

RF TEST REPORT



Report No.: FCC_RF_SL15032301-SLX-004
Supersede Report No.: NONE

Applicant	:	Philips Medical Systems
Product Name	:	SDIO Wireless Module
Model No.	:	PH-SDMAN
Test Standard	:	47 CFR 15.247
Test Method	:	ANSI C63.10: 2009 558074 D01 DTS Meas Guidance v03r02
FCC ID	:	PQC-MX40WL3
IC ID	:	3549B-MX40WL3
Dates of test	:	04/22/2015-04/29/2015
Issue Date	:	05/07/2015
Test Result	:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
Equipment complied with the specification [X] Equipment did not comply with the specification []		

This Test Report is Issued Under the Authority of:

Nima Molaei	David Zhang
Test Engineer	Engineer Reviewer

Issued By:
SIEMIC Laboratories
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Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Accreditation Body	Scope
USA	FCC, A2LA	EMC, RF/Wireless, Telecom
Canada	IC, A2LA, NIST	EMC, RF/Wireless, Telecom
Taiwan	BSMI, NCC, NIST	EMC, RF, Telecom, Safety
Hong Kong	OFTA, NIST	RF/Wireless, Telecom
Australia	NATA, NIST	EMC, RF, Telecom, Safety
Korea	KCC/RRR, NIST	EMI, EMS, RF, Telecom, Safety
Japan	VCCI, JATE, TELEC, RFT	EMI, RF/Wireless, Telecom
Mexico	NOM, COFETEL, Caniety	Safety, EMC, RF/Wireless, Telecom
Europe	A2LA, NIST	EMC, RF, Telecom, Safety
Israel	MOC, NIST	EMC, RF, Telecom, Safety

Accreditations for Product Certifications

Country	Accreditation Body	Scope
USA	FCC TCB, NIST	EMC, RF, Telecom
Canada	IC FCB, NIST	EMC, RF, Telecom
Singapore	iDA, NIST	EMC, RF, Telecom
EU	NB	EMC & R&TTE Directive
Japan	MIC (RCB 208)	RF, Telecom
Hong Kong	OFTA (US002)	RF, Telecom

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1 Report Revision History

Report No.	Report Version	Description	Issue Date
FCC_RF_SL15032301-SLX-004	None	Original	05/07/2015

2 Executive Summary

The purpose of this test program was to demonstrate compliance of following product

Company: Philips Medical Systems
Product: SDIO Wireless Module
Model: PH-SDMAN

against the current Stipulated Standards. This report is not a complete test report compliant to Stipulated Standard listed on 1st page. The purpose of this report is to present additional measurement data for 11g and 11n-20 mode only due to the increase of output power with higher power level setting.

All other modes will keep the same power level setting thus having the same output power. No extra measurement is required for these modes and please refer to original report (Report No. : 32IE0154-HO-01)

3 Customer information

Applicant Name	:	Philips Medical Systems
Applicant Address	:	3000 Minuteman Road, Andover, MA 01810
Manufacturer Name	:	Philips Medical Systems
Manufacturer Address	:	3000 Minuteman Road, Andover, MA 01810

4 Test site information

Lab performing tests	SIEMIC Laboratories
Lab Address	775 Montague Expressway, Milpitas, CA 95035
FCC Test Site No.	881796
IC Test Site No.	4842D-2
VCCI Test Site No.	A0133

5 Modification

Index	Item	Description	Note
-	-	-	-

6 EUT Information

6.1 EUT Description

Product Name	:	SDIO Wireless Module
Model No.	:	PH-SDMAN
Trade Name	:	Philips Medical
Serial No.	:	84253F010282
Host Model No.	:	N/A
EUT DC Input Power	:	3.3VDC
Adapter Input Power	:	N/A
Power Adapter SN	:	N/A
Product Hardware version	:	rev A
Product Software version	:	V3.4.158.35
Radio Hardware version	:	rev A
Radio Software version	:	V3.4.158.35
Test Software version	:	Athtestcmd v3.4
Date of EUT received	:	11/10/2014
Equipment Class/ Category	:	DTS, UNII
Port/Connectors	:	N/A

6.2 Radio Description

Radio Type	802.11b	802.11g	802.11a	802.11n-20M	802.11n-40M
Operating Frequency	2412-2462MHz	2412-2462MHz	5180-5240MHz 5260-5320MHz 5500-5700MHz 5725-5825MHz	2412-2462MHz 5180-5240MHz 5240-5320MHz 5500-5700MHz 5725-5825MHz	2422-2452MHz 5190-5230MHz 5270-5310MHz 5510-5670MHz 5755-5795MHz
Modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)	OFDM (BPSK, QPSK, 16QAM, 64QAM)
Channel Spacing	5MHz	5MHz	20MHz	5MHz(2.4GHz), 20MHz (5GHz)	40MHz
Number of Channels	11	11	19	11(2.4GH) 19 (5GHz)	7(2.4GH) 9(5GHz)
Antenna Type	Philips P/N (453564553001r1444) Note: Laird antenna (Model: MAP24174 with short cable) Philips P/N (453564252521r1444) Note: Laird antenna (Model: MAP24174 with long cable)				
Antenna Gain (Peak)	3.9dBi (2.4~2.5GHz), 4.1dBi (4.9~5.8GHz) - P/N (453564252521r1444) 4.2dBi (2.4~2.5GHz), 4.4dBi (4.9~5.8GHz) - P/N (453564553001r1444)				
Antenna Connector Type	U. FL connector				

6.3 EUT test modes/configuration Description

802.11 g/n-2.4GHz

Test Item	Operating mode	Tested antenna port	Test frequencies
Peak output Power	Cont-TX, 11g, 11n-20	TX port 1,2	Low, Mid, High
Peak Spectral Density	Cont-TX, 11g, 11n-20	TX port 1,2	Low, Mid, High
Transmitter Radiated Spurious Emissions	Cont-TX, 11g, 11n-20	TX port 1,2	Low, Mid, High
Note:	<p>This report is not a complete test report compliant to Stipulated Standard listed on 1st page. The purpose of this report is to present additional measurement data for 11g and 11n-20 mode only due to the increase of output power with higher power level setting. All other modes will keep the same power level setting thus having the same output power. No extra measurement is required for these modes and please refer to original report (Report No.: 32IE0154-HO-01)</p> <p>EUT has 2 chains however they will not transmit simultaneously. Both chains were evaluated, they have similar results. So, only worse case result was represented in this report.</p>		

