Alcon Laboratories, Inc.

Zigbee Radio Telit Communication

Report #: ALCO0148

Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – www.nwemc.com

California – Minnesota – Oregon – New York – Washington

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Last Date of Test: March 19, 2012
Alcon Laboratories, Inc.
Model: Zigbee Radio Telit Communication

Emissions

Test Description	Specification	Test Method	Pass/Fail
Spurious Radiated Emissions	FCC 15.247:2012	ANSI C63.10:2009	**Pass**

Deviations From Test Standards

None

Approved By:

Tim O'Shea, Operations Manager

NVLAP Lab Code: 200676-0

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
41 Tesla Ave.
Irvine, CA 92618

Phone: (503) 844-4066 Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834B-1).

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.

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. This Report may only be duplicated in its entirety. 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

Revision Number	Description	Date	Page Number
00	None		

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 Guide 65 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. The scope includes radio, ITE, and medical standards from around the world. See: http://www.nwemc.com/accreditations/

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

KCC / 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.

Hong Kong

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

Vietnam

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

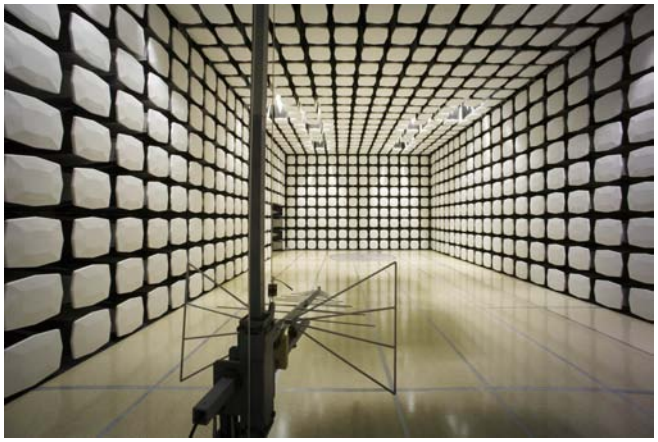
Russia

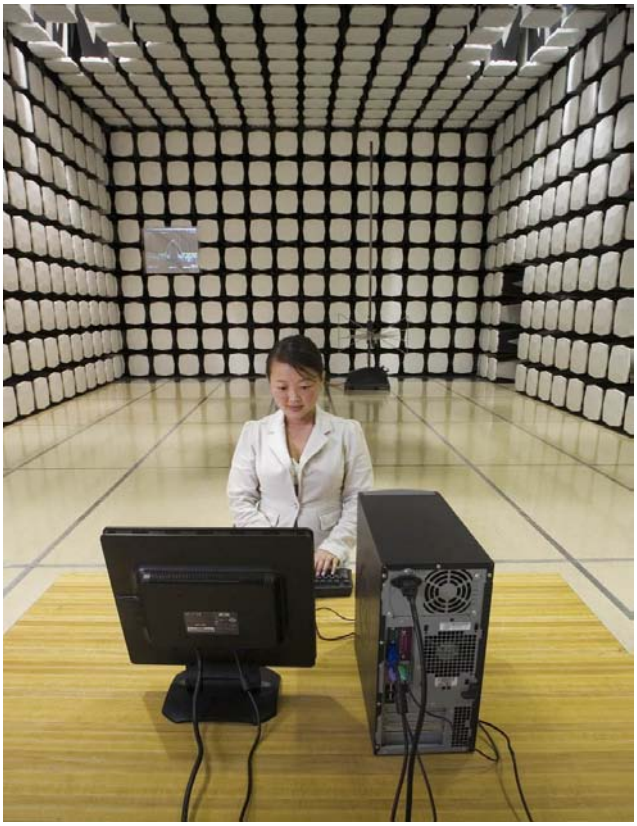
GOST – Accredited by Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC to perform EMC and Hygienic testing for Information Technology products to GOST standards**.**

Locations

Revision 2/23/12

Oregon Labs EV01-EV12 22975 NW Evergreen Pkwy, #400 Hillsboro, OR 97124 (503) 844-4066	**California** Labs OC01-OC13 41 Tesla Irvine, CA 92618 (949) 861-8918	**New York** Labs WA01-WA04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	**Minnesota** Labs MN01-MN08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	**Washington** Labs SU01-SU07 14128 339th Ave. SE Sultan, WA 98294 (360) 793-8675
VCCI				
C-1071, R-1025, G-84, C-2687, T-1658, R-2318	R-1943, G-85, C-2766, T-1659, G-548		R-3125, G-86, G-141, C-3464, T-1634	R-871, G-83, C-3265, T-1511
Industry Canada				
2834D-1, 2834D-*2*	2834B-1, 2834B-2, 2834B-3		2834E-1	2834C-1





