



# element<sup>®</sup>

## Starkey Laboratories, Inc.

The Dash Pro - Right

FCC 2.1093:2017

10.6 MHz NFMI Radio

Bluetooth Radio

Report # STAK0082.11



NVLAP Lab Code: 200630

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# CERTIFICATE OF EVALUATION



Last Date of Evaluation: April 20, 2017  
Starkey Laboratories, Inc.  
Model: The Dash Pro - Right

## Technical Brief

### Standards

| Specification   | Method  |
|-----------------|---|
| FCC 2.1093:2017 | FCC 447498 D01 General RF Exposure Guidance v06 |

### Results

| Method Clause | Description              | Applied | Results | Comments |
|---------------|--------------------------|---------|---------|----------|
| 4.3.1         | SAR Evaluation Exclusion | Yes     | Pass    |          |

### Deviations From Evaluation Standards

None

### Approved By:

Donald Facteau, Systems Architect

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# RF Exposure Condition



**The following RF Exposure conditions were used for the assessment documented in this report:**

|                                  |   |
|----------------------------------|---|
| Intended Use                     | Portable                                      |
| Location on Body (if applicable) | Head/Torso                                    |
| How is the Device Used           | Right Earphone                                |
| Co-located Radios                | 10.6 MHz FCC 15.209 radio<br>Bluetooth radio  |
| Simultaneous Transmitting Radios | 10.6 MHz FCC 15.209 radio and Bluetooth radio |
| Body Worn Accessories            | N/A   |
| Environment                      | General Population/Uncontrolled Exposure      |

# REVISION HISTORY



| Revision Number | Description | Date | Page Number |
|-----------------|-------------|------|-------------|
| 00              | None        |      |             |

# ACCREDITATIONS AND AUTHORIZATIONS



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## United States

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**FCC** - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

**A2LA** - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Element to certify transmitters to FCC and IC specifications.

**NVLAP** - Each laboratory is accredited by NVLAP to ISO 17025

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## Canada

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**ISED** - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with ISED.

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## European Union

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**European Commission** – Validated by the European Commission as a Notified Body under the R&TTE Directive.

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## Australia/New Zealand

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**ACMA** - Recognized by ACMA as a CAB for the acceptance of test data.

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## Korea

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**MSIP / RRA** - Recognized by KCC's RRA as a CAB for the acceptance of test data.

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## Japan

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**VCCI** - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

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## Taiwan

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**BSMI** – Recognized by BSMI as a CAB for the acceptance of test data.

**NCC** - Recognized by NCC as a CAB for the acceptance of test data.

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## Singapore

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**IDA** – Recognized by IDA as a CAB for the acceptance of test data.

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## Israel

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**MOC** – Recognized by MOC as a CAB for the acceptance of test data.

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## Hong Kong

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**OFCA** – Recognized by OFCA as a CAB for the acceptance of test data.

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## Vietnam

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**MIC** – Recognized by MIC as a CAB for the acceptance of test data.

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## SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://portlandcustomer.element.com/ts/scope/scope.htm>

