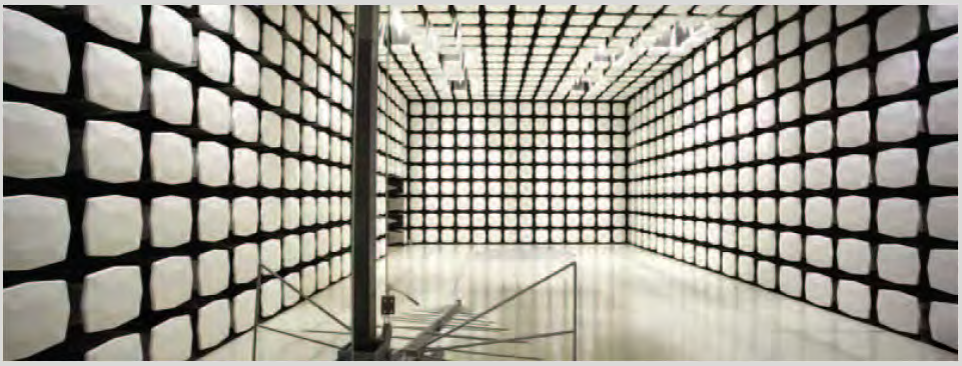
64seconds, Inc.

RE1 Radio Module

FCC 15.207:2014

FCC 15.247:2014

Report # 64SE0001.1



NVLAP Lab Code: 200881-0

NORTHWEST EMC

WTD 13.9.30

CERTIFICATE OF TEST

Last Date of Test: November 04, 2014
64seconds, Inc.
Model: RE1 Radio Module

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2014	ANSI C63.10:2009
FCC 15.247:2014	ANSI C63.10:2009

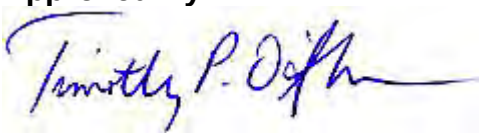
Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
6.7	Band Edge Compliance	Yes	Pass	
6.7	Spurious Conducted Emissions	Yes	Pass	
6.9.1	Occupied Bandwidth	Yes	Pass	
6.10.1	Equivalent Isotropic Radiated Power	Yes	Pass	
6.11.2	Power Spectral Density	Yes	Pass	
7.5	Duty Cycle	Yes	Pass	
7.7.2	Channel Spacing	Yes	Pass	
7.7.3	Number of Hopping Frequencies	Yes	N/A	No limit. Required for Dwell Time
7.7.4	Dwell Time	Yes	Pass	
7.7.9	Band Edge Compliance – Hopping Mode	Yes	Pass	

Deviations From Test Standards

None

Approved By:



Tim O'Shea, 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

REV 2014.10.08

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

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

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.

SCOPE

For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/

MEASUREMENT UNCERTAINTY

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.

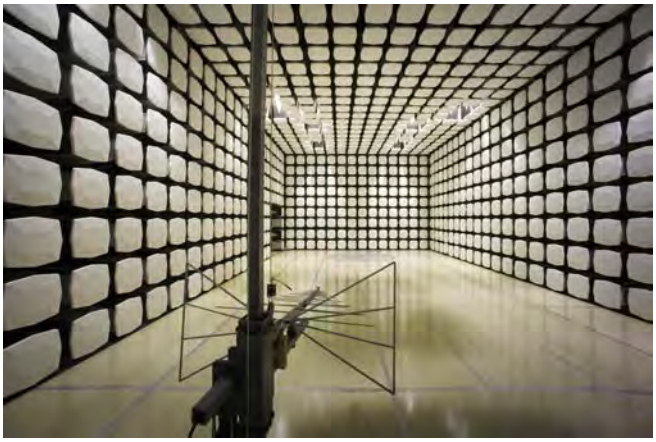
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

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)	4.7 dB	-4.7 dB
AC Powerline Conducted Emissions (dB)	2.9 dB	-2.9 dB

FACILITIES

NORTHWEST EMC
REV 2014.10.08

Oregon Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	**California** Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	**New York** Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	**Minnesota** Labs MN01-08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	**Washington** Labs NC01-05,SU02,SU07 19201 120th Ave. NE Bothell, WA 98011 (425) 984-6600
VCCI				
A-0108	A-0029		A-0109	A-0110
Industry Canada				
2834D-1, 2834D-2	2834B-1, 2834B-2, 2834B-3		2834E-1	2834F-1
NVLAP				
NVLAP Lab Code: 200630-0	NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200629-0



PRODUCT DESCRIPTION

WTD 13.9.30

Client and Equipment Under Test (EUT) Information

Company Name:	64seconds, Inc.
Address:	945 Concord Street
City, State, Zip:	Framingham, MA 01701
Test Requested By:	Paul Lander
Model:	RE1
First Date of Test:	October 30, 2014
Last Date of Test:	November 04, 2014
Receipt Date of Samples:	October 30, 2014
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Low-cost, low-power 2.4 GHz unlicensed-band radio module for general purpose RF communication between a Sensor unit and a Base unit. The radio operates as a FHSS Hybrid and utilizes 1 non-removable antenna.

Testing Objective:
To demonstrate compliance to FCC 15.247 requirements for modular approval.

CONFIGURATIONS

Configuration 64SE0001- 1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
RE1 Radio Module	64seconds, Inc.	None	None

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AA Battery Pack	N/A	None	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power Cable	No	25cm	No	RE1	AA Battery Pack

MODIFICATIONS

WTD 13.9.30

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	10/30/2014	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.
2	11/3/2014	Powerline 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.
3	11/3/2014	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.
4	11/3/2014	Number of Hopping Frequencies	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	11/4/2014	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.
6	11/4/2014	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.
7	11/4/2014	Duty Cycle	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.
8	11/4/2014	Equivalent Isotropic Radiated 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.
9	11/4/2014	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.
10	11/4/2014	Dwell Time	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.
11	11/4/2014	Channel Spacing	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.
12	11/4/2014	Band Edge Compliance – Hopping Mode	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed

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. 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 50 Ω measuring port is terminated by a 50 Ω EMI meter or a 50 Ω resistive load. All 50 Ω measuring ports of the LISN are terminated by 50Ω.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Receiver	Rohde & Schwarz	ESR7	ARI	05/06/2014	12 mo
Attenuator 20dB, BNC	Fairview Microwave	SA01B-20	AQP	07/22/2014	12 mo
High Pass Filter	TTE	H97-100K-50-720B	HGN	05/23/2014	24 mo
MN03 Cables	ESM Cable Corp.	Conducted Cables	MNC	12/05/2013	12 mo
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	05/15/2014	12 mo
Single Output DC Power Supply, 30V/5A, 150W	Agilent	U8002A	TPZ	NCR	0 mo

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

64SE0001-1

MODES INVESTIGATED

Transmitting 2402 MHz
Transmitting 2446 MHz
Transmitting 2480 MHz

POWERLINE CONDUCTED EMISSIONS

EUT:	RE1 Radio Module	Work Order:	64SE0001
Serial Number:	None	Date:	11/03/2014
Customer:	64seconds, Inc.	Temperature:	23.8°C
Attendees:	None	Relative Humidity:	21.3%
Customer Project:	None	Bar. Pressure:	1035.2 mb
Tested By:	Johnathan Lee	Job Site:	MN03
Power:	3.0VDC	Configuration:	64SE0001-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

TEST PARAMETERS

Run #:	3	Line:	Positive Lead	Ext. Attenuation (dB):	20

COMMENTS

None

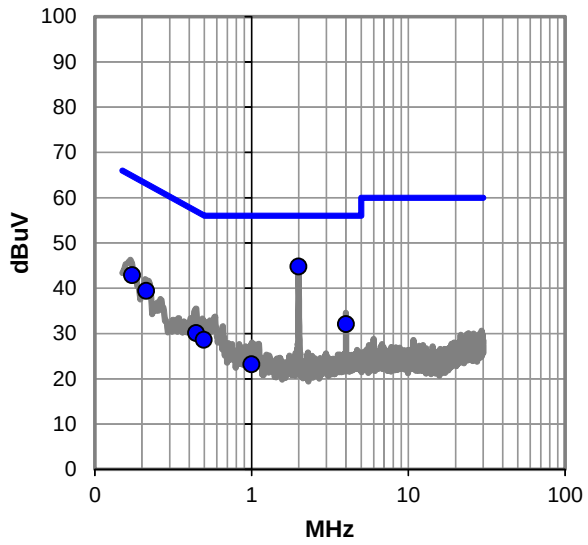
EUT OPERATING MODES

Transmitting 2402 MHz

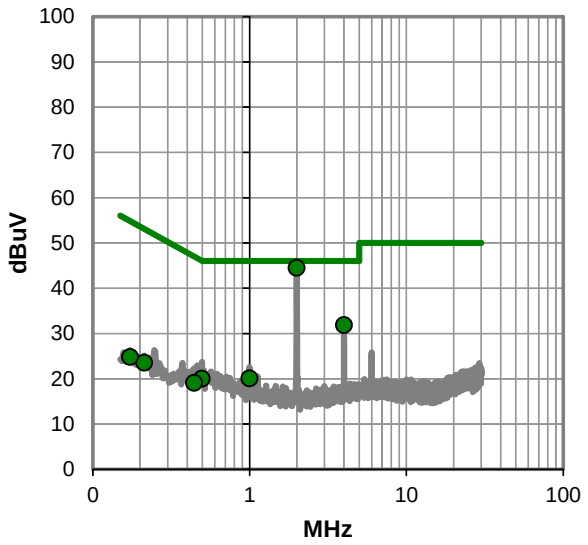
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.000	24.5	20.3	44.8	56.0	-11.2
0.173	22.6	20.3	42.9	64.8	-21.9
0.213	19.2	20.2	39.4	63.1	-23.7
4.000	11.7	20.4	32.1	56.0	-23.9
0.444	9.9	20.2	30.1	57.0	-26.9
0.497	8.4	20.2	28.6	56.1	-27.5
1.000	2.9	20.3	23.2	56.0	-32.8

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.000	24.2	20.3	44.5	46.0	-1.5
4.000	11.5	20.4	31.9	46.0	-14.1
1.000	-0.2	20.3	20.1	46.0	-25.9
0.497	-0.2	20.2	20.0	46.1	-26.1
0.444	-1.1	20.2	19.1	47.0	-27.9
0.213	3.3	20.2	23.5	53.1	-29.6
0.173	4.5	20.3	24.8	54.8	-30.0

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

EUT:	RE1 Radio Module	Work Order:	64SE0001
Serial Number:	None	Date:	11/03/2014
Customer:	64seconds, Inc.	Temperature:	23.8°C
Attendees:	None	Relative Humidity:	21.3%
Customer Project:	None	Bar. Pressure:	1035.2 mb
Tested By:	Johnathan Lee	Job Site:	MN03
Power:	3.0VDC	Configuration:	64SE0001-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

TEST PARAMETERS

Run #:	4	Line:	Negative Lead	Ext. Attenuation (dB):	20

COMMENTS

None

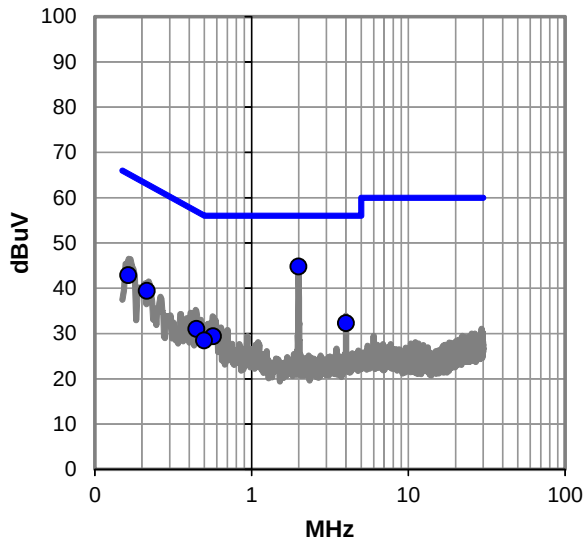
EUT OPERATING MODES

Transmitting 2402 MHz

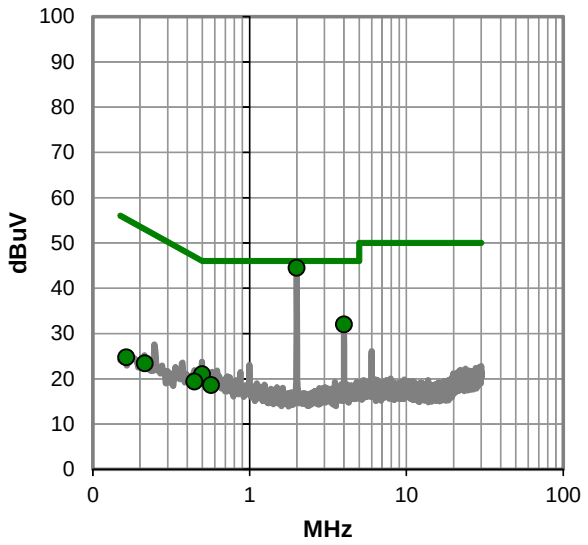
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.000	24.5	20.3	44.8	56.0	-11.2
0.164	22.6	20.3	42.9	65.3	-22.4
0.215	19.2	20.2	39.4	63.0	-23.6
4.000	11.9	20.4	32.3	56.0	-23.7
0.446	10.8	20.2	31.0	56.9	-25.9
0.570	9.2	20.2	29.4	56.0	-26.6
0.499	8.3	20.2	28.5	56.0	-27.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.000	24.2	20.3	44.5	46.0	-1.5
4.000	11.6	20.4	32.0	46.0	-14.0
0.499	0.8	20.2	21.0	46.0	-25.0
0.570	-1.6	20.2	18.6	46.0	-27.4
0.446	-0.8	20.2	19.4	46.9	-27.5
0.215	3.2	20.2	23.4	53.0	-29.6
0.164	4.4	20.3	24.7	55.3	-30.6

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

WTD.2014.08.28, PSA-ESCI 2014.09.10, EmiR5 2014.07.09

EUT:	RE1 Radio Module	Work Order:	64SE0001
Serial Number:	None	Date:	11/03/2014
Customer:	64seconds, Inc.	Temperature:	23.8°C
Attendees:	None	Relative Humidity:	21.3%
Customer Project:	None	Bar. Pressure:	1035.2 mb
Tested By:	Johnathan Lee	Job Site:	MN03
Power:	3.0VDC	Configuration:	64SE0001-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

TEST PARAMETERS

Run #:	5	Line:	Negative Lead	Ext. Attenuation (dB):	20

COMMENTS

None

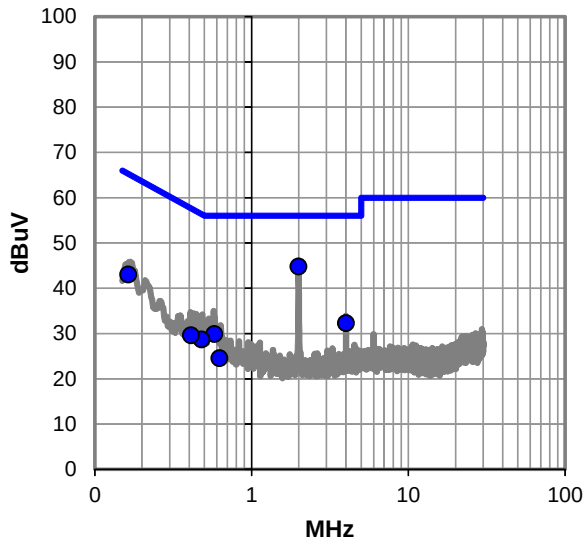
EUT OPERATING MODES

Transmitting 2446 MHz

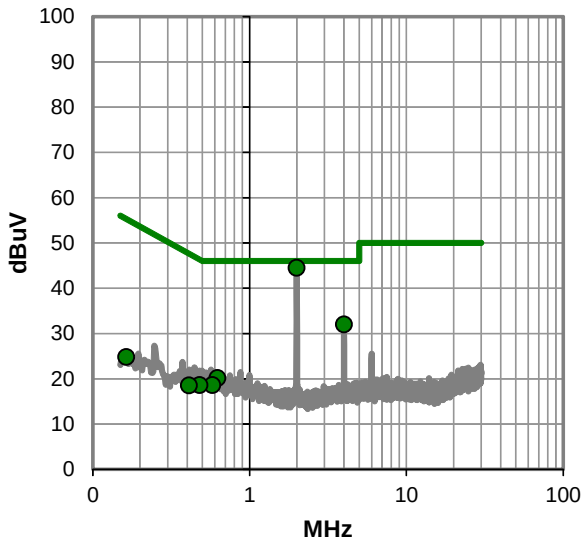
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #5

