NORTHWEST EMC

LightSPEED Technologies, Inc.

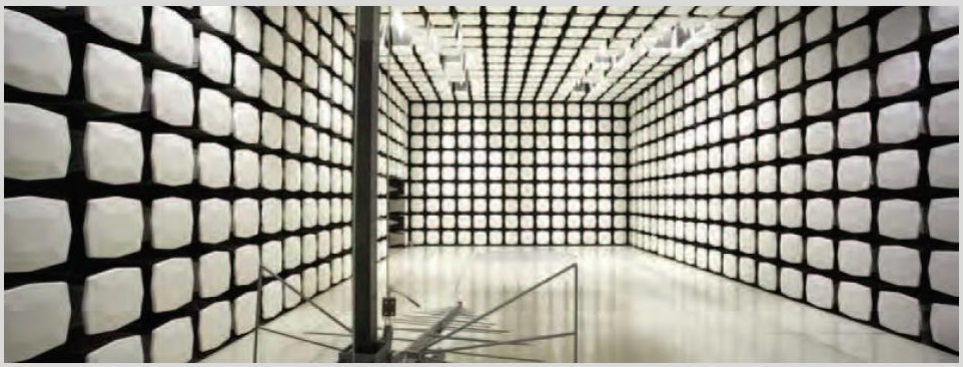
Flexcat Remote

FCC 15.207:2016

FCC 15.247:2016

2.4 GHz DTS Radio

Report # LITS0026.9



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 TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: February 04, 2016
LightSPEED Technologies, Inc.
Model: Flexcat Remote

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2015	ANSI C63.10:2013
FCC 15.247:2016	

Results

Method Clause	Test Description	Applied	Results	Comments
3(b)	Duty Cycle	Yes	N/A	Characterization of radio
3(b)	Power Spectral Density	Yes	Pass	
6.6	Occupied Bandwidth	Yes	Pass	
6.12	Output Power	Yes	Pass	
6.13	Band Edge Compliance	Yes	Pass	
6.13	Spurious Conducted Emissions	Yes	Pass	
6.13	Spurious Radiated Emissions	Yes	Pass	
8.8	AC – Powerline Conducted Emissions	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Kyle Holgate, Operations 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.

REVISION HISTORY

NORTHWEST EMC
REV 2014.10.14

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

NORTHWEST EMC
REV 2015.2.19

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

MEASUREMENT UNCERTAINTY

TMU.2015.07.10

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is on each data sheet. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

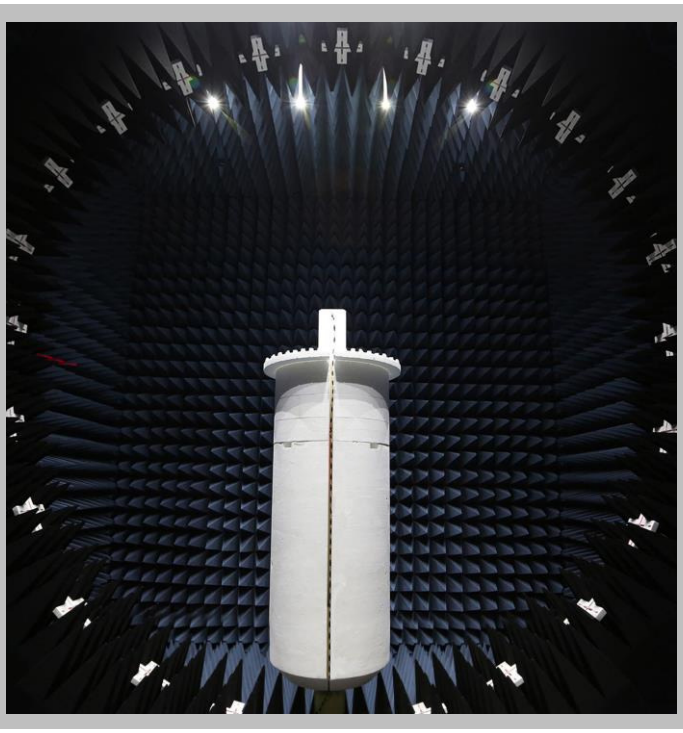
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

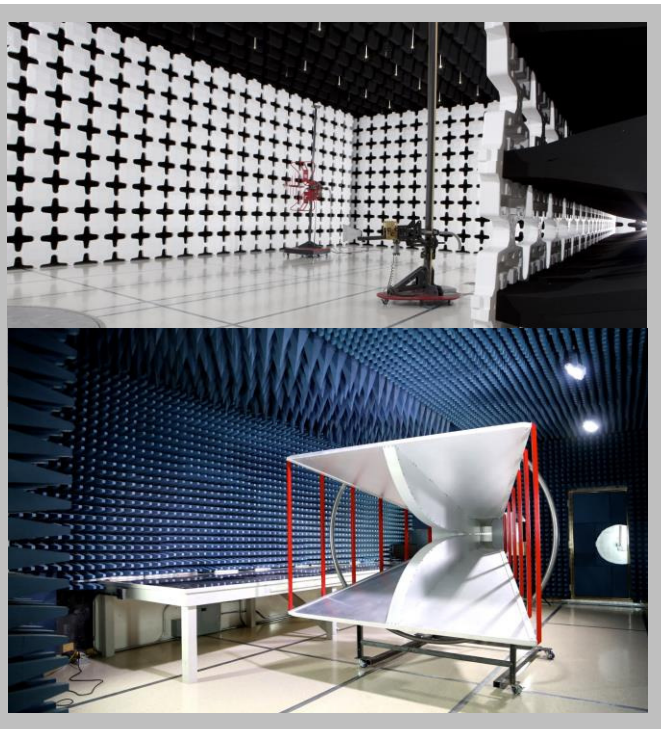
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

FACILITIES

REV 2015.2.19

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (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
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

NORTHWEST EMC 2014-12-10

Client and Equipment Under Test (EUT) Information

Company Name:	LightSPEED Technologies, Inc.
Address:	11509 SW Herman Road
City, State, Zip:	Tualatin, OR 97062
Test Requested By:	Dave Jordahl
Model:	Flexcat Remote
First Date of Test:	December 30, 2015
Last Date of Test:	February 04, 2016
Receipt Date of Samples:	December 02, 2015
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
This is a remote control/bridge that can send control signals to our base unit through Zigbee RF4CE interface. It also allows a BLE device to connect through this remote. The remote receives the command from BLE and retransmits via Zigbee RF4CE to our base unit. It also allows a BLE device to connect through this remote. The remote receives the command from BLE and retransmits via Zigbee RF4CE to our base unit.

Testing Objective:
To demonstrate compliance of the 2.4 GHz DTS Radio to FCC 15.247 requirements.

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration LITS0026- 4

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RF remote	LightSPEED Technologies, Inc.	334-0041-00	AC-FCHRC1-131014-0001

Configuration LITS0026- 8

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RF remote (Zigbee)	LightSPEED Technologies, Inc.	334-0041-00	AC-FCHRC-0022

Configuration LITS0026- 9

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RF remote (Zigbee)	LightSPEED Technologies, Inc.	334-0041-00	AC-FCHRC-0022

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC/DC Adapter	CUI Inc.	SWI5-5-N-I38	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	0.9m	No	RF Remote	AC/DC Adapter

MODIFICATIONS

NORTHWEST EMC 2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	12/30/2015	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	12/30/2015	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	12/30/2015	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	12/30/2015	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
5	12/30/2015	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
6	02/01/2016	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
7	02/04/2016	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Duty Cycle

NORTHWEST EMC

XMit 2015.01.14

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST DESCRIPTION

The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

There is no compliance requirement to be met by this test, so therefore no Pass / Fail criteria.

The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used

The test software provided for operation in a fixed, single channel mode allows the EUT to operate continuously at 100% Duty Cycle.

OCCUPIED BANDWIDTH

NORTHWEST EMC

XMit 2015.01.14

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Attenuator	S.M. Electronics	SA18N-06/SM4032	REE	10/1/2015	12
Generator - Signal	Keysight	5182B	TFU	NCR	0
Meter - Power	Gigatronics	8651A	SPM	5/25/2015	12
Power Sensor	Gigatronics	80701A	SPL	5/25/2015	12
Cable	ESM Cable Corp.	TT	EV1	NCR	0
Block - DC	Fairview Microwave	SD3379	AMP	6/18/2015	12
Attenuator	S.M. Electronics	SA26B-20	AUY	7/14/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	3/10/2015	12

TEST DESCRIPTION

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

The EUT was set to the channels and modes listed in the datasheet. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer.

OCCUPIED BANDWIDTH

NORTHWEST EMC

XMit 2015.01.14

EUT:	Flexcat Remote			**Work Order:**	LITS0026
Serial Number:	AC-FCHRC1-131014-0001			**Date:**	12/30/15
Customer:	LightSPEED Technologies, Inc.			**Temperature:**	22°C
Attendees:	None			**Humidity:**	33%
Project:	None			**Barometric Pres.:**	1019.9 mbar
Tested by:	Brandon Hobbs	**Power:**	Battery (2.4 VDC Nominal)	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2015	ANSI C63.10:2013

COMMENTS

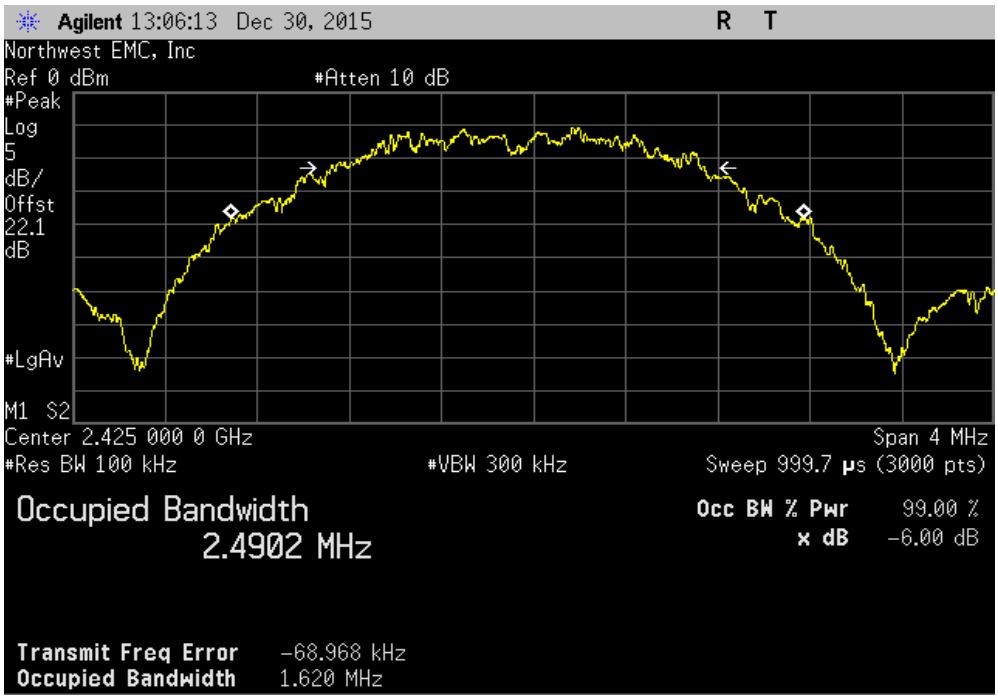
The EUT is operating in a Zigbee mode while at 100% duty cycle. The EUT is using OQPSK modulation.

DEVIATIONS FROM TEST STANDARD

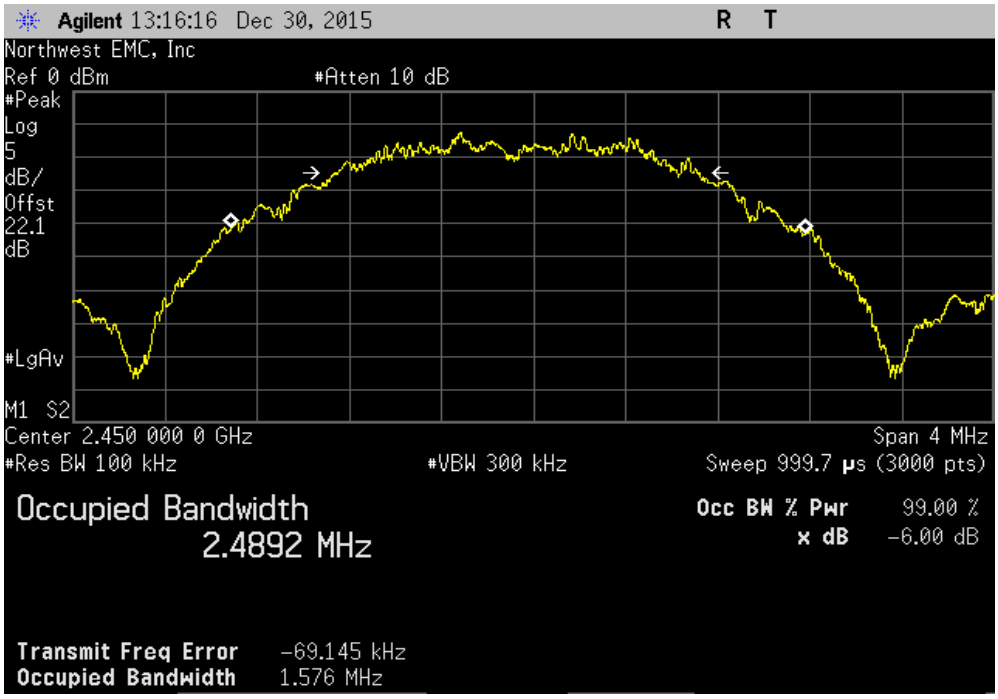
Configuration #	4	Signature

	Value	Limit (>)	Result
Zigbee			
Low Channel, 2425 MHz	1.62 MHz	500 kHz	Pass
Mid Channel, 2450 MHz	1.576 MHz	500 kHz	Pass
High Channel, 2475 MHz	1.599 MHz	500 kHz	Pass