<http://gsi.nist.gov/global/docs/cabs/designations.html>

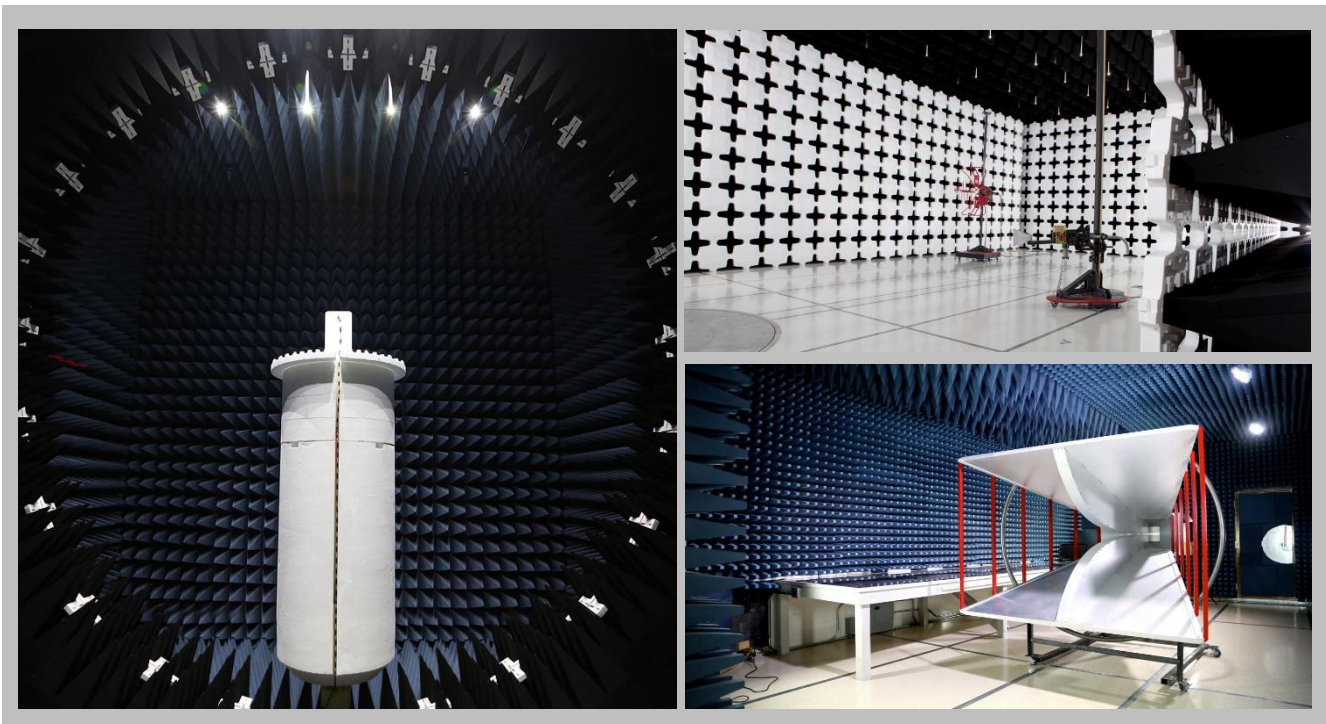
# FACILITIES



2017.3.2



| California   | Minnesota   | New York  | Oregon   | Texas  | Washington   |
|--|---|---|--|--|--|
| Labs OC01-13<br>41 Tesla<br>Irvine, CA 92618<br>(949) 861-8918           | Labs MN01-08, MN10<br>9349 W Broadway Ave.<br>Brooklyn Park, MN 55445<br>(612)-638-5136 | Labs NY01-04<br>4939 Jordan Rd.<br>Elbridge, NY 13060<br>(315) 554-8214 | Labs EV01-12<br>22975 NW Evergreen Pkwy<br>Hillsboro, OR 97124<br>(503) 844-4066 | Labs TX01-09<br>3801 E Plano Pkwy<br>Plano, TX 75074<br>(469) 304-5255 | Labs NC01-05<br>19201 120 <sup>th</sup> Ave NE<br>Bothell, WA 98011<br>(425)984-6600 |
| NVLAP  |   |   |  |  |  |
| NVLAP Lab Code: 200676-0   | NVLAP Lab Code: 200881-0  | NVLAP Lab Code: 200761-0  | NVLAP Lab Code: 200630-0   | NVLAP Lab Code:201049-0  | NVLAP Lab Code: 200629-0   |
| Innovation, Science and Economic Development Canada                      |   |   |  |  |  |
| 2834B-1, 2834B-3   | 2834E-1   | N/A   | 2834D-1, 2834D-2   | 2834G-1  | 2834F-1  |
| BSMI   |   |   |  |  |  |
| SL2-IN-E-1154R   | SL2-IN-E-1152R  | N/A   | SL2-IN-E-1017  | SL2-IN-E-1158R   | SL2-IN-E-1153R   |
| VCCI   |   |   |  |  |  |
| A-0029   | A-0109  | N/A   | A-0108   | A-0201   | A-0110   |
| Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA |   |   |  |  |  |
| US0158   | US0175  | N/A   | US0017   | US0191   | US0157   |



