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# Report On

FCC and Industry Canada Testing of the  
Sepura plc STP8040 Portable Tetra Radio  
In accordance with FCC CFR 47 Part 15 and  
Industry Canada RSS-210

COMMERCIAL-IN-CONFIDENCE

FCC ID: XX6STP8040  
IC ID: 8739A-STP8000

Document 75908190 Report 02 Issue 2

March 2010



Product Service

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COMMERCIAL-IN-CONFIDENCE

**REPORT ON**

FCC and Industry Canada Testing of the  
Sepura plc STP8040 Portable Tetra Radio  
In accordance with FCC CFR 47 Part 15 and RSS-210

Document 75908190 Report 02 Issue 1

March 2010

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**DATED**

09 March 2010

**ENGINEERING STATEMENT**

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 15 and RSS-210. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;

R A Blagg

G Lawler

**This test report has been issued to Issue 2 make changes to the Industry Canada ID and to change the issue date of the FCC Part 15 used.**





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## **SECTION 1**

### **REPORT SUMMARY**

FCC and Industry Canada Testing of the  
Sepura plc STP8040 Portable Tetra Radio  
In accordance with FCC CFR 47 Part 15 and RSS-210



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## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC and Industry Canada Testing of the Sepura plc, STP8040 Portable Tetra Radio to the requirements of FCC CFR 47 Part 15 and RSS-210.

|                               |                                                                                                                                                                         |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective                     | To perform FCC and Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out. |
| Manufacturer                  | Sepura plc                                                                                                                                                              |
| Model Number(s)               | STP8040 Portable Tetra Radio                                                                                                                                            |
| Serial Number(s)              | 2PN400922G4Y1P5                                                                                                                                                         |
| Number of Samples Tested      | One                                                                                                                                                                     |
| Test Specification/Issue/Date | FCC CFR 47 Part 15: 2007<br>RSS-210: Issue 7: 2007                                                                                                                      |
| Disposal                      | Held Pending Disposal                                                                                                                                                   |
| Reference Number              | Not Applicable                                                                                                                                                          |
| Date                          | Not Applicable                                                                                                                                                          |
| Order Number                  | 315350/T0201                                                                                                                                                            |
| Date                          | 19 November 2009                                                                                                                                                        |
| Start of Test                 | 10 December 2009                                                                                                                                                        |
| Finish of Test                | 05 January 2010                                                                                                                                                         |
| Name of Engineer(s)           | R A Blagg<br>G Lawler                                                                                                                                                   |
| Related Document(s)           | ANSI 63.4 : 2003                                                                                                                                                        |

Testing in this report is referenced to FCC CFR 47 Part 15: 2009. At the time of testing the 2009 version was not on our Schedule of Accreditation, the clauses tested have been assessed against the 2007 version and there are no changes to the testing performed therefore the testing meets the requirements of the 2009 version.



Product Service

## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15 and RSS-210 is shown below.

| Section | Spec Clause           |          | Test Description                    | Mode            | Result | Comments |
|---------|-----------------------|----------|-------------------------------------|-----------------|--------|----------|
|         | FCC                   | IC       |                                     |                 |        |          |
| 2.1     | 15.247<br>(a)(1)      | A8.1(a)  | 20dB Bandwidth                      | Transmit Bottom | Pass   |          |
|         |                       |          |                                     | Transmit Middle | Pass   |          |
|         |                       |          |                                     | Transmit Top    | Pass   |          |
| 2.2     | 15.247<br>(b)(3)      | A8.4(2)  | Maximum Peak Conducted Output Power | Transmit Bottom | Pass   |          |
|         |                       |          |                                     | Transmit Middle | Pass   |          |
|         |                       |          |                                     | Transmit Top    | Pass   |          |
| 2.3     | 15.247<br>(b)(3)      | A8.4(2)  | EIRP Peak Power                     | Transmit Bottom | Pass   |          |
|         |                       |          |                                     | Transmit Middle | Pass   |          |
|         |                       |          |                                     | Transmit Top    | Pass   |          |
| 2.4     | 15.247 (d)            | A8.5     | Spurious Emissions                  | Transmit Bottom | Pass   |          |
|         |                       |          |                                     | Transmit Middle | Pass   |          |
|         |                       |          |                                     | Transmit Top    | Pass   |          |
| 2.5     | 15.247<br>(a)(1)(iii) | A8.1(d)  | Channel Dwell Time                  | Transmit Bottom | Pass   |          |
|         |                       |          |                                     | Transmit Middle | Pass   |          |
|         |                       |          |                                     | Transmit Top    | Pass   |          |
| 2.6     | 15.247<br>(a)(1)      | A8.1(b)  | Channel Separation                  | Transmit Bottom | Pass   |          |
|         |                       |          |                                     | Transmit Middle | Pass   |          |
|         |                       |          |                                     | Transmit Top    | Pass   |          |
| 2.7     | 15.247<br>(a)(1)(iii) | A8.1(d)  | Number of Hopping Channels          | Transmit Bottom | Pass   |          |
|         |                       |          |                                     | Transmit Middle | Pass   |          |
|         |                       |          |                                     | Transmit Top    | Pass   |          |
| 2.8     | 15.247<br>(a)(2)      | A8.2 (a) | Radiated Emissions (Enclosure Port) | Transmit Bottom | Pass   |          |
|         |                       |          |                                     | Transmit Middle | Pass   |          |
|         |                       |          |                                     | Transmit Top    | Pass   |          |



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**1.3 DECLARATION OF BUILD STATUS**

|                                                                                      |                                                                           |            |  |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------|------------|--|
| <b>MAIN EUT</b>                                                                      |                                                                           |            |  |
| <b>MANUFACTURING DESCRIPTION</b>                                                     | Tetra Handheld terminal                                                   |            |  |
| <b>MANUFACTURER</b>                                                                  | Sepura                                                                    |            |  |
| <b>TYPE</b>                                                                          | STP8040 (STP8140)                                                         |            |  |
| <b>PART NUMBER</b>                                                                   | n/a                                                                       |            |  |
| <b>SERIAL NUMBER</b>                                                                 | 2PN400922G4Y10S and 2PN400922G4Y1P5                                       |            |  |
| <b>HARDWARE VERSION</b>                                                              | Production                                                                |            |  |
| <b>SOFTWARE VERSION</b>                                                              | -                                                                         |            |  |
| <b>TRANSMITTER OPERATING RANGE</b>                                                   | 407MHz to 473MHz and 2402MHz-2480MHz                                      |            |  |
| <b>RECEIVER OPERATING RANGE</b>                                                      | 407MHz to 473MHz and 2402MHz-2480MHz                                      |            |  |
| <b>COUNTRY OF ORIGIN</b>                                                             | UK                                                                        |            |  |
| <b>INTERMEDIATE FREQUENCIES</b>                                                      | 69.25MHz                                                                  |            |  |
| <b>ITU DESIGNATION OF EMISSION</b>                                                   | 25K0Q1D                                                                   |            |  |
| <b>HIGHEST INTERNALLY GENERATED FREQUENCY</b>                                        | Fc (TX)x4/3 MHz or Fc (RX)+69.25MHz,<br>GPS Module clock on chip 3.145GHZ |            |  |
| <b>OUTPUT POWER (W or dBm)</b>                                                       | 1.8 Watts                                                                 |            |  |
| <b>FCC ID</b>                                                                        | XX6 STP8040                                                               |            |  |
| <b>INDUSTRY CANADA ID</b>                                                            | 8739A-STP8000                                                             |            |  |
| <b>TECHNICAL DESCRIPTION (a brief description of the intended use and operation)</b> | Tetra Handheld terminal                                                   |            |  |
| <b>BATTERY/POWER SUPPLY</b>                                                          |                                                                           |            |  |
| <b>MANUFACTURING DESCRIPTION</b>                                                     | Lithium Polymer                                                           |            |  |
| <b>MANUFACTURER</b>                                                                  | Varta                                                                     |            |  |
| <b>TYPE</b>                                                                          | Standard                                                                  | Hi Cap     |  |
| <b>PART NUMBER</b>                                                                   | 300 00634,                                                                | 300 00635  |  |
| <b>VOLTAGE</b>                                                                       | 7.4Vdc                                                                    |            |  |
| <b>COUNTRY OF ORIGIN</b>                                                             | Indonesia                                                                 |            |  |
| <b>ANCILLARIES (if applicable)</b>                                                   |                                                                           |            |  |
| <b>MANUFACTURING DESCRIPTION</b>                                                     | Advanced RSM                                                              | Ear Hanger |  |
| <b>MANUFACTURER</b>                                                                  | JDI                                                                       | Lowe       |  |
| <b>TYPE</b>                                                                          |                                                                           |            |  |
| <b>PART NUMBER</b>                                                                   | 300-00388                                                                 |            |  |
| <b>SERIAL NUMBER</b>                                                                 |                                                                           |            |  |
| <b>COUNTRY OF ORIGIN</b>                                                             | Taiwan                                                                    | UK         |  |

Signature

Date

10 December 2009

D of B S Serial No

75908190

Note: This document has been prepared to enable manufacturers with no mechanism for producing their own Declaration of Build Status, to declare the build state of the equipment submitted for test.

No responsibility will be accepted by TÜV Product Service as to the accuracy of the information declared in this document by the manufacturer.

## 1.4 PRODUCT INFORMATION

### 1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sepura plc, STP8040 Portable Tetra Radio as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.



Equipment Under Test

#### 1.4.2 Test Configuration

##### Configuration 1: Stand Alone Powered

The EUT was configured as a standalone item and powered via a 7.4 V battery.

#### 1.4.3 EUT Cable / Port Identification

| Port   | Max Cable Length specified | Usage           | Type      | Screened |
|--------|----------------------------|-----------------|-----------|----------|
| Signal | 1.0m                       | Fist Microphone | Multicore | No       |

#### 1.4.4 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 – 2402 MHz Transmit Bottom

Mode 2 – 2441 MHz Transmit Middle

Mode 3 – 2480 MHz Transmit Top

Information on the specific test modes utilised are detailed in the test procedure for each individual test.



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## **1.5 TEST CONDITIONS**

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or an open test area as appropriate.

The EUT was powered via a 7.4 V battery.

FCC Accreditation  
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation  
IC2932B-1 Octagon House, Fareham Test Laboratory

## **1.6 DEVIATIONS FROM THE STANDARD**

No deviations from the applicable test standards or test plan were made during testing.

## **1.7 MODIFICATION RECORD**

No modifications were made to the EUT during testing.



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## **SECTION 2**

### **TEST DETAILS**

FCC and Industry Canada Testing of the  
Sepura plc STP8040 Portable Tetra Radio  
In accordance with FCC CFR 47 Part 15 and RSS-210



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## **2.1 20dB BANDWIDTH**

### **2.1.1 Specification Reference**

FCC CFR 47 Part 15, Clause 15.247 (a)(1)  
RSS-210, Clause A8.1(a)

### **2.1.2 Equipment Under Test**

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

### **2.1.3 Date of Test and Modification State**

10 December 2009 - Modification State 0

### **2.1.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.1.5 Test Procedure**

Test Performed in accordance with FCC CFR 47 Part 15 and RSS-210.

The EUT was transmitted at maximum power at all data rates via a cable to the Spectrum Analyser. The Analyser settings were adjusted to display the resultant trace on screen. The peak point of the trace was measured and the markers positioned to give the –20dBc points of the displayed spectrum.

### **2.1.6 Environmental Conditions**

10 December 2009

Ambient Temperature 23.9°C

Relative Humidity 32.4%

### **2.1.7 Test Results**

| Frequency (MHz) | Data Rate (Mbps) | 20dB Bandwidth (kHz) |
|-----------------|------------------|----------------------|
| 2402            | DH1              | 1024                 |
|                 | DH3              | 1019                 |
|                 | DH5              | 1019                 |
| 2441            | DH1              | 1019                 |
|                 | DH3              | 1019                 |
|                 | DH5              | 1024                 |
| 2480            | DH1              | 1019                 |
|                 | DH3              | 1019                 |
|                 | DH5              | 1019                 |



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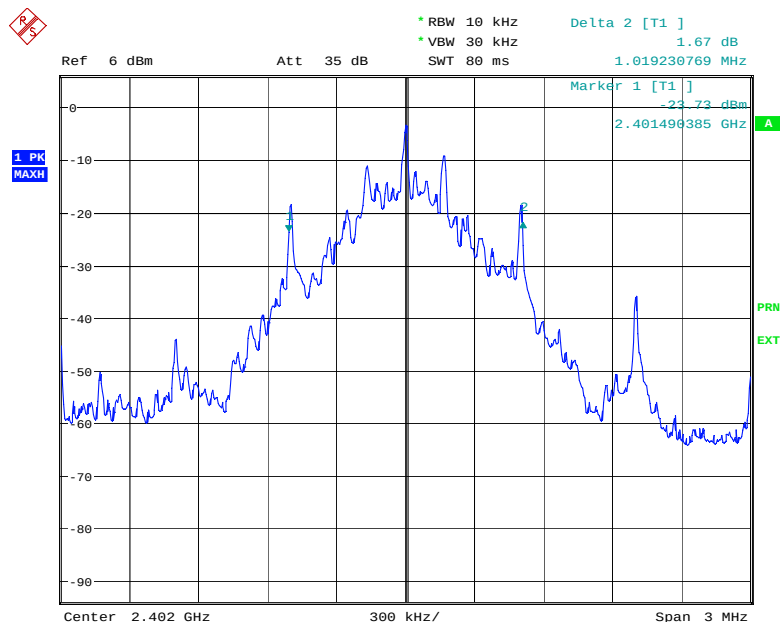
2402 MHz

