

### FCC CFR47 PART 15 SUBPART C INDUSTRY CANADA RSS-210 ISSUE 7 CLASS II PERMISSIVE CHANGE

**CERTIFICATION TEST REPORT** 

FOR

INTEL 1000 SERIES WIFI CARD (TESTED INSIDE OF HP TABLET, MODEL: HSTNN-I77C)

> FCC MODEL NUMBER: 112BNHMW IC MODEL NUMBER: 112BNHU

> > FCC ID: PD9112BNHU IC: 1000M-112BNHU

REPORT NUMBER: 09U12893-1

**ISSUE DATE: NOVEMBER 2, 2009** 

Prepared for INTEL CORPORATION 2111 N. E. 25TH AVENUE HILLSBORO, OR 97124, U.S.A.

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NVLAP LAB CODE 200065-0

### **Revision History**

Rev.	lssue Date	Revisions	Revised By
	11/02/09	Initial Issue	T. Chan

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## **1. ATTESTATION OF TEST RESULTS**

	APPLICABLE STANDARDS
DATE TESTED:	OCTOBER 27 – NOVEMBER 2, 2009
SERIAL NUMBER:	001E6400FD4E
IC MODEL:	112BNHU
FCC MODEL:	112BNHMW
EUT DESCRIPTION:	INTEL 1000 SERIES WIFI CARD (TESTED INSIDE OF HP TABLET, MODEL: HSTNN-177C)
COMPANY NAME:	INTEL CORPORATION 2111 N. E. 25TH AVENUE HILLSBORO, OR 97124, U.S.A.

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 7 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 2	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

Tested By:

THU CHAN EMC MANAGER COMPLIANCE CERTIFICATION SERVICES

DEVIN CHANG EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <u>http://www.ccsemc.com</u>.

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

# 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

# 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

# 5. EQUIPMENT UNDER TEST

# 5.1. DESCRIPTION OF EUT

The EUT is an 802.11b/g/n transceiver Intel Wi-Fi card 1000 Series.

The radio module is manufactured by Intel Corporation.

## 5.2. MAXIMUM OUTPUT POWER

The test measurement passed within  $\pm$  0.5dBm of the original output power.

## 5.3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major change filed under this application is adding portable HP Tablet, model: HSTNN-I77C.

## 5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain of -0.35 dBi.

## 5.5. SOFTWARE AND FIRMWARE

The test utility software used during testing was CRTU version 5.10.25.0.

## 5.6. WORST-CASE CONFIGURATION AND MODE

The tests were performed on full test worst case channel with Wistron antenna installed since it has higher antenna gain.

The worst-case channel is determined as the channel with the highest output power.

The worst-case also investigated for X, Y, Z, and mobile orientation of the support laptop. Mobile position was turned out as worst-case orientation.

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST						
Description	Manufacturer	Model	Serial Number	FCC ID		
LAPTOP	HP	SKU1	79816SI04M	DoC		
AC/DC	HP	PPP009H	F1-09072575080A	DoC		

#### I/O CABLES

	I/O CABLE LIST							
Cable	Port	# of	Connector	Cable	Cable	Remarks		
No.		Identica	Туре	Туре	Length			
		Ports						
1	AC	1	AC	Un-Shielded	1.8 m	N/A		
2	DC	1	DC	Un-Shielded	1.8 m	N/A		

#### TEST SETUP

The EUT is installed in a host laptop computer during the tests. Test software exercised the radio card.

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### SETUP DIAGRAM FOR TESTS



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# 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	Asset	Cal Due	
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	08/24/10	
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	05/06/11	
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/06/10	
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	12/16/09	
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	02/04/10	
Antenna, Horn, 18 GHz	EMCO	3115	C00945	01/29/10	
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	01/14/10	
Peak Power Meter	Boonton	4541	N/A	01/15/10	
Peak / Average Power Sensor	Boonton	57318	N/A	02/02/10	
Reject Filter, 2.4-2.5 GHz	Micro-Tronics	BRM50702	N02685	CNR	

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# 7. RADIATED TEST RESULTS

## 7.1. LIMITS AND PROCEDURE

### LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

### TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each appplicable band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

### <u>RESULT</u>

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### 7.2. TRANSMITTER ABOVE 1 GHz (WISTRON ANTENNA)