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.000	24.5	20.3	44.8	56.0	-11.2
0.163	22.7	20.3	43.0	65.3	-22.3
4.000	11.9	20.4	32.3	56.0	-23.7
0.580	9.7	20.2	29.9	56.0	-26.1
0.479	8.5	20.2	28.7	56.4	-27.7
0.411	9.4	20.2	29.6	57.6	-28.0
0.626	4.3	20.2	24.5	56.0	-31.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.000	24.2	20.3	44.5	46.0	-1.5
4.000	11.6	20.4	32.0	46.0	-14.0
0.626	-0.1	20.2	20.1	46.0	-25.9
0.580	-1.6	20.2	18.6	46.0	-27.4
0.479	-1.6	20.2	18.6	46.4	-27.8
0.411	-1.7	20.2	18.5	47.6	-29.1
0.163	4.5	20.3	24.8	55.3	-30.5

CONCLUSION

Pass

Tested By

NORTHWEST EMC
WTD.2014.08.28, PSA-ESCI 2014.09.10, EmiR5 2014.07.09

POWERLINE CONDUCTED EMISSIONS

EUT:	RE1 Radio Module	Work Order:	64SE0001
Serial Number:	None	Date:	11/03/2014
Customer:	64seconds, Inc.	Temperature:	23.8°C
Attendees:	None	Relative Humidity:	21.3%
Customer Project:	None	Bar. Pressure:	1035.2 mb
Tested By:	Johnathan Lee	Job Site:	MN03
Power:	3.0VDC	Configuration:	64SE0001-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

TEST PARAMETERS

Run #:	6	Line:	Positive Lead	Ext. Attenuation (dB):	20

COMMENTS

None

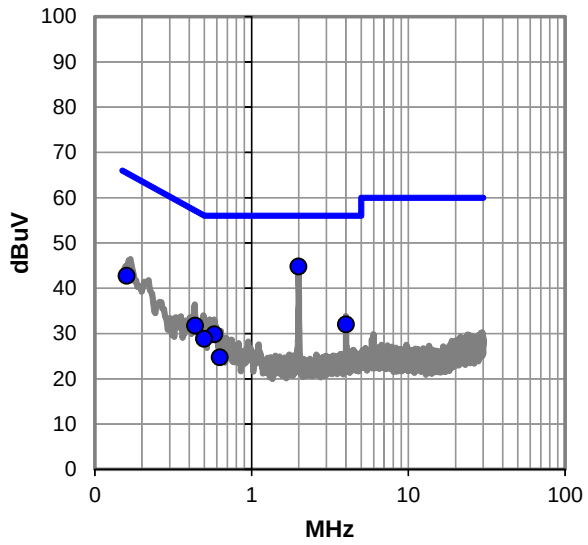
EUT OPERATING MODES

Transmitting 2446 MHz

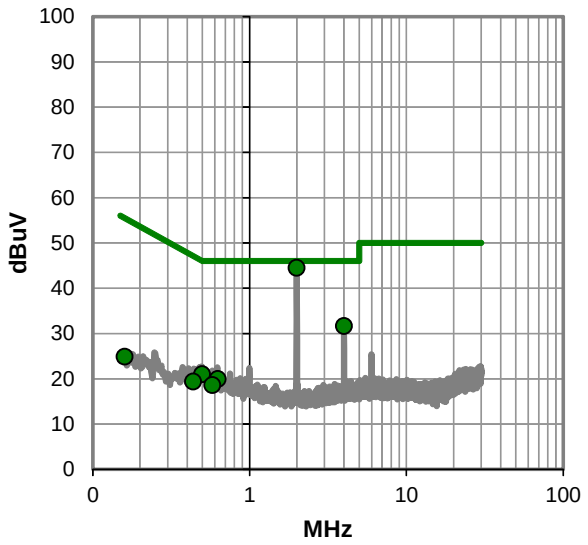
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #6

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.000	24.5	20.3	44.8	56.0	-11.2
0.160	22.4	20.3	42.7	65.5	-22.8
4.001	11.6	20.4	32.0	56.0	-24.0
0.436	11.5	20.2	31.7	57.1	-25.4
0.580	9.6	20.2	29.8	56.0	-26.2
0.499	8.6	20.2	28.8	56.0	-27.2
0.626	4.5	20.2	24.7	56.0	-31.3

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.000	24.2	20.3	44.5	46.0	-1.5
4.001	11.3	20.4	31.7	46.0	-14.3
0.499	0.8	20.2	21.0	46.0	-25.0
0.626	-0.3	20.2	19.9	46.0	-26.1
0.580	-1.6	20.2	18.6	46.0	-27.4
0.436	-0.8	20.2	19.4	47.1	-27.7
0.160	4.6	20.3	24.9	55.5	-30.6

CONCLUSION

Pass

Tested By

NORTHWEST EMC
WTD.2014.08.28, PSA-ESCI 2014.09.10, EmiR5 2014.07.09

POWERLINE CONDUCTED EMISSIONS

EUT:	RE1 Radio Module	Work Order:	64SE0001
Serial Number:	None	Date:	11/03/2014
Customer:	64seconds, Inc.	Temperature:	23.8°C
Attendees:	None	Relative Humidity:	21.3%
Customer Project:	None	Bar. Pressure:	1035.2 mb
Tested By:	Johnathan Lee	Job Site:	MN03
Power:	3.0VDC	Configuration:	64SE0001-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

TEST PARAMETERS

Run #:	8	Line:	Positive Lead	Ext. Attenuation (dB):	20

COMMENTS

None

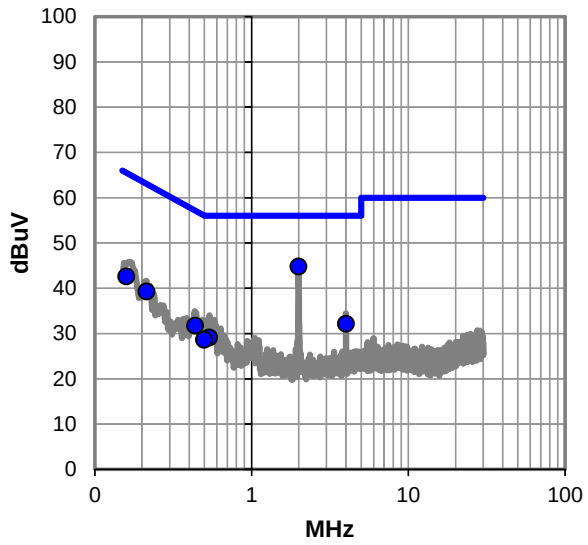
EUT OPERATING MODES

Transmitting 2480 MHz

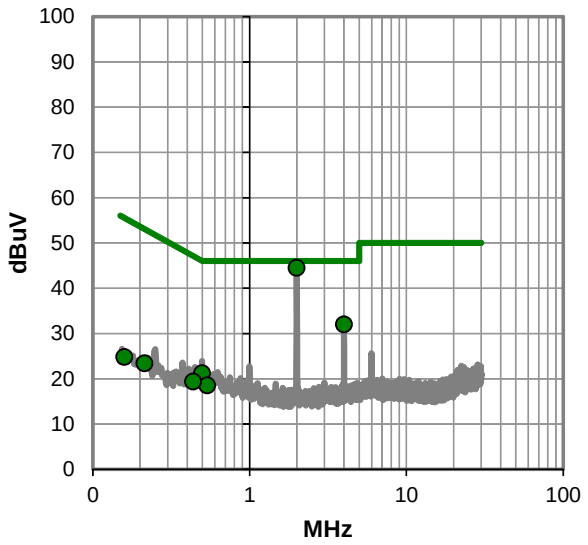
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #8

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.000	24.5	20.3	44.8	56.0	-11.2
0.159	22.3	20.3	42.6	65.5	-22.9
0.213	19.1	20.2	39.3	63.1	-23.8
4.000	11.8	20.4	32.2	56.0	-23.8
0.436	11.5	20.2	31.7	57.1	-25.4
0.538	8.9	20.2	29.1	56.0	-26.9
0.499	8.4	20.2	28.6	56.0	-27.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.000	24.2	20.3	44.5	46.0	-1.5
4.000	11.6	20.4	32.0	46.0	-14.0
0.499	1.0	20.2	21.2	46.0	-24.8
0.538	-1.7	20.2	18.5	46.0	-27.5
0.436	-0.8	20.2	19.4	47.1	-27.7
0.213	3.2	20.2	23.4	53.1	-29.7
0.159	4.5	20.3	24.8	55.5	-30.7

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

WTD.2014.08.28, PSA-ESCI 2014.09.10, EmiR5 2014.07.09

EUT:	RE1 Radio Module	Work Order:	64SE0001
Serial Number:	None	Date:	11/03/2014
Customer:	64seconds, Inc.	Temperature:	23.8°C
Attendees:	None	Relative Humidity:	21.3%
Customer Project:	None	Bar. Pressure:	1035.2 mb
Tested By:	Johnathan Lee	Job Site:	MN03
Power:	3.0VDC	Configuration:	64SE0001-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2014	ANSI C63.10:2009

TEST PARAMETERS

Run #:	9	Line:	Negative Lead	Ext. Attenuation (dB):	20

COMMENTS

None

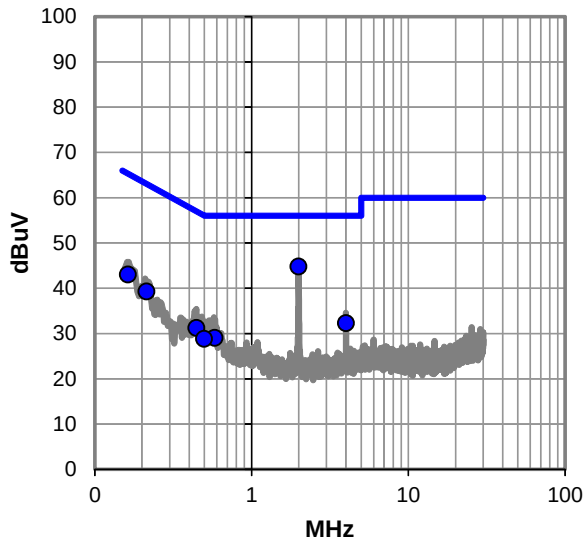
EUT OPERATING MODES

Transmitting 2480 MHz

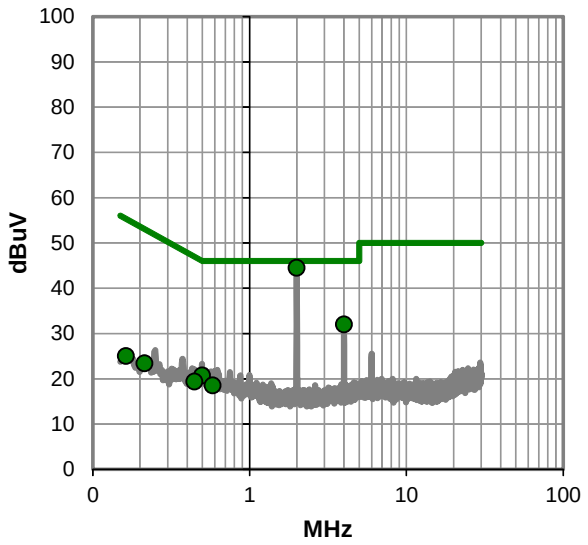
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #9

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.000	24.5	20.3	44.8	56.0	-11.2
0.162	22.7	20.3	43.0	65.3	-22.3
4.000	11.9	20.4	32.3	56.0	-23.7
0.214	19.1	20.2	39.3	63.1	-23.8
0.446	11.0	20.2	31.2	56.9	-25.7
0.583	8.8	20.2	29.0	56.0	-27.0
0.498	8.6	20.2	28.8	56.0	-27.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
2.000	24.2	20.3	44.5	46.0	-1.5
4.000	11.6	20.4	32.0	46.0	-14.0
0.498	0.5	20.2	20.7	46.0	-25.3
0.583	-1.7	20.2	18.5	46.0	-27.5
0.446	-0.8	20.2	19.4	46.9	-27.5
0.214	3.2	20.2	23.4	53.1	-29.7
0.162	4.7	20.3	25.0	55.3	-30.3

CONCLUSION

Pass

Tested By

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

Transmitting GFSK at 2404, 2446, and 2480 MHz.

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

64SE0001 - 1

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
High Pass Filter	Micro-Tronics	HPM50111	HGQ	5/15/2014	24 mo
Attenuator, 20 dB, 'SMA'	SM Electronics	SA6-20	REO	5/15/2014	12 mo
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	10/3/2014	12 mo
MN05 Cable	N/A	18-26GHz Standard Gain Horn Cable	MNP	10/3/2014	12 mo
Antenna, Horn	ETS	3160-09	AHG	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	3/14/2014	12 mo
Antenna, Horn	ETS Lindgren	3160-08	AIQ	NCR	0 mo
MN05 Cables	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	3/14/2014	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	3/14/2014	12 mo
Antenna, Horn	ETS	3160-07	AXP	NCR	0 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	3/14/2014	12 mo
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12 mo
Antenna, Horn	ETS	3115	AJA	6/3/2014	24 mo
Pre-Amplifier	Miteq	AM-1616-1000	PAD	3/14/2014	12 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	3/14/2014	12 mo
Antenna, Biconilog	Teseq	CBL 6141B	AYD	12/17/2013	24 mo
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24 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

TEST DESCRIPTION

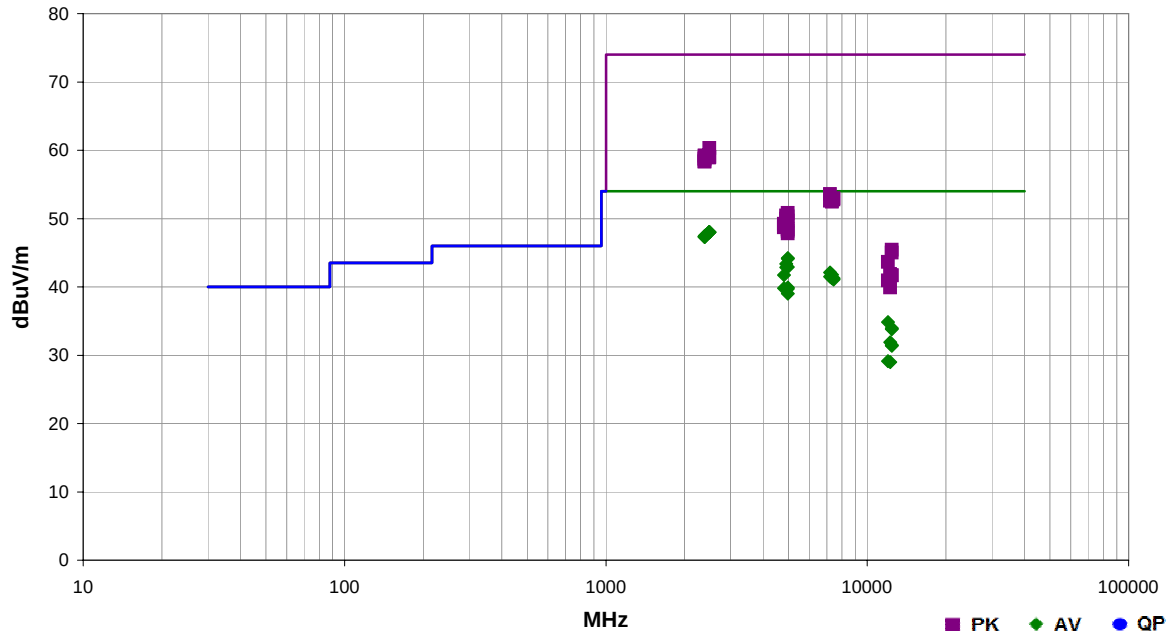
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify 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:	64SE0001	**Date:**	10/30/14		
Project:	None	**Temperature:**	22.9 °C		
Job Site:	MN05	**Humidity:**	26.4% RH		
Serial Number:	None	**Barometric Pres.:**	1019.9 mbar	**Tested by:**	Dustin Sparks
EUT:	RE1 Radio Module				
Configuration:	1				
Customer:	64seconds, Inc.				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Transmitting GFSK at 2404, 2446, and 2480 MHz.				
Deviations:	None				
Comments:	None				