6.4 EUT Power Level Setting

Channel	Frequency	Mode	Power Setting
1	2412	802.11g	13
7	2437	802.11g	13
13	2462	802.11g	13
1	2412	802.11n-20	11
7	2437	802.11n-20	11
13	2462	802.11n-20	11

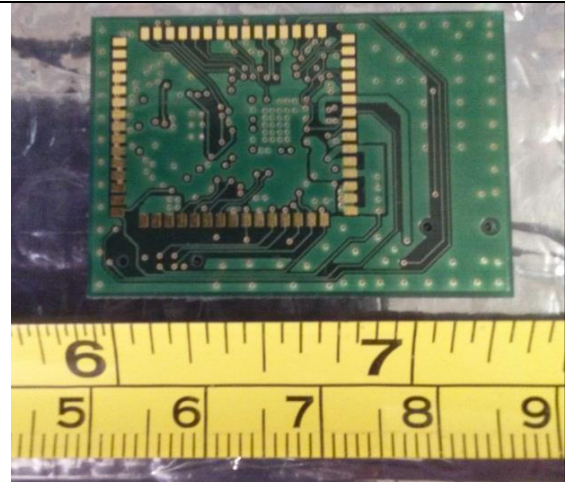
6.5 Test Software Description

Item	Software	Description
RF Testing	ProcomPlus	Set the EUT to transmit continuously in different test mode

6.6 EUT Photos



EUT-RF Board Top View



EUT-RF Board Bottom View



Laird antenna - P/N (453564553001r1444) Top View



Laird antenna - P/N (453564553001r1444) Bottom View



Laird antenna - P/N (453564252521r1444) Top View

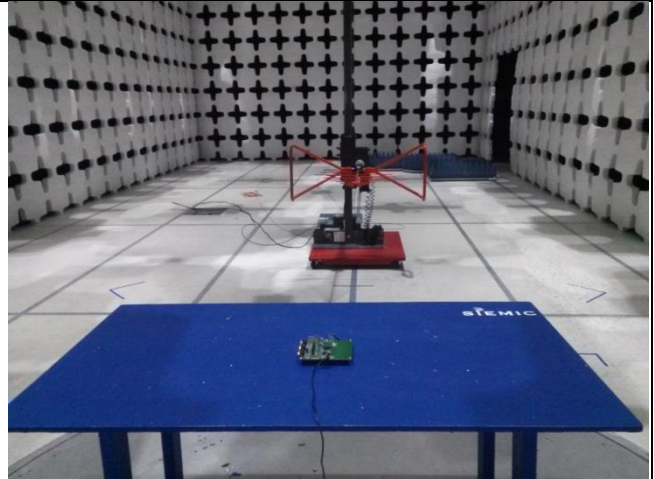


Laird antenna - P/N (453564252521r1444) Bottom View

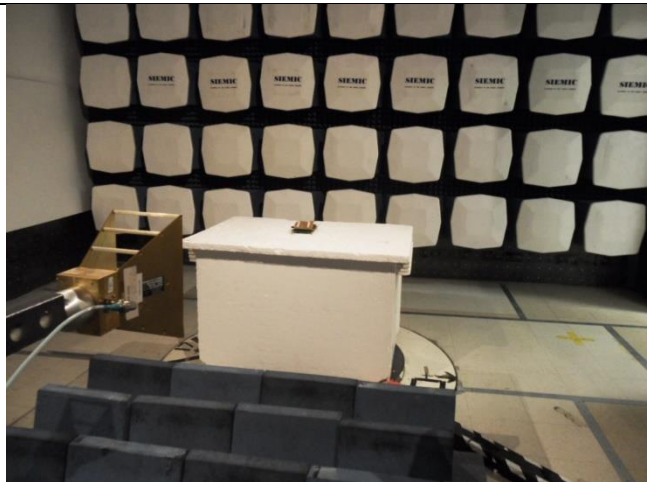
6.7 EUT Test Setup Photos



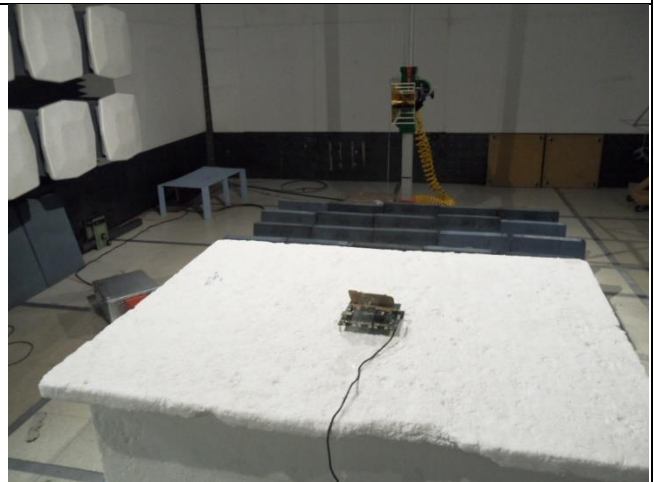
Radiated Emissions (<1GHz) – Front View



Radiated Emissions (<1GHz) – Rear View



Radiated Emissions (>1GHz) – Front View



Radiated Emissions (>1GHz) – Rear View

Note: The spurious emission in different EUT orientation was investigated, including the EUT standing up position and the laying down position. The EUT orientation shown in above setup photo is the worst case position.

7 Supporting Equipment/Software and cabling Description

7.1 Supporting Equipment

Item	Supporting Equipment Description	Model	Serial Number	Manufacturer	Note
1	Development board	-	-	Silex	-

7.2 Cabling Description

Name	Connection Start		Connection Stop		Length / shielding Info		Note
	From	I/O Port	To	I/O Port	Length (m)	Shielding	
-	-	-	-	-	-	-	-

8 Test Summary

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Restricted Band of Operation	FCC	15.205	FCC	ANSI C63.10 – 2009 558074 D01 DTS Meas Guidance v03r02	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
AC Conducted Emissions Voltage	FCC	15.207(a)	FCC	ANSI C63.10 – 2009	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A