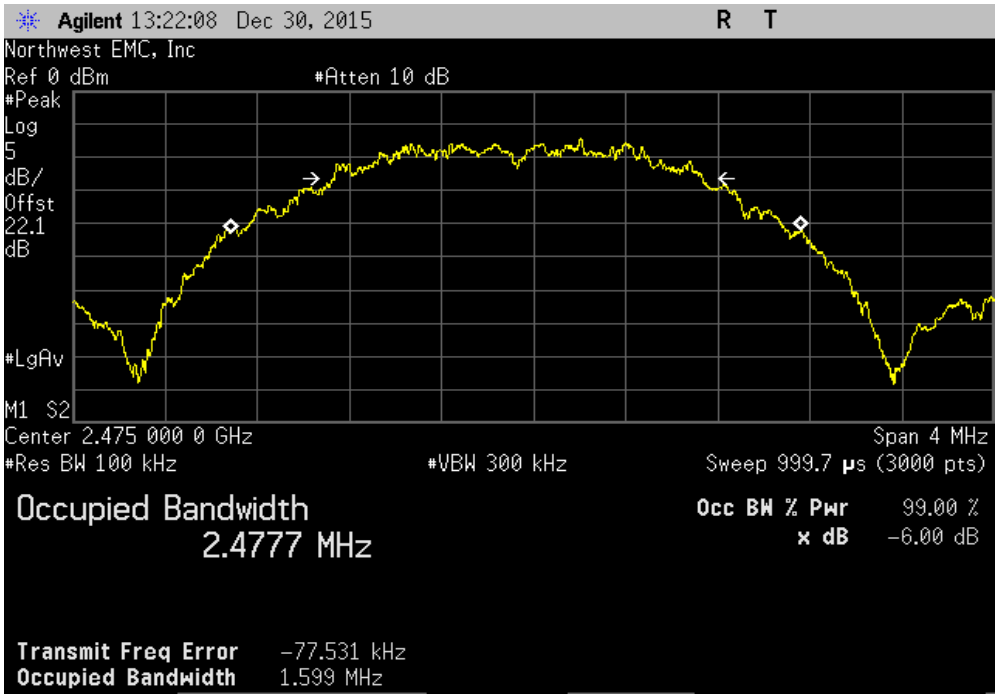
Zigbee, Low Channel, 2425 MHz						
				Value	Limit (>)	Result
				1.62 MHz	500 kHz	Pass



Zigbee, Mid Channel, 2450 MHz						
				Value	Limit (>)	Result
				1.576 MHz	500 kHz	Pass



Zigbee, High Channel, 2475 MHz						
				Value	Limit (>)	Result
				1.599 MHz	500 kHz	Pass



OUTPUT POWER

NORTHWEST EMC

XMit 2015.01.14

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Attenuator	S.M. Electronics	SA18N-06/SM4032	REE	10/1/2015	12
Generator - Signal	Keysight	5182B	TFU	NCR	0
Meter - Power	Gigatronics	8651A	SPM	5/25/2015	12
Power Sensor	Gigatronics	80701A	SPL	5/25/2015	12
Cable	ESM Cable Corp.	TT	EV1	NCR	0
Block - DC	Fairview Microwave	SD3379	AMP	6/18/2015	12
Attenuator	S.M. Electronics	SA26B-20	AUY	7/14/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	3/10/2015	12

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

Prior to measuring peak transmit power the DTS bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Maximum Conducted Output Power. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The method found in ANSI C63.10:2013 Section 11.10.2 was used because the RBW on the analyzer was greater than the DTS Bandwidth of the radio..

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36 dBm.

OUTPUT POWER

NORTHWEST EMC

XMit 2015.01.14

EUT:	Flexcat Remote			**Work Order:**	LITS0026
Serial Number:	AC-FCHRC1-131014-0001			**Date:**	12/30/15
Customer:	LightSPEED Technologies, Inc.			**Temperature:**	22°C
Attendees:	None			**Humidity:**	33%
Project:	None			**Barometric Pres.:**	1019.9 mbar
Tested by:	Brandon Hobbs	**Power:**	Battery (2.4 VDC Nominal)	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2015	ANSI C63.10:2013

COMMENTS

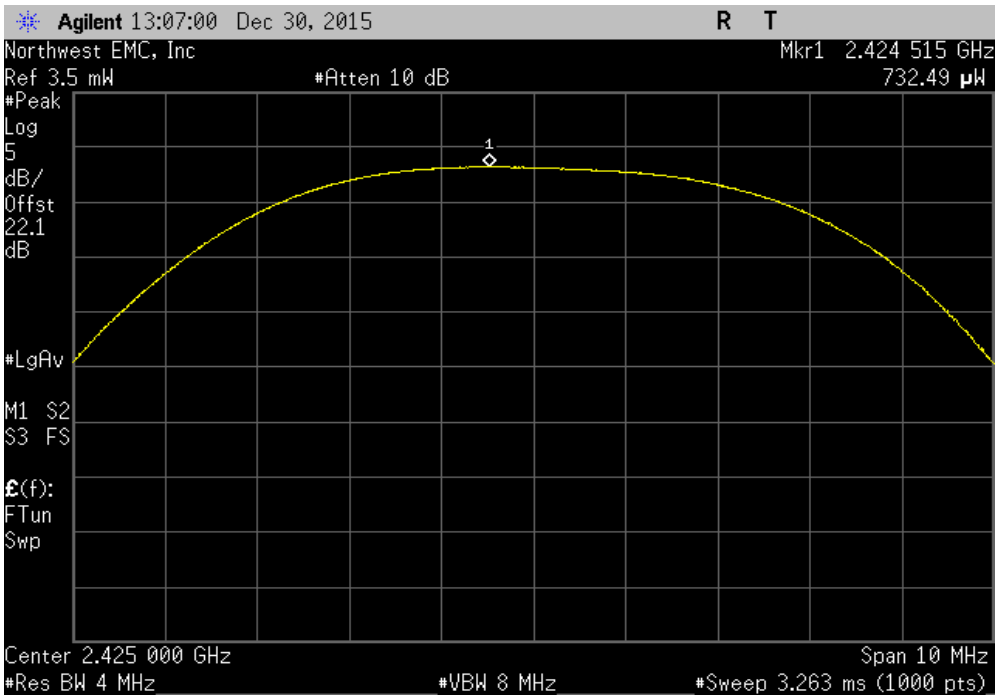
The EUT is operating in a Zigbee mode while at 100% duty cycle. The EUT is using OQPSK modulation.

DEVIATIONS FROM TEST STANDARD

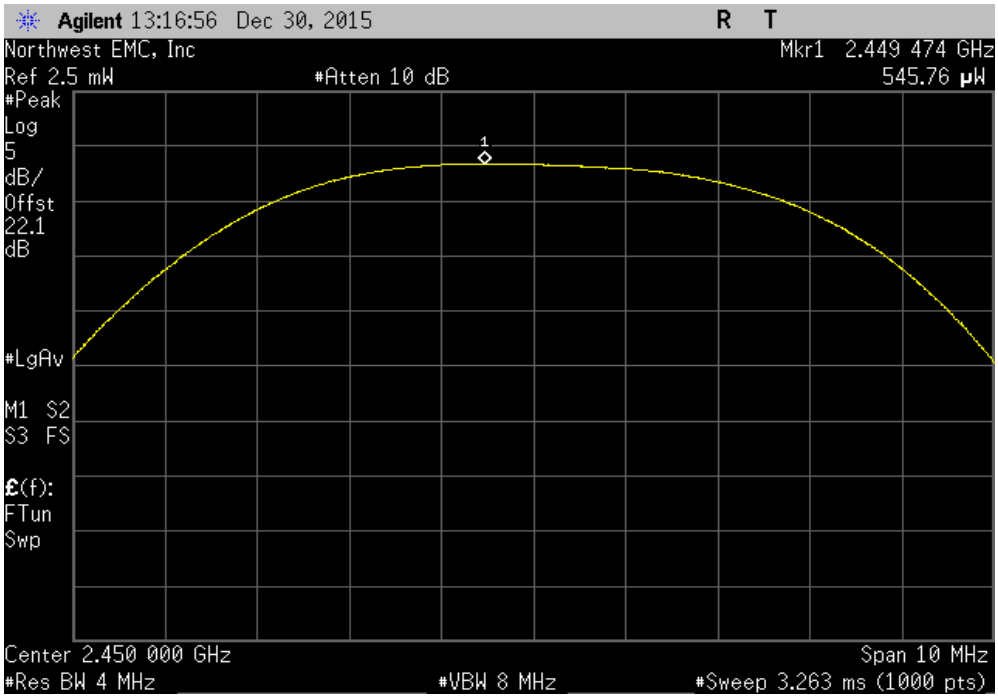
Configuration #	4	Signature

	Value	Limit (<)	Result
Zigbee			
Low Channel, 2425 MHz	732.487 uW	1 W	Pass
Mid Channel, 2450 MHz	545.758 uW	1 W	Pass
High Channel, 2475 MHz	484.507 uW	1 W	Pass

Zigbee, Low Channel, 2425 MHz						
				Value	Limit (<)	Result
				732.487 uW	1 W	Pass



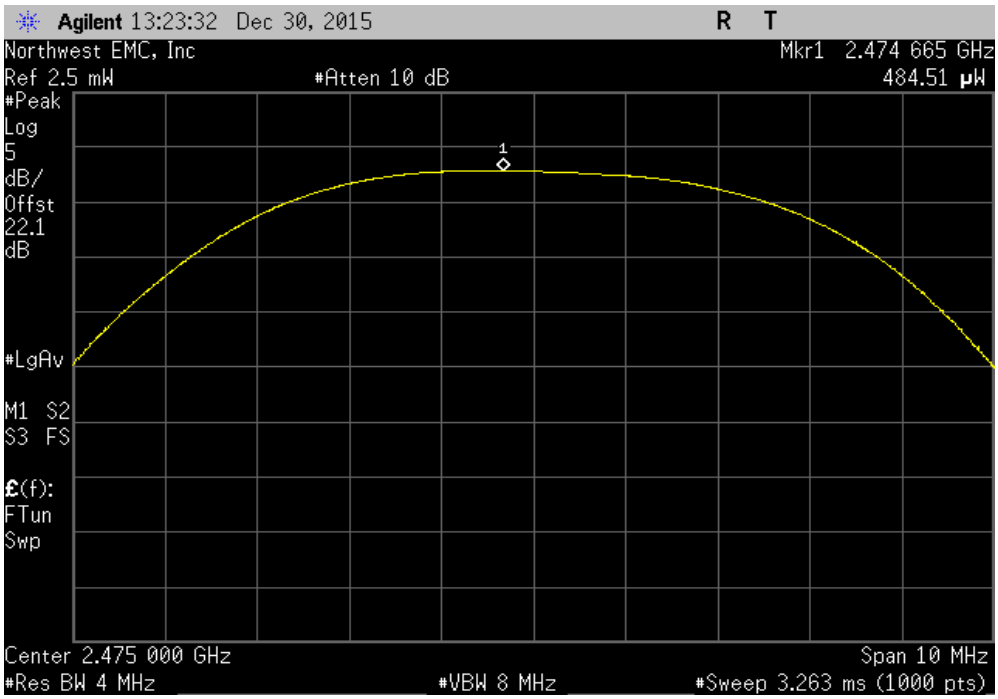
Zigbee, Mid Channel, 2450 MHz						
				Value	Limit (<)	Result
				545.758 uW	1 W	Pass



OUTPUT POWER

XMit 2015.01.14

Zigbee, High Channel, 2475 MHz						
				Value	Limit (<)	Result
				484.507 uW	1 W	Pass



POWER SPECTRAL DENSITY

XMit 2015.01.14

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Meter - Power	Gigatronics	8651A	SPM	5/25/2015	12
Power Sensor	Gigatronics	80701A	SPL	5/25/2015	12
Generator - Signal	Keysight	5182B	TFU	NCR	0
Attenuator	S.M. Electronics	SA18N-06/SM4032	REE	10/1/2015	12
Cable	ESM Cable Corp.	TT	EV1	NCR	0
Block - DC	Fairview Microwave	SD3379	AMP	6/18/2015	12
Attenuator	S.M. Electronics	SA26B-20	AUY	7/14/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	3/10/2015	12

TEST DESCRIPTION

The maximum power spectral density measurements was measured using the channels and modes as called out on the following data sheets.

A direct connection was made between the RF output of the EUT and a spectrum analyzer. External attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

Per the procedure outlined in ANSI C63.10 the peak power spectral density was measured in a 3 kHz RBW.

POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2015.01.14

EUT:	Flexcat Remote			**Work Order:**	LITS0026
Serial Number:	AC-FCHRC1-131014-0001			**Date:**	12/30/15
Customer:	LightSPEED Technologies, Inc.			**Temperature:**	22°C
Attendees:	None			**Humidity:**	33%
Project:	None			**Barometric Pres.:**	1019.9 mbar
Tested by:	Brandon Hobbs	**Power:**	Battery (2.4 VDC Nominal)	**Job Site:**	EV06

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2015	ANSI C63.10:2013

COMMENTS

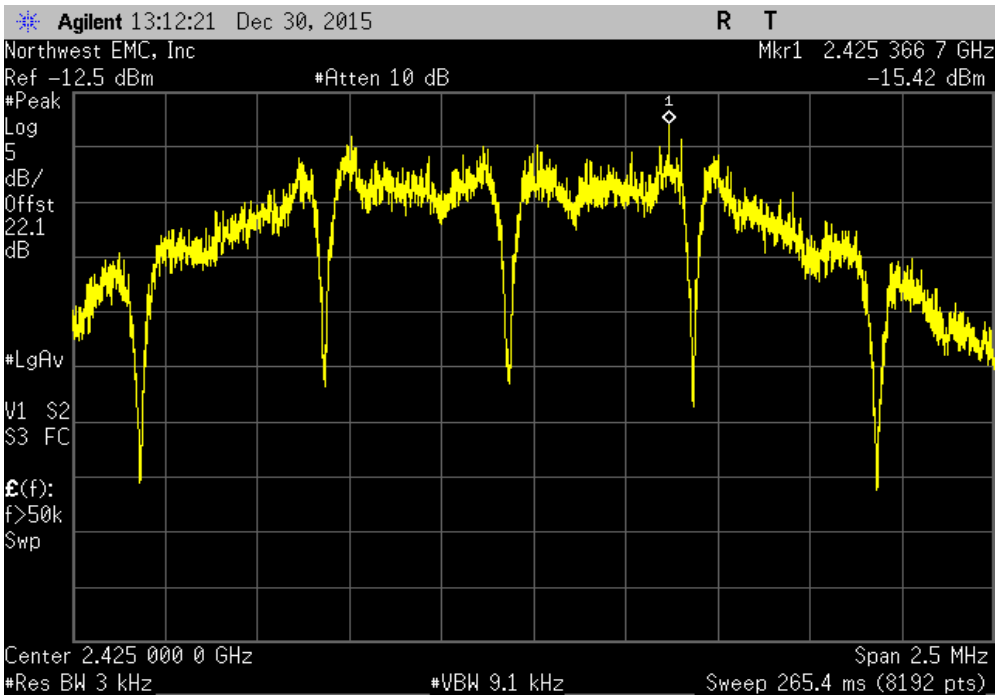
The EUT is operating in a Zigbee mode while at 100% duty cycle. The EUT is using OQPSK modulation.