# PRODUCT DESCRIPTION



## Client and Equipment Under Evaluation Information

|                                 |                            |
|---------------------------------|----------------------------|
| <b>Company Name:</b>            | Starkey Laboratories, Inc. |
| <b>Address:</b>                 | 6600 Washington Ave. SO.   |
| <b>City, State, Zip:</b>        | Eden Prairie, MN 55344     |
| <b>Evaluation Requested By:</b> | Bill Mitchell              |
| <b>Model:</b>                   | The Dash Pro - Right       |
| <b>Date of Evaluation:</b>      | April 20, 2017             |

## Information Provided by the Party Requesting the Evaluation

### Functional Description of the Equipment:

Right Earphone containing both a 10.6 MHz FCC 15.209 radio and a 2.4 GHz Bluetooth radio utilizing both Bluetooth Classic (BR/EDR) and Bluetooth Low Energy.

### Objective:

To demonstrate compliance with FCC RF exposure requirements for 2.1093 portable devices.

# SAR TEST EXCLUSION



## OVERVIEW

Human exposure to RF emissions from portable devices (47 CFR §2.1093) used with the radiating antenna closer than 20 cm to the user requires Specific Absorption Rate (SAR) to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation.

## COMPLIANCE WITH FCC 2.1093

*“Portable devices that operate in the Cellular Radiotelephone Service pursuant to part 22 of this chapter; the Personal Communications Service (PCS) pursuant to part 24 of this chapter; the Satellite Communications Services pursuant to part 25 of this chapter; the Miscellaneous Wireless Communications Services pursuant to part 27 of this chapter; the Maritime Services (ship earth station devices only) pursuant to part 80 of this chapter; the Specialized Mobile Radio Service, the 4.9 GHz Band Service, and the 3650 MHz Wireless Broadband Service pursuant to part 90 of this chapter; the Wireless Medical Telemetry Service (WMTS) and the Medical Device Radiocommunication Service (MedRadio), pursuant to subparts H and I of part 95 of this chapter, respectively, unlicensed personal communication service, unlicensed NII devices and millimeter wave devices authorized under §§15.253(f), 15.255(g), 15.257(g), 15.319(i), and 15.407(f) of this chapter; and the Citizens Broadband Radio Service pursuant to part 96 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use. All other portable transmitting devices are categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, except as specified in §§1.1307(c) and 1.1307(d) of this chapter. Applications for equipment authorization of portable transmitting devices subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in paragraph (d) of this section. Technical information showing the basis for this statement must be submitted to the Commission upon request.”*

**The EUT will be used with a separation distance of less than 20 centimeters between the radiating antenna and the body of the user or nearby persons and must therefore be considered a portable transmitter per 47 CFR 2.1093(b).**

## COMPLIANCE WITH FCC KDB 447498 D01 General RF Exposure Guidance v06

“KDB 447498 D01 General RF Exposure Guidance v06” provides the procedures, requirements, and authorization policies for mobile and portable devices.

Standalone radio SAR test exclusion is covered under section 4.3.1. Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Thresholds are met as shown in the Limits section below.

Simultaneous transmission SAR test exclusion is covered under section 4.3.2. SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneously transmitting antenna. When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration.



# SAR TEST EXCLUSION



EXRPT.2017.03.16

## LIMITS

### Limits for General Population /Uncontrolled Exposure: 47 CFR 1.1310 (c)

The SAR limits for general population/uncontrolled exposure are 0.08 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 1.6 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit is 4 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 30 minutes to determine compliance with general population/uncontrolled SAR limits.

