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# Report On

FCC and Industry Canada Testing of  
The Wand Company Ltd PC-010  
In accordance with FCC 47 CFR Part 15C,  
Industry Canada RSS-247 and Industry Canada RSS-GEN

**COMMERCIAL-IN-CONFIDENCE**

FCC ID: 2AFJA-1701  
IC: 20592-1701

**Document 75933714 Report 03 Issue 1**

**March 2016**



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**DATED**

23 March 2016

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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 47 CFR Part 15C, Industry Canada RSS-247 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

N Rousell





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## **SECTION 1**

### **REPORT SUMMARY**

FCC and Industry Canada Testing of  
The Wand Company Ltd PC-010  
In accordance with FCC 47 CFR Part 15C, Industry Canada RSS-247  
and Industry Canada RSS-GEN



## 1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC and Industry Canada Testing of The Wand Company Ltd PC-010 to the requirements of FCC 47 CFR Part 15C and Industry Canada RSS-247.

|                                |                                                                                                                                                                         |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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                   | The Wand Company Ltd                                                                                                                                                    |
| Model Number(s)                | PC-010                                                                                                                                                                  |
| Serial Number(s)               | Not Serialised (75933714-TSR0005)<br>Not Serialised (75933714-TSR0007)                                                                                                  |
| Number of Samples Tested       | 2                                                                                                                                                                       |
| Test Specification/Issue/Date  | FCC 47 CFR Part 15C (2015)<br>RSS-247 Issue 1<br>RSS-GEN Issue 4                                                                                                        |
| Incoming Release Date          | Application Form<br>01 March 2016                                                                                                                                       |
| Disposal Reference Number Date | Held Pending Disposal<br>Not Applicable<br>Not Applicable                                                                                                               |
| Order Number Date              | 1193<br>15 February 2016                                                                                                                                                |
| Start of Test                  | 23 February 2016                                                                                                                                                        |
| Finish of Test                 | 9 March 2016                                                                                                                                                            |
| Name of Engineer(s)            | G Lawler<br>N Rousell                                                                                                                                                   |
| Related Document(s)            | ANSI C63.4 (2014)<br>ANSI C63.10 (2013)                                                                                                                                 |



## 1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15C and Industry Canada RSS-247 and Industry Canada RSS-GEN is shown below.

| Section   | Specification Clause |         |         | Test Description                                       | Result | Comments/Base Standard                                         |
|-----------|----------------------|---------|---------|--------------------------------------------------------|--------|----------------------------------------------------------------|
|           | Part 15C             | RSS-247 | RSS-GEN |                                                        |        |                                                                |
| Bluetooth |                      |         |         |                                                        |        |                                                                |
| 2.1       | 15.207               | -       | 8.8     | AC Line Conducted Emissions                            | Pass   | ANSI C63.10, clause 6.2                                        |
| 2.2       | 15.247(a)(1)         | 5.1(2)  | -       | Frequency Hopping Systems - Channel Separation         | Pass   | ANSI C63.10, clause 7.8.2                                      |
| 2.3       | 15.247(a)(1)(iii)    | 5.1(4)  | -       | Frequency Hopping Systems - Number of Hopping Channels | Pass   | ANSI C63.10, clause 7.8.3                                      |
| 2.4       | 15.247(a)(1)         | 5.1(1)  | -       | Frequency Hopping Systems - 20 dB Bandwidth            | Pass   | ANSI C63.10, clause 6.9.2                                      |
| 2.5       | 15.247(a)(1)(iii)    | 5.1(4)  | -       | Frequency Hopping Systems - Average Time of Occupancy  | Pass   | ANSI C63.10, clause 7.8.4                                      |
| 2.6       | 15.247(b)(3)         | 5.4(2)  | -       | Maximum Conducted Output Power                         | Pass   | KDB 558074 D01 v03r02,<br>clause 9.1.1<br>RSS-GEN, clause 6.12 |
| 2.7       | 15.247(d)<br>15.209  | 5.5     | -       | Spurious Radiated Emissions                            | Pass   | ANSI C63.10, clause 6.3, 6.5,<br>6.6, 7.5                      |
| 2.8       | 15.205               | -       | 8.10    | Restricted Band Edges                                  | Pass   | ANSI C63.10, clause 6.10.5                                     |
| 2.9       | 15.247(d)            | 5.5     | -       | Authorised Band Edges                                  | Pass   | ANSI C63.10, clause 6.10.4                                     |



### 1.3 APPLICATION FORM

| EQUIPMENT DESCRIPTION                                                                           |                                                                                                                                             |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Model Name/Number                                                                               | PC-010                                                                                                                                      |
| Part Number                                                                                     | WRC-PC-010                                                                                                                                  |
| Hardware Version                                                                                | v1_0                                                                                                                                        |
| Software Version                                                                                | v1_0                                                                                                                                        |
| FCC ID (if applicable)                                                                          | 2AFJA-1701                                                                                                                                  |
| Industry Canada ID (if applicable)                                                              | 20592-1701                                                                                                                                  |
| Technical Description (Please provide a brief description of the intended use of the equipment) | Bluetooth "Classic" (v2.1+EDR) speakerphone module supporting the Hands-Free Profile (HFP), Headset Profile (HSP) and A2DP music streaming. |

| 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: 0.625 ms to 3.75 ms                                   |                                                                                   |
| Minimum Channel Occupation Time: 0.625 ms / 1.25 ms               |                                                                                   |
| 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: ms       |                                                                                   |
| <input type="checkbox"/>                                          | The equipment has implemented an LBT based DAA mechanism                          |
| In case of equipment using modulation different from FHSS:        |                                                                                   |
| <input checked="" 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: (N/A for Bluetooth) μs |                                                                                   |
| <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                          |



| In case of non-adaptive Equipment:                                                                                                                                 |                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The maximum RF Output Power (e.i.r.p.): 8 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): |                                                                                                                                                                               |
|                                                                                                                                                                    |                                                                                                                                                                               |
| The worst case operational mode for each of the following tests:                                                                                                   |                                                                                                                                                                               |
| RF Output Power: DH5                                                                                                                                               |                                                                                                                                                                               |
| Power Spectral Density: DH5                                                                                                                                        |                                                                                                                                                                               |
| Duty cycle, Tx-Sequence, Tx-gap: DH5                                                                                                                               |                                                                                                                                                                               |
| Accumulated Transmit Time, Frequency Occupation & Hopping Sequence (only for FHSS equipment): DH5                                                                  |                                                                                                                                                                               |
| Hopping Frequency Separation (only for FHSS equipment): DH5                                                                                                        |                                                                                                                                                                               |
| Medium Utilisation: N/A                                                                                                                                            |                                                                                                                                                                               |
| Adaptivity & Receiver Blocking: N/A                                                                                                                                |                                                                                                                                                                               |
| Nominal Channel Bandwidth: 1 MHz                                                                                                                                   |                                                                                                                                                                               |
| Transmitter unwanted emissions in the OOB domain: DH5                                                                                                              |                                                                                                                                                                               |
| Transmitter unwanted emissions in the spurious domain: DH5                                                                                                         |                                                                                                                                                                               |
| Receiver spurious emissions: DH5                                                                                                                                   |                                                                                                                                                                               |
| The different transmit operating modes (tick all that apply):                                                                                                      |                                                                                                                                                                               |
| <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™ [2012] 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™ [2012] legacy mode)                                                                                          |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1                                                                                                        |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2                                                                                                        |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 3                                                                                                        |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 4                                                                                                        |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 5                                                                                                        |
| <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™ [2012] legacy mode)                                                                                            |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1                                                                                                        |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2                                                                                                        |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 3                                                                                                        |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 4                                                                                                        |
| <input type="checkbox"/>                                                                                                                                           | High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 5                                                                                                        |
| <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 (additional) beam forming gain:      dB                       |                                                                                                          |     |
| <i>NOTE: The additional beam forming gain does not include the basic gain of a single antenna.</i> |                                                                                                          |     |
| <b>Operating Frequency Range(s) of the equipment:</b>                                              |                                                                                                          |     |
| Operating Frequency Range 1: 2402 MHz to 2480 MHz                                                  |                                                                                                          |     |
| Operating Frequency Range 2:                                                                       | MHz to                                                                                                   | MHz |
| Operating Frequency Range 3:                                                                       | MHz to                                                                                                   | MHz |
| <i>NOTE: Add more lines if more Frequency Ranges are supported.</i>                                |                                                                                                          |     |
| <b>Nominal Channel Bandwidth(s):</b>                                                               |                                                                                                          |     |
| Nominal Channel Bandwidth1: 1 MHz                                                                  |                                                                                                          |     |
| Nominal Channel Bandwidth2:                                                                        | MHz                                                                                                      |     |
| Nominal Channel Bandwidth3:                                                                        | MHz                                                                                                      |     |
| Nominal Channel Bandwidth4:                                                                        | MHz                                                                                                      |     |
| Nominal Channel Bandwidth5:                                                                        | MHz                                                                                                      |     |
| <i>NOTE: Add more lines if more channel bandwidths are supported.</i>                              |                                                                                                          |     |
| <b>Type of Equipment (stand-alone, combined, plug-in radio device, etc.):</b>                      |                                                                                                          |     |
| <input checked="" type="checkbox"/>                                                                | Stand-alone                                                                                              |     |
| <input 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                                                                                                    |     |
| <b>The extreme operating conditions that apply to the equipment:</b>                               |                                                                                                          |     |
| Operating temperature range: 0 °C to 50 °C                                                         |                                                                                                          |     |
| 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: 3 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                                                                                                                                                                                |                                                       |               |                             |
| 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 V         |
| <input checked="" type="checkbox"/> DC                                                                                                                                                                                                                                                                                                             | State DC voltage 3.7 V     |
| 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>                                                                                                                                                                                                                                                                             |                            |
| Test modes initiated by standard CSR BlueTest3 software                                                                                                                                                                                                                                                                                            |                            |
| <b>The equipment type (e.g. Bluetooth®, IEEE 802.11™ [2012] IEEE 802.15.4™ [2011], proprietary, etc.):</b>                                                                                                                                                                                                                                         |                            |
| Bluetooth                                                                                                                                                                                                                                                                                                                                          |                            |
| <b>If applicable, the statistical analysis referred in clause 5.3.1 q)</b>                                                                                                                                                                                                                                                                         |                            |
| To be provided as separate attachment, please state document name:                                                                                                                                                                                                                                                                                 |                            |
| <b>If applicable, the statistical analysis referred in clause 5.3.1 r)</b>                                                                                                                                                                                                                                                                         |                            |
| To be provided as separate attachment, please state document name:                                                                                                                                                                                                                                                                                 |                            |
| <b>Geo-location capability supported by the equipment:</b>                                                                                                                                                                                                                                                                                         |                            |
| <input type="checkbox"/> Yes                                                                                                                                                                                                                                                                                                                       |                            |
| <input type="checkbox"/> The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user.                                                                                                                                                                                 |                            |
| <input checked="" type="checkbox"/> No                                                                                                                                                                                                                                                                                                             |                            |
| <b>Combination for testing (see clause 5.1.3.3 of EN 300 328 V1.9.1)</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 ETSI EN 300 328, this power setting is to be used for testing against the requirements of ETSI 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 ETS EN 300 328, clause 5.1.3.3. |                            |
| Highest overall e.i.r.p. value: dBm                                                                                                                                                                                                                                                                                                                |                            |
| Corresponding Antenna assembly gain: dBi                                                                                                                                                                                                                                                                                                           | Antenna Assembly #:        |
| Corresponding conducted power setting: dB<br>(also the power level to be used for testing)                                                                                                                                                                                                                                                         | Listed as Power Setting #: |
| <b>Additional information provided by the applicant</b>                                                                                                                                                                                                                                                                                            |                            |
| <b>Modulation</b>                                                                                                                                                                                                                                                                                                                                  |                            |
| ITU Class(es) of emission: 1M00FXD                                                                                                                                                                                                                                                                                                                 |                            |
| Can the transmitter operate unmodulated? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                                                                                                                                                                                                                                       |                            |
| <b>Duty Cycle</b>                                                                                                                                                                                                                                                                                                                                  |                            |
| The transmitter is intended for:                                                                                                                                                                                                                                                                                                                   |                            |
| <input type="checkbox"/> Continuous duty                                                                                                                                                                                                                                                                                                           |                            |
| <input checked="" type="checkbox"/> Intermittent duty                                                                                                                                                                                                                                                                                              |                            |
| <input checked="" type="checkbox"/> Continuous operation possible for testing purposes                                                                                                                                                                                                                                                             |                            |



Product Service

| About the UUT                                         |                                                                                                                                       |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <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 type="checkbox"/>                              | In addition to the CE mark, the Class-II identifier (Alert Sign) is affixed.                                                          |
| 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 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 type="checkbox"/>                              | Combined equipment                                                                                                                    |
|                                                       | Manufacturer                                                                                                                          |
|                                                       | Model                                                                                                                                 |
|                                                       | Model Name                                                                                                                            |
| <input checked="" type="checkbox"/>                   | User Manual                                                                                                                           |
| <input checked="" type="checkbox"/>                   | Technical documentation (Handbook and circuit diagrams)                                                                               |

I hereby declare that that the information supplied is correct and complete.

Name: Richard Blakesley      Position held: Director  
 Date: 01/03/2016



Product Service

## **1.4 PRODUCT INFORMATION**

### **1.4.1 Technical Description**

The Equipment Under Test (EUT) was The Wand Company Ltd PC-010. 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 Measurement Facility Registration Number  
90987 Octagon House, Fareham Test Laboratory

Industry Canada Company Address Code  
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 Wand Company Ltd PC-010  
In accordance with FCC 47 CFR Part 15C and Industry Canada RSS-247



Product Service

**2.1 AC LINE CONDUCTED EMISSIONS****2.1.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.207  
RSS-GEN, Clause 8.8

**2.1.2 Equipment Under Test and Modification State**

PC-010 S/N: Not Serialised (75933714-TSR0007) - Modification State 0

**2.1.3 Date of Test**

2 March 2016

**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 test was performed in accordance with ANSI C63.10, clause 6.2.

Remarks

A mains supply cable of 1 m length was used to supply mains power to the EUT from the LISN.

All final measurements were assessed against the Class B emission limits in Clause 15.207 of FCC 47 CFR Part 15.

**2.1.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 20.6°C |
| Relative Humidity   | 25.0%  |



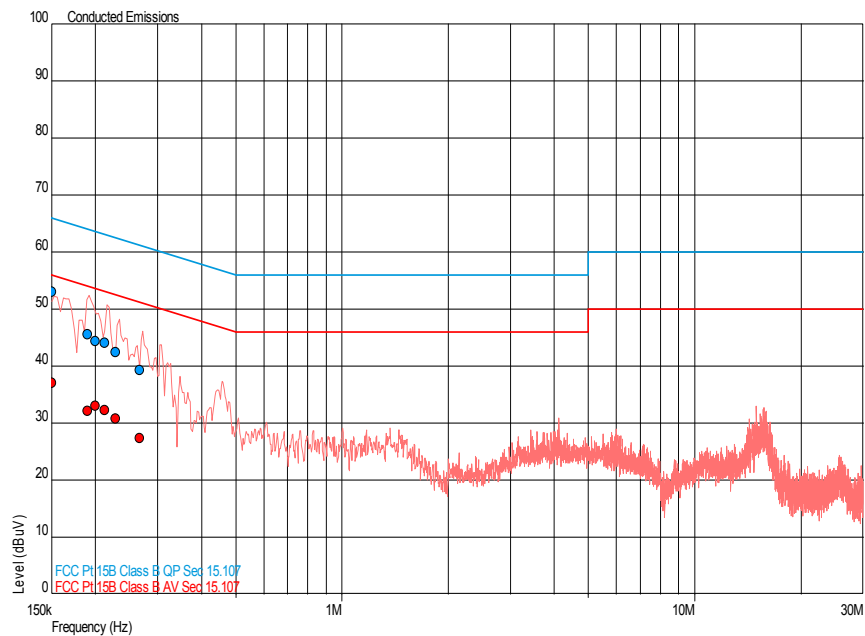
Product Service

## 2.1.7 Test Results

### Bluetooth, Live Line, AC Line Conducted Emissions Result

| Frequency (MHz) | QP Level (dBμV) | QP Limit (dBμV) | QP Margin (dBμV) | AV Level (dBμV) | AV Limit (dBμV) | AV Margin (dBμV) |
|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|------------------|
| 0.150           | 53.0            | 66.0            | -13.0            | 37.1            | 56.0            | -18.9            |
| 0.190           | 45.7            | 64.0            | -18.3            | 32.1            | 54.0            | -21.9            |
| 0.200           | 44.4            | 63.6            | -19.2            | 33.1            | 53.6            | -20.5            |
| 0.212           | 44.0            | 63.1            | -19.1            | 32.3            | 53.1            | -20.8            |
| 0.228           | 42.5            | 62.5            | -20.0            | 30.8            | 52.5            | -21.7            |
| 0.266           | 39.3            | 61.2            | -21.9            | 27.4            | 51.2            | -23.8            |

### Bluetooth, Live Line, AC Line Conducted Emissions Plot



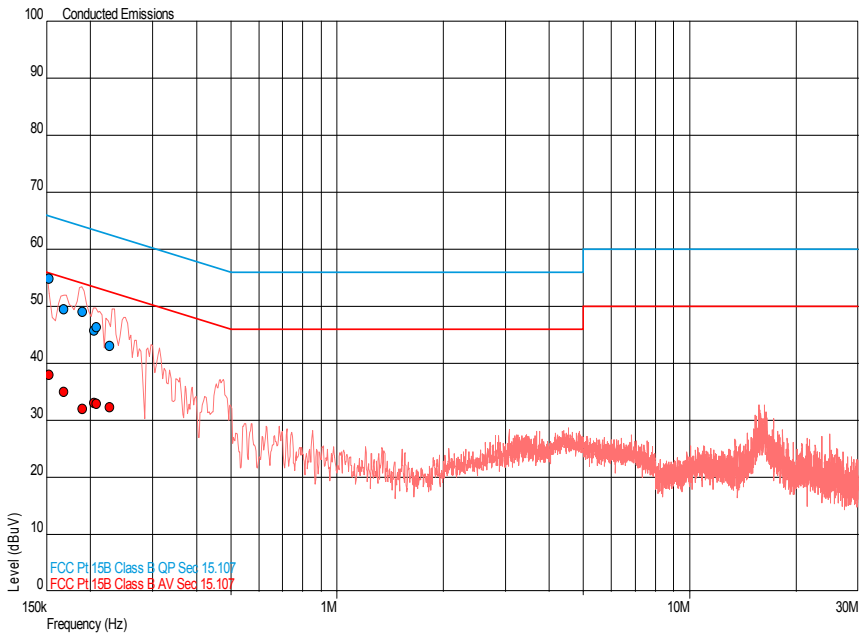


Product Service

Bluetooth, Neutral Line, AC Line Conducted Emissions Result

| Frequency (MHz) | QP Level (dBμV) | QP Limit (dBμV) | QP Margin (dBμV) | AV Level (dBμV) | AV Limit (dBμV) | AV Margin (dBμV) |
|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|------------------|
| 0.153           | 54.9            | 65.8            | -10.9            | 38.0            | 55.8            | -17.8            |
| 0.168           | 49.4            | 65.1            | -15.7            | 34.9            | 55.1            | -20.2            |
| 0.190           | 49.0            | 64.0            | -15.0            | 32.1            | 54.0            | -21.9            |
| 0.205           | 45.7            | 63.4            | -17.7            | 33.1            | 53.4            | -20.3            |
| 0.209           | 46.4            | 63.3            | -16.9            | 33.0            | 53.3            | -20.3            |
| 0.226           | 43.1            | 62.6            | -19.5            | 32.3            | 52.6            | -20.3            |

Bluetooth, Neutral Line, AC Line Conducted Emissions Plot





Product Service

FCC 47 CFR Part 15, Limit Clause 15.207

| Frequency of Emission (MHz) | Conducted Limit (dBμV) |           |
|-----------------------------|------------------------|-----------|
|                             | Quasi-Peak             | Average   |
| 0.15 to 0.5                 | 66 to 56*              | 56 to 46* |
| 0.5 to 5                    | 56                     | 46        |
| 5 to 30                     | 60                     | 50        |

\*Decreases with the logarithm of the frequency.

RSS-GEN, Limit Clause 8.8

| Frequency of Emission (MHz) | Conducted Limit (dBμV) |           |
|-----------------------------|------------------------|-----------|
|                             | Quasi-Peak             | Average** |
| 0.15 to 0.5                 | 66 to 56*              | 56 to 46* |
| 0.5 to 5                    | 56                     | 46        |
| 5 to 30                     | 60                     | 50        |

\*Decreases with the logarithm of the frequency.

\*\*A linear average detector is required



Product Service

## **2.2 FREQUENCY HOPPING SYSTEMS - CHANNEL SEPARATION**

### **2.2.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (a)(1)  
RSS-247, Clause 5.1(2)

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

PC-010 S/N: Not Serialised (75933714-TSR0005) - Modification State 0

### **2.2.3 Date of Test**

2 March 2016

### **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 test was performed in accordance with ANSI C63.10, clause 7.8.2.

