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# APPLICATION FOR CERTIFICATION On Behalf of Intel Corporation Notebook Models No.: HSBUB-SDS FCC ID: RMXHSBUB-SDS IC: 1000V-HSBUBSDS Brand: Intel

Prepared for : Intel Corporation 2200 Mission College Blvd. Santa Clara, CA 95054-1549, USA

Prepared By : AUDIX Technology Corporation EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan, R.O.C.

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Date of Test	:	Dec. 25, 2012 ~ Feb. 01, 2013
Date of Report	:	Feb. 04, 2013

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# **TEST REPORT CERTIFICATION**

Applicant	:	Intel Corporation		
EUT Description	:	Notebook		
FCC ID	:	RMXHSBUB-SDS		
IC	:	1000V-HSBUBSD	S	
		(A) Model No.	:	HSBUB-SDS
		(B) Serial No.	:	N/A
		(C) Brand	:	Intel
		(D) Power Supply	:	DC 19V
		(E) Test Voltage	:	AC 120V, 60Hz (Via AC Adapter)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C, Oct 2012 (FCC CFR 47 Part 15C, §15.205, §15.207, §15.209 and §15.247) ANSI C63.4/2003 FCC Public Notice DA 00-705, Mar. 2000

Industry Canada Rules and Regulations RSS-Gen (Issue 3), December 2010 and RSS-210 (Issue 8), December 2010

The device described above was tested by AUDIX Technology Corporation to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 Subpart C and Canada RSS-Gen, RSS-210 limits.

The measurement results are contained in this test report and AUDIX Technology Corporation is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC Part 15 and Industry Canada RSS-Gen, RSS-210 standards.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX Technology Corporation.

Date of Test : Dec. 25, 2013 ~ Feb. 01, 2013

Date of Report : Feb. 04, 2013

Producer : Tina Huang/Administrator) Signatory : (Leon Liú/Deputy Gener

## **1. GENERAL INFORMATION**

## 1.1. Description of Device (EUT)

Product	Notebook		
Model Number	HSBUB-SDS		
Serial Number	N/A		
Brand Name	Intel		
Amlicont	Intel Corporation		
Applicant	2200 Mission College Blvd, Santa Clara, CA 95054-1549, USA		
Mini HDMI Dongle	Cable: Non-Shielded, Detachable, 0.18m		
HDMI Cable	Non-Shielded, Detachable, 1.8m		
FCC ID	RMXHSBUB-SDS		
IC	1000V-HSBUBSDS		
Fundamental Range	<ul> <li>802.11b/g: 2412MHz ~ 2462MHz</li> <li>802.11a: 5180MHz ~ 5240MHz (UNII Band I) and 5260MHz ~ 5320MHz (UNII Band II) and 5500MHz ~ 5700MHz (UNII Band II) and 5745MHz ~ 5825MHz (UNII Band IV) 5250MHz ~ 5350MHz, 5470MHz ~ 5725MHz (DFS Function, Slave/no In service monitor, no Ad-Hoc mode)</li> <li>802.11n-HT20: 2412MHz ~ 2462MHz and 5180MHz ~ 5240MHz (UNII Band I) and 5260MHz ~ 5320MHz (UNII Band II) and 5260MHz ~ 5320MHz (UNII Band II) and 5500MHz ~ 5700MHz (UNII Band II) and 5500MHz ~ 5700MHz (UNII Band III) and 5745MHz ~ 5825MHz (UNII Band IV) 5250MHz ~ 5350MHz, 5470MHz ~ 5725MHz (DFS Function, Slave/no In service monitor, no Ad-Hoc mode)</li> <li>802.11n-HT40: 2422MHz ~ 2452MHz and 5190MHz ~ 5230MHz (UNII Band I) and 5510MHz ~ 5670MHz (UNII Band II) and 5510MHz ~ 5670MHz (UNII Band II) and 5755MHz ~ 5795MHz (UNII Band III) and 5755MHz ~ 5350MHz, 5470MHz ~ 5725MHz (DFS Function, Slave/no In service monitor, no Ad-Hoc mode)</li> <li>802.11n-HT40: 2422MHz ~ 2452MHz and 5190MHz ~ 5230MHz (UNII Band II) and 5510MHz ~ 5670MHz (UNII Band II) and 5755MHz ~ 5795MHz (UNII Band II) and 5755MHz ~ 5795MHz (UNII Band IV) 5250MHz ~ 5350MHz, 5470MHz ~ 5725MHz (DFS Function, Slave/no In service monitor, no Ad-Hoc mode)</li> <li>BT and BT Low Energy: 2402MHz ~ 2480MHz</li> </ul>		

#### FCC ID. RMXHSBUB-SDS IC: 1000V-HSBUBSDS

Fundamental RangeGPRS/EGPRS 850: UL: 824MHz to 849MHz DL: 869MHz to 894MHz GPRS/EGPRS 1900: UL: 1850MHz to 1910MHz DL: 1930MHz to 1990MHzFundamental RangeWCDMA Band: Band II: UL: 1850MHz to 1910MHz; DL: 1930MHz to 1990MHzFundamental RangeWCDMA Band: Band II: UL: 1850MHz to 1990MHzFundamental RangeWCDMA Band: Band II: UL: 1850MHz to 1990MHzBand IV: UL: 1710MHz to 1755MHz; DL: 2110MHz to 2115MHzBand V: UL: 824MHz to 849MHz; DL: 2110MHz to 849MHz; DL: 869MHz to 894MHzNFC: 13.56MHz802.11b/g: 11 channels802.11a: UNII Band I: 4channels UNII Band II: 4 channelsUNII Band III: 8 channelsUNII Band III: 8 channelsUNII Band III: 8 channelsUNII Band II: 4 channelsUNII Band III: 8 channelsUNII Band III: 9 channels <t< th=""></t<>
Fundamental RangeDL: 869MHz to 894MHzFundamental RangeGPRS/EGPRS 1900: UL: 1850MHz to 1910MHz DL: 1930MHz to 1990MHzFundamental RangeWCDMA Band: Band II: UL: 1850MHz to 1990MHz DL: 1930MHz to 1990MHzFundamental RangeWCDMA Band: Band II: UL: 1710MHz to 1755MHz; DL: 2110MHz to 2115MHz Band IV: UL: 1710MHz to 2115MHz Band V: UL: 824MHz to 849MHz; DL: 2110MHz to 894MHzFrequency Channel802.11b/g: 11 channels 802.11a: UNII Band II: 4 channels UNII Band II: 4 channels 802.11n-HT20: 2.4GHz: 11 channels 2.4G UNII Band II: 8 channels UNII Band II: 9 channels B02.11n-HT40: 2.4GHz: 7 channels UNII Band II: 8 channels UNII Band II: 9 channels <b< td=""></b<>
Fundamental RangeGPRS/EGPRS 1900: UL: 1850MHz to 1910MHz DL: 1930MHz to 1990MHzFundamental RangeWCDMA Band: Band II: UL: 1850MHz to 1990MHz DL: 1930MHz to 1990MHzFundamental RangeBand IV: UL: 1710MHz to 1755MHz; DL: 2110MHz to 2115MHz Band V: UL: 824MHz to 849MHz; DL: 824MHz to 849MHzBand V: UL: 824MHz to 849MHz; DL: 802.11b/g: 11 channelsBoard V: UL: 824MHz to 849MHz802.11b/g: 11 channels 802.11a: UNII Band II: 4 channels UNII Band III: 4 channels UNII Band III: 4 channels 802.11n-HT20: 2.4GHz: 11 channels UNII Band II: 4 channels 802.11n-HT20: 2.4GHz: 11 channels UNII Band II: 4 channels UNII Band II: 4 channels 802.11n-HT40: 2.4GHz: 7 channels 802.11n-HT40: 2.4GHz: 7 channels B02.11n-HT40: 2.4GHz: 7 channels UNII Band II: 5 channels <br< td=""></br<>
Fundamental RangeWCDMA Band: Band II: UL: 1930MH2 to 1990MH2 DL: 1930MH2 to 1910MHz; DL: 1930MH2 to 1990MHzBand IV: UL: 1710MHz to 1755MHz; DL: 2110MHz to 2115MHz Band V: UL: 824MHz to 849MH2; DL: 869MHz to 894MHzNFC: 13.56MHz802.11b/g: 11 channels 802.11a: UNII Band II: 4 channels UNII Band III: 8 channels 802.11n-HT20: 2.4GHz: 11 channels 802.11n-HT20: 2.4GHz: 11 channels 802.11n-HT20: 2.4GHz: 11 channels 802.11n-HT40: 2.4GHz: 12 channels 802.11n-HT40: 2.4GHz: 12 channels UNII Band II: 4 channels UNII Band II: 4 channels UNII Band II: 4 channels UNII Band II: 4 channels UNII Band II: 5 channels UNI Band II: 5 chan
Fundamental RangeWCDMA Band: Band II: UL: 1850MHz to 1910MHz; DL: 1930MHz to 1990MHzFundamental RangeDL: 1930MHz to 1755MHz; DL: 2110MHz to 2115MHzBand IV: UL: 824MHz to 849MHz; DL: 869MHz to 849MHz; DL: 869MHz to 894MHzNFC: 13.56MHz802.11b/g: 11 channels802.11b/g: 11 channels802.11a: UNII Band I: 4channels UNII Band II: 4 channelsUNII Band II: 4 channels802.11n-HT20: 2.4GHz: 11 channels 2.4G UNII Band II: 4 channels802.11n-HT20: 2.4GHz: 11 channels 2.4G UNII Band II: 4 channels802.11n-HT40: 2.4GHz: 7 channels802.11n-HT40: 2.4GHz: 7 channels802.11n-HT40: 2.4GHz: 7 channelsBuetooth: 79 channels (GFSK, π/4DQPSK, 8-DPSK) 40 channels (Low Energy)GPRS/EGPRS 1900: CH 512-CH 810
Fundamental RangeDiscrete 1950/0112/00 1950/0112Band IV: UL: 1710MHz to 1755MHz; DL: 2110MHz to 2115MHz DL: 2110MHz to 2115MHz DL: 869MHz to 849MHz; DL: 869MHz to 894MHzNFC: 13.56MHz802.11b/g: 11 channels 802.11a: UNII Band I: 4channels UNII Band II: 4 channels UNII Band II: 4 channels 802.11n-HT20: 2.4GHz: 11 channels 2.4G UNII Band II: 4 channels 802.11n-HT20: 2.4GHz: 11 channels 2.4G UNII Band II: 4 channels 802.11n-HT20: 2.4GHz: 7 channels UNII Band II: 8 channels UNII Band II: 9 channels UNII Band IV: 3 c
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Frequency Channel802.11n-HT20: 2.4GHz: 11 channels2.4GUNI Band I: 4 channelsUNII Band II: 4 channelsUNII Band III: 8 channelsUNII Band IV: 4 channels802.11n-HT40: 2.4GHz: 7 channels802.11n-HT40: 2.4GHz: 7 channelsUNII Band II: 2 channelsUNII Band II: 2 channelsUNII Band II: 5 channelsUNII Band IV: 3 channelsBluetooth: 79 channels (GFSK, $\pi$ /4DQPSK, 8-DPSK)40 channels (Low Energy)GPRS/EGPRS 850: CH 128- CH 251GPRS/EGPRS 1900: CH 512-CH 810
Frequency ChannelBilletooth: 79 channels (Low Energy)GPRS/EGPRS 850: CH 128- CH 251GPRS/EGPRS 1900: CH 512-CH 810
Frequency ChannelFrequency ChannelUNII Band II: 4 channelsUNII Band IV: 4 channels802.11n-HT40: 2.4GHz: 7 channelsUNII Band I: 2channelsUNII Band I: 2channelsUNII Band II: 2 channelsUNII Band III: 5 channelsUNII Band IV: 3 channelsBluetooth: 79 channels (GFSK,π/4DQPSK, 8-DPSK)40 channels (Low Energy)GPRS/EGPRS 850: CH 128- CH 251GPRS/EGPRS 1900: CH 512-CH 810
Frequency ChannelWill Band III: 8 channelsUNII Band IV: 4 channels802.11n-HT40: 2.4GHz: 7 channelsUNII Band I: 2channelsUNII Band II: 2 channelsUNII Band II: 2 channelsUNII Band III: 5 channelsUNII Band IV: 3 channelsBluetooth: 79 channels (GFSK,π/4DQPSK, 8-DPSK)40 channels (Low Energy)GPRS/EGPRS 850: CH 128- CH 251GPRS/EGPRS 1900: CH 512-CH 810
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Frequency Channel802.11n-HT40: 2.4GHz: 7 channels UNII Band I: 2channels UNII Band II: 2 channels UNII Band III: 5 channels UNII Band IV: 3 channels Bluetooth: 79 channels (GFSK,π/4DQPSK, 8-DPSK) 40 channels (Low Energy) GPRS/EGPRS 850: CH 128- CH 251 GPRS/EGPRS 1900: CH 512-CH 810
Frequency ChannelUNII Band I: 2channels UNII Band II: 2 channels UNII Band III: 5 channels UNII Band IV: 3 channelsBluetooth: 79 channels (GFSK,π/4DQPSK, 8-DPSK) 40 channels (Low Energy) GPRS/EGPRS 850: CH 128- CH 251 GPRS/EGPRS 1900: CH 512-CH 810
Frequency Channel       UNII Band II: 2 channels         UNII Band III: 5 channels       UNII Band III: 5 channels         UNII Band IV: 3 channels       Bluetooth: 79 channels (GFSK,π/4DQPSK, 8-DPSK)         40 channels (Low Energy)       GPRS/EGPRS 850: CH 128- CH 251         GPRS/EGPRS 1900: CH 512-CH 810       GPRS/EGPRS 1900: CH 512-CH 810
Frequency Channel UNII Band III: 5 channels UNII Band IV: 3 channels Bluetooth: 79 channels (GFSK,π/4DQPSK, 8-DPSK) 40 channels (Low Energy) GPRS/EGPRS 850: CH 128- CH 251 GPRS/EGPRS 1900: CH 512-CH 810
UNII Band IV: 3 channels Bluetooth: 79 channels (GFSK,π/4DQPSK, 8-DPSK) 40 channels (Low Energy) GPRS/EGPRS 850: CH 128- CH 251 GPRS/EGPRS 1900: CH 512-CH 810
Bluetooth: 79 channels (GFSK,π/4DQPSK, 8-DPSK) 40 channels (Low Energy) GPRS/EGPRS 850: CH 128- CH 251 GPRS/EGPRS 1900: CH 512-CH 810
40 channels (Low Energy) GPRS/EGPRS 850: CH 128- CH 251 GPRS/EGPRS 1900: CH 512-CH 810
GPRS/EGPRS 850: CH 128- CH 251 GPRS/EGPRS 1900: CH 512-CH 810
GPRS/EGPRS 1900: CH 512-CH 810
WCDMA Band: Band II: UL: CH 9262-CH9538:
DL: CH 9662-CH9938
Band IV: UL: CH 1312-CH1513;
DL: CH 1537-CH1738
Band V: UL: CH 4132-CH4233;
DL: CH 4357-CH4458
NFC: 1 Channel
802.11b: DSSS Modulation (DBPSK/DQPSK/CCK)
802.11g: OFDM Modulation (BPSK/QPSK/16QAM/64QAM)
802.11a: OFDM Modulation (BPSK/QPSK/16QAM/64QAM)
802.11n: OFDM Modulation (MIMO)
Radio Technology (BPSK/QPSK/16QAM/64QAM)
Bluetooth: FHSS (GFSK, $\pi/4DQPSK$ , 8-DPSK)
WCDMA/HSPA/HSLIDA/HSLIDA+
GSM/GPR S/EDGE
GPS/AGPS

