NORTHWEST EMC

i1 Biometrics, Inc.

Vector Mouthguard

FCC 15.207:2014
FCC 15.247:2014

Report # I1BM0001.1

NVLAP Lab Code: 200629-0

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: December 22, 2014
i1 Biometrics, Inc.
Model: Vector Mouthguard

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2014 FCC 15.247:2014	ANSI C63.10:2009 DA 00-705:2000

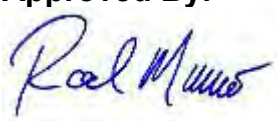
Results

Method Clause	Test Description	Applied	Results	Comments
6.2	AC Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
6.7	Spurious Conducted Emissions	Yes	Pass	
6.9.1	Occupied Bandwidth	Yes	Pass	
6.10.1	Output Power	Yes	Pass	
7.5	Duty Cycle	Yes	Pass	
7.7.2	Channel Spacing	Yes	Pass	
7.7.3	Number of Hopping Channels	Yes	Pass	
7.7.4	Dwell Time	Yes	Pass	
7.7.9	Band Edge Compliance	Yes	Pass	
7.7.9	Band Edge Compliance - Hopping Mode	Yes	Pass	

Deviations From Test Standards

None

Approved By:



Rod Munro, 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

TMU.2014.12.03

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.

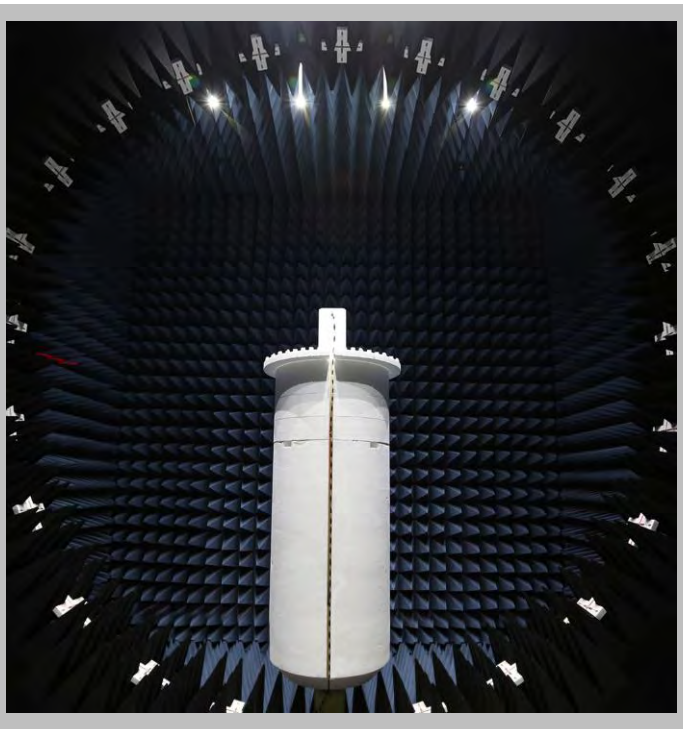
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

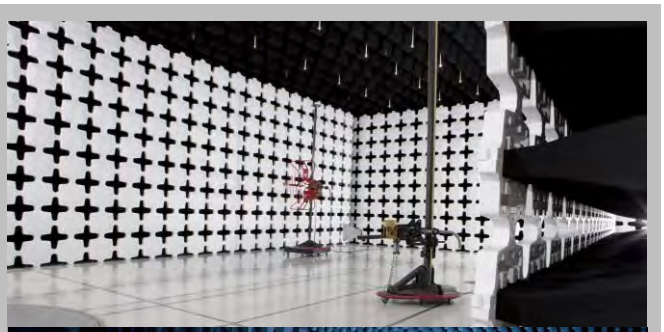
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	4.5 dB	-4.5 dB
AC Powerline Conducted Emissions (dB)	2.9 dB	-2.9 dB

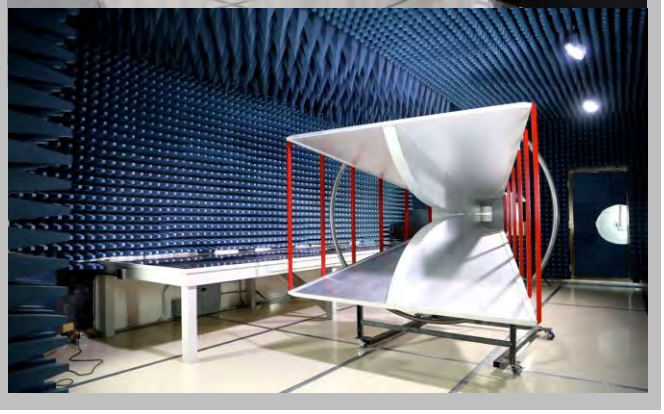
FACILITIES

REV 2014.10.08

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) 685-0796	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 9801 (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	In Process	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110







PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	i1 Biometrics, Inc.
Address:	12020 113th Avenue NE Suite 210
City, State, Zip:	Kirkland, WA 98034
Test Requested By:	David Brown
Model:	Vector Mouthguard
First Date of Test:	December 17, 2014
Last Date of Test:	December 22, 2014
Receipt Date of Samples:	December 17, 2014
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Wireless Mouthguard.

Testing Objective:
To demonstrate compliance of the 902-928 FHSS radio to FCC 15.247 requirements.

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration I1BM0001- 1

Software/Firmware Running during test	
Description	**Version**
FCC Firmware v4	BDF299D6

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Mouthguard	i1 Biometrics, Inc.	D0001	3350

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop PC	Lenovo	Yoga 2 Pro	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB	No	0.5m	No	Wireless Mouthguard	Laptop PC

Configuration I1BM0001- 2

Software/Firmware Running during test	
Description	**Version**
FCC Firmware v4	BDF299D6

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Mouthguard	i1 Biometrics, Inc.	D0001	3348

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Adapter	Lenovo	ADLX65SLC2A	None
Charging Case	i1 Biometrics, Inc.	A0001	B
Laptop PC	Lenovo	Yoga 2 Pro	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	1.0m	No	AC Mains	AC Adapter
DC Power	No	1.8m	Yes	AC Adapter	Laptop PC
USB	No	0.5m	No	Charging Case	Laptop PC

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration I1BM0001- 3

Software/Firmware Running during test	
Description	**Version**
FCC Firmware v4	BDF299D6

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Mouthguard	i1 Biometrics, Inc.	D0001	3348

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC-USB Power Adapter	BLU Products	US-BM-1000	None
Charging Case	i1 Biometrics, Inc.	A0001	B

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB	No	0.5m	No	AC-USB Power Adapter	Charging Case

Configuration I1BM0001- 4

Software/Firmware Running during test	
Description	**Version**
FCC Firmware v4	BDF299D6

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Mouthguard	i1 Biometrics, Inc.	D0001	3348

MODIFICATIONS

NORTHWEST EMC 2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	12/17/2014	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
2	12/17/2014	Band Edge Compliance – Hopping Mode	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
3	12/17/2014	Channel Spacing	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
4	12/17/2014	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
5	12/17/2014	Dwell Time	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
6	12/17/2014	Number of Hopping Frequencies	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
7	12/17/2014	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
8	12/17/2014	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
9	12/17/2014	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
10	12/19/2014	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT was taken home by the client before the next scheduled test.
11	12/22/2014	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

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	ESCI	ARE	06/06/2014	12 mo
NC05 Cables	N/A	Conducted / NF Probe Cable	NC4	10/14/2014	12 mo
High Pass Filter	TTE	H97-100K-50-720B	HHF	12/08/2014	12 mo
Attenuator	Fairview Microwave	SA03B-20	RKD	10/14/2014	12 mo
LISN	Solar	9252-50-R-24-BNC	LIM	12/09/2014	12 mo

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

I1BM0001-2
I1BM0001-3

MODES INVESTIGATED

Transmitting Low Channel 2
Transmitting Mid Channel 63
Transmitting High Channel 126

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

EUT:	Vector Mouthguard	Work Order:	I1BM0001
Serial Number:	3348	Date:	12/19/2014
Customer:	i1 Biometrics, Inc.	Temperature:	24°C
Attendees:	David Brown, Rob Phibbs	Relative Humidity:	36%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	I1BM0001-2

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	1	Line:	High Line	Ext. Attenuation (dB):	20

COMMENTS

None

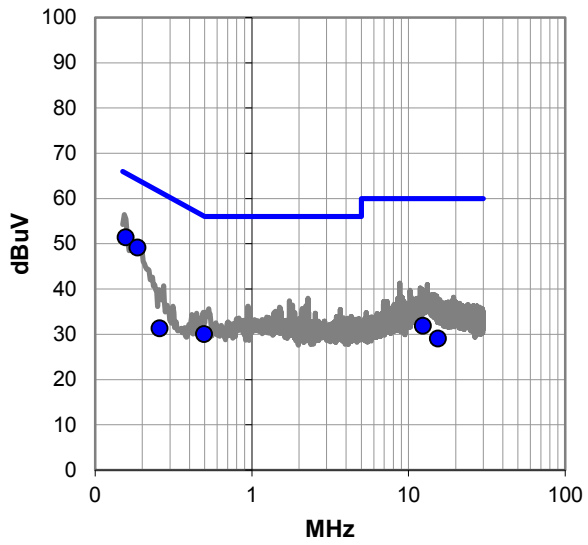
EUT OPERATING MODES

Transmitting Low Channel 2 at Maximum Duty Cycle, 902.399871 MHz, Power Level at 10dBm.

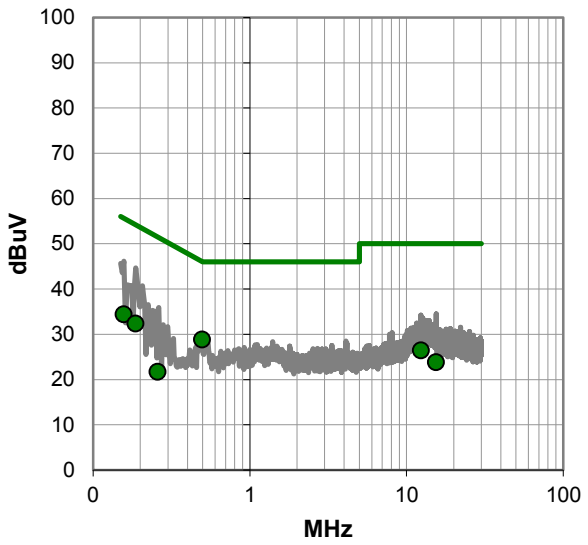
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

RESULTS - Run #1

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.157	30.9	20.5	51.4	65.6	-14.2
0.187	28.7	20.5	49.2	64.2	-15.0
0.495	9.8	20.2	30.0	56.1	-26.1
12.363	10.3	21.5	31.8	60.0	-28.2
0.258	11.0	20.3	31.3	61.5	-30.2
15.464	7.1	21.9	29.0	60.0	-31.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.495	8.6	20.2	28.8	46.1	-17.3
0.157	13.9	20.5	34.4	55.6	-21.2
0.187	11.9	20.5	32.4	54.2	-21.8
12.363	4.9	21.5	26.4	50.0	-23.6
15.464	1.9	21.9	23.8	50.0	-26.2
0.258	1.4	20.3	21.7	51.5	-29.8

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

EUT:	Vector Mouthguard	Work Order:	I1BM0001
Serial Number:	3348	Date:	12/19/2014
Customer:	i1 Biometrics, Inc.	Temperature:	24°C
Attendees:	David Brown, Rob Phibbs	Relative Humidity:	36%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	I1BM0001-2

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	2	Line:	Neutral	Ext. Attenuation (dB):	20

COMMENTS

None

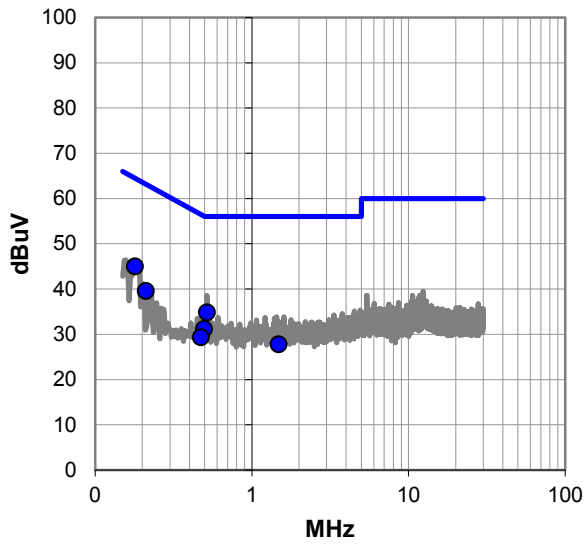
EUT OPERATING MODES

Transmitting Low Channel 2 at Maximum Duty Cycle, 902.399871 MHz, Power Level at 10dBm.

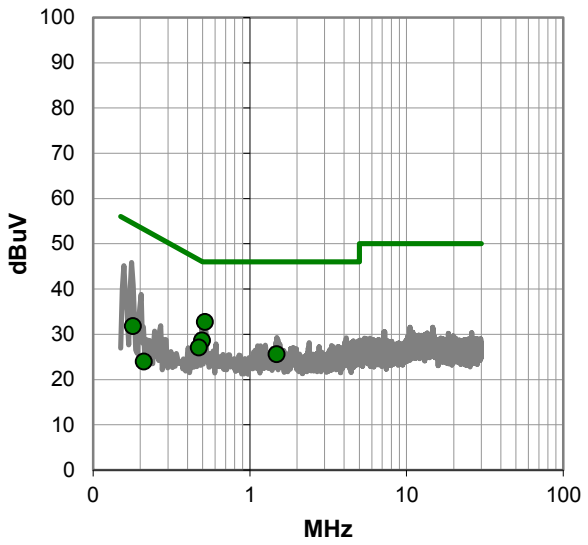
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

RESULTS - Run #2

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.179	24.5	20.5	45.0	64.5	-19.5
0.519	14.6	20.2	34.8	56.0	-21.2
0.211	19.2	20.4	39.6	63.2	-23.6
0.496	10.9	20.2	31.1	56.1	-24.9
0.473	9.1	20.2	29.3	56.5	-27.1
1.487	7.3	20.5	27.8	56.0	-28.2

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.519	12.5	20.2	32.7	46.0	-13.3
0.496	8.4	20.2	28.6	46.1	-17.4
0.473	6.8	20.2	27.0	46.5	-19.4
1.487	5.1	20.5	25.6	46.0	-20.4
0.179	11.3	20.5	31.8	54.5	-22.7
0.211	3.6	20.4	24.0	53.2	-29.2

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

EUT:	Vector Mouthguard	Work Order:	I1BM0001
Serial Number:	3348	Date:	12/19/2014
Customer:	i1 Biometrics, Inc.	Temperature:	24°C
Attendees:	David Brown, Rob Phibbs	Relative Humidity:	36%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	I1BM0001-2

TEST SPECIFICATIONS

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

TEST PARAMETERS

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

COMMENTS

None

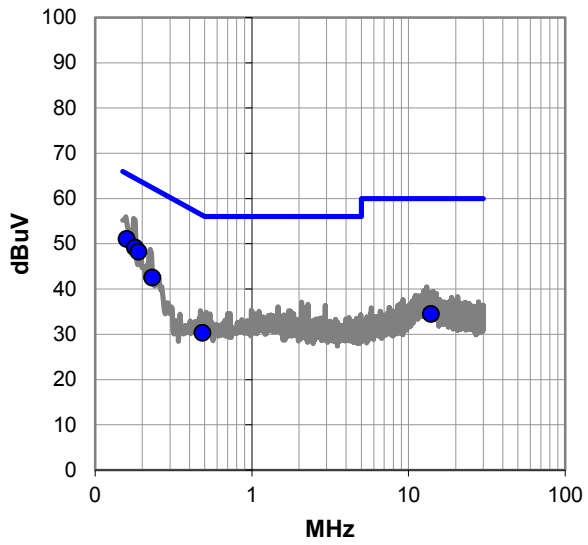
EUT OPERATING MODES

Transmitting Mid Channel 63 at Maximum Duty Cycle, 914.596882 MHz, Power Level at 10dBm.

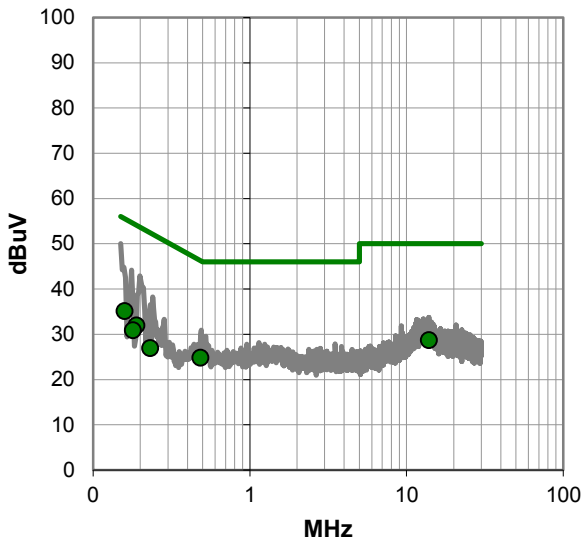
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.159	30.5	20.5	51.0	65.5	-14.5
0.180	28.7	20.5	49.2	64.5	-15.3
0.189	27.8	20.5	48.3	64.1	-15.8
0.231	22.2	20.3	42.5	62.4	-19.9
13.899	12.8	21.7	34.5	60.0	-25.5
0.484	10.1	20.2	30.3	56.3	-25.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.159	14.6	20.5	35.1	55.5	-20.4
13.899	7.0	21.7	28.7	50.0	-21.3
0.484	4.6	20.2	24.8	46.3	-21.4
0.189	11.5	20.5	32.0	54.1	-22.1
0.180	10.4	20.5	30.9	54.5	-23.6
0.231	6.6	20.3	26.9	52.4	-25.5

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

EUT:	Vector Mouthguard	Work Order:	I1BM0001
Serial Number:	3348	Date:	12/19/2014
Customer:	i1 Biometrics, Inc.	Temperature:	24°C
Attendees:	David Brown, Rob Phibbs	Relative Humidity:	36%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	I1BM0001-2

TEST SPECIFICATIONS

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

TEST PARAMETERS

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

COMMENTS

None

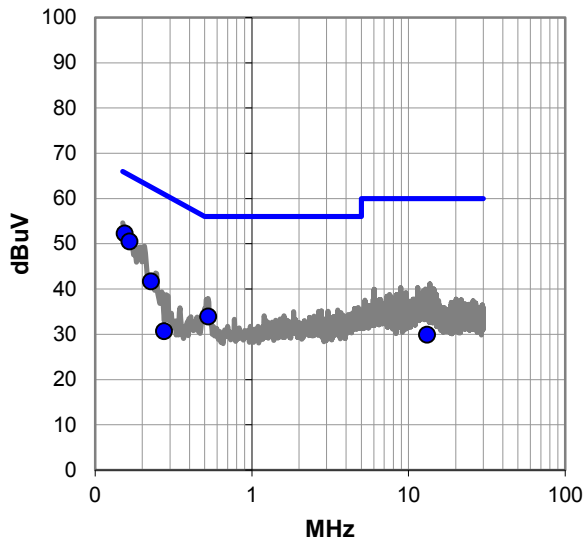
EUT OPERATING MODES

Transmitting Mid Channel 63 at Maximum Duty Cycle, 914.596882 MHz, Power Level at 10dBm.

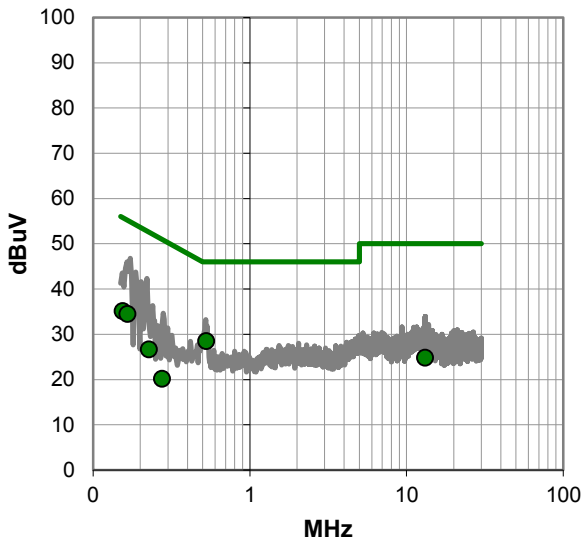
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.155	31.7	20.5	52.2	65.7	-13.5
0.166	30.0	20.5	50.5	65.1	-14.7
0.227	21.3	20.3	41.6	62.6	-20.9
0.526	13.6	20.3	33.9	56.0	-22.1
13.178	8.3	21.6	29.9	60.0	-30.1
0.276	10.3	20.4	30.7	60.9	-30.3

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.526	8.2	20.3	28.5	46.0	-17.5
0.155	14.6	20.5	35.1	55.7	-20.6
0.166	14.0	20.5	34.5	55.1	-20.7
13.178	3.2	21.6	24.8	50.0	-25.2
0.227	6.3	20.3	26.6	52.6	-25.9
0.276	-0.2	20.4	20.2	50.9	-30.8

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

EUT:	Vector Mouthguard	Work Order:	I1BM0001
Serial Number:	3348	Date:	12/19/2014
Customer:	i1 Biometrics, Inc.	Temperature:	24°C
Attendees:	David Brown, Rob Phibbs	Relative Humidity:	36%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	I1BM0001-2

TEST SPECIFICATIONS

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

TEST PARAMETERS

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

COMMENTS

None

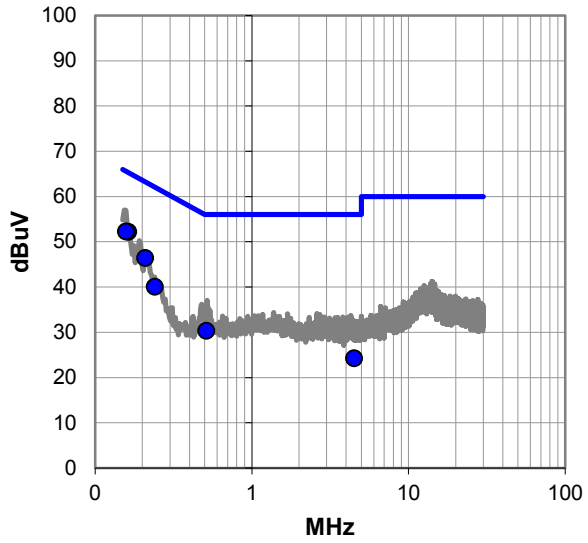
EUT OPERATING MODES

Transmitting High Channel 126 at Maximum Duty Cycle, 927.193795 MHz, Power Level at 10dBm.

