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# Report On

FCC and Industry Canada Testing of the  
Inmarsat Global Ltd IsatPhone2

In accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210  
and Industry Canada RSS-GEN

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FCC ID: YCT-ISATPHONE2  
IC ID: 8944A-ISATPHONE2

Document 75924065 Report 06 Issue 1

November 2013



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COMMERCIAL-IN-CONFIDENCE

**REPORT ON**

FCC and Industry Canada Testing of the  
Inmarsat Global Ltd IsatPhone2  
In accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210  
and Industry Canada RSS-GEN

Document 75924065 Report 06 Issue 1

November 2013

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**DATED**

15 November 2013

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**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 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler

A Galpin





## CONTENTS

| Section  | Page No                                                                                |
|----------|----------------------------------------------------------------------------------------|
| <b>1</b> | <b>REPORT SUMMARY ..... 3</b>                                                          |
| 1.1      | Introduction ..... 4                                                                   |
| 1.2      | Brief Summary of Results ..... 5                                                       |
| 1.3      | Application Form ..... 6                                                               |
| 1.4      | Product Information ..... 12                                                           |
| 1.5      | Test Conditions ..... 12                                                               |
| 1.6      | Deviations from the Standard ..... 12                                                  |
| 1.7      | Modification Record ..... 12                                                           |
| <b>2</b> | <b>TEST DETAILS ..... 13</b>                                                           |
| 2.1      | AC Line Conducted Emissions ..... 14                                                   |
| 2.2      | Maximum Peak Conducted Output Power ..... 17                                           |
| 2.3      | Frequency Hopping Systems - 20 dB Bandwidth and Channel Separation ..... 19            |
| 2.4      | Frequency Hopping Systems - Channel Dwell Time and Number of Hopping Channels ..... 24 |
| 2.5      | EIRP Peak Power ..... 28                                                               |
| 2.6      | Spurious and Band Edge Emissions ..... 32                                              |
| <b>3</b> | <b>TEST EQUIPMENT USED ..... 52</b>                                                    |
| 3.1      | Test Equipment Used ..... 53                                                           |
| 3.2      | Measurement Uncertainty ..... 55                                                       |
| <b>4</b> | <b>ACCREDITATION, DISCLAIMERS AND COPYRIGHT ..... 56</b>                               |
| 4.1      | Accreditation, Disclaimers and Copyright ..... 57                                      |



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## **SECTION 1**

### **REPORT SUMMARY**

FCC and Industry Canada Testing of the  
Inmarsat Global Ltd IsatPhone2  
In accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada  
RSS-GEN



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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 Inmarsat Global Ltd IsatPhone2 to the requirements of FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada RSS-GEN.

|                                |                                                                                                                                                                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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                   | Inmarsat Global Ltd                                                                                                                                                     |
| Model Number(s)                | IsatPhone2                                                                                                                                                              |
| Serial Number(s)               | IX40100471                                                                                                                                                              |
| Number of Samples Tested       | 2                                                                                                                                                                       |
| Test Specification/Issue/Date  | FCC CFR 47 Part 15C (2012)<br>Industry Canada RSS-210 (2010)<br>Industry Canada RSS-GEN (2010)                                                                          |
| Incoming Release Date          | Application Form<br>08 November 2013                                                                                                                                    |
| Disposal Reference Number Date | Held Pending Disposal<br>Not Applicable<br>Not Applicable                                                                                                               |
| Order Number Date              | 57-00098-01/1<br>30 August 2013                                                                                                                                         |
| Start of Test                  | 30 October 2013                                                                                                                                                         |
| Finish of Test                 | 5 November 2013                                                                                                                                                         |
| Name of Engineer(s)            | G Lawler<br>A Galpin                                                                                                                                                    |
| Related Document(s)            | ANSI C63.10: 2009                                                                                                                                                       |



## 1.2 BRIEF SUMMARY OF RESULTS

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

| Section   | Spec Clause        |             |         | Test Description                                                              | Result | Comments/Base Standard |
|-----------|--------------------|-------------|---------|-------------------------------------------------------------------------------|--------|------------------------|
|           | Pt 15C             | RSS-210     | RSS-GEN |                                                                               |        |                        |
| Bluetooth |                    |             |         |                                                                               |        |                        |
| 2.1       | 15.207             | 7.2.4       | -       | AC Line Conducted Emissions                                                   | Pass   |                        |
| 2.2       | 15.247 (b)(3)      | A8.4 (2)    | -       | Maximum Peak Conducted Output Power                                           | Pass   |                        |
| 2.3       | 15.247 (a)(1)      | A8.1 (a)(b) | -       | Frequency Hopping Systems - 20 dB Bandwidth and Channel Separation            | Pass   |                        |
| 2.4       | 15.247 (a)(1)(iii) | A8.1 (d)    | -       | Frequency Hopping Systems - Channel Dwell Time and Number of Hopping Channels | Pass   |                        |
| 2.5       | 15.247 (b)(4)      | A8.4 (4)    | -       | EIRP Peak Power                                                               | Pass   |                        |
| 2.6       | 15.247 (d)         | A8.5        | 2.2     | Spurious and Band Edge Emissions                                              | Pass   |                        |



### 1.3 APPLICATION FORM

| EQUIPMENT DESCRIPTION                                                                           |                                                              |
|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| Model Name/Number                                                                               | IsatPhone2                                                   |
| Part Number                                                                                     | NA                                                           |
| FCC ID (if applicable)                                                                          | YCT-ISATPHONE2                                               |
| Industry Canada ID (if applicable)                                                              | 8944A-ISATPHONE2                                             |
| Technical Description (Please provide a brief description of the intended use of the equipment) | Satellite phone for Inmarsat GMR2+ satellite network system. |

| Types of Modulations used by the Equipment                        |                                                                                   |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/>                               | FHSS                                                                              |
| <input type="checkbox"/>                                          | Other forms of modulation                                                         |
| In case of FHSS Modulation                                        |                                                                                   |
| In case of non-Adaptive Frequency Hopping equipment:              |                                                                                   |
| Number of Hopping Frequencies: 79                                 |                                                                                   |
| In case of Adaptive Frequency Hopping Equipment:                  |                                                                                   |
| Maximum number of Hopping Frequencies: 79                         |                                                                                   |
| Minimum number of Hopping Frequencies: 20                         |                                                                                   |
| Dwell Time: 0.625ms                                               |                                                                                   |
| Minimum Channel Occupation Time: 0.625ms                          |                                                                                   |
| Adaptive / non-adaptive equipment:                                |                                                                                   |
| <input type="checkbox"/>                                          | non-adaptive Equipment                                                            |
| <input type="checkbox"/>                                          | adaptive Equipment without the possibility to switch to a non-adaptive mode       |
| <input checked="" type="checkbox"/>                               | adaptive Equipment which can also operate in a non-adaptive mode                  |
| In case of adaptive equipment:                                    |                                                                                   |
| The Channel Occupancy Time implemented by the equipment: 2.905 ms |                                                                                   |
| <input type="checkbox"/>                                          | The equipment has implemented an LBT based DAA mechanism                          |
| In case of equipment using modulation different from FHSS:        |                                                                                   |
| <input type="checkbox"/>                                          | The equipment is Frame Based equipment                                            |
| <input type="checkbox"/>                                          | The equipment is Load Based equipment                                             |
| <input type="checkbox"/>                                          | The equipment can switch dynamically between Frame Based and Load Based equipment |
| The CCA time implemented by the equipment: $\mu$ s                |                                                                                   |
| The value q as referred to in clause 4.3.2.5.2.2.2                |                                                                                   |
| <input checked="" type="checkbox"/>                               | The equipment has implemented a non-LBT based DAA mechanism                       |
| <input type="checkbox"/>                                          | The equipment can operate in more than one adaptive mode                          |



|                                                                                                                                                                    |                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>In case of non-adaptive Equipment:</b>                                                                                                                          |                                                                                                                                                                              |
| The maximum RF Output Power (e.i.r.p.): 6.2 dBm                                                                                                                    |                                                                                                                                                                              |
| The maximum (corresponding) Duty Cycle: 77 %                                                                                                                       |                                                                                                                                                                              |
| Equipment with dynamic behaviour, that behaviour is described here. (e.g. the different combinations of duty cycle and corresponding power levels to be declared): |                                                                                                                                                                              |
| NA                                                                                                                                                                 |                                                                                                                                                                              |
| <b>The worst case operational mode for each of the following tests:</b>                                                                                            |                                                                                                                                                                              |
| RF Output Power:                                                                                                                                                   |                                                                                                                                                                              |
| Power Spectral Density:                                                                                                                                            |                                                                                                                                                                              |
| Duty cycle, Tx-Sequence, Tx-gap:                                                                                                                                   |                                                                                                                                                                              |
| Dwell time, Minimum Frequency Occupation & Hopping Sequence (only for FHSS equipment):                                                                             |                                                                                                                                                                              |
| Hopping Frequency Separation (only for FHSS equipment):                                                                                                            |                                                                                                                                                                              |
| Medium Utilisation:                                                                                                                                                |                                                                                                                                                                              |
| Adaptivity & Receiver Blocking:                                                                                                                                    |                                                                                                                                                                              |
| Occupied Channel Bandwidth:                                                                                                                                        |                                                                                                                                                                              |
| Transmitter unwanted emissions in the OOB domain:                                                                                                                  |                                                                                                                                                                              |
| Transmitter unwanted emissions in the spurious domain:                                                                                                             |                                                                                                                                                                              |
| Receiver spurious emissions:                                                                                                                                       |                                                                                                                                                                              |
| <b>The different transmit operating modes (tick all that apply):</b>                                                                                               |                                                                                                                                                                              |
| <input checked="" type="checkbox"/>                                                                                                                                | Operating mode 1: Single Antenna Equipment                                                                                                                                   |
| <input checked="" type="checkbox"/>                                                                                                                                | Equipment with only 1 antenna                                                                                                                                                |
| <input type="checkbox"/>                                                                                                                                           | Equipment with 2 diversity antennas but only 1 antenna active at any moment in time                                                                                          |
| <input type="checkbox"/>                                                                                                                                           | Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems) |
| <input type="checkbox"/>                                                                                                                                           | Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming                                                                                             |
| <input type="checkbox"/>                                                                                                                                           | Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)                                                                                          |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1                                                                                                      |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2                                                                                                      |
| <i>NOTE: Add more lines if more channel bandwidths are supported.</i>                                                                                              |                                                                                                                                                                              |
| <input type="checkbox"/>                                                                                                                                           | Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming                                                                                                |
| <input type="checkbox"/>                                                                                                                                           | Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)                                                                                            |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1                                                                                                      |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2                                                                                                      |
| <i>NOTE: Add more lines if more channel bandwidths are supported.</i>                                                                                              |                                                                                                                                                                              |
| <b>In case of Smart Antenna Systems:</b>                                                                                                                           |                                                                                                                                                                              |
| The number of Receive chains:                                                                                                                                      |                                                                                                                                                                              |
| The number of Transmit chains:                                                                                                                                     |                                                                                                                                                                              |
| <input type="checkbox"/>                                                                                                                                           | symmetrical power distribution                                                                                                                                               |
| <input type="checkbox"/>                                                                                                                                           | asymmetrical power distribution                                                                                                                                              |
| In case of beam forming, the maximum beam forming gain:                                                                                                            |                                                                                                                                                                              |
| <i>NOTE: Beam forming gain does not include the basic gain of a single antenna.</i>                                                                                |                                                                                                                                                                              |



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| Operating Frequency Range(s) of the equipment:                         |                                                                                                          |                                                                    |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Operating Frequency Range 1: 2402 MHz to 2480 MHz                      | Bluetooth (e.g Bluetooth for EU)                                                                         |                                                                    |
| Operating Frequency Range 2:        MHz to        MHz                  | (e.g WLAN for EU)                                                                                        |                                                                    |
| Operating Frequency Range 3:        MHz to        MHz                  | (e.g Bluetooth for FCC and/or Industry Canada)                                                           |                                                                    |
| Operating Frequency Range 4:        MHz to        MHz                  | (e.g WLAN for FCC and/or Industry Canada)                                                                |                                                                    |
| <i>NOTE: Add more lines if more Frequency Ranges are supported.</i>    |                                                                                                          |                                                                    |
| Occupied Channel Bandwidth(s):                                         |                                                                                                          |                                                                    |
| Occupied Channel Bandwidth1: 1 MHz to        MHz                       |                                                                                                          |                                                                    |
| Occupied Channel Bandwidth2:        MHz to        MHz                  |                                                                                                          |                                                                    |
| <i>NOTE: Add more lines if more channel bandwidths are supported.</i>  |                                                                                                          |                                                                    |
| Type of Equipment (stand-alone, combined, plug-in radio device, etc.): |                                                                                                          |                                                                    |
| <input type="checkbox"/>                                               | Stand-alone                                                                                              |                                                                    |
| <input checked="" type="checkbox"/>                                    | Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment) |                                                                    |
| <input type="checkbox"/>                                               | Plug-in radio device (Equipment intended for a variety of host systems)                                  |                                                                    |
| <input type="checkbox"/>                                               | Other                                                                                                    |                                                                    |
| The extreme operating conditions that apply to the equipment:          |                                                                                                          |                                                                    |
| Operating temperature range: -20 °C to +55 °C                          |                                                                                                          |                                                                    |
| Operating voltage range: 3.55 V to 4.2 V                               |                                                                                                          | <input type="checkbox"/> AC <input checked="" type="checkbox"/> DC |
| Details provided are for the:                                          |                                                                                                          |                                                                    |
| <input checked="" type="checkbox"/>                                    | stand-alone equipment                                                                                    |                                                                    |
| <input type="checkbox"/>                                               | combined (or host) equipment                                                                             |                                                                    |
| <input type="checkbox"/>                                               | test jig                                                                                                 |                                                                    |