Data Transfer Rate	802.11b: 1/2/5.5/11Mbps 802.11a/g: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps Bluetooth: 1/2/3Mbps GSM:DL 14.4kbps/UL 14.4kbps GPRS: DL 85.6kbps/UL 14.4kbps EGPRS:DL 236.8kbps/UL 236.8kpbs			
	WCDMA CS: DL 64kbps/UL 64kpbs WCDMA PS: DL 384kbps/UL 384kbps HSPA+:DL 21.6Mbps/UL 5.76Mpbs			
Date of Receipt of Sample	Dec. 18, 2012			
Date of Test	Dec. 25, 2012 ~ Feb. 01, 2013			
Note: This EUT has 2.4GHz (WLAN, BT and Low Energy), 5GHz, GPRS/EGPRS, WCDMA and NFC function. See below for related test reports based on radio functionality.				
1. The 2.4GHz (WLAN and Low Energy) & 5.8GHz (UNII Band IV) function has been test in other report of EM-F1020109.				
2. The 5GHz (UNII Band II, III & IV) function has been test in other report of EM-F1020110.				

3. The DFS function has been test in other report of EM-F1020111.

4. The NFC function has been test in other report of EM-F1020112.

## 1.2. Antenna Information

Antenna Part	Manufactura	Antenna	Peak Gain		
Number	Manufacture	Туре	Frequency	Max Gain	
			2400MHz	1.24dBi	
			2442MHz	0.63dBi	
			2484MHz	1.93dBi	
Project Name:			5150MHz	0.74dBi	
Harris Beach			5250MHz	0.64dBi	
WLAN	TE		5350MHz	0.24dBi	
Antenna (Main)	Connectivity	PIFA	5470MHz	-0.54dBi	
Part Number:			5600MHz	-0.20dBi	
1556570			5725MHz	-0.55dBi	
			5785MHz	0.84dBi	
			5800MHz	0.03dBi	
			5850MHz	-0.29dBi	
			2400MHz	0.75dBi	
			2442MHz	1.39dBi	
			2484MHz	1.82dBi	
Project Name:			5150MHz	1.79dBi	
Harris Beach			5250MHz	0.79dBi	
WLAN/BT	TE	PIFA	5350MHz	1.27dBi	
Antenna (AUX)	Connectivity		5470MHz	0.72dBi	
Part Number:	Part Number:		5600MHz	0.36dBi	
1556568			5725MHz	1.31dBi	
			5785MHz	1.86dBi	
			5800MHz	3.04dBi	
			5850MHz	2.45dBi	

Antenna Part	Manufactura	Antenna	Peak Gain		
Number	Ivialiuracture	Туре	Frequency (TX)	Max Gain	
			704MHz	-2.04dBi	
			710MHz	-1.57dBi	
			716MHz	-1.45dBi	
			777MHz	-2.31dBi	
			782MHz	-2.22dBi	
			787MHz	-2.61dBi	
			832MHz	-2.42dBi	
			847MHz	-3.26dBi	
			862MHz	-3.20dBi	
			824MHz	-3.44dBi	
			836MHz	-4.03dBi	
Project Name: Harris Beach	TE Connectivity		849MHz	-3.89dBi	
			880MHz	-2.79dBi	
		PIFA	900MHz	-2.71dBi	
WWAN			915MHz	-3.08dBi	
Antenna (Main)			1710MHz	-4.09dBi	
Dart Number			1750MHz	-3.34dBi	
1556567			1785MHz	-3.77dBi	
			1710MHz	-3.69dBi	
			1732MHz	-3.43dBi	
			1755MHz	-3.34dBi	
			1850MHz	-3.88dBi	
			1880MHz	-2.86dBi	
			1910MHz	-2.97dBi	
			1920MHz	-3.30dBi	
			1950MHz	-3.28dBi	
			1980MHz	-2.86dBi	
			2500MHz	-1.90dBi	
			2535MHz	-2.29dBi	
			2570MHz	-2.08dBi	

Antenna Part	Manufactura	Antenna	Peak Gain (dBi)	
Number	Ivianulaciule	Туре	Frequency (RX)	Max Gain
Project Name: Harris Beach WWAN	TE	PIFA	1575MHz	-3.67dBi
Antenna (AUX) Part Number: 1556569	Connectivity		1602MHz	-3.71dBi