### **2.2.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 21.4°C |
| Relative Humidity   | 28.5%  |



Product Service

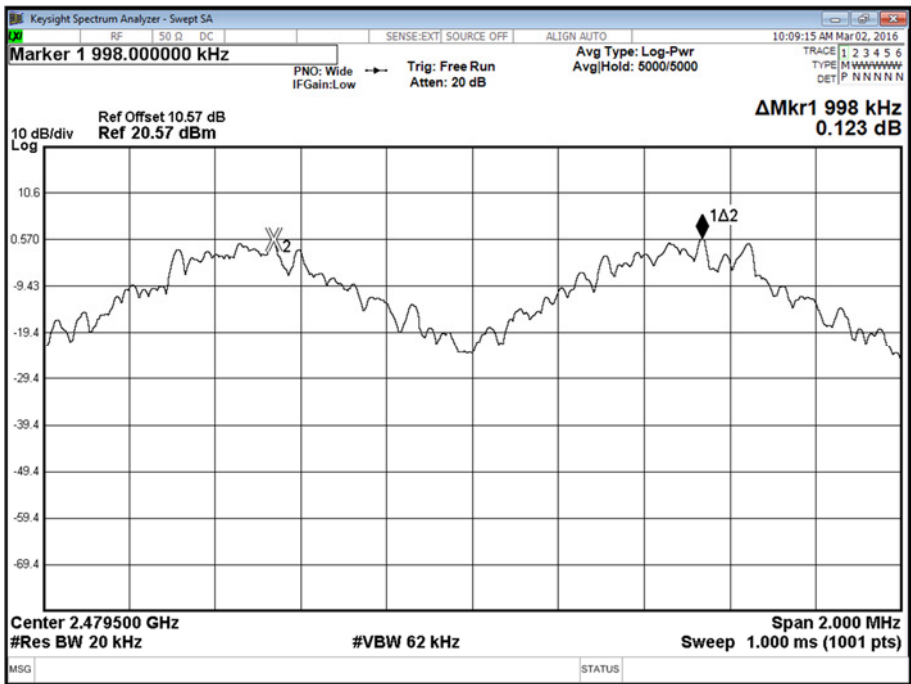
2.2.7 Test Results

3.7 V DC Supply

Bluetooth, Channel Separation Results

|            |                   |
|------------|-------------------|
| Modulation | Frequency Hopping |
|            | MHz               |
| GFSK       | 0.998             |
| pi/4 DQPSK | 0.998             |
| 8-DPSK     | 1.002             |

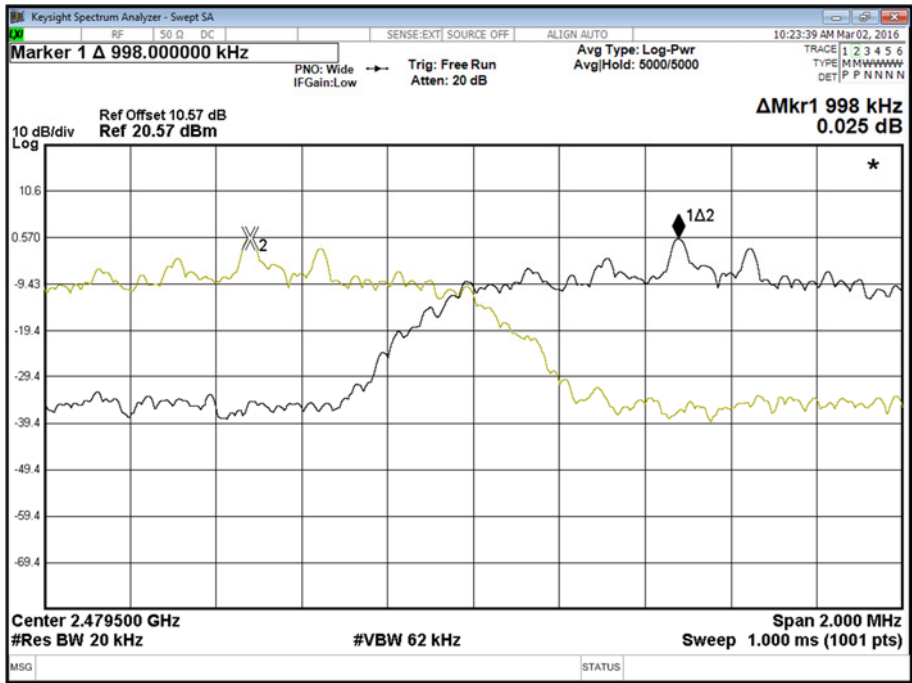
Bluetooth, GFSK, Channel Separation Plot



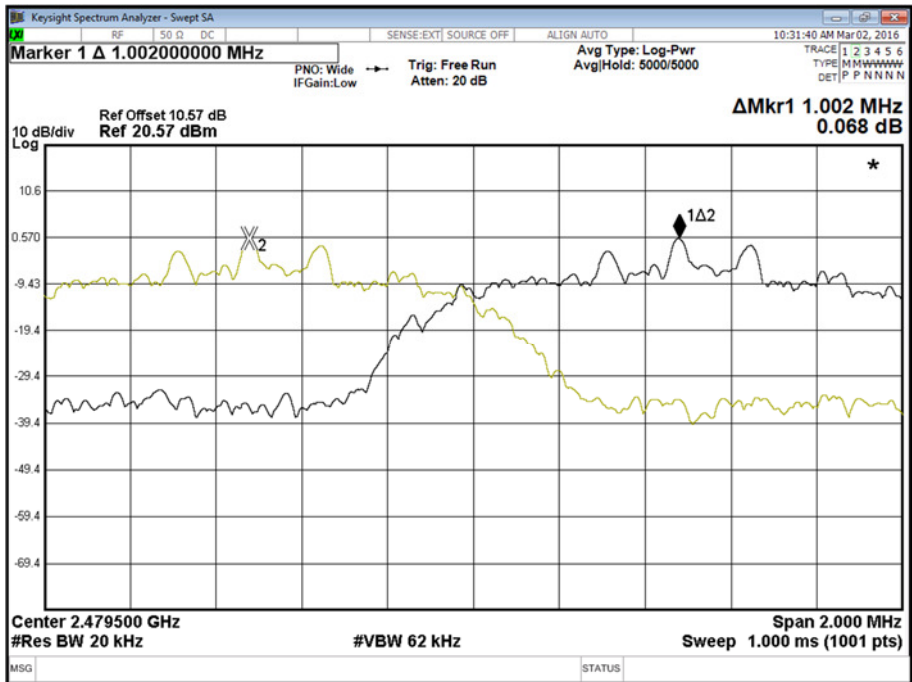


Product Service

Bluetooth, pi/4 DQPSK, Channel Separation Plot



Bluetooth, 8-DPSK, Channel Separation Plot





Product Service

FCC 47 CFR Part 15, Limit Clause 15.247 (a)(1)

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.

Industry Canada RSS-247, Limit Clause, 5.1(2)

FHSs 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, FHSs 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 that the systems operate with an output power no greater than 0.125 W.



Product Service

## **2.3 FREQUENCY HOPPING SYSTEMS - NUMBER OF HOPPING CHANNELS**

### **2.3.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (a)(1)(iii)  
RSS-247, Clause 5.1(4)

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

PC-010 S/N: Not Serialised (75933714-TSR0005) - Modification State 0

### **2.3.3 Date of Test**

2 March 2016

### **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**

The test was performed in accordance with ANSI C63.10, clause 7.8.3.

### **2.3.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 21.4°C |
| Relative Humidity   | 28.5%  |



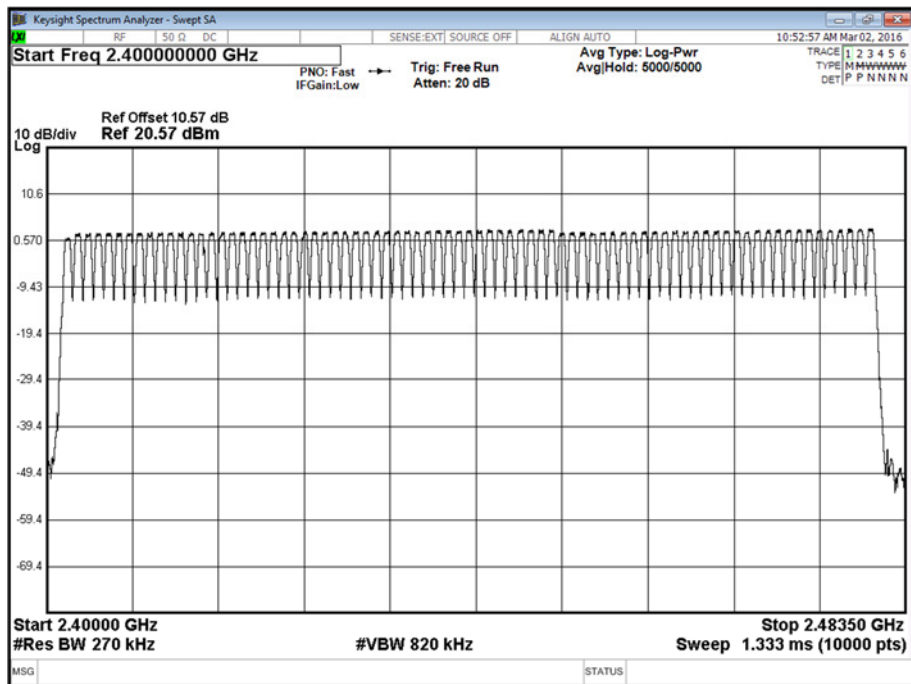
Product Service

### 2.3.7 Test Results

#### Bluetooth, Number of Hopping Channels Results

Number of Hopping Channels: 79

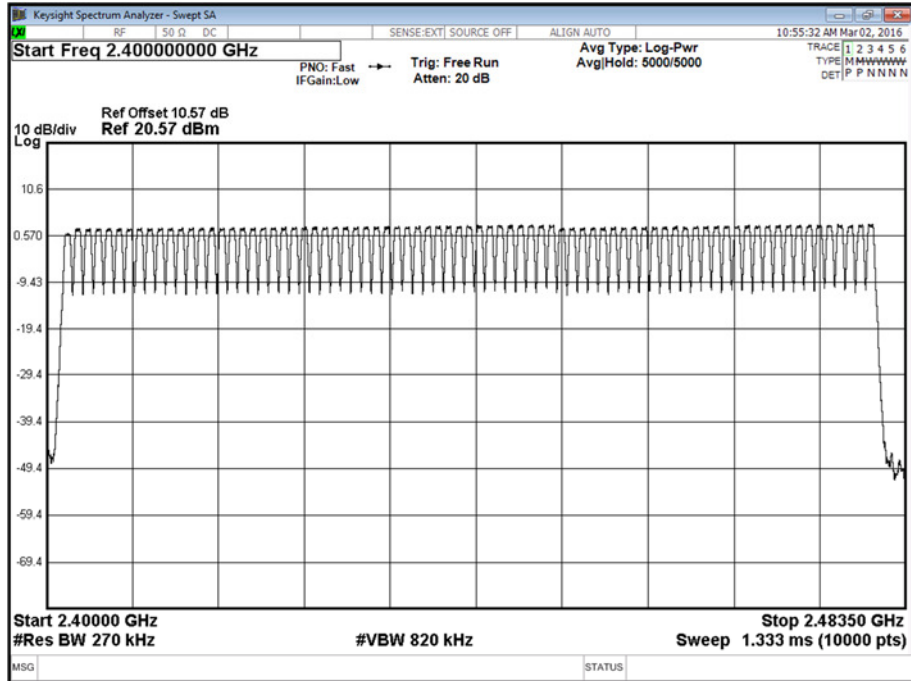
#### Bluetooth, Segment 1, DH1, Number of Hopping Channels Plot



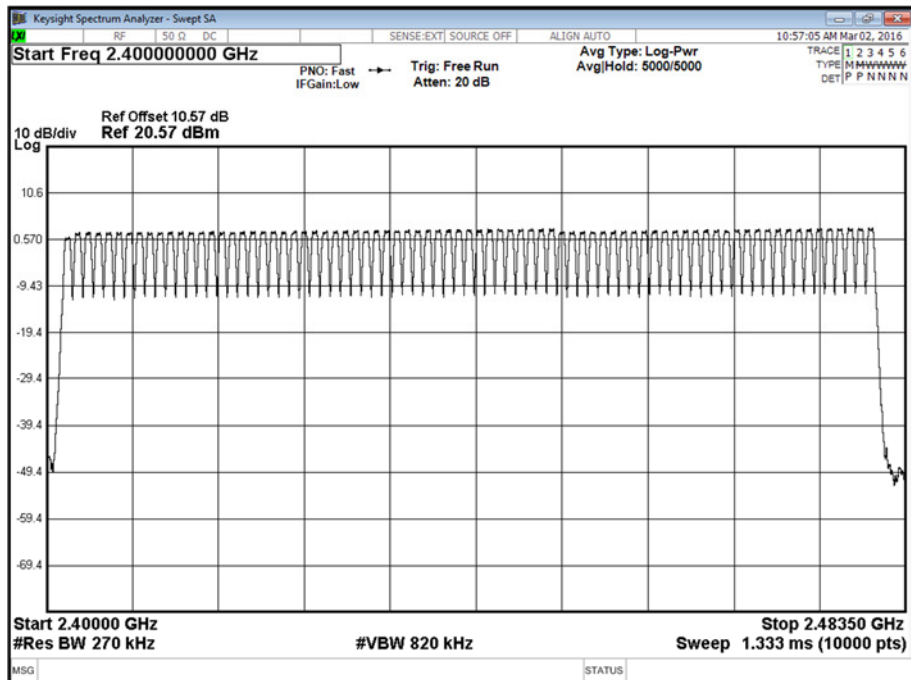


Product Service

### Bluetooth, Segment 1, DH3, Number of Hopping Channels Plot



### Bluetooth, Segment 1, DH5, Number of Hopping Channels Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (a)(1)(iii) and Industry Canada RSS-247, Limit Clause, 5.1(4)

≥ 15 channels



Product Service

**2.4 FREQUENCY HOPPING SYSTEMS - 20 DB BANDWIDTH****2.4.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (a)(1)  
RSS-247, Clause 5.1(1)

**2.4.2 Equipment Under Test and Modification State**

PC-010 S/N: Not Serialised (75933714-TSR0005) - Modification State 0

**2.4.3 Date of Test**

2 March 2016

**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 test was performed in accordance with ANSI C63.10, clause 6.9.2.

**2.4.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 21.4°C |
| Relative Humidity   | 28.5%  |



Product Service

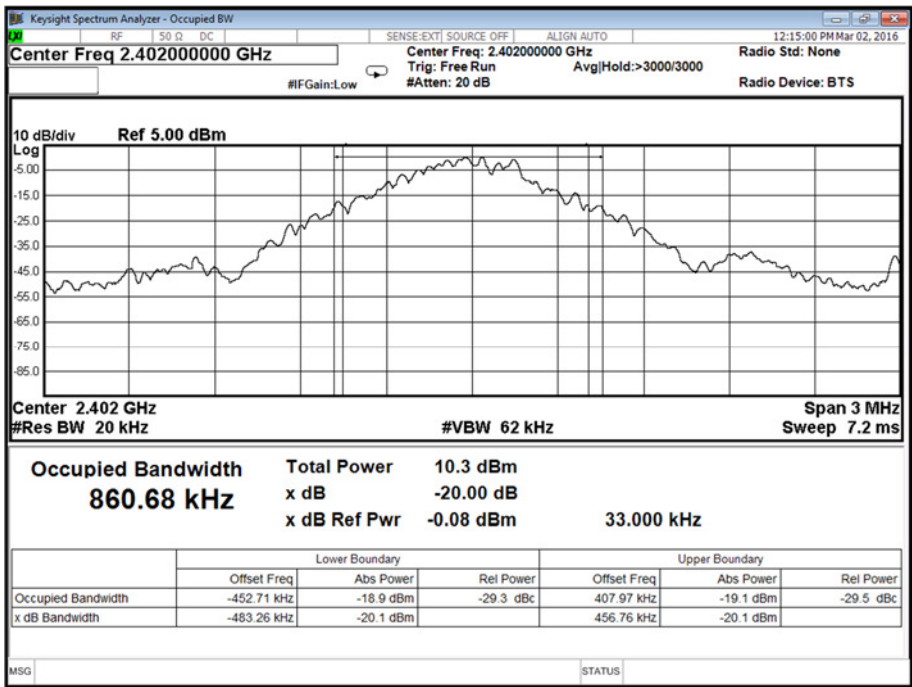
2.4.7 Test Results

3.7 V DC Supply

Bluetooth, 20 dB Bandwidth Results

|            |          |          |          |
|------------|----------|----------|----------|
| Modulation | 2402 MHz | 2441 MHz | 2480 MHz |
|            | kHz      | kHz      | kHz      |
| GFSK       | 940.02   | 937.22   | 936.39   |
| pi/4 DQPSK | 1269.93  | 1241.61  | 1263.05  |
| 8-DPSK     | 1255.22  | 1259.22  | 1261.79  |

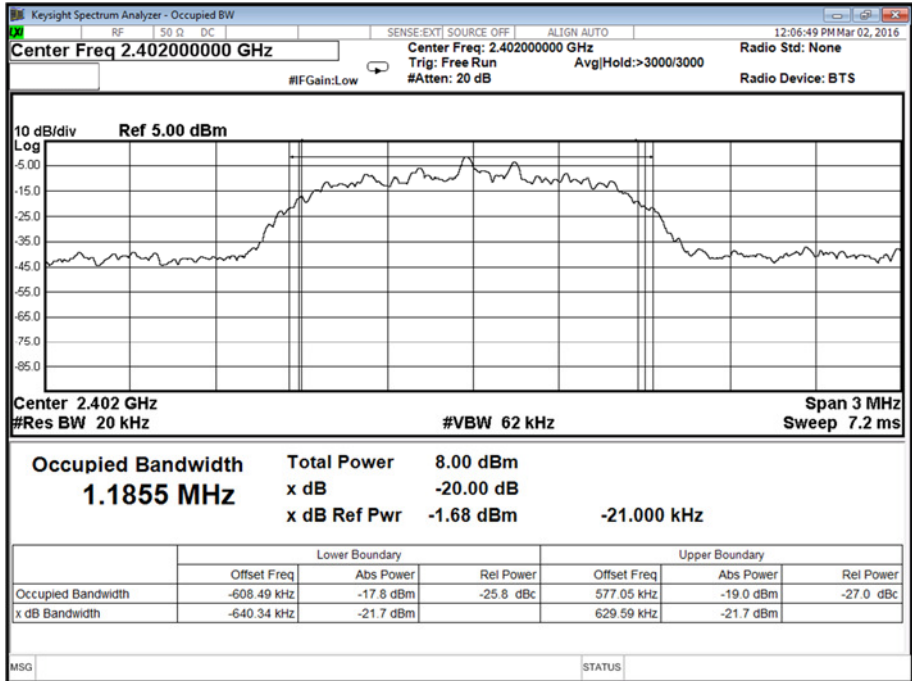
Bluetooth, 2402 MHz, GFSK, 20 dB Bandwidth Plot



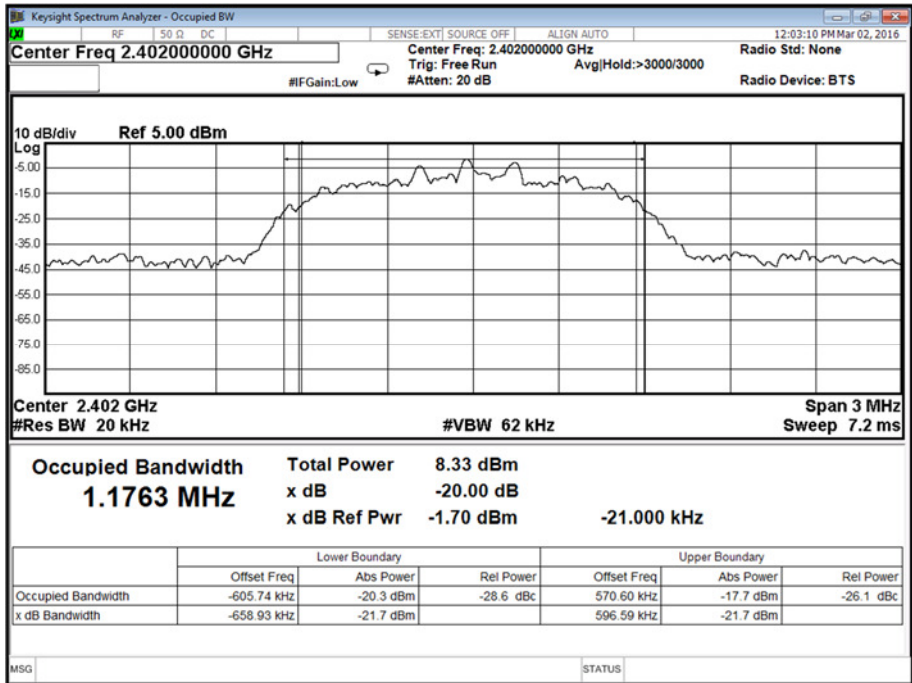


Product Service

Bluetooth, 2402 MHz, pi/4 DQPSK, 20 dB Bandwidth Plot



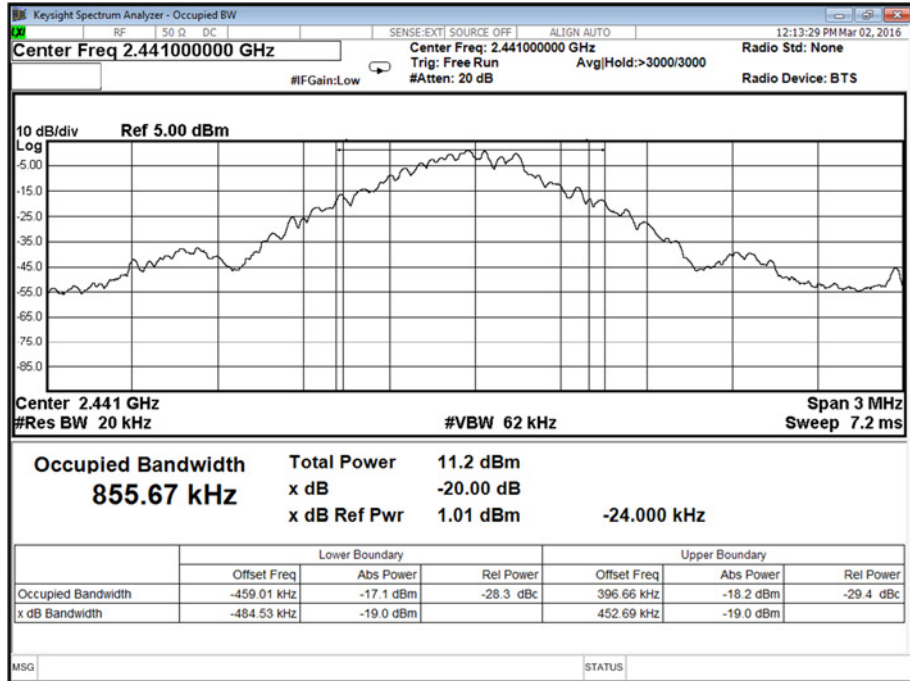
Bluetooth, 2402 MHz, 8-DPSK, 20 dB Bandwidth Plot



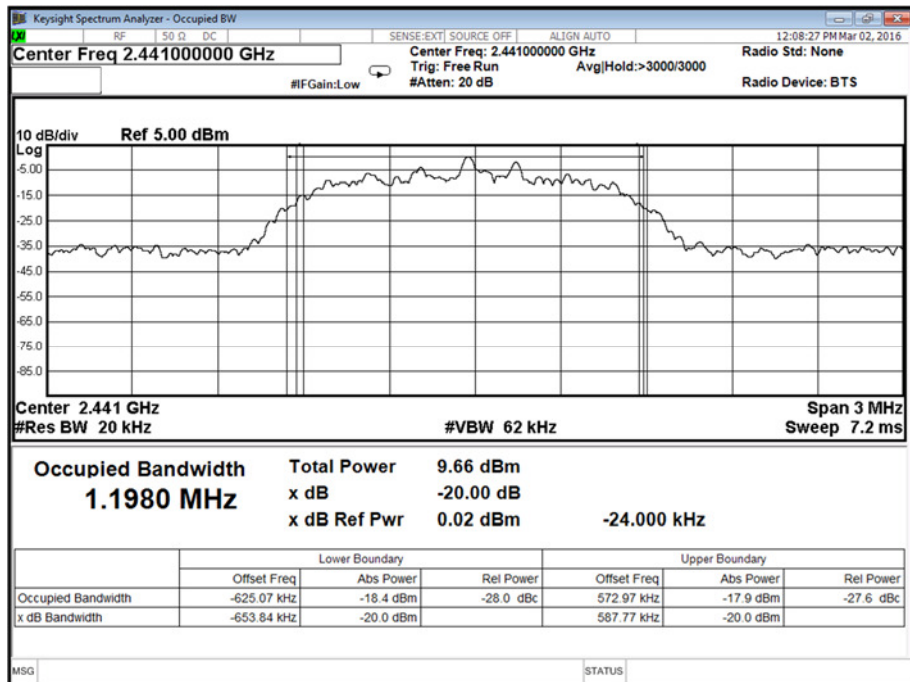


Product Service

### Bluetooth, 2441 MHz, GFSK, 20 dB Bandwidth Plot



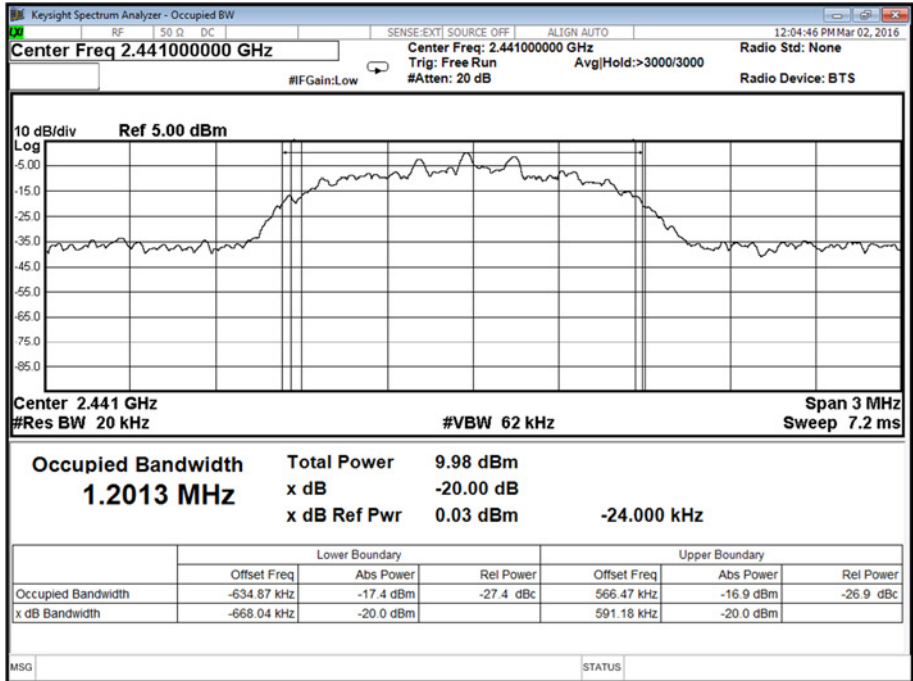
### Bluetooth, 2441 MHz, pi/4 DQPSK, 20 dB Bandwidth Plot