| The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p levels:                                                           |                                                                                    |               |                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------|-----------------------------|
| Antenna Type:                                                                                                                                                                                          |                                                                                    |               |                             |
| <input checked="" type="checkbox"/>                                                                                                                                                                    | Integral Antenna                                                                   |               |                             |
|                                                                                                                                                                                                        | Antenna Gain: 2.2 dBi                                                              |               |                             |
|                                                                                                                                                                                                        | If applicable, additional beamforming gain (excluding basic antenna gain):      dB |               |                             |
| <input checked="" type="checkbox"/>                                                                                                                                                                    | Temporary RF connector provided                                                    |               |                             |
| <input type="checkbox"/>                                                                                                                                                                               | No temporary RF connector provided                                                 |               |                             |
| <input type="checkbox"/>                                                                                                                                                                               | Dedicated Antennas (equipment with antenna connector)                              |               |                             |
| <input type="checkbox"/>                                                                                                                                                                               | Single power level with corresponding antenna(s)                                   |               |                             |
| <input type="checkbox"/>                                                                                                                                                                               | Multiple power settings and corresponding antenna(s)                               |               |                             |
| Number of different Power Levels:                                                                                                                                                                      |                                                                                    |               |                             |
|                                                                                                                                                                                                        | Power Level 1:      dBm                                                            |               |                             |
|                                                                                                                                                                                                        | Power Level 2:      dBm                                                            |               |                             |
|                                                                                                                                                                                                        | Power Level 3:      dBm                                                            |               |                             |
|                                                                                                                                                                                                        | Power Level 4:      dBm                                                            |               |                             |
| NOTE 1: Add more lines in case the equipment has more power levels.                                                                                                                                    |                                                                                    |               |                             |
| NOTE 2: These power levels are conducted power levels (at antenna connector).                                                                                                                          |                                                                                    |               |                             |
| For each of the Power Levels, provide the intended antenna assemblies, their corresponding gains (G) and the resulting e.i.r.p. levels also taking into account the beamforming gain (Y) if applicable |                                                                                    |               |                             |
|                                                                                                                                                                                                        | Power Level 1:      dBm                                                            |               |                             |
| Number of antenna assemblies provided for this power level:                                                                                                                                            |                                                                                    |               |                             |
| Assembly #                                                                                                                                                                                             | Gain (dBi)                                                                         | e.i.r.p (dBm) | Part number or model number |
| 1                                                                                                                                                                                                      |                                                                                    |               |                             |
| 2                                                                                                                                                                                                      |                                                                                    |               |                             |
| 3                                                                                                                                                                                                      |                                                                                    |               |                             |
| 4                                                                                                                                                                                                      |                                                                                    |               |                             |
| NOTE: Add more rows in case more antenna assemblies are supported for this power level.                                                                                                                |                                                                                    |               |                             |
|                                                                                                                                                                                                        | Power Level 2:      dBm                                                            |               |                             |
| Number of antenna assemblies provided for this power level:                                                                                                                                            |                                                                                    |               |                             |
| Assembly #                                                                                                                                                                                             | Gain (dBi)                                                                         | e.i.r.p (dBm) | Part number or model number |
| 1                                                                                                                                                                                                      |                                                                                    |               |                             |
| 2                                                                                                                                                                                                      |                                                                                    |               |                             |
| 3                                                                                                                                                                                                      |                                                                                    |               |                             |
| 4                                                                                                                                                                                                      |                                                                                    |               |                             |
| NOTE: Add more rows in case more antenna assemblies are supported for this power level.                                                                                                                |                                                                                    |               |                             |
|                                                                                                                                                                                                        | Power Level 3:      dBm                                                            |               |                             |
| Number of antenna assemblies provided for this power level:                                                                                                                                            |                                                                                    |               |                             |
| Assembly #                                                                                                                                                                                             | Gain (dBi)                                                                         | e.i.r.p (dBm) | Part number or model number |
| 1                                                                                                                                                                                                      |                                                                                    |               |                             |
| 2                                                                                                                                                                                                      |                                                                                    |               |                             |
| 3                                                                                                                                                                                                      |                                                                                    |               |                             |
| 4                                                                                                                                                                                                      |                                                                                    |               |                             |
| NOTE: Add more rows in case more antenna assemblies are supported for this power level.                                                                                                                |                                                                                    |               |                             |



|                                                                                                                                                                                                                                                                                                                                      |                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| <b>The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices:</b>                                                                                                                                                                      |                                      |
| Details provided are for the: <input checked="" type="checkbox"/> stand-alone equipment                                                                                                                                                                                                                                              |                                      |
| <input type="checkbox"/> combined (or host) equipment                                                                                                                                                                                                                                                                                |                                      |
| <input type="checkbox"/> test jig                                                                                                                                                                                                                                                                                                    |                                      |
| Supply Voltage <input type="checkbox"/> AC mains State AC voltage                                                                                                                                                                                                                                                                    |                                      |
| <input checked="" type="checkbox"/> State DC voltage 3.7                                                                                                                                                                                                                                                                             |                                      |
| In case of DC, indicate the type of power source                                                                                                                                                                                                                                                                                     |                                      |
| <input type="checkbox"/> Internal Power Supply                                                                                                                                                                                                                                                                                       |                                      |
| <input type="checkbox"/> External Power Supply or AC/DC adapter                                                                                                                                                                                                                                                                      |                                      |
| <input checked="" type="checkbox"/> Battery                                                                                                                                                                                                                                                                                          |                                      |
| <input type="checkbox"/> Other:                                                                                                                                                                                                                                                                                                      |                                      |
| <b>Describe the test modes available which can facilitate testing:</b>                                                                                                                                                                                                                                                               |                                      |
| BT Testmode to allow tester communication and control. Activated via PC with provided script                                                                                                                                                                                                                                         |                                      |
| <b>The equipment type (e.g. Bluetooth®, IEEE 802.11™ [1.3], proprietary, etc.):</b>                                                                                                                                                                                                                                                  |                                      |
| Bluetooth                                                                                                                                                                                                                                                                                                                            |                                      |
| <b>Combination for testing (see clause 5.1.3.3 of EN 300 328 V1.8.1)</b>                                                                                                                                                                                                                                                             |                                      |
| From all combinations of conducted power settings and intended antenna assembly(ies) specified in clause 3.1 m), specify the combination resulting in the highest e.i.r.p. for the radio equipment.                                                                                                                                  |                                      |
| Unless otherwise specified in EN 300 328, this power setting is to be used for testing against the requirements of EN 300 328. In case there is more than one such conducted power setting resulting in the same (highest) e.i.r.p. level, the highest power setting is to be used for testing. See also EN 300 328, clause 5.1.3.3. |                                      |
| Highest overall e.i.r.p. value: 6.2 dBm                                                                                                                                                                                                                                                                                              |                                      |
| Corresponding Antenna assembly gain: 2.2 dBi                                                                                                                                                                                                                                                                                         | Antenna Assembly #: Internal antenna |
| Corresponding conducted power setting: 4 dBm                                                                                                                                                                                                                                                                                         | Listed as Power Setting #:           |
| (also the power level to be used for testing)                                                                                                                                                                                                                                                                                        |                                      |
| <b>Additional information provided by the applicant</b>                                                                                                                                                                                                                                                                              |                                      |
| <b>Modulation</b>                                                                                                                                                                                                                                                                                                                    |                                      |
| ITU Class(es) of emission:                                                                                                                                                                                                                                                                                                           |                                      |
| Can the transmitter operate unmodulated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                                                                                                                                                                                                         |                                      |
| <b>Duty Cycle</b>                                                                                                                                                                                                                                                                                                                    |                                      |
| The transmitter is intended for:                                                                                                                                                                                                                                                                                                     |                                      |
| <input checked="" type="checkbox"/> Continuous duty                                                                                                                                                                                                                                                                                  |                                      |
| <input type="checkbox"/> Intermittent duty                                                                                                                                                                                                                                                                                           |                                      |
| <input type="checkbox"/> Continuous operation possible for testing purposes                                                                                                                                                                                                                                                          |                                      |
| <b>About the UUT</b>                                                                                                                                                                                                                                                                                                                 |                                      |
| <input type="checkbox"/> The equipment submitted are representative production models                                                                                                                                                                                                                                                |                                      |
| <input checked="" type="checkbox"/> If not, the equipment submitted are pre-production models ?                                                                                                                                                                                                                                      |                                      |
| <input checked="" type="checkbox"/> If pre-production equipment are submitted, the final production equipment will be identical in all respects with the equipment tested                                                                                                                                                            |                                      |
| <input type="checkbox"/> If not, supply full details                                                                                                                                                                                                                                                                                 |                                      |
| <input type="checkbox"/> The equipment submitted is CE marked                                                                                                                                                                                                                                                                        |                                      |
| <input checked="" type="checkbox"/> In addition to the CE mark, the Class-II identifier (Alert Sign) is affixed.                                                                                                                                                                                                                     |                                      |



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| Additional items and/or supporting equipment provided |                                                          |
|-------------------------------------------------------|----------------------------------------------------------|
| <input checked="" type="checkbox"/>                   | Spare batteries (e.g. for portable equipment)            |
| <input checked="" type="checkbox"/>                   | Battery charging device                                  |
| <input checked="" type="checkbox"/>                   | External Power Supply or AC/DC adapter                   |
| <input checked="" type="checkbox"/>                   | Test Jig or interface box                                |
| <input type="checkbox"/>                              | RF test fixture (for equipment with integrated antennas) |
| <input type="checkbox"/>                              | Host System                                              |
|                                                       | Manufacturer                                             |
|                                                       | Model                                                    |
|                                                       | Model Name                                               |
| <input checked="" type="checkbox"/>                   | Combined equipment                                       |
|                                                       | Manufacturer Inmarsat                                    |
|                                                       | Model IsatPhone2                                         |
|                                                       | Model Name NA                                            |
| <input checked="" type="checkbox"/>                   | User Manual                                              |
| <input checked="" type="checkbox"/>                   | Technical documentation (Handbook and circuit diagrams)  |

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature:

Name: Ari Tastula

Position held:

R&amp;D HW Senior Architect

Date:

08.11.2013



Product Service

## **1.4 PRODUCT INFORMATION**

### **1.4.1 Technical Description**

The Equipment Under Test (EUT) was an Inmarsat Global Ltd IsatPhone2. A full technical description can be found in the manufacturer's documentation.

## **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.

The EUT was powered from a 3.7 V DC supply.

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 standard were made during testing.

## **1.7 MODIFICATION RECORD**

Modification 0 - No modifications were made to the test sample during testing.



Product Service

## **SECTION 2**

### **TEST DETAILS**

FCC and Industry Canada Testing of the  
Inmarsat Global Ltd IsatPhone2  
In accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210 and Industry Canada  
RSS-GEN



## **2.1 AC LINE CONDUCTED EMISSIONS**

### **2.1.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.207  
Industry Canada RSS-210, Clause 7.2.4

### **2.1.2 Equipment Under Test and Modification State**

IsatPhone2 S/N: IX40100471 - Modification State 0

### **2.1.3 Date of Test**

4 November 2013

### **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**

The EUT was set up on a test table 800mm above a horizontal ground plane. A vertical ground plane was also required and is placed 400mm from the EUT.

The EUT was powered through a Line Impedance Stabilisation Network (LISN) which was bonded to the ground plane. The EUT was located so that the distance between the EUT and the LISN was no less than 800mm. Where possible the cable between the mains input of the EUT and the LISN was 1m. Where this is not possible the cable is non-inductively bundled with the bundle not exceeding 400mm in length.

A preliminary profile of the Conducted Emissions was obtained over the frequency range 150kHz to 30MHz. Any points of interest are noted for formal measurements.

During formal measurements, the measuring receiver was tuned to the emission of interest where Quasi – Peak and Average measurements are performed in a 9 kHz Video and Resolution Bandwidth.

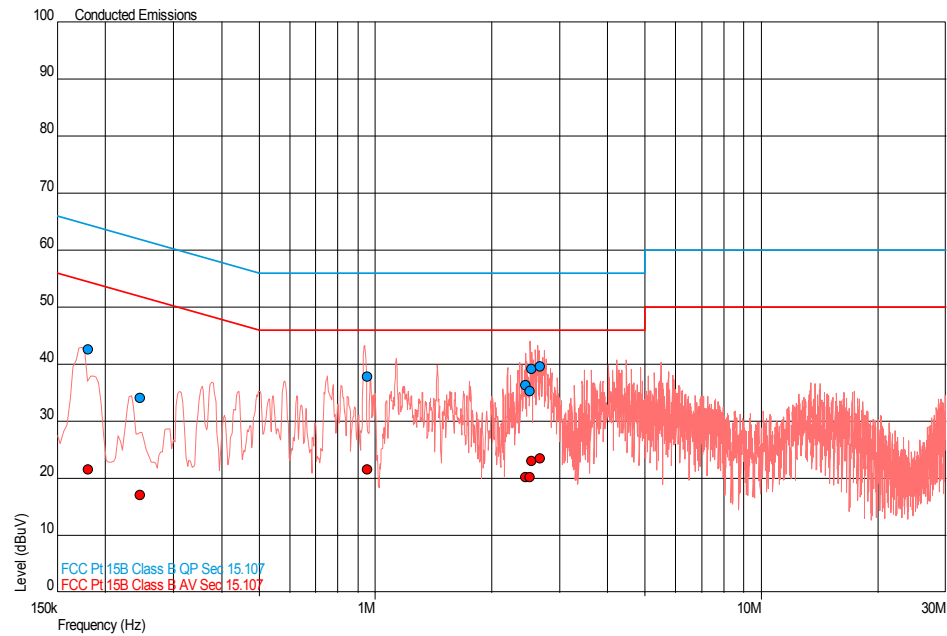
### **2.1.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 18.6°C |
| Relative Humidity   | 36.0%  |



2.1.7 Test Results

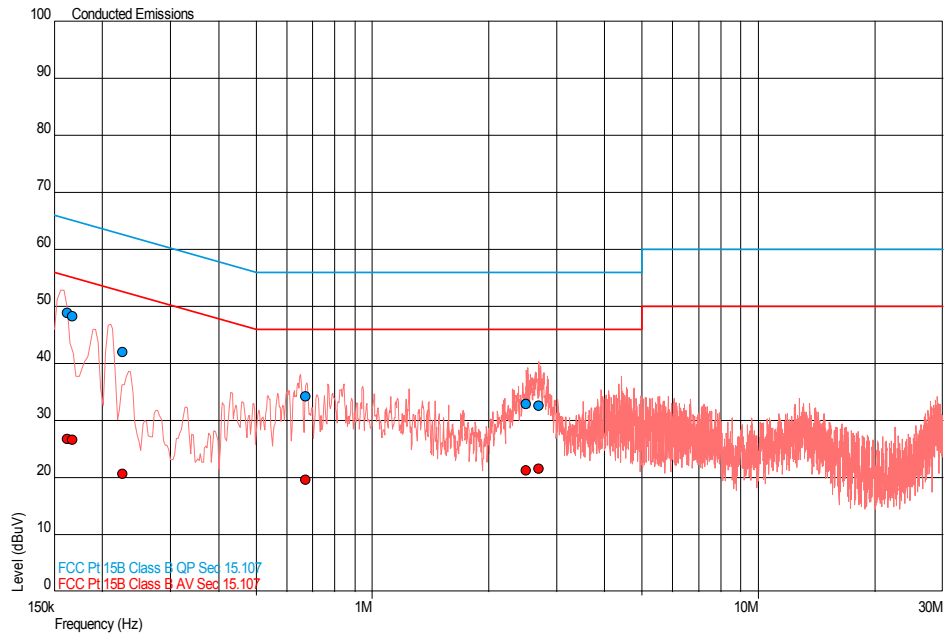
Live Line



| Frequency (MHz) | QP Level (dBuV) | QP Limit (dBuV) | QP Margin (dBuV) | AV Level (dBuV) | AV Limit (dBuV) | AV Margin (dBuV) |
|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|------------------|
| 0.181           | 42.6            | 64.4            | -21.9            | 21.5            | 54.4            | -32.9            |
| 0.246           | 34.1            | 61.9            | -27.8            | 17.1            | 51.9            | -34.8            |
| 0.955           | 37.8            | 56.0            | -18.2            | 21.6            | 46.0            | -24.4            |
| 2.457           | 36.3            | 56.0            | -19.7            | 20.2            | 46.0            | -25.8            |
| 2.519           | 35.2            | 56.0            | -20.8            | 20.2            | 46.0            | -25.8            |
| 2.539           | 39.1            | 56.0            | -16.9            | 23.0            | 46.0            | -23.0            |
| 2.667           | 39.7            | 56.0            | -16.3            | 23.5            | 46.0            | -22.5            |