### 7.2.1. 802.11b MODE IN THE 2.4 GHz BAND

### **RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**





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### **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**





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### **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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### **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**

			Mbr1 2 487 270	25 GHz	·
f 110 dBµ∨	#Atten 0 dB		63.	.15 dBµ∨	Center Fred 2.49175000 GH:
g					
V					Start Fred 2.48350000 GH
.9					Stop Fre
.0	1				
	the Ward and a second	the hat man have been	الوادة المجمع المراجع	Neinlast Sector Internet	1.65000000 MH Auto <u>M</u>
M2 FC					Freq Offset 0.00000000 Hz
): un /p					Signal Trac On <u>(</u>
art 2.483 500 00 (	GHz		Stop 2.500 000	00 GHz	



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### HARMONICS AND SPURIOUS EMISSIONS

		tification	Service	s, Fre	mont 5n	n Chamb	er						
est Engr: Devin Chang													
Date: 10/29/09 Project #: 09U12900 Company: Intel FUT Description: FUT only													
Mode One		2.4GHz	b mode										
	f	Measuren	nent Fred	mency	Amn	Preamp (	Tain			Average	Field Stren	eth Limit	
	Dist	Distance	to Anter	ina	D Corr	Distance	Correc	t to 3 me	eters	Peak Fie	ld Strength	Limit	
	Read	Analyzer	Reading		Ave	Average	Field S	trength @	3 m	Margin	a. Average	Limit	
	AF	Antenna	Factor		Peak	Calculate	d Peak	Field Sto	ength	Margin	a. Peak Lie	nit	
	CL	Cable Los	15		HPF	High Pas	s Filter						
	_												
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
412MHz													
1.824	3.0	40.7	32.8	5.8	-36.5	0.0	0.0	42.8	74.0	-31.2	V	P	
1.824	3.0	30.8	32.8	5.8	-36.5	0.0	0.0	32.9	54.0	- <b>21.1</b>	V	A	
1.824	3.0	40.9	32.8	5.8	-36.5	0.0	0.0	43.0	74.0	-31.0	H	P	
1.824	3.0	32.6	32.8	5.8	-36.5	0.0	0.0	34.7	54.0	-19.4	H	A	
437MHz				ļ		ļ				ļ			
1.874	3.0	39.9	32.8	5.8	-36.5	0.0	0.0	42.1	74.0	-31.9	V	P	
1.874	3.0	30.6	32.8	5.8	-36.5	0.0	0.0	32.8	54.0	-21.2	V	A	
7.311	3.0	38.8	35.2	7.3	-36.2	0.0	0.0	45.0	74.0	-29.0	V	P	
.311	3.0	25.2	35.2	7.3	-36.2	0.0	0.0	31.4	54.0	-22.6	V	A	
1.074	3.0	38.5	32.8	5.0 2.0	-30.5	0.0	0.0	40.7	74.0	-33.3	л ч	P A	
1.0/4 7311	3.0	40.4 37.4	34.0	3.0 72	-30.5	0.0	0.0	30.0	54.0 74.0	-43.4	л म	P	
7311	3.0	25.2	35.2	73	-36.2	0.0	0.0	31.5	54.0	-22.5	H	A	
462MHz	0.0												
1.924	3.0	38.3	32.8	5.9	-36.5	0.0	0.0	40.6	74.0	-33.4	V	P	
1.924	3.0	26.1	32.8	5.9	-36.5	0.0	0.0	28.4	54.0	-25.6	V	A	
7.386	3.0	38.5	35.3	7.3	-36.2	0.0	0.0	44.9	74.0	-29.1	V	P	
7.386	3.0	25.0	35.3	7.3	-36.2	0.0	0.0	31.4	54.0	-22.6	V	A	
1.924	3.0	38.0	32.8	5.9	-36.5	0.0	0.0	40.3	74.0	-33.7	H	P	
1.924	3.0	26.2	32.8	5.9	-36.5	0.0	0.0	28.4	54.0	-25.6	H	A	
1 202	3.0	37.3	35.3	7.3	-36.2	0.0	0.0	43.7	74.0	-30.3	H	Р	
.200		25.0	35.3	7.3	-36.2	0.0	0.0	31.4	54.0	-22.6	н	A	

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### 7.2.2. 802.11g MODE IN THE 2.4 GHz BAND

#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





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### **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**





