

# NORTHWEST EMC

## Intel Corporation

Crescent Dunes (Rev D)

FCC 15.207:2015

FCC 15.247:2015

Report # INTE5628.1



NVLAP Lab Code: 200630-0

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

# CERTIFICATE OF TEST

**Last Date of Test: October 02, 2015**  
**Intel Corporation**  
**Model: Crescent Dunes (Rev D)**

## Radio Equipment Testing

### Standards

Specification	Method
FCC 15.207:2015	ANSI C63.10:2013
FCC 15.247:2015	ANSI C63.10:2013

### Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6, 11.12.1, 11.13.2	Spurious Radiated Emissions	Yes	Pass	
6.10.4	Band Edge Compliance	Yes	Pass	
11.6	Duty Cycle	Yes	N/A	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9	Output Power	Yes	Pass	
11.10	Power Spectral Density	Yes	Pass	
11.11	Spurious Conducted Emissions	No	N/A	Device had an integral antenna and all spurious emissions were measured using the radiated method.

### Deviations From Test Standards

None

### Approved By:



Kyle Holgate, Operations Manager

*Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information.*

# REVISION HISTORY

Revision Number		Description	Date	Page Number
00		None		

# ACCREDITATIONS AND AUTHORIZATIONS

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## United States

**FCC** - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

**A2LA** - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

**NVLAP** - Each laboratory is accredited by NVLAP to ISO 17025

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## Canada

**IC** - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

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## 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.

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## Australia/New Zealand

**ACMA** - Recognized by ACMA as a CAB for the acceptance of test data.

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## Korea

**MSIP / RRA** - Recognized by KCC's RRA as a CAB for the acceptance of test data.

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## Japan

**VCCI** - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

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## 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.

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## Singapore

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

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## Israel

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

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## Hong Kong

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

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## Vietnam

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

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## SCOPE

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

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

# MEASUREMENT UNCERTAINTY

## Measurement Uncertainty

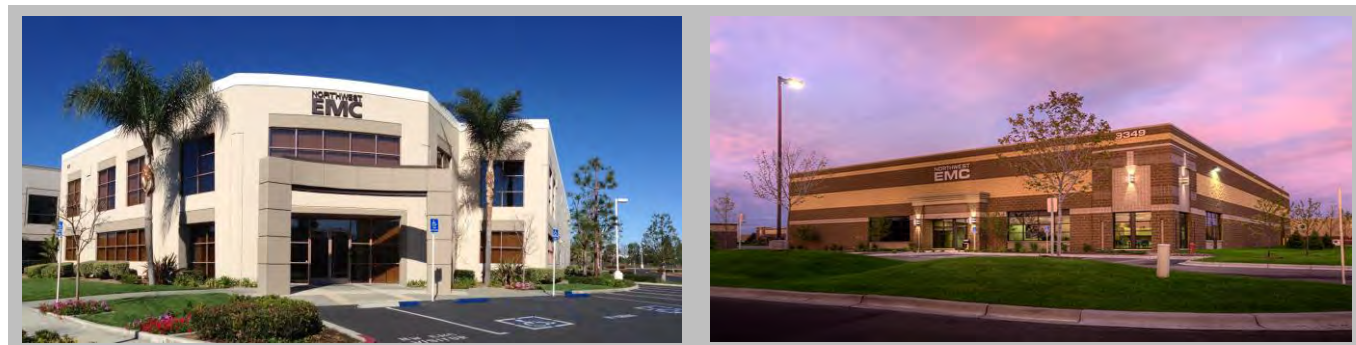
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement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

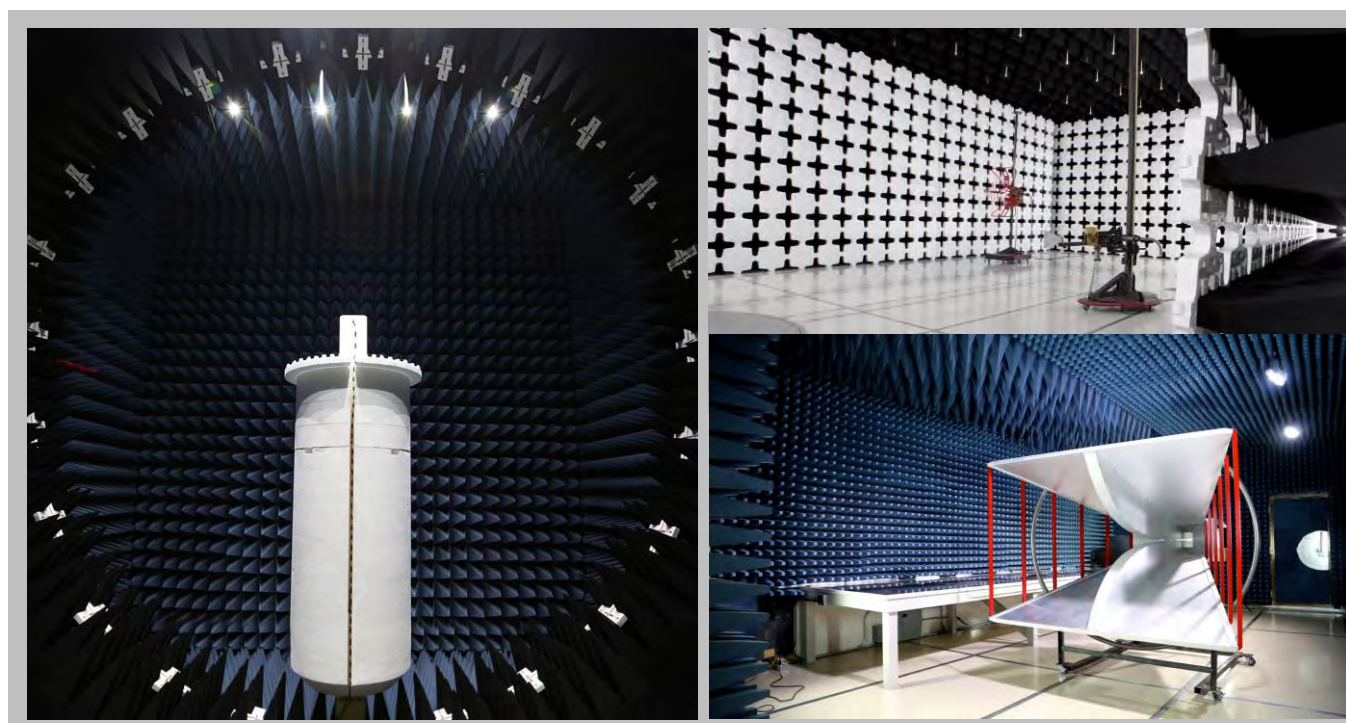
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

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

# FACILITIES



<b>California</b> Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	<b>Minnesota</b> Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	<b>New York</b> Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	<b>Oregon</b> Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	<b>Texas</b> Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	<b>Washington</b> Labs NC01-05 19201 120 <sup>th</sup> Ave NE Bothell, WA 9801 (425)984-6600
<b>NVLAP</b>					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
<b>Industry Canada</b>					
2834B-1, 2834B-3	2834E-1	N/A	2834D-1, 2834D-2	2834G-1	2834F-1
<b>BSMI</b>					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
<b>VCCI</b>					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
<b>Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRR, MIC, MOC, NCC, OFCA</b>					
US0158	US0175	N/A	US0017	US0191	US0157



# PRODUCT DESCRIPTION

## Client and Equipment Under Test (EUT) Information

<b>Company Name:</b>	Intel Corporation
<b>Address:</b>	PO Box 1000
<b>City, State, Zip:</b>	Hillsboro, OR 97123-1000
<b>Test Requested By:</b>	Mark Briggs
<b>Model:</b>	Crescent Dunes (Rev D)
<b>First Date of Test:</b>	September 29, 2015
<b>Last Date of Test:</b>	October 02, 2015
<b>Receipt Date of Samples:</b>	September 24, 2015
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No Damage

## Information Provided by the Party Requesting the Test

<b>Functional Description of the EUT:</b>
The system is a 20W resonant charging PTU (Power transmit Unit) that operates at 6.78MHz and follows the A4WP standard.
<b>Testing Objective:</b>
To demonstrate compliance of the Bluetooth radio to FCC 15.247 requirements.



# CONFIGURATIONS

## Configuration INTE5628- 1

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
20W resonant charging mat (PTU)	Intel Corporation	Crescent Dunes (Rev D)	Board 701192
AC/DC Power Brick	Ktec	KSAS0651900342M3	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Cable	No	2.0 m	No	AC Mains	AC/DC Power Brick
DC Cable	Yes	1.6 m	Yes	AC/DC Power Brick	20W resonant charging mat (PTU)



# MODIFICATIONS

## Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	9/29/2015	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	10/2/2015	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	10/2/2015	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	10/2/2015	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.
5	10/2/2015	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
6	10/2/2015	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
7	10/2/2015	Power Spectral Density	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

## 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  $\Omega$  measuring port is terminated by a 50  $\Omega$  EMI meter or a 50  $\Omega$  resistive load. All 50  $\Omega$  measuring ports of the LISN are terminated by 50 $\Omega$ .

The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

## TEST EQUIPMENT

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

## MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

## CONFIGURATIONS INVESTIGATED

INTE5628-1

## MODES INVESTIGATED

Continuous Tx BTLE, High channel, 2480MHz  
Continuous Tx BTLE, Low channel, 2402MHz  
Continuous Tx BTLE, Mid channel, 2440MHz

# AC POWERLINE CONDUCTED EMISSIONS

EUT:	Crescent Dunes (Rev D)	Work Order:	INTE5628
Serial Number:	Board 701192	Date:	10/02/2015
Customer:	Intel Corporation	Temperature:	23.1°C
Attendees:	Mark Briggs	Relative Humidity:	42.2%
Customer Project:	None	Bar. Pressure:	1022.7 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	INTE5628-1

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

## TEST PARAMETERS

Run #:	1	Line:	High Line	Add. Ext. Attenuation (dB):	0
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## COMMENTS

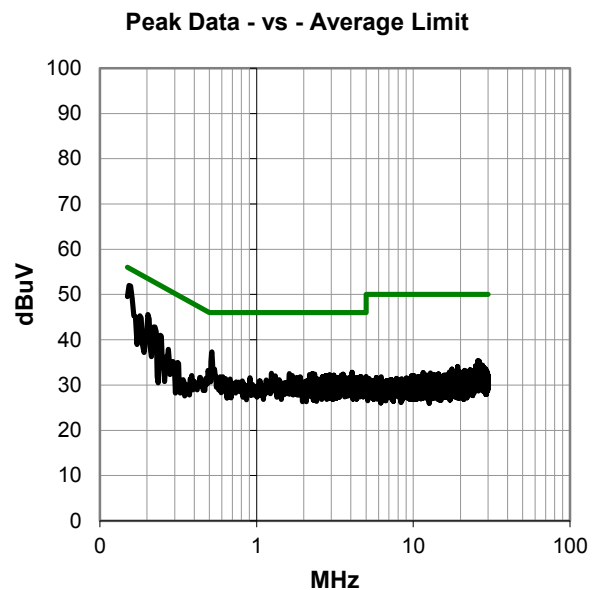
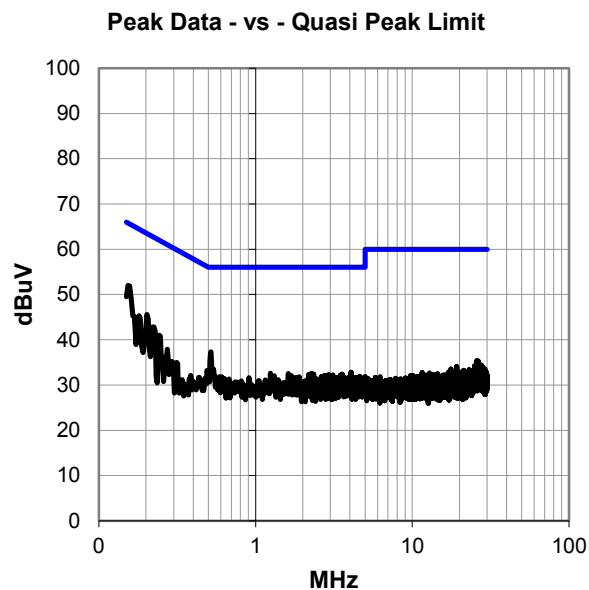
None

