at a fixed height of 0.8 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (UL Asset Number K0001) at a distance of 3 metres. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

**Transmitter Radiated Emissions (continued)****Results: Bottom Channel / QPSK / Peak / Plate Antenna**

| Frequency (MHz) | Antenna Polarity | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|----------------------|----------------------|-------------|----------|
| 11457.692       | Horizontal       | 40.6                 | 74.0                 | 33.4        | Complied |
| 17189.087       | Horizontal       | 55.6                 | 74.0                 | 18.4        | Complied |

**Results: Bottom Channel / QPSK / Average / Plate Antenna**

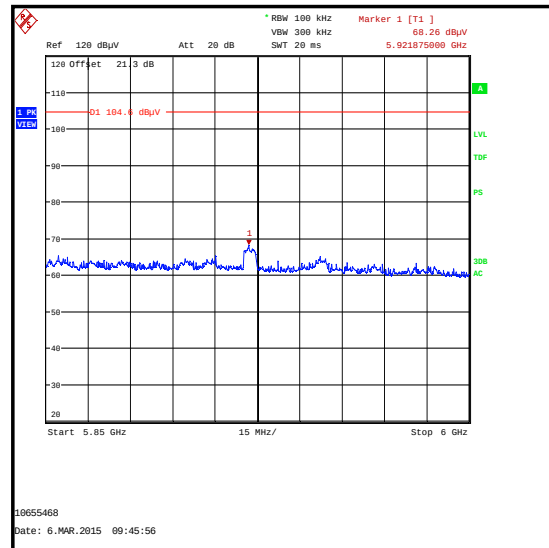
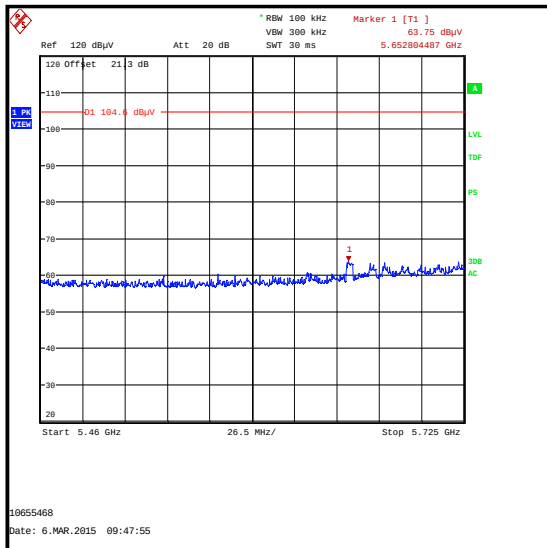
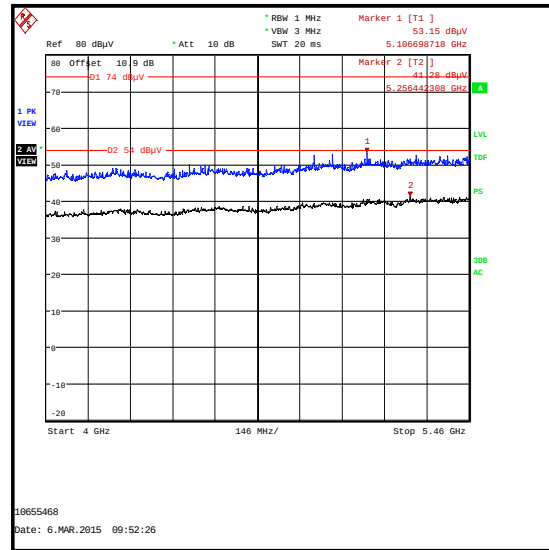
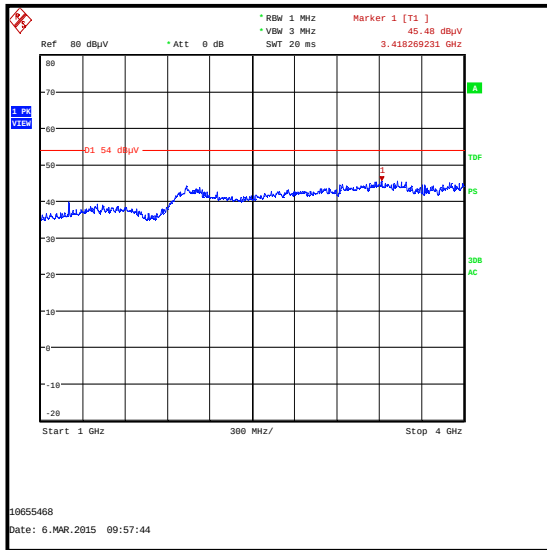
| Frequency (MHz) | Antenna Polarity | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|----------------------|----------------------|-------------|----------|
| 17189.920       | Horizontal       | 42.7                 | 54.0                 | 11.3        | Complied |

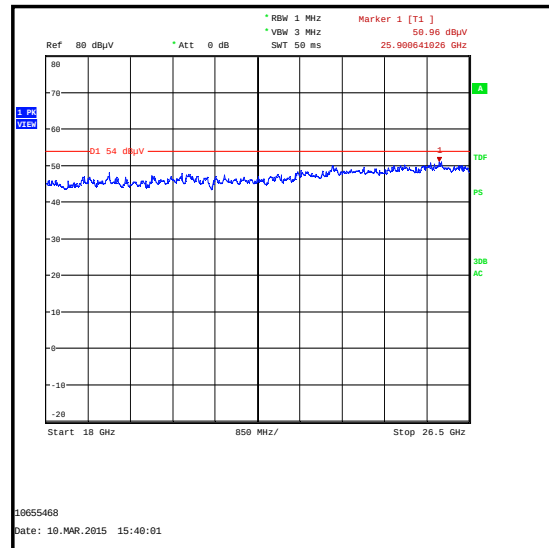
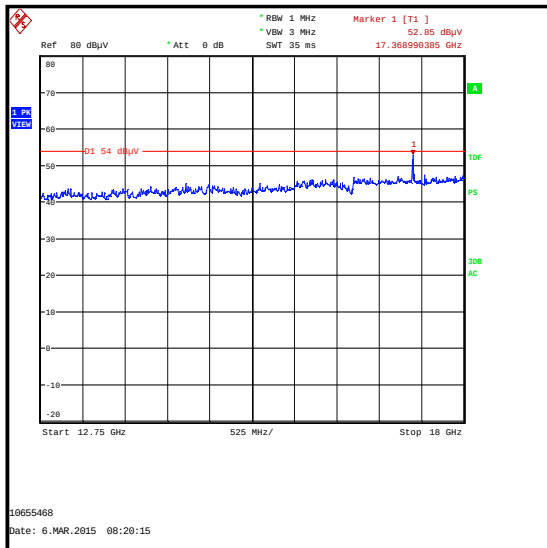
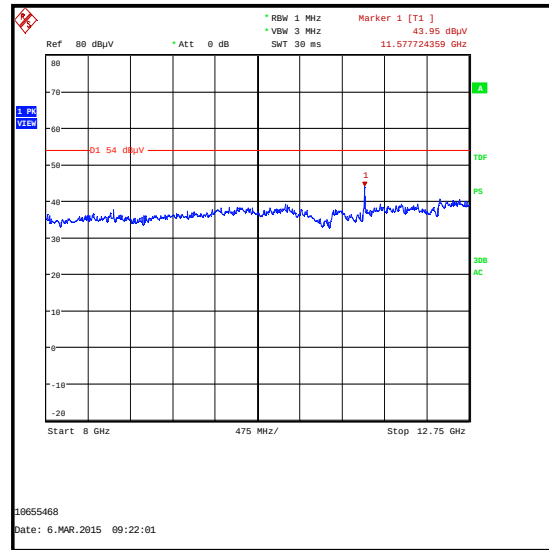
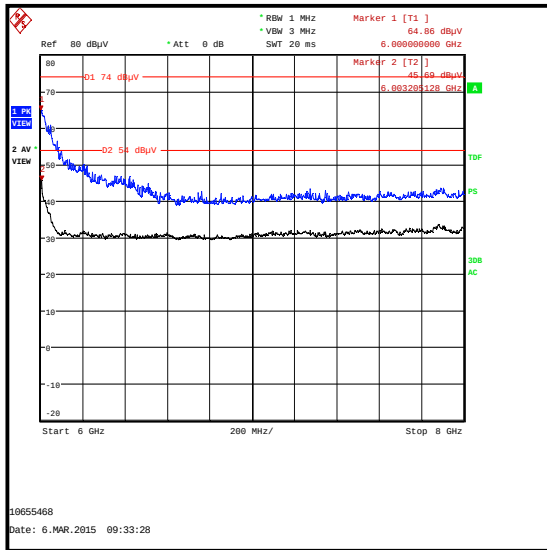
**Results: Middle Channel / QPSK / Peak / Plate Antenna**