## 1.3. Description of Key Component Lists

Item		Supplier	Description	Character			
System		Microsoft	Windows 8				
Main Board		Flex	832-FIG-ITLH-G71865-4 00	PCBA for NB shuold not be listed separately			
LCD Panel	l	Chimei Innolux Corp	N133HSE-EXX	13.3 inches TFT Type			
CPU		Intel		Up to 3.3GHz			
Graphics		Intel	Intel <sup>®</sup> HD Graphics with DX11				
Memory		Samsung		4GB			
SSD		Samsung	<ul> <li>#1 MZ-C*****</li> <li>#2 MZ-D*****</li> <li>#3 MZ-E*****</li> <li>#4 MZ-N*****</li> <li>(* can be 0-9, A-Z, blank, slash or dash for different market purpose)</li> </ul>	128GB			
Keyboard		Kunshan YingHui Precision Electronic Co.	YH-BH12LCxx (xx=01 for US language; 02 for SP language)				
Battery Pack		Getac Technology Corp	HB FFRD	7.5V, 7100 mAh, 53.25Whr			
Web Camera		CHICONY Electronics Co., Ltd.	CKFCF01				
WLAN+BT Combo Module		Broadcom	AW-NB136	IEEE 802.11a/b/g+ 2X2 n Bluetooth 4.0+Low Energy			
WWAN		Huawei	MU736	WCDMA/HSDPA/HSUPA /HSPA GSM/GPRS/EDGE, GPS/A-GPS			
WWAN I	Main	TE Connectivity	1556567				
Antenna A	AUX	Ltd.	1556569				
WiFi/BT	Main	TE Connectivity	1556570				
Antenna 🛛	AUX	Ltd.	1556568				
AC Adapter #1		Chicony	A12-045N2A	I/P: 100-240V~, 1.3A 50-60Hz O/P: 19V, 2.37A			
		DC Power Cord: Non-Shielded, Undetached, 1.0m					
		AC Power Cord: Non-Shielded, Detached, 1.8m					
AC Adapta	or #2	Delta	ADP-45BE AA	I/P: 100-240V~, 1.3A 50-60Hz O/P: 20V, 2.25A			
AU Adapter #2		DC Power Cord: Non-Shielded, Undetached, 1.0m AC Power Cord: Non-Shielded, Detached, 1.8m					

1.3.1. For the All Component Lists

Remark: For a more detailed features description, please refer to the manufacturer's specifications or the user manual.

Configuration	SKU #1	
System	Microsoft, Windows 8	
Main Board	Flex, 832-FIG-ITLH-G71865-400	
LCD Panel	Chimei Innolux Corp., N133HSE-EXX	
CPU	Intel, i7-4650U	
Graphics	Intel, Intel® HD Graphics with DX11	
Memory	Samsung, K4E8E304EB-EGCE, 4GB	
SSD	Samsung, MZNTD128HAGM	
Keyboard	YH-BH12LC01	
Battery Pack	Getac Technology Corp, M/N HB FFRD	
Web Camera	CHICONY Electronics Co., Ltd., CKFCF01	
WLAN+BT Combo Module	Broadcom, M/N AW-NB136	
WWAN	Huawei, M/N MU736	
WLAN/BT Antenna	Main: TE Connectivity Ltd., 1556570	
	AUX: TE Connectivity Ltd., 1556570	
WWAN Antenna	Main: TE Connectivity Ltd., 1556567	
	AUX: TE Connectivity Ltd., 1556569	
AC Adapter	Chicony, M/N A12-045N2A	
Resolution	1920*1080	

1.3.2. For the EUT Test Configuration

## 1.4. Tested Supporting System Details

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Monitor	DELL	U3011T	CN-0C34G2-74445 -29I-031L	FCC DoC Approved
2.	USB 3.0 External HDD	BUFFALO	HD-LBU3	55292020409776	FCC DoC Approved
3.	USB Mouse	DELL	MS111-T	CN-0KW2YH-716 16-282-0XYP	FCC DoC Approved
4.	Earphone	APPLE	N/A	N/A	N/A
5.	SD Card	ADATA	AD4GSDHC4-S	N/A	N/A
6.	SIM Card	Taiwan Mobile	0907 41 003894 5	N/A	N/A
7.	AP Server	LG	Di-624	F34U177001194	KA2DI624D2
8.	Bluetooth Headset	INNOSTAR	IH-05	N/A	UU9MBH200

### 1.4.1. Support Peripheral Unit

#### 1.4.2. Cable Lists

No.	Signal Cable Description Of The Above Support Units
1.	N/A
2.	USB Cable: Shielded, Detachable, 1.0m
3.	USB Cable: Shielded, Undetachable, 1.8m
4.	Earphone Cable: Non-Shielded, Detachable, 0.9m
5.	N/A
6.	N/A
7.	N/A
8.	N/A

Note: 1. Support Unit 1: Power Cord: Non-Shielded, Detachable, 1.8m

- Support Unit 2 AC Adapter: BUFFALO, M/N: WA-18H12, S/N: 219019279; Cord: Non-Shielded, Undetachable, 1.5m
- 3 Support Unit 7 AC Adapter: D-Link, M/N: AM-91000A; Cord: Non-Shielded, Detachable, 1.8m
- 4. The support units (7-8) are communicated partner system.

## 1.5. Description of Test Facility

Name of Firm	:	AUDIX Technology Corporation EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan, R.O.C.
Test Location & Facility (C7AC)	:	<b>No. 7 Shielded Room</b> No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan, R.O.C.
		<b>Semi-Anechoic Chamber</b> No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan, R.O.C. May 11, 2012 Renewal on Federal Communication Commission Registration Number: 90993
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724

## 1.6. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conduction Test	150kHz~30MHz	±1.73dB
	30MHz~300MHz	±2.91dB
Radiation Test	300MHz~1000MHz	±2.94dB
(Distance, 511)	Above 1GHz	± 5.02dB

Remark : Uncertainty =  $ku_c(y)$ 

Test Item	Uncertainty
20dB Bandwidth	$\pm 0.2 \mathrm{kHz}$
Carrier Frequency Separation	$\pm 0.2 \mathrm{kHz}$
Time Of Occupancy	$\pm 0.03 sec$
Maximum peak Output power	± 0.52dBm
Emission Limitations	± 0.13dB
Band Edges	± 0.13dB

## 2. POWERLINE CONDUCTED EMISSION MEASUREMENT

## 2.1. Test Equipment

The following test equipment were used during the power line conducted measurement: (No. 7 Shielded Room)

Item	Туре	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101276	Apr. 30, 12'	Apr. 29, 13'
2.	A.M.N.	R&S	ENV4200	100169	May 04, 12'	May 03, 13'
3.	L.I.S.N.	Kyoritsu	KNW-407	8-881-13	Feb. 01, 12'	Jan. 31, 13'
4.	Pulse Limiter	R&S	ESH3-Z2	101495	Mar. 26, 12'	Mar. 25, 13'

## 2.2. Block Diagram of Test Setup



2.3. Powerline Conducted Emission Limit (§15.207, RSS-Gen

§7.2.2/Table 2)

Fraguanay	Maximum RF Line Voltage				
Frequency	Quasi-Peak Level	Average Level			
150kHz ~ 500kHz	$66 \sim 56 \text{ dB}\mu\text{V}$	$56 \sim 46 \; dB \mu V$			
$500 \mathrm{kHz} \sim 5 \mathrm{MHz}$	56 dBµV	46 dBµV			
5MHz ~ 30MHz	60 dBµV	50 dBµV			

Remark1.: If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.

2.: The lower limit applies at the band edges.

### 2.4. Operating Condition of EUT

- 2.4.1. Setup the EUT and simulator as shown on 2.2.
- 2.4.2. Turn on the power of all equipment.
- 2.4.3. Set to EUT (Notebook) on transmitting and receiving during all testing.

### 2.5. Test Procedure

The EUT link AC adapter was put on table which was above the ground by 80cm and its AC adapter's power cord was connected to power mains through an Artificial Mains Network (A.M.N.). This provided a 50 ohm coupling impedance for the measuring equipment. (Please refer to the block diagram of the test setup and photographs.) Both sides of A.C. line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions simulators of the interface cables should be manipulated according to FCC ANSI C63.4-2003, RSS-Gen and RSS-210 during conducted measurement.

The bandwidth of the R & S Test Receiver ESCI was set at 10kHz.

The frequency range from 150kHz to 30MHz was checked.

All the final readings from Test Receiver were measured with the Quasi-Peak detector and Average detector. (Remark: If the Average limit is met when using a Quasi-Peak detector, the Average detector is unnecessary)

### 2.6. Powerline Conducted Emission Measurement Results

**PASSED**. All emissions not reported below are too low against the prescribed limits.

The EUT was measured during this section testing and all the test results are listed in next pages.

EUT : Notebook Model No. : HSBUB-SDS

Test Date: Dec. 25, 2012 Temperature: 25 Humidity: 52%

The details are as follows :

Mada	Reference Test Data					
Mode	Neutral	Line				
1.	# 4	# 3				



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		AMN.	Cable		Emission			
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB)	(dB)	(dBµV)	(dBµV)	(dBµV)	(dB)	
1	0.15	10.23	9.92	20.48	40.63	55.82	15.19	Average
2	0.15	10.23	9.92	38.10	58.25	65.82	7.57	QP
3	0.19	10.23	9.93	16.57	36.73	53.84	17.11	Average
4	0.19	10.23	9.93	38.65	58.81	63.84	5.03	QP
5	0.26	10.21	9.95	17.54	37.70	51.38	13.68	Average
6	0.26	10.21	9.95	32.62	52.78	61.38	8.60	QP
7	0.32	10.19	9.96	10.98	31.13	49.66	18.53	Average
8	0.32	10.19	9.96	28.89	49.04	59.66	10.62	QP
9	0.46	10.17	9.98	7.87	28.02	46.76	18.74	Average
10	0.46	10.17	9.98	22.28	42.43	56.76	14.33	QP
11	2.36	10.14	10.00	6.83	26.97	46.00	19.03	Average
12	2.36	10.14	10.00	13.29	33.43	56.00	22.57	QP
Remarks	: 1. Em	ission	Level=	AMN Facto	or + Cable	Loss +	Reading.	
	2. If	the av	erage l	imit is m	ıet when u	sing a q	uasi-pea	k detector
	th	e EUT s	hall be	deemed t	o meet bo	th limit	s and me	asurement
	wi	th aver	age det	ector is	unnecessa	ry.		



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		AMN.	Cable		Emission			
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB)	(dB)	(dBµV)	(dBµV)	(dBµV)	(dB)	
1	0.15	10.22	9.92	25.10	45.24	55.91	10.67	Average
2	0.15	10.22	9.92	36.25	56.39	65.91	9.52	QP
3	0.19	10.24	9.93	22.73	42.90	53.93	11.03	Average
4	0.19	10.24	9.93	38.38	58.55	63.93	5.38	QP
5	0.26	10.23	9.95	14.65	34.83	51.56	16.73	Average
6	0.26	10.23	9.95	33.06	53.24	61.56	8.32	QP
7	0.33	10.21	9.96	15.50	35.67	49.57	13.90	Average
8	0.33	10.21	9.96	28.65	48.82	59.57	10.75	QP
9	0.67	10.19	9.99	5.06	25.24	46.00	20.76	Average
10	0.67	10.19	9.99	18.76	38.94	56.00	17.06	QP
11	1.15	10.18	10.00	5.19	25.37	46.00	20.63	Average
12	1.15	10.18	10.00	12.71	32.89	56.00	23.11	QP
Remarks	: 1. Em	ission	Level=	AMN Facto	or + Cable	Loss +	Reading.	
	2. If	the ave	erage l	imit is m	iet when u	sing a q	uasi-pea	k detector
	th	e EUT sl	hall be	deemed t	o meet bo	th limit	s and me	asurement
	wi	th avera	age det	ector is	unnecessa	ry.		

