

# NORTHWEST EMC

**LightSPEED Technologies, Inc.**

**Flexcat Remote**

**FCC 2.1091:2016**

**Report # LITS0026.1**



NVLAP Lab Code: 200630-0

*This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America. This Report may only be duplicated in its entirety*

# 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

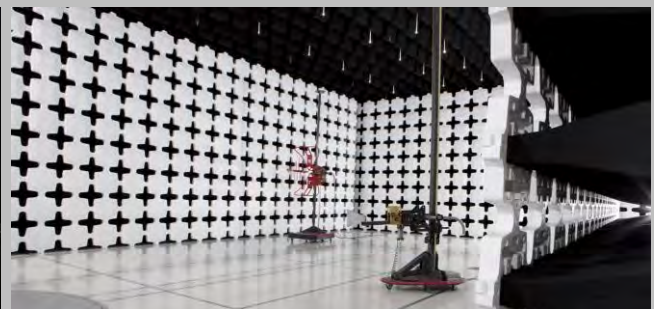
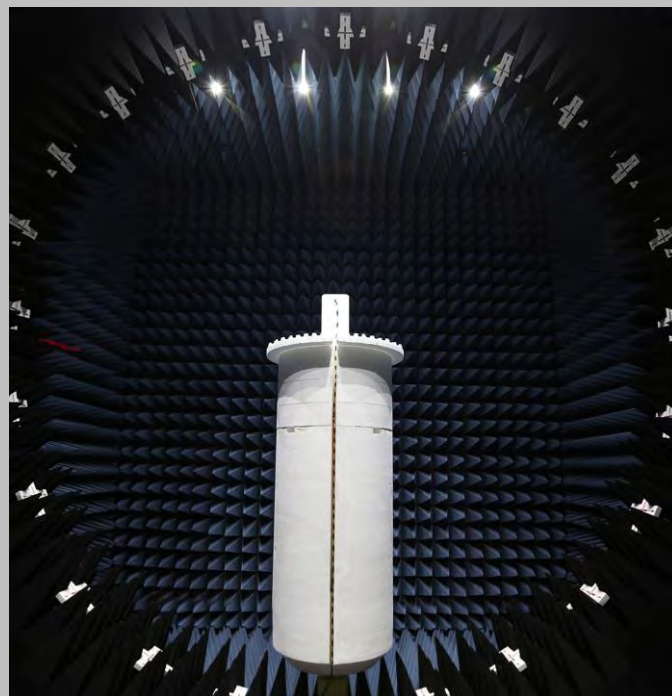
For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>  
<http://gsi.nist.gov/global/docs/cabs/designations.html>

# FACILITIES



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



# PRODUCT DESCRIPTION

## Client and Equipment Under Evaluation(EUT) Information

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

## Information Provided by the Party Requesting the Evaluation

<b>Functional Description of the EUT:</b>
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.
<b>Objective:</b>
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:*

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

## 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)  $\frac{[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})]}{[f(\text{GHz}/x)] \text{ W/kg}}$ , 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  $= 0.4 \text{ W/kg}$ . 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