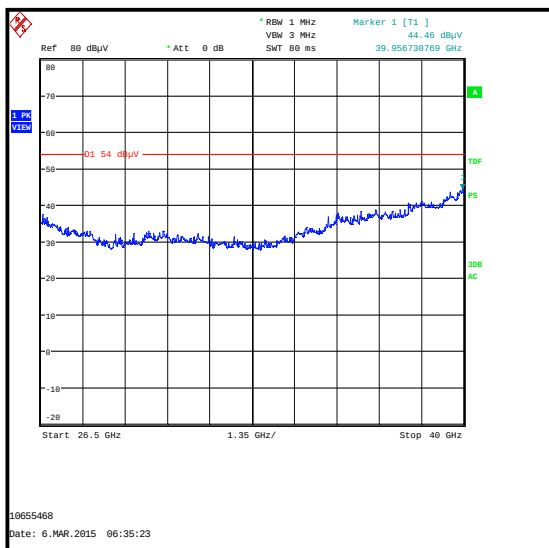
| Frequency (MHz) | Antenna Polarity | Peak Level (dB $\mu$ V/m) | Average Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|---------------------------|------------------------------|-------------|----------|
| 11577.403       | Horizontal       | 44.6                      | 54.0                         | 9.4         | Complied |

**Results: Top Channel / QPSK / Peak / Plate Antenna**

| Frequency (MHz) | Antenna Polarity | Peak Level (dB $\mu$ V/m) | Average Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|---------------------------|------------------------------|-------------|----------|
| 11689.679       | Horizontal       | 47.3                      | 54.0                         | 6.7         | Complied |

**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / Plate Antenna**

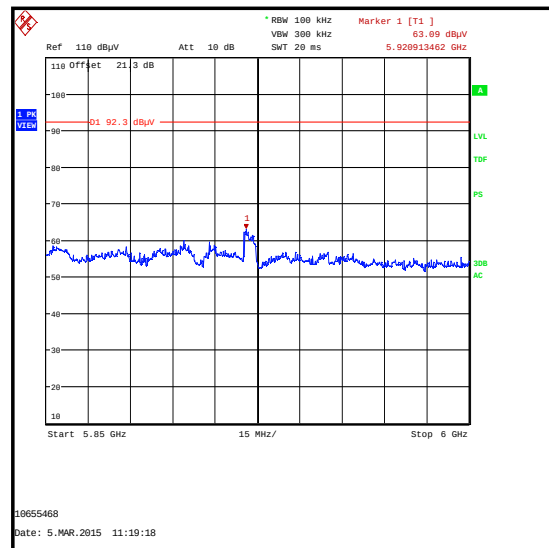
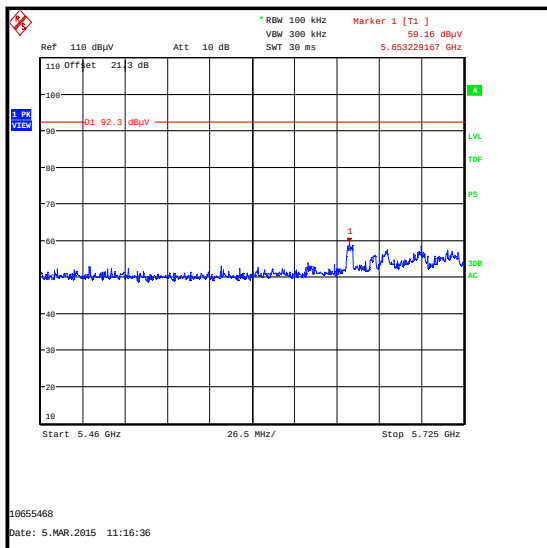
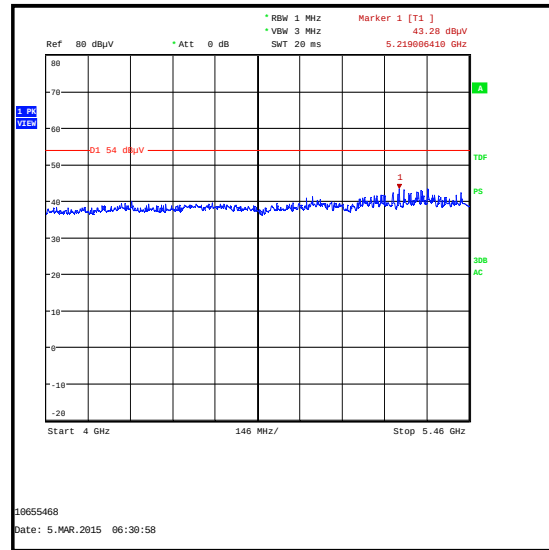
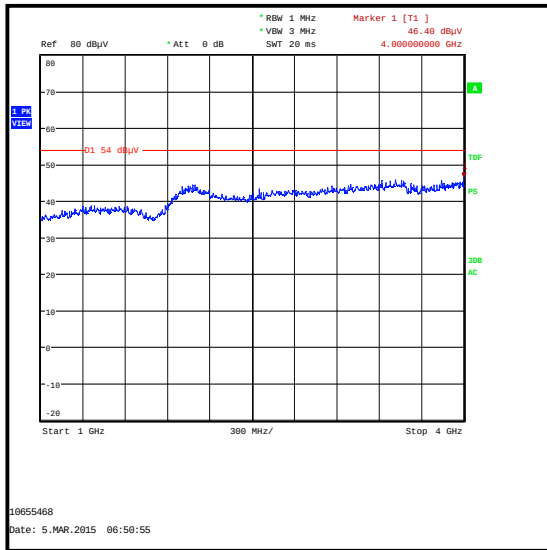
**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / Plate Antenna**