DTS band Requirement

Test Item	Test standard		Test Method/Procedure		Pass / Fail
Channel Separation	FCC	15.247 (a)(1)	FCC	-	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
6db Bandwidth	FCC	15.247(a)(2)	FCC	558074 D01 DTS Meas Guidance v03r02	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
Number of Hopping Channels	FCC	15.247(a)(1)	FCC	-	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
Band Edge and Radiated Spurious Emissions	FCC	15.247(d)	FCC	ANSI C63.10 – 2009 558074 D01 DTS Meas Guidance v03r02	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Time of Occupancy	FCC	15.247(a)(1)	FCC	-	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
Output Power	FCC	15.247(b)	FCC	558074 D01 DTS Meas Guidance v03r02	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Antenna Gain > 6 dBi	FCC	15.247(e)	FCC	-	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
Power Spectral Density	FCC	15.247(e)	FCC	558074 D01 DTS Meas Guidance v03r02	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> N/A
Hybrid System Requirement	FCC	15.247(f)	FCC	-	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
Hopping Capability	FCC	15.247(g)	FCC	-	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
Hopping Coordination Requirement	FCC	15.247(h)	FCC	-	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A
RF Exposure requirement	FCC	15.247(i)	FCC	-	<input type="checkbox"/> Pass <input checked="" type="checkbox"/> N/A

- | | |
|--------|---|
| Remark | <ol style="list-style-type: none"> All measurement uncertainties do not take into consideration for all presented test results. The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual. This report is not a complete test report compliant to Stipulated Standard listed on 1st page. The purpose of this report is to present additional measurement data for 11g and 11n-20 mode only due to the increase of output power with higher power level setting. All other modes will keep the same power level setting thus having the same output power. No extra measurement is required for these modes and please refer to original report (Report No.: 32IE0154-HO-01) |
|--------|---|


9 Measurement Uncertainty

Emissions			
Test Item	Frequency Range	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	30MHz – 1GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
Band Edge and Radiated Spurious Emissions	1GHz – 40GHz	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+4.3dB/-4.1dB

10 Measurements, Examination and Derived Results

10.1 Peak Output Power

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247	a)	FHSS in 2400-2483.5MHz with ≥ 75 channels: ≤1 Watt	<input type="checkbox"/>
	b)	FHSS in 5725-5850MHz: ≤1 Watt	<input type="checkbox"/>
	c)	For all other FHSS in the 2400-2483.5MHz band: ≤0.125 Watt.	<input type="checkbox"/>
	d)	FHSS in 902-928MHz with ≥ 50 channels: ≤1 Watt	<input type="checkbox"/>
	e)	FHSS in 902-928MHz with ≥ 25 & <50 channels: ≤0.25 Watt	<input type="checkbox"/>
	f)	DSSS in 902-928MHz, 2400-2483.5MHz, 5725-5850MHz: ≤1 Watt	<input checked="" type="checkbox"/>
Test Setup			
Test Procedure	<p><u>Measurement using a Power Meter (PM)</u></p> <p>Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.</p> <ul style="list-style-type: none"> - Connect EUT's RF output power to power meter - Set EUT to be continuous transmission mode - Measurement the average output power using power meter and record the result - Repeat above steps for different test channel and other modulation type. 		
Test Date	04/27/2015	Environmental condition	Temperature 23°C Relative Humidity 44% Atmospheric Pressure 1021mbar
Remark	<p>This report is not a complete test report compliant to Stipulated Standard listed on 1st page. The purpose of this report is to present additional measurement data for 11g and 11n-20 mode only due to the increase of output power with higher power level setting. All other modes will keep the same power level setting thus having the same output power. No extra measurement is required for these modes and please refer to original report (Report No.: 32IE0154-HO-01)</p>		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Test Data Yes N/A

Test Plot Yes (See below) N/A


Output Power measurement result

Type	Test mode	Freq (MHz)	CH	Conducted Power (dBm)	Limit (dBm)	Result
Output power	802.11g	2412	Low	13.1	30	Pass
Output power	802.11g	2437	Mid	12.8	30	Pass
Output power	802.11g	2462	High	12.8	30	Pass
Output power	802.11n-20M	2412	Low	11.2	30	Pass
Output power	802.11n-20M	2437	Mid	11	30	Pass
Output power	802.11n-20M	2462	High	10.9	30	Pass

Note: EUT has 2 chains however they will not transmit simultaneously. Both chains were evaluated, they have similar results. So, only worse case result was represented in this report.

10.2 Band Edge

Requirement(s):

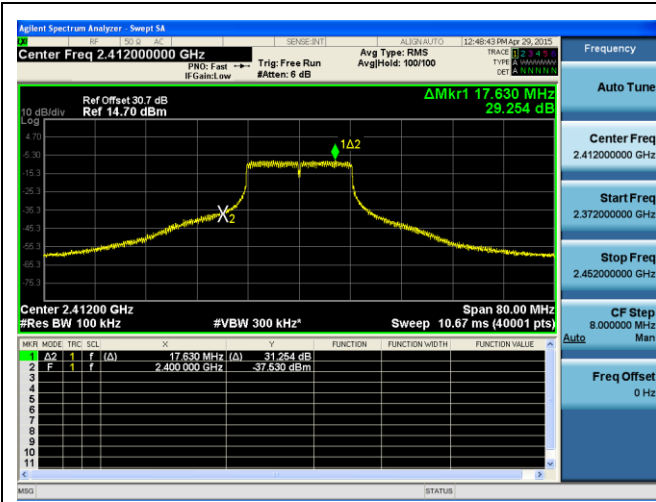
Spec	Item	Requirement	Applicable
§ 15.247	d)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209 (a) is not required <input type="checkbox"/> 20 dB down <input checked="" type="checkbox"/> 30 dB down	☒
Test Setup			
Test Procedure	<p>558074 D01 DTS Meas Guidance v03r02</p> <p><u>Band Edge measurement procedure</u></p> <ol style="list-style-type: none"> 1. Set the EUT to maximum power setting and enable the EUT transmit continuously. 2. Band edge emissions must be at least 30 dB down from the highest emission level within the authorized band as a measured. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used. 3. Change modulation and channel bandwidth then repeat step 1 to 2. 4. Measured and record the results in the test report. 		
Test Date	04/29/2015	Environmental condition	Temperature 22°C Relative Humidity 46% Atmospheric Pressure 1020mbar
Remark	This report is not a complete test report compliant to Stipulated Standard listed on 1st page. The purpose of this report is to present additional measurement data for 11g and 11n-20 mode only due to the increase of output power with higher power level setting. All other modes will keep the same power level setting thus having the same output power. No extra measurement is required for these modes and please refer to original report (Report No.: 32IE0154-HO-01)		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Equipment Setting

TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
Band Edge	100KHz	≥3 x RBW	135 MHz / 55 MHz	Peak	Auto	Peak MAX	-