## **3. RADIATED EMISSION MEASUREMENT**

## 3.1. Test Equipment

The following test equipment was used during the radiated emission measurement:

Item	Туре	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 08, 12'	Aug. 06, 13'
2.	Test Receiver	R & S	ESCS30	100338	Jul. 04, 12'	Jul. 03, 13'
3.	Amplifier	HP	8447D	2944A06305	Feb. 13, 12'	Feb. 12, 13'
4.	Biconical Antenna	CHASE	VBA6106A	1264	Mar. 03, 12'	Mar. 02, 13'
5.	Log Periodic Antenna	Schwarzbeck	UHALP9108- A	0810	Mar. 03, 12'	Mar. 02, 13'

3.1.1. For Frequency Range 30MHz~1000MHz (at Semi-Anechoic Chamber)

3.1.2. For Frequency Above 1GHz (at Semi-Anechoic Chamber)

Item	Туре	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 07, 12'	Aug. 06, 13'
2.	Test Receiver	R & S	ESCS30	100338	Jul. 04, 12'	Jul. 03, 13'
3.	Pre-Amplifier	HP	8449B	3008A02678	Mar. 07, 12'	Mar. 06, 13'
4.	2.4GHz Notch Filter	EWT	EWT-14-0070 -R1	G2	Feb. 14, 12'	Feb. 13, 13'
5.	3.5G High Pass Filter	HP	84300-80038	005	Dec. 14, 12'	Dec. 13, 13'
6.	Horn Antenna	EMCO	3115	9112-3775	May 09, 12'	May 08, 13'
7.	Horn Antenna	EMCO	3116	2653	Oct. 15, 12'	Oct. 14, 13'

## 3.2. Block Diagram of Test Setup

3.2.1. Block Diagram of connection between EUT and simulators





3.2.3. Semi-Anechoic Chamber (3m) Setup Diagram for above 1GHz ANTENNA TOWER



Frequency	Distance Motors	Field Strengths Limits		
MHz	Distance Meters	μV/m	dBµV/m	
30 ~ 88	3	100	40.0	
88 ~ 216	3	150	43.5	
$216 \sim 960$	3	200	46.0	
Above 960	3	500	54.0	
Above 1000	2	$74.0 \text{ dB}\mu\text{V/m}$ (Peak)		
	3	54.0 dBµV	/m (Average)	

### 3.3. Radiated Emission Limits (§15.209, RSS-210 §2.7/Table 2)

Remark : (1) Emission level  $(dB\mu V/m) = 20 \log Emission level (\mu V/m)$ 

- (2) The tighter limit applies at the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) The limits in this table are based on CFR 47 Part 15.205(a)(b) and Part 15.209 (a).
- (5) The over 1GHz limit, FCC limit is used based on CFR 47 Part 15.35 (b) and Part 15.205(b) & Part 15.209(e) and Part 15.207(c).

## 3.4. Operating Condition of EUT

- 3.4.1. Set up the EUT (Notebook) and simulator as shown on 3.2.1.
- 3.4.2. To turn on the power of all equipments.
- 3.4.3. The **EUT (Notebook)** set to continuously transmit signals at 2402MHz, 2441MHz and 2480MHz during all test time. (The test program is WIN8App)

## 3.5. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna such as calibrated biconical and log-periodical antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to FCC ANSI C63.4-2003, RSS-Gen and RSS-210 regulation, and the measurement guideline was according to FCC Public Notice DA 00-705. The bandwidth of the R&S Test Receiver ESCS30 was set at 120kHz. (For 30MHz to 1000MHz)

The resolution bandwidth and video bandwidth of test spectrum analyzer is 1MHz for peak detection (PK) at frequency above 1GHz.

The resolution bandwidth of test spectrum analyzer is 1MHz and the video bandwidth is 10Hz for average detection (AV) at frequency above 1GHz.

The frequency range from 30MHz to 40GHz (Up to 10<sup>th</sup> harmonics from fundamental frequency) was checked.

Above 1GHz was measured with peak and average detector. For frequency from 1GHz to 40GHz, we checked it in 1 meter distance and with a shorter cable 2 meter instead of original's. There is no signal exist.

Pursuant to ANSI C63.4 8.3.1.2, when peak value complies with the average limit, we didn't perform measurement in average detector.

#### 3.6. Radiated Emission Measurement Results

**PASSED**. (All the emissions not reported below are too low against the prescribed limits.)

EUT: Notebook	M/N: HSBUB-SDS

Test Date: Feb. 01, 2013 Temperature: 26 Humidity: 61%

#### For Frequency Range 30MHz-1000MHz:

#### [Note: We performed testing of the highest data rate.]

The EUT linked to AC adapter with the following test modes were tested during the testing and all the test results are listed in section 3.6.1.

No	Test Mode and Frequency		Reference Test Data No.		
10.	Test Mo	de and Frequency	Horizontal	Vertical	
1.		2402MHz (CH0)	# 2	# 1	
2.	Transmitting	2441MHz (CH39)	# 2	# 1	
3.		2480MHz (CH78)	# 2	# 1	

Type of modulation: 8-DPSK.

All above final readings were measured with Quasi-Peak detector.

#### For Frequency Range above 1GHz:

#### [Note: We performed testing of the highest data rate.]

The EUT linked to AC adapter with following test modes was performed during this section testing and all the test results are listed in section 3.6.2.

Mode	Chnnel	Frequency	Test Mode	Position	Test Frequency Range
1.					1000-2680MHz*
2.	00	240214117	Transmit	Stand	2680-5500MHz*
3.	00	2402MITZ	Tansiint	Stand	5500-18000MHz
4.					18000-25000MHz
5.					1000-2680MHz*
6.	20	2441MUz	Transmit	Stand	2680-5500MHz*
7.	39	2441101612	Transmit	Stand	5500-18000MHz
8.					18000-25000MHz
9.					1000-2680MHz*
10.	79	2480MUz	Transmit	Stand	2680-5500MHz*
11.	/0	2460MITZ	Tansiint	Stallu	5500-18000MHz
12.					18000-25000MHz

Type of modulation: 8-DPSK.

Note: 1. Above all final readings were measured with Peak detector.

- 2. For measurements above 1GHz to 2.68GHz or 2.68GHz-5.5GHz, the peak measured value complies with the average limit, it is unnecessary to perform an average measurement. (According to ANSI C63.4-2003 section 8.3.1.2)
- 3. The emissions (up to 40GHz) not reported are too low to be measured.

### For Restricted Bands:

#### [Note: We performed testing of the highest data rate.]

The EUT linked to AC adapter was tested in restricted bands and all the test results are listed in section 3.6.3. (The restricted bands defined in part 15.205(a))

No	Tost M	ada and Fraguanay	Reference Test Data No.		
INU.	I ESt IVI	oue and Frequency	Horizontal	Vertical	
1.	Transmitting	2402MHz (CH0)	# 2	# 1	
2.	Transmitting	2480MHz (CH78)	# 4	# 3	

Type of modulation: 8-DPSK.

## 3.6.1. Frequency Range 30MHz-1000MHz Measurement Result

#### Transmit, Frequency: 2402MHz (8-DPSK)

	1						
Site no. : Dis. / Ant. : Limit : Env. / Ins. : EUT : Power Rating : Test Mode :	A/C Ch: 3m VI FCC PAI E4446A HSBUB-: AC120 , TX2402	amber 8A61062 RT-15C 26°C/0 SDS / 60Hz	4/UHALP91	Dat 08A Ant	za no. : z. pol. :	2 HORIZON Djianlu	WTAL un_hung
Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
240.330 337.800 481.300 672.400	23.10 15.09 18.74 22.85	3.40 4.25 6.10 6.40	4.10 7.66 5.20 4.35	30.60 27.00 30.04 33.60	46.00 46.00 46.00 46.00 46.00	15.40 19.00 15.96 12.40	Peak Peak Peak Peak Peak
Remarks: 1. En 2. Th li	hission : he emiss: .mit are	Level= ion lev not ro	Antenna vels that eported.	Factor + ( are 20dB	Cable Los: below the	s + Read e offici	ling. Lal
Dis. / Ant. :	3m VI FCC PAI E4446A	BA61062 RT-15C 26°C/0 SDS	4/UHALP91	08A Ant	5. pol. :	VERTICA	AL un_hung
Simit : Env. / Ins. : SUT : Power Rating : Fest Mode :	HSBUB-: AC120 , TX2402	/ 60Hz					
Freq. (MHZ)	HSBUB-: AC120 , TX2402 Ant. Factor (dB/m)	/ 60Hz Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark

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#### Transmit, Frequency: 2441MHz (8-DPSK)

11 ai	151111, 1110	1ucncy. 27711		N)			
Site Dis. Limit Env. EUT Power Test	no. : / Ant. : t : / Ins. : : r Rating : Mode :	A/C Chamber 3m VBA6106 FCC PART-15C E4446A 26°C/ H3BUB-SDS AC120 / 60Hz TX2441	A/UHALP9108A 61%	Data no. Ant. pol	: 2 . : HORIZON Djianlu	NTAL un_hung	
	Freq. (MHz)	Ant. Cable Factor Loss (dB/m) (dB)	Em Reading I (dBµV) (d	ission evel Limi BµV/m) (dBµV	ts Margin '/m) (dB)	Remark	
	223.590	21.96 3.30	5.78 3	1.04 46.0	0 14.96	Peak	
	481.300	18.74 6.10	5.44 3	0.28 46.0	0 15.72	Peak	
Remai	cks: 1. Em 2. Th li	ission Level= e emission le mit are not r	Antenna Fac vels that ar eported.	tor + Cable e 20dB below	Loss + Read the offic:	ding. ial	
Site	no. :	A/C Chamber	. /	Data no.	: 1		
Dis. Limit Env. EUT Power Test	/ Ant. : t : / Ins. : : r Rating : Mode :	3m VBA6106 FCC PART-15C E4446A 26°C/ HSBUB-SDS AC120 / 60Hz TX2441	a/UHALP9108A 61%	. Ant. pol	. : VERTIC.	AL un_hung	
	Freq. (MHz)	Ant. Cable Factor Loss (dB/m) (dB)	Em Reading I (dBµV) (d	ission evel Limi BµV/m) (dBµV	ts Margin '/m) (dB)	Remark	
	93.990	16.37 2.00	14.21 3	2.58 43.5	0 10.92	Peak	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