## EUT OPERATING MODES

Continuous Tx BTLE, Low channel, 2402MHz

## DEVIATIONS FROM TEST STANDARD

None



# AC POWERLINE CONDUCTED EMISSIONS

## RESULTS - Run #1

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.154	31.7	20.3	52.0	65.8	-13.8
0.202	25.5	20.1	45.6	63.5	-17.9
0.519	17.3	20.0	37.3	56.0	-18.7
0.180	25.2	20.1	45.3	64.5	-19.2
0.221	22.7	20.1	42.8	62.8	-20.0
0.243	20.9	20.1	41.0	62.0	-21.0
0.273	17.9	20.0	37.9	61.0	-23.1
4.067	12.4	20.4	32.8	56.0	-23.2
1.247	12.5	20.1	32.6	56.0	-23.4
2.273	12.3	20.3	32.6	56.0	-23.4
1.620	12.3	20.2	32.5	56.0	-23.5
3.567	12.1	20.3	32.4	56.0	-23.6
2.347	12.1	20.3	32.4	56.0	-23.6
2.180	12.1	20.2	32.3	56.0	-23.7
2.933	12.0	20.3	32.3	56.0	-23.7
3.112	11.9	20.3	32.2	56.0	-23.8
3.489	11.9	20.3	32.2	56.0	-23.8
2.769	11.8	20.3	32.1	56.0	-23.9
1.687	11.9	20.2	32.1	56.0	-23.9
3.019	11.7	20.3	32.0	56.0	-24.0
1.318	11.9	20.1	32.0	56.0	-24.0
4.619	11.5	20.4	31.9	56.0	-24.1
4.996	11.5	20.4	31.9	56.0	-24.1
3.661	11.5	20.3	31.8	56.0	-24.2
0.609	11.8	20.0	31.8	56.0	-24.2
1.896	11.6	20.2	31.8	56.0	-24.2

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.154	31.7	20.3	52.0	55.8	-3.8
0.202	25.5	20.1	45.6	53.5	-7.9
0.519	17.3	20.0	37.3	46.0	-8.7
0.180	25.2	20.1	45.3	54.5	-9.2
0.221	22.7	20.1	42.8	52.8	-10.0
0.243	20.9	20.1	41.0	52.0	-11.0
0.273	17.9	20.0	37.9	51.0	-13.1
4.067	12.4	20.4	32.8	46.0	-13.2
1.247	12.5	20.1	32.6	46.0	-13.4
2.273	12.3	20.3	32.6	46.0	-13.4
1.620	12.3	20.2	32.5	46.0	-13.5
3.567	12.1	20.3	32.4	46.0	-13.6
2.347	12.1	20.3	32.4	46.0	-13.6
2.180	12.1	20.2	32.3	46.0	-13.7
2.933	12.0	20.3	32.3	46.0	-13.7
3.112	11.9	20.3	32.2	46.0	-13.8
3.489	11.9	20.3	32.2	46.0	-13.8
2.769	11.8	20.3	32.1	46.0	-13.9
1.687	11.9	20.2	32.1	46.0	-13.9
3.019	11.7	20.3	32.0	46.0	-14.0
1.318	11.9	20.1	32.0	46.0	-14.0
4.619	11.5	20.4	31.9	46.0	-14.1
4.996	11.5	20.4	31.9	46.0	-14.1
3.661	11.5	20.3	31.8	46.0	-14.2
0.609	11.8	20.0	31.8	46.0	-14.2
1.896	11.6	20.2	31.8	46.0	-14.2

## CONCLUSION

Pass



Tested By

# AC POWERLINE CONDUCTED EMISSIONS

EUT:	Crescent Dunes (Rev D)	Work Order:	INTE5628
Serial Number:	Board 701192	Date:	10/02/2015
Customer:	Intel Corporation	Temperature:	23.1°C
Attendees:	Mark Briggs	Relative Humidity:	42.2%
Customer Project:	None	Bar. Pressure:	1022.7 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	INTE5628-1

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

## TEST PARAMETERS

Run #:	2	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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## COMMENTS

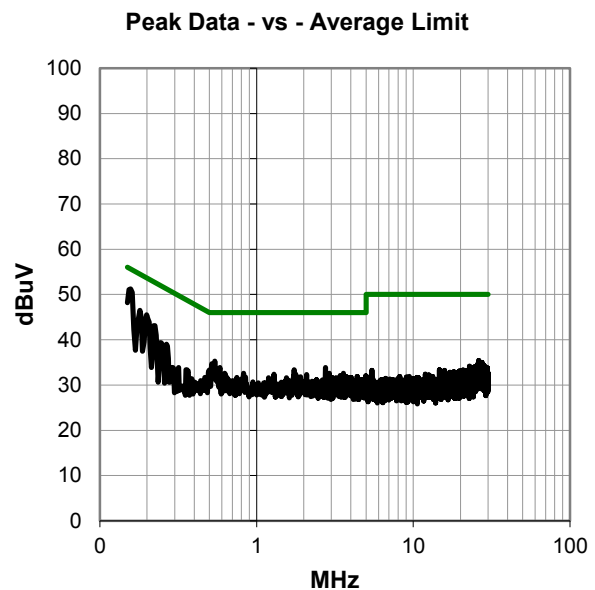
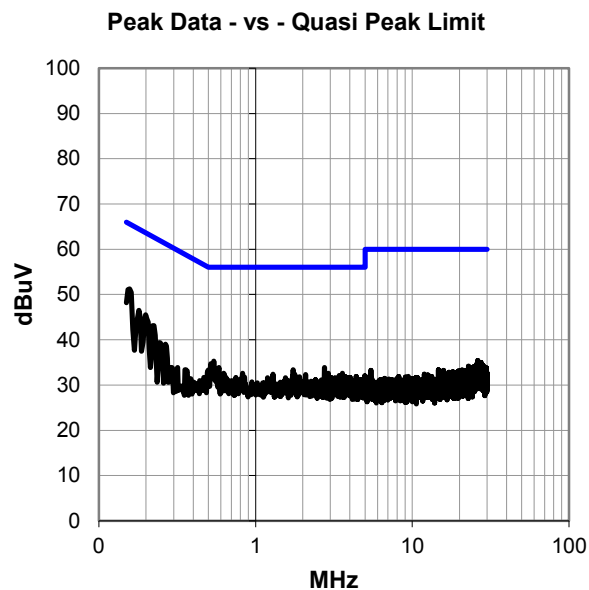
None
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## EUT OPERATING MODES

Continuous Tx BTLE, Low channel, 2402MHz
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## DEVIATIONS FROM TEST STANDARD

None
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# AC POWERLINE CONDUCTED EMISSIONS

## RESULTS - Run #2

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.157	31.0	20.3	51.3	65.6	-14.3
0.180	26.4	20.1	46.5	64.5	-18.0
0.199	25.4	20.1	45.5	63.7	-18.2
0.221	23.0	20.1	43.1	62.8	-19.7
0.542	15.3	20.0	35.3	56.0	-20.7
0.583	13.9	20.0	33.9	56.0	-22.1
2.750	13.6	20.3	33.9	56.0	-22.1
0.266	19.0	20.0	39.0	61.3	-22.2
0.243	19.3	20.1	39.4	62.0	-22.6
1.739	13.2	20.2	33.4	56.0	-22.6
0.501	13.3	20.0	33.3	56.0	-22.7
0.825	12.6	20.0	32.6	56.0	-23.4
0.628	12.6	20.0	32.6	56.0	-23.4
2.911	12.3	20.3	32.6	56.0	-23.4
3.590	12.3	20.3	32.6	56.0	-23.4
1.292	12.3	20.1	32.4	56.0	-23.6
1.780	12.2	20.2	32.4	56.0	-23.6
2.083	12.1	20.2	32.3	56.0	-23.7
3.414	11.8	20.3	32.1	56.0	-23.9
1.728	11.9	20.2	32.1	56.0	-23.9
4.981	11.6	20.4	32.0	56.0	-24.0
3.724	11.6	20.3	31.9	56.0	-24.1
4.384	11.5	20.4	31.9	56.0	-24.1
1.911	11.6	20.2	31.8	56.0	-24.2
0.851	11.7	20.0	31.7	56.0	-24.3
0.601	11.7	20.0	31.7	56.0	-24.3

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.157	31.0	20.3	51.3	55.6	-4.3
0.180	26.4	20.1	46.5	54.5	-8.0
0.199	25.4	20.1	45.5	53.7	-8.2
0.221	23.0	20.1	43.1	52.8	-9.7
0.542	15.3	20.0	35.3	46.0	-10.7
0.583	13.9	20.0	33.9	46.0	-12.1
2.750	13.6	20.3	33.9	46.0	-12.1
0.266	19.0	20.0	39.0	51.3	-12.2
0.243	19.3	20.1	39.4	52.0	-12.6
1.739	13.2	20.2	33.4	46.0	-12.6
0.501	13.3	20.0	33.3	46.0	-12.7
0.825	12.6	20.0	32.6	46.0	-13.4
0.628	12.6	20.0	32.6	46.0	-13.4
2.911	12.3	20.3	32.6	46.0	-13.4
3.590	12.3	20.3	32.6	46.0	-13.4
1.292	12.3	20.1	32.4	46.0	-13.6
1.780	12.2	20.2	32.4	46.0	-13.6
2.083	12.1	20.2	32.3	46.0	-13.7
3.414	11.8	20.3	32.1	46.0	-13.9
1.728	11.9	20.2	32.1	46.0	-13.9
4.981	11.6	20.4	32.0	46.0	-14.0
3.724	11.6	20.3	31.9	46.0	-14.1
4.384	11.5	20.4	31.9	46.0	-14.1
1.911	11.6	20.2	31.8	46.0	-14.2
0.851	11.7	20.0	31.7	46.0	-14.3
0.601	11.7	20.0	31.7	46.0	-14.3

## CONCLUSION

Pass



Tested By

# AC POWERLINE CONDUCTED EMISSIONS

EUT:	Crescent Dunes (Rev D)	Work Order:	INTE5628
Serial Number:	Board 701192	Date:	10/02/2015
Customer:	Intel Corporation	Temperature:	23.1°C
Attendees:	Mark Briggs	Relative Humidity:	42.2%
Customer Project:	None	Bar. Pressure:	1022.7 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	INTE5628-1

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

## TEST PARAMETERS

Run #:	3	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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## COMMENTS

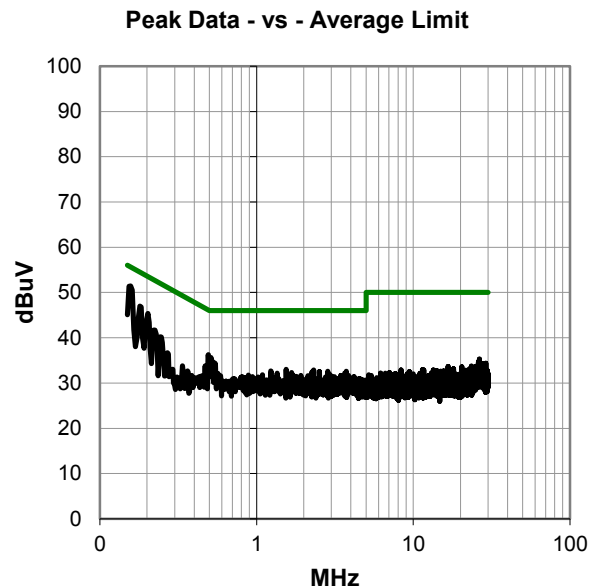
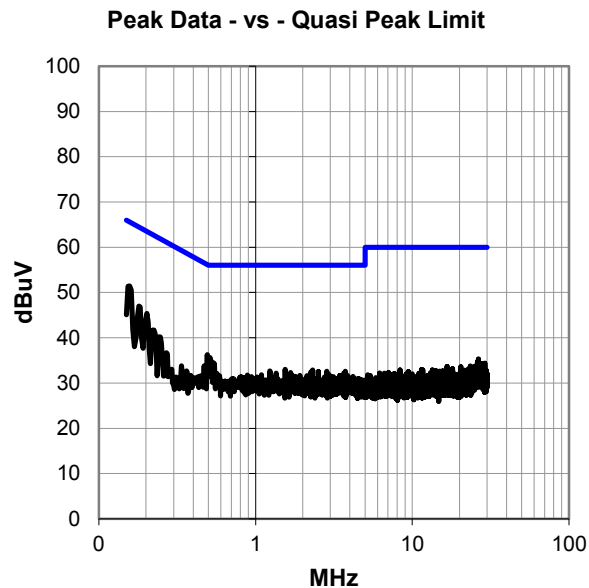
None

## EUT OPERATING MODES

Continuous Tx BTLE, Mid channel, 2440MHz

## DEVIATIONS FROM TEST STANDARD

None





# AC POWERLINE CONDUCTED EMISSIONS

## RESULTS - Run #3

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.157	31.2	20.3	51.5	65.6	-14.1
0.180	26.9	20.1	47.0	64.5	-17.5
0.202	25.3	20.1	45.4	63.5	-18.1
0.493	16.3	20.0	36.3	56.1	-19.8
0.512	15.6	20.0	35.6	56.0	-20.4
0.221	21.6	20.1	41.7	62.8	-21.1
0.542	14.4	20.0	34.4	56.0	-21.6
0.243	20.1	20.1	40.2	62.0	-21.8
0.471	13.8	20.0	33.8	56.5	-22.7
1.545	12.8	20.2	33.0	56.0	-23.0
2.310	12.6	20.3	32.9	56.0	-23.1
1.232	12.6	20.1	32.7	56.0	-23.3
3.746	12.3	20.3	32.6	56.0	-23.4
2.851	12.3	20.3	32.6	56.0	-23.4
2.519	12.2	20.3	32.5	56.0	-23.5
2.262	12.2	20.3	32.5	56.0	-23.5
1.676	12.1	20.2	32.3	56.0	-23.7
3.661	11.9	20.3	32.2	56.0	-23.8
1.351	12.1	20.1	32.2	56.0	-23.8
0.568	12.1	20.0	32.1	56.0	-23.9
2.941	11.5	20.3	31.8	56.0	-24.2
1.090	11.7	20.1	31.8	56.0	-24.2
0.885	11.7	20.1	31.8	56.0	-24.2
1.709	11.5	20.2	31.7	56.0	-24.3
1.922	11.5	20.2	31.7	56.0	-24.3
3.452	11.4	20.3	31.7	56.0	-24.3