DH1



Date: 11.DEC.2009 10:40:47

DH3

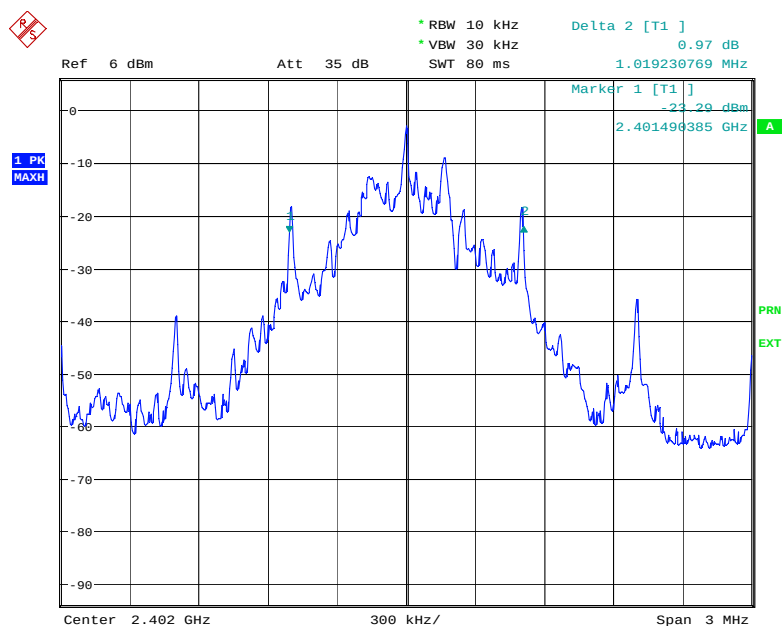


Date: 11.DEC.2009 11:10:33



Product Service

## DH5



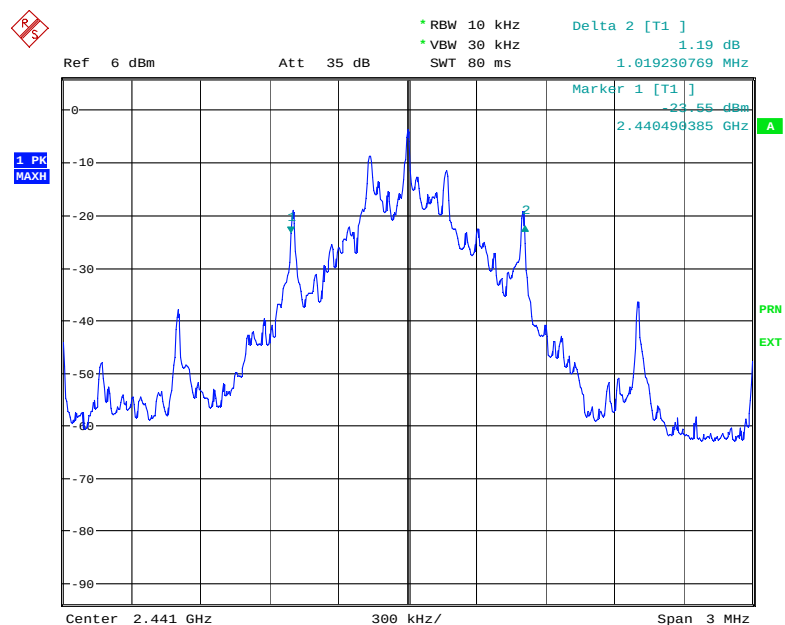
Date: 10.DEC.2009 17:11:37



Product Service

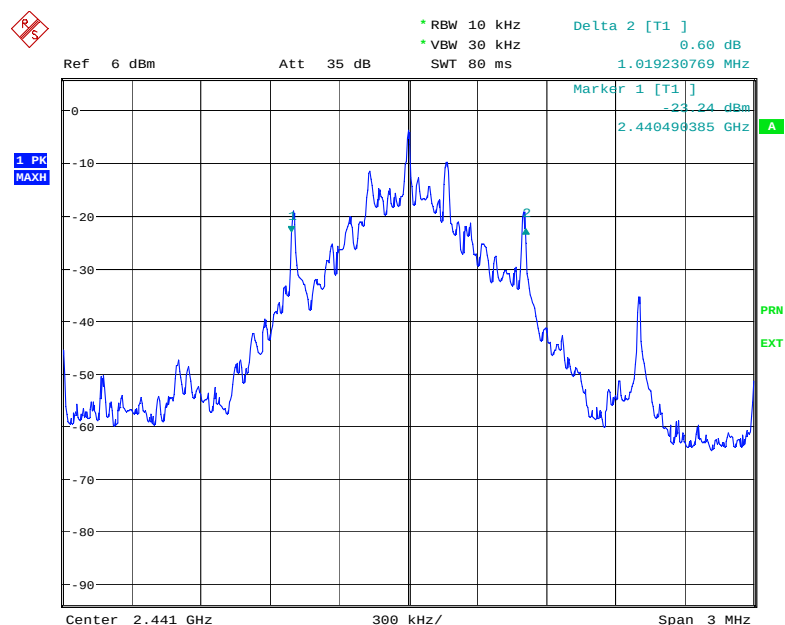
2441 MHz

DH1



Date: 11.DEC.2009 11:03:24

DH3

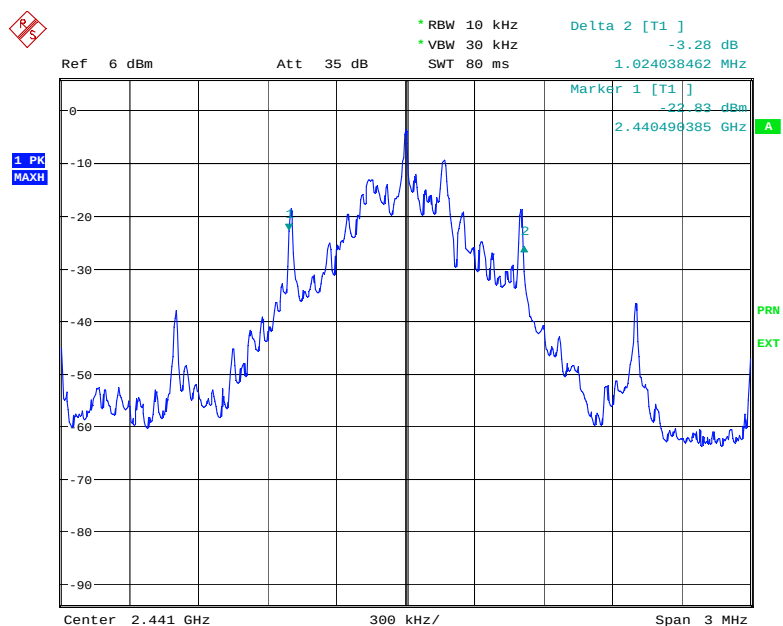


Date: 11.DEC.2009 11:12:55



Product Service

## DH5



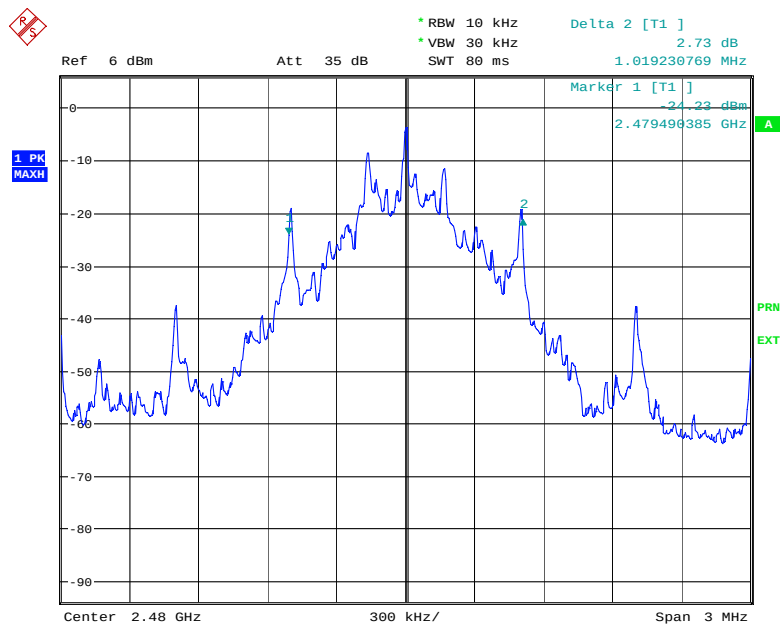
Date: 10.DEC.2009 16:49:42



Product Service

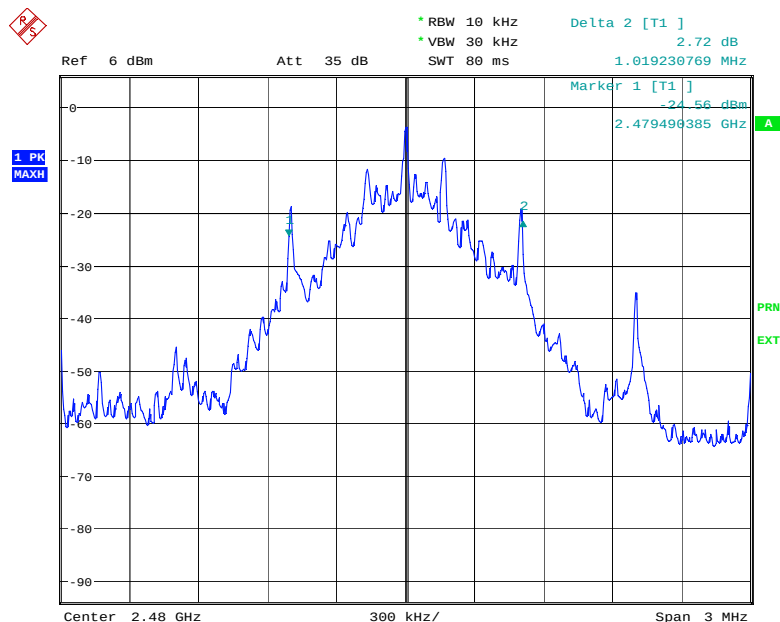
2480 MHz

DH1



Date: 11.DEC.2009 11:06:07

DH3

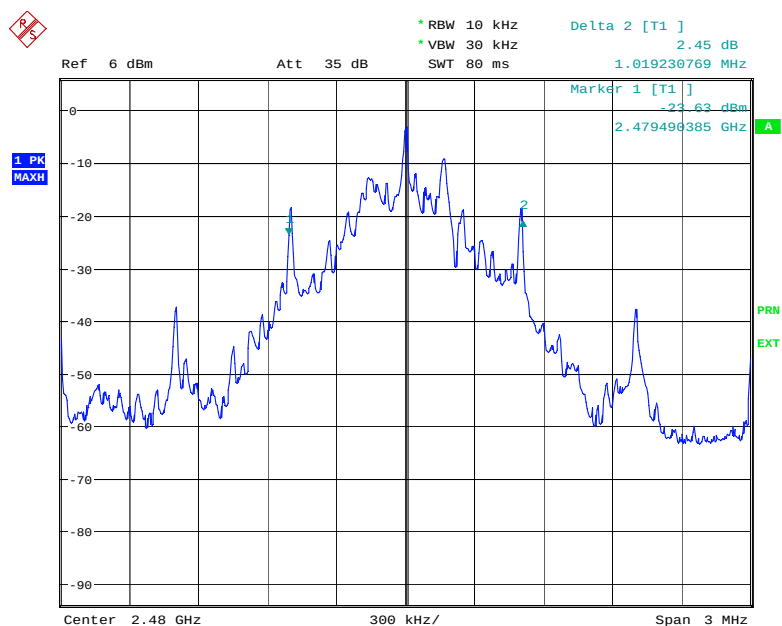


Date: 11.DEC.2009 11:14:40



Product Service

## DH5



Date: 10.DEC.2009 16:56:45



Product Service

## 2.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER

### 2.2.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.247 (b)(3)  
RSS-210, Clause A8.4(2)

### 2.2.2 Equipment Under Test

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

### 2.2.3 Date of Test and Modification State

10 December 2009 - Modification State 0

### 2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.2.5 Test Procedure

Test Performed in accordance with FCC CFR 47 Part 15 and RSS-210.

### 2.2.6 Environmental Conditions

10 December 2009

Ambient Temperature 23.4°C

Relative Humidity 24.1%

### 2.2.7 Test Results

7.4 V DC

| Frequency (MHz) | Maximum Peak Conducted Output Power |      |      |       |       |       |
|-----------------|-------------------------------------|------|------|-------|-------|-------|
|                 | dBm                                 |      |      | mW    |       |       |
|                 | DH1                                 | DH3  | DH5  | DH1   | DH3   | DH5   |
| 2402            | 4.19                                | 4.50 | 4.49 | 2.624 | 2.818 | 2.812 |
| 2441            | 4.09                                | 4.45 | 4.47 | 2.564 | 2.799 | 2.799 |
| 2480            | 4.20                                | 4.50 | 4.48 | 2.630 | 2.818 | 2.805 |



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#### Limit Clause

##### 15.247 (b)(1) for FCC

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

##### A8.4 (2) for RSS-210

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W; for all other frequency hopping systems in the band, the maximum peak conducted output power shall not exceed 0.125 W. Except as provided in Section A8.4(5), the e.i.r.p shall not exceed 4W.



Product Service

## **2.3 EIRP PEAK POWER**

### **2.3.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.247 (b)(3)  
RSS-210, Clause A8.4(4)

### **2.3.2 Equipment Under Test**

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

### **2.3.3 Date of Test and Modification State**

04 to 05 January 2010 - Modification State 0

### **2.3.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.3.5 Test Method and Operating Modes**

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15C and RSS-210.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1  
                          - Mode 2  
                          - Mode 3

### **2.3.6 Environmental Conditions**

|                      | 04 January 2010 | 05 January 2010 |
|----------------------|-----------------|-----------------|
| Ambient Temperature  | 16°C            | 16°C            |
| Relative Humidity    | 29%             | 29%             |
| Atmospheric Pressure | 1013mbar        | 1013mbar        |



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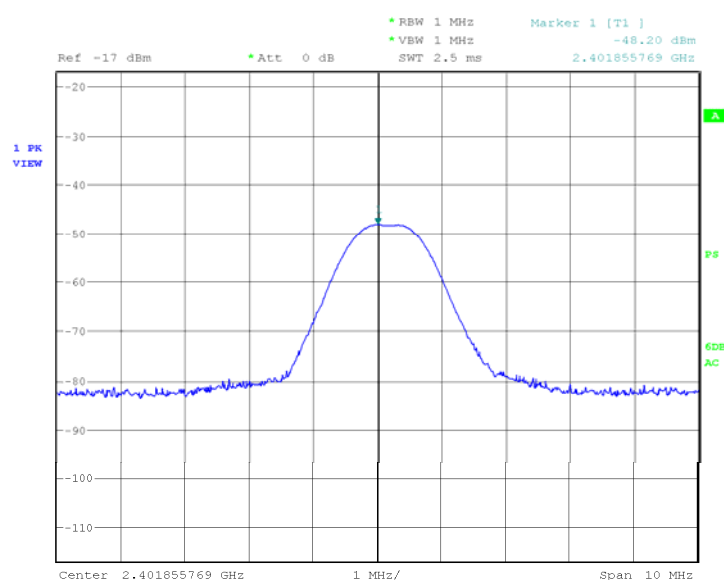
## 2.3.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15C and RSS-210 for EIRP Peak Power.

The test results are shown below.

### Configuration 1 - Mode 1

| Frequency GHz | Result (dBm) | FCC Limit (dBm) | IC Limit (dBm) | Result (W) | FCC Limit (W) | IC Limit (W) |
|---------------|--------------|-----------------|----------------|------------|---------------|--------------|
| 2.402         | -2.0         | 30              | 36             | 0.001      | 1             | 4            |



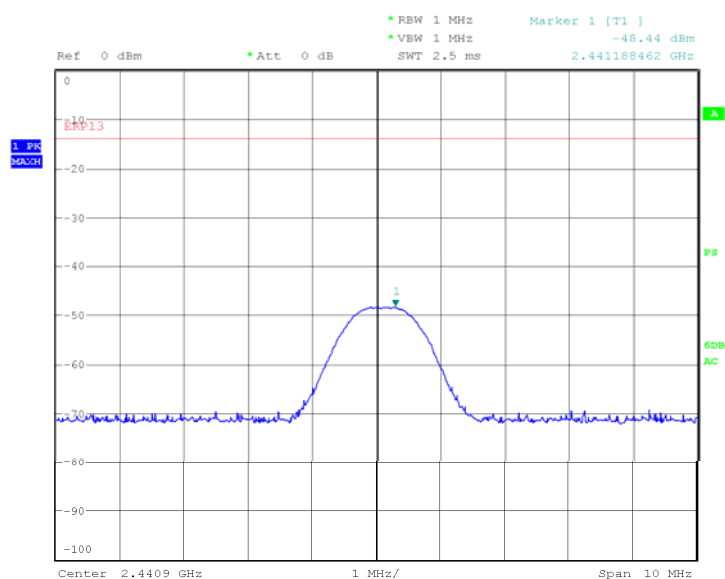
Date: 4.JAN.2010 23:07:43



Product Service

### Configuration 1 - Mode 2

| Frequency<br>GHz | Result (dBm) | FCC Limit<br>(dBm) | IC Limit<br>(dBm) | Result (W) | FCC Limit (W) | IC Limit (W) |
|------------------|--------------|--------------------|-------------------|------------|---------------|--------------|
| 2.441            | -0.8         | 30                 | 36                | 0.001      | 1             | 4            |



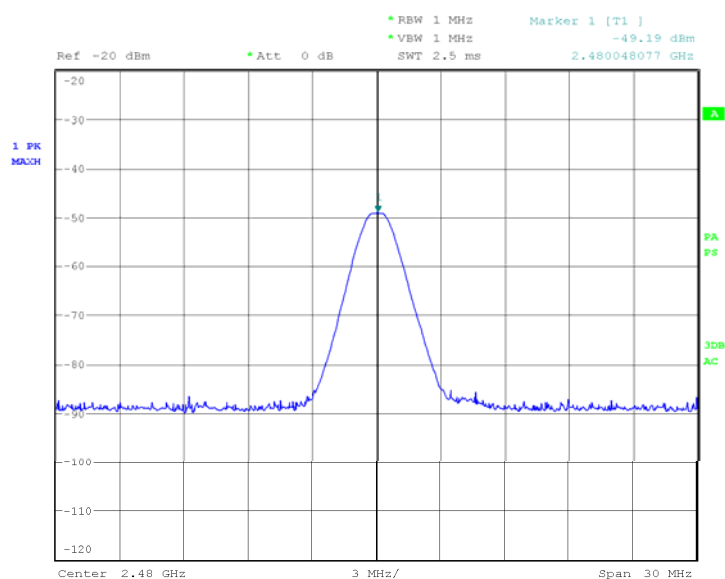
Date: 13.JAN.2010 00:23:32



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### Configuration 1 - Mode 3

| Frequency<br>GHz | Result (dBm) | FCC Limit<br>(dBm) | IC Limit<br>(dBm) | Result (W) | FCC Limit (W) | IC Limit (W) |
|------------------|--------------|--------------------|-------------------|------------|---------------|--------------|
| 2.480            | -2.2         | 30                 | 36                | 0.001      | 1             | 4            |



Date: 4.JAN.2010 23:59:57



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## **2.4 SPURIOUS EMISSIONS**

### **2.4.1 Specification Reference**

FCC CFR 47 Part 15, Clause 15.247 (d)  
RSS-210, Clause A8.5

### **2.4.2 Equipment Under Test**

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

### **2.4.3 Date of Test and Modification State**

14 December 2009 - Modification State 0

### **2.4.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.4.5 Test Procedure**

Test Performed in accordance with FCC CFR 47 Part 15 and RSS-210.

In accordance with Part 15.247(c), the Spurious Conducted Emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 9 kHz to 25 GHz. The EUT was set to transmit on full power and frequency hopping on all channels. The resolution and video bandwidths were set to 100kHz in accordance with Part 15.247. The spectrum analyser detector was set to Max Hold.

With the EUT transmitting at maximum power, the Spectrum Analyser was set to Max Hold and the fundamental peak measured in a RBW and VBW of 100kHz. This level was used to determine the limit line as displayed on the plots of -20dBc.

The maximum path loss across each measurement band was used as the reference level offset to ensure worst case results.