Test Data Yes N/A
 Test Plot Yes (See below) N/A

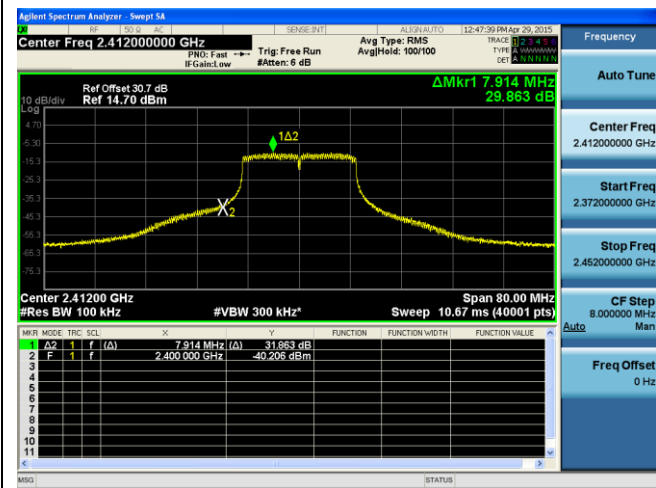
Band Edge Test Plots



Band Edge-2.4G-802.11g Low



Band Edge-2.4G-802.11g High




Band Edge-2.4G-802.11n20 Low



Band Edge-2.4G-802.11n20 High

10.3 Peak Spectral Density

Requirement(s):

Spec	Item	Requirement	Applicable
§ 15.247(e)	e)	DSSS: ≤8dBm/3KHz	<input checked="" type="checkbox"/>
	f)	DSSS in hybrid sys with FH turned off: ≤8dBm/3KHz	<input type="checkbox"/>
Test Setup			
Test Procedure	558074 D01 DTS Meas Guidance v03r02, 10.3 Method AVGPSD-1 <u>Peak spectral density measurement procedure</u> <ul style="list-style-type: none"> - Set analyzer center frequency to DTS channel center frequency. - Set the span to 1.5 times the DTS bandwidth. - Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz. - Set the VBW ≥ 3 x RBW. - Detector = RMS - Sweep time = auto couple. - Trace mode = Trace average over 100 traces - Allow trace to fully stabilize. - Use the peak marker function to determine the maximum amplitude level within the RBW. - If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat. 		
Test Date	04/29/2015	Environmental condition	Temperature 22°C Relative Humidity 46% Atmospheric Pressure 1020mbar
Remark	This report is not a complete test report compliant to Stipulated Standard listed on 1st page. The purpose of this report is to present additional measurement data for 11g and 11n-20 mode only due to the increase of output power with higher power level setting. All other modes will keep the same power level setting thus having the same output power. No extra measurement is required for these modes and please refer to original report (Report No.: 32IE0154-HO-01)		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Equipment Setting

TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
PSD	100KHz	≥3x RBW	1.5x DTS BW	RMS	Auto	Trace average	-

Test Data Yes N/A

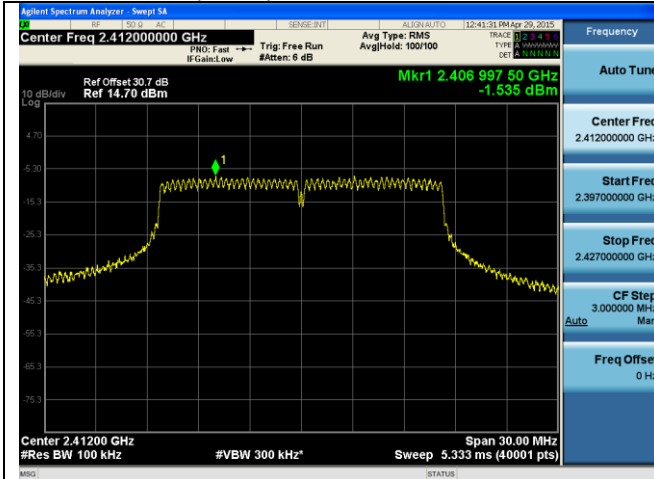
Test Plot Yes (See below) N/A

PSD measurement result (WLAN)

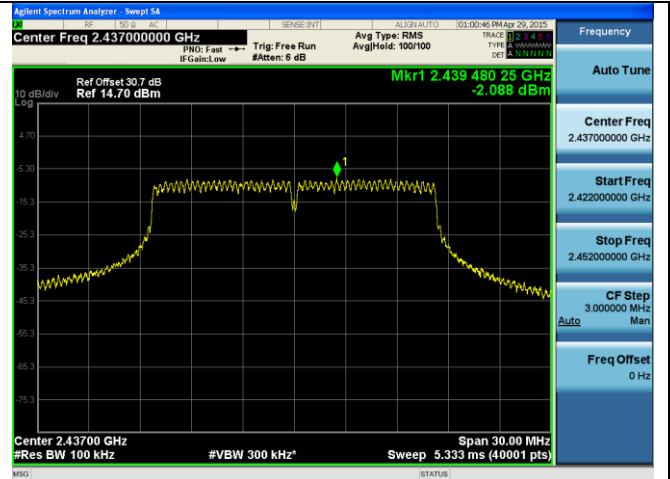
Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/100KHz)	Limit (dBm/3KHz)	Result
PSD	802.11g	2412	Low	-1.535	≤8	Pass
PSD	802.11g	2437	Mid	-2.088	≤8	Pass
PSD	802.11g	2462	High	-1.615	≤8	Pass
PSD	802.11n-20M	2412	Low	-5.202	≤8	Pass
PSD	802.11n-20M	2437	Mid	-5.285	≤8	Pass
PSD	802.11n-20M	2462	High	-5.330	≤8	Pass

Note: EUT has 2 chains however they will not transmit simultaneously. Both chains were evaluated, they have similar results. So, only worse case result was represented in this report.

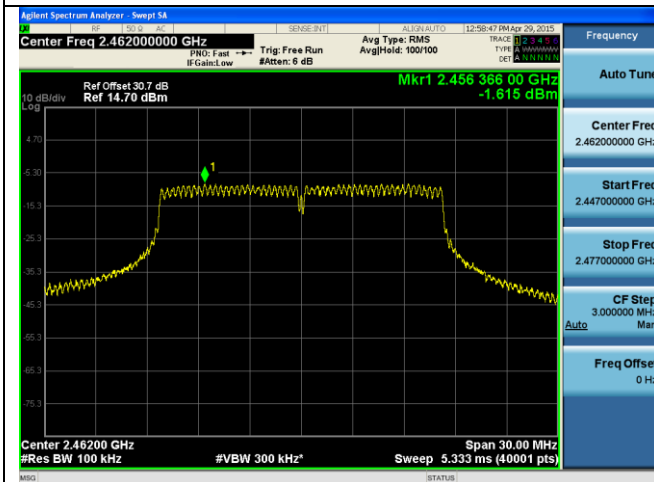
PSD Test Plots (WLAN)