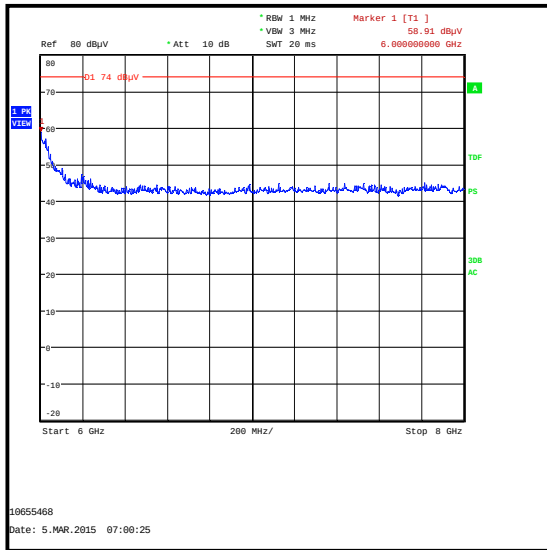
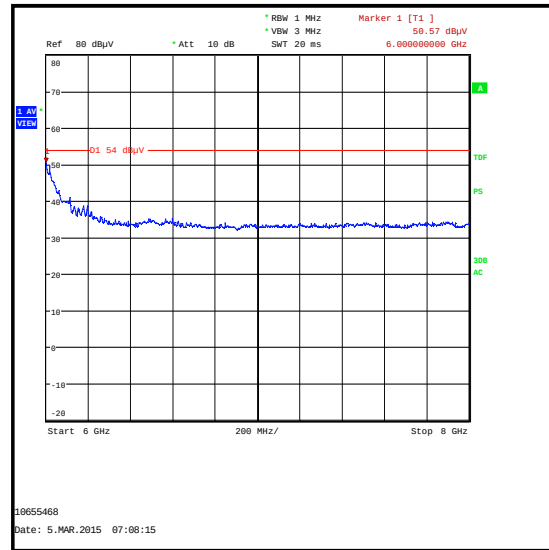
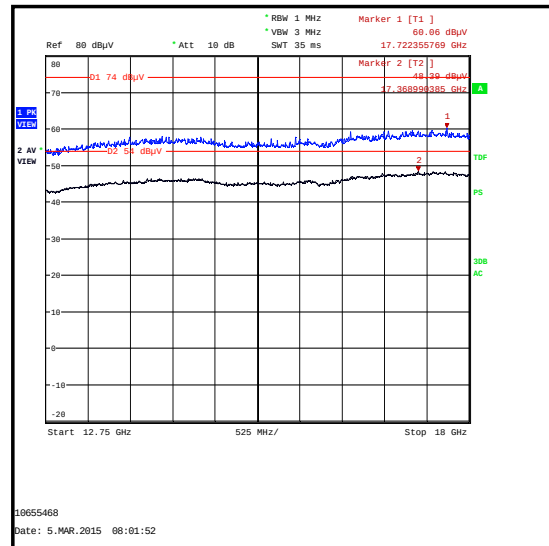
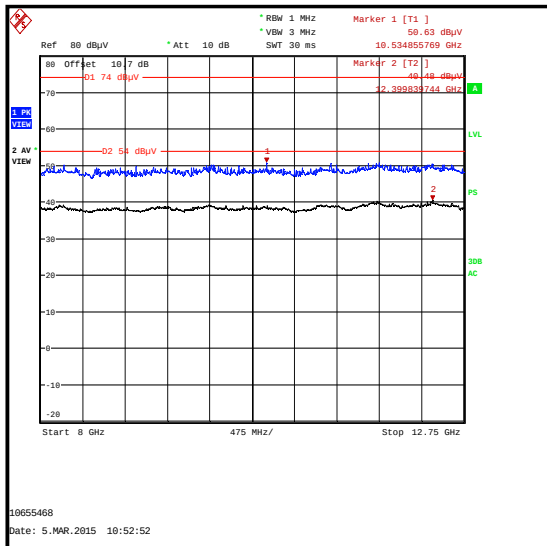
**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / Plate Antenna**

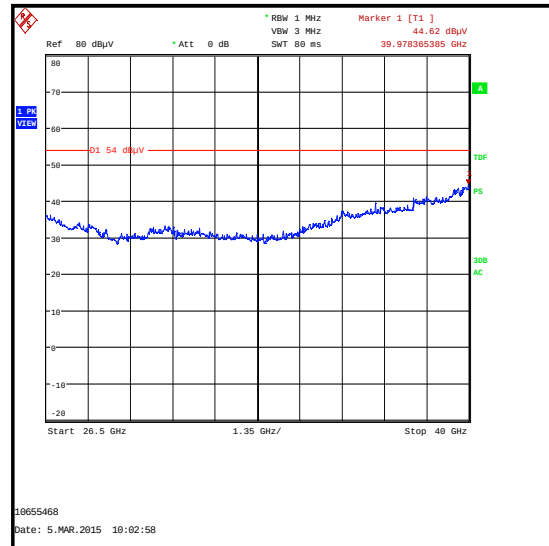
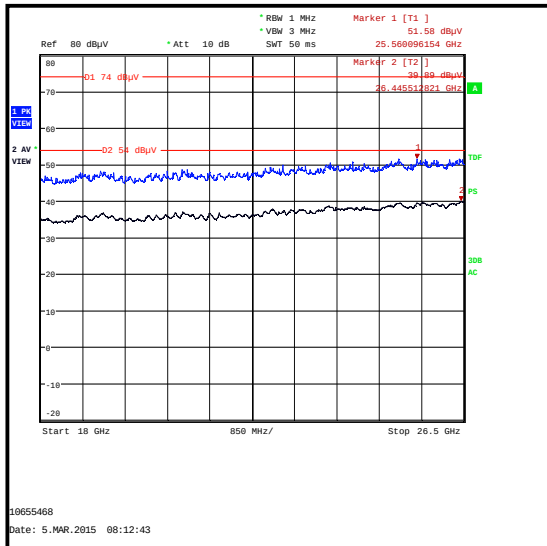
*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 4' Parabolic Antenna**

| Frequency<br>(MHz) | Antenna<br>Polarity | Level<br>(dB $\mu$ V/m) | Limit<br>(dB $\mu$ V/m) | Margin<br>(dB) | Result   |
|--------------------|---------------------|-------------------------|-------------------------|----------------|----------|
| 6000.000           | Vertical            | 58.9                    | 74.0                    | 15.1           | Complied |