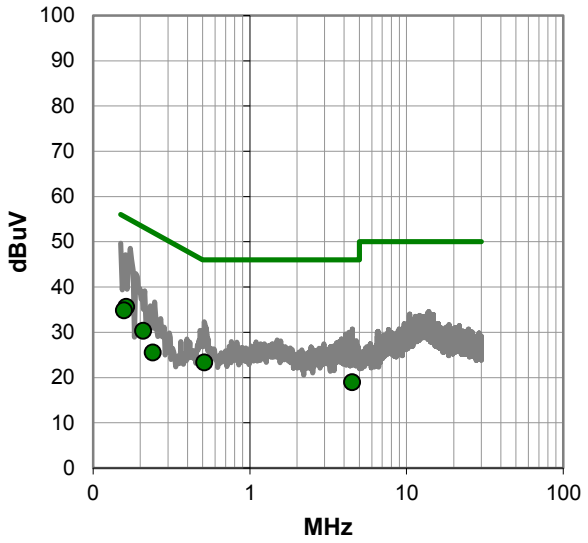
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

RESULTS - Run #5

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.163	31.7	20.5	52.2	65.3	-13.1
0.158	31.7	20.5	52.2	65.6	-13.4
0.209	26.0	20.4	46.4	63.3	-16.9
0.240	19.7	20.3	40.0	62.1	-22.1
0.513	10.1	20.2	30.3	56.0	-25.7
4.499	3.5	20.7	24.2	56.0	-31.8

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.163	15.1	20.5	35.6	55.3	-19.7
0.158	14.3	20.5	34.8	55.6	-20.8
0.513	3.1	20.2	23.3	46.0	-22.7
0.209	9.9	20.4	30.3	53.3	-23.0
0.240	5.2	20.3	25.5	52.1	-26.6
4.499	-1.8	20.7	18.9	46.0	-27.1

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

EUT:	Vector Mouthguard	Work Order:	I1BM0001
Serial Number:	3348	Date:	12/19/2014
Customer:	i1 Biometrics, Inc.	Temperature:	24°C
Attendees:	David Brown, Rob Phibbs	Relative Humidity:	36%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	I1BM0001-2

TEST SPECIFICATIONS

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

TEST PARAMETERS

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

COMMENTS

None

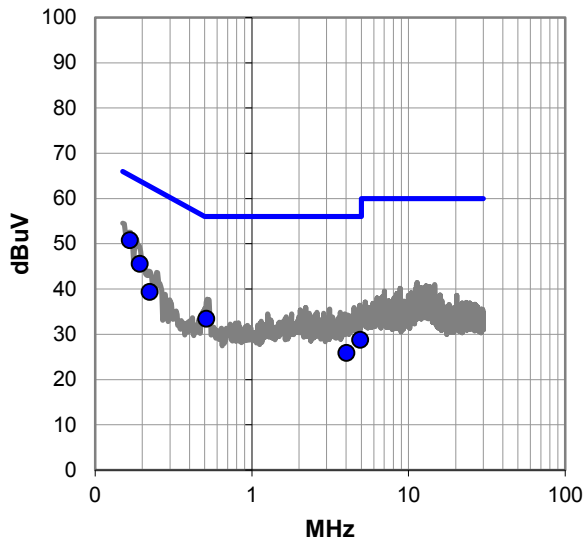
EUT OPERATING MODES

Transmitting High Channel 126 at Maximum Duty Cycle, 927.193795 MHz, Power Level at 10dBm.

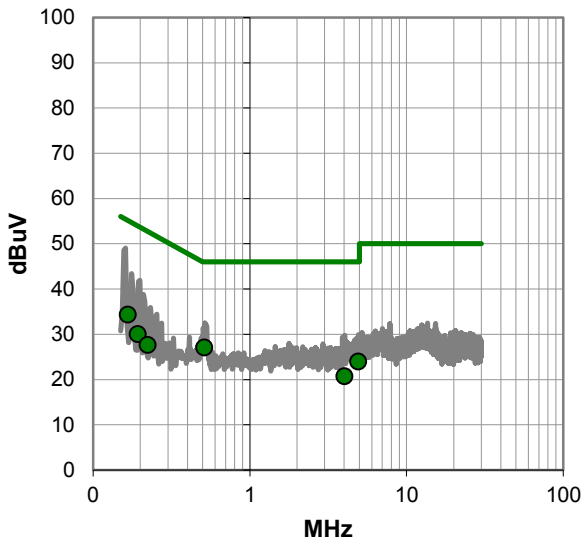
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

RESULTS - Run #6

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.166	30.3	20.5	50.8	65.1	-14.3
0.193	25.1	20.4	45.5	63.9	-18.4
0.512	13.2	20.2	33.4	56.0	-22.6
0.223	19.0	20.3	39.3	62.7	-23.3
4.933	8.0	20.7	28.7	56.0	-27.3
4.027	5.2	20.7	25.9	56.0	-30.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.512	6.8	20.2	27.0	46.0	-19.0
0.166	13.8	20.5	34.3	55.1	-20.8
4.933	3.2	20.7	23.9	46.0	-22.1
0.193	9.6	20.4	30.0	53.9	-23.9
0.223	7.3	20.3	27.6	52.7	-25.0
4.027	0.0	20.7	20.7	46.0	-25.3

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

EUT:	Vector Mouthguard	Work Order:	I1BM0001
Serial Number:	3348	Date:	12/19/2014
Customer:	i1 Biometrics, Inc.	Temperature:	24°C
Attendees:	David Brown, Rob Phibbs	Relative Humidity:	36%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	I1BM0001-3

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	7	Line:	High Line	Ext. Attenuation (dB):	20

COMMENTS

None

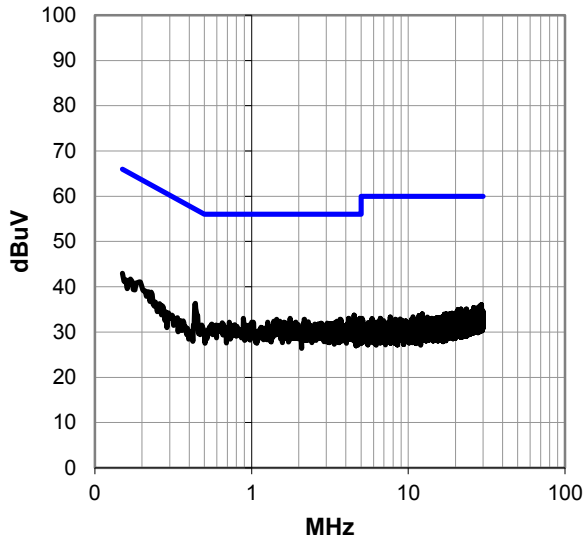
EUT OPERATING MODES

Transmitting Low Channel 2 at Maximum Duty Cycle, 902.399871 MHz, Power Level at 10dBm.

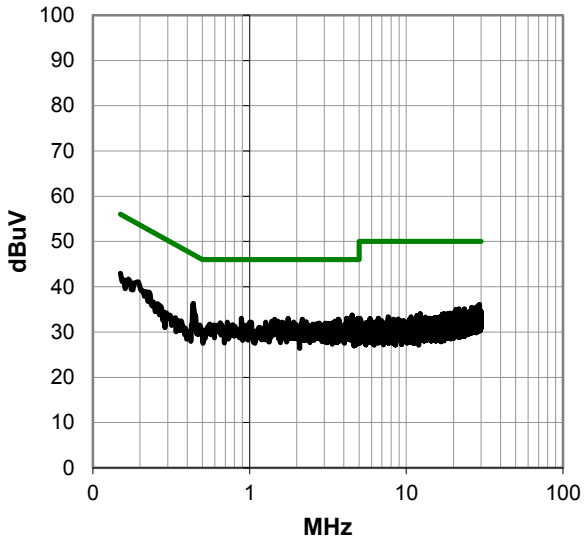
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

RESULTS - Run #7

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.437	16.1	20.2	36.3	57.1	-20.8
4.519	13.0	20.7	33.7	56.0	-22.3
0.889	12.6	20.4	33.0	56.0	-23.0
4.907	12.3	20.7	33.0	56.0	-23.0
1.765	12.5	20.5	33.0	56.0	-23.0
4.172	12.3	20.7	33.0	56.0	-23.0
0.150	22.4	20.6	43.0	66.0	-23.1
2.172	12.3	20.5	32.8	56.0	-23.2
3.691	12.1	20.7	32.8	56.0	-23.2
1.445	12.3	20.5	32.8	56.0	-23.2
4.858	12.0	20.7	32.7	56.0	-23.3
4.198	11.9	20.7	32.6	56.0	-23.4
3.746	11.9	20.7	32.6	56.0	-23.4
3.638	11.7	20.7	32.4	56.0	-23.6
3.560	11.7	20.7	32.4	56.0	-23.6
3.508	11.7	20.7	32.4	56.0	-23.6
2.303	11.7	20.5	32.2	56.0	-23.8
2.213	11.7	20.5	32.2	56.0	-23.8
4.679	11.5	20.7	32.2	56.0	-23.8
1.911	11.7	20.5	32.2	56.0	-23.8
1.612	11.7	20.5	32.2	56.0	-23.8
1.266	11.7	20.5	32.2	56.0	-23.8
0.721	11.7	20.5	32.2	56.0	-23.8
1.027	11.7	20.4	32.1	56.0	-23.9
1.004	11.7	20.4	32.1	56.0	-23.9
4.134	11.4	20.7	32.1	56.0	-23.9

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.437	16.1	20.2	36.3	47.1	-10.8
4.519	13.0	20.7	33.7	46.0	-12.3
0.889	12.6	20.4	33.0	46.0	-13.0
4.907	12.3	20.7	33.0	46.0	-13.0
1.765	12.5	20.5	33.0	46.0	-13.0
4.172	12.3	20.7	33.0	46.0	-13.0
0.150	22.4	20.6	43.0	56.0	-13.1
2.172	12.3	20.5	32.8	46.0	-13.2
3.691	12.1	20.7	32.8	46.0	-13.2
1.445	12.3	20.5	32.8	46.0	-13.2
4.858	12.0	20.7	32.7	46.0	-13.3
4.198	11.9	20.7	32.6	46.0	-13.4
3.746	11.9	20.7	32.6	46.0	-13.4
3.638	11.7	20.7	32.4	46.0	-13.6
3.560	11.7	20.7	32.4	46.0	-13.6
3.508	11.7	20.7	32.4	46.0	-13.6
2.303	11.7	20.5	32.2	46.0	-13.8
2.213	11.7	20.5	32.2	46.0	-13.8
4.679	11.5	20.7	32.2	46.0	-13.8
1.911	11.7	20.5	32.2	46.0	-13.8
1.612	11.7	20.5	32.2	46.0	-13.8
1.266	11.7	20.5	32.2	46.0	-13.8
0.721	11.7	20.5	32.2	46.0	-13.8
1.027	11.7	20.4	32.1	46.0	-13.9
1.004	11.7	20.4	32.1	46.0	-13.9
4.134	11.4	20.7	32.1	46.0	-13.9

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

EUT:	Vector Mouthguard	Work Order:	I1BM0001
Serial Number:	3348	Date:	12/19/2014
Customer:	i1 Biometrics, Inc.	Temperature:	24°C
Attendees:	David Brown, Rob Phibbs	Relative Humidity:	36%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	I1BM0001-3

TEST SPECIFICATIONS

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

TEST PARAMETERS

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

COMMENTS

None

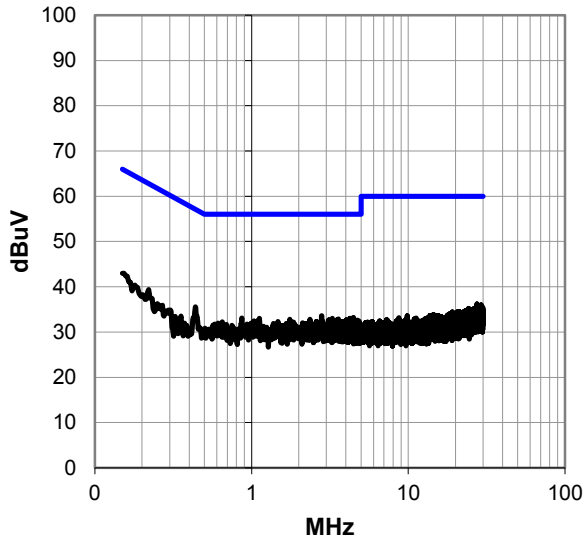
EUT OPERATING MODES

Transmitting Low Channel 2 at Maximum Duty Cycle, 902.399871 MHz, Power Level at 10dBm.

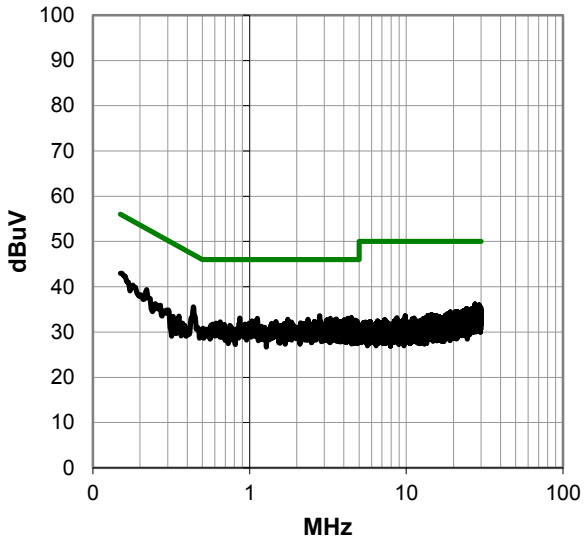
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

RESULTS - Run #8

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.437	15.3	20.2	35.5	57.1	-21.6
2.803	13.0	20.6	33.6	56.0	-22.4
4.463	12.5	20.7	33.2	56.0	-22.8
0.866	12.7	20.4	33.1	56.0	-22.9
1.124	12.6	20.5	33.1	56.0	-23.0
4.243	12.3	20.7	33.0	56.0	-23.0
3.284	12.4	20.6	33.0	56.0	-23.0
0.150	22.4	20.6	43.0	66.0	-23.1
3.590	12.2	20.7	32.9	56.0	-23.1
2.362	12.3	20.5	32.8	56.0	-23.2
1.751	12.3	20.5	32.8	56.0	-23.2
3.538	12.1	20.7	32.8	56.0	-23.2
4.019	12.0	20.7	32.7	56.0	-23.3
3.112	12.1	20.6	32.7	56.0	-23.3
4.724	11.9	20.7	32.6	56.0	-23.4
1.098	12.1	20.5	32.6	56.0	-23.5
3.478	11.9	20.6	32.5	56.0	-23.5
2.832	11.9	20.6	32.5	56.0	-23.5
1.038	12.0	20.4	32.4	56.0	-23.6
4.855	11.7	20.7	32.4	56.0	-23.6
4.493	11.7	20.7	32.4	56.0	-23.6
2.594	11.8	20.5	32.3	56.0	-23.7
3.847	11.6	20.7	32.3	56.0	-23.7
3.750	11.6	20.7	32.3	56.0	-23.7
1.474	11.8	20.5	32.3	56.0	-23.7
3.075	11.7	20.6	32.3	56.0	-23.7

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.437	15.3	20.2	35.5	47.1	-11.6
2.803	13.0	20.6	33.6	46.0	-12.4
4.463	12.5	20.7	33.2	46.0	-12.8
0.866	12.7	20.4	33.1	46.0	-12.9
1.124	12.6	20.5	33.1	46.0	-13.0
4.243	12.3	20.7	33.0	46.0	-13.0
3.284	12.4	20.6	33.0	46.0	-13.0
0.150	22.4	20.6	43.0	56.0	-13.1
3.590	12.2	20.7	32.9	46.0	-13.1
2.362	12.3	20.5	32.8	46.0	-13.2
1.751	12.3	20.5	32.8	46.0	-13.2
3.538	12.1	20.7	32.8	46.0	-13.2
4.019	12.0	20.7	32.7	46.0	-13.3
3.112	12.1	20.6	32.7	46.0	-13.3
4.724	11.9	20.7	32.6	46.0	-13.4
1.098	12.1	20.5	32.6	46.0	-13.5
3.478	11.9	20.6	32.5	46.0	-13.5
2.832	11.9	20.6	32.5	46.0	-13.5
1.038	12.0	20.4	32.4	46.0	-13.6
4.855	11.7	20.7	32.4	46.0	-13.6
4.493	11.7	20.7	32.4	46.0	-13.6
2.594	11.8	20.5	32.3	46.0	-13.7
3.847	11.6	20.7	32.3	46.0	-13.7
3.750	11.6	20.7	32.3	46.0	-13.7
1.474	11.8	20.5	32.3	46.0	-13.7
3.075	11.7	20.6	32.3	46.0	-13.7

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

EUT:	Vector Mouthguard	Work Order:	I1BM0001
Serial Number:	3348	Date:	12/19/2014
Customer:	i1 Biometrics, Inc.	Temperature:	24°C
Attendees:	David Brown, Rob Phibbs	Relative Humidity:	36%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	I1BM0001-3

TEST SPECIFICATIONS

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

TEST PARAMETERS

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

COMMENTS

None

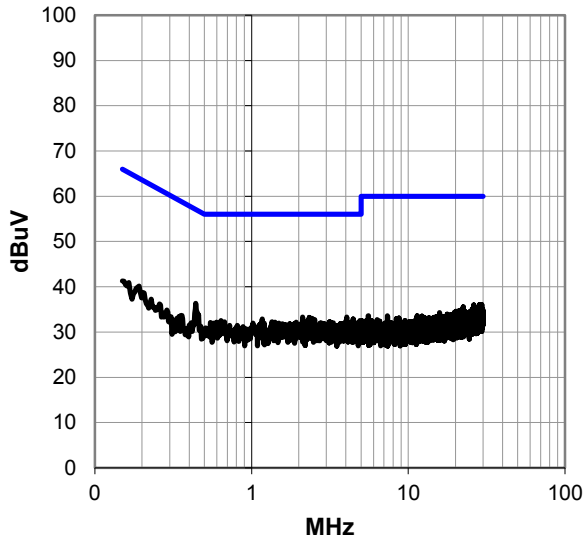
EUT OPERATING MODES

Transmitting Mid Channel 63 at Maximum Duty Cycle, 914.596882 MHz, Power Level at 10dBm.

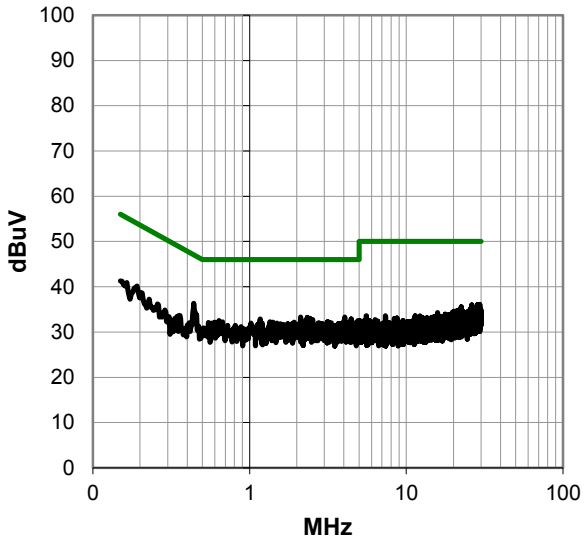
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

RESULTS - Run #9

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.441	16.1	20.2	36.3	57.0	-20.7
2.120	12.8	20.5	33.3	56.0	-22.7
4.045	12.6	20.7	33.3	56.0	-22.7
2.336	12.7	20.5	33.2	56.0	-22.8
2.433	12.5	20.5	33.0	56.0	-23.0
4.452	12.2	20.7	32.9	56.0	-23.1
1.169	12.4	20.5	32.9	56.0	-23.1
2.527	12.2	20.5	32.7	56.0	-23.3
2.284	12.1	20.5	32.6	56.0	-23.4
4.023	11.9	20.7	32.6	56.0	-23.4
0.639	12.1	20.5	32.6	56.0	-23.5
4.903	11.8	20.7	32.5	56.0	-23.5
1.351	11.8	20.5	32.3	56.0	-23.7
3.142	11.7	20.6	32.3	56.0	-23.7
4.526	11.5	20.7	32.2	56.0	-23.8
1.930	11.7	20.5	32.2	56.0	-23.8
1.411	11.7	20.5	32.2	56.0	-23.8
3.209	11.6	20.6	32.2	56.0	-23.8
0.598	11.7	20.5	32.2	56.0	-23.9
0.545	11.7	20.4	32.1	56.0	-23.9
4.217	11.4	20.7	32.1	56.0	-23.9
2.784	11.5	20.6	32.1	56.0	-23.9
29.478	12.0	24.0	36.0	60.0	-24.0
28.582	12.2	23.8	36.0	60.0	-24.0
4.858	11.3	20.7	32.0	56.0	-24.0
3.317	11.4	20.6	32.0	56.0	-24.0

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.441	16.1	20.2	36.3	47.0	-10.7
2.120	12.8	20.5	33.3	46.0	-12.7
4.045	12.6	20.7	33.3	46.0	-12.7
2.336	12.7	20.5	33.2	46.0	-12.8
2.433	12.5	20.5	33.0	46.0	-13.0
4.452	12.2	20.7	32.9	46.0	-13.1
1.169	12.4	20.5	32.9	46.0	-13.1
2.527	12.2	20.5	32.7	46.0	-13.3
2.284	12.1	20.5	32.6	46.0	-13.4
4.023	11.9	20.7	32.6	46.0	-13.4
0.639	12.1	20.5	32.6	46.0	-13.5
4.903	11.8	20.7	32.5	46.0	-13.5
1.351	11.8	20.5	32.3	46.0	-13.7
3.142	11.7	20.6	32.3	46.0	-13.7
4.526	11.5	20.7	32.2	46.0	-13.8
1.930	11.7	20.5	32.2	46.0	-13.8
1.411	11.7	20.5	32.2	46.0	-13.8
3.209	11.6	20.6	32.2	46.0	-13.8
0.598	11.7	20.5	32.2	46.0	-13.9
0.545	11.7	20.4	32.1	46.0	-13.9
4.217	11.4	20.7	32.1	46.0	-13.9
2.784	11.5	20.6	32.1	46.0	-13.9
29.478	12.0	24.0	36.0	50.0	-14.0
28.582	12.2	23.8	36.0	50.0	-14.0
4.858	11.3	20.7	32.0	46.0	-14.0
3.317	11.4	20.6	32.0	46.0	-14.0

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

EUT:	Vector Mouthguard	Work Order:	I1BM0001
Serial Number:	3348	Date:	12/19/2014
Customer:	i1 Biometrics, Inc.	Temperature:	24°C
Attendees:	David Brown, Rob Phibbs	Relative Humidity:	36%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	I1BM0001-3

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	10	Line:	Neutral	Ext. Attenuation (dB):	20

COMMENTS

None

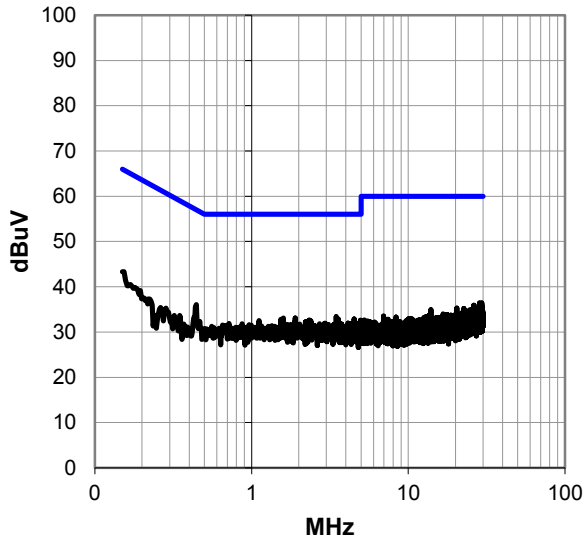
EUT OPERATING MODES

Transmitting Mid Channel 63 at Maximum Duty Cycle, 914.596882 MHz, Power Level at 10dBm.