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### **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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### **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**

			Mbr1 2.494.1	02.25.647	
110 dBµ∨	#Atten 0 dB		MIKIT 2.404 I	02 25 GH2 59.77 dBµ∨	Center Fred 2.49175000 GH
iak I					
					Start Fred 2.48350000 GH
st					Stop Fre
					CF Ste
w North Interruption	hadahadahaa menantan an	Rahad Martin Martin An	unition when when you		1.65000000 MH <u>Auto N</u>
V2 FC					Freq Offse 0.00000000 H;
n					Signal Trac
rt 2.483 500 00 (	GHz		Stop 2.500 0	00 00 GHz	



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### HARMONICS AND SPURIOUS EMISSIONS

fest Engr:													
		Devin Cl	hang										
Jate:		10/29/09	0										
Project #:		09U1290	0										
Company		Intel	-										
UT Descri	ntion:	EUT only	<i>•</i>										
fode Oper		2.4GHz	g mode										
	f	Measuren	nent Fred	mency	Amn	Preamp (	Gain			Average	Field Stren	eth Limit	
	Dist	Distance	to Anter	ina	D Corr	Distance	Correc	t to 3 me	ters	Peak Fie	ld Strength	Limit	
	Read	Analyzer	Reading		Ave	Average	Field S	trength @	3 m	Margin v	a. Average	Limit	
	AF	Antenna	Factor		Peak	Calculate	d Peak	Field Stre	ength	Margin v	a. Peak Lie	nit	
	CL	Cable Los	15		HPF	High Pas	s Filter						
	_												
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
412MHz													
.824	3.0	39.0	32.8	5.8	-36.5	0.0	0.0	41.1	74.0	-32.9	V	P	
.824	3.0	26.5	32.8	5.8	-36.5	0.0	0.0	28.6	54.0	-25.4	V	A	
.824	3.0	38.7	32.8	5.8	-36.5	0.0	0.0	40.8	74.0	-33.2	H	P	
.824	3.0	26.3	32.8	5.8	-36.5	0.0	0.0	28.4	54.0	-25.6	H	A	
437MHz													
.874	3.0	38.4	32.8	5.8	-36.5	0.0	0.0	40.5	74.0	-33.5	V	P	
.874	3.0	25.9	32.8	5.8	-36.5	0.0	0.0	28.0	54.0	-26.0	V	A	
.311	3.0	38.3	35.2	7.3	-36.2	0.0	0.0	44.5	74.0	-29.5	V	P	
.311	3.0	25.3	35.2	7.3	-30.4	0.0	0.0	31.5	54.0	-22.5	V TT	A D	
874	3.0	25.2	32.0	2.0 5.9	-30.5	0.0	0.0	10.5	74.0 54.0	-33.5	л म	A	
311	3.0	373	35.0	73	-36.2	0.0	0.0	43.5	74.0	-20.0	н	P	
311	3.0	25.2	35.2	7.3	-36.2	0.0	0.0	31.5	54.0	-22.5	H	Ā	
462MHz							~		~ 110				
.924	3.0	38.5	32.8	5.9	-36.5	0.0	0.0	40.8	74.0	-33.2	V	P	
.924	3.0	26.2	32.8	5.9	-36.5	0.0	0.0	28.4	54.0	-25.6	V	A	
.386	3.0	37.3	35.3	7.3	-36.2	0.0	0.0	43.7	74.0	-30.3	V	P	
.386	3.0	25.0	35.3	7.3	-36.2	0.0	0.0	31.4	54.0	-22.6	V	Α	
.924	3.0	39.6	32.8	5.9	-36.5	0.0	0.0	41.9	74.0	-32.1	H	P	
.924	3.0	26.1	32.8	5.9	-36.5	0.0	0.0	28.4	54.0	-25.6	H	Α	
.386	3.0	37.9	35.3	7.3	-36.2	0.0	0.0	44.3	74.0	-29.7	H	P	
.386	3.0	25.1	35.3	7.3	-36.2	0.0	0.0	31.4	54.0	-22.6	H	A	

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### 7.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





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### **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**





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### **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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### **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**