### Neutral Line



| Frequency (MHz) | QP Level (dBuV) | QP Limit (dBuV) | QP Margin (dBuV) | AV Level (dBuV) | AV Limit (dBuV) | AV Margin (dBuV) |
|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|------------------|
| 0.162           | 48.9            | 65.4            | -16.5            | 26.8            | 55.4            | -28.6            |
| 0.168           | 48.3            | 65.1            | -16.8            | 26.6            | 55.1            | -28.5            |
| 0.226           | 42.1            | 62.6            | -20.5            | 20.7            | 52.6            | -31.9            |
| 0.672           | 34.2            | 56.0            | -21.8            | 19.6            | 46.0            | -26.4            |
| 2.505           | 32.9            | 56.0            | -23.1            | 21.2            | 46.0            | -24.8            |
| 2.700           | 32.6            | 56.0            | -23.4            | 21.5            | 46.0            | -24.5            |



Product Service

## **2.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER**

### **2.2.1 Specification Reference**

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

### **2.2.2 Equipment Under Test and Modification State**

IsatPhone2 Pro 2+ S/N: Ant Number IN50000242 - Modification State 0

### **2.2.3 Date of Test**

5 November 2013

### **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**

The EUT was configured to transmit at maximum power via a cable to the Peak Power Analyser. The Analyser settings were adjusted to display the resultant trace on screen and a reference level offset was entered to account for the measurement path loss. The measurement bandwidth was set according to the signal being measured and the peak and average levels were recorded.

### **2.2.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 23.9°C |
| Relative Humidity   | 41.1%  |



## 2.2.7 Test Results

### 3.7 V DC Supply

| Packet Type | Maximum Peak Conducted Output Power |          |          |          |          |          |
|-------------|-------------------------------------|----------|----------|----------|----------|----------|
|             | dBm                                 |          |          | mW       |          |          |
|             | 2402 MHz                            | 2441 MHz | 2480 MHz | 2402 MHz | 2441 MHz | 2480 MHz |
| DH1         | 5.10                                | 4.63     | 3.56     | 3.23     | 2.90     | 2.26     |
| DH3         | 5.13                                | 4.67     | 3.88     | 3.25     | 2.93     | 2.44     |
| DH5         | 5.07                                | 4.66     | 3.88     | 3.21     | 2.92     | 2.44     |

### Limit Clause

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 5725-5850MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.



Product Service

## **2.3 FREQUENCY HOPPING SYSTEMS - 20 dB BANDWIDTH AND CHANNEL SEPARATION**

### **2.3.1 Specification Reference**

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

### **2.3.2 Equipment Under Test and Modification State**

IsatPhone2 Pro 2+ S/N: Ant Number IN50000242 - Modification State 0

### **2.3.3 Date of Test**

4 November 2013

### **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 Procedure**

For the 20 dB bandwidth measurement, the EUT was configured to transmit at maximum power 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.

For the channel separation measurement, 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.

### **2.3.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 23.7°C |
| Relative Humidity   | 29.6%  |



Product Service

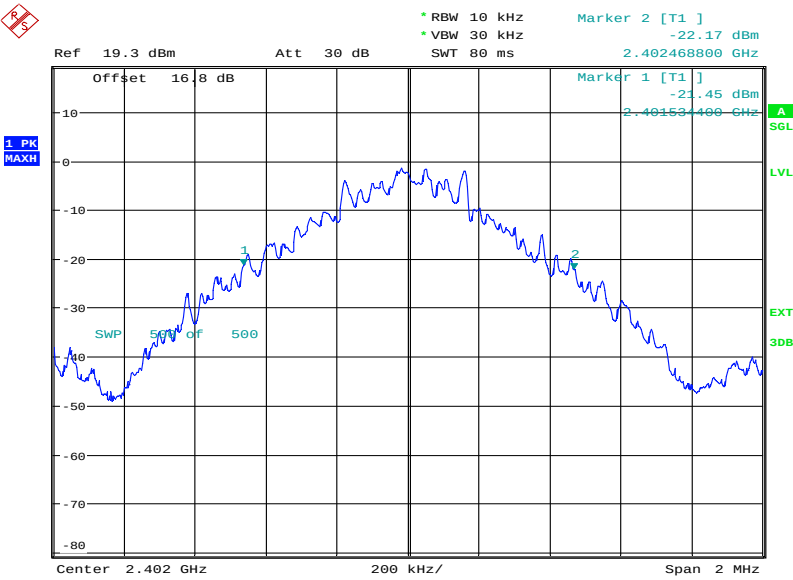
2.3.7 Test Results

3.7 V DC Supply

20dB Bandwidth

2402 MHz

|                  |                      |
|------------------|----------------------|
| Data Rate (Mbps) | 20dB Bandwidth (kHz) |
| DH3              | 934.4                |



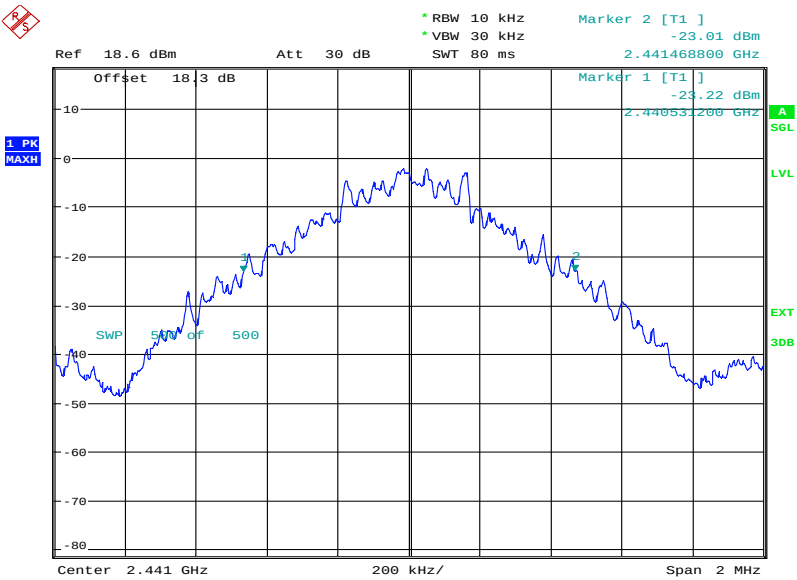
Date: 4.NOV.2013 15:28:14



Product Service

2441 MHz

|                  |                      |
|------------------|----------------------|
| Data Rate (Mbps) | 20dB Bandwidth (kHz) |
| DH3              | 937.6                |



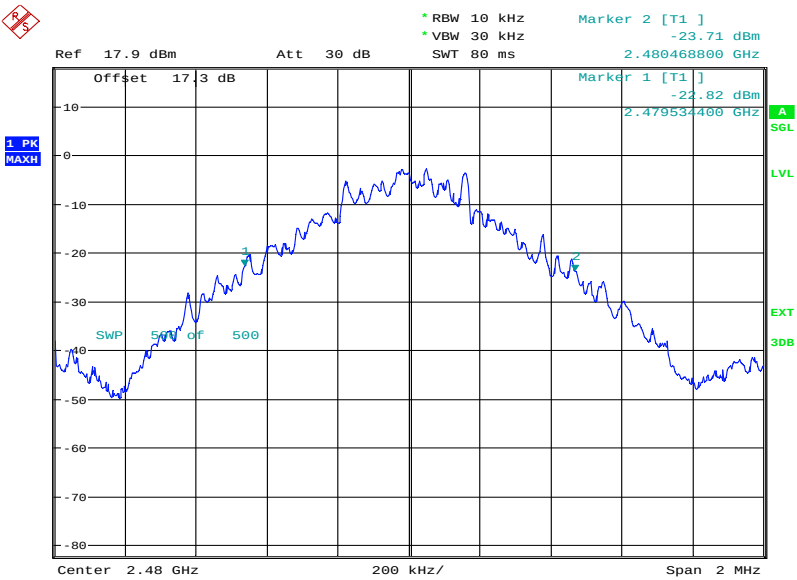
Date: 4.NOV.2013 15:42:06



Product Service

2480 MHz

|                  |                      |
|------------------|----------------------|
| Data Rate (Mbps) | 20dB Bandwidth (kHz) |
| DH3              | 934.4                |



Date: 4.NOV.2013 15:48:46

Limit Clause

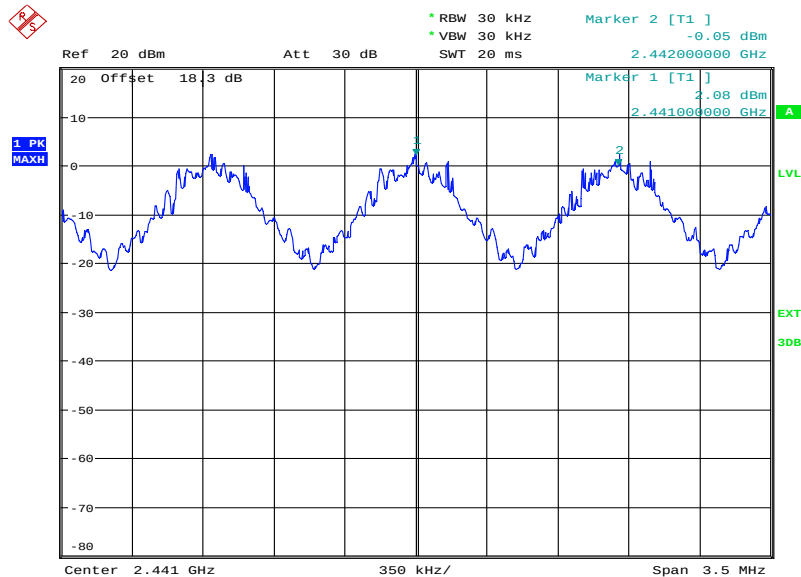
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater.



Product Service

### Channel Separation

Channel Separation: 1 MHz



Date: 4.NOV.2013 15:39:49

### Limit Clause

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively, frequency hopping systems operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 0.125 W.

The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.



Product Service

## **2.4 FREQUENCY HOPPING SYSTEMS - CHANNEL DWELL TIME AND NUMBER OF HOPPING CHANNELS**

### **2.4.1 Specification Reference**

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

### **2.4.2 Equipment Under Test and Modification State**

IsatPhone2 Pro 2+ S/N: Ant Number IN50000242 - Modification State 0

### **2.4.3 Date of Test**

4 November 2013

### **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**

The EUT was connected to a Spectrum Analyser via a cable. The EUT was set to transmit on maximum power on the middle channel. The frequency span was set to 0 Hz and a video trigger was used to measure the dwell time of the transmitted signal. This was performed using DH1, DH3 and DH5 packet types.

In order to measure the number of hopping channels, the EUT was set to transmit on maximum power and hopping on all channels. The span was adjusted to show the individual channels. The display trace was set to Max Hold and the plot recorded.