**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 4' Parabolic Antenna**

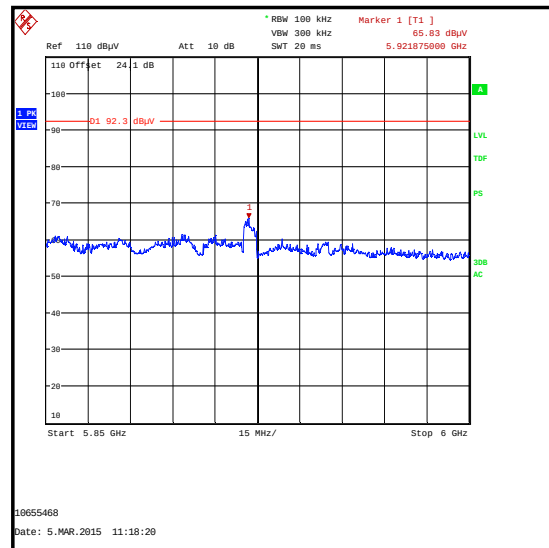
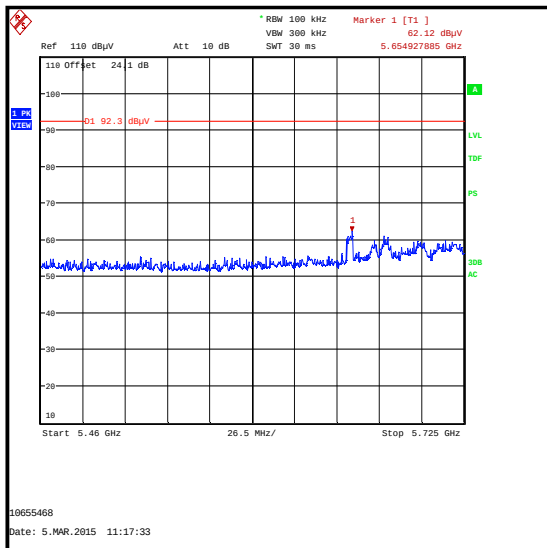
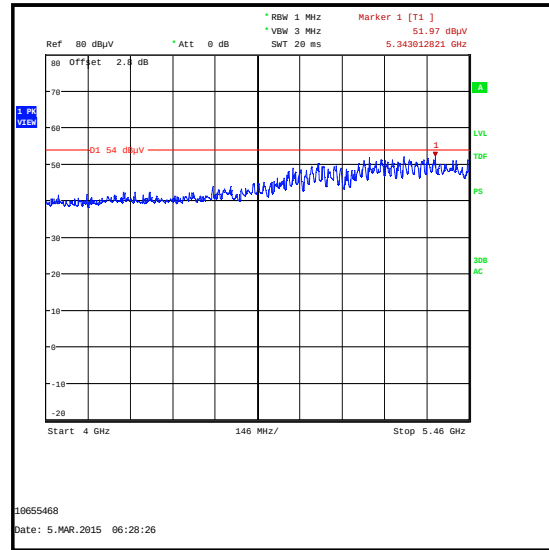
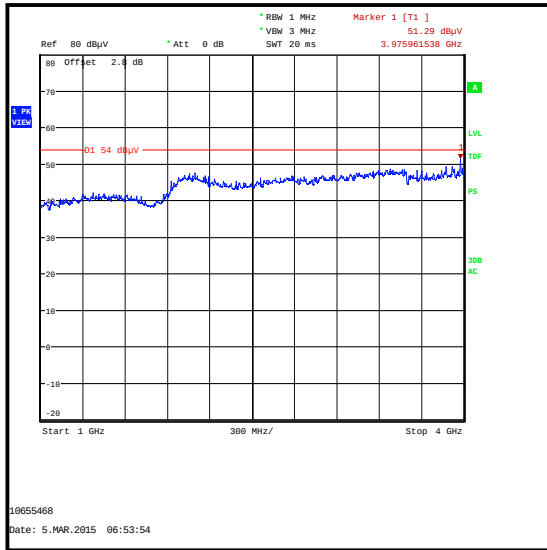
**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 4' Parabolic Antenna****Peak Detector****Average Detector**

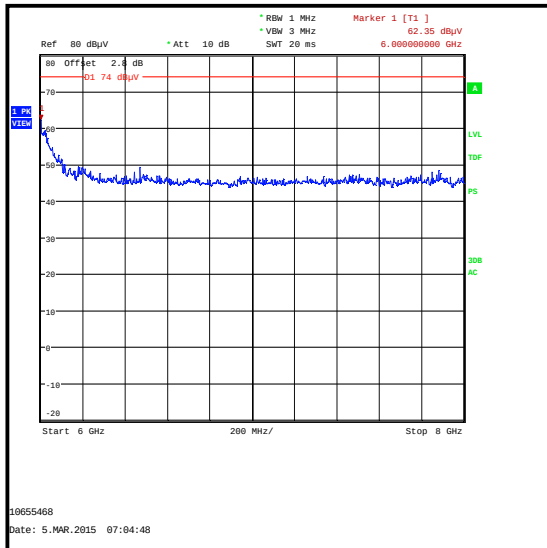
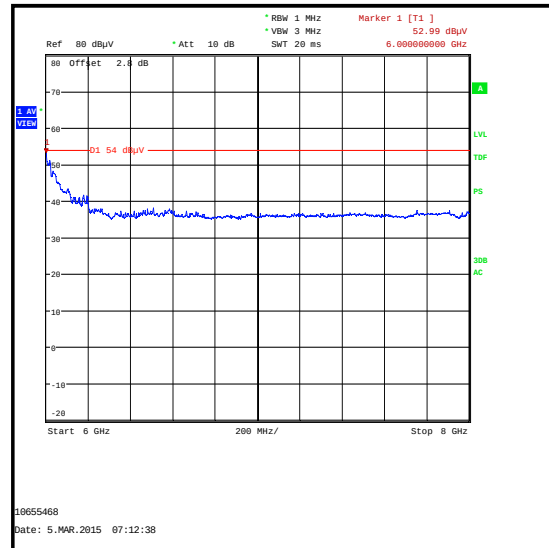
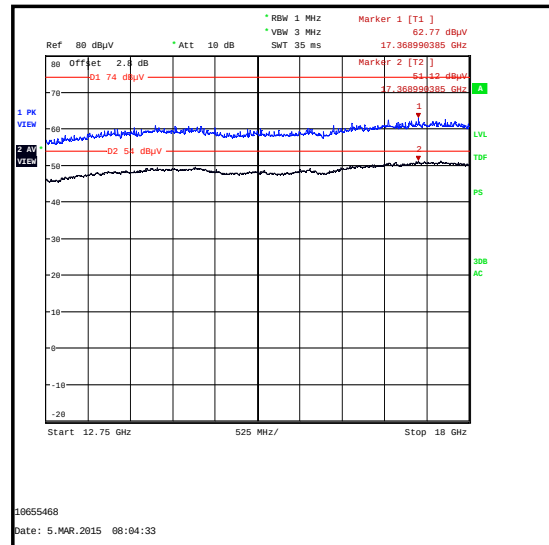
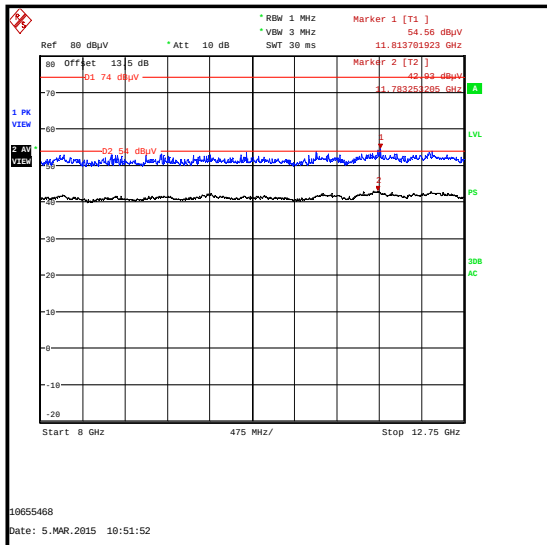
**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 4' Parabolic Antenna**

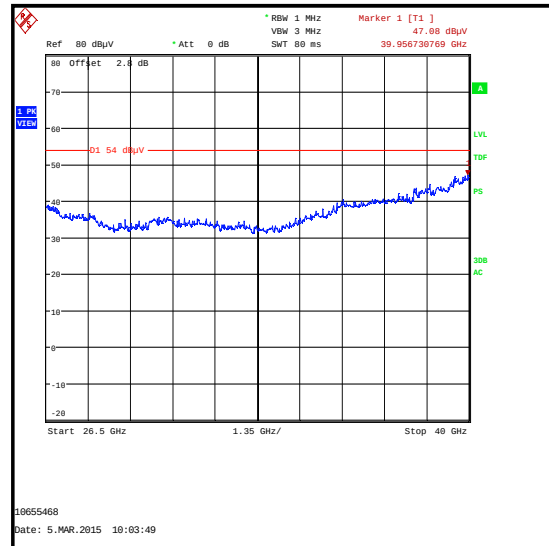
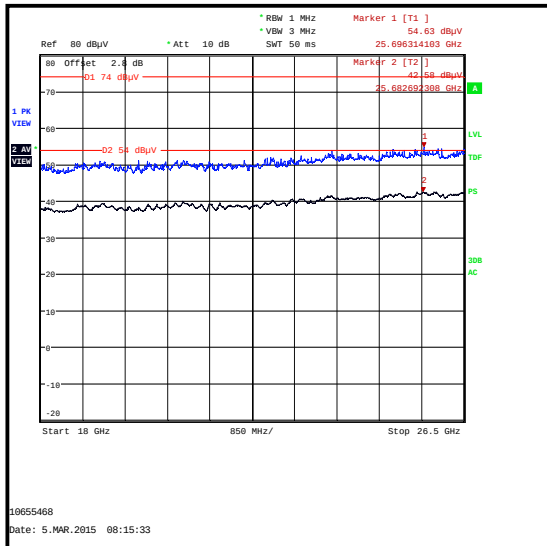
*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 6' Parabolic Antenna**

| Frequency (MHz) | Antenna Polarity | Level (dB $\mu$ V/m) | Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|----------------------|----------------------|-------------|----------|
| 6000.000        | Vertical         | 62.4                 | 74.0                 | 11.6        | Complied |