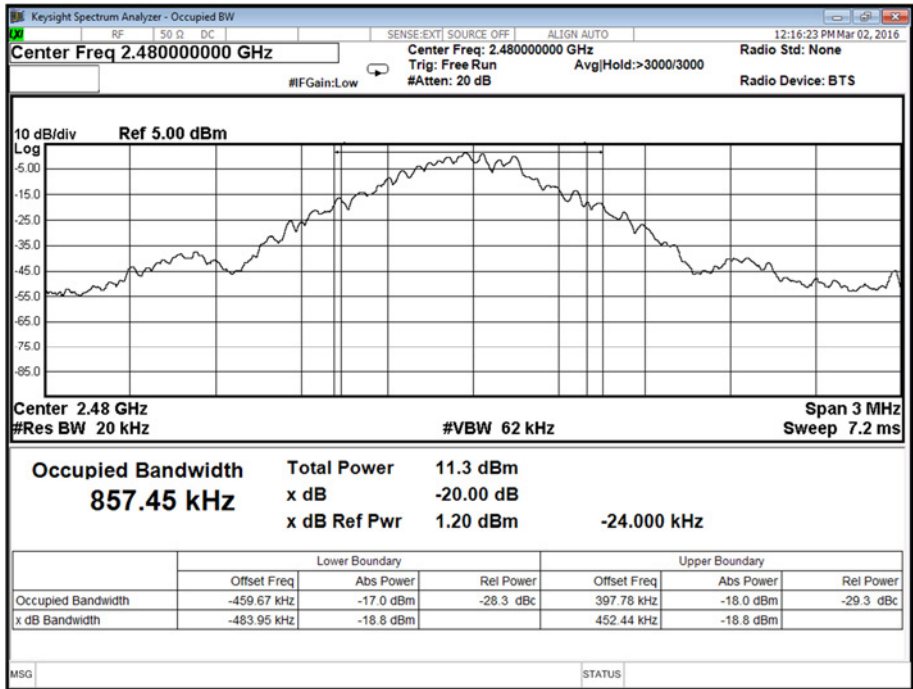


Product Service

Bluetooth, 2441 MHz, 8-DPSK, 20 dB Bandwidth Plot



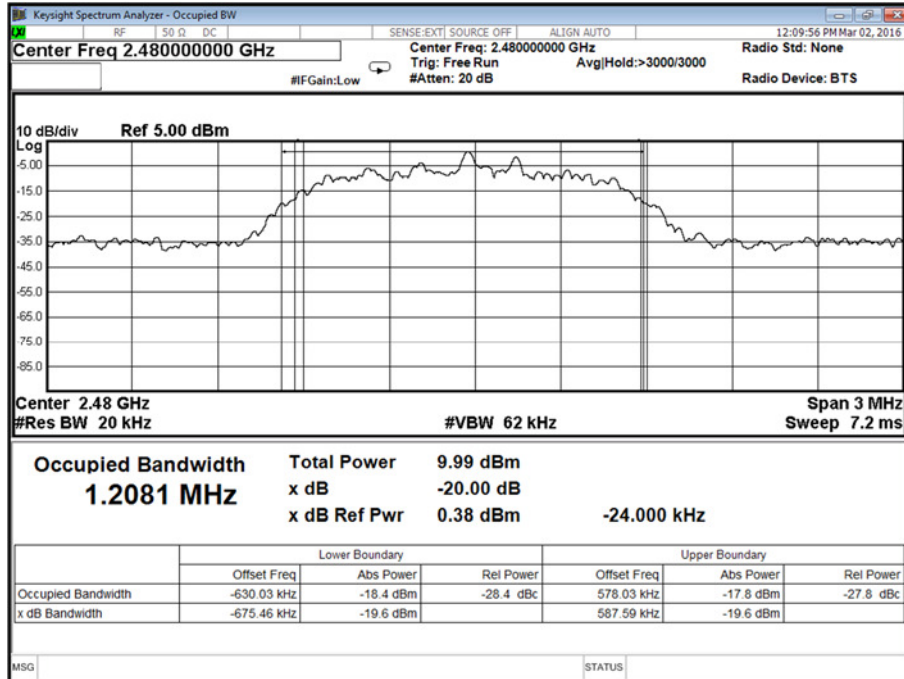
Bluetooth, 2480 MHz, GFSK, 20 dB Bandwidth Plot



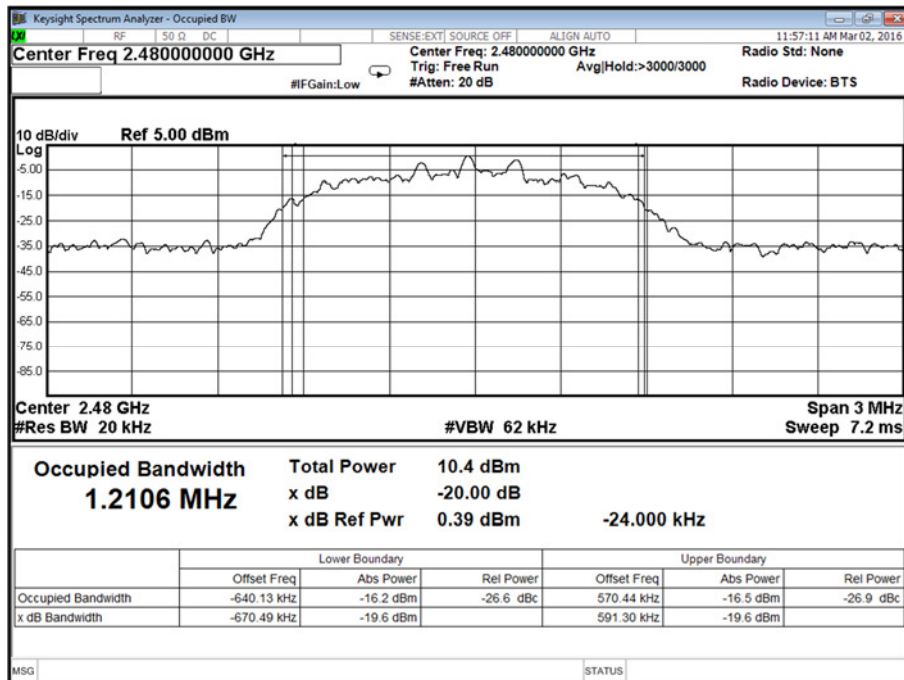


Product Service

### Bluetooth, 2480 MHz, pi/4 DQPSK, 20 dB Bandwidth Plot



### Bluetooth, 2480 MHz, 8-DPSK, 20 dB Bandwidth Plot



### Remarks

The x bandwidth is shown on the plots by summing the lower and upper boundaries of the frequency offsets as shown in the table on the plots.



Product Service

FCC 47 CFR Part 15, Limit Clause

None specified.

Industry Canada RSS-247, Limit Clause 5.1(1)

None specified.



Product Service

**2.5 FREQUENCY HOPPING SYSTEMS - AVERAGE TIME OF OCCUPANCY****2.5.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (a)(1)(iii)  
RSS-247, Clause 5.1(4)

**2.5.2 Equipment Under Test and Modification State**

PC-010 S/N: Not Serialised (75933714-TSR0005) - Modification State 0

**2.5.3 Date of Test**

2 March 2016 & 3 March 2016

**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 test was performed in accordance with ANSI C63.10, clause 7.8.4.

**2.5.6 Environmental Conditions**

|                     |               |
|---------------------|---------------|
| Ambient Temperature | 21.2 - 21.4°C |
| Relative Humidity   | 28.5 - 31.5%  |



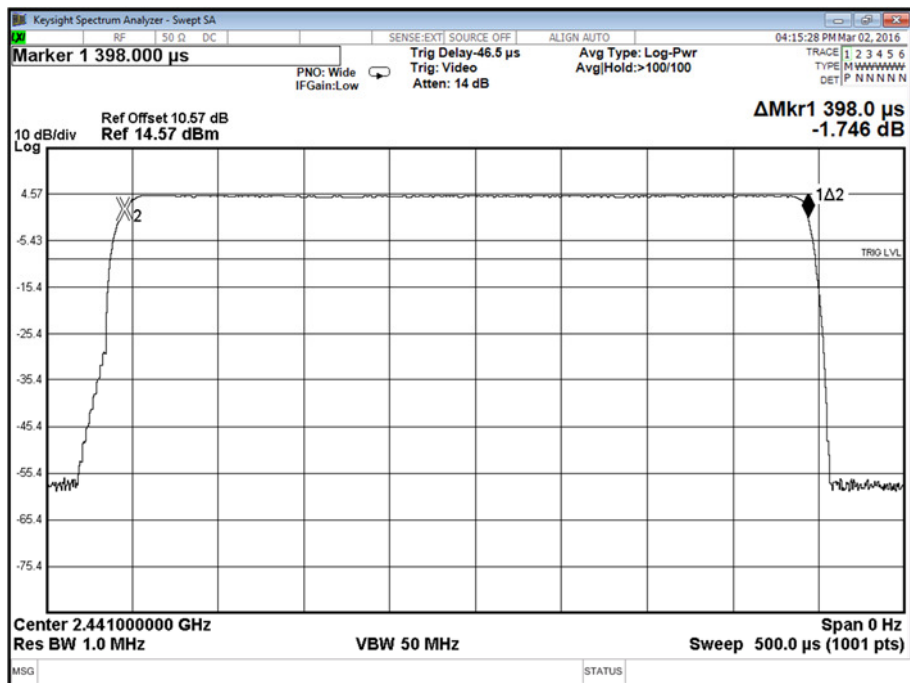
Product Service

## 2.5.7 Test Results

### Bluetooth, Average Time of Occupancy Results

| Packet Type | Dwell Time (ms) | Number of Transmissions | Average Occupancy Time (ms) |
|-------------|-----------------|-------------------------|-----------------------------|
| DH1         | 0.398           | 320                     | 127.36                      |
| DH3         | 1.654           | 160                     | 264.64                      |
| DH5         | 2.903           | 107                     | 310.62                      |

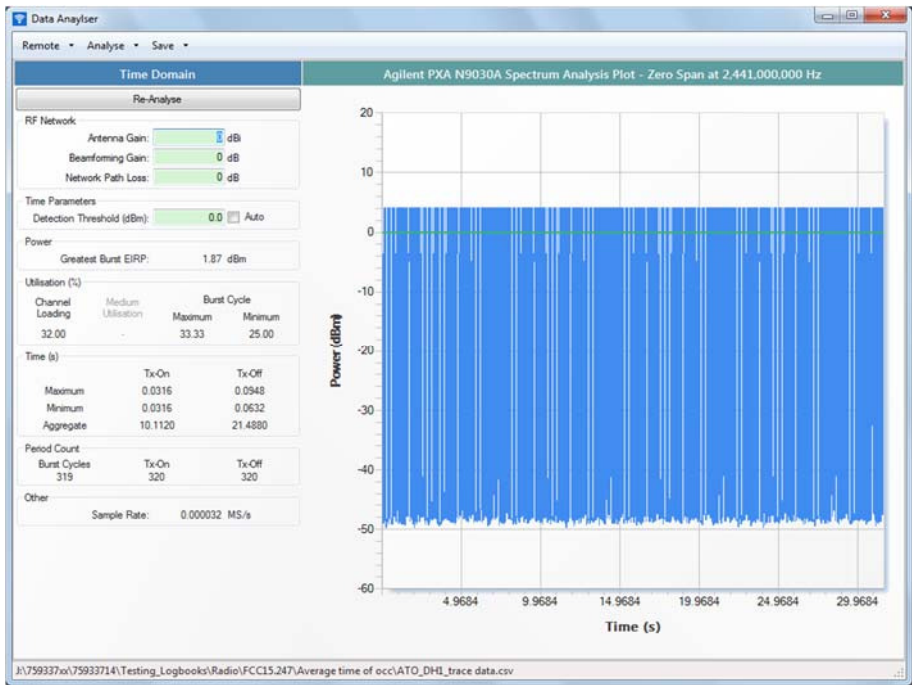
### Bluetooth, DH1, Average Time of Occupancy Plot



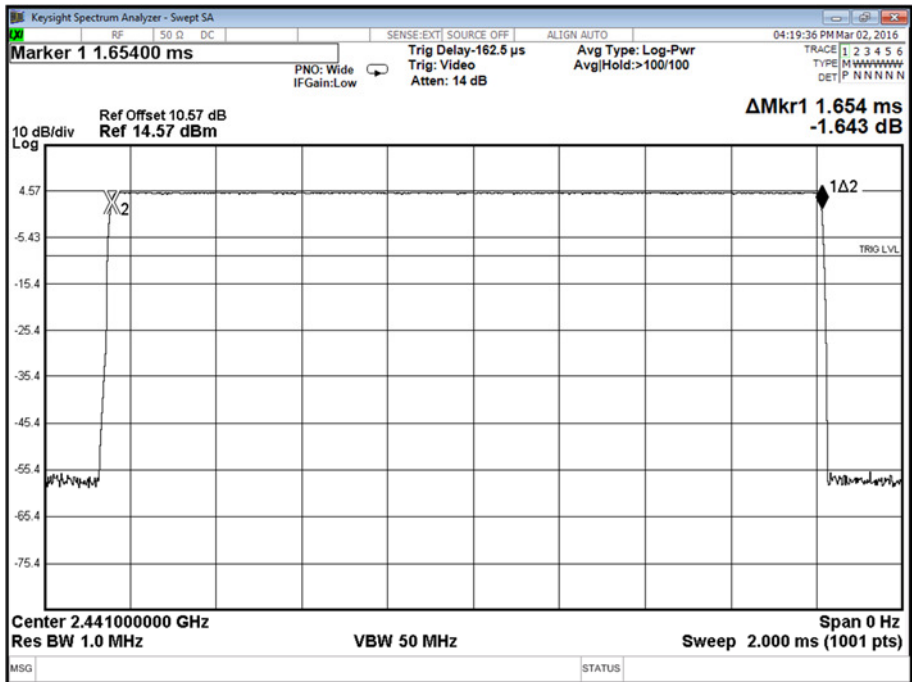


Product Service

Bluetooth, DH1, Total Average Time of Occupancy Plot



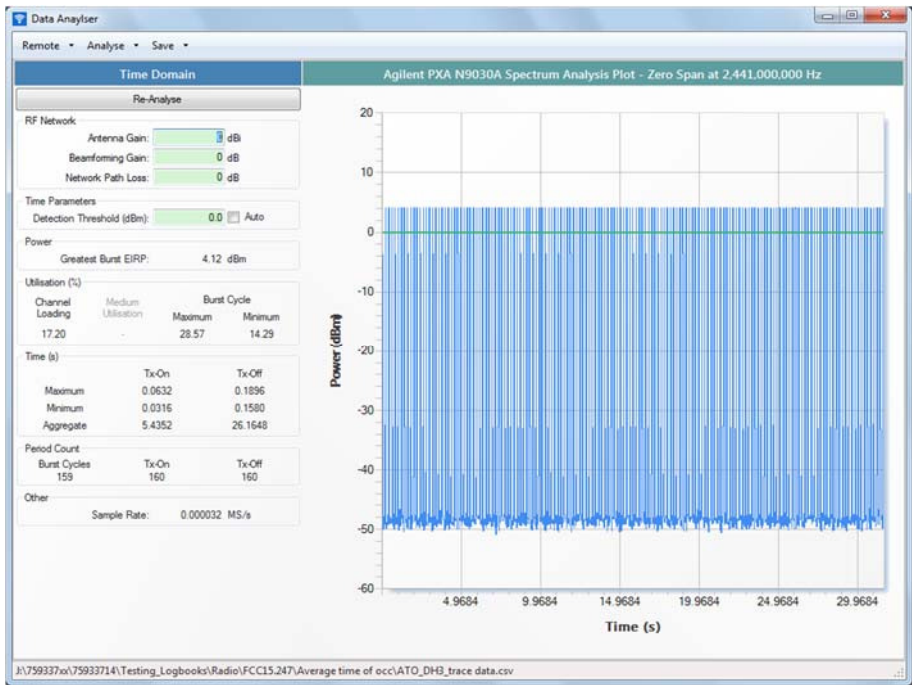
Bluetooth, DH3, Average Time of Occupancy Plot



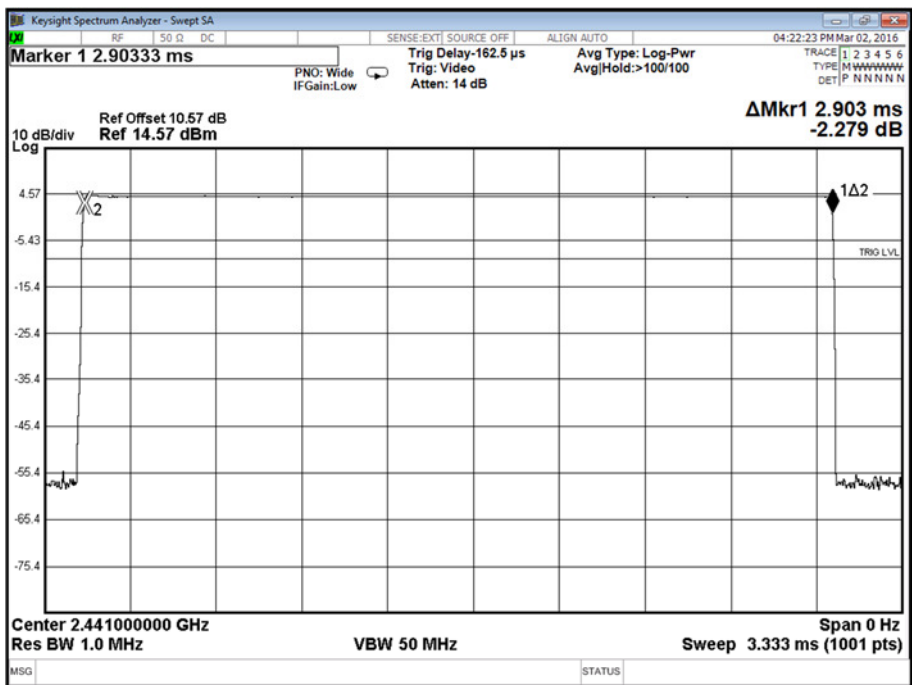


Product Service

Bluetooth, DH3, Total Average Time of Occupancy Plot



Bluetooth, DH5, Average Time of Occupancy Plot





Product Service

Bluetooth, DH5, Total Average Time of Occupancy Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (a)(1)(iii)

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.

Industry Canada RSS-247, Limit Clause, 5.1(4)

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 at least 15 hopping channels are used.



Product Service

**2.6 MAXIMUM CONDUCTED OUTPUT POWER****2.6.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (b)(3)  
RSS-247, Clause 5.4(2)

**2.6.2 Equipment Under Test and Modification State**

PC-010 S/N: Not Serialised (75933714-TSR0005) - Modification State 0

**2.6.3 Date of Test**

1 March 2016

**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**

The test was performed in accordance with KDB 558074 D01 v03r02, clause 9.1.1 and Industry Canada RSS-GEN, clause 6.12.

**2.6.6 Environmental Conditions**

|                     |        |
|---------------------|--------|
| Ambient Temperature | 23.6°C |
| Relative Humidity   | 43.1%  |



Product Service

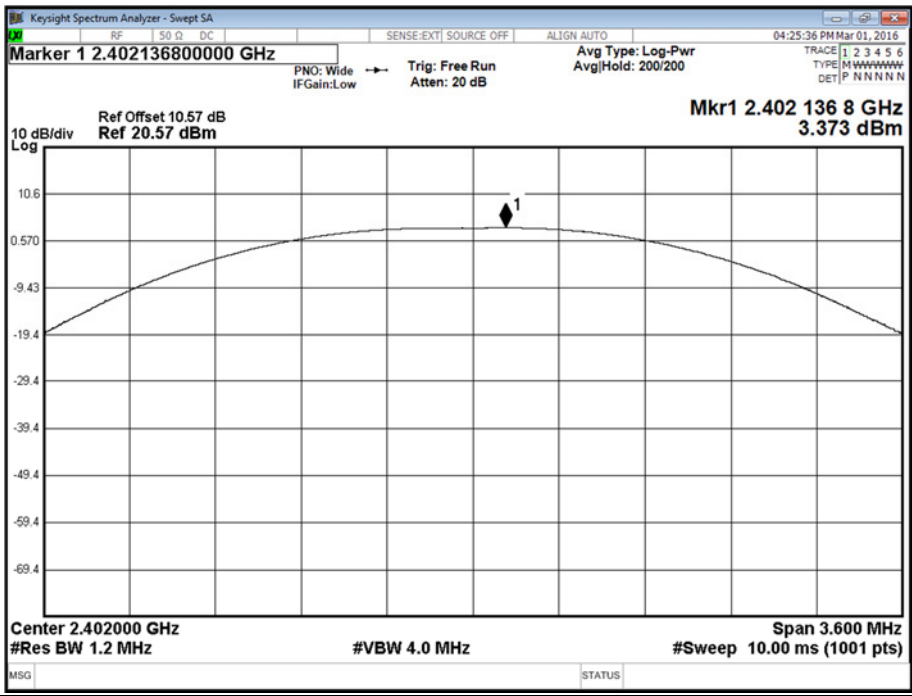
2.6.7 Test Results

3.7 V DC Supply

Bluetooth, DH5, Maximum Conducted Output Power Results

| 2402 MHz |       | 2441 MHz |       | 2480 MHz |       |
|----------|-------|----------|-------|----------|-------|
| dBm      | mW    | dBm      | mW    | dBm      | mW    |
| 3.373    | 2.174 | 4.167    | 2.610 | 4.249    | 2.660 |

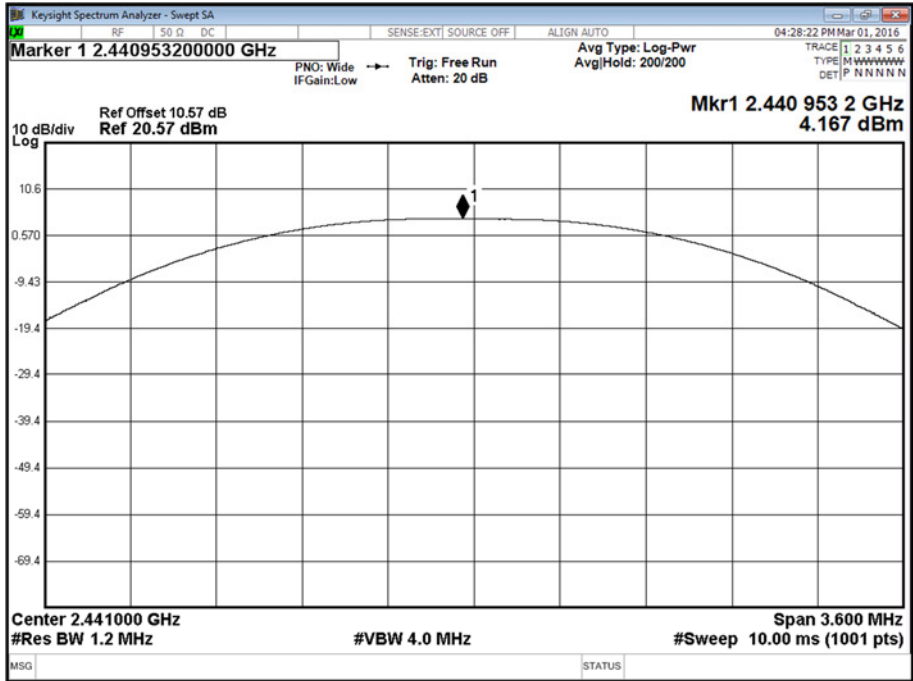
Bluetooth, 2402 MHz, GFSK, DH5, Maximum Conducted Output Power Plot



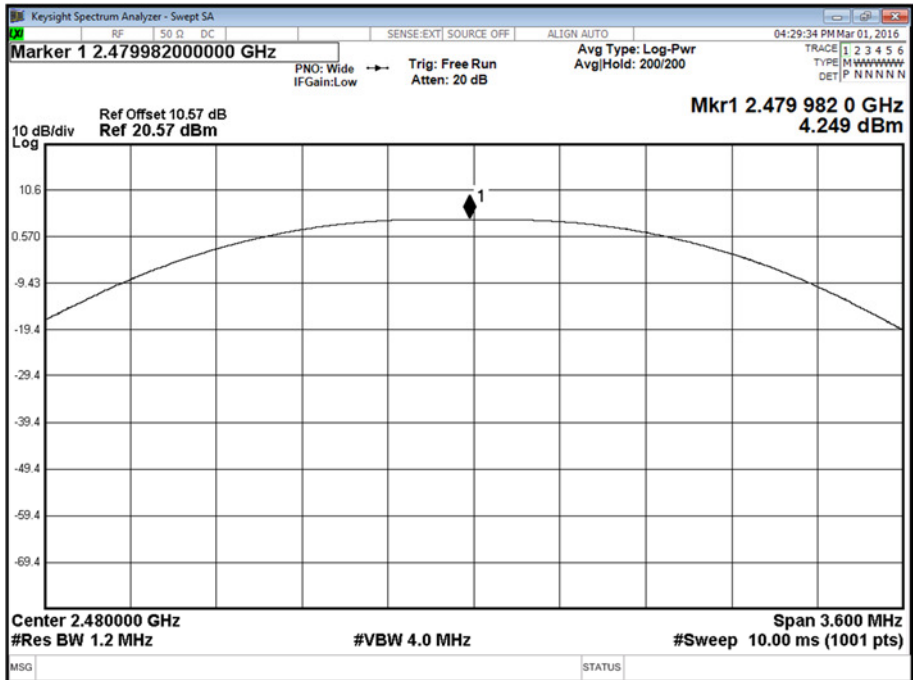


Product Service

Bluetooth, 2441 MHz, GFSK, DH5, Maximum Conducted Output Power Plot



Bluetooth, 2480 MHz, GFSK, DH5, Maximum Conducted Output Power Plot





Product Service

FCC 47 CFR Part 15, Limit Clause 15.247 (b)

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.