### **2.4.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 23.7°C |
| Relative Humidity   | 29.6%  |



Product Service

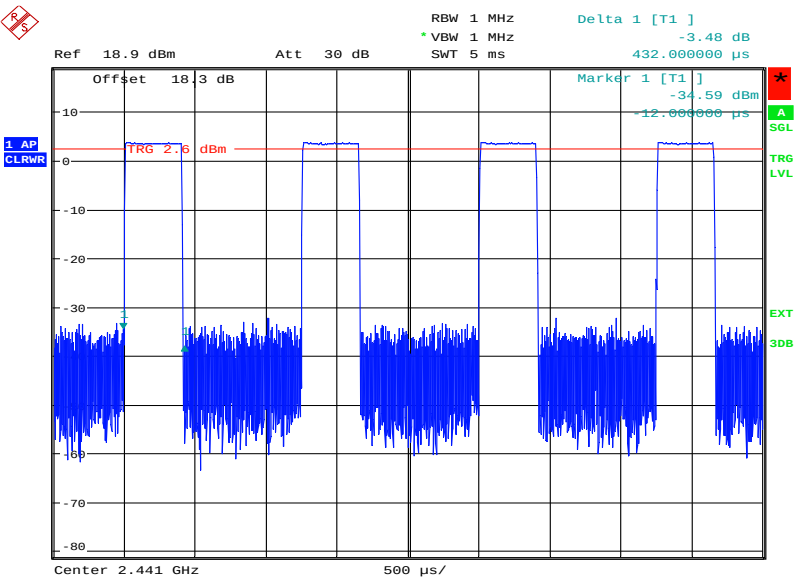
2.4.7 Test Results

3.7 V DC Supply

Channel Dwell Time

DH1

0.000432 ms



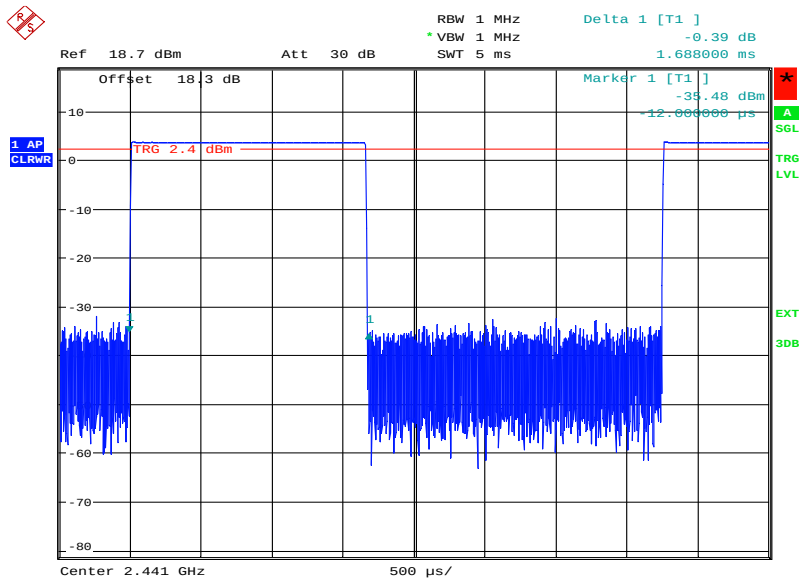
Date: 4.NOV.2013 15:45:06

DH3

0.001688 ms



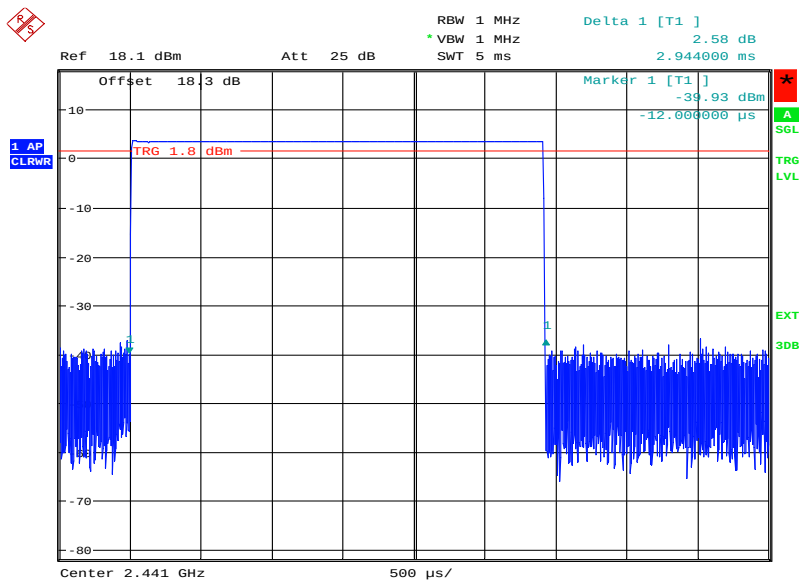
Product Service



Date: 4.NOV.2013 15:43:23

DH5

0.002944 ms



Date: 4.NOV.2013 16:07:23

Limit

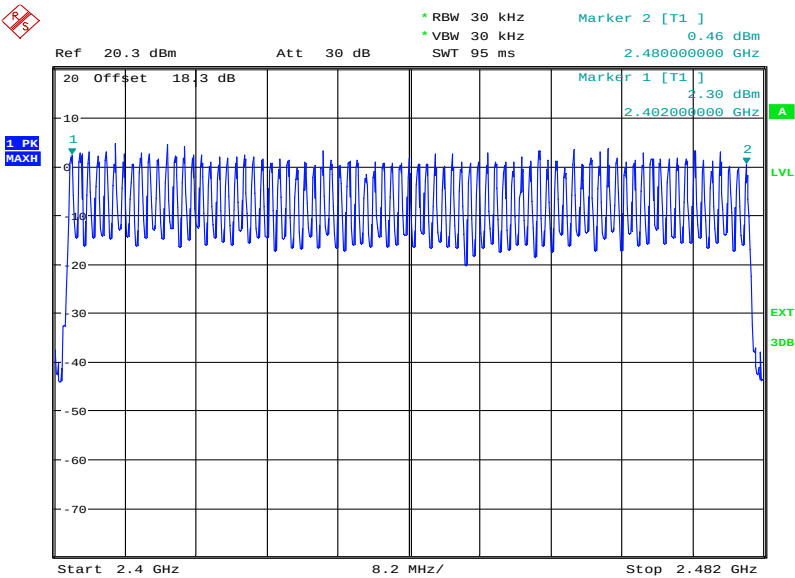
Frequency hopping systems operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.



Product Service

Number of Hopping Channels

79 channels



Date: 4.NOV.2013 15:35:17

Limit

≥ 15 channels



Product Service

**2.5 EIRP PEAK POWER****2.5.1 Specification Reference**

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

**2.5.2 Equipment Under Test and Modification State**

IsatPhone2 S/N: IX40100471 - Modification State 0

**2.5.3 Date of Test**

30 October 2013

**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**

The EUT was configured to transmit at maximum power via a cable to the Peak Power Analyser. The Analyser settings were adjusted to display the resultant trace on screen and a reference level offset was entered to account for the measurement path loss. The measurement bandwidth was set according to the signal being measured and the peak and average levels were recorded.

**2.5.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 19.8°C |
| Relative Humidity   | 43.0%  |

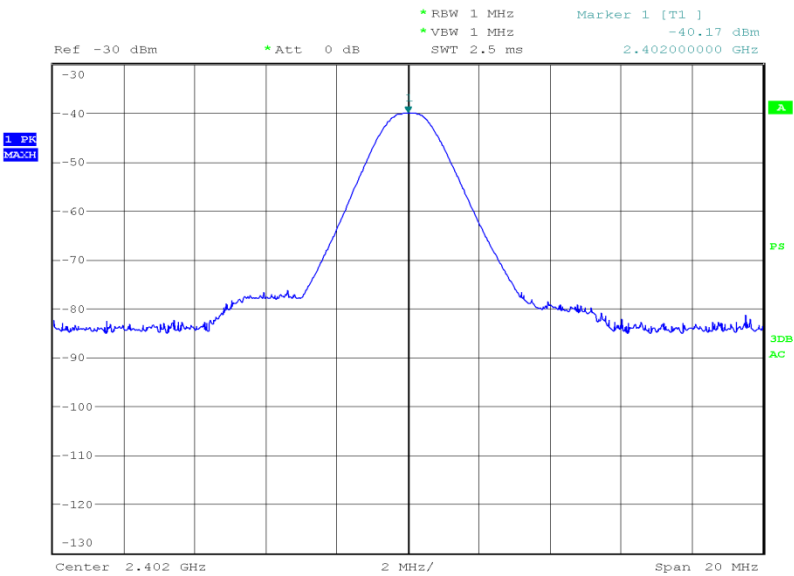


Product Service

2.5.7 Test Results

2402 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 1.84       | 1.528     |



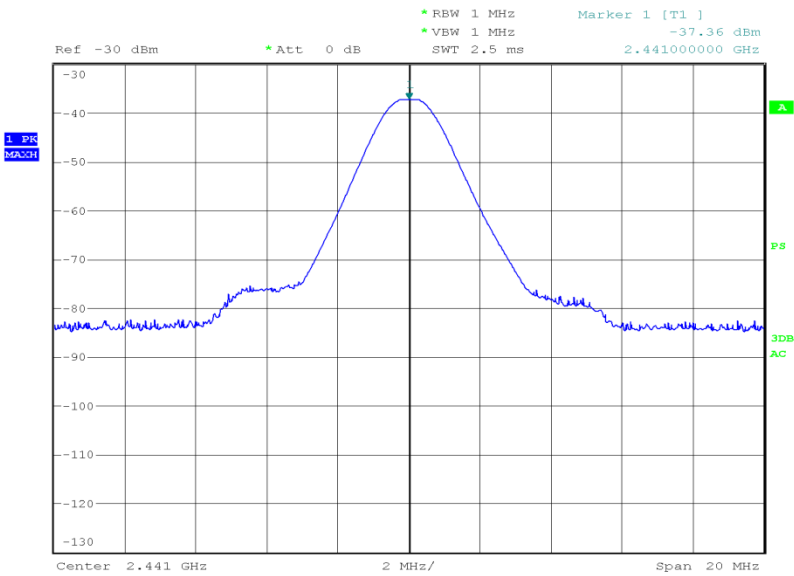
Date: 30.OCT.2013 19:06:02



Product Service

2441 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 5.06       | 3.206     |



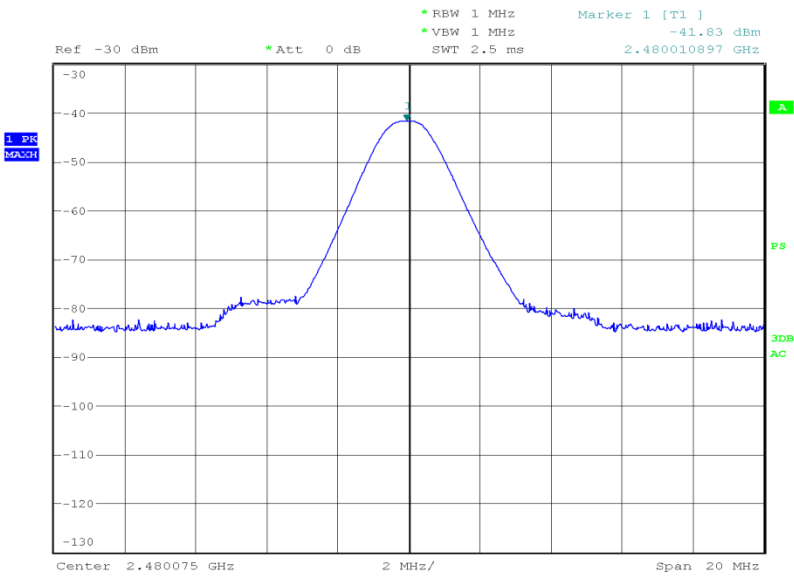
Date: 30.OCT.2013 19:49:06



Product Service

2480 MHz

| EIRP (dBm) | EIRP (mW) |
|------------|-----------|
| 0.95       | 1.245     |



Date: 30.OCT.2013 19:58:17

Limit

| Limit EIRP (dBm) | Limit EIRP(mW) |
|------------------|----------------|
| 36.0             | 4000           |



Product Service

## **2.6 SPURIOUS AND BAND EDGE EMISSIONS**

### **2.6.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.247 (d)  
Industry Canada RSS-210, Clause A8.5  
Industry Canada RSS-GEN, Clause 2.2

### **2.6.2 Equipment Under Test and Modification State**

IsatPhone2 Pro 2+ S/N: Ant Number IN50000242 - Modification State 0

### **2.6.3 Date of Test**

30 October 2013 & 5 November 2013

### **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**

For conducted emissions, the EUT was set to operate at maximum power on the worst case data rate. The test was performed on the bottom, middle and top channels. The test was performed from 9 kHz to 25 GHz. Firstly, the power of each fundamental frequency was measured in 100 kHz bandwidth and this was used to show a -20 dBc limit line on the trace. The measurement path loss in each relevant frequency band was measured and entered as a reference level offset.

For radiated emissions, the test method described above was also used. However, the measurement was performed from 30 MHz to 25 GHz and the path loss is incorporated as a transducer factor and entered into the spectrum analyser.

The band edge measurements were performed in accordance with ANSI C63.10, Clause 6.9.2. The results were analysed to ensure compliance with restricted bands. The EUT was set to the lowest and highest operating frequencies.

### **2.6.6 Environmental Conditions**

|                     |               |
|---------------------|---------------|
| Ambient Temperature | 19.8 - 24.3°C |
| Relative Humidity   | 32.8 - 44.0%  |