Test Specifications	**Test Method**
FCC 15.247:2014	ANSI C63.10:2009

Run #	22	**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
2488.250	31.0	-3.0	1.2	193.0	3.0	20.0	Horz	AV	0.0	48.0	54.0	-6.0	GFSK, EUT vert, high ch
2486.400	31.0	-3.0	1.0	174.1	3.0	20.0	Horz	AV	0.0	48.0	54.0	-6.0	GFSK, EUT on side, high ch
2486.025	31.0	-3.0	1.0	111.0	3.0	20.0	Vert	AV	0.0	48.0	54.0	-6.0	GFSK, EUT horz, high ch
2485.217	31.0	-3.0	1.0	358.0	3.0	20.0	Vert	AV	0.0	48.0	54.0	-6.0	GFSK, EUT on side, high ch
2483.725	31.0	-3.0	1.3	261.0	3.0	20.0	Horz	AV	0.0	48.0	54.0	-6.0	GFSK, EUT horz, high ch
2483.625	31.0	-3.0	1.0	193.0	3.0	20.0	Vert	AV	0.0	48.0	54.0	-6.0	GFSK, EUT vert, high ch
2389.933	30.8	-3.3	1.0	57.0	3.0	20.0	Vert	AV	0.0	47.5	54.0	-6.5	GFSK, EUT horz, low ch
2388.767	30.7	-3.3	1.8	200.0	3.0	20.0	Horz	AV	0.0	47.4	54.0	-6.6	GFSK, EUT horz, low ch
2389.225	30.7	-3.3	1.0	256.0	3.0	20.0	Horz	AV	0.0	47.4	54.0	-6.6	GFSK, EUT on side, low ch
2389.825	30.7	-3.3	1.0	162.0	3.0	20.0	Vert	AV	0.0	47.4	54.0	-6.6	GFSK, EUT on side, low ch
2387.667	30.6	-3.3	1.0	79.0	3.0	20.0	Vert	AV	0.0	47.3	54.0	-6.7	GFSK, EUT vert, low ch
2389.175	30.6	-3.3	1.6	286.0	3.0	20.0	Horz	AV	0.0	47.3	54.0	-6.7	GFSK, EUT vert, low ch
4960.083	39.3	4.9	1.3	357.0	3.0	0.0	Horz	AV	0.0	44.2	54.0	-9.8	GFSK, EUT on side, high ch
4960.100	39.2	4.9	1.3	72.0	3.0	0.0	Vert	AV	0.0	44.1	54.0	-9.9	GFSK, EUT vert, high ch
4892.125	38.4	5.0	1.4	39.0	3.0	0.0	Vert	AV	0.0	43.4	54.0	-10.6	GFSK, EUT vert, mid ch
4960.075	38.0	4.9	1.4	344.9	3.0	0.0	Horz	AV	0.0	42.9	54.0	-11.1	GFSK, EUT vert, high ch
4892.100	37.9	5.0	1.0	358.9	3.0	0.0	Horz	AV	0.0	42.9	54.0	-11.1	GFSK, EUT on side, mid ch
7206.025	30.4	11.7	2.0	20.0	3.0	0.0	Vert	AV	0.0	42.1	54.0	-11.9	GFSK, EUT vert, low ch
7338.225	29.3	12.5	1.0	39.0	3.0	0.0	Horz	AV	0.0	41.8	54.0	-12.2	GFSK, EUT on side, mid ch
4804.125	36.2	5.5	1.3	350.0	3.0	0.0	Horz	AV	0.0	41.7	54.0	-12.3	GFSK, EUT on side, low ch
7206.633	29.8	11.7	1.0	229.9	3.0	0.0	Horz	AV	0.0	41.5	54.0	-12.5	GFSK, EUT on side, low ch
7439.608	28.3	13.0	1.0	18.0	3.0	0.0	Horz	AV	0.0	41.3	54.0	-12.7	GFSK, EUT on side, high ch

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
7338.325	28.8	12.5	1.0	143.0	3.0	0.0	Vert	AV	0.0	41.3	54.0	-12.7	GFSK, EUT vert, mid ch
7437.508	28.1	13.0	3.2	103.0	3.0	0.0	Vert	AV	0.0	41.1	54.0	-12.9	GFSK, EUT vert, high ch
2487.650	43.3	-3.0	1.3	261.0	3.0	20.0	Horz	PK	0.0	60.3	74.0	-13.7	GFSK, EUT horz, high ch
4960.025	35.0	4.9	1.2	97.0	3.0	0.0	Horz	AV	0.0	39.9	54.0	-14.1	GFSK, EUT horz, high ch
4804.158	34.3	5.5	1.4	62.1	3.0	0.0	Vert	AV	0.0	39.8	54.0	-14.2	GFSK, EUT vert, low ch
4960.017	34.8	4.9	1.6	69.1	3.0	0.0	Vert	AV	0.0	39.7	54.0	-14.3	GFSK, EUT horz, high ch
2483.625	42.3	-3.0	1.0	193.0	3.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	GFSK, EUT vert, high ch
2484.558	42.2	-3.0	1.0	111.0	3.0	20.0	Vert	PK	0.0	59.2	74.0	-14.8	GFSK, EUT horz, high ch
2387.333	42.5	-3.3	1.0	57.0	3.0	20.0	Vert	PK	0.0	59.2	74.0	-14.8	GFSK, EUT horz, low ch
2389.642	42.5	-3.3	1.0	162.0	3.0	20.0	Vert	PK	0.0	59.2	74.0	-14.8	GFSK, EUT on side, low ch
2487.292	42.0	-3.0	1.0	174.1	3.0	20.0	Horz	PK	0.0	59.0	74.0	-15.0	GFSK, EUT on side, high ch
2485.892	42.0	-3.0	1.0	358.0	3.0	20.0	Vert	PK	0.0	59.0	74.0	-15.0	GFSK, EUT on side, high ch
4960.183	34.1	4.9	1.0	354.9	3.0	0.0	Vert	AV	0.0	39.0	54.0	-15.0	GFSK, EUT on side, high ch
2484.733	41.9	-3.0	1.2	193.0	3.0	20.0	Horz	PK	0.0	58.9	74.0	-15.1	GFSK, EUT vert, high ch
2387.525	42.1	-3.3	1.0	79.0	3.0	20.0	Vert	PK	0.0	58.8	74.0	-15.2	GFSK, EUT vert, low ch
2389.367	42.0	-3.3	1.6	286.0	3.0	20.0	Horz	PK	0.0	58.7	74.0	-15.3	GFSK, EUT vert, low ch
2387.142	41.7	-3.3	1.0	256.0	3.0	20.0	Horz	PK	0.0	58.4	74.0	-15.6	GFSK, EUT on side, low ch
2386.300	41.6	-3.3	1.8	200.0	3.0	20.0	Horz	PK	0.0	58.3	74.0	-15.7	GFSK, EUT horz, low ch
12011.330	40.3	-5.5	1.1	351.0	3.0	0.0	Horz	AV	0.0	34.8	54.0	-19.2	GFSK, EUT on side, low ch
12402.450	33.4	0.5	3.8	217.1	3.0	0.0	Horz	AV	0.0	33.9	54.0	-20.1	GFSK, EUT on side, high ch
12401.360	33.3	0.5	1.0	54.0	3.0	0.0	Vert	AV	0.0	33.8	54.0	-20.2	GFSK, EUT vert, high ch
7206.642	41.9	11.7	2.0	20.0	3.0	0.0	Vert	PK	0.0	53.6	74.0	-20.4	GFSK, EUT vert, low ch
7441.450	40.0	13.0	3.2	103.0	3.0	0.0	Vert	PK	0.0	53.0	74.0	-21.0	GFSK, EUT vert, high ch
7440.583	39.8	13.0	1.0	18.0	3.0	0.0	Horz	PK	0.0	52.8	74.0	-21.2	GFSK, EUT on side, high ch
7205.692	40.9	11.7	1.0	229.9	3.0	0.0	Horz	PK	0.0	52.6	74.0	-21.4	GFSK, EUT on side, low ch
7336.033	40.1	12.5	1.0	143.0	3.0	0.0	Vert	PK	0.0	52.6	74.0	-21.4	GFSK, EUT vert, mid ch
7335.758	40.0	12.5	1.0	39.0	3.0	0.0	Horz	PK	0.0	52.5	74.0	-21.5	GFSK, EUT on side, mid ch
12231.270	36.9	-5.0	1.1	2.0	3.0	0.0	Horz	AV	0.0	31.9	54.0	-22.1	GFSK, EUT on side, mid ch
12399.280	35.9	-4.4	1.4	328.0	3.0	0.0	Vert	AV	0.0	31.5	54.0	-22.5	GFSK, EUT vert, high ch
12399.390	35.8	-4.4	1.0	347.9	3.0	0.0	Horz	AV	0.0	31.4	54.0	-22.6	GFSK, EUT on side, high ch
4960.575	45.9	4.9	1.3	357.0	3.0	0.0	Horz	PK	0.0	50.8	74.0	-23.2	GFSK, EUT on side, high ch
4891.775	45.5	5.0	1.0	358.9	3.0	0.0	Horz	PK	0.0	50.5	74.0	-23.5	GFSK, EUT on side, mid ch
4960.592	45.4	4.9	1.3	72.0	3.0	0.0	Vert	PK	0.0	50.3	74.0	-23.7	GFSK, EUT vert, high ch
4892.583	45.0	5.0	1.4	39.0	3.0	0.0	Vert	PK	0.0	50.0	74.0	-24.0	GFSK, EUT vert, mid ch
4960.492	44.8	4.9	1.4	344.9	3.0	0.0	Horz	PK	0.0	49.7	74.0	-24.3	GFSK, EUT vert, high ch
4803.658	43.7	5.5	1.3	350.0	3.0	0.0	Horz	PK	0.0	49.2	74.0	-24.8	GFSK, EUT on side, low ch
12011.450	34.6	-5.5	1.0	107.0	3.0	0.0	Vert	AV	0.0	29.1	54.0	-24.9	GFSK, EUT vert, low ch
12231.320	34.0	-5.0	1.0	88.1	3.0	0.0	Vert	AV	0.0	29.0	54.0	-25.0	GFSK, EUT vert, mid ch
4804.225	43.2	5.5	1.4	62.1	3.0	0.0	Vert	PK	0.0	48.7	74.0	-25.3	GFSK, EUT vert, low ch
4960.517	43.5	4.9	1.6	69.1	3.0	0.0	Vert	PK	0.0	48.4	74.0	-25.6	GFSK, EUT horz, high ch
4960.375	43.3	4.9	1.2	97.0	3.0	0.0	Horz	PK	0.0	48.2	74.0	-25.8	GFSK, EUT horz, high ch
4959.558	42.9	4.9	1.0	354.9	3.0	0.0	Vert	PK	0.0	47.8	74.0	-26.2	GFSK, EUT on side, high ch
12400.150	44.9	0.5	1.0	54.0	3.0	0.0	Vert	PK	0.0	45.4	74.0	-28.6	GFSK, EUT vert, high ch
12400.430	44.5	0.5	3.8	217.1	3.0	0.0	Horz	PK	0.0	45.0	74.0	-29.0	GFSK, EUT on side, high ch
12011.560	49.1	-5.5	1.1	351.0	3.0	0.0	Horz	PK	0.0	43.6	74.0	-30.4	GFSK, EUT on side, low ch
12228.980	46.9	-5.0	1.1	2.0	3.0	0.0	Horz	PK	0.0	41.9	74.0	-32.1	GFSK, EUT on side, mid ch
12399.150	46.1	-4.4	1.0	347.9	3.0	0.0	Horz	PK	0.0	41.7	74.0	-32.3	GFSK, EUT on side, high ch
12398.830	46.1	-4.4	1.4	328.0	3.0	0.0	Vert	PK	0.0	41.7	74.0	-32.3	GFSK, EUT vert, high ch
12010.660	46.4	-5.5	1.0	107.0	3.0	0.0	Vert	PK	0.0	40.9	74.0	-33.1	GFSK, EUT vert, low ch
12232.330	44.9	-5.0	1.0	88.1	3.0	0.0	Vert	PK	0.0	39.9	74.0	-34.1	GFSK, EUT vert, mid ch

BAND EDGE COMPLIANCE

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
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12
Antenna, Horn	ETS	3115	AJA	6/3/2014	24
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24

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

EUT:	RE1 Radio Module			**Work Order:**	64SE0001
Serial Number:	None			**Date:**	11/04/14
Customer:	64seconds, Inc.			**Temperature:**	23.1°C
Attendees:	None			**Humidity:**	27%
Project:	None			**Barometric Pres.:**	1015.5
Tested by:	Bryan Weller	**Power:**	Battery	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009, KDB 453039

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

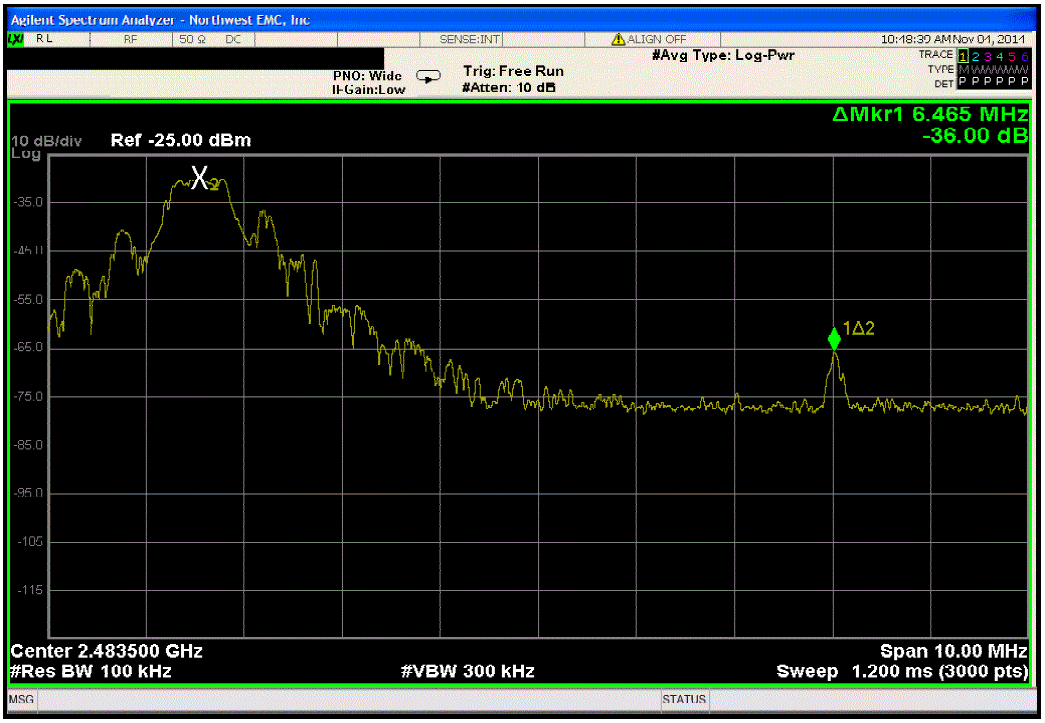
None

Configuration #	1	Signature	Bryan Weller

	Value (dBc)	Limit ≤ (dBc)	Result
Low Channel 2402 MHz	-27.97	-20	Pass
High Channel 2480 MHz	-36.01	-20	Pass

Low Channel 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-27.97	-20	Pass

High Channel 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-36.01	-20	Pass



SPURIOUS CONDUCTED 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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna, Horn	ETS	3115	AJA	6/3/2014	24
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24

TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. 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

EUT:	RE1 Radio Module			**Work Order:**	64SE0001
Serial Number:	None			**Date:**	11/04/14
Customer:	64seconds, Inc.			**Temperature:**	23.1°C
Attendees:	None			**Humidity:**	27%
Project:	None			**Barometric Pres.:**	1015.5
Tested by:	Bryan Weller	**Power:**	Battery	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009, KDB 453039