			Mbr1 2	483 557 75 CH	17
of 110 dB-57	#Atton 0 dB		MINIT 2	59.36 JB.	🕺 📔 Center Fre
Peak	mAtten o ub				2.49175000 GH
q					
					Start Free
3/					2.48350000 GH
ifst					
.9					Stop Fre
3					2.5000000 GH
.0   8.07 1					CF St
<sup>2</sup> <sup>4</sup> •					1.65000000 MH
	A grad all which is a long to be a long to	niaup fulling time	to an a state of the second second	و ورسان بالنوز المرسور و	Auto <u>N</u>
					Freq Offse
, , , ,					U.UUUUUUUU H
n:					
un l					Signal Trac
vp					On
102 500 00			Ctore 2	500.000.00 CU	
art 2.465 500 00	GHZ		5top 2.	.500 000 00 GH	z



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### HARMONICS AND SPURIOUS EMISSIONS

Test Engr:		Devin C	hang														
Date:		10/29/09															
Project #:		09U1290	0														
Company		Intel															
EUT Descr	iption:	EUT only															
Mode Ope	r: 2.4GHz_HT20																
	f	Measuren	Amp	Preamp (	Gain			Average	Field Stren	gth Limit							
	Dist	Distance	to Anter	ina	D Corr	Distance	Correc	t to 3 me	ters	Peak Fie	ld Strength	Limit					
	Read	Analyzer	Reading		Avg	Average	Field S	trength @	3 m	Margin v	/s. Average	Limit					
	AF	Antenna	Factor		Peak	Calculate	d Peak	Field Str	ength	Margin v	/s. Peak Lis	nit					
	CL	Cable Los	35		HPF	High Pas	s Filter										
								-									
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes				
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP					
2412MHz																	
4.824	3.0	38.7	32.8	5.8	-36.5	0.0	0.0	40.8	74.0	-33.2	V	P					
4.824	3.0	26.3	32.8	5.8	-36.5	0.0	0.0	28.4	54.0	-25.6	V	A					
4.824	3.0	39.4	32.8	5.8	-36.5	0.0	0.0	41.5	74.0	-32.6	H	P					
4.824	3.0	26.3	32.8	5.8	-36.5	0.0	0.0	28.4	54.0	-25.6	H	A					
2437MHz			20.0					40.4	=		••	_					
4.874	3.0	38.2	32.8	5.8	-30.5	0.0	0.0	40.4	74.0	-33.0	V	P					
4.8/4	3.0	25.8	34.8	5.8	-30.5	0.0	0.0	42.6	54.0	-20.0	V	A D					
7.311	2.0	37.4	35.4	7.3	-30.4	0.0	0.0	45.0	74.0	-30.4	V	P					
1.511	3.0	28.2	37.8	2.8	-30.4	0.0	0.0	40.3	54.0 74.0	22.0	и Н	D D					
4 874	3.0	25.8	32.8	5.0	-36.5	0.0	0.0	27.9	54.0	-26.1	H	A					
7.311	3.0	37.6	35.2	7.3	-36.2	0.0	0.0	43.8	74.0	-30.2	H	P					
7.311	3.0	25.2	35.2	7.3	-36.2	0.0	0.0	31.5	54.0	-22.5	H	Ā					
2462MHz	-14																
4.924	3.0	38.4	32.8	5.9	-36.5	0.0	0.0	40.6	74.0	-33.4	V	P					
4.924	3.0	26.1	32.8	5.9	-36.5	0.0	0.0	28.4	54.0	-25.6	V	A					
7.386	3.0	37.7	35.3	7.3	-36.2	0.0	0.0	44.1	74.0	-29.9	V	P					
7.386	3.0	25.1	35.3	7.3	-36.2	0.0	0.0	31.5	54.0	-22.5	V	A					
4.924	3.0	38.7	32.8	5.9	-36.5	0.0	0.0	40.9	74.0	-33.1	H	P					
4.924	3.0	26.2	32.8	5.9	-36.5	0.0	0.0	28.4	54.0	-25.6	H	A					
7.386	3.0	37.4	35.3	7.3	-36.2	0.0	0.0	43.7	74.0	-30.3	H	P					
7.386	3.0	25.0	35.3	7.3	-36.2	0.0	0.0	31.4	54.0	-22.6	H	A					

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### 7.2.4. 802.11n HT40 MODE IN THE 2.4 GHz BAND

### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)





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### **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**





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### **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





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### **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**