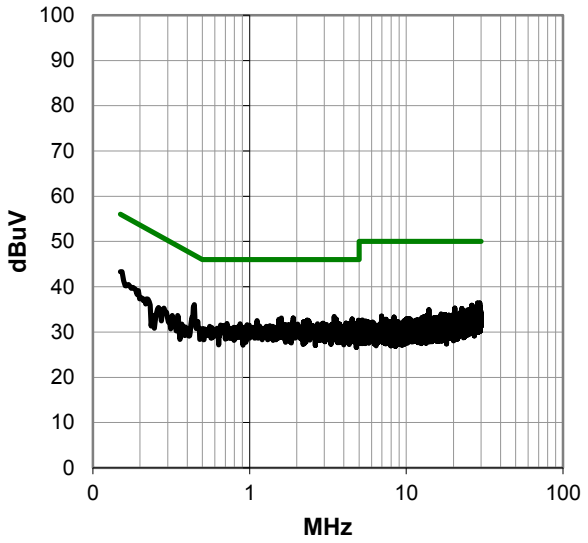
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

RESULTS - Run #10

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.445	15.8	20.2	36.0	57.0	-20.9
3.474	12.8	20.6	33.4	56.0	-22.6
0.150	22.8	20.6	43.4	66.0	-22.7
1.900	12.6	20.5	33.1	56.0	-22.9
1.594	12.6	20.5	33.1	56.0	-22.9
4.515	12.2	20.7	32.9	56.0	-23.1
3.567	12.2	20.7	32.9	56.0	-23.1
1.538	12.3	20.5	32.8	56.0	-23.2
2.340	12.1	20.5	32.6	56.0	-23.4
4.966	11.9	20.7	32.6	56.0	-23.4
1.116	12.1	20.5	32.6	56.0	-23.5
2.396	11.9	20.5	32.4	56.0	-23.6
29.463	12.4	24.0	36.4	60.0	-23.6
28.500	12.6	23.8	36.4	60.0	-23.6
2.209	11.7	20.5	32.2	56.0	-23.8
4.881	11.4	20.7	32.1	56.0	-23.9
28.381	12.3	23.8	36.1	60.0	-23.9
4.127	11.3	20.7	32.0	56.0	-24.0
2.937	11.4	20.6	32.0	56.0	-24.0
4.847	11.2	20.7	31.9	56.0	-24.1
4.601	11.2	20.7	31.9	56.0	-24.1
4.317	11.2	20.7	31.9	56.0	-24.1
26.195	12.5	23.4	35.9	60.0	-24.1
3.661	11.2	20.7	31.9	56.0	-24.1
0.717	11.4	20.5	31.9	56.0	-24.1
2.713	11.3	20.6	31.9	56.0	-24.2

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.445	15.8	20.2	36.0	47.0	-10.9
3.474	12.8	20.6	33.4	46.0	-12.6
0.150	22.8	20.6	43.4	56.0	-12.7
1.900	12.6	20.5	33.1	46.0	-12.9
1.594	12.6	20.5	33.1	46.0	-12.9
4.515	12.2	20.7	32.9	46.0	-13.1
3.567	12.2	20.7	32.9	46.0	-13.1
1.538	12.3	20.5	32.8	46.0	-13.2
2.340	12.1	20.5	32.6	46.0	-13.4
4.966	11.9	20.7	32.6	46.0	-13.4
1.116	12.1	20.5	32.6	46.0	-13.5
2.396	11.9	20.5	32.4	46.0	-13.6
29.463	12.4	24.0	36.4	50.0	-13.6
28.500	12.6	23.8	36.4	50.0	-13.6
2.209	11.7	20.5	32.2	46.0	-13.8
4.881	11.4	20.7	32.1	46.0	-13.9
28.381	12.3	23.8	36.1	50.0	-13.9
4.127	11.3	20.7	32.0	46.0	-14.0
2.937	11.4	20.6	32.0	46.0	-14.0
4.847	11.2	20.7	31.9	46.0	-14.1
4.601	11.2	20.7	31.9	46.0	-14.1
4.317	11.2	20.7	31.9	46.0	-14.1
26.195	12.5	23.4	35.9	50.0	-14.1
3.661	11.2	20.7	31.9	46.0	-14.1
0.717	11.4	20.5	31.9	46.0	-14.1
2.713	11.3	20.6	31.9	46.0	-14.2

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

EUT:	Vector Mouthguard	Work Order:	I1BM0001
Serial Number:	3348	Date:	12/19/2014
Customer:	i1 Biometrics, Inc.	Temperature:	24°C
Attendees:	David Brown, Rob Phibbs	Relative Humidity:	36%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	I1BM0001-3

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	11	Line:	High Line	Ext. Attenuation (dB):	20

COMMENTS

None

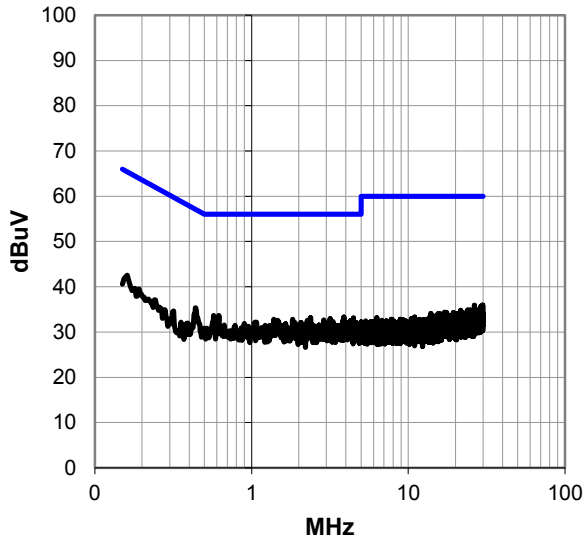
EUT OPERATING MODES

Transmitting High Channel 126 at Maximum Duty Cycle, 927.193795 MHz, Power Level at 10dBm.

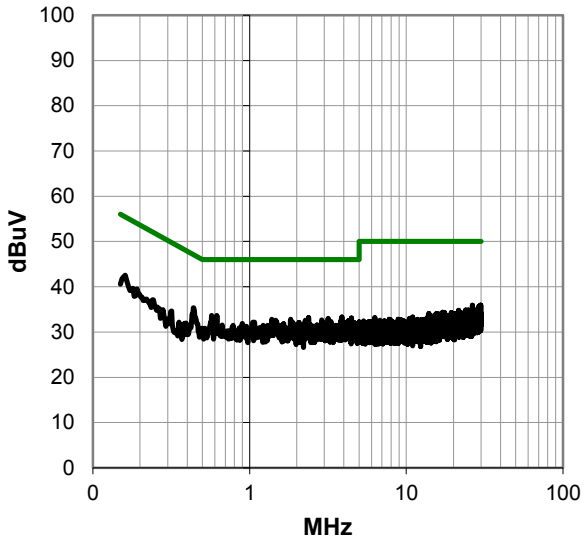
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

RESULTS - Run #11

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.437	15.1	20.2	35.3	57.1	-21.8
0.572	13.2	20.5	33.7	56.0	-22.3
0.616	13.2	20.5	33.7	56.0	-22.4
3.885	12.6	20.7	33.3	56.0	-22.7
2.381	12.6	20.5	33.1	56.0	-22.9
0.161	22.0	20.5	42.5	65.4	-22.9
4.478	12.4	20.7	33.1	56.0	-22.9
3.172	12.4	20.6	33.0	56.0	-23.0
1.829	12.3	20.5	32.8	56.0	-23.2
1.389	12.3	20.5	32.8	56.0	-23.2
2.892	12.1	20.6	32.7	56.0	-23.3
2.269	12.1	20.5	32.6	56.0	-23.4
3.836	11.9	20.7	32.6	56.0	-23.4
1.467	12.1	20.5	32.6	56.0	-23.4
4.284	11.8	20.7	32.5	56.0	-23.5
4.373	11.6	20.7	32.3	56.0	-23.7
3.314	11.7	20.6	32.3	56.0	-23.7
1.885	11.7	20.5	32.2	56.0	-23.8
3.911	11.5	20.7	32.2	56.0	-23.8
1.049	11.7	20.5	32.2	56.0	-23.9
1.075	11.7	20.5	32.2	56.0	-23.9
2.068	11.6	20.5	32.1	56.0	-23.9
4.646	11.4	20.7	32.1	56.0	-23.9
4.041	11.4	20.7	32.1	56.0	-23.9
2.959	11.5	20.6	32.1	56.0	-23.9
4.161	11.3	20.7	32.0	56.0	-24.0

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.437	15.1	20.2	35.3	47.1	-11.8
0.572	13.2	20.5	33.7	46.0	-12.3
0.616	13.2	20.5	33.7	46.0	-12.4
3.885	12.6	20.7	33.3	46.0	-12.7
2.381	12.6	20.5	33.1	46.0	-12.9
0.161	22.0	20.5	42.5	55.4	-12.9
4.478	12.4	20.7	33.1	46.0	-12.9
3.172	12.4	20.6	33.0	46.0	-13.0
1.829	12.3	20.5	32.8	46.0	-13.2
1.389	12.3	20.5	32.8	46.0	-13.2
2.892	12.1	20.6	32.7	46.0	-13.3
2.269	12.1	20.5	32.6	46.0	-13.4
3.836	11.9	20.7	32.6	46.0	-13.4
1.467	12.1	20.5	32.6	46.0	-13.4
4.284	11.8	20.7	32.5	46.0	-13.5
4.373	11.6	20.7	32.3	46.0	-13.7
3.314	11.7	20.6	32.3	46.0	-13.7
1.885	11.7	20.5	32.2	46.0	-13.8
3.911	11.5	20.7	32.2	46.0	-13.8
1.049	11.7	20.5	32.2	46.0	-13.9
1.075	11.7	20.5	32.2	46.0	-13.9
2.068	11.6	20.5	32.1	46.0	-13.9
4.646	11.4	20.7	32.1	46.0	-13.9
4.041	11.4	20.7	32.1	46.0	-13.9
2.959	11.5	20.6	32.1	46.0	-13.9
4.161	11.3	20.7	32.0	46.0	-14.0

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

EUT:	Vector Mouthguard	Work Order:	I1BM0001
Serial Number:	3348	Date:	12/19/2014
Customer:	i1 Biometrics, Inc.	Temperature:	24°C
Attendees:	David Brown, Rob Phibbs	Relative Humidity:	36%
Customer Project:	None	Bar. Pressure:	1011 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	I1BM0001-3

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	12	Line:	Neutral	Ext. Attenuation (dB):	20

COMMENTS

None

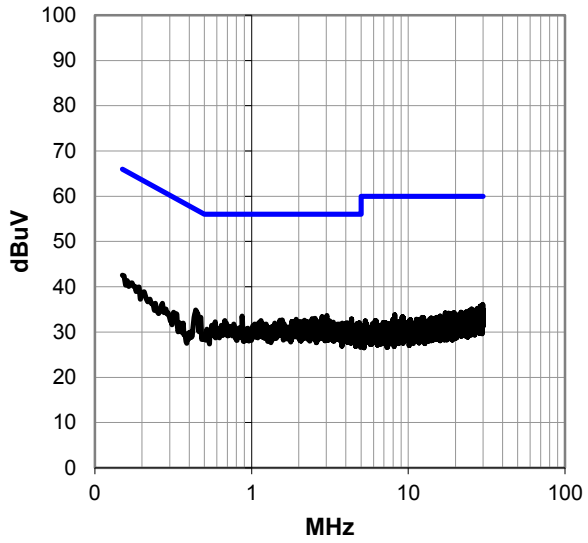
EUT OPERATING MODES

Transmitting High Channel 126 at Maximum Duty Cycle, 927.193795 MHz, Power Level at 10dBm.

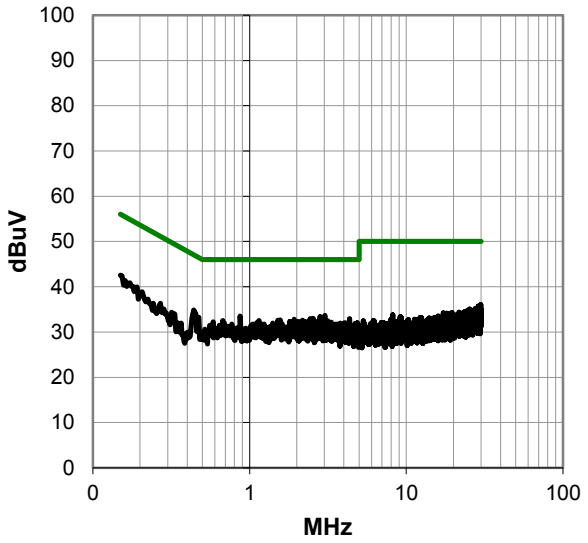
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2014.10.14
PSA-ESCI 2014.09.10, EmiR5 2014.11.10

RESULTS - Run #12

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.441	14.6	20.2	34.8	57.0	-22.2
3.023	13.1	20.6	33.7	56.0	-22.3
0.870	13.1	20.4	33.5	56.0	-22.5
2.818	12.8	20.6	33.4	56.0	-22.6
2.538	12.5	20.5	33.0	56.0	-23.0
2.441	12.4	20.5	32.9	56.0	-23.1
4.347	12.2	20.7	32.9	56.0	-23.1
1.930	12.3	20.5	32.8	56.0	-23.2
0.471	13.0	20.2	33.2	56.5	-23.3
1.568	12.2	20.5	32.7	56.0	-23.3
2.176	12.1	20.5	32.6	56.0	-23.4
1.515	12.1	20.5	32.6	56.0	-23.4
0.676	12.1	20.5	32.6	56.0	-23.4
1.146	12.1	20.5	32.6	56.0	-23.4
0.150	22.0	20.6	42.6	66.0	-23.5
3.153	11.9	20.6	32.5	56.0	-23.5
2.735	11.9	20.6	32.5	56.0	-23.6
2.056	11.8	20.5	32.3	56.0	-23.7
1.806	11.8	20.5	32.3	56.0	-23.7
0.587	11.8	20.5	32.3	56.0	-23.8
2.299	11.7	20.5	32.2	56.0	-23.8
2.250	11.7	20.5	32.2	56.0	-23.8
1.993	11.7	20.5	32.2	56.0	-23.8
3.332	11.6	20.6	32.2	56.0	-23.8
2.933	11.6	20.6	32.2	56.0	-23.8
3.220	11.5	20.6	32.1	56.0	-23.9

Peak Data - vs - Average Limit

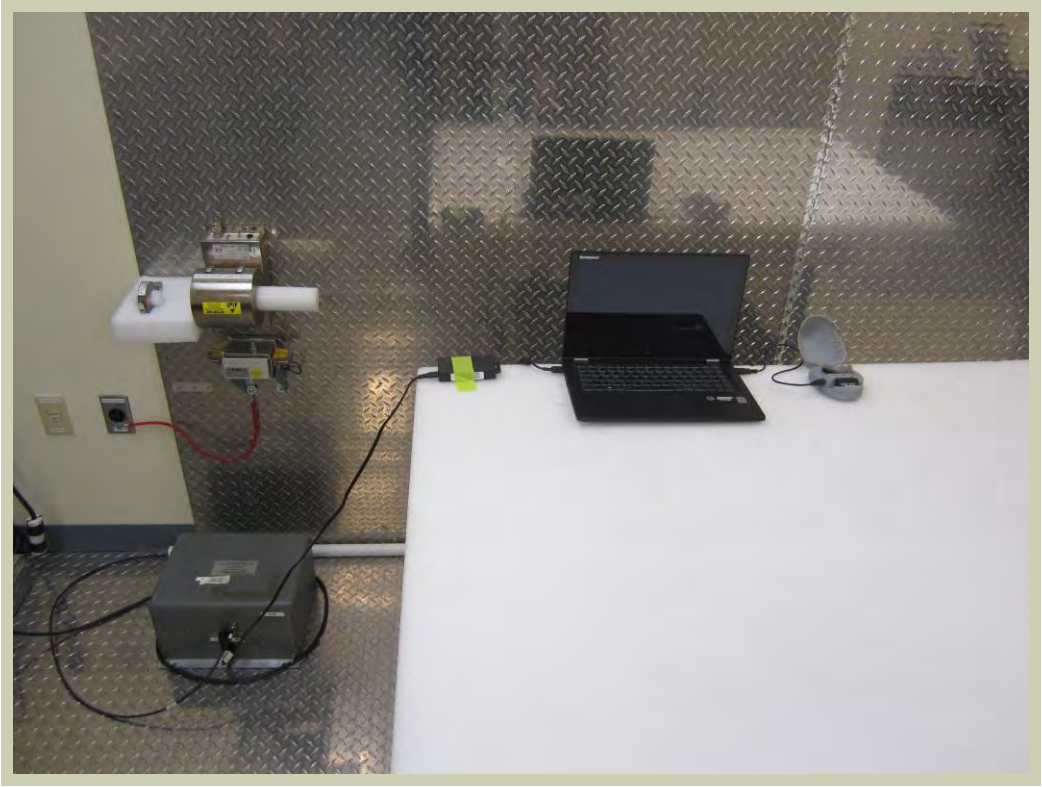
Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.441	14.6	20.2	34.8	47.0	-12.2
3.023	13.1	20.6	33.7	46.0	-12.3
0.870	13.1	20.4	33.5	46.0	-12.5
2.818	12.8	20.6	33.4	46.0	-12.6
2.538	12.5	20.5	33.0	46.0	-13.0
2.441	12.4	20.5	32.9	46.0	-13.1
4.347	12.2	20.7	32.9	46.0	-13.1
1.930	12.3	20.5	32.8	46.0	-13.2
0.471	13.0	20.2	33.2	46.5	-13.3
1.568	12.2	20.5	32.7	46.0	-13.3
2.176	12.1	20.5	32.6	46.0	-13.4
1.515	12.1	20.5	32.6	46.0	-13.4
0.676	12.1	20.5	32.6	46.0	-13.4
1.146	12.1	20.5	32.6	46.0	-13.4
0.150	22.0	20.6	42.6	56.0	-13.5
3.153	11.9	20.6	32.5	46.0	-13.5
2.735	11.9	20.6	32.5	46.0	-13.6
2.056	11.8	20.5	32.3	46.0	-13.7
1.806	11.8	20.5	32.3	46.0	-13.7
0.587	11.8	20.5	32.3	46.0	-13.8
2.299	11.7	20.5	32.2	46.0	-13.8
2.250	11.7	20.5	32.2	46.0	-13.8
1.993	11.7	20.5	32.2	46.0	-13.8
3.332	11.6	20.6	32.2	46.0	-13.8
2.933	11.6	20.6	32.2	46.0	-13.8
3.220	11.5	20.6	32.1	46.0	-13.9