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

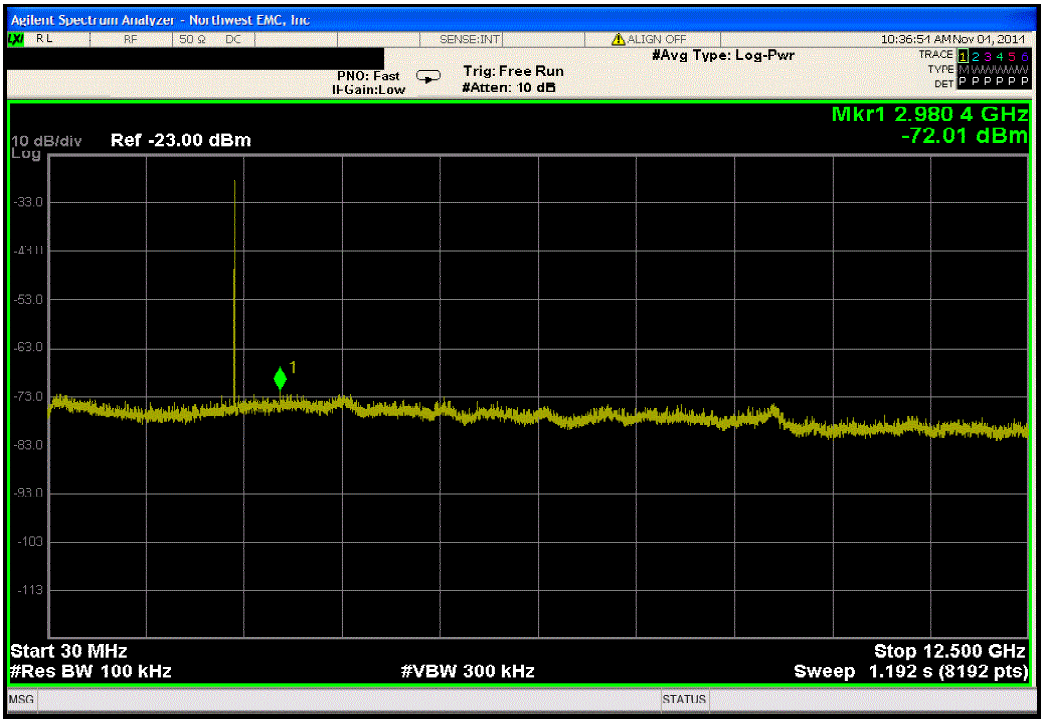
None

Configuration #	1	Signature	Bryan Weller

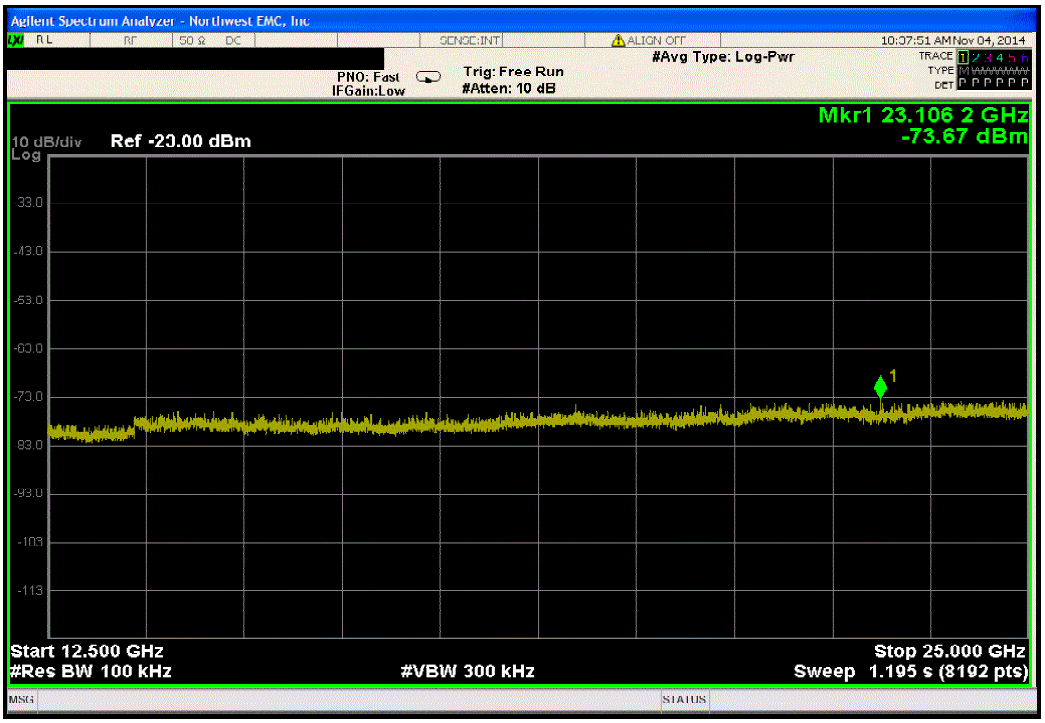
	Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result
Low Channel 2402 MHz	Fundamental	N/A	N/A	N/A
Low Channel 2402 MHz	30 MHz - 12.5 GHz	-43.52	-20	Pass
Low Channel 2402 MHz	12.5 GHz - 25 GHz	-45.18	-20	Pass
Mid Channel 2446 MHz	Fundamental	N/A	N/A	N/A
Mid Channel 2446 MHz	30 MHz - 12.5 GHz	-43.52	-20	Pass
Mid Channel 2446 MHz	12.5 GHz - 25 GHz	-45.33	-20	Pass
High Channel 2480 MHz	Fundamental	N/A	N/A	N/A
High Channel 2480 MHz	30 MHz - 12.5 GHz	-41.17	-20	Pass
High Channel 2480 MHz	12.5 GHz - 25 GHz	-43.08	-20	Pass

Low Channel 2402 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A

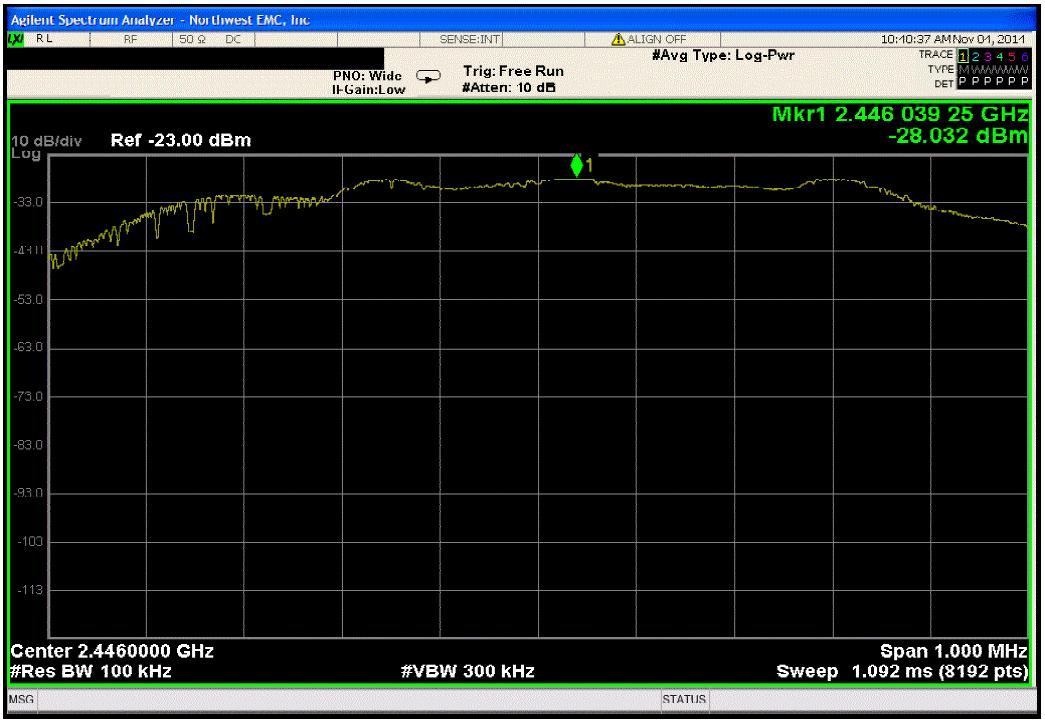
Low Channel 2402 MHz					
Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-43.52	-20	Pass



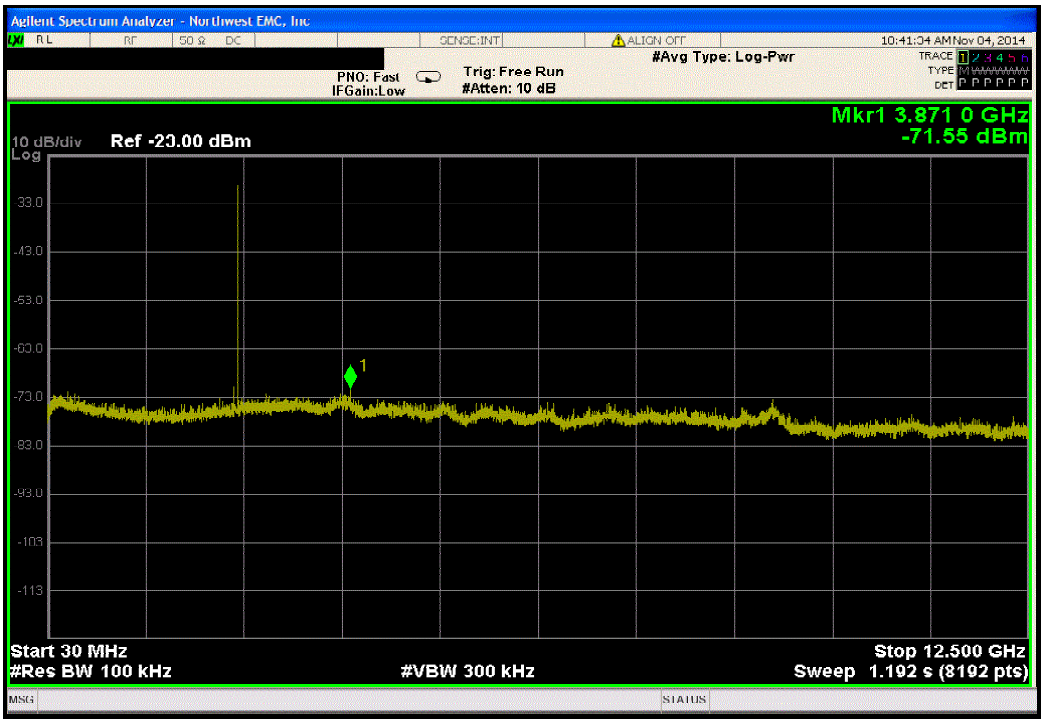
Low Channel 2402 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-45.18	-20	Pass



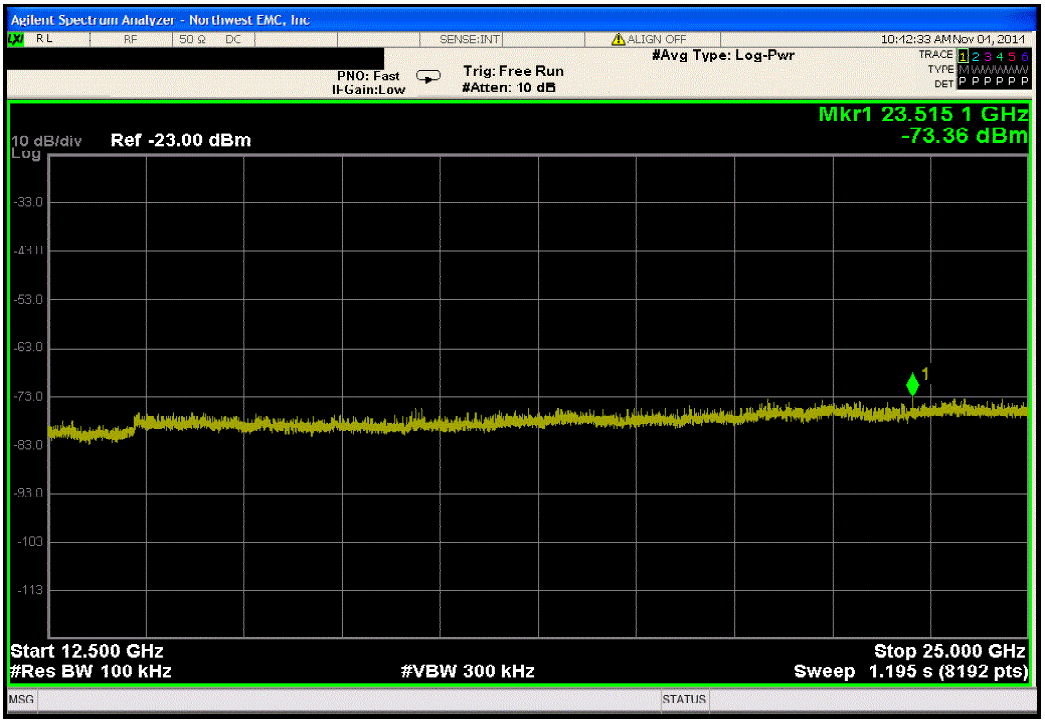
Mid Channel 2446 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



Mid Channel 2446 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz		-43.52	-20	Pass

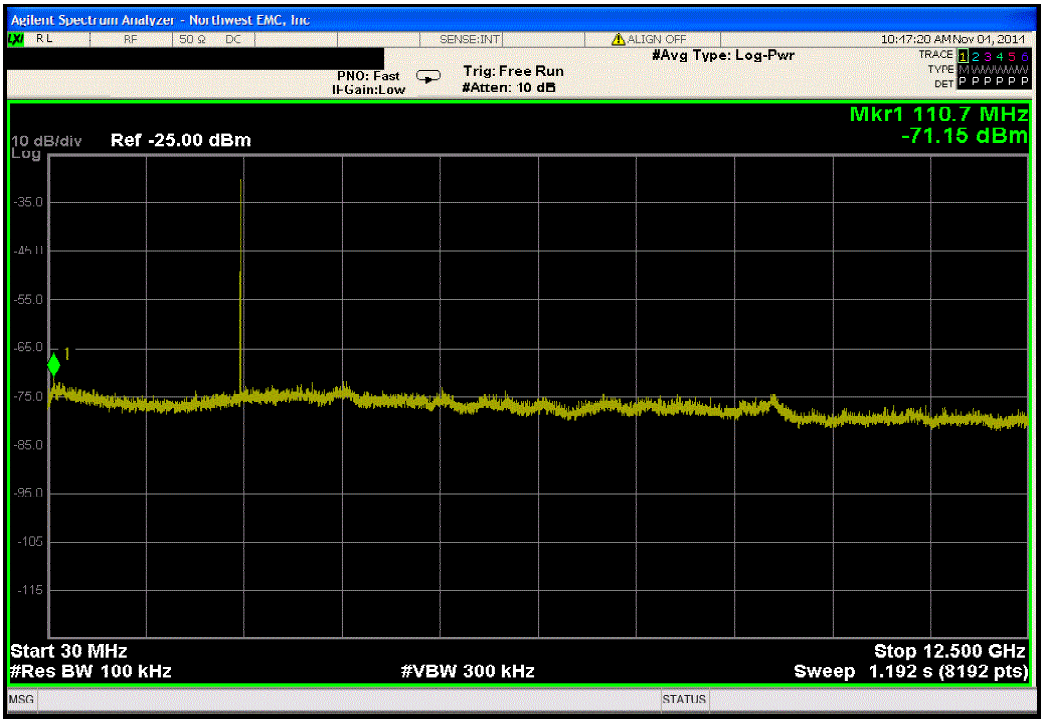


Mid Channel 2446 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-45.33	-20	Pass

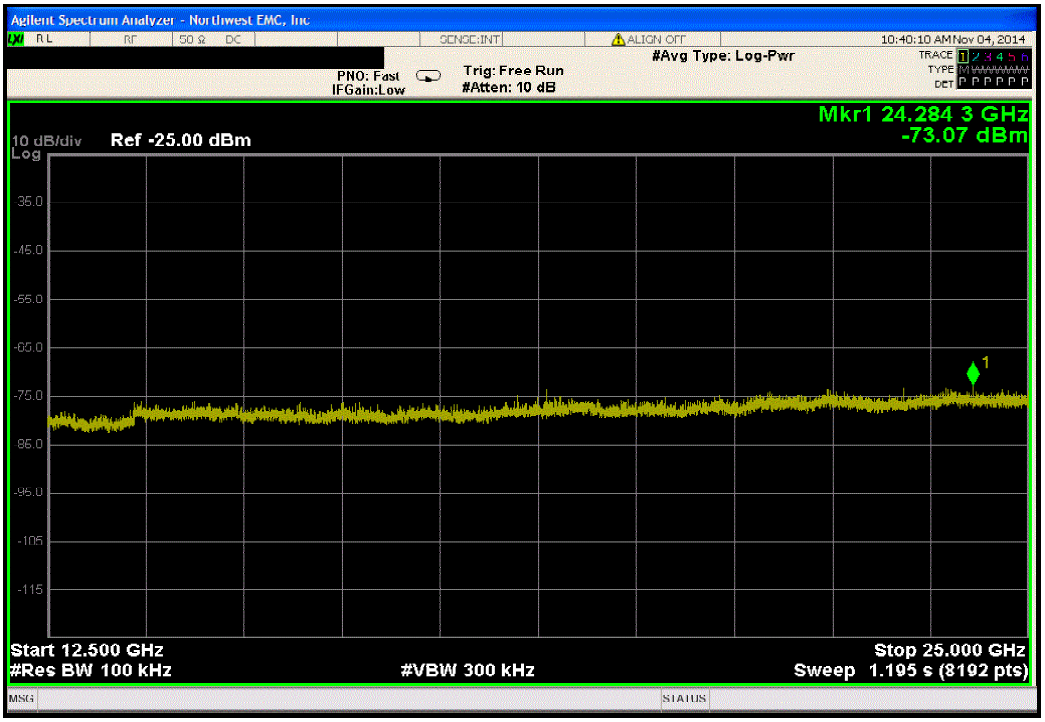


High Channel 2480 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A

High Channel 2480 MHz					
Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-41.17	-20	Pass



High Channel 2480 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-43.08	-20	Pass



OCCUPIED BANDWIDTH

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
Antenna, Horn	ETS	3115	AJA	6/3/2014	24
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24

TEST DESCRIPTION

The 6dB occupied bandwidth was measured. The 26 dB (99.9%) emission bandwidth (EBW) was also measured at the same time.