Product Description

Client and Equipment Under Test (EUT) Information

Company Name:	Alcon Laboratories, Inc.
Address:	15800 Alton Parkway
City, State, Zip:	Irvine, CA 92618-3818
Test Requested By:	Sergey Marker
Model:	Zigbee Radio Telit Communication
First Date of Test:	March 19, 2012
Last Date of Test:	March 19, 2012
Receipt Date of Samples:	March 19, 2012
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
Radio

Testing Objective:
The applicant desires to add a new 2 dBi antenna to the modular approval of the Zigbee radio module FCC ID: RI7XE61. Additional radiated spurious emissions testing, documented in this report, was performed to demonstrate compliance under FCC 15.247 for the new antenna.

Configurations

Configuration 1 ALCO0148

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Radio PCB	Telit Communication	ZE61-2.4	FXDK2101484
2.4 GHz Ceramic Patch Antenna	Taoglas	WPC25A	None

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Battery	Totex Mfg Inc.	U280253	1136
Interface board	Alcon	215-2376-501	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Interface	No	0.25m	No	Interface board	Radio PCB
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Modifications

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	3/19/2012	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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

Channel 11 (2405 MHz), Max Power (Level 0)
Channel 18 (2440 MHz), Max Power (Level 0)
Channel 26 (2480 MHz), Max Power (Level 0)

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

ALCO0148 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	1 GHz	Stop Frequency	26 GHz

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
Attenuator, 20db, 'SMA'	Weinschel Corp	4H-20	AWB	6/17/2011	12 mo
High Pass Filter	Micro-Tronics	HPM50111	HGC	11/30/2010	24 mo
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOI	4/29/2011	12 mo
Antenna, Horn	EMCO	3160-09	AHN	NCR	0 mo
OC floating Cable	N/A	18-26GHz RE Cables	OCK	4/29/2011	12 mo
OC07 Cables	ESM Cable Corp.	8-18GHz cables	OCY	3/7/2012	12 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVP	1/24/2012	12 mo
Antenna, Horn	EMCO	3160-08	AHK	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVL	1/24/2012	12 mo
Antenna, Horn	ETS	3160-07	AHX	NCR	0 mo
OC07 Cables	ESM Cable Corp.	1-8GHz cables	OCX	3/7/2012	12 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVJ	1/24/2012	12 mo
Antenna, Horn (DRG)	ETS Lindgren	3115	AIR	5/26/2011	24 mo
Spectrum Analyzer	Agilent	E4446A	AAY	1/9/2012	12 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

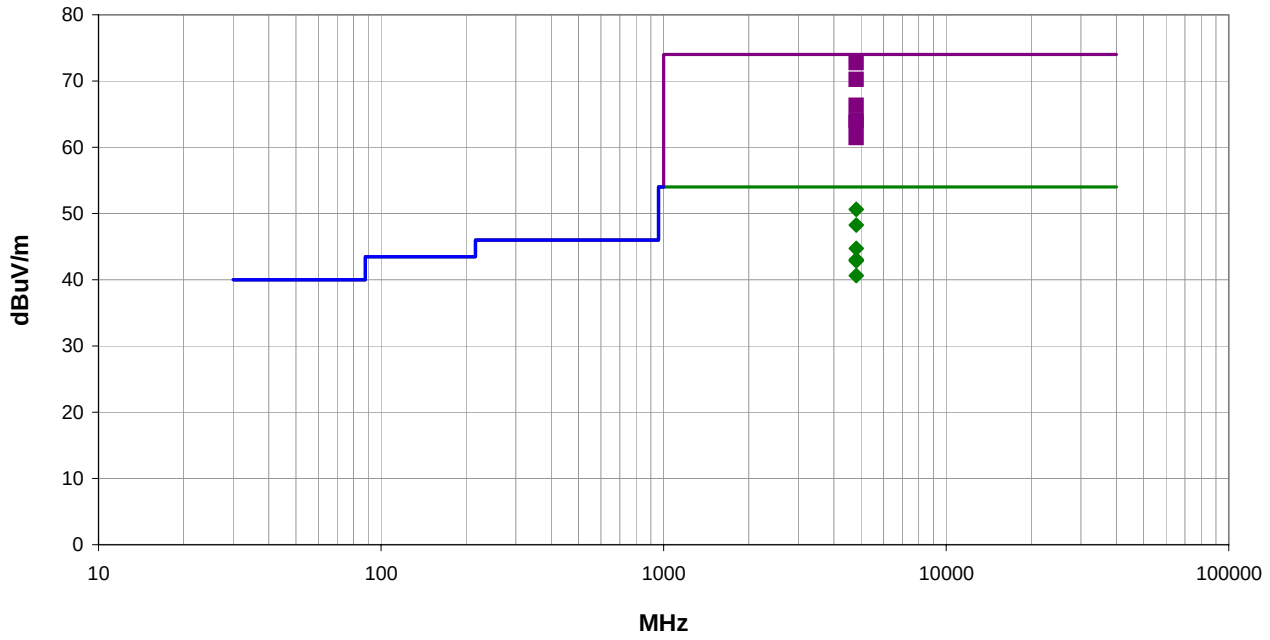
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify 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, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