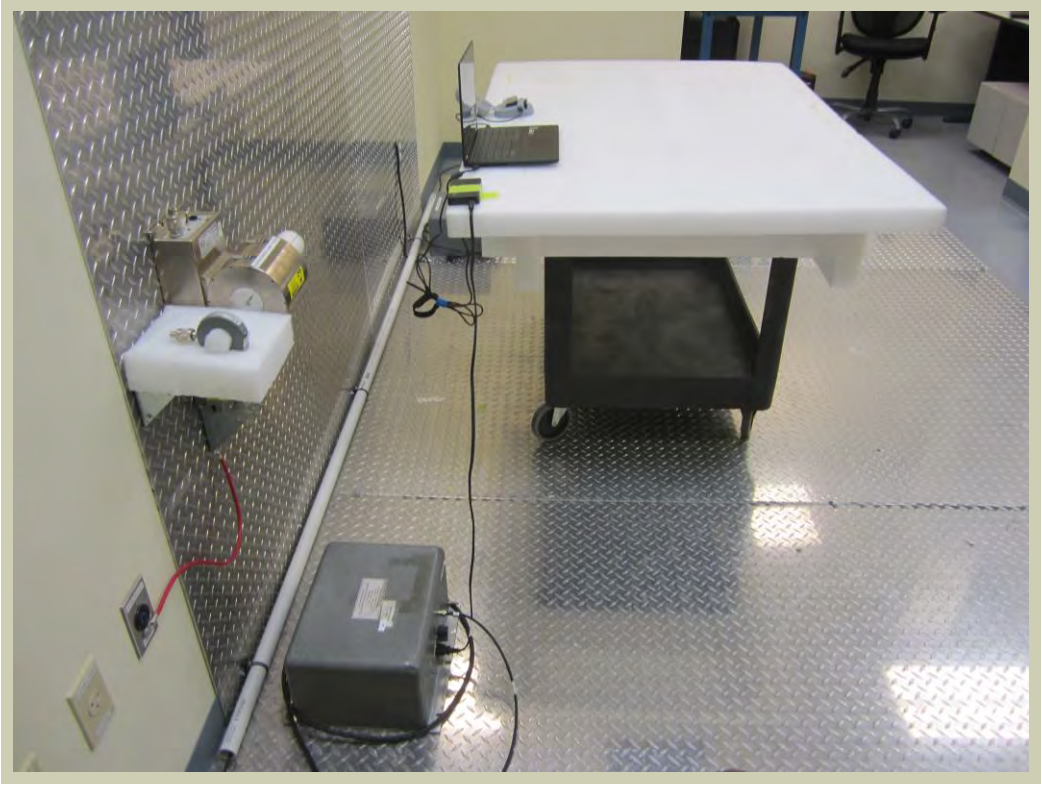
CONCLUSION

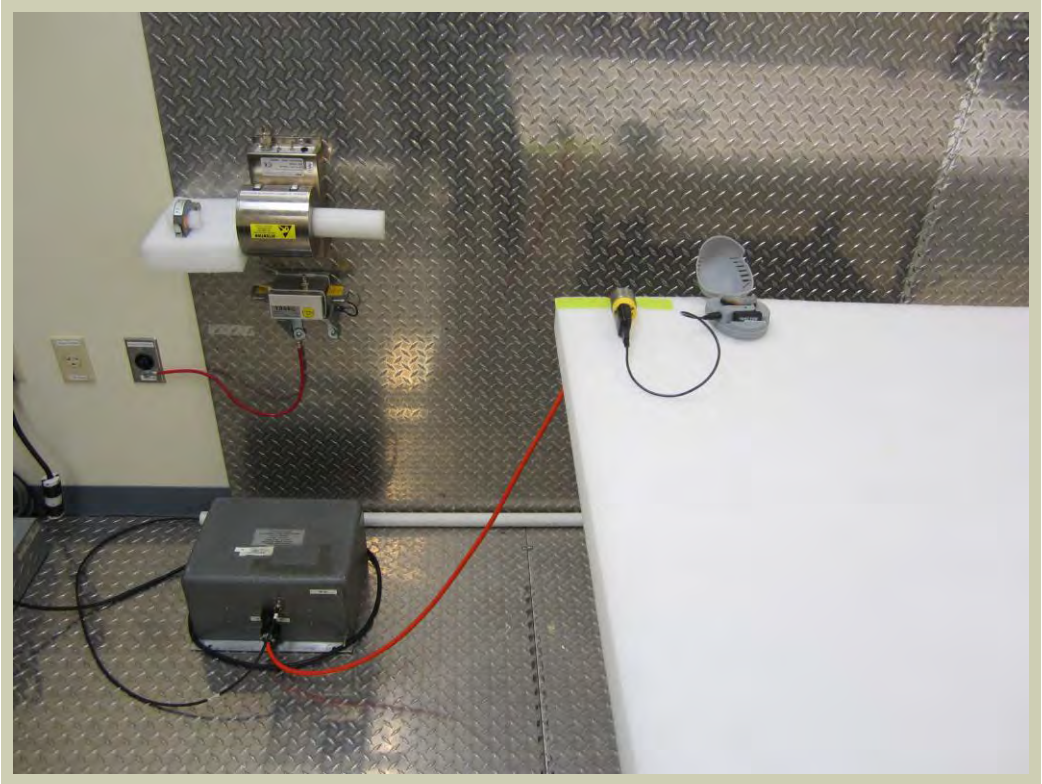
Pass

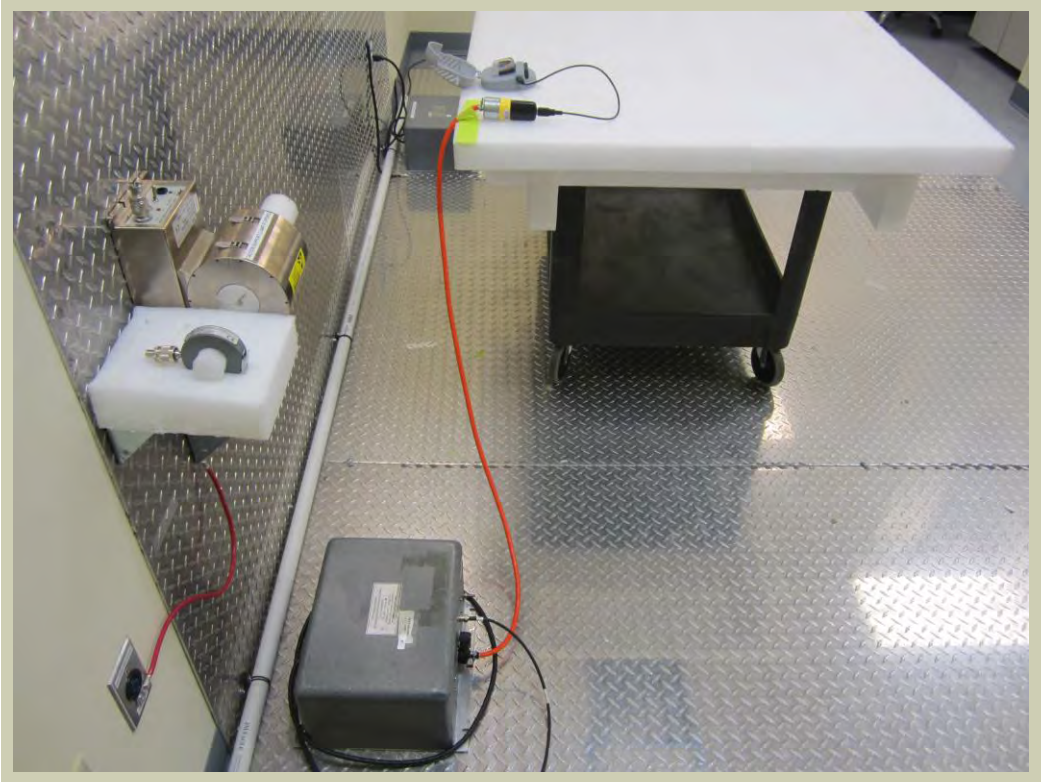
Tested By

AC POWERLINE CONDUCTED EMISSIONS









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

GFSK, 61.44 kb/s

CHANNELS TESTED

Low Channel 2, 902.399871 MHz
Mid Channel 63, 914.596882 MHz
High Channel 126, 927.193795 MHz

POWER SETTINGS INVESTIGATED

110VAC/60Hz
Battery

CONFIGURATIONS INVESTIGATED

I1BM0001 - 3
I1BM0001 - 4

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	12400 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
HP Filter	Micro-Tronics	HPM50114	HFN	1/18/2013	36 mo
Notch Filter	K&L Microwave	3TNF-500/1000-N/N	HHO	7/8/2014	12 mo
Attenuator	Fairview Microwave	SA18E-20	AQV	10/13/2014	12 mo
Low Pass Filter	Micro-Tronics	LPM50004	LFF	11/14/2013	24 mo
Low Pass Filter	Micro-Tronics	LPM50003	LFE	12/9/2014	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	10/13/2014	12 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	9/8/2014	12 mo
Pre-Amplifier	Miteq	AM-1616-1000	PAB	9/8/2014	12 mo
Antenna, Horn	EMCO	3160-07	AHP	NCR	0 mo
Antenna, Horn	EMCO	3115	AHM	6/3/2014	24 mo
Antenna, Biconilog	EMCO	3142B	AXJ	5/16/2012	36 mo
NC01 Cables	N/A	Standard Gain Horn Cable	NC3	10/13/2014	12 mo
NC01 Cables	N/A	3115 Horn Cable	NC2	10/13/2014	12 mo
NC01 Cables	N/A	Bilog Cables	NC1	9/8/2014	12 mo
Spectrum Analyzer	Agilent	E4440A	AFE	10/28/2014	12 mo

TEST DESCRIPTION

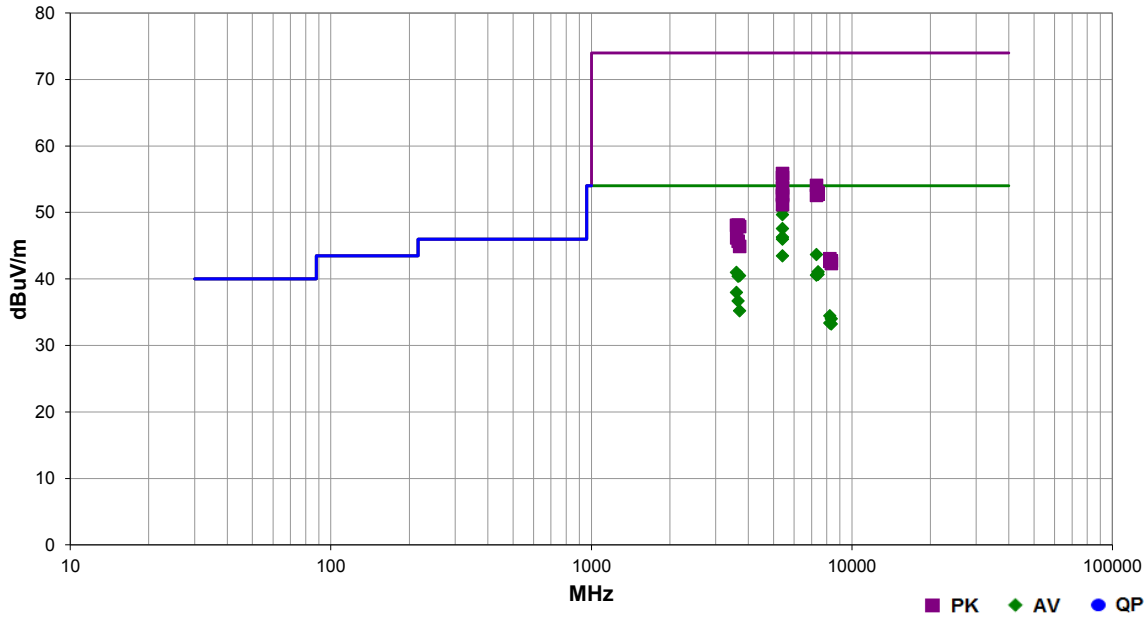
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify 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. For devices employing FHSS, a duty cycle correction factor (DCCF) may be applied to the peak pulse amplitude to calculate average measurements. If applied, the DCCF shall be noted on the corresponding data sheet.

SPURIOUS RADIATED EMISSIONS

Work Order:	I1BM0001	**Date:**	12/22/14		
Project:	None	**Temperature:**	24 °C		
Job Site:	NC01	**Humidity:**	36% RH		
Serial Number:	3348	**Barometric Pres.:**	1026 mbar	**Tested by:**	Richard Mellroth
EUT:	Vector Mouthguard				
Configuration:	3				
Customer:	i1 Biometrics, Inc.				
Attendees:	David Bernhardt, Rob Phibbs				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at Maximum Duty Cycle, 61.44 kb/s, Power Level at 10dBm. See comments next to data points for EUT channel information and EUT orientation.				
Deviations:	None				
Comments:	None				

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

Run #	22-23	**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
5414.410	41.1	9.3	1.5	310.0	3.0	0.0	Horz	AV	0.0	50.4	54.0	-3.6	Low Ch 2, 902 MHz, EUT Vert
5414.420	40.4	9.3	1.1	15.0	3.0	0.0	Horz	AV	0.0	49.7	54.0	-4.3	Low Ch 2, 902 MHz, EUT Flat
5414.380	38.3	9.3	1.5	322.0	3.0	0.0	Vert	AV	0.0	47.6	54.0	-6.4	Low Ch 2, 902 MHz, EUT Horz
5414.400	37.0	9.3	1.5	327.0	3.0	0.0	Horz	AV	0.0	46.3	54.0	-7.7	Low Ch 2, 902 MHz, EUT Horz
5414.420	36.7	9.3	1.5	32.0	3.0	0.0	Vert	AV	0.0	46.0	54.0	-8.0	Low Ch 2, 902 MHz, EUT Flat
7316.755	30.4	13.3	2.1	271.0	3.0	0.0	Horz	AV	0.0	43.7	54.0	-10.3	Mid Ch 63, 914 MHz, EUT Vert
5414.430	34.2	9.3	1.5	201.0	3.0	0.0	Vert	AV	0.0	43.5	54.0	-10.5	Low Ch 2, 902 MHz, EUT Vert
7417.515	26.9	14.2	1.7	277.0	3.0	0.0	Vert	AV	0.0	41.1	54.0	-12.9	High Ch 126, 927 MHz, EUT Horz
3609.615	38.3	2.7	1.8	88.0	3.0	0.0	Horz	AV	0.0	41.0	54.0	-13.0	Low Ch 2, 902 MHz, EUT Vert
7417.485	26.5	14.2	1.5	199.0	3.0	0.0	Horz	AV	0.0	40.7	54.0	-13.3	High Ch 126, 927 MHz, EUT Vert
7316.775	27.3	13.3	1.5	54.0	3.0	0.0	Vert	AV	0.0	40.6	54.0	-13.4	Mid Ch 63, 914 MHz, EUT Horz
3708.830	36.8	3.7	2.1	274.0	3.0	0.0	Horz	AV	0.0	40.5	54.0	-13.5	High Ch 126, 927 MHz, EUT Vert
3658.440	37.1	3.3	2.1	261.0	3.0	0.0	Horz	AV	0.0	40.4	54.0	-13.6	Mid Ch 63, 914 MHz, EUT Vert
3609.635	35.3	2.7	1.5	7.0	3.0	0.0	Vert	AV	0.0	38.0	54.0	-16.0	Low Ch 2, 902 MHz, EUT Horz
3658.410	33.4	3.3	1.5	9.0	3.0	0.0	Vert	AV	0.0	36.7	54.0	-17.3	Mid Ch 63, 914 MHz, EUT Horz
5414.180	46.6	9.3	1.5	310.0	3.0	0.0	Horz	PK	0.0	55.9	74.0	-18.1	Low Ch 2, 902 MHz, EUT Vert
5414.375	46.0	9.3	1.1	15.0	3.0	0.0	Horz	PK	0.0	55.3	74.0	-18.7	Low Ch 2, 902 MHz, EUT Flat
3708.795	31.5	3.7	1.3	19.0	3.0	0.0	Vert	AV	0.0	35.2	54.0	-18.8	High Ch 126, 927 MHz, EUT Horz
8231.425	39.7	-5.3	1.8	287.0	3.0	0.0	Horz	AV	0.0	34.4	54.0	-19.6	Mid Ch 63, 914 MHz, EUT Vert
7316.730	40.8	13.3	2.1	271.0	3.0	0.0	Horz	PK	0.0	54.1	74.0	-19.9	Mid Ch 63, 914 MHz, EUT Vert
8344.730	39.4	-5.4	1.4	10.0	3.0	0.0	Vert	AV	0.0	34.0	54.0	-20.0	High Ch 126, 927 MHz, EUT Horz
5414.340	44.4	9.3	1.5	322.0	3.0	0.0	Vert	PK	0.0	53.7	74.0	-20.3	Low Ch 2, 902 MHz, EUT Horz
8231.375	38.6	-5.3	1.4	11.0	3.0	0.0	Vert	AV	0.0	33.3	54.0	-20.7	Mid Ch 63, 914 MHz, EUT Horz
8344.735	38.6	-5.4	1.7	271.0	3.0	0.0	Horz	AV	0.0	33.2	54.0	-20.8	High Ch 126, 927 MHz, EUT Vert
7417.870	38.8	14.2	1.7	277.0	3.0	0.0	Vert	PK	0.0	53.0	74.0	-21.0	High Ch 126, 927 MHz, EUT Horz

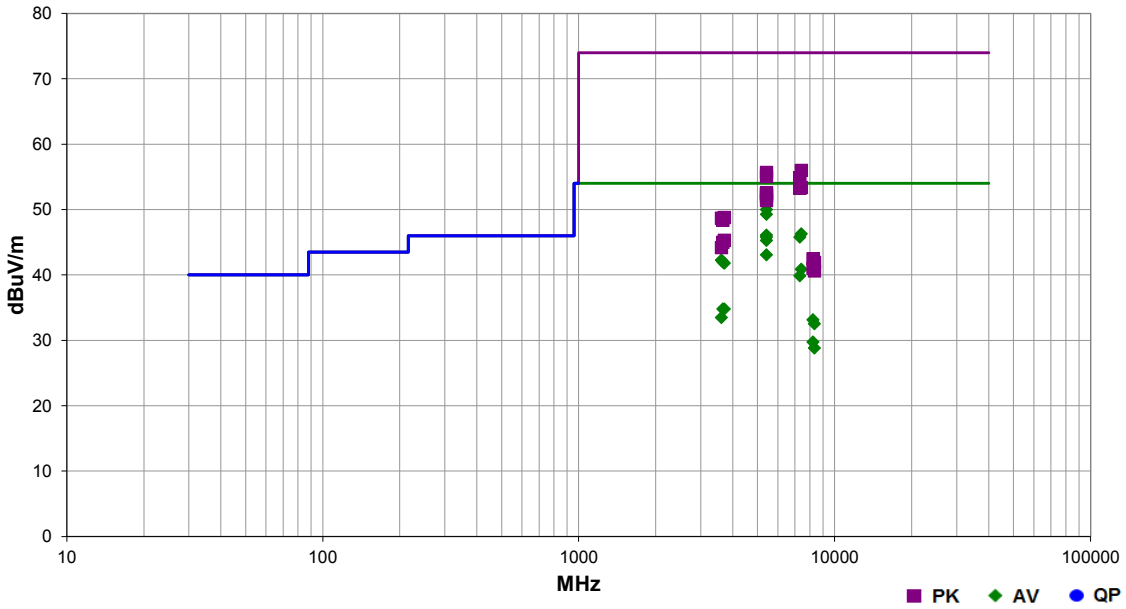
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7417.275	38.6	14.2	1.5	199.0	3.0	0.0	Horz	PK	0.0	52.8	74.0	-21.2	High Ch 126, 927 MHz, EUT Vert
5413.935	43.4	9.3	1.5	32.0	3.0	0.0	Vert	PK	0.0	52.7	74.0	-21.3	Low Ch 2, 902 MHz, EUT Flat
7317.220	39.3	13.3	1.5	54.0	3.0	0.0	Vert	PK	0.0	52.6	74.0	-21.4	Mid Ch 63, 914 MHz, EUT Horz
5414.275	43.2	9.3	1.5	327.0	3.0	0.0	Horz	PK	0.0	52.5	74.0	-21.5	Low Ch 2, 902 MHz, EUT Horz
5414.150	41.9	9.3	1.5	201.0	3.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	Low Ch 2, 902 MHz, EUT Vert
3658.580	44.8	3.3	2.1	261.0	3.0	0.0	Horz	PK	0.0	48.1	74.0	-25.9	Mid Ch 63, 914 MHz, EUT Vert
3609.455	45.4	2.7	1.8	88.0	3.0	0.0	Horz	PK	0.0	48.1	74.0	-25.9	Low Ch 2, 902 MHz, EUT Vert
3708.440	44.2	3.7	2.1	274.0	3.0	0.0	Horz	PK	0.0	47.9	74.0	-26.1	High Ch 126, 927 MHz, EUT Vert
3609.860	43.5	2.7	1.5	7.0	3.0	0.0	Vert	PK	0.0	46.2	74.0	-27.8	Low Ch 2, 902 MHz, EUT Horz
3658.160	42.4	3.3	1.5	9.0	3.0	0.0	Vert	PK	0.0	45.7	74.0	-28.3	Mid Ch 63, 914 MHz, EUT Horz
3708.625	41.2	3.7	1.3	19.0	3.0	0.0	Vert	PK	0.0	44.9	74.0	-29.1	High Ch 126, 927 MHz, EUT Horz
8231.800	48.3	-5.3	1.8	287.0	3.0	0.0	Horz	PK	0.0	43.0	74.0	-31.0	Mid Ch 63, 914 MHz, EUT Vert
8344.950	48.1	-5.4	1.4	10.0	3.0	0.0	Vert	PK	0.0	42.7	74.0	-31.3	High Ch 126, 927 MHz, EUT Horz
8231.270	47.9	-5.3	1.4	11.0	3.0	0.0	Vert	PK	0.0	42.6	74.0	-31.4	Mid Ch 63, 914 MHz, EUT Horz
8345.055	47.7	-5.4	1.7	271.0	3.0	0.0	Horz	PK	0.0	42.3	74.0	-31.7	High Ch 126, 927 MHz, EUT Vert

SPURIOUS RADIATED EMISSIONS

Work Order:	I1BM0001	**Date:**	12/22/14		
Project:	None	**Temperature:**	24 °C		
Job Site:	NC01	**Humidity:**	34% RH		
Serial Number:	3348	**Barometric Pres.:**	1026 mbar	**Tested by:**	Richard Mellroth
EUT:	Vector Mouthguard				
Configuration:	4				
Customer:	i1 Biometrics, Inc.				
Attendees:	David Bernhardt, Rob Phibbs				
EUT Power:	Battery				
Operating Mode:	Transmitting at Maximum Duty Cycle, 61.44 kb/s, Power Level at 10dBm. See comments next to data points for EUT channel information and EUT orientation.				
Deviations:	None				
Comments:	None				