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.157	31.2	20.3	51.5	55.6	-4.1
0.180	26.9	20.1	47.0	54.5	-7.5
0.202	25.3	20.1	45.4	53.5	-8.1
0.493	16.3	20.0	36.3	46.1	-9.8
0.512	15.6	20.0	35.6	46.0	-10.4
0.221	21.6	20.1	41.7	52.8	-11.1
0.542	14.4	20.0	34.4	46.0	-11.6
0.243	20.1	20.1	40.2	52.0	-11.8
0.471	13.8	20.0	33.8	46.5	-12.7
1.545	12.8	20.2	33.0	46.0	-13.0
2.310	12.6	20.3	32.9	46.0	-13.1
1.232	12.6	20.1	32.7	46.0	-13.3
3.746	12.3	20.3	32.6	46.0	-13.4
2.851	12.3	20.3	32.6	46.0	-13.4
2.519	12.2	20.3	32.5	46.0	-13.5
2.262	12.2	20.3	32.5	46.0	-13.5
1.676	12.1	20.2	32.3	46.0	-13.7
3.661	11.9	20.3	32.2	46.0	-13.8
1.351	12.1	20.1	32.2	46.0	-13.8
0.568	12.1	20.0	32.1	46.0	-13.9
2.941	11.5	20.3	31.8	46.0	-14.2
1.090	11.7	20.1	31.8	46.0	-14.2
0.885	11.7	20.1	31.8	46.0	-14.2
1.709	11.5	20.2	31.7	46.0	-14.3
1.922	11.5	20.2	31.7	46.0	-14.3
3.452	11.4	20.3	31.7	46.0	-14.3

## CONCLUSION

Pass



Tested By

# AC POWERLINE CONDUCTED EMISSIONS

EUT:	Crescent Dunes (Rev D)	Work Order:	INTE5628
Serial Number:	Board 701192	Date:	10/02/2015
Customer:	Intel Corporation	Temperature:	23.1°C
Attendees:	Mark Briggs	Relative Humidity:	42.2%
Customer Project:	None	Bar. Pressure:	1022.7 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	INTE5628-1

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

## TEST PARAMETERS

Run #:	4	Line:	High Line	Add. Ext. Attenuation (dB):	0
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## COMMENTS

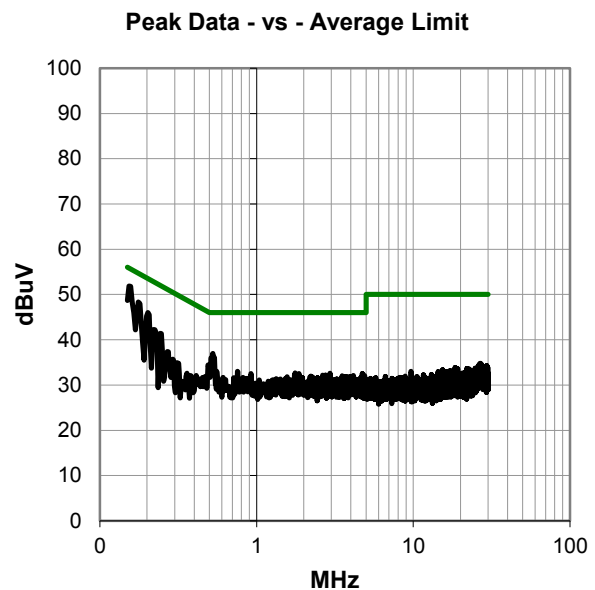
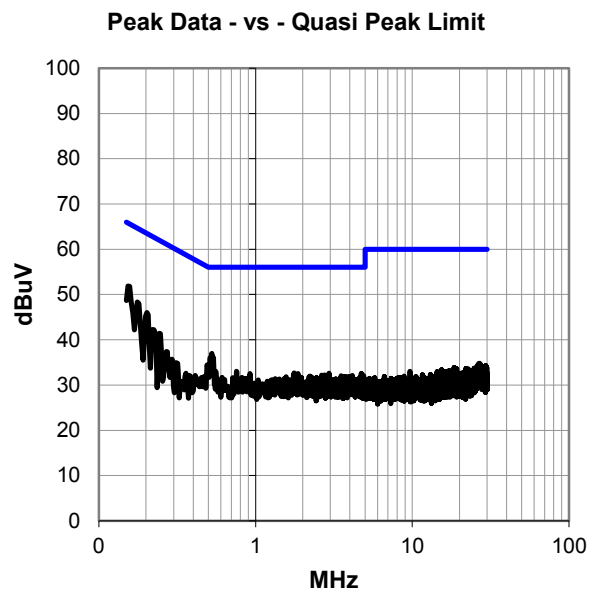
None
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## EUT OPERATING MODES

Continuous Tx BTLE, Mid channel, 2440MHz
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## DEVIATIONS FROM TEST STANDARD

None
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# AC POWERLINE CONDUCTED EMISSIONS

## RESULTS - Run #4

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.154	31.6	20.3	51.9	65.8	-13.9
0.176	28.2	20.1	48.3	64.7	-16.3
0.202	25.9	20.1	46.0	63.5	-17.5
0.527	17.0	20.0	37.0	56.0	-19.0
0.534	16.3	20.0	36.3	56.0	-19.7
0.221	22.2	20.1	42.3	62.8	-20.5
0.243	21.3	20.1	41.4	62.0	-20.6
0.557	13.0	20.0	33.0	56.0	-23.0
0.754	13.0	20.0	33.0	56.0	-23.0
1.762	12.5	20.2	32.7	56.0	-23.3
2.948	12.3	20.3	32.6	56.0	-23.4
0.922	12.4	20.1	32.5	56.0	-23.5
1.862	12.3	20.2	32.5	56.0	-23.5
4.728	12.1	20.4	32.5	56.0	-23.5
0.269	17.4	20.0	37.4	61.1	-23.7
2.646	11.9	20.3	32.2	56.0	-23.8
2.754	11.9	20.3	32.2	56.0	-23.8
4.157	11.7	20.4	32.1	56.0	-23.9
4.899	11.7	20.4	32.1	56.0	-23.9
3.511	11.7	20.3	32.0	56.0	-24.0
2.217	11.7	20.2	31.9	56.0	-24.1
3.724	11.6	20.3	31.9	56.0	-24.1
3.959	11.5	20.4	31.9	56.0	-24.1
1.564	11.6	20.2	31.8	56.0	-24.2
4.679	11.4	20.4	31.8	56.0	-24.2
2.273	11.5	20.3	31.8	56.0	-24.2

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.154	31.6	20.3	51.9	55.8	-3.9
0.176	28.2	20.1	48.3	54.7	-6.3
0.202	25.9	20.1	46.0	53.5	-7.5
0.527	17.0	20.0	37.0	46.0	-9.0
0.534	16.3	20.0	36.3	46.0	-9.7
0.221	22.2	20.1	42.3	52.8	-10.5
0.243	21.3	20.1	41.4	52.0	-10.6
0.557	13.0	20.0	33.0	46.0	-13.0
0.754	13.0	20.0	33.0	46.0	-13.0
1.762	12.5	20.2	32.7	46.0	-13.3
2.948	12.3	20.3	32.6	46.0	-13.4
0.922	12.4	20.1	32.5	46.0	-13.5
1.862	12.3	20.2	32.5	46.0	-13.5
4.728	12.1	20.4	32.5	46.0	-13.5
0.269	17.4	20.0	37.4	51.1	-13.7
2.646	11.9	20.3	32.2	46.0	-13.8
2.754	11.9	20.3	32.2	46.0	-13.8
4.157	11.7	20.4	32.1	46.0	-13.9
4.899	11.7	20.4	32.1	46.0	-13.9
3.511	11.7	20.3	32.0	46.0	-14.0
2.217	11.7	20.2	31.9	46.0	-14.1
3.724	11.6	20.3	31.9	46.0	-14.1
3.959	11.5	20.4	31.9	46.0	-14.1
1.564	11.6	20.2	31.8	46.0	-14.2
4.679	11.4	20.4	31.8	46.0	-14.2
2.273	11.5	20.3	31.8	46.0	-14.2

## CONCLUSION

Pass



Tested By

# AC POWERLINE CONDUCTED EMISSIONS

EUT:	Crescent Dunes (Rev D)	Work Order:	INTE5628
Serial Number:	Board 701192	Date:	10/02/2015
Customer:	Intel Corporation	Temperature:	23.1°C
Attendees:	Mark Briggs	Relative Humidity:	42.2%
Customer Project:	None	Bar. Pressure:	1022.7 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	INTE5628-1

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

## TEST PARAMETERS

Run #:	6	Line:	High Line	Add. Ext. Attenuation (dB):	0
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## COMMENTS

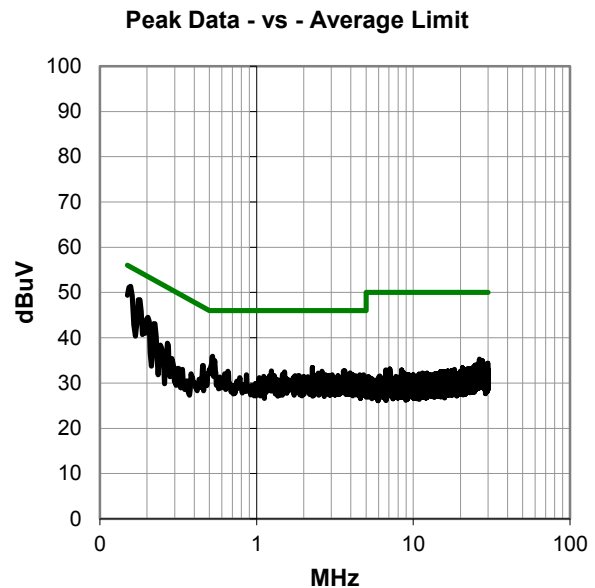
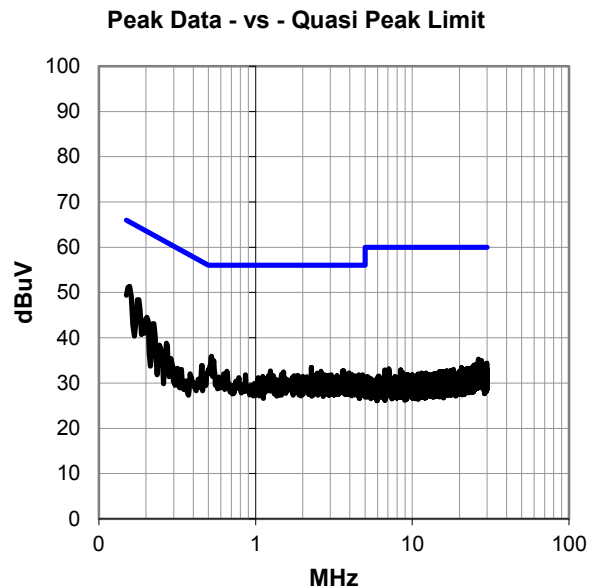
None
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## EUT OPERATING MODES

Continuous Tx BTLE, High channel, 2480MHz
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## DEVIATIONS FROM TEST STANDARD

None
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# AC POWERLINE CONDUCTED EMISSIONS

## RESULTS - Run #6

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.157	31.1	20.3	51.4	65.6	-14.2
0.176	28.3	20.1	48.4	64.7	-16.2
0.202	24.4	20.1	44.5	63.5	-19.0
0.221	23.0	20.1	43.1	62.8	-19.7
0.523	15.9	20.0	35.9	56.0	-20.1
0.542	14.9	20.0	34.9	56.0	-21.1
0.269	18.8	20.0	38.8	61.1	-22.3
2.273	13.2	20.3	33.5	56.0	-22.5
0.452	13.9	20.0	33.9	56.8	-22.9
3.661	12.4	20.3	32.7	56.0	-23.3
1.247	12.6	20.1	32.7	56.0	-23.3
3.590	12.4	20.3	32.7	56.0	-23.3
0.657	12.6	20.0	32.6	56.0	-23.4
2.612	12.3	20.3	32.6	56.0	-23.4
1.512	12.3	20.2	32.5	56.0	-23.5
0.243	18.3	20.1	38.4	62.0	-23.6
3.963	11.9	20.4	32.3	56.0	-23.7
2.467	11.9	20.3	32.2	56.0	-23.8
0.628	12.0	20.0	32.0	56.0	-24.0
1.467	11.8	20.1	31.9	56.0	-24.1
4.030	11.5	20.4	31.9	56.0	-24.1
0.863	11.8	20.1	31.9	56.0	-24.1
2.747	11.5	20.3	31.8	56.0	-24.2
3.034	11.5	20.3	31.8	56.0	-24.2
4.108	11.4	20.4	31.8	56.0	-24.2
4.564	11.4	20.4	31.8	56.0	-24.2