### **2.4.6 Environmental Conditions**

14 December 2009

Ambient Temperature 24.3°C

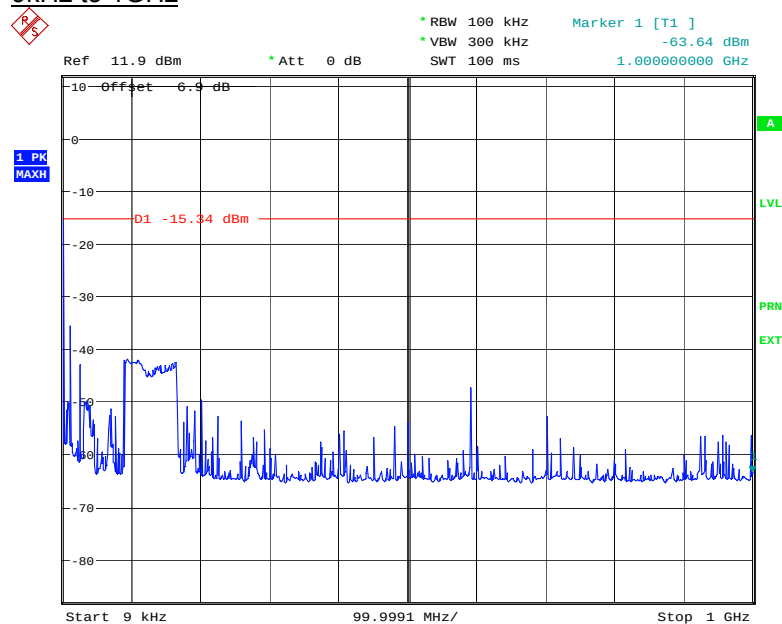
Relative Humidity 27.7%

## 2.4.7 Test Results

7.4 V DC Supply

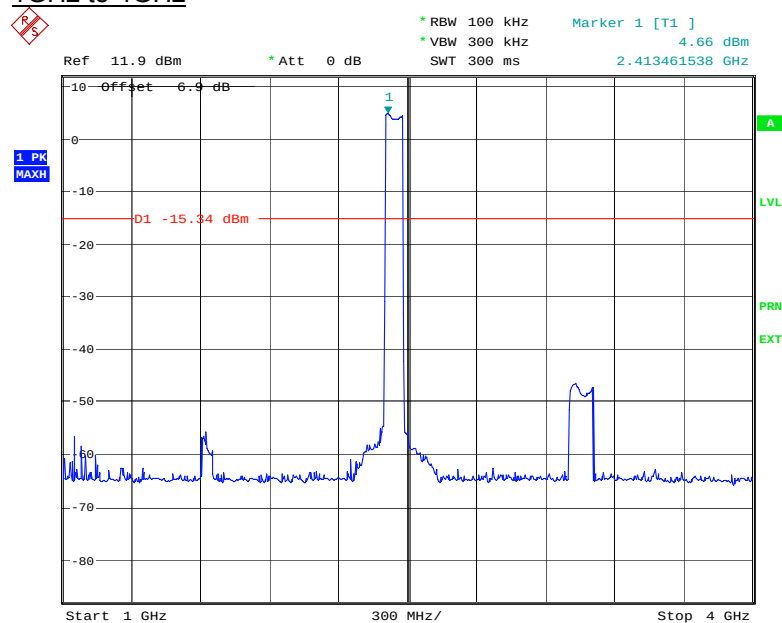
DH1

9kHz to 1GHz



Date: 14.DEC.2009 12:38:03

1GHz to 4GHz

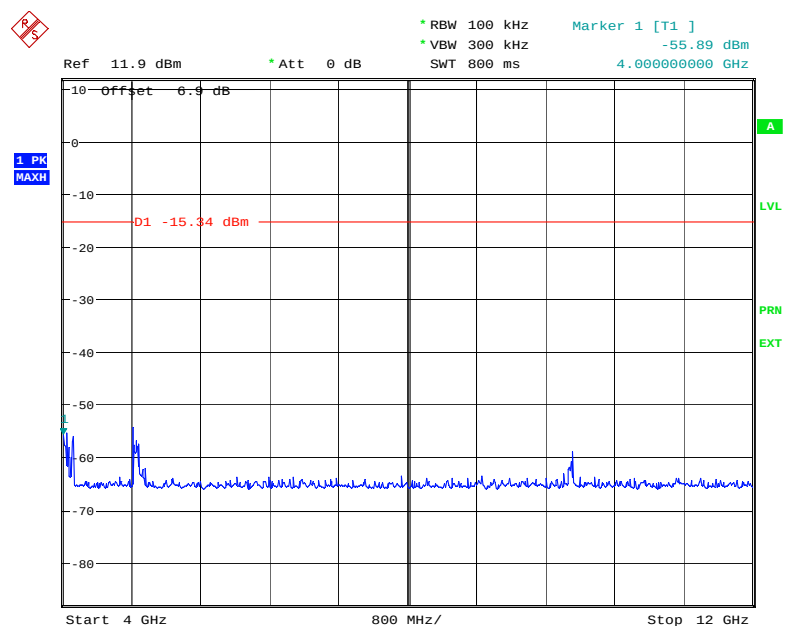


Date: 14.DEC.2009 11:02:31



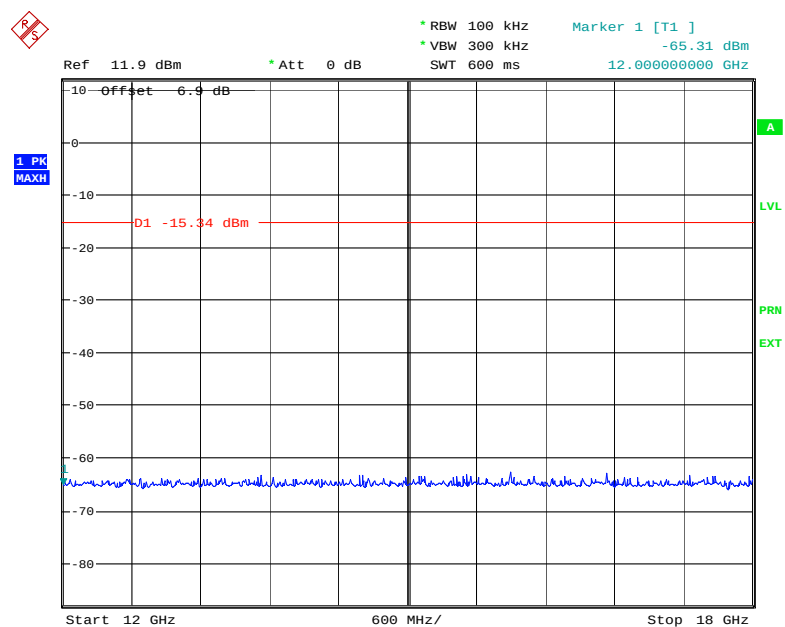
Product Service

## 4GHz to 12GHz



Date: 14.DEC.2009 11:07:12

## 12GHz to 18GHz

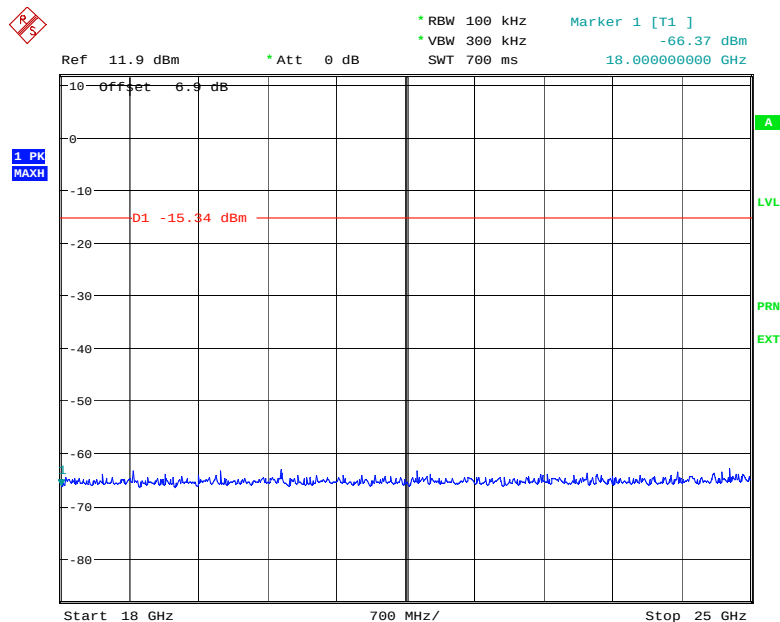


Date: 14.DEC.2009 11:12:07



Product Service

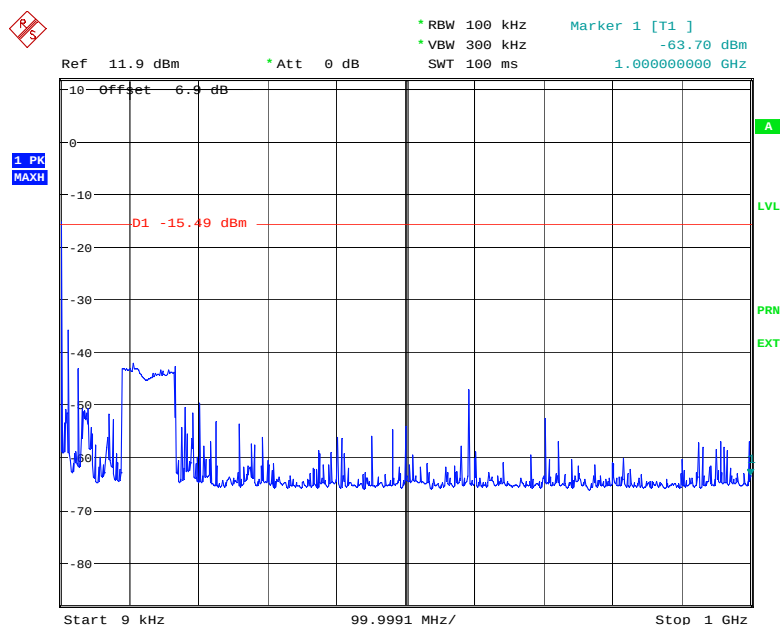
### 18GHz to 25GHz



Date: 14.DEC.2009 11:13:51

### DH3

### 9kHz to 1GHz

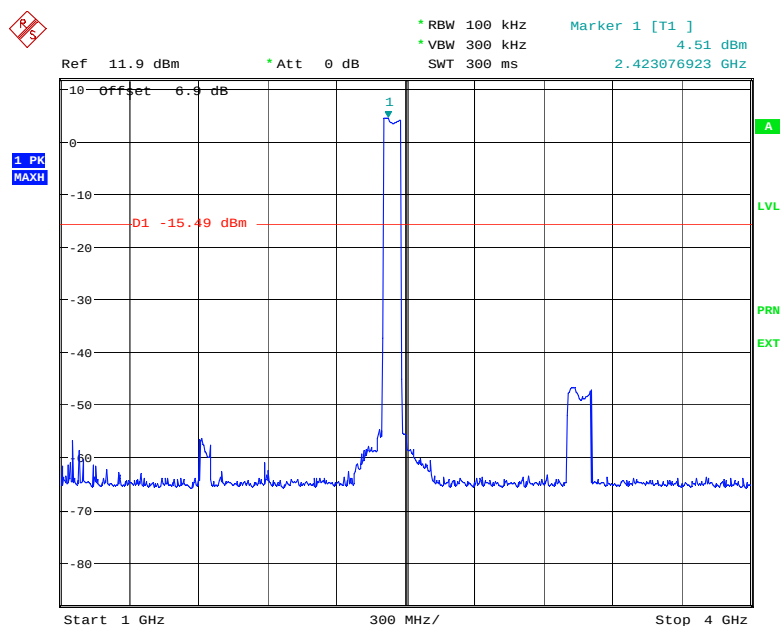


Date: 14.DEC.2009 11:35:01



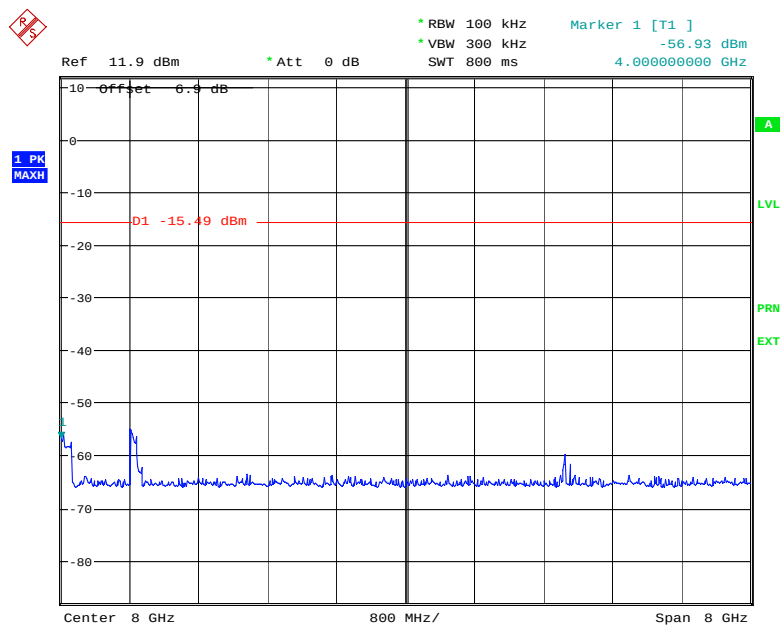
Product Service

## 1GHz to 4GHz



Date: 14.DEC.2009 11:32:55

## 4GHz to 12GHz

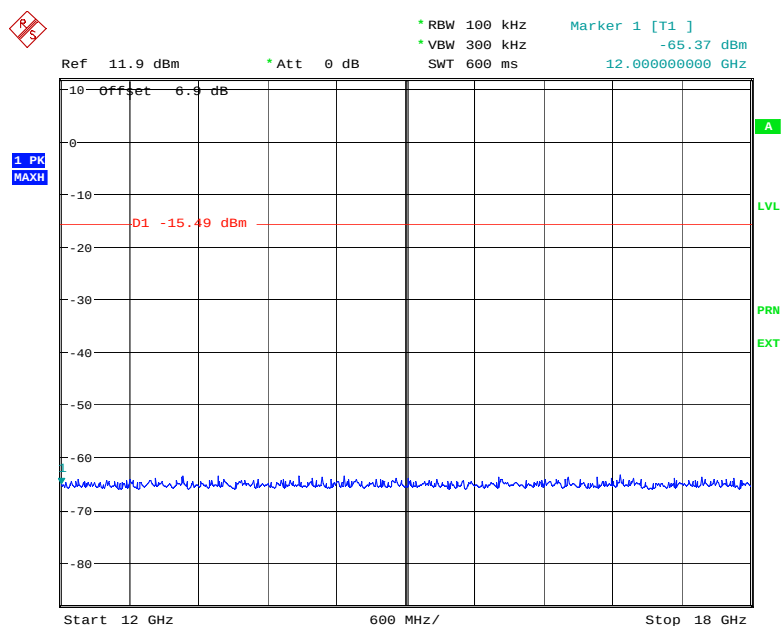


Date: 14.DEC.2009 11:36:49



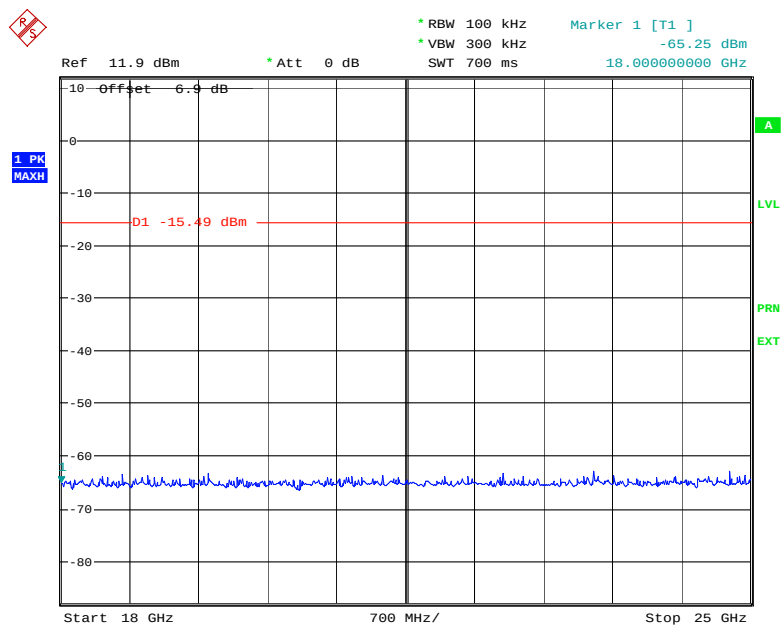
Product Service

## 12GHz to 18GHz



Date: 14.DEC.2009 11:38:40

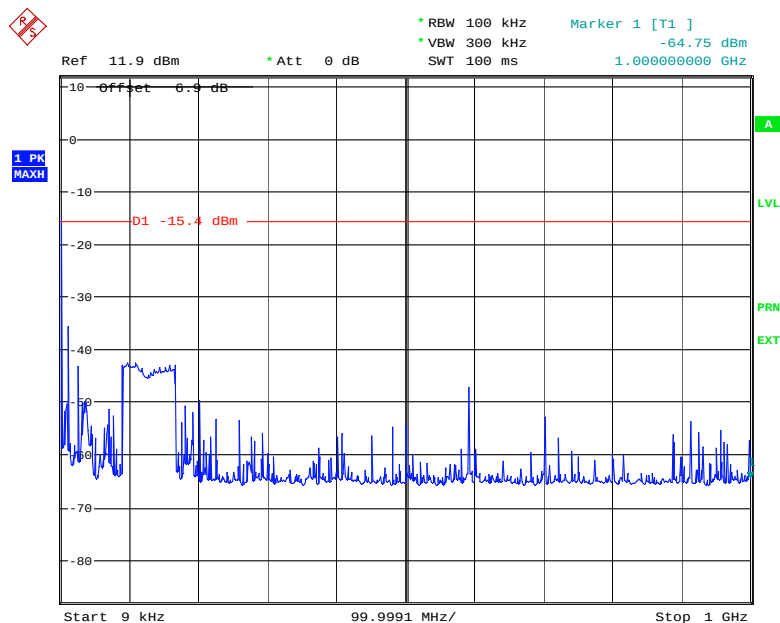
## 18GHz to 25GHz



Date: 14.DEC.2009 11:50:51

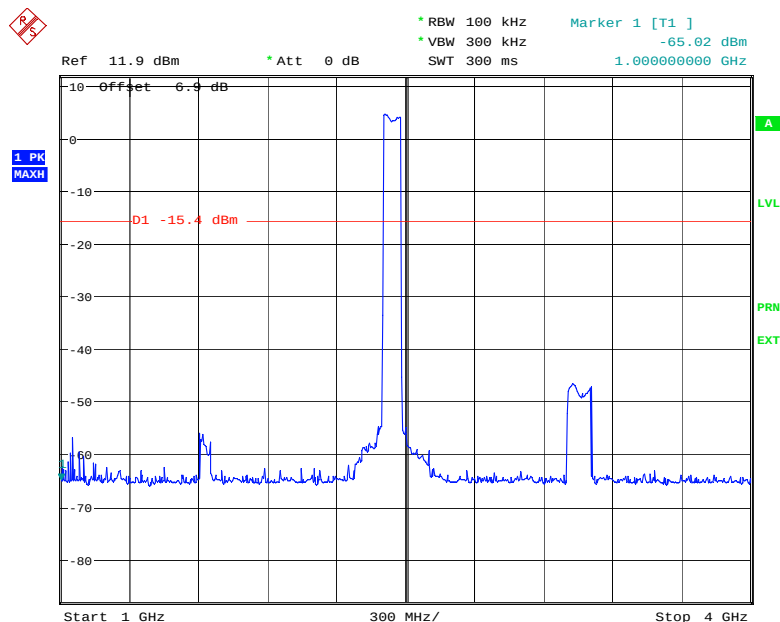
## DH5

### 9kHz to 1GHz



Date: 14.DEC.2009 12:04:02

### 1GHz to 4GHz

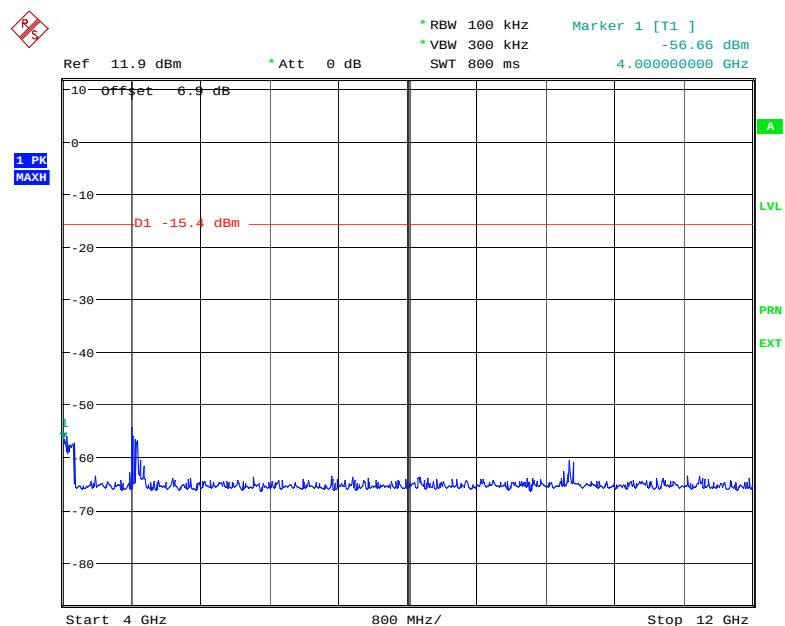


Date: 14.DEC.2009 12:07:09



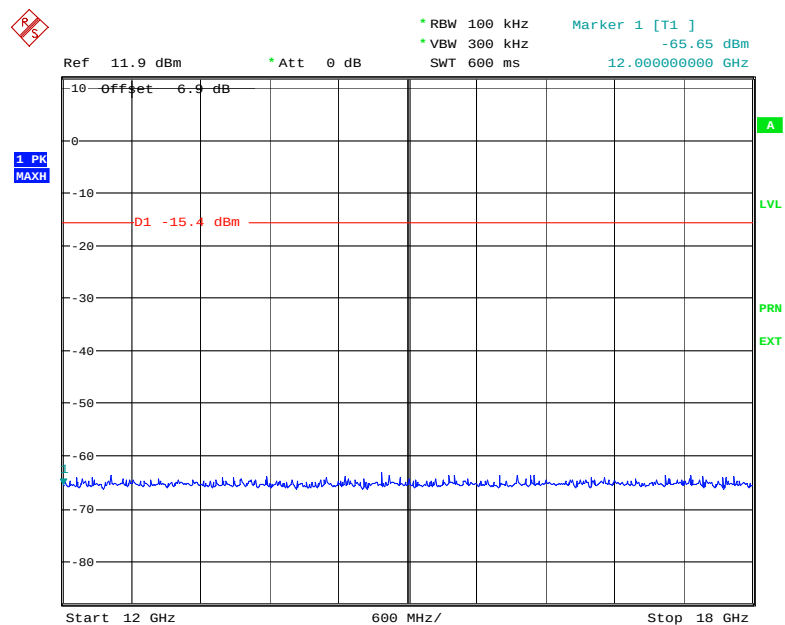
Product Service

## 4GHz to 12GHz



Date: 14.DEC.2009 12:08:32

## 12GHz to 18GHz

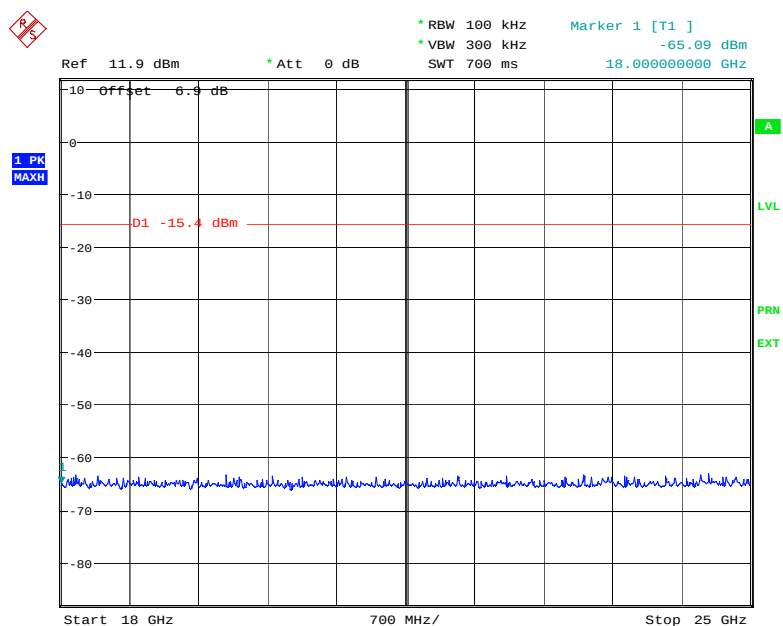


Date: 14.DEC.2009 12:10:06



Product Service

## 18GHz to 25GHz



Date: 14.DEC.2009 12:12:34



Product Service

## 2.5 CHANNEL DWELL TIME

### 2.5.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.247 (a)(1)(iii)  
RSS-210, Clause A8.1(d)

### 2.5.2 Equipment Under Test

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

### 2.5.3 Date of Test and Modification State

11 December 2009 - Modification State 0

### 2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

### 2.5.5 Test Procedure

Test Performed in accordance with FCC CFR 47 Part 15 and RSS-210.

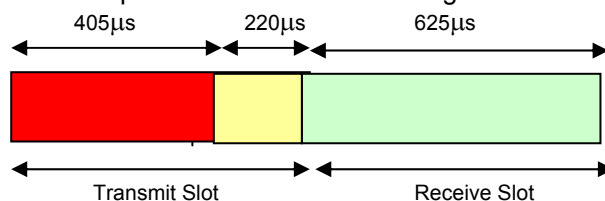
The Bluetooth system hops at a rate of 1600 times per second. Thus, this equates to 1600 timeslots in 1 second.

The DH1 data rate operates on a Transmit on 1 timeslot and Receive on 1 timeslot basis. Thus, in 1 second, there are 800 Transmit timeslots and 800 Receive timeslots.

Thus:

$$1 \text{ Timeslot} = \frac{1}{1600} = 625\mu\text{s}$$

In 1 transmit timeslot, the transmit on time is only 405μs. 220μs is reserved as off time for the synthesizer to re-tune ready for the next transmit frequency. The following timeslot is a receive slot. This process continues assuming the data rate remains the same.



DH1 Timeslot Arrangement Showing One Complete Transmit and Receive Cycle

So, with 800 Tx and 800 Rx timeslots, the transmitter is on for  $800 \times 405\mu\text{s} = 0.324$  seconds.

$$\therefore \frac{\text{Total Tx Time On}}{\text{No of Channels}} = \frac{0.324}{80} = 4.05\text{ms}$$

So, in 32 seconds, the transmitter dwell time per channel is:

$$32 \times 4.05\text{ms} = 0.1296 \text{ seconds}$$



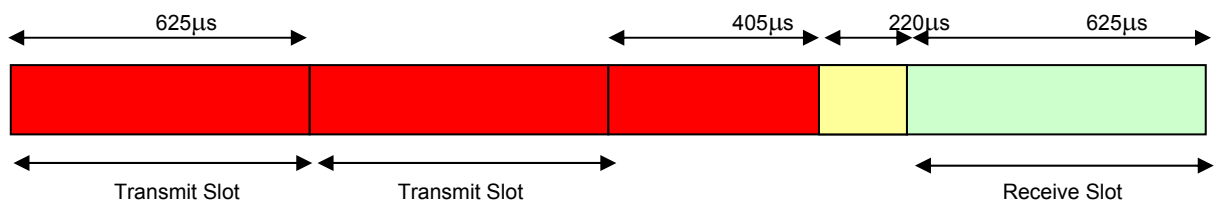
With data rate DH3, the data payload is higher and can use up to 3 timeslots. When more than one timeslot is used, the frequency does not hop and transmission is continuous on all 3 slots, (ie. no receive slot in-between the 3 transmit slots). The 220µs off time for synthesizer re-tuning at the end of a slot is only used on the final slot. Thus, for one cycle, there are 3 transmit timeslots. 2 are 625µs long and the final slot is transmitting for 405µs.

The DH3 data rate operates on a Transmit on 3 timeslots and Receives on 1 timeslot basis, (assuming maximum data payload). The frequency-hopping rate is the same. Thus, in 1 second, there are 1200 Transmit timeslots and 400 Receive timeslots.

Thus:

$$1 \text{ Timeslot} = \frac{1}{1600} = 625\mu\text{s}$$

The first 2 Transmit timeslots are transmitting for the complete 625µs. In the third transmit slot, the transmit on time is only 405µs. 220µs is reserved as off time for the synthesizer to re-tune ready for the next transmit frequency. The following timeslot is a receive slot. This process continues assuming the data rate remains the same.



DH3 Timeslot Arrangement Showing One Complete Transmit and Receive Cycle, (Maximum Payload)

Thus, the transmitter for one complete transmit and receive cycle would be on for:

$$T_x \quad (2 \times 625\mu\text{s}) + (1 \times 405\mu\text{s}) = 1.655\text{ms}$$

So:

$$\begin{aligned} 800 \times 625\mu\text{s} &= 0.5 \text{ seconds} \\ 400 \times 405\mu\text{s} &= 0.162 \text{ seconds} \end{aligned}$$

$$\text{Thus:} \quad 0.5 + 0.162 = 0.662 \text{ seconds}$$

$$\therefore \frac{\text{Total Tx Time On}}{\text{No Of Channels}} = \frac{0.662}{80} = 8.275\text{ms}$$

So, in 32 seconds, the transmitter dwell time per channel is:

$$32 \times 8.275\text{ms} = 0.2648 \text{ seconds}$$

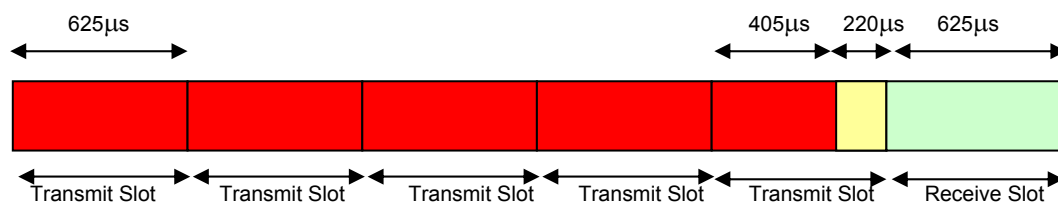
With data rate DH5, the data payload is higher and can use up to 5 timeslots. When more than one timeslot is used, the frequency does not hop and transmission is continuous on all 5 slots, (ie. no receive slot in-between the 5 transmit slots). The 220µs off time for synthesizer re-tuning at the end of a slot is only used on the final slot. Thus, for one cycle, there are 5 transmit timeslots. 4 are 625µs long and the final slot is transmitting for 405µs.

The DH5 data rate operates on a Transmit on 5 timeslots and Receives on 1 timeslot basis, (assuming maximum data payload). The frequency-hopping rate is the same. Thus, in 1 second, there are 1333.3 Transmit timeslots and 266.7 Receive timeslots.

Thus:

$$1 \text{ Timeslot} = \frac{1}{1600} = 625\mu\text{s}$$

The first 4 Transmit timeslots are transmitting for the complete 625µs. In the fifth transmit slot, the transmit on time is only 405µs. 220µs is reserved as off time for the synthesizer to re-tune ready for the next transmit frequency. The following timeslot is a receive slot. This process continues assuming the data rate remains the same.