SPURIOUS RADIATED EMISSIONS

Work Order:	ALCO0148	**Date:**	03/19/12		
Project:	None	**Temperature:**	21 °C		
Job Site:	OC07	**Humidity:**	31.13% RH		
Serial Number:	FXDK2101484	**Barometric Pres.:**	1013.9 mbar	**Tested by:**	Johnny Candelas
EUT:	Zigbee Radio Telit Communication				
Configuration:	1				
Customer:	Alcon Laboratories, Inc.				
Attendees:	Thai Lam				
EUT Power:	Battery				
Operating Mode:	Channel 11 (2405 MHz), Max Power (Level 0)				
Deviations:	None				
Comments:	Model: ZE61-2.4 FCC ID: RI7XE61 & IC ID: 5131A-XE61				

Test Specifications	**Test Method**
FCC 15.247:2012	ANSI C63.10:2009

Run #	2	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



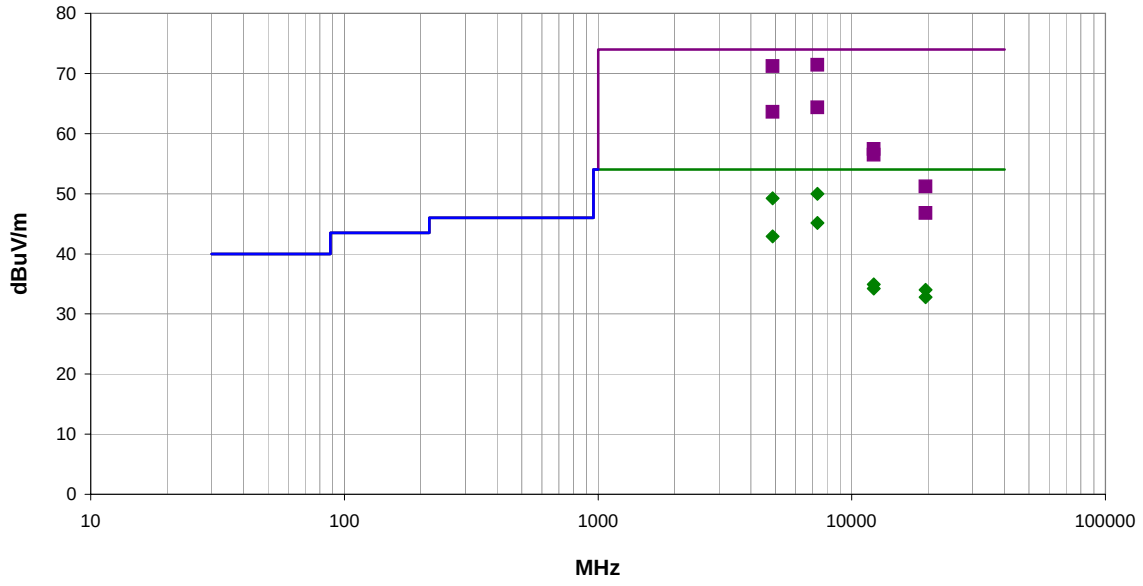
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance ()	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted ()	Spec. Limit ()	Compared to Spec. (dB)	Comments
4809.003	67.6	5.1	1.2	37.0	3.0	0.0	Horz	PK	0.0	72.7	74.0	-1.3	Z-Axis
4810.986	45.5	5.1	1.2	37.0	3.0	0.0	Horz	AV	0.0	50.6	54.0	-3.4	Z-Axis
4808.986	65.1	5.1	1.2	323.0	3.0	0.0	Horz	PK	0.0	70.2	74.0	-3.8	Y-Axis
4810.986	43.1	5.1	1.2	323.0	3.0	0.0	Horz	AV	0.0	48.2	54.0	-5.8	Y-Axis
4808.873	61.2	5.1	1.2	79.0	3.0	0.0	Vert	PK	0.0	66.3	74.0	-7.7	X-Axis
4810.973	39.6	5.1	1.2	79.0	3.0	0.0	Vert	AV	0.0	44.7	54.0	-9.3	X-Axis
4809.073	58.9	5.1	1.2	324.0	3.0	0.0	Vert	PK	0.0	64.0	74.0	-10.0	Z-Axis
4809.003	58.6	5.1	1.2	119.0	3.0	0.0	Horz	PK	0.0	63.7	74.0	-10.3	X-Axis
4810.948	37.9	5.1	1.2	324.0	3.0	0.0	Vert	AV	0.0	43.0	54.0	-11.0	Z-Axis
4810.953	37.7	5.1	1.2	119.0	3.0	0.0	Horz	AV	0.0	42.8	54.0	-11.2	X-Axis
4808.881	56.3	5.1	1.2	287.0	3.0	0.0	Vert	PK	0.0	61.4	74.0	-12.6	Y-Axis
4810.998	35.5	5.1	1.2	287.0	3.0	0.0	Vert	AV	0.0	40.6	54.0	-13.4	Y-Axis