The EUT was set to low, medium and high transmit frequencies. The measurement was made in a radiated configuration in a semi-anechoic chamber with the fundamental of the carrier full maximized for its highest radiated power. The EUT was transmitting at the data rate(s) listed in the datasheet.

OCCUPIED BANDWIDTH

EUT:	RE1 Radio Module			**Work Order:**	64SE0001
Serial Number:	None			**Date:**	11/04/14
Customer:	64seconds, Inc.			**Temperature:**	23.1°C
Attendees:	None			**Humidity:**	27%
Project:	None			**Barometric Pres.:**	1015.5
Tested by:	Bryan Weller	**Power:**	Battery	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009, KDB 453039

COMMENTS

None

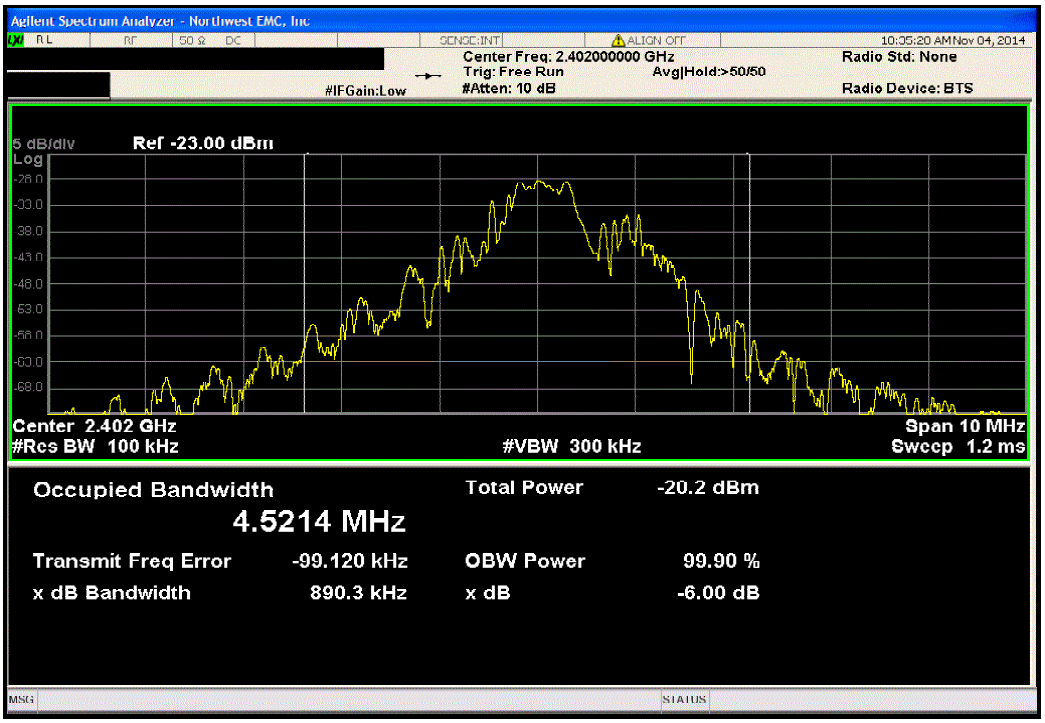
DEVIATIONS FROM TEST STANDARD

None

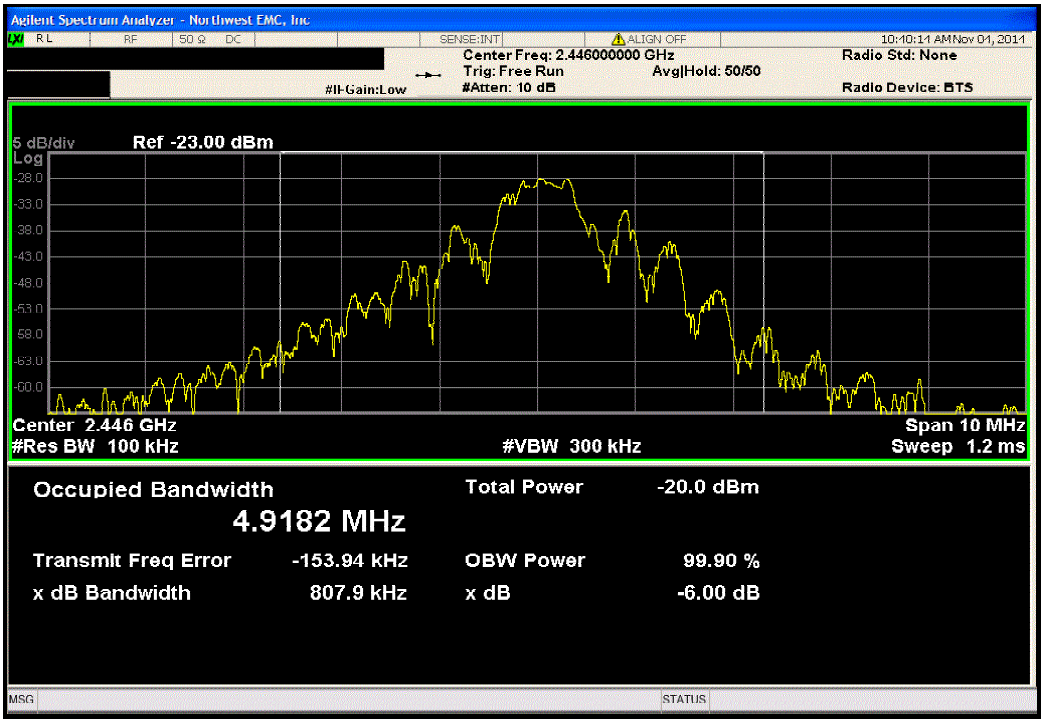
Configuration #	1	Signature	Bryan Weller

	Value	Limit (≥)	Result
Low Channel 2402 MHz	890.299 kHz	500 kHz	Pass
Mid Channel 2446 MHz	807.921 kHz	500 kHz	Pass
High Channel 2480 MHz	692.833 kHz	500 kHz	Pass

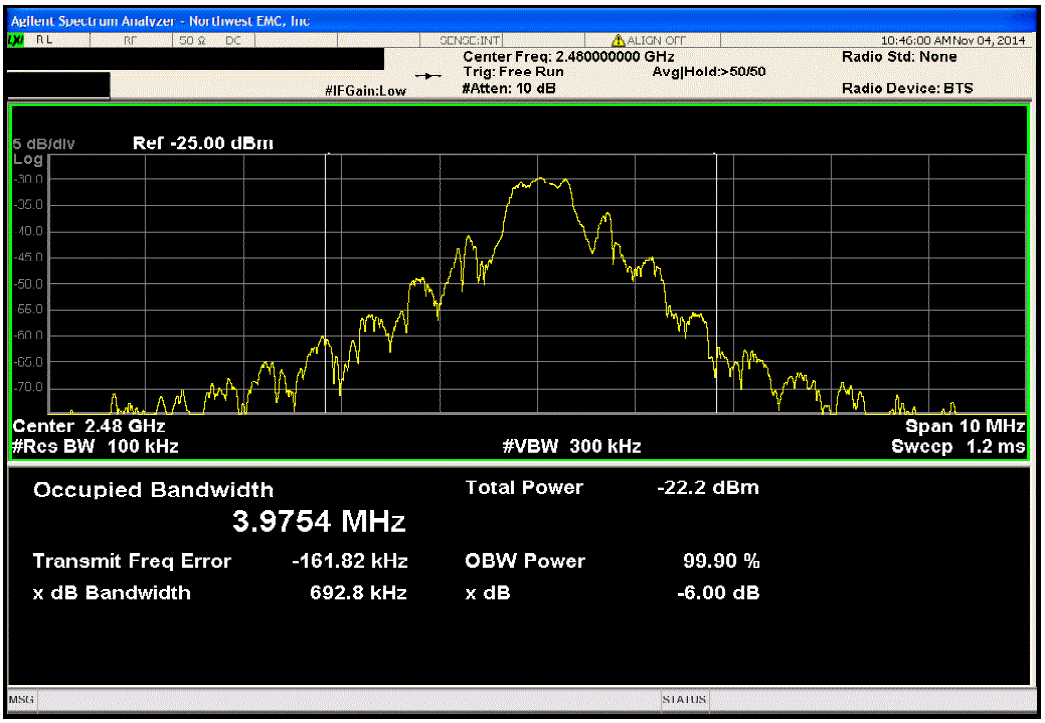
Low Channel 2402 MHz						
				Value	Limit (≥)	Result
				890.299 kHz	500 kHz	Pass



Mid Channel 2446 MHz						
				Value	Limit (≥)	Result
				807.921 kHz	500 kHz	Pass



High Channel 2480 MHz						
				Value	Limit (≥)	Result
				692.833 kHz	500 kHz	Pass



EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

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

Transmitting Low Channel 2402Mhz, Mid channel 2446MHz, High Channel 2480 Mhz. GFSK Modulation, data rate 1 Mbps.

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

64SE0001 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	2400 MHz	Stop Frequency	2483.5 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
MXG Vector Signal Generator	Agilent	N5182A	TIF	8/12/2014	36 mo
Power Sensor	Agilent	N8481A	SQN	8/22/2014	12 mo
Power Meter	Agilent	N1913A	SQL	8/22/2014	12 mo
Antenna, Horn	ETS	3115	AIB	8/12/2014	24 mo
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24 mo
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12 mo
Antenna, Horn	ETS	3115	AJA	6/3/2014	24 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

TEST DESCRIPTION

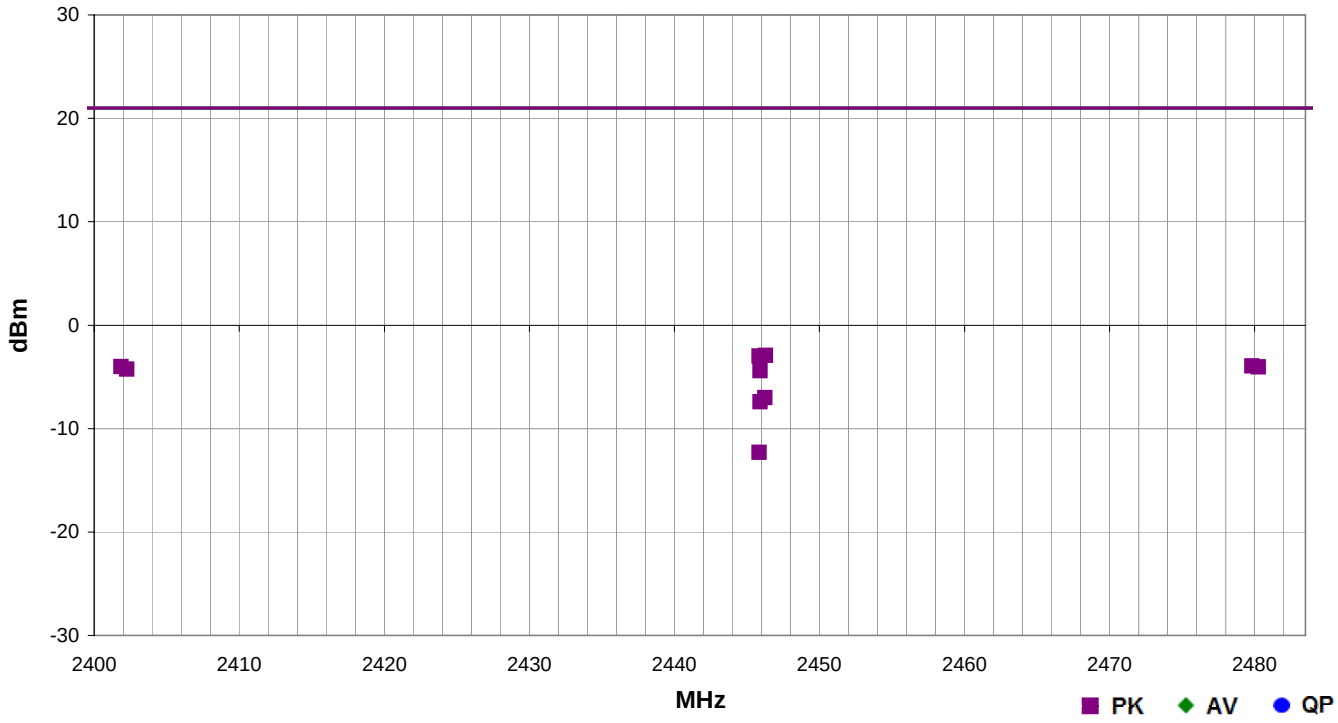
The EUT was operated in three orthogonal axis in transmit mode. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height (1-4 meters) and polarization. The amplitude and frequency of the highest emissions were noted. The EUT was then replaced with a horn antenna. A signal generator was connected to the horn antenna and its output was adjusted to match the level previously noted for each frequency. The output of the signal generator was recorded, and by factoring in the cable loss to the horn antenna and its gain (dBi); the EIRP for the fundamental emission was determined.

EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)

Work Order:	64SE0001	**Date:**	11/03/14	Bryan Weller	
Project:	None	**Temperature:**	22.8 °C		
Job Site:	MN05	**Humidity:**	26.7% RH		
Serial Number:	None	**Barometric Pres.:**	1015.2 mbar	**Tested by:**	Bryan Weller
EUT:	RE1 Radio Module				
Configuration:	1				
Customer:	64seconds, Inc.				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Transmitting Low Channel 2402Mhz, Mid channel 2446MHz, High Channel 2480 Mhz. GFSK Modulation, data rate 1 Mbps.				
Deviations:	None				
Comments:	None				

Test Specifications	**Test Method**
FCC 15.247:2014	ANSI C63.10:2009

Run #	44	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



	Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
	2446.283	2.8	191.1	Horz	PK	5.09E-04	-2.9	36.0	-38.9	Mid Channel 2446 MHz EUT Horizontal
	2445.833	1.2	220.1	Vert	PK	5.01E-04	-3.0	36.0	-39.0	Mid Channel 2446 MHz EUT on Side
	2479.825	1.0	163.1	Vert	PK	4.04E-04	-3.9	36.0	-39.9	High Channel 2402 MHz EUT on Side
	2480.258	1.0	216.0	Horz	PK	3.94E-04	-4.1	36.0	-40.1	High Channel 2480 Mhz EUT Horizontal
	2401.858	1.0	225.0	Vert	PK	3.98E-04	-4.0	36.0	-40.0	Low Channel 2402 MHz EUT on Side
	2402.242	1.0	202.1	Horz	PK	3.75E-04	-4.3	36.0	-40.3	Low Channel 2402 MHz EUT Horizontal
	2445.908	1.1	94.1	Vert	PK	3.63E-04	-4.4	36.0	-40.4	Mid Channel 2446 MHz EUT Vertical
	2446.233	1.3	13.0	Horz	PK	1.99E-04	-7.0	36.0	-43.0	Mid Channel 2446 MHz EUT Vertical
	2445.900	1.1	115.0	Vert	PK	1.82E-04	-7.4	36.0	-43.4	Mid Channel 2446 MHz EUT Horizontal
	2445.842	1.2	219.0	Horz	PK	5.87E-05	-12.3	36.0	-48.3	Mid Channel 2446 MHz EUT on Side

POWER SPECTRAL DENSITY

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
Antenna, Horn	ETS	3115	AJA	6/3/2014	24
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24

TEST DESCRIPTION

The maximum power spectral density measurements were measured with the EUT set to the required transmit frequencies in each band. The EUT was transmitting at the lowest, middle, and maximum data rate for each modulation type available.