DH5 Timeslot Arrangement Showing One Complete Transmit and Receive Cycle, (Maximum Payload)

Thus, the transmitter for one complete transmit and receive cycle would be on for:

$$\text{Tx} \quad (2 \times 625\mu\text{s}) + (1 \times 405\mu\text{s}) = 2.905\text{ms}$$

So:

$$\begin{aligned} 1066.7 \times 625\mu\text{s} &= 0.666 \text{ seconds} \\ 266.7 \times 405\mu\text{s} &= 0.108 \text{ seconds} \end{aligned}$$

$$\text{Thus:} \quad 0.666 + 0.108 = 0.774 \text{ seconds}$$

$$\therefore \frac{\text{Total Tx Time On}}{\text{No Of Channels}} = \frac{0.774}{80} = 9.675\text{ms}$$

So, in 32 seconds, the transmitter dwell time per channel is:

$$32 \times 9.675\text{ms} = 0.31 \text{ seconds}$$



Product Service

## 2.5.6 Environmental Conditions

11 December 2009

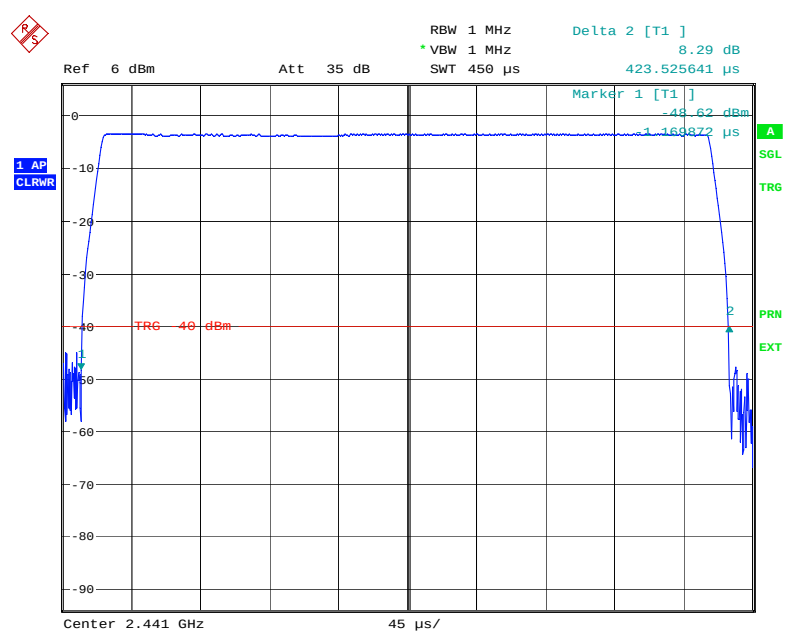
Ambient Temperature 24.1-24.6°C

Relative Humidity 23.8-24.5%

## 2.5.7 Test Results

DH1

On

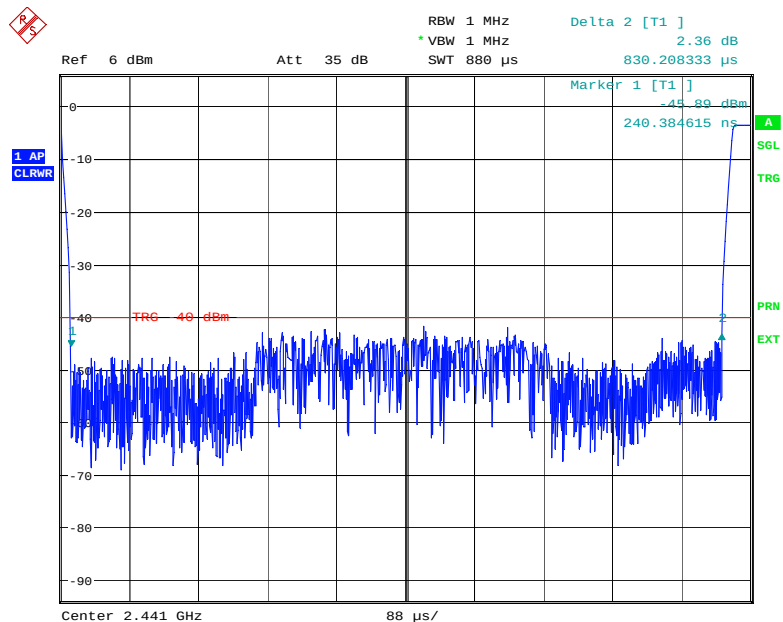


Date: 11.DEC.2009 11:45:30



Product Service

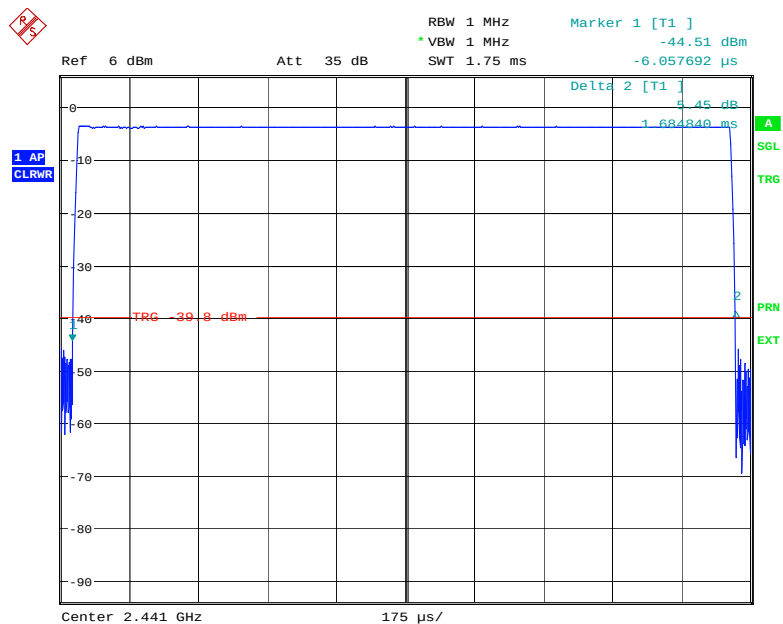
Off



Date: 11.DEC.2009 11:54:39

DH3

On

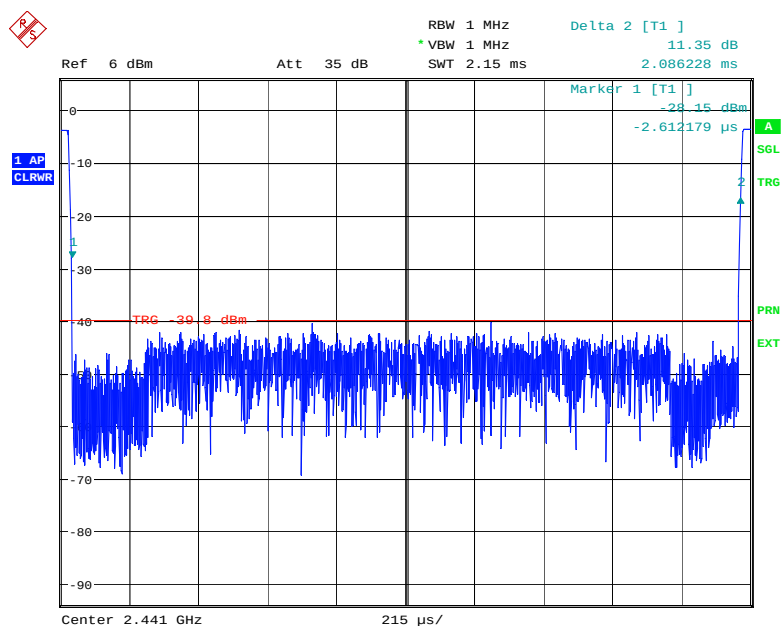


Date: 11.DEC.2009 12:16:07



Product Service

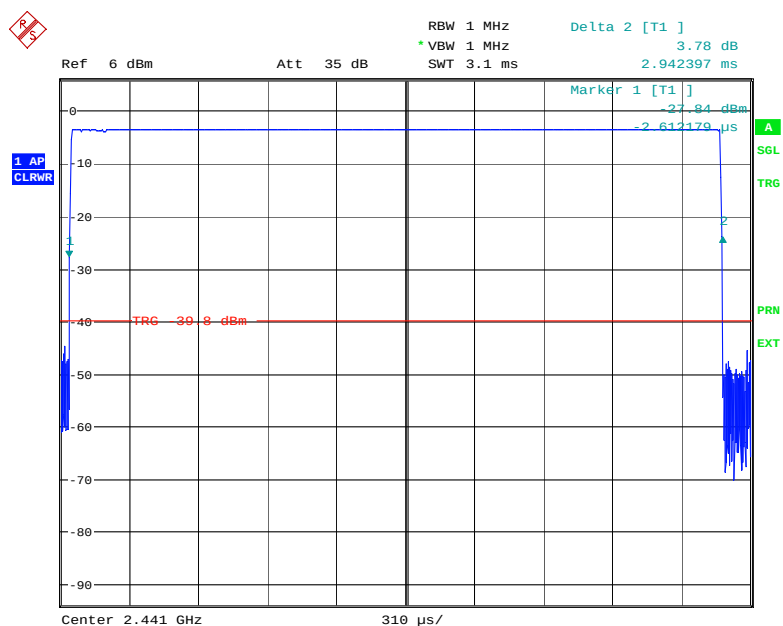
Off



Date: 11.DEC.2009 12:18:03

DH5

On

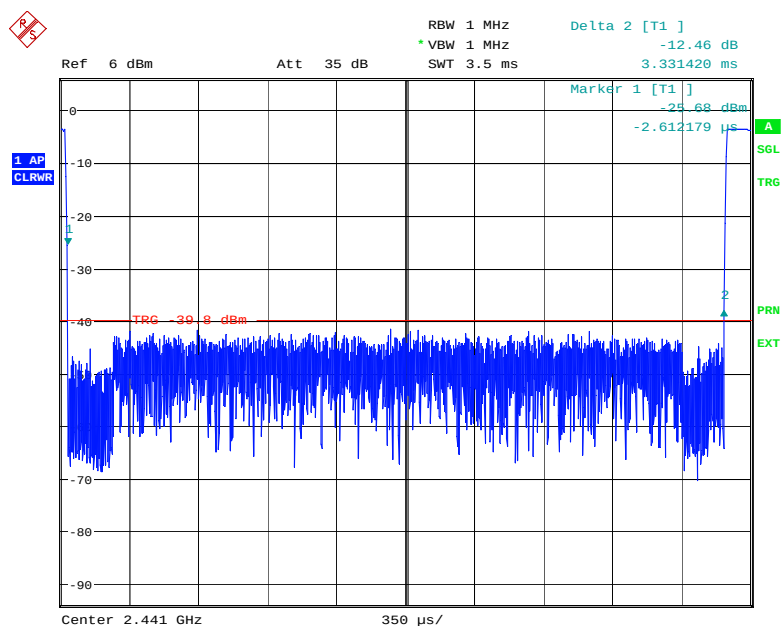


Date: 11.DEC.2009 12:21:08



Product Service

Off



Date: 11.DEC.2009 12:19:59



Product Service

## **2.6 CHANNEL SEPARATION**

### **2.6.1 Specification Reference**

FCC CFR 47 Part 15, Clause 15.247 (a)(1)  
RSS-210, Clause A8.1(b)

### **2.6.2 Equipment Under Test**

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

### **2.6.3 Date of Test and Modification State**

11 December 2009 - Modification State 0

### **2.6.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.6.5 Test Procedure**

Test Performed in accordance with FCC CFR 47 Part 15 and RSS-210.

The EUT was transmitted at maximum power into a Spectrum Analyser. The trace was set to Max Hold to store several adjacent channels on screen. Using the marker delta function, the markers were positioned to show the separation between adjacent channels.

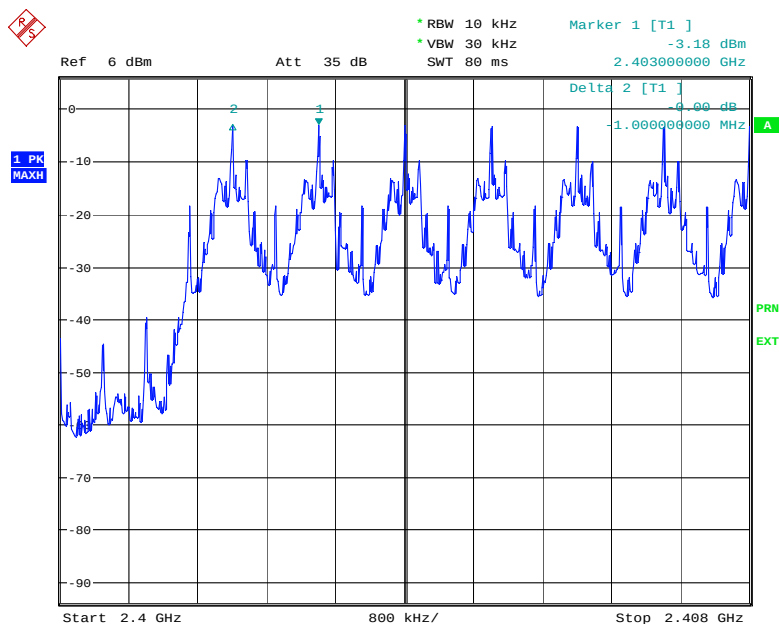
### **2.6.6 Environmental Conditions**

11 December 2009

Ambient Temperature 24.7°C

Relative Humidity 26.5%

## 2.6.7 Test Results



Date: 11.DEC.2009 15:31:40

### Limit Clause

15.247 (a)(1) for FCC  
A8.1(b) for RSS-210

|       |        |
|-------|--------|
| Limit | >25kHz |
|-------|--------|



Product Service

## **2.7 NUMBER OF HOPPING CHANNELS**

### **2.7.1 Specification Reference**

FCC CFR 47 Part 15, Clause 15.247 (a)(1)(iii)  
RSS-210, Clause A8.1(d)

### **2.7.2 Equipment Under Test**

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

### **2.7.3 Date of Test and Modification State**

11 December 2009 - Modification State 0

### **2.7.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

The EUT was connected to a Spectrum Analyser via a cable. The EUT was set to transmit on maximum power and hopping on all channels. The span was adjusted to show the individual channels. To reasonably display the number of channels, the occupied band was split into four traces. The display trace was set to Max Hold and the plots recorded.

### **2.7.5 Test Procedure**

Test Performed in accordance with FCC CFR 47 Part 15 and RSS-210.

### **2.7.6 Environmental Conditions**

11 December 2009

Ambient Temperature 24.1°C

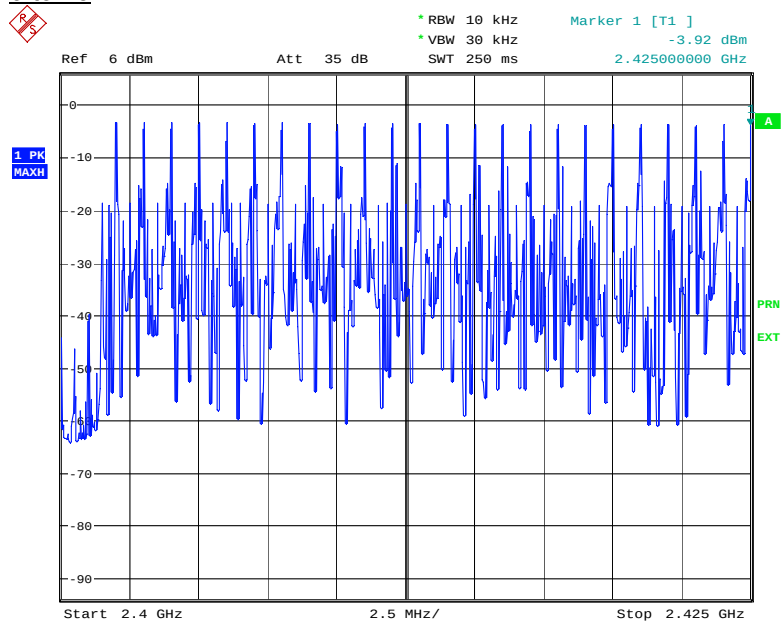
Relative Humidity 27.1%



Product Service

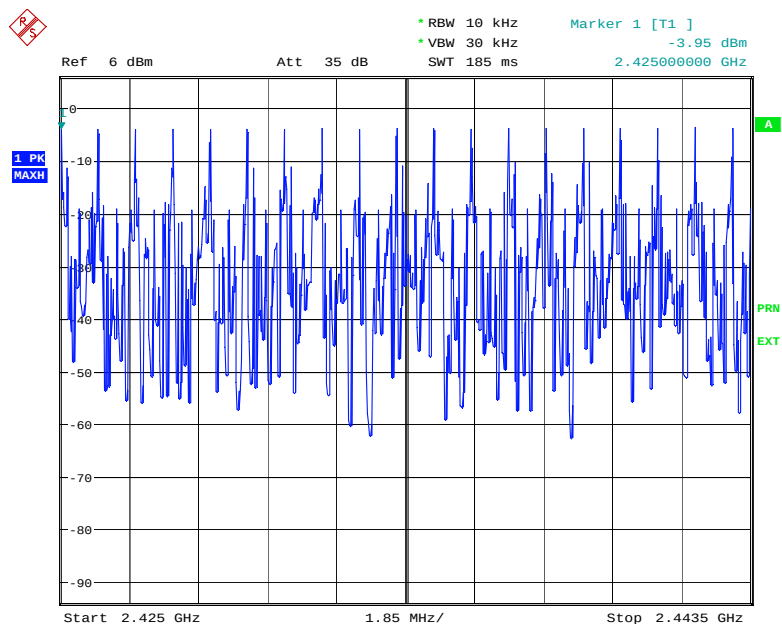
## 2.7.7 Test Results

### 0 to 23



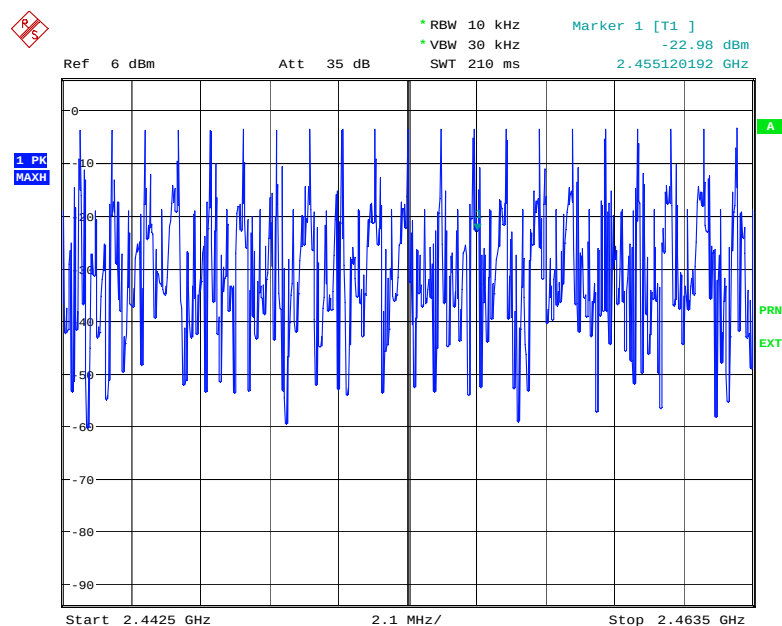
Date: 11.DEC.2009 15:56:07

### 23 to 43



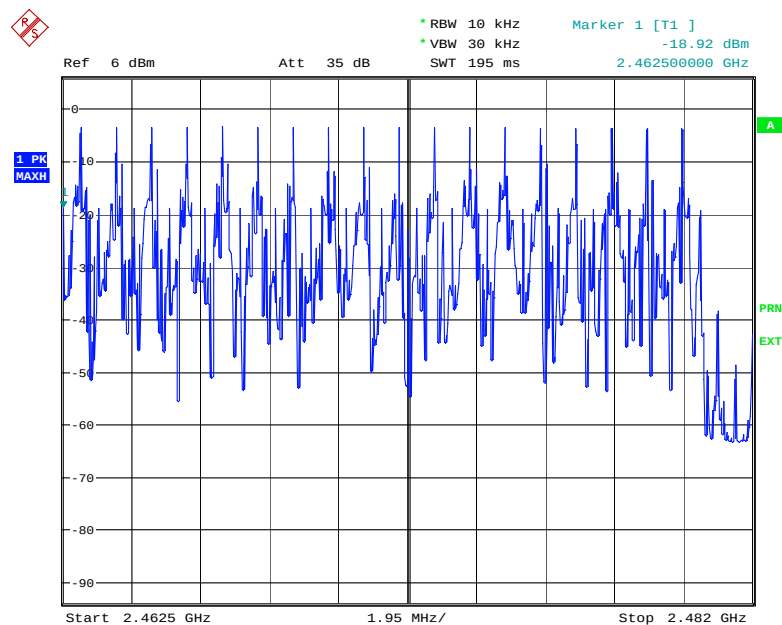
Date: 11.DEC.2009 16:00:18

### 43 to 63



Date: 11.DEC.2009 16:05:54

### 64 to 79



Date: 11.DEC.2009 16:14:58

### Limit Clause

15.247 (a)(1)(iii) for FCC and A8.1(d) for RSS-210

|       |              |
|-------|--------------|
| Limit | ≥75 channels |
|-------|--------------|



Product Service

## **2.8 RADIATED EMISSIONS (ENCLOSURE PORT)**

### **2.8.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.247 (a)(2)  
RSS-210, Clause A8.2(a)

### **2.8.2 Equipment Under Test**

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

### **2.8.3 Date of Test and Modification State**

05 January 2010 - Modification State 0

### **2.8.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

### **2.8.5 Test Method and Operating Modes**

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15C and RSS-210.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1  
                          - Mode 2  
                          - Mode 3

### **2.8.6 Environmental Conditions**

05 January 2010

Ambient Temperature 16°C

Relative Humidity 29%

Atmospheric Pressure 1013mbar



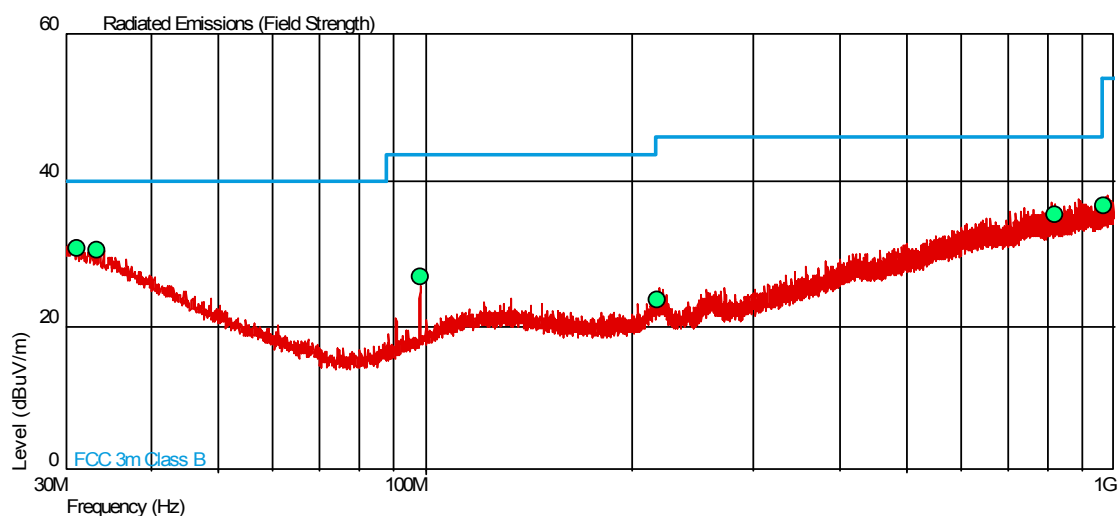
Product Service

## 2.8.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15C and RSS-210 2009 for Radiated Emissions (Enclosure Port).