Industry Canada RSS-247, Limit Clause, 5.4(2)

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W and the e.i.r.p. shall not exceed 4 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W and the e.i.r.p. shall not exceed 0.5 W if the hopset uses less than 75 hopping channels.



Product Service

## **2.7 SPURIOUS RADIATED EMISSIONS**

### **2.7.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (d), 15.205 and 15.209  
RSS-247, Clause 5.5

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

PC-010 S/N: Not Serialised (75933714-TSR0005) - Modification State 0  
PC-010 S/N: Not Serialised (75933714-TSR0007) - Modification State 0

### **2.7.3 Date of Test**

1 March 2016 and 9 March 2016

### **2.7.4 Test Equipment Used**

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

### **2.7.5 Test Procedure**

The test was performed in accordance with ANSI C63.10, clause 6.3, 6.5, 6.6 and 7.5.

### **2.7.6 Environmental Conditions**

|                     |             |
|---------------------|-------------|
| Ambient Temperature | 20.2-22.9°C |
| Relative Humidity   | 35.0-30.8%  |



Product Service

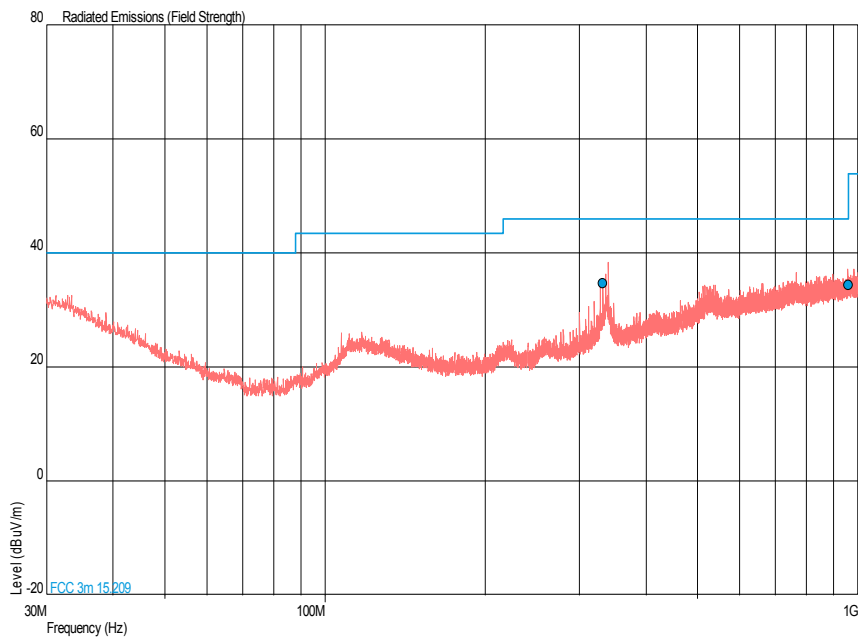
2.7.7 Test Results

3.7 V DC Supply

Bluetooth, 2402 MHz, DH5, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

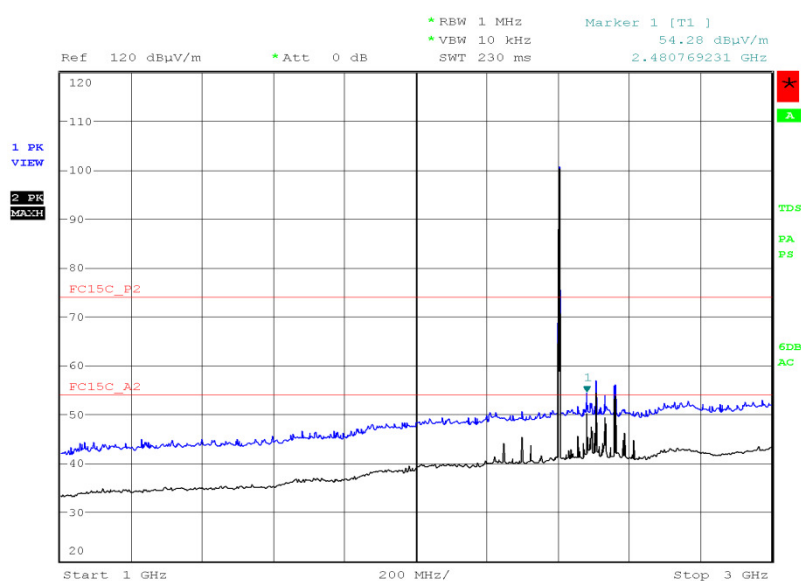
| Frequency (MHz) | QP Level (dBµV/m) | QP Margin (dBµV/m) | QP Level (µV/m) | QP Margin (µV/m) | Angle (°) | Height (m) | Polarisation |
|-----------------|-------------------|--------------------|-----------------|------------------|-----------|------------|--------------|
| 332.035         | 34.6              | -11.4              | 53.7            | -146.3           | 201       | 1.08       | Horizontal   |
| 960.000         | 34.4              | -11.6              | 52.5            | -147.5           | 0         | 2.31       | Vertical     |

Bluetooth, 2402 MHz, DH5, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot



| Frequency (MHz) | Final Peak (dBμV/m) | Final Average (dBμV/m) | Final Peak (μV/m) | Final Average (μV/m) | Angle (°) | Height (m) | Polarisation |
|-----------------|---------------------|------------------------|-------------------|----------------------|-----------|------------|--------------|
| 2494.125        | 53.75               | 44.40                  | 486.97            | 165.96               | 115       | 1.00       | Horizontal   |

### Bluetooth, 2402 MHz, DH5, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

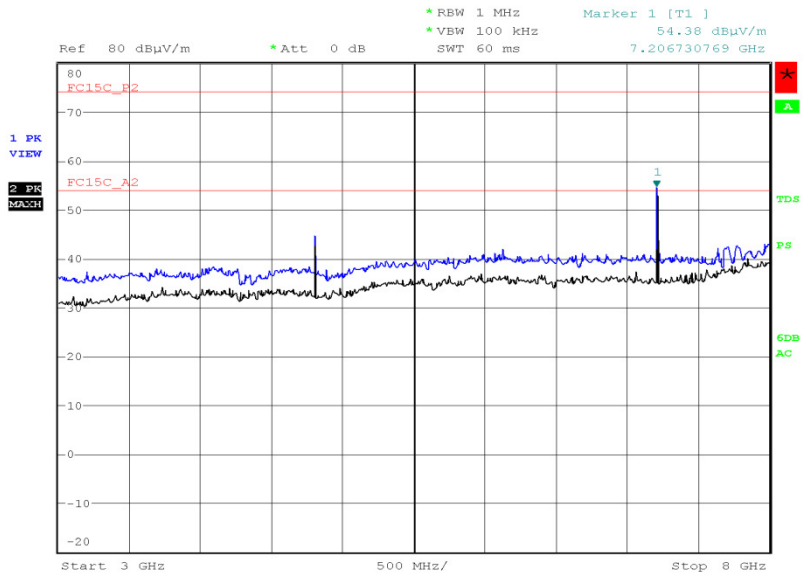


Date: 23.FEB.2016 20:38:59



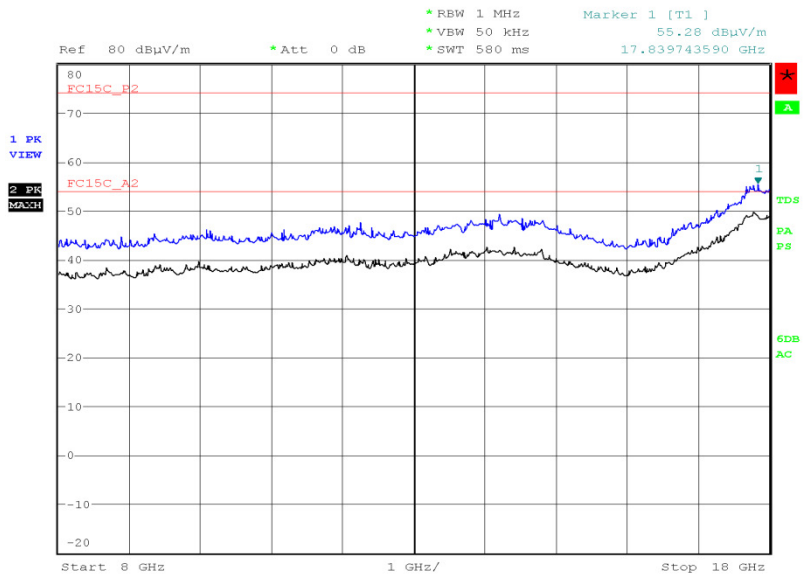
Product Service

Bluetooth, 2402 MHz, DH5, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 23.FEB.2016 22:41:48

Bluetooth, 2402 MHz, DH5, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot

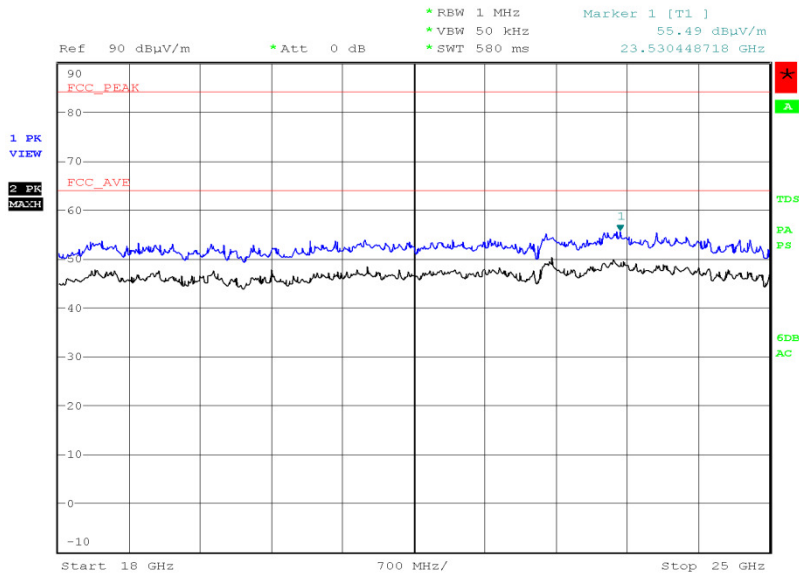


Date: 1.MAR.2016 18:58:38



Product Service

Bluetooth, 2402 MHz, DH5, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



Date: 1.MAR.2016 19:34:31

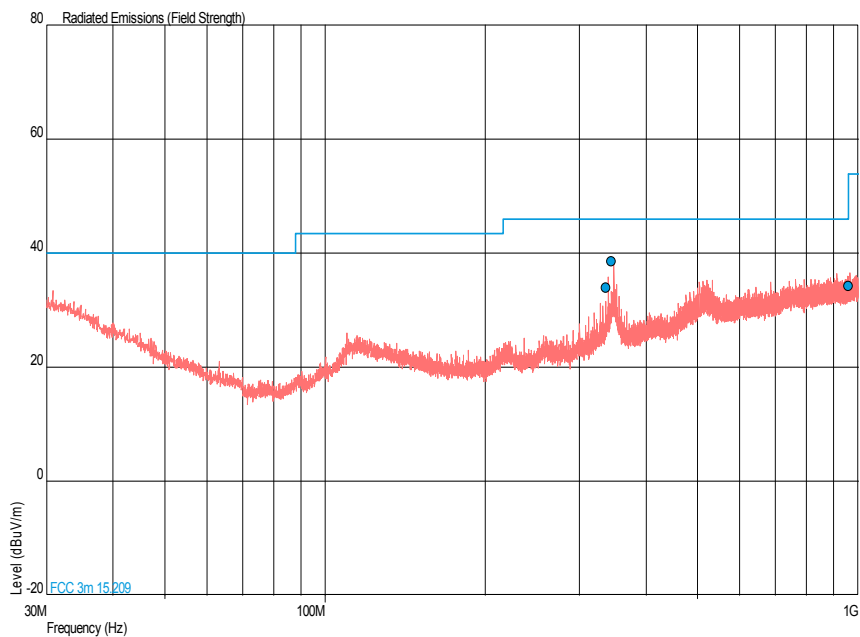


Product Service

Bluetooth, 2441 MHz, DH5, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

| Frequency (MHz) | QP Level (dBµV/m) | QP Margin (dBµV/m) | QP Level (µV/m) | QP Margin (µV/m) | Angle (°) | Height (m) | Polarisation |
|-----------------|-------------------|--------------------|-----------------|------------------|-----------|------------|--------------|
| 335.973         | 34.0              | -12.0              | 50.1            | -149.9           | 29        | 1.00       | Horizontal   |
| 344.008         | 38.6              | -7.4               | 85.1            | -114.9           | 207       | 1.00       | Horizontal   |
| 960.000         | 34.3              | -11.7              | 51.9            | -148.1           | 322       | 3.44       | Vertical     |

Bluetooth, 2441 MHz, DH5, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot





Product Service

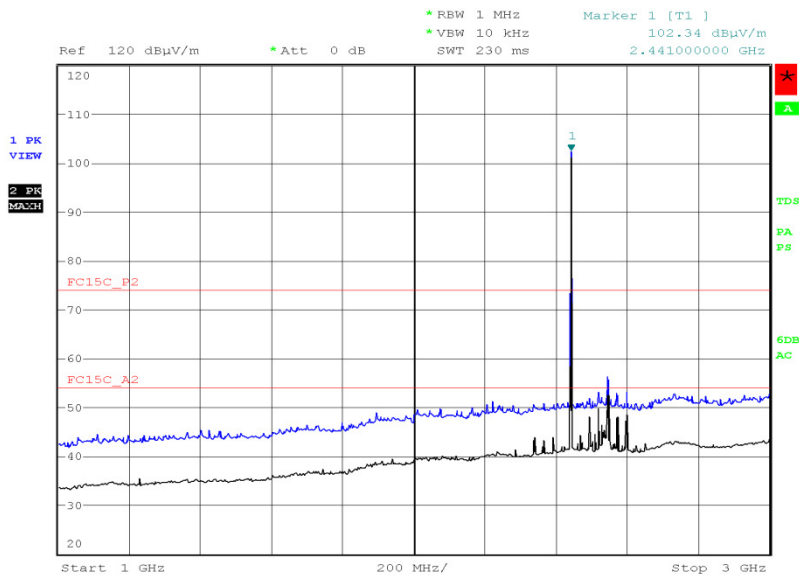
Bluetooth, 2441 MHz, DH5, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

| Frequency (MHz) | Final Peak (dBμV/m) | Final Average (dBμV/m) | Final Peak (μV/m) | Final Average (μV/m) | Angle (°) | Height (m) | Polarisation |
|-----------------|---------------------|------------------------|-------------------|----------------------|-----------|------------|--------------|
| 2494.454        | 53.78               | 44.04                  | 488.65            | 159.22               | 103       | 1.00       | Horizontal   |
| 7323.010        | 62.29               | 32.45                  | 1301.67           | 41.93*               | 100       | 154        | Horizontal   |

No other emissions were detected within 10 dB of the limit.

\*Emission has been corrected using a calculated duty cycle correction factor. See Annex A for details.

Bluetooth, 2441 MHz, DH5, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

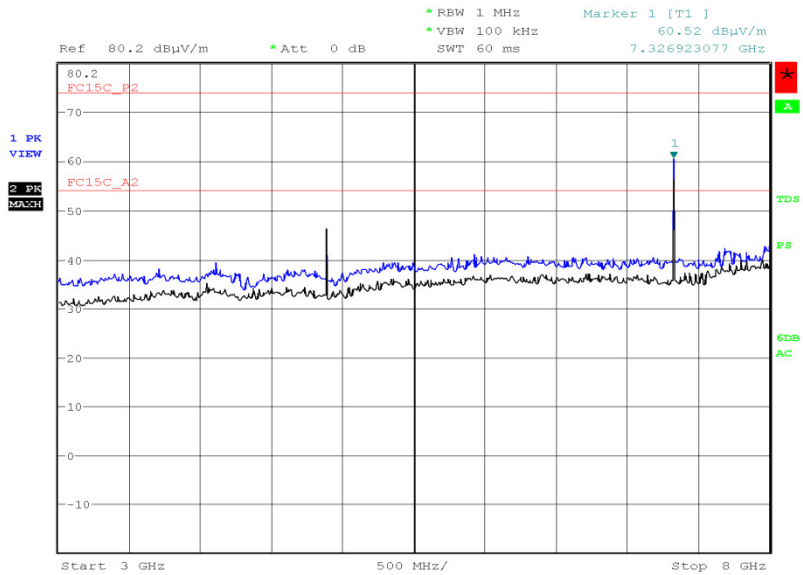


Date: 23.FEB.2016 21:11:55



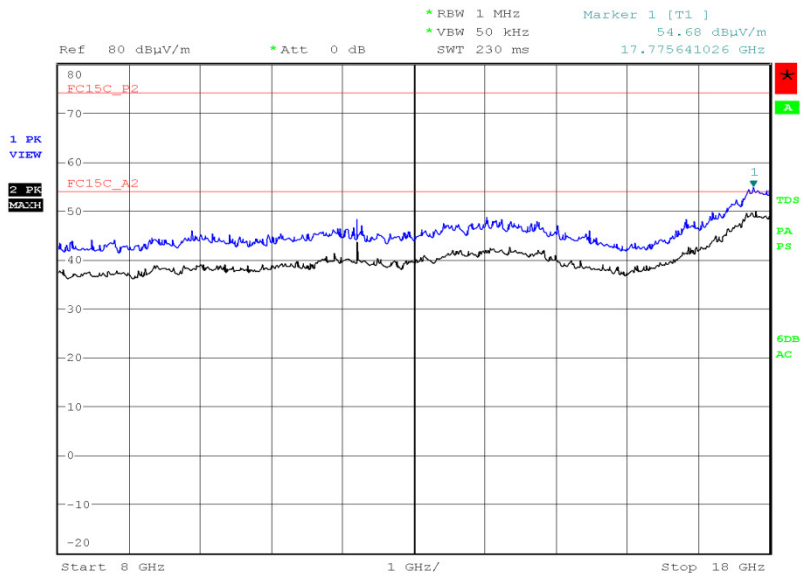
Product Service

Bluetooth, 2441 MHz, DH5, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 23.FEB.2016 23:09:55

Bluetooth, 2441 MHz, DH5, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot

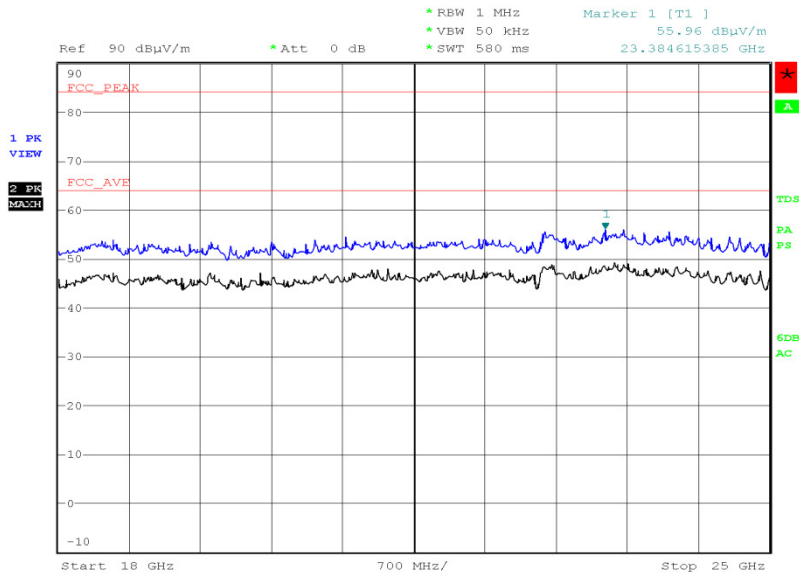


Date: 1.MAR.2016 18:48:18



Product Service

Bluetooth, 2441 MHz, DH5, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



Date: 1.MAR.2016 19:39:30

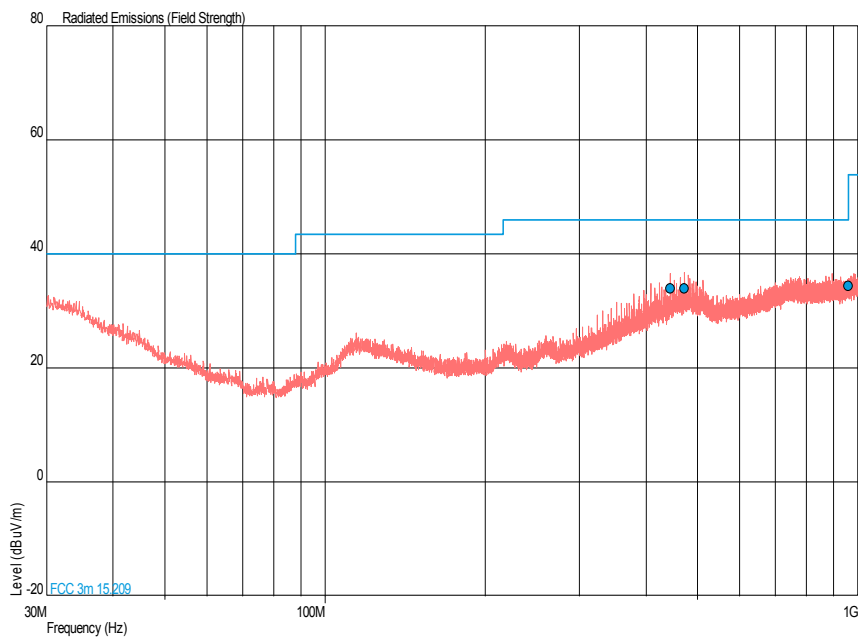


Product Service

Bluetooth, 2480 MHz, DH5, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

| Frequency (MHz) | QP Level (dBµV/m) | QP Margin (dBµV/m) | QP Level (µV/m) | QP Margin (µV/m) | Angle (°) | Height (m) | Polarisation |
|-----------------|-------------------|--------------------|-----------------|------------------|-----------|------------|--------------|
| 443.989         | 33.9              | -12.1              | 49.5            | -150.5           | 30        | 1.00       | Horizontal   |
| 472.035         | 33.9              | -12.1              | 49.5            | -150.5           | 42        | 2.29       | Horizontal   |
| 960.000         | 34.4              | -11.6              | 52.5            | -147.5           | 325       | 1.00       | Horizontal   |