DEVIATIONS FROM TEST STANDARD

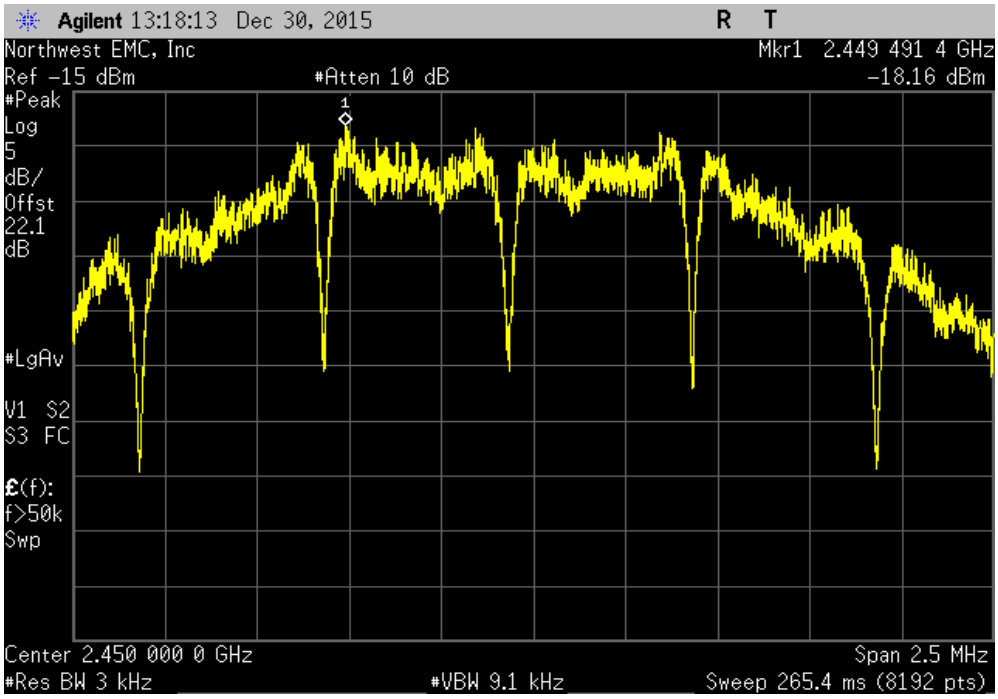
Configuration #	4	*Signature*

	Value dBm/3kHz	**Limit < dBm/3kHz**	**Results**
Zigbee			
Low Channel, 2425 MHz	-15.419	8	Pass
Mid Channel, 2450 MHz	-18.157	8	Pass
High Channel, 2475 MHz	-18.234	8	Pass

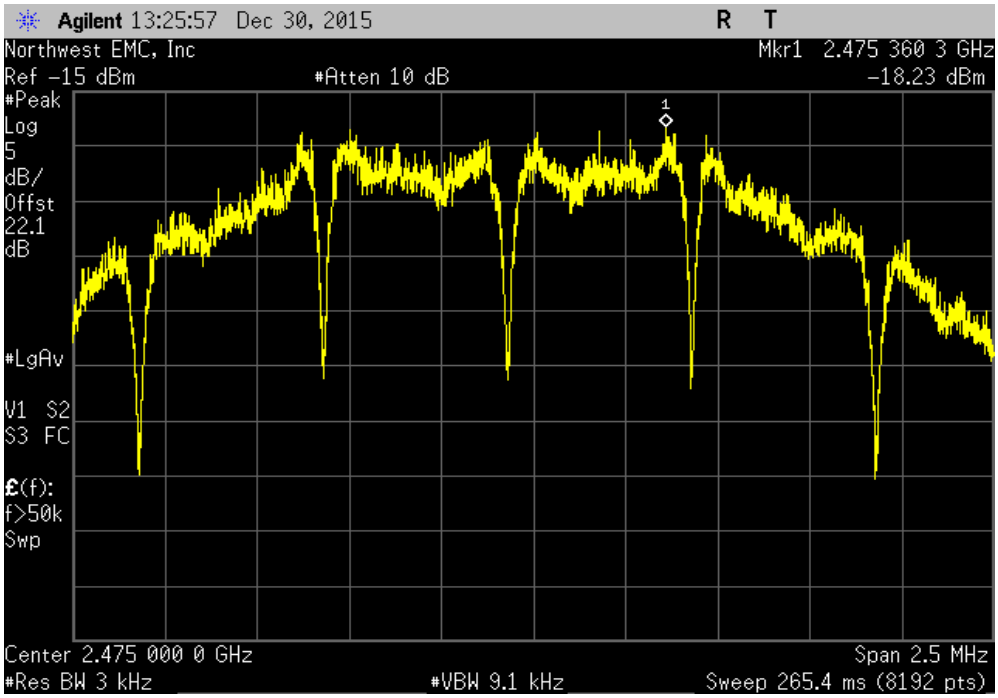
Zigbee, Low Channel, 2425 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-15.419	8	Pass



Zigbee, Mid Channel, 2450 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-18.157	8	Pass



Zigbee, High Channel, 2475 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-18.234	8	Pass



BAND EDGE COMPLIANCE

XMit 2015.01.14

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Attenuator	S.M. Electronics	SA18N-06/SM4032	REE	10/1/2015	12
Generator - Signal	Keysight	5182B	TFU	NCR	0
Meter - Power	Gigatronics	8651A	SPM	5/25/2015	12
Power Sensor	Gigatronics	80701A	SPL	5/25/2015	12
Cable	ESM Cable Corp.	TT	EV1	NCR	0
Block - DC	Fairview Microwave	SD3379	AMP	6/18/2015	12
Attenuator	S.M. Electronics	SA26B-20	AUY	7/14/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	3/10/2015	12

TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

BAND EDGE COMPLIANCE

NORTHWEST EMC

XMit 2015.01.14

EUT:	Flexcat Remote			**Work Order:**	LITS0026
Serial Number:	AC-FCHRC1-131014-0001			**Date:**	12/30/15
Customer:	LightSPEED Technologies, Inc.			**Temperature:**	22°C
Attendees:	None			**Humidity:**	33%
Project:	None			**Barometric Pres.:**	1019.9 mbar
Tested by:	Brandon Hobbs	**Power:**	Battery (2.4 VDC Nominal)	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2015	ANSI C63.10:2013

COMMENTS

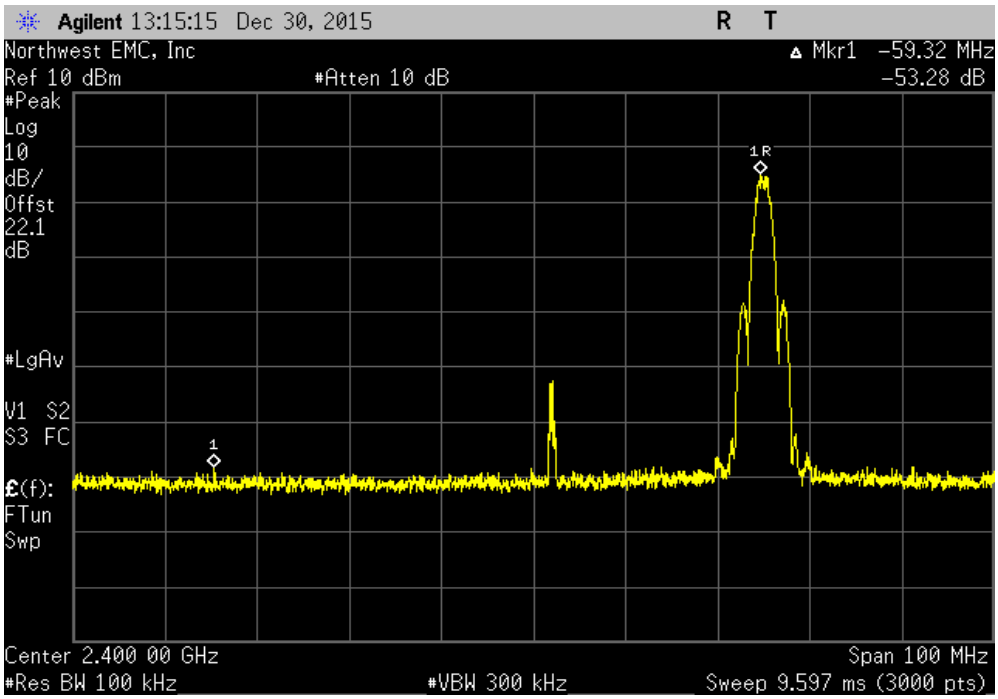
The EUT is operating in a Zigbee mode while at 100% duty cycle. The EUT is using OQPSK modulation.

DEVIATIONS FROM TEST STANDARD

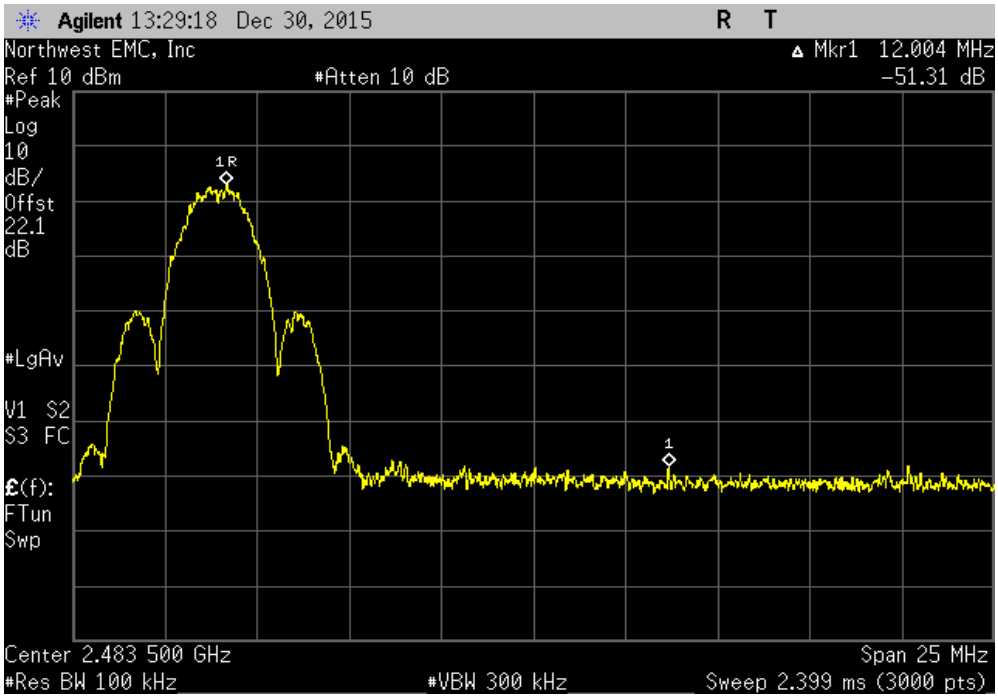
Configuration #	4	Signature

	Value (dBc)	Limit ≤ (dBc)	Result
Zigbee			
Low Channel, 2425 MHz	-53.28	-20	Pass
High Channel, 2475 MHz	-51.31	-20	Pass

Zigbee, Low Channel, 2425 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-53.28	-20	Pass



Zigbee, High Channel, 2475 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-51.31	-20	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2015.01.14

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Attenuator	S.M. Electronics	SA18N-06/SM4032	REE	10/1/2015	12
Generator - Signal	Keysight	5182B	TFU	NCR	0
Meter - Power	Gigatronics	8651A	SPM	5/25/2015	12
Power Sensor	Gigatronics	80701A	SPL	5/25/2015	12
Cable	ESM Cable Corp.	TT	EV1	NCR	0
Attenuator	S.M. Electronics	SA26B-20	AUY	7/14/2015	12
Block - DC	Fairview Microwave	SD3379	AMP	6/18/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	3/10/2015	12

TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

SPURIOUS CONDUCTED EMISSIONS

NORTHWEST EMC

XMit 2015.01.14

EUT:	Flexcat Remote			**Work Order:**	LITS0026
Serial Number:	AC-FCHRC1-131014-0001			**Date:**	12/30/15
Customer:	LightSPEED Technologies, Inc.			**Temperature:**	22°C
Attendees:	None			**Humidity:**	33%
Project:	None			**Barometric Pres.:**	1019.9 mbar
Tested by:	Brandon Hobbs	**Power:**	Battery (2.4 VDC Nominal)	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.247:2015	ANSI C63.10:2013

COMMENTS

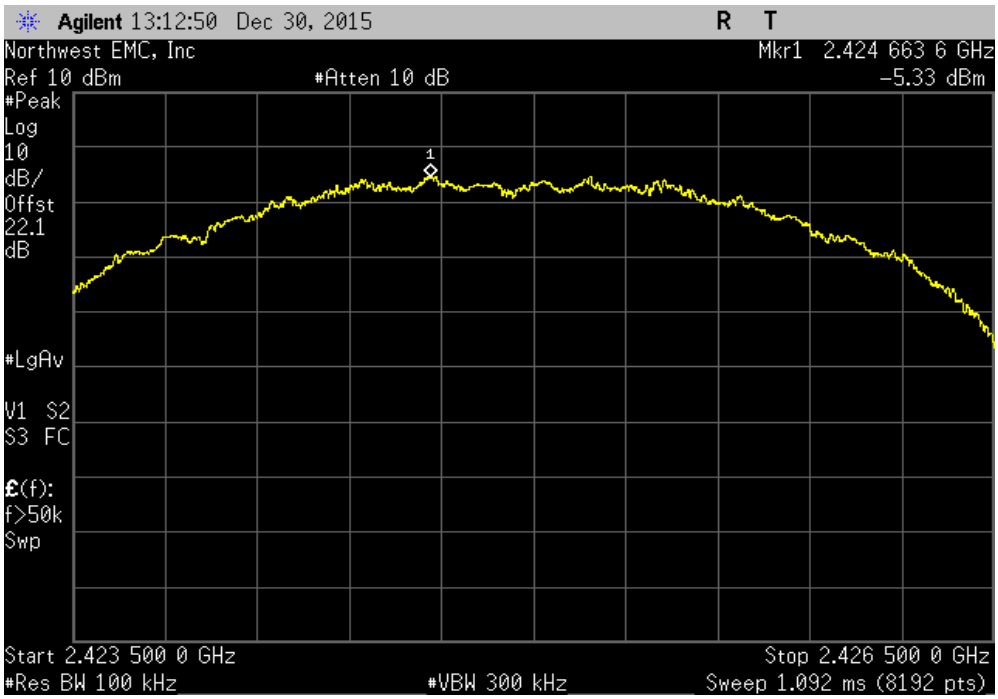
The EUT is operating in a Zigbee mode while at 100% duty cycle. The EUT is using OQPSK modulation.