The test results are shown below.

### Configuration 1 - Mode 1



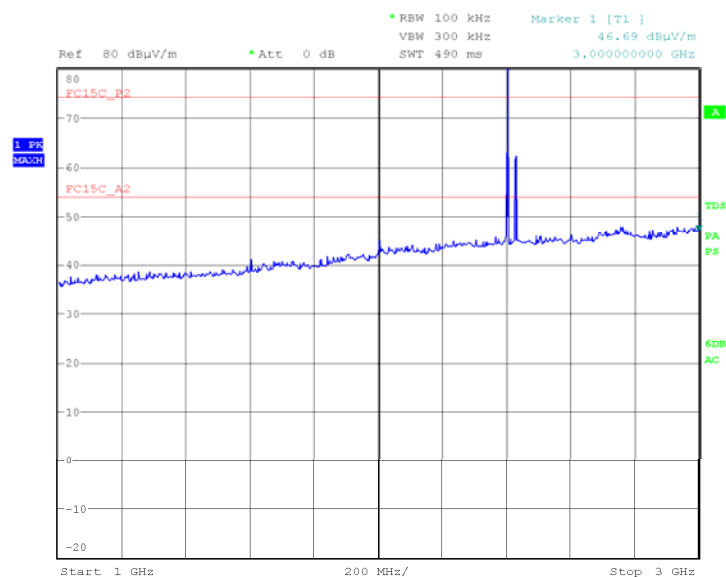
| Frequency (MHz) | QP Level (dBuV/m) | QP Level (uV/m) | QP Limit (dBuV/m) | QP Limit (uV/m) | QP Margin (dBuV/m) | QP Margin (uV/m) | Angle (deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 31.164          | 30.7              | 34.3            | 40.0              | 100             | -9.3               | 65.7             | 0           | 1.00       | Vertical   |
| 33.324          | 30.3              | 32.7            | 40.0              | 100             | -9.7               | 67.3             | 0           | 1.00       | Horizontal |
| 98.146          | 26.8              | 21.9            | 43.5              | 150             | -16.7              | 128.1            | 0           | 1.00       | Vertical   |
| 217.393         | 23.5              | 15.0            | 46.0              | 200             | -22.5              | 185.0            | 0           | 1.00       | Vertical   |
| 820.100         | 35.1              | 56.9            | 46.0              | 200             | -10.9              | 143.1            | 0           | 1.00       | Vertical   |
| 970.191         | 36.5              | 66.8            | 54.0              | 501             | -17.5              | 434.2            | 0           | 1.00       | Vertical   |