**Results: Middle Channel / QPSK / Peak / 6' Parabolic Antenna**

**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 6' Parabolic Antenna****Peak Detector****Average Detector**

**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 6' Parabolic Antenna**

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

**Transmitter Radiated Emissions (continued)****Results: Bottom Channel / QPSK / Peak / 60° Sectorised Antenna**

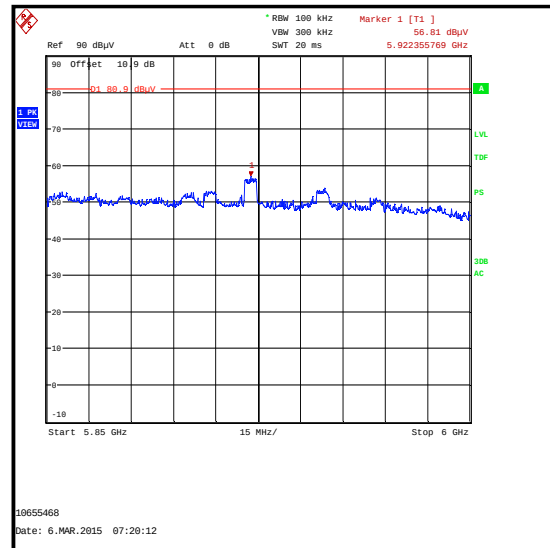
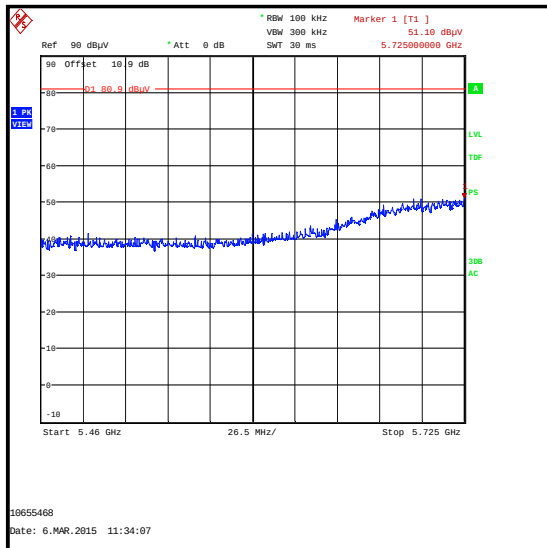
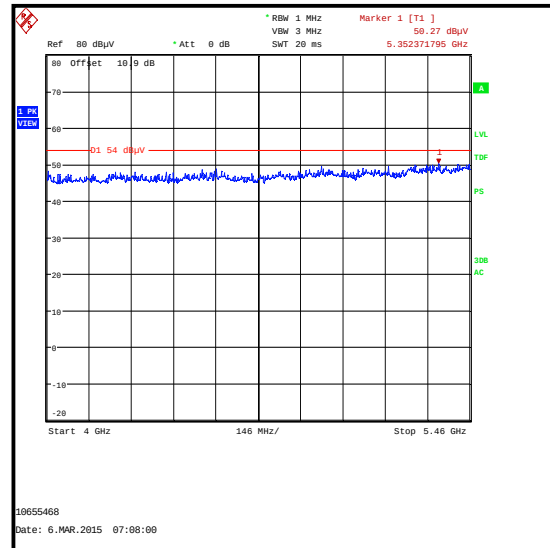
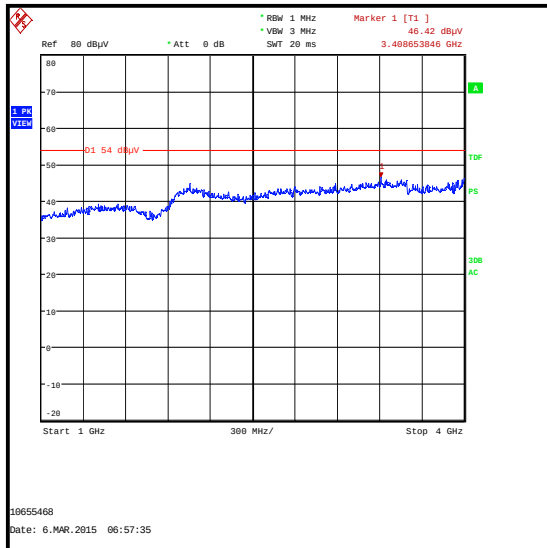
| Frequency (MHz) | Antenna Polarity | Peak Level (dBµV/m) | Average Limit (dBµV/m) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|------------------------|-------------|----------|
| 11457.750       | Horizontal       | 44.8                | 54.0                   | 9.2         | Complied |

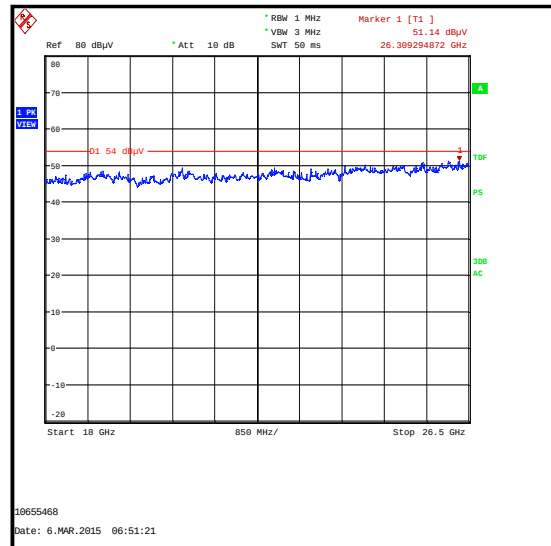
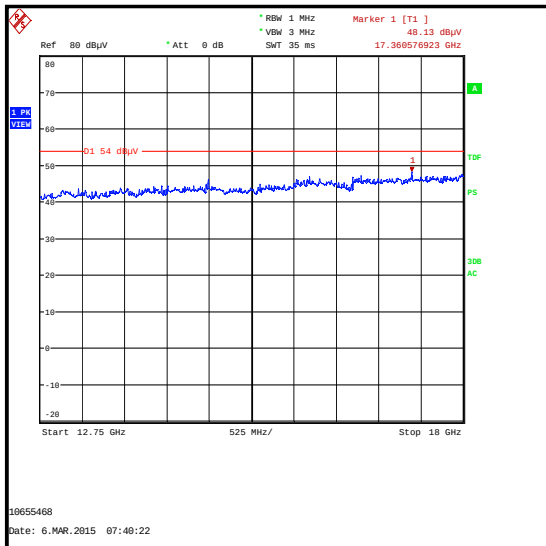
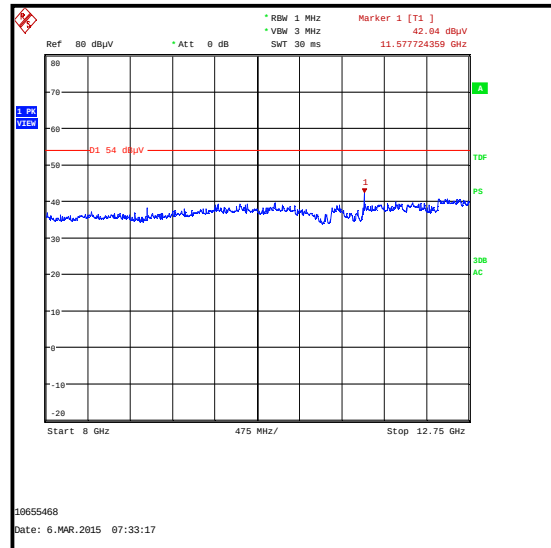
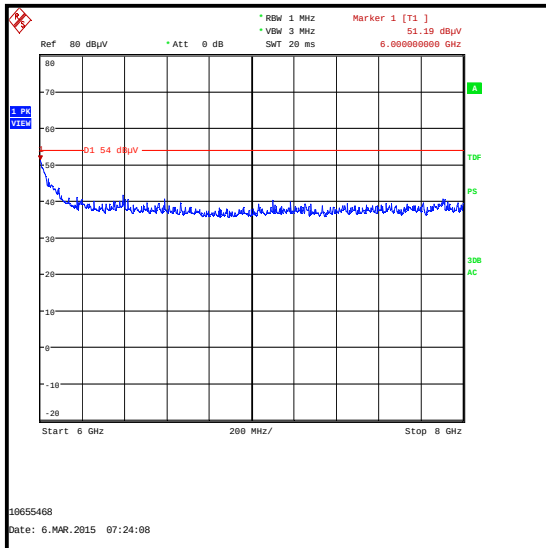
**Results: Middle Channel / QPSK / Peak / 60° Sectorised Antenna**