DEVIATIONS FROM TEST STANDARD

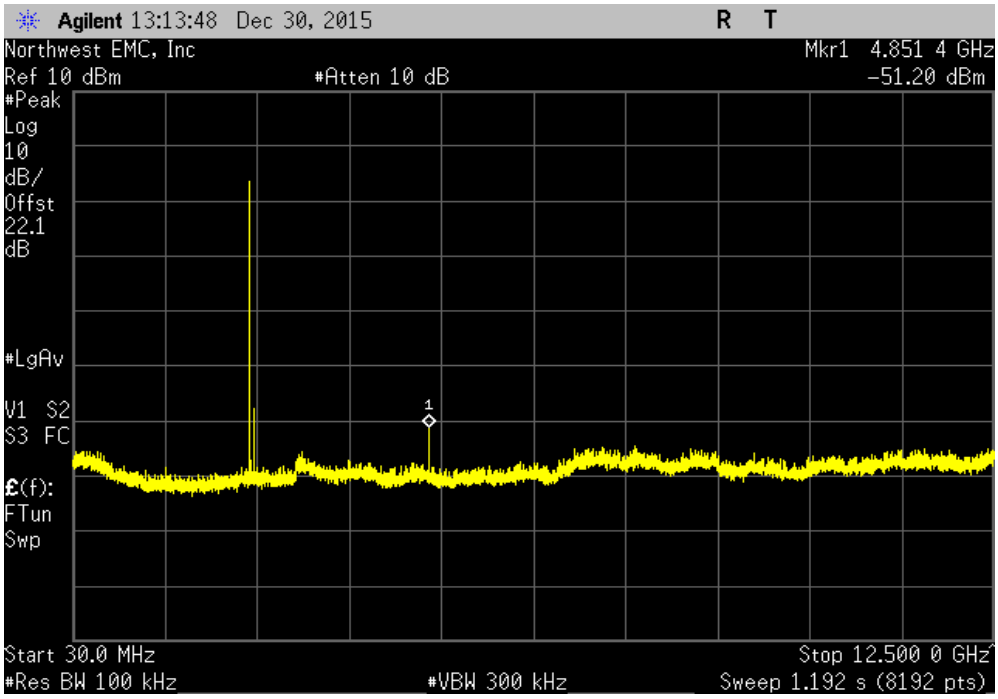
Configuration #	4	Signature

		Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result
Zigbee					
	Low Channel, 2425 MHz	Fundamental	N/A	N/A	N/A
	Low Channel, 2425 MHz	30 MHz - 12.5 GHz	-45.87	-20	Pass
	Low Channel, 2425 MHz	12.5 GHz - 25 GHz	-42.62	-20	Pass
	Mid Channel, 2450 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel, 2450 MHz	30 MHz - 12.5 GHz	-46.88	-20	Pass
	Mid Channel, 2450 MHz	12.5 GHz - 25 GHz	-41.87	-20	Pass
	High Channel, 2475 MHz	Fundamental	N/A	N/A	N/A
	High Channel, 2475 MHz	30 MHz - 12.5 GHz	-47.32	-20	Pass
	High Channel, 2475 MHz	12.5 GHz - 25 GHz	-40.56	-20	Pass

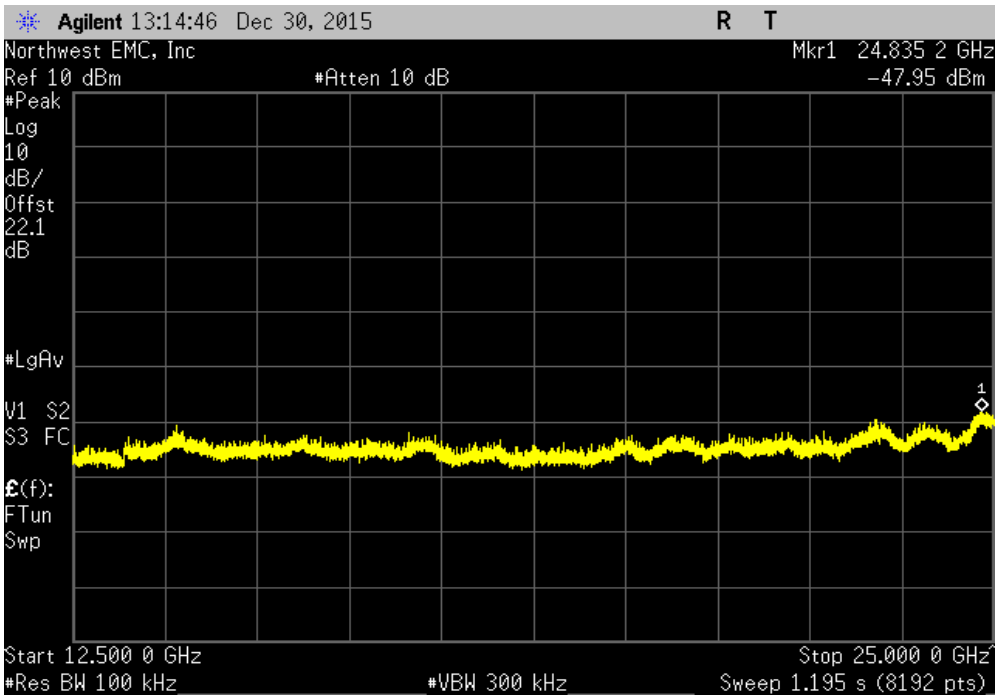
Zigbee, Low Channel, 2425 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



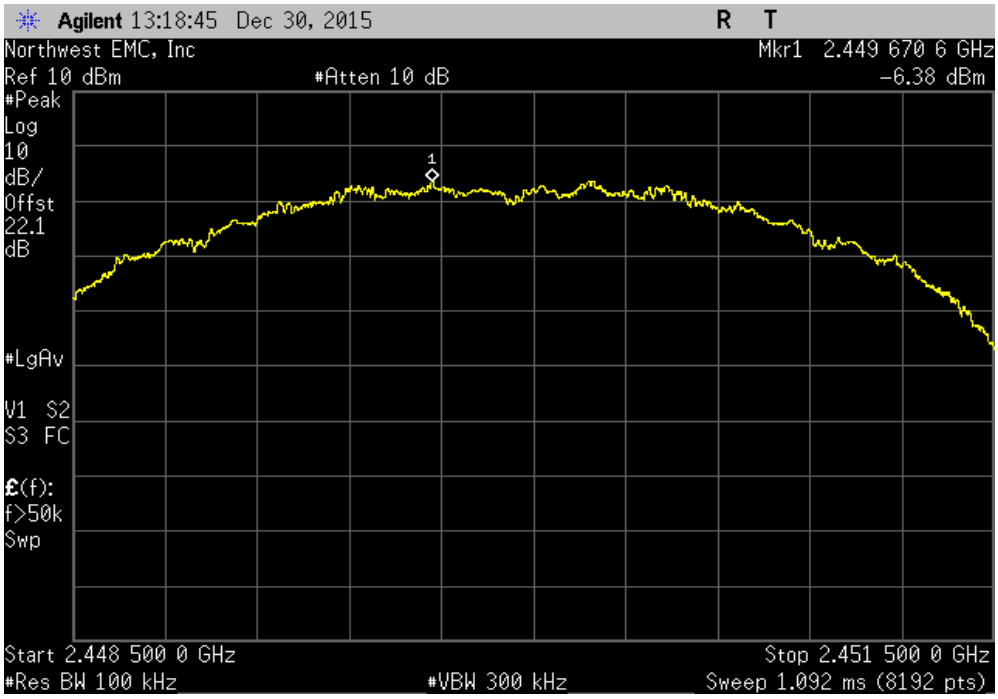
Zigbee, Low Channel, 2425 MHz					
Frequency Range		Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz		-45.87	-20	Pass



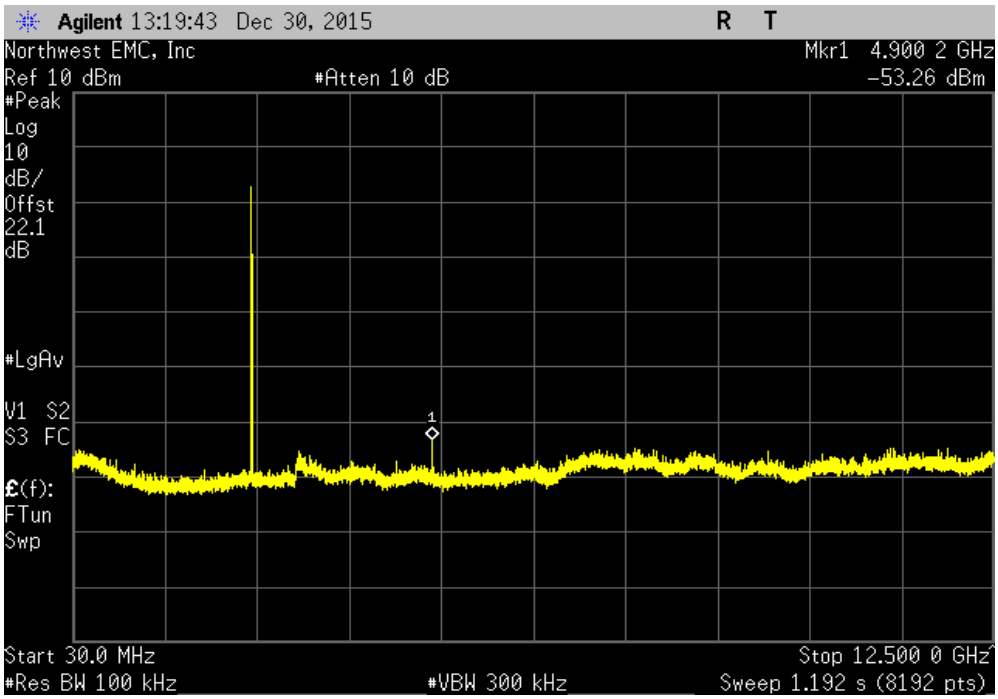
Zigbee, Low Channel, 2425 MHz				
Frequency Range		Max Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-42.62	-20	Pass



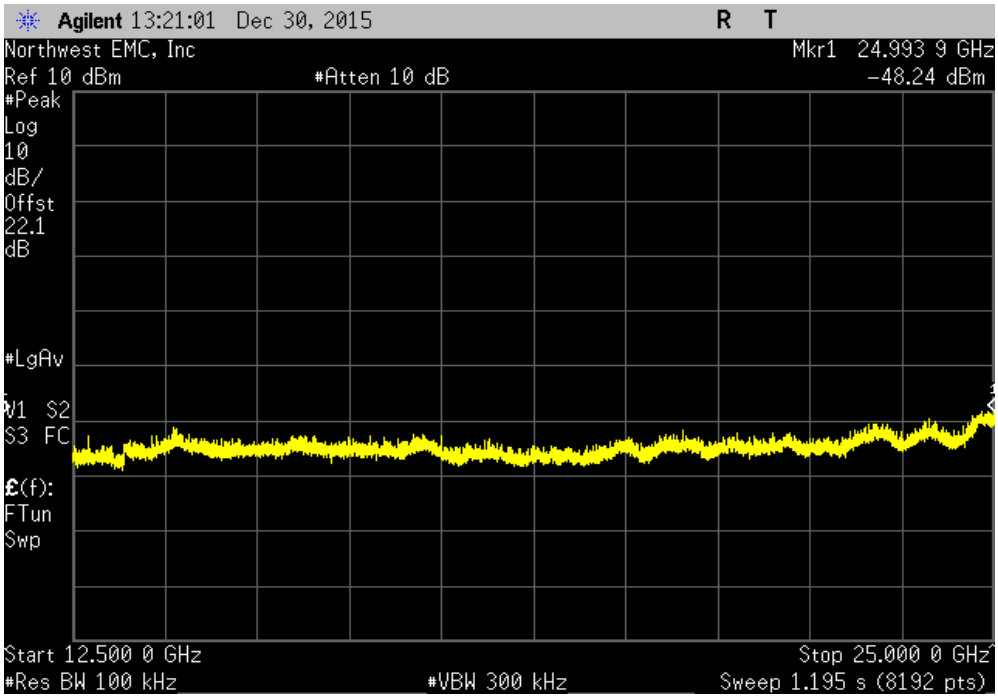
Zigbee, Mid Channel, 2450 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



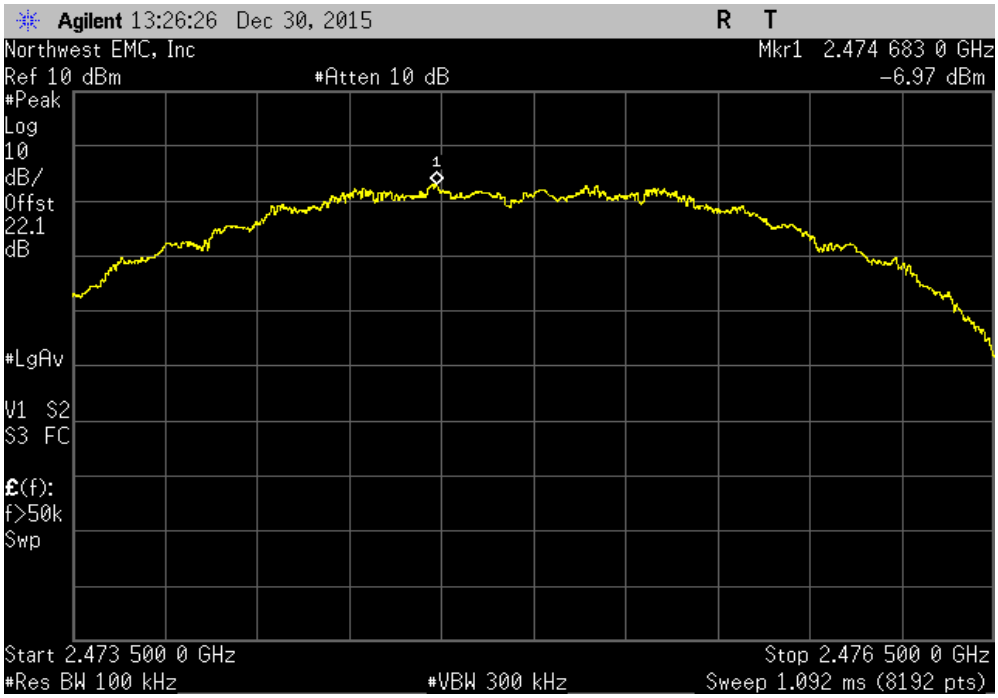
Zigbee, Mid Channel, 2450 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-46.88	-20	Pass