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

Run #	41-42	**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
5414.400	40.7	9.3	1.5	312.0	3.0	0.0	Horz	AV	0.0	50.0	54.0	-4.0	Low Ch 2, 902 MHz, EUT Vert
5414.395	40.0	9.3	1.2	214.0	3.0	0.0	Horz	AV	0.0	49.3	54.0	-4.7	Low Ch 2, 902 MHz, EUT Flat
7417.620	32.1	14.2	1.7	14.0	3.0	0.0	Vert	AV	0.0	46.3	54.0	-7.7	High Ch 126, 927 MHz, EUT Vert
5414.455	36.8	9.3	1.5	250.0	3.0	0.0	Vert	AV	0.0	46.1	54.0	-7.9	Low Ch 2, 902 MHz, EUT Vert
5414.420	36.5	9.3	2.7	43.0	3.0	0.0	Horz	AV	0.0	45.8	54.0	-8.2	Low Ch 2, 902 MHz, EUT Horz
7316.755	32.5	13.3	1.0	360.0	3.0	0.0	Vert	AV	0.0	45.8	54.0	-8.2	Mid Ch 63, 914 MHz, EUT Vert
5414.410	36.0	9.3	1.3	360.0	3.0	0.0	Vert	AV	0.0	45.3	54.0	-8.7	Low Ch 2, 902 MHz, EUT Flat
5414.410	33.8	9.3	1.5	342.0	3.0	0.0	Vert	AV	0.0	43.1	54.0	-10.9	Low Ch 2, 902 MHz, EUT Horz
3609.670	39.6	2.7	1.9	286.0	3.0	0.0	Horz	AV	0.0	42.3	54.0	-11.7	Low Ch 2, 902 MHz, EUT Vert
3658.405	38.7	3.3	1.9	286.0	3.0	0.0	Horz	AV	0.0	42.0	54.0	-12.0	Mid Ch 63, 914 MHz, EUT Vert
3708.805	38.1	3.7	1.8	290.0	3.0	0.0	Horz	AV	0.0	41.8	54.0	-12.2	High Ch 126, 927 MHz, EUT Vert
7417.595	26.7	14.2	1.5	277.0	3.0	0.0	Horz	AV	0.0	40.9	54.0	-13.1	High Ch 126, 927 MHz, EUT Vert
7316.815	26.6	13.3	1.5	277.0	3.0	0.0	Horz	AV	0.0	39.9	54.0	-14.1	Mid Ch 63, 914 MHz, EUT Vert
7417.520	41.8	14.2	1.7	14.0	3.0	0.0	Vert	PK	0.0	56.0	74.0	-18.0	High Ch 126, 927 MHz, EUT Vert
5414.455	46.4	9.3	1.5	312.0	3.0	0.0	Horz	PK	0.0	55.7	74.0	-18.3	Low Ch 2, 902 MHz, EUT Vert
5414.440	45.8	9.3	1.2	214.0	3.0	0.0	Horz	PK	0.0	55.1	74.0	-18.9	Low Ch 2, 902 MHz, EUT Flat
7316.250	41.6	13.3	1.0	360.0	3.0	0.0	Vert	PK	0.0	54.9	74.0	-19.1	Mid Ch 63, 914 MHz, EUT Vert
3708.785	31.1	3.7	1.5	95.0	3.0	0.0	Vert	AV	0.0	34.8	54.0	-19.2	High Ch 126, 927 MHz, EUT Vert
3658.375	31.5	3.3	1.5	63.0	3.0	0.0	Vert	AV	0.0	34.8	54.0	-19.2	Mid Ch 63, 914 MHz, EUT Vert
3609.635	30.8	2.7	1.5	53.0	3.0	0.0	Vert	AV	0.0	33.5	54.0	-20.5	Low Ch 2, 902 MHz, EUT Vert
7417.525	39.2	14.2	1.5	277.0	3.0	0.0	Horz	PK	0.0	53.4	74.0	-20.6	High Ch 126, 927 MHz, EUT Vert
7317.070	40.0	13.3	1.5	277.0	3.0	0.0	Horz	PK	0.0	53.3	74.0	-20.7	Mid Ch 63, 914 MHz, EUT Vert
8231.415	38.4	-5.3	1.5	24.0	3.0	0.0	Vert	AV	0.0	33.1	54.0	-20.9	Mid Ch 63, 914 MHz, EUT Vert
5414.510	43.3	9.3	2.7	43.0	3.0	0.0	Horz	PK	0.0	52.6	74.0	-21.4	Low Ch 2, 902 MHz, EUT Horz
8344.745	37.9	-5.4	1.5	25.0	3.0	0.0	Vert	AV	0.0	32.5	54.0	-21.5	High Ch 126, 927 MHz, EUT Vert
5414.290	43.1	9.3	1.5	250.0	3.0	0.0	Vert	PK	0.0	52.4	74.0	-21.6	Low Ch 2, 902 MHz, EUT Vert
5414.355	42.7	9.3	1.3	360.0	3.0	0.0	Vert	PK	0.0	52.0	74.0	-22.0	Low Ch 2, 902 MHz, EUT Flat

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
5414.745	42.1	9.3	1.5	342.0	3.0	0.0	Vert	PK	0.0	51.4	74.0	-22.6	Low Ch 2, 902 MHz, EUT Horz
8231.405	35.0	-5.3	1.0	165.0	3.0	0.0	Horz	AV	0.0	29.7	54.0	-24.3	Mid Ch 63, 914 MHz, EUT Vert
8344.770	34.2	-5.4	1.5	133.0	3.0	0.0	Horz	AV	0.0	28.8	54.0	-25.2	High Ch 126, 927 MHz, EUT Vert
3709.100	45.1	3.7	1.8	290.0	3.0	0.0	Horz	PK	0.0	48.8	74.0	-25.2	High Ch 126, 927 MHz, EUT Vert
3609.420	46.0	2.7	1.9	286.0	3.0	0.0	Horz	PK	0.0	48.7	74.0	-25.3	Low Ch 2, 902 MHz, EUT Vert
3658.210	45.1	3.3	1.9	286.0	3.0	0.0	Horz	PK	0.0	48.4	74.0	-25.6	Mid Ch 63, 914 MHz, EUT Vert
3708.800	41.6	3.7	1.5	95.0	3.0	0.0	Vert	PK	0.0	45.3	74.0	-28.7	High Ch 126, 927 MHz, EUT Vert
3658.105	41.7	3.3	1.5	63.0	3.0	0.0	Vert	PK	0.0	45.0	74.0	-29.0	Mid Ch 63, 914 MHz, EUT Vert
3609.980	41.5	2.7	1.5	53.0	3.0	0.0	Vert	PK	0.0	44.2	74.0	-29.8	Low Ch 2, 902 MHz, EUT Vert
8230.765	47.7	-5.3	1.5	24.0	3.0	0.0	Vert	PK	0.0	42.4	74.0	-31.6	Mid Ch 63, 914 MHz, EUT Vert
8344.365	47.3	-5.4	1.5	25.0	3.0	0.0	Vert	PK	0.0	41.9	74.0	-32.1	High Ch 126, 927 MHz, EUT Vert
8231.385	46.3	-5.3	1.0	165.0	3.0	0.0	Horz	PK	0.0	41.0	74.0	-33.0	Mid Ch 63, 914 MHz, EUT Vert
8345.355	46.0	-5.4	1.5	133.0	3.0	0.0	Horz	PK	0.0	40.6	74.0	-33.4	High Ch 126, 927 MHz, EUT Vert

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 (mo)
Spectrum Analyzer	Agilent	E4446A	AAT	6/27/2014	12
Signal Generator	Agilent	N5183A	TIA	4/7/2014	36
40GHz DC Block	Fairview Microwave	SD3379	AMJ	6/9/2014	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/13/2014	12
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/9/2014	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 in a no-hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

SPURIOUS CONDUCTED EMISSIONS

EUT:	Vector Mouthguard			**Work Order:**	I1BM0001
Serial Number:	3350			**Date:**	12/17/14
Customer:	i1 Biometrics, Inc.			**Temperature:**	24°C
Attendees:	David Brown, Rob Phibbs			**Humidity:**	32%
Project:	None			**Barometric Pres.:**	1011
Tested by:	Richard Mellroth	**Power:**	Power Over USB	**Job Site:**	NC02

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

COMMENTS

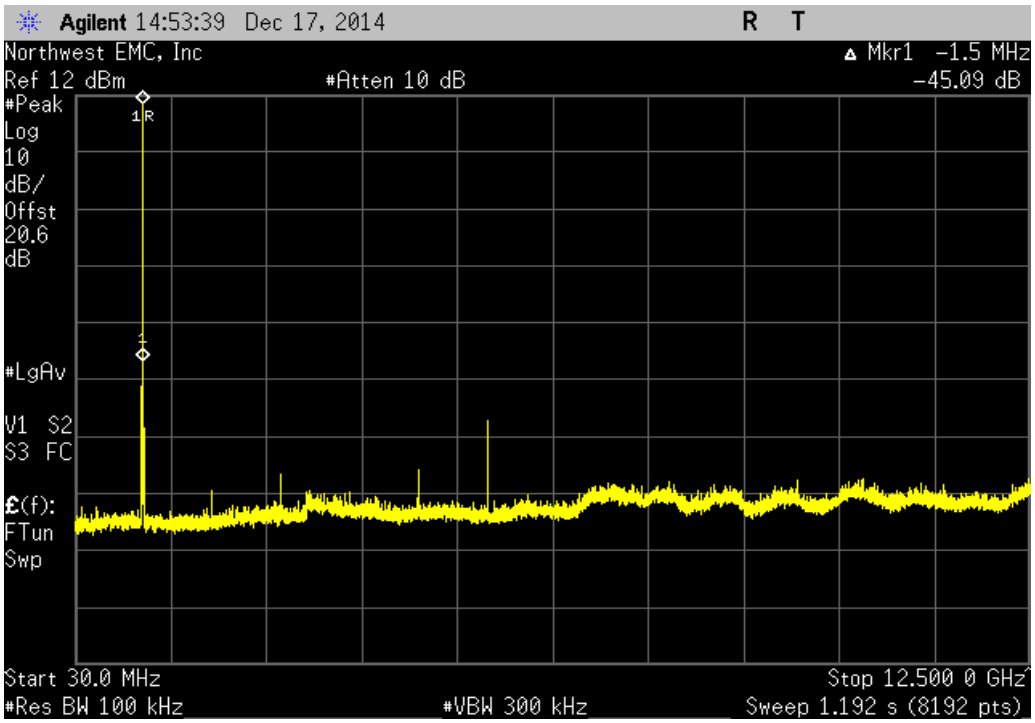
Power Level set at 10dBm. Transmitting at maximum duty cycle.

DEVIATIONS FROM TEST STANDARD

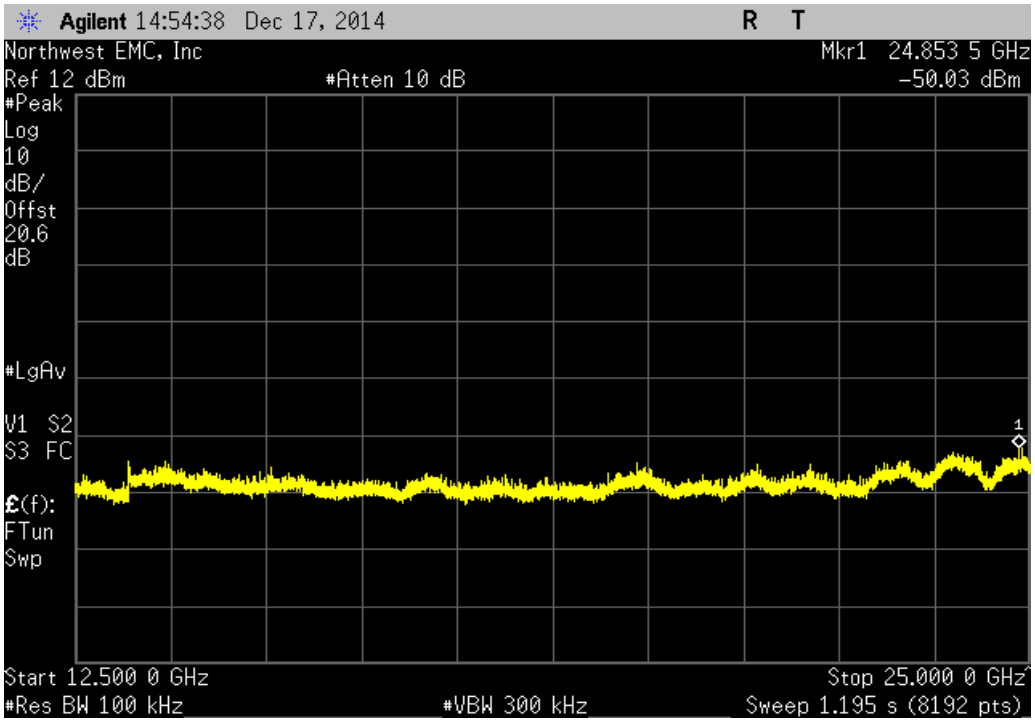
Configuration #	1	Signature

	Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result
Single Channel Mode				
61.44 Kb/s, GFSK				
Low Channel 2, 902.399871 MHz	30 MHz - 12.5 GHz	-45.09	-20	Pass
Low Channel 2, 902.399871 MHz	12.5 GHz - 25 GHz	-60.44	-20	Pass
Mid Channel 63, 914.596882 MHz	30 MHz - 12.5 GHz	-52.04	-20	Pass
Mid Channel 63, 914.596882 MHz	12.5 GHz - 25 GHz	-60.37	-20	Pass
High Channel 126, 927.193795 MHz	30 MHz - 12.5 GHz	-51.8	-20	Pass
High Channel 126, 927.193795 MHz	12.5 GHz - 25 GHz	-58.03	-20	Pass

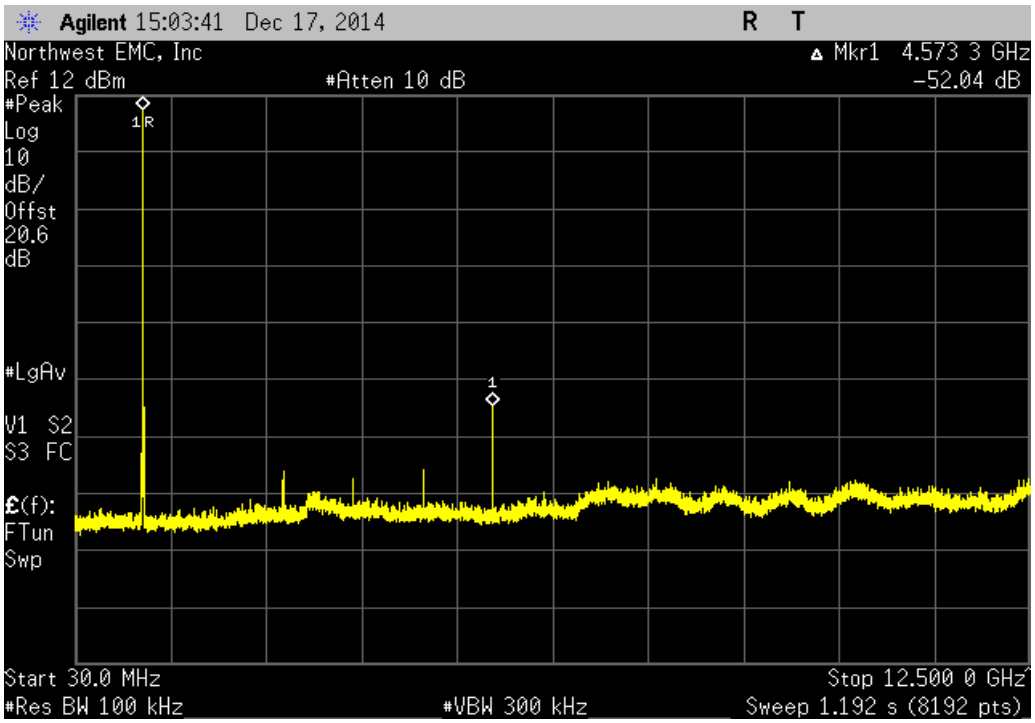
Single Channel Mode, 61.44 Kb/s, GFSK, Low Channel 2, 902.399871 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz		-45.09	-20	Pass



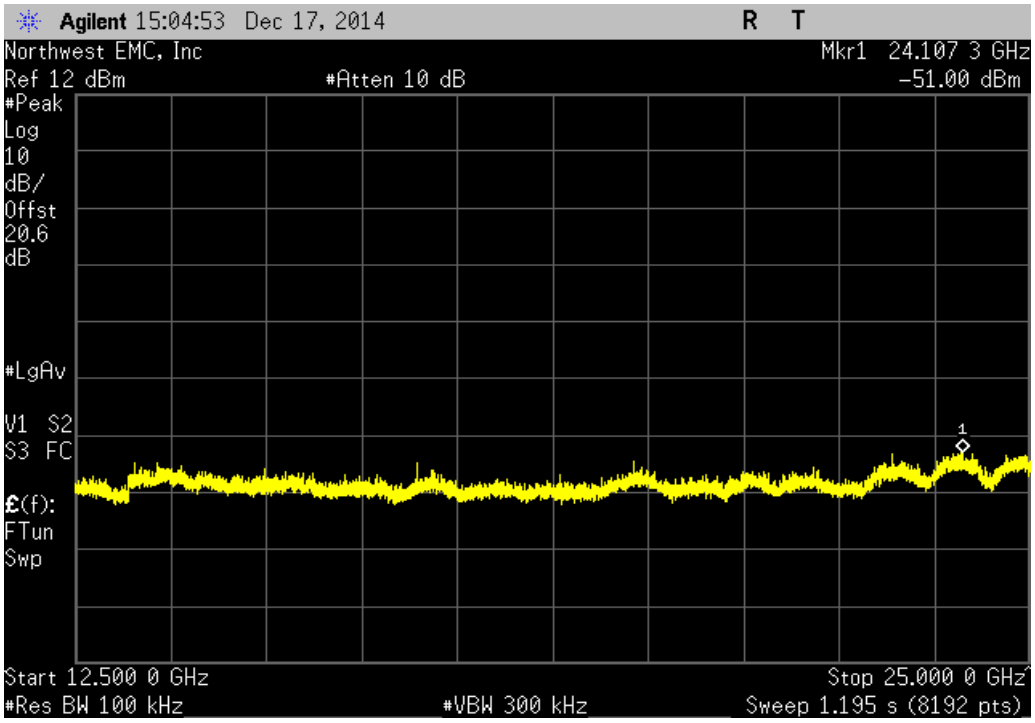
Single Channel Mode, 61.44 Kb/s, GFSK, Low Channel 2, 902.399871 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-60.44	-20	Pass



Single Channel Mode, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz		-52.04	-20	Pass

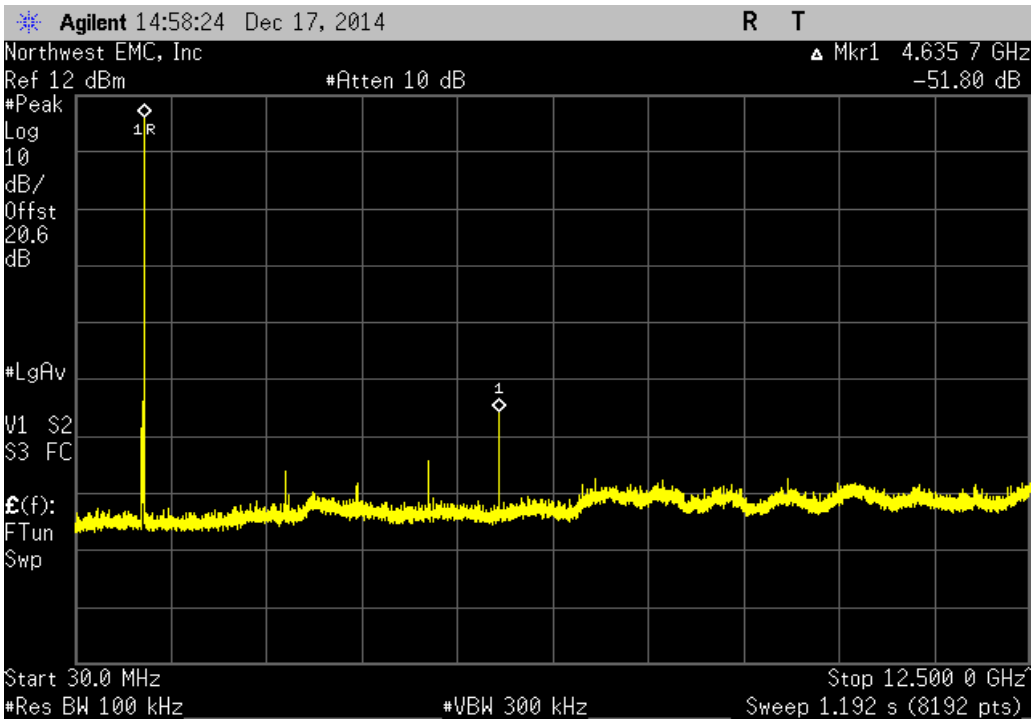


Single Channel Mode, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
12.5 GHz - 25 GHz		-60.37	-20	Pass

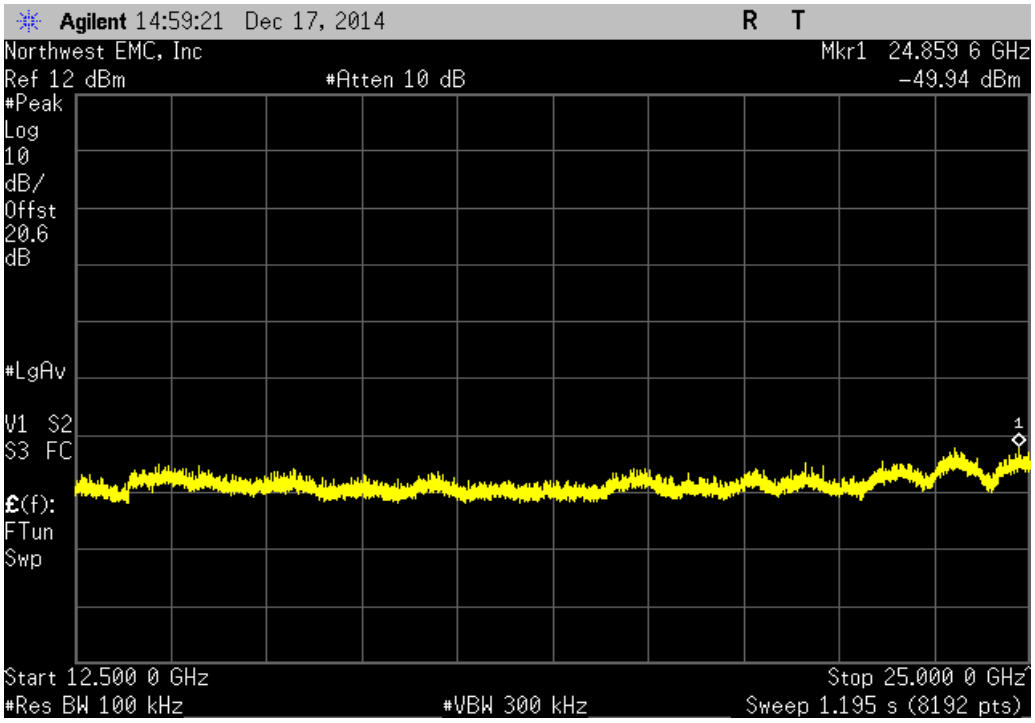


SPURIOUS CONDUCTED EMISSIONS

Single Channel Mode, 61.44 Kb/s, GFSK, High Channel 126, 927.193795 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-51.8	-20	Pass



Single Channel Mode, 61.44 Kb/s, GFSK, High Channel 126, 927.193795 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-58.03	-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 (mo)
Spectrum Analyzer	Agilent	E4446A	AAT	6/27/2014	12
Signal Generator	Agilent	N5183A	TIA	4/7/2014	36
Attenuator	Fairview Microwave	SA4014-20	TKE	2/13/2014	12
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/9/2014	12

TEST DESCRIPTION

The occupied bandwidth was measured with the EUT set to low, medium and high transmit frequencies. 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 in a no-hop mode.