Product Service

2.6.7 Test Results

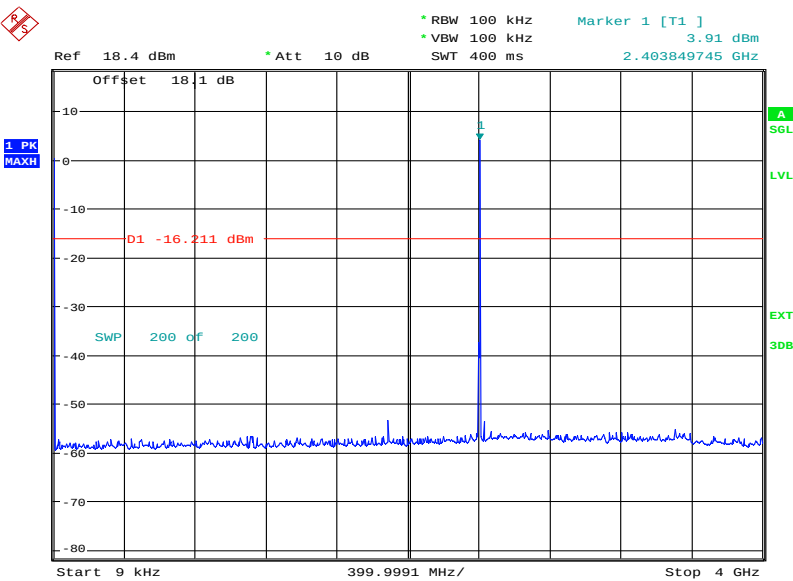
3.7 V DC Supply

Spurious Conducted Emissions

2402 MHz

DH3

9 kHz to 4 GHz

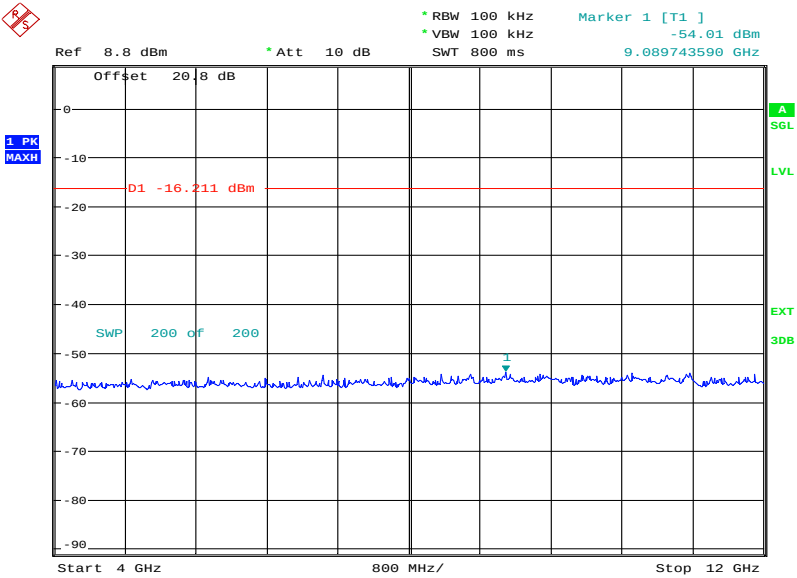


Date: 5.NOV.2013 13:13:35



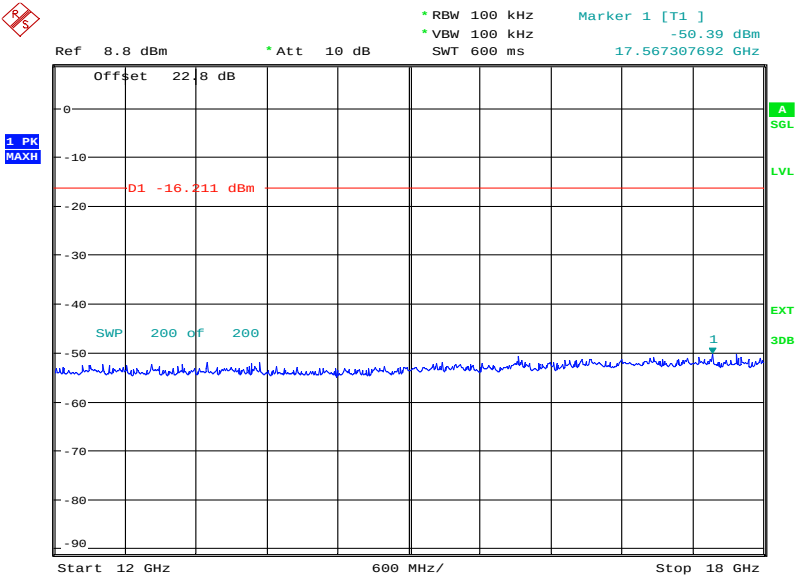
Product Service

4 GHz to 12 GHz



Date: 5.NOV.2013 13:41:57

12 GHz to 18 GHz

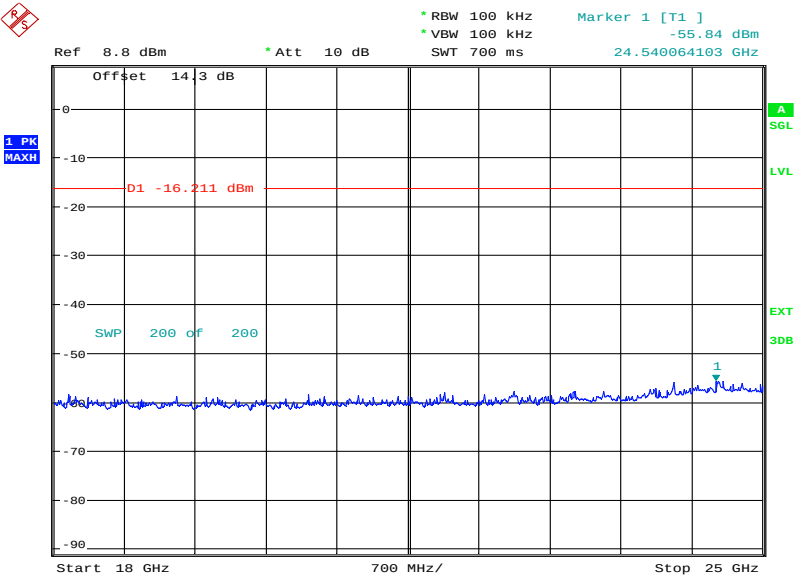


Date: 5.NOV.2013 13:44:48



Product Service

18 GHz to 25 GHz



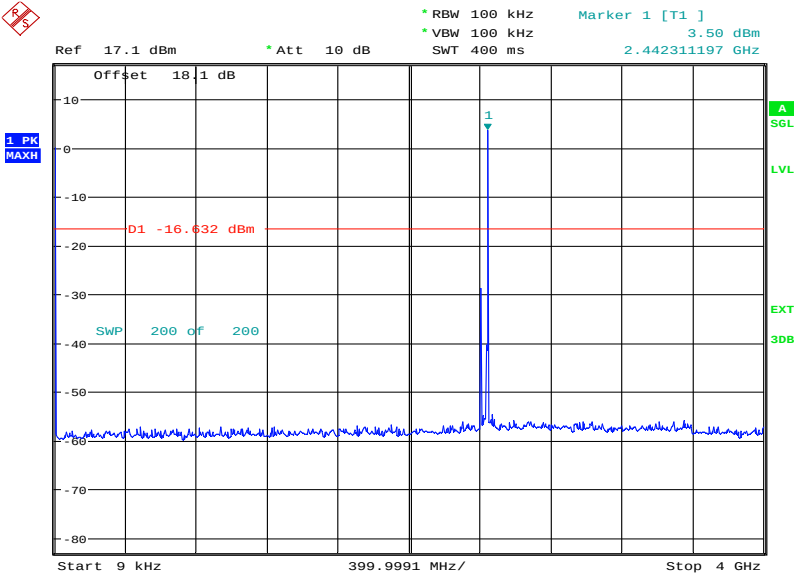
Date: 5.NOV.2013 14:08:17



Product Service

2441 MHz

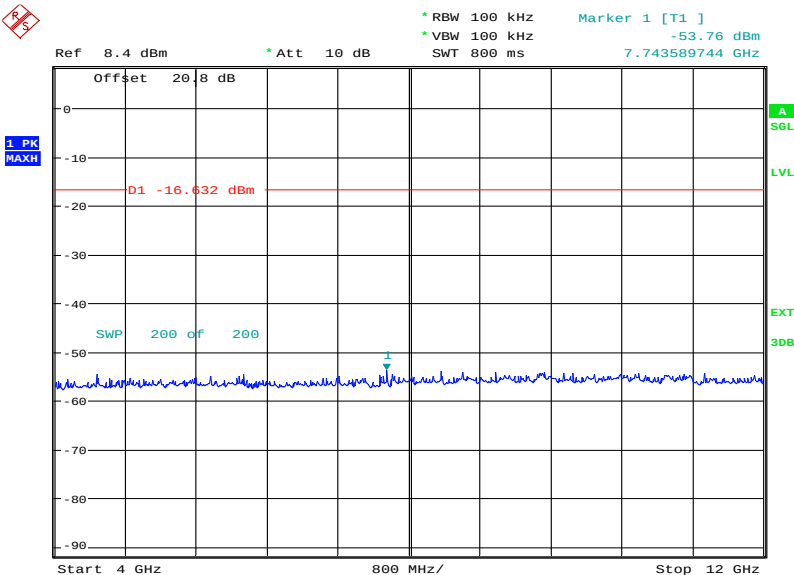
9 kHz to 4 GHz



Date: 5.NOV.2013 13:22:25

The plot above shows a second signal at 2402 MHz which is generated from the Bluetooth Test Set.

4 GHz to 12 GHz

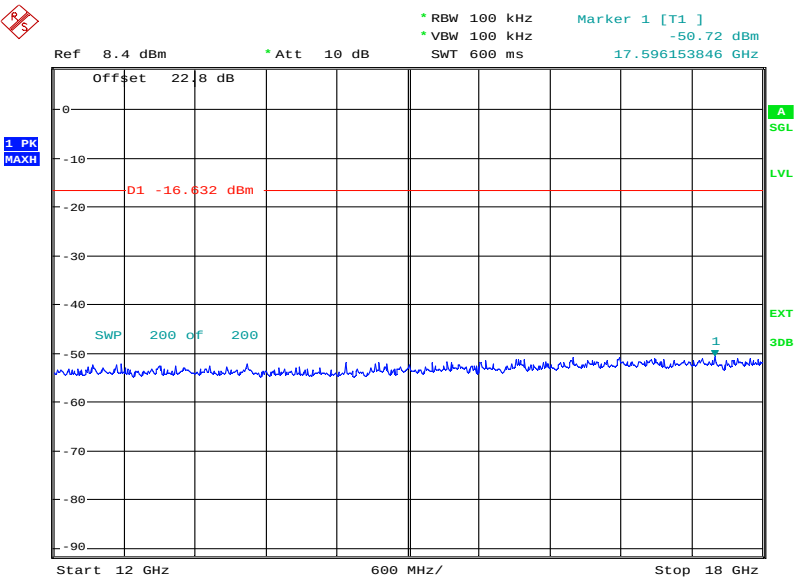


Date: 5.NOV.2013 13:38:22



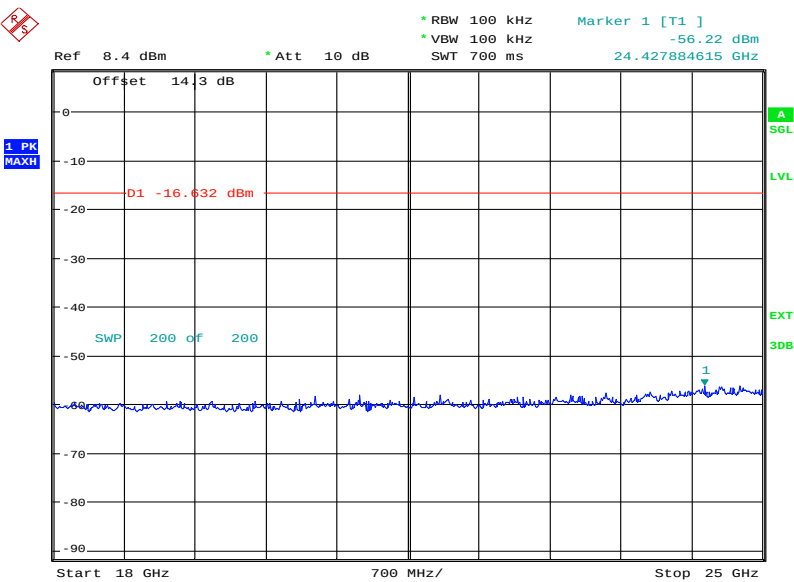
Product Service

12 GHz to 18 GHz



Date: 5.NOV.2013 13:50:25

18 GHz to 25 GHz



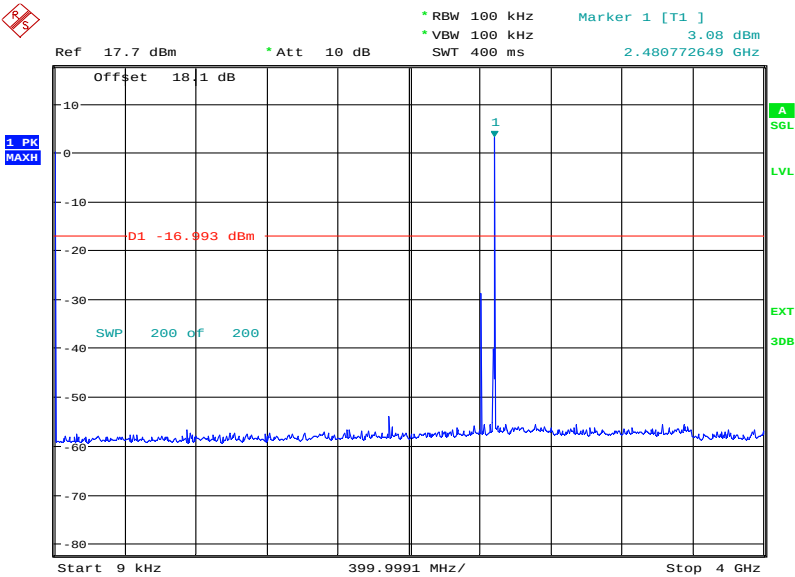
Date: 5.NOV.2013 14:11:28



Product Service

2480 MHz

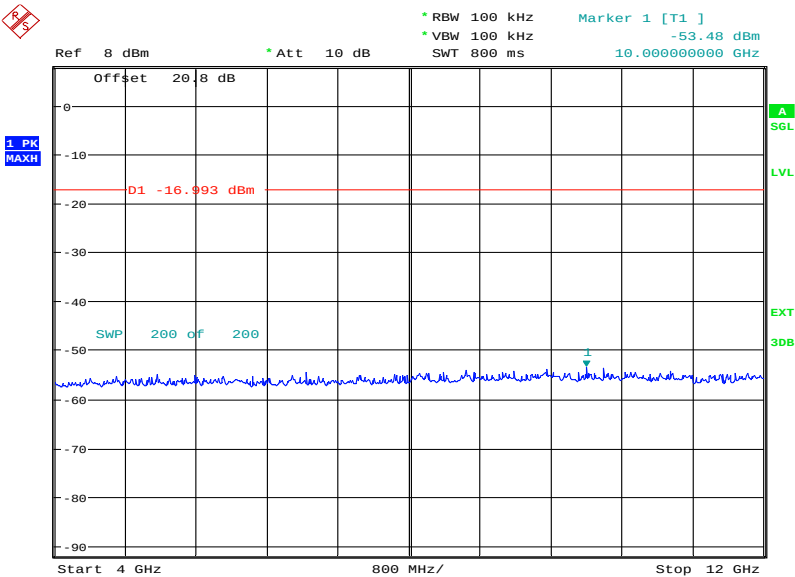
9 kHz to 4 GHz



Date: 5.NOV.2013 13:25:39

The plot above shows a second signal at 2402 MHz which is generated from the Bluetooth Test Set.

4 GHz to 12 GHz

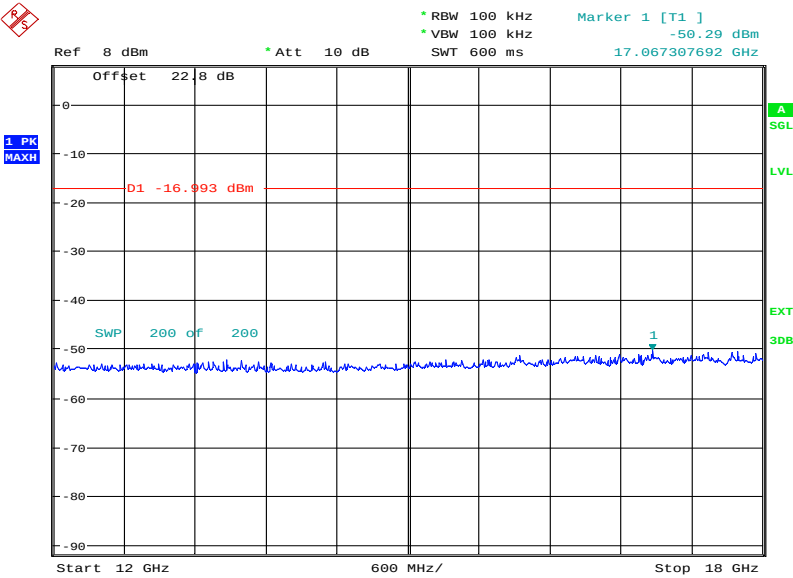


Date: 5.NOV.2013 13:34:38



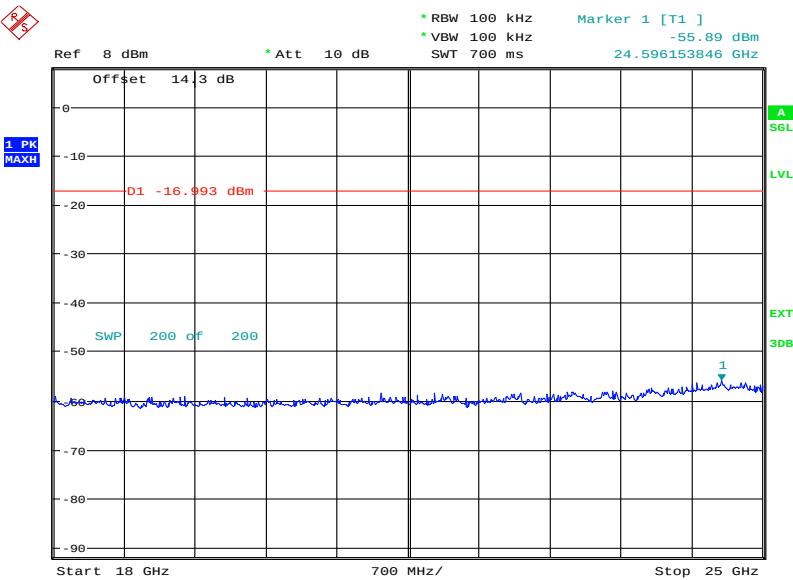
Product Service

12 GHz to 18 GHz



Date: 5.NOV.2013 13:53:26

18 GHz to 25 GHz



Date: 5.NOV.2013 14:14:40



Product Service

Limit Clause

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB.