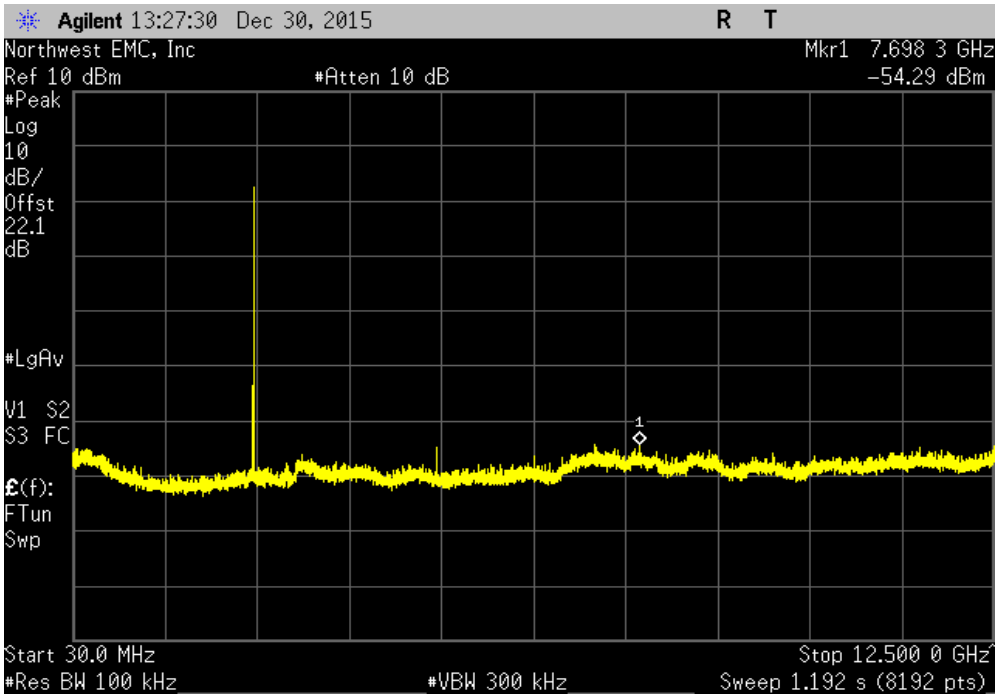
Zigbee, Mid Channel, 2450 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-41.87	-20	Pass



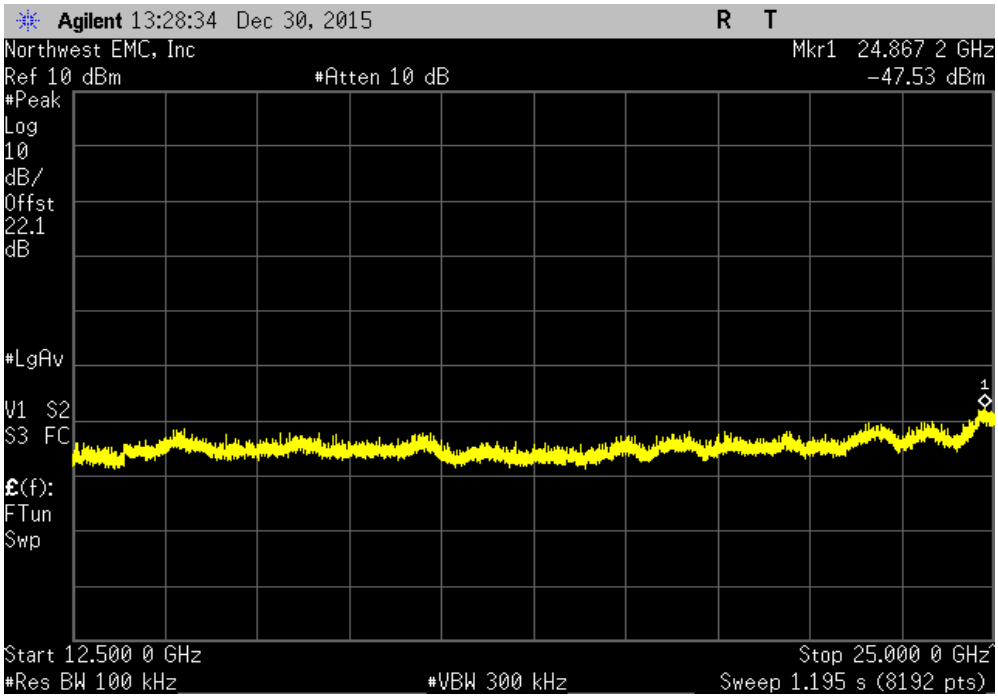
Zigbee, High Channel, 2475 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



Zigbee, High Channel, 2475 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-47.32	-20	Pass



Zigbee, High Channel, 2475 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-40.56	-20	Pass



SPURIOUS RADIATED EMISSIONS

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Continuos Zigbee Tx, Low channel, 2425MHz, charging
Continuos Zigbee Tx, Mid channel, 2450MHz, charging
Continuos Zigbee Tx, High channel, 2475MHz, charging
Continuos Zigbee Tx, Low channel, 2425MHz, stand alone
Continuos Zigbee Tx, Mid channel, 2450MHz, stand alone
Continuos Zigbee Tx, High channel, 2475MHz, stand alone

POWER SETTINGS INVESTIGATED

2.4 VDC

CONFIGURATIONS INVESTIGATED

LITS0026 - 8
LITS0026 - 9

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Cable	ESM Cable Corp.	KMKM-72	EVY	11/4/2015	12
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	11/4/2015	12
Antenna - Standard Gain	ETS Lindgren	3160-09	AIV	NCR	0
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	4/16/2015	12
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	0
Cable	None	Standard Gain Horns Cable	EVF	4/20/2015	12
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	4/20/2015	12
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	0
Filter - High Pass	Micro-Tronics	HPM50111	HFO	3/31/2015	12
Attenuator	Coaxicom	3910-20	AXZ	5/24/2015	12
Cable	N/A	Double Ridge Horn Cables	EVB	4/16/2015	12
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	4/16/2015	12
Antenna - Double Ridge	EMCO	3115	AHC	6/13/2014	24
Cable	N/A	Bilog Cables	EVA	2/10/2015	12
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	2/10/2015	12
Antenna - Biconilog	EMCO	3141	AXE	8/29/2014	24
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	3/10/2015	12

TEST DESCRIPTION

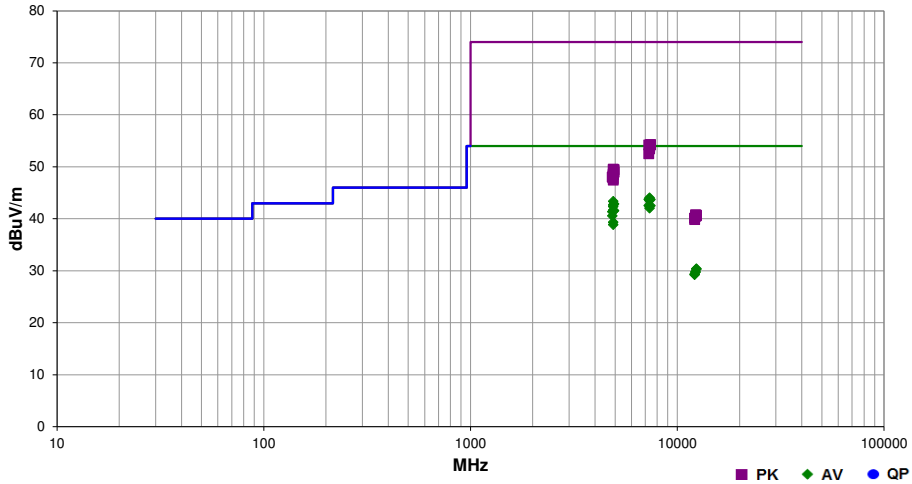
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

SPURIOUS RADIATED EMISSIONS

Work Order:	LITS0026	**Date:**	02/01/16		
Project:	None	**Temperature:**	20 °C		
Job Site:	EV01	**Humidity:**	36.8% RH		
Serial Number:	AC-FCHRC-0022	**Barometric Pres.:**	1023.7 mbar	**Tested by:**	Cole Ghizzone, Rod Peloquin
EUT:	Flexcat Remote				
Configuration:	8, 9				
Customer:	LightSPEED Technologies, Inc.				
Attendees:	None				
EUT Power:	2.4 VDC				
Operating Mode:	Continuos Zigbee Tx, reference the data comments for channel, frequency and charging/stand alone.				
Deviations:	None				
Comments:	See data comments for EUT orientation				

Test Specifications	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

Run #	96	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



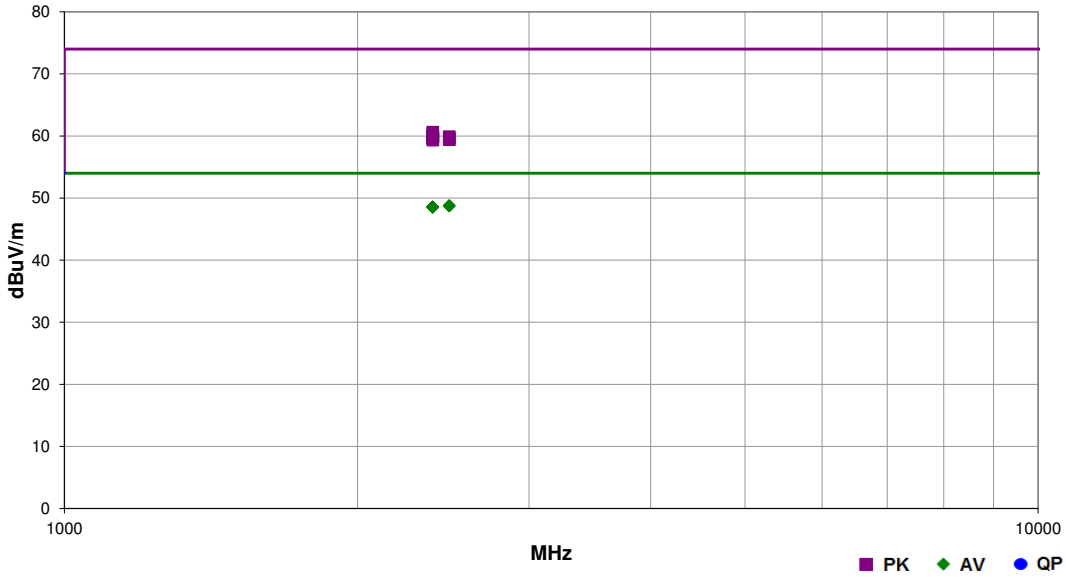
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7351.150	29.6	14.4	1.0	142.0	3.0	0.0	Horz	AV	0.0	44.0	54.0	-10.0	Mid channel, 2450MHz, charging, EUT Horz
7276.308	29.6	14.1	1.0	168.0	3.0	0.0	Horz	AV	0.0	43.7	54.0	-10.3	Low channel, 2425MHz, charging, EUT Horz
7423.167	29.1	14.6	1.0	96.0	3.0	0.0	Horz	AV	0.0	43.7	54.0	-10.3	High channel, 2475MHz, charging, EUT Horz
7348.117	29.1	14.4	1.0	173.0	3.0	0.0	Horz	AV	0.0	43.5	54.0	-10.5	Mid channel, 2450MHz, stand alone, EUT Horz
4899.833	35.6	7.7	1.0	270.0	3.0	0.0	Horz	AV	0.0	43.3	54.0	-10.7	Mid channel, 2450MHz, charging, EUT Horz
4949.833	35.1	7.8	1.0	273.0	3.0	0.0	Horz	AV	0.0	42.9	54.0	-11.1	High channel, 2475MHz, charging, EUT Horz
4899.817	34.9	7.7	1.0	216.0	3.0	0.0	Vert	AV	0.0	42.6	54.0	-11.4	Mid channel, 2450MHz, charging, EUT On Side
7276.083	28.4	14.1	3.8	280.0	3.0	0.0	Vert	AV	0.0	42.5	54.0	-11.5	Low channel, 2425MHz, charging, EUT On Side
7423.567	27.9	14.6	1.0	148.0	3.0	0.0	Vert	AV	0.0	42.5	54.0	-11.5	High channel, 2475MHz, charging, EUT On Side
4899.892	34.6	7.7	1.0	235.0	3.0	0.0	Vert	AV	0.0	42.3	54.0	-11.7	Mid channel, 2450MHz, stand alone, EUT On Side
7348.660	27.6	14.4	1.0	123.0	3.0	0.0	Vert	AV	0.0	42.0	54.0	-12.0	Mid channel, 2450MHz, charging, EUT On Side
4899.800	33.9	7.7	1.0	187.0	3.0	0.0	Horz	AV	0.0	41.6	54.0	-12.4	Mid channel, 2450MHz, charging, EUT Vert
4949.875	33.8	7.8	1.0	233.0	3.0	0.0	Vert	AV	0.0	41.6	54.0	-12.4	High channel, 2475MHz, charging, EUT On Side
4899.925	33.7	7.7	1.0	315.0	3.0	0.0	Vert	AV	0.0	41.4	54.0	-12.6	Mid channel, 2450MHz, charging, EUT Horz
4849.825	33.7	7.6	1.0	158.0	3.0	0.0	Vert	AV	0.0	41.3	54.0	-12.7	Low channel, 2425MHz, charging, EUT On Side
4849.875	32.9	7.6	1.0	275.0	3.0	0.0	Horz	AV	0.0	40.5	54.0	-13.5	Low channel, 2425MHz, charging, EUT Horz
4899.850	31.6	7.7	2.2	185.0	3.0	0.0	Horz	AV	0.0	39.3	54.0	-14.7	Mid channel, 2450MHz, charging, EUT On Side
4899.825	31.1	7.7	1.0	47.0	3.0	0.0	Vert	AV	0.0	38.8	54.0	-15.2	Mid channel, 2450MHz, charging, EUT Vert
7424.500	39.7	14.6	1.0	148.0	3.0	0.0	Vert	PK	0.0	54.3	74.0	-19.7	High channel, 2475MHz, charging, EUT On Side
7273.342	40.1	14.1	1.0	168.0	3.0	0.0	Horz	PK	0.0	54.2	74.0	-19.8	Low channel, 2425MHz, charging, EUT Horz
7423.550	39.6	14.6	1.0	96.0	3.0	0.0	Horz	PK	0.0	54.2	74.0	-19.8	High channel, 2475MHz, charging, EUT Horz
7350.450	39.5	14.4	1.0	142.0	3.0	0.0	Horz	PK	0.0	53.9	74.0	-20.1	Mid channel, 2450MHz, charging, EUT Horz
7347.917	39.3	14.4	1.0	173.0	3.0	0.0	Horz	PK	0.0	53.7	74.0	-20.3	Mid channel, 2450MHz, stand alone, EUT Horz
7350.630	39.0	14.4	1.0	123.0	3.0	0.0	Vert	PK	0.0	53.4	74.0	-20.6	Mid channel, 2450MHz, charging, EUT On Side
7273.108	38.4	14.1	3.8	280.0	3.0	0.0	Vert	PK	0.0	52.5	74.0	-21.5	Low channel, 2425MHz, charging, EUT On Side
12374.510	28.6	1.8	1.0	343.0	3.0	0.0	Vert	AV	0.0	30.4	54.0	-23.6	High channel, 2475MHz, charging, EUT On Side
12377.060	28.5	1.8	1.0	123.0	3.0	0.0	Horz	AV	0.0	30.3	54.0	-23.7	High channel, 2475MHz, charging, EUT Horz
12250.520	28.4	1.4	1.0	349.0	3.0	0.0	Vert	AV	0.0	29.8	54.0	-24.2	Mid channel, 2450MHz, charging, EUT On Side
12251.990	28.3	1.4	1.0	260.0	3.0	0.0	Horz	AV	0.0	29.7	54.0	-24.3	Mid channel, 2450MHz, charging, EUT Horz
4900.033	41.8	7.8	1.0	270.0	3.0	0.0	Horz	PK	0.0	49.6	74.0	-24.5	Mid channel, 2450MHz, charging, EUT Horz
4949.950	41.7	7.8	1.0	273.0	3.0	0.0	Horz	PK	0.0	49.5	74.0	-24.5	High channel, 2475MHz, charging, EUT Horz
4899.675	41.7	7.7	1.0	216.0	3.0	0.0	Vert	PK	0.0	49.4	74.0	-24.6	Mid channel, 2450MHz, charging, EUT On Side
12125.180	28.6	0.7	1.0	30.0	3.0	0.0	Vert	AV	0.0	29.3	54.0	-24.7	Low channel, 2425MHz, charging, EUT On Side
12125.950	28.5	0.7	1.0	117.0	3.0	0.0	Horz	AV	0.0	29.2	54.0	-24.8	Low channel, 2425MHz, charging, EUT Horz
4949.875	41.2	7.8	1.0	233.0	3.0	0.0	Vert	PK	0.0	49.0	74.0	-25.0	High channel, 2475MHz, charging, EUT On Side
4899.800	40.9	7.7	1.0	235.0	3.0	0.0	Vert	PK	0.0	48.6	74.0	-25.4	Mid channel, 2450MHz, stand alone, EUT On Side
4899.942	40.8	7.7	1.0	187.0	3.0	0.0	Horz	PK	0.0	48.5	74.0	-25.5	Mid channel, 2450MHz, charging, EUT Vert
4900.025	40.7	7.7	1.0	315.0	3.0	0.0	Vert	PK	0.0	48.5	74.0	-25.6	Mid channel, 2450MHz, charging, EUT Horz
4850.042	40.4	7.6	1.0	158.0	3.0	0.0	Vert	PK	0.0	48.0	74.0	-26.0	Low channel, 2425MHz, charging, EUT On Side
4849.633	40.4	7.6	1.0	275.0	3.0	0.0	Horz	PK	0.0	48.0	74.0	-26.0	Low channel, 2425MHz, charging, EUT Horz
4898.817	40.0	7.7	1.0	47.0	3.0	0.0	Vert	PK	0.0	47.7	74.0	-26.3	Mid channel, 2450MHz, charging, EUT Vert
4899.667	39.7	7.7	2.2	185.0	3.0	0.0	Horz	PK	0.0	47.4	74.0	-26.6	Mid channel, 2450MHz, charging, EUT On Side
12250.380	39.4	1.4	1.0	349.0	3.0	0.0	Vert	PK	0.0	40.8	74.0	-33.2	Mid channel, 2450MHz, charging, EUT On Side
12373.780	38.9	1.8	1.0	343.0	3.0	0.0	Vert	PK	0.0	40.7	74.0	-33.3	High channel, 2475MHz, charging, EUT On Side
12373.780	38.8	1.8	1.0	123.0	3.0	0.0	Horz	PK	0.0	40.6	74.0	-33.4	High channel, 2475MHz, charging, EUT Horz
12247.600	39.1	1.4	1.0	260.0	3.0	0.0	Horz	PK	0.0	40.5	74.0	-33.5	Mid channel, 2450MHz, charging, EUT Horz
12123.280	39.4	0.7	1.0	30.0	3.0	0.0	Vert	PK	0.0	40.1	74.0	-33.9	Low channel, 2425MHz, charging, EUT On Side
12126.570	39.1	0.7	1.0	117.0	3.0	0.0	Horz	PK	0.0	39.8	74.0	-34.2	Low channel, 2425MHz, charging, EUT Horz