Bluetooth, 2480 MHz, DH5, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot





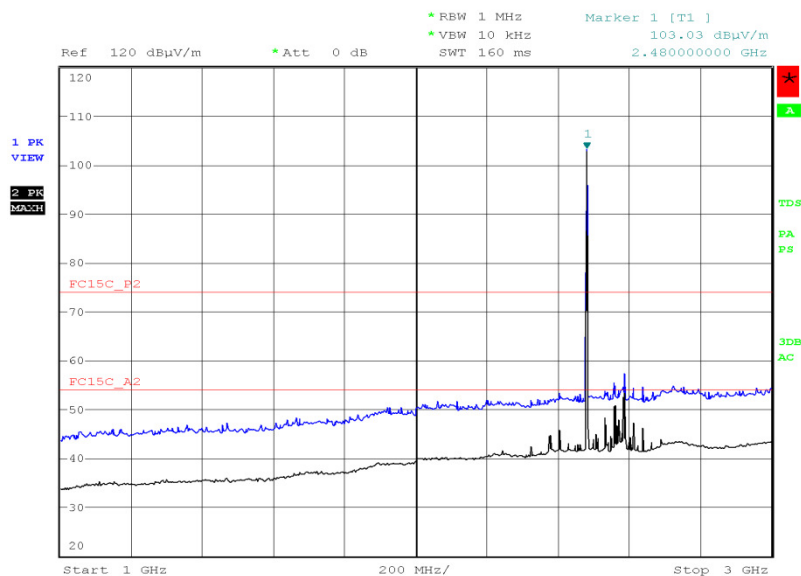
### Bluetooth, 2480 MHz, DH5, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

| Frequency (MHz) | Final Peak (dBμV/m) | Final Average (dBμV/m) | Final Peak (μV/m) | Final Average (μV/m) | Angle (°) | Height (m) | Polarisation |
|-----------------|---------------------|------------------------|-------------------|----------------------|-----------|------------|--------------|
| 7439.467        | 62.29               | 32.07*                 | 1301.67           | 40.13                | 107       | 387        | Horizontal   |

No other emissions were detected within 10 dB of the limit.

\*Emission has been corrected using a calculated duty cycle correction factor. See Annex A for details.

### Bluetooth, 2480 MHz, DH5, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

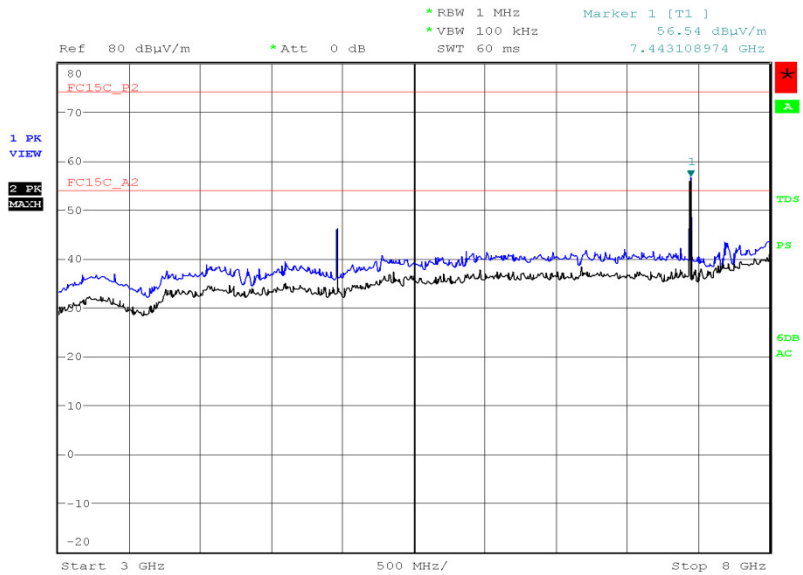


Date: 23.FEB.2016 21:31:01



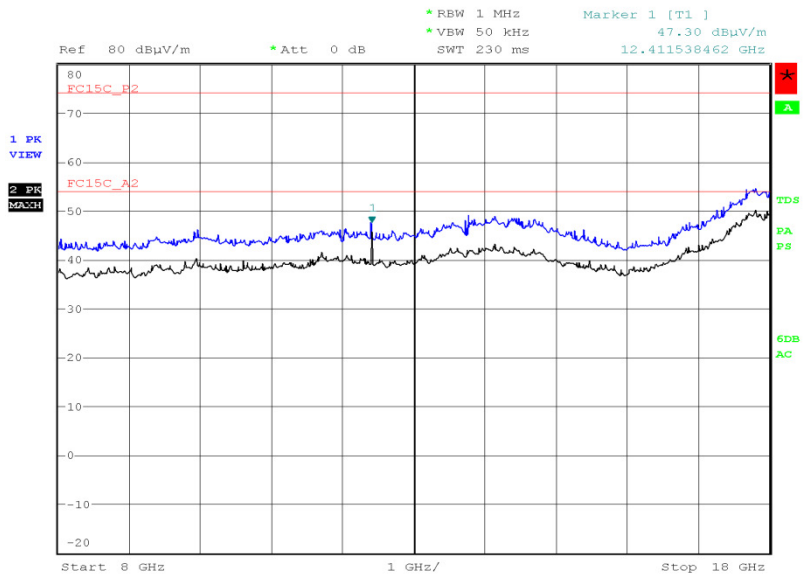
Product Service

Bluetooth, 2480 MHz, DH5, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 1.MAR.2016 17:55:07

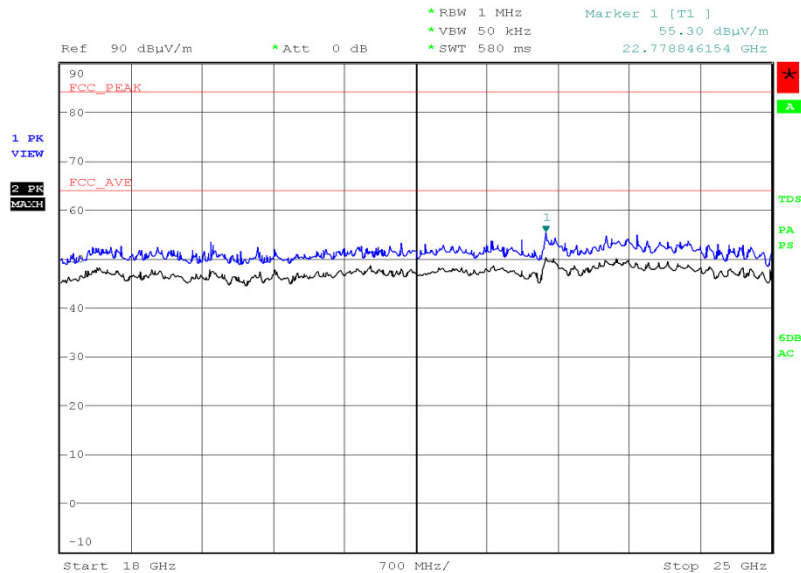
Bluetooth, 2480 MHz, DH5, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 1.MAR.2016 18:38:44



### Bluetooth, 2480 MHz, DH5, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



Date: 1.MAR.2016 19:51:29

### FCC 47 CFR Part 15, Limit Clause 15.247 (d)

Emissions outside the restricted bands shall be at least 20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. 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 below the fundamental instead of 20 dB.

### FCC 47 CFR Part 15, Limit Clause 15.205

|                               | Peak (dBμV/m) | Average (dBμV/m) |
|-------------------------------|---------------|------------------|
| Restricted Bands of Operation | 74            | 54               |

### FCC 47 CFR Part 15, Limit Clause 15.209

| Frequency (MHz) | Field Strength |                  |               | Measurement Distance (m) |
|-----------------|----------------|------------------|---------------|--------------------------|
|                 | (μV/m)         | Average (dBμV/m) | Peak (dBμV/m) |                          |
| 30-88           | 100            | 40.0             | 60.0          | 3                        |
| 88-216          | 150            | 43.5             | 63.5          | 3                        |
| 216-960         | 200            | 46.0             | 66.0          | 3                        |
| Above 960       | 500            | 54.0             | 74.0          | 3                        |

### Industry Canada RSS-247, Limit Clause, 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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,



Product Service

based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.



Product Service

**2.8 RESTRICTED BAND EDGES****2.8.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.205  
RSS-GEN, Clause 8.10

**2.8.2 Equipment Under Test and Modification State**

PC-010 S/N: Not Serialised (75933714-TSR0007) - Modification State 0

**2.8.3 Date of Test**

23 February 2016 & 2 March 2016

**2.8.4 Test Equipment Used**

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

**2.8.5 Test Procedure**

The test was performed in accordance with ANSI C63.10, clause 6.10.5

**2.8.6 Environmental Conditions**

|                     |               |
|---------------------|---------------|
| Ambient Temperature | 18.4 - 20.6°C |
| Relative Humidity   | 25.0 - 30.0%  |



Product Service

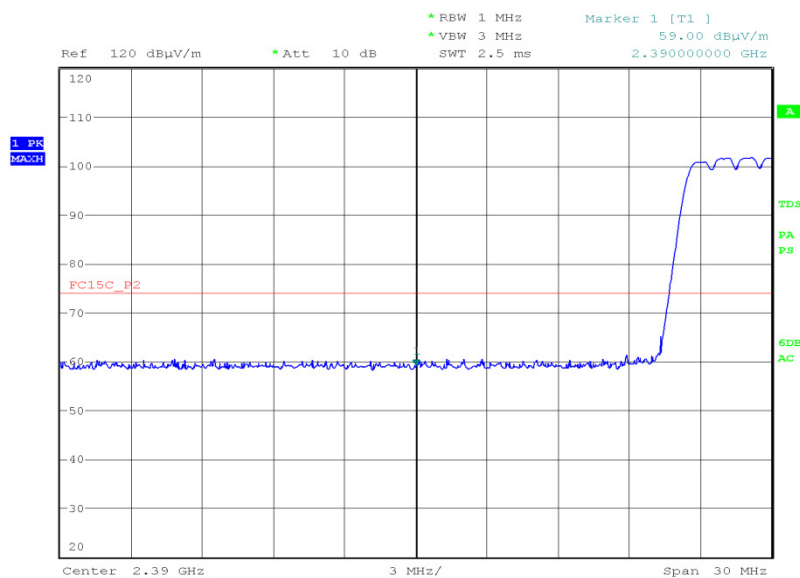
## 2.8.7 Test Results

3.7 V DC Supply

Hopping ModeBluetooth, GFSK, Restricted Band Edges Results

| 2402 MHz                    |               | 2480 MHz                      |               |
|-----------------------------|---------------|-------------------------------|---------------|
| Measured Frequency 2390 MHz |               | Measured Frequency 2483.5 MHz |               |
| dBμV/m                      |               | dBμV/m                        |               |
| Final Peak                  | Final Average | Final Peak                    | Final Average |
| 59.00                       | 47.68         | 58.47                         | 47.62         |

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, GFSK, Final Peak, Restricted Band Edges Plot

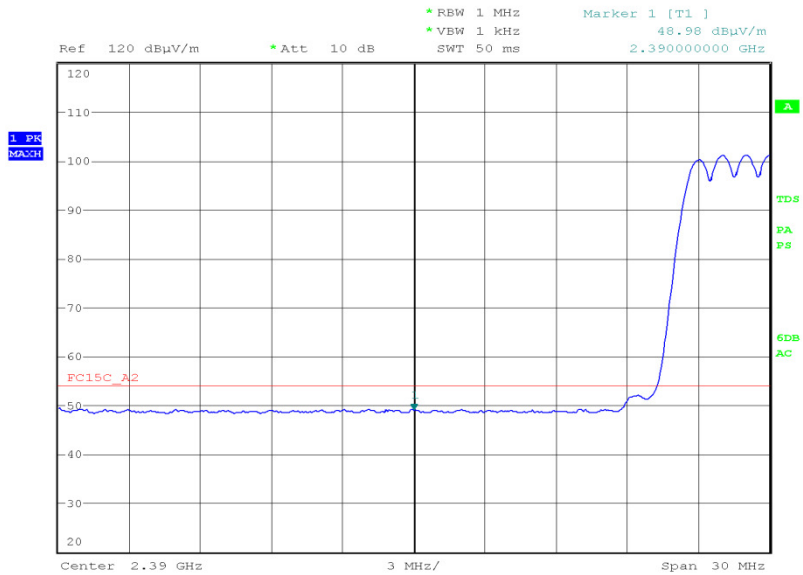


Date: 23.FEB.2016 22:06:41



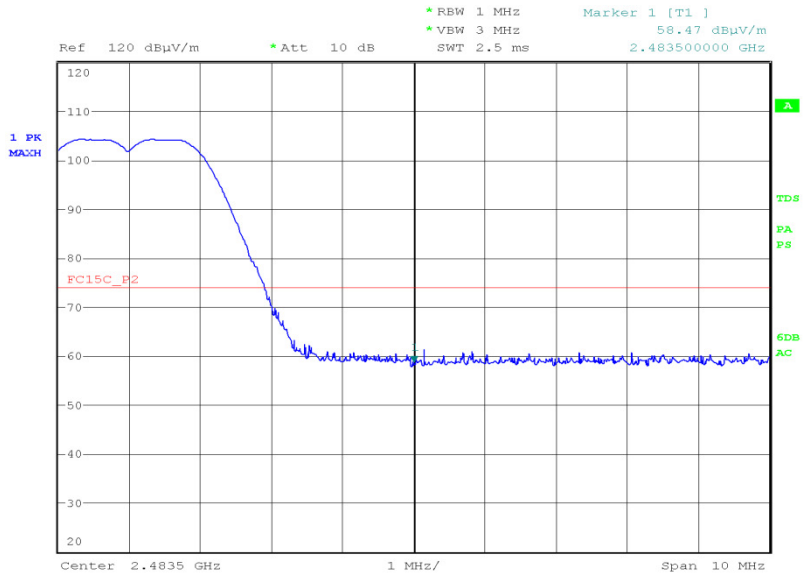
Product Service

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, GFSK, Final Average, Restricted Band Edges Plot



Date: 23.FEB.2016 22:07:26

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, GFSK, Final Peak, Restricted Band Edges Plot

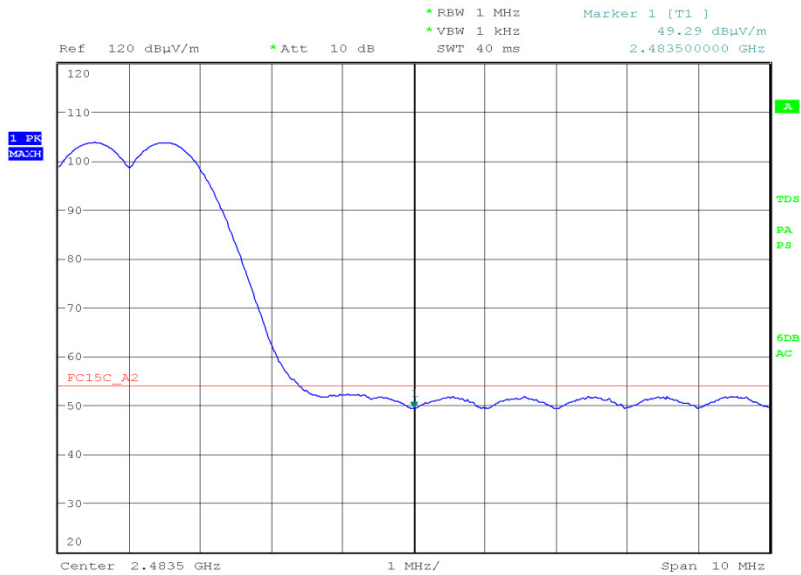


Date: 23.FEB.2016 22:14:27



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, GFSK, Final Average, Restricted Band Edges Plot



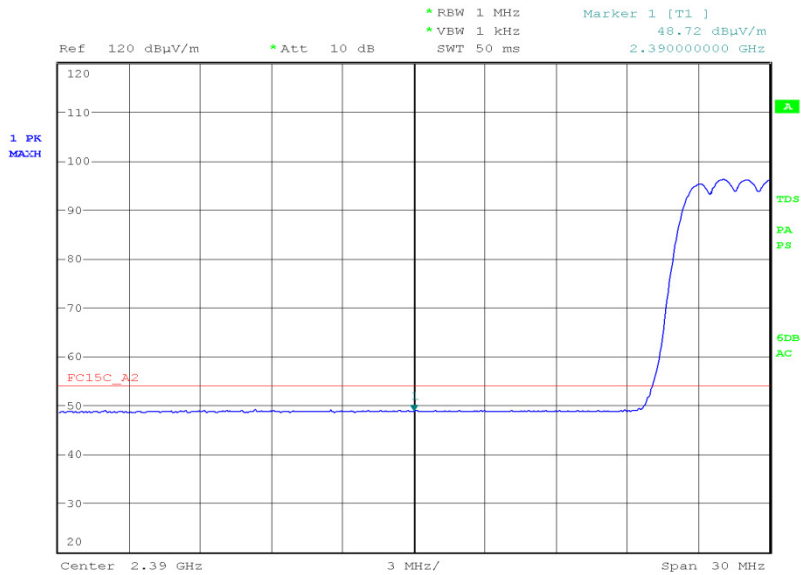
Date: 23.FEB.2016 22:17:15





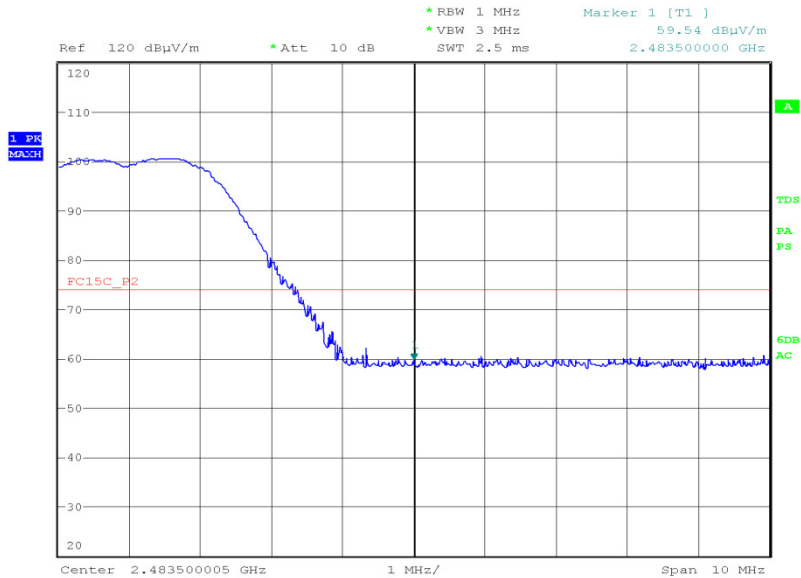
Product Service

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, pi/4 DQPSK, Final Average, Restricted Band Edges Plot



Date: 2.MAR.2016 19:34:34

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, pi/4 DQPSK, Final Peak, Restricted Band Edges Plot

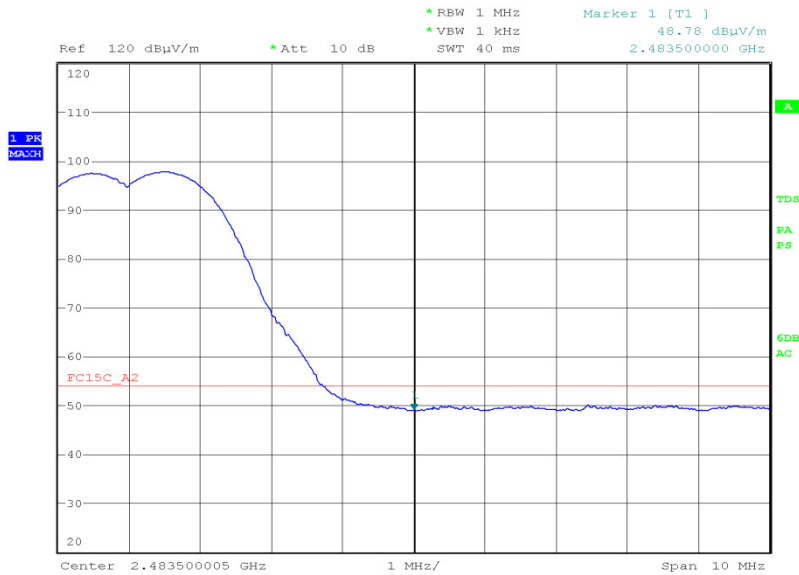


Date: 2.MAR.2016 19:26:15



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, pi/4 DQPSK, Final Average, Restricted Band Edges Plot



Date: 2.MAR.2016 19:26:43

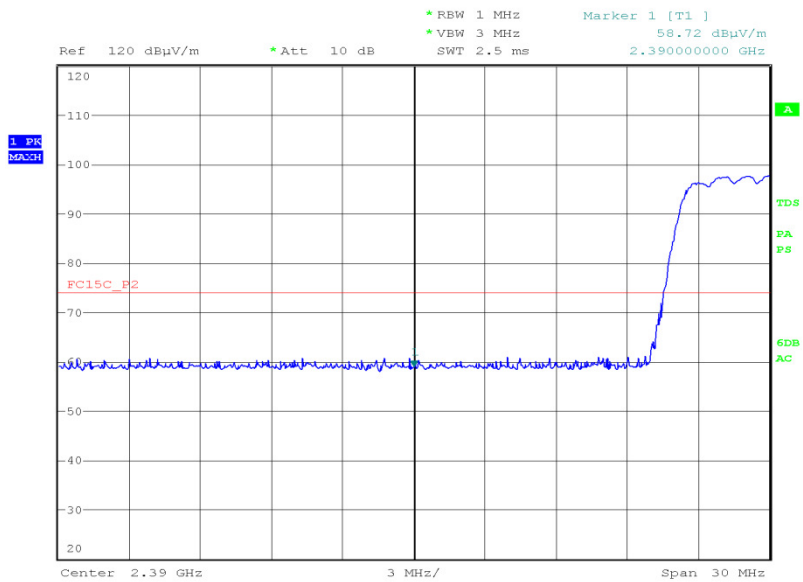


Product Service

Bluetooth, 8-DPSK, Restricted Band Edges Results

| 2402 MHz                    |               | 2480 MHz                      |               |
|-----------------------------|---------------|-------------------------------|---------------|
| Measured Frequency 2390 MHz |               | Measured Frequency 2483.5 MHz |               |
| dBµV/m                      |               | dBµV/m                        |               |
| Final Peak                  | Final Average | Final Peak                    | Final Average |
| 58.72                       | 47.91         | 58.76                         | 47.89         |