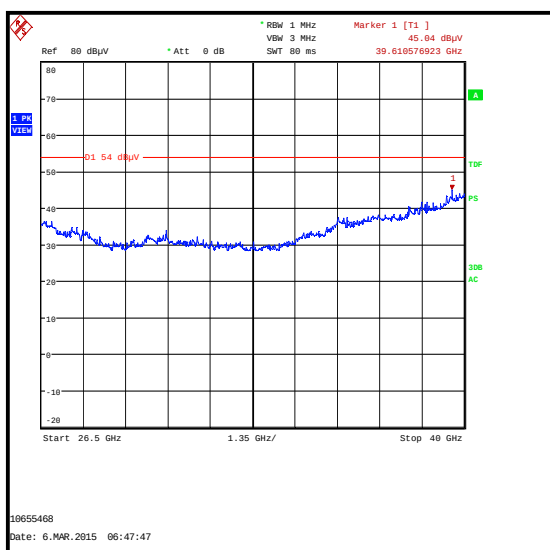
| Frequency (MHz) | Antenna Polarity | Peak Level (dBµV/m) | Average Limit (dBµV/m) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|------------------------|-------------|----------|
| 11578.965       | Horizontal       | 52.4                | 54.0                   | 1.6         | Complied |

**Results: Top Channel / QPSK / Peak / 60° Sectorised Antenna**

| Frequency (MHz) | Antenna Polarity | Peak Level (dBµV/m) | Average Limit (dBµV/m) | Margin (dB) | Result   |
|-----------------|------------------|---------------------|------------------------|-------------|----------|
| 11689.766       | Horizontal       | 53.2                | 54.0                   | 0.8         | Complied |

**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 60° Sectorised Antenna**

**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 60° Sectorised Antenna**

**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / 60° Sectorised Antenna**

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

**Transmitter Radiated Emissions (continued)****Results: Bottom Channel / QPSK / Peak / Omnidirectional Antenna**

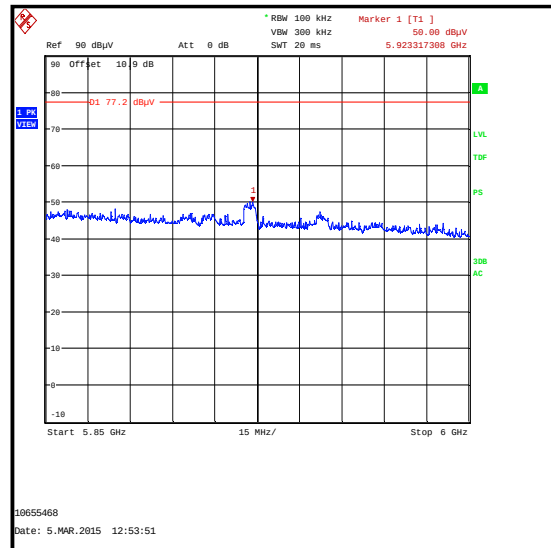
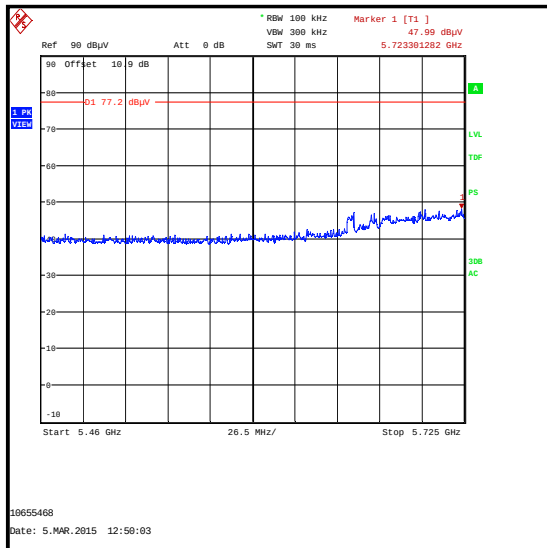
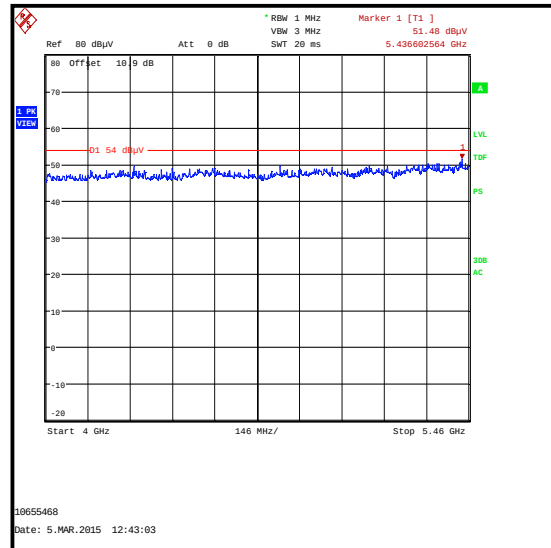
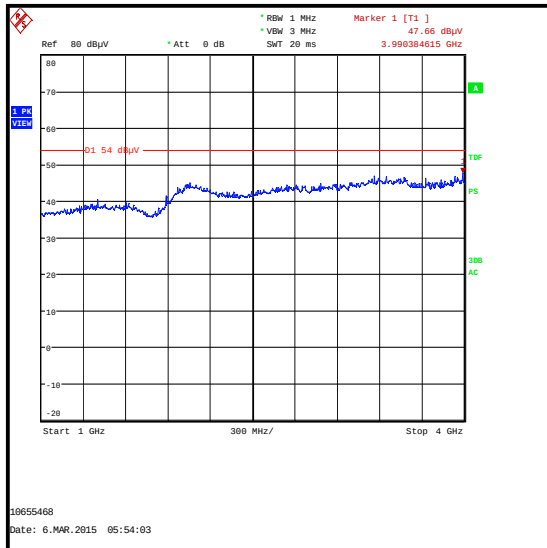
| Frequency (MHz) | Antenna Polarity | Peak Level (dB $\mu$ V/m) | Average Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|---------------------------|------------------------------|-------------|----------|
| 11459.083       | Horizontal       | 42.6                      | 54.0                         | 11.4        | Complied |