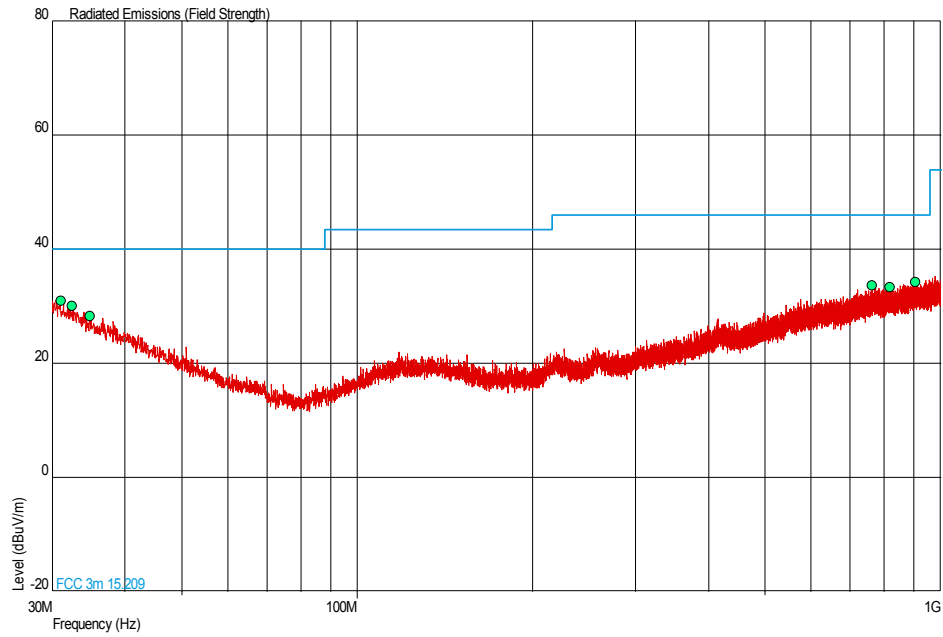


Product Service

Spurious Radiated Emissions

2402 MHz

30 MHz to 1 GHz

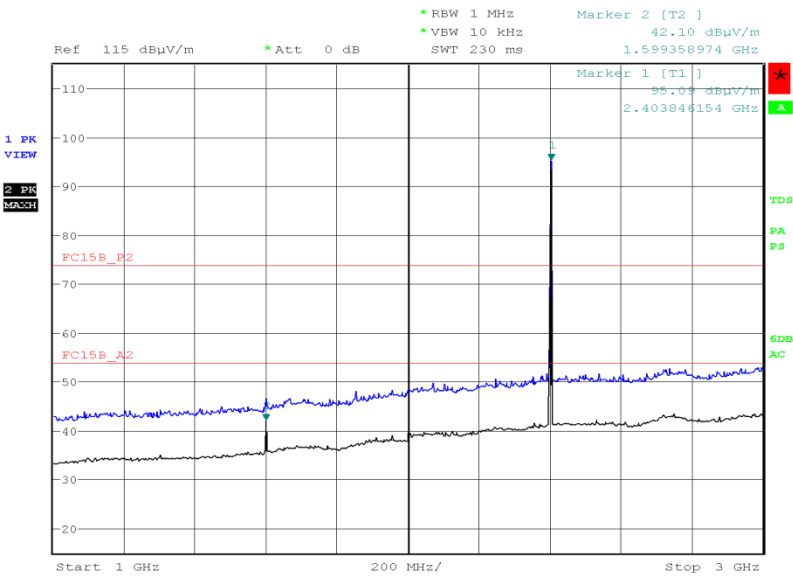


| Frequency (MHz) | QP Level (dBuV/m) | QP Level (uV/m) | QP Limit (dBuV/m) | QP Limit (uV/m) | QP Margin (dBuV/m) | QP Margin (uV/m) | Angle (Deg) | Height (m) | Polarity   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 31.067          | 30.9              | 35.1            | 40.0              | 100             | -9.1               | 64.9             | 0           | 1.00       | Vertical   |
| 32.474          | 30.1              | 32.0            | 40.0              | 100             | -9.9               | 68.0             | 0           | 1.00       | Horizontal |
| 34.802          | 28.4              | 26.3            | 40.0              | 100             | -11.6              | 73.7             | 0           | 1.00       | Vertical   |
| 764.242         | 33.7              | 48.4            | 46.0              | 200             | -12.3              | 151.6            | 0           | 1.00       | Vertical   |
| 817.931         | 33.4              | 46.8            | 46.0              | 200             | -12.6              | 153.2            | 0           | 1.00       | Vertical   |
| 906.347         | 34.2              | 51.3            | 46.0              | 200             | -11.8              | 148.7            | 0           | 1.00       | Horizontal |



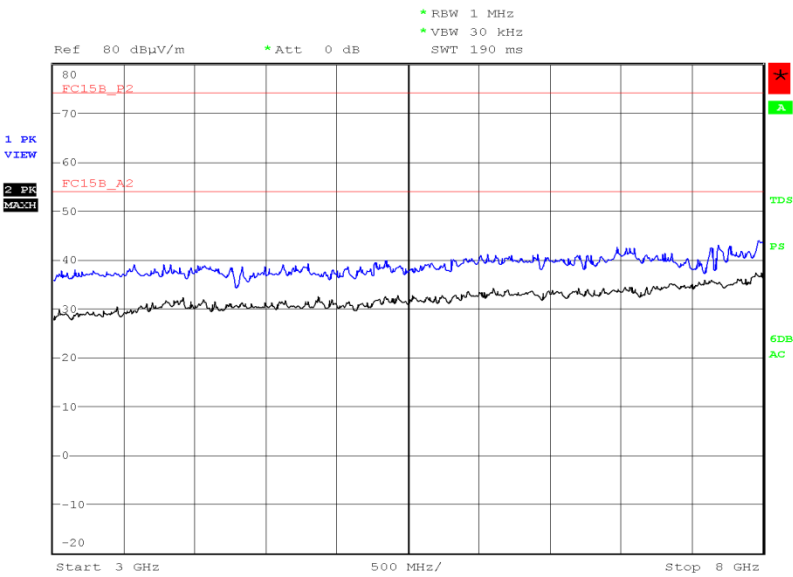
Product Service

1 GHz to 3 GHz



Date: 30.OCT.2013 19:33:44

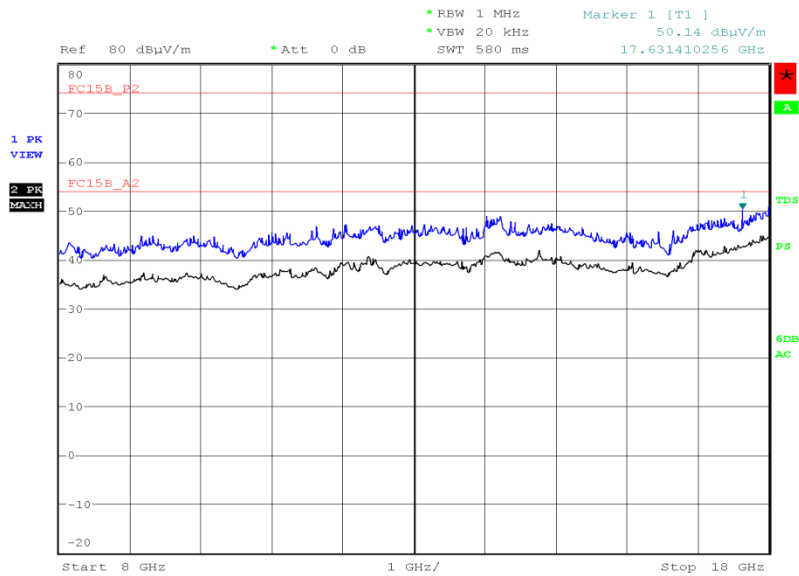
3 GHz to 8 GHz



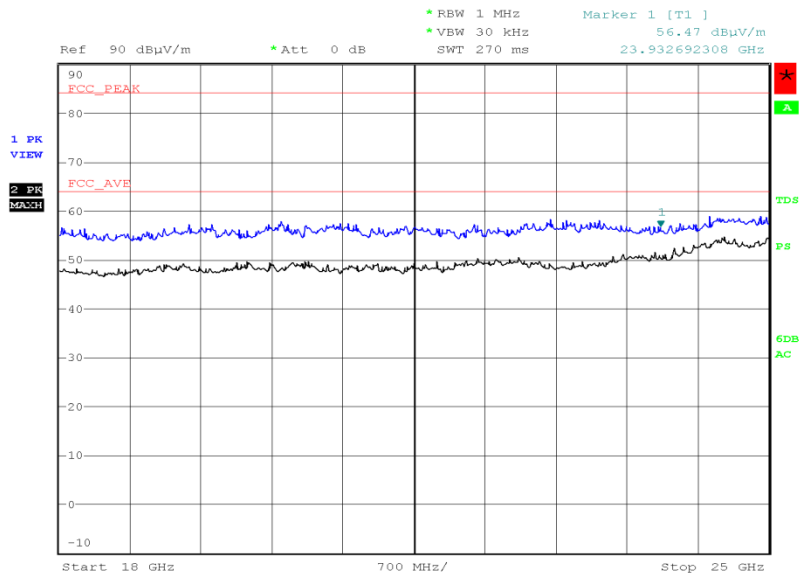
Date: 30.OCT.2013 21:08:06



Product Service

8 GHz to 18 GHz

Date: 30.OCT.2013 21:47:30

18 GHz to 25 GHz

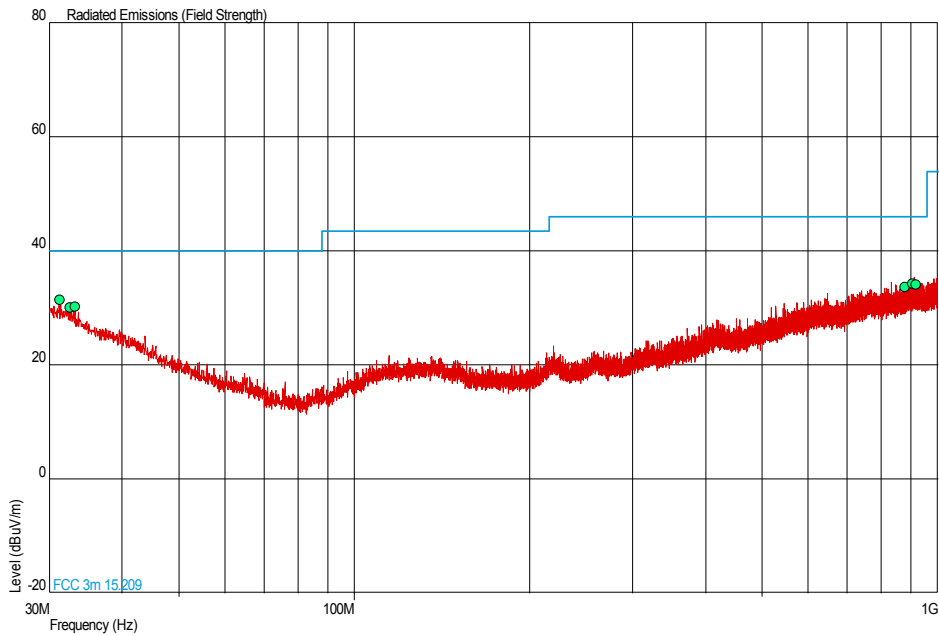
Date: 30.OCT.2013 22:24:20



Product Service

2441 MHz

30 MHz to 1 GHz



| 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   |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|------------|
| 31.261          | 31.4              | 37.2            | 40.0              | 100             | -8.6               | 62.8             | 0           | 1.00       | Horizontal |
| 32.522          | 30.1              | 32.0            | 40.0              | 100             | -9.9               | 68.0             | 0           | 1.00       | Horizontal |
| 33.250          | 30.3              | 32.7            | 40.0              | 100             | -9.7               | 67.3             | 0           | 1.00       | Vertical   |
| 879.235         | 33.7              | 48.4            | 46.0              | 200             | -12.3              | 151.6            | 0           | 1.00       | Horizontal |
| 905.668         | 34.2              | 51.3            | 46.0              | 200             | -11.8              | 148.7            | 0           | 1.00       | Vertical   |
| 917.987         | 34.2              | 51.3            | 46.0              | 200             | -11.8              | 148.7            | 0           | 1.00       | Vertical   |