Product Service

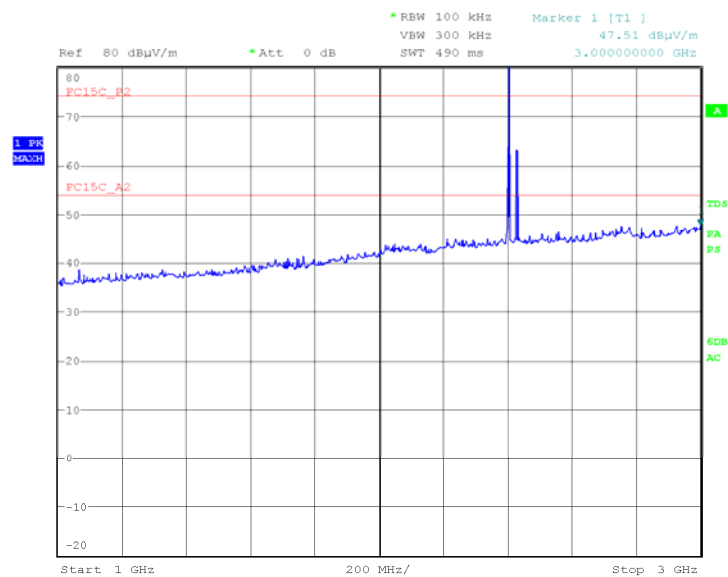
## 1GHz to 3GHz

### Vertical



Date: 5.JAN.2010 20:13:18

### Horizontal



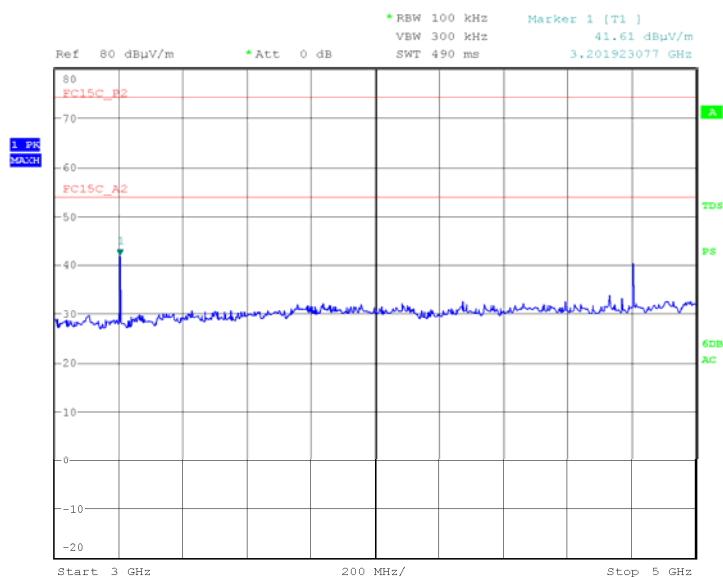
Date: 5.JAN.2010 20:16:53



Product Service

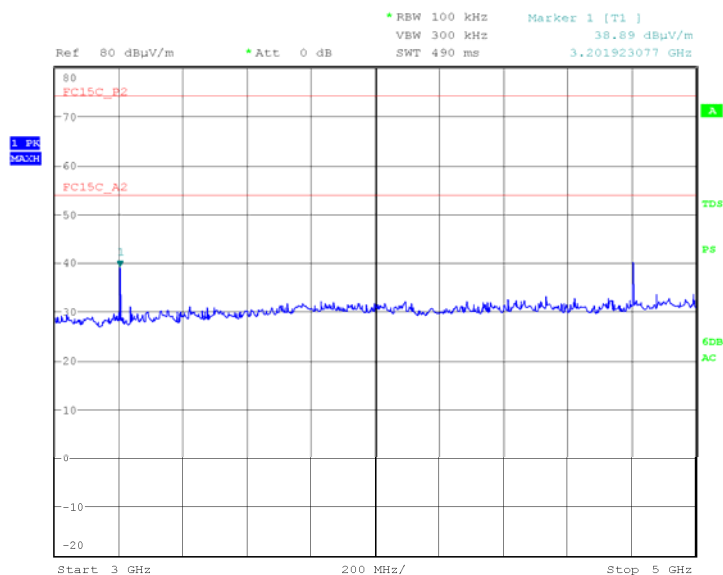
## 3GHz to 5GHz

### Vertical



Date: 5.JAN.2010 20:29:56

### Horizontal



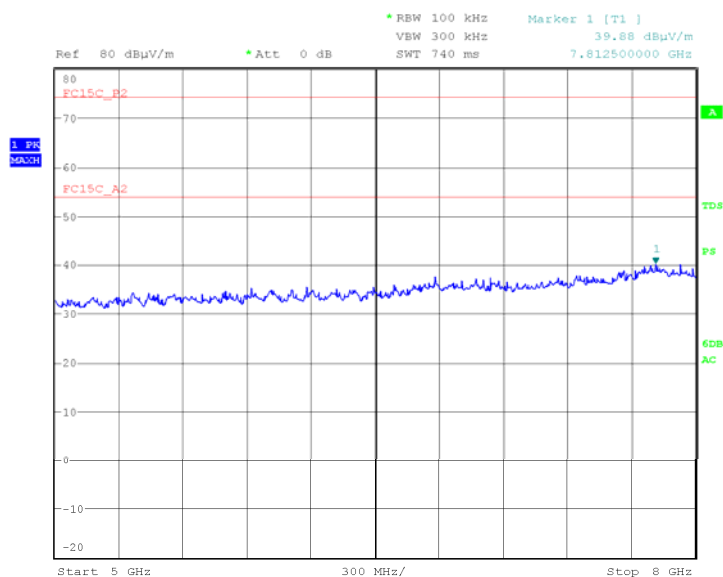
Date: 5.JAN.2010 20:33:40



Product Service

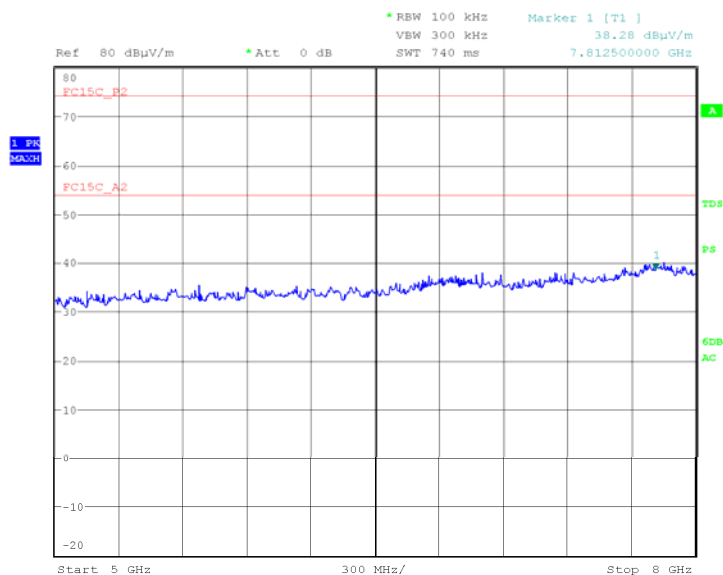
## 5GHz to 8GHz

### Vertical



Date: 5.JAN.2010 20:31:04

### Horizontal



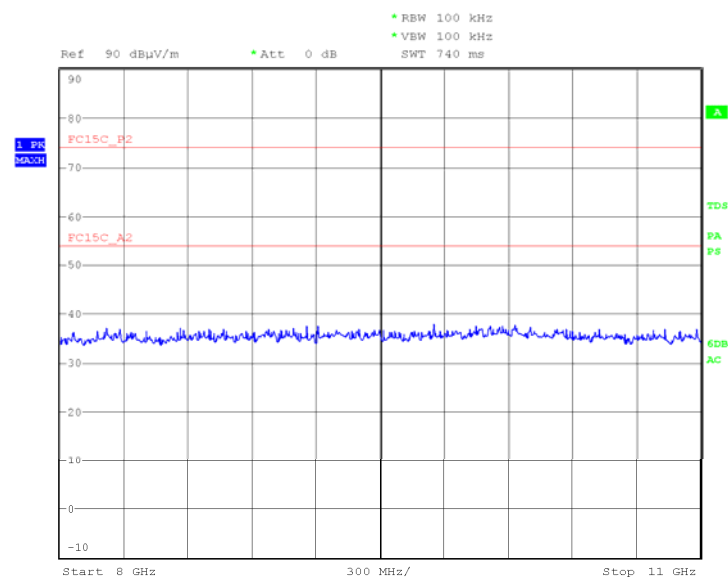
Date: 5.JAN.2010 20:32:31



Product Service

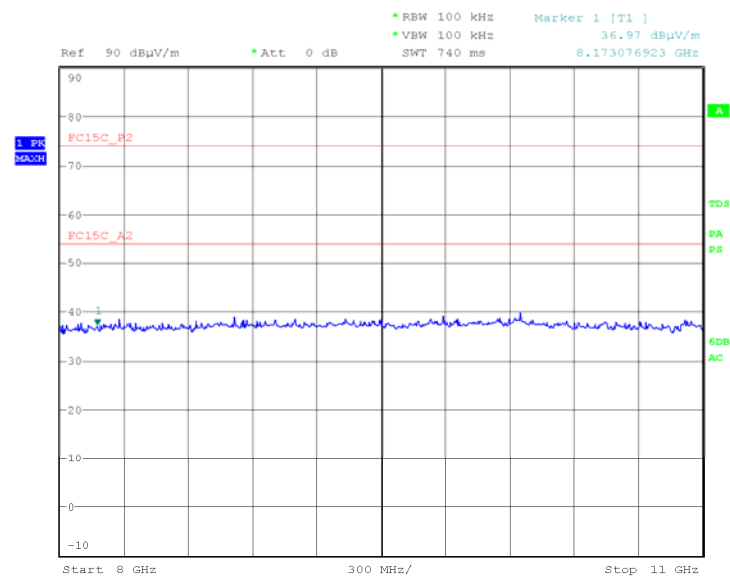
## 8GHz to 11GHz

### Vertical



Date: 12.JAN.2010 17:53:04

### Horizontal



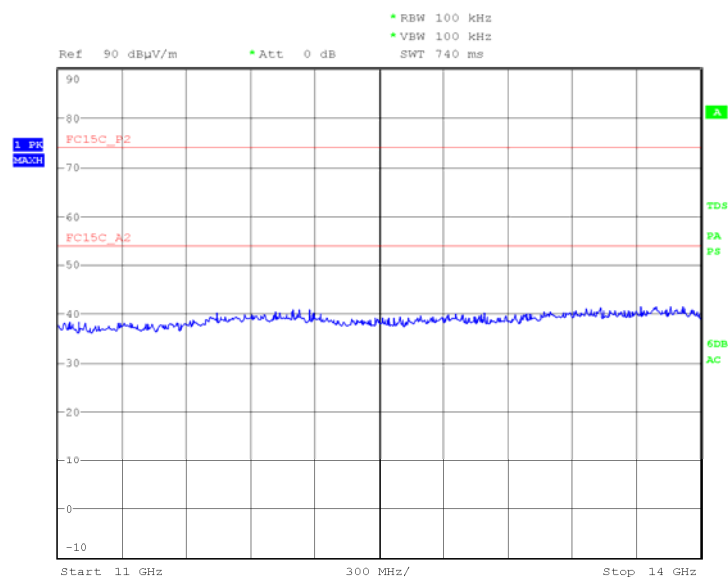
Date: 12.JAN.2010 18:11:30



Product Service

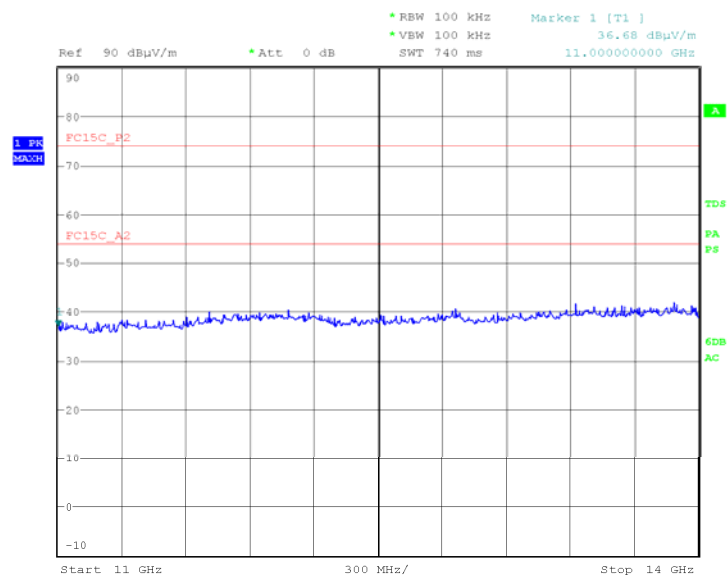
## 11GHz to 14GHz

### Vertical



Date: 12.JAN.2010 17:56:25

### Horizontal



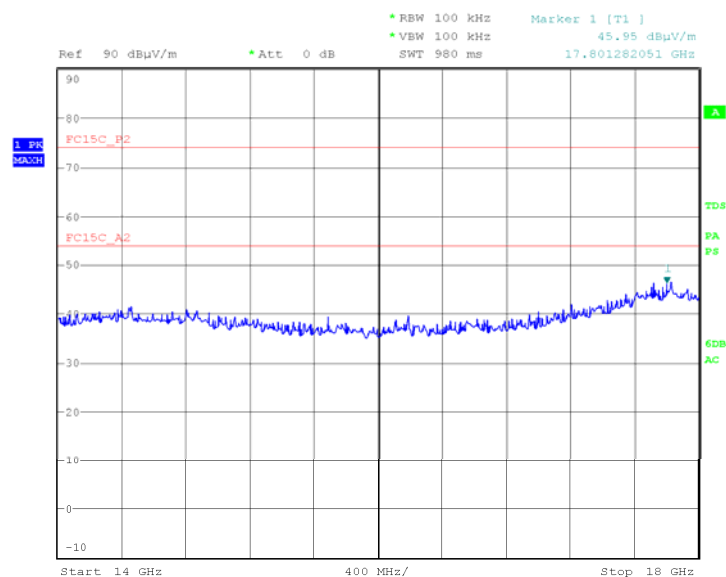
Date: 12.JAN.2010 18:13:02



Product Service

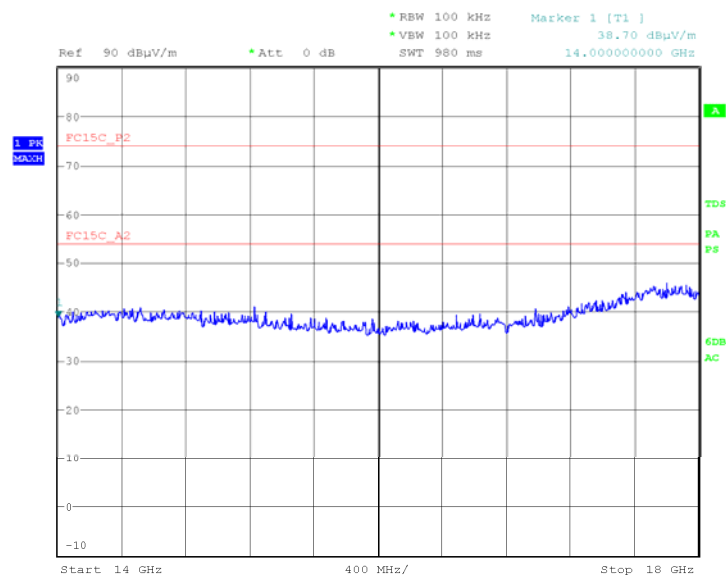
## 14GHz to 18GHz

### Vertical



Date: 12.JAN.2010 17:57:52

### Horizontal



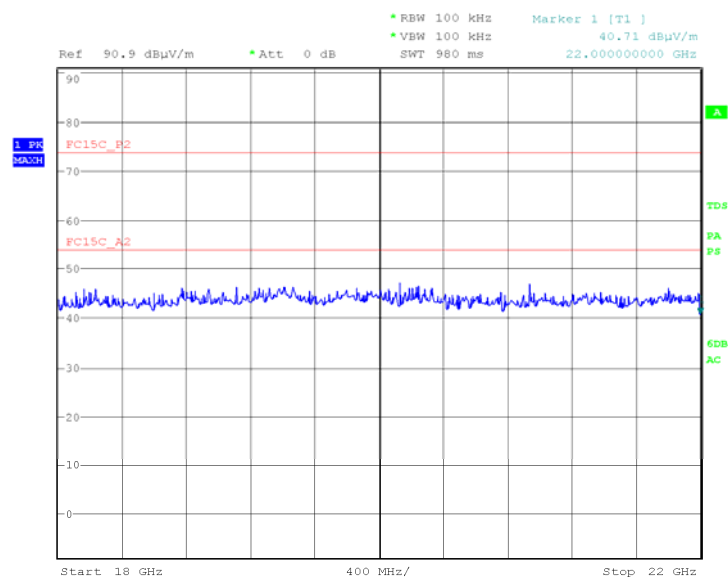
Date: 12.JAN.2010 18:14:34



Product Service

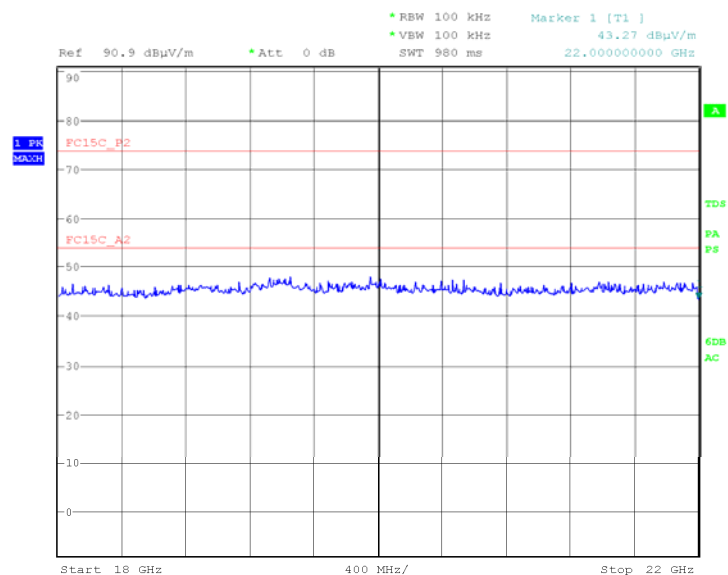
## 18GHz to 22GHz

### Vertical



Date: 12.JAN.2010 19:48:12

### Horizontal



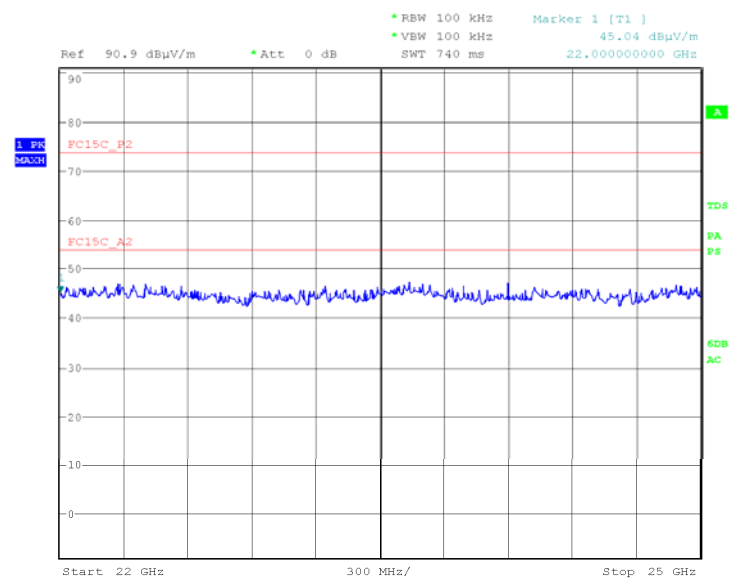
Date: 12.JAN.2010 19:53:20



Product Service

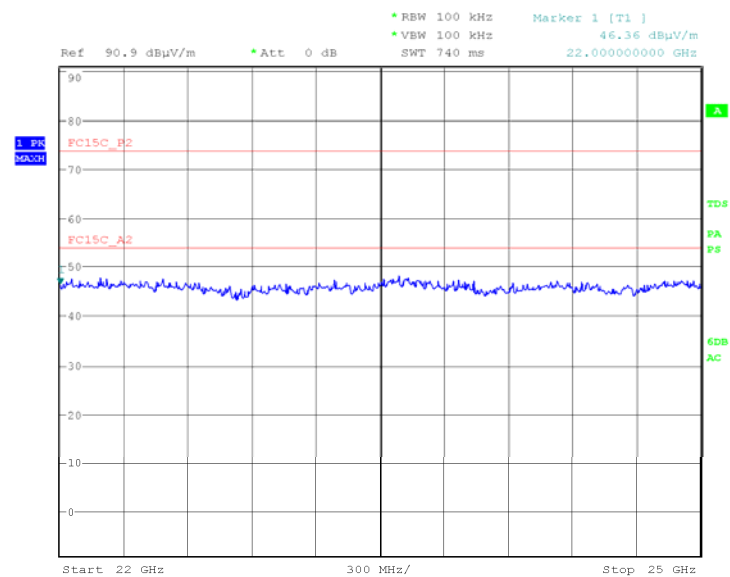
## 22GHz to 25GHz

### Vertical



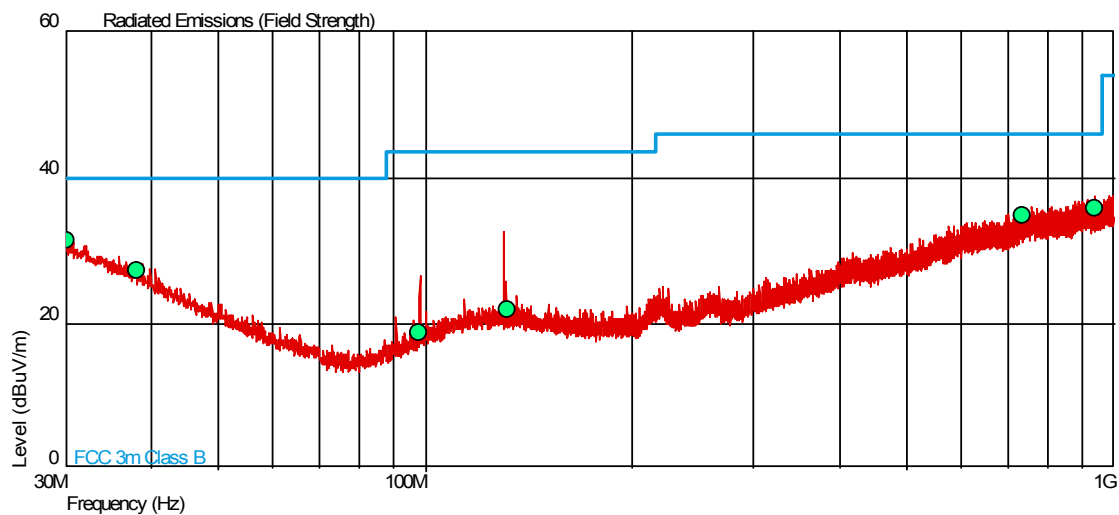
Date: 12.JAN.2010 19:50:55

### Horizontal



Date: 12.JAN.2010 19:55:38

## Configuration 1 - Mode 2



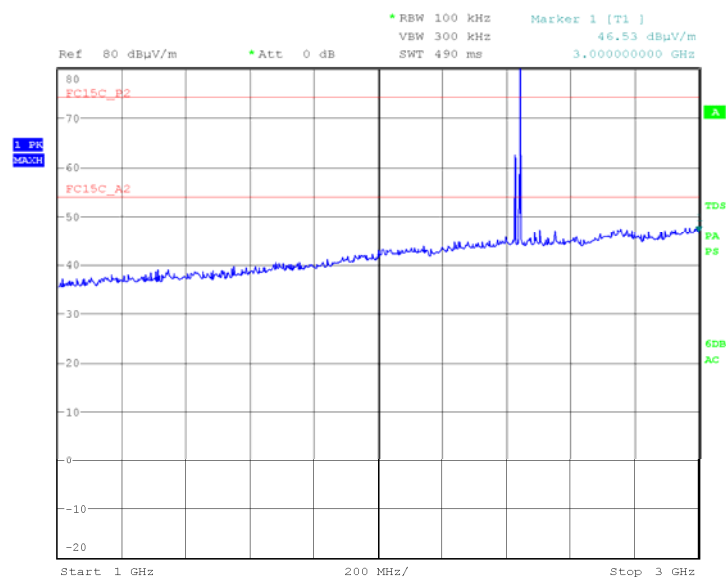
| Frequency (MHz) | QP Level (dBuV/m) | QP Level (uV/m) | QP Limit (dBuV/m) | QP Limit (uV/m) | QP Margin (dBuV/m) | QP Margin (uV/m) | Angle (deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 30.170          | 31.2              | 36.3            | 40.0              | 100             | -8.8               | 63.7             | 0           | 1.00       | Vertical   |
| 38.132          | 27.1              | 22.6            | 40.0              | 100             | -12.9              | 77.4             | 0           | 1.00       | Horizontal |
| 97.748          | 18.7              | 8.6             | 43.5              | 150             | -24.8              | 141.4            | 0           | 1.00       | Vertical   |
| 131.400         | 21.8              | 12.3            | 43.5              | 150             | -21.7              | 137.7            | 0           | 1.00       | Vertical   |
| 738.478         | 34.7              | 54.3            | 46.0              | 200             | -11.3              | 145.7            | 0           | 1.00       | Horizontal |
| 937.055         | 35.8              | 61.7            | 46.0              | 200             | -10.2              | 138.3            | 0           | 1.00       | Horizontal |