The final data was converted from a field strength to a radiated power value. Equation 5 found in ANSI C63.10:2009, was used to derive this conversion formula:

dBm/m (field strength) + 11.77 = dBm EIRP

Per the procedure outlined in FCC KDB 558074 D01 DTS Measurement Section 5.3.1, the spectrum analyzer was used as follows:

- RBW = 100 kHz
- VBW = 300 kHz
- Detector = Peak (to match method used for power measurement)
- Trace = Max hold

The observed power level is then scaled to an equivalent value in 3 kHz by adding a Bandwidth Correction Factor (BWCF) where:

BWCF = 10*LOG (3 kHz / 100 kHz) = -15.2 dB

POWER SPECTRAL DENSITY

EUT:	RE1 Radio Module			**Work Order:**	64SE0001
Serial Number:	None			**Date:**	11/04/14
Customer:	64seconds, Inc.			**Temperature:**	23.1°C
Attendees:	None			**Humidity:**	27%
Project:	None			**Barometric Pres.:**	1015.5
Tested by:	Bryan Weller	**Power:**	Battery	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009, KDB 453039

COMMENTS

None

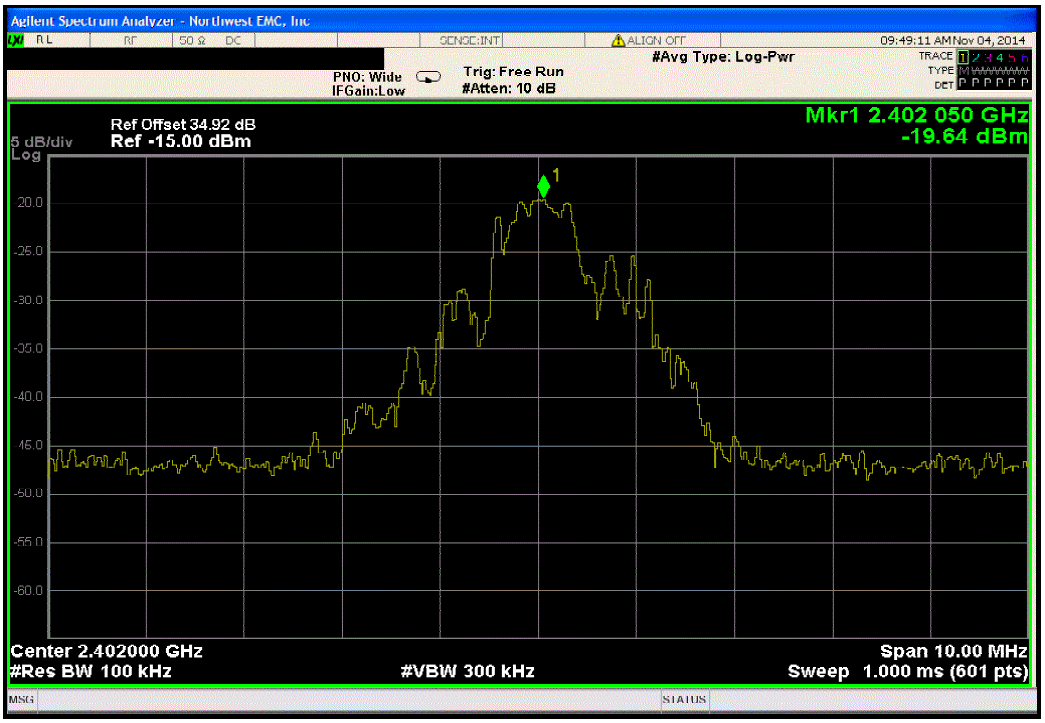
DEVIATIONS FROM TEST STANDARD

None

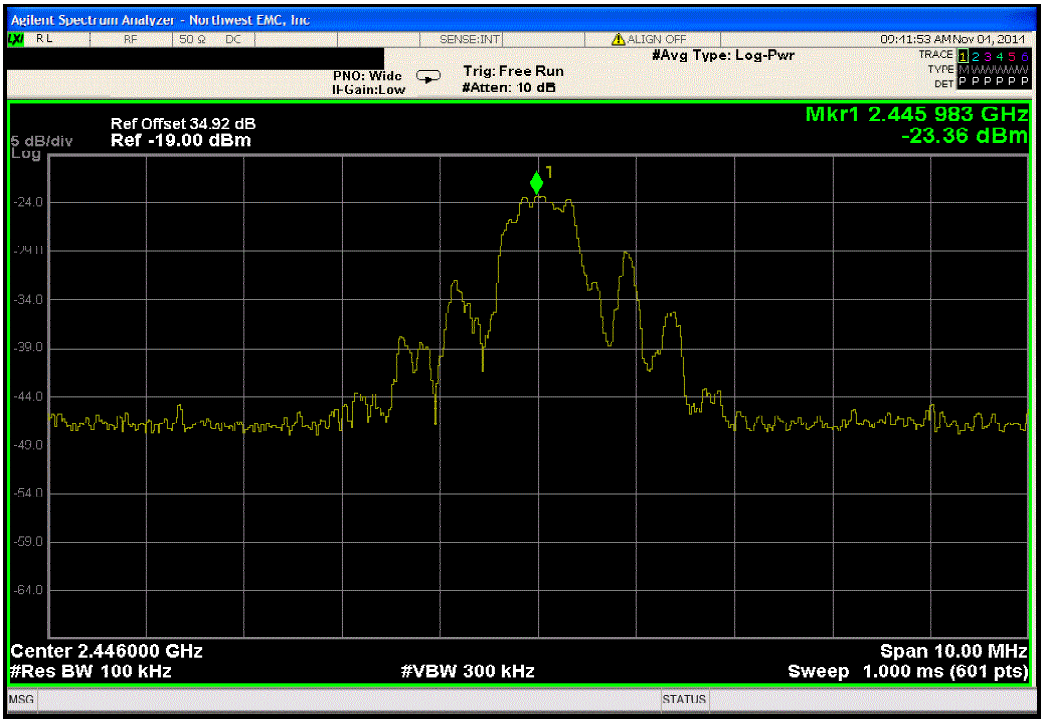
Configuration #	1	Signature	Bryan Weller

	Value dBm/100kHz	dBm/m to dBm	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
Low Channel 2402 MHz	-19.639	11.77	-15.2	-23.069	8	Pass
Mid Channel 2446 MHz	-23.359	11.77	-15.2	-26.789	8	Pass
High Channel 2480 MHz	-22.195	11.77	-15.2	-25.625	8	Pass

Low Channel 2402 MHz						
	dBm/m to dBm	dBm/m to dBm	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
	-19.639	11.77	-15.2	-23.069	8	Pass

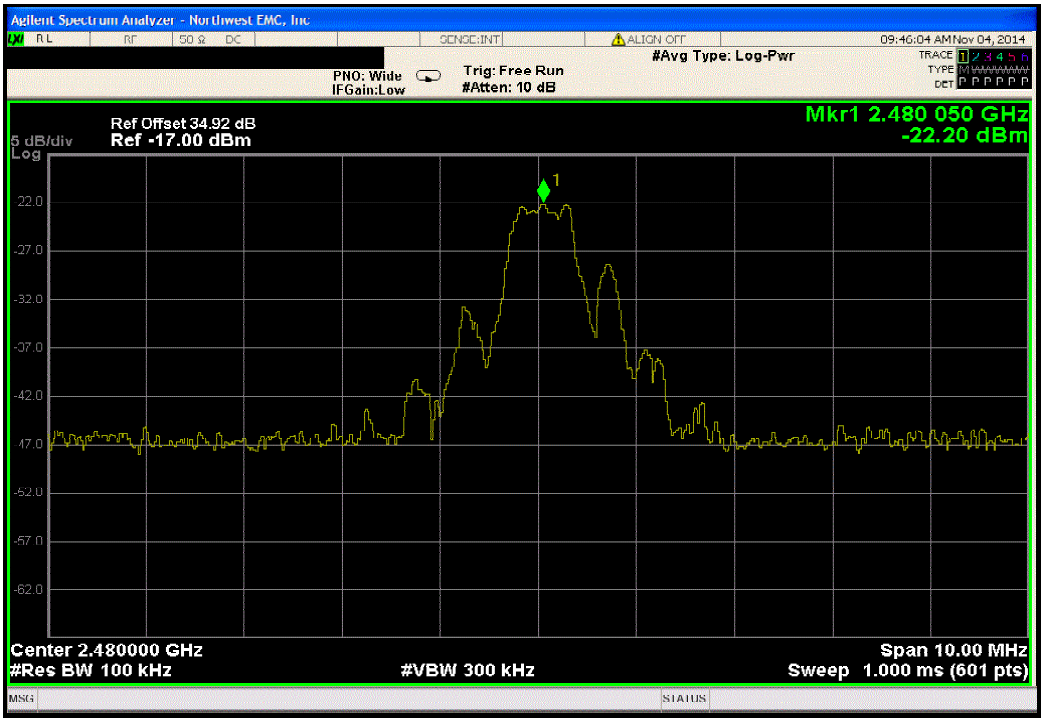


Mid Channel 2446 MHz						
	dBm/m to dBm	dBm/m to dBm	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
	-23.359	11.77	-15.2	-26.789	8	Pass



POWER SPECTRAL DENSITY

High Channel 2480 MHz						
	dBm/m to dBm	dBm/m to dBm	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
	-22.195	11.77	-15.2	-25.625	8	Pass



DUTY CYCLE

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
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12
Antenna, Horn	ETS	3115	AJA	6/3/2014	24

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.

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.

The duty cycle was calculated by dividing the transmission pulse duration (T) by the total period of a single on and total off time.

If the transmit duty cycle < 98 percent, burst gating was used during some of the other tests in this report to only measure during the burst duration.

DUTY CYCLE

EUT:	RE1 Radio Module			**Work Order:**	64SE0001
Serial Number:	None			**Date:**	11/04/14
Customer:	64seconds, Inc.			**Temperature:**	23.1°C
Attendees:	None			**Humidity:**	27%
Project:	None			**Barometric Pres.:**	1015.5
Tested by:	Bryan Weller	**Power:**	Battery	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009, KDB 453039

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

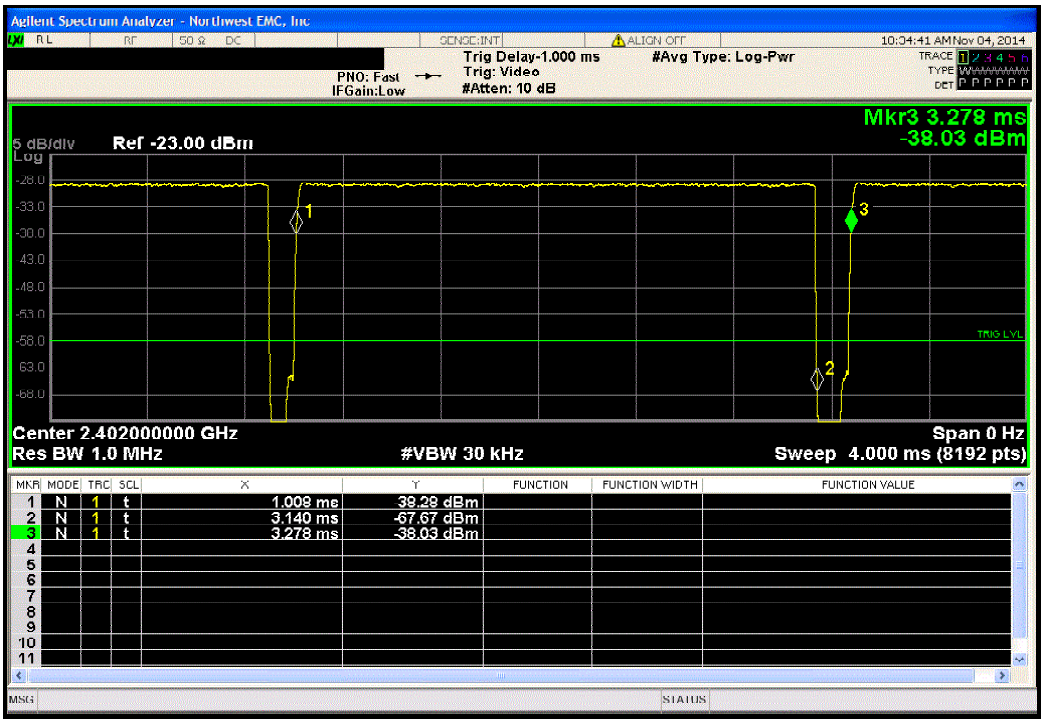
None

Configuration #	1	Signature

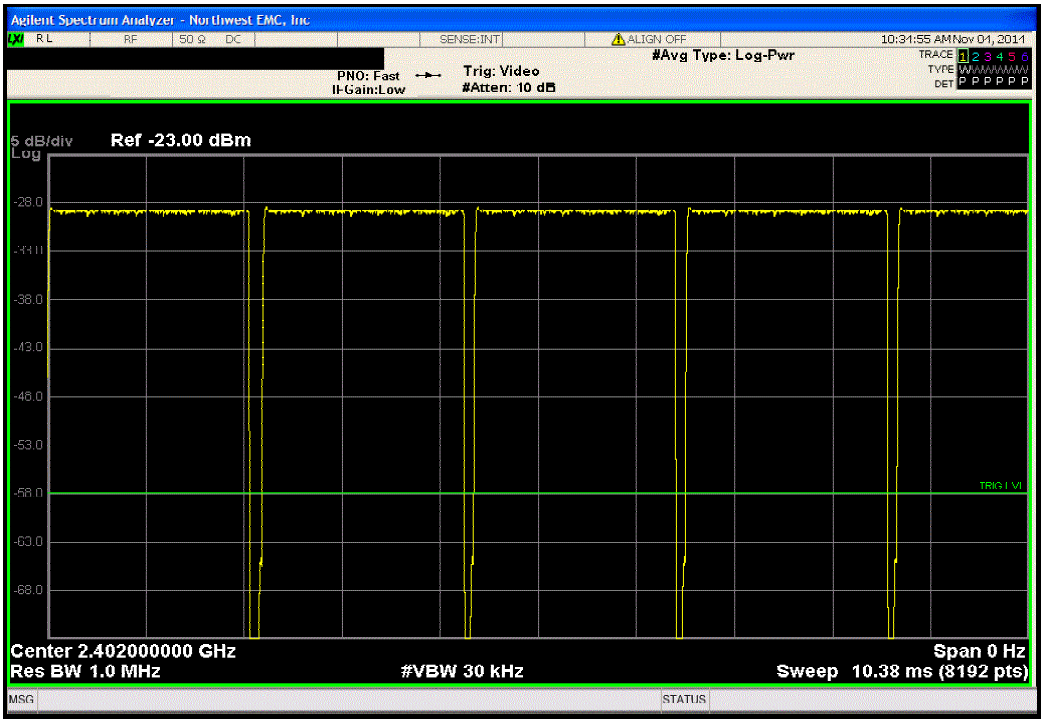
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
Low Channel 2402 MHz	2.131 mS	2.27 mS	1	93.9	N/A	N/A
Low Channel 2402 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel 2446 MHz	2.131 mS	2.238 mS	1	95.2	N/A	N/A
Mid Channel 2446 MHz	N/A	N/A	5	N/A	N/A	N/A
High Channel 2480 MHz	2.134 mS	2.238 mS	1	95.4	N/A	N/A
High Channel 2480 MHz	N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE

Low Channel 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.131 mS	2.27 mS	1	93.9	N/A	N/A