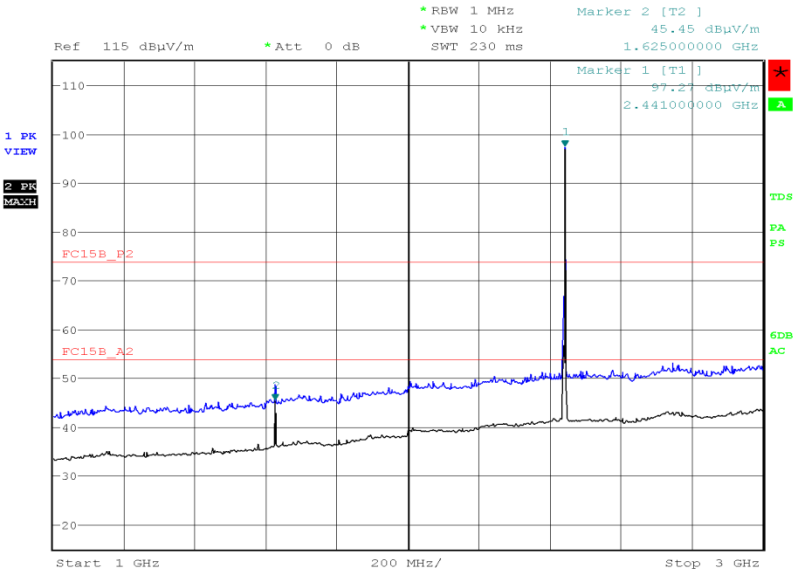


Product Service

1 GHz to 25 GHz

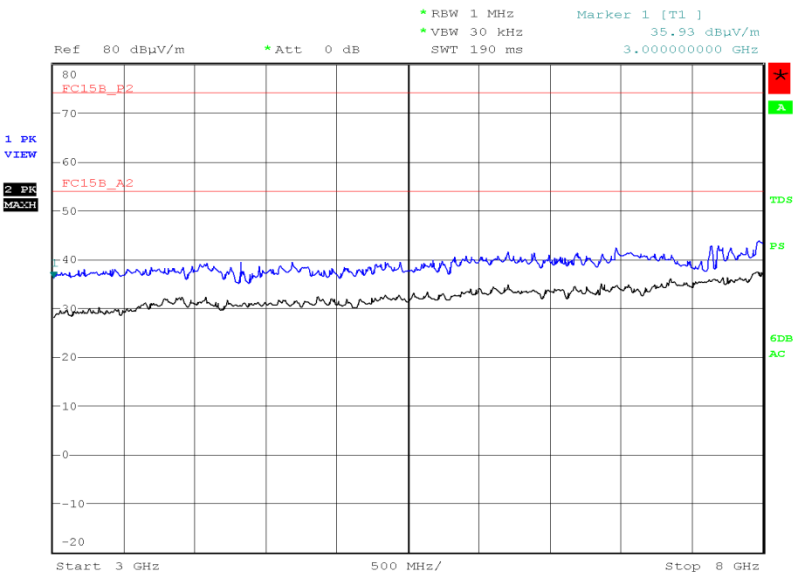
| Frequency (GHz) | Antenna Polarisation | Antenna Height (cm) | EUT Arc (degrees) | Final Peak (dBµV/m) | Final Average (dBµV/m) |
|-----------------|----------------------|---------------------|-------------------|---------------------|------------------------|
| 1.6264          | Horizontal           | 100                 | 299               | 50.76               | 44.08                  |

1 GHz to 3 GHz



Date: 30.OCT.2013 19:37:19

3 GHz to 8 GHz

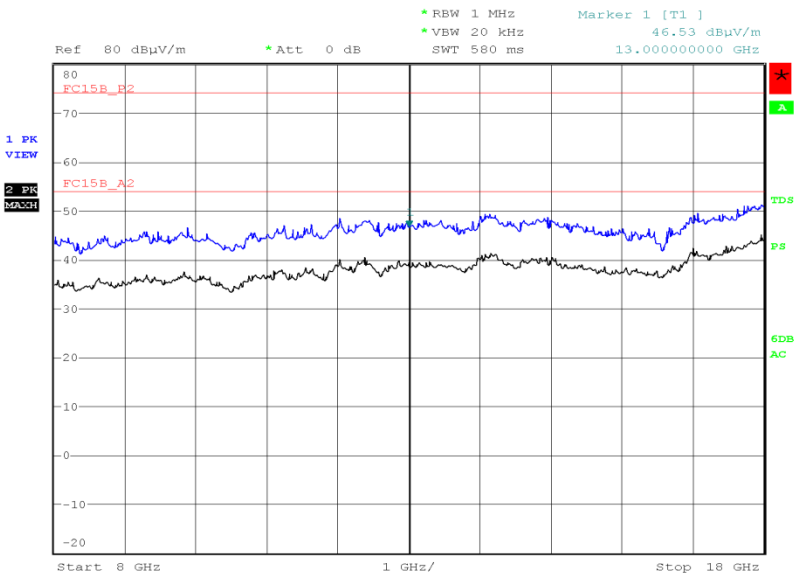


Date: 30.OCT.2013 21:17:37



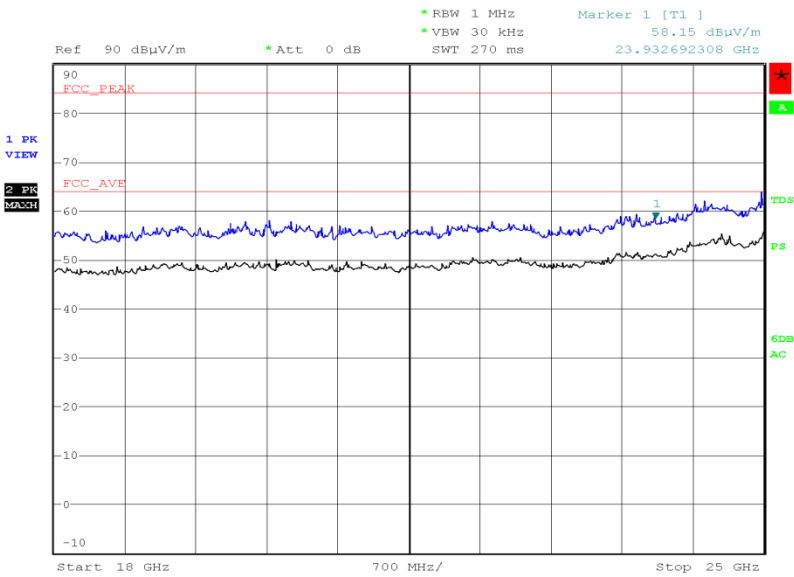
Product Service

8 GHz to 18 GHz



Date: 30.OCT.2013 21:39:32

18 GHz to 25 GHz



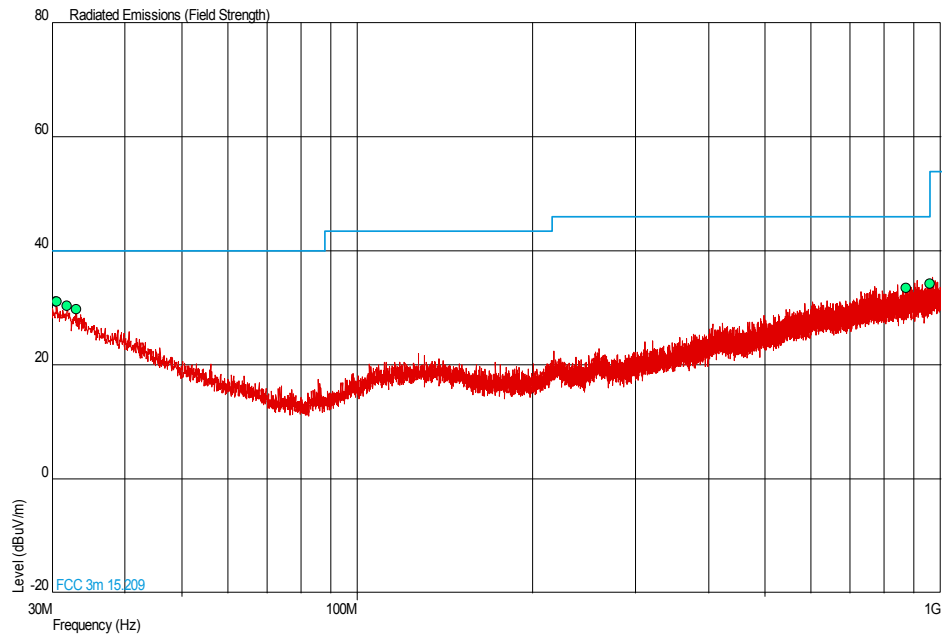
Date: 30.OCT.2013 22:28:23



Product Service

2480 MHz

30 MHz to 1 GHz

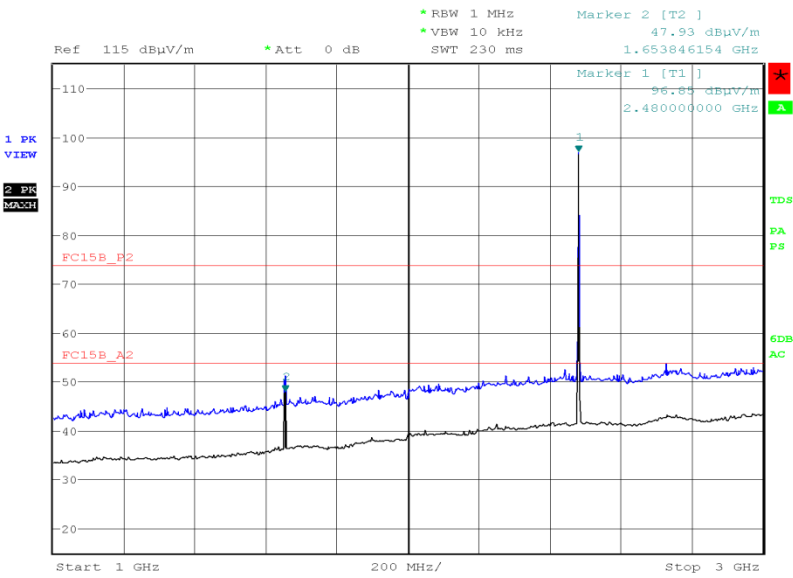


| Frequency (MHz) | QP Level (dBuV/m) | QP Level (uV/m) | QP Limit (dBuV/m) | QP Limit (uV/m) | QP Margin (dBuV/m) | QP Margin (uV/m) | Angle (Deg) | Height (m) | Polarity |
|-----------------|-------------------|-----------------|-------------------|-----------------|--------------------|------------------|-------------|------------|----------|
| 30.485          | 31.2              | 36.3            | 40.0              | 100             | -8.8               | 63.7             | 0           | 1.00       | Vertical |
| 30.582          | 31.1              | 35.9            | 40.0              | 100             | -8.9               | 64.1             | 0           | 1.00       | Vertical |
| 31.843          | 30.4              | 33.1            | 40.0              | 100             | -9.6               | 66.9             | 0           | 1.00       | Vertical |
| 33.007          | 29.8              | 30.9            | 40.0              | 200             | -10.2              | 169.1            | 0           | 1.00       | Vertical |
| 871.378         | 33.5              | 47.3            | 46.0              | 200             | -12.5              | 152.7            | 0           | 1.00       | Vertical |
| 957.369         | 34.3              | 51.9            | 46.0              | 200             | -11.7              | 148.1            | 0           | 1.00       | Vertical |



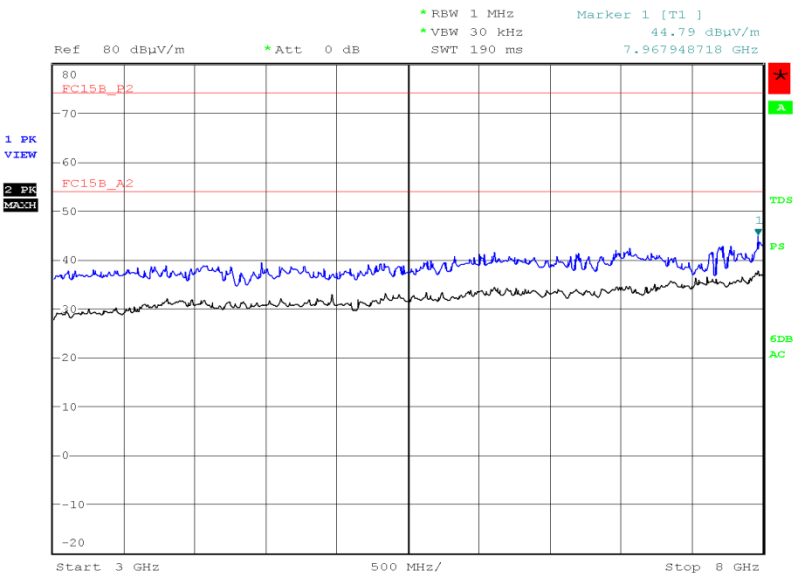
Product Service

1 GHz to 3 GHz



Date: 30.OCT.2013 20:13:08

3 GHz to 8 GHz

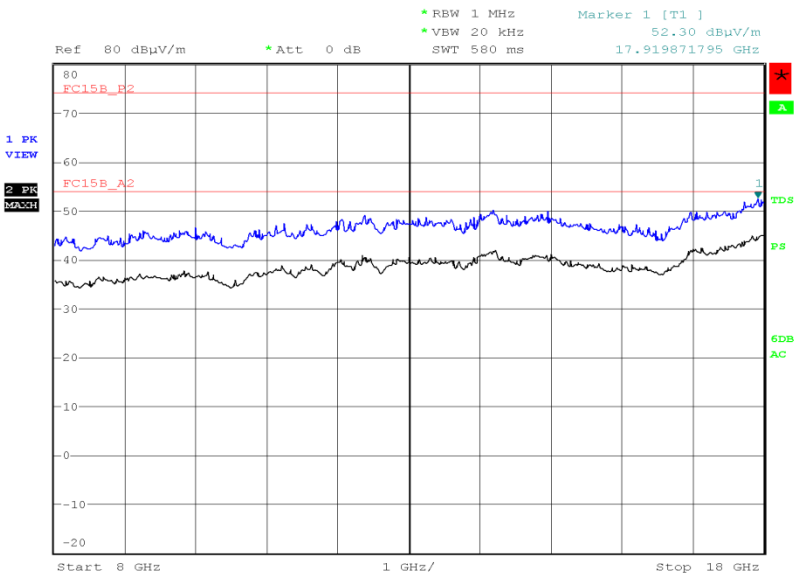


Date: 30.OCT.2013 21:23:30



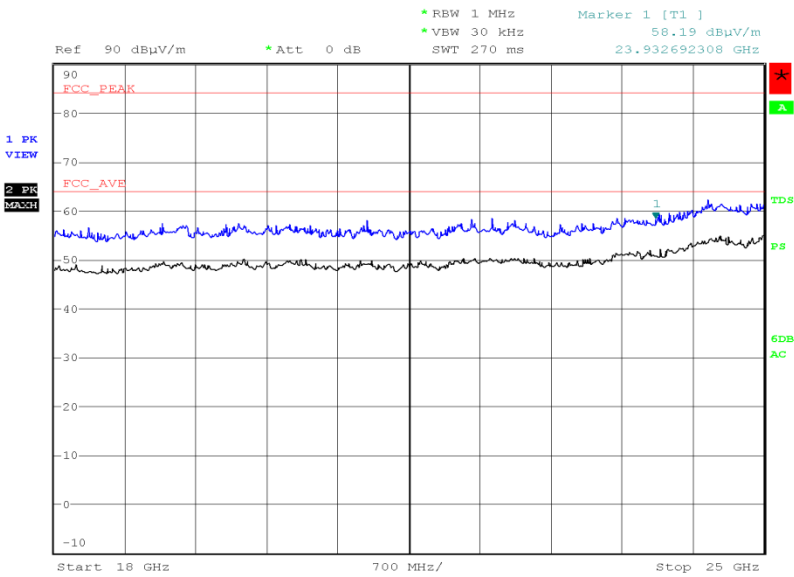
Product Service

8 GHz to 18 GHz



Date: 30.OCT.2013 21:33:49

18 GHz to 25 GHz



Date: 30.OCT.2013 22:32:45

Limit

| Peak (dBμV/m) | Average (dBμV/m) |
|---------------|------------------|
| 74.0          | 54.0             |