			ML-1 2	100 435 35 CH-	
ef 110 dBµ∨	#Atten 0 dB		MIKIT 2.	58.34 dBµ∨	Center Freq 2.49175000 GHz
g g					
3/					Start Freq 2.48350000 GHz
ifist .9 3					Stop Fred
					2.5000000 GHz
.0 3µ∨	1				CF Ste
Av belaning	une contractor association	Alterna Maides And	Land in the second second	-	Auto M
1 V2 3 FC					Freq Offset 0.00000000 Hz
<u>)</u> :					 Signal Tracl
vp					
2 492 500 00	<u></u>		Stop 24	500 000 00 GHz	



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### HARMONICS AND SPURIOUS EMISSIONS

fest Engr:		Devin C	hang										
Date:		10/29/09											
Project #:		09U1290	0										
Company:		Intel											
UT Descr	iption:	EUT only											
Mode Ope	r:	2.4GHz	_HT40										
	f Measurement Frequency Am					Preamp (	Jain			Average	Field Stren	gth Limit	
	Dist	Distance	to Anter	ina	D Corr	Distance	Correc	et to 3 me	eters	Peak Fie	ld Strength	Limit	
	Read	Analyzer	Reading		Avg	Average	Field S	trength @	) 3 m	Margin v	vs. Average	Limit	
	AF	Antenna	Factor		Peak	Calculate	d Peak	Field Str	ength	Margin v	vs. Peak Lis	nit	
	CL	Cable Los	38		HPF	High Pas	s Filter	r					
	Dist	Peed	AF	CT	A	D.C.	E14	C	Time	M	Arre D. 1	Det	Netze
CH-	U1st (m)	dBuV	dB/m	dB	Amp	JCorr	dB	dBnV/-	dBnV/m	Aargin	Ant. Pol.	Det.	INOTES
GHZ	( <b>m</b> )	abuv	ab/m	ab	ab	aD	ab	abuv/m	ubuv/m	ab	V/II	riniQr	
4444MITZ	3.0	30 /	37.8	£ 9	36 5	0.0	0.0	41.5	74.0	32 5	V	σ	
1 844	3.0	263	32.8	2.0 5.9	-30.5	0.0	0.0	28.4	74.0 54.0	-34.5	v V	A	
1 844	3.0	39.0	32.8	5.8	-36.5	0.0	0.0	41.1	74.0	-40.0	н	P	
1.844	3.0	34.6	32.8	5.8	-36.5	0.0	0.0	36.8	54.0	-17.2	H	A	
437MHz													
1.874	3.0	38.1	32.8	5.8	-36.5	0.0	0.0	40.3	74.0	-33.7	V	P	
1.874	3.0	25.7	32.8	5.8	-36.5	0.0	0.0	27.9	54.0	-26.1	V	A	
7.311	3.0	37.9	35.2	7.3	-36.2	0.0	0.0	44.1	74.0	-29.9	V	P	
7.311	3.0	25.2	35.2	7.3	-36.2	0.0	0.0	31.5	54.0	-22.5	V	Α	
1.874	3.0	38.4	32.8	5.8	-36.5	0.0	0.0	40.6	74.0	-33.4	H	P	
1.874	3.0	25.8	32.8	5.8	-36.5	0.0	0.0	27.9	54.0	-26.1	H	A	
7.311	3.0	37.4	35.2	7.3	-36.2	0.0	0.0	43.6	74.0	-30.4	H	P	
7.311	3.0	25.2	35.2	7.3	-36.2	0.0	0.0	31.5	54.0	-22.5	H	A	
452MHz					ļ	ļ				ļ			
1.904	3.0	38.2	32.8	5.9	-36.5	0.0	0.0	40.4	74.0	-33.6	V	P	
1.904	3.0	25.9	32.8	5.9	-36.5	0.0	0.0	28.1	54.0	-25.9	V	A	
1.350	3.0	37.3	35.3	7.3	-30.2	0.0	0.0	43.6	74.0	-30.4	V	P	
004	3.0	45.1	32.5	7.3	-30.2	0.0	0.0	31.5	54.0	-44.5	V H	n D	
1 904	3.0	25 0	32.0	5.7 5.0	-36.5	0.0	0.0	2,8 1	54.0	-33.4	п Н	A	
1.356	3.0	37.5	35.3	7.3	-36.2	0.0	0.0	43.8	74.0	-30.2	H	P	
7.356	3.0	25.1	35.3	7.3	-36.2	0.0	0.0	31.5	54.0	-22.5	H	Ā	
1.904 1.904 7.356 7.356	3.0 3.0 3.0 3.0	38.6 25.9 37.5 25.1	32.8 32.8 35.3 35.3		5.9 5.9 7.3 7.3	5.9 -36.5   5.9 -36.5   7.3 -36.2   7.3 -36.2	5.9 -36.5 0.0   5.9 -36.5 0.0   7.3 -36.2 0.0   7.3 -36.2 0.0	5.9 -36.5 0.0 0.0   5.9 -36.5 0.0 0.0   7.3 -36.2 0.0 0.0   7.3 -36.2 0.0 0.0	5.9 -36.5 0.0 0.0 40.8   5.9 -36.5 0.0 0.0 28.1   7.3 -36.2 0.0 0.0 43.8   7.3 -36.2 0.0 0.0 31.5	5.9 -36.5 0.0 0.0 40.8 74.0   5.9 -36.5 0.0 0.0 28.1 54.0   7.3 -36.2 0.0 0.0 43.8 74.0   7.3 -36.2 0.0 0.0 43.8 74.0   7.3 -36.2 0.0 0.0 31.5 54.0	5.9 -36.5 0.0 0.0 40.8 74.0 -33.2   5.9 -36.5 0.0 0.0 28.1 54.0 -25.9   7.3 -36.2 0.0 0.0 43.8 74.0 -30.2   7.3 -36.2 0.0 0.0 31.5 54.0 -22.5	5.9 -36.5 0.0 0.0 40.8 74.0 -33.2 H   5.9 -36.5 0.0 0.0 28.1 54.0 -25.9 H   7.3 -36.2 0.0 0.0 43.8 74.0 -30.2 H   7.3 -36.2 0.0 0.0 31.5 54.0 -22.5 H	5.9 -36.5 0.0 0.0 40.8 74.0 -33.2 H P   5.9 -36.5 0.0 0.0 28.1 54.0 -25.9 H A   7.3 -36.2 0.0 0.0 43.8 74.0 -30.2 H P   7.3 -36.2 0.0 0.0 43.8 74.0 -30.2 H P   7.3 -36.2 0.0 0.0 31.5 54.0 -22.5 H A