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.157	31.1	20.3	51.4	55.6	-4.2
0.176	28.3	20.1	48.4	54.7	-6.2
0.202	24.4	20.1	44.5	53.5	-9.0
0.221	23.0	20.1	43.1	52.8	-9.7
0.523	15.9	20.0	35.9	46.0	-10.1
0.542	14.9	20.0	34.9	46.0	-11.1
0.269	18.8	20.0	38.8	51.1	-12.3
2.273	13.2	20.3	33.5	46.0	-12.5
0.452	13.9	20.0	33.9	46.8	-12.9
3.661	12.4	20.3	32.7	46.0	-13.3
1.247	12.6	20.1	32.7	46.0	-13.3
3.590	12.4	20.3	32.7	46.0	-13.3
0.657	12.6	20.0	32.6	46.0	-13.4
2.612	12.3	20.3	32.6	46.0	-13.4
1.512	12.3	20.2	32.5	46.0	-13.5
0.243	18.3	20.1	38.4	52.0	-13.6
3.963	11.9	20.4	32.3	46.0	-13.7
2.467	11.9	20.3	32.2	46.0	-13.8
0.628	12.0	20.0	32.0	46.0	-14.0
1.467	11.8	20.1	31.9	46.0	-14.1
4.030	11.5	20.4	31.9	46.0	-14.1
0.863	11.8	20.1	31.9	46.0	-14.1
2.747	11.5	20.3	31.8	46.0	-14.2
3.034	11.5	20.3	31.8	46.0	-14.2
4.108	11.4	20.4	31.8	46.0	-14.2
4.564	11.4	20.4	31.8	46.0	-14.2

## CONCLUSION

Pass



Tested By

# AC POWERLINE CONDUCTED EMISSIONS

EUT:	Crescent Dunes (Rev D)	Work Order:	INTE5628
Serial Number:	Board 701192	Date:	10/02/2015
Customer:	Intel Corporation	Temperature:	23.1°C
Attendees:	Mark Briggs	Relative Humidity:	42.2%
Customer Project:	None	Bar. Pressure:	1022.7 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	110VAC/60Hz	Configuration:	INTE5628-1

## TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2013

## TEST PARAMETERS

Run #:	7	Line:	Neutral	Add. Ext. Attenuation (dB):	0
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## COMMENTS

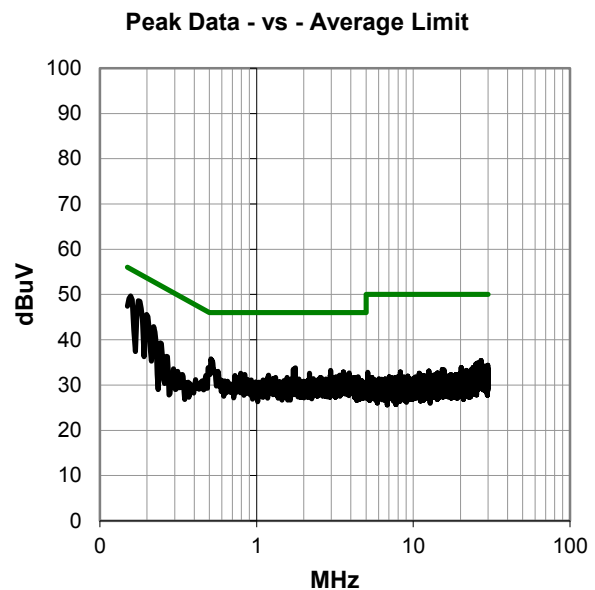
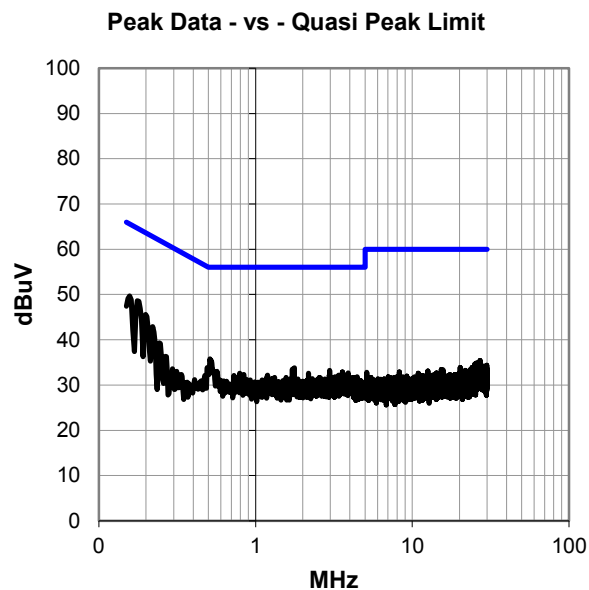
None
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## EUT OPERATING MODES

Continuous Tx BTLE, High channel, 2480MHz
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## DEVIATIONS FROM TEST STANDARD

None
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# AC POWERLINE CONDUCTED EMISSIONS

## RESULTS - Run #7

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.157	29.4	20.3	49.7	65.6	-15.9
0.176	28.5	20.1	48.6	64.7	-16.0
0.199	25.5	20.1	45.6	63.7	-18.1
0.221	22.8	20.1	42.9	62.8	-19.9
0.512	15.8	20.0	35.8	56.0	-20.2
1.769	13.6	20.2	33.8	56.0	-22.2
1.721	13.3	20.2	33.5	56.0	-22.5
0.243	19.2	20.1	39.3	62.0	-22.7
2.974	12.9	20.3	33.2	56.0	-22.8
0.568	13.0	20.0	33.0	56.0	-23.0
3.582	12.6	20.3	32.9	56.0	-23.1
3.896	12.3	20.4	32.7	56.0	-23.3
2.176	12.4	20.2	32.6	56.0	-23.4
0.792	12.6	20.0	32.6	56.0	-23.4
0.840	12.3	20.0	32.3	56.0	-23.7
3.698	11.9	20.3	32.2	56.0	-23.8
1.191	12.1	20.1	32.2	56.0	-23.8
3.396	11.9	20.3	32.2	56.0	-23.8
0.728	12.1	20.0	32.1	56.0	-23.9
3.213	11.5	20.3	31.8	56.0	-24.2
4.459	11.4	20.4	31.8	56.0	-24.2
0.743	11.7	20.0	31.7	56.0	-24.3
1.321	11.6	20.1	31.7	56.0	-24.3
1.568	11.5	20.2	31.7	56.0	-24.3
3.157	11.4	20.3	31.7	56.0	-24.3
4.351	11.3	20.4	31.7	56.0	-24.3

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.157	29.4	20.3	49.7	55.6	-5.9
0.176	28.5	20.1	48.6	54.7	-6.0
0.199	25.5	20.1	45.6	53.7	-8.1
0.221	22.8	20.1	42.9	52.8	-9.9
0.512	15.8	20.0	35.8	46.0	-10.2
1.769	13.6	20.2	33.8	46.0	-12.2
1.721	13.3	20.2	33.5	46.0	-12.5
0.243	19.2	20.1	39.3	52.0	-12.7
2.974	12.9	20.3	33.2	46.0	-12.8
0.568	13.0	20.0	33.0	46.0	-13.0
3.582	12.6	20.3	32.9	46.0	-13.1
3.896	12.3	20.4	32.7	46.0	-13.3
2.176	12.4	20.2	32.6	46.0	-13.4
0.792	12.6	20.0	32.6	46.0	-13.4
0.840	12.3	20.0	32.3	46.0	-13.7
3.698	11.9	20.3	32.2	46.0	-13.8
1.191	12.1	20.1	32.2	46.0	-13.8
3.396	11.9	20.3	32.2	46.0	-13.8
0.728	12.1	20.0	32.1	46.0	-13.9
3.213	11.5	20.3	31.8	46.0	-14.2
4.459	11.4	20.4	31.8	46.0	-14.2
0.743	11.7	20.0	31.7	46.0	-14.3
1.321	11.6	20.1	31.7	46.0	-14.3
1.568	11.5	20.2	31.7	46.0	-14.3
3.157	11.4	20.3	31.7	46.0	-14.3
4.351	11.3	20.4	31.7	46.0	-14.3

## CONCLUSION

Pass



Tested By



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 at 91% duty cycle, BTLE

## POWER SETTINGS INVESTIGATED

110VAC/60Hz

## CONFIGURATIONS INVESTIGATED

INTE5628 - 1

## FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz
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## 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
Filter - High Pass	Micro-Tronics	HPM50111	HFO	3/31/2015	12 mo
Attenuator	Coaxicom	3910-20	AXZ	5/24/2015	12 mo
Cable	ESM Cable Corp.	KMKM-72	EVY	11/9/2014	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	11/9/2014	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	4/16/2015	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	0 mo
Cable	None	Standard Gain Horns Cable	EVF	4/20/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	4/20/2015	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	0 mo
Cable	N/A	Double Ridge Horn Cables	EVB	4/16/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	4/16/2015	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	1/27/2014	24 mo
Cable	N/A	Bilog Cables	EVA	2/10/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	2/10/2015	12 mo
Antenna - Biconilog	EMCO	3141	AXE	8/29/2014	24 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2/10/2015	12 mo

## TEST DESCRIPTION

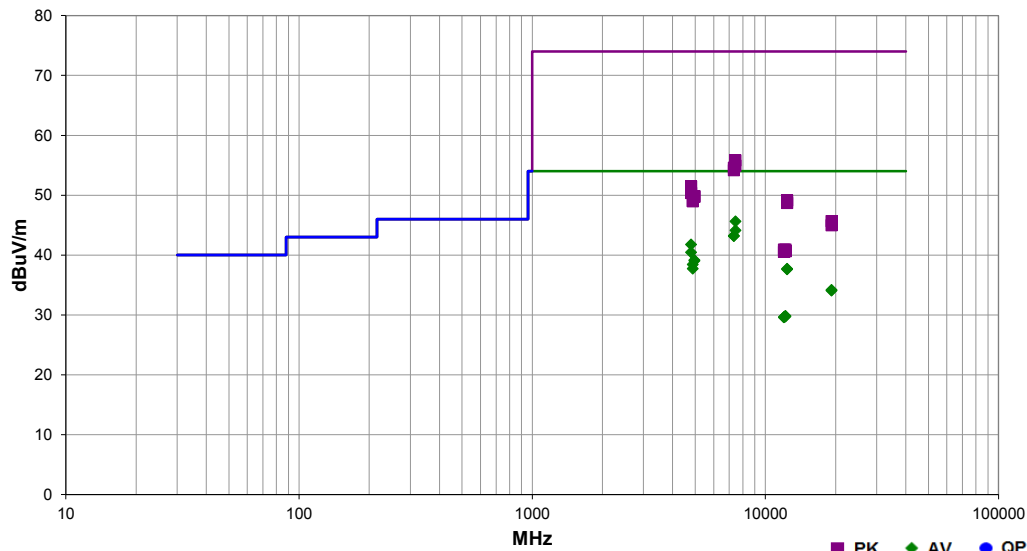
The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. Emissions falling within the restricted bands were compared to FCC 15.209 limits. Emissions outside of the restricted bands were compared to the out of band limit of FCC 15.247(d). Emissions from the EUT were maximized by rotating the EUT on a turntable 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.

The measurement analyzer was configured for a 1 MHz resolution bandwidth and a 3 MHz video bandwidth. A peak detector was used to compare the measurements to the peak emissions limit. An RMS detector was used to compare the measurements to the average emissions limit. The EUT was operating with a 91% duty cycle. The RMS data was corrected with a duty cycle correction factor (DCCF) of 0.4 dB: DCCF (dB) = 10\*log(duty cycle).