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#### Transmit, Frequency: 2480MHz (8-DPSK)

Site no. : A/C Chamber Data no. : 2 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL Limit : FCC PART-15C Env. / Ins. : E4446A 26°C/61% Dijanlun hung
EUT : HSBUB-SDS Power Rating : AC120 / 60Hz Test Mode : TX2480
Ant. Cable Emission Freq. Factor Loss Reading Level Limits Margin Remark (MHz) (dB/m) (dB) (dBµV) (dBµV/m) (dB) 
672.400 22.85 6.40 5.21 34.46 46.00 11.54 Peak
2. The emission levels that are 20dB below the official limit are not reported.
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
Site no. : A/C Chamber Data no. : I Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL Limit : FCC PART-15C Env. / Ins. : E4446A 26°C/61% Djianlun_hung EUT : HSBUB-SDS Power Rating : AC120 / 60Hz Test Mode : TX2480
Site no.       : A/C Chamber       Data no. : I         Dis. / Ant.       : 3m       VBA6106A/UHALP9108A       Ant. pol. : VERTICAL         Limit       : FCC PART-15C       Djianlun_hung         Env. / Ins.       : E4446A 26°C/61%       Djianlun_hung         EUT       : HSBUB-SDS       Power Rating : AC120 / 60Hz         Test Mode       : TX2480         Ant. Cable         Emission         Freq.       Factor Loss Reading         Level       Limits         MHz)       (dB/m)         (dB/m)       (dBµV)         (dBµV/m)       (dBµV/m)

 I. Emission level Antenna ractor + cable boss + Reading
 2. The emission levels that are 20dB below the official limit are not reported.

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Date of Test:		Feb. 01, 2	2013	Temp	perature:	26		
EUT:		Notebook		H	umidity:	61%		
Test Mode:	Transmitting Mode, Frequency: 2402MHz, 8-DPSK							
Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Horizontal	Emission Level Horizontal	Limits	Margin		
(MHz)	(dB/m)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)		
3207.340	30.77	7.36	14.53	52.66	74.00	21.34		
Remarks 1 E								

3.6.2. For Above 1GHz Frequency Range Measurement Results

nission level=Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official limit are not reported.

3. All final readings of measurement were with Peak values.

4. The pre-amplifier factor has been subtracted by test program actively.

Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value	Limit	Margin			
(MHz)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)			
3207.34	52.66	-30.54	22.12	54.00	31.88			
Pamarks: 1 Duty Cycle Correction Factor -								

Remarks: 1. Duty Cycle Correction Factor =

20log(dwell time/100ms)=20log(2.970ms/100ms)=-30.54

2. Average value=Peak value+ Duty Cycle Correction Factor

3. All final readings of measurement were with Average values.

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Date of Test:		Feb. 01, 2	2013	Temp	perature:	26
EUT:	Notebook			H	umidity:	61%
Test Mode:	Tr	ansmitting	g Mode, Fred	quency: 24021	MHz, 8-DPSF	<u> </u>
Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Vertical	Emission Level Vertical	Limits	Margin
(MHz)	(dB/m)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
1599.760	26.08	6.14	17.34	49.55	74.00	24.45
3207.340	30.77	7.36	13.98	52.11	74.00	21.89

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official limit are not reported.

3. All final readings of measurement were with Peak values.

4. The pre-amplifier factor has been subtracted by test program actively.

Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value	Limit	Margin
(MHz)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
1599.76	49.55	-30.54	19.01	54.00	34.99
3207.34	52.11	-30.54	21.57	54.00	32.43

Remarks: 1. Duty Cycle Correction Factor =

20log(dwell time/100ms)=20log(2.970ms/100ms)=-30.54

2. Average value=Peak value+ Duty Cycle Correction Factor

3. All final readings of measurement were with Average values.

FCC ID. RMXHSBUB-SDS IC: 1000V-HSBUBSDS Page 28 of 99

Date of Test:	Feb. 01, 2013			Temp	perature:	26		
EUT:		Notebo	ok	H	umidity:	61%		
Test Mode: Transmitting Mode, Frequency: 2441MHz, 8-DPSK								
Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Horizontal	Emission Level Horizontal	Limits	Margin		
(MHz)	(dB/m)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)		
3255.280	30.87	7.40	10.08	48.34	74.00	25.66		

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official limit are not reported.

3. All final readings of measurement were with Peak values.

4. The pre-amplifier factor has been subtracted by test program actively.

Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value	Limit	Margin				
(MHz)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)				
3255.28	48.34	-30.54	17.80	54.00	36.20				
Pomerka: 1 Duty Cycle Correction Factor =									

Remarks: 1. Duty Cycle Correction Factor =

20log(dwell time/100ms)=20log(2.970ms/100ms)=-30.54

2. Average value=Peak value+ Duty Cycle Correction Factor

3. All final readings of measurement were with Average values.

FCC ID. RMXHSBUB-SDS IC: 1000V-HSBUBSDS Page 29 of 99

Date of Test:		Feb. 01, 2	2013	Temp	perature:	26		
EUT:		Notebo	ok	H	umidity:	61%		
Test Mode:	Transmitting Mode, Frequency: 2441MHz, 8-DPSK							
Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Vertical	Emission Level Vertical	Limits	Margin		
(MHz)	(dB/m)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)		
1599.760 2649.760 3255.280	26.08 29.21 30.87	6.14 6.71 7.40	18.51 16.14 12.15	50.72 52.06 50.41	74.00 74.00 74.00	23.28 21.94 23.59		

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official limit are not reported.

3. All final readings of measurement were with Peak values.

4. The pre-amplifier factor has been subtracted by test program actively.

Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Limit Value		Margin
(MHz)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
1599.76	50.72	-30.54	20.18	54.00	33.82
2649.76	52.06	-30.54	21.52	54.00	32.48
3255.28	50.41	-30.54	19.87	54.00	34.13

Remarks: 1. Duty Cycle Correction Factor =

20log(dwell time/100ms)=20log(2.970ms/100ms)=-30.54

2. Average value=Peak value+ Duty Cycle Correction Factor

3. All final readings of measurement were with Average values.

FCC ID. RMXHSBUB-SDS IC: 1000V-HSBUBSDS Page 30 of 99

Date of Test:		Feb. 01, 2	2013	Temp	perature:	26			
EUT:		Notebo	ook	H	umidity:	61%			
Test Mode:	Tr	ansmittin	g Mode, Freq	lode, Frequency: 2480MHz, 8-DPSK					
Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Horizontal	Emission Level Horizontal	Limits	Margin			
(MHz)	(dB/m)	(dB)	(dBµV)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)			
1599.760	26.08	6.14	14.89	47.10	74.00	26.90			
3311.680	30.96	7.49	9.93	48.37	74.00	25.63			

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official limit are not reported.

3. All final readings of measurement were with Peak values.

4. The pre-amplifier factor has been subtracted by test program actively.

Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value	Limit	Margin
(MHz)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
1599.76	47.1	-30.54	16.56	54.00	37.44
3311.68	48.37	-30.54	17.83	54.00	36.17

Remarks: 1. Duty Cycle Correction Factor =

20log(dwell time/100ms)=20log(2.970ms/100ms)=-30.54

2. Average value=Peak value+ Duty Cycle Correction Factor

3. All final readings of measurement were with Average values.

FCC ID. RMXHSBUB-SDS IC: 1000V-HSBUBSDS Page 31 of 99

Date of Test:		Feb. 01, 2	2013	Temp	perature:	26		
EUT:		Notebo	ook	H	umidity:	61%		
Test Mode:	Tra	Transmitting Mode, Frequency: 2480MHz, 8-DPSK						
Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Vertical	Emission Level Vertical	Limits	Margin		
(MHz)	(dB/m)	(dB)	$(dB\mu V)$	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)		
1599.760 3311.680	26.08 30.96	6.14 7.49	13.01 8.76	45.22 47.20	74.00 74.00	28.78 26.80		

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.

2. The emission levels that are 20dB below the official limit are not reported.

3. All final readings of measurement were with Peak values.

4. The pre-amplifier factor has been subtracted by test program actively.

Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value	Limit	Margin
(MHz)	(dB/m)	(dB)	$(dB\mu V/m)$	$(dB\mu V/m)$	(dB)
1599.76	45.22	-30.54	14.68	54.00	39.32
3311.68	47.20	-30.54	16.66	54.00	37.34

Remarks: 1. Duty Cycle Correction Factor =

20log(dwell time/100ms)=20log(2.970ms/100ms)=-30.54

2. Average value=Peak value+ Duty Cycle Correction Factor

3. All final readings of measurement were with Average values.

	Date of Test:	Feb. 01, 2013				Temperature:	26
	EUT:		No	otebook		Humidity:	61%
	Test Mode:		Tra	nsmit, Freque	ncy: 2402N	1Hz, 8-DPSK	
	Emission Frequency	Antenna Factor	Cable Loss	e Meter Reading Horizonta	Emissio Level I Horizont	n Limits	Margin
	(MHz)	(dB/m)	(dB)	(dBµV)	(dBµV/r	n) $(dB\mu V/m)$	(dB)
Peak *	2387.220	28.47	6.33	10.35	45.15	5 74.00	28.85
	Emission Frequ	ency Peak	x Value	Duty Cyc Correction I	cle Aver Factor Val	rage Limit ue	Margin
	(MHz)	(d	B/m)	(dB)	(dBµ	V/m) ( $dB\mu V/m$ )	(dB)
Average *	2387.220	4:	5.15	-30.54	14.	61 54.00	39.39
	 Data: 2  115	20 5. Th ac I(dBuv/im) File: C:Docur	llog(dw e pre-ar tively.	ell time/100ms nplifier factor ings呢-3)桌面に1M1212198	has been sub	70ms/100ms)=-30 tracted by test pro	.54 gram
	58 0 2310 Site no. Dis. / Ant. Limit Env. / Ins. EUT Power Rating Test Mode Freq. (MHz)	2332. : A/C Chamber : 3m 3115(49) : FCC PART-15C : E4446A 26°C/ : HSBUB-SDS : AC120 / 60Hz : TX2402 Ant. Cable Factor Loss (dB/m) (dB)	2354. F 27) (1G-PK) 61% Reading (dBµV)	Z376. requency (MHz) Data no. : Ant. pol. : Emission Level Limits (dBµV/m) (dBµV/m)	FCC PART-15C (10 FCC PART-15C (10 2 2 2 3 2 3 2 3 3 2 HORIZONTAL Djianlun_hung Margin Remark (dB)		