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# 7.3. WORST CASE RECEIVER ABOVE 1 GHz

Test Engr		Devin C	hang										
Date:		10/30/09											
Project #	:	09U1290	0										
Company	<b>*</b>	Intel											
EUT Desc	ription:	EUT only	Y										
Mode Op	er:	2.4GHz	_Rx mo	de									
	f	Measuren	nent Free	quency	Amp	Preamp (	Gain			Average	Field Stren	gth Limit	
	Dist	Distance	to Anter	ina	D Corr	Distance	Corre	ct to 3 me	ters	Peak Fie	ld Strength	Limit	
	Read	Analyzer	Reading		Avg	Average	Field S	trength @	3 m	Margin v	s. Average	Limit	
	AF	Antenna	Factor		Peak	Calculate	d Peak	c Field Str	ength	Margin v	s. Peak Lir	nit	
	CL	Cable Los	38		HPF	High Pas	s Filter	r					
							_						
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
1.197	3.0	64.2	24.7	2.6	-36.0	0.0	0.0	55.5	74.0	-18.5	V	P	
1.197	3.0	37.1	24.7	2.6	-36.0	0.0	0.0	28.4	54.0	-25.6	V	Α	
1.440	3.0	53.8	25.6	2.9	-35.8	0.0	0.0	46.4	74.0	-27.6	V	P	
1.440	3.0	32.6	25.6	2.9	-35.8	0.0	0.0	25.2	54.0	-28.8	V	A	
1.596	3.0	53.9	26.1	3.0	-35.7	0.0	0.0	47.4	74.0	-26.6	V	P	
1.596	3.0	39.4	26.1	3.0	-35.7	0.0	0.0	32.9	54.0	-21.1	V	A	
1.197	3.0	65.9	24.7	2.6	-36.0	0.0	0.0	57.1	74.0	-16.9	H	P	
1.197	3.0	38.0	24.7	2.0	-30.0	0.0	0.0	29.9	54.0	-24.1	H	A	
1.440	3.0	26.2	25.0	2.9	-35.8	0.0	0.0	49.0	74.0	-25.0	n u	P	
1.440	3.0	57.0	25.0	2.9	-35.8	0.0	0.0	20.9 50.5	54.0 74.0	-40.1	п	D D	
1.570	3.0	43.1	26.1	3.0	-35.7	0.0	0.0	36.6	54.0	-40.0	н	Г Д	
1.370	0.0	40.1	40.1	5.0	-33.7	0.0	0.0	50.0	24.0	-1/.4	11	<b>A</b>	
Rev. 4.1.2	.7	:			:							:	
						-		_					