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, 8-DPSK, Final Peak, Restricted Band Edges Plot

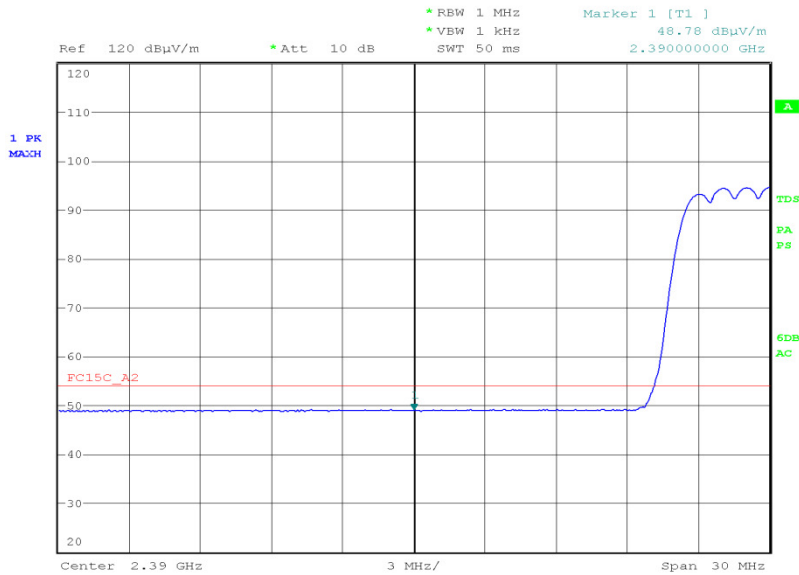


Date: 2.MAR.2016 19:06:14



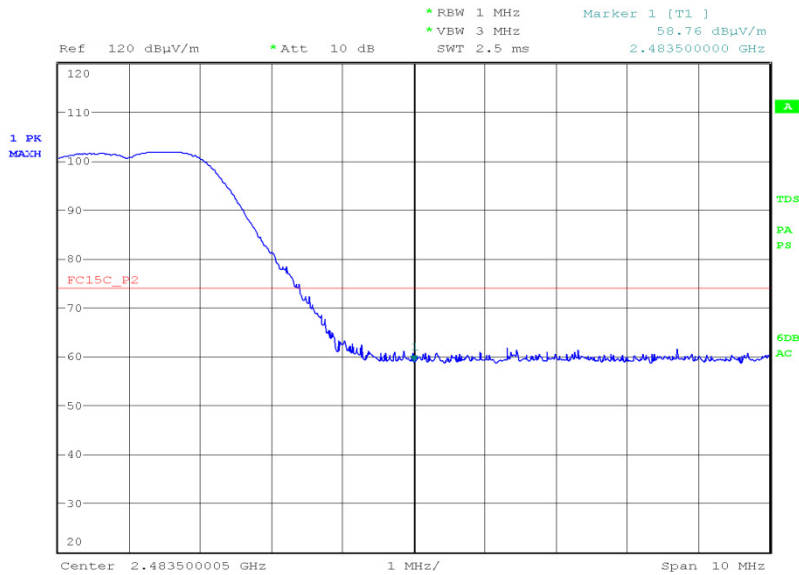
Product Service

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, 8-DPSK, Final Average, Restricted Band Edges Plot



Date: 2.MAR.2016 19:00:42

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, 8-DPSK, Final Peak, Restricted Band Edges Plot

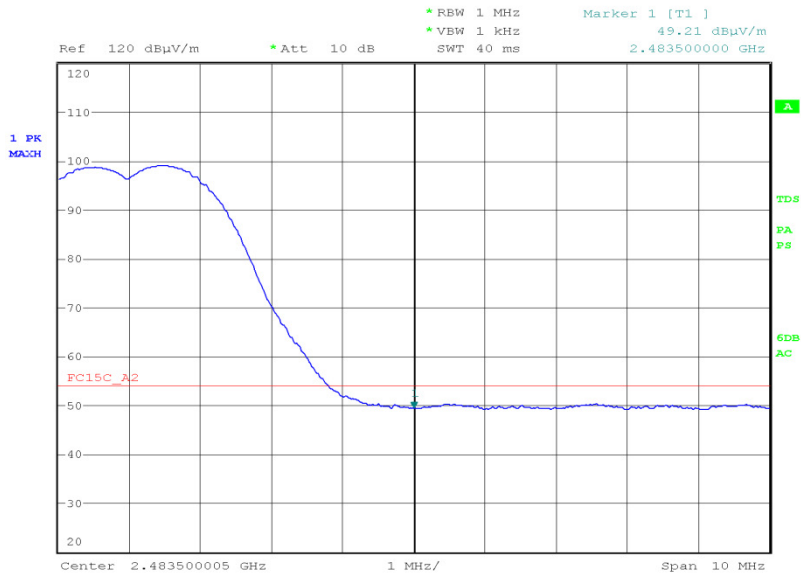


Date: 2.MAR.2016 19:13:29



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, 8-DPSK, Final Average, Restricted Band Edges Plot



Date: 2.MAR.2016 19:14:15



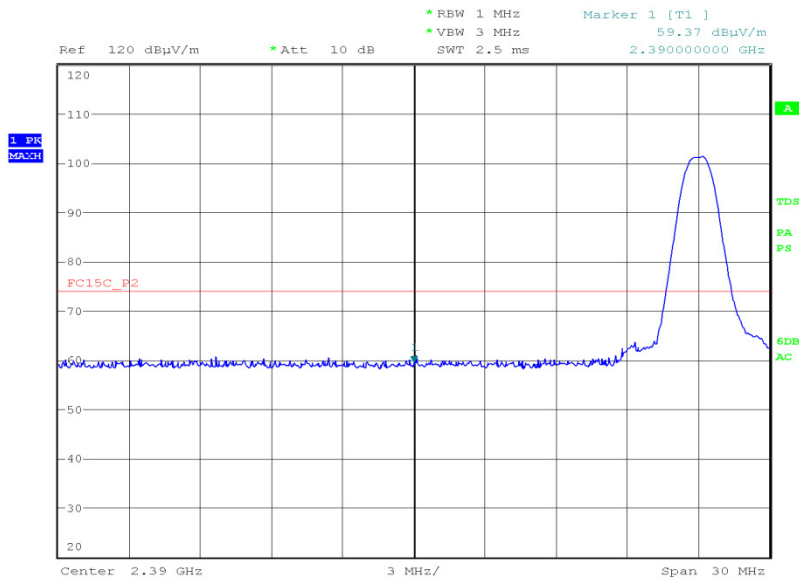
Product Service

Static Mode

Bluetooth, GFSK, Restricted Band Edges Results

| 2402 MHz                    |               | 2480 MHz,                     |               |
|-----------------------------|---------------|-------------------------------|---------------|
| Measured Frequency 2390 MHz |               | Measured Frequency 2483.5 MHz |               |
| dBµV/m                      |               | dBµV/m                        |               |
| Final Peak                  | Final Average | Final Peak                    | Final Average |
| 59.37                       | 47.67         | 59.45                         | 48.02         |

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, GFSK, Final Peak, Restricted Band Edges Plot

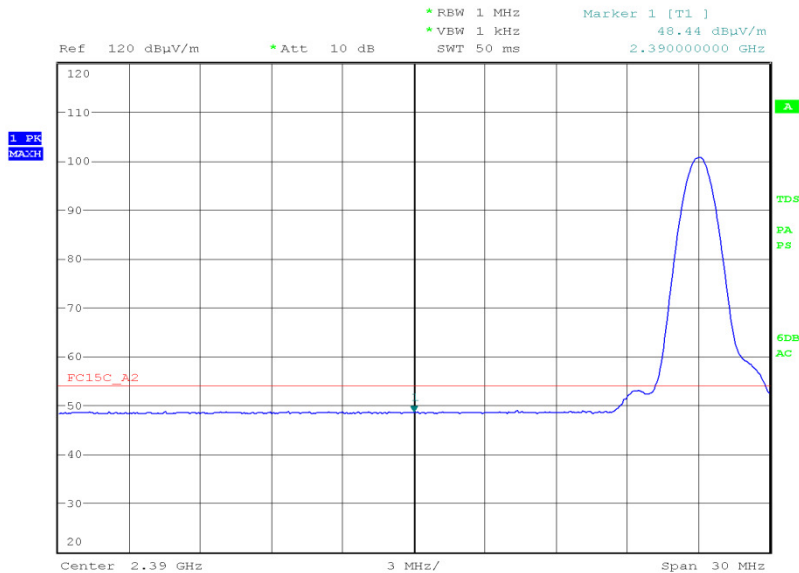


Date: 23.FEB.2016 20:26:11



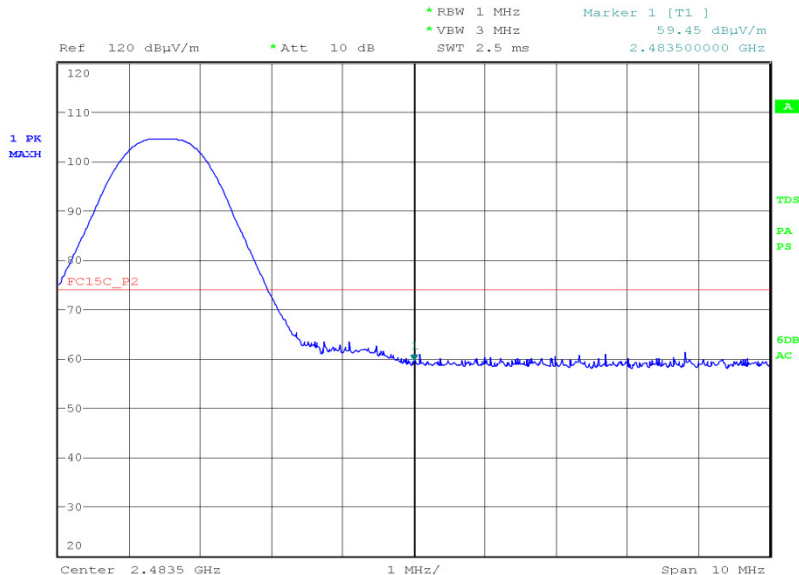
Product Service

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, GFSK, Final Average, Restricted Band Edges Plot



Date: 23.FEB.2016 20:26:43

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, GFSK, Final Peak, Restricted Band Edges Plot



Date: 23.FEB.2016 21:50:11



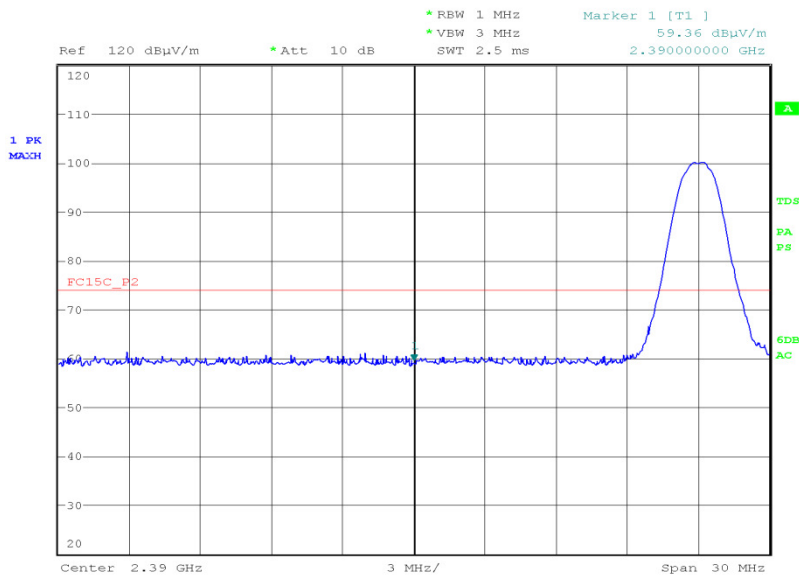


Product Service

Bluetooth, pi/4 DQPSK, Restricted Band Edges Results

| 2402 MHz                    |               | 2480 MHz,                     |               |
|-----------------------------|---------------|-------------------------------|---------------|
| Measured Frequency 2390 MHz |               | Measured Frequency 2483.5 MHz |               |
| dBuV/m                      |               | dBuV/m                        |               |
| Final Peak                  | Final Average | Final Peak                    | Final Average |
| 59.36                       | 47.60         | 59.71                         | 48.44         |

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, pi/4 DQPSK, Final Peak, Restricted Band Edges Plot

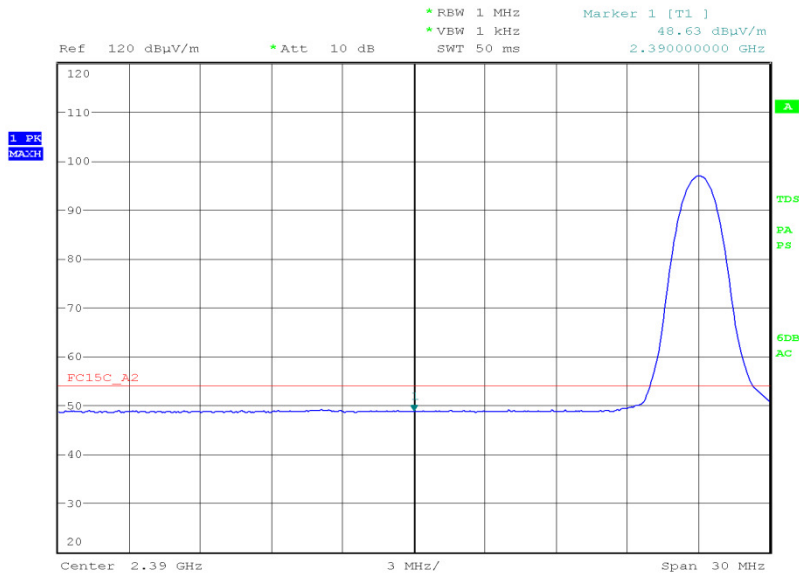


Date: 2.MAR.2016 17:39:21



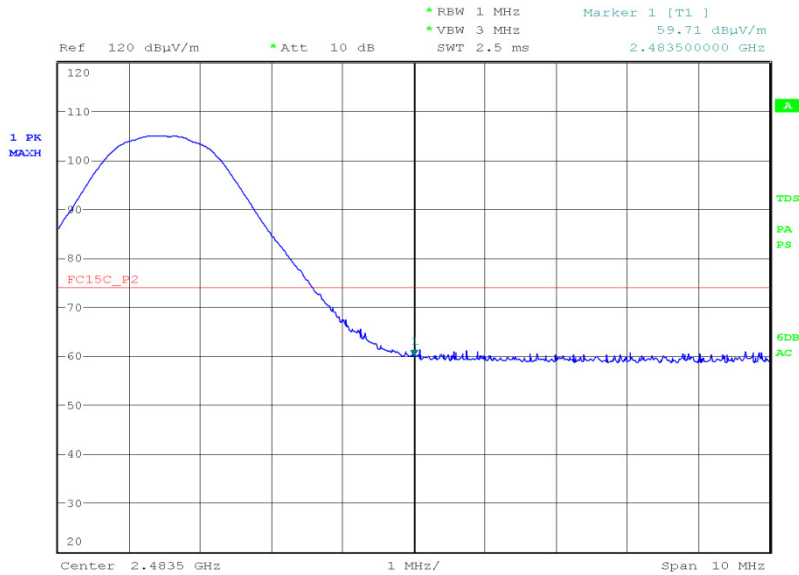
Product Service

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, pi/4 DQPSK, Final Average, Restricted Band Edges Plot



Date: 2.MAR.2016 17:44:12

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, pi/4 DQPSK, Final Peak, Restricted Band Edges Plot

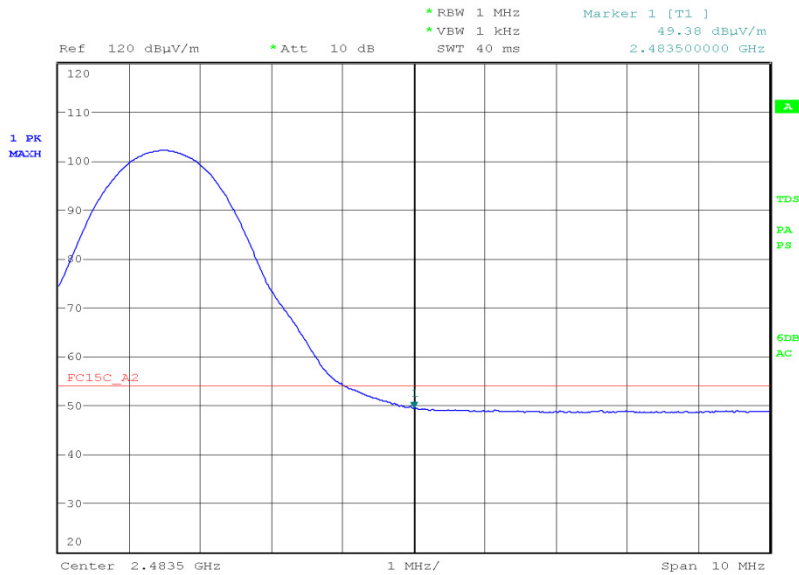


Date: 2.MAR.2016 18:04:10



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, pi/4 DQPSK, Final Average, Restricted Band Edges Plot



Date: 2.MAR.2016 18:04:40

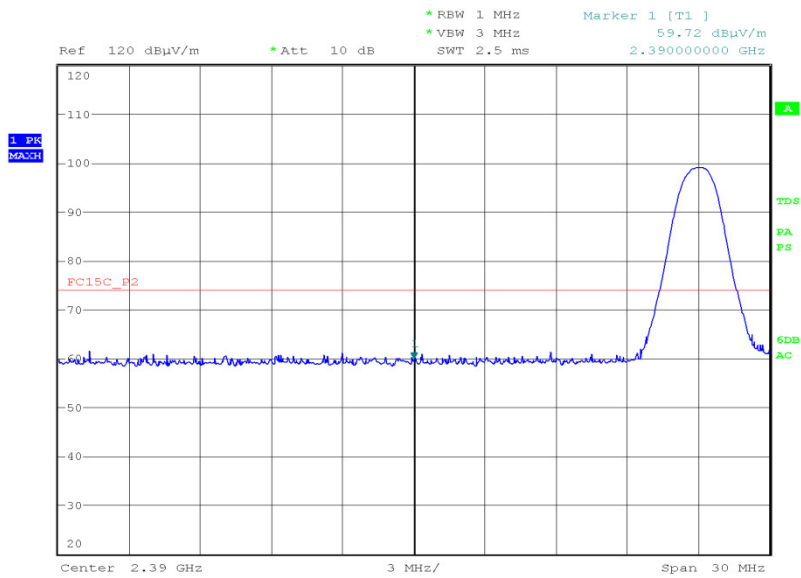


Product Service

Bluetooth, 8-DPSK, Restricted Band Edges Results

| 2402 MHz                    |               | 2480 MHz                      |               |
|-----------------------------|---------------|-------------------------------|---------------|
| Measured Frequency 2390 MHz |               | Measured Frequency 2483.5 MHz |               |
| dBµV/m                      |               | dBµV/m                        |               |
| Final Peak                  | Final Average | Final Peak                    | Final Average |
| 59.72                       | 47.90         | 59.34                         | 48.67         |

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, 8-DPSK, Final Peak, Restricted Band Edges Plot

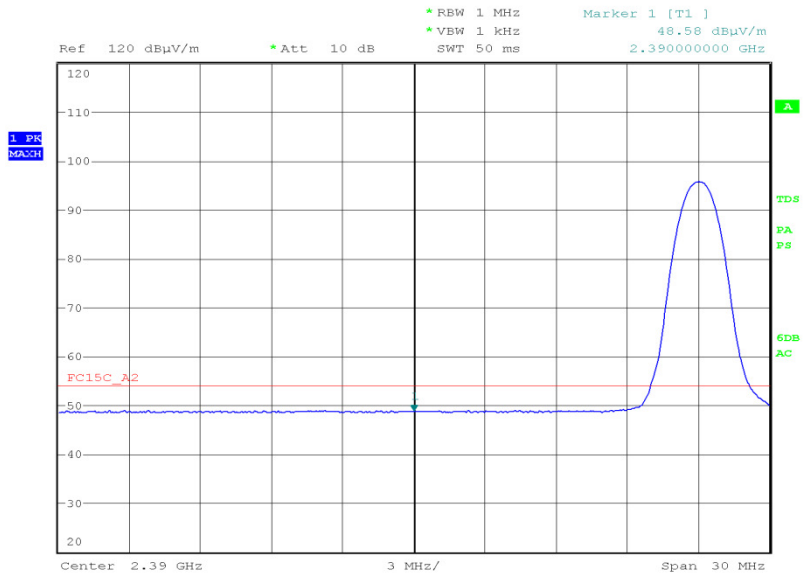


Date: 2.MAR.2016 18:36:22



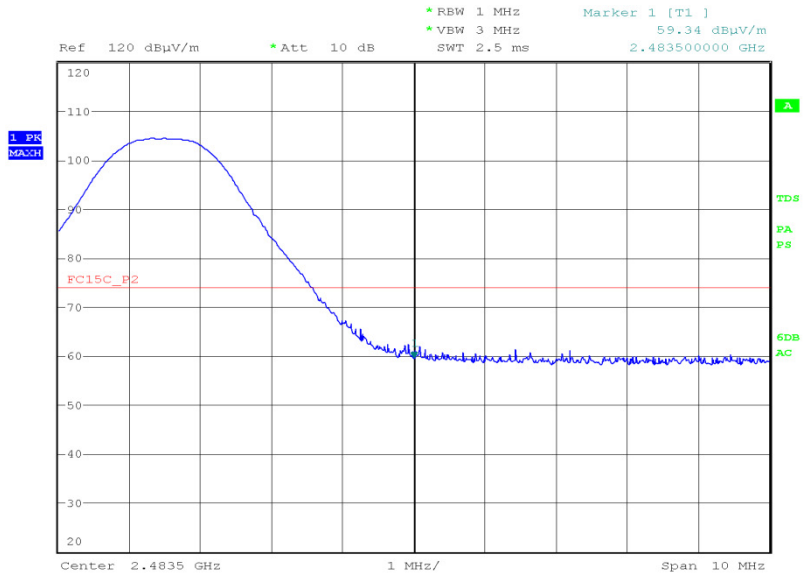
Product Service

Bluetooth, 2402 MHz, Measured Frequency 2390 MHz, 8-DPSK, Final Average, Restricted Band Edges Plot



Date: 2.MAR.2016 18:36:44

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, 8-DPSK, Final Peak, Restricted Band Edges Plot

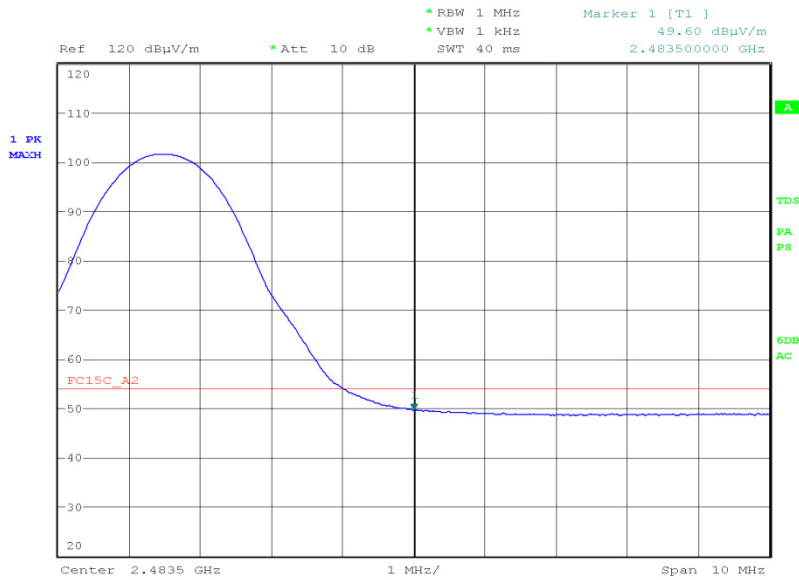


Date: 2.MAR.2016 18:27:22



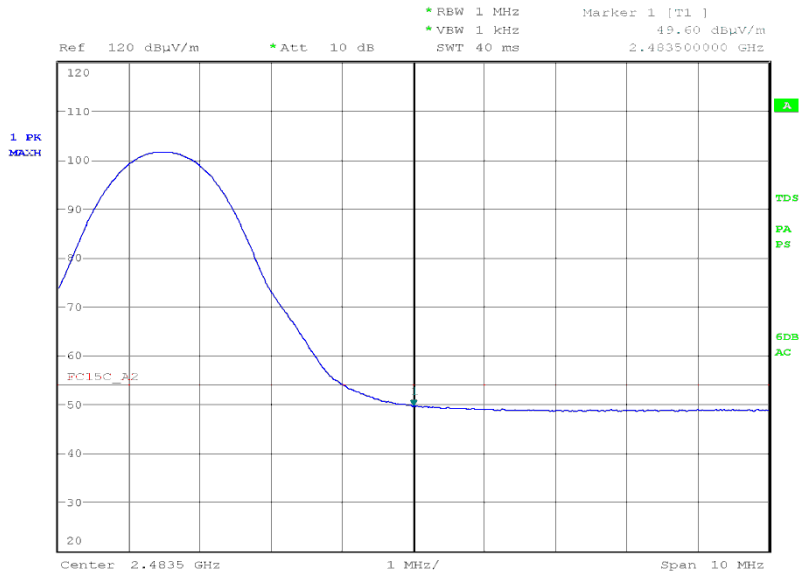
Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.5 MHz, 8-DPSK, Final Average, Restricted Band Edges Plot



Date: 2.MAR.2016 18:26:04

Bluetooth, 2480 MHz, Measured Frequency 960 MHz, GFSK, Final Average, Restricted Band Edges Plot



Date: 2.MAR.2016 18:26:04



### Remarks

Testing was performed on the bottom and top channels using GFSK modulation because this was the modulation which produced the highest level of conducted average power.