Work Order:	INTE5628	Date:	09/29/15		
Project:	None	Temperature:	21 °C		
Job Site:	EV01	Humidity:	37% RH		
Serial Number:	Board 701192	Barometric Pres.:	1012.7 mbar		
				Tested by:	Cole Ghizzone, Brandon Hobbs
EUT: Crescent Dunes (Rev D)					
Configuration: 1					
Customer: Intel Corporation					
Attendees: Mark Briggs					
EUT Power: 110VAC/60Hz					
Operating Mode:		Transmitting at 91% duty cycle BTLE, see data comments for channel and frequency			
Deviations:		None			
Comments:		EUT horizontal			


Test Specifications	FCC 15.247:2015	Test Method	ANSI C63.10:2013
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Run #	8	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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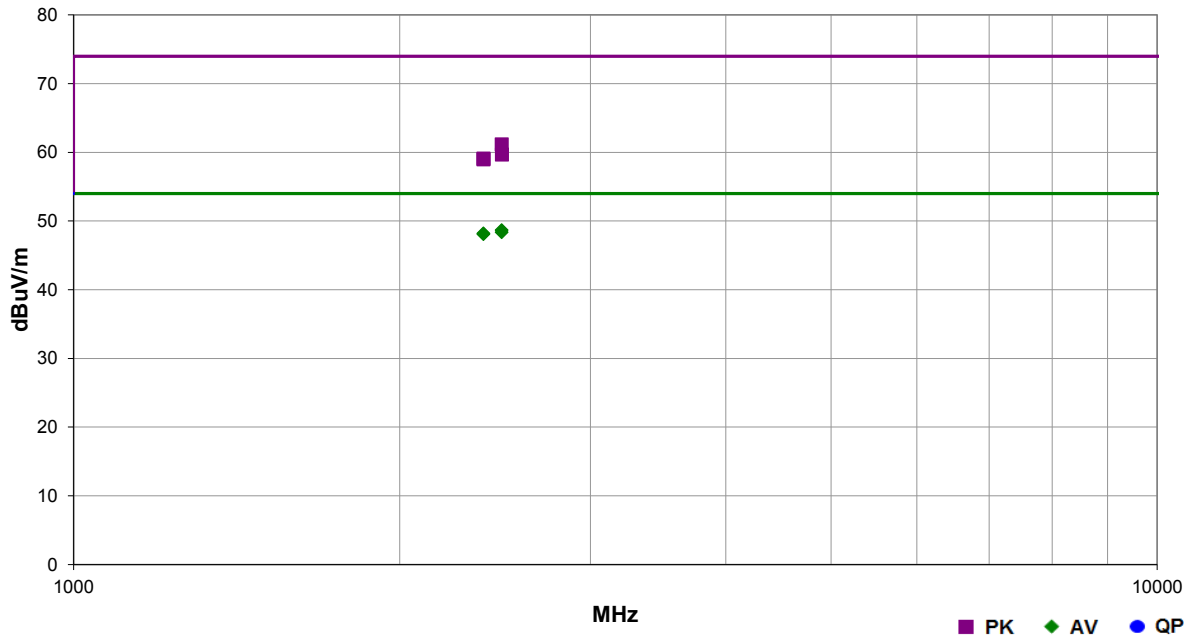
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Duty Cycle Correction Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7440.470	29.8	15.4	1.2	276.0	3.0	0.0	Vert	AV	0.4	45.6	54.0	-8.4	High channel 2480MHz
7440.300	28.3	15.4	4.0	287.0	3.0	0.0	Horz	AV	0.4	44.1	54.0	-9.9	High channel 2480MHz
7326.525	27.6	15.2	1.0	52.0	3.0	0.0	Vert	AV	0.4	43.2	54.0	-10.8	Mid channel, 2440MHz
7324.710	27.6	15.2	1.0	288.0	3.0	0.0	Horz	AV	0.4	43.2	54.0	-10.8	Mid channel, 2440MHz
4803.892	34.0	7.4	1.0	22.0	3.0	0.0	Horz	AV	0.4	41.8	54.0	-12.2	Low channel, 2402MHz
4803.958	32.7	7.4	1.1	354.0	3.0	0.0	Vert	AV	0.4	40.5	54.0	-13.5	Low channel, 2402MHz
4959.875	31.2	7.5	1.0	91.0	3.0	0.0	Vert	AV	0.4	39.1	54.0	-14.9	High channel 2480MHz
4960.080	31.1	7.5	1.0	338.0	3.0	0.0	Horz	AV	0.4	39.0	54.0	-15.0	High channel 2480MHz
4879.860	30.6	7.4	1.1	352.0	3.0	0.0	Vert	AV	0.4	38.4	54.0	-15.6	Mid channel, 2440MHz
4880.050	29.9	7.4	1.0	82.0	3.0	0.0	Horz	AV	0.4	37.7	54.0	-16.3	Mid channel, 2440MHz
12400.040	28.5	8.8	1.0	144.0	3.0	0.0	Horz	AV	0.4	37.7	54.0	-16.3	High channel 2480MHz
12400.360	28.4	8.8	1.0	139.0	3.0	0.0	Vert	AV	0.4	37.6	54.0	-16.4	High channel 2480MHz
7439.315	40.4	15.4	1.2	276.0	3.0	0.0	Vert	PK	0.0	55.8	74.0	-18.2	High channel 2480MHz
7439.360	39.5	15.4	4.0	287.0	3.0	0.0	Horz	PK	0.0	54.9	74.0	-19.1	High channel 2480MHz
7325.550	39.4	15.2	1.0	52.0	3.0	0.0	Vert	PK	0.0	54.6	74.0	-19.4	Mid channel, 2440MHz
7324.895	39.0	15.2	1.0	288.0	3.0	0.0	Horz	PK	0.0	54.2	74.0	-19.8	Mid channel, 2440MHz
19216.200	34.4	-0.6	1.6	292.0	3.0	0.0	Vert	AV	0.4	34.2	54.0	-19.8	Low channel, 2402MHz
19214.710	34.3	-0.6	1.6	75.0	3.0	0.0	Horz	AV	0.4	34.1	54.0	-19.9	Low channel, 2402MHz
4803.450	44.1	7.4	1.0	22.0	3.0	0.0	Horz	PK	0.0	51.5	74.0	-22.5	Low channel, 2402MHz
4803.767	43.0	7.4	1.1	354.0	3.0	0.0	Vert	PK	0.0	50.4	74.0	-23.6	Low channel, 2402MHz
4959.775	42.3	7.5	1.0	338.0	3.0	0.0	Horz	PK	0.0	49.8	74.0	-24.2	High channel 2480MHz
4960.295	42.2	7.5	1.0	91.0	3.0	0.0	Vert	PK	0.0	49.7	74.0	-24.3	High channel 2480MHz
12199.950	28.3	1.1	1.0	199.0	3.0	0.0	Horz	AV	0.4	29.8	54.0	-24.2	Mid channel, 2440MHz
12200.110	28.2	1.1	1.0	271.0	3.0	0.0	Vert	AV	0.4	29.7	54.0	-24.3	Mid channel, 2440MHz
12009.220	29.1	0.1	1.0	256.0	3.0	0.0	Horz	AV	0.4	29.6	54.0	-24.4	Low channel, 2402MHz
12008.790	29.1	0.1	1.0	39.0	3.0	0.0	Vert	AV	0.4	29.6	54.0	-24.4	Low channel, 2402MHz
12400.730	40.3	8.8	1.0	144.0	3.0	0.0	Horz	PK	0.0	49.1	74.0	-24.9	High channel 2480MHz
4879.910	41.6	7.4	1.1	352.0	3.0	0.0	Vert	PK	0.0	49.0	74.0	-25.0	Mid channel, 2440MHz
4879.465	41.6	7.4	1.0	82.0	3.0	0.0	Horz	PK	0.0	49.0	74.0	-25.0	Mid channel, 2440MHz
12400.680	39.9	8.8	1.0	139.0	3.0	0.0	Vert	PK	0.0	48.7	74.0	-25.3	High channel 2480MHz
19215.100	46.3	-0.6	1.6	292.0	3.0	0.0	Vert	PK	0.0	45.7	74.0	-28.3	Low channel, 2402MHz
19216.010	45.6	-0.6	1.6	75.0	3.0	0.0	Horz	PK	0.0	45.0	74.0	-29.0	Low channel, 2402MHz
12199.520	39.8	1.1	1.0	271.0	3.0	0.0	Vert	PK	0.0	40.9	74.0	-33.1	Mid channel, 2440MHz
12009.250	40.8	0.1	1.0	39.0	3.0	0.0	Vert	PK	0.0	40.9	74.0	-33.1	Low channel, 2402MHz
12201.450	39.5	1.1	1.0	199.0	3.0	0.0	Horz	PK	0.0	40.6	74.0	-33.4	Mid channel, 2440MHz
12010.640	40.4	0.1	1.0	256.0	3.0	0.0	Horz	PK	0.0	40.5	74.0	-33.5	Low channel, 2402MHz

## SPURIOUS RADIATED EMISSIONS

Work Order:	INTE5628	Date:	09/29/15		
Project:	None	Temperature:	21 °C		
Job Site:	EV01	Humidity:	37% RH		
Serial Number:	Board 701192	Barometric Pres.:	1012.7 mbar	Tested by:	Cole Ghizzone, Brandon Hobbs
EUT:	Crescent Dunes (Rev D)				
Configuration:	1				
Customer:	Intel Corporation				
Attendees:	Mark Briggs				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at 91% duty cycle BTLE, see data comments for channel and frequency				
Deviations:	None				
Comments:	EUT horizontal				

Test Specifications	Test Method
FCC 15.247:2015	ANSI C63.10:2013

Run #	10	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Duty Cycle Correction Factor (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2484.122	31.3	-3.0	1.0	18.0	3.0	20.0	Horz	AV	0.4	48.7	54.0	-5.3	High channel 2480MHz
2484.200	31.0	-3.0	1.0	336.0	3.0	20.0	Vert	AV	0.4	48.4	54.0	-5.6	High channel 2480MHz
2389.513	31.1	-3.3	1.0	23.0	3.0	20.0	Horz	AV	0.4	48.2	54.0	-5.8	Low channel, 2402MHz
2389.377	31.0	-3.3	2.4	333.0	3.0	20.0	Vert	AV	0.4	48.1	54.0	-5.9	Low channel, 2402MHz
2484.048	44.2	-3.0	1.0	18.0	3.0	20.0	Horz	PK	0.0	61.2	74.0	-12.8	High channel 2480MHz
2484.600	42.7	-3.0	1.0	336.0	3.0	20.0	Vert	PK	0.0	59.7	74.0	-14.3	High channel 2480MHz
2389.808	42.4	-3.3	1.0	23.0	3.0	20.0	Horz	PK	0.0	59.1	74.0	-14.9	Low channel, 2402MHz
2389.525	42.3	-3.3	2.4	333.0	3.0	20.0	Vert	PK	0.0	59.0	74.0	-15.0	Low channel, 2402MHz

# 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 (mos)
Cable	N/A	Double Ridge Horn Cables	EVB	4/16/2015	12
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	1/27/2014	24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2/10/2015	12

## TEST DESCRIPTION

The spurious RF 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 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.

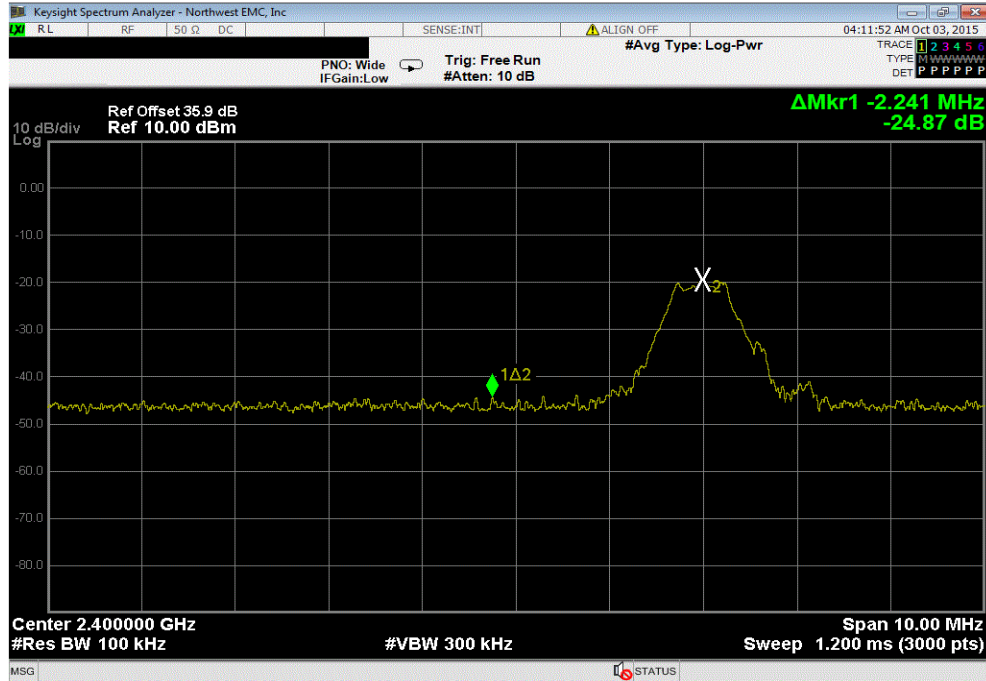
The spectrum was scanned below the lower band edge and above the higher band edge.