For 100 MHz to 6 GHz and test separation distances  $\leq 50$  mm, the SAR test exclusion thresholds are 1-g for head and body SAR and 10-g SAR for extremity SAR.

## ASSESSMENT

For 100 MHz to 6 GHz and test separation distances  $\leq 50$  mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [f(\text{GHz})] = 3.0$   
for 1-g SAR and  $= 7.5$  for 10-g extremity SAR,  
where

- $f(\text{GHz})$  is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step b below

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm according to 4.1f) is applied to determine SAR test exclusion.

The SAR Test Exclusion Threshold is summarized in the following table:

| Radio | Transmit Frequency (MHz) | Measured Conducted Output Power (mW) | Duty Cycle | Minimum Separation Distance (mm) | Exclusion Threshold | Limit | Compliant |
|-------|--------------------------|--------------------------------------|------------|----------------------------------|---------------------|-------|-----------|
| BT    | 2480                     | 7.055                                | 0.167      | 5                                | 0.371               | 3.0   | Yes       |

Values for the measured radiated and conducted output powers, and the antenna gains were obtained from:

Report No. STAK0082.1 and antenna info



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May 9, 2017

Certification and Engineering Bureau  
Innovation, Science and Economic Development Canada  
3701 Carling Avenue (Building 94)  
Ottawa, Ontario, K2H 8S2

Model Name: The Dash Pro, Model B1002-S Right  
IC #: 6903A-2AF5TB1002R

To whom it may concern,

We attest that the minimum spacing between the antenna of The Dash Pro Right and the body is 5 mm.

We further attest that the maximum duty cycle of the 2.4 to 2.483 GHz Bluetooth radio in this product is defined by version 4.1 of the Bluetooth Core Specification and that **the worst case duty cycle is 16.7%**.

During SCO, the phone transmits a packet, which the Dash receives. The Dash then transmits a packet (microphone audio) to send to the phone. For Classic Basic Rate Bluetooth operation (1 Mb/s modulation), that means the duty cycle is 1 in 6 (16.7%). This is rarely used as all modern phones support EDR (BT 2.1) onwards. So the Dash negotiates to eSCO packets (2eV3), and these transmit for half the duration of the slot, meaning the duty cycles is actually, for the most part, 1 in 12 (8.3%). However, with 2eV3, there is an opportunity to retransmit a lost packet, in which case, under interference conditions, the radio could revert to as much as 1 in 6 (16.7%) duty cycle.

In A2DP, the phone is doing most of the transmissions, possibly up to 50% duty cycle (1 in 2), if using all 3 basic rate slots, but again, EDR is negotiated and this results, for the phone, more like a 1 in 4 (25%) duty cycle. One would think the same must be true for the Dash, but since there is no Microphone data during A2DP (music), it is simply acknowledging the packets it receives. These ACK packets, known as POLL or NULL packets, are much shorter in duration (as they only contain Header and CRC, no payload), and so the Dash in A2DP mode has duty cycles less than 1 in 12 (8.3%).

So, the worst case for Dash Pro, with Basic Rate SCO, is a 1 in 6 (16.7%) duty cycle, using a Bluetooth 1.0 device. Typically, with almost all devices today that are Bluetooth version 2.1 or later, the duty cycle will be typically 1 in 12 (8.3%), worst case 1 in 6 (16.7%).

Assuming only the duty cycle is lowered, Element Material Technologies has worked out that the threshold for the maximum duty cycle to meet the thresholds in RSS-102 is 56%. Since our worst case duty cycle is 16.7%, please include this duty cycle attestation in a revised RF exposure report.

Sincerely,

A handwritten signature in black ink that reads "William J. Mitchell". The signature is written in a cursive, flowing style.

William J. Mitchell, PE  
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