OCCUPIED BANDWIDTH

EUT:	Vector Mouthguard			**Work Order:**	I1BM0001
Serial Number:	3350			**Date:**	12/17/14
Customer:	i1 Biometrics, Inc.			**Temperature:**	24°C
Attendees:	David Brown, Rob Phibbs			**Humidity:**	32%
Project:	None			**Barometric Pres.:**	1011
Tested by:	Richard Mellroth	**Power:**	Power Over USB	**Job Site:**	NC02

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

COMMENTS

Power Level set at 10dBm. Transmitting at maximum duty cycle.

DEVIATIONS FROM TEST STANDARD

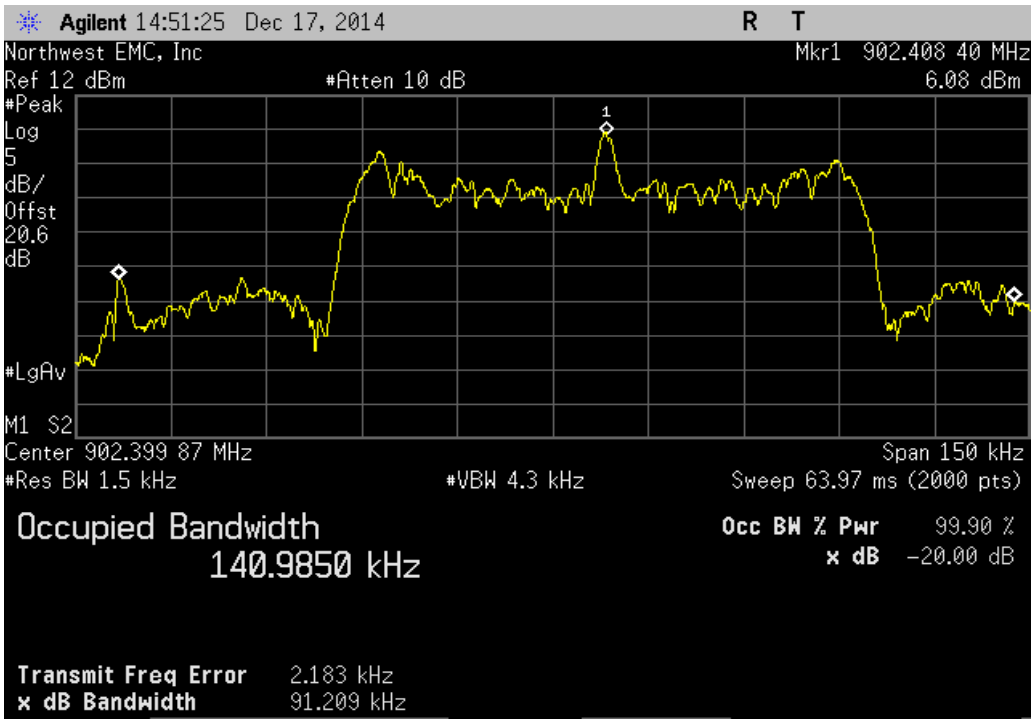
None

Configuration #	1	Signature

	Value	Limit (<)	Result
Single Channel Mode			
61.44 Kb/s, GFSK			
Low Channel 2, 902.399871 MHz	91.209 kHz	250 kHz	Pass
Mid Channel 63, 914.596882 MHz	86.876 kHz	250 kHz	Pass
High Channel 126, 927.193795 MHz	88.856 kHz	250 kHz	Pass

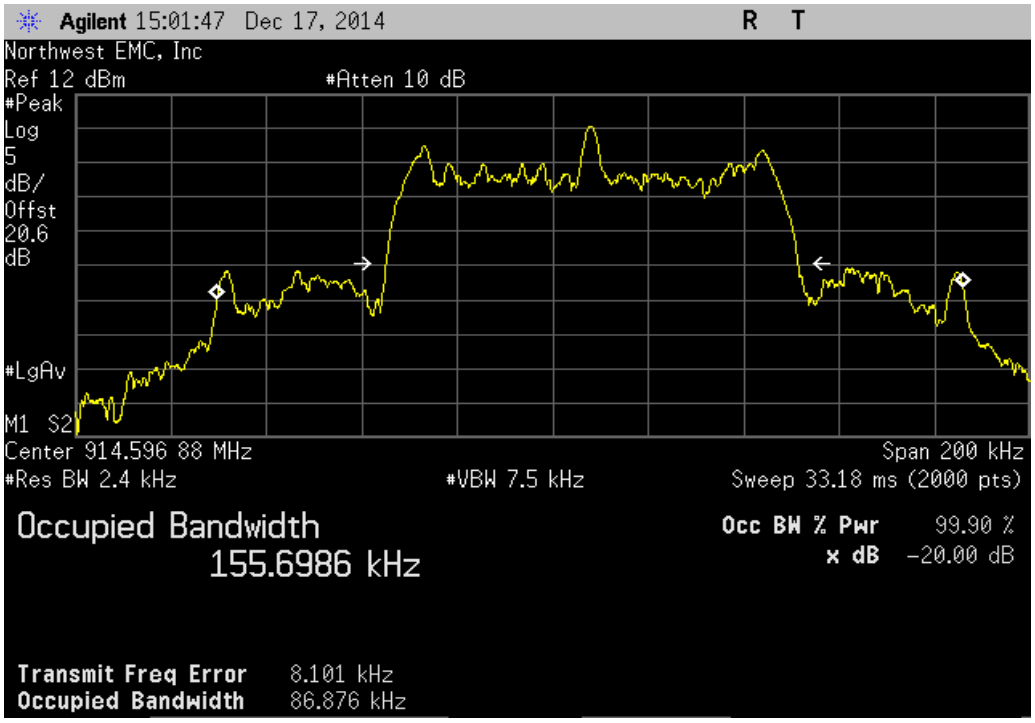
Single Channel Mode, 61.44 Kb/s, GFSK, Low Channel 2, 902.399871 MHz

				Value	Limit (<)	Result
				91.209 kHz	250 kHz	Pass

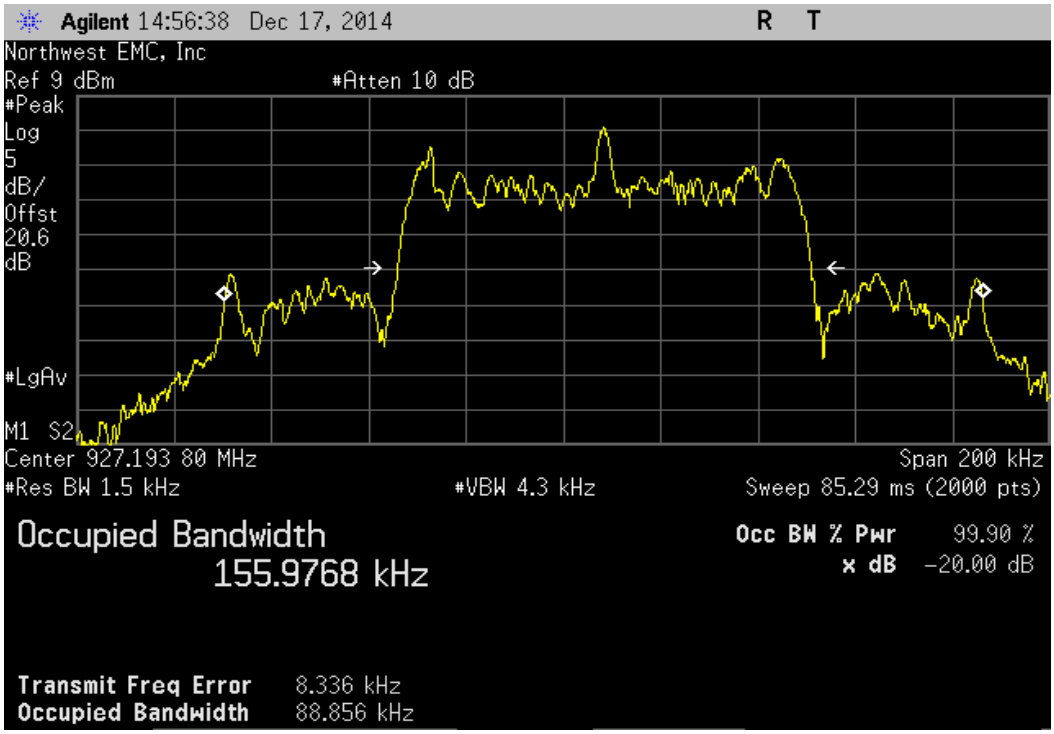


Single Channel Mode, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz

				Value	Limit (<)	Result
				86.876 kHz	250 kHz	Pass



Single Channel Mode, 61.44 Kb/s, GFSK, High Channel 126, 927.193795 MHz						
				Value	Limit (<)	Result
				88.856 kHz	250 kHz	Pass



OUTPUT POWER

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)
Spectrum Analyzer	Agilent	E4446A	AAT	6/27/2014	12
Signal Generator	Agilent	N5183A	TIA	4/7/2014	36
40GHz DC Block	Fairview Microwave	SD3379	AMJ	6/9/2014	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/13/2014	12
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/9/2014	12

TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

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

EUT:	Vector Mouthguard			**Work Order:**	I1BM0001
Serial Number:	3350			**Date:**	12/17/14
Customer:	i1 Biometrics, Inc.			**Temperature:**	24°C
Attendees:	David Brown, Rob Phibbs			**Humidity:**	32%
Project:	None			**Barometric Pres.:**	1011
Tested by:	Richard Mellroth	**Power:**	Power Over USB	**Job Site:**	NC02

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

COMMENTS

Power Level set at 10dBm. Transmitting at maximum duty cycle.

DEVIATIONS FROM TEST STANDARD

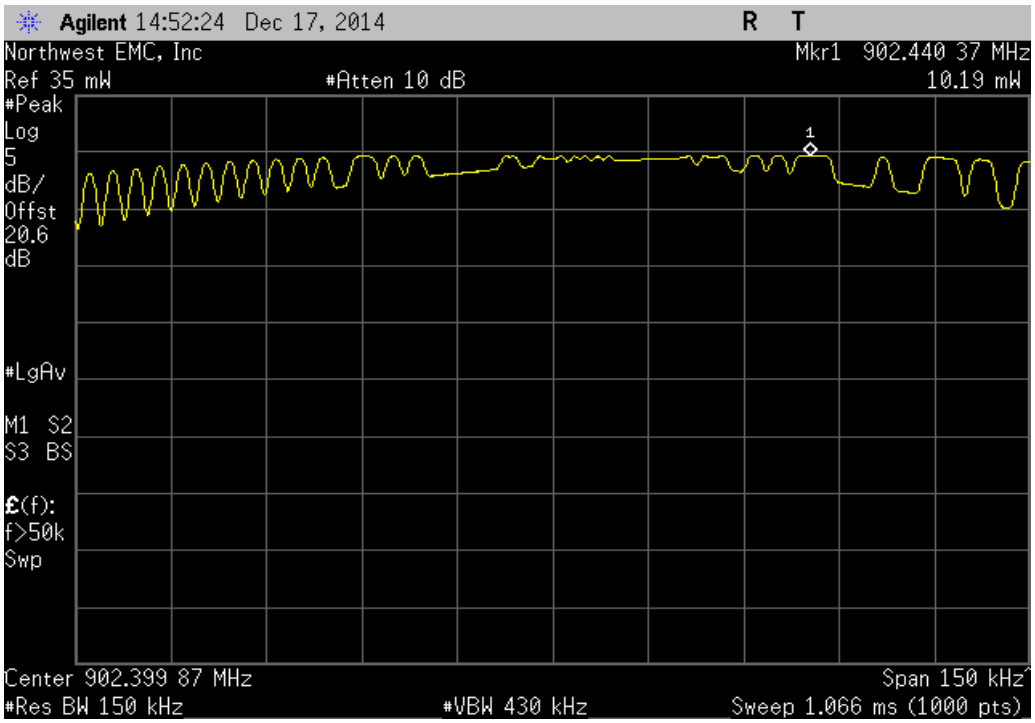
None

Configuration #	1	Signature

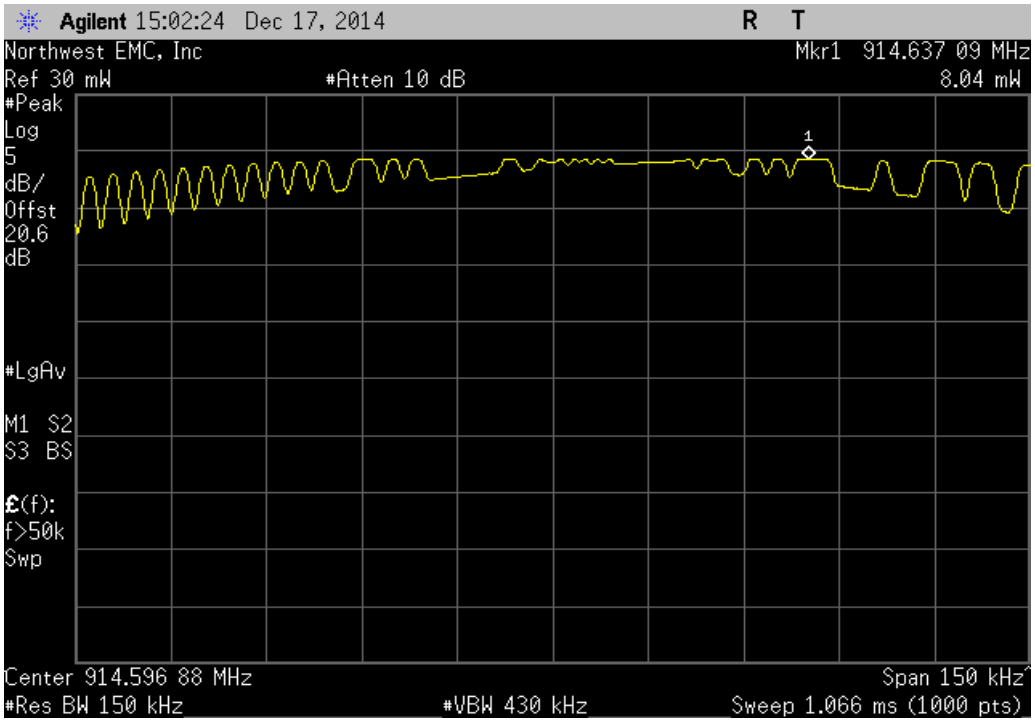
	Value	Limit (<)	Result
Single Channel Mode			
61.44 Kb/s, GFSK			
Low Channel 2, 902.399871 MHz	10.191 mW	1 W	Pass
Mid Channel 63, 914.596882 MHz	8.037 mW	1 W	Pass
High Channel 126, 927.193795 MHz	6.028 mW	1 W	Pass

OUTPUT POWER

Single Channel Mode, 61.44 Kb/s, GFSK, Low Channel 2, 902.399871 MHz						
				Value	Limit (<)	Result
				10.191 mW	1 W	Pass

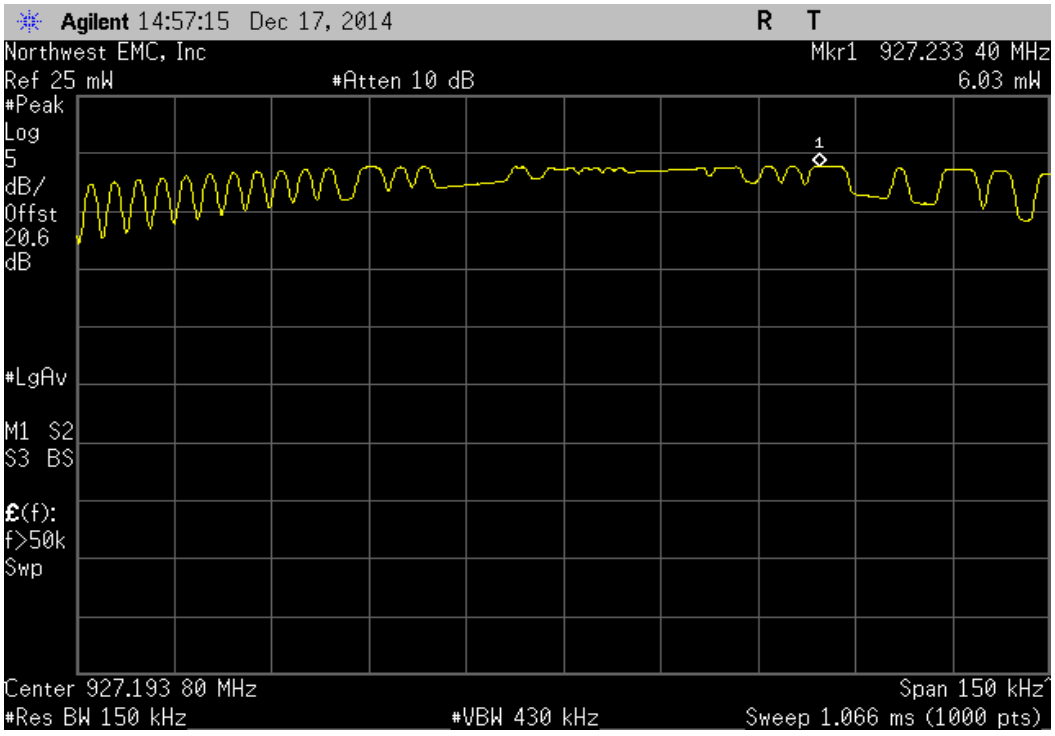


Single Channel Mode, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz						
				Value	Limit (<)	Result
				8.037 mW	1 W	Pass



OUTPUT POWER

Single Channel Mode, 61.44 Kb/s, GFSK, High Channel 126, 927.193795 MHz						
				Value	Limit (<)	Result
				6.028 mW	1 W	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 (mo)
Spectrum Analyzer	Agilent	E4446A	AAT	6/27/2014	12
Signal Generator	Agilent	N5183A	TIA	4/7/2014	36
40GHz DC Block	Fairview Microwave	SD3379	AMJ	6/9/2014	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/13/2014	12
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/9/2014	12

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. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used.

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:	Vector Mouthguard			Work Order:	I1BM0001
Serial Number:	3350			Date:	12/17/14
Customer:	i1 Biometrics, Inc.			Temperature:	24°C
Attendees:	David Brown, Rob Phibbs			Humidity:	32%
Project:	None			Barometric Pres.:	1011
Tested by:	Richard Mellroth	Power:	Power Over USB	Job Site:	NC02

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

COMMENTS

Power Level set at 10dBm. Transmitting at maximum duty cycle.