# BAND EDGE COMPLIANCE

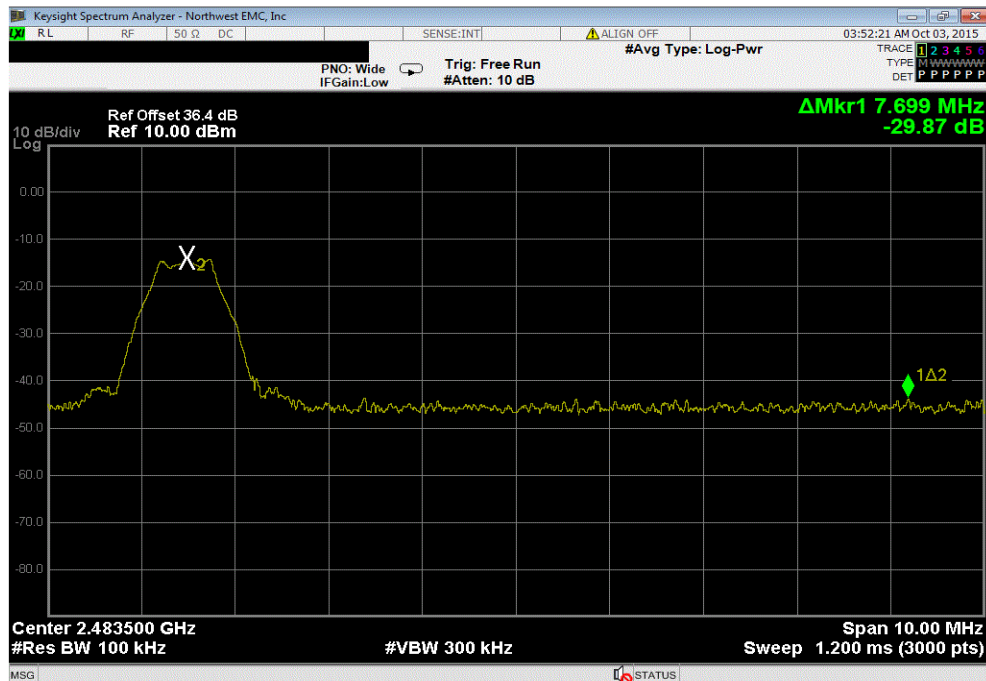
EUT: Crescent Dunes (Rev D)		Work Order: INTE5628		
Serial Number: Board 701192		Date: 10/02/15		
Customer: Intel Corporation		Temperature: 22.7°C		
Attendees: Mark Briggs		Humidity: 42%		
Project: None		Barometric Pres.: 1024.5		
Tested by: Brandon Hobbs	Power: 110VAC/60Hz	Job Site: EV01		
TEST SPECIFICATIONS		Test Method		
FCC 15.247:2015		ANSI C63.10:2013		
COMMENTS				
The EUT is in the worst case orientation while using the worst case antenna polarity. This was used to determine the highest output level. The reference level offset was used to normalize against the radiated power measurements by accounting for the associated antenna and cable factors.				
DEVIATIONS FROM TEST STANDARD				
None				
Configuration #	1	Signature 		
		Value (dBc)	Limit ≤ (dBc) Result	
BTLE	Low Channel, 2402 MHz	-24.87	-20	Pass
	High Channel, 2480 MHz	-29.87	-20	Pass

# BAND EDGE COMPLIANCE

BTLE, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-24.87	-20	Pass



BTLE, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-29.87	-20	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 (mos)
Cable	N/A	Double Ridge Horn Cables	EVB	4/16/2015	12
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	1/27/2014	24
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2/10/2015	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.


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

The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum. The duty cycle was measured radiated in the RF chamber.

The test software provided for operation in a fixed, single channel mode allows the EUT to operate continuously at the values shown in the data.

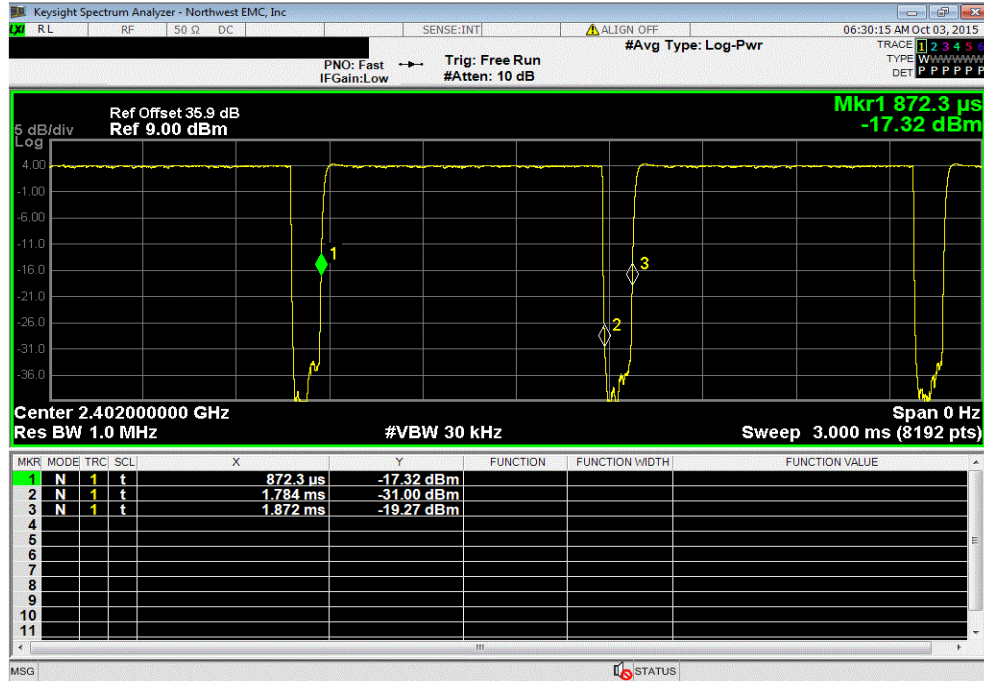


## DUTY CYCLE

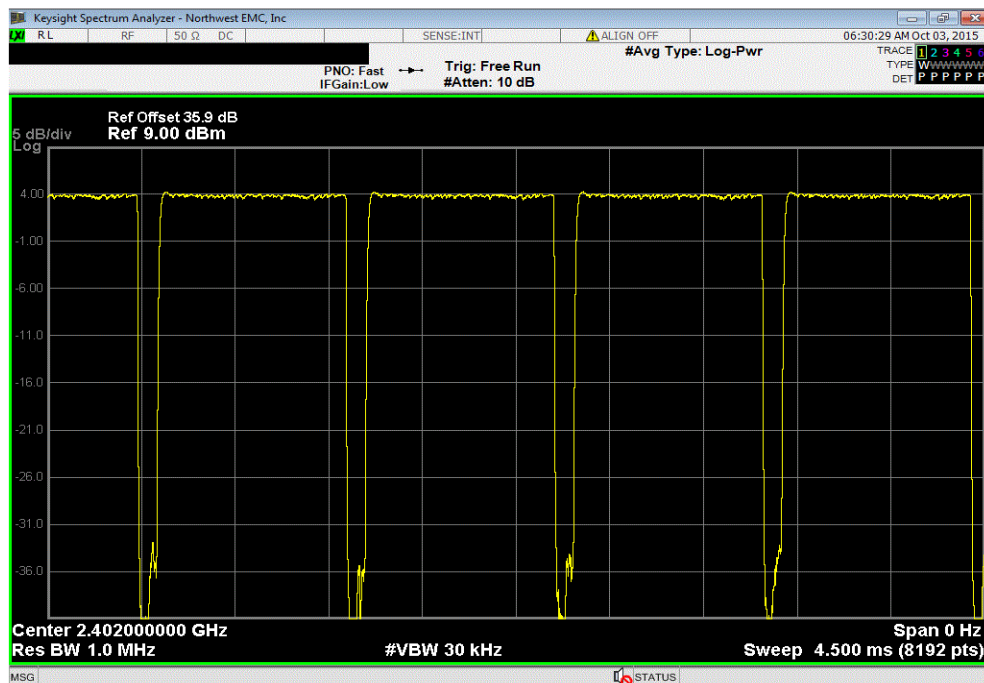
EUT: Crescent Dunes (Rev D)			Work Order: INTE5628				
Serial Number: Board 701192			Date: 10/02/15				
Customer: Intel Corporation			Temperature: 22.7°C				
Attendees: Mark Briggs			Humidity: 42%				
Project: None			Barometric Pres.: 1024.5				
Tested by: Brandon Hobbs		Power: 110VAC/60Hz	Job Site: EV01				
TEST SPECIFICATIONS			Test Method				
FCC 15.247:2015			ANSI C63.10:2013				
COMMENTS							
The EUT is in the worst case orientation while using the worst case antenna polarity. This was used to determine the highest output level. The reference level offset was used to normalize against the radiated power measurements by accounting for the associated antenna and cable factors.							
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #	1						
		Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
BTLE							
	Low Channel, 2402 MHz	911.775 us	1 ms	1	91.2	N/A	N/A
	Low Channel, 2402 MHz	N/A	N/A	5	N/A	N/A	N/A
	Mid Channel, 2440 MHz	904.643 us	998.043 us	1	90.6	N/A	N/A
	Mid Channel, 2440 MHz	N/A	N/A	6	N/A	N/A	N/A
	High Channel, 2480 MHz	913.64 us	1.005 ms	1	91	N/A	N/A
	High Channel, 2480 MHz	N/A	N/A	6	N/A	N/A	N/A

# DUTY CYCLE

BTLE, Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
911.775 us	1 ms	1	91.2	N/A	N/A	

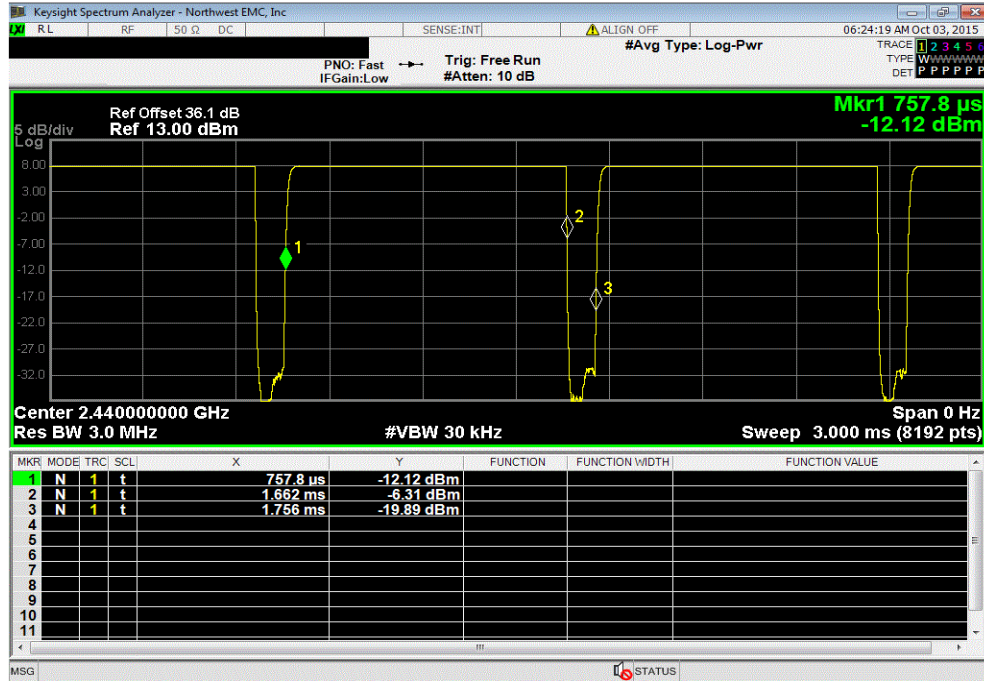


BTLE, Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	5	N/A	N/A	N/A	

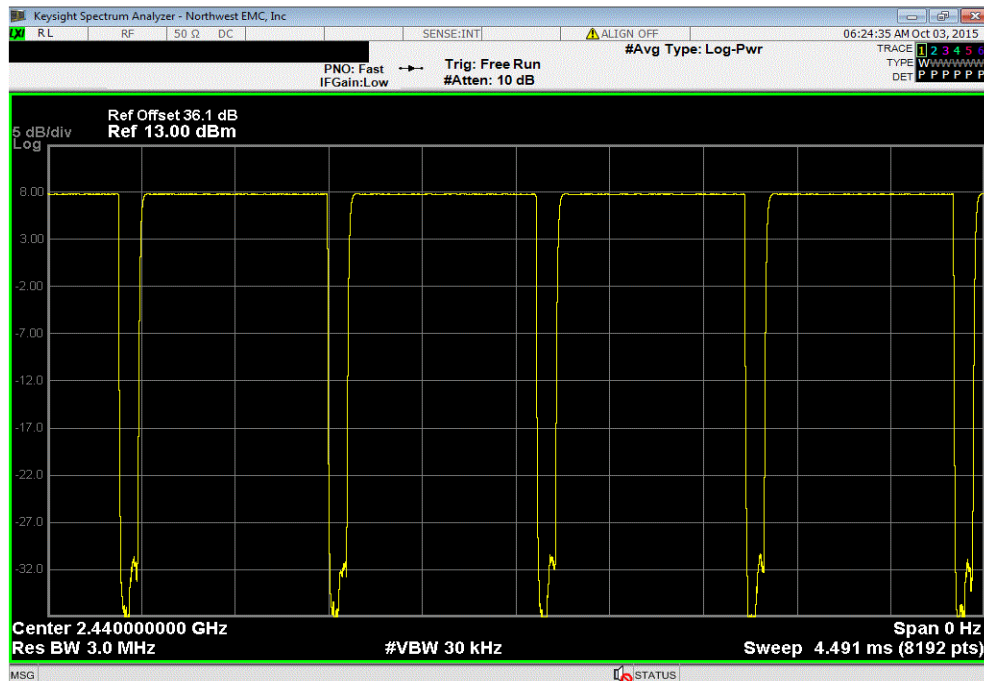


# DUTY CYCLE

BTLE, Mid Channel, 2440 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
904.643 us	998.043 us	1	90.6	N/A	N/A	