Product Service

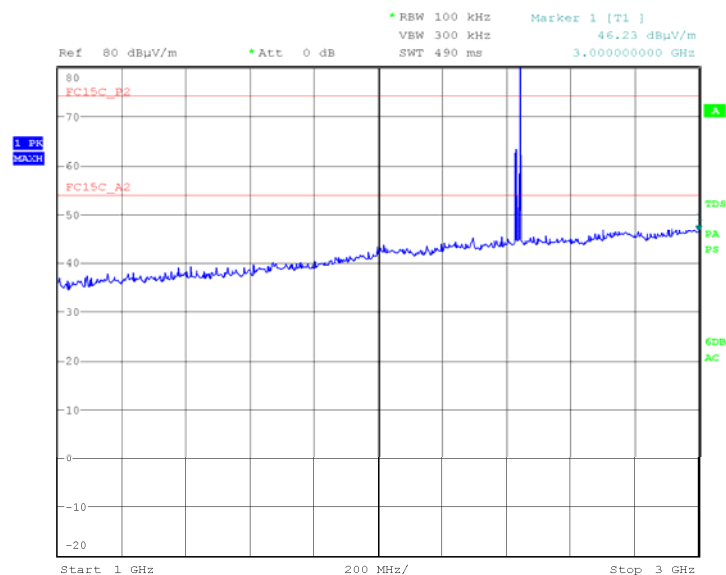
## 1GHz to 3GHz

### Vertical



Date: 5.JAN.2010 20:06:11

### Horizontal



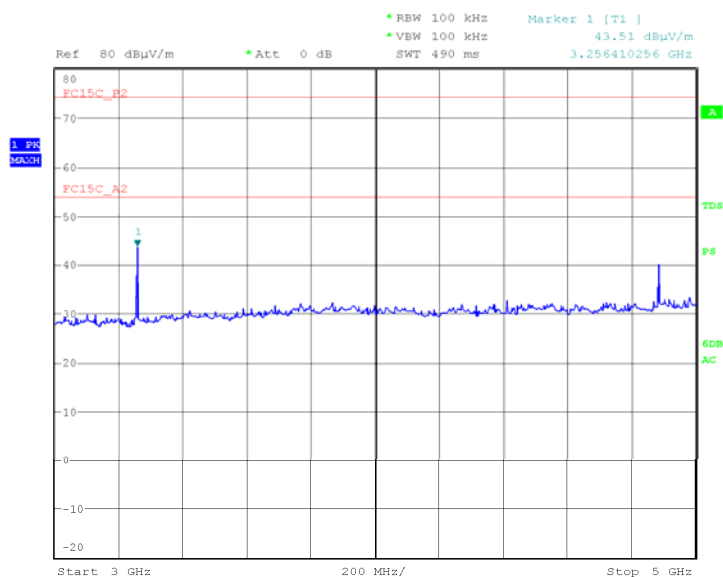
Date: 5.JAN.2010 20:02:54



Product Service

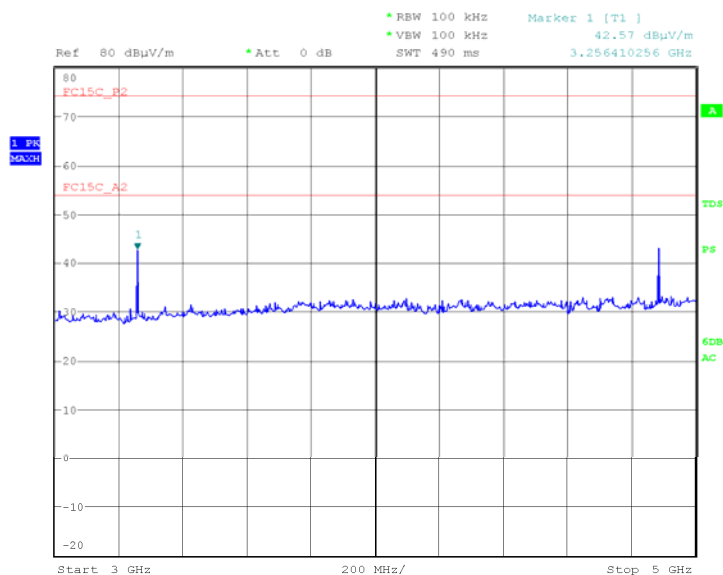
## 3GHz to 5GHz

### Vertical



Date: 5.JAN.2010 20:59:20

### Horizontal



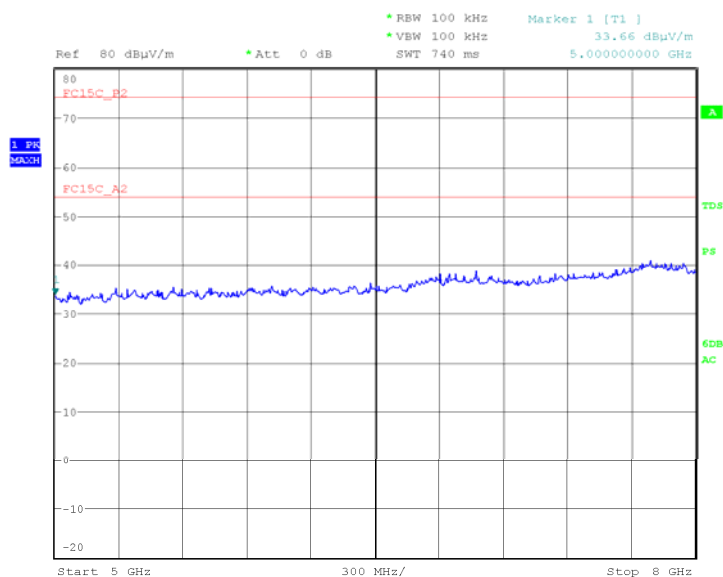
Date: 5.JAN.2010 21:10:26



Product Service

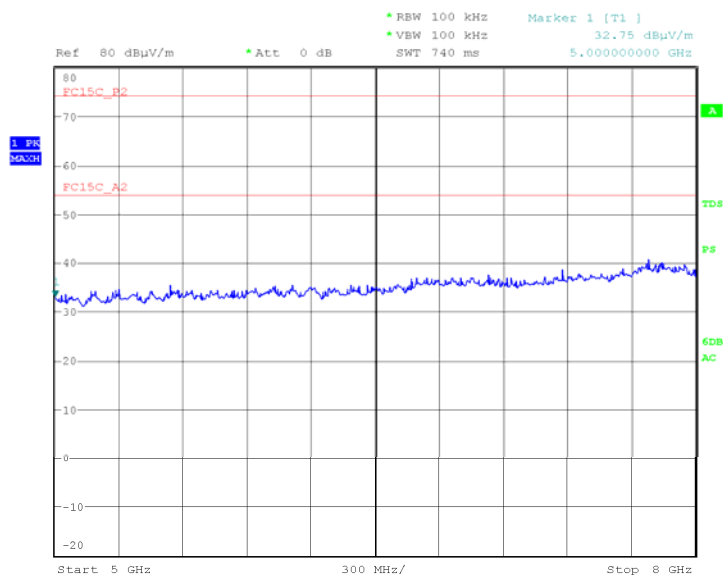
## 5GHz to 8GHz

### Vertical



Date: 5.JAN.2010 21:27:01

### Horizontal



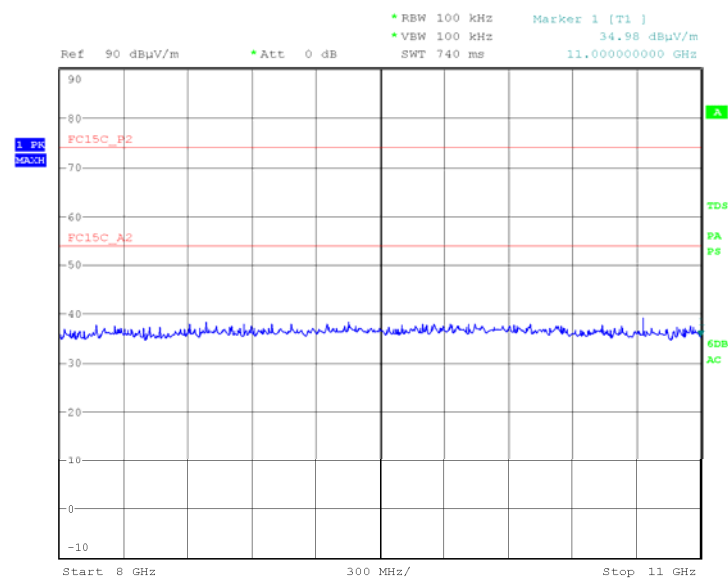
Date: 5.JAN.2010 21:13:15



Product Service

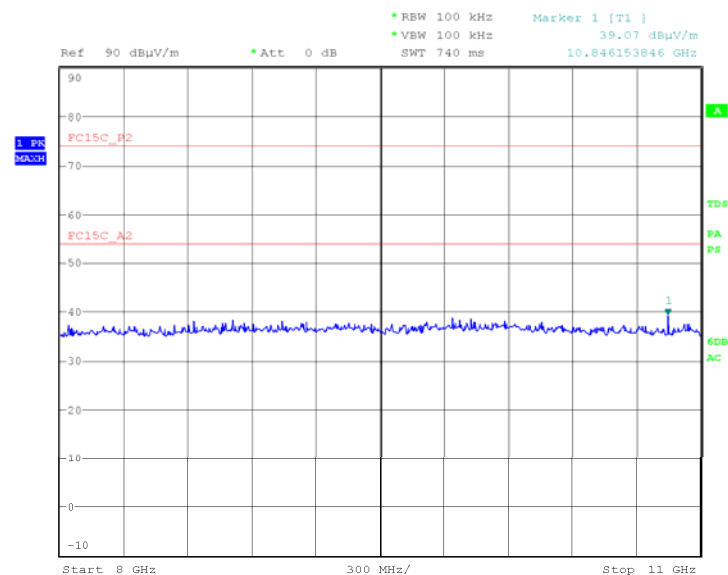
## 8GHz to 11GHz

### Vertical



Date: 12.JAN.2010 18:24:57

### Horizontal



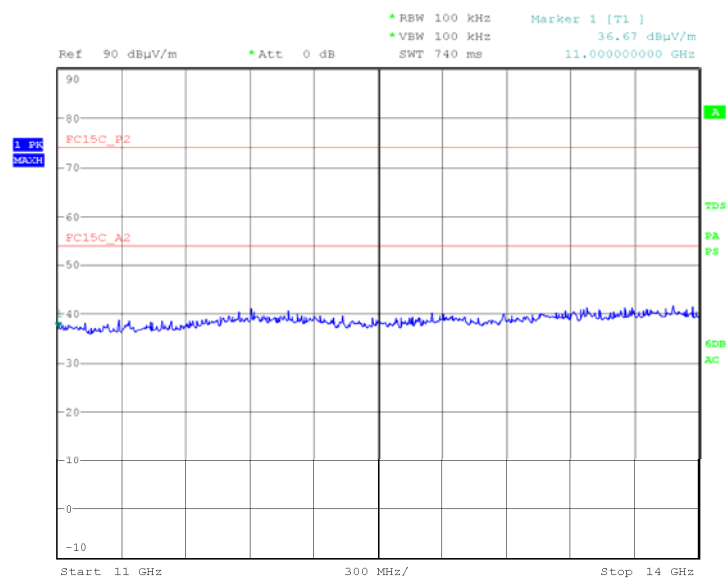
Date: 12.JAN.2010 18:18:17



Product Service

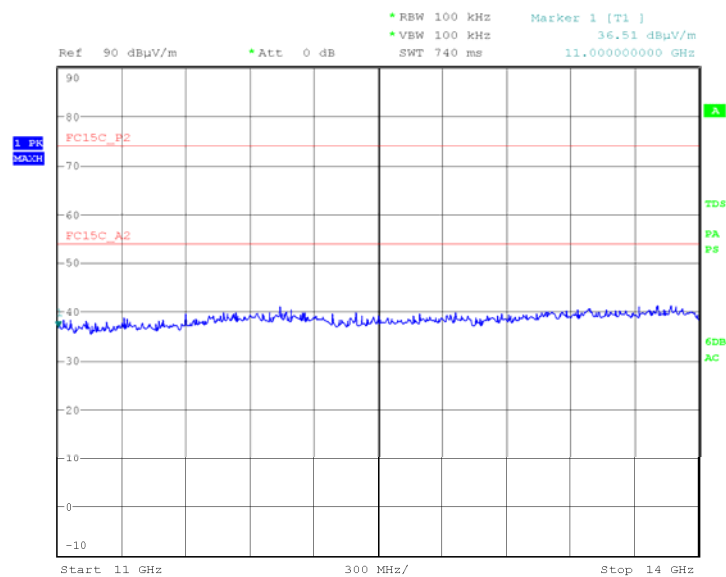
## 11GHz to 14GHz

### Vertical



Date: 12.JAN.2010 18:26:41

### Horizontal



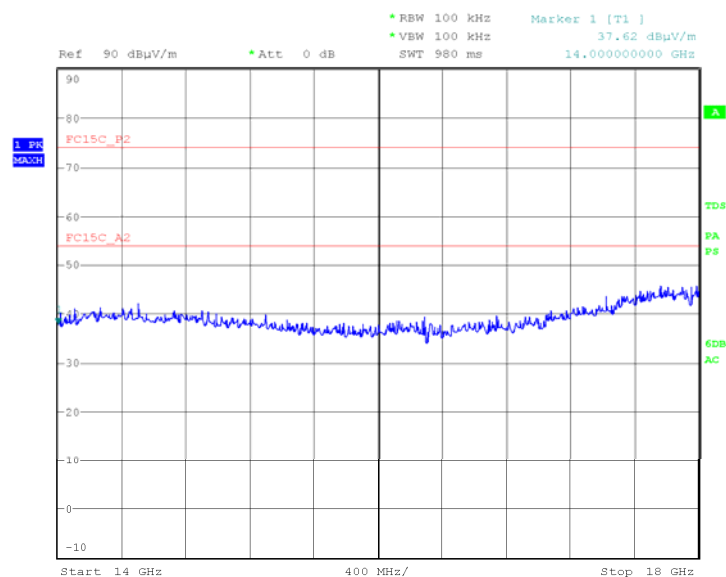
Date: 12.JAN.2010 18:19:30



Product Service

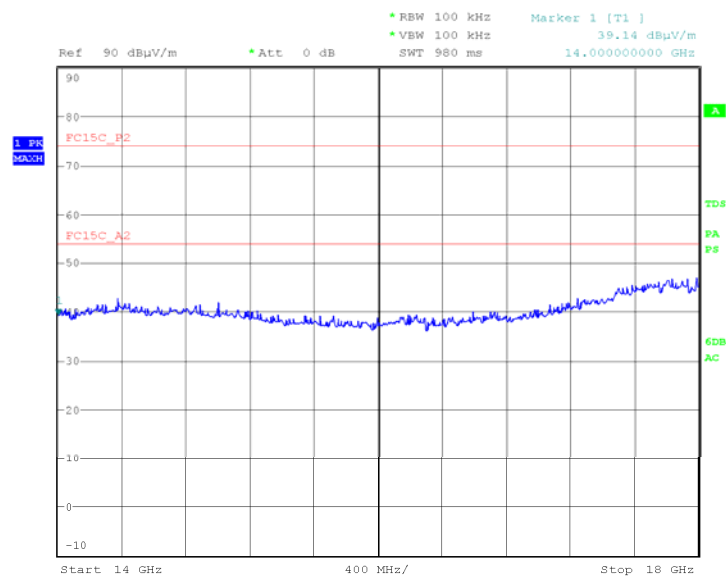
## 14GHz to 18GHz

### Vertical



Date: 12.JAN.2010 18:23:35

### Horizontal



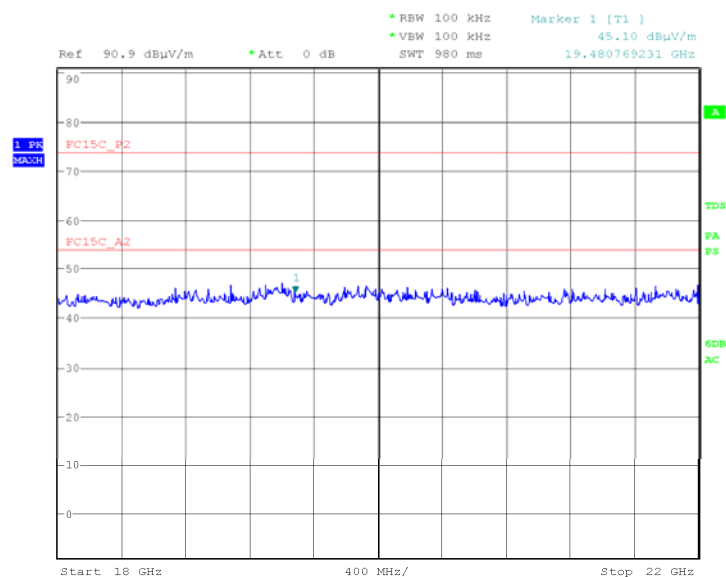
Date: 12.JAN.2010 18:20:15



Product Service

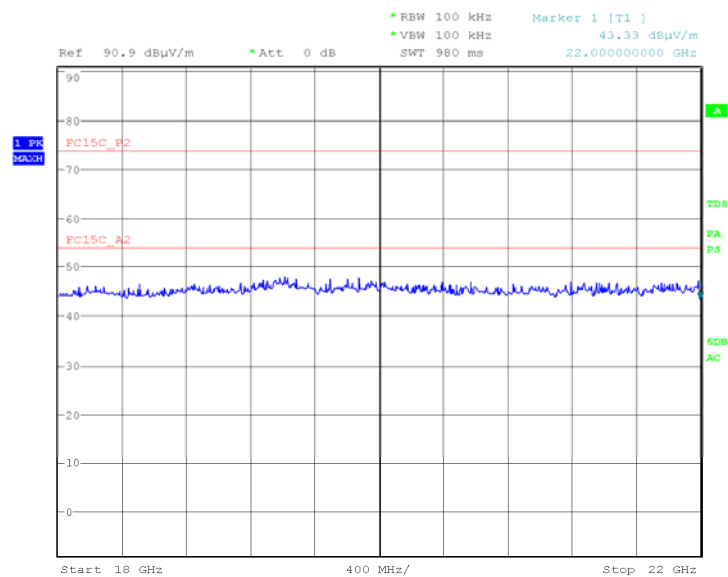
## 18GHz to 22GHz

### Vertical



Date: 12.JAN.2010 19:33:16

### Horizontal



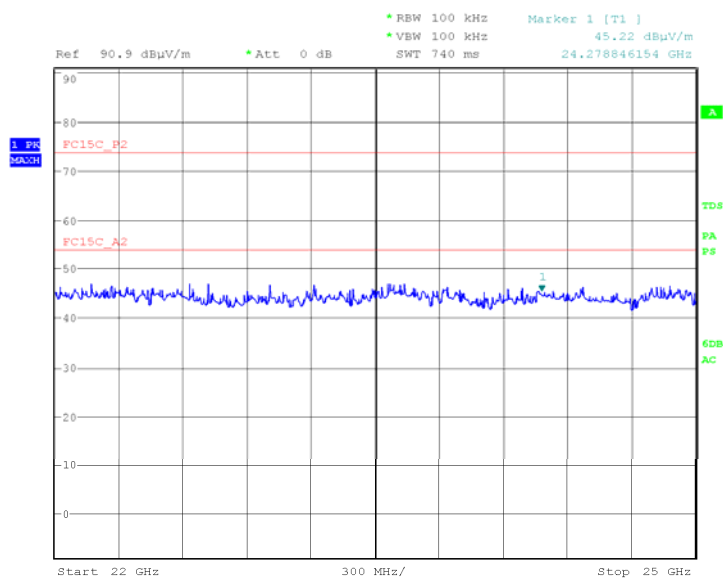
Date: 12.JAN.2010 19:40:22



Product Service

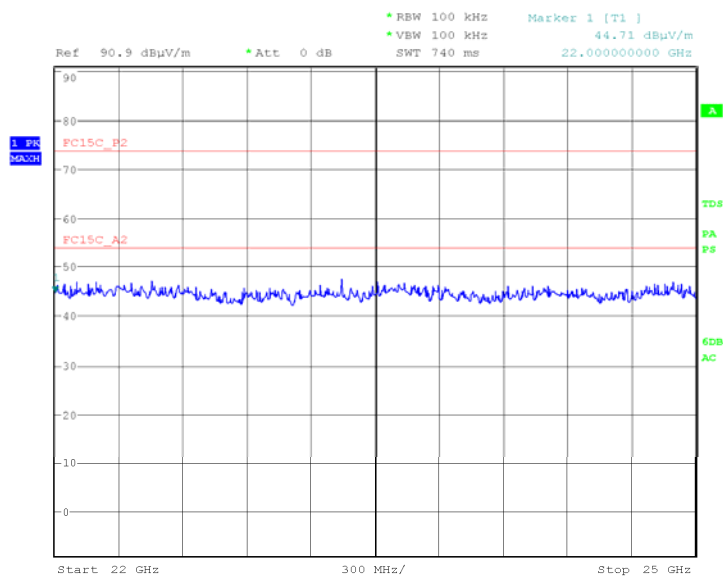
## 22GHz to 25GHz

### Vertical



Date: 12.JAN.2010 19:38:03

### Horizontal

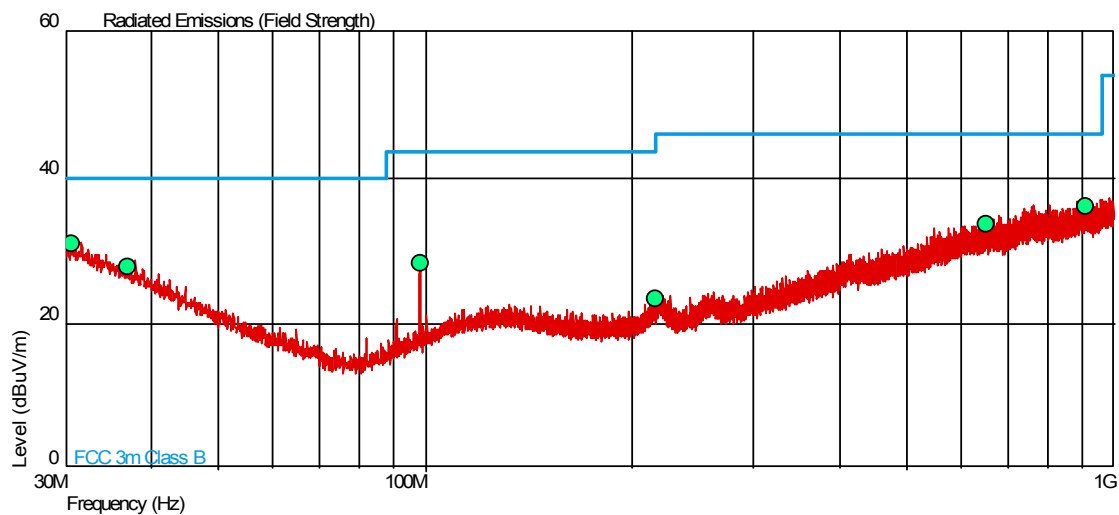


Date: 12.JAN.2010 19:44:59



Product Service

### Configuration 1 - Mode 3



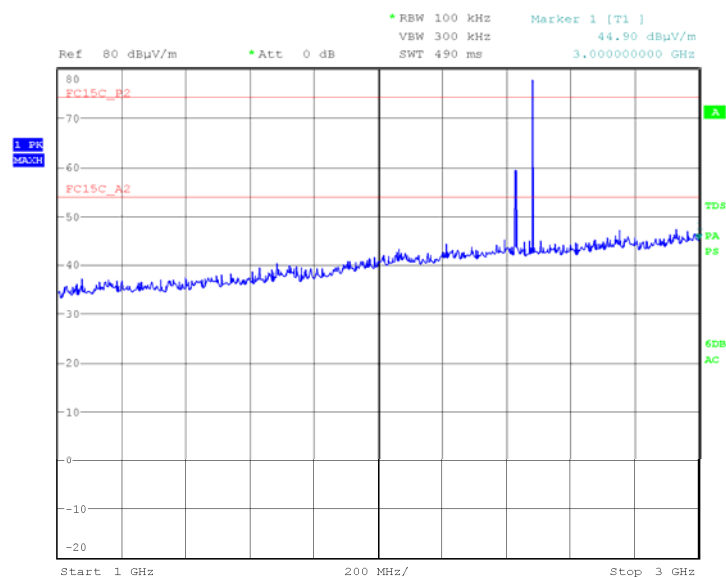
| Frequency (MHz) | QP Level (dBuV/m) | QP Level (uV/m) | QP Limit (dBuV/m) | QP Limit (uV/m) | QP Margin (dBuV/m) | QP Margin (uV/m) | Angle (deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 30.553          | 30.8              | 34.7            | 40.0              | 100             | -9.2               | 65.3             | 0           | 1.00       | Horizontal |
| 36.847          | 27.7              | 24.3            | 40.0              | 100             | -12.3              | 75.7             | 0           | 1.00       | Horizontal |
| 98.174          | 28.1              | 25.4            | 43.5              | 150             | -15.4              | 124.6            | 0           | 1.00       | Horizontal |
| 216.608         | 23.4              | 14.8            | 46.0              | 200             | -22.6              | 185.2            | 0           | 1.00       | Vertical   |
| 653.414         | 33.4              | 46.8            | 46.0              | 200             | -12.6              | 153.2            | 0           | 1.00       | Vertical   |
| 910.237         | 35.9              | 62.4            | 46.0              | 200             | -10.1              | 137.6            | 0           | 1.00       | Vertical   |