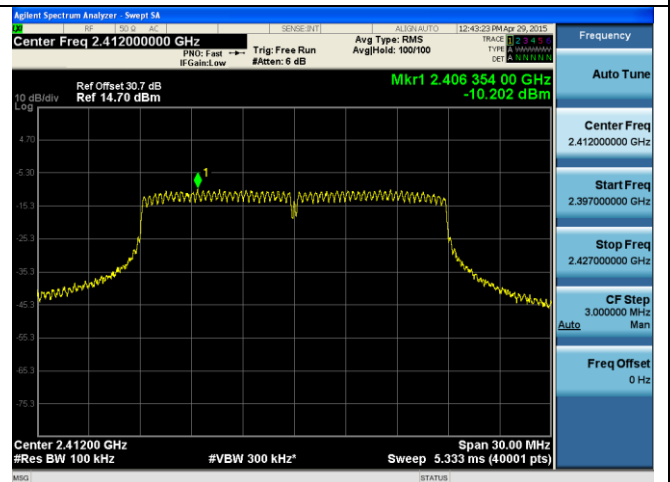
PSD-2.4G-802.11g Low



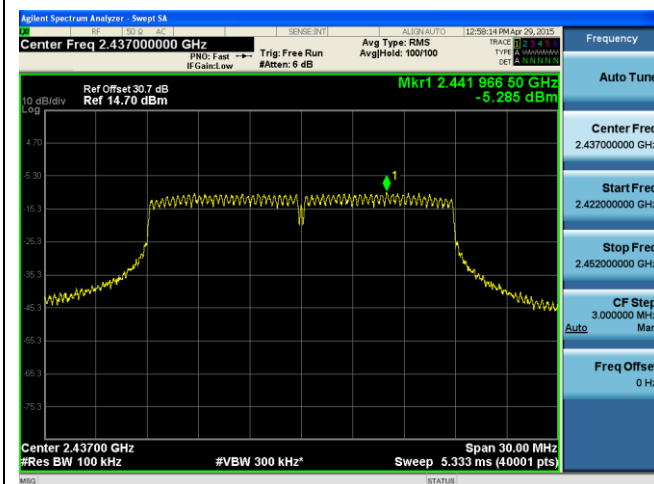
PSD-2.4G-802.11g Mid



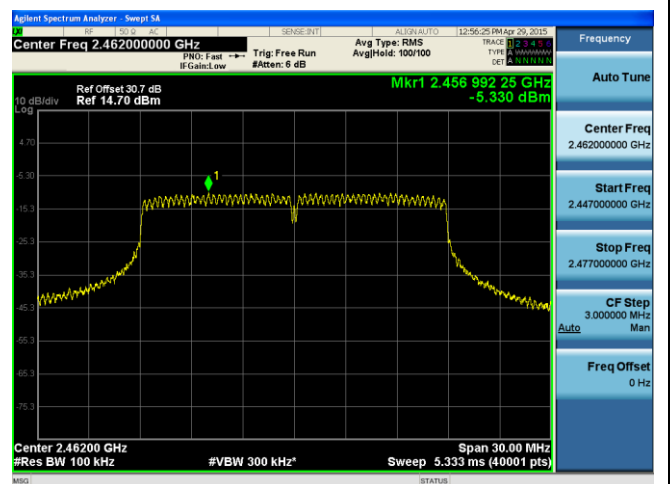
PSD-2.4G-802.11g High



PSD-2.4G-802.11n-20M Low



PSD-2.4G-802.11n-20M Mid



PSD-2.4G-802.11n-20M High

10.4 Transmitter Radiated Spurious Emissions Below 1GHz

Requirement(s):

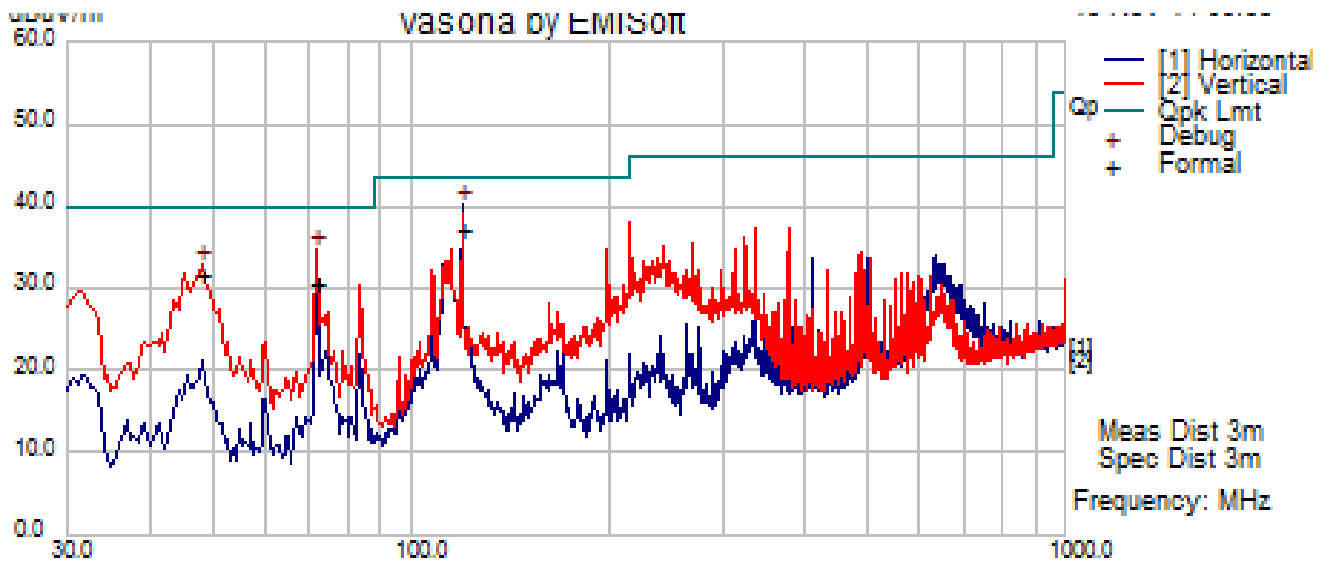
Spec	Item	Requirement	Applicable										
47CFR§15.247(d)	a)	<p>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges</p> <table border="1"> <thead> <tr> <th>Frequency range (MHz)</th> <th>Field Strength (uV/m)</th> </tr> </thead> <tbody> <tr> <td>30 – 88</td> <td>100</td> </tr> <tr> <td>88 – 216</td> <td>150</td> </tr> <tr> <td>216 960</td> <td>200</td> </tr> <tr> <td>Above 960</td> <td>500</td> </tr> </tbody> </table>	Frequency range (MHz)	Field Strength (uV/m)	30 – 88	100	88 – 216	150	216 960	200	Above 960	500	☒
Frequency range (MHz)	Field Strength (uV/m)												
30 – 88	100												
88 – 216	150												
216 960	200												
Above 960	500												
Test Setup													
Procedure		<ol style="list-style-type: none"> The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarisation, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. The EUT was then rotated to the direction that gave the maximum emission. Finally, the antenna height was adjusted to the height that gave the maximum emission. A Quasi-peak measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured. 											
Remark		<p>The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case. This report is not a complete test report compliant to Stipulated Standard listed on 1st page. The purpose of this report is to present additional measurement data for 11g and 11n-20 mode only due to the increase of output power with higher power level setting. All other modes will keep the same power level setting thus having the same output power. No extra measurement is required for these modes and please refer to original report (Report No.: 32IE0154-HO-01)</p>											
Result		<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail											