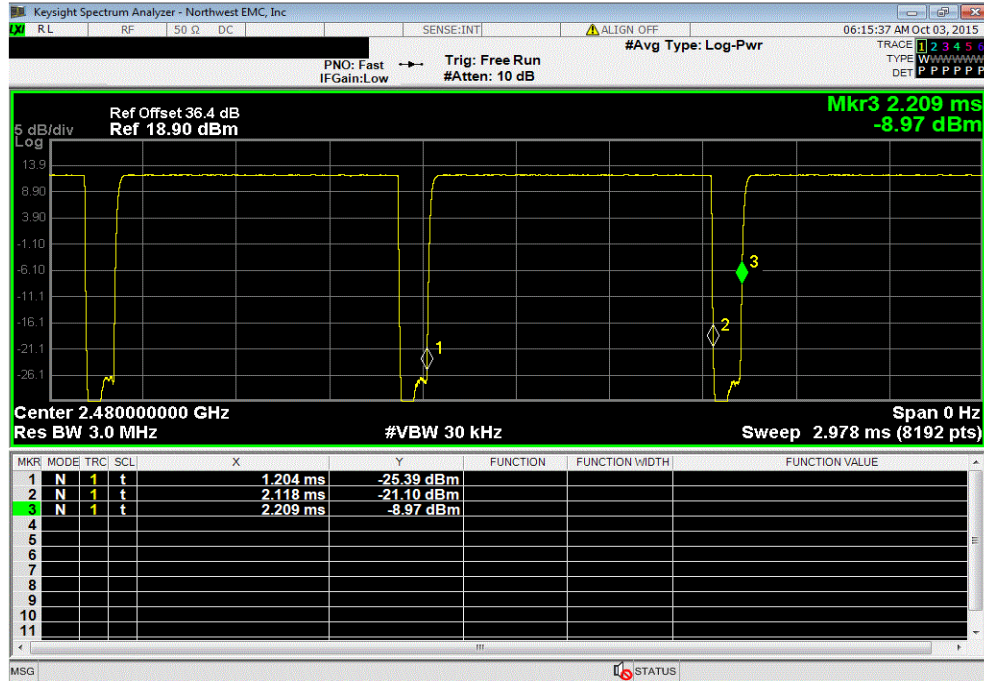


BTLE, Mid Channel, 2440 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	6	N/A	N/A	N/A	

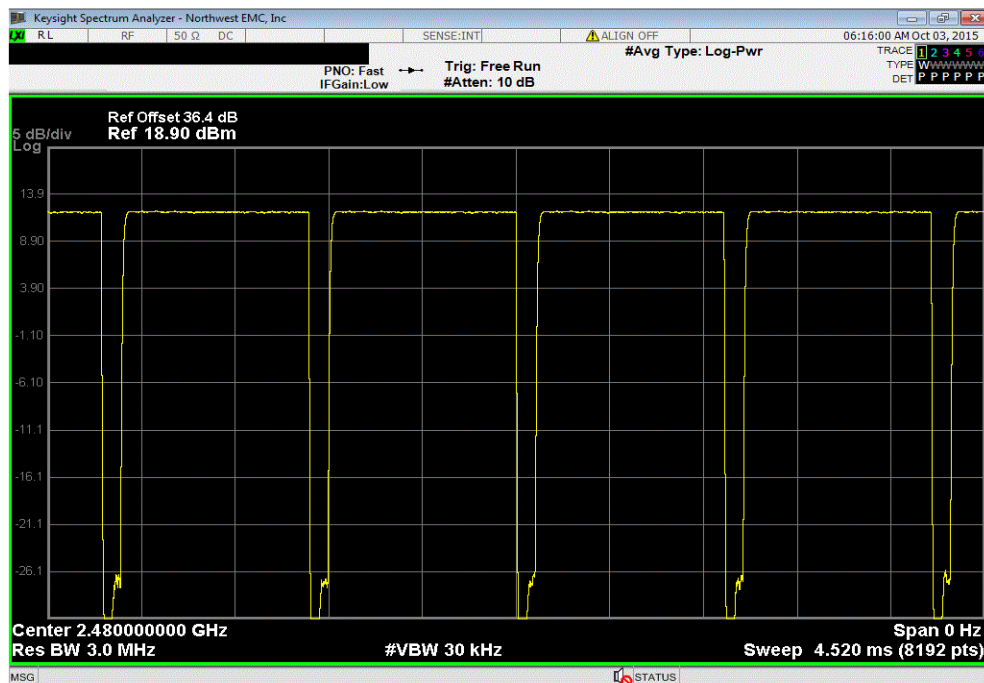


# DUTY CYCLE

BTLE, High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
913.64 us	1.005 ms	1	91	N/A	N/A	



BTLE, High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results	
N/A	N/A	6	N/A	N/A	N/A	



# 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 (mos)
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	1/27/2014	24
Cable	N/A	Double Ridge Horn Cables	EVB	4/16/2015	12
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2/10/2015	12

## TEST DESCRIPTION

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth.

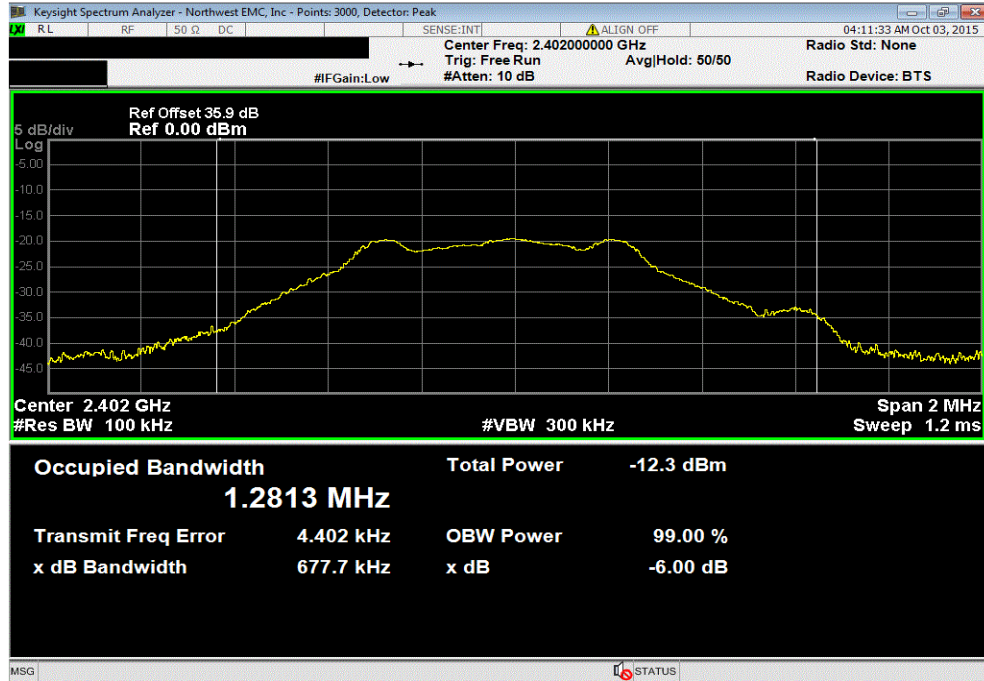
The EUT was set to low, medium and high transmit frequencies. The measurement was made in a radiated configuration in a semi-anechoic chamber with the fundamental of the carrier full maximized for its highest radiated power. The EUT was transmitting at the data rate(s) listed in the datasheet.

# OCCUPIED BANDWIDTH

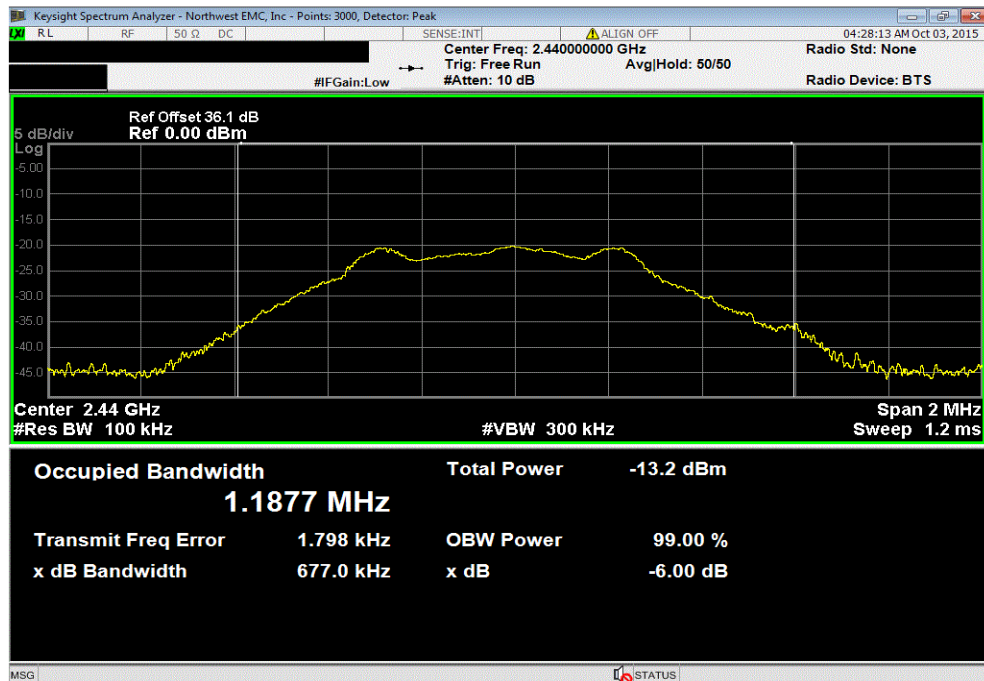
EUT: Crescent Dunes (Rev D)		Work Order: INTE5628	
Serial Number: Board 701192		Date: 10/02/15	
Customer: Intel Corporation		Temperature: 22.7°C	
Attendees: Mark Briggs		Humidity: 42%	
Project: None		Barometric Pres.: 1024.5	
Tested by: Brandon Hobbs		Power: 110VAC/60Hz	
		Job Site: EV01	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2015		ANSI C63.10:2013	
COMMENTS			
The EUT is in the worst case orientation while using the worst case antenna polarity. This was used to determine the highest output level. The reference level offset was used to normalize against the radiated power measurements by accounting for the associated antenna and cable factors.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature 	
		Value	Limit (±) Result
BTLE			
Low Channel, 2402 MHz		677.665 kHz	500 kHz Pass
Mid Channel, 2440 MHz		677.018 kHz	500 kHz Pass
High Channel, 2480 MHz		710.088 kHz	500 kHz Pass

# OCCUPIED BANDWIDTH

BTLE, Low Channel, 2402 MHz						
				Value	Limit (≥)	Result
				677.665 kHz	500 kHz	Pass



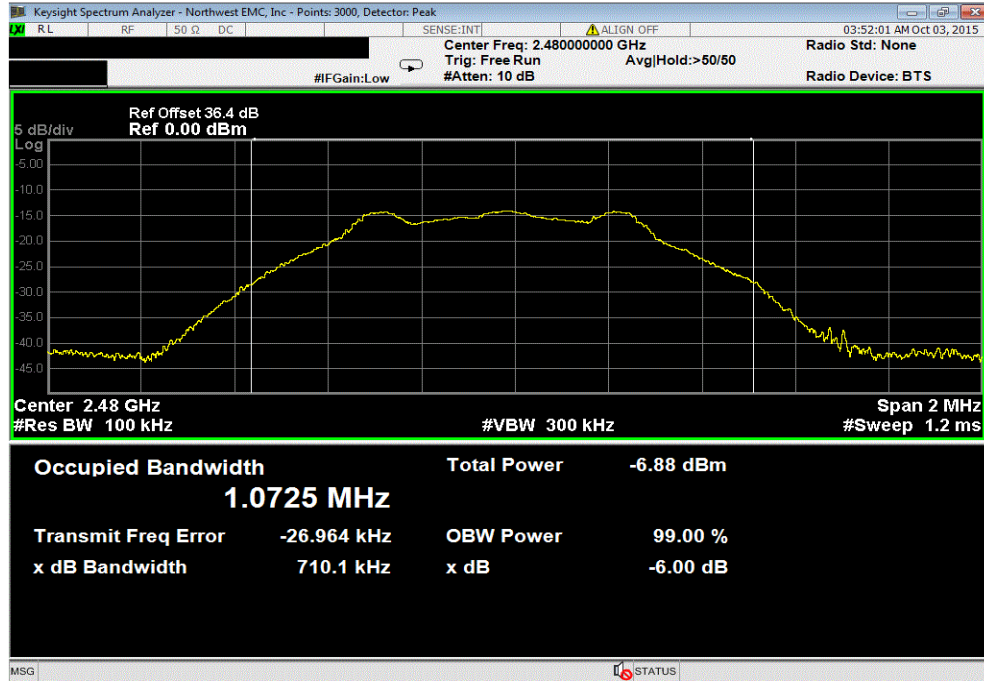
BTLE, Mid Channel, 2440 MHz						
				Value	Limit (≥)	Result
				677.018 kHz	500 kHz	Pass