SPURIOUS RADIATED EMISSIONS

Work Order:	LITS0026	**Date:**	02/01/16		
Project:	None	**Temperature:**	20 °C		
Job Site:	EV01	**Humidity:**	36.8% RH		
Serial Number:	AC-FCHRC-0022	**Barometric Pres.:**	1023.7 mbar	**Tested by:**	Cole Ghizzone, Rod Peloquin
EUT:	Flexcat Remote				
Configuration:	8, 9				
Customer:	LightSPEED Technologies, Inc.				
Attendees:	None				
EUT Power:	2.4 VDC				
Operating Mode:	Continuos Zigbee Tx, reference the data comments for channel, frequency and charging/stand alone.				
Deviations:	None				
Comments:	See data comments for EUT orientation				

Test Specifications	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

Run #	98	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2484.137	31.3	-2.5	1.0	213.0	3.0	20.0	Horz	AV	0.0	48.8	54.0	-5.2	High channel, 2475MHz, charging, EUT Vert
2485.163	31.2	-2.5	1.9	283.0	3.0	20.0	Horz	AV	0.0	48.7	54.0	-5.3	High channel, 2475MHz, stand alone, EUT Vert
2484.160	31.2	-2.5	2.1	213.0	3.0	20.0	Vert	AV	0.0	48.7	54.0	-5.3	High channel, 2475MHz, charging, EUT Horz
2388.907	31.3	-2.7	1.0	268.0	3.0	20.0	Vert	AV	0.0	48.6	54.0	-5.4	Low channel, 2425MHz, charging, EUT Horz
2389.673	31.2	-2.7	1.0	83.0	3.0	20.0	Horz	AV	0.0	48.5	54.0	-5.5	Low channel, 2425MHz, charging, EUT Vert
2389.650	31.2	-2.7	1.0	79.0	3.0	20.0	Horz	AV	0.0	48.5	54.0	-5.5	Low channel, 2425MHz, charging, EUT Horz
2389.423	31.2	-2.7	1.0	238.0	3.0	20.0	Vert	AV	0.0	48.5	54.0	-5.5	Low channel, 2425MHz, charging, EUT On Side
2388.660	31.2	-2.7	1.0	171.0	3.0	20.0	Horz	AV	0.0	48.5	54.0	-5.5	Low channel, 2425MHz, charging, EUT On Side
2388.660	31.2	-2.7	1.0	196.0	3.0	20.0	Vert	AV	0.0	48.5	54.0	-5.5	Low channel, 2425MHz, stand alone, EUT Horz
2388.467	31.2	-2.7	1.0	53.0	3.0	20.0	Vert	AV	0.0	48.5	54.0	-5.5	Low channel, 2425MHz, charging, EUT Vert
2388.853	43.3	-2.7	1.0	53.0	3.0	20.0	Vert	PK	0.0	60.6	74.0	-13.4	Low channel, 2425MHz, charging, EUT Vert
2389.570	42.9	-2.7	1.0	196.0	3.0	20.0	Vert	PK	0.0	60.2	74.0	-13.8	Low channel, 2425MHz, stand alone, EUT Horz
2389.330	42.7	-2.7	1.0	83.0	3.0	20.0	Horz	PK	0.0	60.0	74.0	-14.0	Low channel, 2425MHz, charging, EUT Vert
2484.560	42.4	-2.5	1.0	213.0	3.0	20.0	Horz	PK	0.0	59.9	74.0	-14.1	High channel, 2475MHz, charging, EUT Vert
2389.977	42.5	-2.7	1.0	268.0	3.0	20.0	Vert	PK	0.0	59.8	74.0	-14.2	Low channel, 2425MHz, charging, EUT Horz
2389.743	42.5	-2.7	1.0	171.0	3.0	20.0	Horz	PK	0.0	59.8	74.0	-14.2	Low channel, 2425MHz, charging, EUT On Side
2484.617	42.2	-2.5	2.1	213.0	3.0	20.0	Vert	PK	0.0	59.7	74.0	-14.3	High channel, 2475MHz, charging, EUT Horz
2388.163	42.3	-2.7	1.0	79.0	3.0	20.0	Horz	PK	0.0	59.6	74.0	-14.4	Low channel, 2425MHz, charging, EUT Horz
2485.463	41.9	-2.5	1.9	283.0	3.0	20.0	Horz	PK	0.0	59.4	74.0	-14.6	High channel, 2475MHz, stand alone, EUT Vert
2389.530	42.0	-2.7	1.0	238.0	3.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	Low channel, 2425MHz, charging, EUT On Side

AC POWERLINE CONDUCTED EMISSIONS

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESCI	ARH	3/11/2015	3/11/2016
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKA	EVGA	5/12/2015	5/12/2016
LISN	Solar Electronics	9252-50-R-24-BNC	LIP	1/27/2015	1/27/2017

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

LITS0026-9

MODES INVESTIGATED

Charging, AC-DC Adapter input voltage 110VAC/60Hz, ZigBee set to Tx High Channel.
Charging, AC-DC Adapter input voltage 110VAC/60Hz, ZigBee set to Tx Low Channel.
Charging, AC-DC Adapter input voltage 110VAC/60Hz, ZigBee set to Tx Mid Channel.

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

EUT:	Flexcat Remote	Work Order:	LITS0026
Serial Number:	AC-FCHRC-0022	Date:	02/04/2016
Customer:	LightSPEED Technologies, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	40%
Customer Project:	None	Bar. Pressure:	1015 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC Via AC-DC adapter	Configuration:	LITS0026-9

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	10	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

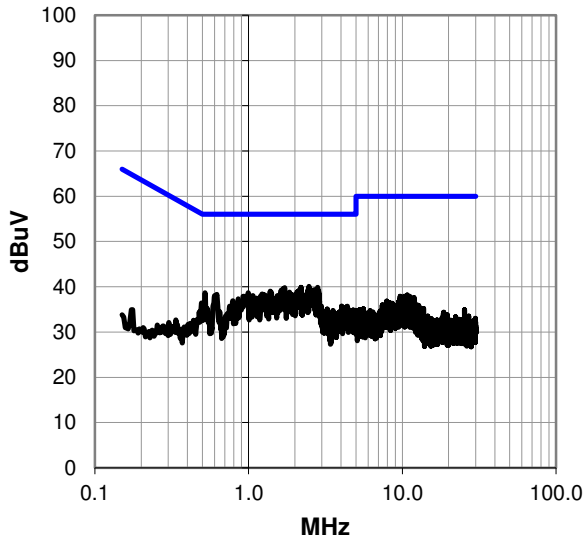
EUT OPERATING MODES

Charging, AC-DC Adapter input voltage 110VAC/60Hz, ZigBee set to Tx Low Channel.

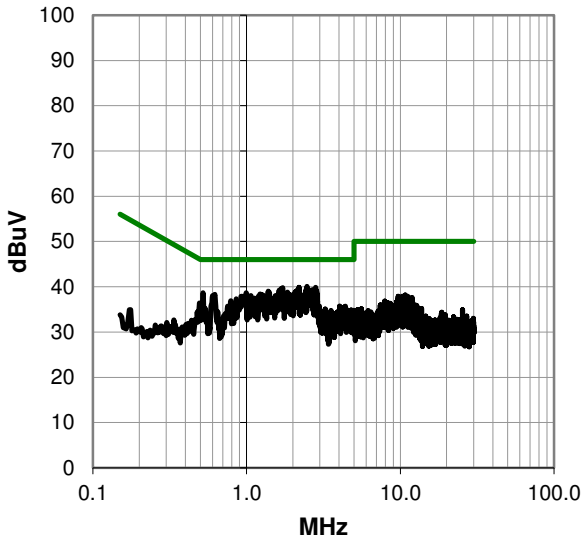
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

RESULTS - Run #10

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.467	19.9	20.2	40.1	56.0	-15.9
2.818	19.7	20.2	39.9	56.0	-16.1
2.191	19.7	20.1	39.8	56.0	-16.2
1.713	19.7	20.1	39.8	56.0	-16.2
1.672	19.5	20.1	39.6	56.0	-16.4
2.691	19.2	20.2	39.4	56.0	-16.6
2.135	19.1	20.1	39.2	56.0	-16.8
2.430	19.0	20.2	39.2	56.0	-16.8
2.601	19.0	20.2	39.2	56.0	-16.8
2.851	18.9	20.2	39.1	56.0	-16.9
1.381	18.9	20.1	39.0	56.0	-17.0
1.848	18.7	20.1	38.8	56.0	-17.2
2.060	18.7	20.1	38.8	56.0	-17.2
0.519	18.7	20.0	38.7	56.0	-17.3
0.993	18.6	20.1	38.7	56.0	-17.3
2.396	18.4	20.2	38.6	56.0	-17.4
2.769	18.4	20.2	38.6	56.0	-17.4
1.221	18.3	20.1	38.4	56.0	-17.6
0.620	18.3	20.0	38.3	56.0	-17.7
1.765	18.2	20.1	38.3	56.0	-17.7
1.892	18.2	20.1	38.3	56.0	-17.7
1.262	18.1	20.1	38.2	56.0	-17.8
1.982	18.1	20.1	38.2	56.0	-17.8
1.590	18.0	20.1	38.1	56.0	-17.9
1.064	17.9	20.1	38.0	56.0	-18.0
1.538	17.9	20.1	38.0	56.0	-18.0

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.467	19.9	20.2	40.1	46.0	-5.9
2.818	19.7	20.2	39.9	46.0	-6.1
2.191	19.7	20.1	39.8	46.0	-6.2
1.713	19.7	20.1	39.8	46.0	-6.2
1.672	19.5	20.1	39.6	46.0	-6.4
2.691	19.2	20.2	39.4	46.0	-6.6
2.135	19.1	20.1	39.2	46.0	-6.8
2.430	19.0	20.2	39.2	46.0	-6.8
2.601	19.0	20.2	39.2	46.0	-6.8
2.851	18.9	20.2	39.1	46.0	-6.9
1.381	18.9	20.1	39.0	46.0	-7.0
1.848	18.7	20.1	38.8	46.0	-7.2
2.060	18.7	20.1	38.8	46.0	-7.2
0.519	18.7	20.0	38.7	46.0	-7.3
0.993	18.6	20.1	38.7	46.0	-7.3
2.396	18.4	20.2	38.6	46.0	-7.4
2.769	18.4	20.2	38.6	46.0	-7.4
1.221	18.3	20.1	38.4	46.0	-7.6
0.620	18.3	20.0	38.3	46.0	-7.7
1.765	18.2	20.1	38.3	46.0	-7.7
1.892	18.2	20.1	38.3	46.0	-7.7
1.262	18.1	20.1	38.2	46.0	-7.8
1.982	18.1	20.1	38.2	46.0	-7.8
1.590	18.0	20.1	38.1	46.0	-7.9
1.064	17.9	20.1	38.0	46.0	-8.0
1.538	17.9	20.1	38.0	46.0	-8.0

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

EUT:	Flexcat Remote	Work Order:	LITS0026
Serial Number:	AC-FCHRC-0022	Date:	02/04/2016
Customer:	LightSPEED Technologies, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	40%
Customer Project:	None	Bar. Pressure:	1015 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC Via AC-DC adapter	Configuration:	LITS0026-9

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	11	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

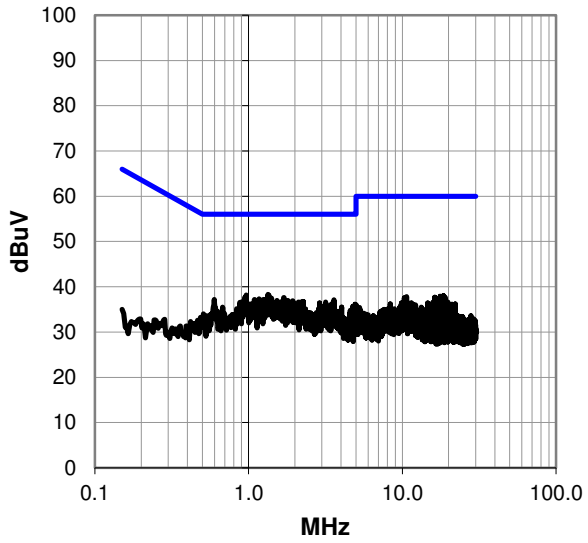
EUT OPERATING MODES

Charging, AC-DC Adapter input voltage 110VAC/60Hz, ZigBee set to Tx Low Channel.