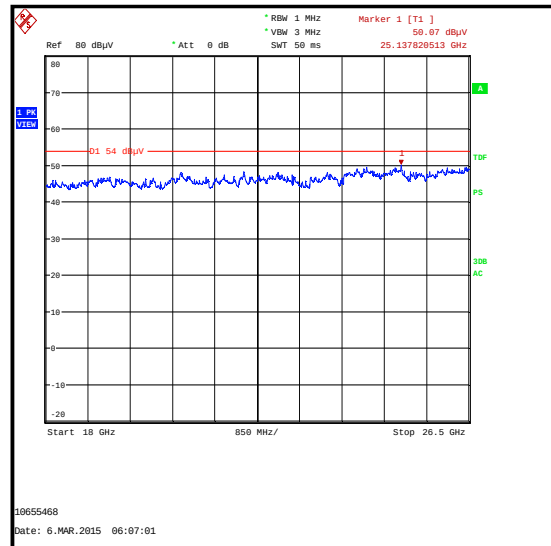
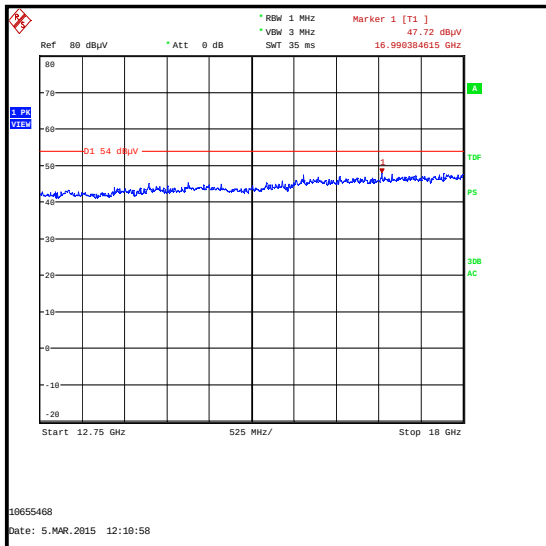
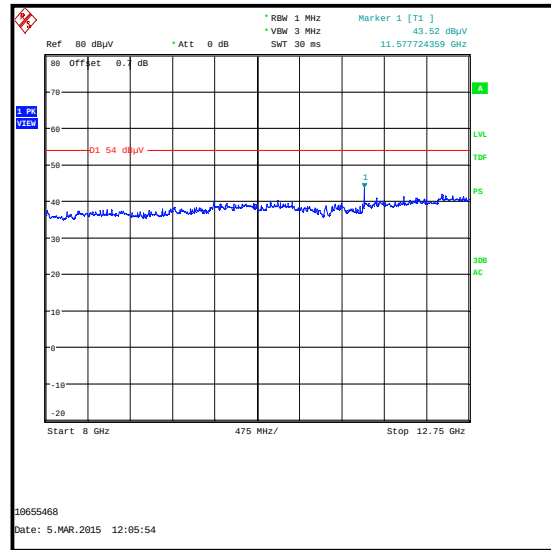
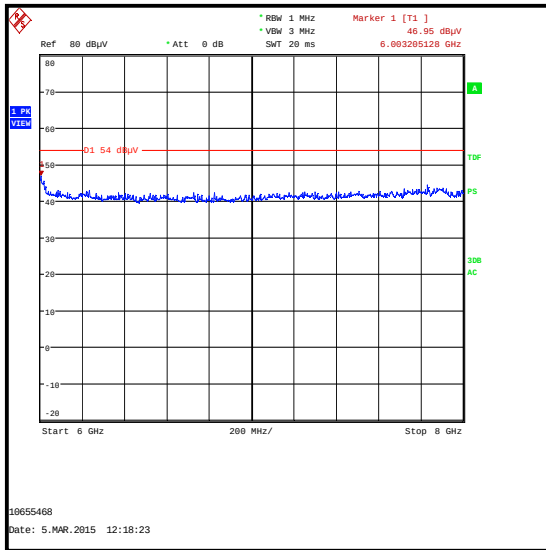
**Results: Middle Channel / QPSK / Peak / Omnidirectional Antenna**

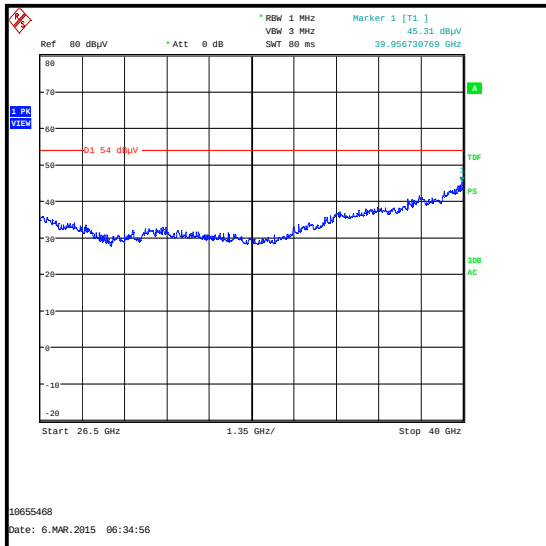
| Frequency (MHz) | Antenna Polarity | Peak Level (dB $\mu$ V/m) | Average Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|---------------------------|------------------------------|-------------|----------|
| 11576.907       | Horizontal       | 47.9                      | 54.0                         | 6.1         | Complied |

**Results: Top Channel / QPSK / Peak / Omnidirectional Antenna**

| Frequency (MHz) | Antenna Polarity | Peak Level (dB $\mu$ V/m) | Average Limit (dB $\mu$ V/m) | Margin (dB) | Result   |
|-----------------|------------------|---------------------------|------------------------------|-------------|----------|
| 11691.917       | Horizontal       | 45.3                      | 54.0                         | 8.7         | Complied |