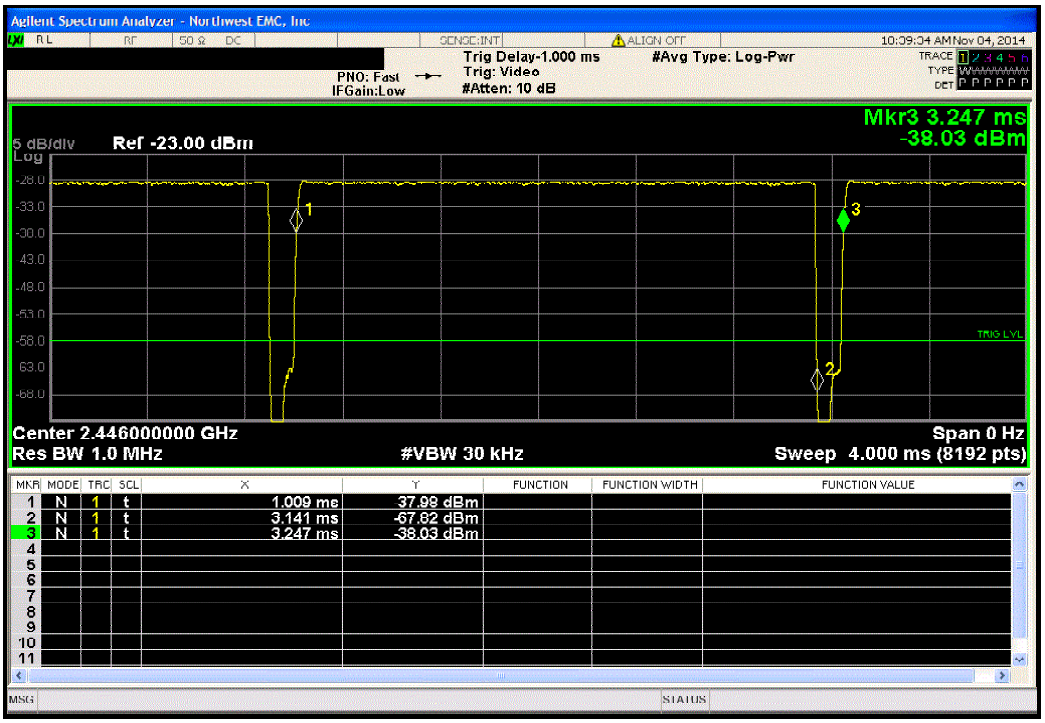


Low Channel 2402 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

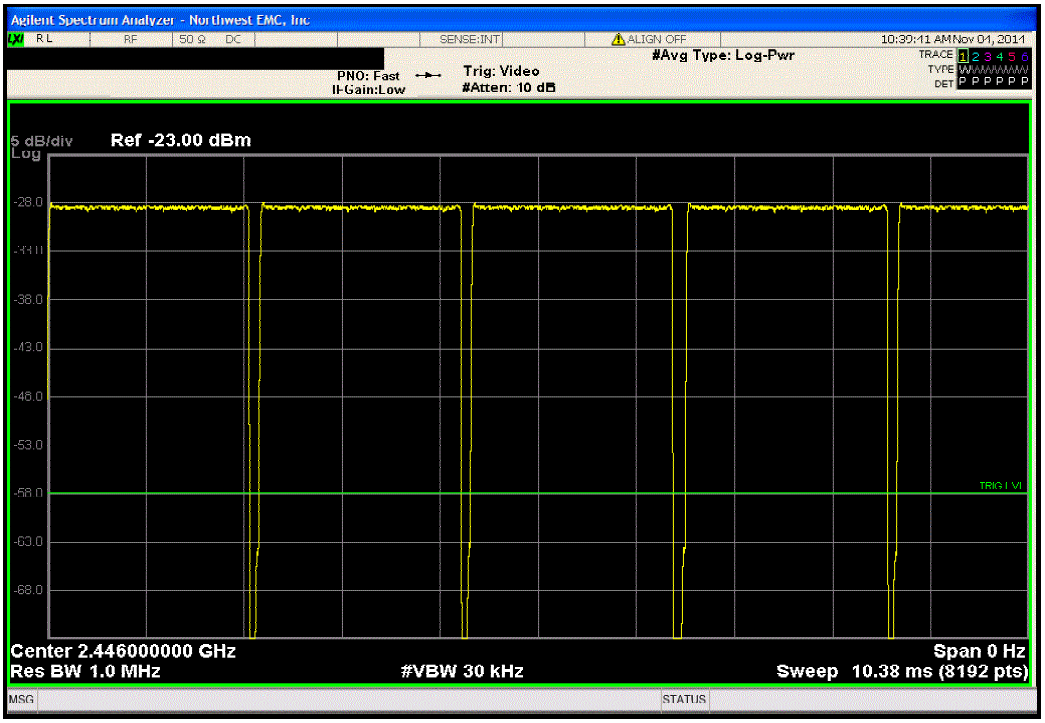


DUTY CYCLE

Mid Channel 2446 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.131 mS	2.238 mS	1	95.2	N/A	N/A

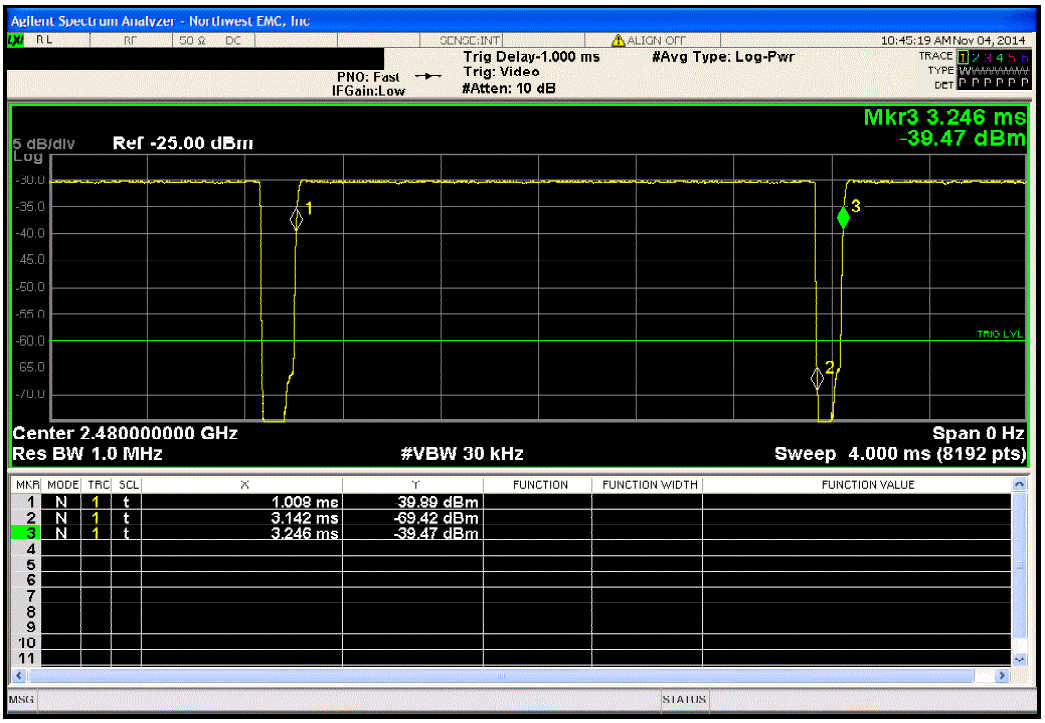


Mid Channel 2446 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

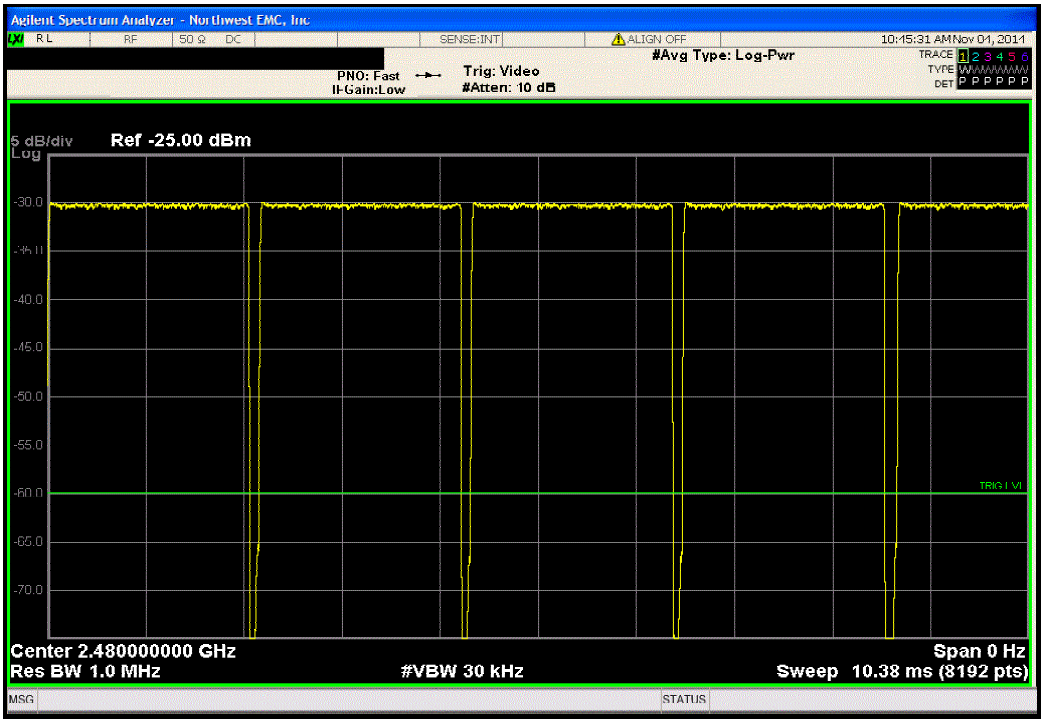


DUTY CYCLE

High Channel 2480 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	2.134 mS	2.238 mS	1	95.4	N/A	N/A



High Channel 2480 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



CHANNEL SPACING

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
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12
Antenna, Horn	ETS	3115	AJA	6/3/2014	24

TEST DESCRIPTION

The channel carrier frequencies in the 2400-2483.5MHz band must be separated by 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Or, if the output power is less than 125 mW, the channel separation can be 25 kHz or 2/3 of the 20dB bandwidth. The EUT was operated in pseudorandom hopping mode. The spectrum was scanned across two adjacent peaks. The separation between the peaks of these channels was measured.

CHANNEL SPACING

EUT:	RE1 Radio Module			**Work Order:**	64SE0001
Serial Number:	None			**Date:**	11/04/14
Customer:	64seconds, Inc.			**Temperature:**	23.1°C
Attendees:	None			**Humidity:**	27%
Project:	None			**Barometric Pres.:**	1015.5
Tested by:	Bryan Weller	**Power:**	Battery	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009, KDB 453039

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

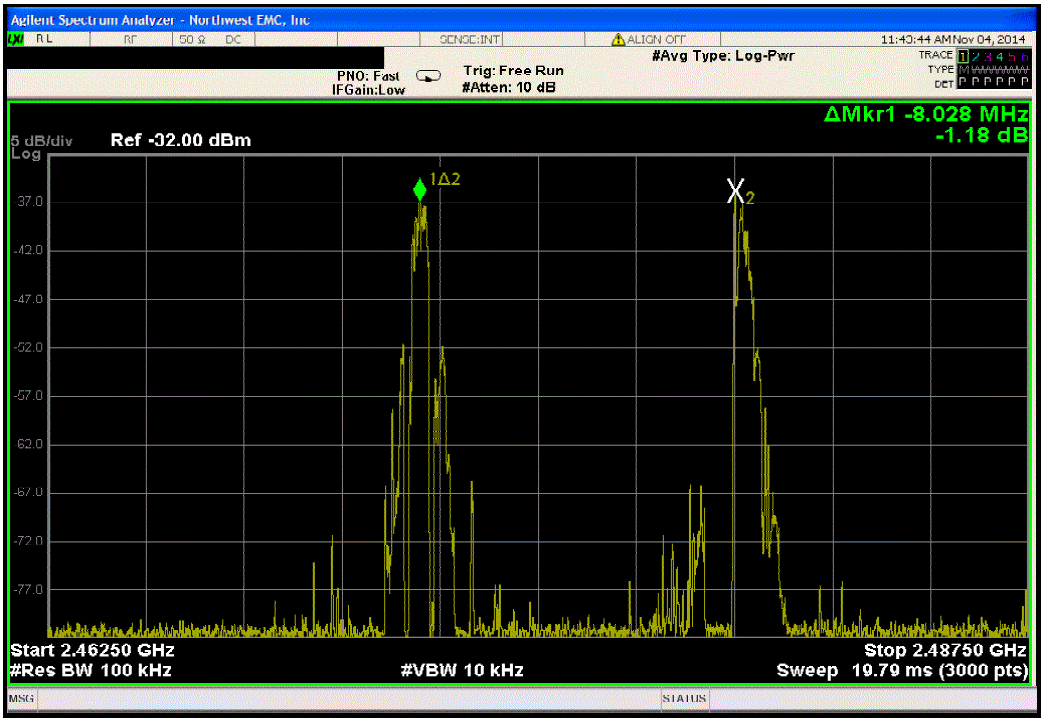
None

Configuration #	1	Signature Bryan Weller

	Value	Limit (≥)	Results
Mid Band	8.0 MHz	1 MHz	Pass

CHANNEL SPACING

Mid Band						
				Value	Limit (≥)	Results
				8.0 MHz	1 MHz	Pass



NUMBER OF HOPPING FREQUENCIES

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
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12
Antenna, Horn	ETS	3115	AJA	6/3/2014	24

TEST DESCRIPTION

The number of hopping frequencies was measured across the authorized band. The hopping function of the EUT was enabled.

For Hybrid systems there is no minumum or maximum number of channels specified. The number of channels is measured to characterize the system and for dwell time calculations contained elsewhere in the report.

NUMBER OF HOPPING FREQUENCIES

EUT:	RE1 Radio Module			**Work Order:**	64SE0001
Serial Number:	None			**Date:**	11/04/14
Customer:	64seconds, Inc.			**Temperature:**	23.1°C
Attendees:	None			**Humidity:**	27%
Project:	None			**Barometric Pres.:**	1015.5
Tested by:	Bryan Weller	**Power:**	Battery	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009, KDB 453039

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

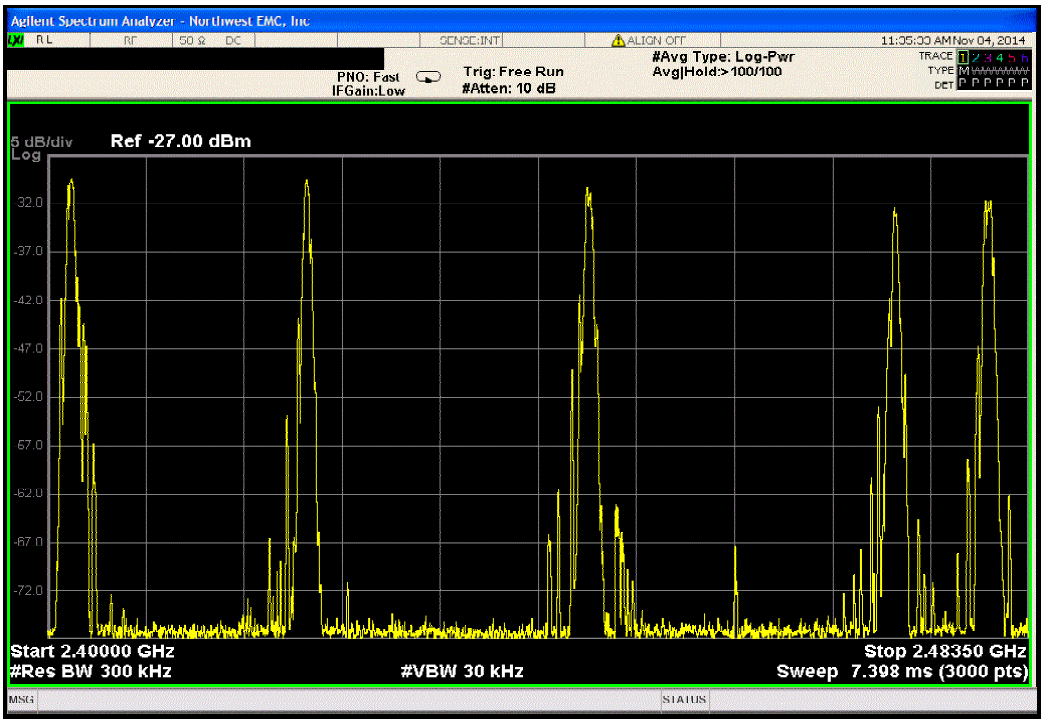
None

Configuration #	1	Signature	Bryan Weller

	Number of Channels	Limit	Results
Mid Channel, 2446 MHz	5	N/A	N/A

NUMBER OF HOPPING FREQUENCIES

Mid Channel, 2446 MHz						
				Number of Channels	Limit	Results
				5	N/A	N/A



DWELL TIME

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
Antenna, Horn	ETS	3115	AJA	6/3/2014	24
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24

TEST DESCRIPTION

The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

The dwell time limit is based on the Number of Hopping Channels * 400 mS. This would be 5 Channels * 400mS =2 Sec.

On Time During 2 Sec = Pulse Width * Average Number of Pulses * Scale Factor

- Average Number of Pulses is based on 4 samples.