#### 3.6.3. Restricted Bands Measurement Results

FCC ID. RMXHSBUB-SDS IC: 1000V-HSBUBSDS Page 33 of 99

	Date of Test:	Feb. 01, 2013				Τe	emperature:	26		
	EUT:		N	otebook				Humidity:	61%	
	Test Mode:		Tra	insmit, F	Freque	ncy: 2402N	MHz, 8-DPSK			
	Emission Frequency	Antenna Factor	Cabl Loss	e N s Re Ve	feter ading ertical	Emissic Level Vertica	on ıl	Limits	Margin	
	(MHz)	(dB/m)	(dB)	) (d	BµV)	(dBµV/1	n)	$(dB\mu V/m)$	(dB)	
Peak *	2388.980	28.47	6.34	8	8.37	43.18	3	74.00	30.82	
	Emission Frequ	ency Peak	Value	Du Correc	ty Cyc ction F	le Aver actor Val	age ue	Limit	Margin	
	(MHz)	(d	B/m)		(dB)	(dBµ'	V/m)	$(dB\mu V/m)$	(dB)	
Average *	2388.980	43	3.18	-	30.54	12.	64	54.00	41.36	
	Data: 1 Leve 115 58 0 2310 Site no. Dis. / Ant. Limit Env. / Ins. EUT Power Rating Test Mode	I (dBuV/m)       File: C:Docul         I (dBuV/m)       File: C:Docul	2354 27) (1G-PK) 61%	ttings RF-3 读面(	376.	BTout of band.EMI (4)	<u>G-PK)</u> -6dB 			
	Freq. (MH2)  1 2388.98 2 2390.00 3 2401.52  Remarks: 1. 2	Ant. Cable Factor Loss (dB/m) (dB) 0 28.47 6.34 0 28.47 6.34 0 28.47 6.35 Emission Level= The emission Level	Reading (dBµV) 8.37 7.47 68.95 Antenna	Emission Level (dBµV/m) 	Limits (dBµV/m) 74.00 74.00 74.00  able Los	Margin Remark (dB) 30.82 Peak 31.72 Peak -29.77 Peak + Reading. e official	 @ 			

FCC ID. RMXHSBUB-SDS IC: 1000V-HSBUBSDS Page 34 of 99

	Date of Test:		Feb.	01, 2013		Temperature:	26
	EUT:		No	otebook		Humidity:	61%
	Test Mode:		Tra	nsmit, Freque	ncy: 2480MH	z, 8-DPSK	
	Emission Frequency	Antenna Factor	Cable Loss	e Meter Reading Horizonta	Emission Level I Horizontal	Limits	Margin
	(MHz)	(dB/m)	(dB)	(dBµV)	(dBµV/m)	$(dB\mu V/m)$	(dB)
Peak *	2483.500	28.66	6.45	23.48	58.59	74.00	15.41
	Emission Frequ	ency Peak	Value	Duty Cyc Correction F	le Average actor Value	e Limit	Margin
	(MHz)	(d	B/m)	(dB)	(dBµV/n	n) ( $dB\mu V/m$ )	(dB)
Average *	2483.500	58	8.59	-30.54	28.05	54.00	25.95
	Data: 4 115 58 0 2460	5. The ac	e pre-an tively. nents and Sett	nplifier factor	BTiout of band.EMI (4)  FCC PART-15C (1G-PK)  GdB  2516. 25	cted by test pro	gram
	Site no. Dis. / Ant. Limit Env. / Ins. EUT Power Rating Test Mode Freq. (MH2) 	: A/C Chamber : 3m 3115(49; : FCC PART-15C : E4446A 26°C/ : H3BUB-SD3 : AC120 / 60Hz : TX2480 Ant. Cable Factor Loss (dB/m) (dB) 	27) (IG-PK) 61% Reading (dBµV)  73.69 23.48 17.61  Antenna I vels that	Data no. : Ant. pol. : Level Limits (dBµV/m) (dBµV/m) 108.79 74.00 58.59 74.00 52.73 74.00 52.73 74.00 7actor + Cable Los are 20dB below th	4 HORIZONTAL Djianlun_hung (dB) 		

FCC ID. RMXHSBUB-SDS IC: 1000V-HSBUBSDS Page 35 of 99

	Date of Test:	Feb. 01, 2013				Te	emperature:	26
	EUT:		No	otebook			Humidity:	61%
	Test Mode:		Tra	nsmit, Freq	uency: 24	480MHz	, 8-DPSK	
	Emission Frequency	Antenna Factor	Cable Loss	e Meter Readir Vertic	r Em 1g L al Ve	nission evel ertical	Limits	Margin
	(MHz)	(dB/m)	(dB)	(dBµV	7) (dB	μV/m)	$(dB\mu V/m)$	(dB)
Peak *	2483.500	28.66	6.45	17.49	) 4	52.60	74.00	21.40
	Emission Freque	ency Peak	Value	Duty C Correction	ycle Factor	Average Value	Limit	Margin
	(MHz)	(dl	B/m)	(dB	) (	dBμV/m)	$(dB\mu V/m)$	(dB)
Average *	2483.500	52	2.60	-30.5	54	22.06	54.00	31.94
	Data: 3 Level 115	20 5. The ac (dBuV/m) File: C:Docur	log(dw e pre-ar tively.	ell time/100m nplifier facto tingsRF-3读面C1M121	ms)=20log or has been 2198/BT/out of ban	g(2.970ms n subtract	s/100ms)=-30 red by test pro	.54 gram
		/			FCÇ PAF	T-15C (1G-PK)		
	58		k			-6dB		
		manusat	hun	han an a		erelyna ywara		
	0 2460	2474.	2488. F	2502. requency (MHz)	2516.	2530		
	Site no. Dis. / Ant. Limit Env. / Ins. EUT Power Rating Test Mode	: A/C Chamber : 3m 3115(49) : FCC PART-15C : E4446A 26°C/0 : H3BUE-SDS : AC120 / 60Hz : TX2480	27) (1G-PK) 51%	Data no. Ant. pol	Data no. : 3 Ant. pol. : VERTICAL Djianlun_hu			
	Freq. (MHz)	Ant. Cable Factor Loss (dB/m) (dB)	Reading (dBµV)	Emission Level Limi (dBµV/m) (dBµV 	ts Margin P /m) (dB) 	emark 		
	2 2483.500 3 2483.870	) 28.66 6.45 ) 28.66 6.45	17.49 13.49	52.60 74.0 48.61 74.0	20.10 F 21.40 F 25.39 F	eak eak		
	Remarks: 1. E 2. J	Emission Level= The emission lev Limit are not re	Antenna vels that eported.	Factor + Cable are 20dB below	Loss + Readi the officia	ng. 1		

## 4. 20dB BANDWIDTH MEASUREMENT

## 4.1. Test Equipment

The following test equipment was used during the 20dB bandwidth measurement:

Item	Туре	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 17, 12'	Oct. 16, 13'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Mar. 21, 12'	Mar. 20, 13'

## 4.2. Block Diagram of Test Setup



## 4.3. Specification Limits [§15.247(a)(1), RSS-210 §A8.2 (a)]

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

## 4.4. Operating Condition of EUT

The test program "WIN8App" for Lowe Energy was used to enable the EUT to transmit data at different channel frequency individually.

## 4.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The RBW of the fundamental frequency was measure by spectrum analyzer 1% of the 20dB bandwidth and the setting equal to RBW and VBW is equal to RBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

The measurement guideline was according to FCC Public Notice DA 00-705.
### 4.6. Test Results

**PASSED.** All the test results are attached in next pages.

#### [Note: We performed testing of the highest and lowest data rate.]

#### EUT: Notebook M/N: HSBUB-SDS

Test Date: Jan. 23, 2013 Temperature: 24 Humidity: 50%

4.6.1. Type of Modulation: 8-DPSK

No.	Channel	Test Frequency	20dB Bandwidth	2/3 (20dB Bandwidth)
1.	0	2402MHz	1.275MHz	0.850MHz
2.	39	2441MHz	1.275MHz	0.850MHz
3.	78	2480MHz	1.275MHz	0.850MHz

The maximum two-thirds of the 20dB bandwidth shall be at maximum 0.850MHz.

4.6.2. Type of Modulation: GFSK

No.	Channel	Test Frequency	20dB Bandwidth	2/3 (20dB Bandwidth)
1.	0	2402MHz	924kHz	616kHz
2.	39	2441MHz	924kHz	616kHz
3.	78	2480MHz	924kHz	616kHz

The maximum two-thirds of the 20dB bandwidth shall be at maximum 616kHz.



#### Figure 1: 8-DPSK, Channel 0, Frequency: 2402MHz







#### Figure 3: 8-DPSK, Channel 78, Frequency: 2480MHz







#### Figure 5: GFSK, Channel 39, Frequency: 2441MHz





# 5. CARRIER FREQUENCY SEPARATION

# MEASUREMENT

## 5.1. Test Equipment

The following test equipment was used during the carrier frequency separation measurement:

Item	Туре	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 17, 12'	Oct. 16, 13'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Mar. 21, 12'	Mar. 20, 13'

## 5.2. Block Diagram of Test Setup

The same as section.4.2.

## 5.3. Specification Limits [§15.247(a)(1), RSS-210 §A8.2 (b)]

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output no greater than 125mW.

## 5.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

## 5.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The channel separation was measure by spectrum analyzer with RBW equal to 1% of the span. The video bandwidth not to be smaller than resolution bandwidth, the peak was mark on adjacent bandwidth, the between of peak is carrier frequency separation.

The measurement guideline was according to FCC Public Notice DA 00-705.