**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / Omnidirectional Antenna**

**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / Omnidirectional Antenna**

**Transmitter Radiated Emissions (continued)****Results: Middle Channel / QPSK / Peak / Omnidirectional Antenna**

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

**Transmitter Radiated Emissions (continued)****Test Equipment Used:**

| Asset No. | Instrument                        | Manufacturer      | Type No.   | Serial No.  | Date Calibration Due  | Cal. Interval (Months) |
|-----------|-----------------------------------|-------------------|------------|-------------|-----------------------|------------------------|
| K0001     | 5m RSE Chamber                    | Rainford EMC      | N/A        | N/A         | 26 Mar 2015           | 12                     |
| M1624     | Thermohygrometer                  | JM Handelspunkt   | 30.5015.10 | Not stated  | 07 Jan 2016           | 12                     |
| M1379     | Test Receiver                     | Rohde & Schwarz   | ESIB7      | 100330      | 08 Dec 2015           | 12                     |
| G0543     | Pre Amplifier                     | Sonoma            | 310N       | 230801      | 05 Jun 2015           | 3                      |
| A2131     | Low Pass Filter                   | Atlan TecRF       | AFL-02000  | JFB1004-002 | 25 Apr 2015           | 12                     |
| A1834     | Attenuator                        | Hewlett Packard   | 8491B      | 10444       | Calibrated before use | 12                     |
| A490      | Antenna                           | Chase             | CBL6111A   | 1590        | 29 Apr 2015           | 12                     |
| K0002     | 3m RSE Chamber                    | Rainford EMC      | N/A        | N/A         | 31 Mar 2015           | 12                     |
| M1656     | Thermohygrometer                  | JM Handelspunkt   | 30.5015.13 | Not stated  | 14 Mar 2015           | 12                     |
| A1534     | Pre Amplifier                     | Hewlett Packard   | 8449B      | 3008A00405  | 21 Dec 2015           | 12                     |
| M1874     | Test Receiver                     | Rohde & Schwarz   | ESU26      | 100553      | 13 May 2015           | 12                     |
| M1630     | Test Receiver                     | Rohde & Schwarz   | ESU40      | 100233      | 20 Feb 2016           | 12                     |
| A2000     | Attenuator                        | Huber & Suhner    | 6830.17.B  | 301623      | 12 Apr 2015           | 12                     |
| A2140     | Attenuator                        | Atlan TecRF       | AN18-10    | 090918-04   | 25 Apr 2015           | 12                     |
| A2176     | High Pass Filter                  | AtlanTec RF       | AFH-07000  | 800980      | 12 Apr 2015           | 12                     |
| A1818     | Antenna                           | EMCO              | 3115       | 00075692    | 20 Dec 2015           | 12                     |
| A253      | Antenna                           | Flann Microwave   | 12240-20   | 128         | 20 Dec 2015           | 12                     |
| A254      | Antenna                           | Flann Microwave   | 14240-20   | 139         | 20 Dec 2015           | 12                     |
| A255      | Antenna                           | Flann Microwave   | 16240-20   | 519         | 20 Dec 2015           | 12                     |
| A256      | Antenna                           | Flann Microwave   | 18240-20   | 400         | 20 Dec 2015           | 12                     |
| A436      | Antenna                           | Flann Microwave   | 20240-20   | 330         | 21 Dec 2015           | 12                     |
| A203      | WG 22 Microwave Horn              | Flann Microwave   | 22240-20   | 343         | 19 May 2016           | 36                     |
| M1390     | 26.5 GHz to 40 GHz Harmonic Mixer | Farran Technology | WHMP 28    | FTL1677B    | Calibrated before use | N/A                    |
| A1785     | 26.5 GHz to 40 GHz Pre-amplifier  | Farran Technology | FLNA-28-30 | FTL 6483    | Calibrated before use | N/A                    |
| A366      | Isolator                          | MRI               | FRR-400    | 169         | Calibrated before use | N/A                    |

## 6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

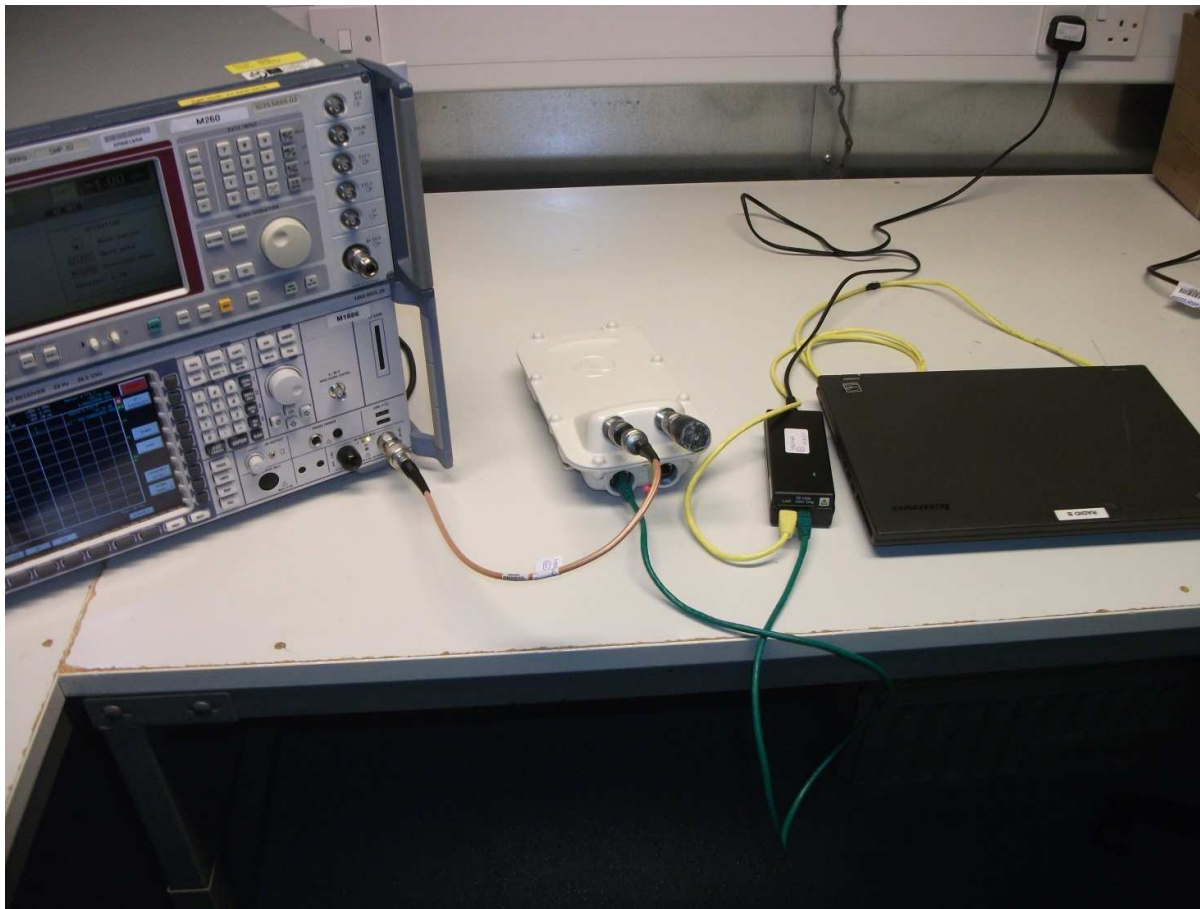
| Measurement Type                    | Range                | Confidence Level (%) | Calculated Uncertainty |
|-------------------------------------|----------------------|----------------------|------------------------|
| AC Conducted Spurious Emissions     | 0.15 MHz to 30 MHz   | 95%                  | ±4.69 dB               |
| Conducted Maximum Peak Output Power | 5725 MHz to 5850 MHz | 95%                  | ±0.76 dB               |
| Power Spectral Density              | 5725 MHz to 5850 MHz | 95%                  | ±1.13 dB               |
| 6 dB Bandwidth                      | 5725 MHz to 5850 MHz | 95%                  | ±3.92 %                |
| Conducted Spurious Emissions        | 9 kHz to 40 GHz      | 95%                  | ±2.62 dB               |
| Radiated Spurious Emissions         | 30 MHz to 1 GHz      | 95%                  | ±5.65 dB               |
| Radiated Spurious Emissions         | 1 GHz to 40 GHz      | 95%                  | ±2.94 dB               |

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

## **7. Report Revision History**

| Version Number | Revision Details    |        |                                                                                                                        |
|----------------|---------------------|--------|------------------------------------------------------------------------------------------------------------------------|
|                | Page No(s)          | Clause | Details                                                                                                                |
| 1.0            | -                   | -      | Initial Version                                                                                                        |
| 2.0            | 6<br>10<br>36<br>78 | -      | Inserted additional test methods and procedures<br>Inserted Note 4<br>Changed Note 2 wording<br>Changed order of Notes |

## **Appendix 1. Conducted Test Setup Photograph**



**EUT configuration for conducted measurements**

**--- END OF REPORT---**