Testing was performed on the bottom channel using pi/4 DQPSK modulation because this was the modulation which produced the widest value of 20 dB bandwidth.

Testing was performed on the top channel using 8-DPSK modulation because this was the modulation which produced the widest value of 20 dB bandwidth.

Final average results in the table of results show the final CISPR average result determined from the highest emission recorded within the restricted band as shown by the plots included in this section.

### FCC 47 CFR Part 15, Limit Clause 15.205

|                               | Peak (dB $\mu$ V/m) | Average (dB $\mu$ V/m) |
|-------------------------------|---------------------|------------------------|
| Restricted Bands of Operation | 74                  | 54                     |

### Industry Canada RSS-GEN, Limit Clause 8.10

|                               | Peak (dB $\mu$ V/m) | Average (dB $\mu$ V/m) |
|-------------------------------|---------------------|------------------------|
| Restricted Bands of Operation | 74                  | 54                     |



Product Service

**2.9 AUTHORISED BAND EDGES****2.9.1 Specification Reference**

FCC 47 CFR Part 15C, Clause 15.247 (d)  
RSS-247, Clause 5.5

**2.9.2 Equipment Under Test and Modification State**

PC-010 S/N: Not Serialised (75933714-TSR0007) - Modification State 0

**2.9.3 Date of Test**

23 February 2016 & 2 March 2016

**2.9.4 Test Equipment Used**

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

**2.9.5 Test Procedure**

The test was performed in accordance with ANSI C63.10, clause 6.10.4

**2.9.6 Environmental Conditions**

|                     |               |
|---------------------|---------------|
| Ambient Temperature | 18.4 - 20.6°C |
| Relative Humidity   | 25.0 - 30.0%  |



Product Service

2.9.7 Test Results

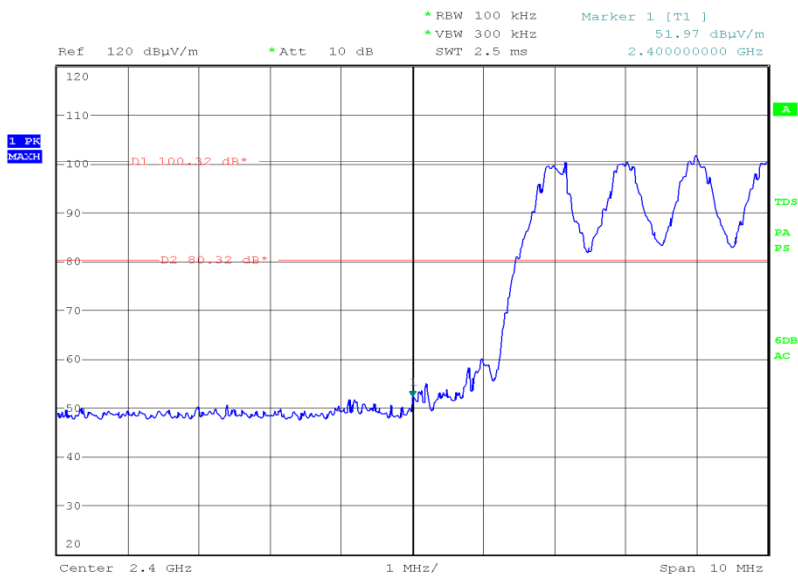
3.7 V DC Supply

Hopping Mode

Bluetooth, GFSK, Authorised Band Edges Results

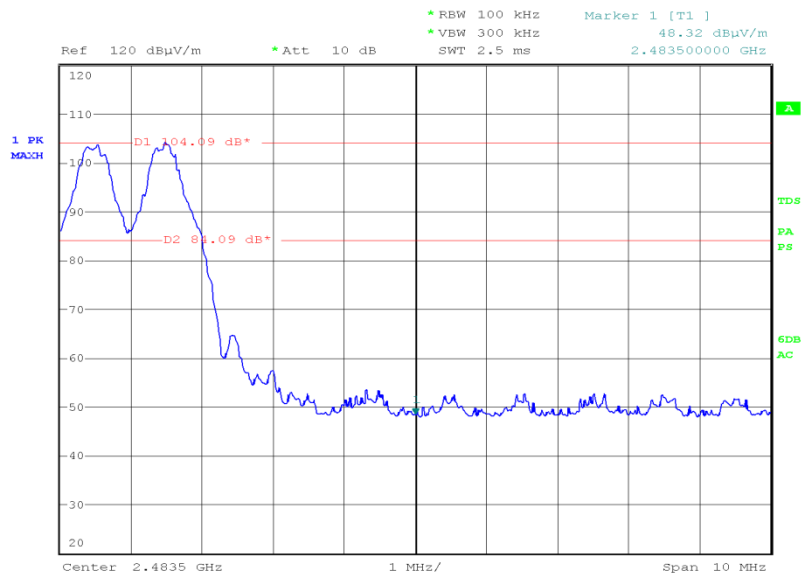
|                                |                                |
|--------------------------------|--------------------------------|
| 2402 MHz                       | 2480 MHz                       |
| Measured Frequency 2400.00 MHz | Measured Frequency 2483.50 MHz |
| dBµV/m                         | dBµV/m                         |
| Final Peak                     | Final Peak                     |
| 51.97                          | 48.32                          |

Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, GFSK, Final Peak, Authorised Band Edges Plot



Date: 23.FEB.2016 22:05:17

Bluetooth, 2480 MHz, Measured Frequency 2483.50 MHz, GFSK, Final Peak, Authorised Band Edges Plot



Date: 23.FEB.2016 22:13:49

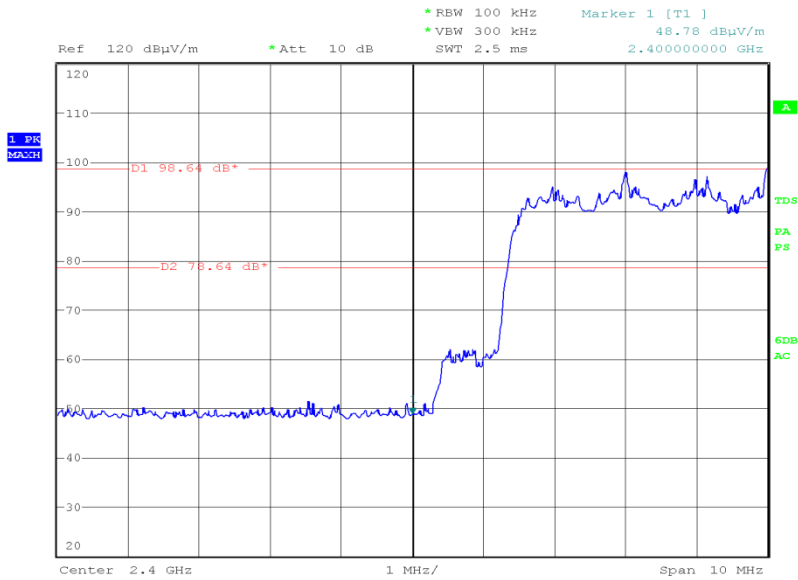


Product Service

Bluetooth, pi/4 DQPSK, Authorised Band Edges Results

|                                |                                |
|--------------------------------|--------------------------------|
| 2402 MHz                       | 2480 MHz                       |
| Measured Frequency 2400.00 MHz | Measured Frequency 2483.50 MHz |
| dBµV/m                         | dBµV/m                         |
| Final Peak                     | Final Peak                     |
| 48.78                          | 48.67                          |

Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, pi/4 DQPSK, Final Peak, Authorised Band Edges Plot

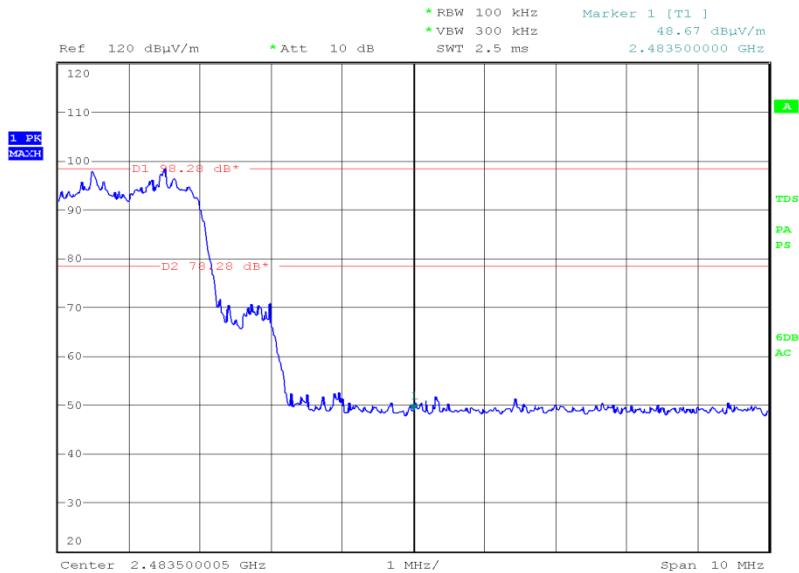


Date: 2.MAR.2016 19:41:46



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.50 MHz, pi/4 DQPSK, Final Peak, Authorised Band Edges Plot



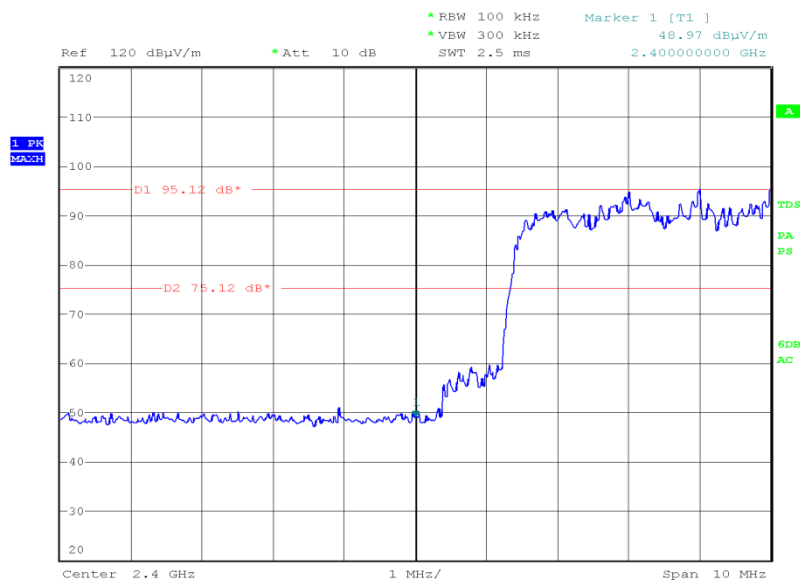
Date: 2.MAR.2016 19:25:39



### Bluetooth, 8-DPSK, Authorised Band Edges Results

|                                |                                |
|--------------------------------|--------------------------------|
| 2402 MHz                       | 2480 MHz                       |
| Measured Frequency 2400.00 MHz | Measured Frequency 2483.50 MHz |
| dB $\mu$ V/m                   | dB $\mu$ V/m                   |
| Final Peak                     | Final Peak                     |
| 48.97                          | 48.06                          |

### Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, 8-DPSK, Final Peak, Authorised Band Edges Plot

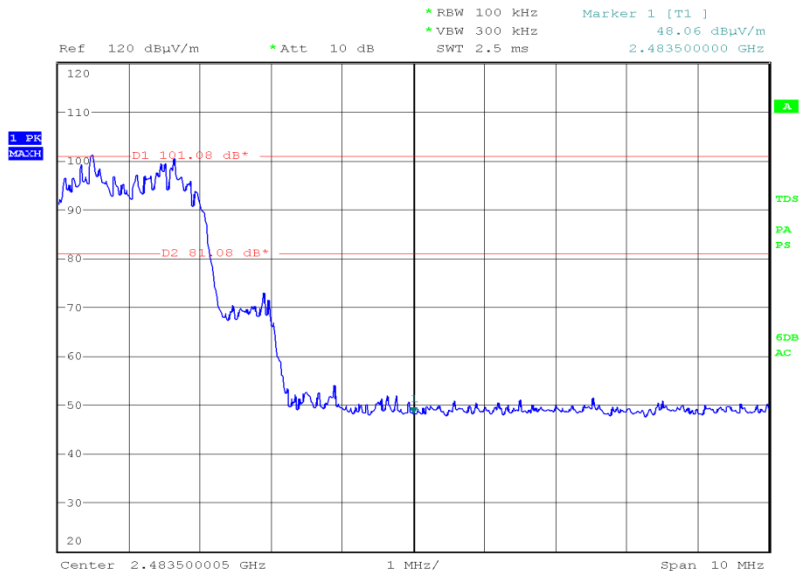


Date: 2.MAR.2016 19:05:33



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.50 MHz, 8-DPSK, Final Peak, Authorised Band Edges Plot



Date: 2.MAR.2016 19:16:20



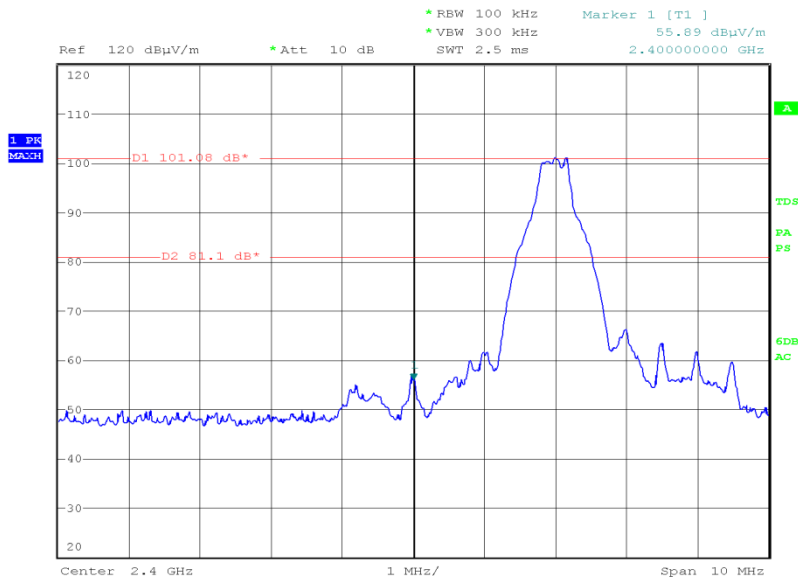
Product Service

Static Mode

Bluetooth, GFSK, Authorised Band Edges Results

|                                |                                |
|--------------------------------|--------------------------------|
| 2402 MHz                       | 2480 MHz                       |
| Measured Frequency 2400.00 MHz | Measured Frequency 2483.50 MHz |
| dBµV/m                         | dBµV/m                         |
| Final Peak                     | Final Peak                     |
| 55.89                          | 47.67                          |

Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, GFSK, Final Peak, Authorised Band Edges Plot

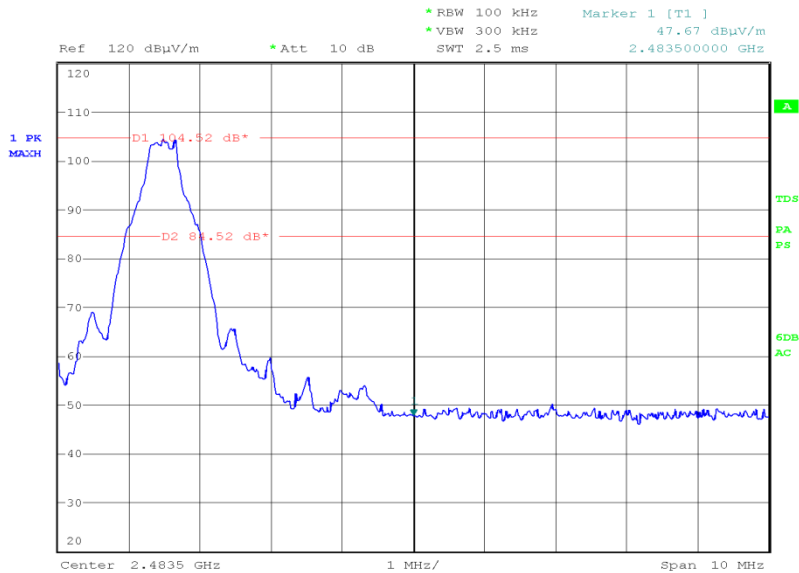


Date: 23.FEB.2016 20:24:08



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.50 MHz, GFSK, Final Peak, Authorised Band Edges Plot



Date: 23.FEB.2016 21:48:50

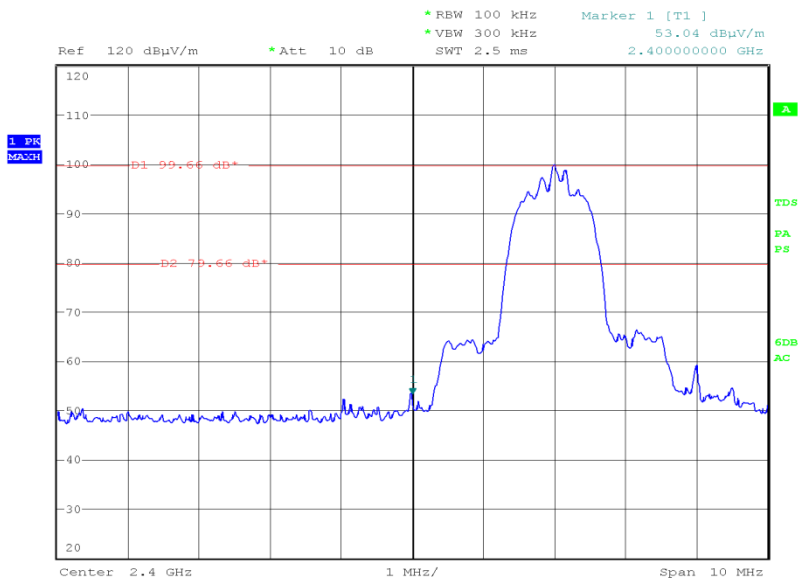


Product Service

Bluetooth, pi/4 DQPSK, Authorised Band Edges Results

|                                |                                |
|--------------------------------|--------------------------------|
| 2402 MHz                       | 2480 MHz                       |
| Measured Frequency 2400.00 MHz | Measured Frequency 2483.50 MHz |
| dBµV/m                         | dBµV/m                         |
| Final Peak                     | Final Peak                     |
| 53.04                          | 50.59                          |

Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, pi/4 DQPSK, Final Peak, Authorised Band Edges Plot

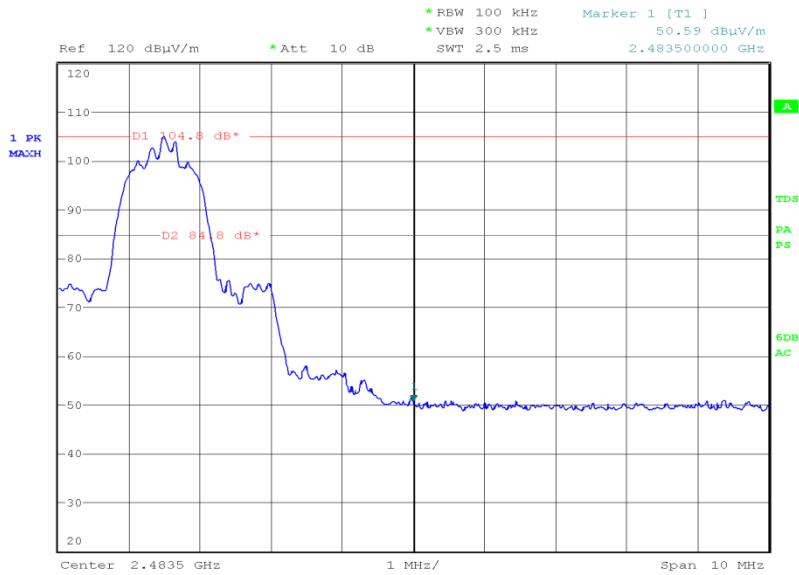


Date: 2.MAR.2016 17:45:23



Product Service

Bluetooth, 2480 MHz, Measured Frequency 2483.50 MHz, pi/4 DQPSK, Final Peak, Authorised Band Edges Plot



Date: 2.MAR.2016 16:03:02

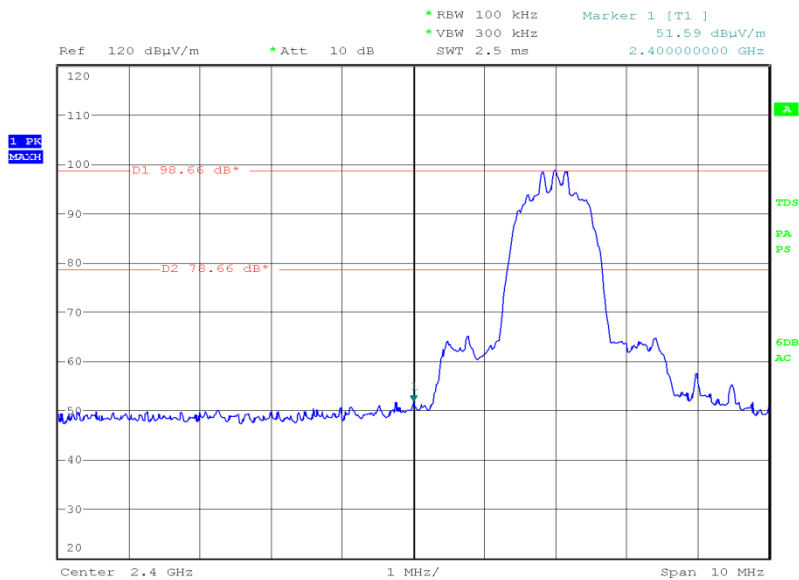


Product Service

Bluetooth, 8-DPSK, Authorised Band Edges Results

|                                |                                |
|--------------------------------|--------------------------------|
| 2402 MHz                       | 2480 MHz                       |
| Measured Frequency 2400.00 MHz | Measured Frequency 2483.50 MHz |
| dBµV/m                         | dBµV/m                         |
| Final Peak                     | Final Peak                     |
| 51.59                          | 49.48                          |

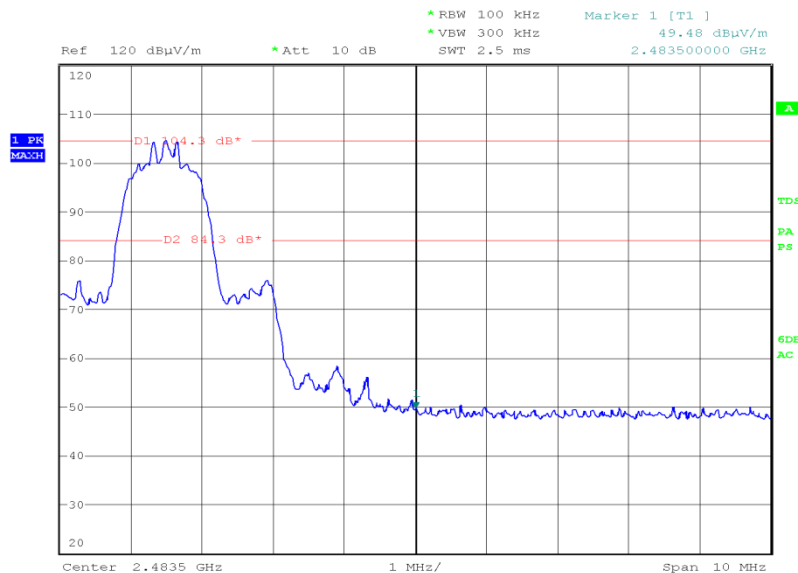
Bluetooth, 2402 MHz, Measured Frequency 2400.00 MHz, 8-DPSK, Final Peak, Authorised Band Edges Plot



Date: 2.MAR.2016 18:35:14



Bluetooth, 2480 MHz, Measured Frequency 2483.50 MHz, 8-DPSK, Final Peak, Authorised Band Edges Plot



Date: 2.MAR.2016 16:28:11

Remark

Testing was performed on the bottom and top channels using GFSK modulation because this was the modulation which produced the highest level of conducted average power.