DEVIATIONS FROM TEST STANDARD

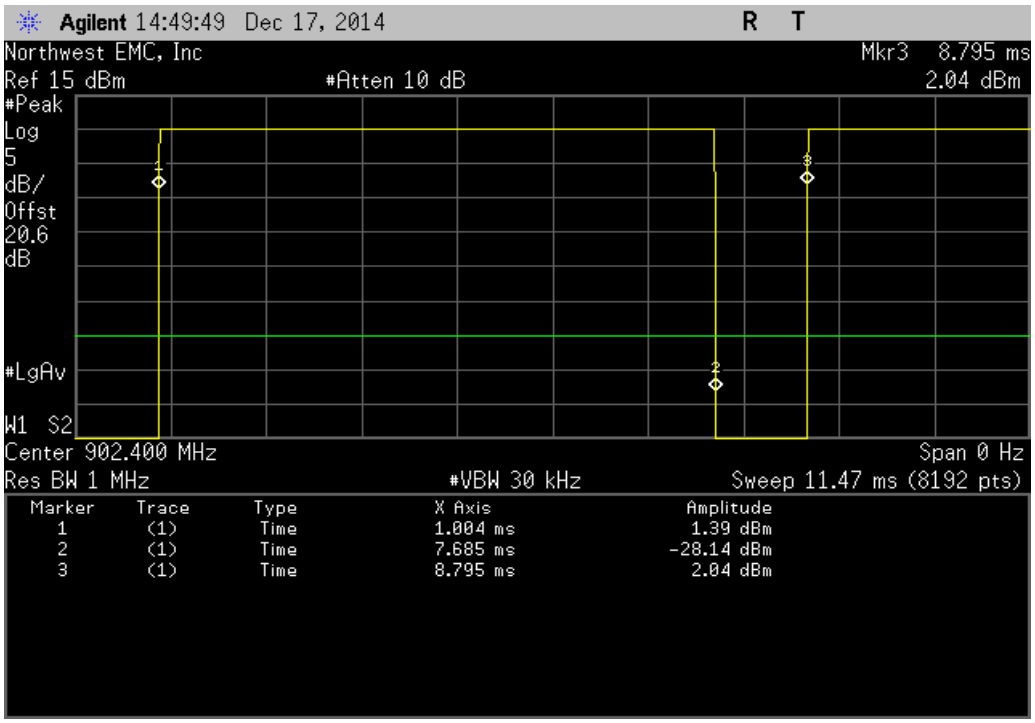
None

Configuration #	1	Signature

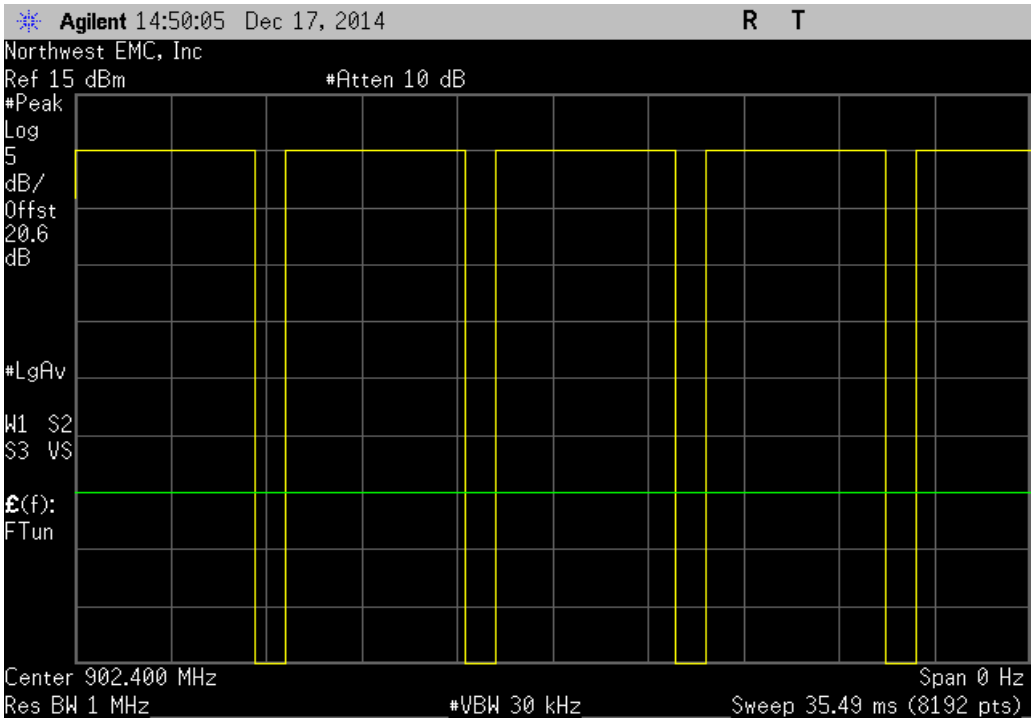
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
Single Channel Mode						
61.44 Kb/s, GFSK						
Low Channel 2, 902.399871 MHz	6.681 ms	7.791 ms	1	85.8	N/A	N/A
Low Channel 2, 902.399871 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel 63, 914.596882 MHz	6.681 ms	7.825 ms	1	85.4	N/A	N/A
Mid Channel 63, 914.596882 MHz	N/A	N/A	5	N/A	N/A	N/A
High Channel 126, 927.193795 MHz	6.682 ms	7.836 ms	1	85.3	N/A	N/A
High Channel 126, 927.193795 MHz	N/A	N/A	5	N/A	N/A	N/A

DUTY CYCLE

Single Channel Mode, 61.44 Kb/s, GFSK, Low Channel 2, 902.399871 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	6.681 ms	7.791 ms	1	85.8	N/A	N/A

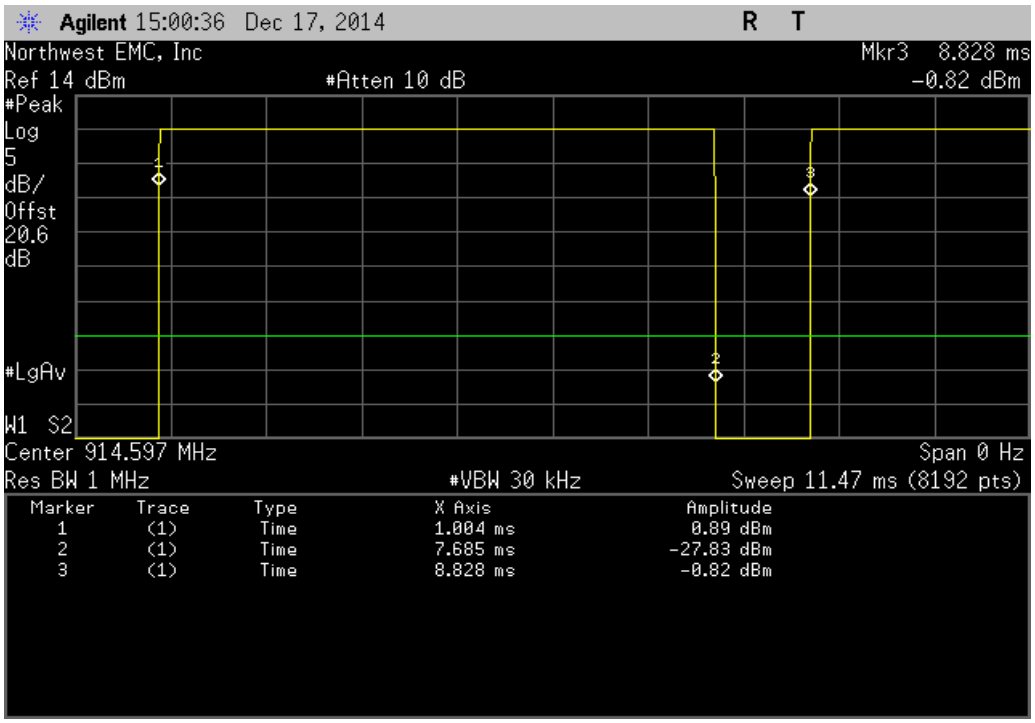


Single Channel Mode, 61.44 Kb/s, GFSK, Low Channel 2, 902.399871 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

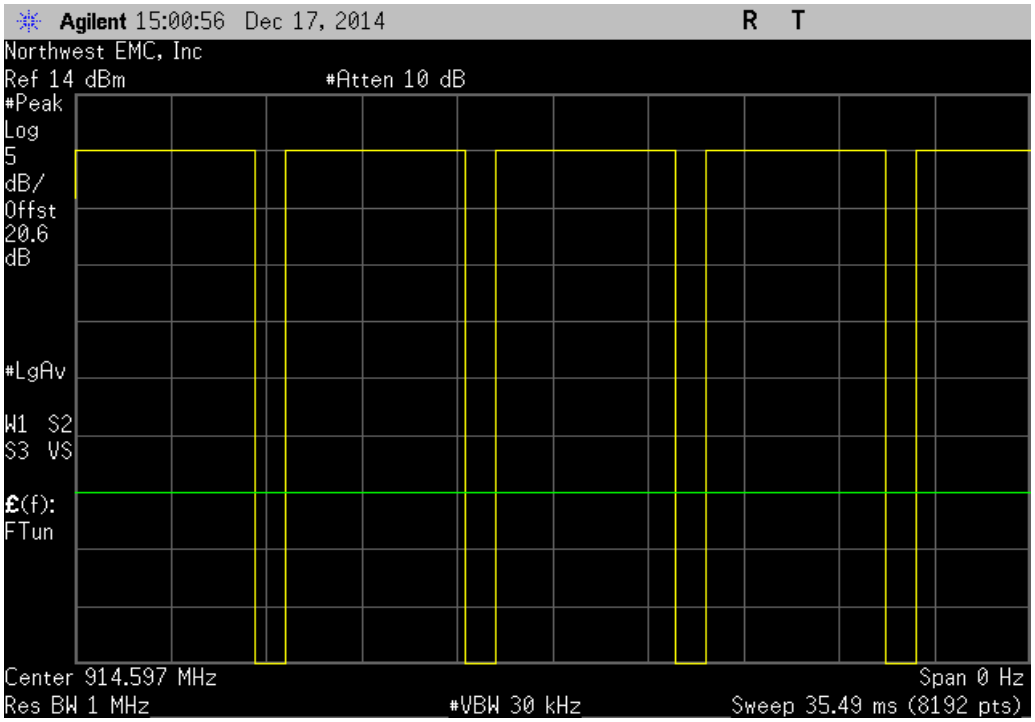


DUTY CYCLE

Single Channel Mode, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	6.681 ms	7.825 ms	1	85.4	N/A	N/A

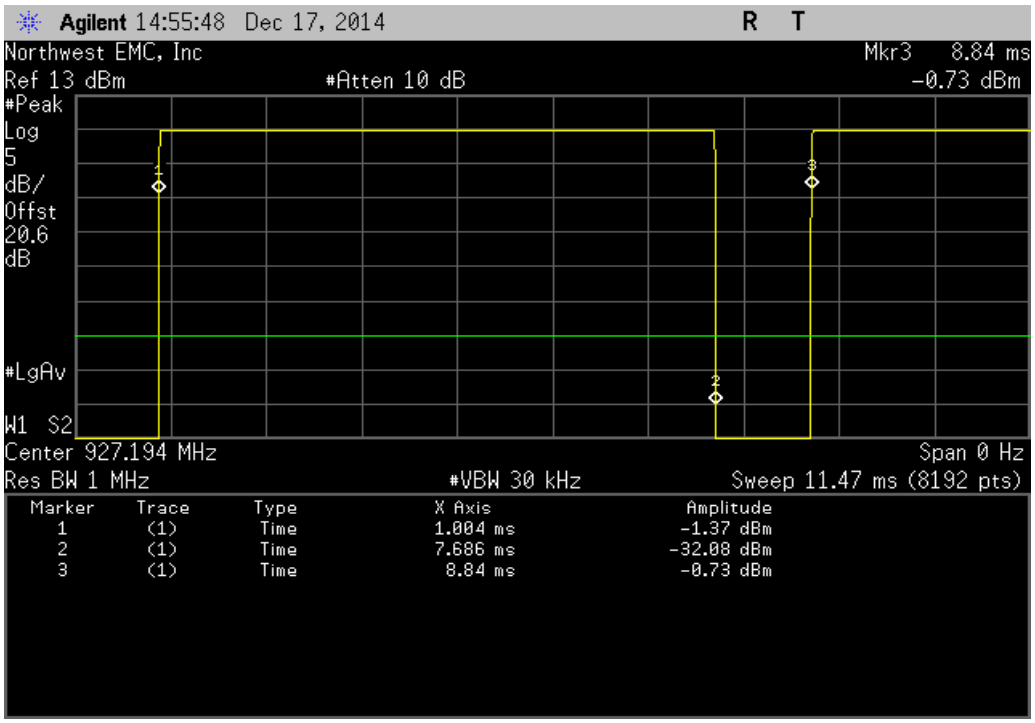


Single Channel Mode, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

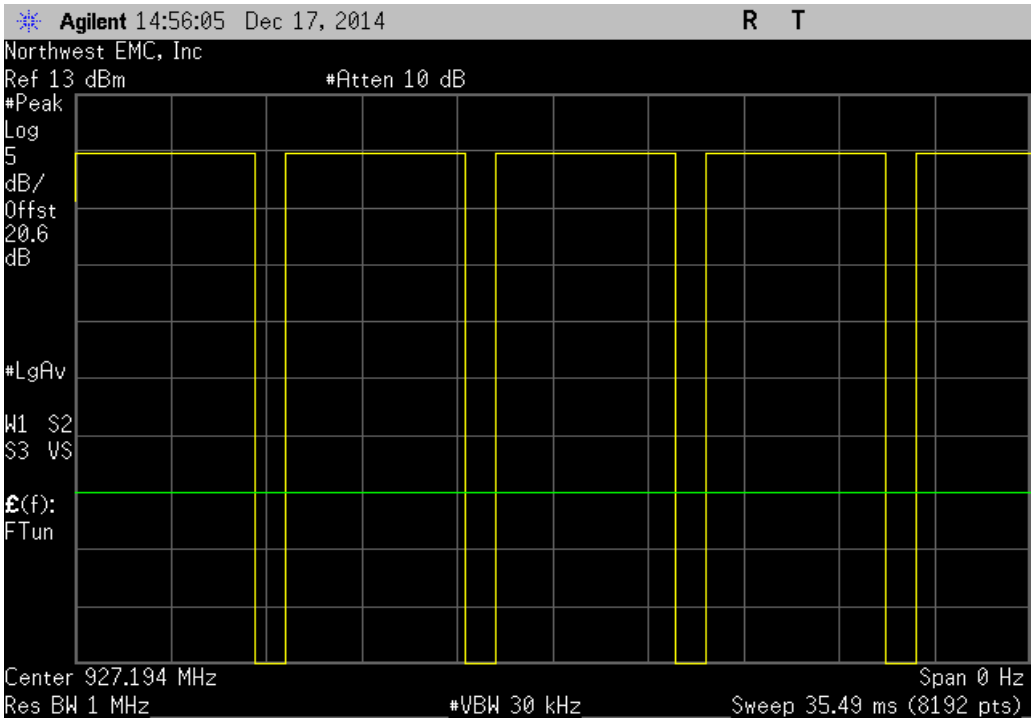


DUTY CYCLE

Single Channel Mode, 61.44 Kb/s, GFSK, High Channel 126, 927.193795 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	6.682 ms	7.836 ms	1	85.3	N/A	N/A



Single Channel Mode, 61.44 Kb/s, GFSK, High Channel 126, 927.193795 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 (mo)
Spectrum Analyzer	Agilent	E4446A	AAT	6/27/2014	12
Signal Generator	Agilent	N5183A	TIA	4/7/2014	36
Attenuator	Fairview Microwave	SA4014-20	TKE	2/13/2014	12
40GHz DC Block	Fairview Microwave	SD3379	AMJ	6/9/2014	12
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/9/2014	12

TEST DESCRIPTION

The channel carrier frequencies in the 902-928 MHz band must be separated by 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. 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:	Vector Mouthguard			Work Order:	I1BM0001
Serial Number:	3350			Date:	12/17/14
Customer:	i1 Biometrics, Inc.			Temperature:	24°C
Attendees:	David Brown, Rob Phibbs			Humidity:	32%
Project:	None			Barometric Pres.:	1011
Tested by:	Richard Mellroth	Power:	Power Over USB	Job Site:	NC02

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

COMMENTS

Power Level set at 10dBm.

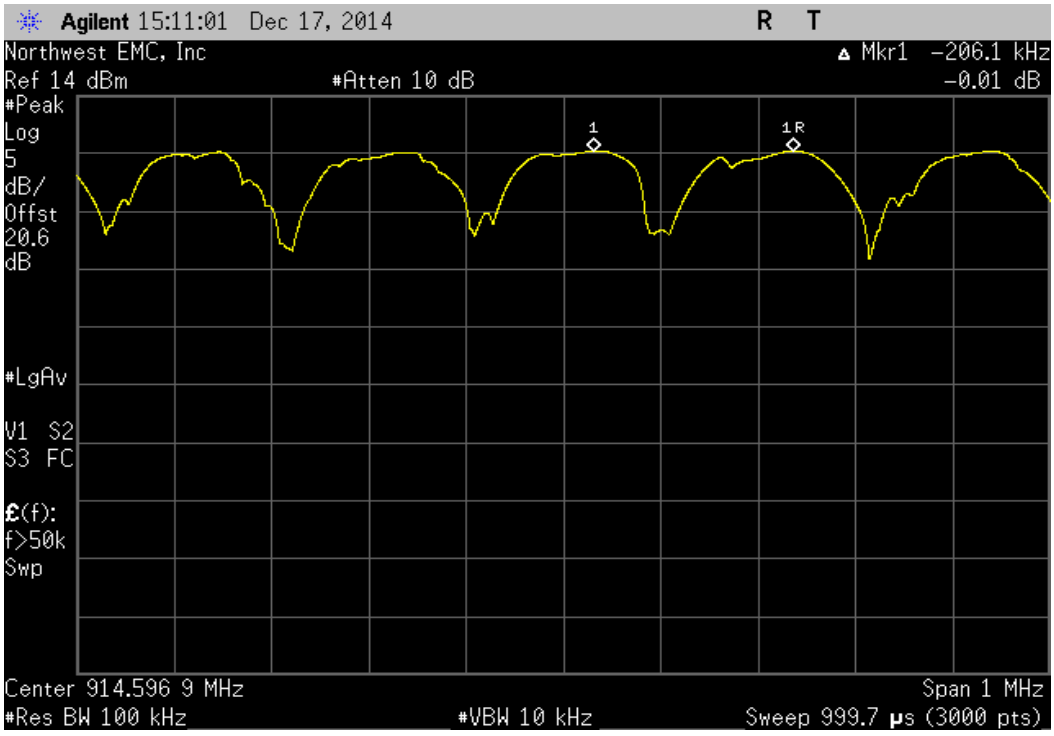
DEVIATIONS FROM TEST STANDARD

None

Configuration #	1	Signature

	Value	Limit (≥)	Results
Hopping Mode, Application Duty Cycle			
61.44 Kb/s, GFSK			
Mid Channel 63, 914.596882 MHz	206.1 kHz	100 kHz	Pass

Hopping Mode, Application Duty Cycle, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz						
				Value	Limit (≥)	Results
				206.1 kHz	100 kHz	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 (mo)
Signal Generator	Agilent	N5183A	TIA	4/7/2014	36
Spectrum Analyzer	Agilent	E4446A	AAT	6/27/2014	12
40GHz DC Block	Fairview Microwave	SD3379	AMJ	6/9/2014	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/13/2014	12
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/9/2014	12

TEST DESCRIPTION

The number of hopping frequencies was measured across 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.

NUMBER OF HOPPING FREQUENCIES

EUT:	Vector Mouthguard			**Work Order:**	I1BM0001
Serial Number:	3350			**Date:**	12/17/14
Customer:	i1 Biometrics, Inc.			**Temperature:**	24°C
Attendees:	David Brown, Rob Phibbs			**Humidity:**	32%
Project:	None			**Barometric Pres.:**	1011
Tested by:	Richard Mellroth	**Power:**	Power Over USB	**Job Site:**	NC02

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

COMMENTS

Power Level set at 10dBm.

DEVIATIONS FROM TEST STANDARD

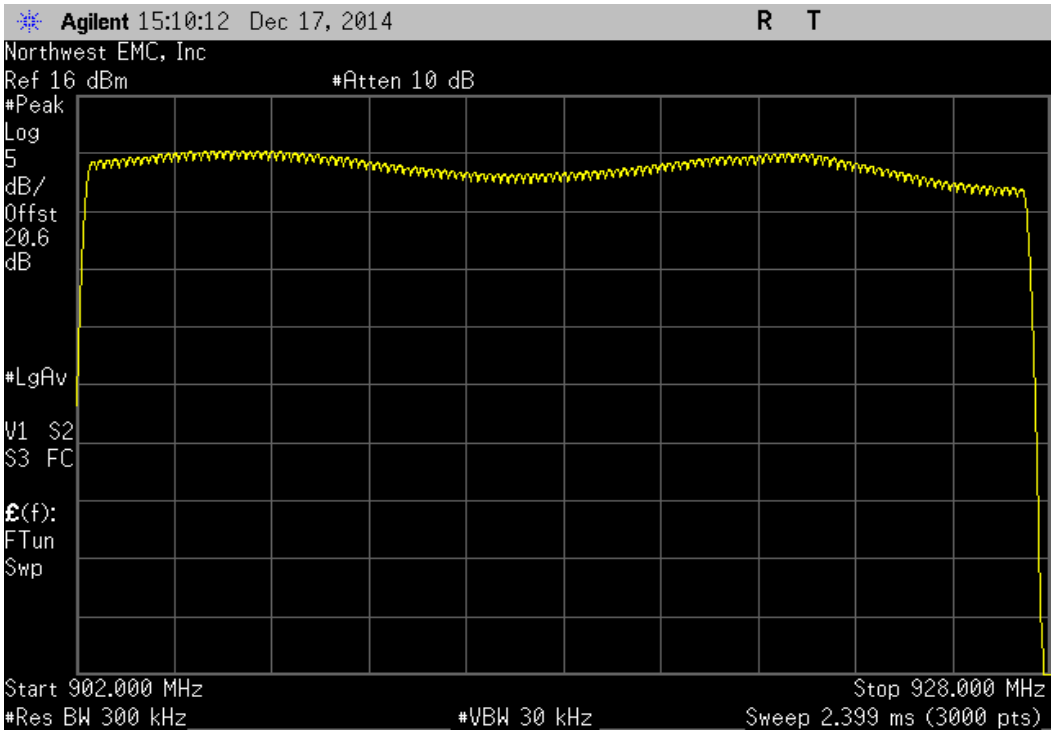
None

Configuration #	1	Signature

	Number of Channels	Limit	Results
Hopping Mode, Application Duty Cycle			
61.44 Kb/s, GFSK			
Mid Channel 63, 914.596882 MHz	125	> 50	Pass

NUMBER OF HOPPING FREQUENCIES

Hopping Mode, Application Duty Cycle, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz						
				Number of Channels	Limit	Results
				125	> 50	Pass



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 (mo)
Spectrum Analyzer	Agilent	E4446A	AAT	6/27/2014	12
Signal Generator	Agilent	N5183A	TIA	4/7/2014	36
40GHz DC Block	Fairview Microwave	SD3379	AMJ	6/9/2014	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/13/2014	12
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/9/2014	12

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 for a transmitter operating in the 902-928MHz band employing at least 50 channels is specified at a maximum of 0.4s in a 20s period. The measurement was repeated 4 times.

DWELL TIME

EUT:	Vector Mouthguard			Work Order:	I1BM0001
Serial Number:	3350			Date:	12/17/14
Customer:	i1 Biometrics, Inc.			Temperature:	24°C
Attendees:	David Brown, Rob Phibbs			Humidity:	32%
Project:	None			Barometric Pres.:	1011
Tested by:	Richard Mellroth	Power:	Power Over USB	Job Site:	NC02

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

COMMENTS

Power Level set at 10dBm.

