

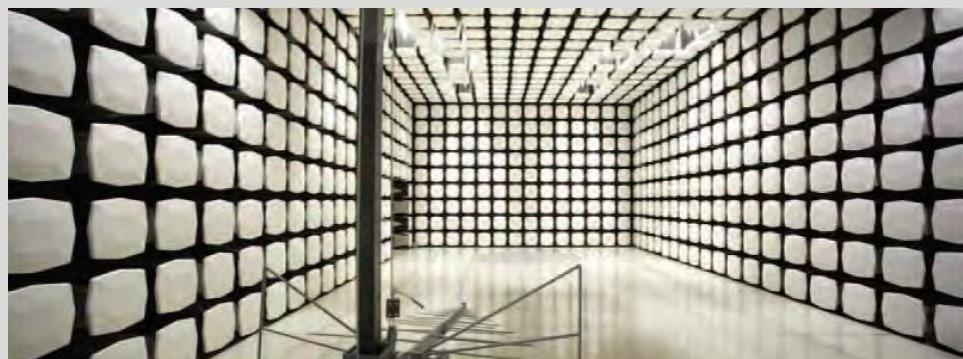
NORTHWEST EMC

LightSPEED Technologies, Inc.

Flexcat Remote

FCC 2.1091:2016

Report # LITS0026.1



NVLAP®

NVLAP Lab Code: 200630-0

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CERTIFICATE OF EVALUATION

Last Date of Evaluation: February 22, 2016
LightSPEED Technologies, Inc.
Model: Flexcat Remote

Radio Equipment Evaluation

Standards

| Specification | Method |
|-----------------|---|
| FCC 2.1093:2016 | FCC 447498 D01 General RF Exposure Guidance v06 |

Results

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

Deviations From Test Standards

None

Approved By:



Donald Facteau, IT Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information.

REVISION HISTORY

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

ACCREDITATIONS AND AUTHORIZATIONS

United States

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 Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission - Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

Australia/New Zealand

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

Korea

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

Japan

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

Taiwan

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.

Singapore

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

Israel

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

Hong Kong

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

Vietnam

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

SCOPE

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

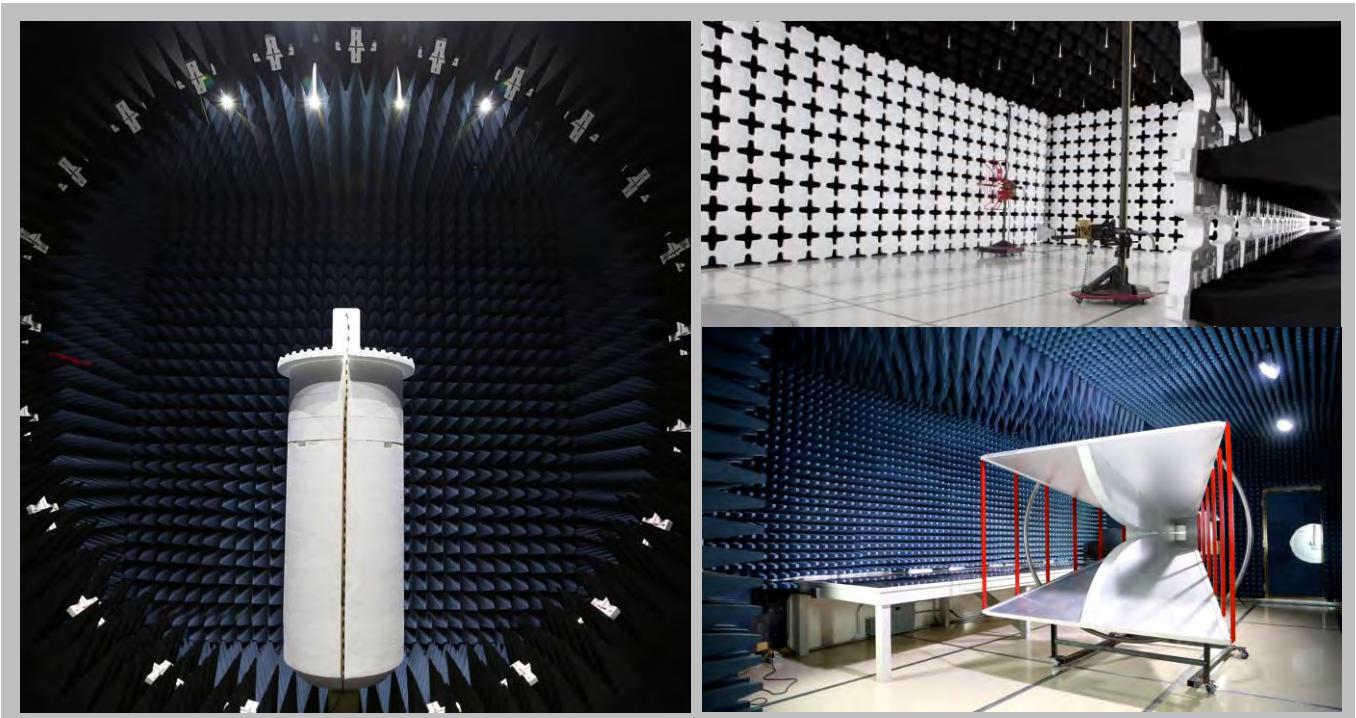
<http://www.nwemc.com/accreditations/>

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

FACILITIES



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| 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 |
| Industry 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(EUT) Information