Testing was performed on the bottom channel using pi/4 DQPSK modulation because this was the modulation which produced the widest value of 20 dB bandwidth.

Testing was performed on the top channel using 8-DPSK modulation because this was the modulation which produced the widest value of 20 dB bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. 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 below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. 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 below the fundamental instead of 20 dB.



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                          | 1-Apr-2016      |
| Screened Room (5)                                                           | Rainford              | Rainford                   | 1545   | 36                          | 20-Dec-2017     |
| Transient Limiter                                                           | Hewlett Packard       | 11947A                     | 2378   | 12                          | 1-Jul-2016      |
| Hygrometer                                                                  | Rotronic              | A1                         | 2677   | 12                          | 11-Jun-2016     |
| EMI Test Receiver                                                           | Rohde & Schwarz       | ESU40                      | 3506   | 12                          | 2-Nov-2016      |
| 7m Armoured RF Cable                                                        | SSI Cable Corp.       | 1501-13-13-7m WA(-)        | 3600   | -                           | TU              |
| <b>Section 2.2 - Frequency Hopping Systems - Channel Separation</b>         |                       |                            |        |                             |                 |
| Rubidium Standard                                                           | Rohde & Schwarz       | XSRM                       | 1316   | 6                           | 4-Mar-2016      |
| Hygrometer                                                                  | Rotronic              | I-1000                     | 3220   | 12                          | 19-Aug-2016     |
| Network Analyser                                                            | Rohde & Schwarz       | ZVA 40                     | 3548   | 12                          | 2-Sep-2016      |
| Calibration Unit                                                            | Rohde & Schwarz       | ZV-Z54                     | 4368   | 12                          | 7-Sep-2016      |
| Frequency Standard                                                          | Spectracom            | Secure Sync 1200-0408-0601 | 4393   | 6                           | 4-Mar-2016      |
| PXA Signal Analyser                                                         | Keysight Technologies | N9030A                     | 4654   | 12                          | 8-Oct-2016      |
| <b>Section 2.3 - Frequency Hopping Systems - Number of Hopping Channels</b> |                       |                            |        |                             |                 |
| Rubidium Standard                                                           | Rohde & Schwarz       | XSRM                       | 1316   | 6                           | 4-Mar-2016      |
| Hygrometer                                                                  | Rotronic              | I-1000                     | 3220   | 12                          | 19-Aug-2016     |
| Network Analyser                                                            | Rohde & Schwarz       | ZVA 40                     | 3548   | 12                          | 2-Sep-2016      |
| Calibration Unit                                                            | Rohde & Schwarz       | ZV-Z54                     | 4368   | 12                          | 7-Sep-2016      |
| Frequency Standard                                                          | Spectracom            | Secure Sync 1200-0408-0601 | 4393   | 6                           | 4-Mar-2016      |
| PXA Signal Analyser                                                         | Keysight Technologies | N9030A                     | 4654   | 12                          | 8-Oct-2016      |
| <b>Section 2.4 - Frequency Hopping Systems - 20 dB Bandwidth</b>            |                       |                            |        |                             |                 |
| Rubidium Standard                                                           | Rohde & Schwarz       | XSRM                       | 1316   | 6                           | 4-Mar-2016      |
| Hygrometer                                                                  | Rotronic              | I-1000                     | 3220   | 12                          | 19-Aug-2016     |
| Network Analyser                                                            | Rohde & Schwarz       | ZVA 40                     | 3548   | 12                          | 2-Sep-2016      |
| Calibration Unit                                                            | Rohde & Schwarz       | ZV-Z54                     | 4368   | 12                          | 7-Sep-2016      |
| Frequency Standard                                                          | Spectracom            | Secure Sync 1200-0408-0601 | 4393   | 6                           | 4-Mar-2016      |
| PXA Signal Analyser                                                         | Keysight Technologies | N9030A                     | 4654   | 12                          | 8-Oct-2016      |
| <b>Section 2.5 - Frequency Hopping Systems - Average Time of Occupancy</b>  |                       |                            |        |                             |                 |
| Rubidium Standard                                                           | Rohde & Schwarz       | XSRM                       | 1316   | 6                           | 4-Mar-2016      |
| Hygrometer                                                                  | Rotronic              | I-1000                     | 3220   | 12                          | 19-Aug-2016     |
| Network Analyser                                                            | Rohde & Schwarz       | ZVA 40                     | 3548   | 12                          | 2-Sep-2016      |
| Calibration Unit                                                            | Rohde & Schwarz       | ZV-Z54                     | 4368   | 12                          | 7-Sep-2016      |
| Frequency Standard                                                          | Spectracom            | Secure Sync 1200-0408-0601 | 4393   | 6                           | 4-Mar-2016      |
| PXA Signal Analyser                                                         | Keysight Technologies | N9030A                     | 4654   | 12                          | 8-Oct-2016      |
| <b>Section 2.6- Maximum Conducted Output Power</b>                          |                       |                            |        |                             |                 |
| Rubidium Standard                                                           | Rohde & Schwarz       | XSRM                       | 1316   | 6                           | 4-Mar-2016      |
| Hygrometer                                                                  | Rotronic              | I-1000                     | 3220   | 12                          | 19-Aug-2016     |
| Network Analyser                                                            | Rohde & Schwarz       | ZVA 40                     | 3548   | 12                          | 2-Sep-2016      |
| Calibration Unit                                                            | Rohde & Schwarz       | ZV-Z54                     | 4368   | 12                          | 7-Sep-2016      |
| Frequency Standard                                                          | Spectracom            | Secure Sync 1200-0408-0601 | 4393   | 6                           | 4-Mar-2016      |
| PXA Signal Analyser                                                         | Keysight Technologies | N9030A                     | 4654   | 12                          | 8-Oct-2016      |



Product Service

| Instrument                                       | Manufacturer             | Type No.               | TE No. | Calibration Period (months) | Calibration Due |
|--------------------------------------------------|--------------------------|------------------------|--------|-----------------------------|-----------------|
| <b>Section 2.7 - Spurious Radiated Emissions</b> |                          |                        |        |                             |                 |
| Antenna (Double Ridge Guide, 1GHz-18GHz)         | EMCO                     | 3115                   | 235    | 12                          | 27-Nov-2016     |
| Attenuator 10dB/25W                              | Weinschel                | 46-10-43               | 400    | 12                          | 18-Jun-2016     |
| Multimeter                                       | Fluke                    | 75 Mk3                 | 455    | 12                          | 10-Sep-2016     |
| Antenna 18-40GHz (Double Ridge Guide)            | Q-Par Angus Ltd          | QSH 180K               | 1511   | 24                          | 27-Nov-2016     |
| Pre-Amplifier                                    | Phase One                | PS04-0086              | 1533   | 12                          | 30-Jul-2016     |
| 18GHz - 40GHz Pre-Amplifier                      | Phase One                | PS04-0087              | 1534   | 12                          | 23-Dec-2016     |
| Screened Room (5)                                | Rainford                 | Rainford               | 1545   | 36                          | 20-Dec-2017     |
| Turntable Controller                             | Inn-Co GmbH              | CO 1000                | 1606   | -                           | TU              |
| Power Supply                                     | Hewlett Packard          | 6104A                  | 1948   | -                           | TU              |
| Cable (2m)                                       | Rosenberger              | FA147A2020002020       | 2195   | 12                          | 19-Aug-2016     |
| Antenna (Bilog)                                  | Chase                    | CBL6143                | 2904   | 24                          | 11-Jun-2017     |
| Hygrometer                                       | Rotronic                 | I-1000                 | 3220   | 12                          | 19-Aug-2016     |
| EMI Test Receiver                                | Rohde & Schwarz          | ESU40                  | 3506   | 12                          | 2-Nov-2016      |
| Signal Analyser                                  | Rohde & Schwarz          | FSQ 26                 | 3545   | 12                          | 19-Aug-2016     |
| 9m RF Cable (N Type)                             | Rhophase                 | NPS-2303-9000-NPS      | 3791   | -                           | TU              |
| Tilt Antenna Mast                                | matur GmbH               | TAM 4.0-P              | 3916   | -                           | TU              |
| Mast Controller                                  | matur GmbH               | NCD                    | 3917   | -                           | TU              |
| 1GHz to 8GHz Low Noise Amplifier                 | Wright Technologies      | APS04-0085             | 4365   | 12                          | 6-Oct-2016      |
| Suspended Substrate Highpass Filter              | Advance Power Components | 11SH10-3000/X18000-O/O | 4412   | 12                          | 24-Mar-2016     |
| Cable (Yellow, Rx, Km-Km 2m)                     | Scott Cables             | KPS-1501-2000-KPS      | 4527   | -                           | TU              |
| <b>Section 2.8 - Restricted Band Edges</b>       |                          |                        |        |                             |                 |
| Antenna (Double Ridge Guide, 1GHz-18GHz)         | EMCO                     | 3115                   | 235    | 12                          | 27-Nov-2016     |
| Screened Room (5)                                | Rainford                 | Rainford               | 1545   | 36                          | 20-Dec-2017     |
| Turntable Controller                             | Inn-Co GmbH              | CO 1000                | 1606   | -                           | TU              |
| Hygrometer                                       | Rotronic                 | A1                     | 2677   | 12                          | 11-Jun-2016     |
| EMI Test Receiver                                | Rohde & Schwarz          | ESU40                  | 3506   | 12                          | 2-Nov-2016      |
| 9m RF Cable (N Type)                             | Rhophase                 | NPS-2303-9000-NPS      | 3791   | -                           | TU              |
| Tilt Antenna Mast                                | matur GmbH               | TAM 4.0-P              | 3916   | -                           | TU              |
| Mast Controller                                  | matur GmbH               | NCD                    | 3917   | -                           | TU              |
| Cable (Yellow, Rx, Km-Km 2m)                     | Scott Cables             | KPS-1501-2000-KPS      | 4527   | -                           | TU              |
| <b>Section 2.9 - Authorised Band Edges</b>       |                          |                        |        |                             |                 |
| Antenna (Double Ridge Guide, 1GHz-18GHz)         | EMCO                     | 3115                   | 235    | 12                          | 27-Nov-2016     |
| Screened Room (5)                                | Rainford                 | Rainford               | 1545   | 36                          | 20-Dec-2017     |
| Turntable Controller                             | Inn-Co GmbH              | CO 1000                | 1606   | -                           | TU              |
| Hygrometer                                       | Rotronic                 | A1                     | 2677   | 12                          | 11-Jun-2016     |
| EMI Test Receiver                                | Rohde & Schwarz          | ESU40                  | 3506   | 12                          | 2-Nov-2016      |
| 9m RF Cable (N Type)                             | Rhophase                 | NPS-2303-9000-NPS      | 3791   | -                           | TU              |
| Tilt Antenna Mast                                | matur GmbH               | TAM 4.0-P              | 3916   | -                           | TU              |
| Mast Controller                                  | matur GmbH               | NCD                    | 3917   | -                           | TU              |
| Cable (Yellow, Rx, Km-Km 2m)                     | Scott Cables             | KPS-1501-2000-KPS      | 4527   | -                           | TU              |

TU – Traceability Unscheduled



### 3.2 MEASUREMENT UNCERTAINTY

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

| Test Discipline                                        | MU                                                                                 |
|--------------------------------------------------------|------------------------------------------------------------------------------------|
| Frequency Hopping Systems - Average Time of Occupancy  | -                                                                                  |
| Frequency Hopping Systems - Channel Separation         | $\pm 16.74$ kHz                                                                    |
| Frequency Hopping Systems - 20 dB Bandwidth            | $\pm 16.74$ kHz                                                                    |
| Maximum Conducted Output Power                         | $\pm 0.70$ dB                                                                      |
| AC Line Conducted Emissions                            | $\pm 3.2$ dB                                                                       |
| Frequency Hopping Systems - Number of Hopping Channels | -                                                                                  |
| Spurious Radiated Emissions                            | 30 MHz to 1 GHz: $\pm 5.1$ dB<br>1 GHz to 40 GHz: $\pm 6.3$ dB                     |
| Authorised Band Edges                                  | Radiated: 30 MHz to 1 GHz: $\pm 5.1$ dB<br>Radiated: 1 GHz to 40 GHz: $\pm 6.3$ dB |
| Restricted Band Edges                                  | 30 MHz to 1 GHz: $\pm 5.1$ dB<br>1 GHz to 40 GHz: $\pm 6.3$ 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.

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

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA  
(Not UKAS Accredited).

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Product Service

## **ANNEX A**

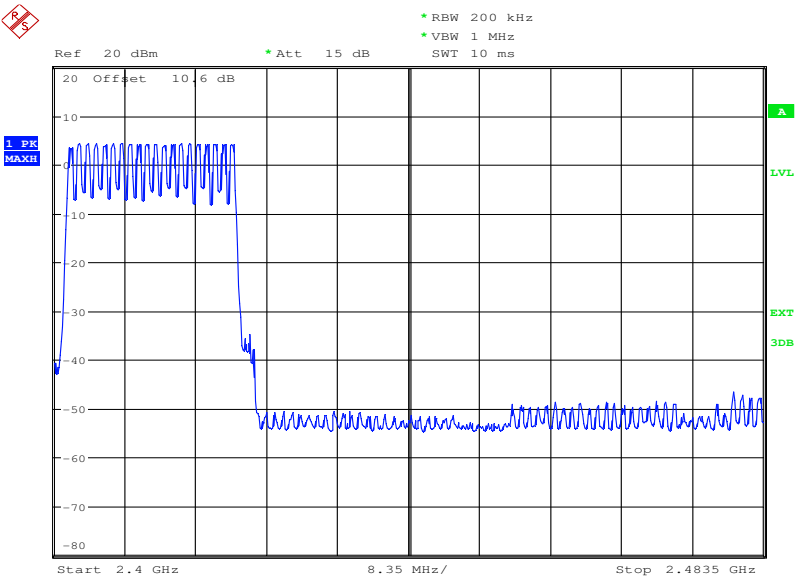
### **DWELL TIME CORRECTION FACTOR DATA**



Product Service

Bluetooth Harmonic Emission Averaging Correction

The EUT was configured with GFSK modulation in Adaptive Frequency Hopping mode (AFH) as this was identified as the modulation scheme resulting in the highest output power and was the modulation scheme used when measuring emissions. The EUT was also configured to hop using the minimum number of hopping frequencies (20) as shown by the plot below.



Date: 9.MAR.2016 10:43:39

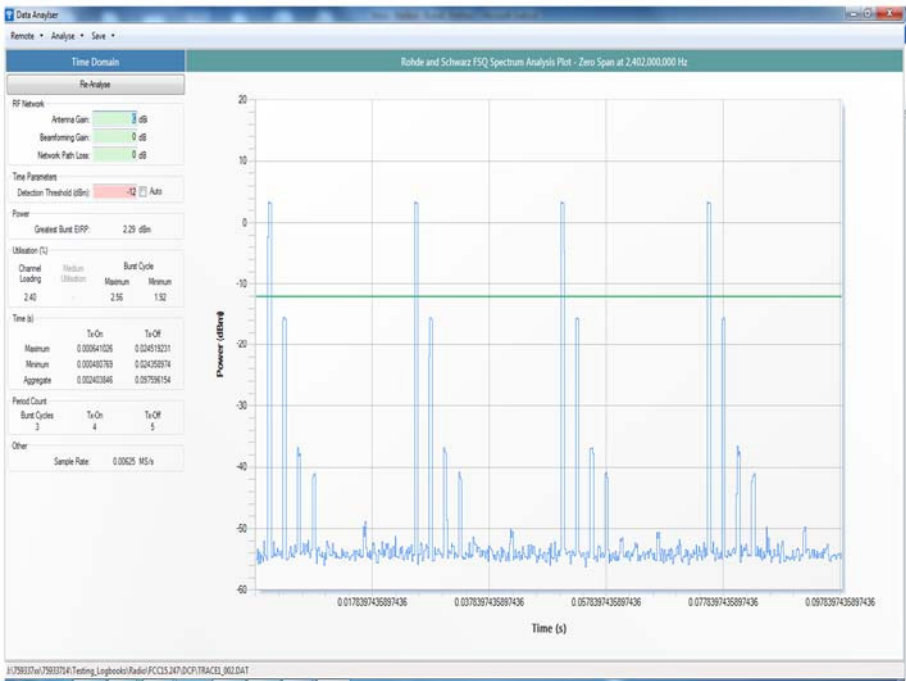
Packet types DH1, DH3 and DH5 were then investigated to determine which packet type resulted in the highest dwell time within a 100 ms period. No other packet types using GFSK modulation were supported by the EUT.

| Packet Type | Accumulated Dwell Time (ms) |
|-------------|-----------------------------|
| DH1         | 2.404                       |
| DH3         | 3.686                       |
| DH5         | 6.250                       |

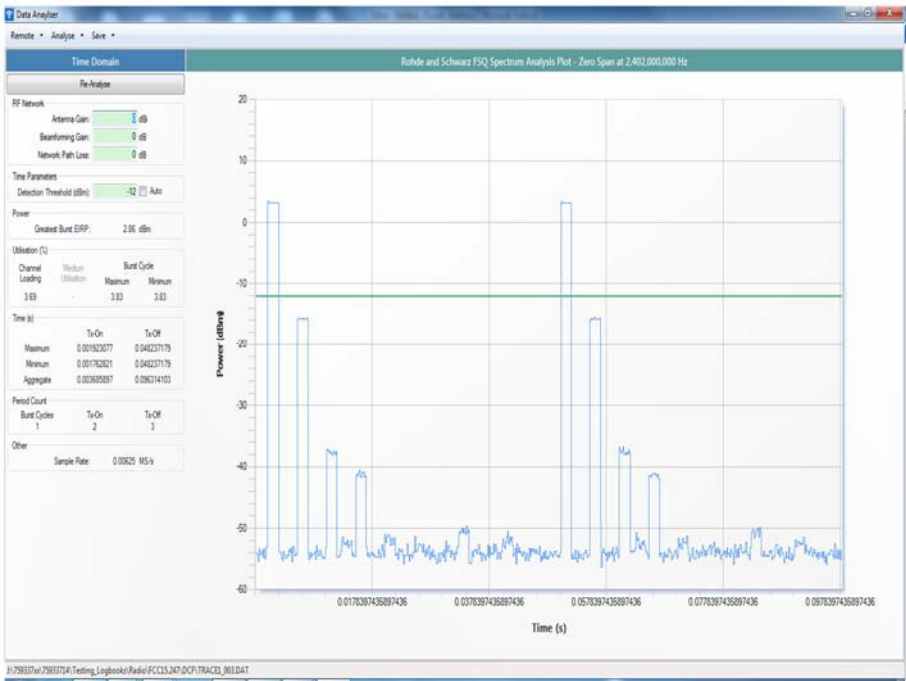


Product Service

Dwell Time – DH1

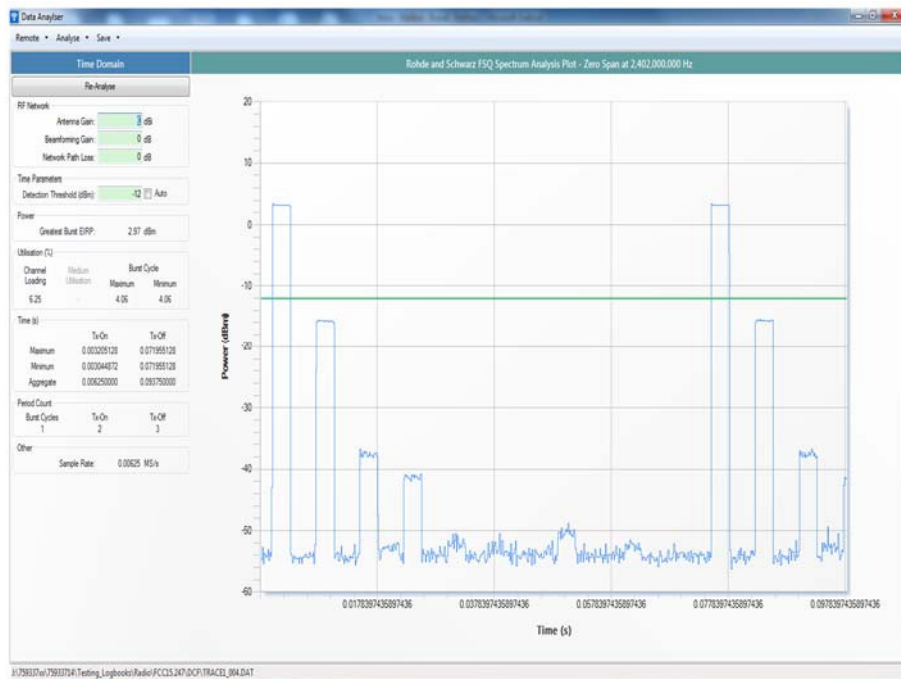


Dwell Time – DH3





Product Service

Dwell Time – DH5

$$\begin{aligned} \text{D.C.F (Duty cycle Correction Factor)} &= 20\log(\text{worst case dwell time ms} / 100 \text{ ms}) \\ &= 20\log(6.25 \text{ ms} / 100 \text{ ms}) = -24.08 \text{ dB} \end{aligned}$$