# OCCUPIED BANDWIDTH

BTLE, High Channel, 2480 MHz						
				Value	Limit (≥)	Result
				710.088 kHz	500 kHz	Pass



## RADIATED 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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

### MODES OF OPERATION

Continuous Tx BTLE

### POWER SETTINGS INVESTIGATED

110VAC/60Hz

### CONFIGURATIONS INVESTIGATED

INTE5628 - 1

### FREQUENCY RANGE INVESTIGATED

Start Frequency	2390 MHz	Stop Frequency	2490 MHz
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### 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
Generator - Signal	Keysight	N5182B	TFX	4/16/2015	36 mo
Meter - Power	Gigatronics	8651A	SPM	5/25/2015	12 mo
Power Sensor	Gigatronics	80701A	SPL	5/25/2015	12 mo
Attenuator	S.M. Electronics	SA18N-06/SM4032	REE	10/20/2014	12 mo
Antenna - Double Ridge	EMCO	3115	AHC	6/13/2014	24 mo
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2/10/2015	12 mo
Cable	N/A	Double Ridge Horn Cables	EVB	4/16/2015	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	1/27/2014	24 mo

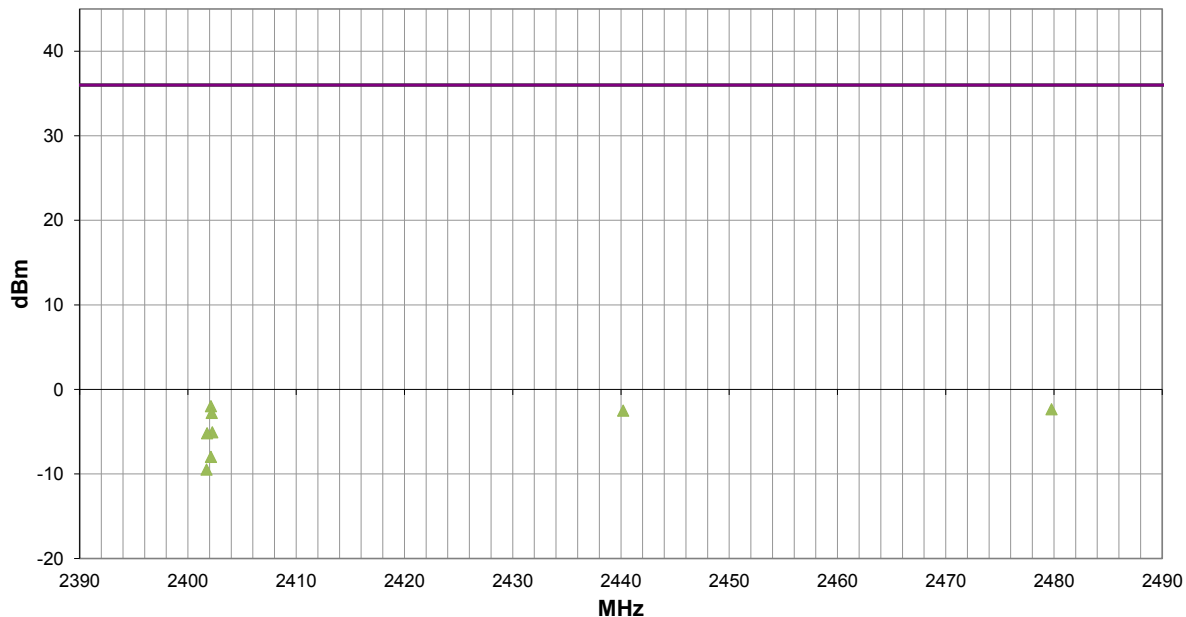
### TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium and high transmit frequencies. A field strength measurement was made of the fundamental with the carrier fully maximized for its highest radiated power. The final data was converted from field strength to a radiated power value using equation 5 found in ANSI C63.10:2013

<b>Work Order:</b>	INTE5628	<b>Date:</b>	10/02/15	
<b>Project:</b>	None	<b>Temperature:</b>	21.9 °C	
<b>Job Site:</b>	EV01	<b>Humidity:</b>	42% RH	
<b>Serial Number:</b>	Board 701192	<b>Barometric Pres.:</b>	1023 mbar	
<b>EUT:</b>	Crescent Dunes (Rev D)			
<b>Configuration:</b>	1			
<b>Customer:</b>	Intel Corporation			
<b>Attendees:</b>	Mark Briggs			
<b>EUT Power:</b>	110VAC/60Hz			
<b>Operating Mode:</b>	Continuous Tx BTLE			
<b>Deviations:</b>	None			
<b>Comments:</b>	Please Reference the data comments for EUT orientation, channel and frequency			

Test Specifications	Test Method
FCC 15.247:2015	ANSI C63.10:2013

Run #	27	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	EIRP Spec. Limit (dBm)	Antenna Gain (dBi)	Conducted Output Power (dBm)	Conducted Spec. Limit (dBm)	Comments
2402.120	1.8	203.0	Horz	PK	6.36E-04	-2.0	36.0	2.0	-4.0	30.0	Low CH. 2402 MHz, EUT On Side
2479.780	1.0	225.0	Horz	PK	5.84E-04	-2.3	36.0	2.0	-4.3	30.0	High CH. 2480 MHz, EUT On Side
2440.195	1.5	210.0	Horz	PK	5.62E-04	-2.5	36.0	2.0	-4.5	30.0	Mid CH. 2440 MHz, EUT On Side
2402.195	1.0	274.0	Horz	PK	5.29E-04	-2.8	36.0	2.0	-4.8	30.0	Low CH. 2402 MHz, EUT Horizontal
2402.250	1.0	195.0	Vert	PK	3.12E-04	-5.1	36.0	2.0	-7.1	30.0	Low CH. 2402 MHz, EUT Vertical
2401.765	1.0	94.0	Vert	PK	3.04E-04	-5.2	36.0	2.0	-7.2	30.0	Low CH. 2402 MHz, EUT On Side
2402.125	1.0	155.0	Horz	PK	1.60E-04	-8.0	36.0	2.0	-10.0	30.0	Low CH. 2402 MHz, EUT Vertical
2401.720	1.0	327.0	Vert	PK	1.13E-04	-9.5	36.0	2.0	-11.5	30.0	Low CH. 2402 MHz, EUT Horizontal

# 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 (mos)
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2/10/2015	12
Cable	N/A	Double Ridge Horn Cables	EVN	4/16/2015	12
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	1/27/2014	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. The equations in section 9.5 of ANSI C63.10:2013, were used to derive this conversion formula:

$$\text{dBm/m (field strength)} + 11.77 = \text{dBm EIRP}$$

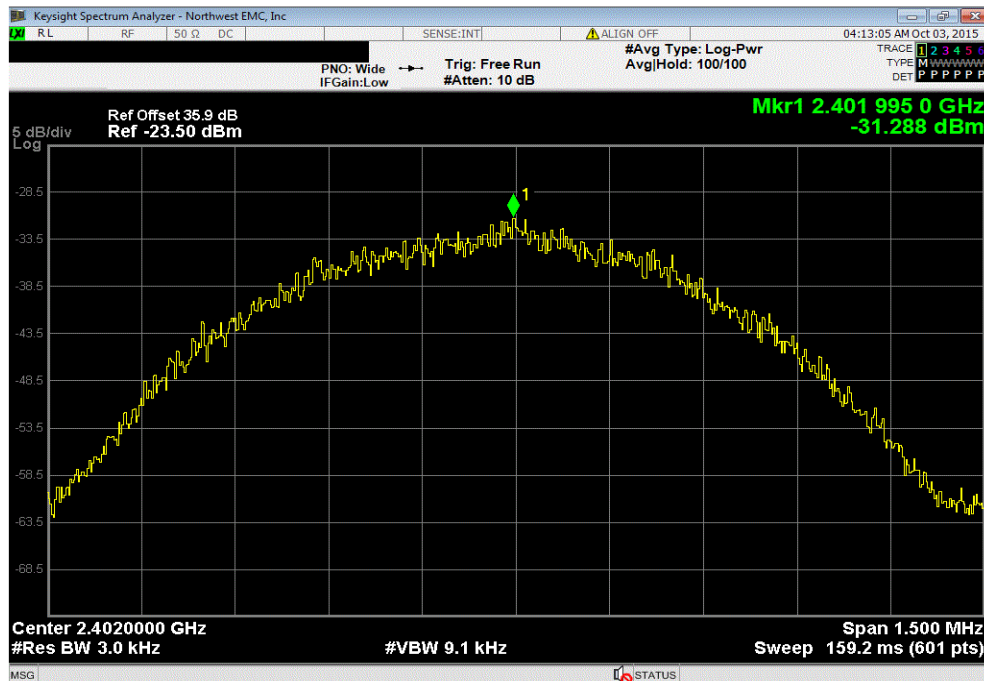
Per the procedure outlined in ANSI C63.10:2013 Section 11.10.2, the peak power spectral density was measured.

# POWER SPECTRAL DENSITY

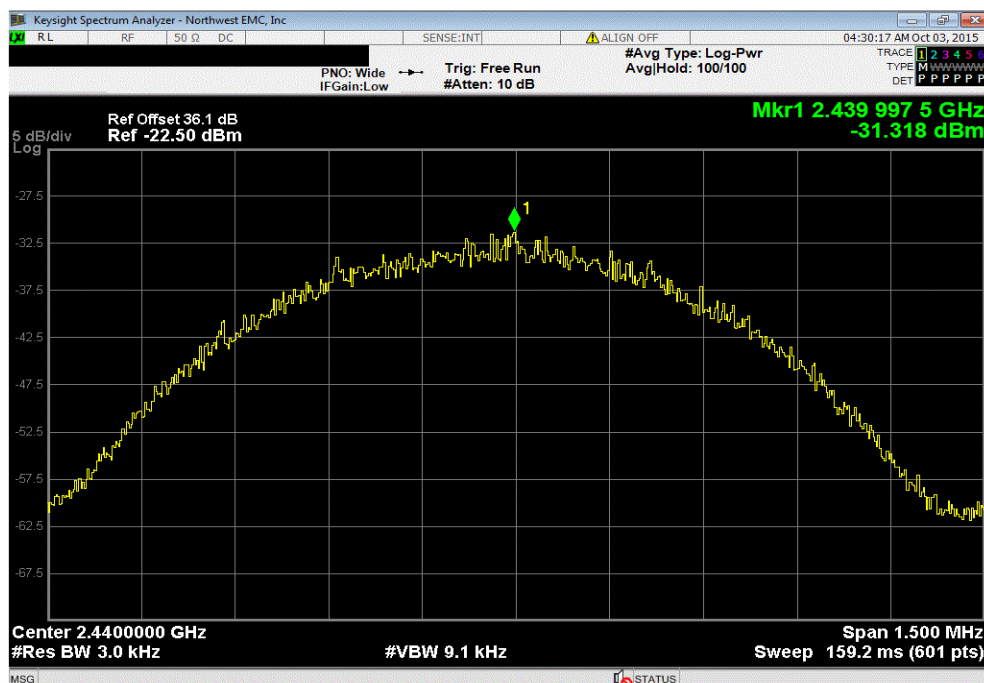
EUT: Crescent Dunes (Rev D)		Work Order: INTE5628	
Serial Number: Board 701192		Date: 10/02/15	
Customer: Intel Corporation		Temperature: 22.7°C	
Attendees: Mark Briggs		Humidity: 42%	
Project: None		Barometric Pres.: 1024.5	
Tested by: Brandon Hobbs		Power: 110VAC/60Hz	
		Job Site: EV01	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2015		ANSI C63.10:2013	
COMMENTS			
The EUT is in the worst case orientation while using the worst case antenna polarity. This was used to determine the highest output level. The reference level offset was used to normalize against the radiated power measurements by accounting for the associated antenna and cable factors.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature 	
		Initial Value dBm/3kHz	Conversion Factor
		Final Value dBm/3kHz EIRP	Limit < dBm/3kHz
			Results
BTLE			
Low Channel, 2402 MHz		-31.288	11.77
Mid Channel, 2440 MHz		-31.318	11.77
High Channel, 2480 MHz		-29.131	11.77
		-19.518	8
		-19.548	8
		-17.361	8
			Pass
			Pass
			Pass

# POWER SPECTRAL DENSITY

BTLE, Low Channel, 2402 MHz						
	Initial Value	Conversion	Final Value	Limit	Results	
	dBm/3kHz	Factor	dBm/3kHz EIRP	< dBm/3kHz		
	-31.288	11.77	-19.518	8	Pass	



BTLE, Mid Channel, 2440 MHz						
	Initial Value	Conversion	Final Value	Limit	Results	
	dBm/3kHz	Factor	dBm/3kHz EIRP	< dBm/3kHz		
	-31.318	11.77	-19.548	8	Pass	



# POWER SPECTRAL DENSITY

BTLE, High Channel, 2480 MHz						
	Initial Value	Conversion	Final Value	Limit	Results	
	dBm/3kHz	Factor	dBm/3kHz EIRP	< dBm/3kHz		
	-29.131	11.77	-17.361	8	Pass	