Test Data Yes (See below) N/A

Test Plot Yes (See below) N/A

Radiated Emission Test Results (Below 1GHz)

Test specification	below 1GHz			Result	Pass
Environmental Conditions:	Temp (°C):	26.1			
	Humidity (%)	47.5			
	Atmospheric (mbar):	1020			
Mains Power:	120VAC, 60Hz				
Tested by:	Nima Molaei				
Test Date:	04/28/2015				
Remarks:	2.4GHz 11g 2437MHz				

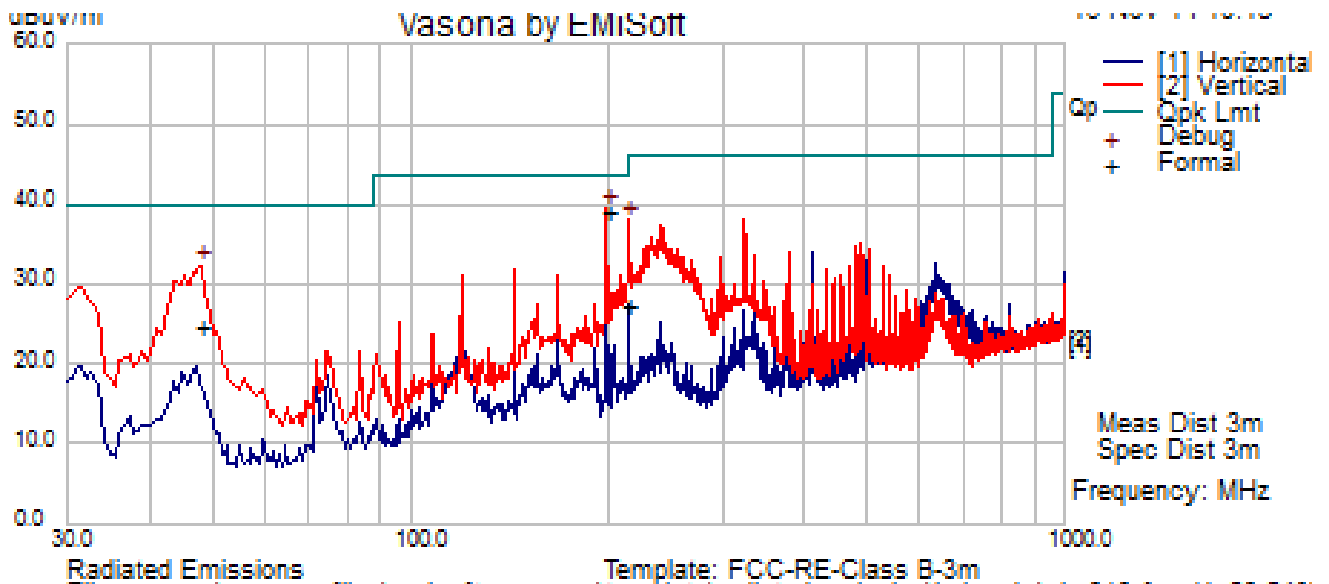


Quasi Max Measurement

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
119.96	61.40	2.01	-26.09	37.32	Quasi Max	H	295.00	249.00	43.50	-6.18	Pass
71.96	60.19	1.42	-31.04	30.57	Quasi Max	V	129.00	165.00	40.00	-9.43	Pass
48.01	59.76	1.16	-29.46	31.47	Quasi Max	V	116.00	174.00	40.00	-8.53	Pass

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

Test specification	below 1GHz			Result	Pass
Environmental Conditions:	Temp (°C):	26.1			
	Humidity (%)	47.5			
	Atmospheric (mbar):	1020			
Mains Power:	110VAC, 60Hz				
Tested by:	Nima Molaei				
Test Date:	04/28/2015				
Remarks:	2.4GHz 11n20 2437MHz				



Quasi Max Measurement

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
199.79	63.36	2.50	-26.88	38.98	Quasi Max	V	108.00	211.00	43.50	-4.52	Pass
215.81	53.69	2.59	-28.97	27.32	Quasi Max	V	212.00	109.00	43.50	-16.18	Pass
47.94	53.00	1.16	-29.41	24.75	Quasi Max	V	177.00	332.00	40.00	-15.25	Pass

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

10.5 Transmitter Radiated Spurious Emissions Above 1GHz

Requirement(s):