| | |
|---------------------------------|-------------------------------|
| Company Name: | LightSPEED Technologies, Inc. |
| Address: | 11509 SW Herman Road |
| City, State, Zip: | Tualatin, OR 97062 |
| Evaluation Requested By: | Dave Jordahl |
| Model: | Flexcat Remote |
| Date of Evaluation: | February 22, 2016 |

Information Provided by the Party Requesting the Evaluation

Functional Description of the EUT:

Remote control/bridge that sends control signals to the base unit thru Zigbee RF4CE interface. BLE devices can be connected thru this remote as well. The remote receives the command from BLE and retransmits via Zigbee RF4CE to the base unit. The radios are co-located and can transmit simultaneously.

Objective:

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

SAR TEST EXCLUSION

OVERVIEW

SAR testing is not required when the applicable SAR Test Exclusion Threshold conditions are satisfied.

The device is excluded from SAR evaluation and therefore deemed compliant with FCC RF exposure requirements as described below:

COMPLIANCE WITH FCC KDB 447498 D01 General RF Exposure Guidance v06, Section 4.3.1

KDB 447498 D01 General RF Exposure Guidance v06, Section 4.3.1(a)

"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:

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

- *f(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."

METHOD OF EVALUATION – STANDALONE CONFIGURATION

The standalone SAR Test Exclusion Threshold for each radio is summarized in the following table.

The result of the calculation is well below the exclusion threshold of 3.0, therefore the unit is excluded from SAR evaluation and deemed compliant with FCC RF exposure requirements.

| Radio | Transmit Frequency (GHz) | Test Separation (mm) | Output Power (mW) | Duty Cycle | Exclusion Threshold | Specification |
|--------|--------------------------|----------------------|-------------------|------------|---------------------|---------------|
| BLE | 2.402 | 5 | 2.656 | 1 | .8233 | \leq 3.0 |
| Zigbee | 2.425 | 5 | 0.7325 | 1 | .2281 | \leq 3.0 |

SAR TEST EXCLUSION

METHOD OF EVALUATION – SIMULTANEOUS TRANSMISSION CONFIGURATION

KDB 447498 D01 General RF Exposure Guidance v06, Section 4.3.2(b)

“When an antenna qualifies for the standalone SAR test exclusion of 4.3.1 and also transmits simultaneously with other antennas, the standalone SAR value must be estimated according to the following to determine the simultaneous transmission SAR test exclusion criteria:

- 1) $[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz}/x)}] \text{ W/kg, for test separation distances} \leq 50\text{mm};$
where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.
- 2) $0.4 \text{ W/kg for 1-g SAR and } 1.0 \text{ W/kg for 10-g SAR, when the test separation distance is} > 50 \text{ mm.}$

This SAR estimation formula has been considered in conjunction with the SAR Test Exclusion Thresholds to result in substantially conservative SAR values of = 0.4 W/kg. When SAR is estimated, the peak SAR location is assumed to be at the feed-point or geometric center of the antenna, whichever provides a smaller antenna separation distance, and this location must be clearly identified in test reports. The estimated SAR is used only to determine simultaneous transmission SAR test exclusion; it should not be reported as the standalone SAR. When SAR is estimated, it must be applied to determine the sum of 1-g SAR test exclusion. When SAR to peak location separation ratio test exclusion is applied, the highest reported SAR for simultaneous transmission can be an estimated standalone SAR if the estimated SAR is the highest among the simultaneously transmitting antennas (see also KDB Publication 690783 D01). For situations where the estimated SAR is overly conservative for certain conditions, the test lab may choose to perform standalone SAR measurements, then use the measured SAR to determine simultaneous transmission SAR test exclusion. Estimated SAR values at selected frequencies, distances, and power levels are illustrated in Appendix D.

In the table below, the estimated stand-alone SAR for each radio has been estimated. The estimated values have been summed and compared to the SAR limit. The result of the calculation is well below the limit therefore the unit is excluded from simultaneous SAR evaluation and deemed compliant with FCC RF exposure requirements.

| Radio | Transmit Frequency (GHz) | Test Separation (mm) | Output Power (mW) | Duty Cycle | Estimated Standalone SAR (W/kg) | Specification (W/kg) |
|--------|--------------------------|----------------------|-------------------|------------|---------------------------------|----------------------|
| BLE | 2.402 | 5 | 2.656 | 1 | 0.1098 | 1.6 |
| Zigbee | 2.425 | 5 | 0.7325 | 1 | 0.0304 | 1.6 |

| Estimated Summed SAR (W/kg) | Specification (W/kg) |
|-----------------------------|----------------------|
| 0.1402 | 1.6 |