- Scale Factor = 2 Sec / Screen Capture Sweep Time = 2 Sec / 0.4 Sec = 5

DWELL TIME

EUT:	RE1 Radio Module			**Work Order:**	64SE0001
Serial Number:	None			**Date:**	11/04/14
Customer:	64seconds, Inc.			**Temperature:**	23.1°C
Attendees:	None			**Humidity:**	27%
Project:	None			**Barometric Pres.:**	1015.5
Tested by:	Bryan Weller	**Power:**	Battery	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009, KDB 453039

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

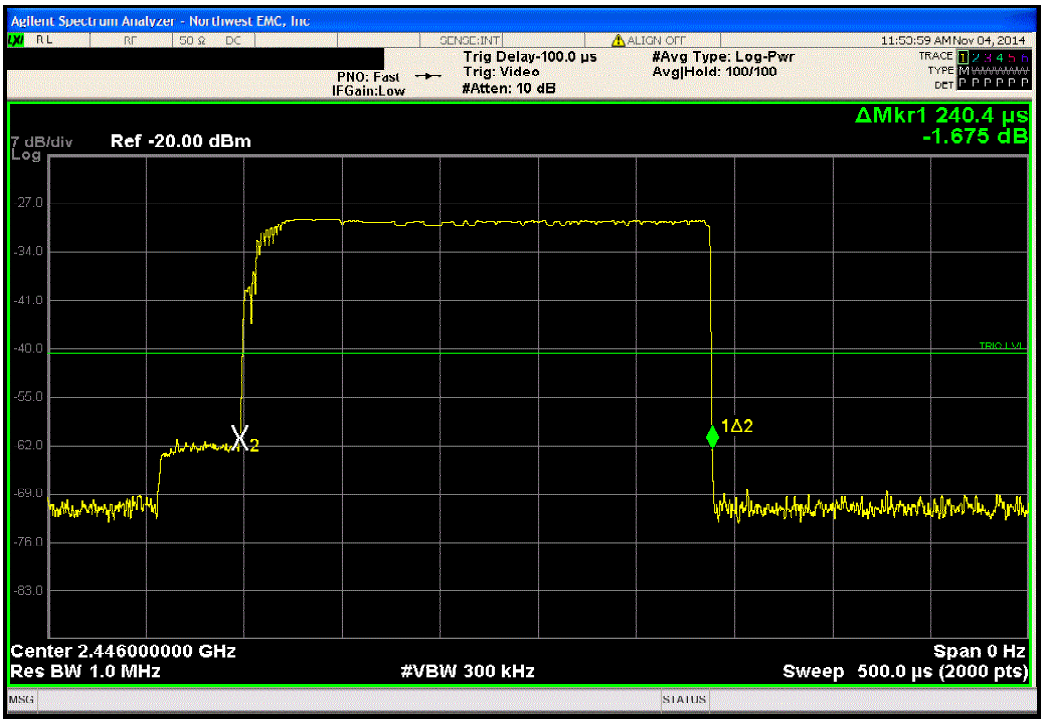
None

Configuration #	1	Signature	Bryan Weller

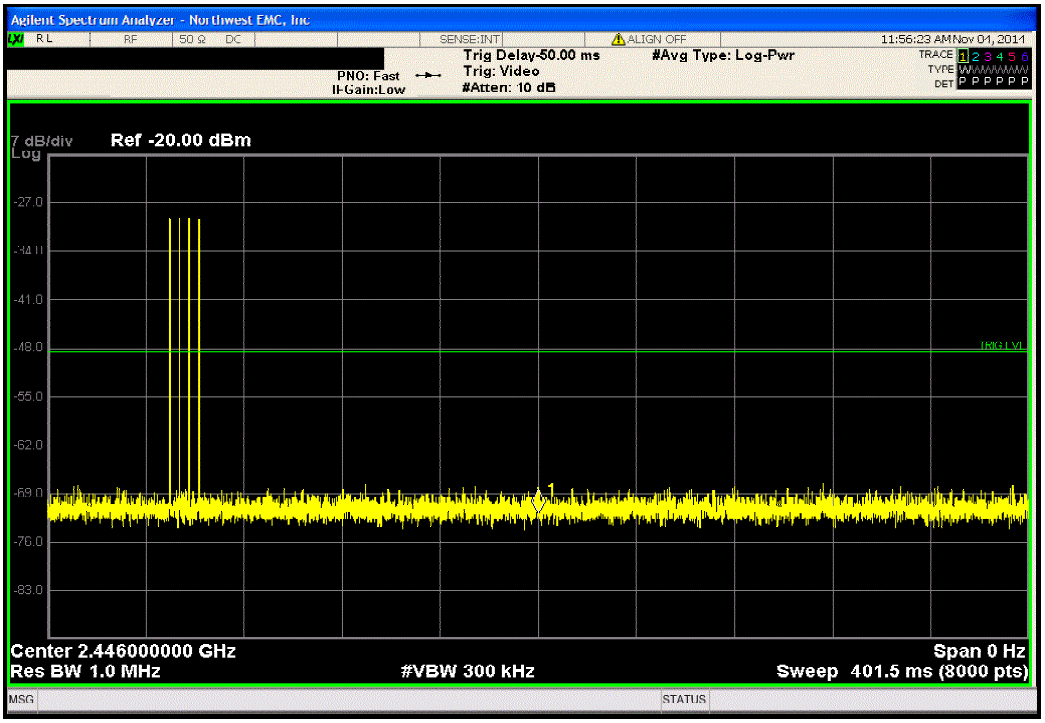
	Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 2 S	Limit (mS)	Results
Mid Channel, 2446 MHz	0.24	N/A	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2446 MHz	N/A	4	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2446 MHz	N/A	7	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2446 MHz	N/A	4	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2446 MHz	N/A	3	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2446 MHz	0.24	N/A	4.5	5	5.4	400	Pass

DWELL TIME

Mid Channel, 2446 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 2 S	Limit (mS)	Results
0.24	N/A	N/A	N/A	N/A	N/A	N/A

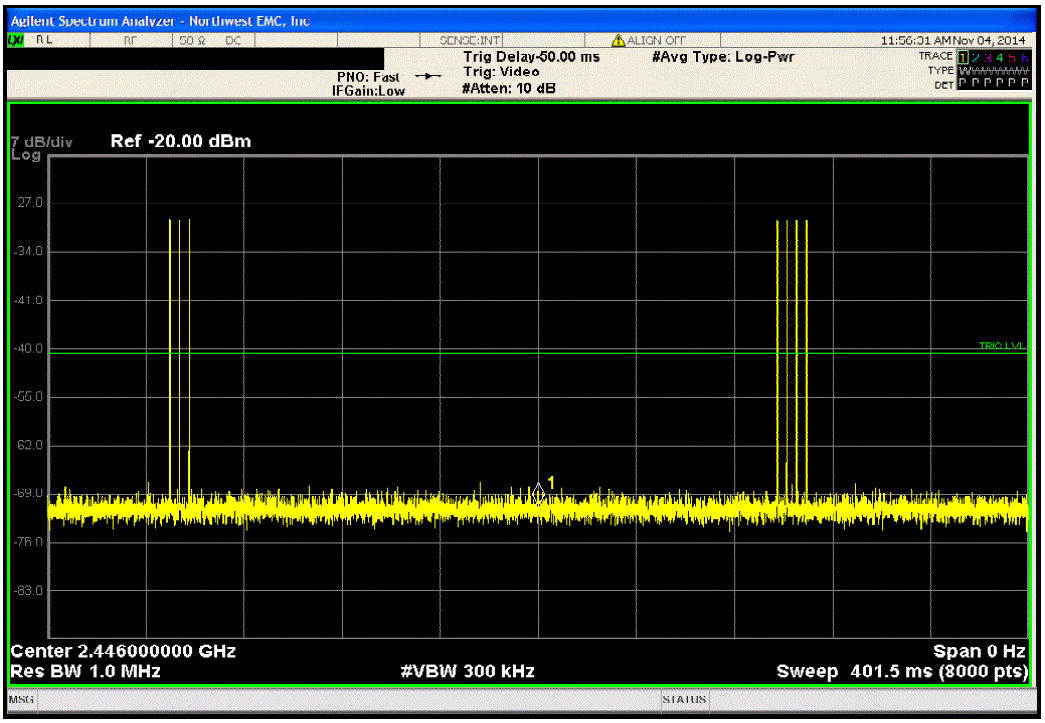


Mid Channel, 2446 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 2 S	Limit (mS)	Results
N/A	4	N/A	N/A	N/A	N/A	N/A

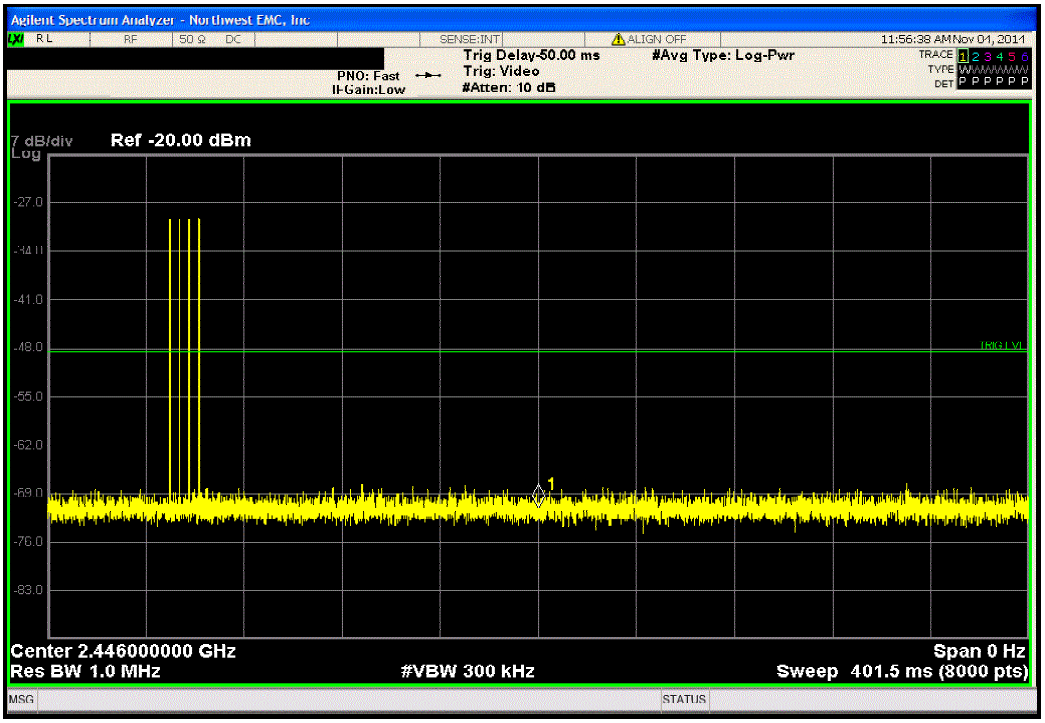


DWELL TIME

Mid Channel, 2446 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 2 S	Limit (mS)	Results
N/A	7	N/A	N/A	N/A	N/A	N/A

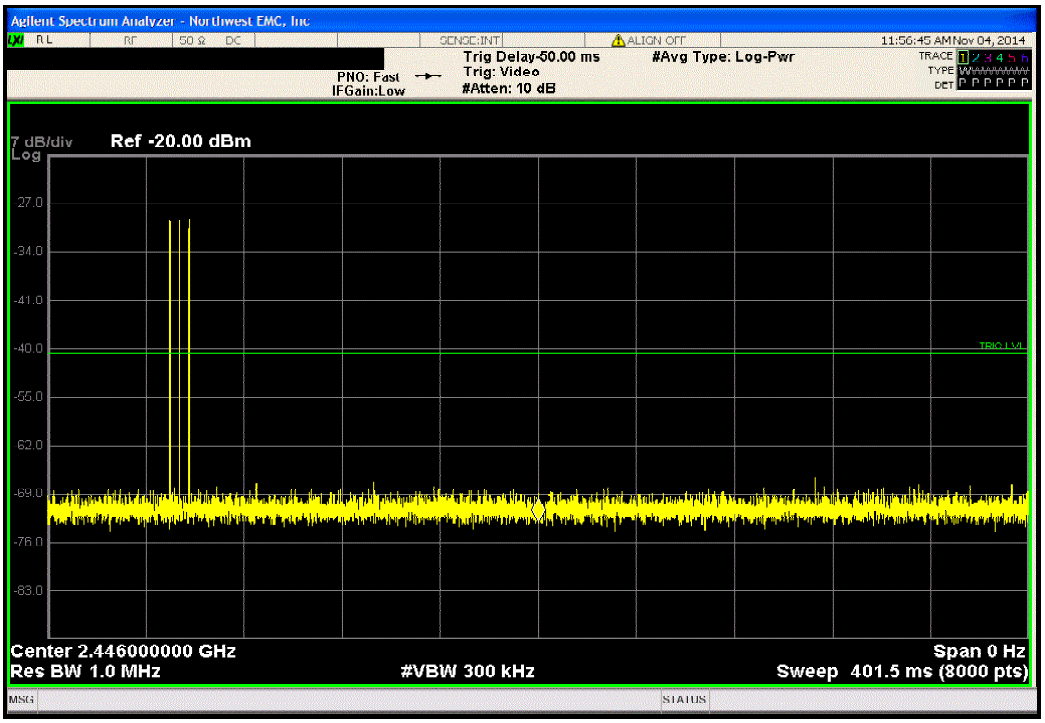


Mid Channel, 2446 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 2 S	Limit (mS)	Results
N/A	4	N/A	N/A	N/A	N/A	N/A



DWELL TIME

Mid Channel, 2446 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 2 S	Limit (mS)	Results
N/A	3	N/A	N/A	N/A	N/A	N/A



Mid Channel, 2446 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 2 S	Limit (mS)	Results
0.24	N/A	4.5	5	5.4	400	Pass

Calculation Only

No Screen Capture Required

BAND EDGE COMPLIANCE - HOPPING MODE

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
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2013	24
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/14/2014	12
Antenna, Horn	ETS	3115	AJA	6/3/2014	24

TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to its normal pseudo-random hopping sequence. 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 - HOPPING MODE

EUT:	RE1 Radio Module			**Work Order:**	64SE0001
Serial Number:	None			**Date:**	11/04/14
Customer:	64seconds, Inc.			**Temperature:**	23.1°C
Attendees:	None			**Humidity:**	27%
Project:	None			**Barometric Pres.:**	1015.5
Tested by:	Bryan Weller	**Power:**	Battery	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.247:2014	ANSI C63.10:2009, KDB 453039

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

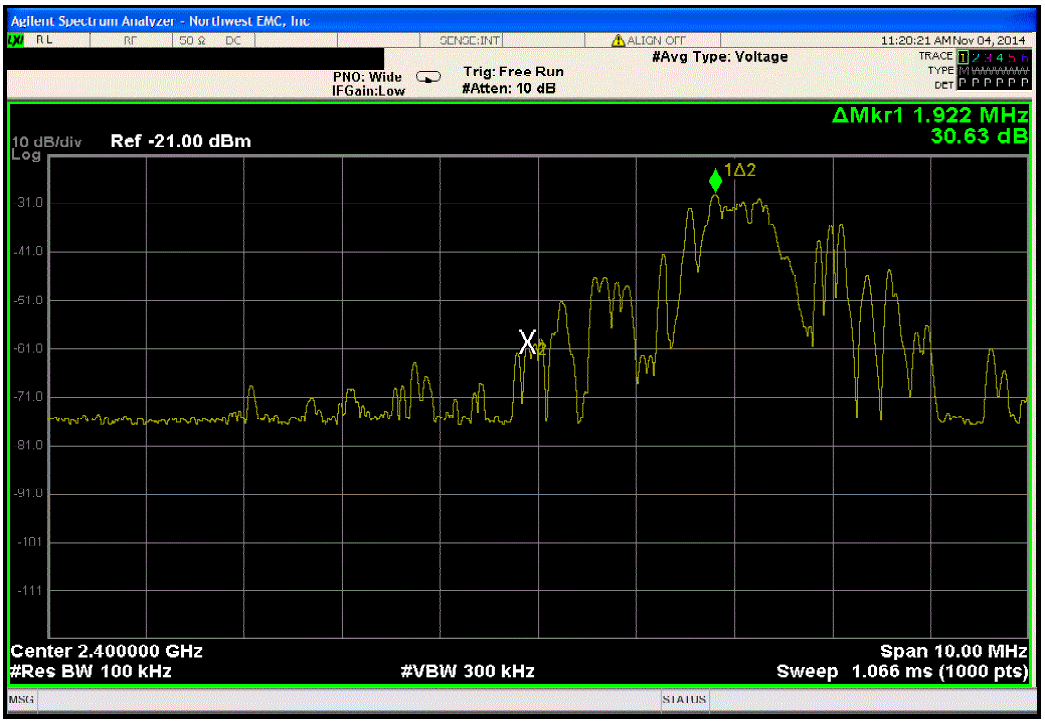
None

Configuration #	1	Signature Bryan Weller

	Value (dBc)	Limit ≤ (dBc)	Result
Low Channel, 2402 MHz	-30.64	-20	Pass
High Channel, 2480 MHz	-34.95	-20	Pass

BAND EDGE COMPLIANCE - HOPPING MODE

Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-30.64	-20	Pass



High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-34.95	-20	Pass