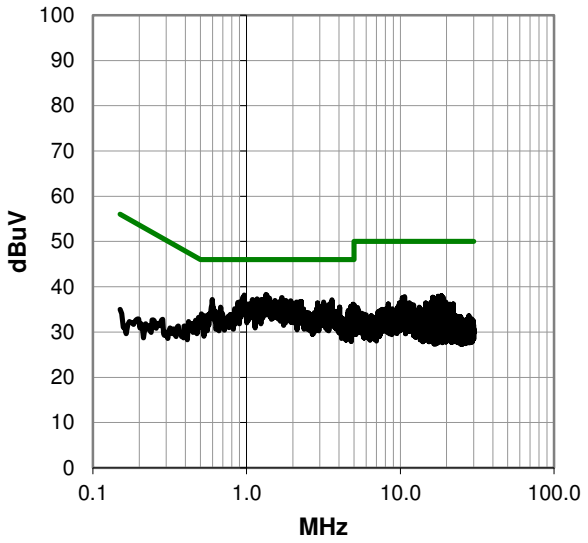
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

RESULTS - Run #11

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.336	18.2	20.1	38.3	56.0	-17.7
0.967	18.1	20.1	38.2	56.0	-17.8
1.351	18.0	20.1	38.1	56.0	-17.9
0.945	17.5	20.1	37.6	56.0	-18.4
1.695	17.5	20.1	37.6	56.0	-18.4
1.172	17.2	20.1	37.3	56.0	-18.7
0.598	17.2	20.0	37.2	56.0	-18.8
1.094	17.1	20.1	37.2	56.0	-18.8
1.243	17.1	20.1	37.2	56.0	-18.8
1.303	17.1	20.1	37.2	56.0	-18.8
3.597	16.9	20.2	37.1	56.0	-18.9
1.527	16.9	20.1	37.0	56.0	-19.0
1.799	16.9	20.1	37.0	56.0	-19.0
1.933	16.8	20.1	36.9	56.0	-19.1
2.265	16.6	20.2	36.8	56.0	-19.2
1.631	16.6	20.1	36.7	56.0	-19.3
0.907	16.6	20.1	36.7	56.0	-19.3
2.180	16.5	20.1	36.6	56.0	-19.4
2.105	16.5	20.1	36.6	56.0	-19.4
1.948	16.5	20.1	36.6	56.0	-19.4
3.164	16.4	20.2	36.6	56.0	-19.4
0.881	16.5	20.1	36.6	56.0	-19.4
3.541	16.3	20.2	36.5	56.0	-19.5
1.974	16.3	20.1	36.4	56.0	-19.6
2.892	16.2	20.2	36.4	56.0	-19.6
1.665	16.2	20.1	36.3	56.0	-19.7

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.336	18.2	20.1	38.3	46.0	-7.7
0.967	18.1	20.1	38.2	46.0	-7.8
1.351	18.0	20.1	38.1	46.0	-7.9
0.945	17.5	20.1	37.6	46.0	-8.4
1.695	17.5	20.1	37.6	46.0	-8.4
1.172	17.2	20.1	37.3	46.0	-8.7
0.598	17.2	20.0	37.2	46.0	-8.8
1.094	17.1	20.1	37.2	46.0	-8.8
1.243	17.1	20.1	37.2	46.0	-8.8
1.303	17.1	20.1	37.2	46.0	-8.8
3.597	16.9	20.2	37.1	46.0	-8.9
1.527	16.9	20.1	37.0	46.0	-9.0
1.799	16.9	20.1	37.0	46.0	-9.0
1.933	16.8	20.1	36.9	46.0	-9.1
2.265	16.6	20.2	36.8	46.0	-9.2
1.631	16.6	20.1	36.7	46.0	-9.3
0.907	16.6	20.1	36.7	46.0	-9.3
2.180	16.5	20.1	36.6	46.0	-9.4
2.105	16.5	20.1	36.6	46.0	-9.4
1.948	16.5	20.1	36.6	46.0	-9.4
3.164	16.4	20.2	36.6	46.0	-9.4
0.881	16.5	20.1	36.6	46.0	-9.4
3.541	16.3	20.2	36.5	46.0	-9.5
1.974	16.3	20.1	36.4	46.0	-9.6
2.892	16.2	20.2	36.4	46.0	-9.6
1.665	16.2	20.1	36.3	46.0	-9.7

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

EUT:	Flexcat Remote	Work Order:	LITS0026
Serial Number:	AC-FCHRC-0022	Date:	02/04/2016
Customer:	LightSPEED Technologies, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	40%
Customer Project:	None	Bar. Pressure:	1015 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC Via AC-DC adapter	Configuration:	LITS0026-9

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	12	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

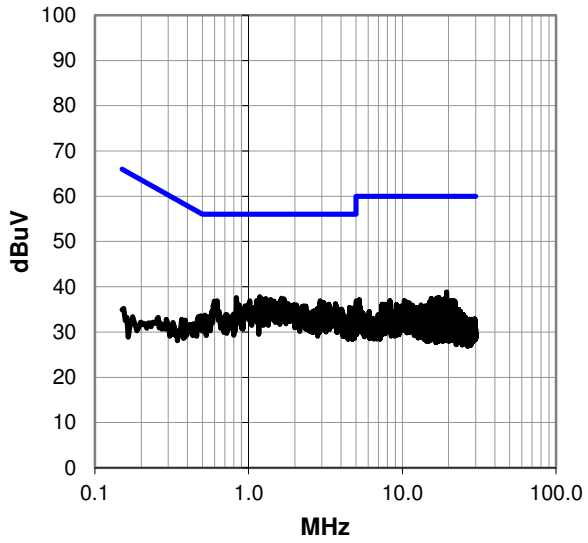
EUT OPERATING MODES

Charging, AC-DC Adapter input voltage 110VAC/60Hz, ZigBee set to Tx Mid Channel.

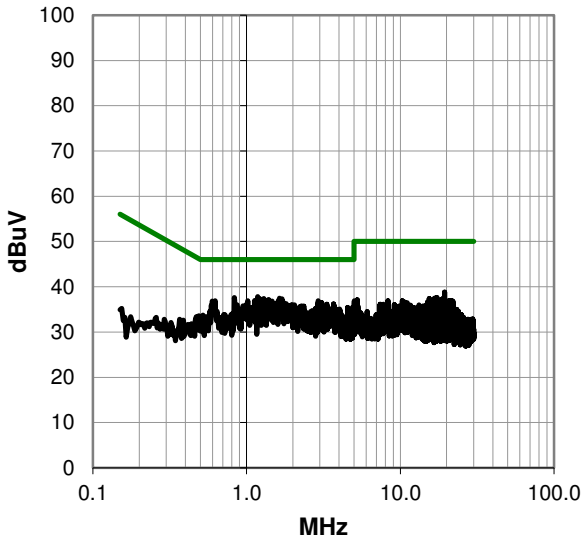
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

RESULTS - Run #12

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.183	17.7	20.1	37.8	56.0	-18.2
0.833	17.6	20.0	37.6	56.0	-18.4
1.639	17.4	20.1	37.5	56.0	-18.5
1.295	17.3	20.1	37.4	56.0	-18.6
1.221	17.2	20.1	37.3	56.0	-18.7
1.698	17.2	20.1	37.3	56.0	-18.7
1.389	17.1	20.1	37.2	56.0	-18.8
1.131	16.9	20.1	37.0	56.0	-19.0
1.616	16.9	20.1	37.0	56.0	-19.0
0.624	16.9	20.0	36.9	56.0	-19.1
1.019	16.8	20.1	36.9	56.0	-19.1
1.407	16.8	20.1	36.9	56.0	-19.1
2.929	16.7	20.2	36.9	56.0	-19.1
1.463	16.7	20.1	36.8	56.0	-19.2
1.142	16.5	20.1	36.6	56.0	-19.4
3.079	16.3	20.2	36.5	56.0	-19.5
1.568	16.3	20.1	36.4	56.0	-19.6
1.430	16.2	20.1	36.3	56.0	-19.7
1.594	16.2	20.1	36.3	56.0	-19.7
1.806	16.2	20.1	36.3	56.0	-19.7
1.254	16.1	20.1	36.2	56.0	-19.8
3.679	16.0	20.2	36.2	56.0	-19.8
0.997	16.0	20.1	36.1	56.0	-19.9
1.333	16.0	20.1	36.1	56.0	-19.9
3.329	15.9	20.2	36.1	56.0	-19.9
1.952	15.9	20.1	36.0	56.0	-20.0

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
1.183	17.7	20.1	37.8	46.0	-8.2
0.833	17.6	20.0	37.6	46.0	-8.4
1.639	17.4	20.1	37.5	46.0	-8.5
1.295	17.3	20.1	37.4	46.0	-8.6
1.221	17.2	20.1	37.3	46.0	-8.7
1.698	17.2	20.1	37.3	46.0	-8.7
1.389	17.1	20.1	37.2	46.0	-8.8
1.131	16.9	20.1	37.0	46.0	-9.0
1.616	16.9	20.1	37.0	46.0	-9.0
0.624	16.9	20.0	36.9	46.0	-9.1
1.019	16.8	20.1	36.9	46.0	-9.1
1.407	16.8	20.1	36.9	46.0	-9.1
2.929	16.7	20.2	36.9	46.0	-9.1
1.463	16.7	20.1	36.8	46.0	-9.2
1.142	16.5	20.1	36.6	46.0	-9.4
3.079	16.3	20.2	36.5	46.0	-9.5
1.568	16.3	20.1	36.4	46.0	-9.6
1.430	16.2	20.1	36.3	46.0	-9.7
1.594	16.2	20.1	36.3	46.0	-9.7
1.806	16.2	20.1	36.3	46.0	-9.7
1.254	16.1	20.1	36.2	46.0	-9.8
3.679	16.0	20.2	36.2	46.0	-9.8
0.997	16.0	20.1	36.1	46.0	-9.9
1.333	16.0	20.1	36.1	46.0	-9.9
3.329	15.9	20.2	36.1	46.0	-9.9
1.952	15.9	20.1	36.0	46.0	-10.0

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

EUT:	Flexcat Remote	Work Order:	LITS0026
Serial Number:	AC-FCHRC-0022	Date:	02/04/2016
Customer:	LightSPEED Technologies, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	40%
Customer Project:	None	Bar. Pressure:	1015 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC Via AC-DC adapter	Configuration:	LITS0026-9

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	13	Line:	High	Add. Ext. Attenuation (dB):	0

COMMENTS

None

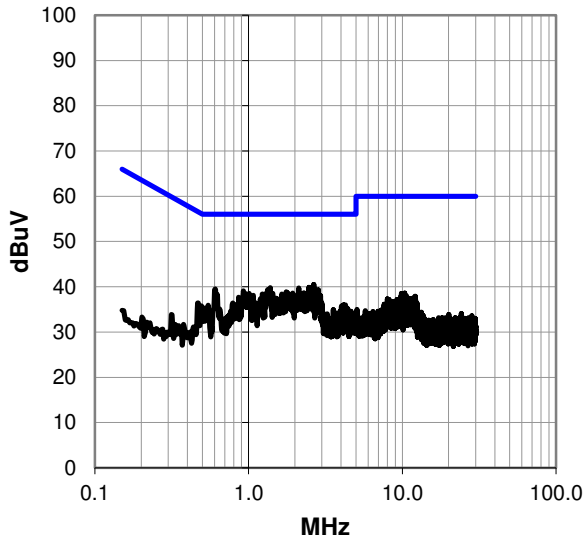
EUT OPERATING MODES

Charging, AC-DC Adapter input voltage 110VAC/60Hz, ZigBee set to Tx Mid Channel.