SPURIOUS RADIATED EMISSIONS

Work Order:	ALCO0148	**Date:**	03/19/12		
Project:	None	**Temperature:**	21 °C		
Job Site:	OC07	**Humidity:**	31.13% RH		
Serial Number:	FXDK2101484	**Barometric Pres.:**	1013.9 mbar	**Tested by:**	Johnny Candelas
EUT:	Zigbee Radio Telit Communication				
Configuration:	1				
Customer:	Alcon Laboratories, Inc.				
Attendees:	Thai Lam				
EUT Power:	Battery				
Operating Mode:	Channel 18 (2440 MHz), Max Power (Level 0)				
Deviations:	None				
Comments:	Z-Axis (Standing Up), Model: ZE61-2.4 FCC ID: RI7XE61 & IC ID: 5131A-XE61				

Test Specifications	**Test Method**
FCC 15.247:2012	ANSI C63.10:2009

Run #	7	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



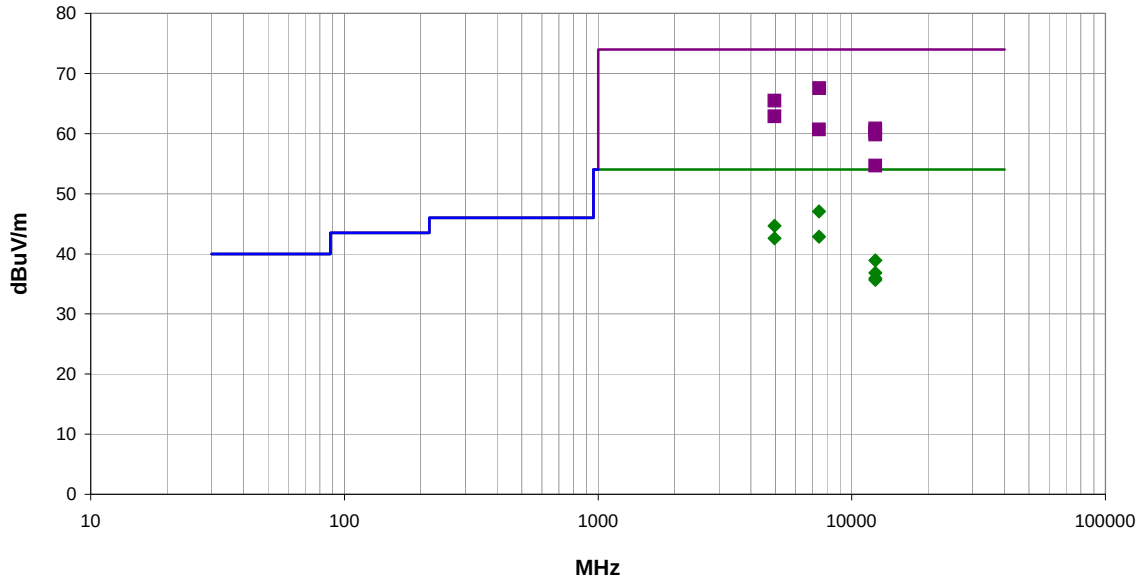
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance ()	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted ()	Spec. Limit ()	Compared to Spec. (dB)
7321.321	59.3	12.2	1.2	242.0	3.0	0.0	Vert	PK	0.0	71.5	74.0	-2.5
4879.090	65.9	5.3	1.2	45.0	3.0	0.0	Horz	PK	0.0	71.2	74.0	-2.8
7321.338	37.8	12.2	1.2	242.0	3.0	0.0	Vert	AV	0.0	50.0	54.0	-4.0
4880.998	43.9	5.3	1.2	45.0	3.0	0.0	Horz	AV	0.0	49.2	54.0	-4.8
7321.494	33.0	12.2	1.2	77.0	3.0	0.0	Horz	AV	0.0	45.2	54.0	-8.8
7321.152	52.2	12.2	1.2	77.0	3.0	0.0	Horz	PK	0.0	64.4	74.0	-9.6