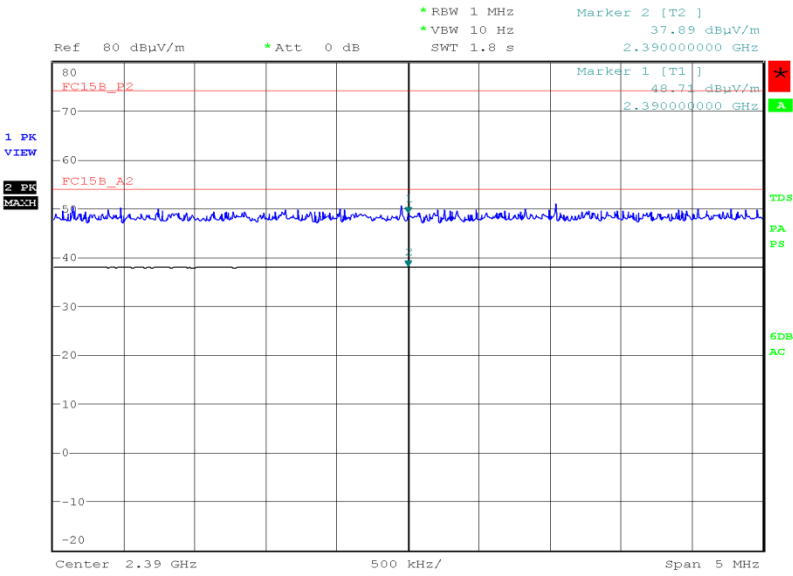


Product Service

Band Edge Emissions

2402 MHz

| Polarisation | Final Peak (dBµV/m) | Final Average (dBµV/m) |
|--------------|---------------------|------------------------|
| Horizontal   | 48.71               | 37.89                  |



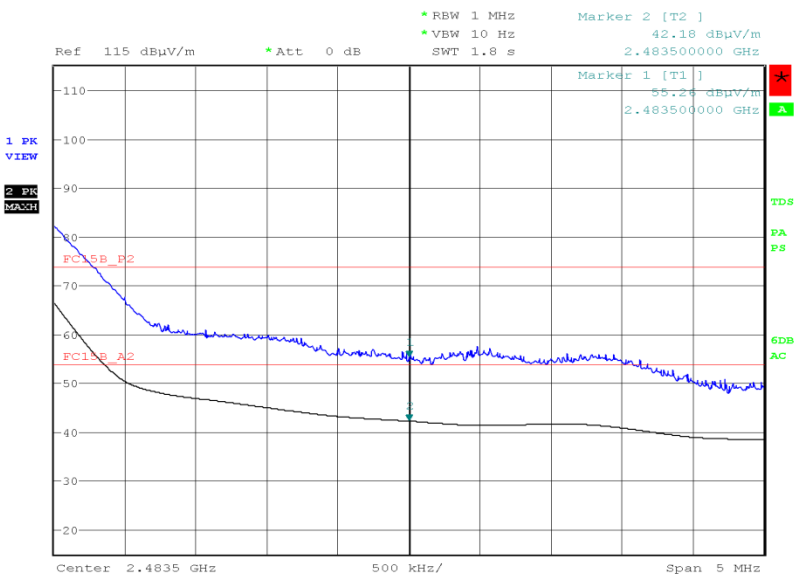
Date: 30.OCT.2013 19:10:48



Product Service

2480 MHz

| Polarisation | Final Peak (dBµV/m) | Final Average (dBµV/m) |
|--------------|---------------------|------------------------|
| Horizontal   | 55.26               | 42.18                  |



Date: 30.OCT.2013 20:02:12

Limit

| Peak (dBµV/m) | Average (dBµV/m) |
|---------------|------------------|
| 74.0          | 54.0             |



Product Service

### **SECTION 3**

#### **TEST EQUIPMENT USED**



### 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- AC Line Conducted Emissions</b>                                                   |                      |                     |        |                             |                 |
| LISN (1 Phase)                                                                                    | Chase                | MN 2050             | 336    | 12                          | 28-Mar-2014     |
| Screened Room (5)                                                                                 | Rainford             | Rainford            | 1545   | 36                          | 25-Dec-2013     |
| Transient Limiter                                                                                 | Hewlett Packard      | 11947A              | 2377   | 12                          | 13-Feb-2014     |
| EMI Test Receiver                                                                                 | Rohde & Schwarz      | ESU40               | 3506   | 12                          | 22-Oct-2014     |
| 7m Armoured RF Cable                                                                              | SSI Cable Corp.      | 1501-13-13-7m WA(-) | 3600   | -                           | TU              |
| <b>Section 2.2- Maximum Peak Conducted Output Power</b>                                           |                      |                     |        |                             |                 |
| Multimeter                                                                                        | White Gold           | WG022               | 190    | 12                          | 28-Oct-2014     |
| Attenuator (10dB)                                                                                 | Weinschel            | 47-10-34            | 481    | 12                          | 27-Mar-2014     |
| Broadband Resistive Power Divider                                                                 | Weinschel            | 1506A               | 605    | 12                          | 11-Oct-2014     |
| Power Supply                                                                                      | Hewlett Packard      | 6104A               | 1948   | -                           | TU              |
| Hygrometer                                                                                        | Rotronic             | I-1000              | 3220   | 12                          | 16-Jul-2014     |
| Network Analyser                                                                                  | Rohde & Schwarz      | ZVA 40              | 3548   | 12                          | 13-Sep-2014     |
| P-Series Power Meter                                                                              | Agilent Technologies | N1911A              | 3980   | 12                          | 18-Sep-2014     |
| 50 MHz-18 GHz Wideband Power Sensor                                                               | Agilent Technologies | N1921A              | 3982   | 12                          | 18-Sep-2014     |
| <b>Section 2.3 - Frequency Hopping Systems - 20dB Bandwidth and Channel Separation</b>            |                      |                     |        |                             |                 |
| Multimeter                                                                                        | White Gold           | WG022               | 190    | 12                          | 28-Oct-2014     |
| Attenuator (10dB)                                                                                 | Weinschel            | 47-10-34            | 481    | 12                          | 27-Mar-2014     |
| Broadband Resistive Power Divider                                                                 | Weinschel            | 1506A               | 605    | 12                          | 11-Oct-2014     |
| GPS Frequency Standard                                                                            | Rapco                | GPS-804/3           | 1312   | 6                           | 24-Jan-2014     |
| Power Supply                                                                                      | Hewlett Packard      | 6104A               | 1948   | -                           | TU              |
| Hygrometer                                                                                        | Rotronic             | I-1000              | 3220   | 12                          | 16-Jul-2014     |
| Signal Analyser                                                                                   | Rohde & Schwarz      | FSQ 26              | 3545   | 12                          | 4-Jul-2014      |
| Network Analyser                                                                                  | Rohde & Schwarz      | ZVA 40              | 3548   | 12                          | 13-Sep-2014     |
| <b>Section 2.4- Frequency Hopping Systems - Channel Dwell Time and Number of Hopping Channels</b> |                      |                     |        |                             |                 |
| Multimeter                                                                                        | White Gold           | WG022               | 190    | 12                          | 28-Oct-2014     |
| Attenuator (10dB)                                                                                 | Weinschel            | 47-10-34            | 481    | 12                          | 27-Mar-2014     |
| Broadband Resistive Power Divider                                                                 | Weinschel            | 1506A               | 605    | 12                          | 11-Oct-2014     |
| GPS Frequency Standard                                                                            | Rapco                | GPS-804/3           | 1312   | 6                           | 24-Jan-2014     |
| Power Supply                                                                                      | Hewlett Packard      | 6104A               | 1948   | -                           | TU              |
| Hygrometer                                                                                        | Rotronic             | I-1000              | 3220   | 12                          | 16-Jul-2014     |
| Signal Analyser                                                                                   | Rohde & Schwarz      | FSQ 26              | 3545   | 12                          | 4-Jul-2014      |



| Instrument                                           | Manufacturer    | Type No.               | TE No. | Calibration Period (months) | Calibration Due |
|------------------------------------------------------|-----------------|------------------------|--------|-----------------------------|-----------------|
| <b>Section 2.5- EIRP Peak Power</b>                  |                 |                        |        |                             |                 |
| Antenna (Double Ridge Guide, 1GHz-18GHz)             | EMCO            | 3115                   | 234    | 12                          | 3-Apr-2014      |
| Antenna (Double Ridge Guide, 1GHz-18GHz)             | EMCO            | 3115                   | 235    | 12                          | 9-Nov-2013      |
| Turntable Controller                                 | Inn-Co GmbH     | CO 1000                | 1606   | -                           | TU              |
| Signal Generator: 10MHz to 20GHz                     | Rohde & Schwarz | SMR20                  | 3475   | 12                          | 1-Feb-2014      |
| EMI Test Receiver                                    | Rohde & Schwarz | ESU40                  | 3506   | 12                          | 22-Oct-2014     |
| 9m RF Cable (N Type)                                 | Rhophase        | NPS-2303-9000-NPS      | 3791   | -                           | TU              |
| Tilt Antenna Mast                                    | maturo GmbH     | TAM 4.0-P              | 3916   | -                           | TU              |
| Mast Controller                                      | maturo GmbH     | NCD                    | 3917   | -                           | TU              |
| <b>Section 2.6- Spurious and Band Edge Emissions</b> |                 |                        |        |                             |                 |
| Multimeter                                           | White Gold      | WG022                  | 190    | 12                          | 28-Oct-2014     |
| Antenna (Double Ridge Guide, 1GHz-18GHz)             | EMCO            | 3115                   | 234    | 12                          | 3-Apr-2014      |
| Antenna (Bilog)                                      | Schaffner       | CBL6143                | 287    | 24                          | 18-Jan-2014     |
| Attenuator (10dB)                                    | Weinschel       | 47-10-34               | 481    | 12                          | 27-Mar-2014     |
| Broadband Resistive Power Divider                    | Weinschel       | 1506A                  | 605    | 12                          | 11-Oct-2014     |
| Splitter                                             | Weinschel       | 1593                   | 1292   | 12                          | 10-May-2014     |
| GPS Frequency Standard                               | Rapco           | GPS-804/3              | 1312   | 6                           | 24-Jan-2014     |
| Antenna (Double Ridge Guide)                         | Q-Par Angus Ltd | QSH 180K               | 1511   | 24                          | 7-Nov-2014      |
| Pre-Amplifier                                        | Phase One       | PSO4-0087              | 1534   | 12                          | 30-Sep-2014     |
| Screened Room (5)                                    | Rainford        | Rainford               | 1545   | 36                          | 25-Dec-2013     |
| Turntable Controller                                 | Inn-Co GmbH     | CO 1000                | 1606   | -                           | TU              |
| Power Supply                                         | Hewlett Packard | 6104A                  | 1948   | -                           | TU              |
| High Pass Filter (4GHz)                              | RLC Electronics | F-100-4000-5-R         | 2773   | 12                          | 1-Feb-2014      |
| Amplifier (1 - 8GHz)                                 | Phase One       | PS06-0060              | 3175   | 12                          | 9-Aug-2014      |
| Amplifier (8 - 18GHz)                                | Phase One       | PS06-0061              | 3176   | 12                          | 9-Aug-2014      |
| Hygrometer                                           | Rotronic        | I-1000                 | 3220   | 12                          | 16-Jul-2014     |
| Signal Generator: 10MHz to 20GHz                     | Rohde & Schwarz | SMR20                  | 3475   | 12                          | 1-Feb-2014      |
| EMI Test Receiver                                    | Rohde & Schwarz | ESU40                  | 3506   | 12                          | 22-Oct-2014     |
| Signal Analyser                                      | Rohde & Schwarz | FSQ 26                 | 3545   | 12                          | 4-Jul-2014      |
| Network Analyser                                     | Rohde & Schwarz | ZVA 40                 | 3548   | 12                          | 13-Sep-2014     |
| 3 GHz High Pass Filter                               | K&L Microwave   | 11SH10-3000/X18000-O/O | 3552   | 12                          | 1-Feb-2014      |
| 9m RF Cable (N Type)                                 | Rhophase        | NPS-2303-9000-NPS      | 3791   | -                           | TU              |
| Tilt Antenna Mast                                    | maturo GmbH     | TAM 4.0-P              | 3916   | -                           | TU              |
| Mast Controller                                      | maturo GmbH     | NCD                    | 3917   | -                           | TU              |

TU – Traceability Unscheduled



### 3.2 MEASUREMENT UNCERTAINTY

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

| Test Discipline                                                               | MU                                                         |
|-------------------------------------------------------------------------------|------------------------------------------------------------|
| Spurious and Band Edge Emissions                                              | 30MHz to 1GHz: $\pm 5.1$ dB<br>1GHz to 40GHz: $\pm 6.3$ dB |
| Frequency Hopping Systems - 20 dB Bandwidth and Channel Separation            | $\pm 16.74$ kHz                                            |
| EIRP Peak Power                                                               | 30MHz to 1GHz: $\pm 5.1$ dB<br>1GHz to 40GHz: $\pm 6.3$ dB |
| Frequency Hopping Systems - Channel Dwell Time and Number of Hopping Channels | -                                                          |
| Maximum Peak Conducted Output Power                                           | $\pm 0.70$ dB                                              |
| AC Line Conducted Emissions                                                   | $\pm 3.2$ dB                                               |



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.

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