DEVIATIONS FROM TEST STANDARD

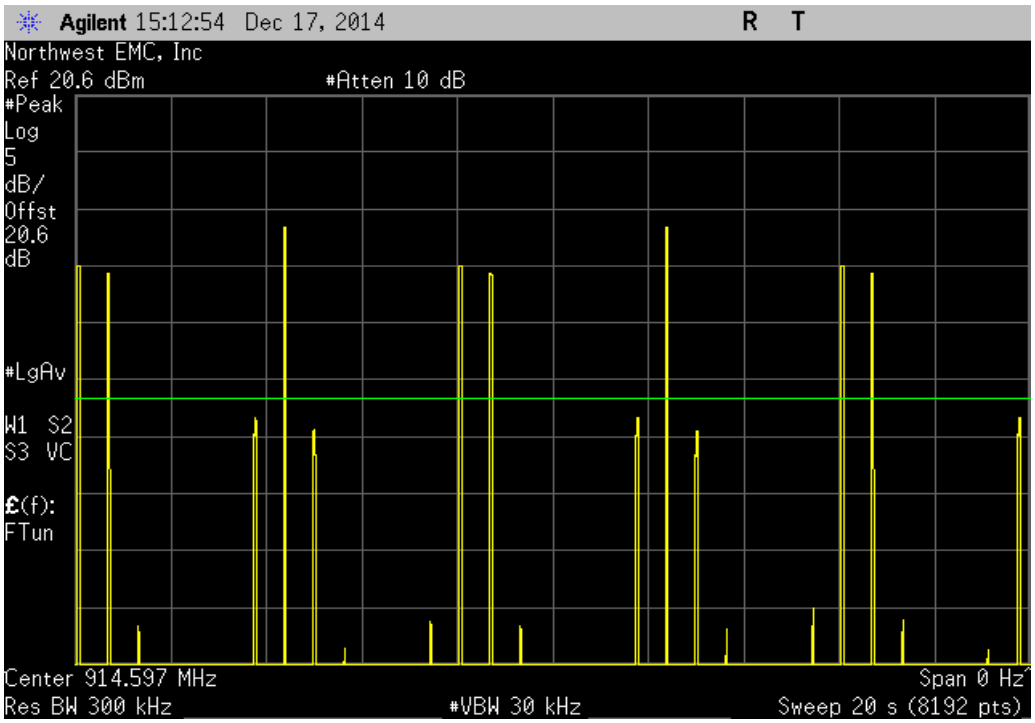
None

Configuration #	1	Signature

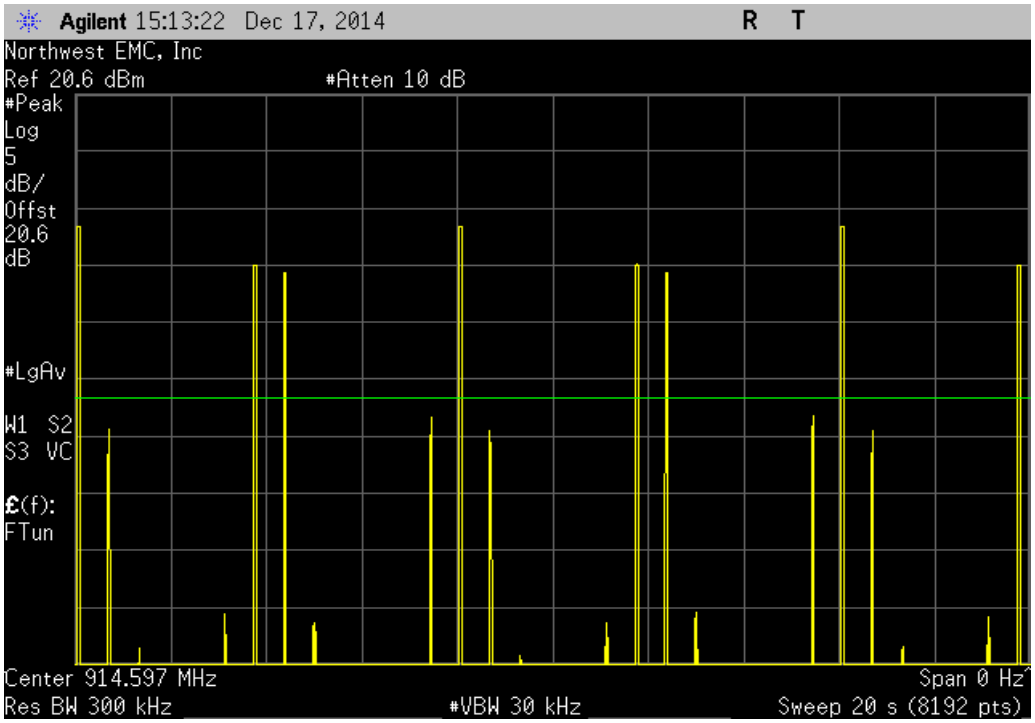
	Pulse Width (ms)	Number of Pulses	On Time (ms) During 20 s	Limit (ms)	Results
Hopping Mode, Application Duty Cycle					
61.44 Kb/s, GFSK					
Mid Channel 63, 914.596882 MHz	6.678	N/A	N/A	N/A	N/A
Mid Channel 63, 914.596882 MHz	6.678	8	53.424	400	Pass
Mid Channel 63, 914.596882 MHz	6.678	8	53.424	400	Pass
Mid Channel 63, 914.596882 MHz	6.678	8	53.424	400	Pass
Mid Channel 63, 914.596882 MHz	6.678	8	53.424	400	Pass

DWELL TIME

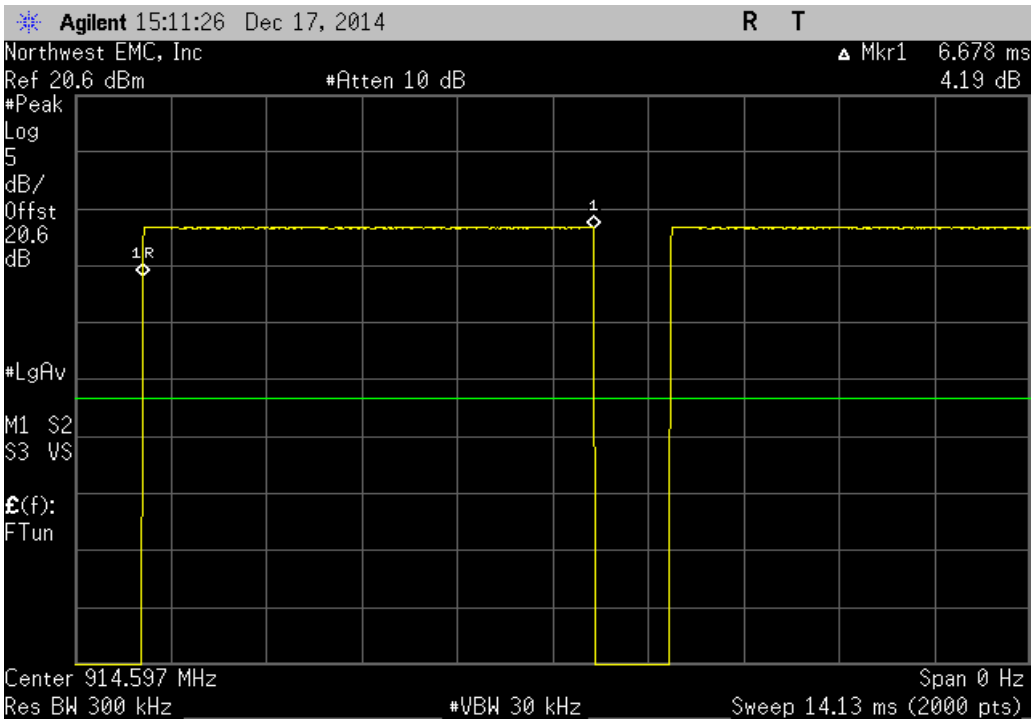
Hopping Mode, Application Duty Cycle, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz						
		Pulse Width (ms)	Number of Pulses	On Time (ms) During 20 s	Limit (ms)	Results
		6.678	8	53.424	400	Pass



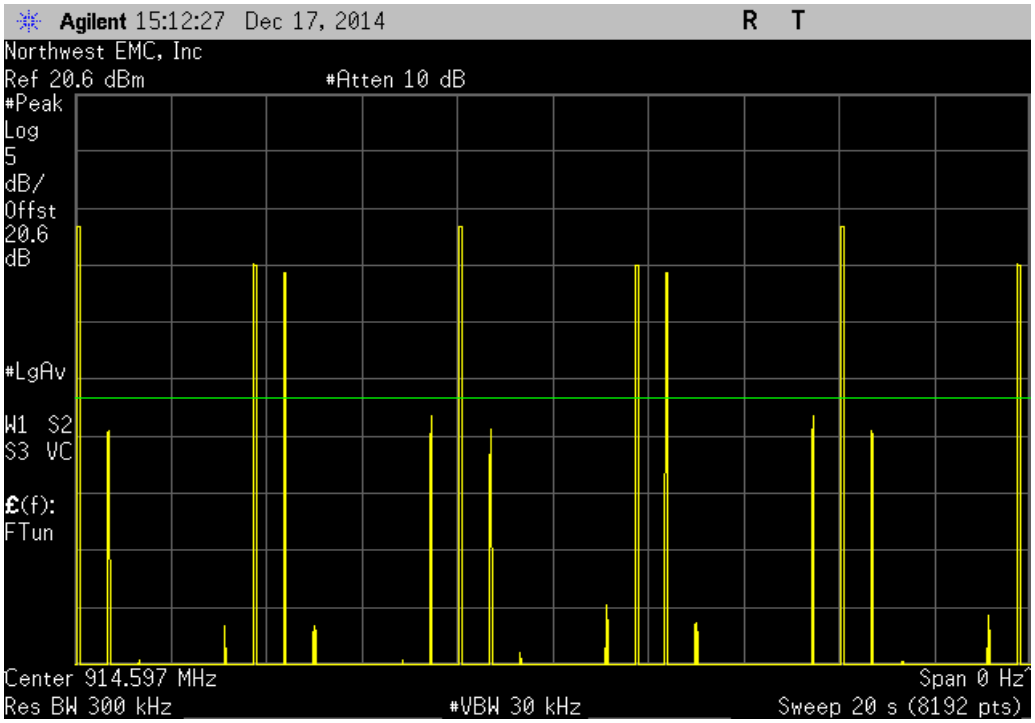
Hopping Mode, Application Duty Cycle, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz						
		Pulse Width (ms)	Number of Pulses	On Time (ms) During 20 s	Limit (ms)	Results
		6.678	8	53.424	400	Pass



Hopping Mode, Application Duty Cycle, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz						
		Pulse Width (ms)	Number of Pulses	On Time (ms) During 20 s	Limit (ms)	Results
		6.678	N/A	N/A	N/A	N/A

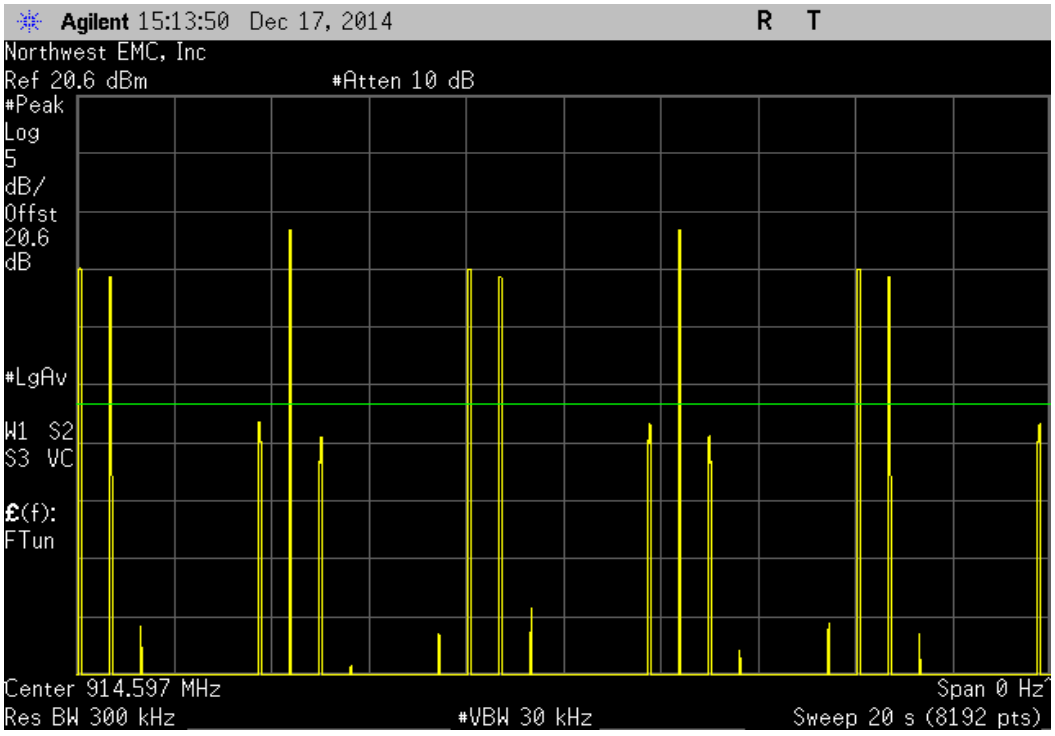


Hopping Mode, Application Duty Cycle, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz						
		Pulse Width (ms)	Number of Pulses	On Time (ms) During 20 s	Limit (ms)	Results
		6.678	8	53.424	400	Pass



DWELL TIME

Hopping Mode, Application Duty Cycle, 61.44 Kb/s, GFSK, Mid Channel 63, 914.596882 MHz						
		Pulse Width (ms)	Number of Pulses	On Time (ms) During 20 s	Limit (ms)	Results
		6.678	8	53.424	400	Pass



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 (mo)
Spectrum Analyzer	Agilent	E4446A	AAT	6/27/2014	12
Signal Generator	Agilent	N5183A	TIA	4/7/2014	36
40GHz DC Block	Fairview Microwave	SD3379	AMJ	6/9/2014	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/13/2014	12
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/9/2014	12

TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. 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 in a no hop mode. The channels closest to the band edges were selected.

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

BAND EDGE COMPLIANCE

EUT:	Vector Mouthguard			Work Order:	I1BM0001
Serial Number:	3350			Date:	12/17/14
Customer:	i1 Biometrics, Inc.			Temperature:	24°C
Attendees:	David Brown, Rob Phibbs			Humidity:	32%
Project:	None			Barometric Pres.:	1011
Tested by:	Richard Mellroth	Power:	Power Over USB	Job Site:	NC02

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

COMMENTS

Power Level set at 10dBm. Transmitting at maximum duty cycle.

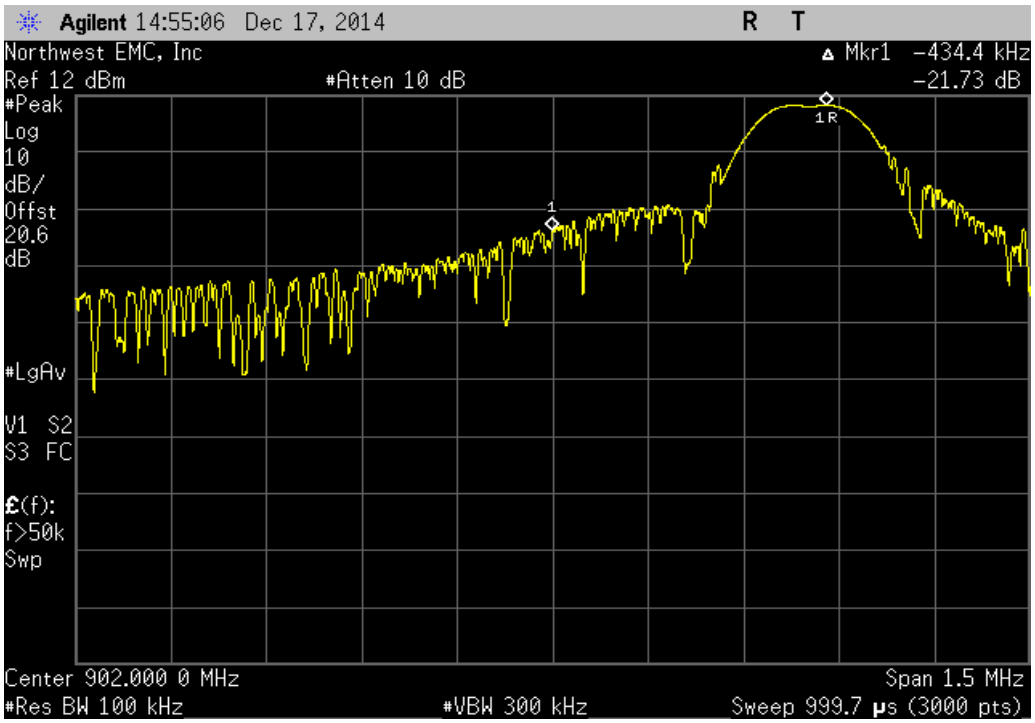
DEVIATIONS FROM TEST STANDARD

None

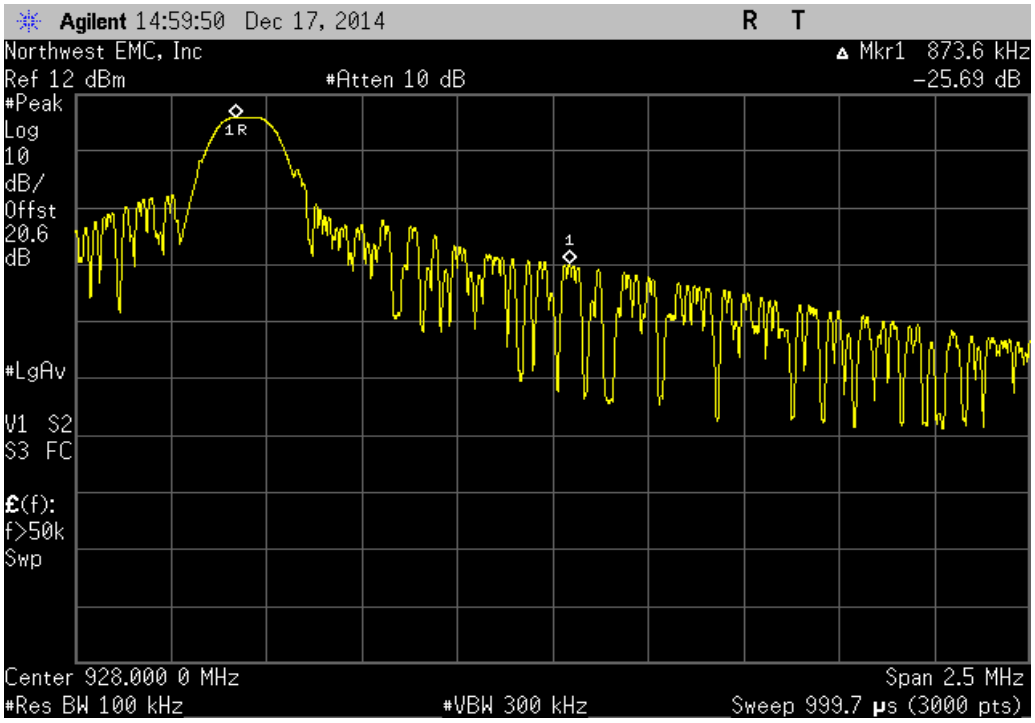
Configuration #	1	Signature

	Value (dBc)	Limit ≤ (dBc)	Result
Single Channel Mode			
61.44 Kb/s, GFSK			
Low Channel 2, 902.399871 MHz	-21.73	-20	Pass
High Channel 126, 927.193795 MHz	-25.69	-20	Pass

Single Channel Mode, 61.44 Kb/s, GFSK, Low Channel 2, 902.399871 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-21.73	-20	Pass



Single Channel Mode, 61.44 Kb/s, GFSK, High Channel 126, 927.193795 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-25.69	-20	Pass



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 (mo)
Spectrum Analyzer	Agilent	E4446A	AAT	6/27/2014	12
Signal Generator	Agilent	N5183A	TIA	4/7/2014	36
Attenuator	Fairview Microwave	SA4014-20	TKE	2/13/2014	12
40GHz DC Block	Fairview Microwave	SD3379	AMJ	6/9/2014	12
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	6/9/2014	12

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 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 -HOPPING MODE

EUT:	Vector Mouthguard			**Work Order:**	I1BM0001
Serial Number:	3350			**Date:**	12/17/14
Customer:	i1 Biometrics, Inc.			**Temperature:**	24°C
Attendees:	David Brown, Rob Phibbs			**Humidity:**	32%
Project:	None			**Barometric Pres.:**	1011
Tested by:	Richard Mellroth	**Power:**	Power Over USB	**Job Site:**	NC02

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

COMMENTS

Power Level set at 10dBm.

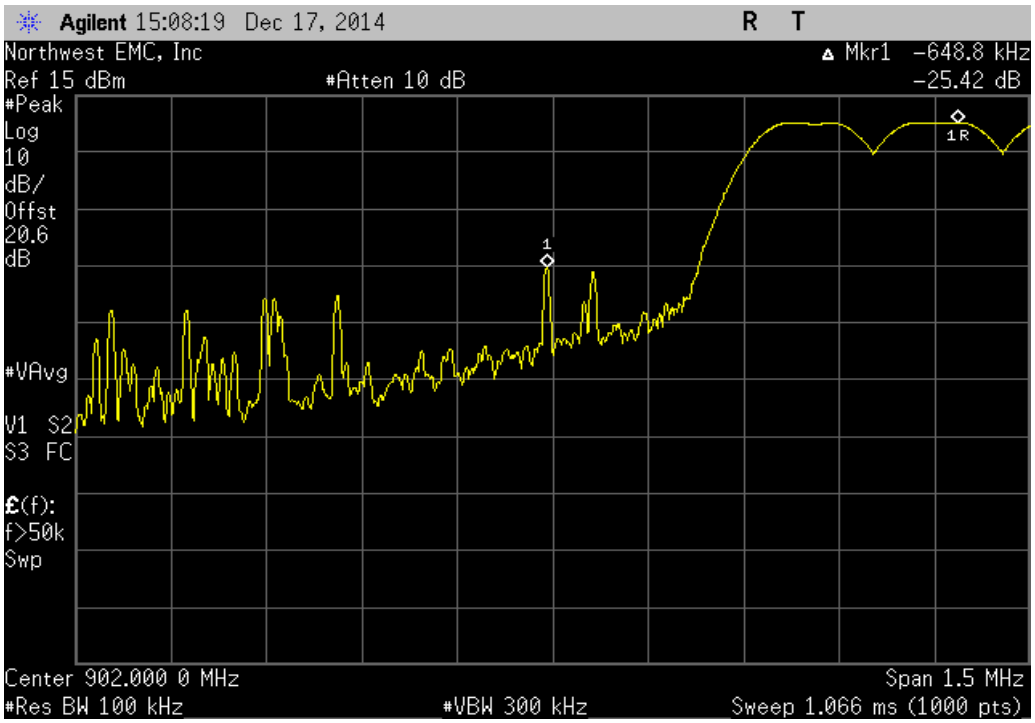
DEVIATIONS FROM TEST STANDARD

None

Configuration #	1	Signature

	Value (dBc)	Limit ≤ (dBc)	Result
Hopping Mode, Application Duty Cycle			
61.44 Kb/s, GFSK			
Low Channel 2, 902.399871 MHz	-25.42	-20	Pass
High Channel 126, 927.193795 MHz	-33.36	-20	Pass

Hopping Mode, Application Duty Cycle, 61.44 Kb/s, GFSK, Low Channel 2, 902.399871 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-25.42	-20	Pass



Hopping Mode, Application Duty Cycle, 61.44 Kb/s, GFSK, High Channel 126, 927.193795 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-33.36	-20	Pass