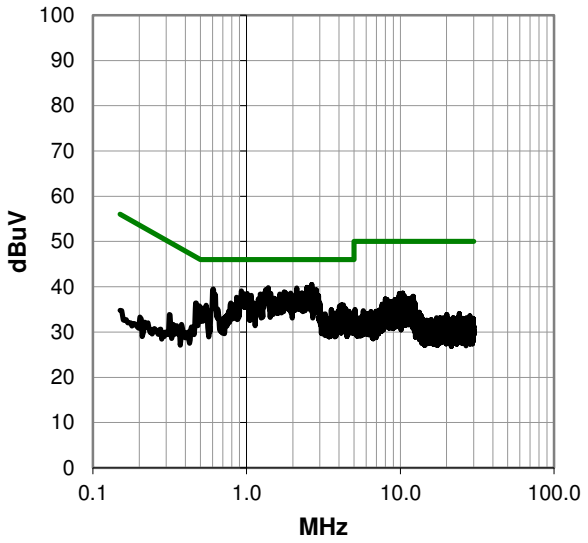
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

RESULTS - Run #13

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.653	20.3	20.2	40.5	56.0	-15.5
2.471	19.7	20.2	39.9	56.0	-16.1
2.560	19.7	20.2	39.9	56.0	-16.1
1.385	19.7	20.1	39.8	56.0	-16.2
2.124	19.6	20.1	39.7	56.0	-16.3
2.691	19.4	20.2	39.6	56.0	-16.4
0.605	19.5	20.0	39.5	56.0	-16.5
1.333	19.3	20.1	39.4	56.0	-16.6
2.840	19.1	20.2	39.3	56.0	-16.7
0.926	19.0	20.1	39.1	56.0	-16.9
2.504	18.9	20.2	39.1	56.0	-16.9
1.754	18.8	20.1	38.9	56.0	-17.1
1.784	18.6	20.1	38.7	56.0	-17.3
2.291	18.5	20.2	38.7	56.0	-17.3
1.933	18.5	20.1	38.6	56.0	-17.4
2.172	18.4	20.1	38.5	56.0	-17.5
1.008	18.4	20.1	38.5	56.0	-17.5
1.437	18.4	20.1	38.5	56.0	-17.5
1.228	18.3	20.1	38.4	56.0	-17.6
1.646	18.3	20.1	38.4	56.0	-17.6
2.351	18.2	20.2	38.4	56.0	-17.6
2.717	18.1	20.2	38.3	56.0	-17.7
1.072	18.0	20.1	38.1	56.0	-17.9
1.415	18.0	20.1	38.1	56.0	-17.9
1.724	18.0	20.1	38.1	56.0	-17.9
2.937	17.8	20.2	38.0	56.0	-18.0

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.653	20.3	20.2	40.5	46.0	-5.5
2.471	19.7	20.2	39.9	46.0	-6.1
2.560	19.7	20.2	39.9	46.0	-6.1
1.385	19.7	20.1	39.8	46.0	-6.2
2.124	19.6	20.1	39.7	46.0	-6.3
2.691	19.4	20.2	39.6	46.0	-6.4
0.605	19.5	20.0	39.5	46.0	-6.5
1.333	19.3	20.1	39.4	46.0	-6.6
2.840	19.1	20.2	39.3	46.0	-6.7
0.926	19.0	20.1	39.1	46.0	-6.9
2.504	18.9	20.2	39.1	46.0	-6.9
1.754	18.8	20.1	38.9	46.0	-7.1
1.784	18.6	20.1	38.7	46.0	-7.3
2.291	18.5	20.2	38.7	46.0	-7.3
1.933	18.5	20.1	38.6	46.0	-7.4
2.172	18.4	20.1	38.5	46.0	-7.5
1.008	18.4	20.1	38.5	46.0	-7.5
1.437	18.4	20.1	38.5	46.0	-7.5
1.228	18.3	20.1	38.4	46.0	-7.6
1.646	18.3	20.1	38.4	46.0	-7.6
2.351	18.2	20.2	38.4	46.0	-7.6
2.717	18.1	20.2	38.3	46.0	-7.7
1.072	18.0	20.1	38.1	46.0	-7.9
1.415	18.0	20.1	38.1	46.0	-7.9
1.724	18.0	20.1	38.1	46.0	-7.9
2.937	17.8	20.2	38.0	46.0	-8.0

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

EUT:	Flexcat Remote	Work Order:	LITS0026
Serial Number:	AC-FCHRC-0022	Date:	02/04/2016
Customer:	LightSPEED Technologies, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	40%
Customer Project:	None	Bar. Pressure:	1015 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC Via AC-DC adapter	Configuration:	LITS0026-9

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	14	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

None

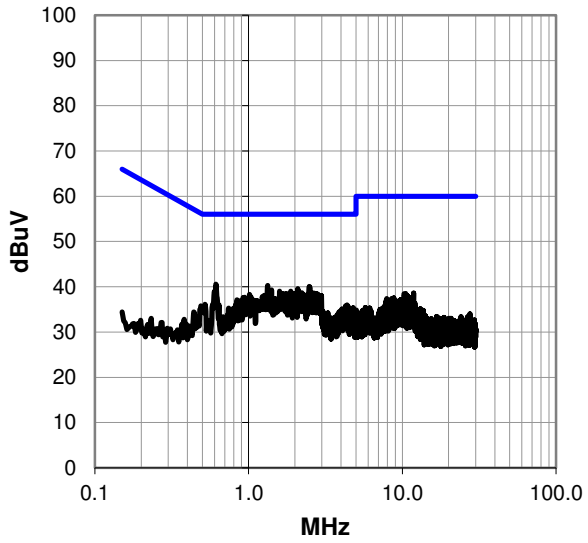
EUT OPERATING MODES

Charging, AC-DC Adapter input voltage 110VAC/60Hz, ZigBee set to Tx High Channel.

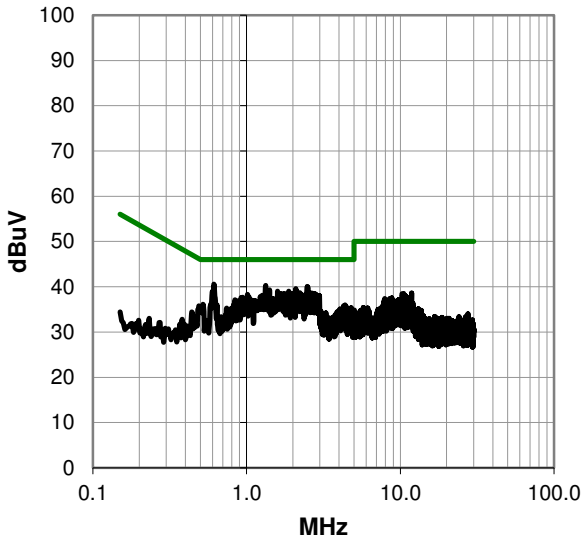
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

RESULTS - Run #14

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.613	20.6	20.0	40.6	56.0	-15.4
1.329	20.2	20.1	40.3	56.0	-15.7
2.478	19.9	20.2	40.1	56.0	-15.9
2.086	19.5	20.1	39.6	56.0	-16.4
1.411	19.2	20.1	39.3	56.0	-16.7
2.116	18.9	20.1	39.0	56.0	-17.0
1.586	18.9	20.1	39.0	56.0	-17.0
1.885	18.9	20.1	39.0	56.0	-17.0
2.221	18.5	20.1	38.6	56.0	-17.4
2.601	18.4	20.2	38.6	56.0	-17.4
2.665	18.4	20.2	38.6	56.0	-17.4
1.657	18.4	20.1	38.5	56.0	-17.5
1.751	18.4	20.1	38.5	56.0	-17.5
2.015	18.4	20.1	38.5	56.0	-17.5
2.769	18.3	20.2	38.5	56.0	-17.5
1.810	18.3	20.1	38.4	56.0	-17.6
2.430	18.2	20.2	38.4	56.0	-17.6
2.814	18.1	20.2	38.3	56.0	-17.7
1.016	18.2	20.1	38.3	56.0	-17.7
2.859	18.0	20.2	38.2	56.0	-17.8
1.266	18.0	20.1	38.1	56.0	-17.9
2.948	17.8	20.2	38.0	56.0	-18.0
2.982	17.8	20.2	38.0	56.0	-18.0
1.780	17.8	20.1	37.9	56.0	-18.1
2.038	17.8	20.1	37.9	56.0	-18.1
0.945	17.6	20.1	37.7	56.0	-18.3

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.613	20.6	20.0	40.6	46.0	-5.4
1.329	20.2	20.1	40.3	46.0	-5.7
2.478	19.9	20.2	40.1	46.0	-5.9
2.086	19.5	20.1	39.6	46.0	-6.4
1.411	19.2	20.1	39.3	46.0	-6.7
2.116	18.9	20.1	39.0	46.0	-7.0
1.586	18.9	20.1	39.0	46.0	-7.0
1.885	18.9	20.1	39.0	46.0	-7.0
2.221	18.5	20.1	38.6	46.0	-7.4
2.601	18.4	20.2	38.6	46.0	-7.4
2.665	18.4	20.2	38.6	46.0	-7.4
1.657	18.4	20.1	38.5	46.0	-7.5
1.751	18.4	20.1	38.5	46.0	-7.5
2.015	18.4	20.1	38.5	46.0	-7.5
2.769	18.3	20.2	38.5	46.0	-7.5
1.810	18.3	20.1	38.4	46.0	-7.6
2.430	18.2	20.2	38.4	46.0	-7.6
2.814	18.1	20.2	38.3	46.0	-7.7
1.016	18.2	20.1	38.3	46.0	-7.7
2.859	18.0	20.2	38.2	46.0	-7.8
1.266	18.0	20.1	38.1	46.0	-7.9
2.948	17.8	20.2	38.0	46.0	-8.0
2.982	17.8	20.2	38.0	46.0	-8.0
1.780	17.8	20.1	37.9	46.0	-8.1
2.038	17.8	20.1	37.9	46.0	-8.1
0.945	17.6	20.1	37.7	46.0	-8.3

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

EUT:	Flexcat Remote	Work Order:	LITS0026
Serial Number:	AC-FCHRC-0022	Date:	02/04/2016
Customer:	LightSPEED Technologies, Inc.	Temperature:	22°C
Attendees:	None	Relative Humidity:	40%
Customer Project:	None	Bar. Pressure:	1015 mb
Tested By:	Jeff Alcoke	Job Site:	EV07
Power:	5VDC Via AC-DC adapter	Configuration:	LITS0026-9

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	15	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

None

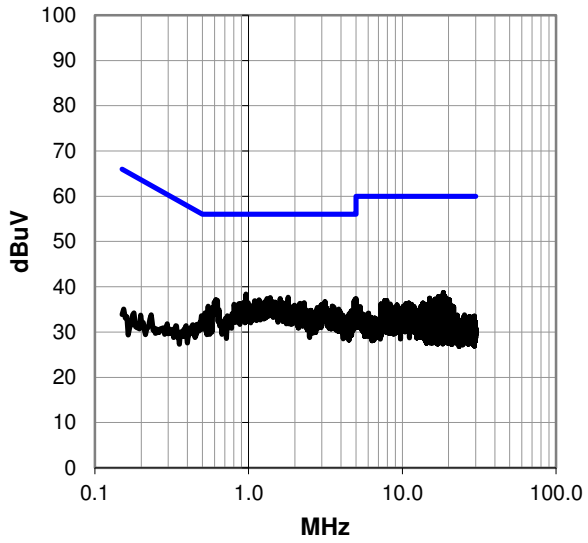
EUT OPERATING MODES

Charging, AC-DC Adapter input voltage 110VAC/60Hz, ZigBee set to Tx High Channel.

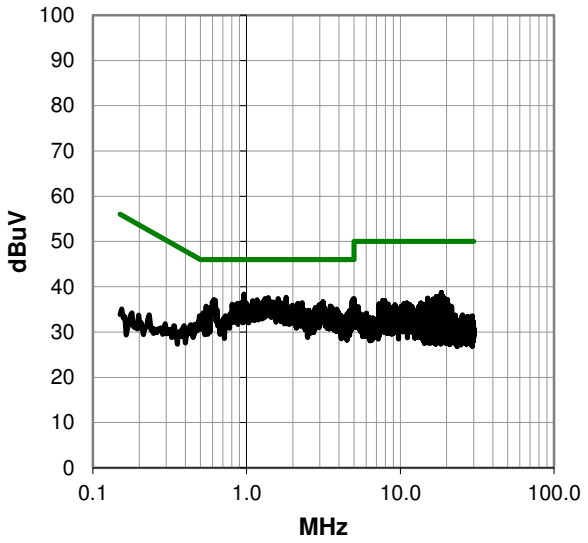
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

RESULTS - Run #15

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.963	18.3	20.1	38.4	56.0	-17.6
1.806	17.6	20.1	37.7	56.0	-18.3
1.385	17.5	20.1	37.6	56.0	-18.4
1.318	17.3	20.1	37.4	56.0	-18.6
1.609	17.3	20.1	37.4	56.0	-18.6
4.989	17.1	20.3	37.4	56.0	-18.6
4.940	17.0	20.3	37.3	56.0	-18.7
0.613	17.2	20.0	37.2	56.0	-18.8
1.172	17.0	20.1	37.1	56.0	-18.9
1.094	16.8	20.1	36.9	56.0	-19.1
4.858	16.6	20.2	36.8	56.0	-19.2
0.941	16.6	20.1	36.7	56.0	-19.3
1.273	16.6	20.1	36.7	56.0	-19.3
3.138	16.5	20.2	36.7	56.0	-19.3
1.489	16.5	20.1	36.6	56.0	-19.4
0.989	16.4	20.1	36.5	56.0	-19.5
2.303	16.3	20.2	36.5	56.0	-19.5
0.922	16.3	20.1	36.4	56.0	-19.6
1.676	16.3	20.1	36.4	56.0	-19.6
2.168	16.2	20.1	36.3	56.0	-19.7
1.202	16.2	20.1	36.3	56.0	-19.7
0.866	16.2	20.1	36.3	56.0	-19.7
2.142	16.1	20.1	36.2	56.0	-19.8
1.777	16.1	20.1	36.2	56.0	-19.8
0.807	16.1	20.0	36.1	56.0	-19.9
2.967	15.8	20.2	36.0	56.0	-20.0

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.963	18.3	20.1	38.4	46.0	-7.6
1.806	17.6	20.1	37.7	46.0	-8.3
1.385	17.5	20.1	37.6	46.0	-8.4
1.318	17.3	20.1	37.4	46.0	-8.6
1.609	17.3	20.1	37.4	46.0	-8.6
4.989	17.1	20.3	37.4	46.0	-8.6
4.940	17.0	20.3	37.3	46.0	-8.7
0.613	17.2	20.0	37.2	46.0	-8.8
1.172	17.0	20.1	37.1	46.0	-8.9
1.094	16.8	20.1	36.9	46.0	-9.1
4.858	16.6	20.2	36.8	46.0	-9.2
0.941	16.6	20.1	36.7	46.0	-9.3
1.273	16.6	20.1	36.7	46.0	-9.3
3.138	16.5	20.2	36.7	46.0	-9.3
1.489	16.5	20.1	36.6	46.0	-9.4
0.989	16.4	20.1	36.5	46.0	-9.5
2.303	16.3	20.2	36.5	46.0	-9.5
0.922	16.3	20.1	36.4	46.0	-9.6
1.676	16.3	20.1	36.4	46.0	-9.6
2.168	16.2	20.1	36.3	46.0	-9.7
1.202	16.2	20.1	36.3	46.0	-9.7
0.866	16.2	20.1	36.3	46.0	-9.7
2.142	16.1	20.1	36.2	46.0	-9.8
1.777	16.1	20.1	36.2	46.0	-9.8
0.807	16.1	20.0	36.1	46.0	-9.9
2.967	15.8	20.2	36.0	46.0	-10.0

CONCLUSION

Pass

Tested By