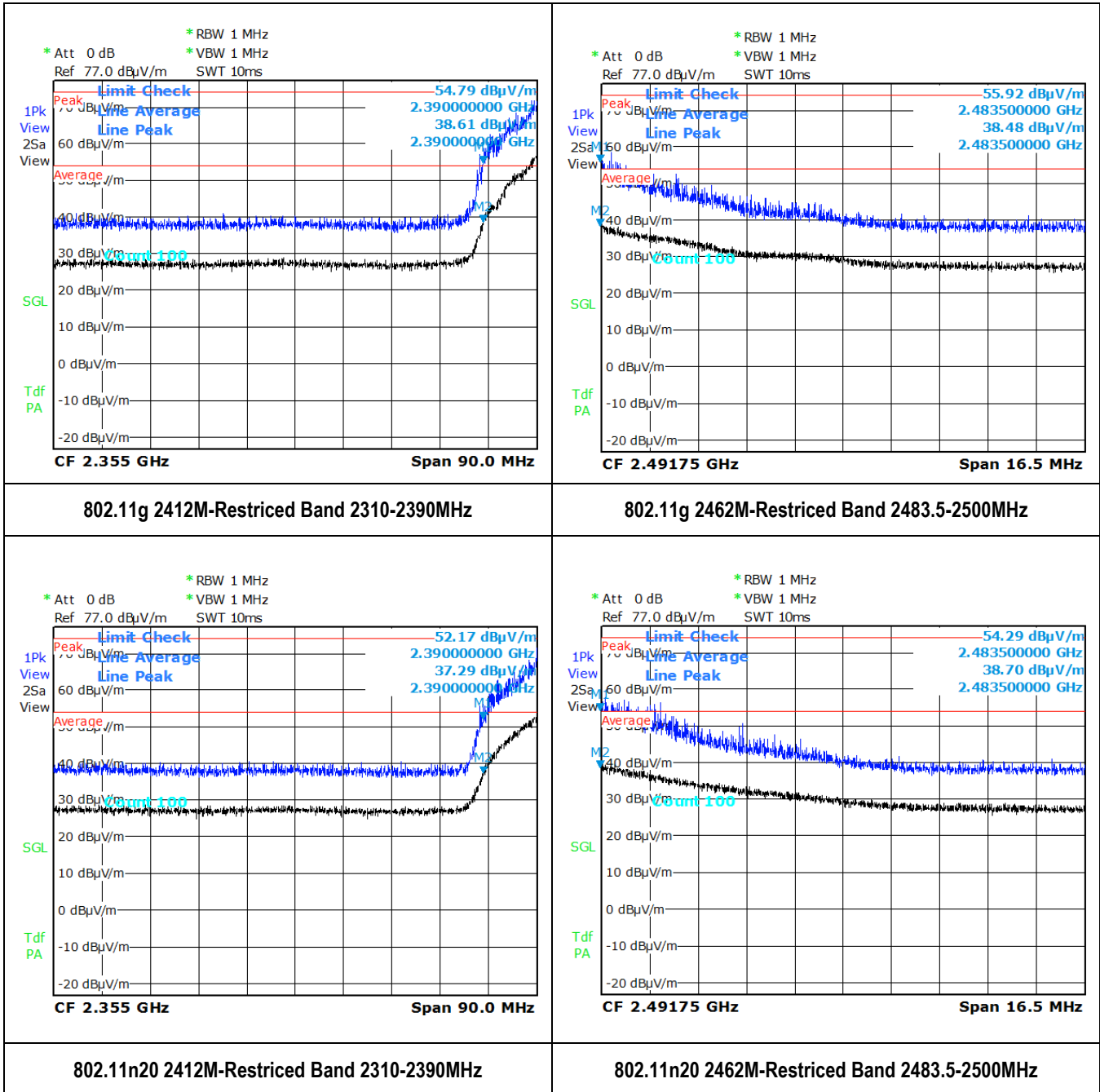
Spec	Item	Requirement	Applicable
47CFR§15.247(d)	a)	For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required <input type="checkbox"/> 20 dB down <input checked="" type="checkbox"/> 30 dB down	<input checked="" type="checkbox"/>
	b)	or restricted band, emission must also comply with the radiated emission limits specified in 15.209	<input checked="" type="checkbox"/>
Test Setup			
Procedure	<ol style="list-style-type: none"> The EUT was switched on and allowed to warm up to its normal operating condition. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: <ol style="list-style-type: none"> Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen. The EUT was then rotated to the direction that gave the maximum emission. Finally, the antenna height was adjusted to the height that gave the maximum emission. An average measurement was then made for that frequency point. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured. 		
Remark	The EUT was scanned up to 40GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case. This report is not a complete test report compliant to Stipulated Standard listed on 1st page. The purpose of this report is to present additional measurement data for 11g and 11n-20 mode only due to the increase of output power with higher power level setting. All other modes will keep the same power level setting thus having the same output power. No extra measurement is required for these modes and please refer to original report (Report No.: 32IE0154-HO-01)		
Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail		

Equipment Setting

TEST	RBW	VBW	SPAN	Detector	SWEEP	Trace	NOTES
Radiated Spurious Emission	1MHz	3MHz	1GHz - 25 GHz	Peak	Auto	Max hold	PK Measurement
Radiated Spurious Emission	1MHz	10Hz	1GHz - 25 GHz	Peak	Auto	Max hold	Ave Measurement

Test Data Yes (See below) N/A
Test Plot Yes (See below) N/A

Restricted Band Measurement Plots:



Transmitter Radiated Emission Test Results (Above 1GHz)

Test specification:	Radiated Spurious Emissions (above 1GHz)			
Environmental Conditions:	Temp(°C):	22	Result:	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail
	Humidity (%):	39		
	Atmospheric(mbar):	1021		
Mains Power:	120VA, 60Hz			
Tested by:	Nima Molaei			
Test Date:	04/30/2015			
Remarks:	WLAN 802.11 g/n-20			

WLAN 802.11g – 2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
17608.22	31.30	6.57	13.14	51.01	Peak Max	H	322.00	319.00	54.00(PK)	-2.99	Pass
14150.30	33.63	6.14	10.29	50.07	Peak Max	V	190.00	97.00	54.00(PK)	-3.93	Pass
1017.03	47.13	1.76	-7.15	41.73	Peak Max	H	235.00	321.00	54.00(PK)	-12.27	Pass

WLAN 802.11g – 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
17923.35	29.85	6.60	14.21	50.66	Peak Max	H	201.00	285.00	54.00(PK)	-3.34	Pass
14184.37	33.89	6.16	10.36	50.41	Peak Max	V	289.00	139.00	54.00(PK)	-3.59	Pass
1008.52	46.99	1.75	-7.17	41.57	Peak Max	V	282.00	63.00	54.00(PK)	-12.43	Pass

WLAN 802.11g – 2462MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
17957.42	30.21	6.61	14.32	51.14	Peak Max	V	159.00	82.00	54.00(PK)	-2.86	Pass
14039.58	34.17	6.10	10.08	50.35	Peak Max	H	116.00	111.00	54.00(PK)	-3.65	Pass
3291.08	43.70	2.96	-1.52	45.15	Peak Max	H	269.00	235.00	54.00(PK)	-8.85	Pass

WLAN 802.11n20 – 2412MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
17948.90	30.30	6.61	14.29	51.20	Peak Max	H	107.00	165.00	54.00(PK)	-2.80	Pass
14499.50	33.07	6.29	10.97	50.33	Peak Max	H	284.00	218.00	54.00(PK)	-3.67	Pass
1017.03	46.56	1.76	-7.15	41.16	Peak Max	H	282.00	115.00	54.00(PK)	-12.84	Pass