4880.940	58.3	5.3	1.2	38.0	3.0	0.0	Vert	PK	0.0	63.6	74.0	-10.4
4881.048	37.6	5.3	1.2	38.0	3.0	0.0	Vert	AV	0.0	42.9	54.0	-11.1
12197.530	63.3	-5.9	1.2	0.0	3.0	0.0	Vert	PK	0.0	57.4	74.0	-16.6
12199.130	62.3	-5.9	1.2	3.0	3.0	0.0	Horz	PK	0.0	56.4	74.0	-17.6
12197.390	40.8	-5.9	1.2	0.0	3.0	0.0	Vert	AV	0.0	34.9	54.0	-19.1
12197.360	40.1	-5.9	1.2	3.0	3.0	0.0	Horz	AV	0.0	34.2	54.0	-19.8
19523.070	33.8	0.2	1.2	325.0	3.0	0.0	Vert	AV	0.0	34.0	54.0	-20.0
19523.130	32.6	0.2	1.2	280.0	3.0	0.0	Horiz	AV	0.0	32.8	54.0	-21.2
19524.040	51.0	0.2	1.2	325.0	3.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8
19523.430	46.6	0.2	1.2	280.0	3.0	0.0	Horiz	PK	0.0	46.8	74.0	-27.2

SPURIOUS RADIATED EMISSIONS

Work Order:	ALCO0148	**Date:**	03/19/12		
Project:	None	**Temperature:**	21 °C		
Job Site:	OC07	**Humidity:**	31.13% RH		
Serial Number:	FXDK2101484	**Barometric Pres.:**	1013.9 mbar	**Tested by:**	Johnny Candelas
EUT:	Zigbee Radio Telit Communication				
Configuration:	1				
Customer:	Alcon Laboratories, Inc.				
Attendees:	Thai Lam				
EUT Power:	Battery				
Operating Mode:	Channel 26 (2480 MHz), Max Power (Level 0)				
Deviations:	None				
Comments:	Z-Axis (Standing Up), Model: ZE61-2.4 FCC ID: RI7XE61 & IC ID: 5131A-XE61				