Product Service

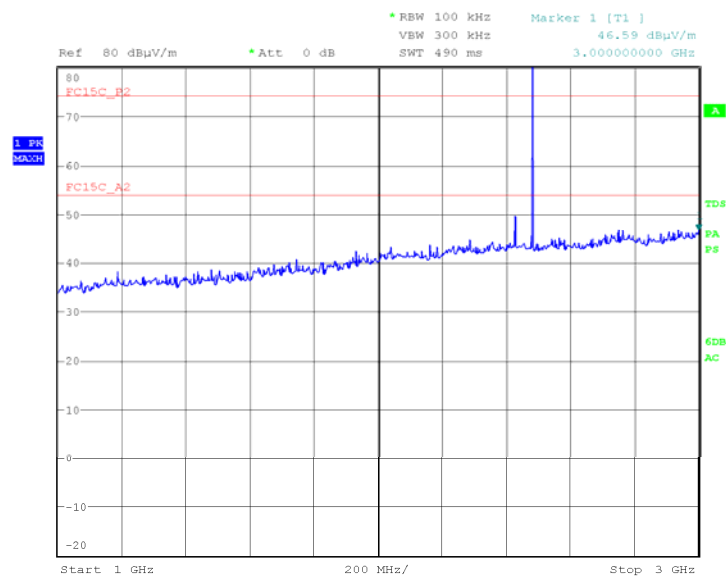
## 1GHz to 3GHz

### Vertical



Date: 5.JAN.2010 19:58:56

### Horizontal



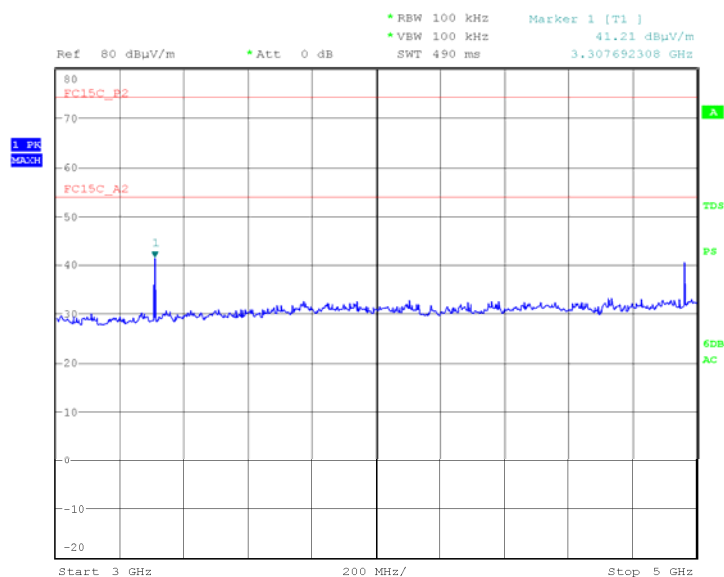
Date: 5.JAN.2010 20:00:50



Product Service

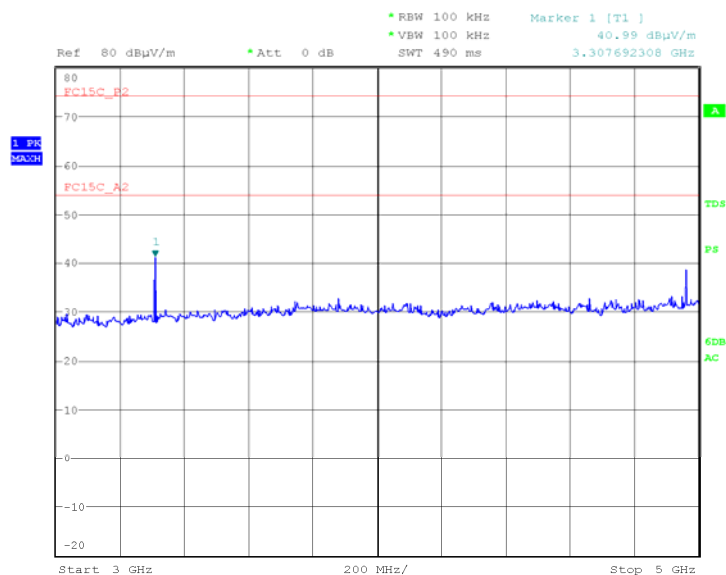
## 3GHz to 5GHz

### Vertical



Date: 5.JAN.2010 21:42:37

### Horizontal



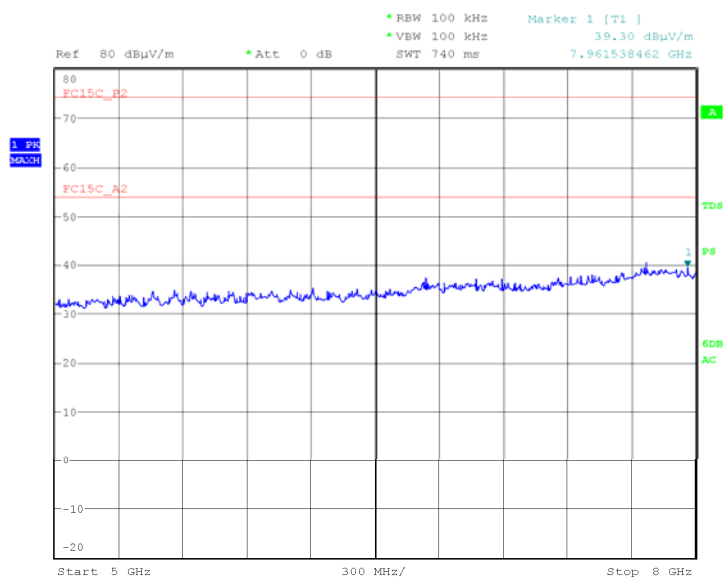
Date: 5.JAN.2010 22:15:36



Product Service

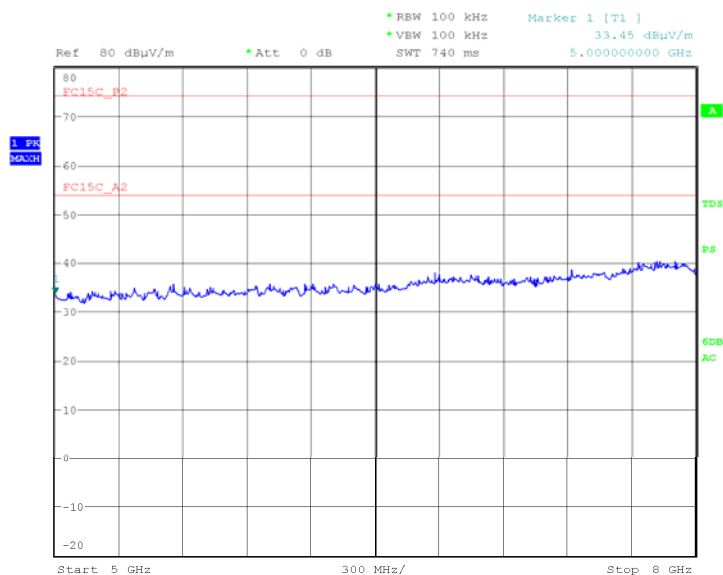
## 5GHz to 8GHz

### Vertical



Date: 5.JAN.2010 21:57:06

### Horizontal



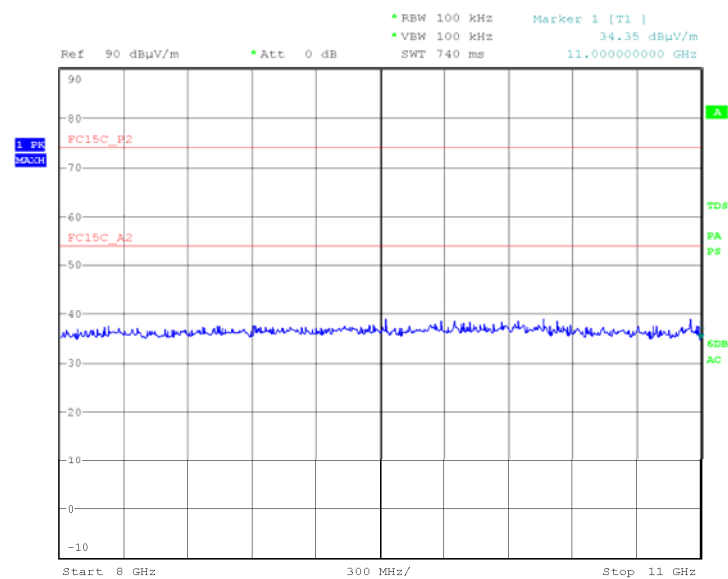
Date: 5.JAN.2010 22:14:28



Product Service

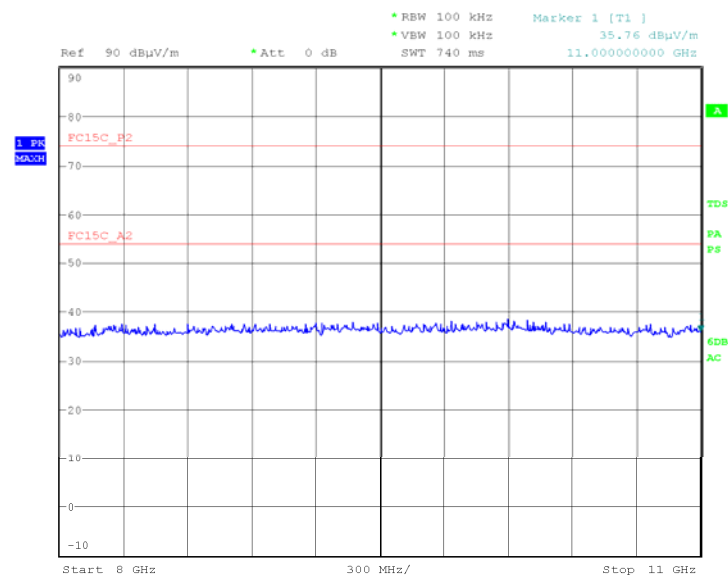
## 8GHz to 11GHz

### Vertical



Date: 12.JAN.2010 18:41:22

### Horizontal



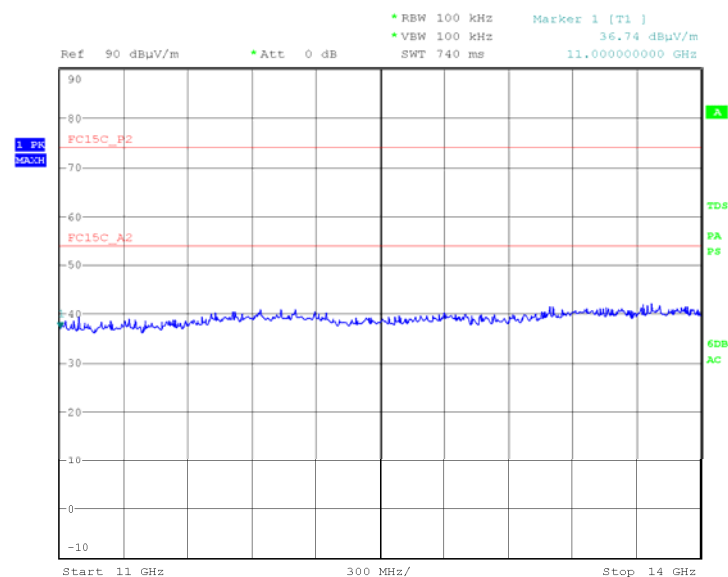
Date: 12.JAN.2010 18:52:56



Product Service

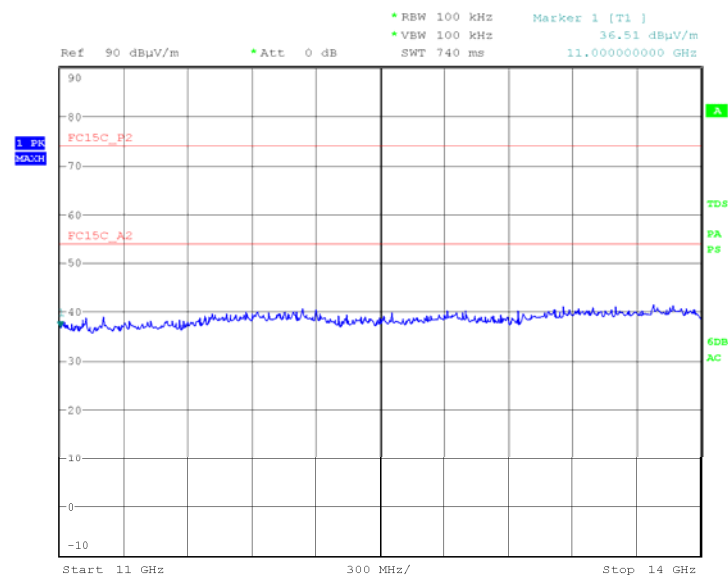
## 11GHz to 14GHz

### Vertical



Date: 12.JAN.2010 18:45:33

### Horizontal



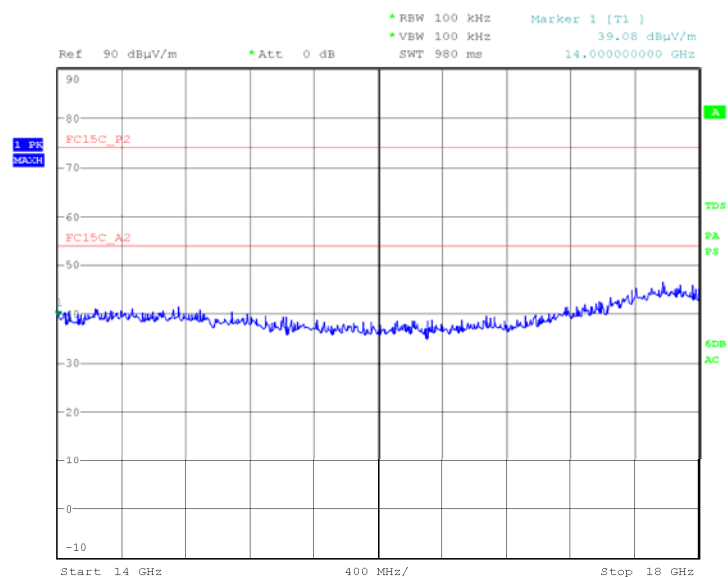
Date: 12.JAN.2010 18:54:24



Product Service

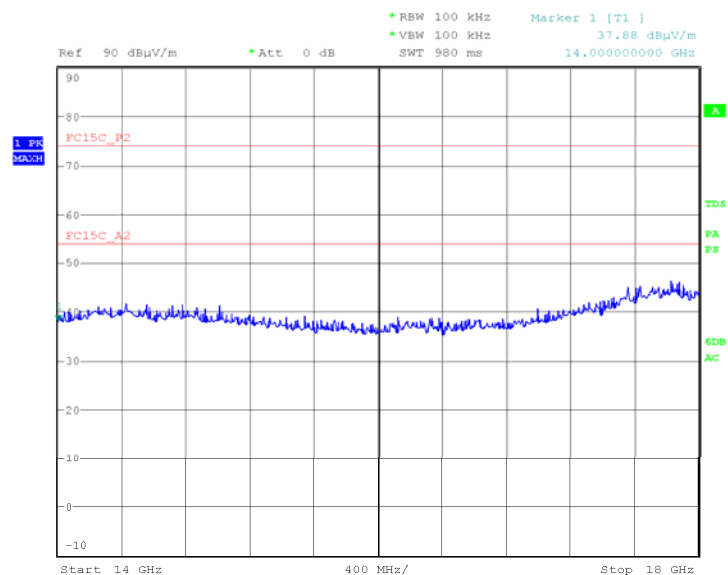
## 14GHz to 18GHz

### Vertical



Date: 12.JAN.2010 18:50:56

### Horizontal



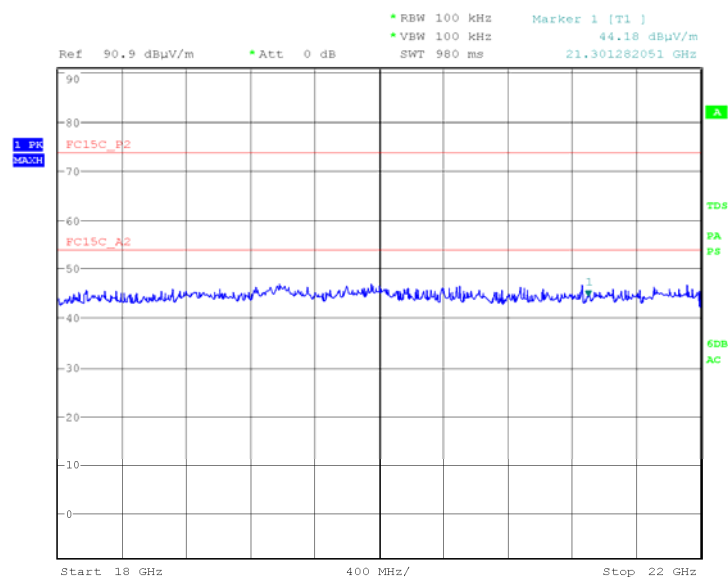
Date: 12.JAN.2010 18:56:52



Product Service

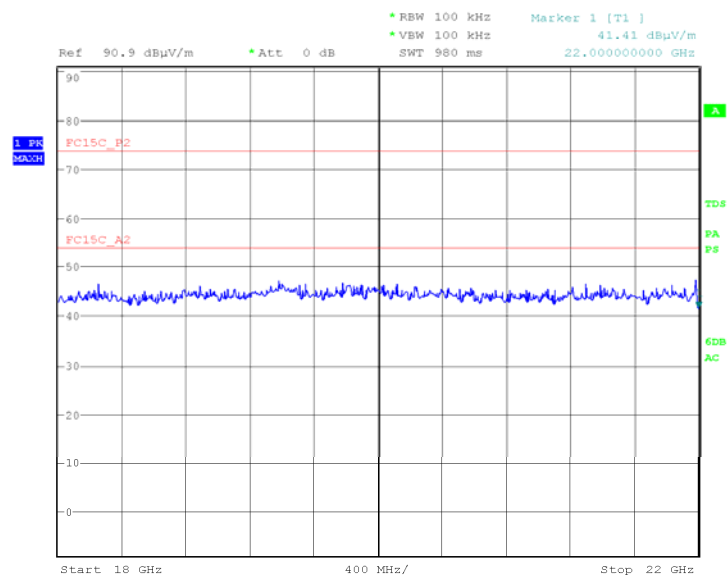
## 18GHz to 22GHz

### Vertical



Date: 12.JAN.2010 19:31:15

### Horizontal



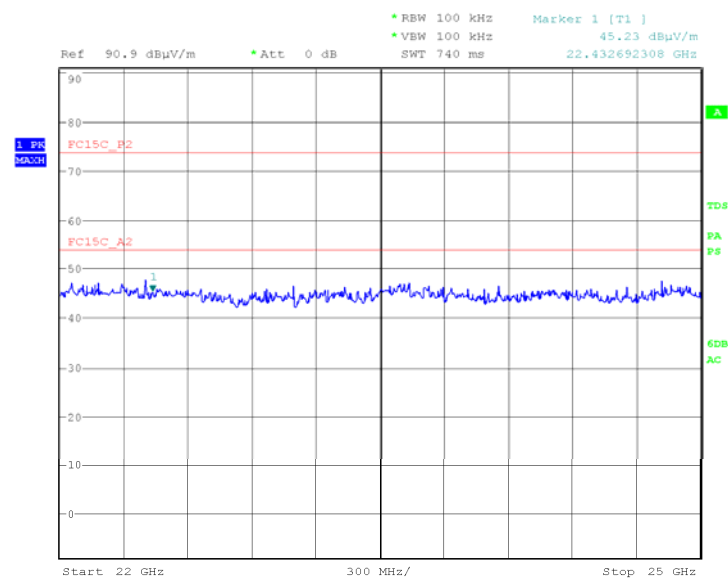
Date: 12.JAN.2010 19:20:03



Product Service

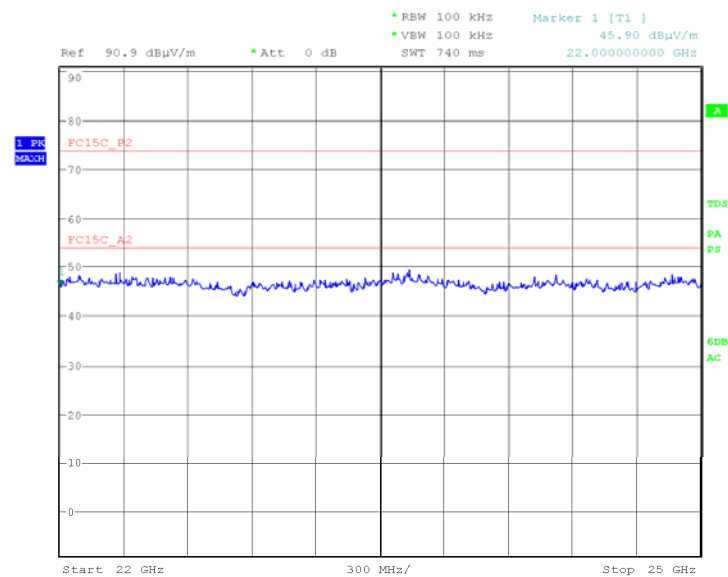
## 22GHz to 25GHz

### Vertical



Date: 12.JAN.2010 19:30:26

### Horizontal



Date: 12.JAN.2010 19:30:01



Product Service

## **SECTION 3**

### **TEST EQUIPMENT USED**



Product Service

### 3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

| Instrument                                                                           | Manufacturer    | Type No.       | TE No. | Calibration Period (months) | Calibration Due |
|--------------------------------------------------------------------------------------|-----------------|----------------|--------|-----------------------------|-----------------|
| <b>Section 2.1 - 20dB Bandwidth</b>                                                  |                 |                |        |                             |                 |
| True RMS Multimeter                                                                  | Fluke           | 79 Series III  | 411    | 12                          | 24-Jul-2010     |
| Power Divider                                                                        | Weinschel       | 1506A          | 603    | 12                          | 19-Mar-2010     |
| GPS Frequency Standard                                                               | Rapco           | GPS-804/3      | 1312   | 6                           | 4-Mar-2010      |
| Cable (1m, sma(m) - sma(m))                                                          | Reynolds        | 262-0248-1000  | 2406   | 12                          | 15-Oct-2010     |
| Programmable Power Supply                                                            | Iso-tech        | IPS 2010       | 2437   | -                           | O/P Mon         |
| Spectrum Analyser                                                                    | Rohde & Schwarz | FSU26          | 2747   | 12                          | 2-Nov-2010      |
| Hygrometer                                                                           | Rotronic        | I-1000         | 2891   | 12                          | 17-Apr-2010     |
| <b>Section 2.2 - Maximum Peak Conducted Output Power</b>                             |                 |                |        |                             |                 |
| Signal Generator                                                                     | Hewlett Packard | ESG4000A       | 38     | 12                          | 11-May-2010     |
| Peak Power Analyser                                                                  | Hewlett Packard | 8990A          | 107    | 12                          | 2-Feb-2010      |
| True RMS Multimeter                                                                  | Fluke           | 79 Series III  | 411    | 12                          | 24-Jul-2010     |
| Power Divider                                                                        | Weinschel       | 1506A          | 603    | 12                          | 19-Mar-2010     |
| GPS Frequency Standard                                                               | Rapco           | GPS-804/3      | 1312   | 6                           | 4-Mar-2010      |
| Cable (1m, sma(m) - sma(m))                                                          | Reynolds        | 262-0248-1000  | 2406   | 12                          | 15-Oct-2010     |
| Programmable Power Supply                                                            | Iso-tech        | IPS 2010       | 2437   | -                           | O/P Mon         |
| Power Sensor                                                                         | Hewlett Packard | 84812A         | 2743   | -                           | TU              |
| Spectrum Analyser                                                                    | Rohde & Schwarz | FSU26          | 2747   | 12                          | 2-Nov-2010      |
| Hygrometer                                                                           | Rotronic        | I-1000         | 2891   | 12                          | 17-Apr-2010     |
| Attenuator (30dB, 150W)                                                              | Narda           | 769-30         | 3369   | 12                          | 19-May-2010     |
| 5 metre Tape Measure                                                                 | Stanley         | 33-719         | 3549   | -                           | TU              |
| <b>Section 2.3 &amp; 2.8 EMC - Effective Radiated Power &amp; Radiated Emissions</b> |                 |                |        |                             |                 |
| Load                                                                                 | Diamond Antenna | DL-30N         | 218    | 12                          | 22-Jun-2010     |
| Antenna (Double Ridge Guide, 1GHz-18GHz)                                             | EMCO            | 3115           | 235    | 12                          | 12-Oct-2010     |
| Antenna (Bilog)                                                                      | Schaffner       | CBL6143        | 287    | 24                          | 21-Jan-2010     |
| Pre-Amplifier                                                                        | Phase One       | PS04-0085      | 1532   | 12                          | 16-Sep-2010     |
| Pre-Amplifier                                                                        | Phase One       | PS04-0086      | 1533   | 12                          | 17-Sep-2010     |
| Screened Room (5)                                                                    | Rainford        | Rainford       | 1545   | 36                          | 11-Feb-2011     |
| Turntable/Mast Controller                                                            | EMCO            | 2090           | 1610   | -                           | TU              |
| 4GHz HPF                                                                             | Sematron        | F-100-4000-5-R | 2245   | -                           | TU              |
| Cable (2m, SMA(m) - SMA(m))                                                          | Reynolds        | 262-0248-2000  | 2401   | 12                          | TU              |
| Antenna (Bilog)                                                                      | Chase           | CBL6143        | 2904   | 24                          | 4-Dec-2011      |
| Antenna (Log Periodic)                                                               | Schaffner       | UPA6108        | 3108   | 12                          | 4-Apr-2010      |
| Signal Generator (10MHz to 40GHz)                                                    | Rohde & Schwarz | SMR40          | 3171   | 12                          | 4-Aug-2010      |
| EMI Test Receiver                                                                    | Rohde & Schwarz | ESU40          | 3506   | 12                          | 1-Sep-2010      |
| Turntable                                                                            | EMCO            | 1060-04        | 3693   | -                           | TU              |



Product Service

| Instrument                                        | Manufacturer    | Type No.      | TE No. | Calibration Period (months) | Calibration Due |
|---------------------------------------------------|-----------------|---------------|--------|-----------------------------|-----------------|
| <b>Section 2.4 - Conducted Spurious Emissions</b> |                 |               |        |                             |                 |
| True RMS Multimeter                               | Fluke           | 79 Series III | 411    | 12                          | 24-Jul-2010     |
| Power Divider                                     | Weinschel       | 1506A         | 603    | 12                          | 19-Mar-2010     |
| Cable (1m, sma(m) - sma(m))                       | Reynolds        | 262-0248-1000 | 2406   | 12                          | 15-Oct-2010     |
| Programmable Power Supply                         | Iso-tech        | IPS 2010      | 2437   | -                           | O/P Mon         |
| Spectrum Analyser                                 | Rohde & Schwarz | FSU26         | 2747   | 12                          | 2-Nov-2010      |
| Hygrometer                                        | Rotronic        | I-1000        | 2891   | 12                          | 17-Apr-2010     |
| Network Analyser                                  | Rohde & Schwarz | ZVA 40        | 3548   | 12                          | 13-Feb-2010     |
| <b>Section 2.5 - Channel Dwell Time</b>           |                 |               |        |                             |                 |
| True RMS Multimeter                               | Fluke           | 79 Series III | 411    | 12                          | 24-Jul-2010     |
| Power Divider                                     | Weinschel       | 1506A         | 603    | 12                          | 19-Mar-2010     |
| GPS Frequency Standard                            | Rapco           | GPS-804/3     | 1312   | 6                           | 4-Mar-2010      |
| Cable (1m, sma(m) - sma(m))                       | Reynolds        | 262-0248-1000 | 2406   | 12                          | 15-Oct-2010     |
| Programmable Power Supply                         | Iso-tech        | IPS 2010      | 2437   | -                           | O/P Mon         |
| Spectrum Analyser                                 | Rohde & Schwarz | FSU26         | 2747   | 12                          | 2-Nov-2010      |
| Hygrometer                                        | Rotronic        | I-1000        | 2891   | 12                          | 17-Apr-2010     |
| <b>Section 2.6 - Frequency Range</b>              |                 |               |        |                             |                 |
| True RMS Multimeter                               | Fluke           | 79 Series III | 411    | 12                          | 24-Jul-2010     |
| Power Divider                                     | Weinschel       | 1506A         | 603    | 12                          | 19-Mar-2010     |
| Cable (1m, sma(m) - sma(m))                       | Reynolds        | 262-0248-1000 | 2406   | 12                          | 15-Oct-2010     |
| Programmable Power Supply                         | Iso-tech        | IPS 2010      | 2437   | -                           | O/P Mon         |
| Spectrum Analyser                                 | Rohde & Schwarz | FSU26         | 2747   | 12                          | 2-Nov-2010      |
| Hygrometer                                        | Rotronic        | I-1000        | 2891   | 12                          | 17-Apr-2010     |
| <b>Section 2.7- Number of Hopping Channels</b>    |                 |               |        |                             |                 |
| True RMS Multimeter                               | Fluke           | 79 Series III | 411    | 12                          | 24-Jul-2010     |
| Power Divider                                     | Weinschel       | 1506A         | 603    | 12                          | 19-Mar-2010     |
| GPS Frequency Standard                            | Rapco           | GPS-804/3     | 1312   | 6                           | 4-Mar-2010      |
| Cable (1m, sma(m) - sma(m))                       | Reynolds        | 262-0248-1000 | 2406   | 12                          | 15-Oct-2010     |
| Programmable Power Supply                         | Iso-tech        | IPS 2010      | 2437   | -                           | O/P Mon         |
| Spectrum Analyser                                 | Rohde & Schwarz | FSU26         | 2747   | 12                          | 2-Nov-2010      |
| Hygrometer                                        | Rotronic        | I-1000        | 2891   | 12                          | 17-Apr-2010     |

TU – Traceability Unscheduled

OP/Mon – Output monitored using calibrated equipment

### 3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

| Test Discipline                          | Frequency / Parameter                                                                                         | MU             |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------|
| Radiated Emissions, Bilog Antenna, AOATS | 30MHz to 1GHz Amplitude                                                                                       | 5.1dB*         |
| Radiated Emissions, Horn Antenna, AOATS  | 1GHz to 40GHz Amplitude                                                                                       | 6.3dB*         |
| Conducted Emissions, LISN                | 150kHz to 30MHz Amplitude                                                                                     | 3.2dB*         |
| Conducted Emissions, ISN                 | 150kHz to 30MHz Amplitude                                                                                     | 2.1dB          |
| Substitution Antenna, Radiated Field     | 30MHz to 18GHz Amplitude                                                                                      | 2.6dB          |
| Discontinuous Interference               | 150kHz to 30MHz Amplitude                                                                                     | 3.0dB*         |
| Interference Power                       | 30MHz to 300MHz Amplitude                                                                                     | 3.0dB*         |
| Radiated E-Field Susceptibility          | 26MHz to 2.5GHz Test Amplitude                                                                                | 1.4dB†         |
| Conducted Susceptibility                 | 100kHz to 250MHz Amplitude                                                                                    | 1.8dB†         |
| DC Input Ripple Immunity                 | Current<br>Voltage                                                                                            | 0.45%<br>0.91% |
| Power Frequency Magnetic Field           | 50Hz/60Hz Amplitude                                                                                           | 0.45%          |
| Magnetic Emissions                       | 9kHz to 30MHz Amplitude                                                                                       | 3.4dB*         |
| Magnetic Field/Flux iaw EN 50366         | 10Hz to 400kHz                                                                                                | 2.64%          |
| Harmonics and Flicker                    | The test was applied using proprietary equipment that meets the requirements of EN 61000-3-2 and EN 61000-3-3 | —              |
| Mains Voltage Variations and Interrupts  | The test was applied using proprietary equipment that meets the requirements of EN 61000-4-11                 | —              |
| Fast Transient Burst                     | The test was applied using proprietary equipment that meets the requirements of EN 61000-4-4                  | —              |
| Electrostatic Discharge                  | The test was applied using proprietary equipment that meets the requirements of EN 61000-4-2                  | —              |
| Surge                                    | The test was applied using proprietary equipment that meets the requirements of EN 61000-4-5                  | —              |
| Vehicle Transients                       | The test was applied using proprietary equipment that meets the requirements of ISO 7637-1 and 2              | —              |
| Compass Safe Distance                    | Azimuth Accuracy                                                                                              | 0.10°          |

Worst case error for both Time and Frequency measurement 12 parts in 10<sup>6</sup>.

\* In accordance with CISPR 16-4

† In accordance with UKAS Lab 34



Product Service

## **SECTION 4**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



Product Service

#### 4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA  
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