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# 7.4. WORST CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



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### HORIZONTAL AND VERTICAL DATA

		Devin Ch	ang										
Date:		10/31/09											
Project #:		09U12900	)										
Company		Intel	·										
UT Descript	tion:	EUT only											
Mode Oner		2.4GHz	h mode										
actic open	f	Measurem	ent Frem	encv	Amp	Preamo (	Gain			Margin	Margin vs	Limit	
,	- Dist	Distance to	o Antenn	a	D Corr	Distance	Correct	to 3 meters			gill vo.		
,	Read	Analyzer F	Reading	-	Filter	Filter Ins	ert Loss						
-	AF	Antenna F	actor		Corr	Calculate	d Field S	trength					
-	CT.	Cable Loss			Limit	Field Stre	meth Lin	nit					
		00012 2000						••••					
f	Dist	Read	AF	CL	Amp	D Corr	Filter	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
MHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
31.560	3.0	43.7	19.6	0.5	29.7	0.0	0.0	34.1	40.0	-5.9	v	P	
98.883	3.0	51.5	9.8	0.9	29.5	0.0	0.0	32.7	43.5	-10.8	v	P	
207.367	3.0	50.1	12.0	1.3	28.9	0.0	0.0	34.5	43.5	-9.0	V	Р	
279.970	3.0	51.5	12.7	1.5	28.8	0.0	0.0	36.9	46.0	- <b>9.1</b>	V	P	
528.021	3.0	46.0	17.2	2.2	29.7	0.0	0.0	35.7	46.0	-10.3	V	P	
524.024	3.0	45.1	18.5	2.4	29.6	0.0	0.0	36.4	46.0	- <b>9.6</b>	V	P	
99.603	3.0	54.2	10.0	0.9	29.5	0.0	0.0	35.5	43.5	- <mark>8.0</mark>	H	P	
183.966	3.0	51.3	11.0	1.2	29.0	0.0	0.0	34.5	43.5	- <b>9.0</b>	H	P	
295.931	3.0	46.7	13.2	1.6	28.8	0.0	0.0	32.6	46.0	-13.4	H	P	
528.021	3.0	45.2	17.2	2.2	29.7	0.0	0.0	34.9	46.0	-11.1	H	P	
307.992	3.0	45.2	21.1	2.8	29.1	0.0	0.0	39.9	46.0	-6.1	H	P	
	3.0	39.3	21.9	3.1	28.5	0.0	0.0	35.8	46.0	-10.2	H	P	
937.477					1	1				1			

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# 8. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted I	Limit (dBuV)
	Quasi-peak	Average
0.15-0.5	66 to 56 °	56 to 46 *
0.5-5	56	46
5-30	60	50

Decreases with the logarithm of the frequency.

### TEST PROCEDURE

### ANSI C63.4

### **RESULTS**

### **6 WORST EMISSIONS**

		CONDUC	TED EMISS	IONS D.	ATA (115	VAC 60H	z)		
Freq.		Reading		Closs	Limit	FCC_B	Marg	Remark	
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1/L2
0.20	48.76		28.94	0.00	63.74	53.74	-14.98	-24.80	L1
0.55	37.86		22.66	0.00	56.00	46.00	-18.14	-23.34	L1
18.72	39.55		27.36	0.00	60.00	50.00	-20.45	-22.64	L1
0.20	50.81		31.51	0.00	63.74	53.74	-12.93	-22.23	L2
0.62	38.34		24.87	0.00	56.00	46.00	-17.66	-21.13	L2
14.99	44.79		32.69	0.00	60.00	50.00	-15.21	-17.31	L2
6 Worst I	Data								

### LINE 1 RESULTS



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### LINE 2 RESULTS



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