Test Specifications	**Test Method**
FCC 15.247:2012	ANSI C63.10:2009

Run #	12	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



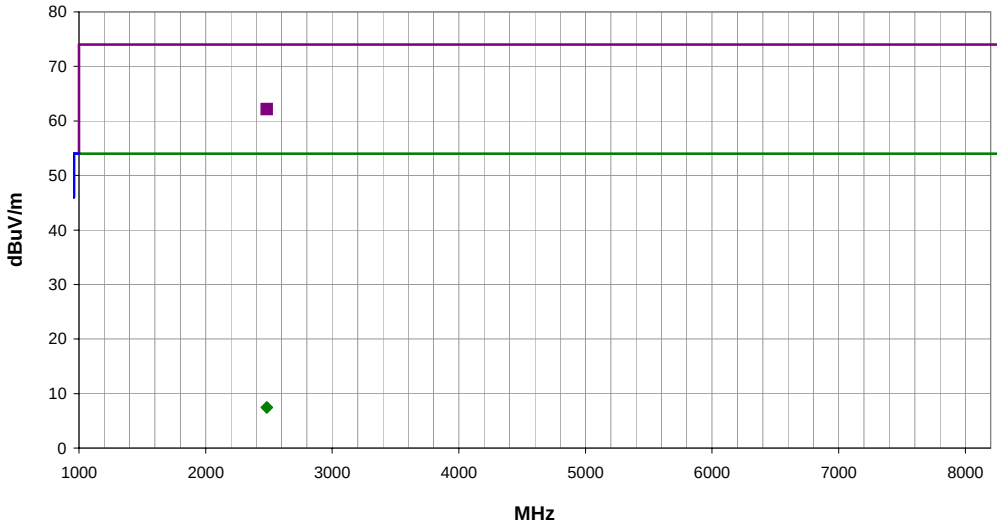
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance ()	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted ()	Spec. Limit ()	Compared to Spec. (dB)
7441.670	55.3	12.3	1.2	207.0	3.0	0.0	Vert	PK	0.0	67.6	74.0	-6.4
7441.254	34.8	12.3	1.2	207.0	3.0	0.0	Vert	AV	0.0	47.1	54.0	-6.9
4959.180	59.9	5.6	1.2	80.0	3.0	0.0	Horz	PK	0.0	65.5	74.0	-8.5
4961.005	39.1	5.6	1.2	80.0	3.0	0.0	Horz	AV	0.0	44.7	54.0	-9.3
4961.238	57.3	5.6	1.2	77.0	3.0	0.0	Vert	PK	0.0	62.9	74.0	-11.1
7441.256	30.6	12.3	1.2	43.0	3.0	0.0	Horz	AV	0.0	42.9	54.0	-11.1
4960.955	37.0	5.6	1.2	77.0	3.0	0.0	Vert	AV	0.0	42.6	54.0	-11.4
12396.750	66.0	-5.1	1.2	3.0	3.0	0.0	Vert	PK	0.0	60.9	74.0	-13.1
7438.315	48.4	12.3	1.2	43.0	3.0	0.0	Horz	PK	0.0	60.7	74.0	-13.3
12402.650	56.6	3.8	1.2	39.0	3.0	0.0	Horz	PK	0.0	60.4	74.0	-13.6
12396.730	65.0	-5.1	1.2	358.0	3.0	0.0	Horz	PK	0.0	59.9	74.0	-14.1
12402.430	35.1	3.8	1.2	39.0	3.0	0.0	Horz	AV	0.0	38.9	54.0	-15.1
12397.330	42.0	-5.1	1.2	3.0	3.0	0.0	Vert	AV	0.0	36.9	54.0	-17.1
12397.380	41.1	-5.1	1.2	358.0	3.0	0.0	Horz	AV	0.0	36.0	54.0	-18.0
12402.410	31.9	3.8	1.2	276.0	3.0	0.0	Vert	AV	0.0	35.7	54.0	-18.3
12403.020	50.9	3.8	1.2	276.0	3.0	0.0	Vert	PK	0.0	54.7	74.0	-19.3

SPURIOUS RADIATED EMISSIONS

Work Order:	ALCO0148	**Date:**	03/19/12		
Project:	None	**Temperature:**	21 °C		
Job Site:	OC07	**Humidity:**	31.13% RH		
Serial Number:	FXDK2101484	**Barometric Pres.:**	1013.9 mbar	**Tested by:**	Johnny Candelas
EUT:	Zigbee Radio Telit Communication				
Configuration:	1				
Customer:	Alcon Laboratories, Inc.				
Attendees:	Thai Lam				
EUT Power:	Battery				
Operating Mode:	Channel 26 (2480 MHz), Max Power (Level 0)				
Deviations:	None				
Comments:	Z-Axis (Standing Up), Model: ZE61-2.4 FCC ID: RI7XE61 & IC ID: 5131A-XE61				

Test Specifications	**Test Method**
FCC 15.247:2012	ANSI C63.10:2009

Run #	19	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**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
2480.000	91.8	-4.0	1.2	320.0	3.0	20.0	Vert	PK	0.0	107.8			Fundamental peak measurement
2480.000	37.1	-4.0	1.2	320.0	3.0	20.0	Vert	AV	0.0	53.1			Fundamental average measurement
2483.50	46.14	-4.0	1.2	320.0	3.0	20.0	Vert	PK	0.00	62.14	74.00	-11.86	Marker Delta Method = Fundamental - 45.66dB
2483.50	-8.60	-4.0	1.2	320.0	3.0	20.0	Vert	AV	0.00	7.44	54.00	-46.56	Marker Delta Method = Fundamental - 45.66dB