### 5.6. Test Results

**PASSED.** All the test results are attached in next pages.

#### [Note: We performed testing of the highest and lowest data rate.]

EUT: Notebook M/N: HSBUB-SDS

Test Date: Jan. 23, 2013 Temperature: 24 Humidity: 50%

- 5.6.1. Type of Modulation: 8-DPSK
  - 1. 2402MHz adjacent channel of carrier frequency separation: 1.008MHz<sub>o</sub>
  - 2. 2441MHz adjacent channel of right carrier frequency separation: 1.008MHz<sub>o</sub>
  - 3. 2441MHz adjacent channel of left carrier frequency separation: 1.008MHz<sub>o</sub>
  - 4. 2480MHz adjacent channel of carrier frequency separation: 1.008MHz₀

[Above values have met the requirement as specified in section 4.3: frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.]

#### 5.6.2. Type of Modulation: GFSK

- 1. 2402MHz adjacent channel of carrier frequency separation: 1.000MHz<sub>o</sub>
- 2. 2441MHz adjacent channel of right carrier frequency separation: 100MHz<sub>o</sub>
- 3. 2441MHz adjacent channel of left carrier frequency separation: 1.000MHz<sub>o</sub>
- 4. 2480MHz adjacent channel of carrier frequency separation: 1.000MHz<sub>o</sub>

[Above values have met the requirement as specified in section 4.3: frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.]



Figure 1: 8-DPSK, 2402MHz adjacent channel of carrier frequency separation







Figure 3: 8-DPSK, 2441MHz adjacent channel of left carrier frequency separation



Agilen	t Spectru	ım Anal	yzer - Swept Si	A							
<b>(%</b> )		85	50 Q DC			SENSE:INT	AL,	Ave Type:	l e a Durr	05:11:5	1 PM Jan 23, 2013
man	ker 17	Δ 1.	00800000		PNO: Far Gain:Low	Trig: Free #Atten: 30	Run dB	Avg Hold>	100/100		DET P NNNNN
10 dE	3/div	Ref 0 Ref ∷	ffset 1 dB 20.00 dBn	n						∆Mkr1 1. -	008 MHz 0.720 dB
10.0							▲1∆2				
0.00	M	- 11		m	2	mm	Mm				
-10.0	- W	~ 7	ų., no p		~ ~~~			and the second			
-20.0											
-30.0											
-40.0									mr	have	
-50.0											S.
-60.0											N. Ma
-70.0											
Cent #Res	ter 2.4 5 BW 3	8000 39 kH	0 GHz z		#VB	W 39 kHz			Swe	Span ep 3.20 ms	4.000 MHz (1001 pts)
MSG								STATUS			



## Figure 5: GFSK, 2402MHz adjacent channel of carrier frequency separation



Agilen	t Spectrum /	Analyzer - Swept S/	N.							
(Mori	kor 1 A	1 00000000	O MH-		SENSE:INT	AL,	Avg Type:	og-Pwr	03:36:5 TS	3 PM Jan 23, 2013
man	Ker 1 Δ	1.00000000		PNO: Far Gain:Low	Trig: Free #Atten: 30	Run dB	Avg Hold>	100/100		DET P NNNNN
10 dE	B/div R	ef Offset 1 dB ef 20.00 dBm	n						∆Mkr1 1.	000 MHz 1.099 dB
10.0						1∆2				
0.00	M		Nr 2		an	M.		Nan		, Sr
-10.0	5	Warn		man	N	J.	- And	v	h	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
-20.0		VW.		~\(\r.			Gen J C			
-30.0										
-40.0										
-50.0										
-60.0										
-70.0										
-10.0										
Cen #Re:	ter 2.441 s BW 39	000 GHz kHz		#VB	W 39 kHz			Swe	Span ep 3.20 ms	4.000 MHz (1001 pts)
MSG							STATUS			



## Figure 7: GFSK, 2441MHz adjacent channel of left carrier frequency separation



Agilen	t Spectru	um Anal	yzer - Swept SA	1							
Mari	ker 1	Δ 1.	50 0 DC	0 MHz		SENSEDNT	AL	Avg Type:	Log-Pwr	03:41: T	10 PM Jan 23, 2013 RACE 1 2 3 4 5 6
				15	PNO: Far 🕞 Gain:Low	Trig: Free #Atten: 30	Run dB	Avg Hold>	100/100		DET P N N N N N
10 dE	3/div	Ref ( Ref	offset 1 dB 20.00 dBm	1						∆Mkr1 1	.000 MHz -0.363 dB
209				3.0			▲1∆2				
10.0	m			m	2	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	W				
0.00	<u> </u>	5	mod	v-	m	N <sup>N</sup>	h.				
-10.0		Ň	www.		-nor	r –	N N	m			
-20.0		_									
-30.0								- '\_			
-40.0								-	W)		
-40.0									1 1	m	
-50.0									*	NA N	huna
-60.0		_									
-70.0		_									
Cen	ter 2.4	8000	0 GHz							Spar	4.000 MHz
#Res	S BW	39 kH	z		#VB	W 39 kHz			Swe	ep 3.20 m	s (1001 pts)
MSG								STATUS			

# 6. TIME OF OCCUPANCY MEASUREMENT

## 6.1. Test Equipment

The following test equipment was used during the time of occupancy measurement:

Item	Туре	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 17, 12'	Oct. 16, 13'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Mar. 21, 12'	Mar. 20, 13'

## 6.2. Block Diagram of Test Setup

The same as section.4.2.

## 6.3. Specification Limits [§15.247(a)(1)(iii), RSS-210 §A8.2 (d)]

Frequency hopping systems in the 2400-2483.5MHz shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by number of hopping channels employed.

## 6.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

## 6.5. Test Procedure

The EUT was connected to the notebook. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 1MHz RBW and 1MHz VBW. VBW≥RBW ; Span=zero span.

Centred on a hopping channel sweep=as necessary to capture the entire dwell time per hopping channel ; Detector function=peak ; Trace=Max hold The measurement guideline was according to FCC Public Notice DA 00-705.

#### 6.6. Test Results

**PASSED.** All the test results are attached in next pages.

#### [Note: We performed testing of the highest and lowest data rate.]

EUT: Notebook	M/N: HSBUB-SDS
---------------	----------------

Test Date: Jan. 16, 2013 Temperature: 25 Humidity: 60%

6.6.1. Type of Modulation: 8-DPSK, Test Frequency: 2402MHz

Duty cycle: 79channels\*0.4 seconds = 31.6 seconds

- 3DH1 : For each 5 seconds of 49 channels appearance, the longest time of occupancy for each of 31.6 seconds is:
  49 channels\*31.6 seconds/5\* 0.455ms = 140.90ms (<400ms)</li>
- 3DH3 : For each 5 seconds of 28 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

28 channels\*31.6 seconds/5\* 1.70ms = 300.83ms (<400ms)

3DH5 : For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

17 channels\*31.6 seconds/5\*2.96ms = 318.02ms (<400ms)



#### Figure 1: 8-DPSK, 2402MHz, 3DH1











#### Figure 3: 8-DPSK, 2402MHz, 3DH5



#### 6.6.2. Type of Modulation: 8-DPSK, Test Frequency: 2441MHz

Duty cycle: 79channels\*0.4 seconds = 31.6 seconds

- 3DH1 : For each 5 seconds of 50 channels appearance, the longest time of occupancy for each of 31.6 seconds is:
  50 channels\*31.6 seconds/5\* 0.445ms = 140.62ms (<400ms)</li>
- 3DH3 : For each 5 seconds of 23 channels appearance, the longest time of occupancy for each of 31.6 seconds is:
  23 channels\*31.6 seconds/5\* 1.695ms = 246.39ms (<400ms)</li>
- 3DH5 : For each 5 seconds of 18 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

18 channels\*31.6 seconds/5\*2.955ms = 336.16ms (<400ms)



Figure 1: 8-DPSK, 2441MHz, 3DH1









#### or 54 n Ar 08:09:37 PM Jan 16, 2013 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P NNNNN Marker 1 & 2.95500 ms Avg Type: Log-Pwr Trig: Free Run Atten: 30 dB PNO: Far IFGain:Low ∆Mkr1 2.955 ms -2.55 dB Ref Offset 1 dB Ref 20.00 dBm 10 dB/div 10.0 marrows 0.00 -10.0 -20.0 30.0 40.0 -50.0 1∆2 ∭101 ployphysigh -60.0 70.0 Span 0 Hz Sweep 5.000 ms (1001 pts) Center 2.441000000 GHz Res BW 1.0 MHz #VBW 1.0 MHz **K**STATUS SG





#### 6.6.3. Type of Modulation: 8-DPSK, Test Frequency: 2480MHz

Duty cycle: 79channels\*0.4 seconds = 31.6 seconds

3DH1 : For each 5 seconds of 51 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

51 channels\*31.6 seconds/5\* 0.44ms = 141.82ms (<400ms)

3DH3 : For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

25 channels\*31.6 seconds/5\* 1.695ms = 267.81ms (<400ms)

3DH5 : For each 5 seconds of 18 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

18 channels\*31.6 seconds/5\*2.97ms = 337.97ms (<400ms)



Figure 1: 8-DPSK, 2480MHz, 3DH1















#### 6.6.4. Type of Modulation: GFSK, Test Frequency: 2402MHz

Duty cycle: 79channels\*0.4 seconds = 31.6 seconds

DH1 : For each 5 seconds of 48 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

48 channels\*31.6 seconds/5\* 0.43ms = 130.44ms (<400ms)

DH3 : For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

25 channels\*31.6 seconds/5\* 1.71ms = 270.18ms (<400ms)

DH5 : For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

17 channels\*31.6 seconds/5\*2.95ms = 316.95ms (<400ms)

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#### Figure 4: GFSK, 2402MHz, DH1









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#### Figure 6: GFSK, 2402MHz, DH5





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#### 6.6.5. Type of Modulation: GFSK, Test Frequency: 2441MHz

Duty cycle: 79channels\*0.4 seconds = 31.6 seconds

DH1 : For each 5 seconds of 50 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

50 channels\*31.6 seconds/5\* 0.455ms = 143.78ms (<400ms)

DH3 : For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

25 channels\*31.6 seconds/5\* 1.685ms = 266.23ms (<400ms)

DH5 : For each 5 seconds of 16 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

16 channels\*31.6 seconds/5\*2.94ms = 297.29ms (<400ms)

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#### Figure 4: GFSK, 2441MHz, DH1



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### Figure 5: GFSK, 2441MHz, DH3





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#### Figure 6: GFSK, 2441MHz, DH5





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#### 6.6.6. Type of Modulation: GFSK, Test Frequency: 2480MHz

Duty cycle: 79channels\*0.4 seconds = 31.6 seconds

DH1 : For each 5 seconds of 49 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

49 channels\*31.6 seconds/5\* 0.44ms = 136.26ms (<400ms)

DH3 : For each 5 seconds of 24 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

24 channels\*31.6 seconds/5\* 1.685ms = 255.58ms (<400ms)

DH5 : For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

17 channels\*31.6 seconds/5\*2.935ms = 315.34ms (<400ms)

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Figure 4: GFSK, 2480MHz, DH1









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#### Figure 6: GFSK, 2480MHz, DH5





# 7. NUMBER OF HOPPING CHANNELS MEASUREMENT

## 7.1. Test Equipment

The following test equipment was used during the number of hopping channels measurement:

Item	Туре	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 17, 12'	Oct. 16, 13'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Mar. 21, 12'	Mar. 20, 13'

## 7.2. Block Diagram of Test Setup

The same as section.4.2.