WLAN 802.11n20 – 2437MHz

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
17897.80	30.16	6.60	14.12	50.89	Peak Max	H	212.00	30.00	54.00(PK)	-3.11	Pass
14542.08	32.76	6.31	10.79	49.86	Peak Max	H	202.00	128.00	54.00(PK)	-4.14	Pass
1059.62	47.63	1.80	-7.06	42.37	Peak Max	H	159.00	86.00	54.00(PK)	-11.63	Pass

















WLAN 802.11n20 – 2462MHz








Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
17914.83	30.47	6.60	14.18	51.26	Peak Max	V	263.00	25.00	54.00(PK)	-2.74	Pass
14107.72	34.01	6.13	10.21	50.35	Peak Max	V	272.00	42.00	54.00(PK)	-3.65	Pass
7336.67	38.99	4.51	3.34	46.84	Peak Max	H	276.00	170.00	54.00(PK)	-7.16	Pass

Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Cycle	Cal Due	In use
Conducted Emissions						
Spectrum Analyzer	N9010A	MY50210206	08/13/2014	1 Year	08/13/2015	<input type="checkbox"/>
Spectrum Analyzer	FSIQ7	825555/013	05/31/2014	1 Year	05/31/2015	<input type="checkbox"/>
V-LISN (150 kHz – 30 MHz)	NNLK 8129	8129-190	08/11/2014	1 Year	08/11/2015	<input type="checkbox"/>
LISN (9 kHz – 30 MHz)	MN2050B	1018	07/31/2014	1 Year	07/31/2015	<input type="checkbox"/>
Radiated Emissions						
EMI Test Receiver	ESIB 40	100179	05/24/2014	1 Year	05/24/2015	<input checked="" type="checkbox"/>
Bi-Log antenna (30MHz~2GHz)	JB1	A030702	08/12/2014	1 Year	08/12/2015	<input checked="" type="checkbox"/>
Horn Antenna (1-18GHz)	3115	10SL0059	08/11/2014	1 Year	08/11/2015	<input checked="" type="checkbox"/>
Horn Antenna (18-40 GHz)	AH-840	101013	08/11/2014	1 Year	08/11/2015	<input checked="" type="checkbox"/>
Pre-Amplifier	LPA-6-30	11140711	02/19/2015	1 Year	02/19/2016	<input checked="" type="checkbox"/>
Microwave Preamplifier (18-40 GHz)	PA-840	181251	02/19/2015	1 Year	02/19/2016	<input checked="" type="checkbox"/>
3 Meters SAC	3M	N/A	08/29/2014	1 Year	08/29/2015	<input checked="" type="checkbox"/>
10 Meters SAC	10M	N/A	09/05/2014	1 Year	09/05/2015	<input checked="" type="checkbox"/>
Hygro Hermograph	ST-50	HE01-000092	05/25/2014	1 Year	05/25/2015	<input checked="" type="checkbox"/>
EMI Test Receiver	ESIB 40	100179	05/24/2014	1 Year	05/24/2015	<input checked="" type="checkbox"/>
RF Conducted Measurement						
Power Sensor	EMPower7002-006	00159859	04/30/2014	1 Year	04/30/2015	<input checked="" type="checkbox"/>
Spectrum Analyzer	N9010A	MY50210206	08/13/2014	1 Year	08/13/2015	<input checked="" type="checkbox"/>
EMI Test Receiver	ESIB 40	100179	05/24/2014	1 Year	05/24/2015	<input checked="" type="checkbox"/>
Adaptivity/DFS						
Agilent Signal Analyzer	N9010A	MY50210206	8/13/2014	1 Year	8/13/2015	<input type="checkbox"/>
Dual Channels Arbitrary Waveform Generator (Tabor Electronics Ltd)	WWW-1072	207593	8/7/2014	1 Year	8/7/2015	<input type="checkbox"/>
Synthesized Signal Generator (Agilent/HP)	HP8665B	3744A01304	8/11/2014	1 Year	8/11/2015	<input type="checkbox"/>
Splitter/Combiner (Mini-Circuit)	ZFSC-2-9G+	N/A	N/A	1 Year	N/A	<input type="checkbox"/>
Splitter/Combiner (Mini-Circuit)	ZFSC-2-9G+	N/A	N/A	1 Year	N/A	<input type="checkbox"/>
Agilent Signal Generator	MXG N5182A	MY47071065	05/13/2014	1 Year	05/13/2015	<input type="checkbox"/>

Annex B. SIEMIC Accreditation

Accreditations	Document	Scope / Remark
ISO 17025 (A2LA)		Please see the documents for the detailed scope
ISO Guide 65 (A2LA)		Please see the documents for the detailed scope
TCB Designation		A1, A2, A3, A4, B1, B2, B3, B4, C
FCC DoC Accreditation		FCC Declaration of Conformity Accreditation
FCC Site Registration		3 meter site
FCC Site Registration		10 meter site
IC Site Registration		3 meter site
IC Site Registration		10 meter site
EU NB		Radio & Telecommunications Terminal Equipment: EN45001 – EN ISO/IEC 17025
		Electromagnetic Compatibility: EN45001 – EN ISO/IEC 17025
Singapore iDA CB(Certification Body)	 	Phase I, Phase II
Vietnam MIC CAB Accreditation		Please see the document for the detailed scope
Hong Kong OFCA		(Phase II) OFCA Foreign Certification Body for Radio and Telecom
		(Phase I) Conformity Assessment Body for Radio and Telecom
Industry Canada CAB		Radio: Scope A – All Radio Standard Specification in Category I
		Telecom: CS-03 Part I, II, V, VI, VII, VIII

Japan Recognized Certification Body Designation		<p>Radio: A1. Terminal equipment for purpose of calling</p> <p>Telecom: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law</p>
Korea CAB Accreditation		<p>EMI: KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI KN22: Test Method for EMI</p> <p>EMS: KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS</p>
		<p>Radio: RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68</p> <p>Telecom: President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4</p>
Taiwan NCC CAB Recognition		LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08
Taiwan BSMI CAB Recognition		CNS 13438
Japan VCCI		<p>R-3083: Radiation 3 meter site</p> <p>C-3421: Main Ports Conducted Interference Measurement</p> <p>T-1597: Telecommunication Ports Conducted Interference Measurement</p>
Australia CAB Recognition		<p>EMC: AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4</p>
		<p>Radio communications: AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771</p> <p>Telecommunications: AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1</p>
Australia NATA Recognition		AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016, AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2