## 7.3. Specification Limits [§15.247(a)(1)(iii), RSS-210 §A8.2 (d)]

Frequency hopping systems which use fewer than 20 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels.

## 7.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

## 7.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 100kHz RBW and 100kHz VBW. Sweep=Auto ; Detector function=peak ; Trace=Max hold

The measurement guideline was according to FCC Public Notice DA 00-705.
#### 7.6. Test Results

**PASSED.** All the test results are attached in next page.

### [Note: We performed testing of the highest and lowest data rate.]

Test Date Jan. 23, 2013 Temperature: 24 Humidity: 50%

7.6.1.Type of Modulation: 8-DPSK

The number hopping channel is 79.

7.6.2. Type of Modulation: GFSK

The number hopping channel is 79.

#### Figure 1: 8-DPSK



#### Figure 2: GFSK



# 8. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

#### 8.1. Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Туре	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 17, 12'	Oct. 16, 13'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Mar. 21, 12'	Mar. 20, 13'

#### 8.2. Block Diagram of Test Setup

The same as section.4.2.

8.3. Specification Limits [§15.247(b)-(1), RSS-210 §A8.4 (2)]

The Limits of maximum Peak Output Power for frequency hopping systems in 2400-2483.5MHz is: 0.125Watt. (21dBm)

## 8.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in 4.4.

#### 8.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. Span can encompass the waveform RBW>EBW VBW RBW Sweep=5MHz The measurement guideline was according to FCC Public Notice DA 00-705.

#### 8.6. Test Results

**PASSED.** All the test results are listed below

### [Note: We performed testing of the highest and lowest data rate.]

EUT: Notebook M/N: HSBUB-SDS

Test Date: Jan. 23, 2013 Temperature: 24 Humidity: 50%

8.6.1.Type of Modulation: 8-DPSK

No.	Channel	Test Frequency	Peak Output Power	Limit
1.	0	2402MHz	10.360dBm	21dBm
2.	39	2441MHz	11.164dBm	21dBm
3.	78	2480MHz	11.379dBm	21dBm

8.6.2.Type of Modulation: GFSK

No.	Channel	Test Frequency	Peak Output Power	Limit
1.	0	2402MHz	10.223dBm	21dBm
2.	39	2441MHz	10.904dBm	21dBm
3.	78	2480MHz	11.053dBm	21dBm

Agilen	t Spectri	ım Analyzer - Swept SA	l							
<mark>1)0</mark> Mari	kor 4	RF 50 Q DC			SENSE:INT	JA,	JGNAUTO	on-Pwr	06:06:1	7 PM Jan 23, 2013
war	Keri	2.402000000	IUU GHZ	PNO: Fast G	Trig: Free #Atten: 30	Run dB	Avg Hold>	100/100		DET P N N N N
10 de	B/div	Ref Offset 1 dB Ref 20.00 dBm	I					M	kr1 2.402 10.	000 GHz 360 dBm
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Cen #Re	ter 2.4 s BW	02000 GHz 2.0 MHz		#VB	W 3.0 MHz	1		Swe	Span	5.000 MHz
MSG							STATUS	- The		(

#### Figure 1: 8-DPSK, Channel 0, Frequency: 2402MHz



Agilent Spectre	um Analyzer - Swept SA						
<b>L)0</b>	RF 50 Ω DC	SEN	SE:INT	ALIGNAUTO		06:09:5	3 PM Jan 23, 2013
Marker 1	2.441025000000 GHz	PNO: Fast G	Trig: Free Run #Atten: 30 dB	Avg Type: L Avg Hold≫1	.og-Pwr 00/100	TR T	ACE 1 2 3 4 5 6 VPE MUMANN DET P N N N N N
10 dB/div	Ref Offset 1 dB Ref 20.00 dBm				Mkr	1 2.441 11.	025 GHz 164 dBm
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-30.0							
-40.0							
-50.0							
-60.0							
-70.0							
Center 2.4 #Res BW	41000 GHz 2.0 MHz	#VBW	3.0 MHz		Sweep	Span 1.00 ms	5.000 MHz (1001 pts)
MSG				STATUS			,,



#### Figure 3: 8-DPSK, Channel 78, Frequency: 2480MHz



Agilent Spectr	um Analyzer - Swept SA								
<mark>1,00</mark>	RF 50 Ω DC	00.011		SENSE:INT	A.	JGN AUTO	a a Duar	04:27:4	9 PM Jan 23, 2013
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10 dB/div	Ref Offset 1 dB Ref 20.00 dBm						M	kr1 2.402 10.	170 GHz 223 dBm
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-40.0									
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-60.0									
-70.0									
Center 2.4 #Res BW	02000 GHz 1.0 MHz		#VB	W 3.0 MHz	1		Swe	Span ep 2.53 ms	5.000 MHz (1001 pts)
MSG						STATUS			



#### Figure 5: GFSK, Channel 39, Frequency: 2441MHz





# 9. EMISSION LIMITATIONS MEASUREMENT

### 9.1. Test Equipment

The following test equipment was used during the emission limitations test :

Item	Туре	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 17, 12'	Oct. 16, 13'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Mar. 21, 12'	Mar. 20, 13'

#### 9.2. Block Diagram of Test Setup

The same as section.4.2.

## 9.3. Specification Limits (§15.247(c), RSS-210 §A8.5)

- 9.3.1. In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.205(c)).( This test result attaching to §3.6.3)
- 9.3.2. The reference level for determining limit of emission limitations is according to the value measured indicated in plots at section 8.6.

## 9.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

#### 9.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100kHz bandwidth from band edge.

The measurement guideline was according to FCC Public Notice DA 00-705.

9.6. Test Results

**PASSED.** The testing data was attached in the next pages.

Test Date: Jan. 31, 2012 Temperature : 24 Humidity : 60%

## 8-DPSK, Channel 0, Frequency: 2402MHz

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10.0									
tart 30. Res BV	0 MHz V 100 kHz		#V8	W 100 kHz			Sw	Stop reep 117 m	1.0000 GH
46						STATUS.			

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#50)				STATUS		and a state of the

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		Mkr1 5.795 GHz dBm
	Adama	A sharehouse
and and a second of the second s	advantining the state	and the second se
		Stop 15.000 GHz
	PHOL Feet Trig: Free Run BrGelniuw Alten: 20 dB	Arg Type: Leg-Per Biologian Trig: Free Run Biologian Arg Type: Leg-Per Arg Type: Leg

Stop Fre	eq 20.00000	0000 GHz	PND: Fast	Trig Free #Atten: 30	Run 48	Avg Type: Avgitteld 6	Leg-Pwr /100	12.340	6 DM 3m 01, 2013 GACE 1 2 3 4 5 6 Ture Grand And DET P N 11 11 14
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20.0									
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450						STATUS			

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85						STATUS			

#### 8-DPSK, Channel 39, Frequency: 2441MHz

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Start 1.000 GHz	#VBW 1	00 kHz	Sv	Stop 5.000 GHz
wsp.		Are Britt Mar	status	



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Stop Fre	eq 15.00000	0000 GHz	PHD: Fast	Trig Free #Atten: 30	Ran dB	Avg Type: Avg Hold: 3	Leg-Pur /100	12:40.2	24M 3er 31, 2013 WCE 1 2 3 4 5 6 Fore Montania Det P Not Not N
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MINE-						STATUS			

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			Stop 25.000 GHz
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### GFSK, Channel 0, Frequency: 2402MHz

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## GFSK, Channel 39, Frequency: 2441MHz

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#### GFSK, Channel 78, Frequency: 2480MHz

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## **10.BAND EDGES MEASUREMENT**

## 10.1.Test Equipment

The following test equipment was used during the band edges measurement:

Item	Туре	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 17, 12'	Oct. 16, 13'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Mar. 21, 12'	Mar. 20, 13'

#### 10.2.Block Diagram of Test Setup

The same as section.4.2.

## 10.3.Specification Limits [§15.247(c), RSS-210 §A8.5]

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)). (This test result attaching to §3.6.3)

## 10.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

#### 10.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100kHz bandwidth from band edge.

The measurement guideline was according to FCC Public Notice DA 00-705.

#### 10.6. Test Results

**PASSED.** The testing data was attached in the next pages.

#### [Note: We performed testing of the highest and lowest data rate.]

EUT: Notebook M/N: HSBUB-SDS

Test Date: Jan. 23, 2013 Temperature: 24 Humidity: 50%

- 10.6.1. Type of Modulation: 8-DPSK
  - Below Band edge : The highest emission level is -51.367dBm on 2.39990GHz<sub>o</sub>
  - Upper Band edge: The highest emission level is -55.283dBm on 2.48360GHz₀
- 10.6.2. Type of Modulation: GFSK
  - 1. Below Band edge : The highest emission level is -49.777dBm on  $2.39990GHz_{o}$
  - Upper Band edge: The highest emission level is -56.308dBm on 2.48360GHz₀



#### Figure 1: 8-DPSK, Below Band edge







#### Figure 3: GFSK, Below Band edge





# **11.DEVIATION TO TEST SPECIFICATIONS**

# [NONE]

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# **12.PHOTOGRAPHS**

## 12.1.Photos of Conducted Disturbance Measurement



FRONT VIEW OF CONDUCTED MEASUREMENT



BACK VIEW OF CONDUCTED MEASUREMENT

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12.2.Photos of Radiated Emission Measurement at Semi-Anechoic

## Chamber



12.2.1. Frequency Range 30MHz-1GHz

12.2.2. Frequency Range Above 1GHz



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## 12.3.Photo of Section RF Conducted Measurement